UNIVERSAL POSTAL UNION

**UPU Global Monitoring System Technical Design**
**(UPU GMS TD)**

**3rd Edition, v1.0**

15 August 2020

**Note to this 3rd Edition, v1.0 of the UPU GMS Technical Design**

The 1st Edition of the UPU GMS Technical Design (short form as UPU GMS TD) came to effect in November 2008 with approval by the 24th Congress. The roll-out of quality of service measurements thereafter that follow the UPU GMS TD specification has seen a significant increase in the number of users but also the need to refine and/or introduce new specifications. A 2nd Edition was released on 10th October 2011, which has been in use since then. With the recent increase in E-format global volumes for documents and goods but also significant reduction of the traditional letter- and flat-shaped items, it has necessitated the production of the 3rd edition of the UPU GMS TD (POC C2 2019.2–Doc 3c) to adapt to the new global trends.

This 3rd edition has retained part or whole chapters of the 2nd Edition. However, part or whole chapters have also been re-written, completely replaced or introduced into the 3rd edition. Below is a highlight of the changes and new chapters. This document is, nonetheless, to be considered a standalone and complete UPU GMS TD for providing the necessary technical specification and information for implementing a quality of service measurement.

Summary of main changes/additions of the UPU GMS Technical Design

1. Statistical Design:
The Annual valid test mail target is reduced for Levels A, B and C. In contrast, for Levels D and E the Annual valid test mail target is increased.

2. City Coverage
*Inbound Country/Territory*: There are now two criteria for choosing cities to be measured, namely;
**Criteria 1**: use real mail volume data or population to select cities in the same way as the current system. Additionally, Level E measure a minimum of 2 cities unlike previously.
**Criteria 2**: measure whole country while allowing possibility to exclude certain areas (deserts, islands, etc.).
*Outbound Country/Territory*: there's possibility to apply boosting option for outbound panel coverage to be placed in specific cities of Outbound country/Territory. Requesting Designated Operator (DO) assumes cost of the boost.

3. Mail Characteristics
E-format measurement is included as an optional boost to the P and G base design. When E-format is opted for, the PGE percentage ratio for allocation and weighting are 75:15:10 for P:G:E respectively, to start with. Without E-format, the ratio remain as 80:20 for P:G respectively. If not advised otherwise by POC bodies, the default service standard for E-format will be *plus* two days in addition to the POC applicable PG service standard.

4. Border agency (BA)/Customs correction
BA correction process is improved with the possibility to support multiple facilities.

5. Performance On Time (POT) calculation
City weight is applied conditionally only if the flow-to-city ratio of Valid On Target, VOT, (or Valid Mail Rate, VMR) falls below an agreed threshold. Re-weighting mechanisms have been formulated to adjust POT in case of asymmetry in the measurement parameters.

6. Non-acceptability of quality results
This is a new section that sets rules for declaring unsuitability of quality results

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# 1 Introduction

## *1.1 Management summary*

The need to improve the overall end-to-end quality of international mail was recognized by the 1999 Beijing Congress, which decided on the need for a link between the quality of service that designated postal operators (DOs) offered each other and terminal dues payments. A mail measurement system, designed with the needs of industrialised countries (ICs) in mind and based on existing monitoring systems, was introduced in January 1995. The 2004 Bucharest Congress reaffirmed this need for a link between quality of service and terminal dues. A team was set up responsible for developing an affordable global quality of service monitoring system that could accommodate the needs of all the many different Universal Postal Union (UPU) members. The Global Monitoring System (GMS) Development Group was also set up to formulate a proposal on the technical specifications of such an all-encompassing system. The team carried out its work in line with its mandate and proposed a solution, the UPU GMS Technical Design that balances the need for high accuracy and affordability for all UPU member countries.

The 24th Congress approved the UPU GMS Technical Design through resolution C 45/2008 and consequently instructing the Post Operations Council (POC) to develop and create the GMS as the UPU measurement system (Articles 215 and 216 of the Letter Post Regulations) for quality of service link to terminal dues. The UPU GMS Technical Design (2008) – this Document – was adopted as the source of the technical specifications for the measurement design for the UPU-agreed measurement systems. Further, POC approved the creation of other relevant bodies within Committee 1 with the responsibilities of, among others, to ensure the implementation of GMS as well as to ensuring the compliance of the UPU-agreed measurement systems with the UPU GMS Technical Design.

The GMS measurement design envisages a monitoring system based on the use of test letters, which simulate real mail flows between DOs. A radio frequency identification (RFID) transponder is inserted in each test letter and automatically recorded passing through RFID gates or by readers installed at the office of exchange (OE) or airmail units (AMUs) of each receiving DO. The data read at the OE signals the start of the test. The test letters are then processed with all other mail and sent to anonymous receiver panellists. Externally, the letters are indistinguishable from the other items, thus minimizing the chance of special treatment by the receiving DO. The panellists then record key data concerning the test letter, such as time of receipt, physical condition, etc. These data from the panellist, when compared with the OE reading, makes it possible to determine the duration or quality of service of the inbound segment.

The GMS design is driven by inbound mail volumes. The underlying principle here is that the larger the inbound mail volumes, the greater the risk to terminal dues and therefore the greater the accuracy required for the results.

As with real mail, DOs receive the test letters from countries all over the world. This test mail is organized into permanently measured flows and pools. Permanently measured flows represent large flows for the DO. Pool flows represent largely marginal flows and are broken down further into two pools (Pool 1 and Pool 2). The pool mechanisms ensure that the volume of the flows is taken into account and that, from a global perspective, marginal flows from smaller countries are pooled so that the total volume has sufficient significance. These pools offer some protection to low-volume DOs, whose mail might otherwise be disregarded as being insignificant when compared with the larger flows from high-volume countries.

The number of permanent links has been determined so as to provide a fixed amount of coverage for each DO category level. The number of samples for the permanent links is determined from the coverage expected, which is based on the profile of gross domestic product (GDP) compared with total UPU GDP. In the absence of actual mail volume data, GDP is chosen as a traditionally accepted substitute for relative global mail volume.

The system design provides information for operational purposes and covers as much of the country as possible in accordance with universal service obligation (USO) principles. For this reason, city

distribution represents the sum of the number of offices of exchange and an assigned number of the next most populated cities.

The number of valid test mail items is determined on the basis of the binomial model. There are no approved alternatives at this time. The numbers have been adjusted so that the results are robust against bias arising from the simplified design structure, particularly with respect to the sending country and destination city structure. In previous versions of the UPU GMS TD, an on-time percentage of 85% was assumed as a theoretical estimator due to lack historical data. In this 3rd edition, the median (from historical DO GMS performance results) has been used as the estimator since there is sufficient data to accurately determine the measurable valid mail target for each country level. Notably, GMS Levels A, B and C have their valid mail target determined using 88% as the estimator in the binomial model. For GMS Levels D and E, an estimator of 84% and 78% respectively, is used.

The following diagram outlines the main elements of the GMS design:

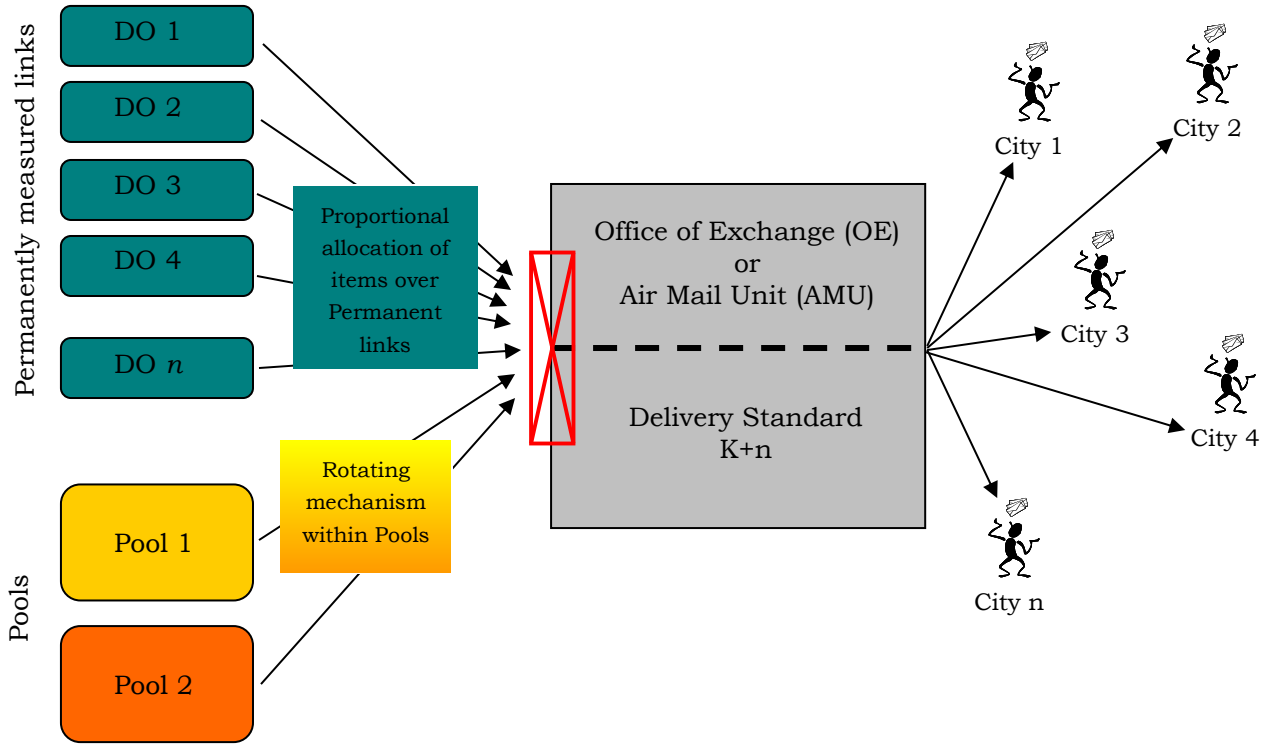



*Figure 1.1 Elements of GMS Design*

The GMS design provides increased statistical accuracy by making it possible to "boost" flows. Boosting (i.e. the sending of additional test items) is permitted either at different GMS design classification country levels, from an individual flow or link to many flows, or may even involve upgrading the DO category to a level with higher volumes and associated higher accuracies. As a general principle, the DO requesting such boosting is responsible for any and all costs involved. Boosting is also carried out over complete measurement periods.

The heart of the GMS design is the dispatch and receipt of test letters to and from the panellists, who are carefully recruited and trained for the measurement. The test mail item is a **P** and **G** mail format priority with an option of including **E** mail Format (see details under “Mail characteristics”). Dropper panellists post or "drop" test items to be received by receiver panellists. The items are delivered to a street address or a post office box, depending on the norm of the destination country. Rigorous validation, analysis and reporting of data and basic logic checks are powerful tools employed to monitor and manage the measurement as well as checking panellists' performance. In addition to the in-process checks, external audit verifies and eliminates any gaps that might exist in the measurement and ultimately provide assurance to all stakeholders.

A key objective of the GMS design is to provide an affordable global measurement system. The design ensures that costs are in line with the DOs level and therefore its mail flows.

*1.2 Background of the link between quality of service and terminal dues*

The 1999 Beijing Congress decided on the need for a link between quality of service and the level of terminal dues payments, with the overall aim of improving the end-to-end quality of the international postal service. That objective was given to the Quality of Service Link Project Team (PT 3) of the POC Terminal Dues Action Group (TDAG), which operated from 2001 to 2004.

The implementation plan for the measurement system featuring the quality link between ICs (known as the "IC–IC system" for short) was approved by the 2003 POC and the system was up and running by January 2005.

Bucharest Congress resolution C 46/2004 confirmed that the terminal dues payments of all countries in the target system would be affected by the quality of service results and instructed the POC to "propose the necessary improvements to enable the maximum number of countries to participate".

Following the work of the previous PT 3 under the TDAG, the succeeding PT 3, under the Terminal Dues Project Group (TD PG), proposed an affordable GMS that comprises all UPU member countries.

A Monitoring System Subgroup was set up to develop initial project plans for the measurement system (design, management, costs, financing and implementation). It was decided that such a link should be based on a measurement system that was diagnostic, external, permanent and reliable.

In 2007, the POC decided to make the Quality of Service Project Group (QS PG) responsible for further GMS development and all related tasks (e.g. procurement, governance structure, legal aspects, UPU bodies, pilot system and implementation).

The GMS Development Group (GMS DG) was set up to finalize the technical specifications for a future global monitoring system. With the approval and adoption of the UPU GMS Technical design in 2008, the GMS Implementation Group (GMS IG) was created to ensure the implementation of GMS measurement system as well as to ensuring the compliance of other UPU-agreed measurement systems with the UPU GMS Technical Design.

*1.3 The Global Monitoring measurement System (GMS)*

1.3.1 General concepts

The aim of the measurement system is to provide each participating DO with precise diagnostic quality performance results for inbound mail, which will be linked to terminal dues remuneration. The system measures the time from receipt of the test items by the destination DO to delivery at their final destination.

To calculate a DO's performance, the system compares results transit time of the test item against the delivery standards duly accepted by the designated UPU body. These standards must be compatible with the domestic delivery standards published for each DO.

To minimize measurement costs, another basic principle that has been adopted in the measurement is only to use first class letter mail. The system is designed to meet the fundamental requirements for terminal dues and allow better temporal control of the statistical design than is possible using non-priority letter mail.

The GMS system is based on external measurements, meaning that external panellists receive the test items at addresses that remain unknown to the particular DO. The system uses RFID diagnostic technology, which makes it possible to identify arriving test items prepared without any external marks, which could be identified by postal employees.

To guarantee maximum flexibility in the future and to provide the UPU community with reliable information at low cost, the GMS is designed as a stand-alone technical solution (i.e. not dependent on other measurement systems or conditions). As regards the analysis, management and reporting of data,

the system is self-sufficient. However, the possibility of making use of synergies with other measurement systems at a later stage might be considered.

### 1.3.2 Key principles and requirements from the POC, TD PG and QS PG

To achieve the required goals for an appropriate measurement, the Global Monitoring System was recommended to be:

- customer-driven;
- globally applicable;
- affordable;
- transparent and unbiased;
- sufficiently accurate and reliable;
- external to UPU member countries;
- diagnostic;
- locally relevant;
- simple;
- continuous.

On the basis of these key principles and requirements, the following additional GMS guidelines included:

- To ensure that all participating countries are measured on the basis of at least one permanent flow.
- To ensure minimum statistical accuracy (between 1% and 5%) according to DO categories; i.e. the larger the inbound volumes, the greater the accuracy.
- To ensure that flows not measured permanently are weighted in such a way that the flows of smaller countries cannot be neglected; i.e. pool results should be weighted against permanent flows on the basis of total volumes from countries in the pool.
- To ensure that these principles are maintained at the lowest cost possible.

## 2 Purpose of document

The purpose of this document is to describe the Technical design of the GMS system in detail, including the various components of its underlying principles. It covers the entire UPU GMS Technical design down to specific processes that are needed to ensure that the outputs sought can be realized. The document explains how a UPU-agreed measurement system (e.g. UPU GMS) should operate by outlining the functions and activities that will be performed. It does not indicate the persons or agents that will perform them. For simplicity, the use of UPU GMS system (or simply GMS) in this document is used synonymous to explaining the underlying principles and requirements of the UPU GMS Technical Design.

For the development of the UPU GMS, major cost drivers and cost estimates are provided for each type of DO; the document does not cover funding, however.

The following drawing shows the responsibility of the GMS DG that led to the development of the UPU GMS Technical Design:

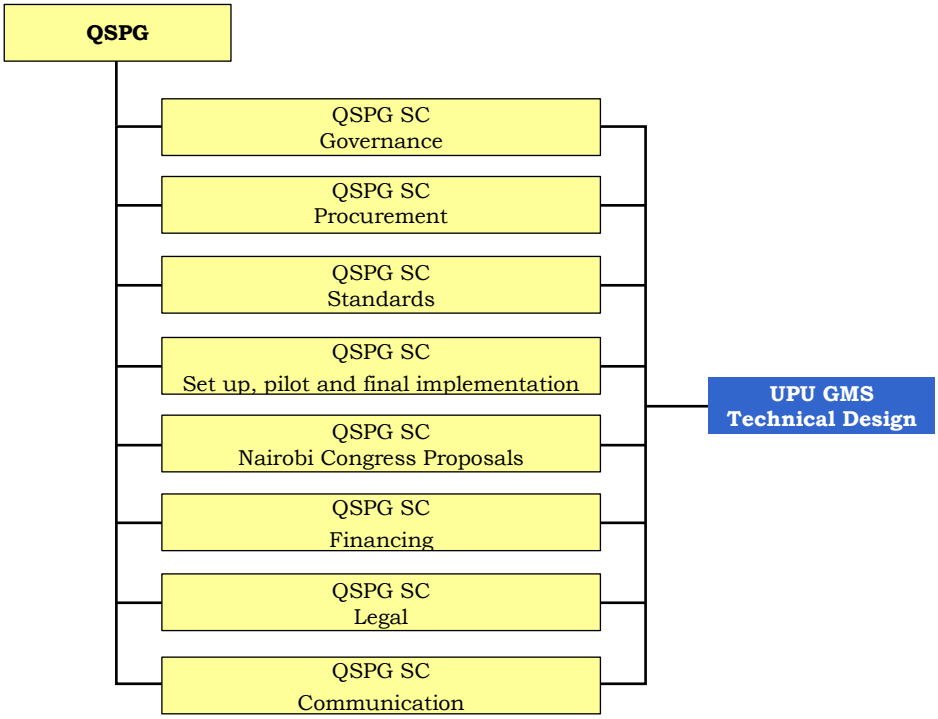



*Figure 2.1 Initial Groups involved in the development of the UPU GMS Technical Design*

## 3 Underlying principles

The UPU GMS is based on the need for global coverage, integrity and cost efficiency. For it to be applicable to all UPU member countries, it takes into account differences in volumes and affordability among countries.

The design of the GMS is based on the assumption that the accuracy of the measurement system results should not depend on a DO's legal status, but rather on the size of its inbound mail flow (thus the amount of terminal dues payments at stake). A DO's total inbound volume will be the criterion for classifying that DO at one of five levels (A to E). The nomenclature has changed from categories to levels to avoid confusion with other uses of the term by other UPU bodies.

The distribution of countries into five different levels makes it possible to optimize costs, since the accuracy required may be lower depending on the total volumes received by each group of countries. Table 1 below shows the proposed thresholds for classifying countries according to these five levels, and the estimated number of countries belonging to each level. Owing to the lack of accurate volume information, these current thresholds can only be considered an "educated estimate" and may need to be adjusted when this information becomes available.

*Table 3.1 Levels of DO classification*

| *Level* | *Weight step thresholds (tonnes of inbound mail per year)* | *Estimated number of countries* |
|---|---|---|
| A | 10,000 or more | 10 to 15 |
| B | From 1,000 to 9,999 | 25 to 40 |
| C | From 500 to 999 | 20 to 30 |
| D | From 250 to 499 | 30 to 40 |
| E | Below 250 | 60 to 80 |

### *3.1 Diagnostic monitoring*

Radio frequency identification (RFID) technology, already in use around the world for years, is assumed to be the basis for the design of this measurement system.

### *3.2 DO weighting*

Figures on real volumes of mail (weight or total number of items) will be collected from all UPU countries. For those countries that do not sample, the worldwide average items per kilogramme (IPK) based on the most recent UPU flow study will be used to determine these volumes. The weighting of the valid volumes of test items will be calculated on the basis of real volume weights provided in accordance with the agreed specified rules.

### *3.3 Multiple standards*

The multiple service standards used by a DO will be taken into consideration; in other words, the weighted average figure for inbound performance will be used for calculating terminal dues.

### *3.4 Confidentiality*

The respective bodies will treat as fully confidential all actual mail volume figures to be used to weight performance results. The matrix of DO-to-DO volumes will not be disclosed in any communication.

# 4 Statistical design

## *4.1 Classification of DOs*

The design of the GMS is based on the assumption that the accuracy of the measurement system results should not depend on a DO's legal status, but rather on the size of its inbound mail flow (thus the amount of the terminal dues payments at stake). The distribution of countries into categories based on five different levels is aimed at minimizing costs, since the minimum required accuracy may be lower with smaller inbound volumes.

Precision target requirements for the GMS have been agreed for each level, using a certain number of valid test items and panellists per year. Statistical parameters are seen as the minimum needed to link results to terminal dues. Many parameters can be upgraded, or "boosted", if a DO requires higher statistical accuracy. The system allows for increased statistical accuracy by boosting the number of test items or by adding permanently measured links to the standard design. However, clear rules have been prepared to prevent unwanted side effects.

*Table 4.1 Key features of statistical design*

| | *Element* | *Level A* | *Level B* | *Level C* | *Level D* | *Level E* |
|---|---|---|---|---|---|---|
| General parameters | 1 Total annual volume of inbound mail (in tonnes) | ≥10,000 | 1,000–9,999 | 500–999 | 250–499 | <250 |
| | 2 Minimum annual statistical accuracy | 1.0% | 1.50% | 2.0% | 3.0% | 5.0% |
| | 3 Number of cities/domains covered | 7 to 15 | 5 to 7 | 3 to 5 | 1 to 3 | 1 to 2 |
| | 4 Minimum number of receiver panellists per city | 3 | 3 | 3 | 3 | 3 |
| | 5 Minimum total number of receiver panellists | ≥50 | ≥30 | ≥15 | ≥9 | ≥3 |
| Permanent links | 6 Expected coverage[1] | 80% | 70% | 60% | 40% | 20% |
| | 7 Number of permanent links | 16 | 10 | 7 | 5 | 1 |
| | 8 Minimum number of items per link | ≥125 | ≥100 | ≥75 | ≥60 | ≥60 |
| | 9 Total number of valid items for all links | 6,640 | 2,240 | 1,080 | 380 | 80 |
| Pool 1 | 10 Expected coverage | 15% | 23% | 30% | 50% | 60% |
| | 11 Number of pool 1 links | ≤45 | ≤38 | ≤30 | ≤30 | ≤16 |
| | 12 Total valid items for pool 1 | 1245 | 736 | 540 | 475 | 240 |
| Pool 2 | 13 Expected coverage[1] | 5% | 7% | 10% | 10% | 20% |
| | 14 Number of pool 2 links | Remainder | Remainder | Remainder | Remainder | Remainder |
| | 15 Total number of valid items for pool 2 | 415 | 224 | 180 | 95 | 80 |
| Total | 16 Expected coverage[1] | 100% | 100% | 100% | 100% | 100% |
| | 17 Total number of valid annual test items | 8,300 | 3,200 | 1,800 | 950 | 400 |

[1]Expected coverage is based on GDP, if real mail volumes is unavailable.

*4.2 General parameters*

4.2.1 Total annual volume of inbound mail (in tonnes)

Thresholds are being proposed for classifying countries according to one of five levels. This classification is intended to provide a sufficient relationship between the cost of the system and terminal dues revenues.

Volume thresholds are shown in Table 4.1, element 1 of *General parameters* ("Total annual volume of inbound mail (in tonnes)").

However, since no real mail volumes were available to the UPU GMS DG, these thresholds might need to be revised and adjusted when this information becomes available and serious unwanted side effects may occur.

4.2.2 Minimum annual statistical accuracy

The range of accuracy thresholds has been approved by the Postal Operations Council (POC) and documented in POC TD PG 2007.1–Doc 6.2a of 23 April 2007.

The accuracies are shown in Table 4.1, element 2 of *General parameters* ("Minimum annual statistical accuracy").

4.2.3 Definition of a measurement "city" in GMS

A "city" is a single urban area defined by the government. For example, for United States of America, it would be the metropolitan area; for France it is the agglomeration area. If the list of cities is exhausted, the largest towns are included. Where appropriate, the "city" should be defined by a zip-code or post code range.

A "city" can also be considered as an agglomeration of more than one urban areas and/or towns, suburbs and villages. This will be referred to as a "domain".

4.2.4 Number of cities[2] covered

There are 2 allowed methods for the selection of the inbound city coverage:

i) Validated Real International Inbound Mail Volumes
ii) Population

The conditions that the Validated Real International Inbound Mail Volumes can be used for an inbound designated operator are as follows:

- The inbound city profile must be based on inbound international mail volumes.
- The inbound city profile must be validated. This could be where the information has been provided to UPU by an approved external third party auditor for the designated operator.
- Ideally, validated volumes should be used for the city selection. However, where the validated volumes for the selection of the inbound cities are unavailable, the population will be used.
- References to volumes in relation to the city selection refer to validated real international mail volumes.

Only one city selection criteria for a DO can be applied per annual measurement period: either volume or population, not both.

[2] Unless otherwise stated, "city" will mean also "domain"

The design has to provide operational information and cover as much of the DO territory as possible for the sake of universal service obligation (USO) principles. For this reason, city coverage is an assigned number of the largest volume or most populated cities as appropriate subject to a maximum and minimum per number and a volume or population coverage constraint as appropriate.

4.2.5 City selection procedure

If selected as a design parameter, a maximum and a minimum total number of cities are fixed for each DO level to maximize coverage while keeping the design simple to use.

For selecting the cities to be measured, there are two approaches depending on whether single urban areas/agglomerates (i.e. “city”) are to be selected, or “domains” are to be selected. Each DO can choose which approach is suitable for them.

4.2.5.1 Procedure for city coverage by selection of “cities”

- The largest volume or most populated cities are added up to the minimum number of cities, starting with the largest volume or most populated city, then the second largest volume or most populated city and third largest volume or most populated city, as appropriate.

- If the volume or population coverage exceeds 25% of the nation volume or population as appropriate, the process stops.

- If the volume or population of the minimum number of cities does not exceed 25% of the nation volume or population as appropriate, the next largest volume or most populated city is selected until the population threshold of 25% of the nation volume or population as appropriate first achieved or the maximum number of cities has been reached.

Taken from Table 4.1, element 3 of *General parameters* ("City/Domain coverage"), the specific city coverage formula for each level is listed below:

- Level A has an expected coverage of between 7 and 15 cities:
  - Level A city coverage = the largest volume or most populated cities as appropriate subject to a minimum number of cities of 7, then the population limit of 25% up to a total of 15.
- Level B has an expected coverage of between 5 and 7 cities:
  - Level B city coverage = the largest volume or most populated cities as appropriate subject to a minimum number of cities of 5, then the population limit of 25% up to a total of 7.
- Level C has an expected coverage of between 3 and 5 cities:
  - Level C city coverage = the largest volume or most populated cities as appropriate subject to a minimum number of cities of 3, then the population limit of 25% up to a total of 5.
- Level D has an expected coverage of between 1 and 3 cities:
  - Level D city coverage = the largest volume or most populated cities as appropriate subject to a minimum number of cities of 1, then the population limit of 25% up to a total of 3.
- Level E has an expected coverage of the most populated city:
  - Level E city coverage = the largest volume or most populated city as appropriate.

4.2.5.2 Procedure for full country coverage by “domains”

Unlike the selection of “cities” where about 25% or a little more of the country is measured, the use “domains” enables DO’s to achieve full country/territory coverage measurement. The approach offers a better reflection of a DO’s Inbound performance hence providing a more relevant and accurate data for calculating Terminal Dues as well as for quality improvement purposes.

The domains are created by the designated operator (DO). The number of domains are defined for each GMS level according to Table 4.1, element 3 of General parameters ("city/domain coverage").

4.2.5.2.1 Creation of "domains"

The creation of domains follows the population or real mail data criteria as mentioned in section 4.2.4. All areas of the country must be covered i.e. no post-/zip-code left out, except for documented areas that need to be excluded (see below).

Each post-/zip-code can only be associated to one defined domain. Each domain will strictly carry the weight according to its covered population as confirmed by publicly available records (or by auditable real mail proportions)

Any defined domain shall cover at least 5% of the applicable population or real mail proportion.

In cases where there is no post-/zip-code system, any other administrative system would be accepted (e.g. states, districts, provinces, counties, municipalities, etc. or equivalent in each country) provided that it would adhere to the above listed rules, in particular:

- no area can be part of two domains
- all areas in a country are covered by the classification (except for exclusions)
- for each domain area, the population/or mail volume must be known and auditable

4.2.5.2.2 Excluded areas

Countries with challenging geographical situations may submit a request to exclude particular areas covering less than 10% of the total population. This is generally to be considered favourably unless the request appears to be obviously arbitrary. The request shall be presented to the relevant POC bodies for a decision.

The areas to be excluded may fall, among others, under the following:

- scarcely populated mainland areas e.g. deserts, forests, mountains, oases, etc.
- small Islands served by mainland designated operator
- areas whose political situation does not allow free postal operations
- warzone areas
- other reasons that can be adjudicated on a case-by-case basis by the relevant POC bodies

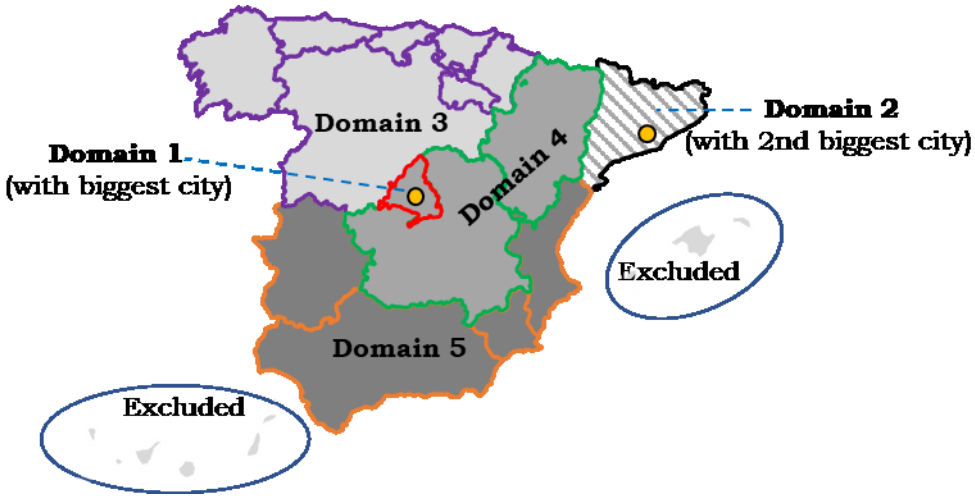
There is in principle no limit regarding the proportion of excluded areas in a country, however the full country coverage must cover at least 25% of the country's population or mail volume, whichever is appropriate.

4.2.5.2.3 Example of domain scenarios

Scenario 1 – city/domain mix
Group all "cities" (urban/agglomerate areas) into domains. The rest of country (includes less populated towns/suburbs/villages) form a separate domain.

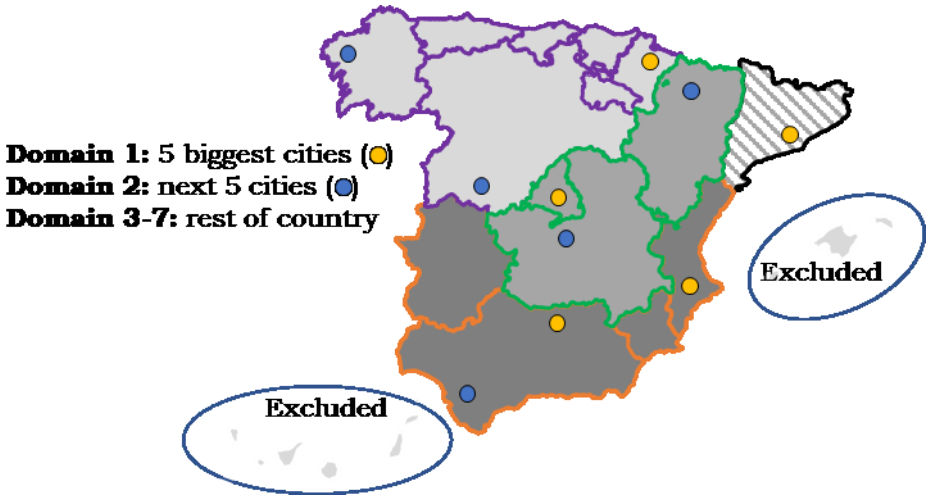
Example of Level B country:

- number of required domains are 5 – 7. The islands were excluded.
- DO chooses to create the minimum 5 domains:
  - domains 1 and 2 are covering the 2 main cities in the country;
  - rest of 3 domains cover 3 administrative regions that represent the rest of the country.




Scenario 2 – Cities/Rest-of-country mix
Using the example of Level B country above;

- number of required domains are 5 – 7. The islands were excluded.
- DO chooses to create the maximum 7 domains:
  - domain 1 covers all the 5 largest cities in the country;
  - domain 2 covers the next 5 largest cities;
  - domains 3-7 cover the rest of country.




Scenario 3 – Split country/territory into geographical or operational regions (e.g. East-West-North-South-Central, Islands-Mainland, highland-lowland, Industrial, Residential, etc.). Upon DO's creativity, the domains can be created based on regional or operational considerations. For example in this scenario, and while using a Level B country, Domains 1 – 5 can be created by dividing country in 5 areas. The Domain 4 may include, for example, the Islands (if they are not excluded).

### 4.2.6 Allocation and distribution to city/domain coverage

In the absence of actual mail volumes, the panellists and test mail items should be distributed across cities as far as possible in proportion to the volume or population as appropriate, subject to a minimum number per city/domain.

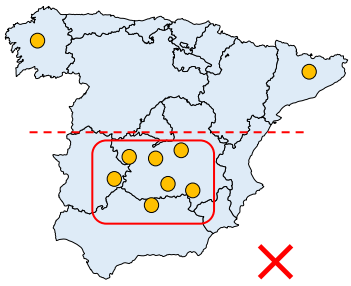
4.2.6.1 Distribution of panellists to city/domain

Within each city/domain, the panel will normally be spread randomly while ensuring the requirements on panel recruitment (see section 7.2) are observed. The Panel Management Company (PMC) is to ensure a "good spread" of the panel within each city/domain but without having clear targets at postcode level.

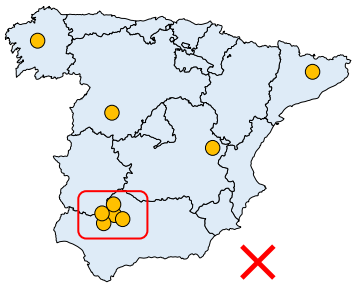
A "good spread" means that the panel is not clustered in certain areas leaving large parts within a city/domain uncovered over long periods within a measurement cycle. Nonetheless, if unavoidable (e.g., due to low densely populated areas that are not excluded, etc.) the natural panel turnover should ensure such areas are also covered within a Congress cycle, otherwise become part of the excluded areas.

Below are some examples of panel "spread" across a domain, city or country/territory. The filled circles represent panellist location.

"good spread" of panel



Not good because panel is situated in only half of the area



Not good because panel is clustered in some areas

The relevant party for assessing whether or not a panel in a domain fulfils the requirement of a "good spread" lies with the responsible panel management contractors. For optimising the process, the contractors are to submit maps on a quarterly basis to the responsible system managers such as the UPU International Bureau indicating the location of the panellists in each domain. This allows for swift and reliable checks regarding the appropriate placement and spread of the panel. Any non-conforming panel distribution will be communicated to the contractor to improve and achieve "good spread".

To avoid potential clustering or extreme close positioning of receiver panellists, the following logic is to be applied:

- within the domain, receiver panellists can be placed anywhere by the measurement provider, i.e. all covered post-/zip-code are suitable for panel placement
- in case of a domain constituting only of cities, the following rules apply:
  - if number of cities is **greater** than the number of available receiver panellists, a maximum of one receiver panellist should be placed in each city within the domain. A new panellist to be recruited shall be placed randomly in any of the unallocated cities, if any.
  - if number of cities is **less** than the number of available receiver panellists, a minimum of one receiver panellist should be placed in each city within the domain and remaining panellists equally distributed in the domain cities. A new panellist to be recruited shall be placed in the cities in a way to fulfil the equal distribution.
- in case of a domain where not only cities are included, the following rules apply:
  - within each domain, a fully "random" distribution of the panel applies so long as to fulfil the above-mentioned "good spread".

4.2.6.2 Allocation of panellists to city/domain

The example below illustrates the method using population. If volume is to be used, simply replace population in the example below to get the corresponding process for volume. The example uses “city” however the same logic is applicable for “domains”.

Example – Suppose that the world is the area covered by a DO at Level A. On the basis of the population data, the following would apply:

The 15 most populated cities are: Mexico City (18.1 m), Mumbai (18.0 m), Sao Paulo (17.7 m), New York (16.6 m), Shanghai (14.2 m), Lagos (13.5 m), Los Angeles (13.1 m), Calcutta (12.9 m), Tokyo (12.8 m), Buenos Aires (12.4 m), Seoul (12.2 m), Beijing (12.0 m), Karachi (11.8 m), Delhi (11.7 m) and Dhaka (11.0 m). The population coverage from these 15 cities is 3.2% of the world population of 6,492 m.

Since the total minimum number of panellists is 50, the structure would look like the table below.

*Table 4.2 Allocation of panellists across cities*

| City | Population | Proportion panellists | Panellists | Class |
|---|---|---|---|---|
| Mexico City, Mexico | 18,131,000 | 4 | 4 | Pop 1 |
| Mumbai, India | 18,042,000 | 4 | 4 | Pop 2 |
| Sao Paulo, Brazil | 17,117,000 | 4 | 4 | Pop 3 |
| New York City, United States of America | 16,626,000 | 4 | 4 | Pop 4 |
| Shanghai, China (People's Rep.) | 14,173,000 | 3 | 3 | Pop 5 |
| Lagos, Nigeria | 13,488,000 | 3 | 3 | Pop 6 |
| Los Angeles, United States of America | 13,129,000 | 3 | 3 | Pop 7 |
| Calcutta, India | 12,900,000 | 3 | 3 | Pop 8 |
| Tokyo, Japan | 12,790,000 | 3 | 3 | Pop 9 |
| Buenos Aires, Argentina | 12,431,000 | 3 | 3 | Pop 10 |
| Seoul, South Korea | 12,215,000 | 3 | 3 | Pop 11 |
| Beijing, China (People's Rep.) | 12,033,000 | 3 | 3 | Pop 12 |
| Karachi, Pakistan | 11,774,000 | 3 | 3 | Pop 13 |
| Delhi, India | 11,680,000 | 3 | 3 | Pop 14 |
| Dhaka, Bangladesh | 10,979,000 | 3 | 3 | Pop 15 |

Note that all the above cities meet the minimum required number of panellists per city (three).

As far as possible, test mail should be allocated across cities in proportion to the pools and the major permanent links. This allocation across cities should be random, so that the first batch does not go to the first city, the second batch to the second city, and so on.

4.2.7 Minimum number of receiver panellists per city

A minimum number of receiver panellists per city are required to minimize associated risks regarding reliability, integrity, validation and city area coverage. That number is three as shown in Table 4.1, element 4 of *General parameters* ("Minimum number of receiver panellists per city/domain").

4.2.8 Minimum total number of receiver panellists

A minimum number of receiver panellists for each DO are required to ensure that the minimum number of cities within each level can be covered and fulfil the minimum numbers of receiver panellists per city. There is a close relationship between the number of panellists and accuracy.

The figures in Table 4.1, element 5 of *General parameters* ("Minimum total number of receiver panellists") provide comprehensive representation for the prescribed precision requirements with sufficient replicates minimizing bias.

*4.3 Valid annual test items*

4.3.1 Definition of a valid test item

A “valid” test item is an item that has been posted and received according to the destination operator’s measurement design, has a valid transponder registration from a designated terminal dues handover point at the destination international mail processing centre, and has been validated according to the validation rules, which include, but are not limited to the rules listed in the Annex (“Basic test item validation rules”) for producing quality reports used for the UPU quality of service link to terminal dues (QS Link TD).

4.3.2 Total number of valid annual test items

The number of valid test mail items is determined by using the binomial model. The numbers have been adjusted so that the results are robust against bias arising from the simplified design structure, particularly with respect to the sending DO and the destination city structure. A minimum percentage of 85% on-time delivery is assumed as the statistical estimator adopted for the binomial model.

The figures appear in Table 4.1, General parameters, element 17 (“Total number of valid annual test items”).

4.3.3 Valid on Target (VOT)

This is the ratio expressed as a percentage of the total amount of valid items for a given period compared with the expected valid items in the same period (see also section 12.1.1). The term “valid” in both this context and throughout this document refers to the definition as given in section 4.3.1.

*4.4 Total number of valid annual test items*

The number of valid test mail items is determined by using the binomial model. There are no approved alternatives at this time. The numbers have been adjusted so that the results are robust against bias arising from the simplified design structure, particularly with respect to the sending DO and the destination city structure. Notably, GMS Levels A, B and C have their valid mail target determined using 88% as the estimator in the binomial model. For GMS Levels D and E, an estimator of 84% and 78% respectively, is used.

The figures appear in Table 4.1, element 17 of *Total* ("Total number of valid annual test items").

*4.5 Permanent links*

4.5.1 Expected coverage for permanent links

The number of permanent links has been determined to provide a fixed amount of coverage for each DO level. The number of samples for the permanent links is determined from the expected coverage. The expected coverage has been determined from the profile of gross domestic product (GDP) compared with the UPU total GDP. The GDP was chosen as a traditionally accepted substitute for relative global mail volume in the absence of actual mail volume data. In addition, it has also been used in the UPU DO

classification system. The profile is given below. Specific thresholds have been chosen for each DO level to provide a simple and affordable coverage approach.[3]

This universal approach has been selected since it provides the same basis for all and supports the application and the robustness of the item allocation process. An individual approach that takes the specific situation of each country into account would lead to a very heterogeneous situation between countries classified at the same level and would not lead to cost savings, since the amount foreseen of test items for each level is required to meet the statistical accuracy.

4.5.2 Number of permanent links

The number of permanent links appears in Table 4.1, elements 6 and 7 of *Permanent links* ("Expected coverage for permanent links" and "Number of permanent links").

– Level A has an expected coverage of 80% of GDP, which represents 16 permanent links.
– Level B has an expected coverage of 70% of GDP, which represents 10 permanent links.
– Level C has an expected coverage of 60% of GDP, which represents 7 permanent links.
– Level D has an expected coverage of 50% of GDP, which represents 3 permanent links.
– Level E has an expected coverage of 20% of GDP, which represents 1 permanent link.

Rather than fix the proportion of expected coverage, the number of permanent links is fixed because each DO will be treated equally in the provision of information; that is, the same number of permanent links at each level. It will also make the allocation easier.

The aim of the design is to maximize the coverage and minimize the bias. This is achieved by measuring a major portion of the mail volumes, as represented by the permanent links. This is done by using a Pareto approach or 80/20 rule, where 80% of the volume is accounted for by 20% of the number of flows. It maximizes coverage with the minimum amount of work by limiting the number of permanent links.

The target level of coverage required for permanent links is related to the accuracy expectation. If the expected accuracy is very good, the permanent link coverage must be great. If the expected accuracy is moderate, the permanent link coverage can be moderate. Level A is therefore set at 80% with a sliding scale down to 20% for Level E.

Level E is set at 20% and one permanent link because the pool structures are more important to provide a global coverage with a small sample size. Nevertheless, 20% is a significant component of the model. Usually, each DO has at least one major partner sending mail.

With the GDP distribution for Level A, 80% of the total GDP is accounted for by only 16 permanent links. This can be seen below in Table 4.3 *Allocation of valid test mail items and distribution of GDP by link number*, which shows the full distribution of GDP by the number of links.

4.5.3 Allocation to permanent links

Items are allocated to the permanent links in proportion to the actual traffic volumes as much as possible. The general procedure is described below; examples are given in **Annex A**.

The permanent links are ordered by descending volumes.

[3] In section IV, paragraph 13 of document CA 2004–Doc 9c "Classification of countries for terminal dues purposes", the UPU International Bureau shows a clear correlation between Gross national product (GNP) per capita and outward volumes per capita of international letter mail. This is why the GMS uses GDP as a general substitute for outward international letter mail volumes. The GMS applies the relationship in the construction of the statistical design in connection with flows: permanent links, Pool 1 and Pool 2.

The initial calculation is done using the proportions of the total permanent links. For instance, for Level A, the first permanent link would be 21.5%/80.2% x 5,600 = 1,500 if the actual weight proportion of the link was 21.5% and the proportion of total permanent links was 80.2%.

However, to keep the system cost-efficient, the total number of samples can never be more than the total permanent link test volume.

If the sum of samples up to and including that permanent link plus the rest at the minimum number of items per permanent link is below the total number of valid test items for the permanent link, the proportional estimate is retained. This minimum is explained in the next section below.

If the sum of samples up to but not including that permanent link, plus that permanent link and the rest at the minimum number of items per permanent link, is below the total number of valid test items for the permanent link, the permanent link is topped up from the minimum so that the total number of valid items for the permanent links is achieved.

The remainder of the permanent links are set at the minimum valid number of test items.

The example in the table below shows the calculation based on the GDP profile for Level D. The minimum per link is 60 and the total is 360.

*Table 4.3 Allocation of valid test mail items and distribution of GDP by link number*

| Link No. | % GDP | Proportion | Proportional adjustment |
|---|---|---|---|
| 1 | 27.1% | 185 | 120 |
| 2 | 9.9% | 67 | 60 |
| 3 | 6.1% | 42 | 60 |
| 4 | 4.9% | 33 | 60 |
| 5 | 4.8% | 33 | 60 |
| Total | 52.8% | 360 | 360 |

The GDP for link No. 5 is 4.8%. The total for the five links in Level D is 52.8%. The proportional allocation for link No. 5 is 360 x 4.8% / 52.8% = 33. This figure is below the minimum per link of 60. Therefore, we must raise link No. 5 from 33 to 60.

Link number 4 is exactly the same and must be raised to 60 from 33 (i.e. 360 x 4.9% / 52.8%).

Link 3 is the same as well and must be raised from 42 (i.e. 360 x 6.1% / 52.8%) to 60.

To keep the total at 360, we need to deduct the extra samples we have allocated to links Nos. 3, 4 and 5. The amount to deduct is 60 less 42 plus 60 less 33 plus 60 less 33, which = 72.

Link No.2 is 67 (i.e., 360 x 9.9% / 52.8%). This number can only be reduced by 7 to the minimum of 60.

There are still too many items by 65. Reduce link No. 1 by 65 from 185 to 120.

4.5.4 Minimum number of items per permanent link

Technical documents recommend a minimum sample of 30 valid test items per cell (Cochran (1977), Fleiss, Levin & Cho Paik (2003)). Given the need for a replicate in each cell, the minimum number needed for each permanent link is therefore 2 x 30 or 60. This is the equivalent of about one item per week over the year. This is the amount that has been set as the minimum number of items per permanent link for Level E.

For improved reliability and accuracy, more regular postings are required. The figure of 125 is roughly equivalent to one test item every other working day. This is the amount that has been set as the minimum number of items per permanent link for Level A.

Therefore, the minimum number of items per permanent link varies from 60 to 125, as shown in Table 4.1, element 8 of *Permanent links* ("Minimum number items per permanent link").

The number of items for each DO at Level B, C and D relates to the expected accuracy and reliability.

4.5.5 Total valid items for permanent links

The total number of items for the permanent links has been determined from the following formula:

**Total number of valid items for permanent links = total number of valid annual test items x expected coverage**

The full list of figures is shown in Table 4.1, element 9 of *Permanent links* ("Total number of valid items for permanent links").

For example: for Level C, the total number of valid test items for all permanent links is 1,800 x 60% = 1,080. See the table below for all categories.

*Table 4.4 Required total number of valid items for permanent links per level*

| | Total number valid test items | Expected coverage[4] | Total number of valid test items for permanent link |
|---|---|---|---|
| Level A | 8,300 | 80% | 6,640 |
| Level B | 3,200 | 70% | 2,240 |
| Level C | 1,800 | 60% | 1,080 |
| Level D | 950 | 50% | 475 |
| Level E | 400 | 20% | 80 |

4.5.6 Calculation of permanent links performance

The performance of the permanently measured links is calculated on the basis of the following general formula:

**Result of permanent links = sum of permanent link performance x relative weighting**

The relative weighting is the permanent link declared weight as a ratio of the total sum of all the declared weights of all the permanent links.

For example, for Level D, if the permanent links have 150 tonnes, 100 tonnes and 50 tonnes with performance rates of 90%, 85%, and 80%, permanent link performance would be:

$$\frac{(150{,}000 \text{ x } 90\%) + (100{,}000 \text{ x } 85\%) + (50{,}000 \text{ x } 80\%)}{150{,}000 + 100{,}000 + 50{,}000} = 86.7\%$$

*4.6 Pool 1*

4.6.1 Expected coverage for Pool 1

The expected coverage was determined from the profile of GDP compared with the total UPU GDP. The GDP was chosen as a traditionally accepted substitute for relative global mail volume in the absence of actual mail volume data. In addition, it was also used in the UPU DO classification system. The profile is given below. Specific thresholds were chosen for each DO level to provide a simple and affordable coverage approach.

The number of Pool 1 links was determined to provide a fixed amount of coverage for each DO level. The number of samples for the Pool 1 links is determined from the expected coverage.

The figures in Table 4.5 below are taken from Table 4.1.

[4] Expected coverage is based on GDP as a substitute for real mail volumes.

*Table 4.5 Expected coverage for Pool 1*

| Pool 1 | Level A | Level B | Level C | Level D | Level E |
|---|---|---|---|---|---|
| Expected coverage for Pool 1 links | 15% | 23% | 30% | 50% | 60% |
| Expected coverage combining permanent links plus Pool 1 links | 95% | 93% | 90% | 90% | 80% |
| Pool 1 links | ≤ 45 | ≤ 38 | ≤ 30 | ≤ 30 | ≤ 16 |

4.6.2 Number of links for Pool 1

Again, the design applies the Pareto principle. For instance, the permanent links for Level A have a coverage of 80%, leaving 20%. However, 80% of 20% is 15%. Adding 15% and 80% gives a coverage of 95%, which is achieved using only 45 links, as shown in Table 4.5.

– Level A has an expected coverage of 95% of GDP, which represents 45 links.
– Level B has an expected coverage of 93% of GDP, which represents 38 links.
– Level C has an expected coverage of 90% of GDP, which represents 30 links.
– Level D has an expected coverage of 90% of GDP, which represents 30 links.
– Level E has an expected coverage of 80% of GDP, which represents 16 links.

4.6.3 Pool 1 performance

The performance of Pool 1 is calculated on the basis of the following general formula:

**Number of on-time items in Pool 1 divided by the number of valid test items in Pool 1**

*4.7 Allowed Adjustment to Permanent Links and Pool 1 Valid Mail Targets*

4.7.1 Background

One of the main aims of the sampling regime was to make the sample sizes proportional to mail volumes as far as possible so that the results are self-weighting as much as is possible. All things being equal, a proportional approach is most cost effective.

The original design was based on a fixed Pareto split for Permanent Links, Pool 1 and Pool 2 of 80%, 15% and 5%.

However, it has been noted that some countries exceed the target volume for Permanent Links considerably. This causes an imbalance between the Permanent Link and Pool 1 allocation where some or all Pool 1 countries would have more valid mail than the smallest Permanent Link.

For example, suppose a Level A country has 94% of its volume covered by the 16 permanent links, it is likely to have very few pool 1 countries left. Similarly, it may happen if a Level E country has over 50% of its volume from 1 Permanent Link.

The following section describes how the valid mail targets can be adjusted to reflect better the actual volumes of each stratum: Permanent Links & Pool 1.

4.7.2 Adjustment Process

The idea is to make a proportional adjustment to the valid mail targets for the Permanent Links and Pool 1. However, the Permanent Links or the overall total Pool 1 valid mail target should not be less than the minimum for a Permanent Link for that level. This is done to preserve the temporal nature of the design.

The process to adjust the valid mail target is as follows:

- Add the valid mail targets for the Permanent Links and Pool 1 to give the combined total valid mail target items for both Permanent Links and Pool 1.
- Calculate the adjusted valid mail target of Permanent Links as the proportion of Permanent Links compare to the total proportion of Permanent Links and Pool 1 *times* the combined total valid mail target items for both Permanent Links and Pool 1.
- Calculate the adjusted valid mail target of Pool 1 as the total unadjusted valid mail targets for both Permanent Links and Pool 1 less the adjusted valid mail target of Permanent Links.
- If the adjusted valid mail target of Permanent Links is at least as large as the number of Permanent Links *times* the Minimum Valid Mail Target for a Permanent Link for the country Level **and** the adjusted valid mail target of Pool 1 is as large as the Minimum Valid Mail Target for a Permanent Link for the country Level, then use the adjusted valid mail targets for the Permanent Links and Pool 1.
- If the adjusted valid mail target of Permanent Links is less than the number of Permanent Links *times* the Minimum Valid Mail Target for a Permanent Link for the country Level, then the adjusted valid mail target of Permanent Links is the number of Permanent Links *times* the Minimum Valid Mail Target for a Permanent Link for the country Level. The Pool 1 is the adjusted.
- If the adjusted valid mail target of Pool 1 is less than the Minimum Valid Mail Target for a Permanent Link for the country Level, then set the adjusted valid mail target of Pool 1 as the Minimum Valid Mail Target for a Permanent Link for the country Level. The adjusted valid mail target for Permanent Links would be the *difference* between the combined valid mail targets *less* the adjusted valid mail target of Pool 1.

Use the adjusted valid mail target for Permanent Links and Pool 1. The algebraic formulation is given in **Annex B** with some examples.

*4.8 Pool 2*

4.8.1 Expected coverage for Pool 2

The expected coverage was determined from the GDP profile compared with the UPU total GDP. The GDP was chosen as a traditionally accepted substitute for relative global mail volume in the absence of actual mail volume data. It was also used in the UPU DO classification system. The profile is given in Table 4.6 below. Specific thresholds have been chosen for each DO level to provide a simple and affordable coverage approach.

The figures in the table below were taken from Table 4.1 above.

*Table 4.6 Expected coverage for Pool 2*

| Pool 2 | Level A | Level B | Level C | Level D | Level E |
|---|---|---|---|---|---|
| Expected coverage for Pool 2 links | 5% | 7% | 10% | 10% | 20% |
| Number of Pool 2 links | Remainder | Remainder | Remainder | Remainder | Remainder |
| Expected coverage combining permanent links plus Pool 1 links and Pool 2 links | 100% | 100% | 100% | 100% | 100% |

Number of links for Pool 2:

- Level A has an expected coverage of 5%, which represents all remaining countries for an expected coverage of 100% of GDP.
- Level B has an expected coverage of 7%, which represents all remaining countries for an expected coverage of 100% of GDP.
- Level C has an expected coverage of 10%, which represents all remaining countries for an expected coverage of 100% of GDP.
- Level D has an expected coverage of 10%, which represents all remaining countries for an expected coverage of 100% of GDP.
- Level E has an expected coverage of 20%, which represents all remaining countries for an expected coverage of 100% of GDP.

4.8.2 Pool 2 performance

The performance of Pool 2 is calculated on the basis of the following general formula:

**Number of on-time items in Pool 2 divided by number of valid test items in Pool 2**

*4.9 Contingency*

The ideal situation and ultimate goal is full take-up by the vast majority of DOs.

However, a full take-up is not expected from the outset and there is the need to phase in system participation for valid logistical reasons.

During this interim period, coverage in Pool 1 and Pool 2 may be less than ideal. The statistical design must be adjusted accordingly.

To achieve accuracy, the total number of valid test mail items must be complied with. Whatever the situation, Level A has a target of 8,300 valid test mail items, Level B a target of 3,200, Level C a target of 1,800, Level D a target of 950 and Level E a target of 400.

The allocation profile should be adjusted for the GDP proportion of participating DOs. Suppose that Level C has 75% of GDP for the permanent links, the remaining Pool 1 DOs have 20% and the Pool 2 DOs have 5%. The allocation would be adjusted to 1,800 x 75%, or 1,350, for the permanent links, 1,800 x 20%, or 360, for Pool 1 and1,800 x 5%, or 90, for Pool 2.

If a regional group in Pool 2 is not represented, the items are allocated to the other regions. Thus, for the example above, if there are only three regional groups, each would receive 90/3, or 30, items.

If the total number of participating DOs in Pool 1 and Pool 2 is less than eight, there should be only one pool. Moreover, the number of valid test items per link in the pool should be limited to 60 in order to ensure that the Pool 1 or Pool 2 link does not have more items than the permanent link volume.

# 5 Calculation of total result

## *5.1 Summary of expected coverage*

The table below summarizes the expected coverage (as modelled by the GDP) for the design's building blocks (permanent links, Pool 1 and Pool 2) for each level.

*Table 5.1 Summary of expected coverage*

| Expected coverage | Level A | Level B | Level C | Level D | Level E |
|---|---|---|---|---|---|
| Permanent link | 80% | 70% | 60% | 40% | 20% |
| Pool 1 | 15% | 23% | 30% | 50% | 60% |
| Pool 2 | 5% | 7% | 10% | 10% | 20% |
| Total coverage | 100% | 100% | 100% | 100% | 100% |

Performance formula:

Total result =

$$\frac{(\%\ \text{permanent link x result of permanent links}) + (\%\ \text{Pool 1 x result of Pool 1}) + (\%\ \text{Pool 2 x result of Pool 2})}{\%\ \text{permanent link} + \%\ \text{Pool 1} + \%\ \text{Pool 2}}$$

## *5.2 Pool allocation*

The allocation formulation tries to distribute the valid test items in such a way that unweighted performance is as close as possible to expected weighted performance. As a result, the item allocation is in proportion to expected coverage as far as possible. Some minor adjustments to the proportional allocation have been made to keep the statistical design simple to operate.

The table below describes the overall profile of the number of DOs, the GDP percentage and the number of valid test mail samples by level and flow group (permanent links, Pool 1 and Pool 2).

*Table 5.2 Number of DOs, GDP % and sample by level and group profile*

| | Number of DOs | | | | GDP % | | | | Number of samples | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Level | Perm. links | Pool 1 | Pool 2 | Total | Links % | Pool 1 % | Pool 2 % | Total % | Perm. links | Pool 1 | Pool 2 | Total |
| A | 16 | 29 | 145 | 190 | 80.7% | 14.3% | 5.0% | 100% | 6,640 | 1,245 | 415 | 8,300 |
| B | 10 | 28 | 152 | 190 | 70.6% | 22.6% | 6.8% | 100% | 2,240 | 736 | 224 | 3,200 |
| C | 7 | 23 | 160 | 190 | 61.9% | 28.4% | 9.7% | 100% | 1,080 | 540 | 180 | 1,800 |
| D | 5 | 25 | 160 | 190 | 52.7% | 37.7% | 9.7% | 100% | 380 | 475 | 95 | 950 |
| E | 1 | 15 | 174 | 190 | 27.1% | 53.6% | 19.3% | 100% | 80 | 240 | 80 | 400 |

The procedures below outline the process where full participation occurs. The numbers would be different if some DOs did not participate in the pools.

The recommended approaches are described below for Pool 1 and Pool 2.

*5.3 Allocation in Pool 1*

5.3.1 Simple quota of DOs in the pool

The intention here is to rotate the DOs in the study within the pool. The ideal solution would be to rotate the DOs over the period between Congresses, which is currently four years. Each DO would send roughly the same number of valid test mail items; this is because weighting would not be possible since there is no universal coverage of all the possible links in the pool.

5.3.2 DO selection in the pool

It is proposed to have Pool 1 rotated systematically to ensure full coverage of all DOs. However, to avoid knowing which DOs are selected at a given time, no information on the dispatching countries should be disclosed (not even retroactively).

The DO selection could be as follows:

– For Level E and Pool 1, all 15 DOs would not necessarily be part of the study. The number per year could be as low as 15/4, or 4, per year; the corresponding valid test mail per DO would be roughly 240/4, or 64 (one item per week). A different set of 4 DOs could be in the study each year.

– For Level D and Pool 1, all 25 DOs would not necessarily be part of the study. The number per year could be as low as 25/4, or 6, per year; the corresponding valid test mail per DO would be roughly 475/6, or 76 (one item per week). A different set of 6 DOs could be in the study each year.

– For Level C and Pool 1, all 23 DOs would not necessarily be part of the study. The number per year could be as low as 23/4, or 6, per year; the corresponding valid test mail per DO would be roughly 540/6, or 94 (one item per week). A different set of 6 DOs could be in the study each year.

– For Level B and Pool 1, all 28 DOs would not necessarily be part of the study. The number per year could be as low as 28/4, or 7, per year; the corresponding valid test mail per DO would be roughly 736/7, or 105 (one item per week). A different set of 7 DOs could be in the study each year.

– For Level A and Pool 1, all 29 DOs would not necessarily be part of the study. The number per year could be as low as 29/4, or 7, per year; the corresponding valid test mail per DO would be roughly 1,245/7, or 172 (one item per week). A different set of 7 DOs could be in the study each year.

It may be possible to operate such a regime in Pool 1 for Levels A, B and C, with a single dropper for each outbound DO. Items from Pool 1 DOs to different receiving DOs would have to be made up for Levels D and E to work at the least acceptable efficiency level of 2 to 3 items per week, by combining this with items to other delivery DOs.

*5.4 Allocation in Pool 2*

5.4.1 Dispatching region split

It is proposed to split Pool 2 on a regional basis, as this will help to manage the arrival pattern of the mail so that all regions of the world are represented. The dispatching regions proposed are:

i. Americas and Caribbean
ii. Europe and Israel
iii. Arab countries and Central Asia
iv. Africa
v. Asia, Pacific and Oceania

The regional groups are based on the current UPU regions, amalgamated into five regional geographical groups to simplify the allocation process, while maintaining global coverage. **Annex F** lists all countries to be used as Pool 2 and their associated dispatching regions.

5.4.2 Expected number of valid test mail Items in each region

This section describes how the number of valid test items per region is calculated.

The tables below show the likely distribution of GDP (Table 5.3) and the number of DOs (Table 5.4) between the permanent links and pools.

*Table 5.3 Distribution of GDP % by region for Pool 2*

| Region | Level A | Level B | Level C | Level D | Level E |
|---|---|---|---|---|---|
| Americas and Caribbean | 0.8% | 1.3% | 2.0% | 2.0% | 2.0% |
| Europe and Israel | 0.9% | 1.4% | 2.5% | 2.5% | 9.5% |
| Arab countries and Central Asia | 1.9% | 1.9% | 1.9% | 1.9% | 2.6% |
| Africa | 0.8% | 0.8% | 0.8% | 0.8% | 1.3% |
| Asia, Pacific and Oceania | 0.7% | 1.4% | 2.5% | 2.5% | 3.9% |
| Total | 5.0% | 6.8% | 9.7% | 9.7% | 19.3% |

*Table 5.4 Distribution of number of DOs by region for Pool 2*

| Region | Level A | Level B | Level C | Level D | Level E |
|---|---|---|---|---|---|
| Americas and Caribbean | 28 | 30 | 32 | 32 | 32 |
| Europe and Israel | 19 | 21 | 24 | 24 | 34 |
| Arab countries and Central Asia | 29 | 29 | 29 | 29 | 30 |
| Africa | 42 | 42 | 42 | 42 | 43 |
| Asia, Pacific and Oceania | 27 | 30 | 33 | 33 | 35 |
| Total | 145 | 152 | 160 | 160 | 174 |

There is a more even split of GDP proportions for Pool 2 for all categories, provided they are not distorted by the permanent links (except for Level E).

One could apply an even spread of the valid test items to each region (i.e. 20%). For Level A, each region would have 100 valid test items per region per year; for Level E, 12 valid test items per region per year. This may require a top-up to cover all days of the week and times of the year, if this was considered essential.

5.4.3 Choice of DOs in each region

Where the design is based on a regional model, it is not possible to have wide coverage of the DOs within that region.

The number of sending DOs per region depends on the volumes of valid test items and the number of participating DOs.

In isolation, the volumes in Pool 2 would warrant only one or two sending DOs per region at a time.

With a large number of participating DOs, the spread of countries within a region could be much wider. The design would be more like a simple random sample from the sending side, as there could be little or no clustering.

*5.5 Temporal coverage capability*

One of the aims of the system is to improve coverage of the design's building blocks over time. These relate to the control of the drop pattern, which should ensure that no seasonal bias occurs.

There are various levels of coverage over time:

– The best temporal coverage is ensured by the ability to drop items every day. This possibility requires a minimum of 250 valid test mail items per year.

– The second best temporal coverage occurs when items can be dropped every week and requires at least 52 valid test mail items per year or one per week.

– The third best temporal coverage occurs when items can be dropped every month, requiring at least 12 valid test mail items per year or one per month.

– For the least temporal coverage, items need to be dropped at least once for every drop day (for example, Monday to Friday) or having five items dropped (one for each day of the drop week).

The table below shows the temporal coverage expected from the proposed sample design (the word "FALSE" indicate areas of possible design weakness for temporal coverage).

*Table 5.5 Coverage of the main sample design parameters over time*

| Threshold | | | 250 | 52 | 12 |
|---|---|---|---|---|---|
| Element | Component | Volume | Daily | Week | Monthly |
| Level A | Total | 8,300 | True | True | True |
| | Link | 6,640 | True | True | True |
| | Pool 1 | 1,245 | True | True | True |
| | Pool 2 | 415 | True | True | True |
| Level B | Total | 3,200 | True | True | True |
| | Link | 2,240 | True | True | True |
| | Pool 1 | 736 | True | True | True |
| | Pool 2 | 224 | False | True | True |
| Level C | Total | 1,800 | True | True | True |
| | Link | 1,080 | True | True | True |
| | Pool 1 | 540 | True | True | True |
| | Pool 2 | 180 | False | True | True |
| Level D | Total | 950 | True | True | True |
| | Link | 380 | True | True | True |
| | Pool 1 | 475 | True | True | True |
| | Pool 2 | 95 | False | True | True |
| Level E | Total | 400 | True | True | True |
| | Link | 80 | False | True | True |
| | Pool 1 | 240 | False | True | True |
| | Pool 2 | 80 | False | True | True |
| Minimum link | Level A | 125 | False | True | True |
| | Level B | 100 | False | True | True |
| | Level C | 75 | False | True | True |
| | Level D | 60 | False | True | True |
| | Level E | 60 | False | True | True |
| Minimum Pool 1 | Level A | 45 | False | False | True |
| | Level B | 38 | False | False | True |
| | Level C | 30 | False | False | True |
| | Level D | 30 | False | False | True |
| | Level E | 16 | False | False | True |

For good temporal allocation, the following recommendations therefore apply:

- If the expected number of valid test mail items for any profile is over 250, an equal amount should as far as possible be allocated for a daily drop.
- If the expected number of valid test mail items for any profile is over 52, an equal amount should as far as possible be allocated for a weekly drop.
- If the expected number of valid test mail items for any profile is over 12, an equal amount should as far as possible be allocated for a monthly drop.
- If the expected number of valid test mail items for any profile is over five, an equal amount (at least one) should as far as possible be allocated for a drop spanning five days.
- Within the limits of the volume of valid test mail items, the design should maximize the daily, weekly and monthly allocation of valid test mail items at all levels of the design:
    - flow components of permanent links, Pool 1 and Pool 2;
    - city;
    - mail characteristics;
    - flow-city combinations;
    - mail characteristics of flow-city combinations.

### *5.6 Example of allocation of flows to cities*

Let us consider Level D again.

The table below shows the allocation of valid test mail items (VTMIs) to cities by flow. It uses population for the cities, but the process applies equally as well where Validated Real International Inbound Mail Volumes apply. Calculation of the figures is described below.

*Table 5.6 Allocation of items by flow to city*

| Flow | City 1 | City 2 | City 3 | Total % | Total VTMIs |
|---|---|---|---|---|---|
| Total population (m) | 28.0 | 18.1 | 18.0 | 64.1 | |
| Total % | 43.7% | 28.2% | 28.1% | 100.0% | |
| Total | 415 | 268 | 267 | 100.0% | 950 (Target 950) |
| Permanent links | 166 | 107 | 107 | 52.7% | 380 (Target 380) |
| Permanent link 1 | 64 | 41 | 41 | 27.1% | 146 |
| Permanent link 2 | 24 | 15 | 15 | 9.9% | 54 |
| Permanent link 3 | 26 | 17 | 17 | 6.1% | 60 |
| Permanent link 4 | 26 | 17 | 17 | 4.9% | 60 |
| Permanent link 5 | 26 | 17 | 17 | 4.8% | 60 |
| Pool 1 | 208 | 134 | 126 | 37.7% | 475 (Target 475) |
| Pool 1 Link 1–7 | 30 | 19 | 18 | 5.39% | 68 |
| Pool 2 | 42 | 27 | 25 | 9.7% | 96 (Target 95) |
| Pool 2 Region 1–5 | 8 | 5 | 5 | 1.94% | 18 |

For Level D, there are three cities. The example uses Tokyo, Mexico City and Mumbai.

The (population) proportion for City 1 (Tokyo) is 28.0 m / (28.0 m + 18.1 m + 18.0 m). With this approach, the proportion for City 1 (Tokyo) is 43.7%, for City 2 (Mexico City) 28.2% and for City 3 (Mumbai) 28.1%.

In the example of the allocation to permanent links, permanent link No. 1 has 146 items.

Therefore, from permanent link 1, City 1 (Tokyo) would expect to receive 43.7% of the 146 items, or 64 items; City 2 (Mexico City) would expect to receive 28.2% of the 146 items, or 41 items; and City 3 (Mumbai) would expect to receive 28.1% of the 146 items, or 41 items.

Because Pool 1 has seven links, each link has a total of 475/7, or 68 items. Therefore, Pool 1 Link 1 to City 1 is 43.7% of 68, or 30 items. The other cities are calculated in the same way. The other Pool 1 links have the same figures.

Pool 2 has five regions. Each region sends 96/5, or 19 items. Pool 2 Region 1 to City 1 has 43.7% of 19, or 8 items. The other cities are calculated in the same way. The other Pool 2 regions have the same figures.

With whole number rounded up, the total allocation is 950 items, compared with 950 as the target.

Further examples of the flow-city allocation are given in **Annex A**.

*5.7 Redistribution/reallocation of missing inbound volumes in case of design asymmetry during the measurement period*

In cases of force majeure, the distribution of test mail changes and creates an imbalance in the volume coverage across the design parameters measured, namely city coverage, permanent links and/or pools. The following procedure should be applied in order to recover lost test volumes and reach valid annual mail targets.

5.7.1 Redistribution of samples to cities

For the specific situation when a city can no longer continue to be measured during the year due to force majeure, the following procedure should be applied for the remaining period of the year:

- city weights should be re-calculated and normalized, while excluding the force majeure city;
- re-calculated weights should be assigned proportionally to the remaining cities;
- remaining sample volume should be allocated proportionally to the remaining cities.
- annual performance results of the inbound DO should be calculated, taking into consideration:
    - pro-rata number of days per reporting period that the city was measured;
    - pro-rata city weights per reporting period.

The redistribution of samples reverts to the planned annual design as soon as the force majeure situation ends.

The redistribution of samples reverts to the planned annual design as soon as the force majeure situation ends.

5.7.2 Redistribution of samples to inbound links

For the specific situation when one or more permanent links can no longer continue to be measured during the year owing to force majeure, the following procedure should be applied for the remaining period of the year:

- weights for the permanent links should be re-calculated while excluding the force majeure link(s);
- re-calculated weights should be assigned proportionally to the remaining permanent links;
- the re-calculated permanent link weights should then be normalized together with the pool links;
- remaining sample volume should be allocated proportionally to the remaining inbound links.

– annual performance results of the inbound DO should be calculated, taking into consideration:
    - pro-rata number of days per reporting period that the inbound link was measured;
    - pro-rata inbound link weights per reporting period.

In the case where all pool 1 and/or pool 2 links can no longer continue to be measured during the year owing to force majeure, the same procedure as for permanent links above is to be followed.

The redistribution of samples reverts to the planned annual design as soon as the force majeure situation ends.

# 6 Boosting options

The GMS provides for increased statistical accuracy by offering participating countries several boosting options that can:

– improve accuracy;

– make improvement possible for supporting improvements in bilateral cooperation.

However, since changes in design can possibly have a direct impact on measurement results, it is important to prevent unwanted side effects when increasing statistical accuracy. Only the following system extensions are therefore permitted:

– Upgrading of DO level.

– Promoting a flow from a pool to become a permanent link.

– Boosting a permanent link with a greater number of valid test mail items.

– Increasing the number of items from the pool(s).

– adding a city link either at destination country or at outbound country or both.

– adding “small packet” E-Format in addition to the basic P and G formats.

The DO (or country) that opts for boosting must pay the extra cost, which can be shared by the sending DO and receiving DO, if both agree.

All boosts and extensions can be implemented for a full year only, and under no circumstances can they exclude certain weeks or months during the period which is the basis for the yearly result (January to December). Furthermore, test items are to be boosted in accordance with the allocation of the regular test items within the study, so as not to change the allocation pattern of the standard design.

The boosting option needs to be notified sufficiently in advance to allow its implementation the following year. The advance notification is expected to be take place at least six months before 1 January of the calendar year of operation. Boosts will be implemented for a minimum duration of one calendar year, and last for full calendar years only, from January to December.

## *6.1 Upgrading level of receiving DO*

The simplest option would be to allow DOs to move up the ladder of complexity and improve accuracy. For instance, a Level E DO could ask to be considered a DO at Level D, C, B or A. The full range of upgrades is shown in following table.

*Table 6.1 Options for upgrading level of receiving DO*

| Current level | Option 1 | Option 2 | Option 3 | Option 4 |
|---|---|---|---|---|
| Level E | Level D | Level C | Level B | Level A |
| Level D | Level C | Level B | Level A | |
| Level C | Level B | Level A | | |
| Level B | Level A | | | |

This option would be available to all countries without restriction, provided that the move is upward. A downgrade to a level providing lower accuracy than what is foreseen as a standard is not permitted since the standard levels are seen as an absolute minimum for purposes of terminal dues.

*6.2 Promoting a pool flow to become a permanent link*

Another boosting option would be to transform a sending public DO from Pool 1 or Pool 2 into a permanent link. The minimum number of valid test mail items must be adapted for this new permanent link.

The allocation process must follow the normal procedure for a permanent link, both geographically and over time. The particular DO flow result would be weighted, and no undue bias would be introduced.

There are currently no problems foreseen in transforming a Pool 1 DO into a permanent link.

*6.3 Boosting a permanent link with more valid test mail items*

Another option would be to allow more valid test mail items than those planned for a particular permanent link. A DO might feel it necessary to increase the number of test items on a particular permanently measured flow to ensure the higher statistical accuracy of that link.

For instance, suppose a sending DO (or receiving DO) feels that the accuracy of its permanent link with another receiving DO (or sending DO) is insufficient. It could top up the numbers to achieve a specific accuracy (for example, 5%, 2.5%, 1% or 0.5%).

The allocation must follow the normal procedure for a permanent link, both geographically and over time.

*6.4 Increase the number of items coming from pool(s)*

A DO might feel it necessary to increase the number of test items coming from the pool(s) in order to ensure a higher statistical accuracy for the inbound result. This can be done as long as the volume of test items for the pool as such is increased and no individual DO is selected.

*6.5 Adding a city link in the destination country*

The rules for the selection of a city, the additional valid test mail items required, and the allocation of valid test items are given here.

6.5.1 Selection of cities

The procedure for selecting an additional city for measurement is the same as the general rules in Section 4.2.4 "Number of cities covered" always opting for the same selection method (population or Validated Real International Inbound Mail Volume) that was used for the other measured cities. The selection procedure is based on the descending order of volumes or population (as applicable) for cities. The next city in descending order on the list must be added.

For example, suppose that the DO is in Level B. It has seven cities already covered and it wants to add a further city. The eighth city in descending order must be selected.

Similarly, suppose that the DO is in Level B. It has seven cities already covered and it wants to add two further cities. The eighth and ninth cities in descending order must be selected.

6.5.2 Number of additional valid test mail items

For each city that is added, the number of additional valid test items that must be added is given below:

*Table 6.2 Boosted number of valid test mail items per city*

| *Level* | *Level A* | *Level B* | *Level C* | *Level D* | *Level E* |
|---|---|---|---|---|---|
| Additional number of items per city | 300 | 300 | 300 | 300 | 300 |

The number of required items per level varies because of the additional structure of permanent links to cover.

Therefore, if a Level B DO decides to increase by one city, the expected total number of valid annual test items would increase by 300 items from 3,200 to 3,500 items. Similarly, if a Level B DO decides to increase by two cities, the expected total number of valid annual test items would increase by 600 items from 3,200 to 3,800 items.

6.5.3 Allocation of valid test mail items

The allocation process follows the normal city allocation rules with the revised total number of valid annual test items in Sections 4.2.6 "Allocation and distribution to city/domain coverage" and 5.6 "Example of allocation of flows to cities".

*6.6 Adding a city link in the origin country*

It is possible to boost the outbound panel coverage in order to measure specific cities of the outbound country/territory so that the requesting DO can obtain additional operational data to improve quality.

*6.7 Adding test mail Format*

In addition to the basic P and G formats, DO's can choose to boost the formats to include "small packet" E-Format. With this option chosen, the PGE format weight proportion are adapted accordingly as given in Chapter 8. Further details of the format specifications are given in the Table 8.2.

*6.8 Restricted boosted design*

GMS is designed to measure global flow of mail (permanent links and pools) into a country/territory. However, for operational purposes, by restricting the catchment source (e.g. region, continent, agreement, etc.) of the measured links, a restricted design can be made while adhering to all specifications as stipulated in chapter 4. An example of a restricted boosted design is the *Specific report design* in **Annex H**.

# 7 Panel management

## *7.1 Introduction*

Panel management includes all activities associated with:

- Upgrading of DO level.
- recruitment of panellists;
- training of panellists;
- duties of a dropper panellist;
- duties of a receiver panellist;
- panel maintenance.

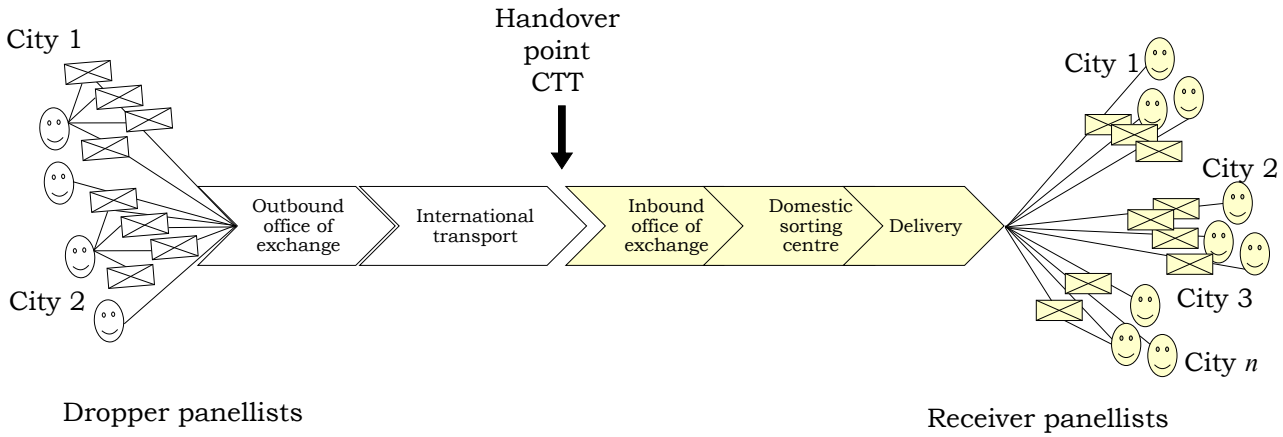



*Figure 7.1 Dropper/ Receiver panellist overview*

How test mail information from receiver panellists is validated, is described in chapter 12.2 (Validation)

In general, it may be possible to get by using only the most popular world languages. However, for certain countries, it may be necessary to speak the local language to complete the recruitment and training and maintain proper communication when specific queries arise.

## *7.2 Recruitment of panellists*

In all cases, panellists:

- may be volunteers or professional;
- should be willing to participate for at least six months;
- should be able to communicate in one of the GMS languages;
- should have access to real-time electronic communication tools (e.g. Internet, SMS).

7.2.1 Dropper panellists

At least two dropper panellists in different cities should be recruited for each participating DO. In countries where the DO maintains more than one outbound OE, a dropper panellist needs to be recruited to cover each facility. A dropper panellist may be a private individual or a professional representing a business. The panellist may be contracted to prepare the test letters to be dropped according to a set scheme. In other countries, the dropper panellist may receive pre-prepared test letters. Depending on the DO, test letter envelopes are either furnished with stamps or marked/stamped by other means (e.g. postage paid impression). In some countries, the panellist may be given the means of purchasing stamps at the post office; in others, it may be agreed to have the panellist provided with stamps from the post office.

Dropper panellists should be available according to the schedule determined by the contractor.

Bundling of items from the same outbound country to the same inbound city shall be avoided, if possible. If the statistical design makes that unavoidable, bundling from the same outbound country to the same receiver panellist should be avoided.

7.2.2 Receiver panellists

A number of receiver panellists should be recruited for each participating DO. As a rule, receiver panellists should be private individuals. However, for DO's that use P.O.BOX as the predominant mail delivery method, business individual panellists may be used as well so long as there are no internal delays for the mail within the company from pick up to the named recipient. The statistical design model defines the number of receiver panellists for each DO. Depending on the inbound DOs mail volume, the number of receiver panellists may vary from at least three to as many as 50.

Backup panellists should also be recruited. They may be asked to "stand in" for any regular receiver panellists who have notified the contractor that they are unable to act as a panellist for a specified period (vacation leave, for example). They may also serve as continuous extra panellists for a receiving DO or a city where the panellists' situation is not yet stable. Use of these backup panellists will ensure that the required number of valid test mail items and the allocation based on the system design are achieved.

The recruitment process is likely to vary from one DO to the next. In some cases, initial contact may be made by telephone or via the Internet; in others, through contractor networks or other networks involving bodies such as the UPU. In general, a receiver panellist:

– or his close relatives must not be employed or identified as a panellist by the DO or postal operator;

– should be available to confirm the delivery of test letters;

– especially for PO boxes, must pick up delivered mail on each delivery day after the delivery has taken place;

– should be able to ensure that all test mail intended for them is received only by them. No one else in the household is to handle or delay the receipt of test mail;

– should not use any delivery service provided by a third party not connected with the DO;

– should give advance notice of vacation plans or other periods when temporary replacement will be required;

– must be easy to contact by panel management (for checks, follow-up etc.);

The delivery address of a receiver panellist shall be:

a. street address;

b. P.O.Box (in countries/cities where few or no street delivery takes place) the panellists need to be aware of the up time, the latest time when mail is made available for collection from the box that. For countries or circumstances where receiver panellists have to pick up their mail from the post office counter, this shall be considered also in the same category as P.O.Box;

c. Permanent (i.e. not temporary address such as hospital, jail or student campus and not mobile address such as mobile home, boat);

The receiver panellists in the same city shall be spread around the city and not:

a. live in the same zip code area or district;

b. live in the same street;

c. have the same P.O.Box post office delivery (if possible) – the delivery address of a receiver panellist must be secure so that test items will not be damaged or stolen after delivery;

d. the test item must not be delivered to a concierge (who makes the final delivery to the receiver panellist) except in cities where there is no other alternative.

*7.3 Training of panellists*

The contractor should ensure that there is a documented training programme and define a proficiency level to be reached within a given time to indicate that the panellist as sufficiently trained. The training should confirm that the panellist has understood the task involved and is able to carry it out as instructed.

The quality and effectiveness of any applied training procedure is vital to the success of the UPU GMS, as it will ensure the reliability and cost-effectiveness of the study.

Instructions and training are to be given in the most appropriate language, i.e. one that enables the panellist to fully understand and properly execute the tasks involved.

Training and recruitment must be adapted to the habits of each participating country.

To reduce the time lost when a panellist proves not to be performing satisfactorily despite training, adequate controls of the panellist comprehension and performance shall be made repeatedly during the training period.

7.3.1 Training of dropper panellists

The training of dropper panellists will cover:

– how to prepare test letters;
– the procedure for dropping test letters (date, place and time);
– the procedure for recording data on dropped test letters;
– how to transmit the recorded data to the contractor;
– how to effectively deal with problems or disruptions;
– The training may also include actual practical exercises in preparing, dropping and recording test items and transmitting the data to the contractor. There should also be some exercises in handling transponders and purchasing stamps (where applicable);
– The contractor gives the dropper panellist general instructions on how to prepare test letters. These instructions may cover when to download the test letter form, how to fold the test letter form, how to insert the transponder, where to place the address label and where to place stamp and indicators (where applicable).
– The contractor may also provide a complete list of the stamps to be used over a given period.
– The instructions should also include how and when to record the posting of test items, when to transmit the recorded data to the contractor and the procedure to follow for obtaining assistance if irregularities occur (errors, deficiencies, lack of agreement, etc.).

– The contractor will specify how the dropper panellist checks the quality of each test letter and the day of the week and time for dropping test letters.

The dropper panellist should be given specific information about each test item:

– item number (including number on the test letter form);

– designated transponder to be used;

– address of receiver panellist to provide assistance if problems arise;

– the postage required for each test item.

7.3.2 Training for receiver panellists

The training of receiver panellists (including backup panellists) should enable them to:

– confirm the date and day of the week of delivery (street delivery or post office box);

– inform the contractor of cases where the date or day of the week of delivery cannot be determined;

– know how and when to record all necessary details on the receipt;

– transmit to the contractor all data on the test items received.

This training may also include practical exercises on receiving test items and recording data on the test item receipt, and on receiving and returning transponders.

The contractor gives the receiver panellists general instructions on:

– how and when to record delivery of each test letter (preferably on a fixed website) and when to transmit these data to the contractor, if not instantaneously when recording the information on the website;

– how, where and when to return the transponders used.

These instructions should indicate:

– how to record data when the day and date of delivery of a specific test letter is not certain;

– how to indicate the condition of the item received (envelope damaged, address label damaged or not fully legible, transponder missing, etc.);

– whom to contact if irregularities occur (errors, deficiencies, lack of agreement, etc.).

The receiver panellist should be given specific instructions on:

– how to record all the data confirming the delivery of a specific test letter, including the day and the date of receipt;

– how to check that the letter received is in good condition and that the data recorded are correct.

The contractor also provides the receiver panellists with envelopes or packets for returning the test letters received and the transponders, and the means to purchase/obtain stamps for these return consignments.

*7.4 Duties of the dropper panellist*

The duties of the dropper panellist may vary, depending on the particular situation in the DO concerned. Nevertheless, his/her general responsibilities and tasks will be as follows:

– prepares the test letters as instructed (where applicable);

– checks quality of test letters as instructed;

– drops test letters at location indicated (letter box, post office or office of exchange);

– records data for each test letter posted in accordance with instructions;
– transmits data on posted items contractor on the day and date agreed in accordance with the instructions.

#### 7.4.1 Production of test letters

It is important to prepare the test items beforehand. Although some panellists prefer having the test items prepared at central or regional level, many will prepare the test items themselves. In some, if not all, cases, the droppers are to produce the test items as instructed by the study contractor.

Each test letter is supplied with:

– a test letter form;
– a transponder;
– an envelope;
– an address label;
– one or more stamps;
– a priority/airmail/par avion indicator (where applicable).

Meter franking can be used for postage as well as stamps.

The panellist should generally communicate with the contractor via the Internet. The test letter forms are made available as a PDF file, to be downloaded from a central website and printed out locally. This will enable the study contractor to check whether the droppers keep to their posting schedule.

The dropper panellist receives the transponders, envelopes and address labels by post, in accordance with the study parameters.

The panellist may choose to receive stamps or to buy them locally.

### *7.5 Duties of the receiver panellist*

The procedure to follow will depend on whether or not the receiver panellist has Internet access.[5]

According to the training instructions, the receiver panellist shall:

– Check mail delivered every delivery day (for PO Boxes, this should be after the agreed up-time);
– Communicate delivery date per delivered test item;
– Return or store transponders or test items;
– Inform supplier in advance about planned absence (vacation);
– Inform supplier after an unexpected absence / failure to check mail delivery;
– Communicate (internet, SMS, telephone) with supplier for checks, follow- ups etc. as agreed.

#### 7.5.1 Electronic substitute for capturing the date of delivery

The use of technological solutions to capture the date of delivery is permitted where the integrity of the panellist is not compromised. For countries where post clients receive notification via phone (e.g. SMS) when their mail is ready for collection at the post office counter, the date of notification shall be considered as the date of delivery.

[5] Because the Internet has shown to be an effective tool for mail measurements, panellists with regular Internet access are given preference. However, other electronic communication methods, such as SMS, may also be used.

If there is a risk of identifying the panellist using the technological solution for capturing the date of delivery, action must be taken, and demonstrated as such, to hide or disguise the panellist's identity.

*7.6 Panel maintenance*

In addition to a panellist's initial training, the contractor should take the following steps to ensure the consistent performance of panellists:

– continuous standardized assessment of panellists' performance including validation of receipt date and analysis of the reliability of the panellist;

– standardized retraining of panellists failing to comply with instructions;

– standardized rules and procedures when a panellist is no longer part of the measurement;

– rewards and incentive programmes.

An analysis of panellists' recording deficiencies and their causes should be carried out and should include an evaluation of ways to improve the training programme.

The effectiveness of the training programme should be audited (see chapter on **Auditing**).

## 8 Test mail characteristics and production of test letters

*8.1 Characteristics of test mail*

The following characteristics apply to GMS test mail:

– single-piece airmail/priority first-class mail;
– typewritten or machine-typed addresses (address labels, printed addresses);
– single addressing format (conforming to UPU international address standard S42–1);
– with postage stamps or meter franking;
– white envelopes without window;
– with RFID transponder.
– Test mail formats as defined in Table 8.1 and 8.2 below;

8.1.1 Basic characteristics of test mail (mandatory)

*Table 8.1 Formats definitions of test mail items.*

| | Letter-shaped | Flat-shaped | Small packet |
|---|---|---|---|
| Abbreviation | P (C6) | G (C4) | E (≤C5) |
| Length, minimum–maximum, mm | 140–245 | 245–381 | ≤229 |
| Width, minimum–maximum, mm | 90–165 | 165–305 | ≤162 |
| Thickness, maximum, mm | ≤ 5 | ≤20 | 20 ≤ 30 |
| Weight, maximum, g | 20 | 50 | 100 ≤ 200 |
| Content | Document | Document | Goods |
| Proportion | 80% | 20% | 0% |

“C4” items are included in the “Flat-shaped” or “G” item format, provided that the thickness criterion is met. “C6” items are classified as “Letter-shaped” or “P” items, provided that the thickness criterion is met.

8.1.2 Basic characteristics of test mail including small packet (E-format) option as a boost

*Table 8.2 Formats definitions of test mail items including small packet (E-format) option as a boost.*

| | Letter-shaped | Flat-shaped | Small packet |
|---|---|---|---|
| Abbreviation | P (C6) | G (C4) | E (≤C5) |
| Length, minimum–maximum, mm | 140–245 | 245–381 | ≤229 |
| Width, minimum–maximum, mm | 90–165 | 165–305 | ≤162 |
| Thickness, maximum, mm | ≤ 5 | ≤20 | 20 ≤ 30 |
| Weight, maximum, g | 20 | 50 | 100 ≤ 200 |
| Content | Document | Document | Goods |
| Proportion | 75% | 15% | 10% |

The “small packet” or “E” format is an envelope size up to “C5” containing goods, e.g. a small sized USB stick, a USB cable, etc. The item is classified as a “small packet” or “E” item, provided that the thickness and weight ranges criterion are met.

A key feature of the test mail is the addressing used. Several options are available to satisfy the requirement for addresses to be "typewritten" or "machine-typed" (address label, printed).

For the sake of controllability and uniformity, the use of a single addressing method is preferred. This would also help to avoid a situation in which DOs tailor the particular addressing method to their operational capabilities, therefore measuring a "best-case" scenario rather than a real one.

### 8.1.3 Characteristics of mail receipt points

The following requirements for mail receipt points are to be complied with:

- As a rule, addressing and mail receipt points used by a DO should comply with the norm for that DO, i.e. delivered to a post office box/bag or residential address or by some other means;
- Where a post office box is used as a receipt point, the latest mail sorting completion times (i.e. when all mail for the day is guaranteed to have been sorted to the particular box location) should be obtained from the DO. This published information should be communicated to panellists so that they know when to collect mail. These times should be those for all mail collection boxes in towns where the panellists are located in order not to compromise or reveal the specific post office box location (an hour or so may be added to the published times as a buffer for the receiver panellist's benefit);
- Receiver panellists should, as a rule, be found to enable the "common" mail delivery conditions in the territory covered by a particular DO to continue to exist. To that end, the preferred receipt method shall not be to use a concierge service or have mail received by proxies, but where this is unavoidable or is the "norm" in a particular country;
- In general, the addresses of panellists should be fixed locations and accessible by anyone delivering the mail; in other words, there should be no peculiarities known only to the "regular" postal delivery staff;
- Addresses at locations such as holiday resorts and sub-divided private residences that share a mail receptacle should be excluded;

The particular point of delivery/receipt of the mail should not be exposed to the elements;

### 8.1.4 Priority mail sticker

UPU regulations do not require a priority indicator (sticker or stamp) for determining the service level on the inbound side, since all letter items received by the inbound DO have to be forwarded by the domestic priority service or, in the absence of such a service, by the most rapid means used for mails as stipulated in the UPU Regulations.

The application of a priority indicator is not required by the study design and should be done only in countries where such indicators are widely used (on more than 50% of all outbound letter mail) or as requested by the study contractor.

Since the treatment of mail may differ considerably in countries that also offer a non-priority domestic service, the standard application of a priority indicator could influence the speed of treatment and therefore bias the study. Consequently, no inbound DO may request the application of such indicators for test items destined to it.

Instead, the indicator's main purpose is to ensure a controlled process that complies with the pattern expected in the receipt of test items by the destination DO. Since a timely allocation of test items in the receiving DO is desirable, the transit time for the outbound segment needs to be as predictable as possible. This means ensuring that items do not accidentally travel by sea or through a second-class mail stream in the country of origin.

## *8.2 Production of test letters*

The test letter production process needs to ensure that all items within the study meet the requirements of the GMS design and are available at the right time and place and in the proper condition to be sent according to the allocation plan.

The contractor may consider having the test letters produced centrally or regionally. Dispatches prior to the test should aim to provide the testers with the test materials in the fastest, least costly manner. While the letters being tested should always be sent via the DO's mail networks during the test, the test materials transmitted before and after the test may be sent through a non-DO network (e.g. bundles of test envelopes can be sent to droppers by courier).

The mail production process must ensure maximum cost-efficiency and test items must fully comply with letter mail criteria (correct stamp value, legible addressing, etc.). Any irregularity in this regard could lead to problems that can seriously affect the study's integrity.

It is crucial to avoid the following irregularities:

– test mail or transponders that are unavailable on day of posting;

– addressing that does not comply with the agreed standard (address illegible, crooked, etc.);

– application of insufficient stamp or meter value or postage not corresponding to the test mail specification (e.g. the correct Postage to be Paid);

– additional indicators on envelope that do not comply with standard;

– any visible mark reveals that the item is a test letter;

### 8.2.1 Options for the production of test letters

In principle, the following solutions, either separately or together, can be considered a way to avoid the above irregularities:

– test letters prepared by the droppers themselves;

– test letters prepared centrally or regionally and sent to droppers.

With the first solution, droppers would be required to print out the prepared test mail documents (PDF files), fold them in strict accordance with the instructions, and insert them into envelopes. Particular attention should be given to ensuring that the address is legible, the correct postage is affixed and the transponder is properly inserted.

This approach involves a risk (droppers not following instructions), though it has the advantage of cost-efficiency, speed and flexibility. In particular, it is beneficial to allow the opportunity for the contractor to react to any irregularities (e.g. unreliable receiver panellist, late holiday notice by receiver panellist, etc.) and avoid the production of invalid test letters. They will become invalid even before being sent or received. Instead, the contractor would be able to react to any irregularity of this kind up to the day before the planned dispatch date by triggering a re-run of the allocation programme and updating the PDF file provided. In addition, a process for the necessary functional test of transponders would need to be developed to avoid having test letters without operating transponders.

The centralized production of test letters allows much better control over the suitability of the items.

However, owing to the production process itself and the time it takes for the droppers to receive the test items (including a reasonable buffer for possible delays), a lead time of about two to five weeks, depending on the region, may be needed. Any change involving the sender or receiver during this period would ultimately result in invalid items and, consequently, a bias in the study, since scheduled items would not be sent or delivered as planned.

The regional production of test letters would spread production to different regions and thus shorten the necessary lead times considerably, but the same difficulties with costs and flexibility would persist.

The centralized or regional production of test items will tend to be more costly since, in most countries, private droppers will produce the items themselves (i.e. no overall costs and lower expectations on payments); shipping costs will also be lower (few shipments of transponders and envelopes compared with bi-weekly shipments of test mail batches).

The likely solution is to combine professional droppers (small businesses or specialized shops) and private droppers who will be responsible for producing the test items; this seems to provide the best compromise in terms of control, cost-effectiveness and flexibility.

*8.3 Provision of stamps*

The timely and sufficient availability of stamps is crucially important in the letter production process. Although a reliable supply should be ensured at all times, experience has shown that this might be difficult to achieve owing to a number of obstacles.

Stamps are legal tender in many countries and are always at risk of being stolen. The risk for theft is not limited to the postal chain, but also exists at the dropper's end since, in some countries, the amount of stamps involved could represent a sizeable value. The dispatch of all stamps by registered mail or by courier may be required, thus increasing the overall GMS cost.

In many countries, customs authorities treat postage as they do cash and this could lead to delays, a complex follow-up process and additional payments. Moreover, some postal DOs do not allow the exportation of stamps to other countries.

Another consideration is the reimbursement of droppers who purchase stamps. Where droppers are responsible for producing and posting a large amount of test letters, this concern will be less problematic since the value involved justifies setting up a proper money transfer system. In many countries, however, droppers will need to send only a small number items and, in many cases, for a shorter period of time. These droppers will be reluctant to purchase the stamps and then be reimbursed afterwards, preferring to receive the funds first before making the purchase. However, there is the risk that droppers might not buy the stamps or that the solution may prove unreliable during the process after money has already been transferred.

In view of the above, the following approach may be considered the most appropriate:

- Each DO participating in the GMS has to provide the required number of stamps to either the contractor or to an address made known to the DO by the contractor (e.g. the address of the dropper panellist in the DOs country);
- The DO would be responsible for ensuring that the correct value and denominations of stamps arrive on time at the address provided and would inform the contractor before any change of tariffs;
- Since the provision of stamps could give rise to a situation where some countries would have to provide an amount of stamps which, in many cases, would exceed the number of test letters that the DO receives from other countries, a mechanism would be needed that takes these imbalances into account;
- For the sake of transparency and simplicity, these imbalances could be compensated centrally (e.g. by deducting or adding the variances from or to each DOs annual GMS contribution);
- DO-specific boosts could be treated in a separate process in order to ensure a transparent allocation of costs between all Dos;
- As the sending DO bears all related costs pertaining to the sorting and transport of test mail and related terminal dues payments, it seems justified to use the full stamp value as the basis for calculation;

*8.4 Management of transponders*

As regards the use of RFID transponders in the GMS, a number of issues need to be considered to ensure their timely availability, limited loss rates and cost efficiency.

Transponders shall be given a unique identity number. There should be a process to ensure the transponder can be read as planned and has sufficient battery power where necessary.

The receipt of the transponders by droppers might be delayed because they are being held in Customs or by security authorities. A consistent follow-up process should be implemented to ensure that the transponders are made available to droppers on time, since any delay could result in the delayed posting of test letters. Such a process would probably require the enclosure of explanatory letters from the UPU International Bureau intended for Customs and security officials, as well as the creation of a central information website providing official agencies with information on transponders, their use and technical specifications. Other concerns to be addressed involve possible theft and the extensive or unstable (and thus unpredictable) transmission times for mail between countries.

The receiver panellists should return all transponders that are not single use either to a central or regional hub for redistribution to the droppers or directly to the droppers themselves. The reuse process should allow such transponders to be used at least four separate test mail items a year. Apart from other questions, such as compensation for any postage purchased, the same issues as above apply.

In order to optimize and simplify logistical aspects, allowing large courier service providers to tender for a global transport contract could be considered. This would make it possible to manage the entire shipment and Customs clearance process. Another advantage would be the need for fewer transponders since turnover times would be faster and the need for buffers minimized. In view of the size of the contract and the possible image enhancement for the forwarder, a competitive price could be negotiated for this service. Since courier service providers tend to provide global end-to-end track and trace capability, the measurement tools (transponders and test materials) need not be dependent on the process that is being measured, thereby reducing the risk of having the process adversely affect and compromise the measurement.

To ensure the full functionality of the transponders, a continuous testing procedure needs to be developed, making it possible to detect malfunctioning transponders (damaged or with weak or dead batteries) in order to avoid invalid transponder data.

The GMS contractor should be asked to maintain an inventory management system that provides detailed information on the whereabouts of every transponder to manage panellist's use of transponders and minimise the loss of transponders.

*8.5 Archiving test letters*

The central archiving of test letters for validation purposes requires substantial resources and increases the complexity and costs of the GMS considerably. It is proposed to refrain from archiving since only machine-typed addresses will be used. The scope for address revision is therefore very limited since most concerns relate to handwritten addresses.

All receiver panellists should be asked to keep all test letters for a specified period (eight weeks, for example) so that anyone could be sent, either physically or electronically, as a scanned image or photograph, if required for a detailed review.

It may also be possible for the receiving panellist to provide a scanned image or digital photograph of the front and back of the test item, together with the other data.

For the sake of reliability, all receiver panellists should always be asked by the data entry system to confirm that the address was fully legible and conformed to the rules, so that delays caused by addressing irregularities can be avoided. This would enable the contractor to resolve problems before they affect the measurement and also possibly reduce the number of disputes and detailed reviews.

## 9 Collection of data

The set-up and operation of the GMS requires a certain level of information to be gathered in an effective and reliable manner. This information will come from various sources and requires structured processes and confidentiality agreements that are efficient and trustworthy.

A number of DOs use data from measurement systems for improving general quality of service and operations. It is therefore important that the data formats and reporting rules do not prevent DOs from using GMS data for their own operational improvements, subject to limitations, so that system integrity is not compromised.

### *9.1 Information required*

The management and statistical design of the GMS require up-to-date information for each participating DO. DOs are responsible for communicating these data to the system manager in a timely manner to ensure that procedures are applied properly and that the system results are reported correctly.

The most important data are:

- total volume (in Kilogrammes or tonnes or number of items) of inbound mail from all UPU member states and territories. The data provided should be from the most recent full year available, but not older than 5 years;
- list of cities in descending order of volume of inbound mail (or human population/number of inhabitants as appropriate) in to the cities;
- postal tariffs for international mail for the formats according to Chapter 8;
- domestic service standards;
- non-working days (weekends and public holidays);
- non-delivery days (weekends and public holidays);
- critical tag times (CTTs).

All information should be gathered as part of a standardized annual process designed to support the efforts of the DOs. Any changes to holidays or tariffs planned should be collected at least quarterly.

It would be helpful to have a standardized format for providing data, preferably electronic where possible. It is the DOs responsibility to provide this information, failing which default standards will be used.

## 10 Calculation of inbound performance results

The calculation of inbound performance results follows specified rules and consists of three components:

– actual delivery time of each inbound item;

– on-time delivery standard for each inbound item;

– percentage of on-time inbound deliveries;

### *10.1 Non-working days*

There are different types of non-working days (NWDs):

– public holidays, which are published official national or regional holidays; to apply, national holidays must cover more than 50% of the cities measured by the GMS; regional holidays must cover 100% of the defined city area;

– days when the airmail unit (AMU), office of exchange (OE) or domestic sorting centre is not operating (one or two days during weekend);

– standard set days during the week when the DO makes no deliveries.

Non-working days must be notified in advance by the date specified for the closing of data collection in the previous year (see Chapter 9).

### *10.2 Concept of critical tag time (CTT)*

The critical tag time is the latest planned time at which a test item can be registered by the RFID-equipment at the handover point in the destination country in order to be processed for the next possible scheduled delivery. The following examples of how the CTT works may help to understand the concept.

The following table lists a regime that applies to a delivery period spanning Monday to Friday and a domestic service standard of K + 1 (i.e. next-day delivery):

*Table 10.1 Sample list of CTTs throughout the week*

| *Arrival of test item From* | *To* | *CTT* | *Delivery standard* |
|---|---|---|---|
| Monday 4.00 p.m. | Tuesday 3.59 p.m. | Tuesday 4.00 p.m. | Wednesday |
| Tuesday 4.00 p.m. | Wednesday 3.59 p.m. | Wednesday 4.00 p.m. | Thursday |
| Wednesday 4.00 p.m. | Thursday 3.59 p.m. | Thursday 4.00 p.m. | Friday |
| Thursday 4.00 p.m. | Friday 3.59 p.m. | Friday 4.00 p.m. | Monday |
| Friday 4.00 p.m. | Monday 3.59 p.m. | Monday 4.00 p.m. | Tuesday |

*Table 10.2 Sample list of registrations and corresponding 4 p.m CTT*

| *No.* | *Recording* | *Next available CTT* |
|---|---|---|
| 1 | Tuesday, 03 December 2019 3:00 PM | Tuesday, 03 December 2019 4:00 PM |
| 2 | Tuesday, 03 December 2019 5:00 PM | Wednesday, 04 December 2019 4:00 PM |
| 3 | Wednesday, 04 December 2019 2:00 PM | Wednesday, 04 December 2019 4:00 PM |
| 4 | Wednesday, 04 December 2019 5:00 PM | Thursday, 05 December 2019 4:00 PM |
| 5 | Thursday, 05 December 2019 4:00 PM | Friday, 06 December 2019 4:00 PM |
| 6 | Thursday, 05 December 2019 4:01 PM | Friday, 06 December 2019 4:00 PM |
| 7 | Friday, 06 December 2019 3:45 PM | Friday, 06 December 2019 4:00 PM |
| 8 | Friday, 06 December 2019 4:45 PM | Monday, 09 December 2019 4:00 PM |
| 9 | Saturday, 07 December 2019 2:45 PM | Monday, 09 December 2019 4:00 PM |
| 10 | Saturday, 07 December 2019 5:45 PM | Monday, 09 December 2019 4:00 PM |
| 11 | Sunday, 08 December 2019 12:45 PM | Monday, 09 December 2019 4:00 PM |
| 12 | Monday, 09 December 2019 5:45 PM | Tuesday, 10 December 2019 4:00 PM |

Example: A test item is registered at 3 p.m. on Tuesday, 03 December 2019 3:00 PM. The next available CTT is 4 p.m. on Tuesday, 03 December 2019 4:00 PM, because the recording took place before 4 p.m. on the same day.

Example: A test item is registered at 5 p.m. on Wednesday, 04 December 2019 at 5:00 PM. The next available CTT is Thursday, 05 December 2019 4:00 PM, because the recording took place after 4 p.m. on Wednesday. A registration at exactly 4:00 PM is considered as after 4:00 PM since time is transient.

*10.3 Date of arrival*

If the arrival of the test item at the DO entry point is recorded before the CTT for that day, the date of arrival is the date of the first registration (recording) at the DO entry point.

If the arrival of the test item at the DO entry point is recorded after the CTT for that day, the date of arrival is the day of the next available CTT after the date of first registration at the DO entry point.

For example, if a test item arrives after the CTT on the day before a public holiday and the public holiday is a non-working day with no CTT, the date of arrival is the day of the next available CTT after the public holiday.

*10.4 Service standards*

Service standards refer to the inward delivery time (in days) of a test letter mail from the date of arrival as defined in section 10.3 above to the final recipient in the country/territory. Service standards vary between countries and sometimes even within countries. Calculation of the test item's delivery time is based on the domestic service standard for the inbound DO or otherwise as approved by POC. The service standard is linked to the postcodes or cities. Domains derive their service standards from the city link.

*10.5 Non-working day adjustment*

According to Section 10.1, the Non-working days are either holidays, non-delivery days or days when neither the office of exchange nor the domestic sorting centres are operating. Generally, they are days when the mail processing and delivery procedure, according to the Domestic service standard, is not fully operational. Therefore, adjustments are required because these days should not be accounted for in the measurement.

The rules for Non-working days adjustments are:

i. All Non-working days between the arrival date and the day of delivery should be excluded;

ii. A non-working day (e.g. public holiday) that also happens to be a non-delivery day is excluded only once, not twice. For example, if the national bank holiday is also a non-delivery day, the difference between the delivery date and the arrival date is reduced by one day, not two.

For the sake of examples of Non-working days adjustments, “Non-working day” will exclude non-delivery days because they are explicitly stated in the examples.

Taking the letter "n" to stand for the number of days between date of arrival and date of delivery adjusted for the critical tag time (CTT), the delivery time is written as K + n.

**Example 1:** Non-working days’ adjustment(s) for five Delivery days in a week (Monday to Friday).

Consider that the unadjusted inbound delivery time for an item is K + 4.

If there is one non-working day after the date of first registration at DO entry, the adjusted delivery time is four days minus one non-working day, or K + 3.

If the Monday immediately after the non-delivery days of Saturday and Sunday is a holiday, the adjusted delivery time is four days minus the holiday minus two non-delivery days, or K + 1.

If there are two holidays that are non-delivery days after the date of first registration at DO entry, the adjusted delivery time is four days minus two non-working days, or K + 2.

**Example 2:** Non-working days’ adjustment(s) for six Delivery days in a week (Monday to Saturday).

The unadjusted inbound delivery time for the item is K + 4.

If there is one non-working day that is not a delivery day after the date of first registration at DO entry, the adjusted delivery time is four days minus one non-working day, or K + 3.

If the Monday immediately after the non-delivery day of Sunday is a holiday, the adjusted delivery time is four days minus one non-working day minus one non-delivery day, or K + 2.

If there are two holidays that are non-delivery days after the date of first registration at DO entry, the adjusted delivery time is four days minus two non-working days, or K + 2.

Other examples of Non-working days adjustments to determine the inbound delivery time are given in tables in the next sections.

*10.6 Rules for calculating inbound delivery time*

The inbound delivery time is calculated as:

- the number of days between the Date of arrival of the item and its delivery:
  - minus the number of Non-working days that are not delivery days after the date of first registration at DO entry;
  - minus the number of non-delivery days after the date of first registration at DO entry.

10.6.1 Calculation for five Delivery days during the week (Monday to Friday)

The tables below are based on a five-day delivery week (Monday to Friday) and a domestic service standard of K + 1. There is no delivery on Saturday and Sunday (although the office of exchange and the domestic sorting centres operate on both days).

The equivalent specification for a six-day delivery model (such as Monday to Saturday) is given in section 10.6.5. If appropriate, it is easy to adjust the tables for other five-day delivery models (e.g. Saturday to Wednesday or Sunday to Thursday).

10.6.2 Standard calculation for five Delivery days during the week (Monday to Friday)

The following table shows the standard calculation without any other non-working day (e.g. holiday) adjustment.

*Table 10.2 Day delivery time from Monday to Friday*

| *Arrival before CTT on Monday* | *Arrival before CTT on Tuesday* | *Arrival before CTT on Wednesday* | *Arrival before CTT on Thursday* | *Arrival before CTT on Friday* | *Delivery day* | *Week* |
|---|---|---|---|---|---|---|
| K + 0 | | | | | Monday | 1 |
| K + 1 | K + 0 | | | | Tuesday | 1 |
| K + 2 | K + 1 | K + 0 | | | Wednesday | 1 |
| K + 3 | K + 2 | K + 1 | K + 0 | | Thursday | 1 |
| K + 4 | K + 3 | K + 2 | K + 1 | K + 0 | Friday | 1 |
| | | | | | Saturday | 1 |
| | | | | | Sunday | 1 |
| K + 5 | K + 4 | K + 3 | K + 2 | K + 1 | Monday | 2 |
| K + 6 | K + 5 | K + 4 | K + 3 | K + 2 | Tuesday | 2 |
| K + 7 | K + 6 | K + 5 | K + 4 | K + 3 | Wednesday | 2 |
| K + 8 | K + 7 | K + 6 | K + 5 | K + 4 | Thursday | 2 |
| K + 9 | K + 8 | K + 7 | K + 6 | K + 5 | Friday | 2 |
| | | | | | Saturday | 2 |
| | | | | | Sunday | 2 |
| K + 10 | K + 9 | K + 8 | K + 7 | K + 6 | Monday | 3 |
| K + 11 | K + 10 | K + 9 | K + 8 | K + 7 | Tuesday | 3 |
| K + 12 | K + 11 | K + 10 | K + 9 | K + 8 | Wednesday | 3 |
| K + 13 | K + 12 | K + 11 | K + 10 | K + 9 | Thursday | 3 |
| K + 14 | K + 13 | K + 12 | K + 11 | K + 10 | Friday | 3 |
| | | | | | Saturday | 3 |
| | | | | | Sunday | 3 |

Note. – indicates a non-delivery day.

In column 1, for example, the inbound delivery time is shown for the situation where the item arrives before the CTT on Monday.

If a test item is delivered on the same day (Monday of week 1), the inbound delivery time is K + 0. If the item is delivered on the next day (Tuesday of week 1), the inbound delivery time is K + 1. The calculation continues in a similar fashion for Wednesday and Thursday of week 1. If the item is delivered on Friday of week 1, the inbound delivery time is K + 4, i.e. four days after the date of arrival.

If the item is delivered a week later, on Monday of week 2, the inbound delivery time is K + 5. The reason for this is that the item could not be delivered on the two previous days (Saturday and Sunday of week 1) because they are non-delivery days. The inbound delivery time is therefore equal to the elapsed time (seven days) minus the two non-delivery days, or K + 5.

The calculations follow a similar pattern down the column *Arrival before CTT on Monday* for the days Monday to Friday in week 3.

A similar sequence is applied to the arrival of items before CTT on Tuesday, Wednesday, Thursday and Friday, to produce the other columns in the table.

Once the day of arrival before CTT is determined, use 10.6 to calculate the inbound delivery time.

10.6.3 One non-working day adjustment for five Delivery days during the week (Monday to Friday)

The example in the table below applies to arrivals before CTT on Monday with a single non-working day. The non-working day is Tuesday in column 1, Wednesday in column 2, Thursday in column 3 and so on until the following Monday.

*Table 10.3 Inbound delivery times for a single non-working day*

| *Arrival before CTT on Monday* | *Arrival before CTT on Monday* | *Arrival before CTT on Monday* | *Arrival before CTT on Monday* | *Arrival before CTT on Monday* | *Delivery day* | *Week* |
|---|---|---|---|---|---|---|
| K + 0 | K +0 | K + 0 | K + 0 | K + 0 | Monday | 1 |
| NWD | K +1 | K + 1 | K + 1 | K + 1 | Tuesday | 1 |
| K + 1 | NWD | K + 2 | K + 2 | K + 2 | Wednesday | 1 |
| K + 2 | K +2 | NWD | K + 3 | K + 3 | Thursday | 1 |
| K +3 | K +3 | K + 3 | NWD | K + 4 | Friday | 1 |
| | | | | | Saturday | 1 |
| | | | | | Sunday | 1 |
| K + 4 | K +4 | K + 4 | K + 4 | NWD | Monday | 2 |
| K + 5 | K + 5 | K + 5 | K + 5 | K + 5 | Tuesday | 2 |
| K + 6 | K + 6 | K + 6 | K + 6 | K + 6 | Wednesday | 2 |
| K + 7 | K + 7 | K + 7 | K + 7 | K + 7 | Thursday | 2 |
| K + 8 | K + 8 | K + 8 | K + 8 | K + 8 | Friday | 2 |
| | | | | | Saturday | 2 |
| | | | | | Sunday | 2 |
| K + 9 | K + 9 | K + 9 | K + 9 | K + 9 | Monday | 3 |
| K + 10 | K + 10 | K + 10 | K + 10 | K + 10 | Tuesday | 3 |
| K + 11 | K + 11 | K + 11 | K + 11 | K + 11 | Wednesday | 3 |
| K + 12 | K + 12 | K + 12 | K + 12 | K + 12 | Thursday | 3 |
| K + 13 | K + 13 | K + 13 | K + 13 | K + 13 | Friday | 3 |

Note. – | | indicates a non-delivery day.
NWD indicates a non-working day (e.g. holiday) that is also a non-delivery day.
NWD indicates a non-working day.

10.6.4 Two or more non-working days adjustment for five Delivery days during the week (Monday to Friday)

The examples in the tables below apply to arrival of the item before CTT on Monday with two or more non-working days. For simplicity, the Monday–Friday period is used. In the two examples shown, the non-working days are Friday and Monday and one entire week.

10.6.4.1 Friday and Monday as non-working days adjustment for five Delivery days during the week (Monday to Friday)

The following table shows the inbound delivery times when Friday in week 1 and Monday in week 2 are additional non-working days.

*Table 10.4 Effect on inbound delivery times of having Friday and Monday as non-working days*

| *Arrival before CTT on Monday* | *Arrival before CTT on Monday* | *Arrival before CTT on Monday* | *Arrival before CTT on Monday* | *Arrival before CTT on Monday* | *Delivery day* | *Week* |
|---|---|---|---|---|---|---|
| K + 0 | | | | No Friday CTT since it is a non-working day and the next day is a non-delivery day | Monday | 1 |
| K + 1 | K + 0 | | | | Tuesday | 1 |
| K + 2 | K + 1 | K + 0 | | | Wednesday | 1 |
| K + 3 | K + 2 | K + 1 | K + 0 | | Thursday | 1 |
| NWD | NWD | NWD | NWD | | Friday | 1 |
| | | | | | Saturday | 1 |
| | | | | | Sunday | 1 |
| NWD | NWD | NWD | NWD | | Monday | 2 |
| K + 4 | K + 3 | K + 2 | K + 1 | | Tuesday | 2 |
| K + 5 | K + 4 | K + 3 | K + 2 | | Wednesday | 2 |
| K + 6 | K + 5 | K + 4 | K + 3 | | Thursday | 2 |
| K + 7 | K + 6 | K + 5 | K + 4 | | Friday | 2 |
| | | | | | Saturday | 2 |
| | | | | | Sunday | 2 |
| K + 8 | K + 7 | K + 6 | K + 5 | | Monday | 3 |
| K + 9 | K + 8 | K + 7 | K + 6 | | Tuesday | 3 |
| K + 10 | K + 9 | K + 8 | K + 7 | | Wednesday | 3 |
| K + 11 | K + 10 | K + 9 | K + 8 | | Thursday | 3 |
| K + 12 | K + 11 | K + 10 | K + 9 | | Friday | 3 |

Note. – | | indicates a non-delivery day.
NWD indicates a non-working day (e.g. holiday) that is also a non-delivery day.
NWD indicates a non-working day.

10.6.4.2 One entire week of non-working days adjustment for five Delivery days during the week (Monday to Friday)

The following table shows the inbound delivery times for an entire week (week 2) that includes an additional five non-delivery days.

*Table 10.5 Effect on inbound delivery times of having Monday to Friday as non-working days*

| *Arrival before CTT on Monday* | *Arrival before CTT on Monday* | *Arrival before CTT on Monday* | *Arrival before CTT on Monday* | *Arrival before CTT on Monday* | *Delivery day* | *Week* |
|---|---|---|---|---|---|---|
| K + 0 | | | | | Monday | 1 |
| K + 1 | K + 0 | | | | Tuesday | 1 |
| K + 2 | K + 1 | K + 0 | | | Wednesday | 1 |
| K + 3 | K + 2 | K + 1 | K + 0 | | Thursday | 1 |
| K + 4 | K + 3 | K + 2 | K + 1 | K + 0 | Friday | 1 |
| | | | | | Saturday | 1 |
| | | | | | Sunday | 1 |
| NWD | NWD | NWD | NWD | NWD | Monday | 2 |
| NWD | NWD | NWD | NWD | NWD | Tuesday | 2 |
| NWD | NWD | NWD | NWD | NWD | Wednesday | 2 |
| NWD | NWD | NWD | NWD | NWD | Thursday | 2 |
| NWD | NWD | NWD | NWD | NWD | Friday | 2 |
| | | | | | Saturday | 2 |
| | | | | | Sunday | 2 |
| K + 5 | K + 4 | K + 3 | K + 2 | K + 1 | Monday | 3 |
| K + 6 | K + 5 | K + 4 | K + 3 | K + 2 | Tuesday | 3 |
| K + 7 | K + 6 | K + 5 | K + 4 | K + 3 | Wednesday | 3 |
| K + 8 | K + 7 | K + 6 | K + 5 | K + 4 | Thursday | 3 |
| K + 9 | K + 8 | K + 7 | K + 6 | K + 5 | Thursday | 3 |
| K + 10 | K + 9 | K + 8 | K + 7 | K + 6 | Friday | 3 |
| | | | | | Saturday | 3 |
| | | | | | Sunday | 3 |

Note. – | | indicates a non-delivery day.
NWD indicates a non-working day (e.g. holiday) that is also a non-delivery day.
NWD indicates a non-working day.

10.6.5 Calculation for six Delivery days during the week (Monday to Saturday)

Consider the situation where mail is delivered from Monday to Saturday.

The standard calculation is shown first, followed by some adjustments for non-working days other than days with no delivery.

It is straightforward to change the tables for other six-day delivery models such as Sunday to Thursday delivery patterns if appropriate. Monday becomes Sunday, Tuesday becomes Monday, etc.

10.6.6 Standard calculation for six Delivery days during the week (Monday to Saturday)

The following table shows how to calculate inbound delivery times where there are no intervening non-working days and no delivery on Sunday.

*Table 10.6 Six-day delivery period (Monday to Saturday)*

| *Arrival before CTT on Monday* | *Arrival before CTT on Tuesday* | *Arrival before CTT on Wednesday* | *Arrival before CTT on Thursday* | *Arrival before CTT on Friday* | *Arrival before CTT on Saturday* | *Delivery day* | *Week* |
|---|---|---|---|---|---|---|---|
| K + 0 | | | | | | Monday | 1 |
| K + 1 | K + 0 | | | | | Tuesday | 1 |
| K + 2 | K + 1 | K + 0 | | | | Wednesday | 1 |
| K + 3 | K + 2 | K + 1 | K + 0 | | | Thursday | 1 |
| K + 4 | K + 3 | K + 2 | K + 1 | K + 0 | | Friday | 1 |
| K + 5 | K + 4 | K + 3 | K + 2 | K + 1 | K + 0 | Saturday | 1 |
| | | | | | | Sunday | 1 |
| K + 6 | K + 5 | K + 4 | K + 3 | K + 2 | K + 1 | Monday | 2 |
| K + 7 | K + 6 | K + 5 | K + 4 | K + 3 | K + 2 | Tuesday | 2 |
| K + 8 | K + 7 | K + 6 | K + 5 | K + 4 | K + 3 | Wednesday | 2 |
| K + 9 | K + 8 | K + 7 | K + 6 | K + 5 | K + 4 | Thursday | 2 |
| K + 10 | K + 9 | K + 8 | K + 7 | K + 6 | K + 5 | Friday | 2 |
| K + 11 | K + 10 | K + 9 | K + 8 | K + 7 | K + 6 | Saturday | 2 |
| | | | | | | Sunday | 2 |
| K + 12 | K + 11 | K + 10 | K + 9 | K + 8 | K + 7 | Monday | 3 |
| K + 13 | K + 12 | K + 11 | K + 10 | K + 9 | K + 8 | Tuesday | 3 |
| K + 14 | K + 13 | K + 12 | K + 11 | K + 10 | K + 9 | Wednesday | 3 |
| K + 15 | K + 14 | K + 13 | K + 12 | K + 11 | K + 10 | Thursday | 3 |
| K + 16 | K + 15 | K + 14 | K + 13 | K + 12 | K + 11 | Friday | 3 |
| K + 17 | K + 16 | K + 15 | K + 14 | K + 13 | K + 12 | Saturday | 3 |

Note. – [ ] indicates a non-delivery day

In column 1, for example, the inbound delivery time is shown for the situation where the item arrives before the CTT on Monday.

If a test item is delivered on the same day (Monday of week 1), the inbound delivery time is K + 0. If the item is delivered on the next day (Tuesday of week 1), the inbound delivery time is K + 1. The calculation continues in a similar fashion for Wednesday, Thursday and Friday of week 1. If the item is delivered on Saturday of week 1, the inbound delivery time is K + 5, i.e. five days after the date of arrival.

If the item is delivered a week later, on Monday of week 2, the inbound delivery time is K + 6. The reason for this is that the item could not be delivered on the previous day (Sunday of week 1). The inbound delivery time is therefore equal to the elapsed time (seven days) minus the one non-delivery day, or K + 6.

The calculations follow a similar pattern down the column *Arrival before CTT on Monday* for the days Monday to Saturday in week 3.

A similar sequence is applied to the arrival of items before CTT on Tuesday, Wednesday, Thursday, Friday and Saturday, to produce the other columns in the table.

Once the day of arrival before CTT day is determined, use 10.6 to calculate the inbound delivery time.

10.6.7 One non-working day for six-day delivery days during the week (Monday to Saturday)

The example in the table below applies to arrivals before CTT on Monday with a single non-working day. The non-working day is Tuesday in column 1, Wednesday I column 2, Thursday in column 3 and so on until the following Monday.

*Table 10.7 Inbound delivery times for a single non-working day with six-day delivery from Monday to Saturday*

| *Arrival before CTT on Monday* | *Arrival before CTT on Monday* | *Arrival before CTT on Monday* | *Arrival before CTT on Monday* | *Arrival before CTT on Monday* | *Arrival before CTT on Monday* | *Delivery day* | *Week* |
|---|---|---|---|---|---|---|---|
| K + 0 | K + 0 | K + 0 | K + 0 | K + 0 | K + 0 | Monday | 1 |
| NWD | K + 1 | K + 1 | K + 1 | K + 1 | K + 1 | Tuesday | 1 |
| K + 1 | NWD | K + 2 | K + 2 | K + 2 | K + 2 | Wednesday | 1 |
| K + 2 | K + 2 | NWD | K + 3 | K + 3 | K + 3 | Thursday | 1 |
| K + 3 | K + 3 | K + 3 | NWD | K + 4 | K + 4 | Friday | 1 |
| K + 4 | K + 4 | K + 4 | K + 4 | NWD | K + 5 | Saturday | 1 |
| | | | | | | Sunday | 1 |
| K + 5 | K + 5 | K + 5 | K + 5 | K + 5 | NWD | Monday | 2 |
| K + 6 | K + 6 | K + 6 | K + 6 | K + 6 | K + 6 | Tuesday | 2 |
| K + 7 | K + 7 | K + 7 | K + 7 | K + 7 | K + 7 | Wednesday | 2 |
| K + 8 | K + 8 | K + 8 | K + 8 | K + 8 | K + 8 | Thursday | 2 |
| K + 9 | K + 9 | K + 9 | K + 9 | K + 9 | K + 9 | Friday | 2 |
| K + 10 | K + 10 | K + 10 | K + 10 | K + 10 | K + 10 | Saturday | 2 |
| | | | | | | Sunday | 2 |
| K + 11 | K + 11 | K + 11 | K + 11 | K + 11 | K + 11 | Monday | 3 |
| K + 12 | K + 12 | K + 12 | K + 12 | K + 12 | K + 12 | Tuesday | 3 |
| K + 13 | K + 13 | K + 13 | K + 13 | K + 13 | K + 13 | Wednesday | 3 |
| K + 14 | K + 14 | K + 14 | K + 14 | K + 14 | K + 14 | Thursday | 3 |
| K + 15 | K + 15 | K + 15 | K + 15 | K + 15 | K + 15 | Friday | 3 |
| K + 16 | K + 16 | K + 16 | K + 16 | K + 16 | K + 16 | Saturday | 3 |

Note. – | | indicates a non-delivery day.
| NWD | indicates a non-working day (e.g. holiday) that is also a non-delivery day.
| NWD | indicates a non-working day.

10.6.8 Two or more non-working days for six-day delivery days during the week (Monday to Saturday)

The examples in the tables below apply to arrival of the item before CTT on Monday with two or more non-working days. For simplicity, the Monday to Saturday period is used. In the two examples shown, the non-working days are Friday and Monday and one entire week.

10.6.8.1 Friday and Monday as non-working days for six-day delivery days during the week (Monday to Saturday)

The following table shows the inbound delivery time when Friday in week 1 and Monday in week 2 are additional non-working days.

*Table 10.8 Effect of Friday and Monday non-working days on inbound delivery time for six-day delivery from Monday to Saturday*

| *Arrival before CTT on Monday* | *Arrival before CTT on Tuesday* | *Arrival before CTT on Wednesday* | *Arrival before CTT on Thursday* | *Arrival before CTT on Saturday* | *Delivery day* | *Week* |
|---|---|---|---|---|---|---|
| K + 0 | | | | | Monday | 1 |
| K + 1 | K + 0 | | | | Tuesday | 1 |
| K + 2 | K + 1 | K +0 | | | Wednesday | 1 |
| K + 3 | K + 2 | K + 1 | K + 0 | | Thursday | 1 |
| NWD | NWD | NWD | NWD | NWD | Friday | 1 |
| K + 4 | K + 3 | K + 2 | K + 1 | K + 0 | Saturday | 1 |
| | | | | | Sunday | 1 |
| NWD | NWD | NWD | NWD | NWD | Monday | 2 |
| K + 5 | K + 4 | K + 3 | K + 2 | K + 1 | Tuesday | 2 |
| K + 6 | K + 5 | K + 4 | K + 3 | K + 2 | Wednesday | 2 |
| K + 7 | K + 6 | K + 5 | K + 4 | K + 3 | Thursday | 2 |
| K + 8 | K + 7 | K + 6 | K + 5 | K + 4 | Friday | 2 |
| K + 9 | K + 8 | K + 7 | K + 6 | K + 5 | Saturday | 2 |
| | | | | | Sunday | 2 |
| K + 10 | K + 9 | K + 8 | K + 7 | K + 6 | Monday | 3 |
| K + 11 | K + 10 | K + 9 | K + 8 | K + 7 | Tuesday | 3 |
| K + 12 | K + 11 | K + 10 | K + 9 | K + 8 | Wednesday | 3 |
| K + 13 | K + 12 | K + 11 | K + 10 | K + 9 | Thursday | 3 |
| K + 14 | K + 13 | K + 12 | K + 11 | K + 10 | Friday | 3 |
| K + 15 | K + 14 | K + 13 | K + 12 | K + 11 | Saturday | 3 |

Note. – | | indicates a non-delivery day.
NWD indicates a non-working day (e.g. holiday) that is also a non-delivery day.
NWD indicates a non-working day.

10.6.8.2 A full week of non-working days for six-day delivery days during the week (Monday to Saturday)

The following table shows the inbound delivery time when a full week (week 2) includes an extra six non-delivery days.

*Table 10.9 Effect of Monday to Saturday non-working days on inbound delivery time for six-day delivery from Monday to Saturday*

| *Arrival before CTT on Monday* | *Arrival before CTT on Tuesday* | *Arrival before CTT on Wednesday* | *Arrival before CTT on Thursday* | *Arrival before CTT on Friday* | *Arrival before CTT on Saturday* | *Delivery day* | *Week* |
|---|---|---|---|---|---|---|---|
| K + 0 | | | | | | Monday | 1 |
| K + 1 | K + 0 | | | | | Tuesday | 1 |
| K + 2 | K + 1 | K + 0 | | | | Wednesday | 1 |
| K + 3 | K + 2 | K + 1 | K + 0 | | | Thursday | 1 |
| K + 4 | K + 3 | K + 2 | K + 1 | K + 0 | | Friday | 1 |
| K + 5 | K + 4 | K + 3 | K + 2 | K + 1 | K + 0 | Saturday | 1 |
| | | | | | | Sunday | 1 |
| NWD | NWD | NWD | NWD | NWD | NWD | Monday | 2 |
| NWD | NWD | NWD | NWD | NWD | NWD | Tuesday | 2 |
| NWD | NWD | NWD | NWD | NWD | NWD | Wednesday | 2 |
| NWD | NWD | NWD | NWD | NWD | NWD | Thursday | 2 |
| NWD | NWD | NWD | NWD | NWD | NWD | Friday | 2 |
| NWD | NWD | NWD | NWD | NWD | NWD | Saturday | 2 |
| | | | | | | Sunday | 2 |
| K + 6 | K + 5 | K + 4 | K + 3 | K + 2 | K + 1 | Monday | 3 |
| K + 7 | K + 6 | K + 5 | K + 4 | K + 3 | K + 2 | Tuesday | 3 |
| K + 8 | K + 7 | K + 6 | K + 5 | K + 4 | K + 3 | Wednesday | 3 |
| K + 9 | K + 8 | K + 7 | K + 6 | K + 5 | K + 4 | Thursday | 3 |
| K + 10 | K + 9 | K + 8 | K + 7 | K + 6 | K + 5 | Friday | 3 |
| K + 11 | K + 10 | K + 9 | K + 8 | K + 7 | K + 6 | Saturday | 3 |

Note. – | | indicates a non-delivery day.
| NWD | indicates a non-working day (e.g. holiday) that is also a non-delivery day.
| NWD | indicates a non-working day.

*10.7 Calculation of on-time inbound delivery*

Calculation of on-time inbound delivery is based on:

– the inbound delivery time;

– the appropriate domestic service standard.

Calculation of the inbound delivery time is described in the previous section. For each item, this time is compared against the service standard to determine whether delivery was on time.

For example, a test item with an inbound delivery time of K + 2 is to be delivered to an address near the office of exchange. If the local domestic service standard is K + 1, then the on-time delivery was unsuccessful because K + 2 exceeds the K + 1 service standard. Unsuccessful on-time delivery is usually denoted by "0".

Suppose the same item is to be delivered to an address in a remote region with a K + 2 service standard. In this case, the on-time inbound delivery was successful because K + 2 matches the K + 2 service standard. Successful on-time delivery is usually denoted by "1".

*10.8 Calculating the percentage of on-time inbound deliveries*

The percentage of on-time inbound deliveries is a weighted average on-time percentage. It has three levels of weighting in the following order with format first, then city, and finally flow. It is a weighted combination of simple performance on-time (POT) at the format, city (optional, see below) and flow levels.

***Format weight***: apply weights of measured formats as described in chapter 8 with the specific options chosen by the DO. Format weight is applied for the format with at least one valid test item.

***City weight***: As default, the city weight is not applied. For cases where city weight is applied, it is applied conditionally for each measured flow-city if the specific flow-city valid on target (VOT) or valid mail rate (VMR) falls below an agreed threshold.

***Flow weight***: A flow is either a permanent link or pool 1 or pool 2. The weights of pool 1, pool 2 and each permanent link is applied for the flows with at least one valid test item.

The simple performance on-time figure is the ratio of the number of on-time test valid mail items compared with the total number of valid test mail items. For example, suppose that a particular format-flow-city has 90 on-time items out of 100 valid mail test items, the simple performance on-time is 90%, that is 90 divided by 100.

10.8.1 Re-weighting in the case of design asymmetry during the measurement period

The format-city-flow weight design parameters (section 4) used for test item allocation and/or boosting process(es) (sections 4-6) are also applied when calculating the final POT. This is to mitigate any disparity in the POT that may be introduced by reduced number of items for the format-city-flow combination. This self-correction mechanism works well for small deviations from the expected output while maintaining the same weight combinations used for allocation. Design asymmetry arises when the expected number of valid test items is not attained, for example due to force majeure circumstances where a city or one or more inbound links stop to be measured during the measurement year. For such large asymmetry in the expected output of format-city-flow item combination, it requires re-calculation of the weights (i.e. re-weighting) for use in the POT evaluation.

Where the format-city-flow combination has no samples, the figures are suitably adjusted to avoid bias to give preference to the flow. The DO gets its full weighting.

10.8.1.1 City re-weighting in case of design asymmetry during the measurement period

In case a city can no longer be measured during the measurement year, city weights are re-calculated as explained in section 5.7.1 ("Redistribution of samples to cities") and applied, taking into consideration:

– pro-rata number of days per reporting period that the city was measured;

– pro-rata city weights per reporting period.

10.8.1.2 Flow re-weighting in case of design asymmetry during the measurement period

10.8.1.2.1 Discontinued Flow(s) during measurement year

In case one or more flows can no longer be measured during the measurement year, Flow weights are re-calculated as explained in section 5.7.2 ("Redistribution of samples to inbound links") and applied, taking into consideration:

– pro-rata number of days per reporting period that the flow was measured;

– pro-rata flow weights per reporting period.

10.8.1.2.2 Flow(s) with reduced number of valid test items during measurement year

The weight adjustment principle for the flow is conditional, as follows:

– If the VOT (adjusted for any boosting) for a flow link is greater than or equal to 85%, the original weight is used as the new weight to avoid unnecessary variations in POT calculations. That is, no re-weighting is applied.

– If the VOT (adjusted for any boosting) for a flow link is below 85%, a new weight is calculated from its actual VOT using the following formula: new weight = original weight x actual VOT.

– The final flow weights are a normalized value of all new weights.

10.8.1.3 AMU/OE re-weighting in case of design asymmetry during the measurement period

The calculation of the end-of-year POT as described above is based on a complete calendar year's (12 months) measurement with non-variant mail entry points (AMU/OE). It is necessary, however, with the introduction of a new AMU/OE or the discontinuation of an existing one during the year, the quality performance result should be adjusted to correctly reflect the changes of the handover point(s) in order to avoid a possible disproportionate impact due to extrapolation of a potentially small sample size over the entire measurement period. Therefore, an additional scaling (prorata) factor, namely $ProrataW_t$, linked to the discontinued or a new AMU/OE operational period, would be required to correct the bias. Should that be the case, the following is to be applied to the test items that were registered at the new or discontinued AMU/OE during the during the measurement period;

- assign period *t1* =1 to represent the ratio for the entire measurement period. This ratio is assigned to each item with first inbound registration at an AMU/OE that was in use for the entire measurement period.
- calculate period *t2* to represent the ratio of the number of days the new or discontinued AMU/OE was in use during the measurement period. This ratio is assigned to each item with first inbound registration at the new or discontinued AMU/OE. If more AMU/OE's were introduced (i.e. new) or discontinued, each will have a separate period *t3, t4, ….., tn.*
- add periods *t1, t2, t3, t4, ….., tn.*
- calculate the relative weights $ProrataW_1$, $ProrataW_2$, $ProrataW_3$, $ProrataW_4$, ….., $ProrataW_n$, for each period *t1, t2, t3, t4, ….., tn* respectively.
- apply the $ProrataW_t$ at the flow-to-city POT level as detailed in **Annex C**.

For the case where $t2 = 1$, the prorata scaling factor is irrelevant to the flow-to-city POT adjustment. All re-weighting procedures form part of the standard POT calculation process for any reporting period. The full formula is contained in **Annex C**.

## 11 Reporting

The results reported represent the output of the entire measurement study. The reports provide the quality measurement results and are used in calculating the terminal dues quality link.

A number of monthly electronic reports will be issued. The summary report is to be sent to all participating DOs, while the other, much more detailed reports are intended only for individual DOs and the relevant UPU bodies.

There will be specific dates for the dispatch of these reports (both the monthly reports and the final year-end report) to the participating DOs.

Each DO will be given the performance results for each of its permanent links (inbound and outbound). Only the inbound DO will be able to view the pool total results.

### *11.1 GMS monthly summary report: intended for all participating DOs*

Each month, all participating DOs will receive a GMS summary report, containing the monthly and year-to-date (YTD) aggregate results for each DO. The report will contain only the **totals** of these results for each DO (based on the results from permanent links and Pools 1 and 2).

The report, which is made available to all participating DOs, will contain the weighted monthly results and the year-to-date aggregate results of each participating DO's inbound quality performance.

*Table 11.1 Example of a GMS summary report*

| Receiving DO | Target % | **YTD on-time** % | Precision % | Jan % | Feb % | Mar % | Apr % | May % | Jun % | Jul % | Aug % | Sep % | Oct % | Nov % | Dec % |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DO 1 | X | **89** | ± 3,0 | 87 | 91 | 90 | 88 | | | | | | | | |
| DO 2 | X | **87** | ± 3,5 | 86 | 88 | 89 | 85 | | | | | | | | |
| DO 3 | X | **89** | ± 3,0 | 87 | 91 | 90 | 88 | | | | | | | | |
| DO 4 | X | **87** | ± 3,5 | 86 | 88 | 89 | 85 | | | | | | | | |

The results in the report remain preliminary until an agreed date after completion of the year. The reason for this is that a monthly result may still need to be validated after it is published. This need for validation process could involve, for example, unusual panellist patterns that become evident only over time.

### *11.2 GMS monthly inbound DO report (specific to each DO)*

Each DO can view the performance of each of its permanent links (inbound and outbound). Pool results can be viewed only by the inbound DO.

Each participating DO will receive a DO report containing more details than the summary report. The inbound and outbound weighted results of each permanent link are included, as well as the inbound aggregate weighted results from Pools 1 and 2. The report also includes an aggregate weighted result for all permanent links and the two pools.

Depending on the performance level and the terminal dues involved, the monthly inbound DO report is used to help decide whether to make operational improvements to reduce the risks of not reaching the target, and whether to boost the following year.

*Table 11.2 Example of a GMS inbound DO report*

| Inbound DO 33 | Target % | **YTD on-time %** | Precision % | Jan % | Feb % | Mar % | Apr % | May % | Jun % | Jul % | Aug % | Sep % | Oct % | Nov % | Dec % | No. of items |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Permanent links total:** | **X** | **89** | **± 3,0** | **87** | **91** | **90** | **88** | | | | | | | | | **9,481** |
| – from DO 1 | X | **87** | ± 3,5 | 86 | 88 | 89 | 85 | | | | | | | | | 2,876 |
| – from DO 2 | X | **91** | ± 3,0 | 87 | 91 | 90 | 88 | | | | | | | | | 1,765 |
| – from DO 3 | X | **89** | ± 3,5 | 86 | 88 | 89 | 85 | | | | | | | | | 1,354 |
| – from DO 4 | X | **88** | ± 3,0 | 87 | 91 | 90 | 88 | | | | | | | | | 1,043 |
| – from DO 5 | X | **90** | ± 3,5 | 86 | 88 | 89 | 85 | | | | | | | | | 924 |
| – from DO 6 | X | **90** | ± 3,0 | 87 | 91 | 90 | 88 | | | | | | | | | 865 |
| – from DO 7 | X | **90** | ± 3,5 | 86 | 88 | 89 | 85 | | | | | | | | | 654 |
| Pool 1: | X | **88** | ± 3,0 | 87 | 91 | 90 | 88 | | | | | | | | | 932 |
| Pool 2: | X | **90** | ± 3,5 | 86 | 88 | 89 | 85 | | | | | | | | | 623 |
| **Total inbound results** | **X** | **XX** | **± 3,5** | **86** | **88** | **89** | **85** | | | | | | | | | **11,036** |

*11.3 GMS monthly and year-to-date inbound (YTD) city report (specific to each DO)*

Each participating DO can view the inbound performance into each measured city measured. The purpose of the report is to help the DO to better analyse the possible shortcomings and take decisions on quality improvement measures.

*Table 11.3 Example of a GMS monthly inbound city report*

| Inbound DO 33 | Target % | **YTD on-time %** | Precision % | Jan % | Feb % | Mar % | Apr % | May % | Jun % | Jul % | Aug % | Sep % | Oct % | Nov % | Dec % | No of items |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Inbound Office** | **X** | **89** | **± 3,5** | **86** | **88** | **89** | **85** | | | | | | | | | **11,036** |
| – City 1 | X | **87** | ± 3,0 | 87 | 91 | 90 | 88 | | | | | | | | | 4,012 |
| – City 2 | X | | ± 3,5 | 86 | 88 | 89 | 85 | | | | | | | | | 2,702 |
| – City 3 | X | | ± 3,0 | 87 | 91 | 90 | 88 | | | | | | | | | 2,113 |
| – City 4 | X | | ± 3,5 | 86 | 88 | 89 | 85 | | | | | | | | | 1,207 |
| – City 5 | X | | ± 3,0 | 87 | 91 | 90 | 88 | | | | | | | | | 1,002 |
| **Total inbound results** | **X** | **XX** | **± 3,5** | **86** | **88** | **89** | **85** | | | | | | | | | **11,036** |

One reason for linking terminal dues and quality of service results is to promote quality improvement. Managers need as much data as possible to find bottlenecks in the operational process. Details may show a considerable spread of results, depending on the city of destination. Reporting should assist

operational services in the analysis, without risking the integrity of the external measurement. The name or postcode of a panellist is never disclosed. The reason for specifying the permanent link or pool from which the test letters are sent is to show where improvement is needed. The identity of the sending DOs in the pools is never disclosed.

The following report contains performance details for each measured inbound city and each permanent link or pool. It is sent out on a monthly basis but only to provide year-to-date data for maximum precision.

*Table 11.4 Example of a detailed GMS year-to-date (YTD) inbound city report*

| Inbound DO AA | Target % | **YTD on-time %** | Precision % | City 1 on time % | City 1 item No. | City 2 on time % | City 2 item No. | City 3 on time % | City 3 item No. | No of items. |
|---|---|---|---|---|---|---|---|---|---|---|
| **Permanent links total:** | **xx** | **87** | **± 3,5** | **86** | **4,812** | **89** | **1,571** | | | **9,481** |
| – from DO 1 | xx | **63** | ± 3,0 | 87 | 1,214 | 90 | 120 | | | 2,876 |
| – from DO 2 | xx | **92** | ± 3,5 | 86 | 421 | 80 | 452 | | | 1,765 |
| – from DO 3 | xx | **88** | ± 3,0 | 87 | 914 | 92 | 12 | | | 1,354 |
| – from DO 4 | xx | **78** | ± 3,5 | 86 | 884 | 89 | 85 | | | 1,043 |
| – from DO 5 | xx | **90** | ± 3,0 | 87 | 623 | 90 | 586 | | | 924 |
| – from DO 6 | xx | **84** | ± 3,5 | 86 | 492 | 81 | 85 | | | 865 |
| – from DO 7 | xx | **78** | ± 3,0 | 87 | 264 | 90 | 231 | | | 654 |
| Pool 1 | xx | **90** | ± 3,5 | 86 | 324 | 89 | 308 | | | 932 |
| Pool 2 | xx | **84** | ± 3,0 | 87 | 231 | 94 | 117 | | | 623 |
| **Total inbound results** | **xx** | **XYZ** | **± 3,5** | **86** | **5,367** | **89** | **1,996** | | | **11,036** |

### *11.4 GMS monthly outbound DO report (specific to each DO)*

The GMS outbound DO report contains all the permanent links to other participating DOs. Its purpose is to enable the outbound DO to discuss with the inbound DO what can be done, either jointly or at the outbound end, to improve quality. It also helps to decide whether or not to boost the number of items on a specific outbound permanent link the following year in order to reduce the risk of lower precision.

*Table 11.5 Example of a GMS monthly outbound DO report*

| DO 33 | Target % | **YTD on-time %** | Precision % | Jan % | Feb % | Mar % | Apr % | May % | Jun % | Jul % | Aug % | Sep % | Oct % | Nov % | Dec % | No of items |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Permanent links** | | | **± 3,5** | **86** | **88** | **89** | **85** | | | | | | | | | |
| – to DO 1 | X | **87** | ± 3,0 | 87 | 91 | 90 | 88 | | | | | | | | | 1,256 |
| – to DO 12 | X | **63** | ± 3,5 | 86 | 88 | 89 | 85 | | | | | | | | | 3,678 |
| – to DO 23 | X | **92** | ± 3,0 | 87 | 91 | 90 | 88 | | | | | | | | | 1,141 |
| – to DO 45 | X | **88** | ± 3,5 | 86 | 88 | 89 | 85 | | | | | | | | | 1,234 |
| – to DO 56 | X | **78** | ± 3,0 | 87 | 91 | 90 | 88 | | | | | | | | | 978 |
| – to DO 67 | X | **90** | ± 3,5 | 86 | 88 | 89 | 85 | | | | | | | | | 1,902 |
| – to DO 78 | X | **84** | ± 3,5 | 86 | 88 | 89 | 85 | | | | | | | | | 234 |

*11.5 GMS monthly inbound item report (specific to each DO)*

The inbound item report provides detailed information on each item, which will enable the inbound DO to analyse the results for possible improvement at a detailed level. The following parameters are provided about each item, regardless of whether it is valid or invalid.

– item ID;
– transponder ID;
– receiver ID (number code);
– receiver type (door or post office box);
– origin of flow: permanent link (DO code), Pool 1 (P 1) or Pool 2 (P 2);
– receiving DO;
– receiving city zone;
– actual date of posting;
– date of postmark;
– RFID PC identifier;
– RFID reader number;
– date and time of registration at receiving office of exchange;
– date of delivery;
– test letter format;
– addressing (label/printed address);
– address correct (Y/N or code);
– number of days from RFID reader registration to delivery;
– delivery on time (Y/N).

All dates are given as DDMMYYYY, and all times as HHMMSS in a 24-hour format. The data must be supplied in a universally acceptable format (such as CSV) to allow easy access. Except where a city has only one delivery office, the receiving city zones could be groupings of zip code ranges within a city so

long as the level of detail provided does not allow identification of the specific delivery office of a panellist, the specific postman, or the panellists themselves; otherwise, receiving city zone information will be provided at city level only.

*11.6 Reporting schedule: monthly, quarterly and annual quality of service reports*

Appropriate information technology (IT) software is to be used to collect, store, collate and coherently structure the data for analysis and reporting in the end-user applicable format(s).

Through the IT software, reports will be available in real time, daily or as per an agreed reporting period. The real-time reports may change often owing to continuous updating of incoming valid and calculated items. POT values in the reports for the current month are fairly stable after the end of the month. By the end of the following month, reports for the current month are close to remaining unchanged since most, if not all, of the valid items are validated and calculated. To monitor progress of the POT throughout the year, the following schedule will be put in place:

*Table 11.6 Schedule of reporting*

| | Issue date | Reporting period | Comments |
|---|---|---|---|
| Monthly | 25th of the current month or next available working day | Last month (same year of issue date) | Report represents over 90% of valid items, so its fairly representative of the last month's quality performance |
| Quarterly: Q1 | 25th May or next available working day after this date | January–March (same year of issue date) | All queries and force majeure cases in the reporting period should be implemented before producing this report |
| Quarterly: Q2 | 25th August or next available working day after this date | January–June (same year of issue date) | All queries and force majeure cases in the reporting period should be implemented before producing this report |
| Quarterly: Q3 | 25th November or next available working day after this date | January–September (same year of issue date) | All queries and force majeure cases in the reporting period should be implemented before producing this report |
| Annual: Q4 (year end) | 25th March or next available working day after this date | January–December (previous year of issue date) | All queries and force majeure cases in the reporting period should be implemented before producing this report |

The monthly, Q1, Q2 and Q3 reports are provisional and could be used for operational and/or monitoring the progress of the DO's quality of service performance. The end-of-year Q4 report provides the closure of the reporting year and the POT results therein can be used for QS Link to terminal dues purposes.

## 12 Quality control and validation

### *12.1 Quality control*

The purpose of quality control is to ensure that the system is running smoothly according to specifications and that the results provided are reliable for the calculation of terminal dues.

Quality control is carried out by continuously monitoring the key performance indicators given below.

#### 12.1.1 Various key performance indicators and definitions

- *Valid mail rate* – percentage of the volume of allocated mail that is valid mail;
- *Allocation on target* – volume of allocated mail, expressed as a percentage of the target volume;
- *Transponder loss rate*: percentage of the total number of transponders allocated for a given allocation period which are not returned;
- *Panel turnover* – percentage of the total number of panellists for a given allocation period that drop out or are removed;
- *Receiving pattern by day of the week of delivery* – proportion of items delivered on the days of the week of delivery by permanent link, Pool 1 and Pool 2 marginal totals;
- *Posting to plan rate*: percentage of the total amount of allocated items for a given period which are valid test items inducted on the day specified in the posting schedule;
- *Valid mail on target*: percentage of the total amount of valid items for a given period compared with the expected valid items;
- *Data recency*: The (average) time it takes for the panellist to enter the data;
- *Item return recency*: The (average) time it takes for the panellist to return the received test item;

#### 12.1.2 Quality control of system management

Quality control of system management consists in monitoring the several key performance indicators (KPIs) generated by the allocation data, the daily mail file, the item history file (comprising the pattern query file), the panellist information file and the transponder file. The following indicators are monitored:

- allocation shortfalls/overages;
- allocation not in accordance with system design or necessary mail characteristics;
- valid volume vs. target volume;
- KPI (valid mail rate, allocation on target, etc.);
- recency of data entry (number of days between required entry of data and actual entry;
- recency of query (number of days between notification of query and resolution of query);
- loss of transponder;
- panellist performance and panel follow-up;
- panellist workload per week;
- panellist integrity analysis;
- day of the week of dropping profile for allocation as well as valid items;
- panel coverage.

12.1.3 Quality control of system integrity

Given that the system results will be used to calculate terminal dues, it is crucial to ensure the system's integrity through a quality control process.

In this sense, information relating to panellists will be available only to the panel managers and not be released to any user or system participant.

In cases where a test letter is detected by a DO, action will be taken to exclude the panellist and delete the test items relating to that panellist after the fact.

The quality control managers will be provided with the relevant information (information on the status of the envelope after it is received by the panellist) in order to assess the integrity of the panellist.

Participating DO's and designated GMS governing bodies will receive reports on the status of system compliance. Also, continuous checks need to be made throughout the year to assess that undesirable bundling is not made.

12.1.4 Reporting process within the framework of quality control

Users and respective UPU bodies will regularly receive reports on the results of system management quality control.

The quality control management will liaise with the designated GMS governing bodies to report the results of system management quality control and to assist in cases involving disputes relating to a particular test item (data validity) or to panellist performance.

Through regular meetings between the quality control management and the designated GMS governing body, the former will introduce the system management quality control report.

In cases of disagreement regarding a query between the user and the quality control management, the two parties will submit the facts related to the case to the designated UPU body.

*12.2 Validation*

A number of data elements relating to test letters need to be assessed and verified before the information is used for data analysis and reporting. This assessment process is called validation. Overall, the validation process consists of four elements:

– real-time validation;

– off-line validation;

– pattern queries validation;

– DO (user) queries validation.

Some assessments and verifications make up what is referred to as real-time validation. This facility is built into the computer system, which receives the information on posted and delivered test letters, together with transponder readings. The computer system recognizes incompatible combinations of information and alerts the panellist and the contractor accordingly. The panellist is then given the opportunity to correct the error immediately.

Other validations are made after the panellist has recorded the relevant data elements of the test letter information. This off-line validation is made by the contractor or the system managers, who will monitor overall and individual panel performance over time. Such validations may require a number of repeated events before the matter is found to involve an irregularity.

The contractor keeps track of the number and types of errors made by a particular panellist. There is a pre-determined number of errors that a panellist can make before retraining becomes necessary. The same applies to cases where a panellist leaves the system.

The contractor will have a problem detection facility built into the GMS data validation and analysis system in order to, among other things, follow up panellist patterns. There should be checks that the correct postage has been paid for the test mail item. This should include checks on the invoice for the purchase of stamps or meter franking where necessary. There should be checks that the dropper has received the items to post. Relevant parts of the system will be made available to the users, without compromising the integrity of the system as a whole and at the level of the relevant panellist or test letter item.

The identification of errors and the corrective and preventive measures taken to eliminate or minimize the risk of repeated panellist error will be audited.

For a simple measurement system, being less stringent with some of the validation requirements could be considered.

12.2.1 Real-time validation

Real-time validation takes place when the panellist enters data on the contractor's website. The website interface includes various filters that question or challenge the panellist (quick questions) when entering illogical data.

Example: The wrong combination of day and date or a future date is indicated.

The computer system and the website will contain certain filters that challenge the panellist and/or alert the contractor. Depending on the nature of the data being entered, both the panellist and the contractor may be challenged or alerted; at other times, only the contractor should be alerted, to avoid encouraging the panellist in any way to change the date of delivery.

The following irregularities may be considered reasons for such real-time alerts.

– day of the week and date of posting do not correspond;
– day of the week and date of posting do not correspond to the scheduled date of posting;
– day of the week and date of delivery do not match;
– month and day in the date have been reversed;
– PDF file with the test letter form was not downloaded by the panellist according to schedule;
– delivery takes place on a non-delivery day.

It may be helpful to have built into the system a list of holidays, bank holidays, early closing days, etc. for all participating DOs.

12.2.2 Off-line validation

This process takes place after the panellist has entered the data elements of test letter information on the website and has sent the data by SMS or telephone. The panellist may be queried by e-mail or telephone in cases where inconsistencies are detected.

Examples:

– The date of delivery does not match the transponder information;
– The date of delivery precedes the date on which the transponder registered the item's arrival at the inbound office of exchange.

The following irregularities aspects may be considered reasons for such real-time alerts:

- The day and date of delivery are given without the registration of the test letter's transponder at the inbound office of exchange;
- The day and date of delivery precedes the date of registration of the test letter's transponder at the inbound office of exchange (impossible to continue);
- The day and date of delivery correspond to a non-delivery day.

All available sources of information that can be checked should be used.

12.2.3 Validation of pattern queries

This process monitors panellist performance in order to compare panellist behaviour or patterns against set indicators and a set standard. The contractor will have a systematic approach to follow up panellist behaviour over time.

Example:

The panellist frequently indicates delivery of test letters on a certain day of the week, particularly in connection with the weekend. (The panellist could be going to a summer house directly after work on Fridays and, on Monday morning, leaving to go directly to work, making it impossible for him to know whether a test item was delivered on the Friday or the Monday.) In the meantime, the panellist has indicated that the test letters delivered on Fridays were received on the following Mondays.

12.2.4 Validation of user queries

This option enables users to make queries about particular panellists or items. The contractor or system management coordinates the process.

Some validations will be carried out at the request of the receiving DO, which may have additional GMS information not available to the contractor/system management, which justifies the need for further validation.

Example:

The receiving DO has evidence of additional RFID registrations occurring at domestic RFID antennas involving the test letter transponder in question, proving that the date of delivery indicated by the panellist cannot be correct.

If there is more than one delivery office in a city, information to the level of delivery office must not be revealed to the DO so that the integrity of the system and the location and identity of the panellist is not compromised.

12.2.5 Summary of validation rules

Each panel management contractor (PMC) shall have detailed and specific validation rules and procedures. In order to ensure that all PMC’s fulfil the UPU GMS Technical design requirements, PMC’s are required to implement validation procedures that fulfil the basic validation rules as described in **Annex G**.

# 13 Diagnostic monitoring

## *13.1 RFID technology*

The Global Monitoring System uses **R**adio **F**requency **ID**entification (RFID) technology to detect and monitor test items. Small RFID chips (called transponders) are inserted and concealed in an envelope, which is then detected at an appropriate location fitted with matching RFID detectors/Readers.

A typical standard RFID Reader or kit for postal site operation generally comprises the reader and antennas covering a doorway or processing pathway. The Reader is the engine of the RFID unit consisting of a microprocessor/computer connected to the Internet. Setting up an RFID system for the measurement involves on-site visits, shipments of materials, installation, site certification and acceptance tests (SATs), etc. It also involves also costs for the initial set up but also follow-up thereafter.

With advances in technology, new RFID plug-and-play solutions are readily available and specifically designed to cover smaller postal operations. What is important is to connect the RFID system to reliable power and internet (either via mobile phone network or LAN/WAN connectivity) supply so that there is continuous data exchange between the RFID and the measurement servers.

Today, the use of passive RFID technology has gained a lot of attention to postal operators due to, not only its affordability but also compactness and the ever-evolving smart solutions available for the postal and logistics market. It is thus recommended as the solution for running an RFID-based measurement as the case for GMS.

It is assumed that most countries at Levels D and E have most of their international inbound mail arriving at one site only, the size of which would be small enough to accommodate simple RFID unit solutions. Proper installation by local staff (which replace costly site visits and SATs) can be monitored remotely via internet connectivity.

## *13.2 Principles for installation*

### 13.2.1 Background

The purpose of this chapter is to:

– set out the underlying principles of installing the diagnostic monitoring equipment in the international letter mail processing system;

– describe the practical procedures of the site survey process for the various Levels (A to E) as defined in the GMS design.

Since the data have a direct impact on the UPU terminal dues agreement, it is important for all participants in the monitoring system to apply these procedures to any circumstances and at any location in order to ensure complete consistency across the network being monitored.

This chapter does not cover installation of "customs gates"; refer to **Annex D** for information on that particular process.

### 13.2.2 Outline of approach

Assessment of a site's operational situation and installation of the necessary equipment requires an independent, objective and consistent agent working on behalf of all participants in the UPU terminal dues system. The participating DOs and the designated UPU body establish the basic system rules. The survey (see section 13.5 “Site Survey”) applies these rules consistently in the practical arrangements made at each individual monitoring location and based on the decisions reached by those bodies.

In cases of disagreement, a decision by the respective UPU body may be required. However, the clarity and consistency of the methodology applied by the site survey process are intended to reassure

participants sufficiently so that the need to refer questions about gate placement to a review or bilateral discussion process, can be minimized.

The basic requirement of the diagnostic monitoring system producing terminal dues data is to have the gates installed as close as possible to the point of physical handover of the mail.

The aim here is to minimize the opportunities for manipulating data and bypassing antennas, as well as operational irregularities (unintentional processing delays) on the part of the receiving DO by having mail not pass through the gates until after CTT in order to gain an additional 24 hours for making delivery, which would obviously give an unfair advantage in terminal dues agreements and financial remuneration.

The principles underlying the installation of gates need to be transparent to everyone. To maximize cost-effectiveness and limit the complexity of the process for the participating DOs, efforts should be made to bring GMS requirements sufficiently into line with existing gate installations (the content of the documentation in line with the decision-making process for locating the equipment).

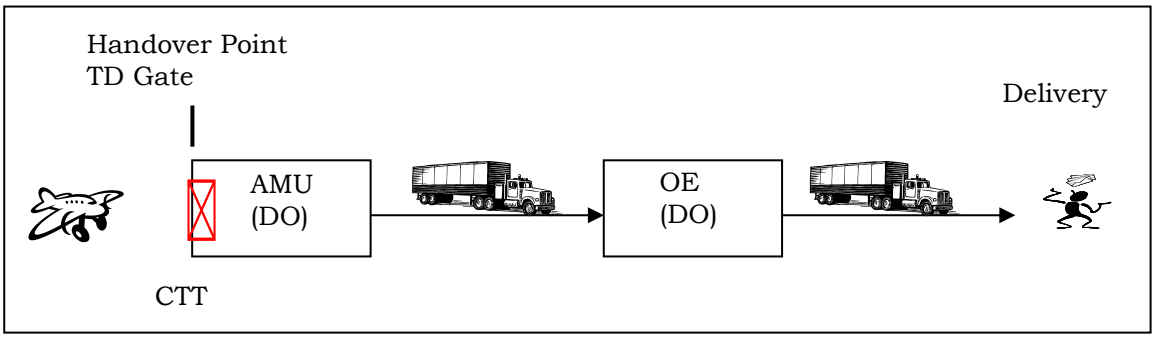
*13.3 Installation procedures*

The basic procedures governing the installation process are as follows.

13.3.1 Terminal Dues Gate Location

A Terminal Dues (TD) gate is located at the Handover Point which is usually at the entry point to an Air Mail Unit (AMU) or an Office of Exchange (OE) or is within an Air Cargo Handler's facility.

The figures below depict the TD gate locations at the three typical handover points. The TD gates are marked with ☒.




AMU: Air Mai Unit; OE: Office of Exchange; DO: Designated Operator;
CTT: Critical Tag Time; TD: Terminal Dues

*Figure 13.1 Handover Point at an Air Mail Unit*

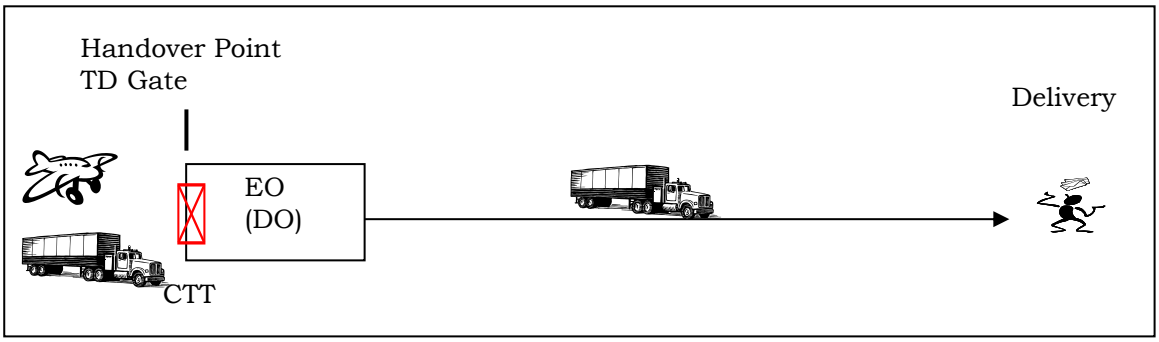



*Figure 13.2 Handover Point at an Office of Exchange*

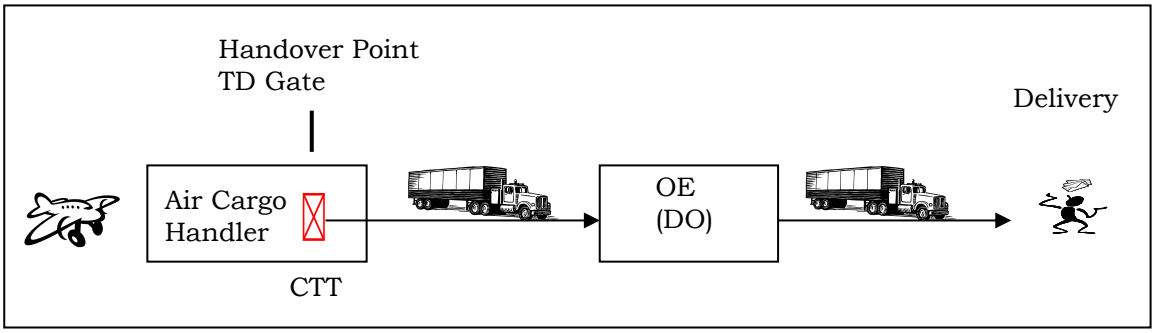



*Figure 13.3 Handover Point at an Air Cargo Handler*

The handover points shall have a Critical Tag Time (CTT) as defined in Section 10.2. The Handover Time is given by the registration of transponder mail by the Terminal Dues gate at the agreed Handover Point at the destination DO.

13.3.2 Responsibility for international mail in transit

It is reasonable for customers to expect international mail to be under the practical or theoretical responsibility of either the dispatching DO or the receiving DO at any point in the mail transmission chain, from posting to delivery. From the customer's perspective, it is unacceptable for neither DO to claim that the mail is under its responsibility at some stage in this process. There is probably a legal and/or contractual basis for this principle in the relationship between the customer (sender and/or addressee) and the international postal service (principally the dispatching and receiving DOs).

The basis for determining which DO is responsible for the mail at any given time is either financial (which DO is paying for that particular part of the process) or geopolitical (which DO is operating in the same territory as whichever third party is involved in the mail handling process (e.g. DO and Customs in the same territory).

It should be noted that there is a difference between "responsibility" and "control", the first term implying a contractual relationship and the second term referring to the physical presence of the mail. In the discussions on terminal dues, "responsibility" and not "control" represents the major concern. This distinction is significant and will be referred to later in 13.4.1.

However, with the GMS, certain exceptions to this principle have been agreed where official authorities (such as Border, Customs and Security Agencies) are involved.

13.3.3 Inclusion of all relevant mail

Diagnostic monitoring gates are installed so as to ensure that all relevant mail passes within range of the gate(s), with an RFID efficiency rate of 95% or above from Certification/SAT tests. Any small volume of mail below an agreed threshold may be excluded from measurement (for example, less than 5% of the total cross-border mail volume of two neighbouring towns which do not send mail through the regular offices of exchange).

13.3.4 Consistency of methodology

The process of deciding where to locate gates is consistent, regardless of which DO is involved in the mail exchange being monitored.

13.3.5 Transparency

The site survey is required to result in a detailed written report describing the situation at the site in question. The report should explain the procedure used for determining the gate location, thus enabling all the parties involved to compare the decisions taken with the general rules in effect and raise questions where there is doubt about compliance with these rules.

To ensure that the interests of both the sending and receiving countries have been served, any sending DO with substantial mail volumes sent to the receiving DO can, at its own expense, participate in the site survey.

*13.4 Practical considerations*

There are basically four types of practical considerations that may affect the principles outlined above.

13.4.1 Operational and logistical considerations

Given that it is the dispatching DO that selects and pays the carrier which conveys the mail to the country of destination, there is no doubt that the mail is under the dispatching DOs responsibility throughout the process. At the destination airport, however, a handling agent employed and paid by the carrier takes the mail from the aircraft. The dispatching DO is, in the end, paying that handling agent and, at this stage, the mail is still the responsibility of the dispatching DO.

In practical terms, however, the dispatching DO has little opportunity to monitor the service provided by the handling agent. To do this, it requires the active participation of either the carrier or the delivering DO, or both. While such monitoring can be arranged from time to time, it is rare for this to happen regularly on a large scale. There is always the possibility of a "black hole" where unmonitored delays can occur. While responsibility for the mail is clear, responsibility for taking action to deal with these delays may be difficult to define.

Responsibility for the mail need not be confined to being physically in charge of the mail. For example, if a handling agent informs a receiving DO that mail is available for collection, from that point on the receiving DO has responsibility for the mail. Similarly, van runs linking the airport and the inward office of exchange should be scheduled so as to ensure that any mail arriving on flights before the agreed cut-off times is collected so that it can pass by the gate before CTT, regardless of the gate's location in the mail handling system. In essence, if the receiving DO is aware that the mail is available for collection at the airport, responsibility for the mail has passed from the dispatching DO to the receiving DO.

13.4.2 Technical considerations

The RFID equipment currently used by many DOs requires the mail being tested to pass within a few metres of the diagnostic monitoring gates. To do so, the gates need to be installed at "choke points" (e.g. doorways) where the mail is certain to pass within the range necessary. Placement of the equipment would need to be such that the limitations of the RFID equipment used are not exaggerated and/or do not adversely affect or compromise the data readings.

This could lead to a situation where gates are installed at the first practical location, rather than at the ideal location, owing to a lack of suitable "choke points" where the mail is physically handed over.

13.4.3 Organizational considerations

Although there have been no cases of diagnostic monitoring equipment interfering with other radio systems at airports, some airport authorities are said to be very reluctant to have DOs set up RFID monitoring systems on their premises. Similarly, some third-party handlers are equally concerned about having gates installed at their facilities, citing "legal restrictions" or other reasons, despite the fact that the location in question constitutes a suitable "choke point".

In the past, it was possible to resolve disagreements through lengthy negotiation, testing and experimentation. For very problematic cases, however, the best course of action may be to accept a slightly less than ideal location for the monitoring gates, while allowing the local DO and third parties to continue discussions off-line and carrying out continuous cross-checks (for example, determining the ratio of items passing the antennae shortly after CTT).

13.4.4 Office of exchange considerations

If the office of exchange accounts for at least 0.5% of the total annual national inbound volume used for the application of the GMS Technical Design, the office of exchange must be equipped with RFID gates for quality link to terminal dues purposes.

*13.5 Site survey process*

Decisions regarding the location of the gates are taken following application of the defined standard procedures. In principle, there are two main procedures that apply to the GMS:

– on-site survey process;

– remote survey process.

While the remote survey process is available only to countries classified at Levels D or E, the on-site survey process is available to all countries in the other GMS levels A, B and C.

Notwithstanding the simplified remote survey process, any DO may have a full pre- or post-survey undertaken on its mail processing sites provided that it agrees to cover all costs related to this enhanced procedure. This request is reasonable where the particular DO represents a major portion of the inbound volume of a Level D or E DO and wants to ensure that the measurement is 100% accurate from the outset.

The following table provides an overview of the various steps for participating countries.

*Table 13.1 RFID installation procedure*

| | | *Classification* | |
|---|---|---|---|
| | *Process* | *Levels A, B and C* | *Levels D and E* |
| *Installation* | 1 Pre-survey<br>(e.g. assessment of facility layout and equipment needed, verification of "correct" gate location) | On-site survey mandatory | Remote survey;<br>on-site survey on request |
| | 2 RFID Equipment supply | As per site survey report | As per site survey report |
| | 3 Installation procedure<br>(e.g. proper technical installation, connect RFID to Internet network, etc.) | Done by RFID contractor | Recommended to be done by RFID contractor |
| | 4 Post-survey<br>(i.e. check whether gate is at correct location and if documentation is in line with situation at site) | To be done during RFID audits | Recommended |
| *Running* | 5 Overall system checks/audits<br>(i.e. continuous checks of integrity of overall system) | Yes, by respective UPU body | Yes, by respective UPU body |

13.5.1 On-site survey process

This is where the involved parties visit the site and gather the necessary information for proposing the appropriate locations to install the RFID equipment for the terminal dues and/or handover process. Those attending a site survey includes a representative from the RFID contractor, representatives from one or more important sending partner DOs (optional) and staff of the DO concerned. The staff of the receiving DO should include an official responsible for terminal dues and an official from the local office familiar with the actual logistics of the mail's transmission from its arrival (by aircraft and/or truck) up to the start of processing of individual items.

*Table 13.2 Stages of the on-site survey process*

| *Steps* | *Task* | *Main responsibility* |
|---|---|---|
| 1 | In discussion with the local DO staff, establish an overview of the real-life mail movements from point where inbound mail is handed over to the receiving DO | Survey manager |
| 2 | Identify the handover procedure between the handling agent for the carrier and the DO, including both DO staff and agents employed by the DO | Survey manager |
| 3 | Identify the precise location of the mail when responsibility for it is transferred to the receiving DO | Survey manager |
| 4 | Identify optimum location for the gates in terms of postal logistics | Survey manager |
| 5 | Identify local organizational or mandatory inspection problems that may affect the positioning of the gates at the optimum location | Receiving DO staff |
| 6 | Identify optimum location for the gates in terms of technical limitations | Technical contractor |
| 7 | The remarks (on the approval or otherwise) of the receiving DO and attendant sending DO must be included in the Site Survey Report | Sending and/or receiving DO |
| 8 | Submit comprehensive site survey report to the respective UPU body for consideration | Survey manager |

If this process results in an agreed suitable location, the technical contractor/engineer will then gather all the technical data required to produce a site survey report, including costing, which will ultimately be given to the receiving DO coordinator for agreement.

The site survey manager should strive to ensure that arrangements are as cost effective as possible. There may be some margin for compromise where there is a choice between an optimum location at a very high cost and a slightly less ideal location for substantially less. However, all proposals which deviate from the ideal location need to be described in detail in the site survey report and sufficiently justified.

13.5.2 Remote survey process

This is where necessary information about the site and mail handover process is gathered remotely through a questionnaire template. This can be followed up by clarifications through phone/video interactions where the completed template is clarified. This mode is reserved for countries meeting certain requirements, namely, those in Levels D and E. This simplified procedure does not provide the same high level of transparency and accuracy as the standard On-site survey.

In cases where the information gathered through questionnaire template on the operational situation of the DO at Level D or E is simple, a remote site survey report can be compiled and installation carried out. In cases where the initial site assessment through questionnaire template indicates a level of complexity, an on-site survey should be conducted – regardless of the DO's classification under GMS design.

In addition to the above general rules, any sending DO or group of sending countries may request a standard survey for any DO at Level D or E, provided that the related survey costs are covered by the requesting party or parties. This process will ensure the most cost-effective system for smaller-volume countries, and offer more reliability in specific cases where this might be justified.

Since the remote survey process relies mainly on the information supplied by the receiving DO and does not require the presence of any external auditor, particular attention should be given to the completeness and correctness of the information about the situation at the site in question.

Countries applying for the simplified site survey should be given a standardized questionnaire (covering all main aspects) and sample site maps to ensure the completeness and comparability of the information provided.

*Table 13.3 Stages of the remote survey process*

| *Steps* | *Task* | *Main responsibility* |
|---|---|---|
| 1 | The receiving DO provides a description of actual mail movements from point where inbound mail is handed over to the receiving DO. Description should be detailed and accompanied by photographs of the facility and a detailed site map indicating all important areas | Receiving DO |
| 2 | Thorough review of the information provided and resolution of any questions with the DO | Survey manager |
| 3 | Production of a site survey report showing where to locate the RFID gates, with explanation. Submission of site survey report to the appropriate UPU body for final acceptance/communication | Survey manager |
| 4 | Formal approval of proposed gate location and clarification of comments made or concerns raised by authorities | Appropriate UPU body |
| 5 | Installation of the gates as decided by appropriate UPU body. A signed confirmation, together with photographs of the installed gates, should be provided to show that the location conforms to the UPU body's decision | Receiving DO |
| 6 | On-site check to verify the correct location of the gate. Possible visits by the Regional Adviser, external auditors or dedicated UPU staff | Appropriate UPU body |

*13.6 Site survey report*

To ensure maximum transparency and provide a sufficient level of information, particular attention should be paid to the reporting of the situation at the site in question.

In general, the survey manager is responsible for providing the appropriate UPU bodies with complete documentation of the site survey and proposing the appropriate location for the terminal dues gate. This documentation should include:

- description of the handover of mail to the postal DO (i.e. "transfer of responsibility");
- description of the operational situation at the postal facility (including process flow);
- detailed site map indicating layout of the facility and movement of the mail from the building;
- photographs, if necessary, to help understand the situation on site (gates, docking area, staging areas etc.);
- recommendation for the suitable location of the gate(s), including a detailed explanation;
- clear and extensive reasons for a gate location that differs from the standard rules.
- a document confirming that all relevant information has been provided and that it accurately describes the situation at the facility. This document will be provided by the UPU and signed by the DO management or a representative.

The relevant body supervising the site survey process should ensure that the information provided by the DO is confirmed within a reasonable period (e.g. by the Regional Adviser or by random audit checks).

13.6.1 Checklist for site survey reports

In particular, the site survey reports shall apply the following principles:

a. the site survey reports shall provide clear information on the operational process of mail arriving at the facility, including the following
   - how it is received, processed and released for domestic or local processing
   - at which points it shall receive RFID registrations
   - for sites where customs corrections are to be requested, where the handover points and into-border agency and out-of-border agency registrations are in respect of the process of acceptance, processing and release at the facility.

b. site maps provided with the site survey report shall clearly indicate the operational logic, the sequence in processing and the exact locations where responsibility of the mail changes hands. Symbols and markings used in the site maps should be explained.

c. the use of photos, drawings and other visual aids is recommended to support information provided in relation to the exact locations of designated points in the operational process.

d. the designated operator responsible for the site shall ensure the completeness of the site survey report, which will be provided by the measurement system provider and shall contain the following sections and information:

*General information*
This section describes the general information about the facility;

- document reference and date/version of report.
- name of the site and its purpose (AMU, OE, etc.).
- physical address of the facility.
- date of the site survey, purpose of the site survey (e.g. new facility, changes in operational flow including the location of the RFID gates, etc.).
- participants in the site survey – name, company, roles.
- relevant site information such as opening hours of the facility, distance to the relevant postal facility (e.g. between AMU and OE) including travel time and frequency of transport, and operational times of the customs/border agencies at the site.
- overview of RFID reading points that are used for quality-linked terminal dues purposes and those that are proposed to be used for quality-link terminal dues purposes, including their purpose (first inbound, into-border agency, out-of-border agency, exit OE, etc.).

*Description of the operational situation and the processing of inbound mail*
This section describes the operational situation and the processing of inbound mail at the facility

- description of the handover of mail to the designated operator or its subcontractor ("change of responsibility"), including information on whether the mail is pulled or pushed into the facility and by whom.
- description of the operational situation within the facility – process flow of the inbound mail as a receptacle and as an item (by format if treated differently); sequence of events, including receptacle scanning for RESDIT, RESCON and RESDES; and change of responsibility within the facility (e.g. handover points to/from Customs/border agency and to the domestic operation).
- detailed site map indicating the layout of the facility and clearly showing the flow of mail to/within/from the facility, including an explanation of the symbols and markings used (in English).
- photographs to help in understanding the situation at the site (gates, doors, staging areas, equipment used for processing, etc.).

- information on whether all inbound mail can bypass the handover points and/or whether any of the gates/doors are not planned to be equipped with RFID equipment (reasons for such a decision, operational processes ensuring that all inbound mail gets the inbound reads).

*Border agencies*
This section describes the nature and location of border agencies (BAs) and their impact on the processing of mail.
- description of the BA at the site and its purpose.
- operating hours of the BA at the facility, including any impact on further postal processing (e.g. mail not allowed to be processed further outside operating hours or unless the BA releases the mail for further processing).
- information on whether all inbound mail passes through the BA at the facility.
- if it does not, a description of the criteria for mail subject to BA checks, with examples.
- description of the place(s) where the BA checks take place.
- information on whether the mail is pushed by the designated operator to the BA or pulled by Customs/BA, as well as the same information for exit from Customs/BA.
- information on whether there are any staging areas before and/or after the BA checks.
- information on whether any mail subject to BA checks bypasses the proposed reading points (RFID gates) and whether there are any doors not equipped with RFID gates.
- functions, roles and responsibilities of BA staff.

*Technical report*
This section includes information related to the proposed location of the RFID gates and other technical information (written by the RFID technical expert, considering the optimal location in terms of technical limitations and costs).
- detailed site map indicating the layout of the facility and the proposed location of the RFID gates (exciters), the readers (if separate) and the server PC.
- detailed description of the individual RFID reading points.
- supporting drawings and photographs.
- list of the proposed RFID readings points, the technical equipment and details (type, active/passive, mail pushed/pulled, etc.), and description of their purpose (TD, BA in/out, etc.)
- information on whether there are any backup reading points.
- data cable connection diagram.
- server location and technical requirements.
- description of the real-time data transfer to the designated repository and any measures to prevent the designated operator's direct access to the data and its manipulation.
- information on whether there is any backup of the RFID data.
- information on whether there is any 24/7 monitoring of the RFID exciters' function and data transfer and who is responsible.
- checklist of the pre-installation work needed to be carried out by the designated operator. Cost proposal (the latter can be submitted separately to the designated operator only).

### *13.7 Site acceptance process*

The certification of a diagnostic gate as a designated UPU terminal dues gate requires the official acceptance by the appropriate UPU body. This process will provide sufficient transparency to enable DOs sending mail to the DO concerned to raise concerns or questions when they do not agree with the proposal.

The relevant UPU body reaches its final decision on the basis of the following:

– official site survey report by the survey agent;

– any technical implications reported by the RFID equipment supplier (e.g. equipment cannot be installed in ideal location because metal structures);

– any concerns raised by a DO that attended the site survey;

– any concerns raised by other DOs based on the documentation.

However, where terminal dues gates from another system already exist, a simplified process might be carried out in cases where there is no indication that the location of these gates might not conform to UPU requirements.

Any needed changes to the layout of the gates should be made known by the DO to the UPU International Bureau, together with supporting documents. The situation will be assessed to determine whether a further survey is necessary before approval. A decision should be made known before the gates are moved.

*13.8 Border Agency (BA) and Customs correction*

13.8.1 General rules

To allow a correction for test mail delays due to inspection, staging or treatment by Customs, Border Control Agency and/or other governmental authorities, rules and procedures will need to be agreed by the relevant UPU body.

The use of the RFID diagnostic gates is the main and preferred option, as it allows an objective, clear and transparent measurement of the impact, caused by Border Control.

Where Border Control RFID gates cannot be used (despite all effort), other options may be considered on a case by case basis:

- acceptance of a certain off-target percentage for DOs;
- no application of Border Control correction;
- certain maximum time allowance in processing the mail upon handover. However, such cases should be exceptional and require a thorough review of the operational process in the particular country; the RFID Diagnostic gates should be installed wherever possible.

In cases where a Border Control correction is based on the installation of additional diagnostic equipment (antennae gates), the rules and procedures to be applied appear in **Annex D**.

*13.9 Minimum requirements for RFID-based diagnostic monitoring systems*

13.9.1 General remarks

Any diagnostic monitoring system with a link to terminal dues must meet the following minimum user requirements:

– global applicability;

– transparency;

– flexibility;

– stability;

– integrity;

– accuracy;

– cost-effectiveness.

The greatly diverse situations worldwide regarding country accessibility could make it difficult to quickly detect and resolve problems, and the resulting loss of valid transponder data would easily distort the statistical design and compromise the validity of the GMS study results.

It is therefore in the best interest of all participating countries to have any technical system used by the future GMS for determining the point of transfer of responsibility for mail items to a DO (normally at the office of exchange) adequately satisfy the criteria listed below. These criteria are of particular importance to the future GMS, which will use a basic statistical design requiring a rather small volume of test items to be cost-effective.

For the sake of comprehension, the terms used in this document often refer to the existing RFID (Radio Frequency Identification) diagnostic monitoring system that uses "antennas" and "RFID transponder" technology. These terms may or may not be found in other diagnostic monitoring systems, which would be compared on the basis of the principles contained in this document.

13.9.2 Maintenance

Continuous monitoring of network – The independent monitoring of a complex global diagnostic monitoring network has to be operational at any given time so that disruptions in the network's operations can be detected immediately. Delays in detecting problems will not only result in a dropping and/or fluctuating data capture process, but also lead to increased costs and the introduction of bias into the study.

Structure and resources – Resources, expertise and technologies need to be available to deal with any technical problems in a timely and effective manner. It is important to ensure that immediate corrective action can and will be taken to resolve problems, since their effects will lead to a bias in the statistical design, possible lost items and additional costs. The resolution of problems should ideally include remote interventions and timely on-site visits.

13.9.3 Reliability

Mail-flow compliance – Terminal dues systems require the safeguarding of data objectivity at all times. This means, amongst other things, accurately recording the time of transfer of responsibility for the mail, regardless of staff behaviour or potential interventions at the accepting site.

Under no circumstances can any diagnostic monitoring solution require specific actions or procedures by the operational staff at the receiving site (e.g. passing mail along dedicated paths or passing mail through an "antenna tunnel"); this would not only allow the possibility of avoiding antenna readings, but would also lead to inefficient mail flow as extra procedures are implemented for all mail entering the facility.

Proven technology – To minimize risk associated with the GMS and the calculation of terminal dues payments under UPU rules, any diagnostic monitoring system under consideration should be proven (i.e. sufficiently tested under various conditions). Untested solutions used for the GMS would not be desirable, as they could lead to major complications for both system management and terminal dues calculations.

Universal application – Any diagnostic monitoring solution considered for the GMS should be accepted universally and not be limited to very specific situations or conditions. Any such technology once accepted should, instead, be available to all other DOs participating in the GMS. An independent patchwork situation, in which countries could devise with their own solutions, would be impossible to assess and fully control in each case, and create a highly ambiguous situation for all participants.

Independent verification – Each diagnostic monitoring solution meant to be used for the GMS would require an independent assessment to ensure that it meets the minimum requirements. This process would include testing its functionality under various conditions and its compliance with all other rules. This process has yet to be developed and applies to all solutions.

### 13.9.4 Security/integrity

For the sake of transparency, trust and integrity, it is necessary to ensure that the data gathered cannot be manipulated or tampered with in any way or provide corrupt files that cannot be used for calculations.

Data capture – The secured process for capturing transponder data represents a very crucial requirement for GMS validity and integrity. Particularly important here are steps to ensure against:

- any loss of data resulting from power outages, computer viruses, electromagnetic interferences, etc.);
- the induction of "alternative" data or the introduction of "amended" data;
- the deliberate deletion of unwanted/disadvantageous data.

Data transfer – Any solution for transferring data to a central database needs to ensure that the data files passing between the facility and the database cannot be accessed, altered, erased or corrupted in any way. It should be sufficiently frequent to ensure that, through a back-up system, little or no data is lost.

Data visibility – Since most diagnostic monitoring systems are used not only for the GMS, but also for internal systems (such as domestic monitoring systems), a very strict separation between both areas has to be ensured by any system. Since detailed information concerning a test item with GMS transponder may be accessed by the receiving DO on a real-time basis, that DO could not only influence the item's delivery, but also determine the location of the test customer (panellist).

### 13.9.5 Technical requirements

The DO facilities that accept mail (e.g. office of exchange) are industrial environments designed to optimize operational workflow and ensure the shortest possible times for processing/forwarding mail. Moreover, the domestic sorting process places certain restrictions on the layout, weight and size of letters within each product class.

Any diagnostic monitoring solution has to take these "guidelines" into account and as far as possible blend into the existing environment. In no circumstances should any technology or solution interfere with the operational processes or require special arrangements, which would alter the optimal workflow.

Read rate – A consistently high transponder registration rate ("read rate") of at least 95% in a controlled situation and 85% in the live environment at the antenna gates is required for the efficiency of any monitoring system. Read failures at dedicated terminal dues gates result in a loss of usable test letter information and make it more difficult to allocate test items in a way that conforms to the system's design and minimizes bias.

It is important to recognize that each gate read failure could result in the loss of the test letter, and thereby financial loss.

Appropriate technology – Any solution should be compatible with the industrial environment of a postal production facility (e.g. large doors, metal cages, dust, etc.).

Interoperability/integration – Any diagnostic monitoring solution considered for the UPU GMS should work with the existing structure, which is currently in use in more than 50 countries. An environment of two or more competing systems, which would not interact sufficiently with each other and would not allow the community to seamlessly follow up on transponders travelling cross-border, would not be desirable.

Transponder requirements – transponders should weigh less than 12 g (to allow for the weight of the envelope, stamp, one sheet of paper, etc.) and be able to withstand mechanized sorting. They should be able to function inside test letters placed in bags or trays that pass through doorways on conveyor belts

or on chain conveyors, on carts or in cages, at speeds of up to 5 m/second. To ensure against the loss of data, any system should be able to record data from at least 15 transponders passing through a doorway simultaneously.

Any solution would also need to comply with airline security regulations, as well as national regulations covering the radio frequency being used.

## 14 Confidentiality and integrity

### *14.1 Confidentiality*

All parties, including external contractors, conducting the measurement study should ensure the confidentiality of all participating DOs. This basic requirement will be included in all GMS contracts.

The particular information that must remain confidential includes:

- mail volumes – All participating DOs must supply actual figures on mail volumes in order to participate in the GMS. This information will be used to determine the DO's classification level and to weight the performance results;
- report results – Only agreed measurement results will be published and distributed to all participating DOs. DO-specific reports will be sent only to the DOs concerned.

### *14.2 Integrity*

The GMS results will form part of the database used to calculate terminal dues payments between countries. It is of the utmost importance that the results are reliable and independent of the DOs involved. The following principles must apply to all participating DOs:

- the identity of receiver panellists must remain confidential. Should a receiver DO detect a transponder test letter, that fact must be reported to the appropriate authorities and the transponder returned as instructed. The receiver panellist concerned will be replaced.
- The identity of the sending DO in Pool 1 or Pool 2 must remain confidential. The name of the countries involved must not be disclosed to the receiving DO to avoid any risk of preference given to any sending DO.
- No receiving DO should be able to identify (e.g. by using so-called RFID "mobile equipment") the delivery office in its inbound test cities receiving GMS test letters.
- No data from the internal diagnostic monitoring gates used will be disclosed until 24 hours after passage of the test item in question.
- RFID equipment must not be moved or altered in any way by the receiving DO without formal authorization to do so in accordance with the installation process proposed.
- Any problems involving system integrity or security will be audited.

#### 14.2.1 RFID Read Visibility in Delivery Offices

Data integrity requires that visibility of test letter RFID registrations are not provided at the delivery office level. This is to ensure the integrity of the RFID system and the location and identity of the panellist is not compromised.

Designated Operators are to instruct their respective RFID providers to:

- restrict data transmission of test letter RFID registrations to reading points, defined in the GMS Configuration.
- where a DOs international sorting centre (SC) facility has delivery offices. RFID data transmission of test letter reads may be provided for designated reading points entering the facility only.
- no data transmission of test letter RFID registrations of reading points exiting the facility are to be provided.

14.2.1.1 GMS RFID Configuration

- GMS Configurations are to be submitted to the UPU International Bureau (IB)
- GMS Configurations are to include reading points of TD handover gates and international diagnostic reading points in DO international facilities
- optional GMS Configurations may include domestic reading points in international facilities

*Table 14.1 GMS RFID configuration sample*

| # | Office/site code | Office Name | City | Reading Point (RP) | RFID License Plate Identifier (LPI) | Valid From |
|---|---|---|---|---|---|---|
| 1 | ABCDEF01 | ABCDEF (Air) | XYZ | RP24 | J99999999995 | 01-01-2015 |
| 2 | ABCDEF01 | ABCDEF (Air) | XYZ | RP25 | J99999999996 | 01-07-2015 |
| 3 | ABCDEF02 | ABCDEF (Road) | XYZ | RP97 | J99999999997 | 01-07-2015 |
| 4 | ABCDEF02 | ABCDEF (Road) | XYZ | RP98 | J99999999998 | 01-11-2016 |
| 5 | ABCDEF03 | ABCDEF | XYZ | RP99-Customs | J99999999999 | 01-11-2016 |

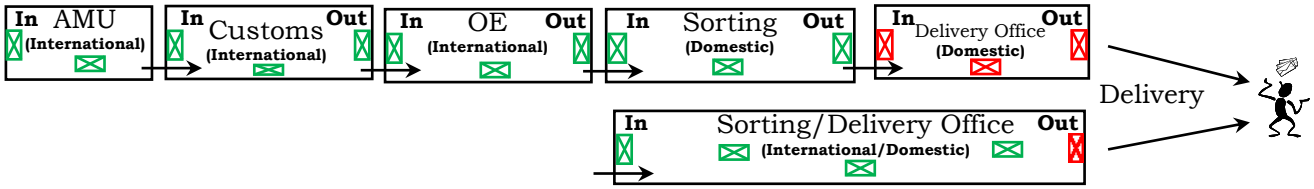



*Figure14.1 Acceptable/Non - acceptable RFID reading point visibility*

# 15 Auditing

## *15.1 Introduction*

As a measurement system that has an impact on financial revenues (terminal dues), the GMS requires a high degree of transparency and accountability to ensure correct data for all participants and ultimately encourage more DOs to participate.

Auditing is the method proposed for evaluating whether the system operates in accordance with the procedures, rules and principles defined. Audits are conducted by an external body, preferably an external auditing firm, with a relevant reputation and proven track record.

Because terminal dues based on GMS results are calculated on a yearly basis, an audit is done once a year.

Quality control includes the system operation follow-up for the various elements and the monitoring of several key performance indicators.

Auditing and quality control complement system management. Auditing aims to improve system processes. Quality control ensures that the system performs as expected through continuous monitoring, which makes it possible for timely and customized measures to resolve system problems on a day-to-day basis.

## *15.2 Auditing the GMS*

The audit focuses on specific processes decided for each system element. The main objective is to ensure that all critical processes are audited in accordance with the procedures defined, so as to identify systematic irregularities, which can be prevented or corrected by the adoption of measures proposed by the auditor.

It is important to remember that auditing is only one of the elements that contribute to quality assurance. Operation of the system includes several validation processes that promote quality assurance.

For data collection, it is imperative that all processes comply with the procedures defined to guarantee that the system is being properly supplied with reliable and consistent data that serve as the basis for further processes. The elements of data collection subject to auditing are:

– collection;
– validation;
– organization;
– transmission.

Measurement study is a relevant system element, which has an impact on the calculation of terminal dues, which in turn affect financial results. Thus, particular attention needs to be given when auditing this element. The main elements of measurement study subject to auditing are:

– collection of data;
– allocation of test letters;
– production of test letters;
– panel management;
– validation;
– analysis;
– calculation;

- reporting;
- distribution;
- statistical design;
- archiving;
- organization.

Diagnostic monitoring, comprising the following elements, also needs to be audited:

- installation of gates;
- monitoring;
- transfer of data;
- analysis of data.

### 15.2.1 RFID Compliance Audit

To ensure compliance of DO RFID terminal due gates, audits of DO office of exchange (OE) and/or airmail unit (AMU) facilities will be scheduled and conducted by the appropriate UPU body. Prior to scheduled audits, standardised questionnaires will be provided to the DO requiring completion and request of supporting documentation where available prior to the scheduled audit.

#### 15.2.1.1 Supporting Documentation

- recent RFID site surveys for TD gates, international diagnostic reading points, and domestic reading points within the international facility, where available;
- reading point report of TD gates within the international facility, where available;
- international RFID configuration report for TD gates and international diagnostic reading points;
- domestic RFID configuration report of domestic reading points within international facility, where applicable;
- RFID site acceptance test (SAT) where available;
- detailed letter mail flow diagrams from entering facility to exiting facility indicating established handover points, and customs gates;
- documented Customs In/Out processes where applicable;
- documented AMU mail handling process where applicable;

#### 15.2.1.2 RFID Compliance Audit Process

a. Communicate with DO of pending RFID compliance audit;
   - send communication letter with background and reason for audit;
   - schedule audit dates OEs/AMUs;
   - provide questionnaire;
   - request supporting documentation;
   - obtain authorization for requesting GMS test item data extract directly from RFID provider;
   - request access to safety vests and shoes as required;

b. Pre-audit check list:
   - obtain completed DO questionnaire;

- obtain contact names, email and phone numbers of DO employee accompanying you during audit;
- confirm scheduled audit dates and times with local employees prior to audit;
- obtain current site surveys international and domestic;
- obtain RFID TD reading point report;
- obtain RFID site acceptance test (SAT);
- obtain mail flow diagrams from entering facility to exiting facility indicating established handover points, and customs gates;
- obtain documented Customs In/Out process where applicable;
- obtain documented AMU mail handling process where applicable;
- obtain RFID configuration domestic and international;
- obtain GMS test item RFID read data extract from GMS UPU IB for 2 months prior to audit with item level details including key elements (Item ID, Tag ID, Origin Country, Destination Country, Send Date, Received Date, Site Code, Site Name, Read Date Time, Validated, Valid, Reader, Reader ID);
- obtain GMS test item RFID read data extract from RFID provider for the 2 months prior to audit including key elements (Item ID, Tag ID, Read Date Time, Site Code, Site Name);
- do analysis of all RFID data extracts to assist in understanding mail flows;
- validate RFID configurations against RFID data extract;
- confirm access to required safety shoes and vest where applicable;
- observe local safety guidelines e.g. no cell phone usage and stay in designated walkways;
- prepare questions based on mail flow diagrams and data analysis;
- bring camera to take pictures of exciter number, Reader number, mail containers, bags, trolleys, boxes, pallets, where permitted.

c. Conducting audit:

- upon arrival, state your business, provide contact person name;
- review audit process with contact:
  - starting at location of where letter mail enters facility;
  - following flow of mail through facility until exits facility;
  - including customs areas if applicable;
  - understand mail entry/exit points of OE and where mail is handed over to Domestic;
  - request permission to take photos of related gates and processes;
  - request permission to ask questions of employees on mail flows if required;
- compare locations of RFID gates to documentation noting discrepancies with the following, where applicable:
  - mail flow diagram;
  - TD reading point report;
  - site survey;
- take pictures of dock doors, RFID exciters (close up of reading point numbers), readers and surrounding areas, and mail containers when permitted;
- take notes of any special processes for specific inbound countries: e.g. goes to different area of facility:

  - note where mail enters/exits OE and goes to Domestic;
- be sure to ask questions about mail processes;
- during the audit it is important to report any major (and minor) findings to the operator in order to provide opportunity for discussion;
- prepare draft audit report as soon as possible to DO for feedback to ensure timely completion of audit report.

### *15.3 Audit report and quality assurance*

The auditor submits an annual comprehensive audit report to the designated UPU bodies. The report should clearly identify the audit objectives for each system element and the methodology adopted. For each system element the auditor clearly describes the processes audited as well as any irregularities. The auditor also proposes corrective measures for these irregularities in order to improve overall system efficiency.

## 16 Costs borne by the Designated Operator for the GMS measurement

Costs generally fall into three categories: RFID costs (set-up, running and maintenance), Measurement system costs (Panel Management and test letter production) and Management costs.

### *16.1 RFID cost*

These costs concern acquisition of the RFID equipment, installation/set- up at the facility, monitoring and maintenance. As mentioned in chapter 13, site survey may need to be conducted at the inbound offices of exchange or airmail units and may involve additional costs.

### *16.2 Measurement system cost*

The measurement system cost elements include one-off costs and annual running costs. These costs depend a great deal on the measurement requirements and the complexity of the statistical design but also any country specific design boost.

Set-up costs typically include formation and training of the panel, depending on the system requirements, and development of an IT system that manages data entry, panel management, validation and reporting.

The running costs cover all elements that are on-going and ensure that the study produces the results intended and that the statistical design is complied with. These elements include, *inter alia*, panel maintenance, the production and dispatch and receipt of test mail, data entry by the receiver panellists, continuous validation and reporting.

Various costing models are used within the industry, which include, among others:

– one amount for complete set-up and a price per item that includes all running costs;

– one amount for complete set-up and the combination of a price per item and a fixed amount per year;

– one amount for complete set-up and the combination of a price per item and a fixed amount for each receiving test customer.

In all costing models, what is important is that the measurement provider will strive to deliver a cost-effective solution to the UPU member countries.

### *16.3 Management cost*

The management cost relate to the basic services that the Measurement Service Provider (MSP) provides, namely among others, IT configurations, data collection, etc. All participants will share the management costs. Other value-added elaborate services like country specific-training, workshops, etc. may involve additional costs to each of the DO that requests for it.

## 17 Updates and Annual Review of Essential Design Parameters

Updated information on the holidays and postage rates will be requested, ideally from the designated operators on a quarterly basis.

There will be a yearly review of the statistical design parameters; update and implement annually the revised statistical design structure (for example, permanent links, Pool 1, Pool 2) as defined in Section 4: Statistical Design. For example, suppose that a sending designated operator moves from Pool 1 in the current year to be a permanent link for the next year. In that case, this sending designated operator must replace the corresponding sending designated operator that is no longer a permanent link. Given the volatility of the postal market, designated operators may change Levels. Permanent links are based on volumes; consequently, the permanent links may change as volume proportions change. City populations may change; consequently, cities included in the measurement may change.

Possible boosts will affect the statistical design and allocation.

There may also be changes that impact on the calculation such as Critical Tag Times (CTTs) and up times for PO Boxes.

Updates to CTTs should be notified when things change according to the current CTT rules. CTTs should be confirmed on an annual basis by each DO.

Updates to up times for PO Boxes should be notified when things change according to the current PO Box rules. Up times for PO Boxes should be confirmed on an annual basis by each DO.

Entry or exit to GMS needs to be notified well in advance of the year in question.

A DO should request an allowable statistical change or boost no less than 6 months before the change coming into effect which will be in January the following year unless agreed differently with the service provider.

# 18 Non-acceptability of quality results

*18.1 Non-conformance in the GMS measurement and non-acceptability of quality results*

Even if all participants of the measurement providers do their best to comply with the relevant rules and regulations, there are situations, where certain test items cannot be accepted for the calculation of the inbound performance, as they could have undesired (negative or positive) effects on the quality result of the inbound DO.

Further to ensure, that the fairness of the GMS measurement is secured, there is a need for having some rules in play, in case of undesired behaviour from the side of either the sending or receiving DO, influencing the quality result of the inbound DO.

The following situations have been identified, based on the past experience:

18.1.1 Priority shipments sent in the non-priority flows

*Problem description:*
There is still a large number of DOs, processing outbound and inbound priority and non-priority mail in a different way. Priority mail, arriving in the non-priority flow (dispatches) may not be treated with the same operational urgency, like the dispatches with priority mail. It can result in undesired delays of the test mail, having a negative effect on the inbound performance of the inbound DO in the GMS measurement.

*Action taken:*
Items in this category are discovered through RFID-reads recorded at the different time than the usual arriving pattern of the Priority mail from the relevant outbound DO for cases where there are several transports from the origin DO for various mail products. In case such test items are discovered, the inbound DO has a right to challenge such item. The inbound DO consults the outbound DO and the relevant Measurement System Provider (MSP) and supply relevant details for the case. If the outbound DO, based on his own investigation, can confirm or cannot deny the possible mistake, such item should be taken out of the measurement by the MSP. Should the inbound DO discover several such cases within a month or in the subsequent months, the relevant POC body has to be contacted and the solution will be sought. If the outbound DO is not able to take relevant operational measures, preventing this from happening, such flow has to be taken out of the measurement, until the corrective measures on the side of outbound DO are taken.

18.1.2 Misrouted mail at handover

*Problem description*:
It may happen, that the outbound country misroutes the mail to another country and the test item arrives to the inbound DO from the other country than the original outbound one (does not apply for the regular scheduled transports via the 3rd country).

*Action taken*:
This can be discovered via the RFID reads and the MSP should take such items out of the measurement as a part of validation process. In case this does not happen (for whatever reason), the inbound DO has a right to challenge such an item and ask MSP for its removal. Reason for it: it cannot be guaranteed, that the 3rd country has sent such mail in the correct dispatch and/or that this country is part of the GMS.

18.1.3 Re-entry of the same test-item on various days

*Problem description*:
In case the test item has re-entered the handover/TD gates for the second time, after it has been sent to the other country (either back to origin or to any 3rd country) evidenced via RFID reads, MSP should remove it from the measurement as a part of validation process.

*Reason*:
Test shipment may have been put into the wrong bag for the other destination country, but still sent to the correct inbound DO. The inbound DO has sent the mailbag either back to the origin country or to the 3rd country. Re-entry can be treated as misrouted mail (see above).

*Exception*:
In a few cases, the item may be registered after its first handover/TD-entry by another RFID at the OE or domestic operation and the item finally delivered to the panellist (i.e. the address and the country were correct). Such item cannot be removed from the measurement (it was incorrectly sorted as items to be returned).

18.1.4 Handover of (test) mail in the wrong handover location(s)

*Problem description*:
Each DO has to identify its International Mail Processing Centres (IMPC's)(AMU/OE) for receiving the international mail, for various formats and products. The GMS measurement uses the RFID registrations from handover/TD reading points installed in these facilities to calculate the quality performance. Any changes at the AMU/OE that affect the agreed locations of the TD RFID reading points have to be communicated by the concerned inbound DO to the MSP and/or the relevant POC body well in advance before any of the planned changes are implemented. The sending DO, sending the mail to the receiving DO, has to respect these handover/TD RFID reading points (valid both for multinational and bilateral service level agreements). When the test mail items get RFID registrations at other RFID reading points locations other than the agreed handover/TD locations, the proper inbound processing of the items cannot be guaranteed.

*Action taken*:
This can be discovered via the RFID reads. The relevant MSP should take such items automatically out of the measurement. Alternatively, the inbound DO has a right to challenge such items and ask MSP for their removal. The sending DOs have to be informed about the non-conformance and asked for the corrective action to avoid repetition. Should the situation not improve, the relevant POC body will be contacted to provide a decision on next steps.

18.1.5 Incorrect Format separation

*Problem description*:
As required by the UPU Convention Manual, designated operators in the target system are required to exchange format-separated mails in accordance with the conditions specified in the Letter Post Regulations. Sending mail on the non-separated basis can lead to delays, as the receiving DO often processes various formats of mail differently, sometimes even in another facility.

*Action taken*:
The sending DOs has to be informed[6] by the receiving DO about the non-conformance and asked for the corrective action to avoid repetition. Should the situation not improve in the coming weeks, the relevant POC body has to be contacted. The receiving DO has also a right to challenge the test shipments received from the relevant sending DO within the affected period of time.

The requesting DO shall provide clear evidence establishing that the mail from the sending DO was received on a non-format-separated basis or included multiple errors in the presentation by format. This evidence should require proof that will be assessed by the relevant POC body, such as a verification note, receptacle information, photographic evidence, accounting documents, screenshot, etc.

Information needs to be provided that clearly confirms that all the processes in relation to requesting the receipt of format-separated mails from the origin DO have been followed. These conditions are set out in the UPU Convention Manual concerning the exchange of format-separated mails.

The evidence in relation to the request by the destination DO to the sending DO for receiving format separated mails shall contain the following information:

[6]Information exchange is through agreed documents as per Letter Post Regulations

- information that confirms that the inbound annual volumes exceed the threshold as defined in the Acts;
- evidence that the request for format separation has been made and within a timely fashion in accordance with the deadlines in the Convention Regulations for the year in question;
- if the request has been agreed by the sending DO, what level of format separation is required, whether in three (P, G and E) or in two (S and E) formats.

The submitted evidence will be assessed by relevant POC body and provide recommendations on the next steps, for example:

- instructing the sending DO to take relevant operational measures to correct the anomaly;
- exclusion of the sending DO from the measurement until the corrective measures are confirmed to have been put in place.

18.1.6 Priority mail in incorrect and/or mixed-format dispatches (e.g. Returns).

*Problem description*:
One of the mail characteristics (see section 8.1) is that test mail must be dispatched as priority letters. These should thus be sent only in the relevant priority dispatches (UN, UA, UL). Convention Regulations also details procedures for sending the "Returns" back to the sender DO. In circumstances where priority letters are mixed with returned shipments without indicating which are the "Returns", it impacts the operations of the receiving DO, which can cause delays in processing the returned shipments.

*Action taken*:
The receiving DO has to provide the clear evidence and to inform the sending DO and the relevant POC body of the anomaly. The submitted evidence will be assessed by relevant POC body and will recommend the next steps.

18.1.7 Bundling on arrival due to operations

*Problem description*:
The outbound DO should prepare and send its priority dispatches ideally on a daily basis, to ensure a daily arrival of the dispatches in the destination country. As the outbound DO is also responsible for the transport stretch, it should optimize its international transportation solutions in such a way that the priority dispatches arrive in the receiving country regularly as mentioned above. Regular dispatches ensure that test mail is not "bundled" or clustered on the import side of the receiving DO, which when it happens, distorts the pre-designed arrival pattern in the receiving country. This impacts negatively on the processing and forwarding of the mail according to the set delivery standards. The quality performance measurement of the inbound DO is therefore also negatively affected.

*Action taken*:
Test mail items identified by the receiving DO or by the MSP (through analysis of RFID registrations) as having been bundled on arrival, will be excluded from quality of service performance reporting if all the identified bundled test mail items fulfil the following criteria:

- from the same sending DO;
- the first handover/terminal dues registration is dated on the same day (decisive is the day, not time of the RFID registration);
- if on the same day, as proven by RFID registrations, the volume of items exceeds three (3) times the planned average daily inbound volume from that particular sending DO. A minimum of three items will be considered bundled.

If possible, the "bundling check" should be made automatically by the system or by the MSP as part of the validation process. Where the automatic process is not possible, the inbound DO must provide

evidence of the bundled items within the specific period of time to the MSP for verification and further action.

The MSP will also check the particular sending DO in the relevant period of time for other cases of bundling, not requested by the inbound DO, to ensure fairness of the measuring system.

All items identified and confirmed as bundled will be deleted from the measurement.

Should the bundling problem persist due to no corrective measures being taken by the sending DO, the anomaly will be assessed by the relevant POC body and provide recommendations on the next steps will be provided, for example:

– instructing the sending DO to take relevant operational measures to correct the anomaly;

– excluding the sending DO from the measurement until the corrective measures are confirmed to have been put in place.

*Exception*:
Bundling may also occur in the sending DO owing to incapacity of the receiving DO to process incoming mail due to force majeure–related issues for example, extreme weather conditions, earthquakes, strikes, war, etc. In such circumstances, UPU members are informed by the International Bureau via established communication channels e.g. via UPU Emergency Information System (EmIS), circulars, etc. Test mail items that arrive in the receiving DO and are identified as bundled for the above-mentioned reasons will be treated within the framework of force majeure.

18.1.8 Change of handover/TD conditions

*Problem description*:
Designated operators make changes in their operations and/or RFID network regularly to optimize operations. Some of these changes have direct impact on the agreed parameters, for example;

- changes to operation may affect CTT or render location of handover/TD points obsolete
- changes to RFID network may impact negatively to the efficiency of transponder registration, or data communication with the measurement servers, or render the type of transponder used for the measurement completely incompatible with the changed RFID system.

To ensure the parameters are updated correctly for the measurement, and within acceptable timeframe, the concerned DO is required to coordinate with the MSP's and the relevant POC bodies to ensure that the proposed changes are implemented in accordance to the measurement rules.

*Action taken*:
Any unauthorised changes to the agreed measurement parameters (CTT, RFID type linked to transponder used, location of handover/TD points, etc.) is not allowed and can result in non-acceptance of the measurement quality results. Changes of operation affecting the processing of international mail at the agreed handover/TD points or at the points for Border Agency (BA)(e.g. Customs, etc.) at the OE or AMU, has to be communicated by the concerned inbound DO at least one month in advance to the MSP and the relevant POC body. The new process flow of mail has to be provided. Similarly, any planned change of location or transponder type (e.g. semi-active to passive) used for the measurement has to be communicated as well within the same timeframe indicated above. The MSP and/or the relevant POC body will assess the scope of the changes and, if necessary, organise together with the DO, a new site survey processes.

Processing of the inbound international mail through non-approved handover/TD points is not allowed. It is the responsibility of the inbound DO to ensure that mail operation follows the designated handover/TD gates equipped functional RFID technology to avoid loss of the measurement data. Should the impact of data loss for the GMS measurement is significant, the concerned inbound DO can be excluded from the measurement for the necessary period of time, if POC decides so.

### 18.1.9 Validity of handover/TD RFID registrations

*Problem description*:

The description of Terminal Dues location (Chapter 13) assumes that international inbound test mail receives the 1st TD registration as the mail is handed over and enters, for the first time, the AMU/OE facility of the receiving DO. Such 1st registration is generally considered as the "valid" TD registration to be used for the calculation of the quality performance. In practice, facilities and associated operations are complex, for example, a facility whose TD RFID gates are used for IN and OUT mail flow. In this case, a lot of care is needed to identify the correct and valid 1st TD registration. Another example is if items registered at the facility end up more often with K+0 transit time, which may indicate the need to check carefully if the 1st TD registration taken is the valid one.

*Action taken (see 18.1.9.1-3)*:

#### 18.1.9.1 RFID 24/7 functionality

It is the responsibility of the inbound DO and its RFID provider to ensure that the RFID infrastructure used for the GMS measurement works 24/7, the function of such RFID infrastructure is constantly monitored and there are clear contingency plans in case of its failure. MSP should monitor statistics of items registered at the facility level (AMU, OE), which can be granularized into, for example, flow, format, city, etc. This process ensures that any deviations in the statistic, e.g. lower read rate, can be traced easily to RFID functionality, changes in operations, or any other causes that may results in reduces valid items. For such deviations, the MSP should take action to resolve the detected issues.

#### 18.1.9.2 K+0-check

If items registered at the facility end up often with K+0 transit time, it may indicate severe cases of wrong identification of the valid TD registration. The calculation of the K+n standard minus 1 day has been shown to be an effective tool as a high percentage-on-time below the officially set standard could be an indicator for the repeated occurrence of the described issues. For Example, an inbound operator with a standard of K+1 normally cannot achieve a rather high percentage of items with K+0 transit time result, as its network does not support this. Therefore, an above average value for K+0 could, in this case, be an indicator the need of a more detailed analysis by MSP.

#### 18.1.9.3 Back-up TD gate

A back-up TD gate is a set of one or more RFID readers installed at the AMU/OE facility at a strategic location *after* the conventional handover/TD gate. The back-up TD gate is located where all the inbound passes by or processed (e.g. at the conveyor belt, x-ray machine, bag-opening area, operational strategic check-point, etc.). The objective of the back-up TD gate is to provide redundancy to transponder registrations in case of missed registrations at the conventional handover/TD gate (due to, for example, failure of the RFID system), that can be used to recover the otherwise would-be-loss of valid test items.

### 18.1.10 Integrity of Panel and processes

Information relating to panellists will be available only to the panel managers and not to any user or system participant.

In cases where a test letter is detected by a DO, the DO should notify the MSP, who has to exclude the panellist from the measurement and delete the test items associated to that panellist, starting from the time the relevant test item has been sent.

Any active, deliberate effort from the side of the DO, to find out the location of the panellist (especially the receiving DO) is strictly prohibited and will be treated as a serious non-conformance. The same applies to the set-up of general or local operational processes that only aim at accelerating test mail pieces (in contrast to all mail of the same type and product) or only focus on those areas where test mail

receivers are assumed to be located. Such cases must be reported to the UPU IB, which will decide about the further course of action.

A grossly negligent behaviour by a postal operator or its staff and/or the failure to actively and timely report any known information on actual or possible violations of these TD rules, is treated equal to a case of deliberate harmful interference with the GMS Data.

18.1.11 Data security and data integrity

For the sake of transparency, trust and data integrity, it is necessary to ensure that the data gathered cannot be manipulated or tampered with in any way or provide corrupt files that cannot be used for calculations.

18.1.11.1 Data capture

The secured process for capturing transponder data represents a very crucial requirement for GMS validity and integrity. Particularly important here are steps to ensure against:

- any loss of data resulting from power outages, computer viruses, electromagnetic interferences, etc.);
- the induction of “alternative” data or the introduction of “amended” data;
- the deliberate deletion of unwanted/disadvantageous data.

18.1.11.2 Data transfer

Any solution for transferring data to a central measurement database needs to ensure that the data files passing between the facility and the database cannot be accessed, altered, erased or corrupted in any way by the affected inbound postal operator. This restriction also includes any other party, whether legally or contractually connected to the postal operator, to access the transfer processes, unless it concerns the officially appointed provider(s) for required services in regards to the RFID equipment and data. Between these parties, a legally binding agreement needs to be in place, clearly defining the level of data access, the IT setup for avoiding unwanted access by the operator and a clear description of what is shared with the affected inbound postal operator. The relevant UPU bodies may, if found necessary, define minimum requirements to be respected by these agreements and the final documents need to be submitted in copy to the UPU IB for checks against requirements and archiving. Such data transfer should be sufficiently frequent to ensure that, through a back-up system, little or no data is lost.

## 19 Glossary

List of terms, acronyms/abbreviations and definitions

| Full term | Acronym/abbreviation | Explanation/description |
|---|---|---|
| Air Mail Unit/Airport Mail Unit | AMU | A facility of the DO located at an airport, whose main purpose is to receive mail dispatches destined for the inbound OE and to hand over to the airline handlers mail dispatches prepared by the outbound OE |
| Boosting | | The addition of more test letters (through permanent links or cities or formats) beyond the minimum number required for measurement purposes |
| Critical Transponder Time/Critical Tag Time | CTT | The latest agreed time during the day at which a test letter can be handed over to the inbound DO in time to be processed and delivered in accordance with the service standard for domestic letters posted on the same day |
| Delivery date | | Date recorded by the receiving panellist on which the item was delivered |
| Developing country | DC | Country which, according to the classification system developed by the United Nations Development Programme (UNDP) on the basis of various developmental indicators and factors, has generally not achieved a high level of industrialization |
| Designated postal Operator | DO | A public postal administration within the meaning of the UPU Constitution and UPU Convention, or a private postal operator providing mandatory universal delivery service |
| Dropper/dropper panellist | | Person or entity that posts test items in one country destined for another country. These test items are posted according to a pre-determined schedule |
| Grand format | G format | Large letters or flats up to ISO C4 in size<br>(305 mm x 381 mm) |
| Gate | | Piece of equipment that senses an electronic device (transponder) inside a test letter as it passes along the mail supply chain. A gate normally comprises an exciter, which queries the transponder, and a receiver, which receives a signal from the transponder. Other components include a power supply and a mechanism for transmitting the data to another device for analysis. Gates are installed at an agreed interface where responsibility for the mail in the logistical supply chain transfers from one party to another; a gate is placed in such a way as to ensure that all the items to be measured pass by or through that gate only |

| Full term | Acronym/abbreviation | Explanation/description |
|---|---|---|
| Gross domestic product | GDP | An indication of the size of a country's economy, equalling the market value of all goods and services produced by that country during a specified period (normally a year) |
| Global Monitoring System | GMS | The measurement system proposed in this document |
| Industrialized country | IC | Country which, according to a classification system developed by the United Nations Development Programme (UNDP) on the basis of various developmental indicators and factors, has achieved a high level of industrialization |
| IC–IC system | | Quality of service measurement system operating between many industrialized countries. The IC–IC system began operation in January 2005 |
| Inbound stretch | | Segment of an end-to-end measurement during which the mail is the responsibility of the inbound DO, from the moment of handover by the international transport service up to final delivery to the customer |
| Items per kilogramme | IPK | The average number of mail items in a kilogramme of mail received. This figure is used for terminal dues calculations and payments |
| Latest arrival time | LAT | The latest acceptable time of arrival that will allow delivery of received airmail items the next working day |
| Least developed country | LDC | Country which, according to a classification system developed by the United Nations Development Programme (UNDP) on the basis of various developmental indicators and factors, has achieved a low level of industrialization and requires significant developmental assistance |
| Latest mail sortation | | The latest time at which a DO has completed mail sortation and, in the case of a DO using post office boxes, all the mail for particular boxes is assumed to be available for collection |
| Office of exchange | OE | A postal sorting office, which specializes in receiving and sending cross-border mail |
| Panellist | | A designated person or body external to the DO that either sends (dropper panellist) or receives (receiver panellist) test letter items |
| Petit format | P format | Small letters up to ISO C6 in size (165 mm x 245 mm) |
| Portable data format | PDF | Format developed by Adobe Systems for compressing and exchanging documents. The format is an open standard that has widespread usage. One key feature makes it possible to send and receive documents without changing the document format |

| Full term | Acronym/abbreviation | Explanation/description |
|---|---|---|
| Postage paid indicator | PPI | Postage paid indicator |
| Priority mail | | Mail designated as priority by the sending DO |
| Project Team 3 of the Terminal Dues Project Group | PT 3 | |
| Quality of service | QoS | A large number of incoming cross-border mail items delivered on the working day following their handover to the receiving PPO in Europe or on the second working day following their handover to the receiving PPO in North America |
| Quality of Service Guide | QoS Guide | Document setting out, *inter alia*, rules and procedures relating to the determination of quality of service performance |
| Quality of Service Fund | QSF | Fund created by the Beijing Congress for financing projects aimed at improving quality of service |
| Quality of Service Project Group | QS PG | |
| Quality of service diagnostic systems | | Transponder-based system, introduced by International Postal Corporation (organization owned by several postal operators), used to measure and diagnose the quality of service provided by receiving DOs |
| Reader | | Piece of equipment that records the passage (through a gate) of transponders inserted in test letters. See also "Gate", "Radio frequency identification" and "Transponder" |
| Radio frequency identification | RFID | An automatic identification method that enables data on a storage device (transponder or tag) to be read without direct contact. The data on the transponder are transmitted to the reader by means of radio waves |
| Terminal dues | TD | See UPU Convention |
| Transponder (or tag) | | Electronic device with a unique identity (data) inserted in a test letter and whose details are recorded by a reader that registers the letter's passage along the mail processing chain |
| UPU Convention | | The UPU Convention and Regulations contain the common rules applicable to the international postal service and are binding on all UPU member countries |
| Universal service obligation | USO | Obligation of a DO, as decided by its regulator, to provide universal services to customers |
| Valid test mail item | VTMI | Test letter that has been validated and found to be correct by the entity conducting the test |

**Annexes**

## *Annex A Examples of the allocation over flows and cities of valid test mail items (VTMIs)*

The following tables give examples of the expected number of valid test mail items allocated to each flow (permanent link, Pool 1, Pool 2) and city combination. An example is given for each level (A, B, C, D and E).

These examples are based on the GDP proportions as a substitute for the real mail volumes of the flows. The city allocation is based on population proportions. The examples assume the same allocation of cities across all flows.

The tables show the allocation for the individual permanent links and the allocation for each pool. They also show the expected allocation for each chosen country link in pool 1 and each of the regions (1 to 5).

Each level has been calculated in the manner shown in the example for Level D provided earlier (see Section 4.4.3).

Example – Level A

| *Flow* | *City 1* | *City 2* | *City 3* | *City 4* | *City 5* | *City 6* | *City 7* | *City 8* | *City 9* | *City 10* | *City 11* | *City 12* | *City 13* | *City 14* | *City 15* | *Total %* | *Total VTMI* | *Expected VTMI* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total population (m) | 28.0 | 18.1 | 18.0 | 17.7 | 16.6 | 14.2 | 13.5 | 13.1 | 12.9 | 12.4 | 12.2 | 12.0 | 11.8 | 11.7 | 11.0 | | | |
| Total % | 12.5% | 8.1% | 8.1% | 7.9% | 7.4% | 6.3% | 6.0% | 5.9% | 5.8% | 5.6% | 5.5% | 5.4% | 5.3% | 5.2% | 4.9% | 100.0% | | |
| Total | 1,039 | 672 | 671 | 661 | 611 | 525 | 502 | 492 | 486 | 460 | 458 | 445 | 435 | 434 | 414 | 100.0% | 8,305 | 8,300 |
| Permanent links | 835 | 538 | 537 | 527 | 493 | 423 | 400 | 390 | 384 | 369 | 367 | 359 | 349 | 348 | 328 | 80.7% | 6,647 | 6,640 |
| Permanent link 1 | 280 | 181 | 180 | 177 | 166 | 142 | 135 | 131 | 129 | 124 | 122 | 120 | 118 | 117 | 110 | 27.1% | 2,232 | 2,230 |
| Permanent link 2 | 102 | 66 | 66 | 65 | 61 | 52 | 49 | 48 | 47 | 45 | 45 | 44 | 43 | 43 | 40 | 9.9% | 816 | 815 |
| Permanent link 3 | 62 | 40 | 40 | 39 | 37 | 31 | 30 | 29 | 29 | 27 | 27 | 27 | 26 | 26 | 24 | 6.0% | 494 | 494 |
| Permanent link 4 | 51 | 33 | 33 | 32 | 30 | 26 | 24 | 24 | 23 | 22 | 22 | 22 | 21 | 21 | 20 | 4.9% | 404 | 403 |
| Permanent link 5 | 50 | 32 | 32 | 31 | 29 | 25 | 24 | 23 | 23 | 22 | 22 | 21 | 21 | 21 | 19 | 4.8% | 395 | 395 |
| Permanent link 6 | 47 | 31 | 31 | 30 | 28 | 24 | 23 | 22 | 22 | 21 | 21 | 20 | 20 | 20 | 19 | 4.6% | 379 | 378 |
| Permanent link 7 | 47 | 31 | 31 | 30 | 28 | 24 | 23 | 22 | 22 | 21 | 21 | 20 | 20 | 20 | 19 | 4.6% | 379 | 378 |
| Permanent link 8 | 40 | 26 | 26 | 25 | 24 | 20 | 19 | 19 | 19 | 18 | 18 | 17 | 17 | 17 | 16 | 3.9% | 321 | 321 |
| Permanent link 9 | 25 | 16 | 16 | 16 | 15 | 13 | 12 | 12 | 11 | 11 | 11 | 11 | 10 | 10 | 10 | 2.4% | 199 | 197 |
| Permanent link 10 | 25 | 16 | 16 | 16 | 15 | 13 | 12 | 12 | 11 | 11 | 11 | 11 | 10 | 10 | 10 | 2.4% | 199 | 197 |
| Permanent link 11 | 19 | 12 | 12 | 12 | 11 | 9 | 9 | 9 | 9 | 8 | 8 | 8 | 8 | 8 | 7 | 1.8% | 149 | 148 |
| Permanent link 12 | 18 | 11 | 11 | 11 | 10 | 9 | 8 | 8 | 8 | 8 | 8 | 8 | 7 | 7 | 7 | 1.7% | 139 | 140 |
| Permanent link 13 | 18 | 11 | 11 | 11 | 10 | 9 | 8 | 8 | 8 | 8 | 8 | 8 | 7 | 7 | 7 | 1.7% | 139 | 140 |
| Permanent link 14 | 18 | 11 | 11 | 11 | 10 | 9 | 8 | 8 | 8 | 8 | 8 | 8 | 7 | 7 | 7 | 1.7% | 139 | 140 |
| Permanent link 15 | 17 | 11 | 11 | 11 | 10 | 9 | 8 | 8 | 8 | 8 | 8 | 7 | 7 | 7 | 7 | 1.7% | 137 | 138 |
| Permanent link 16 | 16 | 10 | 10 | 10 | 9 | 8 | 8 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 6 | 1.5% | 126 | 125 |
| Pool 1 | 154 | 99 | 99 | 99 | 88 | 77 | 77 | 77 | 77 | 66 | 66 | 66 | 66 | 66 | 66 | 14.3% | 1,243 | 1,245 |
| Pool 1 link 1–11 | 14 | 9 | 9 | 9 | 8 | 7 | 7 | 7 | 7 | 6 | 6 | 6 | 6 | 6 | 6 | 1.3% | 113 | 113 |
| Pool 2 | 50 | 35 | 35 | 35 | 30 | 25 | 25 | 25 | 25 | 25 | 25 | 20 | 20 | 20 | 20 | 5.0% | 415 | 415 |
| Region 1–5 | 10 | 7 | 7 | 7 | 6 | 5 | 5 | 5 | 5 | 5 | 5 | 4 | 4 | 4 | 4 | 1.0% | 83 | 83 |

Example – Level B

| *Flow* | *City 1* | *City 2* | *City 3* | *City 4* | *City 5* | *City 6* | *City 7* | *Total %* | *Total VTMI* | *Expected VTMI* |
|---|---|---|---|---|---|---|---|---|---|---|
| Total population (m) | 28.0 | 18.1 | 18.0 | 17.7 | 16.6 | 14.2 | 13.5 | | | |
| Total % | 22.2% | 14.4% | 14.3% | 14.0% | 13.2% | 11.2% | 10.7% | 100.0% | | |
| Total | 709 | 459 | 457 | 443 | 422 | 356 | 347 | 89.9% | 3,193 | 3,200 |
| Permanent links | 497 | 321 | 319 | 314 | 293 | 250 | 241 | 70.6% | 2,235 | 2,240 |
| Permanent link 1 | 191 | 124 | 123 | 121 | 113 | 97 | 92 | 27.1% | 861 | 860 |
| Permanent link 2 | 70 | 45 | 45 | 44 | 41 | 35 | 34 | 9.9% | 314 | 314 |
| Permanent link 3 | 42 | 27 | 27 | 27 | 25 | 21 | 20 | 6.0% | 189 | 190 |
| Permanent link 4 | 35 | 22 | 22 | 22 | 20 | 17 | 17 | 4.9% | 155 | 155 |
| Permanent link 5 | 34 | 22 | 22 | 21 | 20 | 17 | 16 | 4.8% | 152 | 152 |
| Permanent link 6 | 32 | 21 | 21 | 20 | 19 | 16 | 16 | 4.6% | 145 | 146 |
| Permanent link 7 | 27 | 18 | 17 | 17 | 16 | 14 | 13 | 4.6% | 122 | 122 |
| Permanent link 8 | 22 | 14 | 14 | 14 | 13 | 11 | 11 | 3.9% | 99 | 100 |
| Permanent link 9 | 22 | 14 | 14 | 14 | 13 | 11 | 11 | 2.4% | 99 | 100 |
| Permanent link 10 | 22 | 14 | 14 | 14 | 13 | 11 | 11 | 2.4% | 99 | 100 |
| Pool 1 | 162 | 108 | 108 | 99 | 99 | 81 | 81 | 14.3% | 738 | 736 |
| Pool 1 link 1–9 | 18 | 12 | 12 | 11 | 11 | 9 | 9 | 1.6% | 82 | 82 |
| Pool 2 | 50 | 30 | 30 | 30 | 30 | 25 | 25 | 5.0% | 220 | 224 |
| Region 1–5 | 10 | 6 | 6 | 6 | 6 | 5 | 5 | 1.0% | 44 | 45 |

Example – Level C

| *Flow* | *City 1* | *City 2* | *City 3* | *City 4* | *City 5* | *Total %* | *Total VTMI* | *Expected VTMI* |
|---|---|---|---|---|---|---|---|---|
| Total population (m) | 28.0 | 18.1 | 18.0 | 17.7 | 16.6 | | | |
| Total % | 28.4% | 18.4% | 18.3% | 18.0% | 16.9% | 100.0% | | |
| Total | 511 | 332 | 332 | 321 | 304 | 81.2% | 1,800 | 1,800 |
| Permanent links | 307 | 199 | 199 | 193 | 183 | 61.9% | 1,081 | 1,080 |
| Permanent link 1 | 134 | 87 | 87 | 85 | 80 | 27.1% | 473 | 473 |
| Permanent link 2 | 49 | 32 | 32 | 31 | 29 | 9.9% | 173 | 173 |
| Permanent link 3 | 30 | 19 | 19 | 19 | 18 | 6.0% | 105 | 105 |
| Permanent link 4 | 24 | 16 | 16 | 15 | 14 | 4.9% | 85 | 85 |
| Permanent link 5 | 24 | 15 | 15 | 15 | 14 | 4.8% | 83 | 84 |
| Permanent link 6 | 23 | 15 | 15 | 14 | 14 | 4.6% | 81 | 80 |
| Permanent link 7 | 23 | 15 | 15 | 14 | 14 | 4.6% | 81 | 80 |
| Pool 1 | 154 | 98 | 98 | 98 | 91 | 14.3% | 539 | 540 |
| Pool 1 Link 1–7 | 22 | 14 | 14 | 14 | 13 | 2.0% | 77 | 77 |
| Pool 2 | 50 | 35 | 35 | 30 | 30 | 5.0% | 180 | 180 |
| Region 1–5 | 10 | 7 | 7 | 6 | 6 | 1.0% | 36 | 36 |

Example – Level D

| *Flow* | *City 1* | *City 2* | *City 3* | *Total %* | *Total VTMI* | *Expected VTMI* |
|---|---|---|---|---|---|---|
| Total population (m) | 28.0 | 18.1 | 18.0 | | | |
| Total % | 43.7% | 28.2% | 28.1% | 100.0% | | |
| Total | 415 | 266 | 265 | 72.0% | 946 | 950 |
| Permanent links | 165 | 108 | 107 | 52.7% | 380 | 380 |
| Permanent link 1 | 61 | 40 | 39 | 27.1% | 140 | 140 |
| Permanent link 2 | 26 | 17 | 17 | 9.9% | 60 | 60 |
| Permanent link 3 | 26 | 17 | 17 | 6.0% | 60 | 60 |
| Permanent link 4 | 26 | 17 | 17 | 4.9% | 60 | 60 |
| Permanent link 5 | 26 | 17 | 17 | 4.8% | 60 | 60 |
| Pool 1 | 210 | 133 | 133 | 14.3% | 476 | 475 |
| Pool 1 Link 1–7 | 30 | 19 | 19 | 2.0% | 68 | 68 |
| Pool 2 | 40 | 25 | 25 | 5.0% | 90 | 95 |
| Region 1–5 | 8 | 5 | 5 | 1.0% | 18 | 19 |

Example – Level E

| *Flow* | *City 1* | *Total %* | *Total VTMI* | *Expected VTMI* |
|---|---|---|---|---|
| Total population (m) | 28.0 | 18.1 | | |
| Total % | 60.7% | 39.3% | 100.0% | |
| Total | 243 | 157 | 46.4% | 400 |
| Permanent links | 49 | 31 | 27.1% | 80 |
| Permanent link 1 | 49 | 31 | 27.1% | 80 |
| Pool 1 | 144 | 96 | 14.3% | 240 |
| Pool 1 link 1–5 | 36 | 24 | 3.6% | 60 |
| Pool 2 | 50 | 30 | 5.0% | 80 |
| Region 1–5 | 10 | 6 | 1.0% | 16 |

***Annex B Formulae of the Adjustment of Valid Mail Targets for Permanent Links & Pool 1***

Let

$T_{PL}$ = Test item valid target for the Permanent Links

$T_{Pool1}$ = Test item valid target for Pool 1

$P_{PL}$ = Total traffic volume for Permanent Links

$P_{Pool1}$ = Total traffic volume for Pool 1

N = Number of valid target for a permanent link for the specific Postal Operator Level

M = Number of Permanent Links for the specific Postal Operator Level

$AT_{PL}$ = Adjusted Test item valid target for the Permanent Links

$AT_{Pool1}$ = Adjusted Test item valid target for Pool 1

$IT_{PL}$ = Interim Test item valid target for the Permanent Links

| Step | Formula | Condition |
|---|---|---|
| 1 | $IT_{PL} = (T_{PL} + T_{Pool1})\ P_{PL} / (P_{PL} + P_{Pool1})$<br><br>$IT_{Pool1} = (T_{PL} + T_{Pool1})\ P_{Pool1} / (P_{PL} + P_{Pool1})$ | None |
| 2 | $AT_{PL} = N\ M$<br><br>$AT_{Pool1} = (T_{PL} + T_{Pool1}) - N\ M$ | $IT_{PL} < N\ M$ |
| 3 | $AT_{PL} = (T_{PL} + T_{Pool1})\ ) - N$<br><br>$AT_{Pool1} = N$ | $IT_{Pool1} < N$ |
| 4 | $AT_{PL} = (T_{PL} + T_{Pool1})\ P_{PL} / (P_{PL} + P_{Pool1})$<br><br>$AT_{Pool1} = (T_{PL} + T_{Pool1})\ P_{Pool1} / (P_{PL} + P_{Pool1})$ | $IT_{Pool1} \geq N$<br>and<br>$IT_{PL} \geq N\ M$ |

Examples of the Valid Mail Target Adjustments for Permanent Links & Pool 1

| Level | A | B | C | D | E |
|---|---|---|---|---|---|
| $T_{PL}$ | 6,640 | 2,240 | 1,080 | 380 | 80 |
| $T_{Pool1}$ | 1,245 | 736 | 540 | 475 | 240 |
| Sub-Total | 7,885 | 2,976 | 1,620 | 855 | 320 |
| $P_{PL}$ | 90.0% | 90.0% | 88.0% | 88.0% | 50.0% |
| $P_{Pool1}$ | 5.0% | 3.0% | 2.0% | 2.0% | 30.0% |
| Sub-Total | 95.0% | 93.0% | 90.0% | 90.0% | 80.0% |
| N | 125 | 100 | 75 | 60 | 60 |
| M | 16 | 10 | 7 | 5 | 1 |
| $IT_{PL}$ | 7,470 | 2,880 | 1,584 | 836 | 200 |
| $IT_{Pool1}$ | 415 | 96 | 36 | 19 | 120 |
| $IT_{PL}$ Less than N x M | FALSE | FALSE | FALSE | FALSE | FALSE |
| $IT_{Pool1}$ Less than N | FALSE | TRUE | TRUE | TRUE | FALSE |
| $AT_{PL}$ | 7,470 | 2,876 | 1,545 | 795 | 200 |
| $AT_{Pool1}$ | 415 | 100 | 75 | 60 | 120 |
| Sub-Total | 7,885 | 2,976 | 1,620 | 855 | 320 |

## *Annex C Performance On-Time Calculation*

### *C1.1 Performance On-Time*

The UPU GMS Technical Design is set up to measure performance at the flow-to-city level with a continuous weighting of envelope formats. The weights that are used to construct the weighting are:

– AMU/OE (simply referred here as *Office*) weight *t*, based on how many days the office was in use during the measurement period as explained in section 10.8.1.3.

– Format weight *k* as per the GMS design set as appropriate according to format definitions in Table 8.1;

– City weight *j*, if used, are based on population statistics or real mail volumes. City weighting is applied conditionally for each measured flow-city if the specific flow-city valid on target (VOT) or valid mail rate (VMR) falls below an agreed threshold.

– Flow weight *i* based on inbound total real mail in kilo's to the country (as provided by the inbound postal operator);

By combining the flow weight with the optional use of city weights, one calculates the flow to city weights that form the basis of the weighting structure.

The weighting formula begins, for a single Format, with unweighted POT normalised to office weight *t*, with, then City (if used) and finally Flow to produce the overall performance on time.

**STEP I: Format Level**

Let, *POT = Performance On Time.*

For single Format calculation:

***A. Including office-linked prorata weight***

$POT\_FlowCityFormat_{ijkt}$= *POT from Flow i to City j for Format k with office weight t.*

$$POT\_FlowCityFormat_{ijkt} = \frac{S_{ijkt}}{n_{ijkt}} \quad \text{.....(1)}$$

Where

$S_{ijkt}$ = number of On Time items from Flow i to City j for Format k with office weight t.

$n_{ijkt}$ = number of valid items from Flow i to City j for Format k with office weight t.

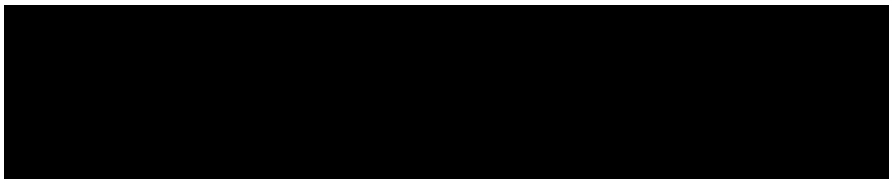
To mitigate the impact of office weight, the $POT\_FlowCityFormat_{ijkt}$ is corrected with the prorata office weight accordingly.

The office weight, $ProrataW_t$, is evaluated only if an existing office was discontinued or a new office was introduced during the measurement period. Should that be the case, the following is to be applied to the test items that were registered at the new or discontinued office during the during the measurement period, as follows;

There are two distinct time periods:

– *t1* (period 1) represents the complete measurement year from 1 January to 31 December. Assign this period *t1* =1 to represent the ratio for the entire measurement period. This ratio is assigned to each item with first inbound registration at an office that was in use for the entire measurement period.

- *t2* (period 2) represents the period (number of days) when the new or discontinued office was in use during the measurement period. Calculate period *t*2 ratio with respect to the full year and assign to each item with first inbound registration at the new or discontinued office. If more offices were introduced (i.e. new) or discontinued, each will have a separate period *t*3, *t*4, ….., *tn*.
- add periods *t1*, *t2, t3, t4, ….., tn*.
- calculate the relative weights $ProrataW_1$, $ProrataW_2$, $ProrataW_3$, $ProrataW_4$, ….., $ProrataW_n$, for each period *t1*, *t2, t3, t4, ….., tn* respectively.
- apply the $ProrataW_t$ as in Equation 1.1 below.



(1.1)

Where:

$POT\_FlowCityFormat_{ijk}$ : represents the weighted POT for period *t*>1.

$ProrataW_t$ : reflects the proportional ratio of number of calendar days that the office has been used in the reporting period.

$t = 1,2,3,....,n$ : are the distinct time periods that the office has been used in the reporting period.

Equation 1.1 is applied to all the flow-to-city inbound links with test items greater than 0.

The calculation proceeds to STEP II below.

*Example of calculating the prorata weight*

Assume a new office was opened 38 days before the end of the measurement period and a few items were registered at the new office. The respective prorata weights $ProrataW_1$ and $ProrataW_2$ for the periods *t1* and *t2* respectively, are calculated as follows:

- *t1*: ratio with respect to the number of calendar days = 365/365 = 1
- *t2*: ratio with respect to the number of calendar days = 38/365 = 0.10410959

Calculating the prorata weight contributions:

- For period *t1*: $ProrataW_1$ = 1/(1+0.10410959) = 0.9057
- For period *t2*: $ProrataW_2$ = 0.10410959/(1+0.10410959) = 0.09043

***B. Without office-linked prorata weight***

Equation 1.1 reduces to;

$$POT\_FlowCityFormat_{ijk} = \frac{S_{ijk}}{n_{ijk}} \quad \text{.....(1.2)}$$

Where

$POT\_FlowCityFormat_{ijk}$= *POT from Flow i to City j for Format k.*

$S_{ijk}$ = number of On Time items from Flow i to City j for Format k.

$n_{ijk}$ = number of valid items from Flow i to City j for Format k.

Equation 1.2 is applied to all the flow-to-city inbound links with test items greater than 0.

The calculation proceeds to STEP II below.

**STEP II: City Level**

Let, $POT\_FlowCity_{ij}$ = *Format weighted POT from Flow i to City j*

At a single City level,

$$POT\_FlowCity_{ij} = \frac{\sum_{k|n_{ijk}>0} FormatW_k (POT\_FlowCityFormat_{ijk})}{\sum_{k|n_{ijk}>0} FormatW_k} \quad \text{.....(2)}$$

Where

$FormatW_k$ = item weight for contributing Format k (set as appropriate according to format definitions in Table 8.1)

**STEP III: Flow Level**

Let, $POT\_Flow_k$ = *Format & City weighted POT for Flow i*

Flow = Each Permanent Link or All Pool 1 or All Pool 2

At a single Flow level,

$$POT\_Flow_k = \frac{\sum_{j|n_{ij.}>0} CityW_j (POT\_FlowCity_{ij})}{\sum_{j|n_{ij.}>0} CityW_j} \quad \text{.....(3)}$$

Where

$CityW_j$ = city weight for contributing city j

$n_{ij.} = \sum_k n_{ijk}$

**STEP IV: Aggregation at Country Level**

Let, $POT\_Country$ = *Format, City & Flow weighted Inbound POT for the country for all contributing Flows.*

The Country Inbound performance is therefore calculated as;

$$POT\_Country = \frac{\sum_{i|n_i..>0} FlowW_i(POT\_Flow_i)}{\sum_{i|n_i..>0} FlowW_i} \quad \text{.....(4)}$$

Where

$FlowW_i$ = Flow weight for contributing Flow i

$n_i.. \quad = \sum_j \sum_k n_{ijk}$

By combining (1.1) or (1.2) with (2), (3) and (4), to get;

$$POT\_Country = \frac{\sum_{i|n_i..>0} FlowW_i \left[ \frac{\sum_{j|n_{ij.}>0} CityW_j \left[ \frac{\sum_{k|n_{ijk}>0} FormatW_k (\frac{s_{ijk}}{n_{ijk}})}{\sum_{k|n_{ijk}>0} FormatW_k} \right]}{\sum_{j|n_{ij.}>0} CityW_j} \right]}{\sum_{i|n_i..>0} FlowW_i} \quad \text{.....(5)}$$

### *C1.2 Estimation of accuracy*

The accuracy (precision) of the POT is calculated as follows:

$$Accuracy(P) = \pm 1.96 * design\ factor * \sqrt{\frac{P(1-P)}{N}}$$

where $P$ = *POT_Country*;
$N$ = total number of valid test items.

Currently, the ***design factor*** is one (1), as in a simple random sample. This ***design factor*** should be calculated annually using an approved statistical method such as the formula in CEN (European Committee for Standardization or *Comité Européen de Normalisation*) standard EN13850.

## *Annex D Border Agency (BA)/Customs Control Correction*

### *D1.1 General Rules*

It has not yet been decided whether a Customs correction will be included in the future GMS. However, if it does allow a correction for test mail delays due to inspection, staging or treatment by Customs and/or other governmental authorities, rules and procedures will be needed.

To keep the GMS fairly simple and cost-effective, the following options should be considered before adopting a very sophisticated and costly system for Customs correction:

– acceptance of a certain off-target percentage for all participating DOs;

– no application of Customs correction;

– general allowance for DOs that have all of their mail intercepted by Customs.

This chapter describes the rules and procedures to be applied in cases where a Customs correction is based on the installation of additional diagnostic equipment (antennae gates). These rules and procedures will help to determine the cause and impact of the delay and show how to calculate the transmission times of the items affected.

These rules concern all agencies that perform a sovereign function on the behalf of the government or in accordance with legally binding federal regulations, including inter alia Customs, agricultural authorities and federal security bodies. In order to be considered for correction, the delays caused by these bodies or agencies cannot in any way be controlled or influenced by the DO of the destination country.

For the sake of simplicity, the term "Customs" is used in this chapter to refer to any of the agencies and bodies mentioned above.

The purpose of the Customs correction rule is to provide a balanced solution that serves the interests of both the sending DO and the receiving DO affected by the delays caused by the particular government agency or body. Any rule relating to Customs correction should therefore always take the valid interests of both DOs into account.

As a prerequisite for Customs correction, indisputable supporting evidence is required for each item. In other words, the correction procedure does not constitute a right of the inbound DO to be corrected for all delays, but rather offers an opportunity for correction, provided that the information is sufficient and the required procedures are followed.

The item in question therefore needs to receive both a "Customs In" and "Customs Out" reading from accepted Customs gates, since only this will ensure that any delays have indeed been caused by Customs, and not the postal operator itself. The Customs exemption from the calculation of transmission time begins with the handover to Customs and ends with handover from Customs. Items without both these readings cannot be considered for Customs correction.

Since the correction for delays caused by third parties requires a controlled process for installing RFID equipment, transparent calculation rules and the acceptance for standardized operational procedures can be covered only by the Customs correction rules. Any ad hoc activities or temporarily altered procedures which might be applied by these third-party authorities outside these standardized procedures cannot be considered for correction.

As regards Customs correction, it is particularly important to determine which party has "physical control" of the mail, rather than which has "legal responsibility" for it. Since it is the party with actual control of the mail that decides when to forward it, no correction of any kind is possible when it is the inbound postal operator exercising this control. Even if certain facility or transportation process is declared as being “under Customs control”, the physical control of the mail is the decisive factor. Customs may but may not interfere in the processing of mail and

therefore only the mail, where there is an evidence, that it was directly affected by the Customs Control, can be considered for time correction.

This physical control is also assumed to lie with the DO in cases where all or part of the mail forwarding procedure is contracted out to another entity on behalf of the DO.

Moreover, in cases where the DO staff provides these services on behalf of official agencies, delays cannot be considered for correction since the direct physical control of the mail lies with the DO (e.g. loading, unloading or internal forwarding on behalf of Customs). However, where the solely dedicated and specifically trained (by official government agency) DO staff provide the customs check on behalf of Customs, the corrections are allowed.

Experience has shown that the inbound processing of mail in some countries is subjected to multiple Border Agency (BA) control at various stages of the processing (e.g. security- or drug-check at the AMU and then the Customs-/fiscal-check at OE). If such BA control always takes place at the dedicated and clearly marked places with “Customs In” and “Customs Out” RFID-gates and reads, then the multiple BA correction can be implemented. In such cases, the basic rules for the customs correction (see below) also apply. In all cases, the implementation of BA correction is done after a site survey process and subsequent approval by the relevant UPU Bodies.

The DO requesting a Customs correction is responsible for providing all the information needed to document, assess and grant the request. Any failure to provide this information cannot be justified by the fact that the DO may not have the right to reveal this information (e.g. information classified as confidential) or does not have access to the information. Since the lack of important information would prevent the respective UPU bodies from fully documenting and reviewing the situation, there is the risk that the Customs correction process might not ensure that the sending countries' interests are safeguarded. The Customs correction process would therefore have to be suspended until this information was available.

The DO is required to inform the relevant UPU bodies of any changes in logistics, handover times, procedures, etc. that may impact the validity of the location of the Customs gates or the applied Customs correction procedure. In general, these UPU bodies should be involved not only after the changes have come into effect, but sufficiently before them as well. This will allow all the parties involved to determine whether some or all elements of the Customs correction need to be implemented (e.g. calculation rules, CTTs, location of Customs gates, time allowances, etc.).

If any of the above changes have not been properly communicated by the DO concerned or not communicated in time to allow the assessment or adjustment to be completed, the Customs correction in question will not be made. In cases where the relevant UPU bodies receive this information only after the changes have been implemented, the Customs correction will end on the day on which the changes take effect.

The dismantling or removal of the RFID equipment at Customs gates without prior authorization by the relevant UPU body will also result in suspension of the Customs correction procedure for the DO.

The Customs correction will resume as soon as the Customs correction procedure has been completed and accepted.

The CTT, CTT-1, as well as any "time allowances" $\Delta t$ (see below) must be defined clearly during the relevant site survey.

### *D1.2 Installation of RFID gates for purposes of Customs correction*

Any application of the Customs correction process requires very accurate information on the precise time that a third party takes control of the test item and the precise time that this direct control ends. Since all the information provided by the transponder readings will be used for the calculation as part of an automated process, it will not be possible to evaluate specific or deviating cases on a day-by-day basis.

RFID gates are needed to determine the exact locations where this handover of direct control takes place. In principle, two general scenarios are possible:

– passage through: items enter the Customs area through one door and leave through another (at least two gates required);

– circular passage: items enter and leave the Customs area through the same door (at least one gate required).

The appropriate location of the gates depends on the relevant operational processes as well as the layout of the facility, and might be influenced by the practical limitations of the RFID technology used (e.g. metal structures nearby, low ceiling, etc.).

Any designated staging area for mail before entering the Customs-In gate is to be considered belonging to Customs. Similarly, any designated area after the Customs-Out for which a Customs RFID registration can still take place, is to be considered part of the Customs-controlled zone. The Customs-In and –Out gates mark the customs zone.

For determining the appropriate location for the RFID Customs gates, in principle the same rules apply as those for installing RFID terminal dues gates. These include, among other things, site surveys for Levels A to C DOs or the remote assessment process upon request for Levels D and E DOs, the required documentation and the transparent decision-making process.

However, the Customs gates installation process is not an integral part of the regular site survey process and needs to be specifically requested in order to be applied. A joint site survey process that covers both areas (terminal dues gates and Customs gates) might benefit some countries but is not envisioned as a standard.

All related costs are to be borne by the DO requesting the Customs gates, including among other things:

– RFID Customs gates for all necessary equipment;

– travel costs for all participants in the process;

– labour costs of all representatives required for installation process.

### *D1.3 Setting of CTTs in connection with the Customs correction*

Any CTT in a terminal dues system indicates the latest time by which items need to be registered at the terminal dues gate to ensure delivery by the receiving DO on the next defined delivery day. It is therefore an important deadline for both the receiving DO and sending DO, since it determines, for example, the flights that can be used and the processing deadlines that apply to the sending DO's office of exchange.

Merely applying the regular CTT (terminal dues gate) at a later point in the process (at the Customs-Out gate) would not address the valid interests and needs of the sending DOs and customers for the following reasons:

– the CTT is regularly set on the basis of all processes in the receiving country in order for the mail to be delivered on next scheduled delivery day. Moving the CTT to a later point in the process (after Customs-Out gate) would ignore important postal processes that could happen before the Customs, and therefore giving undue advantage for the receiving DO.

– experience has shown that the time the mail spend in Customs can vary significantly from a few minutes to many days, for which the DO has no control. Thus, a fixed time allowance ( $\Delta t$ ) cannot be predetermined and added to the CTT. This would penalize the receiving DO for possible delays caused by Customs.

Therefore, the setting of CTTs in connection with the Customs correction needs to consider the following;

– the identified handover point as the correct CTT point;

– exclude (from transit time) the time when the mail spends in a customs facility between the Customs-In and the Customs-Out gates, namely, Customs In Time (CIT) and Customs Out Time (COT) respectively;

– for cases where there is DO operations before the Customs facility and/or between multiple Customs facilities, a fixed time allowance ($\Delta t$) before and/or between the Customs facilities needs to be determined as part of the site survey process. The fixed time allowance ($\Delta t$) enables the DO to perform their operations and present the mail to the customs within the given ($\Delta t$) for which failure to do so results in no customs correction. This is to ensures that the receiving DO operations before the Customs are done swiftly and efficiently, which is also fair for the sending DO;

– at the last Customs facility, the item's COT is compared with the latest "Local Processing Time" (LPT) of the DO's domestic operations for further processing of the mail from the Customs facility. If COT is after LPT, receiving DO gains an extra time (transit time resumes counting from beginning of COT+1 day) is awarded. If COT is before LPT, no extra time is awarded and transit time resumes counting from COT onwards;

– an item is therefore customs corrected by:

  - excluding all the time spent in Customs (between CIT and COT) in all facilities;
  - excluding the extra time if COT is after LPT;

In particular, the fact that the sending DO, in this case, can no longer rely on the CTT as the ultimate guarantee that the items will be delivered on the next scheduled delivery day creates uncertainty that adversely affects general quality of service.

The following examples illustrate what happens with and without Customs correction using the same CTT applied at the Customs-Out gate:

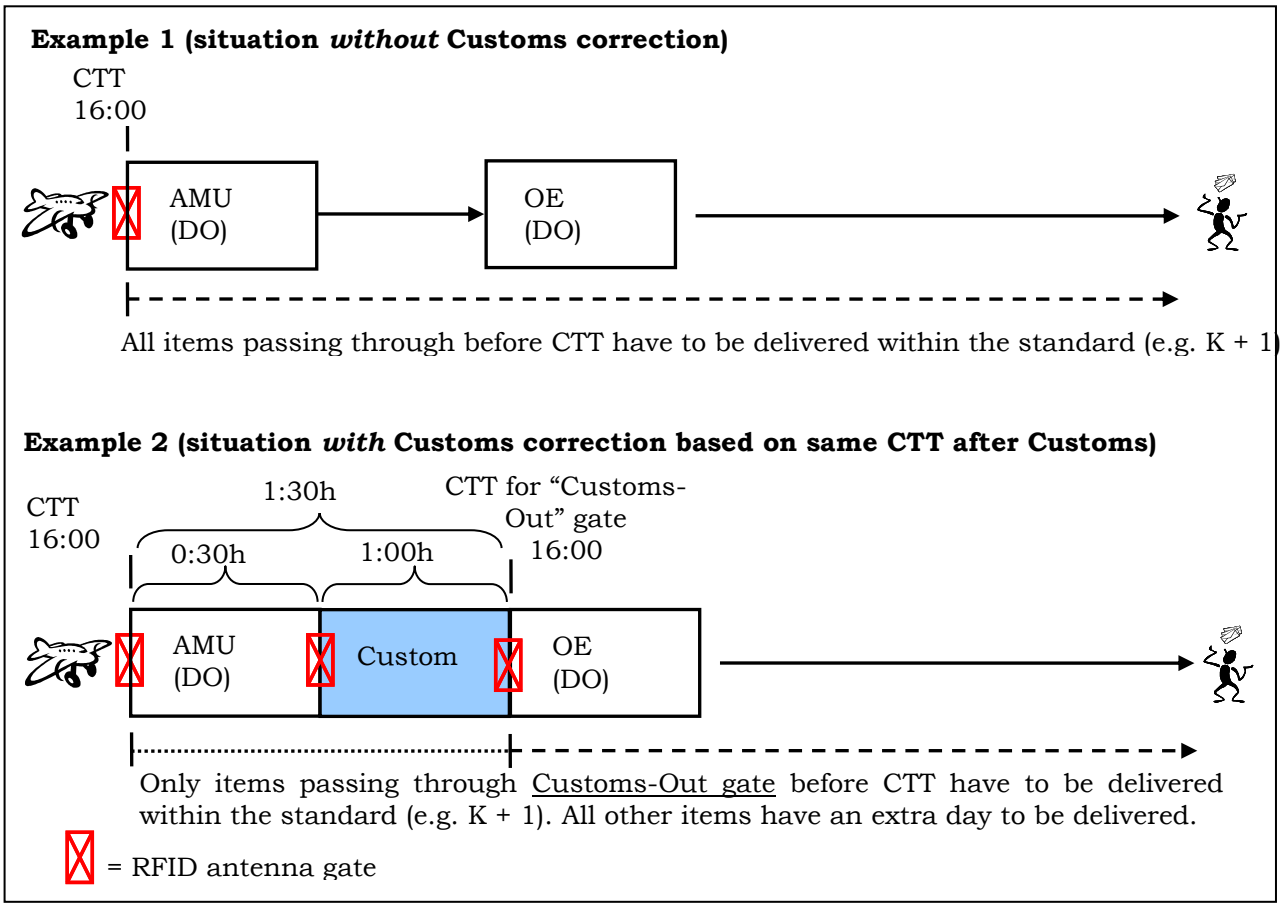



*Figure D.1 Applying CTT at Customs-Out gate*

All CTTs used in the Customs correction procedure therefore need to take in account the expected processing time at Customs and all possible DO operations carried out prior to handover of the mail to Customs.

In practical terms, the defined "time allowances"($=\Delta t$) (see also below) would be determined for both the Customs procedure and the DO operations, as part of the scheduled site survey process. The time allowances should be set in such a way as to provide a good balance between the regular average processing times and the reasonable interests of the sending DO.

These time allowances ($\Delta t$) are added to the regular CTT of the receiving country for the office of exchange in question and represent the "Customs-adjusted CTT"($=CTT+\Delta t$), which is then be applied at the Customs-Out gate to determine whether or not the items are on time.

This procedure will ensure that the Customs-adjusted CTT is set so that all mail received by the regular CTT can be processed and forwarded by the receiving DO the same day. Since the Customs-adjusted CTT would, in most cases, apply to the rather limited volumes passing through Customs, this is not seen as too demanding a requirement for the receiving DO.[1]

For countries that screen all items, a certain degree of relaxation might be allowed.

[1] Since the regular CTT is set so as to ensure that all mail arriving by that deadline will be delivered on the next scheduled delivery day, it can be assumed that the receiving DO can, in principle, process additional small volumes afterwards and still meet the delivery standard.

### *D1.4 Calculation of results*

This section covers the rules governing the various Customs situations. In general, there are three scenarios possible:

*i* *standard process without Customs correction;*

*ii* *standard process with Customs correction in a single facility;*

*iii* *standard process with Customs correction in a multiple facilities;*

#### *D1.4.1 Standard process without Customs correction*

The outbound process ends and the inbound process begins at the agreed handover point in the inbound country, usually at the point of entry to an airmail unit (AMU) or office of exchange (OE). The handover point marked ☒ below is equipped with an RFID device (one or more antennas and readers) which is used for the Terminal Dues (TD) purposes, and is the point of CTT (i.e. start of transit time counting).

In this example, Customs clearance may or may not be carried out in the receiving DO facility, but no correction has been requested or the request has not been implemented. The DO has responsibility of mail from handover onwards.

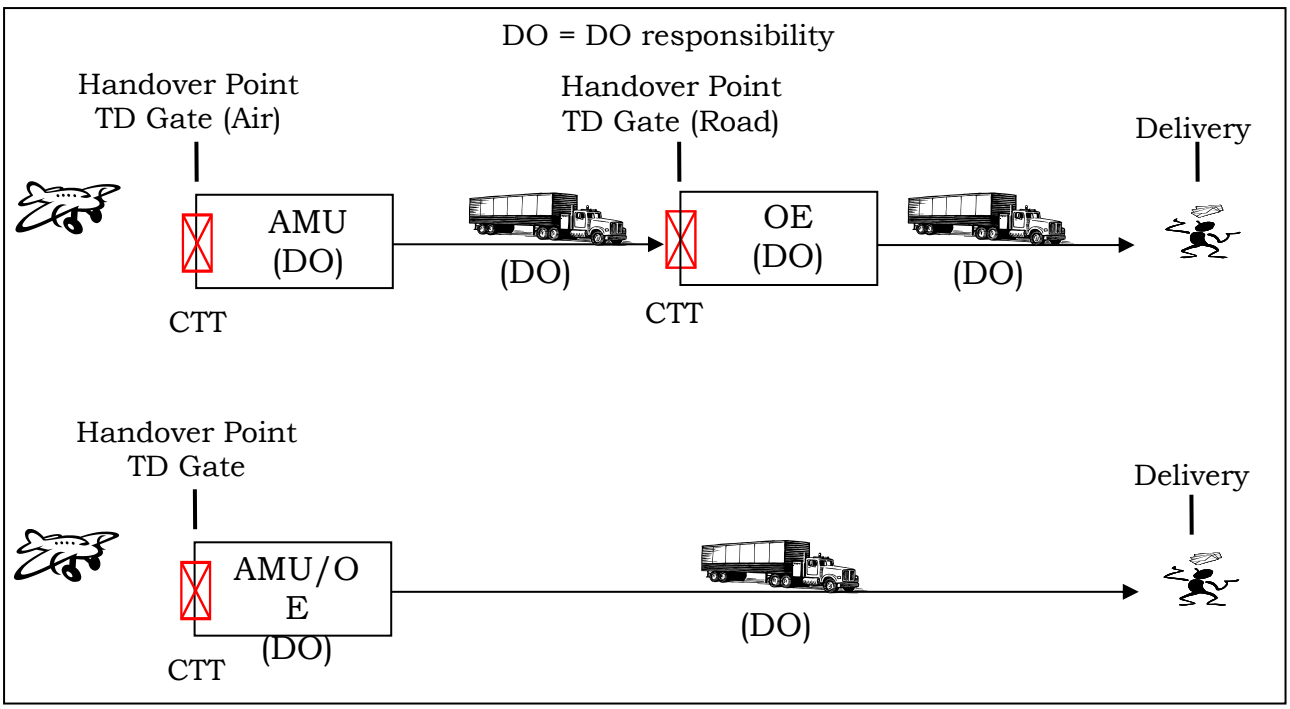



*Figure D.2 Standard process without Customs correction*

All mail received after CTT on a given day is considered to have arrived before the next CTT (usually the following day). That is, there is CTT adjustment to the next immediate available CTT.
All mail received before CTT on a given day, there is not CTT adjustment.

### *D1.4.2 Standard process with Customs correction in a single facility*

Generally, Customs correction in a single facility involves the DO receiving the mail from abroad and forwarding to the customs directly or performing some operations (e.g. processing and/or transportation) prior to the mail being presented to the Customs. The time taken for the DO responsibility ($\Delta t_{DO\ responsibility}$) prior to the Customs varies from country to country. For a DO receiving mail from abroad and directly forwarding to the customs, $\Delta t_{DO\ responsibility} = 0$, otherwise it is greater than zero. This time needs to be determined as part of the site survey process.

In most cases, border agency (BA) customs control is done centrally in a single facility. A country may have several airports within the city where mail is received and forwarded to the central BA control centre, usually the OE.

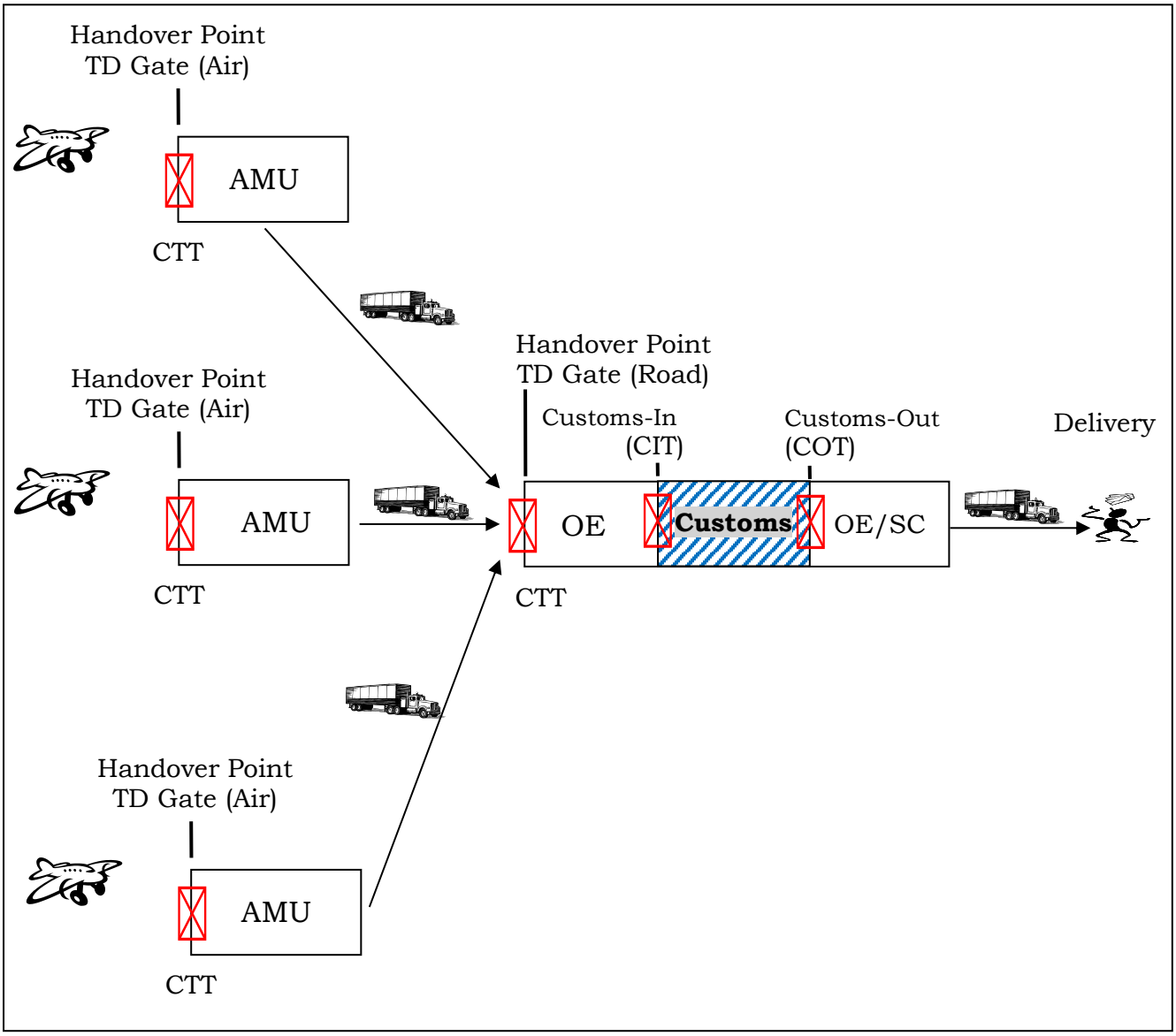



*Figure D.3.1 Customs correction in a single facility (multiple AMU's)*

All mail destined for delivery in the receiving country will be forwarded to the OE where it may be subjected to BA customs control. This can be represented in Figure D.3.2 below.

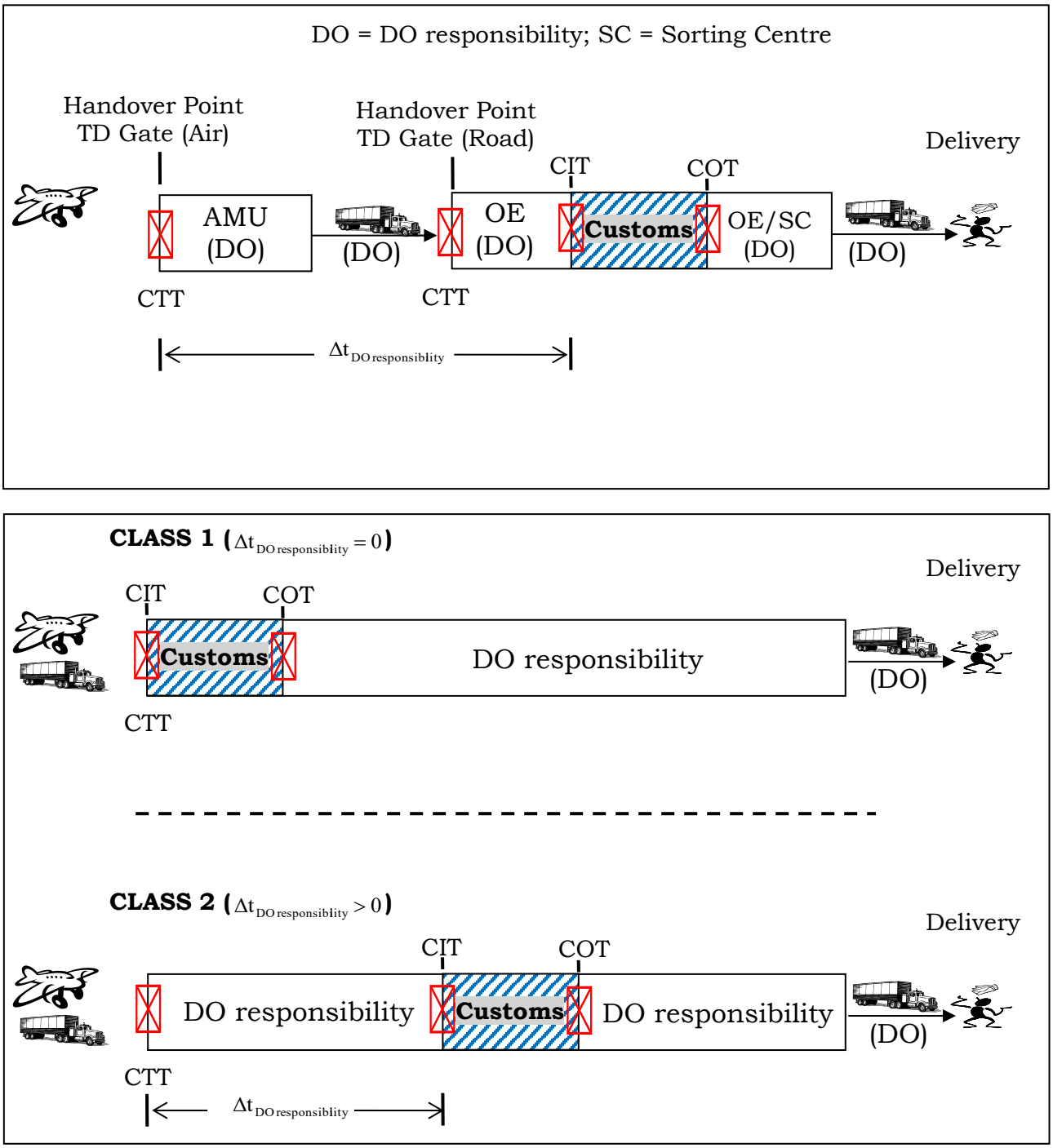



*Figure D.3.2 Customs correction in a single facility*

**CLASS 1** practical examples where $\Delta t_{DO\ responsibility} = 0$ is when all inbound mail in mailbags need to be presented to the BA customs control (e.g. dogs sniffing for drugs, etc.), and some cases for bags to be opened in the presence of BA control. In this example, a DO receives mail at the handover point, however the mail (is staged and) cannot be processed by the DO until cleared by the BA control.

**CLASS 2** practical examples where $\Delta t_{DO\ responsibility} > 0$ is when mail bag labels are scanned, sorted according to various criteria (e.g. letters, parcels, EMS, Priority, Economy, ID (with barcode), non-ID (without barcode) etc. and or transported by the DO before presenting to BA customs control. During the site survey process, $\Delta t$ can be determined (e.g. 2 hours).

**BA agency Custom Correction mechanism**

**CLASS 1**
Logical concept

Only items "passing through"(= transponder registration) at both the Customs-In [CIT] and Customs-Out [COT] gates would qualify for Customs correction.

- $\Delta t_{DO\ responsibility} = 0$, therefore CIT = CTT.
- Transit time clock begins and stops at CTT/CIT;
- Item comes out at COT;
- If $COT < LPT$, all time the item spent in Customs (CIT to COT) is excluded from the transit time. No *extra time* is awarded and so transit time counting resumes from COT.

*Example 1-1: same day RFID registrations* (*before CTT*)
CTT = 15:00
LPT = 18:00
$\Delta t_{DO\ responsibility} = 0$
Handover TD read = 14:45
CIT = 14:50
COT = 16:15 (*which is after CTT but before LPT*)

***BA customs correction***: Transit time clock begins and stops at 14:45. The time spent in Customs (CIT to COT) is excluded. Transit time clock resumes at 16:15.

*Example 1-2: same day RFID registrations* (*before CTT*)
CTT = 15:00
LPT = 18:00
$\Delta t_{DO\ responsibility} = 0$
Handover TD read = 14:45;
CIT = 14:50
COT = 18:30 (*which is both after CTT and LPT*)

***BA customs correction***: Transit time clock begins and stops at 14:45. The time spent in Customs (CIT to COT) is excluded. *Extra time* is awarded from 18:30 of COT day to 00:00:00 of COT+1 day (or next available day with CTT). This means transit time counting resumes at 00:00:00.

*Example 1-3: same day RFID registrations* (*after CTT*)
CTT = 15:00
LPT = 18:00
$\Delta t_{DO\ responsibility} = 0$

Handover TD read = 15:45;
CIT = 15:50
COT = 18:30 (*which is both after CTT and LPT*)

***BA customs correction***: No correction; the *after* CTT adjustment takes precedence.

*Example 1-4: different days of RFID registrations* (*before CTT*)
CTT = 15:00
LPT = 18:00
$\Delta t_{DO\ responsibility} = 0$
Handover TD read = 14:45 (Thursday);
CIT = 14:50 (Thursday)
COT = 18:30 (next week Tuesday)(*COT is both after CTT and LPT*)

***BA customs correction***: Transit time clock begins and stops at 14:45 (Thursday). The time spent in Customs (CIT to COT) is excluded. *Extra time* is awarded from 18:30 Tuesday to 00:00:00 Wednesday (or next available day with CTT). This means transit time counting resumes at 00:00:00.

**CLASS 2**
Logical concept

Only items "passing through"(= transponder registration) at both the Customs-In [CIT] and Customs-Out [COT] gates would qualify for Customs correction.

- $\Delta t_{DO\ responsibility} > 0$, therefore CIT ≠ CTT.
- Transit time clock begins at CTT;
- Item is then registered at CIT. If $CIT < CTT + \Delta t_{DO\ responsibility}$, Transit time clock stops at CIT.
- Item comes out at COT, and the application of BA control correction mechanism depends on the COT-LPT check as explained in CLASS 1;

*Example 2-1: same day RFID registrations* (*before CTT*)
CTT = 16:00
LPT = 19:00
$\Delta t_{DO\ responsibility} = 2$ hours
Handover TD read = 15:00
CIT = 16:30 (*DO forwarded mail to customs within* $\Delta t_{DO\ responsibility}$ *time, i.e. 1.5 hours*).
COT = 18:55 (*which is after CTT but before LPT*)

***BA customs correction***: Transit time clock begins at 14:45 and stops at 16:30. The time spent in Customs (CIT to COT) is excluded. Transit time clock resumes at 18:55.

*Example 2-2: same day RFID registrations* (*before CTT*)
CTT = 16:00
LPT = 19:00
$\Delta t_{DO\ responsibility} = 2$ hours
Handover TD read = 15:00;
CIT = 16:30
COT = 19:05 (*which is both after CTT and LPT*)

***BA customs correction***: Transit time clock begins at 14:45 and stops at 16:30. The time spent in Customs (CIT to COT) is excluded. Transit time clock resumes at 19:05. *Extra time*

is awarded from 19:05 of COT day to 00:00:00 of COT+1 day (or next available day with CTT). This means transit time counting resumes at 00:00:00.

*Example 2-3: same day RFID registrations* (*after CTT*)

CTT = 16:00
LPT = 19:00
$\Delta t_{\text{DO responsibility}} = 2$ hours
Handover TD read = 16:05;
CIT = 18:00
COT = 18:57 (*which is both after CTT but before LPT*)

***BA customs correction***: No correction; the *after* CTT adjustment takes precedence.

*Example 2-4: different days of RFID registrations* (*before CTT*)

CTT = 16:00
LPT = 19:00
$\Delta t_{\text{DO responsibility}} = 2$ hours
Handover TD read = 13:00 (Wednesday);
CIT = 18:00 (Wednesday)(*DO did not forward mail to customs within* $\Delta t_{\text{DO responsibility}}$ *time, i.e. took 5 hours instead of 2 hours*).
COT = 18:56 (next week Monday)(*COT is both after CTT and LPT*)

***BA customs correction***: Transit time clock begins at 13:00 (Wednesday). No Customs correction is applied since DO failed its responsibility in forwarding the mail to BA control within the required time.

In general, an item qualifies for a CLASS 2 BA control correction only if the condition $CIT < CTT + \Delta t_{\text{DO responsibility}}$ is fulfilled, otherwise automatically not. If the condition is fulfilled, the time spent in Customs (CIT to COT) is excluded as basis, and possibly an *extra time* awarded if the condition $COT > LPT$ is true.

### *D1.4.3 Standard process with Customs correction in multiple facilities*

Unlike border agency (BA) customs processes centralised in one facility, some countries may have several BA customs process centres. This can take the form of pre-/primary customs inspections in one facility followed by an extensive main-/secondary customs inspection in another facility. In most, if not all cases, cargo identified by the primary customs requiring to go to the secondary customs is transported by the DO. That means the DO has responsibility over the transportation until the cargo is handed over to the main-/secondary customs facility.

Customs correction in multiple BA customs facility generally involve an interchange of responsibilities between the DO and BA customs for which a clear identification of whose responsibility is required from the time the mail is received until it is delivered to the final recipient. This needs to be determined as part of the site survey process, as shown schematically in Figure D 3.3 below.

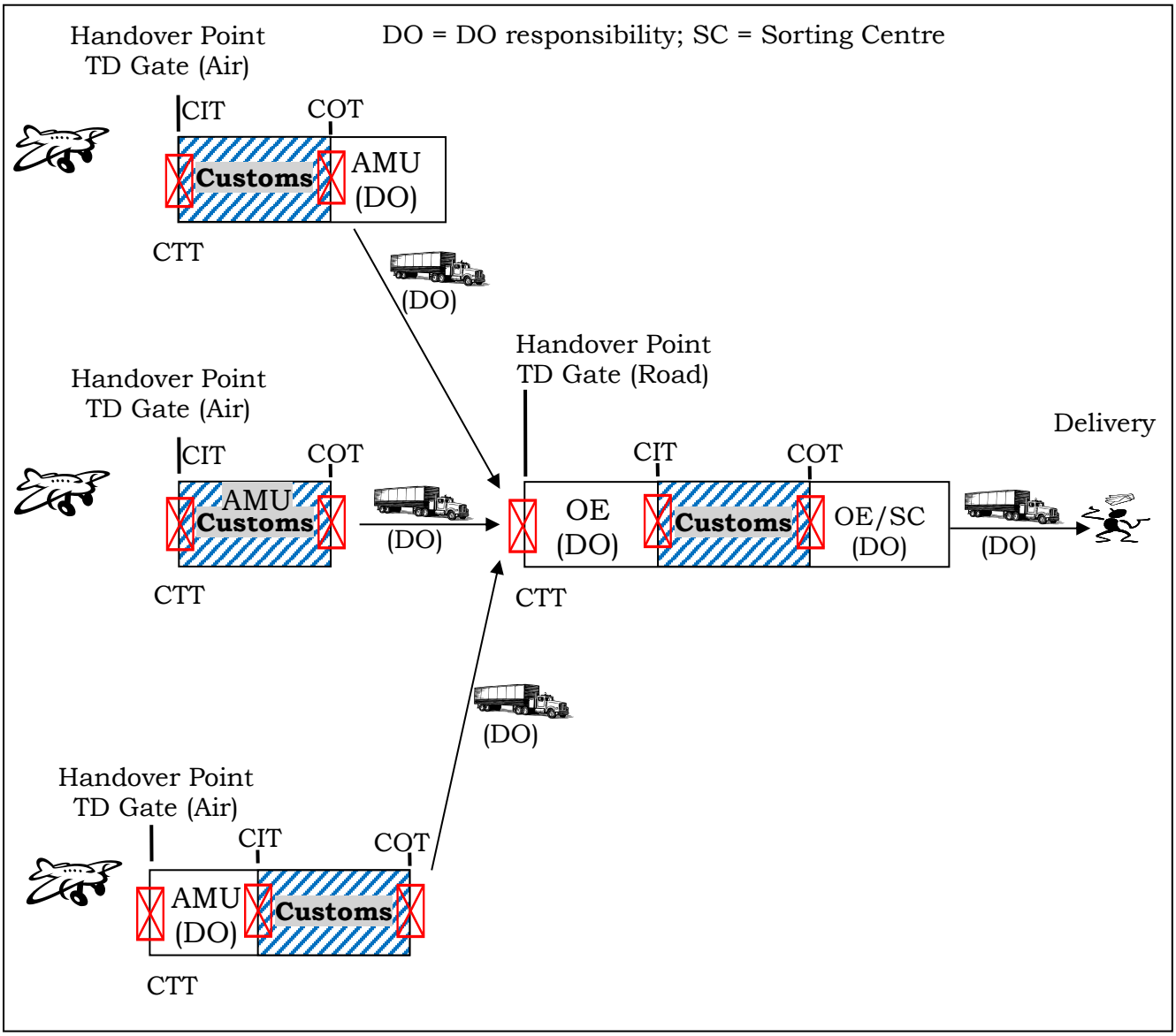



*Figure D.3.3 Customs correction in multiple BA customs facilities*

All mail destined for delivery in the receiving country will be moved from the pre-/primary customs to the main-/secondary customs for inspection, represented schematically as in Figure D.3.4 below.

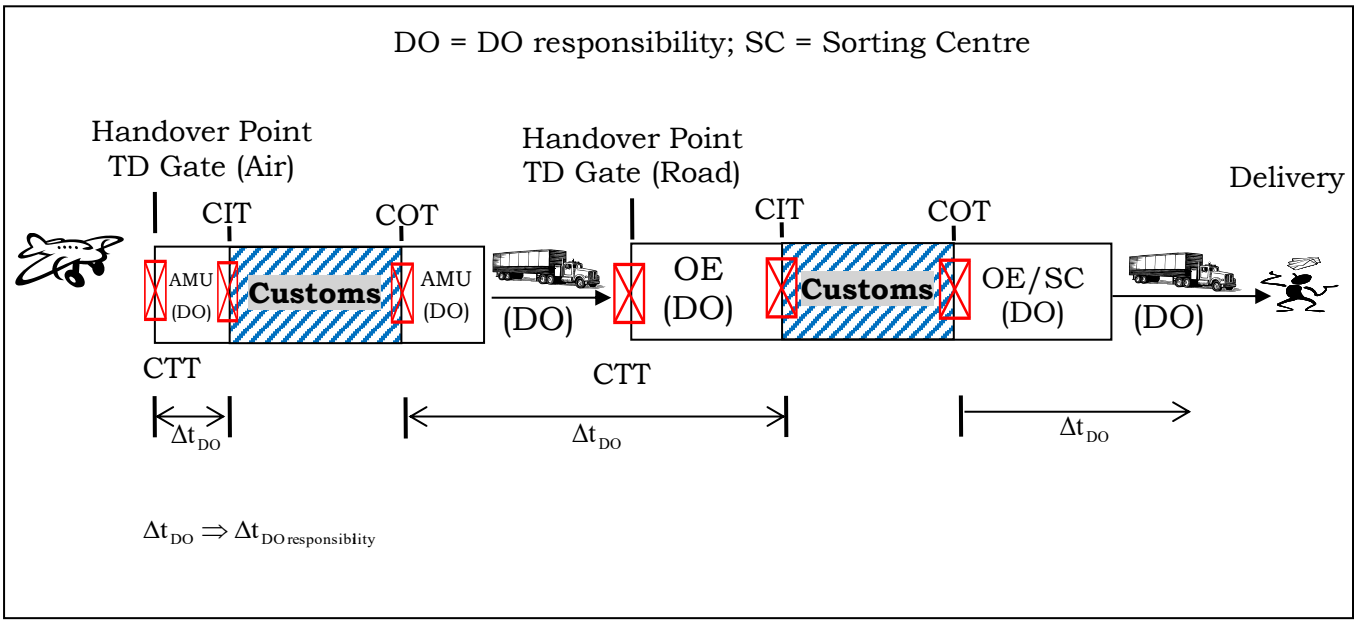



*Figure D.3.4 Customs correction in multiple BA customs facilities: correction schema*

The BA customs correction procedure in multiple facilities can involve **CLASS 1** and/or **CLASS 2** configuration at each facility. The basic principles however remain that;

- CTT is always the handover point.
- $\Delta t_{DO\ responsibility}$ is assigned appropriately.
- Transit time clock begins at CTT and stops at CIT and resumes at the next COT.
- Item comes out at COT;
- The following conditions are checked and executed appropriately;
  - for the first CIT-COT, apply **CLASS 1** or **CLASS 2** correction procedure accordingly.
  - for the next CIT-COT, transit time clock stops at CIT and;
    - check if the condition $CIT < COT(previous) + \Delta t_{DO\ responsibility}(previous)$ is true.
      - If condition above is true, the time spent in that particular Customs (CIT to COT) is excluded and transit time clock resumes at COT. *Extra time* is NOT awarded.
      - If condition above is false, no correction and transit time clock resumes at CIT of the current office.
  - for the last CIT-COT, transit time clock stops at CIT and;
    - check if the condition $CIT < COT(previous) + \Delta t_{DO\ responsibility}(previous)$ is true.
      - If the condition above is true, the time spent in that last Customs (CIT to COT) is excluded and possibly an *extra time* awarded if the condition $COT > LPT$ is true as explained in preceding section.

In summary, the BA customs correction procedure in multiple facilities involves "starting and stopping" the transit time clock to check certain conditions for all the operations/transportation where $\Delta t_{DO\ responsibility}$ is concerned. Only the last BA customs correction is the LPT condition evaluated.

## *Annex E Distribution of Gross Domestic Product (GDP)*

Distribution of GDP[1]

| Designated Operator of | ISO code | GDP amalgam | GDP % | No |
|---|---|---|---|---|
| United States of America | US | 12,455,068 | 27.1% | 1 |
| Japan | JP | 4,533,965 | 37.0% | 2 |
| Germany | DE | 2,794,926 | 43.0% | 3 |
| China (People's Rep.) | CN | 2,234,297 | 47.9% | 4 |
| United Kingdom (Great Britain & N. Ireland) | GB | 2,198,789 | 52.7% | 5 |
| France | FR | 2,126,630 | 57.3% | 6 |
| France | FR | 2,126,630 | 61.9% | 7 |
| Italy | IT | 1,762,519 | 65.8% | 8 |
| Spain | ES | 1,124,640 | 68.2% | 9 |
| Canada | CA | 1,113,810 | 70.6% | 10 |
| India | IN | 805,714 | 72.4% | 11 |
| Brazil | BR | 796,055 | 74.1% | 12 |
| Korea (Rep.) | KR | 787,624 | 75.8% | 13 |
| Mexico | MX | 768,438 | 77.5% | 14 |
| Russian Federation | RU | 763,720 | 79.2% | 15 |
| Australia | AU | 700,672 | 80.7% | 16 |
| Netherlands | NL | 594,755 | 82.0% | 17 |
| Switzerland | CH | 365,937 | 82.8% | 18 |
| Belgium | BE | 364,735 | 83.6% | 19 |
| Turkey | TR | 363,300 | 84.4% | 20 |
| Sweden | SE | 354,115 | 85.1% | 21 |
| Saudi Arabia | SA | 309,778 | 85.8% | 22 |
| Austria | AT | 304,527 | 86.5% | 23 |
| Poland | PL | 299,151 | 87.1% | 24 |
| Indonesia | ID | 287,217 | 87.8% | 25 |
| Norway | NO | 283,920 | 88.4% | 26 |
| Denmark | DK | 254,401 | 88.9% | 27 |
| South Africa | ZA | 240,152 | 89.5% | 28 |
| Greece | GR | 213,698 | 89.9% | 29 |
| Ireland | IE | 196,388 | 90.3% | 30 |
| Iran (Islamic Rep.) | IR | 196,343 | 90.8% | 31 |
| Finland | FI | 193,176 | 91.2% | 32 |
| Argentina | AR | 183,309 | 91.6% | 33 |
| Thailand | TH | 176,602 | 92.0% | 34 |
| Portugal | PT | 173,085 | 92.4% | 35 |
| Venezuela (Bolivarian Rep.) | VE | 138,857 | 92.7% | 36 |
| Malaysia | MY | 130,143 | 92.9% | 37 |
| Israel | IL | 123,434 | 93.2% | 38 |
| Czech Rep. | CZ | 122,345 | 93.5% | 39 |
| Colombia | CO | 122,309 | 93.7% | 40 |
| Singapore | SG | 116,764 | 94.0% | 41 |
| Chile | CL | 115,248 | 94.2% | 42 |
| Pakistan | PK | 110,732 | 94.5% | 43 |
| Hungary (Rep.) | HU | 109,154 | 94.7% | 44 |
| New Zealand | NZ | 109,041 | 95.0% | 45 |
| Philippines | PH | 104,204 | 95.2% | 46 |

[1]Year 2008

| Designated Operator of | ISO code | GDP amalgam | GDP % | No |
|---|---|---|---|---|
| United Arab Emirates | AE | 102,257 | 95.4% | 47 |
| Algeria | DZ | 100,257 | 95.6% | 48 |
| Nigeria | NG | 98,559 | 95.8% | 49 |
| Romania | RO | 98,306 | 96.1% | 50 |
| Egypt | EG | 89,336 | 96.3% | 51 |
| Ukraine | UA | 81,664 | 96.4% | 52 |
| Peru | PE | 78,431 | 96.6% | 53 |
| Kuwait | KW | 74,658 | 96.8% | 54 |
| Bangladesh | BD | 59,958 | 96.9% | 55 |
| Kazakhstan | KZ | 56,088 | 97.0% | 56 |
| Viet Nam | VN | 52,408 | 97.1% | 57 |
| Morocco | MA | 51,745 | 97.2% | 58 |
| Slovakia | SK | 46,412 | 97.3% | 59 |
| Cuba | CU | 39,840 | 97.4% | 60 |
| Libya | LY | 38,756 | 97.5% | 61 |
| Croatia | HR | 37,412 | 97.6% | 62 |
| Ecuador | EC | 36,244 | 97.7% | 63 |
| Slovenia | SI | 34,030 | 97.7% | 64 |
| Luxembourg | LU | 33,779 | 97.8% | 65 |
| Guatemala | GT | 31,683 | 97.9% | 66 |
| Belarus | BY | 29,566 | 98.0% | 67 |
| Tunisia | TN | 28,683 | 98.0% | 68 |
| Qatar | QA | 28,451 | 98.1% | 69 |
| Dominican Republic | DO | 28,303 | 98.1% | 70 |
| Angola | AO | 28,038 | 98.2% | 71 |
| Sudan | SD | 27,699 | 98.3% | 72 |
| Bulgaria | BG | 26,648 | 98.4% | 73 |
| Syrian Arab Rep. | SY | 26,320 | 98.4% | 74 |
| Lithuania | LT | 25,495 | 98.5% | 75 |
| Oman | OM | 24,284 | 98.5% | 76 |
| Sri Lanka | LK | 23,479 | 98.6% | 77 |
| Lebanon | LB | 22,210 | 98.6% | 78 |
| Costa Rica | CR | 19,432 | 98.7% | 79 |
| Kenya | KE | 17,977 | 98.7% | 80 |
| Cameroon | CM | 16,985 | 98.8% | 81 |
| El Salvador | SV | 16,974 | 98.8% | 82 |
| Uruguay | UY | 16,792 | 98.8% | 83 |
| Cote d'Ivoire (Rep.) | CI | 16,055 | 98.9% | 84 |
| Latvia | LV | 15,771 | 98.9% | 85 |
| Panama (Rep.) | PA | 15,467 | 98.9% | 86 |
| Cyprus | CY | 15,418 | 99.0% | 87 |
| Iceland | IS | 15,036 | 99.0% | 88 |
| Trinidad and Tobago | TT | 14,762 | 99.0% | 89 |
| Yemen | YE | 14,452 | 99.1% | 90 |
| Uzbekistan | UZ | 13,667 | 99.1% | 91 |
| Montenegro (Rep.) | ME | 13529.5 | 98.3% | 92 |
| Serbia (Rep.) | RS | 13529.5 | 98.3% | 93 |
| Estonia | EE | 13,107 | 99.1% | 94 |
| Myanmar | MM | 13,002 | 99.2% | 95 |
| Bahrain (Kingdom of) | BH | 12,995 | 99.2% | 96 |
| Jordan | JO | 12,861 | 99.2% | 97 |
| Iraq | IQ | 12,602 | 99.2% | 98 |

| Designated Operator of | ISO code | GDP amalgam | GDP % | No |
|---|---|---|---|---|
| Azerbaijan | AZ | 12,561 | 99.3% | 99 |
| Tanzania (United Rep.) | TZ | 12,111 | 99.3% | 100 |
| Brunei Darussalam | BN | 11,438 | 99.3% | 101 |
| Ethiopia | ET | 11,174 | 99.3% | 102 |
| Ghana | GH | 10,695 | 99.4% | 103 |
| Jamaica | JM | 9,696 | 99.4% | 104 |
| Bosnia and Herzegovina | BA | 9,369 | 99.4% | 105 |
| Botswana | BW | 9,350 | 99.4% | 106 |
| Bolivia | BO | 9,334 | 99.4% | 107 |
| Uganda | UG | 8,712 | 99.5% | 108 |
| Albania | AL | 8,379 | 99.5% | 109 |
| Senegal | SN | 8,318 | 99.5% | 110 |
| Paraguay | PY | 8,152 | 99.5% | 111 |
| Gabon | GA | 8,055 | 99.5% | 112 |
| Honduras (Rep.) | HN | 7,976 | 99.6% | 113 |
| Nepal | NP | 7,346 | 99.6% | 114 |
| Zambia | ZM | 7,257 | 99.6% | 115 |
| Afghanistan | AF | 7,168 | 99.6% | 116 |
| Democratic Republic of the Congo | CD | 6,974 | 99.6% | 117 |
| Turkmenistan | TM | 6,774 | 99.6% | 118 |
| Mozambique | MZ | 6,630 | 99.6% | 119 |
| Mauritius | MU | 6,447 | 99.7% | 120 |
| Georgia | GE | 6,395 | 99.7% | 121 |
| Namibia | NA | 6,126 | 99.7% | 122 |
| North Macedonia (Rep.) | MK | 5,762 | 99.7% | 123 |
| Malta | MT | 5,570 | 99.7% | 124 |
| Bahamas | BS | 5,502 | 99.7% | 125 |
| Chad | TD | 5,469 | 99.7% | 126 |
| Cambodia | KH | 5,391 | 99.7% | 127 |
| Somalia | SO | 5,318 | 99.8% | 128 |
| Burkina Faso | BF | 5,171 | 99.8% | 129 |
| Mali | ML | 5,098 | 99.8% | 130 |
| Congo (Rep.) | CG | 5,091 | 99.8% | 131 |
| Madagascar | MG | 5,040 | 99.8% | 132 |
| Nicaragua | NI | 4,911 | 99.8% | 133 |
| Armenia | AM | 4,903 | 99.8% | 134 |
| Papua New Guinea | PG | 4,731 | 99.8% | 135 |
| Benin | BJ | 4,287 | 99.8% | 136 |
| Haiti | HT | 4,245 | 99.9% | 137 |
| Niger | NE | 3,405 | 99.9% | 138 |
| Zimbabwe | ZW | 3,364 | 99.9% | 139 |
| Equatorial Guinea | GQ | 3,231 | 99.9% | 140 |
| Bonaire, Saba and St Eustatius (Dutch Carib.) | BQ | 3,204 | 99.9% | 141 |
| Barbados | BB | 2,976 | 99.9% | 142 |
| Moldova | MD | 2,906 | 99.9% | 143 |
| Lao People's Dem. Rep. | LA | 2,855 | 99.9% | 144 |
| Fiji | FJ | 2,810 | 99.9% | 145 |
| Eswatini | SZ | 2,731 | 99.9% | 146 |
| Guinea | GN | 2,689 | 99.9% | 147 |
| Kyrgyzstan | KG | 2,441 | 99.9% | 148 |
| Tajikistan | TJ | 2,326 | 99.9% | 149 |

| Designated Operator of | ISO code | GDP amalgam | GDP % | No |
|---|---|---|---|---|
| Togo | TG | 2,203 | 99.9% | 150 |
| Rwanda (Rep.) | RW | 2,131 | 99.9% | 151 |
| Malawi | MW | 2,072 | 99.9% | 152 |
| Mauritania | MR | 1,888 | 99.9% | 153 |
| Mongolia | MN | 1,880 | 100.0% | 154 |
| Lesotho | LS | 1,453 | 100.0% | 155 |
| Central African Rep. | CF | 1,369 | 100.0% | 156 |
| Suriname | SR | 1,342 | 100.0% | 157 |
| Sierra Leone | SL | 1,193 | 100.0% | 158 |
| Belize | BZ | 1,105 | 100.0% | 159 |
| Cape Verde | CV | 1,024 | 100.0% | 160 |
| San Marino | SM | 1,012 | 100.0% | 161 |
| Eritrea | ER | 986 | 100.0% | 162 |
| Antigua and Barbuda | AG | 905 | 100.0% | 163 |
| Liechtenstein | LI | 850 | 100.0% | 164 |
| Bhutan | BT | 840 | 100.0% | 165 |
| Saint Lucia | LC | 825 | 100.0% | 166 |
| Maldives | MV | 817 | 100.0% | 167 |
| Burundi | BI | 800 | 100.0% | 168 |
| Guyana | GY | 783 | 100.0% | 169 |
| Djibouti | DJ | 702 | 100.0% | 170 |
| Seychelles | SC | 694 | 100.0% | 171 |
| Liberia | LR | 548 | 100.0% | 172 |
| Gambia | GM | 461 | 100.0% | 173 |
| Grenada | GD | 454 | 100.0% | 174 |
| Saint Christopher and Navis | KN | 453 | 100.0% | 175 |
| Saint Vincent and the Grenadines | VC | 428 | 100.0% | 176 |
| Samoa | WS | 399 | 100.0% | 177 |
| Comoros | KM | 382 | 100.0% | 178 |
| Timor Leste | TL | 349 | 100.0% | 179 |
| Vanuatu | VU | 341 | 100.0% | 180 |
| Guinea-Bissau | GW | 301 | 100.0% | 181 |
| Solomon Islands | SB | 286 | 100.0% | 182 |
| Dominica | DM | 279 | 100.0% | 183 |
| Tonga | TO | 244 | 100.0% | 184 |
| Dem. People's Rep. of Korea | KP | 145 | 100.0% | 185 |
| Vatican | VA | 92 | 100.0% | 186 |
| Kiribati | KI | 76 | 100.0% | 187 |
| Falkland Islands | FK | 74 | 100.0% | 188 |
| Nauru | NR | 66 | 100.0% | 189 |
| São Tomé and Príncipe | ST | 57 | 100.0% | 190 |
| Tuvalu | TV | 13 | 100.0% | 191 |

***Annex F Pool 2 country listing and their associated dispatching regions***

| ISO Code | UPU member Country/ Territory | Region | |
|---|---|---|---|
| | | Full name | Short form |
| AC | Ascension | Americas and Caribbean | AMERICAS |
| AD | Andorra | Europe and Israel | EUROPE |
| AE | United Arab Emirates | Arab countries and Central Asia | ARAB/CTL ASIA |
| AF | Afghanistan | Arab countries and Central Asia | ARAB/CTL ASIA |
| AG | Antigua and Barbuda | Americas and Caribbean | AMERICAS |
| AI | Anguilla | Americas and Caribbean | AMERICAS |
| AL | Albania | Europe and Israel | EUROPE |
| AM | Armenia | Europe and Israel | EUROPE |
| AO | Angola | Africa | AFRICA |
| AR | Argentina | Americas and Caribbean | AMERICAS |
| AT | Austria | Europe and Israel | EUROPE |
| AU | Australia | Asia, Pacific and Oceania | ASIA/PAC |
| AW | Aruba | Americas and Caribbean | AMERICAS |
| AX | Åland Islands | Europe and Israel | EUROPE |
| AZ | Azerbaijan | Europe and Israel | EUROPE |
| BA | Bosnia and Herzegovina | Europe and Israel | EUROPE |
| BB | Barbados | Americas and Caribbean | AMERICAS |
| BD | Bangladesh | Asia, Pacific and Oceania | ASIA/PAC |
| BE | Belgium | Europe and Israel | EUROPE |
| BF | Burkina Faso | Africa | AFRICA |
| BG | Bulgaria (Rep.) | Europe and Israel | EUROPE |
| BH | Bahrain | Arab countries and Central Asia | ARAB/CTL ASIA |
| BI | Burundi | Africa | AFRICA |
| BJ | Benin | Africa | AFRICA |
| BM | Bermuda | Americas and Caribbean | AMERICAS |
| BN | Brunei Darussalam | Asia, Pacific and Oceania | ASIA/PAC |
| BO | Bolivia | Americas and Caribbean | AMERICAS |
| BQ | Bonaire, Saba, Sint Eustatius | Americas and Caribbean | AMERICAS |
| BR | Brazil | Americas and Caribbean | AMERICAS |
| BS | Bahamas | Americas and Caribbean | AMERICAS |
| BT | Bhutan | Asia, Pacific and Oceania | ASIA/PAC |
| BW | Botswana | Africa | AFRICA |
| BY | Belarus | Europe and Israel | EUROPE |
| BZ | Belize | Americas and Caribbean | AMERICAS |
| CA | Canada | Americas and Caribbean | AMERICAS |
| CD | Democratic Rep. of the Congo | Africa | AFRICA |
| CF | Central African Rep. | Africa | AFRICA |
| CG | Congo (Rep.) | Africa | AFRICA |
| CH | Switzerland | Europe and Israel | EUROPE |
| CI | Côte d'Ivoire (Rep.) | Africa | AFRICA |
| CK | Cook Islands | Asia, Pacific and Oceania | ASIA/PAC |
| CL | Chile | Americas and Caribbean | AMERICAS |
| CM | Cameroon | Africa | AFRICA |
| CN | China (People's Rep.) | Asia, Pacific and Oceania | ASIA/PAC |
| CO | Colombia | Americas and Caribbean | AMERICAS |
| CR | Costa Rica | Americas and Caribbean | AMERICAS |
| CU | Cuba | Americas and Caribbean | AMERICAS |
| CV | Cape Verde | Africa | AFRICA |

| ISO Code | UPU member Country/ Territory | Region | |
|---|---|---|---|
| | | Full name | Short form |
| CW | Curaçao | Americas and Caribbean | AMERICAS |
| CY | Cyprus | Europe and Israel | EUROPE |
| CZ | Czech Rep. | Europe and Israel | EUROPE |
| DE | Germany | Europe and Israel | EUROPE |
| DJ | Djibouti | Arab countries and Central Asia | ARAB/CTL ASIA |
| DK | Denmark | Europe and Israel | EUROPE |
| DM | Dominica | Americas and Caribbean | AMERICAS |
| DO | Dominican Republic | Americas and Caribbean | AMERICAS |
| DZ | Algeria | Arab countries and Central Asia | ARAB/CTL ASIA |
| EC | Ecuador | Americas and Caribbean | AMERICAS |
| EE | Estonia | Europe and Israel | EUROPE |
| EG | Egypt | Arab countries and Central Asia | ARAB/CTL ASIA |
| ER | Eritrea | Africa | AFRICA |
| ES | Spain | Europe and Israel | EUROPE |
| ET | Ethiopia | Africa | AFRICA |
| FI | Finland | Europe and Israel | EUROPE |
| FJ | Fiji | Asia, Pacific and Oceania | ASIA/PAC |
| FK | Falkland Islands (Malvinas) | Americas and Caribbean | AMERICAS |
| FM | Micronesia (Federated States of) | Asia, Pacific and Oceania | ASIA/PAC |
| FO | Faröe Islands | Europe and Israel | EUROPE |
| FR | France | Europe and Israel | EUROPE |
| GA | Gabon | Africa | AFRICA |
| GB | Great Britain | Europe and Israel | EUROPE |
| GD | Grenada | Americas and Caribbean | AMERICAS |
| GE | Georgia | Europe and Israel | EUROPE |
| GF | French Guiana | Americas and Caribbean | AMERICAS |
| GG | Guernsey | Europe and Israel | EUROPE |
| GH | Ghana | Africa | AFRICA |
| GI | Gibraltar | Europe and Israel | EUROPE |
| GL | Greenland | Europe and Israel | EUROPE |
| GM | Gambia | Africa | AFRICA |
| GN | Guinea | Africa | AFRICA |
| GP | French Guadeloupe (incl. St Barthélémy and St Martin) | Americas and Caribbean | AMERICAS |
| GQ | Equatorial Guinea | Africa | AFRICA |
| GR | Greece | Europe and Israel | EUROPE |
| GS | South Georgia and the South Sandwich Islands | Americas and Caribbean | AMERICAS |
| GT | Guatemala | Americas and Caribbean | AMERICAS |
| GW | Guinea-Bissau | Africa | AFRICA |
| GY | Guyana | Americas and Caribbean | AMERICAS |
| HK | Hong Kong, China | Asia, Pacific and Oceania | ASIA/PAC |
| HN | Honduras (Rep.) | Americas and Caribbean | AMERICAS |
| HR | Croatia | Europe and Israel | EUROPE |
| HT | Haiti | Americas and Caribbean | AMERICAS |
| HU | Hungary | Europe and Israel | EUROPE |
| ID | Indonesia | Asia, Pacific and Oceania | ASIA/PAC |
| IE | Ireland | Europe and Israel | EUROPE |
| IL | Israel | Europe and Israel | EUROPE |
| IM | Isle of Man | Europe and Israel | EUROPE |
| IN | India | Asia, Pacific and Oceania | ASIA/PAC |

| ISO Code | UPU member Country/ Territory | Region | |
|---|---|---|---|
| | | Full name | Short form |
| IO | British Indian Ocean Territory | Asia, Pacific and Oceania | ASIA/PAC |
| IQ | Iraq | Arab countries and Central Asia | ARAB/CTL ASIA |
| IR | Iran (Islamic Rep.) | Arab countries and Central Asia | ARAB/CTL ASIA |
| IS | Iceland | Europe and Israel | EUROPE |
| IT | Italy | Europe and Israel | EUROPE |
| JE | Jersey | Europe and Israel | EUROPE |
| JM | Jamaica | Americas and Caribbean | AMERICAS |
| JO | Jordan | Arab countries and Central Asia | ARAB/CTL ASIA |
| JP | Japan | Asia, Pacific and Oceania | ASIA/PAC |
| KE | Kenya | Africa | AFRICA |
| KG | Kyrgyzstan | Arab countries and Central Asia | ARAB/CTL ASIA |
| KH | Cambodia | Asia, Pacific and Oceania | ASIA/PAC |
| KI | Kiribati | Asia, Pacific and Oceania | ASIA/PAC |
| KM | Comoros | Arab countries and Central Asia | ARAB/CTL ASIA |
| KN | Saint Christopher (Saint Kitts) and Nevis | Americas and Caribbean | AMERICAS |
| KP | Dem People's Rep. of Korea | Asia, Pacific and Oceania | ASIA/PAC |
| KR | Korea (Rep.) | Asia, Pacific and Oceania | ASIA/PAC |
| KW | Kuwait | Arab countries and Central Asia | ARAB/CTL ASIA |
| KY | Cayman Islands | Americas and Caribbean | AMERICAS |
| KZ | Kazakhstan | Arab countries and Central Asia | ARAB/CTL ASIA |
| LA | Lao People's Dem. Rep. | Asia, Pacific and Oceania | ASIA/PAC |
| LB | Lebanon | Arab countries and Central Asia | ARAB/CTL ASIA |
| LC | Saint Lucia | Americas and Caribbean | AMERICAS |
| LI | Liechtenstein | Europe and Israel | EUROPE |
| LK | Sri Lanka | Asia, Pacific and Oceania | ASIA/PAC |
| LR | Liberia | Africa | AFRICA |
| LS | Lesotho | Africa | AFRICA |
| LT | Lithuania | Europe and Israel | EUROPE |
| LU | Luxembourg | Europe and Israel | EUROPE |
| LV | Latvia | Europe and Israel | EUROPE |
| LY | Libya | Arab countries and Central Asia | ARAB/CTL ASIA |
| MA | Morocco | Arab countries and Central Asia | ARAB/CTL ASIA |
| MC | Monaco | Europe and Israel | EUROPE |
| MD | Moldova | Europe and Israel | EUROPE |
| ME | Montenegro (Rep.) | Europe and Israel | EUROPE |
| MG | Madagascar | Africa | AFRICA |
| MH | Marshall Islands | Asia, Pacific and Oceania | ASIA/PAC |
| MK | North Macedonia | Europe and Israel | EUROPE |
| ML | Mali | Africa | AFRICA |
| MM | Myanmar | Asia, Pacific and Oceania | ASIA/PAC |
| MN | Mongolia | Asia, Pacific and Oceania | ASIA/PAC |
| MO | Macao, China | Asia, Pacific and Oceania | ASIA/PAC |
| MQ | French Martinique | Americas and Caribbean | AMERICAS |
| MR | Mauritania | Arab countries and Central Asia | ARAB/CTL ASIA |
| MS | Montserrat | Americas and Caribbean | AMERICAS |
| MT | Malta | Europe and Israel | EUROPE |
| MU | Mauritius | Africa | AFRICA |
| MV | Maldives | Asia, Pacific and Oceania | ASIA/PAC |
| MW | Malawi | Africa | AFRICA |
| MX | Mexico | Americas and Caribbean | AMERICAS |

| ISO Code | UPU member Country/ Territory | Region | |
|---|---|---|---|
| | | Full name | Short form |
| MY | Malaysia | Asia, Pacific and Oceania | ASIA/PAC |
| MZ | Mozambique | Africa | AFRICA |
| NA | Namibia | Africa | AFRICA |
| NC | French New Caledonia | Asia, Pacific and Oceania | ASIA/PAC |
| NE | Niger | Africa | AFRICA |
| NF | Norfolk Island | Asia, Pacific and Oceania | ASIA/PAC |
| NG | Nigeria | Africa | AFRICA |
| NI | Nicaragua | Americas and Caribbean | AMERICAS |
| NL | Netherlands | Europe and Israel | EUROPE |
| NO | Norway | Europe and Israel | EUROPE |
| NP | Nepal | Asia, Pacific and Oceania | ASIA/PAC |
| NR | Nauru | Asia, Pacific and Oceania | ASIA/PAC |
| NU | Niue | Asia, Pacific and Oceania | ASIA/PAC |
| NZ | New Zealand (including the Ross Dependency) | Asia, Pacific and Oceania | ASIA/PAC |
| OM | Oman | Arab countries and Central Asia | ARAB/CTL ASIA |
| PA | Panama (Rep.) | Americas and Caribbean | AMERICAS |
| PE | Peru | Americas and Caribbean | AMERICAS |
| PF | French Polynesia (including Clipperton Island) | Asia, Pacific and Oceania | ASIA/PAC |
| PG | Papua New Guinea | Asia, Pacific and Oceania | ASIA/PAC |
| PH | Philippines | Asia, Pacific and Oceania | ASIA/PAC |
| PK | Pakistan | Asia, Pacific and Oceania | ASIA/PAC |
| PL | Poland | Europe and Israel | EUROPE |
| PM | French Territorial Community of St Pierre and Miquelon | Americas and Caribbean | AMERICAS |
| PN | Pitcairn, Henderson, Ducie and Oeno (Islands) | Americas and Caribbean | AMERICAS |
| PT | Portugal | Europe and Israel | EUROPE |
| PW | Palau | Asia, Pacific and Oceania | ASIA/PAC |
| PY | Paraguay | Americas and Caribbean | AMERICAS |
| QA | Qatar | Arab countries and Central Asia | ARAB/CTL ASIA |
| RE | French Réunion | Africa | AFRICA |
| RO | Romania | Europe and Israel | EUROPE |
| RS | Serbia (Rep.) | Europe and Israel | EUROPE |
| RU | Russian Federation | Arab countries and Central Asia | ARAB/CTL ASIA |
| RW | Rwanda | Africa | AFRICA |
| SA | Saudi Arabia | Arab countries and Central Asia | ARAB/CTL ASIA |
| SB | Solomon Islands | Asia, Pacific and Oceania | ASIA/PAC |
| SC | Seychelles | Africa | AFRICA |
| SD | Sudan | Arab countries and Central Asia | ARAB/CTL ASIA |
| SE | Sweden | Europe and Israel | EUROPE |
| SG | Singapore | Asia, Pacific and Oceania | ASIA/PAC |
| SH | St Helena (dependencies) (Islands) | Americas and Caribbean | AMERICAS |
| SI | Slovenia | Europe and Israel | EUROPE |
| SK | Slovakia | Europe and Israel | EUROPE |
| SL | Sierra Leone | Africa | AFRICA |
| SM | San Marino | Europe and Israel | EUROPE |
| SN | Senegal | Africa | AFRICA |
| SO | Somalia | Arab countries and Central Asia | ARAB/CTL ASIA |
| SR | Suriname | Americas and Caribbean | AMERICAS |

| ISO Code | UPU member Country/ Territory | Region | |
|---|---|---|---|
| | | Full name | Short form |
| SS | South Sudan (Rep.) | Africa | AFRICA |
| ST | Sao Tome and Principe | Africa | AFRICA |
| SV | El Salvador | Americas and Caribbean | AMERICAS |
| SX | Sint Maarten | Americas and Caribbean | AMERICAS |
| SY | Syrian Arab Rep. | Arab countries and Central Asia | ARAB/CTL ASIA |
| SZ | Swaziland | Africa | AFRICA |
| TA | Tristan da Cunha | Americas and Caribbean | AMERICAS |
| TC | Turks and Caicos Islands | Americas and Caribbean | AMERICAS |
| TD | Chad | Africa | AFRICA |
| TF | French Southern and Antarctic Territories (St Paul & Amsterdam Isl., Crozet Isl., Kerguelen Isl., Terre Adélie) | Asia, Pacific and Oceania | ASIA/PAC |
| TG | Togo | Africa | AFRICA |
| TH | Thailand | Asia, Pacific and Oceania | ASIA/PAC |
| TJ | Tajikistan | Arab countries and Central Asia | ARAB/CTL ASIA |
| TK | Tokelau | Asia, Pacific and Oceania | ASIA/PAC |
| TL | Timor-Leste (Dem. Rep.) | Asia, Pacific and Oceania | ASIA/PAC |
| TM | Turkmenistan | Arab countries and Central Asia | ARAB/CTL ASIA |
| TN | Tunisia | Arab countries and Central Asia | ARAB/CTL ASIA |
| TO | Tonga (including Niuafo'ou) | Asia, Pacific and Oceania | ASIA/PAC |
| TR | Turkey | Europe and Israel | EUROPE |
| TT | Trinidad and Tobago | Americas and Caribbean | AMERICAS |
| TV | Tuvalu | Asia, Pacific and Oceania | ASIA/PAC |
| TZ | Tanzania (United Rep.) | Africa | AFRICA |
| UA | Ukraine | Europe and Israel | EUROPE |
| UG | Uganda | Africa | AFRICA |
| US | United States of America | Americas and Caribbean | AMERICAS |
| UY | Uruguay | Americas and Caribbean | AMERICAS |
| UZ | Uzbekistan | Arab countries and Central Asia | ARAB/CTL ASIA |
| VA | Vaticano | Europe and Israel | EUROPE |
| VC | Saint Vincent and the Grenadines | Americas and Caribbean | AMERICAS |
| VE | Venezuela | Americas and Caribbean | AMERICAS |
| VG | British Virgin Islands | Americas and Caribbean | AMERICAS |
| VN | Viet Nam | Asia, Pacific and Oceania | ASIA/PAC |
| VU | Vanuatu | Asia, Pacific and Oceania | ASIA/PAC |
| WF | French Wallis and Futuna Islands | Asia, Pacific and Oceania | ASIA/PAC |
| WS | Samoa | Asia, Pacific and Oceania | ASIA/PAC |
| YE | Yemen | Arab countries and Central Asia | ARAB/CTL ASIA |
| YT | French Territorial Community of Mayotte | Africa | AFRICA |
| ZA | South Africa | Africa | AFRICA |
| ZM | Zambia | Africa | AFRICA |
| ZW | Zimbabwe | Africa | AFRICA |

***Annex G Basic test item validation rules***

| Code | Area | Sub-Code | Issue | Action | Reason | UPU GMS Technical Design reference | Example(s) |
|---|---|---|---|---|---|---|---|
| P1 | Panel | | Posting of items | | | | |
| | | P1.1 | Data entry delay of more than 7 days (posting date) | Validation | Posting date is required to ensure there is no deviation from the posting plan | 12.2.1 | Item has to be sent on 16th March but is not declared on 23rd March |
| | | P1.2 | No posting date or incorrect posting date | Validation | Posting date is required to ensure there is no deviation from the posting plan to minimize bundling | 7.4<br>12.1.1 | An item does not have a posting date or TD read before posting date |
| | | P1.3 | Postmark date does not equal posting date | Check | Postmark ensures that posting date is respected | 12.2.1 | An item does have different postmark and posting dates |
| | | P1.4 | More than 1 item with the same posting date from the same posting panellist to the same receiver panellist | Validation | Bundling of items from the same outbound country to the same inbound city shall be avoided, if possible | 7.2.1 | Case of bundling |
| | | | Receipt of items | | | | |
| | | P1.5 | Received date is same as posting date | Validation | It is not plausible that an item will be posted and received on the same day due to operational processes of the outbound country and inbound country | 12.2 | The item has same receipt and posting date |
| P1 (cont.) | Panel (cont.) | P1.6 | Questionable date of receipt | Dud | An item has no receipt date or receipt date is incorrect | 12.2.2 | The item is declared unsure after item/panellist query |
| | | P1.7 | | Validation | Delivery date is after first inbound registration read | 12.2.2 | The receipt date is before transponder read |

| Code | Area | Sub-Code | Issue | Action | Reason | UPU GMS Technical Design reference | Example(s) |
|---|---|---|---|---|---|---|---|
| | | P1.8 | | Check | The receipt date declared has to be checked | 12.2.2 | The day and date of delivery correspond to a non-delivery day (ex: national holiday)<br>Item is recorded as received on the same day it was sent |
| | | P1.9 | | Check | The receipt date declared was entered 3 days or more after delivery | 12.2.2 | The receipt date is declared 7 days after delivery by the receiver panellist |
| | | P1.10 | Receipt and proxy read are different | Validation | Receipt date does not equal captured date delivery | 7.5.1<br>12.2.1 | Electronic substitute for capturing the date of delivery has detected mail delivered in mailbox of a neighbour following mis-delivered item |
| R1 | RFID | | RFID | | | | |
| | | R1.1 | No valid transponder registration at the International mail facility (AMU/OE) | Dud | Transponder registration from designated handover points is prerequisite for an item to be valid. The item however can be re-used for diagnostic purpose and/or other reporting where applicable | 1.1 | 1 An item is received but there are completely no RFID registrations associated with the item<br>2 An item is received but there are no RFID registrations associated with the item from designated handover points in the receiving country |
| T1 | Item travel time | T1.1 | Transit time between countries | Check | Long transit time or inbound transit time is exceeding a country specific threshold | 12.2.2 | Transit time is K+1 on a route that is not K+1 |
| I1 | Integrity | | Integrity | | | | |
| | | I1.1 | A test letter or sender/receiver panellist is detected, action will be taken to exclude the | Validation | Respect of integrity of measurement | 12.1.3 | An item is damaged in the mail leading to a panellist potentially being discovered by the Post as a receiver |

| Code | Area | Sub-Code | Issue | Action | Reason | UPU GMS Technical Design reference | Example(s) |
|---|---|---|---|---|---|---|---|
| | | | panellist and delete the test items relating to that panellist after the fact | | | | panellist. All data potentially affected will be removed |
| O1 | Organizational | | Organizational | | | | |
| | | O1.1 | An item is posted but without a (working) transponder | Dud | Missing transponder | 8.1 | An item is posted but without a (working) transponder |
| | | O1.2 | Allocated/posted items do not reach the destination panellist | Dud | Lost items | 7.3.2, 7.5 | Receipt date is not recorded |
| F1 | Force Majeure | | POC instruction | | | | |
| | | F1.1 | Items are to be removed from measurement due to POC decision | Dud | POC | N/A | All items with inbound transponder registration from 14.01.2019 to 26.01.2019 should be excluded on account of force majeure due to earthquake in the city of YY impacting postal operations in the areas of postcodes xxx–xxx |

## *Annex H An example of Restricted boosted design: the Specific report for QS Link*[1]

For each country participating in the quality of service link (QS Link) to terminal dues, the principle is to first apply the technical design to all flows received and then to apply the technical design restricted to those flows received from countries participating in the quality of service link to terminal dues. Both designs are then mixed to obtain the full boosted GMS design.

1. Determine the level of a country in the GMS general design and in the GMS specific design:
   a. the total inbound flow of a country gives the level of a country (A to E) and the number of permanent links and the structure of the pools for the GMS general report.
   b. the inbound flows from countries participating in the quality of service link to terminal dues give the level for the GMS specific report and the number of permanent links. This level could be either the same as or below the general one. As a consequence, the number of permanent links needed for the GMS specific report is the same or lower than the general one. The same goes for the number of cities to be covered.
2. Implement the basic GMS design: apply the technical design according to the level of each country.
3. Determine the permanent links and the pools for the GMS specific report: apply the technical design specifically to the flows received from countries in the quality of service link to terminal dues.
   a. Permanent links are initially determined by the normal rules. Pool 1 links for the specific report are boosted with quality of service link to terminal dues as described below.
   b. Pools 1 and 2: For the general report, the pools are determined by the technical design (using the percentage of flow). Since a boost is not allowed between pools, pools 1 and 2 for the specific report are the same as for the general report, less the flows which are boosted as permanent links, minus the flow which is not in the quality of service link to terminal dues. Furthermore, this principle ensures coherence with the general report. It respects the integrity of the pools and minimizes the size of the boost needed.
   c. Weighting: the weights of the permanent links and pools 1 and 2 will be calculated on the basis of the countries participating in the quality of service link to terminal dues.
   d. Accuracy: As the designs of both measurements follow the technical guide, the theoretical levels of accuracy will be in accordance with the importance of the inbound flows.
4. Determine the permanent links and the pools for the boosted GMS general report:
   – In order to improve the accuracy of the GMS general report, all information available will be used, so that flows boosted for the GMS specific report will be used for the GMS general report.
   – Those flows that are permanent links in the GMS specific report instead of pool links will be added to the other permanent links in the GMS general report resulting in the boosted GMS general report.
   – Pools 1 and 2 of the boosted GMS general report comprise the same flows as for the GMS general report, minus the boosted flows for the GMS specific report.

*Example*

In the following example, the chosen country is classified as level C for the GMS general report and for the GMS specific report.

[1]POC C1 2011.1–Doc 7b.Annexe 1.Pièce 1

This example has been chosen to show a complex case. Most cases, when the level of the country is reduced in the specific GMS report, will require fewer boosts.

For the sake of simplicity, and because it will happen only in very specific cases (e.g. only one flow in pool 1), no pool 2 flows are boosted in the example.

*From the basic GMS general report to the GMS specific report*

First step: permanent links

- Determine which permanent links are not eligible for the GMS specific report (in the example: permanent links #3 and #6).
- Determine which pool links will be boosted so as to make up for the missing permanent links in the GMS specific report (the eligible pool links will be the first ranked links from countries in the quality of service link to terminal dues. In the example, pool 1 links #1 and #4 are boosted).

Second step: pool 1 links

- Include remaining pool 1 links from countries in the quality of service link to terminal dues in the GMS specific report.

Third step: pool 2 links

- Include remaining pool 2 links from countries in the quality of service link to terminal dues in the GMS specific report.

*Creation of the boosted GMS general report*

First step: permanent links

- All permanent links from the basic GMS general report and from the specific GMS general report are included in the permanent links of the boosted GMS general report.

Second step: pool 1 links

- All pool 1 links from the basic GMS general report and from the specific GMS general report are included in the pool 1 links of the boosted GMS general report, except those links upgraded into permanent links.

Third step: pool 2 links

- All pool 2 links from the basic GMS general report and from the specific GMS general report are included in the pool 2 links of the boosted GMS general report, except those links upgraded into permanent links.

The 29 countries (out of 192 UPU member countries) participating in the terminal dues to quality of service link are in bold.

| 1 Basic GMS general report |
|---|
| Permanent link: 60% of flows |
| **Permanent link #1** |
| **Permanent link #2** |
| Permanent link #3 |
| **Permanent link #4** |
| **Permanent link #5** |
| Permanent link #6 |
| **Permanent link #7** |

| 2 GMS specific report |
|---|
| Permanent link: % to be calculated |
| **Permanent link #1** |
| **Permanent link #2** |
| **Permanent link #4** |
| **Permanent link #5** |
| **Permanent link #7** |
| **Pool 1 link #1** |
| **Pool 1 link #4** |

| 3 Boosted GMS general report |
|---|
| Permanent link: 60% + 10% flow |
| **Permanent link #1** |
| **Permanent link #2** |
| Permanent link #3 |
| **Permanent link #4** |
| **Permanent link #5** |
| Permanent link #6 |
| **Permanent link #7** |
| **Pool 1 link #1 (6%)** |
| **Pool 1 link #4 (4%)** |

| Pool 1: 30% of flows |
|---|
| **Pool 1 link #1 (6%)** |
| Pool 1 link #2 |
| Pool 1 link #3 |
| **Pool 1 link #4 (4%)** |
| **Pool 1 link #5** |
| **Pool 1 link #6** |
| Pool 1 link #7 |
| **Pool 1 link #8** |
| Pool 1 link #9 |
| **Pool 1 link #10** |

| Pool1: % to be calculated |
|---|
| **Pool 1 link #2** |
| **Pool 1 link #5** |
| **Pool 1 link #6** |
| **Pool 1 link #8** |
| **Pool 1 link #10** |

| Pool 1: 30%-10% of flows |
|---|
| **Pool 1 link #2** |
| Pool 1 link #3 |
| Pool 1 link #5 |
| **Pool 1 link #6** |
| **Pool 1 link #7** |
| **Pool 1 link #8** |
| Pool 1 link #9 |
| **Pool 1 link #10** |

| Pool 2: 10% of flows |
|---|
| Remaining countries = 175 countries (192-7 permanent links – 10 pool 1 links) |

| Pool 2: % to be calculated |
|---|
| Remaining countries in the link to terminal dues = 17 countries (29-7 permanent links – 5 pool 1 links) |

| Pool 2: 10% of flows |
|---|
| Remaining countries = 175 countries (192-9 permanent links – 8 pool 1 links) |