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# **BABT 680**

# **Guide to the TUV SUD BABT Implementation of the 2017 Ofcom Metering and Billing Scheme**

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TUV SUD BABT is the Certification body of  
TUV SUD Group



## Foreword

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This guide explains the TUV SUD BABT Metering and Billing Approval Scheme as applicable to the 2017 Ofcom Metering and Billing Direction. Approval is open to any Communication Provider or associated company (generally referred to as an Applicant - see section 2.1), whether located in the UK or elsewhere.

This scheme describes how Applicants can apply for and maintain an Approval to the Direction.

This scheme also describes how Regulated Providers in the UK who are subject to and must comply with General Condition C3.1 of the Notification under Section 48(1) of the Communications Act 2003 can apply for, obtain and maintain Regulatory Approval.

This guide should be read in conjunction with the following documents:

- The United Kingdom Communications Act 2003
- Notification of a modification under Section 48 (1) of the UK Communications Act 2003, Revised General Conditions (dated 19 September 2017)
- The Ofcom Metering and Billing Direction (19 September 2017), (“Direction”)
- Testing and Certification Regulations TUV SUD Group (“Certification Regulations”)
- ISO9001: 2015 Quality management system – Requirements. (“ISO9001”)

The formal requirements of the scheme are set out in the TUV SUD Group Certification Regulations (May 2009). Sections A, B2, and C3 of these Regulations apply to applications for and holders of TUV SUD BABT Metering and Billing approval certificates

In this document, unless the context requires otherwise, “you” and “your” means the Applicant applying for approval of a TMBS<sup>1</sup> and “we”, “us” and “our” refers to TUV SUD BABT.

All TUV SUD BABT publications are available from: <http://www.tuv-sud.co.uk/uk-en/about-tuev-sued/tuev-sued-in-the-uk/tuev-sued-babt>

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<sup>1</sup> See list of abbreviations.

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List of Abbreviations

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BAPM	Billing Accuracy Programme Manager	Defined in section 2.3
BS	British Standard	
CDR	Call Data Record	
CP	Communication Provider	e.g. Network Operator, Service Provider, Reseller
EN	European Norm	i.e. European Standard
EPF	Extraordinary Performance Failure	Defined in section A.8.12
GC	General Condition	One of a series of requirements imposed by Ofcom on CPs in the United Kingdom as a condition of providing PECS
HLD	High Level Description document	Defined in section A.4
ISO	International Standards Organisation	
ITU	International Telecommunication Union	
MNO	Mobile Network Operator	
MSD	Measurement Strategy	
MVNO	Mobile Virtual Network Operator	
OBAPM	Ofcom Billing Accuracy Programme Manager	Defined in section 2.3
Ofcom	Office of Communications	The National Regulatory Authority for communications in the UK
PATS	Publicly Available Telephone Service	Defined in the UK Communications Act 2003
PECS	Public Electronic Communications Services	Defined in the UK Communications Act 2003
PMS	Process Management System	Defined in section A.9.1
QMS	Quality Management System	
RP	Regulated Provider	A CP who must comply with the requirements of the General Condition of Entitlement
SS7	ITU Signalling System 7	Also known as C7
TMBS	Total Metering and Billing System	Defined in section A.2
VoIP	Voice over Internet Protocol	
WLR	Wholesale Line Rental	

## 1 INTRODUCTION

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### 1.1 Scope

This document covers:

- Mandatory Approval – Metering and Billing Approval to comply with General Condition C3.1 of the Notification under Section 48(1) of the UK Communications Act 2003 (the Act)<sup>2</sup>.
- Voluntary Approval which can be granted to Communication Providers who are not required to seek UK Regulatory Metering and Billing Approval.

### 1.2 Definitions

It is necessary for clarity to distinguish between the various organisations associated with Metering and Billing activities. They are:

*Communication Provider (CP) or Regulated Provider (RP):* The organisation providing public electronic communications services. Unless otherwise stated, the CP's clients are retail customers (or end-users) who either receive a bill for communications services (post-pay) or pay for them in advance (pre-pay).

*Supplier:* An organisation supplying services to a CP that might affect the latter's billing accuracy.

*Applicant:* Either a CP or a Supplier seeking Approval from TUV SUD BABT. An Applicant can be a person or a body corporate.

*Organisation:* This is a general term covering all CPs and Suppliers, not just those seeking Approval from TUV SUD BABT.

### 1.3 Overview

Regulatory Metering and Billing Approval is available to those UK RPs required or permitted by the Direction to seek it. Voluntary Approval is open to other Applicants (*see section 2.1*), whether located in the UK or elsewhere. The TUV SUD BABT scheme is designed so that Approval can be given to any UK RP upon achieving the relevant threshold specified in GC C3.1.

As a prerequisite to the issue of a TUV SUD BABT Metering and Billing Approval you are required to agree to conform to the Certification Regulations<sup>3</sup> as relevant to Metering and Billing Approval.

This implementation requires comprehensive initial and on-going assessment of the Applicant's Total Metering and Billing System (TMBS) against the Direction, together with regular reporting of the TMBS performance. Detailed guidance on preparing for, and maintaining Approval is contained within *Annex A*.

When TUV SUD BABT is satisfied that the Applicant's TMBS is compliant with the requirements of the Direction, it will issue an Approval to that effect. This will list the Public Electronic Communications Services (PECS) provided by the Applicant using the compliant TMBS. Where Regulatory Approval is sought, this will only be issued once the requirements have been attained and following a period of notification. The details will also be published on the TUV SUD BABT web site, [Metering & Billing - Approval Services](#).

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<sup>2</sup> Notification under Section 48(1) of the UK Communications Act 2003 - <http://stakeholders.ofcom.org.uk/telecoms/policy/metering-billing/docs/>

<sup>3</sup> TUV SUD BABT Certification Regulations

## 2 MAKING AN APPLICATION

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### 2.1 Who can apply

Applications can be made by a RP or by an organisation supplying services to a RP that may affect the latter's billing accuracy. An example of a service organisation is a Billing Bureau.

### 2.2 What can you apply for

You can apply for Approval to one or more of the following:

- Retail fixed or mobile Publicly Available Telephone Service (PATS) and/or Publicly Available Internet Access Service (PAIAS) (Annex A2)
- Wholesale fixed or mobile Publicly Available Telephone Service (PATS) and/or Publicly Available Internet Access Service PAIAS (Annex A3)

The Annexes shown refer to the Annexes in the Direction.

Those UK RPs required to seek Regulatory Approval must select fixed and/or mobile PATS/PAIAS as appropriate.

Approval of Wholesale services can be sought by any Applicant. Examples of the types of services provided include:

- Mobile CP (MNO) providing services to Mobile Virtual Network Operators (MVNOs)
- Fixed CP offering Wholesale Line Rental (WLR) services

A UK RP subject to GC C3.2 is required to seek Approval for Wholesale services if they provide data to another UK CP that impact on that CP's end-user customer billing.

Examples of the types of data provided by the Wholesale CP could include:

- Call progress signals
- Unrated electronic data records
- Rated electronic data records
- Non-recurring items such as installation charges

For each of the above services selected, the CP may also apply for Approval covering Undercharging Detrimental to End-Users. For CPs subject to GC C3.1 providing wholesale PATS/PAIAS, under metering Approval is mandatory, but it is voluntary for all retail PATS/PAIAS.

TUV SUD BABT considers it an advantage for Retail Applicants to apply for Undercharging Approval. Customers' confidence in bills depends on the bill being complete and correct, not just avoiding overcharging. Additional TUV SUD BABT charges due to the addition of Undercharging are minimal.

### 2.3 Preparation for an application

Prior to formal submission (either as a part of your decision making process, or to ensure efficient progress of your application) you are recommended to discuss your application with TUV SUD BABT. This will give you the opportunity for an early estimate of the costs, timeframes, and documentary aspects associated with the process. If the discussion includes a meeting then, provided the meeting is minuted, this meeting may form part or all of the Initial Assessment (see section 3.5).

We require you to appoint two specific persons to manage your relations with TUV SUD BABT.

The first is a Senior Manager to manage the relationship with TUV SUD BABT and is authorised to enter into the agreement referred to in section 1.3, above. The Senior Manager is required:

- "to provide the strategic direction for the implementation of the Direction" within your organisation,
- "to act as the escalation point" for TUV SUD BABT, and

- to appoint the second person (see below), “ensuring that they are of sufficient capability and experience to carry out the role”.

Where Regulatory Approval is being sought this person will be responsible for managing the relationship with Ofcom.

The Senior Person must hold sufficient authority to be able to ensure that adequate budgetary provision is made for the entire Approval process. Ideally this is a board member.

The second person is the Billing Accuracy Programme Manager (BAPM), who will be responsible for “the day-to-day operation management”. The BAPM must “have the authority to enforce compliance internally” within your organisation, and will be the usual point of contact with TUV SUD BABT. Examples of people suitable to become BAPMs are Billing, Revenue Assurance or Technical System Managers.

Where Regulatory Approval is being sought the BAPM will act as the Ofcom Billing Accuracy Programme Manager (OBAPM) [*see Direction clause 5.1*]

## 2.4 How to apply

The application is to be made on form BABT 685 and sent to TUV SUD BABT. It will be accepted

- By mail; (for details see the Foreword) or
- By Email: to [metering.billing@tuv-sud.co.uk](mailto:metering.billing@tuv-sud.co.uk)

An application form should normally be signed by the senior person described in section 2.3. Where an application form or notification of a change is signed by an authorised representative instead of a member of the applicant company a letter from the applicant company appointing them must be included with the submission.

TUV SUD BABT will formally acknowledge receipt of the form.

## 2.5 Information to be supplied on the application

Information related to the following is required on the application form:

- Name and registered address of the Applicant
- Name and position of the Senior Manager
- Name and contact details of the BAPM
- Whether you are a UK RP providing PATS and/or PAIAS have a relevant turnover in your most recent complete financial year exceeding £55 million (Regulatory Approval is required).
- The Services you require Approval against.
- Whether you require Approval for Wholesale, Retail or both service types. Identification of the Public Electronic Communications Services relevant to the Total Metering and Billing System for which Approval is sought. (see *section A.2*)

TUV SUD BABT maintains strict confidentiality with regard to its clients' matters. If you wish to authorise TUV SUD BABT to discuss your application with any other person or organisation acting on behalf of, but not employed by, your organisation, this must be done in writing. However, your organisation retains all intellectual property rights in the application and will be responsible for paying all fees.

You can indicate on the BABT 685 form if you wish your application to remain confidential until formally certified. Please note this option is not available to RPs required to seek UK Regulatory Approval<sup>4</sup>.

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<sup>4</sup> Please note that, for applications for UK Regulatory Approval, Ofcom have the legal power under Sections 135 to 145 of the Communications Act 2003 to require TUV SUD BABT to disclose to them such matters pertaining to your business as they may direct. Be aware that this will include the fact of your application for Approval, which will be made public.

Where the system or scope originally declared changes significantly or where the response cycle becomes protracted TUV SUD BABT reserves the right to cancel the application and require that a new application be submitted. Any costs due for the first application will still be due.

For UK Regulatory Approval application timescales are defined in the Direction, section 3. Failure to meet these timescales could lead to enforcement action or an investigation being launched by Ofcom.

### 3 PROGRESSING YOUR APPLICATION

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#### 3.1 General

The following activities are performed by TUV SUD BABT in the process to enable Approval to be granted:

- Supply of Documentation: BABT680 (this document), along with an Application Form (BABT685) and the Certification Regulations.
- Assessment of your Application
- Preparation of an Approval Plan which will be submitted to Ofcom for endorsement, for those UK RPs seeking Regulatory Approval
- Initial Assessment
- Full Assessment
- Agreement of Measurement Strategy
- Consideration of Routine Performance
- Notification (for UK Regulatory Approval only)
- Approval Decision (for UK Regulatory Approval only)
- Approval

#### 3.2 Assessing your application

TUV SUD BABT will formally acknowledge receipt of the application and allocate a reference number to the application.

TUV SUD BABT will allocate one of its metering and billing experts as your prime contact. The prime contact will arrange one or more meetings with the BAPM. The purpose of the meetings is to:

- establish the completeness and acceptability of the application;
- identify the information to enable the assessment to progress and the provision of such information
- define the anticipated programme of work which must be completed by both you and TUV SUD BABT in order to complete an assessment of your TMBS. Unless it has already been undertaken, this will include an Initial Assessment. It should also allow for submission in due course of your High Level Description document (HLD) and Measurement Strategy Document (MSD) as required by the Direction;
- allow TUV SUD Ltd<sup>5</sup> to prepare a proposal for a contract (see *section 3.3*)
- establish progress reporting processes with you;
- establish processes for the management of changes to the TMBS (see *section A.10*), if required, during the period leading up to Approval.

These meetings may precede or follow receipt of the Application.

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<sup>5</sup> TUV SUD Ltd conducts Metering and Billing assessments on behalf of TUV SUD BABT, your commercial relationship will be with TUV SUD Ltd.

### 3.3 Contract for work

The Application Form is a formal request for Approval.

However, the work described in *section 3.1* is carried out under annual contracts (or other agreed periods) between you and TUV SUD Ltd. You will be sent a proposal for each contractual period. You may request that a proposal be issued for an Initial Assessment (*see section 3.5*) only.

Note that if any significant information is missing or a major concern remains unresolved work progressing the application may have to be suspended pending resolution.

Where the proposal includes an Initial Assessment it will assume that the work commences within 10 weeks of contract signature. If this is not the case, the amount of work necessary may require adjustment.

The proposal will contain an acceptance sheet, which you will be asked to sign, accepting the proposal and the terms and conditions attached to it. On receipt of this by TUV SUD Ltd, it will be countersigned and a copy returned to you.

On receipt by TUV SUD Ltd of a purchase order covering the agreed period of work, you will receive a confirmation of your order. We will then commence the programme of work.

Towards the end of each contract period, TUV SUD BABT will review the work required for the coming period, either towards Approval or its maintenance. A further proposal will be provided to you, and the work undertaken on receipt by TUV SUD Ltd of a purchase order and signed proposal.

### 3.4 Expenses and Fees

Proposals for work contain budgetary estimates of the time required, certification fees and expenses arising from an application which are likely to be charged within a contract period.

Fees are charged at a daily rate according to the time actually spent by TUV SUD assessors on approval activities, both on- and off-site. Expenses are charged at cost.

We will invoice you monthly in arrears for the work done by assessors in each month. Expenses will be invoiced 2 months in arrears for expenses incurred by assessors in each month. Invoicing may be less frequent to avoid invoicing small amounts.

Note that the contracts described in *section 3.3* include all the fees described in the Certification Regulations.

### 3.5 Initial Assessment

The purpose of Initial Assessment is to establish the current readiness of your organisation for Approval. A member of the TUV SUD BABT team, usually the prime contact, will agree with your BAPM a programme of interviews. These will be with those members of your staff responsible for processes directly or indirectly affecting the accuracy of metering and billing.

The outcome of the Initial Assessment will be a report that lists your company's strengths and weaknesses with respect to metering and billing. Weaknesses will be categorised according to the industry standard definitions<sup>6</sup>. You will be given the opportunity to comment on a draft of the report and to have any errors of fact corrected before final issue.

If an application is made for additional services requiring modification to the TMBS, an Initial Assessment would be limited in scope to those areas not already assessed.

### 3.6 Preparation of an Audit Programme

Once the Initial Assessment has been reported upon, it is normal for a programme of corrective action to be planned. Some remedial actions may be taken in a short timescale, others may take longer to resolve.

Once remedial action has been taken for a particular process, TUV SUD BABT will wish to undertake a formal audit of it to confirm that the original deficiency has been rectified and that no additional deficiencies have arisen.

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<sup>6</sup> The Direction, Annex A1, Definitions and Interpretations

A programme of audits, known as the Main Assessment, can thus be generated from the corrective action plan. Initially this will be provisional and dates will be fixed upon review of progress (see section 3.7). The programme may be modified at any time to address newly discovered weaknesses or avoid work found to be unnecessary. We will use our best endeavours to keep fees to a minimum.

It should be noted that, if the need to achieve Approval is mandated by Ofcom, excessive delay may be viewed unfavourably by the regulator.

### 3.7 Main Assessment<sup>7</sup>

This will be directed towards establishing that your TMBS complies with the Direction. Such work will comprise a combination of *technical audits*, including *witnessed audits* and *desk audits* as necessary, and *progress meetings*.

Please note the following: We may, when conducting these assessments, require access to your sub-contractors' (or other relevant third party's) premises and/or documentation. It is recognised that a contractual right to such access may not be achievable. However, we would ask you to use your best endeavours to obtain such access. Our budgetary estimates assume that any access required is forthcoming, and may need to be revised if that is not the case. If access is not available, as an alternative we may wish to conduct an assessment of the management of your interface with the sub-contractor.

### 3.8 Progress Meetings

TUV SUD BABT's prime contact will meet your BAPM at regular intervals to review progress towards obtaining or maintaining Approval. Such meetings are an essential part of the approval process. Either side may ask appropriate experts to assist with the review. The agenda will include a review of progress towards meeting the requirements of the Direction and of this document. It will also include a review of:

- recovery plans following an Extraordinary Performance Failure [see *Direction clause 4.8.3*]
- identified weaknesses (including findings from technical audits and progress with corrective actions)
- Performance measurement data (if any)
- the details of forthcoming modifications to the TMBS
- for Annex B (retail) applicants a review of the KPIs as documented in Annex B clause 4.3

The meetings will be formally minuted.

TUV SUD BABT will not provide consultancy to redesign parts of the TMBS. However, progress meetings usually discuss the shortcomings that may have been discovered and debate the relative merits of possible solutions and enhancements.

### 3.9 Consideration of Routine Performance

The Direction requires a CP to define routine performance (see section 4.8.2.1) as part of the Measurement Strategy. Once you have agreed a measurement strategy with TUV SUD BABT and have implemented it, performance reports should be produced monthly and presented to TUV SUD BABT. Performance against the agreed measurement strategy should be calculated both on a monthly basis, and also over a rolling 12-month period. When considering whether your TMBS should be Approved (or the Approval renewed), we will normally look at the aggregate of performance taken over a 12-month period, in order to average out inevitable monthly fluctuations. However, if these fluctuations are significant further investigations into the reliability of the TMBS may be necessary. The relationship between you and TUV SUD BABT should ensure that the reasons for any such fluctuations are investigated on an on-going basis, rather than creating a potential delay in granting or renewing Approval.

A minimum of 6 months performance data may be acceptable for Approval purposes provided that TUV SUD BABT is satisfied that the TMBS is consistently performing well within the required

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<sup>7</sup> The Direction clause 5.2.4

parameters and that all other requirements for Approval have been met. It is possible that part of the measurement period offered may pre-date the application; provided that you can demonstrate that throughout this period the measurement system conformed to that subsequently agreed with us and had been accurately reflecting the performance of the TMBS.

### 3.10 Approval Decision

When the prime contact judges that you have met, and are likely to continue to meet, the requirements of the Direction, he will place the evidence from performance reporting, technical audits and progress meetings before a suitably qualified TUV SUD BABT Technical Certifier who has not had any significant prior involvement in your assessment. The Technical Certifier will review the evidence and report on his findings to TUV SUD BABT's Certification Manager with a recommendation to grant Approval, or not, as appropriate. If Regulatory Approval is required, there will be a period for Notification (see *section 4.2*) prior to Approval being granted (see *section 4.3*).

### 3.11 Failure to achieve Approval

An Applicant seeking only Voluntary Approval may normally take as long as they require achieving this approval. Where the systems or scope originally declared change significantly or where the response cycle becomes protracted TUV SUD BABT reserves the right to cancel the application and require that a new application be submitted. Any fees due for the first application will still be due.

However, if you are a UK RP required to seek Regulatory Approval, this must be achieved within the timescales defined in *clauses 3.2, 3.3 or 3.4* of the Direction as appropriate. If after due consideration, TUV SUD BABT see little prospect of you achieving Approval, TUV SUD BABT will notify you in writing giving reasons. You are then required to inform Ofcom what action you intend to take to rectify the absence of Approval, or that you intend to cease operation of the relevant whole or part TMBS, in both cases giving timescales. Please note the warning under *section 2.5* of this document regarding Ofcom's powers to require disclosure. TUV SUD BABT is required to provide routine performance reports to Ofcom on the progress towards approval of all Regulatory applicants.

## 4 APPROVAL

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### 4.1 Certificate Issue

If the Certification Manager is content to grant Approval, a certificate will be prepared. The certificate will specify:

- the name and registered address of the Communications Provider
- the identification of the Public Electronic Communications Services relevant to the TMBS being certified
- the annexes from the Direction being approved or certified
- a description of the services within the scope of the approval
- any exclusions to the scope of approval.

If the Applicant is a UK RP required to seek Regulatory Approval then a public Notification will be issued (see *section 4.2*) prior to the issue of the Approval certificate. All other Voluntary Approval applicants will have their Approval issued (see *section 4.3*)

TUV SUD BABT maintains records for the following periods:

- Applications, Recommendations, Notifications, Certificates and all the details on a certificate for 6 years after the last significant file activity;
- Audit Schedules, and Audit Reports, for two approval cycles or 6 years whichever is the longer.

## 4.2 Notification

Under Section 49(1) of the Act, before TUV SUD BABT can issue, modify or withdraw any Regulatory Approval, it is obliged to publish a public Notification<sup>8</sup> which:

- states that TUV SUD BABT propose to give, modify or withdraw the Approval;
- provides the text of the Approval;
- sets out the effect of the issue, modification or withdrawal of the Approval;
- gives the reasons for the proposal; and
- specifies how and by when representations may be made to TUV SUD BABT about the proposal. The date by which representations are to be made will be at least one calendar month from the date of publication of the Notice.

TUV SUD BABT will publish a Notice of Consultation on its website providing the above details, and will e-mail a copy of the Notice to an agreed list of recipients

At the expiry of the notification period, one calendar month, approval will normally be granted.

If during the notification period TUV SUD BABT receives any representations these will be assessed on receipt. If a representation is an objection to the granting of approval TUV SUD BABT will request the objector to provide evidence to substantiate their objection. TUV SUD BABT allows one calendar month for this evidence to be provided. If no evidence is forthcoming the approval will be issued.

If evidence is provided that substantiates the objection the approval process will be halted until the CP has addressed the objection, when the Prime Contact is satisfied that the issue has been addressed the approval process will recommence, *see section 4.1*.

TUV SUD will summarise all representations received in a report on the TUV SUD BABT website.

## 4.3 Approval

The Approval will be issued and a copy will be sent to Ofcom for all UK approvals, (both Mandatory and Voluntary). Current Approvals issued by TUV SUD BABT will also be published on the TUV SUD BABT web site [TUV SUD BABT Clients with Ofcom Metering & Billing Approval](#).

## 4.4 Continuation

Initial Approvals are normally issued for a duration of 3 years. Towards the end of this period the Applicant/Holder will need to request continuation of the existing Approval; this is also known as *renewal*. (Note that this is distinct from annual contract renewal, *see section 3.3*.)

## 4.5 Modification

From time to time it may be necessary to vary the scope or conditions of an Approval. This may apply where the Applicant's corporate details have changed or there is a substantial change to the description of the PATS or PECS relevant to the TMBS. In this case the Applicant should notify TUV SUD BABT, either formally by letter or at a meeting which is formally minuted. If TUV SUD BABT agrees to the modification, a revised Certificate will be issued. If the Applicant is required to hold UK Regulatory Approval then the notification process described in *section 4.2* may be initiated.

## 4.6 Withdrawal

An Applicant may wish to discontinue Approval of a particular communications service. As for modification the Applicant should notify TUV SUD BABT, either formally by letter or at a meeting

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<sup>8</sup> Prior to the public notification the other ABs will be provided with a copy of the intended public notification and are given 1 week to respond with any representations or objections to the intent to grant approval.

which is formally minuted. Note that if the service is already approved, then the service must be either scheduled for withdrawal or have already been withdrawn. In this case, the notification process described in *section 4.2* will be initiated.

Where TUV SUD BABT wishes to withdraw an Approval this will not be done without issuing prior notification to the Applicant (and to Ofcom where an approval/or notification has been issued) before withdrawing the certificate

## 5 TUV SUD BABT APPROVED PRODUCT MARKING

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Holders of TUV SUD BABT Metering and Billing Certificates may use the BABT Approved Product Mark in connection with the certified products and on advertisements under the conditions stipulated in the Certification Regulations for products.

Details of the rules and colour schemes for the mark are defined in document BABT AP014  
“Marks associated with TUV SUD BABT Certification Schemes”



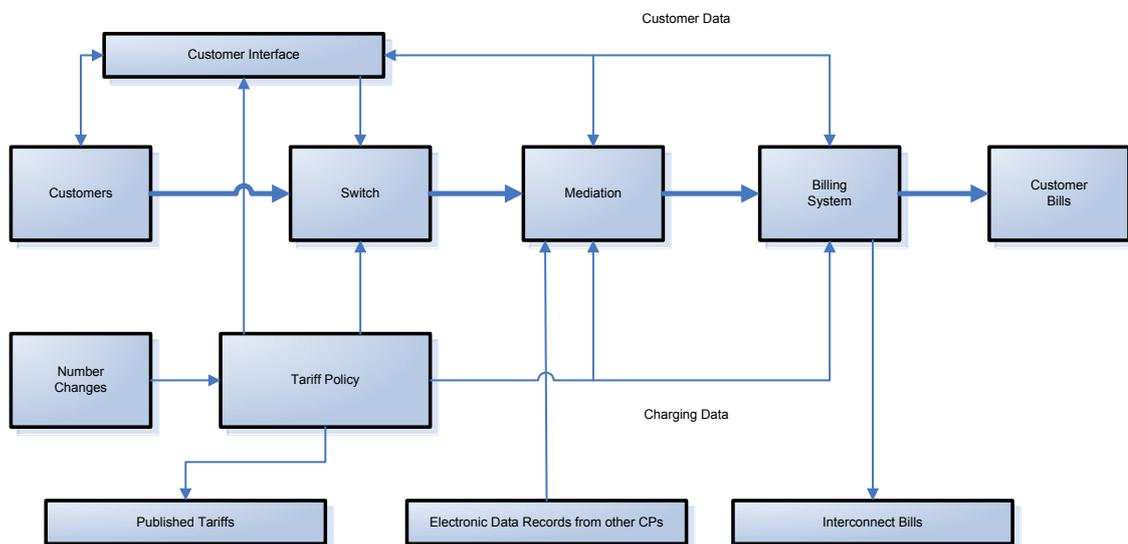
## Annex – Guidance on the Metering and Billing Approval Scheme

### A.1 Scope

Most CPs offer a range of services. Often, different service delivery and/or billing platforms are used for each product, or group of products. These may range from legacy systems to state-of-the-art. Gaining Approval for the whole range of services simultaneously may therefore be impractical. TUV SUD BABT, after assessing the contribution of each identifiable product or service that contributes to the overall performance of the TMBS, will consider restricting with your agreement the initial scope of approval to specific services. As experience is gained, the scope of an existing Approval can be extended or separate Approvals granted. We strongly recommend you to discuss with us at an early stage how Approval should be structured.

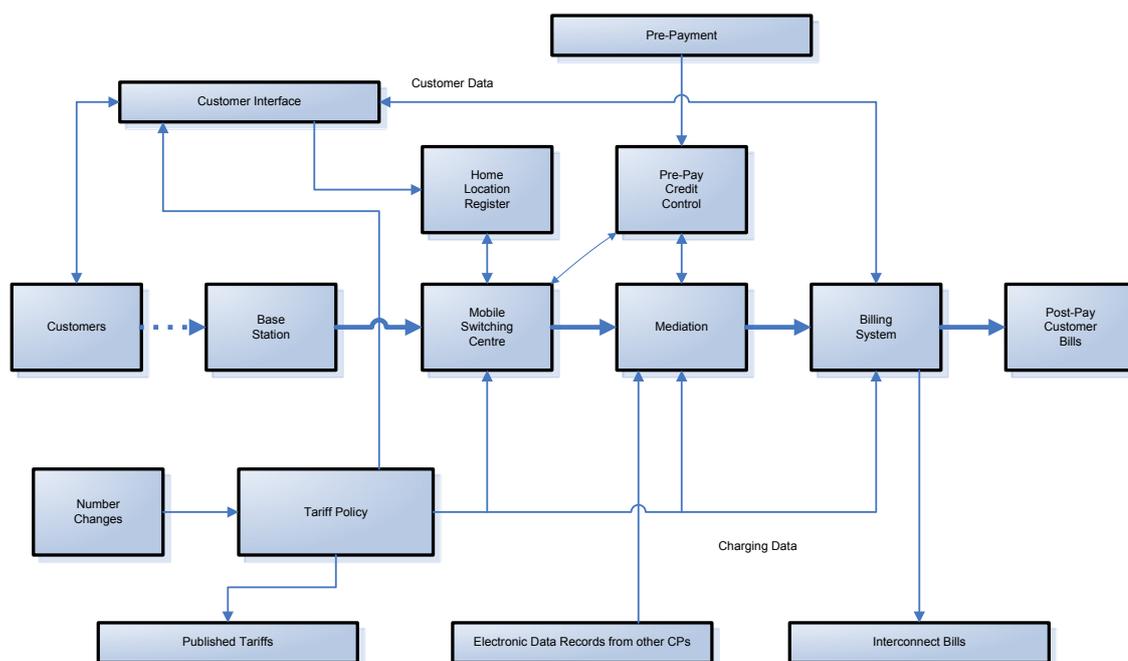
### A.2 Total Metering and Billing System

The meter and billing process can be represented as a system design comprising both equipment and human activity. In its entirety it is known as the Total Metering and Billing System (TMBS). The following are conceptual diagrams of a TMBS operated by a typical Applicant:



**Figure A.1: Typical TMBS diagram for Fixed-Line Services**

*Note: The functional blocks in this diagram may all be owned and operated by a single Body Corporate, or some of them may belong to Sub-contractors, Suppliers, Resellers, and Billing Bureaus etc. In the latter case, the Contractual arrangements between the various parties form part of the TMBS for the purposes of assessment and Approval.*



**Figure A.2: Typical TMBS diagram for Mobile Services**

Note: See Figure A.1

Each of the components and their interconnections represents a mixture of equipment and processes. The equipment may comprise switches, base stations and/or processors, each of which may run various forms of software (e.g. call detail recording, data warehousing, mediation, rating, bill production). Processes include such activities as file transfer, data-fill, error handling, and will operate automatically or with human intervention.

### A.3 The Target

The target is compliance with the Direction, *clause 1.1* of which states:

*Consumers cannot reasonably be expected to verify the accuracy of all charges made by any **Communications Provider (CP)** for services provided, especially where those charges are based on the extent of consumers' usage of such services.*

*This Direction and its Annexes set out the requirements on CPs to ensure that the risk to consumers of being incorrectly charged for their use of **Regulated Services** is minimal.*

The charge (or *tariff*) against which accuracy is determined is that actually set before the customer. This may not always be the tariff that the CP intended to set. The tariff can manifest itself in various ways. One or more tariffs may be published by advertisement generally, on a web site, or by bill message to each customer, who selects the desired tariff. There may be an individual contract in operation between your organisation and the customer.

Reduction of the risk of customers being overcharged is best achieved through a programme of self-appraisals as part of Risk Management, which is mandated by the Direction (*clause 4.3*). These should be an all-encompassing and set a benchmark against which subsequent changes can be assessed. The comprehensive nature of the first appraisal is important in order to establish and document which parts of your processes are important, or of no consequence, for Approval purposes. Once Approval has been granted, you should review and, if necessary, update the self-appraisal at regular intervals. Normally, a programme of annual reviews will suffice.

When change to the TMBS is contemplated, you should undertake appropriate self-appraisal before, during and after implementing the modifications. The management of changes to the TMBS is a significant task in its own right, bringing its own problems and recommendations. Refer to *section A.10* for details.

Irrespective of any self-appraisal that you might undertake, we retain the right to conduct our own appraisal of any aspect of your TMBS. Typically, this would occur if a problem was identified for which the cause was obscure, suggesting that something might have been overlooked during self-appraisal. This is additional to our undertaking an audit of the self-appraisal process itself.

It is in the nature of the complexity of metering and billing that post-implementation and routine self-appraisal frequently raise new issues requiring further change.

You are expected to undertake self-appraisal of the TMBS to determine if it is so designed as to be capable of meeting the requirements of the Direction.

There must be the capability to measure objectively the performance of the TMBS. This is not a trivial process and the applicant must demonstrate the credibility of data obtained from measurement.

Your process management system must not only encompass the entire TMBS but also ensure that links between the various metering and billing processes, including performance reporting, are effective.

Where the end-to-end TMBS extends over one or more organisations, the interfaces between the organisations must be equally effective.

The TMBS will change with time on the introduction of new equipment, services and processes. The effective management of these changes is vital to avoid the introduction of consequential weaknesses into the TMBS.

Guidance on all of the above matters is provided later in this document. The guidance tends towards a specific proven methodology. You may choose to adopt an alternative methodology to manage the conduct and maintenance of self-appraisal, measurement, process management, change management and the HLD. TUV SUD BABT will accept an alternative methodology provided that you can demonstrate to our satisfaction that it is at least as effective as that described here and complies with the specific requirements of the Direction.

#### A.4 High Level Description

##### A.4.1 Introduction

Clause 4.2 of the Direction requires the Applicant to produce a High Level Description document (HLD) for each TMBS and agree its content with their Approval Body. A HLD is defined to be a detailed description of the basis on which an end-user's use of the electronic communications facilities is assessed for charging purposes. The HLD should contain details of mechanisms which may lead to overcharging that cannot be corrected prior to billing; such details must also be declared in Published Tariffs [see *Direction, clause 4.6*].

##### A.4.2 System Description

The system description needs to be sufficient for a person who has no personal knowledge of the system, but has a reasonable level of technical understanding, to comprehend the principles of operation. It must cover service provision and service usage, the latter involving the end-to-end operation of the TMBS. Using the example of a typical CP, service provision would include non-recurring charges (e.g. installation) and recurring charges (rentals); service usage would typically apply from the customer making a call through to the details of the call appearing on the customer's bill, or being decremented from a pre-paid account. Service usage may also include the download of data packets or data items if approval for Data is being sought.

We recommend that the description should also provide a broad understanding of the metering and billing methodology that you employ. Areas of the TMBS which employ different methodologies should be identified. For example, a legacy billing system may lack certain automated checks and might require additional monitoring to maintain an equivalent level of control.

The description should include a summary of the way customer complaints are handled, and their root causes investigated [see *Direction clause 4.9.1*].

The HLD should define any equipment accuracy requirements in terms relevant to the Direction that are to be defined in the procurement specification for any equipment used in the TMBS.

If a suitable high-level description is already available in an existing document then, providing that it is made available to us, the HLD need only make reference to that document.

If an end to end TMBS is implemented by using systems from different Organisations [see *Direction clause 4.7 - Interworking between Communications Providers*] the HLD should describe the interaction and dependencies between the Organisations involved in the implementation.

It is not necessary for the HLD system description to provide a detailed commentary on the design of the TMBS. Such detail would merely duplicate other system documentation featuring in the full appraisal.

##### A.4.3 Presentation of the HLD

The HLD may be in the form of a single document or a series of documents, each addressing different aspects of the TMBS design and operation. In such a case we will regard the HLD as the complete set of documents defined by document references and issue numbers.

The generation of a HLD is likely to need some interaction between you and us. Every situation will be different, and some discussion as to the best approach will save time overall.

You may initially supply an incomplete HLD. However, the missing parts must be supplied before Approval can be granted.

You must regularly review the HLD and maintain it in a current state throughout the period of Approval.

## A.5 Risk Management

### A.5.1 Introduction

Risk management is a discipline with a wide range of applications in many fields.

TUV SUD BABT references international risk management standards when it assesses compliance to the Risk Management requirements of the Direction, *clause 4.3*.

The Risk Management needed in the present context has a narrower definition. The kind of risk relates to "risk of inaccuracy" rather than the broader risk to business. To demonstrate compliance with the Direction, you need to have a clear understanding of the entirety of the TMBS in question and how its components interact or could interact. This involves the on-going study of the design and realisation of the TMBS and the interpretation of information gained during its operation. The objective is to make an informed judgement on the accuracy and reliability of metering and billing achievable in the system as a whole and confirm that it is fit for purpose. The outcome of this exercise will determine if the TMBS as currently designed is inherently capable of meeting the requirements of the Direction. This process is appraisal; it is a requirement of the Direction and guidance is given in *section A.7* below. Self appraisal is fundamental to the understanding and implementation of Metering and Billing Approval and its importance cannot be overstated. It will in turn be the basis for determining the Measurement Strategy (*see section A.8*) and the scope of Process Management (*see section A.9*).

It is important that every aspect of equipment design, hardware and software is considered, and also that the processes used for procuring, modifying and operating the equipment are thoroughly investigated. If the TMBS is operated by more than one organisation, the interactions across the various interfaces need to be carefully considered. *See section A.8.9*.

In general, the complexity of metering and billing systems makes it difficult for any Approval Body to conduct its own comprehensive risk assessment of each Applicant's TMBS. *Clause 4.3* of the Direction makes it clear that you need to carry out an effective assessment of risks within the TMBS.

### A.5.2 Identifying and Mitigating Risks

As each appraisal is conducted risks will be identified. It is recommended that you establish a Risk Register, identifying the risk, the likelihood of it occurring and the potential consequences if it did. If you already operate a Risk Management system, TMBS risks may be recorded there. For each risk, either:

- mitigation actions must be defined and documented, or
- acceptance of the risk is documented, or
- removal of the risk is documented

The Measurement Strategy must define how each risk is monitored and if there is an occurrence how it is measured and reported.

The TMBS will change with time as new equipment, services and processes are introduced. It is necessary to assess the effect of proposed changes and, from time to time, to confirm that effectiveness is being maintained.

## A.6 Technical Audits

Technical audits are the principal means by which TUV SUD BABT establishes that the requirements of the Direction are met. In general, technical audits assess fitness-for-purpose, whereas quality audits verify that an effective Quality Management System (QMS) is in place and that all the processes forming a part of that QMS are being applied.

A technical audit may take the form of a review of documentation and records held by you (or your sub-contractor). If the documents or records are sent to us, this becomes a *desk audit*. It may take the form of a specific audit of your appraisal, process management or measurement system processes and/or activities.

Normally on an annual basis TUV SUD BABT will conduct technical audits on each item in the work programme (*see section 3.6*) but this may be more frequent if required. We may, however, conduct additional audits on any relevant element / part of the system on a random sampling basis or as a result of notification of a specific weakness.

### A.6.1 Technical Audit of Self-Appraisal

From time-to-time TUV SUD BABT will carry out technical audits on your approach to appraisal. We will also audit the methodology used in, and the findings from, some of the self-appraisal studies and the way they are managed to confirm that their breadth, depth, independence and completeness meet the requirements. The findings of these technical audits may lead you to conduct further appraisal studies and/or revise the study reports. To validate your findings, we may investigate in depth samples of self-appraisal studies.

TUV SUD BABT may conduct a detailed technical audit of any aspect of the TMBS to verify the accuracy of the HLD.

#### A.6.2 Technical Audit of Measurement Systems

TUV SUD BABT will undertake technical audits of the methodology used to extract measurement results and the accuracy and deployment of any test equipment used to generate them. The findings of these technical audits may lead to refinement of your measurement strategy.

Specific aspects of measurement which may form the basis of technical audit relate to the capability of the measures defined in your measurement strategy, individually and collectively, to provide a true measure of performance.

#### A.6.3 Technical Audit of Process Management System

TUV SUD BABT will audit your Process Management system for compliance with *clause 4.5* of the Direction. Where you can show a current accredited certification of your Quality Management System to ISO9001:2015, TUV SUD BABT will not seek to audit those parts of the TMBS within the scope of the QMS certification unless evidence is found elsewhere of non-compliance with *clause 4.5* of the Direction. TUV SUD BABT will expect to be advised of any non-conformities relating to the TMBS raised by the QMS certifier/registrar and of progress to their resolution.

TUV SUD BABT will also take into consideration the results of other formal external audits, such as Sarbanes Oxley, when determining the scope of audits to ensure that repetition and audit fatigue is minimised.

We may accompany your internal auditor on a routine QMS audit for the above purposes or, as part of a Technical Audit, to explore a particular topic without subjecting your staff to "audit fatigue"; this is a *witnessed audit*.

We will audit the process for identifying, recording, investigating and dealing with customer complaints for equitable treatment as well as the matters contained in *clause 4.5* and the appropriate annexes of the Direction.

#### A.6.4 Technical Audit of Change Control

TUV SUD BABT will audit the processes used by your organisation for managing change. This will include audits of selected changes which are considered to have the potential to make significant impact upon the performance of the TMBS. Depending upon the circumstances, it may also include reviewing records, interviewing those responsible for specifying and carrying out testing and such other investigations as are necessary for us to be satisfied that Change Management is fit-for-purpose.

### A.7 Appraisal

#### A.7.1 Introduction

It is important that the business and system processes are thoroughly investigated, this should include every aspect of equipment design and use, and also the processes used for procuring, modifying and operating the systems.

Undertaking appraisal according to the provisions of this section, and under our guidance, is intended to demonstrate compliance with *clause 4.3* (Risk Management) of the Direction.

In general, the complexity of metering and billing processes and systems makes it difficult for us to conduct our own comprehensive appraisal of each Applicant's TMBS. In addition we consider that you need to carry out an effective appraisal of your processes (that is: self-appraisal) if you are to have full confidence in them. Provided we can satisfy ourselves that effective self-appraisal has been undertaken there is no reason to repeat your detailed work.

#### A.7.2 General

You may already be carrying out much of what is required for self-appraisal, although it may be called something different. "Design Verification", "Verification, Validation & Test", "Billing Integrity Verification", "Data Integrity Assessment", "Revenue Assurance" etc. are examples of activities that may go some way towards effective appraisal. Certain parts of existing change control processes or audits may also be relevant.

The appraisal strategy should be discussed with us at an early stage. This discussion will include a review of existing activities to determine their adequacy or contribution.

#### A.7.3 Partitioning

You should think carefully about your TMBS, and decide an overall strategy for appraisal. It will be necessary firstly to identify the overall extent of the TMBS in terms of its end-to-end operation. This includes identifying those parts of your systems or processes that have no effect on the accuracy of metering and billing. Most systems are sufficiently complex to make it advisable to partition the TMBS into subject areas which are self-contained, and have readily defined interfaces to the remainder of the TMBS. Examples might be:

- Switches of each technology/design
- Billing Data Collection / Mediation System
- Data Transfer Systems
- Rating Engine
- Billing System

- Tariff Database Management System
- Tariff Publication process
- Customer Management Systems, e.g. Provisioning, Enquiry & Complaint Handling
- Data Audit Systems
- Data Recovery Procedures
- Management / Revenue Assurance Systems / Controls
- Disaster Recovery / Business Continuity Procedures
- General features, serving several of the above, e.g. Incident, Problem & Change Management

Depending upon the size of your operation, some of these may be combined or further sub-divided. For certain Applicants, e.g. switchless resellers, some of the above may be subject to sub-contract [see *Direction clause 4.7*].

Partitioning should take account of main data flows such as those:

- from a service being used to a bill being despatched
- for activating billing and service for a new customer
- to change network configuration and/or tariff data

When the partitioning exercise has reached tentative conclusions on the range of self-appraisal studies needed, you should undertake a gap analysis to confirm that the range covers the entire TMBS. Where gaps are found the range should be adjusted accordingly. The outcome of the completed partitioning exercise should be a programme of self-appraisal studies. The programme should take into account the relative importance (see *section A.5*) of each part of the TMBS.

The following sections describe how the outputs from each study should be treated.

#### A.7.4 Strengths

As each self-appraisal study is undertaken, it will reveal the strengths and weaknesses within the TMBS. The strengths should be acknowledged and recorded to provide a guide as to best practice when considering improvements elsewhere.

A particular strength could be the quality and extent of management information available. During each study, you should note every potential opportunity for a management statistic that might contribute to a measurement of TMBS performance.

Each opportunity should be considered for its usefulness when designing the measurement strategy (see *section A.8*).

#### A.7.5 Weaknesses

As well as strengths, each self-appraisal study will reveal weaknesses within, and limitations on the accuracy of, the TMBS. Weaknesses can also be revealed from:

- reports of incidents – e.g. accidental deletion of chargeable event records
- examination of customer complaints [see *Direction clause 4.9.1*]
- internal audits undertaken by the Applicant (see *section A.9.2*)
- audits undertaken by TUV SUD BABT
- third-party audits

You are expected to identify all sources from which weaknesses can be deduced. Subsequently, you should maintain a log of all weaknesses revealed, together with their relative importance, details of their investigation, proposals for corrective action and progress towards their resolution. As soon as possible, you should inform us of all weaknesses in, or limitations on the accuracy of, the TMBS, from whatever source, which you consider may have a significant impact on metering and billing accuracy.

We encourage you to align the indicators of relative importance within your log of weaknesses to the industry-standard categories of deficiencies [see *Direction Annex A*]. We will either confirm or advise modification of the category allocated, in consultation with you.

Where a CP holds Approval, Ofcom requires Approval Bodies to advise them whenever a Category 1 non-compliance is identified in an approved TMBS.

We will expect you to undertake corrective action within an agreed timescale to resolve the weakness. As a precursor to corrective action, you should establish for each weakness or limitation a monitor point so that improvement, or otherwise, can be measured. The monitor points form an input to the measurement strategy (see *section A.8*).

As well as weaknesses, self-appraisal studies may reveal gaps in the TMBS omitted either from its initial definition, during the partitioning process or as a result of subsequent changes to the TMBS or its scope. You should fill such gaps by redefining the TMBS, if necessary, and performing additional self-appraisal studies.

#### A.7.6 Relative Importance

Not all parts of the TMBS will have the same significance on the accuracy of metering and billing in terms of the system-wide performance referred to in the Direction. It will be necessary to establish the relative importance of each part.

During self-appraisal, each process, procedure and item of equipment forming a part of the TMBS should be evaluated to determine its potential impact on accuracy. For example if a billing platform handles all call records then that platform, together with its operational procedures, will have a high importance. On the other hand, a particular type of switch which serves 10% of customers, and which carries 7% of calls in the network, might be regarded, with its operational procedures, as having a medium importance, and so on. Such an analysis is the essential input to the determination of the emphasis and priorities to be placed on resolution of weaknesses in equipment and procedures.

Relative importance also provides an input to the establishment of a measurement strategy by indicating the emphasis to be placed on measures at different points within the overall metering and billing process (see section A.8). It also forms an input when deciding the volume and frequency of internal audits (see section A.9.2).

#### A.7.7 Management of Self-Appraisal

In view of the all-embracing nature of self-appraisal, including the appraisal of changes, it is important that the process itself is sufficiently robust to withstand organisational change and staff redeployment. Experience demonstrates that clear ownership of the process has to be a necessary part of its management, so that it remains effective throughout, and subsequent to, organisational and personnel changes.

Ownership can be assigned to a post or an individual. In either case, the process should define how change of ownership is to be managed.

#### A.7.8 Appraisal Personnel

Self-appraisal needs to be carried out by technically competent people who know, or can readily understand, the systems being appraised, but who are not so intimately involved as to be unable to take an independent view. They must be able to identify strengths, weaknesses and potential weaknesses, and make recommendations in an impartial and professional manner. Self-appraisal is an example of audit activity. Therefore, we will expect you to apply the requirements of ISO 9001:2015 clauses 7.1.1 and 7.1.2 when selecting appraisal personnel, and to apply the following requirement from ISO 9001:2015 clause 9.2.

*"Selection of auditors and the conduct of audits shall ensure objectivity and impartiality of the audit process."*

The knowledge and skills advisable to complete an effective self-appraisal therefore include:

- knowledge of the technical and operational aspects of the system being appraised. However, system designers may not be best placed to conduct appraisal. Consultants or others who have designed comparable elements of a TMBS in another context, e.g. for export, may have something valuable to contribute. Those responsible for acceptance testing proprietary products for inclusion in the TMBS may be able to appraise those products, and may already be meeting some of the requirements of this section. However, care may need to be taken to avoid conflicts of interest.
- an auditor's approach to assessing the effectiveness of controls built into the system. Formal qualifications as an auditor may be of benefit.
- experience in the design, implementation and maintenance of quality management systems to ISO 9001 in order to assess the management controls and documentation supporting the TMBS.
- training in techniques such as brainstorming, valuable when attempting to identify all possible "What-if" situations. This is to ensure that any potential failure or combination of circumstances that might affect meter accuracy is identified and analysed.

It may be necessary to draw together a number of people to form a team for effective self-appraisal, and/or to enhance the skills of appropriate people by specific training in the above aspects.

#### A.7.9 Questions to Ask During Appraisal

Appraisal should not be limited to hardware and software. In practice, about 80% of problems within a TMBS have been found to be human-related. For example, a system could have a clock that is accurate to a millisecond per annum. However if there is a procedure to set the clock by manual intervention, say from the speaking clock, then it will not give the accuracy expected at first sight.

The following set of questions may be useful in considering each aspect of appraisal:

- What is the purpose of the item considered?
- How is it deployed?
- What is its impact on metering or billing accuracy?
- Is it fit for purpose?
- Does it cover every eventuality?
- What are its interfaces, where and how are they defined? Are they covered by other appraisal areas?
- What could cause a failure?
- What will be the effects of a failure?
- What controls are in place?

- What is the effect of staff training (or lack of it), or changes to personnel?
- What measures are used to record performance?
- Are the measures obtained interpreted in terms of the Direction?
- Can a threshold value be applied to the measures which, if exceeded, will justify stopping the issue of bills?
- To whom are the measurement results reported? Is Top Management aware if compliance with the Direction is in jeopardy?
- What improvements are necessary?

#### A.7.10 How an Appraisal should be Recorded?

The appraisal of each subject area should be documented in a form that allows both you and us to assess the performance of that part of the TMBS. Also, as the process is continuous, the personnel undertaking self-appraisal and making use of the findings will change from time to time. It is vital, therefore, that there is continuity of information about the TMBS and how it develops.

Each self-appraisal study should be recorded to a depth such that:

- you can use its findings to make further improvements to the TMBS;
- it can be understood by personnel taking over responsibility for further appraisal from the original author;
- reference can be made to it later, either by the author or others; and
- it can be audited effectively by us.

We do not specify what format or medium should be used for the record. However, as self-appraisal is a process, we would expect compliance with ISO 9001:2015 clause 7.5.3 – Control of documented information.

The way the appraisal is documented should include the following elements:

- brief identification of the precise equipment and/or procedures involved in the appraisal, by build-level, revision number, etc.
- a list of technical experts who have been involved in the appraisal and/or are available to answer technical enquiries on the subject area
- the relative importance (*see section A.7.3*) of the subject area
- identification of the future plans for this area, e.g. will all of this type of equipment be removed from service within a short period? Will a hardware or software upgrade significantly alter the system in the foreseeable future? Will the relative importance significantly alter as a result of new equipment, procedures or services being introduced in parallel or series with the area being appraised?
- a system description or, preferably, a reference out to available documents that contain such a description. Ideally this should be sub-divided into an equipment description, followed by a procedures description. Where an existing system description, perhaps part of the original equipment supplier's documentation, is used by cross-reference, care needs to be taken to ensure that the principles of appraisal have been fully applied in its inclusion
- a list of weaknesses identified, with recommendations for corrective action. These can sometimes be included in the system descriptive text, so that each is read in context.

The list of weaknesses, suitably categorised [*Direction Annex A*] should be added to the log described in section A.7.5.

#### A.7.11 Published Tariffs

TMBS accuracy is not limited to the accuracy of internal systems within the TMBS but also extends to the information provided to customers as published tariffs and terms and conditions. A TMBS that internally creates accurate customer bills which disagree with the published tariff information is inaccurate within the context of the Direction. Published tariffs can be produced using many media forms, contracts, price guides, advertisements, etc. Each method of production should be subject to appraisal to ensure the accuracy of the information produced.

The Direction requires the CP to identify one source of material as being "known good" with all others deferring to it in the case of a conflict or omission. For example, the CP's website may be identified as the definitive source of tariff information; all other published tariffs such as brochures or media advertisements should then refer to this.

Experience has indicated that the control and management of published media is not a trivial exercise, a CP needs to be able to demonstrate that appropriate controls are in place.

Clause 4.6 of the Direction gives the requirements of what details published tariffs are expected to contain to comply with the Direction.

#### A.7.12 Databases

The databases upon which accuracy of metering and billing depend may include:

- customer profile data, indicating for example which tariff package is appropriate to each line
- digit analysis tables, to determine the locations of calling and called parties, and derive the distance between them or in which country(ies) they are located, also to identify special codes such as free calls, premium and mobile services, and calls attracting a fixed fee
- tariff tables to price each type of chargeable event, at each time of day/week/year, where applicable, and for each customer tariff option
- discount or "Bundle" information, affecting the final price to the end-user
- system parameters which allow an Applicant to select a mode of operation from a variety of options available within the design of equipment; thus enabling either a CP to tailor the equipment to the needs of their particular network or to their particular country's telecommunications system needs, or an Organisation to meet their clients' needs
- polling or delivery schedules, causing billing related data to be collected and delivered in a timely fashion for the preparation of bills and before storage capacity is exceeded at any stage of the process
- data transformation tables, to allow the translation of usage information into a different format.

These databases may be resident on switches, data management systems, mediation systems, billing systems or customer business support systems. Each will need to be kept up to date, and in many instances one database will need to be kept in step with another. For example, if a customer opts for a bulk-discount tariff, the system supporting the order-taking department may need to update databases in the rating engine, billing system and/or switches to apply the discount.

Digit analysis tables will continually change in response to international and national numbering changes. For example, national regulatory authorities regularly allocate new codes for new services, and make changes to the numbering scheme to cater for growth in services.

The appraisal will need to consider whether all necessary and valid sources of information are being fed into the databases, and whether there is a clearly identified "Trusted Data Source" against which working data is validated to detect any discrepancies that may have crept in during day to day management of the systems. The number and nature of errors found should form a management statistic that will contribute to the measurement of performance for Approval purposes.

#### A.7.13 Accuracy of Timing, Quantity and Count

Where charges are based upon duration of chargeable events or time of day, events such as call answer and call clear require validation periods to prevent premature metering and/or release of calls. Validation periods, which may be technology-dependent, are therefore likely to be material to determining call commencement and call termination. In addition there will be delays in signalling call events across a network that may be material in determining accuracy. These factors often require a reference point to be defined at which the accuracy of metering is to be judged.

Where the time recording of the start and finish of a call is carried out at different points in the network this needs to be accounted for in determining the accuracy of call duration.

Different types of service may utilise different network elements which may in turn introduce discrepancies between clocks and introduce inaccuracies in call duration.

Consideration will need to be given to including a suitable definition of "Call Duration" into the relevant Published Tariffs. [see *Direction clause 4.6.3*]. For example, details of minimum durations and charging periods should be included.

As the nature of communications changes customer charges are more likely to be as a result of one or more discrete events, e.g. a text message or a packet of data. Consideration needs to be given to quantifying these event elements, how they are measured and how inaccuracies can be introduced.

Data may also be charged by quantity (e.g. megabyte) or be subject to a "fair usage" policy. In these cases it may be necessary to define how the quantity of data is calculated. For example, repeat transmissions may, or may not, be included in the calculation.

## A.8 Measurement Systems

### A.8.1 Introduction

*Clause 4.4* of the Direction requires you to agree with us a Measurement Strategy document, which is "a documented statement of how risks are to be monitored and where the occurrence of the risk is measured for reporting on the TMBS performance"

Measurement and monitoring is necessary to demonstrate conformity with the requirements of the Direction and to help avoid incidents which might compromise that conformity. Implementation of the techniques described in this chapter has also been shown to benefit the revenue assurance process.

Because of differences between the metering and billing systems used by different Applicants, we do not seek to impose a particular measurement strategy on you; we will accept any that adequately demonstrates compliance with the requirements of the Direction and your particular situation. This section gives guidance on developing a strategy and implementing the corresponding measuring system, and on presenting the measured performance on a regular basis to us.

## A8.1 What needs to be measured?

## A.8.1.1 Accuracy of Individual Charges

The Direction (*clause 4.6.1*) states that

*"In order for End-Users to understand the charges on the Bill, the Tariffs and rules that determine Event charges shall be made readily available to those End-Users. Tariffs shall specify the method and the units of measure applied in relation to the resolution and rounding of event durations and charges, both at an individual and aggregate level. For example, the expression 'rounded to the penny' defines the resolution, but not the method of rounding, whereas the expression 'rounded down to the nearest penny' defines the method of rounding."*

This should ensure that the end user is charged correctly for all services which are within the scope of Approval. Some services may have been excluded from Approval because they have not reached the revenue threshold.

Measurement capabilities and requirements are specified in Annexes A2 and A3 of the Direction.

The types of charges which need to be checked for accuracy include:

- Non-Usage Non-Recurring Events ~ "one-off charges" for the provision, modification or cessation of services (e.g. connection or installation fees, supply of equipment where title is transferred to the end user, bundles or package "add-ons");
- Non-Usage Recurring Events ~ recurring charges for the continuation of services (e.g. rentals and facility charges, bundles, discounts);
- Usage Events ~ usage charges for the services by duration (e.g. phone calls), quantity (e.g. megabytes of data) or count (e.g. SMS messages), or by a combination of these;
- the correct application of VAT and other taxes where appropriate.

For post-pay (contract) customers, the accuracy of charges appearing on their bills against published or bespoke tariffs should be checked. For pre-pay customers, the equivalent process of decrementing of their accounts with usage and other charges (for example, the charging for content in text and other multimedia messages) and the recharging ("topping up") of the accounts will need to be checked.

Generally, any of the types of measure specified in *section 8.8.6*, can be used to measure the above. However, so far as network operators are concerned, measurement is usually only done by monitoring live traffic and/or signalling messages, or by the generation and monitoring of test traffic. Only these measures can check the accuracy of customers' usage and the accurate delivery of their records to the rating and billing system or to another CP.

## A.8.2 Individual Bill Accuracy

The requirements of *clause 4.8* and *Annexes A2* and *A3* of the Direction relate to network-wide performance standards; i.e. performance is measured across the whole customer base. In theory at least, it is possible for your entire error allowance to end up on a single customer's bill. To address this, *clause 4.9* of the Direction requires you to have safeguards (i.e. controls) in place to prevent gross errors being included in individual customers' bills. Such controls could include the checking of a sample of bills before dispatch or the monitoring of customers' usage for significant deviations from the normal pattern. The latter control may already be in place as part of a fraud management system to detect significant variations in customers' bills arising from fraudulent use<sup>9</sup>.

The Direction does not define numerically what constitutes a "gross error", so we would look at the effectiveness of the controls which are in place to prevent errors occurring. For example, if a bill sampling control is in place:

- is the sample taken statistically significant?
- does it cover an adequate range of customer types?
- is the sample sufficiently random (i.e. not the same bills sampled every time)?

Account should be taken of the effects of skewing the samples to check for the introduction of novelties to the bills. The ISO 2859 series of standards provides useful guidance on sampling techniques.

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<sup>9</sup> Fraud is outside the scope of the Direction but can give rise to significant numbers of customer complaints which will require investigation.

### A.8.3 Timeliness

The Direction [*clause 4.8.4*] has a requirement for the timeliness of post pay billing, and any charges which fail to be billed within the specified time are required to be written off. However, if a prevailing bespoke contract exists, it is permissible to specify in that contract the acceptable delay to Billing Events. If you are seeking approval for Undercharging Detrimental to End-Users, the number and value of such written-off charges should be included as under billing in the reported accuracy figures.

If more than one Organisation is involved in the operation of the TMBS then it will be necessary to apportion the timeliness allowance between them – see *section 8.8.9* below.

### A.8.4 Qualification Threshold

GC3.1b and Direction *clause 3.4.2* sets out the criterion for products and services which need to be included in accuracy reporting. Any products and services meeting this criterion should be included in your measurement strategy. Services which do not meet the criterion may be included on a voluntary basis by agreement with us if, for example, separating these services out for measurement purposes would be impracticable. Periodic reviews of the strategy (see *section 8.8.3*) should assess whether the portfolio of products and services being measured includes all those which meet the criterion or whether there are some which need to be included or could be removed.

### A.8.5 Developing a Measurement Strategy

Once you have identified through appraisal (see *section A.7*) those elements of the TMBS contributing to metering and billing accuracy and have analysed where errors could occur within that system you are in a position to develop a measurement strategy.

The strategy should contain:

- a set of measures which will detect any such errors and quantify their impact
- a demonstration that you are meeting the Allowable Measurement Capability requirements of appropriate Annex(es) of the Direction
- a means of reporting these performance measures on a monthly basis to us.

In order to meet the requirements of *clause 4.4* of the Direction you will need to develop and agree with us the strategy that you propose to follow to provide a measurement system capable of demonstrating compliance with the requirements of the Direction. Within the strategy you need to:

- demonstrate that the strategy proposed will enable you to measure accurately the metering and billing performance of the TMBS;
- outline the individual measures which are in place or which you intend to implement;
- specify the programme for realising any measures not already in place;
- if appropriate, indicate how the individual measures will be aggregated to demonstrate compliance with the requirements of the Direction;
- indicate how the measurement results will be presented to us

The measurement strategy may propose a single measure reflecting each aspect of performance or, more likely, a combination of complementary measures. As far as possible, measurement systems should be independent of the TMBS; it is not wise to rely on a TMBS element self-reporting that it is performing accurately. Further details on the types of measure which could be considered for inclusion in the strategy are given in *section A.8.6*.

You should provide in the measurement strategy an outline description of each individual measure and how it contributes to the overall strategy. Each description of a measure will analyse how the measure will quantify the impact of the potential sources of error identified in appraisal, and may refer out to more detailed descriptive documentation if necessary. It may be helpful to show the measures on an overall TMBS diagram to identify which element(s) of the TMBS will be addressed by which measure(s). Such a diagram will readily indicate any gaps in measurement coverage and where allowances may have to be made for double-counting, i.e. where the same error could be picked up by more than one measure.

You are encouraged to discuss and agree your strategy proposals with us at an early stage in the Approval process to enable effective performance measurement to be put in place as soon as possible. This is important since you will need to demonstrate a minimum period of compliance with the performance requirements of the Direction before Approval could be considered. Implementation of an agreed measurement strategy is therefore usually on the critical path towards Approval.

A measurement strategy should not be considered to be unchanging. Changes to the TMBS or the introduction of new services may mean that new measures will need to be introduced or existing measures modified. The appraisal of any such TMBS change or service introduction should consider measurement requirements so that any necessary alterations can be made to the measurement system. The provision of data feeds from TMBS elements or processes to enable measurement of the new system or service to take place should also be considered at an early stage of the planning.

Experience with the operation of the measurement system and the reporting of its results may suggest more efficient or more accurate methods of measuring performance. Similarly, new audit tools or software may become available which could increase the accuracy and reduce the operating overheads of the system. All these factors indicate that the measurement strategy should be regularly reviewed and, if necessary, changes proposed to us. Such changes will normally be agreed provided we are satisfied that the strategy continues to be fully effective.

#### A.8.6 Implementation of the Measurement System

Having agreed the measurement strategy with us, you should now take steps to implement the corresponding measurement system. You should produce an implementation plan identifying the major milestones and target dates for those measures not already in place. We will review this plan regularly at progress meetings. Note that it is not necessary to wait until all measures are in place before commencing performance measurement; it is preferable to start reporting the output from a measurement tool as soon as it is operational. It is also possible that part of the measurement system may predate the application for Approval. Provided that you can demonstrate that throughout this period the output conformed to that subsequently agreed with us and had been accurately reflecting the performance of the TMBS element being measured this output may be taken into consideration when Approval is being sought.

We are aware that some types of measurement tools (for example, a test call sending capability) are expensive and may take a considerable time to implement. This can cause budget issues within your organisation and could delay Approval. If such problems arise, you should discuss them at an early stage with us. It may be possible to suggest an alternative approach which would be acceptable in the short term, such as manual analysis rather than an automated tool, or to agree the phased implementation of a tool, for example to roll out a test call system to the busiest switches first. Putting the full solution in place would then typically become a Category 2 Corrective Action [see *Direction Annex A1*] with agreed timescales.

#### A.8.7 Reporting

Once you have agreed a measurement strategy with us and have implemented it, performance reports should be produced monthly and presented to us. Performance against the agreed strategy should be calculated both on a monthly basis and also over a rolling 12-month period. When considering whether you should be granted Approval (or its renewal), we will normally look at the cumulative mean of measurement results taken over a 12-month period in order to average out inevitable monthly fluctuations. However, if these fluctuations are significant further investigations into the reliability of the TMBS may be necessary. The relationship between you and us should ensure that the reasons for any such fluctuations are investigated on an on-going basis, rather than creating a potential delay in granting or renewing Approval. Measurements taken over a period of less than 12 months (but not less than 6 months) may be acceptable for Approval purposes provided that we are satisfied that the TMBS is consistently performing well within the required standards and that all other requirements for Approval have been met.

After Approval has been granted, you should continue to provide us with performance information on a monthly basis. This will constitute part of the evidence required for continuation of Approval. At any time during the currency of your Approval, unsatisfactory performance figures could lead us to consider withdrawal or variation of your Approval. Treatment of specific incidents which might jeopardise your Approval is considered in more detail in *section A.8.10*.

For continuation of Approval, we will normally consider the cumulative performance over the whole of the preceding 12 months, unless during that period there has been a significant change to the TMBS which would render these figures unrepresentative of the TMBS performance at the time of renewal. In this case, we may agree with you to consider the performance since the change as the principal input to renewal and use the performance over the remainder of the 12 month period as supporting evidence towards the granting or withholding of renewal. For example, a new billing system installed during the year may have a markedly better (or worse) reliability than its predecessor. Similarly, a major incident [see *Direction clause 4.8.3 - Extraordinary Performance Failure*] following which an effective correction action was put in place could also render the 12-month figures unrepresentative of the underlying TMBS performance.

#### A.8.8 Types of Measures

There are a number of different types of measures available to you which can be incorporated into a measurement strategy. These include, but are not limited to:

**Generation of test traffic**, using test call senders and receivers. This provides a more controlled environment for measurement. The extent to which test traffic can be made to reflect real traffic is dependent on how much of the metering and billing system is covered by the call sender based measure, how the mix of test calls types matches the mix of calls in live traffic and what other measures are in place. As a minimum test calls are used to determine the accuracy and completeness of CDR generation at the switch and their transfer to mediation or rating, but they can also be used to check the accuracy of switch clocks, rating, billing, call bundling and the application of discounts. An end-to-end measure such as a test-call sender is also useful as a cross-check on the other measures, as a probe for investigating suspected problems or as a trigger to initiate investigative or corrective action.

**Use of system controls**. Modern data processing systems generally have built-in controls to monitor system performance. The output of these controls can be used as a basis for a measure. As an example, file numbers can be used to monitor the contiguity of data flowing through the system. If a file is lost during any part of the data transfer the impact on accuracy can be estimated from knowledge of the average contents of such files. The use of controls offers an opportunity for you to detect and correct errors before the customer receives the bill. If the error is corrected before the bill is presented to the customer this does not count as an inaccuracy against the Direction.

**Data validation packages**. The use of a standard test set of metering or other tariff data (sometimes known as a "Basket of Calls"), run through the rating/billing system(s) at regular intervals (e.g. daily, or before each rating or billing run) and after tariff changes will provide an early indication of tariff data errors. Should a charging error be found after bills have been sent to customers its impact on billing accuracy would then be calculated from knowledge of the length of time the error has been in place, the frequency with which that piece of data is exercised and the known profiles of use of the data.

**Data reconciliation.** If similar data are available in more than one form or at different points in the TMBS then reconciliation of the data can be undertaken. Examples include:

- (i) the financial reconciliations carried out in prepay systems to ensure that debits and credits are compatible,
- (ii) the matching of line rentals against generated CDRs to ensure that lines for which rentals are being charged are in use and being metered (and vice versa),
- (iii) the reconciliation of HLR and customer billing data in a mobile network or
- (iv) the comparison of the contents of rating tables against published tariffs. There are also a number of commercially-available revenue assurance systems and services which can measure, compare and report on data monitored at multiple points in the TMBS. These may produce performance dashboards which can feed directly into a measurement reporting system.

**Manual data checks.** In some circumstances it may be necessary to check data manually against a set of reference data, where the installation of an automated system may not be justified on cost grounds. An example would be the checking of little-used tariffs whose inclusion in an automated test routine would increase the running time of the tool unacceptably.

**Write-offs and Customer Credits.** You may have to write-off CDRs either because they don't contain sufficient data to rate or allocate them correctly, or because they have become too old to bill. These write-offs will be counted as under-billing if this is included within the scope of certification and you must have the capability to determine their number and value. Their value may have to be estimated from average call values if corrupt data prevents accurate rating. You should also be able to separate out records which are being written off for good-will reasons; for example, there may be a company policy not to bill for late calls which nevertheless are still within the Direction's permitted billing window. Similarly, you must be able to separate out those credits given out to customers because of billing errors and those given for good-will reasons. The measure should capture both those credits given out directly as the result of customer complaint and those given to customers who may not have complained but who have been identified through a root cause analysis of the original complaint.

**Sampling measures.** If you have a significant number of business customers who have bespoke tariffs it may be difficult to implement automated measures, especially if rates are determined on an individual basis rather than from a set of permitted discounts. Equally, a manual check of all such bills may not be practicable every billing period. In this case it could be acceptable to determine performance against the Direction by examining a sample of such bills each billing period such that over a determined period of time (e.g. a year) all customers have had at least one bill examined. If possible checks should be made as soon as possible after a customer has had a tariff or service change.

**Customer complaints.** Customer complaints should be analysed to determine if they indicate a trend in inaccurate billing is occurring, the Direction requires that Root Cause Analysis should be undertaken and a recovery plan put in place to identify all customers impacted by an error and adjustments to their bills to correct any errors. These adjustments form part of measurement reporting.

**Automated RA tools / dashboards.** Automated RA tools can provide information on the performance of a TMBS providing reconciliation data from different points within the TMBS.. This data can be analysed to identify record loss, and to determine incorrect tariffing.

**Process failures.** Process failures such as customer activations, migrations across platforms can have a significant impact on metering and billing. Detection methods should be deployed to assess the impact.

#### A.8.9 Dimensioning and Aggregation of Individual Measures

Your measurement strategy should provide a high level of confidence that the Direction is being met. The measures proposed should be supported by an analysis which confirms that each measure is dimensioned to deliver an acceptable degree of confidence and indicates how the measures will be aggregated to produce an overall measure to the required level of confidence. We will request you to provide the necessary supporting documentation to verify that this confidence is achievable in practice.

An example of dimensioning a measure would be determining how many calls per month a test call sender should send. If the performance was to be calculated from a statistical analysis of test call sending alone, smaller Applicants would have difficulty in demonstrating confidence because of the large number of test calls required, as the sample size required is effectively independent of network size. In these circumstances, additional measures are required to reduce the number of test calls required.

#### A.8.10 Limitations and Systematic Errors

A particular measure may contain a limitation or a systematic error. For example, a test call sender is unlikely to record exactly the defined duration of the call. However, the tolerance may be stated by the manufacturer and there may be a consistent offset between the metered and measured durations. You should identify the location and extent of all limitations and systematic errors. The information so gained may form an input to the analysis of the performance.

#### A.8.11 Interworking between Organisations

In some cases, the TMBS may be under the control of more than one Organisation [see *Direction clause 4.7*]. For example, a mobile Network CP (MNO) may sell its services through an independent service provider, who may or may not re-price the CDRs from the CP before billing the end user. The service provider will also be responsible for order taking and may or may not be able to activate customers directly on the network Provider's system. A further example would be a switchless reseller who sells service on another Provider's network and who outsources customer billing to yet another organisation.

In each case the Organisations will have to reach a contractual agreement as to how the overall services provided meet the requirements of the Direction. This has proved to be an area of difficulty in the past with reluctance by some CPs to commit contractually to an agreement.

If this situation cannot be resolved it will initially be escalated to the appropriate Approval Body (or Bodies) concerned and then, where Regulatory Approval is relevant, ultimately to Ofcom.

Each Provider should be reported in such a way that it is possible to demonstrate that if each Provider's accuracy is within the agreed limit then the TMBS as a whole will meet the performance requirements of the Direction.

The Metering and Billing Approval Bodies Forum (MABABF) has been established to act as a forum to resolve issues between Applicants, other Organisations and their Approval Bodies and to resolve issues of interpretation of the Direction. A website (<http://mababf.org>) has been established where members of industry may seek guidance on particular issues associated with the Direction. It is probable that case law will develop as the implementation of the Direction matures, this website will be used as the medium for disseminating that information.

#### A.8.12 Incidents and Extraordinary Performance Failure

Experience shows that significant breaches of the Direction may result from a single incident, such as the accidental disabling of CDR generation at the switch or the erroneous application of a tariff or discount. Even with relatively prompt corrective action, the impact on the relevant performance measure may be such that it will not return to normal for many months. During this period its effect could be to mask other smaller but still significant errors.

You should have adequate controls in place to minimise the risk of such incidents occurring. For example, you should implement monitoring to verify that:

- all functional units involved in the TMBS are effectively managed at all times so that any malfunction is quickly spotted;
- the implementation of any change to the TMBS or tariff structure is carried out under controlled conditions so that any problems encountered can be dealt with effectively;
- the correct tariff rate is applied at all times. If tariff discrepancies are identified, records should be kept of any corrective action taken to enable customers' bills to be rectified and any impact on accuracy to be calculated.

If an incident occurs which causes performance to exceed a level agreed between the CP and the Approval Body, and documented in the Measurement Strategy, this is an Extraordinary Performance Failure (EPF) [see *Direction clause 4.8.3*]. From the month within the measurement period when an EPF occurs until the effect of the EPF no longer impacts the rolling 12-month average, data must be presented to TUV SUD BABT with the EPF included and the EPF excluded. This also applies to any subsequent EPFs. This will allow us to judge the underlying performance of the TMBS.

Each EPF will be raised as a Category 1, Category 2 or Category 3<sup>10</sup> finding, based on the following criteria:

- How many customers were impacted?
- What the value of over or under billing?
- How long did the issue last? And,
- How long did it take the RP to rectify?

Should more than 3 Category 2 EPFs occur within a 12-month rolling period a full review by the Approval Body of the TMBS shall take place to re-establish fitness for Approval. Failure to implement a Recovery Plan as stated or to time will result in escalation of the finding to a Category 1. Where Regulatory Approval is relevant, Approval Bodies are required to report Category 1 findings to Ofcom.

## A.9 Process Management

### A.9.1 Introduction

Clause 4.5 of the Direction requires that a Communications Provider (CP):

*"shall have in place and enforce the effective use of procedures and/or documentation covering all aspects of TMBS.*

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<sup>10</sup> See Annex A1 for Definitions

*All business and technical processes that can impact the TMBS shall be included within the scope of a process management system for approval purposes, including those related to third parties or sub-contractors."*

This section gives guidance on how you can demonstrate that you have implemented a Process Management System (PMS) that meets the requirements of the Direction.

There is no requirement for your PMS to be formally certified; however if you hold accredited certification to the current version of ISO9001 with an appropriate scope this will be taken into account when we are auditing compliance (*see section A.9.4*).

#### A.9.2 Process Management System Guidance

In our experience this can best be demonstrated by addressing the following:

You should establish, document, implement and maintain an effective Process Management System (PMS) that addresses as a minimum, the following (clause numbers refer to ISO9001: 2015):

5.1 – Leadership

5.2 - Policy

5.3 – Organisational roles, responsibilities and authorities

6 – Planning

7.1 – Resources

8.2 – Requirements for products and services

8.3 – Design and development of products and services

8.4 – Control of externally provided processes, products and services

8.5 – Product and service provision

9.1 – Monitoring, measurement, analysis and evaluation

9.3 – Management review

10 - Improvement

All processes and procedures that can have any effect on the performance of the TMBS should be encompassed within the scope of the PMS for certification purposes. For examples see *section A.7.3*.

For the purposes of certification, the "product" should be interpreted as the bill received by your customer or service usage information that you supply to a service provider (or equivalent). In the case of pre-pay services, it is the accurate credit and debit of the customer's account.

You should define within the PMS the procedures and controls operated for each component of your TMBS such that the latter may be effectively audited.

The appraisal process described in *section A.7.3* will have identified the key features of your TMBS. It will also have identified the associated human processes. We would expect your PMS to be structured to permit effective surveillance of the TMBS. In particular, we would expect to see an overall control function covering the metering and billing process (not just the billing "pipeline") to collate all customer complaints related to, and incidents affecting, metering and billing accuracy. This function should report such complaints and incidents centrally and also to customer support teams so that they can service billing enquiries.

The internal audit regime and audit programme should encompass the totality of the metering and billing process. The programme should include headquarters operations and external support units, such as marketing and sales (including retail outlets which are operating units of a CP). Consideration should be given to the relative importance of each unit (*see section A.7.2.5*).

There should be sufficient documentation of the organisation, key procedures, ancillary activity and support tools to avoid the establishment of processes that depend for their effectiveness on local knowledge. This weakness becomes all too apparent when the persons concerned are unavailable.

#### A.9.3 Demonstration of Compliance prior to Approval

The amount of work to demonstrate compliance with the Direction, and the degree of our involvement, depends on the state of the existing process and/or quality management systems.

At one extreme, you may not initially have established a formal PMS system. This does not necessarily indicate a malfunctioning TMBS. However, to continue to ensure consistent operation, repeatability and measurability, we will encourage you to build up a PMS system compliant with the Direction. We will undertake audits of the evolving PMS system to monitor progress and decide when compliance has been achieved.

There are many variations between the case described above and a PMS already fully compliant with the Direction. We will take account of existing evidence, such as internal or external quality or financial audit reports, which cover one or more aspects of the TMBS.

#### A.9.4 Exemptions

You may claim qualified exemption from the procedure described in *section A.9.3* by showing to us a current certificate of compliance with ISO 9001 issued by an accredited certification/registrar body.

We will examine in an audit the scope of the certification and other evidence that you submit to confirm that it entirely covers your part of the overall TMBS. Where we find gaps in the scope and coverage, we may undertake additional quality audits to complete the coverage.

#### A.9.5 Continuing Compliance

We will undertake audits as necessary to show that the PMS is being maintained in compliance with the Direction. Where you have claimed an exemption (*see section A.9.4*), we will need to be satisfied that it remains valid. Where we have doubts, through appraisal (*see section A.7.4*), or audit, as to the effectiveness of the PMS, we reserve the right to undertake further audits irrespective of the status of the QMS certification.

#### A.9.6 Changes to the PMS

Changes to the PMS should be notified to TUV SUD BABT in the same way as other changes to the TMBS (*see A.10*). Irrespective of any exemptions claimed, we will wish to satisfy ourselves that the scope of the revised PMS still covers the entire TMBS effectively. Likewise, changes to the TMBS itself will be assessed to confirm that the PMS remains effective.

### A.10 Change Management

#### A.10.1 Introduction

Change management is a critical part of Approval. An initially well designed and implemented system can become inaccurate if poorly controlled changes are made. Each component of the TMBS (*see section A.2*) usually comprises some hardware, some software and some human procedures. Different criteria may apply to changes in each of these areas.

Hardware and software changes are usually designed by the manufacturer. Some are a direct response to a request from the Applicant. Some may be related to demands made by the world market, the need for cost reduction or the replacement of components that are becoming obsolete. Others are made to fix problems. Software may be modified at planned intervals or patches issued to solve urgent problems. Human processes may be changed to make use of newly available technology, to simplify tasks or as a result of reorganisation.

Few of these exercises are intentionally related to metering and billing accuracy. However, experience indicates that unexpected effects can easily occur when changes are made, some of which will impact on accuracy. Apparently innocuous changes have thereby caused significant loss of charging data.

Tariff and numbering changes, if the associated data fill exercises are incomplete or incorrect, can give rise to incidents involving un-billable call records. Sometimes the number of records in suspense can overwhelm the resources allocated to rectification of such problems.

Sometimes individual changes are tested in isolation. Problems may arise if they are implemented simultaneously. Also, for example, if a new service is provided with an initial period of tariff reduction set for removal at a later date, an intervening modification could disable the trigger for reverting to the normal tariff.

Experience shows that many incidents leading to non-compliance with the Direction arise from implementation of changes considered not to affect the TMBS, or the improper implementation of changes that do. This section describes what we have found to be best practice to minimise such incidents.

#### A.10.2 Appraisal of Changes

Clause 5.4 of the Direction states:

*“Once Approval has been granted, the Communications Provider is required to maintain its Approval. This is achieved through the on-going audit and surveillance of the Total Metering and Billing System by the Approval Body.*

*Changes to the Total Metering and Billing System continue to be assessed through the review of appraisals of the key parts of the system.”*

As stated in *section A.7*, the TMBS will change with time. To prevent the degradation of accuracy, all changes to systems, products, services, tariffs, terms and conditions, advertising campaigns need to be controlled. You should appraise all changes to equipment, data, processes and procedures, and organisational structures in areas relevant to the TMBS prior to their implementation. The appraisal needs to consider the potential of each change to cause a breach of the requirements of the Direction.

Appraisal (*as defined in section A.7*) of changes is a high priority activity. It needs to include a critical review of the intended features of a change, and the application of experience and / or brainstorming to interpret the possible unexpected effects.

Provocative testing in these areas will be of value, as will the application of standard test patterns, such as a set of test calls to a switch, or a file of known charging data to a mediation, rating, or billing system (see section A.10.4).

The relevant areas will be those that have been defined as part of the self-appraisal process (see section A.7.3).

Situations can arise when changes to the operator's organisation are made that result in the non-performance of an activity essential to metering and billing accuracy. Allied to such changes is the need for clear definitions of responsibilities to initiate and sanction changes. All managers responsible for equipment, data or procedures forming part of the TMBS should therefore have defined their authority to change them. Any reorganisation impacting on responsibilities for metering and billing should be implemented only after any necessary, consequential reallocation of such responsibilities has been fully defined, and at the same time as those responsibilities are reallocated.

#### A.10.3 Management of Changes

It will be necessary to manage the change process so as to avoid the inadvertent introduction of modifications that have not been subjected to appraisal. You may already have a change control regime which requires sign-off from all affected departments. However, experience shows that even well-controlled change management can occasionally permit modifications that inadvertently cause a breach of the requirements of the Direction.

In our experience, achievement of Approval, and its subsequent maintenance, is accompanied by a growing level of knowledge and experience of what gives rise to metering and billing errors. This should be harnessed to the change management process and those having the knowledge and expertise should be included in the authorisation of changes. However, the change control process should have clearly identified ownership, ideally controlled by a single manager. Regular review of the success or otherwise of implemented changes may point to ways of improving change management. In assessing compliance with the risk management requirements (clause 4.3) of the Direction, we will investigate the effectiveness of your change control regime.

It is unlikely that any single person within your organisation will have the expertise to appraise all proposed changes. You should therefore identify people with appropriate technical knowledge in each area and train them in appraisal techniques. They would also need to be conversant with the requirements of this scheme and the Direction. We would need to be satisfied that such people have the relevant experience and training.

#### A.10.4 Testing Proposed Changes

We strongly recommend that all changes should be subject to a verification programme of provocative testing prior to their introduction onto the Applicant's system. This could be undertaken by you either on a dedicated test bed or on a trial site on your live network. Alternatively, the evidence may be obtained from the equipment supplier or another Organisation (see section A.10.5). Where you intend to rely on evidence of satisfactory testing from the supplier or another CP, or from your own test-bed, you should confirm that the conditions of test are relevant to the network for which you are responsible.

#### A.10.5 Suppliers

An Applicant is dependent on the accuracy of the service provided by any Wholesale CP they utilise and any third party to which they have outsourced any processes, e.g. Customer Management. An Applicant is reliant to some extent on his suppliers of equipment and software.

Clause 4.7 of the Direction requires you to contractually commit certain suppliers to operate and/or maintain relevant equipment so as to maintain compliance with the Direction. You should also place reasonable obligations on such suppliers to advise you of all changes to their product which might affect the TMBS for agreement prior to implementation. Such obligations should be sufficient to enable you to meet all the requirements of the Direction.

You may require evidence of satisfactory testing before accepting the change (see A.10.4).

#### A.10.5 Notification of Changes to TUV SUD BABT

The section applies to all those changes to equipment, procedures and organisation in areas relevant to the TMBS which are found, through self-appraisal, to have the potential to cause a breach of the Direction.

If you wish to implement a major change to the structure of the TMBS which would affect the wording of the Approval document, you should notify us according to section 4.3. Sufficient detail should be given to allow us to understand in broad terms the consequences of the proposed change and its relationship to other changes. There is usually a significant lead time between proposal and implementation of changes. Notification can then be given to the TUV SUD BABT Prime Contact at a regular, minuted, progress meeting. Otherwise, it can be done by letter or e-mail. Whichever method is used, the TUV SUD BABT Change Notification form should be completed. We will acknowledge these notifications.

END