TECHNICAL CODE

**SPECIFICATION FOR
INTEGRATED SERVICES DIGITAL NETWORK (ISDN)
USING PRIMARY RATE ACCESS**

First Revision

Developed by   **Registered by**

Malaysian Technical Standards Forum Bhd

Registered date: 18 December 2014

DEVELOPMENT OF TECHNICAL CODES

The Communications and Multimedia Act 1998 ('the Act') provides for Technical Standards Forum designated under section 184 of the Act or the Malaysian Communications and Multimedia Commission ('the Commission') to prepare a technical code. The technical code prepared pursuant to section 185 of the Act shall consist of, at least, the requirement for network interoperability and the promotion of safety of network facilities.

Section 96 of the Act also provides for the Commission to determine a technical code in accordance with section 55 of the Act if the technical code is not developed under an applicable provision of the Act and it is unlikely to be developed by the Technical Standards Forum within a reasonable time.

In exercise of the power conferred by section 184 of the Act, the Commission has designated the Malaysian Technical Standards Forum Berhad ('MTSFB') as a Technical Standards Forum which is obligated, among others, to prepare the technical code under section 185 of the Act.

A technical code prepared in accordance with section 185 shall not be effective until it is registered by the Commission pursuant to section 95 of the Act.

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Committee Representation

The Fixed Terminal Working Group under the Malaysian Technical Standards Forum Bhd (MTSFB) which developed this Technical Code consists of representatives from the following organisations:

NEC Corporation of Malaysia Sdn. Bhd.

SIRIM QAS International Sdn Bhd

Telekom Malaysia Berhad

TIME dotCom Berhad

FOREWORD

This technical code for the Specification for Integrated Services Digital Network (ISDN) using Primary Rate Access (First Revision) ('this Technical Code') was developed pursuant to section 185 of the Act 588 by the Malaysian Technical Standards Forum Bhd (MTSFB) via its Fixed Terminal Working Group.

This Technical Code was developed for the purpose of certifying communications equipment under the Communications and Multimedia (Technical Standards) Regulations 2000.

This Technical Code cancels and replaces Technical Specification for Connecting to the Integrated Services Digital Network (ISDN) using Primary Rate Access, SKMM FTS ISDN-PA Rev. 1.01:2007.

This Technical Code shall continue to be valid and effective until reviewed or cancelled.

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SPECIFICATION FOR INTERGRATED SERVICES DIGITAL NETWORK (ISDN) USING PRIMARY RATE ACCESS

Section A

Introduction

1. Scope

1.1 This Specification identifies the minimum technical requirements for connecting to the Integrated Services Digital Network (ISDN) at the T interface, using Primary Rate Access (PRA).

Figure 1. Reference Configuration for Multiple Connections (Figure 1/I.412)

1.2 The ISDN PRA equipment connected to the T interface (see Figure 1) shall have the Network Termination 2 (NT2) function. Suppliers shall demonstrate that the equipment has been tested to comply with the requirements defined in Section A, B, C and D of this Specification.

Section B – Physical layer requirements based on ITU-T Rec. I.431, Primary Rate User-Network Interface – Layer 1 Specification

Section C – Link Access Procedure on the D-channel, LAPD based on ITU-T Rec. Q.921, ISDN User-Network Interface – Data Link Layer Specification

Section D – Network layer requirements based on EN 300 403-1 11/99, Integrated Services Digital Network (ISDN): Digital Subscriber Signaling System No. One (DSS1) protocol: Signaling network layer for circuit-mode basic call control; Part 1: Protocol Specification [ITU-T Recommendation Q.931 (1993), modified].

2. Normative references

The following normative references are indispensable for the application of this Specification. For dated references, only the edition cited applies. For undated references, the latest edition of the normative references (including any amendments) applies.

See Annex A.

3. Abbreviations

The use of the term Terminal Equipment (TE) within the Specification refers to a Terminal Equipment Type 1 (TE1), a Terminal Adaptor (TA) or a NT2.

The following notations are used in the Specification:

CR   Conformance Requirement defines features and functions that must be supported at minimum.

M   Mandatory requirement is where the TE implementation shall conform to those clauses in that section relating to the operation of Layer 1, Layer 2 and Layer 3 protocol in the TE.

O   Optional requirement means it is optional whether TE implements that function but if function is implemented, it shall conform to the clauses in that section relating to the operation of the TE Layer 1, Layer 2 and Layer 3 protocol.

        However, the use of optional functions is possible only if the network operators have implemented these options in their networks.

NA   Not Applicable is where the requirements specified in that section on the TE shall not be applicable for attachment.

GID   The section provides General Information and Definitions.

TE1   ISDN-capable terminal equipment e.g.: Digital phone and digital fax

TE2   Non-ISDN equipment e.g: Analogue phone and the RS-232 serial port on computer

TA   Terminal adapter that interfaces the TE2 devices with ISDN network

NT1   Network terminator that resides between telco's network and customer equipment

NT2   An intelligent device that can perform switching function e.g: PABX and Local Area Network (LAN)

4. General requirements

4.1 Design of Equipment

CR

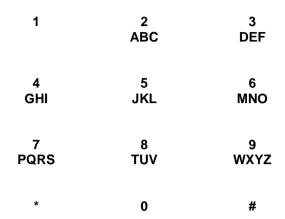|		
Power supply	a) For AC powered TE, the operating voltage shall be rated/ marked at 230V or 240V in line with the country's nominal voltage and frequency in accordance to MS IEC 60038. If the product is rated with multiple or a range of voltages, voltage range between 230V (+10%,-6%) shall be included. Testing shall be conducted based on 230V (+10%,-6%) or 240V and other relevant voltages, if the product is marked with multiple or a range of voltages.	Note 1
	b) Product shall be rated/ marked at 50Hz and testing shall be conducted at 50Hz. If the product is marked at 50/60Hz or 50-60Hz then testing shall be conducted either at 50Hz or 60Hz, whichever is more unfavorable.	
	c) Where external power supply is used, e.g AC adaptor, it shall not affect the capacity of the equipment to meet this specification. Adaptor must be pre-approved by the relevant regulatory body before it can be used with the equipment.	
	Note	
	i) Either one of these options shall be applied.	
Identification of equipment	Equipment shall be marked with:	M
	a) supplier's or manufacturer's name or identification mark	
	b) supplier's or manufacturer's model or type reference	M
	The markings shall be legible, indelible and readily visible	M
Keypad Dialing	a) Keypads used in equipment for dialing shall be alphanumeric keypads and the relationships between the letters and the digits shall comply with ITU-T Rec E.161 as shown in Figure 2.	M
	b) The associated letters shall not impair the legibility of the digit (§ 3.1.1, ITU-T Rec. E.161).	M
	c) The `tactile identifier on the "5" button shall be provided (§ 3.6, ITU-T Rec. E.161).	M

3

1	2 ABC	3 DEF
4 GHI	5 JKL	6 MNO
7 PQRS	8 TUV	9 WXYZ
*	0	#

Figure 2. Alphanumeric Keypad Layout (ITU-T Rec. E. 161)

4.2   Interface

4.2.1 Network Interface

Connector	-	Coaxial cable or RJ45
Line Coding	-	HDB3
Impedance	-	120Ω (RJ45) or 75Ω (coaxial cable)
Framing	-	Multi frame CRC
Switch Type	-	NET 5

4.3   Interoperability

TE1 and TA are dynamically interoperable if they implement a common and compatible set of features, functions and options and can demonstrate satisfactory mutual communication in a real network architecture environment as performance test conditions are varied and exercised. It is mandatory that the TE1 and TA be tested with the respective Service Provider to ensure interoperability. The general reference model for interoperability is shown in Figure 1.

5.   Electromagnetic Compatibility & Electrical Safety Requirements

5.1   The equipment shall comply with the limits for conducted disturbance at the main terminals and telecommunication ports, and the limits for radiated disturbance are defined in the IEC CISPR 22.

5.2   The equipment shall comply with the IEC 60950-1 safety standard[1]. The requirements in IEC 60950-1 that are applicable to the equipment [e.g. class of equipment, type of telecommunication network voltage (TNV) circuit and types of components shall be identified and complied with.

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[1] The safety standard includes, among others, protection of telecommunications network service personnel and users of other equipment connected to the network from hazards in the equipment.

Section B

Primary Rate User-Network Interface – Layer 1 Specification
(ITU-T Recommendation I.431 03/1993 & Amendment 1 06/1997)

Title	ITU-T Rec. I.431	ETSI TBR 4		Remarks
Introduction	1	-	GID	Supports user-network interface at 2048 kbit/s
Type of configuration	2	-	M	Primary rate access at the T reference point shall support the point-to-point configuration only. Electrical characteristics are defined in ITU-T Rec. G.703.
Functional characteristics	3		M	Heading
Summary of functions (Layer 1)	3.1	–	M	– B-channel (64 kbit/s)
			O	– H0-channel
			O	– H1-channel
			M	– D-channel (64 kbit/s)
			M	– Bit timing
			M	– Octet timing
			M	– Frame alignment
			O	– Power feeding
			M	– Maintenance
			M	– CRC procedure
Interchange circuits	3.2	–	M	Two interchange circuits, one for each direction, are used for the transmission of digital signals
Activation/deactivation	3.3	–	M	Active at all times
Operational functions	3.4	–	M	Heading
Definitions of signals at the interface	3.4.1	9.5.1	GID	
Definitions of state tables at network and user sides	3.4.2	–	GID	
Layer 1 states on the user side of the interface	3.4.3	9.5.2	M	
Layer 1 states at the network side of the interface	3.4.4	–	NA	Network side
Definition of primitives	3.4.5	–	M	
State tables	3.4.6	9.5.3	M	Table 2/I.431 is applicable
Interface at 1544 kbit/s	4	–	NA	

Title	ITU-T Rec. I.431	ETSITBR 4	CR	Remarks
Interface at 2048 kbit/s	5	–	–	Heading
Electrical characteristics	5.1	9.2 9.3	M	a) 120 Ω symmetrical pair interface b) ITU-T Rec. G.703 section 6
Frame structure	5.2	9.4	M	Note 1
Timing considerations	5.3		M	
Jitter	5.4	9.3.3	M	
Tolerable longitudinal voltage	5.5	9.3.4	M	
Output signal balance	5.6	–	M	f=1 MHz; $\geq$ 40 dB 1 MHz < f $\leq$ 30 MHz; decreasing from 40 dB at 20 dB/decade
Impedance towards ground	5.7	9.2.2 9.3.5	M	10 Hz < f $\leq$ 1 MHz; > 1000 Ω
Interface procedures	5.8	9.5.5	M	
Maintenance at the interface	5.9	9.5.4	M	On the user side
Connector	6	–	M	ISO/IEC standards and permanent wiring are permitted
Interface wiring impedance	7	–	M	120 Ω ± 20%, 200 kHz - 1 MHz 120 Ω ± 10%, 1 MHz Two symmetrical pair connections shall be provided. No power feeding is available in either direction.
Power feeding to the NT	8	–	O	Provision of power using a separate pair of wires, is optional.
Timeslot assignment for interfaces having only H0 channels	Annex A	–	Note 2	
Timeslot assignment for 2048 kbits/s interface having H11 channel	Annex B	–	Note 3	
NOTES: i) H-channels may not be supported depending on local implementation. ii) 'M' if H0 channels are supported. iii) 'M' if H11 channels are supported. iv) The use of optional functions is possible only if the network operators have implemented these options in their networks.					

Section C

**ISDN User-Network Interface – Data Link Layer
(ITU-T Recommandation Q.921 09/1997 & Amendment 1 06/2000)**

Table 1. Frame structure for peer-to-peer communication

Title	ITU-T Rec. Q.921	ETSI TBR 4	CR	Remarks
General	1	–	GID	
Frame structure for peer-to-peer communication	2	10.1	GID	Heading
General	2.1	10.1.1	M	
Flag sequence	2.2	10.1.2	M	
Address field	2.3	10.1.3	M	
Control field	2.4	10.1.4	M	
Information field	2.5	10.1.5	M	
Transparency	2.6	10.1.6	M	
FCS field	2.7	10.1.7	M	
Format convention	2.8	10.1.8	–	
Invalid frames	2.9	10.1.9 Note	M	
Frame abort	2.10	–	M	Not a TBR 4 requirement
NOTE. TBR 4 includes a frame, which contains a TEI that is not assigned to the TE as invalid.				

Table 2. Elements of procedure and formats of field for data link layer peer-to-peer communication

Title	ITU-T Rec. Q.921	ETSI TBR 4	CR	Remarks
Elements of procedure and formats of field for data link layer peer-to- peer communication	3	10.2	–	Heading
General	3.1	10.2.1	GID	
Address field format	3.2	10.2.2	M	
Address field variables	3.3	10.2.3	–	Note 1

Table 2. Elements of procedure and formats of field for data link layer peer-to-peer communication *(continued)*

Title	ITU-T Rec. Q.921	ETSI TBR 4	CR	Remarks
Control field formats	3.4	10.2.4	M	
Control field parameters and associated state variables	3.5	10.2.5	M	
Poll/Final (P/F) bit	3.5.1	10.2.5.1	M	
Multiple frame operation – variables and sequence numbers	3.5.2	10.2.5.2	M	
Unacknowledged operation – variables and parameters	3.5.3		GID	One parameter is defined, N201 (see 5.9.3).
Frame types	3.6	10.2.6	–	Heading
Commands and responses	3.6.1	10.2.6.1 Note 3	M	Refer to Table 5/Q.921
Information (I) command	3.6.2	10.2.6.2	M	
Set Asynchronous Balanced Mode Extended (SABME) command	3.6.3	10.2.6.3	M	
Disconnect (DISC) command	3.6.4	10.2.6.4	M	
Unnumbered Information (UI) command	3.6.5	10.2.6.5	M	
Receive Ready (RR) command/response	3.6.6	10.2.6.6	M	
Reject (REJ) command/response	3.6.7	10.2.6.7	M	
Receive Not Ready (RNR) command/response	3.6.8	10.2.6.8	M	
Unnumbered Acknowledgement (UA) response	3.6.9	10.2.6.9	M	
Disconnected Mode (DM) response	3.6.10	10.2.6.10	M	
Frame Reject (FRMR) response	3.6.11	–	M	Note 2
Exchange Identification (XID) command/response	3.6.12	–	NA	Note 2
NOTES:				
i) Value '0' is allocated to TEI. Other values are not used in PRA.				
ii) TBR 4 does not support FRMR response and XID command/response.				

Table 3. Elements for layer-to-layer communication

Title	ITU-T Rec. Q.921	ETSI TBR 4	CR	Remarks
Elements for layer-to-layer communication	4	–	GID	

Table 4. Procedures for use by the data link layer

Title	ITU-T Rec. Q.921	ETSI TBR 4	CR	Remarks
Definition of peer-to-peer procedures for the data link layer	5	–	GID	
Procedures for the use of P/F bit	5.1	–	–	Heading
Unacknowledged information transfer	5.1.1	10.4.1	M	NA to PRA
Acknowledged multiple frame information transfer	5.1.2	10.6 and 10.7	M	
Procedure for unacknowledged information transfer	5.2	10.4	–	NA to PRA
TEI management procedures	5.3	10.5	–	NA to PRA
Initialization of data link layer parameters	5.4	–	NA	Note 1
Procedure for establishment and release of multiple frame operation	5.5	10.6	–	
Procedure for information transfer in multiple frame operation	5.6	10.7	GID	
Re-establishment of multiple frame operation	5.7	–	–	
Exception condition reporting and recovery	5.8	10.9 Note 2	GID	Multiple TEI assignment is not applicable.
List of system parameters	5.9	10.10	M	
Timer T200	5.9.1	10.10.1	M	The default value shall be 1 s.
Max number of retransmissions (N200)	5.9.2	10.10.2	M	The default value shall be 3.
Max number of octets in an information field (N201)	5.9.3	10.10.3	M	The default value shall be 260 octets.

Table 4. Procedures for use by the data link layer *(continued)*

Title	ITU-T Rec. Q.921	ETSI TBR 4	CR	Remarks
Max number of transmission of the TEI identity request message (N202)	5.9.4	10.10.4	M	NA to PRA
Max number of outstanding I frames (k)	5.9.5	10.10.5	M	For a SAP supporting primary rate signaling, the value is 7.
Timer T201	5.9.6	–	NA	NA to PRA
Timer T202	5.9.7	10.10.6	M	NA to PRA
Timer T203	5.9.8	–	O	The default value is 10 s.
–	–	10.10.7 Note 3	GID	Layer 2 response time
Data link monitor function	5.10	–	O	
NOTES:				
i) The data link layer parameters shall be initialized to default values.				
Ii) TBR 4 considers the receipt of an invalid N(R) as the only condition for frame rejection.				
iii) The maximum time between receipt of an incoming frame and generation of a response shall not exceed 500 ms, operating in a point-to-point signaling connection.				

Table 5. Annexes and Appendices

Title	ITU-T Rec. Q.921	ETSI TBR 4	CR	Remarks
Provision for point-to-point data link connection	Annex A	10.3	M	For single point-to-point signaling connection at layer 3, TEI value 0 shall be used in combination with SAPI 0.
An SDL representation of the point- to-point procedures of data link layer	Annex B	–	–	
SDL representation of the broadcast procedures of the data link layer	Annex C	–	GID	
State transition table of the point-to- point procedures of the data link layer	Annex D	–	–	

Table 5. Annexes and Appendices *(continued)*

Title	ITU-T Rec. Q.921	ETSI TBR 4	CR	Remarks
Provision of multi-selective reject option	Annex E	–	GID	
Protocol Implementation Conformance Statement (PICS) to Recommendation Q.921 for Basic Rate (User-side)	Annex F	–	GID	
Protocol Implementation Conformance Statement (PICS) to Recommendation Q.921 for Basic Rate (Network-side)	Annex G	–	GID	
Protocol Implementation Conformance Statement (PICS) to Recommendation Q.921 for Primary Rate (User-side)	Annex H	–	GID	
Protocol Implementation Conformance Statement (PICS) to Recommendation Q.921 for Primary Rate (Network-side)	Annex I	–	GID	
Inter-exchange signaling data link layer protocol in Private Integrated Services Networks (PISNs)	Annex J (Q.921 Amend-ment 1)	–	GID	Applicability and additions to frame structure, elements of procedures, formats of fields, elements for layer-to-layer communication, peer-to-peer procedures to accommodate PISN inter-exchange requirements
Retransmission of REJ response frame	Appendix I	–	O	
Occurrence of MDL-ERROR-INDICATION within the basic states & actions to be taken by the management entity	Appendix II	–	GID	
Optional basic access deactivation procedures	Appendix III	–	NA	May be used by network side system management to control deactivation of access
Automatic negotiation of data link layer parameters	Appendix IV	–	O	
Inter-exchange signaling data link layer protocol in PISNs	Appendix V (Q.921 Amend-ment 1)	–	GID	Occurrence of the MDL-ERROR indication primitive in the data link layer protocol for the support of Inter-exchange signaling in PISNs

Section D

Network layer requirements based on EN 300 403-1 11/99, Integrated Services Digital Network (ISDN): Digital Subscriber Signaling System No. One (DSS1) protocol: Signaling network layer for circuit-mode basic call control; Part 1: Protocol Specification [ITU-T Recommendation Q.931 (1993), modified]

1 Introduction

This section contains clarification and recommended option selections for the ETSI ISDN standards and technical reports related to basic call control procedures of ISDN basic and primary access signaling. This document covers the basic call control of layers 1, 2 and 3. The aim of this document is to avoid unnecessary options and vagueness in ISDN implementations and to ensure the interoperability of ISDN networks and terminal equipment in Malaysia. This requirement has to be followed when implementing access-signaling protocol i.e. Digital Subscriber Signaling System No. 1 (DSS1).

2 Supporting Information

2.1 Integrated Services Digital Network (ISDN): Standards Guide (ETR 076 - December 1996, Fourth Edition)

2.2 Integrated Services Digital Network (ISDN): Customer Access Maintenance (ETR 001 August 1990)

2.3 Integrated Services Digital Network: User –Network interface layer 3 Specifications for basic call control (ETS 300 102-1 12/90)

2.4 Integrated Services Digital Network (ISDN): Digital Subscriber Signaling System No. 1 (DSS1) protocol: Data link layer; Part 2: General protocol specification [ITU-T Recommendation Q.921 (1993), modified] (ETS 300 402-2 11/95).

2.5 Integrated Services Digital Network (ISDN): Digital Subscriber Signaling System No. One (DSS1) protocol: Signaling network layer for circuit-mode basic call control; Part 1: Protocol Specification [ITU-T Recommendation Q.931 (1993), modified]) (ETS 300 403-1 11/95)

2.6 Integrated Services Digital Network (ISDN): Digital Subscriber Signaling System No. One (DSS1) protocol: Signaling network layer for circuit-mode basic call control; Part 1: Protocol Specification [ITU-T Recommendation Q.931 (1993), modified] (EN 300 403-1 11/99).

2.7 Integrated Services Digital Network (ISDN): Digital Subscriber Signaling System No. One (DSS1) Protocol: Signaling Network Layer For Circuit-Mode Basic Call Control: Part 2: Specification and Description Language (SDL) Diagrams (ETS 300 403-2 11/95).

2.8 Integrated Services Digital Network (ISDN) : Application Of The Bearer Capability (BC), High Layer Compatibility (HLC) and Low Layer Compatibility (LLC) Information Elements By Terminals Supporting ISDN Services (ETR 018 11/95)

2.9 ISDN User –Network Interface Layer 3 Specification for basic call control (ITU-T Q.931 3/93)

2.10 Technical Guidelines of ISDN Supplementary Services (Functional Protocol)

3   National Option Selections and Clarifications

3.1   Layer One Protocol for Basic Call Control (DSS1)

The DSS1 basic call layer one protocol for the basic access is contained in the standard ETS 300 012 (10/98) and for the primary rate access in the standard ETS 300 011 (3/98)

The ETSI technical report ETR 001(8/90) defines the maintenance requirement for basic and primary access.

3.2   Layer Two Protocol for Basic Call Control (DSS1)

The DSS1 basic call layer two protocol for the basic and primary access is contained in   the standard ETS 300 402-1 (11/95).

It is recommended that a reset of layer 3 always reset layer 2 in   ISDN-terminal equipment. If layer 3 can be reset without resetting layer 2, an ISDN terminal which is reset during the active phase of a call, may lose control over that call.

3.3   Layer Three Protocol for Basic Call Control (DSS1)

The DSS1 layer three protocol for basic call control is contained in the base standard ETS 300 102-1 (12/90), ITU-T Q.931 (3/93), ETS 300 403-1 (11/95) and EN 300 403-1 (11/99).). The EN 300 403-1 (11/99) is a main standard for DSSI Layer 3 implementation.

When implementing the DSS1 layer three protocol in Malaysia network, the following guidelines are recommended to be taken into account (The main numbering refers to the ITU-T Q.931 (3/93), this standard had been adopted and extended by EN 300 403-1 (11/99).

Table 6. Appendices

Clause No.	Clause Description	Recommendation
2	OVERVIEW OF CALL CONTROL	SDL diagrams in the standard ETS 300 403-2 (11/95) are recommended to be used as informative.
3.1.3	CONNECT	The transport of low layer compatibility information element (LLC) to the calling user is supported on the ISDN end-to-end connections. The date/time information element is recommended to be sent by the network.
3.1.6	INFORMATION	The use of Keypad facility information element is defined in EN 300 122-1 (6/98), "Integrated Services Digital Network (ISDN); Generic keypad protocol for the support of supplementary services; Digital Subscriber Signaling System No. One (DSS1) protocol; Part 1: Protocol Specification ".

Table 6. Appendices (*continued***)**

Clause No.	Clause Description	Recommendation
3.1.14	SETUP	Annex E (network specific facility selection) and Annex C (transit network selection) are not applicable. Transit network selection is implemented in the DSS1 signaling by using operator codes in the called number digits (operator code + called party number). The use of Keypad facility information element is defined in EN 300 122-1 (6/98). Two bearer capability information elements are supported (EN 300 403-1 (11/99), subclause 5.11). Two high layer compatibility information elements are supported (EN 300 403-1(11/99), subclause 5.12)
4	General message format and information elements coding	
4.4	Message type	No national message types are defined.
4.5.2	Extension of codesets	No information elements belonging to codeset 6 (national) are defined.
4.5.7	Call state	Only CCITT standardized coding is used.
4.5.8	Called party number	Type of number: Codepoint showing "subscriber number" shall be used from network to user. The codepoint used in connection with the supplementary services Direct Dialing In (DDI) and Multiple Subscriber Number (MSN) is specified in a separate document for ISDN supplementary services Technical Guidelines of ISDN Supplementary Services(Functional Protocol)
4.5.10	Calling party number	The use of the fields is subject to a separate document for ISDN supplementary services Technical Guidelines of ISDN Supplementary Services(Functional Protocol)
4.5.12	Cause	Coding standard: Codepoints showing "CCITT standardized coding" and "National standard" may be used. No national cause values are defined.
4.5.13	Channel identification	Coding standard: CCITT standardized coding is always used.
4.5.15	Date/time	The date/time indicated is local date / time.
4.5.21	Network specific facilities	Not applicable.
4.5.22	Progress indicator	Coding standard: CCITT standardized coding is always used.

Table 6. Appendices (*continued)*

Clause No.	Clause Description	Recommendation
4.5.29	Transit network selection	Not applicable. Transit network selection is implemented in the DSS1 signaling by using operator codes in the called number digits (operator code + called party number).
5	Circuit-switched call control procedures	Optional extensions to the basic protocol and exceptions that apply in the case of supplementary services are not subject to this guideline document. An INFORMATION message received in the Release Request State shall be ignored.
5.1.1	Call request	The network shall recognize both the sending complete information element and the "#" character.
5.1.3	Overlap sending	In case (a) the dial tone option with Progress Indicator #8 is applied
5.1.10	Transit network selection	Not applicable. Transit network selection is implemented in the DSS1 signaling by using operator codes in the called number digits (operator code + called party number).
5.2	Call establishment at the destination interface	It is recommended for the basic access that a timer is implemented on the network side in order to ensure that layer 2 is released if during a time period, (e.g. 10-15 seconds) no layer 3 connections are present on the data link. In special cases, e.g. NT2, data link connections may be established as soon as TEI is assigned (either locally or by the automatic assignment procedure), and may be retained indefinitely. It is recommended that a reset of layer 3 always reset layer 2 in ISDN-terminal equipment. If layer 3 can be reset without resetting layer 2, an ISDN terminal which is reset during the active phase of a call, may lose control over that call.
5.2.1	Incoming call	The network shall have the knowledge that a single-point configuration exists, and that information is entered at the time of configuration of the access.
5.2.3.1	SETUP message delivered by point-to-point data link	Only options 1) "channel is indicated, no acceptable alternative" and 4) "no B channel available" are used.
5.2.4	Overlap receiving	In overlap receiving the network cannot in all cases determine that sufficient call setup information has been received, and the Sending complete information element is not required (Refer to Technical Guidelines of ISDN Supplementary Services (Functional Protocol), DDI).

Table 6. Appendices (*continued*)

Clause No.	Clause Description	Recommendation
5.2.5.2	Receipt of CALL PROCEEDING and ALERTING	Timer 304 is only used on point-to-point data links, as overlap receiving is applicable only on point-to-point connections.
5.2.6	Notification of interworking at the terminating interface.	Concerning the first subsection a) the normal call handling procedures shall be applied at the terminating exchange (i.e. the terminating exchange shall only through-connect after a CONNECT message has been received from the called user).
5.2.7	Call accept	In case the private exchange has diverted the speech call it is recommended that the Calling party is informed of the diversion (with an announcement) if the private exchange sends the call acceptance message (CONNECT) towards the Calling party before the call acceptance message has been received from the diverted connection. This in-band information is given immediately after the call acceptance message sending. Note: Establishment of the bearer connection prior to call acceptance is described in ETS 300 403-1 Annex K. If this procedure is applied then the inband information is given prior the call acceptance message sending.
5.3.4.1	Clearing when tones/announcements provided	In order to receive the inband information it is recommended that the user connects to the B-channel on receipt of the DISCONNECT message with progress indicator No. 8.
5.3.4bis (EN 300 403-1 11/99)	Absence of response during call clearing	In case a B-channel is placed in a maintenance condition, the actions to be taken are described in subclause 5.5.
5.6.1	Call suspension	When the call identity is used, it is recommended for the terminals to use IA5-coded characters.
5.6.2	Call suspended	When the call identity is used, it is recommended for the terminals to use IA5- coded characters.
5.6.5	Call resume errors	The network shall preserve the call identity along with a clearing cause during the period of timer T307.
5.8.5.1	Information element out of sequence	The network is not required to process information elements received out of sequence.
5.8.5.2	Duplicated information elements	The BC (Bearer Capability) and HLC (High Layer Compatibility) information elements may be duplicated in the SETUP message (EN 300 403-1 (11/99), subclause 5.11 and 5.12).

Table 6. Appendices (*continued*)

Clause No.	Clause Description	Recommendation
5.8.7.2	Non-mandatory information element content error	Information elements exceeding the maximum length shall not be truncated and processed except the call identity information element.
5.8.9	Data link failure	It is recommended that the network transmits a STATUS ENQUIRY message when layer 2 is re-established.
5.11	Signaling procedures for bearer capability selection	Supported on ISDN end-to-end connections (i.e. the network signaling system is ISUP)
5.12	Signaling procedures for high layer compatibility selection	Supported on ISDN end-to-end connections (i.e. the network signaling system is ISUP)
8	Circuit-mode multirate (64 kbit/s base rate) procedures	Not Applicable
9.1	Timers in the network side	Timer No. 302 : Time-out value is 5s
9.2	Timers in the user side	Timer No. 301 : Time-out value is 3 min.
Annex B	Compatibility and address checking	
B.1	Introduction	Codings of BC, HLC and LLC are subject to the ETR 018 (11/95).
B.3.1	Compatibility checking with addressing information	Called party number (whole subscriber number) is always included in the SETUP message from the network to user in point-to-multipoint configurations. Compatibility checking with addressing information should be used in terminals, since otherwise it may restrict the use of several terminals in the same access or the use of multi-service terminals. (Further information can be found in the supplementary services guideline document Technical Guidelines of ISDN Supplementary Services (Functional Protocol), e.g. Multiple Subscriber Number supplementary service).
B.4	Interworking with existing networks	When a Progress indicator information element #1 or #3 is sent to the terminal equipment, the network will not send the High layer or Low layer compatibility information elements to the terminal equipment. The terminal equipment should in this case use compatibility checking only with Addressing Information and Bearer Capability. When the High layer and/or Low layer information elements are sent to the terminal equipment, the terminal equipment shall use them in the compatibility checking.

Table 6. Appendices (*continued*)

Clause No.	Clause Description	Recommendation
ANNEX C	Transit network selection	Not applicable.
ANNEX D	Extension for symmetric call operation	Not applicable
ANNEX E	Network specific facility selection	Not Applicable
ANNEX F	D-channel backup procedures	Not Applicable
ANNEX J	Low layer compatibility negotiation	The transport of LLC to the calling user is only supported on the ISDN end-to-end connections.

4.   Terminal Characteristics Related To Access Signaling

Terminal characteristics related to access signaling and used for type approval purposes arecontained in standards ETS 300 085(12/90), ETS 300 087 (4/94), ETS 300 104 (6/94), NET 003 (9/95), NET 005 (9/95), I-ETS 300 245-1 (2/96), TBR 003 (11/95), TBR 003/A1 (2/98), TBR 004 (11/95), TBR 004/A1 (2/98), TBR 008(9/94), TBR 008(10/98), TBR 008/C2 (2/2001) and the corresponding CTRs.

5.   Terminal Adaptors

5.1 Circuit Mode Bearer Services

Terminal adaptor functions and associated access signaling requirements for circuit mode bearer services are contained in the standard ETS 300 103 (12/90).

Annex A
(Normative)

Normative references

Erratum1 (02/2003) to ITU-T Rec. Q.931	ISDN User-Network Interface Layer 3 Specification for Basic Call Control
ETR 080 Nov 96	Digital transmission system on metallic local lines
ETSI TBR 3 Nov 95	Attachment requirements for terminal equipment to connect to an ISDN using ISDN basic access
ETSI TBR 3 A1 Dec 97	This amendment A1 modifies the TBR 3 (1995)
IEC 60950-1: 2001	Information Technology Equipment – Safety
IEC CISPR 22: 2003-04	Information Technology Equipment – Radio disturbance characteristics – Limits and methods of measurement
ITU-T Rec. I.430 (11/95)	Basic User-Network Interface – Layer 1 Specification
ITU-T Rec. Q.921 (09/97)	ISDN User-Network Interface – Data Link Layer Specification
ITU-T Rec. Q.921 Amendment 1 (02/2000)	ISDN User-Network Interface – Data Link Layer Specification Amendment 1
[ITU-T Recommandation Q.931 (1993), modified] (EN 300 403-1 11/99)	Integrated Services Digital Network (ISDN): Digital Subscriber Signaling System No. One (DSS1) protocol: Signaling network layer for circuit-mode basic call control; Part 1: Protocol Specification
ITU-T Rec. Q.931 Amendement 1 (05/98)	ISDN User-Network Interface Layer 3 Specification for Basic Call Control Amendment 1 Extensions for the support of digital multiplexing equipment
ITU-T Rec. G.961 03/93	Digital Transmission System on Metallic Local Lines for ISDN Basic Rate Access

NOTES:

ETSI	European Telecommunications Standards Institute
ETR	ETSI Technical Report
IEC	International Electro-technical Commission
ITU-T	International Telecommunication Union – Telecommunication Sector
TBR	Technical Basis for Regulation

Annex B
(Informative)

Technical Guidelines of ISDN Supplementary Service

B1.   Introduction

This document contains clarifications and recommended option selections for the ETSI ISDN standards related to ISDN supplementary services. This document covers the implementation of ISDN supplementary services using functional protocol. The aim of this document is to avoid unnecessary options and vagueness in ISDN implementations and to ensure the interoperability of ISDN networks and terminal equipment in Malaysia.

B2.   Supporting Information

B2.1 Integrated Services Digital Network (ISDN); Multiple Subscriber Number (MSN) supplementary service; Service Description (ETS 300 050, October 1991)

B2.2 Integrated Services Digital Network (ISDN); Multiple Subscriber Number (MSN) supplementary service; Functional capabilities and information flows (ETS 300 051, October 1991)

B2.3 Integrated Services Digital Network (ISDN); Multiple Subscriber Number (MSN) supplementary service; Digital Subscriber Signaling System No. one (DSS1) protocol (ETS 300 052-1, October 1991)

B2.4 Integrated Services Digital Network (ISDN); Terminal Portability (TP) supplementary service; Service Description (ETS 300 053, October 1991)

B2.5 Integrated Services Digital Network (ISDN); Terminal Portability (TP) supplementary service; Functional capabilities and information flows (ETS 300 054, October 1991)

B2.6 Integrated Services Digital Network (ISDN); Terminal Portability (TP) supplementary service; Digital Subscriber Signaling System No. one (DSS1) protocol (ETS 300 055-1, October 1991)

B2.7 Integrated Service Digital Network (ISDN); Call Waiting (CW) supplementary service; Service Description (ETS 300 056, October 1991) and Amendment A1 (September 1996)

B2.8 Integrated Services Digital Network (ISDN); Call Waiting (CW) supplementary service; Functional capabilities and information flows (ETS 300 057, May 1992)

B2.9 Integrated Services Digital Network (ISDN); Call Waiting (CW) supplementary service; Digital Subscriber Signaling System No. one (DSS1) protocol (ETS 300 058-1, October 1991)

B2.10 Integrated Services Digital Network (ISDN); Sub-addressing (SUB) supplementary service; Service Description (ETS 300 059, October 1991)

B2.11 Integrated Services Digital Network (ISDN); Sub-addressing (SUB) supplementary service; Functional capabilities and information flows (ETS 300 060, October 1991)

B2.12 Integrated Services Digital Network (ISDN); Sub-addressing (SUB) supplementary service; Digital Subscriber Signaling System No. one (DSS1) protocol (ETS 300 061-1, October 1991)

B2.13 Integrated Services Digital Network (ISDN); Direct Dialing In (DDI) supplementary service; Service Description (ETS 300 062, October 1991)

B2.14 Integrated Services Digital Network (ISDN); Direct Dialling In (DDI) supplementary service; Functional capabilities and information flows (ETS 300 063, October 1991)

B2.15 Integrated Services Digital Network (ISDN); Direct Dialing In (DDI) supplementary service; Digital Subscriber Signaling System No. one (DSS1) protocol (ETS 300 064-1, October 1991)

B2.16 Integrated Services Digital Network (ISDN); Calling Line Identification Presentation (CLIP) supplementary service; Service description (ETS 300 089, January 1992)

B2.17 Integrated Services Digital Network (ISDN); Calling Line Identification Restriction (CLIR) supplementary service; Service description (ETS 300 090, January 1992)

B2.18 Integrated Services Digital Network (ISDN); Calling Line Identification Presentation (CLIP) and Calling Line Identification Restriction (CLIR) supplementary services; Functional capabilities and information flows (ETS 300 091, March 1992)

B2.19 Integrated Services Digital Network (ISDN); Calling Line Identification Presentation (CLIP) supplementary service; Digital Subscriber Signaling System No. one (DSS1) protocol (ETS 300 092-1, March 1992), Amendment A1 (April 1993) and Amendment A2 (November 1994)

B2.20 Integrated Services Digital Network (ISDN); Calling Line Identification Restriction (CLIR) supplementary service; Digital Subscriber Signaling System No. one (DSS1) protocol (ETS 300 093-1, March 1992)

B2.21 Integrated Services Digital Network (ISDN); Connected Line Identification Presentation (COLP) supplementary service; Service description (ETS 300 094, January 1992)

B2.22 Integrated Services Digital Network (ISDN); Connected Line Identification Restriction (COLR) supplementary service; Service description (ETS 300 095, January 1992)

B2.23 Integrated Services Digital Network (ISDN); Connected Line Identification Presentation (COLP) and Connected Line Identification Restriction (COLR) supplementary services; Functional capabilities and information flows (ETS 300 096, May 1992)

B2.24 Integrated Services Digital Network (ISDN); Connected Line Identification Presentation (COLP) supplementary service; Digital Subscriber Signaling System No. one (DSS1) protocol (ETS 300 097-1, March 1992) and Amendment A1 (November 1994)

B2.25 Integrated Services Digital Network (ISDN); Connected Line Identification Restriction (COLR) supplementary service; Digital Subscriber Signaling System No. one (DSS1) protocol (ETS 300 098-1, May 1992)

B2.26 Integrated Services Digital Network (ISDN); Malicious Call Identification (MCID) supplementary service; Service description (ETS 300 128, May 1992)

B2.27 Integrated Services Digital Network (ISDN); Malicious Call Identification (MCID) supplementary service; Functional capabilities and information flows (ETS 300 129, May 1992)

B2.28 Integrated Services Digital Network (ISDN); Malicious Call Identification (MCID) supplementary service; Digital Subscriber Signaling System No. one (DSS1) protocol (ETS 300 130-1, May 1992)

B2.29 Integrated Services Digital Network (ISDN); Closed User Group (CUG) supplementary service; Service description (ETS 300 136, March 1992)

B2.30 Integrated Services Digital Network (ISDN); Closed User Group (CUG) supplementary service; Functional capabilities and information flows (ETS 300 137, May 1992)

B2.31 Integrated Services Digital Network (ISDN); Closed User Group (CUG) supplementary service; Digital Subscriber Signaling System No. one (DSS1) protocol (ETS 300 138-1, May 1992) and Amendment A1 (January 1996)

B2.32 Integrated Services Digital Network (ISDN); Call Hold (HOLD) supplementary service; Service description (ETS 300 139, March 1992)

B2.33 Integrated Services Digital Network (ISDN); Call Hold (HOLD) supplementary service; Functional capabilities and information flows (ETS 300 140, May 1992)

B2.34 Integrated Services Digital Network (ISDN); Call Hold (HOLD) supplementary service; Digital Subscriber Signaling System No. one (DSS1) protocol (ETS 300 141-1, May 1992) including Corrigendum (August 1993)

B2.35 Integrated Services Digital Network (ISDN); Advice of Charge: charging information at call set-up time (AOC-S) supplementary service; Service description (ETS 300 178, October 1992)

B2.36 Integrated Services Digital Network (ISDN); Advice of Charge: charging information during the call (AOC-D) supplementary service; Service description (ETS 300 179, October 1992)

B2.37 Integrated Services Digital Network (ISDN); Advice of Charge: charging information at the end of the call (AOC-E) supplementary service; Service description (ETS 300 180, October 1992)

B2.38 Integrated Services Digital Network (ISDN); Advice of Charge (AOC) supplementary service; Functional capabilities and information flows (ETS 300 181, April 1993)

B2.39 Integrated Services Digital Network (ISDN); Advice of Charge (AOC) supplementary service; Digital Subscriber Signaling System No. one (DSS1) protocol (ETS 300 182-1, April 1993)

B2.40 Integrated Services Digital Network (ISDN); Three-Party (3PTY) supplementary service; Service description (ETS 300 186, July 1993)

B2.41 Integrated Services Digital Network (ISDN); Three-Party (3PTY) supplementary service; Functional capabilities and information flows (ETS 300 187, August 1993)

B2.42 Integrated Services Digital Network (ISDN); Three-Party (3PTY) supplementary service; Digital Subscriber Signaling System No. one (DSS1) protocol (ETS 300 188-1, August 1993)

B2.43 Integrated Services Digital Network (ISDN); Supplementary Service Interactions; Digital Subscriber Signaling System No. one (DSS1) protocol, Part 1: Protocol specification (ETS 300 195-1, February 1995)

B2.44 Integrated Services Digital Network (ISDN); Generic functional protocol for the support of supplementary services; Digital Subscriber Signaling System No. one (DSS1) protocol
(ETS 300 196-1, August 1993) and Amendment A1 (May 1995)

B2.45 Integrated Services Digital Network (ISDN); Call Forwarding Busy (CFB) supplementary service; Service description (ETS 300 199, December 1994)

B2.46 Integrated Services Digital Network (ISDN); Call Forwarding Unconditional (CFU) supplementary service; Service description (ETS 300 200, December 1994)

B2.47 Integrated Services Digital Network (ISDN); Call Forwarding No Reply (CFNR) supplementary service; Service description (ETS 300 201, December 1994) and Amendment A1 (September 1996)

B2.48 Integrated Services Digital Network (ISDN); Call Forwarding Busy (CFB) supplementary service; Functional capabilities and information flows (ETS 300 203, December 1994)

B2.49 Integrated Services Digital Network (ISDN); Call Forwarding Unconditional (CFU) supplementary service; Functional capabilities and information flows (ETS 300 204, December 1994)

B2.50 Integrated Services Digital Network (ISDN); Call Forwarding No Reply (CFNR) supplementary service; Functional capabilities and information flows (ETS 300 205, December 1994)

B2.51 Integrated Services Digital Network (ISDN); Diversion supplementary services; Digital Subscriber Signaling No. one (DSS1) protocol (ETS 300 207-1, December 1994) and Corrigendum (June 1995)

B2.52 Integrated Services Digital Network (ISDN); User-to-user signaling (UUS) supplementary service; Service description (ETS 300 284, March 1996)

B2.53 Integrated Services Digital Network (ISDN); User-to-user signaling (UUS) supplementary service; Functional capabilities and information flows (ETR 285, March 1996)

B2.54 Integrated Services Digital Network (ISDN); User-to-user signaling (UUS) supplementary service; Digital Subscriber Signaling one (DSS1) protocol (ETS 300 286-1, February 1993)

B2.55 Integrated Services Digital Network (ISDN); Explicit Call Transfer (ECT) supplementary service; Service description (EN 300 367, V1.2.1, October 1998)

B2.56 Integrated Services Digital Network (ISDN); Explicit Call Transfer (ECT) supplementary service; Functional capabilities and information flows (EN 300 368, V1.2.2, December 1998)

B2.57 Integrated Services Digital Network (ISDN); Explicit Call Transfer (ECT) supplementary service; Digital Subscriber Signaling one (DSS1) protocol (EN 300 369-1, V1.2.4, October 1998)

B3.   National Option Selections and Clarifications

B3.1   Generic functional protocol for the support of supplementary services

The supplementary services of this specification are based on the functional protocol. Therefore, the public network shall support the generic part of the functional protocol according to ETS 300 196-1 [44].

Only those functions need to be implemented, which are required to support the selected supplementary services. Network options of ETS 300 196-1 are left as implementation options, unless stated otherwise in the Sub clauses relating to the individual supplementary services. Should any conflict arise between ETS 300 196-1 and the specifications in Sub clause 3.2 to 3.16, then the text of the individual supplementary services shall be taken as definitive.

B3.2   Multiple Subscriber Number (MSN)

B3.2.1   Definition

The Multiple Subscriber Number (MSN) supplementary service provides the possibility for assigning multiple numbers to a single public or private access.

NOTE: This allows e.g.:

1)   A calling user to select, via the public network, one or multiple distinct terminals out of multiple choices;
2)   To identify the terminal to the network for the application of other supplementary services.

B3.2.2 Service Description

The service description (stage 1 description) for the MSN supplementary service is contained in the standard ETS 300 050 [1].

The following gives the recommended guidelines for the implementation of the MSN supplementary service in the Malaysian network.

Clause 5 and sub clause 6.2.3	The multiple subscriber number provided by the calling party shall be the full ISDN subscriber number. The called party number to be transmitted to the user's installation shall comprise the full ISDN subscriber number
Sub clause 6.1	The maximum number of MSNs per access shall be 16.
Sub clause 7.2	The MSN supplementary service can apply at an access to a private ISDN (e.g. when the public network does not know what equipment is connected to the access)
Clause 8	Supplementary services can be individually assigned to each MSN number.
Sub clause 8.9	Subscription to the DDI supplementary service and the MSN supplementary service is mutually exclusive

Additional requirement

On outgoing calls, when the screening of the calling party number is successful, the CLI to be recorded in the charging record shall be the MSN number provided by the calling party. If the number screening is unsuccessful, the default ISDN number of the access shall be recorded in the charging record

B3.2.3 Functional Capabilities and Information Flows

The functional capabilities and information flows (stage 2 description) for the MSN supplementary service are contained in the standard ETS 300 051 [2]. The stage 2 description can be taken as informative. The implementation of the MSN supplementary service in the Malaysian network shall be based on the stage 1 and stage 3 descriptions.

B3.2.4 Digital Subscriber Signaling System No. One (DSS1) Protocol

The DSS1 protocol (stage 3 description) for the MSN supplementary service is contained in the standard ETS 300 052-1 [3].

The following gives the recommended guidelines for the implementation of the MSN supplementary service in the Malaysian network.

Sub clause 6.2	If the access has the MSN supplementary service, the network may use the information in the calling party number information element to identify the calling terminal, and, if necessary, the appropriate basic or supplementary service
Sub clause 9.2.1	The type of number indicated in the Called party number information element sent to the user shall be coded as "subscriber number" and the full appropriate number shall be sent. The "numbering plan identification" field of the Called party number information element shall be coded "ISDN/telephony numbering plan" (ITU-T Recommendation E.164).
Sub clause 9.3.1	All the coding options provided in this sub clause shall be implemented in the network. It is recommended that the type of number indicated in the Calling party number information element sent to the network shall be coded as "subscriber number" and the full appropriate number shall be sent.

B3.3 Terminal Portability (TP)

B3.3.1 Definition

The Terminal Portability (TP) supplementary service allows a user to move a terminal from one socket to another within one given basic access during the active state of a call. It also allows a user to move a call from one terminal to another terminal within one given basic access during the active phase of the call.

B3.3.2 Service Description

The service description (stage 1 description) for the TP supplementary service is contained in the standard ETS 300 053 [4].

The following gives the recommended guidelines for the implementation of the TP supplementary service in the Malaysian network.

Sub clause 8.1.2	At call suspension request, the cumulative information (i.e. total charge incurred up to the moment when the call is suspended) shall be given.
	On resumption of the call, the sending of charging information shall start again and the updated cumulative charging information shall be given.
	If the call is cleared while the call is suspended at the calling user's access, and if the calling user attempts to resume the call within the timer, then, advice of charge information shall be given to the user at the time of the resume attempt.
Sub clause 8.1.3	If the call is cleared while the call is suspended at the calling user's access, and if the calling user attempts to resume the call within the timer, then advice of charge information can be given to the user at the time of the resume attempt

B3.3.3 Functional Capabilities and Information Flows

The functional capabilities and information flows (stage 2 description) for the TP supplementary service are contained in the standard ETS 300 054 [5]. The stage 2 description can be taken as informative. The implementation of the TP supplementary service in the Malaysian network shall be based on the stage 1 and stage 3 descriptions.

B3.3.4 Digital Subscriber Signaling System No. One (DSS1) Protocol

The DSS1 protocol (stage 3 description) for the TP supplementary service is contained in the standard ETS 300 055-1 [6]. The TP supplementary service is implemented in the Malaysian network without national definitions or exceptions.

B3.4 Call Waiting (CW)

B3.4.1 Definition

The Call Waiting (CW) supplementary service allows a user to be informed of an incoming call (as per basic call procedures) with an indication that no interface information channel is available. The user then has the choice of accepting, rejecting or ignoring the waiting call (as per basic call procedures).

B3.4.2 Service Description

The service description (stage 1 description) for the CW supplementary service is contained in the standard ETS 300 056 [7].

The following gives the recommended guidelines for the implementation of the CW supplementary service in the Malaysian network.

Clause 3 and sub clause 6.1	No specific time-out T2 will be used for no answer situation. Basic call timer shall apply in this Case.
Clause 5	On the primary rate access, only notifications for the CW supplementary service are supported. The maximum number of calls that the network must be able to handle (e.g. active, held, alerting, waiting) on the basic access is six (6).
Sub clause 6.1	The network will support the subscription option presented in Table 1. The network will support value two (2) for the network provider option in Table 2. This is specified for all ISDN numbers on the basic access.
Sub clause 7.1	In interworking cases with non-ISDNs, no special in-band indication will be provided to the calling user.

B3.4.3 Functional Capabilities and Information Flows

The functional capabilities and information flows (stage 2 description) for the CW supplementary service are contained in the standard ETS 300 057 [8]. The stage 2 description can be taken as informative. The implementation of the CW supplementary service in the Malaysian network shall be based on the stage 1 and stage 3 descriptions.

B3.4.4 Digital Subscriber Signaling System No. One (DSS1) Protocol

The DSS1 protocol (stage 3 description) for the CW supplementary service is contained in the standard ETS 300 058-1 [9].

The following gives the recommended guidelines for the implementation of the CW supplementary service in the Malaysian network.

Sub clauses 9.5.1.1, 9.5.2, 9.6.1 and 9.6.2, and clauses 13 and 14	In the network side the basic call timer T301 is used.

B3.5   Sub addressing (SUB)

B3.5.1   Definition

The Sub addressing (SUB) supplementary service allows the called (served) user to expand his addressing capacity beyond the one given by the ISDN number.

B3.5.2 Service Description

The service description (stage 1 description) for the SUB supplementary service is contained in the standard ETS 300 059 [10].

The following gives the recommended guidelines for the implementation of the SUB supplementary service in the Malaysian network.

Sub clause 5.1	The 20 octets maximum size of is applied.

B3.5.3 Functional Capabilities and Information Flows

The functional capabilities and information flows (stage 2 description) for the SUB supplementary service are contained in the standard ETS 300 060 [11]. The stage 2 description can be taken as informative. The implementation of the SUB supplementary service in the Malaysian network shall be based on the stage 1 and stage 3 descriptions.

B3.5.4 Digital Subscriber Signaling System No. One (DSS1) Protocol

The DSS1 protocol (stage 3 description) for the SUB supplementary service is contained in the standard ETS 300 061-1 [12].

The following gives the recommended guidelines for the implementation of the SUB supplementary service in the Malaysian network.

Clause 5, note 2	The 20 octets maximum size of the sub address is applied.

B3.6   Direct Dialing In (DDI)

B3.6.1 Definition

The DDI supplementary service enables a user to call directly via a public ISDN a user on a private ISDN by using the public ISDN numbering plan.

B3.6.2 Service Description

The service description (stage 1 description) for the DDI supplementary service is contained in the standard ETS 300 062 [13].

The following gives the recommended guidelines for the implementation of the DDI supplementary service in Malaysian network.

Clause 5	The number of digits is defined on a per subscriber basis.
Sub clauses 8.5.1 and 8.5.3	A special arrangement for not screening the user provided number may be applied. For network wide operation ISUP version 2 is required.
Sub clause 8.12	If the DDI supplementary service is provided to the served user of the MCID supplementary service, then the MCID supplementary service shall be provided globally for the whole access. The network option on provision for specific ISDN numbers forming part of the DDI supplementary service is not supported.
Sub clause 8.13	The subscription to the DDI supplementary service and the Multiple Subscriber Number (MSN) supplementary service is mutually exclusive.

B3.6.3 Functional Capabilities and Information Flows

The functional capabilities and information flows (stage 2 description) for the DDI supplementary service are contained in the standard ETS 300 063 [14]. The stage 2 description can be taken as informative. The implementation of the DDI supplementary service in Malaysian network shall be based on the stage 1 and stage 3 descriptions.

B3.6.4 Digital Subscriber Signaling System No. One (DSS1) Protocol

The DSS1 protocol (stage 3 description) for the DDI supplementary service is contained in the standard ETS 300 064-1 [15].

The following gives the recommended guidelines for the implementation of the DDI supplementary service in Malaysian network.

Sub clause 6.1, note	The subscription to the DDI supplementary service and the Multiple Subscriber Number (MSN) supplementary service is mutually exclusive

B3.7 Calling Line Identification Presentation (CLIP) and Calling Line Identification Restriction (CLIR)

B3.7.1 Definition

The CLIP supplementary service provides the called party with the possibility of receiving identification of the calling party.

The CLIR supplementary service enables the calling party to prevent presentation of its ISDN number to the called party.

B3.7.2 Service Description

CLIP:

The service description (stage 1 description) for the CLIP supplementary service is contained in the standard ETS 300 089 [16].

The following gives the recommended guidelines for the implementation of the CLIP supplementary service in Malaysian network.

Sub clauses 6.1, 6.2.3.1, 7.2, 8.9 and 8.13	In case of two calling party number delivery option a special arrangement for not screening the user provided number may be applied. For network wide operation ISUP version 2 is required.
Sub clause 7.1	The CLIP supplementary service is always applicable when interworking to non-ISDN has occurred. The calling line identity can be provided to called user in the ISDN if the identity has been received and it is known that presentation is not restricted. On calls to or via non-ISDN, the originating network may restrict calling line identity from being forwarded to the destination network when the CLIR supplementary service is applicable (see also ETS 300 090, sub clause 7.1).
Sub clause 8.5.2	Technical capabilities to provide override category service have to be available in Malaysian network.
Annex A	The two calling party number delivery option is applicable. For network wide operation ISUP version 2 is required.

CLIR:

The service description (stage 1 description) for the CLIR supplementary service is contained in the standard ETS 300 090 [17].

The following gives the recommended guidelines for the implementation of the CLIR supplementary service in the Malaysian network.

Clause 3, and sub clauses 6.2.3.2 (note 1) and 8.5.1	Technical capabilities to provide override category service have to be available in the Malaysian network.
Sub clause 6.1	Both subscription options, permanent mode and temporary mode (defaults presentation restricted and presentation not restricted), are offered.
Sub clause 7.1	On calls to or via non-ISDNs, it cannot be assured that a restriction indication can be carried to the destination network. The originating network in Malaysia may restrict any information identifying the calling user from being forwarded to the destination network when the CLIR supplementary service is applicable

B3.7.3 Functional Capabilities and Information Flows

The functional capabilities and information flows (stage 2 description) for the CLIP and CLIR supplementary services are contained in the standard ETS 300 091 [18]. The stage 2 description can be taken as informative. The implementation of the CLIP and CLIR supplementary services in the Malaysian network shall be based on the stage 1 and stage 3 descriptions.

B3.7.4 Digital Subscriber Signaling System No. One (DSS1) Protocol

CLIP:

The DSS1 protocol (stage 3 description) for the CLIP supplementary service is contained in the standard ETS 300 092-1 [19].

The following gives the recommended guidelines for the implementation of the CLIP supplementary service in the Malaysian network.

Sub clauses 6.2 and 9.4	In case of two calling party number delivery option a special arrangement for not screening the user provided number may be applied. For network wide operation ISUP version 2 is required.
Sub clause 9.2.1	It is recommended for the coding of the calling party information element sent by the calling user: -The "numbering plan identification" field shall be coded "ISDN/Telephony numbering plan". In case DDI is not activated for the same access: - The "type of number" field shall be coded "subscriber number" and the full ISDN subscriber number shall be sent. In case DDI is activated for the same access: - The "type of number" field shall be coded "unknown" and only the extension number of the calling party shall be sent. The network then completes the calling party number by adding the national number of the access to the calling party number information element.
Sub clause 9.3.1	Networks in Malaysia may accept a full ISDN number in a Calling party number information element with the addition of a prefix or escape digits to the number digits field and the type of number field set to "National Number".
Sub clause 9.5.1 and Table 1, note 7	The coding of the calling party information element sent by the destination local exchange: - The "numbering plan identification" field shall be coded "ISDN/Telephony numbering plan"; - The "type of number" field shall be coded "unknown", and the number is organized according to the network dialing plan.

Clause 11	The following option is according to the network rules and operations in Malaysia: - The network shall send the Calling party number information element according to sub clause9.5.1 fifth paragraph and shall include no Calling party sub address information element.
Annex B	The two Calling party number information elements delivery option is applicable. For network wide operation ISUP version 2 is required.

CLIR:

The DSS1 protocol (stage 3 description) for the CLIR supplementary service is contained in the standard ETS 300 093-1 [20]. The following gives the recommended guidelines for the implementation of the CLIR supplementary service in the Malaysian network.

Clause 11
On calls to or via non-ISDNs, the originating network may restrict calling line identity from being forwarded to the destination network when the CLIR supplementary service is applicable.

B3.8 Connected Line Identification Presentation (COLP) and Connected Line Identification Restriction (COLR)

B3.8.1 Definition

The COLP supplementary service provides the calling party with the possibility to receive identification of the connected party.

The COLR supplementary service enables the connected party to prevent presentation of its ISDN number to the calling party.

B3.8.2 Service Description

COLP:

The service description (stage 1 description) for the COLP supplementary service is contained in the standard ETS 300 094 [21].

The following gives the recommended guidelines for the implementation of the COLP supplementary service in the Malaysian network.

Sub clauses 6.1, 6.2.3.1, 7.2, 8.9 and 8.13	A special arrangement for not screening the user provided number may be applied. For network wide operation ISUP version 2 is required.
Sub clause 7.1	The use of the COLP supplementary service can be guaranteed only when the call is end-to end ISDN.
Sub clauses 8.5.4 and 8.10	Technical capabilities to provide override category service have to be available in ;the Malaysian network

COLR:

The service description (stage 1 description) for the COLR supplementary service is contained in the standard ETS 300 095 [22].

The following gives the recommended guidelines for the implementation of the COLR supplementary service in the Malaysian network.

Clause 3, and sub clauses 6.2.3.2, 8.5.3 and 8.10	Technical capabilities to provide override category service have to be available in the Malaysian network
Sub clause 6.1	Both subscription options, permanent mode and temporary mode (defaults: presentation restricted and presentation not restricted), are offered.
Sub clause 7.1	Destination network in Malaysia may restrict any information identifying the connected party from being returned to the originating network when the COLR supplementary service has been invoked.

B3.8.3 Functional Capabilities and Information Flows

The functional capabilities and information flows (stage 2 description) for the COLP and COLR supplementary services are contained in the standard ETS 300 096 [23]. The stage 2 description can be taken as informative. The implementation of the COLP and COLR supplementary services in the Malaysian network shall be based on the stage 1 and stage 3 descriptions.

B3.8.4 Digital Subscriber Signaling System No. One (DSS1) Protocol

COLP:

The DSS1 protocol (stage 3 description) for the COLP supplementary service is contained in the standard ETS 300 097-1 [24].

The following gives the recommended guidelines for the implementation of the COLP supplementary service in the Malaysian network.

Sub clauses 6.3 and 9.4	A special arrangement for not screening the user provided number may be applied. For network wide operation ISUP version 2 is required.
Sub clause 9.2.1	It is recommended for the coding of the connected party information element sent by the connected user: - The "numbering plan identification" field shall be coded "ISDN/Telephony numbering plan"; - The "type of number" field shall be coded "subscriber number" and the full ISDN subscriber number shall be sent.

Sub clause 9.3.1	Networks in Malaysia may accept a full ISDN number in a Connected party number information element with the addition of a prefix or escape digits to the number digits field and the type of number field set to "National Number".
Sub clause 9.5.1 and Table 1, note 7	The coding of the connected party information element sent by the originating local exchange: - The "numbering plan identification" field shall be coded "ISDN/Telephony numbering plan"; - The "type of number" field shall be coded "unknown", and the number is organized according to the network dialing plan.

COLR:

The DSS1 protocol (stage 3 description) for the COLR supplementary service is contained in the standard ETS 300 098-1 [25].

The following gives the recommended guidelines for the implementation of the COLR supplementary service in the Malaysian network.

Clause 11	Destination network in Malaysia may restrict any information identifying the connected party from being returned to the originating network when the COLR supplementary service has been invoked.

B3.9   Malicious Call Identification (MCID)

B3.9.1 Definition

The MCID supplementary service enables a user to request that the source of an incoming call is identified and registered by the network.

B3.9.2 Service Description

The service description (stage 1 description) for the MCID supplementary service is contained in the standard ETS 300 128 [26].

The following gives the recommended guidelines for the implementation of the MCID supplementary service in the Malaysian network.

Clause 5	The network will support the registration of calling party sub address.
Sub clauses 5, 6.1 and 6.2.3	The network will not support the automatic invocation of the service on unanswered calls.
Sub clause 6.2.3	The network will not support the continuation of the call to be presented after the calling user has cleared.
Sub clause 7.1	When interworking between the PSTN and the ISDN occurs and if the number of the calling user is not available, the network will support the option of registering information about the routing of the call. The option in the note is not supported.

Sub clause 8.9	The network will not provide the service for specific ISDN numbers forming part of the DDI supplementary service.
Sub clauses 8.10.1, 8.10.2 and 8.10.3	The network will support the registration of the last diverting user.
Sub clause 8.11	The network will not support the registration of the called free phone number

B3.9.3 Functional Capabilities and Information Flows

The functional capabilities and information flows (stage 2 description) for the MCID supplementary service are contained in the standard ETS 300 129 [27]. The stage 2 description can be taken as informative. The implementation of the MCID supplementary service in the Malaysian network shall be based on the stage 1 and stage 3 descriptions.

B3.9.4 Digital Subscriber Signaling System No. One (DSS1) Protocol

The DSS1 protocol (stage 3 description) for the MCID supplementary service is contained in the standard ETS 300 130-1 [28].

The following gives the recommended guidelines for the implementation of the MCID supplementary service in the Malaysian network.

Clause 3	The call information shall include the calling party sub address, if provided by the calling user.

B3.10   Closed User Group (CUG)

B3.10.1 Definition

The CUG supplementary service enables users to form groups to and from which access is restricted. A specific user may be a member of one or more closed user groups. Members of a specific closed user group can communicate among themselves but not, in general, with users outside the group.

B3.10.2 Service Description

The service description (stage 1 description) for the CUG supplementary service is contained in the standard ETS 300 136 [29].

The following gives the recommended guidelines for the implementation of the CUG supplementary service in the Malaysian network.

Sub clause 6.1	The maximum number of closed user groups which can be allocated to an individual user is 75. All the subscription options defined in this Sub clause are supported.

B3.10.3 Functional Capabilities and Information Flows

The functional capabilities and information flows (stage 2 description) for the CUG supplementary service are contained in the standard ETS 300 137 [30]. The stage 2 description can be taken as informative. The implementation of the CUG supplementary service in the Malaysian network shall be based on the stage 1 and stage 3 descriptions.

B3.10.4 Digital Subscriber Signaling System No. One (DSS1) Protocol

The DSS1 protocol (stage 3 description) for the CUG supplementary service is contained in the standard ETS 300 138-1 [31].

The following gives the recommended guidelines for the implementation of the CUG supplementary service in the Malaysian network.

Sub clause 6.1	All the subscription options defined in this Sub clause are supported.
Sub clause 9.2.4.1 b)	The return error component shall be retained along with the ETS 300 403-1 cause.

B3.11 Call Hold (HOLD)

B3.11.1 Definition

The HOLD supplementary service allows a user to interrupt communications on an existing call and then subsequently, if desired, re-establish communications.

B3.11.2 Service Description

The service description (stage 1 description) for the HOLD supplementary service is contained in the standard ETS 300 139 [32].

The following gives the recommended guidelines for the implementation of the HOLD supplementary service in the Malaysian network.

Clause 5	On the primary rate access, only notifications for the HOLD supplementary service are supported.
Sub clause 6.2.3.1	The network may support the option: A call can be placed on hold after the call has been offered to the called user.
	The sending of notifications to the remote user is supported.
Sub clause 6.2.3.2	The sending of notifications to the remote user is supported.
Sub clause 7.1, note	If a remote user is a PSTN user, the notifications about the hold request or retrieve request of the call to that user are not supported. The last sentence of the note is not applicable.

B3.11.3 Functional Capabilities and Information Flows

The functional capabilities and information flows (stage 2 description) for the HOLD supplementary service are contained in the standard ETS 300 140 [33]. The stage 2 description can be taken as informative. The implementation of the HOLD supplementary service in the Malaysian network shall be based on the stage 1 and stage 3 descriptions.

B3.11.4 Digital Subscriber Signaling System No. One (DSS1) Protocol

The DSS1 protocol (stage 3 description) for the HOLD supplementary service is contained in the standard ETS 300 141-1 [34]. The following gives the recommended guidelines for the implementation of the HOLD supplementary service in the Malaysian network.
Clause 9, and Sub clauses 9.1.1, 9.2.1 and 9.4.1

The user A at the originating side can hold a call in the Call Delivered state (U4).

B3.12   Advice of Charge (AOC)

B3.12.1 Definition

Advice of Charge (AOC) is a group of supplementary services allowing the served user to be informed of usage-based charging information.

The AOC group of supplementary services includes the following:

AOC-S Advice of Charge, charging information at call set-up time; AOC-D Advice of Charge, charging information during the call; AOC-E Advice of Charge, charging information at the end of a call.

B3.12.2 Service Description

AOC-S:

The service description (stage 1 description) for the AOC-S supplementary service is contained in the standard ETS 300 178 [35].

The following gives the recommended guidelines for the implementation of the AOC-S supplementary service in the Malaysian network.

Clause 5	The AOC-S supplementary service is applicable only in relation to time tariff setting at call establishment and time tariff changes.
Sub clause 8.16	No charging information for the use of the Three-Party supplementary service can be sent to the served user.

AOC-D:

The service description (stage 1 description) for the AOC-D supplementary service is contained in the standard ETS 300 179 [36].

The following gives the recommended guidelines for the implementation of the AOC-D supplementary service in the Malaysian network.

Sub clause 6.2.3	The value of the timer t shall be 10 seconds.
Sub clause 8.15	The cumulative charging information is given in all the described cases: at the suspension request, on the resumption of the call, and if the call is terminated while the call is suspended at the calling user's access and the calling user attempts to resume the call within the timer
Sub clause 8.16	No charging information for the use of the Three-Party supplementary service can be sent to the served user.
Annex A, Sub clause A.2.1	The Malaysian network may not include some charges, e.g. charges incurred by the use of some supplementary services, in the subtotal charges and/or the total charges.
Annex A, Sub clause A.3	Charging information (AOC) can be given in currency units or metering pulses according to access arrangements

AOC-E:

The service description (stage 1 description) for the AOC-E supplementary service is contained in the standard ETS 300 180 [37].

The following gives the recommended guidelines for the implementation of the AOC-E supplementary service in the Malaysian network.

Sub clause 8.4	After a call has been transferred and the transferring user is charged for that transferred part of the call, and the AOC-E supplementary service has been invoked for that call, then the charging information shall be sent to the transferring user when the call is terminated.
Sub clauses 8.10.1, 8.10.2 and 8.10.3	Forwarding user: When a call is forwarded and the forwarding user is charged for the forwarded part of the call, then the charging information shall be sent to the forwarding user when the call is terminated provided that the served user has subscribed to the AOC-E supplementary service with the value of the subscription option set to "for all calls automatically".
Sub clause 8.15	If the call is terminated while the call is suspended at the calling user's access, and if the calling user attempts to resume the call within the timer, then advice of charge information shall be given to that user at the time of the resume attempt.
Sub clause 8.16	No charging information for the use of the Three-Party supplementary service can be sent to the served user.

Annex A, Sub clause A.2.1	The Malaysian network may not include some charges, e.g. charges incurred by the use of some supplementary services, in the subtotal charges and/or the total charges.
Annex A, Sub clause A.3	Charging information (AOC) can be given in currency units or metering pulses according to access arrangements.

B3.12.3 Functional Capabilities and Information Flows

The functional capabilities and information flows (stage 2 description) for the AOC supplementary service are contained in the standard ETS 300 181 [38]. The stage 2 description can be taken as informative. The implementation of the AOC supplementary service in the Malaysian network shall be based on the stage 1 and stage 3 descriptions.

B3.12.4 Digital Subscriber Signaling System No. One (DSS1) Protocol

The DSS1 protocol (stage 3 description) for the AOC supplementary service is contained in the standard ETS 300 182-1 [39]. The AOC supplementary service is implemented in the Malaysian network without national definitions or exceptions.

B3.13 Three Party (3PTY)

B3.13.1 Definition

The 3PTY supplementary service enables a user to establish, participate in and control, a three-way conversation, i.e. a simultaneous communication involving the served user and two remote parties.

B3.13.2 Service Description

The service description (stage 1 description) for the 3PTY supplementary service is contained in the standard ETS 300 186 [40].

The following gives the recommended guidelines for the implementation of the 3PTY supplementary service in the Malaysian network.

Sub clause 6.2.3.1	Establishing a three-way conversation that would include calls which are not intended for speech communication is not prevented.
Sub clauses 8.1.1, 8.1.2 and 8.1.3	No charging information for the use of the Three-Party supplementary service can be sent to the served user.
Sub clause 8.16	A remote party in a three-way conversation can invoke the 3PTY supplementary service in order to make their connection to the three-way conversation a part of another three-way conversation controlled by that remote party.

B3.13.3 Functional Capabilities and Information Flows

The functional capabilities and information flows (stage 2 description) for the 3PTY supplementary service are contained in the standard ETS 300 187 [41]. The stage 2 description can be taken as informative. The implementation of the 3PTY supplementary service in the Malaysian network shall be based on the stage 1 and stage 3 descriptions.

B3.13.4 Digital Subscriber Signaling System No. One (DSS1) Protocol

The DSS1 protocol (stage 3 description) for the 3PTY supplementary service is contained in the standard ETS 300 188-1 [42].   The 3PTY supplementary service is implemented in the Malaysian network without national definitions or exceptions.

B3.14   Call Forwarding (CFB, CFU, CFNR)

B3.14.1B
Definition

The Call Forwarding supplementary services comprise the following services:
-Call Forwarding Busy (CFB);
-Call Forwarding Unconditional (CFU);
-Call Forwarding No Reply (CFNR).

The CFB supplementary service enables a served user to have the network redirect to another user calls which are addressed to the served user´s ISDN number and meet busy.

The CFU supplementary service enables a served user to have the network redirect to another user calls which are addressed to the served user´s ISDN number.
The CFNR supplementary service enables a served user to have the network redirect to another user call which are addressed to the served user´s ISDN number, and for which the connection is not established within a defined period of time.

B3.14.2 Service Description

CFB:

The service description (stage 1 description) for the CFB supplementary service is contained in the standard ETS 300 199 [45].

The following gives the recommended guidelines for the implementation of the CFB supplementary service in the Malaysian network.

Clause 5 and Sub clause 6.2.3	The maximum number for call diversions is 5 for each call.
Sub clause 7.1	Once a call has been forwarded to a non-ISDN network the indication call forwarded is used. Once a call arrives at an ISDN network from a non-ISDN network with the indication forwarded call the call forwarding counter will be set to one, if no other value for the call forwarding counter is supplied.
Sub clause 8.17	Forwarding any UUI or request for UUS may be restricted to forwarding users who subscribe to the relevant parts of the UUS supplementary service.

CFU:

The service description (stage 1 description) for the CFU supplementary service is contained in the standard ETS 300 200 [46].

The following gives the recommended guidelines for the implementation of the CFU supplementary service in the Malaysian network.

Clause 5 and Sub clause 6.2.3	The maximum number for call diversions is 5 for each call.
Sub clause 7.1	Once a call has been forwarded to a non-ISDN network the indication call forwarded is used. Once a call arrives at an ISDN network from a non-ISDN network with the indication forwarded call the call forwarding counter will be set to one, if no other value for the call forwarding counter is supplied.
Sub clause 8.17	Forwarding any UUI or request for UUS may be restricted to forwarding users who subscribe to the relevant parts of the UUS supplementary service.

CFNR:

The service description (stage 1 description) for the CFNR supplementary service is contained in the standard ETS 300 201 [47].

The following gives the recommended guidelines for the implementation of the CFNR supplementary service in the Malaysian network.

Clause 5 and Sub clause 6.2.3	The maximum number for call diversions is 5 for each call.
Sub clause 6.1	The value of 30 seconds will be used for the no reply timer.
Sub clauses 6.2.3.1 and 6.3.3	The method b) is used. The call to the served user will be cleared when the CFNR supplementary service is invoked. If the forwarded call cannot be completed the call shall be terminated.
Sub clause 7.1	Once a call has been forwarded to a non-ISDN network the indication call forwarded is used. Once a call arrives at an ISDN network from a non-ISDN network with the indication forwarded call the call forwarding counter will be set to one, if no other value for the call forwarding counter is supplied.

| Sub clause 8.17 | Forwarding any UUI or request for UUS may be restricted to forwarding users who subscribe to the relevant parts of the UUS supplementary service.

If the calling user requests service 1 and indicates that it is not required on the call, then if the called user has explicitly accepted the request, the request for the call forwarding no reply supplementary service will be rejected and the call shall not be forwarded. |
| --- | --- |
| Annex A | The following service provider option in the note is supported: the request for the call forwarding no reply supplementary service will be rejected and the call will not be forwarded. |

B3.14.3 Functional Capabilities and Information Flows

<u>CFB:</u>

The functional capabilities and information flows (stage 2 description) for the CFB supplementary services are contained in the standard ETS 300 203 [48]. The stage 2 description can be taken as informative. The implementation of the CFB supplementary service in the Malaysian network shall be based on the stage 1 and stage 3 descriptions.

<u>CFU:</u>

The functional capabilities and information flows (stage 2 description) for the CFU supplementary services are contained in the standard ETS 300 204 [49]. The stage 2 description can be taken as informative. The implementation of the CFU supplementary service in the Malaysian network shall be based on the stage 1 and stage 3 descriptions.

<u>CFNR:</u>

The functional capabilities and information flows (stage 2 description) for the CFNR supplementary services are contained in the standard ETS 300 205 [50]. The stage 2 description can be taken as informative. The implementation of the CFNR supplementary service in the Malaysian network shall be based on the stage 1 and stage 3 descriptions.

B3.14.4 Digital Subscriber Signaling System No. One (DSS1) Protocol

The DSS1 protocol (stage 3 description) for the Call Forwarding supplementary services is contained in the standard ETS 300 207-1 [51].

The following gives the recommended guidelines for the implementation of the Call Forwarding supplementary services in the Malaysian network.

| Clause 5 | The diversion supplementary services are provided on a per ISDN number basis.

The call forwarding services can be subscribed collectively for all the basic services to which the user(s) subscribes. |
| --- | --- |

Sub clause 6.1	The subscription options listed in the table 1 are provided.
	In the table 2 the following network provider option values are applicable:
	-served user call is cleared on invocation of diversion;
	-maximum number of diversions for a single call is 5;
	-call forwarding on no reply timer value is 20 s;
	-partial rerouting is provided at the T reference point.
Sub clause 9.1.1.1	The forwarding exchange shall verify the forwarded-to number only for a limited set of numbers; the minimum requirement is that emergency numbers are not accepted as forwarded to numbers
Sub clauses 9.2.3.1 and 9.2.5.1	The type of the number shall be set to "unknown" and the number is organized according to the network dialing plan.
Sub clause 9.2.4.4.1 and clause 13	The value of T-CFNR is 20 s.
Sub clause 9.2.4.4.1	The network provider option "served user call retention on invocation of diversion" is "clear call on invocation"
Sub clauses 10.4.1 and 10.5.1	If a diverted call is presented from a private network to the public network, then the public network is required to check the redirecting number from the SETUP message. The number shall be checked against the numbering space of the private network. In case of a mismatch the redirecting number shall be replaced by the default number associated with the private network.
	It is recommended for the coding of the redirecting number information sent by the private network:
	The "numbering plan identification" field shall be coded "ISDN/Telephony numbering plan". In case DDI is not activated for the same access:
	The "type of number" field shall be coded "subscriber number" and the full ISDN subscriber number shall be sent.
	In case DDI is activated for the same access:
	-The "type of number" field shall be coded "unknown" and only the extension number of the redirecting number shall be sent. The network then completes the redirecting number by adding the national number of the access to the redirecting number information.
Sub clause 10.5.1	The public network shall clear the call towards the private network on acceptance of the call rerouting request.

B3.15   User-to-User Signaling (UUS)

B3.15.1 Definition

The UUS supplementary service enables a user to send/receive a limited amount of information to/from another user over the signaling channel in association with a call to the other user. This information shall be passed transparently (i.e. without modification of contents) through the network. The network shall not interpret or act upon this information.

The user can transfer UUI in different phases of the call depending on the service(s) to which the user subscribes. These services are:

a)   Service 1   -   User-to-user information exchanged during the set-up and clearing phases of a call/connection, by transporting the User-to-user information element within call/connection control messages;

b)   Service 2   -   User-to user information exchanged from the sender's point of view during call/connection establishment, between the ALERTING and CONNECT messages, within USER INFORMATION messages; and

c)   Service 3   -   User-to-user information exchanged while a call/connection is in the Active state, within USER INFORMATION messages.

B3.15.2 Service Description

The service description (stage 1 description) for the UUS supplementary service is contained in the standard ETS 300 284 [52].

The following gives the recommended guidelines for the implementation of the UUS supplementary service in the Malaysian network.

Clause 5	Service provider option for service 2, UUI sent by the calling user prior to receiving the acceptance of the call by the called user may be delivered to the called user after the call has been established, is supported. Note on limitation of UUI to only 32 octets during an interim period of time is not applicable for the Malaysian network.
Sub clause 6.1	Service provider option about provision of one or any combination of services is supported. Service provider option about withdrawal separately per service is supported.
Sub clause 6.2.1.3	Service provider option about activation of service 3 by the called user after the connection has been established is supported.
Sub clause 6.3.3	In case of excessive UUI length the sending user shall be informed.
Clause 7	Service provider option about explicit acceptance, if the remote user replies with UUI to explicit request sent to an ISDN only supporting implicit requests, is supported.

Sub clauses 8.10.1, 8.10.2 and 8.10.3	Forwarding any UUI or request for UUS may be restricted to forwarding users who subscribe to the relevant parts of the UUS supplementary service.
Sub clause 8.10.3	If the calling user requests service 1 and indicates that it is not required on the call, then if the called user has explicitly accepted the request, the request for the call forwarding no reply supplementary service will be rejected and the call shall not be forwarded.
Annex A	The following service provider option in the note is supported: the request for the call forwarding no reply supplementary service will be rejected and the call will not be forwarded.

B3.15.3 Functional Capabilities and Information Flows

The functional capabilities and information flows (stage 2 description) for the UUS supplementary service are contained in the standard ETR 285 [53]. The stage 2 description can be taken as informative. The implementation of the UUS supplementary service in the Malaysian network shall be based on the stage 1 and stage 3 descriptions.

B3.15.4 Digital Subscriber Signaling System No. One (DSS1) Protocol

The DSS1 protocol (stage 3 description) for the UUS supplementary service is contained in the standard ETS 300 286-1 [54].

The following gives the recommended guidelines for the implementation of the UUS supplementary service in the Malaysian network.

Sub clause 6.1	Any combination of the following possibilities can be provided separately or globally: -service 1 implicit, or service 1 implicit together with service 1 explicit; -service 2; -service 3.
Sub clauses 9.2.2.1 and 9.2.2.2	The calling network shall accept the first two USER INFORMATION messages from the calling user and the calling network shall deliver them to the called user after the calling and called network have entered the Active (N10) call state.
Sub clause 9.2.2.2	The calling network shall send a STATUS message with cause #43 to the calling user when discarding the USER INFORMATION message. The called network shall send a STATUS message with cause #43 to the called user when discarding the USER INFORMATION message.
Sub clause 9.3.1.2.1	During the Active (U10) call state, the calling user or the called user can activate service 3.
Sub clause 9.3.2.2	The sending network shall send a STATUS message with cause #43 to the sending user when discarding the USER INFORMATION message.

B3.16 Explicit Call Transfer (ECT)

B3.16.1 Definition

The ECT supplementary service enables a user (user A) to transform two of that user's calls (an active call and a held call), each of which can be an incoming call or an outgoing call, into a new call between user B and user C.

B3.16.2 Service Description

The service description (stage 1 description) for the ECT supplementary service is contained in the standard ETS 300 367 [55].

The following gives the recommended guidelines for the implementation of the ECT supplementary service in the Malaysian network.

Clause 5 and Sub clause 6.2.3	The service provider option, that the ECT supplementary service can be invoked after user C has been informed of the call (i.e. an outgoing call from A to user C, where the connection has not yet been established), is supported.
Sub clause 8.1.3	When the call is transferred and the transferring user is charged for the transferred part of the call, then the charging information shall be sent to the transferring user when the transferred call is terminated provided that the served user has activated the AOC-E supplementary service for that call.

B3.16.3 Functional Capabilities and Information Flows

The functional capabilities and information flows (stage 2 description) for the ECT supplementary service are contained in the standard ETS 300 368 [56]. The stage 2 description can be taken as informative. The implementation of the ECT supplementary service in the Malaysian network shall be based on the stage 1 and stage 3 descriptions.

B3.16.4 Digital Subscriber Signaling System No. One (DSS1) Protocol

The DSS1 protocol (stage 3 description) for the ECT supplementary service is contained in the standard ETS 300 369-1 [57].

The following gives the recommended guidelines for the implementation of the ECT supplementary service in the Malaysian network.

Clause 5 and Sub clause 9.2.5	The network option to allow the invocation of the ECT service when one of the calls is an outgoing call in the Call delivered (alerting) state is supported.
Sub clause 9.2	The explicit linkage procedure is supported.
Sub clause 10.3	The "mechanism to avoid looping of uncontrolled circuits" is supported by the public network. If the loop prevention procedure cannot decide whether the resulting connection would result in a loop, the call transfer is completed. The time supervision for the loop prevention procedure is 2 seconds.

B3.17 Supplementary Service Interactions

The public network shall support protocol interaction between the various supplementary services according to ETS 300 195-1 [43]. Network options of ETS 300 195-1 are left as implementation options, unless stated otherwise in the Sub clauses relating to the individual supplementary services. Should any conflict arise between ETS 300 195-1 and the specifications in Sub clause 3.2 to 3.16, then the text of the individual supplementary services shall be taken as definitive.

Annex C
(Normative)

Amendments

Amendments to SKMM FTS ISDN-PA Rev. 1.01:2007		
Page	**Clause**	**Items Amended**
Cover	-	The document has adopted new numbering system and cover page. It has been renumbered as "MCMC MTSFB TC T009:2014".
i	-	Explanatory note on the development of Technical Codes has been included.
1	1.2	Reference for Section D has been replaced with EN 300 403-1 11/99.
2	2	New clause on normative references has been included.
2	3	The abbreviations have been updated.
3	4.1	Power supply requirements have been revised based on the Information Booklet 2012 Edition, Approval of Electrical Equipment, issued by the Energy Commission.
4	4.1 (Figure 2)	Alphanumeric keypad layout has been included.
4	4.2.1	New clause on network interface specifications has been included.
-	-	Old clause 2.2 on analogue interface has been removed.
-	-	Old clause 2.3 on characteristics of telephone has been removed.
4	4.3	New clause on interoperability requirement has been included.
12	Section D	Network layer requirements have been revised to be based on EN 300 403-1 11/99, Integrated Services Digital Network (ISDN): Digital Subscriber Signaling System No. One (DSS1) protocol: Signaling network layer for circuit-mode basic call control; Part 1: Protocol Specification [ITU-T Recommendation Q.931 (1993), modified].
19	Annex A	The normative references have been updated.
20	Annex B	Technical guidelines of ISDN supplementary service have been included.

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