BOCRA

ANNEX C-TERMINATION EQUIPMENT TECHNICAL SPECIFICATIONS

REVIEW OF TYPE APPROVAL TECHNICAL STANDARDS AND PROCEDURES

ISSUED BY

BOTSWANA COMMUNICATIONS REGULATORY AUTHORITY

Date: 14 March 2016

INDEX Terminal Equipment Technical Specification

BOCRA

TECHNICAL SPECIFICATION

FOR

EQUIPMENT CONNECTING TO THE ANALOGUE PSTN

ISSUED BY

BOTSWANA COMMUNICATIONS REGULATORY AUTHORITY

Document Number: **TS0024**
Revision: **Original V1.1**
Date: **11 December 2015**

Technical Specification for Equipment Connecting to the Analogue PSTN

Contents

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Scope

This specification applies to any equipment which offers an interface that may be directly connected to an Analogue Public Switched Telephone Network (PSTN) interface of any public network in Botswana.

Where terminal equipment supports more than one interface type, each interface must meet the requirements applicable to it. It may therefore be necessary to make reference to additional specifications.

Entry into Force

This specification shall enter into force on 15/01/2016.

Document History

Description	Status	Date
Equipment Connecting to the Analogue PSTN	Original V1.1	11/12/2015

Health, Safety, and Generic Emissions

The following universal specifications shall be applied.

TS0001: Health, Safety and Generic Emissions of Radio and Telecommunications Terminal Equipment.

Technical, Spectrum and EMC Requirements

The following specifications shall be applied.

ETSI TBR 021 ed.1
Terminal Equipment (TE); Attachment requirements for pan-European approval for connection to the analogue Public Switched Telephone Networks (PSTNs) of TE (excluding TE supporting the voice telephony service) in which network addressing, if provided, is by means of Dual Tone Multi Frequency (DTMF) signalling

Or

ETSI ES 203 021 –1 V.2.1.1
Access and Terminals (AT); Harmonized basic attachment requirements for Terminals for connection to analogue interfaces of the Telephone Networks; Update of the technical contents of TBR 021, EN 301 437, TBR 015, TBR 017; Part 1: General aspects

ETSI ES 203 021 –2 V2.1.2
Access and Terminals (AT); Harmonized basic attachment requirements for Terminals for connection to analogue interfaces of the Telephone Networks; Update of the technical contents of TBR 021, EN 301 437, TBR 015, TBR 017; Part 2: Basic transmission and protection of the network from harm

ETSI ES 203 021 –3 V2.1.2
Access and Terminals (AT); Harmonized basic attachment requirements for Terminals for connection to analogue interfaces of the Telephone Networks; Update of the technical contents of TBR 021, EN 301 437, TBR 015, TBR 017; Part 3: Basic Interworking with the Public Telephone Networks

Additional requirements

Pulse Dialling

For products that offer Pulse or Loop Disconnect dialling, the performance shall be in conformance with **ETSI ES201 187**.

ETSI ES 201 187 V1.1.1
2-wire analogue voice band interfaces; Loop Disconnect (LD) dialling specific requirements

Analogue Voice

Analogue telephones and other equipment which offer analogue handset telephony such as modems or fax machines shall comply with:

ETSI EN 300 659-2 V1.3.1
Access and Terminals (AT); Analogue access to the Public Switched Telephone Network (PSTN); Subscriber line protocol over the local loop for display (and related) services; Part 2: Off-hook data transmission

ETSI ES 200 778-2 V1.2.2
Access and Terminals (AT); Analogue access to the Public Switched Telephone Network (PSTN); Protocol over the local loop for display and related services; Terminal equipment requirements; Part 2: Off-hook data transmission

ETSI ES 201 235-3 V1.3.1
Access and Terminals (AT); Specification of Dual-Tone Multi-Frequency (DTMF) Transmitters and Receivers; Part 3: Receivers

ETSI ES 201 912 V1.2.1
Access and Terminals (AT); Short Message Service (SMS) for PSTN/ISDN; Short Message Communication between a fixed network Short Message Terminal Equipment and a Short Message Service Centre

ETSI TBR 038 ed.1
Public Switched Telephone Network (PSTN); Attachment requirements for a terminal equipment incorporating an analogue handset function capable of supporting the justified case service when connected to the analogue interface of the PSTN in Europe

Caller Line Identification (CLI)

Products which offer CLI, should recognize DTMF signalling in accordance with the following standard:

ETSI ES 201 235-1-V1.1.1
Specification of Dual Tone Multi-Frequency (DTMF) Transmitters and Receivers; Part 1: General

ETSI ES 203 021 –1 V.2.1.1
Access and Terminals (AT); Harmonized basic attachment requirements for Terminals for connection to analogue interfaces of the Telephone Networks; Update of the technical contents of TBR 021, EN 301 437, TBR 015, TBR 017; Part 1: General aspects

ETSI ES 203 021 –2 V2.1.2
Access and Terminals (AT); Harmonized basic attachment requirements for Terminals for connection to analogue interfaces of the Telephone Networks; Update of the technical contents of TBR 021, EN 301 437, TBR 015, TBR 017; Part 2: Basic transmission and protection of the network from harm

ETSI ES 203 021 –3 V2.1.2
Access and Terminals (AT); Harmonized basic attachment requirements for Terminals for connection to analogue interfaces of the Telephone Networks; Update of the technical contents of TBR 021, EN 301 437, TBR 015, TBR 017; Part 3: Basic Interworking with the Public Telephone Networks

Important Note: The revision numbers of the documents given in the approval standard are the minimum standards that apply. Should updated versions of these documents be published, the latest version will always apply. This also applies to documents where no revision number is currently quoted.

Obtaining Technical Standards

ETSI technical standards may be obtained free of charge for individual use from the ETSI web site. www.etsi.org

CENELEC, IEC and CISPR standards may be obtained at cost from, or through www.cenelec.org and from www.iec.ch respectively.

BOCRA

TECHNICAL SPECIFICATION

FOR

EQUIPMENT CONNECTING TO ANALOGUE LEASED LINE SERVICES

ISSUED BY

BOTSWANA COMMUNICATIONS REGULATORY AUTHORITY

Document Number: **TS0025**
Revision: **Original V1.1**
Date: **11 December 2015**

Technical Specification
for
Equipment Connecting to Analogue Leased Line Services

Contents

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Scope

This specification applies to any equipment which offers an interface that may be connected to public 2 or 4 wire Analogue Leased Lines in Botswana.

Where terminal equipment supports more than one interface type, each interface must meet the requirements applicable to it. It may therefore be necessary to make reference to additional specifications.

Equipment covered by this specification includes, but is not limited to, the Analogue Leased Line interfaces of the following equipment types:

- PBX
- Modems
- Answering machines
- Security alarms
- Remote telemetry

Entry into Force

This specification shall enter into force on 15/01/2016.

Document History

Description	Status	Date
Equipment Connecting to Analogue Leased Line Services	Original V1.1	11/12/2015

Health, Safety, and Generic Emissions

The following universal specifications shall be applied.

TS0001: Health, Safety and Generic Emissions of Radio and Telecommunications Terminal Equipment.

Technical, Spectrum and EMC Requirements

The following specifications shall be applied.

ETSI TBR 015 ed.1
Business TeleCommunications (BTC);Ordinary and Special quality voice bandwidth 2-wire analogue leased lines (A2O and A2S);Attachment requirements for terminal equipment interface

ETSI TBR 017 ed.1
Business TeleCommunications (BTC);Ordinary and Special quality voice bandwidth 4-wire analogue leased lines (A4O and A4S); Attachment requirements for terminal equipment interface

Or

ETSI ES 203 021 –1 V.2.1.1
Access and Terminals (AT); Harmonized basic attachment requirements for Terminals for connection to analogue interfaces of the Telephone Networks; Update of the technical contents of TBR 021, EN 301 437, TBR 015, TBR 017; Part 1: General aspects

ETSI ES 203 021 –2 V2.1.2
Access and Terminals (AT); Harmonized basic attachment requirements for Terminals for connection to analogue interfaces of the Telephone Networks; Update of the technical contents of TBR 021, EN 301 437, TBR 015, TBR 017; Part 2: Basic transmission and protection of the network from harm

ETSI ES 203 021 –3 V2.1.2
Access and Terminals (AT); Harmonized basic attachment requirements for Terminals for connection to analogue interfaces of the Telephone Networks; Update of the technical contents of TBR 021, EN 301 437, TBR 015, TBR 017; Part 3: Basic Interworking with the Public Telephone Networks
Important Note: The revision numbers of the documents given in the approval standard are the minimum standards that apply. Should updated versions of these documents be published, the latest version will always apply. This also applies to documents where no revision number is currently quoted.

Additional Requirements

No additional requirements exist for equipment connecting to analogue leased line services

Obtaining Technical Standards

ETSI technical standards may be obtained free of charge for individual use from the ETSI web site. www.etsi.org

CENELEC, IEC and CISPR standards may be obtained at cost from, or through www.cenelec.org and from www.iec.ch respectively.

BOCRA

TECHNICAL SPECIFICATION

FOR

EQUIPMENT CONNECTING TO ADSL SERVICES

ISSUED BY

BOTSWANA COMMUNICATIONS REGULATORY AUTHORITY

Document Number: **TS0026**
Revision: **Original V1.1**
Date: **11 December 2015**

Technical Specification for Equipment Connecting to ADSL Services

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Scope

This specification applies to any equipment which offers an interface that may be connected to public ADSL services in Botswana.

Where terminal equipment supports more than one interface type, each interface must meet the requirements applicable to it. It may therefore be necessary to make reference to additional specifications.

Equipment covered by this specification includes, but is not limited to the Analogue Leased Line interfaces of the following equipment types:

- Modems
- splitters

Entry into Force

This specification shall enter into force on 15/01/2016.

Document History

Description	Status	Date
Equipment Connecting to ADSL Services	Original V1.1	11/12/2015

Health, Safety, and Generic Emissions

The following universal specifications shall be applied.

TS0001: Health, Safety and Generic Emissions of Radio and Telecommunications Terminal Equipment.

Technical, Spectrum and EMC Requirements

The following specifications shall be applied.

ETSI TS 101 135 V1.5.3
Transmission and Multiplexing (TM); High bit-rate Digital Subscriber Line (HDSL) transmission systems on metallic local lines; HDSL core specification and applications for combined ISDN-BA and 2 048 kbit/s transmission

ETSI ETR 152 ed.3
Transmission and Multiplexing (TM); High bit-rate Digital Subscriber Line (HDSL) transmission system on metallic local lines; HDSL core specification and applications for 2 048 kbit/s based access digital sections

ETSI ES 202 913 V1.2.2
Access and Terminals (AT); POTS requirements applicable to ADSL modems when connected to an analogue presented PSTN line

ETSI TS 101 952-1 V1.1.1
Access network xDSL splitters for European deployment; Part 1: Generic specification of xDSL over POTS splitters

ETSI TS 101 952-2 V1.1.1
Access, Terminals, Transmission and Multiplexing (ATTM); Access network xDSL splitters for European deployment; Part 2: Generic specification of xDSL over ISDN splitters and xDSL universal splitters

ETSI TS 101 952-3 V1.1.1
Access, Terminals, Transmission and Multiplexing (ATTM); Access network xDSL splitters for European deployment; Part 3: Generic specification of static distributed filters for xDSL over POTS

ETSI TS 101 952-4 V1.1.1
Access, Terminals, Transmission and Multiplexing (ATTM); Access network xDSL splitters for European deployment; Part 4: Specification for dynamic distributed filters for xDSL over POTS

Important Note: The revision numbers of the documents given in the approval standard are the minimum standards that apply. Should

updated versions of these documents be published, the latest version will always apply. This also applies to documents where no revision number is currently quoted.

Additional Requirements

ADSL equipment should not affect the performance of the analogue PSTN. Reference should also be made to BTA specification TS0024 "Requirement for equipment connecting to the Analogue PSTN" in order to understand any additional requirements which apply.

It is recommended that consideration should be given to the following document:

ETSI TS 101 388 V1.4.1
Access Terminals Transmission and Multiplexing (ATTM); Access transmission systems on metallic access cables; Asymmetric Digital Subscriber Line (ADSL) - European specific requirements [ITU-T Recommendation G.992.1 modified]

ITU-T Recommendation G.992.2
Asymmetric Digital Subscriber Line (ADSL) transceivers

Obtaining Technical Standards

ETSI technical standards may be obtained free of charge for individual use from the ETSI web site. www.etsi.org

CENELEC, IEC and CISPR standards may be obtained at cost from, or through www.cenelec.org and from www.iec.ch respectively.

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TECHNICAL SPECIFICATION

FOR

EQUIPMENT CONNECTING TO 2.048 Mbit/s DIGITAL LEASED LINE SERVICES

ISSUED BY

BOTSWANA COMMUNICATIONS REGULATORY AUTHORITY

Document Number: TS0027
Revision: Original V1.1
Date: 11 December 2015

Technical Specification for Equipment Connecting to 2.048 Mbit/s Digital Leased Line Services

Contents

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Scope

This specification applies to any equipment which offers an interface that may be connected to public 2.048Mb/s Digital Leased Lines in Botswana. This specification assumes that E1 terminal equipment will always connect behind a network termination unit (NTU).

Where terminal equipment supports more than one interface type, each interface must meet the requirements applicable to it. It may therefore be necessary to make reference to additional specifications.

Equipment covered by this specification includes, but is not limited to the Digital Leased Line interfaces of the following equipment types:

- PBX
- Modems
- Routers
- Remote telemetry

Entry into Force

This specification shall enter into force on 15/01/2016.

Document History

Description	Status	Date
Equipment Connecting to 2.048 Mbit/s Digital Leased Line Services	Original V1.1	11/12/2015

Health, Safety, and Generic Emissions

The following universal specifications shall be applied.

TS0001: Health, Safety and Generic Emissions of Radio and Telecommunications Terminal Equipment.

Technical, Spectrum and EMC Requirements

The following specifications shall be applied.

ETSI TBR 012 ed.1
Business TeleCommunications (BTC);Open Network Provision (ONP) technical requirements; 2 048 kbit/s digital unstructured leased lines (D2048U);
Attachment requirements for terminal equipment interface

ETSI TBR 013 ed.1
Business TeleCommunications (BTC);
2 048 kbit/s digital structured leased lines (D2048S);
Attachment requirements for terminal equipment interface

ETSI EN 300 248 v1.2.1
Access and Terminals (AT); 2 048 kbit/s digital unstructured leased line (D2048U); Terminal equipment interface

ETSI EN 300 420 V1.2.1
Access and Terminals (AT); 2 048 kbit/s digital structured leased lines (D2048S); Terminal equipment interface

ACIF/ACA S0016 section 5.3
Requirements for Customer Equipment for connection to hierarchical digital interfaces

This latter ACIF/ACA standard may be used for either 120Ω or 75Ω connection.
Important Note: The revision numbers of the documents given in the approval standard are the minimum standards that apply. Should updated versions of these documents be published, the latest version will always apply. This also applies to documents where no revision number is currently quoted.

Additional Requirements

Terminal equipment shall provide a facility to ground the outer conductor or screen of the coaxial pair or the screen of the symmetrical pair in accordance with ITU-T G.703. Section 9.4.

ITU-T G.703. Section 9.4

Physical/electrical characteristics of hierarchical
digital interfaces; Grounding of outer conductor or screen

Where it is intended that a 75Ω interface connects via a Balun to 120Ω
services, testing should be carried out with the Balun in place.

Obtaining Technical Standards

ETSI technical standards may be obtained free of charge for individual
use from the ETSI web site. www.etsi.org

CENELEC, IEC and CISPR standards may be obtained at cost from, or
through www.cenelec.org and from www.iec.ch respectively.

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TECHNICAL SPECIFICATION

FOR

EQUIPMENT CONNECTING TO 34 Mb/s DIGITAL LEASED LINE SERVICES

ISSUED BY

BOTSWANA COMMUNICATIONS REGULATORY AUTHORITY

Document Number: **TS0028**
Revision: **Original V1.1**
Date: **11 December 2015**

Technical Specification
for
Equipment Connecting to 34 Mbit/s Digital Leased Line Services

Contents

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Scope

This specification applies to any equipment which offers an interface that may be connected to public 34Mbit/s Digital Leased Lines in Botswana.

Where terminal equipment supports more than one interface type, each interface must meet the requirements applicable to it. It may therefore be necessary to make reference to additional specifications.

Equipment covered by this specification includes, but is not limited to the Digital Leased Line interfaces of the following equipment types:

- Routers
- Frame relay equipment
- ATM equipment

Entry into force

This specification shall enter into force on 15/01/2016.

Document History

Description	Status	Date
Equipment Connecting to 34 Mbit/s Digital Leased Line Services	Original V1.1	11/12/2015

Health, Safety, and Generic Emissions

The following universal specifications shall be applied.

TS0001: Health, Safety and Generic Emissions of Radio and Telecommunications Terminal Equipment.

Technical, Spectrum and EMC Requirements

It is recognised that a number of largely equivalent specifications exist for terminal equipment offering connection to E3 34Mbs services; it is also recognised that a great number of manufacturers continue to reference older ETSI specifications such as ETSI TBR 24 for this technology. Testing should be carried out to ensure compliance with either one of the following specifications:

ETSI EN 300 689 v1.2.1
Access and Terminals (AT); 34Mbit/s digital leased line (D34U and D34S) Terminal equipment interface

ETSI TBR 024 ed.1
Business TeleCommunications (BTC);
34 Mbit/s digital unstructured and structured leased lines (D34U and D34S); Attachment requirements for terminal equipment interface

ACIF/ACA S0016 section 5.5
Requirements for Customer Equipment for connection to hierarchical digital interfaces

Important Note: The revision numbers of the documents given in the approval standard are the minimum standards that apply. Should updated versions of these documents be published, the latest version will always apply. This also applies to documents where no revision number is currently quoted.

Additional Requirements

No additional requirements exist for equipment offering connection to analogue leased lines at this time.

Obtaining Technical Standards

ETSI technical standards may be obtained free of charge for individual use from the ETSI web site. www.etsi.org

CENELEC, IEC and CISPR standards may be obtained at cost from, or through www.cenelec.org and from www.iec.ch respectively.

BOCRA

TECHNICAL SPECIFICATION

FOR

EQUIPMENT CONNECTING TO CO-DIRECTIONAL G.703 DIGITAL LEASED LINE SERVICES

ISSUED BY

BOTSWANA COMMUNICATIONS REGULATORY AUTHORITY

Document Number: TS0029
Revision: Original V1.1
Date: 11 December 2015

Technical Specification for Equipment Connecting to Co-Directional G.703 Digital Leased Line Services

Contents

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Scope

This specification applies to any equipment which offers an interface that may be connected to public co-directional digital leased lines in Botswana.

Where terminal equipment supports more than one interface type, each interface must meet the requirements applicable to it. It may therefore be necessary to make reference to additional specifications.

Equipment covered by this specification includes, but is not limited to the interfaces of the following equipment types:

- Routers
- Frame relay equipment

Entry into Force

This specification shall enter into force on 15/01/2016.

Document History

Description	Status	Date
Equipment Connecting to Co-Directional G.703 Digital Leased Line Services	Original V1.1	11/12/2015

Health, Safety, and Generic Emissions

The following universal specifications shall be applied.

TS0001: Health, Safety and Generic Emissions of Radio and Telecommunications Terminal Equipment.

Technical, Spectrum and EMC Requirements

The following specifications shall be applied.

ITU-T Recommendation G.703
Physical/Electrical characteristics of Hierarchical Digital Interfaces

Important Note: The revision numbers of the documents given in the approval standard are the minimum standards that apply. Should updated versions of these documents be published, the latest version will always apply. This also applies to documents where no revision number is currently quoted.

Additional Requirements

No additional requirements exist for equipment connecting to co-directional G.703 digital leased line services

Obtaining Technical Standards

ETSI technical standards may be obtained free of charge for individual use from the ETSI web site. www.etsi.org

CENELEC, IEC and CISPR standards may be obtained at cost from, or through www.cenelec.org and from www.iec.ch respectively.

BOCRA

TECHNICAL SPECIFICATION

FOR

EQUIPMENT CONNECTING TO X.25 PACKET SWITCHED NETWORKS

ISSUED BY

BOTSWANA COMMUNICATIONS REGULATORY AUTHORITY

Document Number: **TS0030**
Revision: **Original V1.1**
Date: **11 December 2015**

Technical Specification for Equipment Connecting to X.25 Packet Switched Networks

Contents

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Scope

This specification applies to any equipment that may be connected to public X.25 packet switched networks in Botswana.

Where terminal equipment supports more than one interface type, each interface must meet the requirements applicable to it. It may therefore be necessary to make reference to additional specifications.

Equipment covered by this specification includes, but is not limited to the interfaces of the following service types:

- X.25
- Other services offering X.21 connections

Entry into Force

This specification shall enter into force on 15/01/2016.

Document History

Description	Status	Date
Equipment Connecting to X.25 Packet Switched Networks	Original V1.1	11/12/2015

Health, Safety, and Generic Emissions

The following universal specifications shall be applied.

TS0001: Health, Safety and Generic Emissions of Radio and Telecommunications Terminal Equipment.

Technical, Spectrum and EMC Requirements

The following specifications shall be applied.

ETSI TBR 002 ed.1
Digital Terminals and Access (DTA); Attachment requirements for Data Terminal Equipment (DTE) to connect to Packet Switched Public Data Networks (PSPDNs)
for CCITT Recommendation X.25 interfaces at data signaling rates up to 1920 kbit/s utilizing interfaces derived from CCITT Recommendations X.21 and X.21bis

or

ITU-T recommendation X.25
X.25 : Interface between Data Terminal Equipment (DTE) and Data Circuit-terminating Equipment (DCE) for Terminals operating in the Packet Mode and connected to Public Data Networks by Dedicated Circuit.

ITU-T Recommendation X.21
X.21 : Interface between Data Terminal Equipment and Data Circuit-terminating equipment for synchronous operation on Public Data Network

ITU-T Recommendation X.21 bis
X.21 : Interface between Data Terminal Equipment and Data Circuit-terminating Equipment for synchronous operation on public data networks

Important Note: The revision numbers of the documents given in the approval standard are the minimum standards that apply. Should updated versions of these documents be published, the latest version will always apply. This also applies to documents where no revision number is currently quoted.

Additional Requirements

For connections to X.25 packet switched networks, the physical interface of the terminal equipment shall conform to either ITU-T Recommendation V.35 or V.24

ITU-T Recommendation V.35
V.35 : Data transmission at 48 kbit/s using 60-108 kHz group band circuits

ITU-T Recommendation V.24
V.24 : List of definitions for interchange circuits between data terminal equipment (DTE) and data circuit-terminating equipment (DCE)

Other types of interface may be provided to the customer at the discretion of network operator.

Obtaining Technical Standards

ETSI technical standards may be obtained free of charge for individual use from the ETSI web site. www.etsi.org

CENELEC, IEC and CISPR standards may be obtained at cost from, or through www.cenelec.org and from www.iec.ch respectively.

BOCRA

TECHNICAL SPECIFICATION

FOR

EQUIPMENT CONNECTING TO HIGH SPEED SERIAL INTERFACES (HSSI)

ISSUED BY

BOTSWANA COMMUNICATIONS REGULATORY AUTHORITY

Document Number: **TS0031**
Revision: **Original V1.1**
Date: **11 December 2015**

Technical Specification
for
Equipment Connecting to High Speed
Serial Interfaces (HSSI)

Contents

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Scope

This specification applies to any equipment that may be connected to public HSSI services in Botswana.

Where terminal equipment supports more than one interface type, each interface must meet the requirements applicable to it. It may therefore be necessary to make reference to additional specifications.

Equipment covered by this specification includes, but is not limited to the interfaces of the following service types:

- X.25
- Frame relay
- Other services offering HSSI connections

Entry into Force

This specification shall enter into force on 15/01/2016.

Document History

Description	Status	Date
Equipment Connecting to High Speed Serial Interfaces (HSSI)	Original V1.1	11/12/2015

Health, Safety, and Generic Emissions

The following universal specifications shall be applied.

TS0001: Health, Safety and Generic Emissions of Radio and Telecommunications Terminal Equipment.

Technical, Spectrum and EMC Requirements

The following specifications shall be applied.

ANSI/TIA/EIA-612
Electrical Characteristics for an Interface at Data Signalling Rates up to 52 Mbit/s.

Important Note: The revision numbers of the documents given in the approval standard are the minimum standards that apply. Should updated versions of these documents be published, the latest version will always apply. This also applies to documents where no revision number is currently quoted.

Additional Requirements

No additional requirements exist for equipment connecting to High Speed Serial Interfaces (HSSI)

Obtaining Technical Standards

ETSI technical standards may be obtained free of charge for individual use from the ETSI web site. www.etsi.org

CENELEC, IEC and CISPR standards may be obtained at cost from, or through www.cenelec.org and from www.iec.ch respectively.

BOCRA

TECHNICAL SPECIFICATION

FOR

EQUIPMENT CONNECTING TO 64Kbit/s SERVICES

ISSUED BY

BOTSWANA COMMUNICATIONS REGULATORY AUTHORITY

Document Number: TS0032
Revision: Original V1.1
Date: 11 December 2015

Technical Specification for Equipment Connecting to 64Kbit/s Services

Contents

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Scope

This specification applies to any equipment which offers an interface that may be directly connected to public 64Kbit/s services in Botswana.

Where terminal equipment supports more than one interface type, each interface must meet the requirements applicable to it. It may therefore be necessary to make reference to additional specifications.

Equipment covered by this specification includes, but is not limited to the interfaces of the following service types:

- Frame relay
- N*64kbit/s
- All other services which offer 64Kbit/s interfaces

Entry into Force

This specification shall enter into force on 15/01/2016.

Document History

Description	Status	Date
Equipment Connecting to 64Kbit/s Services	Original V1.1	11/12/2015

Health, Safety, and Generic Emissions

The following universal specifications shall be applied.

TS0001: Health, Safety and Generic Emissions of Radio and Telecommunications Terminal Equipment.

Technical, Spectrum and EMC Requirements

The following specifications shall be applied.

ITU-T REC H.323
H.323 : Packet-based multimedia communications systems

ITU-T REC. H.244
H.244 : Synchronized aggregation of multiple 64 or 56 kbit/s channels

ETSI TBR 014 ed.1
Business TeleCommunications (BTC);64 kbit/s digital unrestricted leased line with octet integrity (D64U);Attachment requirements for terminal equipment interface

including

ETSI TBR 014/A1 ed.1
Business TeleCommunications (BTC);64 kbit/s digital unrestricted leased line with octet integrity (D64U);Attachment requirements for terminal equipment interface

Or

ETSI EN 300 290 V1.2.1
Access and Terminals (AT); 64 kbit/s digital unrestricted leased line with octet integrity (D64U);Terminal equipment interface

Important Note: The revision numbers of the documents given in the approval standard are the minimum standards that apply. Should updated versions of these documents be published, the latest version will always apply. This also applies to documents where no revision number is currently quoted.

Additional Requirements

No additional requirements exist for equipment connecting to 64Kbit/s services

Obtaining Technical Standards

ETSI technical standards may be obtained free of charge for individual use from the ETSI web site. www.etsi.org

CENELEC, IEC and CISPR standards may be obtained at cost from, or through www.cenelec.org and from www.iec.ch respectively.

BOCRA

TECHNICAL SPECIFICATION

FOR

EQUIPMENT CONNECTING TO X.21 SERVICES

ISSUED BY

BOTSWANA COMMUNICATIONS REGULATORY AUTHORITY

Document Number:	**TS0033**
Revision:	**Original V1.1**
Date:	**11 December 2015**

Technical Specification
for
Equipment Connecting to X.21 Services

Contents

Issued by:

Botswana Communications Regulatory Authority
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Scope

This specification applies to any equipment which offers an interface that may be connected to public X.21 services in Botswana.

Where terminal equipment supports more than one interface type, each interface must meet the requirements applicable to it. It may therefore be necessary to make reference to additional specifications.

Equipment covered by this specification includes, but is not limited to the interfaces of the following service types:

- Frame Relay
- X.25
- Other X.21 connections to leased lines

Entry into Force

This specification shall enter into force on 15/01/2016.

Document History

Description	Status	Date
Equipment Connecting to X.21 Services	Original V1.1	11/12/2015

Health, Safety, and Generic Emissions

The following universal specifications shall be applied.

TS0001: Health, Safety and Generic Emissions of Radio and Telecommunications Terminal Equipment.

Technical, Spectrum and EMC Requirements

The following specifications shall be applied.

ETSI ETS 300 103 ed.1
Integrated Services Digital Network (ISDN); Support of CCITT Recommendation X.21, X.21 bis and X.20 bis based Data Terminal Equipments (DTEs) by an ISDN Synchronous and asynchronous terminal adaptation functions

ITU-T Recommendation X.21 :
Interface between Data Terminal Equipment and Data Circuit-terminating equipment for synchronous operation on Public Data Networks

ITU-T Recommendation X.21 bis :
Interface between Data Terminal Equipment and Data Circuit-terminating Equipment for synchronous operation on public data networks

Important Note: The revision numbers of the documents given in the approval standard are the minimum standards that apply. Should updated versions of these documents be published, the latest version will always apply. This also applies to documents where no revision number is currently quoted.

Additional Requirements

No additional requirements exist for equipment connecting to X.21 services

Obtaining Technical Standards

ETSI technical standards may be obtained free of charge for individual use from the ETSI web site. www.etsi.org

CENELEC, IEC and CISPR standards may be obtained at cost from, or through www.cenelec.org and from www.iec.ch respectively.

BOCRA

TECHNICAL SPECIFICATION

FOR

EQUIPMENT CONNECTING TO HDSL SERVICES

ISSUED BY

BOTSWANA COMMUNICATIONS REGULATORY AUTHORITY

Document Number: TS0034
Revision: Original V1.1
Date: 11 December 2015

Technical Specification for Equipment Connecting to HDSL Services

Contents

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Scope

This specification applies to any equipment which offers an interface that may be connected to public HDSL services in Botswana.

Where terminal equipment supports more than one interface type, each interface must meet the requirements applicable to it. It may therefore be necessary to make reference to additional specifications.

Entry into Force

This specification shall enter into force on 15/01/2016.

Document History

Description	Status	Date
Equipment Connecting to HDSL Services	Original V1.1	11/12/2015

Health, Safety, and Generic Emissions

The following universal specifications shall be applied.

TS0001: Health, Safety and Generic Emissions of Radio and Telecommunications Terminal Equipment.

Technical, Spectrum and EMC Requirements

The following specifications shall be applied.

ETSI ETR 152 ed.3
Transmission and Multiplexing (TM); High bit-rate Digital Subscriber Line (HDSL) transmission system on metallic local lines; HDSL core specification and applications for 2 048Kbit/s based access digital section

ETSI TS 101 135 V1.5.3
Transmission and Multiplexing (TM); High bit-rate Digital Subscriber Line (HDSL) transmission systems on metallic local lines; HDSL core specification and applications for combined ISDN-BA and 2 048 kbit/s transmission

Important Note: The revision numbers of the documents given in the approval standard are the minimum standards that apply. Should updated versions of these documents be published, the latest version will always apply. This also applies to documents where no revision number is currently quoted.

Additional Requirements

No additional requirements exist for equipment connecting to HDSL services.

Obtaining Technical Standards

ETSI technical standards may be obtained free of charge for individual use from the ETSI web site. www.etsi.org

CENELEC, IEC and CISPR standards may be obtained at cost from, or through www.cenelec.org and from www.iec.ch respectively.

BOCRA

TECHNICAL SPECIFICATION

FOR

EQUIPMENT CONNECTING TO BASIC RATE ISDN SERVICES AT S/T INTERFACES

ISSUED BY

BOTSWANA COMMUNICATIONS REGULATORY AUTHORITY

Document Number: TS0035
Revision: Original V1.1
Date: 11 December 2015

Technical Specification for Equipment Connecting to Basic Rate ISDN Services at S/T Interfaces

Contents

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Scope

This specification applies to any equipment which offers an interface that may be connected to public Basic Rate ISDN Services at S/T interfaces in Botswana.

Where terminal equipment supports more than one interface type, each interface must meet the requirements applicable to it. It may therefore be necessary to make reference to additional specifications.

Entry into Force

This specification shall enter into force on 15/01/2016.

Document History

Description	Status	Date
Equipment Connecting to Basic Rate ISDN Services at S/T Interfaces	Original V1.1	11/12/2015

Health, Safety, and Generic Emissions

The following universal specifications shall be applied.

TS0001: Health, Safety and Generic Emissions of Radio and Telecommunications Terminal Equipment.

Technical, Spectrum and EMC Requirements

The following specifications shall be applied.

ETSI TBR 003/A1 ed.1
Integrated Services Digital Network (ISDN); Attachment requirements for terminal equipment to connect to an ISDN using ISDN basic access

ETSI TBR 008 ed.2   /C1 ed.1   /C2 ed.1
Integrated Services Digital Network (ISDN); Telephony 3,1 kHz teleservice; Attachment requirements for handset terminals systems

Important Note: The revision numbers of the documents given in the approval standard are the minimum standards that apply. Should updated versions of these documents be published, the latest version will always apply. This also applies to documents where no revision number is currently quoted.

Additional Requirements

No additional requirements exist for equipment connecting to basic rate ISDN services at S/T interfaces

Obtaining Technical Standards

ETSI technical standards may be obtained free of charge for individual use from the ETSI web site. www.etsi.org

CENELEC, IEC and CISPR standards may be obtained at cost from, or through www.cenelec.org and from www.iec.ch respectively.

BOCRA

TECHNICAL SPECIFICATION

FOR

EQUIPMENT CONNECTING TO BASIC RATE ISDN SERVICES AT THE U INTERFACE

ISSUED BY

BOTSWANA COMMUNICATIONS REGULATORY AUTHORITY

Document Number: TS0036
Revision: Original V1.1
Date: 11 December 2015

Technical Specification for Equipment Connecting to Basic Rate ISDN Services at the U Interface

Contents

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Scope

This specification applies to any equipment which offers an interface that may be directly connected to public Basic Rate ISDN Services at the U Interface in Botswana.

Where terminal equipment supports more than one interface type, each interface must meet the requirements applicable to it. It may therefore be necessary to make reference to additional specifications.

Entry into Force

This specification shall enter into force on 15/01/2016.

Document History

Description	Status	Date
Equipment Connecting to Basic Rate ISDN Services at the U Interface	Original V1.1	11/12/2015

Health, Safety, and Generic Emissions

The following universal specifications shall be applied.

TS0001: Health, Safety and Generic Emissions of Radio and Telecommunications Terminal Equipment.

Technical, Spectrum and EMC Requirements

The following specifications shall be applied.

ITU- T Recommendation G.961
Digital transmission system on metallic local lines for ISDN basic rate access.

or

ETSI ETR 080 ed.2
Transmission and Multiplexing (TM);Integrated Services Digital Network (ISDN) basic rate access; Digital transmission system on metallic local lines

It should be noted that ETSI ETR 80 does not include all clauses of ITU-T G.961. BTA reserves the right to request that testing against the additional clauses of ITU-T is carried out where it believes this to be appropriate.

Important Note: The revision numbers of the documents given in the approval standard are the minimum standards that apply. Should updated versions of these documents be published, the latest version will always apply. This also applies to documents where no revision number is currently quoted.

Additional Requirements

At the terminal equipment side of the NT1, the interface at the S/T reference point shall conform to the network requirements of ITU-T Recommendation I.430.

ITU-T Recommendation I.430
Integrated Services Digital Network (ISDN) ISDN User-Network Interfaces : Basic User-Network Interface - Layer 1 Specification, International Telecommunication Union, 1993

Obtaining Technical Standards

ETSI technical standards may be obtained free of charge for individual use from the ETSI web site. www.etsi.org

CENELEC, IEC and CISPR standards may be obtained at cost from, or through www.cenelec.org and from www.iec.ch respectively.

BOCRA

TECHNICAL SPECIFICATION

FOR

EQUIPMENT CONNECTING TO PRIMARY RATE ISDN SERVICES

ISSUED BY

BOTSWANA TELECOMMUNICATIONS AUTHORITY

Document Number: TS0037
Revision: Original V1.1
Date: 11 December 2015

Technical Specification
for
Equipment Connecting to Primary Rate ISDN Services

Contents

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Scope

This specification applies to any equipment which offers an interface that may be connected to public Primary Rate ISDN Services in Botswana.

Where terminal equipment supports more than one interface type, each interface must meet the requirements applicable to it. It may therefore be necessary to make reference to additional specifications.

Entry into Force

This specification shall enter into force on 15/01/2016.

Document History

Description	Status	Date
Equipment Connecting to Primary Rate ISDN Services	Original V1.1	11/12/2015

Health, Safety, and Generic Emissions

The following universal specifications shall be applied.

TS0001: Health, Safety and Generic Emissions of Radio and Telecommunications Terminal Equipment.

Technical, Spectrum and EMC Requirements

The following specifications shall be applied.

ETSI TBR 004/A1 ed.1
Integrated Services Digital Network (ISDN); Attachment requirements for terminal equipment to connect to an ISDN using ISDN primary rate access

ETSI TBR 008/C1 ed.1 / C2 ed.1 / ed.2
Integrated Services Digital Network (ISDN); Telephony 3,1 kHz teleservice; Attachment requirements for handset terminals

ETSI ETR 080 ed.2
Transmission and Multiplexing (TM); Integrated Services Digital Network (ISDN) basic rate access; Digital transmission system on metallic local lines

Important Note: The revision numbers of the documents given in the approval standard are the minimum standards that apply. Should updated versions of these documents be published, the latest version will always apply. This also applies to documents where no revision number is currently quoted.

Additional Requirements

No additional requirements exist for equipment connecting to primary rate ISDN services.

Obtaining Technical Standards

ETSI technical standards may be obtained free of charge for individual use from the ETSI web site. www.etsi.org

CENELEC, IEC and CISPR standards may be obtained at cost from, or through www.cenelec.org and from www.iec.ch respectively.