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SERIES H: AUDIOVISUAL AND MULTIMEDIA SYSTEMS

Infrastructure of audiovisual services – Communication procedures

Gateway control protocol: Line test packages

ITU-T Recommendation H.248.17

ITU-T H-SERIES RECOMMENDATIONS

AUDIOVISUAL AND MULTIMEDIA SYSTEMS

For further details, please refer to the list of ITU-T Recommendations.

ITU-T Recommendation H.248.17

Gateway control protocol: Line test packages

Summary

This Recommendation describes line test components and how they are used across an MGC/MG H.248.1 interface to complete line tests.

FOREWORD

The International Telecommunication Union (ITU) is the United Nations specialized agency in the field of telecommunications. The ITU Telecommunication Standardization Sector (ITU-T) is a permanent organ of ITU. ITU-T is responsible for studying technical, operating and tariff questions and issuing Recommendations on them with a view to standardizing telecommunications on a worldwide basis.

The World Telecommunication Standardization Assembly (WTSA), which meets every four years, establishes the topics for study by the ITU-T study groups which, in turn, produce Recommendations on these topics.

The approval of ITU-T Recommendations is covered by the procedure laid down in WTSA Resolution 1.

In some areas of information technology which fall within ITU-T's purview, the necessary standards are prepared on a collaborative basis with ISO and IEC.

NOTE

In this Recommendation, the expression "Administration" is used for conciseness to indicate both a telecommunication administration and a recognized operating agency.

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As of the date of approval of this Recommendation, ITU had not received notice of intellectual property, protected by patents, which may be required to implement this Recommendation. However, implementors are cautioned that this may not represent the latest information and are therefore strongly urged to consult the TSB patent database.

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ITU-T Recommendation H.248.17

Gateway control protocol: Line test packages

1 Scope

This Recommendation describes line test components and how they are used to complete line tests. The definition of line test components, rather than of complete line tests, allows the Media Gateway Controller and Media Gateway to implement a minimal set of signals and packages to achieve a larger set of line tests. It is assumed that the Media Gateway Controller is responsible for sequencing and timing of the line test components to complete the relevant line tests. The detailing of results that are reported (e.g. events and statistics), as well as the timing and mechanisms used for transmitting such records from the MG to the MGC, are outside the scope of this Recommendation.

2 References

The following ITU-T Recommendations and other references contain provisions which, through reference in this text, constitute provisions of this Recommendation. At the time of publication, the editions indicated were valid. All Recommendations and other references are subject to revision; users of this Recommendation are therefore encouraged to investigate the possibility of applying the most recent edition of the Recommendations and other references listed below. A list of the currently valid ITU-T Recommendations is regularly published. The reference to a document within this Recommendation does not give it, as a stand-alone document, the status of a Recommendation.

– ITU-T Recommendation G.711 (1988), *Pulse code modulation (PCM) of voice frequencies*.

– ITU-T Recommendation H.248.1 (2002), *Gateway control protocol: Version 2*.

– ITU-T Recommendation O.6 (1988), *1020 Hz reference test frequency*.

– ITU-T Recommendation O.11 (1992), *Maintenance access lines*.

– ITU-T Recommendation O.22 (1992), *CCITT automatic transmission measuring and signalling testing equipment ATME No. 2*.

– ITU-T Recommendation O.152 (1992), *Error performance measuring equipment for bit rates of 64 kbit/s and N × 64 kbit/s*.

– ITU-T Recommendation Q.107 (1988), *Standard sending sequence of forward address information*.

– ITU-T Recommendation Q.551 (2002), *Transmission characteristics of digital exchanges*.

– ITU-T Recommendation Q.1950 (2002), *Bearer independent call bearer control protocol*.

– ANSI T1.206-1994, *Digital exchanges and PBXs – Digital circuit loopback test line with NxDS0 capability*.

– ANSI T1.207-2000, *Operations, Administration, Maintenance and Provisioning (OAM&P) – Terminating Test Line Access and Capabilities*.

– TTC Standard JJ-90-10 Ver4, *Common Interface for Intercarrier (Appendix A)*.

3 Definitions

This Recommendation defines the following terms:

3.1 **Add/Move/Modify (AMM)**: commands as defined by ITU-T Rec. H.248.1.

3.2 **Modify/Move (MM)**: commands as defined by ITU-T Rec. H.248.1.

4   Abbreviations

This Recommendation uses the following abbreviations:

ANSI   American National Standards Institute

ATME   Automatic Test and Measurement Equipment

CMS   Circuit Multiplication Systems

MG   Media Gateway

MGC   Media Gateway Controller

PCM   Pulse Code Modulation

TE   Test Equipment

TTC   Telecommunication Technology Committee

5   Test System Architecture and flows

Figure 1 gives an example of a test system architecture in a split MGC/MG switching centre with the test equipment separate from the Switching Centre.
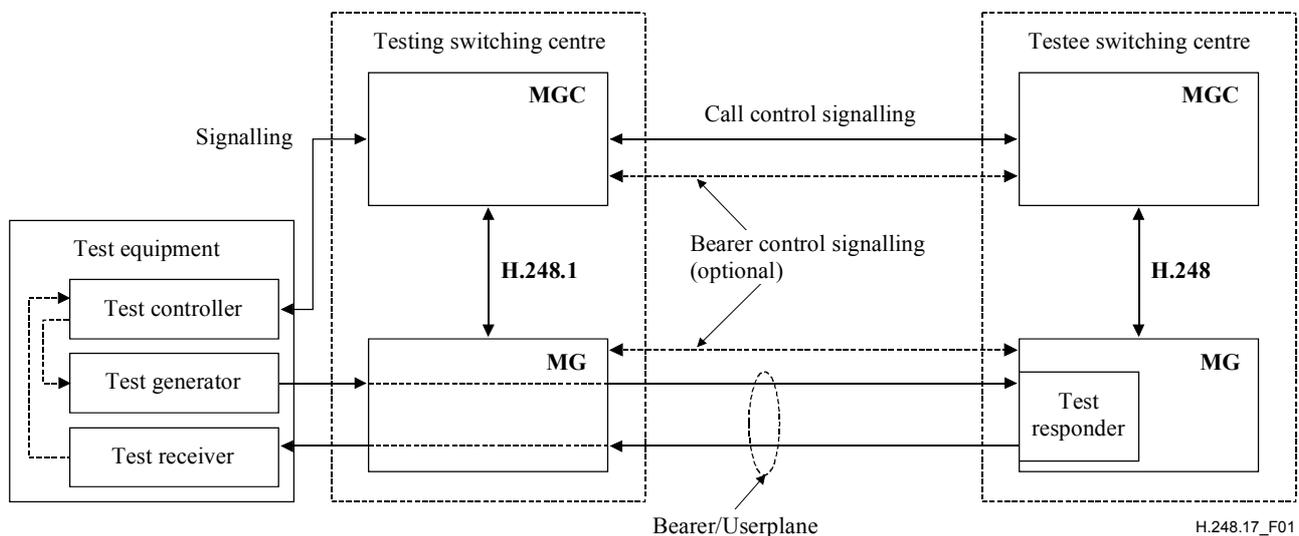
Figure 1/H.248.17 – Test system architecture (TE separate)

In Figure 1, the functionality of the test responder in the Testee Switching Centre may be implemented through the procedures defined in clause 8. This Recommendation does not give guidance on implementing the Testing Switching Centre, nor the Test Equipment for the example shown in Figure 1.

Figure 2 gives an illustration of a test system architecture in a split MGC/MG switching centre with the test equipment combined with the Switching Centre.
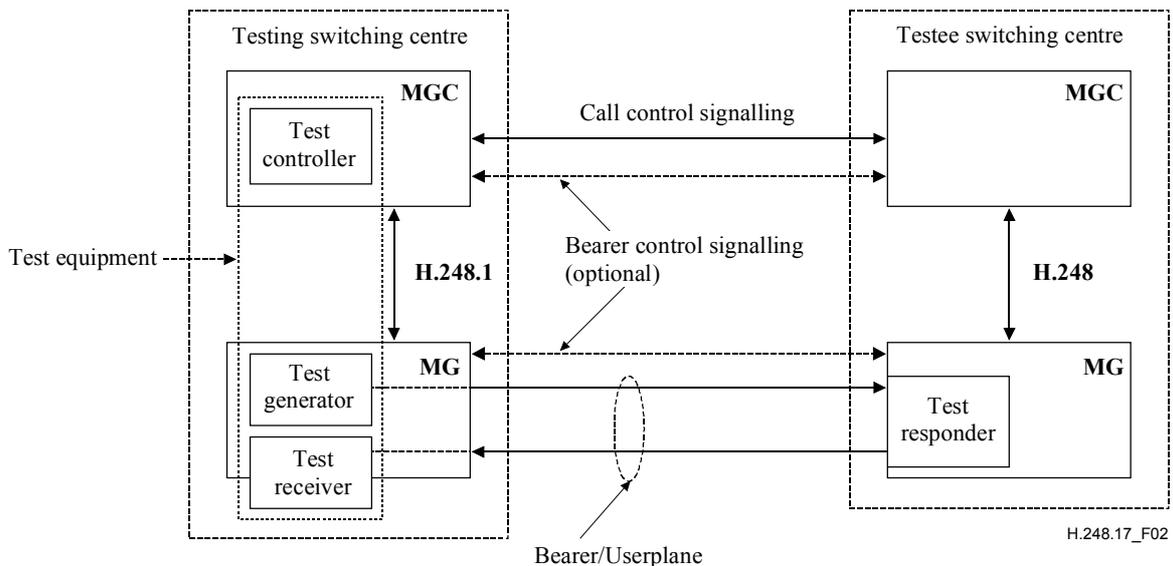
Figure 2/H.248.17 – Test system architecture (TE combined)

In Figure 2, the functionality of the test controller, test generator and test responder in the Testee Switching Centre may be implemented through the procedures defined in clauses 7 and 8.

In certain scenarios, the role of the Testing and Testee switching centres may be combined into one switching centre, for example, to test the successful addition of new components (routes, MGs) to a switching centre. The examples in the above figures are not exhaustive and other test architectures may be implemented by using the test components and procedures from this Recommendation.

This Recommendation describes the use of various H.248.1, packages, signals, parameters and procedures across the MGC/MG interface in the Testee switching centre. The MGC/MG interface is common to both the TE combined and TE separated architectures depicted above. This Recommendation also describes the test procedures across the MGC/MG interface between the test controller and test generator in the Testing switching centre in the architecture with TE combined.

This Recommendation does not provide any guidance on the procedures and H.248.1 information elements used across the MGC/MG interfaces for normal H.248.1 connection establishment procedures. The procedures and information elements used across the interface will be dictated by the call control used. This Recommendation does not provide guidance as to what point in a call control signalling the line test components should be sent. This information is provided in the relevant Line Test Recommendations e.g. ITU-T Rec. O.11 and ANSI T1.207-2000.

At the Switching centres the MGC may use of a number of test components to complete a certain line test. Clause 6 provides details of these test components. Clause 7 provides the procedures to initiate the relevant line tests. Clause 8 provides the procedures to respond to the relevant line test. The Test Components and Line Tests procedures are documented according to the standard they are defined in.

Figure 3 is an example of test the 1.5.1/O.11 test "Analogue Loopback Test Line". It shows how the line test components as assembled to form a response to a line test.
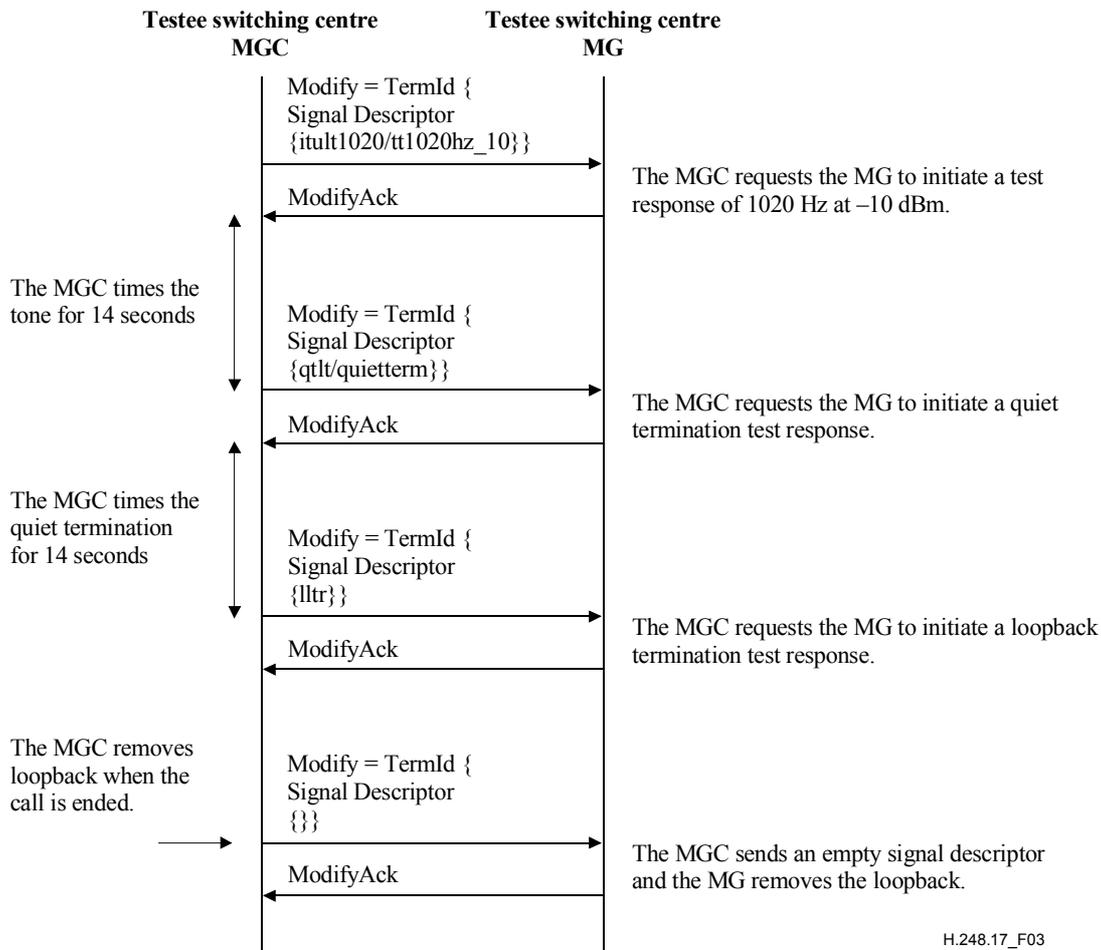
Figure 3/H.248.17 – Analogue loopback test call flow

6 Line test components

This clause defines the components that are used by the different line test variants to complete a full line testing procedure. The individual line test components are described in separate packages so that the support of one test component does not mandate the support of other test components.

6.1 Common line tests components for ANSI, ITU-T and TTC

This clause lists Test Tone Components used in several Line Tests. The following packages and signals are applicable for ANSI, ITU-T and TTC line tests.

6.1.1 Quiet termination test component

Package Name: Quiet Termination Line Test Component

PackageID: qtlt (0x0053)

Description:

> This package defines a generic line test component for Quiet Line Test functionality. For example: Quiet Termination as defined in 2.3.1/Q.551 and ITU-T Rec. G.711.

Version: 1

Extends: None

6.1.1.1   Properties

None.

6.1.1.2   Events

None.

6.1.1.3   Signals

6.1.1.3.1   Quiet termination test component

SignalID: quietterm (0x0001)

Description:

Quiet Termination (also called zero pattern) is applied to the termination that is a PCM signal corresponding to decoder output value 0 (μ-law) or output value 1 (A-law), with the sign bit in a fixed state that should be applied to the exchange test point. A-law has pattern 0x80 with decoder value 1 and μ-law has pattern 0xFF with decoder value 0.

SignalType: On/Off

Duration: N/A

Additional Parameters: None

6.1.1.4   Statistics

None.

6.1.1.5   Procedures

When the MGC wants MG to apply quiet termination, an AMM command is sent to the MG containing signal descriptor with the quietterm signal. Physical characteristics of the Quiet Termination are provisioned in the MG.

6.1.2   Loopback line test response

Package Name: Loopback Line Test Response

PackageID: lltr (0x0054)

Description:

This package defines a generic line test component for Loopback Line Test functionality.

Version: 1

Extends: None

6.1.2.1   Properties

None.

6.1.2.2   Events

None.

6.1.2.3   Signals

6.1.2.3.1 Loopback line test component

SignalID: loopback (0x0001)

Description:

SignalType: On/Off

Duration: N/A

Additional Parameters:

      Attenuation Level (optional)

      ParameterID: attlevel (0x0001)

      Type: Enumeration

      Possible Values: "0 dBm"   (0x0001) [Default]

                     "10 dBm"   (0x0002) 5.1.7/T1.207-2000

6.1.2.4   Procedures

When the MGC wants the MG to connect loopback, the MGC sends a signal descriptor with the lltr (Loopback Line Test Response) signal. Upon reception of a command with the lltr signal, the MG applies a loopback, where any incoming information shall be treated according to 1.5/O.11 or ANSI T1.207-2000, clause 5.2.1, as appropriate.

Loopback can be stopped at any time by MGC sending an empty Signal Descriptor in a Modify command or by application of a new signal.

6.2   ITU-T line tests components

6.2.1   ITU-T 404 Hz line test package

Package Name: ITU-T 404 Hz Line Test package

PackageID: itult404 (0x0055)

Description:

      This package defines a generic line test component for an ITU-T 404 Hz Test Tone for ITU-T Line Test functionality.

Version: 1

Extends: None

6.2.1.1   Properties

None.

6.2.1.2   Events

None.

6.2.1.3   Signals

6.2.1.3.1 Test tone 404 Hz −10 dBm0

SignalID: tt404hz_10 (0x0001)

Description:

      Generate line test tone of 404 Hz at −10 dBm0 according to 9.1.1/O.22.

SignalType: On/Off

Duration: N/A

Additional Parameters: None

6.2.1.4   Statistics

None.

6.2.1.5   Procedures

The MGC shall send an AMM command with the above the signal to initiate a test tone component of the indicated frequency. Clauses 7.1 and 8.1 describe how the test tone components are used to complete a line test.

6.2.2   ITU-T 816 Hz line test package

Package Name: ITU-T 816 Hz Line Test package

PackageID: itult816 (0x0056)

Description:

      This package defines a generic line test component for an ITU-T 816 Hz Test Tone for ITU Line Test functionality.

Version: 1

Extends: None

6.2.2.1   Properties

None.

6.2.2.2   Events

None.

6.2.2.3   Signals

6.2.2.3.1 Test tone 816 Hz −10 dBm0

SignalID: tt816hz_10 (0x0001)

Description:

      Generate line test tone of 816 Hz at −10 dBm0 according to clause 3/O.6.

SignalType: On/Off

Duration: N/A

Additional Parameters: None

6.2.2.4   Statistics

None.

6.2.2.5   Procedures

The MGC shall send an AMM command with the above the signal to initiate a test tone component of the indicated frequency. Clauses 7.1 and 8.1 describe how the test tone components are used to complete a line test.

6.2.3 ITU-T 1020 Hz line test package

Package Name: ITU-T 1020 Hz Line Test package

PackageID: itult1020 (0x0057)

Description:

> This package defines a generic line test component for an ITU-T 1020 Hz Test Tone for ITU-T Line Test functionality.

Version: 1

Extends: None

6.2.3.1 Properties

None.

6.2.3.2 Events

None.

6.2.3.3 Signals

6.2.3.3.1 Test tone 1020 Hz

SignalID: tt1020hz (0x0001)

Description:

> Generate line test tone of 1020 Hz at –10 dBm0 according to clause 3/O.6.

SignalType: On/Off

Duration: N/A

Additional Parameters: None

6.2.3.4 Statistics

None.

6.2.3.5 Procedures

The MGC shall send an AMM command with the above the signal to initiate a test tone component of the indicated frequency. Clauses 7.1 and 8.1 describe how the test tone components are used to complete a line test.

6.2.4 ITU-T 2100 Hz disable tone line test package

Package Name: ITU-T 2100 Hz Disable Tone Line Test package

PackageID: itultdist (0x0058)

Description:

> This package defines a generic line test component for an ITU-T 2100 Hz Disable Tone for ITU-T Line Test functionality.

Version: 1

Extends: None

6.2.4.1 Properties

None.

6.2.4.2   Events

None.

6.2.4.3   Signals

6.2.4.3.1 Test tone 2100 Hz disable tone

SignalID: tt2100hz_dis (0x0001)

Description:

Generate line test tone of 2100 Hz at −12 dBm0 according to 9.4.1 b)/O.22.

SignalType: On/Off

Duration: N/A

Additional Parameters: None

6.2.4.4   Statistics

None.

6.2.4.5   Procedures

The MGC shall send an AMM command with the above the signal to initiate a test tone component of the indicated frequency. Clauses 7.1 and 8.1 describe how the test tone components are used to complete a line test.

6.2.5   ITU-T 2100 Hz disable echo canceller tone line test package

Package Name: ITU-T 2100 Hz Disable Echo Canceller Tone Line Test package

PackageID: itultdisecd (0x0059)

Description:

This package defines a generic line test component for an ITU-T 2100 Hz Disable Echo Canceller Tone for ITU-T Line Test functionality.

Version: 1

Extends: None

6.2.5.1   Properties

None.

6.2.5.2   Events

None.

6.2.5.3   Signals

6.2.5.3.1 Test tone 2100 Hz disable echo canceller tone

SignalID: tt2100hz_disecd (0x0001)

Description:

Generate line test tone of 2100 Hz at −12 dBm0 according to 9.4.1 c)/O.22.

SignalType: On/Off

Duration: N/A

Additional Parameters: None

6.2.5.4 Statistics

None.

6.2.5.5 Procedures

The MGC shall send an AMM command with the above the signal to initiate a test tone component of the indicated frequency. Clauses 7.1 and 8.1 describe how the test tone components are used to complete a line test.

6.2.6 ITU-T 2804 Hz tone line test package

Package Name: ITU-T 2804 Hz Tone Line Test package

PackageID: itult2804 (0x005a)

Description:

> This package defines a generic line test component for an ITU-T 2804 Hz Tone for ITU-T Line Test functionality.

Version: 1

Extends: None

6.2.6.1 Properties

None.

6.2.6.2 Events

None.

6.2.6.3 Signals

6.2.6.3.1 Test tone 2804 Hz –10 dBm0

SignalID: tt2804hz_10 (0x0001)

Description:

> Generate line test tone of 2804 Hz at –10 dBm0 according to 9.1.1 and 9.3/O.22.

SignalType: On/Off

Duration: N/A

Additional Parameters: None

6.2.6.4 Statistics

None.

6.2.6.5 Procedures

The MGC shall send an AMM command with the above the signal to initiate a test tone component of the indicated frequency. Clauses 7.1 and 8.1 describe how the test tone components are used to complete a line test.

6.2.7 ITU-T noise test tone line test package

Package Name: ITU-T Noise Test Tone Line Test package

PackageID: itultntt (0x005b)

Description:

This package defines a generic line test component for an ITU-T Noise Test Tone for ITU-T Line Test functionality.

Version: 1

Extends: None

6.2.7.1 Properties

None.

6.2.7.2 Events

None.

6.2.7.3 Signals

6.2.7.3.1 Noise test tone

SignalID: ttnoise (0x0001)

Description:

Generate line test tone of noise at −12 dBm0 according to 9.4.1 e)/O.22.

SignalType: On/Off

Duration: N/A

Additional Parameters: None

6.2.7.4 Statistics

None.

6.2.7.5 Procedures

The MGC shall send an AMM command with the above the signal to initiate a test tone component of the indicated frequency. Clauses 7.1 and 8.1 describe how the test tone components are used to complete a line test.

6.2.8 ITU-T digital pseudo random test tone line test package

Package Name: ITU-T Digital Pseudo Random Test Tone Line Test package

PackageID: itultdprt (0x005c)

Description:

This package defines a generic line test component for an ITU-T Digital Pseudo Random Test Tone for ITU-T Line Test functionality.

Version: 1

Extends: None

6.2.8.1 Properties

None.

6.2.8.2 Events

None.

6.2.8.3 Signals

6.2.8.3.1 Test tone digital pseudo random

SignalID: ttrandom (0x0001)

Description:

    Generate line test of a pseudo random digital signal according to clause 2/O.152.

SignalType: On/Off

Duration: N/A

Additional Parameters: None

6.2.8.4 Statistics

None.

6.2.8.5 Procedures

The MGC shall send an AMM command with the above the signal to initiate a test tone component of the indicated frequency. Clauses 7.1 and 8.1 describe how the test tone components are used to complete a line test.

6.2.9 ITU-T ATME No. 2 test line response package

Package Name: ITU-T ATME No. 2 Test Line Response package

PackageID: itultatme2 (0x005d)

Description:

    This package defines a generic line test component for an ITU-T ATME No. 2 Test Line Response for ITU-T Line Test functionality.

Version: 1

Extends: None

6.2.9.1 Properties

None.

6.2.9.2 Events

None.

6.2.9.3 Signals

6.2.9.3.1 ATME No. 2 test lines response

SignalID: atme2res (0x0001)

Description:

    Generate line test ATME No.2 response as defined in clause 1.7/O.11.

SignalType: On/Off

Duration: N/A

Additional Parameters:

Response type (optional)

ParameterID: resp (0x0001)

Type: Enumeration

Possible Values: "type_a"   (0x0001) 1.7 a)/O.11.

"type_b"   (0x0002) 1.7 b)/O.11.

NOTE – For ATME Type c see 8.1.1.7.

6.2.9.4   Statistics

None.

6.2.9.5   Procedures

The MGC shall send an AMM command with the above the signal to initiate a test tone component of the indicated frequency. Clauses 7.1 and 8.1 describe how the test tone components are used to complete a line test.

6.3   ANSI line test components

6.3.1   ANSI 1004 Hz test tone line test package

Package Name: ANSI 1004 Hz Test Tone Line Test package

PackageID: ansilt1004 (0x005e)

Description:

This package defines a generic line test component for an ANSI 1004 Hz Test Tone for ANSI Line Test functionality.

Version: 1

Extends: None

6.3.1.1   Properties

None.

6.3.1.2   Events

None.

6.3.1.3   Signals

6.3.1.3.1 Test tone 1004 Hz

SignalID: tt1004hz (0x0001)

Description:

Generates a line test tone of 1004 Hz according as defined in clauses 5.1.1.2 and 5.1.3.1 of T1.207-2000. Depending on the test tone device a 1000, 1004 or 1013 Hz tone may be generated at 0, 2 or 3 dBm. The default is to provide a 1004 Hz 0 dBm tone.

SignalType: On/Off

Duration: N/A

Additional Parameters:

      Level (optional)

      ParameterID: level (0x0001)

      Type: Enumeration

      Possible Values: "0dBm"   (0x0001) 3.1.3.1/T1.207-2000 [Default]

                           "2dBm"   (0x0002) 3.1.3.1/T1.207-2000

                           "3dBm"   (0x0003) 3.1.3.1/T1.207-2000

                           "–10dBm" (0x0004) 5.1.7/T1.207-2000

6.3.1.4 Statistics

None.

6.3.1.5 Procedures

The MGC shall send an AMM command with the above the signal to initiate a test tone component of the indicated frequency. Clauses 7.2 and 8.2 describe how the test tone components are used to complete a line test.

6.3.2 ANSI test responder line test package

Package Name: ANSI Test Responder Line Test package

PackageID: ansilttres (0x005f)

Description:

      This package defines a generic line test component for an ANSI Test Responses for ANSI Line Test functionality.

Version: 1

Extends: None

6.3.2.1 Properties

None.

6.3.2.2 Events

None.

6.3.2.3 Signals

6.3.2.3.1 Test responders

SignalID: res (0x0001)

Description:

      Performs the 105-type responder role as defined in 5.1.5.1/T1.207-2000.

SignalType: On/Off

Duration: N/A

Additional Parameters:

      Responder Type

      ParameterID: rt (0x0001)

      Type: Enumeration

Possible Values: "51B" (0x0001)

"52" (0x0002)

"56A" (0x0003)

"RTTU" (0x0004)

"RMS-D" (0x0005)

6.3.2.4 Statistics

None.

6.3.2.5 Procedures

The MGC shall send an AMM command with the above the signal to initiate a test tone component of the indicated frequency. Clauses 7.2 and 8.2 describe how the test tone components are used to complete a line test.

6.3.3 ANSI 2225 Hz test progress tone line test package

Package Name: ANSI 2225 Hz Test Progress Tone Line Test package

PackageID: ansilt2225 (0x0060)

Description:

This package defines a generic line test component for an ANSI 2225 Hz Test Progress Tone for ANSI Line Test functionality.

Version: 1

Extends: None

6.3.3.1 Properties

None.

6.3.3.2 Events

None.

6.3.3.3 Signals

6.3.3.3.1 Test progress tone 2225 Hz

SignalID: tt2225Hz (0x0001)

Description:

Generates a test progress tone of 2225 Hz at –10 dBm0 as defined in 5.1.5/T1.207-2000.

SignalType: On/Off

Duration: N/A

Additional Parameters: None

6.3.3.4 Statistics

None.

6.3.3.5 Procedures

The MGC shall send an AMM command with the above the signal to initiate a test tone component of the indicated frequency. Clauses 7.2 and 8.2 describe how the test tone components are used to complete a line test.

6.3.4 ANSI digital test signal line test package

Package Name: ANSI Digital Test Signal Line Test package

PackageID: ansiltdts (0x0061)

Description:

This package defines a generic line test component for an ANSI Digital Test Signal for ANSI Line Test functionality.

Version: 1

Extends: None

6.3.4.1 Properties

None.

6.3.4.2 Events

None.

6.3.4.3 Signals

6.3.4.3.1 Digital test signal

SignalID: digtestsig (0x0001)

Description:

Generates digital test signals as defined in 5.2.1/T1.207-2000.

SignalType: On/Off

Duration: N/A

Additional Parameters: None

6.3.4.4 Statistics

None.

6.3.4.5 Procedures

The MGC shall send an AMM command with the above the signal to initiate a test tone component of the indicated frequency. Clauses 7.2 and 8.2 describe how the test tone components are used to complete a line test.

6.3.5 ANSI inverting loopback line test response

Package Name: ANSI Inverting Loopback Line Test Response

PackageID: ansiinvlltr (0x0062)

Description:

This package defines a generic line test component for Inverting Loopback Line Test functionality.

Version: 1

Extends: None

6.3.5.1 Properties

None.

6.3.5.2   Events

None.

6.3.5.3   Signals

6.3.5.3.1   Inverting loopback test response

SignalID: invloopback (0x0001)

Description:

        Generates an Inverting Loopback Test Response according to 5.2.2/T1.207-2000.

SignalType: On/Off

Duration: N/A

Additional Parameters: None

6.3.5.4   Procedures

When the MGC wants the MG to connect an inverting loopback as defined in 5.2.2/T1.207-2000 the MGC sends a signal descriptor with the "ansiinvlltr/invloopback" (Inverting Loopback Line Test Response) signal. Upon reception of a command with the "ansiinvlltr/invloopback" signal, the MG applies an inverting loopback where any incoming information shall be treated according to 5.2.2/T1.207-2000.

Inverting loopback can be stopped at any time by MGC sending an empty Signal Descriptor in a Modify command, or by application of a new signal.

6.4   TTC line test components

The TTC Line Tests use test components from A.8/Q.1950 packages, "Basic Call Progress Tones Generator with Directionality", and generic test components defined in this Recommendation (see 8.3).

7   Line test procedures at the testing switching centre

This clause details test procedures that may be initiated by the Testing Switching Centre. The MGC may determine the relevant line test to perform according to operator command.

The MGC is responsible for implementing the delays between the receipt of off hook and the generation of signals. The MGC is also responsible for implementing periodic interruptions to line tests.

7.1   ITU-T

7.1.1   Test line types according to ITU-T Rec. O.11

ITU-T Rec. O.11 describes test responder behaviour. For a description of this behaviour see clause 9.

7.1.2   Automatic testing measuring equipment according to ITU-T Rec. O.22

7.1.2.1   Absolute power level measurements 3.1/O.22

To provide the procedures of 3.1.1/O.22 over an MCG/MG interface, the MGC at the access point at the input to the path to be measured shall request the MG via the signals, "itult404/tt404hz", "itult1020/tt1020hz_10", "itult2804/tt2804hz_10" to initiate tones of the indicated frequencies.

7.1.2.2   Noise measurements 3.2/O.22

To provide the procedures of 3.2.1/O.22 over an MCG/MG interface, the MGC at the access point at the input to the path to be measured shall:

•   request the MG via signal "qtlt/quietterm" to initiate a quiet termination or;

•   request the MG via signal "itult2804/tt2804hz_10" to initiate a tone.

7.1.2.3   Signal-to-total-distortion ratio measurements 3.3/O.22

To provide the procedures of 3.3.1/O.22 over an MCG/MG interface, the MGC at the access point at the input to the path to be measured shall request the MG via the signal "itult1020/tt1020hz", to initiate tones for Signal-total-distortion ratio measurement. The MG may decide to use levels −10 dBm0, −25 dBm0 or 0 dBm0.

7.1.2.4   Echo canceller testing system 3.4/O.22

These tests may be achieved through normal call establishment procedures between the MGC and MG. The use of echo cancellation equipment may be specified as per E.13.1/H.248.1. The subclauses below specify the behaviour of individual tests.

7.1.2.4.1   Absolute power level measurements 3.4.1/O.22

To provide the procedures of 3.4.1/O.22 over an MCG/MG interface, the MGC at the access point at the input to the path to be measured shall request the MG via the signals, "itult1020/tt1020hz_10", "itultdis/tt2100hz_dis", "itultdisecd/tt2100hz_disecd", "itult2804/tt2804hz_10", "itultntt/noise" to initiate tones of the indicated frequencies.

7.1.2.4.2   Noise measurements 3.4.2/O.22

As per 7.1.2.2.

7.1.2.4.3   Echo performance ratio measurements 3.4.3/O.22

To provide the procedures of 3.4.3/O.22 over an MCG/MG interface, the MGC at the access point at the input to the path to be measured shall request the MG, via the signals "itultntt/ttnoise", to initiate noise test signal.

7.1.2.5   Digital test pattern tests to a digital loopback test line 3.5.1/O.22

To provide the procedures of 3.5.1/O.22 over an MCG/MG interface, the MGC at the access point at the input to the path to be measured shall request the MG, via the signals "itultdprt/ttrandom", to initiate pseudo-random digital test signal. At the access point where the loopback is to be initiated, the procedures of 8.1.1.5 apply.

7.1.2.6   Transmission tests to a digital loopback test line 3.5.2/O.22

To provide the procedures of 3.5.2/O.22 over an MCG/MG interface, the MGC at the access point at the input to the path to be measured shall request the MG, via the signals "itult404/tt404hz", "itult1020/tt1020hz_10", "itultdis/tt2100hz_dis", "itultdisecd/tt2100hz_disecd" or "itult2804/tt2804hz_10", to initiate tones of the indicated frequency. At the access point where the loopback is to be initiated, the procedures of 8.1.1.5 apply.

7.2   ANSI

7.2.1   100-type test lines – Quiet termination 5.1.1.1/T1.207-2000

This line test procedure is used in a responding role, see 8.2.1.

7.2.2   100-type test lines – 1000 Hz (milliwatt) Test tone 5.1.1.2/T1.207-2000

This line test procedure is used in a responding role, see 8.2.2.

7.2.3 101-type test line – Communications 5.1.2/T1.207-2000

These tests may be achieved through normal call establishment procedures between the MGC and MG. No line test components are used.

7.2.4 102-type test line – Milliwatt 5.1.3/T1.207-2000

This line test procedure is used in a responding role, see 8.2.4.

7.2.5 104-type test line 5.1.4/T1.207-2000

Not applicable to the MGC/MG interface as test pads are contained in a remote office.

7.2.6 105-type test line – Automatic transmission measuring 5.1.5/T1.207-2000

This line test procedure is used in a responding role, see 8.2.6.

7.2.7 107-type line test – Data transmission test line 5.1.6/T1.207-2000

These tests may be achieved through normal call establishment procedures between the MGC and MG. No line test components are used.

7.2.8 109-test line – Echo canceller testing 5.17/T1.207-2000

This line test procedure is used in a responding role, see 8.2.8.

7.2.9 108-type test line – Digital non inverting loop-back 5.2.1/T1.207-2000

To provide the procedures of 5.2.1/T1.207-2000 over an MGC/MG interface at a testing switching centre, the MGC shall request the MG via the signal ansi/digtestsig in an AMM command, to initiate the digital test signals.

7.2.10 606-type test line – Digital inverting loop-back 5.2.2/T1.207-2000

No line test procedures are used as digital tests are performed by test set.

7.2.11 Operational line tests 5.3/T1.207-2000

These tests may be achieved through normal call establishment procedures between the MGC and MG. No line test components are used.

7.3 TTC line tests

See 9.3 for testee procedures.

8 Line test procedures at the testee switching centre

The MGC may determine the relevant line test to perform according to the forward addressing information provided by the appropriate signalling system.

The MGC is responsible for implementing the delays between the receipt of off hook and the generation of signals. The MGC is also responsible for implementing periodic interruptions to line tests.

8.1 ITU-T

8.1.1 Test line types according to ITU-T Rec. O.11

8.1.1.1 Quiet termination test line 1.2/O.11

To provide the procedures of 1.2/O.11 over an MGC/MG interface, the MGC shall request the MG, via the signal "itult1020/tt1020hz" in an AMM command, to initiate a 1020 Hz tone. After 13-15 seconds, the MGC shall then request the MG, via the signal "qtlt/quietterm", to initiate a

quiet termination. When the calling party disconnects, the MGC shall remove any the "qtlt/quietterm" signal.

8.1.1.2   Test and/or communications access line 1.3/O.11

These tests may be achieved through normal call establishment procedures between the MGC and MG. No line test components are used.

8.1.1.3   Echo suppressor test line 1.4/O.11

FFS.

8.1.1.4   Analogue loopback test line 1.5.1/O.11

To provide the procedures of 1.5.1/O.11 over an MGC/MG interface, the MGC shall request the MG, via the signal "itult1020/tt1020hz" in an AMM command, to initiate a 1020 Hz tone. After 13-15 seconds, the MGC shall then request the MG, via the signal "qtlt/quietterm" in a MM command, to initiate a quiet termination. After another 13-15 seconds, the MGC shall request the MG, via the signal "lltr/loopback", to loopback the local and remote ("GO" and "RETURN") sides of the termination. When the calling party releases, the MGC shall remove the loopback.

8.1.1.5   Digital loopback test line 1.5.2/O.11

To provide the procedures of 1.5.2/O.11 over an MGC/MG interface, the MGC shall request the MG, via the signal "lltr/loopback", to loopback the local and remote ("GO" and "RETURN") sides of the termination.

8.1.1.6   Echo canceller test line 1.6/O.11

These tests may be achieved through normal call establishment procedures between the MGC and MG. The use of Echo Cancellation equipment may be specified as per E.13.1/H.248.1. No line test components are used.

8.1.1.7   ATME No. 2 test lines 1.7/O.11

To provide the procedures of 1.7/O.11 over an MGC/MG interface, the MGC shall request the MG, via the signal "itultatme2/atme2res" with the appropriate response type, to initiate an ATME No. 2 response.

8.1.1.8   Busy flash signal test line 1.8/O.11

To provide the procedures of 1.8/O.11 over an MGC/MG interface, the MGC shall request the MG, via the signal "Busy Tone" (E.7.3/H.248.1), to initiate a Busy Flash Test Line response.

8.1.2   Automatic testing measuring equipment according to ITU-T Rec. O.22

For responses to ATME No. 2 line tests, see 8.1.1.7 and 8.1.1.8.

8.2   ANSI

8.2.1   100-type test lines – Quiet termination 5.1.1.1/T1.207-2000

To provide the procedures of 5.1.1.3/T1.207-2000 over an MGC/MG interface, the MGC shall request the MG, via the signal "qtlt/quietterm", to initiate a quiet termination. When the calling party disconnects, the MGC shall remove any the "qtlt/quietterm" signal.

8.2.2   100-type test lines – 1000 Hz (milliwatt) test tone 5.1.1.2/T1.207-2000

To provide the procedures of 5.1.1.3/T1.207-2000 over an MGC/MG interface, the MGC shall request the MG, via the signal "ansilt1004/tt1004hz" in an AMM command, to initiate a 1004 Hz tone. After 5.5 seconds, the MGC shall then request the MG, via the signal "qtlt/quietterm", to

initiate a quiet termination. When the calling party disconnects, the MGC shall remove any the "qtlt/quietterm" signal.

8.2.3   101-type test line – Communications 5.1.2/T1.207-2000

These tests may be achieved through normal call establishment procedures between the MGC and MG. No line test components are used.

8.2.4   102-type test line – Milliwatt 5.1.3/T1.207-2000

To provide the procedures of 5.1.3.2/T1.207-2000 over an MGC/MG interface, the MGC shall request the MG, via the signal "ansilt1004/tt1004hz" in an AMM command, to initiate a 1004 Hz tone. After the reception of the acknowledgement of the generation of the signal, the MGC shall supervise any intervals or interruptions of the test by removing the "ansilt1004/tt1004hz" and reapplying it after the necessary delay.

8.2.5   104-type test line 5.1.4/T1.207-2000

Not applicable to the MGC/MG interface as test pads are contained in a remote office.

8.2.6   105-type test line – Automatic transmission measuring 5.1.5/T1.207-2000

To provide the procedures of 5.1.5/T1.207-2000 over an MGC/MG interface at a far-end office, the MGC shall request the MG, via the signal "ansilt2225/tt2225Hz" in an AMM command, to initiate the test progress tone. When the responder becomes available, the MGC shall request the MG, via the signal "ansilttres/res", to insert the indicated test responder.

8.2.7   107-type test line – Data transmission test line 5.1.6/T1.207-2000

These tests may be achieved through normal call establishment procedures between the MGC and MG. No line test components are used.

8.2.8   109-test line – Echo canceller testing 5.1.7/T1.207-2000

To provide the procedures of 5.1.7/T1.207-2000 over an MGC/MG interface, the MGC shall request the MG, via the signal "ansilt1004/tt1004hz" (at –10 dBm) in an AMM command, to initiate a 1004 Hz tone. After approximately 8 seconds, the MGC shall then request the MG, via the signal "qtlt/quietterm", to initiate a quiet termination. After approximately 16 seconds, the MGC shall then request the MG, via the signal "qtlt/loopback" (no attenuation), to initiate a loop of the trunk. After approximately 16 seconds, the MGC shall then request the MG, via the signal "qtlt/loopback" (10 dB attenuation), to initiate a loop of the trunk with attenuation. This procedure is repeated until disconnect.

8.2.9   108-type test line – Digital non inverting loop-back 5.2.1/T1.207-2000

To provide the procedures of 5.2.1/T1.207-2000 over an MGC/MG interface at a far-end office, the MGC shall request the MG, via the signal "lltr/loopback" in an AMM command, to initiate the loopback of the incoming and outgoing direction.

8.2.10   606-type test line – Digital inverting loop-back 5.2.2/T1.207-2000

To provide the procedures of 5.2.2/T1.207-2000 over an MGC/MG interface at a far-end office, the MGC shall request the MG, via the signal "ansiinvlltr/invloopback" (indicating inverting loopback) in an AMM command, to initiate inverting loopback of the incoming and outgoing direction.

8.2.11   Operational line tests 5.3/T1.207-2000

These tests may be achieved through normal call establishment procedures between the MGC and MG. No line test components are used.

8.3 TTC line tests

8.3.1 TTC Standard JJ-90-10 Ver4, common interface for intercarrier (Appendix A)

The testee MGC can determine the test type to apply by examining the transmission medium requirement as described in JJ-90-10 Appendix A.2.2.

8.3.1.1 Loop trunk test line

To perform the line test described in JJ-90-10 Appendix A.4.2 over an MGC/MG interface, the MGC shall request the signal "lltr/loopback" to loopback the local and remote ("GO" and "RETURN") sides of the termination.

8.3.1.2 Auto Answering Trunk (AAT)

Auto Answering Trunk with forced disconnection

To perform the line test described in JJ-90-10 Appendix A.4.1 over an MGC/MG interface, the MGC shall request the MG, via the signal "bgc/brt"(A.8/Q.1950, "Basic Call Progress Tones Generator with Directionality") in an AMM command, to initiate a ringing tone. After 6 seconds the MGC shall then request the MG, via the signal "bcg/bdtq" (A.8/Q.1950), to initiate a dial tone. After reception of Modify acknowledgement, the MGC having timed the Dial Tone for a period of 10 seconds will request MG to stop Dial Tone by sending a MOD command.

Auto Answering Trunk without forced disconnection

To perform the line test described in JJ-90-10 Appendix A.4.1 over an MGC/MG interface, the MGC shall request the MG, via the signal "bcg/brt" (A.8/Q.1950, "Basic Call Progress Tones Generator with Directionality") in an AMM command, to initiate a ringing tone. After reception of Modify acknowledgement, the MGC having timed the ringing tone for a period of 6 seconds shall then request the MG via the signal "bcg/bdt" (A.8/Q.1950) to initiate a dial tone.

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