Technical Specification Group Services and System Aspects   *TSGS#13(01)0454*
Meeting #13, Beijing, China, 24-27 September 2001

Source: **TSG-SA WG4**

Title: CRs to TS 26.132 on Test signals and Bandwidth of test signals for acoustic testing (R99, Release 4 and Release 5)

Document for: **Approval**

Agenda Item: **7.4.3**

The following CRs, agreed at the TSG-SA WG4 meeting #18, are presented to TSG SA #13 for approval.

Spec	CR	Rev	Phase	Subject	Cat	Vers	WG	Meeting	S4 doc
26.132	004		REL-5	Extended scope of test signals for Ambient Noise Rejection	B	5.0.0	S4	TSG-SA WG4#18	S4-010452
26.132	006		REL-5	Restricted scope of ITU-T P.501 test signals for 3G acoustic tests	F	5.0.0	S4	TSG-SA WG4#18	S4-010517
26.132	005		R99	Bandwidth of test signals for acoustic testing	F	3.2.0	S4	TSG-SA WG4#18	S4-010516
26.132	007		REL-4	Bandwidth of test signals for acoustic testing	A	4.0.0	S4	TSG-SA WG4#18	S4-010547
26.132	008		REL-5	Bandwidth of test signals for acoustic testing	A	5.0.0	S4	TSG-SA WG4#18	S4-010548

⌘   *CR-Form-v4*

CHANGE REQUEST

| ⌘ | **26.132 CR 004** | ⌘ | ev | **-** | ⌘ | Current version: | **5.0.0** | ⌘ |

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘ (U)SIM ☐ ME/UE **X** Radio Access Network ☐ Core Network ☐

Title:	⌘	Extended scope of test signals for Ambient Noise Rejection
Source:	⌘	TSG SA WG4

Work item code:	⌘	TEI5		*Date:* ⌘	2001-09-24

Category:	⌘	**B**		*Release:* ⌘	Rel-5

Use <u>one</u> of the following categories:
   F (correction)
   A (corresponds to a correction in an earlier release)
   B (addition of feature),
   C (functional modification of feature)
   D (editorial modification)
Detailed explanations of the above categories can be found in 3GPP <u>TR 21.900</u>.

Use <u>one</u> of the following releases:
   2   (GSM Phase 2)
   R96   (Release 1996)
   R97   (Release 1997)
   R98   (Release 1998)
   R99   (Release 1999)
   REL-4 (Release 4)
   REL-5 (Release 5)

Reason for change: ⌘	Beside artificial voice P.50, which is at the moment the only allowed test signal for Ambient Noise Rejection, other speech like test signals according to ITU-T P.501 should be possible. Such an extended scope of test signals has already been specified for other test cases, like loudness ratings and frequency response.
Summary of change: ⌘	Speech like test signals according to ITU-T P.501 are added as test signals for Ambient Noise Rejection.
Consequences if not approved: ⌘	No other test signals but P.50 allowed

Clauses affected:	⌘	7

Other specs affected:	⌘	☐ Other core specifications	⌘	
		☐ Test specifications		
		☐ O&M Specifications		

Other comments:	⌘	

How to create CRs using this form:

Comprehensive information and tips about how to create CRs can be found at: http://www.3gpp.org/3G_Specs/CRs.htm. Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

7.9   Ambient Noise Rejection

Handset and Headset UE:

Note: This section applies to terminals providing narrow- and wide-band telephony. However, the procedure for measuring ambient noise rejection is defined only over narrow-band frequency range. Thus the test method for ambient noise rejection is the same for either narrow- or wide-band telephony.

a) A 1/2 inch pressure microphone is calibrated using a known sound source and mounted at the MRP, without the LRGP or HATS present. A frequency analyser is calibrated to enable the sound pressure levels at the microphone to be determined in $1/3^{rd}$ Octave bands.

b) Flood the room in which the measurement is to be made with a band limited (100 Hz to 8 kHz) pink noise to within ±3 dB. The level at MRP shall be adjusted to 70 dB(A) (-24 dBPa(A)). The tolerance on this level is +/-1 dB. The resulting sound spectrum is P_{rn} dBPa, measured in $1/3^{rd}$ Octave bands.

To ensure that the sound field is diffuse enough, the following apply:

The diffuse sound field is calibrated in the absence of any local obstacles. The averaged field shall be uniform to within +/- 3 dB within a radius of 0,15 m of the MRP, when measured in one-third octave bands from 100 Hz to 3,15 kHz.

NOTE 1: The pressure intensity index, as defined in ISO 9614, may prove to be a suitable method for assessing the diffuse field.

NOTE 2: Where more than one loudspeaker is used to produce the desired sound field, the loudspeakers must be fed with non-coherent electrical signals to eliminate standing waves and other interference effects.

c) Position the HATS or LRGP test head in the correct relative position to the MRP and mount the MS under test, according to clause 5.1.1. Recalibrate the $1/3^{rd}$ Octave frequency analyser using a known voltage source to facilitate the analysis of the voltage V_{rn}, where V_{rn} is the voltage at the audio output of the SS due to the noise spectrum input.

d) Set up a speech path between the MS and the System Simulator (SS).

e) Determine, as a function of frequency, using the frequency analyser, in $1/3^{rd}$ Octave bands (index j), the electrical output V_{jrn}, (expressed as dB rel . 1V) at the audio output of the SS for the applied acoustic pressure P_{jrn} (expressed as dB rel 1Pa) at the MRP. Since, the MS sending sensitivity is not defined above 3,4 kHz the measurement shall be cut off at 3,4 kHz. For the bands below 315 Hz, the noise level shall be referenced to the speech level at 315 Hz to yield the DELSM.

The room noise sensitivity is expressed as:- $Sm_{jrn} = V_{jrn}$ (dBV) - P_{jrn} (dBPa).

The MS ambient noise send sensitivity has now been determined.

f) The MS speech send sensitivity is now required. The required sensitivity is defined as the electrical output from the MS, measured at the audio output of the SS, as a function of the free field sound pressure at the MRP of the artificial mouth.

~~The measurement is made using an artificial speech source at the MRP of the artificial mouth.~~ The test signal to be used for the measurements shall be the artificial voice according to ITU-Recommendation P.50 or a speech like test signal as described in ITU-T Recommendation P.501. The type of test signal used shall be stated in the test report. The 1/2 inch pressure microphone is calibrated using a known sound source. The frequency analyser is calibrated to measure in $1/3^{rd}$ Octave bands. ~~The artificial mouth output shall be in accordance with the ITU-T P.50 male artificial voice. Whilst maintaining the ITU-T P.50 "male" spectrum, adjust the total signal level to -4,7 dBPa.~~ The spectrum of acoustic signal produced by the artificial mouth is calibrated under free field conditions at the MRP. The test signal level shall be –4,7 dBPa, measured at the MRP. The resulting sound spectrum is P_o dBPa, measured in $1/3^{rd}$ Octave bands. The $1/3^{rd}$ Octave frequency analyser should be re-calibrated, using a known voltage source, to facilitate the analysis of the voltage V_j. Where V_j is the voltage in each $1/3^{rd}$ octave band at the audio output of the SS due to the ~~speech spectrum~~ test signal input. Set up a speech path between the MS and the SS. Determine the function of frequency, using the frequency analyser, and in $1/3^{rd}$

Octave bands, the electrical output, V_j, (expressed as dB rel. 1V), at the audio output of the SS for the applied acoustic pressure, P_{j0}, (expressed as dB rel. 1Pa/V), at the MRP.

The speech sending sensitivity is expressed as:

Sm_{js} (dB) = V_j (dBV) - P_{jo} (dBPa) dBrel. 1V/Pa..

g) The difference of the room noise sensitivity and the speech sending sensitivity DELSM (Δ_{jSM}) in each 1/3rd Octave band for the MS is determined as:

Sm_{jrn} - Sm_{js} (dB)   (for j = 1 to 2, Sm_{js} = Sm_{3s}).

h) The Ambient noise rejection ANR is calculated as the single figure value according to the following formula, the ANR shall be ≥ 0dB.

$$ANR = -\frac{4}{5}\sum_{i=1}^{13}\Delta_{jSM}\cdot 10^{-0.0175W_{jsi}}$$

j   = The index of third octave bands centered at frequencies from 200 Hz to 3 150 Hz inclusive.

Wjsi = The sending weighting factors from ITU-T Recommendation P.79 [16], table 1 for the jth 1/3rd Octave band centre frequency.

Hands-free UE (all categories):

For further study

CR-Form-v3

CHANGE REQUEST

⌘ **26.132** CR **005** ⌘ rev ⌘ Current version: **3.2.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘ (U)SIM ☐ ME/UE **X** Radio Access Network ☐ Core Network ☐

Title: ⌘	Bandwidth of test signals for acoustic testing.	
Source: ⌘	TSG SA WG4	
Work item code: ⌘	TEI	***Date:*** ⌘ 24-Sep-2001
Category: ⌘	**F**	***Release:*** ⌘ R99

Use one of the following categories:
  F (correction)
  A (corresponds to a correction in an earlier release)
  B (Addition of feature),
  C (Functional modification of feature)
  D (Editorial modification)
Detailed explanations of the above categories can
be found in 3GPP TR 21.900.

Use one of the following releases:
  2   (GSM Phase 2)
  R96   (Release 1996)
  R97   (Release 1997)
  R98   (Release 1998)
  R99   (Release 1999)
  REL-4   (Release 4)
  REL-5   (Release 5)

Reason for change: ⌘	Inconsistency between test signal specification and requirements
Summary of change: ⌘	Band-limiting of test signals changed to match bandwidth of requirements.
Consequences if not approved: ⌘	Not possible to test requirements according to TS 26.131.

Clauses affected: ⌘	5.4

Other specs ⌘ ☐ Other core specifications ⌘
affected: ☐ Test specifications
☐ O&M Specifications

Other comments: ⌘

5.4   Test signals

Due to the coding of the speech signals, standard sinusoidal test signals are not applicable for 3G acoustic tests, appropriate test signals (general description) are defined in ITU-T Recommendation P.50 and P.501. More information can be found in the test procedures described below.

For testing the narrow-band telephony service provided by a terminal the test signal used shall be band limited between ~~200~~ 100 Hz and 4 kHz with a bandpass filter providing a minimum of 24 dB/Oct. filter roll off, when feeding into the receiving direction.

For testing the wide-band telephony service provided by a terminal the test signal used shall be band limited between 100 Hz and 8 kHz with a bandpass filter providing a minimum of 24 dB/Oct. filter roll off, when feeding into the receiving direction.

The test signal levels are referred to the average level of the (band limited in receiving direction) test signal, averaged over the complete test sequence . unless specified otherwise.

CR-Form-v4

CHANGE REQUEST

⌘ **26.132 CR 006** ⌘ ᵉv **-** ⌘ Current version: **5.0.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘ (U)SIM ☐ ME/UE **X** Radio Access Network ☐ Core Network ☐

Title: ⌘	Restricted scope of ITU-T P.501 test signals for 3G acoustic tests.
Source: ⌘	TSG SA WG4

Work item code: ⌘	Terminal acoustic characteristics TEI	***Date:*** ⌘	2001-09-24

Category: ⌘	**F**	***Release:*** ⌘	Rel-5

Use one of the following categories:
* **F** (correction)
* **A** (corresponds to a correction in an earlier release)
* **B** (addition of feature),
* **C** (functional modification of feature)
* **D** (editorial modification)
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:
* 2 (GSM Phase 2)
* R96 (Release 1996)
* R97 (Release 1997)
* R98 (Release 1998)
* R99 (Release 1999)
* REL-4 (Release 4)
* REL-5 (Release 5)

Reason for change: ⌘	Test signals for 3G acoustic tests are defined in ITU-T P.50 and P.501. The wide scope of speech like test signals defined in ITU-T P.501 might cause problems to compare the results of tests, conducted with different test signals. So the scope of test signals from P.501 which are allowed to be used shall be restricted.
Summary of change: ⌘	Normative requirements for the use of test signals from P.501 are for further study. For the time being, if test signals from P.501 are used, a multisine signal is recommended.
Consequences if not approved: ⌘	Test results may depend on the test signal selected from P.501.

Clauses affected: ⌘	5.4
Other specs Affected: ⌘	☐ Other core specifications ⌘ ☐ Test specifications ☐ O&M Specifications
Other comments: ⌘	

How to create CRs using this form:

Comprehensive information and tips about how to create CRs can be found at: http://www.3gpp.org/3G_Specs/CRs.htm. Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

5.4   Test signals

Due to the coding of the speech signals, standard sinusoidal test signals are not applicable for 3G acoustic tests, appropriate test signals (general description) are defined in ITU-T Recommendation P.50 and P.501. Normative requirements for the use of test signals from P.501 are for further study. For the time being, if test signals from P.501 are used, a multisine signal is recommended. More information can be found in the test procedures described below.

CR-Form-v3

CHANGE REQUEST

| ⌘ | **26.132** CR **007** | ⌘ rev | ⌘ Current version: | **4.0.0** ⌘ |

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘   (U)SIM ☐   ME/UE **X**   Radio Access Network ☐   Core Network ☐

Title:	⌘	Bandwidth of test signals for acoustic testing.
Source:	⌘	TSG SA WG4
Work item code:	⌘ TEI4	***Date:*** ⌘ 24-Aug-2001
Category:	⌘ **A**	***Release:*** ⌘ Rel-4

Use one of the following categories: *F (correction)* *A (corresponds to a correction in an earlier release)* *B (Addition of feature),* *C (Functional modification of feature)* *D (Editorial modification)* Detailed explanations of the above categories can be found in 3GPP TR 21.900.	*Use one of the following releases:* *2 (GSM Phase 2)* *R96 (Release 1996)* *R97 (Release 1997)* *R98 (Release 1998)* *R99 (Release 1999)* *REL-4 (Release 4)* *REL-5 (Release 5)*

Reason for change:	⌘	Inconsistency between test signal specification and requirements
Summary of change:	⌘	Band-limiting of test signals changed to match bandwidth of requirements.
Consequences if not approved:	⌘	Not possible to test requirements according to TS 26.131.

Clauses affected:	⌘	5.4

Other specs affected:	⌘ ☐ ☐ ☐	Other core specifications Test specifications O&M Specifications	⌘

Other comments:	⌘	

5.4   Test signals

Due to the coding of the speech signals, standard sinusoidal test signals are not applicable for 3G acoustic tests, appropriate test signals (general description) are defined in ITU-T Recommendation P.50 and P.501. More information can be found in the test procedures described below.

For testing the narrow-band telephony service provided by a terminal the test signal used shall be band limited between 200 100 Hz and 4 kHz with a bandpass filter providing a minimum of 24 dB/Oct. filter roll off, when feeding into the receiving direction.

For testing the wide-band telephony service provided by a terminal the test signal used shall be band limited between 100 Hz and 8 kHz with a bandpass filter providing a minimum of 24 dB/Oct. filter roll off, when feeding into the receiving direction.

The test signal levels are referred to the average level of the (band limited in receiving direction) test signal, averaged over the complete test sequence . unless specified otherwise.

CR-Form-v3

CHANGE REQUEST

| ⌘ | **26.132** CR **008** | ⌘ rev | ⌘ Current version: | **5.0.0** ⌘ |

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘   (U)SIM ☐   ME/UE **X**   Radio Access Network ☐   Core Network ☐

Title:	⌘	Bandwidth of test signals for acoustic testing.
Source:	⌘	TSG SA WG4
Work item code:	⌘ TEI5	***Date:*** ⌘ 24-Sep-2001
Category:	⌘ **A**	***Release:*** ⌘ Rel-5

Use one of the following categories:
   F *(correction)*
   A *(corresponds to a correction in an earlier release)*
   B *(Addition of feature),*
   C *(Functional modification of feature)*
   D *(Editorial modification)*
Detailed explanations of the above categories can
be found in 3GPP TR 21.900.

Use one of the following releases:
   2   (GSM Phase 2)
   R96   (Release 1996)
   R97   (Release 1997)
   R98   (Release 1998)
   R99   (Release 1999)
   REL-4 (Release 4)
   REL-5 (Release 5)

Reason for change:	⌘	Inconsistency between test signal specification and requirements
Summary of change:	⌘	Band-limiting of test signals changed to match bandwidth of requirements.
Consequences if not approved:	⌘	Not possible to test requirements according to TS 26.131.

Clauses affected:	⌘	5.4

Other specs affected:	⌘	☐ Other core specifications	⌘	
		☐ Test specifications		
		☐ O&M Specifications		

Other comments:	⌘	

5.4   Test signals

Due to the coding of the speech signals, standard sinusoidal test signals are not applicable for 3G acoustic tests, appropriate test signals (general description) are defined in ITU-T Recommendation P.50 and P.501. More information can be found in the test procedures described below.

For testing the narrow-band telephony service provided by a terminal the test signal used shall be band limited between ~~200~~ 100 Hz and 4 kHz with a bandpass filter providing a minimum of 24 dB/Oct. filter roll off, when feeding into the receiving direction.

For testing the wide-band telephony service provided by a terminal the test signal used shall be band limited between 100 Hz and 8 kHz with a bandpass filter providing a minimum of 24 dB/Oct. filter roll off, when feeding into the receiving direction.

The test signal levels are referred to the average level of the (band limited in receiving direction) test signal, averaged over the complete test sequence . unless specified otherwise.