Technical Specification Group Services and System Aspects
Meeting #7, Madrid, Spain, March 15-17, 2000

TSGS#7(00)0025
Agenda Item: 5.4.3

Source **TSG-S4**

Title **11 CRs on AMR**

S4 Tdoc.	Spec.	Ver.	CR	Rev.	Cat.	Rel.	Subject
S4-000023	06.73	7.3.0	A021		F	R98	Avoidance of pulse cancellation in FCB excitation
S4-000032	26.073	3.0.0	001		F	R99	Avoidance of pulse cancellation in FCB excitation
S4-000006	06.75	7.1.0	A002		D	R98	Threshold and Hysteresis for Exp. 4a and 4b
S4-000007	06.75	7.1.0	A003		D	R98	Introduction of Annex D (AMR Performances as a function of FER/RBER)
S4-000139	26.101	3.0.0	001		F	R99	Correction of indices in Annex B table
S4-000140	26.101	3.0.0	002		F	R99	Addition of comfort noise bit ordering
S4-000141	26.101	3.0.0	003		F	R99	Correction of table indexing for AMR Core Frame class division
S4-000168	26.101	3.0.0	004		F	R99	Clarification of bit transmission order for AMR frame structure parameters for AMR IF1
S4-000193	26.102	3.0.0	001	3	C	R99	Introduction of QoS parameters used at RAB assignment
S4-000067	26.102	3.0.0	002		C	R99	Introduction of different RFCS set on Iu User Plane
S4-000177	26.102	3.0.0	003	2	B	R99	Introduction of Time Alignment

Document S4-000023
e.g. for 3GPP use the format TP-99xxx
or for SMG, use the format P-99-xxx

CHANGE REQUEST

Please see embedded help file at the bottom of this page for instructions on how to fill in this form correctly.

06.73	**CR**	**A021**	Current Version:	7.3.0 (R98)

GSM (AA.BB) or 3G (AA.BBB) specification number ↑ *↑ CR number as allocated by MCC support team*

For submission to:	TSG-SA#7	for approval	X	strategic	X	*(for SMG use only)*
List expected approval meeting # here ↑		for information		non-strategic		

Form: CR cover sheet, version 2 for 3GPP and SMG *The latest version of this form is available from: ftp://ftp.3gpp.org/Information/CR-Form-v2.doc*

Proposed change affects: *(at least one should be marked with an X)*	(U)SIM		ME	X	UTRAN / Radio	X	Core Network	

Source:	TSG-S4	**Date:**	15.03.2000
Subject:	Avoidance of pulse cancellation in FCB excitation		
Work item:	AMR		

Category:	F	Correction	X	**Release:**	Phase 2	
	A	Corresponds to a correction in an earlier release			Release 96	
(only one category	B	Addition of feature			Release 97	
Shall be marked	C	Functional modification of feature			Release 98	X
With an X)	D	Editorial modification			Release 99	
					Release 00	

Reason for change:

The MR59 FCB allows for both tracks to have their pulse in the same position. When this occurs, the pulses are added. In the case of opposite signs the pulses may cancel each other. As both in encoder and decoder the excitation gain is calculated by normalising with the energy of the pulse excitation, a division by a very small number may occur giving rise to an extremely high gain value.
On non-ideal channels, excitation pulse cancellation may occur in the decoder as a result of transmission errors of the pulse positions even though the encoder has chosen two distinct pulse positions. This can result in annoying effects in the decoded speech signal.
As a solution, it is suggested to merely allow single pulse amplitudes rather than adding the pulse amplitudes if the two pulses have the same position.

Clauses affected: C code file c2_11pf.c and d2_11pf.c

Other specs Affected:	Other 3G core specifications		→ List of CRs:	
	Other GSM core specifications		→ List of CRs:	
	MS test specifications		→ List of CRs:	
	BSS test specifications		→ List of CRs:	
	O&M specifications		→ List of CRs:	

Other comments:

help.doc

<--------- double-click here for help and instructions on how to create a CR.

1. How the code is changed

1.1 File `c2_11pf.c`

1.1.1 Before the change (lines 336..346)

```
if (j > 0)
{
   cod[i] = add(cod[i], 8191);
   _sign[k] = 32767;
   rsign = add(rsign, shl(1, track));
}
else
{
   cod[i] = sub(cod[i], 8192);
   _sign[k] = (Word16) - 32768L;
}
```

1.1.2 After the change

```
if (j > 0)
{
   cod[i] = 8191;
   _sign[k] = 32767;
   rsign = add(rsign, shl(1, track));
}
else
{
   cod[i] = -8192;
   _sign[k] = (Word16) - 32768L;
}
```

1.2 File `d2_11pf.c`

1.2.1 Before the change (lines 100..104)

```
if (i != 0) {
   cod[pos[j]] = add(cod[pos[j]], 8191);             move16 (); /* +1.0 */
} else {
   cod[pos[j]] = sub(cod[pos[j]], 8192);             move16 (); /* -1.0 */
}
```

1.2.2 After the change

```
if (i != 0) {
   cod[pos[j]] = 8191;                               move16 (); /* +1.0 */
} else {
   cod[pos[j]] = -8192;                              move16 (); /* -1.0 */
}
```

Joint SMG11/TSG-SA4 Meeting #14 / #9
Puerto Vallarta, Mexico, 24-28 January 2000

***Document* S4-000032**
e.g. for 3GPP use the format TP-99xxx
or for SMG, use the format P-99-xxx

CHANGE REQUEST

Please see embedded help file at the bottom of this page for instructions on how to fill in this form correctly.

26.073	**CR**	**001**	Current Version:	3.0.0 (R99)

GSM (AA.BB) or 3G (AA.BBB) specification number ↑ *↑ CR number as allocated by MCC support team*

For submission to:	TSG-SA#7	for approval	X	strategic		(for SMG use only)
List expected approval meeting # here ↑		For information		non-strategic		

Form: CR cover sheet, version 2 for 3GPP and SMG The latest version of this form is available from: ftp://ftp.3gpp.org/Information/CR-Form-v2.doc

Proposed change affects: *(at least one should be marked with an X)*	(U)SIM		ME	X	UTRAN / Radio	Core Network	X

Source: TSG-S4 **Date:** 16.03.2000

Subject: Avoidance of pulse cancellation in FCB excitation

Work item: AMR

Category:				**Release:**		
	F	Correction	X		Phase 2	
	A	Corresponds to a correction in an earlier release			Release 96	
(only one category	B	Addition of feature			Release 97	
Shall be marked	C	Functional modification of feature			Release 98	
With an X)	D	Editorial modification			Release 99	X
					Release 00	

Reason for change:

The MR59 FCB allows for both tracks to have their pulse in the same position. When this occurs, the pulses are added. In the case of opposite signs the pulses may cancel each other. As both in encoder and decoder the excitation gain is calculated by normalising with the energy of the pulse excitation, a division by a very small number may occur giving rise to an extremely high gain value.
On non-ideal channels, excitation pulse cancellation may occur in the decoder as a result of transmission errors of the pulse positions even though the encoder has chosen two distinct pulse positions. This can result in annoying effects in the decoded speech signal.
As a solution, it is suggested to merely allow single pulse amplitudes rather than adding the pulse amplitudes if the two pulses have the same position.

Clauses affected: C code file c2_11pf.c and d2_11pf.c

Other specs Affected:				
	Other 3G core specifications		→ List of CRs:	
	Other GSM core specifications		→ List of CRs:	
	MS test specifications		→ List of CRs:	
	BSS test specifications		→ List of CRs:	
	O&M specifications		→ List of CRs:	

Other comments:

1. How the code is changed

1.1 File `c2_11pf.c`

1.1.1 Before the change (lines 336..346)

```
if (j > 0)
{
   cod[i] = add(cod[i], 8191);
   _sign[k] = 32767;
   rsign = add(rsign, shl(1, track));
}
else
{
   cod[i] = sub(cod[i], 8192);
   _sign[k] = (Word16) - 32768L;
}
```

1.1.2 After the change

```
if (j > 0)
{
   cod[i] = 8191;
   _sign[k] = 32767;
   rsign = add(rsign, shl(1, track));
}
else
{
   cod[i] = -8192;
   _sign[k] = (Word16) - 32768L;
}
```

1.2 File `d2_11pf.c`

1.2.1 Before the change (lines 100..104)

```
if (i != 0) {
   cod[pos[j]] = add(cod[pos[j]], 8191);           move16 (); /* +1.0 */
} else {
   cod[pos[j]] = sub(cod[pos[j]], 8192);           move16 (); /* -1.0 */
}
```

1.2.2 After the change

```
if (i != 0) {
   cod[pos[j]] = 8191;                             move16 (); /* +1.0 */
} else {
   cod[pos[j]] = -8192;                            move16 (); /* -1.0 */
}
```

3GPP TSG-S4#9/SMG11#14
Puerto Vallarta, Mexico, January 24-28, 2000

***Document* S4-000006**
e.g. for 3GPP use the format TP-99xxx
or for SMG, use the format P-99-xxx

CHANGE REQUEST

Please see embedded help file at the bottom of this page for instructions on how to fill in this form correctly.

06.75	**CR**	**A002**	Current Version:	7.1.0

GSM (AA.BB) or 3G (AA.BBB) specification number ↑ *↑ CR number as allocated by MCC support team*

For submission to:	TSG-SA#7	for approval	X	strategic		*(for SMG use only)*
list expected approval meeting # here ↑		for information		non-strategic	X	

Form: CR cover sheet, version 2 for 3GPP and SMG The latest version of this form is available from: ftp://ftp.3gpp.org/Information/CR-Form-v2.doc

Proposed change affects: *(at least one should be marked with an X)*	(U)SIM		ME	X	UTRAN / Radio	X	Core Network	

Source: TSG-S4 **Date:** 15/03/00

Subject: Introduction of Thresholds and Hysteresis used for Experiments 4a & 4b

Work item: AMR

Category: *(only one category shall be marked with an X)*

F	Correction		**Release:**	Phase 2	
A	Corresponds to a correction in an earlier release			Release 96	
B	Addition of feature			Release 97	
C	Functional modification of feature			Release 98	X
D	Editorial modification	X		Release 99	
				Release 00	

Reason for change: The table providing the Thresholds and Hysteresis used during the Characterisation Phase was still not complete in the approved version of the Technical Report.

Clauses affected: 8

Other specs affected:

Other 3G core specifications		→ List of CRs:	
Other GSM core specifications		→ List of CRs:	
MS test specifications		→ List of CRs:	
BSS test specifications		→ List of CRs:	
O&M specifications		→ List of CRs:	

Other comments:

help.doc

<--------- double-click here for help and instructions on how to create a CR.

8 Performances with the Codec Adaptation turned on

Experiments 4a (Full Rate) and 4b (Half Rate) of the Characterisation phase of testing were designed to evaluate the AMR performances with the adaptation turned on in long dynamic C/I profiles representative of operational propagation conditions. Multiple C/I profile were generated simulating different behaviour of the radio channel and different slow fading effects. One profile was used to generate multiple Error Patterns representative of different Frequency Hopping operation mode: Ideal frequency hopping, non-ideal frequency hopping limited to 4 frequencies and no frequency hoping. Three different sets of codec modes were used in these Experiments. They are defined in the following table:

	Codec Modes for Experiment 4a	Codec Modes for Experiment 4b
Set #1	12.2, 7.95, 5.9	7.95, 6.7, 5.9, 5.15
Set #2	12.2, 7.95	6.7, 5.9, 4.75
Set #3	12.2, 7.40, 6.7, 5.15	7.40, 5.15

Table 8.1: Sets of codec modes for Experiment 4a & 4b

The thresholds and Hysteresis used for the codec adaptation in the different configurations are listed in the following table:

Adaptation Thresholds and Hysteresis for Experiment 4a

	Threshold 1	Hysteresis 1	Threshold 2	Hysteresis 2	Threshold 3	Hysteresis 3
Set #1	11.5 dB	2.0 dB	6.5 dB	2.0 dB		
Set #2	11.5 dB	2.0 dB				
Set #3	11.5 dB	2.0 dB	7.0 dB	2.0 dB	5.5 dB	2.0 dB

Adaptation Thresholds and Hysteresis for Experiment 4b

	Threshold 1	Hysteresis 1	Threshold 2	Hysteresis 2	Threshold 3	Hysteresis 3
Set #1	15.0 dB	2.0 dB	12.5 dB	2.5 dB	11.0 dB	2.0 dB
Set #2	12.5 dB	2.0 dB	11.0 dB	2.0 dB		
Set #3	13.5 dB	2.0 dB				

Table 8.2: Codec Mode Adaptation thresholds & Hysteresis used in Experiment 4a & 4b

The results of Experiments 4a and4b are presented in the following figures:

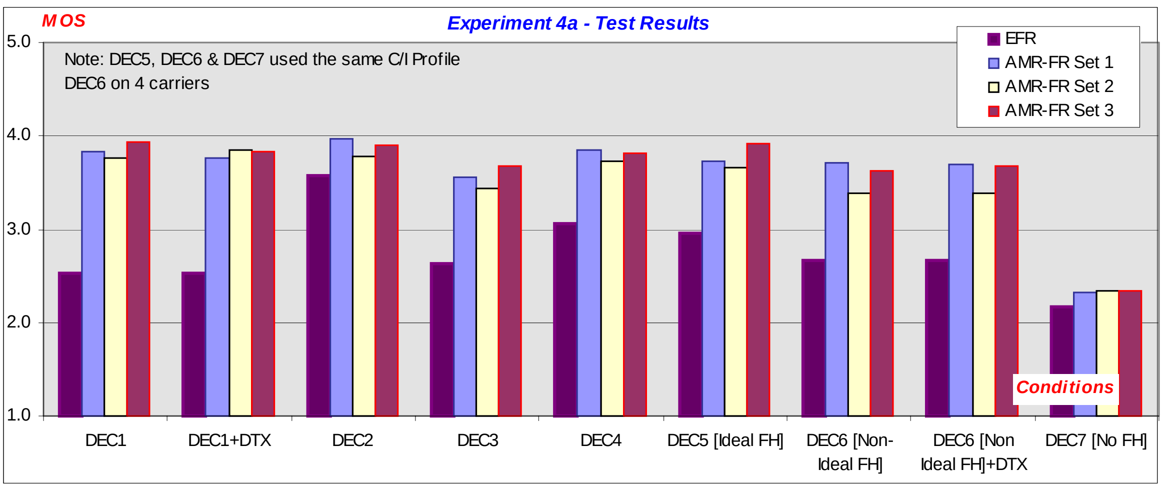


Figure 8.1: Experiment 4a Test Results (Dynamic Error conditions in Full Rate)

3GPP TSG-S4#9/SMG11#14
Puerto Vallarta, Mexico, January 24-28, 2000

Attachment 1 to S4-000007
e.g. for 3GPP use the format TP-99xxx
or for SMG, use the format P-99-xxx

CHANGE REQUEST

Please see embedded help file at the bottom of this page for instructions on how to fill in this form correctly.

06.75	**CR**	**A003**	Current Version:	7.1.0

GSM (AA.BB) or 3G (AA.BBB) specification number ↑   *↑ CR number as allocated by MCC support team*

For submission to:	TSG-SA#7	for approval	X	strategic		(for SMG use only)
list expected approval meeting # here ↑		for information		non-strategic	X	

Form: CR cover sheet, version 2 for 3GPP and SMG   The latest version of this form is available from: ftp://ftp.3gpp.org/Information/CR-Form-v2.doc

Proposed change affects: *(at least one should be marked with an X)*	(U)SIM		ME	X	UTRAN / Radio	X	Core Network

Source: TSG-S4   **Date:** 15/03/00

Subject: Introduction of new Annex D

Work item: AMR

Category:				**Release:**		
	F	Correction			Phase 2	
	A	Corresponds to a correction in an earlier release			Release 96	
(only one category	B	Addition of feature			Release 97	
shall be marked	C	Functional modification of feature			Release 98	X
with an X)	D	Editorial modification	X		Release 99	
					Release 00	

Reason for change: Annex D shows the AMR speech codec performances as a function of the FER and RBER.

Clauses affected: 4.4, New Annex D

Other specs affected:			
	Other 3G core specifications		→ List of CRs:
	Other GSM core specifications		→ List of CRs:
	MS test specifications		→ List of CRs:
	BSS test specifications		→ List of CRs:
	O&M specifications		→ List of CRs:

Other comments:

help.doc

<--------- double-click here for help and instructions on how to create a CR.

4.4 Presentation of the following sections

The following sections provide a summary of the Characterisation Phase test results and background information on the codec performances analysed during the Verification Phase.

Sections 5 to 9 summarise the codec subjective quality performances under different representative environmental conditions as measured during the Characterisation Phase of the project. An overview of the Characterisation Phase is included in Annex A. Additional test results are also provided in Annex C and D.

Sections 10 to 16 provide information on the codec characteristics as reported during the Verification Phase including:

- The transparency to DTMF tones,
- The transparency to network signalling tones
- The performances special input signals
- The language and talker dependency
- The frequency response
- The transmission delay
- The complexity

Annex B lists the reference contributions used in these sections.

Annex D: AMR Performances as a function of FER and RBER

In this annex, the characterization test results are charted as a function of the Frame Erasure Rate (FER) or Residual Bit Error Rate (RBER) as measured for each Error Pattern used for the subjective listening tests. They are provided as an indication of the quality degradation to be expected for the implementation of the AMR speech codec in 3G networks.

In the following diagrams, the quality degradation is expressed in ∆MOS (or ∆DMOS) obtained by comparing the MOS (or DMOS) obtained by the different codecs for each impairment condition with the MOS (or DMOS) obtained by the EFR in Error Free in the same experiment.

The results were compiled as explained below:

- In all cases, the results represent the average scores obtained over all tests performed for each experiment as compiled in [D1]
- The reference is always EFR in Error Free as measured in the same experiment.
- The charts in clean speech (Figures D1a-D1d) were obtained from the Characterization test results for Experiments 1a and 1b (Test performed by AT&T and Berkom)
- The charts in Car Noise (Figures D.a-D2d) were obtained from the Characterization test results for Experiments 3b and 3e (Test performed by France Telecom and Conexant)
- The charts in Street Noise (Figures D3a-D3d) were obtained from the Characterization test results for Experiments 3a and 3d (Test performed by France Telecom and Conexant)
- The charts in Office Noise (Figures D4a-D4e) were obtained from the Characterization test results for Experiments 3c and 3f (Test performed by France Telecom and Conexant)
- In all cases, the actual results were manually altered to smoothen the shape of the curves.
- The reference FER and RBER were extracted from [2] (document prepared in 12/98 for the selection of the AMR Channel Coding scheme).

It should also be noted that the diagrams function of the FER are affected by the Residual Bit Error Rate for each test condition, while the diagrams function of the RBER are also function of the FER present for each test condition. The two sets of diagrams cannot be considered totally independent.

Finally, it should be pointed out that the FER and RBER estimates used to derive these diagrams are based on the limited number of error patterns used for the AMR characterization phase. These could be affected by some inaccuracies that could explain the difference in shapes between the different speech codec modes.

These results can also be compared to previous indications provided by S4 to R1 and S2 regarding the robustness of the AMR Speech Codec (Ref [3] and [4]). The following section is extracted from a Liaison Statement sent to R1 [3], the same reference is also used in [4] (Liaison to S2):

> *The frame error rate required for producing high speech quality with only small quality degradation compared to error free speech is typically FER < 0.5%. This requirement guarantees retaining the maximum quality of, e.g., the GSM EFR codec. The quality then degrades gracefully with increasing frame error rate. This FER limit should be considered as a conservative figure.*

1. Results in Clean Speech in ΔMOS:

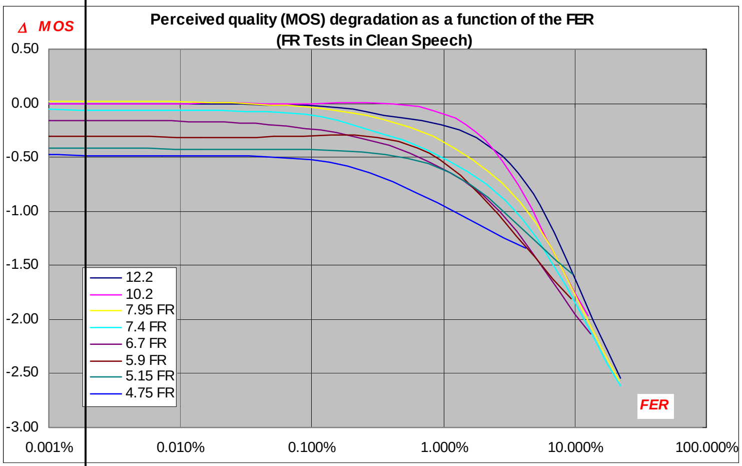


Figure D1a: Quality Degradation function of FER (FR Test Results)

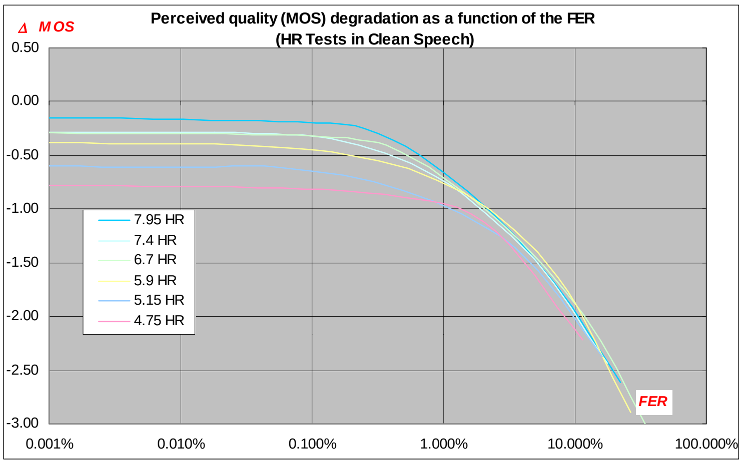


Figure D1b: Quality Degradation function of FER (HR Test Results)

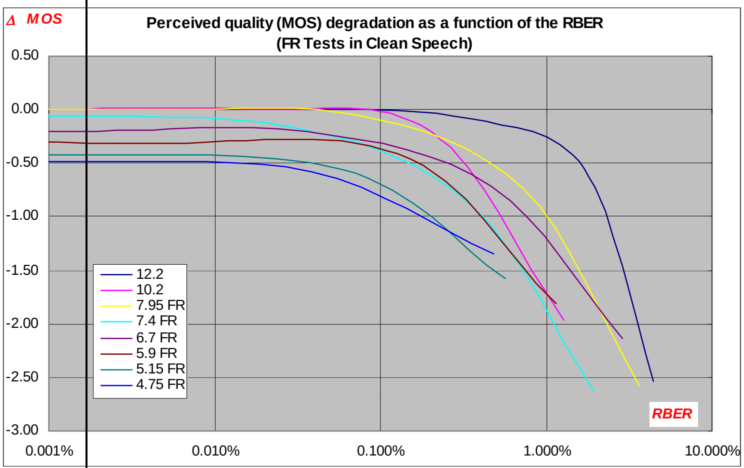


Figure D1c: Quality Degradation function of RBER (FR Test Results)

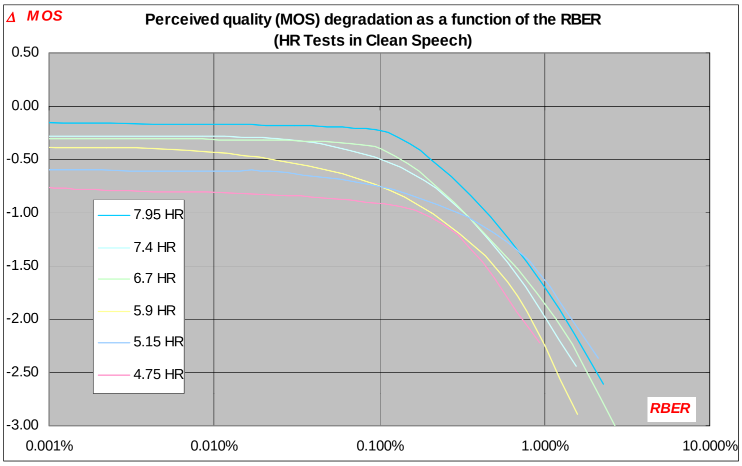


Figure D1d: Quality Degradation function of RBER (HR Test Results)

Comments on the previous results:

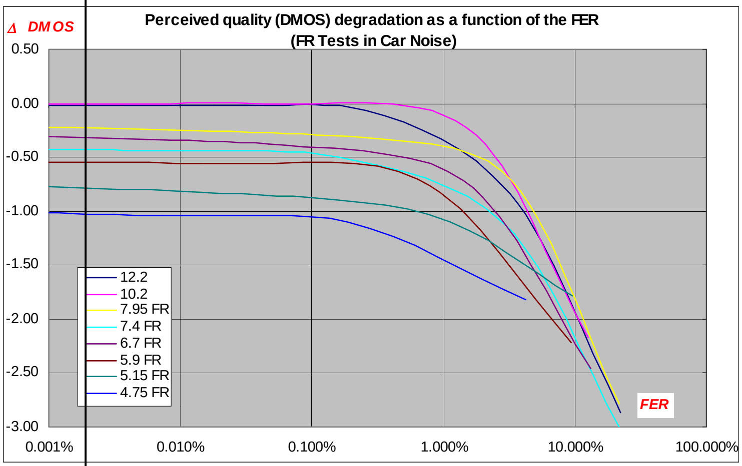
In clean speech, it appears that all codec modes do not show any significant quality degradation when the Frame Erasure Rate is lower than 0.5%. In some instances, the range can even be extended to 1% FER without any quality degradation.

It is also interesting to note that at 1% FER degradation, the highest codec modes (12.2 and 10.2) are still equivalent to the second tier of codec modes (7.95 to 5.9) in error free. Similarly, the middle range codec modes (7.95 to 5.9) present the same quality at 1% FER than the lower rate codec modes (5.15 & 4.75) in error free conditions.

The experiments in Half Rate have slightly increased the differences between the codecs and with EFR as could have been expected, but the same trends can be observed.

The results as a function of the RBER are also very similar with a different range of acceptable RBER. The different codec modes do not present any significant quality degradation when the RBER is below 0.1%.

2. Results in Car Noise:



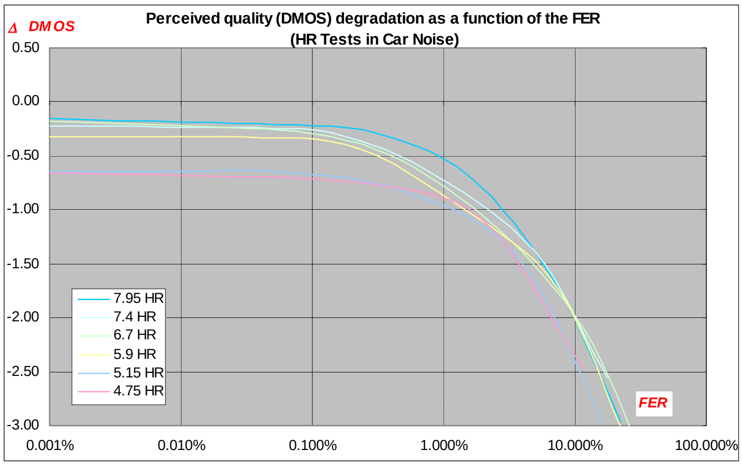
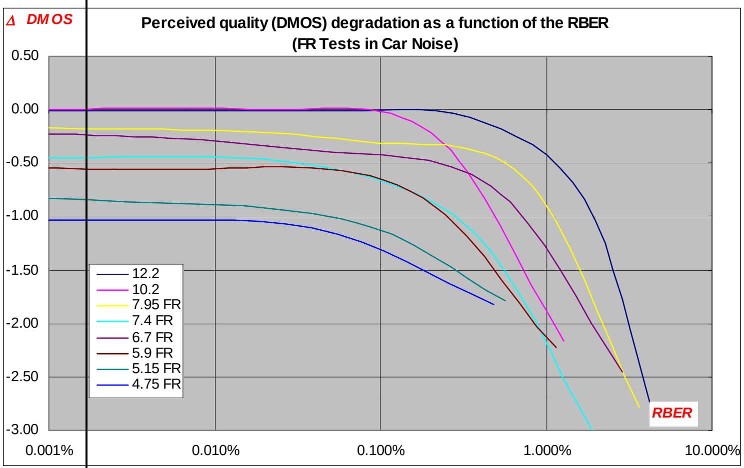


Figure D2a: Quality Degradation function of FER (FR Test Results)

Figure D2b: Quality Degradation function of FER (HR Test Results)



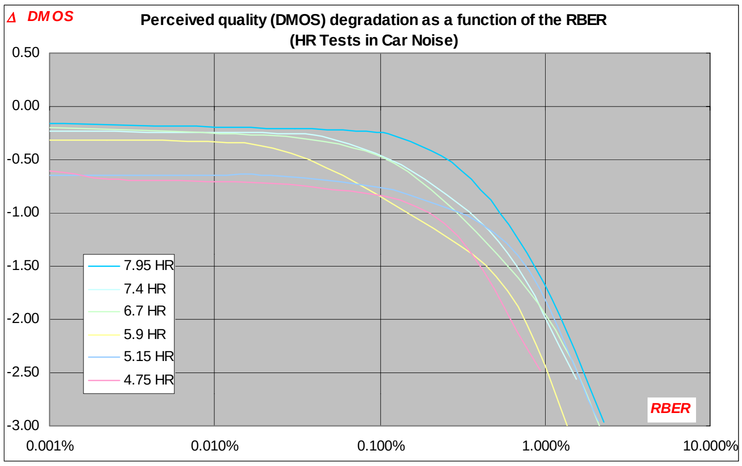


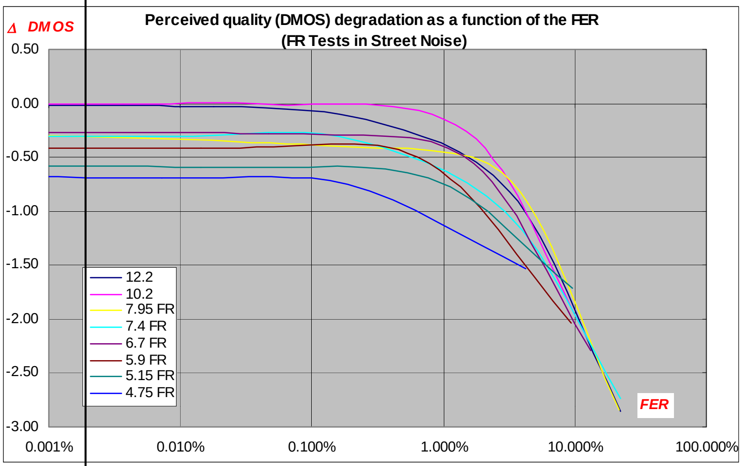
Figure D2c: Quality Degradation function of RBER (FR Test Results)

Figure D2d: Quality Degradation function of RBER (HR Test Results)

Comments on the previous results:

In car noise, no significant degradation is observed when the FER stays below 1% and the difference in quality between the different codecs is slightly amplified compared to the results clean speech.

3. Results in Street Noise:



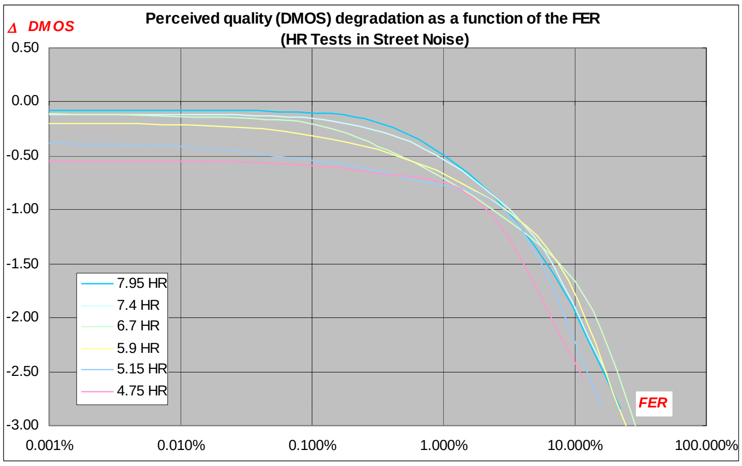
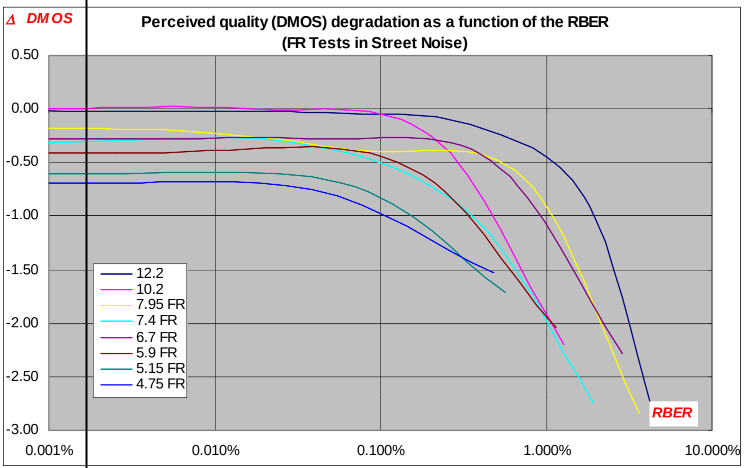


Figure D3a: Quality Degradation function of FER (FR Test Results)

Figure D3b: Quality Degradation function of FER (HR Test Results)



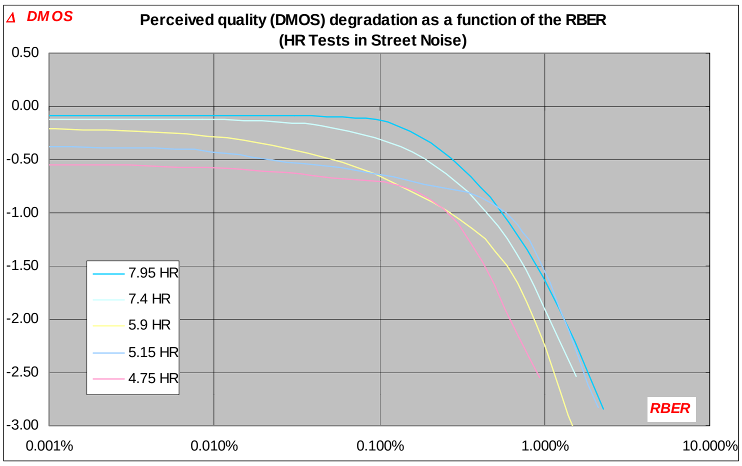


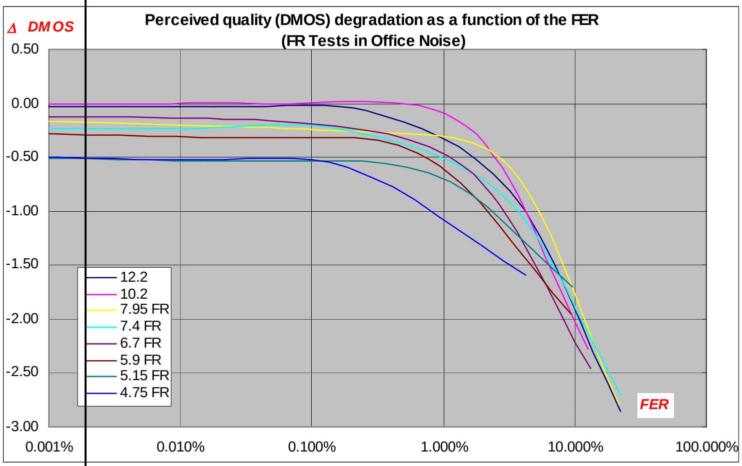
Figure D3c: Quality Degradation function of RBER (FR Test Results)

Figure D3d: Quality Degradation function of RBER (HR Test Results)

Comments on the previous results:

The results in street noise are in line with the previous results.

4. Results in Office Noise:



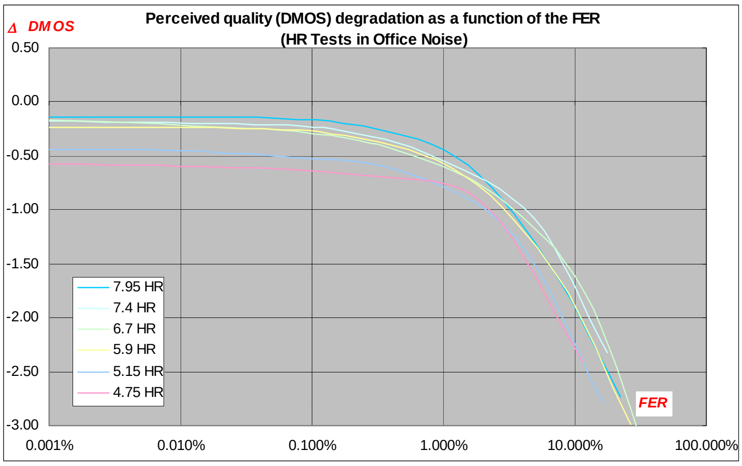
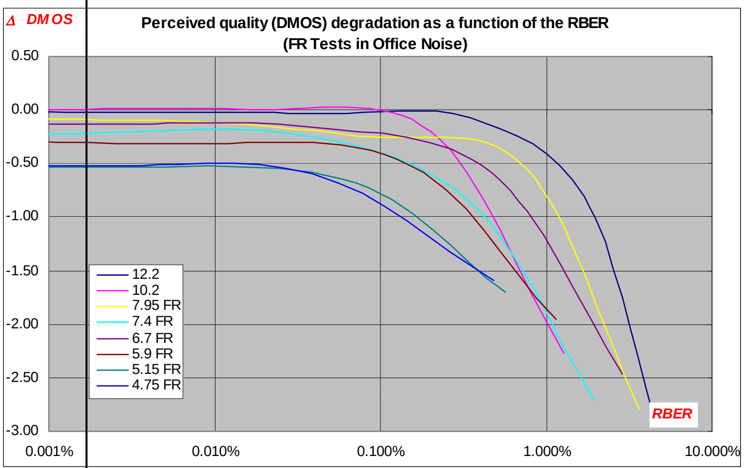


Figure D4a: Quality Degradation function of FER (FR Test Results)

Figure D4b: Quality Degradation function of FER (HR Test Results)



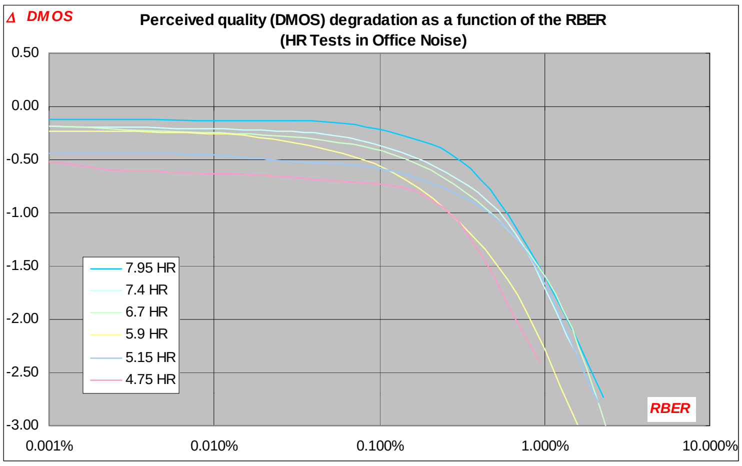


Figure D4c: Quality Degradation function of RBER (FR Test Results)

Figure D4d: Quality Degradation function of RBER (HR Test Results)

Comments on the previous results:

Same comment for the results in Office Noise

References to Annex D:

[D1]: AMR Characterization Combined Test Results (spreadsheet): SMG11 Tdoc 243/99, SMG11#10, June 4-11, 1999, Tampere, Finland

[D2]: Annex 3 to the LS to SMG2 WPB on alternative AMR channel coding schemes: “Objective test results for alternative AMR channel coding schemes” from Ericsson/Nokia/Siemens SMG11 Tdoc 329/98, SMG11#8Bis, December 17, 1998, London Heathrow, UK

[D2]: S4 LS to TSG-R1 “Response to the TSG-R1 LS on Speech Services” Tdoc 185R/99, TSG-S4#3, March 24-26, 1999, Yokosuka, Japan

[D4]: S4 LS to TSG-S2, S2 QoS and R3 “Error resilience in real-time packet multimedia payloads” Tdoc 179R/99, TSG-S4#5, June 14-16, 1999, Miami, FL-USA

Annex E (informative): Change Request History

SMG#	Tdoc SMG	Spec	CR	Cat	PH	Vers	New Vers	Subject
sa6	570/99	06.75	A001	F	R98	7.0.0	7.1.0	Update of AMR Transmission Delay Figures

3GPP TSG-S4 meeting #10 Helsinki, Finland, 28 Feb – 3 Mar 2000	***Document*** ***S4-(00)0139***

3G CHANGE REQUEST

Please see embedded help file at the bottom of this page for instructions on how to fill in this form correctly.

26.101 **CR** **001** Current Version: 3.0.0

3G specification number ↑ *↑ CR number as allocated by 3G support team*

For submision to TSG SA#7 for approval X (only one box should be marked with an X)
list TSG meeting no. here ↑ for information

Form: 3G CR cover sheet, version 1.0 The latest version of this form is available from: ftp://ftp.3gpp.org/Information/3GCRF-xx.rtf

Proposed change affects: USIM [ ] ME [X] UTRAN [ ] Core Network [ ]
(at least one should be marked with an X)

Source:	TSG-S4	**Date:**	15-Mar-2000
Subject:	Correction of indices in Annex B table captions		
3G Work item:	AMR		

Category: *(only one category shall be marked with an X)*

F	Correction	X
A	Corresponds to a correction in a 2G specification	
B	Addition of feature	
C	Functional modification of feature	
D	Editorial modification	

Reason for change: Table captions in Annex B have incorrect indexing for $table_i()$ where i=1..8 when it should be i=0..7.

Clauses affected: Annex B

Other specs affected:

Other 3G core specifications	[ ]	→ List of CRs:
Other 2G core specifications	[ ]	→ List of CRs:
MS test specifications	[ ]	→ List of CRs:
BSS test specifications	[ ]	→ List of CRs:
O&M specifications	[ ]	→ List of CRs:

Other comments: The change affects only a single index with a small font in each table caption of Annex B and one index in the body of Annex B. It can be difficult to notice in the following page. The tables themselves are not reproduced in this CR.

help.doc

<--------- double-click here for help and instructions on how to create a CR.

Annex B: Tables for AMR Core Frame bit ordering

This section contains the tables required for ordering the AMR Core Frame speech bits corresponding to the different AMR modes. These tables represent $table_m(j)$ in Section 4.2.1 where m=0..7 is the AMR mode. The tables are read from left to right so that the first element (top left corner) of the table has index 0 and the last element (the rightmost element of the last row) has the index K-1 where K is the total number of speech bits in the specific mode. For example, $table_{0\cancel{1}}(20)=27$, as defined in Table B.1.

[Table B.1 omitted for clarity.]

Table B.1: Ordering of the speech encoder bits for the 4.75 kbit/s mode: $table_{0\cancel{1}}(j)$

[Table B.2 omitted for clarity.]

Table B.2: Ordering of the speech encoder bits for the 5.15 kbit/s mode: $table_{1\cancel{2}}(j)$

[Table B.3 omitted for clarity.]

Table B.3: Ordering of the speech encoder bits for the 5.9 kbit/s mode: $table_{2\cancel{3}}(j)$

[Table B.4 omitted for clarity.]

Table B.4: Ordering of the speech encoder bits for the 6.7 kbit/s mode: $table_{3\cancel{4}}(j)$

[Table B.5 omitted for clarity.]

Table B.5: Ordering of the speech encoder bits for the 7.4 kbit/s mode: $table_{4\cancel{5}}(j)$

[Table B.6 omitted for clarity.]

Table B.6: Ordering of the speech encoder bits for the 7.95 kbit/s mode: $table_{5\cancel{6}}(j)$

[Table B.7 omitted for clarity.]

Table B.7: Ordering of the speech encoder bits for the 10.2 kbit/s mode: $table_{6\cancel{7}}(j)$

[Table B.8 omitted for clarity.]

Table B.8: Ordering of the speech encoder bits for the 12.2 kbit/s mode: $table_{7\cancel{8}}(j)$

3GPP TSG-S4 meeting #10 *Document* ***S4-(00)0140***
Helsinki, Finland, 28 Feb – 3 Mar 2000

3G CHANGE REQUEST

Please see embedded help file at the bottom of this page for instructions on how to fill in this form correctly.

26.101 CR 002 Current Version: 3.0.0

3G specification number ↑ *↑ CR number as allocated by 3G support team*

For submission to TSG SA#7 for approval X
list TSG meeting no. here ↑ for information
(only one box should be marked with an X)

Form: 3G CR cover sheet, version 1.0 *The latest version of this form is available from: ftp://ftp.3gpp.org/Information/3GCRF-xx.rtf*

Proposed change affects: USIM [ ] ME [X] UTRAN [ ] Core Network [ ]
(at least one should be marked with an X)

Source:	TSG-S4
Date:	15-Mar-2000
Subject:	Addition of comfort noise bit ordering
3G Work item:	AMR

Category:
(only one category shall be marked with an X)

F	Correction	X
A	Corresponds to a correction in a 2G specification	
B	Addition of feature	
C	Functional modification of feature	
D	Editorial modification	

Reason for change: The present version of TS 26.101 does not unambiguously define the bit ordering of comfort noise frames. This change excplicitly defines that ordering for Frame Type 8.

Clauses affected: 4.2.3

Other specs affected:

Other 3G core specifications	[ ]	→ List of CRs:
Other 2G core specifications	[ ]	→ List of CRs:
MS test specifications	[ ]	→ List of CRs:
BSS test specifications	[ ]	→ List of CRs:
O&M specifications	[ ]	→ List of CRs:

Other comments: The change consists of added text and one corrected typing error above the new text. The added text may have an effect on the page numbering for table of contents.

help.doc

<--------- double-click here for help and instructions on how to create a CR.

4.2.3 AMR Core Frame with comfort noise bits

The AMR Core Frame content for the additional frame types with Type Indices 8-15 in Table 1a are described in this section. These mainly consist of the frames related to Source Controlled Rate Operation specified in [2].

The data content (comfort n~~b~~oise bits) of the additional frame types is carried in AMR Core Frame. The comfort noise bits are all mapped to Class A of AMR Core Frame and Classes B and C are not used. This is a notation convention only and the class division has no meaning for comfort noise bits.

The number of bits in each class (Class A, Class B, and Class C) for the AMR comfort noise bits (Frame Type Index 8) is shown in Table 3. The contents of SID_UPDATE and SID_FIRST are divided into three parts (SID Type Indicator, Mode Indication, and Comfort Noise Parameters) as defined in [2].

The comfort noise parameter bits produced by the AMR speech encoder are denoted as $\{s(1),s(2),...,s(35)\}$. The notation $s(i)$ follows that of [3]. These bits are numbered in the order they are produced by the AMR encoder without any reordering. These bits are followed by the SID Type Indicator bit ($t1$) and Mode Indication bits ($\{smi(0),smi(1),smi(2)\}$. Thus, the AMR comfort noise bits $\{d(0),d(1),\ldots,d(38)\}$are formed as defined by the pseudo code below.

```
for j = 0 to 34

        d(j) := s(j+1);

d(35) := t1;

for j = 36 to 38

        d(j) := smi(j-36);
```

3GPP TSG-S4 meeting #10
Helsinki, Finland, 28 Feb – 3 Mar 2000

Document ***S4-(00)0141***

3G CHANGE REQUEST

Please see embedded help file at the bottom of this page for instructions on how to fill in this form correctly.

26.101 **CR** **003** Current Version: 3.0.0

3G specification number ↑ *↑ CR number as allocated by 3G support team*

For submision to TSG SA#7 for approval [X] for information [ ] *(only one box should be marked with an X)*

list TSG meeting no. here ↑

Form: 3G CR cover sheet, version 1.0 *The latest version of this form is available from: ftp://ftp.3gpp.org/Information/3GCRF-xx.rtf*

Proposed change affects: USIM [ ] ME [X] UTRAN [ ] Core Network [ ]
(at least one should be marked with an X)

Source: TSG-S4 **Date:** 15-Mar-2000

Subject: Correction of table indexing for AMR Core Frame class division example

3G Work item: AMR

Category:
(only one category shall be marked with an X)

F	Correction	X
A	Corresponds to a correction in a 2G specification	
B	Addition of feature	
C	Functional modification of feature	
D	Editorial modification	

Reason for change: Table indexing in the AMR Core Frame class division example uses table indexing starting from 1 while the first index should be 0.

Clauses affected: 4.2.2

Other specs affected:

Other 3G core specifications		→ List of CRs:	
Other 2G core specifications		→ List of CRs:	
MS test specifications		→ List of CRs:	
BSS test specifications		→ List of CRs:	
O&M specifications		→ List of CRs:	

Other comments: The proposed change consists of four corrected indices and one unrelated corrected typing error.

help.doc

<--------- double-click here for help and instructions on how to create a CR.

4.2.2 AMR Core Frame with speech bits: Class division

The reordered bits are further divided into three indicative classes according to their subjective importance. This class division is only informative and provides supporting information for mapping this generic format into specific~~s~~ formats. The three different importance classes can then be subject to different error protection in the network

The importance classes are Class A, Class B, and Class C. Class A contains the bits most sensitive to errors and any error in these bits typically results in a corrupted speech frame which should not be decoded without applying appropriate error concealment. This class is protected by the CRC in AMR Auxiliary Information. Classes B and C contain bits where increasing error rates gradually reduce the speech quality, but decoding of an erroneous speech frame is usually possible without annoying artifacts. Class B bits are more sensitive to errors than Class C bits. The importance ordering applies also within the three different classes and there are no significant step-wise changes in subjective importance between neighboring bits at the class borders.

The number of speech bits in each class (Class A, Class B, and Class C) for each AMR mode is shown in Table 2 below. The classification in Table 2 and the importance ordering $d(j)$, together, are sufficient to assign all speech bits to their correct classes. For example, when the AMR codec mode is 4.75, then the Class A bits are *d*(0~~1~~)..*d*(41~~2~~), Class B bits are *d*(42~~3~~)..*d*(94~~5~~), and there are no Class C bits.

3GPP TSG-S4 meeting #10
Helsinki, Finland, 28 Feb – 3 Mar 2000

Document* *S4-(00)0168

3G CHANGE REQUEST

Please see embedded help file at the bottom of this page for instructions on how to fill in this form correctly.

26.101 CR 004 Current Version: 3.0.0

3G specification number ↑ *↑ CR number as allocated by 3G support team*

For submission to TSG SA#7 for approval [X] for information [ ] *(only one box should be marked with an X)*

list TSG meeting no. here ↑

Form: 3G CR cover sheet, version 1.0 The latest version of this form is available from: ftp://ftp.3gpp.org/Information/3GCRF-xx.rtf

Proposed change affects: USIM [ ] ME [X] UTRAN [ ] Core Network [ ]
(at least one should be marked with an X)

Source:	TSG-S4
Date:	15-Mar-2000
Subject:	Clarification of bit transmission order for AMR frame structure parameters for AMR IF1.
3G Work item:	AMR

Category: *(only one category shall be marked with an X)*

F	Correction	X
A	Corresponds to a correction in a 2G specification	
B	Addition of feature	
C	Functional modification of feature	
D	Editorial modification	

Reason for change: In the present version of TS 26.101 the AMR IF1 Core Frame description does not unambiguously describe the bit ordering of certain AMR frame stucture parameters.

Clauses affected: 4.3

Other specs affected:

Other 3G core specifications		→ List of CRs:
Other 2G core specifications		→ List of CRs:
MS test specifications		→ List of CRs:
BSS test specifications		→ List of CRs:
O&M specifications		→ List of CRs:

Other comments:

help.doc

<--------- double-click here for help and instructions on how to create a CR.

4.2 AMR frame composition

The compound AMR frame is formed as a concatenation of AMR Header, AMR Auxiliary Information, and AMR Core Frame, in this order. The first bit of the AMR frame is the first bit of the Frame Type field. The last bit of the AMR frame is the last bit of AMR Core Frame which is the last bit of speech bits or the last bit of comfort noise bits as defined in Sections 4.2.1 and 4.2.3. The bit ordering for each parameter in AMR Header and AMR Auxiliary Information is defined so that the first bit is the least significant bit (LSB) and the last bit is the most significant bit (MSB).

Table 5 below summarizes all possible AMR frame format combinations in terms of number of bits in each field.

Joint TSG-S4#9 – SMG11#14 meeting ***Document*** ***S4-(00)0193***

January 24-28 2000, Puerto Vallarta, Mexico

3G CHANGE REQUEST

Please see embedded help file at the bottom of this page for instructions on how to fill in this form correctly.

26.102	**CR**	**001 Rev3**	Current Version:	3.0.0
3G specification number ↑		*↑ CR number as allocated by 3G support team*		

For submision to TSG	SA4#9	for approval	**X**	*(only one box should*
list TSG meeting no. here ↑		for information		*be marked with an X)*

Proposed change affects: USIM [ ] ME [ ] UTRAN [ ] Core Network [X]
(at least one should be marked with an X)

Source:	TSG-S4	**Date:**	15-03-2000
Subject:	Introduction of determination of QoS parameters used at RAB assignment		
3G Work item:	QoS for Speech & Multimedia Codecs / Adaptive Multi-Rate Speech Codec		

Category:	F	Correction	
	A	Corresponds to a correction in a 2G specification	
(only one category	B	Addition of feature	
shall be marked	C	Functional modification of feature	**X**
with an X)	D	Editorial modification	

Reason for change: The determination of the QoS parameters, generated by the bearer capability information element received at call set up, that are used at RAB assignment is clarified. In addition, in this version some clarifications are included due to the agreed CR in R3-000377. The latter CR requires the specification of the asymmetry or symmetry of the RAB and traffic direction. It further clarifies that no separate indication must be provided to UTRAN to indicate a change of the inter-PDU transmission interval for some frames

Clauses affected: 2, 5, 6.2

Other specs affected:	Other 3G core specifications		→ List of CRs:	
	Other 2G core specifications		→ List of CRs:	
	MS test specifications		→ List of CRs:	
	BSS test specifications		→ List of CRs:	
	O&M specifications		→ List of CRs:	

Other comments:

help.doc

<---------- double-click here for help and instructions on how to create a CR.

TS 26.102 V3.0.0 (1999-12)

Technical Specification

TSG-SA Codec Working Group
Mandatory speech codec;
AMR speech codec; Interface to Iu and Uu

Reference

TSG-SA4-W1 (26102-050.doc)

Keywords

Adaptive Multi-Rate, Mandatory speech codec

3GPP

Postal address

Office address

Internet

secretariat@3gpp.org

Individual copies of this deliverable
can be downloaded from
http://www.3gpp.org

2 Normative References

This TS incorporates by dated and undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this TS only when incorporated in it by amendment or revision. For undated references, the latest edition of the publication referred to applies.

[1] 3G TS 25.415 : "Iu Interface CN-UTRAN User plane Protocols"

[2] 3G TS 26.101 : "AMR Speech Codec, Frame structure".

[3] 3G TS 23.107: "QoS Concept and Architecture".

[Editor's note : To add references to the 3G TS 28.062 (TFO), GSM EFR, IS-641and PDC 6,70]

5 RAB aspects

During the RAB Assignment procedure initiated by the CN to establish the RAB for AMR, the RAB parameters are defined. The AMR RAB is established with one or more RAB co-ordinated sub flows with predefined sizes and QoS parameters. In this way, each Transport Format Combination between sub flows corresponds to one AMR frame type. On the Iu interface, these RAB parameters define the corresponding parameters regarding the transport of AMR frames.

Some of the QoS parameters in the RAB assignment procedure are determined from the Bearer Capability Information Element used at call set up. These QoS parameters as defined in [3], can be set as follows:

RAB service attribute	***RAB service attribute value***			***Comments***
Traffic Class	Conversational			
RAB Asymmetry Indicator	Symmetric, bidirectional			Symmetric RABs are used for uplink and downlink
Maximum bit rate	12.2 / 10.2 / 7.95 / 7.4 / 6.7 / 5.9 / 5.15 / 4.75 kbit/s ~~12.2 kbit/s~~			This value depends on the highest mode rate in the RFCS
Guaranteed bit rate	12.2 / 10.2 / 7.95 / 7.4 / 6.7 / 5.9 / 5.15 / 4.75 kbit/s			One of the values is chosen, depending on the lowest rate controllable SDU format (note 2)
Delivery Order	Yes			(note 1)
Maximum SDU size	244 / 204 / 159 / 148 / 134 / 118 / 103 / 95 bits			Maximum size of payload field in IU UP, according to the highest mode rate in the RFCS
Traffic Handling Priority	Not applicable			Parameter not applicable for the conversational traffic class. (note 1)
Source statistics descriptor	Speech			(note 1)
SDU Parameters	RAB subflow 1 (Class A bits)	RAB subflow 2 (Class B bits)	RAB subflow 3 (Class C bits)	The number of SDU, their number of RAB subflow and their relative subflow size is subject to operator tuning (note 3)

RAB service attribute			***RAB service attribute value***			***Comments***
	SDU error ratio		$7 * 10^{-3}$	-	-	(note 3)
	Residual bit error ratio		10^{-6}	10^{-3}	$5 * 10^{-3}$	(note 3 – applicable for every subflow)
	Delivery of erroneous SDUs		yes	~~-yes~~	~~-yes~~	Class A bits are delivered with error indication; Class B and C bits are delivered without any error indication.
	SDU format information 1-9					(note 4)
		Subflow SDU size 1-9	(note 5)	(note 5)	(note 5)	
	~~Subflow SDU size parameters 10~~ SDU format information 10					~~(note 6)~~ (note 4)
		Subflow SDU size 10	0	0	0	(note 6)

Table 5-1: Example of mapping of BC IE into QoS parameters for UMTS AMR.

Note 1: these parameters apply to all UMTS speech codec types.
Note 2: the guaranteed bit rate depends on the periodicity and the lowest rate controllable SDU size.
Note 3: these parameters are subject to operator tuning.
Note 4: SDU format information has to be specified for each AMR core frame type (i.e. with speech bits and comfort noise bits) included in the RFCS as defined in [2].
Note 5: The subflow SDU size corresponding to an AMR core frame type indicates the number of bits in the class A, class B and class C fields.
~~Note 6: The same RAB attribute values are defined for uplink and downlink.~~
~~Note 67: Indication of SDU size = 0 is needed to inform RNC about possible change of the inter PDU transmission interval for some frames (SID frame in this case).~~
Note 6: SDU size = 0 is needed for Initial Time Alignment

The conversational traffic class shall be used for the speech service, which is identified by the ITC parameter of the bearer capability information element in the SETUP message. This shall apply for all UMTS speech codec types.
The parameters traffic class, transfer delay, traffic handling priority and source statistics descriptor shall be the same for all speech codec types applicable for UMTS.

6 Iu Interface User Plane (RAN)

The data structure exchanged on the Iu interface are symmetrical, i.e. the structure of the uplink data frames is identical to that of the downlink data frames. This facilitates Tandem Free Operation and Transcoder Free Operation.

6.1 Frame structure on the Iu UP transport protocol

6.1.1 Initialisation

At the initialisation of the SMpSDU mode of operation, several parameters are set by the CN. The initialisation procedure is described in TS 25.415 [1].

- RFCS

In the case of AMR, the RFCS corresponds to the Active Codec Set (ACS) authorised in the communication. Annex A of [1] gives an illustration of the usage of RFCI for AMR speech RAB.

- Delivery of erroneous SDUs

This parameter shall be set to YES. Erroneous speech frames may be used to assist the error concealment procedures.

- [Editor’s note : this might need to be specified in another specifications]PDU type

The PDU type 0 shall be used for the transport of AMR data.

[Editor’s note : this might need to be specified in another specifications]

6.1.2 Time Alignment Procedure

[ffs as in [1]]

6.2 Mapping of the bits

The mapping of the bits between the generic AMR frames and the PDU is the same for both uplink and downlink frames.

The following table gives the correspondence of the bit fields between the generic AMR frames at the TC interface and the PDU exchanged with the Iu transport layer.

PDU field	Corresponding AMR generic frame field	Comment
PDU Type	N/A	Type 0
Frame Number	N/A	
FQC	Frame Quality Indicator	
RFCI	AMR Frame Type	
Payload CRC	N/A	
Header CRC	N/A	
Payload Fields (N Sub Flows)	Class A or SID payload Class B Class C	
SDU #1	Most important speech bits come first	Mandatory
SDU #2	Next bits follow	Optional
…	…	Optional
SDU #N	Least important speech bits	Optional

Table 0-1 : Mapping of generic AMR frames onto Iu PDUs

The number of RAB sub flows, their corresponding sizes, and their attributes such as "Delivery of erroneous SDUs" ~~and " PDU type"~~ shall be defined at the RAB establishment and signalled in the RANAP RAB establishment request~~.~~, as proposed in chapter 5. The number of RAB sub flows are corresponding to the desired bit protection classes. ~~Their respective sizes and their respective QoS are left open to specification at RAB establishment.~~ The total number of bits in all sub flows for one RFC shall correspond to the total number given in TS 26.101 for the corresponding Codec Mode respectively Frame Type.

Guidance for setting the number of bits in each RAB Sub Flow according to their relative subjective importance is given in TS 26.101.

The following two tables are examples of mapping of RAB sub flows.

Table 6-2 gives three examples of sub flow mapping.
The RFCI definition is given in order of increasing SDU sizes.

- Example 1 describes Codec Type UMTS_AMR, with all eight codec modes foreseen in the Active Codec Set (ACS) and provision for Source Controlled Rate operation (SCR). In this example, Blind Transport Format Detection is supported and the sub flow mapping follows the 26.101 class division guidance.
- Example 2 describes Codec Type GSM_EFR, with one codec mode, including SCR.
- Example 3 describes Codec Type GSM_AMR, including AMR SCR

UMTS_AMR	GSM_EFR	GSM_AMR	RAB sub-flows			Total size of bits/RAB sub-flows combination (Mandatory)	Source rate
RFCI Example 1	**RFCI Example 2**	**RFCI Example 3**	**RAB sub-Flow 1 (Optional)**	**RAB sub-Flow 2 (Optional)**	**RAB sub-Flow 3 (Optional)**		
2		**2**	**42**	**53**	**0**	95	AMR 4.75kbps
3			**49**	**54**	**0**	103	AMR 5.15kbps
4		**3**	**55**	**63**	**0**	118	AMR 5.9kbps
5			**58**	**76**	**0**	134	AMR 6.7kbps
6		**4**	**61**	**87**	**0**	148	AMR 7.4kbps
7			**75**	**84**	**0**	159	AMR 7.95kbps
8		**5**	**65**	**99**	**40**	204	AMR 10.2kbps
9	**2**		**81**	**103**	**60**	244	AMR 12.2kbps
1		**1**	**39**	**0**	**0**	39	AMR SID
	1		**47**	**0**	**0**	47	GSM EFR SID
0	**0**	**0**	**0**	**0**	**0**	0	NO DATA

Table 6-2 : Example for AMR with SCR and three sub flows, according to subjective class division indication of TS 26.101.

Table 6-3 gives one examples of sub flow mapping that supports Equal Error Protection.
The RFCI definition is given in order of increasing SDU sizes.

- Example 4 describes Codec Type PDC_EFR and the corresponding Source Controlled Rate operation (SCR).

PDC_EFR	RAB sub-flow	Total size of bits/RAB sub-flows combination (Mandatory)	Source rate
RFCI Example 4	RAB sub-Flow 1 (Mandatory)		
	95	95	AMR 4.75kbps
	103	103	AMR 5.15kbps
	118	118	AMR 5.9kbps
2	**134**	134	AMR 6.7kbps
	148	148	AMR 7.4kbps
	159	159	AMR 7.95kbps
	204	204	AMR 10.2kbps
	244	244	AMR 12.2kbps
	39	39	AMR SID
	47	47	GSM EFR SID
	42	42	IS-641 SID
1	**41**	41	PDC 6,7 SID
0	**0**	0	NO DATA

Table 6-3 : Example of SDU sizes for PDC_EFR with SCR and Equal Error Protection

6.3 Frame handlers

Iu PDU Frame handling functions are described in TS 25.415. This sections describes the mandatory frame handling functions at the AMR Generic frame interface.

6.3.1 Handling of frames from TC to Iu interface (downlink)

The frames from the TC in AMR generic frame format are mapped onto the Iu PDU as follows.

6.3.1.1 Frame Quality Indicator

The Frame Quality Indicator from the TC, respectively from the distant TFO partner, is directly mapped to the Frame Quality Classification of the IU frame according to Table 6-6.

FQI AMR	FQC PDU	FQC value
GOOD	GOOD	0
BAD	BAD	1

Table 6-4 : FQI AMR to FQC Iu PDU mapping

6.3.1.2 Frame Type

The received Frame Type Index is mapped onto the RFCI thanks to the assigned RFCS table: The correspondence between Codec Mode, Frame Type Index and RFCI is defined at RAB assignment.

6.3.1.3 Codec Mode Indication

The Codec Mode Indication is not used because it is redundant to the Frame Type.

6.3.1.4 Codec Mode Request

Codec Mode Request (CMR) in downlink direction is forwarded to the rate control procedure if it changes.

6.3.1.5 Optional internal 8 bits CRC

The internal AMR CRC is not used on the Iu interface.

6.3.1.6 Mapping of Speech or Comfort Noise parameter bits

Let define the N payload fields of the N Sub flows for RFCI j as follow :

$U_i(k)$ shall be the bits in Sub Flow i, for k =1 to Mi
M_i shall be the size of Sub Flow i, for i = 1 to N
S(k) shall be the bits of the speech or comfort noise parameters of the corresponding Frame Type j in decreasing subjective importance.

Then the following mapping in pseudo code applies:

$U_1(k) = S(k)$ with k = 1, … M_1

$U_2(k) = S(k + M_1)$ with k = 1, … M_2

$U_3(k) = S(k + M_2)$ with k = 1, … M_3

…

$U_N(k) = S(k + M_{N-1})$ with k = 1 … M_N

6.3.2 Handling of frames from Iu interface to TC (uplink)

The uplink Iu frames are mapped onto generic AMR frames as follow :

6.3.2.1 Frame Quality Indicator

At reception of Iu PDU the Iu frame handler function set the Frame Quality Classification according to the received FQC, Header-CRC check, and Payload-CRC check (see 25.415). AMR Frame Type and Frame Quality Indicator are determined according to the following table:

FQC	**Resulting FQI**	**resulting Frame Type**
GOOD	GOOD	from RFCI
BAD	BAD	NO_DATA
BAD Radio	BAD	from RFCI
Reserved	Reserved	Reserved

Table 6-5 : FQC Iu PDU type 0 to AMR FQI and AMR Frame Type mapping

6.3.2.2 Frame Type

The received RFCI is mapped onto the Frame Type thanks to the RFCS table. I.e. the Type_Index is set according to the AMR mode.

6.3.2.3 Codec Mode Indication

The Codec Mode Indication is not used because it is redundant to the Frame Type.

6.3.2.4 Codec Mode Request

The received Downlink Rate Control command is mapped onto the Codec Mode Request. In case a new DRC is received it is mapped into the corresponding CMR AMR generic frame format. It is remembered by the TC until the next DRC is received. In each new frame that is sent to the AMR Codec, the stored CMR is resent, in order to control the Codec Mode for the downlink direction.

6.3.2.5 Optional internal 8 bits CRC

The internal AMR CRC is not used on the Iu interface.

6.3.2.6 Speech and Comfort noise parameter bits

The speech and Comfort noise parameter bits are mapped from the sub flows to the payload of the generic AMR frames with the reverse function of subclause 6.3.1.6.

Joint TSG-S4#9 – SMG11#14 meeting
January 24-28 2000, Puerto Vallarta, Mexico

Document S4-000067

3G CHANGE REQUEST

Please see embedded help file at the bottom of this page for instructions on how to fill in this form correctly.

26.102 CR 002 Current Version: 3.0.0

3G specification number ↑ *↑ CR number as allocated by 3G support team*

For submission to TSG TSG-SA#7 for approval [X] for information [ ] *(only one box should be marked with an X)*

list TSG meeting no. here ↑

Form: 3G CR cover sheet, version 1.0 The latest version of this form is available from: ftp://ftp.3gpp.org/Information/3GCRF-xx.rtf

Proposed change affects: USIM [ ] ME [ ] UTRAN [X] Core Network [X]

(at least one should be marked with an X)

Source: NTT DoCoMo **Date:** 27-01-2000

Subject: Introduction of different RFCS set on Iu User Plane

3G Work item: Adaptive Multi-Rate Speech Codec

Category: *(only one category shall be marked with an X)*

F	Correction	
A	Corresponds to a correction in a 2G specification	
B	Addition of feature	
C	Functional modification of feature	X
D	Editorial modification	

Reason for change: Different RFCS may be used on Iu userplane is clarified.

Clauses affected: 6.1.1

Other specs affected:

Other 3G core specifications		→ List of CRs:	
Other 2G core specifications		→ List of CRs:	
MS test specifications		→ List of CRs:	
BSS test specifications		→ List of CRs:	
O&M specifications		→ List of CRs:	

Other comments:

help.doc

<--------- double-click here for help and instructions on how to create a CR.

6.1.1 Initialisation

At the initialisation of the SMpSDU mode of operation, several parameters are set by the CN. The initialisation procedure is described in TS 25.415 [1].

- RFCS

In the case of AMR, the RFCS corresponds to the Active Codec Set (ACS) authorised in the communication. Annex A of [1] gives an illustration of the usage of RFCI for AMR speech RAB. RFCS used in downlink may differ from that in uplink.

- Delivery of erroneous SDUs

This parameter shall be set to YES. Erroneous speech frames may be used to assist the error concealment procedures.

- [Editor's note : this might need to be specified in another specifications]PDU type

The PDU type 0 shall be used for the transport of AMR data.

[Editor's note : this might need to be specified in another specifications]

Joint TSG-S4#10 – SMG11#15 meeting *Document* ***S4-000177***

February 28-March 3 2000, Helsinki, Finland

3G CHANGE REQUEST

Please see embedded help file at the bottom of this page for instructions on how to fill in this form correctly.

26.102	**CR**	**003Rev.2**	Current Version:	3.0.0

3G specification number ↑ *↑ CR number as allocated by 3G support team*

For submision to TSG	SA#7	for approval	X	*(only one box should*
list TSG meeting no. here ↑		for information		*be marked with an X)*

Form: 3G CR cover sheet, version 1.0 *The latest version of this form is available from:* ftp://ftp.3gpp.org/Information/3GCRF-xx.rtf

Proposed change affects: USIM [ ] ME [ ] UTRAN [X] Core Network [ ]

(at least one should be marked with an X)

Source: TSG-S4 **Date:** 15-03-2000

Subject: Introduction of Time Alignment

3G Work item: Adaptive Multi-Rate Speech Codec

Category: *(only one category shall be marked with an X)*

F	Correction	
A	Corresponds to a correction in a 2G specification	
B	Addition of feature	X
C	Functional modification of feature	
D	Editorial modification	

Reason for change: Procedure for Time Alignment on the TC side is clarified.

Clauses affected: 6.1.2

Other specs affected:

Other 3G core specifications		→	List of CRs:
Other 2G core specifications		→	List of CRs:
MS test specifications		→	List of CRs:
BSS test specifications		→	List of CRs:
O&M specifications		→	List of CRs:

Other comments:

help.doc

<--------- double-click here for help and instructions on how to create a CR.

6.1.2 Time Alignment Procedure

~~[ffs as in [1]]~~

TC should adjust timing of speech data transmission according to time alignment frame sent by RNC.

TC should get into Initial Time Alignment state immediately after Iu initialisation. At Initial Time Alignment state, TC shall send Iu userplane PDU type 0 frame with SDU size = 0 to RNC until speech data transmission starts.

Time alignment procedure shall be dismissed in case of TFO.