Technical Specification Group Services and System Aspects
Meeting #14, Kyoto, Japan, 17-20 December 2001

TSGS#14(01)0697

Source: **TSG-SA WG4**

Title: CRs to TS 06.73 and TS 26.073 on Correction in AMR decoder to avoid division by zero in RX- DTX handling (R98, R99, and Rel-4)

Document for: **Approval**

Agenda Item: **7.4.3**

The following CRs, agreed at the TSG-SA WG4 meeting #19, are presented to TSG SA #14 for approval.

Spec	CR	Rev	Phase	Subject	Cat	Vers	WG	Meeting	S4 doc
06.73	A29		R98	Correction in AMR decoder to avoid division by zero in RX- DTX handling	F	7.5.0	S4	TSG-SA WG4#19	S4-010671
26.073	015		R99	Correction in AMR decoder to avoid division by zero in RX- DTX handling	A	3.2.0	S4	TSG-SA WG4#19	S4-010672
26.073	016		REL-4	Correction in AMR decoder to avoid division by zero in RX- DTX handling	A	4.0.0	S4	TSG-SA WG4#19	S4-010673

3GPP TSG-SA WG4 Meeting #19
December 3-7, 2001; Tokyo, Japan

Tdoc S4 (01)0671

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CHANGE REQUEST

⌘ **06.73** **CR** **A29** ⌘**rev** **-** ⌘ Current version: **7.5.0** ⌘

*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 ☒ Radio Access Network ☒ Core Network ☐

Title:	⌘	CR to TS 06.73 A29 on Correction in AMR decoder to avoid division by zero in RX-DTX Handling
Source:	⌘	TSG SA WG4
Work item code:	⌘	AMR
Date:	⌘	Dec. 17, 2001
Category:	⌘	**F**
Release:	⌘	R98

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:	⌘	Late SID_UPDATE frames may not update the decoder SID-states correctly, causing a division by zero that makes the AMR C-simulation abort and end processing.
Summary of change:	⌘	The file dtx_dec.c has to be changed in 3 code lines
Consequences if not approved:	⌘	When the frame type SID_UPDATE is received exactly when the decoder was prepared to enter into the DTX MUTE state, the C-simulation stops executing.

Clauses affected:	⌘	
Other specs Affected:	⌘	☐ Other core specifications ⌘ ☐ Test specifications ☐ O&M Specifications
Other comments:	⌘	As the change merely affects error concealment functionality, it does not impact the speech codec test vectors (TS 06.74)

1 How the code and execution is changed

1.1 File dtx_dec.c

1.1.1 Before the change (lines 638..639, function `dtx_dec`)

```
      move16();
      st->true_sid_period_inv = div_s(1 << 10, shl(tmp_int_length, 10));
```

1.1.2 Before the change (lines 767…772, function `rx_dtx_handler`)

```
      /* no update of sid parameters in DTX for a long while */
      test();
      if (sub(st->since_last_sid, DTX_MAX_EMPTY_THRESH) > 0)
      {
         newState = DTX_MUTE;                                    move16();
      }
```

1.1.3 Before the change, simulation execution response

```
>> decoder car_32dBov.sid.51.cod car_32dBov.sid.51.bug.raw

************************************************************

     European digital cellular telecommunications system
           4750 ... 12200 bits/s speech codec for
         Adaptive Multi-Rate speech traffic channels

     Bit-Exact C Simulation Code - Decoder

     R98:   Version 7.5.0
     R99:   Version 3.2.0
     REL-4: Version 4.0.0   March 02, 2001
************************************************************

Input bitstream file:   car_32dBov.sid.51.cod
Synthesis speech file:  car_32dBov.sid.51.bug.raw
frame=150  Division Error var1=1024  var2=0
Abort (core dumped)
>>
```

1.2 Changes in dtx_dec.c

1.2.1 After the change (function dtx_dec)

```
      /* safety guard against division by zero */
      test();
      if(tmp_int_length <= 0) {
         tmp_int_length = 8;                                          move16();
      }

      move16();
      st->true_sid_period_inv = div_s(1 << 10, shl(tmp_int_length, 10));
```

1.2.2 After the change (function rx_dtx_handler)

```
      /* no update of sid parameters in DTX for a long while */
      /* Due to the delayed update of  st->since_last_sid counter
         SID_UPDATE frames need to be handled separately to avoid
         entering DTX_MUTE for late SID_UPDATE frames
      */
      test(); test(); logic16();
      if((sub(frame_type, RX_SID_UPDATE) != 0) &&
         (sub(st->since_last_sid, DTX_MAX_EMPTY_THRESH) > 0))
      {
         newState = DTX_MUTE;                                         move16();
      }
```

1.2.3 After the change, simulation execution response

```
>> decoder car_32dBov.sid.51.cod car_32dBov.sid.51.bugfix.raw

************************************************************

     European digital cellular telecommunications system
           4750 ... 12200 bits/s speech codec for
        Adaptive Multi-Rate speech traffic channels

     Bit-Exact C Simulation Code - Decoder

     R98:   Version x.x.x
     R99:   Version x.x.x
     REL-4: Version x.x.x
************************************************************

Input bitstream file:   car_32dBov.sid.51.cod
Synthesis speech file:  car_32dBov.sid.51.bugfix.raw

250 frame(s) processed
>>
```

3GPP TSG-SA WG4 Meeting #19
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CHANGE REQUEST

⌘ **26.73** **CR** **015** ⌘**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 **X** Core Network ☐

Title:	⌘	CR to TS 26.073-015 on Correction in AMR decoder to avoid division by zero in RX-DTX Handling
Source:	⌘	TSG SA WG4
Work item code:	⌘	AMR
Date:	⌘	Dec. 17, 2001
Category:	⌘	**A**
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:	⌘	Late SID_UPDATE frames may not update the decoder SID-states correctly, causing a division by zero that makes the AMR C-simulation abort and end processing.
Summary of change:	⌘	The file dtx_dec.c has to be changed in 3 code lines
Consequences if not approved:	⌘	When the frame type SID_UPDATE is received exactly when the decoder was prepared to enter into the DTX MUTE state, the C-simulation stops executing.

Clauses affected:	⌘	
Other specs Affected:	⌘	☐ Other core specifications ⌘ ☐ Test specifications ☐ O&M Specifications
Other comments:	⌘	As the change merely affects error concealment functionality, it does not impact the speech codec test vectors (TS 26.074)

1 How the code and execution is changed

1.1 File dtx_dec.c

1.1.1 Before the change (lines 638..639, function dtx_dec)

```
      move16();
      st->true_sid_period_inv = div_s(1 << 10, shl(tmp_int_length, 10));
```

1.1.2 Before the change (lines 767...772, function rx_dtx_handler)

```
      /* no update of sid parameters in DTX for a long while */
      test();
      if (sub(st->since_last_sid, DTX_MAX_EMPTY_THRESH) > 0)
      {
         newState = DTX_MUTE;                                    move16();
      }
```

1.1.3 Before the change, simulation execution response

```
>> decoder car_32dBov.sid.51.cod car_32dBov.sid.51.bug.raw

************************************************************

     European digital cellular telecommunications system
           4750 ... 12200 bits/s speech codec for
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     Bit-Exact C Simulation Code - Decoder

     R98:   Version 7.5.0
     R99:   Version 3.2.0
     REL-4: Version 4.0.0   March 02, 2001
************************************************************

Input bitstream file:   car_32dBov.sid.51.cod
Synthesis speech file:  car_32dBov.sid.51.bug.raw
frame=150  Division Error var1=1024  var2=0
Abort (core dumped)
>>
```

1.2 Changes in dtx_dec.c

1.2.1 After the change (function dtx_dec)

```
      /* safety guard against division by zero */
      test();
      if(tmp_int_length <= 0) {
         tmp_int_length = 8;                                          move16();
      }

      move16();
      st->true_sid_period_inv = div_s(1 << 10, shl(tmp_int_length, 10));
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      /* no update of sid parameters in DTX for a long while */
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     Bit-Exact C Simulation Code - Decoder

     R98:   Version x.x.x
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     REL-4: Version x.x.x
************************************************************

Input bitstream file:   car_32dBov.sid.51.cod
Synthesis speech file:  car_32dBov.sid.51.bugfix.raw

250 frame(s) processed
>>
```

3GPP TSG-SA WG4 Meeting #19
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CHANGE REQUEST

⌘ **26.073** **CR** **016** ⌘**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 ☒ Radio Access Network ☒ Core Network ☐

Title:	⌘	CR to TS 26.073-016 on Correction in AMR decoder to avoid division by zero in RX-DTX Handling
Source:	⌘	TSG SA WG4
Work item code:	⌘	AMR
Date:	⌘	Dec. 17, 2001
Category:	⌘	**A**
Release:	⌘	Rel-4

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      }
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