Tdoc R1-99j58

Source: **TSG RAN WG1 Chairman[1], TSG SA WG4 Chairman[2]**

Title: **Joint TSG-R1-S4 Meeting Notes**

Document for: **Information**

Agenda Item:

The Joint TSG-R1-S4 meeting took place on November 19, 1999 hosted by Nortel Networks in Les Mesnuls, France. The meeting was chaired by the R1 Chairman Antti Toskala, Nokia Networks. A total of 39 delegates usually attending R1, R2, R3 or S4 participated to the meeting.

Approval of the agenda:

The meeting Agenda proposed by the R1 Chairman, contained in R1-99H84 was approved. A derived version is included in Annex 1. Annex 2 contains the list of documents. Annex 3 includes the list of participants.

AMR Class A Bits allocation:

This issue was first addressed in an R1 LS to S4 (R1-99E42). S4 considered the R1 request and modified the number of class A Bits for the AMR 6.7 mode from 55 to 56 bits (S4-99264R). However, R1 further indicated in R1-99H60, presented by NTT DoCoMo, that the performance of the Bind Rate Format Detection would improve if the difference in the number of class A bits between the different modes was maximized. Consequently, R1 proposed to S4 to set the number of class A bits for the 6.7 mode to 58 bits at equal distance from the number of class A bits for the AMR 7.4 mode (61 bits) and the AMR 5.9 mode (55 bits). When presenting the document, NTT DoCoMo also pointed out that a similar problem existed for the number class A bits of the SID frame and the AMR 4.75 mode (39 bits each).

S4 clarified that the distribution of AMR bits in the TS 26.101 between Class A, B and C was only an indication based on the subjective quality importance of these bits. The mapping of these bits in sub-flows over the Iu interface was left open to each operator to set. Any distribution between sub-flows could only be defined as possible examples in the Iu User Plane specification (TS 25.415) or the mapping specification under preparation in S4 (TS 26.102).

It was however agreed that it was critical to include at least in the mapping specification (TS 26.102) a recommendation to use different numbers of class A bits between the different AMR RAB sub-flow Format Combinations over the Iu Interface for compatibility with the Blind Rate Format Detection. It was also identified that since the sub-flows were actually defined by the Core Network and the Core Network was not aware if Blind Rate Format Detection was used or not, any AMR RAB sub-flow Format Combination would have to be compatible by default with the Blind Rate Format Detection. S4 agreed to prepare the TS 26.102 accordingly and to include in this specification a mapping example compatible with this principle. S4 will also consider using 58 class A bits for the AMR 6.7 mode in this example as well different number of class bits between the AMR 4.75 modes and SID payload. The need for having different numbers of bits for Blind Rate Format Detection should also appear in the informative annex in TS 25.212, where Blind Rate Detection is described.

Support of AMR Mode Command:

The R1 Chairman presented the possible options for the transport of the AMR Codec Mode Command over

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the Physical Layer with their respective advantages and weaknesses, including a summary picture of the different options reported in Figure 1. The R1 Chairman also confirmed that first option relying on a separate Transport Channel was already provided by the Layer 1 specification but resulted in additional signaling overhead. The other options (multiplexing with the class A bits in the transcoder, in the MAC Layer or as a 1st Multiplexing step in Layer 1) would on the other hand require slight modifications of the existing specifications while improving the overhead requirements. Different channel coding options were also described in R1-99H66 while R1-99H67 requested additional information from S4 on the error robustness required for the Codec Mode Command and on the objective transmission rate).

S4 clarified that the transmission of the Codec Mode Command should have the most demanding performances in case of Tandem Free Operation between a UMTS UE and a GSM MS. In that case the Codec Mode Command would actually come from the remote MS and would have be transmitted to the UE with similar performances as in GSM. In GSM the Codec Mode Command can change every other speech frame (40 ms) and the associated channel coding provides a level of protection equivalent to the Class A bits.

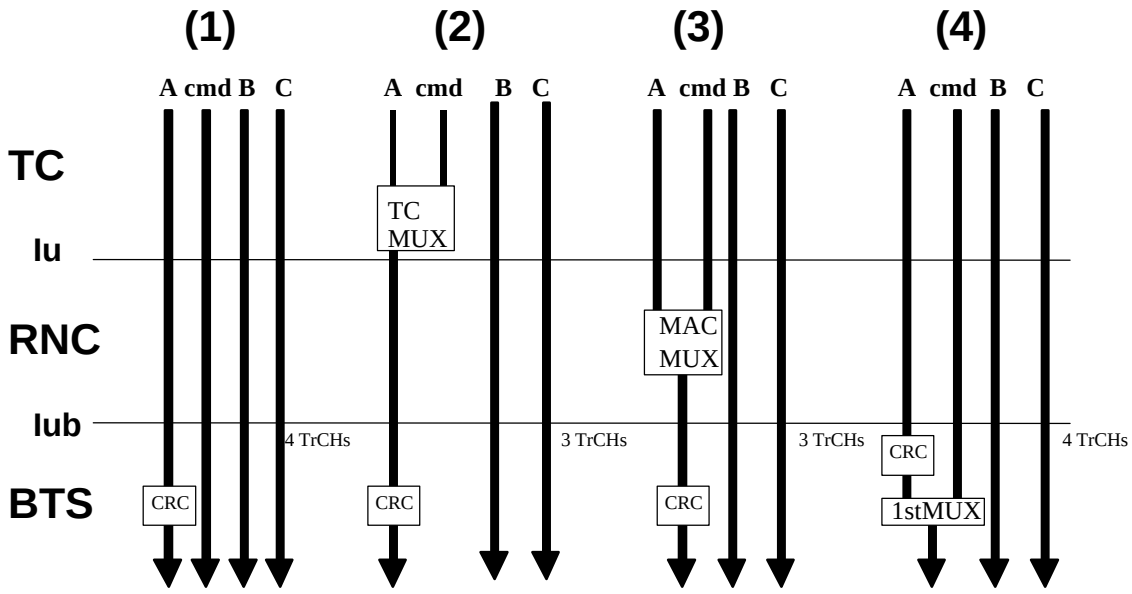

Figure 1. Alternatives for mode command transmission in case of fast mode adaptation.

The requirements for the transmission of the Codec Mode Command were also addressed in R1-99I44 from Nortel Networks. The document also considered the necessity for error detection while indicating that R2 had already decided that the Codec Mode Command should be transported on a separate Transport Channel. This decision was based on the R2 understanding that the Layer 1 was defined for 'efficient' transmission of transport channels ranging from 1 to 5000 bits.

Other participants indicated that for a normal UMTS call, the codec mode command should change slowly and would not require a dedicated transport channel. This additional transport channel would be established in case of TFO with a GSM MS.

A Liaison Statement form R2 (R2-99G32) indicated that R2 preferred a solution providing the possibility to set independently the channel coding performances for the Codec Mode Command and for the Class A bits (Option 1 in the Chairman presentation, options 1 or 3 in R1-99H66).

NTT DoCoMo presented document R1-99i79 proposing to multiplex the codec mode command with the class A bits in the transcoder in case of TFO with a GSM MS.. In this case, the UE would also have to combine the codec mode command sent with the class A bits with the codec mode command requested at Layer 2 to always choose the most demanding codec mode (lower rate). This proposal was in line with the option 2 presented in R1-99H66.

It was commented that option 2 could be problematic for the Layer 2 operation since RNC would not able to identify if the Codec Mode Command was included or not in the class A bits sub-flow.

Based on these considerations, it was finally decided to rely on the current available option based on a separate Transport Channel in Layer 1, and on the use of convolutional coding for mode commands when sent as a separate transport channel. Alternatively it is possible to use the Dedicated Control Channel

(DCCH) with Layer 3 signaling if the mode is not to be changed frequently. The proposal of using block coding in Layer 1 for mode commands was withdrawn.

Document R1-99I45 from Nortel Networks also proposed to introduce in the standard the possibility for the UE to request a Codec Mode modification (Uplink Codec Mode Command), especially when the radio propagation conditions are degraded and the power control has already reached the limit of its dynamic range. However due to time constraint, this was not further discussed.

Finally, Nortel Networks presented document R1-99I43, which considers possible AMR Codec Mode restrictions. However, it was considered that the existing system procedures already allowed to introduce restrictions in the active AMR codec modes and this contribution did not impact the previous decision on the preferred option for the transmission on the downlink, of the uplink Codec Mode Command.

AMR Service Implementation Capability

This issue was covered very briefly. The main point considered was the number of transport channels for AMR. The current scheme is to have 4 TrCHs for AMR in the downlink and 3 TrChs in the uplink. In R1-99I45 it was proposed to have a larger number of transport channels in order to have the possibility to use different coding for example for the class A bits when changing the mode.

The same issue was simulated for UTRA TDD in R1-99i08 from Siemens. The simulation results showed a gain of 0.4 dB when having the possibility to use the 1/3 rate coding instead of ½ rate coding and repetition when switching to lower rate mode in AMR. This was related to the use of a spreading factor 16 with AMR in TDD, where the highest rate AMR mode (12.2 kbit/s) cannot use 1/3 rate coding in order to fit to the desired spreading factor.

The maximum case would be to have 19 TrChs for a single AMR connection as was raised in R1-99I45 from Nortel Networks. Concerns were raised on the complexity of this for the UTRAN interfaces.

The issue was to be considered further in the next R1 meeting but would require some concrete examples cases with UTRA FDD to get a concrete understanding of the achievable gains.

AMR Characterization Testing

Two documents (R1-99i78 from Nokia and R1-99I46 from Nortel Networks) provided preliminary lists of relevant channel conditions to include in the characterization phase.

S4 indicated that the AMR performances had been tested exhaustively during the GSM AMR Characterization Phase and that the 3G AMR Characterization phase was intended to specifically evaluate the degradation of the codec performances under 3G radio channel conditions. It was also indicated that the principle of a funding of 55 kEuros was accepted by the 3GPP PCG. This level of funding should support the development and execution of 2 basic experiments (to be performed by 2 listenning laboratories each), with the possibility to include around 40 different channel conditions in each experiment (80 total).

S4 and R1 agreed to further consider these inputs during their future meetings, to finalize the list of conditions to be included in the 3G AMR Characterization Plan. As R1 is meeting a week before S4, R1 is expected to give refined guidance to S4 based on the test cases presented in R1-99I46 and R1-99I78. It was noted that information should reach S4 secretary before his departure to Japan on December 2nd.

Conclusion:

The Chairman thanked Nortel Networks for hosting the meeting with such a short notice and thanked the attendance for their participation and contributions. The R1 and S4 Chairmen are expected to report the conclusions to their respective WGs. The meeting was closed at 16:30.

Annex 1: Joint TSG-R1-S4 Meeting Agenda

	Tdoc
1. Approval of the agenda	R1-99H84,
2. AMR Class A bit allocation	R1-99H60,
3. Support of AMR Mode Commands on the Physical Layer	R1 Chairman Slides R1-99H67, R1-99H66, R2-99G92 R1-99I45, R1-99I44, R1-99I79 R1-99I43, R1-99I08
4. AMR Service Implementation Capability	R1-99H63, R2-99G61
5. AMR Characterization Testing	R1-99I46, R1-99I78
6. Summary & Conclusion	

Annex 2: Joint TSG-R1-S4 Meeting - Document List

Tdoc.	Title	Source	S4 Numbers
R1-99H60	Liaison statement on updating the number of AMR speech bits	R1 LS to S4	S4-99389
R1-99H63	Liaison on Physical Layer Service Implementation Capabilities	R1 LS to R2, T2 & S4	
R1-99H66	Liaison Statement on transmitting AMR Mode Command bits	R1 LS to S4, R2, cc R3	~ S4-99385 (=R1-99H00)
R1-99H67	Liaison statement on requirements for fast switching between AMR modes	R1 LS to S4, cc R2, R3 & R4	~S4-99384 (=R1-99H68)
R1-99H84	Joint R1/S4 Meeting Agenda	R1 Chairman	
R1-99I08	Link performance of low-rate AMR-encoded speech services (TDD)	Siemens	
R1-99I43	AMR modes for the UTRA-FDD	Nortel Networks	
R1-99I44	Discussion on requirements for transmission of AMR Mode command in UTRA	Nortel Networks	
R1-99I45	Discussion on AMR adaptation requirements for UTRA	Nortel Networks	
R1-99I46	Characterization test plan and Error patterns for UTRA FDD	Nortel Networks	
R1-99I78	AMR characterization test cases with UTRA	Nokia	
R1-99I79	AMR command signaling and command bits transmission	NTT DoCoMo	
N/A	R1 Chairman Presentation on Uplink Codec Mode Command	R1 Chairman	
R2-99G61	Reply to liaison on Physical Layer Service Implementation Capabilities	R2 LS to R1 cc T2 & S4	
R2-99G62	Reply to liaison statement on transmitting AMR Mode Command bits	R2 LS to R1 cc S4	

Other reference contributions not reviewed during the meeting:

R1-99E31	Liaison statement on Support of Speech Service in RAN	R1 LS to S4, R2, R3, R4	S4-99235
R1-99E32	Liaison statement on Support of Speech Service in RAN for FDD	R1 LS to S4, cc R2, R3, R3 & T2	S4-99236
R1-99E42	Liaison statement on classification of AMR speech bits	R1 LS to S4	S4-99239
S4-99264R	Liaison statement on Support of Speech Service in RAN	S4 LS to R1, R2, R3 & R4	S4-99264R
R2-99G72	Answer to liaison statement from RAN3 on Radio Access Bearer attributes	R2 LS toS2, R3 cc N1, N3 & S4	
	Related R1 & S4 specifications		

Annex 3: Joint TSG-R1-S4 Meeting - List of Participants

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