Title:	**Draft Report on the AMR-WB#4 Subgroup Meeting**
Source:	**Rapporteur**
Agenda Item:	**7**

1. General

The agenda was approved and the documents were allocated to the agenda items (see Annex A). The first part of the meeting was held as a joint meeting with SQ.

Tdoc 100/00 "**Communication on 16 kbit/s wideband speech coding**" was already presented at the Plenary. Mr. R. Drogo summarized the item relevant for the discussion in the ad-hoc group.
Talker dependency requirements, transmission of DTMF, and S/N values + measurements methods for the background noise conditions were the items felt worth-considering. The bit rate issue was felt the only one correlated with design constraints.

2. Design constraints (WB-4)

First, the design constraints permanent document was briefly presented by Mr. K. Jarvinen (Tdoc S4-00087, v.1.0). The document was felt completed for the AMR-WB qualification phase (and fulfilling the new bit rate constraints set by ITU-T).

3. Performance requirements (WB-3)

As a next item, the performance requirements permanent document was addressed by the AMR-WB chairman (Tdoc 90/00, v.1.2).

One open issue in the Notes to Table 1a and 1b was raised from Motorola on the evaluation of C/I under 13 dB in terms of intervals of interest. It was proposed to task the Analysis laboratory to study and propose a statistical approach (formula) to be applied to the results. For clean speech, it was proposed to adopt a curve in terms of PoW % and ask the performance of the WB candidate not to increase the number of "dissatisfied customers". Erdal asked a MOS curve from GSM 06.75 to be adopted instead than PoW values. F. Gabin commented a reference curve should be identified, to fix what graceful degradation is allowed to WB candidate. E. Ekudden asked to stick to the original proposal of measuring difference in performance (if a suitable statistical approach can be identified by SQ experts).
Debate took place at length: the conclusion was that F. Gabin asked to rephrase the requirement in Note 1, and this was agreed.
Another question was requested to be answered by S. Kendall on Table 2 on dynamic conditions, about "typical" conditions; after the clarification that several profiles will be employed in the tests, covering a range of C/I values, the requirement was accepted to be left as is.
About the Notes to Table 5a and 5b for application E, Motorola asked to clarify the meaning, whether the Notes are intended to be design constraints, and this was confirmed to apply to all

phases, while simulation parameters were requested to be further elaborated, and this was an additional issue, for which Ericsson will forward a contribution

Finally, the requirements for application C and D in background noise were proposed to be set to 64 kbit/s for No errors, and the Objective was deleted, which was agreed.

For consistency reasons, the Notes to Tables 4a and 4b were modified as for Note 1.

Mr. K. Fischer asked to modify Table 3b to bring it in line with Table 1b, adopting the PoW criterium for tandeming in background noise conditions. Mr. E. Ekudden and Mr. J. Vainio remarked the present requirements were discussed at length at last meeting and asked not to change the existing requirements. The requirement was left as is.

An editorial change was requested in table 5a and 5b, i.e. to replace "0.0%" by "-", which was agreed.

The issues raised by the ITU-T document for the Talker dependency requirement (in the sense to align the requirements with the ones for different input level), transmission of DTMF tones (as a requirement instead than an objective), and S/N values + measurements methods for the background noise conditions were addressed by Mr. R. Drogo de Iacovo. Talker Dependency requirement was left unchanged and DTMF requirement was left as an Objective (transparency), while the request on S/N values + measurements methods for the background noise conditions was felt not a performance requirement issue and left for the discussion on the processing task.

All brackets "[ ]" in Tdoc 90/00 were agreed to be removed, and WCDMA simulation issues were moved to the processing functions document.

The whole document was agreed (it will be revised in Tdoc 131/00, v.2.0).

Note that a further change was agreed in Note 5 belonging to Tables 5a and 5b:
Note 5: The least significant bits shall be subjected to the residual error profile. The number of bits in this class shall be 50% of the total bits per frame.

This change is incorporated in the final Tdoc 173/00 of the **"AMR-WB Performance requirements (AMR-WB-3) v.2.0"** which was agreed in the AMR-WB subgroup.

4. Processing functions

The permanent document WB-7a v. 0.11 (Tdoc 129/00) for the qualification phase was produced by the Editor (P. Barrett, BT), and was presented by the AMR-WB Chairman. The document was reviewed in detail.

A "background noise weighted P.341 filter" (to take into account the wideband equivalent of the □SM filtering function in the narrowband domain will possibly be provided by correspondence. If agreed (within one week time, i.e. by March 10th, 2000), the new filtering characteristics will be adopted; otherwise the presently described procedure will be adopted.

The option for the inclusion of a possible post-processing filter for wideband signals (to "mask" the output from all the processing stages in the same way for all proponents) was left open until March 10th, 2000. If proposals will be made and agreed, such post-processing stage will be adopted; otherwise, no wideband post-processing will take place.

One open issue: the tandeming of AMR-WB will need the insertion of a transcoding stage, to simulate the realistic situation; to the purpose, Nortel Networks proposed to insert a further encoding-decoding G.722 stage. This proposal is to reflect realistic conditions. An alternative proposal (i.e. not to insert any encoding-decoding stage) got the support of Ericsson, Nokia, Siemens and FT. No change was agreed for the qualification phase.

Functions of data base laboratory and listening laboratory were agreed. A deadline (March 10th, 2000) was set for the check of the add function provided by BT (filename "add.c").

Ericsson will provide the EID (Error Insertion device for the WCDMA).

The document 129/00R "**AMR-WB-7a Processing functions v. 0.12**" was revisited after the approval of the AMR-WB Qualification Test Plan.

Tdoc 149/00 was presented by Ericsson. Based on this document, an Annex D was added to the processing functions document on file format of WCDMA channel errror files. Annex E describes the functionality of the WCDMA EID.

Tdoc 138/00 was presented by Ericsson on WCDMA channel simulator settings for application E testing. Annex F was added to the processing functions document.

Significant progress was achieved on Sections 6,7,8 as well. Section 6 is related to Background Noise Files. Arcon was identified as the potential source for providing the noise files; this is to be confirmed. It was left for clarification whether Arcon is able to provide the files in an encrypted format by winzip.

Section 7 considering Error Insertion Device for Application E was completed; Ericsson was volounteering to provide the WCDMA EID in C source code.

Section 8 related to Error Patterns for applications A, B, E was completed; Nortel Networks was volounteering to provide the error patterns for applications A and B, Ericsson volounteered to provide the channel error files for UL and Nokia for DL conditions.

The document 166/00 "**AMR-WB-7a Processing functions v. 0.2**" was produced. The oustanding issues are listed on page 4 in the document: verification of add.c; „background noise weighted P.341 filter"; potential postprocessing for WB signals. Note that comments related to the oustanding issues are required on the reflector by March 10 at the latest.

5. Test plans for the AMR-WB Qualification Phase

Permanent document AMR-WB-8a v. 0.4 (Tdoc 114/00) was presented by Mr. J. Vainio. Open issues were listed and most solved.

Independent Distributor	The independent distributor is supposed to redistribute the speech samples received from the test laboratories to the different candidates, hiding to each candidate which other candidates are included in their own test.
Independent Distributor	Must be identified. Should the Independent Distributor sign NDAs with the different candidate test laboratories? This issue was moved to the Deliverables discussion.
Noise Laboratory	Arcon will deliver the noise samples. The open question is, whether the old noise samples can be used or do we require new samples.The Noise Laboratory is likely to require NDAs for the release of noise samples
Error Patterns	Identify who will deliver the EP was left open
Listening Environment	Section to be completed for wideband experiments was discussed
Analysis laboratory	Needed

Processing Tables	First draft exists, to be checked and approved
Randomization Tables	First draft exists, to be checked and approved
Naming Convention	To be completed
Schedule	To be discussed in the Deliverable session

In particular:

Independent Distributor: tbd

Noise Laboratory: Arcon tbc; files be provided in winzip encrypted format tbc

Analysis Laboratory: tbd

Schedule see Qualification Deliverables permanent document

Tables tbv by SQ experts

Note that FT/CNET clarified they are not any more members of the Cobasca Consortium. "Mono-aural listening" means that the sound is presented to one ear and the other ear is subject to the surrounding background noise (Hoth spectrum), i.e. the second hear is in open air. The listening level will be set at -15 dB Pa (79 dB SPL).

It was agreed to allow, for the combination of sentences to produce speech samples, that listening laboratories re-utilise, if needed, one sentence in more than one speech sample.

The values from Exps. 1a and 1b will be used for the check of performance requirements for the differences at C/I values (MOS at 13 dB - MOS at 10 dB, MOS at 13dB -MOS at 7 dB, MOS at 13 dB - MOS at 4 dB). This was agreed.

Annex D (schedule) was moved to the Qualification Deliverables document.

The document was updated in Tdoc 144/00 "**Test plans for the AMR-WB Qualification Phase (AMR-WB-8a) v. 0.5**".

The group discussed the impact of number of candidates. It was understood that the maximum number of candidates is nine. In order to be prepared for the potential event of withdrawals, the group identified that withdrawals impact Table 5.1 only. Therefore, similar tables were added for situations with candidates less than nine to have a fallback solution.

The document was updated in Tdoc 162/00 "**Test plans for the AMR-WB Qualification Phase (AMR-WB-8a) v. 0.5**".

6. Funding

The issue of funding was debated and the funding commitment (up to 150 kEuro as a first estimate, tbc) per candidate, related to the selection and characterisation phases, was found needed by May 31st, 2000; this was agreed. It was clarified that this commitment will be applicable ONLY to the candidates admitted to the selection phase. Candidates failing to send the commitment will be automatically eliminated.

7. Qualification rules

Permanent document **„AMR-WB Qualification Rules (AMR-WB-5a) v.0.2"** (Tdoc 98/00) was prepared by A. Ohana. It was presented and the on-line editing work was led by the AMR-WB chairman.

The document was reviewed in detail. Rule 1 was agreed. Regarding rule 2a, the list of test sets was completed as follows:

> List of test sets for Rule 2a:
> Set #1:   all conditions (39)
> Set #2:   all clean conditions (13)
> Set #3:   all background noise conditions (26)
> Set #4:   all conditions of application A (15)
> Set #5:   all conditions of application B (12)
> Set #6:   all conditions of application C, D, E (12)

Rule 2a was also agreed. Then, rule 2b was discussed and some changes were introduced and agreed. A change is related to defining a severe failure leading to an exclusion, as follows:

> Any candidate failing severly in more than 10% of the test conditions contained in any of the following test sets will be excluded.
>
> > List of test sets for Rule 2b:
> > Set #1:   all conditions (39)
> > Set #2:   all clean conditions (13)
> > Set #3:   all background noise conditions (26)
> > Set #4:   all conditions of application A (15)
> > Set #5:   all conditions of application B (12)
> > Set #6:   all conditions of application C, D, E (12)
>
> The 10% threshold should be computed for each test set across the conditions tested by all listening laboratories performing an experiment included in this test set.
>
> A severe failure is defined by more than 6dBq MOS score difference or ΔPoW > 15% if applicable.
>
> This criteria will only apply if either the equivalent Q value of the codec under test or the equivalent Q value of the reference codec is in the linear region of the MNRU curve and the test results in:
>
> - ΔMOS<-0.5 for any ACR test
> - ΔMOS <-1 for any DCR test based on MOS
> - ΔMOS <-1 as well as ΔPoW > 15% for any DCR test based on PoW
> - (ΔMOS = Codec MOS - Reference Codec MOS)

For this purpose, the definition of ΔPoW was felt needed and this was given in Annex C. Annex A contains some examples for application of rule 2b; an example 4 was added for illustrating the application of rule 2b regarding ΔPoW related criteria. The group agreed to the modified form of rule 2b, to Annex A and C.

Next, rule 3 was discussed (FOMs). The group felt that it is not more relevant to distinguish between unweighted and weighted ΔMOS since all weights are 1 or 0. Therefore, the weighted FOM was kept only. FOM number of failures was improved to becoming number of majority failures. A new FOM was added reflecting to the use of PoW criteria. The group agreed to the use of the following FOMs:

- Number of majority Failures (2 failures out of 3 tests)
- Weighted ΔMOS (ΔMOS = Codec MOS - Reference MOS)
- Weighted ΔdBq (ΔdBq = Codec dBq - Reference dBq)
- Unweighted ΔPoW percentages (for the relevant conditions)

Some further corrections were introduced. Moreover, the balance factor for experiments 2a and 2b was changed to 0.5 in order to keep the weights of experiment 1 and 2 as a whole in balance. The group agreed to rule 3 as given in the final version of the subgroup editing work.

As a next step, the Section describing the selection procedure was reviewed and agreed.

The updated permanent document **„AMR-WB Qualification Rules (AMR-WB-5a) v.0.3"** was produced and agreed in Tdoc 164/00.

8. Qualification deliverables

Permanent document **„AMR-WB Qualification Deliverables (AMR-WB-6a) v.0.1"** (Tdoc 120/00) was prepared and presented by the editor S. Aftelak. On-line editing work was led by the AMR-WB chairman. Significant progress was achieved on the document: it was clarified which NDAs were needed; which level of approval was needed for each permanent document; what tasks have to be performed during the qualification phase; the deadlines were discussed and edited on-line. The group was asked to take the updated version of the document for further consideration and to verify it for consistency.

The updated **„AMR-WB Qualification Deliverables (AMR-WB-6a) v.0.2"** is included in Tdoc 165/00.

9. AMR-WB overview

Permanent document **AMR-WB overview v.0.1** (Tdoc 314/99) was addressed by the AMR-WB chairman. Some editorial changes and clarifications were introduced. The updated version 0.2 is included in Tdoc 167/00.

During the review, it was agreed to use the AMR-9 permanent document for complexity and delay evaluation of AMR-WB candidate proposals. It is reproduced in Tdoc 71/00. Therefore, there is no need for an AMR-WB permanent document for complexity evaluation. Mr. Usai was requested to remove WB-9 from the server as soon as possible.

<u>Annex A:</u>

Agenda for the AMR-WB#4 Meeting and allocation of document numbers

1. Approval of the agenda   126
2. Allocation of documents to agenda items

3. Reports/liaisons from/to other groups   100, 151
4. Design constraints (WB-4)   87
5. Performance requirements (WB-3)   90, 131, 173
6. Selection rules (WB-5)   98, 164

7. Qualification phase deliverables (WB-6)   120, 165

8. Joint SQ / AMR WB items:
   - 8.1. Processing functions (WB-7)   129, 138, 149, 166
   - 8.2. Test methods and test plan (WB-8)   114, 144, 162
   - 8.3. Funding of selection and characterization phase testing
   - 8.4. Organization for qualification phase for candidates, host labs and test labs (NDA etc.)

9. Standard process and project plan (WB-2)   99-488R

10. Documents and editors (WB-1)   99-314, 167

11. AOB   71