Source: ARIB Codec WG

Title: Proposal for Baseline version and schedule

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INTRODUCTION

From ARIB point of view, it is important that the work in Working Group 4 proceeds quickly with clear milestones. It would be beneficial if Working Group 4 could discuss and agree on work packages and schedules already in the 1st meeting. This paper introduces the work items of the ARIB Codec WG to be used here as a discussion basis for work packages and makes a proposal to prepare a Baseline specification version by April 1999.

WORK ITEMS IN ARIB CODEC WG

Work in ARIB Codec WG can be catergorised into three different items, namely (1). Mandatory Speech Codec for Telephony Service, (2). Codecs for other speech and audio related services and (3). Codecs and Systems for the Video Multimedia Services. Below provides some detailed information about the categories and the approach taken in ARIB in the standardisation work. The information here is provided as the discussion basis for the work packages for this Working Group 4.

1. Mandatory Speech Codec for Telephony Service

The purpose of this work in ARIB is to select one mandatory speech codec for Telephony Service. This codec must be supported in terminals and in the network transcoder. In order to do the selection according to the tight time schedules, ARIB Codec WG chose to study only already standardised speech codecs and codecs which will be standardised in time for the final selection.

2. Codecs for other speech and audio related services

A list of work items for this category is given below. The text in the parenthesis provides the tentative standardisation classification in the final standard (Mandatory/Optional/Recommended[*1]). The final standardisation schedule and the need for each specific codec to be included in the specifications will be assessed separately and it will depend on the specified services and system requirements.

- optional codec(s) for Telephony Service (Optional)
- codec(s) for High Quality Speech Service (Optional or Recommended)
- codec(s) for High Quality Audio Service (Recommended)
- codec(s) for Hi-Fi audio Broadcasting Service (Recommended)

[*1] Recommended : Recommended Specification means the specification to which equipment is recommended to be designed as a preferred approach in order for the service to be maintained to the intended quality and connectivity. The operators and equipment manufactures may choose other specifications for the same service at their discretion.

3-2 Survey result of video coding standards applicable to IMT2000
    The following table was included in the VMG activity report of 1997.

3-2.1 Summary of SG-2 activity report
    Followings are the summary of the SG-2 activity report.
(1) Video coding standard
    Among many video coding standards in Table.1, most of the coding standards except MPEG-2 can be applied to IMT2000 network because their codec bit-rate is lower than 2 Mbps.
(2) Requirements for real-time bi-directional VM codecs
Bit error rate: BER equal to or less than 1e-6 could be required t for VM codecs, which are designed for the use of conventional land networks. Though BER equal to or less than 1e-3 should be required for error resilient VM codecs, which are designed for the mobile terminals in IMT2000, BER equal to or less than 1e-4 seemed to be practical. This is because BER equal to 1e-3 sometimes makes a tough condition even for error resilient VM codecs.
Delay: Based on the end to end delay requirement for speech communications using echo canceller, the same upper limit, 400msec, is also defined as the delay requirement for real time bi-directional VM codecs.

3-2.2 1st test
    This test aims at evaluating the performance of the possible VM codecs on mobile channels at the average BER =10^{-3} and 10^{-4}.
The outline of the 1st test is as follows:
(1) Participant: DoCoMo, Oki, Texas Instruments, Motorola, Nokia, Ericsson, Matsushita,
         Sharp, Toshiba
(2) Test schedule: Test plan   15th of Jan. – 26th of May. 1998
(3) Video coding: MPEG-4 Simple Profile / H.263 Ver.2 (No feed back channel)
(4) Mux/De-mux: H.223 M (Mobile extension of ITU-T H.223)
(5) Speech coding: No speech coding
(6) Bit rate: 64kbps (at Multiplexer output)
(7) Error pattern: 1e-3/ 1e-4 W-CDMA up/down link (3km/h 40km/h)
(8) Test material: Overtime (NTT-DoCoMo) QCIF
(9) Evaluation: Very simple subjective test by VMG members

3-2.3 2nd test
    This test aims at clarifying the relationship between source/channel codec parameters and the channel QoS parameters of available bearer channel set.

Outline of the test procedure is shown bellow:
(1) Experimenters: Canon, Ericsson, Hitachi, Matsushita, Mitsubishi, NEC,
        Nokia, DoCoMo, Oki, Sharp, Texas Instruments, Toshiba
(2) Test schedule: – Mar. 15th 1999
(3) Video coding: ISO MPEG-4 Simple Profile / ITU-T H.263 Ver.2
(4) Mux/De-mux: H.223 M (Mobile extension of ITU-T H.223)
(5) Audio/speech coding: actual codec or dummy data (random number)
        decoded signals are not to be evaluated
(6) Bit rate: 32,64,128 kbps (at Multiplexer output)
(7) Error pattern: 1e-3/ 1e-4 /1e-6 (3km/120km)
        based on IMT2000 Air-Interface specification (Vol.3) Ver 0.5 (ARIB)
(8) Test material: Overtime (NTT-DoCoMo)
        Australia (France Telecom)
(9) Evaluation: T.B.D.

3-3   Video Multimedia codec standrd draft
    This section describes the draft of Vol.8 chapter 6 and 7. The chapter 6 describes 'Video Multimedia Codec for Circuit Switched Channels' and the chapter 7 'Video Multimedia Codec for Packet Switched Channels.'

,U•DVideo Multimedia Codec for Circuit Switched Channels
        -Real-time and Bi-directional -

6.1   Overview
    This chapter describes video multimedia (VM) codec systems that can be applied to the real-time and bi-directional video services stated in Volume 1 within the use of the circuit switched channels over the IMT-2000 networks. As the levels of the Quality Of Service (QoS) provided by IMT-2000 networks will vary, the applicable codec may change.

    The purpose of this chapter is not to set any mandatory implementation requirements for the IMT-2000 terminal and network manufacturers but to provide a set of recommendations instead. Among the possible VM codec systems for circuit switched channels, the ITU-T's H.320, H.324, H.324 Annex C and the H.324 extensions are designed for mobile environments. Since they have error resilient capabilities, they could be applied to the error prone conditions in the IMT-2000 network. Also, the H.320 and the H.324 may be applied to the low transmission error conditions in the IMT-2000 network .

    The relation between the QoS of the IMT-2000 networks and the examples of applicable codec systems are shown in Table XXX of Appendix ?? as information for implementation.

    As for the textstandards used in this section, the latest versions will be referred to, unless any specific reasons are illustrated . This section may be revised in some special occasions.

6.2 Application and services
6.3 Requirements
6.4 System description
   6.4.1 VM codec systems for IMT2000 circuit switched networks
     6.4.1.1   H.324 Annex-C
     6.4.1.2   Extended H.324 Annex-C
6.5 Video coding
6.6 Speech Coding

4 CONCLUSIONS

This paper introduced ARIB CODEC-WG activities and will be helpful for the further discussion of the work packages in this Working Group 4.