MM DKT. 87-268

IS/WP2-0185
17 APR 92

ADVISORY COMMITTEE ON ADVANCED TELEVISIONS SERVICE
IMPLEMENTATION SUBCOMMITTEE
WORKING PARTY 2 - TRANSITION SCENARIOS
MINUTES OF THIRTY-SEVENTH MEETING 3/25/92

I. PROPONENTS MEETING

1. The meeting was called to order by Acting Chairman, Merrill Weiss, at 9:35 A.M. at Bellcore in Washington, D.C. This meeting was a joint meeting which included IS/WP2, SS/WP3, PS/WP5 and ATV system proponents (NHK, General Instruments, ATRC and Zenith).

2. The agenda was adopted with corrections of spelling errors.

3. A list of attendees is attached.

4. Merrill Weiss opened the meeting by briefly describing the IS/WP2 efforts on development of industry PERT charts. He also stated that each of the Proponents (except MIT) has responded to a list of questions developed by IS/WP2 and that some additional follow-up questions have been generated after reviewing Proponent responses. IS/WP2-0184. Mr. Weiss explained that a joint meeting with the Proponents is being held since many of the questions for Proponents are common among the participating working parties. The order of proceedings for the meeting was established as follows:

   a) Proponent Presentations/Q&A

   b) Review of Proponent Responses

   c) Review of ATV Block Diagrams

   d) Review of System Specific PERT Networks/Assumptions

   Mr. Weiss stated that Proponent responses may assist IS/WP2 in their resurvey of professional equipment manufacturers.

5. NHK Presentation

Keiichi Kubota presented an overview of the Narrow Muse system and reviewed NHK responses to the IS/WP2 question list (IS/WP2-0179) and IS/WP2 follow-up questions (IS/WP2-0180). Considerable discussion took place on the topics of VCR special effects, Narrow Muse power requirements and S/N of Narrow Muse.

6. DigiCipher Presentation

Bob Rast declined to make a formal presentation and objected to the possible competitive situation with which the Proponents were faced in this joint meeting. Mr. Rast stated that all Proponents are faced with 20 Mbits through a channel, but many different claims are being made. Mr. Rast also made the following comments:

- The DigiCipher system has been tested with over the air transmissions in San Diego and four different times in Washington, D.C.

- GI is not worried about handling VCR special effects, but cannot share any details at this time.

- Six different custom IC designs are required with an 18-24 development cycle. The key is when there is enough certainly to start development.

- 1995 product is still realistic.

Merrill Weiss responded to Bob Rast's concerns by stating that IS/WP2 is tasked with identifying system specific differences that may impact implementation and that the intent is not to create a competition, but IS/WP2 needs information to sort out claims from facts.

Bob Rast stated that GI recognizes the need for release of more information concerning data structure and that this is likely to happen within the next few weeks. The need for more technical information is also recognized, but efforts have not begun to generate such information. Mr. Rast also stated that industry specific questions generated by IS/WP2 have previously been answered in writing, but responses to the second set of questions have not been generated.

7. Zenith Presentation

Carl Eilers began the Zenith presentation by stating that he doesn't believe most broadcasters can afford implementation of the "ATV Transitional Television Station" block diagram. Mr. Eilers then briefly described a simplified view of the start-up process. Merrill Weiss suggested that further discussion on this topic be deferred until Thursday's meeting.

Carl Eilers reviewed Zenith's responses to the IS/WP2 follow-up questions. IS/WP2-0181. Significant discussion took place on the amount of compression that could be done on an HDTV signal and still have that signal be used in a broadcast facility for doing image manipulation. A discussion also took place on the availability of 3H consumer type magnetic components.

8. ATRC Presentation

Glenn Reitmeier reviewed the key elements of AD-HDTV and discussed the decisions involved in selecting these elements. The full presentation is shown in IS/WP2-0182. Considerable discussion took place on the MPEG++ compression system. Mr. Reitmeier commented that a time frame of two years for general market availability of HDTV product was reasonable after an unambiguous system decision by the FCC. Merrill Weiss stated that this was not consistent with the PERT charts presented by IS/WP2 and that ATRC should review these PERT charts.

Mr. Reitmeier reviewed ATRC's response to IS/WP2 follow-up questions and said that written answers will be provided.

II. IS/WP2 BUSINESS

1. The minutes of the 2/26/92 meeting were not reviewed. Those having corrections were instructed to contact Larry Cochran prior to the next meeting. The document number for the 2/26/92 meeting will be corrected to IS/WP2-0178.

2. A brief discussion took place on the MIT response to IS/WP2 questions. IS/WP2-0183. It was decided that a conference call would be scheduled on 4/2/92 at 3:00 P.M to review the MIT response in more detail and prepare follow-up questions.

3. Merrill Weiss reported that SS/WP4 Chairman, Bob Hopkins, has asked for preliminary inputs for the Final Report by 4/15/92. It was agreed that this subject will be taken up during the 4/2/92 IS/WP2 conference call.

4. The next meeting is scheduled as follows:

Tuesday, April 21, 1992
12:30 P.M. - 5:30 P.M.
NCTA
3rd Floor Conference Room
1724 Massachusetts Avenue
Washington, D.C.

5. The meeting was adjourned at 6:35 P.M.

ADVISORY COMMITTEE ON ADVANCED TELEVISION SERVICE
IMPLEMENTATION SUBCOMMITTEE
WORKING PARTY 2 ON TRANSITION SCENARIOS (IS/WP-2)
JOINT MEETING WITH PROPONENTS, SS/WP-3, AND PS/WP-5

Wednesday, March 25, 1992
9:00 AM
Bellcore
2101 L Street NW
Suite 600
Washington, DC

AGENDA

1. Adoption of Agenda

Proponent Presentations/Q&A

2. Introduction (M. Weiss) (20 min)
3. Narrow MUSE (K. Kubota) (2 hr)
4. DigiCipher (R. Rast) (2 hr)
5. DSC-HDTV (C. Eilers) (2 hr)
6. AD-HDTV (G. Reitmeier) (2 hr)

IS/WP2 Business

7. Approval of 2/26/92 Minutes
8. Review MIT Submission
9. Review and Update 2/26/92 Meeting Action Items
10. Next Meeting

TRANSITION SCENARIOS

WP-2

March 26, 1992

NAME	COMPANY	ADDRESS	PHONE
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Ron Lee	Zenith	1000 N. Milwaukee Ave, Glenview IL.	(708)391-8384
Bob Rast	GI	6262 Lusk Blvd. San Diego, CA 92121	619/535-2532
Matt Miller	General Instrument	125 Chubb Avenue Lyndhurst, NJ 07071	201-507-3027
Ralph Gerbone	AT&T-Microelectronics	2 Oak Way Berkeley Hts. N.J.	908-771-3958
Wayne Luplow	Zenith	1000 N. Milwaukee Glenview IL 60091	708-391-7873
Charles Heller	Zenith	1000 Milwaukee Ave Glenview IL 60022	708 391-8531
Werner Wedam	Samsung	1009 Lenox Dr. Lawrenceville, NJ 08648	609-896-3738
Ralph Justus EIA		2001 Penn. Ave NW WDC 20006	202-457-8216
Weston Vivian	University of Michigan	Ann Arbor, Michigan 48109	313-763-9181 (F) 313-764-9114

TRANSITION SCENARIOS

WP-2

March 25, 1992

NAME	COMPANY	ADDRESS	PHONE
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13/WP2-0114
25 MAR 92

Summary of Narrow-MUSE Simulcast System

Coding Scheme: Motion Adaptive/Compensated Multiple Sub-Nyquist Sampling

Modulation Scheme: Frequency Split Amplitude Modulation Analog!

Advantages:
- Performance is proven.
- Decoder chips are already available.
- Production equipment is available. (based on SMPTE 240M)
- Simple transmitter can be used.

NHK

Extensibility (General, 1)

Improvement of Dynamic Resolution using multiple motion vectors

Upgrade to Fullband MUSE

MUSE Family
- MUSE-T (designed for contribution)
- MUSE-E (used for DBS)
- N-MUSE (designed for terrestrial HDTV)
- MUSE-4 (four-channel NTSC)

NHK

Extensibility (General, 1)

Improvement of Dynamic Resolution

Certain data capacity in ancillary data channel must be reserved for additional motion vector data.

Ex. 60 kbps if 140 vectors/field
(currently one vector/field)

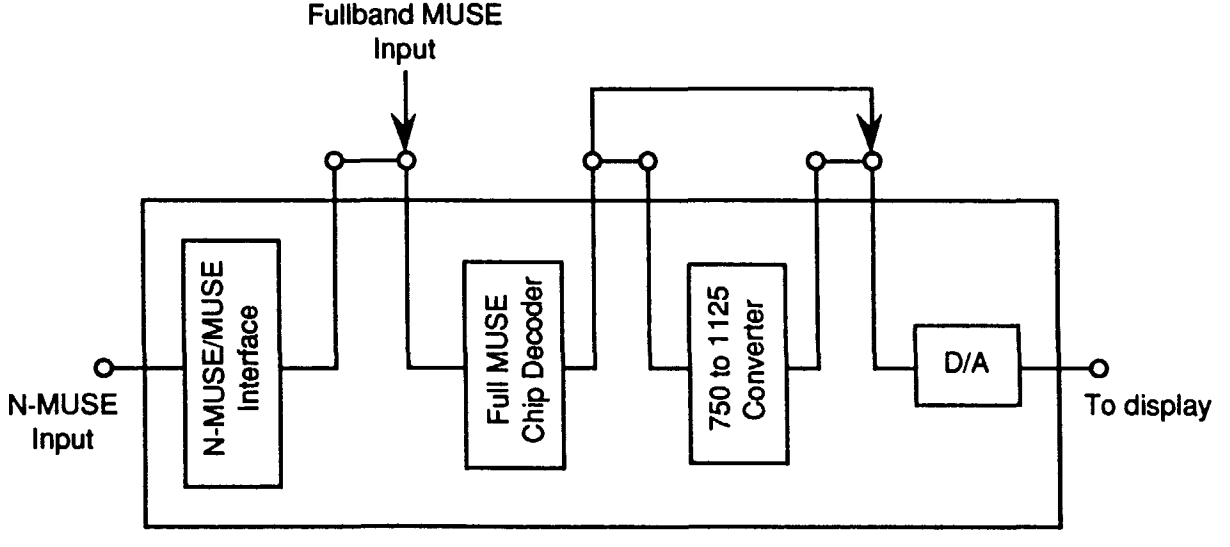
Receivers should include additional control circuit and memory.

NHK

Extensibility (General, 1)

Upgrade to Fullband MUSE

Narrow-MUSE receiver should use fullband MUSE decoder chips, and must have interface point with fullband MUSE.



Narrow-MUSE decoder

NHK

Information Availability & Transfer
(General, 2, 3)

Information for standardization will be available immediately after the ACATS's recommendation for field test.

A part of baseband coding is already standardized in Japan and is in public domain.

Information for manufacturing commercial equipment will be available during the period of generation of the NPRM.

This information is provided to any applicants through NHK Engineering Service Inc. under reasonable terms and conditions.

NHK

Decoder Chips (General, 4)

No plans and no arrangements to develop specific Narrow-MUSE chips.

First generation decoder chips for fullband MUSE are available now, and can be used for Narrow-MUSE receivers.

The use of fullband MUSE chips for Narrow-MUSE receiver is recommended from economical and extensibility points of view.

NHK

Decoder Chips (General, 4)

Second generation decoder chips is under development and will be available in April, 1992.

- o TOSHIBA + MOTOROLA
- o SANYO + LSI LOGIC
- o SONY + HITACHI + FUJITSU + TEXAS INSTRUMENTS
- o NEC + MATSUSHITA + MITSUBISHI + SHARP + PIONEER
  + MATSUSHITA + NEC HOME ELECTRONICS + LSI LOGIC
  + VLSI TECHNOLOGY + JVC

NHK

Time of Introduction (General, 5)

Narrow-MUSE can be introduced within 3 years after FCC's decision to both terrestrial and alternate media.

The critical path would be broadcast transmitter facility.

Development period of the following equipment can be shortened or eliminated.

Consumer receiver: Chips already available

Professional equipment:

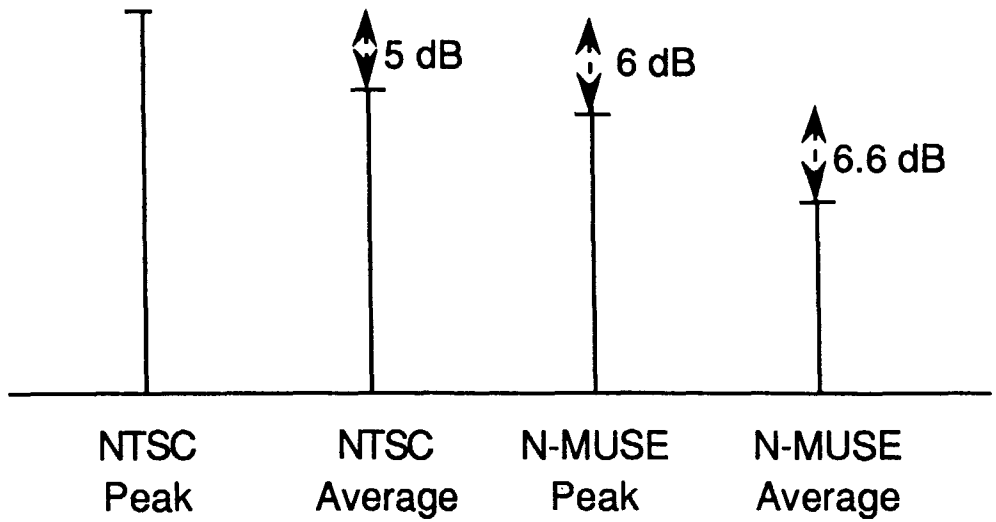
240Mequipment available

NHK

Power Level Requirement (Broadcast, 1)

Narrow-MUSE <u>peak</u> power is 6 dB lower relative to NTSC <u>peak</u> power.

Narrow-MUSE <u>average</u> power is 7.6 dB lower relative to NTSC <u>average</u> power. (This is not important for analog modulation.)



NHK

Power Level Requirement (Broadcast, 1)

The same S/N is obtained by 6 dB lower power level under the same noise figure because of 1) positive sync (3 dB) and 2) Nyquist filter at transmitter end (3 dB).

Improvement of noise figure in ATV receiver (4 to 7 dB compared to NTSC receiver is expected) will be reserved for S/N improvement of Narrow-MUSE service.

NHK

Transmitter & Antenna Characteristics

(Broadcast, 1)

Frequency response variation:

± 1.5 dB (f_V-0.2 to f_V+5.8)

Group delay variation:

± 50 nsec (f_V-0.2 to f_V+5.8)

Transient response errors:

less than 2% (measured by 2T pulse)

Amplitude nonlinearity:

less than 5%

Output system return loss:

-20 dB over the 6 MHz channel

NHK

Transmitter & Antenna Characteristics (Continued)

(Broadcast, 1)

Incidental carrier phase modulation:

±3 degrees relative to the phase at the peak white level

Phase stability:

50 dB down in a 1 kHz bandwidth, 20 kHz from the video carrier as observed on a spectrum analyzer

60, 120, and 360 Hz AC hum:

-50 dB (rms)

NHK

Program Origination Format (Broadcast, 2)

SMPTE 240M (1125/60/2:1) is the program origination format for Narrow-MUSE.

At the very beginning of service, NTSC can be used for program origination in conjunction with upconverter. Up converter from NTSC to 240M is available on the market.

Narrow-MUSE can accept intermediate format, however this approach is not recommended.

NHK

Compression in the Studio (Broadcast, 2)

Two to one or four to one compression of 240M could be used for production and post production.

No clear answer at this moment, further study is necessary.

NHK

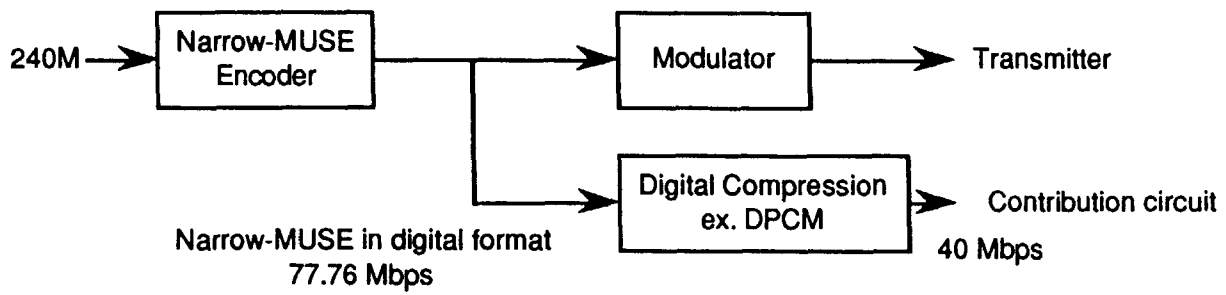
Distribution Signal Format (Broadcast, 3)

Digitally compressed 240M

240M signal is compressed to approximately 60 Mbps.
Motion compensated DCT is most likely.

Digitally compressed Narrow-MUSE

Narrow-MUSE is further compressed to 40 Mbps.
DPCM is most likely.



NHK

Further production at Affiliates (Broadcast, 4, 5)

Digitally compressed 240M

Three processes (cut, key, full) are possible after full decoding.

Number of possible concatenations of coding/decoding is two.

Digitally compressed Narrow-MUSE

"Cut" is possible in Narrow-MUSE domain after decoding of digital compression.

Number of possible concatenations of coding/decoding is two.

NHK

STL and Similar Circuit (Broadcast, 6)

Analog transmission: (FM)

45 MHz channel required

NTSC:	17 MHz
N-MUSE:	17 MHz
Guard band:	11 MHz

Digital transmission: (QPSK)

34 MHz channel required

NTSC:	17 Mbps
N-MUSE:	40 Mbps

Digital transmission: (8PSK)

25 MHz channel required

NTSC:	17 Mbps
N-MUSE:	40 Mbps

NHK

Contribution Signal Format (Broadcast, 7)

Digitally compressed 240M

120 Mbps: Number of possible concatenations = more than five

60 Mbps: Number of possible concatenations = two

NHK

Conditional Access (Cable, 1)

The combination of line rotation and line permutation is used.

Key data is multiplexed during vertical blanking interval as a digital form. This part must be decoded to obtain key data, although there is no need to decode video signal.

Decoder chips are already developed.

Current prototype encoder consists of one rack with three shelves, and can be reduced in size.

NHK