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100/2566/DC

2015-09-04

INTERNATIONAL ELECTROTECHNICAL COMMISSION

TECHNICAL COMMITTEE No. 100: AUDIO, VIDEO AND MULTIMEDIA SYSTEMS AND EQUIPMENT

TECHNICAL AREA 4: Digital system interfaces and protocols

Subject: Call for experts for a new Stage 0 project,

PT 100-12

“IEC 60958 enhancement” (TA 4)

To all National Committees,

According to the TA 4 Action Item and AGM recommendation (100/TA4(Milan/TS)30 and 100/AGM(Secretariat)1223), IEC TC 100 TA 4 would like to establish a Stage 0 Project as follows:

- Title : Stage 0 Project on “IEC 60958 enhancement”
- Scope : To identify opportunities for standardization of higher quality consumer audio interfaces based on the IEC 60958, which includes:
 - To study use cases,
 - To investigate backward compatibility,
 - To estimate future scalability and
 - To prepare proposals for higher quality consumer audio interfaces

TA 4 expects this project will enhance the existing standards, IEC 60958-1, 60958-3 and 61937-1, and be able to develop new potential standards, 60958-5 and so on. For more information, it is recommended to refer to a presentation material presented at the previous TA 4 meeting held in Milan, which is attached as Annex. TA 4 is also pleased to inform that it was agreed to appoint the following member as a Project Leader.

Mr. Gen Ichimura (JP)

National committees are kindly requested to nominate experts who have expertise in this field and can make a contribution to the work of this project, using the IEC Expert Management System by

2015-10-16.

Kwang-Soon Choi
Technical Secretary, IEC TC 100 TA 4

Annex



100/TA4(Milan/JPNC)28

Proposal: Start-up of New Study Session in TA 4

IEC TC 100 TA 4 Meeting
2015/04/21 Milan

MT 60958-1&-3 Convenor: Mr. Junichi Yoshio
MT 61937-1, -2&-7 Convenor: Mr. Gen Ichimura
MT 61937-6 Convenor: Mr. Akihisa Kawamura

We, 3 convenors, would like to propose start-up
of new Study Session in TA 4.

A candidate of the session name is
IEC 60958 ENHANCEMENT

- Enhanced digital audio interface and protocol
for consumer applications .

Your cooperation would be appreciated.

contents

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- Organization
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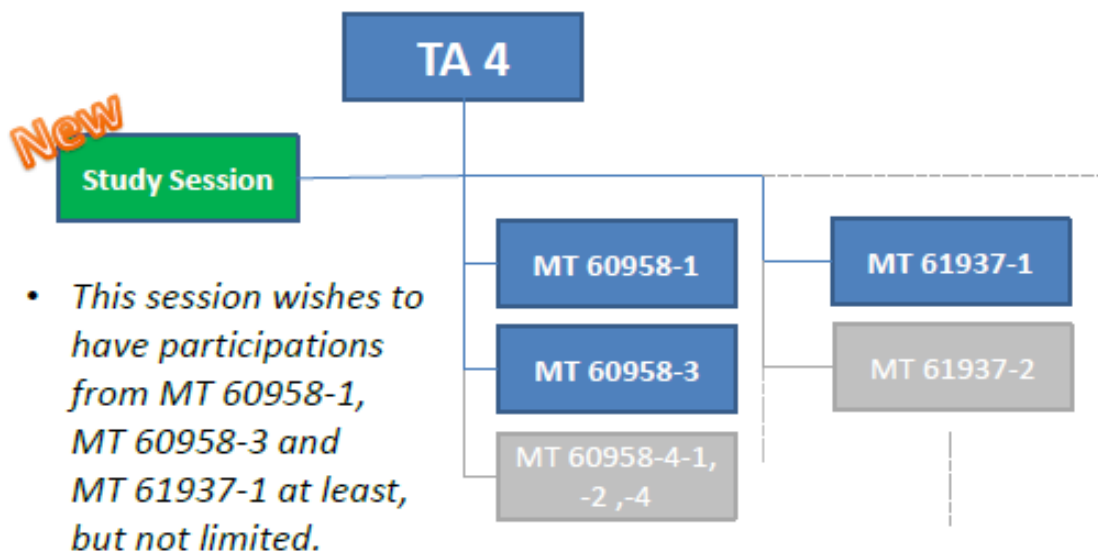
Background

- Modern consumer digital audio application supports higher quality audio(Hi-Fi/Hi-Res /Surround) than primary IEC 60958.
- IEC 60958 is expected for fundamental enhancement to interface such a higher quality audio.
 - *Needs more channel than the current (LPCM)2ch*
 - *Needs more bit depth than the current 24bit*
 - *etc*

Scope

- Study Use case and make proposals to interface higher quality consumer audio.
- Investigate backward compatibility.
- Estimate future scalability.
- Wish list
 - Utilize IEC 60958 eco-system
 - Low complexity

Organization



Preparatory study

- We have already discussed some solutions;
 - *Assign Multi LPCM mode to IEC 60958*
 - *Assign specific IEC 60958 -3 frame rate*
 - *New preamble*
 - *New balanced transmission physical layer*

– but has not concluded.
- This Study Session will be expected to discuss more deeply and widely about higher quality audio interface and protocol.

Goal

- Expected outcome of this session may be
 - Maintenance requests of
 - *IEC 60958-1*
 - *IEC 60958-3*
 - *IEC 61937-1*
 - New standardization proposal
 - *New IEC 60958-5(?)*

– *But not limited.*

Schedule

- We believe this Study Session could conclude within 2 years.
- We recommend Mr. Gen Ichimura for a session leader.
- We will have a pre-meeting with AES experts in Warsaw 2015 May 07/08 in conjunction with the AEISSC meeting.

thanks

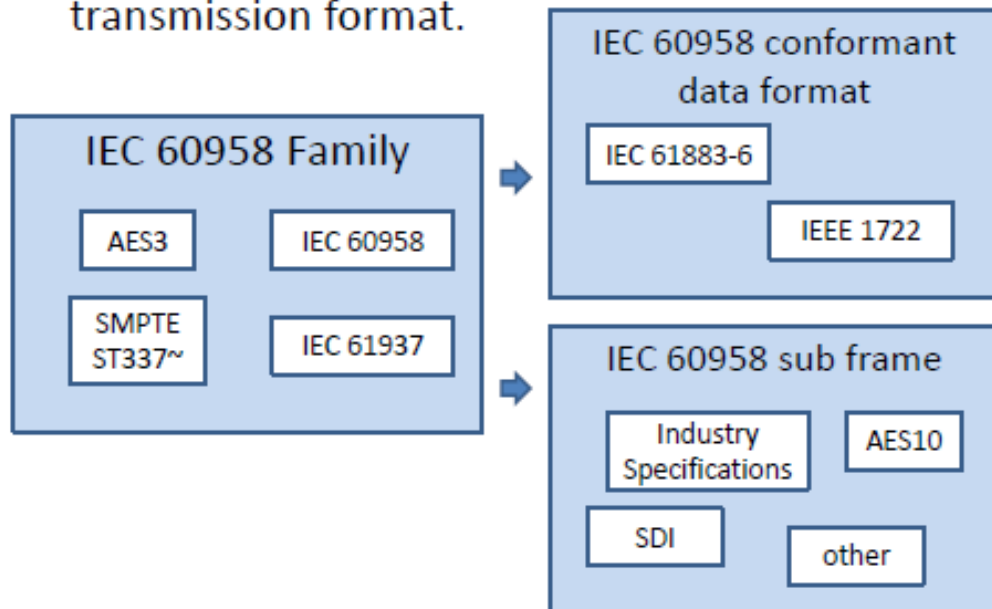
SUPPLEMENT

Scope of the current IEC 60958-1

- This International Standard describes a serial, uni-directional, self-clocking interface for the interconnection of digital audio equipment for consumer and professional applications.
- It provides the basic structure of the interface. Separate documents define items specific to particular applications.
- The interface is **primarily** intended to carry **monophonic or stereophonic** programmes, encoded using linear PCM and with a resolution of **up to 24 bits per sample**.
- When used for other purposes, the interface is able to carry audio data coded other than as linear PCM coded audio samples. Provision is also made to allow the interface to carry data related to computer software or signals coded using non-linear PCM. The format specification for these applications is not part of this standard.
- The interface is intended for operation at audio sampling frequencies of 32kHz and above.
- Auxiliary information is transmitted along with the programme.

IEC 60958 Eco-system

- IEC 60958 is used as a fundamental audio transmission format.

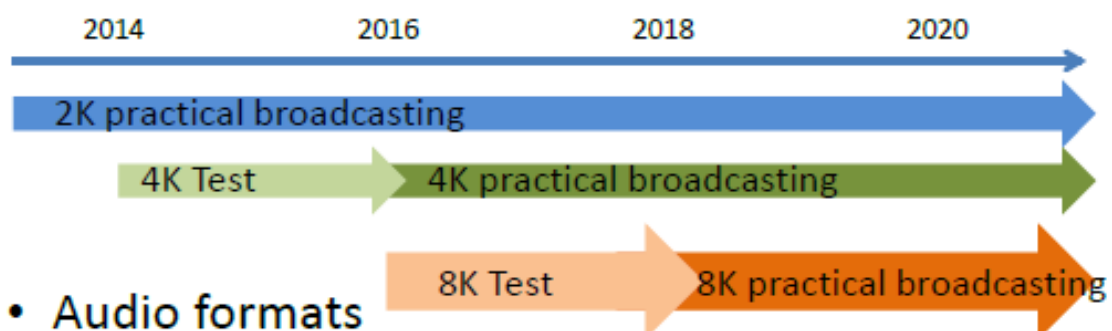


Proposal: New SS in TA 4: Milan meeting

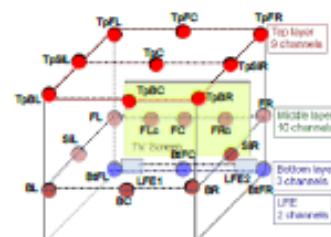
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22.2ch for 8K SHV broadcasting

- Roadmap toward 8K broadcast via satellite



- Audio formats
 - Up to 22.2ch multi-channel (Rec. ITU-R BS.2051)
- Audio source coding
 - MPEG-4 AAC
 - MPEG-4 ALS (lossless)



Proposal: New SS in TA 4: Milan meeting

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Audio format extension

	IEC 60958-3	Hi-Fi/Hi-Res	Surround
Channel number	2-ch	2-ch	up to 32-ch
Sample word length	up to 24bit	up to 48bit	16bit, 24bit
Sampling frequency	up to 192kHz	up to 384kHz	48kHz, 96kHz

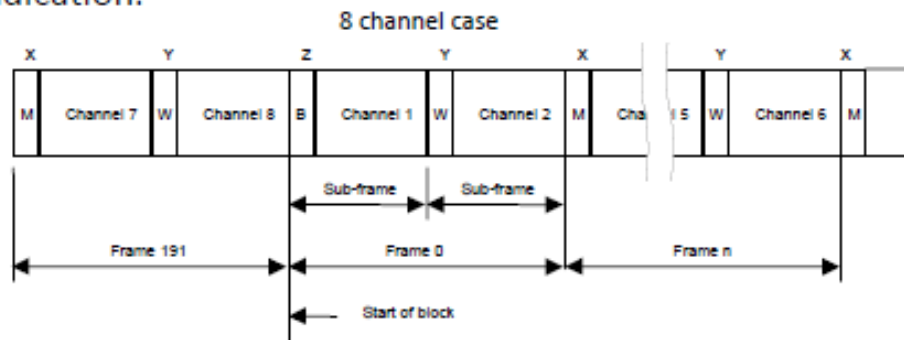
- Hi-Fi/Hi-Res: need more audio sample word length
- Surround: need more audio channel number

High Frame Rate Audio

- *IEC 61937-5/-9 has already utilized high IEC frame rate such as 768kHz.*
 - *Commercially they can be realized by industry specified Audio/Video interface using conformable packet to IEC 60958 format.*
- *We wish IEC 60958 to have real transport in a low complex way.*

Assign Multi LPCM mode to IEC 60958

- Some methods can be applied, the basic method is what it was originally planned as showed bellow with channel status indication.



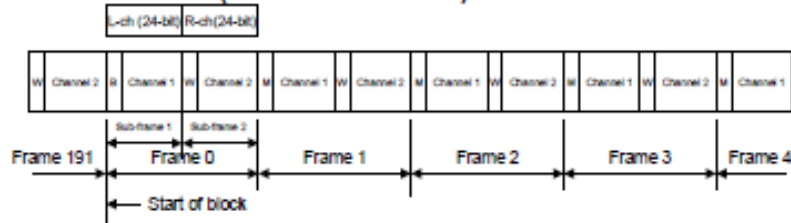
- The best method should be chosen from the view point of impact and compatibility to the legacy receivers.

Assign specific IEC 60958 Frame Rate

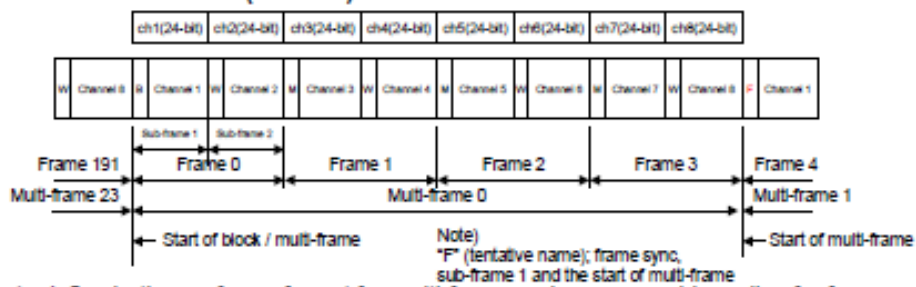
- *For multichannel LPCM usage, specific IEC 60958-3 frame rates will be assigned.*
 - 144kHz (= 48k x 3) for 6 (5.1)ch LPCM
 - 288kHz (= 48k x 6) for 12 (10.2)ch LPCM
 - 576kHz (= 48k x 12) for 24 (22.2)ch LPCM
 - *These are new sampling frequencies and has not been utilized in the IEC 60958-3.*
 - *Also multichannel mode should be identified with new area of channel status bit.*
- *Any impact on legacy receivers?*

Example of Channel number extension

2-ch 24-bit LPCM (IEC 60958-3)



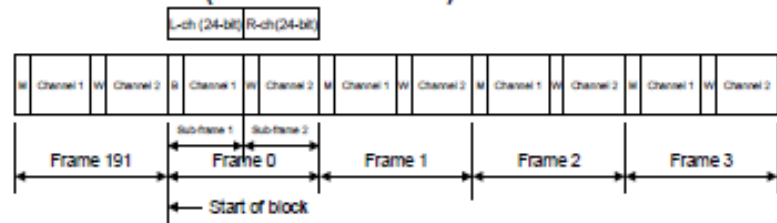
8-ch 24-bit LPCM (New)



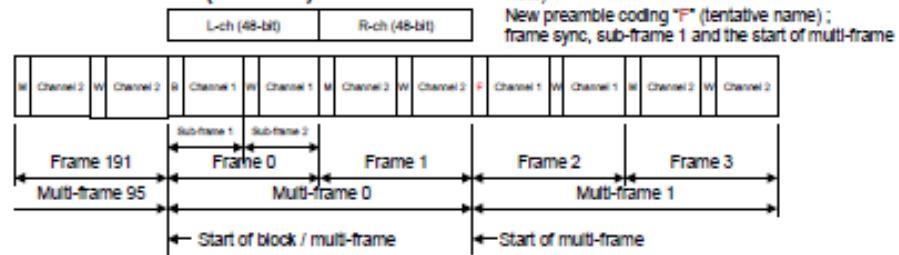
> It is necessary to define both new frame format for multi-frame and new preamble coding for frame sync

Example of Sample word length extension

24-bit 2-ch LPCM (IEC 60958-3)



48-bit 2-ch LPCM (New)



> It is necessary to define both new frame format for multi-frame and new preamble coding for frame sync

New balanced transmission physical layer

- According to IEC 60958-1/3, Consumer application has utilized unbalanced line or optical one.
 - Higher quality audio requires higher speed, so balanced transmission is appropriate in avoiding EMI/EMC.
 - New optical link should be investigated.
- Conflict with IEC 60958-4 shall be considered...
- Different type connector (not XLR, not RJ45)?

Potential standardization work

