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| **Keywords:** | QoS; QoE; driver distraction; car communications; video quality; SG12; |
| **Abstract:** | In line with WTSA-16 Resolution 1, this report provides updates about the SG12 lead study group activities. |

## Lead study group on quality of service and quality of experience

In the reporting period, SG12 held two study group meetings; one meeting of its Regional Group on QoS for the Africa Region (SG12RG-AFR); one meeting of the Quality of Service Development Group (QSDG); and organized three workshops.

Since the last meeting of TSAG, new organizations have enrolled in ITU-T SG12 as new Associates, a positive trend that can be attributed to proactive outreach, technically sound outputs, and constructive and cordial working environment.

The executive summary of the May 2018 meeting of SG12 can be found at https://www.itu.int/en/ITU-T/studygroups/2017-2020/12/Pages/1805-summary.aspx. A webinar ([announcement](http://news.itu.int/new-itu-standards-for-video-gaming-experience-webinar/) | [recording](https://itu.int/en/ITU-T/studygroups/2017-2020/12/Documents/2018-05-10-webinar.mp4) | [slides](https://www.itu.int/md/T17-SG12-180501-TD-GEN-0575/en)) was held following the closing plenary, summarizing key meeting results.

The second meeting of SG12 this year concluded last Thursday, 6 December. The traditional webinar was held following the closing plenary, summarizing key meeting results ([announcement](https://news.itu.int/standards-webinar-sg12/) | [recording](https://itu.int/en/ITU-T/studygroups/2017-2020/12/Documents/2018-12-06-webinar.mp4) | [slides](https://www.itu.int/md/T17-SG12-181127-TD-GEN-0744/en)).

Among other achievements in the reporting period, SG12 revised and amended Recommendations ITU-T E.802 (“Framework and methodologies for the determination and application of QoS parameters”), P.501 (“Test signals for use in telephonometry”), Y.1543 (“Measurements in IP networks for inter-domain performance assessment”) and Y.1546 (“Hand-over performance among multiple access networks”).

New Recommendations address “Artificial noise-fields in laboratory conditions” (ITU-T P.570 (06/18)), “Subjective evaluation of speech quality with a crowdsourcing approach” (ITU-T P.808 (06/18)), “Statistical framework for end to end network-performance benchmark scoring and ranking” (ITU-T E.840 (06/18)).

The recent SG12 meeting consented a revision to ITU-T G.191 “Software tools for speech and audio coding standardization”. The revision represents a major overhaul of the software tool library and was developed in an open source software project on GitHub, <https://github.com/openitu/STL>.

The meeting also gave consent to Recommendation ITU-T Y.1550 “Considerations for realizing virtual measurement systems”, the first in a series of Recommendations on virtual measurement systems studied under Question 8/12 (Virtualized deployment of recommended methods for network performance, QoS and QoE assessment), established by WTSA-16.

SG12 also finalized work on a “Subjective test methodology for evaluating speech oriented stereo communication systems over headphones” which will be known as P.811.

Achievements related to video communications and applications will be discussed below.

## Lead study group on driver distraction and voice aspects of car communications

Q4/12 on objective methods for speech and audio evaluation in vehicles held one rapporteur group meeting in the reporting period.

Revisions to Recommendations ITU-T P.1100 and P.1110 on hands-free communication in motor vehicles were consented on 6 December 2018.

The work item on transmission characteristics for in car communication (P.ICC) is seeing great interest from the automotive industry and remains a key priority for SG12. Completion is targeted for 2019.

SG12 is liaising with the newly established Focus Group on Vehicular Multimedia.

## Lead study group on quality assessment of video communications and applications

Several Recommendations discussing on quality assessment of video communications and applications were revised by SG12 in the reporting timeframe: This includes revisions to the “Opinion model for video-telephony applications” (ITU-T G.1070 (06/18)) and to two modules of the “Parametric bitstream-based quality assessment of progressive download and adaptive audiovisual streaming services over reliable transport” suite of Recommendations (P.1203.1 and P.1203.3, consented on 6 December 2018), and an Amendment to the “Hybrid perceptual bitstream models for objective video quality measurements” (J.343).

New work addresses “Subjective evaluation methods for gaming quality” (P.809 (06/18)), “End-to-end QoS for Video Telephony over 4G mobile networks” (G.1028.1, consented on 6 December 2018), and a “Subjective test methodology for assessing impact of initial loading delay on Quality of Experience” (P.917, consented on 6 December 2018)

Under the leadership of Q14/12 on models and tools for multimedia quality assessment of packet-based video services, SG12, in collaboration with the Video Quality Experts Group (VQEG), is progressing work to extend P.1203 to provide support for ‘4K’ UHD video (work item P.NATS Phase II).

A table covering important elements of the work on this topic is made available in Annex.

**Annex: Recommendations and Work Items for Video Services**

|  | **Recommendation** | **Title** | **Summary** |
| --- | --- | --- | --- |
| Factors or Measurement parameters | G.1010 | End-user multimedia QoS categories | This Recommendation defines a model for multimedia QoS categories from an  end-user viewpoint. By considering user expectations for a range of multimedia applications, eight  distinct categories are identified, based on tolerance to information loss and delay. |
| G.1032 | Influence factors on gaming quality of experience | This Recommendation describes the QoE factors of video gaming |
| G.1080 | Quality of experience requirements for IPTV services | This Recommendation defines user requirements for QoE for IPTV services. |
| G.QoE-VR  (ongoing) | Influence factors on virtual reality service quality of experience |  |
| G.QoE-AR  (ongoing) | QoE factors of Augmented Reality (AR) |  |
| G.IPTV-MP  (ongoing) | IPTV monitoring parameters | This work will define different monitoring parameters for IPTV services at different monitoring points |
| G.MDKT  (ongoing) | Methodology for Determining QoE-relevant KPI Thresholds | This Recommendation will provide a methodology for selecting QoE-relevant KPIs (e.g. throughput) as independent variables and the per-session MOS predicted with a QoE model as a dependent variable |
| Planning models | G.1071 | Opinion model for network planning of video and audio streaming applications | This Recommendation provides algorithmic models for network planning of video and audio quality of IP-based video services. |
| G.1070 | Opinion model for video-telephony applications | This Recommendation defines an algorithm that estimates videophone quality for QoE/QoS planners. This model can be used by QoE/QoS planners to help ensure that users will be satisfied with end-to-end service quality. |
| Monitoring models | P.1201 (PNAMS) | Parametric non-intrusive assessment of audiovisual media streaming quality | This Recommendation provides an algorithmic model for non-intrusive monitoring of the audio, video and audiovisual quality of IP-based video services based on packet-header information. Video resolution should be HD or below. |
| P.1203 (PNATS) | Parametric bitstream-based quality assessment of progressive download and adaptive audiovisual streaming services over reliable transport | This Recommendation provides model algorithms for monitoring the integral media session quality for TCP-type video streaming. Supported video resolution should be HD or below. |
| P.NATS-PH2  (ongoing in Q14, Recommendation planned end of 2019) | Parametric bitstream-based and pixel based quality assessment of progressive download and adaptive audiovisual streaming services over reliable transport for HEVC and UHD | This work extends P.1203 to UHD, and also includes pixel-based and hybrid model types. |
| P.NAMS-PH2  (ongoing in Q14) | Parametric Non-intrusive Bitstream Assessment for High Efficiency Video Coding (HEVC) and 4K Media Streaming Quality over UDP | This work extends P.1201 to UHD |

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