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| 35TH QUALITY OF SERVICE DEVELOPMENT GROUP (QSDG) MEETING – ITU-T STUDY GROUP 12  Istanbul, Turkey, 5-6 September 2018  Draft Program |

Presentation material available at [https://www.itu.int/ifa/t/2017/sg12/exchange/qsdg/201809/](https://www.itu.int/ifa/t/2017/sg12/exchange/qsdg/201809)

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| Day 1: Wednesday, 5th September 2018 | |
| 09:00 – 09:30 | Opening of the meeting   * Adoption of the Agenda * Recent QSDG Activities * Short introduction on upcoming events and related topics   Chairman: Mrs. Yvonne Umutoni, RURA, Rwanda (QSDG Chairperson) |
| 09:30 – 10:30 | Session 1: QoS requirements and management in 5G networks  Chairman: Mr. Mehmet Özdem, Türk Telekom (QSDG Vice Chairman)  Speaker 1: Mr. Ian Fogg, VP Analysis, OpenSignal  Title: The benefits of real world measurements of 5G experiences  Abstract: With 5G, the range of speeds user devices will enjoy will increase enormously. In part this is because of the imminent arrival of mm Wave-capable smartphones alongside regular 5G devices, as well as the continuing use of LTE networks to provide a ubiquitous mobile data cover layer. As devices will connect to rising numbers of network bands -- both licensed and unlicensed -- device-based methodology will be critical to understand the true mobile experience. Much higher video resolutions will be possible, moving from HD through 4K in time to 8K and stereoscopic 360 video, all of which places new requirements on how to measure the true user experience. Yet, the use of network slicing may complicate device-based measurement approaches unless there is transparency in the way operators manage end users. Already, different ways operators manage video traffic today is a sign of the need for industry coordination on experiential standards in the 5G era.  Speaker 2: Dr. Rami Alnatsheh, Professional Services Manager, for Dr. Irina Cotanis, InfoVista  Abstract: 5G networks come with the promise of supporting completely three different use cases, eMBB, URLCC, mMTC and therefore with high demanding performance requirements, which span from extremely high throughput, very low latency, extreme throughput to massive connectivity. In order to achieve these, 5G networks have to ensure very good coverage and/or high user capacity at cell fringe with high spectrum efficiency, to be leaner, faster, and flexible. These features have been met by introducing 5 technology disruptions: mobile mmW, mMiMO/3D beamforming, self-contained slot structure, advanced modulation and coding schemes and last but not least scalable OFDM numerology. As one would expect these technologies come with a series of challenges and therefore with high demand for more complex and different testing procedures than all the previous “Gs”. The presentation explains these challenges, unveils new testing procedures and last but not least discusses some initial test use cases, covering from initial coverage, to deployments and end to end scenarios. |
| 10:30 – 11:00 | Coffee Break |
| 11:00 – 12:30 | Session 2: QoS requirements and management in 5G networks (Cont…)  Chairman: Mr. Mehmet Özdem, Turk Telekom (QSDG Vice Chairman)  Speaker 1: Mr. Sezer Erkli, Türk Telekom  Title: The 5G network architecture, importance of QoS for operators and 4G vs 5G QoS overview  Speaker 2: Mr. Utku Özmat, Huawei Technologies  Title: 5G QoS requirements, KPI parameters, use cases  Abstract: The 2 presentations will cover: 5G introduction (eMBB, mMTC and URLLC, network slicing); 5G QoS requirements (Non-GBR QoS: 5QI, ARP, and RQA; GBR QoS: 5QI, ARP, GFBR, MFBR, and Notification Control); 5G KPI parameters (throughput, mobility, latency, guaranteed QoS, massive connectivity); 5G use cases (FWA, AR/VR, drones, healthcare); 5G difficulties and challenges, 5G equipment issues.  Speaker 3: Mr. Jari Schroderus, Solution Marketing Manager, Keysight Nemo Wireless Solutions  Title: QoS/QoE assessment in 5G/pre-5G, practical challenges  Speaker 4: Mr. Çağdaş Durmuş, Ericsson  Title: 5G and QoS requirements  Abstract:  QoS continues to be an important function in 5GS. Like in EPS, QoS is network controlled. E.g. it is the network that authorize the QoS of the traffic for a user. Both application and UE can request a certain QoS, but the decision if the request is granted or not is in the network. QoS in 5GS is to a large extent similar to QoS in EPS. The following changes have been agreed to provide a better, simpler solution in 5GS. A clearer separation of concerns between CN and RAN. Removal of the 1:1 dependency between CN QoS (EPS bearers in EPC, QoS flows in 5GC) and Radio Data Bearers (RDB)  Allow for a more flexible target settings of QoS priority and service characteristics |
| 12:30 – 13:30 | Lunch Break |
| 13:30 – 15:00 | Session 3: How to guarantee the Quality of Service and end-to-end quality troubleshooting / optimization  Chairman: Mrs. Yvonne Umutoni, RURA Rwanda (QSDG Chairman)  Speaker 1: Mr. Ashutosh Singla, Technical University of Ilmenau, Germany  Title: Assessment of QoE and Subjective Quality of 360-degree Videos with Head Mounted Displays  Abstract: The contribution provides the subjective test results on QoE and subjective quality evaluation of the Omnidirectional/360-degree videos. With the aim to find out the influence of the camera motion, resolutions and simulator sickness on evaluating the QoE of the omnidirectional videos. Experimental results show that the video sequence, which has the highest motion, provides the least QoE. The 4K resolution provides better QoE than FHD irrespective of the video sequence. Results also show that users are more prone to simulator sickness in FHD resolution as compared to 4K. Also, the video sequences which have the highest simulator sickness scores will have the lowest QoE and vice-versa. We also compare the performance of the two subjective evaluation methodologies – Modified ACR and DSIS – on HEVC Encoded 360° videos at different bit-rates for different resolutions. We also investigated the influence of simulator sickness on both these evaluation methodologies. Results show that the perceived quality at 15 Mbit/s is slightly higher than 8 Mbit/s. Therefore, it is recommended to transmit the 360-degree videos at 8 Mbit/s would reduce the bandwidth requirements up to 50% at a marginal cost in the quality. Also, the Pearson correlation coefficient (0.992) between M-ACR and DSIS is very high. Users are more prone to simulator sickness while evaluating the videos with the DSIS test method.  Speaker 2: Dr. Rami Alnatsheh, Professional Services Manager, InfoVista, USA  Title: Carrier Aggregation – a detailed look, practical implementation & analysis of its impact on QoS and QoE  Abstract: Carrier Aggregation is widely understood as aggregating multiple frequencies/channels at the same time to enhance throughput, however, the intrinsic details of its operation need to be understood and optimized by Operators and NW vendors. In this presentation, we cover how the different implementations of carrier aggregation affect the QoS and QoE, and how it can be improved. Sample from logs taken from the field and actual vendor implementations will be shown. Also, the need for new KPIs for carrier aggregation will be discussed. |
| 15:00 – 15:30 | Coffee Break |
| 15:30 – 17:00 | Session 4: Big data based technologies applied for end-to-end QoS management, optimization & evaluation; QoE & QoS in multimedia and Internet of things.  Chairman: Mr. Martin Adolph, ITU  Speaker 1: Mr. Arith Hewathenna, Mobitel, Sri Lanka  Title: Mobitel’s web-based big data application to monitor voice and data traffic and traffic growth  Speaker 2: Mr. Vlad Bratu, Product Manager, SIGOS, Germany  Title: NB-IoT and LTE-M performance and service assurance  Abstract: Mobile operators worldwide have deployed or are in the process of deploying NB-IoT and LTE-M. QoS requirements for IoT are varied, from low throughput and delay tolerant metering/monitoring applications to low latency high bandwidth multimedia applications. Power saving features for IoT must be correctly configured and negotiation between the IoT device and network to optimize battery life. The presentation discusses QoS evaluation for NB-IoT and LTE-M at different layers, i.e. connectivity and application. NB-IoT and LTE-M connectivity measurements from live and lab networks are presented and discussed. |
| Day 2: Thursday, 6th September 2018 | |
| 09:00 – 09:30 | Session 5: Round table on upcoming events and related topics  Chairman: Mr. Tiago Sousa Prado, ANATEL, Brazil (QSDG Vice Chairman)  Speaker: Mrs. Yvonne Umutoni, RURA, Rwanda (QSDG Chairperson) |
| 09:30 – 10:00 | Session 6: Tools/Solutions for QoS evaluation, planning and optimization of Mobile Networks and fixed Broadband Networks.  Chairman: Dr. Bouzouki Stavroula EETT, Greece (QSDG Vice Chairman)  Speaker 1: Mr. Kahraman ZAİM, Türk Telekom  Title: Network performance measurement solutions at Türk Telekom  Abstract: Türk Telekom is using both active and passive monitoring methods and solutions for network performance measurement. On one hand we are approaching to network problems proactively, on the other hand analyzing the customer experience with the measurement tools. While doing these, we are nearly following global technological standards and paying necessary attention for applying the standards to solutions with vendors. What's more, we are searching new solutions for coming technologies and planning to adapt our measurement tools with new technologies.  Speaker 2: Mr. Jari Schroderus, Solution Marketing Manager, Keysight Nemo Wireless Solutions  Title: Nemo QoS/QoE measurement solutions |
| 10:00 – 10:30 | Coffee Break |
| 10:30 – 12:00 | Session 7: Customer satisfaction issues, service quality management, customer experience management and future networks  Chairman: Mr. Tiago Sousa Prado, ANATEL, Brazil (QSDG Vice Chairman)  Speaker 1: Mr. Mete Kavuncu, Nokia  Title: Future X Network  Abstract: Next generation of telecommunication networks will be shaped by the digitization and connection of everything and everyone with the goal of automating much of life, effectively creating time by maximizing the efficiency of everything we do and augmenting our intelligence with knowledge that expedites and optimizes decision-making and everyday routines and processes. The Future X Network is a reference architecture developed by Bell Labs, to provide a vision on how networks will evolve towards this goal. Telecommunication service quality will be managed by artificial intelligence and machine learning algorithms integrated into this architecture.  Speaker 2: Mrs. Beyhan Aygün Akyüz, Türk Telekom  Title: Evaluating and Exploring the impact and performance of OTT’s and content provider’s services from the operator’s perspective.  Abstract: Along with recent developments, the effects of OTTs and newly developed content and applications services are increasing in telecommunication sector. OTTs have a significant place in the global market by providing services without any obligation and negative impacts on the revenue / costs of the operators. OTT services are often considered outside the scope of sector specific national or regional regulatory and fiscal obligations (e.g., data privacy, legal interception, emergency calls, universal service contribution, national specific taxes, consumer rights and quality of service), leading to significant regulatory asymmetries between the market players, further disrupting the digital sector. It looks like today; operators make all the investment and fulfil all the obligations while these players get a disproportionate value without providing a fair and proportionate contribution to local economic growth. In addition to this OTT applications substitute traditional telecommunication services and offer different capabilities and experience to customer that go beyond the traditional services. In this context, it is important to create an equal playing field and ecosystem that will enable operators to offer new and differentiated services and to compete with OTT, application and content providers. |
| 12:00 – 12:30 | Any other business & Closing session  Chairman: Mrs. Yvonne Umutoni, RURA, Rwanda (QSDG Chairperson) |