



Regional Workshop for Europe New Issues in Quality of Service Measuring and Monitoring

QoS measurement in Bosnia and Herzegovina

Suada Hadžović
Communications Regulatory Agency
Bosnia and Herzegovina

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1. QoS measurement in fixed networks

- Instruction on the methodology of testing the quality of telecommunications services in fixed telecommunications networks (Official Gazette BH, no. 25/11):
 - Stipulates the obligation of all users of licenses for operators of public fixed telephony, licenses for the provision of fixed telephone services and general licenses for provision of Internet services to comply with obligations under the license and to collect data and keep statistics according to the methodology prescribed by this Instruction
 - Obligation include submitting reports to the Communications Regulatory Agency and publicly publish information on the conditions of access to and use of public telecommunications services in fixed networks.
 - Operators of public telecommunications services in the fixed network are required to conduct regular measurements of the quality of services at their own expense.

~~□ Measurements are carried out in a manner and according to the procedures set in the ETSI guide EG 201 769-1 and EG 202 057-1~~



1. QoS measurement in fixed networks

- ❑ Measurements refer to the standard level of service quality. The exception to the obligation of measurement refers to situations in which an operator offers the same or technology of a higher quality of service for an additional fee.
- ❑ Reference measurement period is the half of calendar year. Measurements are carried out throughout the period of data collection.
- ❑ Operators were required to establish an internal system for measurement of the quality of telecommunications services in fixed networks before May 31st 2011.
- ❑ On January 1st 2012, the operators were required to start with active measuring of the quality of public telecommunications services in fixed networks, with the obligation of regular six-month reporting to the Agency and public disclosure.



2. QoS parameters in fixed networks (1.1.2015.-30.6.2015.)

Operators of public telecommunications services in the fixed network:

69 Internet service providers,

13 providers of public fixed telephone services

3 public fixed telephony operators

Parameter	Measure	Measured value
Supply time for fixed network access	for 95 % of total connections in the period	1-10 days
	% of established services until the agreed time	80%-100%
	Time of receipt of the request	From Monday to Sunday
Fault report rate per fixed access line	For 100 lines in the observed period	1%-10%
Fault report time per fixed access lines	For 80% of faults on access line in the observed period	≤ 70 hours
	For 95% of faults on access line in the observed period	≤ 95 hours
	Time of receipt of fault reports	From Monday to Sunday
Response time for operator services	Average response time in the observed period	4s -30s
	% of answered calls in the period of up to 20 seconds	70%-100%
Proportion of public pay-telephones in working order	% in observed period	> 93%
Bill correctness complaints	% in the observed period	0,01%-5% (majority <1%)
Supply time for Internet access	Average time to establish Internet service in the observed period for dial up	1-2 days
	Average time to establish Internet service in the observed period for broadband Internet access	1-7 days
Proportion of problems with number portability procedures	Number of rejected (and deferred) requests for number portability divided by the total number of claims filed	0,1%-3%
Unsuccessful call ratio	% in the observed period (30s)	0,01% -16%



3. QoS measurement in mobile networks

- ❑ Decision on measurement of quality of GSM services (Official Gazette BH, no. 25/11) prescribes obligations related to methodology and types of data about the quality of GSM services in Bosnia and Herzegovina.
- ❑ Definitions of parameters and types of their estimation comply to the Document of European Institute for Telecommunications Standards: ETSI TS 102 250 – 2.
- ❑ In Bosnia and Herzegovina there are three operators licensed to provide GSM services: BH Telecom d.d. Sarajevo, Telecom Srpske a.d. Banja Luka, JP Hrvatske Telekomunikacije d.o.o. Mostar.
- ❑ As of 1st January 2008, upon request of the Agency, GSM operators are obliged to carry out measurements of quality of GSM services and forward the findings to the Agency



4. QoS parameters in GSM networks (voice and SMS)

- ❑ GSM operators are obliged to measure following parameters of voiced telephony:
 - Service Accessibility Telephony "SA-T", Setup Time Telephony "ST-T", Speech Quality – obliged to submit a detailed description of applied measurement model; Call Completion Rate Circuit Switched Telephony "CCR-CS-T"

- ❑ GSM are obliged to measure following parameters of Short Message Services - SMS:
 - Service Accessibility SMS MO "SA-SMS-MO", Access Delay SMS MO "AD SMS-MO", End-to-end Delivery Time SMS "DT-SMS", Completion Rate SMS Circuit Switched "CR-SMS-CS"



4. QoS parameters in GSM networks (MMS and PDP)

- ❑ GSM operators shall measure following parameters of Multimedia Messages - MMS:
 - MMS Send Failure Ratio (MO), MMS Retrieval Failure Ratio (MT), MMS Send Time (MO) (if available), MMS Retrieval Time (MT) (if available), MMS Notification Failure Ratio, MMS Notification Time (if available), MMS End-to-end Failure Ratio, MMS End-to-end Delivery Time (MO/MT)(if available)

- ❑ GSM operators are obliged to measure following technical parameters of indicators of data portability- commutation package:
 - Attach Failure Ratio; Attach Setup Time, PDP Context Activation Failure Ratio; PDP Context Activation Time, PDP Context Cut-off Ratio



5. QoS parameters in mobile networks (01-01.2015.-30.06.2015.)

Parameter	Measured value
Service Accessibility Telephony "SA-T"	97 %
Setup Time Telephony "ST-T"	1,48 %
Call Completion Rate Circuit Switched Telephony "CCR-CS-T"	98,65 %
Service Accessibility SMS MO "SA-SMS-MO"	97,3 %
Completion Rate SMS Circuit Switched "CR-SMS-CS"	97,89 %
Access Delay SMS MO "AD SMS-MO"	2,25 s
End-to-end Delivery Time SMS "DT-SMS"	4,55 s
MMS Send Failure Ratio (MO)	10,86 %
MMS Retrieval Failure Ratio (MT)	2,69 %
Attach Failure Ratio	14,49 %
PDP Context Activation Failure Ratio	25,85 %



6. Conclusions

- ❑ As of 1st January 2012, the operators are required to carry out measurements of the quality of public telecommunications services in fixed networks, with the obligation of regular six-month reporting to the Agency and public disclosure, i.e.
 - 69 Internet service providers,
 - 13 providers of public fixed telephone services
 - 3 public fixed telephony operators

- ❑ As of 1st January 2008, upon request of the Agency, GSM operators are obliged to carry out measurements of quality of GSM services and forward the findings to the Agency
 - 3 GSM/UMTS operators



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Thank you

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