

CERTIFICATE

P3 communications GmbH

hereby certifies that

Slovak Telekom, a.s.

Bajkalská 28, 817 62 Bratislava, Slovak Republic

achieved „**Best in Test**“ with a

Total Score of **800 of 1000**

in the **Mobile Benchmark Slovakia 02/2015.**

(Score 276 of 400 in Telephony, Score 524 of 600 in Data Services)



Maziar Kianzad
*Head of Network Testing
& Benchmarking*
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Measurement Setup

	Voice	Data
Device	Samsung Galaxy S5 LTE cat6 (SM-G901F) LTE / HSPA+ DC / HSUPA 5.76 12 dB attenuation book	Samsung Galaxy S5 LTE cat6 (SM-G901F) LTE / HSPA+ DC / HSUPA 5.76 12 dB attenuation book
Test Cases	Mobile-to-Mobile Set1 4Gpref (MRAB) to 3G pref (MRAB) Set2 3Gpref (MRAB) to 3G pref 70 sec call duration 115 sec call window multiRAB 1:1 traffic injection One car 4G pref and one 3G pref	HTTP DL stress test 10s HTTP UL stress test 10s Web Browsing-ETSI Ref. Page, 3 live websites YouTube SD Video-60s clip YouTube HD Video-30s clip
Mobility and Route Types	100% Drivetest 80% in Cities and 20% on Transfer Major and Small cities and connecting roads	
Samples	4Gpref: ~ 1840 per Operator	4Gpref ~ 1200 per Operator
Dates	10 measurement days, February 12th - February 25th, 2015	

Testing Route



Score Points and Breakdown

The following table indicates the score points achieved by the networks under test in the modules “Telephony” and “Data Services” as well as the breakdown of achieved points in the geographical categories “Big Cities” and “Connecting Roads”.

Module	Infrastructure	Max.	Telekom	Operator 2	Operator 3
Voice	Total	400	276	281	225
	big cities	260	68%	71%	49%
	small cities and connecting roads	140	71%	70%	69%
Data	Total	600	524	449	402
	big cities	390	91%	83%	69%
	small cities	90	89%	62%	71%
	connecting roads	120	73%	59%	57%
TOTAL		1.000	800	730	627

The following table indicates the achieved percentage of the maximum score in each of the different data services.

Data	Service Group	Max.	Telekom	Operator 2	Operator 3
big cities	Web Browsing	136,5	96,7%	85,4%	80,1%
	File Download	78,0	80,2%	84,3%	69,3%
	File Upload	78,0	89,6%	76,1%	63,8%
	YouTube	97,5	94,3%	83,4%	58,1%
small cities	Web Browsing	31,5	93,4%	72,1%	83,4%
	File Download	18,0	77,9%	70,3%	71,5%
	File Upload	18,0	85,2%	55,5%	67,6%
	YouTube	22,5	95,0%	44,6%	57,6%
connecting roads	Web Browsing	42,0	77,1%	65,4%	63,6%
	File Download	24,0	69,7%	62,6%	51,8%
	File Upload	24,0	63,6%	55,9%	44,2%
	YouTube	30,0	76,9%	48,0%	60,6%

Voice KPI Overview

The following table indicates the achieved values of all networks under test in each of the relevant Telephony Key Performance Indicators (KPIs) for the geographical categories “Big Cities” and “Connecting Roads”.

Voice M2M	Kpi Name	Unit	Telekom	Operator 2	Operator 3
big cities	Qualified	[%]	96,0%	96,0%	92,7%
	Call Setup Time	[s]	7,2	6,6	7,9
	AVG Speech Quality	[MOS-LQO]	2,8	3,1	2,6
small cities and connecting roads	Qualified	[%]	93,3%	91,9%	93,3%
	Call Setup Time	[s]	7,3	6,3	7,5
	AVG Speech Quality	[MOS-LQO]	2,8	3,0	2,5

Data KPI Overview

The following table indicates the achieved values of all networks under test in each of the relevant Data Key Performance Indicators (KPIs) for the geographical categories “Big Cities” and “Connecting Roads”.

Data big cities	Kpi Name	Unit	Telekom	Operator 2	Operator 3
http Live Page DL	Qualified	[%]	99,7%	98,7%	96,8%
	AVG Session Time	[s]	2,5	2,6	3,6
http Static Page DL	Qualified	[%]	99,7%	92,8%	98,4%
	AVG Session Time	[s]	1,2	1,8	2,1
http file DL 3MB	Qualified	[%]	99,4%	99,5%	99,2%
	AVG Session Time	[s]	1,9	1,9	5,1
	90% faster than	[kbit/s]	7931	6847	2854
	10% faster than	[kbit/s]	29268	41667	17751
http file UL 1MB	Qualified	[%]	99,1%	98,3%	97,0%
	AVG Session Time	[s]	1,2	2,2	5,2
	90% faster than	[kbit/s]	6390	1546	1110
	10% faster than	[kbit/s]	12121	13962	8377
http DL FDTT 10s	Qualified	[%]	99,4%	99,6%	99,3%
	AVG throughput	[kbit/s]	17160	31708	7119
	90% faster than	[kbit/s]	9049	7284	2789
	10% faster than	[kbit/s]	26208	53642	13709
http UL FDTT 10s	Qualified	[%]	99,4%	98,6%	99,2%
	AVG throughput	[kbit/s]	21132	14550	3657
	90% faster than	[kbit/s]	9228	1394	1216
	10% faster than	[kbit/s]	39799	28189	13891
Youtube SD	Qualified	[%]	99,7%	95,6%	98,4%
	Start Time	[s]	1,2	1,4	2,3
	Playouts w/o interruptions	[%]	100,0%	100,0%	100,0%
Youtube HD	Qualified	[%]	99,5%	98,3%	90,7%
	Start Time	[s]	1,7	1,4	2,9
	Playouts w/o interruptions	[%]	99,6%	98,6%	94,2%

Data small cities	Kpi Name	Unit	Telekom	Operator 2	Operator 3
http Live Page DL	Qualified	[%]	99,0%	96,5%	98,2%
	AVG Session Time	[s]	2,5	3,4	3,7
http Static Page DL	Qualified	[%]	98,8%	90,6%	98,2%
	AVG Session Time	[s]	1,2	2,5	2,2
http file DL 3MB	Qualified	[%]	99,2%	100,0%	99,5%
	AVG Session Time	[s]	1,8	7,3	5,4
	90% faster than	[kbit/s]	8696	2094	3104
	10% faster than	[kbit/s]	29376	22284	7533
http file UL 1MB	Qualified	[%]	98,3%	95,3%	98,6%
	AVG Session Time	[s]	1,1	6,1	6,4
	90% faster than	[kbit/s]	6441	695	989
	10% faster than	[kbit/s]	11445	8959	1942
http DL FDTT 10s	Qualified	[%]	98,3%	98,6%	100,0%
	AVG throughput	[kbit/s]	17357	11830	5384
	90% faster than	[kbit/s]	8674	2072	2784
	10% faster than	[kbit/s]	25996	28349	7885
http UL FDTT 10s	Qualified	[%]	99,1%	98,1%	100,0%
	AVG throughput	[kbit/s]	17912	3815	1693
	90% faster than	[kbit/s]	9326	456	1180
	10% faster than	[kbit/s]	21847	13696	2030
Youtube SD	Qualified	[%]	100,0%	89,4%	98,2%
	Start Time	[s]	1,2	2,3	2,4
	Playouts w/o interruptions	[%]	100,0%	99,5%	100,0%
Youtube HD	Qualified	[%]	99,6%	88,7%	91,4%
	Start Time	[s]	1,6	2,3	3,2
	Playouts w/o interruptions	[%]	99,6%	97,4%	93,6%

Data connecting routes	Kpi Name	Unit	Telekom	Operator 2	Operator 3
http Live Page DL	Qualified	[%]	91,4%	90,0%	88,1%
	AVG Session Time	[s]	2,7	3,4	3,8
http Static Page DL	Qualified	[%]	90,9%	83,4%	89,9%
	AVG Session Time	[s]	1,5	2,4	2,5
http file DL 3MB	Qualified	[%]	90,1%	91,6%	87,8%
	AVG Session Time	[s]	3,5	8,2	7,2
	90% faster than	[kbit/s]	4172	772	2012
	10% faster than	[kbit/s]	24291	36641	7547
http file UL 1MB	Qualified	[%]	86,4%	88,4%	85,2%
	AVG Session Time	[s]	2,5	5,9	6,6
	90% faster than	[kbit/s]	1220	517	915
	10% faster than	[kbit/s]	11797	9901	1965
http DL FDTT 10s	Qualified	[%]	97,1%	94,2%	92,6%
	AVG throughput	[kbit/s]	12159	14436	5197
	90% faster than	[kbit/s]	3005	682	2238
	10% faster than	[kbit/s]	22582	40083	8068
http UL FDTT 10s	Qualified	[%]	94,8%	93,3%	89,4%
	AVG throughput	[kbit/s]	12382	4792	1863
	90% faster than	[kbit/s]	649	373	741
	10% faster than	[kbit/s]	21763	16671	2038
Youtube SD	Qualified	[%]	93,3%	82,6%	92,7%
	Start Time	[s]	1,7	2,3	2,5
	Playouts w/o interruptions	[%]	99,1%	100,0%	100,0%
Youtube HD	Qualified	[%]	91,8%	80,5%	86,7%
	Start Time	[s]	1,9	2,3	3,5
	Playouts w/o interruptions	[%]	98,1%	96,8%	92,9%