

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 769 of 1000

in the **Mobile Benchmark Slovakia 06/2015.**

(Score 295 of 400 in Telephony, Score 474 of 600 in Data Services)

P3 | communications



Maziar Kianzad
*Head of Network Testing
& Benchmarking*
August 2015

Measurement Setup

	Voice	Data
Device	Samsung Galaxy S5 LTE cat4 (SM-G900F) LTE / HSPA+ DC / HSUPA 5.76 12 dB attenuation book	Samsung Galaxy Note LTE cat6 (SM-G910F) LTE / HSPA+ DC / HSUPA 5.76 12 dB attenuation book
Test Cases	Mobile-to-Mobile Set1 4Gpref (MRAB) to 3G pref (MRAB) 70 sec call duration 115 sec call window multiRAB 1:1 traffic injection One car 4G pref and one 3G pref Email traffic injection on both sides (1 mail per call)	Data 4G preferred HTTP DL stress test 10s HTTP UL stress test 10s HTTP 1MB UL and 3MB DL fixed file transfer Web Browsing-ETSI Ref. Page, 3 live websites YouTube SD Video-30s clip YouTube HD Video-30s clip
Mobility and Route Types	100% Drivetest Big cities, small cities and connecting roads	
Samples	4Gpref: ~ 2200 per Operator	4Gpref ~ 1000 per Operator
Dates	11 measurement days, June 09th - June 20th, 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”, “Small Cities” and “Connecting Roads”.

Module	Infrastructure	Max.	Telekom	Operator 2	Operator 3
Voice	Total	400	295	233	268
	big cities	260	71%	68%	67%
	small cities and connecting roads	140	79%	41%	67%
Data	Total	600	474	477	327
	big cities	390	90%	88%	66%
	small cities	90	81%	81%	50%
	connecting roads	120	43%	50%	21%
TOTAL		1.000	769	710	596

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	93,0%	90,7%	77,5%
	File Download	78,0	84,8%	87,4%	67,7%
	File Upload	78,0	85,7%	82,1%	63,5%
	YouTube	97,5	92,2%	90,7%	51,1%
small cities	Web Browsing	31,5	79,9%	87,2%	60,2%
	File Download	18,0	78,4%	77,8%	49,8%
	File Upload	18,0	77,8%	66,8%	44,8%
	YouTube	22,5	88,2%	87,6%	39,1%
connecting roads	Web Browsing	42,0	46,6%	55,5%	28,5%
	File Download	24,0	47,5%	51,3%	16,1%
	File Upload	24,0	42,0%	41,5%	12,4%
	YouTube	30,0	34,9%	47,0%	19,3%

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	[%]	95,9%	95,2%	96,7%
	Call Setup Time	[s]	7,2	6,7	8,4
	AVG Speech Quality	[MOS-LQO]	3,5	3,2	2,7
small cities and connecting roads	Qualified	[%]	95,1%	82,2%	92,2%
	Call Setup Time	[s]	7,0	6,9	7,8
	AVG Speech Quality	[MOS-LQO]	3,3	2,9	2,7

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”, “Small Cities” and “Connecting Roads”.

Data big cities	Kpi Name	Unit	Telekom	Operator 2	Operator 3
http Live Page DL	Qualified	[%]	98,9%	98,3%	96,8%
	AVG Session Time	[s]	2,6	2,5	3,7
http Static Page DL	Qualified	[%]	99,6%	98,4%	97,8%
	AVG Session Time	[s]	1,4	1,3	2,9
http file DL 3MB	Qualified	[%]	99,3%	99,7%	98,6%
	AVG Session Time	[s]	1,8	1,6	6,2
	90% faster than	[kbit/s]	10038	9475	2369
	10% faster than	[kbit/s]	39669	46602	22151
http file UL 1MB	Qualified	[%]	99,5%	99,0%	97,4%
	AVG Session Time	[s]	1,4	1,7	5,5
	90% faster than	[kbit/s]	4515	2552	929
	10% faster than	[kbit/s]	11283	13445	7612
http DL FDTT 10s	Qualified	[%]	99,7%	99,5%	98,9%
	AVG throughput	[kbit/s]	25259,8	33653,6	9204,3
	90% faster than	[kbit/s]	10374	12096	2326
	10% faster than	[kbit/s]	42104	59600	24659
http UL FDTT 10s	Qualified	[%]	99,3%	99,5%	98,2%
	AVG throughput	[kbit/s]	18029,1	17002,1	4313,8
	90% faster than	[kbit/s]	4542	2540	1132
	10% faster than	[kbit/s]	34243	28200	16197
Youtube SD	Qualified	[%]	99,7%	99,1%	97,0%
	Start Time	[s]	1,2	1,2	2,5
	Playouts w/o interruptions	[%]	100,0%	99,8%	99,6%
Youtube HD	Qualified	[%]	98,4%	98,1%	92,2%
	Start Time	[s]	1,6	1,3	3,3
	Playouts w/o interruptions	[%]	99,8%	99,6%	99,6%

Data small cities	Kpi Name	Unit	Telekom	Operator 2	Operator 3
http Live Page DL	Qualified	[%]	95,6%	97,2%	93,2%
	AVG Session Time	[s]	2,7	2,5	3,8
http Static Page DL	Qualified	[%]	96,8%	99,1%	92,9%
	AVG Session Time	[s]	1,4	1,6	3,3
http file DL 3MB	Qualified	[%]	97,9%	98,3%	95,5%
	AVG Session Time	[s]	2,0	2,5	7,4
	90% faster than	[kbit/s]	7754	5515	2359
	10% faster than	[kbit/s]	34139	35062	6581
http file UL 1MB	Qualified	[%]	97,9%	97,0%	94,0%
	AVG Session Time	[s]	1,9	2,5	7,4
	90% faster than	[kbit/s]	2402	1134	692
	10% faster than	[kbit/s]	10237	10485	1887
http DL FDTT 10s	Qualified	[%]	98,7%	99,2%	94,1%
	AVG throughput	[kbit/s]	22717,2	20558,5	4797,9
	90% faster than	[kbit/s]	10792	7033	2230
	10% faster than	[kbit/s]	37067	39735	7726
http UL FDTT 10s	Qualified	[%]	99,6%	97,9%	94,1%
	AVG throughput	[kbit/s]	14312,1	9973,6	1598,7
	90% faster than	[kbit/s]	2987	1240	825
	10% faster than	[kbit/s]	21281	15914	2036
Youtube SD	Qualified	[%]	97,8%	98,7%	95,7%
	Start Time	[s]	1,4	1,2	2,8
	Playouts w/o interruptions	[%]	99,6%	100,0%	99,0%
Youtube HD	Qualified	[%]	98,3%	97,0%	89,3%
	Start Time	[s]	1,7	1,5	4,2
	Playouts w/o interruptions	[%]	100,0%	100,0%	87,0%

Data connecting routes	Kpi Name	Unit	Telekom	Operator 2	Operator 3
http Live Page DL	Qualified	[%]	79,2%	84,1%	70,9%
	AVG Session Time	[s]	3,0	3,2	3,9
http Static Page DL	Qualified	[%]	79,9%	84,4%	68,2%
	AVG Session Time	[s]	1,8	2,6	3,4
http file DL 3MB	Qualified	[%]	81,4%	87,2%	73,1%
	AVG Session Time	[s]	4,5	6,0	8,1
	90% faster than	[kbit/s]	2716	1844	1926
	10% faster than	[kbit/s]	31455	31835	7467
http file UL 1MB	Qualified	[%]	80,0%	84,3%	72,8%
	AVG Session Time	[s]	3,5	5,3	7,1
	90% faster than	[kbit/s]	961	768	623
	10% faster than	[kbit/s]	9456	9709	1989
http DL FDTT 10s	Qualified	[%]	87,4%	86,2%	77,1%
	AVG throughput	[kbit/s]	15725,4	14436,7	4712,4
	90% faster than	[kbit/s]	2013	1928	1292
	10% faster than	[kbit/s]	32960	35223	7919
http UL FDTT 10s	Qualified	[%]	85,3%	84,5%	75,0%
	AVG throughput	[kbit/s]	8440,1	5022,2	1742,4
	90% faster than	[kbit/s]	724	348	507
	10% faster than	[kbit/s]	20970	13650	2025
Youtube SD	Qualified	[%]	80,3%	84,3%	72,7%
	Start Time	[s]	1,6	2,0	3,5
	Playouts w/o interruptions	[%]	98,7%	97,6%	97,7%
Youtube HD	Qualified	[%]	76,7%	79,0%	57,4%
	Start Time	[s]	2,1	2,3	3,9
	Playouts w/o interruptions	[%]	89,7%	97,4%	88,1%