

CERTIFICATE

P3 communications GmbH

Am Kraftversorgungsturm 3, D-52070 Aachen, Germany

hereby certifies that



Telekom Albania

Rruga 'Gjergj Legisi', Laprake, Tirana, Albania

achieved „**Best in Test**“ with a

Total Score of **587 of 1000**

in the **Mobile Benchmark Albania 06/2016.**

(Score 185 of 400 in Telephony, Score 403 of 600 in Data Services)

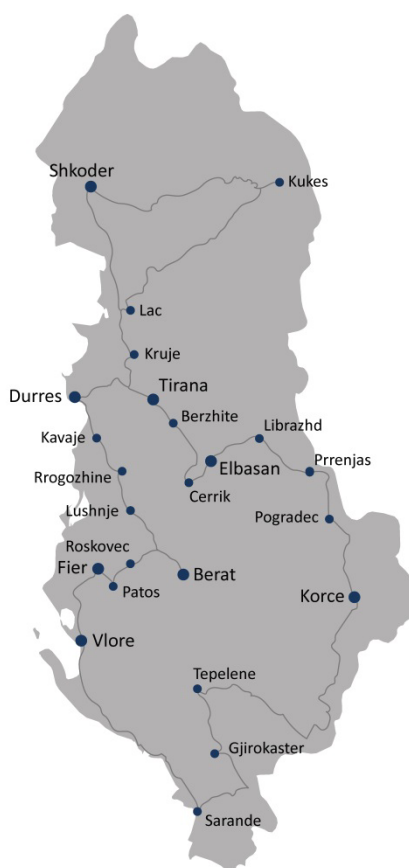


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*Head of Network Testing
& Benchmarking*
July 2016

Measurement Setup

	Voice	Data
Device	Sony Xperia Z5 (E6653) P3 attenuator	Samsung Galaxy Note4 LTE cat6 (SM-N910F) LTE/HSPA+ DC/HSUPA 5.76 P3 attenuator
Test Cases	Mobile-to-Mobile (M2M) Side1 (4G preferred) to Side2 (3G preferred) Side1 (4G preferred) to Side2 (4G preferred) 115 sec call window 70 sec call duration 15 sec call setup timeout Email traffic injection on both sides (100KB) (1 email per call window)	Data 4G preferred CA HTTP DL datastream 10s HTTP UL datastream 10s HTTP 3MB DL fixed file transfer HTTP 1MB UL fixed file transfer Web Browsing - Kepler ETSI Ref. Page 10 Live web pages (50% http, 50% https) YouTube HD/ SD video - 45s
Mobility and Route Types	100% Drivetest 56% in Cities, 21% in Towns and 23% on Roads	
Samples	~ 2620 per Operator	~ 1100 per Service and Operator
Dates	17 measurement days May 28th – June 16th, 2016	

Testing Route



Score Points and Breakdown

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

Module	Infrastructure	Max.	Telekom	Operator 2	Operator 3	Operator 4
Voice	Total	400	185	176	232	242
	Cities	240	56%	54%	64%	70%
	Towns	80	39%	37%	67%	65%
	Roads	80	24%	21%	32%	26%
Data	Total	600	403	406	289	146
	Cities	360	80%	80%	56%	32%
	Towns	120	60%	61%	43%	15%
	Roads	120	35%	38%	30%	13%
TOTAL		1.000	587	582	521	389

Shown voice, data and total scores are rounded

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	Operator 4
Cities	Web Browsing	126	79%	71%	51%	20%
	File Download	72	80%	83%	67%	45%
	File Upload	72	70%	78%	49%	27%
	YouTube	90	90%	90%	60%	43%
Towns	Web Browsing	42	52%	54%	36%	19%
	File Download	24	70%	69%	57%	10%
	File Upload	24	51%	58%	42%	4%
	YouTube	30	72%	66%	41%	20%
Roads	Web Browsing	42	33%	32%	28%	18%
	File Download	24	34%	45%	40%	9%
	File Upload	24	23%	33%	26%	4%
	YouTube	30	48%	47%	28%	15%

Voice KPI Overview

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

Voice M2M	KPI Name	Unit	Telekom	Operator 2	Operator 3	Operator 4
Cities	Qualifier	[%]	93,8	94,2	95,6	97,3
	Call Setup Time	[s]	6,8	8,5	6,4	6,8
	AVG Speech Quality	[MOS-LQO]	3,3	3,4	2,9	2,7
Towns	Qualifier	[%]	90,7	91,0	95,8	96,4
	Call Setup Time	[s]	6,5	8,8	5,9	6,8
	AVG Speech Quality	[MOS-LQO]	3,3	3,5	3,0	2,7
Roads	Qualifier	[%]	76,2	80,5	84,3	83,7
	Call Setup Time	[s]	6,9	8,6	6,5	7,3
	AVG Speech Quality	[MOS-LQO]	3,1	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 “Cities”, “Towns” and “Roads”.

Data Cities	KPI Name	Unit	Telekom	Operator 2	Operator 3	Operator 4
HTTP Live Page DL	Qualifier	[%]	97,6	94,7	91,2	81,3
	AVG Session Time	[s]	4,1	4,1	4,0	5,6
HTTP Static Page DL	Qualifier	[%]	97,8	98,9	93,4	86,2
	AVG Session Time	[s]	1,3	1,2	1,7	5,2
HTTP file DL 3MB	Qualifier	[%]	99,2	99,5	98,1	96,4
	AVG Session Time	[s]	1,9	1,7	4,1	14,1
	90% faster than	[kbit/s]	7566	8914	2464	1686
	10% faster than	[kbit/s]	50368	45593	37360	1945
HTTP file UL 1MB	Qualifier	[%]	96,7	97,8	92,5	0,2
	AVG Session Time	[s]	2,3	1,6	2,4	5,0
	90% faster than	[kbit/s]	1542	2767	1328	
	10% faster than	[kbit/s]	10455	13158	11299	
HTTP DL FDTT 10s	Qualifier	[%]	98,6	99,4	97,5	95,3
	AVG throughput	[kbit/s]	35454	37105	23980	1871
	90% faster than	[kbit/s]	9048	10674	3758	1758
	10% faster than	[kbit/s]	78840	71783	40191	1973
HTTP UL FDTT 10s	Qualifier	[%]	99,0	99,1	94,6	96,0
	AVG throughput	[kbit/s]	12619	16918	13164	290
	90% faster than	[kbit/s]	1770	2611	1095	213
	10% faster than	[kbit/s]	30296	41980	21012	360
YouTube	Qualifier	[%]	98,7	98,6	92,1	93,1
	Start Time	[s]	2,9	2,9	3,0	5,9
	Playouts w/o interruptions	[%]	99,4	99,4	97,9	98,7
	AVG Resolution	[p]	705,6	713,1	682,9	360,0
	HD Share	[%]	96,0	98,1	89,7	0,0

Data Towns	KPI Name	Unit	Telekom	Operator 2	Operator 3	Operator 4
HTTP Live Page DL	Qualifier	[%]	90,6	91,2	88,2	64,0
	AVG Session Time	[s]	4,3	4,2	4,5	5,6
HTTP Static Page DL	Qualifier	[%]	96,4	96,5	93,0	71,5
	AVG Session Time	[s]	1,6	1,5	2,6	5,0
HTTP file DL 3MB	Qualifier	[%]	97,8	98,7	97,0	79,2
	AVG Session Time	[s]	2,4	2,9	5,9	14,0
	90% faster than	[kbit/s]	5665	2862	2088	1675
	10% faster than	[kbit/s]	37384	44986	37067	1928
HTTP file UL 1MB	Qualifier	[%]	93,0	94,3	91,8	0,0
	AVG Session Time	[s]	3,4	2,3	4,5	
	90% faster than	[kbit/s]	860	1660	995	
	10% faster than	[kbit/s]	9490	12559	9316	
HTTP DL FDTT 10s	Qualifier	[%]	97,3	96,6	95,2	80,2
	AVG throughput	[kbit/s]	23654	34059	14498	1831
	90% faster than	[kbit/s]	7882	4348	2653	1683
	10% faster than	[kbit/s]	43981	65492	40093	1973
HTTP UL FDTT 10s	Qualifier	[%]	97,0	96,6	94,7	82,9
	AVG throughput	[kbit/s]	8472	13275	5949	272
	90% faster than	[kbit/s]	892	1060	865	110
	10% faster than	[kbit/s]	18530	22785	20929	339
YouTube	Qualifier	[%]	95,7%	93,6	90,0	76,9
	Start Time	[s]	2,7	2,9	3,3	5,8
	Playouts w/o interruptions	[%]	99,1	99,1	99,0	100,0
	AVG Resolution	[p]	651,9	664,4	497,4	360,0
	HD Share	[%]	81,1	84,6	38,2	0,0

Data Roads	KPI Name	Unit	Telekom	Operator 2	Operator 3	Operator 4
HTTP Live Page DL	Qualifier	[%]	76,0	76,8	73,4	41,2
	AVG Session Time	[s]	4,4	4,6	4,8	5,6
HTTP Static Page DL	Qualifier	[%]	79,4	82,0	79,3	45,3
	AVG Session Time	[s]	2,0	2,3	3,1	5,0
HTTP file DL 3MB	Qualifier	[%]	83,0	87,4	87,5	51,5
	AVG Session Time	[s]	4,0	5,4	7,0	14,6
	90% faster than	[kbit/s]	3494	2309	1677	1670
	10% faster than	[kbit/s]	41244	40194	29063	1940
HTTP file UL 1MB	Qualifier	[%]	77,2	85,0	77,9	0,0
	AVG Session Time	[s]	4,1	3,9	5,9	
	90% faster than	[kbit/s]	862	921	758	
	10% faster than	[kbit/s]	9421	11096	8732	
HTTP DL FDTT 10s	Qualifier	[%]	81,5	87,7	86,9	64,4
	AVG throughput	[kbit/s]	23354	23221	11218	1507
	90% faster than	[kbit/s]	3587	1767	1999	159
	10% faster than	[kbit/s]	47690	51119	32559	1972
HTTP UL FDTT 10s	Qualifier	[%]	79,0	84,5	84,4	65,6
	AVG throughput	[kbit/s]	7295	8034	4380	239
	90% faster than	[kbit/s]	359	376	413	74
	10% faster than	[kbit/s]	17951	21307	18426	361
YouTube	Qualifier	[%]	83,6	83,9	76,0	48,3
	Start Time	[s]	3,0	3,4	3,6	5,9
	Playouts w/o interruptions	[%]	99,1	97,7	99,0	94,9
	AVG Resolution	[p]	578,7	566,9	471,8	360,0
	HD Share	[%]	60,8	57,5	31,1	0,0