

CERTIFICATE

P3 communications GmbH

Am Kraftversorgungsturm 3, D-52070 Aachen, Germany

hereby certifies that



Vodafone Albania Sh.A.

autostrada Tiranë-Durrës, Pavarësia 61; Tiranë, Kashar
Albania

achieved „**Best in Test**“ with a
Total Score of **827 of 1000**

in the **Mobile Benchmark Albania 02/2017.**

(Score 341 of 400 in Telephony, Score 486 of 600 in Data Services)



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*Head of Network Testing
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Measurement Setup

	Voice	Data
Device	Samsung S5 P3 attenuator	Samsung Galaxy Note 4 Cat6 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 Data traffic injection on both sides (100KB) (1 download 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 video streaming - 45s
Mobility and Route Types	100% Drivetest 56.6% in Cities, 20.6% in Towns and 22.8% on Roads	
Samples	~ 4000 per Operator	~ 1000 per Operator
Dates	15 measurement days January 27th – February 13th, 2017	

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.	Vodafone	Operator 2	Operator 3	Operator 4
Voice	Total	400	341	295	305	271
	Cities	240	86%	75%	77%	69%
	Towns	80	90%	83%	80%	76%
	Roads	80	78%	60%	71%	57%
Data	Total	600	486	456	360	144
	Cities	360	88%	81%	67%	33%
	Towns	120	83%	75%	56%	15%
	Roads	120	60%	61%	42%	12%
TOTAL		1.000	827	751	666	415

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.	Vodafone	Operator 2	Operator 3	Operator 4
Cities	Web Browsing	126	86%	82%	61%	14%
	File Download	72	85%	80%	67%	43%
	File Upload	72	84%	76%	69%	25%
	YouTube	90	94%	86%	76%	56%
Towns	Web Browsing	42	79%	74%	45%	14%
	File Download	24	82%	78%	61%	15%
	File Upload	24	77%	67%	57%	7%
	YouTube	30	93%	79%	66%	20%
Roads	Web Browsing	42	51%	57%	30%	13%
	File Download	24	64%	69%	55%	8%
	File Upload	24	49%	57%	35%	4%
	YouTube	30	77%	66%	54%	19%

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	Vodafone	Operator 2	Operator 3	Operator 4
Cities	Qualifier	[%]	98,9	96,8	97,8	96,7
	Call Setup Time	[s]	5,9	5,5	6,5	6,4
	AVG Speech Quality	[MOS-LQO]	3,5	3,4	3,2	2,8
Towns	Qualifier	[%]	99,4	98,1	98,2	98,1
	Call Setup Time	[s]	5,6	5,3	6,2	6,4
	AVG Speech Quality	[MOS-LQO]	3,5	3,4	3,1	2,8
Roads	Qualifier	[%]	95,9	90,7	94,7	91,8
	Call Setup Time	[s]	5,4	5,5	6,2	6,8
	AVG Speech Quality	[MOS-LQO]	3,4	3,4	3,2	2,8

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	Vodafone	Operator 2	Operator 3	Operator 4
HTTP Live Page DL	Qualifier	[%]	99,2	98,8	93,3	70,2
	AVG Session Time	[s]	4,2	4,1	4,2	7,1
HTTP Static Page DL	Qualifier	[%]	99,8	97,7	96,1	87,3
	AVG Session Time	[s]	1,2	1,3	1,7	6,0
HTTP file DL 3MB	Qualifier	[%]	100,0	99,6	98,9	96,2
	AVG Session Time	[s]	1,6	2,4	4,7	15,3
	90% faster than	[kbit/s]	7815	4844	2833	1299
	10% faster than	[kbit/s]	52747	46530	29484	1941
HTTP file UL 1MB	Qualifier	[%]	99,3	99,3	96,7	0,0
	AVG Session Time	[s]	1,5	2,2	2,1	
	90% faster than	[kbit/s]	3372	1768	1728	
	10% faster than	[kbit/s]	12555	10139	12255	
HTTP DL FDTT 10s	Qualifier	[%]	99,8	99,5	97,3	94,6
	AVG throughput	[kbit/s]	37255	27186	14241	1852
	90% faster than	[kbit/s]	9994	7092	5811	1616
	10% faster than	[kbit/s]	66588	62419	27401	1973
HTTP UL FDTT 10s	Qualifier	[%]	99,8	99,1	97,5	95,3
	AVG throughput	[kbit/s]	15907	12502	16455	283
	90% faster than	[kbit/s]	3800	1896	1951	135
	10% faster than	[kbit/s]	29050	27993	30265	365
YouTube	Qualifier	[%]	100,0	99,6	98,3	95,9
	Start Time	[s]	2,1	1,9	2,1	3,6
	Playouts w/o interruptions	[%]	100,0	100,0	99,6	99,8
	AVG Resolution	[p]	636,0	533,8	485,1	224,6

Data Towns	KPI Name	Unit	Vodafone	Operator 2	Operator 3	Operator 4
HTTP Live Page DL	Qualifier	[%]	98,0	96,7	89,6	61,1
	AVG Session Time	[s]	4,4	4,2	4,8	7,1
HTTP Static Page DL	Qualifier	[%]	98,3	97,5	96,4	77,0
	AVG Session Time	[s]	1,4	1,4	2,3	5,7
HTTP file DL 3MB	Qualifier	[%]	99,0	99,5	98,0	83,7
	AVG Session Time	[s]	2,3	2,5	7,9	14,0
	90% faster than	[kbit/s]	7309	4923	1257	1714
	10% faster than	[kbit/s]	56378	48368	25360	1931
HTTP file UL 1MB	Qualifier	[%]	98,0	96,6	95,3	0,0
	AVG Session Time	[s]	1,8	2,3	3,7	
	90% faster than	[kbit/s]	2214	1819	989	
	10% faster than	[kbit/s]	12092	9584	10636	
HTTP DL FDTT 10s	Qualifier	[%]	99,5	98,6	97,9	90,5
	AVG throughput	[kbit/s]	36848	28683	11278	1756
	90% faster than	[kbit/s]	9026	7302	2801	1020
	10% faster than	[kbit/s]	76443	64711	24514	1973
HTTP UL FDTT 10s	Qualifier	[%]	100,0	98,0	96,4	89,0
	AVG throughput	[kbit/s]	15279	12392	10080	297
	90% faster than	[kbit/s]	1926	1522	684	139
	10% faster than	[kbit/s]	25539	24825	31008	366
YouTube	Qualifier	[%]	100,0	98,1	96,4	86,5
	Start Time	[s]	2,2	2,0	2,4	3,9
	Playouts w/o interruptions	[%]	100,0	99,5	99,5	99,3
	AVG Resolution	[p]	620,9	531,5	449,3	224,3

Data Roads	KPI Name	Unit	Vodafone	Operator 2	Operator 3	Operator 4
HTTP Live Page DL	Qualifier	[%]	88,0	89,3	79,6	43,6
	AVG Session Time	[s]	4,7	4,3	5,2	7,2
HTTP Static Page DL	Qualifier	[%]	88,8	90,1	86,0	59,1
	AVG Session Time	[s]	2,1	1,9	3,3	5,9
HTTP file DL 3MB	Qualifier	[%]	91,9	93,8	95,6	61,2
	AVG Session Time	[s]	4,0	4,1	12,0	16,9
	90% faster than	[kbit/s]	3373	3037	932	871
	10% faster than	[kbit/s]	34053	38224	14491	1927
HTTP file UL 1MB	Qualifier	[%]	90,0	88,7	85,0	0,0
	AVG Session Time	[s]	4,0	3,0	6,2	
	90% faster than	[kbit/s]	819	1274	553	
	10% faster than	[kbit/s]	10944	9613	8333	
HTTP DL FDTT 10s	Qualifier	[%]	93,3	94,6	94,9	74,4
	AVG throughput	[kbit/s]	21841	20366	6991	1547
	90% faster than	[kbit/s]	4327	5466	1024	172
	10% faster than	[kbit/s]	47972	42834	14659	1972
HTTP UL FDTT 10s	Qualifier	[%]	90,3	95,1	89,2	73,8
	AVG throughput	[kbit/s]	7604	8563	3761	254
	90% faster than	[kbit/s]	515	785	460	79
	10% faster than	[kbit/s]	19998	18888	10491	364
YouTube	Qualifier	[%]	95,3	92,1	26,7	100,0
	Start Time	[s]	2,6	2,3	3,1	3,9
	Playouts w/o interruptions	[%]	99,5%	98,5	99,5	96,6
	AVG Resolution	[p]	546,0	501,8	369,3	222,9