

CERTIFICATE

P3 communications GmbH

hereby certifies that



vodafone

Vodafone Czech Republic a.s.

Náměstí Junkových 2/2808, Praha 5, Czech Republic

achieved „**Best in Test**“ with a

Total Score of **863 of 1000**

in the **Mobile Benchmark Czech Republic 02/2016.**

(Score 357 of 400 in Telephony, Score 506 of 600 in Data Services)



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Measurement Setup

	Voice	Data
Device	Samsung Galaxy S5 LTE cat4 (SM-G900F) LTE / HSPA+ DC / HSUPA 5.76 P3 attenuator	Samsung Galaxy Note4 LTE cat6 (SM-N910F) LTE / HSPA+ DC / HSUPA 5.76 P3 attenuator
Test Cases	Mobile-to-Mobile Side1 (4G preferred) to Side2 (3Gpref) 115 sec call window 70 sec call duration 15 sec call setup timeout Email traffic injection on both sides (1 email per call window)	4G CA preferred 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 5 live web pages YouTube SD video - 30s clip YouTube HD video - 30s clip
Mobility and Route Types	100% Drivetest 80% in Cities/Towns and 20% on Roads	
Samples	~2600 per Operator	~1100 per Operator
Dates	16 measurement days January 21st - February 08th, 2016	

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 “Cities”, “Towns” and “Roads”.

Module	Infrastructure	Max.	Vodafone	Operator 2	Operator 3
Voice	Total	400	357	326	275
	Cities	260	89%	80%	66%
	Towns and roads	140	90%	84%	74%
Data	Total	600	506	480	449
	Cities	390	87%	81%	76%
	Towns	90	80%	77%	67%
	Roads	120	77%	77%	77%
TOTAL		1.000	863	806	724

Shown voice, data and total scores are rounded

The following table indicates the achieved percentage of the maximum score in each of the different infrastructural breakdown.

Data	Service Group	Max.	Vodafone	Operator 2	Operator 3
Cities	Web Browsing	136,5	92%	88%	86%
	File Download	78,0	84%	79%	74%
	File Upload	78,0	84%	75%	73%
	YouTube	97,5	87%	80%	66%
Towns	Web Browsing	31,5	86%	86%	77%
	File Download	18,0	78%	69%	67%
	File Upload	18,0	74%	70%	69%
	YouTube	22,5	78%	75%	51%
Roads	Web Browsing	42,0	86%	82%	81%
	File Download	24,0	75%	75%	74%
	File Upload	24,0	75%	70%	76%
	YouTube	30,0	69%	78%	75%

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 “Cities” and “Towns and Roads”.

Voice M2M	Kpi Name	Unit	Vodafone	Operator 2	Operator 3
Cities	Qualified	[%]	99,3	97,5	96,1
	Call Setup Time	[s]	6,6	6,4	8,7
	AVG Speech Quality	[MOS-LQO]	3,7	3,5	3,0
Towns and roads	Qualified	[%]	98,4	96,9	95,0
	Call Setup Time	[s]	6,6	7,6	9,2
	AVG Speech Quality	[MOS-LQO]	3,5	3,3	3,0

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
HTTP live page DL	Qualified	[%]	98,6	98,0	97,2
	AVG Session Time	[s]	2,6	2,6	2,8
HTTP static page DL	Qualified	[%]	99,3	97,6	99,2
	AVG Session Time	[s]	1,4	1,6	1,6
HTTP file DL 3MB	Qualified	[%]	99,0	99,3	98,4
	AVG Session Time	[s]	1,8	2,8	3,3
	90% faster than	[kbit/s]	7921	4576	3858
	10% faster than	[kbit/s]	38961	32389	27180
HTTP file UL 1MB	Qualified	[%]	99,6	97,6	96,0
	AVG Session Time	[s]	1,4	2,0	1,8
	90% faster than	[kbit/s]	4442	2287	2766
	10% faster than	[kbit/s]	10554	10974	9357
HTTP DL FDTT 10s	Qualified	[%]	99,7	99,4	99,0
	AVG throughput	[kbit/s]	26842	21272	16911
	90% faster than	[kbit/s]	9198	4883	3423
	10% faster than	[kbit/s]	50903	42451	34962
HTTP UL FDTT 10s	Qualified	[%]	99,3	99,1	98,8
	AVG throughput	[kbit/s]	17858	13065	13916
	90% faster than	[kbit/s]	3659	1986	2874
	10% faster than	[kbit/s]	27545	20865	21412
YouTube SD	Qualified	[%]	98,8	98,8	96,7
	Start Time	[s]	1,2	1,3	1,4
	Playouts w/o interruptions	[%]	99,7	99,5	99,4
YouTube HD	Qualified	[%]	97,9	96,2	94,0
	Start Time	[s]	1,7	1,9	2,0
	Playouts w/o interruptions	[%]	98,5	97,2	94,4

Data Towns	Kpi Name	Unit	Vodafone	Operator 2	Operator 3
HTTP live page DL	Qualified	[%]	97,7%	97,6%	94,3%
	AVG Session Time	[s]	2,6	2,5	2,7
HTTP static page DL	Qualified	[%]	95,5	97,1	99,3
	AVG Session Time	[s]	1,4	1,7	1,8
HTTP file DL 3MB	Qualified	[%]	98,1	98,6	98,5
	AVG Session Time	[s]	3,0	3,5	4,4
	90% faster than	[kbit/s]	4925	3924	2893
	10% faster than	[kbit/s]	34188	22599	25946
HTTP file UL 1MB	Qualified	[%]	97,6	97,1	96,1
	AVG Session Time	[s]	1,9	2,6	1,8
	90% faster than	[kbit/s]	2414	1165	2646
	10% faster than	[kbit/s]	9490	9627	9335
HTTP DL FDTT 10s	Qualified	[%]	100,0	97,6	96,6
	AVG throughput	[kbit/s]	19607	14757	15167
	90% faster than	[kbit/s]	5207	3231	3953
	10% faster than	[kbit/s]	38419	27051	29957
HTTP UL FDTT 10s	Qualified	[%]	99,0	98,5	97,6
	AVG throughput	[kbit/s]	11775	11317	12401
	90% faster than	[kbit/s]	2000	1584	2409
	10% faster than	[kbit/s]	19772	19823	19452
YouTube SD	Qualified	[%]	98,0	97,6	92,3
	Start Time	[s]	1,5	1,3	1,6
	Playouts w/o interruptions	[%]	99,5	100,0	100,0
YouTube HD	Qualified	[%]	95,1	94,1	87,4
	Start Time	[s]	1,7	1,9	2,0
	Playouts w/o interruptions	[%]	98,5	98,4	98,9

Data Roads	Kpi Name	Unit	Vodafone	Operator 2	Operator 3
HTTP live page DL	Qualified	[%]	95,2	93,6	93,5
	AVG Session Time	[s]	2,8	2,5	2,7
HTTP static page DL	Qualified	[%]	95,4	91,7	92,6
	AVG Session Time	[s]	1,6	1,6	1,7
HTTP file DL 3MB	Qualified	[%]	95,9	95,0	95,0
	AVG Session Time	[s]	4,5	4,1	4,3
	90% faster than	[kbit/s]	2869	3186	3246
	10% faster than	[kbit/s]	30809	25696	23881
HTTP file UL 1MB	Qualified	[%]	94,6	91,3	93,3
	AVG Session Time	[s]	2,3	2,2	2,1
	90% faster than	[kbit/s]	1719	1699	2182
	10% faster than	[kbit/s]	9512	9132	9270
HTTP DL FDTT 10s	Qualified	[%]	95,0	95,9	95,0
	AVG throughput	[kbit/s]	16767	15886	17435
	90% faster than	[kbit/s]	3140	3735	3381
	10% faster than	[kbit/s]	33868	30974	37977
HTTP UL FDTT 10s	Qualified	[%]	94,2	94,2	95,8
	AVG throughput	[kbit/s]	10455	10465	11200
	90% faster than	[kbit/s]	1444	1090	1468
	10% faster than	[kbit/s]	20471	18983	19183
YouTube SD	Qualified	[%]	93,0	95,1	93,8
	Start Time	[s]	1,7	1,5	1,8
	Playouts w/o interruptions	[%]	98,7	99,6	100,0
YouTube HD	Qualified	[%]	88,0	92,2	92,1
	Start Time	[s]	2,2	1,9	2,1
	Playouts w/o interruptions	[%]	96,7	96,4	95,0