

CERTIFICATE

P3 communications GmbH

Am Kraftversorgungsturm 3, D-52070 Aachen, Germany

hereby certifies that



vodafone

Vodafone Italia S.p.A.

Via Lorenteggio 240, 20147 Milan Lombardy, Italy

achieved „**Best in Test**“ with a

Total Score of **827 of 1000**

in the **Mobile Benchmark Italia 11/2015.**

(Score 319 of 400 in Telephony, Score 509 of 600 in Data Services)



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*Head of Network Testing
& Benchmarking*
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Measurement Setup

	Voice	Data
Device	Samsung Galaxy S5 LTE cat4 (SM-G900F) LTE / HSPA+ DC / HSUPA 5.76 Attenuation book	<i>3G and 4G Preferred</i> Samsung Galaxy S5 LTE cat4 (SM-G900F) LTE / HSPA+ DC / HSUPA 5.76 Attenuation book <i>4G Preferred CA</i> Samsung Galaxy Note4 LTE cat6 (SM-N910F) LTE / HSPA+ DC / HSUPA 5.76 Attenuation book
Test Cases	Mobile-to-ISDN Sys1 4G to ISDN ISDN to 4G Sys2 3G to ISDN ISDN to 3G Mobile-to-Mobile Set1 4Gpref (MRAB) to 3G pref (MRAB) Set2 3Gpref to 4G pref 70 sec call duration 115 sec call window multiRAB 1:1 traffic injection	HTTP File DL 3MB HTTP File UL 1MB HTTP DL stress test 10s HTTP UL stress test 10s Web Browsing-ETSI Ref. Page, 5 live websites YouTube SD Video-30s clip YouTube HD Video-30s clip One car 4G pref. and one 3G pref.
Mobility and Route Types	100% Drivetest 80% in Cities and 20% on Transfer Major and Small cities and connecting roads	
Samples	M2ISDN: ~ 3320 per Operator M2M: ~ 3375 per Operator	Data 3G ~ 900 per Operator Data 4G ~ 920 per Operator Data 4G CA ~ 1800 per Operator
QoS DL/UL	4Gpref Vodafone 226000/52000, Tim 224000/50000, Wind, 150000/50000, Tre 220000/48000 [kbit/s] 3Gpref Vodafone 42000/5312, Tim 43000/5625, Wind 84000/5625, Tre 42000/8437 [kbit/s]	
Dates	29 measurement days, October 23rd - November 28th, 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.	Vodafone	Operator 2	Operator 3	Operator 4
Voice	Total	400	319	265	223	268
	big cities	260	81%	69%	54%	69%
	small cities and connecting roads	140	77%	61%	59%	62%
Data	Total	600	509	433	352	398
	big cities	390	86%	76%	63%	71%
	small cities	90	85%	80%	62%	64%
	connecting roads	120	79%	52%	42%	52%
TOTAL		1.000	827	698	575	666

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
big cities	Web Browsing	136,5	90%	88%	72%	77%
	File Download	78,0	87%	85%	68%	75%
	File Upload	78,0	77%	73%	57%	69%
	YouTube	97,5	88%	55%	51%	63%
small cities	Web Browsing	31,5	91%	91%	70%	70%
	File Download	18,0	85%	87%	68%	70%
	File Upload	18,0	77%	74%	55%	59%
	YouTube	22,5	85%	66%	54%	57%
connecting roads	Web Browsing	42,0	81%	64%	45%	55%
	File Download	24,0	84%	58%	52%	59%
	File Upload	24,0	72%	48%	36%	50%
	YouTube	30,0	76%	36%	35%	42%

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	Vodafone	Operator 2	Operator 3	Operator 4
big cities	Qualified	[%]	98,3	95,7	93,4	96,0
	Call Setup Time	[s]	7,4	7,7	8,2	6,7
	AVG Speech Quality	[MOS-LQO]	3,5	3,6	3,0	2,9
small cities and connecting roads	Qualified	[%]	94,3	88,6	88,7	89,4
	Call Setup Time	[s]	7,7	7,7	7,8	6,2
	AVG Speech Quality	[MOS-LQO]	3,4	3,5	3,0	2,9

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	Vodafone	Operator 2	Operator 3	Operator 4
http Live Page DL	Qualified	[%]	98,4	97,6	94,5	95,5
	AVG Session Time	[s]	2,5	2,5	3,0	3,0
http Static Page DL	Qualified	[%]	98,2	98,3	94,6	96,8
	AVG Session Time	[s]	1,5	1,6	2,1	2,0
http file DL 3MB	Qualified	[%]	99,1	99,4	98,0	98,8
	AVG Session Time	[s]	1,9	1,9	4,8	3,7
	90% faster than	[kbit/s]	8188	8086	2565	4030
	10% faster than	[kbit/s]	50420	44037	23438	28829
http file UL 1MB	Qualified	[%]	98,2	97,3	93,7	96,6
	AVG Session Time	[s]	1,9	2,2	3,1	2,8
	90% faster than	[kbit/s]	2284	1912	1088	1290
	10% faster than	[kbit/s]	14011	10914	8180	9029
http DL FDTT 10s	Qualified	[%]	99,3	99,0	98,4	98,7
	AVG throughput	[kbit/s]	43552	36985	12829	18562
	90% faster than	[kbit/s]	10693	8852	2613	3199
	10% faster than	[kbit/s]	87421	74727	27514	40252
http UL FDTT 10s	Qualified	[%]	98,5	98,7	97,0	98,9
	AVG throughput	[kbit/s]	14347	13291	7718	11232
	90% faster than	[kbit/s]	2206	1749	837	873
	10% faster than	[kbit/s]	27265	27145	16748	24950
Youtube SD	Qualified	[%]	99,5	98,2	96,8	97,2
	Start Time	[s]	1,5	1,6	1,9	1,9
	Playouts w/o interruptions	[%]	99,7	99,7	98,8	98,9
Youtube HD	Qualified	[%]	98,1	89,2	90,0	91,8
	Start Time	[s]	1,6	2,1	2,5	2,3
	Playouts w/o interruptions	[%]	98,4	93,5	92,6	96,2

Data small cities	Kpi Name	Unit	Vodafone	Operator 2	Operator 3	Operator 4
http Live Page DL	Qualified	[%]	98,6	98,4	94,7	94,3
	AVG Session Time	[s]	2,5	2,4	3,0	3,0
http Static Page DL	Qualified	[%]	98,0	98,3	92,9	93,5
	AVG Session Time	[s]	1,6	1,5	2,5	2,1
http file DL 3MB	Qualified	[%]	98,8	100,0	97,0	97,4
	AVG Session Time	[s]	1,8	1,6	4,2	3,6
	90% faster than	[kbit/s]	6991	9401	3207	4147
	10% faster than	[kbit/s]	47077	44362	21486	28402
http file UL 1MB	Qualified	[%]	98,0	97,9	91,7	93,9
	AVG Session Time	[s]	2,1	1,8	3,7	3,1
	90% faster than	[kbit/s]	2313	2469	932	1034
	10% faster than	[kbit/s]	11905	10127	7432	8547
http DL FDTT 10s	Qualified	[%]	99,6	99,2	98,8	97,9
	AVG throughput	[kbit/s]	39569	36470	13132	18401
	90% faster than	[kbit/s]	7623	7324	3377	3777
	10% faster than	[kbit/s]	81076	74665	26736	37557
http UL FDTT 10s	Qualified	[%]	99,6	97,6	98,8	97,1
	AVG throughput	[kbit/s]	13090	13627	6786	8606
	90% faster than	[kbit/s]	2150	2550	619	823
	10% faster than	[kbit/s]	26974	27450	16082	23336
Youtube SD	Qualified	[%]	98,3	99,6	97,5	96,6
	Start Time	[s]	1,6	1,6	2,0	2,1
	Playouts w/o interruptions	[%]	100,0	100,0	99,1	99,6
Youtube HD	Qualified	[%]	97,1	92,3	91,9	89,8
	Start Time	[s]	1,8	2,1	2,6	2,6
	Playouts w/o interruptions	[%]	99,2	93,8	90,8	96,2

Data connecting routes	Kpi Name	Unit	Vodafone	Operator 2	Operator 3	Operator 4
http Live Page DL	Qualified	[%]	93,8	86,7	82,2	84,6
	AVG Session Time	[s]	2,7	3,0	3,6	3,4
http Static Page DL	Qualified	[%]	92,4	88,1	79,8	84,6
	AVG Session Time	[s]	1,9	2,4	3,8	2,7
http file DL 3MB	Qualified	[%]	95,5	87,8	89,7	88,2
	AVG Session Time	[s]	3,1	5,0	7,1	5,1
	90% faster than	[kbit/s]	4028	2690	1471	2894
	10% faster than	[kbit/s]	38961	35294	15595	22070
http file UL 1MB	Qualified	[%]	92,1	83,0	81,7	84,9
	AVG Session Time	[s]	2,6	3,6	5,9	4,4
	90% faster than	[kbit/s]	1504	1007	643	854
	10% faster than	[kbit/s]	11952	8611	5344	7477
http DL FDTT 10s	Qualified	[%]	97,0	89,8	90,3	91,1
	AVG throughput	[kbit/s]	28663	18190	7974	12857
	90% faster than	[kbit/s]	5082	1212	1224	2323
	10% faster than	[kbit/s]	63018	45119	16223	29201
http UL FDTT 10s	Qualified	[%]	95,0	87,9	86,1	90,2
	AVG throughput	[kbit/s]	9636	7739	3067	4626
	90% faster than	[kbit/s]	1144	537	332	652
	10% faster than	[kbit/s]	20377	20689	7502	13383
Youtube SD	Qualified	[%]	95,1	86,9	85,7	85,8
	Start Time	[s]	1,8	2,2	2,5	2,3
	Playouts w/o interruptions	[%]	99,0	97,9	98,1	98,6
Youtube HD	Qualified	[%]	92,4	70,7	74,2	78,2
	Start Time	[s]	2,4	2,8	3,4	3,1
	Playouts w/o interruptions	[%]	96,0	88,9	92,0	92,9