

CERTIFICATE

P3 communications GmbH

Am Kraftversorgungsturm 3, D-52070 Aachen, Germany

hereby certifies that



vodafone

Vodafone New Zealand

20 Viaduct Harbour Avenue, Auckland 1010, New Zealand

achieved „**Best in Test**“ with a

Total Score of **709 of 1000**

in the **Mobile Benchmark New Zealand 02/2017**.

(Score 294 of 400 in Voice, Score 414 of 600 in Data Services)



Maziar Kianzad
*Head of Measurement
and Testing Solutions*
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Measurement Setup

	Voice	Data
Device	Samsung Galaxy S5 Cat4 P3 attenuator	Samsung Galaxy Note 4 Cat6 P3 attenuator
Test Cases	<p>Mobile-to-Mobile</p> <p>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)</p>	<p>4G CA preferred</p> <p>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</p>
Mobility and Route Types	<p>100% Drivetest 64% in Cities, 14% in Towns and 22% on Roads</p>	
Samples	~5000 per Operator	~2000 per Operator
Dates	<p>15 measurement days February 08th - February 23rd, 2017</p>	

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
Voice	Total	400	294	243	258
	Cities	240	85%	66%	74%
	Towns	80	82%	76%	74%
	Roads	80	30%	28%	28%
Data	Total	600	414	380	356
	Cities	360	80%	75%	72%
	Towns	120	70%	59%	54%
	Roads	120	36%	32%	26%
TOTAL		1.000	709	623	614

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	126,0	80%	75%	76%
	File Download	72,0	80%	73%	76%
	File Upload	72,0	69%	67%	53%
	YouTube	90,0	89%	85%	78%
Towns	Web Browsing	42,0	67%	50%	50%
	File Download	24,0	73%	64%	68%
	File Upload	24,0	54%	40%	23%
	YouTube	30,0	83%	81%	71%
Roads	Web Browsing	42,0	31%	29%	25%
	File Download	24,0	42%	32%	28%
	File Upload	24,0	22%	22%	19%
	YouTube	30,0	47%	44%	33%

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	Qualifier	[%]	98,6	95,5	96,5
	Call Setup Time	[s]	5,6	6,7	5,9
	AVG Speech Quality	[MOS-LQO]	3,5	3,6	3,6
Towns	Qualifier	[%]	97,9	97,1	96,4
	Call Setup Time	[s]	5,3	6,2	5,5
	AVG Speech Quality	[MOS-LQO]	3,5	3,6	3,5
Roads	Qualifier	[%]	78,1	76,1	75,2
	Call Setup Time	[s]	5,2	6,3	5,5
	AVG Speech Quality	[MOS-LQO]	3,5	3,6	3,3

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	[%]	97,7	97,0	97,5
	AVG Session Time	[s]	3,8	4,0	4,1
HTTP static page DL	Qualified	[%]	98,6	97,4	98,1
	AVG Session Time	[s]	1,7	1,9	2,1
HTTP file DL 3MB	Qualified	[%]	99,4	99,1	99,3
	AVG Session Time	[s]	2,0	3,4	3,4
	90% faster than	[kbit/s]	7512	3523	4210
	10% faster than	[kbit/s]	57416	36237	29091
HTTP file UL 1MB	Qualified	[%]	98,2	96,7	95,5
	AVG Session Time	[s]	2,9	2,4	2,5
	90% faster than	[kbit/s]	1182	1331	1382
	10% faster than	[kbit/s]	9900	10734	11747
HTTP DL FDTT 10s	Qualified	[%]	98,3	98,6	99,1
	AVG throughput	[kbit/s]	44446	17646	30503
	90% faster than	[kbit/s]	7327	5981	6409
	10% faster than	[kbit/s]	90616	32209	59466
HTTP UL FDTT 10s	Qualified	[%]	97,7	97,9	92,1
	AVG throughput	[kbit/s]	15127	16073	19330
	90% faster than	[kbit/s]	1104	1239	1639
	10% faster than	[kbit/s]	33970	32254	39500
YouTube	Qualified	[%]	99,4	98,4	99,3
	Start Time	[s]	2,2	2,2	2,2
	Playouts w/o interruptions	[%]	99,8	99,8	99,9
	AVG Resolution	[%]	604,5	592,8	462,3

Data Towns	Kpi Name	Unit	Vodafone	Operator 2	Operator 3
HTTP live page DL	Qualified	[%]	95,4	92,8	92,9
	AVG Session Time	[s]	4,1	4,2	4,4
HTTP static page DL	Qualified	[%]	96,4	90,9	91,8
	AVG Session Time	[s]	2,1	2,4	2,6
HTTP file DL 3MB	Qualified	[%]	99,7	97,5	98,6
	AVG Session Time	[s]	3,6	5,6	6,2
	90% faster than	[kbit/s]	4180	2144	1796
	10% faster than	[kbit/s]	44684	29326	28456
HTTP file UL 1MB	Qualified	[%]	94,1	89,3	83,6
	AVG Session Time	[s]	4,0	3,7	3,4
	90% faster than	[kbit/s]	880	848	809
	10% faster than	[kbit/s]	7782	7984	10296
HTTP DL FDTT 10s	Qualified	[%]	97,0	98,3	97,9
	AVG throughput	[kbit/s]	32029	17684	28431
	90% faster than	[kbit/s]	3681	2079	2512
	10% faster than	[kbit/s]	69727	34744	60268
HTTP UL FDTT 10s	Qualified	[%]	97,3	95,5	79,0
	AVG throughput	[kbit/s]	8937	10275	15227
	90% faster than	[kbit/s]	533	497	902
	10% faster than	[kbit/s]	24822	31017	36216
YouTube	Qualified	[%]	98,6	98,2	98,2
	Start Time	[s]	2,4	2,7	2,5
	Playouts w/o interruptions	[%]	100,0	100,0	100,0
	AVG Resolution	[%]	558,7	554,4	424,0

Data Roads	Kpi Name	Unit	Vodafone	Operator 2	Operator 3
HTTP live page DL	Qualified	[%]	78,5	75,5	71,5
	AVG Session Time	[s]	4,4	4,6	5,1
HTTP static page DL	Qualified	[%]	78,6	78,2	71,1
	AVG Session Time	[s]	2,7	3,0	3,8
HTTP file DL 3MB	Qualified	[%]	87,6	84,2	81,8
	AVG Session Time	[s]	6,3	7,2	11,3
	90% faster than	[kbit/s]	1459	1389	862
	10% faster than	[kbit/s]	39092	33253	19203
HTTP file UL 1MB	Qualified	[%]	79,8	69,3	63,6
	AVG Session Time	[s]	5,8	5,5	8,0
	90% faster than	[kbit/s]	664	656	459
	10% faster than	[kbit/s]	7464	8329	9595
HTTP DL FDTT 10s	Qualified	[%]	86,5	85,1	87,5
	AVG throughput	[kbit/s]	19560	13562	13349
	90% faster than	[kbit/s]	1917	1505	487
	10% faster than	[kbit/s]	52094	30503	41321
HTTP UL FDTT 10s	Qualified	[%]	82,5	77,5	61,3
	AVG throughput	[kbit/s]	5191	7690	8473
	90% faster than	[kbit/s]	406	333	217
	10% faster than	[kbit/s]	17618	25615	28419
YouTube	Qualified	[%]	84,6	82,6	82,6
	Start Time	[s]	3,0	3,1	3,5
	Playouts w/o interruptions	[%]	98,7	99,2	98,8
	AVG Resolution	[%]	482,0	498,2	321,6