

CERTIFICATE

P3 communications GmbH

Am Kraftversorgungsturm 3, D-52070 Aachen, Germany

hereby certifies that



Vodacom PTY (LTD)

Vodacom PTY (LTD), 082 Vodacom Boulevard, Midrand 1685, South Africa

achieved „**Best in Test**“ with a

Total Score of **689 of 1000**

in the **Mobile Benchmark South Africa 12/2016.**

(Score 265 of 400 in Telephony, Score 424 of 600 in Data Services)



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Measurement Setup

	Voice	Data
Device	Samsung Galaxy S5 LTE cat4	HTC10 cat9
Test Cases	<p>Mobile-to-Mobile</p> <p>Side1 (4G preferred) to Side2 (4G preferred)</p> <p>Side1 (4G preferred) to Side2 (3G preferred)</p> <p>115 sec call window</p> <p>70 sec call duration</p> <p>15 sec call setup timeout</p> <p>Multi-RAB traffic injection on both sides</p>	<p>Data 4G preferred CA</p> <p>HTTP DL datastream 10s</p> <p>HTTP UL datastream 10s</p> <p>HTTP 3MB DL fixed file transfer</p> <p>HTTP 1MB UL fixed file transfer</p> <p>Web Browsing - Kepler ETSI Ref. Page</p> <p>9 Live web pages (4 http / 5 https)</p> <p>YouTube HD/SD video - 45s</p>
Mobility and Route Types	<p>100% Drivetest</p> <p>57% in Cities, 16% in Towns and 26% on Roads</p>	
Samples	~ 7200 per Operator	~ 2400 per Operator
Dates	<p>16.5 measurement days</p> <p>November 11th - December 12th, 2016</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.	Vodacom	Operator 2	Operator 3	Operator 4
Voice	Total	400	265	231	180	129
	Cities	240	73%	69%	55%	41%
	Towns	80	73%	50%	41%	21%
	Roads	80	38%	31%	20%	18%
Data	Total	600	424	377	149	207
	Cities	360	79%	78%	33%	44%
	Towns	120	68%	47%	12%	20%
	Roads	120	49%	32%	14%	20%
TOTAL		1.000	689	608	329	336

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.	Vodacom	Operator 2	Operator 3	Operator 4
Cities	Web Browsing	126	72%	71%	28%	34%
	File Download	72	78%	78%	22%	57%
	File Upload	72	80%	77%	20%	44%
	YouTube	90	88%	90%	58%	49%
Towns	Web Browsing	42	54%	34%	14%	22%
	File Download	24	74%	57%	7%	13%
	File Upload	24	69%	38%	9%	15%
	YouTube	30	83%	62%	15%	26%
Roads	Web Browsing	42	33%	24%	14%	21%
	File Download	24	59%	36%	10%	17%
	File Upload	24	51%	26%	11%	19%
	YouTube	30	63%	46%	21%	22%

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	Vodacom	Operator 2	Operator 3	Operator 4
Cities	Qualifier	[%]	96,8	95,9	93,7	92,1
	Call Setup Time	[s]	6,7	6,4	6,3	8,3
	AVG Speech Quality	[MOS-LQO]	3,6	3,7	3,1	2,9
Towns	Qualifier	[%]	97,1	92,4	91,5	87,3
	Call Setup Time	[s]	7,5	6,6	6,9	7,8
	AVG Speech Quality	[MOS-LQO]	3,6	3,6	3,0	2,9
Roads	Qualifier	[%]	85,7	82,9	74,0	73,6
	Call Setup Time	[s]	7,5	6,3	7,8	8,4
	AVG Speech Quality	[MOS-LQO]	3,5	3,4	2,8	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	Vodacom	Operator 2	Operator 3	Operator 4
HTTP Live Page DL	Qualifier	[%]	96,6	96,4	79,2	75,5
	AVG Session Time	[s]	5,7	5,6	5,5	5,9
HTTP Static Page DL	Qualifier	[%]	99,3	99,4	85,6	94,3
	AVG Session Time	[s]	1,4	1,4	2,1	2,3
HTTP file DL 3MB	Qualifier	[%]	99,7	99,6	87,4	97,6
	AVG Session Time	[s]	2,1	2,4	6,3	6,4
	90% faster than	[kbit/s]	6497	5649	1319	1741
	10% faster than	[kbit/s]	36474	30793	30640	20604
HTTP file UL 1MB	Qualifier	[%]	99,2	98,9	83,3	92,3
	AVG Session Time	[s]	1,7	1,9	3,9	3,8
	90% faster than	[kbit/s]	2496	2266	828	1010
	10% faster than	[kbit/s]	15776	11796	9249	7547
HTTP DL FDTT 10s	Qualifier	[%]	99,2	99,5	89,3	96,4
	AVG throughput	[kbit/s]	21453	21326	18633	11438
	90% faster than	[kbit/s]	7515	7335	2158	1938
	10% faster than	[kbit/s]	39629	39529	39999	25979
HTTP UL FDTT 10s	Qualifier	[%]	99,3	98,9	86,4	95,9
	AVG throughput	[kbit/s]	12390	11802	8378	4493
	90% faster than	[kbit/s]	2977	3257	982	601
	10% faster than	[kbit/s]	21660	20111	18516	8939
YouTube	Qualifier	[%]	98,8	99,3	92,5	91,6
	Start Time	[s]	1,9	2,0	2,6	2,9
	Playouts w/o interruptions	[%]	99,9%	100,0%	99,2%	99,4%
	AVG Resolution	[p]	611,8	607,9	545,2	473,5

Data Towns	KPI Name	Unit	Vodacom	Operator 2	Operator 3	Operator 4
HTTP Live Page DL	Qualifier	[%]	92,5	86,8	44,2	41,4
	AVG Session Time	[s]	6,0	6,1	6,8	6,1
HTTP Static Page DL	Qualifier	[%]	97,8	94,8	54,0	56,4
	AVG Session Time	[s]	1,7	2,4	4,7	2,6
HTTP file DL 3MB	Qualifier	[%]	99,7	96,7	70,5	58,0
	AVG Session Time	[s]	2,5	4,2	14,8	6,6
	90% faster than	[kbit/s]	5749	2928	698	1558
	10% faster than	[kbit/s]	35608	23176	8380	15504
HTTP file UL 1MB	Qualifier	[%]	96,6	91,2	57,4	53,6
	AVG Session Time	[s]	2,3	4,3	8,7	3,9
	90% faster than	[kbit/s]	1768	803	523	1034
	10% faster than	[kbit/s]	13249	7435	2083	6861
HTTP DL FDTT 10s	Qualifier	[%]	97,8	96,4	80,5	60,1
	AVG throughput	[kbit/s]	21070	13019	5887	9027
	90% faster than	[kbit/s]	6197	2722	425	1644
	10% faster than	[kbit/s]	40953	27687	10314	18612
HTTP UL FDTT 10s	Qualifier	[%]	98,6	94,5	72,9	57,3
	AVG throughput	[kbit/s]	11341	5118	1858	4644
	90% faster than	[kbit/s]	1726	623	258	740
	10% faster than	[kbit/s]	21424	11250	3127	9159
YouTube	Qualifier	[%]	97,7	94,6	77,6	48,6
	Start Time	[s]	2,1	2,7	4,6	3,1
	Playouts w/o interruptions	[%]	100,0	99,4	95,7	100,0
	AVG Resolution	[p]	602,9	500,8	373,6	441,6

Data Roads	KPI Name	Unit	Vodacom	Operator 2	Operator 3	Operator 4
HTTP Live Page DL	Qualifier	[%]	81,5	75,2	32,5	25,6
	AVG Session Time	[s]	6,3	6,3	6,9	6,2
HTTP Static Page DL	Qualifier	[%]	90,0	81,1	39,9	33,8
	AVG Session Time	[s]	2,5	2,8	4,6	2,9
HTTP file DL 3MB	Qualifier	[%]	93,1	85,5	47,6	33,6
	AVG Session Time	[s]	5,6	7,1	14,5	7,7
	90% faster than	[kbit/s]	1930	1726	804	1364
	10% faster than	[kbit/s]	30539	20070	7987	15713
HTTP file UL 1MB	Qualifier	[%]	88,4	77,8	40,6	34,0
	AVG Session Time	[s]	3,8	5,0	9,1	4,5
	90% faster than	[kbit/s]	946	814	464	965
	10% faster than	[kbit/s]	11749	6540	2146	6211
HTTP DL FDTT 10s	Qualifier	[%]	92,5	87,1	51,9	34,7
	AVG throughput	[kbit/s]	15245	11080	5922	7766
	90% faster than	[kbit/s]	2101	2155	737	1734
	10% faster than	[kbit/s]	33139	24785	11225	16097
HTTP UL FDTT 10s	Qualifier	[%]	92,8	85,5	46,7	33,3
	AVG throughput	[kbit/s]	6434	4039	1972	3823
	90% faster than	[kbit/s]	468	315	246	780
	10% faster than	[kbit/s]	18286	9854	3118	8629
YouTube	Qualifier	[%]	90,1	83,9	51,2	30,3
	Start Time	[s]	2,7	2,9	4,1	3,3
	Playouts w/o interruptions	[%]	99,2	98,3	98,8	97,8
	AVG Resolution	[p]	520,9	482,2	384,1	418,1