

CERTIFICATE

P3 communications GmbH

Am Kraftversorgungsturm 3, D-52070 Aachen, Germany

hereby certifies that



T-Mobile Czech Republic a.s.

Tomíčková 2144/1, 148 00 Praha 4, Czech Republic

achieved „**Best in Test**“ with a

Total Score of 908 of 1000

in the Mobile Benchmark Czech Republic 10/2017.

(Score 352 of 400 in Telephony, Score 556 of 600 in Data Services)



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*Head of Network Testing
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October 2017

Measurement Setup

	Voice	Data
Device	Samsung Galaxy S7 cat9	Samsung Galaxy S7 cat9 Sony Xperia XZ cat9
Test Cases	Mobile-to-Mobile (M2M) Side1 (4G preferred) to Side2 (4G preferred) Side1 (VoLTE) to Side2 (VoLTE) 115 sec call window 70 sec call duration 15 sec call setup timeout Multi-RAB traffic injection on both sides	Data 4G preferred CA HTTP DL datastream 7s HTTP UL datastream 7s 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) 4 YouTube HD video ~ 45s
Mobility and Route Types	100% Drivetest 54% in Cities, 20% in Towns and 26% on Roads Cities, towns and roads	
Samples	~ 5800 per Operator	~ 1900 per Operator
Dates	15 measurement days 05.10.2017 – 21.10.2017	

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.	T-Mobile	Operator 2	Operator 3
Voice	Total	400	352	311	309
	Cities	240	88%	79%	81%
	Towns	80	91%	81%	79%
	Roads	80	86%	71%	63%
Data	Total	600	556	571	556
	Cities	360	93%	96%	93%
	Towns	120	91%	93%	91%
	Roads	120	92%	95%	94%
TOTAL		1.000	908	882	865

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.	T-Mobile	Operator 2	Operator 3
Cities	Web Browsing	108	97%	98%	97%
	File Download	90	87%	90%	82%
	File Upload	90	93%	97%	97%
	YouTube	72	95%	98%	95%
Towns	Web Browsing	36	97%	99%	98%
	File Download	30	84%	85%	81%
	File Upload	30	87%	92%	92%
	YouTube	24	95%	96%	95%
Roads	Web Browsing	36	95%	98%	95%
	File Download	30	91%	91%	87%
	File Upload	30	90%	94%	95%
	YouTube	24	93%	98%	98%

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	T-Mobile	Operator 2	Operator 3
Cities	Qualifier	[%]	98,8	98,1	98,9
	Call Setup Time	[s]	3,3	5,4	5,6
	AVG Speech Quality	[MOS-LQO]	3,4	3,5	3,3
Towns	Qualifier	[%]	99,3	98,6	98,7
	Call Setup Time	[s]	3,4	5,8	6,0
	AVG Speech Quality	[MOS-LQO]	3,5	3,5	3,3
Roads	Qualifier	[%]	98,0	95,5	94,1
	Call Setup Time	[s]	4,0	6,4	6,8
	AVG Speech Quality	[MOS-LQO]	3,4	3,5	3,2

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	T-Mobile	Operator 2	Operator 3
HTTP Live Page DL	Qualifier	[%]	99,6	99,8	99,8
	Time to first Byte	[ms]	317	319	332
	KBytes first second	[KB]	519	553	502
HTTP Static Page DL	Qualifier	[%]	99,7	99,9	99,8
	Overall Session Time	[s]	1,2	1,1	1,3
HTTP file DL 3MB	Qualifier	[%]	100,0	100,0	99,8
	AVG Session Time	[s]	1,6	1,4	2,0
	90% faster than	[kbit/s]	9009	11356	6569
	10% faster than	[kbit/s]	62926	61022	47226
HTTP file UL 1MB	Qualifier	[%]	99,8	100,0	100,0
	AVG Session Time	[s]	0,9	0,8	0,8
	90% faster than	[kbit/s]	7263	8557	10390
	10% faster than	[kbit/s]	21053	23256	22409
HTTP DL FDTT 7s	Qualifier	[%]	99,9	99,9	99,8
	AVG throughput	[kbit/s]	51724	61377	32453
	90% faster than	[kbit/s]	13177	20408	7212
	10% faster than	[kbit/s]	99104	111142	75941
HTTP UL FDTT 7s	Qualifier	[%]	99,7	99,9	99,9
	AVG throughput	[kbit/s]	18914	27408	22201
	90% faster than	[kbit/s]	10164	11977	14064
	10% faster than	[kbit/s]	30305	41086	38622
YouTube	Qualifier	[%]	99,8	100,0	99,7
	Start Time	[s]	2,3	2,1	2,3
	Playouts w/o interruptions	[%]	99,1	99,7	99,3
	AVG Resolution	[p]	1076,1	1079,1	1070,4

Data Towns	KPI Name	Unit	T-Mobile	Operator 2	Operator 3
HTTP Live Page DL	Qualifier	[%]	99,6	99,9	100,0
	Time to first Byte	[ms]	328	328	337
	KBytes first second	[KB]	518	546	508
HTTP Static Page DL	Qualifier	[%]	99,9	100,0	99,8
	Overall Session Time	[s]	1,2	1,1	1,2
HTTP file DL 3MB	Qualifier	[%]	99,8	100,0	100,0
	AVG Session Time	[s]	1,6	1,5	2,1
	90% faster than	[kbit/s]	7792	8343	6111
	10% faster than	[kbit/s]	56618	50526	36563
HTTP file UL 1MB	Qualifier	[%]	100,0	100,0	100,0
	AVG Session Time	[s]	1,0	0,9	0,9
	90% faster than	[kbit/s]	5772	6722	8724
	10% faster than	[kbit/s]	15748	18463	15717
HTTP DL FDTT 7s	Qualifier	[%]	99,1	99,8	99,8
	AVG throughput	[kbit/s]	45583	41066	25326
	90% faster than	[kbit/s]	12640	10870	8129
	10% faster than	[kbit/s]	88391	71572	46269
HTTP UL FDTT 7s	Qualifier	[%]	99,4	99,8	99,8
	AVG throughput	[kbit/s]	14635	18606	16733
	90% faster than	[kbit/s]	5785	8281	8853
	10% faster than	[kbit/s]	19338	29269	20985
YouTube	Qualifier	[%]	99,3	99,4	99,3
	Start Time	[s]	2,2	2,1	2,2
	Playouts w/o interruptions	[%]	99,6	100,0	99,8
	AVG Resolution	[p]	1075,5	1077,1	1074,4

Data Roads	KPI Name	Unit	T-Mobile	Operator 2	Operator 3
HTTP Live Page DL	Qualifier	[%]	98,7	99,7	98,9
	Time to first Byte	[ms]	321	338	339
	KBytes first second	[KB]	510	530	499
HTTP Static Page DL	Qualifier	[%]	98,8	99,5	99,0
	Overall Session Time	[s]	1,1	1,1	1,3
HTTP file DL 3MB	Qualifier	[%]	99,5	99,8	99,5
	AVG Session Time	[s]	1,9	1,8	2,4
	90% faster than	[kbit/s]	7113	7246	5427
	10% faster than	[kbit/s]	51949	45096	39775
HTTP file UL 1MB	Qualifier	[%]	98,8	99,3	100,0
	AVG Session Time	[s]	1,2	1,1	0,9
	90% faster than	[kbit/s]	4215	5242	7646
	10% faster than	[kbit/s]	15711	17467	15892
HTTP DL FDTT 7s	Qualifier	[%]	98,5	99,3	99,5
	AVG throughput	[kbit/s]	34785	31710	23648
	90% faster than	[kbit/s]	9002	8565	5999
	10% faster than	[kbit/s]	66083	63390	47764
HTTP UL FDTT 7s	Qualifier	[%]	99,3	99,8	99,2
	AVG throughput	[kbit/s]	14857	17508	17602
	90% faster than	[kbit/s]	5943	7326	10274
	10% faster than	[kbit/s]	19831	22740	21546
YouTube	Qualifier	[%]	98,0	99,8	99,7
	Start Time	[s]	2,3	2,2	2,3
	Playouts w/o interruptions	[%]	100,0	99,8	99,7
	AVG Resolution	[p]	1076,0	1077,1	1073,9