

# CERTIFICATE

## **P3 communications GmbH**

Am Kraftversorgungsturm 3, D-52070 Aachen, Germany

hereby certifies that

**TELE2**

## **Tele2 Croatia**

Ulica grada Vukovara 269D, 1000 Zagreb, Croatia

achieved a

**Total Score of 828 of 1000**

**in the Mobile Benchmark Croatia 05/2016.**

(Score 336 of 400 in Voice, Score 492 of 600 in Data Services)



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## Measurement Setup

	Voice	Data
<b>Device</b>	Samsung Galaxy S5 LTE cat4 (SM-G900F) LTE/HSPA+ DC/HSUPA 5.76 attenuation book	Samsung Galaxy Note4 LTE cat6 (SM-N910F) LTE/HSPA+ DC/HSUPA 5.76 attenuation book
<b>Test Cases</b>	Mobile-to-Mobile 4Gpref – 4G preferred (P3 Scoring) 3Gpref – 4G preferred (P3 Scoring) 115 sec call window 70 sec call duration 15 sec call setup timeout Email traffic injection on both sides (1 mail per call)	Data 4G preferred (P3 Scoring) HTTP UL and DL stress test 10s HTTP 1MB UL and 3MB DL fixed file transfer Web Browsing-ETSI Ref. Page 10 Live Web Browsing Pages YouTube video 45s
<b>Mobility and Route Types</b>	100% drivetest Cities, Towns and Roads	
<b>Samples</b>	~ 1950 per operator	~ 1750 per operator
<b>Dates</b>	April 30th - May 14 <sup>th</sup> 2016	

## 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.	Tele2	Operator 2	Operator 3
<b>Voice</b>	<b>Total</b>	<b>400</b>	<b>336</b>	<b>348</b>	<b>346</b>
	Cities	240	88%	87%	86%
	Towns	80	90%	88%	90%
	Roads	80	65%	84%	83%
<b>Data</b>	<b>Total</b>	<b>600</b>	<b>492</b>	<b>476</b>	<b>487</b>
	Cities	360	85%	82%	83%
	Towns	120	86%	76%	82%
	Roads	120	71%	74%	75%
<b>TOTAL</b>		<b>1.000</b>	<b>828</b>	<b>823</b>	<b>833</b>

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.

<b>Data</b>	<b>Service Group</b>	<b>Max.</b>	<b>Tele2</b>	<b>Operator 2</b>	<b>Operator 3</b>
<b>Cities</b>	Web Browsing	126,0	77%	80%	79%
	File Download	72,0	83%	82%	85%
	File Upload	72,0	90%	81%	78%
	YouTube	90,0	92%	85%	92%
<b>Towns</b>	Web Browsing	42,0	80%	78%	82%
	File Download	24,0	86%	73%	82%
	File Upload	24,0	88%	75%	74%
	YouTube	30,0	94%	78%	88%
<b>Roads</b>	Web Browsing	42,0	64%	73%	75%
	File Download	24,0	78%	75%	81%
	File Upload	24,0	68%	72%	68%
	YouTube	30,0	76%	78%	77%

## 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	Tele2	Operator 2	Operator 3
<b>Cities</b>	Qualifier	[%]	99,7	99,2	98,9
	Call Setup Time	[s]	6,9	6,4	6,4
	AVG Speech Quality	[MOS-LQO]	3,7	3,7	3,8
<b>Towns</b>	Qualifier	[%]	99,8	99,4	99,6
	Call Setup Time	[s]	6,8	6,4	6,3
	AVG Speech Quality	[MOS-LQO]	3,7	3,7	3,8
<b>Roads</b>	Qualifier	[%]	92,8	98,0	97,4
	Call Setup Time	[s]	7,0	6,4	6,4
	AVG Speech Quality	[MOS-LQO]	3,6	3,7	3,8

## 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	Tele2	Operator 2	Operator 3
HTTP Live Page DL	Qualifier	[%]	97,3	97,5	97,0
	AVG Session Time	[s]	4,4	4,1	4,1
HTTP Static Page DL	Qualifier	[%]	99,4	99,1	99,0
	AVG Session Time	[s]	2,0	1,2	1,2
HTTP file DL 3MB	Qualifier	[%]	99,5	98,5	99,5
	AVG Session Time	[s]	1,7	1,4	1,3
	90% faster than	[kbit/s]	7949	12040	11149
	10% faster than	[kbit/s]	33870	58968	58111
HTTP file UL 1MB	Qualifier	[%]	99,5	98,4	98,7
	AVG Session Time	[s]	1,7	1,4	1,3
	90% faster than	[kbit/s]	4394	3442	3603
	10% faster than	[kbit/s]	7491	15256	13267
HTTP DL FDTT 10s	Qualifier	[%]	99,4	98,1	98,0
	AVG throughput	[kbit/s]	39683	51490	58034
	90% faster than	[kbit/s]	15822	16815	17434
	10% faster than	[kbit/s]	70658	94007	111605
HTTP UL FDTT 10s	Qualifier	[%]	99,7	98,1	97,2
	AVG throughput	[kbit/s]	30698	25130	20820
	90% faster than	[kbit/s]	9478	4204	4051
	10% faster than	[kbit/s]	42160	39842	31703
YouTube	Qualifier	[%]	98,8	97,5	99,1
	Start Time	[s]	2,5	2,0	1,7
	Playouts w/o interruptions	[%]	99,9	99,4	99,9
	AVG Resolution	[p]	711,4	692,7	687,3
	HD Share	[%]	97,6	92,4	90,9

Data Towns	KPI Name	Unit	Tele2	Operator 2	Operator 3
HTTP Live Page DL	Qualifier	[%]	98,5	97,0	97,8
	AVG Session Time	[s]	4,4	4,2	4,1
HTTP Static Page DL	Qualifier	[%]	99,3	99,1	99,6
	AVG Session Time	[s]	2,1	1,2	1,2
HTTP file DL 3MB	Qualifier	[%]	100,0	97,2	99,3
	AVG Session Time	[s]	1,9	1,6	2,0
	90% faster than	[kbit/s]	7255	10479	7682
	10% faster than	[kbit/s]	33538	54920	49587
HTTP file UL 1MB	Qualifier	[%]	100,0	98,3	98,2
	AVG Session Time	[s]	1,9	1,8	1,7
	90% faster than	[kbit/s]	3532	2161	2039
	10% faster than	[kbit/s]	6855	14200	13093
HTTP DL FDTT 10s	Qualifier	[%]	100,0	96,3	99,3
	AVG throughput	[kbit/s]	40273	43652	41795
	90% faster than	[kbit/s]	19149	14266	11009
	10% faster than	[kbit/s]	63638	79421	72113
HTTP UL FDTT 10s	Qualifier	[%]	100,0	97,3	97,9
	AVG throughput	[kbit/s]	25309	18687	18581
	90% faster than	[kbit/s]	5232	2740	2072
	10% faster than	[kbit/s]	41519	37111	31287
YouTube	Qualifier	[%]	99,3	95,6	98,9
	Start Time	[s]	2,6	2,1	1,7
	Playouts w/o interruptions	[%]	100,0	99,6	100,0
	AVG Resolution	[p]	708,3	691,6	661,1
	HD Share	[%]	96,8	92,1	83,6

Data Roads	KPI Name	Unit	Tele2	Operator 2	Operator 3
HTTP Live Page DL	Qualifier	[%]	92,3	94,2	95,0
	Overall Session Time	[s]	4,7	4,3	4,4
HTTP Static Page DL	Qualifier	[%]	95,6	96,5	97,4
	Overall Session Time	[s]	2,8	1,9	1,9
HTTP file DL 3MB	Qualifier	[%]	96,8	96,6	97,2
	AVG Session Time	[s]	3,6	3,0	3,8
	90% faster than	[kbit/s]	3220	4133	2901
	10% faster than	[kbit/s]	32742	43135	41783
HTTP file UL 1MB	Qualifier	[%]	94,5	96,2	94,7
	AVG Session Time	[s]	3,6	2,9	3,1
	90% faster than	[kbit/s]	1063	1237	1199
	10% faster than	[kbit/s]	6266	12359	11562
HTTP DL FDTT 10s	Qualifier	[%]	97,3	94,4	98,8
	AVG throughput	[kbit/s]	26645	26919	26330
	90% faster than	[kbit/s]	4239	5299	4061
	10% faster than	[kbit/s]	58227	60447	64639
HTTP UL FDTT 10s	Qualifier	[%]	95,8	95,8	95,9
	AVG throughput	[kbit/s]	15732	11984	10307
	90% faster than	[kbit/s]	930	1269	886
	10% faster than	[kbit/s]	40734	28844	29547
YouTube	Qualifier	[%]	96,2	96,8	97,3
	Start Time	[s]	3,0	2,3	2,1
	Playouts w/o interruptions	[%]	99,6	99,2	99,8
	AVG Resolution	[p]	576,9	564,5	522,9
	HD Share	[%]	60,3	56,8	45,3