

# CERTIFICATE

## **P3 communications GmbH**

Am Kraftversorgungsturm 3, D-52070 Aachen, Germany

hereby certifies that



## **Magyar Telekom Plc.**

H-1117 Budapest, Szerémi street 4

achieved „**Best in Test**“ with a

**Total Score of 895 of 1000**

**in the Mobile Benchmark Hungary 06/2015.**

(Score 350 of 400 in Telephony, Score 545 of 600 in Data Services)

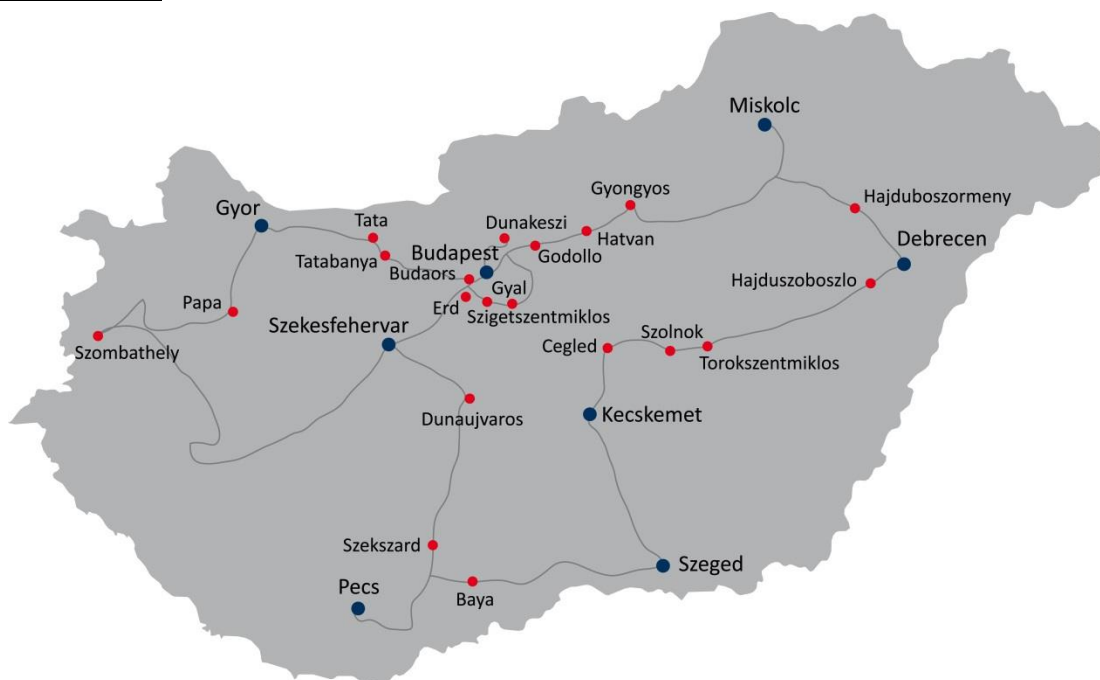


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## Measurement Setup

	Voice	Data
<b>Device</b>	Samsung Galaxy S5 Cat4 (SM-G900F) LTE / HSPA+ DC / HSUPA 5.76 P3 attenuation solution	Samsung Galaxy S5 Cat6 (SM-G901F) LTE / HSPA+ DC / HSUPA 5.76 P3 attenuation solution
<b>Test Cases</b>	Mobile-to-Mobile 4Gpref (MRAB) to 3G pref (MRAB) 90 sec call duration 140 sec call window multiRAB 1:1 traffic injection	HTTP DL stress test 10s HTTP DL user experience 3MB HTTP UL stress test 10s HTTP UL user experience 1MB Web Browsing-ETSI Ref. Page, 3 live websites YouTube SD Video-30s clip YouTube HD Video-30s clip
<b>Mobility and Route Types</b>	100% Drivetest 49% in big cities and 51% in small cities and on transfer	
<b>Samples</b>	4Gpref to 3Gpref: ~1900 per operator	4Gpref ~ 1200 per operator and service
<b>Dates</b>	12 days of measurement: June 4th - June 19th	

## 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”, “Small Cities” and “Connecting Roads”.

Module	Infrastructure	Max.	Telekom	Operator 2	Operator 3
<b>Voice</b>	<b>Total</b>	<b>400</b>	<b>350</b>	<b>349</b>	<b>335</b>
	Big Cities	260	89%	90%	82%
	Small Cities and Connecting Roads	140	85%	82%	87%
<b>Data</b>	<b>Total</b>	<b>600</b>	<b>545</b>	<b>500</b>	<b>495</b>
	Big Cities	390	94%	87%	84%
	Small Cities	90	92%	76%	85%
	Connecting Roads	120	80%	76%	77%
<b>TOTAL</b>		<b>1.000</b>	<b>895</b>	<b>849</b>	<b>830</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.

Data	Service Group	Max.	Telekom	Operator 2	Operator 3
<b>Big Cities</b>	Web Browsing	136,5	94,4%	87,8%	87,4%
	File Download	78,0	94,7%	90,1%	79,7%
	File Upload	78,0	93,8%	79,9%	74,8%
	YouTube	97,5	92,3%	90,3%	88,1%
<b>Small Cities</b>	Web Browsing	31,5	93,3%	78,6%	92,5%
	File Download	18,0	93,4%	76,2%	77,5%
	File Upload	18,0	86,1%	69,4%	71,7%
	YouTube	22,5	92,9%	78,7%	90,5%
<b>Connecting Roads</b>	Web Browsing	42,0	83,2%	79,5%	80,1%
	File Download	24,0	85,2%	76,9%	77,8%
	File Upload	24,0	72,4%	66,3%	71,2%
	YouTube	30,0	79,5%	76,6%	78,0%

## **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”, combined “Small Cities” and “Connecting Roads”.

<b>Voice M2M</b>	<b>Kpi Name</b>	<b>Unit</b>	<b>Telekom</b>	<b>Operator 2</b>	<b>Operator 3</b>
<b>Big Cities</b>	Qualified	[%]	99,1%	99,2%	97,8%
	Call Setup Time	[s]	6,1	5,6	6,3
	AVG Speech Quality	[MOS-LQO]	3,6	3,5	3,6
<b>Small Cities and Connecting Roads</b>	Qualified	[%]	96,6%	95,5%	96,7%
	Call Setup Time	[s]	6,4	5,8	5,7
	AVG Speech Quality	[MOS-LQO]	3,4	3,2	3,6

## 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” , “Small Cities” and “Connecting Roads”.

Data Big Cities	Kpi Name	Unit	Telekom	Operator 2	Operator 3
http Live Page DL	Qualified	[%]	99,1%	97,7%	97,6%
	AVG Session Time	[s]	2,5	3,0	2,8
http Static Page DL	Qualified	[%]	99,4%	99,3%	98,1%
	AVG Session Time	[s]	1,0	1,2	1,2
http file DL 3MB	Qualified	[%]	99,2%	99,2%	98,7%
	AVG Session Time	[s]	1,1	1,3	2,2
	90% faster than	[kbit/s]	21390	14423	7078
	10% faster than	[kbit/s]	57416	50420	35139
http file UL 1MB	Qualified	[%]	99,1%	98,5%	96,3%
	AVG Session Time	[s]	1,0	1,8	1,6
	90% faster than	[kbit/s]	7042	2683	2804
	10% faster than	[kbit/s]	16227	10152	14109
http DL FDTT 10s	Qualified	[%]	99,7%	98,8%	99,3%
	AVG throughput	[kbit/s]	57729,0	49470,0	21026,2
	90% faster than	[kbit/s]	26866	18069	6605
	10% faster than	[kbit/s]	99443	83301	41427
http UL FDTT 10s	Qualified	[%]	99,7%	99,0%	98,9%
	AVG throughput	[kbit/s]	29519,0	16174,2	13770,1
	90% faster than	[kbit/s]	10101	2612	2569
	10% faster than	[kbit/s]	44072	38152	21679
Youtube SD	Qualified	[%]	99,2%	99,2%	98,5%
	Start Time	[s]	1,1	1,2	1,3
	Playouts w/o interruptions	[%]	100,0%	100,0%	99,6%
Youtube HD	Qualified	[%]	98,5%	98,0%	98,0%
	Start Time	[s]	1,3	1,6	1,5
	Playouts w/o interruptions	[%]	99,8%	99,8%	99,4%

Data Small Cities	Kpi Name	Unit	Telekom	Operator 2	Operator 3
<b>http Live Page DL</b>	Qualified	[%]	98,9%	96,0%	99,6%
	AVG Session Time	[s]	2,7	3,7	3,3
<b>http Static Page DL</b>	Qualified	[%]	99,3%	99,2%	99,6%
	AVG Session Time	[s]	1,1	1,8	1,4
<b>http file DL 3MB</b>	Qualified	[%]	99,3%	97,9%	100,0%
	AVG Session Time	[s]	1,2	2,8	2,8
	90% faster than	[kbit/s]	14953	4303	5435
	10% faster than	[kbit/s]	54299	40000	23881
<b>http file UL 1MB</b>	Qualified	[%]	97,2%	97,9%	99,2%
	AVG Session Time	[s]	1,0	3,8	3,4
	90% faster than	[kbit/s]	5138	1152	1308
	10% faster than	[kbit/s]	15504	9889	11696
<b>http DL FDTT 10s</b>	Qualified	[%]	100,0%	98,4%	99,6%
	AVG throughput	[kbit/s]	54384,5	29131,0	14144,0
	90% faster than	[kbit/s]	16213	4568	5415
	10% faster than	[kbit/s]	96623	68587	22811
<b>http UL FDTT 10s</b>	Qualified	[%]	98,9%	98,3%	98,7%
	AVG throughput	[kbit/s]	26288,7	7904,3	5594,9
	90% faster than	[kbit/s]	6751	1129	1328
	10% faster than	[kbit/s]	43828	23421	18679
<b>Youtube SD</b>	Qualified	[%]	99,6%	98,4%	99,6%
	Start Time	[s]	1,1	1,8	1,5
	Playouts w/o interruptions	[%]	100,0%	100,0%	100,0%
<b>Youtube HD</b>	Qualified	[%]	99,0%	95,5%	98,7%
	Start Time	[s]	1,5	2,4	1,9
	Playouts w/o interruptions	[%]	99,3%	98,7%	99,1%

<b>Data Connecting Roads</b>	<b>Kpi Name</b>	<b>Unit</b>	<b>Telekom</b>	<b>Operator 2</b>	<b>Operator 3</b>
<b>http Live Page DL</b>	Qualified	[%]	93,8%	93,8%	94,1%
	AVG Session Time	[s]	2,8	3,6	3,7
<b>http Static Page DL</b>	Qualified	[%]	93,2%	94,7%	95,7%
	AVG Session Time	[s]	1,2	1,7	1,8
<b>http file DL 3MB</b>	Qualified	[%]	94,1%	91,8%	98,3%
	AVG Session Time	[s]	2,2	3,8	5,3
	90% faster than	[kbit/s]	8541	3321	2536
	10% faster than	[kbit/s]	51064	43716	20833
<b>http file UL 1MB</b>	Qualified	[%]	91,5%	91,5%	93,7%
	AVG Session Time	[s]	1,8	3,5	4,1
	90% faster than	[kbit/s]	2025	1083	1032
	10% faster than	[kbit/s]	14235	10088	9768
<b>http DL FDTT 10s</b>	Qualified	[%]	95,3%	95,5%	98,4%
	AVG throughput	[kbit/s]	40624,2	30568,8	10524,7
	90% faster than	[kbit/s]	6314	4096	2698
	10% faster than	[kbit/s]	83576	66998	19933
<b>http UL FDTT 10s</b>	Qualified	[%]	91,4%	93,2%	97,7%
	AVG throughput	[kbit/s]	19058,3	9586,3	4147,4
	90% faster than	[kbit/s]	1282	680	798
	10% faster than	[kbit/s]	40651	25029	13107
<b>Youtube SD</b>	Qualified	[%]	94,6%	94,9%	97,4%
	Start Time	[s]	1,4	1,9	2,2
	Playouts w/o interruptions	[%]	99,4%	99,2%	99,3%
<b>Youtube HD</b>	Qualified	[%]	92,0%	91,4%	93,1%
	Start Time	[s]	1,9	2,1	2,5
	Playouts w/o interruptions	[%]	98,5%	97,4%	94,7%