

# CERTIFICATE

## **P3 communications GmbH**

Am Kraftversorgungsturm 3, D-52070 Aachen, Germany

hereby certifies that



## **VIVA Bahrain BSC Closed**

VIVA Tower 15, Seef District, Kingdom of Bahrain, with CR 71117, PO Box 21529

achieved „**Best in Test**“ with a

Total Score of **732 of 1000**

in the **Mobile Benchmark Bahrain 12/2016**.

(Score 286 of 400 in Telephony, Score 446 of 600 in Data Services)



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## Measurement Setup

	Voice	Data
<b>Device</b>	Samsung Galaxy S5 LTE cat4	Samsung Galaxy Note4 LTE cat6
<b>Test Cases</b>	<p><b>Mobile-to-Mobile</b></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><b>Data 4G preferred CA</b></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 10 Live web pages (50% http / 50% https)</p> <p>YouTube HD/SD video - 45s</p>
<b>Mobility and Route Types</b>	100% Drivetest in Cities	
<b>Samples</b>	~ 1800 per Operator	~ 1500 per Operator
<b>Dates</b>	<p><b>11 measurement days</b></p> <p><b>November 23rd - December 8th, 2016</b></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 category “Cities”.

Module	Infrastructure	Max.	VIVA	Operator 2	Operator 3
<b>Voice</b>	<b>Total</b>	<b>400</b>	<b>286</b>	<b>238</b>	<b>240</b>
	Cities	400	71%	59%	60%
<b>Data</b>	<b>Total</b>	<b>600</b>	<b>446</b>	<b>313</b>	<b>442</b>
	Cities	600	74%	52%	74%
<b>TOTAL</b>		<b>1.000</b>	<b>732</b>	<b>550</b>	<b>682</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.	VIVA	Operator 2	Operator 3
<b>Cities</b>	Web Browsing	210	72%	43%	69%
	File Download	120	68%	60%	72%
	File Upload	120	75%	40%	68%
	YouTube	150	82%	68%	87%

## 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 category “Cities”.

Voice M2M	KPI Name	Unit	VIVA	Operator 2	Operator 3
	Qualifier	[%]	97,6	95,0	96,0
	Call Setup Time	[s]	8,0	8,1	9,0
	AVG Speech Quality	[MOS-LQO]	3,0	3,4	2,9

## 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 category “Cities”.

Data Cities	KPI Name	Unit	VIVA	Operator 2	Operator 3
HTTP Live Page DL	Qualifier	[%]	96,4	91,1	96,6
	AVG Session Time	[s]	4,0	4,4	4,4
HTTP Static Page DL	Qualifier	[%]	98,9	95,2	97,5
	AVG Session Time	[s]	2,8	4,7	3,1
HTTP file DL 3MB	Qualifier	[%]	99,4	98,0	98,5
	AVG Session Time	[s]	6,1	9,3	4,0
	90% faster than	[kbit/s]	1986	1178	3368
	10% faster than	[kbit/s]	17404	14898	27189
HTTP file UL 1MB	Qualifier	[%]	99,1	83,3	97,7
	AVG Session Time	[s]	4,9	6,2	5,0
	90% faster than	[kbit/s]	1437	529	780
	10% faster than	[kbit/s]	11159	4002	3976
HTTP DL FDTT 10s	Qualifier	[%]	99,4	98,4	99,1
	AVG throughput	[kbit/s]	11207	11126	21965
	90% faster than	[kbit/s]	1778	1395	4518
	10% faster than	[kbit/s]	23866	28340	44904
HTTP UL FDTT 10s	Qualifier	[%]	99,8	98,2	99,1
	AVG throughput	[kbit/s]	9680	7774	9225
	90% faster than	[kbit/s]	2781	757	1723
	10% faster than	[kbit/s]	16345	19335	21752
YouTube	Qualifier	[%]	99,3	97,3	99,3
	Start Time	[s]	2,4	2,5	2,3
	Playouts w/o interruptions	[%]	99,4	99,5	99,9
	AVG Resolution	[p]	523,7	441,2	581,1