

# CERTIFICATE

## **P3 communications GmbH**

Am Kraftversorgungsturm 3, D-52070 Aachen, Germany

hereby certifies that



**vodafone**

## **Vodafone Ireland Limited**

Mountainview, Leopardstown, Dublin 18, Ireland

achieved „**Best in Test**“ with a

Total Score of **792 of 1000**

in the **Mobile Benchmark Ireland 10/2015.**

(Score 345 of 400 in Telephony, Score 447 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 Antenuatr book	3G and 4G Preferred Samsung Galaxy S5 LTE cat4 (SM-G900F) LTE / HSPA+ DC / HSUPA 5.76 Antenuatr book  4G Preferred CA Samsung Galaxy Note4 LTE cat6 (SM-N910F) LTE / HSPA+ DC / HSUPA 5.76 Antenuatr book
<b>Test Cases</b>	Mobile-to-ISDN Sys1 4G to ISDN ISDN to 4G Sys2 3G to ISDN ISDN to 3G  Mobile-to-Mobile Set1 4Gpref (MRAB) to 3G pref (MRAB) Set2 3Gpref to 4G pref  70 sec call duration 115 sec call window multiRAB 1:1 traffic injection	HTTP DL stress test 10s HTTP UL stress test 10s HTTP DL 3MB HTTP UL 1MB Web Browsing-ETSI Ref. Page, 5 live websites YouTube SD Video-30s clip YouTube HD Video-30s clip One car 4G pref. and one 3G pref.
<b>Mobility and Route Types</b>	100% Drivetest 80% in Cities and 20% on Transfer Major and Small cities and connecting roads	
<b>Samples</b>	M2ISDN: ~ 1700 per Operator M2M: ~ 2100 per Operator	Data 3G ~ 455 per Operator Data 4G ~ 470 per Operator Data 4G CA ~ 1200 per Operator
<b>QoS DL/UL 4Gpref 3Gpref</b>	Vodafone 150000/150000, Meteor 104000/29000, Three 160000/80000 [kbit/s] Vodafone 42000/8440, Meteor 48000/8440, Three 42000/6000 [kbit/s]	
<b>Dates</b>	<b>17 measurement days: September 22<sup>nd</sup> - October 10<sup>th</sup>, 2015</b>	

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” and “Connecting Roads”.

Module	Infrastructure	Max.	Vodafone	Operator 2	Operator 3
<b>Voice</b>	<b>Total</b>	<b>400</b>	<b>345</b>	<b>272</b>	<b>323</b>
	big cities	260	85%	66%	83%
	small cities and connecting roads	140	88%	72%	77%
<b>Data</b>	<b>Total</b>	<b>600</b>	<b>447</b>	<b>437</b>	<b>333</b>
	big cities	390	80%	83%	68%
	small cities	90	71%	66%	40%
	connecting roads	120	58%	46%	26%
<b>TOTAL</b>		<b>1.000</b>	<b>792</b>	<b>709</b>	<b>656</b>

The following table indicates the achieved percentage of the maximum score in each of the different data services.

Data	Service Group	Max.	Vodafone	Operator 2	Operator 3
<b>big cities</b>	Web Browsing	136,5	72%	88%	73%
	File Download	78,0	82%	76%	70%
	File Upload	78,0	82%	73%	76%
	YouTube	97,5	90%	88%	53%
<b>small cities</b>	Web Browsing	31,5	67%	69%	34%
	File Download	18,0	76%	73%	60%
	File Upload	18,0	68%	60%	58%
	YouTube	22,5	75%	61%	20%
<b>connecting roads</b>	Web Browsing	42,0	52%	51%	27%
	File Download	24,0	71%	55%	32%
	File Upload	24,0	58%	38%	32%
	YouTube	30,0	56%	37%	14%

## 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” and “Connecting Roads”.

Voice M2M	Kpi Name	Unit	Vodafone	Operator 2	Operator 3
<b>big cities</b>	Qualified	[%]	98,2%	95,1%	97,8%
	Call Setup Time	[s]	6,3	6,9	5,4
	AVG Speech Quality	[MOS-LQO]	3,7	3,1	3,2
<b>small cities and connecting roads</b>	Qualified	[%]	97,4%	92,8%	93,7%
	Call Setup Time	[s]	6,3	6,7	5,6
	AVG Speech Quality	[MOS-LQO]	3,6	3,0	3,1

## 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” and “Connecting Roads”.

Data big cities	Kpi Name	Unit	Vodafone	Operator 2	Operator 3
http Live Page DL	Qualified	[%]	94,0%	98,8%	95,0%
	AVG Session Time	[s]	4,0	3,7	3,8
http Static Page DL	Qualified	[%]	99,1%	99,0%	97,7%
	AVG Session Time	[s]	1,4	1,5	1,9
http file DL 3MB	Qualified	[%]	99,0%	96,4%	98,1%
	AVG Session Time	[s]	2,1	1,8	6,5
	90% faster than	[kbit/s]	6907	8863	1834
	10% faster than	[kbit/s]	41451	37152	30075
http file UL 1MB	Qualified	[%]	99,0%	96,9%	98,1%
	AVG Session Time	[s]	1,6	1,6	2,2
	90% faster than	[kbit/s]	3083	3132	2001
	10% faster than	[kbit/s]	11034	11561	8772
http DL FDTT 10s	Qualified	[%]	99,4%	98,7%	99,8%
	AVG throughput	[kbit/s]	24988	25500	11382
	90% faster than	[kbit/s]	6629	9026	1428
	10% faster than	[kbit/s]	51446	46729	28199
http UL FDTT 10s	Qualified	[%]	99,3%	97,8%	98,8%
	AVG throughput	[kbit/s]	15130	15362	16047
	90% faster than	[kbit/s]	3377	2292	1697
	10% faster than	[kbit/s]	35644	26364	33858
Youtube SD	Qualified	[%]	99,4%	99,1%	97,8%
	Start Time	[s]	1,4	1,3	1,7
	Playouts w/o interruptions	[%]	99,9%	99,9%	98,6%
Youtube HD	Qualified	[%]	98,1%	97,7%	91,6%
	Start Time	[s]	1,6	1,6	2,1
	Playouts w/o interruptions	[%]	99,4%	99,1%	86,9%

Data small cities	Kpi Name	Unit	Vodafone	Operator 2	Operator 3
<b>http Live Page DL</b>	Qualified	[%]	93,0%	94,0%	85,5%
	AVG Session Time	[s]	4,3	3,9	4,3
<b>http Static Page DL</b>	Qualified	[%]	98,2%	96,4%	91,4%
	AVG Session Time	[s]	1,4	1,9	2,8
<b>http file DL 3MB</b>	Qualified	[%]	98,6%	99,3%	96,9%
	AVG Session Time	[s]	2,6	4,2	8,7
	90% faster than	[kbit/s]	5297	3228	1091
	10% faster than	[kbit/s]	34632	28436	26287
<b>http file UL 1MB</b>	Qualified	[%]	96,5%	93,9%	93,4%
	AVG Session Time	[s]	1,7	3,5	4,7
	90% faster than	[kbit/s]	2711	739	712
	10% faster than	[kbit/s]	10349	9938	7700
<b>http DL FDTT 10s</b>	Qualified	[%]	98,6%	98,6%	98,8%
	AVG throughput	[kbit/s]	18276	15672	6880
	90% faster than	[kbit/s]	5712	2928	758
	10% faster than	[kbit/s]	40240	31976	16725
<b>http UL FDTT 10s</b>	Qualified	[%]	96,8%	98,9%	98,0%
	AVG throughput	[kbit/s]	11922	7863	8345
	90% faster than	[kbit/s]	1755	481	556
	10% faster than	[kbit/s]	20781	16462	26208
<b>Youtube SD</b>	Qualified	[%]	97,5%	98,2%	90,2%
	Start Time	[s]	1,6	1,8	2,4
	Playouts w/o interruptions	[%]	99,6%	98,1%	95,5%
<b>Youtube HD</b>	Qualified	[%]	94,4%	90,1%	64,7%
	Start Time	[s]	1,8	1,9	2,5
	Playouts w/o interruptions	[%]	98,5%	96,7%	72,4%

Data connecting routes	Kpi Name	Unit	Vodafone	Operator 2	Operator 3
<b>http Live Page DL</b>	Qualified	[%]	83,3%	83,9%	66,1%
	AVG Session Time	[s]	4,4	4,3	4,4
<b>http Static Page DL</b>	Qualified	[%]	87,3%	85,1%	72,0%
	AVG Session Time	[s]	1,9	2,7	3,2
<b>http file DL 3MB</b>	Qualified	[%]	92,6%	87,3%	78,1%
	AVG Session Time	[s]	4,9	7,6	11,8
	90% faster than	[kbit/s]	2568	1578	716
	10% faster than	[kbit/s]	30651	19747	24819
<b>http file UL 1MB</b>	Qualified	[%]	89,6%	77,0%	74,6%
	AVG Session Time	[s]	3,4	6,1	6,0
	90% faster than	[kbit/s]	847	542	582
	10% faster than	[kbit/s]	9195	9346	7143
<b>http DL FDTT 10s</b>	Qualified	[%]	96,6%	93,5%	89,3%
	AVG throughput	[kbit/s]	14377	8907	5638
	90% faster than	[kbit/s]	1687	1388	650
	10% faster than	[kbit/s]	33821	21182	13788
<b>http UL FDTT 10s</b>	Qualified	[%]	90,3%	90,6%	87,6%
	AVG throughput	[kbit/s]	7648	3775	5064
	90% faster than	[kbit/s]	363	303	313
	10% faster than	[kbit/s]	19540	13551	14374
<b>Youtube SD</b>	Qualified	[%]	91,6%	89,9%	70,5%
	Start Time	[s]	2,0	2,4	2,7
	Playouts w/o interruptions	[%]	99,2%	97,7%	90,8%
<b>Youtube HD</b>	Qualified	[%]	82,4%	72,5%	48,5%
	Start Time	[s]	2,6	3,0	3,1
	Playouts w/o interruptions	[%]	93,5%	88,5%	82,5%