

FCC Part 15B Compliance Test Report

Test Report no.:	FCC15B_RM-1104_02.docx	Date of Report:	04-Mar-2015
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FCC listing no.:	94436		
IC recognition no.:	661AK-1		
Tested devices/ accessories:	Phone RM-1104 / Battery BV-T5E / AC charger AC-100E / Headset WH-308 / Laptop Asus T100TA-DK024H / Charger AC-60E / USB Cable CA-190CD / Display / HDMI cable Nokia		
FCC ID:	PYASTT	IC:	661X-STT
Supplement reports:	-		
Testing has been carried out in accordance with:	CFR 47, FCC rules Part 15 Subpart B, ANSI C63.4 (2014), CISPR 22 and IC standards, RSS-GEN (Issue 4, November 2014), RSS-133 (Issue 6, January 2013). Deviations, modifications or clarifications (if any) to above mentioned documents are written in each section under "Test method and limit".		
Documentation:	The test report must always be reproduced in full; reproduction of an excerpt only is subject to written approval of the testing laboratory. The documentation of the testing performed on the tested devices is archived for 15 years at TCC Microsoft.		
Test Results:	The EUT complies with the requirements in respect of all parameters subject to the test. The test results relate only to devices specified in this document		
Date and signature for the contents:	 Digitally signed by Timo Raiskio DN: cn=Timo Raiskio, o, ou, email=timo.raiskio@microsoft.com, c=FI Date: 2015.11.04 20:49:37 +02'00'		

Timo Raiskio, System Manager, EMC

1. Summary for FCC Part 15B Compliance Test Report

Date of receipt	22-Jun-2015
Testing completed	03-Mar-2015
The customer's contact person	Jari Rontu
Test Plan referred to	T:\Projects\RM-1104\TestPlan\RS_TestPlan_RM-1104_EMC_FCC.xlsm
Notes	-
Document name	T:\Projects\RM-1104\EMC\FCC15B_RM-1104_02.docx

1.1. EUT and Accessory Information

The EUT is a mobile phone with following features:
GSM/WCDMA/WLAN/Bluetooth
The EUT is tested with maximum rated TX power.

Devices under tests

Product	Type	SN	HW	MV	SW	DUT
Phone	RM-1104	004402742178365	2012	-	01065.00000.15264.47000	400026
Battery	BV-T5E	4955405211010400583;0670775	LG v4.0	-	-	400027
Charger	AC-60	4090493047580200187;0675677	B1.0 HW0.3 MW0.2 PV02	-	-	400013
Headset	WH-308	-	-	-	-	400014
USB Cable	CA-232CD	-	-	-	-	400033
Laptop	Asus T100TA- DK024H	E6NOBCO54692236	FCC DoC	-	-	43219
Display	HP LP2475W	-	-	-	-	43295
HDMI cable	Nokia	39	-	-	-	43084

1.2. Summary of Test Results

GSM 1900:

Section in CFR 47	Section in RSS-GEN	Name of the test	Result
15.107, a	8.8	AC powerline conducted emissions	-
15.109, a	6.1	Radiated emissions	PASSED

EUT Above RX:

Section in CFR 47	Section in RSS-GEN	Name of the test	Result
15.107, a	8.8	AC powerline conducted emissions	-
15.109, a	6.1	Radiated emissions	PASSED

PASSED
FAILED
NP

The EUT complies with the essential requirements in the standard.
The EUT does not comply with the essential requirements in the standard.
The test was not performed by the TCC Microsoft Laboratory.

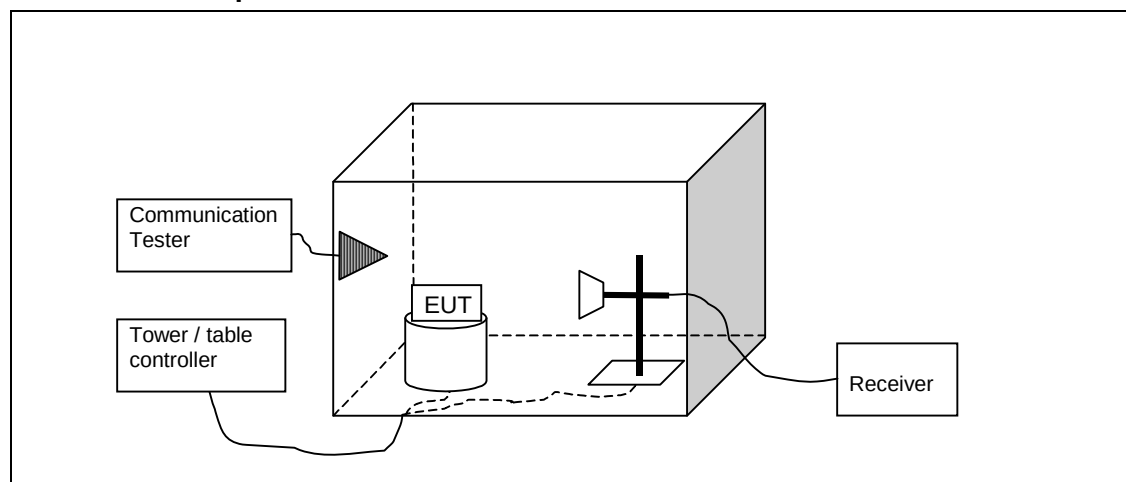
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2. Radiated emissions (FCC 15.109, a, RSS-133 6.1, RSS Gen 6.1)

EUT with DUT number	RM-1104, DUT 400026
Accessories with DUT numbers	BV-T5E, DUT 400027, AC-100E, DUT 400013, HP LP2475W DUT43295, Nokia DUT43084
Operation Voltage [V] / [Hz]	115 / 60
Results	PASSED
Remarks	*Continuous data transfer was active between the phone and the computer during the test. USB I/O cable used to connect the EUT to the host PC is shielded.
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	21 / 45 / 101
Date of measurements	03-Nov-2015
Measured by	Hannu Söderholm

2.1.1 Test setup



2.2. Test method and limit

The measurement is made according to ANSI C63.4-2014as follows:

The measurement is performed in the Semi-Anechoic Chamber with conducting metal floor.

The measurement distance is 3 m.

The EUT is placed on a nonconductive plate at 80 cm height.

For each suspected frequency, the turntable is rotated 360 degrees and antenna is scanned from 1 to 4 m. This is repeated for both horizontal and vertical receive antenna polarizations.

The emissions less than 20 dB below the permissible value are reported.

The measurement results are obtained as described below:

$$E [dB\mu V/m] = U_{RX} + A_{TOT}$$

Where U_{RX} is receiver reading and A_{TOT} is total correction factor including cable loss, antenna factor and preamplifier gain ($A_{TOT} = L_{CABLES} + A_F - G_{PREAMP}$).

CISPR 22 and FCC Part 15 Class B limits (3 m measurement distance)

Frequency range [MHz]	Quasi peak limit [dBμV/m]	Average limit [dBμV/m]	Peak limit [dBμV/m]
30 - 230	40	-	-
230 – 1000	47	-	-
1000 - 3000	-	50	70
Above 3000	-	54	74

2.3. GSM 1900 test results

RX mode, channel 512 / 1930.2 MHz

Peak (RBW: 1 MHz, VBW: 1 MHz), Examined frequency range was 30 MHz – 8 GHz

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Limit [dBμV/m]	Margin	Results
3860.9	39.15	90.678	45.95	-6.8	74	34.85	PASSED
7720.9	46.13	202.535	43.63	2.5	74	27.87	PASSED

Average (RBW: 1 MHz, VBW: 1 MHz), Examined frequency range was 30 MHz – 8 GHz

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Limit [dBμV/m]	Margin	Results
3860.9	25.65	19.165	32.45	-6.8	54	28.35	PASSED
7720.9	32.64	42.855	30.14	2.5	54	21.36	PASSED

RX mode, channel 661 / 1960.0 MHz

Quasi peak (RBW: 100 kHz, VBW: 100 kHz), Examined frequency range was 30 MHz – 8 GHz

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Limit [dBμV/m]	Margin	Results
35.3	35.42	59.02	64.32	-28.9	40	4.58	PASSED
44.609	33.54	47.534	66.54	-33	40	6.46	PASSED
76.723	31.36	36.983	69.66	-38.3	40	8.64	PASSED
229.128	23.37	14.74	59.27	-35.9	40	16.63	PASSED
306.569	34.97	56.04	68.47	-33.5	47	12.03	PASSED
312.146	35.49	59.498	69.09	-33.6	47	11.51	PASSED
613.336	36.17	64.343	63.17	-27	47	10.83	PASSED
707.805	36.1	63.826	61.3	-25.2	47	10.9	PASSED
943.727	42.71	136.616	65.31	-22.6	47	4.29	PASSED
943.731	42.63	135.363	65.23	-22.6	47	4.37	PASSED

RX mode, channel 810 / 1989.8 MHz

Peak (RBW: 1 MHz, VBW: 1 MHz), Examined frequency range was 30 MHz – 8 GHz

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Limit [dBμV/m]	Margin	Results
3979.7	38.68	85.901	44.78	-6.1	74	35.32	PASSED
7960.3	46.52	211.836	42.82	3.7	74	27.48	PASSED

Average (RBW: 1 MHz, VBW: 1 MHz), Examined frequency range was 30 MHz – 8 GHz

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Limit [dBμV/m]	Margin	Results
3979.7	25.82	19.543	31.92	-6.1	54	28.18	PASSED
7960.3	33.99	50.061	30.29	3.7	54	20.01	PASSED

2.4. EUT Above RX test results

Peak (RBW: 1 MHz, VBW: 1 MHz), Examined frequency range was 3 GHz – 12 GHz

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Limit [dBμV/m]	Margin	Results
4619.839	50.7	342.768	55.6	-4.9	74	23.3	PASSED
7833.163	46.39	208.689	43.19	3.2	74	27.61	PASSED
7844.386	46.79	218.524	43.49	3.3	74	27.21	PASSED
7857.713	47.54	238.232	44.14	3.4	74	26.46	PASSED

Average (RBW: 1 MHz, VBW: 1 MHz), Examined frequency range was 3 GHz – 12 GHz

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Limit [dBμV/m]	Margin	Results
4619.839	42.12	127.644	47.02	-4.9	54	11.88	PASSED
7833.163	33.48	47.206	30.28	3.2	54	20.52	PASSED
7844.386	33.58	47.753	30.28	3.3	54	20.42	PASSED
7857.713	33.71	48.473	30.31	3.4	54	20.29	PASSED

3. Test Equipment

3.1. Conducted measurements

Eq. No	Equipment	Type	Manufacturer	Used in
TM350089	Power supply	6632A	Agilent	22/24/27, 15C, 15E
TM350090	Power supply	6632A	Agilent	22/24/27, 15C, 15E
TM30600	Impulse limiter	ESH3-Z2	R&S	15C, 15B
TM490017	LISN 50 µH	ESH3-Z5	R&S	15C, 15B
TM490018	LISN 50 µH	ESH3-Z5	R&S	15C, 15B
TM150128	Spectrum Analyzer	FSU26	R&S	22/24/27, 15C, 15E
TM23007	Oscilloscope	TDS684B	Tektronix	15E
TM22806	Battery	BAT 20/E	Fiskars	15C, 15B
TM22805	UPS	PS 20/1.2	Fiskars	15C, 15B
-	Temperature and humidity logger	175-H2	Testo	15C, 15B
-	Temperature and humidity logger	175-H2	Testo	22/24/27, 15C
-	Air pressure and temperature logger	635-2	Testo	22/24/27, 15C, 15B
-	Air pressure sensor	0638-1835	Testo	22/24/27, 15C, 15B
-	Temperature test chamber	VT 4002	Vötsch	22/24/27
2001	Bluetooth tester	CBT	R&S	15C, 15B
2009	LISN 50 µH	ENV216	R&S	15C, 15B
2010	LISN 50 µH	ENV216	R&S	15C, 15B
2012	Power splitter	11667B	Agilent	22/24/27, 15C
2013	Attenuator	8493C	Agilent	22/24/27, 15C
2014	Attenuator	8493C	Agilent	22/24/27, 15C
2019	Power splitter	ZN2PD-9G-S+	Mini-Circuits	15E
2020	Power splitter	ZN2PD-9G-S+	Mini-Circuits	15E
TM210166	Communication Tester	CMW500	R&S	22/24/27
TM210205	Communication Tester	CMU200	R&S	22/24/27
2023	Spectrum Analyzer	ESMI-RF	R&S	15B/15C
2024	Analyzer display unit	ESAI-D	R&S	15B/15C
TM110070	Signal Generator	SMF 100A	R&S	22/24/27, 15C, 15E, 15B
TM220065	Bluetooth tester	CBT	R&S	15C, 15B
TM210246	Communication Tester	CMU200	R&S	22/24/27, 15B
TM150131	Spectrum Analyzer	FSP30	R&S	22/24/27, 15C, 15E
TM210049	Communication Tester	CMU200	R&S	22/24/27

3.2. Radiated measurements

Eq. No	Equipment	Type	Manufacturer	Used in
-	Antenna	BBHA 9120 D	Schwarzbeck	22/24/27, 15C
TM38845	Receiver	ESIB 26	R&S	22/24/27, 15C, 15E, 15B
-	Antenna	HL562	R&S	22/24/27, 15C, 15E, 15B
-	Turntable	2188	EMCO	22/24/27, 15C, 15E, 15B
-	Turntable controller	2090	EMCO	22/24/27, 15C, 15E, 15B
-	RF system panel	OSP130	R&S	22/24/27, 15C, 15E, 15B
-	Mini mast	2075-2	ETS Lindgren	22/24/27, 15C, 15B
TM38843	Mini mast	2075	Emco	22/24/27, 15C, 15B
TM38842	Antenna mast controller	2090	Emco	22/24/27, 15C, 15B
TM30643	LISN 50 µH	LISN-5-20-2	FCC	22/24/27, 15C, 15B
TM30644	LISN 50 µH	LISN-5-20-2	FCC	22/24/27, 15C, 15B
-	Temperature and humidity logger	175-H2	Testo	22/24/27, 15C, 15B
-	Air pressure and temperature logger	635-2	Testo	22/24/27, 15C, 15B
-	Air pressure sensor	0638-1835	Testo	22/24/27, 15C, 15B
TM37523	Preamplifier	AMF-4D-10M-3G-25-20P	Miteq	22/24/27, 15C, 15B
TM37498	Preamplifier	AMF-5D-020180-26-10P	Miteq	22/24/27, 15C, 15B
TM30599	Semi anechoic chamber	UNKNOWN	TDK	22/24/27, 15C, 15B
TM22638	Power supply	OL63743-901	-	22/24/27, 15C, 15E, 15B
TM38066	High pass filter	WHKX3.0/18G-12SS	Wainwright	22/24/27, 15C, 15E, 15B
2028	High pass filter	WHKX 1.0/15G-12SS	Wainwright	22/24/27, 15C, 15E, 15B
TM37545	Tunable notch filter	800.0/960.0-0.2/40-8SSK	Wainwright	22
TM26512	Tunable notch filter	WRCD1850/1910-0.2/40-10SSK	Wainwright	24
-	Band reject filter	WRCG1877/1883-1870/1890-40/6EE	Wainwright	24
-	Band reject filter	WRCG1729.4/1735.4-1722.4/1742.4-40/6SS	Wainwright	27
TM23892	Controller	G-1000SDX	Yaesu	22/24/27, 15C, 15E
2001	Bluetooth tester	CBT	R&S	15C, 15B
TM210203	Communication Tester	CMU200	R&S	22/24/27, 15B
6023	Antenna	VUBA 9117	Schwarzbeck	22/24/27
TM210166	Communication Tester	CMW500	R&S	22/24/27
2025	Antenna	HFH2-Z2	R&S	15C
TM110070	Signal Generator	SMF 100A	R&S	22/24/27, 15C, 15E, 15B
2052	Antenna	BBHA 9120 D	Schwarzbeck	22/24/27, 15C, 15B, 15E
-	Antenna	QSH18S20	Q-Par	22/24/27, 15C, 15B, 15E
-	Antenna	QSH20S20	Q-Par	22/24/27, 15C, 15B, 15E
-	Antenna	QSH20S20	Q-Par	22/24/27, 15C, 15B, 15E
TM220065	Bluetooth tester	CBT	R&S	15C, 15B

END OF REPORT