

FCC Part 15B Compliance Test Report

Test Report no.:	FCC15B_RM-1154_02.docx	Date of Report:	14-Dec-2015
Number of pages:	11	Customer's Contact person:	Juha Paukku
Testing laboratory:	TCC Microsoft Tampere Laboratory P.O. Box 403 Visiokatu 3 FIN-33101 TAMPERE, FINLAND Tel. +358 71 800 8000 Fax. +358 71 804 6880	Customer:	Microsoft P.O. Box 403 Visiokatu 4 FIN-33720 TAMPERE, FINLAND Tel. +358 (0) 7180 46800 Fax. +358 (0) 7180 46880
FCC listing no.:	94436		
IC recognition no.:	661AK-1		
Tested devices/ accessories:	Phone RM-1154 / Battery BV-T3G (LG) / Headset WH-108 / Charger AC-60E / Data Cable CA-190CD / Laptop Asus T100TA-DK024H / Monitor HP LP2475W / HDMI cable Nokia		
FCC ID:	PYARM-1154	IC:	661X-RM1154
Supplement reports:	-		
Testing has been carried out in accordance with:	47 CFR, Parts 15B, ANSI C63.4 (2014), RSS-GEN (Issue 4). 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:			

Hannu Soderholm, Engineer, EMC

1. Summary for FCC Part 15B Compliance Test Report

Date of receipt	10-Nov-2015
Testing completed	9-Dec-2015
The customer's contact person	Juha Paukku
Test Plan referred to	T:\Projects\RM-1154\TestPlan\TP_EMC_FCC_RM-1154.xlsx
Notes	-
Document name	T:\Projects\RM-1154\EMC\FCC15B_RM-1154_02.docx

1.1. EUT and Accessory Information

Devices under tests

Product	Type	SN	HW	MV	SW / FCC authorization / Cable shielding and length	DUT
Phone	RM-1154	004402743286001	1560	-	01078.00017.15461.48000	400063
Battery	BV-T3G	4955405384B11010253;0670783	1.0	-	-	400062
Headset	WH-108	-	4.0	4.0	-	42927
Laptop	Asus T100TA-DK024H	E6NOBCO54692236	-	-	FCC DoC	43219
Charger	AC-60E	4090493116580300870;0675677	-	-	-	400002
USB Cable	CA-190CD	-	-	-	Shielded, 25cm	43028
USB Cable	CA-190CD	-	-	-	Shielded, 25cm	42720
Display	HP LP2475W	-	-	-	FCC DoC	43295
HDMI Cable	Nokia	-	-	-	Shielded, 300cm	43084
Charger	AC-18E	4090493521750501701;0675695	-	-	-	400050

1.2. Summary of Test Results

GSM 850:

Section in CFR 47	Section in RSS-GEN	Name of the test	Result
15.107, a	2.3.3	AC powerline conducted emissions	PASSED
15.109, a	2.3.3	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.

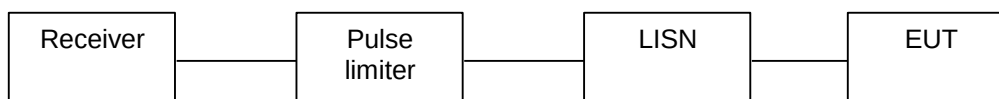
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2. AC powerline conducted emissions

EUT with DUT number	RM-1154, DUT 400063
Accessories with DUT numbers	BV-T3G, DUT 400062 ; WH-108, DUT 42927; T100TA, DUT43219; AC-60E, DUT400002; CA-190CD, DUT 43028; CA-190CD, DUT42720; LP2475W, DUT43295; HDMI cable, 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]	20 / 45 / 101.3
Date of measurements	09-Dec-2015
Measured by	Hannu Söderholm

2.1. Test Setup



2.2. Test method and limit

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

The EUT is placed on a wooden table 80 cm above the reference ground plane.

The EUT is connected via LISN to a test power supply.

The measurement results are obtained as described below:

$$U [dB\mu V] = U_{RX} + A_{TOT}$$

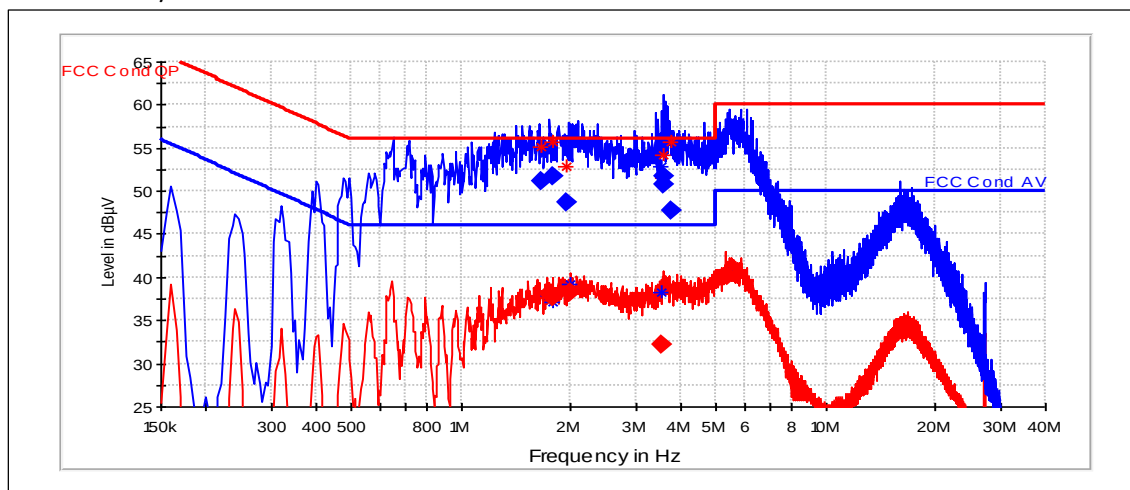
Where U_{RX} is receiver reading and A_{TOT} is total correction factor including cable and pulse limiter attenuations.

CISPR 22 Class B limits

Frequency range [MHz]	Quasi peak limit [dBμV]	Average limit [dBμV]
0.15 - 0.5	66 - 56	56 - 46
0.5 - 5	56	46
5 - 30	60	50

2.3. GSM 850 Test results

Channel 190 / 836.6 MHz



QuasiPeak (RBW: 9 kHz)

Frequency [MHz]	U [dBμV]	Line	Result
1.65	51.08	L1	PASSED
1.78	51.77	L1	PASSED
1.94	48.66	N	PASSED
3.565	50.85	L1	PASSED
3.58	51.72	L1	PASSED
3.74	47.67	N	PASSED

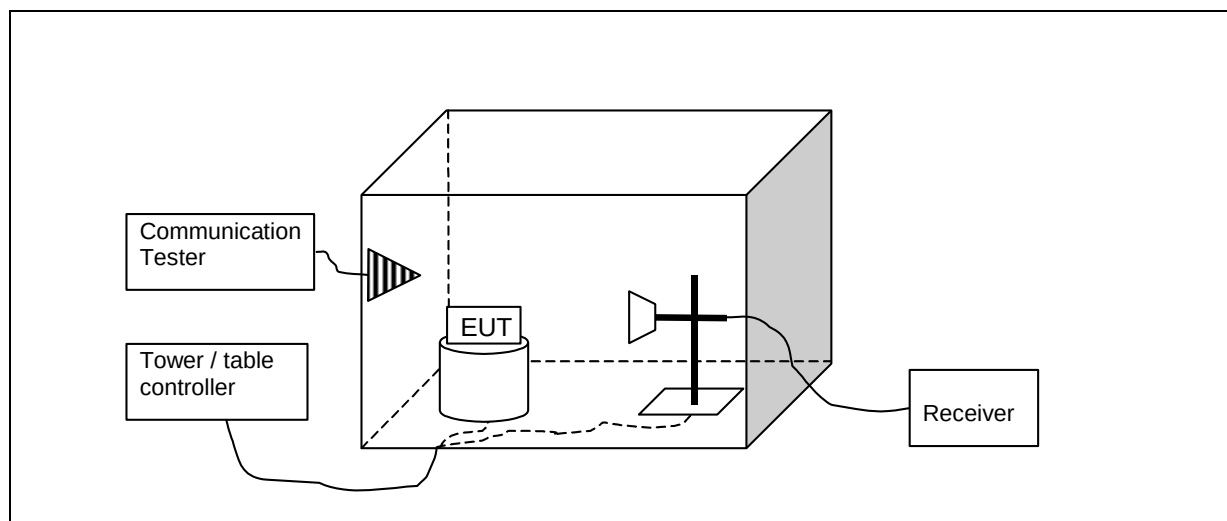
Average (RBW: 9 kHz)

Frequency [MHz]	U [dBμV]	Line	Result
1.745	38.15	L1	PASSED
1.785	37.75	L1	PASSED
1.995	38.32	L1	PASSED
3.545	32.11	N	PASSED
5.34	40.13	L1	PASSED

3. Radiated emissions

EUT with DUT number	RM-1154, DUT 400063
Accessories with DUT numbers	BV-T3G, DUT 400062 ; WH-108, DUT 42927; T100TA, DUT43219; AC-60E, DUT400002; CA-190CD, DUT 43028; CA-190CD, DUT42720; LP2475W, DUT43295; HDMI cable, 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]	22 / 36 / 100
Date of measurements	08-Dec-2015
Measured by	Hannu Söderholm

3.1.1 Test setup



3.2. Test method and limit

The measurement is made according to ANSI C63.4 as 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 [dB μ V/m]	Average limit [dB μ V/m]	Peak limit [dB μ V/m]
30 - 230	40	-	-
230 – 1000	47	-	-
1000 - 3000	-	50	70
Above 3000	-	54	74

3.3. GSM 850 test results (30...8000 MHz). FM Radio on

RX mode, channel 128 / 869.2 MHz

Peak (RBW: 1 MHz, VBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Limit [dBμV/m]	Margin	Results
3477.7	37.89	78.433	45.19	-7.3	74	36.11	PASSED
6955.1	48.1	254.097	48.1	0	74	25.9	PASSED

Average (RBW: 1 MHz, VBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Limit [dBμV/m]	Margin	Results
3477.7	25.32	18.45	32.62	-7.3	54	28.68	PASSED
6955.1	34.86	55.335	34.86	0	54	19.14	PASSED

RX mode, channel 190 / 881.6 MHz

Quasi peak (RBW: 100 kHz, VBW: 100 kHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Limit [dBμV/m]	Margin	Results
40.692	27.85	24.689	58.95	-31.1	40	12.15	PASSED
117.504	24.94	17.66	59.94	-35	40	15.06	PASSED
153.938	26.8	21.878	62.7	-35.9	40	13.2	PASSED
227.472	31.36	36.983	67.36	-36	40	8.64	PASSED
229.126	28.64	27.04	64.54	-35.9	40	11.36	PASSED
307.996	44.54	168.655	78.04	-33.5	47	2.46	PASSED
461.984	42.24	129.42	71.74	-29.5	47	4.76	PASSED
615.982	39.59	95.389	66.59	-27	47	7.41	PASSED
707.775	35.12	57.016	60.32	-25.2	47	11.88	PASSED
943.727	44.26	163.305	66.86	-22.6	47	2.74	PASSED

RX mode, channel 190 / 881.6 MHz

Peak (RBW: 1 MHz, VBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Limit [dBμV/m]	Margin	Results
4619.941	56.32	654.636	61.22	-4.9	74	17.68	PASSED
7835.067	46.41	209.17	43.21	3.2	74	27.59	PASSED
7850.7	47.12	226.986	43.72	3.4	74	26.88	PASSED
7857.519	46.73	217.02	43.33	3.4	74	27.27	PASSED

Average (RBW: 1 MHz, VBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Limit [dBμV/m]	Margin	Results
4619.941	51.37	370.254	56.27	-4.9	54	2.63	PASSED
7835.067	33.54	47.534	30.34	3.2	54	20.46	PASSED
7850.7	33.82	49.091	30.42	3.4	54	20.18	PASSED
7857.519	33.7	48.417	30.3	3.4	54	20.3	PASSED

RX mode, channel 251 / 893.8 MHz

Peak (RBW: 1 MHz, VBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Limit [dBμV/m]	Margin	Results
3576.3	38.81	87.197	46.51	-7.7	74	35.19	PASSED
7148.5	45.66	191.867	44.16	1.5	74	28.34	PASSED

Average (RBW: 1 MHz, VBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Limit [dBμV/m]	Margin	Results
3576.3	25.01	17.803	32.71	-7.7	54	28.99	PASSED
7148.5	32.71	43.202	31.21	1.5	54	21.29	PASSED

4. Test Equipment

The calibration dates for all test equipment are maintained in the equipment register.

The register alerts the test lab about expired calibrations.

Therefore, tests are always done with calibrated equipment. The dates are provided by request.

4.1. 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 μ H	ESH3-Z5	R&S	15C, 15B
TM490018	LISN 50 μ H	ESH3-Z5	R&S	15C, 15B
TM150128	Spectrum Analyzer	FSU26	R&S	22/24/27, 15C, 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
TM770113	Temperature test chamber	VT 4002	Vötsch	22/24/27
TM220042	Bluetooth tester	CBT	R&S	15C, 15B
TM490119	LISN 50 μ H	ENV216	R&S	15C, 15B
TM490120	LISN 50 μ H	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
-	Power splitter	ZN2PD-9G-S+	Mini-Circuits	15E
-	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
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
TM210043	Communication Tester	CMU200	R&S	22/24/27

4.2. 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	dfx	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
TM220042	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
TM540070	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