

FCC Part 15B Compliance Test Report

Test Report no.:	FCC15B_RM-1152_02.docx	Date of Report:	17-Nov-2015
Number of pages:	10	Customer's Contact person:	Juha Paukku
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FCC listing no.:	94436		
IC recognition no.:	661AK-1		
Tested devices/ accessories:	Phone RM-1152 / Battery BV-T3G (LG) / Charger AC-60E / Data Cable CA-190CD / Laptop Asus T100TA-DK024H / Monitor HP LP2475W / HDMI cable Nokia		
FCC ID:	PYARM-1152	IC:	
Supplement reports:	-		
Testing has been carried out in accordance with:	47 CFR 15B, ANSI C63.4 (2014) and 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	12-Nov-2015
The customer's contact person	Juha Paukku
Test Plan referred to	T:\Projects\RM-1152\TestPlan\Test_plan_EMC_FCC_RM-1152.xlsx
Notes	-
Document name	T:\Projects\RM-1152\EMC\FCC final Reports\FCC15B_RM-1152_02.docx

1.1. EUT and Accessory Information

Product	Type	SN	HW	MV	SW / FCC authorization / Cable shielding and length	DUT
Phone	RM-1152	004402742963121	1540	-	01078.00008.15432.40000	400061
Battery	BV-T3G (LG)	4955405343010304094;0670783	1.0	-	-	400051
Charger	AC-60E	4090493116580300870;0675677	-	-	-	400002
Data Cable	CA-190CD	-	-	-	Shielded, 25 cm	43028
Data cable	CA-190CD	-	-	-	Shielded, 25 cm	42720
Laptop	Asus T100TA-DK024H	E6NOBCO54692236		-	FCC DoC	43219
Monitor	HP LP2475W	-	-	-	FCC DoC	43295
HDMI cable	Nokia	-	-	-	Shielded, 300 cm	43084

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.

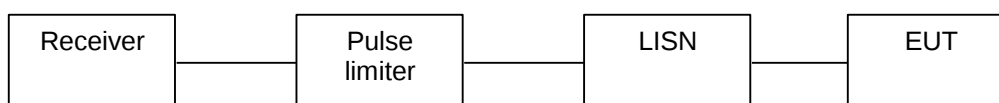
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2. AC powerline conducted emissions

EUT with DUT number	RM-1152, DUT 400061
Accessories with DUT numbers	BV-T3G DUT400051, AC-60E DUT400002, CA-190CD DUT 43028, CA-190CD DUT42720, Laptop 43219, Monitor 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]	21/40/100
Date of measurements	12-Nov-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:

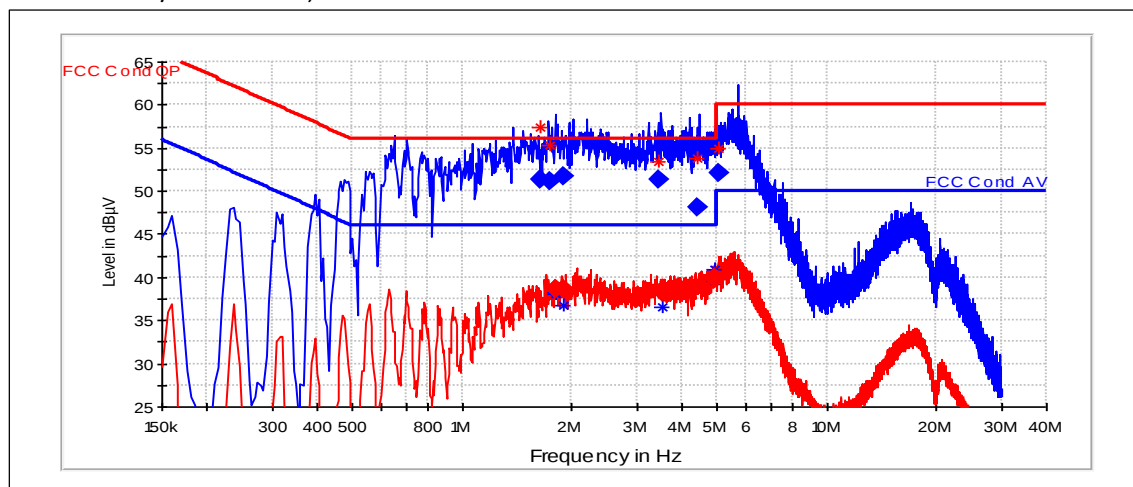
$$U [dB\mu V] = U_{RX} + A_{TOT}$$

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

Channel 190 / 836.6 MHz, Data



QuasiPeak (RBW: 9 kHz)

Frequency [MHz]	U [dBμV]	Line	Result
1.635	51.39	L1	PASSED
1.73	51.09	L1	PASSED
1.905	51.77	L1	PASSED
3.47	51.44	L1	PASSED
4.42	48.17	N	PASSED
5.055	52.11	L1	PASSED

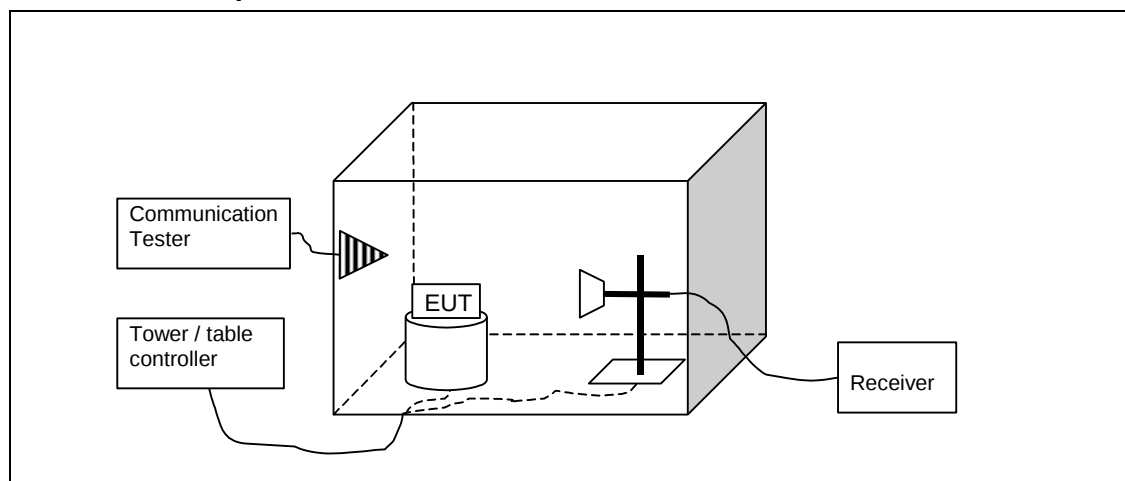
Average (RBW: 9 kHz)

Frequency [MHz]	U [dBμV]	Line	Result
1.805	38.67	L1	PASSED
1.81	38.68	L1	PASSED
1.89	38.63	L1	PASSED
3.54	38.34	L1	PASSED
4.895	39.93	L1	PASSED
4.905	39.88	L1	PASSED

3. Radiated emissions

EUT with DUT number	RM-1152, DUT 400061
Accessories with DUT numbers	BV-T3G DUT400051, AC-60E DUT400002, CA-190CD DUT 43028, CA-190CD DUT42720, Laptop 43219, Monitor 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]	21 / 40 / 100
Date of measurements	11-Nov-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, FM Radio active

RX mode, channel 128 / 869.2 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
3478.7	38.02	79.616	45.32	-7.3	74	35.98	PASSED
6953.7	48.08	253.513	48.08	0	74	25.92	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
3478.7	25.07	17.927	32.37	-7.3	54	28.93	PASSED
6953.7	34.68	54.2	34.68	0	54	19.32	PASSED

RX mode, channel 190 / 881.6 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
228.327	27.5	23.714	63.5	-36	40	12.5	PASSED
306.392	31.14	36.058	64.64	-33.5	47	15.86	PASSED
707.775	40.92	111.173	66.12	-25.2	47	6.08	PASSED

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
2451.604	40.92	111.173	50.62	-9.7	70	29.08	PASSED
2456.616	41.61	120.365	51.21	-9.6	70	28.39	PASSED
2464.031	47.1	226.464	56.6	-9.5	70	22.9	PASSED
3850.001	49.47	297.509	56.37	-6.9	74	24.53	PASSED
4619.941	54.56	534.564	59.46	-4.9	74	19.44	PASSED
7819.437	46.17	203.47	43.07	3.1	74	27.83	PASSED
7832.868	46.38	208.449	43.18	3.2	74	27.62	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
2451.604	28.46	26.485	38.16	-9.7	50	21.54	PASSED
2456.616	28.72	27.29	38.32	-9.6	50	21.28	PASSED
2464.031	33.94	49.774	43.44	-9.5	50	16.06	PASSED
3850.001	36.17	64.343	43.07	-6.9	54	17.83	PASSED
4619.941	47.16	228.034	52.06	-4.9	54	6.84	PASSED
7819.437	33.25	45.973	30.15	3.1	54	20.75	PASSED
7832.868	33.4	46.774	30.2	3.2	54	20.6	PASSED

RX mode, channel 251 / 893.8 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
3573.8	38.67	85.803	46.37	-7.7	74	35.33	PASSED
7149.7	45.53	189.017	44.03	1.5	74	28.47	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
3573.8	24.91	17.599	32.61	-7.7	54	29.09	PASSED
7149.7	32.62	42.756	31.12	1.5	54	21.38	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
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 μ H	ENV216	R&S	15C, 15B
2010	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
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

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	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