

FCC Part 15C Compliance Test Report

Test Report no.:	FCC15CBT_RM-774_13.docx	Date of Report:	03-Jun-2011
Number of pages:	18	Customer's Contact person:	Melava Tia
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FCC listing no.:	94436		
IC recognition no.:	661AK-1		
Tested devices/ accessories:	Phone RM-774 / Battery BL-5K / AC charger AC-15E / Headset WH-207		
FCC ID:	PYARM-774	IC:	661V-RM774
Supplement reports:	-		
Testing has been carried out in accordance with:	CFR 47, FCC rules Part 15 Subpart C, ANSI C63.4 (2003), Public Notice DA 00-705, DTS procedures KDB 558074, IC standards, RSS-210 (Issue 8, December 2010). 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 Nokia.		
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, Senior Engineer, EMC

1. Summary for FCC Part 15C Compliance Test Report

Date of receipt	04-May-2011
Testing completed	30-May-2011
The customer's contact person	Melava Tia
Test Plan referred to	T:\Projects\RM-774\TestPlan\RS_testplan_RM-774.xls
Notes	-
Document name	T:\Projects\RM-774\EMC\FCC15CBT_RM-774_13.docx

1.1. EUT and Accessory Information

The EUT is a 9-band (GSM850/900/1800/1900) and WCDMA Band (I/II(1900)/IV(1700)/V(850)/VIII/) mobile phone with GPRS, EGPRS, HSDPA, HSUPA and WLAN and Bluetooth and FM transmitter. Bluetooth and WLAN are tested with maximum rated TX power.

Product	Type	SN	HW	MV	SW	DUT
Phone	RM-774	004402134700008	1100	-	111.001.0407	42561
Battery	BL-5K	4620408104110002775;0670580	-	-	-	42579
AC charger	AC-15E	4090491014121207849;0675463	-	-	-	42580
Headset	WH-207	06949371091A1R01536	-	-	-	42581

1.2. Summary of Test Results

Bluetooth:

Section in CFR 47	Section in RSS-GEN or RSS-210	Name of the test	Result
15.247(b)(1)	A8(0.4(2))	Conducted peak output power	NP
15.247(d)	A8(0.5)	Band edge compliance of RF emissions	PASSED
15.247(d)	A8(0.5)	Spurious RF conducted emissions	NP
15.247(d), 15.209	A8(0.5)	Spurious radiated emissions	PASSED
15.207	7.2.2	AC powerline conducted emissions	PASSED
15.247(a)(1)	A8(0.1(1))	20dB(bandwidth)	NP
15.247(a)(1)	A8(0.1(2))	Carrier frequency separation	NP
15.247(a)(1)(iii)	A8(0.1(4))	Number of hopping frequencies	NP
15.247(a)(1)(iii)	A8(0.1(4))	Time of occupancy	NP

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 Nokia Laboratory.

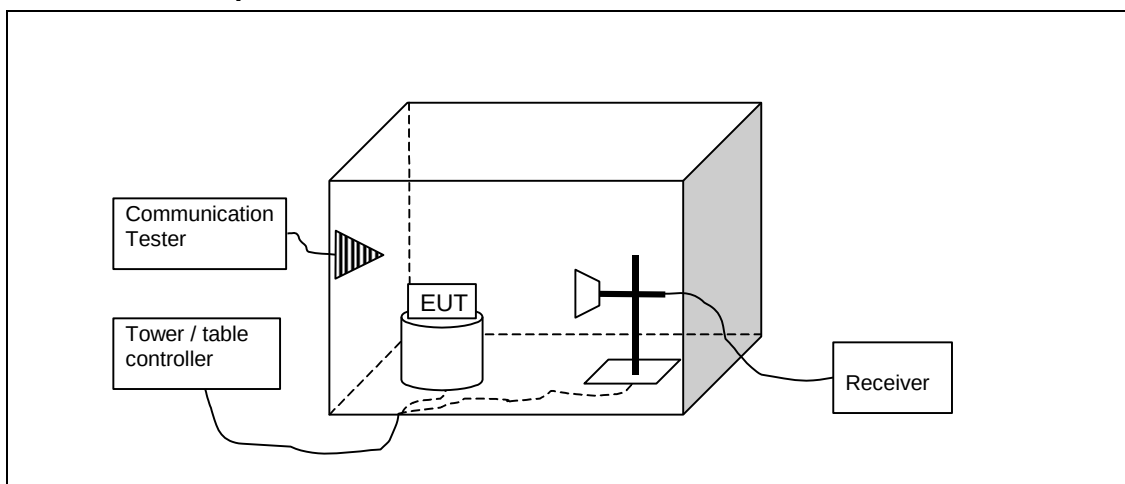
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2. Band edge compliance of RF emissions (FCC §15.247(d), RSS-210 A8.5)

EUT with DUT number	RM-774, DUT 42561
Accessories with DUT numbers	BL-5K, DUT 42579 ; AC-15E, DUT 42580 ; WH-207, DUT 42581
Operation Voltage [V] / [Hz]	115 / 60
Results	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	24 / 45 / 100.3
Date of measurements	17-May-2011
Measured by	Hannu Söderholm

2.1.1 Test Setup



2.2. Test method and limit

The measurement is made according to Public notice DA 00-705 and IC standard RSS-210.

The measurement results are obtained as described below:

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

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

Limits for band edge compliance of RF emissions measurements (3 m measurement distance)

Frequency range [MHz]	Limit Average [dBμV/m]	Limit Peak [dBμV/m]
Below 2390 and above 2483.5	<=54	<=74

2.3. Bluetooth Test results

2.3.1 GFSK modulation, PRBS packet type

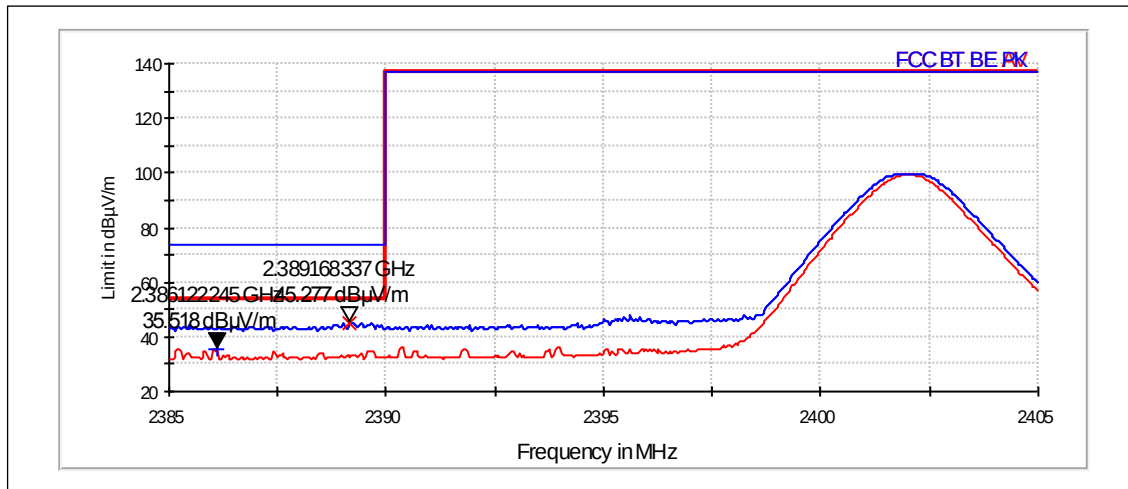
Average (RBW: 1 MHz, VBW: 1 MHz)

Channel / f_c [MHz]	E [dB μ V/m]	E [μ V/m]	U_{RX} [dB μ V]	A_{TOT} [dB]	Result
0 / 2402	35.52	59.688	44.52	-9	PASSED
Hopping on, low end	34.97	56.07	43.97	-9	PASSED
78 / 2480	50.77	345.511	59.47	-8.7	PASSED
Hopping on, high end	50.67	341.607	59.37	-8.7	PASSED

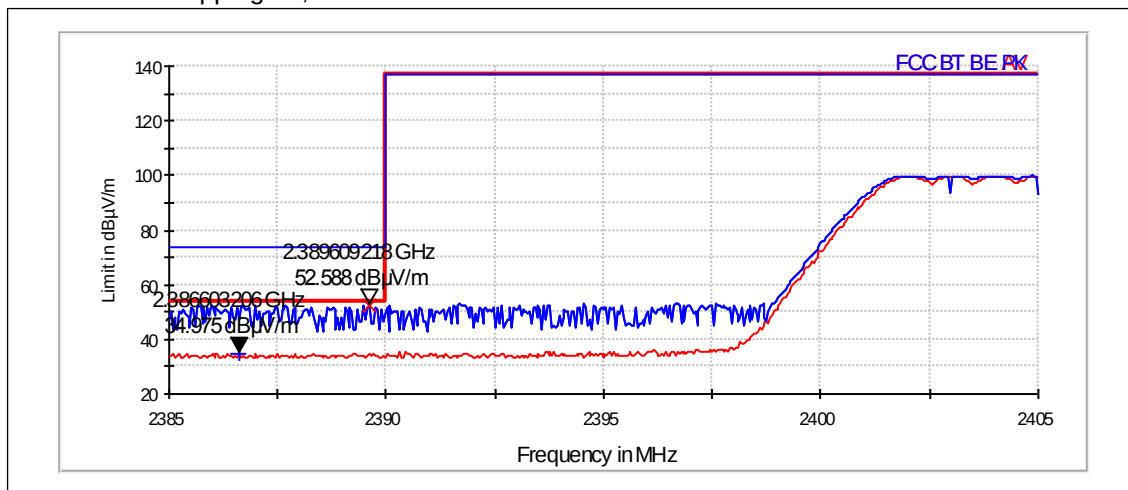
Peak (RBW: 1 MHz, VBW: 1 MHz)

Channel / f_c [MHz]	E [dB μ V/m]	E [μ V/m]	U_{RX} [dB μ V]	A_{TOT} [dB]	Result
0 / 2402	45.28	183.588	54.28	-9	PASSED
Hopping on, low end	52.59	426.001	61.59	-9	PASSED
78 / 2480	56.57	673.884	65.27	-8.7	PASSED
Hopping on, high end	56.19	645.014	64.89	-8.7	PASSED

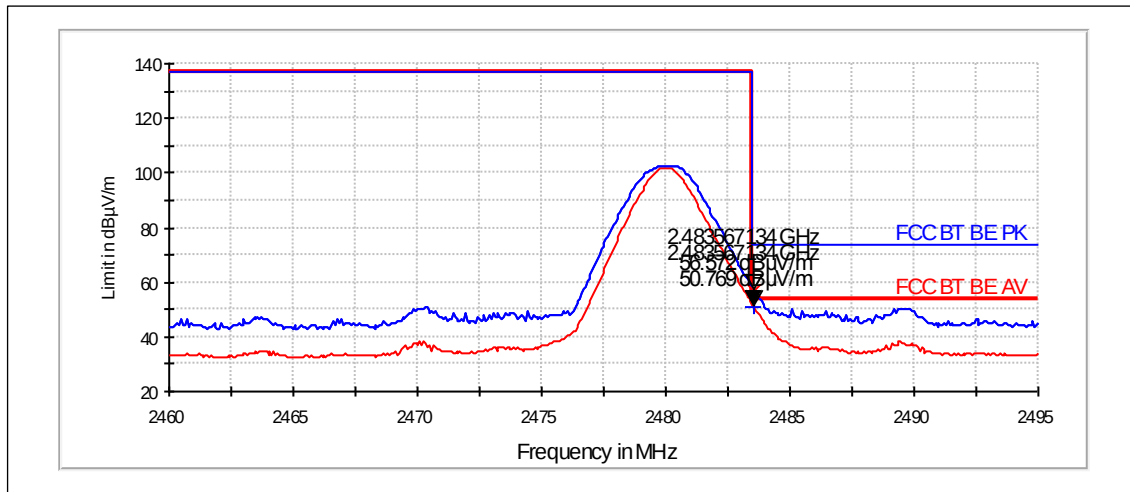
GFSK mode. Channel 0 / 2402 MHz



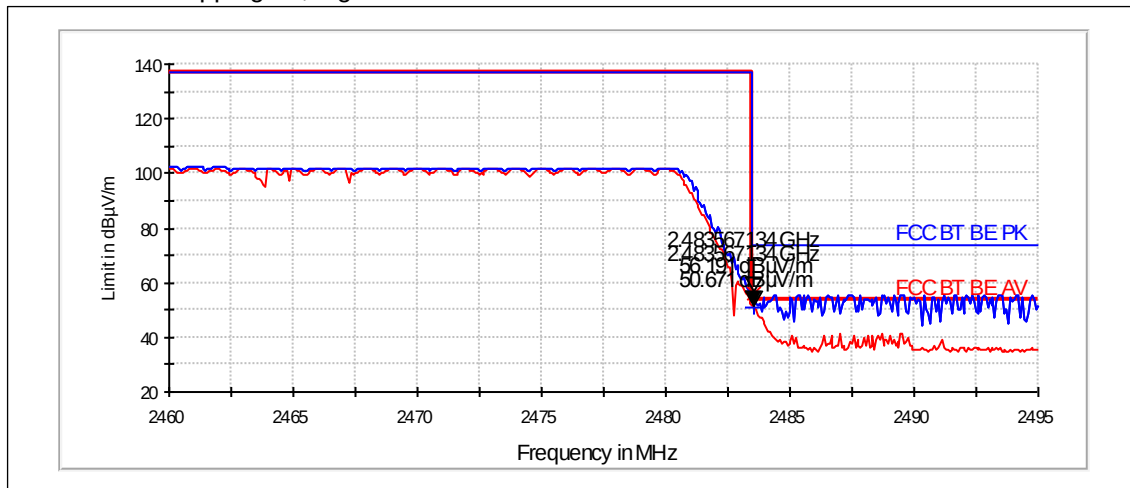
GFSK mode. Hopping on, low end



GFSK mode. Channel 78 / 2480 MHz



GFSK mode. Hopping on, high end



2.3.2 8DPSK modulation, PRBS packet type

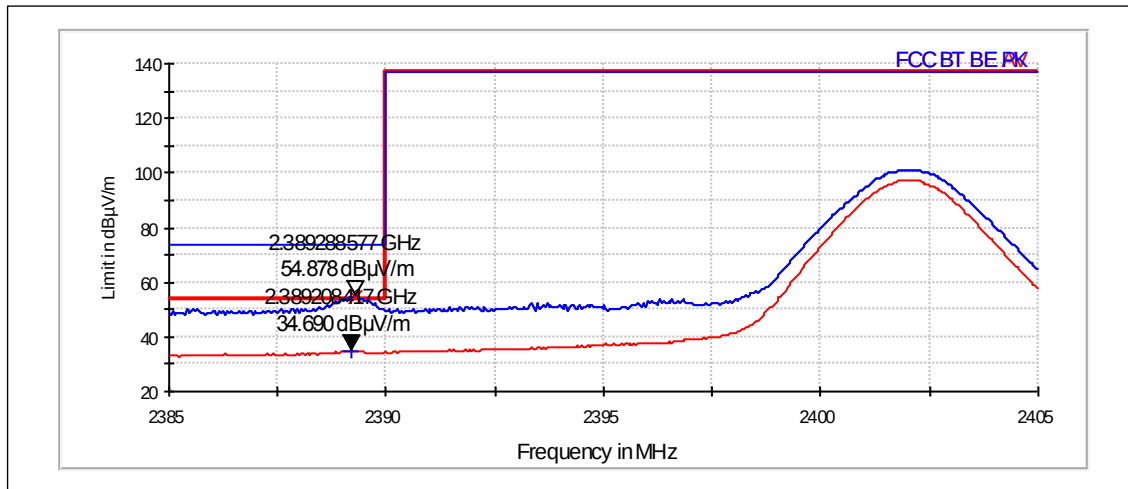
Average (RBW: 1 MHz, VBW: 1 MHz)

Channel / f_c [MHz]	E [dB μ V/m]	E [μ V/m]	U_{RX} [dB μ V]	A_{TOT} [dB]	Result
0 / 2402	34.69	54.261	43.69	-9	PASSED
Hopping on, low end	40.71	108.523	49.71	-9	PASSED
78 / 2480	51.43	372.84	60.13	-8.7	PASSED
Hopping on, high end	52.25	409.929	60.95	-8.7	PASSED

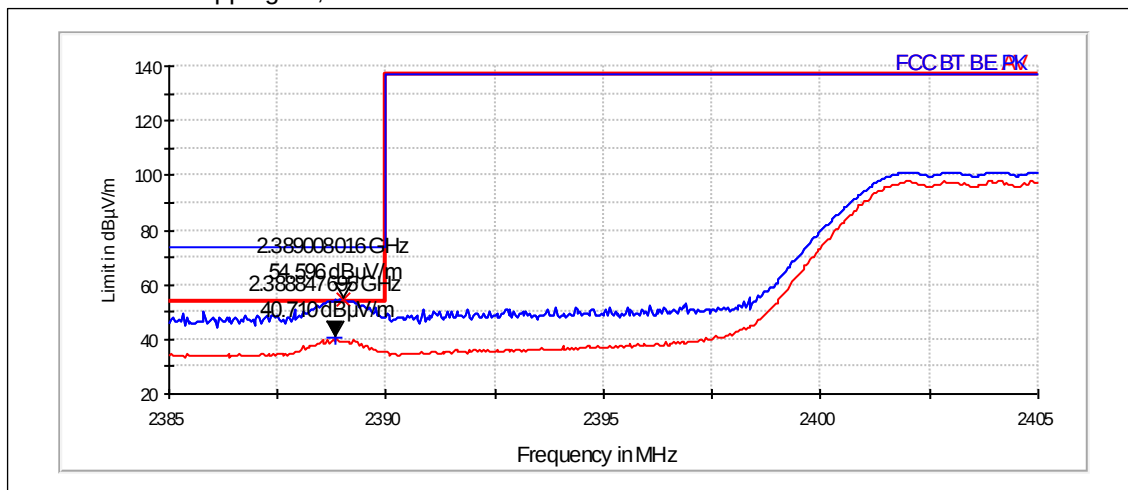
Peak (RBW: 1 MHz, VBW: 1 MHz)

Channel / f_c [MHz]	E [dB μ V/m]	E [μ V/m]	U_{RX} [dB μ V]	A_{TOT} [dB]	Result
0 / 2402	54.88	554.512	63.88	-9	PASSED
Hopping on, low end	54.6	536.755	63.6	-9	PASSED
78 / 2480	58.94	885.011	67.64	-8.7	PASSED
Hopping on, high end	58.47	838.415	67.17	-8.7	PASSED

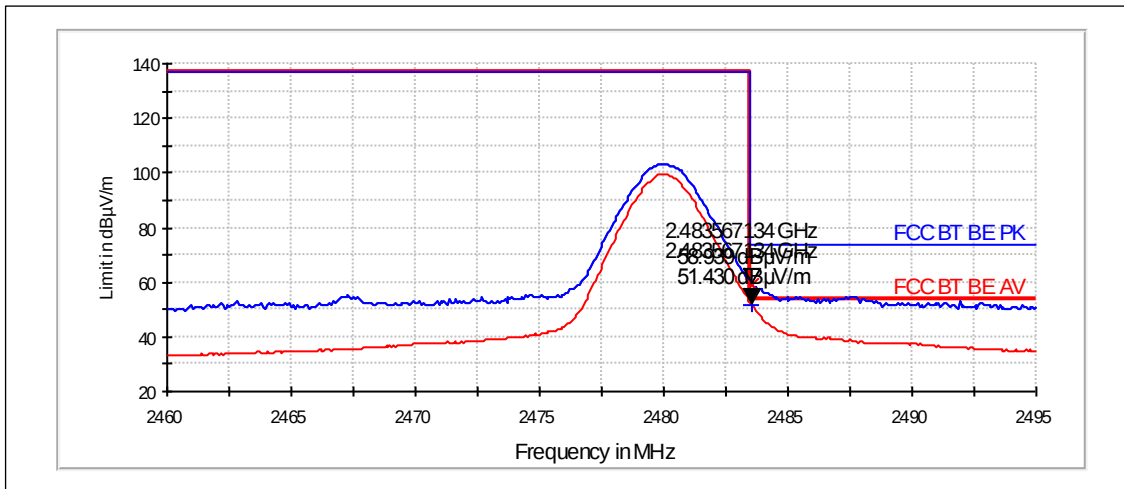
8DPSK mode. Channel 0 / 2402 MHz



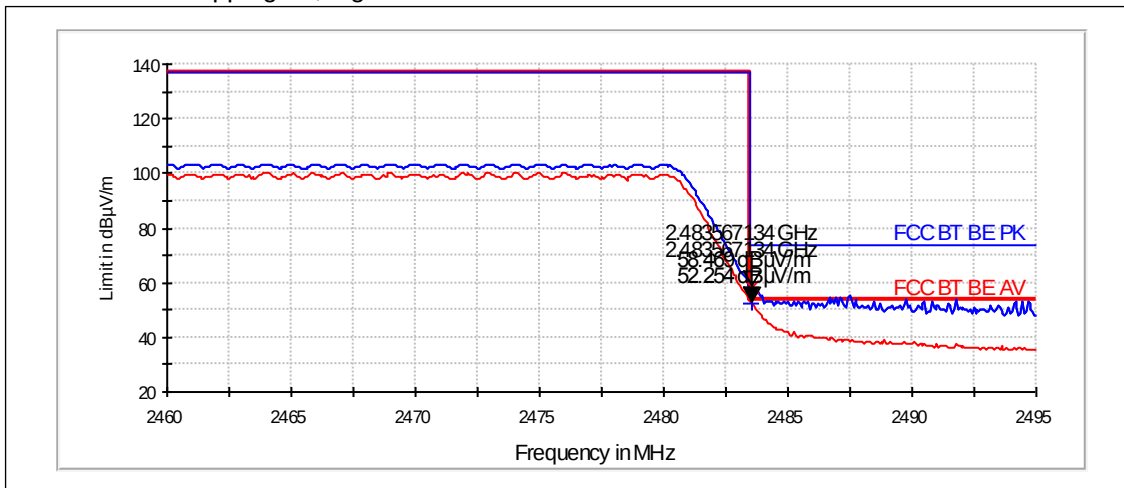
8DPSK mode. Hopping on, low end



8DPSK mode. Channel 78 / 2480 MHz



8DPSK mode. Hopping on, high end



EUT with DUT number	RM-774, DUT 42561
Accessories with DUT numbers	BL-5K, DUT 42579 ; AC-15E, DUT 42580 ; WH-207, DUT 42581
Operation Voltage [V] / [Hz]	115 / 60
Results	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	24 / 45 / 100.3
Date of measurements	17-May-2011
Measured by	Hannu Söderholm

The diagram illustrates a 3D measurement setup for a UUT (Under Test). A central 3D box represents the measurement volume. Inside this volume, a cylindrical component labeled 'EUT' (Electromagnetic Under Test) is positioned. To the left of the EUT, a 'Communication Tester' is connected to the measurement volume via a horn antenna. To the right of the EUT, a 'Receiver' is connected to the measurement volume via a horn antenna. A 'Tower / table controller' is connected to the measurement volume via a cable. Dashed lines indicate the spatial relationships and connections within the 3D environment.

3.2. Test method and limit

The measurement is made according to Public notice DA 00-705 and IC standard RSS-210 as follows:

The measurement is divided into the Preliminary Measurement and the Final Measurement.

The suspected frequencies are searched for in Preliminary Measurement with absorbers on the floor and measuring antenna at fixed height using 2-axis EUT position system.

The Final Measurement is performed in the Semi-Anechoic Chamber with conducting metal floor, if the Preliminary Measurement results are closer than 20 dB to the permissible value.

The EUT is placed at nonconductive plate at the turntable center.

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:

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

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

Limits for spurious radiated emissions measurements (3 m measurement distance)

Frequency range [MHz]	Limit [$\mu V/m$]	Limit [dB $\mu V/m$]	Detector
30 - 88	100	40	Quasi peak
88 – 216	150	43.5	Quasi peak
216 – 960	200	46	Quasi peak
960 – 1000	500	54	Quasi peak
Above 1000	500	54	Average
Above 1000	5000	74	Peak

3.3. Bluetooth Test results

3.3.1 GFSK modulation, PRBS packet type

Channel 0 / 2402 MHz

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

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	
4803.7	56.24	648.56	59	-2.76	HORIZONTAL	PASSED
7206.2	43.8	154.81	42.99	0.81	HORIZONTAL	PASSED

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

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	
4803.7	27.36	23.332	30.12	-2.76	HORIZONTAL	PASSED
7206.2	30.29	32.696	29.48	0.81	HORIZONTAL	PASSED

Channel 40 / 2442 MHz

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

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
32.91	22.72	13.68	45.25	-22.53	VERTICAL	PASSED
33.086	21.18	11.449	43.78	-22.6	VERTICAL	PASSED
33.338	20.57	10.683	43.27	-22.7	VERTICAL	PASSED
33.377	33.8	48.995	56.52	-22.72	VERTICAL	PASSED
33.579	32.17	40.616	54.97	-22.8	VERTICAL	PASSED
34.917	33.03	44.828	56.35	-23.32	VERTICAL	PASSED
35.148	32.52	42.243	55.93	-23.41	VERTICAL	PASSED

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

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
4879.959	58.92	883.487	61.16	-2.24	HORIZONTAL	PASSED
4898.295	58.62	853.002	60.88	-2.26	HORIZONTAL	PASSED

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

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
4879.959	28.82	27.618	31.06	-2.24	HORIZONTAL	PASSED
4898.295	28.81	27.561	31.07	-2.26	HORIZONTAL	PASSED

Channel 78 / 2480 MHz

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

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	
4960.3	57.4	741.481	59.13	-1.73	HORIZONTAL	PASSED
7439.9	43.7	153.021	42.24	1.46	HORIZONTAL	PASSED

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

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	
4960.3	29.28	29.104	31.01	-1.73	HORIZONTAL	PASSED
7439.9	30.27	32.621	28.81	1.46	HORIZONTAL	PASSED

3.3.2 8DPSK modulation, PRBS packet type

Channel 0 / 2402 MHz

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

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	
4805.9	62.54	1339.368	65.28	-2.74	HORIZONTAL	PASSED
7204.8	43.18	144.129	42.36	0.82	VERTICAL	PASSED

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

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	
4805.9	26.79	21.852	29.53	-2.74	HORIZONTAL	PASSED
7204.8	30.19	32.326	29.37	0.82	VERTICAL	PASSED

Channel 40 / 2442 MHz

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

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	
33.6	22.05	12.668	44.85	-22.8	VERTICAL	PASSED
33.647	21.58	11.991	44.4	-22.82	VERTICAL	PASSED
35.092	32.3	41.21	55.69	-23.39	VERTICAL	PASSED
35.096	19.71	9.673	43.1	-23.39	VERTICAL	PASSED
36.269	20.4	10.47	44.27	-23.87	VERTICAL	PASSED
36.861	29.84	31.042	53.95	-24.11	VERTICAL	PASSED
37.919	18.73	8.637	43.27	-24.54	VERTICAL	PASSED

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

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	
4893.789	58.51	842.17	60.75	-2.24	HORIZONTAL	PASSED
4932.267	65.21	1822.426	67.15	-1.94	HORIZONTAL	PASSED

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

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	
4893.789	29.16	28.691	31.4	-2.24	HORIZONTAL	PASSED
4932.267	29.64	30.332	31.58	-1.94	HORIZONTAL	PASSED

Channel 78 / 2480 MHz

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

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	
4959.9	64.66	1710.803	66.4	-1.74	HORIZONTAL	PASSED
7441.5	42.95	140.443	41.47	1.48	HORIZONTAL	PASSED

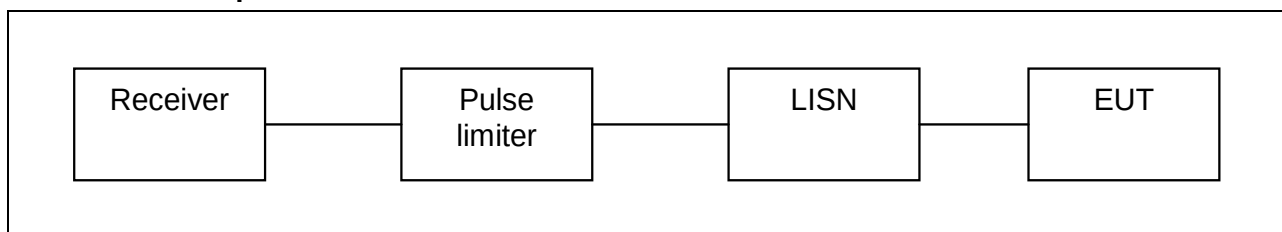
Average(RBW: 1 MHz, VBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	
4959.9	30.33	32.832	32.07	-1.74	HORIZONTAL	PASSED
7441.5	30.26	32.565	28.78	1.48	HORIZONTAL	PASSED

4. AC powerline conducted emissions (FCC §15.207, RSS-GEN 7.2.2)

EUT with DUT number	RM-774, DUT 42561
Accessories with DUT numbers	BL-5K, DUT 42579 ; AC-15E, DUT 42580 ; WH-207, DUT 42581
Operation Voltage [V] / [Hz]	115 / 60
Results	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	20 / 50 / 99.8
Date of measurements	30-May-2011
Measured by	Jari Jantunen

4.1.1 Test Setup



4.2. Test method and limit

The measurement is made according to ANSI C63.4-2003 as follows:

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

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

The measurement results are obtained as described below:

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

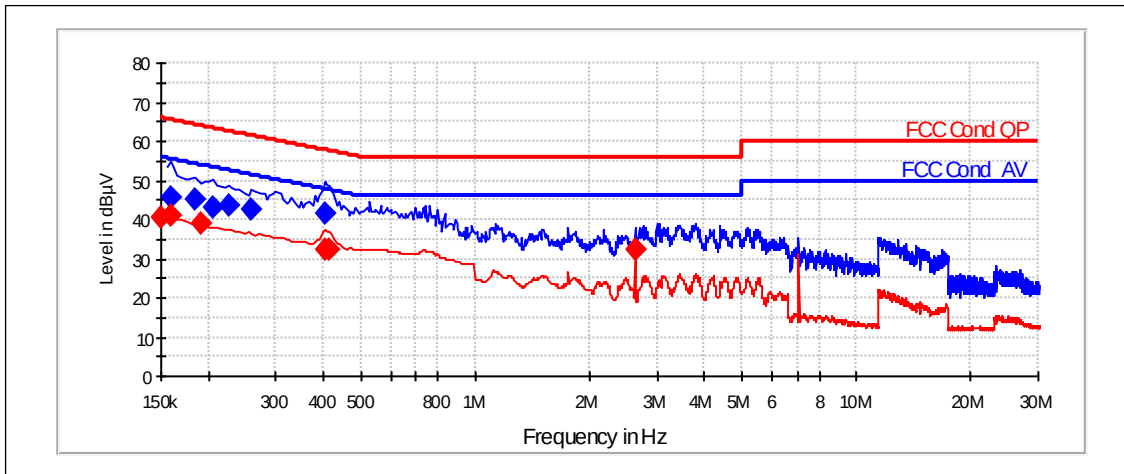
Where U_{RX} is receiver reading and A_{TOT} is total correction factor including cable and pulse limiter attenuations.

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

4.3. Bluetooth Test Results

TX mode, channel 40 / 2442 MHz



Quasi peak

Frequency [MHz]	Level [dBμV]	IF-BW[kHz]	Line	Margin	Result
0.16	45.42	10	N	20.06	PASSED
0.185	45.12	10	N	19.16	PASSED
0.205	43.09	10	N	20.31	PASSED
0.225	43.55	10	L1	19.03	PASSED
0.26	42.32	10	N	19.13	PASSED
0.405	41.42	10	N	16.35	PASSED

Average

Frequency [MHz]	Level [dBμV]	IF-BW[kHz]	Line	Margin	Result
0.15	40.7	10	N	15.3	PASSED
0.16	40.8	10	N	14.66	PASSED
0.19	38.81	10	N	15.24	PASSED
0.405	32.38	10	N	15.35	PASSED
0.415	32.12	10	N	15.45	PASSED
2.625	32.19	10	L1	13.8	PASSED

5. Test Equipment

5.1. Conducted measurements

Eq. No	Equipment	Type	Manufacturer	Used in
TM38112	Power supply	6632A	Agilent	22/24/27, 15C
TM38631	Signal Generator	83640L	Agilent	22/24/27, 15C, 15B
OM06312	Signal Generator	E4422B	Agilent	22/24
TM37678	Communication Tester	CMU200	R&S	22/24/27, 15C, 15B
TM37773	Communication Tester	CMU200	R&S	22/24/27, 15C, 15B
TM30600	Impulse limiter	ESH3-Z2	R&S	15C, 15B
TM26490	LISN 50 µH	ESH3-Z5	R&S	15C, 15B
TM26491	LISN 50 µH	ESH3-Z5	R&S	15C, 15B
TM37610	Spectrum Analyzer	FSU26	R&S	22/24/27, 15C
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
2058	Receiver	ESPC	R&S	15C, 15B
2001	Bluetooth tester	CBT	R&S	22/24/27, 15C, 15B
2002	Communication Tester	CMU200	R&S	22/24/27
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

5.2. Radiated measurements

Eq. No	Equipment	Type	Manufacturer	Used in
TM38114	Power supply	6632A	Agilent	22/24/27, 15C, 15B
TM38631	Signal Generator	83640L	Agilent	22/24/27, 15C, 15B
TM38323	Preamplifier	PA-02 18-26 GHz	EMC Automation	22/24/27, 15C, 15B
-	Antenna	BBHA 9120 D	Schwarzbeck	22/24/27, 15C
TM26497	Antenna	3115	Emco	22/24/27, 15C, 15B
TM37678	Communication Tester	CMU200	R&S	22/24/27, 15C, 15B
TM37773	Communication Tester	CMU200	R&S	22/24/27, 15C, 15B
TM38845	Receiver	ESIB 26	R&S	22/24/27, 15C, 15B
-	Antenna	HL562	R&S	22/24/27, 15C, 15B
-	Turntable	2188	EMCO	22/24/27, 15C, 15B
-	Turntable controller	2090	EMCO	22/24/27, 15C, 15B
-	RF system panel	TS-RSP	R&S	22/24/27, 15C, 15B
-	RF system panel	TS-RSP	R&S	22/24/27, 15C, 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 μ H	LISN-5-20-2	FCC	22/24/27, 15C, 15B
TM30644	LISN 50 μ H	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
TM39180	Laser distance meter	Disto Pro	Leica	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 chambre	UNKNOWN	TDK	22/24/27, 15C, 15B
TM22638	Power supply	OL63743-901	-	22/24/27, 15C, 15B
TM38066	High pass filter	4HC3000/18000-3-KK	Trilithic	22/24/27, 15C, 15B
-	High pass filter	WHKX 1.6/15G-12SS	Wainwright	22/24/27, 15C, 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
-	Band reject filter	WRCG832/838-825/848-40/5SS	Wainwright	22
TM23892	Controller	G-1000SDX	Yaesu	22/24/27
2001	Bluetooth tester	CBT	R&S	22/24/27, 15C, 15B
6023	Antenna	VUBA 9117	Schwarzbeck	22/24/27, 15C