

FCC Part 15C Compliance Test Report

Test Report no.:	FCC15C_RM-601_21.docx	Date of Report:	12-Nov-2010
Number of pages:	16	Customer's Contact person:	Kari Koskela
Testing laboratory:	TCC Nokia Salo Laboratory P.O.Box(86) Joensuunkatu 7H / Kiila 1B FIN-24101 SALO, FINLAND Tel. +358 (0) 7180 08000 Fax. +358 (0) 7180 45220	Customer:	Nokia Corporation P.O.Box(86) Joensuunkatu 7H / Kiila 1B FIN-24101 SALO, FINLAND Tel. +358 (0) 7180 08000 Fax. +358 (0) 7180 45220
FCC listing no.:	533467		
IC recognition no.:	661V-1		
Tested devices/ accessories:	Phone RM-601 / Battery BL-5CT / Headset WH-102 / AC-Charger AC-15E		
FCC ID:	PYARM-601	IC:	661V-RM601
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 7, June 2007). 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:			

Sami Lehtonen, System Specialist, EMC

1. Summary for FCC Part 15C Compliance Test Report

Date of receipt	04-Nov-2010
Testing completed	12-Nov-2010
The customer's contact person	Kari Koskela
Test Plan referred to	T:\Projects\RM-601\TestPlan\RS_testplan_RM-601_CR_BOB_ES43_ES62.xls
Notes	-
Document name	T:\Projects\RM-601\EMC\FCC15C_RM-601_21.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. Bluetooth and WLAN are tested with maximum rated TX power.

Product	Type	SN	HW	MV	SW	DUT
Phone	RM-601	353759040024139	ES6.2	-	12.006	15345
Battery	BL-5CT	363563016591040587500670555	-	-	-	15346
Headset	WH-102	06943230245H4102263	-	-	-	15282
AC-Charger	AC-15E	409049020123080108800675463	-	-	-	15347

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)	A8.4 (2)	Conducted peak output power	NP
15.247(d)	A8.5	Band edge compliance of RF emissions	PASSED
15.247(d)	A8.5	Spurious RF conducted emissions	NP
15.247(d), 15.209	A8.5	Spurious radiated emissions	PASSED
15.207	7.2.2	AC powerline conducted emissions	NP
15.247(a)(1)	A8.1 (a)	20 dB bandwidth	NP
15.247(a)(1)	A8.1 (b)	Carrier frequency separation	NP
15.247(a)(1)(iii)	A8.1 (d)	Number of hopping frequencies	NP
15.247(a)(1)(iii)	A8.1 (d)	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.

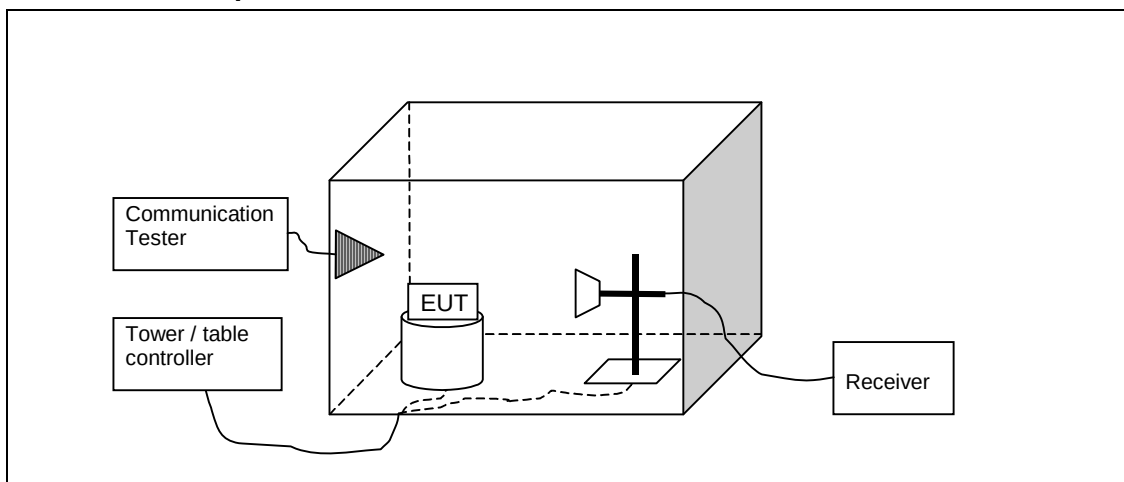
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2. Band edge compliance of RF emissions (FCC §15.247(d), RSS-210 A8.5)

EUT with DUT number	RM-601, DUT 15345
Accessories with DUT numbers	BL-5CT, DUT 15346 ; WH-102, DUT 15282 ; AC-15E, DUT 15347
Operation Voltage [V] / [Hz]	115 / 60
Results	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	20 / 58 / 98.4
Date of measurements	12-Nov-2010
Measured by	Sami Lehtonen

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

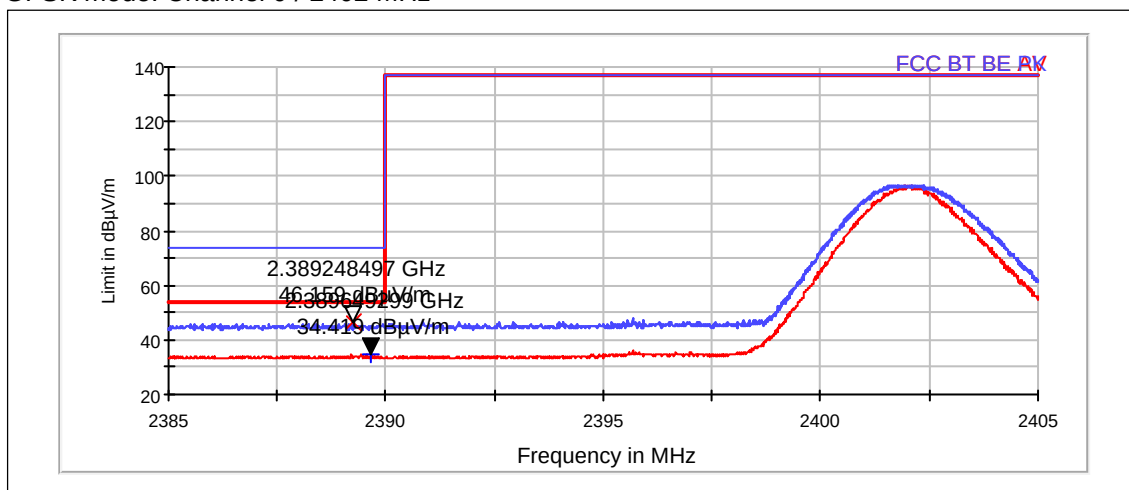
Average (RBW: 1 MHz, VBW: 1 MHz)

Channel / f_c [MHz]	E [dB μ V/m]	E [μ V/m]	U_{RX} [dB μ V]	A_{TOT} [dB]	Result
0 / 2402	34.42	52.594	39.52	-5.1	PASSED
Hopping on, low end	35.73	61.171	40.83	-5.1	PASSED
78 / 2480	48.5	266.033	53.76	-5.26	PASSED
Hopping on, high end	48.78	274.803	54.04	-5.26	PASSED

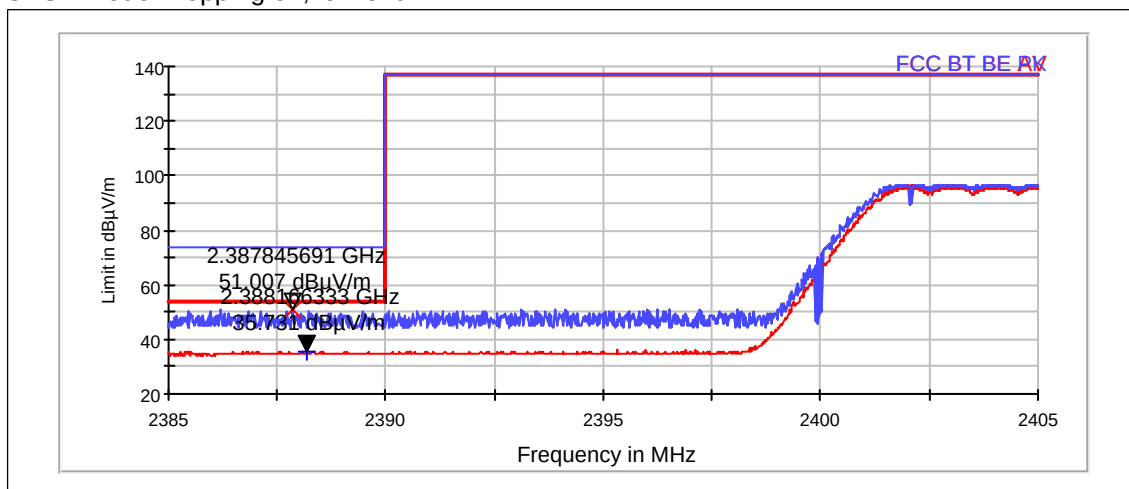
Peak (RBW: 1 MHz, VBW: 1 MHz)

Channel / f_c [MHz]	E [dB μ V/m]	E [μ V/m]	U_{RX} [dB μ V]	A_{TOT} [dB]	Result
0 / 2402	46.16	203.215	51.26	-5.1	PASSED
Hopping on, low end	51.01	355.087	56.11	-5.1	PASSED
78 / 2480	53.2	456.855	58.46	-5.26	PASSED
Hopping on, high end	52.79	435.954	58.05	-5.26	PASSED

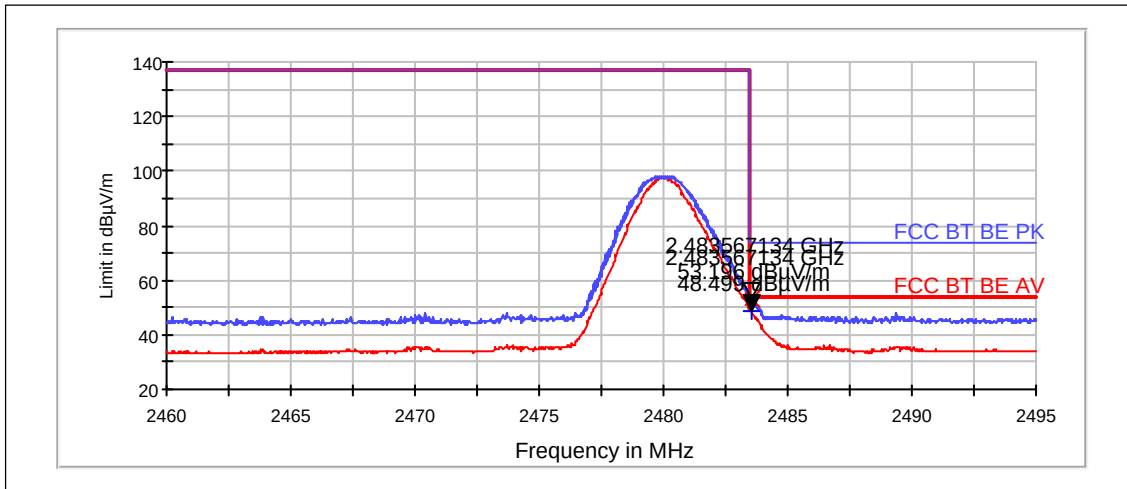
GFSK mode. Channel 0 / 2402 MHz



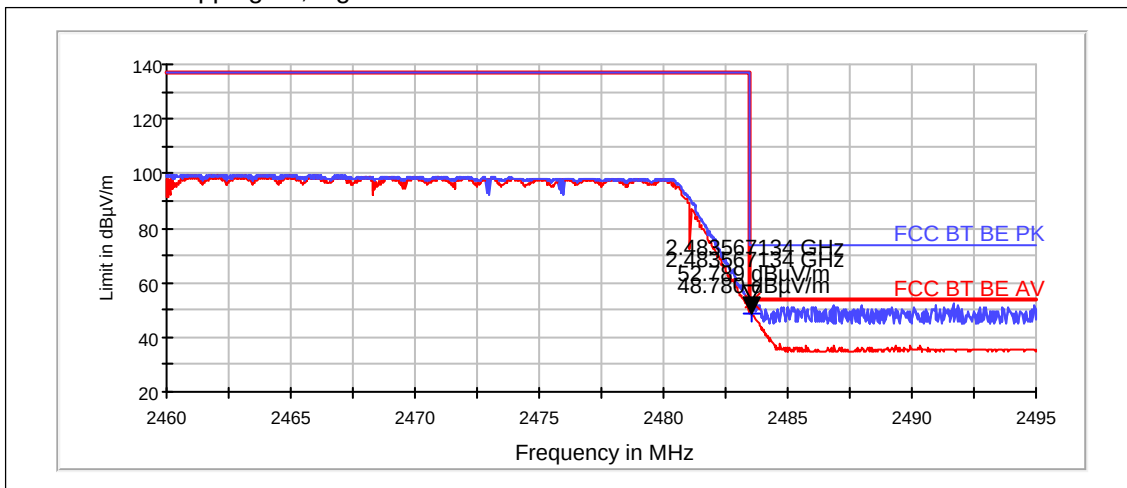
GFSK mode. Hopping on, low end



GFSK mode. Channel 78 / 2480 MHz



GFSK mode. Hopping on, high end



2.3.2 8DPSK modulation, PRBS packet type

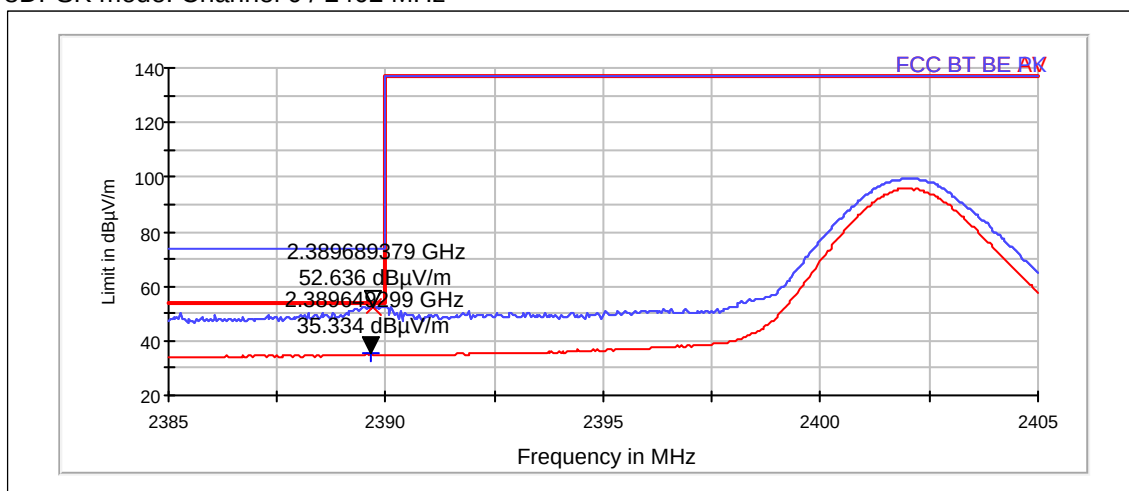
Average (RBW: 1 MHz, VBW: 1 MHz)

Channel / f_c [MHz]	E [dB μ V/m]	E [μ V/m]	U_{RX} [dB μ V]	A_{TOT} [dB]	Result
0 / 2402	35.33	58.437	40.43	-5.1	PASSED
Hopping on, low end	39.69	96.478	44.79	-5.1	PASSED
78 / 2480	50.97	353.736	56.23	-5.26	PASSED
Hopping on, high end	51.46	374.2	56.72	-5.26	PASSED

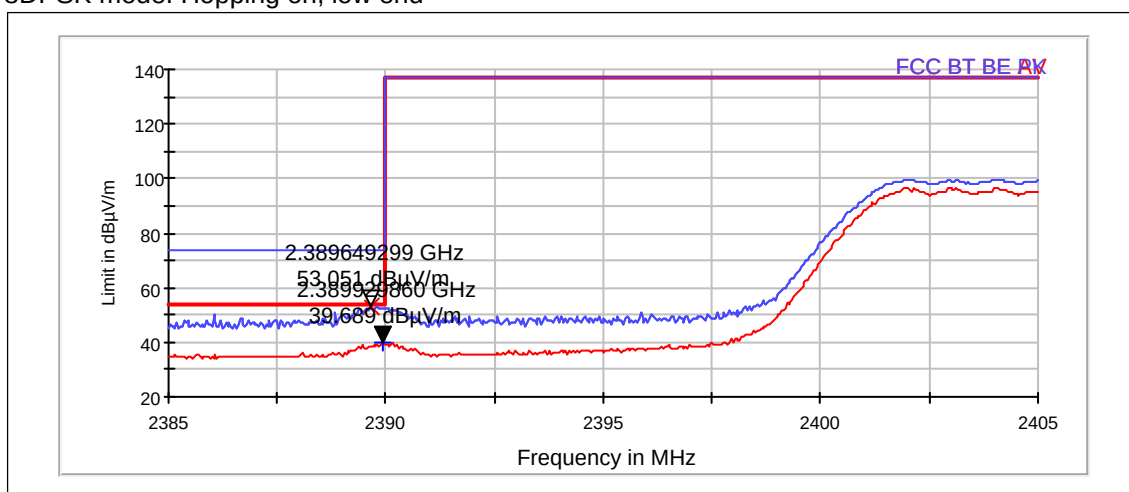
Peak (RBW: 1 MHz, VBW: 1 MHz)

Channel / f_c [MHz]	E [dB μ V/m]	E [μ V/m]	U_{RX} [dB μ V]	A_{TOT} [dB]	Result
0 / 2402	52.64	428.371	57.74	-5.1	PASSED
Hopping on, low end	53.05	449.292	58.15	-5.1	PASSED
78 / 2480	56.94	702.718	62.2	-5.26	PASSED
Hopping on, high end	56.3	653.213	61.56	-5.26	PASSED

8DPSK mode. Channel 0 / 2402 MHz

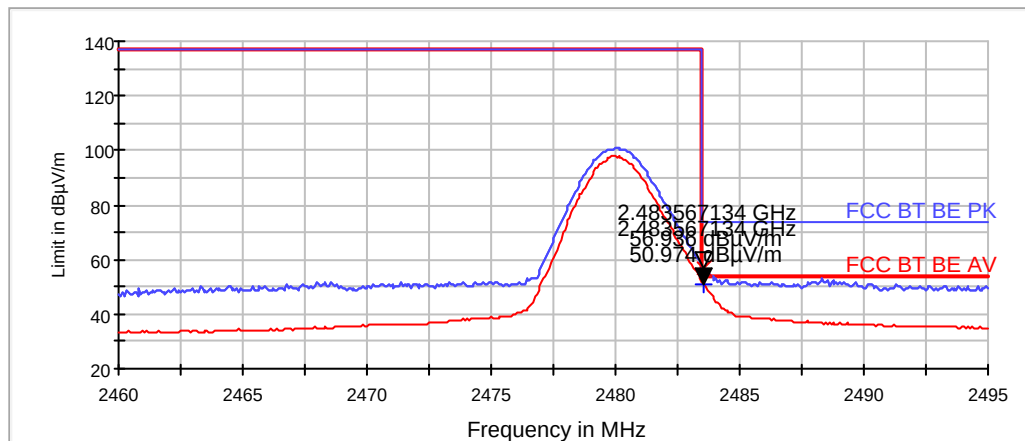


8DPSK mode. Hopping on, low end

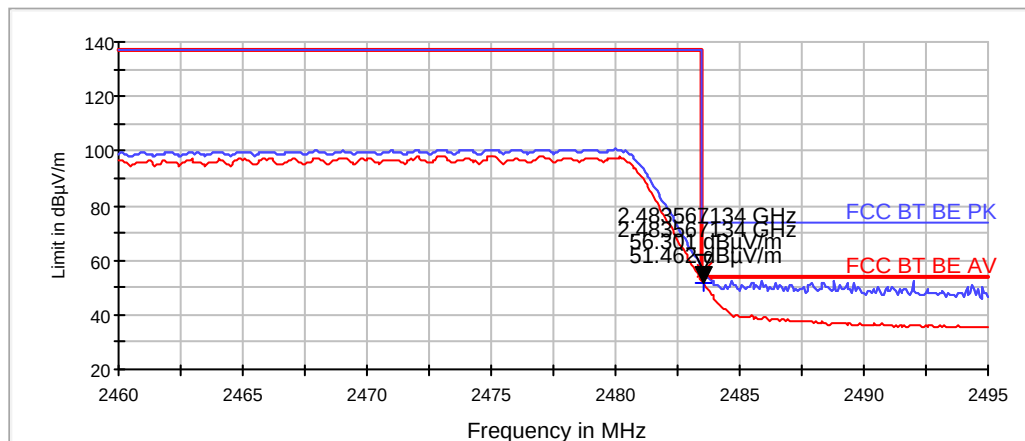


8DPSK mode. Channel 78 / 2480 MHz

7 (16)



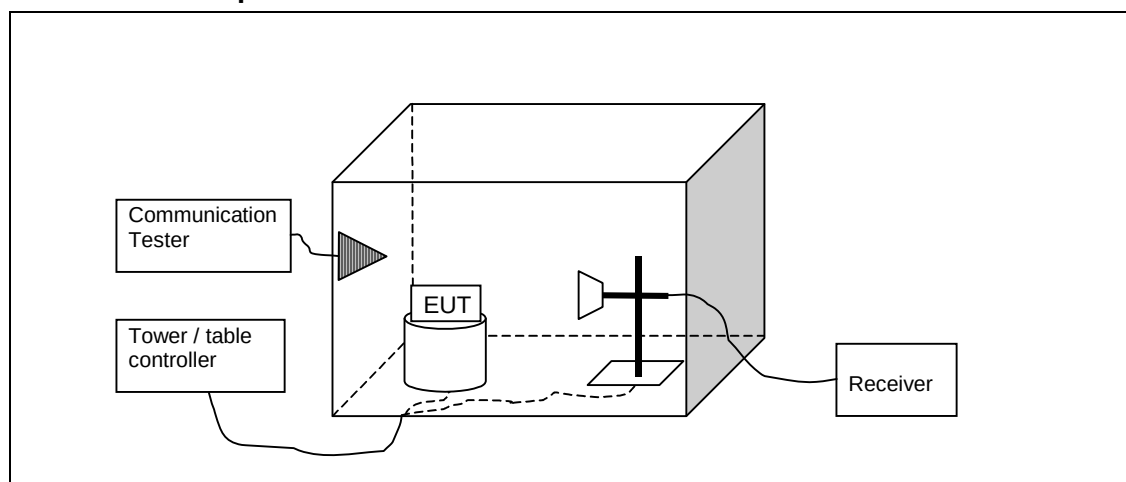
8DPSK mode. Hopping on, high end



3. Spurious radiated emissions (FCC §15.247(d), §15.209, RSS-210 A8.5)

EUT with DUT number	RM-601, DUT 15345
Accessories with DUT numbers	BL-5CT, DUT 15346 ; AC-15E, DUT 15347 ; HS-48, DUT 14677
Operation Voltage [V] / [Hz]	115 / 60
Results	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	20 / 58 / 98.3
Date of measurements	10-Nov-2010
Measured by	Sami Lehtonen

3.1.1 Test Setup



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	Result
4804	44.8	173.84	49.14	-4.34	VERTICAL	PASSED
7205.5	52.87	440.2	52.56	0.31	VERTICAL	PASSED

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

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
4804	31.92	39.446	36.26	-4.34	VERTICAL	PASSED
7205.5	37.98	79.268	37.67	0.31	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	Result
37.196	24.43	16.649	38.81	-14.38	VERTICAL	PASSED
37.245	24.56	16.91	38.97	-14.41	VERTICAL	PASSED
37.714	24.13	16.088	38.82	-14.69	VERTICAL	PASSED
37.715	24.29	16.395	38.98	-14.69	VERTICAL	PASSED
37.764	24.31	16.429	39.03	-14.72	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
2379.468	51.83	390.301	54.33	-2.5	HORIZONTAL	PASSED
4933.671	56.86	696.947	61	-4.14	HORIZONTAL	PASSED
4939.681	57.57	756.31	61.77	-4.2	HORIZONTAL	PASSED
17982.764	63.03	1417.588	41.76	21.27	VERTICAL	PASSED

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

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
2379.468	32.36	41.476	34.86	-2.5	HORIZONTAL	PASSED
4933.671	28.22	25.772	32.36	-4.14	HORIZONTAL	PASSED
4939.681	28.23	25.784	32.43	-4.2	HORIZONTAL	PASSED
17982.764	50.02	317.066	28.75	21.27	VERTICAL	PASSED

Channel 78 / 2480 MHz

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

Frequency [MHz]	E [dB μ V/m]	E [μ V/m]	U _{RX} [dB μ V]	A _{TOT} [dB]	Polarisation	Result
4959.7	57	707.864	61.14	-4.14	VERTICAL	PASSED
7439.7	50.04	317.651	48.63	1.41	VERTICAL	PASSED

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

Frequency [MHz]	E [dB μ V/m]	E [μ V/m]	U _{RX} [dB μ V]	A _{TOT} [dB]	Polarisation	Result
4959.7	43.55	150.453	47.69	-4.14	VERTICAL	PASSED
7439.7	36.25	64.961	34.84	1.41	VERTICAL	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	Result
4804.1	50.27	326.099	54.61	-4.34	VERTICAL	PASSED
7206.4	50.63	339.86	50.3	0.33	VERTICAL	PASSED

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

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
4804.1	36.7	68.415	41.04	-4.34	VERTICAL	PASSED
7206.4	37.28	73.139	36.95	0.33	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	Result
37.344	27.16	22.811	41.63	-14.47	VERTICAL	PASSED
37.527	27.03	22.459	41.61	-14.58	VERTICAL	PASSED
37.626	27.82	24.59	42.46	-14.64	VERTICAL	PASSED
38.275	27.88	24.769	42.91	-15.03	VERTICAL	PASSED
38.505	28.43	26.406	43.6	-15.17	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
2376.724	50.98	353.957	53.64	-2.66	HORIZONTAL	PASSED
4883.968	53.33	463.927	57.5	-4.17	VERTICAL	PASSED
7325.453	53.05	449.055	52.43	0.62	VERTICAL	PASSED
17961.523	62.21	1288.991	41.76	20.45	VERTICAL	PASSED

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

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
2376.724	32.35	41.438	35.01	-2.66	HORIZONTAL	PASSED
4883.968	40.76	109.157	44.93	-4.17	VERTICAL	PASSED
7325.453	39.53	94.7	38.91	0.62	VERTICAL	PASSED
17961.523	49.37	294.171	28.92	20.45	VERTICAL	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	Result
4960.3	53.62	479.899	57.75	-4.13	VERTICAL	PASSED
7440	49.44	296.381	48.01	1.43	VERTICAL	PASSED

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

Frequency [MHz]	E [dB μ V/m]	E [μ V/m]	U _{RX} [dB μ V]	A _{TOT} [dB]	Polarisation	Result
4960.3	37.88	78.361	42.01	-4.13	VERTICAL	PASSED
7440	36.42	66.214	34.99	1.43	VERTICAL	PASSED

4. Test Equipment

4.1. Conducted measurements

Eq. No	Equipment	Type	Manufacturer	Used in
1759	LISN 50 µH	ESH3-Z5	R&S	15C, 15B
1916	Communication Tester	CMTA84	R&S	15B
1986	GPS Antenna	AMHP10-15R/390	European Antenna	15C, 15B
1992	Signal Generator	83630B	Agilent	15C, 15B
2039	Power Supply	PL330QMD	Thurlby	15C, 15B
2060	LISN 50 µH	ESH3-Z5	R&S	15C, 15B
2068	CDN	S1	NMP	15C, 15B
2097	Pulse Limiter	ESH3-Z2	R&S	15C, 15B
2156	Communication Tester	CMU200	R&S	22/24/27, 15C, 15B
2180	Communication Tester	CMU200	R&S	22/24/27, 15C, 15B
2206	Signal Generator	SMX	R&S	15C, 15B
2347	Communication Tester	CMU200	R&S	22/24/27, 15C, 15B
2352	Spectrum Analyzer	FSP-30	R&S	22/24/27, 15C
2359	Temperature Test Chamber	VT4002	Vötsch	22/24/27
2360	Serial Bus Converter	Serial 488A	IO Tech	22/24/27
2362	Power Supply	NGPX 70/5	R&S	22/24/27
2388	Bluetooth Tester	CBT	R&S	15B
2389	Signal Generator	SMJ 100A	R&S	15B
2390	Directional Coupler	DC2600	AR	-
6009	GPS Antenna	SA-700	Chronos	15C
6010	GPS Network amplifier	NLA20FPDC	GPS Networking, Inc	15C
6011	GPS signal Splitter	LDCBS1x4	GPS Networking, Inc	15C
6012	CDN	CDN USB/c	Teseq	-
6015	Receiver	ESI	R&S	22/24, 15C, 15B
6016	ESD gun	PESD 1610	HAEFELY	-
-	BT / WLAN Antenna	SPA 2400/75/9/0/V	Huber-Suhner	15C, 15B
-	BT / WLAN Antenna	SPA 2400/75/9/0/V	Huber-Suhner	15C, 15B
-	RF Emission Software	ES-K1 v.1.71	R&S	22/24/27, 15C, 15B
6036	Data Logger	175-H2	Testo	22/24/27, 15C, 15B
6038	Data Logger	Testo 580	Testo	23/24/27, 15C, 15B
6039	USB Interface	5541765	Testo	23/24/27, 15C, 15B
2059	V-network	ESH3-Z6	R&S	-
6044	V-network	ESH3-Z6	R&S	-
6045	Power splitter	11667B	Agilent	23/24/27, 15C
6046	Attenuator 10dB	8493C	Agilent	23/24/27, 15C
6047	Attenuator 20dB	8493C	Agilent	23/24/27, 15C

4.2. Radiated measurements

Eq. No	Equipment	Type	Manufacturer	Used in
1917	Communication Tester	CMTA84	R&S	15B
1984	Antenna	BBHA 9120 D	Schwarzbeck	22/24/27, 15C, 15B
1986	GPS Antenna	AMHP10-15R/390	European Antenna	15C, 15B
1988	Antenna	HL562	R&S	22/24/27, 15C, 15B
1989	Relay Switch Unit	TS-RSP	R&S	22/24/27, 15C, 15B
2009	Signal Generator	SMP 22	R&S	22/24/27, 15C, 15B
2027	CDN	M2 (modified) DC1	MEB	22/24/27, 15C, 15B
2028	CDN	M3 (modified) DC2	MEB	22/24/27, 15C, 15B
2029	Power Supply	PL330	Thurlby	22/24/27, 15C
2043	Band Reject Filter	WRCA824/849-0.2-6SS	Wainwright	22
2047	Band Reject Filter	WRCC1800/2000-0.2-10SS	Wainwright	24
2051	High Pass Filter	4HC1700-1-KK	R&S	22
2109	Power Supply	PL330QMD	Thurlby	22/24/27, 15C, 15B

Eq. No	Equipment	Type	Manufacturer	Used in
2116	Controller	EMCO 2090	ETS	22/24/27, 15C, 15B
2135	CDN	CDN 801-M3	Lüthi	22/24/27, 15C, 15B
2140	Antenna	EMCO93110B	EMCO	22/24/27, 15C
2142	Antenna	3146	EMCO	22/24/27, 15C
2150	High Pass Filter	F-15041	RLC	22/24/27, 15C
2156	Communication Tester	CMU200	R&S	22/24/27, 15C, 15B
2176	CDN	CDN 801-M3	Lüthi	22/24/27, 15C, 15B
2180	Communication Tester	CMU200	R&S	22/24/27, 15C, 15B
2188	Preamplifier	AFS4-00100300-20-23P-6	Miteq	22/24/27, 15C, 15B
2347	Communication Tester	CMU200	R&S	22/24/27, 15C, 15B
2348	Controller	G-1000DXC	Yaesu	22/24/27, 15C, 15B
2349	Computer Controller	GS-232B	Yaesu	22/24/27, 15C, 15B
2350	Preamplifier	AMF-6D-020180-29-20P	Miteq	22/24/27, 15C, 15B
2353	Receiver	ESIB26	R&S	22/24/27, 15C, 15B
2357	Band Reject Filter	WRCG2400/2483-2390/2493-35/10SS	Wainwright	15C
2361	Anechoic Chamber	3 m Semi / Full Anechoic Chamber	Euroshield	22/24/27, 15C, 15B
2364	Band Reject Filter	WRCG1877/1883 - 1870/1890-40/6SS	Wainwright	24
2366	Relay Switch Unit	TS-RSP	R&S	22/24/27, 15C, 15B
2384	Band Reject Filter	WRCG832/838-825/845-40/5SS	Wainwright	22
2388	Bluetooth Tester	CBT	R&S	15B
2389	Signal Generator	SMJ 100A	R&S	15B
2391	Band Reject Filter	WRCG1729.4/1735.4-1722.4/1742.4-40/6SS	Wainwright	27
6009	GPS Antenna	SA-700	Chronos	15C
6010	GPS Network amplifier	NLA20FPDC	GPS Networking, Inc	15C
6011	GPS signal Splitter	LDCBS1x4	GPS Networking, Inc	15C
6014	Substitute Calibration Cable	Sucoflex 104PB	Suhner	-
6017	Antenna	SBA 9113	Schwarzbeck	22 / 24 / 27
-	BT / WLAN Antenna	SPA 2400/75/9/0/V	Huber-Suhner	15C, 15B
-	BT / WLAN Antenna	SPA 2400/75/9/0/V	Huber-Suhner	15C, 15B
-	RF Emission Software	ES-K1 v.1.71	R&S	22/24/27, 15C, 15B
-	RF immunity / Emission Software	EMC32	R&S	22/24/27, 15C, 15B
6037	Data Logger	175-H2	Testo	23/24/27, 15C, 15B
6038	Data Logger	Testo 580	Testo	23/24/27, 15C, 15B
6039	USB Interface	5541765	Testo	23/24/27, 15C, 15B