

FCC Part 15C Compliance Test Report

Test Report no.:	Tre_FCC_0719_02.doc	Date of Report:	28.6.2007
Number of pages:	16	Customer's Contact person:	Bill Griffin
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FCC listing no.:	94436		
IC recognition no.:	3608		
Tested devices/ accessories:	GSM phone RM-276 / Battery BL-5C, AC charger AC-3, Headset HS-40		
FCC ID:	QMNRM-276	IC:	661X-RM276
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-GEN and RSS-210. 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:			

Jari Jantunen, System Manager

1. Summary for FCC Part 15C Compliance Test Report

Date of receipt	7.5.2007
Testing completed	11.5.2007
The customer's contact person	Bill Griffin
Test Plan referred to	T:\Projects\
Notes	-
Document name	T:\Projects\RM-276\EMC\Results\FCC\Tre_FCC_0719_02.doc

1.1. EUT and Accessory Information

The EUT is a 6-band (GSM850/900/1800/1900 and WCDMA Band II(1900)/V(850)) mobile phone with GPRS, EGPRS and Bluetooth. Bluetooth is tested with maximum rated TX power.

Product	Type	SN	HW	MV	SW	DUT
GSM phone	RM-276	004401012485765	4053	-	Vp md3.01	41083
Battery	BL-5C	-	-	-	-	41087
AC Charger	AC-3	-	-	-	-	41027
Headset	HS-40	-	-	-	-	41085
AC Charger	AC-3	-	-	-	-	41027

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

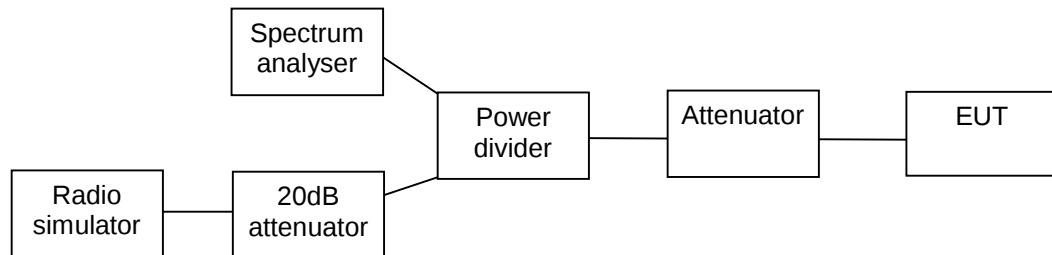
The test was not performed by the TCC Nokia Tampere Laboratory.

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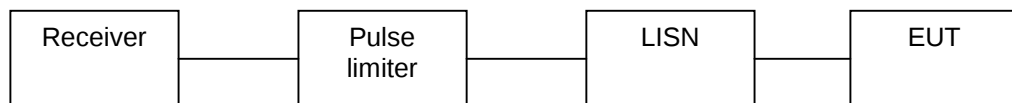
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2. Test setups

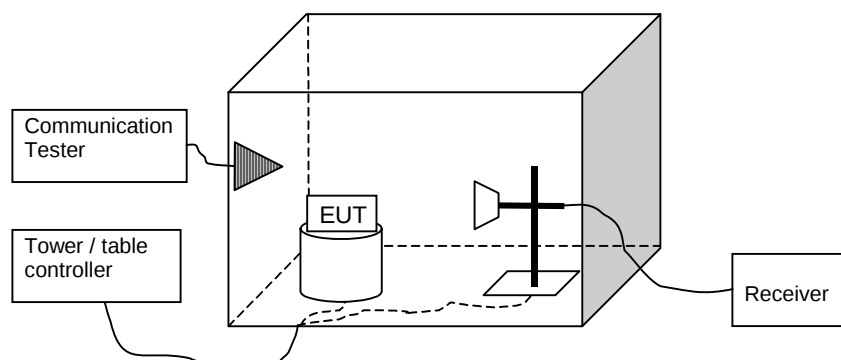
2.1. Conducted RF test setup



2.2. AC powerline conducted emissions test setup



2.3. Spurious radiated emissions test setup



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

EUT with DUT number	RM-276 DUT 41083
Accessories with DUT numbers	HS-40 DUT 41085, BL-5C DUT 41087, AC-3 41027
Operation Voltage [V] / [Hz]	115 / 60
Result	PASSED
Remarks	Flip open
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	23 / 45 / 99.6
Date of measurements	11.5.2007
Measured by	Jari Jantunen

3.1. Test method and limit

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

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

3.2. Bluetooth Test results

3.2.1 GFSK modulation, PRBS packet type

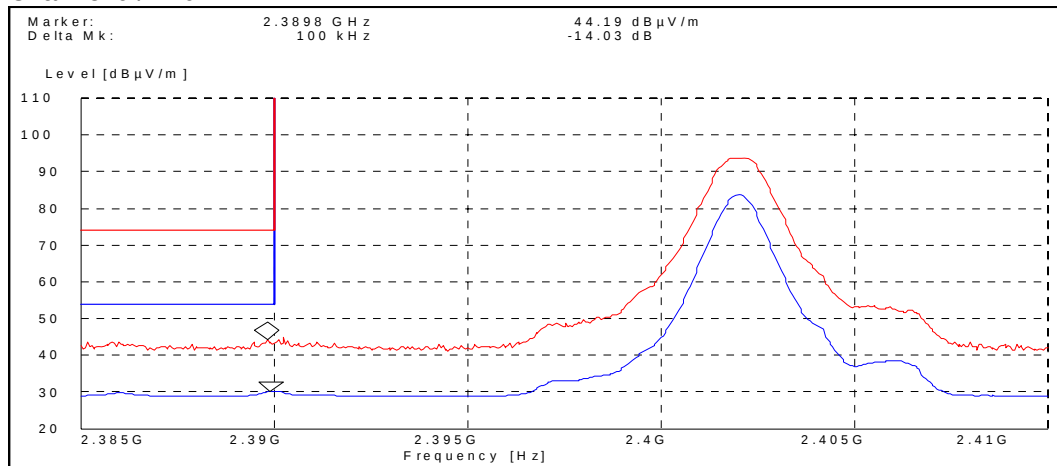
Average (RBW: 1 MHz)

Channel / f_c [MHz]	E [dBμV/m]	Result
0 / 2402	30.16	PASSED
78 / 2480	37.76	PASSED
Hopping on, low end	34.73	PASSED
Hopping on, high end	46.43	PASSED

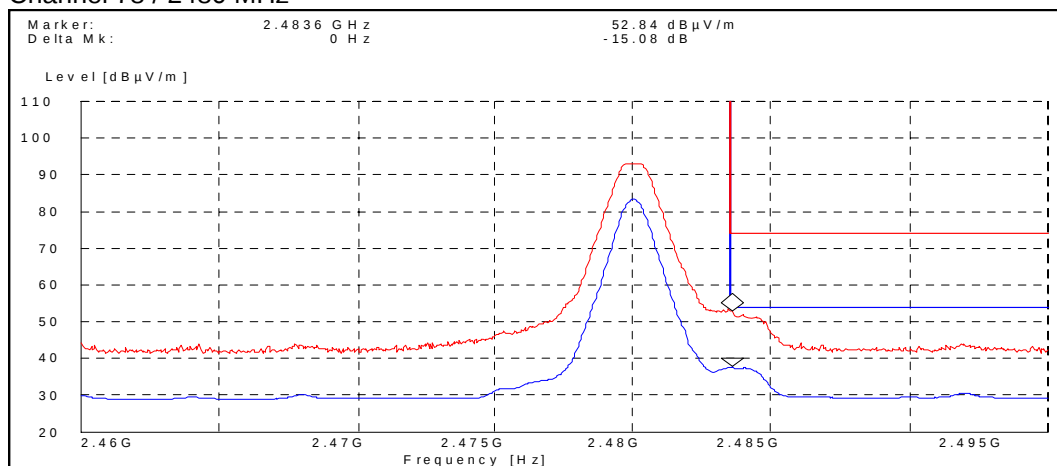
Peak (RBW: 1 MHz)

Channel / f_c [MHz]	E [dBμV/m]	Result
0 / 2402	44.19	PASSED
78 / 2480	52.84	PASSED
Hopping on, low end	46.00	PASSED
Hopping on, high end	52.98	PASSED

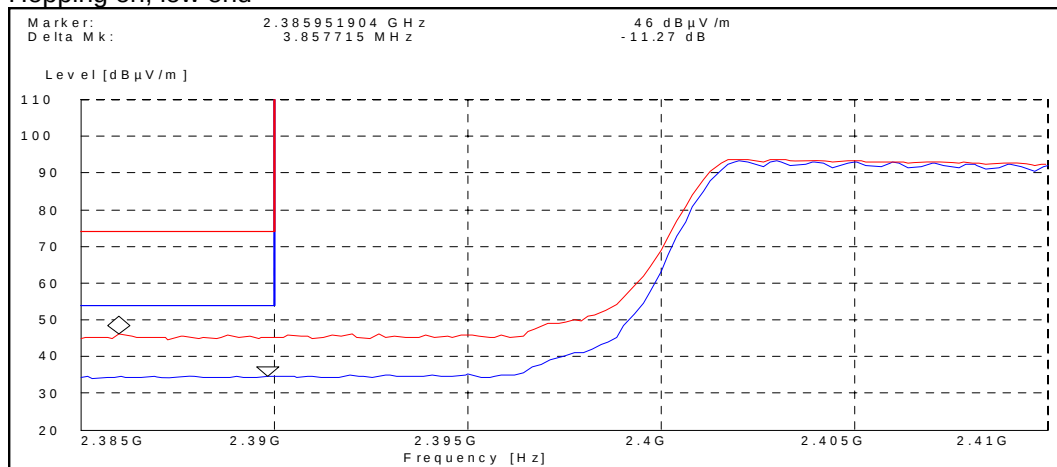
Channel 0 / 2402 MHz



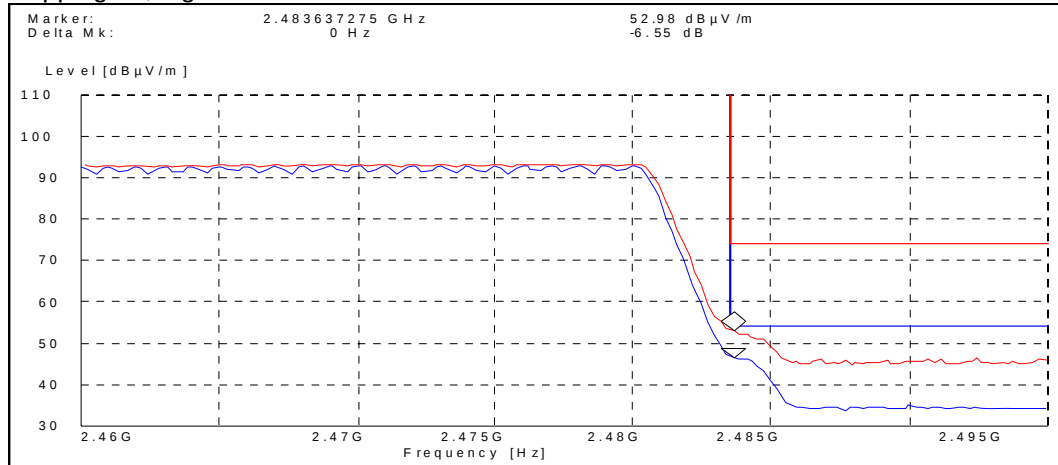
Channel 78 / 2480 MHz



Hopping on, low end



Hopping on, high end



3.2.2 8DPSK modulation, PRBS packet type

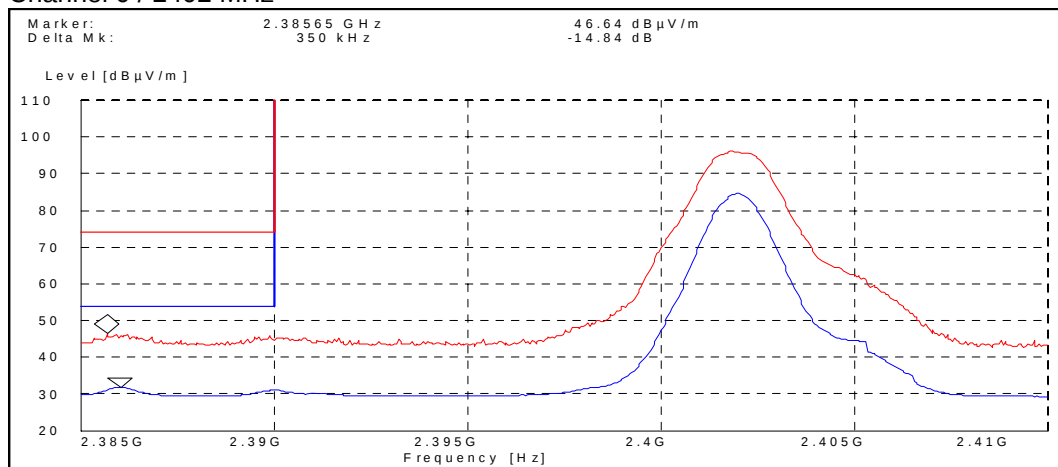
Average (RBW: 1 MHz)

Channel / f_c [MHz]	E [dBμV/m]	Result
0 / 2402	31.80	PASSED
78 / 2480	39.64	PASSED
Hopping on, low end	37.62	PASSED
Hopping on, high end	49.76	PASSED

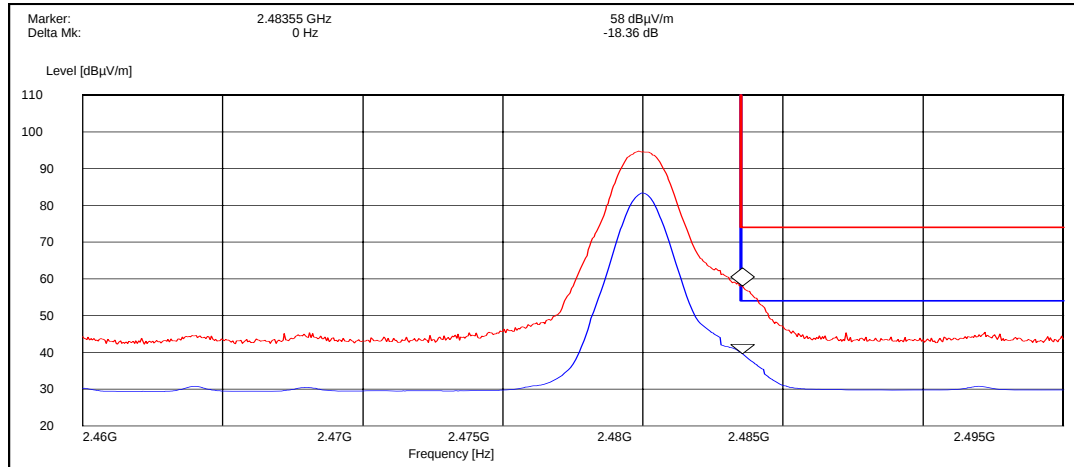
Peak (RBW: 1 MHz)

Channel / f_c [MHz]	E [dBμV/m]	Result
0 / 2402	46.64	PASSED
78 / 2480	58.00	PASSED
Hopping on, low end	47.59	PASSED
Hopping on, high end	58.84	PASSED

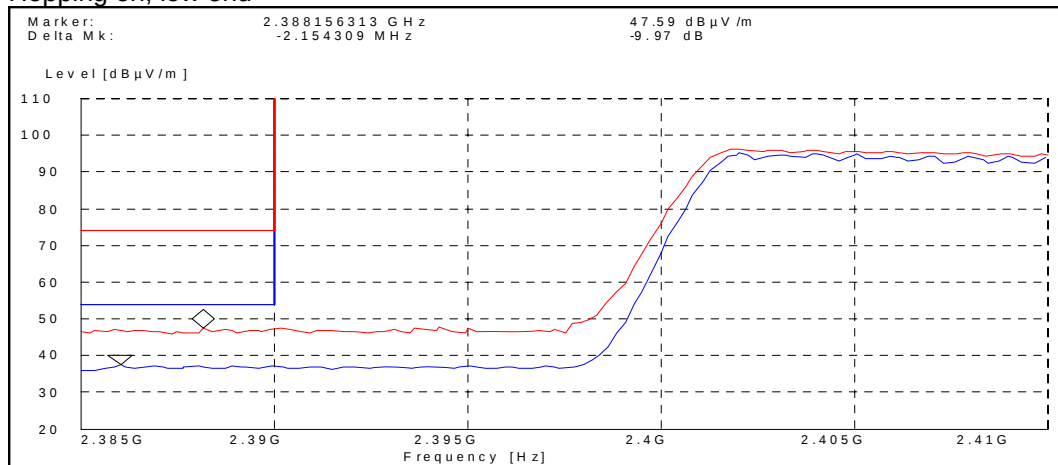
Channel 0 / 2402 MHz



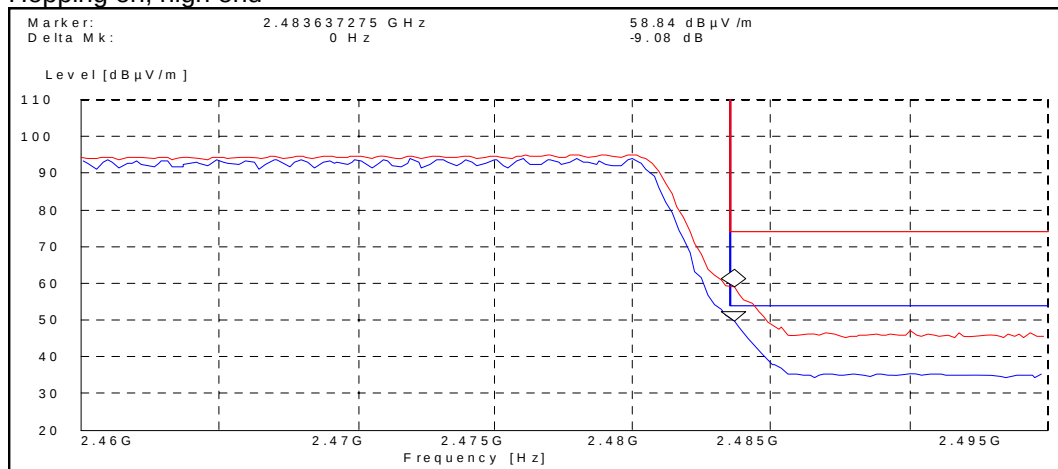
Channel 78 / 2480 MHz



Hopping on, low end



Hopping on, high end



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

EUT with DUT number	RM-276 DUT 41083
Accessories with DUT numbers	HS-40 DUT 41085, BL-5C DUT 41087, AC-3 41027
Operation Voltage [V] / [Hz]	115 / 60
Result	PASSED
Remarks	Flip open
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	23 / 44 / 99.5
Date of measurements	7.5.2007
Measured by	Jari Jantunen

4.1. 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 ($A_{TOT} = L_{CABLES} + AF - G_{PREAMP}$).

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

Frequency range [MHz]	Limit [$\mu\text{V/m}$]	Limit [dB $\mu\text{V/m}$]	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

4.2. Bluetooth Test results

4.2.1 GFSK modulation, PRBS packet type

Channel 0 / 2402 MHz

Peak (RBW: 1 MHz)

Frequency [MHz]	E [dB $\mu\text{V/m}$]	E [$\mu\text{V/m}$]	U _{RX} [dB μV]	A _{TOT} [dB]	Polarisation	Result
4804.000000	39.10	90.16	40.80	-1.7	VERTICAL	PASSED
7206.000000	41.40	117.49	39.70	1.7	HORIZONTAL	PASSED

Average (RBW: 1 MHz)

Frequency [MHz]	E [dB $\mu\text{V/m}$]	E [$\mu\text{V/m}$]	U _{RX} [dB μV]	A _{TOT} [dB]	Polarisation	Result
4804.000000	27.10	22.65	28.80	-1.7	VERTICAL	PASSED
7206.000000	28.40	26.30	26.70	1.7	HORIZONTAL	PASSED

Channel 40 / 2442 MHz

Quasi peak (RBW: 120 kHz)

Frequency [MHz]	E [dB $\mu\text{V/m}$]	E [$\mu\text{V/m}$]	U _{RX} [dB μV]	A _{TOT} [dB]	Polarisation	Result
37.735872	7.10	2.26	18.20	-11.1	HORIZONTAL	PASSED

Peak (RBW: 1 MHz)

Frequency [MHz]	E [dB $\mu\text{V/m}$]	E [$\mu\text{V/m}$]	U _{RX} [dB μV]	A _{TOT} [dB]	Polarisation	Result
4883.769539	41.50	118.85	43.10	-1.6	VERTICAL	PASSED
7279.059118	42.60	134.90	40.20	2.4	VERTICAL	PASSED
7341.687375	42.30	130.32	39.90	2.4	HORIZONTAL	PASSED
7413.329659	43.20	144.54	40.40	2.8	VERTICAL	PASSED
17988.971944	54.90	555.90	33.60	21.3	VERTICAL	PASSED

Average (RBW: 1 MHz)

Frequency [MHz]	E [dB $\mu\text{V/m}$]	E [$\mu\text{V/m}$]	U _{RX} [dB μV]	A _{TOT} [dB]	Polarisation	Result
4887.269539	26.90	22.13	28.50	-1.6	VERTICAL	PASSED
7282.059118	29.70	30.55	27.30	2.4	VERTICAL	PASSED
7339.687375	29.40	29.51	27.00	2.4	HORIZONTAL	PASSED
7411.829659	29.60	30.20	26.80	2.8	VERTICAL	PASSED

17989.471944	42.30	130.32	21.00	21.3	VERTICAL	PASSED
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Channel 78 / 2480 MHz

Peak (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
4960.000000	40.00	100.00	41.20	-1.2	VERTICAL	PASSED
7440.000000	42.90	139.64	40.20	2.7	HORIZONTAL	PASSED

Average (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
4960.000000	28.20	25.70	29.40	-1.2	HORIZONTAL	PASSED
7440.000000	29.60	30.20	26.90	2.7	HORIZONTAL	PASSED

4.2.2 8DPSK modulation, PRBS packet type

Channel 0 / 2402 MHz

Peak (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
4804.000000	39.50	94.41	41.20	-1.7	VERTICAL	PASSED
7206.000000	41.10	113.50	39.40	1.7	HORIZONTAL	PASSED

Average (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
4804.000000	26.30	20.65	28.00	-1.7	VERTICAL	PASSED
7206.000000	28.40	26.30	26.70	1.7	VERTICAL	PASSED

Channel 40 / 2442 MHz

Quasi peak (RBW: 120 kHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
37.595391	7.60	2.40	18.60	-11.0	VERTICAL	PASSED

Peak (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
2496.048096	45.60	190.55	39.40	6.2	HORIZONTAL	PASSED
2898.773547	46.80	218.78	38.00	8.8	HORIZONTAL	PASSED
4917.333667	40.40	104.71	41.80	-1.4	VERTICAL	PASSED
7275.057114	42.70	136.46	40.30	2.4	HORIZONTAL	PASSED
7280.561122	42.60	134.90	40.20	2.4	VERTICAL	PASSED
7386.765531	42.30	130.32	39.60	2.7	VERTICAL	PASSED
7418.329659	43.30	146.22	40.50	2.8	HORIZONTAL	PASSED
17899.295591	55.20	575.44	34.10	21.1	HORIZONTAL	PASSED

Average (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
2496.548096	31.90	39.36	25.70	6.2	HORIZONTAL	PASSED
2898.773547	34.30	51.88	25.50	8.8	HORIZONTAL	PASSED
4918.333667	27.20	22.91	28.60	-1.4	VERTICAL	PASSED
7276.057114	29.70	30.55	27.30	2.4	HORIZONTAL	PASSED
7276.561122	29.70	30.55	27.30	2.4	VERTICAL	PASSED
7380.765531	29.70	30.55	27.10	2.6	VERTICAL	PASSED
7415.329659	29.90	31.26	27.10	2.8	HORIZONTAL	PASSED
17900.795591	42.10	127.35	21.00	21.1	HORIZONTAL	PASSED

Channel 78 / 2480 MHz

Peak (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
4960.000000	40.00	100.00	41.20	-1.2	VERTICAL	PASSED
7440.000000	42.40	131.83	39.70	2.7	HORIZONTAL	PASSED

Average (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
4960.000000	27.50	23.71	28.70	-1.2	HORIZONTAL	PASSED
7440.000000	29.60	30.20	26.90	2.7	HORIZONTAL	PASSED

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

EUT with DUT number	RM-276 DUT 41083
Accessories with DUT numbers	HS-40 DUT 41085, BL-5C DUT 41087, AC-3 41027
Operation Voltage [V] / [Hz]	115 / 60
Result	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	20 / 50 99.1
Date of measurements	9.5.2007
Measured by	Jari Jantunen

5.1. Test method and limit

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

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

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

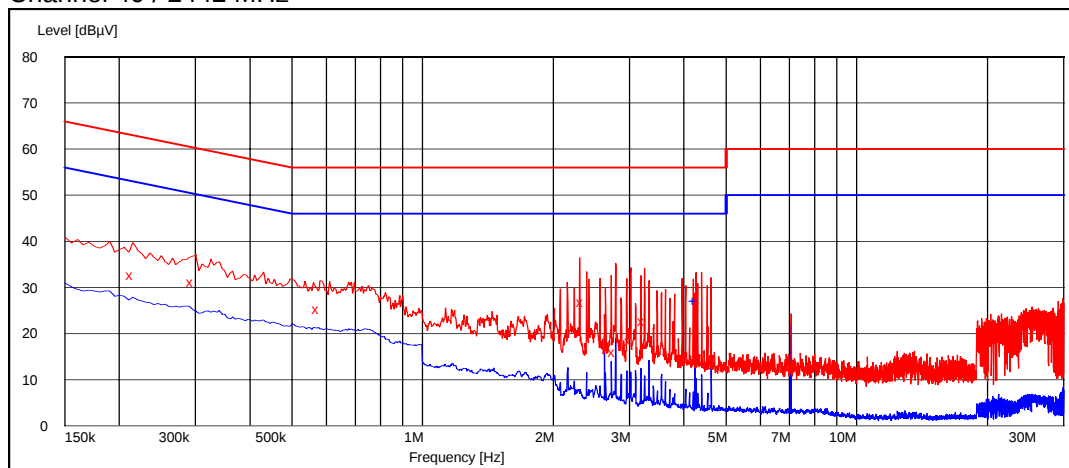
CISPR 22 Class B limits

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

5.2. Bluetooth Test results

5.2.1 GFSK modulation, PRBS packet type

Channel 40 / 2442 MHz



Quasi peak (RBW: 9 kHz)

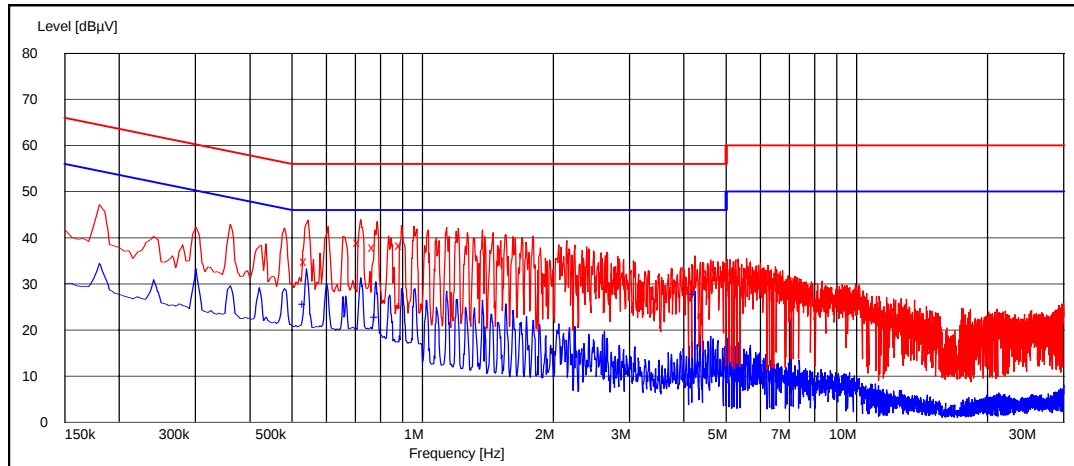
Frequency [MHz]	U [dBμV]	Line	Result
0.215000	32.60	N	PASSED
0.295000	31.20	L1	PASSED
0.575000	25.40	L1	PASSED
2.340000	26.80	L1	PASSED
2.770000	15.90	N	PASSED
3.020000	18.40	N	PASSED
3.240000	22.60	N	PASSED

Average (RBW: 9 kHz)

Frequency [MHz]	U [dBμV]	Line	Result
4.240000	27.10	N	PASSED

5.2.2 8DPSK modulation, PRBS packet type

Channel 40 / 2442 MHz



Quasi peak (RBW: 9 kHz)

Frequency [MHz]	U [dBμV]	Line	Result
0.540000	34.90	N	PASSED
0.715000	39.10	L1	PASSED
0.775000	38.00	L1	PASSED
0.895000	38.40	L1	PASSED

Average (RBW: 9 kHz)

Frequency [MHz]	U [dBμV]	Line	Result
0.535000	25.60	L1	PASSED
0.785000	22.80	N	PASSED
4.240000	27.70	N	PASSED

6. Test Equipment

6.1. Conducted measurements

Eq. No	Equipment	Type	Manufacturer	Used in
TM37610	Spectrum analyzer	FSU	R&S	22/24, 15C
TM37678	Radio communication tester	CMU-200	R&S	22/24, 15C
	Attenuator 10 dB	6251.17.A	Huber+Suhner AG	22/24, 15C
TM37499	Power splitter	11667A	Agilent	22/24, 15C
	Temperature chamber	VT4002	Vötsch	22/24, 15C
TM38112	DC power supply	6632A	Agilent	22/24, 15C
TM38111	Multimeter	34401A	Agilent	22/24, 15C
	EMI Test receiver	ESPC	R&S	15C, 15B
TM37773	Radio communication tester	CMU-200	R&S	15C, 15B
TM38631	Signal generator	83640L	Agilent	15C, 15B
TM38114	DC power supply	6632A	Agilent	15C, 15B
TM22835	Multimeter	87	Fluke	15C, 15B
TM30600	Pulse Limiter	ESH3-Z2	R&S	15C, 15B
TM26490	LISN 50 µH	ESH3-Z5/	R&S	15C, 15B
TM30636	LISN 50 µH	L2-16/	PMM	15C, 15B

6.2. Radiated measurements

Eq. No	Equipment	Type	Manufacturer	Used in
TM30599	3m semi-anechoic chamber		TDK	22/24, 15C, 15B
TM38845	EMI receiver	ESI 40	R&S	22/24, 15C, 15B
TM37498	Preamplifier	AMF-5D-020180-26-10P	MITEQ	22/24, 15C, 15B
TM37523	Preamplifier	AMF-4D-10M-3G-25-20P	MITEQ	22/24, 15C, 15B
TM37516	Biconilog antenna	HL562	R&S	22/24, 15C, 15B
TM26496	Double ridged waveguide antenna	3115	EMCO	22/24, 15C, 15B
TM39158	Horn antenna	3116	EMCO	22/24, 15C, 15B
TM26492	Reference dipole set	UHAP/VHAP	Schwarzbeck	22/24, 15C, 15B
TM37501	Dipole antenna	3125-870	EMCO	22/24
TM37502	Dipole antenna	3125-1880	EMCO	22/24
TM37773	Radio communication tester	CMU-200	R&S	22/24, 15C, 15B
TM38631	Signal generator	83640L	Agilent	22/24, 15C, 15B
TM38066	High pass filter	4HC3000/18000-3-KK	Trilithic	22/24, 15C, 15B
	High pass filter	WHK2010-10SS	Trilithic	22/24, 15C, 15B
	Low pass filter	WLK1750-10SS	Trilithic	22/24, 15C, 15B
TM26511	Tunable notch filter	WRCA870	Wainwright	22/24
TM38215	Tunable notch filter	WRCD1850/1910-0.2/40	Wainwright	22/24
TM38214	Band reject filter	WRCT 2402/2480-2400/2483.5-30	Wainwright	15C
TM30642	Turntable controller	HD-100	Deisel	22/24, 15C, 15B
TM26500	Turntable	DS412	Deisel	22/24, 15C, 15B
TM38842	Antenna mast controller	2090	EMCO	22/24, 15C, 15B
TM38843	Antenna mast	2075	EMCO	22/24, 15C, 15B
TM38114	DC power supply	6632A	Agilent	22/24, 15C, 15B
TM22835	Multimeter	87	Fluke	22/24, 15C, 15B