

FCC Part 15C Compliance Test Report

Test Report no.:	Salo_FCC_0648_09.doc	Date of Report:	28.11.2006
Number of pages:	46	Customer's Contact person:	Jukka Pekkala
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 Lise Meitner Strasse 10 89081 ULM GERMANY Tel. +49 731 1754 0 Fax. +49 731 1754 6800
FCC listing no.:	533467		
IC recognition no.:	5385		
Tested devices/ accessories:	Phone RM-222 / Battery BL-4C, Headset HS-47 and AC-Charger AC-3E		
FCC ID:	PPIRM-222	IC:	661U-RM222
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:			

Sami Lehtonen, System Manager

1. Summary for FCC Part 15C Compliance Test Report

Date of receipt	06.11.2006
Testing completed	13.11.2006
The customer's contact person	Jukka Pekkala
Test Plan referred to	T:\Projects\RM-222\TestPlan_RS\RS_Testplan_RM-222.xls
Notes	-
Document name	T:\Projects\RM-222\EMC\Results\FCC\Salo_FCC_0648_09.doc

1.1. EUT and Accessory Information

The EUT is a 3-band (GSM900/1800/1900) mobile phone with GPRS, EGPRS and Bluetooth. Bluetooth is tested with maximum rated TX power.

Product	Type	SN	HW	MV	SW	DUT
Phone	RM-217	004400/93/163199/6	0315	-	V pc.3.92	11572
Phone	RM-217	004400/93/163195/4	0315	-	V pc.3.92	11573
Phone	RM-217	004400/93/163198/8	0315	-	3.92	11577
Battery	BL-4C	0670386417535N073B11156593	-	-	-	11522
Battery	BL-4C	067038610717244111	-	-	-	11578
Headset	HS-47	3508536425020000475	-	-	-	11575
Headset	HS-47	0239443	-	-	-	11590
AC-Charger	AC-3E	3997915472051200095;0675370	-	-	-	11574
AC- Charger	AC-3E	3997915472051200089;0675370	-	-	-	11563

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	PASSED
15.247(c)	A8.5	Band edge compliance of RF emissions	PASSED
15.247(c)	A8.5	Spurious RF conducted emissions	PASSED
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	PASSED
15.247(a)(1)	A8.1 (2)	Carrier frequency separation	PASSED
15.247(a)(1)(iii)	A8.1 (4)	Number of hopping frequencies	PASSED
15.247(a)(1)(iii)	A8.1 (4)	Time of occupancy	PASSED

PASSED

The EUT complies with the essential requirements in the standard.

FAILED

The EUT does not comply with the essential requirements in the standard.

NP

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

The test results of PPIRM-217 are re-used for certification of the PPIRM-222. The table above indicates the results, which will be re-used.

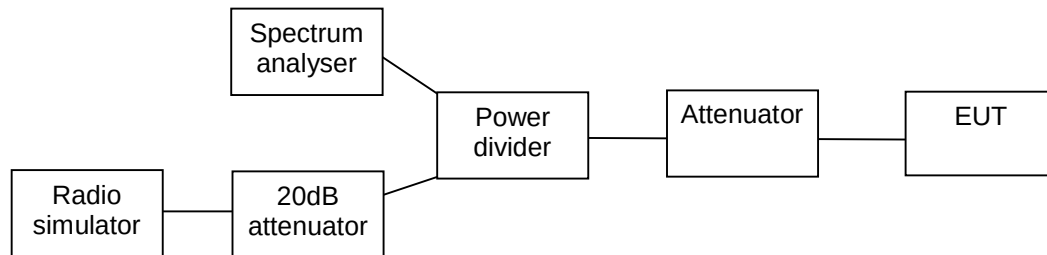
CONTENTS

1. Summary for FCC Part 15C Compliance Test Report.....	2
1.1. EUT and Accessory Information	2
1.2. Summary of Test Results.....	2
2. Test setups.....	5
2.1. Conducted RF test setup	5
2.2. AC powerline conducted emissions test setup.....	5
2.3. Spurious radiated emissions test setup	5
3. Conducted peak output power (FCC §15.247(b)(1), RSS-210 A8.4 (2))	6
3.1. Test method and limit.....	6
3.2. Bluetooth Test results	7
4. Band edge compliance of RF emissions (FCC §15.247(c), RSS-210 A8.5)	10
4.1. Test method and limit.....	10
4.2. Bluetooth Test results	11
5. Spurious RF conducted emissions (FCC §15.247(c), RSS-A8.5).....	16
5.1. Test method and limit.....	16
5.2. Bluetooth Test results	17
6. Spurious radiated emissions (FCC §15.247(c), §15.209, RSS-210 A8.5).....	21
6.1. Test method and limit.....	21
6.2. Bluetooth Test results	22
7. AC powerline conducted emissions (FCC §15.207, RSS-GEN 7.2.2)	28
7.1. Test method and limit.....	28
7.2. Bluetooth Test results	29
8. 20 dB bandwidth (FCC §15.247(a)(1), RSS-210 A8.1 (1))	31
8.1. Test method and limit.....	31
8.2. Bluetooth Test results	32
9. Carrier frequency separation (FCC §15.247(a)(1), RSS-210 A8.1 (2))	36
9.1. Test method and limit.....	36
9.2. Bluetooth Test results	37
10. Number of hopping frequencies (FCC §15.247(a)(1)(iii), RSS-210 A8.1 (4))	39
10.1. Test method and limit.....	39
10.2. Bluetooth Test results	40
11. Time of occupancy (FCC §15.247(a)(1)(iii), RSS-210 A8.1 (4))	42

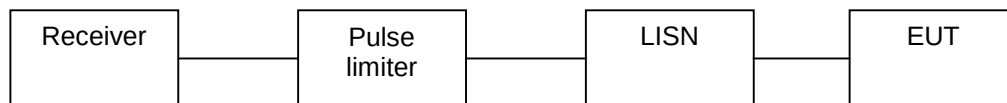
11.1.	Test method and limit	42
11.2.	Bluetooth test results	43
12.	Test Equipment	45
12.1.	Conducted measurements	45
12.2.	Radiated measurements	45

2. Test setups

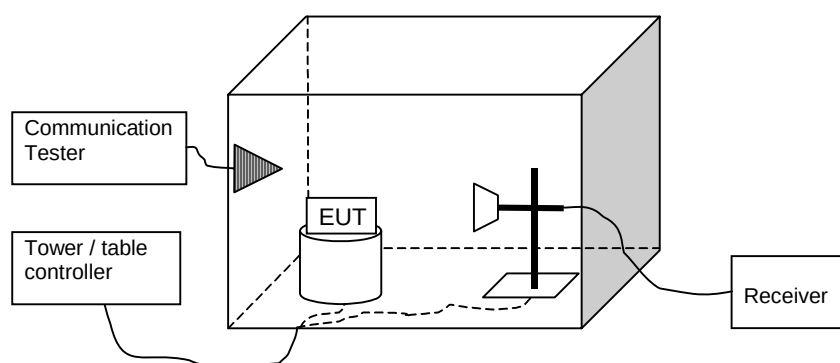
2.1. Conducted RF test setup



2.2. AC powerline conducted emissions test setup



2.3. Spurious radiated emissions test setup



3. Conducted peak output power (FCC §15.247(b)(1), RSS-210 A8.4 (2))

EUT with DUT number	RM-217, DUT 11573
Accessories with DUT numbers	BL-4C, DUT 11522; HS-47, DUT 11575; AC-3E, DUT 11574
Operation Voltage [V] / [Hz]	115 / 60
Result	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	22 / 39 / 100
Date of measurements	13.11.2006
Measured by	Anni Manninen

3.1. Test method and limit

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

Limits for conducted peak output power measurements

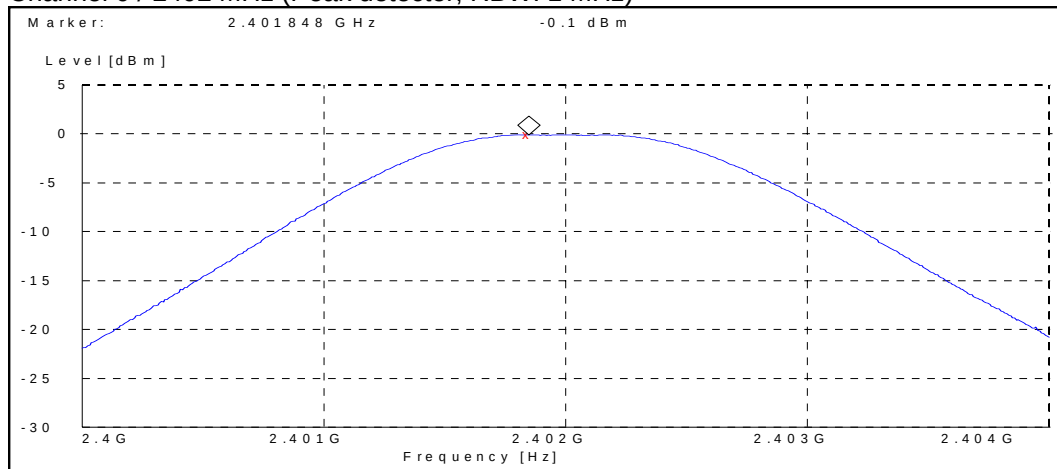
Frequency range [MHz]	Limit [W]	Limit [dBm]
2400 – 2483.5	≤ 1	≤ 30

3.2. Bluetooth Test results

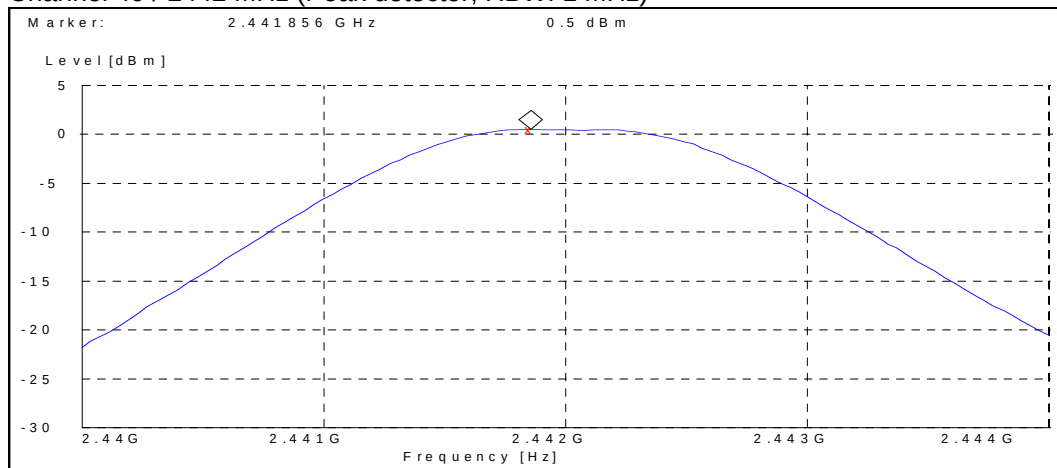
3.2.1 GFSK modulation, PRBS packet type

Channel / f_c [MHz]	P [dBm]	P [mW]	Result
0 / 2402	-0.10	0.977	PASSED
40 / 2442	0.50	1.122	PASSED
78 / 2480	0.40	1.096	PASSED

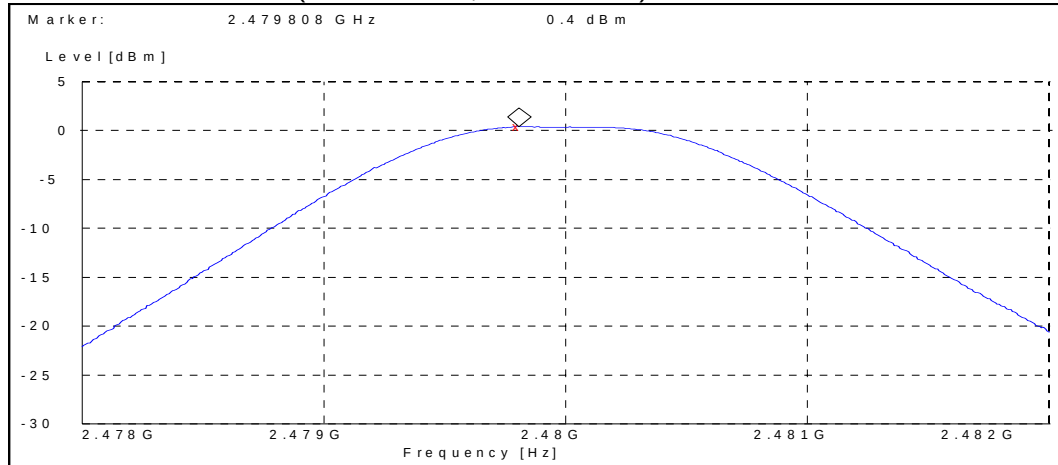
Channel 0 / 2402 MHz (Peak detector, RBW: 1 MHz)



Channel 40 / 2442 MHz (Peak detector, RBW: 1 MHz)



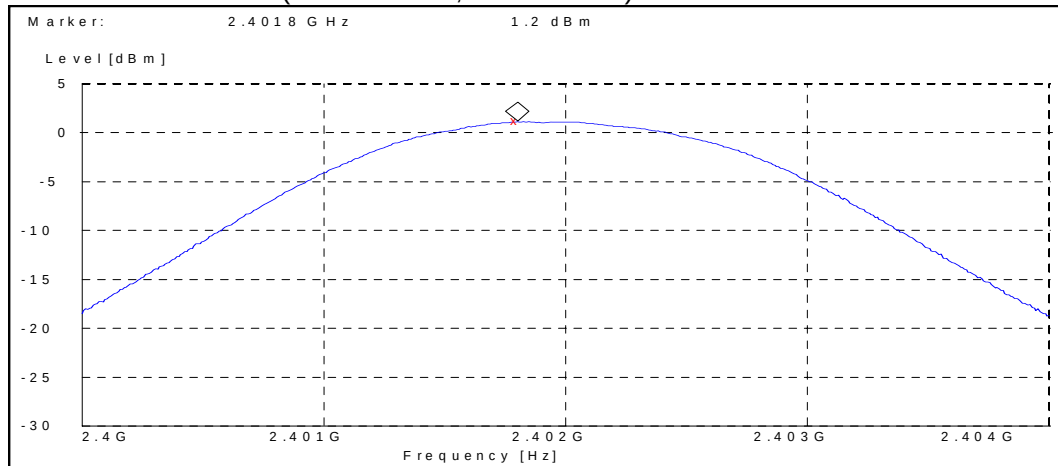
Channel 78 / 2480 MHz (Peak detector, RBW: 1 MHz)



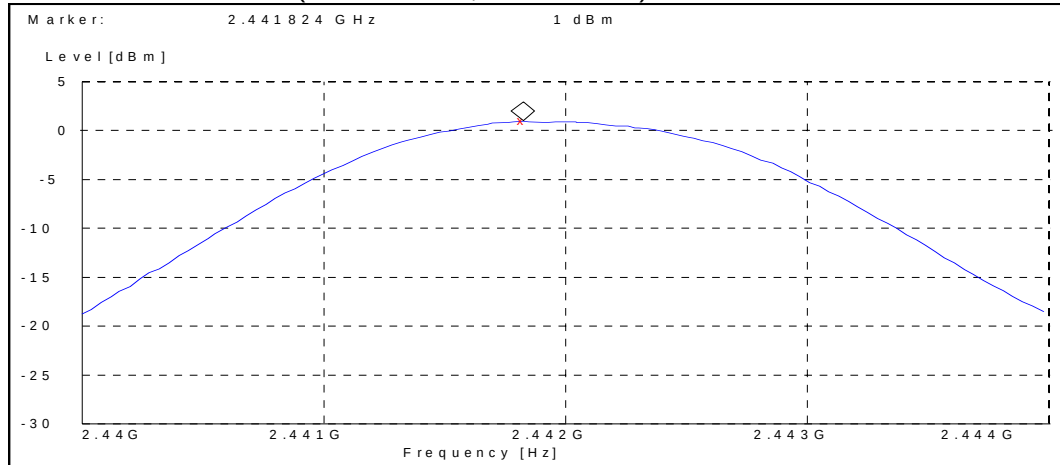
3.2.2 8DPSK modulation, PRBS packet type

Channel / f_c [MHz]	P [dBm]	P [mW]	Result
0 / 2402	1.20	1.318	PASSED
40 / 2442	1.00	1.259	PASSED
78 / 2480	0.50	1.122	PASSED

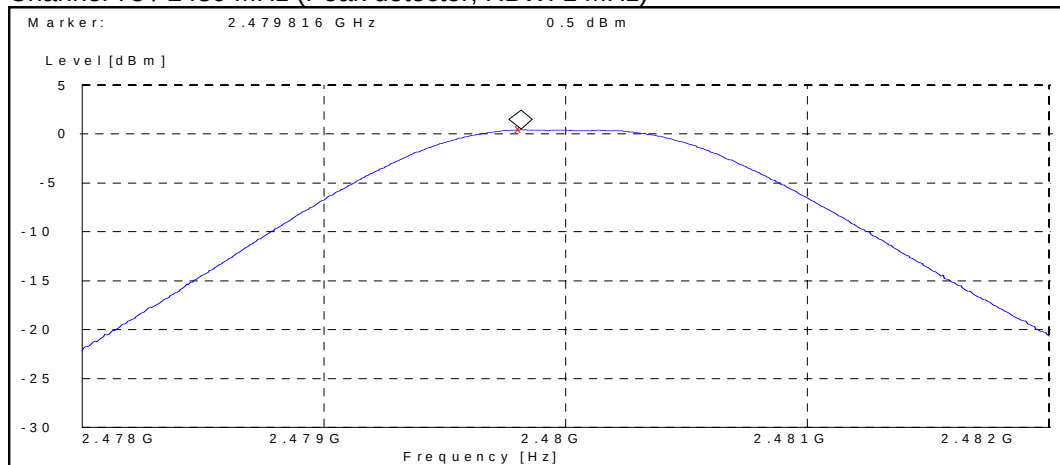
Channel 0 / 2402 MHz (Peak detector, RBW: 1 MHz)



Channel 40 / 2442 MHz (Peak detector, RBW: 1 MHz)



Channel 78 / 2480 MHz (Peak detector, RBW: 1 MHz)



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

EUT with DUT number	RM-217, DUT 11577
Accessories with DUT numbers	BL-4C, DUT 11578; HS-47, DUT 11590; AC-3E, DUT 11563
Operation Voltage [V] / [Hz]	115 / 60
Result	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	20 / 49 / 101.2
Date of measurements	09.11.2006
Measured by	Sami Lehtonen

4.1. 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

4.2. Bluetooth Test results

4.2.1 GFSK modulation, PRBS packet type

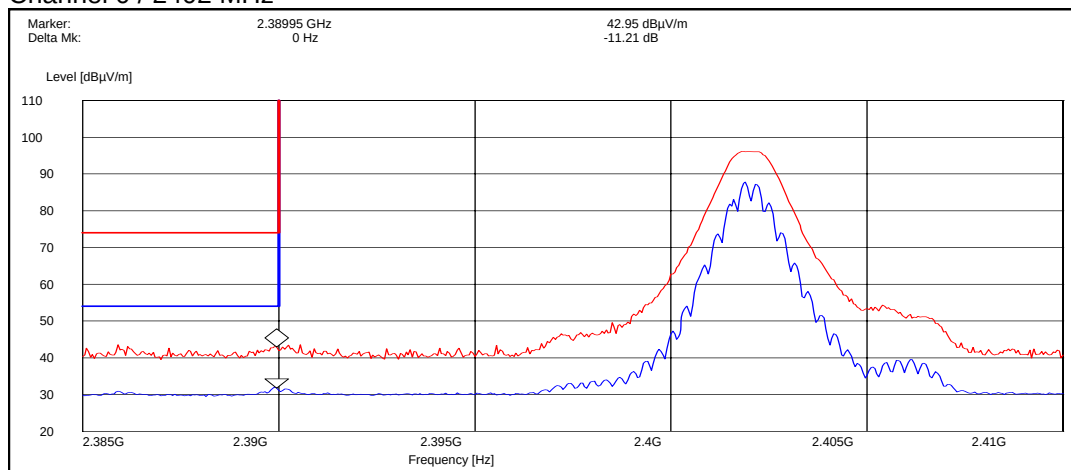
Average (RBW: 1 MHz)

Channel / f_c [MHz]	E [dB μ V/m]	Result
0 / 2402	31.74	PASSED
78 / 2480	39.08	PASSED
Hopping on, low end	35.58	PASSED
Hopping on, high end	40.49	PASSED

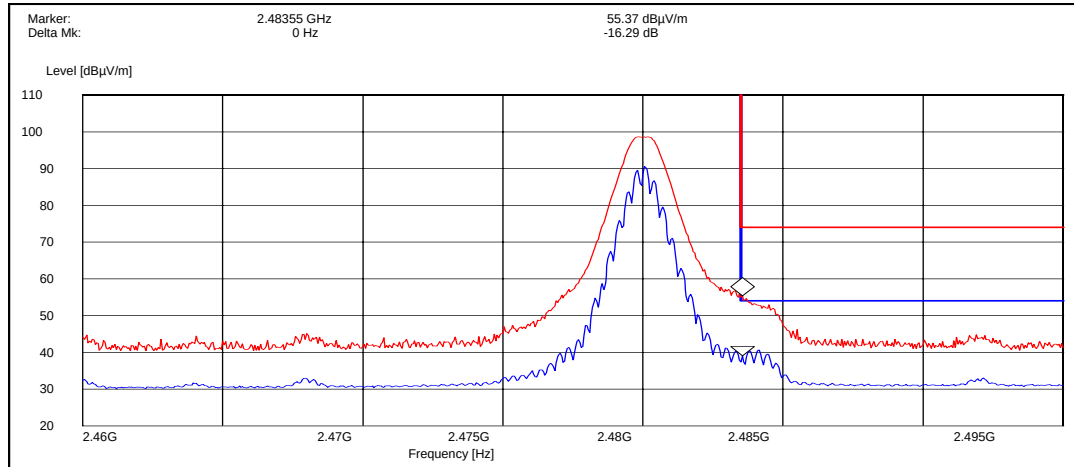
Peak (RBW: 1 MHz)

Channel / f_c [MHz]	E [dB μ V/m]	Result
0 / 2402	42.95	PASSED
78 / 2480	55.37	PASSED
Hopping on, low end	46.87	PASSED
Hopping on, high end	49.74	PASSED

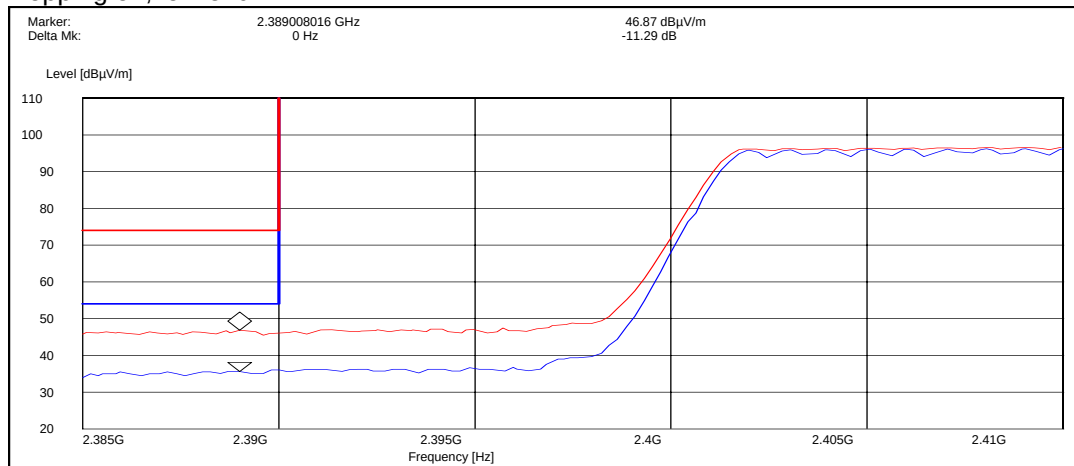
Channel 0 / 2402 MHz



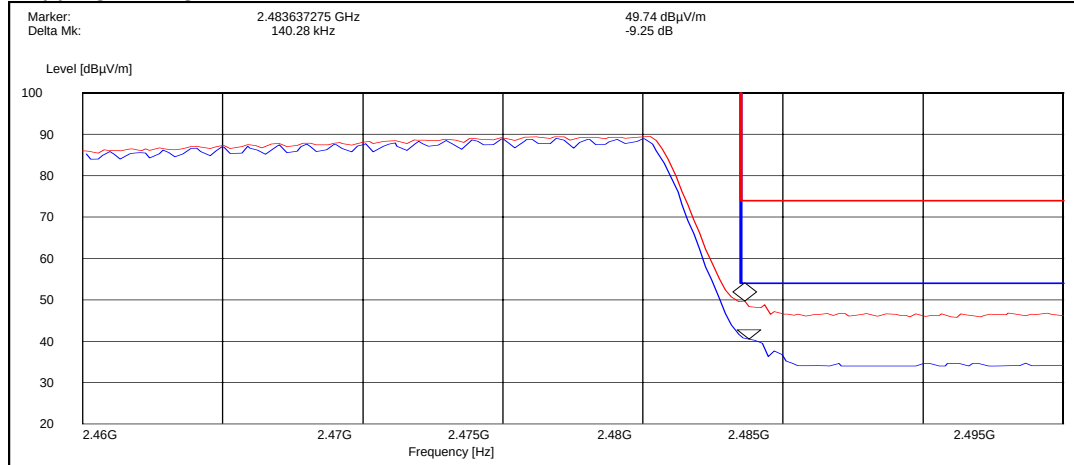
Channel 78 / 2480 MHz



Hopping on, low end



Hopping on, high end



4.2.2 8DPSK modulation, PRBS packet type

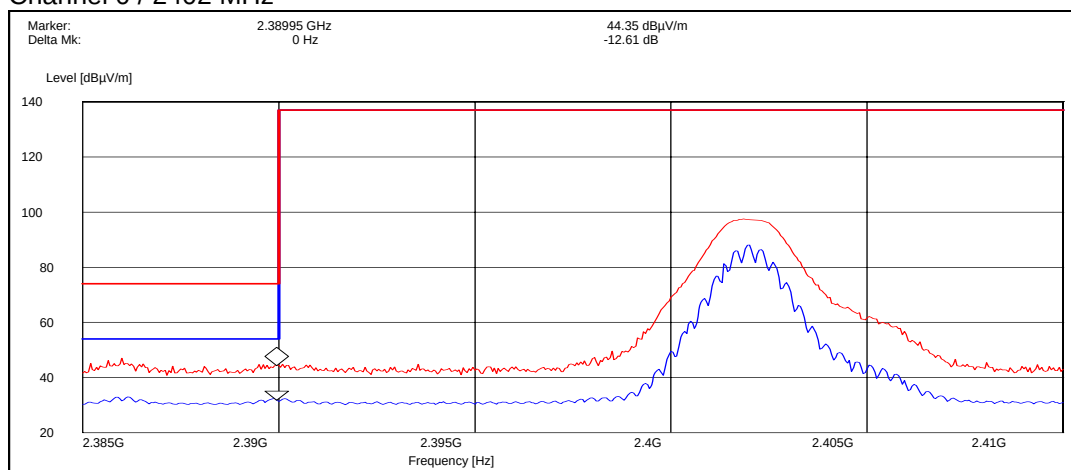
Average (RBW: 1 MHz)

Channel / f_c [MHz]	E [dB μ V/m]	Result
0 / 2402	31.74	PASSED
78 / 2480	42.60	PASSED
Hopping on, low end	37.36	PASSED
Hopping on, high end	51.41	PASSED

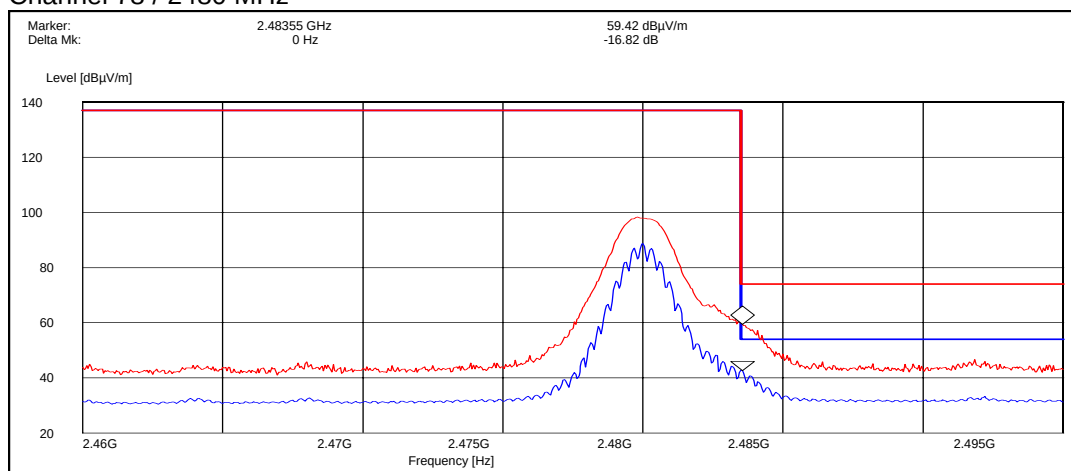
Peak (RBW: 1 MHz)

Channel / f_c [MHz]	E [dB μ V/m]	Result
0 / 2402	44.35	PASSED
78 / 2480	59.42	PASSED
Hopping on, low end	48.01	PASSED
Hopping on, high end	61.72	PASSED

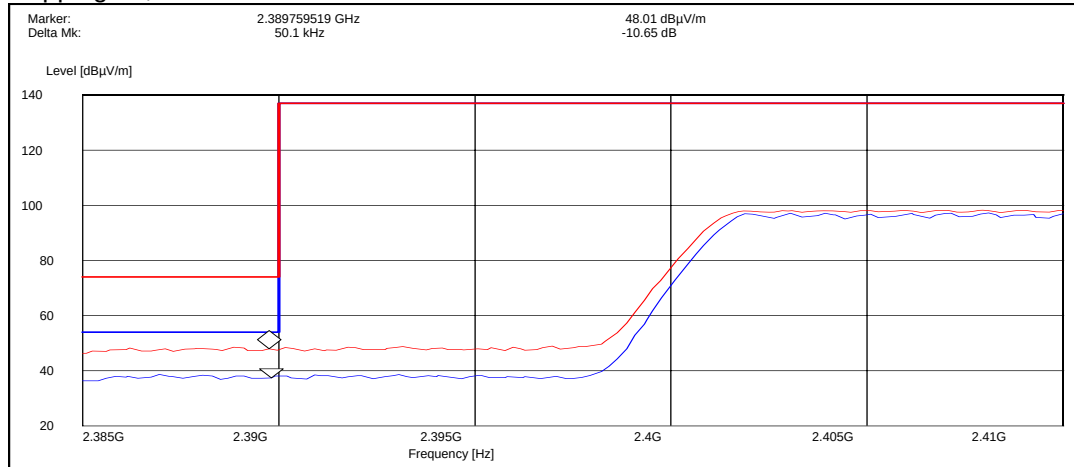
Channel 0 / 2402 MHz



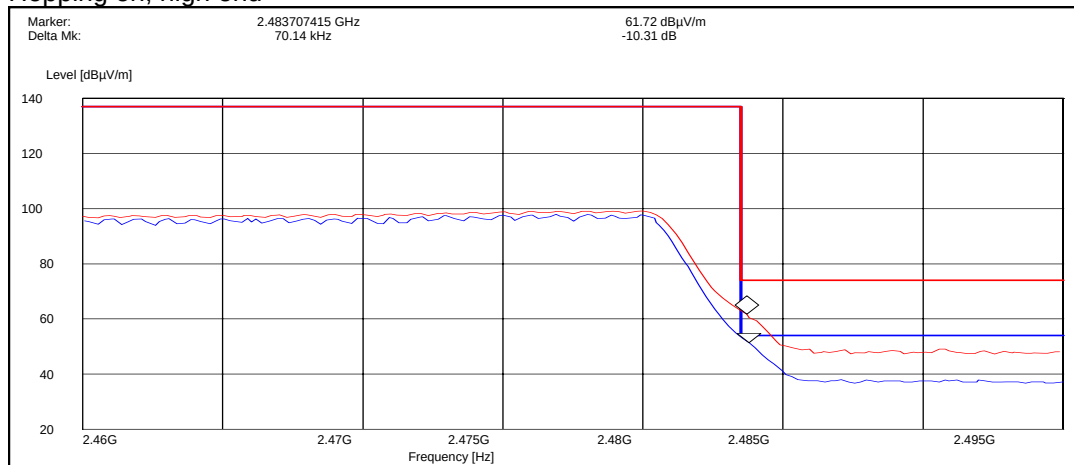
Channel 78 / 2480 MHz



Hopping on, low end



Hopping on, high end



5. Spurious RF conducted emissions (FCC §15.247(c), RSS-A8.5)

EUT with DUT number	RM-217, DUT 11573
Accessories with DUT numbers	BL-4C, DUT 11522; HS-47, DUT 11575; AC-3E, DUT 11574
Operation Voltage [V] / [Hz]	115 / 60
Result	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	22 / 39 / 100
Date of measurements	13.11.2006
Measured by	Anni Manninen

5.1. Test method and limit

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

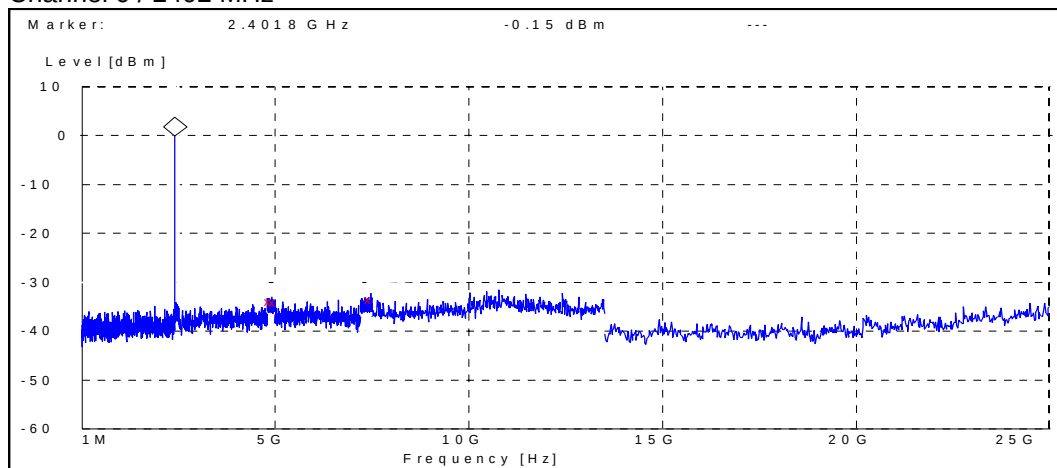
Limits for spurious RF conducted emissions measurements

Frequency range [MHz]	Limit [dBc]
1 – 25000	≤ -20

5.2. Bluetooth Test results

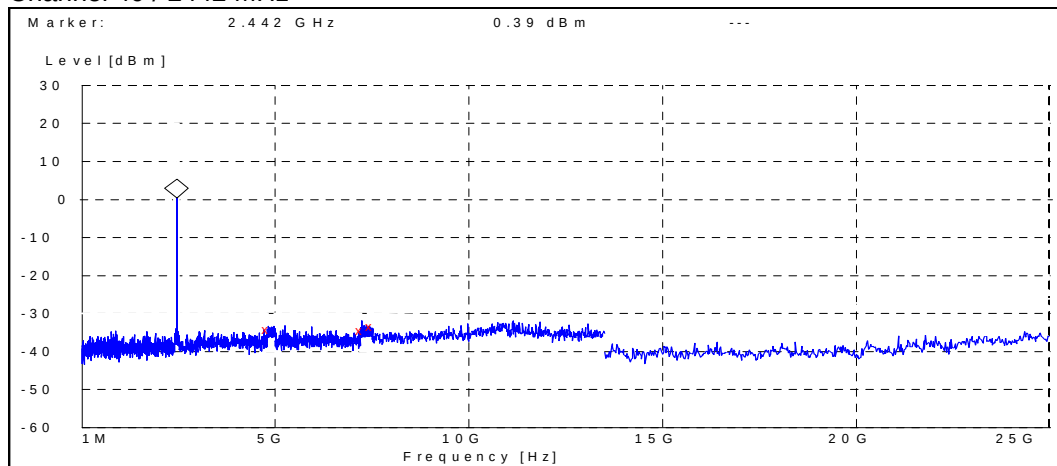
5.2.1 GFSK modulation, PRBS packet type

Channel 0 / 2402 MHz



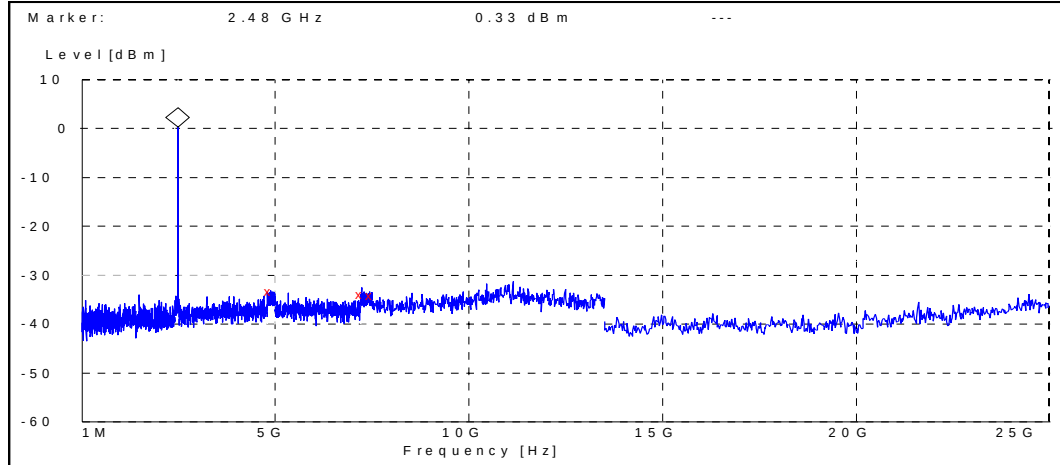
Frequency [MHz]	P [dBc]	Result
4888.800000	-33.754796	PASSED
5000.000000	-34.054796	PASSED
7463.400000	-33.354796	PASSED

Channel 40 / 2442 MHz



Frequency [MHz]	P [dBc]	Result
4823.200000	-34.592203	PASSED
7230.600000	-34.792203	PASSED
7500.000000	-33.792203	PASSED

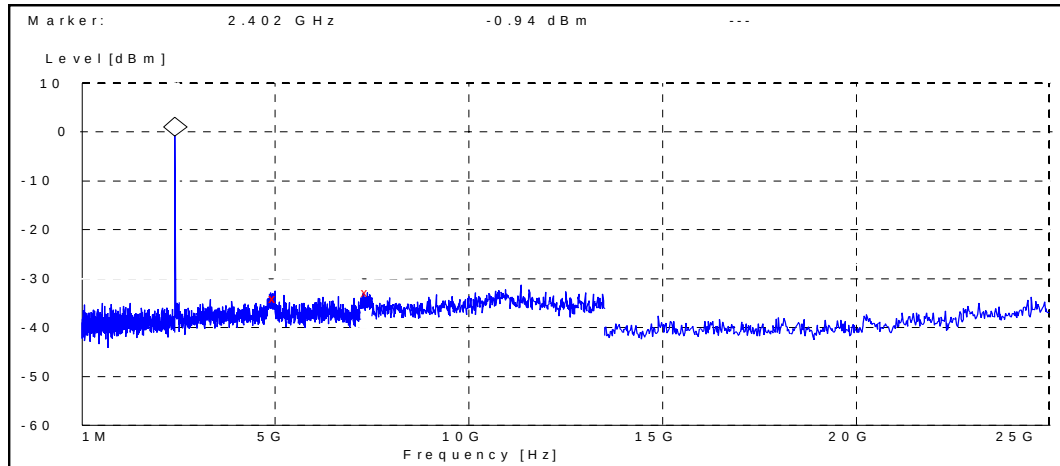
Channel 78 / 2480 MHz



Frequency [MHz]	P [dBc]	Result
4880.800000	-33.632640	PASSED
7233.600000	-34.232640	PASSED
7500.000000	-34.532640	PASSED

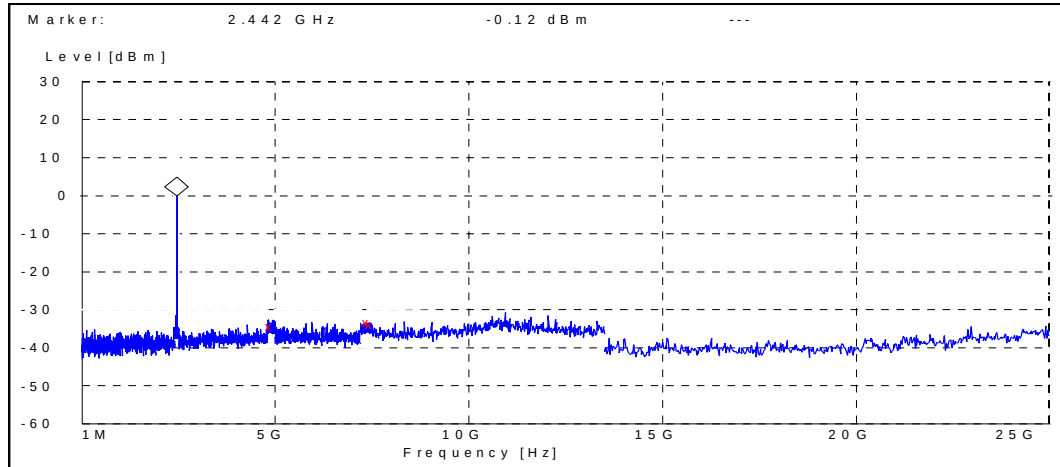
5.2.2 8DPSK modulation, PRBS packet type

Channel 0 / 2402 MHz



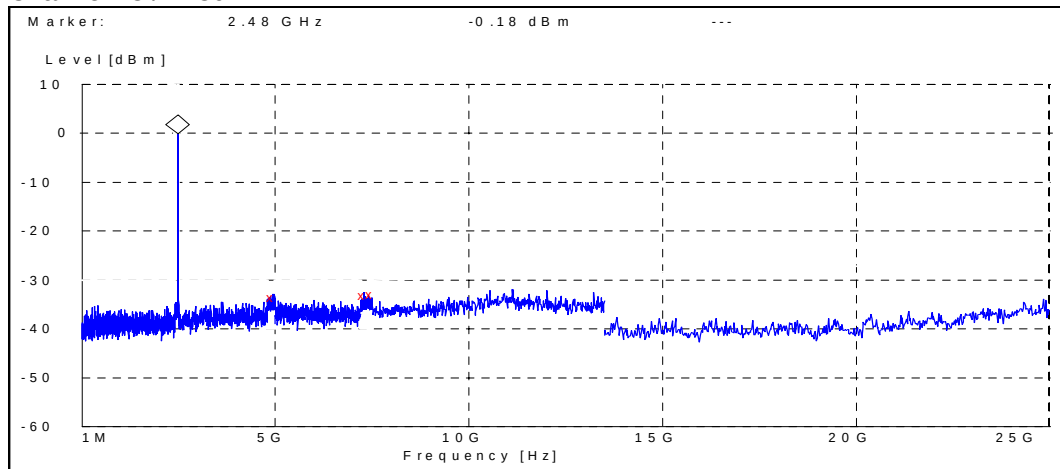
Frequency [MHz]	P [dBc]	Result
4992.400000	-4.000000	PASSED
5000.000000	-4.000000	PASSED
7379.400000	-2.900000	PASSED

Channel 40 / 2442 MHz



Frequency [MHz]	P [dBc]	Result
4923.200000	-34.283162	PASSED
7412.400000	-33.283162	PASSED
7500.000000	-33.883162	PASSED

Channel 78 / 2480 MHz



Frequency [MHz]	P [dBc]	Result
4929.600000	-33.323340	PASSED
7293.000000	-33.023340	PASSED
7500.000000	-32.823340	PASSED

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

EUT with DUT number	RM-217, DUT 11577
Accessories with DUT numbers	BL-4C, DUT 11578; HS-47, DUT 11590; AC-3E, DUT 11563
Operation Voltage [V] / [Hz]	115 / 60
Result	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	20 / 48 / 101.2
Date of measurements	10.11.2006 – 13.11.2006
Measured by	Sami Lehtonen

6.1. 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

6.2. Bluetooth Test results

6.2.1 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	44.00	158.49	43.30	0.70	HORIZONTAL	PASSED
7206.000000	45.60	190.55	42.70	2.90	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
4804.000000	31.50	37.58	30.80	0.70	HORIZONTAL	PASSED
7206.000000	32.90	44.16	30.00	2.90	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
37.976353	14.50	5.31	33.30	-18.80	VERTICAL	PASSED

Peak (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
4842.691383	45.20	181.97	43.90	1.30	VERTICAL	PASSED
7284.575150	46.20	204.17	43.10	3.10	HORIZONTAL	PASSED
7378.765531	46.40	208.93	42.60	3.80	HORIZONTAL	PASSED
12525.042084	51.60	380.19	41.00	10.60	HORIZONTAL	PASSED
14499.500000	52.60	426.58	38.20	14.40	HORIZONTAL	PASSED
15477.963928	52.80	436.52	36.10	16.70	VERTICAL	PASSED
15852.701403	55.30	582.10	37.30	18.00	VERTICAL	PASSED
16177.362725	55.80	616.60	37.20	18.60	HORIZONTAL	PASSED
17995.995992	56.00	630.96	36.70	19.30	HORIZONTAL	PASSED

Average (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
4843.191383	31.80	38.90	30.50	1.30	VERTICAL	PASSED
7288.575150	33.50	47.32	30.40	3.10	HORIZONTAL	PASSED
7383.265531	33.70	48.42	29.90	3.80	HORIZONTAL	PASSED
12523.042084	38.60	85.11	28.00	10.60	HORIZONTAL	PASSED
14497.500000	39.60	95.50	25.20	14.40	HORIZONTAL	PASSED
15484.463928	40.30	103.51	23.50	16.80	VERTICAL	PASSED
15853.701403	41.80	123.03	23.80	18.00	VERTICAL	PASSED
16179.862725	42.60	134.90	24.00	18.60	HORIZONTAL	PASSED
17999.995992	43.00	141.25	23.60	19.40	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	43.40	147.91	43.40	0.00	VERTICAL	PASSED
7440.000000	45.80	194.98	41.80	4.00	HORIZONTAL	PASSED

Average (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
4960.000000	30.90	35.08	30.90	0.00	VERTICAL	PASSED
7440.000000	33.10	45.19	29.10	4.00	VERTICAL	PASSED

6.2.2 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	44.30	164.06	43.60	0.70	VERTICAL	PASSED
7206.000000	45.50	188.36	42.60	2.90	HORIZONTAL	PASSED

Average (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
4804.000000	31.50	37.58	30.80	0.70	VERTICAL	PASSED
7206.000000	32.90	44.16	30.00	2.90	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
38.076353	21.20	11.48	40.00	-18.80	VERTICAL	PASSED

Peak (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
4842.687375	44.50	167.88	43.20	1.30	VERTICAL	PASSED
12489.971944	51.40	371.54	40.80	10.60	HORIZONTAL	PASSED
14499.997996	52.90	441.57	38.50	14.40	VERTICAL	PASSED
15457.921844	52.90	441.57	36.20	16.70	HORIZONTAL	PASSED
15876.253507	54.40	524.81	36.50	17.90	HORIZONTAL	PASSED
16199.392786	55.70	609.54	36.90	18.80	HORIZONTAL	PASSED
17909.813627	55.40	588.84	36.60	18.80	HORIZONTAL	PASSED

Average (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
4841.687375	31.80	38.90	30.50	1.30	VERTICAL	PASSED
12481.971944	38.60	85.11	28.00	10.60	HORIZONTAL	PASSED
14497.997996	39.60	95.50	25.20	14.40	VERTICAL	PASSED
15463.921844	39.80	97.72	23.10	16.70	HORIZONTAL	PASSED
15874.253507	41.50	118.85	23.60	17.90	HORIZONTAL	PASSED
16197.892786	42.30	130.32	23.50	18.80	HORIZONTAL	PASSED
17910.813627	42.70	136.46	23.80	18.90	HORIZONTAL	PASSED

Channel 78 / 2480 MHz

Peak (RBW: 1 MHz)

Frequency [MHz]	E [dB μ V/m]	E [μ V/m]	U _{RX} [dB μ V]	A _{TOT} [dB]	Polarisation	Result
4960.000000	43.20	144.54	43.20	0.00	VERTICAL	PASSED
7440.000000	46.30	206.54	42.30	4.00	HORIZONTAL	PASSED

Average (RBW: 1 MHz)

Frequency [MHz]	E [dB μ V/m]	E [μ V/m]	U _{RX} [dB μ V]	A _{TOT} [dB]	Polarisation	Result
4960.000000	30.80	34.67	30.80	0.00	VERTICAL	PASSED
7440.000000	33.00	44.67	29.00	4.00	HORIZONTAL	PASSED

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

EUT with DUT number	RM-217, DUT 11572
Accessories with DUT numbers	BL-4C, DUT 11522; HS-47, DUT 11575; AC-3E, DUT 11574
Operation Voltage [V] / [Hz]	115 / 60
Result	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	22 / 40 / 99
Date of measurements	10.11.2006
Measured by	Anni Manninen

7.1. 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.

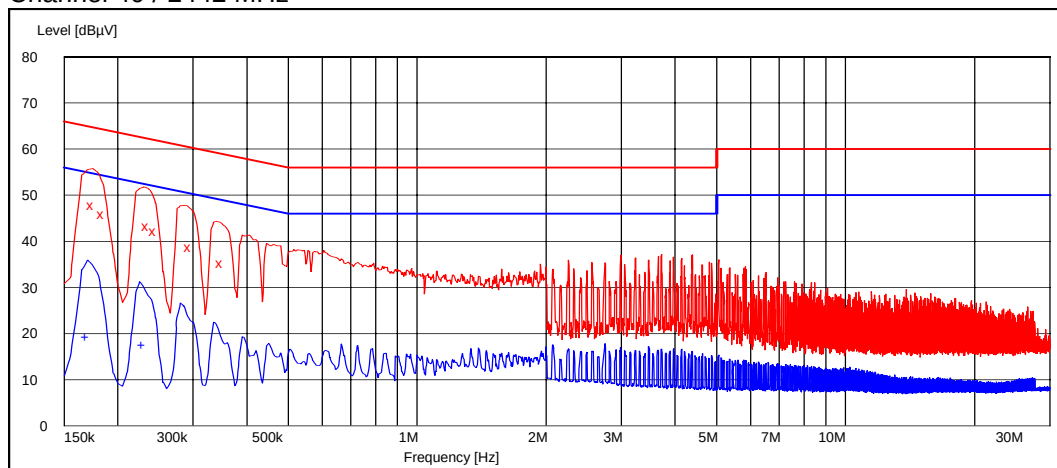
CISPR 22 Class B limits

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

7.2. Bluetooth Test results

7.2.1 GFSK modulation, PRBS packet type

Channel 40 / 2442 MHz



Quasi peak (RBW: 9 kHz)

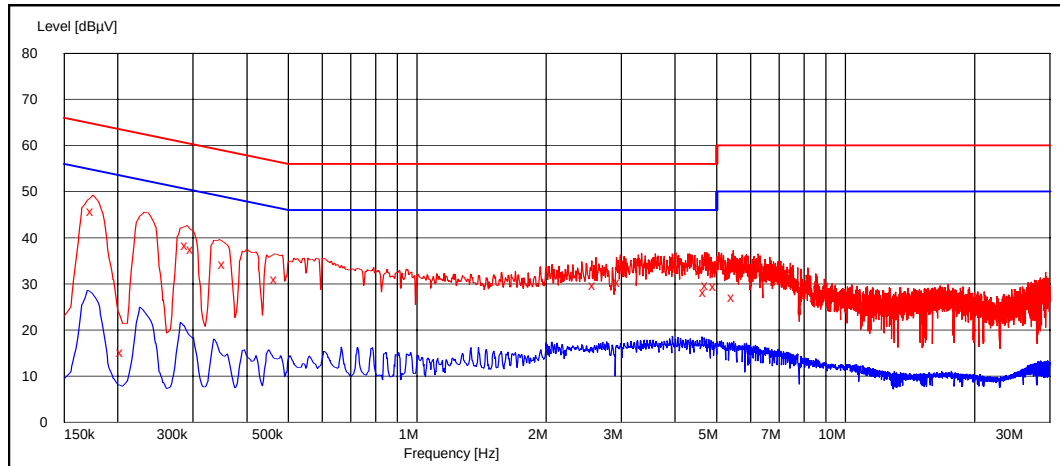
Frequency [MHz]	U [dBμV]	Line	Result
0.175000	47.80	N	PASSED
0.185000	45.90	L1	PASSED
0.235000	43.40	N	PASSED
0.245000	42.20	N	PASSED
0.295000	38.70	N	PASSED
0.350000	35.30	N	PASSED

Average (RBW: 9 kHz)

Frequency [MHz]	U [dBμV]	Line	Result
0.170000	19.30	L1	PASSED
0.230000	17.50	L1	PASSED

7.2.2 8DPSK modulation, PRBS packet type

Channel 40 / 2442 MHz



Quasi peak (RBW: 9 kHz)

Frequency [MHz]	U [dBμV]	Line	Result
0.175000	45.80	N	PASSED
0.205000	15.20	L1	PASSED
0.290000	38.50	N	PASSED
0.300000	37.50	N	PASSED
0.355000	34.30	N	PASSED
0.470000	31.00	N	PASSED
2.600000	29.80	N	PASSED
2.975000	30.40	N	PASSED
4.710000	28.30	N	PASSED
4.770000	29.80	L1	PASSED
4.980000	29.60	L1	PASSED
5.495000	27.20	L1	PASSED

8. 20 dB bandwidth (FCC §15.247(a)(1), RSS-210 A8.1 (1))

EUT with DUT number	RM-217, DUT 11573
Accessories with DUT numbers	BL-4C, DUT 11522; HS-47, DUT 11575; AC-3E, DUT 11574
Operation Voltage [V] / [Hz]	115 / 60
Result	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	22 / 39 / 100
Date of measurements	13.11.2006
Measured by	Anni Manninen

8.1. Test method and limit

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

Limits for 20 dB bandwidth measurements

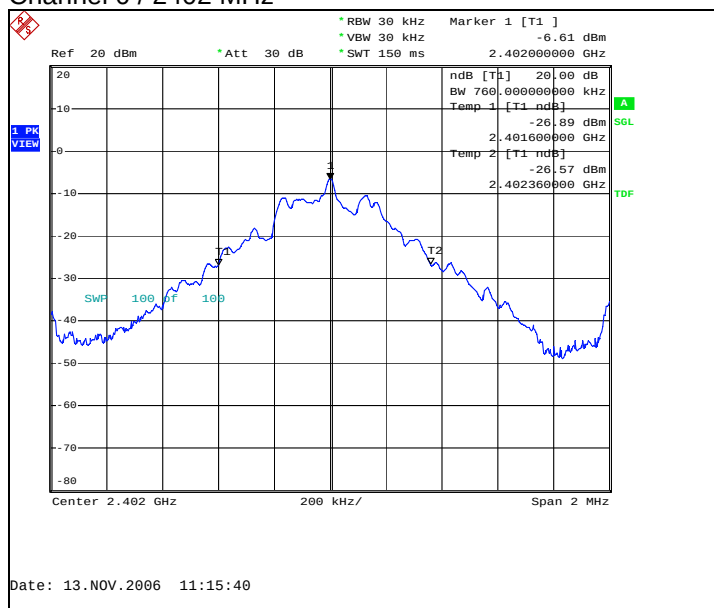
Limit [MHz]
N/A

8.2. Bluetooth Test results

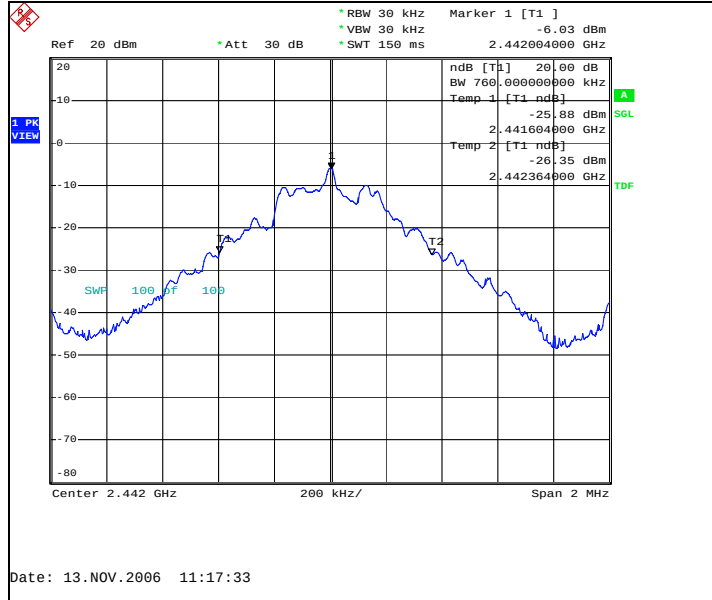
8.2.1 GFSK modulation, PRBS packet type

Channel / f _c [MHz]	20 dB bandwidth [kHz]	Result
0 / 2402	760.000	PASSED
40 / 2442	760.000	PASSED
78 / 2480	756.000	PASSED

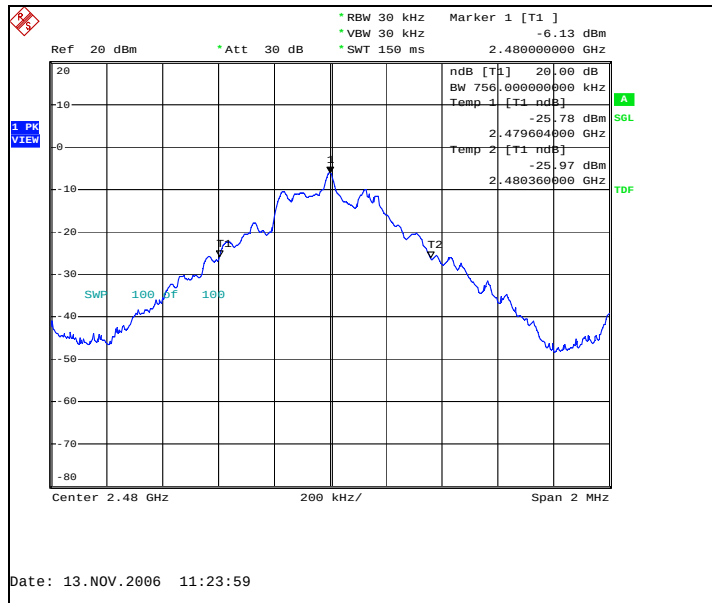
Channel 0 / 2402 MHz



Channel 40 / 2442 MHz



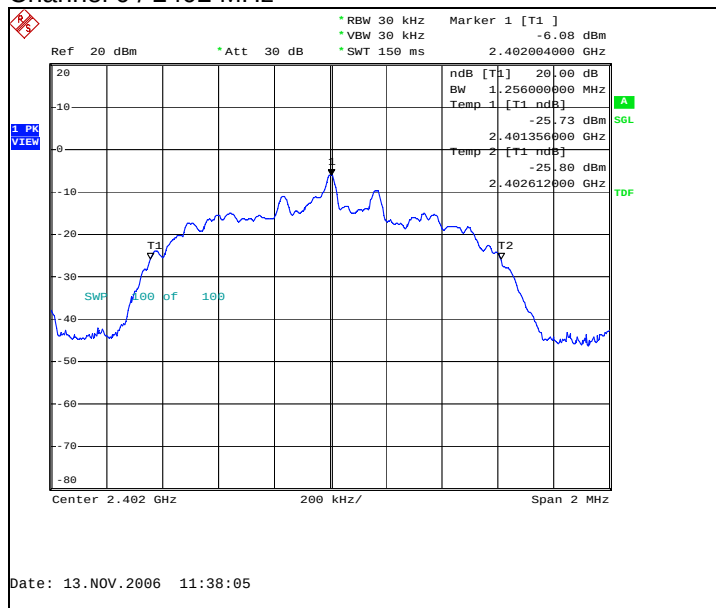
Channel 78 / 2480 MHz



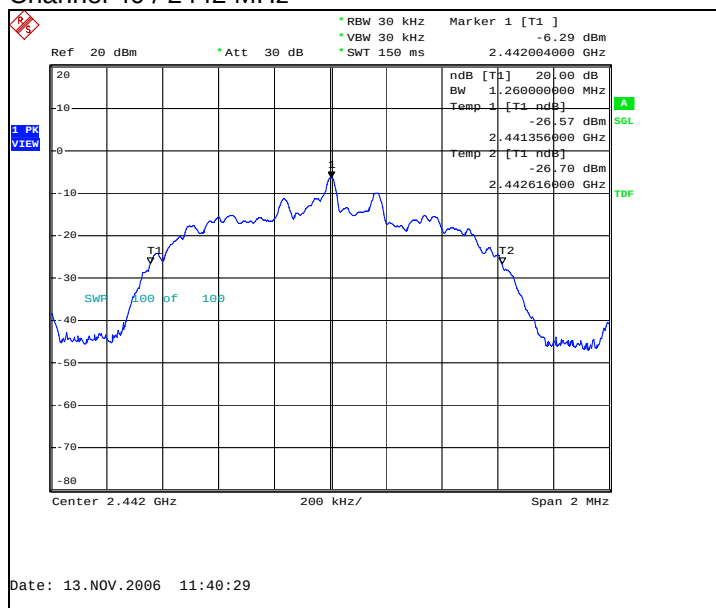
8.2.2 8DPSK modulation, PRBS packet type

Channel / f_c [MHz]	20 dB bandwidth [kHz]	Result
0 / 2402	1256.000	PASSED
40 / 2442	1260.000	PASSED
78 / 2480	1260.000	PASSED

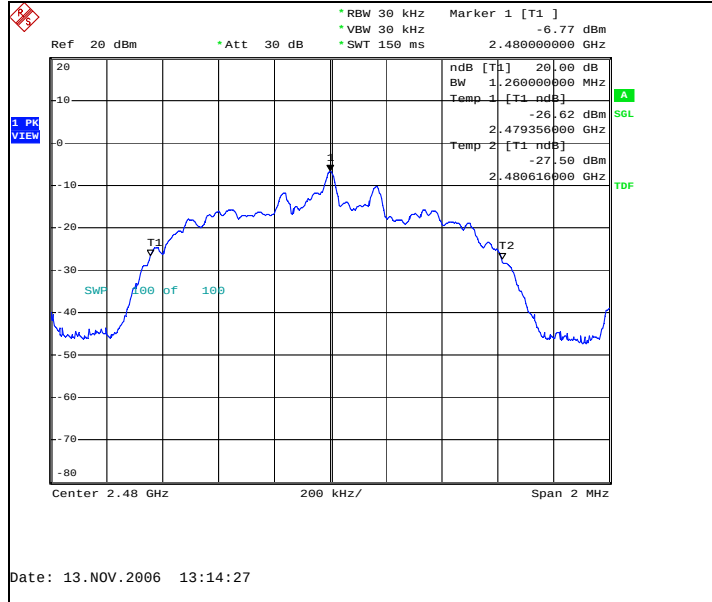
Channel 0 / 2402 MHz



Channel 40 / 2442 MHz



Channel 78 / 2480 MHz



9. Carrier frequency separation (FCC §15.247(a)(1), RSS-210 A8.1 (2))

EUT with DUT number	RM-217, DUT 11573
Accessories with DUT numbers	BL-4C, DUT 11522; HS-47, DUT 11575; AC-3E, DUT 11574
Operation Voltage [V] / [Hz]	115 / 60
Result	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	22 / 39 / 100
Date of measurements	13.11.2006
Measured by	Anni Manninen

9.1. Test method and limit

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

Limits for carrier frequency separation measurements

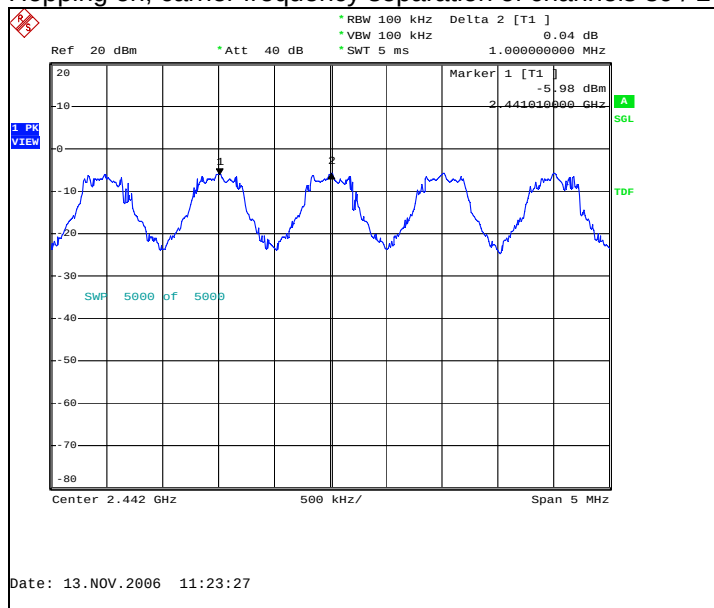
Limit [MHz]
≥ 0.025 or 2/3 of the 20 dB bandwidth

9.2. Bluetooth Test results

9.2.1 GFSK modulation, PRBS packet type

Carrier frequency separation [kHz]	Result
1000	PASSED

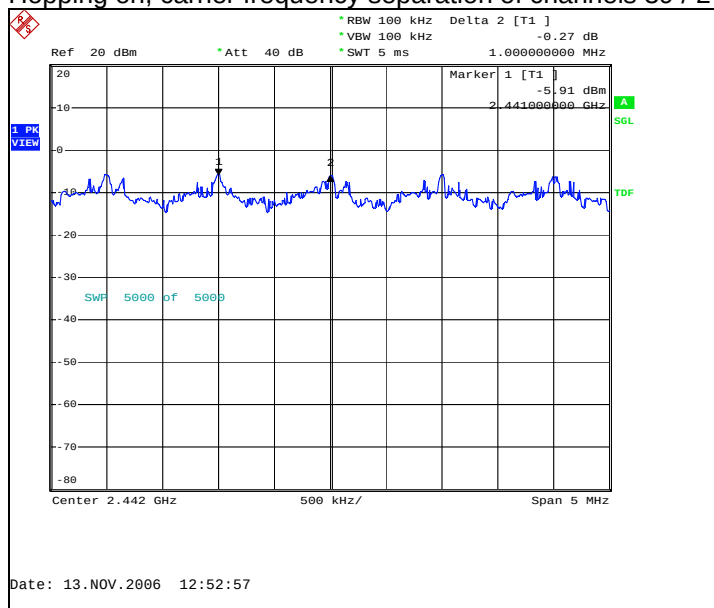
Hopping on, carrier frequency separation of channels 39 / 2441 MHz and 40 / 2442 MHz



9.2.2 8DPSK modulation, PRBS packet type

Carrier frequency separation [kHz]	Result
1000	PASSED

Hopping on, carrier frequency separation of channels 39 / 2441 MHz and 40 / 2442 MHz



10. Number of hopping frequencies (FCC §15.247(a)(1)(iii), RSS-210 A8.1 (4))

EUT with DUT number	RM-217, DUT 11573
Accessories with DUT numbers	BL-4C, DUT 11522; HS-47, DUT 11575; AC-3E, DUT 11574
Operation Voltage [V] / [Hz]	115 / 60
Result	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	22 / 39 / 100
Date of measurements	13.11.2006
Measured by	Anni Manninen

10.1. Test method and limit

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

Limits for number of hopping frequencies measurements

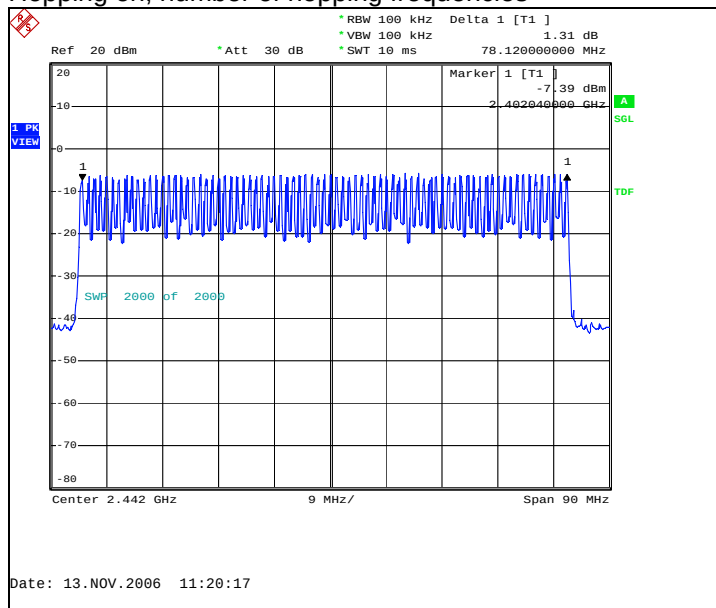
Limit [number]
≥ 15

10.2. Bluetooth Test results

10.2.1 GFSK modulation, PRBS packet type

Measured number of hopping frequencies	Result
79	PASSED

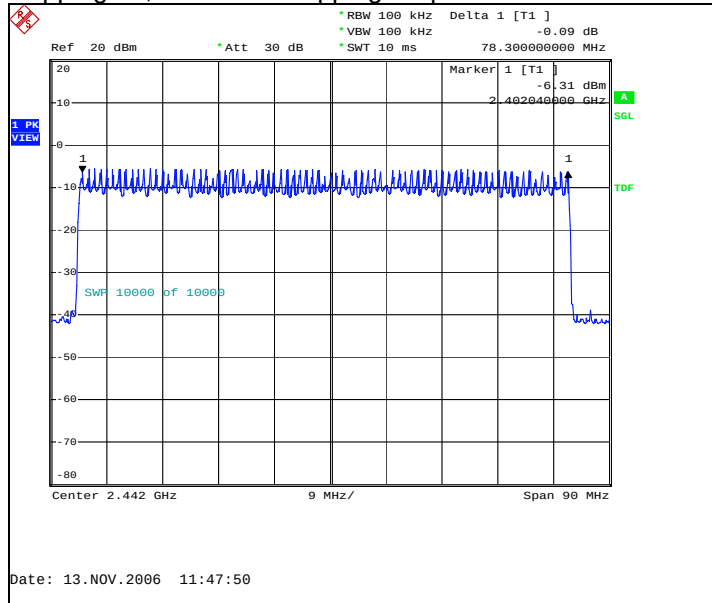
Hopping on, number of hopping frequencies



10.2.2 8DPSK modulation, PRBS packet type

Measured number of hopping frequencies	Result
79	PASSED

Hopping on, number of hopping frequencies



11. Time of occupancy (FCC §15.247(a)(1)(iii), RSS-210 A8.1 (4))

EUT with DUT number	RM-217, DUT 11573
Accessories with DUT numbers	BL-4C, DUT 11522; HS-47, DUT 11575; AC-3E, DUT 11574
Operation Voltage [V] / [Hz]	115 / 60
Result	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	22 / 39 / 100
Date of measurements	13.11.2006
Measured by	Anni Manninen

11.1. Test method and limit

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

The total time of occupancy is get by multiplying the measured number of transmissions occurred during 31.6 second period with the duration of one transmission.

Limits for time of occupancy measurements

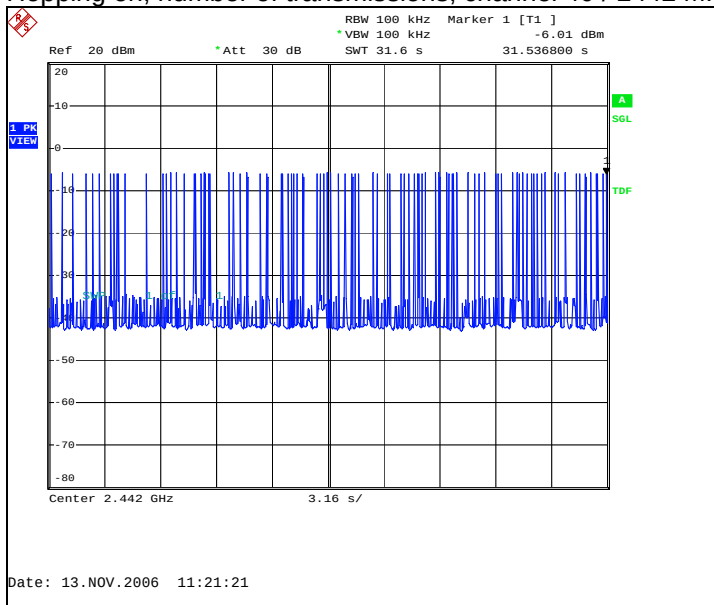
Limit [s]
≤ 0.4

11.2. Bluetooth test results

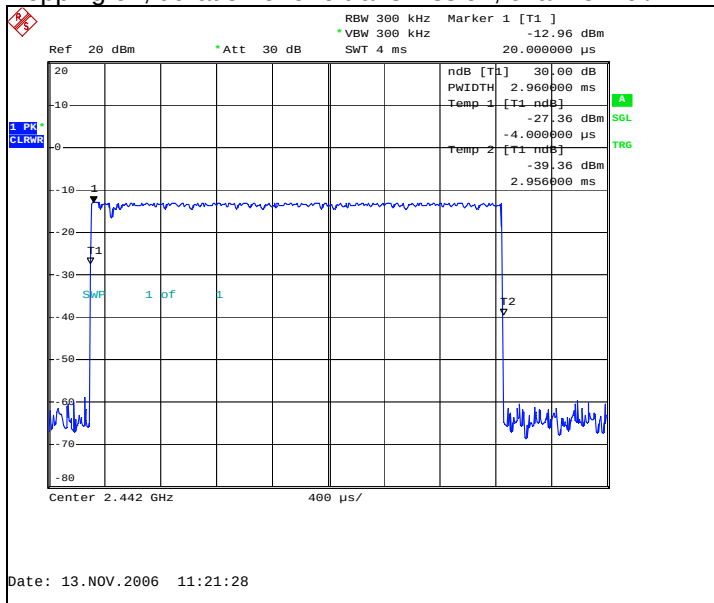
11.2.1 GFSK modulation, PRBS packet type

Measured number of transmissions	Duration of one transmission [μ s]	Time of occupancy [s]	Result
87.00	2960	0.257520	PASSED

Hopping on, number of transmissions, channel 40 / 2442 MHz



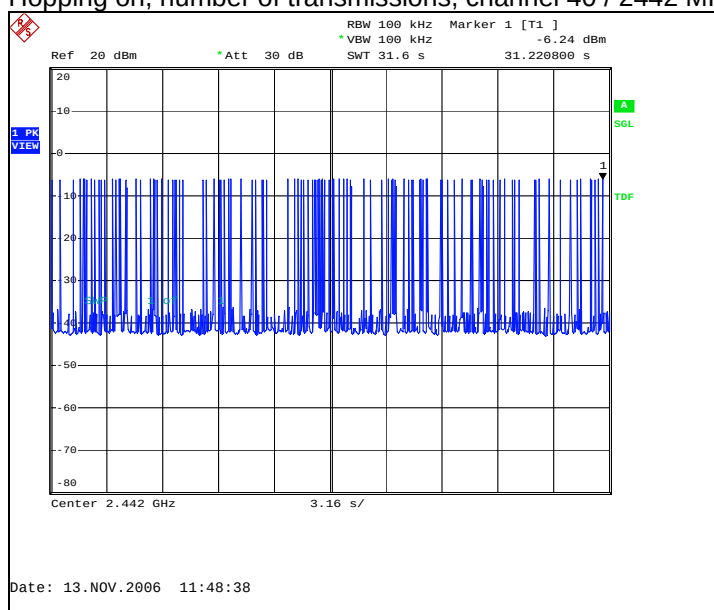
Hopping on, duration of one transmission, channel 40 / 2442 MHz



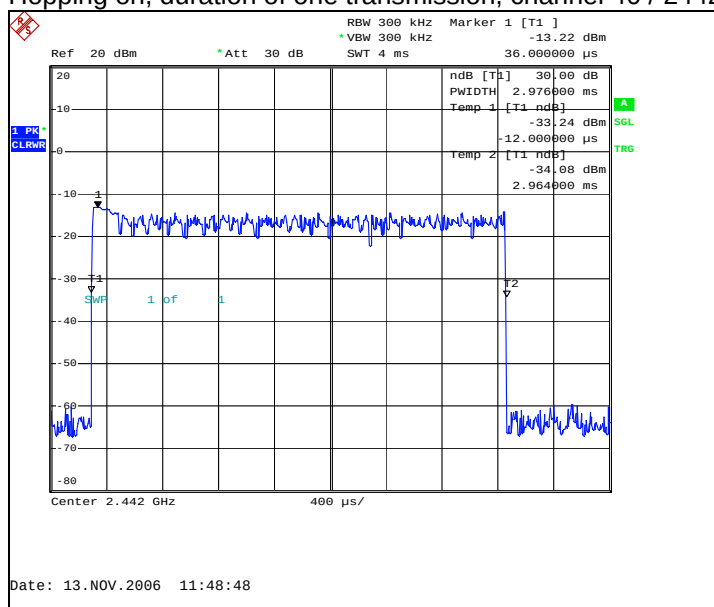
11.2.2 8DPSK modulation, PRBS packet type

Measured number of transmissions	Duration of one transmission [μ s]	Time of occupancy [s]	Result
94.00	2976	0.279744	PASSED

Hopping on, number of transmissions, channel 40 / 2442 MHz



Hopping on, duration of one transmission, channel 40 / 2442 MHz



12. Test Equipment

12.1. Conducted measurements

Eq. No	Equipment	Type	Manufacturer	Used in
1742	EMI Test Receiver	ESMI	R&S	15C, 15B
1759	LISN 50 µH	ESH3-Z5	R&S	15C, 15B
1872	Thermo- Hygrograph	00.02520.150700	Lambrecht	15C, 15B
1916	Radio Communication tester	CMTA84	R&S	15C, 15B
2039	Power Supply	PL330QMD	THURLBY	15C, 15B
2060	LISN 50 µH	ESH3-Z5	R&S	15C, 15B
2068	CDN-Antenna line	S1	NMP	15C, 15B
2097	Pulse Limiter	ESH3-Z2	R&S	15C, 15B
2111	Multimeter	TX3	Tektronix	15C, 15B
2156	Digital Radio Communication Tester	CMU200	R&S	15C, 15B
2206	Signal generator	SMX	R&S	15C, 15B
2335	GPIB Switch 2 to 1	-	National Instruments	15C, 15B
2347	Digital Radio Communication Tester	CMU200	R&S	22/24, 15C, 15B
2352	Spectrum Analyzer	FSP	R&S	22/24, 15C
2359	Temperature Test system	VT4002	Vötsch Industrietechnik	22/24
2360	Serial Bus Converter	Serial 488A	IO Tech	22/24
2362	Power Supply	NGPX 70/5	R&S	22/24
2388	Bluetooth Tester	CBT	R&S	15C, 15B
-	RF Emission Software	ES-K1 v.1.71	R&S	22/24, 15C, 15B

12.2. Radiated measurements

Eq. No	Equipment	Type	Manufacturer	Used in
1748	Log. per. Antenna	HL025	R&S	22/24, 15C
1749	Log. per. Antenna	HL025	R&S	22/24, 15C
1875	Thermo- Hygrograph	00.02520.150700	Lambrecht	22/24, 15C, 15B
1917	Radio Communication tester	CMTA84	R&S	22/24, 15C, 15B
1933	Precision half-wave dipole antennas	HZ-13	R&S	22/24, 15C
1938	Precision half-wave dipole antennas	HZ-12	R&S	22/24, 15C
2006	Radiation Reference Source	VSQ	MEB	22/24, 15C, 15B
2009	Signal generator	SMP 22	R&S	22/24, 15C, 15B
2019	Multimeter	34401A	HP	22/24, 15C, 15B
2027	Coupling and Decoupling Network	M2 (modified) DC1	MEB	22/24, 15C, 15B
2028	Coupling and Decoupling Network	M3 (modified) DC2	MEB	22/24, 15C, 15B
2029	Power Supply	PL330	THURLBY	22/24, 15C, 15B
2043	Band Reject Filter	WRCA824/849-0,2-6SS	Wainwright	22/24, 15C, 15B
2047	Band Reject Filter	WRCC1800/2000-0,2-10SS	Wainwright	22/24, 15C, 15B
2051	High Pass Filter	4HC1700-1-KK	R&S	22/24, 15C
2057	Log. per. Antenna	HL025	R&S	22/24, 15C

Eq. No	Equipment	Type	Manufacturer	Used in
2109	Power Supply	PL330QMD	THURLBY	22/24, 15C, 15B
2110	Multimeter	34401A	HP	22/24, 15C, 15B
2112	Multimeter	TX3	Tektronix	22/24, 15C, 15B
2116	Controller	EMCO MODEL 2090	ETS	22/24, 15C, 15B
2133	Power Meter	NRVS	R&S	22/24, 15C
2134	Power Sensor	NRV-Z32	R&S	22/24, 15C
2135	Coupling and Decoupling Network	CDN 801-M3	LÜTHI	22/24, 15C, 15B
2138	Ultra Broadband Antenna	HL562	R&S	22/24, 15C, 15B
2140	Biconical Antenna	EMCO93110B	EMCO	22/24, 15C
2142	Log.-per.-dipol Antenna	3146	EMCO	22/24, 15C
2144	Attenuator	6803.17B	Huber-Suhner	22/24, 15C, 15B
2150	High Pass Filter	F-15041	RLC ELECTRONICS	22/24, 15C
2176	Coupling and Decoupling Network	CDN 801-M3	LÜTHI	22/24, 15C, 15B
2180	Digital Radio Communication Tester	CMU200	R&S	22/24, 15C, 15B
2188	Preamplifier	AFS4-00100300-20-23P-6	MITEQ	22/24, 15C, 15B
2330	EMI Test receiver	ESIB26	R&S	22/24, 15C, 15B
2334	GPIO Switch 2 to 1	-	National Instruments	22/24, 15C, 15B
2348	Yaesu controller	G-1000DXC	YAESU	22/24, 15C, 15B
2349	Computer controller (Yaesu)	GS-232B	YAESU	22/24, 15C, 15B
2350	Preamplifier	AMF-6D-020180-29-20P	MITEQ	22/24, 15C
2361	Anechoic chamber	3 meter semi/full anechoic chamber	Euroshield	22/24, 15C, 15B
2398	Horn antenna	HF906	R&S	22/24, 15C
2363	Band Reject Filter	WRCG 832/838-825/845/5SS	Wainwright	22/24
2364	Band Reject Filter	WRCG1877/1883 - 1870/1890-40/6SS	Wainwright	22/24
2365	Relay Switch Unit	TS-RSP	R&S	22/24, 15C, 15B
2366	Relay Switch Unit	TS-RSP	R&S	22/24, 15C, 15B
2384	Band Reject Filter	WRCG832/838-825/845-40/5SS	Wainwright	22/24
2388	Bluetooth Tester	CBT	R&S	15C, 15B
-	RF Emission Software	ES-K1 v.1.71	R&S	22/24, 15C, 15B