

FCC Part 15C Compliance Test Report

Test Report no.:	FCC15C_RX-51_45.doc	Date of Report:	12-May-2010
Number of pages:	40	Customer's Contact person:	Tuomo Pursiheimo
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 50 Elektroniikkatie 10 FIN-90571 OULU, FINLAND Tel. +358 (0) 7180 08000 Fax. +358 (0) 7180 47222
FCC listing no.:	533467		
IC recognition no.:	661V-1		
Tested devices/ accessories:	Phone RX-51, Battery BL-5J, AC-Charger AC-10E, Headset WH-205		
FCC ID:	LJPRX-51X	IC:	661E-RX51
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 (Issue 2, June 2007) and 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	08-Jun-2009
Testing completed	14-Jul-2009
The customer's contact person	Tuomo Pursiheimo
Test Plan referred to	T:\Projects\RX-51\TestPlan_RS\RS_testplan_RX-51.xls
Notes	-
Document name	FCC15C_RX-51_45.doc

1.1. EUT and Accessory Information

The EUT is a 7-band (GSM850/900/1800/1900 and WCDMA Band I/IV(1700)/VIII) mobile phone with GPRS, EGPRS, Bluetooth, WLAN and FM transmitter. Bluetooth and WLAN are tested with maximum rated TX power.

Product	Type	SN	HW	MV	SW	DUT
Phone	RX-51	004401107150423	2001	-		13970
Battery	BL-5J	4620409094J1010003260670573	-	-	-	13967
Charger	AC-10E	399791836609050330860675408	-	-	-	13924
Headset	WH-205	06944219175C1R02518	-	-	-	13925
Phone	RX-51	004401107150605	2001	-	1.2009.22-15	13966
Phone	RX-51	004401107150431	2001	-	1.2009.22-15	13894
Battery	BL-5J	4620409094J1010002560670573	-	-	-	13912
Charger	AC-10E	3997918112240401179;0675408	-	-	-	12916
Headset	WH-205	31	A31	3.1	-	13929

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

WLAN:

Section in CFR 47	Section in RSS-GEN or RSS-210	Name of the test	Result
15.247(b)(1)	A8.4 (4)	Conducted peak output power	NP
15.247(d)	A8.5	Band edge compliance of RF emissions	NP
15.247(d)	A8.5	Spurious RF conducted emissions	NP
15.247(d), 15.209	A8.5	Spurious radiated emissions	NP
15.207	7.2.2	AC powerline conducted emissions	NP
15.247(a)(2)	A8.2 (a)	6 dB bandwidth	NP
15.247(e)	A8.2 (b)	Power spectral density	NP

FM TX:

Section in CFR 47	Section in RSS-210	Name of the test	Result
15.239(a)	A2.8	Field strength of the fundamental signal	NP
15.239(c)	A2.8	Spurious radiated emissions	NP
15.207	6.6	AC powerline conducted emissions	NP
15.239(a)	A2.8	26 dB bandwidth	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 Salo Laboratory.

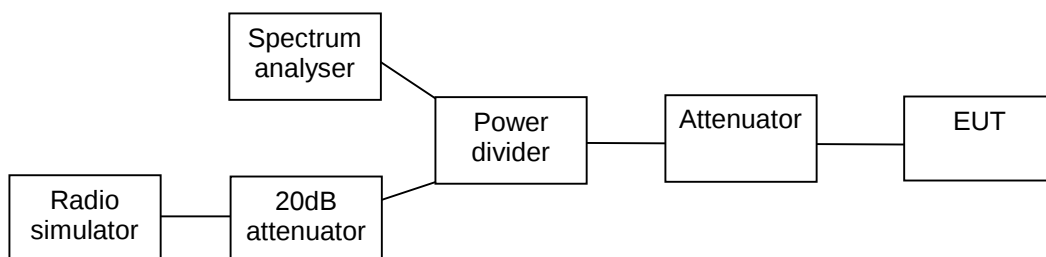
CONTENTS

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. Radiated 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(d), 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(d), RSS-A8.5).....	15
5.1. Test method and limit.....	15
5.2. Bluetooth Test results	16
6. Spurious radiated emissions (FCC §15.247(d), §15.209, RSS-210 A8.5).....	19
6.1. Test method and limit.....	19
6.2. Bluetooth Test results	20
7. AC powerline conducted emissions (FCC §15.207, RSS-GEN 7.2.2)	23
7.1. Test method and limit.....	23
7.2. Bluetooth Test results	24
8. 20 dB bandwidth (FCC §15.247(a)(1), RSS-210 A8.1 (a))	26
8.1. Test method and limit.....	26
8.2. Bluetooth Test results	27
9. Carrier frequency separation (FCC §15.247(a)(1), RSS-210 A8.1 (b)).....	30
9.1. Test method and limit.....	30
9.2. Bluetooth Test results	31
10. Number of hopping frequencies (FCC §15.247(a)(1)(iii), RSS-210 A8.1 (d)).....	33
10.1. Test method and limit.....	33
10.2. Bluetooth Test results	34
11. Time of occupancy (FCC §15.247(a)(1)(iii), RSS-210 A8.1 (d))	36
11.1. Test method and limit.....	36
11.2. Bluetooth test results.....	37

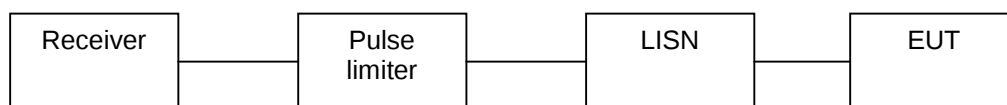
12.	Test Equipment	39
12.1.	Conducted measurements	39
12.2.	Radiated measurements	39

2. Test setups

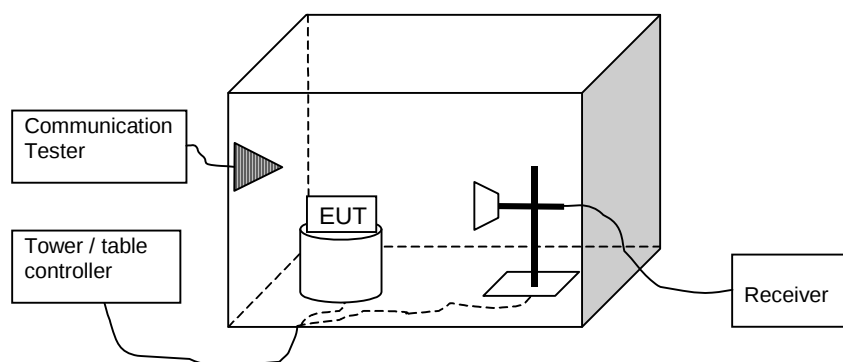
2.1. Conducted RF test setup



2.2. AC powerline conducted emissions test setup



2.3. Radiated test setup



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

EUT with DUT number	RX-51, DUT, 13966
Accessories with DUT numbers	BL-5J, DUT 13967; AC-10E, DUT 13924; WH-205, DUT 13925
Operation Voltage [V] / [Hz]	115 / 60
Result	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	23,2 / 41,1 / 102
Date of measurements	25-Jun-2009
Measured by	Sami Lehtonen / Jouko Kaivonen

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

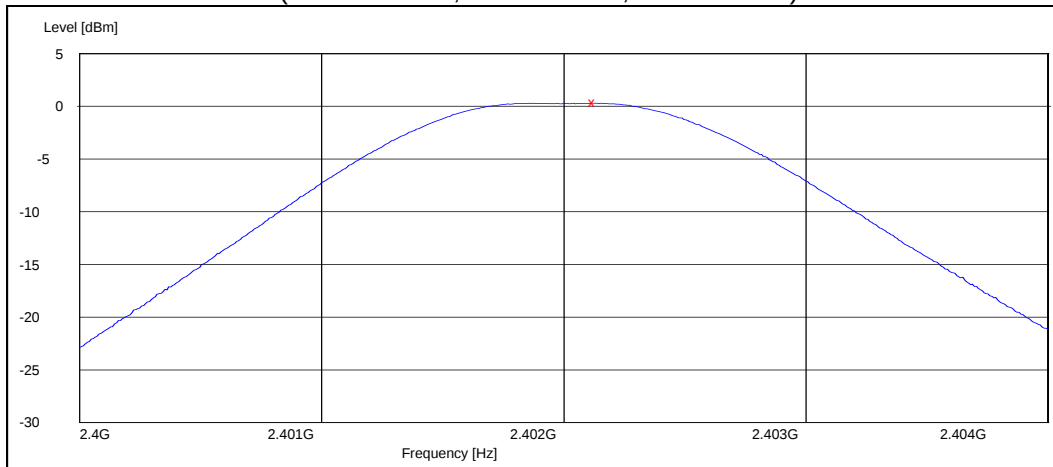
Frequency range [MHz]	Limit [W]	Limit [dBm]
2400 – 2483.5	≤ 1	≤ 30

3.2. Bluetooth Test results

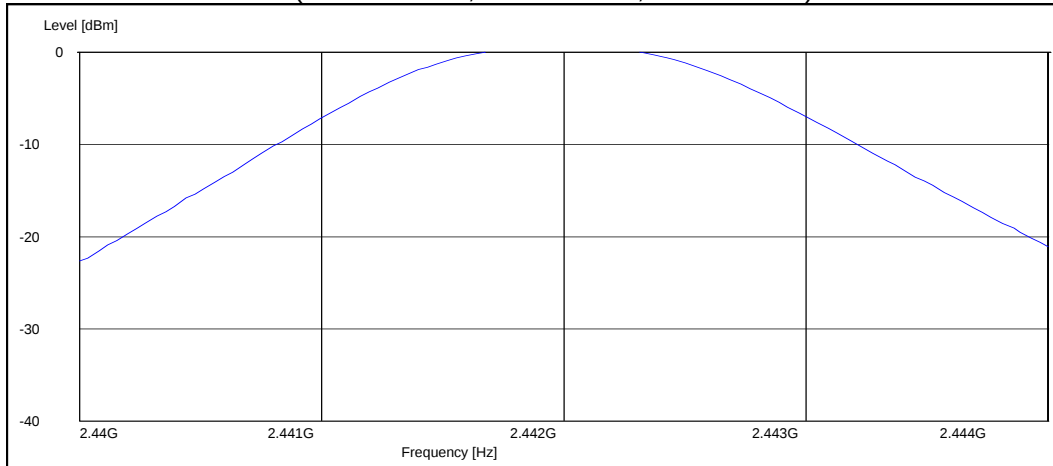
3.2.1 GFSK modulation, PRBS packet type

Channel / f_c [MHz]	P [dBm]	P [mW]	Result
0 / 2402	0.40	1.096	PASSED
40 / 2442	0.50	1.122	PASSED
78 / 2480	0.20	1.047	PASSED

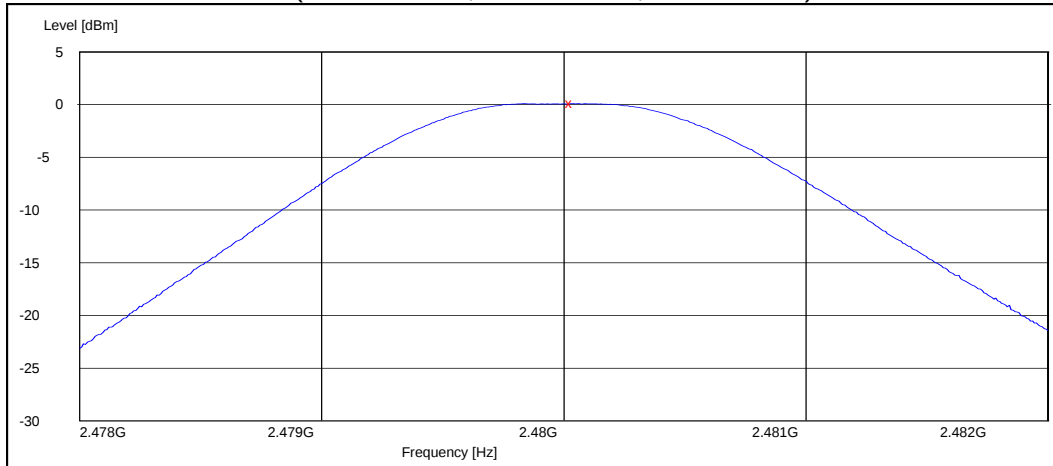
Channel 0 / 2402 MHz (Peak detector, RBW: 1 MHz, VBW: 3 MHz)



Channel 40 / 2442 MHz (Peak detector, RBW: 1 MHz, VBW: 3 MHz)



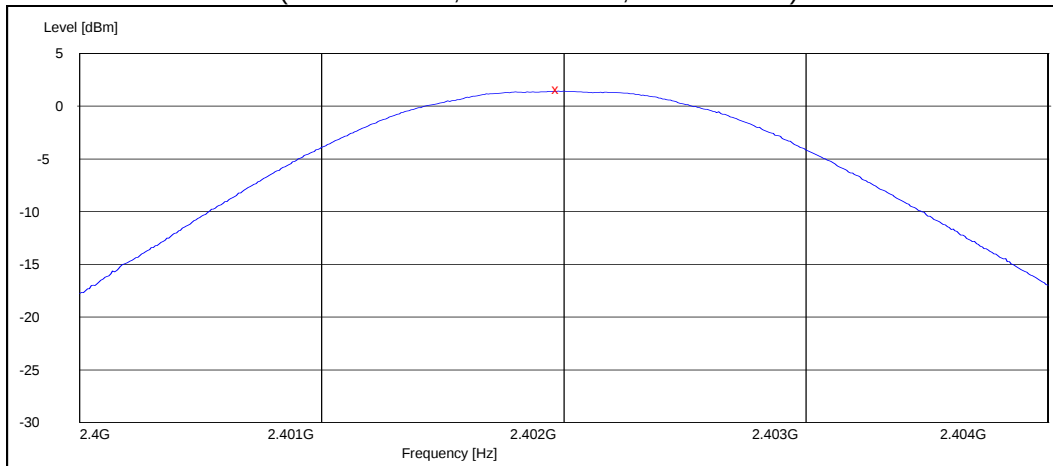
Channel 78 / 2480 MHz (Peak detector, RBW: 1 MHz, VBW: 3 MHz)



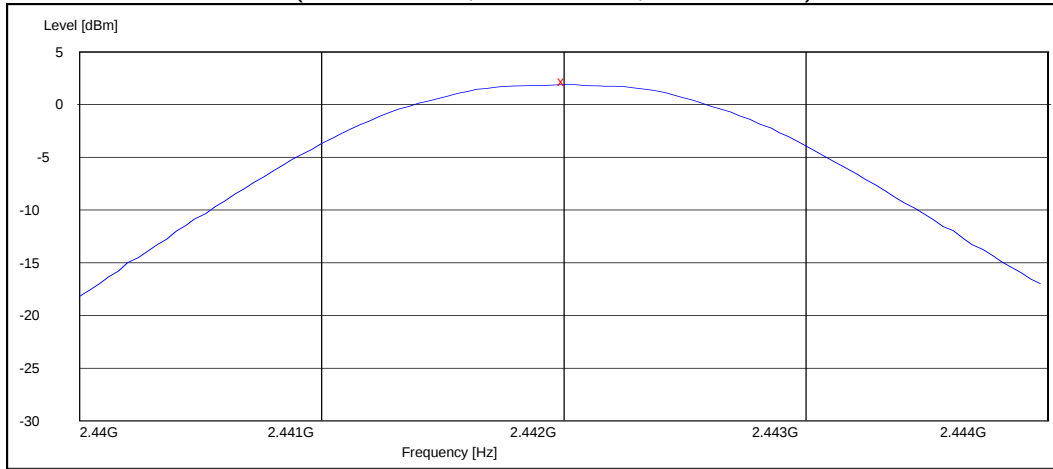
3.2.2 8DPSK modulation, PRBS packet type

Channel / f_c [MHz]	P [dBm]	P [mW]	Result
0 / 2402	1.60	1.445	PASSED
40 / 2442	2.20	1.660	PASSED
78 / 2480	2.00	1.585	PASSED

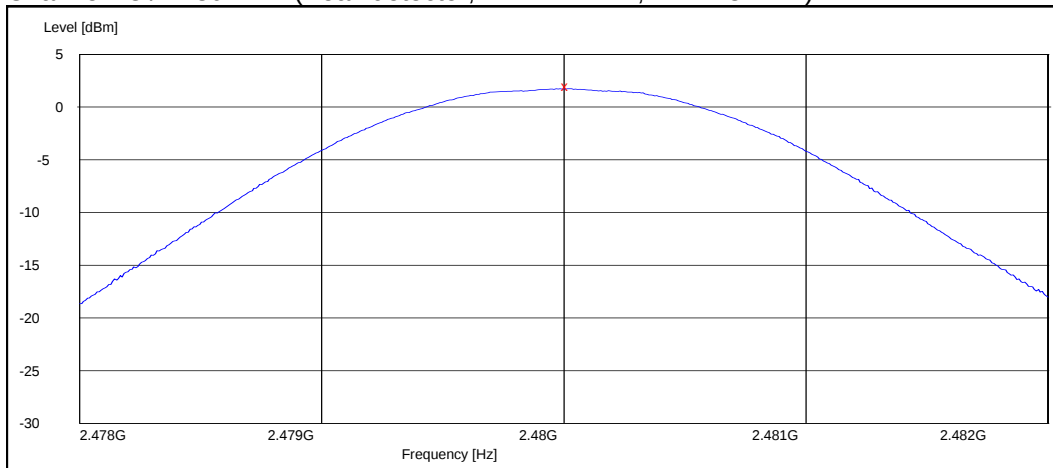
Channel 0 / 2402 MHz (Peak detector, RBW: 1 MHz, VBW: 3 MHz)



Channel 40 / 2442 MHz (Peak detector, RBW: 1 MHz, VBW: 3 MHz)



Channel 78 / 2480 MHz (Peak detector, RBW: 1 MHz, VBW: 3 MHz)



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

EUT with DUT number	RX-51, DUT 13894
Accessories with DUT numbers	BL-5J, DUT 13912; WH-205, DUT 13929; AC-10E, DUT 12916
Operation Voltage [V] / [Hz]	115 / 60
Result	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	21 / 42 / 101.6
Date of measurements	08-Jul-2009 – 10-Jul-2009
Measured by	Kalle Hannila / Sami Lehtonen

4.1. Test method and limit

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

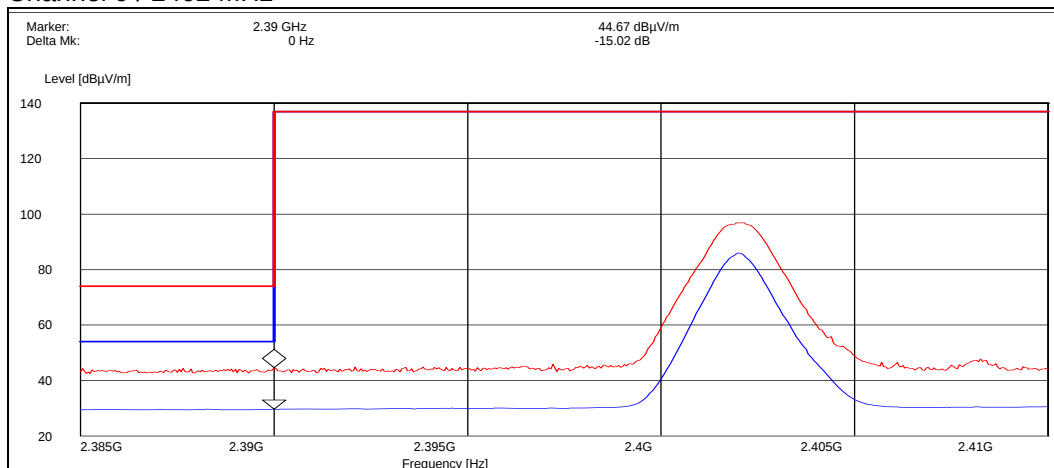
Limits for band edge compliance of RF emissions measurements (3 m measurement distance)

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

4.2. Bluetooth Test results

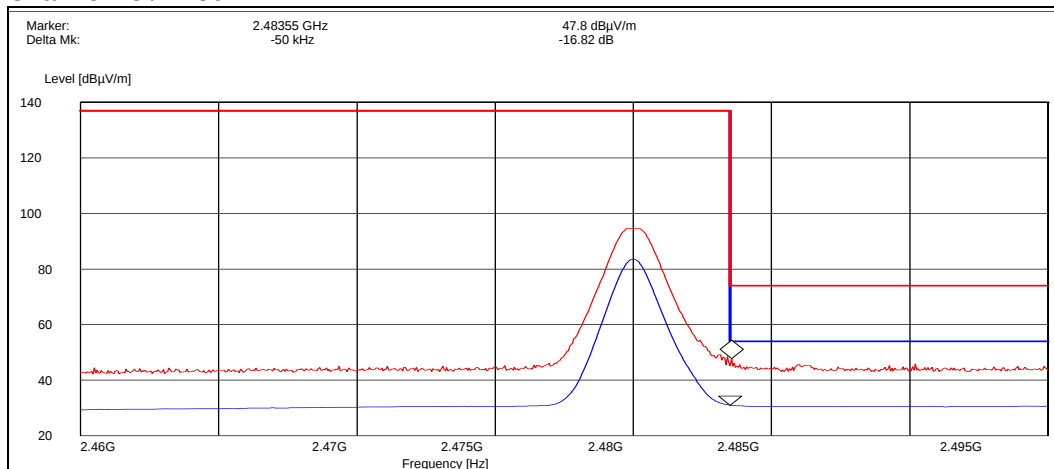
4.2.1 GFSK modulation, PRBS packet type

Channel 0 / 2402 MHz



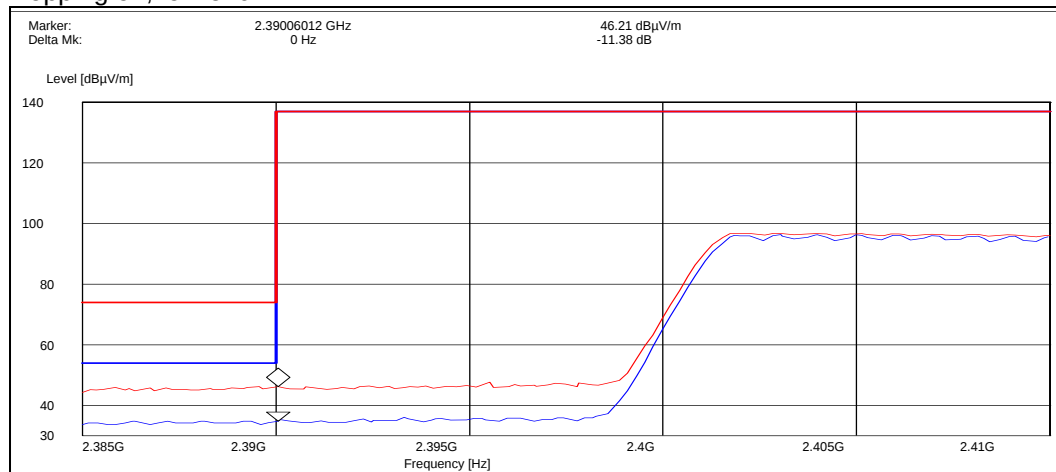
Detector (RBW: 1 MHz)	E [dBμV/m]	Result
Peak	44.70	PASSED
Average	29.70	PASSED

Channel 78 / 2480 MHz



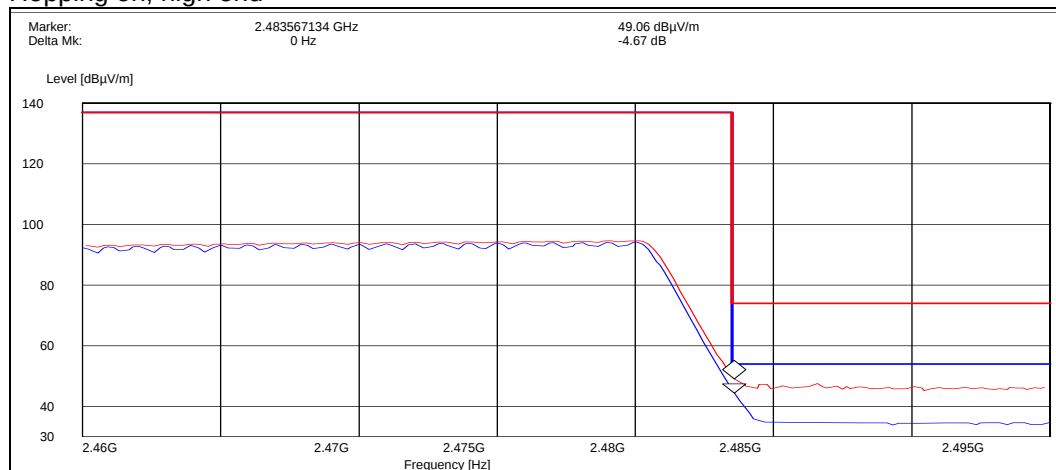
Detector (RBW: 1 MHz)	E [dBμV/m]	Result
Peak	47.80	PASSED
Average	31.00	PASSED

Hopping on, low end



Detector (RBW: 1 MHz)	E [dB μ V/m]	Result
Peak	46.20	PASSED
Average	34.80	PASSED

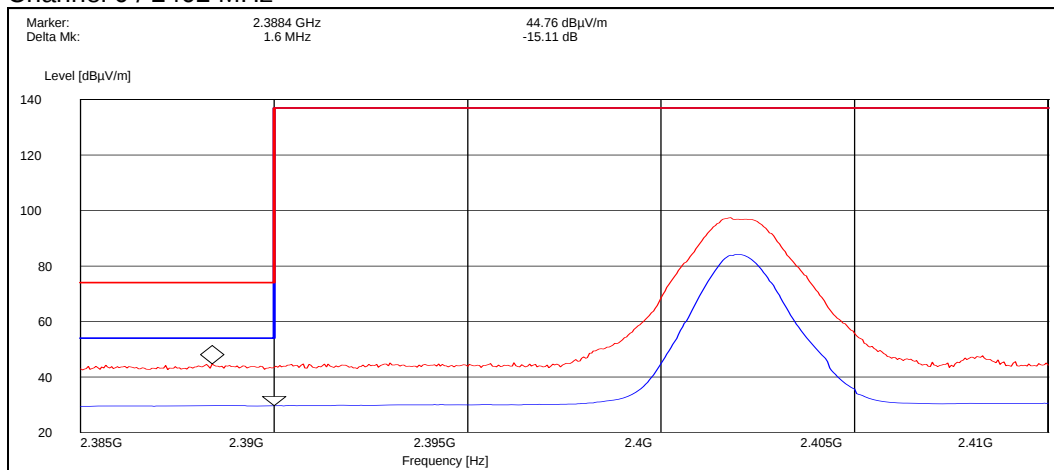
Hopping on, high end



Detector (RBW: 1 MHz)	E [dB μ V/m]	Result
Peak	49.10	PASSED
Average	44.40	PASSED

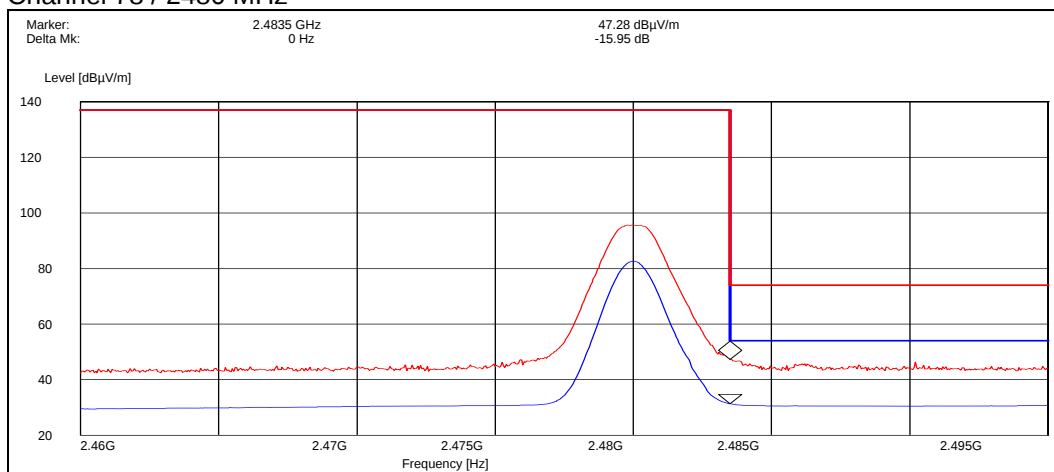
4.2.2 8DPSK modulation, PRBS packet type

Channel 0 / 2402 MHz



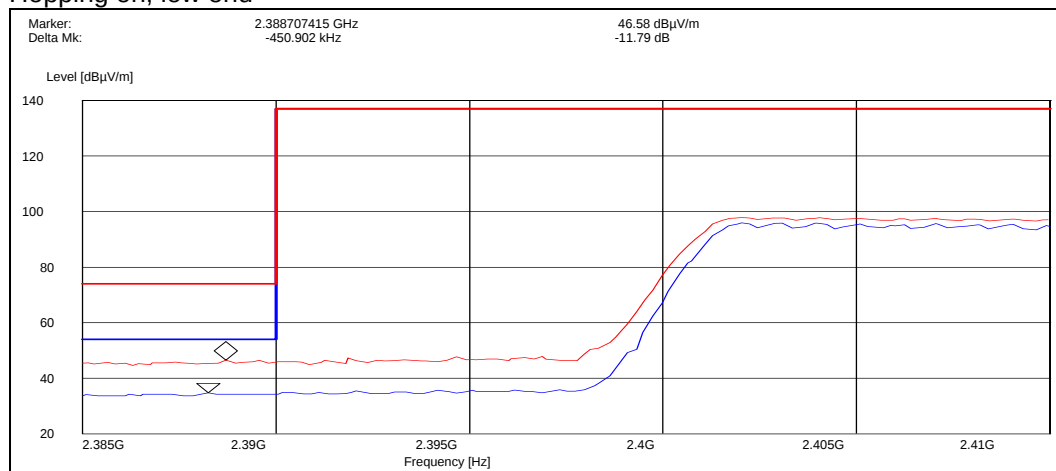
Detector (RBW: 1 MHz)	E [dBμV/m]	Result
Peak	44.80	PASSED
Average	29.70	PASSED

Channel 78 / 2480 MHz



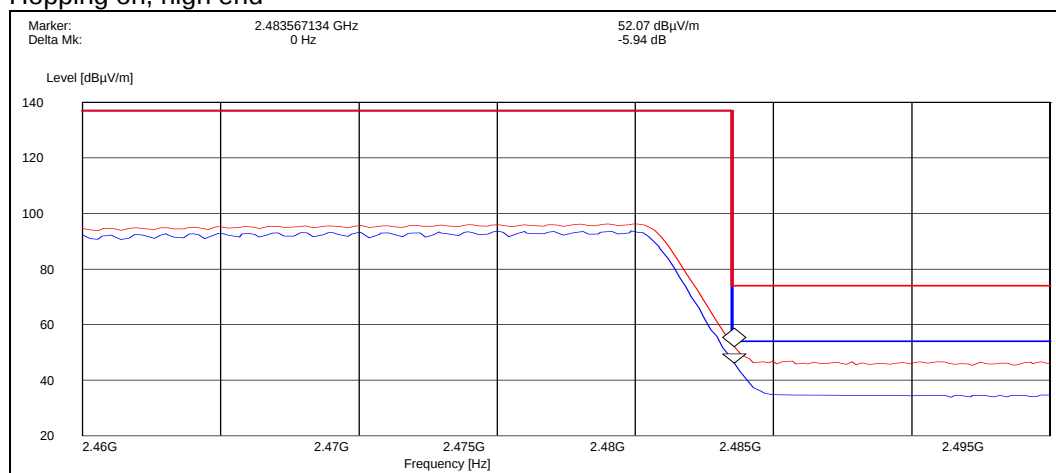
Detector (RBW: 1 MHz)	E [dBμV/m]	Result
Peak	47.30	PASSED
Average	31.30	PASSED

Hopping on, low end



Detector (RBW: 1 MHz)	E [dB μ V/m]	Result
Peak	46.60	PASSED
Average	34.80	PASSED

Hopping on, high end



Detector (RBW: 1 MHz)	E [dB μ V/m]	Result
Peak	52.10	PASSED
Average	46.10	PASSED

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

EUT with DUT number	RX-51, DUT 13966
Accessories with DUT numbers	BL-5J, DUT 13967; AC-10E, DUT 13924; WH-205, DUT 13925
Operation Voltage [V] / [Hz]	115 / 60
Result	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	23,2 / 41,1 / 102
Date of measurements	25-Jun-2009
Measured by	Sami Lehtonen / Jouko Kaivonen

5.1. Test method and limit

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

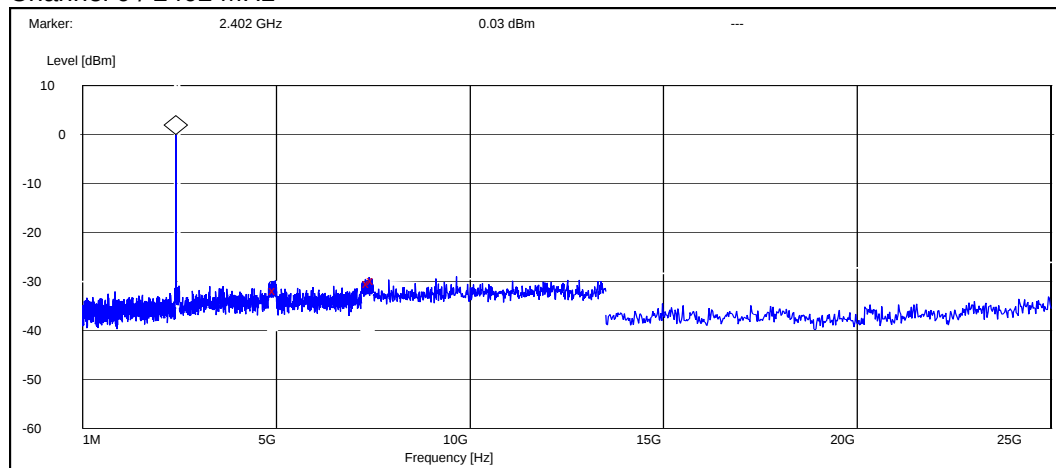
Limits for spurious RF conducted emissions measurements

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

5.2. Bluetooth Test results

5.2.1 GFSK modulation, PRBS packet type

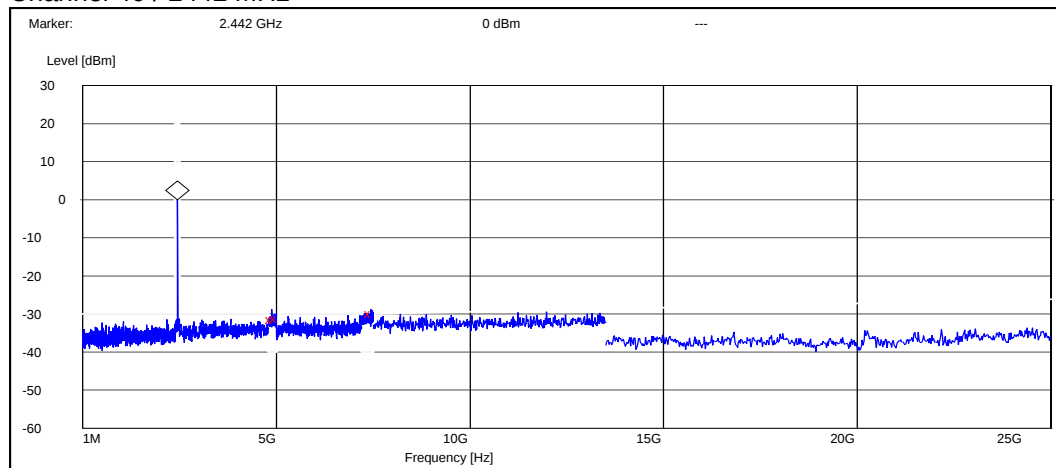
Channel 0 / 2402 MHz



Peak (RBW: 100 kHz, VBW: 100 kHz)

Frequency [MHz]	P [dBc]	Result
4976.000000	-31.831267	PASSED
7390.200000	-30.331267	PASSED
7500.000000	-29.831267	PASSED

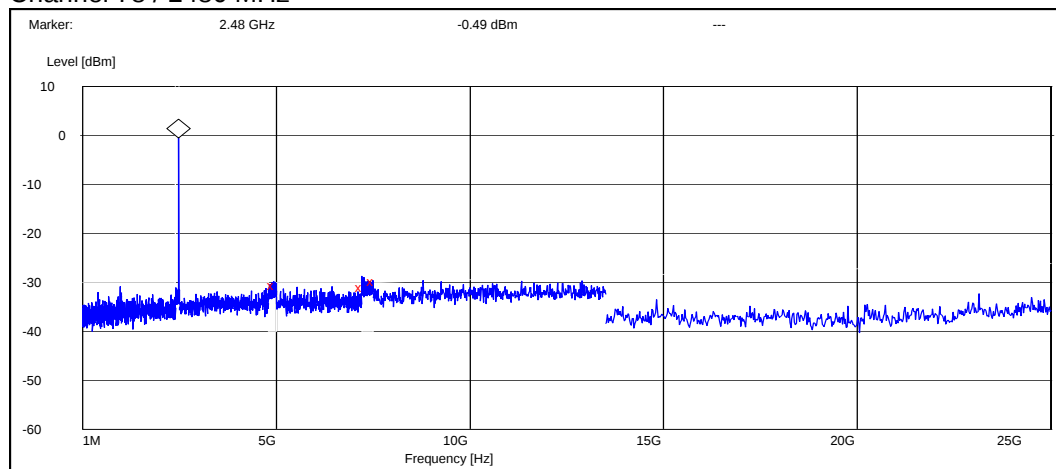
Channel 40 / 2442 MHz



Peak (RBW: 100 kHz, VBW: 100 kHz)

Frequency [MHz]	P [dBc]	Result
4884.400000	-31.296750	PASSED
5000.000000	-31.096750	PASSED
7442.400000	-29.896750	PASSED

Channel 78 / 2480 MHz

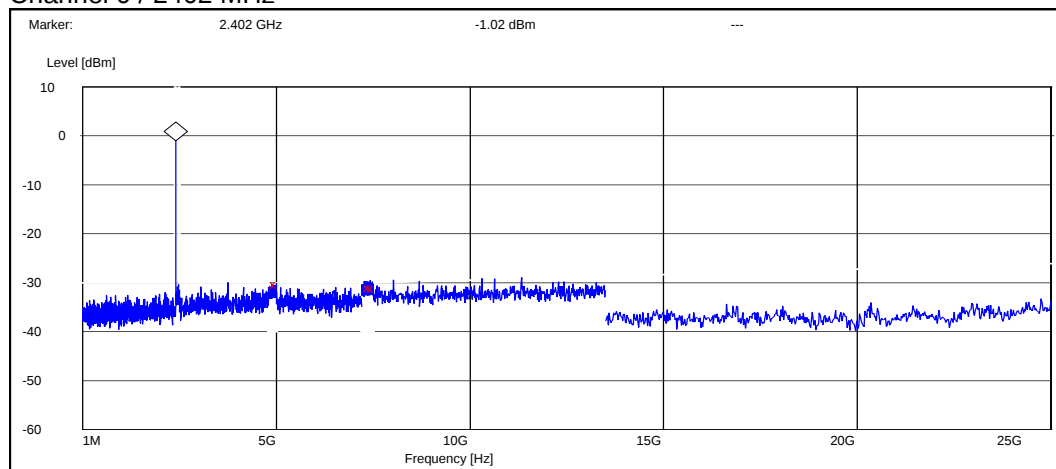


Peak (RBW: 100 kHz, VBW: 100 kHz)

Frequency [MHz]	P [dBc]	Result
4931.200000	-30.108649	PASSED
7201.200000	-30.508649	PASSED
7500.000000	-29.308649	PASSED

5.2.2 8DPSK modulation, PRBS packet type

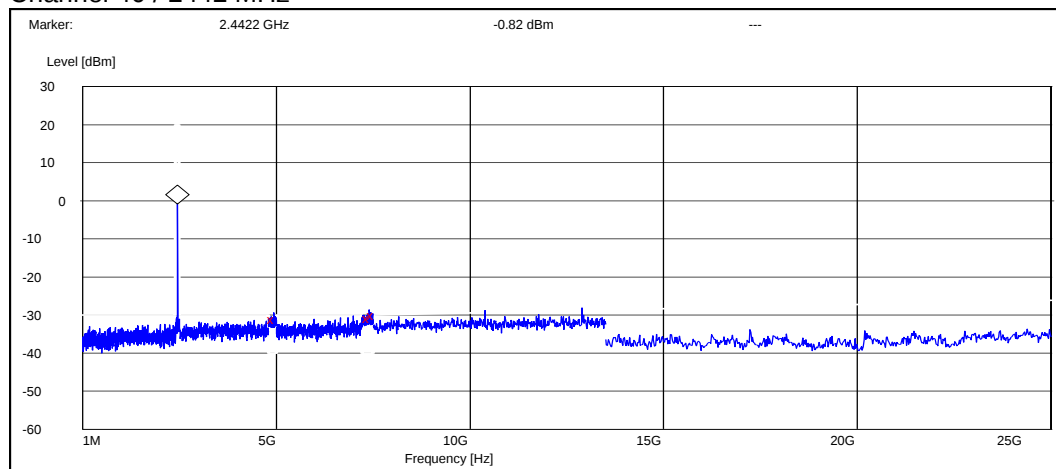
Channel 0 / 2402 MHz



Peak (RBW: 100 kHz, VBW: 100 kHz)

Frequency [MHz]	P [dBc]	Result
5000.000000	-29.277090	PASSED
7416.600000	-29.877090	PASSED
7500.000000	-30.077090	PASSED

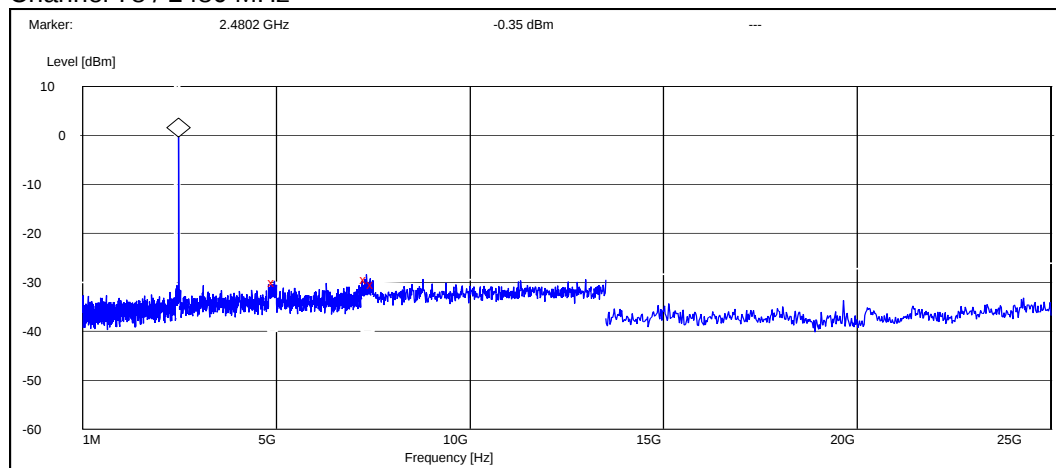
Channel 40 / 2442 MHz



Peak (RBW: 100 kHz, VBW: 100 kHz)

Frequency [MHz]	P [dBc]	Result
4939.200000	-30.181711	PASSED
7393.800000	-30.081711	PASSED
7500.000000	-29.381711	PASSED

Channel 78 / 2480 MHz



Peak (RBW: 100 kHz, VBW: 100 kHz)

Frequency [MHz]	P [dBc]	Result
4952.000000	-29.751934	PASSED
7326.600000	-28.951934	PASSED
7500.000000	-30.051934	PASSED

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

EUT with DUT number	RX-51, DUT 13894
Accessories with DUT numbers	BL-5J, DUT 13912; WH-205, DUT 13929; AC-10E, DUT 12916
Operation Voltage [V] / [Hz]	115 / 60
Result	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	21 / 42 / 101.6
Date of measurements	08-Jul-2009 – 10-Jul-2009
Measured by	Kalle Hannila / 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, VBW: 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	45.40	186.21	44.40	1.0	HORIZONTAL	PASSED
7206.000000	46.80	218.78	43.90	2.9	VERTICAL	PASSED

Average (RBW: 1 MHz, VBW: 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	32.50	42.17	31.50	1.0	HORIZONTAL	PASSED
7206.000000	34.00	50.12	31.10	2.9	VERTICAL	PASSED

Channel 40 / 2442 MHz

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

Frequency [MHz]	E [dB $\mu\text{V/m}$]	E [$\mu\text{V/m}$]	U _{RX} [dB μV]	A _{TOT} [dB]	Polarisation	Result
37.895391	24.20	16.22	42.90	-18.7	VERTICAL	PASSED
119.858918	24.90	17.58	52.20	-27.3	VERTICAL	PASSED
136.273547	26.20	20.42	55.00	-28.8	VERTICAL	PASSED
167.934269	23.50	14.96	54.30	-30.8	VERTICAL	PASSED
172.945090	25.90	19.72	57.20	-31.3	VERTICAL	PASSED

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

Frequency [MHz]	E [dB $\mu\text{V/m}$]	E [$\mu\text{V/m}$]	U _{RX} [dB μV]	A _{TOT} [dB]	Polarisation	Result
4845.693387	45.30	184.08	43.80	1.5	VERTICAL	PASSED
12469.437876	52.70	431.52	41.00	11.7	HORIZONTAL	PASSED
13396.799599	53.60	478.63	40.10	13.5	VERTICAL	PASSED
15381.263527	56.30	653.13	38.20	18.1	VERTICAL	PASSED
15808.109218	56.30	653.13	38.10	18.2	VERTICAL	PASSED
16052.104208	57.10	716.14	36.50	20.6	VERTICAL	PASSED
17958.417836	57.50	749.89	37.40	20.1	VERTICAL	PASSED

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

Frequency [MHz]	E [dB $\mu\text{V/m}$]	E [$\mu\text{V/m}$]	U _{RX} [dB μV]	A _{TOT} [dB]	Polarisation	Result
4850.693387	32.10	40.27	30.50	1.6	VERTICAL	PASSED

12469.437876	39.90	98.86	28.20	11.7	HORIZONTAL	PASSED
13403.299599	41.00	112.20	27.50	13.5	VERTICAL	PASSED
15380.763527	43.20	144.54	25.10	18.1	VERTICAL	PASSED
15807.609218	42.80	138.04	24.60	18.2	VERTICAL	PASSED
16049.604208	44.70	171.79	24.00	20.7	VERTICAL	PASSED
17954.917836	44.80	173.78	24.80	20.0	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
4960.000000	44.40	165.96	44.20	0.2	VERTICAL	PASSED
7440.000000	48.00	251.19	43.60	4.4	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
4960.000000	30.60	33.88	30.40	0.2	HORIZONTAL	PASSED
7440.000000	34.90	55.59	30.50	4.4	VERTICAL	PASSED

6.2.2 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
4804.000000	45.70	192.75	44.70	1.0	VERTICAL	PASSED
7206.000000	47.00	223.87	44.10	2.9	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
4804.000000	33.30	46.24	32.30	1.0	HORIZONTAL	PASSED
7206.000000	34.70	54.33	31.80	2.9	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
37.935872	24.50	16.79	43.20	-18.7	VERTICAL	PASSED
120.820842	24.50	16.79	51.80	-27.3	VERTICAL	PASSED
136.292585	25.70	19.28	54.50	-28.8	VERTICAL	PASSED
167.934269	23.20	14.45	54.00	-30.8	VERTICAL	PASSED
173.046293	24.90	17.58	56.20	-31.3	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
4848.695391	45.00	177.83	43.40	1.6	VERTICAL	PASSED
7325.651303	48.00	251.19	44.70	3.3	VERTICAL	PASSED

12485.469940	53.00	446.68	41.30	11.7	VERTICAL	PASSED
12502.500000	53.10	451.86	41.40	11.7	HORIZONTAL	PASSED
15373.753507	56.10	638.26	37.70	18.4	HORIZONTAL	PASSED
15839.673347	55.70	609.54	37.50	18.2	HORIZONTAL	PASSED
16046.588176	57.80	776.25	37.10	20.7	VERTICAL	PASSED
17960.417836	57.90	785.24	37.80	20.1	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
4848.695391	32.10	40.27	30.50	1.6	VERTICAL	PASSED
7325.651303	34.90	55.59	31.60	3.3	VERTICAL	PASSED
12481.469940	40.10	101.16	28.30	11.8	VERTICAL	PASSED
12503.500000	39.90	98.86	28.20	11.7	HORIZONTAL	PASSED
15375.753507	43.40	147.91	25.00	18.4	HORIZONTAL	PASSED
15836.173347	42.70	136.46	24.40	18.3	HORIZONTAL	PASSED
16047.588176	44.60	169.82	23.90	20.7	VERTICAL	PASSED
17957.417836	44.70	171.79	24.70	20.0	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	Result
4960.000000	43.40	147.91	43.20	0.2	HORIZONTAL	PASSED
7440.000000	47.80	245.47	43.40	4.4	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
4960.000000	30.70	34.28	30.50	0.2	HORIZONTAL	PASSED
7440.000000	35.10	56.89	30.70	4.4	VERTICAL	PASSED

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

EUT with DUT number	RX-51, DUT 13970
Accessories with DUT numbers	BL-5J, DUT 13967; AC-10E, DUT 13924; WH-205, DUT 13925
Operation Voltage [V] / [Hz]	115 / 60
Result	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	20,4 / 71 / 102
Date of measurements	01-Jul-2009
Measured by	Sami Lehtonen / Jouko Kaivonen

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.

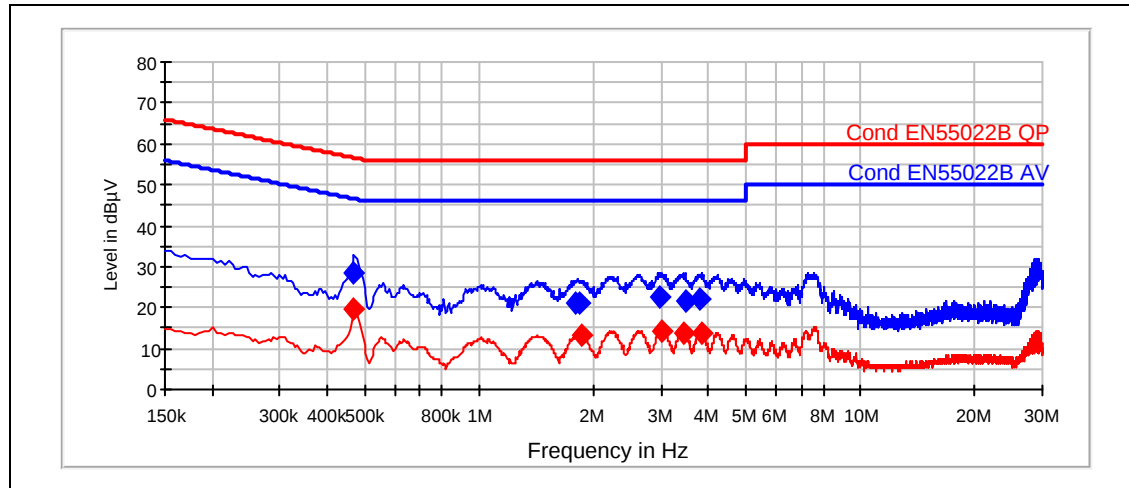
CISPR 22 Class B limits

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)

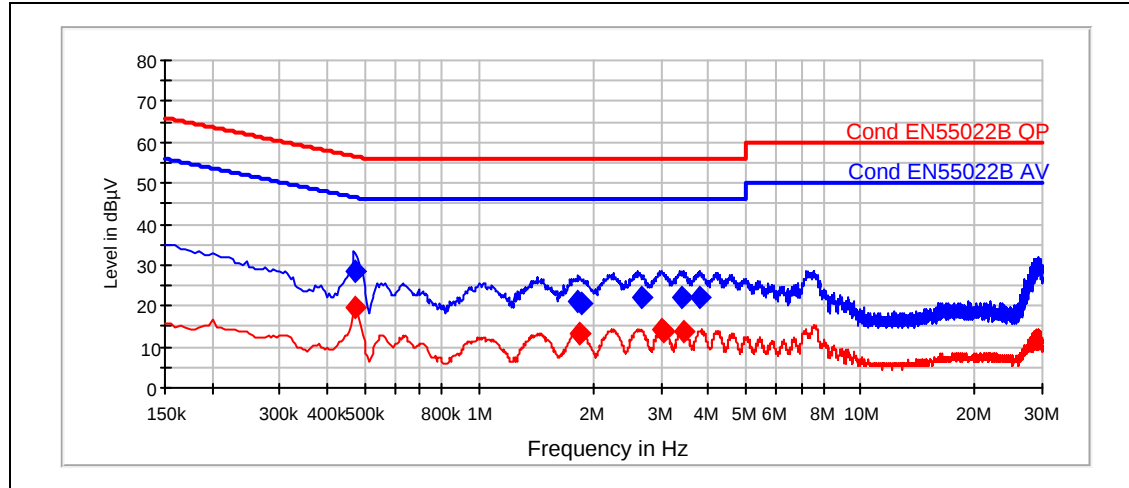
Frequency [MHz]	Quasi peak [dBμV]	Line	Margin [dB]	Result
0.470	28.36	L1	28.11	PASSED
1.795	20.95	L1	35.00	PASSED
1.825	20.96	L1	35.00	PASSED
2.990	22.39	L1	33.60	PASSED
3.475	21.52	L1	34.50	PASSED
3.800	22.02	L1	34.00	PASSED

Average (RBW: 9 kHz)

Frequency [MHz]	Average [dBμV]	Line	Margin [dB]	Result
0.470	19.80	L1	26.71	PASSED
1.850	13.08	L1	32.90	PASSED
3.020	14.02	L1	32.00	PASSED
3.435	13.94	L1	32.10	PASSED
3.845	13.56	L1	32.40	PASSED

7.2.2 8DPSK modulation, PRBS packet type

Channel 40 / 2442 MHz



Quasi peak (RBW: 9 kHz)

Frequency [MHz]	Quasi peak [dBμV]	Line	Margin [dB]	Result
0.475	28.31	L1	28.13	PASSED
1.810	21.33	L1	34.70	PASSED
1.850	20.83	L1	35.20	PASSED
2.670	21.94	L1	34.10	PASSED
3.400	22.32	L1	33.70	PASSED
3.780	22.13	L1	33.90	PASSED

Average (RBW: 9 kHz)

Frequency [MHz]	Average [dBμV]	Line	Margin [dB]	Result
0.475	19.73	L1	26.73	PASSED
1.825	13.38	L1	32.60	PASSED
1.835	13.35	L1	32.70	PASSED
3.020	14.10	L1	31.90	PASSED
3.050	13.96	L1	32.00	PASSED
3.440	13.96	L1	32.00	PASSED

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

EUT with DUT number	RX-51, DUT; 13966
Accessories with DUT numbers	BL-5J, DUT 13967; AC-10E, DUT 13924; WH-205, DUT 13925
Operation Voltage [V] / [Hz]	115 / 60
Result	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	23,2 / 41,1 / 102
Date of measurements	25-Jun-2009
Measured by	Sami Lehtonen / Jouko Kaivonen

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

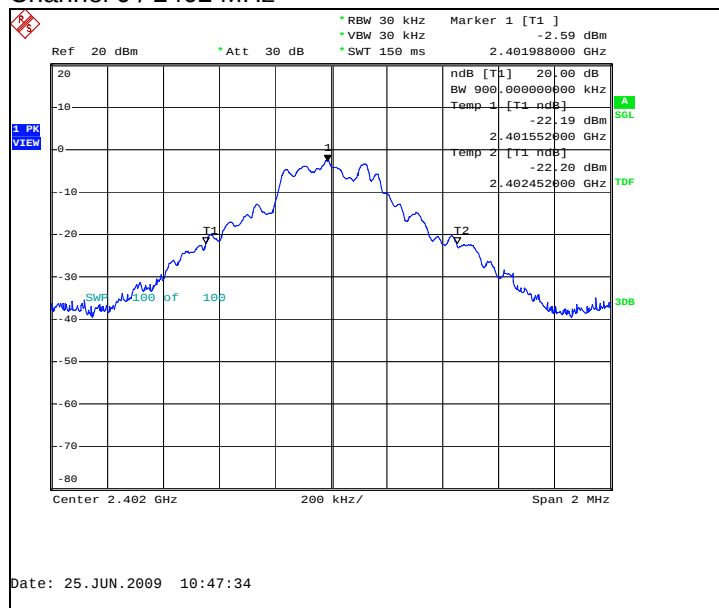
Limit [MHz]
N/A

8.2. Bluetooth Test results

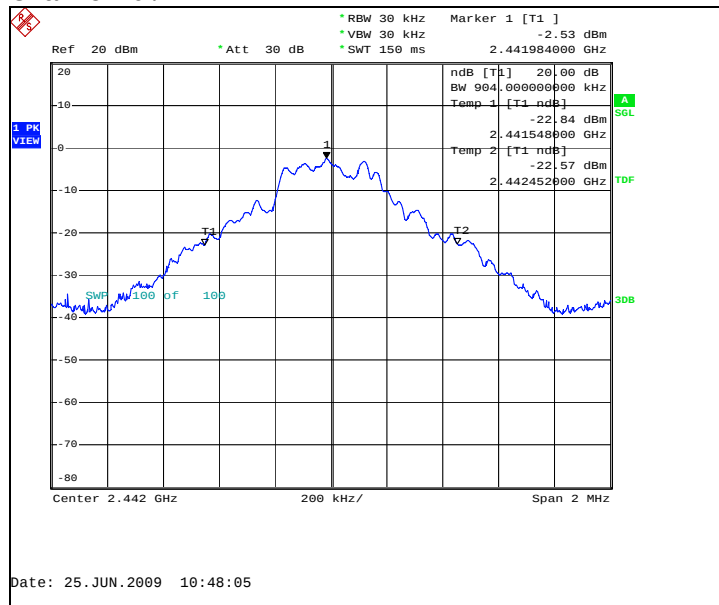
8.2.1 GFSK modulation, PRBS packet type

Channel / f_c [MHz]	20 dB bandwidth [kHz]	Result
0 / 2402	900.000	PASSED
40 / 2442	904.000	PASSED
78 / 2480	900.000	PASSED

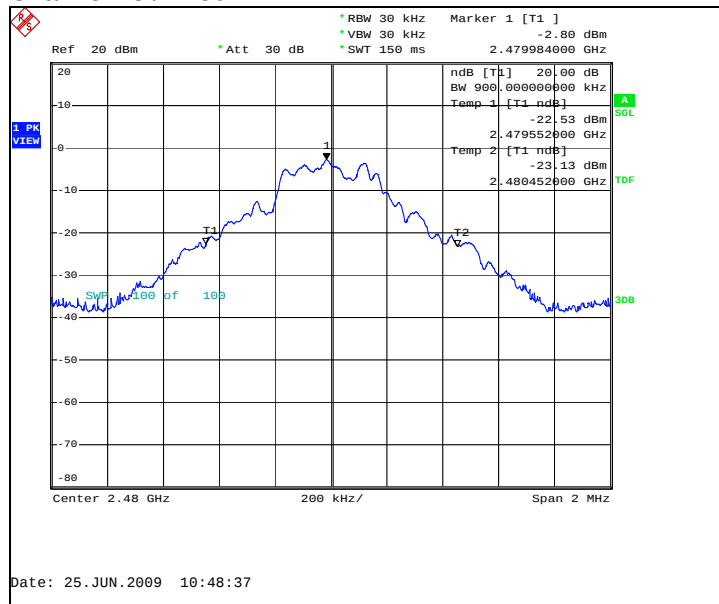
Channel 0 / 2402 MHz



Channel 40 / 2442 MHz



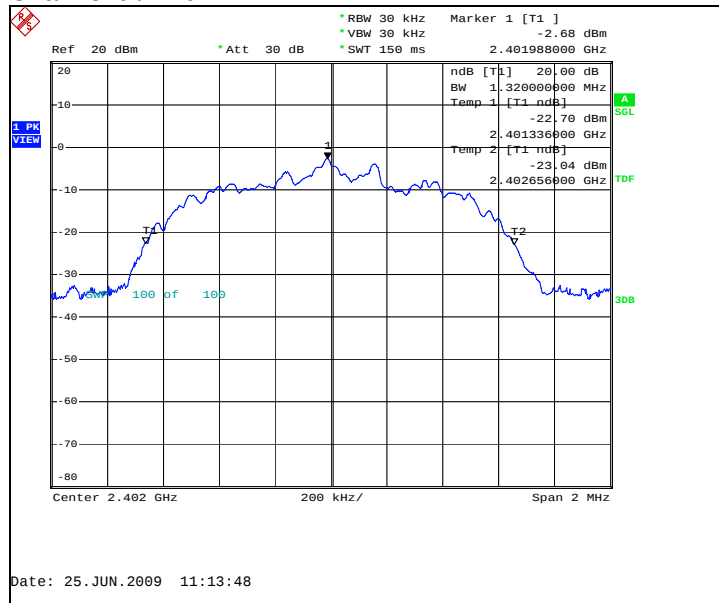
Channel 78 / 2480 MHz



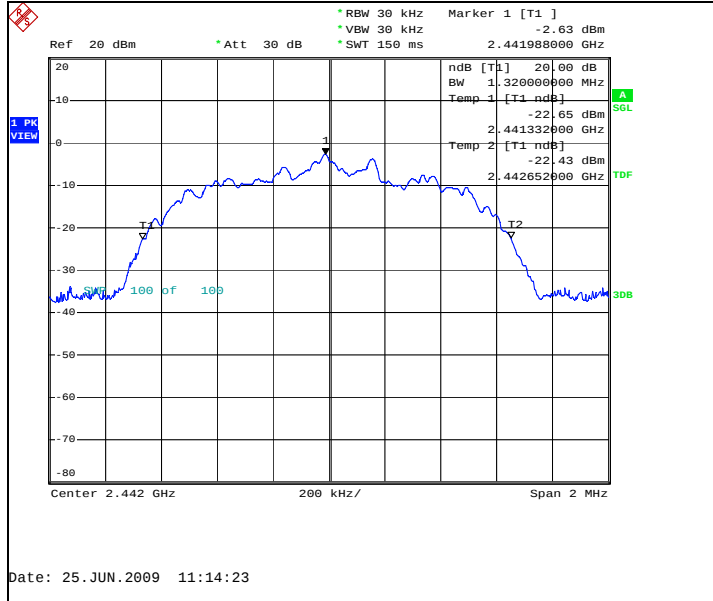
8.2.2 8DPSK modulation, PRBS packet type

Channel / f_c [MHz]	20 dB bandwidth [kHz]	Result
0 / 2402	1320.000	PASSED
40 / 2442	1320.000	PASSED
78 / 2480	1308.000	PASSED

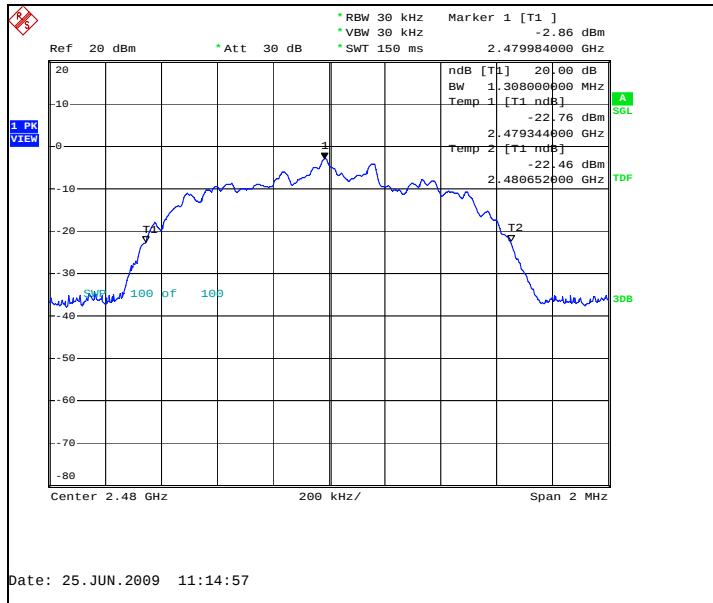
Channel 0 / 2402 MHz



Channel 40 / 2442 MHz



Channel 78 / 2480 MHz



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

EUT with DUT number	RX-51, DUT 13966
Accessories with DUT numbers	BL-5J, DUT 13967; AC-10E, DUT 13924; WH-205, DUT 13925
Operation Voltage [V] / [Hz]	115 / 60
Result	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	23,2 / 41,1 / 102
Date of measurements	25-Jun-2009
Measured by	Sami Lehtonen / Jouko Kaivonen

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

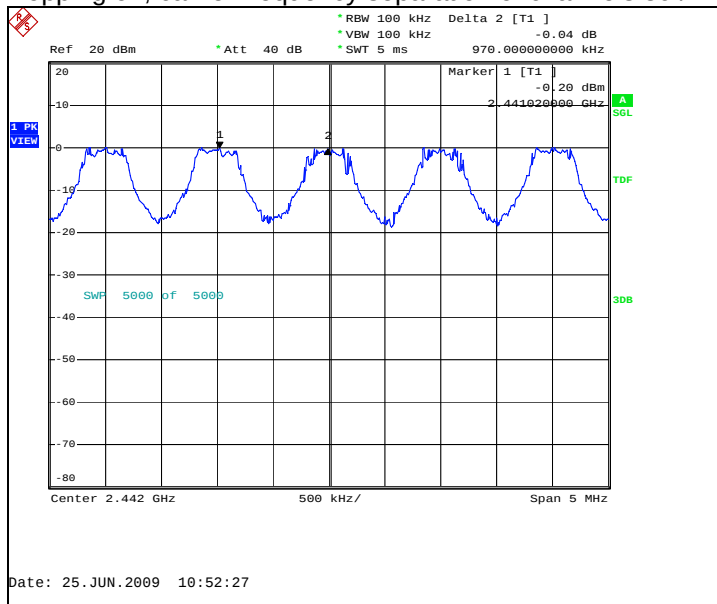
Limit [MHz]
≥ 0.025 or $2/3$ of the 20 dB bandwidth

9.2. Bluetooth Test results

9.2.1 GFSK modulation, PRBS packet type

Carrier frequency separation [kHz]	Result
970	PASSED

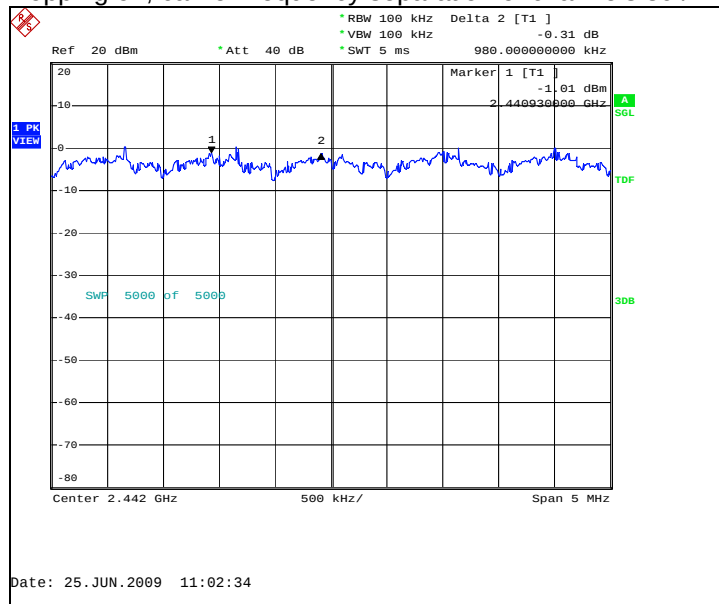
Hopping on, carrier frequency separation of channels 39 / 2441 MHz and 40 / 2442 MHz



9.2.2 8DPSK modulation, PRBS packet type

Carrier frequency separation [kHz]	Result
980	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 (d))

EUT with DUT number	RX-51, DUT 13966
Accessories with DUT numbers	BL-5J, DUT 13967; AC-10E, DUT 13924; WH-205, DUT 13925
Operation Voltage [V] / [Hz]	115 / 60
Result	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	23,2 / 41,1 / 102
Date of measurements	25-Jun-2009
Measured by	Sami Lehtonen / Jouko Kaivonen

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

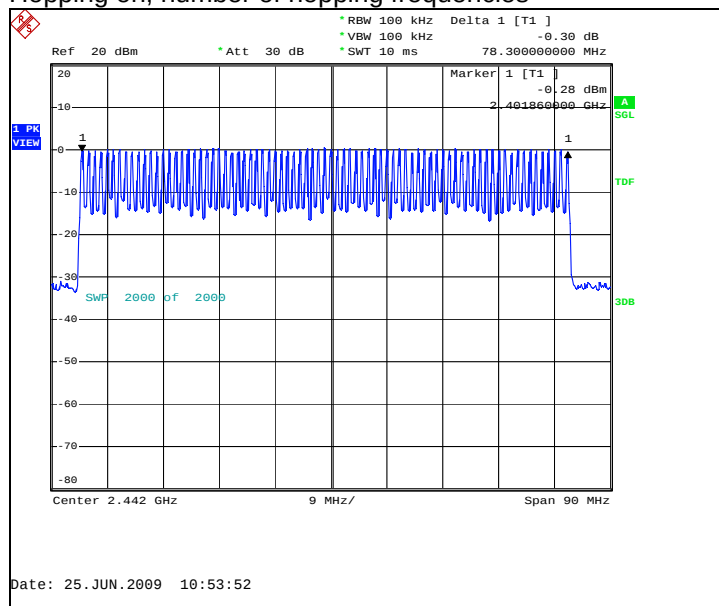
Limit [number]
≥ 15

10.2. Bluetooth Test results

10.2.1 GFSK modulation, PRBS packet type

Measured number of hopping frequencies	Result
78	PASSED

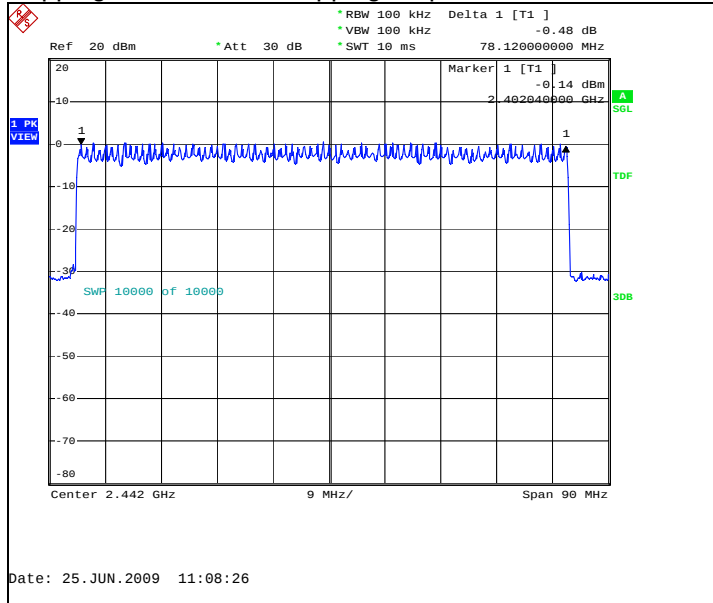
Hopping on, number of hopping frequencies



10.2.2 8DPSK modulation, PRBS packet type

Measured number of hopping frequencies	Result
73	PASSED

Hopping on, number of hopping frequencies



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

EUT with DUT number	RX-51, DUT 13966
Accessories with DUT numbers	BL-5J, DUT 13967; AC-10E, DUT 13924; WH-205, DUT 13925
Operation Voltage [V] / [Hz]	115 / 60
Result	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	23,2 / 41,1 / 102
Date of measurements	25-Jun-2009
Measured by	Sami Lehtonen / Jouko Kaivonen

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

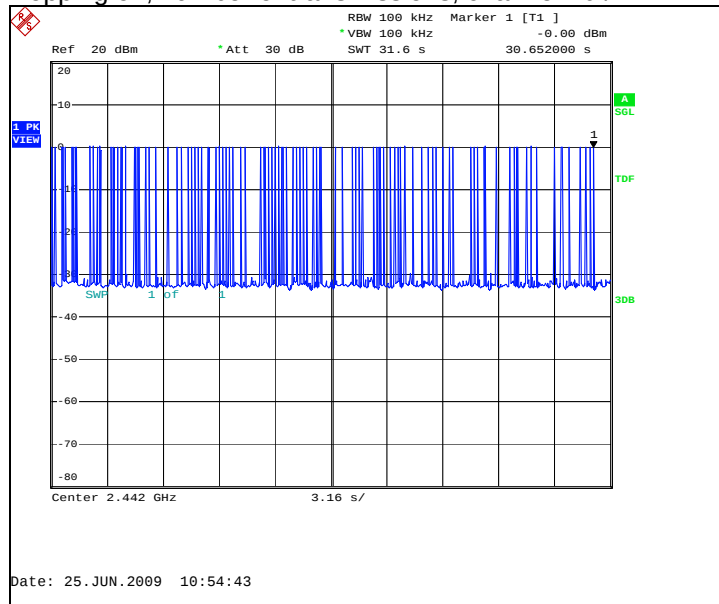
Limit [s]
≤ 0.4

11.2. Bluetooth test results

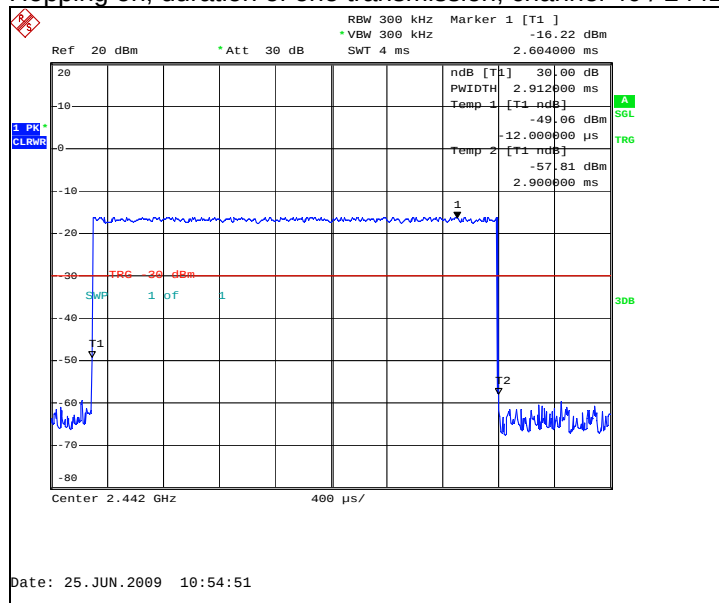
11.2.1 GFSK modulation, PRBS packet type

Measured number of transmissions	Duration of one transmission [μs]	Time of occupancy [s]	Result
94	2 912	0.273728	PASSED

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



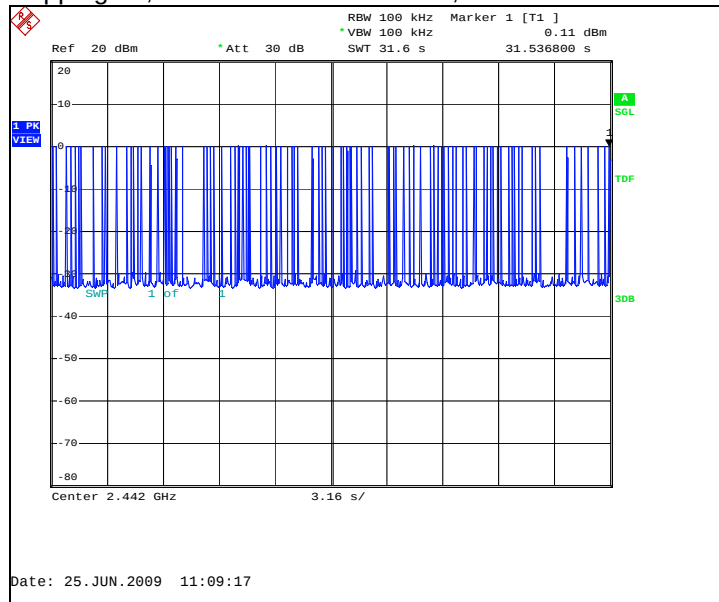
Hopping on, duration of one transmission, channel 40 / 2442 MHz



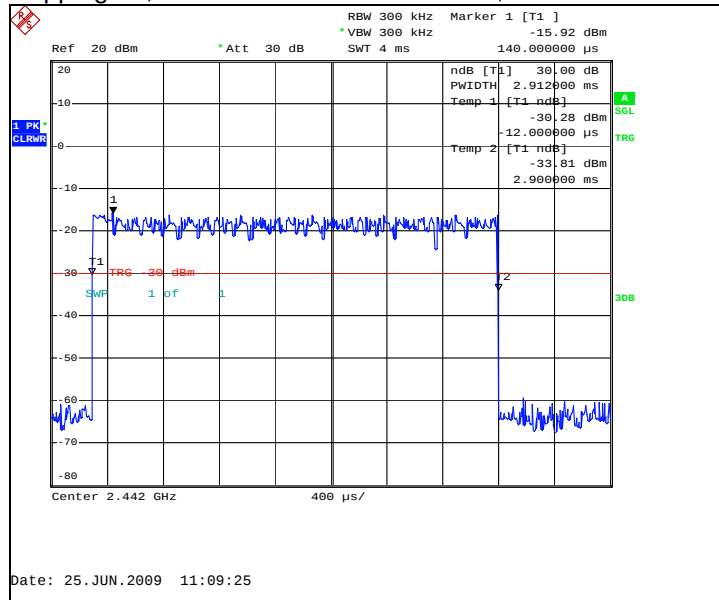
11.2.2 8DPSK modulation, PRBS packet type

Measured number of transmissions	Duration of one transmission [μs]	Time of occupancy [s]	Result
97	2 912	0.282464	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	22/24/27, 15C, 15B
2352	Spectrum Analyzer	FSP	R&S	22/24/27, 15C
2359	Temperature Test system	VT4002	Vötsch Industrietechnik	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	15C, 15B
-	RF Emission Software	ES-K1 v.1.71	R&S	22/24/27, 15C, 15B

12.2. Radiated measurements

Eq. No	Equipment	Type	Manufacturer	Used in
1748	Log. per. Antenna	HL025	R&S	22/24/27, 15C
1749	Log. per. Antenna	HL025	R&S	22/24/27, 15C
1875	Thermo- Hygrograph	00.02520.150700	Lambrecht	22/24/27, 15C, 15B
1917	Radio Communication tester	CMTA84	R&S	22/24/27, 15C, 15B
1933	Precision half-wave dipole antennas	HZ-13	R&S	22/24/27, 15C
1938	Precision half-wave dipole antennas	HZ-12	R&S	22/24/27, 15C
2006	Radiation Reference Source	VSQ	MEB	22/24/27, 15C, 15B
2009	Signal generator	SMP 22	R&S	22/24/27, 15C, 15B
2019	Multimeter	34401A	HP	22/24/27, 15C, 15B
2027	Coupling and Decoupling Network	M2 (modified) DC1	MEB	22/24/27, 15C, 15B
2028	Coupling and Decoupling Network	M3 (modified) DC2	MEB	22/24/27, 15C, 15B
2029	Power Supply	PL330	THURLBY	22/24/27, 15C, 15B
2043	Band Reject Filter	WRCA824/849-0.2-6SS	Wainwright	22, 15C, 15B
2047	Band Reject Filter	WRCC1800/2000-0.2-10SS	Wainwright	24, 15C, 15B
2048	Band Reject Filter	WRCC1700/1800-0.2-10SS	Wainwright	27, 15C, 15B
2051	High Pass Filter	4HC1700-1-KK	R&S	22/24/27, 15C
2057	Log. per. Antenna	HL025	R&S	22/24/27, 15C
2109	Power Supply	PL330QMD	THURLBY	22/24/27, 15C, 15B
2110	Multimeter	34401A	HP	22/24/27, 15C, 15B
2112	Multimeter	TX3	Tektronix	22/24/27, 15C, 15B
2116	Controller	EMCO MODEL 2090	ETS	22/24/27, 15C, 15B
2133	Power Meter	NRVS	R&S	22/24/27, 15C
2134	Power Sensor	NRV-Z32	R&S	22/24/27, 15C

Eq. No	Equipment	Type	Manufacturer	Used in
2135	Coupling and Decoupling Network	CDN 801-M3	LÜTHI	22/24/27, 15C, 15B
2138	Ultra Broadband Antenna	HL562	R&S	22/24/27, 15C, 15B
2140	Biconical Antenna	EMCO93110B	EMCO	22/24/27, 15C
2142	Log.-per.-dipol Antenna	3146	EMCO	22/24/27, 15C
2144	Attenuator	6803.17B	Huber-Suhner	22/24/27, 15C, 15B
2150	High Pass Filter	F-15041	RLC ELECTRONICS	22/24/27, 15C
2176	Coupling and Decoupling Network	CDN 801-M3	LÜTHI	22/24/27, 15C, 15B
2180	Digital Radio Communication Tester	CMU200	R&S	22/24/27, 15C, 15B
2188	Preamplifier	AFS4-00100300-20-23P-6	MITEQ	22/24/27, 15C, 15B
2330	EMI Test receiver	ESIB26	R&S	22/24/27, 15C, 15B
2334	GPIB Switch 2 to 1	-	National Instruments	22/24/27, 15C, 15B
2348	Yaesu controller	G-1000DXC	YAESU	22/24/27, 15C, 15B
2349	Computer controller (Yaesu)	GS-232B	YAESU	22/24/27, 15C, 15B
2350	Preamplifier	AMF-6D-020180-29-20P	MITEQ	22/24/27, 15C
2361	Anechoic chamber	3 meter semi/full anechoic chamber	Euroshield	22/24/27, 15C, 15B
2398	Horn antenna	HF906	R&S	22/24/27, 15C
2363	Band Reject Filter	WRCG 832/838-825/845/5SS	Wainwright	22/24/27
2364	Band Reject Filter	WRCG1877/1883 - 1870/1890-40/6SS	Wainwright	22/24/27
2365	Relay Switch Unit	TS-RSP	R&S	22/24/27, 15C, 15B
2366	Relay Switch Unit	TS-RSP	R&S	22/24/27, 15C, 15B
2384	Band Reject Filter	WRCG832/838-825/845-40/5SS	Wainwright	22/24/27
2388	Bluetooth Tester	CBT	R&S	15C, 15B
-	RF Emission Software	ES-K1 v.1.71	R&S	22/24/27, 15C, 15B