

FCC Part 15C Compliance Test Report

Test Report no.:	Tre_FCC_0632_04.doc	Date of Report:	9.8.2006
Number of pages:	41	Customer's Contact person:	Thomas Reitmayer
Testing laboratory:	TCC Nokia Tampere Laboratory P.O. Box 68 Sinitaival 5 FIN-33720 TAMPERE, FINLAND Tel. +358 (0) 7180 46800 Fax. +358 (0) 7180 46880	Client:	Nokia Corporation Lise Meitner Strasse 10 89081 ULM GERMANY Tel. +49 731 1754 0 Fax. +49 731 1754 6800
FCC listing no.:	94436		
IC recognition no.:	3608		
Tested devices/ accessories:	GSM phone RM-181 / Battery BL-5B, Headset HS-47, AC charger AC-3, Dummy battery SF-17D		
FCC ID:	PPIRM-181	IC:	661U-RM-181
Supplement reports:	-		
Testing has been carried out in accordance with:	CFR 47, FCC rules Part 15 Subpart C, ANSI C63.4 (2003), 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	22.6.2006
Testing completed	30.6.2006
The customer's contact person	Thomas Reitmayer
Test Plan referred to	\\EMC\\TESTPLAN\\
Notes	-
Document name	T:\\Projects\\RM-146\\EMC\\Results\\FCC\\Tre_FCC_0626_02.doc

1.1. EUT and Accessory Information

The EUT is a triple 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
GSM phone	RM-146	004400911600896	0412	-	3.07	40722
GSM phone	RM-146	004400911600649	0412	-	3.07	40740
Battery	BL-5B	-	-	-	-	40731
Headset	HS-47	-	4.1	3.0	-	40719
AC-Charger	AC-3E	-	-	-	-	40733
Dummy Battery	SF-17D	01.11.2005/03618	-	-	-	40724

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)	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 Tampere Laboratory.

The test results of PPIRM-146 are re-used for certification of the PPIRM-181. The table above indicates the results, which will be re-used.

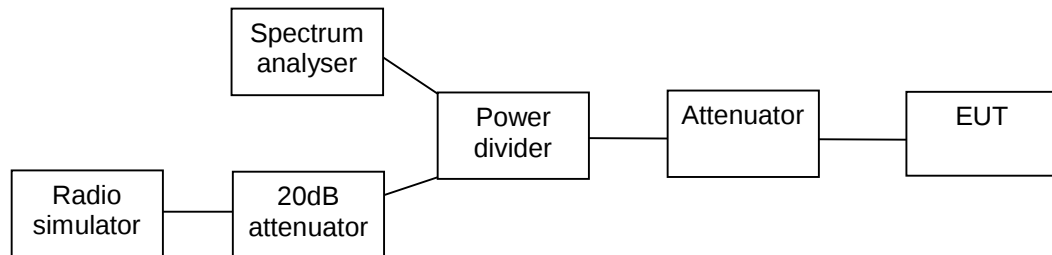
CONTENTS

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. 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).....	20
6.1. Test method and limit.....	20
6.2. Bluetooth Test results	21
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 (1))	26
8.1. Test method and limit.....	26
8.2. Bluetooth Test results	26
9. Carrier frequency separation (FCC §15.247(a)(1), RSS-210 A8.1 (2))	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 (4))	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 (4))	36

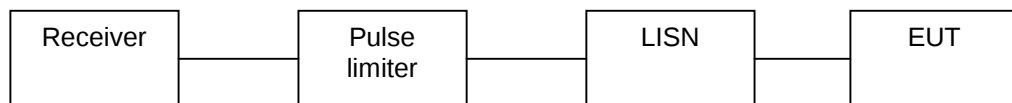
11.1.	Test method and limit	36
11.2.	Bluetooth test results	37
12.	Test Equipment	41
12.1.	Conducted measurements	41
12.2.	Radiated measurements	41

2. Test setups

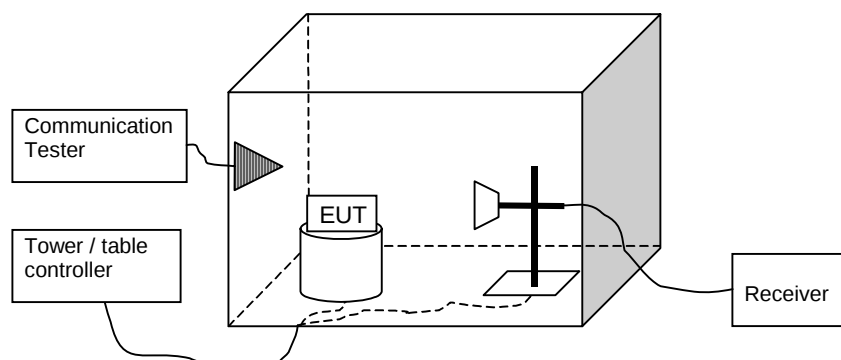
2.1. Conducted RF test setup



2.2. AC powerline conducted emissions test setup



2.3. Spurious radiated emissions test setup



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

EUT with DUT number	RM-146 DUT 40722
Accessories with DUT numbers	SF-17D DUT 40724
Operation Voltage [V] / [Hz]	4.0 VDC
Result	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	22 / 44 / 100.6
Date of measurements	27.6.2006
Measured by	Jari Jantunen

3.1. Test method and limit

The measurement is made according to FCC rules part 15.247 and IC standard RSS-210.

Limits for peak output power measurements

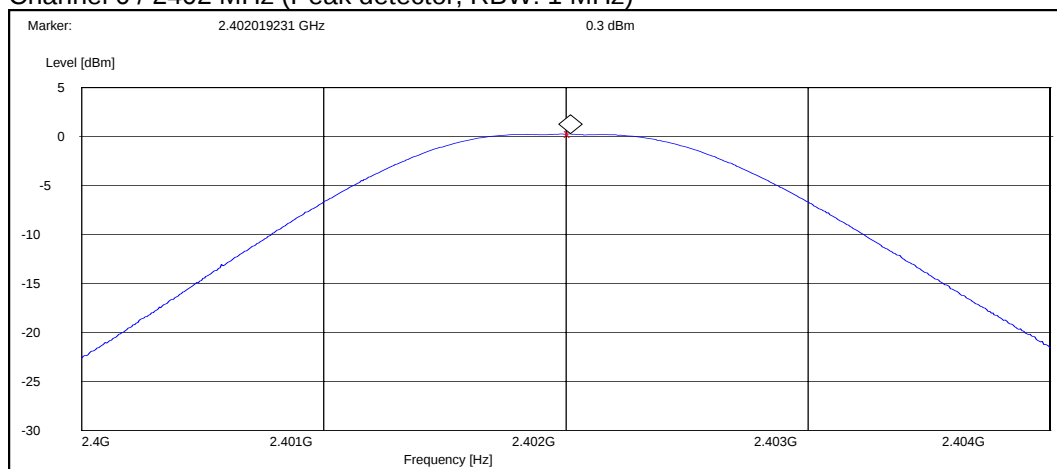
Frequency range [MHz]	Limit [W]	Limit [dBm]
2400 – 2483.5	≤ 1	≤ 30

3.2. Bluetooth Test results

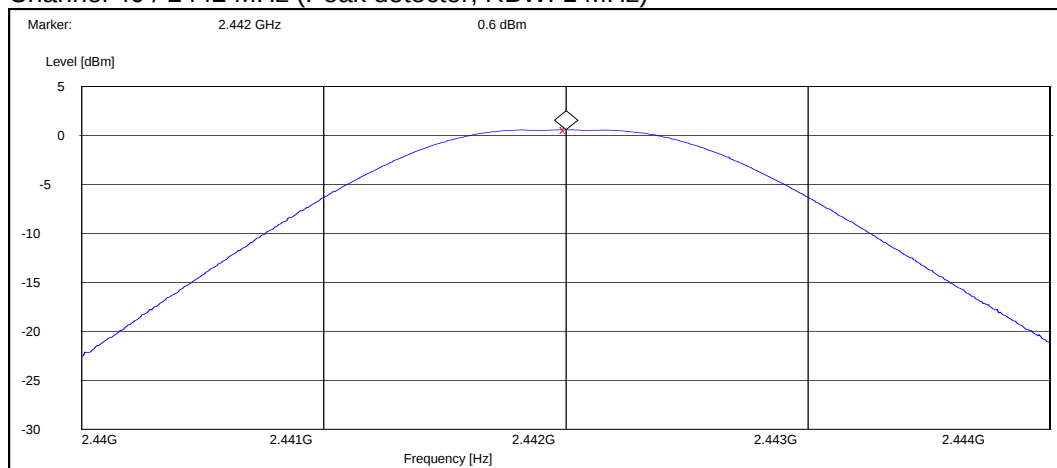
3.2.1 GSKF modulation, PRBS packet type

Channel / f _c [MHz]	P [dBm]	P [mW]	Result
0 / 2402	0.30	1.072	PASSED
40 / 2442	0.60	1.148	PASSED
78 / 2480	0.70	1.175	PASSED

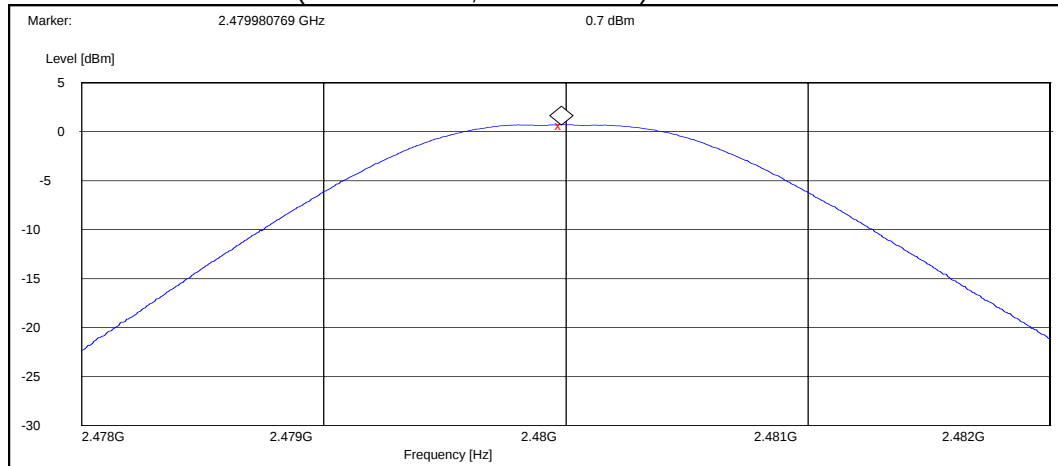
Channel 0 / 2402 MHz (Peak detector, RBW: 1 MHz)



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



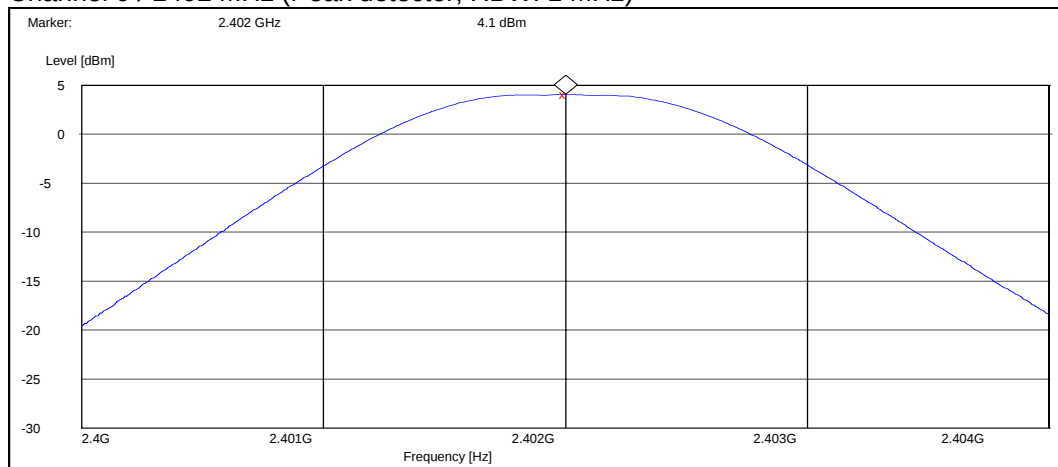
Channel 78 / 2480 MHz (Peak detector, RBW: 1 MHz)



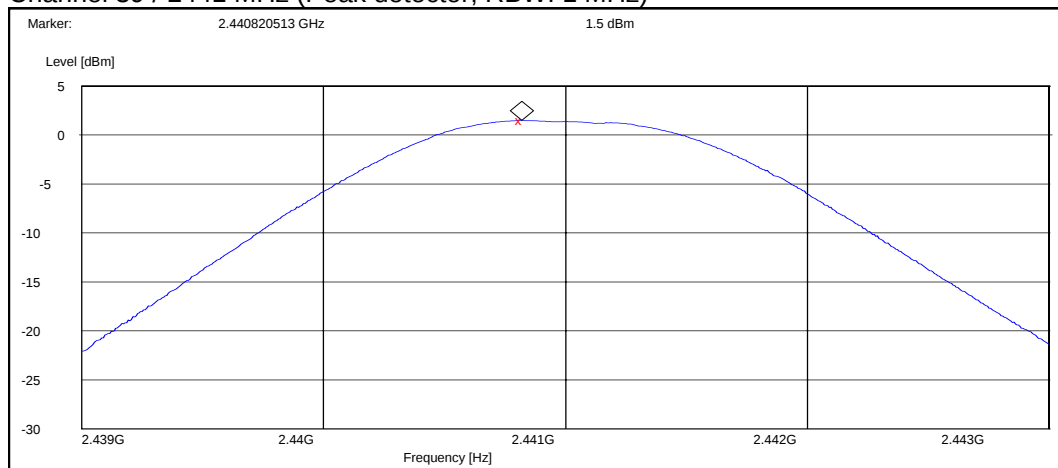
3.2.2 8DPSK modulation, PRBS packet type

Channel / f_c [MHz]	P [dBm]	P [mW]	Result
0 / 2402	4.10	2.570	PASSED
39 / 2441	1.50	1.413	PASSED
78 / 2480	4.30	2.692	PASSED

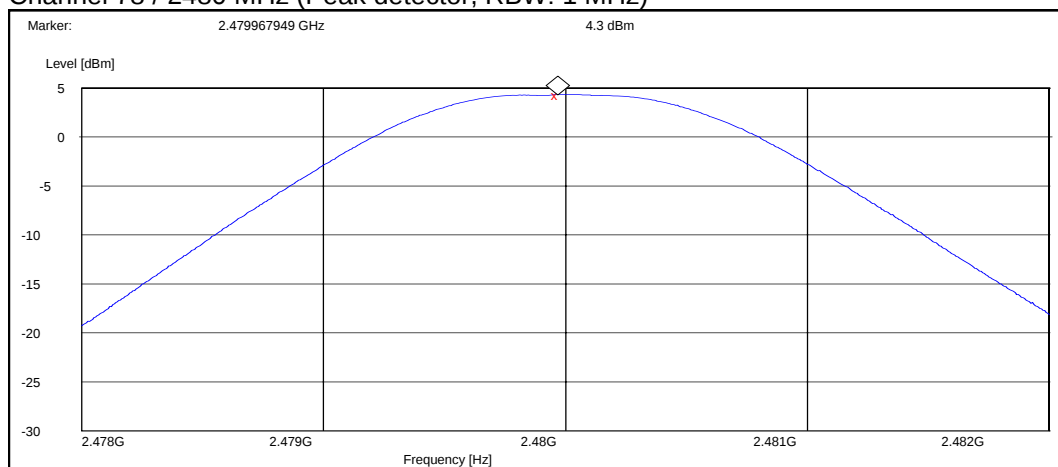
Channel 0 / 2402 MHz (Peak detector, RBW: 1 MHz)



Channel 39 / 2441 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-146 DUT 40740
Accessories with DUT numbers	BL-5B DUT 40731, HS-47 DUT 40719, AC-3 DUT 40733
Operation Voltage [V] / [Hz]	115 / 60
Result	PASSED
Remarks	Slide closed
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	22 / 44 / 101.6-102.7
Date of measurements	26-30.6.2006
Measured by	Jari Jantunen

4.1. Test method and limit

The measurement is made according to FCC rules part 15.247 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

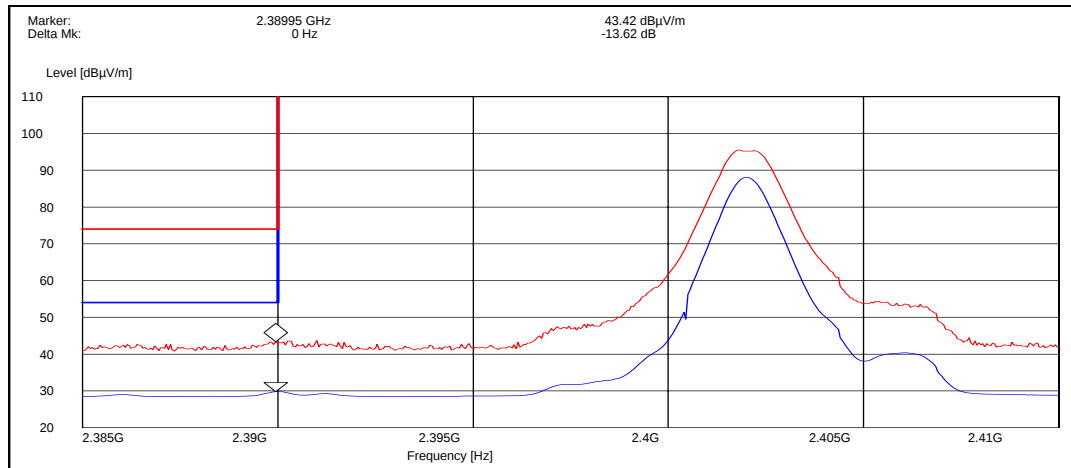
Average (RBW: 1 MHz)

Channel / f_c [MHz]	E [dB μ V/m]	Result
0 / 2402	29.80	PASSED
78 / 2480	41.29	PASSED
Hopping on, low end	28.36	PASSED
Hopping on, high end	31.47	PASSED

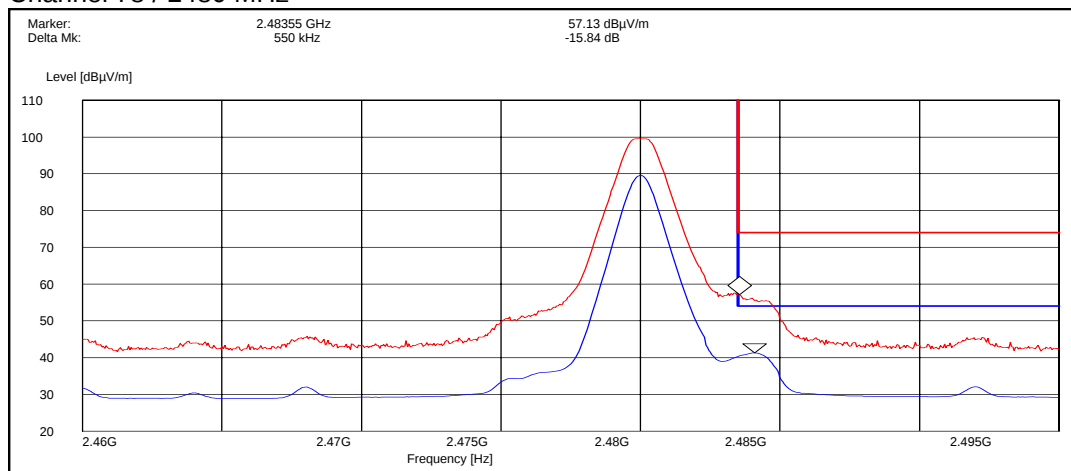
Peak (RBW: 1 MHz)

Channel / f_c [MHz]	E [dB μ V/m]	Result
0 / 2402	43.42	PASSED
78 / 2480	57.13	PASSED
Hopping on, low end	43.08	PASSED
Hopping on, high end	55.55	PASSED

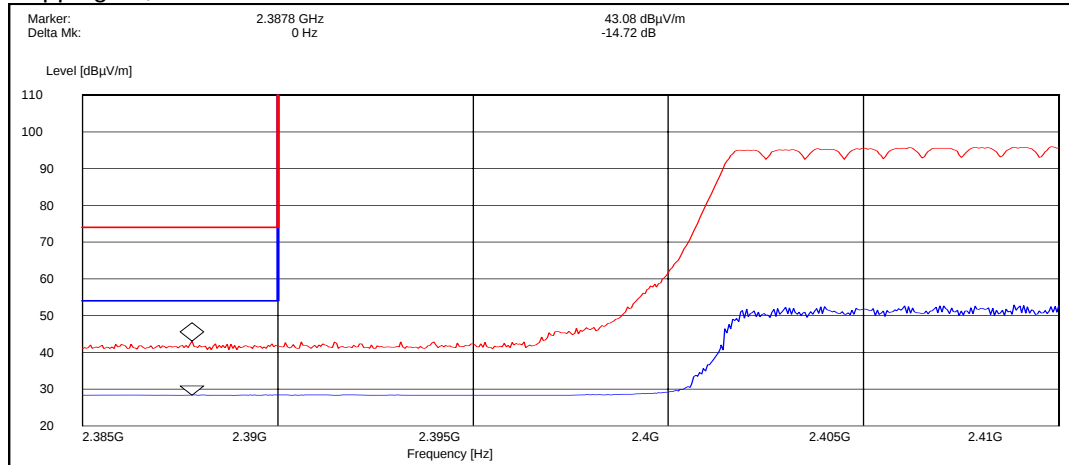
Channel 0 / 2402 MHz



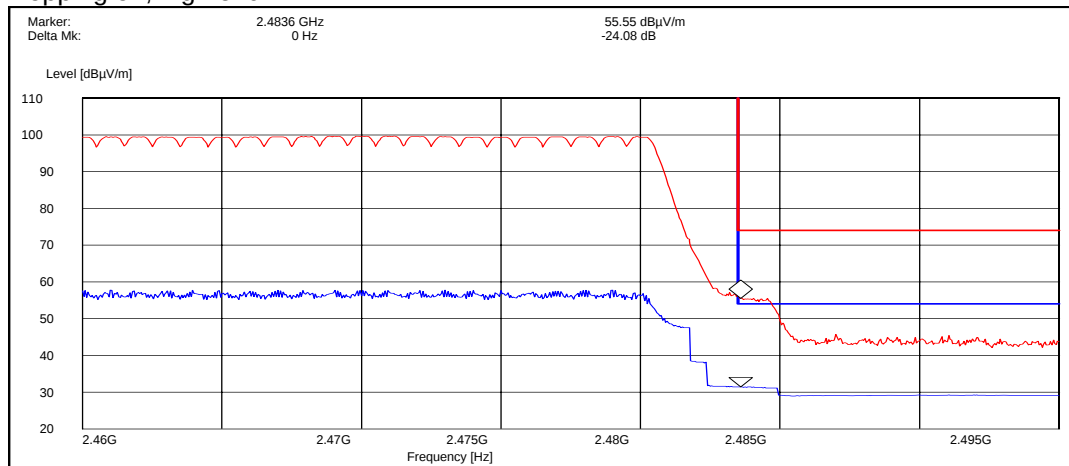
Channel 78 / 2480 MHz



Hopping on, low end



Hopping on, high end



4.2.2 8DPSK modulation, PRBS packet type

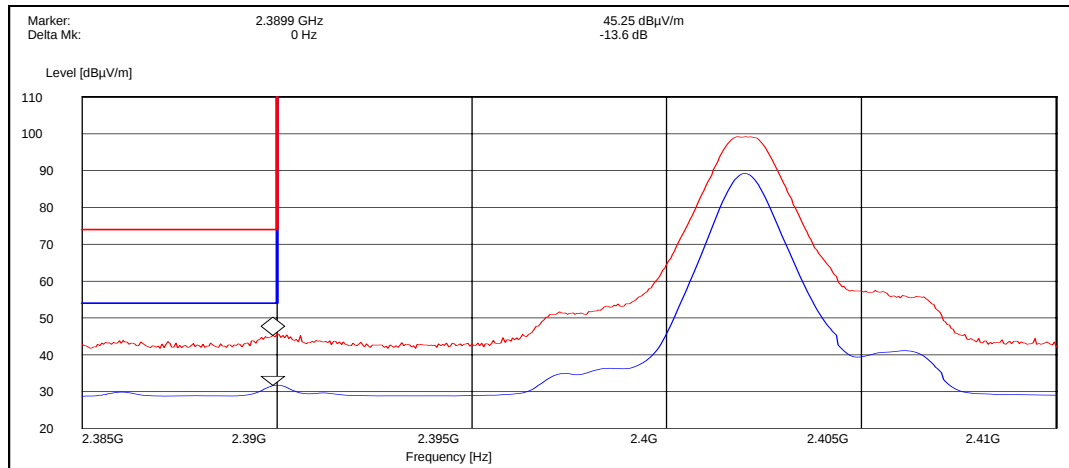
Average (RBW: 1 MHz)

Channel / f_c [MHz]	E [dBμV/m]	Result
0 / 2402	31.65	PASSED
78 / 2480	42.13	PASSED
Hopping on, low end	28.45	PASSED
Hopping on, high end	31.31	PASSED

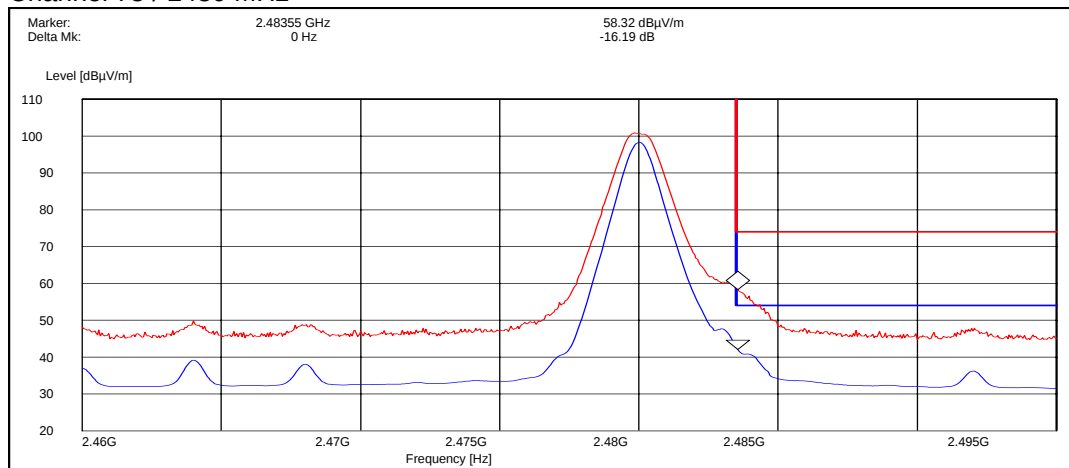
Peak (RBW: 1 MHz)

Channel / f_c [MHz]	E [dBμV/m]	Result
0 / 2402	45.25	PASSED
78 / 2480	52.32	PASSED
Hopping on, low end	43.72	PASSED
Hopping on, high end	56.06	PASSED

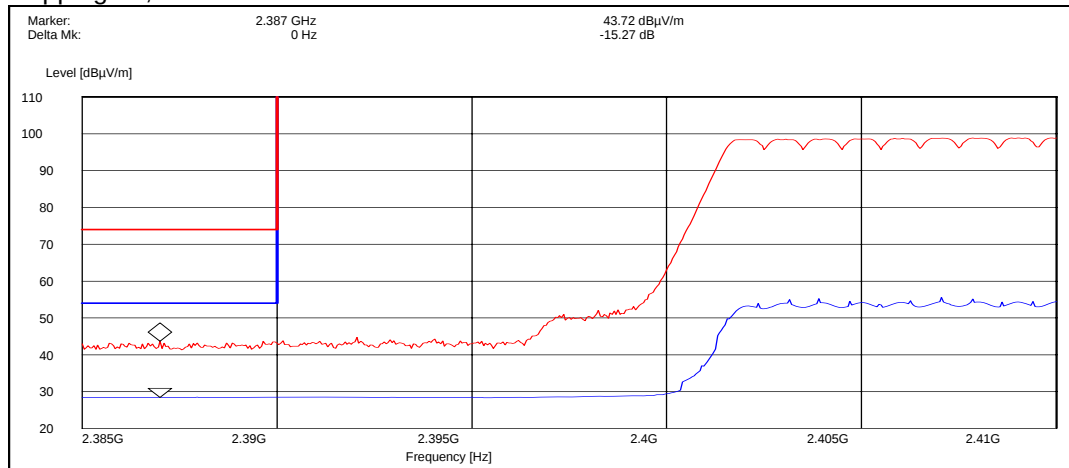
Channel 0 / 2402 MHz



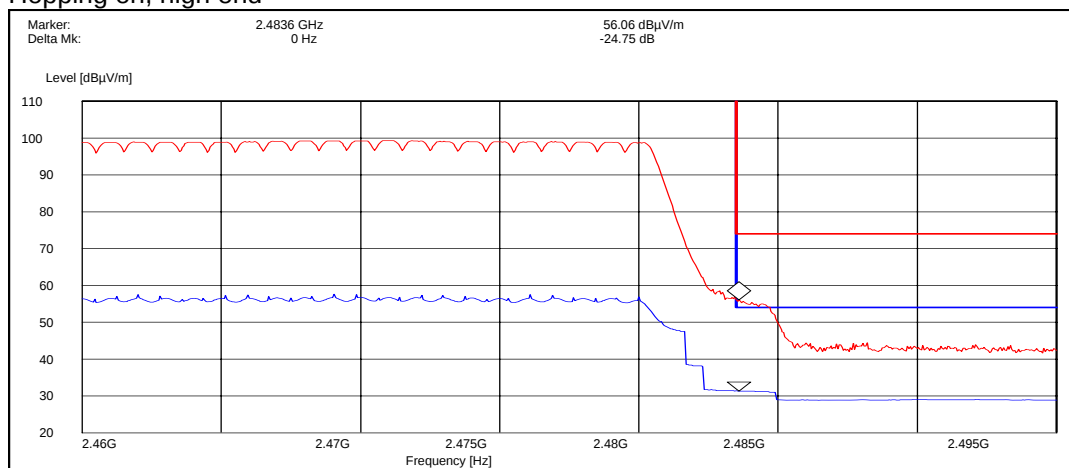
Channel 78 / 2480 MHz



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-146 DUT 40722
Accessories with DUT numbers	SF-17D DUT 40724
Operation Voltage [V] / [Hz]	4.0 VDC
Result	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	22 / 44 / 100.6
Date of measurements	27.6.2006
Measured by	Jari Jantunen

5.1. Test method and limit

The measurement is made according to FCC rules part 15.247 and IC standard RSS-210.

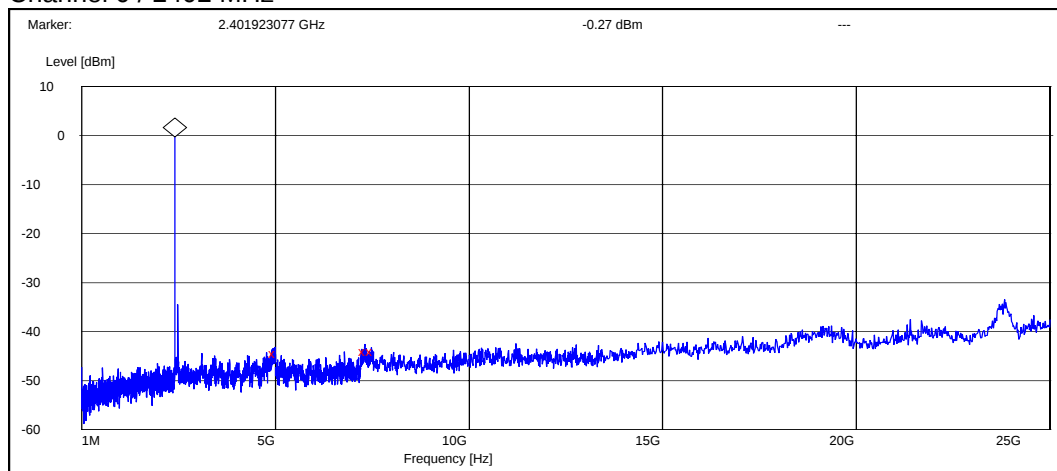
Limits for spurious RF conducted emissions measurements

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

5.2. Bluetooth Test results

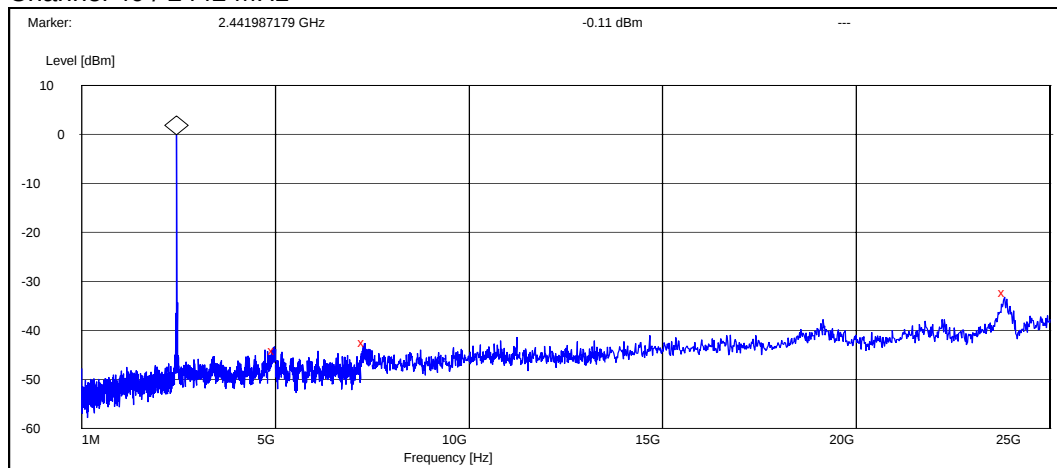
5.2.1 GFSK modulation, PRBS packet type

Channel 0 / 2402 MHz



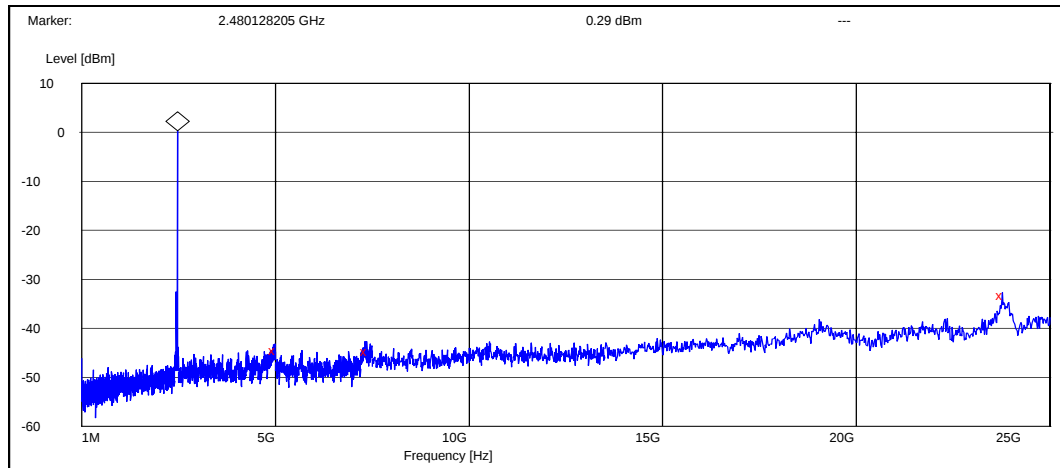
Frequency [MHz]	P [dBc]	Result
4993.589744	-44.234561	PASSED
7313.461538	-43.834561	PASSED
7500.000000	-43.834561	PASSED

Channel 40 / 2442 MHz



Frequency [MHz]	P [dBc]	Result
4973.397436	-43.887902	PASSED
7297.115385	-42.387902	PASSED
23820.512821	-32.087902	PASSED

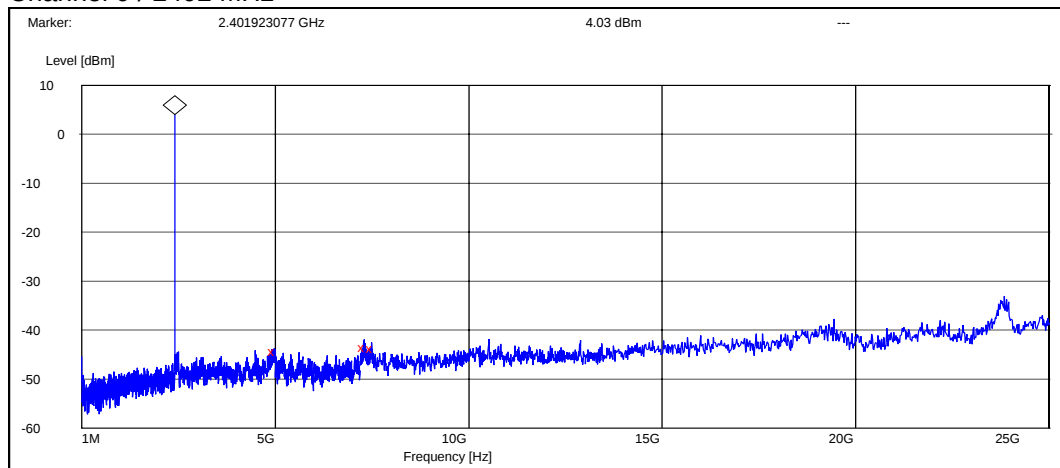
Channel 78 / 2480 MHz



Frequency [MHz]	P [dBc]	Result
4995.512821	-44.789995	PASSED
7351.923077	-44.889995	PASSED
23765.224359	-33.489995	PASSED

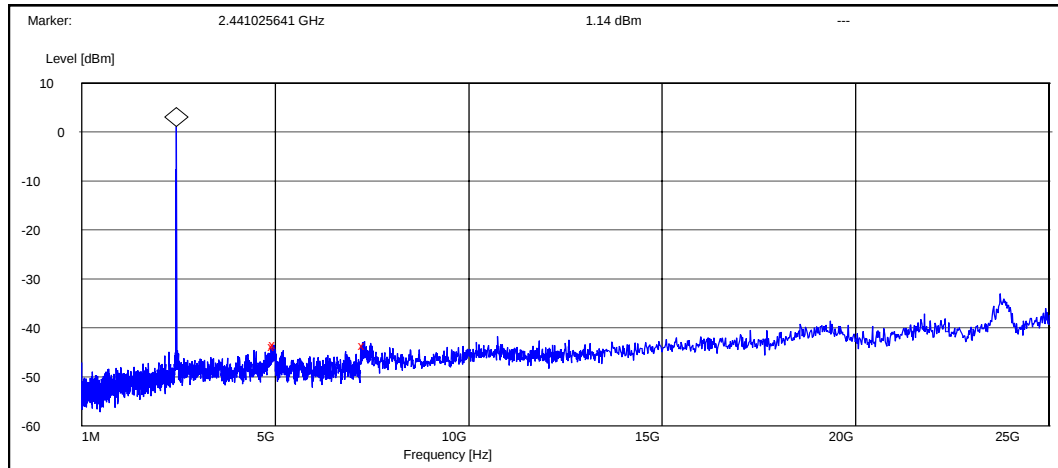
5.2.2 8DPSK modulation, PRBS packet type

Channel 0 / 2402 MHz



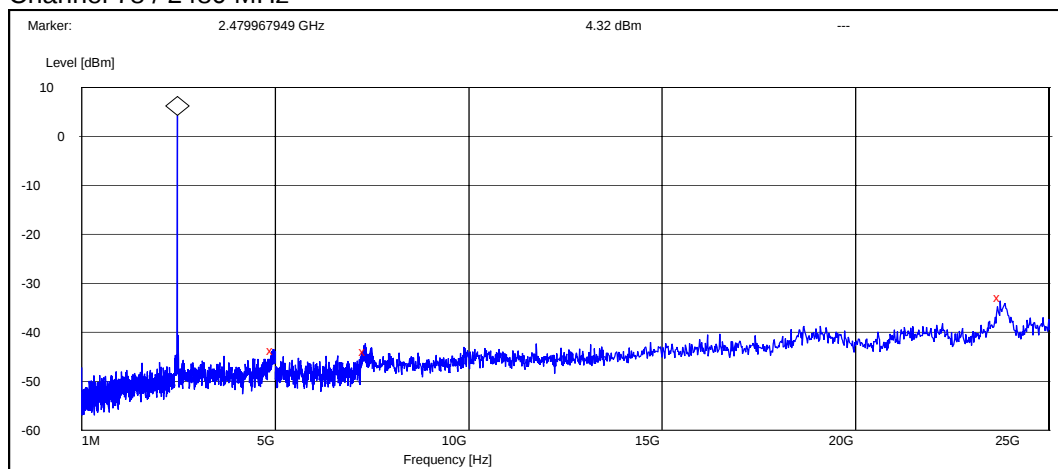
Frequency [MHz]	P [dBc]	Result
4979.166667	-48.329529	PASSED
7306.250000	-47.529529	PASSED
7500.000000	-47.829529	PASSED

Channel 39 / 2441 MHz



Frequency [MHz]	P [dBc]	Result
4978.846154	-44.940592	PASSED
5000.000000	-44.540592	PASSED
7308.653846	-44.640592	PASSED

Channel 78 / 2480 MHz



Frequency [MHz]	P [dBc]	Result
4947.435897	-48.017258	PASSED
7328.365385	-48.317258	PASSED
23728.365385	-37.217258	PASSED

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

EUT with DUT number	RM-146 DUT 40740
Accessories with DUT numbers	BL-5B DUT 40731, HS-47 DUT 40719, AC-3 DUT 40733
Operation Voltage [V] / [Hz]	115 / 60
Result	PASSED
Remarks	Slide closed
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	22 / 44 / 101.6
Date of measurements	26.6.2006
Measured by	Jari Jantunen

6.1. Test method and limit

The measurement is made according to FCC rules part 15.247 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	39.70	96.61	41.00	-1.30	VERTICAL	PASSED
7206.000000	42.20	128.82	40.20	2.00	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	27.10	22.65	28.40	-1.30	HORIZONTAL	PASSED
7206.000000	29.20	28.84	27.20	2.00	HORIZONTAL	PASSED

Channel 40 / 2442 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
4884.000000	39.90	98.86	41.50	-1.60	VERTICAL	PASSED
7326.000000	44.30	164.06	41.60	2.70	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
4884.000000	27.50	23.71	29.10	-1.60	HORIZONTAL	PASSED
7326.000000	30.20	32.36	27.50	2.70	HORIZONTAL	PASSED

Channel 78 / 2480 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
4960.000000	41.20	114.82	42.20	-1.00	HORIZONTAL	PASSED
7440.000000	43.40	147.91	40.20	3.20	VERTICAL	PASSED

Average (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
4960.000000	27.90	24.83	28.90	-1.00	HORIZONTAL	PASSED
7440.000000	30.40	33.11	27.20	3.20	HORIZONTAL	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	39.70	96.61	41.00	-1.30	HORIZONTAL	PASSED
7206.000000	41.60	120.23	39.60	2.00	VERTICAL	PASSED

Average (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
4804.000000	26.90	22.13	28.20	-1.30	HORIZONTAL	PASSED
7206.000000	29.10	28.51	27.10	2.00	HORIZONTAL	PASSED

Channel 39 / 2441 MHz

Peak (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
4963.421844	40.40	104.71	41.30	-0.90	VERTICAL	PASSED
7400.795591	44.50	167.88	41.20	3.30	HORIZONTAL	PASSED
17958.917836	55.70	609.54	34.30	21.40	VERTICAL	PASSED

Average (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
4961.421844	27.70	24.27	28.60	-0.90	VERTICAL	PASSED
7410.827655	30.70	34.28	27.40	3.30	HORIZONTAL	PASSED
17956.917836	42.70	136.46	21.30	21.40	VERTICAL	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	40.50	105.93	41.50	-1.00	HORIZONTAL	PASSED
7440.000000	42.90	139.64	39.70	3.20	VERTICAL	PASSED

Average (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
4960.000000	27.90	24.83	28.90	-1.00	HORIZONTAL	PASSED
7440.000000	30.30	32.73	27.10	3.20	HORIZONTAL	PASSED

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

EUT with DUT number	RM-146 DUT 40740
Accessories with DUT numbers	BL-5B DUT 40731, HS-47 DUT 40719, AC-3 DUT 40733
Operation Voltage [V] / [Hz]	115 / 60
Result	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	19 / 51 / 100.6
Date of measurements	27.6.2006
Measured by	Jari Jantunen

7.1. Test method and limit

The measurement is made according to FCC rules part 15.247 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.

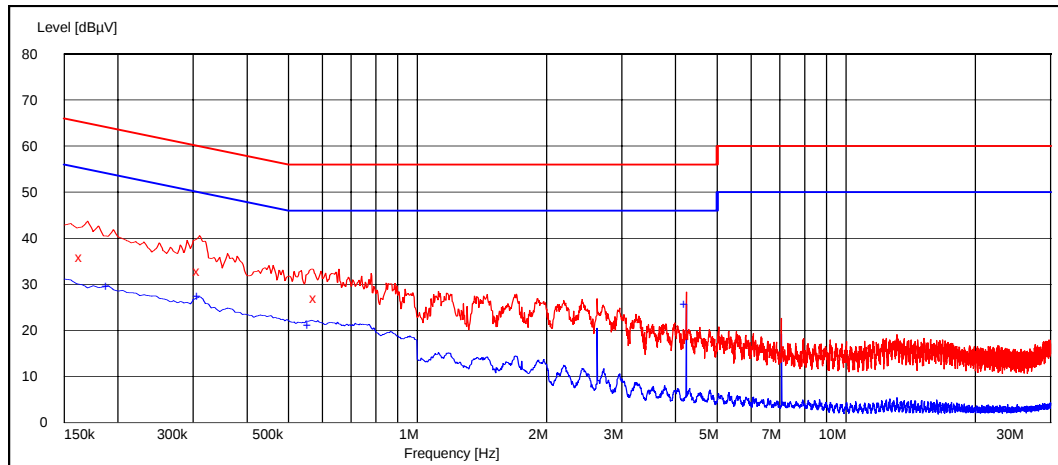
CISPR 22 Class B limits

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)

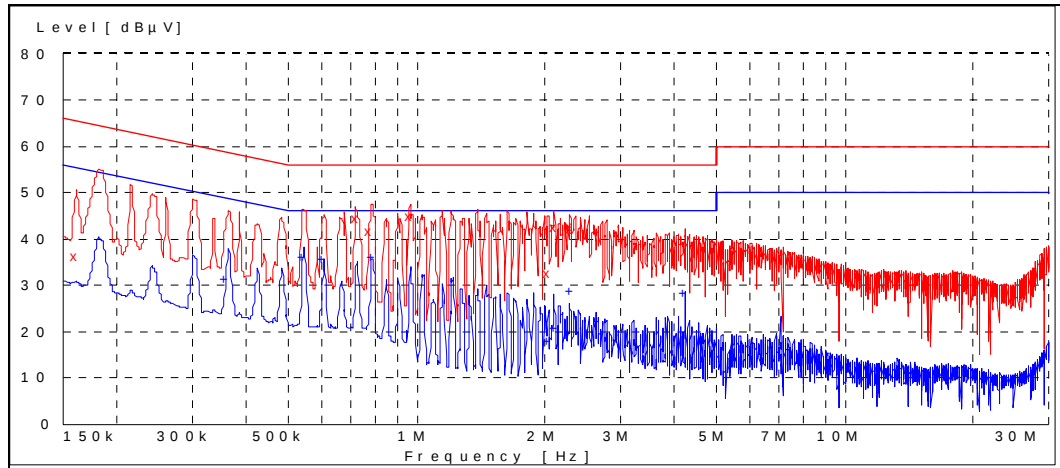
Frequency [MHz]	U [dBμV]	Line	Result
0.165000	35.90	N	PASSED
0.310000	32.90	N	PASSED
0.580000	27.10	L1	PASSED

Average (RBW: 9 kHz)

Frequency [MHz]	U [dBμV]	Line	Result
0.190000	29.60	L1	PASSED
0.310000	27.40	L1	PASSED
0.560000	21.10	L1	PASSED
4.240000	25.60	N	PASSED

7.2.2 8DPSK modulation, PRBS packet type

Channel 39 / 2441 MHz



Quasi peak (RBW: 9 kHz)

Frequency [MHz]	U [dBμV]	Line	Result
0.160000	36.20	N	PASSED
0.725000	44.30	L1	PASSED
0.785000	41.70	L1	PASSED
0.970000	45.10	L1	PASSED
2.045000	32.60	N	PASSED
2.115000	42.50	L1	PASSED
2.300000	42.30	L1	PASSED
2.305000	42.80	L1	PASSED

Average (RBW: 9 kHz)

Frequency [MHz]	U [dBμV]	Line	Result
0.360000	31.20	L1	PASSED
0.545000	36.10	L1	PASSED
0.610000	35.60	L1	PASSED
0.795000	36.00	L1	PASSED
2.050000	18.00	N	PASSED
2.120000	20.80	N	PASSED
2.305000	28.80	L1	PASSED
4.240000	28.30	L1	PASSED

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

EUT with DUT number	RM-146 DUT 40722
Accessories with DUT numbers	SF-17D DUT 40724
Operation Voltage [V] / [Hz]	4.0 VDC
Result	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	22-23 / 44-45 / 100.6-102.7
Date of measurements	27-30.6.2006
Measured by	Jari Jantunen

8.1. Test method and limit

The measurement is made according to FCC rules part 15.247 and IC standard RSS-210.

Limits for 20 dB bandwidth measurements

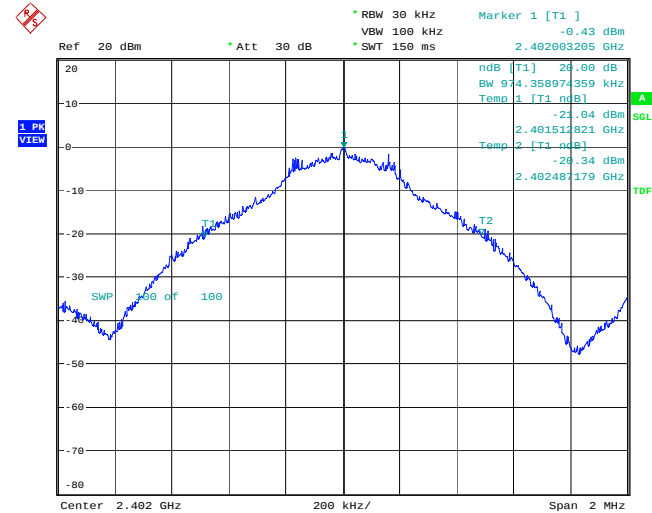
Limit [MHz]
N/A

8.2. Bluetooth Test results

8.2.1 GFSK modulation, PRBS packet type

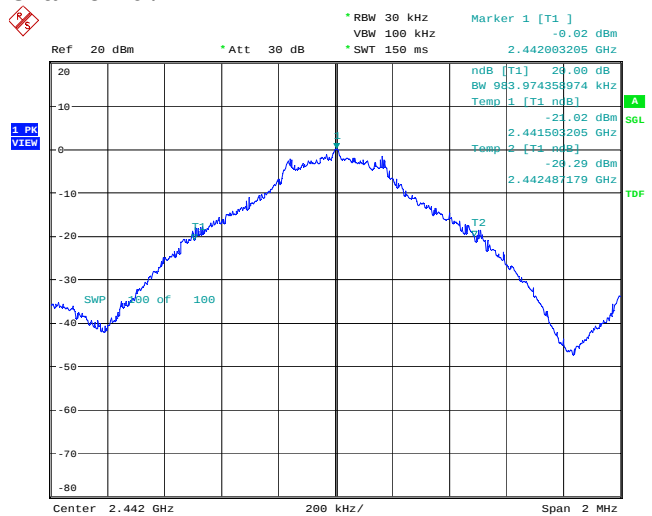
Channel / f _c [MHz]	20 dB bandwidth [kHz]	Result
0 / 2402	974.359	PASSED
40 / 2442	983.974	PASSED
78 / 2480	955.128	PASSED

Channel 0 / 2402 MHz



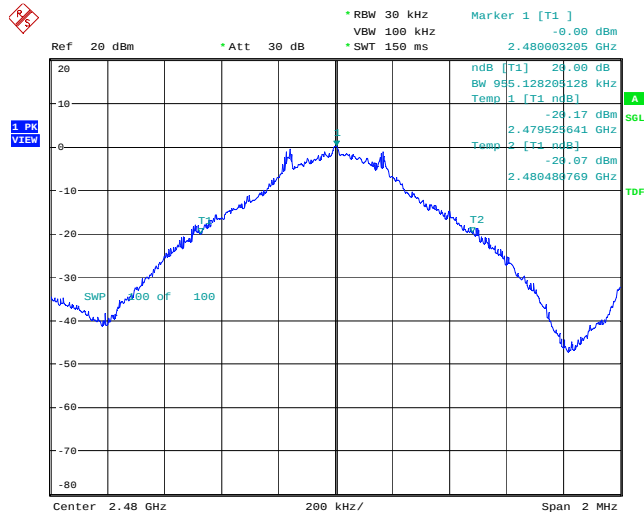
Date: 27.JUN.2006 14:24:44

Channel 40 / 2442 MHz



Date: 27.JUN.2006 14:26:17

Channel 78 / 2480 MHz

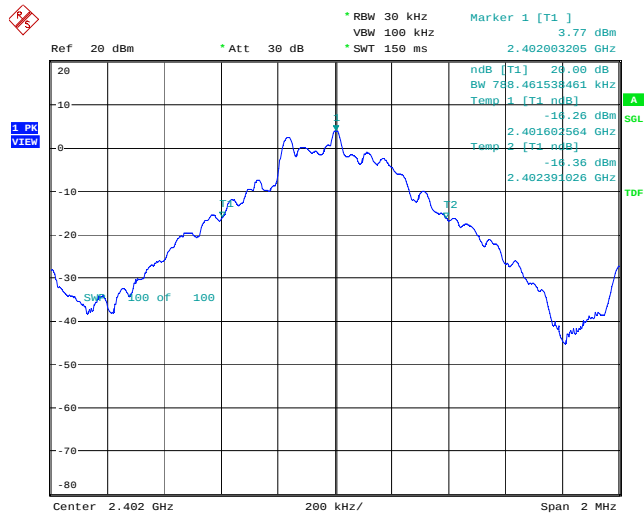


Date: 27. JUN.2006 14:25:30

8.2.2 8DPSK modulation, PRBS packet type

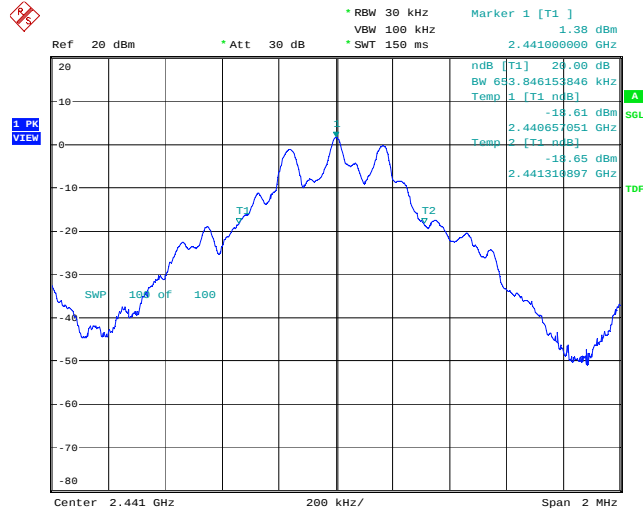
Channel / f _c [MHz]	20 dB bandwidth [kHz]	Result
0 / 2402	788.462	PASSED
39 / 2441	653.846	PASSED
78 / 2480	794.872	PASSED

Channel 0 / 2402 MHz



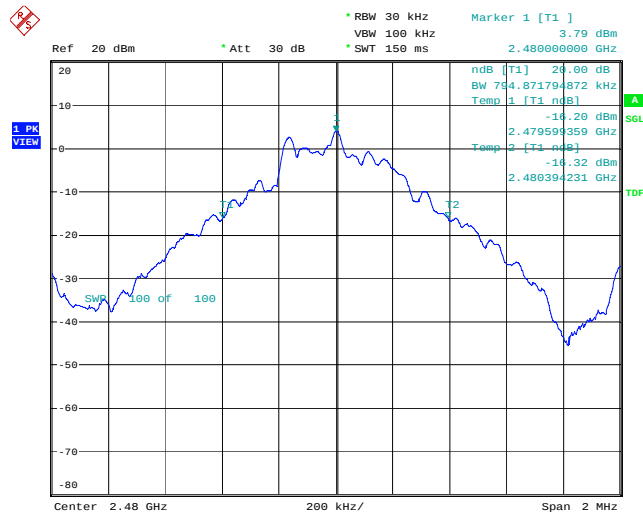
Date: 30. JUN.2006 13:13:53

Channel 39 / 2441 MHz



Date: 30 JUN.2006 13:16:04

Channel 78 / 2480 MHz



Date: 30 JUN.2006 13:17:50

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

EUT with DUT number	RM-146 DUT 40722
Accessories with DUT numbers	SF-17D DUT 40724
Operation Voltage [V] / [Hz]	4.0 VDC
Result	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	22-23 / 44-45 / 100.6-102.7
Date of measurements	27-30.6.2006
Measured by	Jari Jantunen

9.1. Test method and limit

The measurement is made according to FCC rules part 15.247 and IC standard RSS-210.

Limits for carrier frequency separation measurements

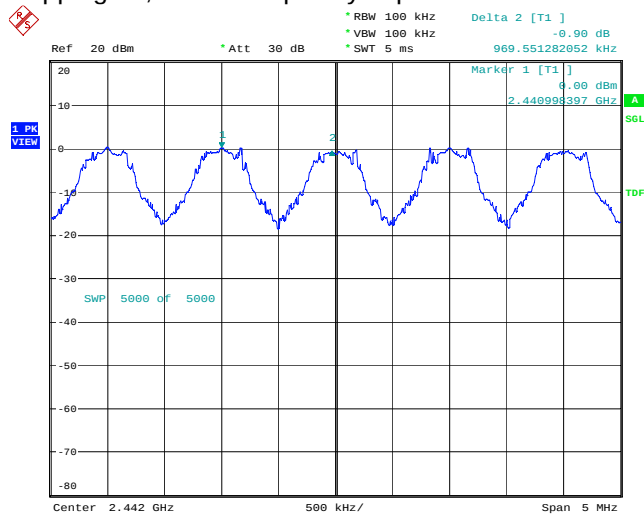
Limit [MHz]
≥ 0.025 or $2/3$ of the 20 dB bandwidth

9.2. Bluetooth Test results

9.2.1 GFSK modulation, PRBS packet type

Carrier frequency separation [kHz]	Result
969.551	PASSED

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

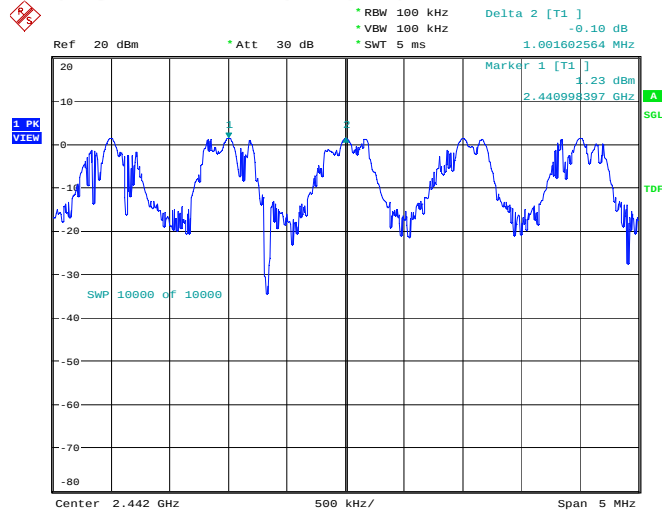


Date: 27. JUN. 2006 12:15:07

9.2.2 8DPSK modulation, PRBS packet type

Carrier frequency separation [kHz]	Result
1001.603	PASSED

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



Date: 30.JUN.2006 14:52:41

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

EUT with DUT number	RM-146 DUT 40722
Accessories with DUT numbers	SF-17D DUT 40724
Operation Voltage [V] / [Hz]	4.0 VDC
Result	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	22-23 / 44-45 / 100.6-102.7
Date of measurements	27-30.6.2006
Measured by	Jari Jantunen

10.1. Test method and limit

The measurement is made according to FCC rules part 15.247 and IC standard RSS-210.

Limits for number of hopping frequencies measurements

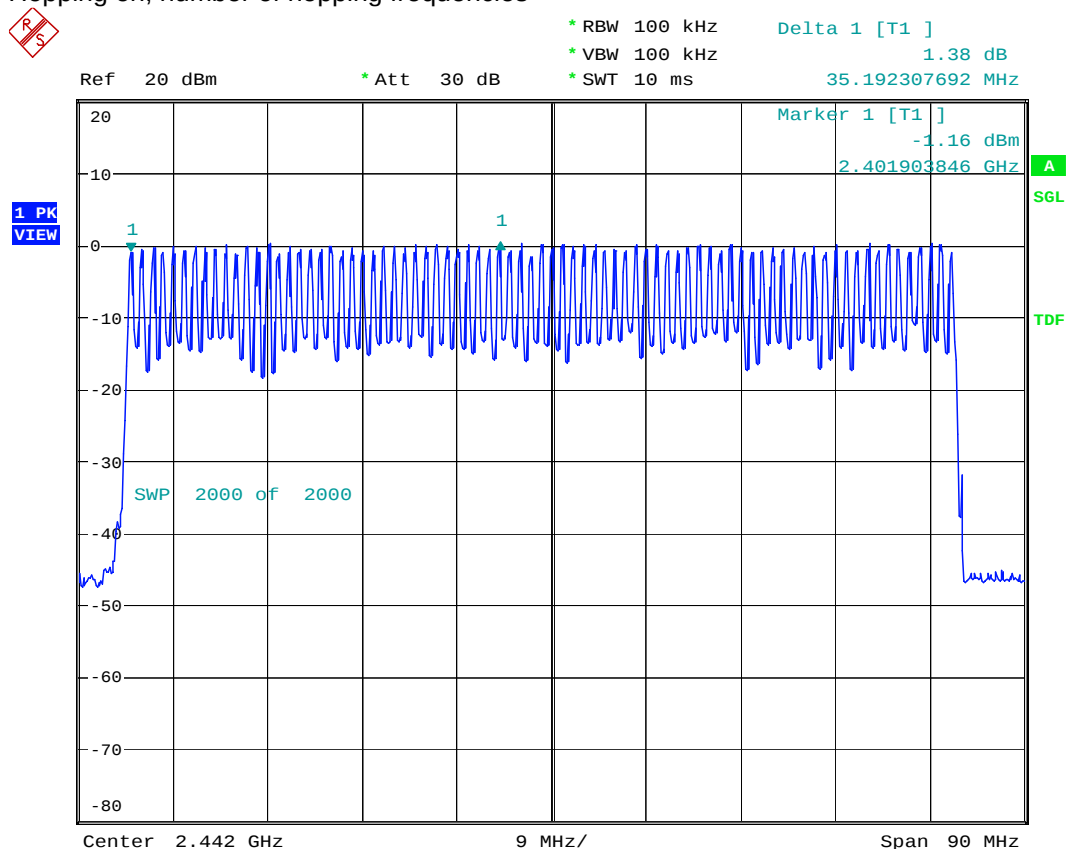
Limit [number]
≥ 15

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

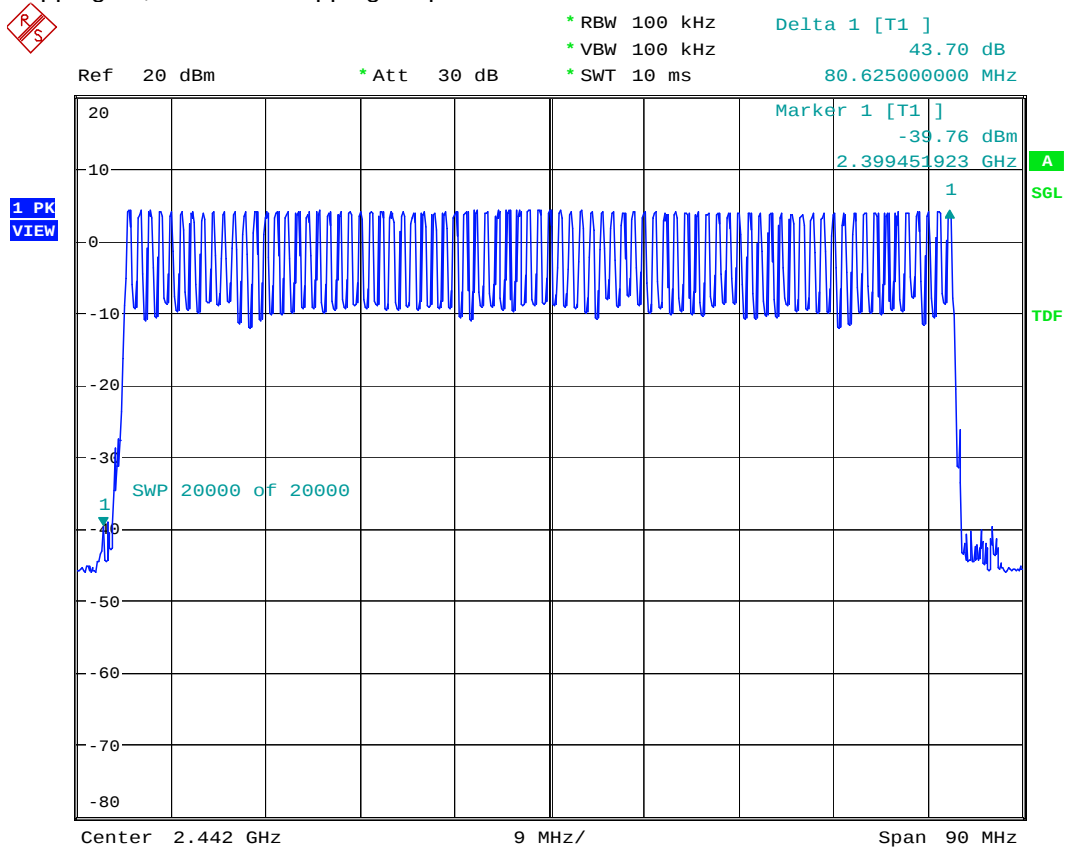


Date: 27.JUN.2006 12:09:39

10.2.2 8DPSK modulation, PRBS packet type

Measured number of hopping frequencies	Result
80	PASSED

Hopping on, number of hopping frequencies



Date: 30.JUN.2006 14:32:16

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

EUT with DUT number	RM-146 DUT 40722
Accessories with DUT numbers	SF-17D DUT 40724
Operation Voltage [V] / [Hz]	4.0 VDC
Result	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	22-23 / 44-45 / 100.6-102.7
Date of measurements	27-30.6.2006
Measured by	Jari Jantunen

11.1. Test method and limit

The measurement is made according to FCC rules part 15.247 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

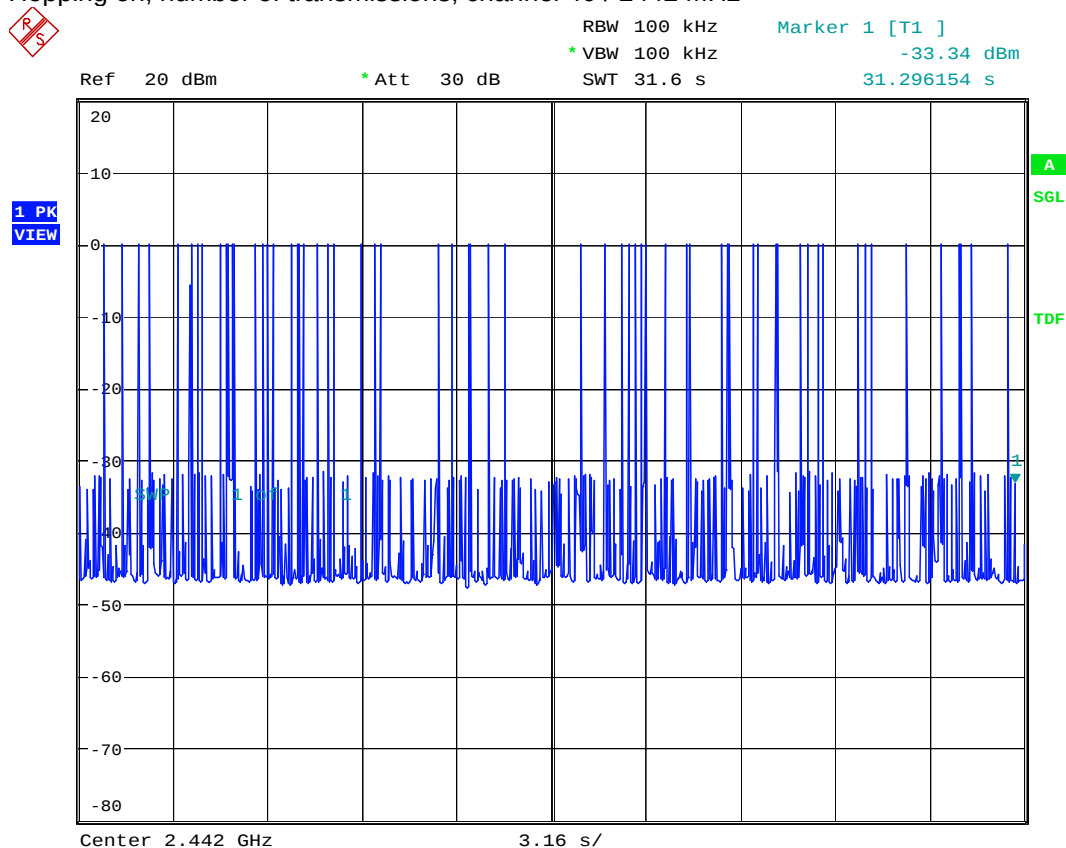
Limit [s]
≤ 0.4

11.2. Bluetooth test results

11.2.1 GFSK modulation, PRBS packet type

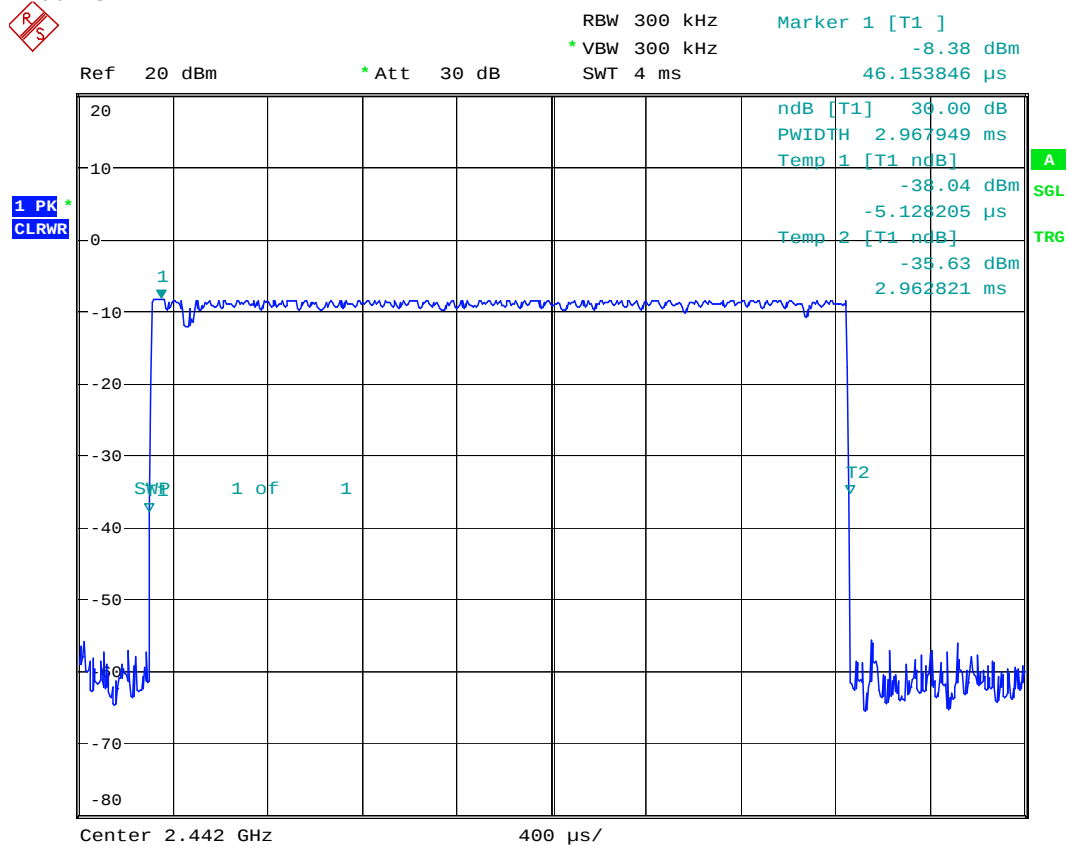
Measured number of transmissions	Duration of one transmission [μ s]	Time of occupancy [s]	Result
61	2967.949	0.181045	PASSED

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



Date: 27.JUN.2006 12:11:35

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

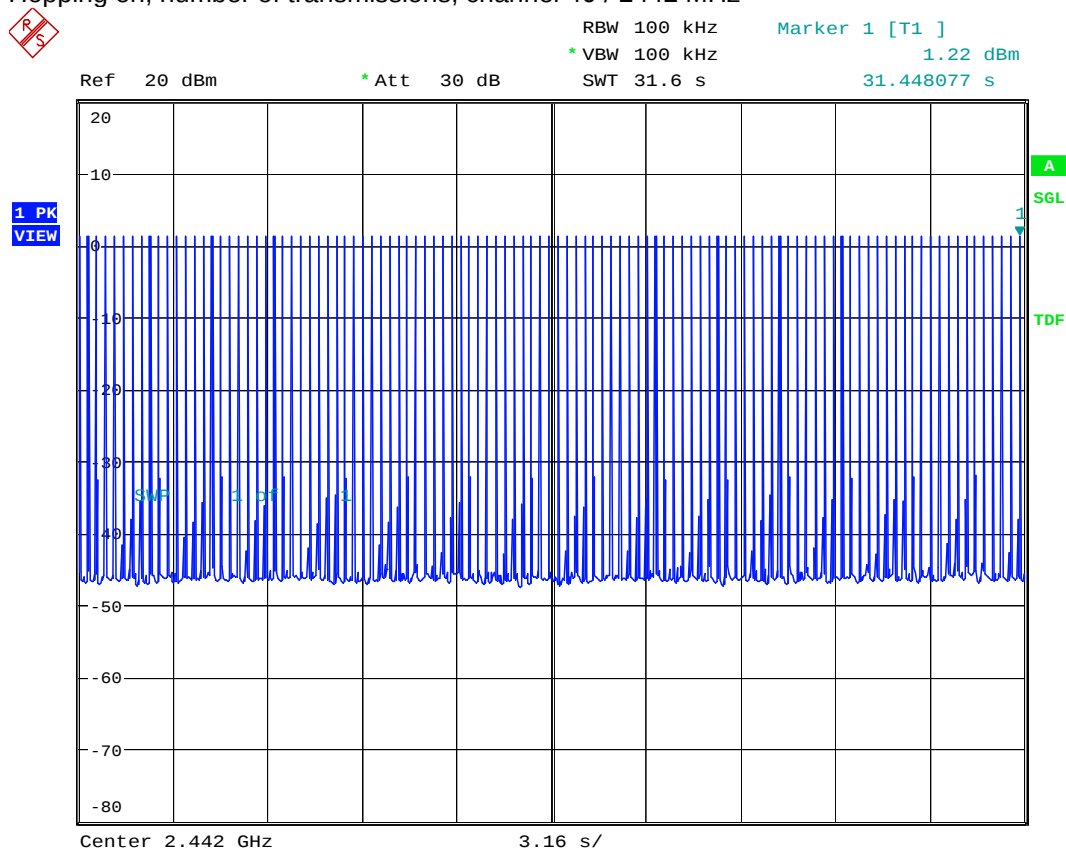


Date: 27.JUN.2006 12:11:45

11.2.2 8DPSK modulation, PRBS packet type

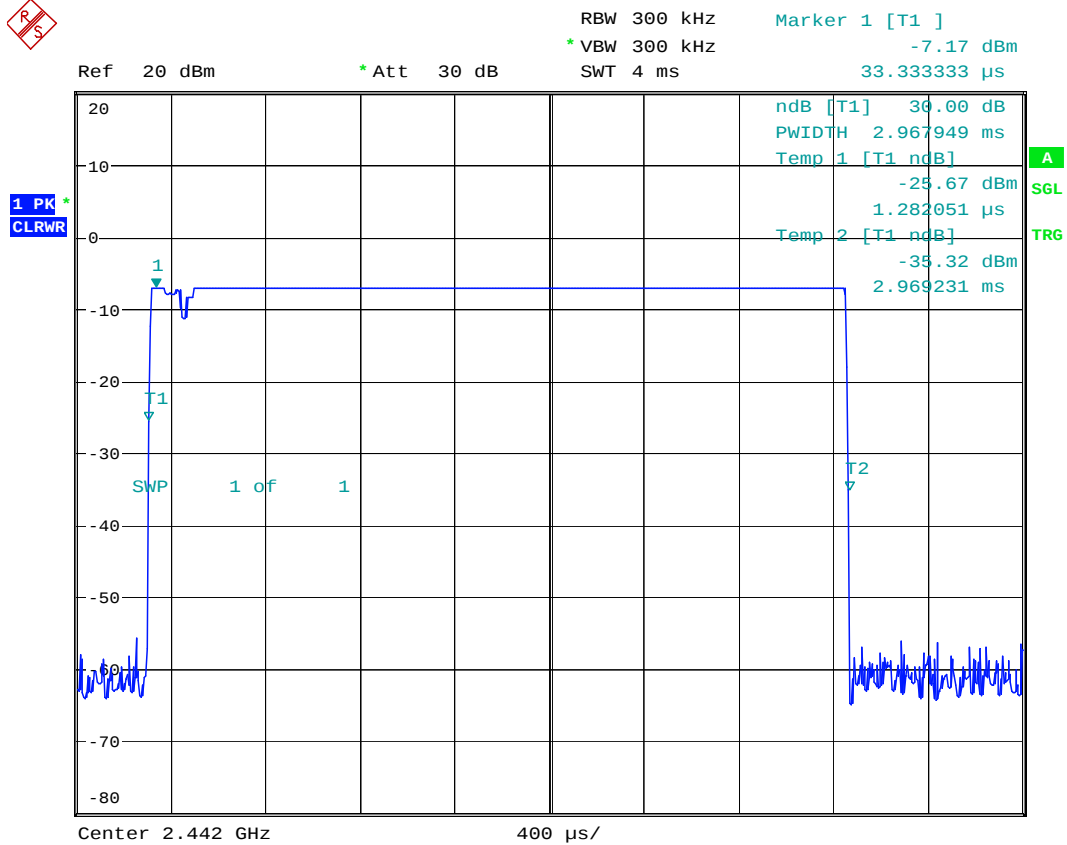
Measured number of transmissions	Duration of one transmission [μ s]	Time of occupancy [s]	Result
107	2967.949	0.317571	PASSED

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



Date: 30.JUN.2006 14:46:31

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



Date: 30.JUN.2006 14:46:41

12. Test Equipment

12.1. Conducted measurements

Eq. No	Equipment	Type	Manufacturer	Used in
TM37610	Spectrum analyzer	FSU	R&S	15C,22/24
TM37678	Radio communication tester	CMU-200	R&S	15C,22/24
	Attenuator 10 dB	6251.17.A	Huber+Suhner AG	15C,22/24
TM22901	Step attenuator 110dB	8496A	Agilent	15C,22/24
TM37499	Power splitter	11667A	Agilent	15C,22/24
	Temperature chamber	VT4002	Vötsch	15C,22/24
TM38112	DC power supply	6632A	Agilent	15C,22/24
TM38111	Multimeter	34401A	Agilent	15C,22/24
TM38845	EMI receiver	ESI 40	R&S	15B,15C
TM37773	Radio communication tester	CMU-200	R&S	15B,15C
TM38631	Signal generator	83640L	Agilent	15B,15C
TM38114	DC power supply	6632A	Agilent	15B,15C
TM22835	Multimeter	87	Fluke	15B,15C
TM30600	Pulse Limiter	ESH3-Z2	R&S	15B,15C
TM26490	LISN 50 µH	ESH3-Z5/	R&S	15B,15C
TM30636	LISN 50 µH	L2-16/	PMM	15B,15C

12.2. Radiated measurements

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