

FCC Part 15C Compliance Test Report

Test Report no.:	Tre_FCC_0847_04.doc	Date of Report:	12-Dec-2008
Number of pages:	40	Customer's Contact person:	Jyrki Juvani
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	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.:	94436		
IC recognition no.:	3608		
Tested devices/ accessories:	Phone RM-431 / AC-Charger AC-10 E, Battery BL-4CT, Audio Adapter AD-54, Headset HS-45		
FCC ID:	LJPRM-431	IC:	661E-RM431
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:			

Petteri Suni, Test System Manager

1. Summary for FCC Part 15C Compliance Test Report

Date of receipt	18-Nov-2008
Testing completed	02-Dec-2008
The customer's contact person	Jyrki Juvani
Test Plan referred to	T:\Projects\RM-431\TestPlan_RS\RS_Testplan_RM-431.xls
Notes	-
Document name	T:\Projects\RM-431\EMC\Results\FCC\Tre_FCC_0847_04.doc

1.1. EUT and Accessory Information

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

Product	Type	SN	HW	MV	SW	DUT
Phone	RM-431	004401104171869	0412	-	v002.002	41710
Phone	RM-431	004401104172545	0412	-	v002.002	41709
Battery	BL-4CT	-	-	-	-	41713
Battery	BL-4CT	-	-	-	-	41712
AC-Charger	AC-10E	-	-	-	-	41700
AC-Charger	AC-10E	-	-	-	-	41701
Audio Adapter	AD-54	-	0.5	2.4	0.2	41703
Audio Adapter	AD-54	-	0.5	2.4	0.2	41704
Headset	HS-45	-	-	-	-	41706
Headset	HS-45	-	-	-	-	41705

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 (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

FAILED

NP

The EUT complies with the essential requirements in the standard.

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

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

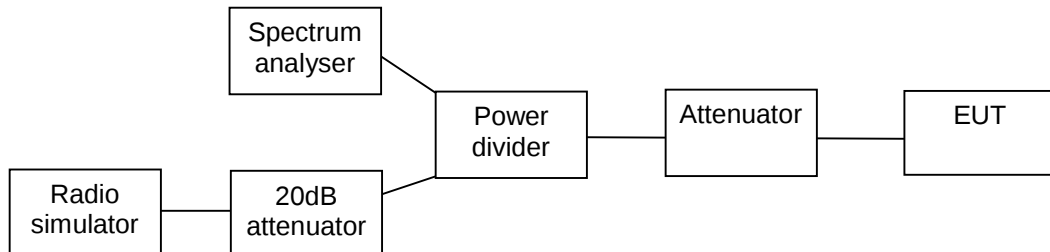
CONTENTS

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 (1))	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 (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

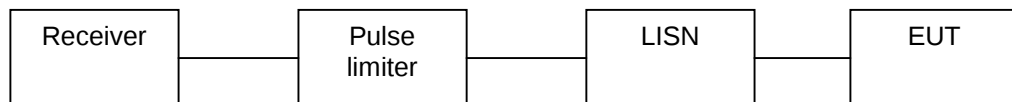
12.	Test Equipment	39
12.1.	Conducted measurements	39
12.2.	Radiated measurements	39

2. Test setups

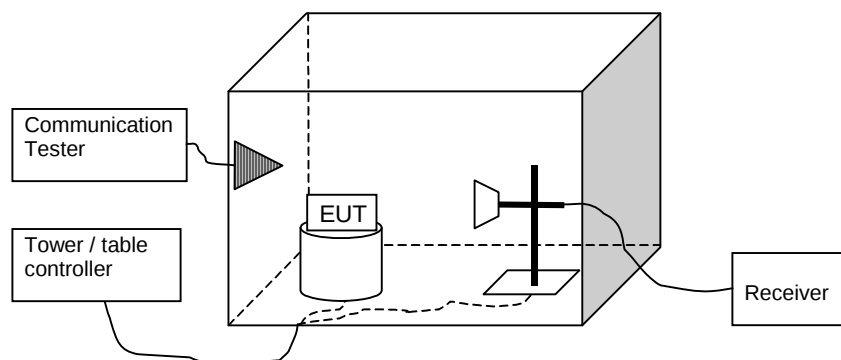
2.1. Conducted RF test setup



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	RM-431 DUT 41710
Accessories with DUT numbers	AC-10 E DUT 41700 / BL-4CT DUT 41713 / AD-54 DUT 41703 / HS-45 DUT 41706
Operation Voltage [V] / [Hz]	115/60
Result	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	21 / 50 / 99.6
Date of measurements	26-Nov-2008
Measured by	Petteri Suni

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

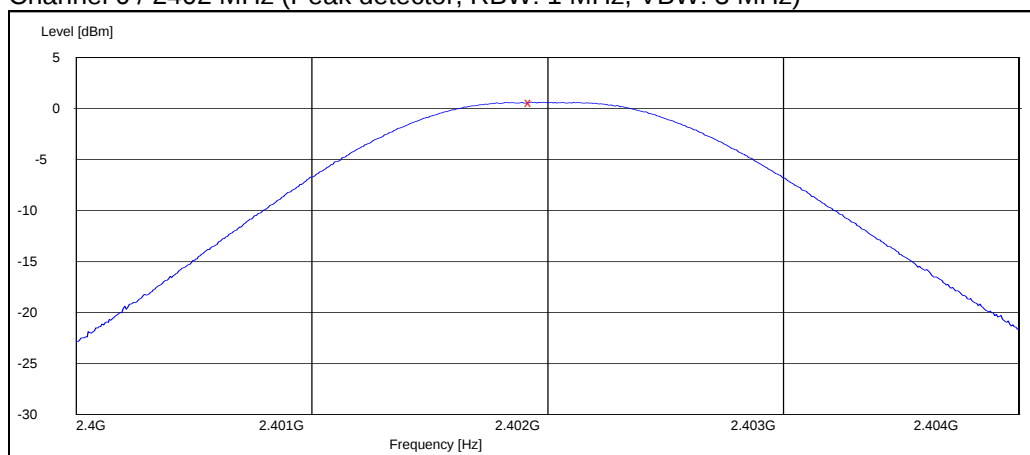
Frequency range [MHz]	Limit [W]	Limit [dBm]
2400 – 2483.5	≤ 1	≤ 30

3.2. Bluetooth Test results

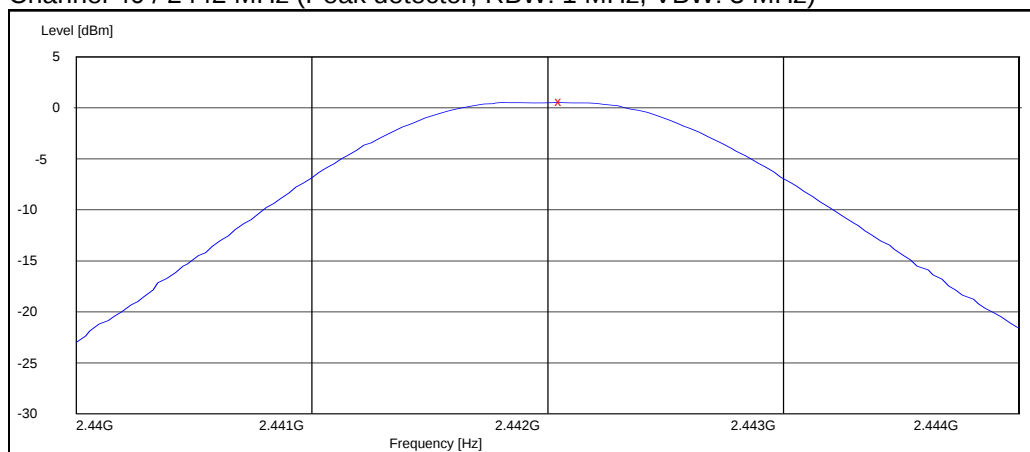
3.2.1 GFSK modulation, PRBS packet type

Channel / f_c [MHz]	P [dBm]	P [mW]	Result
0 / 2402	0.60	1.148	PASSED
40 / 2442	0.60	1.148	PASSED
78 / 2480	0.40	1.096	PASSED

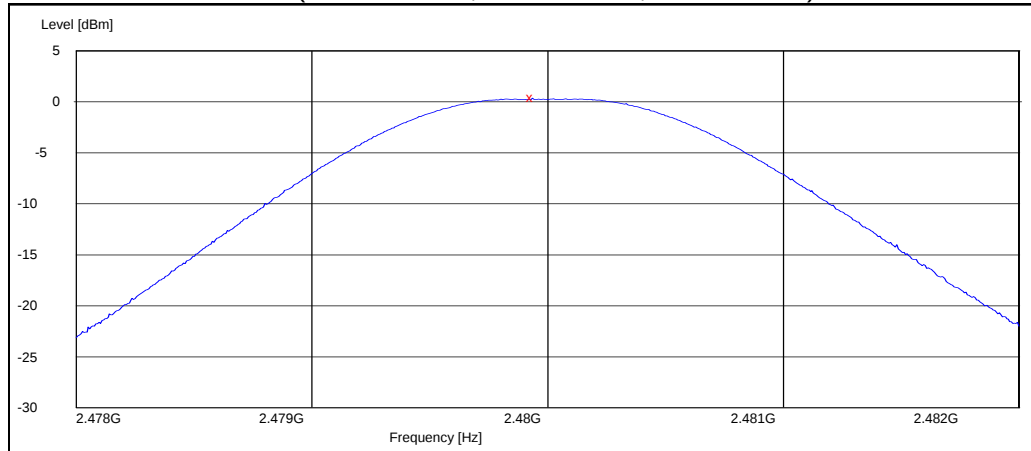
Channel 0 / 2402 MHz (Peak detector, RBW: 1 MHz, VBW: 3 MHz)



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



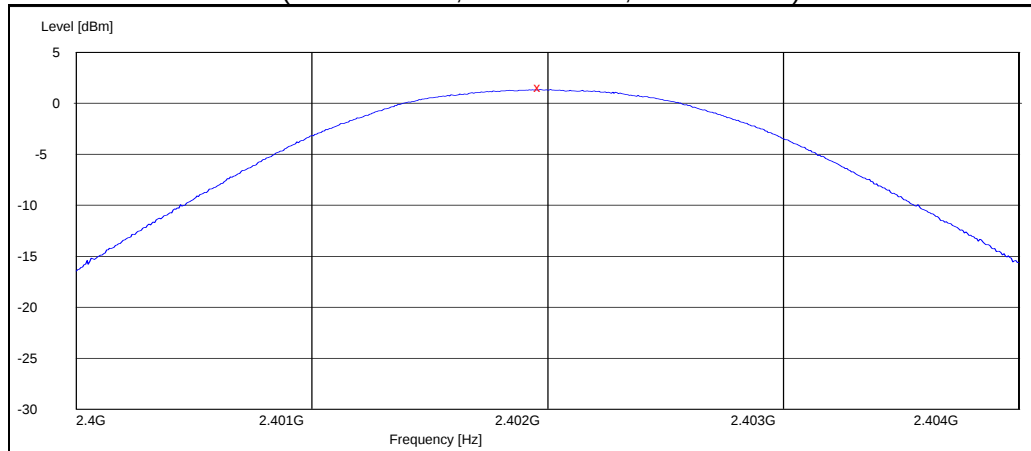
Channel 78 / 2480 MHz (Peak detector, RBW: 1 MHz, VBW: 3 MHz)



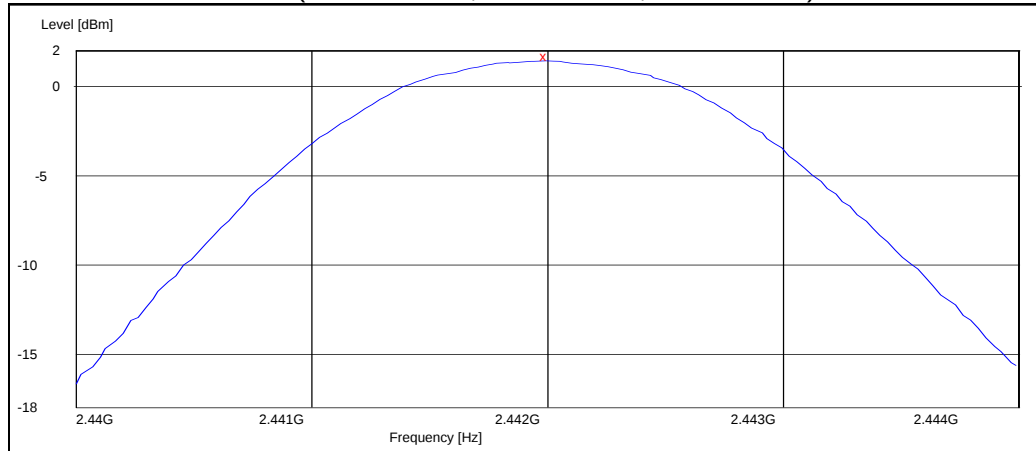
3.2.2 8DPSK modulation, PRBS packet type

Channel / f_c [MHz]	P [dBm]	P [mW]	Result
0 / 2402	1.50	1.413	PASSED
40 / 2442	1.70	1.479	PASSED
78 / 2480	1.60	1.445	PASSED

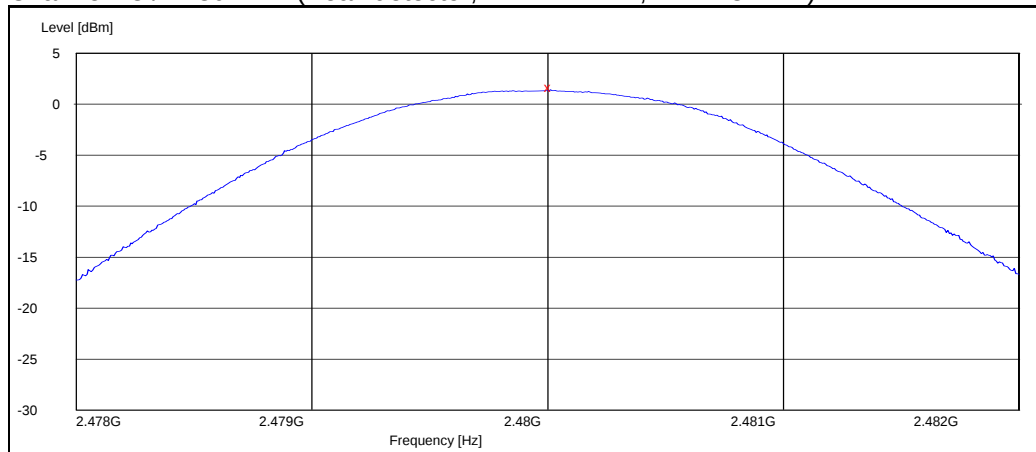
Channel 0 / 2402 MHz (Peak detector, RBW: 1 MHz, VBW: 3 MHz)



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	RM-431 DUT 41709
Accessories with DUT numbers	BL-4CT DUT 41712 / AD-54 DUT 41704 / HS-45 DUT 41705 / AC-10E DUT 41701
Operation Voltage [V] / [Hz]	115/60
Result	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	23 / 47 / 99.7
Date of measurements	25-Nov-2008
Measured by	Jari Jantunen

4.1. Test method and limit

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

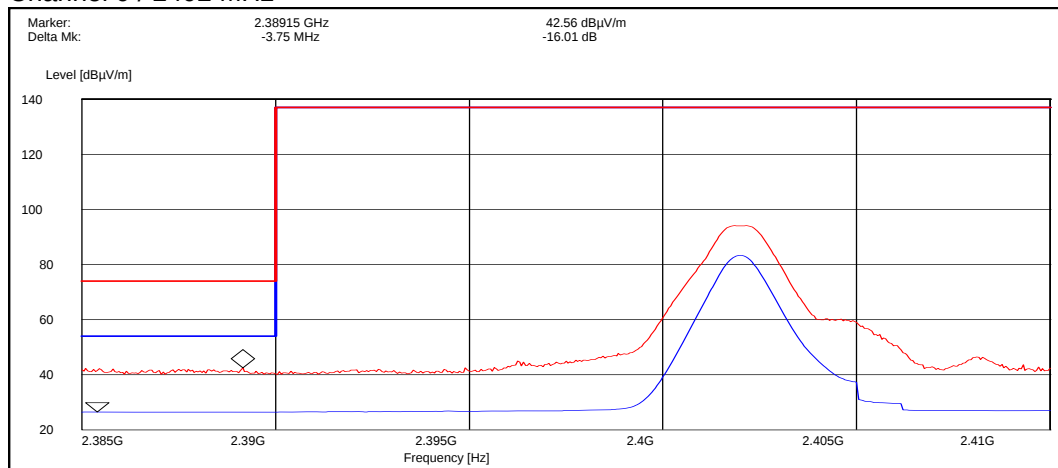
Limits for band edge compliance of RF emissions measurements (3 m measurement distance)

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

4.2. Bluetooth Test results

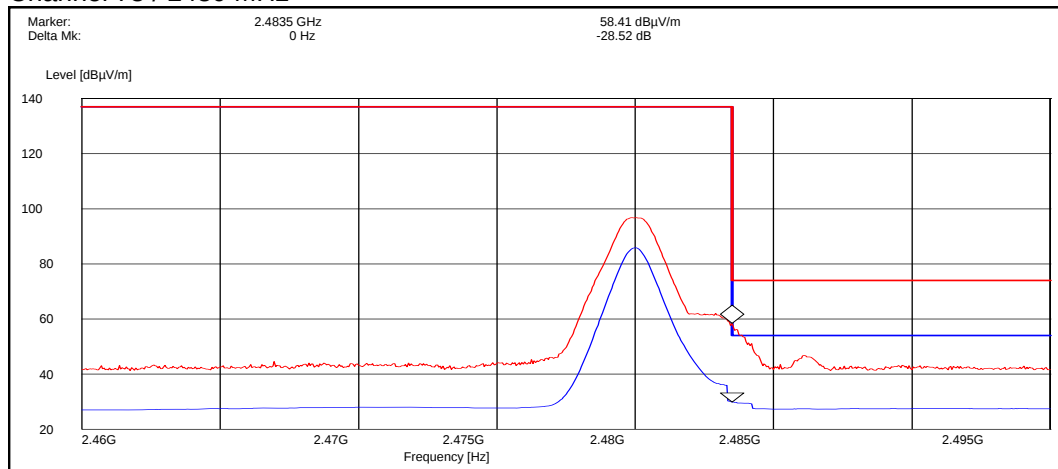
4.2.1 GFSK modulation, PRBS packet type

Channel 0 / 2402 MHz



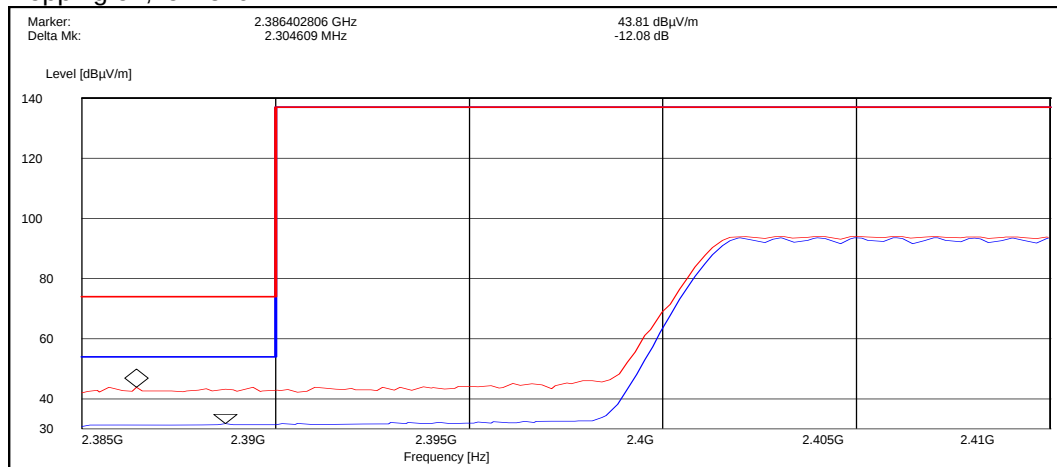
Detector (RBW: 1 MHz)	E [dBμV/m]	Result
Peak	42.60	PASSED
Average	26.60	PASSED

Channel 78 / 2480 MHz



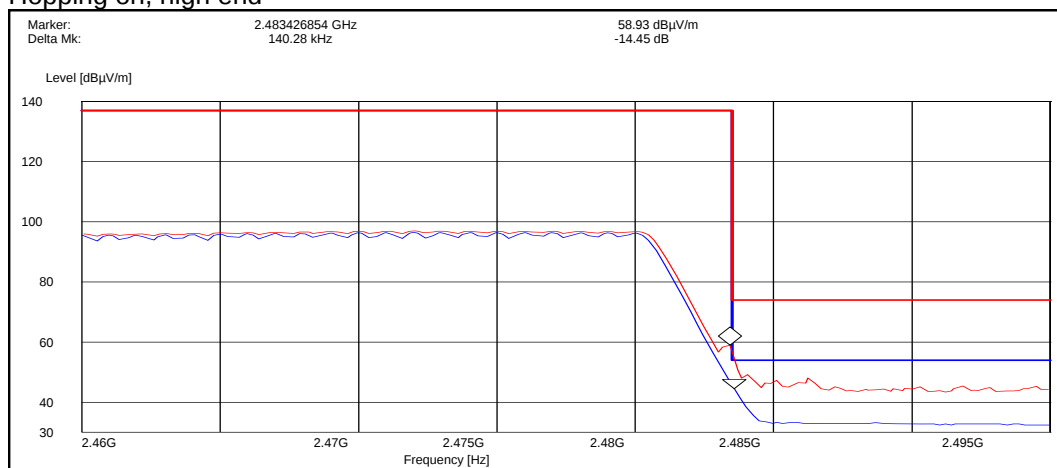
Detector (RBW: 1 MHz)	E [dBμV/m]	Result
Peak	58.40	PASSED
Average	29.90	PASSED

Hopping on, low end



Detector (RBW: 1 MHz)	E [dB μ V/m]	Result
Peak	43.80	PASSED
Average	31.70	PASSED

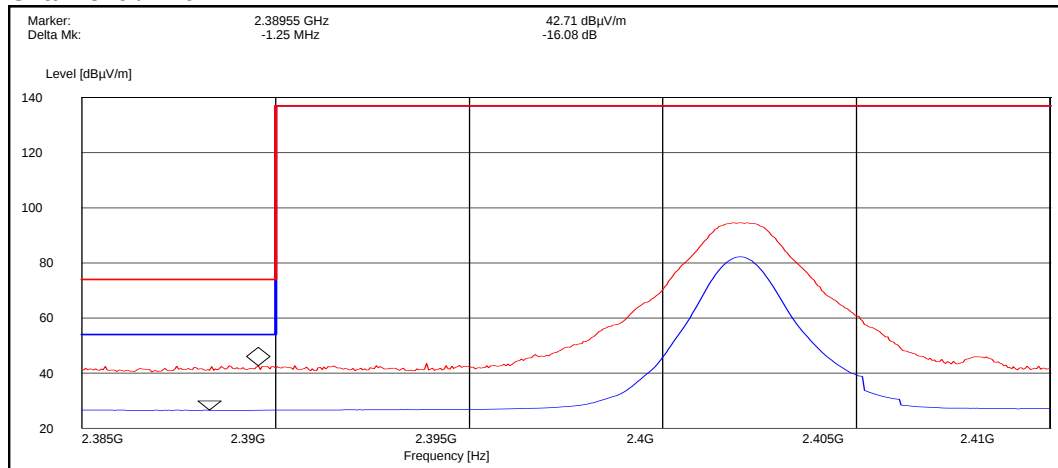
Hopping on, high end



Detector (RBW: 1 MHz)	E [dB μ V/m]	Result
Peak	58.90	PASSED
Average	44.50	PASSED

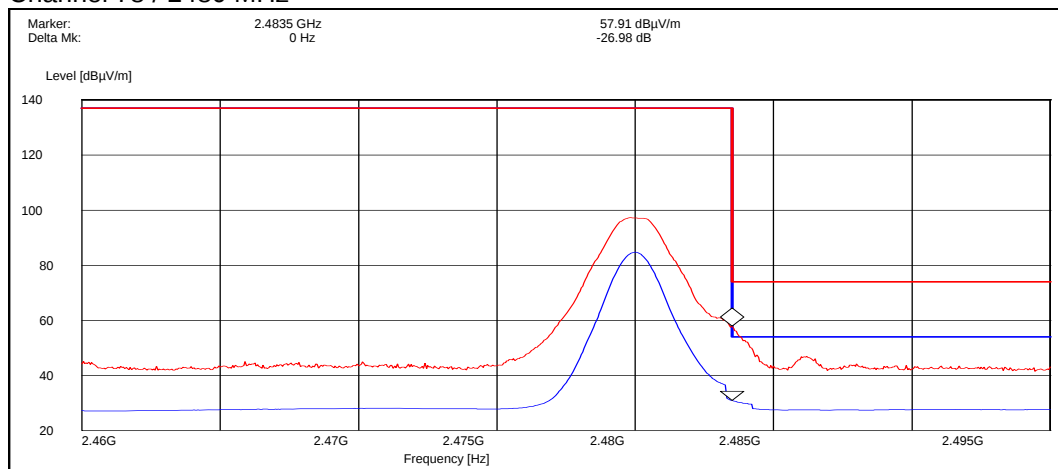
4.2.2 8DPSK modulation, PRBS packet type

Channel 0 / 2402 MHz



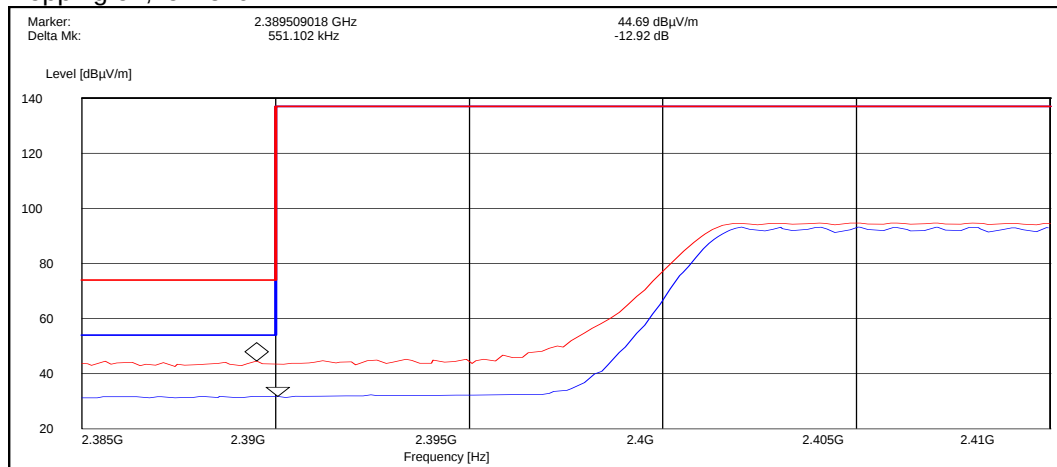
Detector (RBW: 1 MHz)	E [dB μ V/m]	Result
Peak	42.70	PASSED
Average	26.60	PASSED

Channel 78 / 2480 MHz



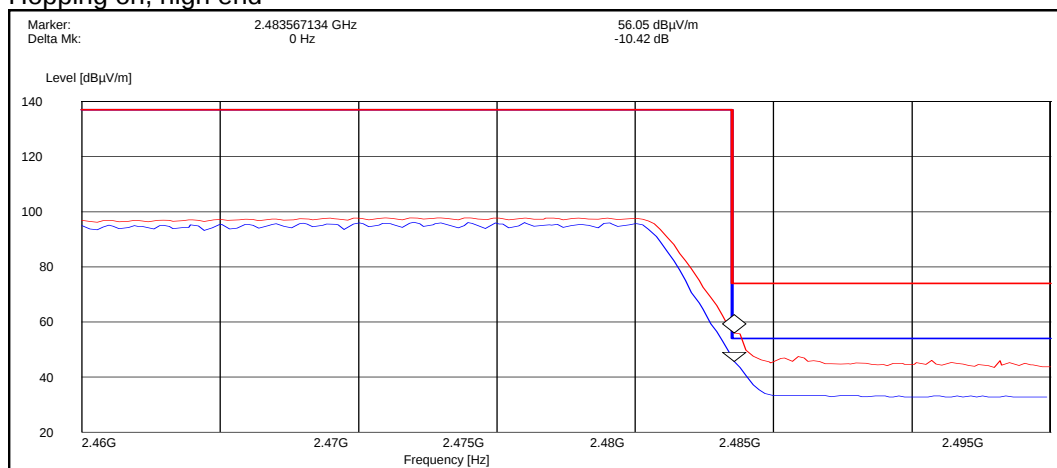
Detector (RBW: 1 MHz)	E [dB μ V/m]	Result
Peak	57.90	PASSED
Average	30.90	PASSED

Hopping on, low end



Detector (RBW: 1 MHz)	E [dB μ V/m]	Result
Peak	44.70	PASSED
Average	31.80	PASSED

Hopping on, high end



Detector (RBW: 1 MHz)	E [dB μ V/m]	Result
Peak	56.10	PASSED
Average	45.60	PASSED

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

EUT with DUT number	RM-431 DUT 41710
Accessories with DUT numbers	AC-10 E DUT 41700 / BL-4CT DUT 41713 / AD-54 DUT 41703 / HS-45 DUT 41706
Operation Voltage [V] / [Hz]	115/60
Result	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	21 / 50 / 99.6
Date of measurements	26-Nov-2008
Measured by	Petteri Suni

5.1. Test method and limit

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

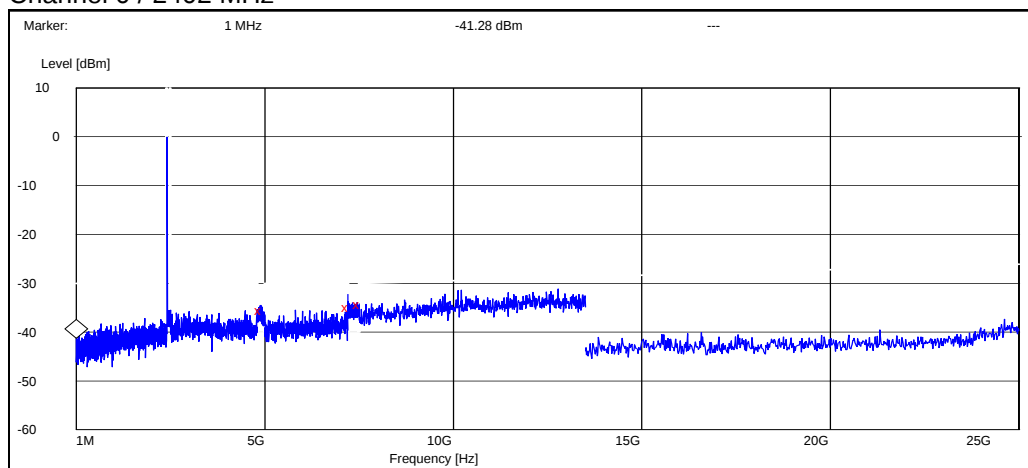
Limits for spurious RF conducted emissions measurements

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

5.2. Bluetooth Test results

5.2.1 GFSK modulation, PRBS packet type

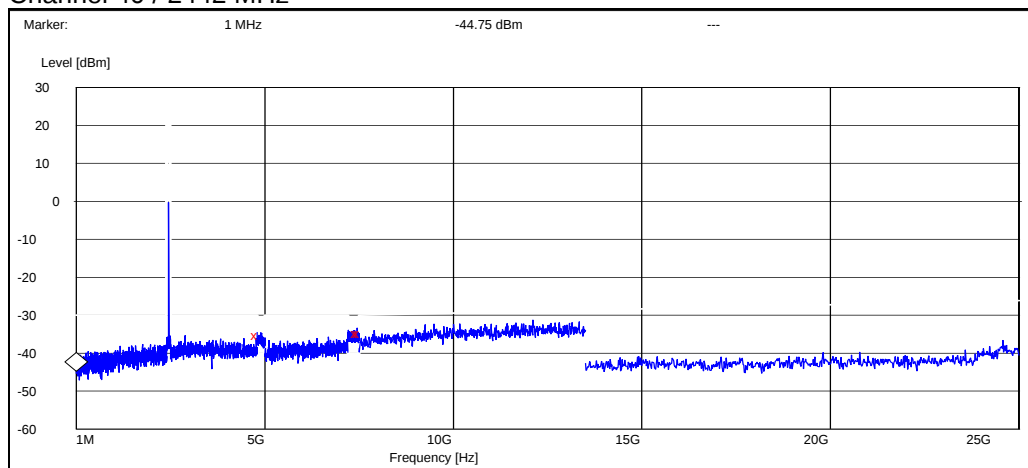
Channel 0 / 2402 MHz



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

Frequency [MHz]	P [dBc]	Result
4900.961538	-35.6824	PASSED
7205.288462	-36.2824	PASSED
7500.000000	-36.8824	PASSED

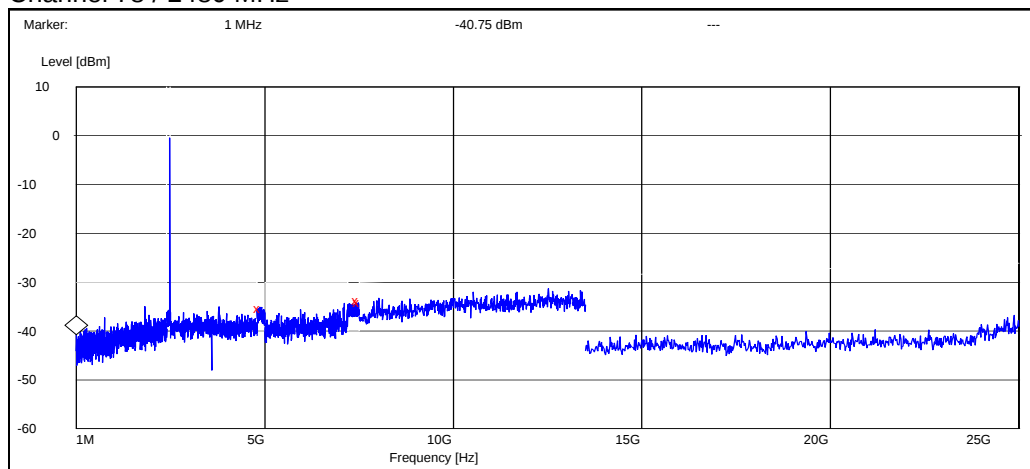
Channel 40 / 2442 MHz



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

Frequency [MHz]	P [dBc]	Result
4804.487179	-39.4476	PASSED
7444.230769	-40.0476	PASSED
7500.000000	-40.0476	PASSED

Channel 78 / 2480 MHz

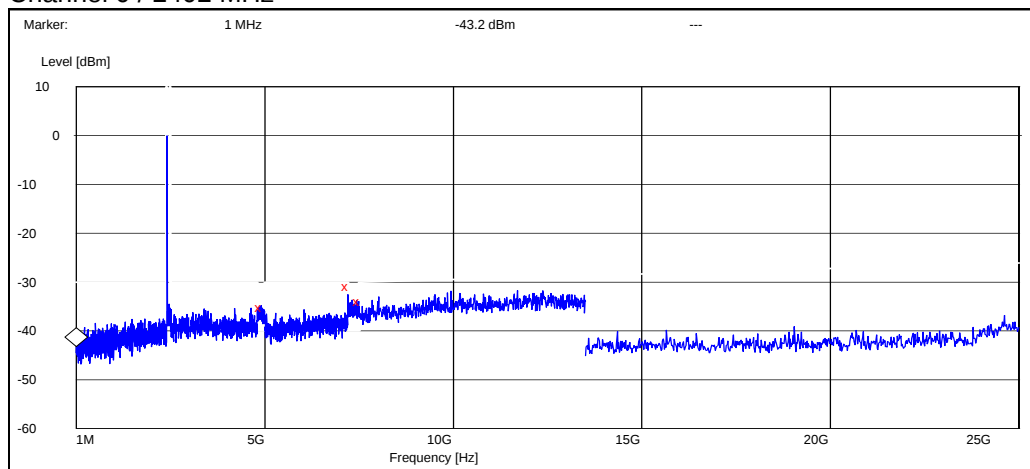


Peak (RBW: 100 kHz, VBW: 100 kHz)

Frequency [MHz]	P [dBc]	Result
4871.153846	-35.3450	PASSED
7480.769231	-36.9450	PASSED
7500.000000	-36.5450	PASSED

5.2.2 8DPSK modulation, PRBS packet type

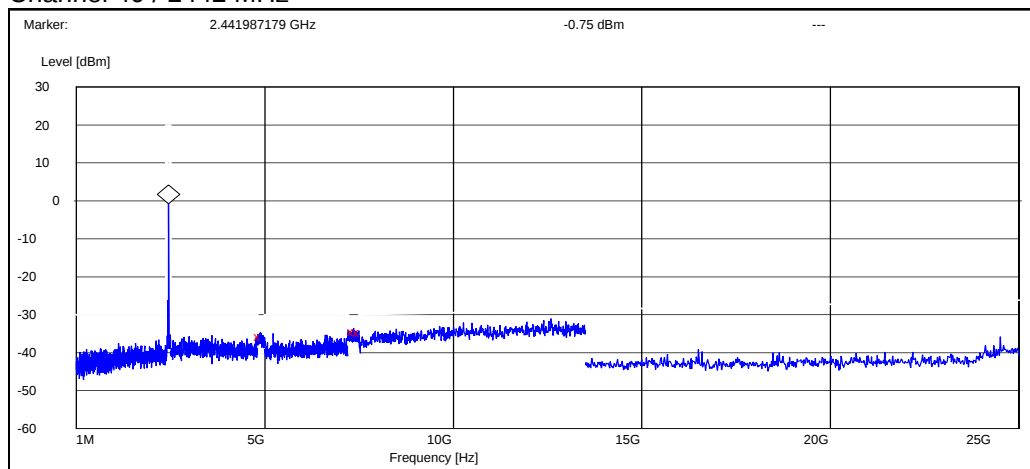
Channel 0 / 2402 MHz



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

Frequency [MHz]	P [dBc]	Result
4911.858974	-37.8993	PASSED
7205.769231	-42.2993	PASSED
7500.000000	-39.1993	PASSED

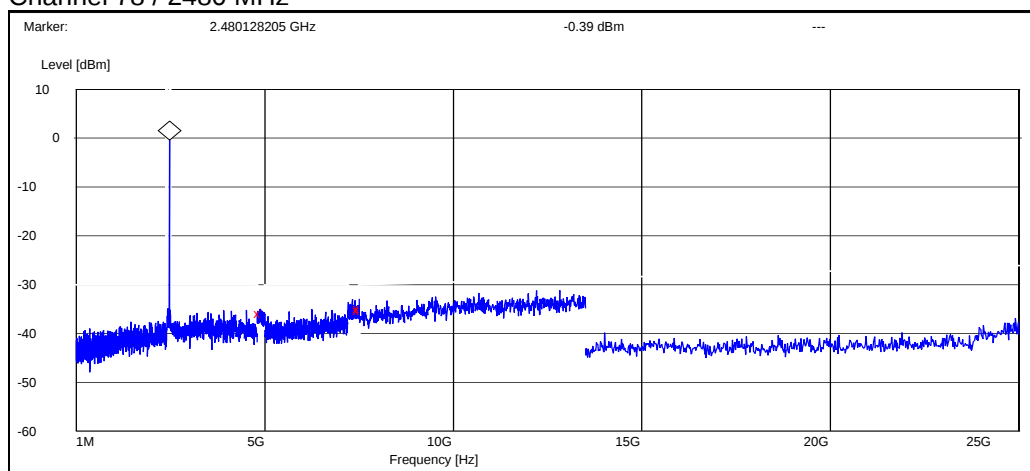
Channel 40 / 2442 MHz



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

Frequency [MHz]	P [dBc]	Result
4880.128205	-34.951161	PASSED
7355.288462	-33.751161	PASSED
7500.000000	-33.851161	PASSED

Channel 78 / 2480 MHz



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

Frequency [MHz]	P [dBc]	Result
4882.371795	-35.406178	PASSED
7500.000000	-34.506178	PASSED
7500.000000	-34.906178	PASSED

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

EUT with DUT number	RM-431 DUT 41709
Accessories with DUT numbers	BL-4CT DUT 41712 / AD-54 DUT 41704 / HS-45 DUT 41705 / AC-10E DUT 41701
Operation Voltage [V] / [Hz]	115/60
Result	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	23 / 47 / 99.7
Date of measurements	25-Nov-2008
Measured by	Jari Jantunen

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:

$$E [\mu\text{V/m}] = U_{RX} + A_{TOT}$$

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	48.90	278.61	50.00	-1.1	HORIZONTAL	PASSED
7206.000000	62.10	1 273.50	59.30	2.8	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	36.40	66.07	37.50	-1.1	HORIZONTAL	PASSED
7206.000000	48.00	251.19	45.20	2.8	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
38.235872	23.00	14.13	37.30	-14.3	VERTICAL	PASSED
74.469940	17.30	7.33	40.90	-23.6	HORIZONTAL	PASSED
74.488978	18.00	7.94	41.60	-23.6	HORIZONTAL	PASSED
121.823246	20.40	10.47	42.50	-22.1	VERTICAL	PASSED
123.666132	22.80	13.80	45.10	-22.3	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
4883.767535	47.00	223.87	48.50	-1.5	HORIZONTAL	PASSED
4883.769539	47.00	223.87	48.50	-1.5	HORIZONTAL	PASSED
7325.653307	58.10	803.53	54.80	3.3	HORIZONTAL	PASSED
7326.151303	57.90	785.24	54.60	3.3	VERTICAL	PASSED
17939.883768	52.90	441.57	33.10	19.8	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
4883.767535	33.80	48.98	35.30	-1.5	HORIZONTAL	PASSED
4884.269539	33.30	46.24	34.70	-1.4	HORIZONTAL	PASSED
7325.651303	44.00	158.49	40.70	3.3	VERTICAL	PASSED
7325.653307	43.60	151.36	40.30	3.3	HORIZONTAL	PASSED
17941.883768	40.40	104.71	20.60	19.8	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	47.10	226.46	47.60	-0.5	HORIZONTAL	PASSED
7440.000000	58.90	881.05	55.40	3.5	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	34.80	54.95	35.30	-0.5	HORIZONTAL	PASSED
7440.000000	45.10	179.89	41.60	3.5	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	49.70	305.49	50.80	-1.1	HORIZONTAL	PASSED
7206.000000	64.00	1 584.89	61.20	2.8	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
4804.000000	40.70	108.39	41.80	-1.1	HORIZONTAL	PASSED
7206.000000	55.20	575.44	52.40	2.8	HORIZONTAL	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
37.695391	18.30	8.22	32.20	-13.9	VERTICAL	PASSED
110.682565	18.00	7.94	40.00	-22.0	VERTICAL	PASSED
123.709018	21.60	12.02	43.90	-22.3	VERTICAL	PASSED
150.000000	21.90	12.45	46.10	-24.2	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
4883.769539	47.80	245.47	49.30	-1.5	HORIZONTAL	PASSED
4884.267535	47.70	242.66	49.10	-1.4	HORIZONTAL	PASSED
7326.151303	60.10	1 011.58	56.80	3.3	VERTICAL	PASSED
17919.843687	53.40	467.74	33.50	19.9	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
4883.767535	38.00	79.43	39.50	-1.5	HORIZONTAL	PASSED
4884.269539	37.80	77.62	39.20	-1.4	HORIZONTAL	PASSED
7326.151303	50.60	338.84	47.30	3.3	VERTICAL	PASSED
17920.343687	40.60	107.15	20.70	19.9	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	48.50	266.07	49.00	-0.5	HORIZONTAL	PASSED
7440.000000	61.50	1 188.50	58.00	3.5	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	38.70	86.10	39.20	-0.5	HORIZONTAL	PASSED
7440.000000	51.30	367.28	47.80	3.5	VERTICAL	PASSED

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

EUT with DUT number	RM-431 DUT 41709
Accessories with DUT numbers	BL-4CT DUT 41712 / AD-54 DUT 41704 / HS-45 DUT 41705 / AC-10E DUT 41701
Operation Voltage [V] / [Hz]	115/60
Result	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	20 / 47 / 100.7
Date of measurements	02-Dec-2008
Measured by	Jari Jantunen

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.

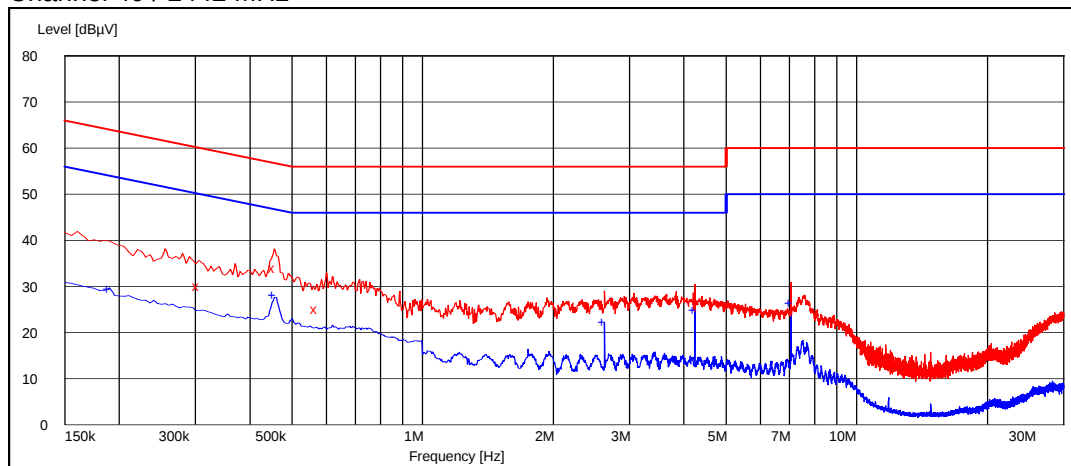
CISPR 22 Class B limits

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)

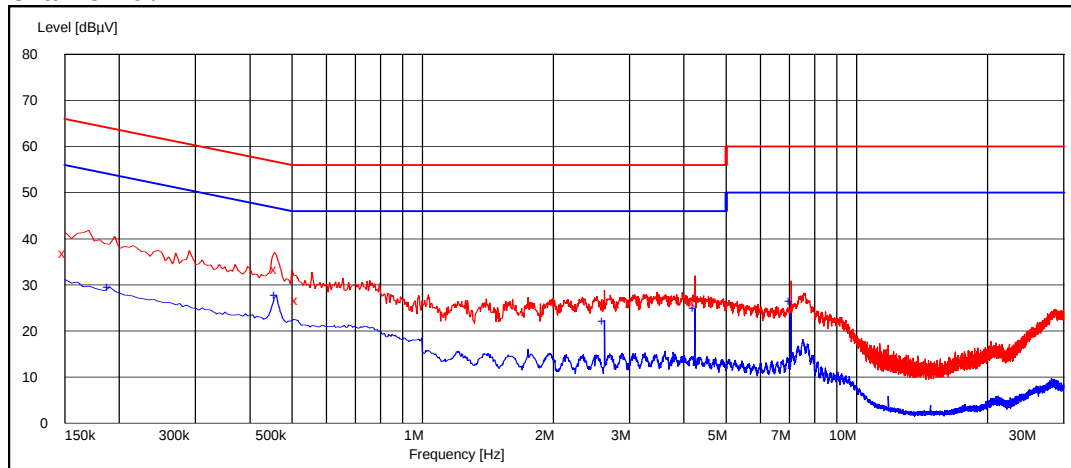
Frequency [MHz]	U [dBμV]	Line	Result
0.305000	30.00	L1	PASSED
0.455000	33.90	L1	PASSED
0.570000	25.10	L1	PASSED

Average (RBW: 9 kHz)

Frequency [MHz]	U [dBμV]	Line	Result
0.190000	29.50	L1	PASSED
0.455000	28.10	L1	PASSED
2.625000	22.30	L1	PASSED
4.240000	24.90	L1	PASSED
7.065000	26.40	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
0.150000	36.80	N	PASSED
0.460000	33.50	L1	PASSED
0.515000	26.60	L1	PASSED
4.240000	26.30	N	PASSED

Average (RBW: 9 kHz)

Frequency [MHz]	U [dBμV]	Line	Result
0.190000	29.50	N	PASSED
0.460000	27.80	L1	PASSED
2.625000	22.20	L1	PASSED
4.240000	25.00	L1	PASSED
7.065000	26.40	L1	PASSED

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

EUT with DUT number	RM-431 DUT 41710
Accessories with DUT numbers	AC-10 E DUT 41700 / BL-4CT DUT 41713 / AD-54 DUT 41703 / HS-45 DUT 41706
Operation Voltage [V] / [Hz]	115/60
Result	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	21 / 50 / 99.6
Date of measurements	26-Nov-2008
Measured by	Petteri Suni

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

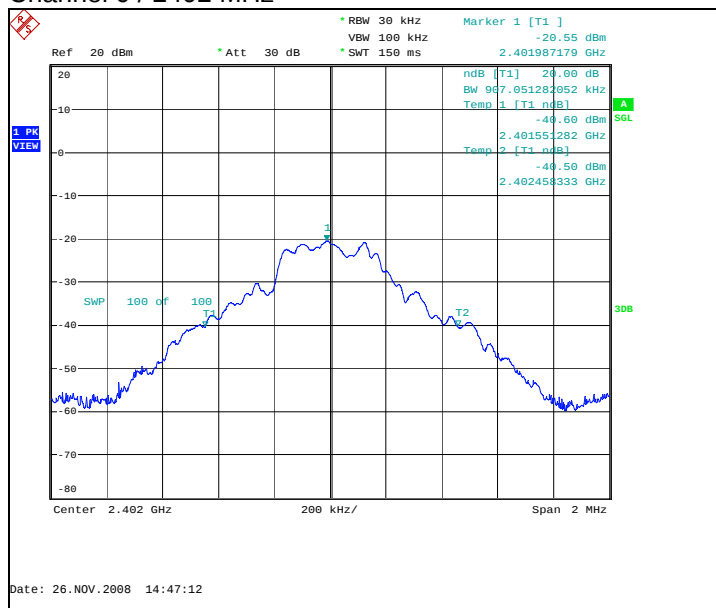
Limit [MHz]
N/A

8.2. Bluetooth Test results

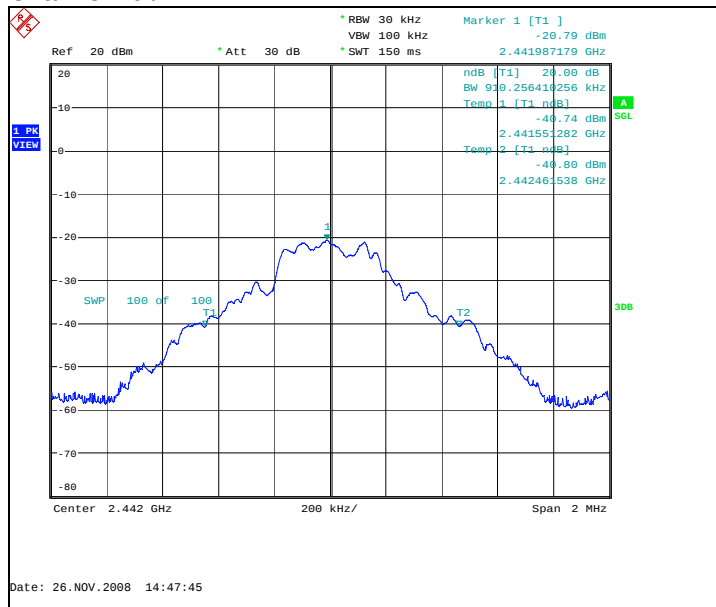
8.2.1 GFSK modulation, PRBS packet type

Channel / f_c [MHz]	20 dB bandwidth [kHz]	Result
0 / 2402	907.051	PASSED
40 / 2442	910.256	PASSED
78 / 2480	971.154	PASSED

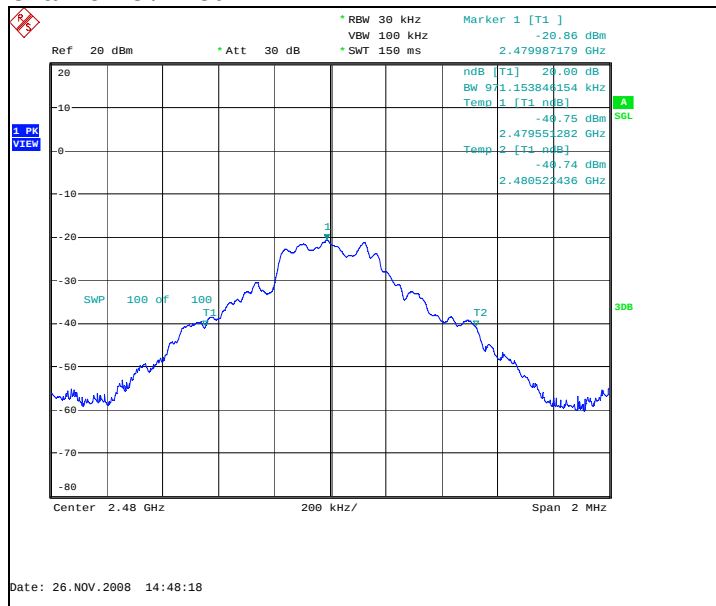
Channel 0 / 2402 MHz



Channel 40 / 2442 MHz



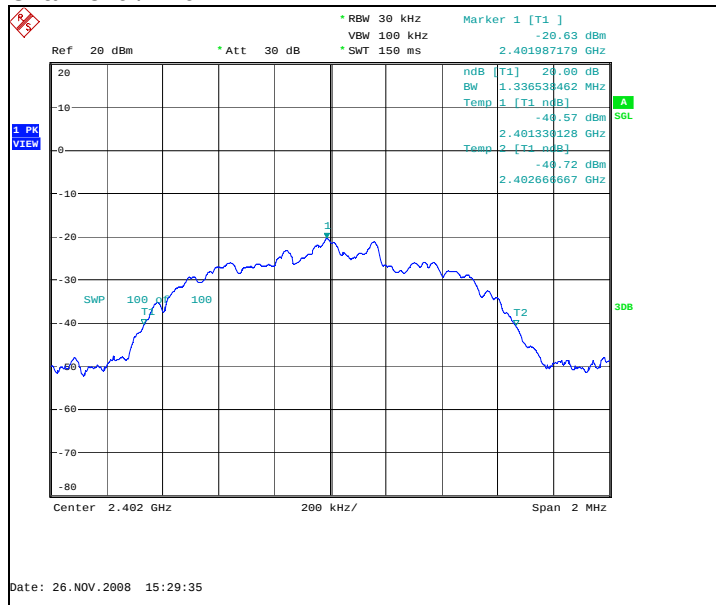
Channel 78 / 2480 MHz



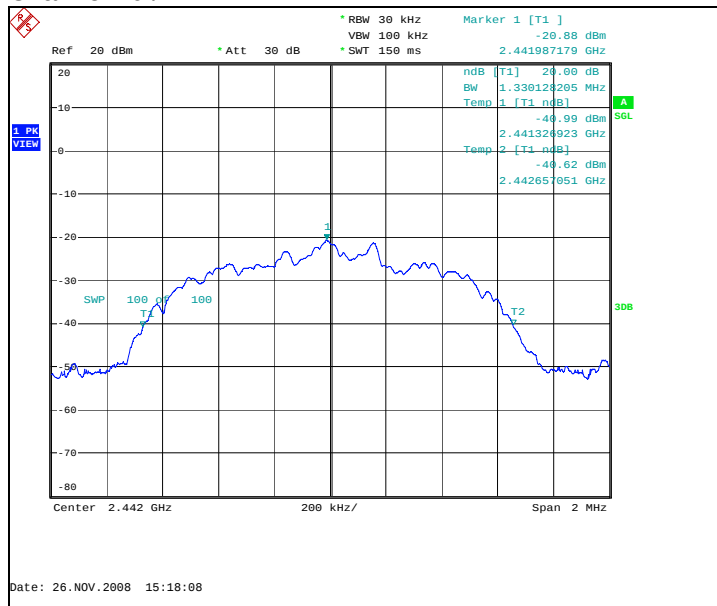
8.2.2 8DPSK modulation, PRBS packet type

Channel / f_c [MHz]	20 dB bandwidth [kHz]	Result
0 / 2402	1336.538	PASSED
40 / 2442	1330.128	PASSED
78 / 2480	1330.128	PASSED

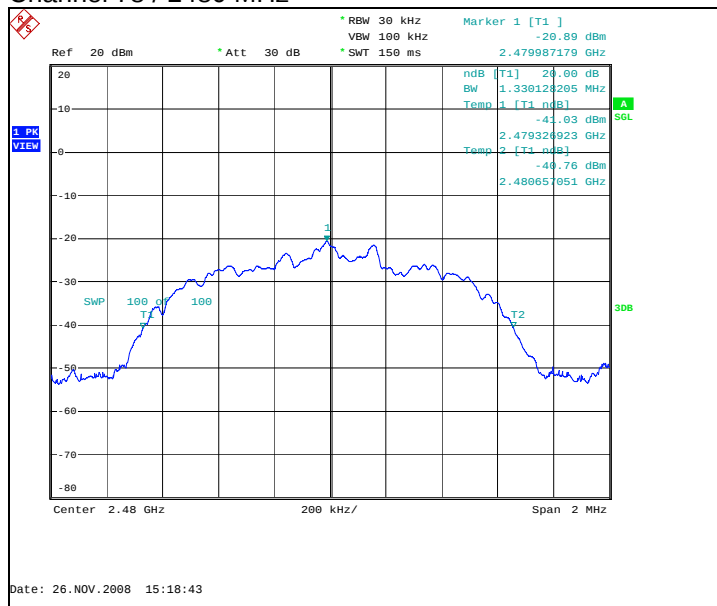
Channel 0 / 2402 MHz



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-431 DUT 41710
Accessories with DUT numbers	AC-10 E DUT 41700 / BL-4CT DUT 41713 / AD-54 DUT 41703 / HS-45 DUT 41706
Operation Voltage [V] / [Hz]	115/60
Result	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	21 / 50 / 99.6
Date of measurements	26-Nov-2008
Measured by	Petteri Suni

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

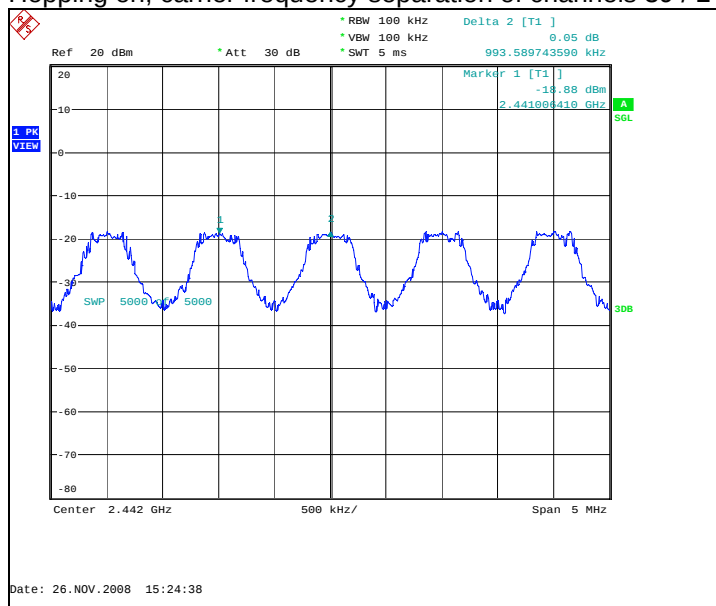
Limit [MHz]
≥ 0.025 or $2/3$ of the 20 dB bandwidth

9.2. Bluetooth Test results

9.2.1 GFSK modulation, PRBS packet type

Carrier frequency separation [kHz]	Result
993.59	PASSED

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



Carrier frequency separation [kHz]	Result
1049.679	PASSED

1 PK VIEW

Ref 20 dBm Att 30 dB

RBW 100 kHz VBW 100 kHz SWT 5 ms

Delta 2 [T1] 0.06 dB

1.049679487 MHz

Marker 1 [T1] -19.39 dBm 2.440982372 GHz

SWR 5000 of 5000

30L

Center 2.442 GHz 500 kHz/ Span 5 MHz

Date: 26.NOV.2008 15:28:42

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

EUT with DUT number	RM-431 DUT 41710
Accessories with DUT numbers	AC-10 E DUT 41700 / BL-4CT DUT 41713 / AD-54 DUT 41703 / HS-45 DUT 41706
Operation Voltage [V] / [Hz]	115/60
Result	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	21 / 50 / 99.6
Date of measurements	26-Nov-2008
Measured by	Petteri Suni

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

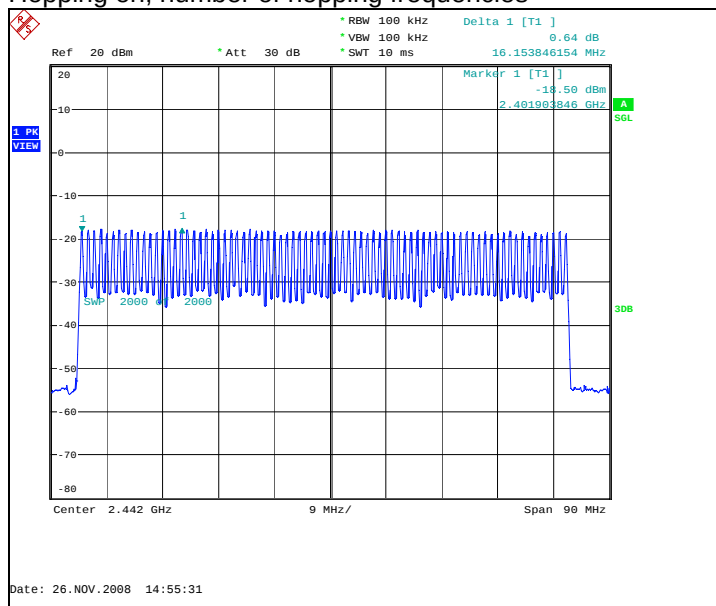
Limit [number]
≥ 15

10.2. Bluetooth Test results

10.2.1 GFSK modulation, PRBS packet type

Measured number of hopping frequencies	Result
79	PASSED

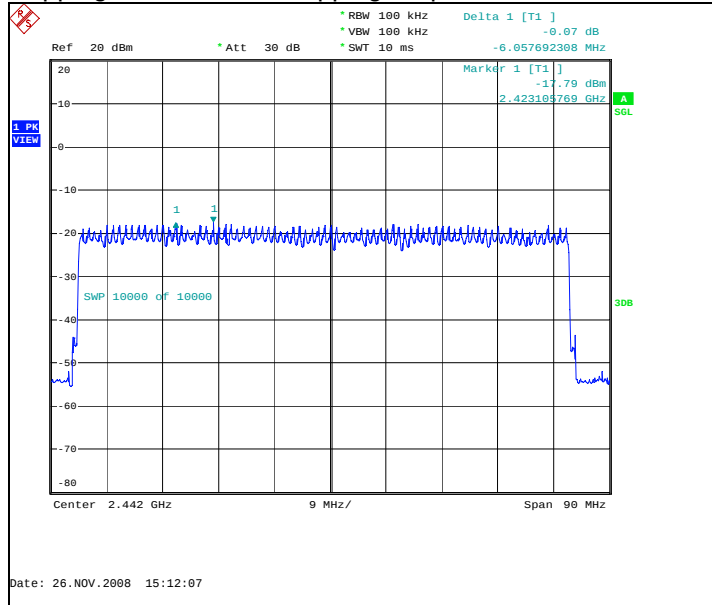
Hopping on, number of hopping frequencies



10.2.2 8DPSK modulation, PRBS packet type

Measured number of hopping frequencies	Result
78	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-431 DUT 41710
Accessories with DUT numbers	AC-10 E DUT 41700 / BL-4CT DUT 41713 / AD-54 DUT 41703 / HS-45 DUT 41706
Operation Voltage [V] / [Hz]	115/60
Result	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	21 / 50 / 99.6
Date of measurements	26-Nov-2008
Measured by	Petteri Suni

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

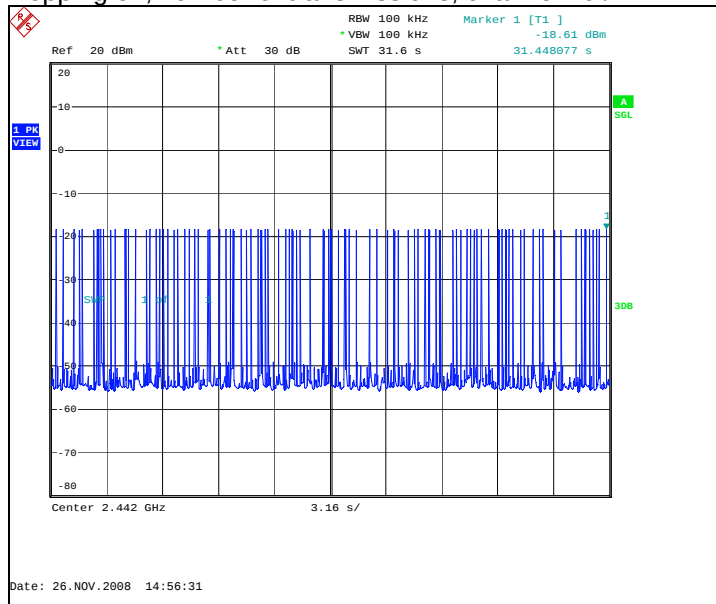
Limit [s]
≤ 0.4

11.2. Bluetooth test results

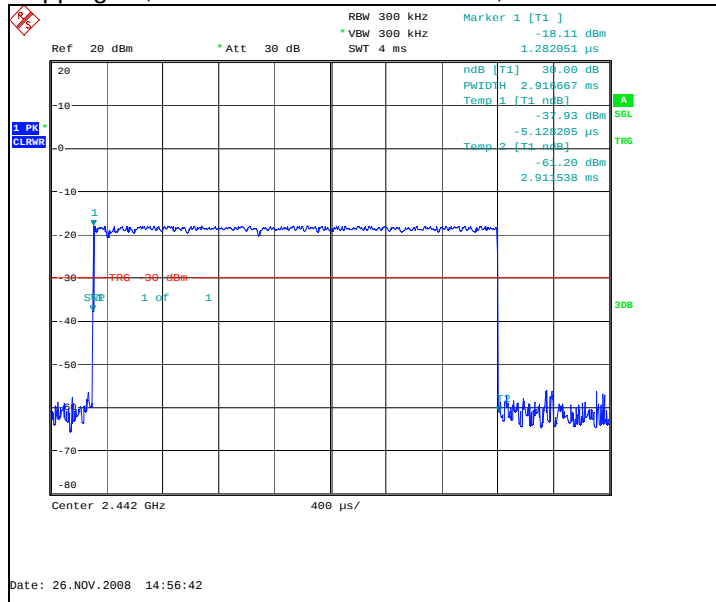
11.2.1 GFSK modulation, PRBS packet type

Measured number of transmissions	Duration of one transmission [μs]	Time of occupancy [s]	Result
95	2,917	0.277083	PASSED

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



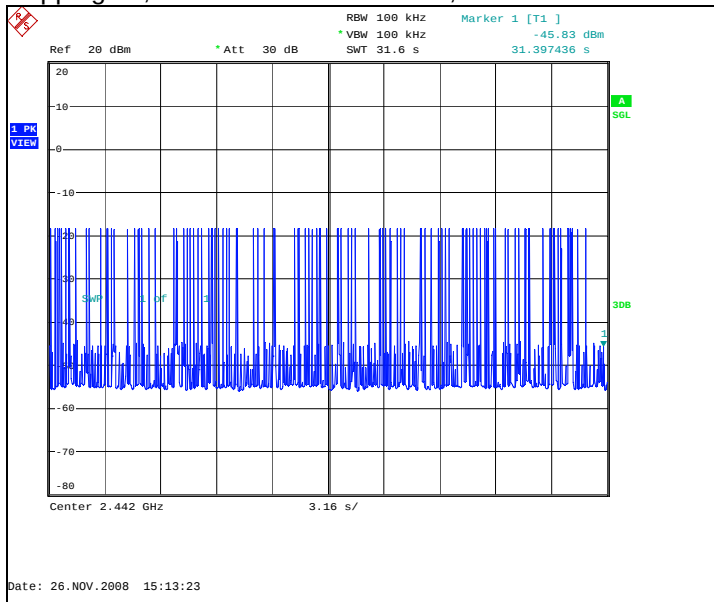
Hopping on, duration of one transmission, channel 40 / 2442 MHz



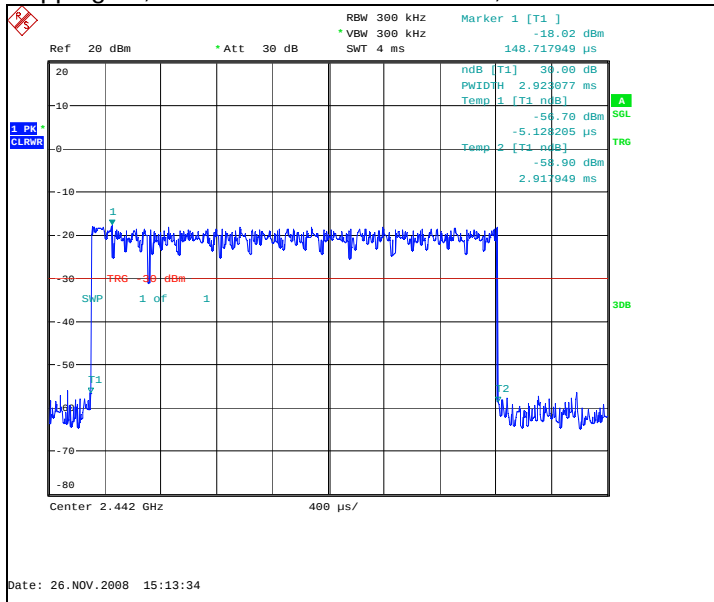
11.2.2 8DPSK modulation, PRBS packet type

Measured number of transmissions	Duration of one transmission [μ s]	Time of occupancy [s]	Result
96	2,923	0.280615	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
TM30597	Power splitter	11667A	Agilent	22/24/27, 15C
TM37499	Power splitter	11667A	Agilent	22/24/27, 15C
TM38111	Multimeter	34401A	Agilent	22/24/27, 15C
TM38112	DC power supply	6632A	Agilent	22/24/27, 15C
TM22901	Attenuator	8496A	Agilent	22/24/27, 15C
TM30636	Artificial mains net	L2-16	PMM	15C, 15B
TM37678	Radio communication tester	CMU-200	R&S	22/24/27, 15C, 15B
TM37773	Radio communication tester	CMU-200	R&S	22/24/27, 15C, 15B
TM30600	Pulse Limiter	ESH3-Z2	R&S	15C, 15B
TM26490	LISN 50 μ H	ESH3-Z5	R&S	15C, 15B
TM37610	Spectrum analyzer	FSU	R&S	22/24/27, 15C
TM22835	Multimeter	87	Fluke	15C, 15B
TM37500	Microwave switch system	7116-MSW	Keithley	22/24/27, 15C, 15B
TM22638	Power supply	OL63743-901	Transmatic	22/24/27, 15C, 15B
	Temperature chamber	VT4002	Vötsch	22/24/27, 15C
2058	EMI Test receiver	ESPC	R&S	15C, 15B
2001	Bluetooth tester	CBT	R&S	22/24/27, 15C, 15B
2002	Radio communication tester	CMU-200	R&S	22/24/27, 15C, 15B

12.2. Radiated measurements

Eq. No	Equipment	Type	Manufacturer	Used in
TM30599	3m semi-anechoic chamber		TDK	22/24/27, 15C, 15B
TM38845	EMI receiver	ESI 40	R&S	22/24/27, 15C, 15B
TM37498	Preamplifier	AMF-5D-020180-26-10P	MITEQ	22/24/27, 15C, 15B
TM37523	Preamplifier	AMF-4D-10M-3G-25-20P	MITEQ	22/24/27, 15C, 15B
TM37516	Biconilog antenna	HL562	R&S	22/24/27, 15C, 15B
TM26496	Double ridged waveguide antenna	3115	EMCO	22/24/27, 15C, 15B
TM39158	Horn antenna	3116	EMCO	22/24/27, 15C, 15B
TM26492	Reference dipole set	UHAP/VHAP	Schwarzbeck	22/24/27, 15C, 15B
TM37501	Dipole antenna	3125-870	EMCO	22/24/27
TM37502	Dipole antenna	3125-1880	EMCO	22/24/27
TM37773	Radio communication tester	CMU-200	R&S	22/24/27, 15C, 15B
TM38631	Signal generator	83640L	Agilent	22/24/27, 15C, 15B
TM38066	High pass filter	4HC3000/18000-3-KK	Trilithic	22/24/27, 15C, 15B
TM26511	Tunable notch filter	WRCA870	Wainwright	22/24/27
TM38215	Tunable notch filter	WRCD1850/1910-0.2/40	Wainwright	22/24/27
TM38214	Band reject filter	WRCT 2402/2480-2400/2483.5-30	Wainwright	15C
TM30642	Mast/Turntable controller	HD-100	Deisel	22/24/27, 15C, 15B
TM26500	Turntable	DS412	Deisel	22/24/27, 15C, 15B
TM38842	Antenna mast controller	2090	EMCO	22/24/27, 15C, 15B
TM38843	Antenna mast	2075	EMCO	22/24/27, 15C, 15B
TM38114	DC power supply	6632A	Agilent	22/24/27, 15C, 15B
TM38323	Preamplifier	PA-02 18-26 GHz	EMC Automation	22/24/27, 15C, 15B
TM37678	Radio communication tester	CMU-200	R&S	22/24/27, 15C, 15B
TM22638	Power supply	OL63743-901	Transmatic	22/24/27, 15C, 15B
TM23892	Yaesu controller	G-1000SDX	Yaesu	22/24/27, 15C, 15B
2001	Bluetooth tester	CBT	R&S	22/24/27, 15C, 15B

Eq. No	Equipment	Type	Manufacturer	Used in
2002	Radio communication tester	CMU-200	R&S	22/24/27, 15C, 15B