

FCC Part 15C Compliance Test Report

Test Report no.:	Tre_FCC_0802_07.doc	Date of Report:	4.2.2008
Number of pages:	63	Customer's Contact person:	Tia Melava
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FCC listing no.:	94436		
IC recognition no.:	3608		
Tested devices/ accessories:	GSM-phone RM-345 / AC-Charger AC-5E / Battery BL-4U / Headset HS-47		
FCC ID:	PYARM-345	IC:	661V-RM345
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:			

Jari Jantunen, System Manager

1. Summary for FCC Part 15C Compliance Test Report

Date of receipt	09.01.2008
Testing completed	
The customer's contact person	Tia Melava
Test Plan referred to	T:\Projects\RM-345\TestPlan_RS
Notes	-
Document name	T:\Projects\RM-345\EMC\Results\FCC\Tre_FCC_0802_07.doc

1.1. EUT and Accessory Information

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

Product	Type	SN	HW	MV	SW	DUT
GSM-Phone	RM-345	004401014463489	0320	-	07.45.3	41360
Battery	BL-4U	-	-	-	-	41364
Headset	HS-47	-	-	-	-	41367
AC-Charger	AC-5E	-	-	-	-	41365
GSM-Phone	RM-345	004401014463380	0320	-	07.45.3	41383
Battery	BL-4U	-	-	-	-	41363

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

WLAN:

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

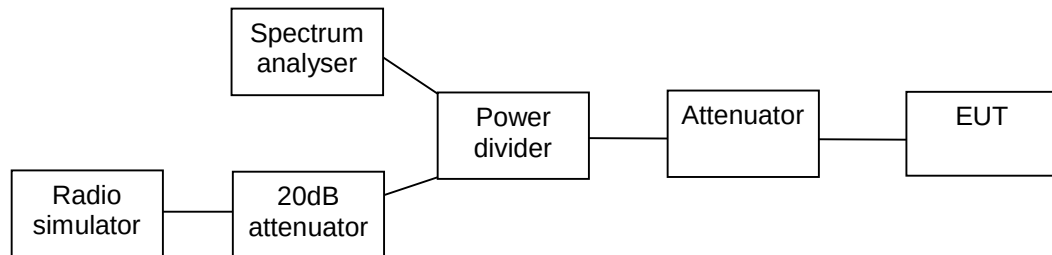
CONTENTS

1. Summary for FCC Part 15C Compliance Test Report.....	2
1.1. EUT and Accessory Information	2
1.2. Summary of Test Results.....	2
2. Test setups.....	5
2.1. Conducted RF test setup	5
2.2. AC powerline conducted emissions test setup.....	5
2.3. Spurious radiated emissions test setup	5
3. Conducted peak output power (FCC §15.247(b)(1), RSS-210 A8.4 (2))	6
3.1. Test method and limit.....	6
3.2. Bluetooth Test results	7
1. Band edge compliance of RF emissions (FCC §15.247(d), RSS-210 A8.5).....	10
1.1. Test method and limit.....	10
1.2. Bluetooth Test results	11
4. Spurious RF conducted emissions (FCC §15.247(d), RSS-A8.5).....	15
4.1. Test method and limit.....	15
4.2. Bluetooth Test results	16
5. Spurious radiated emissions (FCC §15.247(d), §15.209, RSS-210 A8.5).....	19
5.1. Test method and limit.....	19
5.2. Bluetooth Test results	20
6. AC powerline conducted emissions (FCC §15.207, RSS-GEN 7.2.2)	23
6.1. Test method and limit.....	23
6.2. Bluetooth Test results	24
7. 20 dB bandwidth (FCC §15.247(a)(1), RSS-210 A8.1 (1))	26
7.1. Test method and limit.....	26
7.2. Bluetooth Test results	27
8. Carrier frequency separation (FCC §15.247(a)(1), RSS-210 A8.1 (2))	31
8.1. Test method and limit.....	31
8.2. Bluetooth Test results	32
9. Number of hopping frequencies (FCC §15.247(a)(1)(iii), RSS-210 A8.1 (4))	34
9.1. Test method and limit.....	34
9.2. Bluetooth Test results	35
10. Time of occupancy (FCC §15.247(a)(1)(iii), RSS-210 A8.1 (4))	37

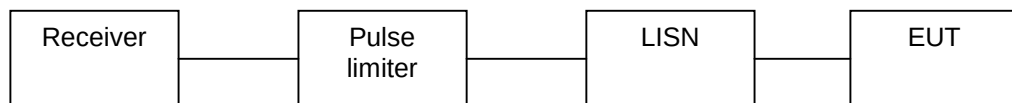
10.1.	Test method and limit.....	37
10.2.	Bluetooth test results.....	38
11.	Conducted peak output power (FCC §15.247(b)(1), RSS-210 A8.4 (4)).....	40
11.1.	Test method and limit.....	40
11.2.	WLAN Test results	41
12.	Spurious RF conducted emissions (FCC §15.247(d), RSS-210 A8.5)	45
12.1.	Test method and limit.....	45
12.2.	WLAN Test results	46
13.	AC powerline conducted emissions (FCC §15.207, RSS-GEN 7.2.2).....	49
13.1.	Test method and limit.....	49
13.2.	WLAN Test results	50
14.	6 dB bandwidth (FCC §15.247(a)(2), RSS-210 A8.2 (1)).....	52
14.1.	Test method and limit.....	52
14.2.	WLAN test results.....	53
15.	Power spectral density (FCC §15.247(e), RSS-210 A8.2 (2)).....	57
15.1.	Test method and limit.....	57
15.2.	WLAN test results.....	58
16.	Test Equipment	62
16.1.	Conducted measurements	62
16.2.	Radiated measurements	62

2. Test setups

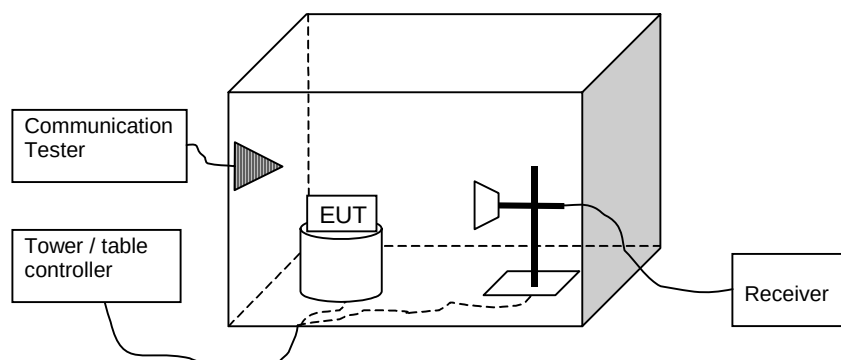
2.1. Conducted RF test setup



2.2. AC powerline conducted emissions test setup



2.3. Spurious radiated emissions test setup



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

EUT with DUT number	RM-345 DUT 41360
Accessories with DUT numbers	AC-5E DUT 41365 / BL-4U DUT 41364 / HS-47 DUT 41367
Operation Voltage [V] / [Hz]	Nominal
Result	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	20 / 50 / 100.9
Date of measurements	14.01.2008
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

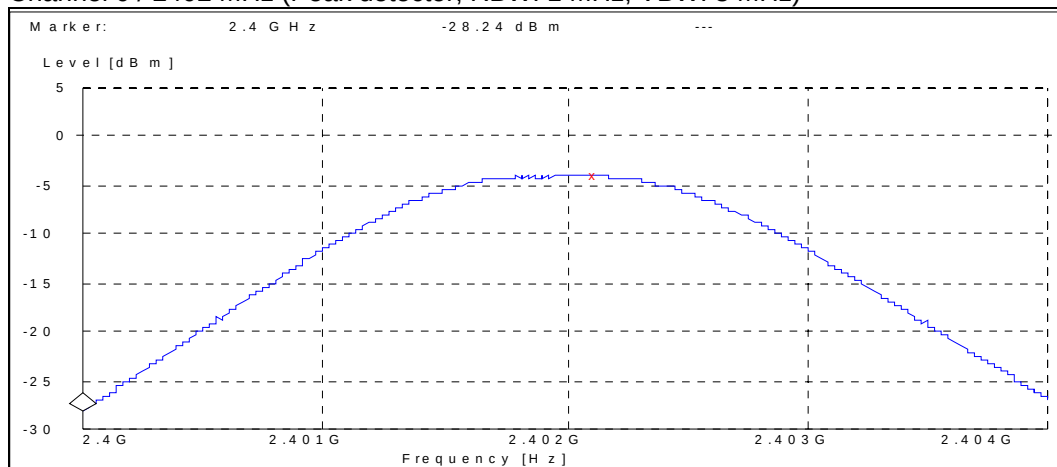
Frequency range [MHz]	Limit [W]	Limit [dBm]
2400 – 2483.5	≤ 1	≤ 30

3.2. Bluetooth Test results

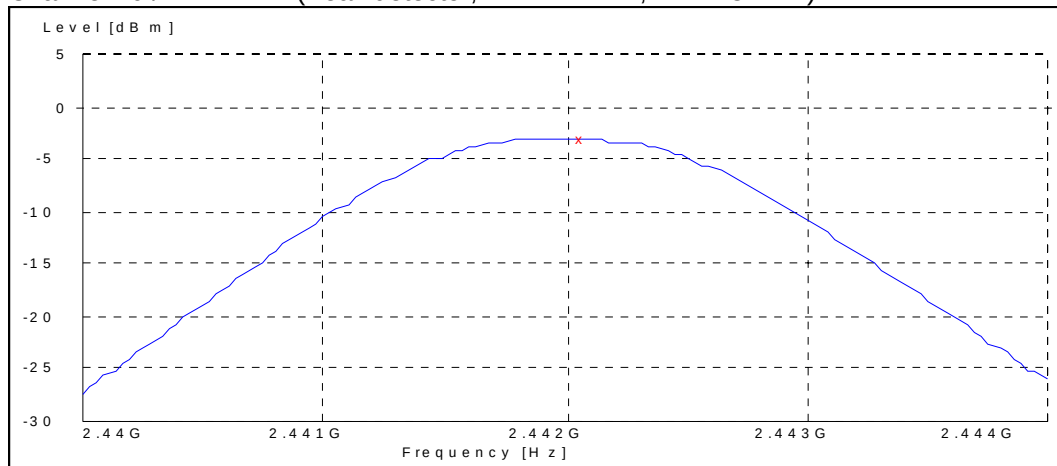
3.2.1 GFSK modulation, PRBS packet type

Channel / f_c [MHz]	P [dBm]	P [mW]	Result
0 / 2402	-4.00	0.398	PASSED
40 / 2442	-3.10	0.490	PASSED
78 / 2480	-1.90	0.646	PASSED

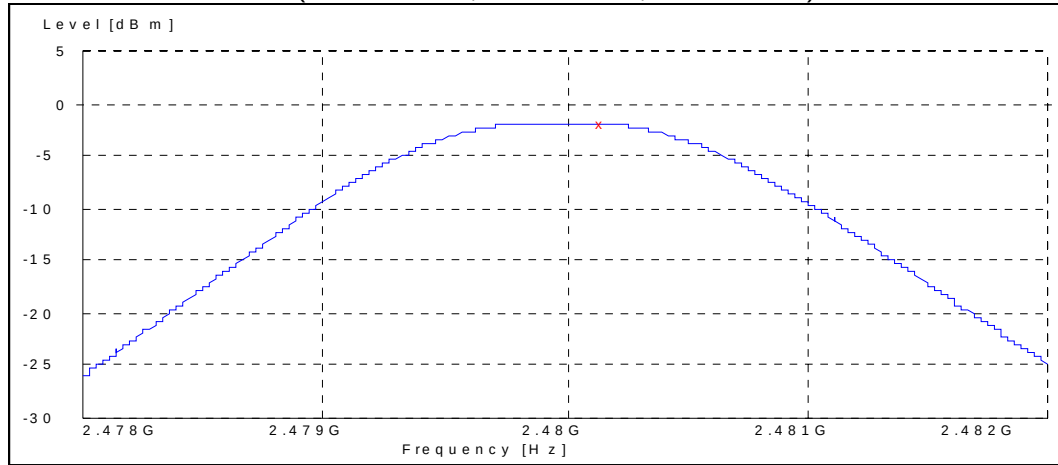
Channel 0 / 2402 MHz (Peak detector, RBW: 1 MHz, VBW: 3 MHz)



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



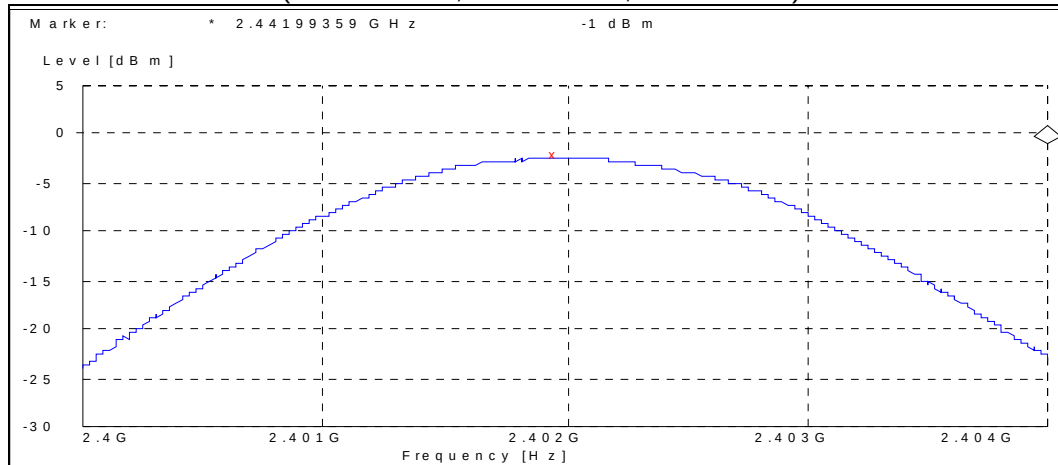
Channel 78 / 2480 MHz (Peak detector, RBW: 1 MHz, VBW: 3 MHz)



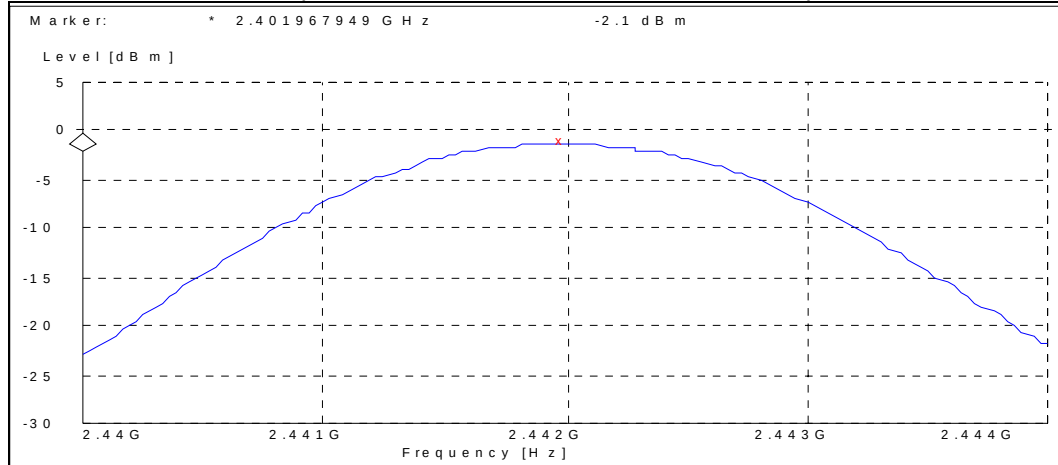
3.2.2 8DPSK modulation, PRBS packet type

Channel / f_c [MHz]	P [dBm]	P [mW]	Result
0 / 2402	-2.10	0.617	PASSED
40 / 2442	-1.00	0.794	PASSED
78 / 2480	0.20	1.047	PASSED

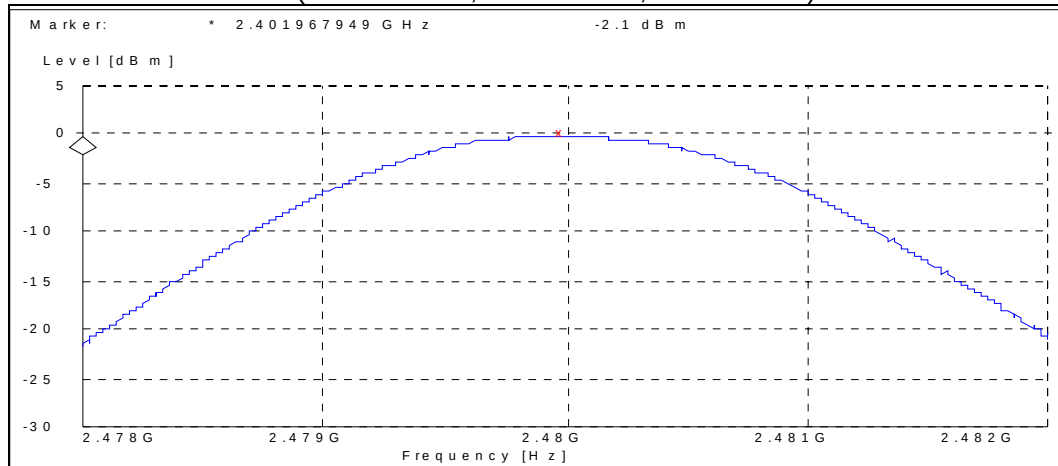
Channel 0 / 2402 MHz (Peak detector, RBW: 1 MHz, VBW: 3 MHz)



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



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



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

EUT with DUT number	RM-345 DUT 41383
Accessories with DUT numbers	BL-4U DUT 41363, AC-5E DUT 41365, HS-47 41367
Operation Voltage [V] / [Hz]	115 / 60
Result	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	20 / 50 / 99.5
Date of measurements	25-Jan-2008
Measured by	Jari Jantunen

1.1. Test method and limit

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

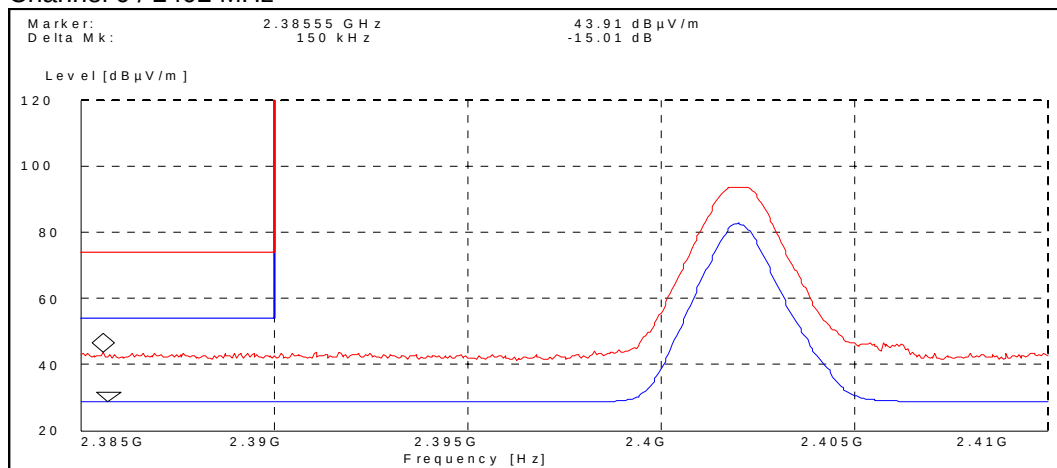
Limits for band edge compliance of RF emissions measurements (3 m measurement distance)

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

1.2. Bluetooth Test results

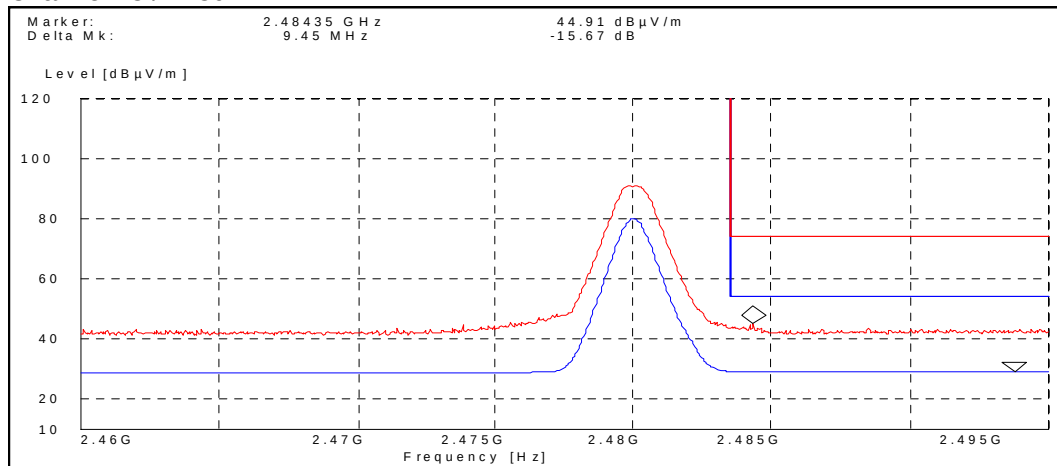
1.2.1 GFSK modulation, PRBS packet type

Channel 0 / 2402 MHz



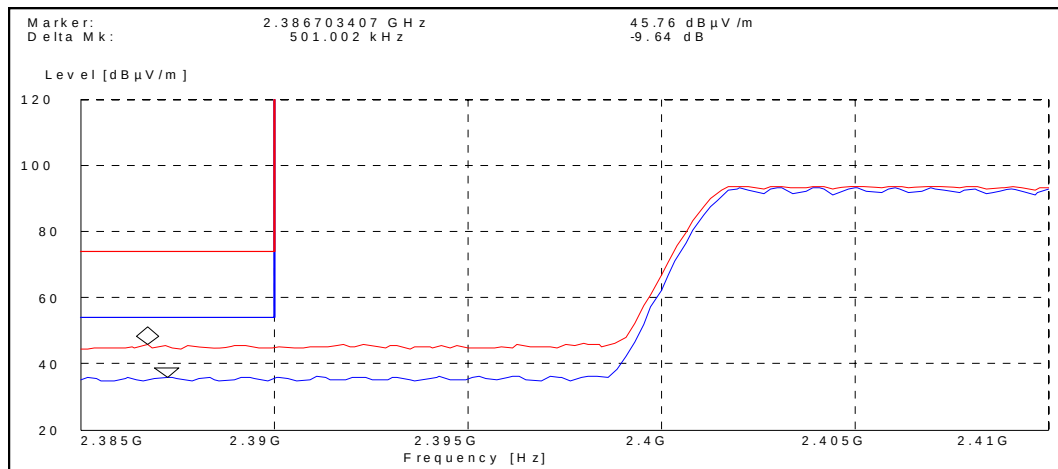
Detector (RBW: 1 MHz)	E [dBμV/m]	Result
Peak	43.90	PASSED
Average	28.90	PASSED

Channel 78 / 2480 MHz



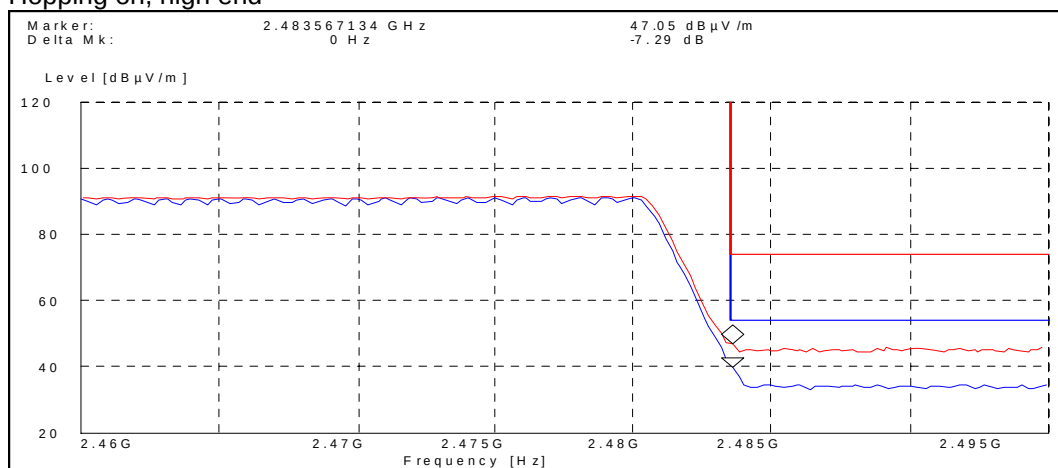
Detector (RBW: 1 MHz)	E [dBμV/m]	Result
Peak	44.90	PASSED
Average	29.20	PASSED

Hopping on, low end



Detector (RBW: 1 MHz)	E [dB μ V/m]	Result
Peak	45.80	PASSED
Average	36.10	PASSED

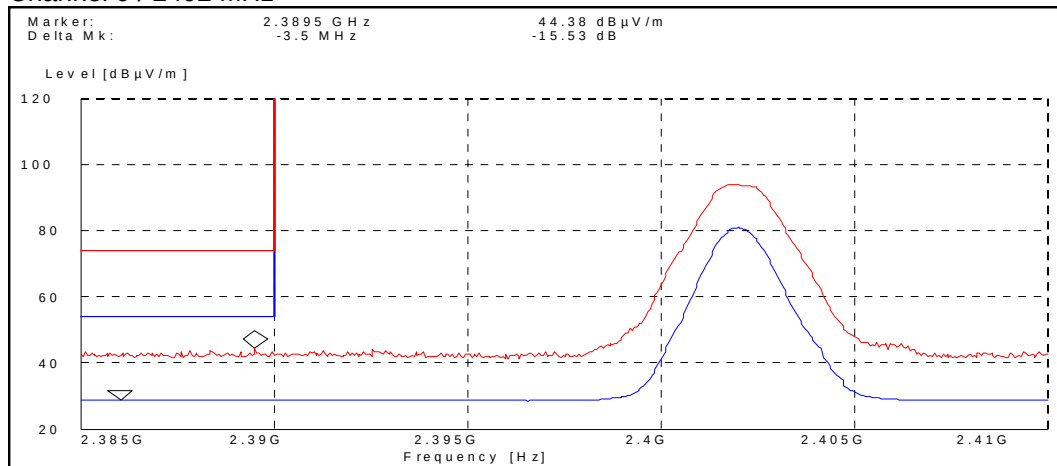
Hopping on, high end



Detector (RBW: 1 MHz)	E [dB μ V/m]	Result
Peak	47.10	PASSED
Average	39.80	PASSED

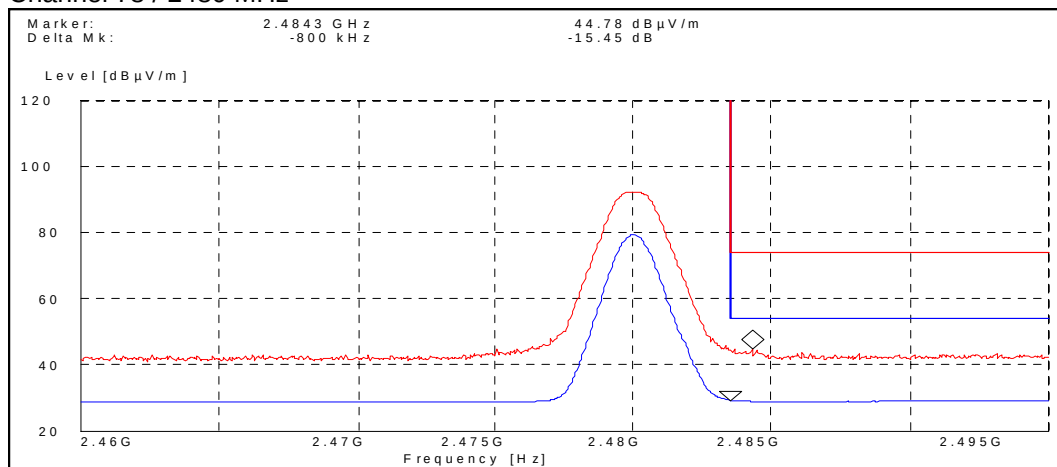
3.2.3 8DPSK modulation, PRBS packet type

Channel 0 / 2402 MHz



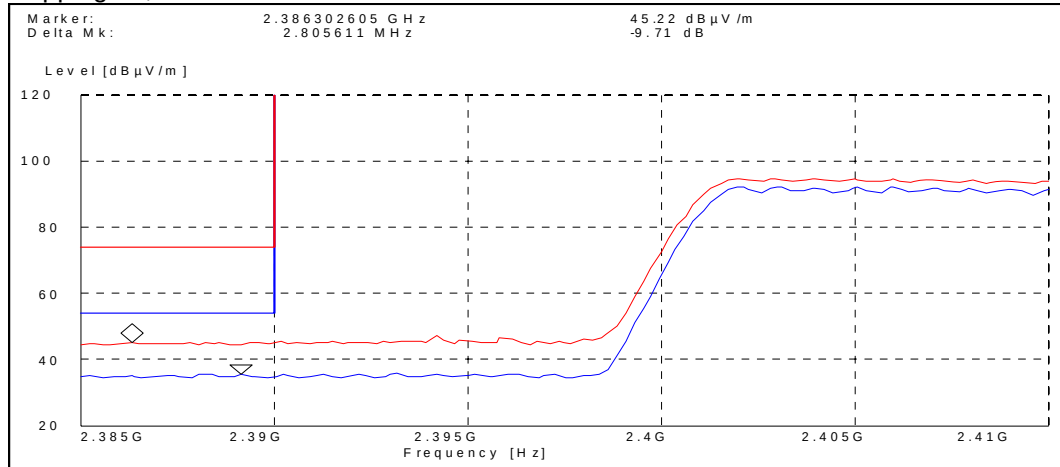
Detector (RBW: 1 MHz)	E [dBμV/m]	Result
Peak	44.40	PASSED
Average	28.80	PASSED

Channel 78 / 2480 MHz



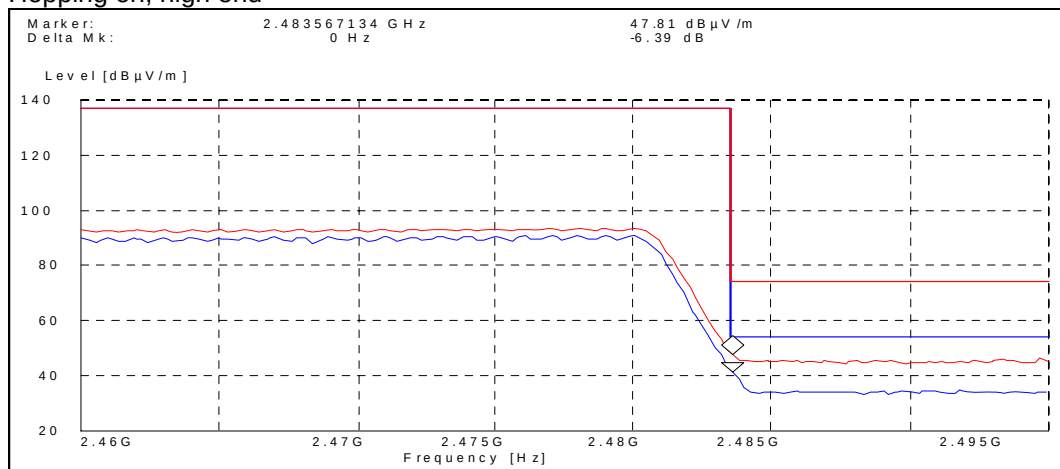
Detector (RBW: 1 MHz)	E [dBμV/m]	Result
Peak	44.80	PASSED
Average	29.30	PASSED

Hopping on, low end



Detector (RBW: 1 MHz)	E [dB μ V/m]	Result
Peak	45.20	PASSED
Average	35.50	PASSED

Hopping on, high end



Detector (RBW: 1 MHz)	E [dB μ V/m]	Result
Peak	47.80	PASSED
Average	41.40	PASSED

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

EUT with DUT number	RM-345 DUT 41360
Accessories with DUT numbers	AC-5E DUT 41365 / BL-4U DUT 41364 / HS-47 DUT 41367
Operation Voltage [V] / [Hz]	Nominal
Result	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	20 / 50 / 100.9
Date of measurements	14.01.2008
Measured by	Petteri Suni

4.1. Test method and limit

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

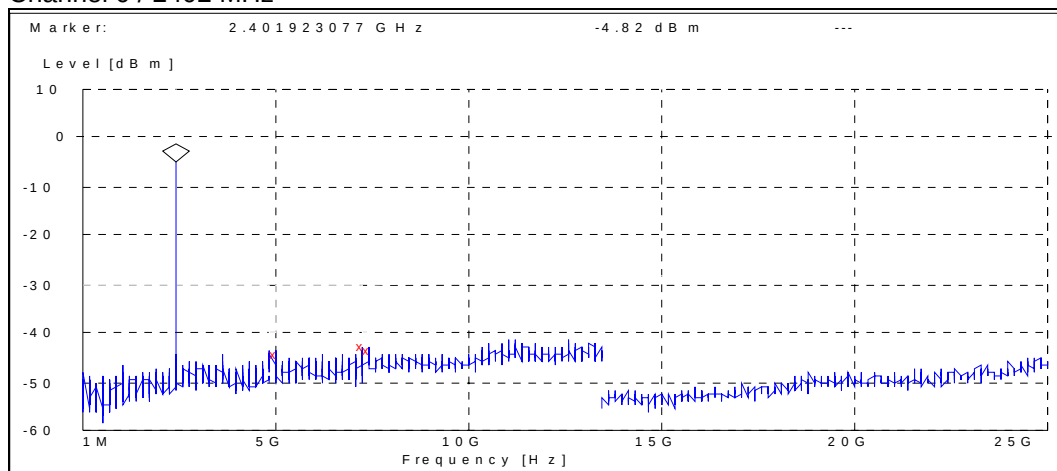
Limits for spurious RF conducted emissions measurements

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

4.2. Bluetooth Test results

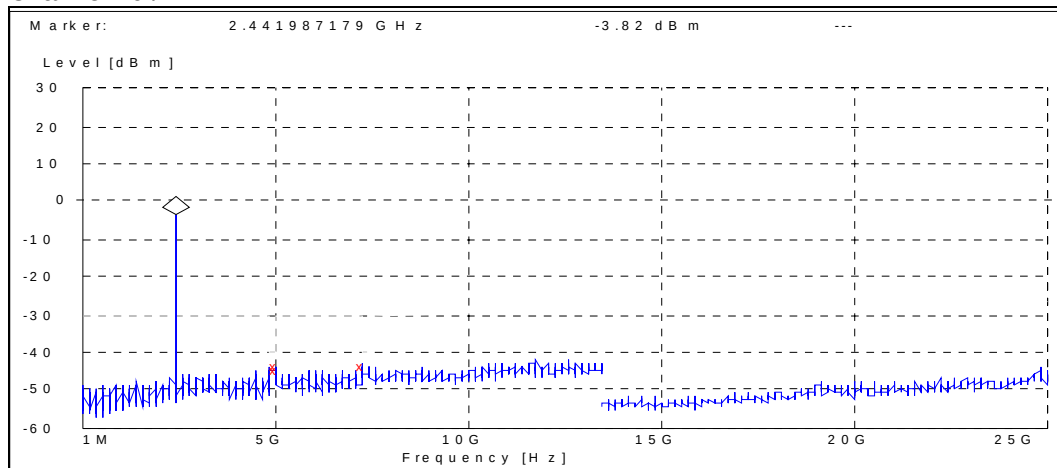
4.2.1 GFSK modulation, PRBS packet type

Channel 0 / 2402 MHz



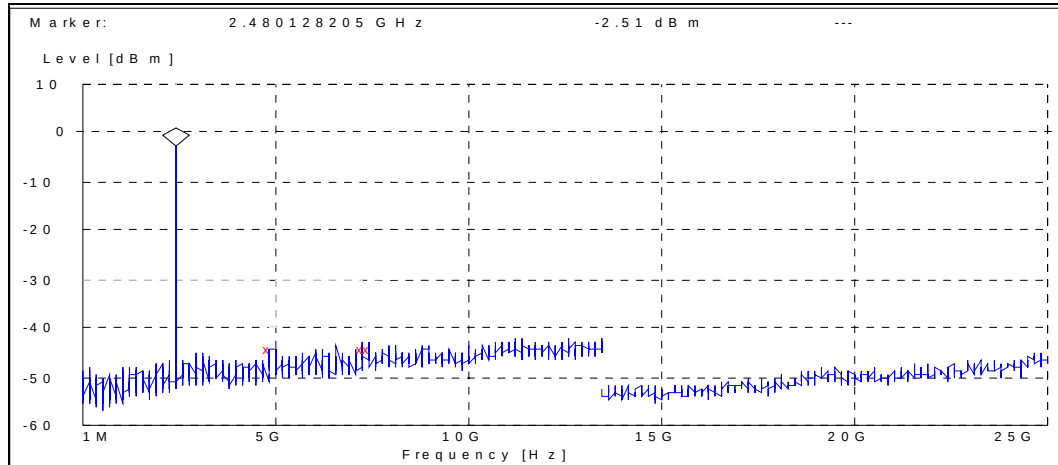
Frequency [MHz]	P [dBc]	Result
4974.679487	-39.482513	PASSED
7319.230769	-38.182513	PASSED
7500.000000	-39.182513	PASSED

Channel 40 / 2442 MHz



Frequency [MHz]	P [dBc]	Result
4968.589744	-40.181009	PASSED
5000.000000	-41.181009	PASSED
7287.019231	-40.381009	PASSED

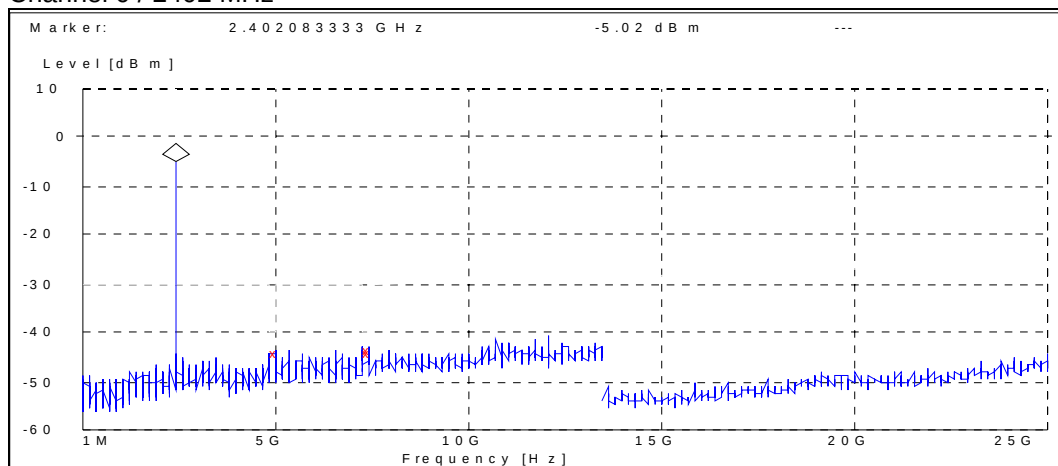
Channel 78 / 2480 MHz



Frequency [MHz]	P [dBc]	Result
4821.794872	-41.988277	PASSED
7281.250000	-41.688277	PASSED
7500.000000	-41.588277	PASSED

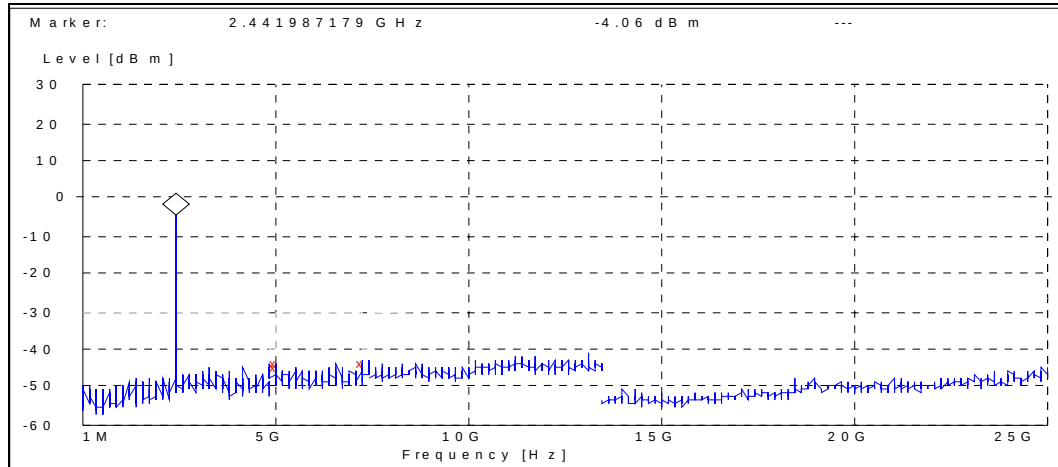
4.2.2 8DPSK modulation, PRBS packet type

Channel 0 / 2402 MHz



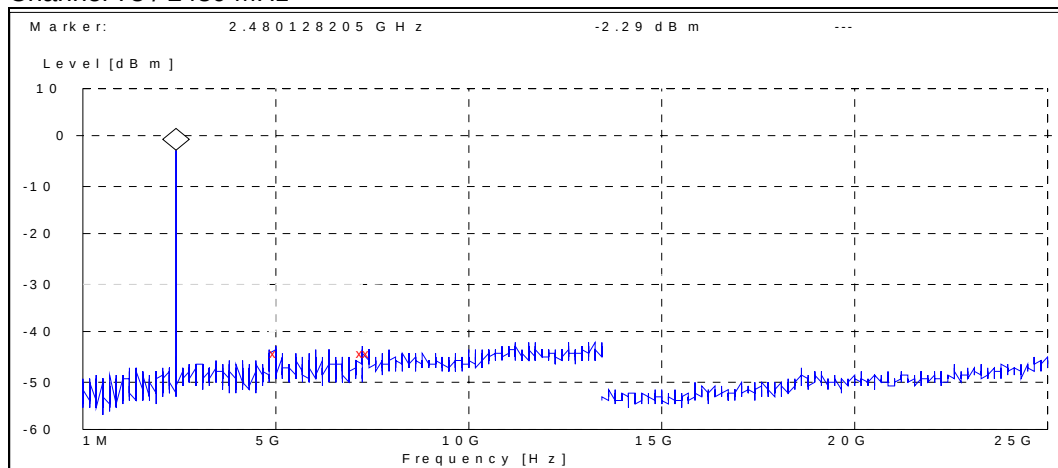
Frequency [MHz]	P [dBc]	Result
4958.012821	-39.079156	PASSED
7461.057692	-39.279156	PASSED
7500.000000	-38.979156	PASSED

Channel 40 / 2442 MHz



Frequency [MHz]	P [dBc]	Result
4990.705128	-39.942530	PASSED
5000.000000	-40.642530	PASSED
7203.365385	-40.142530	PASSED

Channel 78 / 2480 MHz



Frequency [MHz]	P [dBc]	Result
4973.076923	-42.206264	PASSED
7200.480769	-42.006264	PASSED
7500.000000	-41.906264	PASSED

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

EUT with DUT number	RM-345 DUT41383
Accessories with DUT numbers	BL-4U DUT41363;AC-5E DUT41365;HS-4641367
Operation Voltage [V] / [Hz]	115 / 60
Result	PASSED
Remarks	Test was done in slide opened.
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	22 / 48 / 99.9
Date of measurements	24.01.2008
Measured by	Zou Ming

5.1. 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

5.2. Bluetooth Test results

5.2.1 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	39.30	92.26	41.10	-1.8	VERTICAL	PASSED
7206.000000	42.20	128.82	39.60	2.6	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	26.50	21.13	28.30	-1.8	VERTICAL	PASSED
7206.000000	29.50	29.85	26.90	2.6	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
38.035872	24.30	16.41	39.20	-14.9	VERTICAL	PASSED
63.829259	23.80	15.49	50.60	-26.8	VERTICAL	PASSED
73.127054	14.60	5.37	40.20	-25.6	HORIZONTAL	PASSED
75.069940	14.80	5.50	40.20	-25.4	HORIZONTAL	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
7286.067134	43.30	146.22	40.30	3.0	VERTICAL	PASSED
7295.589178	43.80	154.88	40.70	3.1	HORIZONTAL	PASSED
7406.311623	44.20	162.18	40.50	3.7	VERTICAL	PASSED
7415.323647	43.60	151.36	39.90	3.7	HORIZONTAL	PASSED
17944.881764	53.00	446.68	33.40	19.6	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
4967.935872	27.90	24.83	29.10	-1.2	VERTICAL	PASSED
7282.567134	30.60	33.88	27.60	3.0	VERTICAL	PASSED
7298.589178	30.40	33.11	27.30	3.1	HORIZONTAL	PASSED
7403.311623	30.80	34.67	27.10	3.7	VERTICAL	PASSED
7413.823647	30.80	34.67	27.10	3.7	HORIZONTAL	PASSED
17940.881764	40.30	103.51	20.80	19.5	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	40.50	105.93	41.80	-1.3	VERTICAL	PASSED
7440.000000	44.00	158.49	40.40	3.6	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
4960.000000	27.50	23.71	28.80	-1.3	VERTICAL	PASSED
7440.000000	30.70	34.28	27.10	3.6	VERTICAL	PASSED

5.2.2 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	39.20	91.20	41.00	-1.8	HORIZONTAL	PASSED
7206.000000	42.10	127.35	39.50	2.6	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	26.60	21.38	28.40	-1.8	HORIZONTAL	PASSED
7206.000000	29.50	29.85	26.90	2.6	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
38.095391	28.90	27.86	43.80	-14.9	VERTICAL	PASSED
73.227054	17.80	7.76	43.40	-25.6	HORIZONTAL	PASSED

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

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
4963.429860	40.90	110.92	42.20	-1.3	HORIZONTAL	PASSED
7280.065130	44.60	169.82	41.60	3.0	VERTICAL	PASSED
7283.569138	43.60	151.36	40.60	3.0	HORIZONTAL	PASSED
7418.845691	43.30	146.22	39.60	3.7	VERTICAL	PASSED
7422.837675	43.70	153.11	40.00	3.7	HORIZONTAL	PASSED
17906.819639	53.40	467.74	33.80	19.6	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
4964.929860	27.70	24.27	29.00	-1.3	HORIZONTAL	PASSED
7281.565130	30.50	33.50	27.50	3.0	VERTICAL	PASSED
7283.569138	30.60	33.88	27.60	3.0	HORIZONTAL	PASSED
7418.837675	31.00	35.48	27.30	3.7	HORIZONTAL	PASSED
7422.345691	30.80	34.67	27.10	3.7	VERTICAL	PASSED
17911.319639	40.50	105.93	20.90	19.6	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	40.60	107.15	41.90	-1.3	HORIZONTAL	PASSED
7440.000000	43.80	154.88	40.20	3.6	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
4960.000000	27.50	23.71	28.80	-1.3	HORIZONTAL	PASSED
7440.000000	30.70	34.28	27.10	3.6	HORIZONTAL	PASSED

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

EUT with DUT number	RM-345 DUT41383
Accessories with DUT numbers	BL-4U DUT41363;AC-5E DUT41365;HS-4641367
Operation Voltage [V] / [Hz]	115 / 60
Result	PASSED
Remarks	Test was done in slide opened.
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	99.9
Date of measurements	24.01.2008
Measured by	Zou Ming

6.1. 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.

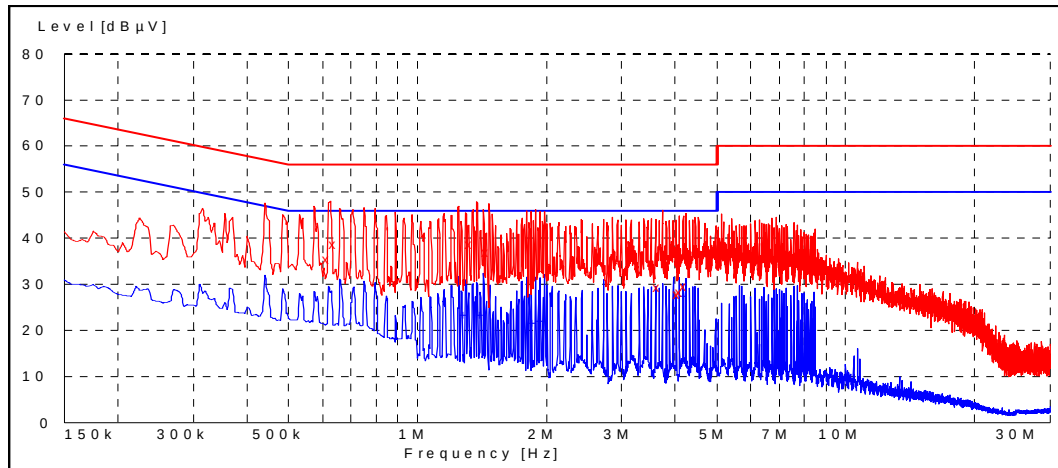
CISPR 22 Class B limits

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

6.2. Bluetooth Test results

6.2.1 GFSK modulation, PRBS packet type

channel 40 / 2442 MHz



Quasi peak (RBW: 9 kHz)

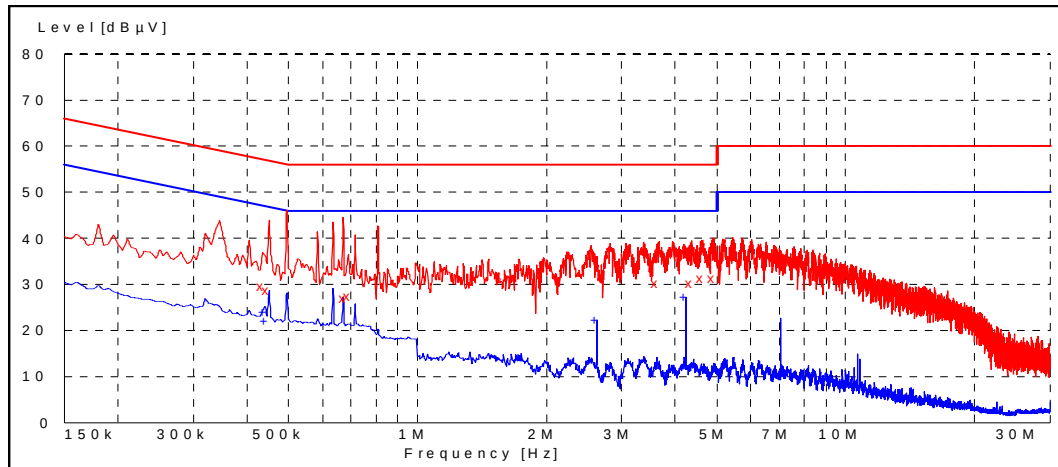
Frequency [MHz]	U [dBμV]	Line	Result
0.620000	35.60	N	PASSED
0.645000	38.80	L1	PASSED
1.335000	38.60	L1	PASSED
1.465000	37.00	L1	PASSED
3.685000	29.40	L1	PASSED
4.085000	27.80	L1	PASSED
4.145000	28.20	L1	PASSED
4.255000	29.50	L1	PASSED

Average (RBW: 9 kHz)

Frequency [MHz]	U [dBμV]	Line	Result
1.295000	23.30	L1	PASSED
1.420000	23.20	L1	PASSED
1.885000	21.50	L1	PASSED
1.960000	22.00	L1	PASSED
4.240000	27.30	L1	PASSED

6.2.2 8DPSK modulation, PRBS packet type

channel 40 / 2442 MHz



Quasi peak (RBW: 9 kHz)

Frequency [MHz]	U [dBμV]	Line	Result
0.435000	29.60	L1	PASSED
0.450000	28.70	L1	PASSED
0.680000	27.00	L1	PASSED
0.695000	27.50	L1	PASSED
3.630000	30.40	L1	PASSED
4.370000	30.10	L1	PASSED
4.630000	31.30	L1	PASSED
4.930000	31.40	L1	PASSED

Average (RBW: 9 kHz)

Frequency [MHz]	U [dBμV]	Line	Result
0.440000	24.00	N	PASSED
0.445000	22.20	L1	PASSED
2.625000	22.30	L1	PASSED
4.240000	27.20	L1	PASSED

7. 20 dB bandwidth (FCC §15.247(a)(1), RSS-210 A8.1 (1))

EUT with DUT number	RM-345 DUT 41360
Accessories with DUT numbers	AC-5E DUT 41365 / BL-4U DUT 41364 / HS-47 DUT 41367
Operation Voltage [V] / [Hz]	Nominal
Result	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	20 / 50 / 100.9
Date of measurements	14.01.2008
Measured by	Petteri Suni

7.1. 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

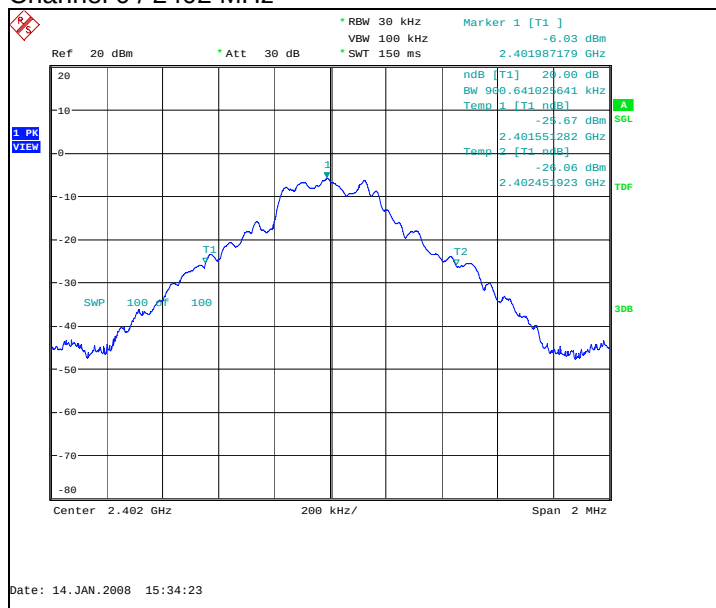
Limit [MHz]
N/A

7.2. Bluetooth Test results

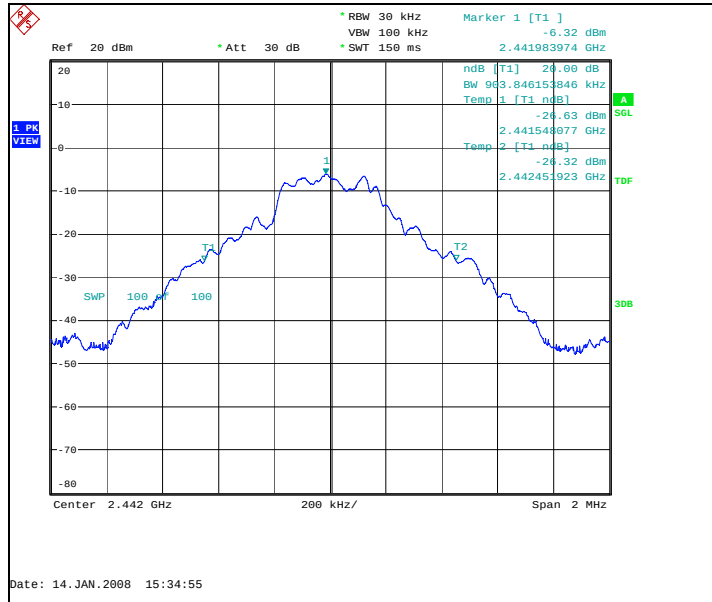
7.2.1 GFSK modulation, PRBS packet type

Channel / f_c [MHz]	20 dB bandwidth [kHz]	Result
0 / 2402	900.641	PASSED
40 / 2442	903.846	PASSED
78 / 2480	903.846	PASSED

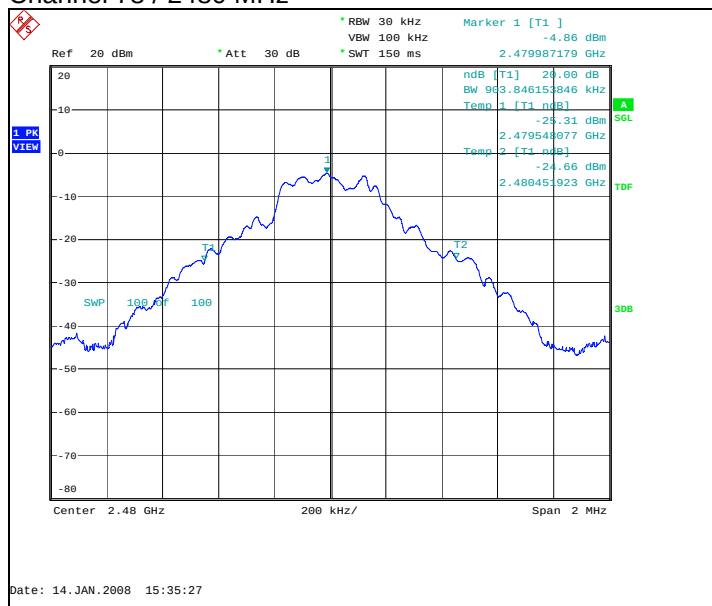
Channel 0 / 2402 MHz



Channel 40 / 2442 MHz



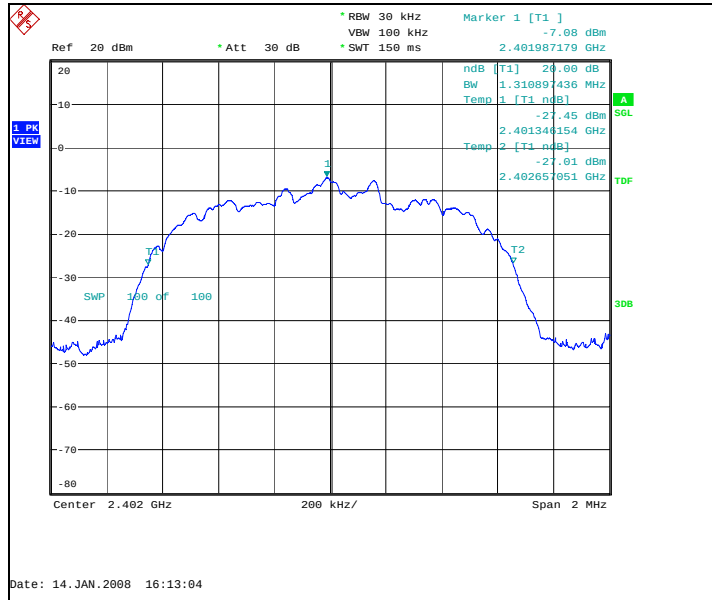
Channel 78 / 2480 MHz



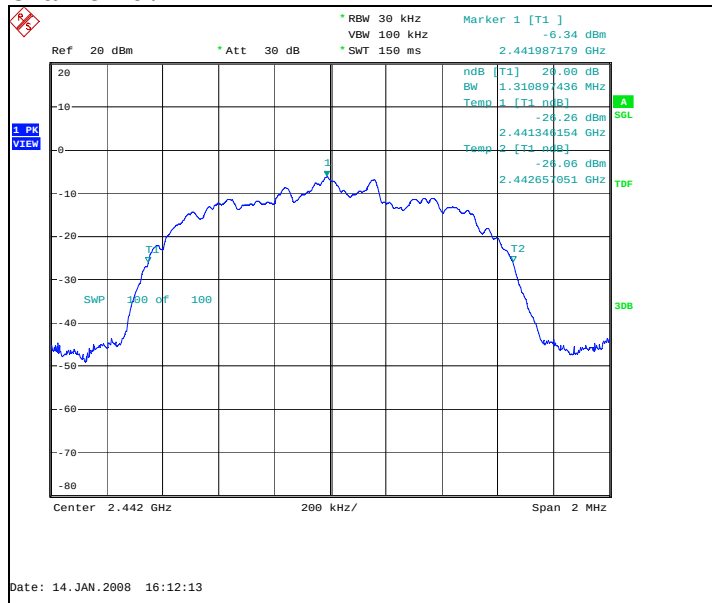
7.2.2 8DPSK modulation, PRBS packet type

Channel / f_c [MHz]	20 dB bandwidth [kHz]	Result
0 / 2402	1310.897	PASSED
40 / 2442	1310.897	PASSED
78 / 2480	1307.692	PASSED

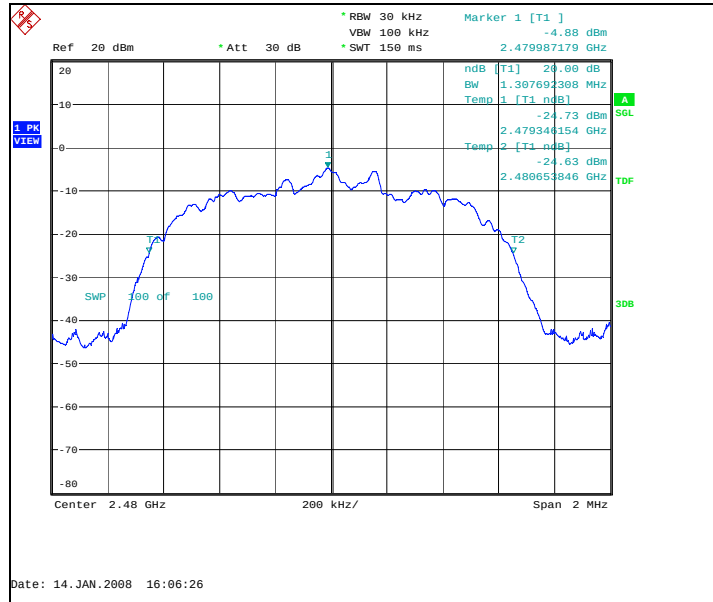
Channel 0 / 2402 MHz



Channel 40 / 2442 MHz



Channel 78 / 2480 MHz



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

EUT with DUT number	RM-345 DUT 41360
Accessories with DUT numbers	AC-5E DUT 41365 / BL-4U DUT 41364 / HS-47 DUT 41367
Operation Voltage [V] / [Hz]	Nominal
Result	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	20 / 50 / 100.9
Date of measurements	14.01.2008
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 carrier frequency separation measurements

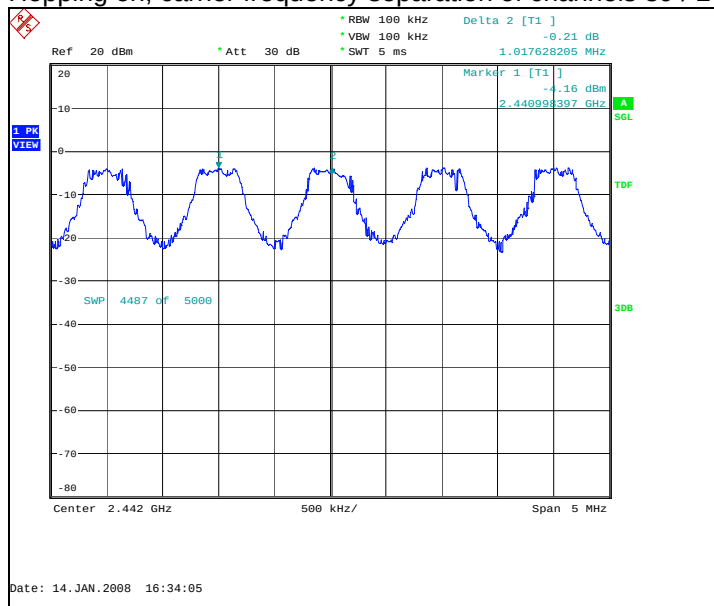
Limit [MHz]
≥ 0.025 or $2/3$ of the 20 dB bandwidth

8.2. Bluetooth Test results

8.2.1 GFSK modulation, PRBS packet type

Carrier frequency separation [kHz]	Result
1017.628	PASSED

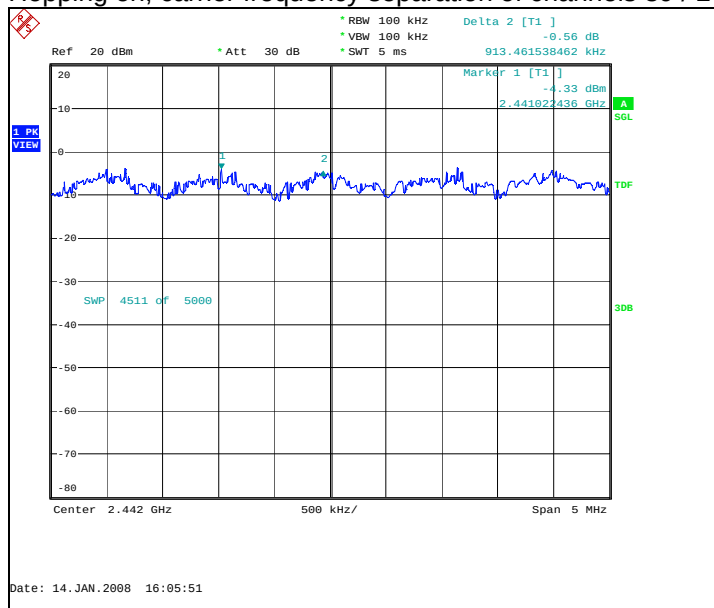
Hopping on, carrier frequency separation of channels 39 / 2441 MHz and 40 / 2442 MHz



8.2.2 8DPSK modulation, PRBS packet type

Carrier frequency separation [kHz]	Result
913.462	PASSED

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



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

EUT with DUT number	RM-345 DUT 41360
Accessories with DUT numbers	AC-5E DUT 41365 / BL-4U DUT 41364 / HS-47 DUT 41367
Operation Voltage [V] / [Hz]	Nominal
Result	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	20 / 50 / 100.9
Date of measurements	14.01.2008
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 number of hopping frequencies measurements

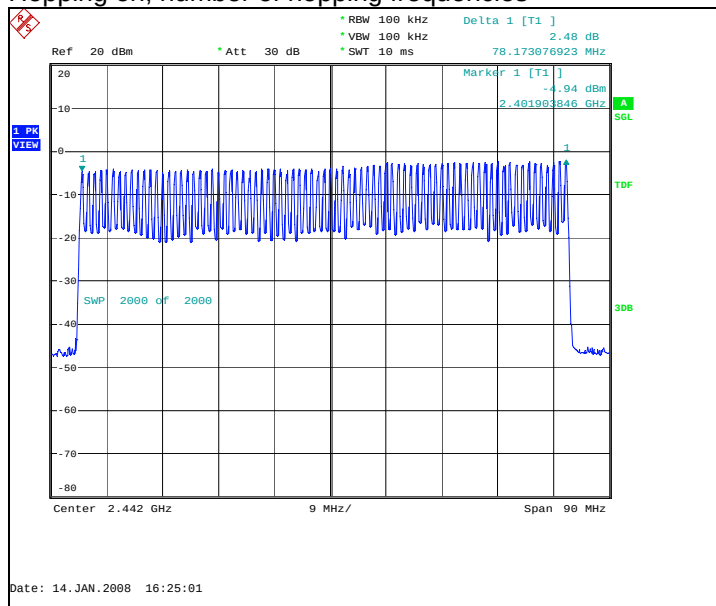
Limit [number]
≥ 15

9.2. Bluetooth Test results

9.2.1 GFSK modulation, PRBS packet type

Measured number of hopping frequencies	Result
79	PASSED

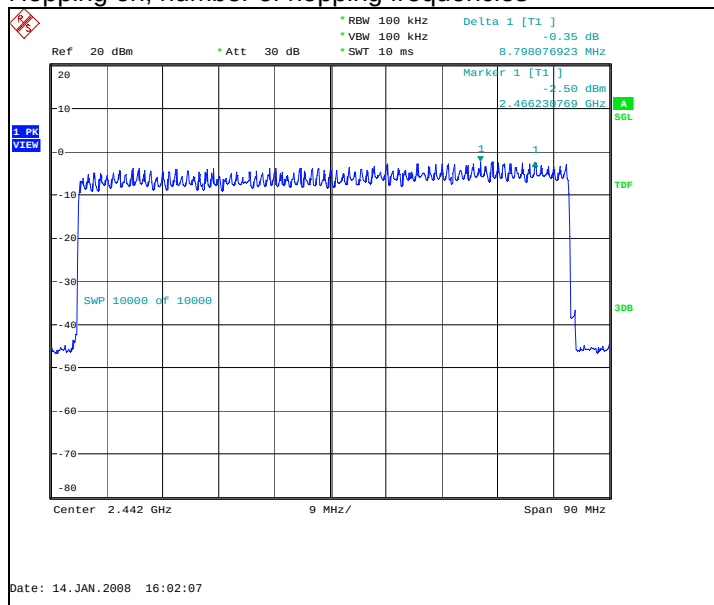
Hopping on, number of hopping frequencies



9.2.2 8DPSK modulation, PRBS packet type

Measured number of hopping frequencies	Result
72	PASSED

Hopping on, number of hopping frequencies



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

EUT with DUT number	RM-345 DUT 41360
Accessories with DUT numbers	AC-5E DUT 41365 / BL-4U DUT 41364 / HS-47 DUT 41367
Operation Voltage [V] / [Hz]	Nominal
Result	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	20 / 50 / 100.9
Date of measurements	14.01.2008
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 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

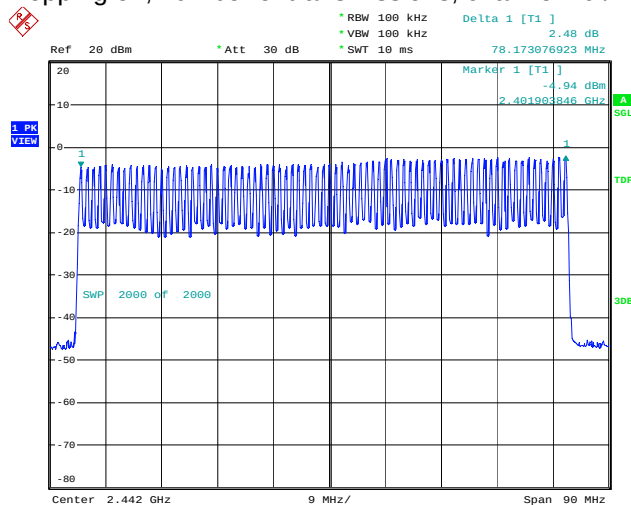
Limit [s]
≤ 0.4

10.2. Bluetooth test results

10.2.1 GFSK modulation, PRBS packet type

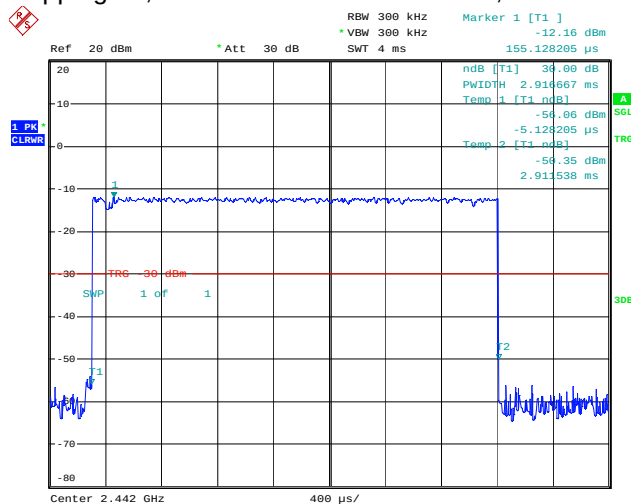
Measured number of transmissions	Duration of one transmission [μ s]	Time of occupancy [s]	Result
1	2,917	0.002917	PASSED

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



Date: 14. JAN.2008 16:25:01

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

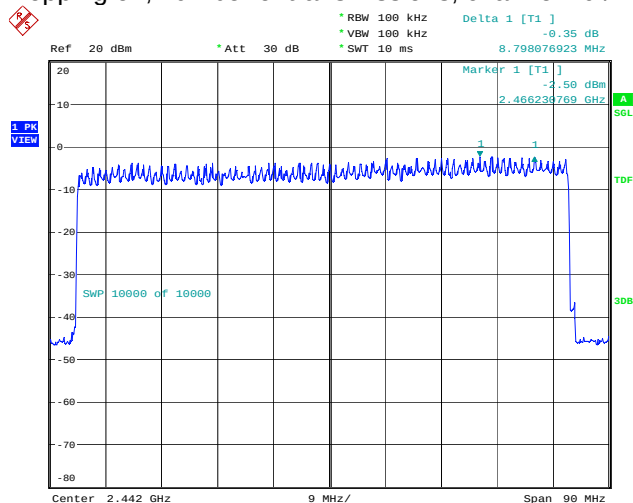


Date: 14. JAN.2008 16:23:01

10.2.2 8DPSK modulation, PRBS packet type

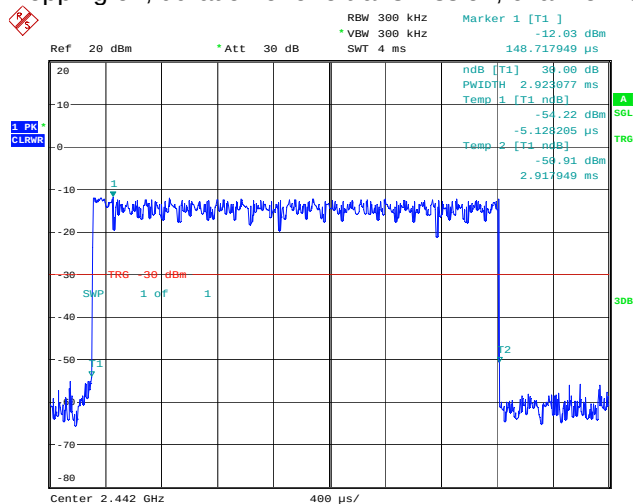
Measured number of transmissions	Duration of one transmission [μs]	Time of occupancy [s]	Result
98	2,923	0.286462	PASSED

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



Date: 14. JAN.2008 16:02:07

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



Date: 14. JAN.2008 16:03:43

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

EUT with DUT number	RM-345 DUT 41360
Accessories with DUT numbers	AC-5E DUT 41365 / BL-4U DUT 41364 / HS-47 DUT 41367
Operation Voltage [V] / [Hz]	Nominal
Result	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	20 / 50 / 100.4
Date of measurements	15.01.2008
Measured by	Petteri Suni

11.1. Test method and limit

The measurement is made according to DTS procedures KDB 558074 and IC standard RSS-210.

Limits for conducted peak output power measurements

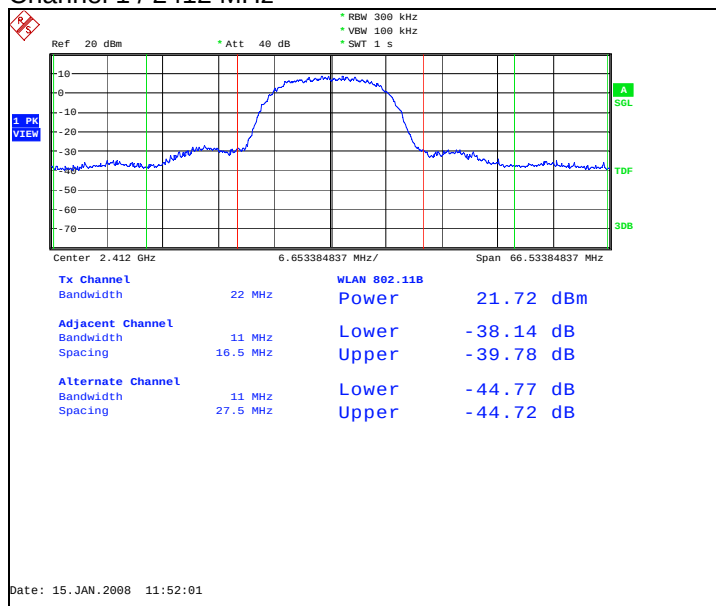
Frequency range [MHz]	Limit [W]	Limit [dBm]
2400 – 2483.5	≤ 1	≤ 30

11.2. WLAN Test results

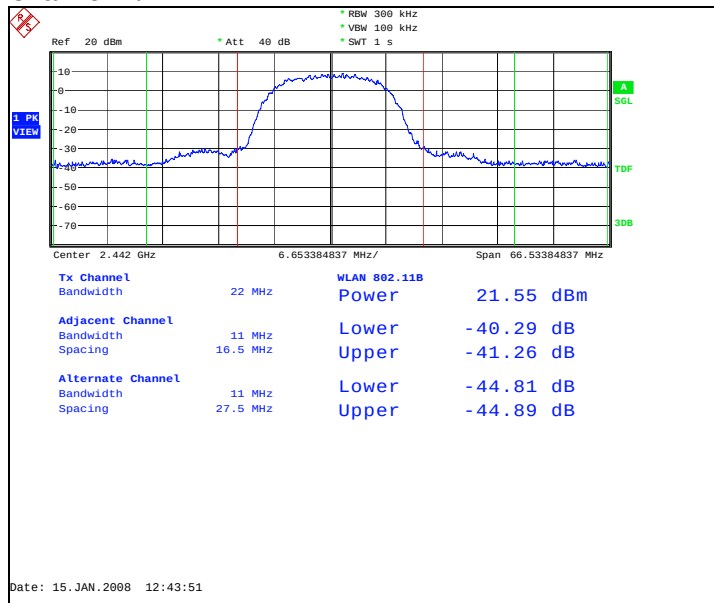
11.2.1 DSSS mode, QPSK modulation, 11 Mbps data rate

Channel / f_c [MHz]	P [dBm]	P [W]	Result
1 / 2412	21.75	0.150	PASSED
7 / 2442	21.55	0.143	PASSED
11 / 2462	21.74	0.149	PASSED

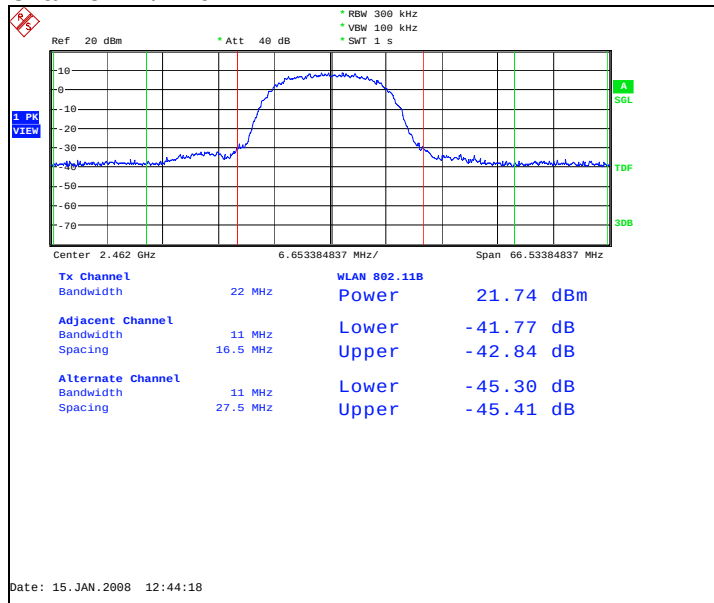
Channel 1 / 2412 MHz



Channel 7 / 2442 MHz



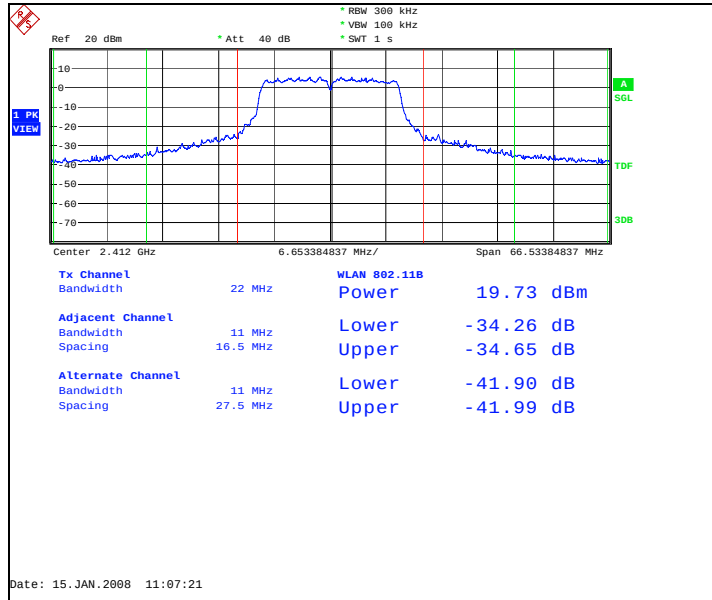
Channel 11 / 2462 MHz



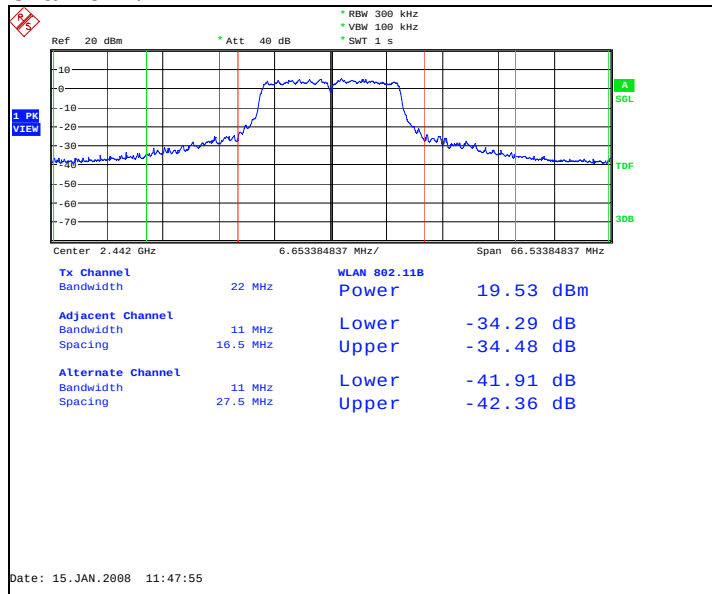
11.2.2 OFDM mode, BPSK modulation, 6 Mbps data rate

Channel / f_c [MHz]	P [dBm]	P [W]	Result
1 / 2412	19.73	0.094	PASSED
7 / 2442	19.53	0.090	PASSED
11 / 2462	19.66	0.092	PASSED

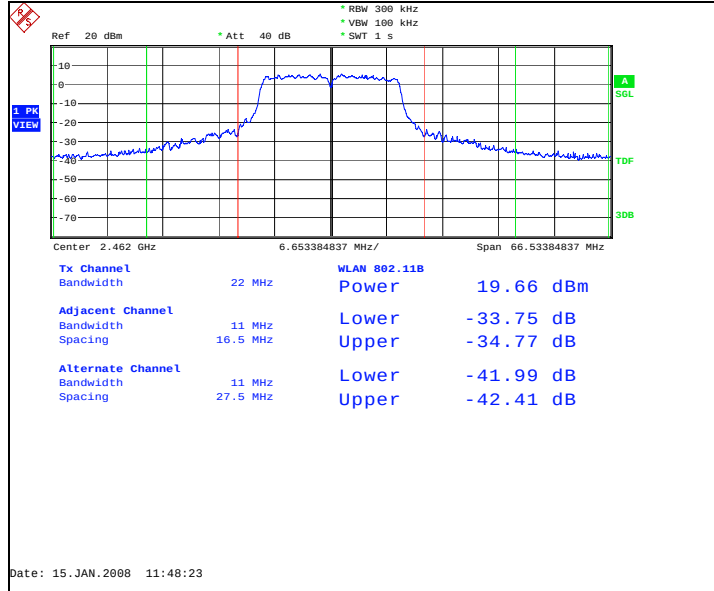
Channel 1 / 2412 MHz



Channel 7 / 2442 MHz



Channel 11 / 2462 MHz



12. Spurious RF conducted emissions (FCC §15.247(d), RSS-210 A8.5)

EUT with DUT number	RM-345 DUT 41360
Accessories with DUT numbers	AC-5E DUT 41365 / BL-4U DUT 41364 / HS-47 DUT 41367
Operation Voltage [V] / [Hz]	Nominal
Result	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	20 / 50 / 100.4
Date of measurements	15.01.2008
Measured by	Petteri Suni

12.1. Test method and limit

The measurement is made according to DTS procedures KDB 558074 and IC standard RSS-210.

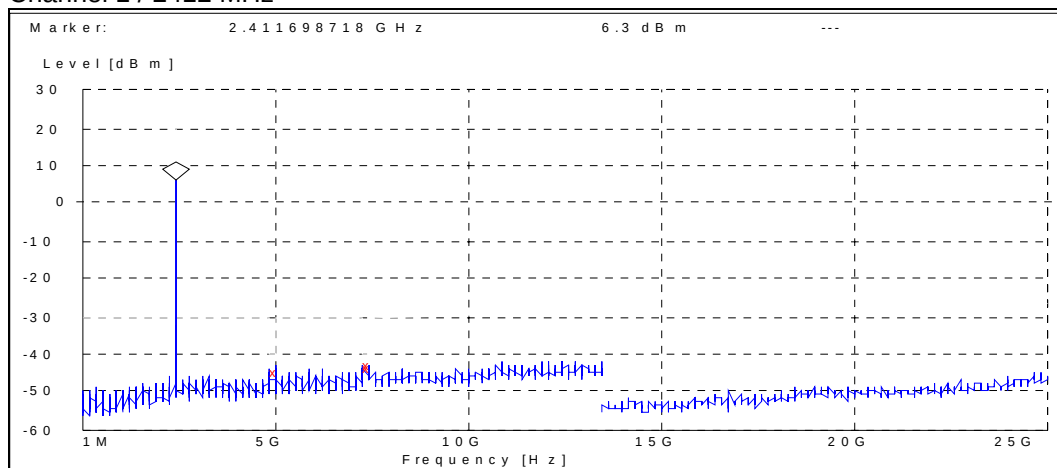
Limits for spurious RF conducted emissions measurements

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

12.2. WLAN Test results

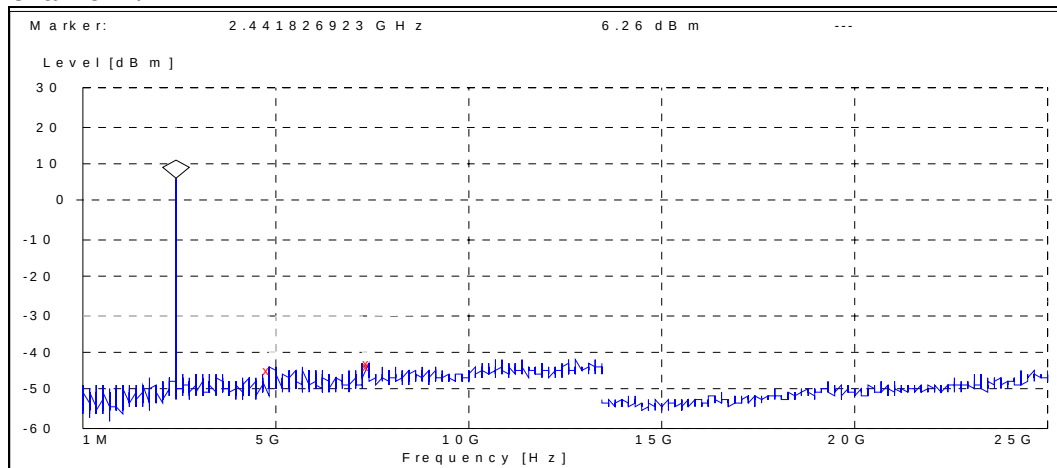
12.2.1 DSSS mode, QPSK modulation, 11 Mbps data rate

Channel 1 / 2412 MHz



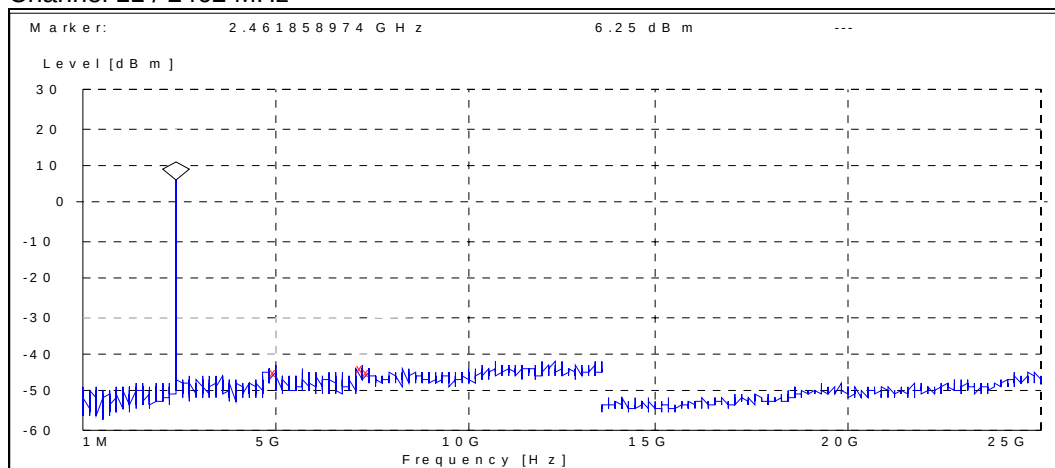
Frequency [MHz]	P [dBc]	Result
4961.217949	-51.304535	PASSED
7382.211538	-49.304535	PASSED
7500.000000	-50.104535	PASSED

Channel 7 / 2442 MHz



Frequency [MHz]	P [dBc]	Result
4837.179487	-51.163642	PASSED
7352.403846	-50.063642	PASSED
7500.000000	-48.863642	PASSED

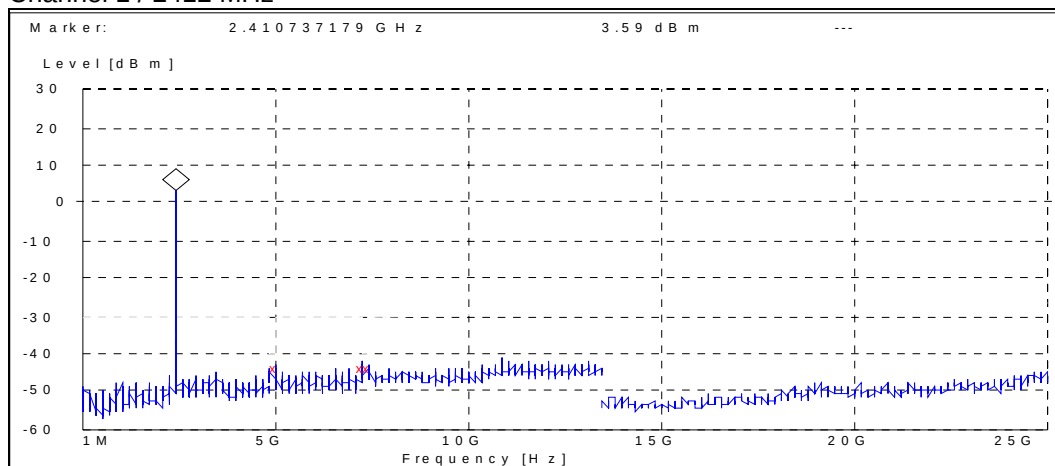
Channel 11 / 2462 MHz



Frequency [MHz]	P [dBc]	Result
4990.705128	-50.752450	PASSED
7246.153846	-50.252450	PASSED
7500.000000	-50.852450	PASSED

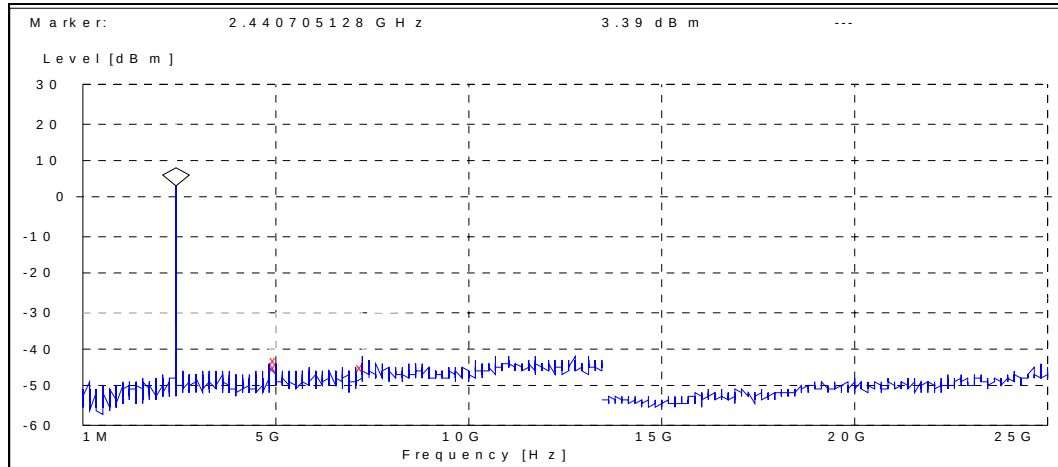
12.2.2 OFDM mode, BPSK modulation, 6 Mbps data rate

Channel 1 / 2412 MHz



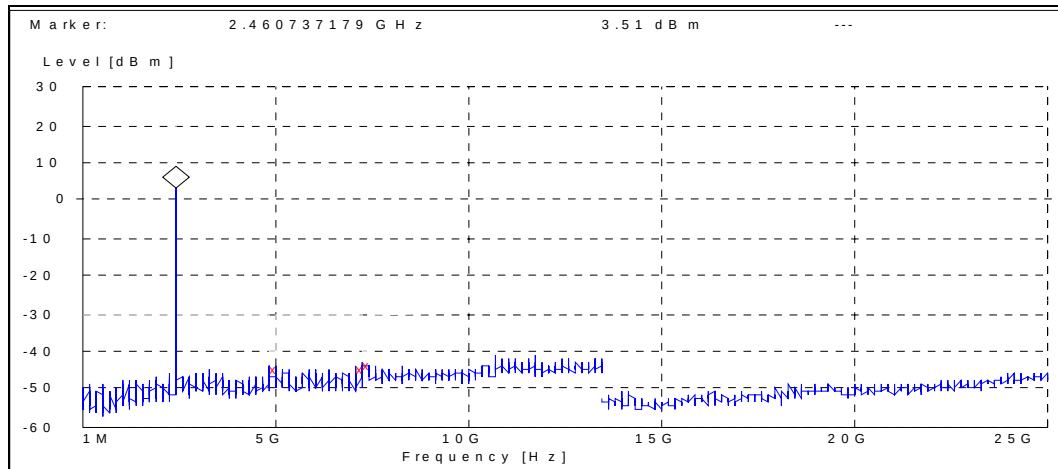
Frequency [MHz]	P [dBc]	Result
4956.730769	-47.791164	PASSED
7327.403846	-47.391164	PASSED
7500.000000	-47.091164	PASSED

Channel 7 / 2442 MHz



Frequency [MHz]	P [dBc]	Result
4972.756410	-47.987631	PASSED
5000.000000	-45.987631	PASSED
7314.423077	-47.687631	PASSED

Channel 11 / 2462 MHz



Frequency [MHz]	P [dBc]	Result
4975.641026	-48.209872	PASSED
7200.961538	-47.809872	PASSED
7500.000000	-47.009872	PASSED

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

EUT with DUT number	RM-345 DUT41383
Accessories with DUT numbers	BL-4U DUT41363;AC-5E DUT41365;HS-4641367
Operation Voltage [V] / [Hz]	115 / 60
Result	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	20 / 49 / 99.9
Date of measurements	24.01.2008
Measured by	Zou Ming

13.1. Test method and limit

The measurement is made according to DTS procedures KDB 558074 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.

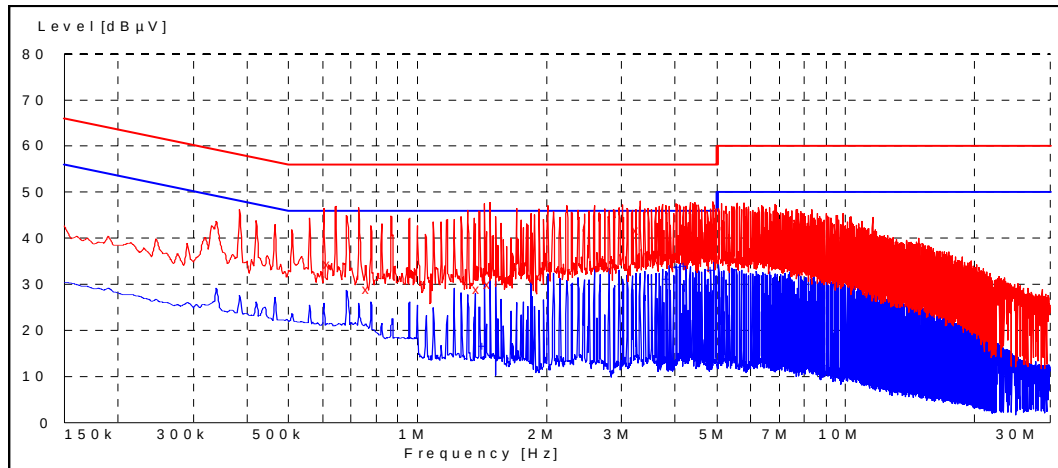
CISPR 22 Class B limits

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

13.2. WLAN Test results

13.2.1 DSSS mode, QPSK modulation, 11 Mbps data rate

channel 7 / 2442 MHz



Quasi peak (RBW: 9 kHz)

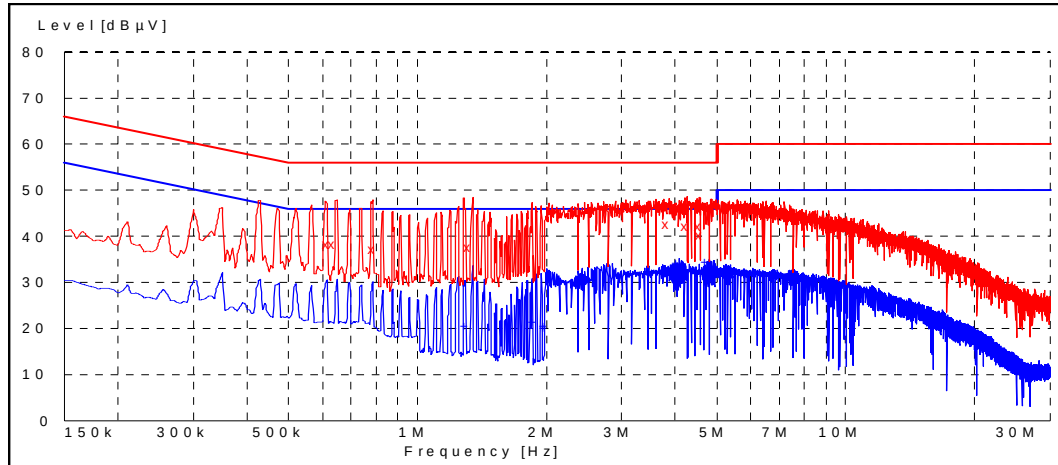
Frequency [MHz]	U [dBμV]	Line	Result
0.625000	34.20	L1	PASSED
0.770000	29.10	N	PASSED
1.395000	28.90	N	PASSED
1.480000	30.00	N	PASSED
3.275000	41.70	L1	PASSED
4.325000	41.90	L1	PASSED
4.440000	41.40	L1	PASSED
4.955000	40.70	L1	PASSED

Average (RBW: 9 kHz)

Frequency [MHz]	U [dBμV]	Line	Result
1.435000	16.50	L1	PASSED
3.850000	31.20	L1	PASSED
4.105000	33.70	L1	PASSED
4.240000	34.00	L1	PASSED
4.900000	33.00	L1	PASSED

13.2.2 OFDM mode, BPSK modulation, 6 Mbps data rate

channel 7 / 2442 MHz



Quasi peak (RBW: 9 kHz)

Frequency [MHz]	U [dBμV]	Line	Result
0.620000	38.20	L1	PASSED
0.640000	38.40	L1	PASSED
0.795000	37.30	L1	PASSED
1.325000	37.60	L1	PASSED
3.850000	42.70	L1	PASSED
4.275000	42.40	L1	PASSED
4.590000	42.30	L1	PASSED
4.610000	40.20	L1	PASSED

Average (RBW: 9 kHz)

Frequency [MHz]	U [dBμV]	Line	Result
1.300000	20.40	L1	PASSED
1.885000	21.30	L1	PASSED
1.990000	20.50	L1	PASSED
2.000000	20.10	L1	PASSED
4.065000	34.20	L1	PASSED
4.070000	33.80	L1	PASSED
4.765000	34.50	L1	PASSED
4.900000	33.60	L1	PASSED

14. 6 dB bandwidth (FCC §15.247(a)(2), RSS-210 A8.2 (1))

EUT with DUT number	RM-345 DUT 41360
Accessories with DUT numbers	AC-5E DUT 41365 / BL-4U DUT 41364 / HS-47 DUT 41367
Operation Voltage [V] / [Hz]	Nominal
Result	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	20 / 50 / 100.4
Date of measurements	15.01.2008
Measured by	Petteri Suni

14.1. Test method and limit

The measurement is made according to DTS procedures KDB 558074 and IC standard RSS-210.

Limits for 6 dB bandwidth measurements

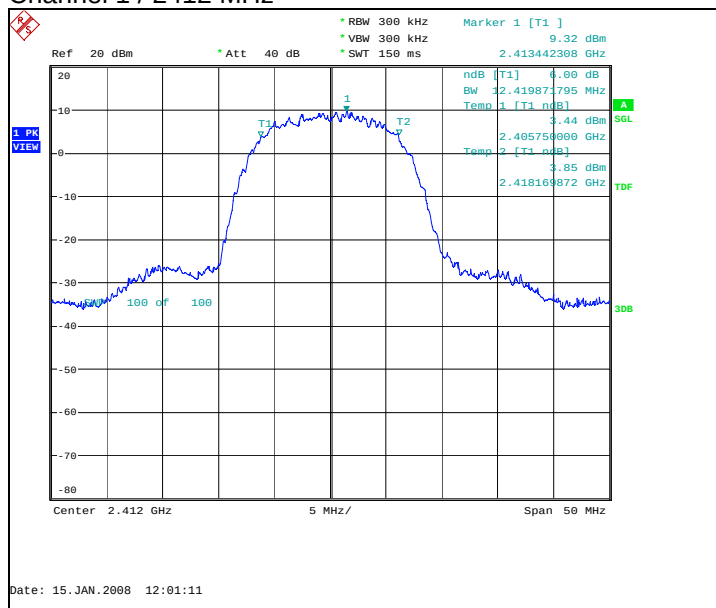
Limit [kHz]
≥ 500

14.2. WLAN test results

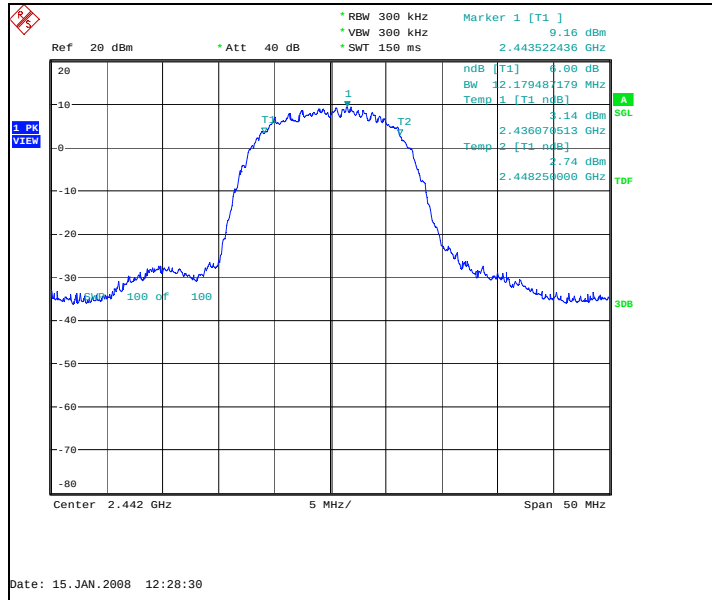
14.2.1 DSSS mode, QPSK modulation, 11 Mbps data rate

Channel / f _c [MHz]	6 dB bandwidth [kHz]	Result
1	12419.872	PASSED
7	12179.487	PASSED
11	12419.872	PASSED

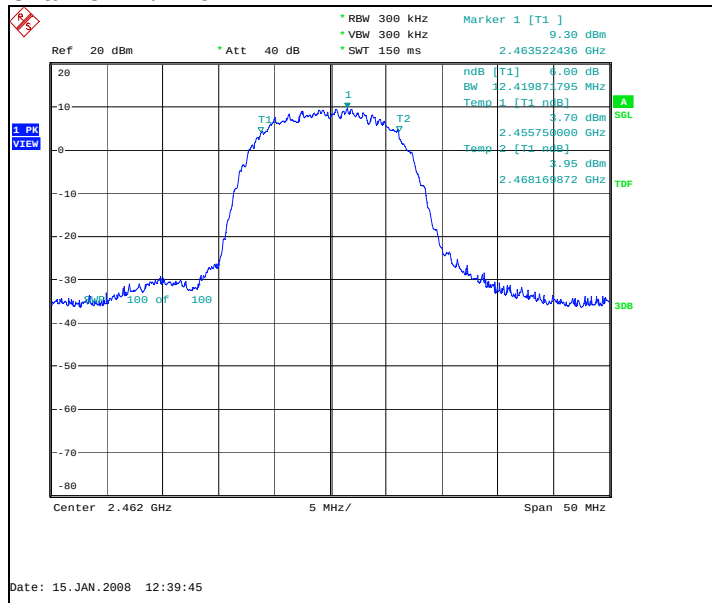
Channel 1 / 2412 MHz



Channel 7 / 2442 MHz



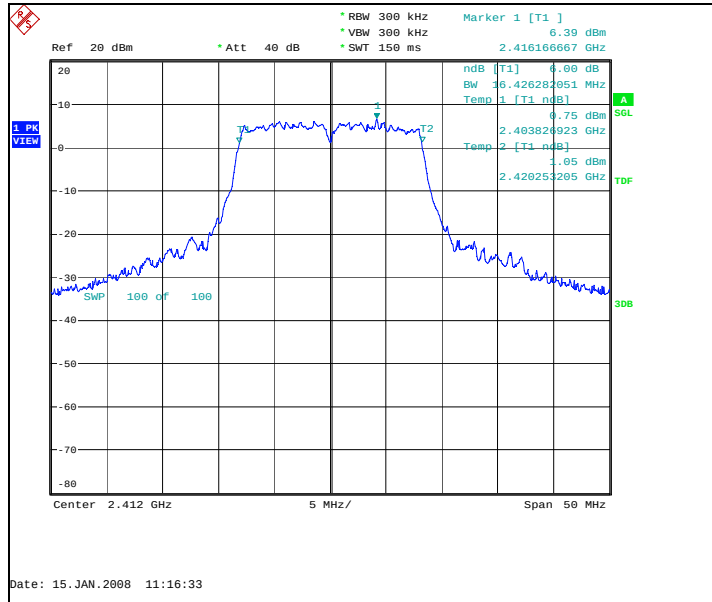
Channel 11 / 2462 MHz



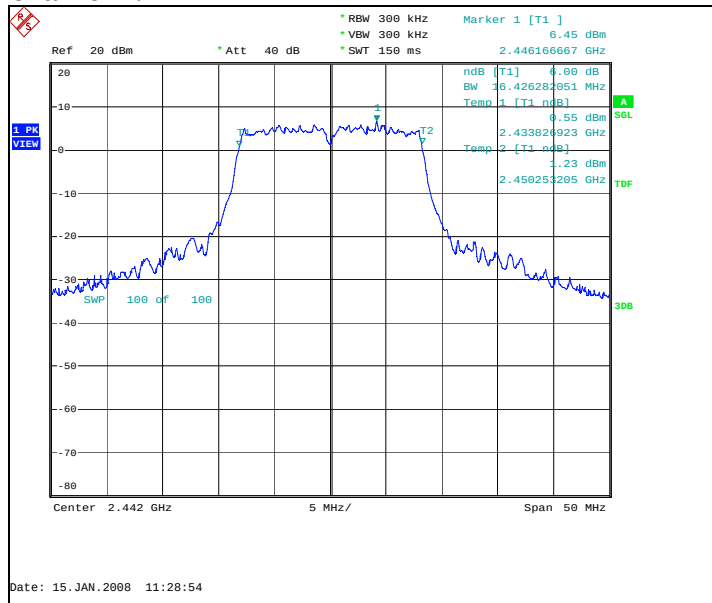
14.2.2 OFDM mode, BPSK modulation, 6 Mbps data rate

Channel / f_c [MHz]	6 dB bandwidth [kHz]	Result
1	16426.282	PASSED
7	16426.282	PASSED
11	16506.410	PASSED

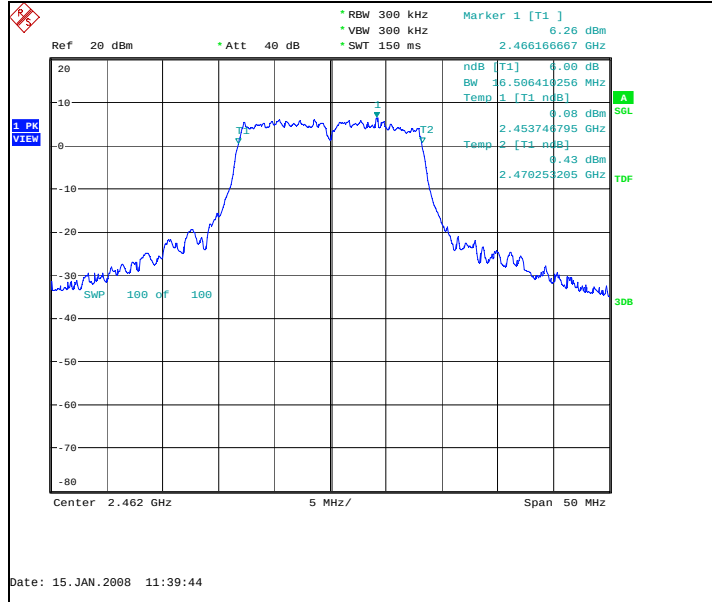
Channel 1 / 2412 MHz



Channel 7 / 2442 MHz



Channel 11 / 2462 MHz



15. Power spectral density (FCC §15.247(e), RSS-210 A8.2 (2))

EUT with DUT number	RM-345 DUT 41360
Accessories with DUT numbers	AC-5E DUT 41365 / BL-4U DUT 41364 / HS-47 DUT 41367
Operation Voltage [V] / [Hz]	Nominal
Result	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	20 / 50 / 100.4
Date of measurements	15.01.2008
Measured by	Petteri Suni

15.1. Test method and limit

The measurement is made according to DTS procedures KDB 558074 and IC standard RSS-210.

Limits for power spectral density measurements

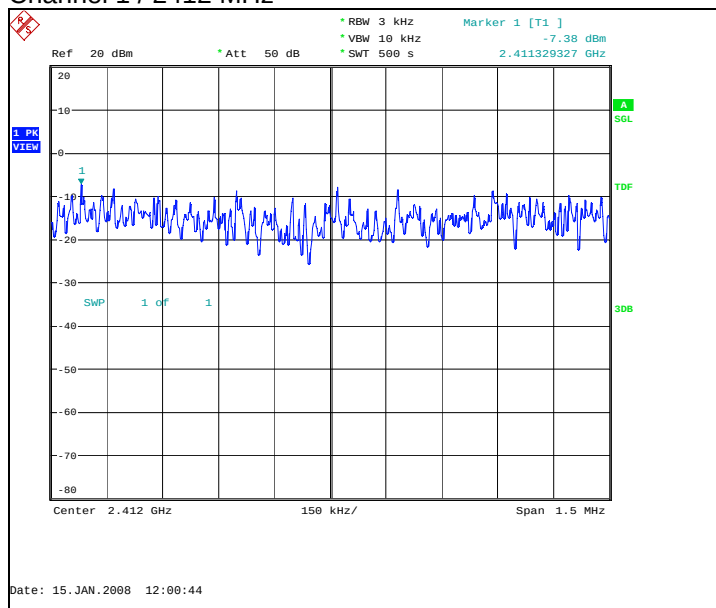
Limit [dBm] @ 3 kHz
≤ 8

15.2. WLAN test results

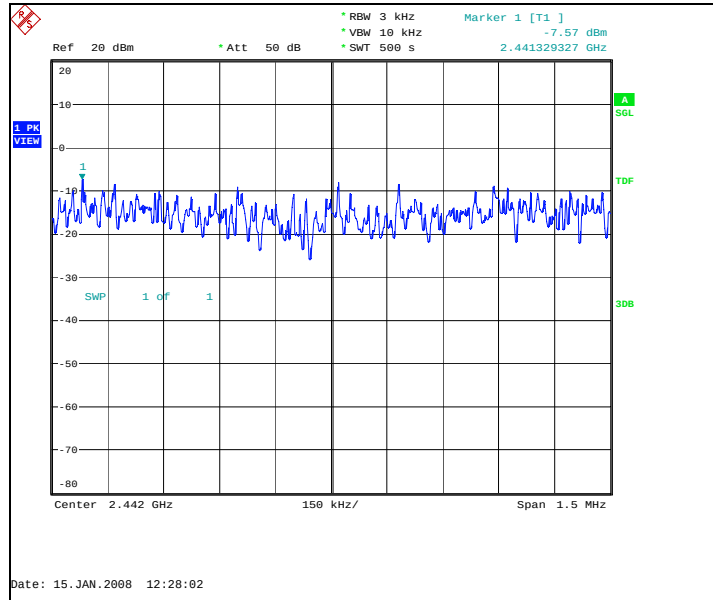
15.2.1 DSSS mode, QPSK modulation, 11 Mbps data rate

Channel / f _c [MHz]	P [dBm]	Result
1 / 2412	-7.38	PASSED
7 / 2442	-7.57	PASSED
11 / 2462	-7.40	PASSED

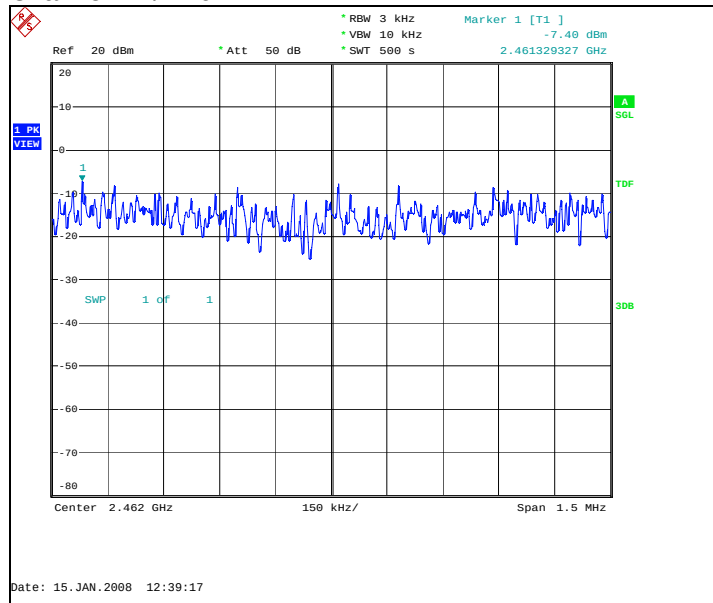
Channel 1 / 2412 MHz



Channel 7 / 2442 MHz



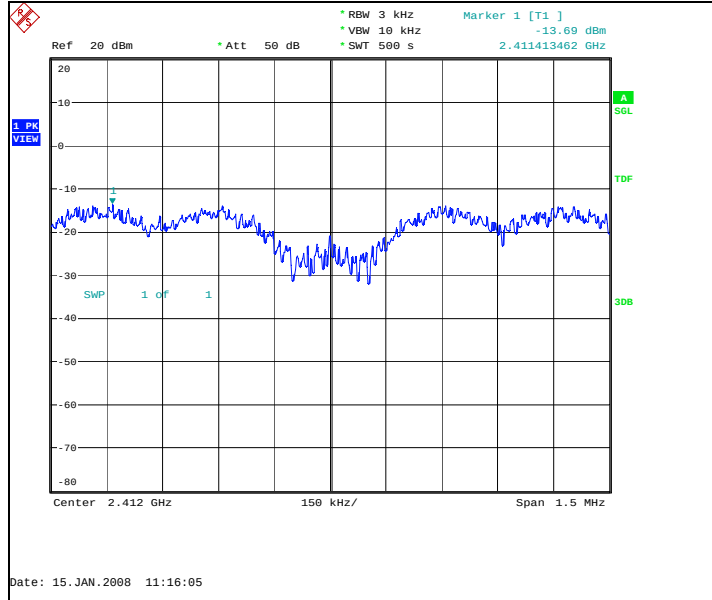
Channel 11 / 2462 MHz



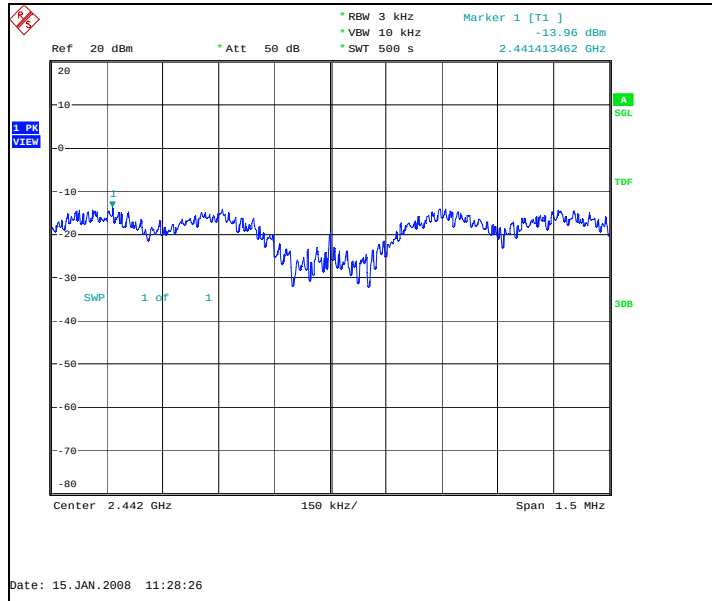
15.2.2 OFDM mode, BPSK modulation, 6 Mbps data rate

Channel / f_c [MHz]	P [dBm]	Result
1 / 2412	-13.69	PASSED
7 / 2442	-13.96	PASSED
11 / 2462	-13.65	PASSED

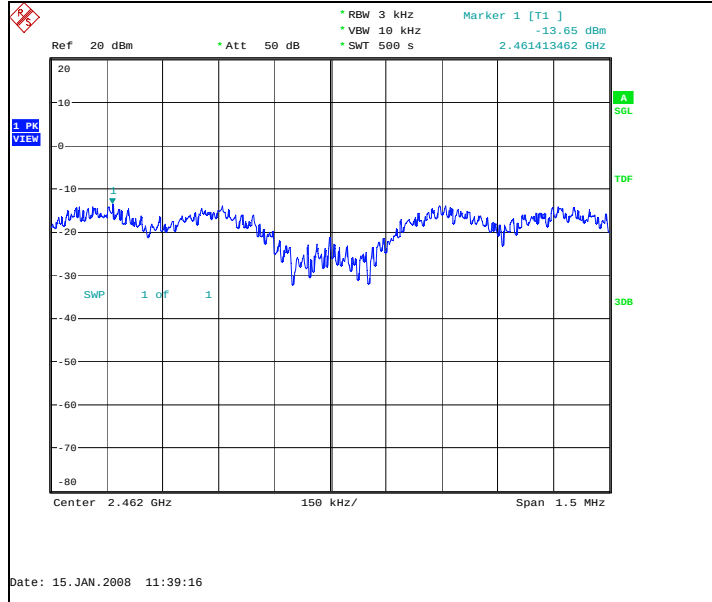
Channel 1 / 2412 MHz



Channel 7 / 2442 MHz



Channel 11 / 2462 MHz



16. Test Equipment

16.1. 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 µH	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

16.2. 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

Eq. No	Equipment	Type	Manufacturer	Used in
TM23892	Yaesu controller	G-1000SDX	Yaesu	22/24/27, 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