TCC Nokia

FINAS Finnish Accreditation Service T117 (EN ISO/IEC 17025)

FCC Part 15C Compliance Test Report

Test Report no.:	Tre_FCC_0813_04.doc	**Date of Report:**	26-Mar-2008
Number of pages:	63	**Customer's Contact person:**	Lasse Vaattovaara
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 86 Joensuunkatu 7 FIN-24101 SALO, FINLAND Tel. +358 (0) 7180 08000 Fax. +358 (0) 7180 44277
FCC listing no.: **IC recognition no.:**	94436 3608		
Tested devices/ accessories:	**GSM phone RM-357 / Battery BP-4L, AC charger AC-5E, Headset HS-47**		
FCC ID:	PYARM-357	**IC:**	661V-RM357
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:	 Digitally signed by Jari Jantunen Date: 2008.03.26 10:37:43 +02'00'		

Jari Jantunen, System Manager

1. Summary for FCC Part 15C Compliance Test Report

Date of receipt	2.1.2008
Testing completed	16.1.2008
The customer's contact person	Lasse Vaattovaara
Test Plan referred to	T:\Projects\
Notes	-
Document name	T:\Projects\RM-346\EMC\Results\FCC\Tre_FCC_0801_02.doc

1.1. EUT and Accessory Information

The EUT is a 6-band (GSM850/900/1800/1900 and WCDMA Band II/V) 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-346	004401014291526	0508	-	007.45.3	**41346**
GSM phone	RM-346	004401014291385	0508	-	007.45.3	**41347**
GSM phone	RM-346	004401014291401	0508	-	007.45.3	**41355**
Battery	BP-4L	-	-	-	-	**41348**
AC Charger	AC-5E	-	-	-	-	**41350**
Headset	HS-47	-	-	-	-	**41352**

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	NP
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

TCC Nokia Tampere Laboratory
P.O. Box 68
Sinitaival 5
FIN-33720 TAMPERE, FINLAND
Tel. +358 (0) 7180 46800
Fax. +358 (0) 7180 46880

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	PASSED
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.

The test results of PYARM-346 are re-used for certification of the PYARM-357. The table above indicates the results, which will be re-used.

TCC Nokia Tampere Laboratory
P.O. Box 68
Sinitaival 5
FIN-33720 TAMPERE, FINLAND
Tel. +358 (0) 7180 46800
Fax. +358 (0) 7180 46880

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 6

2.1. Conducted RF test setup 6
2.2. AC powerline conducted emissions test setup 6
2.3. Spurious radiated emissions test setup 6

3. Conducted peak output power (FCC §15.247(b)(1), RSS-210 A8.4 (2)) 7

3.1. Test method and limit 7
3.2. Bluetooth Test results 8

4. Spurious RF conducted emissions (FCC §15.247(d), RSS-A8.5) 11

4.1. Test method and limit 11
4.2. Bluetooth Test results 12

5. Spurious radiated emissions (FCC §15.247(d), §15.209, RSS-210 A8.5) 15

5.1. Test method and limit 15
5.2. Bluetooth Test results 16

6. AC powerline conducted emissions (FCC §15.207, RSS-GEN 7.2.2) 19

6.1. Test method and limit 19
6.2. Bluetooth Test results 20

7. 20 dB bandwidth (FCC §15.247(a)(1), RSS-210 A8.1 (1)) 22

7.1. Test method and limit 22
7.2. Bluetooth Test results 23

8. Carrier frequency separation (FCC §15.247(a)(1), RSS-210 A8.1 (2)) 27

8.1. Test method and limit 27
8.2. Bluetooth Test results 28

9. Number of hopping frequencies (FCC §15.247(a)(1)(iii), RSS-210 A8.1 (4)) 30

9.1. Test method and limit 30
9.2. Bluetooth Test results 31

10. Time of occupancy (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. Conducted peak output power (FCC §15.247(b)(1), RSS-210 A8.4 (4)) 36

TCC Nokia Tampere Laboratory
P.O. Box 68
Sinitaival 5
FIN-33720 TAMPERE, FINLAND
Tel. +358 (0) 7180 46800
Fax. +358 (0) 7180 46880

11.1. Test method and limit 36
11.2. WLAN Test results 37

12. Spurious RF conducted emissions (FCC §15.247(d), RSS-210 A8.5) 41

12.1. Test method and limit 41
12.2. WLAN Test results 42

13. Spurious radiated emissions (FCC §15.247(d), §15.209, RSS-210 A8.5) 45

13.1. Test method and limit 45
13.2. WLAN Test results 46

14. AC powerline conducted emissions (FCC §15.207, RSS-GEN 7.2.2) 49

14.1. Test method and limit 49
14.2. WLAN Test results 50

15. 6 dB bandwidth (FCC §15.247(a)(2), RSS-210 A8.2 (1)) 52

15.1. Test method and limit 52
15.2. WLAN test results 53

16. Power spectral density (FCC §15.247(e), RSS-210 A8.2 (2)) 57

16.1. Test method and limit 57
16.2. WLAN test results 58

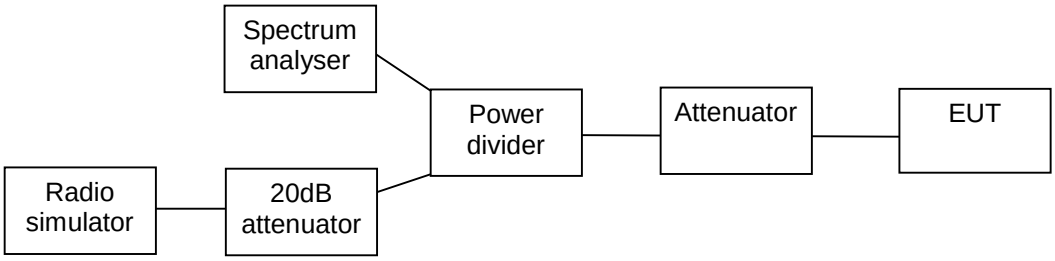
17. Test Equipment 62

17.1. Conducted measurements 62
17.2. Radiated measurements 62

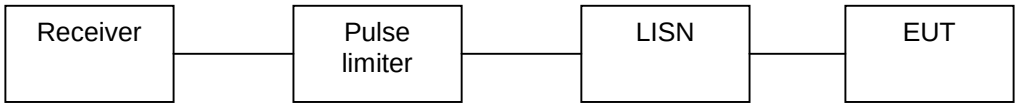
TCC Nokia Tampere Laboratory
P.O. Box 68
Sinitaival 5
FIN-33720 TAMPERE, FINLAND
Tel. +358 (0) 7180 46800
Fax. +358 (0) 7180 46880

2. Test setups

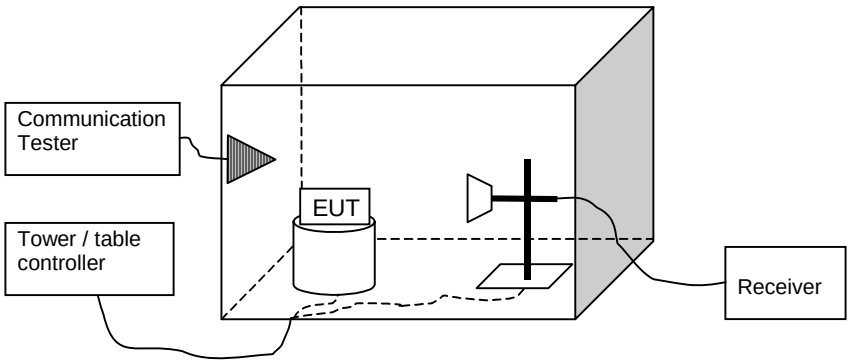
2.1. Conducted RF test setup



2.2. AC powerline conducted emissions test setup



2.3. Spurious radiated emissions test setup



TCC Nokia Tampere Laboratory
P.O. Box 68
Sinitaival 5
FIN-33720 TAMPERE, FINLAND
Tel. +358 (0) 7180 46800
Fax. +358 (0) 7180 46880

3. Conducted peak output power

(FCC §15.247(b)(1), RSS-210 A8.4 (2))

EUT with DUT number	RM-346 DUT 41347
Accessories with DUT numbers	BP-4L DUT 41348
Operation Voltage [V] / [Hz]	115 / 60
Result	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	22 / 48 / 104.5
Date of measurements	2.1.2008
Measured by	Jari Jantunen

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

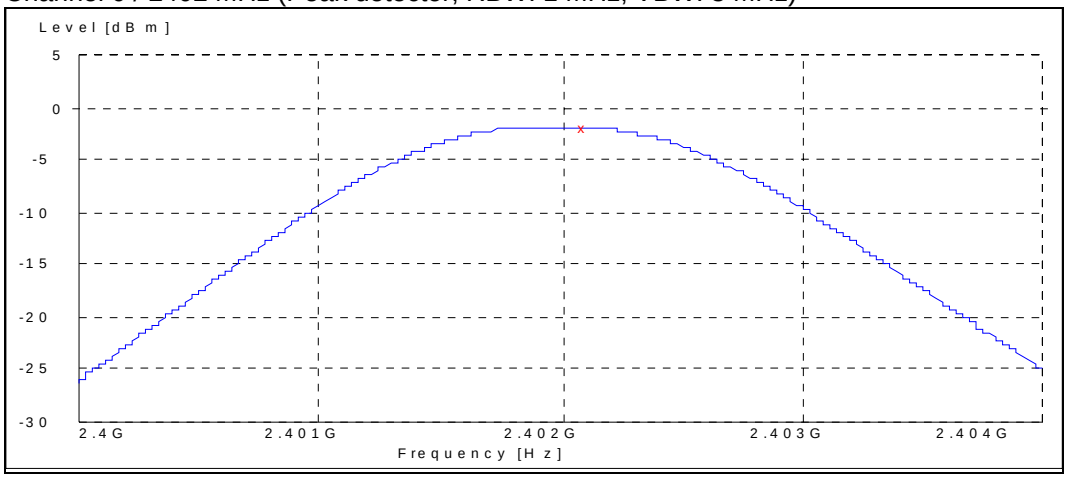
TCC Nokia Tampere Laboratory
P.O. Box 68
Sinitaival 5
FIN-33720 TAMPERE, FINLAND
Tel. +358 (0) 7180 46800
Fax. +358 (0) 7180 46880

3.2. Bluetooth Test results

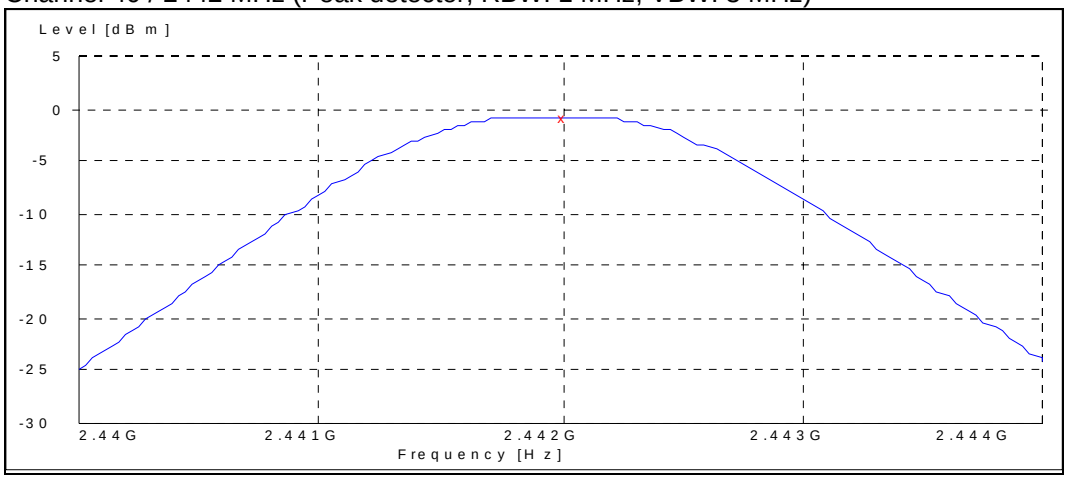
3.2.1 GFSK modulation, PRBS packet type

Channel / f_C [MHz]	P [dBm]	P [mW]	Result
0 / 2402	-1.90	0.646	PASSED
40 / 2442	-0.80	0.832	PASSED
78 / 2480	-0.90	0.813	PASSED

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

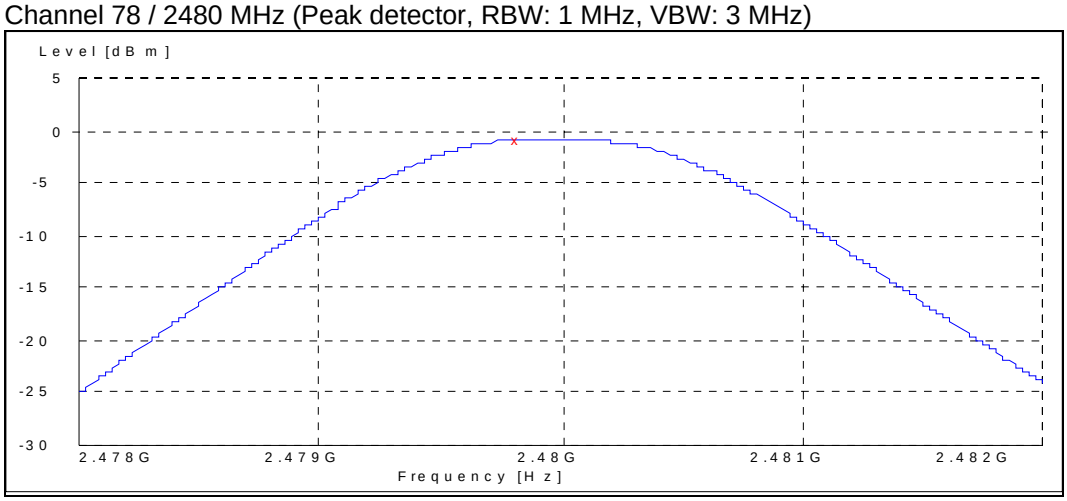


Channel 40 / 2442 MHz (Peak detector, RBW: 1 MHz, VBW: 3 MHz)



TCC Nokia Tampere Laboratory
P.O. Box 68
Sinitaival 5
FIN-33720 TAMPERE, FINLAND
Tel. +358 (0) 7180 46800
Fax. +358 (0) 7180 46880

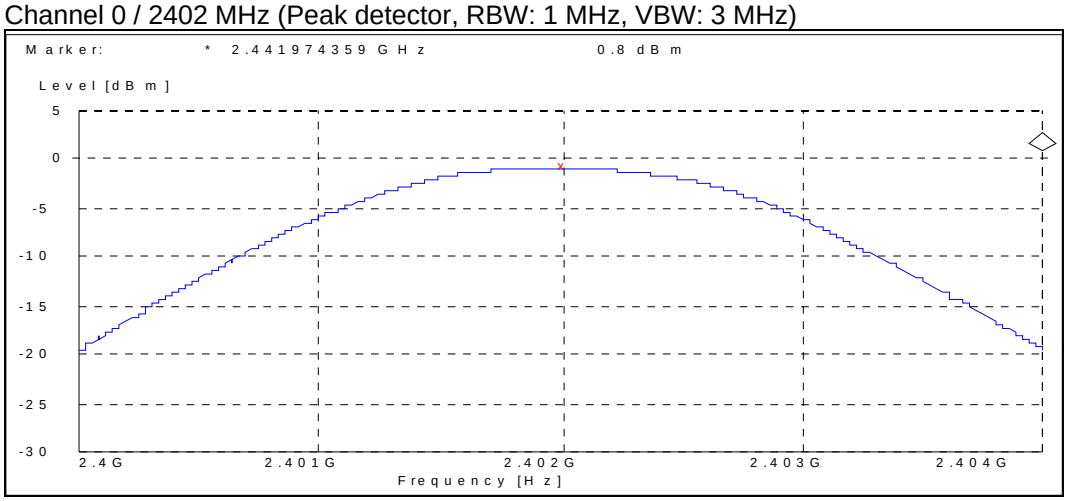
Channel 78 / 2480 MHz (Peak detector, RBW: 1 MHz, VBW: 3 MHz)



3.2.2 8DPSK modulation, PRBS packet type

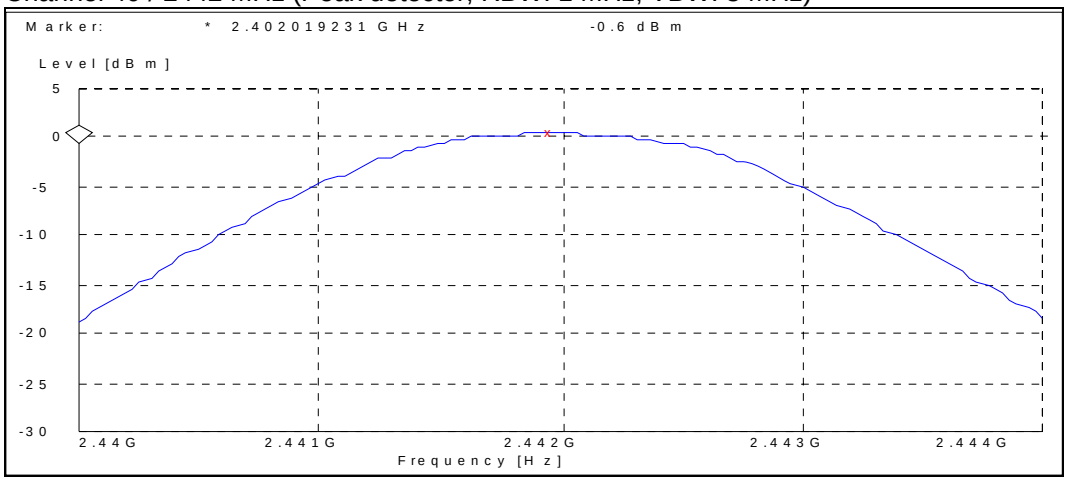
Channel / f_C [MHz]	P [dBm]	P [mW]	Result
0 / 2402	-0.60	0.871	PASSED
40 / 2442	0.60	1.148	PASSED
78 / 2480	0.60	1.148	PASSED

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

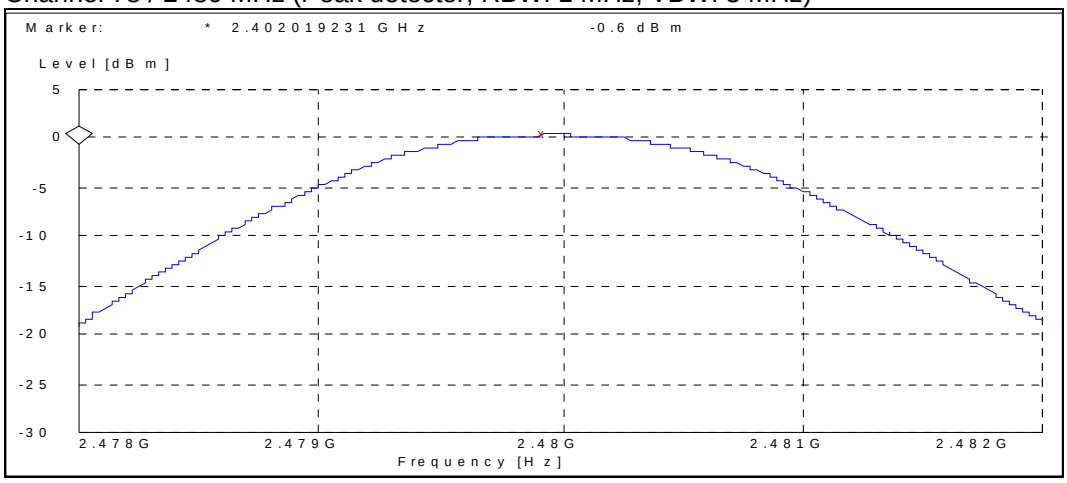


TCC Nokia Tampere Laboratory
P.O. Box 68
Sinitaival 5
FIN-33720 TAMPERE, FINLAND
Tel. +358 (0) 7180 46800
Fax. +358 (0) 7180 46880

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



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



TCC Nokia Tampere Laboratory
P.O. Box 68
Sinitaival 5
FIN-33720 TAMPERE, FINLAND
Tel. +358 (0) 7180 46800
Fax. +358 (0) 7180 46880

4. Spurious RF conducted emissions

(FCC §15.247(d), RSS-A8.5)

EUT with DUT number	RM-346 DUT 41347
Accessories with DUT numbers	BP-4L DUT 41348
Operation Voltage [V] / [Hz]	Nominal
Result	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	22 / 48 / 104.5
Date of measurements	2.1.2008
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 spurious RF conducted emissions measurements

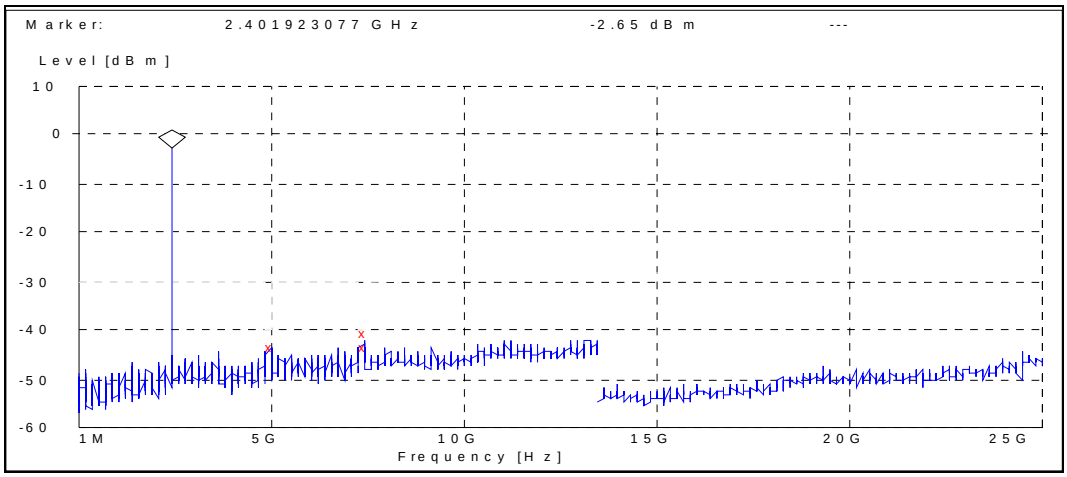
Frequency range [MHz]	Limit [dBc]
1 – 25000	≤ -20

TCC Nokia Tampere Laboratory
P.O. Box 68
Sinitaival 5
FIN-33720 TAMPERE, FINLAND
Tel. +358 (0) 7180 46800
Fax. +358 (0) 7180 46880

4.2. Bluetooth Test results

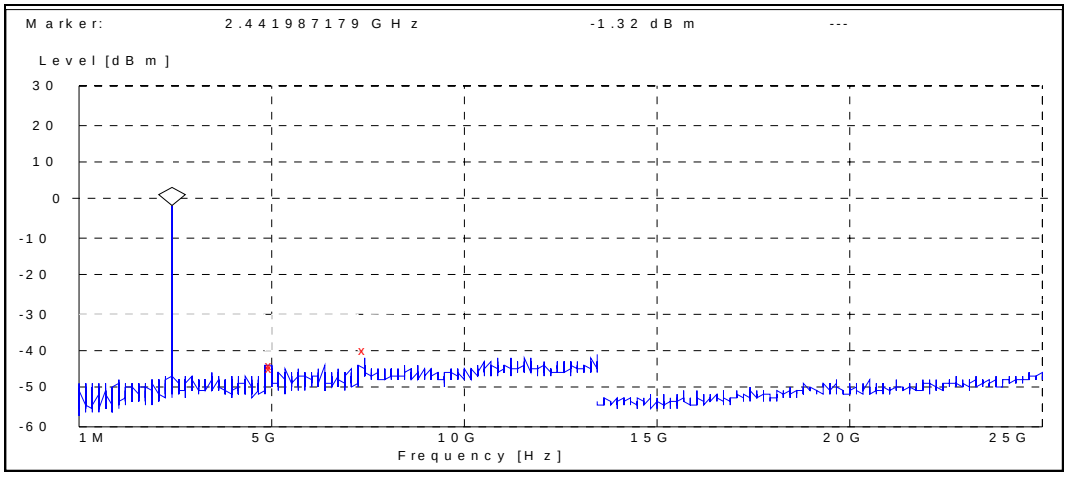
4.2.1 GFSK modulation, PRBS packet type

Channel 0 / 2402 MHz



Frequency [MHz]	P [dBc]	Result
4962.500000	-40.646461	PASSED
7419.711538	-37.746461	PASSED
7500.000000	-41.146461	PASSED

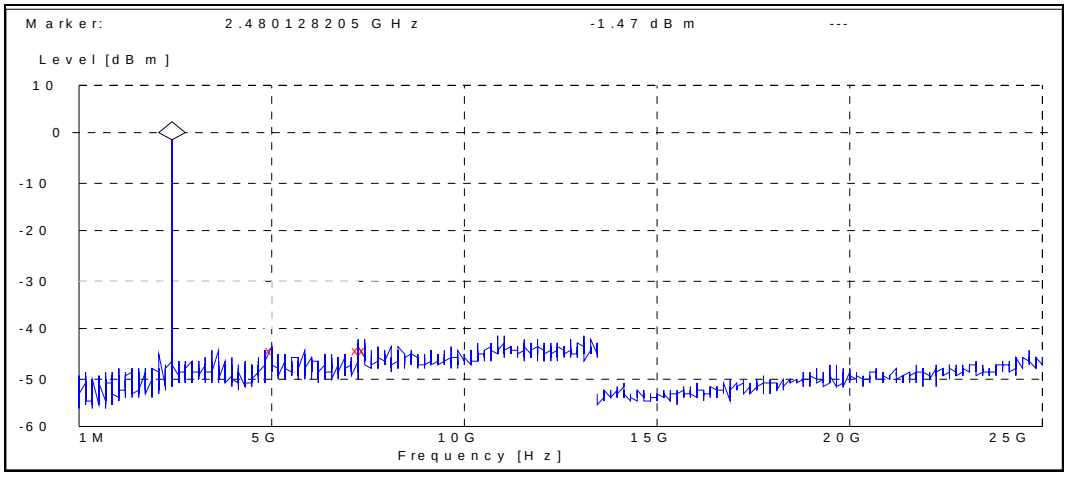
Channel 40 / 2442 MHz



Frequency [MHz]	P [dBc]	Result
4968.589744	-42.775379	PASSED
5000.000000	-43.575379	PASSED
7419.711538	-38.975379	PASSED

TCC Nokia Tampere Laboratory
P.O. Box 68
Sinitaival 5
FIN-33720 TAMPERE, FINLAND
Tel. +358 (0) 7180 46800
Fax. +358 (0) 7180 46880

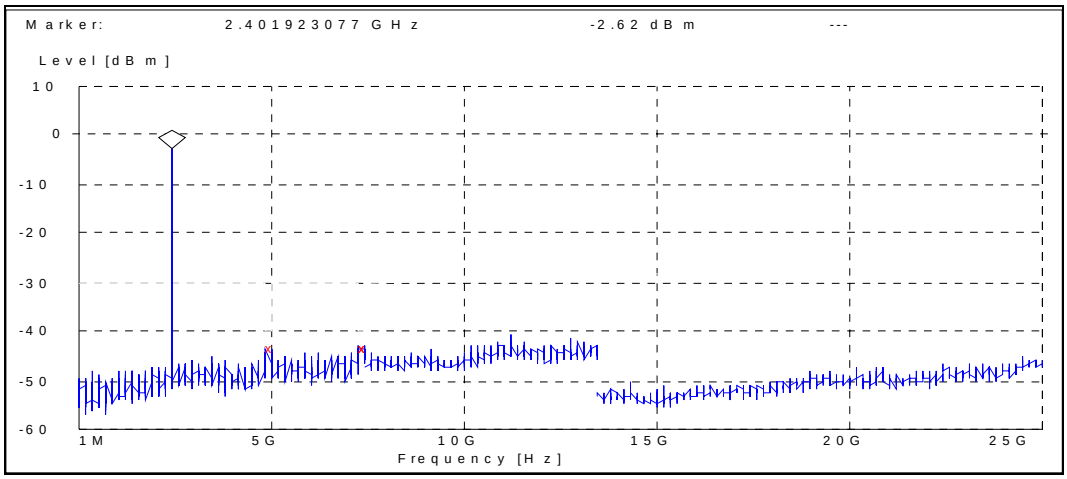
Channel 78 / 2480 MHz



Frequency [MHz]	P [dBc]	Result
4973.717949	-42.826508	PASSED
7254.326923	-43.026508	PASSED
7500.000000	-42.826508	PASSED

4.2.2 8DPSK modulation, PRBS packet type

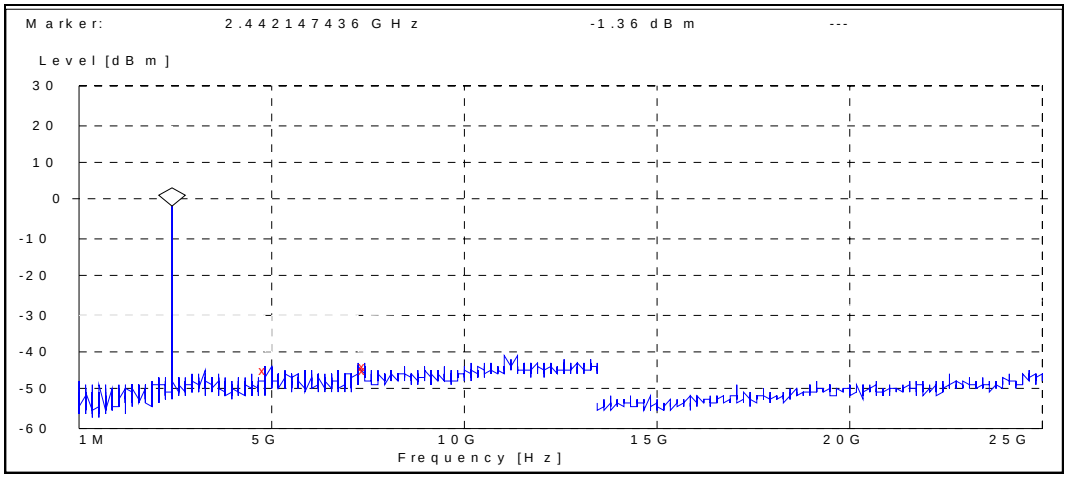
Channel 0 / 2402 MHz



Frequency [MHz]	P [dBc]	Result
4995.833333	-41.379855	PASSED
7419.711538	-41.179855	PASSED
7500.000000	-41.379855	PASSED

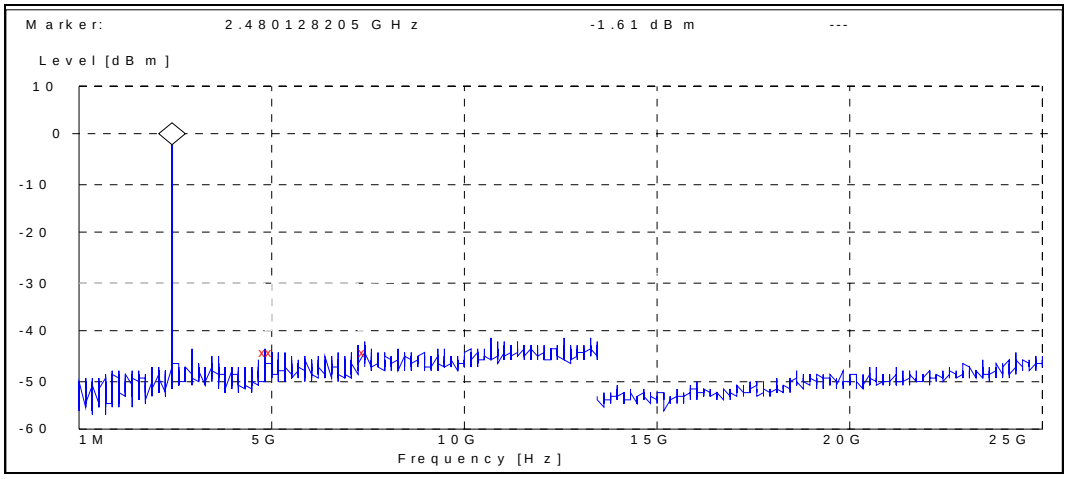
TCC Nokia Tampere Laboratory
P.O. Box 68
Sinitaival 5
FIN-33720 TAMPERE, FINLAND
Tel. +358 (0) 7180 46800
Fax. +358 (0) 7180 46880

Channel 40 / 2442 MHz



Frequency [MHz]	P [dBc]	Result
4936.538462	-43.037149	PASSED
7419.711538	-42.637149	PASSED
7500.000000	-42.937149	PASSED

Channel 78 / 2480 MHz



Frequency [MHz]	P [dBc]	Result
4836.217949	-42.587730	PASSED
5000.000000	-42.887730	PASSED
7419.711538	-42.487730	PASSED

TCC Nokia Tampere Laboratory
P.O. Box 68
Sinitaival 5
FIN-33720 TAMPERE, FINLAND
Tel. +358 (0) 7180 46800
Fax. +358 (0) 7180 46880

5. Spurious radiated emissions

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

EUT with DUT number	RM-346 DUT 41346
Accessories with DUT numbers	BP-4L DUT 41348, AC-5E DUT 41350, HS-47 DUT 41352
Operation Voltage [V] / [Hz]	115 / 60
Result	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	22 / 47 / 104.8
Date of measurements	3.1.2008
Measured by	Jari Jantunen

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 ($A_{TOT} = L_{CABLES} + AF - G_{PREAMP}$).

TCC Nokia Tampere Laboratory
P.O. Box 68
Sinitaival 5
FIN-33720 TAMPERE, FINLAND
Tel. +358 (0) 7180 46800
Fax. +358 (0) 7180 46880

Limits for spurious radiated emissions measurements (3 m measurement distance)

Frequency range [MHz[	Limit [µV/m]	Limit [dBµV/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 [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Polarisation	Result
4804.000000	38.90	88.10	40.70	-1.8	HORIZONTAL	PASSED
7206.000000	42.30	130.32	39.70	2.6	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
4804.000000	25.90	19.72	27.70	-1.8	HORIZONTAL	PASSED
7206.000000	29.20	28.84	26.60	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
38.176353	24.10	16.03	39.10	-15.0	VERTICAL	PASSED
73.327054	11.60	3.80	37.20	-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
4940.387776	39.60	95.50	41.10	-1.5	HORIZONTAL	PASSED
4965.431864	39.50	94.41	40.70	-1.2	HORIZONTAL	PASSED
7285.067134	43.40	147.91	40.40	3.0	HORIZONTAL	PASSED
7308.623246	43.60	151.36	40.60	3.0	HORIZONTAL	PASSED
7390.275551	43.40	147.91	39.80	3.6	HORIZONTAL	PASSED
7417.841683	43.60	151.36	39.90	3.7	VERTICAL	PASSED
17921.839679	53.20	457.09	33.70	19.5	VERTICAL	PASSED

TCC Nokia Tampere Laboratory
P.O. Box 68
Sinitaival 5
FIN-33720 TAMPERE, FINLAND
Tel. +358 (0) 7180 46800
Fax. +358 (0) 7180 46880

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

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Polarisation	Result
4942.387776	26.80	21.88	28.30	-1.5	HORIZONTAL	PASSED
7285.067134	30.30	32.73	27.30	3.0	HORIZONTAL	PASSED
7311.123246	30.10	31.99	27.10	3.0	HORIZONTAL	PASSED
7383.775551	30.60	33.88	27.10	3.5	HORIZONTAL	PASSED
7417.341683	30.60	33.88	26.90	3.7	VERTICAL	PASSED
17916.339679	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	39.90	98.86	41.20	-1.3	HORIZONTAL	PASSED
7440.000000	43.70	153.11	40.10	3.6	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
4960.000000	26.90	22.13	28.20	-1.3	HORIZONTAL	PASSED
7440.000000	30.50	33.50	26.90	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	38.40	83.18	40.20	-1.8	HORIZONTAL	PASSED
7206.000000	42.30	130.32	39.70	2.6	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
4804.000000	25.90	19.72	27.70	-1.8	HORIZONTAL	PASSED
7206.000000	29.30	29.17	26.70	2.6	VERTICAL	PASSED

Channel 40 / 2442 MHz

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

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Polarisation	Result
37.635872	24.50	16.79	39.10	-14.6	VERTICAL	PASSED
51.502806	24.90	17.58	48.30	-23.4	VERTICAL	PASSED
73.346092	11.00	3.55	36.60	-25.6	HORIZONTAL	PASSED

TCC Nokia Tampere Laboratory
P.O. Box 68
Sinitaival 5
FIN-33720 TAMPERE, FINLAND
Tel. +358 (0) 7180 46800
Fax. +358 (0) 7180 46880

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

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Polarisation	Result
4965.927856	40.30	103.51	41.50	-1.2	HORIZONTAL	PASSED
4965.935872	40.20	102.33	41.40	-1.2	HORIZONTAL	PASSED
7275.045090	43.20	144.54	40.20	3.0	HORIZONTAL	PASSED
7287.073146	43.40	147.91	40.40	3.0	VERTICAL	PASSED
7421.843687	43.90	156.68	40.20	3.7	HORIZONTAL	PASSED
7422.337675	43.70	153.11	40.00	3.7	VERTICAL	PASSED
17922.349699	53.20	457.09	33.70	19.5	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
4960.427856	26.90	22.13	28.20	-1.3	HORIZONTAL	PASSED
7273.545090	30.30	32.73	27.40	2.9	HORIZONTAL	PASSED
7284.073146	30.30	32.73	27.30	3.0	VERTICAL	PASSED
7418.343687	30.70	34.28	27.00	3.7	HORIZONTAL	PASSED
7420.837675	30.80	34.67	27.10	3.7	VERTICAL	PASSED
17926.349699	40.50	105.93	21.00	19.5	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	40.00	100.00	41.30	-1.3	HORIZONTAL	PASSED
7440.000000	43.60	151.36	40.00	3.6	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
4960.000000	27.00	22.39	28.30	-1.3	VERTICAL	PASSED
7440.000000	30.50	33.50	26.90	3.6	VERTICAL	PASSED

TCC Nokia Tampere Laboratory
P.O. Box 68
Sinitaival 5
FIN-33720 TAMPERE, FINLAND
Tel. +358 (0) 7180 46800
Fax. +358 (0) 7180 46880

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

EUT with DUT number	RM-346 DUT 41346
Accessories with DUT numbers	BP-4L DUT 41348, AC-5E DUT 41350, HS-47 DUT 41352
Operation Voltage [V] / [Hz]	115 / 60
Result	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	20 / 50 / 100.0
Date of measurements	16.1.2007
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-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

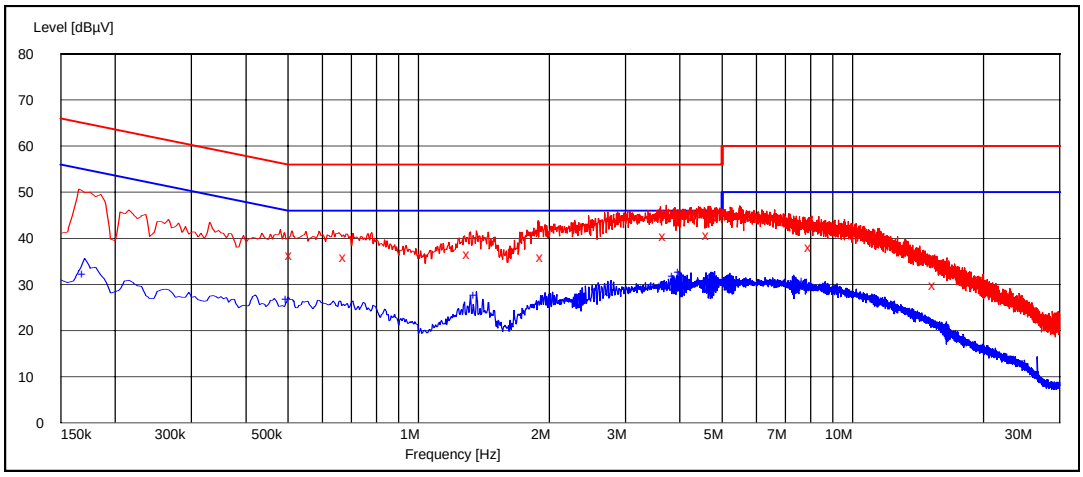
Frequency range [MHz]	Quasi peak limit [dBµV]	Average limit [dBµV]
0.15 - 0.5	66 - 56	56 - 46
0.5 - 5	56	46
5 - 30	60	50

TCC Nokia Tampere Laboratory
P.O. Box 68
Sinitaival 5
FIN-33720 TAMPERE, FINLAND
Tel. +358 (0) 7180 46800
Fax. +358 (0) 7180 46880

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
0.510000	36.30	L1	PASSED
0.680000	36.00	L1	PASSED
1.310000	36.60	L1	PASSED
1.935000	35.90	L1	PASSED
3.705000	40.60	L1	PASSED
4.655000	40.80	L1	PASSED
8.035000	38.00	L1	PASSED
15.480000	29.80	L1	PASSED

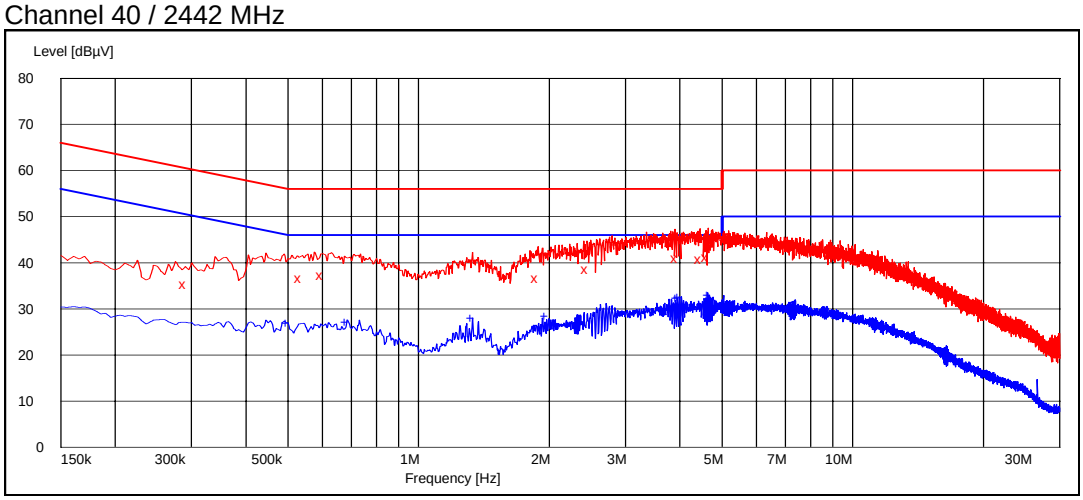
Average (RBW: 9 kHz)

Frequency [MHz]	U [dBµV]	Line	Result
0.170000	32.20	L1	PASSED
0.500000	26.90	L1	PASSED
1.355000	27.70	L1	PASSED
1.990000	27.10	L1	PASSED
3.880000	31.70	L1	PASSED
4.005000	32.70	L1	PASSED
7.730000	30.70	L1	PASSED

TCC Nokia Tampere Laboratory
P.O. Box 68
Sinitaival 5
FIN-33720 TAMPERE, FINLAND
Tel. +358 (0) 7180 46800
Fax. +358 (0) 7180 46880

6.2.2 8DPSK modulation, PRBS packet type

Channel 40 / 2442 MHz



Quasi peak (RBW: 9 kHz)

Frequency [MHz]	U [dBµV]	Line	Result
0.290000	35.30	L1	PASSED
0.535000	36.60	L1	PASSED
0.600000	37.20	L1	PASSED
1.880000	36.60	L1	PASSED
2.450000	38.60	L1	PASSED
3.945000	41.10	L1	PASSED
4.465000	40.90	L1	PASSED
4.635000	41.30	L1	PASSED

Average (RBW: 9 kHz)

Frequency [MHz]	U [dBµV]	Line	Result
0.500000	26.80	L1	PASSED
0.685000	27.10	L1	PASSED
1.330000	28.00	L1	PASSED
1.975000	28.40	L1	PASSED
3.950000	32.40	L1	PASSED
3.995000	32.60	L1	PASSED
4.680000	32.90	L1	PASSED

TCC Nokia Tampere Laboratory
P.O. Box 68
Sinitaival 5
FIN-33720 TAMPERE, FINLAND
Tel. +358 (0) 7180 46800
Fax. +358 (0) 7180 46880

7. 20 dB bandwidth

(FCC §15.247(a)(1), RSS-210 A8.1 (1))

EUT with DUT number	RM-346 DUT 41347
Accessories with DUT numbers	BP-4L DUT 41348
Operation Voltage [V] / [Hz]	Nominal
Result	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	22 / 48 / 104.5
Date of measurements	2.1.2008
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-210.

Limits for 20 dB bandwidth measurements

Limit [MHz]
N/A

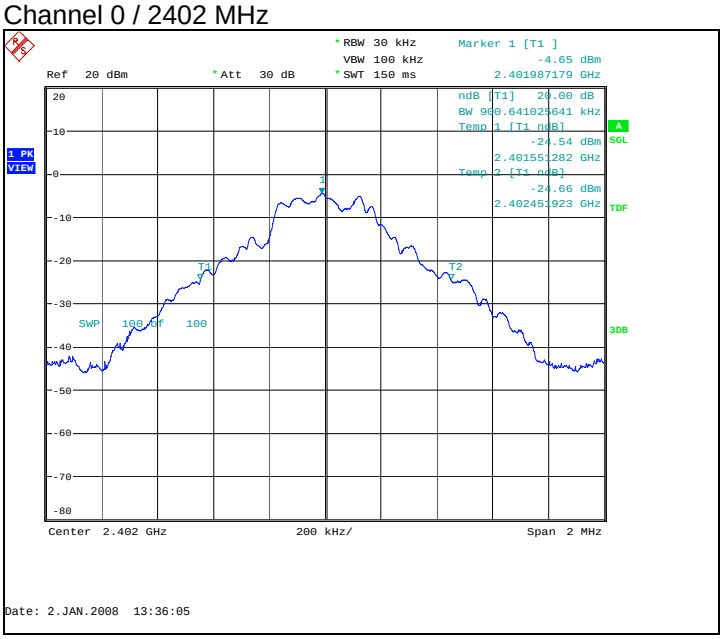
TCC Nokia Tampere Laboratory
P.O. Box 68
Sinitaival 5
FIN-33720 TAMPERE, FINLAND
Tel. +358 (0) 7180 46800
Fax. +358 (0) 7180 46880

7.2. Bluetooth Test results

7.2.1 GFSK modulation, PRBS packet type

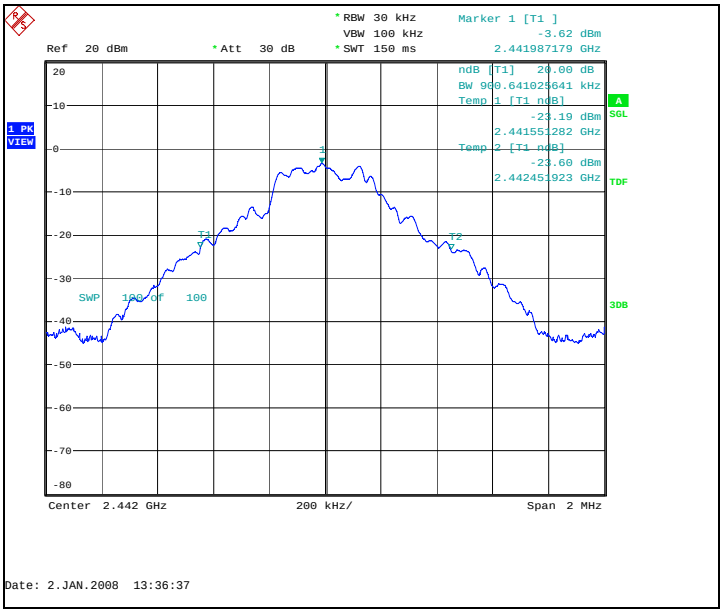
Channel / f_C [MHz]	20 dB bandwidth [kHz]	Result
0 / 2402	900.641	PASSED
40 / 2442	900.641	PASSED
78 / 2480	900.641	PASSED

Channel 0 / 2402 MHz

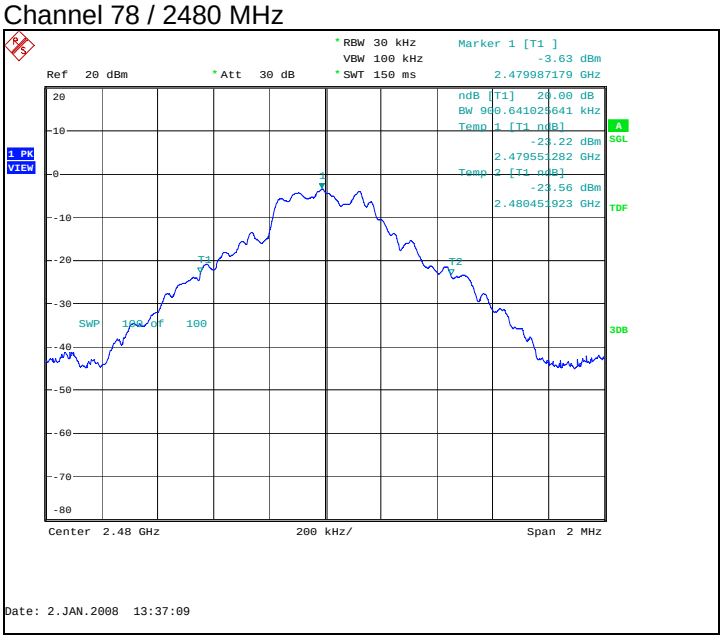


TCC Nokia Tampere Laboratory
P.O. Box 68
Sinitaival 5
FIN-33720 TAMPERE, FINLAND
Tel. +358 (0) 7180 46800
Fax. +358 (0) 7180 46880

Channel 40 / 2442 MHz



Channel 78 / 2480 MHz

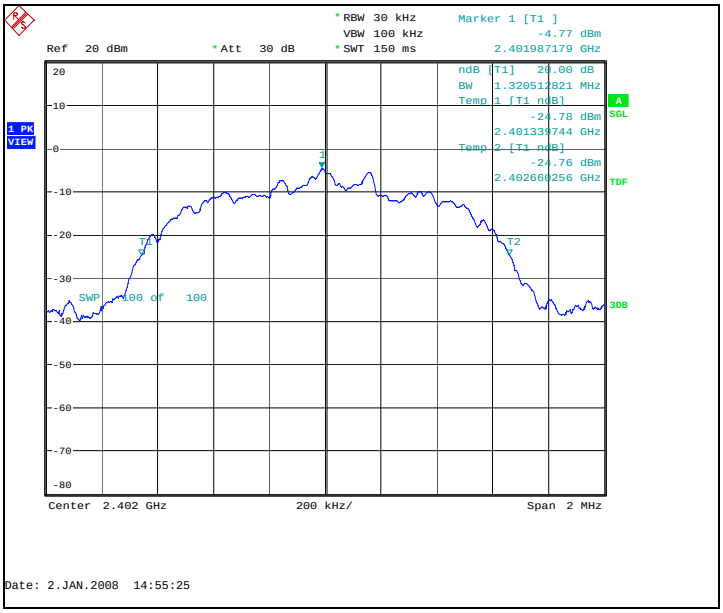


7.2.2 8DPSK modulation, PRBS packet type

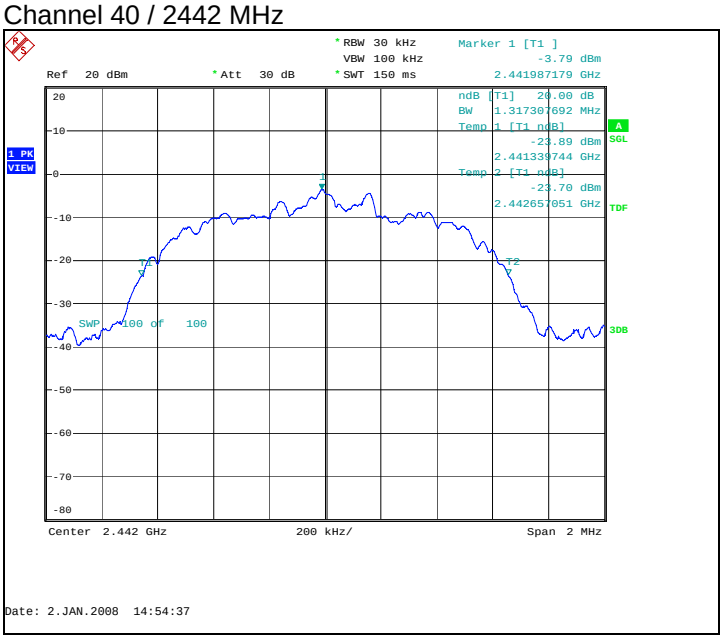
Channel / f_C [MHz]	20 dB bandwidth [kHz]	Result
0 / 2402	1320.513	PASSED
40 / 2442	1317.308	PASSED
78 / 2480	1320.513	PASSED

TCC Nokia Tampere Laboratory
P.O. Box 68
Sinitaival 5
FIN-33720 TAMPERE, FINLAND
Tel. +358 (0) 7180 46800
Fax. +358 (0) 7180 46880

Channel 0 / 2402 MHz

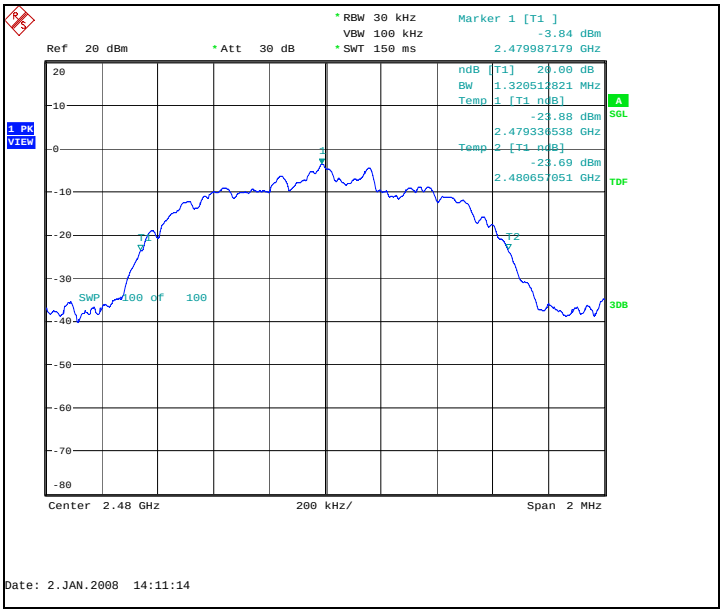


Channel 40 / 2442 MHz



TCC Nokia Tampere Laboratory
P.O. Box 68
Sinitaival 5
FIN-33720 TAMPERE, FINLAND
Tel. +358 (0) 7180 46800
Fax. +358 (0) 7180 46880

Channel 78 / 2480 MHz



TCC Nokia Tampere Laboratory
P.O. Box 68
Sinitaival 5
FIN-33720 TAMPERE, FINLAND
Tel. +358 (0) 7180 46800
Fax. +358 (0) 7180 46880

8. Carrier frequency separation

(FCC §15.247(a)(1), RSS-210 A8.1 (2))

EUT with DUT number	RM-346 DUT 41347
Accessories with DUT numbers	BP-4L DUT 41348
Operation Voltage [V] / [Hz]	Nominal
Result	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	22 / 48 / 104.5
Date of measurements	2.1.2008
Measured by	Jari Jantunen

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

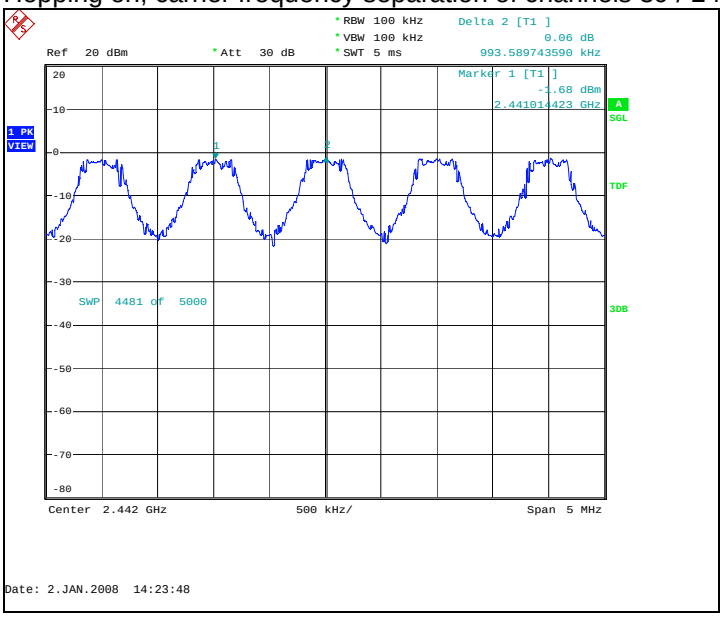
TCC Nokia Tampere Laboratory
P.O. Box 68
Sinitaival 5
FIN-33720 TAMPERE, FINLAND
Tel. +358 (0) 7180 46800
Fax. +358 (0) 7180 46880

8.2. Bluetooth Test results

8.2.1 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

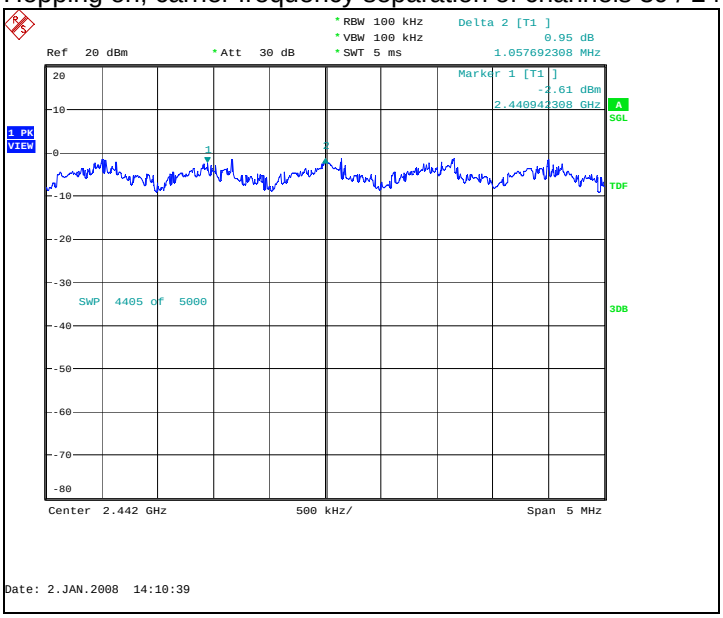


TCC Nokia Tampere Laboratory
P.O. Box 68
Sinitaival 5
FIN-33720 TAMPERE, FINLAND
Tel. +358 (0) 7180 46800
Fax. +358 (0) 7180 46880

8.2.2 8DPSK modulation, PRBS packet type

Carrier frequency separation [kHz]	Result
1057.692	PASSED

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



TCC Nokia Tampere Laboratory
P.O. Box 68
Sinitaival 5
FIN-33720 TAMPERE, FINLAND
Tel. +358 (0) 7180 46800
Fax. +358 (0) 7180 46880

9. Number of hopping frequencies

(FCC §15.247(a)(1)(iii), RSS-210 A8.1 (4))

EUT with DUT number	RM-346 DUT 41347
Accessories with DUT numbers	BP-4L DUT 41348
Operation Voltage [V] / [Hz]	Nominal
Result	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	22 / 48 / 104.5
Date of measurements	2.1.2008
Measured by	Jari Jantunen

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

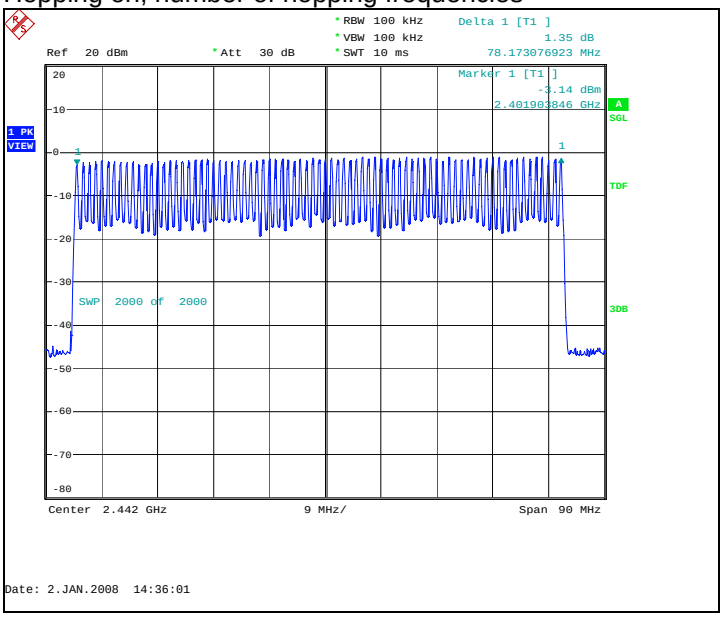
TCC Nokia Tampere Laboratory
P.O. Box 68
Sinitaival 5
FIN-33720 TAMPERE, FINLAND
Tel. +358 (0) 7180 46800
Fax. +358 (0) 7180 46880

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

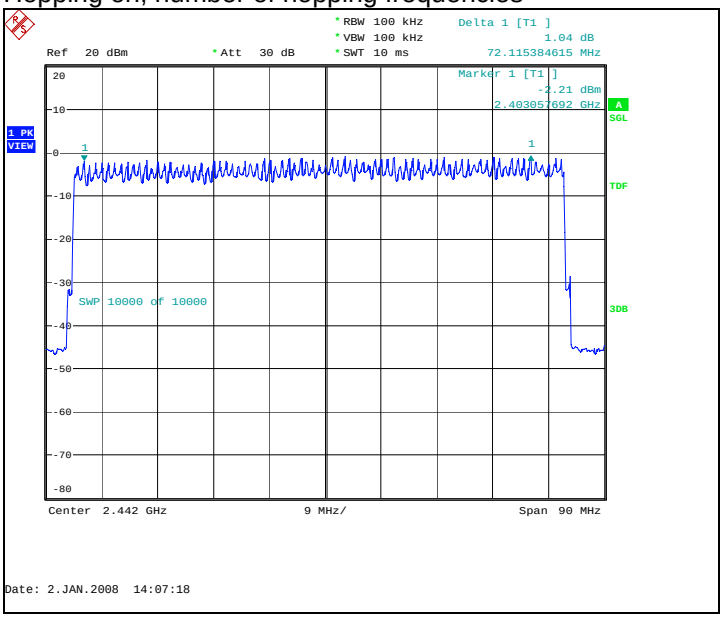


TCC Nokia Tampere Laboratory
P.O. Box 68
Sinitaival 5
FIN-33720 TAMPERE, FINLAND
Tel. +358 (0) 7180 46800
Fax. +358 (0) 7180 46880

9.2.2 8DPSK modulation, PRBS packet type

Measured number of hopping frequencies	Result
77	PASSED

Hopping on, number of hopping frequencies



TCC Nokia Tampere Laboratory
P.O. Box 68
Sinitaival 5
FIN-33720 TAMPERE, FINLAND
Tel. +358 (0) 7180 46800
Fax. +358 (0) 7180 46880

10. Time of occupancy

(FCC §15.247(a)(1)(iii), RSS-210 A8.1 (4))

EUT with DUT number	RM-346 DUT 41347
Accessories with DUT numbers	BP-4L DUT 41348
Operation Voltage [V] / [Hz]	Nominal
Result	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	22 / 48 / 104.5
Date of measurements	2.1.2008
Measured by	Jari Jantunen

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

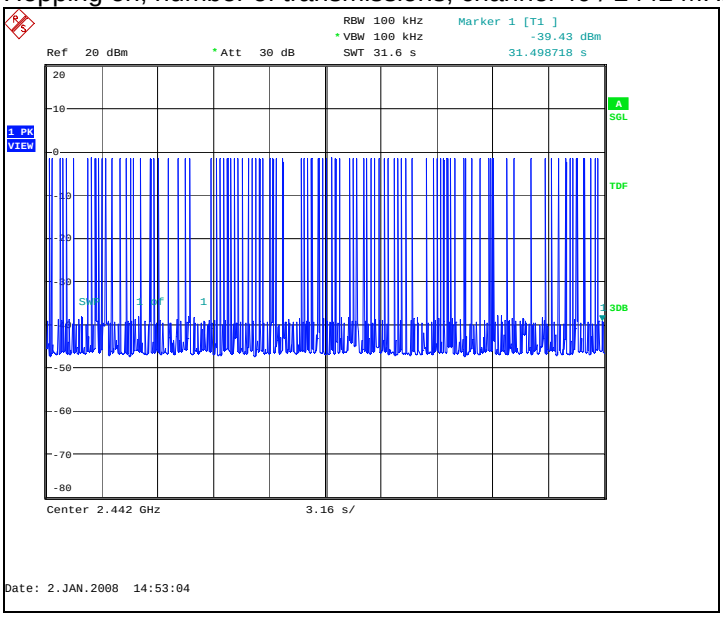
TCC Nokia Tampere Laboratory
P.O. Box 68
Sinitaival 5
FIN-33720 TAMPERE, FINLAND
Tel. +358 (0) 7180 46800
Fax. +358 (0) 7180 46880

10.2. Bluetooth test results

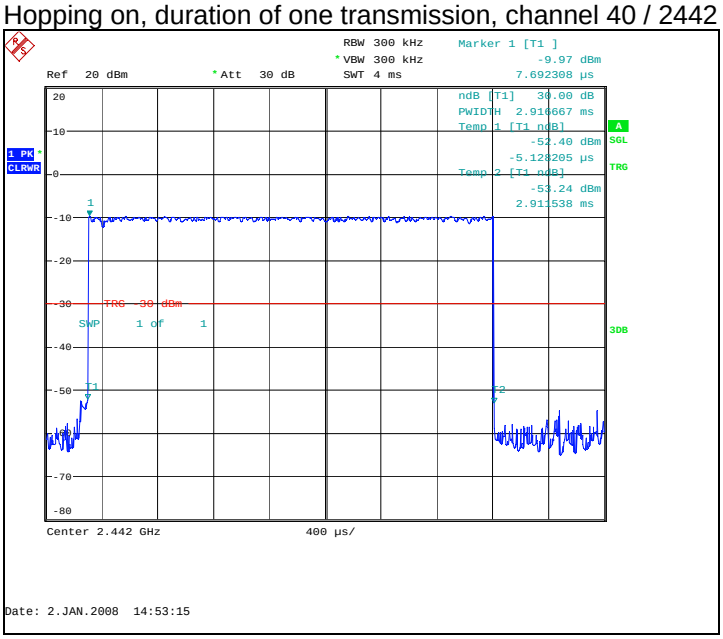
10.2.1 GFSK modulation, PRBS packet type

Measured number of transmissions	Duration of one transmission [µs]	Time of occupancy [s]	Result
77	2,917	0.224583	PASSED

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



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

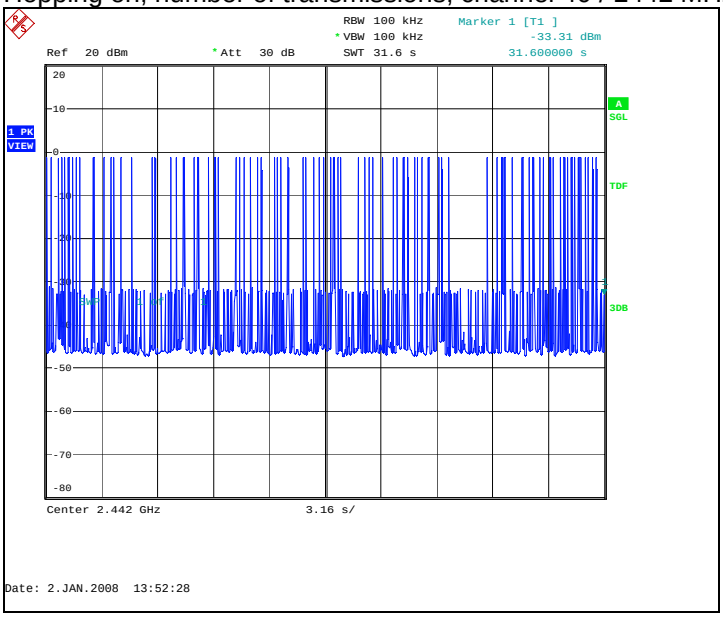


TCC Nokia Tampere Laboratory
P.O. Box 68
Sinitaival 5
FIN-33720 TAMPERE, FINLAND
Tel. +358 (0) 7180 46800
Fax. +358 (0) 7180 46880

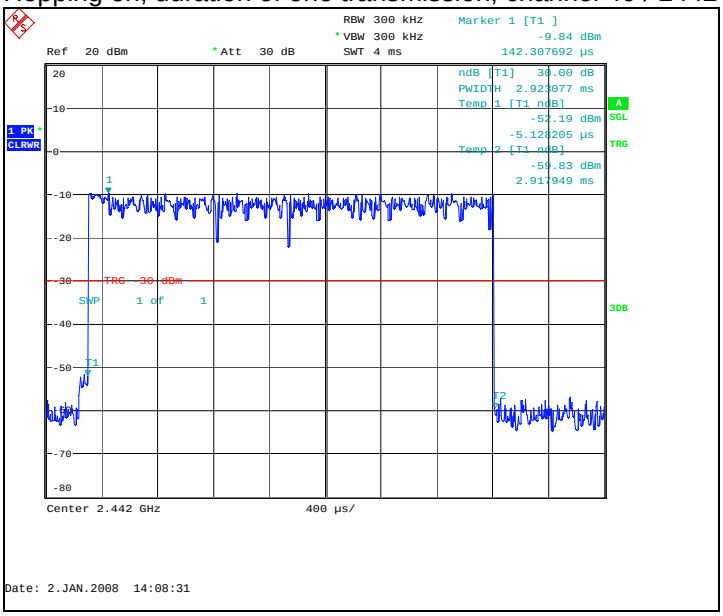
10.2.2 8DPSK modulation, PRBS packet type

Measured number of transmissions	Duration of one transmission [µs]	Time of occupancy [s]	Result
76	2,923	0.222154	PASSED

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



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



TCC Nokia Tampere Laboratory
P.O. Box 68
Sinitaival 5
FIN-33720 TAMPERE, FINLAND
Tel. +358 (0) 7180 46800
Fax. +358 (0) 7180 46880

11. Conducted peak output power

(FCC §15.247(b)(1), RSS-210 A8.4 (4))

EUT with DUT number	RM-346 DUT 41347
Accessories with DUT numbers	BP-4L DUT 41348
Operation Voltage [V] / [Hz]	Nominal
Result	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	23 / 48 / 104.8
Date of measurements	3.1.2008
Measured by	Jari Jantunen

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

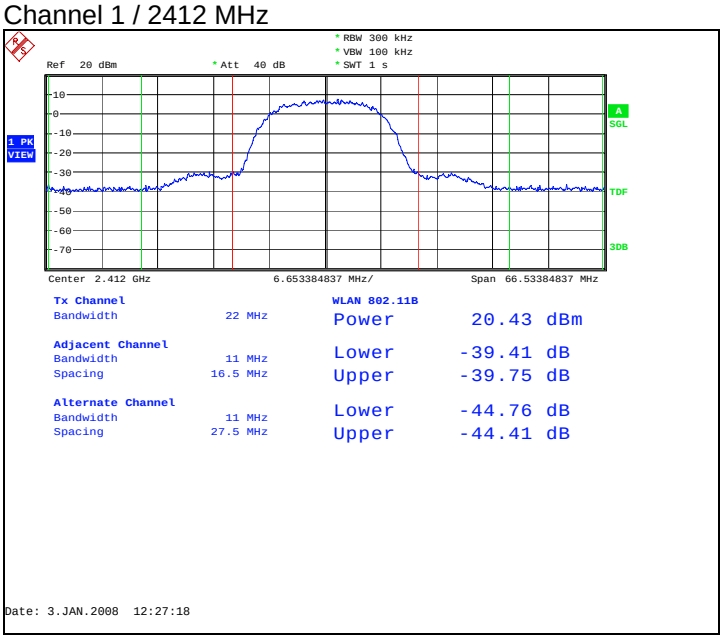
TCC Nokia Tampere Laboratory
P.O. Box 68
Sinitaival 5
FIN-33720 TAMPERE, FINLAND
Tel. +358 (0) 7180 46800
Fax. +358 (0) 7180 46880

11.2. WLAN Test results

11.2.1 DSSS mode, QPSK modulation, 11 Mbps data rate

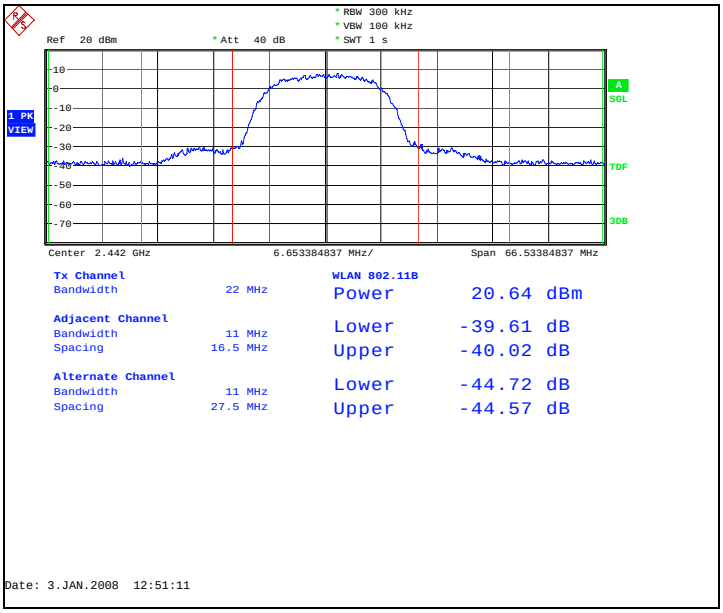
Channel / f_C [MHz]	P [dBm]	P [W]	Result
1 / 2412	20.43	0.110	PASSED
7 / 2442	20.64	0.116	PASSED
11 / 2462	20.57	0.114	PASSED

Channel 1 / 2412 MHz

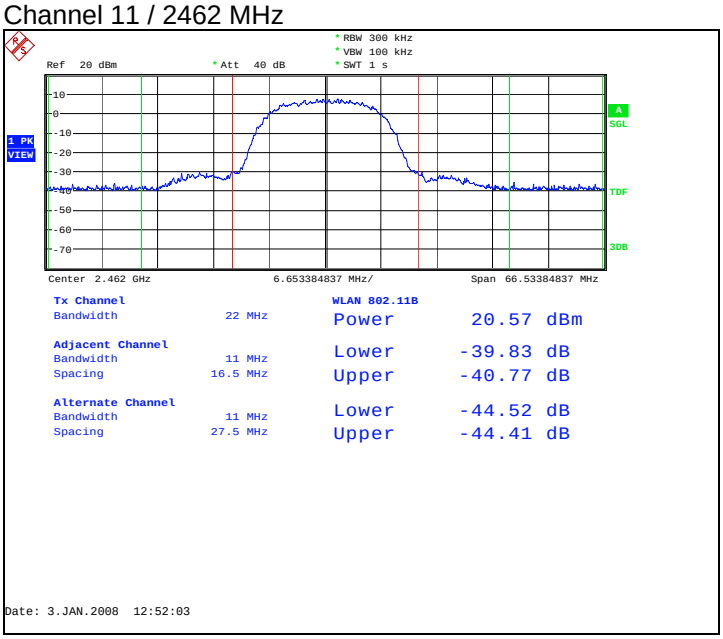


TCC Nokia Tampere Laboratory
P.O. Box 68
Sinitaival 5
FIN-33720 TAMPERE, FINLAND
Tel. +358 (0) 7180 46800
Fax. +358 (0) 7180 46880

Channel 7 / 2442 MHz



Channel 11 / 2462 MHz

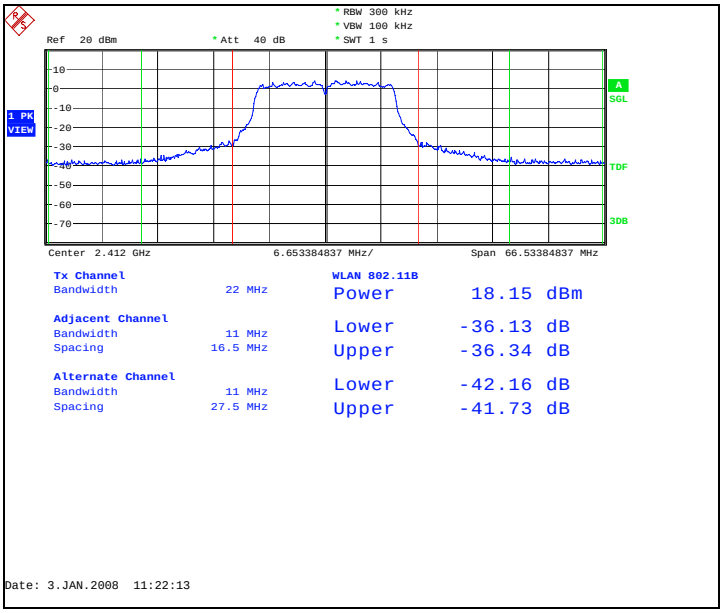


11.2.2 OFDM mode, BPSK modulation, 6 Mbps data rate

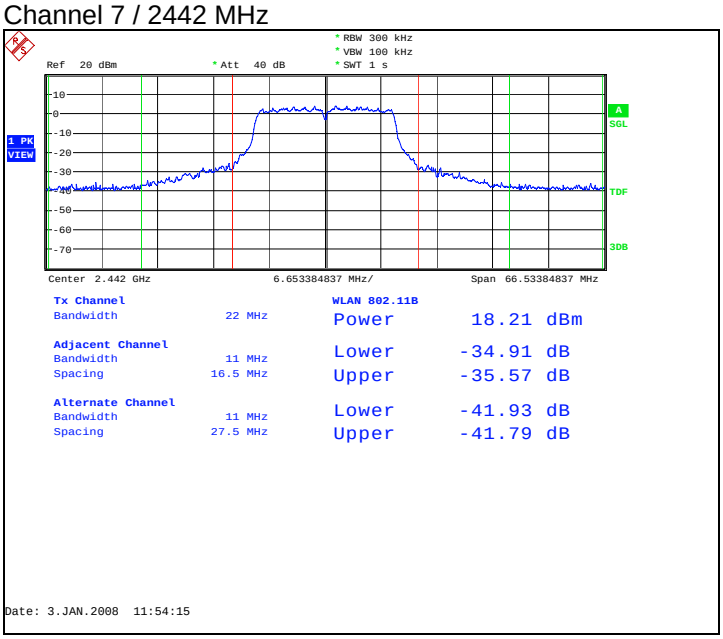
Channel / f_C [MHz]	P [dBm]	P [W]	Result
1 / 2412	18.15	0.065	PASSED
7 / 2442	18.21	0.066	PASSED
11 / 2462	18.13	0.065	PASSED

TCC Nokia Tampere Laboratory
P.O. Box 68
Sinitaival 5
FIN-33720 TAMPERE, FINLAND
Tel. +358 (0) 7180 46800
Fax. +358 (0) 7180 46880

Channel 1 / 2412 MHz

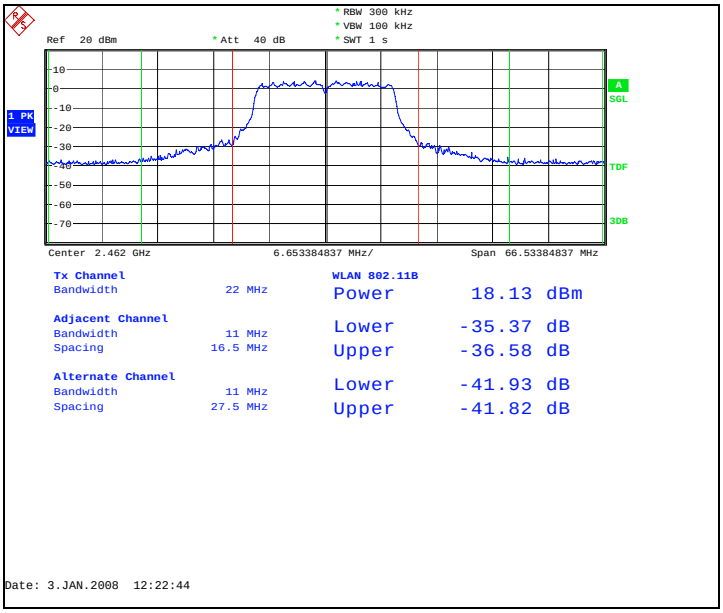


Channel 7 / 2442 MHz



TCC Nokia Tampere Laboratory
P.O. Box 68
Sinitaival 5
FIN-33720 TAMPERE, FINLAND
Tel. +358 (0) 7180 46800
Fax. +358 (0) 7180 46880

Channel 11 / 2462 MHz



TCC Nokia Tampere Laboratory
P.O. Box 68
Sinitaival 5
FIN-33720 TAMPERE, FINLAND
Tel. +358 (0) 7180 46800
Fax. +358 (0) 7180 46880

12. Spurious RF conducted emissions

(FCC §15.247(d), RSS-210 A8.5)

EUT with DUT number	RM-346 DUT 41347
Accessories with DUT numbers	BP-4L DUT 41348
Operation Voltage [V] / [Hz]	Nominal
Result	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	23 / 48 / 104.8
Date of measurements	3.1.2008
Measured by	Jari Jantunen

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

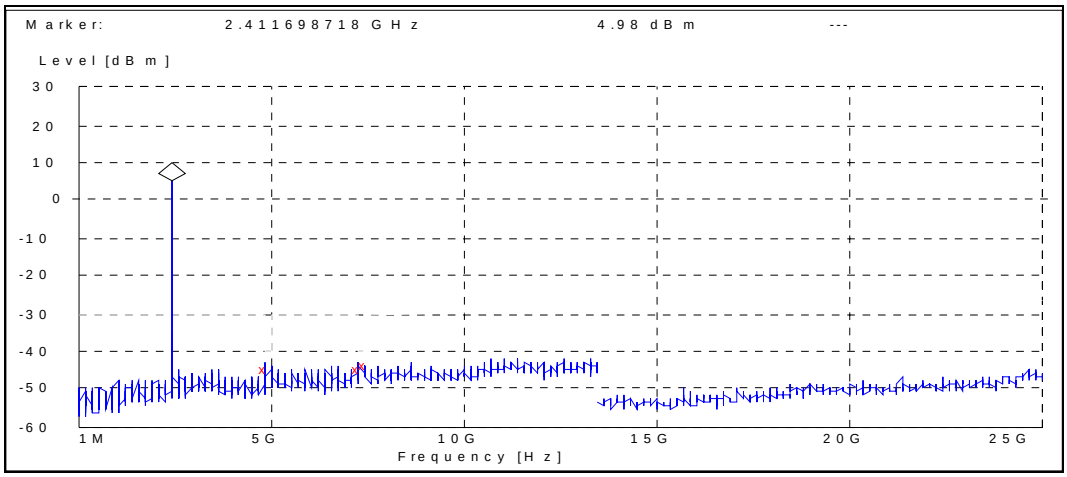
Frequency range [MHz]	Limit [dBc]
1 – 25000	≤ -20

TCC Nokia Tampere Laboratory
P.O. Box 68
Sinitaival 5
FIN-33720 TAMPERE, FINLAND
Tel. +358 (0) 7180 46800
Fax. +358 (0) 7180 46880

12.2. WLAN Test results

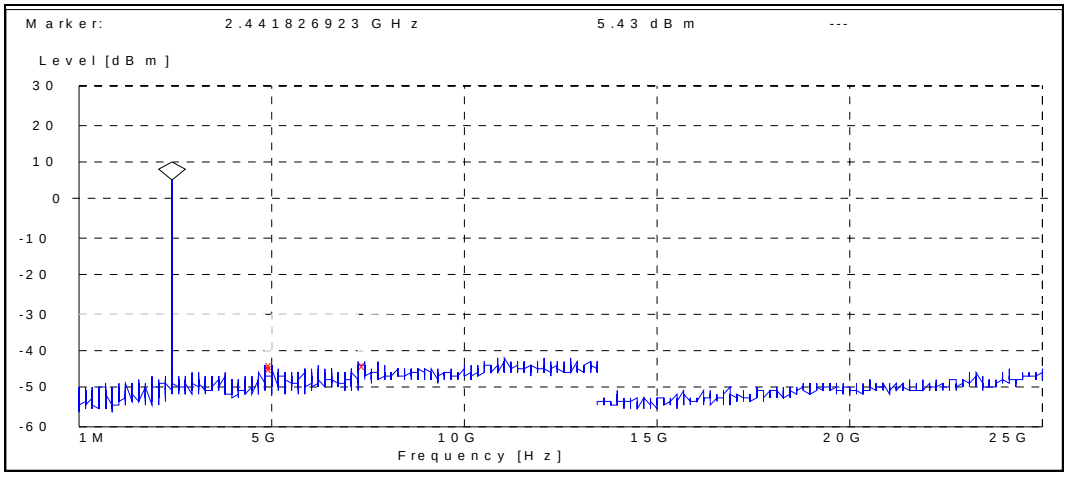
12.2.1 DSSS mode, QPSK modulation, 11 Mbps data rate

Channel 1 / 2412 MHz



Frequency [MHz]	P [dBc]	Result
4840.384615	-49.977951	PASSED
7309.615385	-49.377951	PASSED
7500.000000	-49.077951	PASSED

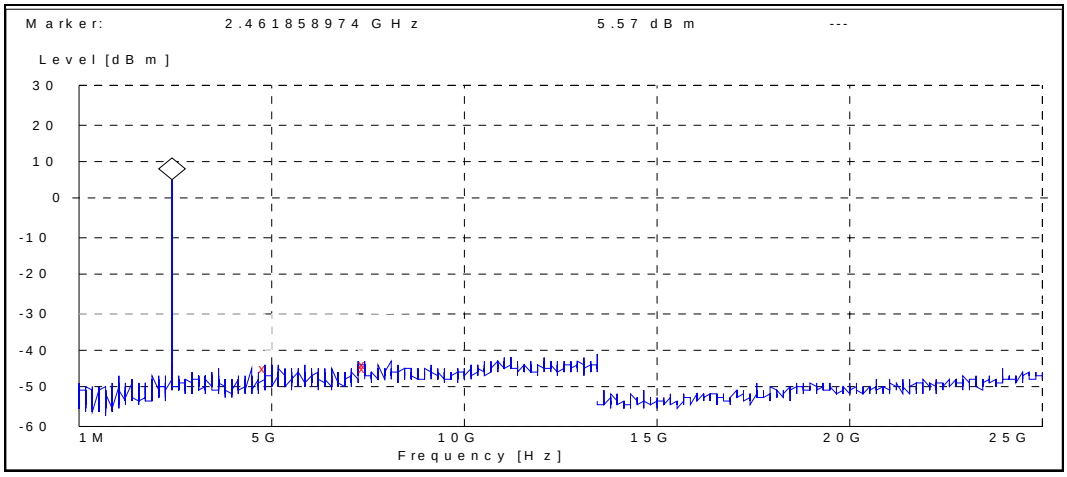
Channel 7 / 2442 MHz



Frequency [MHz]	P [dBc]	Result
4962.820513	-49.230245	PASSED
5000.000000	-50.230245	PASSED
7375.480769	-48.730245	PASSED

TCC Nokia Tampere Laboratory
P.O. Box 68
Sinitaival 5
FIN-33720 TAMPERE, FINLAND
Tel. +358 (0) 7180 46800
Fax. +358 (0) 7180 46880

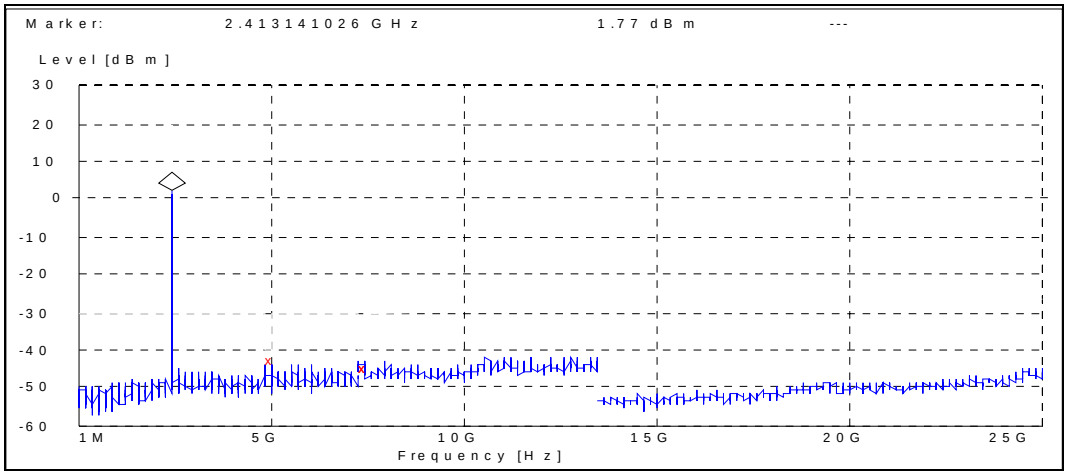
Channel 11 / 2462 MHz



Frequency [MHz]	P [dBc]	Result
4925.641026	-50.371702	PASSED
7379.326923	-49.371702	PASSED
7500.000000	-50.071702	PASSED

12.2.2 OFDM mode, BPSK modulation, 6 Mbps data rate

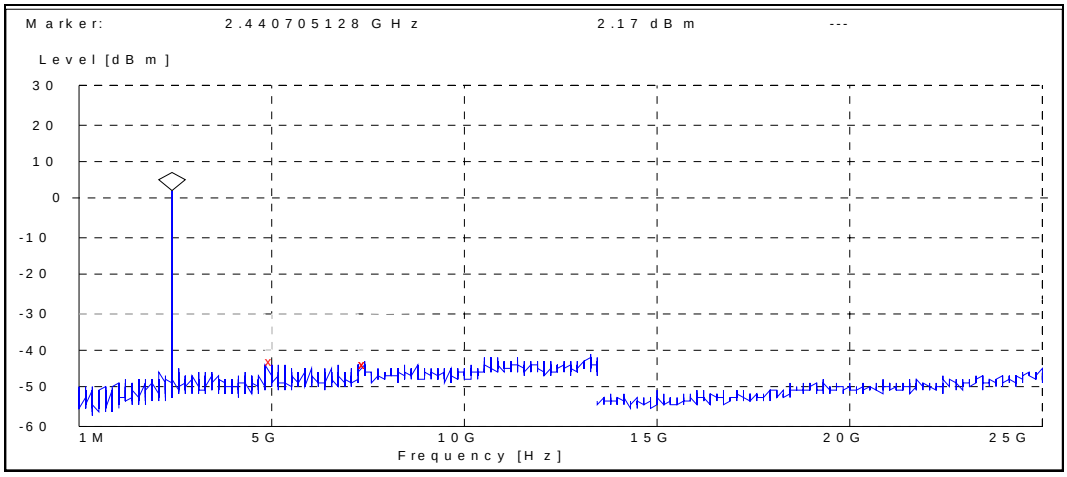
Channel 1 / 2412 MHz



Frequency [MHz]	P [dBc]	Result
4988.461538	-44.966762	PASSED
7436.057692	-46.066762	PASSED
7500.000000	-46.166762	PASSED

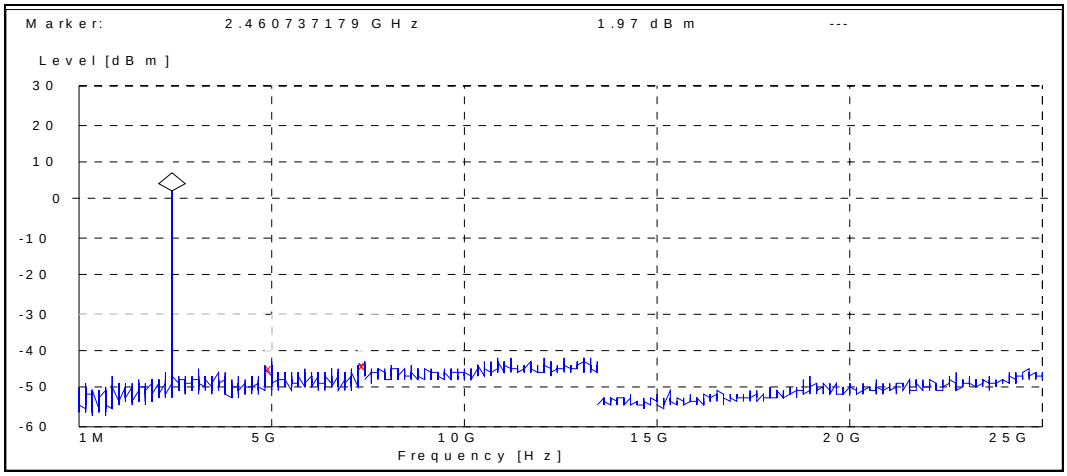
TCC Nokia Tampere Laboratory
P.O. Box 68
Sinitaival 5
FIN-33720 TAMPERE, FINLAND
Tel. +358 (0) 7180 46800
Fax. +358 (0) 7180 46880

Channel 7 / 2442 MHz



Frequency [MHz]	P [dBc]	Result
4997.756410	-45.067798	PASSED
7398.557692	-45.467798	PASSED
7500.000000	-46.367798	PASSED

Channel 11 / 2462 MHz



Frequency [MHz]	P [dBc]	Result
4949.038462	-46.668330	PASSED
7441.346154	-45.868330	PASSED
7500.000000	-45.868330	PASSED

TCC Nokia Tampere Laboratory
P.O. Box 68
Sinitaival 5
FIN-33720 TAMPERE, FINLAND
Tel. +358 (0) 7180 46800
Fax. +358 (0) 7180 46880

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

EUT with DUT number	RM-346 DUT 41346
Accessories with DUT numbers	BP-4L DUT 41348, AC-5E DUT 41350, HS-47 DUT 41352
Operation Voltage [V] / [Hz]	115 / 60
Result	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	20-21 / 48-51 / 101.0-104.7
Date of measurements	2-3. and 14.1.2008
Measured by	Jari Jantunen

13.1. Test method and limit

The measurement is made according to DTS procedures KDB 558074 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 ($A_{TOT} = L_{CABLES} + AF - G_{PREAMP}$).

TCC Nokia Tampere Laboratory
P.O. Box 68
Sinitaival 5
FIN-33720 TAMPERE, FINLAND
Tel. +358 (0) 7180 46800
Fax. +358 (0) 7180 46880

Limits for spurious radiated emissions measurements (3 m measurement distance)

Frequency range [MHz[	Limit [µV/m]	Limit [dBµV/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

13.2. WLAN Test results

13.2.1 DSSS mode, QPSK modulation, 11 Mbps data rate

Channel 1 / 2412 MHz

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

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Polarisation	Result
4824.000000	39.50	94.41	41.20	-1.7	HORIZONTAL	PASSED
7236.000000	42.70	136.46	40.10	2.6	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
4824.000000	27.20	22.91	28.90	-1.7	HORIZONTAL	PASSED
7236.000000	29.60	30.20	27.00	2.6	HORIZONTAL	PASSED

Channel 7 / 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
30.100000	26.60	21.38	36.20	-9.6	VERTICAL	PASSED
38.176353	24.40	16.60	39.40	-15.0	VERTICAL	PASSED
59.057715	18.80	8.71	45.30	-26.5	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
4883.769539	42.90	139.64	44.70	-1.8	HORIZONTAL	PASSED
7283.071142	43.30	146.22	40.30	3.0	VERTICAL	PASSED
7286.567134	43.20	144.54	40.20	3.0	VERTICAL	PASSED
7348.197395	42.70	136.46	39.50	3.2	VERTICAL	PASSED
7409.813627	43.30	146.22	39.60	3.7	VERTICAL	PASSED
17930.855711	53.40	467.74	33.90	19.5	HORIZONTAL	PASSED

TCC Nokia Tampere Laboratory
P.O. Box 68
Sinitaival 5
FIN-33720 TAMPERE, FINLAND
Tel. +358 (0) 7180 46800
Fax. +358 (0) 7180 46880

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

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Polarisation	Result
4884.269539	29.30	29.17	31.10	-1.8	HORIZONTAL	PASSED
7281.067134	30.30	32.73	27.30	3.0	VERTICAL	PASSED
7283.071142	30.30	32.73	27.30	3.0	VERTICAL	PASSED
7350.697395	30.20	32.36	27.00	3.2	VERTICAL	PASSED
7410.813627	30.70	34.28	27.00	3.7	VERTICAL	PASSED
17927.355711	40.50	105.93	21.00	19.5	HORIZONTAL	PASSED

Channel 11 / 2462 MHz

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

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Polarisation	Result
4924.000000	41.40	117.49	43.20	-1.8	VERTICAL	PASSED
7386.000000	43.60	151.36	40.10	3.5	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
4924.000000	31.10	35.89	32.90	-1.8	HORIZONTAL	PASSED
7386.000000	30.80	34.67	27.30	3.5	HORIZONTAL	PASSED

13.2.2 OFDM mode, BPSK modulation, 6 Mbps data rate

Channel 1 / 2412 MHz

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

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Polarisation	Result
4824.000000	39.50	94.41	41.20	-1.7	VERTICAL	PASSED
7236.000000	43.40	147.91	40.80	2.6	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
4824.000000	26.80	21.88	28.50	-1.7	HORIZONTAL	PASSED
7236.000000	29.70	30.55	27.10	2.6	HORIZONTAL	PASSED

Channel 7 / 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
37.895391	26.00	19.95	40.80	-14.8	VERTICAL	PASSED

TCC Nokia Tampere Laboratory
P.O. Box 68
Sinitaival 5
FIN-33720 TAMPERE, FINLAND
Tel. +358 (0) 7180 46800
Fax. +358 (0) 7180 46880

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

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Polarisation	Result
4881.269539	40.40	104.71	42.20	-1.8	VERTICAL	PASSED
4882.761523	40.40	104.71	42.20	-1.8	VERTICAL	PASSED
7283.069138	43.80	154.88	40.80	3.0	VERTICAL	PASSED
7288.071142	43.20	144.54	40.20	3.0	HORIZONTAL	PASSED
7392.289579	43.20	144.54	39.60	3.6	VERTICAL	PASSED
7408.815631	43.20	144.54	39.50	3.7	VERTICAL	PASSED
17992.491984	53.10	451.86	33.70	19.4	VERTICAL	PASSED

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

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Polarisation	Result
4881.761523	27.60	23.99	29.40	-1.8	VERTICAL	PASSED
4886.769539	27.50	23.71	29.30	-1.8	VERTICAL	PASSED
7284.069138	30.30	32.73	27.30	3.0	VERTICAL	PASSED
7286.071142	30.30	32.73	27.30	3.0	HORIZONTAL	PASSED
7397.789579	30.50	33.50	26.80	3.7	VERTICAL	PASSED
7409.315631	30.60	33.88	26.90	3.7	VERTICAL	PASSED
17991.991984	40.60	107.15	21.20	19.4	VERTICAL	PASSED

Channel 11 / 2462 MHz

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

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Polarisation	Result
4924.000000	52.80	436.52	54.60	-1.8	HORIZONTAL	PASSED
7386.000000	43.50	149.62	40.00	3.5	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
4924.000000	28.80	27.54	30.60	-1.8	HORIZONTAL	PASSED
7386.000000	30.90	35.08	27.40	3.5	HORIZONTAL	PASSED

TCC Nokia Tampere Laboratory
P.O. Box 68
Sinitaival 5
FIN-33720 TAMPERE, FINLAND
Tel. +358 (0) 7180 46800
Fax. +358 (0) 7180 46880

14. AC powerline conducted emissions

(FCC §15.207, RSS-GEN 7.2.2)

EUT with DUT number	RM-346 DUT 41355
Accessories with DUT numbers	BP-4L DUT 41348, AC-5E DUT 41350, HS-47 DUT 41352
Operation Voltage [V] / [Hz]	115 / 60
Result	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	19 / 48 / 100.3
Date of measurements	15.1.2008
Measured by	Jari Jantunen

14.1. 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

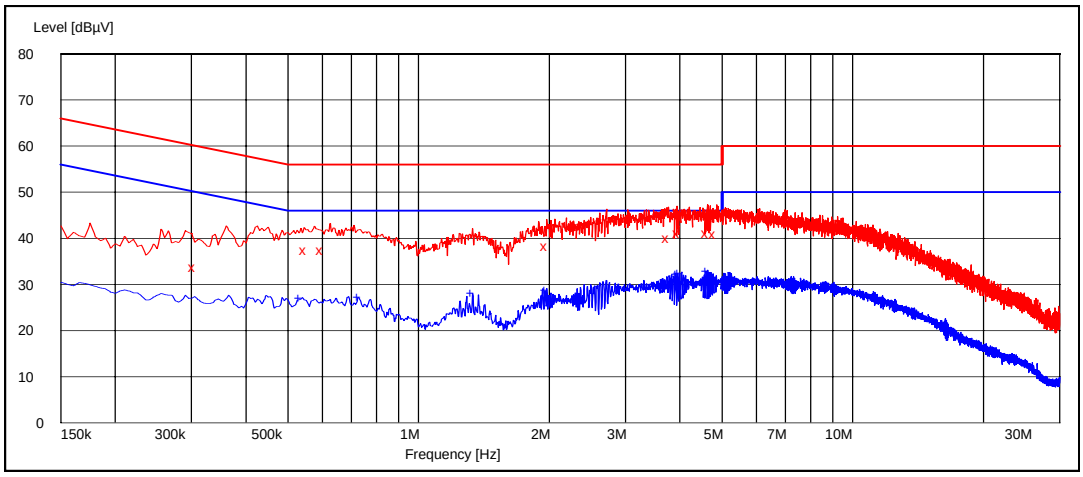
Frequency range [MHz]	Quasi peak limit [dBµV]	Average limit [dBµV]
0.15 - 0.5	66 - 56	56 - 46
0.5 - 5	56	46
5 - 30	60	50

TCC Nokia Tampere Laboratory
P.O. Box 68
Sinitaival 5
FIN-33720 TAMPERE, FINLAND
Tel. +358 (0) 7180 46800
Fax. +358 (0) 7180 46880

14.2. WLAN Test results

14.2.1 DSSS mode, QPSK modulation, 11 Mbps data rate

Channel 7 / 2442 MHz



Quasi peak (RBW: 9 kHz)

Frequency [MHz]	U [dBµV]	Line	Result
0.305000	33.70	N	PASSED
0.550000	37.50	L1	PASSED
0.600000	37.40	L1	PASSED
1.975000	38.30	L1	PASSED
3.770000	40.00	L1	PASSED
3.990000	41.10	L1	PASSED
4.635000	41.10	L1	PASSED
4.820000	41.00	L1	PASSED

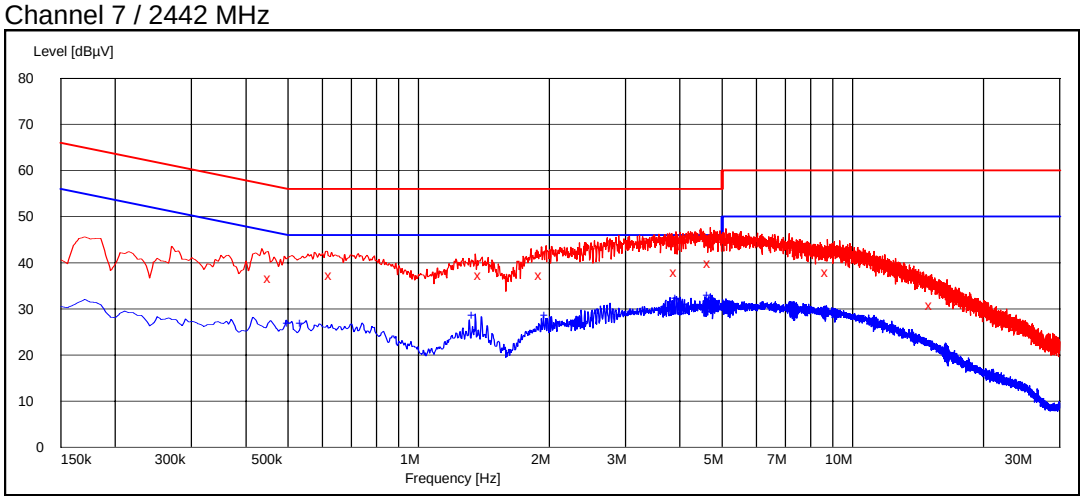
Average (RBW: 9 kHz)

Frequency [MHz]	U [dBµV]	Line	Result
0.535000	27.10	L1	PASSED
0.730000	27.30	L1	PASSED
1.330000	28.20	L1	PASSED
1.975000	28.70	L1	PASSED
3.950000	32.20	L1	PASSED
3.995000	32.50	L1	PASSED
4.640000	33.00	L1	PASSED

TCC Nokia Tampere Laboratory
P.O. Box 68
Sinitaival 5
FIN-33720 TAMPERE, FINLAND
Tel. +358 (0) 7180 46800
Fax. +358 (0) 7180 46880

14.2.2 OFDM mode, BPSK modulation, 6 Mbps data rate

Channel 7 / 2442 MHz



Quasi peak (RBW: 9 kHz)

Frequency [MHz]	U [dBµV]	Line	Result
0.455000	36.60	L1	PASSED
0.630000	37.20	L1	PASSED
1.390000	37.40	L1	PASSED
1.915000	37.30	L1	PASSED
3.925000	38.00	L1	PASSED
4.695000	39.80	L1	PASSED
8.760000	38.00	L1	PASSED
15.230000	30.70	L1	PASSED

Average (RBW: 9 kHz)

Frequency [MHz]	U [dBµV]	Line	Result
0.505000	26.90	L1	PASSED
0.540000	27.00	L1	PASSED
1.345000	28.70	L1	PASSED
1.975000	28.60	L1	PASSED
3.950000	32.30	L1	PASSED
4.680000	33.00	L1	PASSED
7.930000	30.20	L1	PASSED

TCC Nokia Tampere Laboratory
P.O. Box 68
Sinitaival 5
FIN-33720 TAMPERE, FINLAND
Tel. +358 (0) 7180 46800
Fax. +358 (0) 7180 46880

15. 6 dB bandwidth

(FCC §15.247(a)(2), RSS-210 A8.2 (1))

EUT with DUT number	RM-346 DUT 41347
Accessories with DUT numbers	BP-4L DUT 41348
Operation Voltage [V] / [Hz]	Nominal
Result	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	23 / 48 / 104.8
Date of measurements	3.1.2008
Measured by	Jari Jantunen

15.1. 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

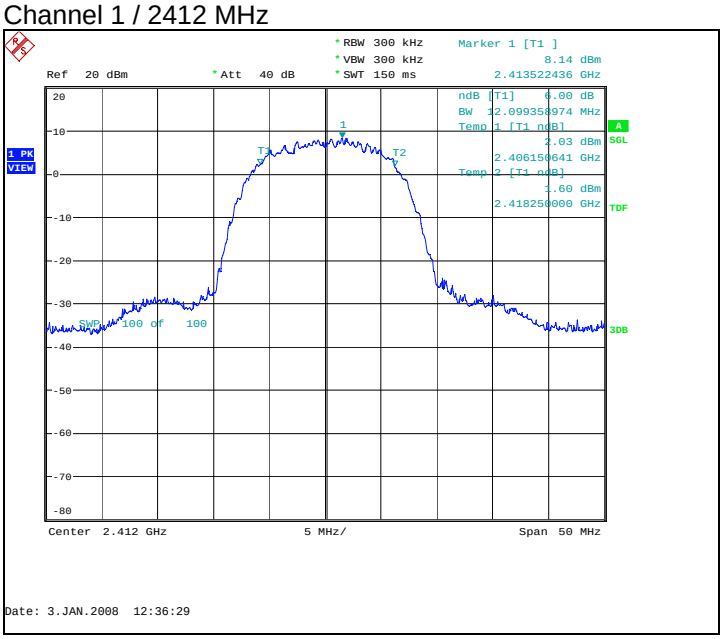
TCC Nokia Tampere Laboratory
P.O. Box 68
Sinitaival 5
FIN-33720 TAMPERE, FINLAND
Tel. +358 (0) 7180 46800
Fax. +358 (0) 7180 46880

15.2. WLAN test results

15.2.1 DSSS mode, QPSK modulation, 11 Mbps data rate

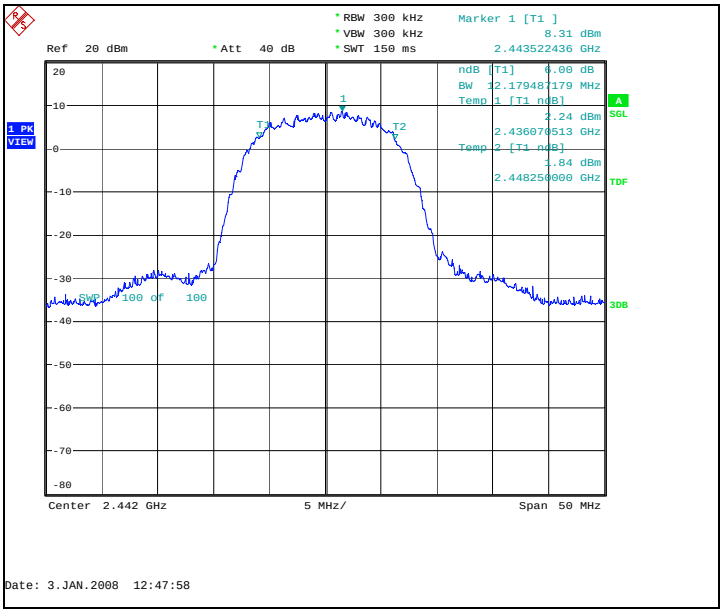
Channel / f_C [MHz]	6 dB bandwidth [kHz]	Result
1	12099.359	PASSED
7	12179.487	PASSED
11	12419.872	PASSED

Channel 1 / 2412 MHz

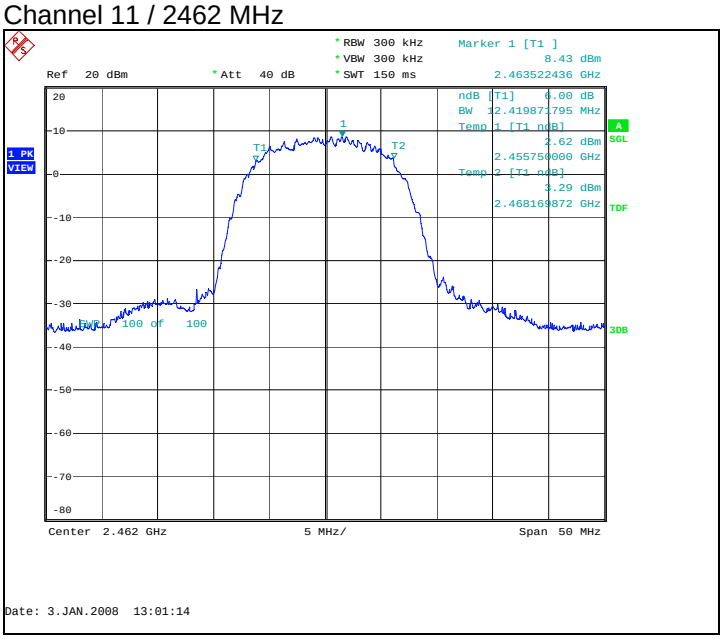


TCC Nokia Tampere Laboratory
P.O. Box 68
Sinitaival 5
FIN-33720 TAMPERE, FINLAND
Tel. +358 (0) 7180 46800
Fax. +358 (0) 7180 46880

Channel 7 / 2442 MHz



Channel 11 / 2462 MHz

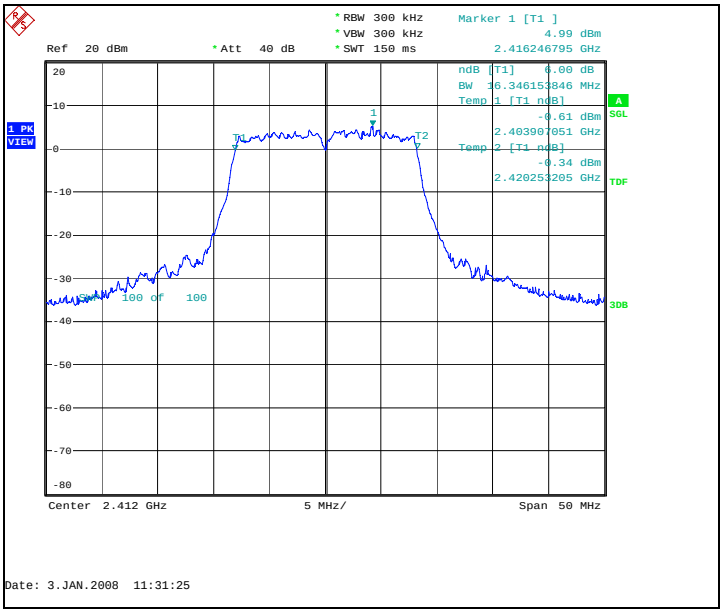


15.2.2 OFDM mode, BPSK modulation, 6 Mbps data rate

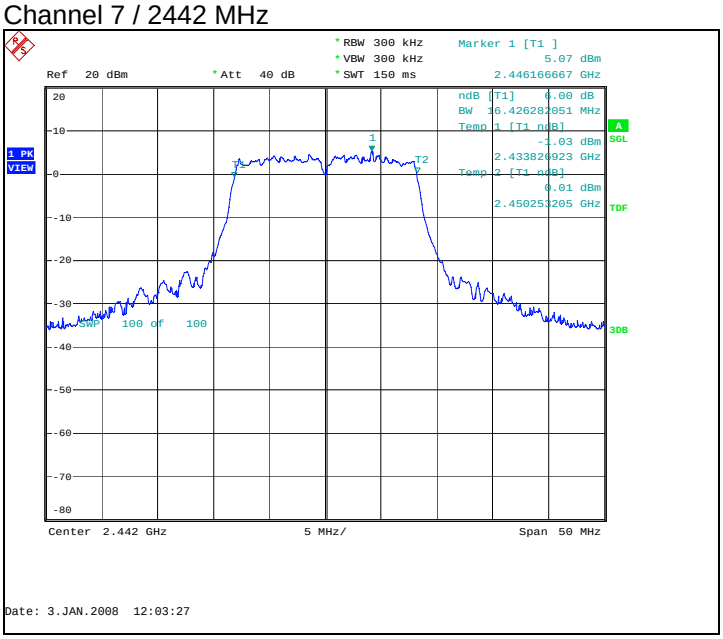
Channel / f_C [MHz]	6 dB bandwidth [kHz]	Result
1	16346.154	PASSED
7	16426.282	PASSED
11	16426.282	PASSED

TCC Nokia Tampere Laboratory
P.O. Box 68
Sinitaival 5
FIN-33720 TAMPERE, FINLAND
Tel. +358 (0) 7180 46800
Fax. +358 (0) 7180 46880

Channel 1 / 2412 MHz

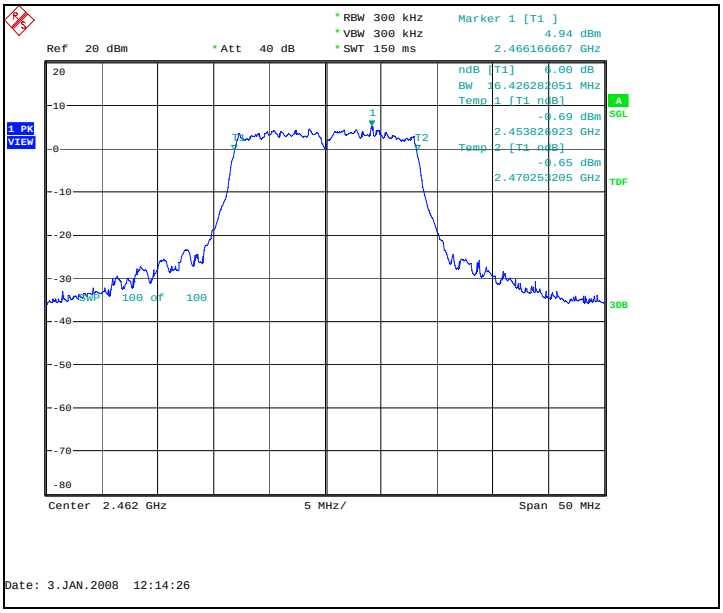


Channel 7 / 2442 MHz



TCC Nokia Tampere Laboratory
P.O. Box 68
Sinitaival 5
FIN-33720 TAMPERE, FINLAND
Tel. +358 (0) 7180 46800
Fax. +358 (0) 7180 46880

Channel 11 / 2462 MHz



TCC Nokia Tampere Laboratory
P.O. Box 68
Sinitaival 5
FIN-33720 TAMPERE, FINLAND
Tel. +358 (0) 7180 46800
Fax. +358 (0) 7180 46880

16. Power spectral density

(FCC §15.247(e), RSS-210 A8.2 (2))

EUT with DUT number	RM-346 DUT 41347
Accessories with DUT numbers	BP-4L DUT 41348
Operation Voltage [V] / [Hz]	Nominal
Result	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	23 / 48 / 104.8
Date of measurements	3.1.2008
Measured by	Jari Jantunen

16.1. 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

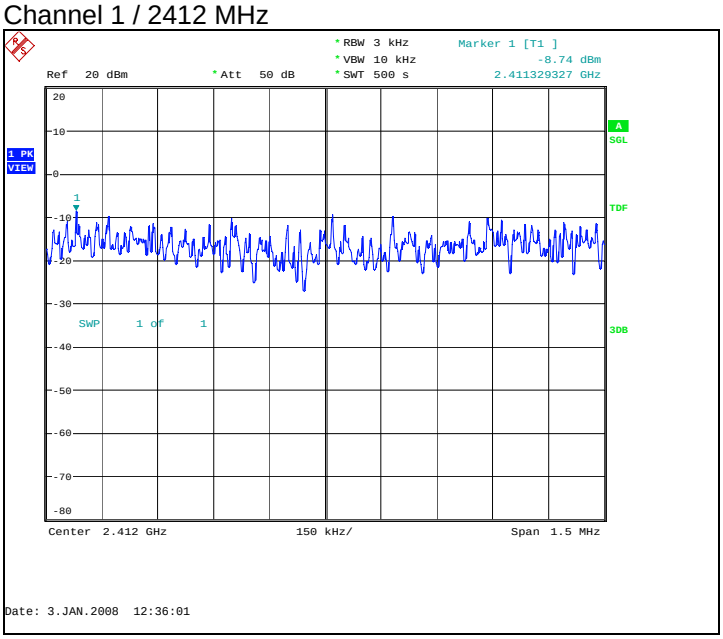
TCC Nokia Tampere Laboratory
P.O. Box 68
Sinitaival 5
FIN-33720 TAMPERE, FINLAND
Tel. +358 (0) 7180 46800
Fax. +358 (0) 7180 46880

16.2. WLAN test results

16.2.1 DSSS mode, QPSK modulation, 11 Mbps data rate

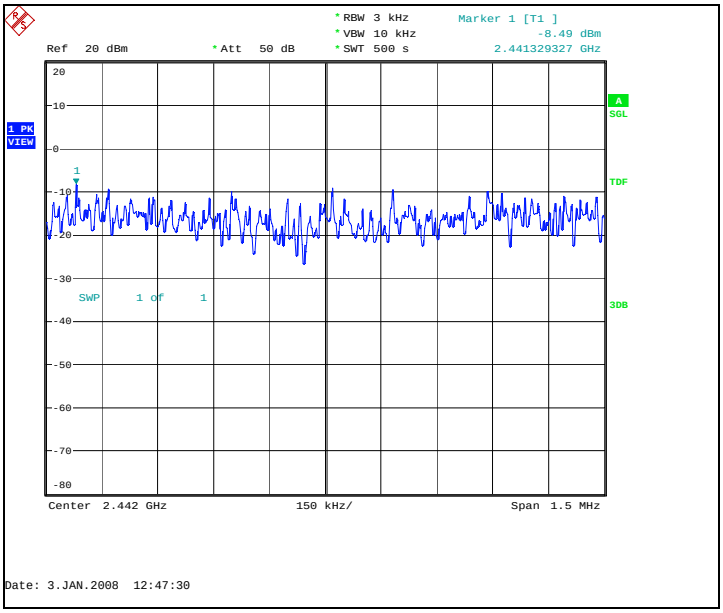
Channel / f_C [MHz]	P [dBm]	Result
1 / 2412	-8.74	PASSED
7 / 2442	-8.49	PASSED
11 / 2462	-8.59	PASSED

Channel 1 / 2412 MHz

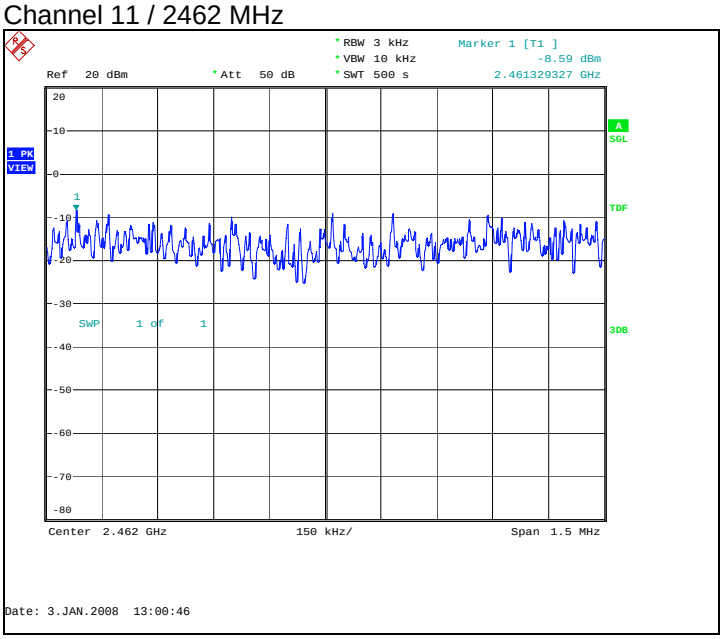


TCC Nokia Tampere Laboratory
P.O. Box 68
Sinitaival 5
FIN-33720 TAMPERE, FINLAND
Tel. +358 (0) 7180 46800
Fax. +358 (0) 7180 46880

Channel 7 / 2442 MHz



Channel 11 / 2462 MHz

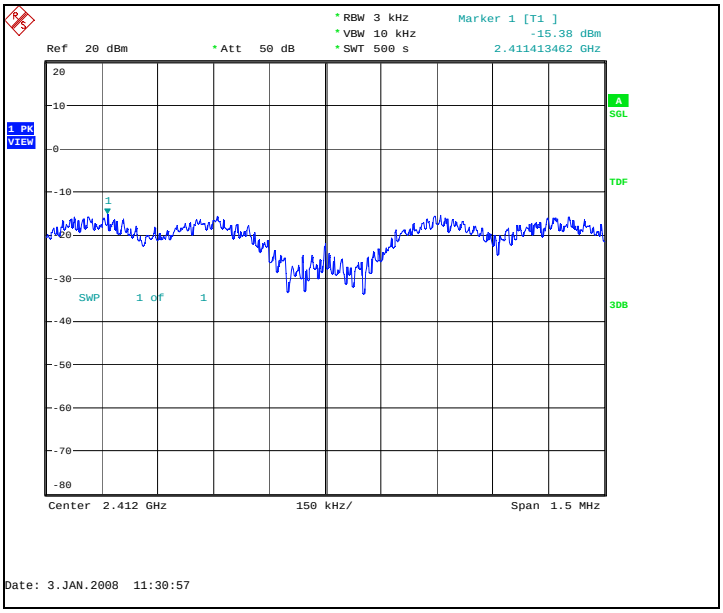


16.2.2 OFDM mode, BPSK modulation, 6 Mbps data rate

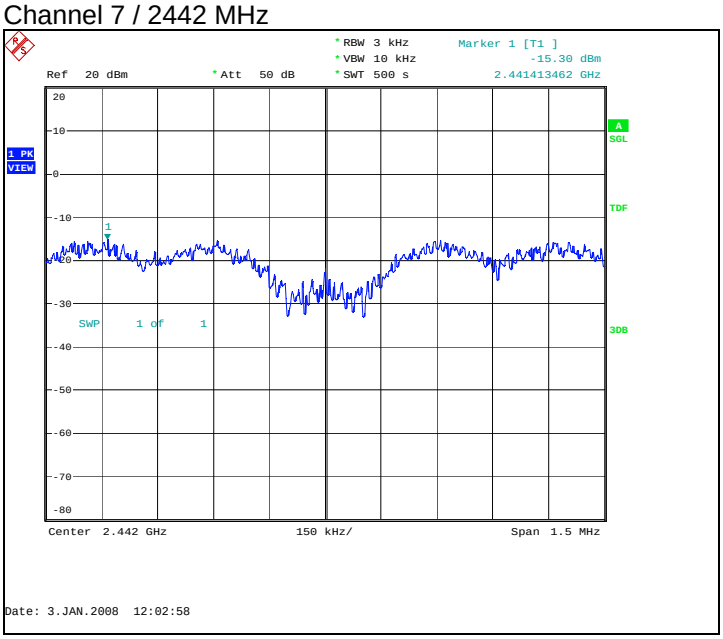
Channel / f_C [MHz]	P [dBm]	Result
1 / 2412	-15.38	PASSED
7 / 2442	-15.30	PASSED
11 / 2462	-14.67	PASSED

TCC Nokia Tampere Laboratory
P.O. Box 68
Sinitaival 5
FIN-33720 TAMPERE, FINLAND
Tel. +358 (0) 7180 46800
Fax. +358 (0) 7180 46880

Channel 1 / 2412 MHz

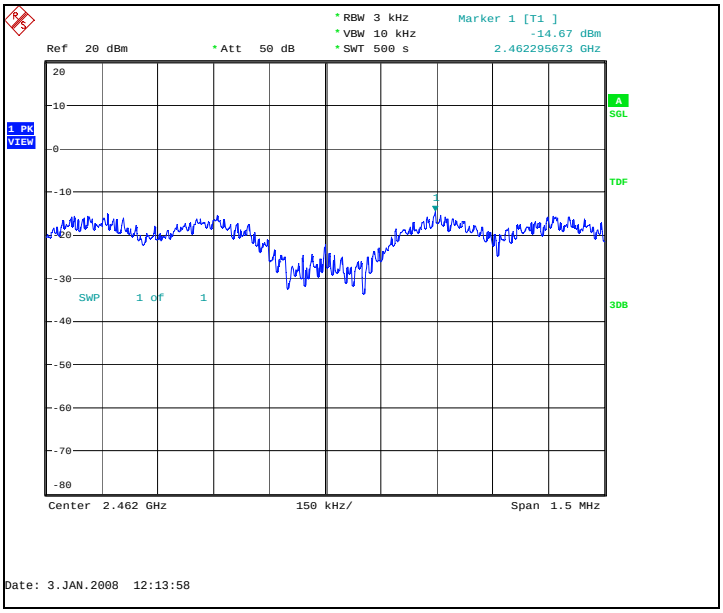


Channel 7 / 2442 MHz



TCC Nokia Tampere Laboratory
P.O. Box 68
Sinitaival 5
FIN-33720 TAMPERE, FINLAND
Tel. +358 (0) 7180 46800
Fax. +358 (0) 7180 46880

Channel 11 / 2462 MHz



TCC Nokia Tampere Laboratory
P.O. Box 68
Sinitaival 5
FIN-33720 TAMPERE, FINLAND
Tel. +358 (0) 7180 46800
Fax. +358 (0) 7180 46880

17. Test Equipment

17.1. 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	Transformatic	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

17.2. 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	Transformatic	22/24/27, 15C, 15B

TCC Nokia Tampere Laboratory
P.O. Box 68
Sinitaival 5
FIN-33720 TAMPERE, FINLAND
Tel. +358 (0) 7180 46800
Fax. +358 (0) 7180 46880

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

TCC Nokia Tampere Laboratory
P.O. Box 68
Sinitaival 5
FIN-33720 TAMPERE, FINLAND
Tel. +358 (0) 7180 46800
Fax. +358 (0) 7180 46880