

FCC Part 15C Compliance Test Report

Test Report no.:	FCC15CWLAN_RM-917_03.docx	Date of Report:	14-Mar-2013
Number of pages:	51	Customer's Contact person:	Hu Ying
Testing laboratory:	TCC Nokia Salo Laboratory P.O.Box(86) Joensuunkatu 7H / Kiila 1B FIN-24101 SALO, FINLAND Tel. +358 (0) 7180 08000 Fax. +358 (0) 7180 45220	Customer:	Nokia Corporation Beijing Economic and Technological Development Area No.5 Donghuan Zhonglu Beijing PRC China 100176 Tel. +86 10 8711 8888 Fax. +86 10 8711 4550
FCC listing no.:	533467		
IC recognition no.:	661V-1		
Tested devices/ accessories:	Phone RM-917 / Battery BL-5J / Headset WH-108 / AC-Charger AC-20U		
FCC ID:	QTLRM-917	IC:	-
Supplement reports:	-		
Testing has been carried out in accordance with:	CFR 47, FCC rules Part 15 Subpart C, ANSI C63.4 (2003), DTS procedures KDB 558074, IC standards. 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:			

Kalle Hannila, System Manager, EMC

1. Summary for FCC Part 15C Compliance Test Report

Date of receipt	05-Feb-2013
Testing completed	28-Feb-2013
The customer's contact person	Hu Ying
Test Plan referred to	T:\Projects\RM-917\TestPlan\RS_testplan_RM-917.xlsm
Notes	-
Document name	T:\Projects\RM-917\EMC\FCC15CWLAN_RM-917_03.docx

1.1. EUT and Accessory Information

The EUT is a mobile phone with following features:

GSM/WCDMA/WLAN/Bluetooth

The EUT is tested with maximum rated TX power.

Devices under tests

Product	Type	SN	HW	MV	SW	DUT
Phone	RM-917	355913050000947	0201	-	1030.6400.1304.10070	17233
Battery	BL-5J	495540221503230720300670574	-	-	-	17239
Headset	WH-108	3022D71	-	-	-	17240
AC-Charger	AC-20U	486867251234050705900675629	-	-	-	17241

1.2. Summary of Test Results

WLAN:

Section in CFR 47	Section in RSS-GEN or RSS-210	Name of the test	Result
15.247(b)(1)	A8(0.4(4))	Conducted peak output power	PASSED
15.247(d), 15.205(b)	A8(0.5)	Band edge compliance of RF emissions	PASSED
15.247(d)	A8(0.5)	Spurious RF conducted emissions	PASSED
15.247(d), 15.209	A8(0.5)	Spurious radiated emissions	PASSED
15.207	7.2.2	AC powerline conducted emissions	PASSED
15.247(a)(2)	A8(0.1(1))	6dB(bandwidth)	PASSED
15.247(e)	A8(0.1(2))	Power spectral density	PASSED

PASSED

FAILED

NP

The EUT complies with the essential requirements in the standard.

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

The test was not performed by the TCC Nokia Laboratory.

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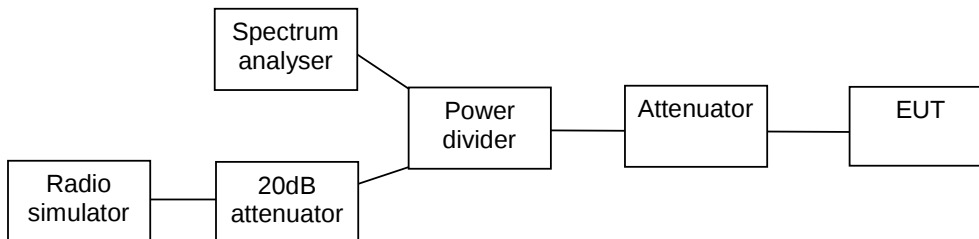
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2. Conducted peak output power (15.247(b)(1), RSS-210 A8.4 (4))

EUT with DUT number	RM-917, DUT 17233
Accessories with DUT numbers	BL-5J, DUT 17239 ; WH-108, DUT 17240 ; AC-20U, DUT 17241
Operation Voltage [V] / [Hz]	Nominal
Results	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	22 / 34 / 100.5
Date of measurements	28-Feb-2013
Measured by	Jari Keto

2.1. Test Setup



2.2. 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 5725 - 5850	≤ 1	≤ 30

2.3. Power results summary

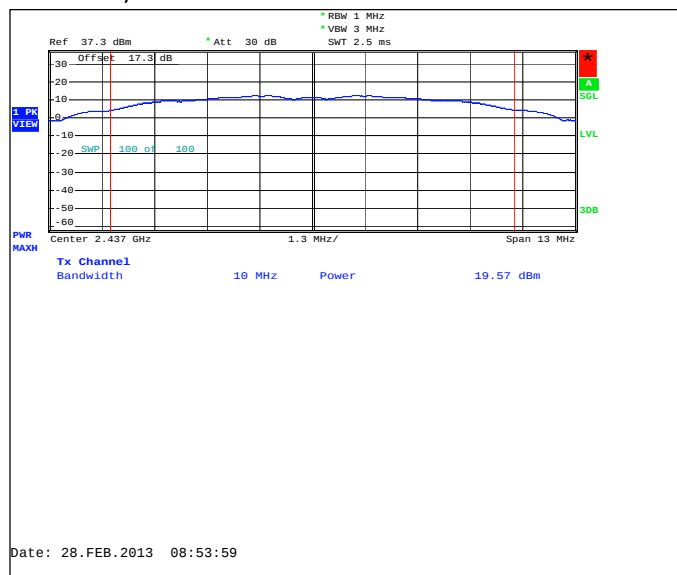
Channel / f_c [MHz]	Mode	Modulation	Data rate	Level [dBm]
6 / 2437	802.11b	BPSK	1 Mbps	19.57
6 / 2437	802.11b	QPSK	2 Mbps	19.71
6 / 2437	802.11b	QPSK	5.5 Mbps	21.12
6 / 2437	802.11b	QPSK	11 Mbps	22.49
6 / 2437	802.11g	BPSK	6 Mbps	23.4
6 / 2437	802.11g	BPSK	9 Mbps	23.22
6 / 2437	802.11g	QPSK	12 Mbps	22.67
6 / 2437	802.11g	QPSK	18 Mbps	22.02
6 / 2437	802.11g	16QAM	24 Mbps	21.75
6 / 2437	802.11g	16QAM	36 Mbps	21.19
6 / 2437	802.11g	64QAM	48 Mbps	20.92
6 / 2437	802.11g	64QAM	54 Mbps	20.85
6 / 2437	802.11n	BPSK	6.5 / 7.25 Mbps	23.33
6 / 2437	802.11n	QPSK	13.0 / 14.4 Mbps	22.23
6 / 2437	802.11n	QPSK	19.5 / 21.7 Mbps	21.69
6 / 2437	802.11n	16QAM	26.0 / 28.9 Mbps	21.33
6 / 2437	802.11n	16QAM	39.0 / 43.3 Mbps	21.23
6 / 2437	802.11n	64QAM	52.0 / 57.8 Mbps	20.61
6 / 2437	802.11n	64QAM	58.5 / 65.0 Mbps	20.2
6 / 2437	802.11n	64QAM	65.0 / 72.2 Mbps	20.13
1 / 2412	802.11g	BPSK	6 Mbps	23.24
1 / 2412	802.11g	QPSK	12 Mbps	22.31
11 / 2462	802.11g	QPSK	12 Mbps	22.24
11 / 2462	802.11g	BPSK	6 Mbps	22.84

2.4. WLAN Test results

2.4.1 802.11b mode, BPSK modulation, 1 Mbps data rate

Channel / f_c [MHz]	P [dBm]	P [mW]	Result
6 / 2437	19.57	90.573	PASSED

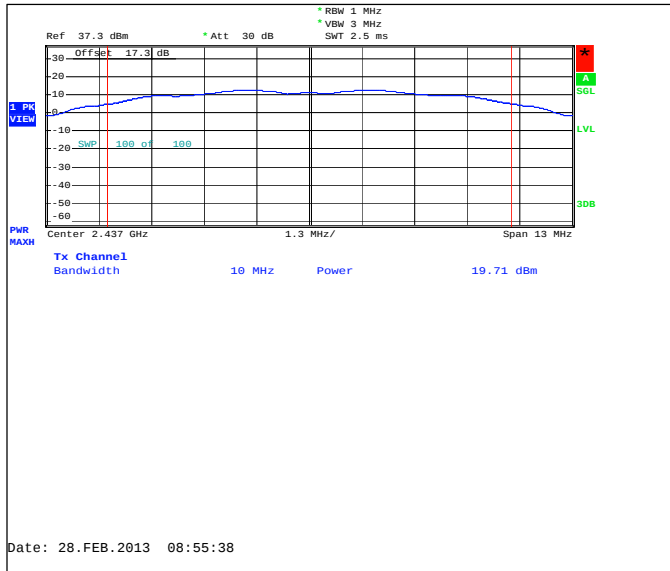
Channel 6 / 2437 MHz



2.4.2 802.11b mode, QPSK modulation, 2 Mbps data rate

Channel / f_c [MHz]	P [dBm]	P [mW]	Result
6 / 2437	19.71	93.541	PASSED

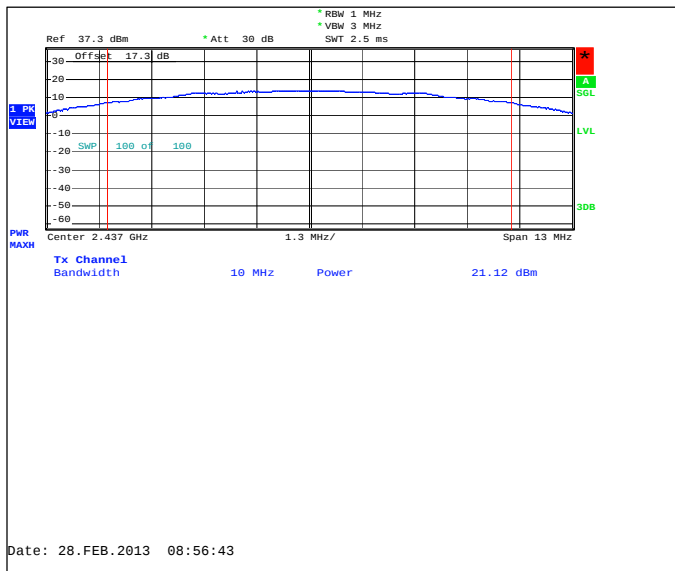
Channel 6 / 2437 MHz



2.4.3 802.11b mode, QPSK modulation, 5.5 Mbps data rate

Channel / f_c [MHz]	P [dBm]	P [mW]	Result
6 / 2437	21.12	129.42	PASSED

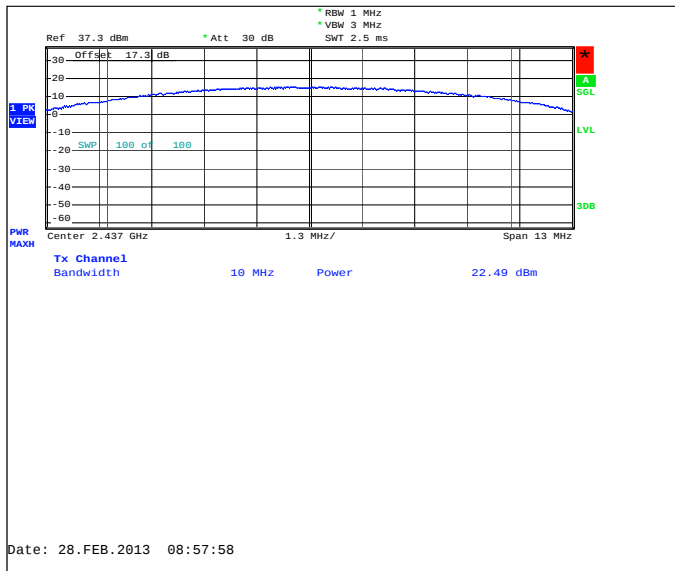
Channel 6 / 2437 MHz



2.4.4 802.11b mode, QPSK modulation, 11 Mbps data rate

Channel / f _c [MHz]	P [dBm]	P [mW]	Result
6 / 2437	22.49	177.419	PASSED

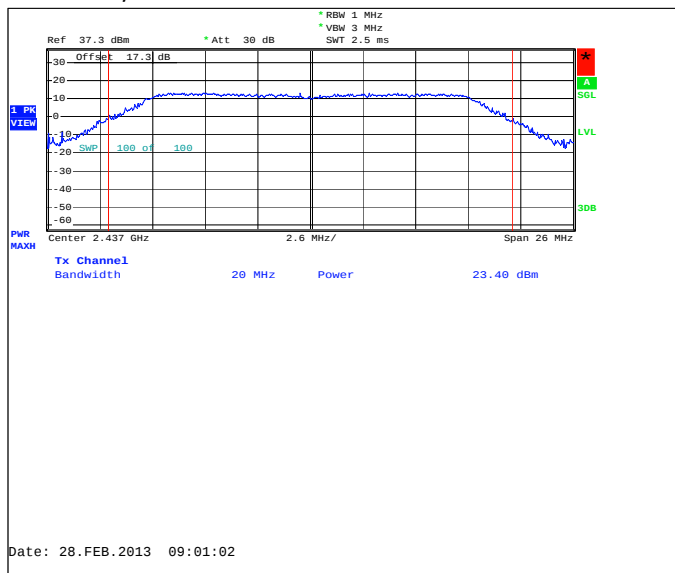
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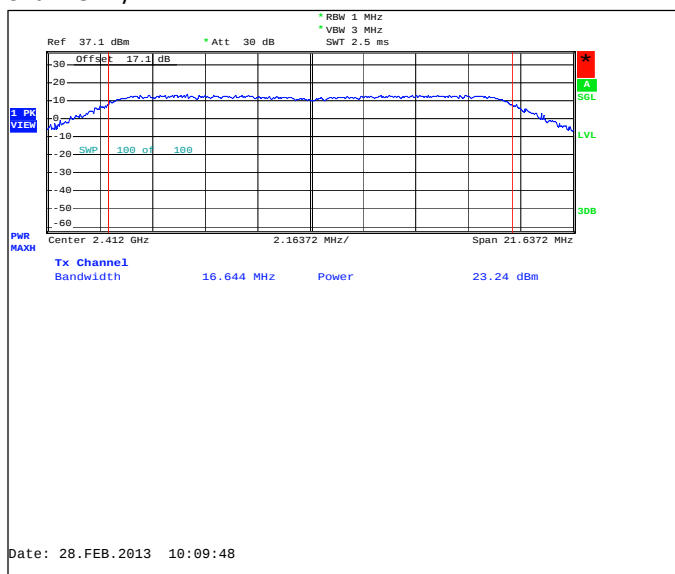
2.4.5 802.11g mode, BPSK modulation, 6 Mbps data rate

Channel / f _c [MHz]	P [dBm]	P [mW]	Result
6 / 2437	23.4	218.776	PASSED
1 / 2412	23.24	210.863	PASSED
11 / 2462	22.84	192.309	PASSED

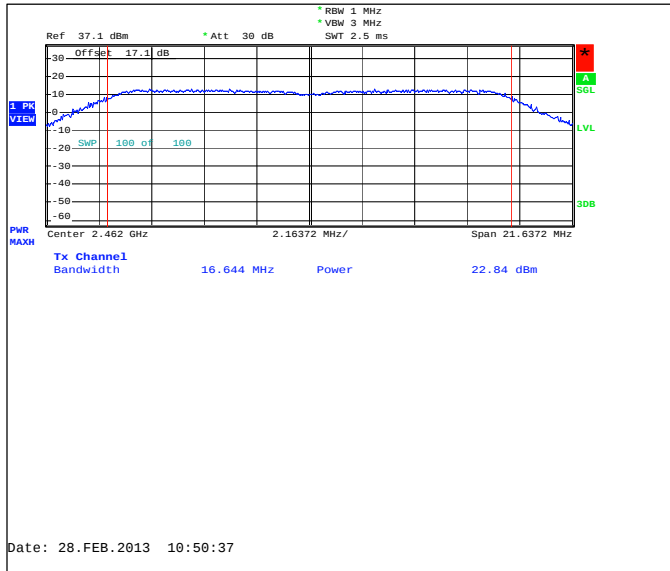
Channel 6 / 2437 MHz



Channel 1 / 2412 MHz



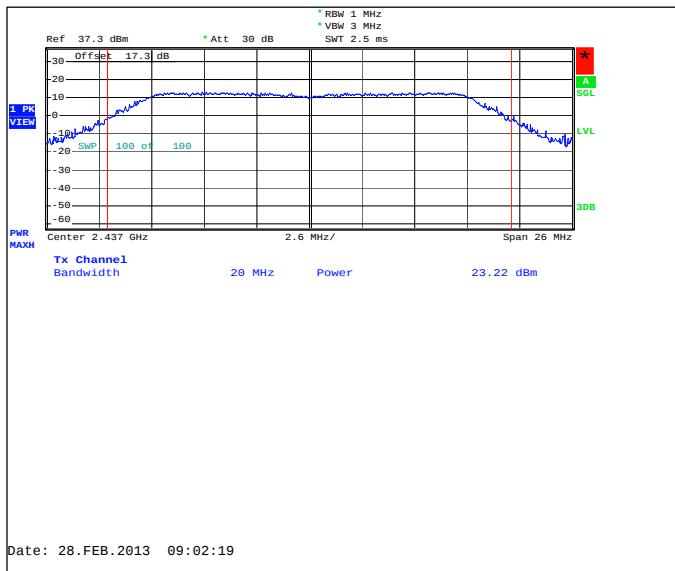
Channel 11 / 2462 MHz



2.4.6 802.11g mode, BPSK modulation, 9 Mbps data rate

Channel / f _c [MHz]	P [dBm]	P [mW]	Result
6 / 2437	23.22	209.894	PASSED

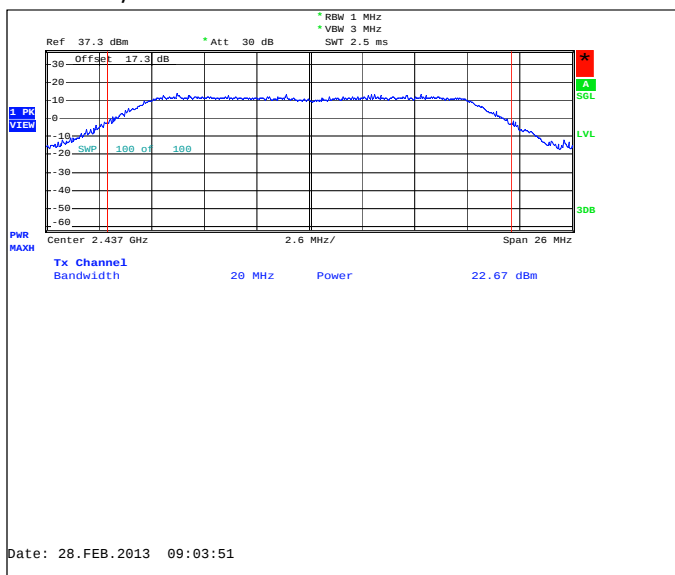
Channel 6 / 2437 MHz



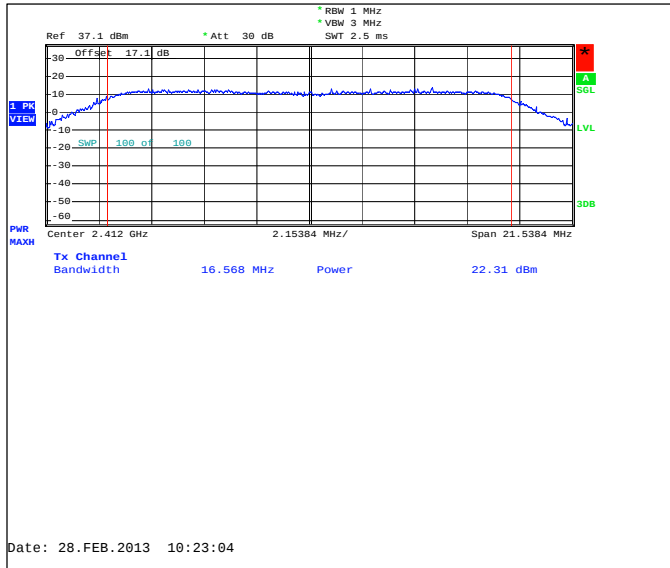
2.4.7 802.11g mode, QPSK modulation, 12 Mbps data rate

Channel / f _c [MHz]	P [dBm]	P [mW]	Result
6 / 2437	22.67	184.927	PASSED
1 / 2412	22.31	170.216	PASSED
11 / 2462	22.24	167.494	PASSED

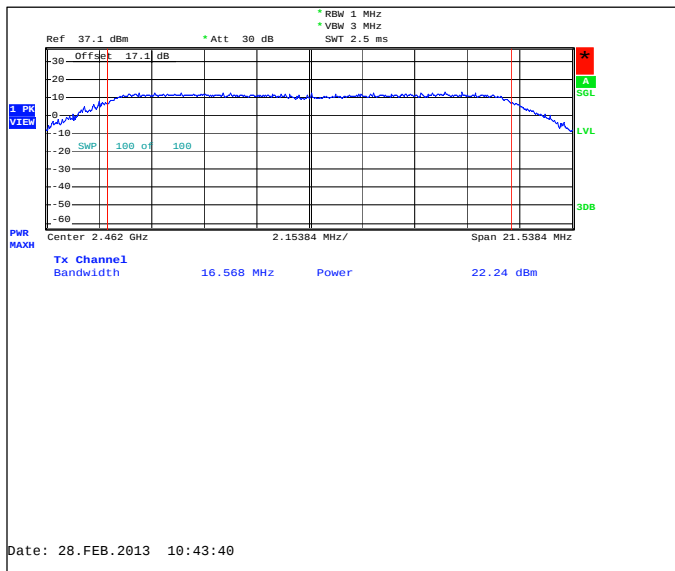
Channel 6 / 2437 MHz



Channel 1 / 2412 MHz



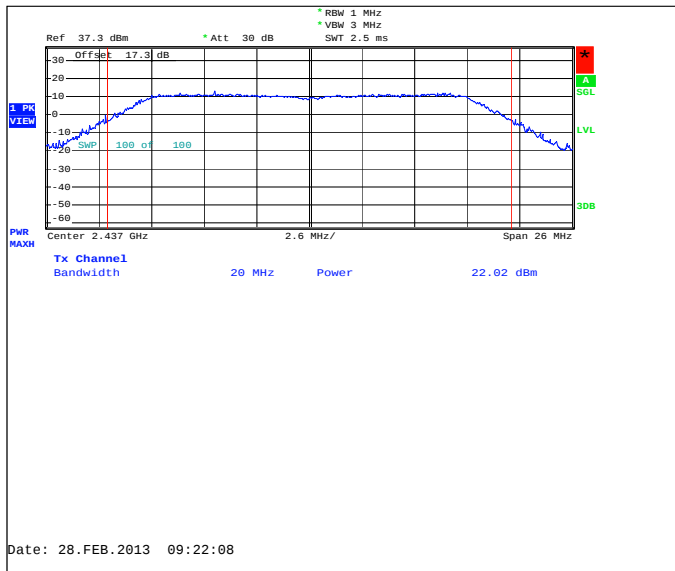
Channel 11 / 2462 MHz



2.4.8 802.11g mode, QPSK modulation, 18 Mbps data rate

Channel / f _c [MHz]	P [dBm]	P [mW]	Result
6 / 2437	22.02	159.221	PASSED

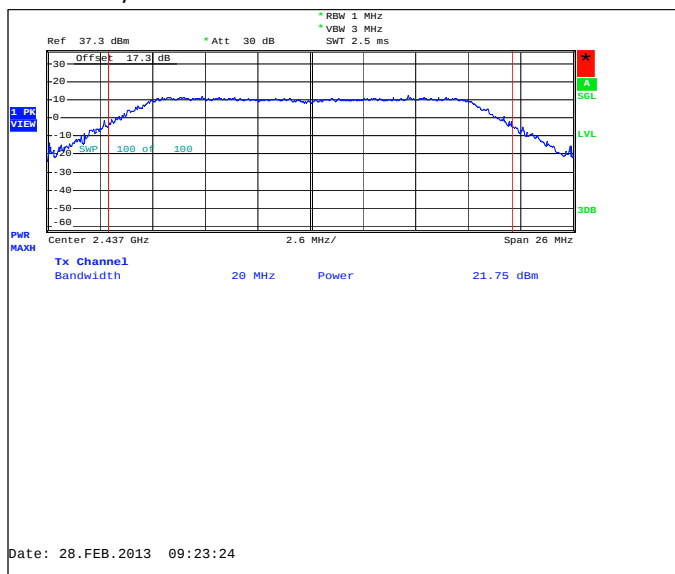
Channel 6 / 2437 MHz



2.4.9 802.11g mode, 16QAM modulation, 24 Mbps data rate

Channel / f _c [MHz]	P [dBm]	P [mW]	Result
6 / 2437	21.75	149.624	PASSED

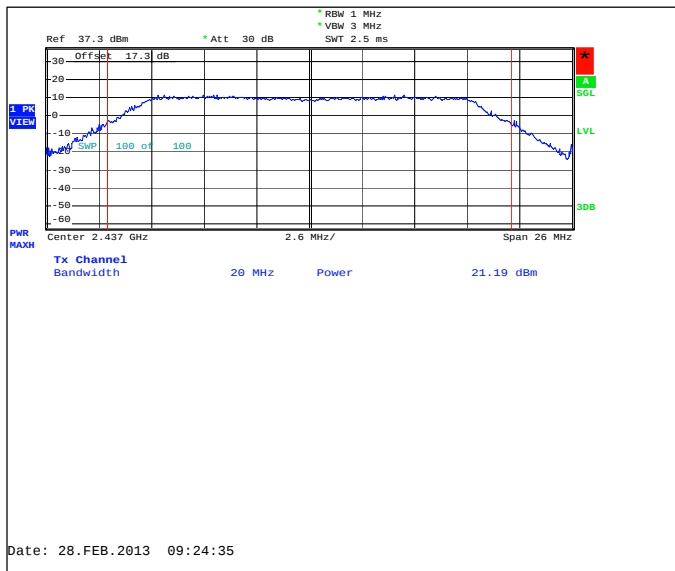
Channel 6 / 2437 MHz



2.4.10 802.11g mode, 16QAM modulation, 36 Mbps data rate

Channel / f _c [MHz]	P [dBm]	P [mW]	Result
6 / 2437	21.19	131.522	PASSED

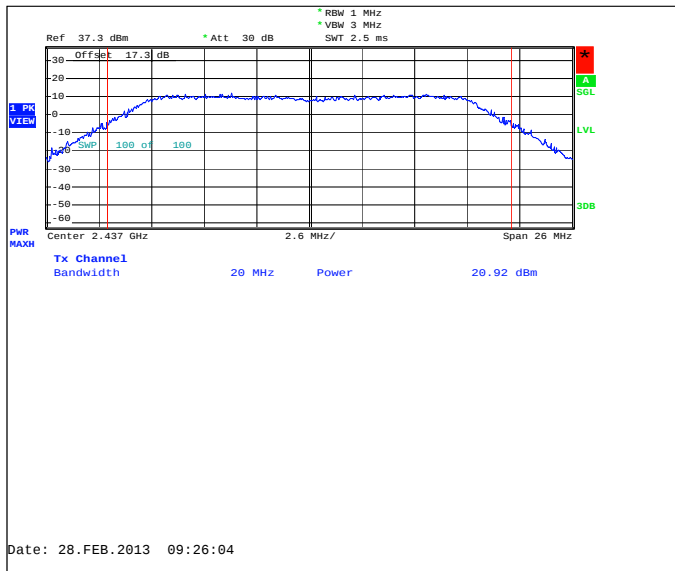
Channel 6 / 2437 MHz



2.4.11 802.11g mode, 64QAM modulation, 48 Mbps data rate

Channel / f _c [MHz]	P [dBm]	P [mW]	Result
6 / 2437	20.92	123.595	PASSED

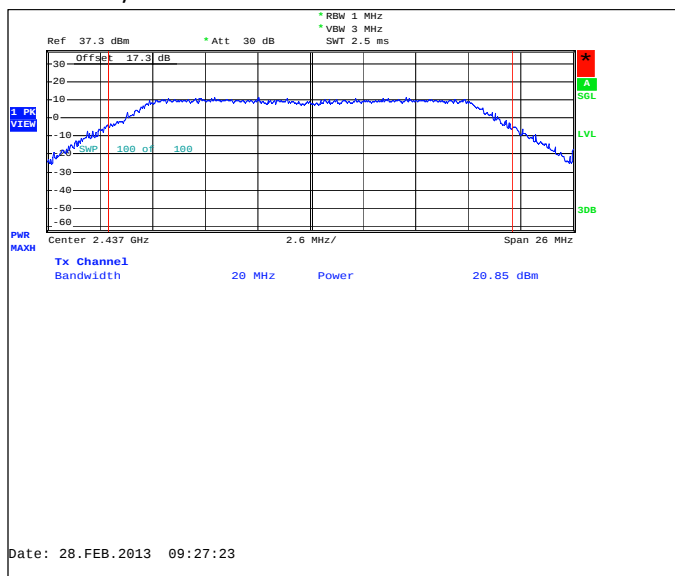
Channel 6 / 2437 MHz



2.4.12 802.11g mode, 64QAM modulation, 54 Mbps data rate

Channel / f _c [MHz]	P [dBm]	P [mW]	Result
6 / 2437	20.85	121.619	PASSED

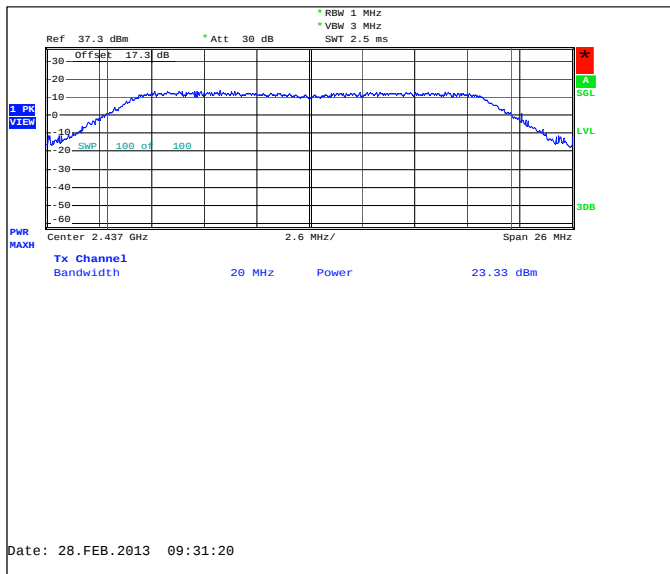
Channel 6 / 2437 MHz



2.4.13 802.11n mode, BPSK modulation, 6.5 / 7.25 Mbps data rate

Channel / f _c [MHz]	P [dBm]	P [mW]	Result
6 / 2437	23.33	215.278	PASSED

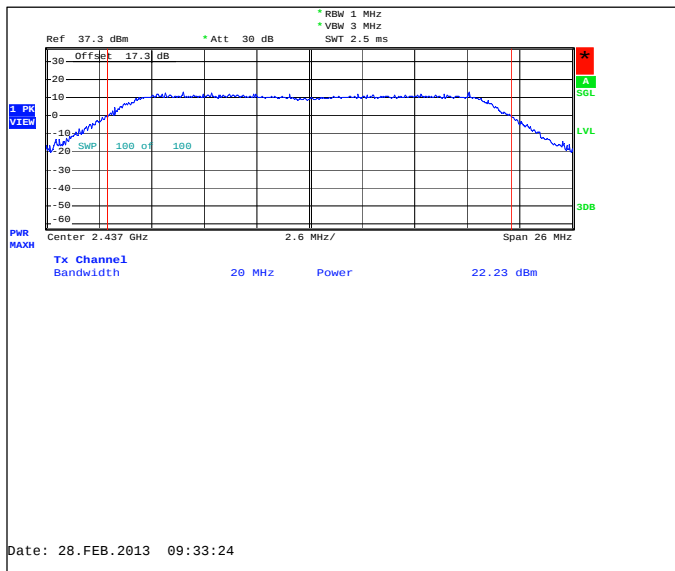
Channel 6 / 2437 MHz



2.4.14 802.11n mode, QPSK modulation, 13.0 / 14.4 Mbps data rate

Channel / f_c [MHz]	P [dBm]	P [mW]	Result
6 / 2437	22.23	167.109	PASSED

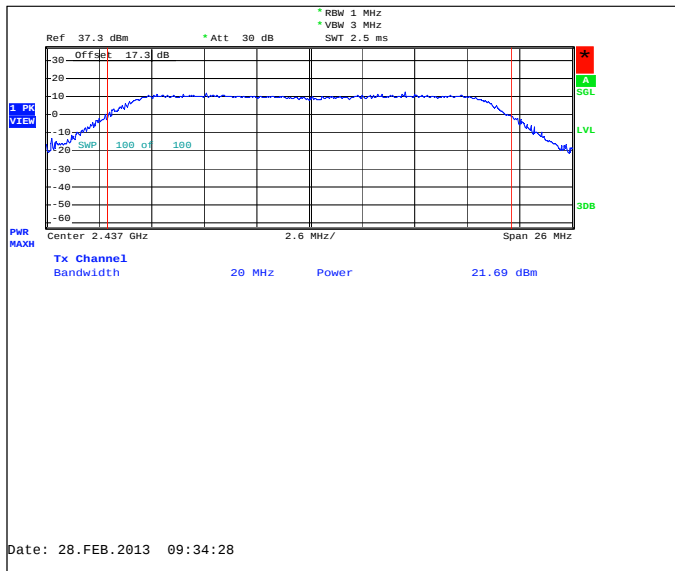
Channel 6 / 2437 MHz



2.4.15 802.11n mode, QPSK modulation, 19.5 / 21.7 Mbps data rate

Channel / f _c [MHz]	P [dBm]	P [mW]	Result
6 / 2437	21.69	147.571	PASSED

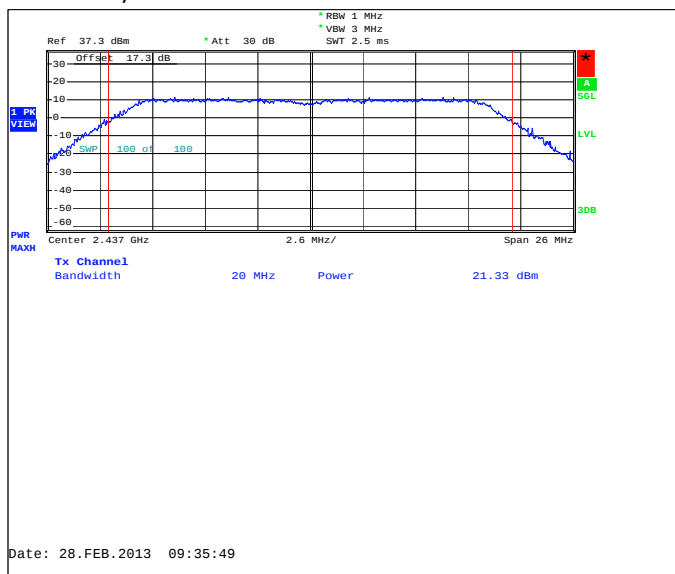
Channel 6 / 2437 MHz



2.4.16 802.11n mode, 16QAM modulation, 26.0 / 28.9 Mbps data rate

Channel / f _c [MHz]	P [dBm]	P [mW]	Result
6 / 2437	21.33	135.831	PASSED

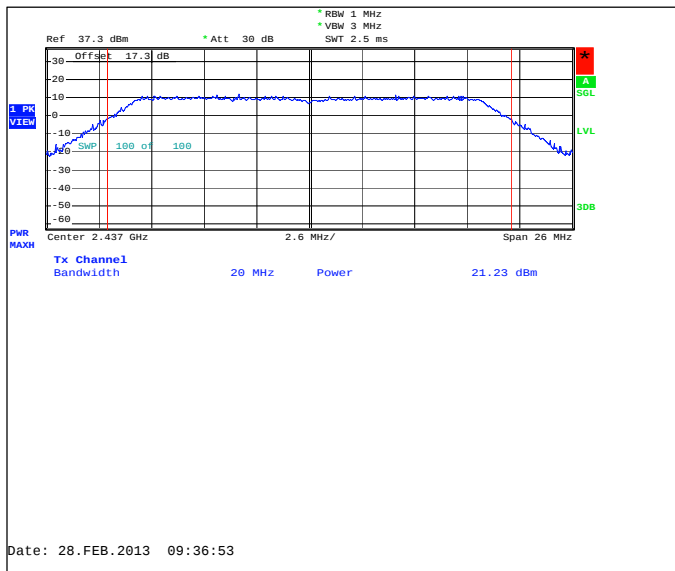
Channel 6 / 2437 MHz



2.4.17 802.11n mode, 16QAM modulation, 39.0 / 43.3 Mbps data rate

Channel / f _c [MHz]	P [dBm]	P [mW]	Result
6 / 2437	21.23	132.739	PASSED

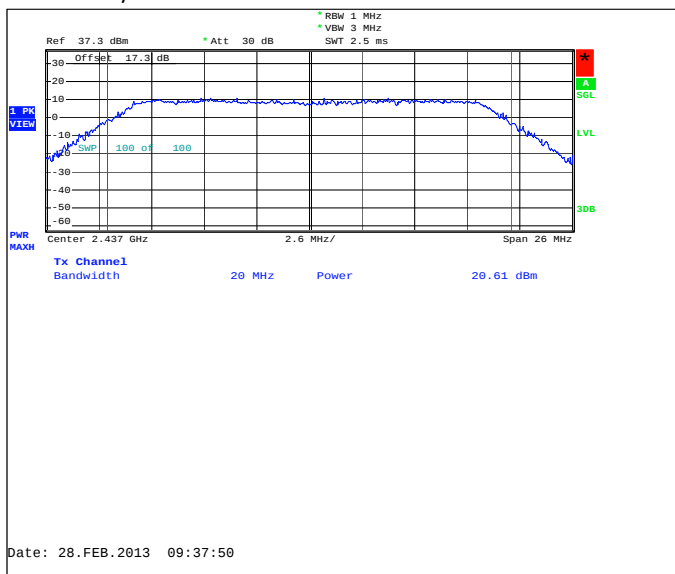
Channel 6 / 2437 MHz



2.4.18 802.11n mode, 64QAM modulation, 52.0 / 57.8 Mbps data rate

Channel / f _c [MHz]	P [dBm]	P [mW]	Result
6 / 2437	20.61	115.08	PASSED

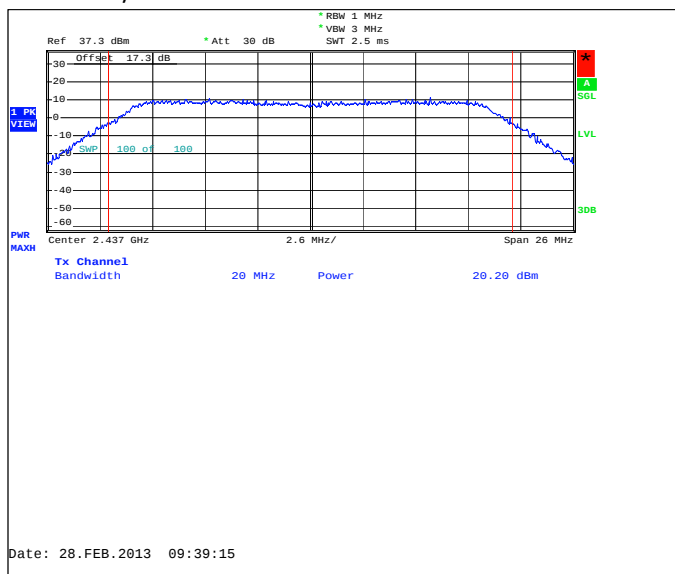
Channel 6 / 2437 MHz



2.4.19 802.11n mode, 64QAM modulation, 58.5 / 65.0 Mbps data rate

Channel / f _c [MHz]	P [dBm]	P [mW]	Result
6 / 2437	20.2	104.713	PASSED

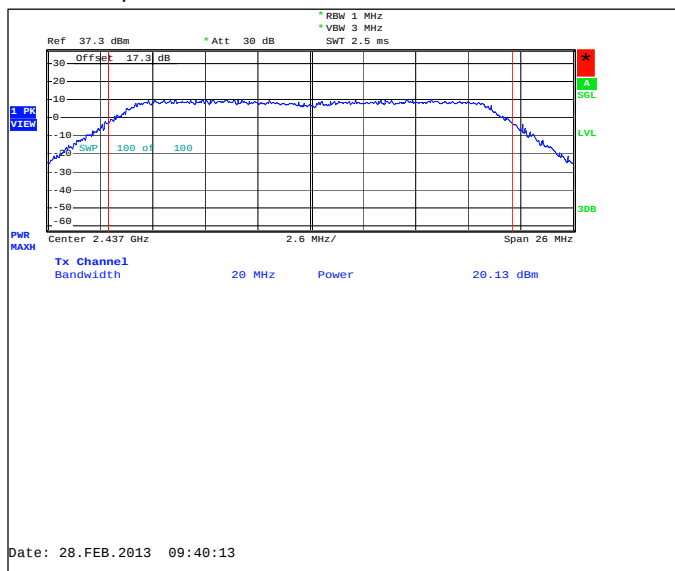
Channel 6 / 2437 MHz



2.4.20 802.11n mode, 64QAM modulation, 65.0 / 72.2 Mbps data rate

Channel / f _c [MHz]	P [dBm]	P [mW]	Result
6 / 2437	20.13	103.039	PASSED

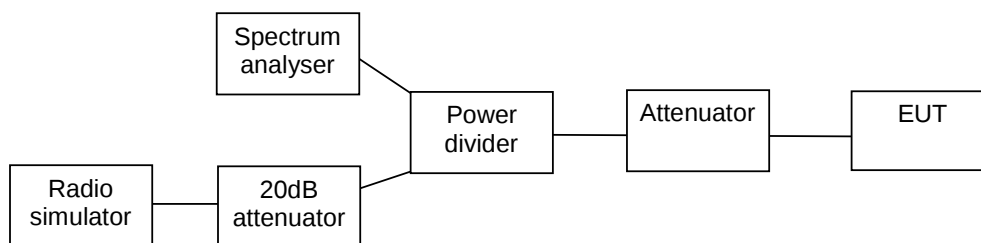
Channel 6 / 2437 MHz



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

EUT with DUT number	RM-917, DUT 17233
Accessories with DUT numbers	BL-5J, DUT 17239 ; WH-108, DUT 17240 ; AC-20U, DUT 17241
Operation Voltage [V] / [Hz]	Nominal
Results	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	22 / 34 / 100.5
Date of measurements	28-Feb-2013
Measured by	Jari Keto

3.1. Test Setup



3.2. Test method and limit

The measurement is made according to Public notice KDB 558 074 and IC standard RSS-210.

The reference level for the -20 dBc measurement was obtained as instructed in section 5.4.1.1 of the KDB 558074, using 5-30 % wider span than the EBW.

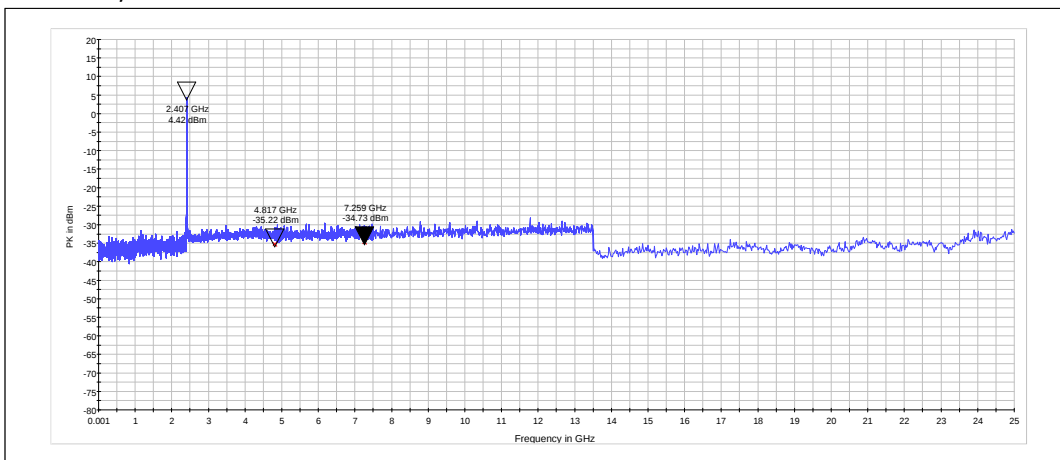
Limits for spurious RF conducted emissions measurements

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

3.3. WLAN Test results

3.3.1 802.11g mode, BPSK modulation, 6 Mbps data rate

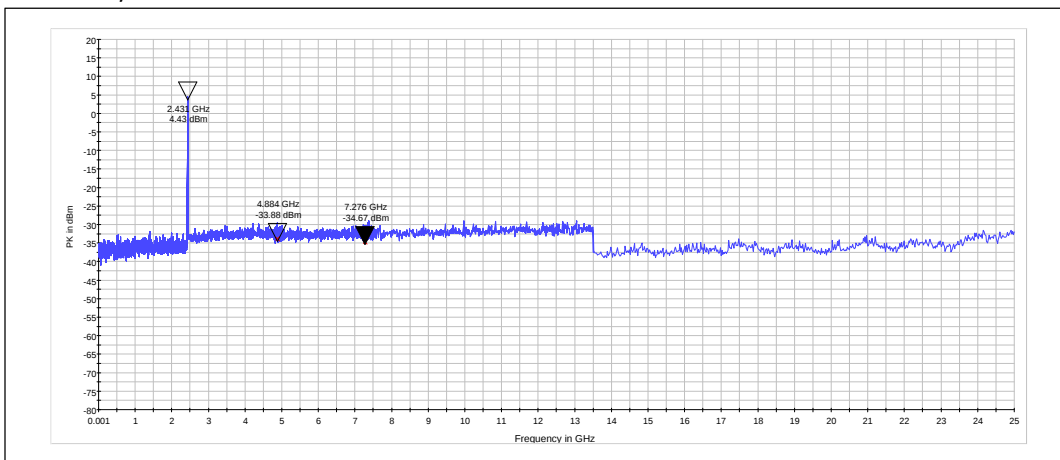
Channel 1 / 2412 MHz



Peak (RBW: 100 kHz, VBW: 300 kHz)

Frequency [MHz]	P [dBc]	Result
4816.800	-35.22	PASSED
7259.400	-34.73	PASSED

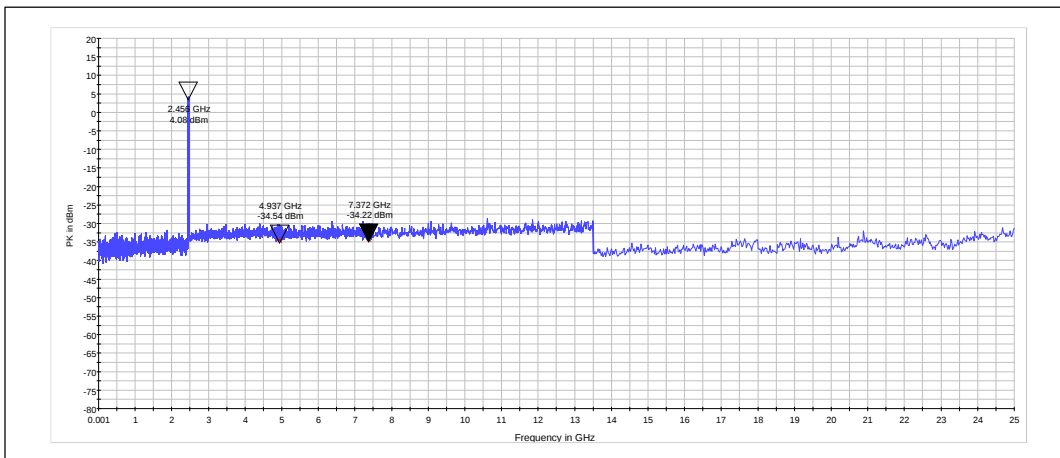
Channel 6 / 2437 MHz



Peak (RBW: 100 kHz, VBW: 300 kHz)

Frequency [MHz]	P [dBc]	Result
4884.000	-33.88	PASSED
7275.600	-34.67	PASSED

Channel 11 / 2462 MHz

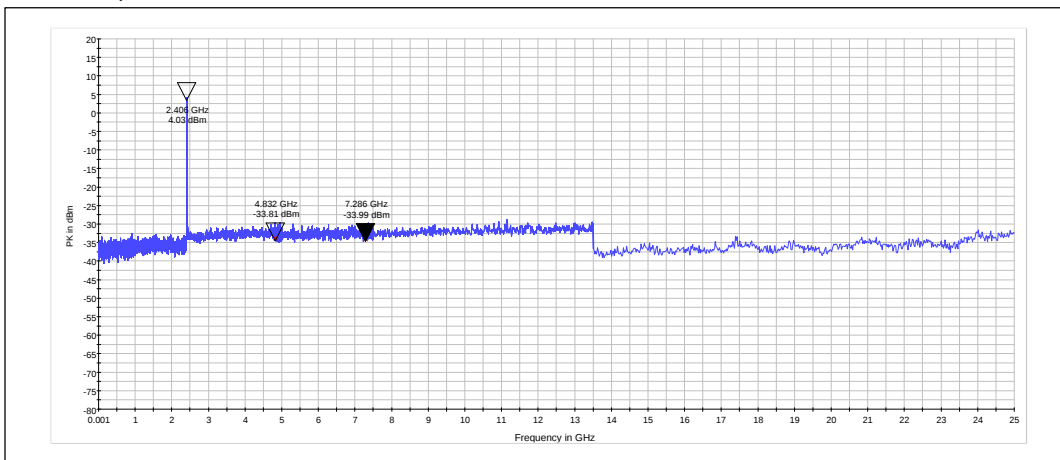


Peak (RBW: 100 kHz, VBW: 300 kHz)

Frequency [MHz]	P [dBc]	Result
4936.800	-34.54	PASSED
7372.200	-34.22	PASSED

3.3.2 802.11g mode, QPSK modulation, 12 Mbps data rate

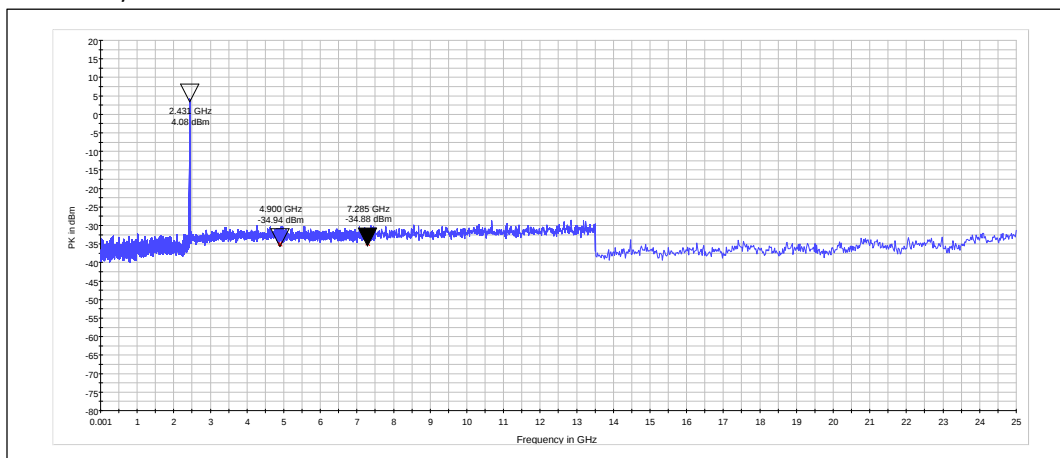
Channel 1 / 2412 MHz



Peak (RBW: 100 kHz, VBW: 300 kHz)

Frequency [MHz]	P [dBc]	Result
4831.600	-33.81	PASSED
7285.800	-33.99	PASSED

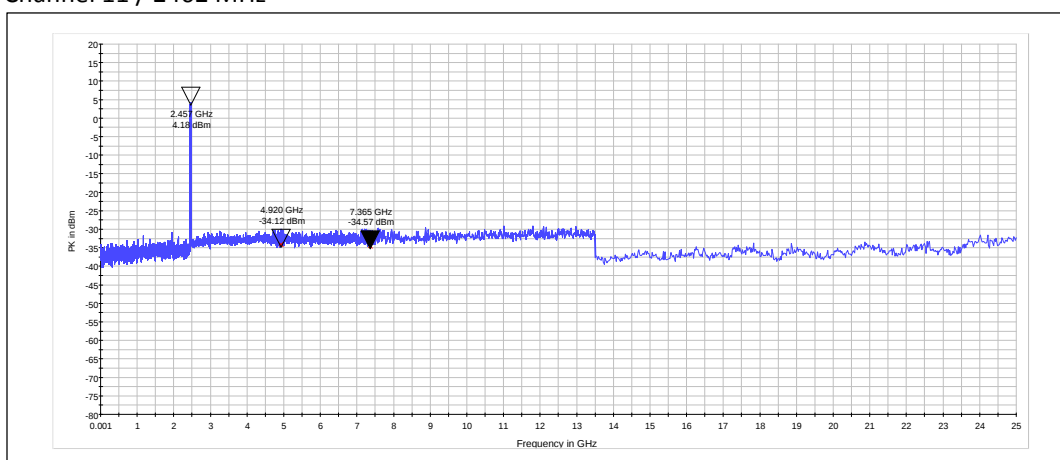
Channel 6 / 2437 MHz



Peak (RBW: 100 kHz, VBW: 300 kHz)

Frequency [MHz]	P [dBc]	Result
4899.600	-34.94	PASSED
7285.200	-34.88	PASSED

Channel 11 / 2462 MHz



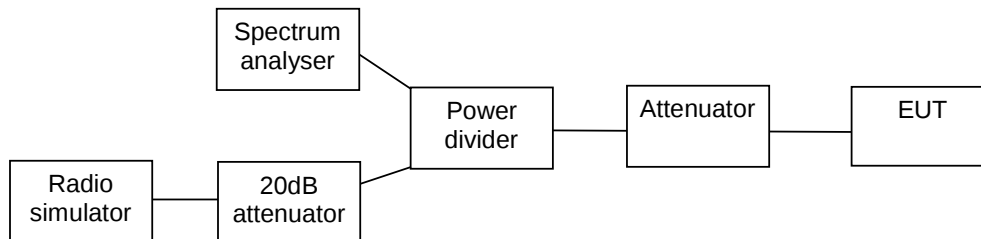
Peak (RBW: 100 kHz, VBW: 300 kHz)

Frequency [MHz]	P [dBc]	Result
4920.400	-34.12	PASSED
7365.000	-34.57	PASSED

4. 6 dB bandwidth (FCC §15.247(a)(2), RSS-210 A8.2 (1))

EUT with DUT number	RM-917, DUT 17233
Accessories with DUT numbers	BL-5J, DUT 17239 ; WH-108, DUT 17240 ; AC-20U, DUT 17241
Operation Voltage [V] / [Hz]	Nominal
Results	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	22 / 34 / 100.5
Date of measurements	28-Feb-2013
Measured by	Jari Keto

4.1. Test Setup



4.2. 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

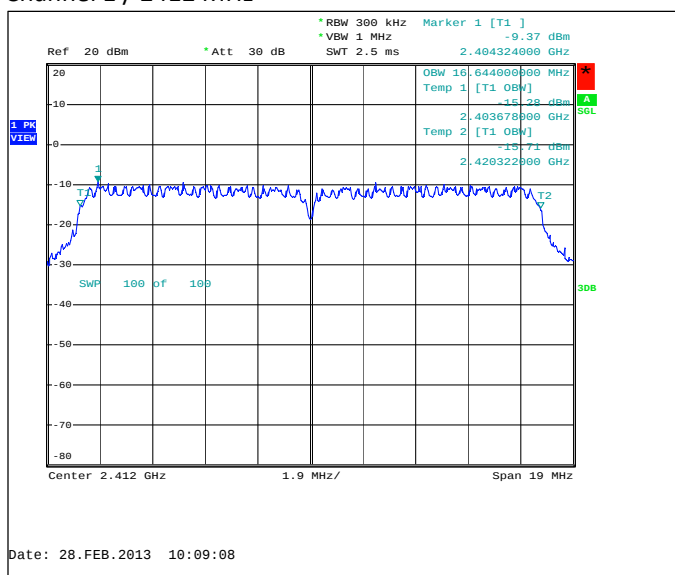
Limit [kHz]
>= 500

4.3. WLAN Test results

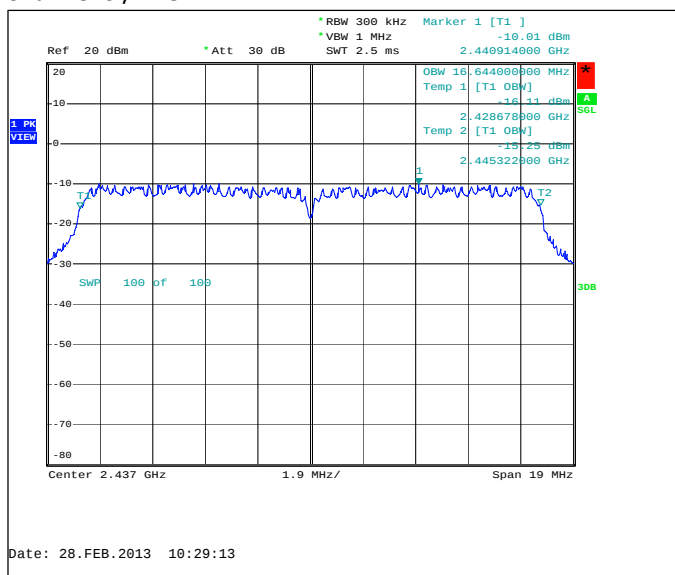
4.3.1 802.11g mode, BPSK modulation, 6 Mbps data rate

Channel / f _c [MHz]	6 dB bandwidth [kHz]	Result
1 / 2412	16644	PASSED
6 / 2437	16644	PASSED
11 / 2462	16644	PASSED

Channel 1 / 2412 MHz



Channel 6 / 2437 MHz



Ref 20 dBm *Att 30 dB RBW 300 kHz VBW 1 MHz SWT 2.5 ms

Marker 1 [T1] -15.13 dBm

OBW 16.64400000 MHz Temp 1 [T1 OBW] -15.18 dBm

2.453678000 GHz Temp 2 [T1 OBW] -15.71 dBm

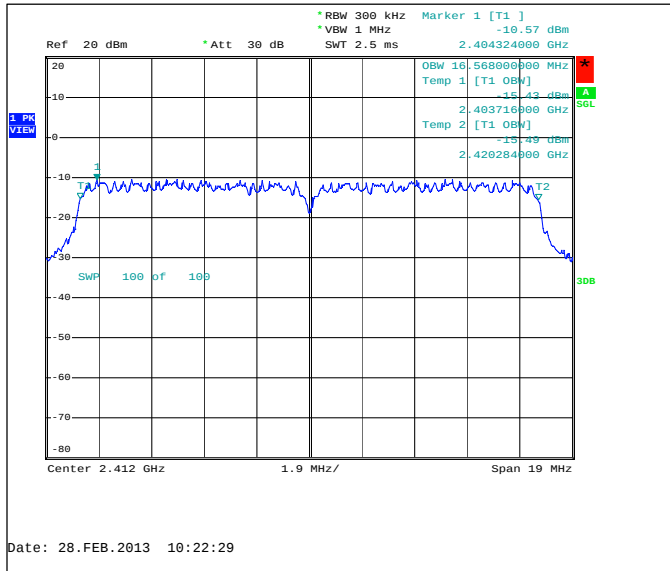
2.470322000 GHz 15.18 dBm

Center 2.462 GHz 1.9 MHz/ Span 19 MHz

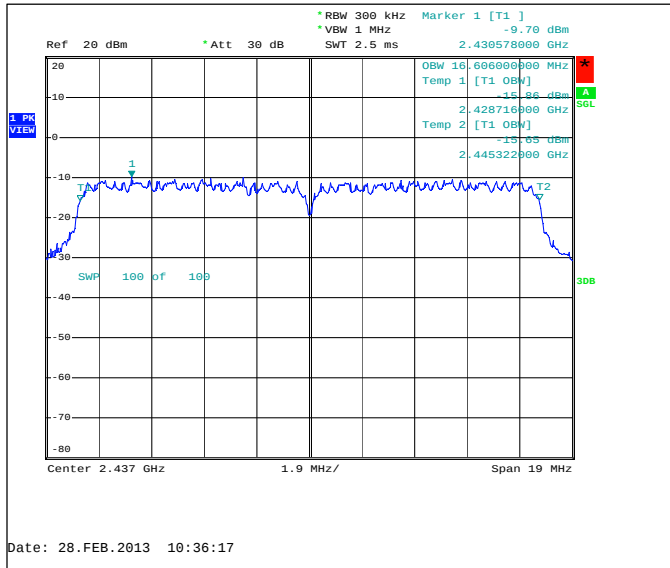
Date: 28.FEB.2013 10:50:03

Channel / f_c [MHz]	6 dB bandwidth [kHz]	Result
1 / 2412	16568	PASSED
6 / 2437	16606	PASSED
11 / 2462	16568	PASSED

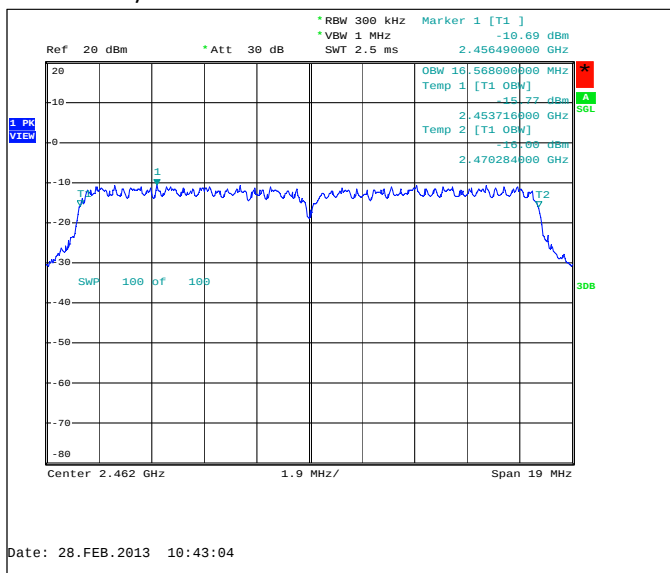
Channel 1 / 2412 MHz



Channel 6 / 2437 MHz



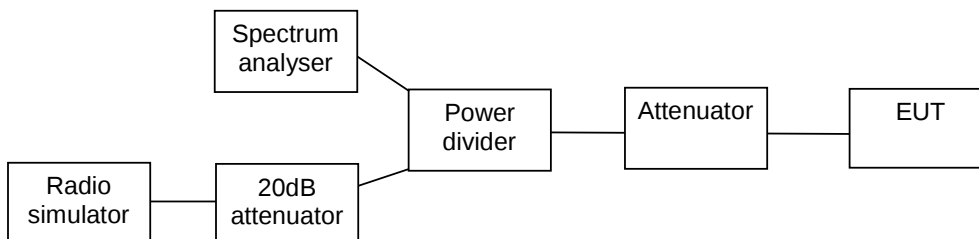
Channel 11 / 2462 MHz



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

EUT with DUT number	RM-917, DUT 17233
Accessories with DUT numbers	BL-5J, DUT 17239 ; WH-108, DUT 17240 ; AC-20U, DUT 17241
Operation Voltage [V] / [Hz]	Nominal
Results	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	22 / 34 / 100.5
Date of measurements	28-Feb-2013
Measured by	Jari Keto

5.1. Test Setup



5.2. Test method and limit

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

Result is corrected by bandwidth correction factor -15.2dB (BWCF = $10\log(3\text{ kHz}/100\text{ kHz}) = -15.2\text{ dB}$).

Limits for power spectral density measurements

Limit [dBm] @ 3 kHz
≤ 8

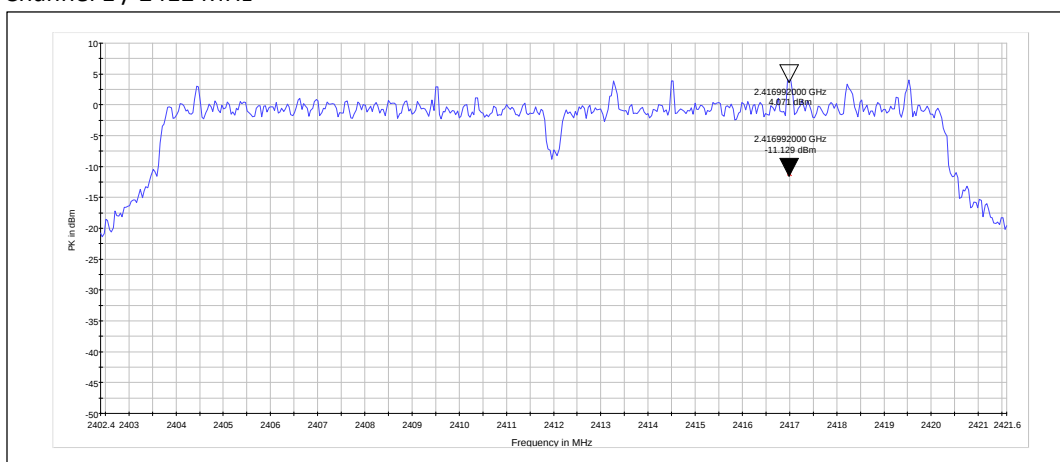
5.3. WLAN Test results

5.3.1 802.11g mode, BPSK modulation, 6 Mbps data rate

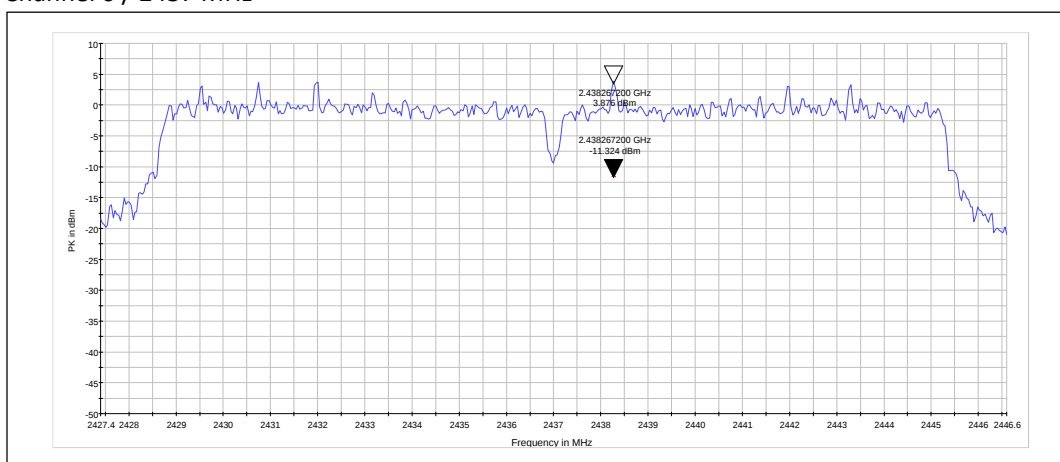
Peak (RBW: 100 kHz, VBW: 300 kHz, Max hold)

Channel / f _c [MHz]	P [dBm]	Result
1 / 2412	-11.13	PASSED
6 / 2437	-11.32	PASSED
11 / 2462	-11.55	PASSED

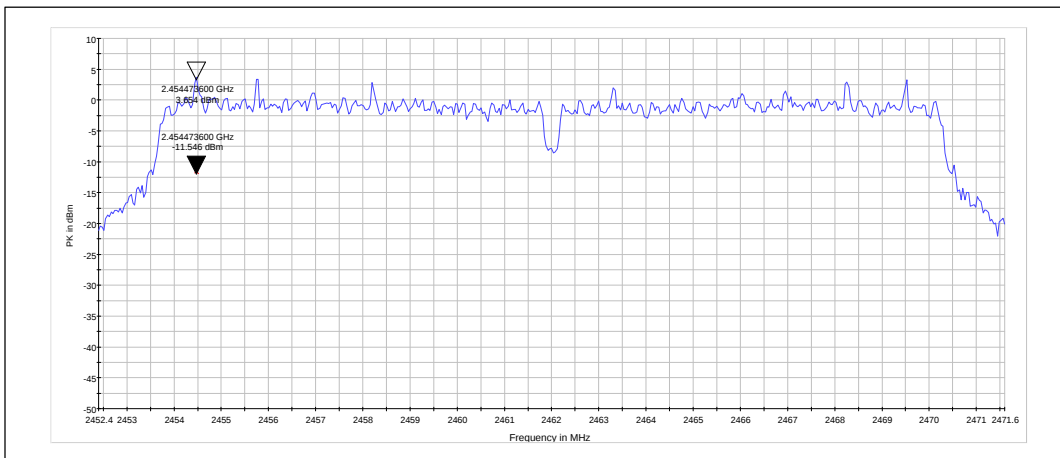
Channel 1 / 2412 MHz



Channel 6 / 2437 MHz



Channel 11 / 2462 MHz

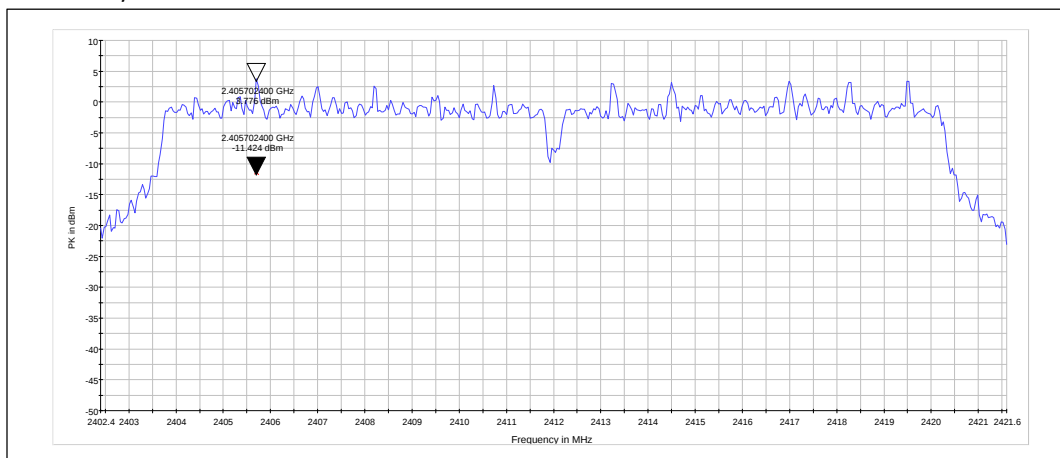


5.3.2 802.11g mode, QPSK modulation, 12 Mbps data rate

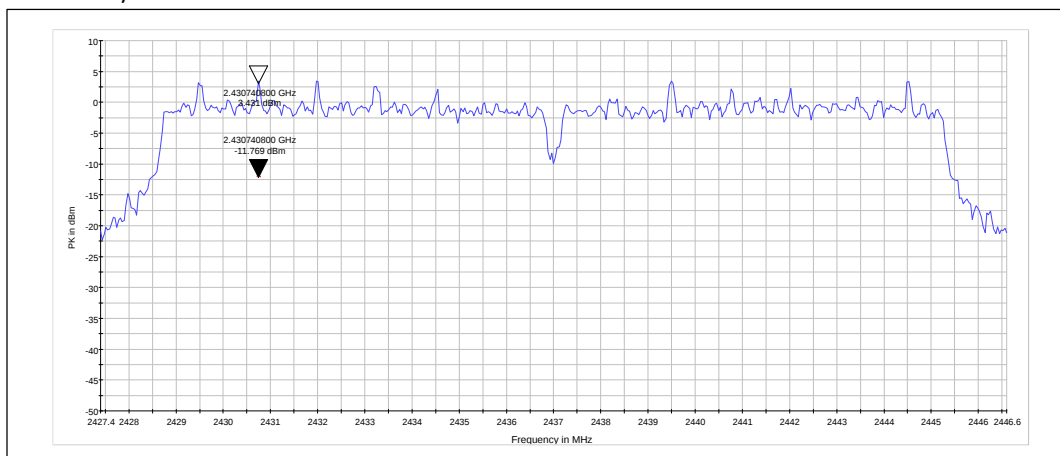
Peak (RBW: 100 kHz, VBW: 300 kHz, Max hold)

Channel / f _c [MHz]	P [dBm]	Result
1 / 2412	-11.42	PASSED
6 / 2437	-11.77	PASSED
11 / 2462	-11.62	PASSED

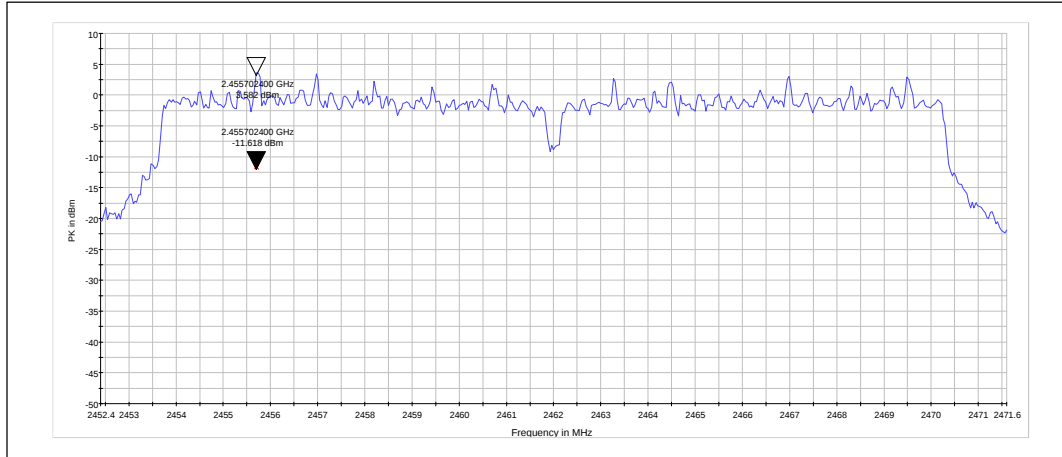
Channel 1 / 2412 MHz



Channel 6 / 2437 MHz



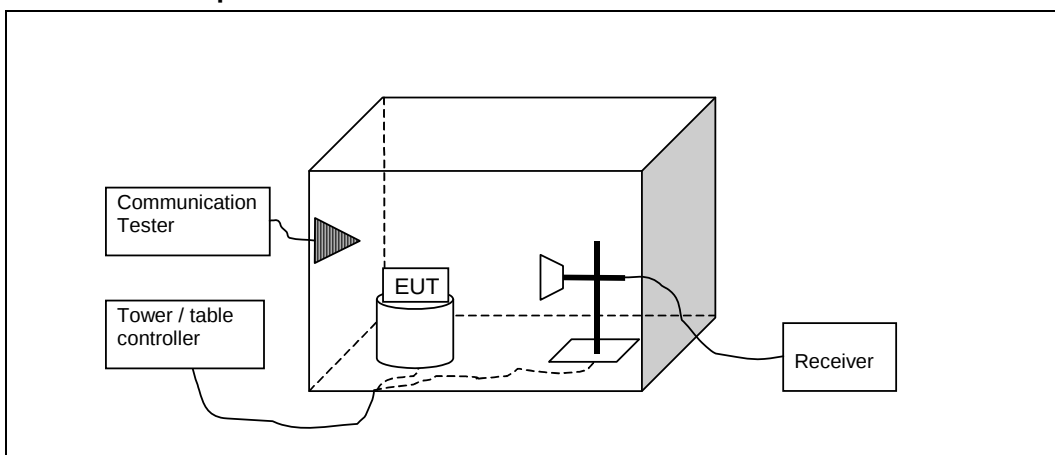
Channel 11 / 2462 MHz



6. Band edge compliance of RF emissions (FCC §15.247(d), 15.205(b), RSS-210 A8.5)

EUT with DUT number	RM-917, DUT 17234
Accessories with DUT numbers	BL-5J, DUT 17235 ; WH-108, DUT 17236 ; AC-20U, DUT 17237
Operation Voltage [V] / [Hz]	Nominal
Results	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	21 / 38
Date of measurements	28-Feb-2013
Measured by	Kalle Hannila

6.1.1 Test setup



6.2. Test method and limit

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

The measurement results are obtained as described below:

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

Where U_{RX} is receiver reading and A_{TOT} is total correction factor including cable loss, antenna factor and preamplifier gain ($A_{TOT} = L_{CABLES} + A_F - G_{PREAMP}$).

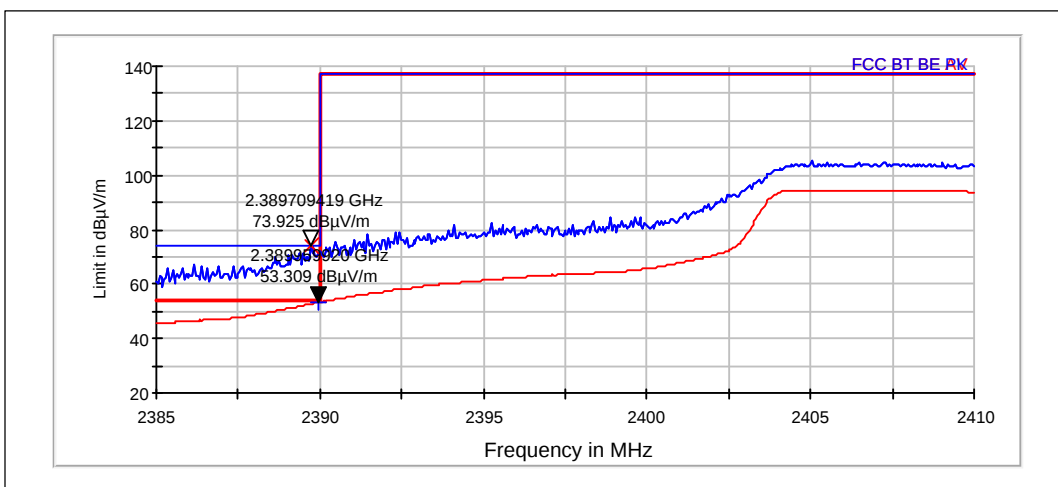
Limits for band edge compliance of RF emissions measurements (3 m measurement distance)

Frequency range [MHz]	Limit
Below 2390 and above 2483.5	54 dBuV/m (avg) and 74 dBuV/m (pk)

6.3. WLAN test results

6.3.1 802.11g, BPSK modulation, 6 Mbps data rate.

Channel 1 / 2412 MHz



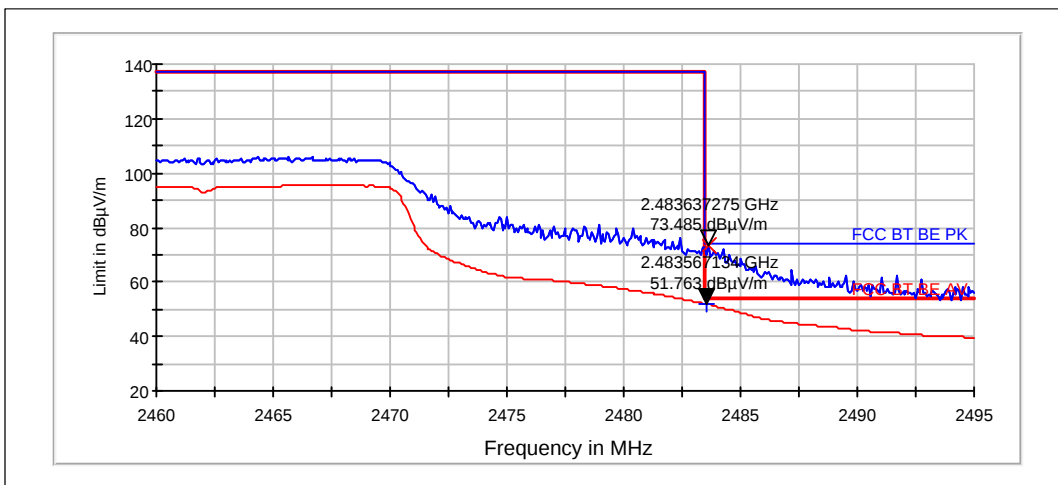
Peak (RBW: 1 MHz, VBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Correction [dB]	Results
2390	73.93	4968.783	73.47	0.46	0.46	PASSED

Average (RBW: 1 MHz, VBW: 10 Hz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Correction [dB]	Results
2390	53.31	462.86	52.85	0.46	0.46	PASSED

Channel 11 / 2462 MHz



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

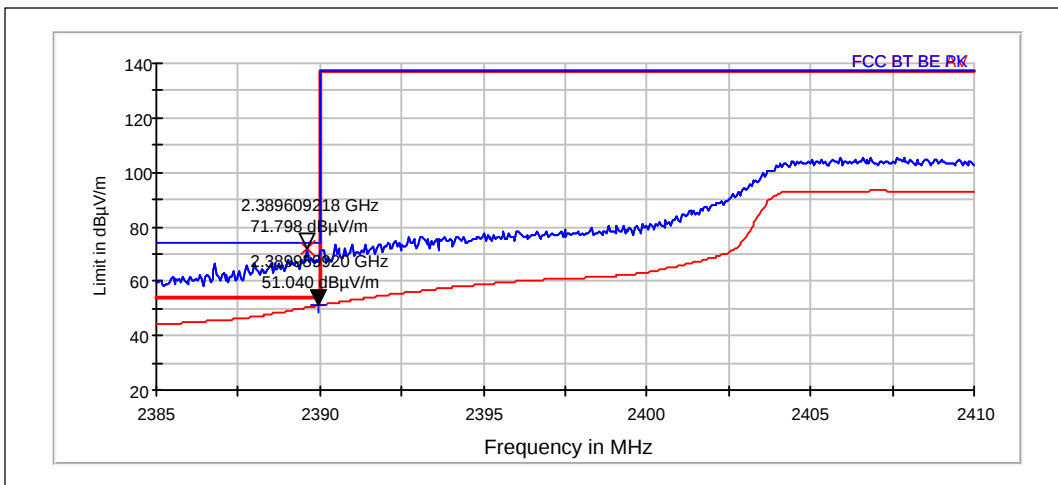
Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Correction [dB]	Results
2484	73.49	4723.349	72.9	0.6	0.595	PASSED

Average (RBW: 1 MHz, VBW: 10 Hz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Correction [dB]	Results
2484	51.76	387.391	51.17	0.6	0.595	PASSED

6.3.2 802.11g, QPSK modulation, 12 Mbps data rate.

Channel 1 / 2412 MHz



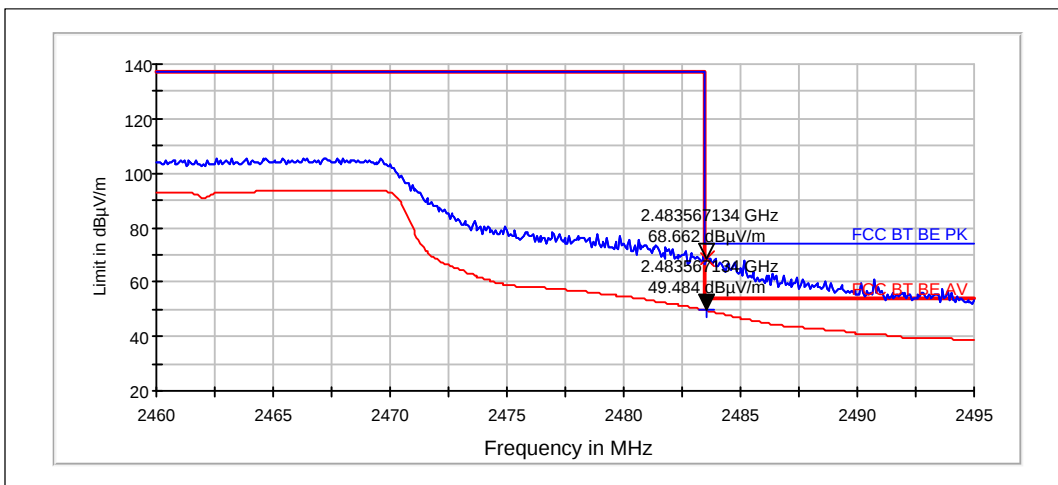
Peak (RBW: 1 MHz, VBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Correction [dB]	Results
2390	71.8	3889.556	71.34	0.46	0.46	PASSED

Average (RBW: 1 MHz, VBW: 10 Hz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Correction [dB]	Results
2390	51.04	356.451	50.58	0.46	0.46	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]	Correction [dB]	Results
2484	68.66	2710.816	68.07	0.6	0.595	PASSED

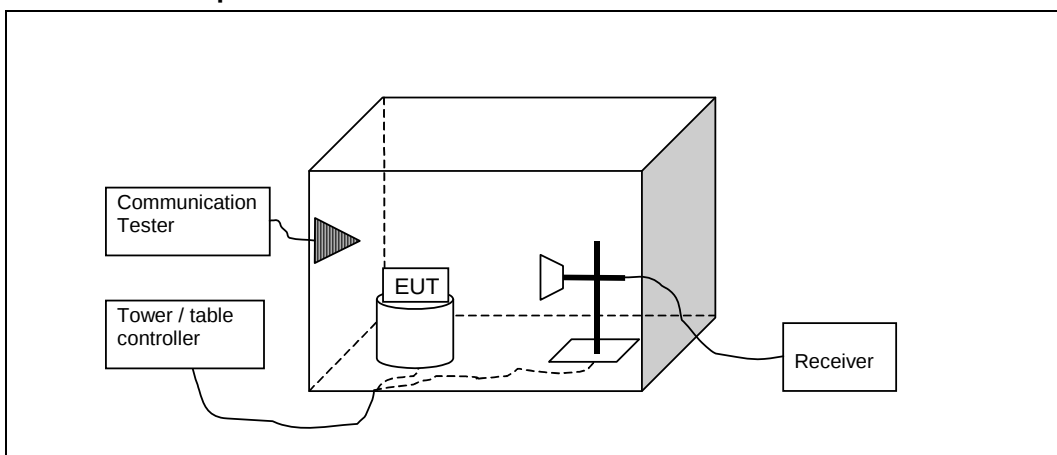
Average (RBW: 1 MHz, VBW: 10 Hz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Correction [dB]	Results
2484	49.48	297.989	48.89	0.6	0.595	PASSED

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

EUT with DUT number	RM-917, DUT 17234
Accessories with DUT numbers	BL-5J, DUT 17235 ; WH-108, DUT 17236 ; AC-20U, DUT 17237
Operation Voltage [V] / [Hz]	Nominal
Results	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	21 / 38
Date of measurements	28-Feb-2013
Measured by	Kalle Hannila

7.1.1 Test setup



7.2. 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:

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

Where U_{RX} is receiver reading and A_{TOT} is total correction factor including cable loss, antenna factor and preamplifier gain ($A_{TOT} = L_{CABLES} + A_F - G_{PREAMP}$).

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

Frequency range [MHz]	Limit [$\mu V/m$]	Limit [$dB\mu V/m$]	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

7.3. WLAN test results

7.3.1 802.11g, BPSK modulation, 6 Mbps data rate.

Channel 7 / 2442 MHz

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

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Margin	Limit [dBμV/m]	Results
2384.7	55.88	622.229	52.93	2.95	18.1	74	PASSED
4881.3	43.67	152.493	43.21	0.46	30.3	74	PASSED
7319.7	52.66	429.586	42.95	9.71	21.3	74	PASSED
10867.13	58	794.603	41.49	16.51	16	74	PASSED

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

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Margin	Limit [dBμV/m]	Results
940.673	24.71	17.207	27.1	-2.39	21.3	46	PASSED

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

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Margin	Limit [dBμV/m]	Results
2384.7	44.24	162.892	41.29	2.95	9.7	54	PASSED
4881.3	30.2	32.352	29.74	0.46	23.8	54	PASSED
7319.7	38.97	88.859	29.26	9.71	15	54	PASSED
10867.13	44.88	175.348	28.37	16.51	9.1	54	PASSED

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]	Margin	Limit [dBμV/m]	Results
4825.3	45.91	197.356	45.17	0.74	28.1	74	PASSED
7235.5	50.19	323.333	40.87	9.32	75	125	PASSED

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

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Margin	Limit [dBμV/m]	Results
4825.3	31.79	38.855	31.05	0.74	22.2	54	PASSED
7235.5	37.13	71.829	27.81	9.32	---	---	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]	Margin	Limit [dBμV/m]	Results
4924.2	44.85	174.763	44.39	0.46	29.1	74	PASSED
7385.4	51.69	384.105	41.74	9.95	22.3	74	PASSED

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

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Margin	Limit [dBμV/m]	Results
4924.2	31.74	38.632	31.28	0.46	22.2	54	PASSED
7385.4	37.61	75.91	27.66	9.95	16.4	54	PASSED

7.3.2 802.11g, QPSK modulation, 12 Mbps data rate.

Channel 7 / 2442 MHz

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

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Margin	Limit [dBμV/m]	Results
4880.5	45.23	182.579	44.78	0.46	28.8	74	PASSED
7319.7	50.58	338.182	40.87	9.71	23.4	74	PASSED
11482.265	57.32	734.598	41	16.32	16.7	74	PASSED
11673.951	57.53	752.315	41.49	16.04	16.5	74	PASSED

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

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Margin	Limit [dBμV/m]	Results
30	23.27	14.568	27.11	-3.84	16.7	40	PASSED

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

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Margin	Limit [dBμV/m]	Results
4880.5	31.13	36.004	30.68	0.46	22.9	54	PASSED
7319.7	37.47	74.757	27.76	9.71	16.5	54	PASSED
11482.265	44.53	168.481	28.21	16.32	9.4	54	PASSED
11673.951	44.72	172.088	28.68	16.04	9.3	54	PASSED

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]	Margin	Limit [dBμV/m]	Results
4822.6	43.46	148.919	42.71	0.75	30.5	74	PASSED
7234.4	50.58	338.182	41.24	9.34	74.6	125	PASSED

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

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Margin	Limit [dBμV/m]	Results
4822.6	30.05	31.802	29.3	0.75	23.9	54	PASSED

7234.4	37.03	71.015	27.69	9.34	---	---	PASSED
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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]	Margin	Limit [dBμV/m]	Results
4924	45.11	180.011	44.65	0.46	28.9	74	PASSED
7386.4	50.58	337.987	40.63	9.96	23.4	74	PASSED

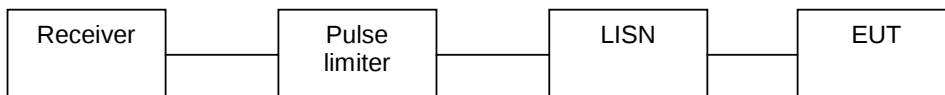
Average (RBW: 1 MHz, VBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Margin	Limit [dBμV/m]	Results
4924	31.91	39.396	31.45	0.46	22.1	54	PASSED
7386.4	37.56	75.501	27.61	9.96	16.4	54	PASSED

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

EUT with DUT number	RM-917, DUT 17234
Accessories with DUT numbers	BL-5J, DUT 17235 ; WH-108, DUT 17236 ; AC-20U, DUT 17237
Operation Voltage [V] / [Hz]	115 / 60
Results	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	20 / 35 / 102
Date of measurements	14-Feb-2013
Measured by	Tomi Lipponen

8.1. Test Setup



8.2. Test method and limit

The measurement is made according to procedure KDB 558074 D01 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.

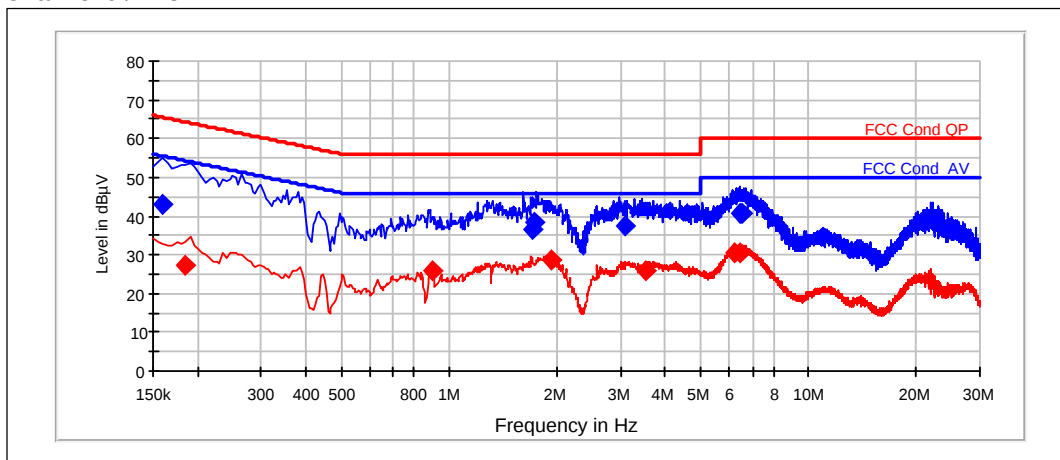
CISPR 22 Class B limits

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

8.3. WLAN Test results

8.3.1 DSSS mode, BPSK modulation, 1 Mbps data rate

Channel 6 / 2437 MHz



QuasiPeak (RBW: 9 kHz)

Frequency [MHz]	U [dBμV]	Line	Result
0.16	42.98	L1	PASSED
1.705	36.51	L1	PASSED
1.725	38.55	L1	PASSED
3.075	37.38	L1	PASSED
6.43	40.53	L1	PASSED
6.53	40.57	L1	PASSED

Average (RBW: 9 kHz)

Frequency [MHz]	U [dBμV]	Line	Result
0.185	27.17	L1	PASSED
0.895	26.1	L1	PASSED
1.925	28.84	L1	PASSED
3.53	25.79	L1	PASSED
6.235	30.62	L1	PASSED
6.47	30.73	L1	PASSED

9. Test Equipment

9.1. Conducted measurements

Eq. No	Equipment	Type	Manufacturer	Used in
6038	Data Logger	Testo 580	Testo	-
-	BT / WLAN Antenna	SPA 2400/75/9/0/V	Huber-Suhner	-
-	BT / WLAN Antenna	SPA 2400/75/9/0/V	Huber-Suhner	-
2389	Signal Generator	SMJ 100A	R&S	-
6009	GPS Antenna	SA-700	Chronos	-
6010	GPS Network amplifier	NLA20FPDC	GPS Networking, Inc	-
6011	GPS signal Splitter	LDCBS1x4	GPS Networking, Inc	-
6015	Receiver	ESI	R&S	-
2059	V-network	ESH3-Z6	R&S	-
6044	V-network	ESH3-Z6	R&S	-
1759	LISN 50 µH	ESH3-Z5	R&S	-
2390	Directional Coupler	DC2600	AR	-
1916	Communication Tester	CMTA84	R&S	-
6012	CDN	CDN USB/c	Teseq	-
2388	Bluetooth Tester	CBT	R&S	-
6046	Attenuator 10dB	8493C	Agilent	-
6047	Attenuator 20dB	8493C	Agilent	-
6036	Data Logger	175-H2	Testo	-
6045	Power splitter	11667B	Agilent	-
6039	USB Interface	5541765	Testo	-
10479	Communication Tester	CMW500	R&S	-
6094	Communication Tester	CMW500	R&S	-
6096	EMC Analyzer	E7405A	HP	-
6098	Signal Generator	8648C	Agilent	-
6103	Bluetooth tester	CBT	R&S	-
6113	Signal Generator	SMF100A	R&S	-
6120	Thermal Chamber	WT 20/40	Weiss	-
6121	Power Splitter	HP11667B	Agilent	-
6122	Power Splitter	HP11667B	Agilent	-
6134	Attenuator 10dB	BW-S10-2W263+	Mini-Circuits	-
6136	Attenuator 20dB	BW-S20-2W263+	Mini-Circuits	-
2359	Temperature Test Chamber	VT4002	Vötsch	-
2347	Communication Tester	CMU200	R&S	-
2180	Communication Tester	CMU200	R&S	-
2156	Communication Tester	CMU200	R&S	-
1999	Receiver	ESIB26	R&S	-
2352	Spectrum Analyzer	FSP-30	R&S	-
2097	Pulse Limiter	ESH3-Z2	R&S	-
2039	Power Supply	PL330QMD	Thurlby	-
1992	Signal Generator	83630B	Agilent	-
2206	Signal Generator	SMX	R&S	-

9.2. Radiated measurements

Eq. No	Equipment	Type	Manufacturer	Used in
2391	Band Reject Filter	WRCG1729.4/1735.4-1722.4/1742.4-40/6SS	Wainwright	27
6038	Data Logger	Testo 580	Testo	-
6014	Substitute Calibration Cable	Sucoflex 104PB	Suhner	-
-	BT / WLAN Antenna	SPA 2400/75/9/0/V	Huber-Suhner	-
-	BT / WLAN Antenna	SPA 2400/75/9/0/V	Huber-Suhner	-
2389	Signal Generator	SMJ 100A	R&S	-
6009	GPS Antenna	SA-700	Chronos	-

Eq. No	Equipment	Type	Manufacturer	Used in
6010	GPS Network amplifier	NLA20FPDC	GPS Networking, Inc	-
6011	GPS signal Splitter	LDCBS1x4	GPS Networking, Inc	-
-	RF immunity / Emission Software	EMC32	R&S	-
1917	Communication Tester	CMTA84	R&S	-
2388	Bluetooth Tester	CBT	R&S	-
6037	Data Logger	175-H2	Testo	-
6039	USB Interface	5541765	Testo	-
6087	Antenna	BBHA 9120D	Scharzbeck	-
6088	Antenna	VUBA 9117	Scharzbeck	-
6089	Antenna	HFH2-Z2	R&S	-
10479	Communication Tester	CMW500	R&S	-
6094	Communication Tester	CMW500	R&S	-
6103	Bluetooth tester	CBT	R&S	-
6113	Signal Generator	SMF100A	R&S	-
6115	Open switch and control unit	OSP 130	R&S	-
6116	Open switch and control unit	OSP 150	R&S	-
6130	Notch Filter	WRCD1880-1.1.25/50-10SS	Wainwright	-
6131	Notch Filter	WRCT902.4-0.4/40-8SS	Wainwright	-
6135	Notch Filter	WRCJV2531/2539-2523/2547-60/12SS	Wainwright	-
2140	Antenna	EMCO93110B	EMCO	-
2142	Antenna	3146	EMCO	-
2357	Band Reject Filter	WRCG2400/2483-2390/2493-35/10SS	Wainwright	-
2364	Band Reject Filter	WRCG1877/1883 - 1870/1890-40/6SS	Wainwright	24
2043	Band Reject Filter	WRCA824/849-0,2-6SS	Wainwright	22
2347	Communication Tester	CMU200	R&S	-
2180	Communication Tester	CMU200	R&S	-
2156	Communication Tester	CMU200	R&S	-
2176	CDN	CDN 801-M3	Lüthi	-
2027	CDN	M2 (modified) DC1	MEB	-
2028	CDN	M3 (modified) DC2	MEB	-
1984	Antenna	BBHA 9120 D	Schwarzbeck	-
6017	Antenna	SBA 9113	Schwarzbeck	-
2009	Signal Generator	SMP 22	R&S	-
2029	Power Supply	PL330	Thurlby	-
2361	Anechoic Chamber	3 m Semi / Full Anechoic Chamber	Euroshield	-
2353	Receiver	ESIB26	R&S	-
2135	CDN	CDN 801-M3	Lüthi	-