

FCC Part 15C Compliance Test Report

Test Report no.:	FCC15C_RM-707_18.docx	Date of Report:	25-Feb-2011
Number of pages:	32	Customer's Contact person:	Griffin Bill
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 12278 Scripps Summit Drive SAN DIEGO CA. 92131 USA Tel. +1 858 831 5000 Fax. +1 858 831 6500
FCC listing no.:	94436		
IC recognition no.:	661AK-1		
Tested devices/ accessories:	Phone RM-707 / AC charger AC-10U / Headset WH-701 / Data cable CA-101		
FCC ID:	QMNRM-707	IC:	661X-RM707
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 3, December 2010) and RSS-210 (Issue 8, December 2010). 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:			

Hannu Söderholm, Senior Engineer, EMC

1. Summary for FCC Part 15C Compliance Test Report

Date of receipt	14-Jan-2011
Testing completed	21-Jan-2011
The customer's contact person	Griffin Bill
Test Plan referred to	T:\Projects\RM-707\TestPlan\RS_testplan_RM-707.xls
Notes	-
Document name	FCC15C_RM-707_18.docx

1.1. EUT and Accessory Information

The EUT is a 9-band (GSM850/900/1800/1900 and WCDMA Band I/II(1900)/IV(1700)/V(850)/VIII) mobile phone with GPRS, EGPRS, Bluetooth and WLAN. Bluetooth and WLAN are tested with maximum rated TX power.

Product	Type	SN	HW	MV	SW	DUT
Phone	RM-707	004402134051030	0100	-	020.027	42471
Phone	RM-707	004402134050636	0100	-	020.027	42465
AC charger	AC-10U	3997910023090100786;0675474	-	-	-	42466
Data cable	CA-101	07306348391T1249258	-	-	-	42467
Headset	WH-701	069482302751A600081	-	-	-	42468

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)	A8.4 (4)	Conducted peak output power	PASSED
15.247(d)	A8.5	Band edge compliance of RF emissions	NP
15.247(d)	A8.5	Spurious RF conducted emissions	PASSED
15.247(d), 15.209	A8.5	Spurious radiated emissions	NP
15.207	7.2.2	AC powerline conducted emissions	PASSED
15.247(a)(2)	A8.2 (a)	6 dB bandwidth	PASSED
15.247(e)	A8.2 (b)	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.

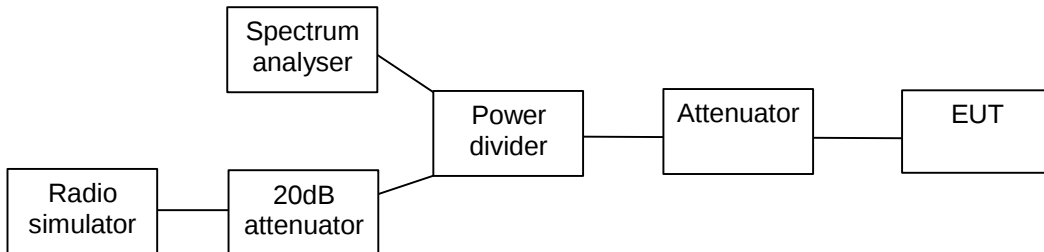
The test was not performed by the TCC Nokia Tampere Laboratory.

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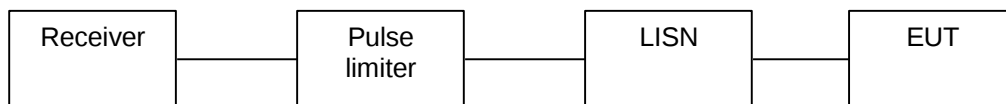
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2. Test setups

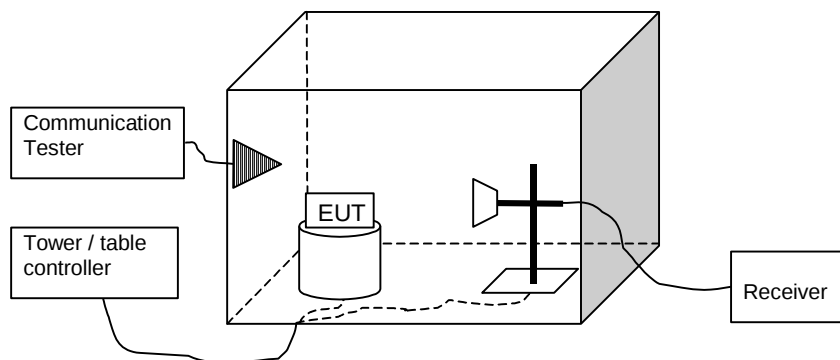
2.1. Conducted RF test setup



2.2. AC powerline conducted emissions test setup



2.3. Radiated test setup



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

EUT with DUT number	RM-707 DUT42471
Accessories with DUT numbers	-
Operation Voltage [V] / [Hz]	Nominal
Result	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	23 / 60 / 101.5
Date of measurements	11-Feb-2011
Measured by	Hannu Söderholm

3.1. 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

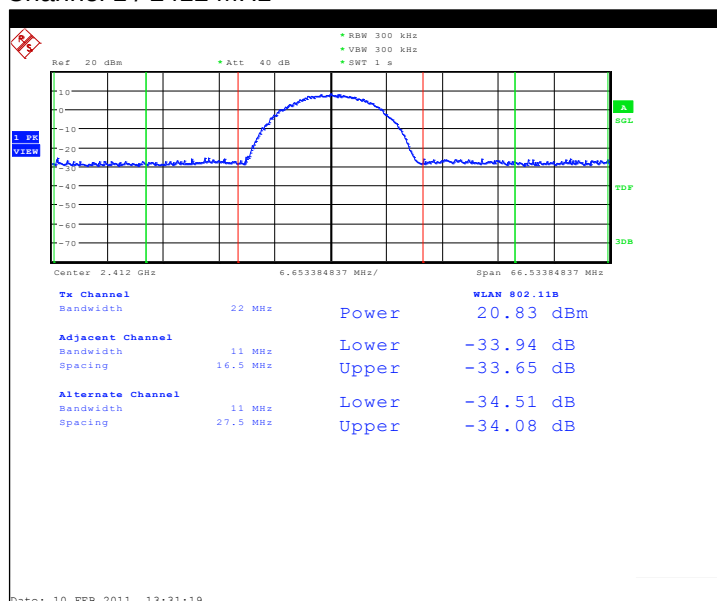
Frequency range [MHz]	Limit [W]	Limit [dBm]
2400 – 2483.5	≤ 1	≤ 30

3.2. WLAN Test results

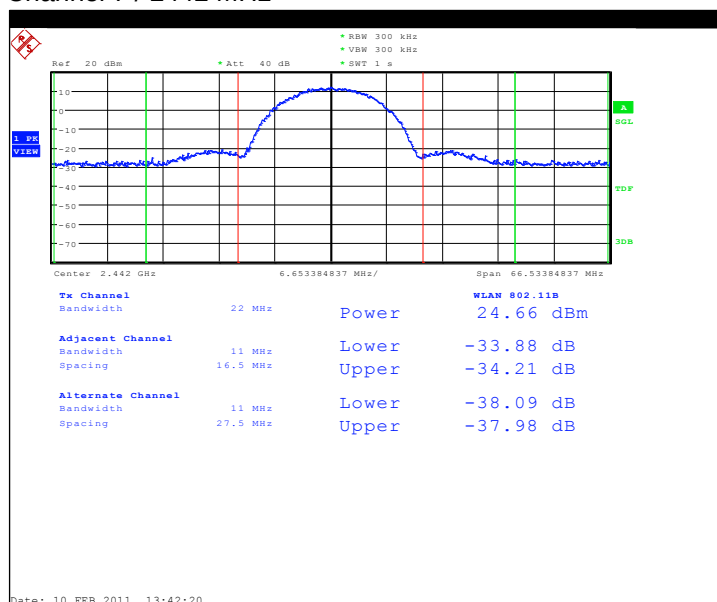
3.2.1 DSSS mode, QPSK modulation, 11 Mbps data rate

Channel / f _c [MHz]	P [dBm]	P [W]	Result
1 / 2412	20.83	0.121	PASSED
7 / 2442	24.66	0.292	PASSED
11 / 2462	20.69	0.117	PASSED

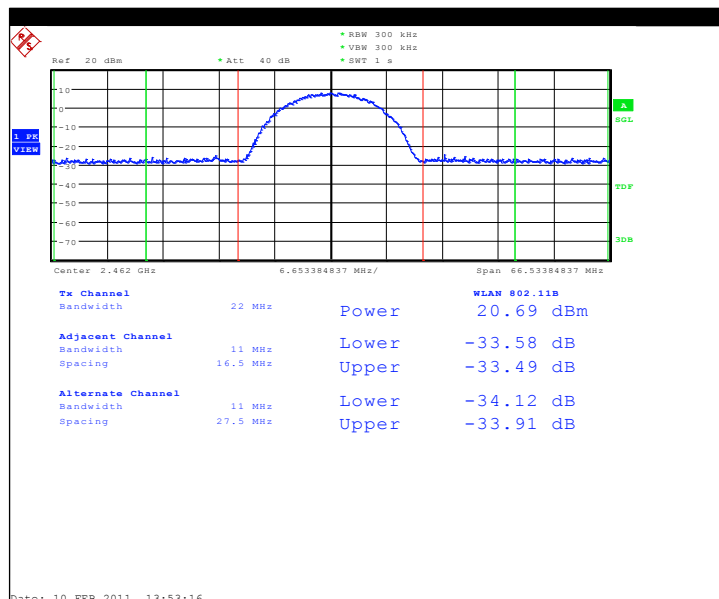
Channel 1 / 2412 MHz



Channel 7 / 2442 MHz



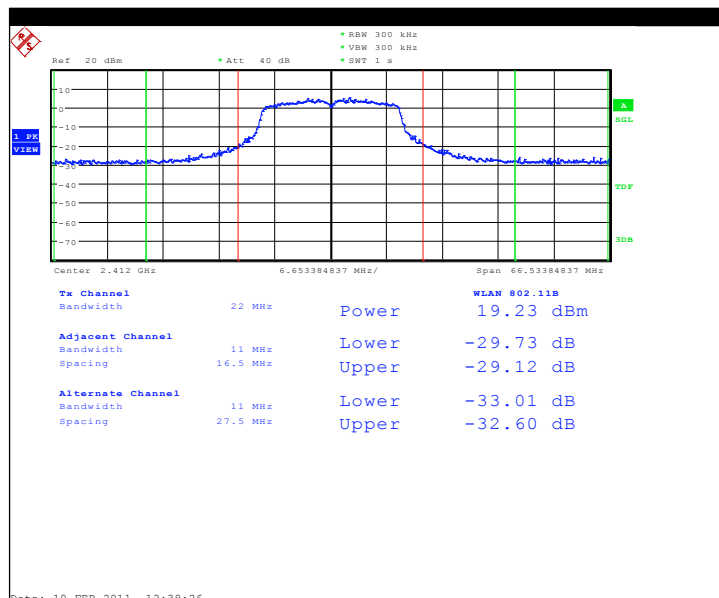
Channel 11 / 2462 MHz



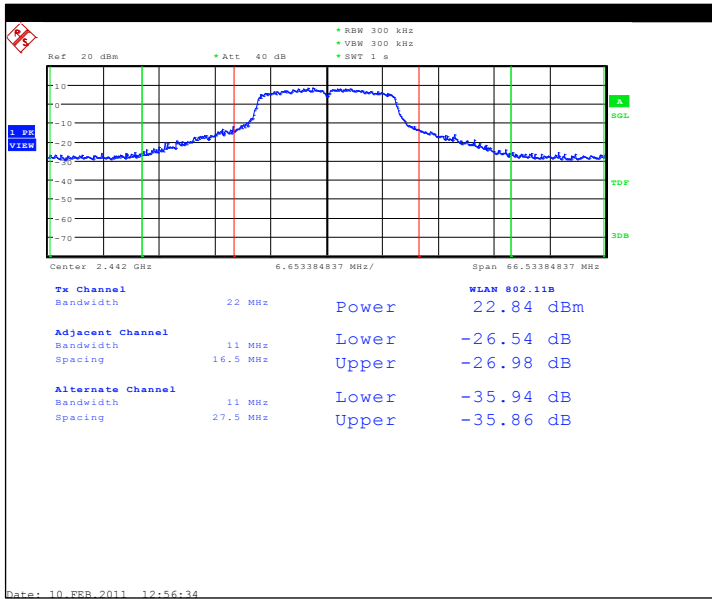
3.2.2 OFDM mode, BPSK modulation, 6 Mbps data rate

Channel / f _c [MHz]	P [dBm]	P [W]	Result
1 / 2412	19.23	0.084	PASSED
7 / 2442	22.84	0.192	PASSED
11 / 2462	19.19	0.083	PASSED

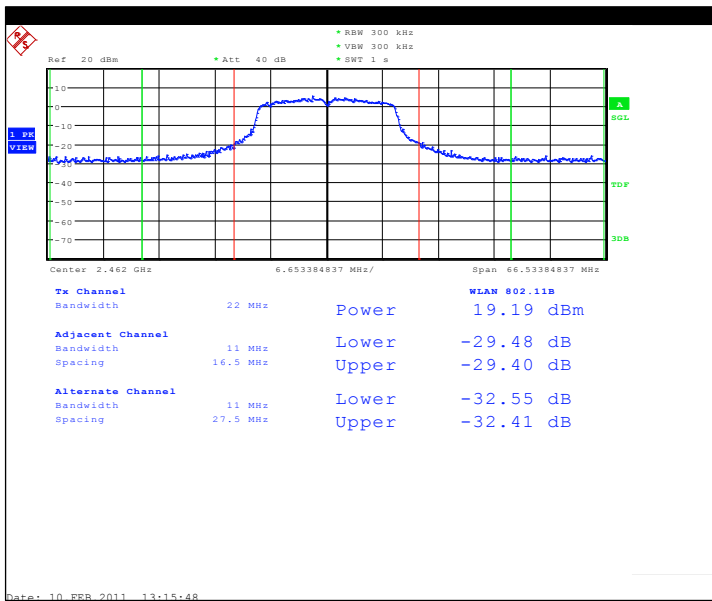
Channel 1 / 2412 MHz



Channel 7 / 2442 MHz



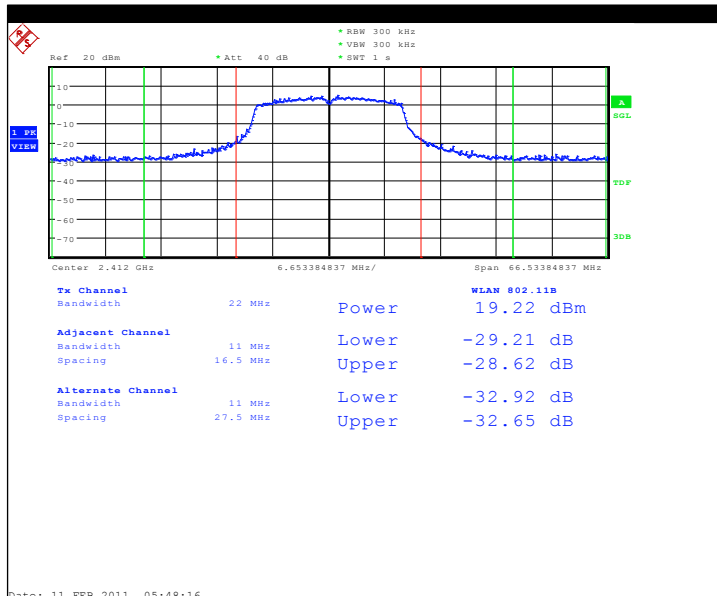
Channel 11 / 2462 MHz



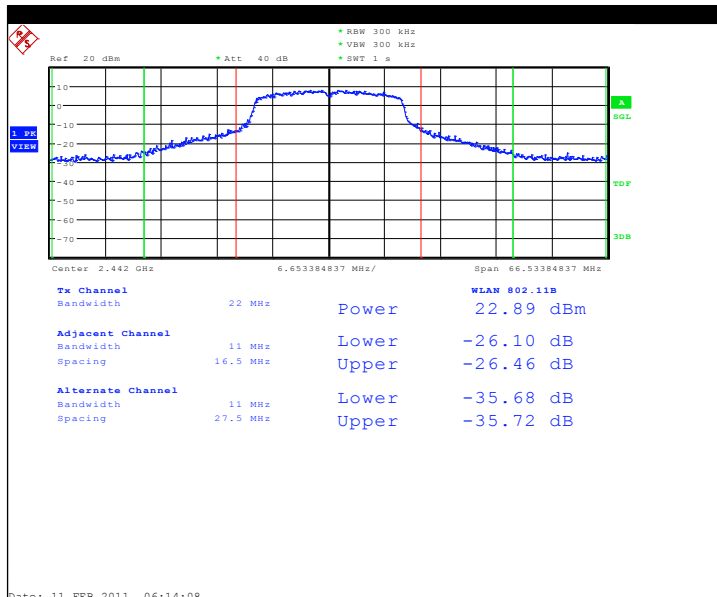
3.2.3 802.11n HT20 MCS 0

Channel / f_c [MHz]	P [dBm]	P [W]	Result
1 / 2412	19.22	0.084	PASSED
7 / 2442	22.89	0.195	PASSED
11 / 2462	19.17	0.083	PASSED

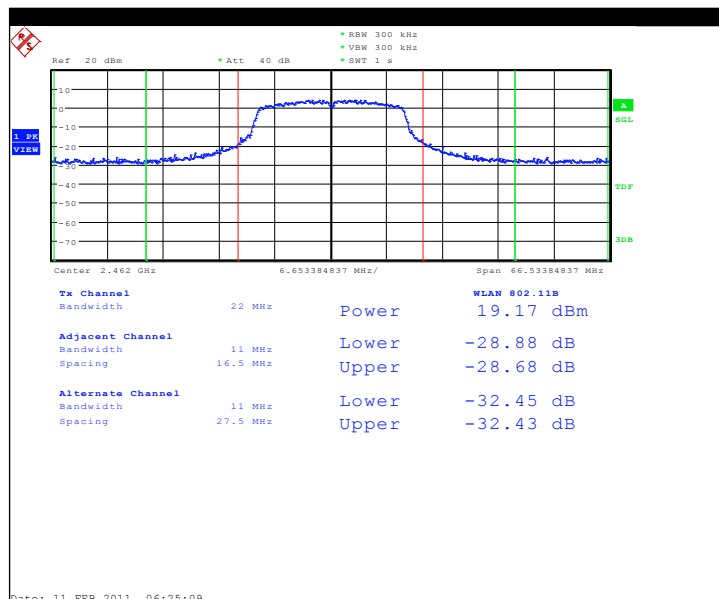
Channel 1 / 2412 MHz



Channel 7 / 2442 MHz



Channel 11 / 2462 MHz



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

EUT with DUT number	RM-707 DUT42471
Accessories with DUT numbers	-
Operation Voltage [V] / [Hz]	Nominal
Result	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	23 / 60 / 101.5
Date of measurements	11-Feb-2011
Measured by	Hannu Söderholm

4.1. Test method and limit

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

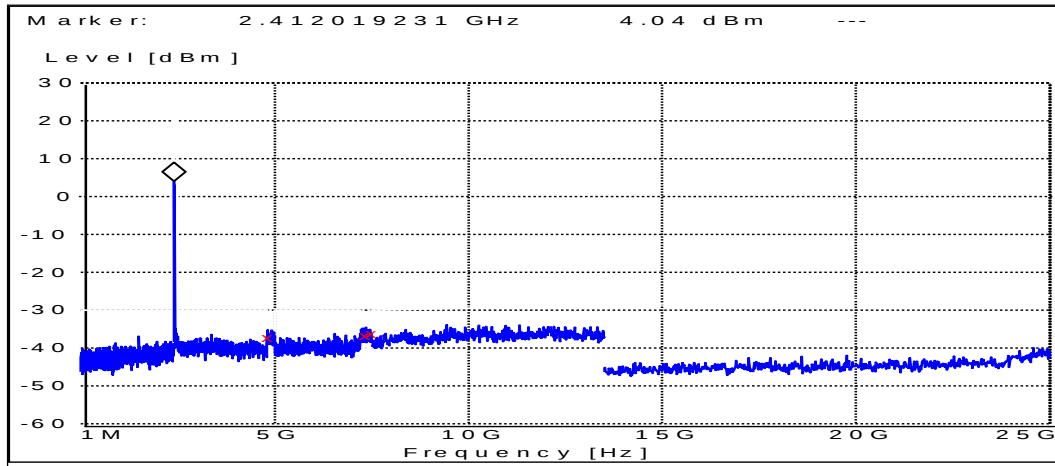
Limits for spurious RF conducted emissions measurements

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

4.2. WLAN Test results

4.2.1 DSSS mode, QPSK modulation, 11 Mbps data rate

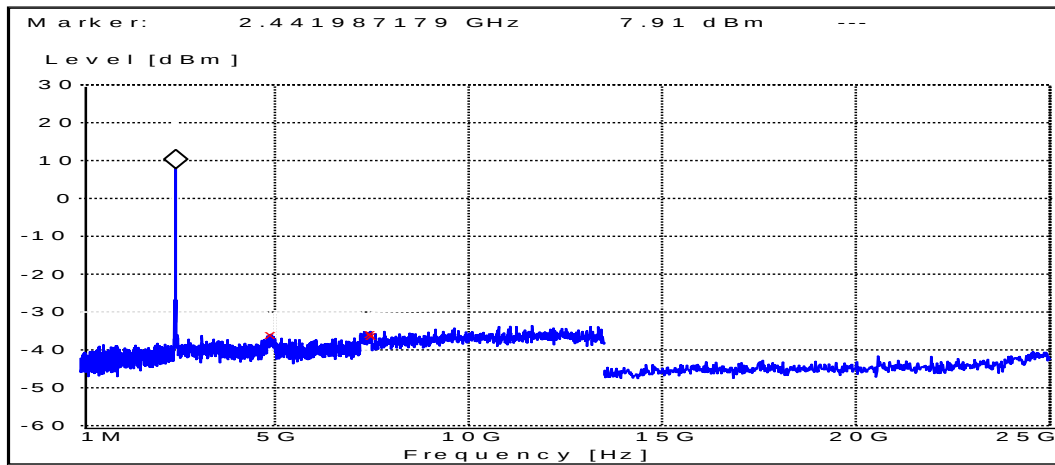
Channel 1 / 2412 MHz



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

Frequency [MHz]	P [dBc]	Result
4826.602564	-41.240146	PASSED
7358.653846	-40.740146	PASSED
7500.000000	-40.340146	PASSED

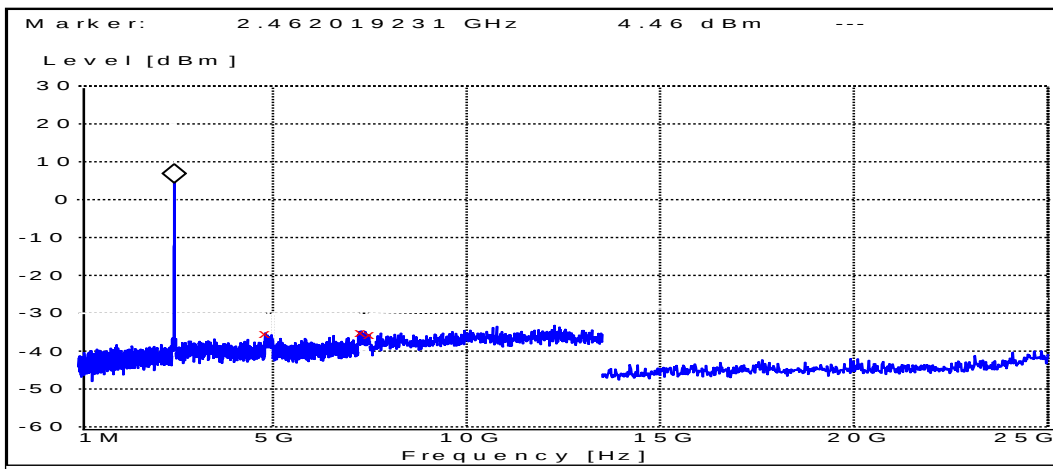
Channel 7 / 2442 MHz



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

Frequency [MHz]	P [dBc]	Result
4912.500000	-44.010135	PASSED
7472.115385	-43.510135	PASSED
7500.000000	-44.110135	PASSED

Channel 11 / 2462 MHz

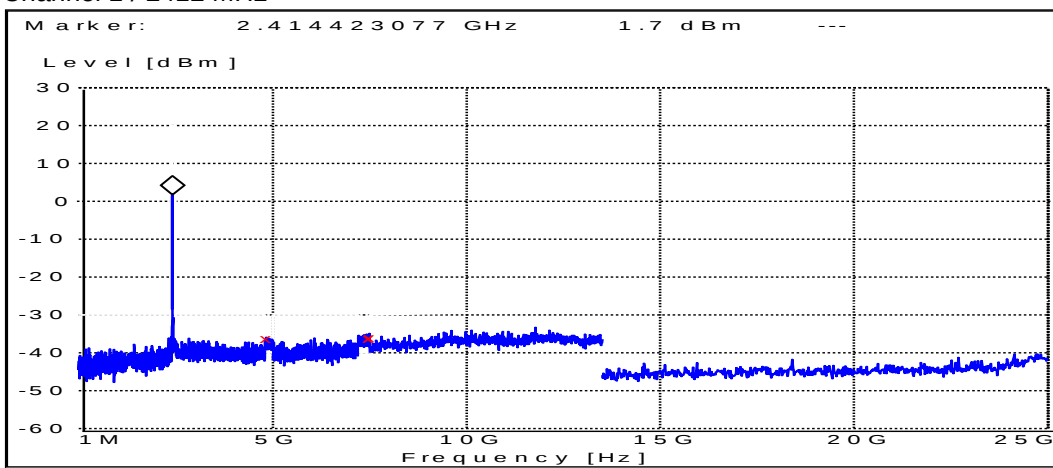


Peak (RBW: 100 kHz, VBW: 100 kHz)

Frequency [MHz]	P [dBc]	Result
4809.615385	-39.955559	PASSED
7285.576923	-39.655559	PASSED
7500.000000	-40.255559	PASSED

4.2.2 OFDM mode, BPSK modulation, 6 Mbps data rate

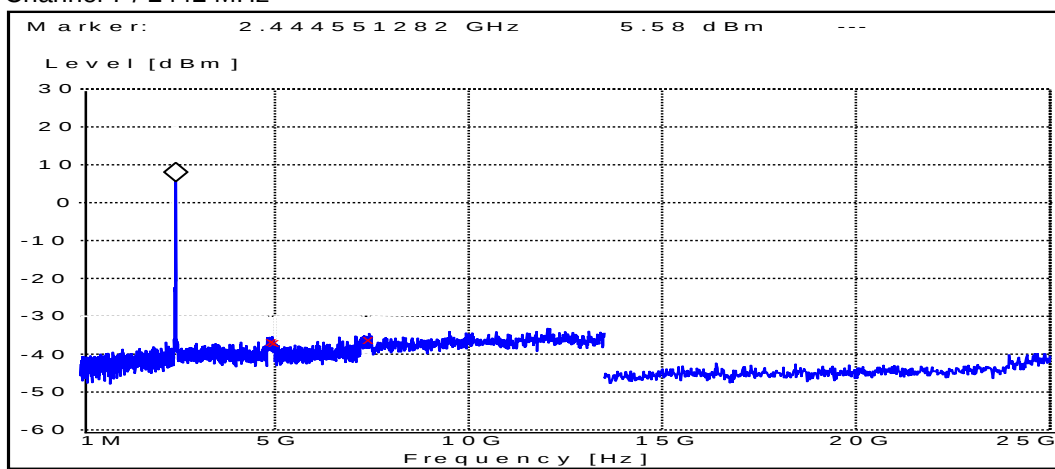
Channel 1 / 2412 MHz



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

Frequency [MHz]	P [dBc]	Result
4833.974359	-38.103173	PASSED
7487.500000	-37.903173	PASSED
7500.000000	-37.803173	PASSED

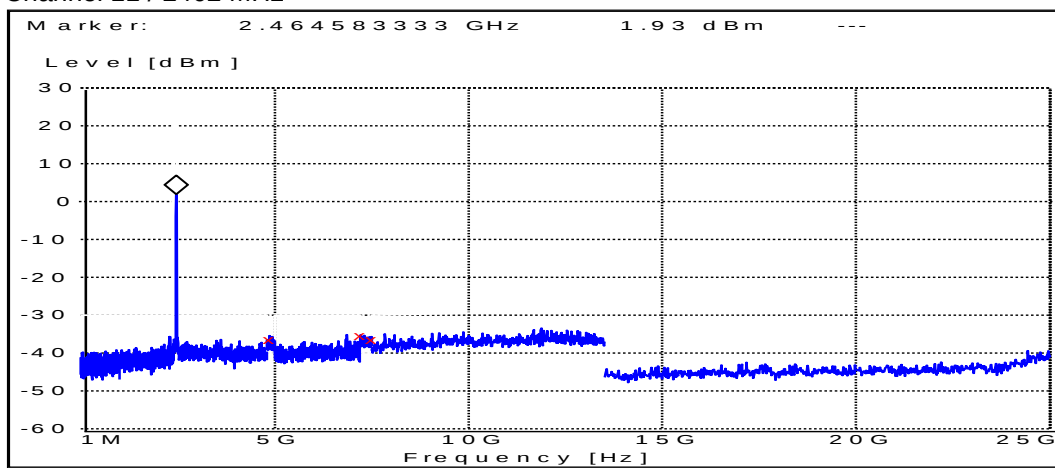
Channel 7 / 2442 MHz



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

Frequency [MHz]	P [dBc]	Result
4940.064103	-42.383906	PASSED
5000.000000	-42.583906	PASSED
7441.346154	-41.883906	PASSED

Channel 11 / 2462 MHz

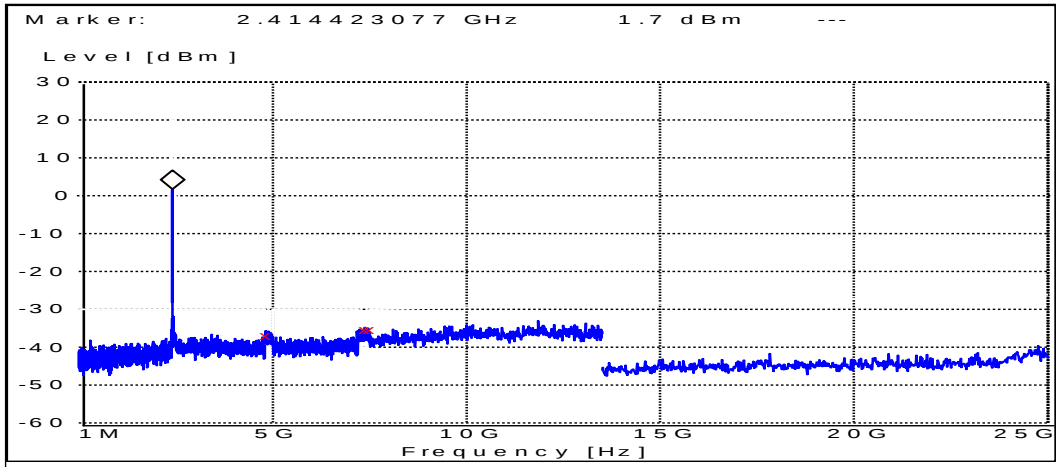


Peak (RBW: 100 kHz, VBW: 100 kHz)

Frequency [MHz]	P [dBc]	Result
4861.858974	-38.425003	PASSED
7221.153846	-37.325003	PASSED
7500.000000	-38.425003	PASSED

4.2.3 802.11n HT20 MCS 0

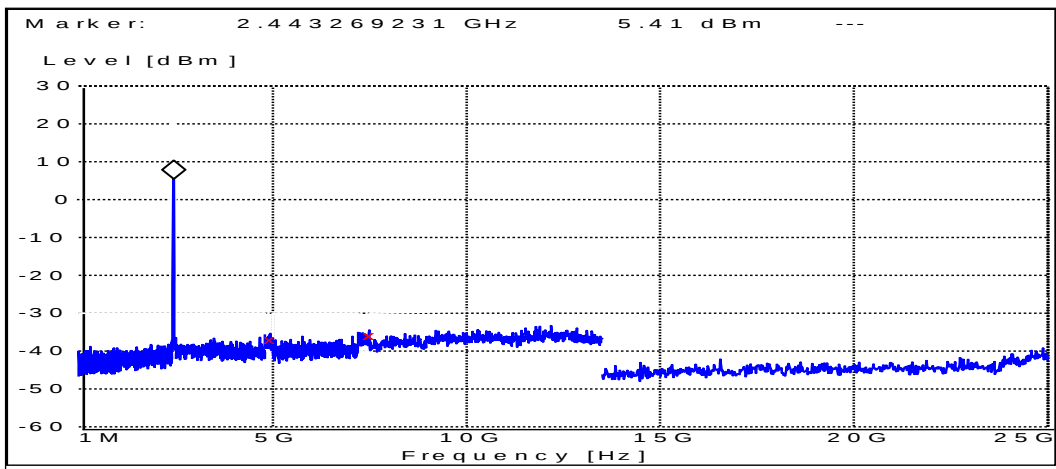
Channel 1 / 2412 MHz



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

Frequency [MHz]	P [dBc]	Result
4831.730769	-38.697939	PASSED
7382.692308	-36.997939	PASSED
7500.000000	-37.097939	PASSED

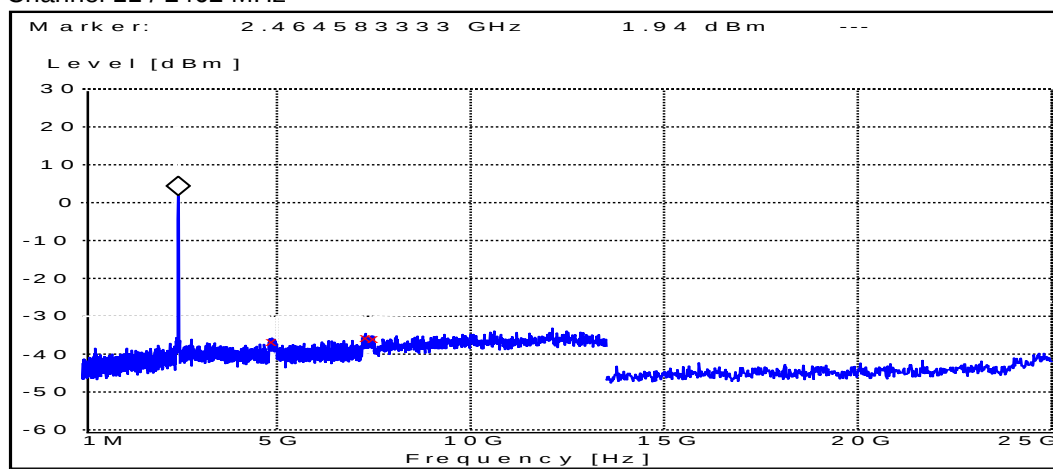
Channel 7 / 2442 MHz



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

Frequency [MHz]	P [dBc]	Result
4940.384615	-42.508034	PASSED
7496.153846	-41.308034	PASSED
7500.000000	-41.308034	PASSED

Channel 11 / 2462 MHz



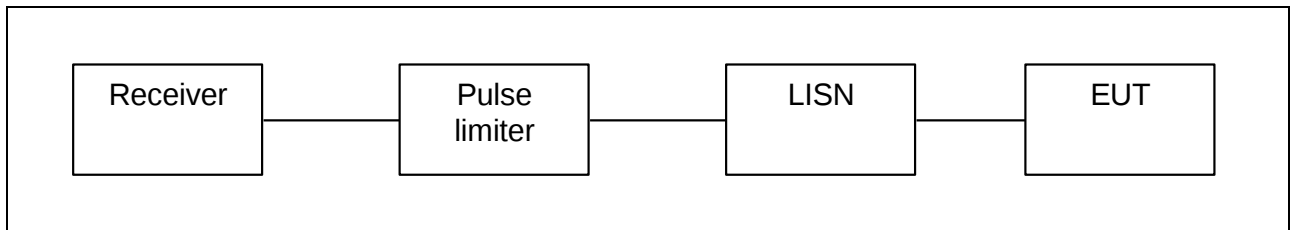
Peak (RBW: 100 kHz, VBW: 100 kHz)

Frequency [MHz]	P [dBc]	Result
4887.179487	-38.641307	PASSED
7300.000000	-37.541307	PASSED
7500.000000	-37.941307	PASSED

5. AC powerline conducted emissions (FCC §15.207, ICES-003 section 5.3)

EUT with DUT number	RM-707 DUT 42465
Accessories with DUT numbers	AC-10U DUT 42466, CA-101 DUT 42467, WH-701 DUT 42468
Operation Voltage [V] / [Hz]	115 / 60
Results	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	20 / 50 / 101.7
Date of measurements	21-Feb-2011
Measured by	Jari Jantunen

5.1.1 Test Setup



5.2. Test method and limit

The measurement is made according to ANSI C63.4-2003 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:

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

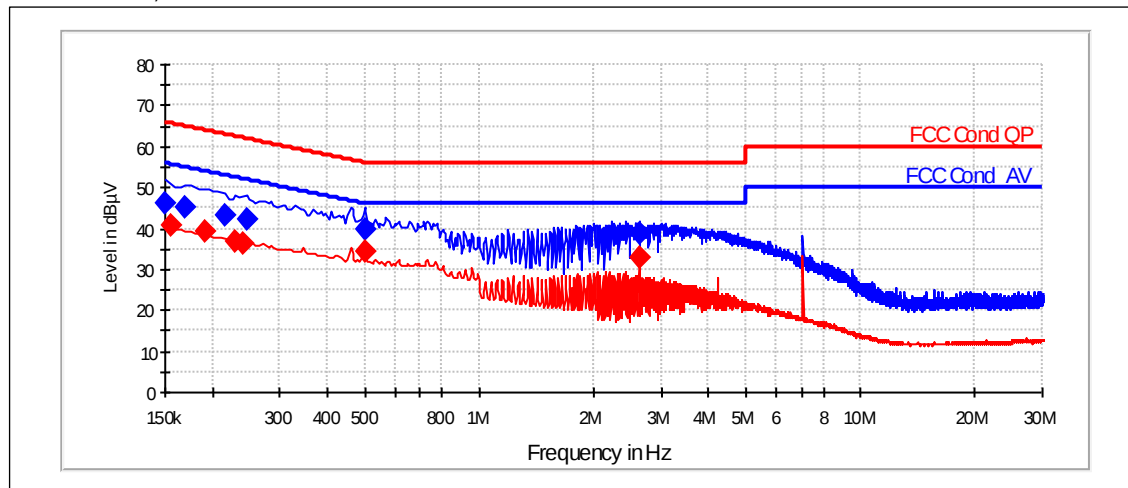
Where U_{RX} is receiver reading and A_{TOT} is total correction factor including cable and pulse limiter attenuations.

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

5.2.1 WLAN Test Results

DSSS mode, channel 7 / 2442 MHz



Quasi peak

Frequency [MHz]	U [dBμV]	IF-BW[kHz]	Line	Margin	Result
0.15	46.29	10	N	19.7	PASSED
0.17	44.95	10	N	20.06	PASSED
0.215	42.95	10	N	20.01	PASSED
0.245	41.97	10	L1	19.92	PASSED
0.5	39.99	10	L1	16	PASSED
2.645	38.6	10	L1	17.4	PASSED

Average

Frequency [MHz]	U [dBμV]	IF-BW[kHz]	Line	Margin	Result
0.155	40.9	10	L1	14.83	PASSED
0.19	39.07	10	N	14.94	PASSED
0.23	36.95	10	N	15.45	PASSED
0.24	36.54	10	N	15.6	PASSED
0.5	34.55	10	L1	11.5	PASSED
2.625	33.1	10	N	12.9	PASSED

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

EUT with DUT number	RM-707 DUT42471
Accessories with DUT numbers	-
Operation Voltage [V] / [Hz]	Nominal
Result	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	23 / 60 / 101.5
Date of measurements	11-Feb-2011
Measured by	Hannu Söderholm

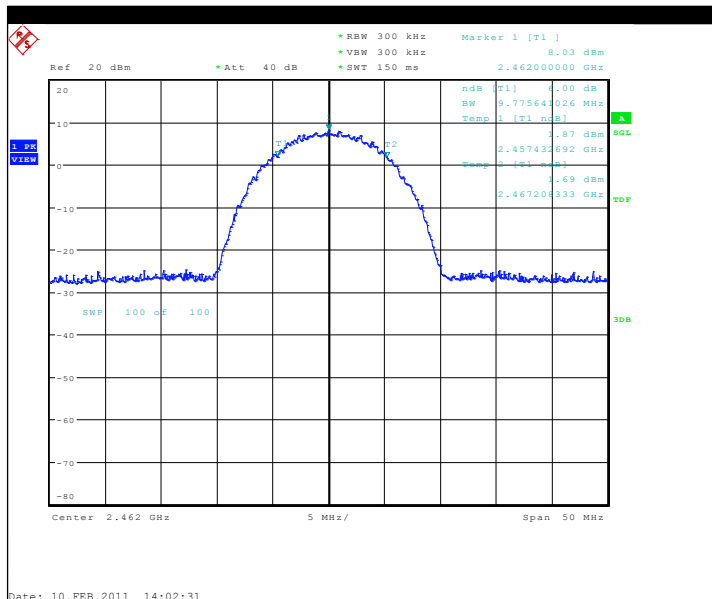
6.1. Test method and limit

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

Limits for 6 dB bandwidth measurements

Limit [kHz]
≥ 500

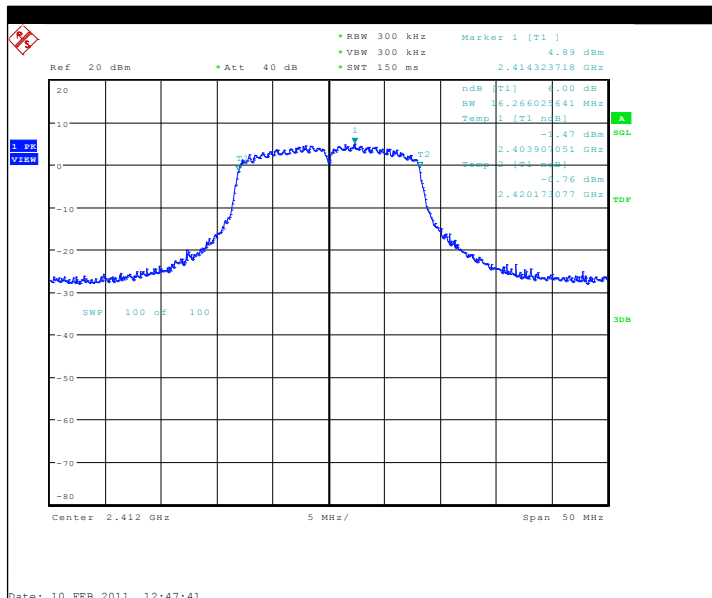
Channel 11 / 2462 MHz



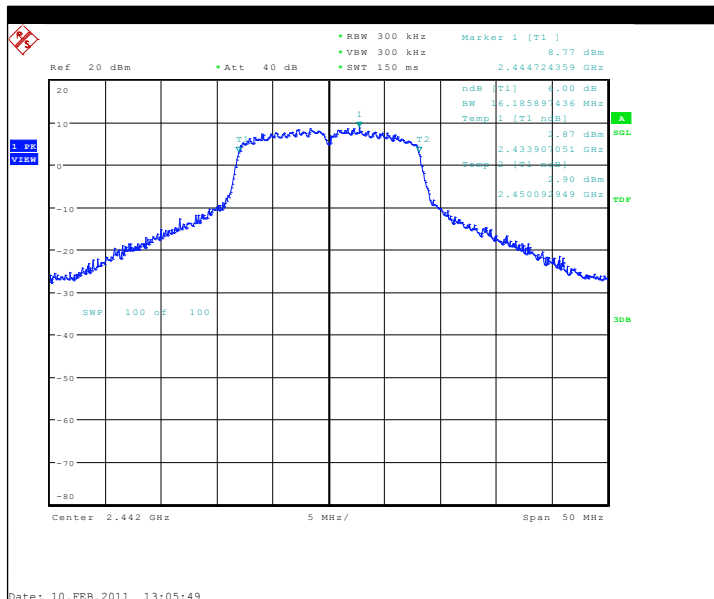
6.2.2 OFDM mode, BPSK modulation, 6 Mbps data rate

Channel / f _c [MHz]	6 dB bandwidth [kHz]	Result
1	16266.026	PASSED
7	16185.897	PASSED
11	16266.026	PASSED

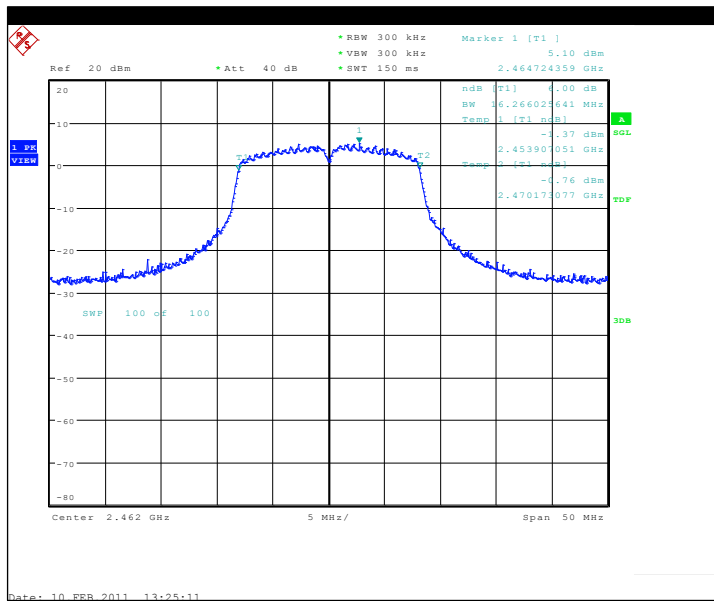
Channel 1 / 2412 MHz



Channel 7 / 2442 MHz



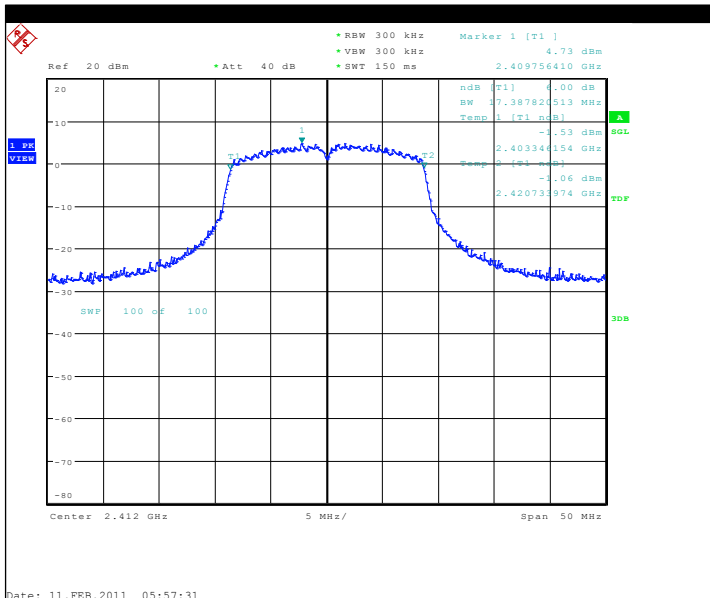
Channel 11 / 2462 MHz



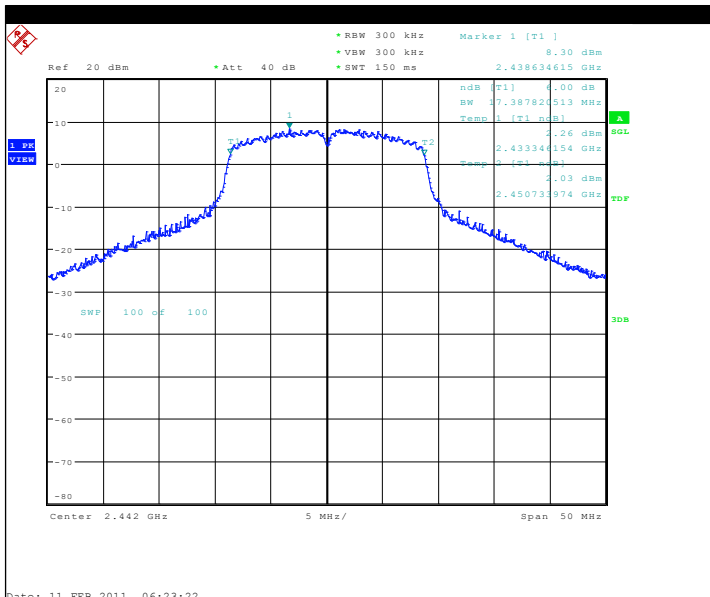
6.2.3 802.11n HT20 MCS 0

Channel / f_c [MHz]	6 dB bandwidth [kHz]	Result
1	17387.821	PASSED
7	17387.821	PASSED
11	17387.821	PASSED

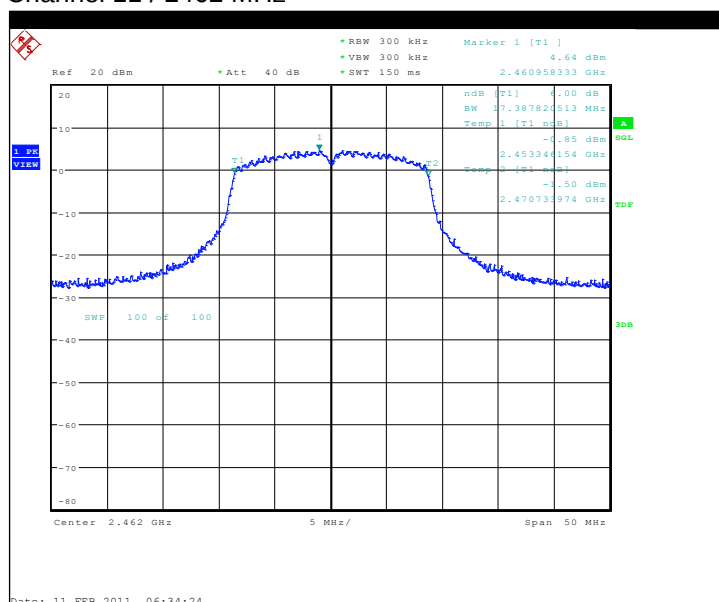
Channel 1 / 2412 MHz



Channel 7 / 2442 MHz



Channel 11 / 2462 MHz



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

EUT with DUT number	RM-707 DUT42471
Accessories with DUT numbers	-
Operation Voltage [V] / [Hz]	Nominal
Result	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	23 / 60 / 101.5
Date of measurements	11-Feb-2011
Measured by	Hannu Söderholm

7.1. 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

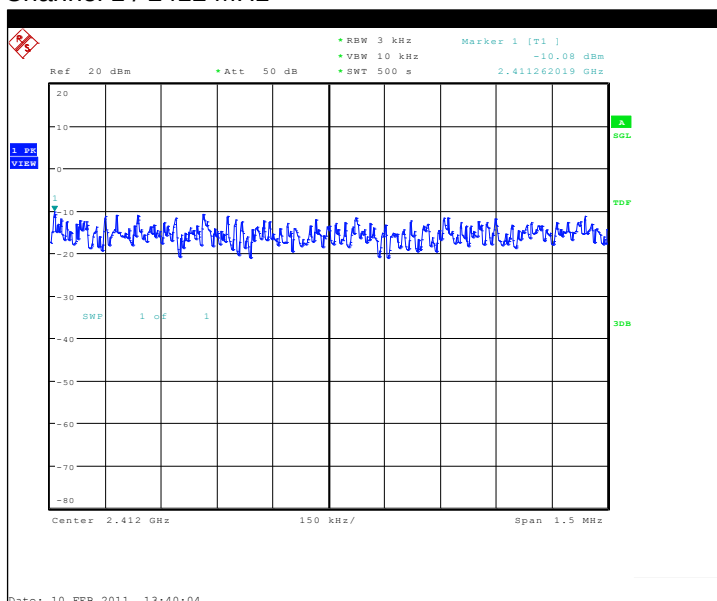
Limit [dBm] @ 3 kHz
≤ 8

7.2. WLAN test results

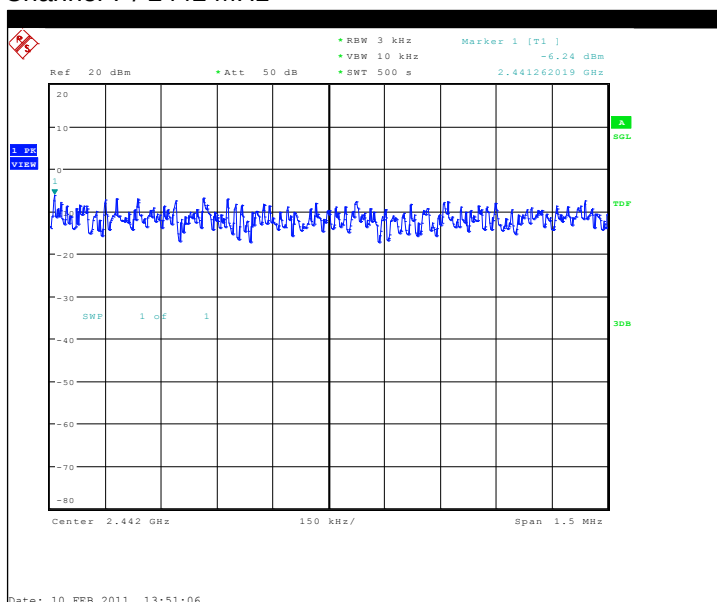
7.2.1 DSSS mode, QPSK modulation, 11 Mbps data rate

Channel / f_c [MHz]	P [dBm]	Result
1 / 2412	-10.08	PASSED
7 / 2442	-6.24	PASSED
11 / 2462	-10.08	PASSED

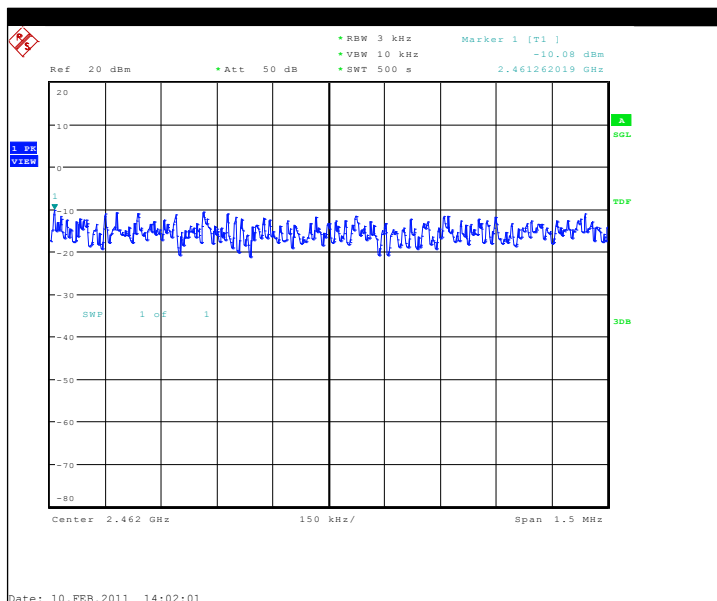
Channel 1 / 2412 MHz



Channel 7 / 2442 MHz



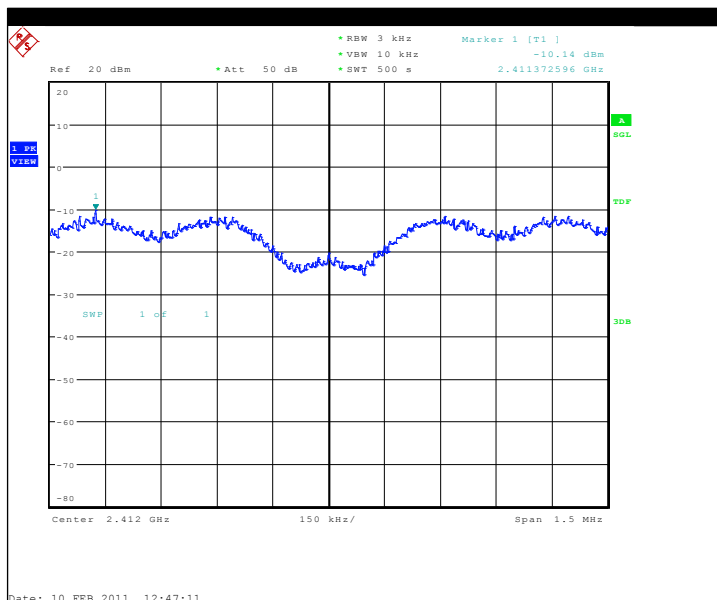
Channel 11 / 2462 MHz



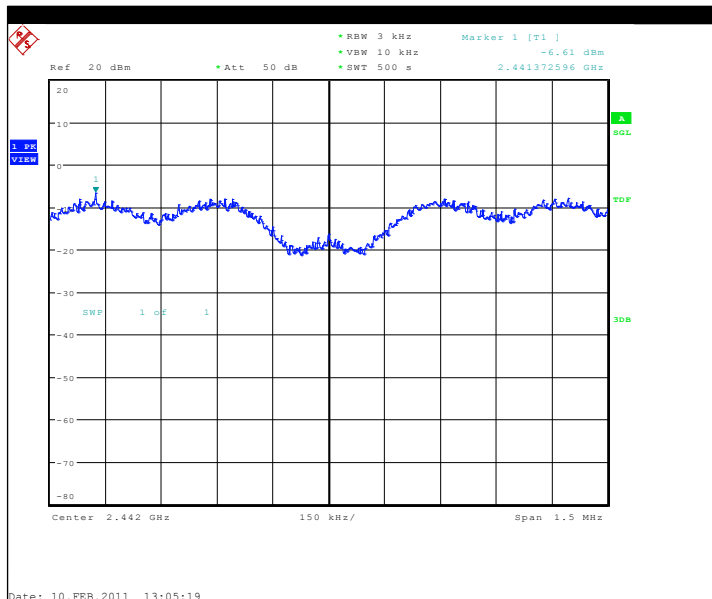
7.2.2 OFDM mode, BPSK modulation, 6 Mbps data rate

Channel / f _c [MHz]	P [dBm]	Result
1 / 2412	-10.14	PASSED
7 / 2442	-6.61	PASSED
11 / 2462	-10.20	PASSED

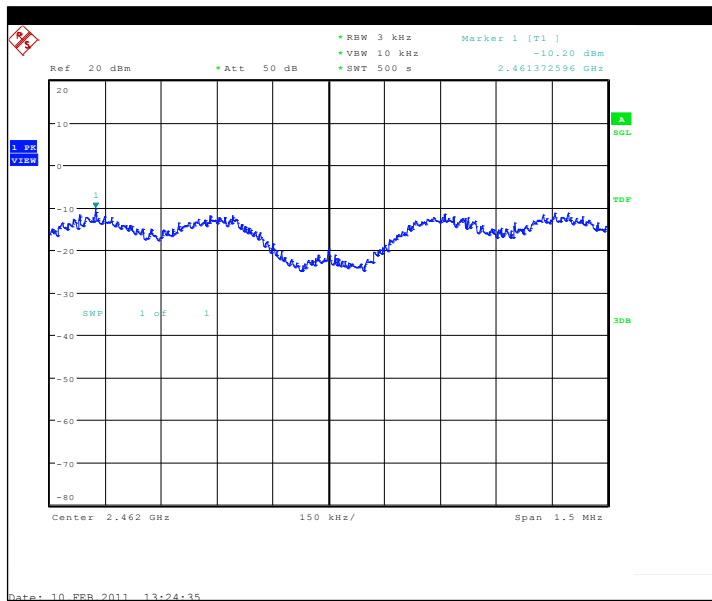
Channel 1 / 2412 MHz



Channel 7 / 2442 MHz



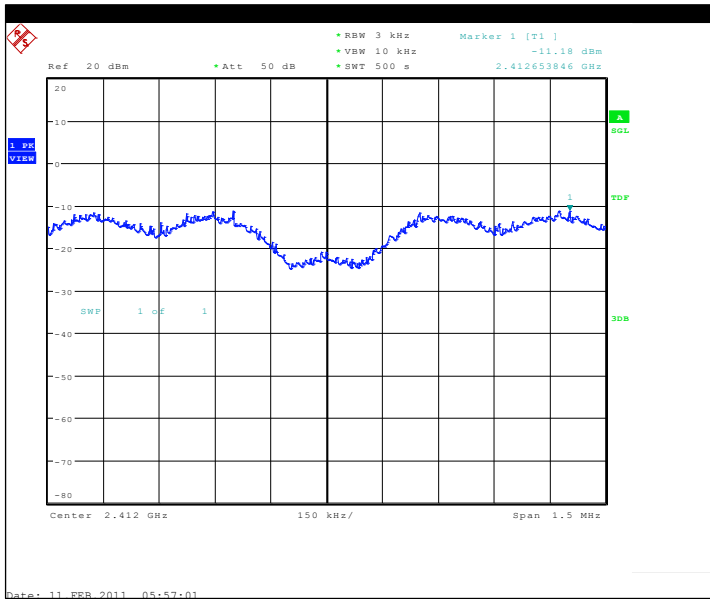
Channel 11 / 2462 MHz



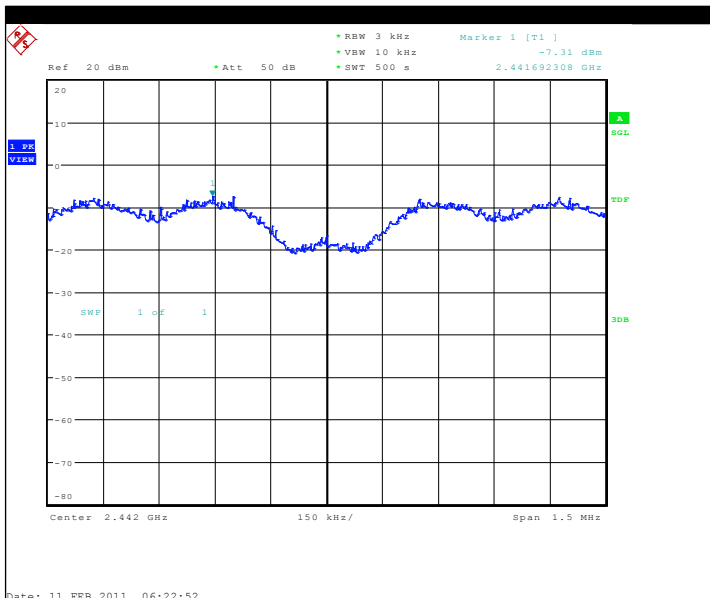
7.2.3 802.11n HT20 MCS 0

Channel / f_c [MHz]	P [dBm]	Result
1 / 2412	-11.18	PASSED
7 / 2442	-7.31	PASSED
11 / 2462	-11.03	PASSED

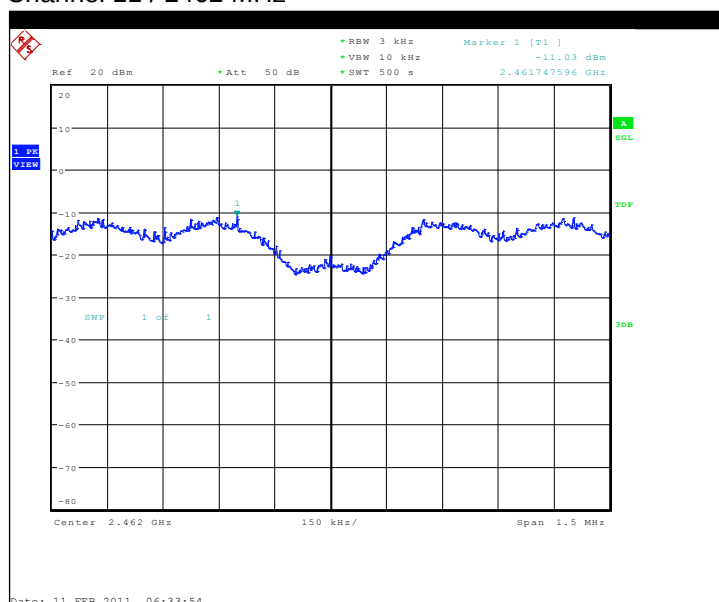
Channel 1 / 2412 MHz



Channel 7 / 2442 MHz



Channel 11 / 2462 MHz



8. Test Equipment

8.1. Conducted measurements

Eq. No	Equipment	Type	Manufacturer	Used in
TM38112	Power supply	6632A	Agilent	22/24/27, 15C
TM38631	Signal Generator	83640L	Agilent	22/24/27, 15C, 15B
OM0631 2	Signal Generator	E4422B	Agilent	22/24
TM37678	Communication Tester	CMU200	R&S	22/24/27, 15C, 15B
TM37773	Communication Tester	CMU200	R&S	22/24/27, 15C, 15B
TM30600	Impulse limiter	ESH3-Z2	R&S	15C, 15B
TM26490	LISN 50 μ H	ESH3-Z5	R&S	15C, 15B
TM26491	LISN 50 μ H	ESH3-Z5	R&S	15C, 15B
TM37610	Spectrum Analyzer	FSU26	R&S	22/24/27, 15C
TM22806	Battery	BAT 20/E	Fiskars	15C, 15B
TM22805	UPS	PS 20/1.2	Fiskars	15C, 15B
-	Temperature and humidity logger	175-H2	Testo	15C, 15B
-	Temperature and humidity logger	175-H2	Testo	22/24/27, 15C
-	Air pressure and temperature logger	635-2	Testo	22/24/27, 15C, 15B
-	Air pressure sensor	0638-1835	Testo	22/24/27, 15C, 15B
-	Temperature test chamber	VT 4002	Vötsch	22/24
2058	Receiver	ESPC	R&S	15C, 15B
2001	Bluetooth tester	CBT	R&S	22/24/27, 15C, 15B
2002	Communication Tester	CMU200	R&S	22/24/27
2009	LISN 50 μ H	ENV216	R&S	15C, 15B
2010	LISN 50 μ H	ENV216	R&S	15C, 15B
2012	Power splitter	11667B	Agilent	22/24/27, 15C
2013	Attenuator	8493C	Agilent	22/24/27, 15C
2014	Attenuator	8493C	Agilent	22/24/27, 15C

8.2. Radiated measurements

Eq. No	Equipment	Type	Manufacturer	Used in
TM38114	Power supply	6632A	Agilent	22/24/27, 15C, 15B
TM38631	Signal Generator	83640L	Agilent	22/24/27, 15C, 15B
TM38323	Preamplifier	PA-02 18-26 GHz	EMC Automation	22/24/27, 15C, 15B
-	Antenna	BBHA 9120 D	Schwarzbeck	22/24/27, 15C
TM26497	Antenna	3115	Emco	22/24/27, 15C, 15B
TM37678	Communication Tester	CMU200	R&S	22/24/27, 15C, 15B
TM37773	Communication Tester	CMU200	R&S	22/24/27, 15C, 15B
TM38845	Receiver	ESIB 26	R&S	22/24/27, 15C, 15B
-	Antenna	HL562	R&S	22/24/27, 15C, 15B
TM26500	Turntable	DS412	Deisel	22/24/27, 15C, 15B
TM30642	Mast/turntable controller	HD-100	Deisel	22/24/27, 15C, 15B
TM38990	Remote switching module	RSM1	EMC Automation	22/24/27, 15C, 15B
TM38341	System interface	SI-300	EMC Automation	22/24/27, 15C, 15B
-	Mini mast	2075-2	ETS Lindgren	22/24/27, 15C, 15B
TM38843	Mini mast	2075	Emco	22/24/27, 15C, 15B
TM38842	Controller	2090	Emco	22/24/27, 15C, 15B
TM39158	Antenna	3116	Emco	22/24/27, 15C, 15B
TM30643	LISN 50 μ H	LISN-5-20-2	FCC	22/24/27, 15C, 15B
TM30644	LISN 50 μ H	LISN-5-20-2	FCC	22/24/27, 15C, 15B
-	Temperature and humidity logger	175-H2	Testo	22/24/27, 15C, 15B
-	Air pressure and temperature logger	635-2	Testo	22/24/27, 15C, 15B

Eq. No	Equipment	Type	Manufacturer	Used in
-	Air pressure sensor	0638-1835	Testo	22/24/27, 15C, 15B
TM39180	Laser distance meter	Disto Pro	Leica	22/24/27, 15C, 15B
TM37523	Preamplifier	AMF-4D-10M-3G-25-20P	Miteq	22/24/27, 15C, 15B
-	Preamplifier	AFS4-00100300-20-23P6	Miteq	15C
TM37498	Preamplifier	AMF-5D-020180-26-10P	Miteq	22/24/27, 15C, 15B
TM30599	Semi anechoic chambre	UNKNOWN	TDK	22/24/27, 15C, 15B
TM22638	Power supply	OL63743-901	Torqueleader	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	27
TM38215	Band reject filter	WRCD 1920/1980-1918/1982-40/20	Wainwright UMTS	27
TM38214	Band reject filter	WRCT 2402/2480-2400/2483.5-30/	Wainwright ISM	15C
-	Band reject filter	WRCG1877/1883-1870/1890-40/6EE	Wainwright	27
-	Band reject filter	WRCG1729.4/1735.4-1722.4/1742.4-40/6SS	Wainwright	27
-	Band reject filter	WRCG832/838-825/848-40/5SS	Wainwright	27
TM23892	Controller	G-1000SDX	Yaesu	22/24/27
2001	Bluetooth tester	CBT	R&S	22/24/27, 15C, 15B
-	Antenna	SBA 9113	Schwarzbeck	22/24/27
6023	Antenna	VUBA 9117	Schwarzbeck	22/24/27, 15C