

FCC Part 15C Compliance Test Report

Test Report no.:	Tre_FCC_0732_06.doc	Date of Report:	5.9.2007
Number of pages:	31	Customer's Contact person:	Janne Ilkka
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FCC listing no.:	94436		
IC recognition no.:	3608		
Tested devices/ accessories:	GSM phone RM-159 / Battery BL-5F, AC charger AC-5E, Audio adapter AD-43, Headset HS-45		
FCC ID:	PDNRM-159	IC:	661R-RM159
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 and RSS-210. Deviations, modifications or clarifications (if any) to above mentioned documents are written in each section under "Test method and limit".		
Documentation:	The test report must always be reproduced in full; reproduction of an excerpt only is subject to written approval of the testing laboratory. The documentation of the testing performed on the tested devices is archived for 15 years at TCC Nokia.		
Test Results:	The EUT complies with the requirements in respect of all parameters subject to the test. The test results relate only to devices specified in this document.		
Date and signature for the contents:			

Jari Jantunen, System Manager

1. Summary for FCC Part 15C Compliance Test Report

Date of receipt	1.8.2007
Testing completed	20.8.2007
The customer's contact person	Janne Ilkka
Test Plan referred to	T:\Projects\
Notes	-
Document name	T:\Projects\RM-159\EMC\Results\FCC\Tre_FCC_0732_06.doc

1.1. EUT and Accessory Information

The EUT is a 5-band (GSM850/900/1800/1900 and WCDMA Band I) 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-159	004401014850107	9000	-	5.9	41211
GSM phone	RM-159	004401014850438	9000	-	12.0.013	41216
GSM phone	RM-159	004401014850289	9000	-	12.0.013	41253
Battery	BL-5F	-	-	-	-	40939
AC-Charger	AC-5E	-	-	-	-	40922
Audio adapter	AD-43	-	-	-	-	41143
Headset	HS-45	-	-	-	-	41144

1.2. Summary of Test Results

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(c)	A8.5	Band edge compliance of RF emissions	PASSED
15.247(c)	A8.5	Spurious RF conducted emissions	PASSED
15.247(c), 15.209	A8.5	Spurious radiated emissions	PASSED
15.207	7.2.2	AC powerline conducted emissions	NP
15.247(a)(2)	A8.2 (1)	6 dB bandwidth	PASSED
15.247(e)	A8.2 (2)	Power spectral density	PASSED

PASSED
FAILED
NP

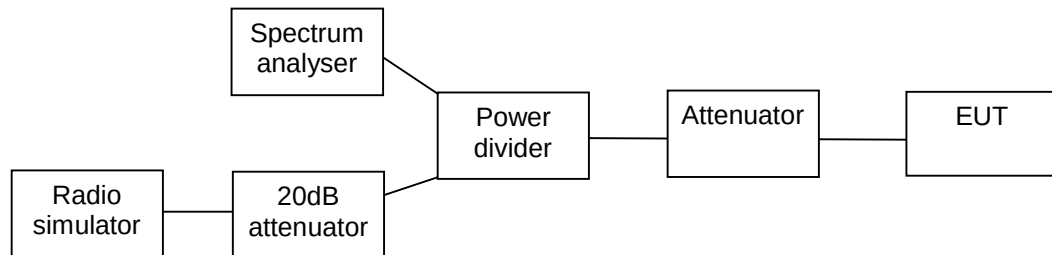
The EUT complies with the essential requirements in the standard.
The EUT does not comply with the essential requirements in the standard.
The test was not performed by the TCC Nokia Tampere Laboratory.

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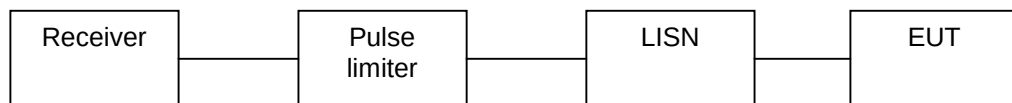
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2. Test setups

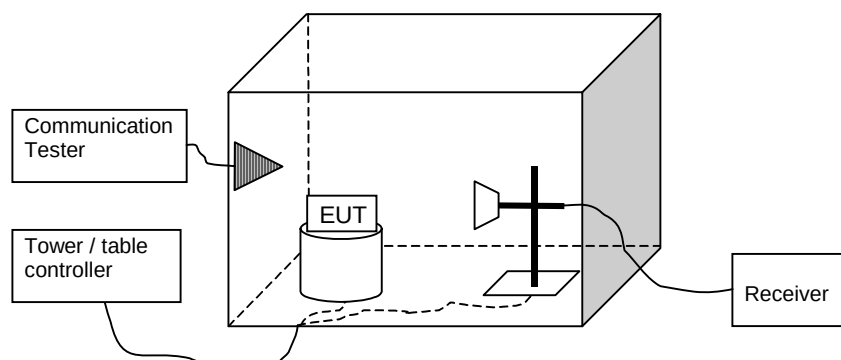
2.1. Conducted RF test setup



2.2. AC powerline conducted emissions test setup



2.3. Spurious radiated emissions test setup



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

EUT with DUT number	RM-159 DUT 41253
Accessories with DUT numbers	BL-5F DUT 40939, AC-5E DUT 40922
Operation Voltage [V] / [Hz]	Nominal
Result	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	21 / 49 / 100.2
Date of measurements	31.8.2007
Measured by	Petteri Suni

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

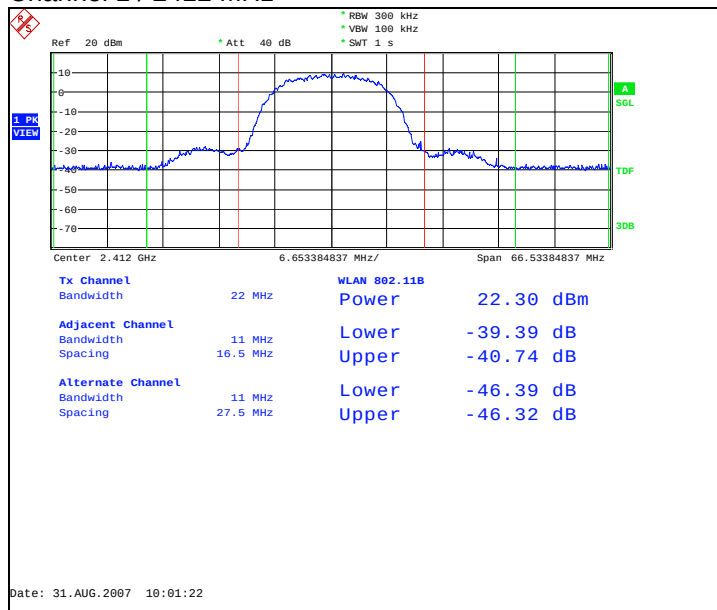
Frequency range [MHz]	Limit [W]	Limit [dBm]
2400 – 2483.5	≤ 1	≤ 30

3.2. WLAN Test results

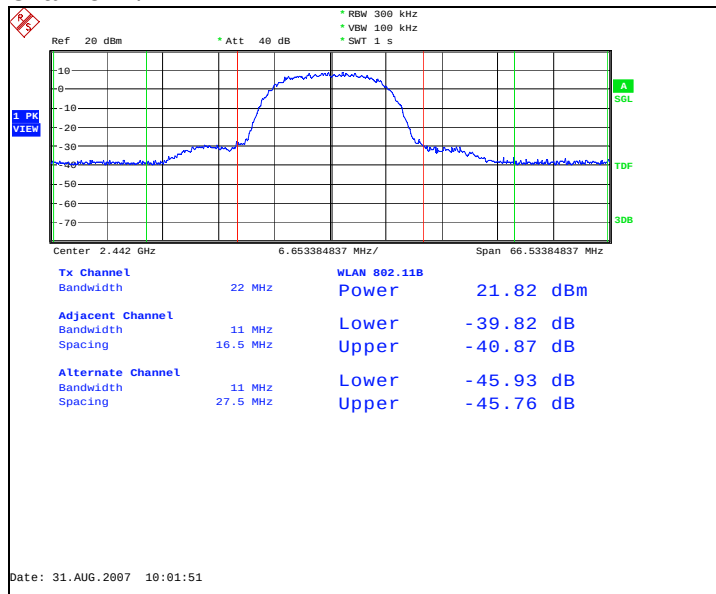
3.2.1 DSSS mode, QPSK modulation, 11 Mbps data rate

Channel / f _c [MHz]	P [dBm]	P [W]	Result
1 / 2412	22.30	0.170	PASSED
7 / 2442	21.82	0.152	PASSED
11 / 2462	22.45	0.176	PASSED

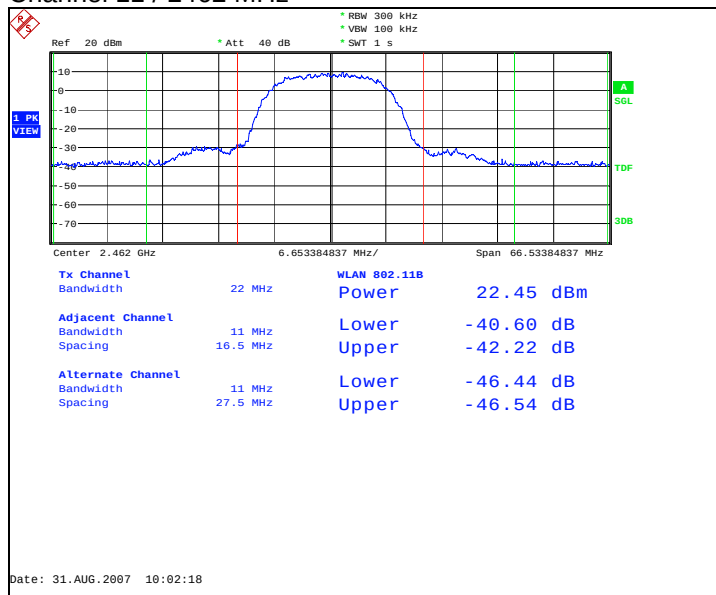
Channel 1 / 2412 MHz



Channel 7 / 2442 MHz



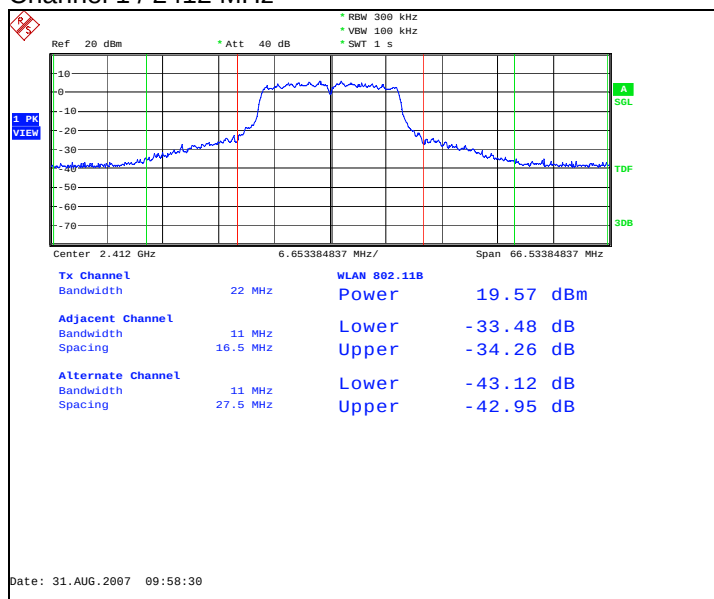
Channel 11 / 2462 MHz



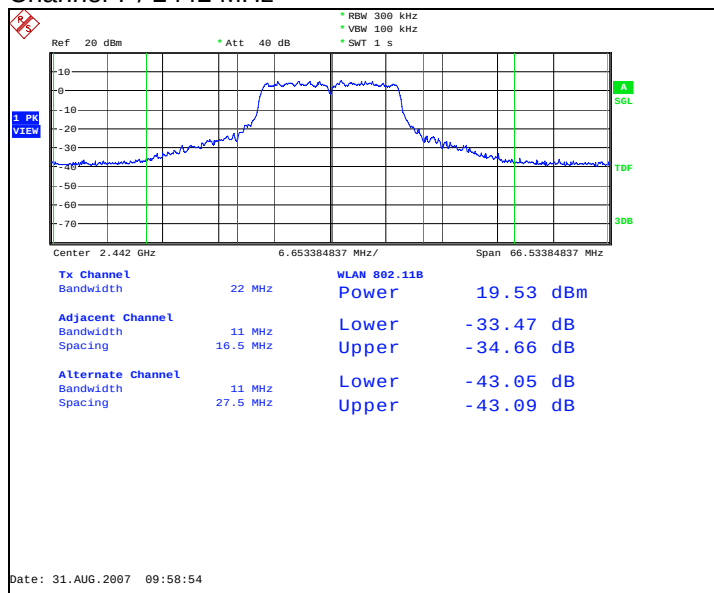
3.2.2 OFDM mode, BPSK modulation, 6 Mbps data rate

Channel / f_c [MHz]	P [dBm]	P [W]	Result
1 / 2412	19.57	0.091	PASSED
7 / 2442	19.53	0.090	PASSED
11 / 2462	19.97	0.099	PASSED

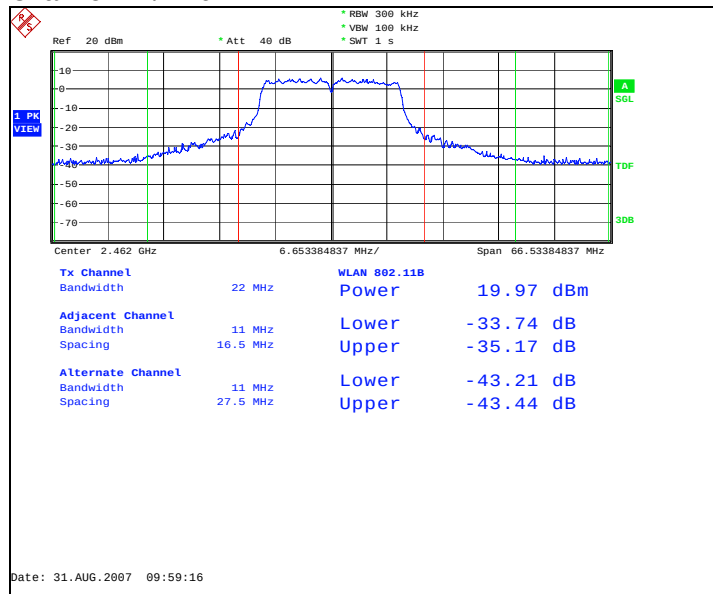
Channel 1 / 2412 MHz



Channel 7 / 2442 MHz



Channel 11 / 2462 MHz



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

EUT with DUT number	RM-159 DUT 41216
Accessories with DUT numbers	BL-5F DUT 40939, AC-5E DUT 40922, AD-43 DUT 41143, HS-45 DUT 41144
Operation Voltage [V] / [Hz]	115 / 60
Result	PASSED
Remarks	Slide open
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	21 / 50 / 102.1
Date of measurements	7.8.2007
Measured by	Jari Jantunen

4.1. Test method and limit

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

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

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

4.2. WLAN Test results

4.2.1 DSSS mode, QPSK modulation, 11 Mbps data rate

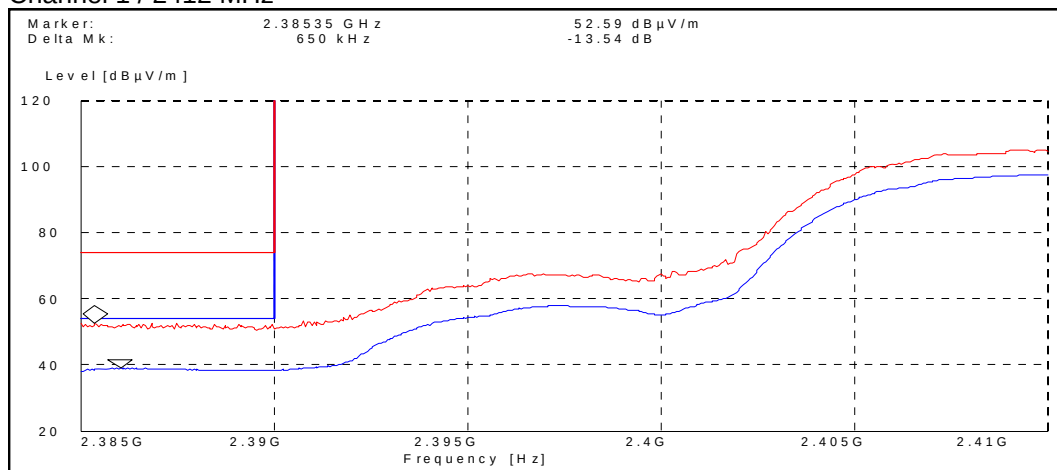
Average (RBW: 1 MHz)

Channel / f_c [MHz]	E [dB μ V/m]	Result
1 / 2412	39.05	PASSED
11 / 2462	35.48	PASSED

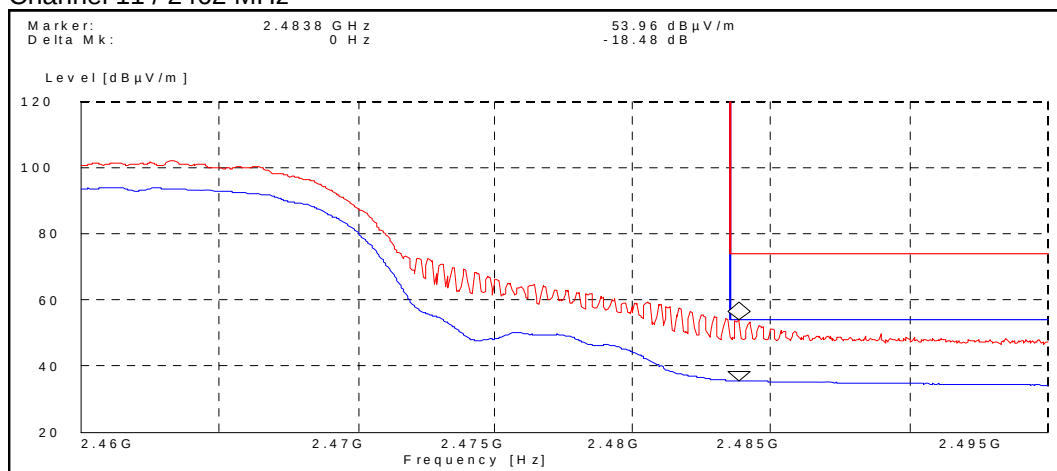
Peak (RBW: 1 MHz)

Channel / f_c [MHz]	E [dB μ V/m]	Result
1 / 2412	52.59	PASSED
11 / 2462	53.96	PASSED

Channel 1 / 2412 MHz



Channel 11 / 2462 MHz



4.2.2 OFDM mode, BPSK modulation, 6 Mbps data rate

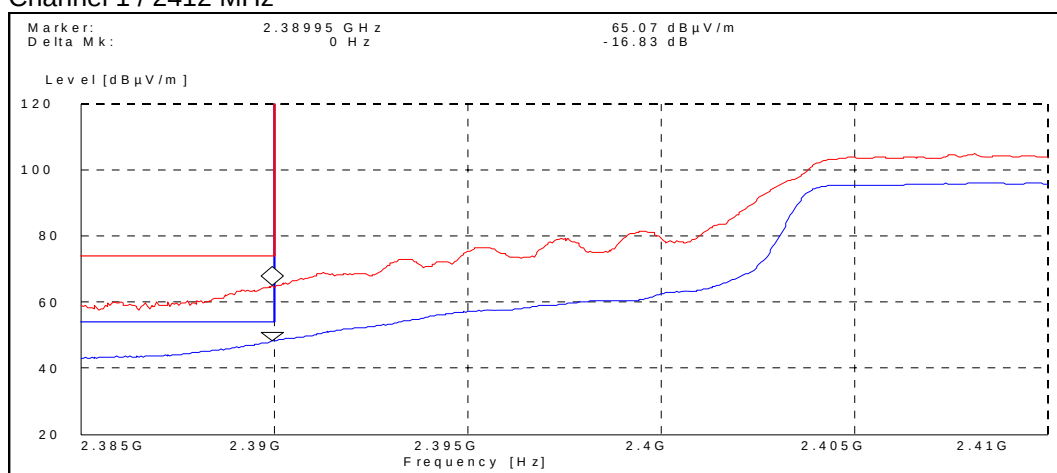
Average (RBW: 1 MHz)

Channel / f_c [MHz]	E [dB μ V/m]	Result
1 / 2412	48.22	PASSED
11 / 2462	42.62	PASSED

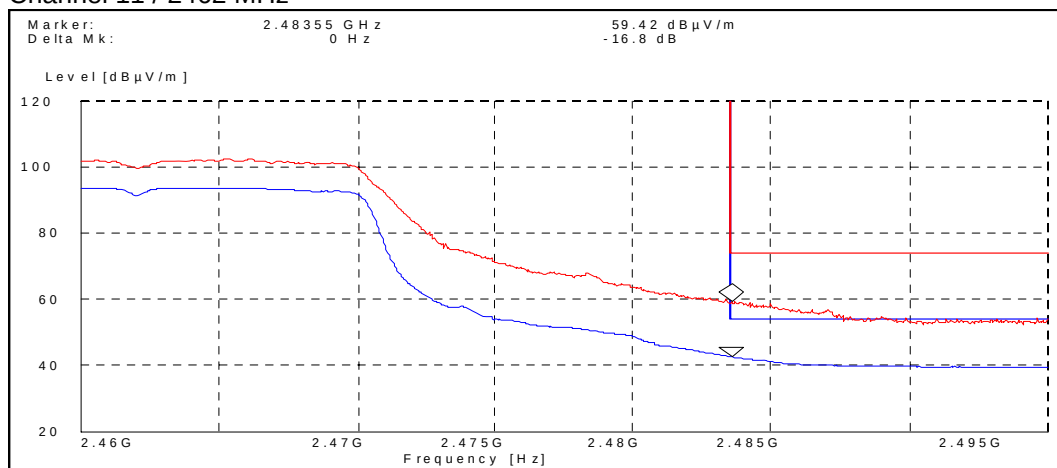
Peak (RBW: 1 MHz)

Channel / f_c [MHz]	E [dB μ V/m]	Result
1 / 2412	65.07	PASSED
11 / 2462	59.42	PASSED

Channel 1 / 2412 MHz



Channel 11 / 2462 MHz



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

EUT with DUT number	RM-159 DUT 41211
Accessories with DUT numbers	BL-5F DUT 40939, AC-5E DUT 40922
Operation Voltage [V] / [Hz]	Nominal
Result	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	20 / 48 / 101.8
Date of measurements	09.08.2007
Measured by	Timo Raiskio

5.1. Test method and limit

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

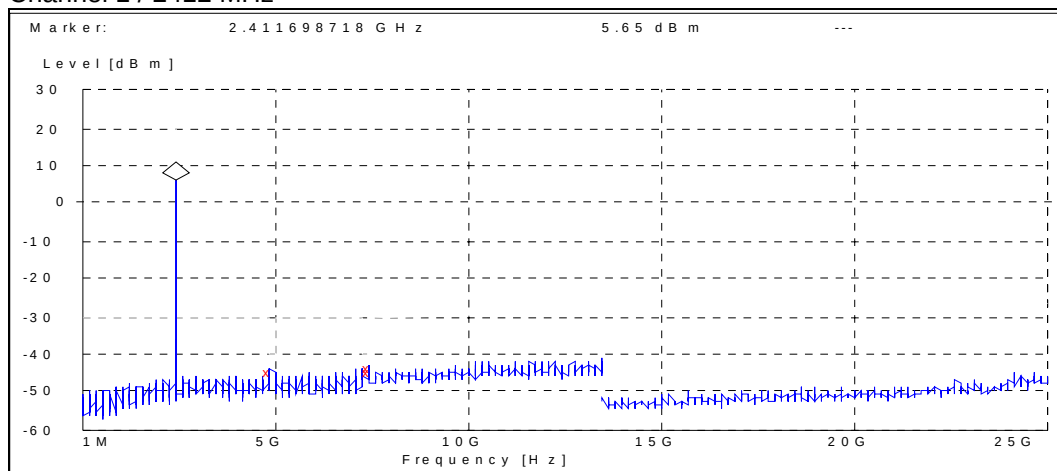
Limits for spurious RF conducted emissions measurements

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

5.2. WLAN Test results

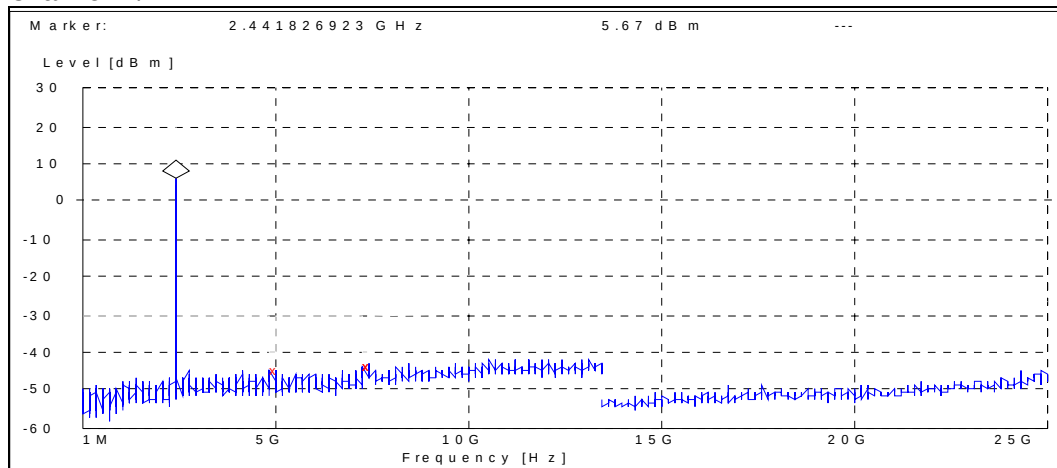
5.2.1 DSSS mode, QPSK modulation, 11 Mbps data rate

Channel 1 / 2412 MHz



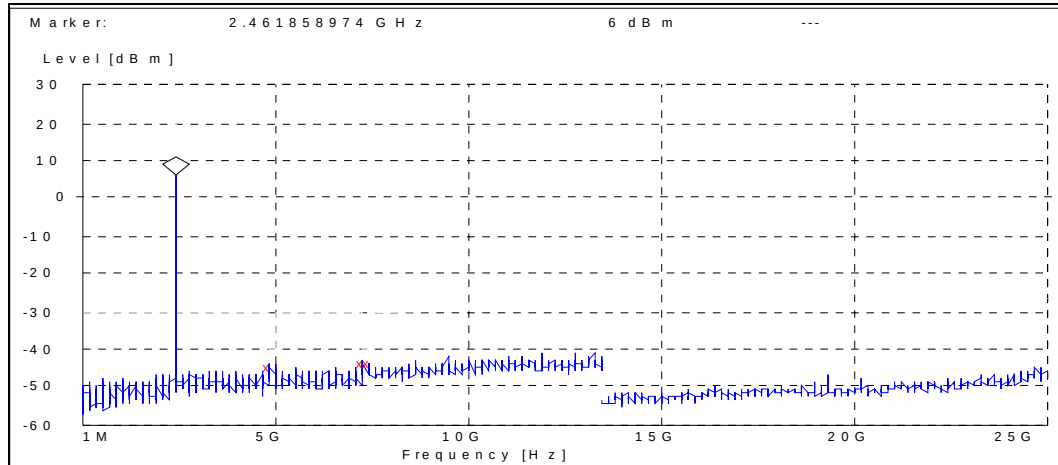
Frequency [MHz]	P [dBc]	Result
4884.294872	-46.55144	PASSED
7459.134615	-46.80214	PASSED
7500.000000	-47.34051	PASSED

Channel 7 / 2442 MHz



Frequency [MHz]	P [dBc]	Result
4999.679487	-49.968631	PASSED
7436.538462	-48.968631	PASSED
7500.000000	-49.368631	PASSED

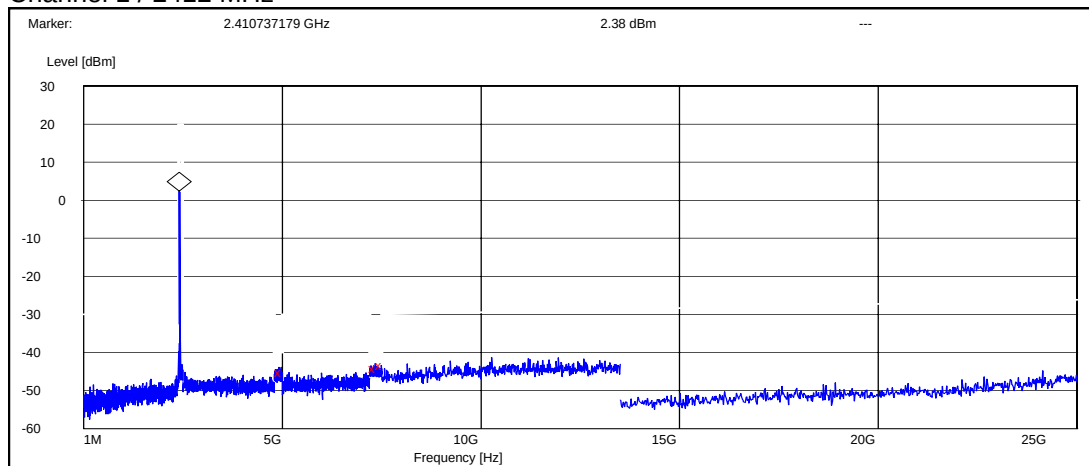
Channel 11 / 2462 MHz



Frequency [MHz]	P [dBc]	Result
4869.871795	-51.004349	PASSED
7262.019231	-49.304349	PASSED
7500.000000	-49.404349	PASSED

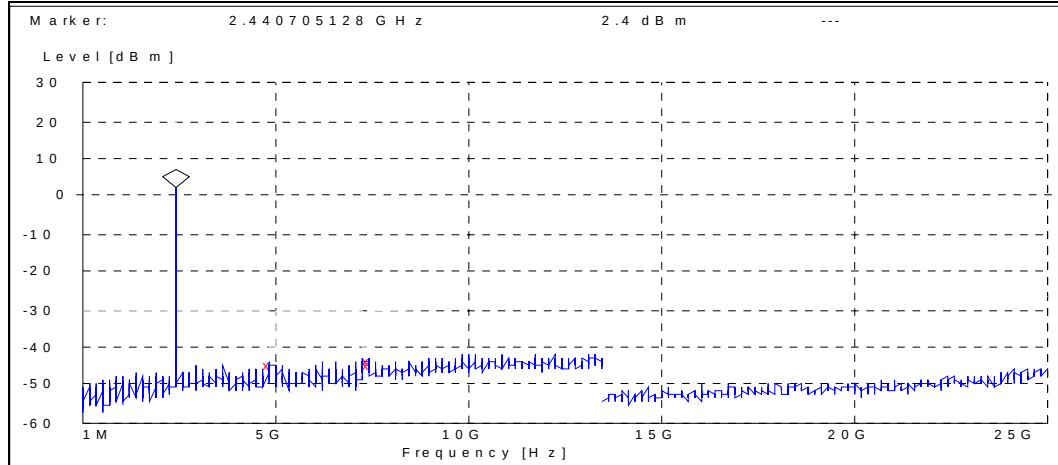
5.2.2 OFDM mode, BPSK modulation, 6 Mbps data rate

Channel 1 / 2412 MHz



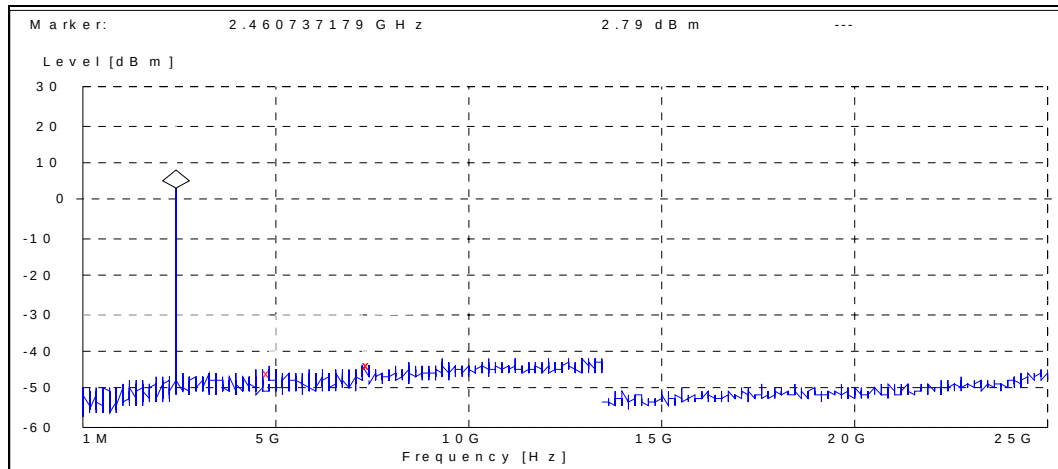
Frequency [MHz]	P [dBc]	Result
4944.230769	-45.49834	PASSED
7473.076923	-47.34934	PASSED
7500.000000	-48.14834	PASSED

Channel 7 / 2442 MHz



Frequency [MHz]	P [dBc]	Result
4837.820513	-45.68372	PASSED
7401.442308	-46.45332	PASSED
7500.000000	-47.33721	PASSED

Channel 11 / 2462 MHz



Frequency [MHz]	P [dBc]	Result
4832.692308	-48.090733	PASSED
7415.865385	-46.490733	PASSED
7500.000000	-46.690733	PASSED

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

EUT with DUT number	RM-159 DUT 41216
Accessories with DUT numbers	BL-5F DUT 40939, AC-5E DUT 40922, AD-43 DUT 41143, HS-45 DUT 41144
Operation Voltage [V] / [Hz]	115 / 60
Result	PASSED
Remarks	Slide open
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	21 / 50 / 102.1
Date of measurements	7.8.2007
Measured by	Jari Jantunen

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

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

Frequency range [MHz]	Limit [$\mu\text{V/m}$]	Limit [dB $\mu\text{V/m}$]	Detector
30 – 88	100	40	Quasi peak
88 – 216	150	43.5	Quasi peak
216 – 960	200	46	Quasi peak
960 – 1000	500	54	Quasi peak
Above 1000	500	54	Average
Above 1000	5000	74	Peak

6.2. WLAN Test results

6.2.1 DSSS mode, QPSK modulation, 11 Mbps data rate

Channel 1 / 2412 MHz

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

Frequency [MHz]	E [dB $\mu\text{V/m}$]	E [$\mu\text{V/m}$]	U _{RX} [dB μV]	A _{TOT} [dB]	Polarisation	Result
4824.000000	40.40	104.71	42.10	-1.7	VERTICAL	PASSED
7236.000000	41.40	117.49	39.40	2.0	HORIZONTAL	PASSED

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

Frequency [MHz]	E [dB $\mu\text{V/m}$]	E [$\mu\text{V/m}$]	U _{RX} [dB μV]	A _{TOT} [dB]	Polarisation	Result
4824.000000	27.80	24.55	29.50	-1.7	VERTICAL	PASSED
7236.000000	28.80	27.54	26.80	2.0	HORIZONTAL	PASSED

Channel 7 / 2442 MHz

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

Frequency [MHz]	E [dB $\mu\text{V/m}$]	E [$\mu\text{V/m}$]	U _{RX} [dB μV]	A _{TOT} [dB]	Polarisation	Result
32.485772	11.20	3.63	18.20	-7.0	VERTICAL	PASSED
37.676353	7.40	2.34	18.40	-11.0	VERTICAL	PASSED

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

Frequency [MHz]	E [dB $\mu\text{V/m}$]	E [$\mu\text{V/m}$]	U _{RX} [dB μV]	A _{TOT} [dB]	Polarisation	Result
4882.269539	39.80	97.72	41.40	-1.6	VERTICAL	PASSED
7283.059118	43.10	142.89	40.70	2.4	VERTICAL	PASSED
7313.623246	42.10	127.35	39.80	2.3	HORIZONTAL	PASSED
7414.825651	42.50	133.35	39.70	2.8	HORIZONTAL	PASSED
17971.935872	54.80	549.54	33.60	21.2	HORIZONTAL	PASSED

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

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
4883.769539	28.20	25.70	29.80	-1.6	VERTICAL	PASSED
7276.559118	29.50	29.85	27.10	2.4	VERTICAL	PASSED
7307.623246	29.30	29.17	26.90	2.4	HORIZONTAL	PASSED
7411.825651	29.40	29.51	26.60	2.8	HORIZONTAL	PASSED
17966.935872	41.90	124.45	20.70	21.2	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	44.50	167.88	45.90	-1.4	VERTICAL	PASSED
7386.000000	44.90	175.79	42.30	2.6	VERTICAL	PASSED

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

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
4924.000000	30.50	33.50	31.90	-1.4	VERTICAL	PASSED
7386.000000	32.70	43.15	30.10	2.6	HORIZONTAL	PASSED

6.2.2 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	38.90	88.10	40.60	-1.7	HORIZONTAL	PASSED
7236.000000	42.30	130.32	40.30	2.0	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	26.00	19.95	27.70	-1.7	HORIZONTAL	PASSED
7236.000000	29.40	29.51	27.40	2.0	VERTICAL	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
37.795391	7.30	2.32	18.40	-11.1	VERTICAL	PASSED

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

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
4889.777555	39.50	94.41	41.00	-1.5	VERTICAL	PASSED
7271.049098	42.70	136.46	40.40	2.3	HORIZONTAL	PASSED
7278.565130	42.90	139.64	40.50	2.4	VERTICAL	PASSED
7392.287575	43.10	142.89	40.40	2.7	HORIZONTAL	PASSED
7414.835671	42.70	136.46	39.90	2.8	VERTICAL	PASSED
17987.475952	54.70	543.25	33.40	21.3	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
4891.277555	27.00	22.39	28.50	-1.5	VERTICAL	PASSED
7276.549098	29.50	29.85	27.10	2.4	HORIZONTAL	PASSED
7281.565130	29.60	30.20	27.20	2.4	VERTICAL	PASSED
7397.787575	29.50	29.85	26.70	2.8	HORIZONTAL	PASSED
7421.835671	29.60	30.20	26.80	2.8	VERTICAL	PASSED
17991.475952	42.20	128.82	20.90	21.3	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	40.40	104.71	41.80	-1.4	VERTICAL	PASSED
7386.000000	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
4924.000000	28.10	25.41	29.50	-1.4	VERTICAL	PASSED
7386.000000	29.70	30.55	27.10	2.6	HORIZONTAL	PASSED

7. 6 dB bandwidth (FCC §15.247(a)(2), RSS-210 A8.2 (1))

EUT with DUT number	RM-159 DUT 41211
Accessories with DUT numbers	BL-5F DUT 40939, AC-5E DUT 40922
Operation Voltage [V] / [Hz]	Nominal
Result	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	20-21 / 48-50 / 101.8-102.0
Date of measurements	9, 20.08.2007
Measured by	Timo Raiskio

7.1. 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

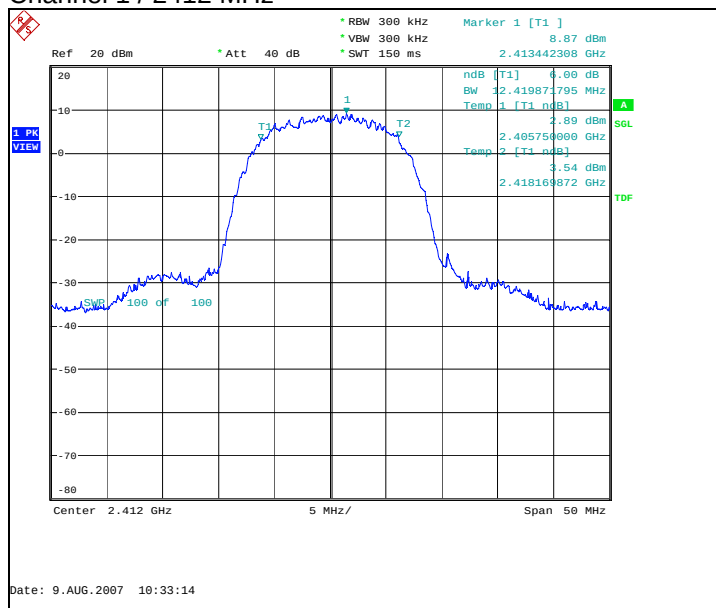
Limit [kHz]
≥ 500

7.2. WLAN test results

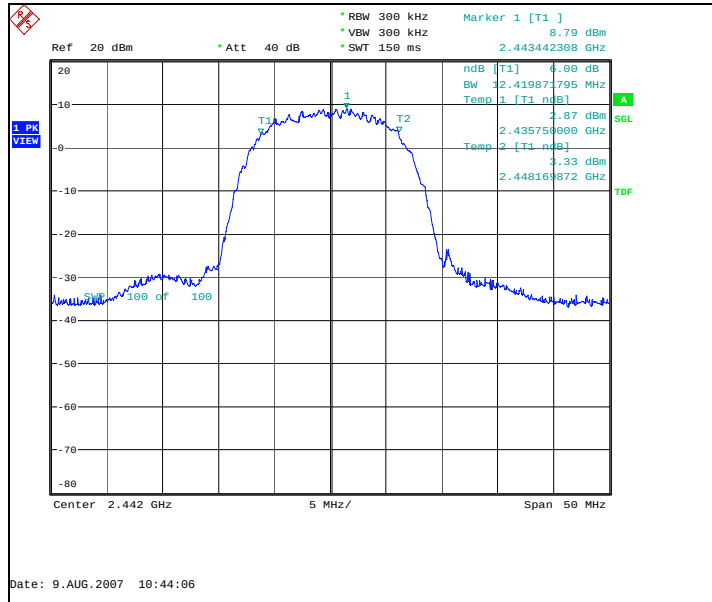
7.2.1 DSSS mode, QPSK modulation, 11 Mbps data rate

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

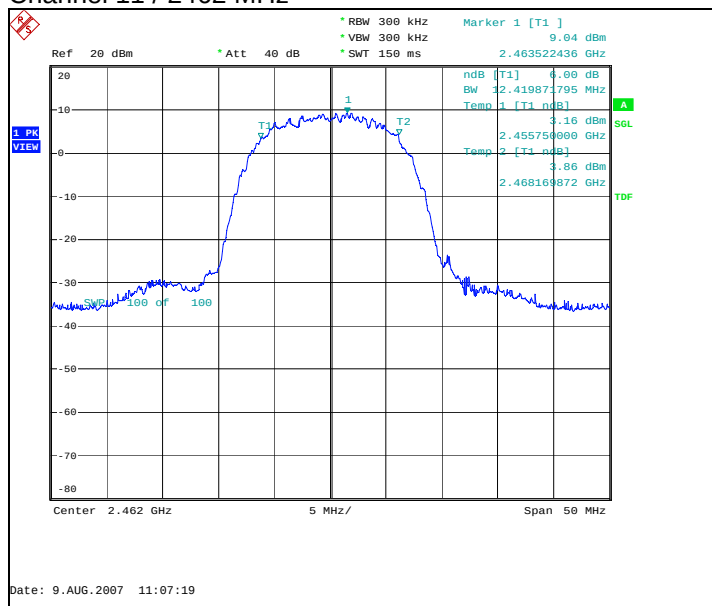
Channel 1 / 2412 MHz



Channel 7 / 2442 MHz



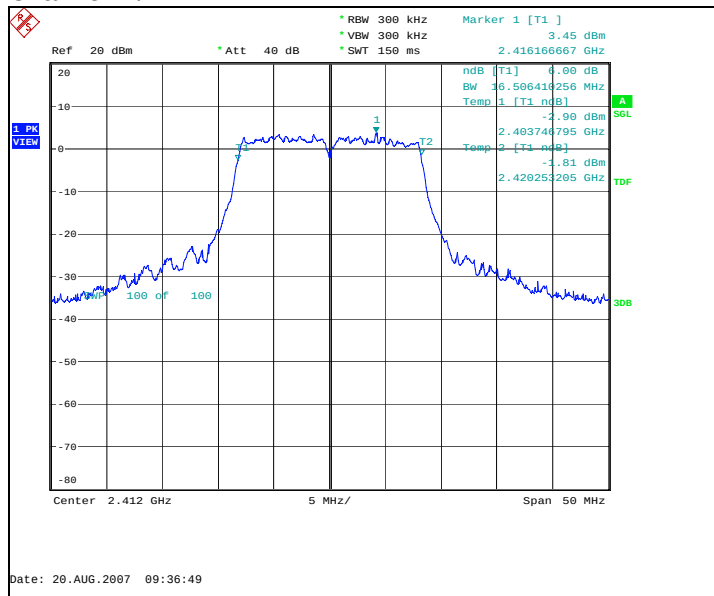
Channel 11 / 2462 MHz



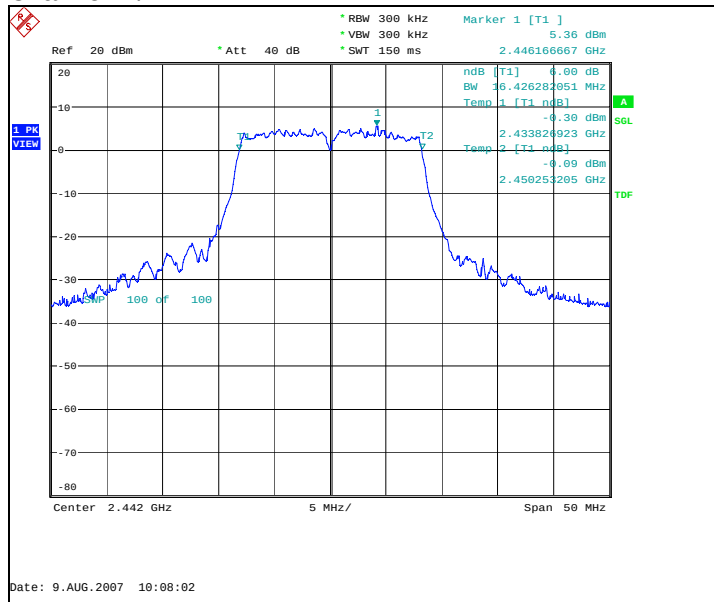
7.2.2 OFDM mode, BPSK modulation, 6 Mbps data rate

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

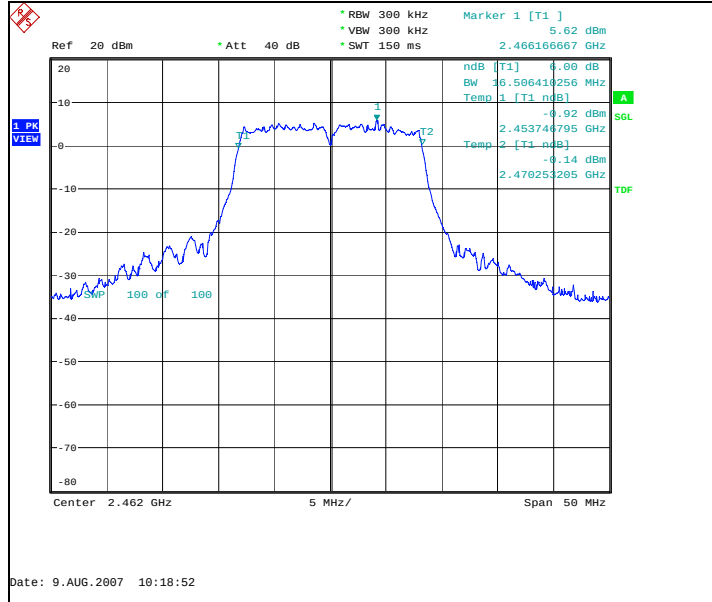
Channel 1 / 2412 MHz



Channel 7 / 2442 MHz



Channel 11 / 2462 MHz



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

EUT with DUT number	RM-159 DUT 41211
Accessories with DUT numbers	BL-5F DUT 40939, AC-5E DUT 40922
Operation Voltage [V] / [Hz]	Nominal
Result	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	20 / 48 / 101.8
Date of measurements	09.08.2007
Measured by	Timo Raiskio

8.1. 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

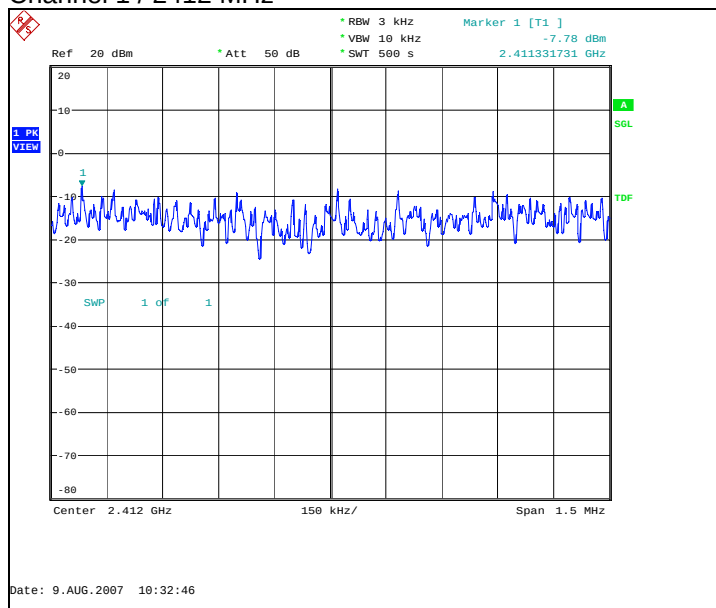
Limit [dBm] @ 3 kHz
≤ 8

8.2. WLAN test results

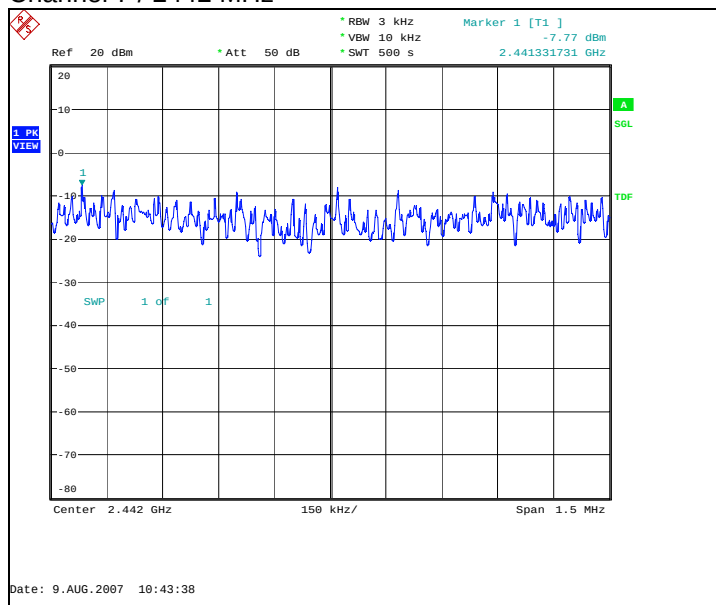
8.2.1 DSSS mode, QPSK modulation, 11 Mbps data rate

Channel / f_c [MHz]	P [dBm]	Result
1 / 2412	-7.78	PASSED
7 / 2442	-7.77	PASSED
11 / 2462	-7.44	PASSED

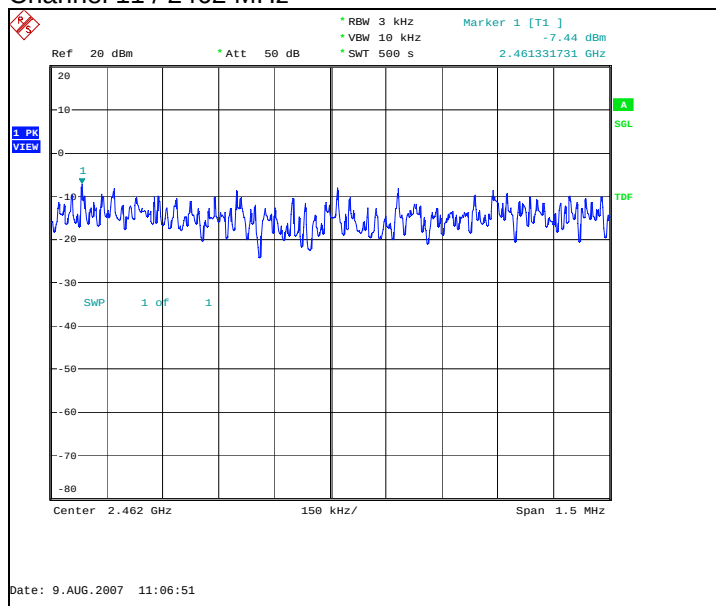
Channel 1 / 2412 MHz



Channel 7 / 2442 MHz



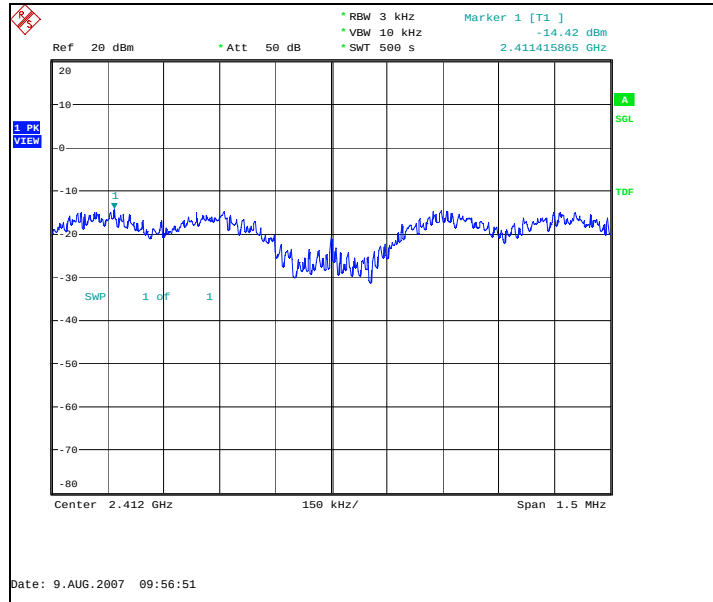
Channel 11 / 2462 MHz



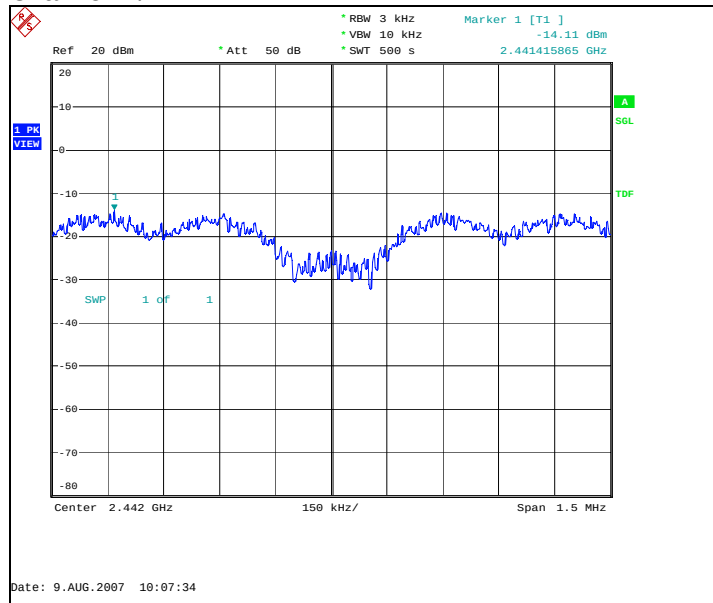
8.2.2 OFDM mode, BPSK modulation, 6 Mbps data rate

Channel / f_c [MHz]	P [dBm]	Result
1 / 2412	-14.42	PASSED
7 / 2442	-14.11	PASSED
11 / 2462	-13.95	PASSED

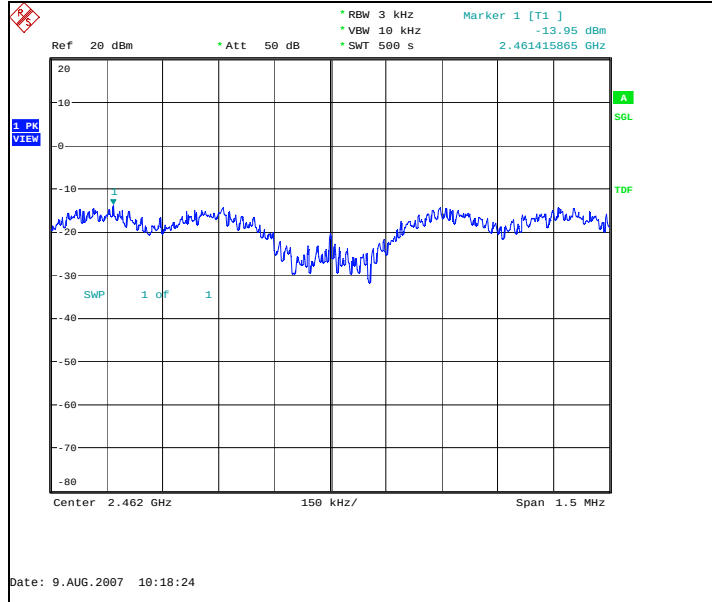
Channel 1 / 2412 MHz



Channel 7 / 2442 MHz



Channel 11 / 2462 MHz



9. Test Equipment

9.1. Conducted measurements

Eq. No	Equipment	Type	Manufacturer	Used in
TM37610	Spectrum analyzer	FSU	R&S	22/24, 15C
TM37678	Radio communication tester	CMU-200	R&S	22/24, 15C
	Attenuator 10 dB	6251.17.A	Huber+Suhner AG	22/24, 15C
TM37499	Power splitter	11667A	Agilent	22/24, 15C
	Temperature chamber	VT4002	Vötsch	22/24, 15C
TM38112	DC power supply	6632A	Agilent	22/24, 15C
TM38111	Multimeter	34401A	Agilent	22/24, 15C
	EMI Test receiver	ESPC	R&S	15C, 15B
TM37773	Radio communication tester	CMU-200	R&S	15C, 15B
TM38631	Signal generator	83640L	Agilent	15C, 15B
TM38114	DC power supply	6632A	Agilent	15C, 15B
TM22835	Multimeter	87	Fluke	15C, 15B
TM30600	Pulse Limiter	ESH3-Z2	R&S	15C, 15B
TM26490	LISN 50 µH	ESH3-Z5/	R&S	15C, 15B
TM30636	LISN 50 µH	L2-16/	PMM	15C, 15B

9.2. Radiated measurements

Eq. No	Equipment	Type	Manufacturer	Used in
TM30599	3m semi-anechoic chamber		TDK	22/24, 15C, 15B
TM38845	EMI receiver	ESI 40	R&S	22/24, 15C, 15B
TM37498	Preamplifier	AMF-5D-020180-26-10P	MITEQ	22/24, 15C, 15B
TM37523	Preamplifier	AMF-4D-10M-3G-25-20P	MITEQ	22/24, 15C, 15B
TM37516	Biconilog antenna	HL562	R&S	22/24, 15C, 15B
TM26496	Double ridged waveguide antenna	3115	EMCO	22/24, 15C, 15B
TM39158	Horn antenna	3116	EMCO	22/24, 15C, 15B
TM26492	Reference dipole set	UHAP/VHAP	Schwarzbeck	22/24, 15C, 15B
TM37501	Dipole antenna	3125-870	EMCO	22/24
TM37502	Dipole antenna	3125-1880	EMCO	22/24
TM37773	Radio communication tester	CMU-200	R&S	22/24, 15C, 15B
TM38631	Signal generator	83640L	Agilent	22/24, 15C, 15B
TM38066	High pass filter	4HC3000/18000-3-KK	Trilithic	22/24, 15C, 15B
	High pass filter	WHK2010-10SS	Trilithic	22/24, 15C, 15B
	Low pass filter	WLK1750-10SS	Trilithic	22/24, 15C, 15B
TM26511	Tunable notch filter	WRCA870	Wainwright	22/24
TM38215	Tunable notch filter	WRCD1850/1910-0.2/40	Wainwright	22/24
TM38214	Band reject filter	WRCT 2402/2480-2400/2483.5-30	Wainwright	15C
TM30642	Turntable controller	HD-100	Deisel	22/24, 15C, 15B
TM26500	Turntable	DS412	Deisel	22/24, 15C, 15B
TM38842	Antenna mast controller	2090	EMCO	22/24, 15C, 15B
TM38843	Antenna mast	2075	EMCO	22/24, 15C, 15B
TM38114	DC power supply	6632A	Agilent	22/24, 15C, 15B
TM22835	Multimeter	87	Fluke	22/24, 15C, 15B