

FCC Part 15C Compliance Test Report

Test Report no.:	FCC15C_RM-640_11.docx	Date of Report:	14-July-2010
Number of pages:	48	Customer's Contact person:	Vivian Kill-Tollnek
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FCC listing no.:	99059		
IC recognition no.:	661AL-1		
Tested devices/ accessories:	Phone RM-640 / Battery BL-5CT / Charger AC-8 / Headset WH-102		
FCC ID:	PPIRM-640	IC:	661U-RM640
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:			

Ruben Hansen, System Manager, EMC

1. Summary for FCC Part 15C Compliance Test Report

Date of receipt	3-June-2010
Testing completed	9-July-2010
The customer's contact person	Vivian Kill-Tollnek
Test Plan referred to	T:\Projects\RM-640\TestPlan\RS_testplan_RM-640.xls
Notes	None
Document name	FCC15C_RM-640_11.docx

1.1. EUT and Accessory Information

The EUT is a WLAN device. WLAN is tested with maximum rated TX power.

Product	Type	SN	HW	MV	SW	DUT
Phone	RM-640	004402/13/036951/9	0210	-	re 5.04	24275
Phone	RM-640	004402/13/036968/1	0210	-	re 5.04	24274
Battery	BL-5CT	3820669492155081010;0670555	-	-	-	24257
Battery	BL-5CT	3820669492155081047;0670555	-	-	-	24263
Charger	AC-8	4090499301040501808;0675387	-	-	-	24255
Charger	AC-8	4090499301040501804;0675387	-	-	-	24250
Headset	WH-102	06943239431A4102158	-	-	-	24240
Headset	WH-102	06943239431A4102160	-	-	-	24247

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	PASSED
15.247(d)	A8.5	Spurious RF conducted emissions	PASSED
15.247(d), 15.209	A8.5	Spurious radiated emissions	PASSED
15.207	7.2.2	AC powerline conducted emissions	PASSED
15.247(a)(2)	A8.2 (a)	6 dB bandwidth	PASSED
15.247(e)	A8.2 (b)	Power spectral density	PASSED

PASSED
FAILED
NP

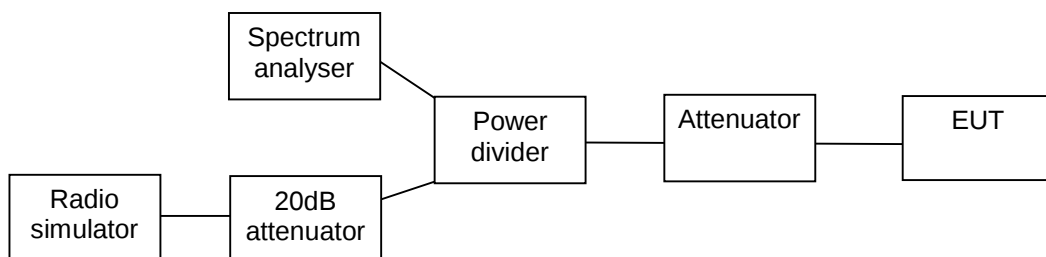
The EUT complies with the essential requirements in the standard.
The EUT does not comply with the essential requirements in the standard.
The test was not performed by the TCC Nokia Copenhagen Laboratory.

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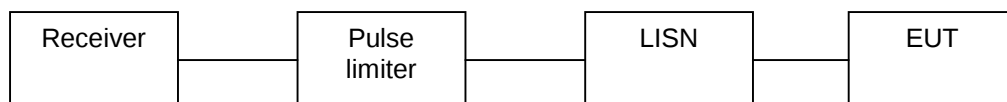
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Test setups

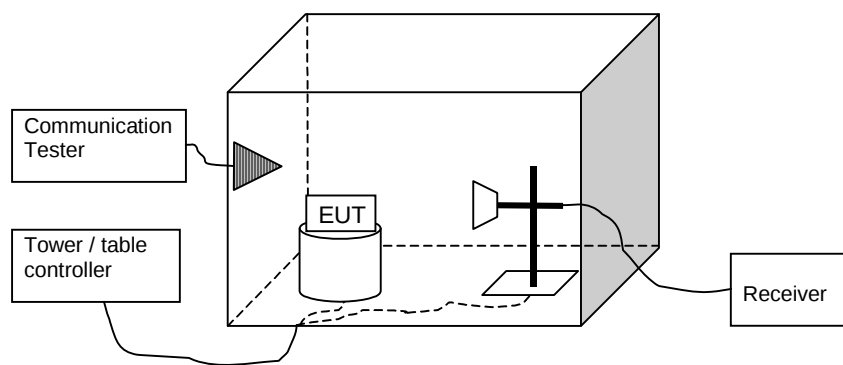
1.3. Conducted RF test setup



1.4. AC powerline conducted emissions test setup



1.5. Radiated test setup



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

EUT with DUT number	RM-640, DUT 24274
Accessories with DUT numbers	BL-5CT, DUT 24263 ; AC-8E, DUT 24250 ; WH-102, DUT 24247
Operation Voltage [V] / [Hz]	115 V / 60 Hz
Result	PASSED
Remarks	None
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	23 / 44 / 1013
Date of measurements	28-June-2010
Measured by	Ruben Hansen

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

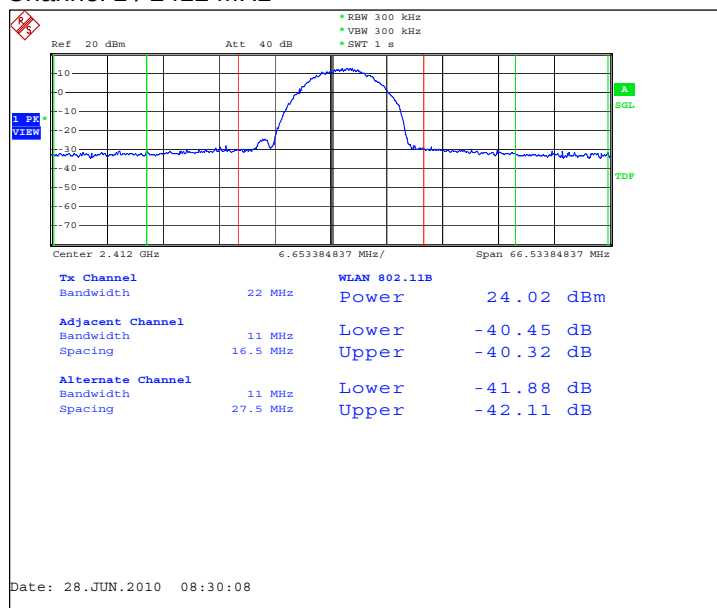
Frequency range [MHz]	Limit [W]	Limit [dBm]
2400 – 2483.5	≤ 1	≤ 30

3.2. WLAN Test results

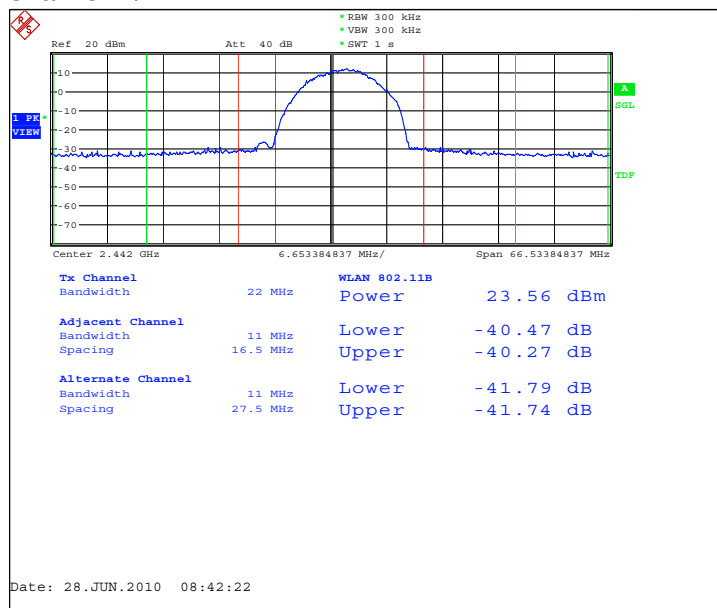
3.2.1 DSSS mode, QPSK modulation, 11 Mbps data rate

Channel / f _c [MHz]	P [dBm]	P [W]	Result
1 / 2412	24.02	0.252	PASSED
7 / 2442	23.56	0.227	PASSED
11 / 2462	23.31	0.214	PASSED

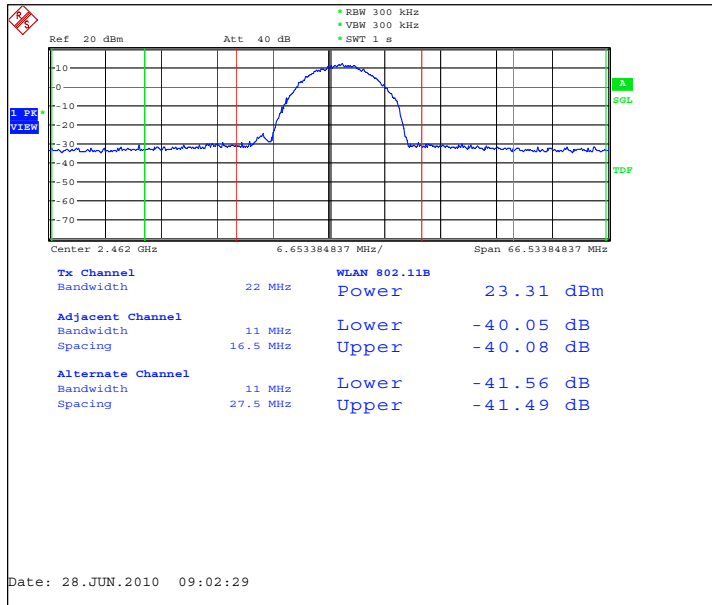
Channel 1 / 2412 MHz



Channel 7 / 2442 MHz



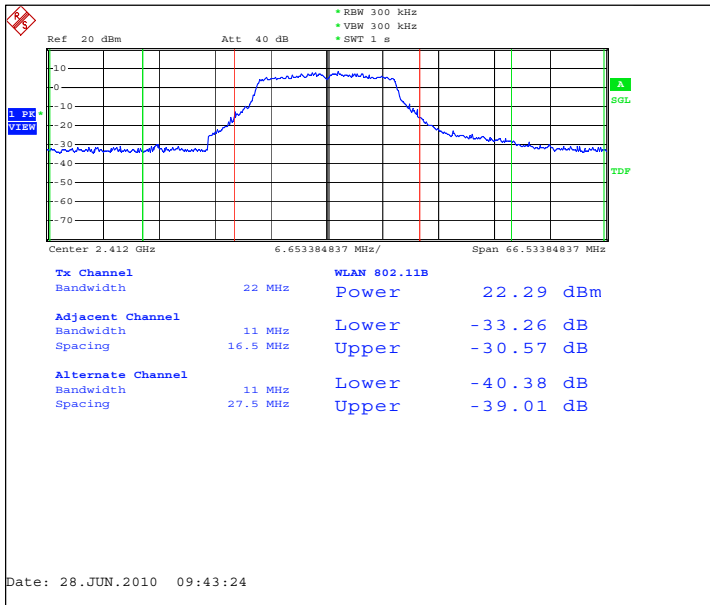
Channel 11 / 2462 MHz



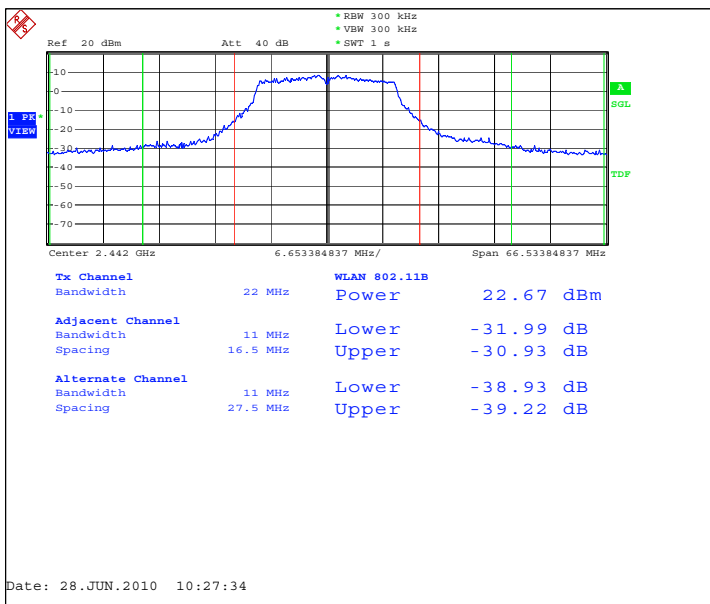
3.2.2 OFDM mode, BPSK modulation, 6 Mbps data rate

Channel / f_c [MHz]	P [dBm]	P [W]	Result
1 / 2412	22.29	0.169	PASSED
7 / 2442	22.67	0.185	PASSED
11 / 2462	22.58	0.181	PASSED

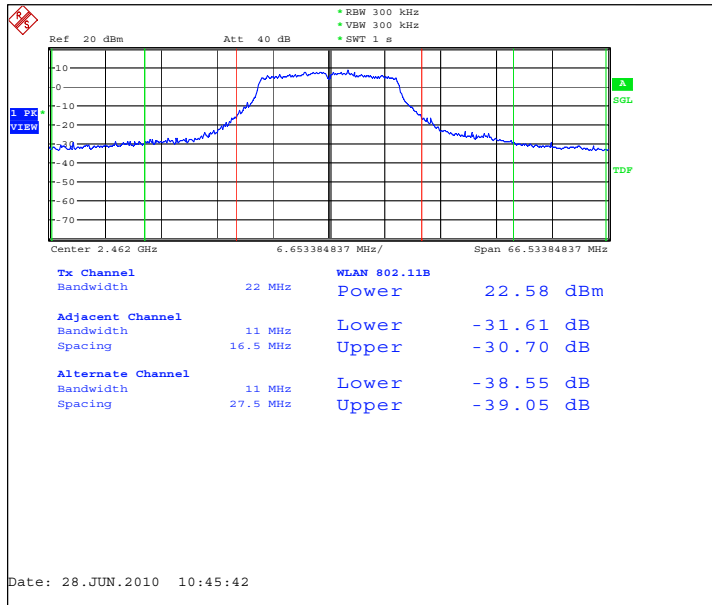
Channel 1 / 2412 MHz



Channel 7 / 2442 MHz



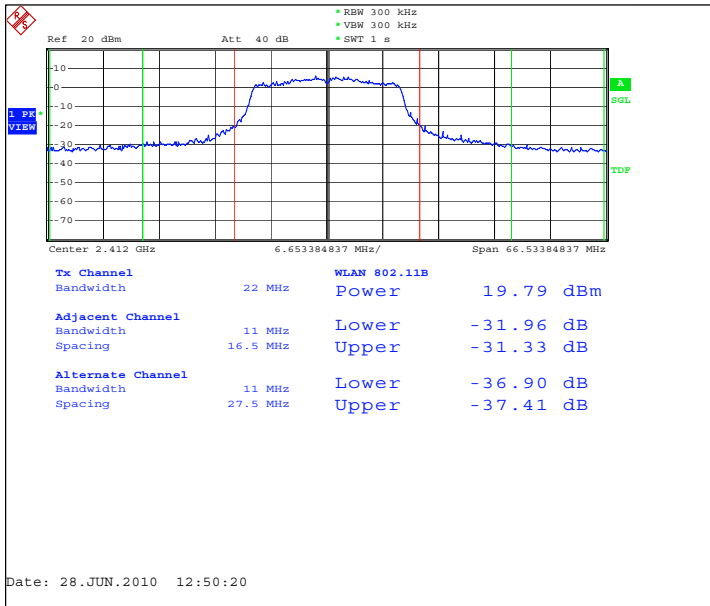
Channel 11 / 2462 MHz



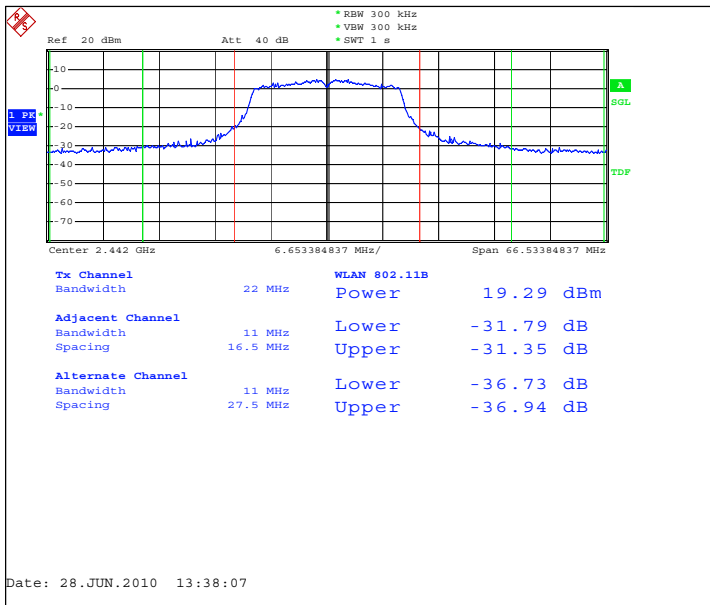
3.2.3 WLAN 802.11n MSC 0

Channel / f_c [MHz]	P [dBm]	P [W]	Result
1 / 2412	19.79	0.095	PASSED
7 / 2442	19.29	0.085	PASSED
11 / 2462	19.43	0.088	PASSED

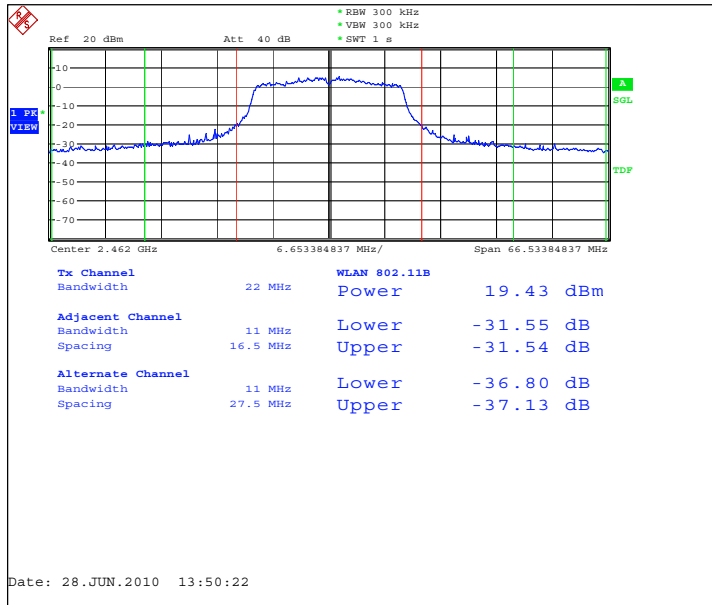
Channel 1 / 2412 MHz



Channel 7 / 2442 MHz



Channel 11 / 2462 MHz



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

EUT with DUT number	RM-640, DUT 24275
Accessories with DUT numbers	BL-5CT, DUT 24257 ; AC-8E, DUT 24255 ; WH-102, DUT 24240
Operation Voltage [V] / [Hz]	115 V / 60 Hz
Result	PASSED
Remarks	None
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	23 / 44 / 1013
Date of measurements	28-June-2010
Measured by	Ruben Hansen

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

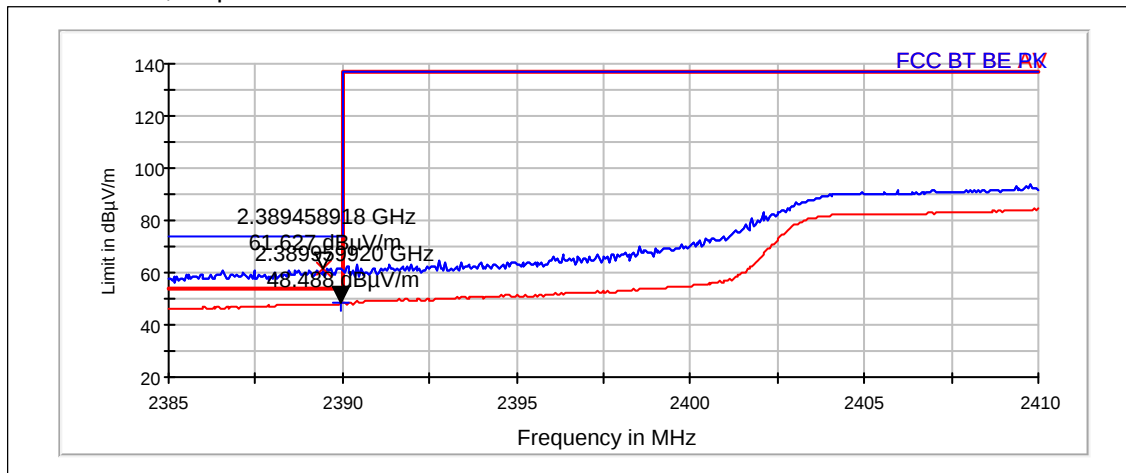
Average (RBW: 1 MHz, VBW: 1 MHz)

Channel / f_c [MHz]	E [dBμV/m]	Result
1 / 2412 (802.11n)	48.49	PASSED
1 / 2412 (OFDM 6 MBps)	53.13	PASSED
1 / 2412 (DSSS 11 MBps)	53.43	PASSED
11 / 2462 (802.11n)	52.94	PASSED
11 / 2462 (OFDM 6 MBps)	51.67	PASSED
11 / 2462 (DSSS 11 MBps)	52.03	PASSED

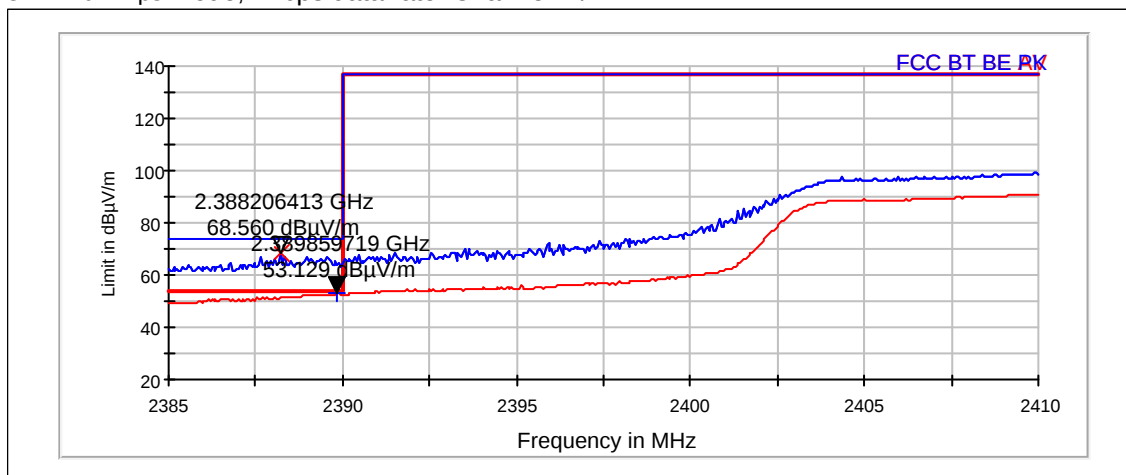
Peak (RBW: 1 MHz, VBW: 1 MHz)

Channel / f_c [MHz]	E [dBμV/m]	Result
1 / 2412 (802.11n)	61.63	PASSED
1 / 2412 (OFDM 6 MBps)	68.56	PASSED
1 / 2412 (DSSS 11 MBps)	67.44	PASSED
11 / 2462 (802.11n)	64.61	PASSED
11 / 2462 (OFDM 6 MBps)	64.14	PASSED
11 / 2462 (DSSS 11 MBps)	64.19	PASSED

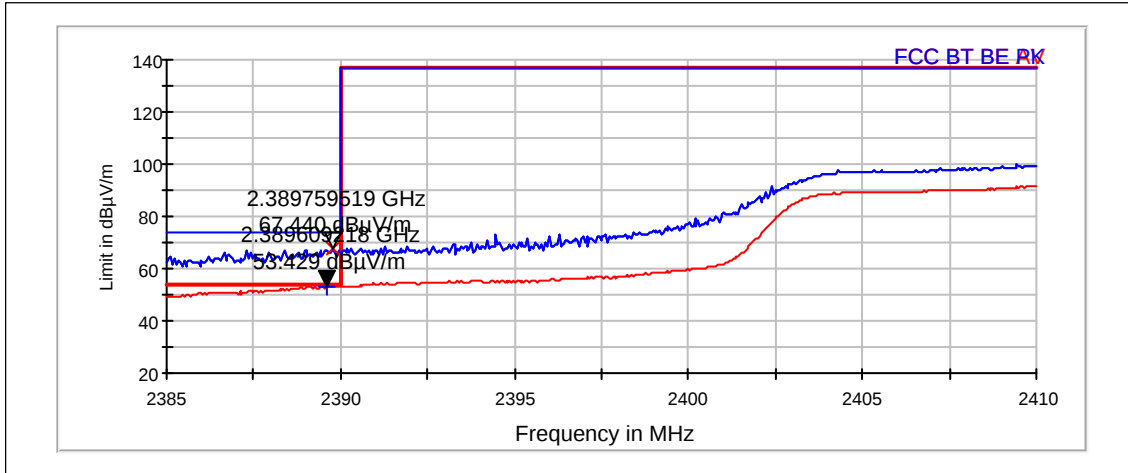
802.11n mode, Mbps data rate. Channel 1 / 2412 MHz



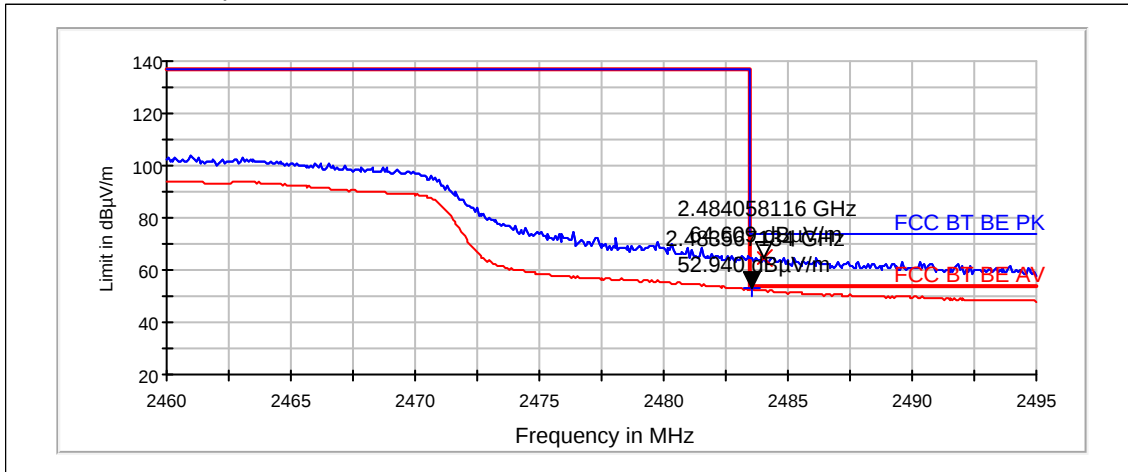
OFDM 6 Mbps mode, Mbps data rate. Channel 1 / 2412 MHz



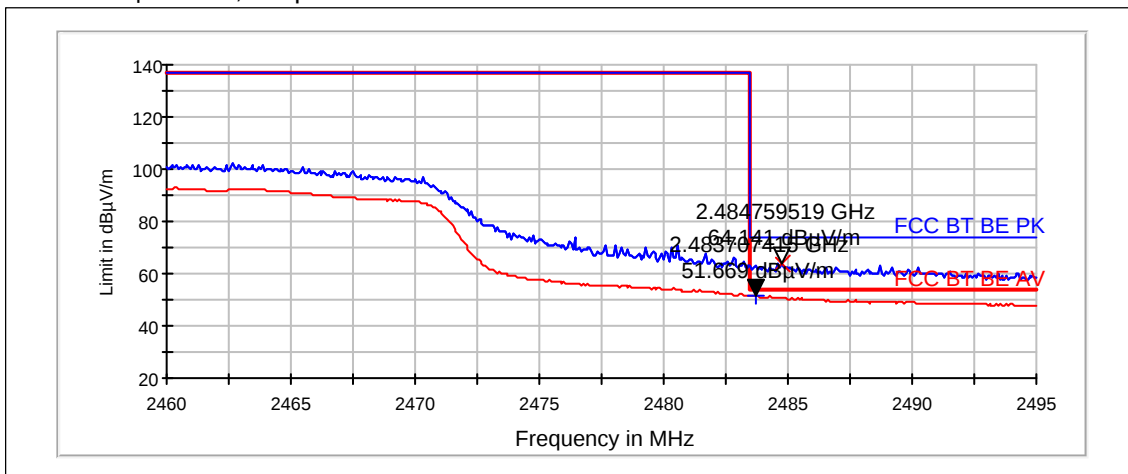
DSSS 11 Mbps mode, Mbps data rate. Channel 1 / 2412 MHz



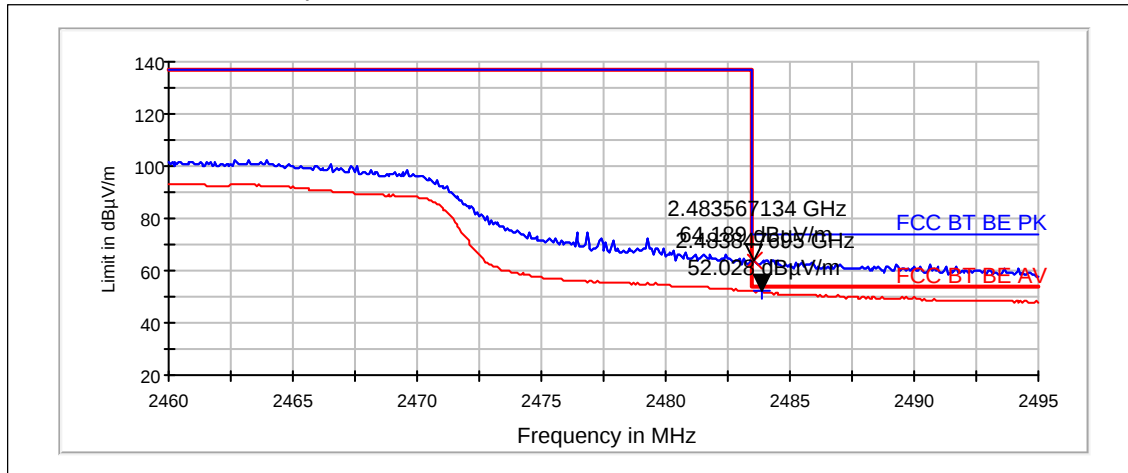
802.11n mode, Mbps data rate. Channel 11 / 2462 MHz



OFDM 6 Mbps mode, Mbps data rate. Channel 11 / 2462 MHz



DSSS 11 Mbps mode, Mbps data rate. Channel 11 / 2462 MHz



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

EUT with DUT number	RM-640, DUT 24274
Accessories with DUT numbers	BL-5CT, DUT 24263 ; AC-8E, DUT 24250 ; WH-102, DUT 24247
Operation Voltage [V] / [Hz]	115 V / 60 Hz
Result	PASSED
Remarks	None
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	23 / 44 / 1013
Date of measurements	28-June-2010
Measured by	Ruben Hansen

5.1. Test method and limit

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

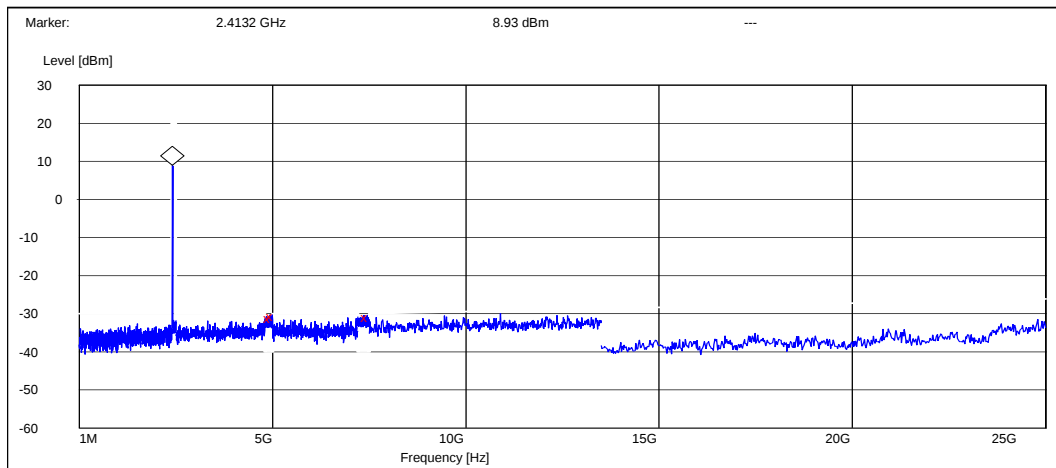
Limits for spurious RF conducted emissions measurements

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

5.2. WLAN Test results

5.2.1 DSSS mode, QPSK modulation, 11 Mbps data rate

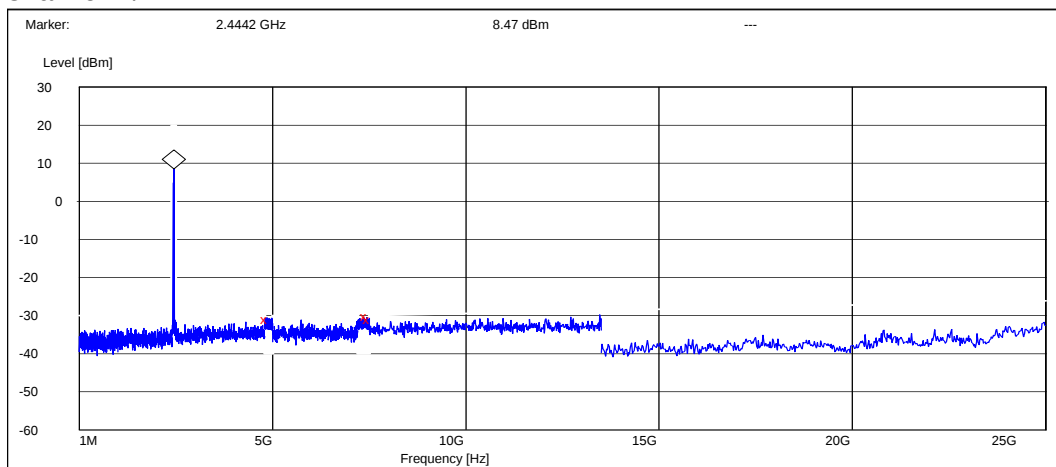
Channel 1 / 2412 MHz



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

Frequency [MHz]	P [dBc]	Result
4930.400000	-40.033586	PASSED
5000.000000	-39.633586	PASSED
7446.600000	-39.933586	PASSED

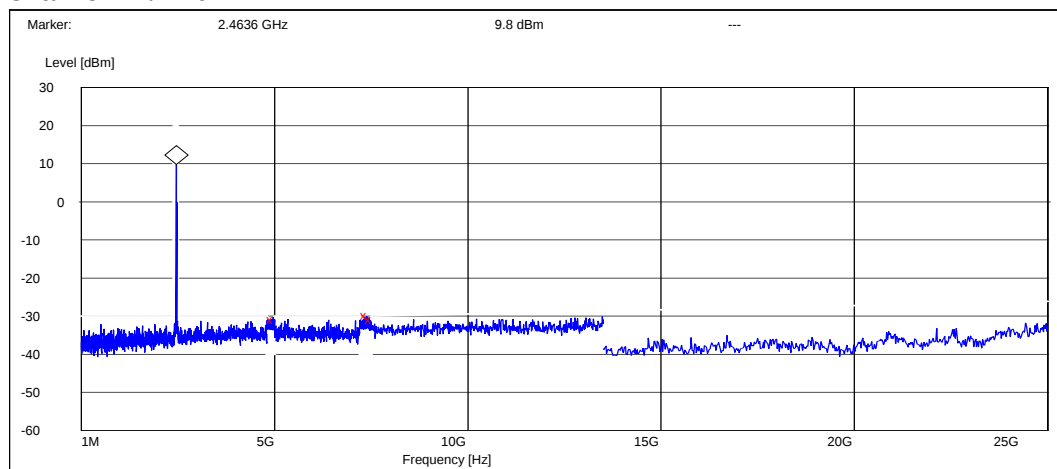
Channel 7 / 2442 MHz



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

Frequency [MHz]	P [dBc]	Result
4850.800000	-39.472214	PASSED
7432.200000	-38.772214	PASSED
7500.000000	-39.372214	PASSED

Channel 11 / 2462 MHz

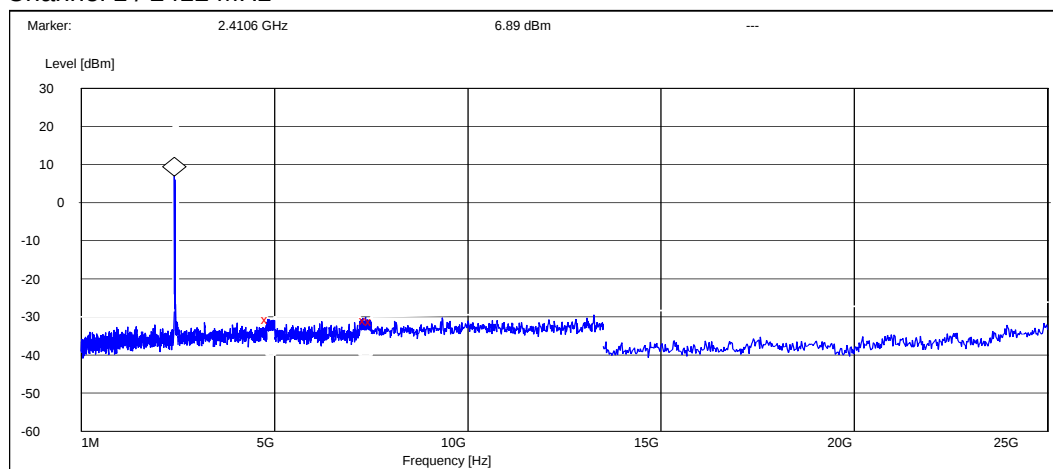


Peak (RBW: 100 kHz, VBW: 100 kHz)

Frequency [MHz]	P [dBc]	Result
4968.800000	-40.700613	PASSED
7386.000000	-39.600613	PASSED
7500.000000	-40.500613	PASSED

5.2.2 OFDM mode, BPSK modulation, 6 Mbps data rate

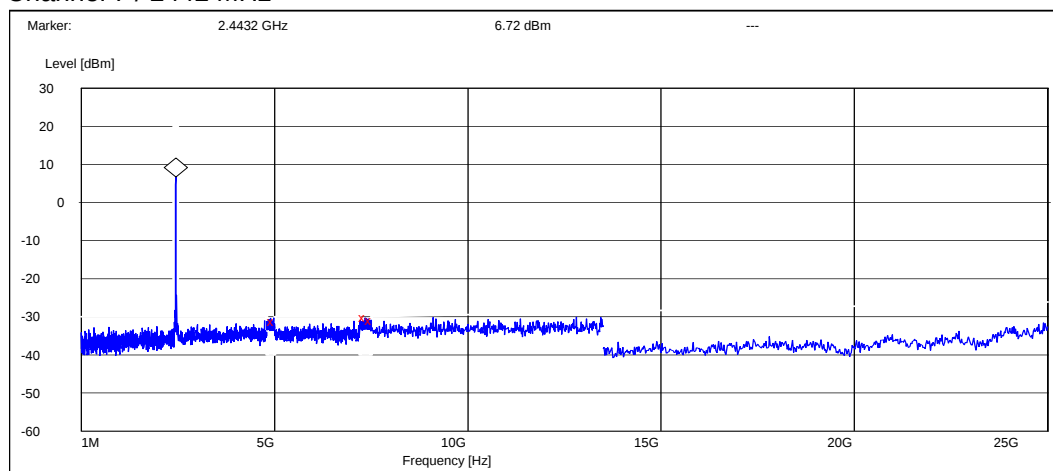
Channel 1 / 2412 MHz



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

Frequency [MHz]	P [dBc]	Result
4830.400000	-37.586482	PASSED
7359.000000	-37.886482	PASSED
7500.000000	-38.086482	PASSED

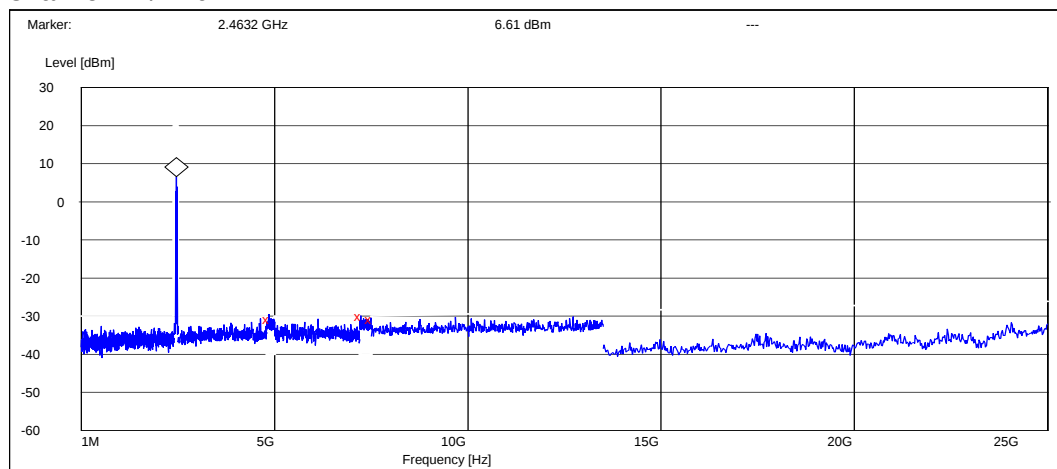
Channel 7 / 2442 MHz



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

Frequency [MHz]	P [dBc]	Result
4977.200000	-37.924541	PASSED
7341.000000	-37.024541	PASSED
7500.000000	-37.624541	PASSED

Channel 11 / 2462 MHz

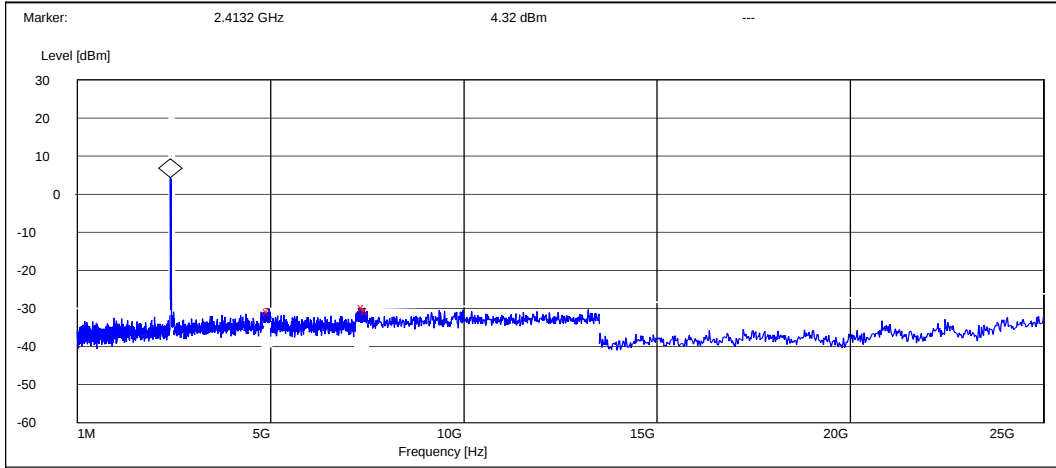


Peak (RBW: 100 kHz, VBW: 100 kHz)

Frequency [MHz]	P [dBc]	Result
4859.200000	-37.511496	PASSED
7225.200000	-36.711496	PASSED
7500.000000	-37.411496	PASSED

5.2.3 WLAN 802.11n MSC 0

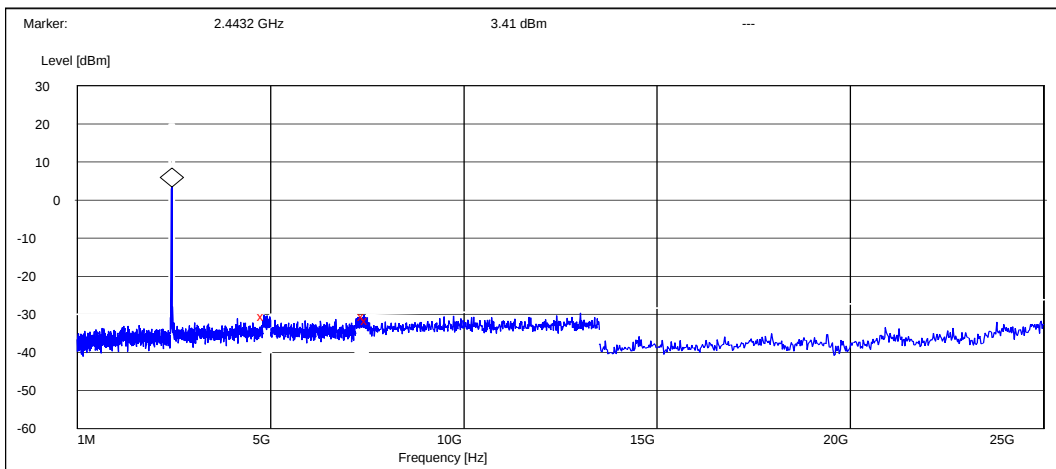
Channel 1 / 2412 MHz



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

Frequency [MHz]	P [dBc]	Result
4956.800000	-35.118497	PASSED
7416.600000	-34.018497	PASSED
7500.000000	-34.718497	PASSED

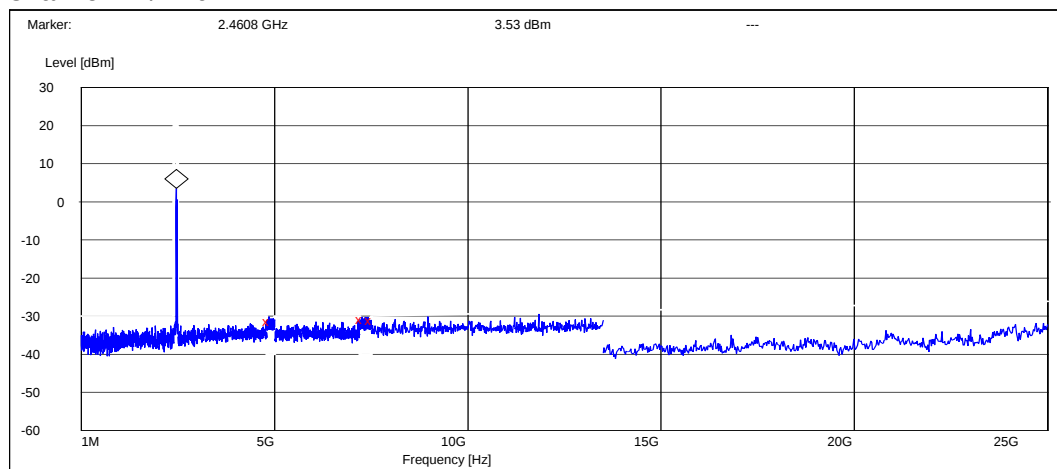
Channel 7 / 2442 MHz



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

Frequency [MHz]	P [dBc]	Result
4828.400000	-33.810751	PASSED
7419.000000	-34.010751	PASSED
7500.000000	-34.810751	PASSED

Channel 11 / 2462 MHz



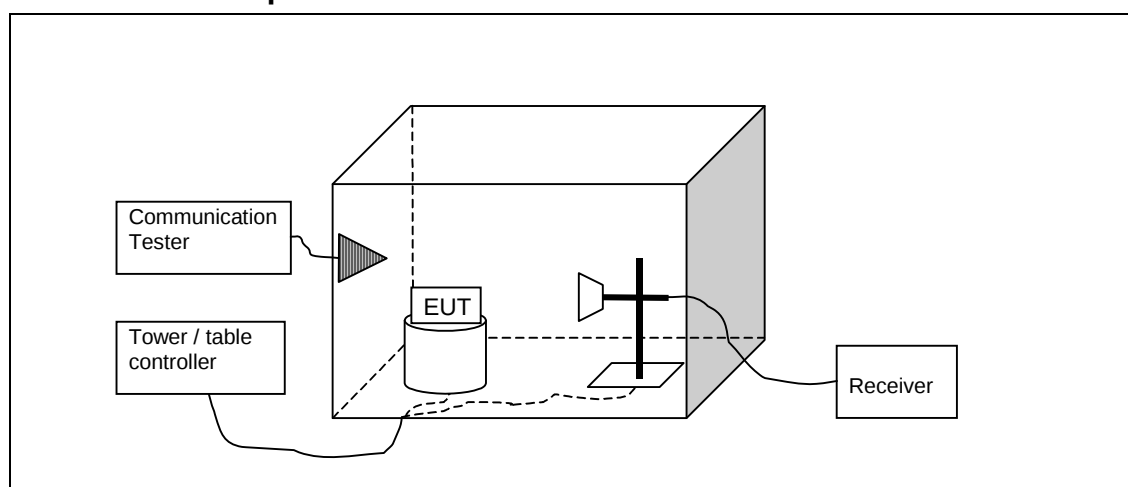
Peak (RBW: 100 kHz, VBW: 100 kHz)

Frequency [MHz]	P [dBc]	Result
4859.600000	-34.928633	PASSED
7262.400000	-34.228633	PASSED
7500.000000	-34.528633	PASSED

6. Spurious radiated emissions (FCC §22.917(a), §24.238(a), §2.1053, RSS-132 4.5, RSS-133 6.5)

EUT with DUT number	RM-640, DUT 24275
Accessories with DUT numbers	BL-5CT, DUT 24257 ; AC-8E, DUT 24255 ; WH-102, DUT 24240
Operation Voltage [V] / [Hz]	115 V / 60 Hz
Results	PASSED
Remarks	None
Temp [°C] / Humidity [%RH] /	23 / 44
Date of measurements	05-Jul-2010
Measured by	Ruben Hansen

6.1. Test Setup



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

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

6.3. WLAN Test results

6.3.1 n-mode

Channel 1 / 2412 MHz

Average(RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
4823.7	27.68	24.199	26.14	1.54	VERTICAL	PASSED
7237.3	34.32	52.018	24.39	9.93	HORIZONTAL	PASSED

Peak (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
4823.7	40.66	107.833	39.12	1.54	VERTICAL	PASSED
7237.3	47.35	233.077	37.42	9.93	HORIZONTAL	PASSED

Channel 7 / 2442 MHz

Average(RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
2361.645	41.34	116.627	41.83	-0.49	VERTICAL	PASSED
2369.321	38.85	87.599	39.52	-0.67	VERTICAL	PASSED
3943.787	24.87	17.525	25.86	-0.99	HORIZONTAL	PASSED
10694.089	42.82	138.42	24.07	18.75	VERTICAL	PASSED

Quasi peak (RBW: 100 kHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
37.635	15.89	6.227	26.02	-10.13	HORIZONTAL	PASSED
48.597	33.72	48.512	51.24	-17.52	VERTICAL	PASSED
49.028	34.2	51.31	52.02	-17.82	VERTICAL	PASSED
49.207	34.06	50.443	52.01	-17.95	VERTICAL	PASSED
49.219	34.29	51.79	52.24	-17.95	VERTICAL	PASSED

Peak (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
2361.645	54.21	513.157	54.7	-0.49	VERTICAL	PASSED
2369.321	51.62	380.89	52.29	-0.67	VERTICAL	PASSED
3943.787	37.87	78.253	38.86	-0.99	HORIZONTAL	PASSED
10694.089	56.04	633.797	37.29	18.75	VERTICAL	PASSED

Channel 11 / 2462 MHz

Average(RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
4925.7	30.33	32.836	27.94	2.39	HORIZONTAL	PASSED
7384.8	36.17	64.343	24.27	11.9	VERTICAL	PASSED

Peak (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
4925.7	42.74	137.088	40.35	2.39	HORIZONTAL	PASSED
7384.8	49.19	287.906	37.29	11.9	VERTICAL	PASSED

6.3.2 OFDM 6Mbps mode

Channel 1 / 2412 MHz

Average(RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
4824.7	27.98	25.067	26.43	1.55	HORIZONTAL	PASSED
7234.5	34.45	52.778	24.46	9.99	HORIZONTAL	PASSED

Peak (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
4824.7	40.67	107.957	39.12	1.55	HORIZONTAL	PASSED
7234.5	47.28	231.26	37.29	9.99	HORIZONTAL	PASSED

Channel 7 / 2442 MHz

Average(RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
2361.745	43.93	157.199	44.41	-0.48	VERTICAL	PASSED
2369.421	41.32	116.386	42	-0.68	VERTICAL	PASSED
3942.383	25.25	18.292	26.25	-1	VERTICAL	PASSED
11385.57	42.23	129.286	24.26	17.97	HORIZONTAL	PASSED

Quasi peak (RBW: 100 kHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
45.829	32.7	43.162	48.28	-15.58	VERTICAL	PASSED
46.45	32.32	41.319	48.33	-16.01	VERTICAL	PASSED
48.897	34.15	50.992	51.88	-17.73	VERTICAL	PASSED
48.959	33.93	49.699	51.7	-17.77	VERTICAL	PASSED
49.518	33.98	50.021	52.14	-18.16	VERTICAL	PASSED

Peak (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
2361.745	55.53	597.654	56.01	-0.48	VERTICAL	PASSED
2369.421	53.74	486.519	54.42	-0.68	VERTICAL	PASSED
3942.383	38.48	83.985	39.48	-1	VERTICAL	PASSED
11385.57	55.26	579.162	37.29	17.97	HORIZONTAL	PASSED

Channel 11 / 2462 MHz

Average(RBW: 1 MHz)

Frequency [MHz]	E [dB μ V/m]	E [μ V/m]	U _{RX} [dB μ V]	A _{TOT} [dB]	Polarisation	Result
4923.3	30.41	33.144	28.06	2.35	VERTICAL	PASSED
7387.4	36.22	64.707	24.25	11.97	VERTICAL	PASSED

Peak (RBW: 1 MHz)

Frequency [MHz]	E [dB μ V/m]	E [μ V/m]	U _{RX} [dB μ V]	A _{TOT} [dB]	Polarisation	Result
4923.3	43.19	144.444	40.84	2.35	VERTICAL	PASSED
7387.4	49.8	309.136	37.83	11.97	VERTICAL	PASSED

6.3.3 DSSS 11Mbps mode

Channel 1 / 2412 MHz

Average(RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
4825.4	28.4	26.315	26.84	1.56	HORIZONTAL	PASSED
7237.1	34.29	51.826	24.37	9.92	VERTICAL	PASSED

Peak (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
4825.4	41.17	114.419	39.61	1.56	HORIZONTAL	PASSED
7237.1	46.81	218.953	36.89	9.92	VERTICAL	PASSED

Channel 7 / 2442 MHz

Average(RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
2353.926	38.9	88.115	38.94	-0.04	VERTICAL	PASSED
2363.389	45.54	189.278	46.01	-0.47	VERTICAL	PASSED
11463.728	42.7	136.49	24.4	18.3	HORIZONTAL	PASSED
11511.122	42.77	137.562	24.34	18.43	VERTICAL	PASSED

Quasi peak (RBW: 100 kHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
48.867	33.51	47.359	51.22	-17.71	VERTICAL	PASSED
49.099	33.29	46.206	51.16	-17.87	VERTICAL	PASSED
49.147	33.41	46.827	51.31	-17.9	VERTICAL	PASSED
49.22	33.52	47.402	51.47	-17.95	VERTICAL	PASSED
49.888	32.94	44.371	51.36	-18.42	VERTICAL	PASSED

Peak (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
2353.926	51.07	357.479	51.11	-0.04	VERTICAL	PASSED
2363.389	55.41	589.658	55.88	-0.47	VERTICAL	PASSED
11463.728	55.46	592.721	37.16	18.3	HORIZONTAL	PASSED
11511.122	55.72	611.083	37.29	18.43	VERTICAL	PASSED

Channel 11 / 2462 MHz

Average(RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
4925.4	30.29	32.689	27.9	2.39	VERTICAL	PASSED
7385.1	36.22	64.684	24.3	11.92	VERTICAL	PASSED

Peak (RBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
4925.4	43.23	145.111	40.84	2.39	VERTICAL	PASSED
7385.1	49.75	307.15	37.83	11.92	VERTICAL	PASSED

7. AC powerline conducted emissions (FCC §15.107, ICES-003 section 5.3)

EUT with DUT number	RM-640, DUT 24276
Accessories with DUT numbers	BL-5CT, DUT 24253 ; AC-8E, DUT 24254 ; WH-102, DUT 24241
Operation Voltage [V] / [Hz]	115 / 60
Result	Passed
Remarks	None
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	24 / 42 / 1007
Date of measurements	22-Jun-2010
Measured by	Bo Moltved Christiansen

7.1. Test setup



7.2. 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:

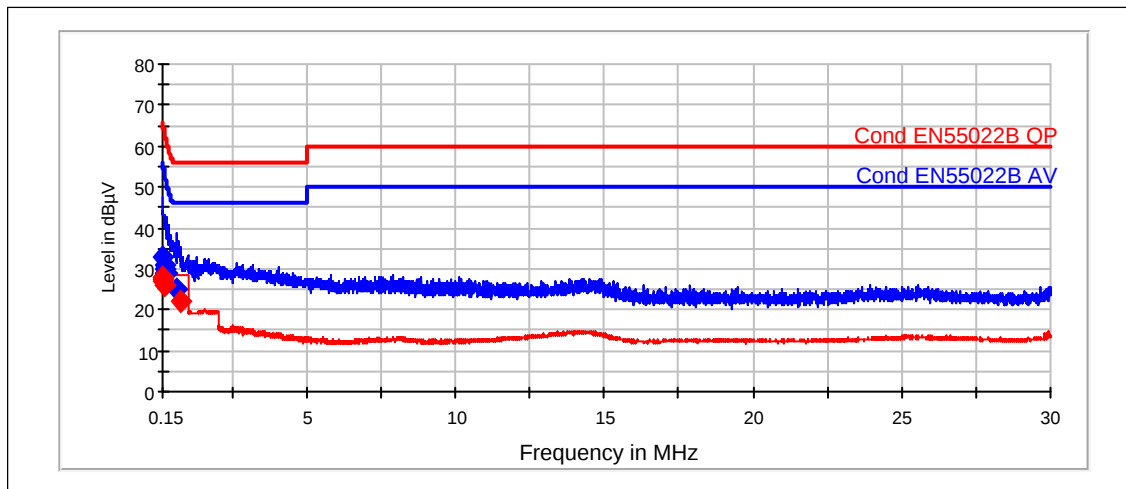
$$U [dB\mu V] = U_{RX} + A_{TOT}$$

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

WLAN 802.11b DSSS



Quasi peak

Frequency [MHz]	Level [dBμV]	IF-BW[kHz]	Line	Margin	Result
0.15	33	10	N	33	PASSED
0.2	30.74	10	N	32.91	PASSED
0.21	30.11	10	N	33.11	PASSED
0.24	29.05	10	N	33.1	PASSED
0.29	28.86	10	N	31.62	PASSED
0.61	24.84	10	N	31.2	PASSED

Average

Frequency [MHz]	Level [dBμV]	IF-BW[kHz]	Line	Margin	Result
0.16	27.95	10	N	27.56	PASSED
0.17	27.37	10	N	27.56	PASSED
0.18	27.11	10	L1	27.39	PASSED
0.195	26.08	10	L1	27.72	PASSED
0.205	25.81	10	N	27.61	PASSED
0.755	21.99	10	N	24	PASSED

8. 6 dB bandwidth (FCC §15.247(a)(2), RSS-210 A8.2 (a))

EUT with DUT number	RM-640, DUT 24274
Accessories with DUT numbers	BL-5CT, DUT 24263 ; AC-8E, DUT 24250 ; WH-102, DUT 24247
Operation Voltage [V] / [Hz]	115 V / 60 Hz
Result	PASSED
Remarks	None
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	23 / 44 / 1013
Date of measurements	28-June-2010
Measured by	Ruben Hansen

8.1. 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

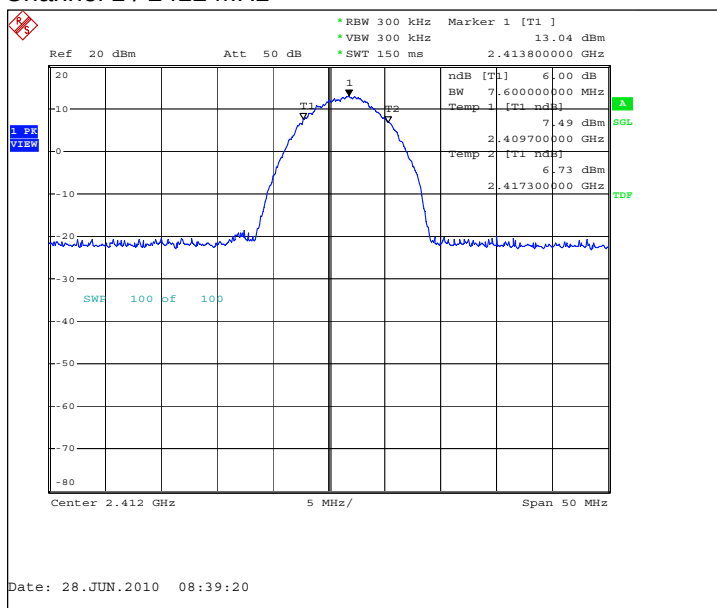
Limit [kHz]
≥ 500

8.2. WLAN test results

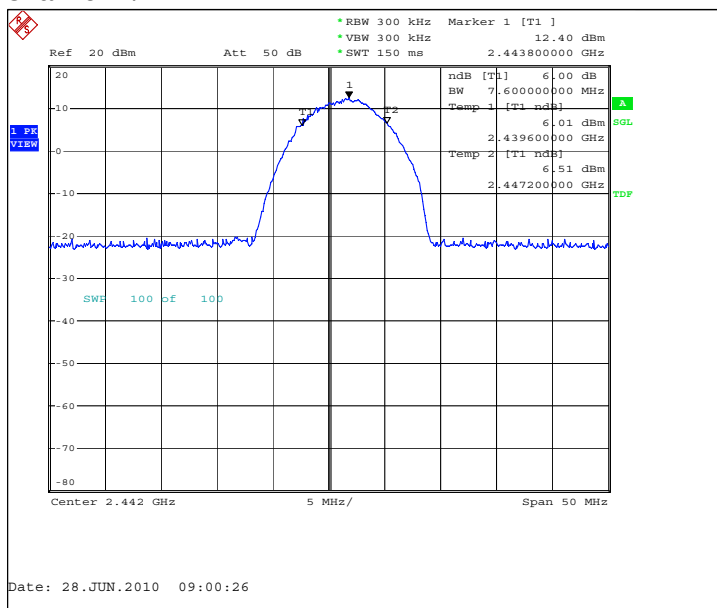
8.2.1 DSSS mode, QPSK modulation, 11 Mbps data rate

Channel / f _c [MHz]	6 dB bandwidth [kHz]	Result
1	7600.000	PASSED
7	7600.000	PASSED
11	7700.000	PASSED

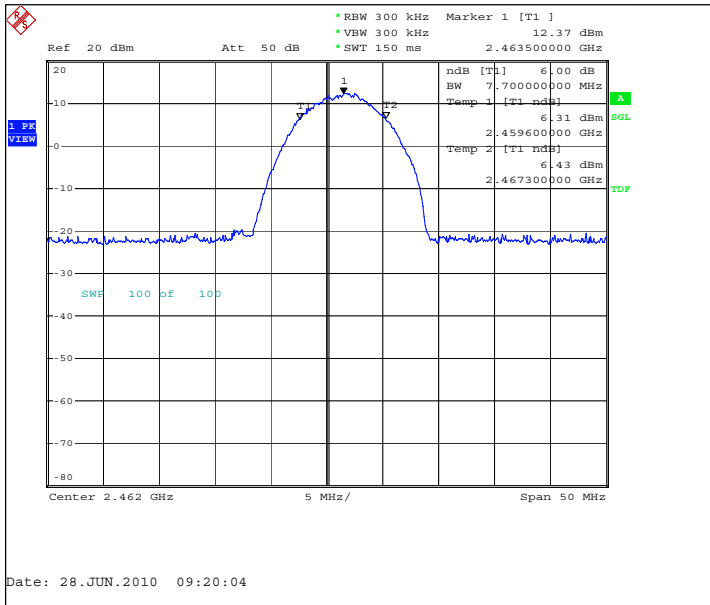
Channel 1 / 2412 MHz



Channel 7 / 2442 MHz



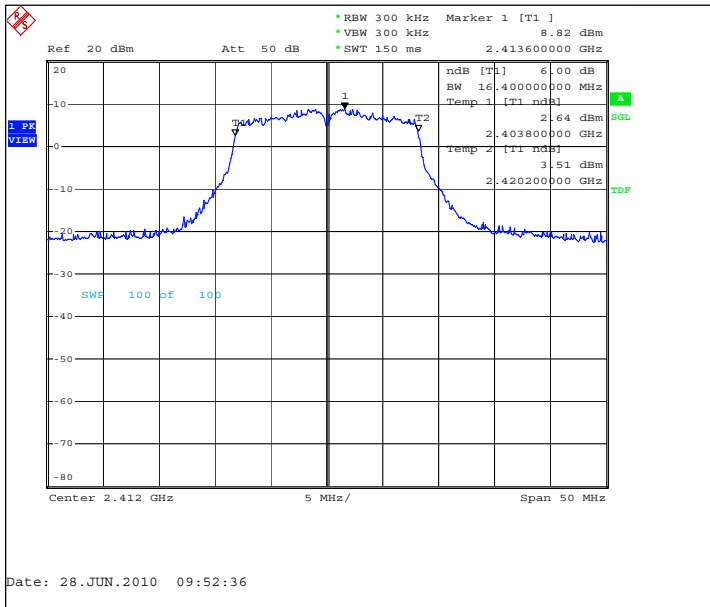
Channel 11 / 2462 MHz



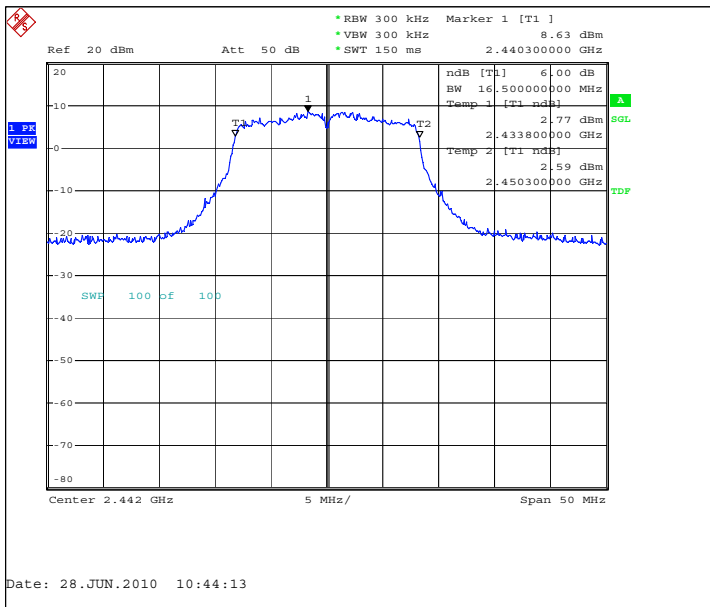
8.2.2 OFDM mode, BPSK modulation, 6 Mbps data rate

Channel / f_c [MHz]	6 dB bandwidth [kHz]	Result
1	16400.000	PASSED
7	16500.000	PASSED
11	16500.000	PASSED

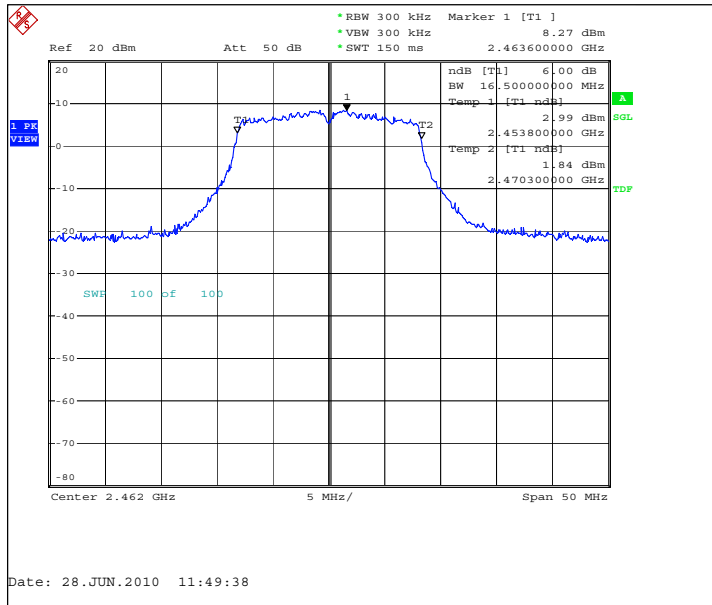
Channel 1 / 2412 MHz



Channel 7 / 2442 MHz



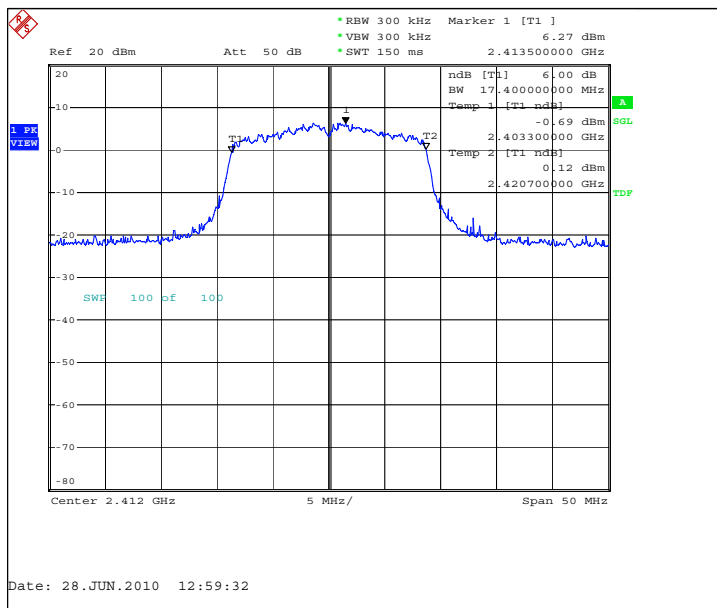
Channel 11 / 2462 MHz



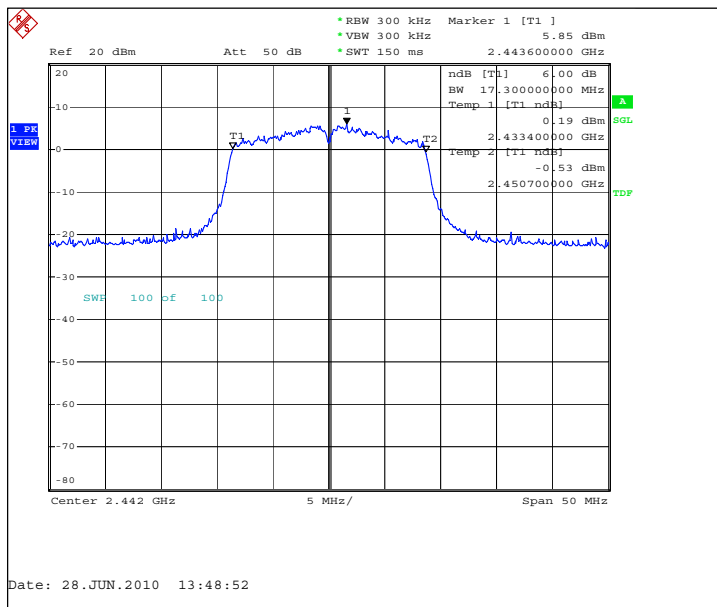
8.2.3 WLAN 802.11n 0 MSC

Channel / f_c [MHz]	6 dB bandwidth [kHz]	Result
1	17400.000	PASSED
7	17300.000	PASSED
11	17400.000	PASSED

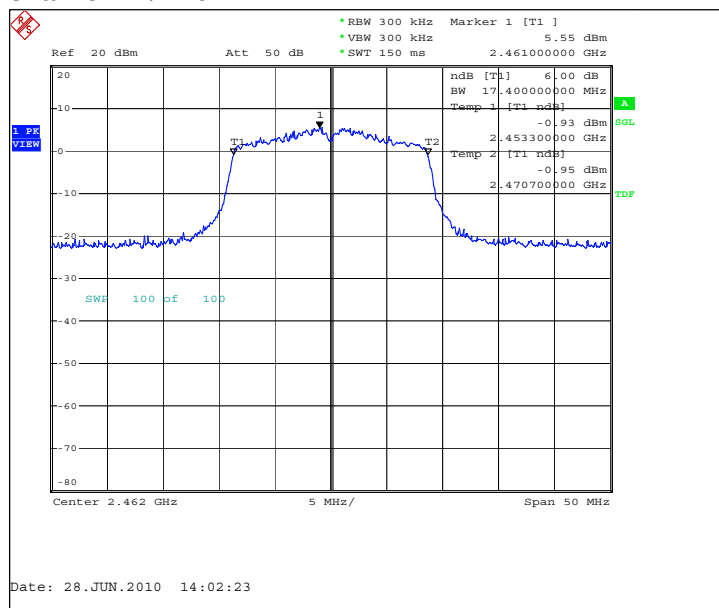
Channel 1 / 2412 MHz



Channel 7 / 2442 MHz



Channel 11 / 2462 MHz



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

EUT with DUT number	RM-640, DUT 24274
Accessories with DUT numbers	BL-5CT, DUT 24263 ; AC-8E, DUT 24250 ; WH-102, DUT 24247
Operation Voltage [V] / [Hz]	115 V / 60 Hz
Result	PASSED
Remarks	None
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	23 / 44 / 1013
Date of measurements	28-June-2010
Measured by	Ruben Hansen

9.1. 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

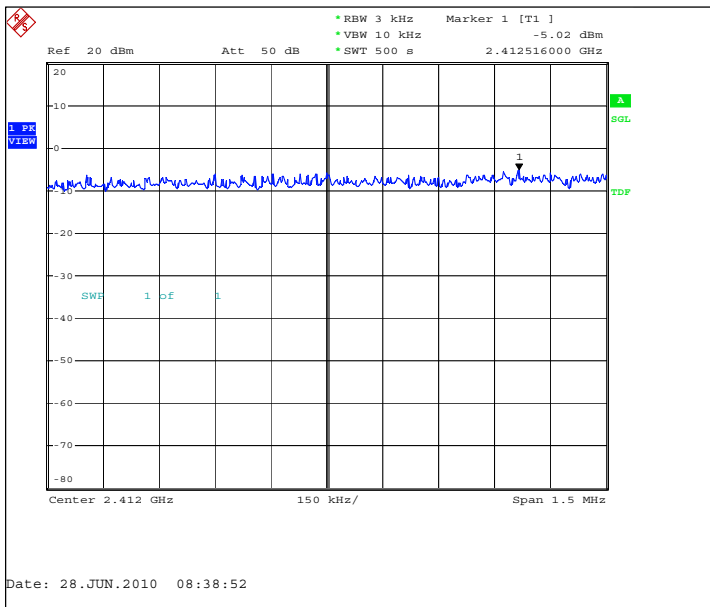
Limit [dBm] @ 3 kHz
≤ 8

9.2. WLAN test results

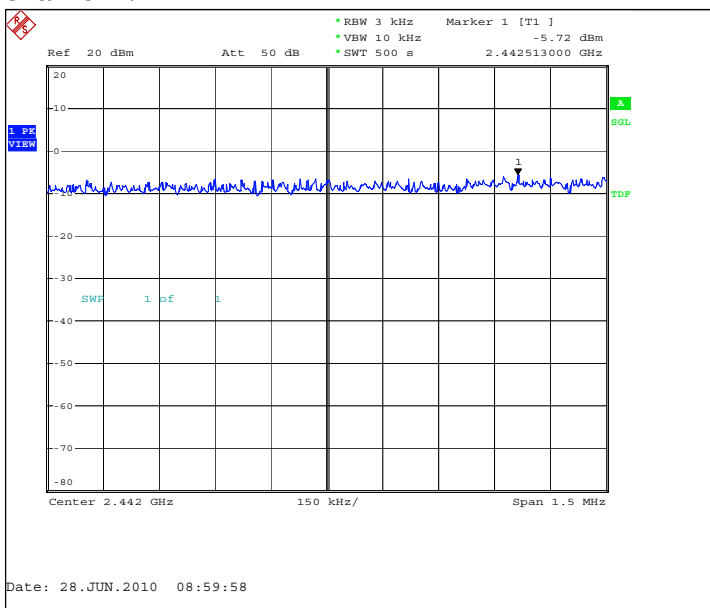
9.2.1 DSSS mode, QPSK modulation, 11 Mbps data rate

Frequency	Level	Transd	Spectr Density
1 / 2412	-5.02	17.0	PASSED
7 / 2442	-5.72	17.0	PASSED
11 / 2462	-5.87	17.0	PASSED

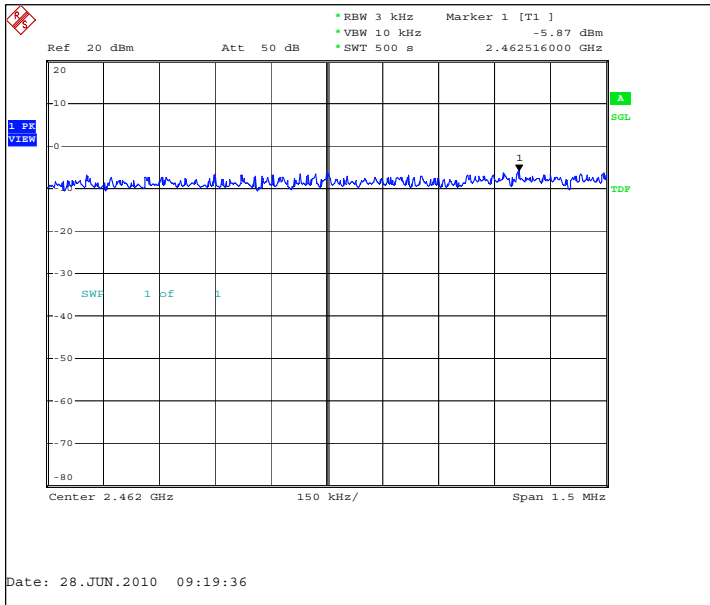
Channel 1 / 2412 MHz



Channel 7 / 2442 MHz



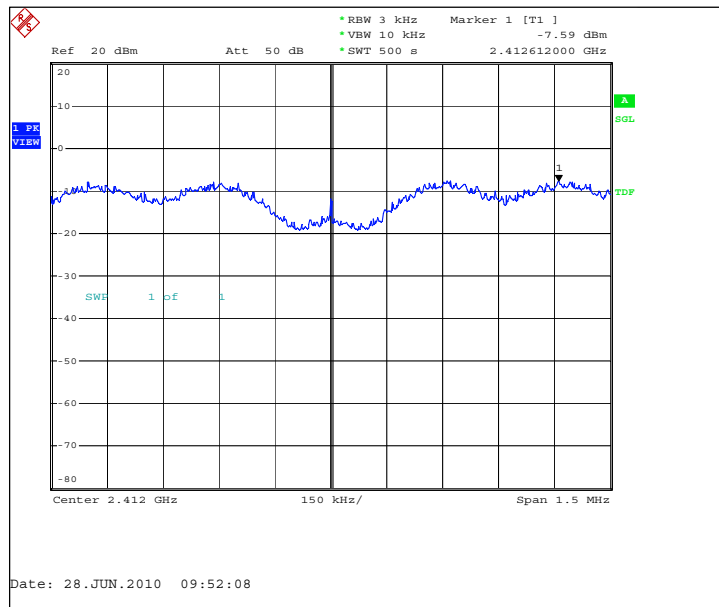
Channel 11 / 2462 MHz



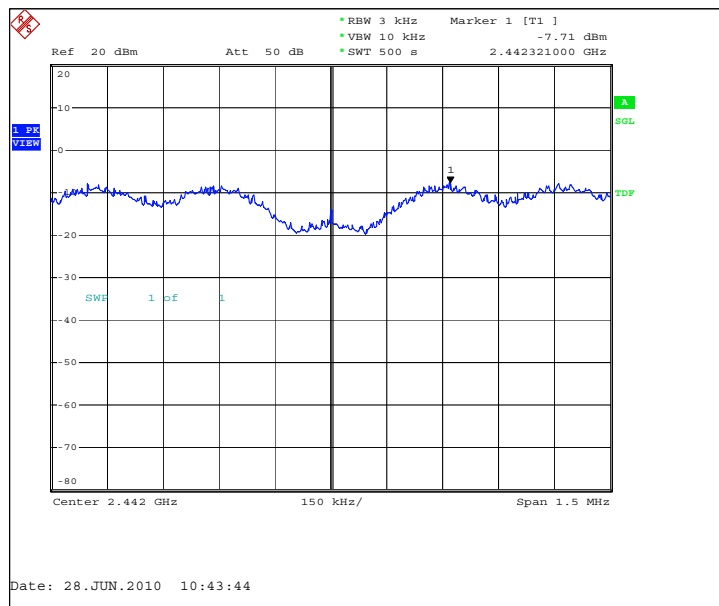
9.2.2 OFDM mode, BPSK modulation, 6 Mbps data rate

Frequency	Level	Transd	Spectr Density
1 / 2412	-7.59	17.0	PASSED
7 / 2442	-7.71	17.0	PASSED
11 / 2462	-7.88	17.0	PASSED

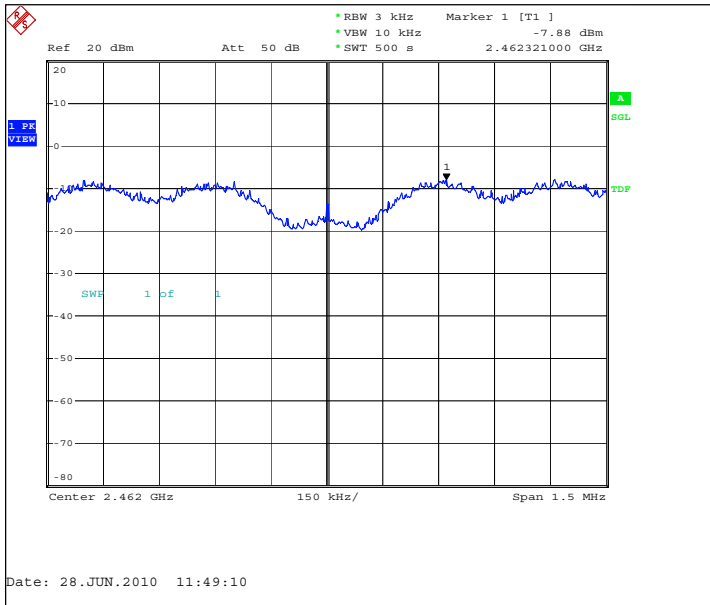
Channel 1 / 2412 MHz



Channel 7 / 2442 MHz



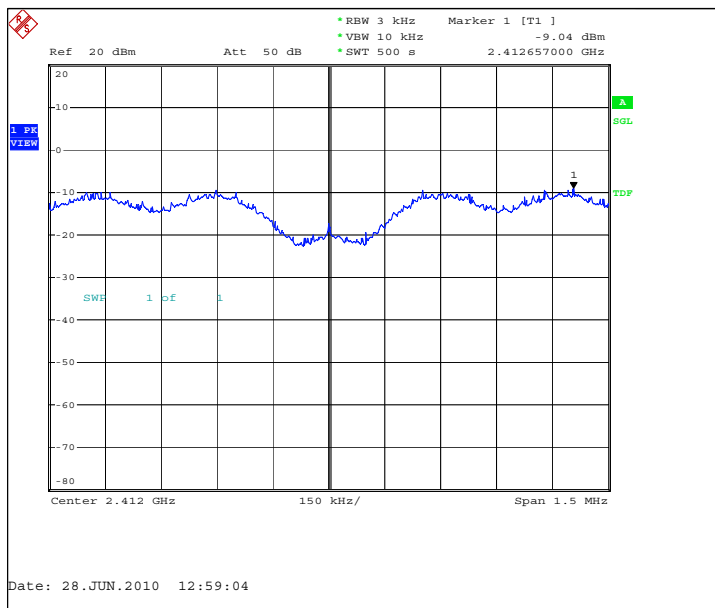
Channel 11 / 2462 MHz



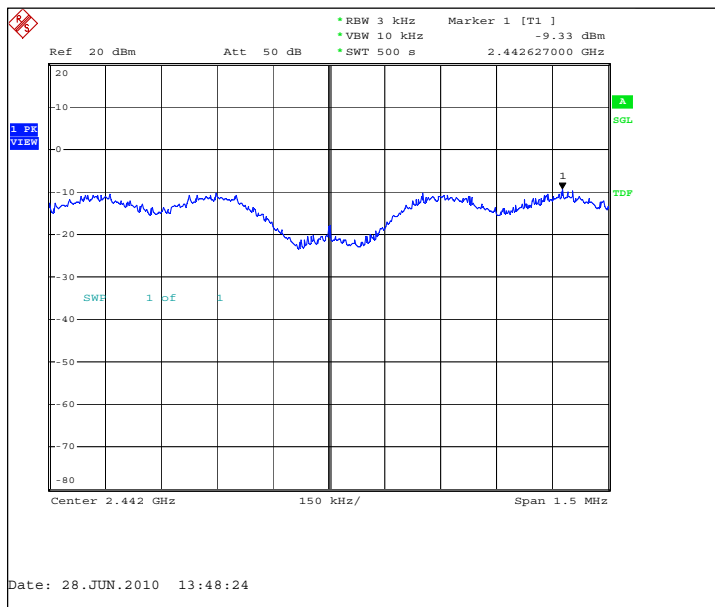
9.2.3 802.11 n MCS 0

Frequency	Level	Transd	Spectr Density
1 / 2412	-9.04	17.0	PASSED
7 / 2442	-9.33	17.0	PASSED
11 / 2462	-9.55	17.0	PASSED

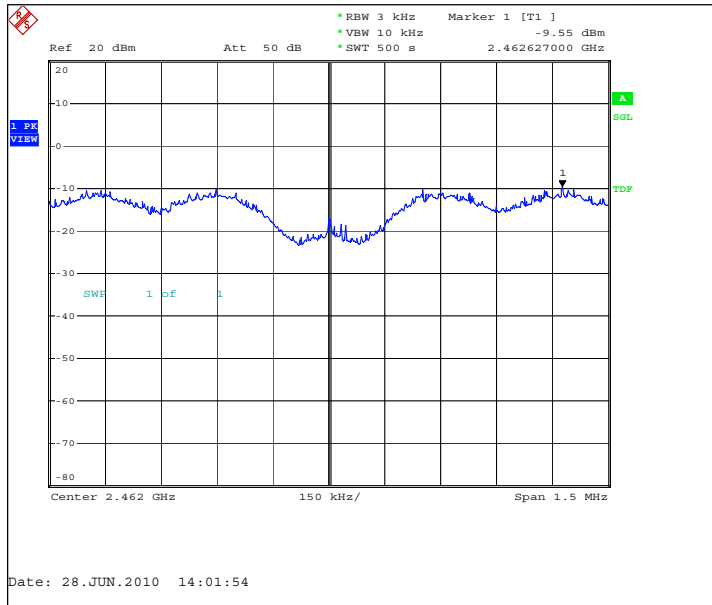
Channel 1 / 2412 MHz



Channel 7 / 2442 MHz



Channel 11 / 2462 MHz



10.

11. Test Equipment

11.1. Conducted measurements

Eq. No	Equipment	Type	Manufacturer	Used in
20168	Bluetooth Tester	CBT	Rohde&Schwarz	22/24/27, 15C, 15B
18772	Shielded Chamber	RFD-100	ETS-Lindgren	15C, 15B
13037	Power Supply 0-15V 10A	EA3012	LP Instruments	15C, 15B
13513	Pulse Limiter	ESH3Z2	Rohde&Schwarz	15C, 15B
13666	Receiver	ESPC	Rohde&Schwarz	15C, 15B
13935	LISN	ESH3-Z5	Rohde&Schwarz	15C, 15B
16995	Directional Coupler 20dB 0,5-2,0 GHz SMA Conn.	1538RA-20	Weinschel	15C, 15B
18772	Shielded Chamber	RFD-100	ETS-Lindgren	15C, 15B
19171	Communication Tester	CMU200	Rohde&Schwarz	15C, 15B
11386	DC Power Supply	HP6632A	Hewlett Packard	22/24/27, 15C, 15B
19678	Spectrum Analyzer	FSP	Rohde&Schwarz	22/24/27, 15C, 15B
16601	Communication Tester	CMU200	Rohde&Schwarz	22/24/27, 15C, 15B
19625	Climatic Chamber	VT4002EMC	Vötsch	22/24/27, 15C, 15B
13357	Signal Generator	SMP02	Rohde&Schwarz	22/24/27, 15C, 15B
19116	Power splitter	-	various	22/24/27, 15C, 15B
20544	Transformer. 230/115V	-	Nokia	22/24/27, 15C, 15B
20543	UPS. 700V/A 490W	PW 9120 700i	Powerware	22/24/27, 15C, 15B

11.2. Radiated measurements

Eq. No	Equipment	Type	Manufacturer	Used in
18792	Mast/turntable controller	2090	ETS-EMCO	22/24/27, 15C, 15B
18416	Communication Tester	CMU200	Rohde&Schwarz	22/24/27, 15C, 15B
20168	Bluetooth Tester	CBT	Rohde&Schwarz	22/24/27, 15C, 15B
13077	Power Supply	EA-3016	-	22/24/27, 15C, 15B
15742	Programmable Relay Switching System	-----	Pickering	22/24/27, 15C, 15B
20078	Relay 2x6 Chnl μ Wave Mux	10-785B-522	Pickering	22/24/27, 15C, 15B
14021	Relay Dual 6 Chnl μ Wave Mux	10-785-522	-	22/24/27, 15C, 15B
-	Relay Dual 6 Chnl μ Wave Mux	10-785-522	-	22/24/27, 15C, 15B
17644	Dual 6 Channel MUX Microwave Relay SMA 50 Ohm	10-785-522	Pickering	22/24/27, 15C, 15B
16948	Dual 6 Channel MUX Microwave Relay SMA 50 Ohm	10-785-522	Pickering	22/24/27, 15C, 15B
16949	Dual 6 Channel MUX Microwave Relay SMA 50 Ohm	10-785-522	Pickering	22/24/27, 15C, 15B
18861	Receiver	EMI Test Receiver 20Hz-26,5GHz ESI	Rohde&Schwarz	22/24/27, 15C, 15B
18860	Antenna	HL562	Rohde&Schwarz	22/24/27, 15C, 15B
18773	Anechoic chamber	RFD-100	ETS-Lindgren	22/24/27, 15C, 15B
18774	Anechoic chamber	RFSD-F/A-100	ETS-Lindgren	22/24/27, 15C, 15B
19151	High Pass Filter	WHJS3000-10SS	Wainwright	22/24/27, 15C, 15B
13937	Band reject filter	WRCA902.4-0.2/40-6SS	Wainwright Instruments	22/24/27, 15C, 15B
13936	Band reject filter	WRCD1747.5-0.2/40-10SS	Wainwright Instruments	22/24/27, 15C, 15B
14114	Highpass Filter	WHK1000-12SS	Wainwright Instruments	22/24/27, 15C, 15B

Eq. No	Equipment	Type	Manufacturer	Used in
14188	Band reject filter	WRCA902.4-0.2/40-6SS	Wainwright	22/24/27, 15C, 15B
14187	Band reject filter	WRCD1747.5-0.2/40-10SS	Wainwright	22/24/27, 15C, 15B
16633	Band reject filter	WRCD1880.0-0.2/40-10SS	Wainwright	22/24/27, 15C, 15B
19587	Band reject filter	WRCG2400/2483-2390/2493-35/10SS	Wainwright	22/24/27, 15C, 15B
20115	Band reject filter	-	Wainwright	22/24/27, 15C, 15B
20114	Band reject filter	WRCG1737/1743-1733/1747-40/6SS	Wainwright	22/24/27, 15C, 15B
20116	Band reject filter	WRCG832/83/-825/845-40/5SS	Wainwright	22/24/27, 15C, 15B
20698	Antenna	BBHA 9120 D	SCHWARZBECK	22/24/27, 15C, 15B
19966	Antenna	HFH2-Z2	Rohde&Schwarz	15C, 15B
13799	Signal Generator	SMP02	Rohde&Schwarz	22/24/27, 15C, 15B
15191	Turntable Contoller Unit	G-800SDX	YAESU	22/24/27, 15C, 15B
14900	Antenna Controller	HD100	HD GmbH	22/24/27, 15C, 15B
20544	Transformer. 230/115V	-	Nokia	22/24/27, 15C, 15B
20543	UPS. 700V/A 490W	PW 9120 700i	Powerware	22/24/27, 15C, 15B