

FCC Part 15C Compliance Test Report

Test Report no.:	FCC15CWLAN_RM-820_10.docx	Date of Report:	11-Jul-2012
Number of pages:	70	Customer's Contact person:	Vaattovaara Lasse
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 P.O.Box(86) Joensuunkatu 7H / Kiila 1B FIN-24101 SALO, FINLAND Tel. +358 (0) 7180 08000 Fax. +358 (0) 7180 45220
FCC listing no.:	533467		
IC recognition no.:	661V-1		
Tested devices/ accessories:	Phone RM-820 / AC-Charger AC-50U / Headset WH-208		
FCC ID:	PYAA	IC:	661V-A
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-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:			

Sami Lehtonen, System Specialist, EMC

1. Summary for FCC Part 15C Compliance Test Report

Date of receipt	19-Jun-2012
Testing completed	09-Jul-2012
The customer's contact person	Vaattovaara Lasse
Test Plan referred to	T:\Projects\RM-820\TestPlan\RS_testplan_RM-820_EMC_FCC_SAR_HAC.xls
Notes	-
Document name	T:\Projects\RM-820\EMC\FCC15CWLAN_RM-820_10.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, modulated with pseudo random bit sequence (PRBS9).

Devices under tests

Product	Type	SN	HW	MV	SW	DUT
Phone	RM-820	004402138706233	2003	-	1121	16489
AC-Charger	AC-50U	4090432185270513678;0675620	-	-	-	16341
Headset	WH-208	-	-	-	-	16345
Phone	RM-820	004402138708700	2003	-	1121.0003.8297.9657.112	16487
Battery	BP-4GW	-	-	-	-	16488
AC-Charger	AC-50U	4090432185270513671;0675620	-	-	-	16340
Headset	WH-208	-	-	-	-	16344

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	-
15.247(d), 15.205(b)	A8.5	Band edge compliance of RF emissions	PASSED
15.247(d)	A8.5	Spurious RF conducted emissions	-
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)	6dB(bandwidth)	-
15.247(e)	A8.2 (b)	Power spectral density	-

5 GHz RLAN:

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), 15.205(b)	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)	6dB(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 Laboratory.

CONTENTS

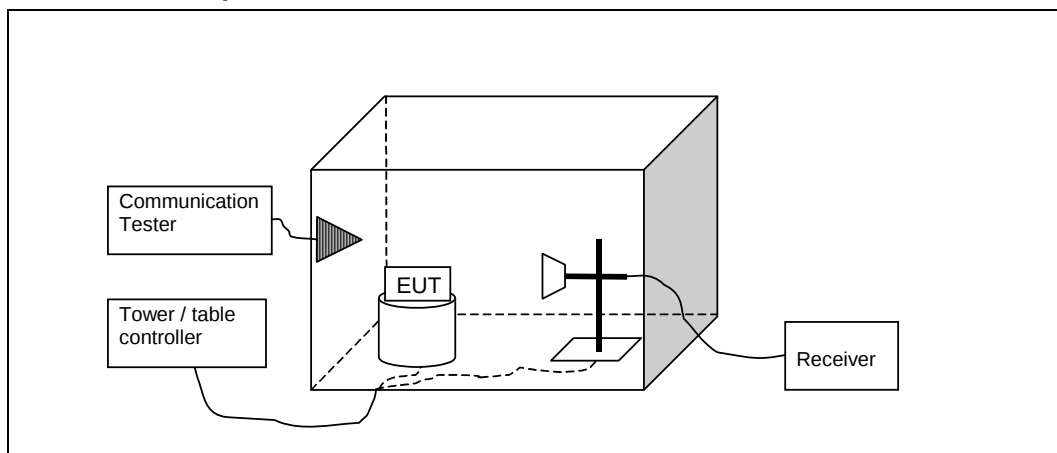
1. Summary for FCC Part 15C Compliance Test Report.....	2
1.1. EUT and Accessory Information.....	2
1.2. Summary of Test Results.....	2
2. Band edge compliance of RF emissions (FCC §15.247(d), 15.205(b), RSS-210 A8.5).....	5
2.2. Test method and limit.....	5
2.3. 5 GHz RLAN Test results.....	6
2.4. 2.4 GHz WLAN Test results	12
3. Spurious radiated emissions (FCC §15.247(d), §15.209, RSS-210 A8.5)	15
3.2. Test method and limit.....	15
3.3. 2.4 GHz WLAN Test results	17
3.4. WLAN 802.11g Test results, OFDM modulation 6Mbps data rate	17
3.5. WLAN 802.11n 20MHz channel Test Results, OFDM Modulation.....	18
3.6. WLAN 802.11n 40MHz channel Test Results, OFDM Modulation.....	19
3.7. WLAN 802.11b Test results, 11Mbps data rate, DSSS Modulation.....	20
3.8. 5 GHz RLAN Test results.....	22
4. Conducted peak output power (15.247(b)(1), RSS-210 A8.4 (4))	26
4.1. Test Setup.....	26
4.2. Test method and limit.....	26
4.3. 5 GHz RLAN Test results.....	27
5. Spurious RF conducted emissions (FCC §15.247(d), RSS-210 A8.5).....	46
5.1. Test Setup.....	46
5.2. Test method and limit.....	46
5.3. 5 GHz RLAN Test results.....	47
6. 6 dB bandwidth (FCC §15.247(a)(2), RSS-210 A8.2 (1)).....	51
6.1. Test Setup.....	51
6.2. Test method and limit.....	51
6.3. 5 GHz RLAN Test results	52
7. AC powerline conducted emissions (FCC §15.207, RSS-GEN 7.2.2)	56
7.1. Test Setup.....	56
7.2. Test method and limit.....	56

7.3. WLAN Test results	57
8. Power spectral density (FCC §15.247(e), RSS-210 A8.2 (2))	64
8.1. Test Setup.....	64
8.2. Test method and limit.....	64
8.3. 5 GHz RLAN Test results	65
9. Test Equipment.....	69
9.1. Conducted measurements	69
9.2. Radiated measurements	69

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

EUT with DUT number	RM-820, DUT 16489
Accessories with DUT numbers	AC-50U , DUT 16341 ; WH-208, DUT 16345
Operation Voltage [V] / [Hz]	115 / 60
Results	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	21 / 36 / 101.6
Date of measurements	02-Jul-2012
Measured by	Kalle Hannila / Jari Keto

2.1.1 Test Setup



2.2. Test method and limit

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

The limit for 5 GHz RLAN is -20 dBc.

When the fundamental value in E [dBμV/m] column is at least 20 dB higher than the out of band emission, the result is pass.

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

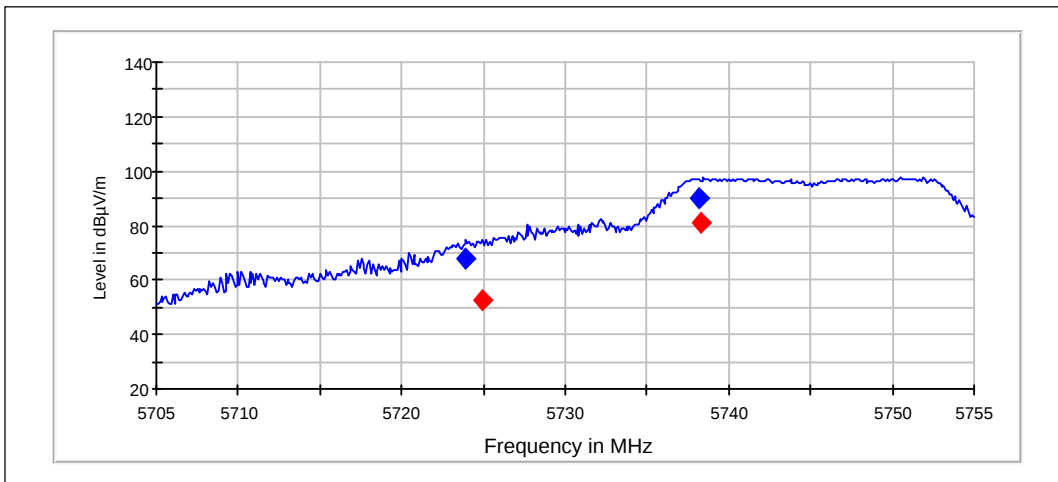
Limits for band edge compliance of RF emissions measurements (3 m measurement distance)

Frequency range [MHz]	Limit Average [dBμV/m]	Limit Peak [dBμV/m]
Below 2390 and above 2483.5	<=54	<=74
Below 5725 and above 5825	-20dBc	-20dBc

2.3. 5 GHz RLAN Test results

2.3.1 a-mode, 20 MHz CBW, OFDM modulation, 6 Mbps data rate.

Channel 149 / 5745MHz



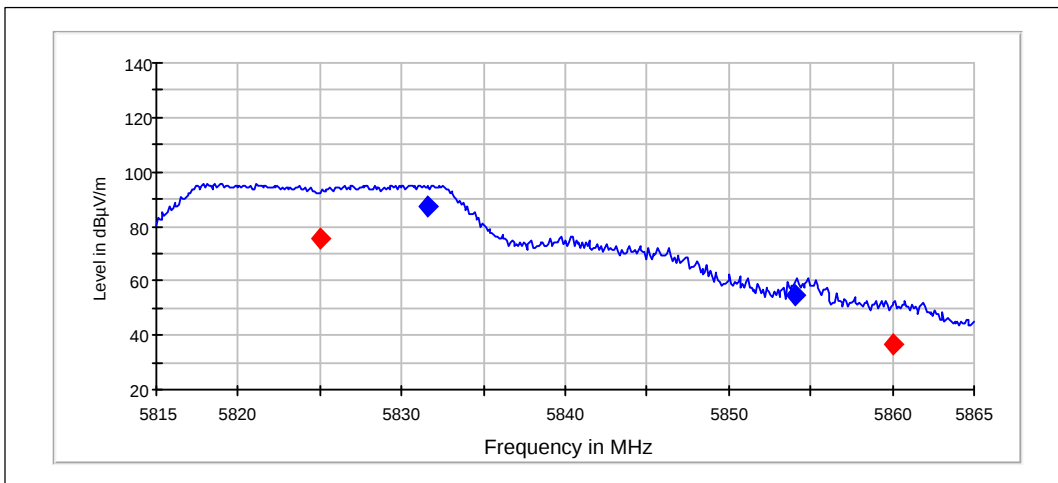
Peak (RBW: 1 MHz, VBW: 3 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Results
5723.918	67.8	2454.426	71.53	-3.73	PASSED
5738.166	90.06	31856.642	93.64	-3.58	PASSED

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

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Results
5724.88	52.62	427.612	56.37	-3.75	PASSED
5738.246	81.07	11307.068	84.65	-3.58	PASSED

Channel 165 / 5825MHz



Peak (RBW: 1 MHz, VBW: 3 MHz)

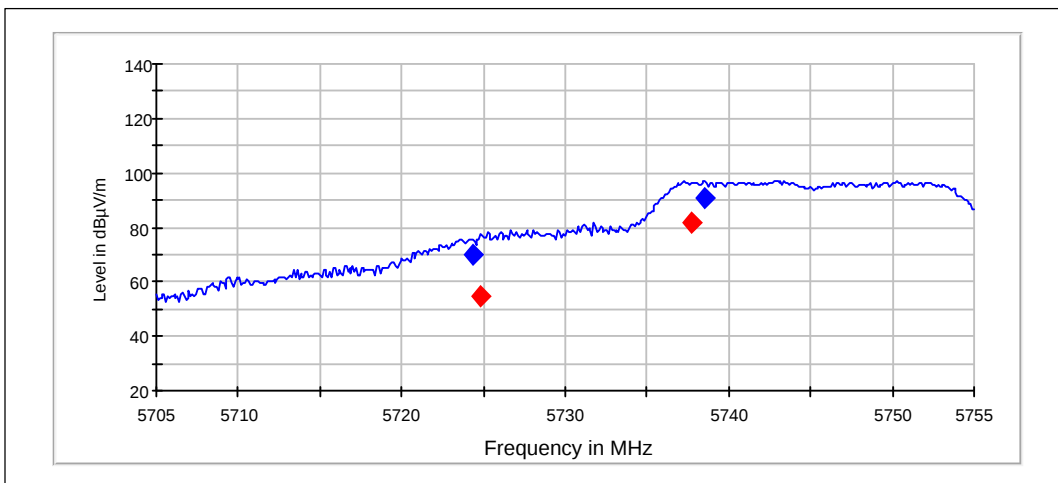
Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Results
5831.553	87.18	22842.835	90.43	-3.25	PASSED
5854.088	54.9	556.032	58.2	-3.3	PASSED

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

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Results
5825	75.74	6122.094	79.03	-3.29	PASSED
5860	36.53	67.042	39.88	-3.35	PASSED

2.3.2 n-mode, 20 MHz CBW, OFDM modulation, 19.5 / 21.7 Mbps data rate.

Channel 149 / 5745MHz



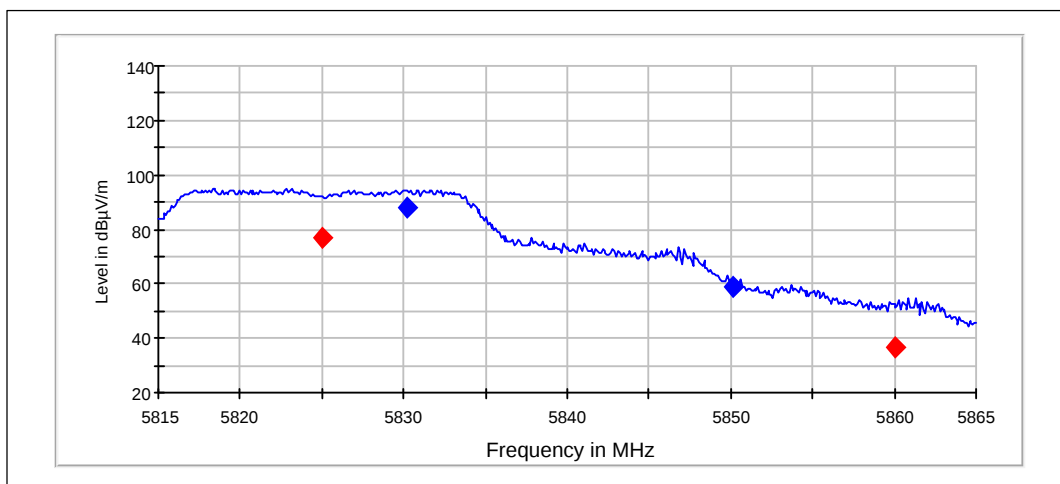
Peak (RBW: 1 MHz, VBW: 3 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Results
5724.319	69.73	3063.727	73.47	-3.74	PASSED
5738.487	90.61	33935.168	94.19	-3.58	PASSED

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

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Results
5724.8	54.48	529.663	58.23	-3.75	PASSED
5737.766	81.85	12379.412	85.43	-3.58	PASSED

Channel 165 / 5825MHz



Peak (RBW: 1 MHz, VBW: 3 MHz)

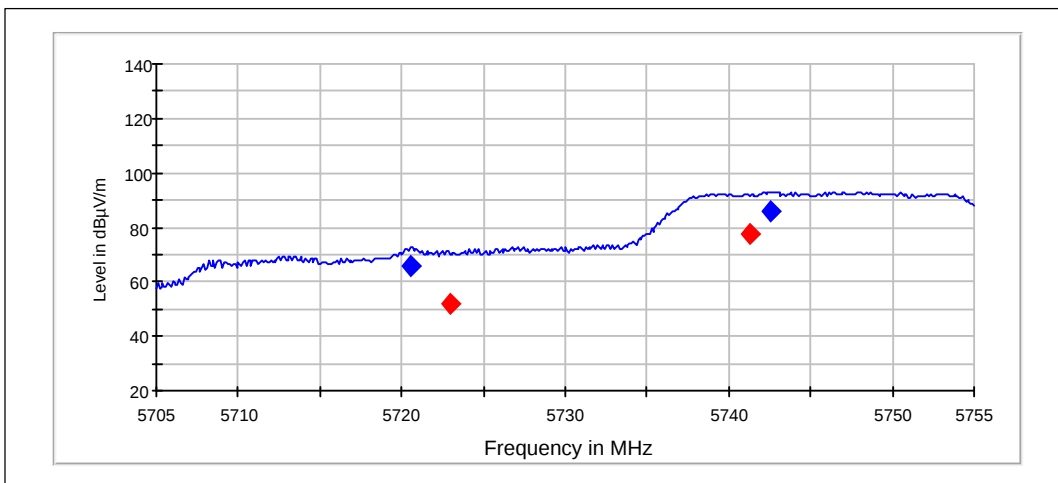
Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Results
5830.23	88.1	25395.104	91.35	-3.25	PASSED
5850.12	58.73	863.674	62	-3.27	PASSED

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

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Results
5825	77.19	7232.692	80.48	-3.29	PASSED
5860	36.84	69.518	40.19	-3.35	PASSED

2.3.3 n-mode, 40 MHz CBW, OFDM modulation, 45 Mbps data rate.

Channel 149+153 / 5755MHz



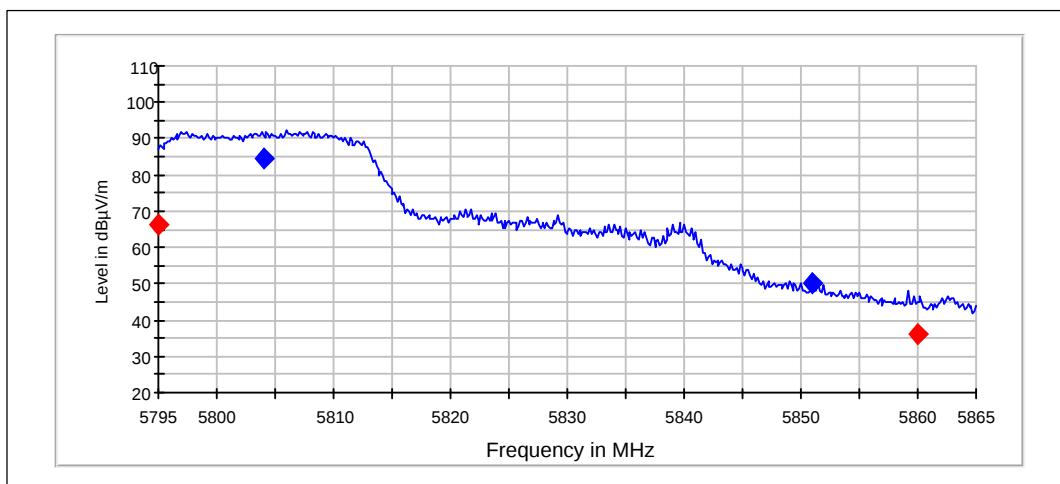
Peak (RBW: 1 MHz, VBW: 3 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Results
5720.591	65.78	1944.464	69.49	-3.71	PASSED
5742.535	86.14	20274.493	89.69	-3.55	PASSED

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

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Results
5722.916	52.06	400.774	55.78	-3.72	PASSED
5741.333	77.51	7509.309	81.07	-3.56	PASSED

Channel 157+161 / 5795MHz



Peak (RBW: 1 MHz, VBW: 3 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Results
5804.018	84.64	17064.753	87.88	-3.24	PASSED
5850.992	50.04	317.505	53.32	-3.28	PASSED

Average (RBW: 1 MHz, VBW: 3 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Results
5795	66.52	2119.093	69.78	-3.26	PASSED
5860	36.33	65.516	39.68	-3.35	PASSED

2.4. 2.4 GHz WLAN Test results

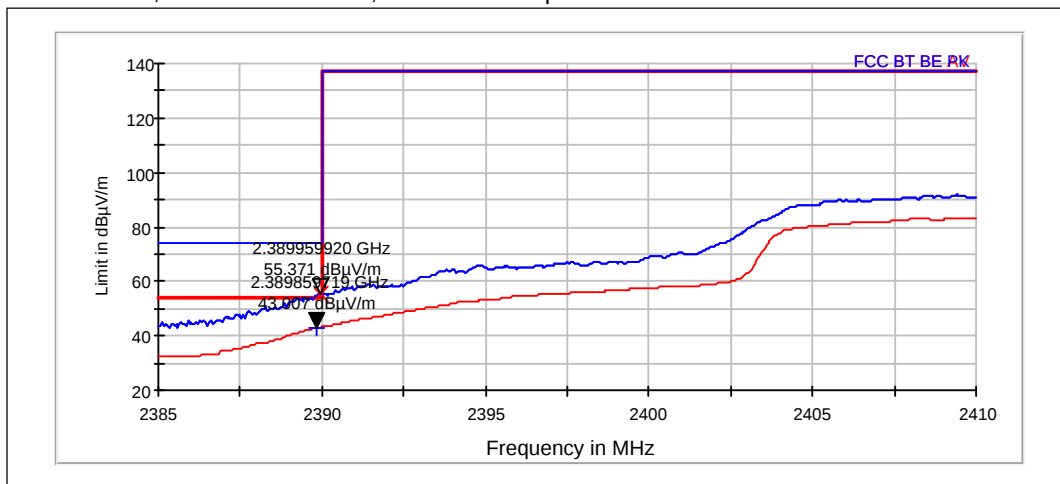
Average (RBW: 1 MHz, VBW: 10 Hz)

Channel / f_c [MHz]	E [dB μ V/m]	Result
1 / 2412 (40MHz)	43.01	PASSED
1 / 2412 (802.11b)	32.55	PASSED
11 / 2462 (802.11b)	36.14	PASSED
1 / 2412 (802.11g)	42.41	PASSED
11 / 2462 (802.11n)	52.03	PASSED
1 / 2412 (802.11n)	31.56	PASSED
1 / 2412 (Mode)	36.99	PASSED
11 / 2462 (Mode)	32.2	PASSED
11 / 2462 (40MHz)	52.24	PASSED

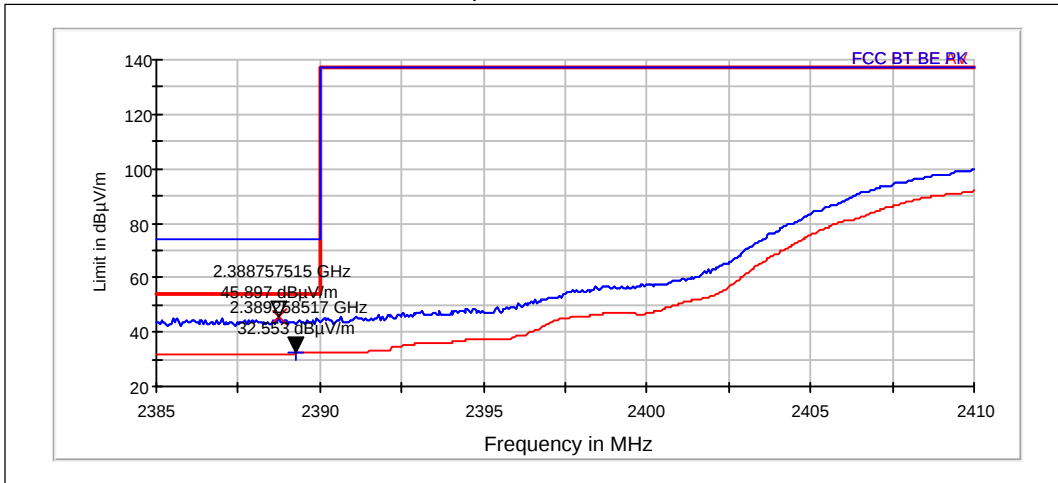
Peak (RBW: 1 MHz, VBW: 1 MHz)

Channel / f_c [MHz]	E [dB μ V/m]	Result
1 / 2412 (40MHz)	55.37	PASSED
1 / 2412 (802.11b)	45.9	PASSED
11 / 2462 (802.11b)	48.44	PASSED
1 / 2412 (802.11g)	57.26	PASSED
11 / 2462 (Mode)	66.84	PASSED
1 / 2412 (Mode)	44.55	PASSED
1 / 2412 (Mode)	53.14	PASSED
11 / 2462 (Mode)	45.93	PASSED
11 / 2462 (40MHz)	64.2	PASSED

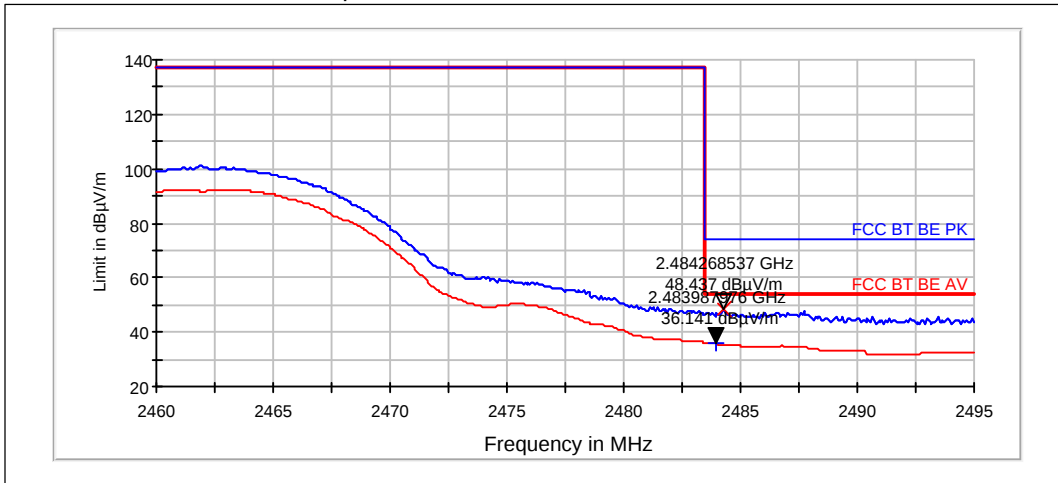
Mode 40MHz, OFDM modulation, 19.5 / 21.7 Mbps data rate. Channel 1 / 2412 MHz



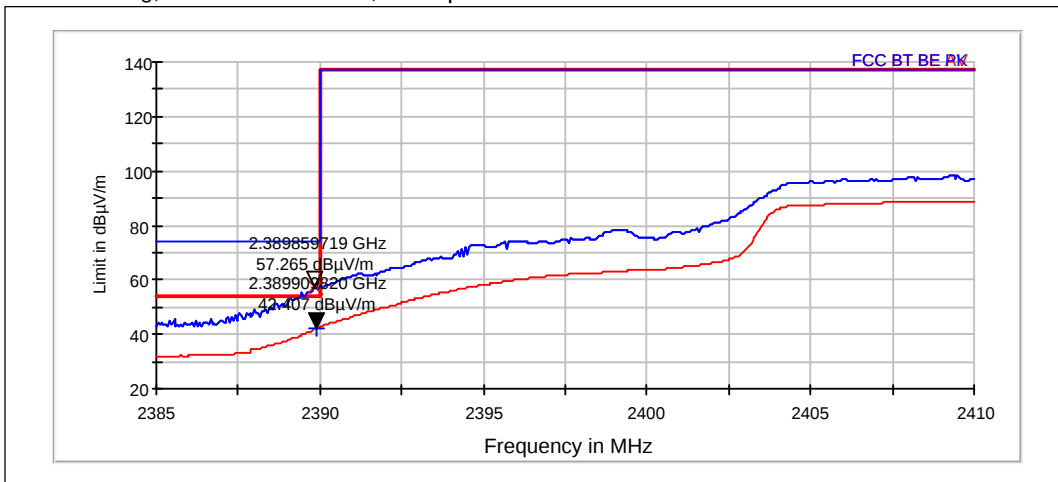
Mode 802.11b, DSSS modulation, 11 Mbps data rate. Channel 1 / 2412 MHz



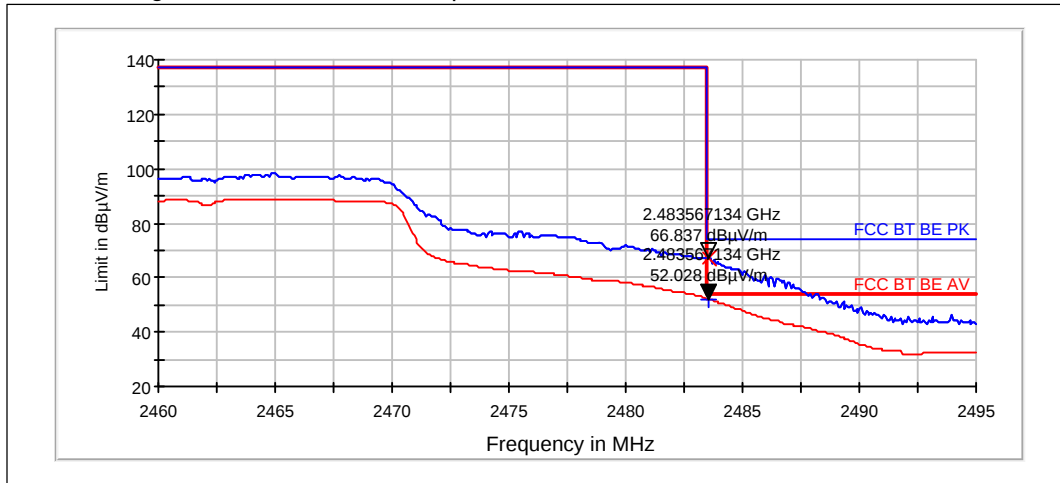
Mode 802.11b, DSSS, 11 Mbps data rate. Channel 11 / 2462 MHz



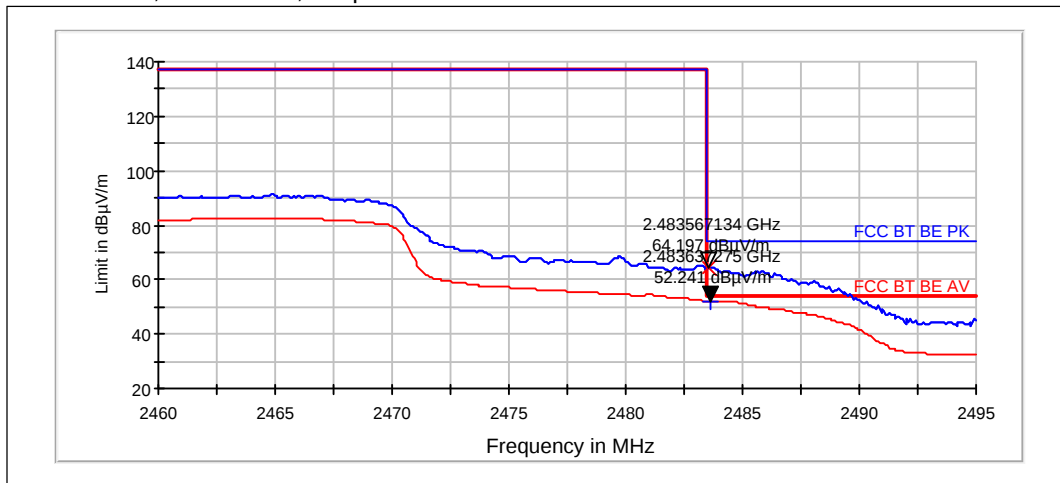
Mode 802.11g, OFDM modulation, 6 Mbps data rate. Channel 1 / 2412 MHz



Mode 802.11g, OFDM modulation, 6 Mbps data rate. Channel 11 / 2462 MHz



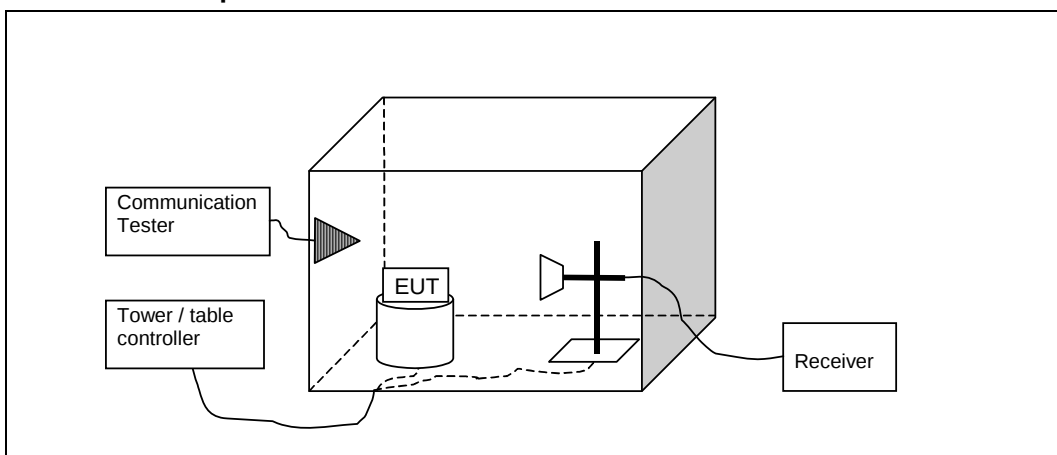
Mode 40MHz, modulation, Mbps data rate. Channel 11 / 2462 MHz



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

EUT with DUT number	RM-820, DUT 16489
Accessories with DUT numbers	AC-50U , DUT 16341 ; WH-208, DUT 16345
Operation Voltage [V] / [Hz]	115 / 60
Results	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	21 / 35 / 101.4
Date of measurements	02-Jul-2012
Measured by	Kalle Hannila / Jari Keto

3.1.1 Test Setup



3.2. 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

3.3. 2.4 GHz WLAN Test results

3.4. WLAN 802.11g Test results, OFDM modulation 6Mbps data rate

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
4924.8	40.61	107.288	44.23	-3.62	VERTICAL	PASSED
7384.7	46.62	214.19	45.16	1.46	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
4924.8	27.64	24.102	31.26	-3.62	VERTICAL	PASSED
7384.7	33.06	44.999	31.6	1.46	HORIZONTAL	PASSED

Channel 7 / 2442 MHz

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

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
30.18	28.6	26.909	33.38	-4.78	VERTICAL	PASSED
30.21	28.55	26.755	33.35	-4.8	VERTICAL	PASSED
733.417	36.37	65.864	41.42	-5.05	HORIZONTAL	PASSED
835.009	42.75	137.23	46.69	-3.94	HORIZONTAL	PASSED
839.086	23.45	14.88	27.36	-3.91	HORIZONTAL	PASSED
948.988	38.66	85.714	41.22	-2.56	HORIZONTAL	PASSED

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

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
4880.2	40.5	105.877	44.24	-3.74	HORIZONTAL	PASSED
7318.6	45.75	193.865	44.5	1.25	HORIZONTAL	PASSED
14662.221	57	707.783	43.18	13.82	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
4880.2	27.39	23.413	31.13	-3.74	HORIZONTAL	PASSED
7318.6	32.99	44.591	31.74	1.25	HORIZONTAL	PASSED
14662.221	43.19	144.295	29.37	13.82	VERTICAL	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]	Polarisation	Result
4823.3	42.76	137.467	46.7	-3.94	VERTICAL	PASSED
7234.4	49.59	301.509	48.57	1.02	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
4823.3	29.58	30.123	33.52	-3.94	VERTICAL	PASSED
7234.4	36.76	68.865	35.74	1.02	VERTICAL	PASSED

3.5. WLAN 802.11n 20MHz channel Test Results, OFDM Modulation

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
4822.6	39.9	98.901	43.83	-3.93	VERTICAL	PASSED
7234.3	45.64	191.47	44.62	1.02	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
4822.6	26.83	21.961	30.76	-3.93	VERTICAL	PASSED
7234.3	32.91	44.193	31.89	1.02	VERTICAL	PASSED

Channel 7 / 2442 MHz 802.11g

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

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
30.09	28.66	27.086	33.38	-4.72	VERTICAL	PASSED
30.09	28.56	26.795	33.28	-4.72	VERTICAL	PASSED
30.15	28.71	27.258	33.47	-4.76	VERTICAL	PASSED
30.18	28.6	26.909	33.38	-4.78	VERTICAL	PASSED
750.02	36.39	65.978	41.1	-4.71	HORIZONTAL	PASSED
948.958	27.81	24.564	30.37	-2.56	HORIZONTAL	PASSED

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

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
4880.6	39.97	99.655	43.71	-3.74	HORIZONTAL	PASSED
7321	46.19	203.986	45.02	1.17	HORIZONTAL	PASSED
17999.2	64.27	1635.498	41.31	22.96	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
4880.6	27.23	22.996	30.97	-3.74	HORIZONTAL	PASSED
7321	33.08	45.092	31.91	1.17	HORIZONTAL	PASSED
17999.2	51.61	380.803	28.65	22.96	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
4923.4	42.03	126.314	45.68	-3.65	VERTICAL	PASSED
7385.2	47.39	234.234	45.93	1.46	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
4923.4	28.8	27.539	32.45	-3.65	VERTICAL	PASSED
7385.2	34.32	51.988	32.86	1.46	VERTICAL	PASSED

3.6. WLAN 802.11n 40MHz channel Test Results, OFDM Modulation

Channel 1 / 2422 MHz 40mhz

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

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
4822.6	39.9	98.901	43.83	-3.93	VERTICAL	PASSED
7234.3	45.64	191.47	44.62	1.02	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
4822.6	26.83	21.961	30.76	-3.93	VERTICAL	PASSED
7234.3	32.91	44.193	31.89	1.02	VERTICAL	PASSED

Channel 7 / 2437 MHz 40mhz

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

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
30.12	28.73	27.318	33.47	-4.74	VERTICAL	PASSED
30.12	28.7	27.221	33.44	-4.74	VERTICAL	PASSED

30.15	28.8	27.545	33.56	-4.76	VERTICAL	PASSED
733.417	37.17	72.194	42.22	-5.05	HORIZONTAL	PASSED
750.02	36.59	67.531	41.3	-4.71	HORIZONTAL	PASSED
949.048	31.61	38.072	34.18	-2.57	HORIZONTAL	PASSED

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

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
4880.5	40.23	102.707	43.97	-3.74	VERTICAL	PASSED
7319.2	46.26	205.471	45.03	1.23	HORIZONTAL	PASSED
14371.245	55.03	564.547	42.05	12.98	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
4880.5	27.27	23.094	31.01	-3.74	VERTICAL	PASSED
7319.2	32.92	44.254	31.69	1.23	HORIZONTAL	PASSED
14371.245	42.06	126.707	29.08	12.98	HORIZONTAL	PASSED

Channel 11 / 2452 MHz 40mhz

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

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
4922.4	41.11	113.593	44.76	-3.65	VERTICAL	PASSED
7385	45.69	192.575	44.23	1.46	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
4922.4	27.66	24.157	31.31	-3.65	VERTICAL	PASSED
7385	33.04	44.849	31.58	1.46	VERTICAL	PASSED

3.7. WLAN 802.11b Test results, 11Mbps data rate, DSSS Modulation

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
4823.9	43.64	152.002	47.58	-3.94	HORIZONTAL	PASSED
7236	51.1	359.087	50.11	0.99	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
4823.9	31.16	36.137	35.1	-3.94	HORIZONTAL	PASSED
7236	37.11	71.713	36.12	0.99	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
30.15	28.62	26.968	33.38	-4.76	VERTICAL	PASSED
30.18	28.72	27.296	33.5	-4.78	VERTICAL	PASSED
41.964	20.05	10.057	30.96	-10.91	HORIZONTAL	PASSED
733.417	36.57	67.352	41.62	-5.05	HORIZONTAL	PASSED
750.02	36.13	64.04	40.84	-4.71	HORIZONTAL	PASSED
949.048	37.48	74.783	40.05	-2.57	HORIZONTAL	PASSED

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

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Polarisation	Result
4879.4	40.49	105.84	44.23	-3.74	VERTICAL	PASSED
7312.724	46.36	207.97	45.15	1.21	VERTICAL	PASSED
7321.8	45.24	182.873	44.1	1.14	HORIZONTAL	PASSED
17998.1	64.7	1717.908	41.8	22.9	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
4879.4	27.23	22.98	30.97	-3.74	VERTICAL	PASSED
7312.724	33.64	48.089	32.43	1.21	VERTICAL	PASSED
7321.8	32.81	43.692	31.67	1.14	HORIZONTAL	PASSED
17998.1	51.56	378.355	28.66	22.9	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
4924.1	44.81	173.94	48.45	-3.64	VERTICAL	PASSED
7387.1	47.4	234.504	45.93	1.47	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
4924.1	32.33	41.329	35.97	-3.64	VERTICAL	PASSED
7387.1	34.71	54.363	33.24	1.47	VERTICAL	PASSED

3.8. 5 GHz RLAN Test results

3.8.1 A-mode, 20 MHz CBW, BPSK, 6 Mbps data rate.

Channel 149 / 5745MHz

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
11487.378	51.71	385.123	42.67	9.04	22.3	74	PASSED
11488.4	51.58	379.49	42.55	9.03	22.4	74	PASSED
17235.8	64.27	1635.498	40.94	23.33	61	125.2	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
940.373	40.93	111.314	44.77	-3.84	5.1	46	PASSED
949.049	42.98	140.961	47	-4.02	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
11487.378	38.95	88.563	29.91	9.04	15	54	PASSED
11488.4	39.05	89.629	30.02	9.03	14.9	54	PASSED
17235.8	51.45	373.852	28.12	23.33	---	---	PASSED

Channel 157 / 5785MHz

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
10325.653	51.52	376.487	42.93	8.59	16.7	68.2	PASSED
11571.9	51.3	367.451	42.55	8.75	22.7	74	PASSED
17356.7	64.34	1648.922	40.94	23.4	3.9	68.2	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
949.049	35.14	57.161	39.16	-4.02	10.9	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
10325.653	38.22	81.499	29.63	8.59	---	---	PASSED
11571.9	38.57	84.781	29.82	8.75	15.4	54	PASSED
17356.7	51.72	385.39	28.32	23.4	---	---	PASSED

Channel 165 / 5825MHz

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
11650	53.74	486.463	45.42	8.32	20.2	74	PASSED
11650.303	53.08	450.765	44.76	8.32	20.9	74	PASSED
17433.4	66.33	2072.049	41.45	24.88	58.9	125.2	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
940.403	42.7	136.38	46.54	-3.84	3.3	46	PASSED
949.079	37.62	76.024	41.64	-4.02	8.4	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
11650	41.71	121.689	33.39	8.32	12.3	54	PASSED
11650.303	41.34	116.614	33.02	8.32	12.6	54	PASSED
17433.4	53.3	462.328	28.42	24.88	---	---	PASSED

3.8.2 n-mode, 20 MHz CBW, GMSK, 6.5Mbps data rate.

Channel 149 / 5745MHz

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
10639.783	51.72	385.257	42.68	9.04	22.3	74	PASSED
11488.7	51.95	395.959	42.92	9.03	22	74	PASSED
17236.8	64.05	1593.492	40.71	23.34	61.2	125.2	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
940.403	44.88	175.368	48.72	-3.84	1.1	46	PASSED
949.079	41.55	119.55	45.57	-4.02	4.5	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
10639.783	38.88	87.882	29.84	9.04	15.1	54	PASSED
11488.7	39.07	89.826	30.04	9.03	14.9	54	PASSED
17236.8	51.48	375.016	28.14	23.34	---	---	PASSED

Channel 157 / 5785MHz

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
5757	57.33	735.529	60.88	-3.55	10.9	68.2	PASSED
11568.4	52.86	439.339	44.12	8.74	21.1	74	PASSED
17354.1	64.98	1773.168	41.82	23.16	3.3	68.2	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
940.343	43.08	142.61	46.92	-3.84	2.9	46	PASSED
949.079	40	100.046	44.02	-4.02	6	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
5757	38.42	83.359	41.97	-3.55	---	---	PASSED
11568.4	39.79	97.6	31.05	8.74	14.2	54	PASSED
17354.1	51.36	369.828	28.2	23.16	---	---	PASSED

Channel 165 / 5825MHz

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
11649.299	51.37	370.382	43.04	8.33	22.6	74	PASSED
11649.9	53.08	451.024	44.76	8.32	20.9	74	PASSED
17436.7	66.38	2084.971	41.57	24.81	58.8	125.2	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
940.343	43.83	155.453	47.67	-3.84	2.2	46	PASSED
949.049	38.56	84.742	42.58	-4.02	7.5	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
11649.299	38.81	87.167	30.48	8.33	15.2	54	PASSED
11649.9	42.3	130.242	33.98	8.32	11.7	54	PASSED
17436.7	53.47	471.466	28.66	24.81	---	---	PASSED

3.8.3 n-mode, 40 MHz CBW, GMSK, 40.5Mbps data rate.

Channel 149+153 / 5755MHz

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
11505.814	53.09	451.544	44.11	8.98	20.9	74	PASSED
11511.4	51.65	382.34	42.68	8.97	22.3	74	PASSED
17265.4	64.13	1608.052	41.08	23.05	61.1	125.2	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
940.323	44.81	173.9	48.65	-3.84	1.2	46	PASSED
949.059	43.2	144.511	47.22	-4.02	2.8	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
11505.814	38.97	88.787	29.99	8.98	15	54	PASSED
11511.4	39.12	90.313	30.15	8.97	14.9	54	PASSED
17265.4	51.31	367.621	28.26	23.05	---	---	PASSED

Channel 157+161 / 5795MHz

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
11590.2	52.93	442.894	44.25	8.68	21.1	74	PASSED
11590.382	52.13	404.017	43.45	8.68	21.9	74	PASSED
17386.3	64.71	1719.689	40.83	23.88	60.5	125.2	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
940.323	40.53	106.292	44.37	-3.84	5.5	46	PASSED
949.059	40.54	106.451	44.56	-4.02	5.5	46	PASSED

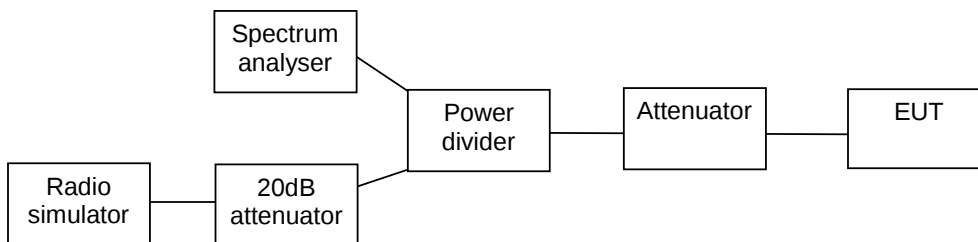
Average (RBW: 1 MHz, VBW: 1 MHz)

Frequency [MHz]	E [dBμV/m]	E [μV/m]	U _{RX} [dBμV]	A _{TOT} [dB]	Margin	Limit [dBμV/m]	Results
11590.2	40.24	102.778	31.56	8.68	13.7	54	PASSED
11590.382	39.01	89.228	30.33	8.68	15	54	PASSED
17386.3	51.96	396.278	28.08	23.88	---	---	PASSED

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

EUT with DUT number	RM-820, DUT 16487
Accessories with DUT numbers	BP-4GW, DUT 16488; AC-50U, DUT 16340 ; WH-208, DUT 16344
Operation Voltage [V] / [Hz]	115 / 60
Results	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	22 / 40 / 101
Date of measurements	26-Jun-2012
Measured by	Tomi Lipponen

4.1. Test Setup



4.2. Test method and limit

Document1Limits for conducted peak output power measurements

Frequency range [MHz]	Limit [W]	Limit [dBm]
2400 – 2483.5 5725 - 5850	<= 1	<= 30

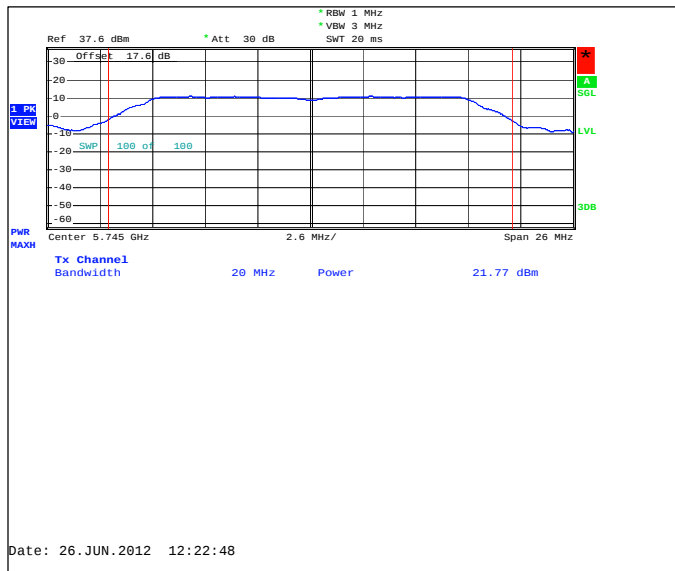
4.3. 5 GHz RLAN Test results

RLAN 5 GHz, peak output power [dBm]	
Mode & data speed	Ch 157
g-mode WLAN OFDM 6 Mbps	21.84
g-mode WLAN OFDM 9 Mbps	21.43
g-mode WLAN OFDM 12 Mbps	21.15
g-mode WLAN OFDM 18 Mbps	21.54
g-mode WLAN OFDM 24 Mbps	19.41
g-mode WLAN OFDM 36 Mbps	19.32
g-mode WLAN OFDM 48 Mbps	18.57
g-mode WLAN OFDM 54 Mbps	18.38
n-mode MCS 0: OFDM 6.5 / 7.25 Mbps	21.94
n-mode MCS 1: OFDM 13.0 / 14.4 Mbps	20.93
n-mode MCS 2: OFDM 19.5 / 21.7 Mbps	21.2
n-mode MCS 3: OFDM 26.0 / 28.9 Mbps	19.22
n-mode MCS 4: OFDM 39.0 / 43.3 Mbps	19.43
n-mode MCS 5: OFDM 52.0 / 57.8 Mbps	17.97
n-mode MCS 6: OFDM 58.5 / 65.0 Mbps	18.09
n-mode MCS 7: OFDM 65.0 / 72.2 Mbps	16.91
n-mode MCS 0: OFDM 13.5 / 15.0 Mbps	19.09
n-mode MCS 1: OFDM 27.0 / 30.0 Mbps	18.6
n-mode MCS 2: OFDM 40.5 / 45.0 Mbps	18.4
n-mode MCS 3: OFDM 54.0 / 60.0 Mbps	18.64
n-mode MCS 4: OFDM 81.0 / 90.0 Mbps	18.3
n-mode MCS 5: OFDM 108.0 / 120.0 Mbps	18.5
n-mode MCS 6: OFDM 121.5 / 135.0 Mbps	17.91
n-mode MCS 7: OFDM 135.0 / 150.0 Mbps	18.22

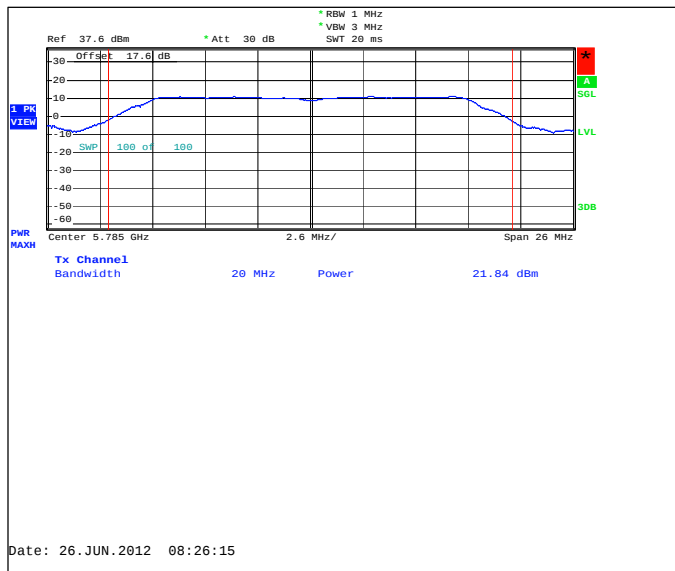
4.3.1 OFDM mode, BPSK modulation, 6 Mbps data rate

Channel / f _c [MHz]	P [dBm]	P [mW]	Result
149 / 5745	21.77	150.314	PASSED
157 / 5785	21.84	152.757	PASSED
165 / 5825	21.41	138.357	PASSED

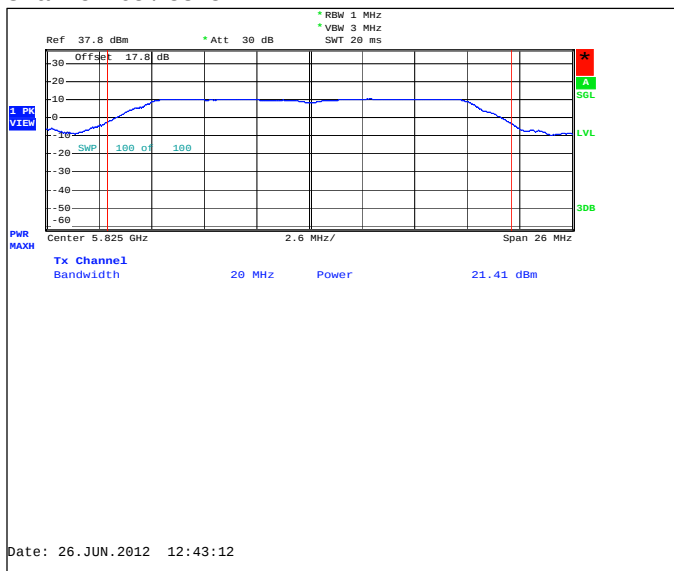
Channel 149 / 5745MHz



Channel 157 / 5785MHz



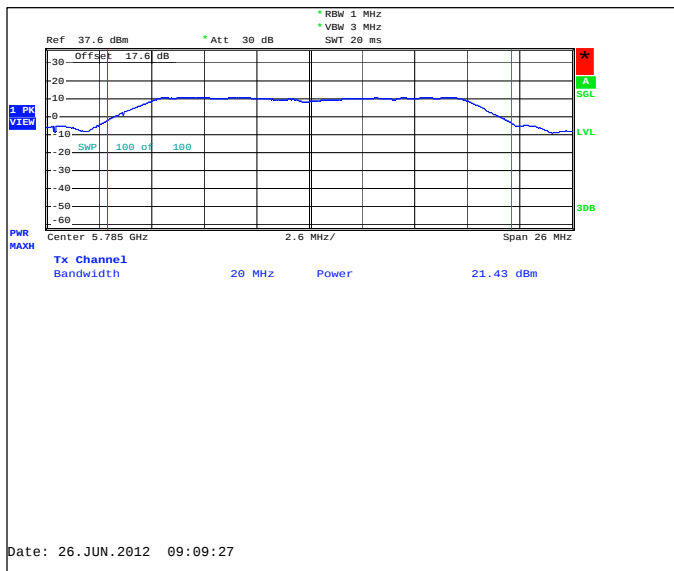
Channel 165 / 5825MHz



4.3.2 OFDM mode, BPSK modulation, 9 Mbps data rate

Channel / f_c [MHz]	P [dBm]	P [mW]	Result
157 / 5785	21.43	138.995	PASSED

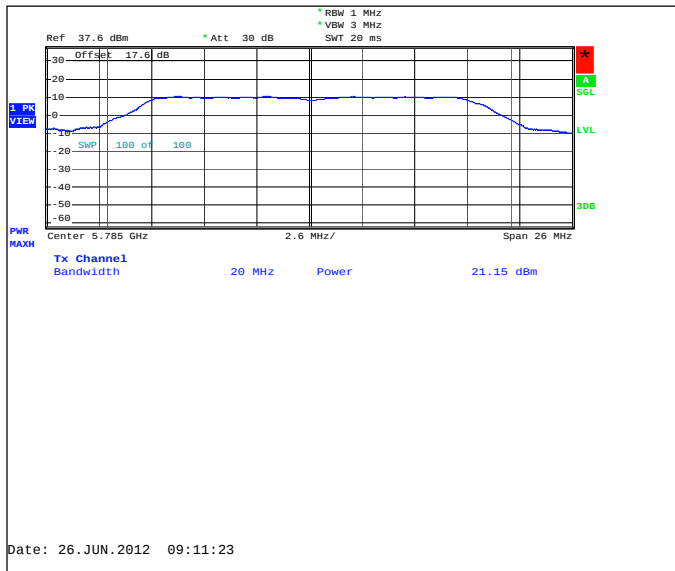
Channel 157 / 5785MHz



4.3.3 OFDM mode, BPSK modulation, 12 Mbps data rate

Channel / f_c [MHz]	P [dBm]	P [mW]	Result
157 / 5785	21.15	130.317	PASSED

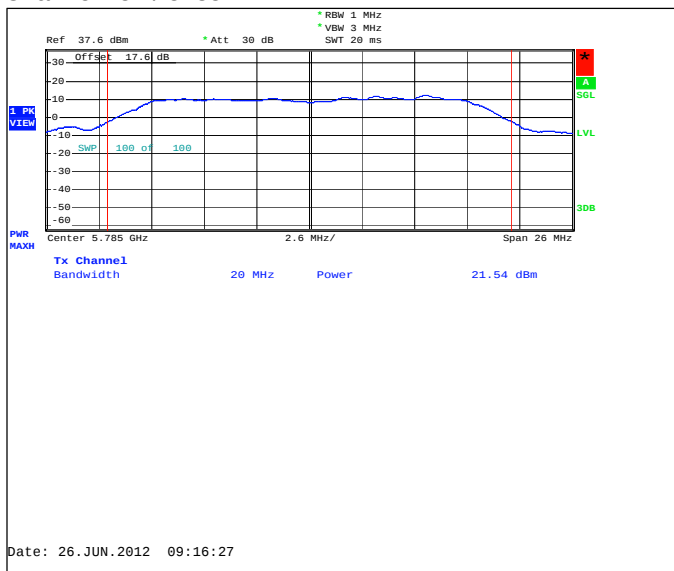
Channel 157 / 5785MHz



4.3.4 OFDM mode, BPSK modulation, 18 Mbps data rate

Channel / f_c [MHz]	P [dBm]	P [mW]	Result
157 / 5785	21.54	142.561	PASSED

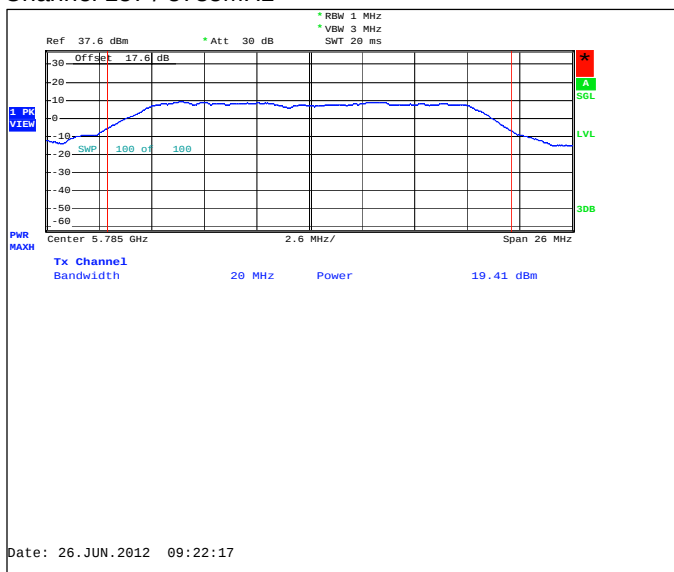
Channel 157 / 5785MHz



4.3.5 OFDM mode, BPSK modulation, 24 Mbps data rate

Channel / f_c [MHz]	P [dBm]	P [mW]	Result
157 / 5785	19.41	87.297	PASSED

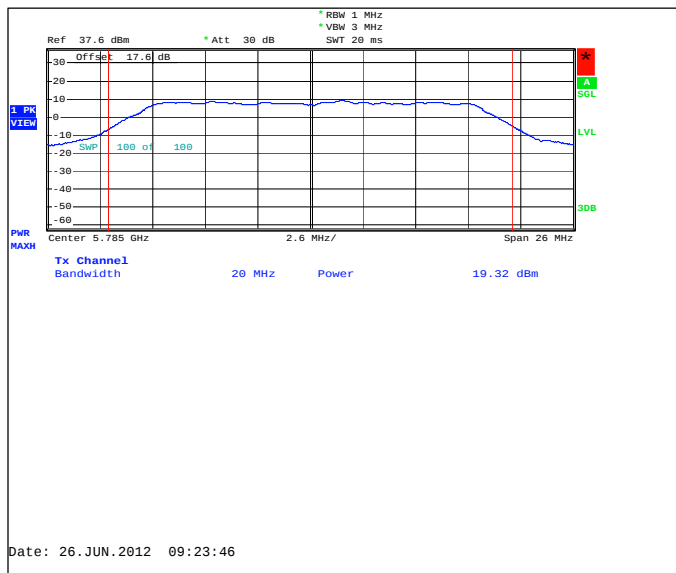
Channel 157 / 5785MHz



4.3.6 OFDM mode, BPSK modulation, 36 Mbps data rate

Channel / f_c [MHz]	P [dBm]	P [mW]	Result
157 / 5785	19.32	85.507	PASSED

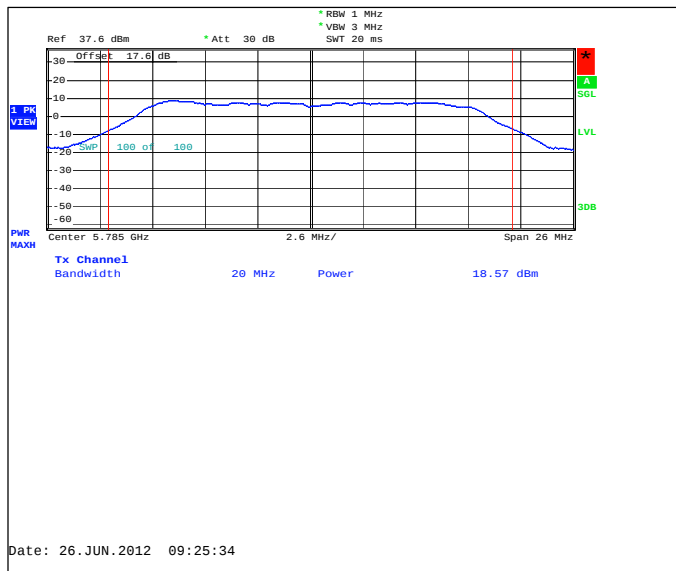
Channel 157 / 5785MHz



4.3.7 OFDM mode, BPSK modulation, 48 Mbps data rate

Channel / f_c [MHz]	P [dBm]	P [mW]	Result
157 / 5785	18.57	71.945	PASSED

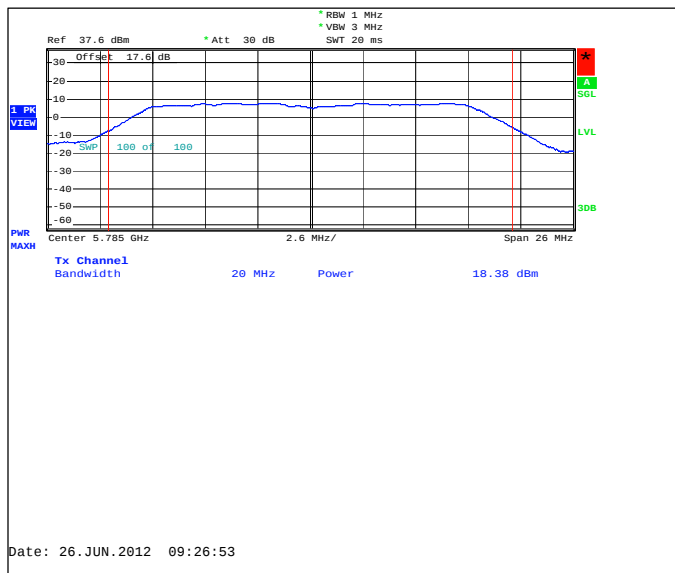
Channel 157 / 5785MHz



4.3.8 OFDM mode, BPSK modulation, 54 Mbps data rate

Channel / f_c [MHz]	P [dBm]	P [mW]	Result
157 / 5785	18.38	68.865	PASSED

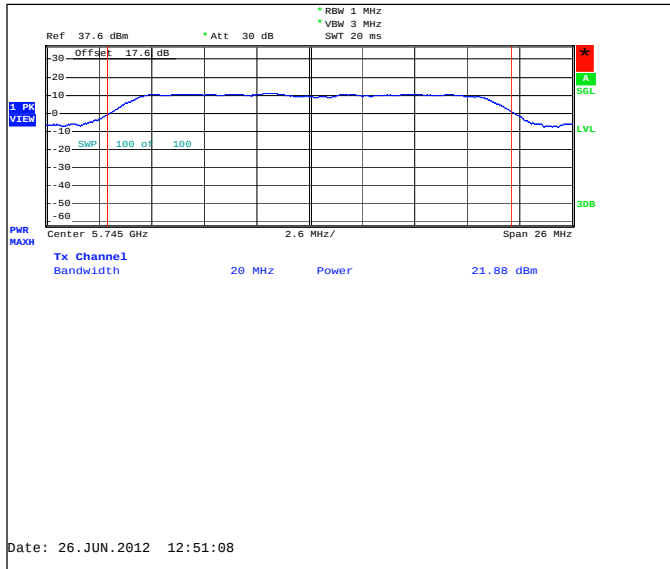
Channel 157 / 5785MHz



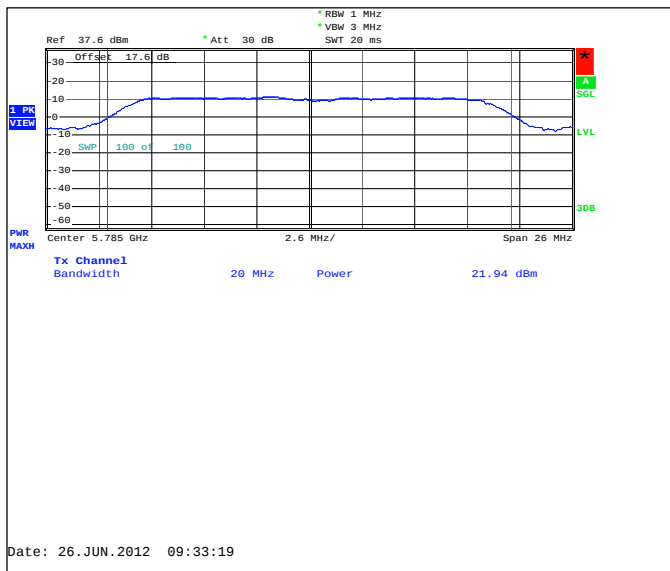
4.3.9 n-mode, 20 MHz CBW mode, BPSK modulation, 6.5 / 7.25 Mbps data rate

Channel / f_c [MHz]	P [dBm]	P [mW]	Result
149 / 5745	21.88	154.17	PASSED
157 / 5785	21.94	156.315	PASSED
165 / 5825	21.63	145.546	PASSED

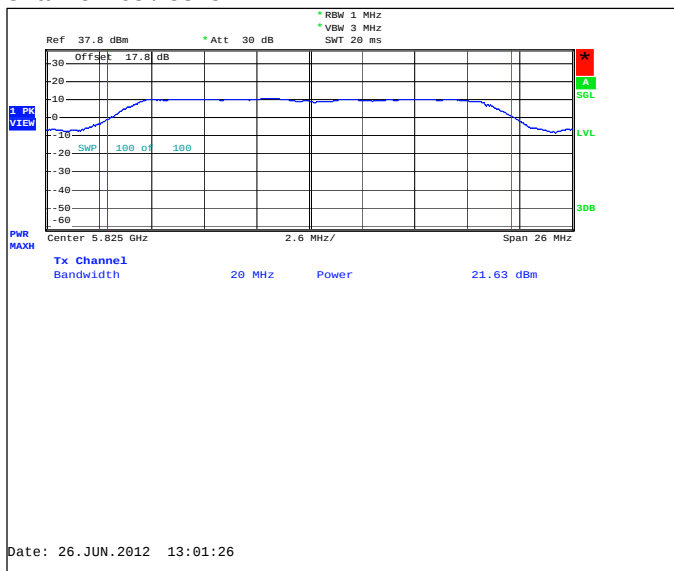
Channel 149 / 5745MHz



Channel 157 / 5785MHz



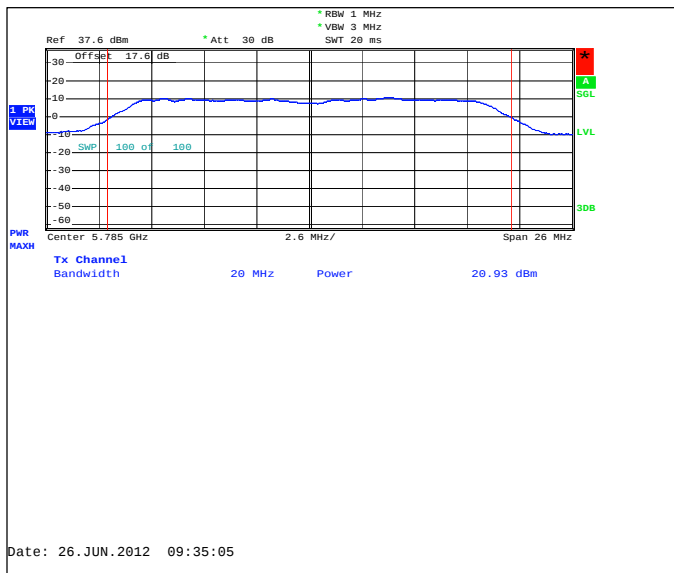
Channel 165 / 5825MHz



4.3.1 n-mode, 20 MHz CBW mode, QPSK modulation, 13.0 / 14.4 Mbps data rate

Channel / f _c [MHz]	P [dBm]	P [mW]	Result
157 / 5785	20.93	123.88	PASSED

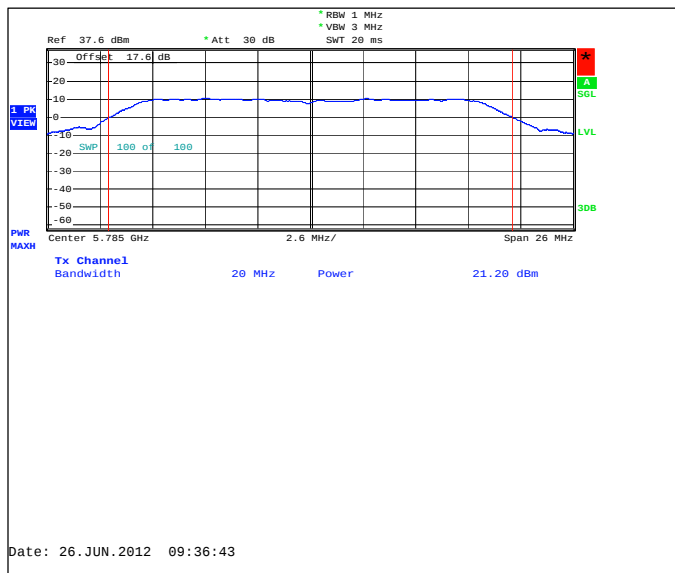
Channel 157 / 5785MHz



4.3.2 n-mode, 20 MHz CBW mode, QPSK modulation, 19.5 / 21.7 Mbps data rate

Channel / f _c [MHz]	P [dBm]	P [mW]	Result
157 / 5785	21.2	131.826	PASSED

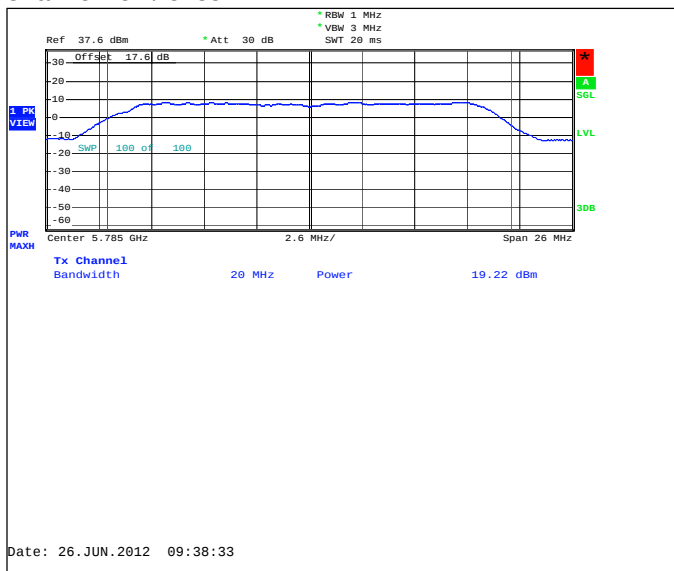
Channel 157 / 5785MHz



4.3.3 n-mode, 20 MHz CBW mode, 16-QAM modulation, 26.0 / 28.9 Mbps data rate

Channel / f _c [MHz]	P [dBm]	P [mW]	Result
157 / 5785	19.22	83.56	PASSED

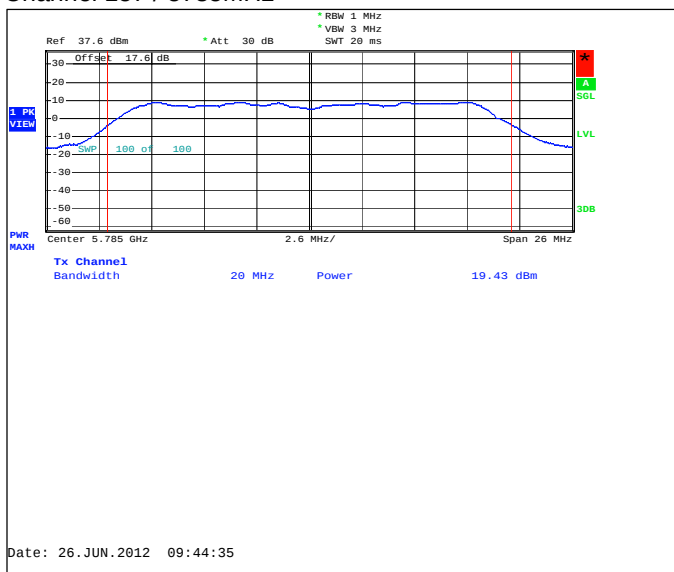
Channel 157 / 5785MHz



4.3.4 n-mode, 20 MHz CBW mode, 16-QAM modulation, 39.0 / 43.3 Mbps data rate

Channel / f _c [MHz]	P [dBm]	P [mW]	Result
157 / 5785	19.43	87.7	PASSED

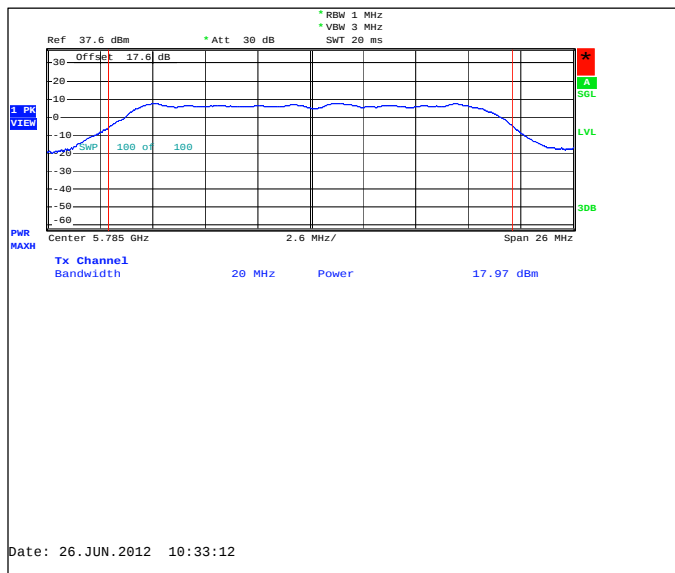
Channel 157 / 5785MHz



4.3.5 n-mode, 20 MHz CBW mode, 64-QAM modulation, 52.0 / 57.8 Mbps data rate

Channel / f _c [MHz]	P [dBm]	P [mW]	Result
157 / 5785	17.97	62.661	PASSED

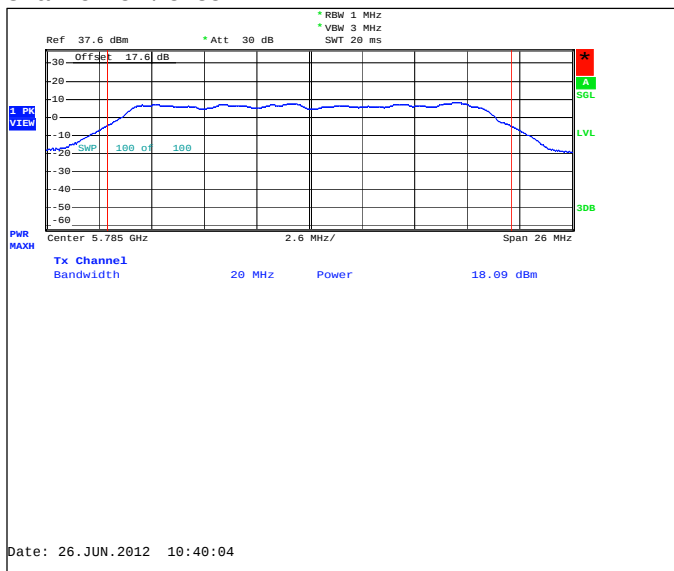
Channel 157 / 5785MHz



4.3.6 n-mode, 20 MHz CBW mode, 64-QAM modulation, 58.5 / 65.0 Mbps data rate

Channel / f _c [MHz]	P [dBm]	P [mW]	Result
157 / 5785	18.09	64.417	PASSED

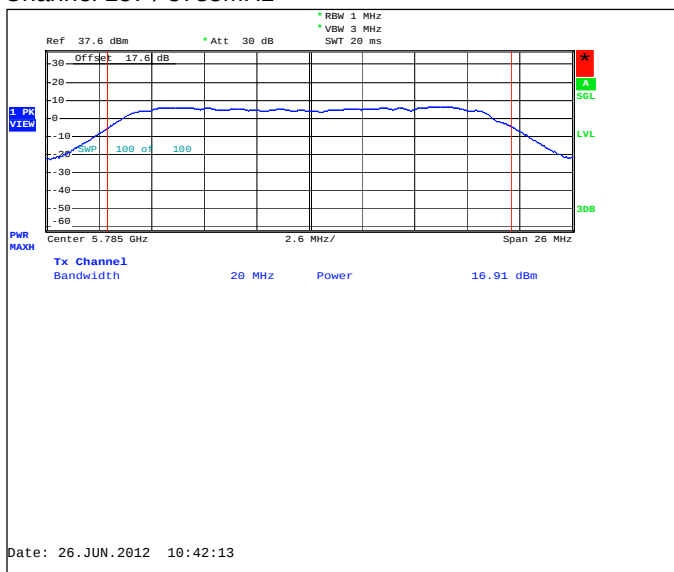
Channel 157 / 5785MHz



4.3.7 n-mode, 20 MHz CBW mode, 64-QAM modulation, 65.0 / 72.2 Mbps data rate

Channel / f_c [MHz]	P [dBm]	P [mW]	Result
157 / 5785	16.91	49.091	PASSED

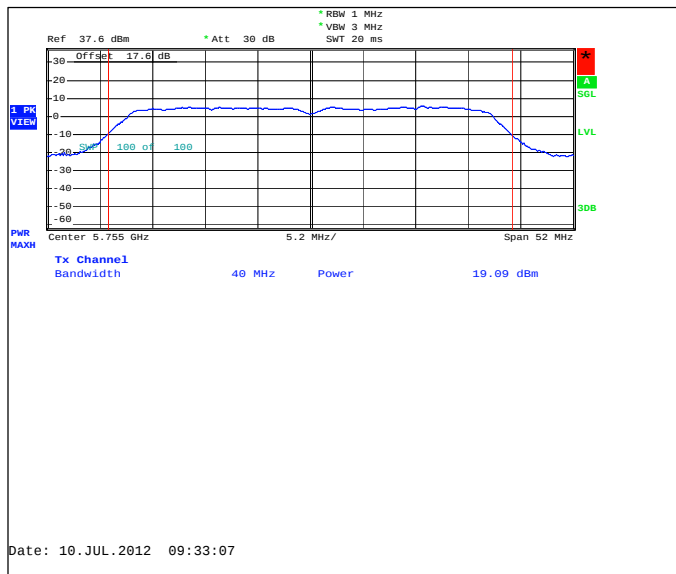
Channel 157 / 5785MHz



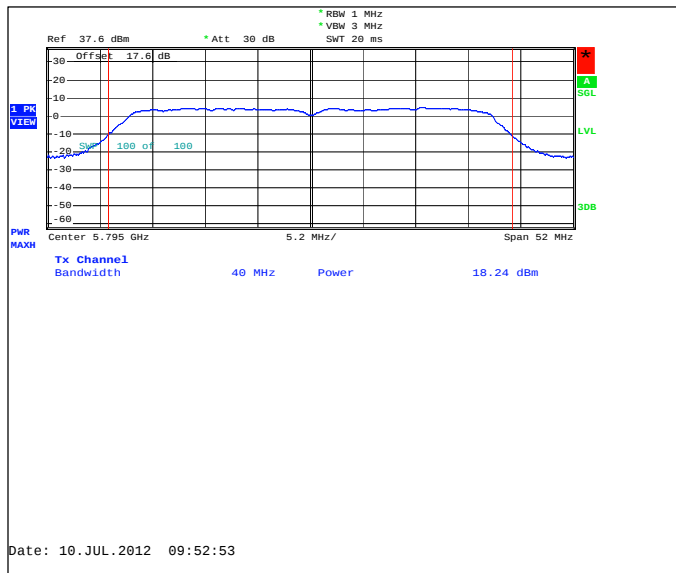
4.3.8 n-mode, 40 MHz CBW mode, BPSK modulation, 13.5 / 15.0 Mbps data rate

Channel / f _c [MHz]	P [dBm]	P [mW]	Result
149+153 / 5755	19.09	81.096	PASSED
157+161 / 5795	18.24	66.681	PASSED

Channel 149+153 / 5755MHz



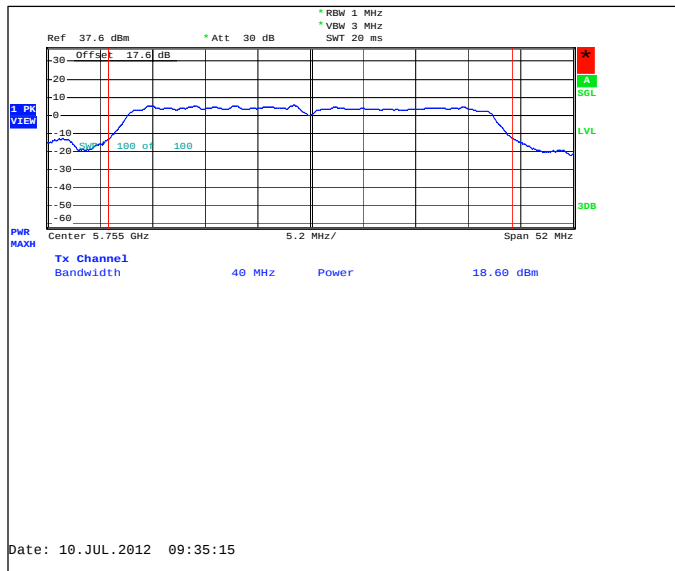
Channel 157+161 / 5795MHz



4.3.9 n-mode, 40 MHz CBW mode, QPSK modulation, 27.0 / 30.0 Mbps data rate

Channel / f _c [MHz]	P [dBm]	P [mW]	Result
149+153 / 5755	18.6	72.444	PASSED

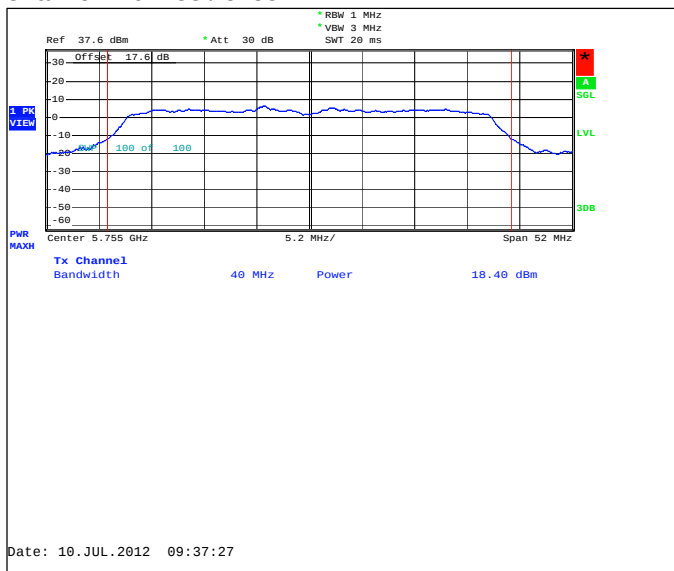
Channel 149+153 / 5755MHz



4.3.10 n-mode, 40 MHz CBW mode, QPSK modulation, 40.5 / 45.0 Mbps data rate

Channel / f _c [MHz]	P [dBm]	P [mW]	Result
149+153 / 5755	18.4	69.183	PASSED

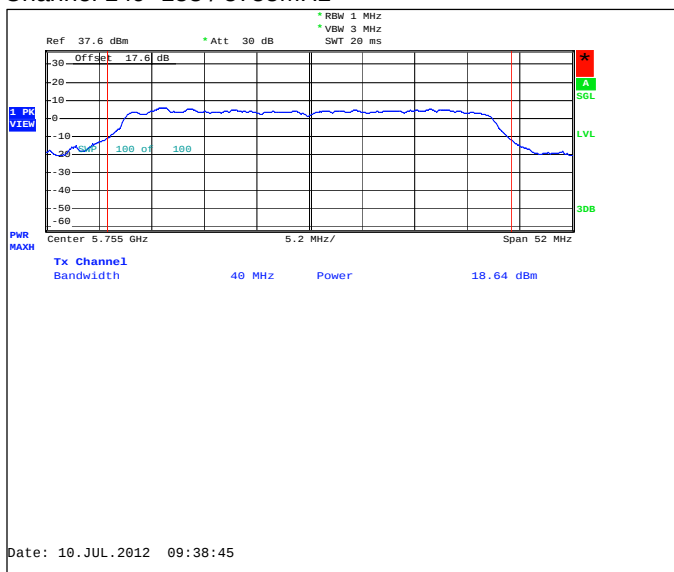
Channel 149+153 / 5755MHz



4.3.11 n-mode, 40 MHz CBW mode, 16-QAM modulation, 54.0 / 60.0 Mbps data rate

Channel / f _c [MHz]	P [dBm]	P [mW]	Result
149+153 / 5755	18.64	73.114	PASSED

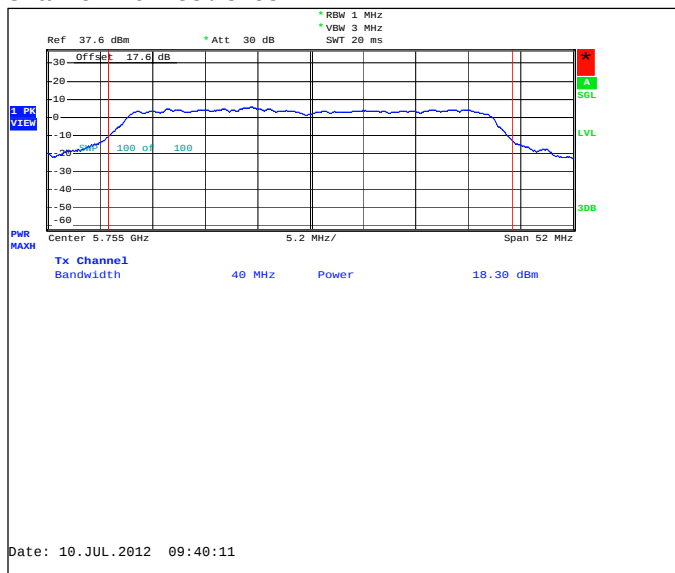
Channel 149+153 / 5755MHz



4.3.12 n-mode, 40 MHz CBW mode, 16-QAM modulation, 81.0 / 90.0 Mbps data rate

Channel / f _c [MHz]	P [dBm]	P [mW]	Result
149+153 / 5755	18.3	67.608	PASSED

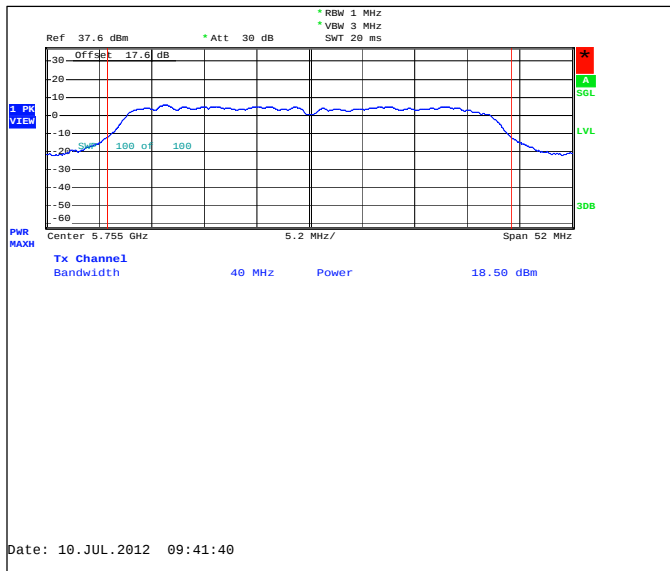
Channel 149+153 / 5755MHz



4.3.13 n-mode, 40 MHz CBW mode, 64-QAM modulation, 108.0 / 120.0 Mbps data rate

Channel / f _c [MHz]	P [dBm]	P [mW]	Result
149+153 / 5755	18.5	70.795	PASSED

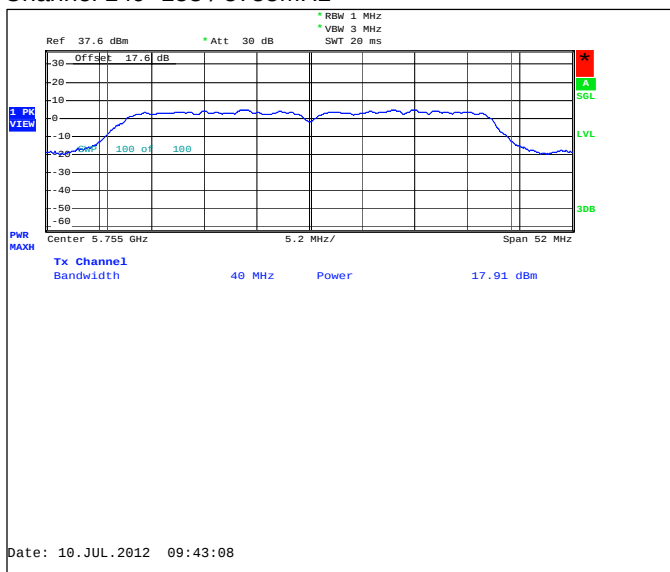
Channel 149+153 / 5755MHz



4.3.14 n-mode, 40 MHz CBW mode, 64-QAM modulation, 121.5 / 135.0 Mbps data rate

Channel / f_c [MHz]	P [dBm]	P [mW]	Result
149+153 / 5755	17.91	61.802	PASSED

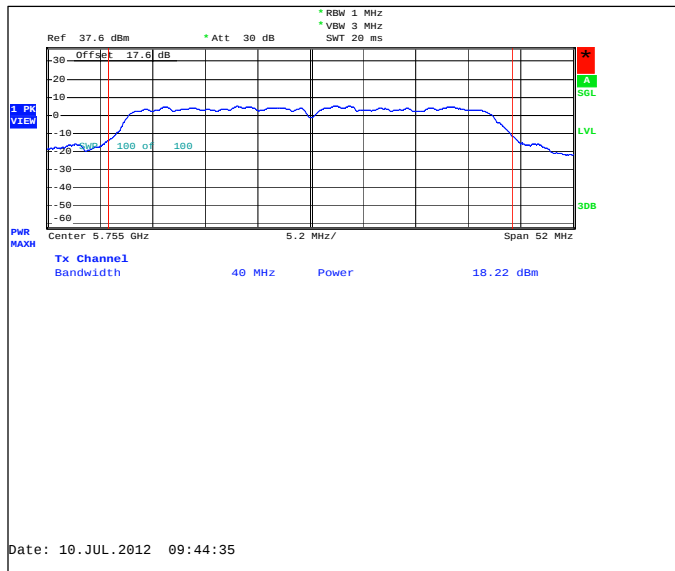
Channel 149+153 / 5755MHz



4.3.15 n-mode, 40 MHz CBW mode, 64-QAM modulation, 135.0 / 150.0 Mbps data rate

Channel / f _c [MHz]	P [dBm]	P [mW]	Result
149+153 / 5755	18.22	66.374	PASSED

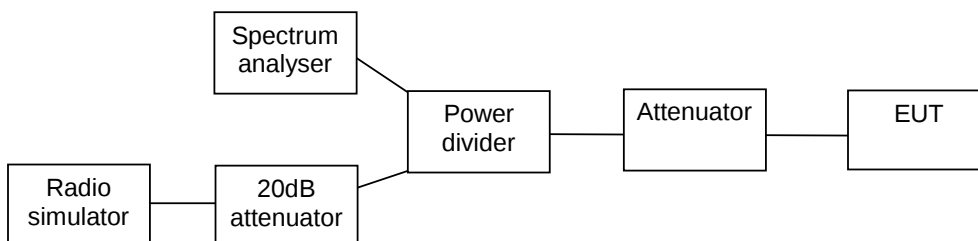
Channel 149+153 / 5755MHz



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

EUT with DUT number	RM-820, DUT 16487
Accessories with DUT numbers	BP-4GW, DUT 16488; AC-50U , DUT 16340 ; WH-208, DUT 16344
Operation Voltage [V] / [Hz]	115 / 60
Results	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	22 / 40 / 101
Date of measurements	26-Jun-2012
Measured by	Tomi Lipponen

5.1. Test Setup



5.2. Test method and limit

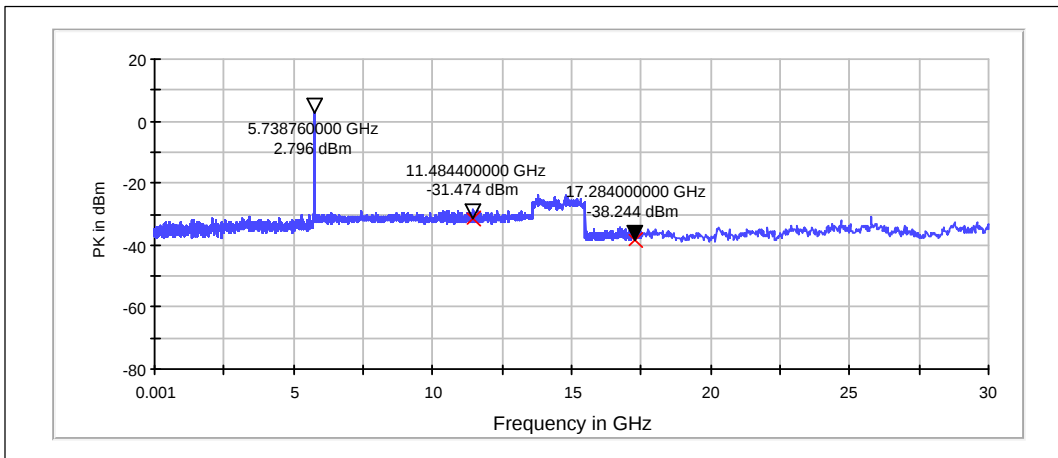
FCC15CWLAN_RM-820_04.docx Limits for spurious RF conducted emissions measurements

Frequency range [MHz]	Limit [dBc]
1 – 30000	<= -20

5.3. 5 GHz RLAN Test results

5.3.1 OFDM mode, BPSK modulation, 6 Mbps data rate

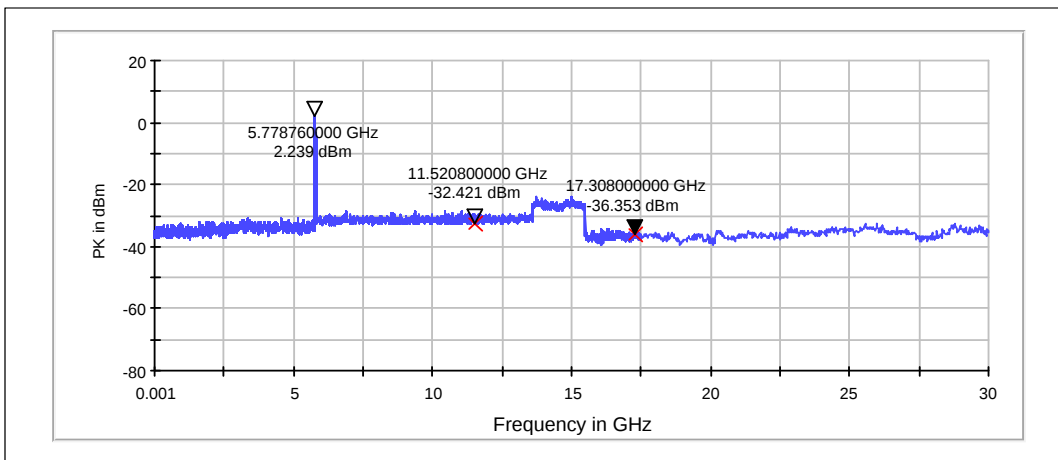
Channel 149 / 5745MHz



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

Frequency [MHz]	P [dBc]	Result
11484.4	-31.47	PASSED
17284	-38.24	PASSED

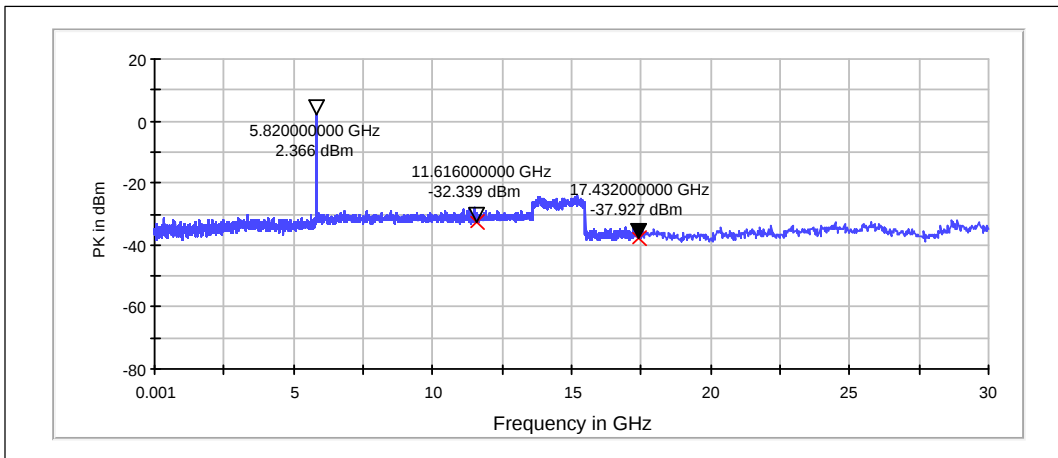
Channel 157 / 5785MHz



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

Frequency [MHz]	P [dBc]	Result
11520.8	-32.42	PASSED
17308	-36.35	PASSED

Channel 165 / 5825MHz

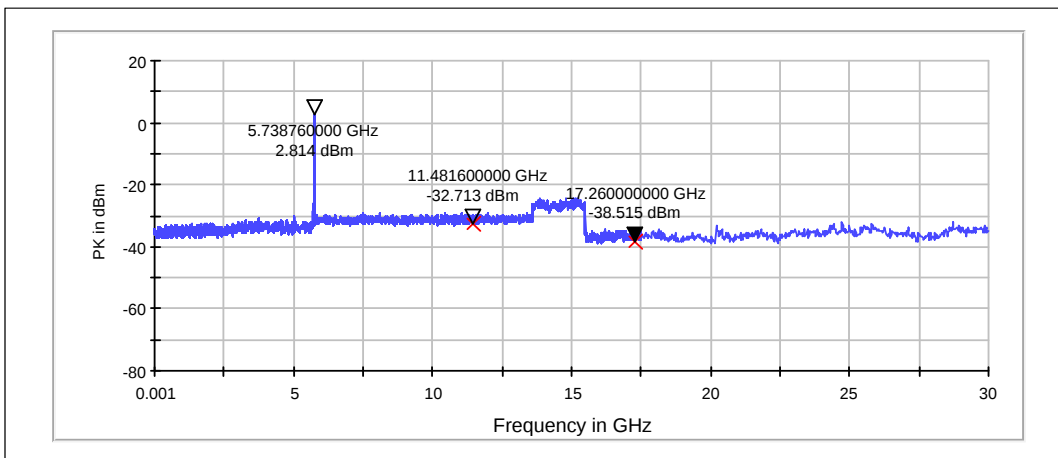


Peak (RBW: 100 kHz, VBW: 300 kHz)

Frequency [MHz]	P [dBc]	Result
11616	-32.34	PASSED
17432	-37.93	PASSED

5.3.2 n-mode, 20 MHz CBW mode, BPSK modulation, 6.5 / 7.25 Mbps data rate

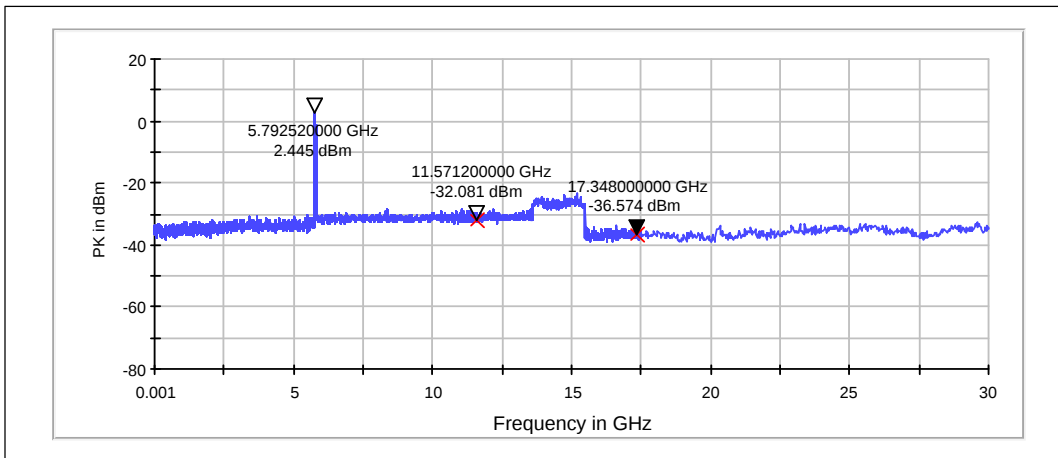
Channel 149 / 5745MHz



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

Frequency [MHz]	P [dBc]	Result
11481.6	-32.71	PASSED
17260	-38.51	PASSED

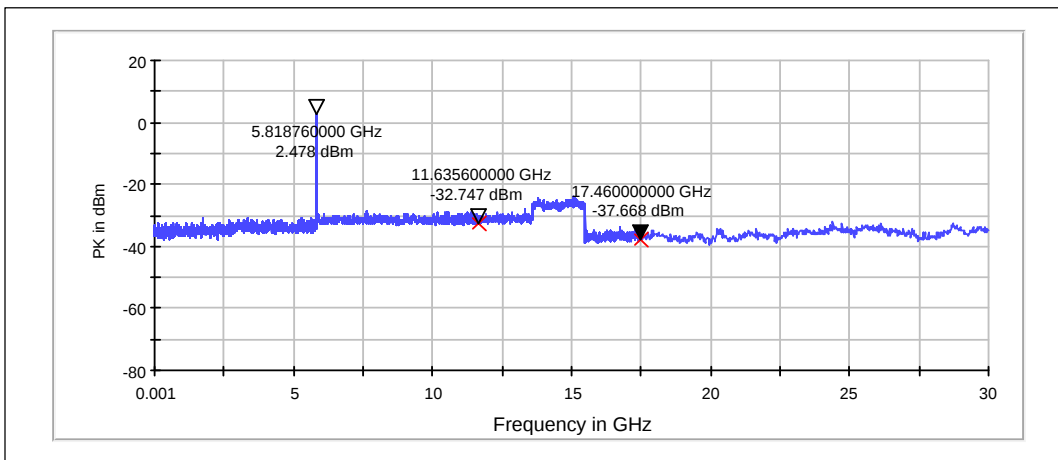
Channel 157 / 5785MHz



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

Frequency [MHz]	P [dBc]	Result
11571.2	-32.08	PASSED
17348	-36.57	PASSED

Channel 165 / 5825MHz

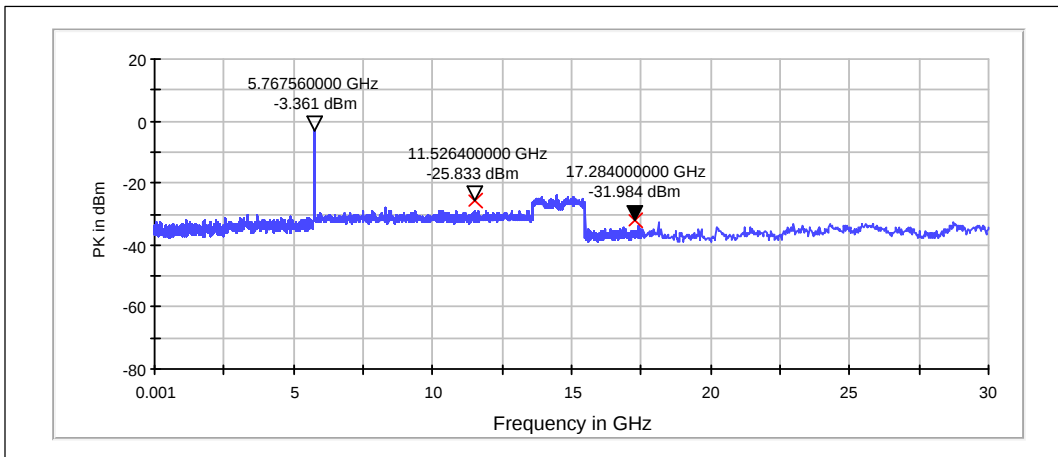


Peak (RBW: 100 kHz, VBW: 300 kHz)

Frequency [MHz]	P [dBc]	Result
11635.6	-32.75	PASSED
17460	-37.67	PASSED

5.3.3 n-mode, 40 MHz CBW mode, BPSK modulation, 13.5 / 15.0 Mbps data rate

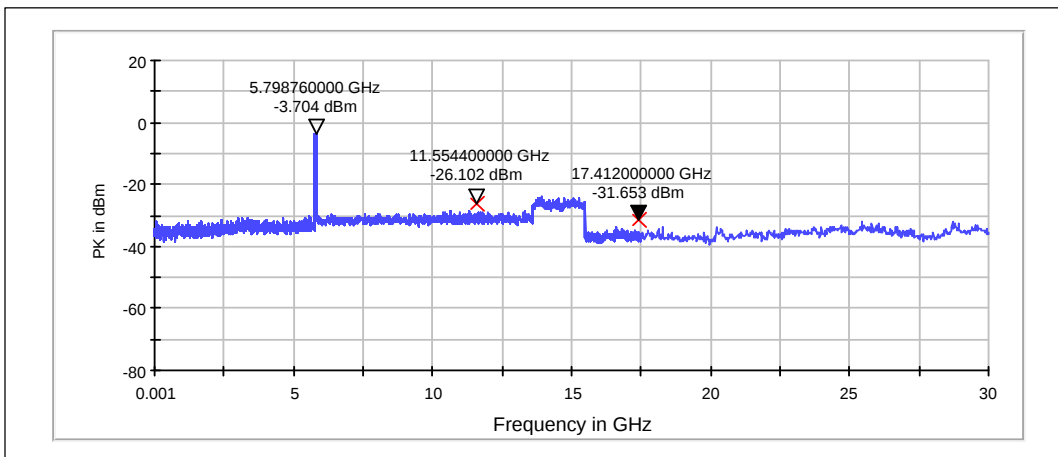
Channel 149+153 / 5755MHz



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

Frequency [MHz]	P [dBc]	Result
11526.4	-25.83	PASSED
17284	-31.98	PASSED

Channel 157+161 / 5795MHz



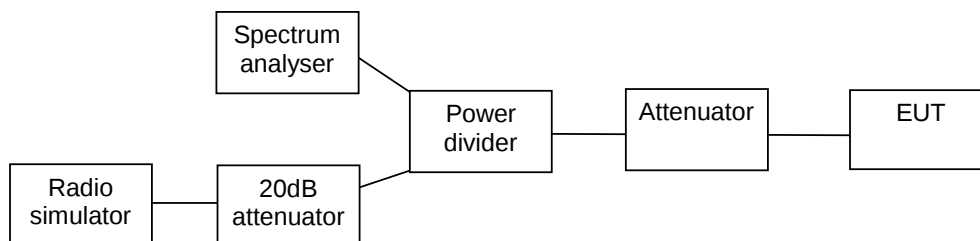
Peak (RBW: 100 kHz, VBW: 300 kHz)

Frequency [MHz]	P [dBc]	Result
11554.4	-26.1	PASSED
17412	-31.65	PASSED

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

EUT with DUT number	RM-820, DUT 16487
Accessories with DUT numbers	BP-4GW, DUT 16488; AC-50U, DUT 16340 ; WH-208, DUT 16344
Operation Voltage [V] / [Hz]	115 / 60
Results	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	22 / 40 / 101
Date of measurements	26-Jun-2012
Measured by	Tomi Lipponen

6.1. Test Setup



6.2. 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

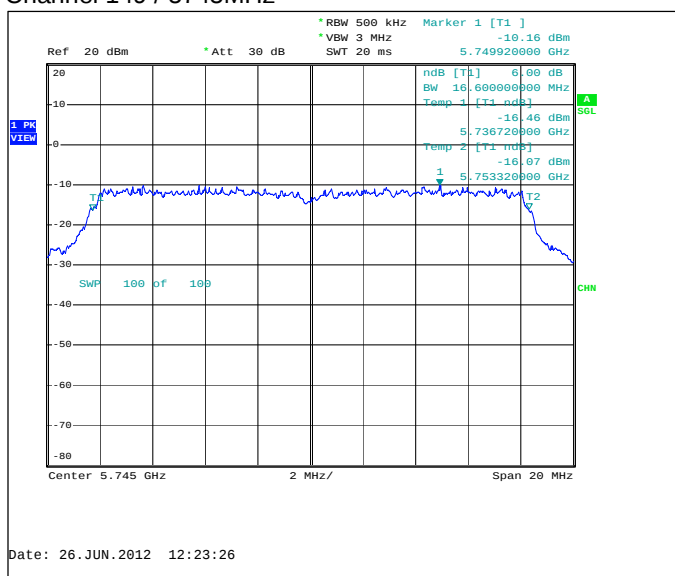
Limit [kHz]
>= 500

6.3. 5 GHz RLAN Test results

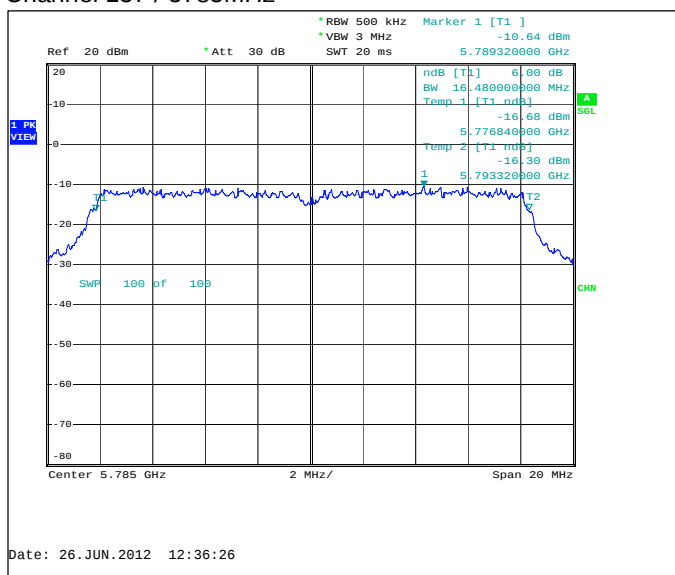
6.3.1 OFDM mode, BPSK modulation, 6 Mbps data rate

Channel / f _c [MHz]	6 dB bandwidth [kHz]	Result
149 / 5745	16600	PASSED
157 / 5785	16480	PASSED
165 / 5825	16480	PASSED

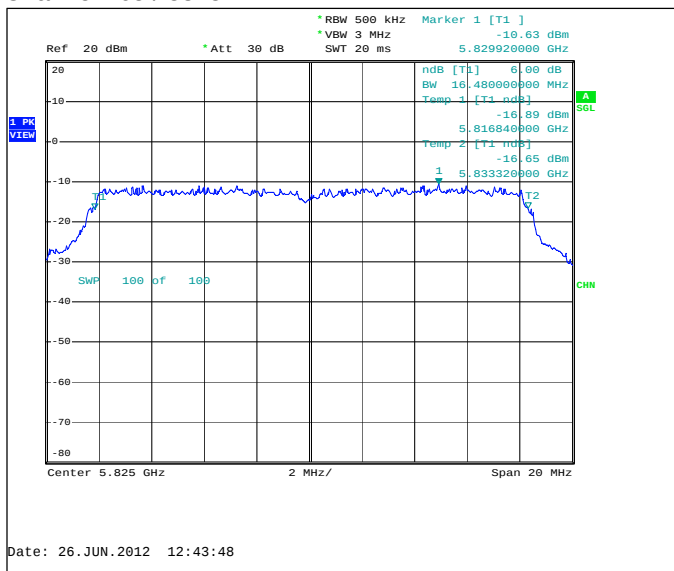
Channel 149 / 5745MHz



Channel 157 / 5785MHz



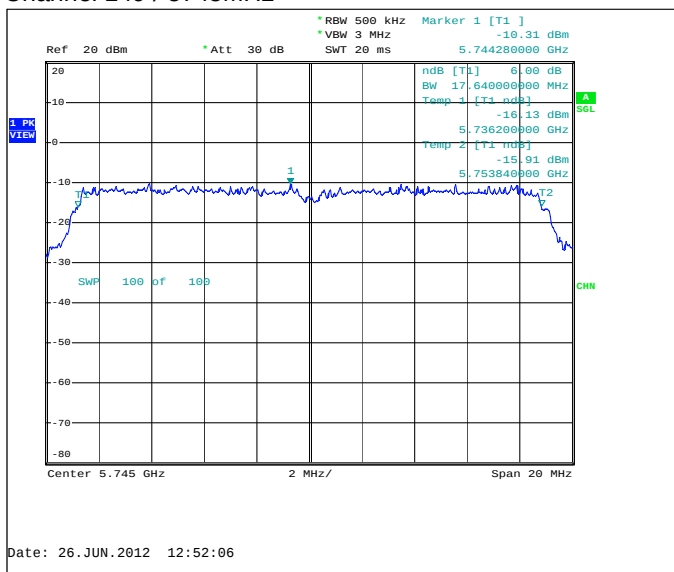
Channel 165 / 5825MHz



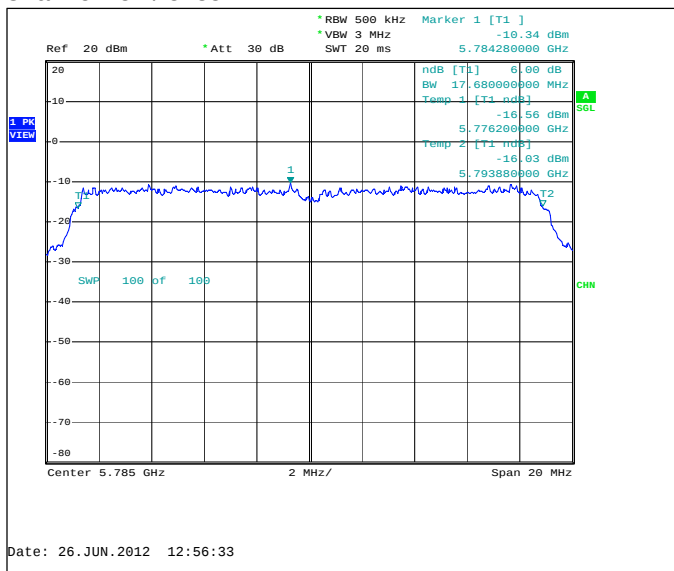
6.3.2 n-mode, 20 MHz CBW mode, BPSK modulation, 6.5 / 7.25 Mbps data rate

Channel / f _c [MHz]	6 dB bandwidth [kHz]	Result
149 / 5745	17640	PASSED
157 / 5785	17680	PASSED
165 / 5825	17640	PASSED

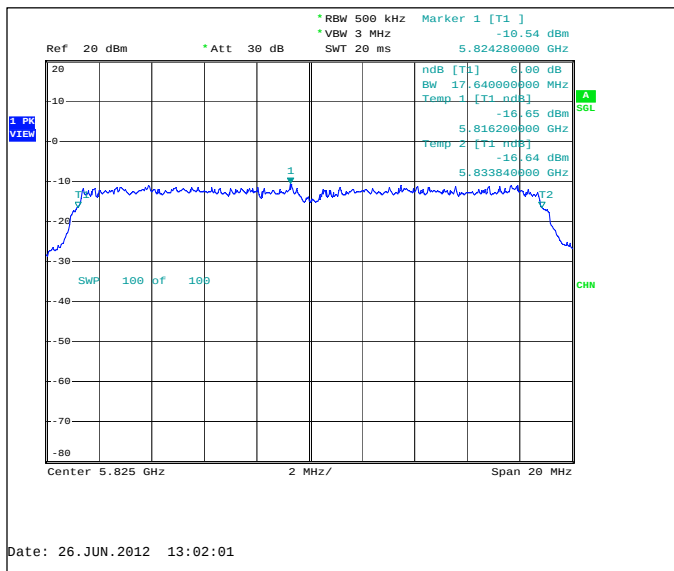
Channel 149 / 5745MHz



Channel 157 / 5785MHz



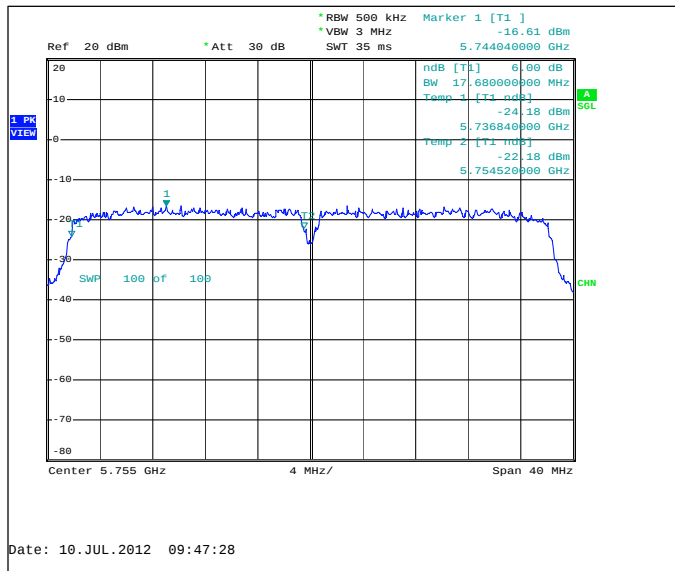
Channel 165 / 5825MHz



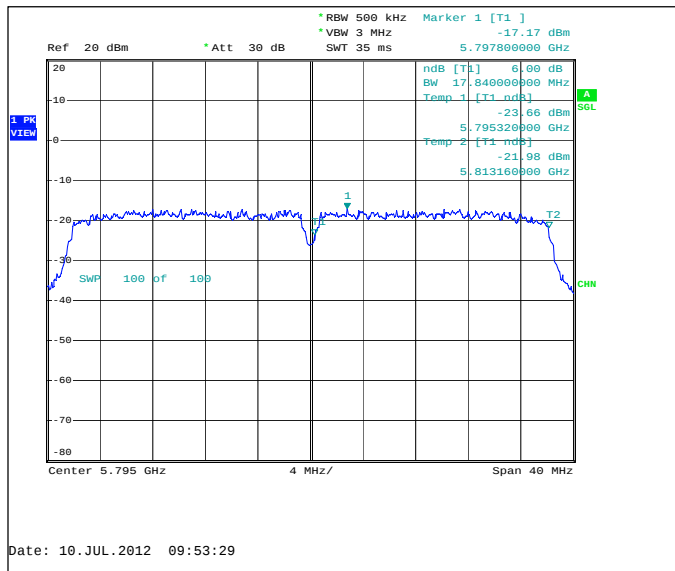
6.3.3 n-mode, 40 MHz CBW mode, BPSK modulation, 13.5 / 15.0 Mbps data rate

Channel / f_c [MHz]	6 dB bandwidth [kHz]	Result
149+153 / 5755	17680	PASSED
157+161 / 5795	17840	PASSED

Channel 149+153 / 5755MHz



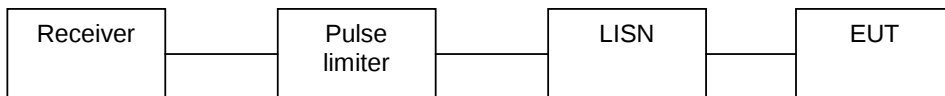
Channel 157+161 / 5795MHz



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

EUT with DUT number	RM-820, DUT 16489
Accessories with DUT numbers	BP-4GW, DUT 16488; AC-50U , DUT 16340 ; WH-208, DUT 16344
Operation Voltage [V] / [Hz]	115 / 60
Results	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	22 / 40 / 101
Date of measurements	02-Jul-2012
Measured by	Tomi Lipponen

7.1. Test Setup



7.2. Test method and limit

The measurement is made according to Public notice DA 00-705 and IC standard RSS-GEN as follows:

The EUT is placed on a wooden table 80 cm above the reference groundplane.

The EUT is connected via LISN to a test power supply.

The measurement results are obtained as described below:

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

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

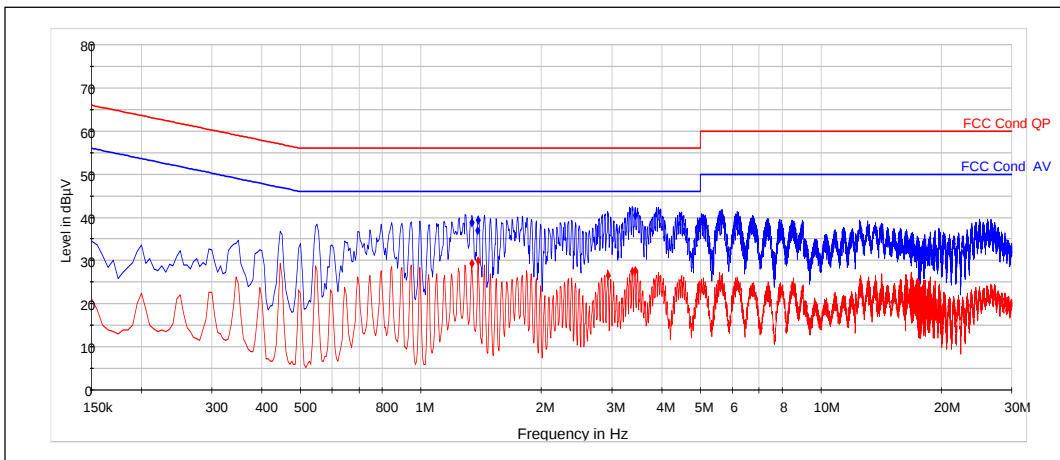
CISPR 22 Class B limits

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

7.3. WLAN Test results

7.3.1 OFDM mode, BPSK modulation, 6 Mbps data rate

Channel 157 / 5785 MHz



QuasiPeak (RBW: 9 kHz)

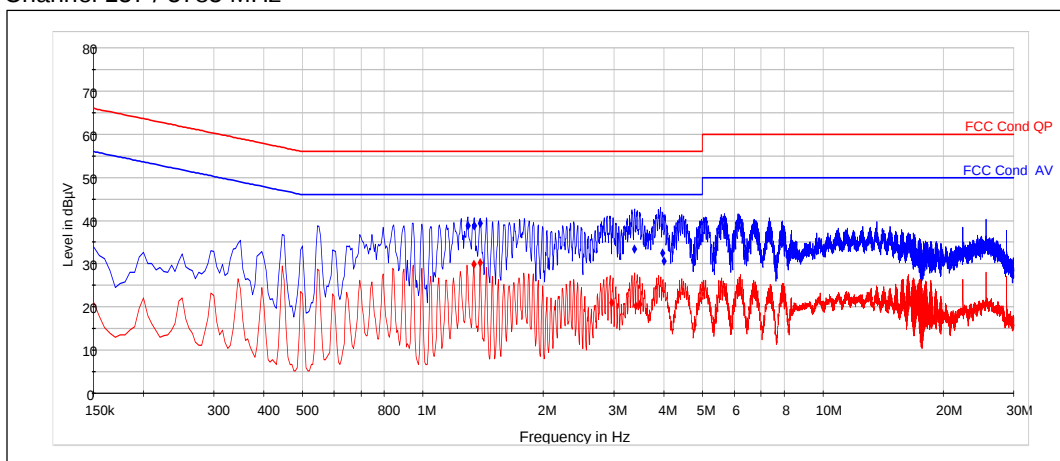
Frequency [MHz]	U [dBμV]	Line	Result
1.34	38.84	N	PASSED
1.385	36.93	N	PASSED
1.39	39.27	N	PASSED
3.43	40.53	N	PASSED

Average (RBW: 9 kHz)

Frequency [MHz]	U [dBμV]	Line	Result
1.34	29.3	N	PASSED
1.39	29.82	N	PASSED
2.935	26.58	N	PASSED
3.38	27.38	N	PASSED
3.43	27.57	N	PASSED

7.3.2 n-mode mode, 20 MHz CBW mode, BPSK modulation, 6.5 / 7.2 Mbps data rate

Channel 157 / 5785 MHz



QuasiPeak (RBW: 9 kHz)

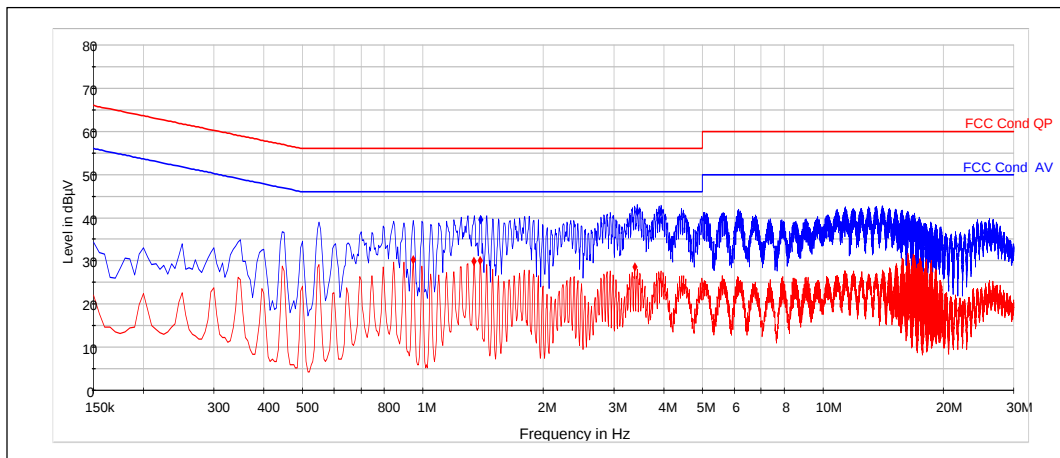
Frequency [MHz]	U [dBμV]	Line	Result
1.295	38.81	N	PASSED
1.345	38.72	N	PASSED
1.39	39.4	N	PASSED
3.375	33.33	N	PASSED
3.97	32.47	N	PASSED
4	30.66	N	PASSED

Average (RBW: 9 kHz)

Frequency [MHz]	U [dBμV]	Line	Result
1.34	29.96	N	PASSED
1.39	30.34	N	PASSED
2.96	21.04	N	PASSED
3.405	20.17	N	PASSED
3.48	20.68	N	PASSED

7.3.3 n-mode mode, 40 MHz CBW mode, BPSK modulation, 13.5 / 15.0 Mbps data rate

Channel 149+153 / 5755 MHz



QuasiPeak (RBW: 9 kHz)

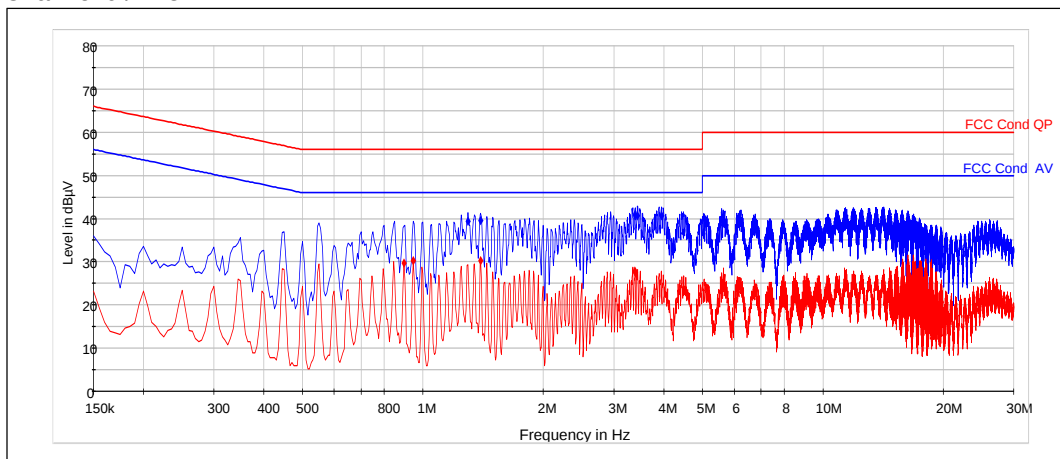
Frequency [MHz]	U [dBμV]	Line	Result
1.395	39.61	N	PASSED
3.43	41.31	N	PASSED
3.89	39.4	N	PASSED
3.925	41.37	N	PASSED

Average (RBW: 9 kHz)

Frequency [MHz]	U [dBμV]	Line	Result
0.945	30.19	N	PASSED
1.34	29.81	N	PASSED
1.39	30.09	N	PASSED
3.385	28.59	N	PASSED
16.255	17.09	N	PASSED

7.3.4 DSSS mode, QPSK modulation, 11 Mbps data rate

Channel 6 / 2437 MHz



QuasiPeak (RBW: 9 kHz)

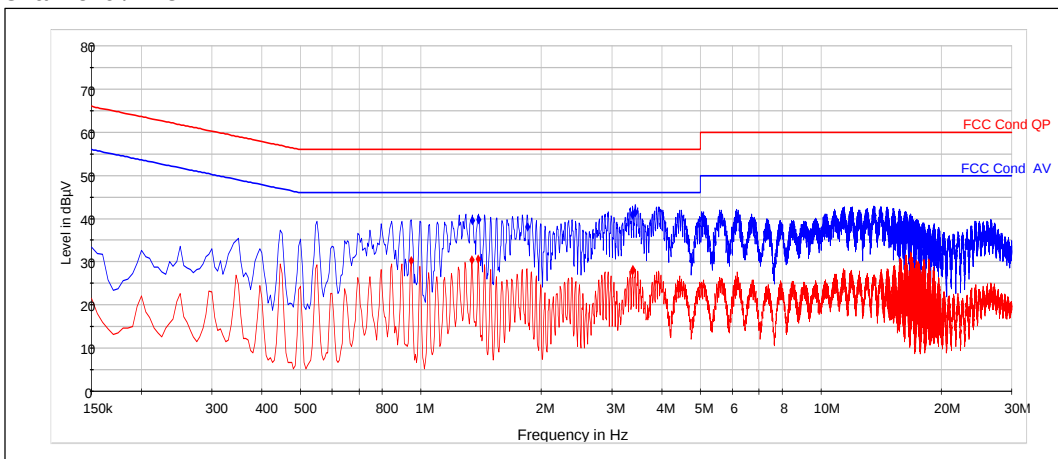
Frequency [MHz]	U [dBμV]	Line	Result
1.295	39.32	N	PASSED
1.395	39.62	N	PASSED
3.385	40.82	N	PASSED
3.435	40.72	N	PASSED
3.945	40.7	N	PASSED

Average (RBW: 9 kHz)

Frequency [MHz]	U [dBμV]	Line	Result
0.895	29.68	N	PASSED
0.945	30.18	N	PASSED
1.395	30.2	N	PASSED
3.39	27.81	N	PASSED
3.395	27.44	N	PASSED

7.3.5 OFDM mode, QPSK modulation, 6 Mbps data rate

Channel 6 / 2437 MHz



QuasiPeak (RBW: 9 kHz)

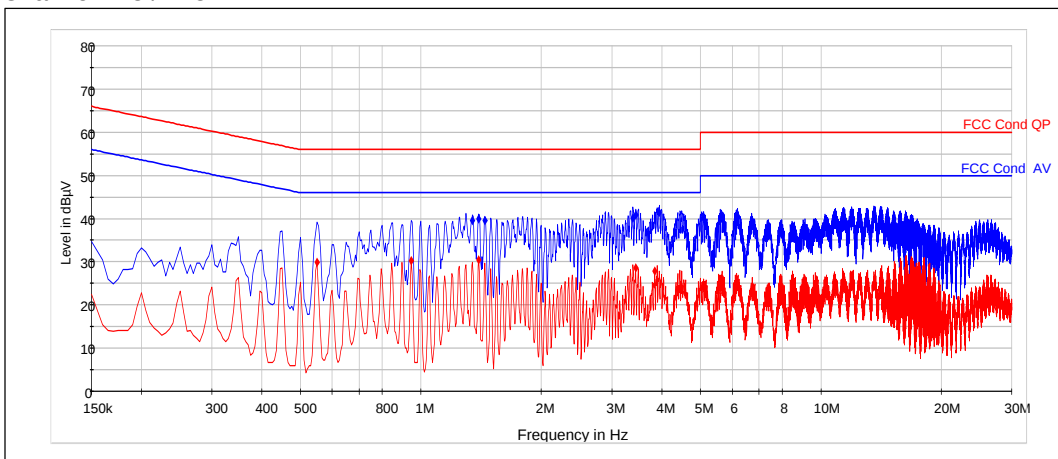
Frequency [MHz]	U [dBµV]	Line	Result
1.345	39.47	N	PASSED
1.395	39.65	N	PASSED
1.845	37.96	N	PASSED
3.38	40.87	N	PASSED
3.385	41.06	N	PASSED
3.43	41.41	N	PASSED

Average (RBW: 9 kHz)

Frequency [MHz]	U [dBµV]	Line	Result
0.945	30.34	N	PASSED
1.34	30.44	N	PASSED
1.39	30.69	N	PASSED
3.38	27.81	N	PASSED
3.385	28.18	N	PASSED
16.8	30.52	N	PASSED

7.3.6 n-mode mode, 40 MHz CBW mode,BPSK modulation, 13.5 Mbps data rate

Channel 4+8 / 2437 MHz



QuasiPeak (RBW: 9 kHz)

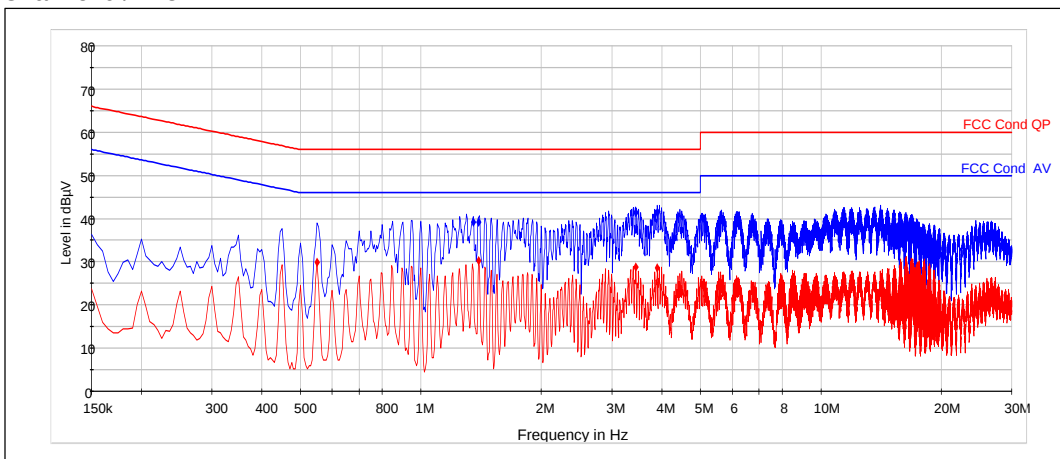
Frequency [MHz]	U [dBμV]	Line	Result
1.345	39.49	N	PASSED
1.395	39.89	N	PASSED
1.445	39.45	N	PASSED
3.385	40	N	PASSED
3.445	40.89	N	PASSED
3.94	41.43	N	PASSED

Average (RBW: 9 kHz)

Frequency [MHz]	U [dBμV]	Line	Result
0.55	29.96	N	PASSED
0.945	30.28	N	PASSED
1.395	30.48	N	PASSED
3.44	28.64	N	PASSED
3.84	27.88	N	PASSED

7.3.7 n-mode mode, 20 MHz CBW mode, BPSK modulation, 6.5 Mbps data rate

Channel 6 / 2437 MHz



QuasiPeak (RBW: 9 kHz)

Frequency [MHz]	U [dBμV]	Line	Result
1.35	39.22	N	PASSED
1.395	39.1	N	PASSED
3.445	41.4	N	PASSED
3.89	41.48	N	PASSED

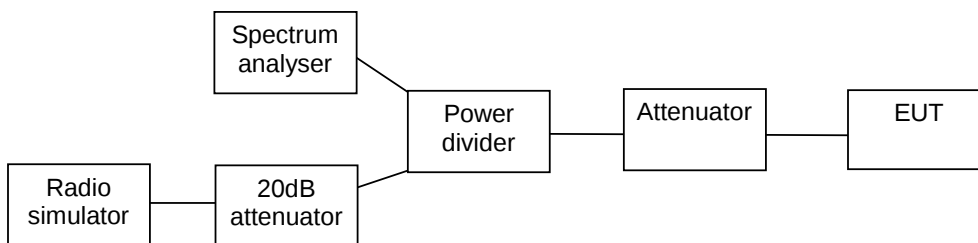
Average (RBW: 9 kHz)

Frequency [MHz]	U [dBμV]	Line	Result
0.55	29.91	N	PASSED
1.395	30.22	N	PASSED
3.445	28.77	N	PASSED
3.89	28.65	N	PASSED

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

EUT with DUT number	RM-820, DUT 16487
Accessories with DUT numbers	BP-4GW, DUT 16488; AC-50U, DUT 16340 ; WH-208, DUT 16344
Operation Voltage [V] / [Hz]	115 / 60
Results	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	22 / 40 / 101
Date of measurements	26-Jun-2012
Measured by	Tomi Lipponen

8.1. Test Setup



8.2. 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

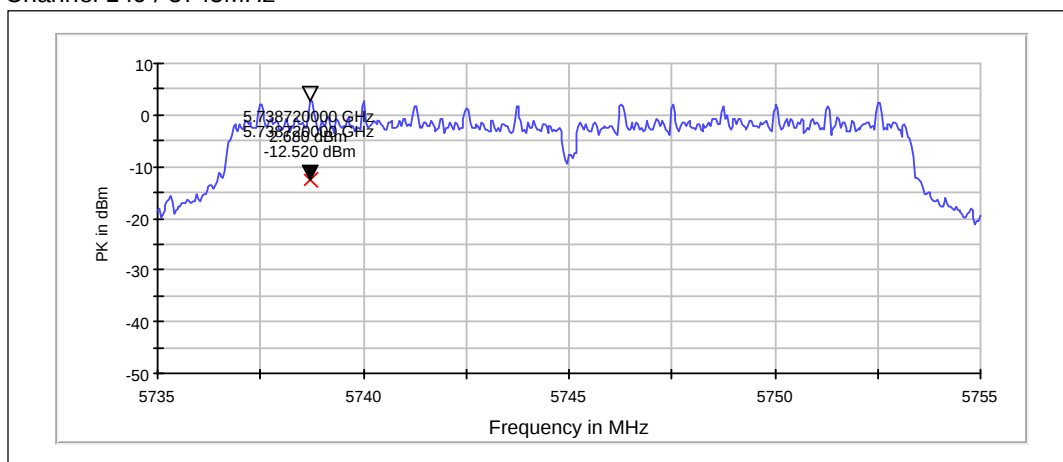
8.3. 5 GHz RLAN Test results

8.3.1 OFDM mode, BPSK modulation, 6 Mbps data rate

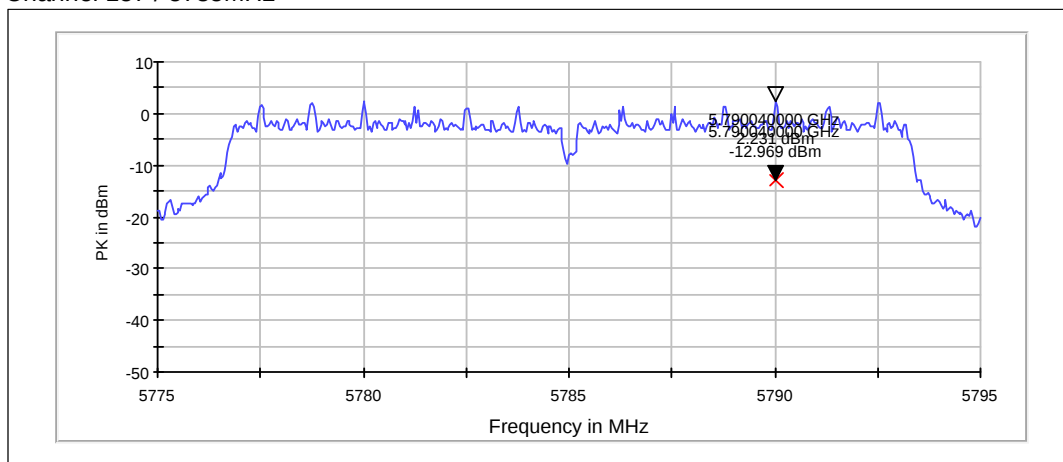
Peak (RBW: 100 kHz, VBW: 300 kHz, Max hold)

Channel / f_c [MHz]	P [dBm]	Result
149 / 5745	-12.52	PASSED
157 / 5785	-12.97	PASSED
165 / 5825	-12.95	PASSED

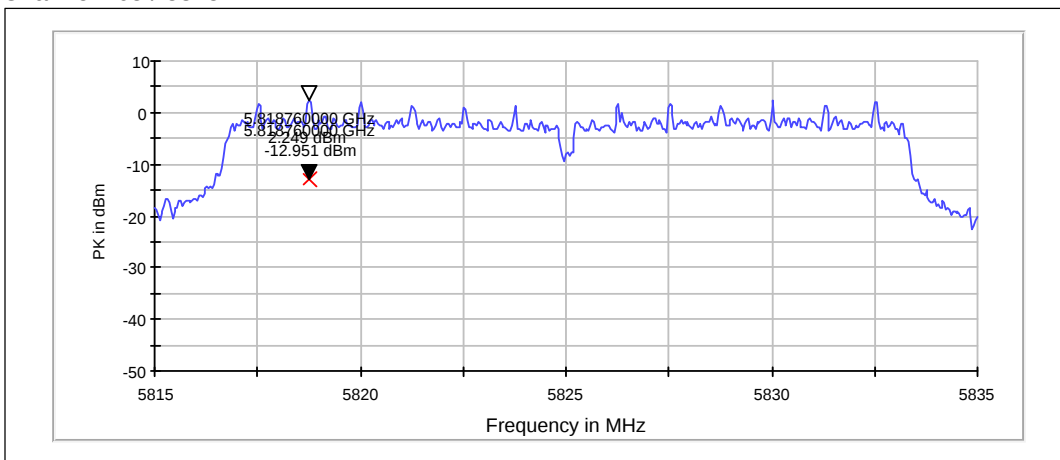
Channel 149 / 5745MHz



Channel 157 / 5785MHz



Channel 165 / 5825MHz

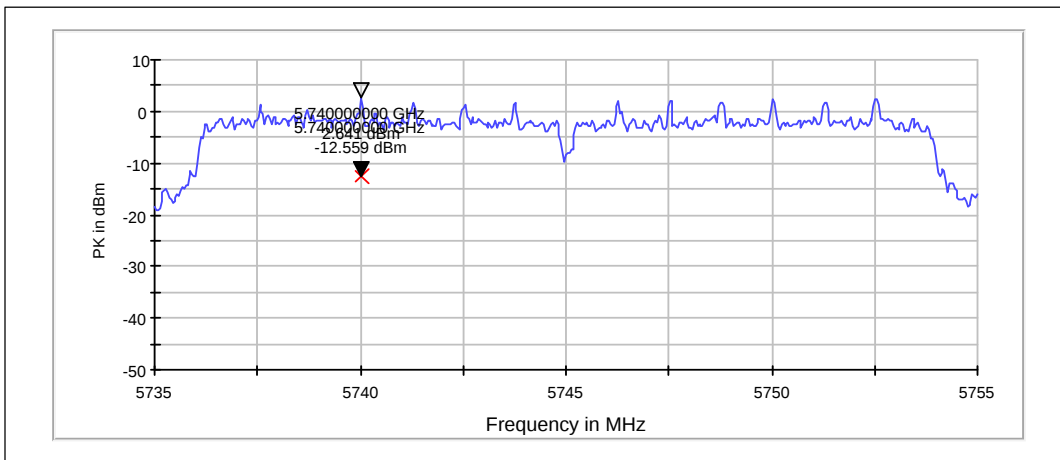


8.3.2 n-mode, 20 MHz CBW mode, BPSK modulation, 6.5 / 7.25 Mbps data rate

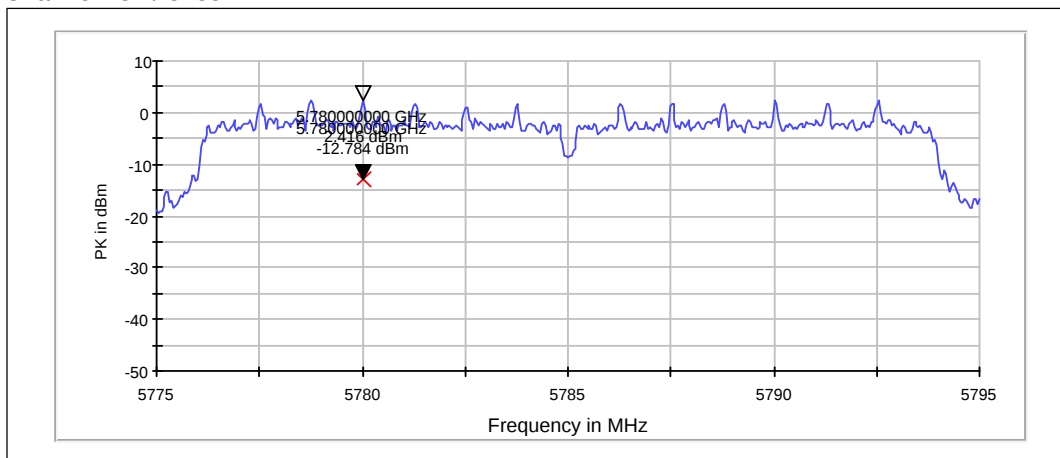
Peak (RBW: 100 kHz, VBW: 300 kHz, Max hold)

Channel / f _c [MHz]	P [dBm]	Result
149 / 5745	-12.56	PASSED
157 / 5785	-12.78	PASSED
165 / 5825	-12.96	PASSED

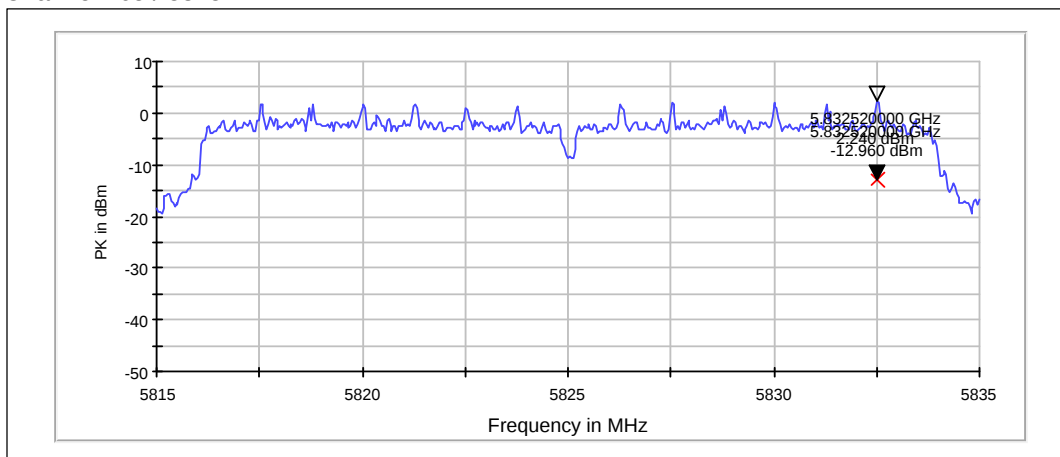
Channel 149 / 5745MHz



Channel 157 / 5785MHz



Channel 165 / 5825MHz

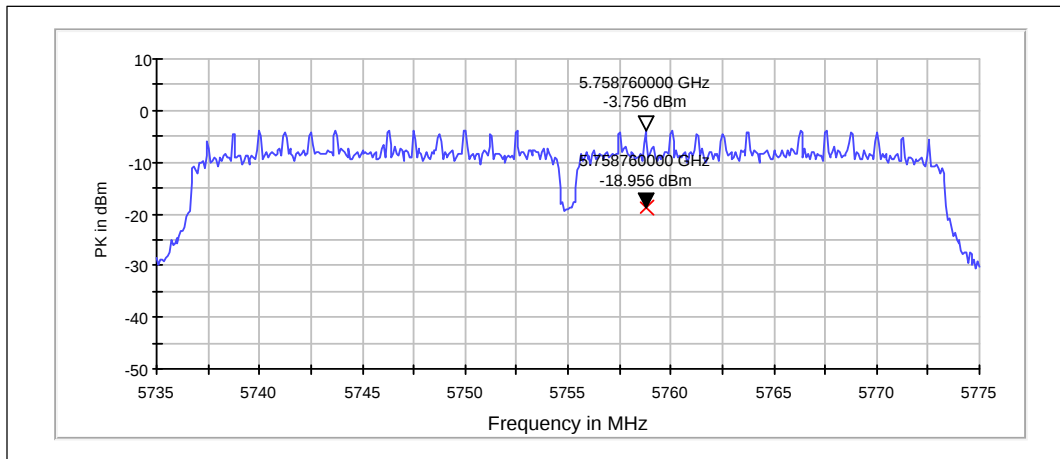


8.3.3 n-mode, 40 MHz CBW mode, BPSK modulation, 13.5 / 15.0 Mbps data rate

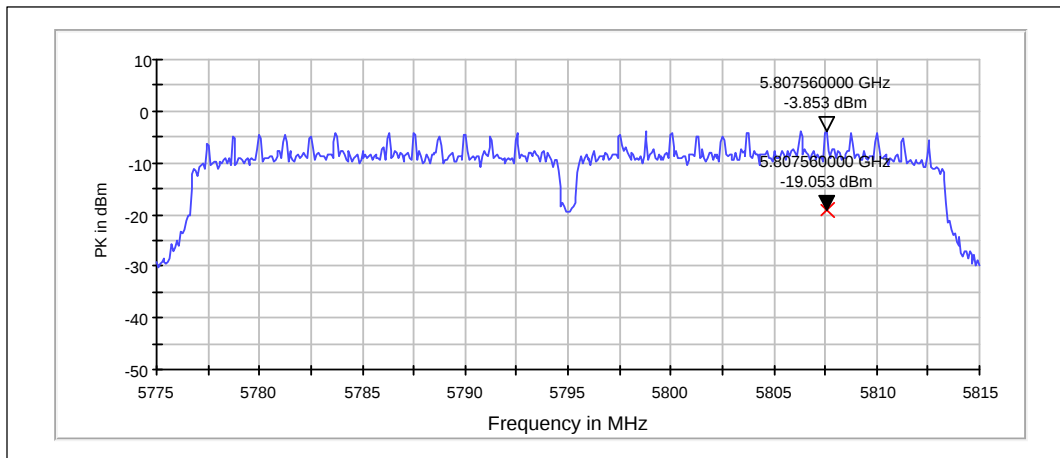
Peak (RBW: 100 kHz, VBW: 300 kHz, Max hold)

Channel / f _c [MHz]	P [dBm]	Result
149+153 / 5755	-18.96	PASSED
157+161 / 5795	-19.05	PASSED

Channel 149+153 / 5755MHz



Channel 157+161 / 5795MHz



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	-
1988	Antenna	HL562	R&S	-
-	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	-