FCC Part 15C Compliance Test Report

Test Report no.:	FCC15CWLAN_RM-983_10.docx	**Date of Report:**	05-Aug-2014
Number of pages:	73	**Customer's Contact person:**	Victoria Abadilla
Testing laboratory:	TCC Microsoft Tampere Laboratory P.O. Box 403 Visiokatu 3 FIN-33101 TAMPERE, FINLAND Tel. +358 71 800 8000 Fax. +358 71 804 6880	**Customer:**	Microsoft 16620 West Bernardo Drive San Diego, CA 92127 USA Tel. +1 858 831 5000 Fax. +1 858 385 1598
FCC listing no.: **IC recognition no.:**	94436 661AK-1		
Tested devices/ accessories:	**Phone RM-983 / Battery BV-L4A / Headset WH-208 / Charger AC-60E / USB Cable CA-190CD**		
FCC ID:	QMNRM-983	**IC:**	-
Supplement reports:	-		
Testing has been carried out in accordance with:	**CFR 47, FCC rules Part 15 Subpart C, ANSI C63.4 (2003), DTS procedures KDB 558074, IC standards, 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 Microsoft.		
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, Specialist, EMC

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1. Summary for FCC Part 15C Compliance Test Report

Date of receipt	09-Jul-2014
Testing completed	22-Jul-2014
The customer's contact person	Victoria Abadilla
Test Plan referred to	T:\Projects\RM-983\TestPlan\RS_TestPlan_RM-983.xlsm
Notes	5GHz functionality checked up to 40 GHz and there are no emission peaks 26.5GHz – 40GHz.
Document name	T:\Projects\RM-983\EMC\FCC15CWLAN_RM-983_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.

Devices under tests

Product	Type	SN	HW	MV	SW	DUT
Phone	RM-983	354250060000364	0200		02028.00000.14224.06004	43191
Battery	BV-L4A	4181574243S114000270670727	3.0	1.0	-	43188
Phone	RM-983	354250060000075	0200	-	02028.00000.14224.06004	43199
Charger	AC-60E	-	-	-	-	43161
USB Cable	CA-190CD	-	-	-	-	43162
Headset	WH-208	-	-	-	-	43189

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), 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	7.2.4	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

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	7.2.4	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	The EUT complies with the essential requirements in the standard.
FAILED	The EUT does not comply with the essential requirements in the standard.
NP	The test was not performed by the TCC Microsoft Laboratory.

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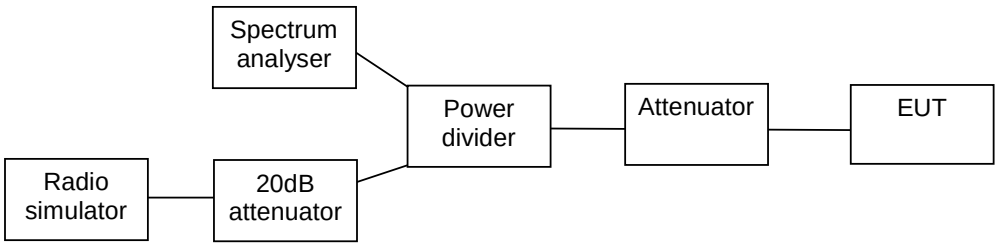
2. Conducted peak output power
(FCC §15.247(b)(1), RSS-210 A8.4(4))

EUT with DUT number	RM-983, DUT 43191
Accessories with DUT numbers	BV-L4A, DUT 43188 ; WH-208, DUT 43189 ; AC-60E, DUT 43161 ; CA-190CD, DUT 43162
Operation Voltage [V] / [Hz]	Nominal
Results	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	22 / 50 / 102.1
Date of measurements	10-Jul-2014
Measured by	Timo Raiskio

2.1. Test Setup



2.2. Test method and limit

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

Limits for conducted peak output power measurements

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

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2.3. Power results summary, all modes

Channel / fc [MHz]	Mode	Modulation	Data rate	Level [dBm]
6 / 2437	802.11b	BPSK	1 Mbps	20.87
6 / 2437	802.11b	QPSK	2 Mbps	21.28
6 / 2437	802.11b	QPSK	5.5 Mbps	23.14
6 / 2437	802.11b	QPSK	11 Mbps	24.19
6 / 2437	802.11g	BPSK	6 Mbps	23.54
6 / 2437	802.11g	BPSK	9 Mbps	23.55
6 / 2437	802.11g	QPSK	12 Mbps	22.1
6 / 2437	802.11g	QPSK	18 Mbps	22.27
6 / 2437	802.11g	16QAM	24 Mbps	21.6
6 / 2437	802.11g	16QAM	36 Mbps	21.54
6 / 2437	802.11g	64QAM	48 Mbps	20.68
6 / 2437	802.11g	64QAM	54 Mbps	20.65
6 / 2437	802.11n	BPSK	6.5 / 7.25 Mbps	21.84
6 / 2437	802.11n	QPSK	13.0 / 14.4 Mbps	21.23
6 / 2437	802.11n	QPSK	19.5 / 21.7 Mbps	21.3
6 / 2437	802.11n	16QAM	26.0 / 28.9 Mbps	21.73
6 / 2437	802.11n	16QAM	39.0 / 43.3 Mbps	20.58
6 / 2437	802.11n	64QAM	52.0 / 57.8 Mbps	20.59
6 / 2437	802.11n	64QAM	58.5 / 65.0 Mbps	20.85
6 / 2437	802.11n	64QAM	65.0 / 72.2 Mbps	20.55
157 / 5785	802.11a	BPSK	6 Mbps	23.48
157 / 5785	802.11a	BPSK	9 Mbps	23.39
157 / 5785	802.11a	QPSK	12 Mbps	23.14
157 / 5785	802.11a	QPSK	18 Mbps	23.08
157 / 5785	802.11a	16QAM	24 Mbps	22.57
157 / 5785	802.11a	16QAM	36 Mbps	22.72
157 / 5785	802.11a	64QAM	48 Mbps	21.72
157 / 5785	802.11a	64QAM	54 Mbps	21.82
157 / 5785	802.11n	BPSK	6.5 / 7.25 Mbps	22.63
157 / 5785	802.11n	QPSK	13.0 / 14.4 Mbps	22.43
157 / 5785	802.11n	QPSK	19.5 / 21.7 Mbps	22.43
157 / 5785	802.11n	16QAM	26.0 / 28.9 Mbps	22.63
157 / 5785	802.11n	16QAM	39.0 / 43.3 Mbps	21.56
157 / 5785	802.11n	64QAM	52.0 / 57.8 Mbps	21.72
157 / 5785	802.11n	64QAM	58.5 / 65.0 Mbps	21.77
157 / 5785	802.11n	64QAM	65.0 / 72.2 Mbps	21.63
157+161 / 5795	802.11n	BPSK	13.5 / 15.0 Mbps	17.05
157+161 / 5795	802.11n	QPSK	27.0 / 30.0 Mbps	16.77
157+161 / 5795	802.11n	QPSK	40.5 / 45.0 Mbps	16.87
157+161 / 5795	802.11n	16QAM	54.0 / 60.0 Mbps	17.01
157+161 / 5795	802.11n	16QAM	81.0 / 90.0 Mbps	17.03
157+161 / 5795	802.11n	64QAM	108.0 / 120.0 Mbps	17.08
157+161 / 5795	802.11n	64QAM	121.5 / 135.0 Mbps	17.08
157+161 / 5795	802.11n	64QAM	135.0 / 150.0 Mbps	16.97

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2.4. Power results summary, selected modes

Channel / fc [MHz]	Mode	Modulation	Data rate	Level [dBm]
1 / 2412	802.11b	QPSK	11 Mbps	24.36
6 / 2437	802.11b	QPSK	11 Mbps	24.19
11 / 2462	802.11b	QPSK	11 Mbps	24.54
1 / 2412	802.11g	BPSK	9 Mbps	23.47
6 / 2437	802.11g	BPSK	9 Mbps	23.55
11 / 2462	802.11g	BPSK	9 Mbps	23.4
149 / 5745	802.11a	BPSK	6 Mbps	23.04
149 / 5745	802.11a	QPSK	12 Mbps	22.93
157 / 5785	802.11a	BPSK	6 Mbps	23.48
157 / 5785	802.11a	QPSK	12 Mbps	23.14
165 / 5825	802.11a	BPSK	6 Mbps	22.9
165 / 5825	802.11a	QPSK	12 Mbps	22.56
149+153 / 5755	802.11n	BPSK	13.5 / 15.0 Mbps	17.15
149+153 / 5755	802.11n	64QAM	108.0 / 120.0 Mbps	17.1
157+161 / 5795	802.11n	BPSK	13.5 / 15.0 Mbps	17.05
157+161 / 5795	802.11n	64QAM	108.0 / 120.0 Mbps	17.08

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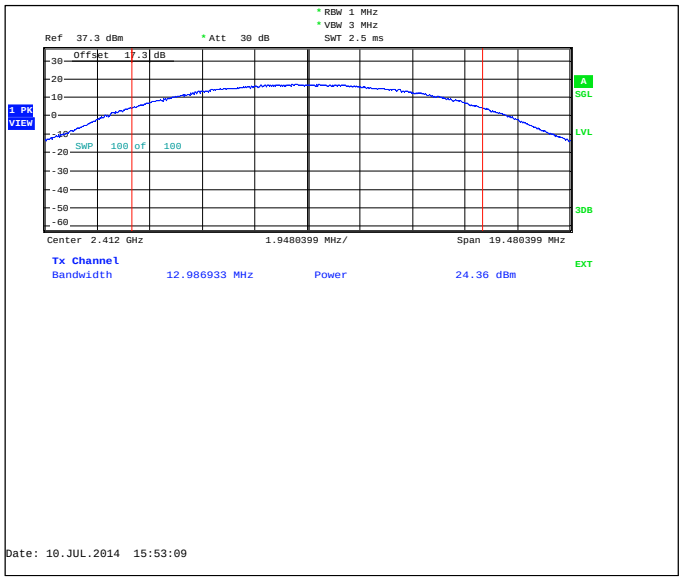
2.5. WLAN Test results

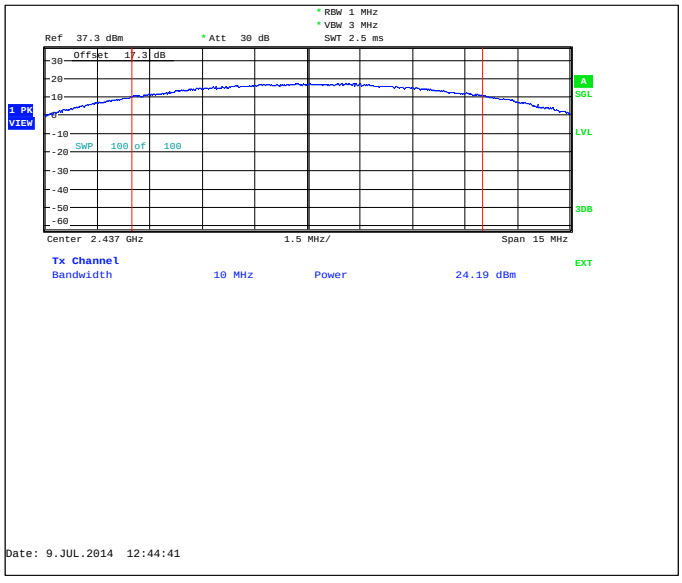
2.5.1 802.11b mode, QPSK modulation, 11 Mbps data rate

Channel / f_C [MHz]	P [dBm]	P [mW]	Result
1 / 2412	24.36	272.898	PASSED
6 / 2437	24.19	262.422	PASSED
11 / 2462	24.54	284.446	PASSED

Channel 1 / 2412 MHz



Channel 6 / 2437 MHz



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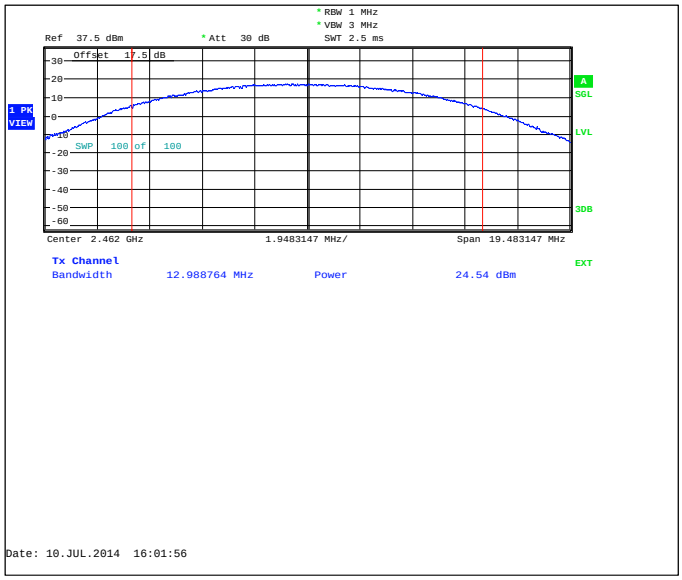
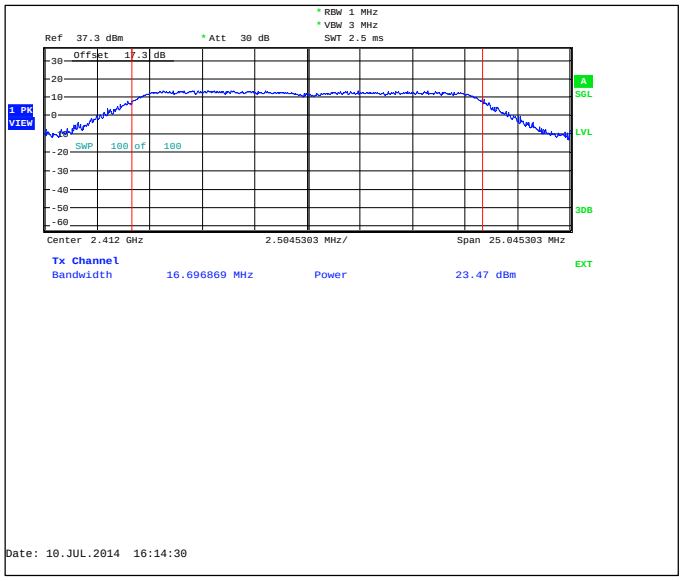
Channel 11 / 2462 MHz



2.5.2 802.11g mode, BPSK modulation, 9 Mbps data rate

Channel / f_C [MHz]	P [dBm]	P [mW]	Result
1 / 2412	23.47	222.331	PASSED
6 / 2437	23.55	226.464	PASSED
11 / 2462	23.4	218.776	PASSED

Channel 1 / 2412 MHz



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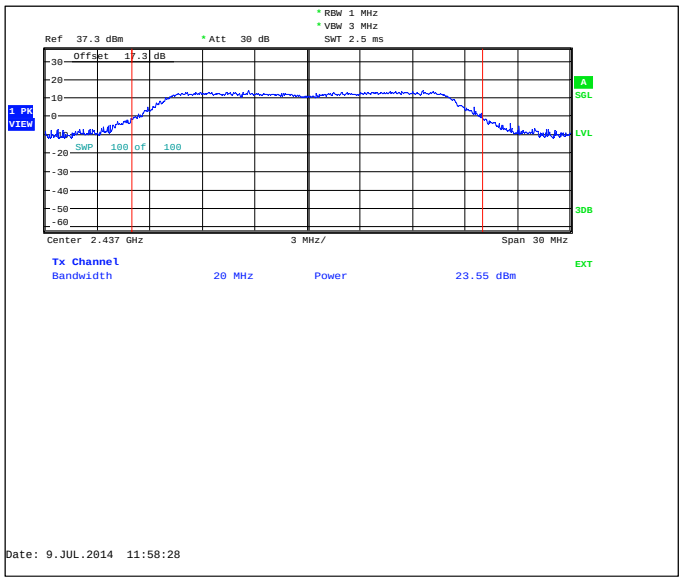
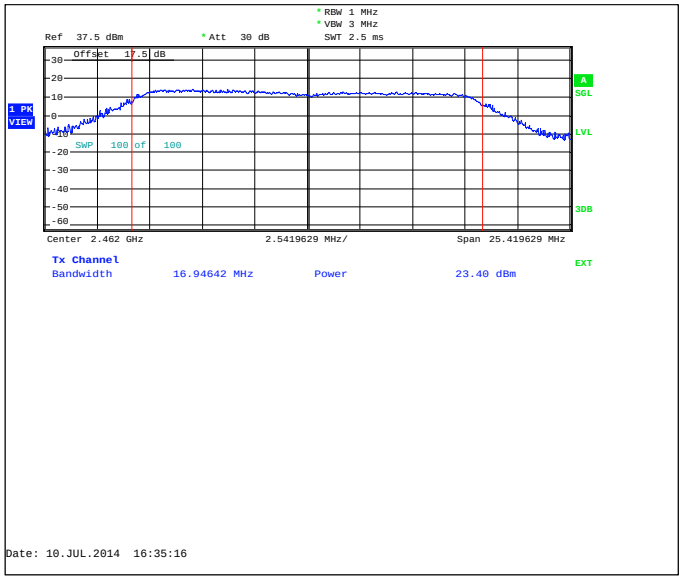
Channel 6 / 2437 MHz



Channel 11 / 2462 MHz



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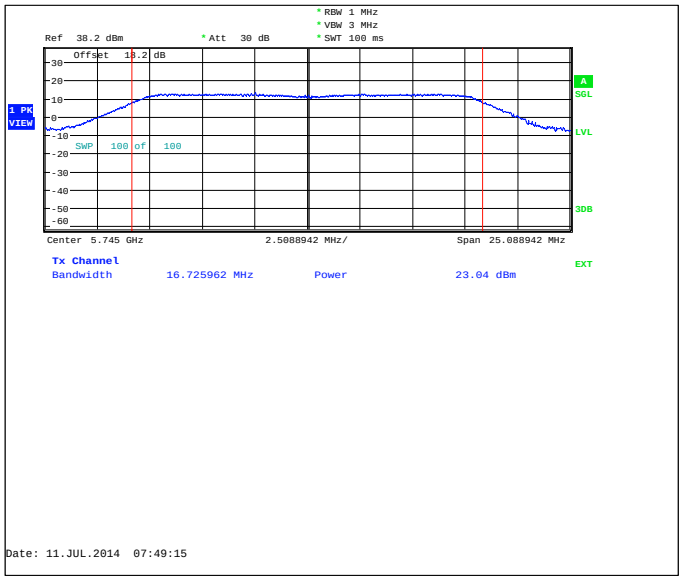
2.6. 5 GHz RLAN Test results

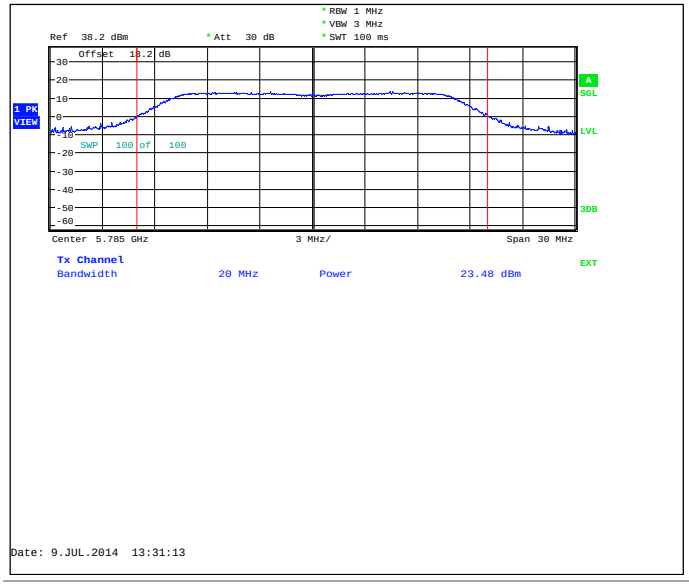
2.6.1 802.11a mode, BPSK modulation, 6 Mbps data rate

Channel / f_C [MHz]	P [dBm]	P [mW]	Result
149 / 5745	23.04	201.372	PASSED
157 / 5785	23.48	222.844	PASSED
165 / 5825	22.9	194.984	PASSED

Channel 149 / 5745MHz



Channel 157 / 5785MHz



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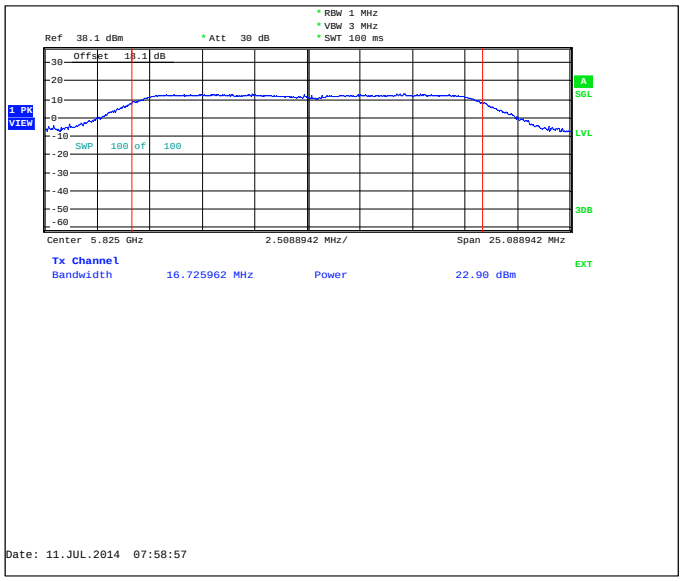
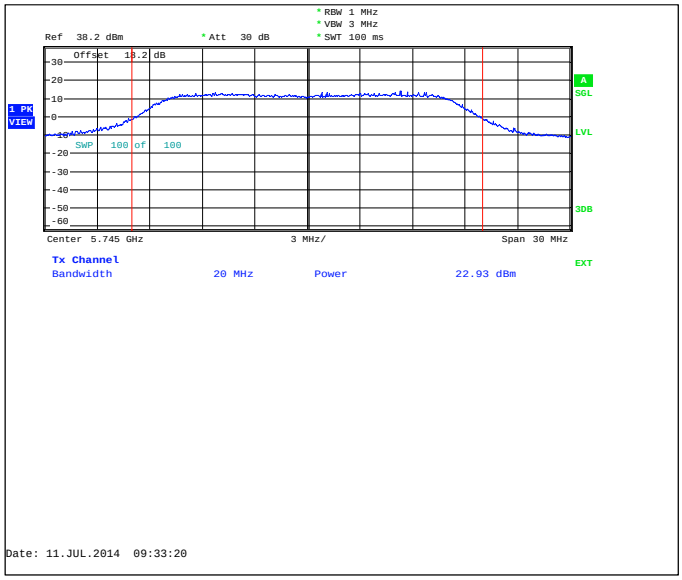
Channel 165 / 5825MHz



2.6.2 802.11a mode, QPSK modulation, 12 Mbps data rate

Channel / f_C [MHz]	P [dBm]	P [mW]	Result
149 / 5745	22.93	196.336	PASSED
157 / 5785	23.14	206.063	PASSED
165 / 5825	22.56	180.302	PASSED

Channel 149 / 5745MHz



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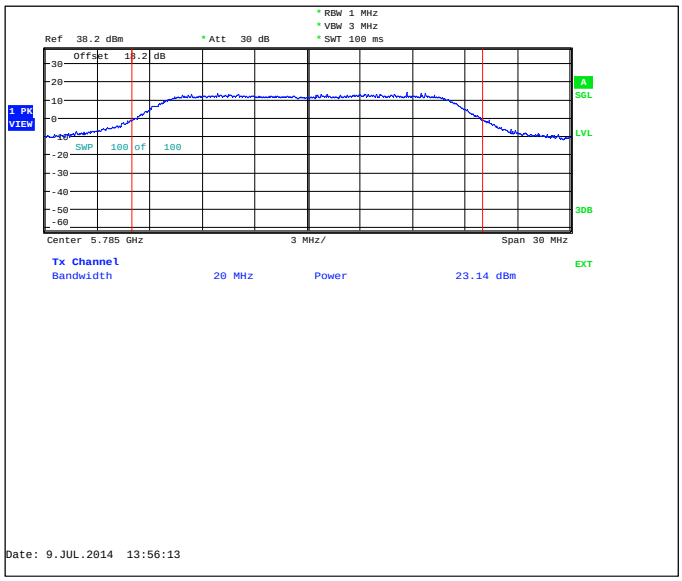
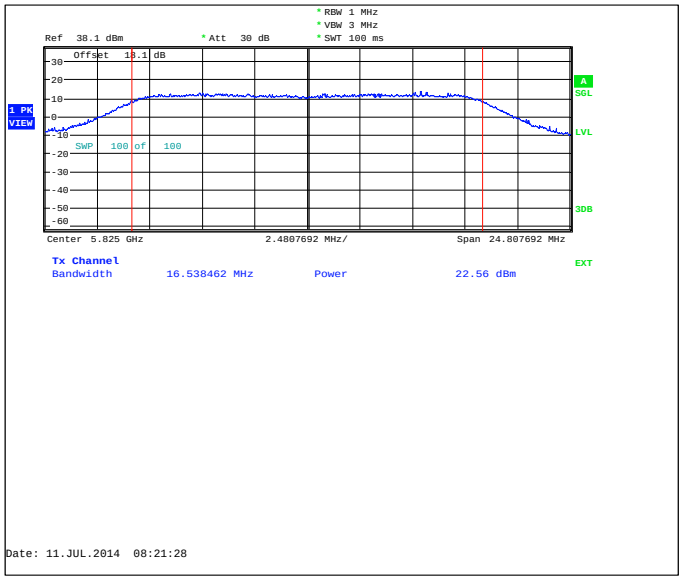
Channel 157 / 5785MHz



Channel 165 / 5825MHz



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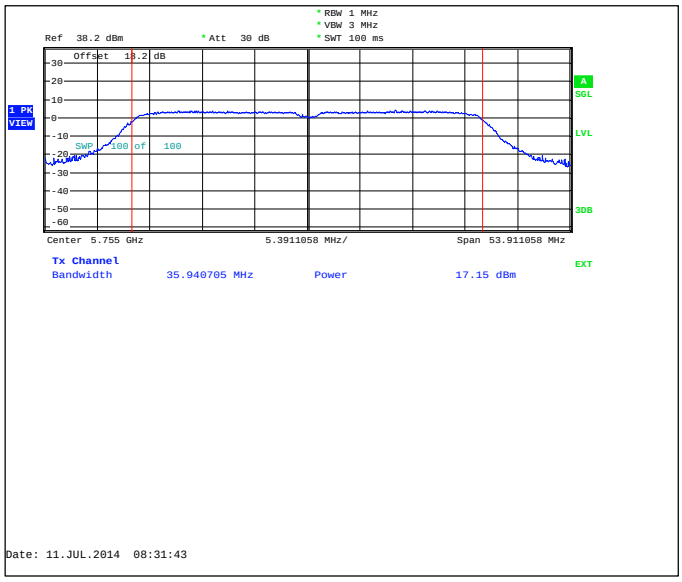
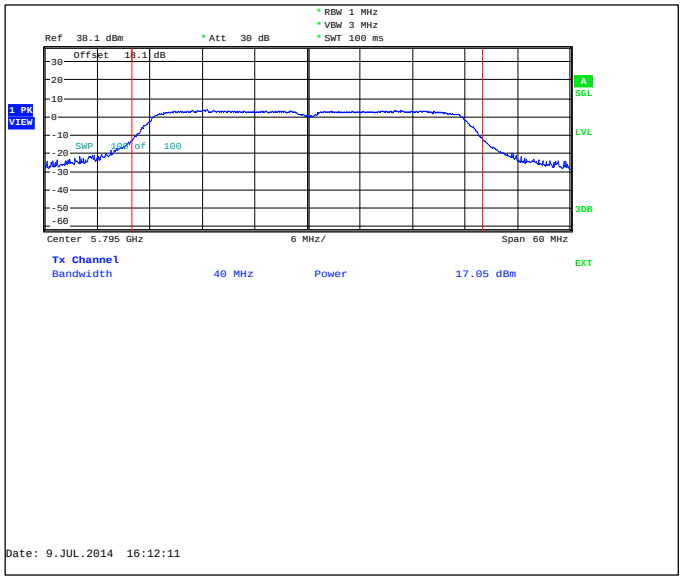
2.6.3 802.11n mode, BPSK modulation, 13.5 / 15.0 Mbps data rate

Channel / f_C [MHz]	P [dBm]	P [mW]	Result
149+153 / 5755	17.15	51.88	PASSED
157+161 / 5795	17.05	50.699	PASSED

Channel 149+153 / 5755MHz



Channel 157+161 / 5795MHz



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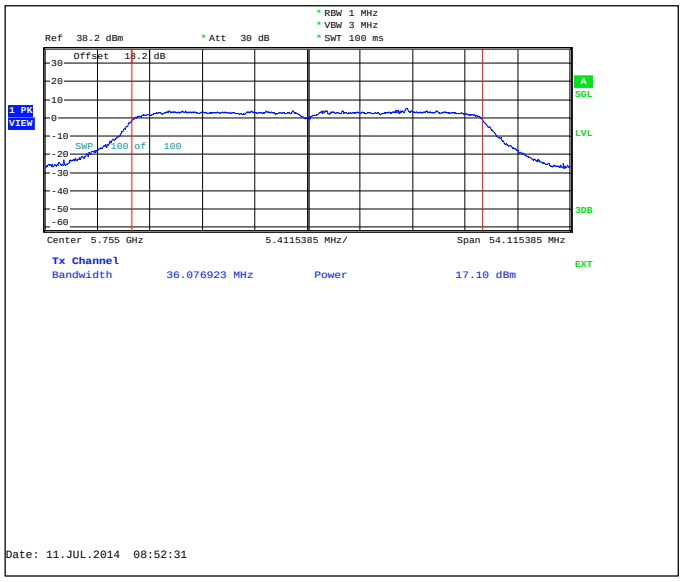
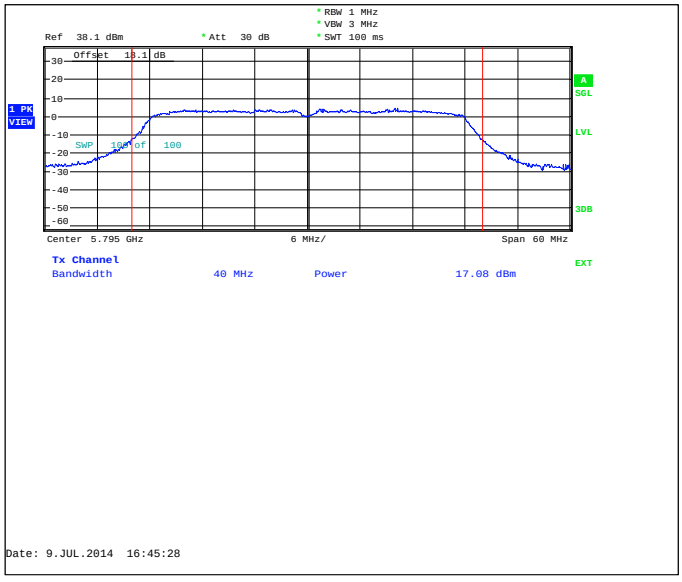
2.6.4 802.11n mode, 64QAM modulation, 108.0 / 120.0 Mbps data rate

Channel / f_C [MHz]	P [dBm]	P [mW]	Result
149+153 / 5755	17.1	51.286	PASSED
157+161 / 5795	17.08	51.05	PASSED

Channel 149+153 / 5755MHz



Channel 157+161 / 5795MHz



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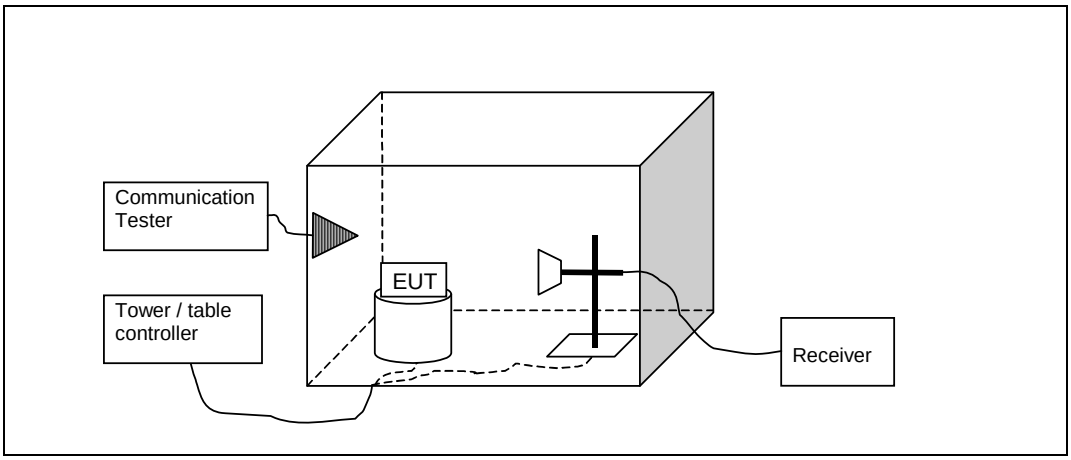
3. Band edge compliance of RF emissions
(FCC 15.247(d), 15.205(b), RSS-210 A8.5)

EUT with DUT number	RM-983, DUT 43199
Accessories with DUT numbers	BV-L4A, DUT 43188 ; WH-208, DUT 43189 ; AC-60E, DUT 43161 ; CA-190CD, DUT 43162
Operation Voltage [V] / [Hz]	Nominal
Results	PASSED
Remarks	-
Temp [ºC] / Humidity [%RH] / Air Pressure [kPa]	19 / 39 / 101.8
Date of measurements	17-Jul-2014
Measured by	Timo Raiskio

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.

The measurement results are obtained as described below:

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

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

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

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

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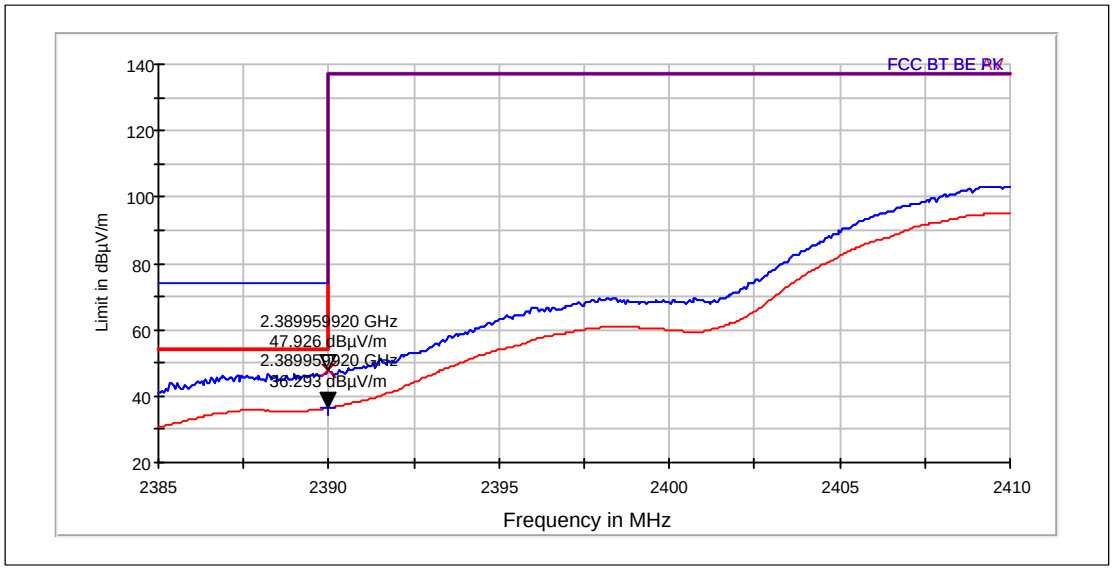
3.3. WLAN test results

3.3.1 802.11b, QPSK modulation, 11 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]	Results
2390	47.93	249.058	60.14	-12.21	PASSED

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

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Results
2390	36.29	65.26	48.5	-12.21	PASSED

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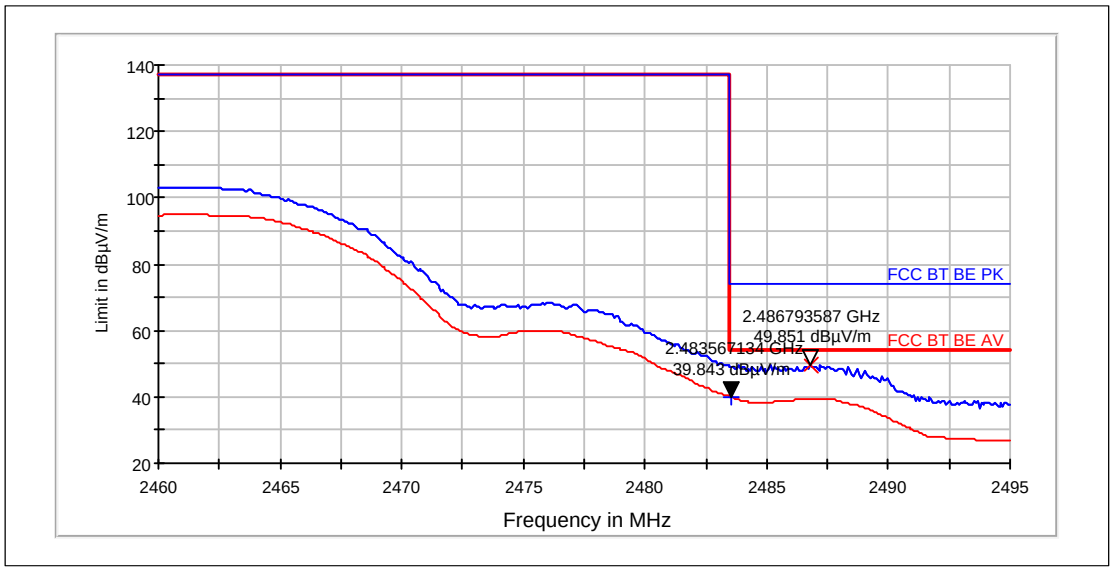
Channel 11 / 2462 MHz



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

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Results
2487	49.85	310.849	62.03	-12.18	PASSED

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

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Results
2484	39.84	98.209	52.02	-12.18	PASSED

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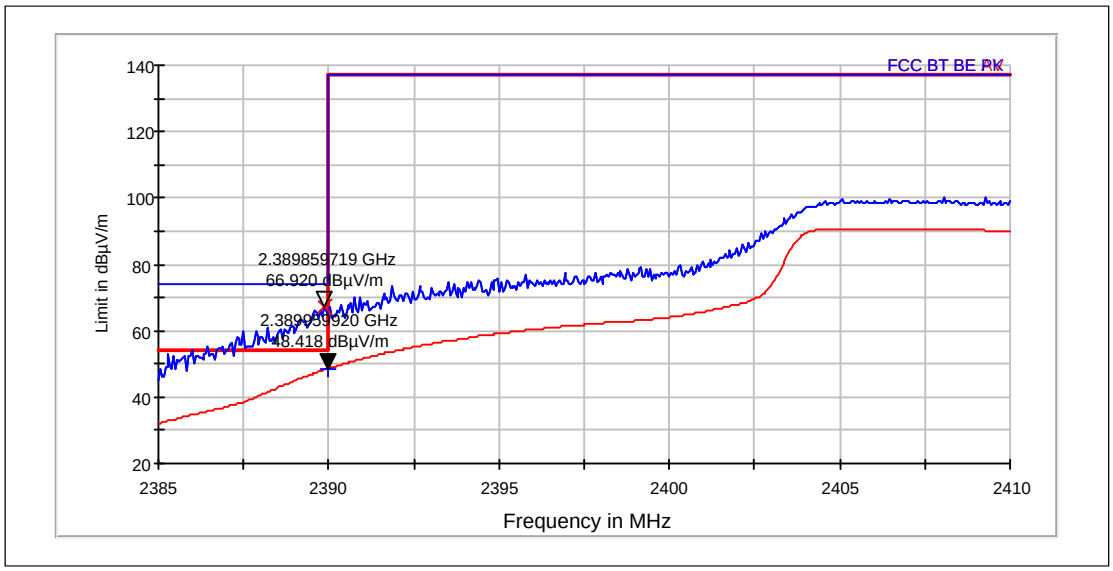
3.3.2 802.11g, BPSK modulation, 9 Mbps data rate.

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]	Results
2390	66.92	2218.196	79.13	-12.21	PASSED

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

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Results
2390	48.42	263.572	60.63	-12.21	PASSED

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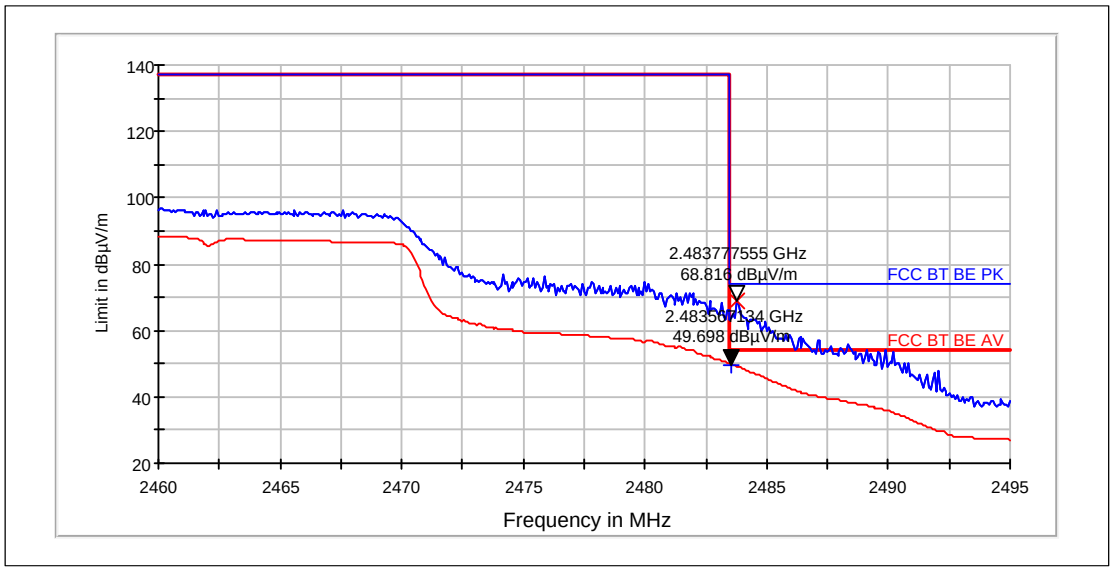
Channel 11 / 2462 MHz



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

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Results
2484	68.82	2759.307	81	-12.18	PASSED

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

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Results
2484	49.7	305.422	61.88	-12.18	PASSED

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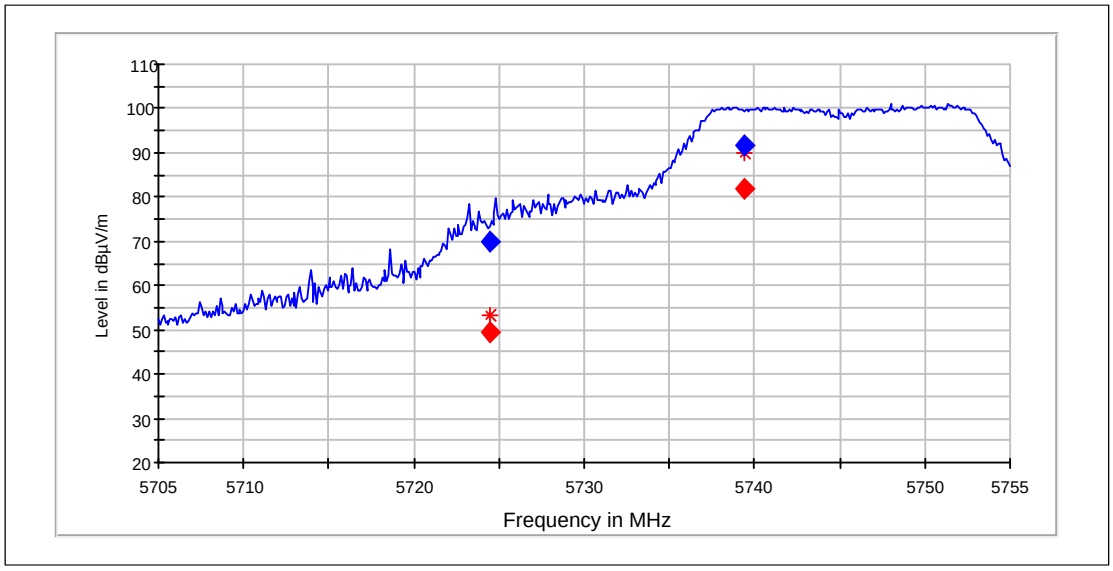
3.4. 5 GHz RLAN test results

3.4.1 802.11a, BPSK modulation, 6 Mbps data rate.

Channel 149 / 5745MHz



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

Frequency [MHz]	MaxPeak [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Pol	Azimuth [deg]	Elevation [deg]	Results
5724.519	69.7	200	130.3	170	H	-2	0.5	PASSED
5739.449	91.55	200	108.45	170	V	-3	0.5	PASSED

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

Frequency [MHz]	Average [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Pol	Azimuth [deg]	Elevation [deg]	Results
5724.519	49.64	---	---	170	H	-2	0.5	PASSED
5739.449	82	---	---	170	V	-3	0.5	PASSED

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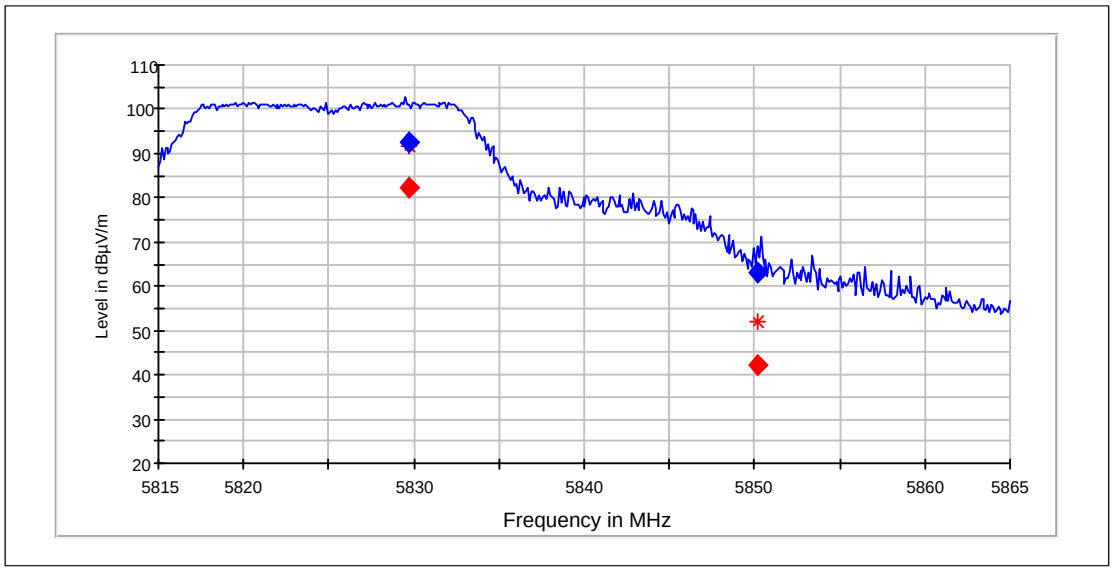
Channel 165 / 5825MHz



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

Frequency [MHz]	MaxPeak [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Pol	Azimuth [deg]	Elevation [deg]	Results
5829.669	92.43	200	107.57	170	H	3	0.5	PASSED
5850.18	62.95	200	137.05	170	V	2	0	PASSED

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

Frequency [MHz]	Average [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Pol	Azimuth [deg]	Elevation [deg]	Results
5829.669	82.21	---	---	170	H	3	0.5	PASSED
5850.18	42.09	---	---	170	V	2	0	PASSED

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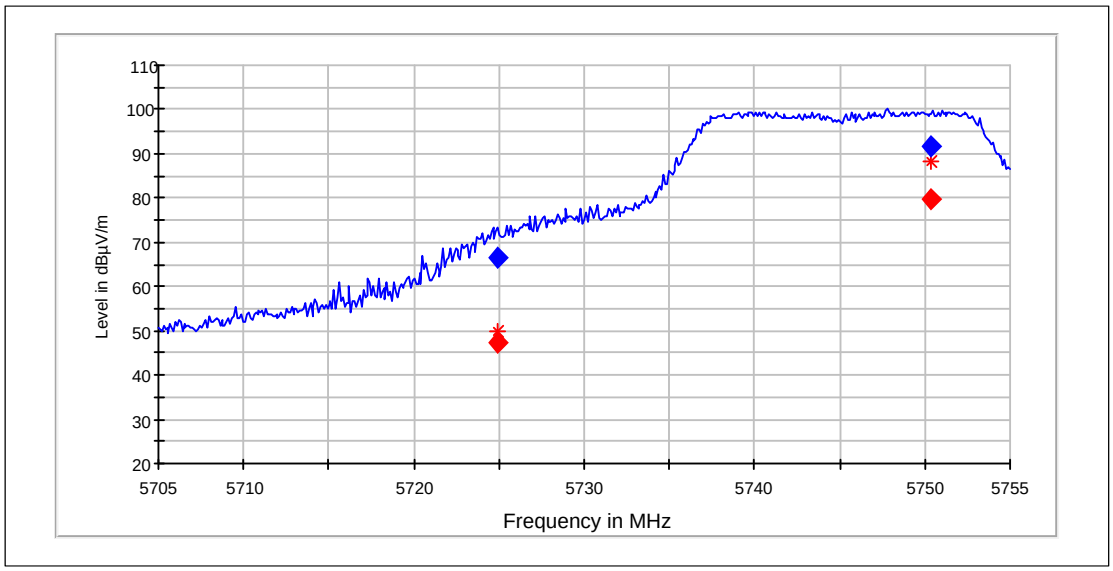
3.4.2 802.11a, QPSK modulation, 12 Mbps data rate.

Channel 149 / 5745MHz



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

Frequency [MHz]	MaxPeak [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Pol	Azimuth [deg]	Elevation [deg]	Results
5724.88	66.51	200	133.49	170	H	4	0	PASSED
5750.311	91.47	200	108.53	170	V	-3	0	PASSED

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

Frequency [MHz]	Average [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Pol	Azimuth [deg]	Elevation [deg]	Results
5724.88	47.48	---	---	170	H	4	0	PASSED
5750.311	79.65	---	---	170	V	-3	0	PASSED

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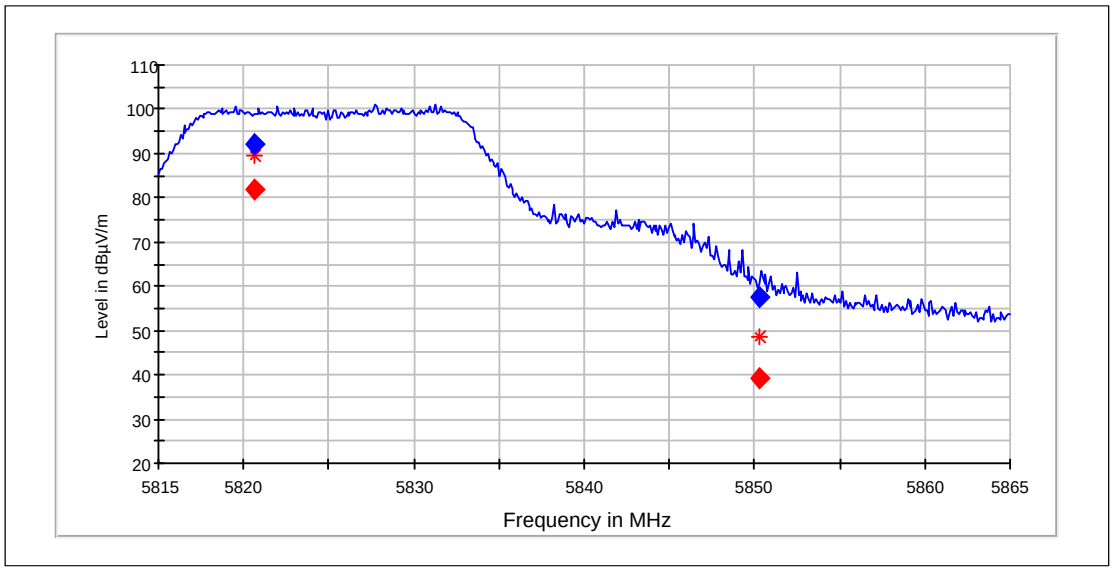
Channel 165 / 5825MHz



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

Frequency [MHz]	MaxPeak [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Pol	Azimuth [deg]	Elevation [deg]	Results
5820.611	92.26	200	107.74	170	V	2	0	PASSED
5850.301	57.57	200	142.43	170	V	3	0	PASSED

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

Frequency [MHz]	Average [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Pol	Azimuth [deg]	Elevation [deg]	Results
5820.611	81.81	---	---	170	V	2	0	PASSED
5850.301	39.09	---	---	170	V	3	0	PASSED

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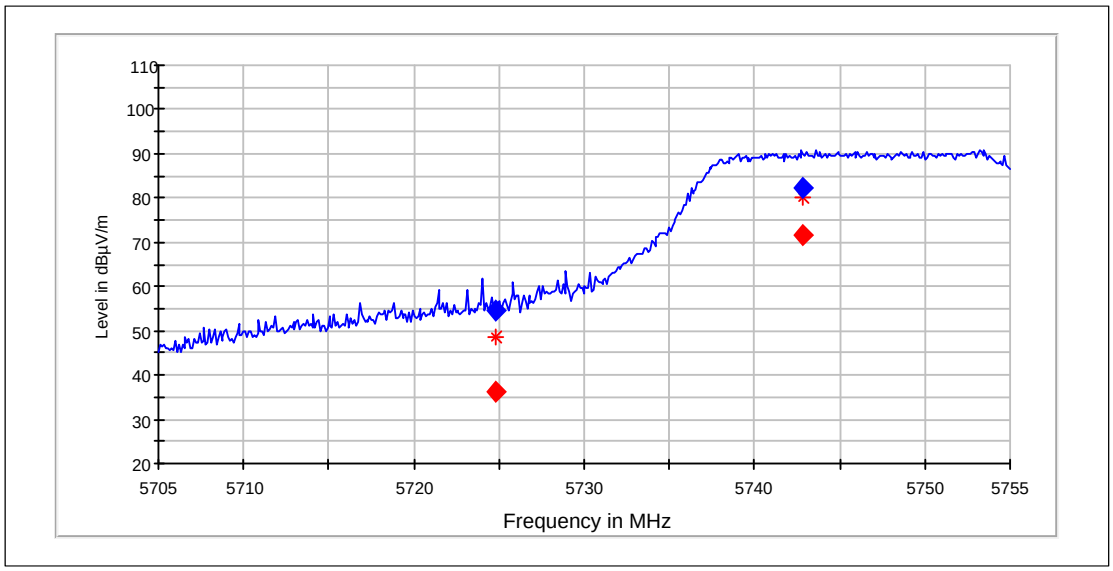
3.4.3 802.11n, BPSK modulation, 13.5 / 15.0 Mbps data rate.

Channel 149+153 / 5755MHz



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

Frequency [MHz]	MaxPeak [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Pol	Azimuth [deg]	Elevation [deg]	Results
5724.84	54.44	200	145.56	170	H	-3	0	PASSED
5742.816	82.12	200	117.88	170	V	-2	0	PASSED

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

Frequency [MHz]	Average [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Pol	Azimuth [deg]	Elevation [deg]	Results
5724.84	36.26	---	---	170	H	-3	0	PASSED
5742.816	71.59	---	---	170	V	-2	0	PASSED

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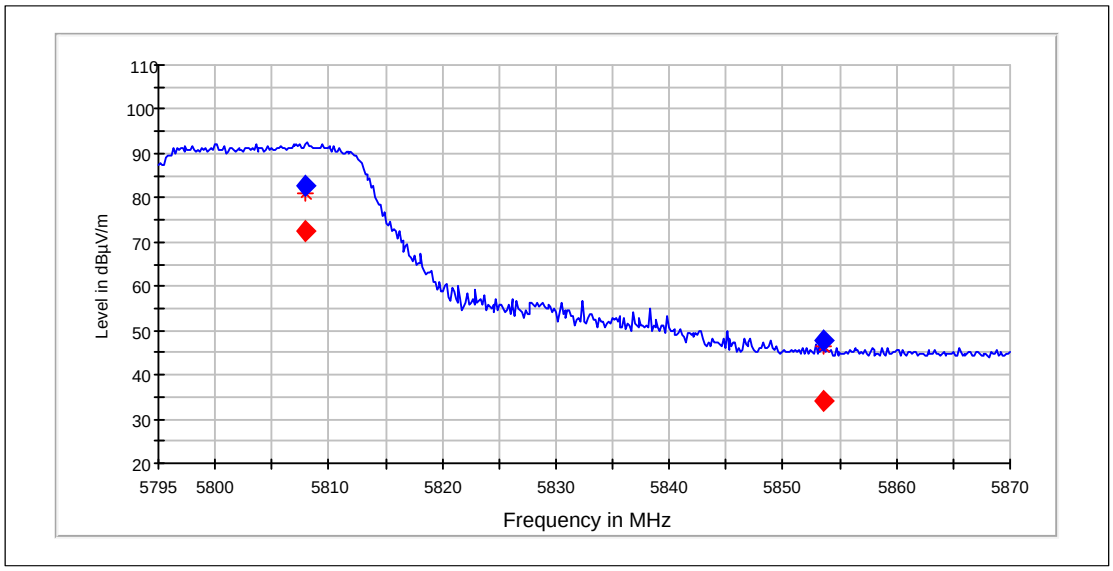
Channel 157+161 / 5795MHz



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

Frequency [MHz]	MaxPeak [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Pol	Azimuth [deg]	Elevation [deg]	Results
5807.866	82.8	200	117.2	170	V	2	0	PASSED
5853.607	47.72	200	152.28	170	V	10	0	PASSED

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

Frequency [MHz]	Average [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Pol	Azimuth [deg]	Elevation [deg]	Results
5807.866	72.31	---	---	170	V	2	0	PASSED
5853.607	34.22	---	---	170	V	10	0	PASSED

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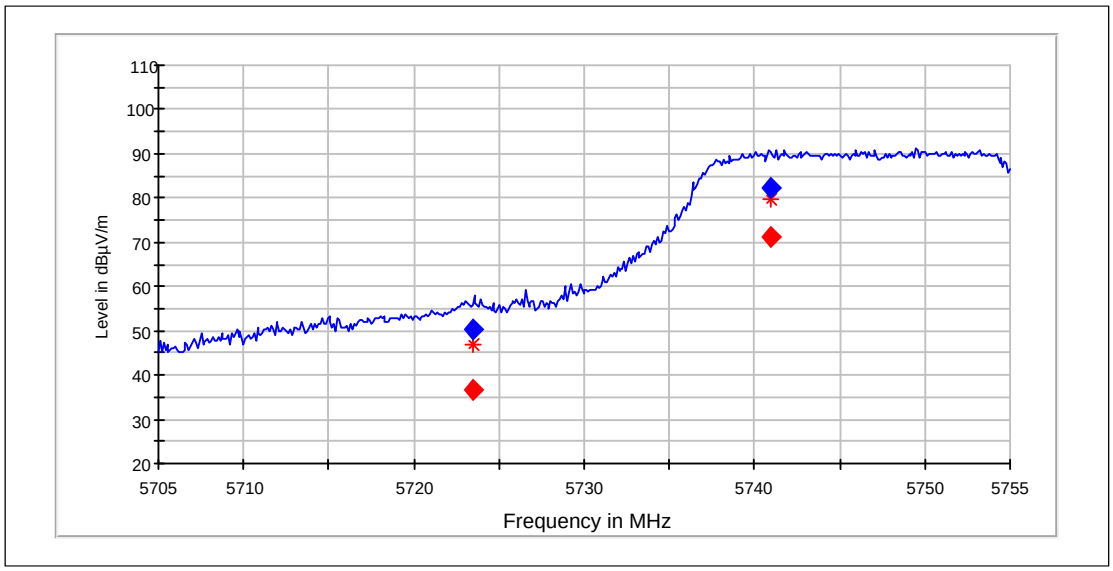
3.4.4 802.11n, 64QAM modulation, 108.0 / 120.0 Mbps data rate.

Channel 149+153 / 5755MHz



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

Frequency [MHz]	MaxPeak [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Pol	Azimuth [deg]	Elevation [deg]	Results
5723.437	50.2	200	149.8	170	V	5	0	PASSED
5740.932	82.28	200	117.72	170	V	-3	0	PASSED

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

Frequency [MHz]	Average [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Pol	Azimuth [deg]	Elevation [deg]	Results
5723.437	36.74	---	---	170	V	5	0	PASSED
5740.932	71.33	---	---	170	V	-3	0	PASSED

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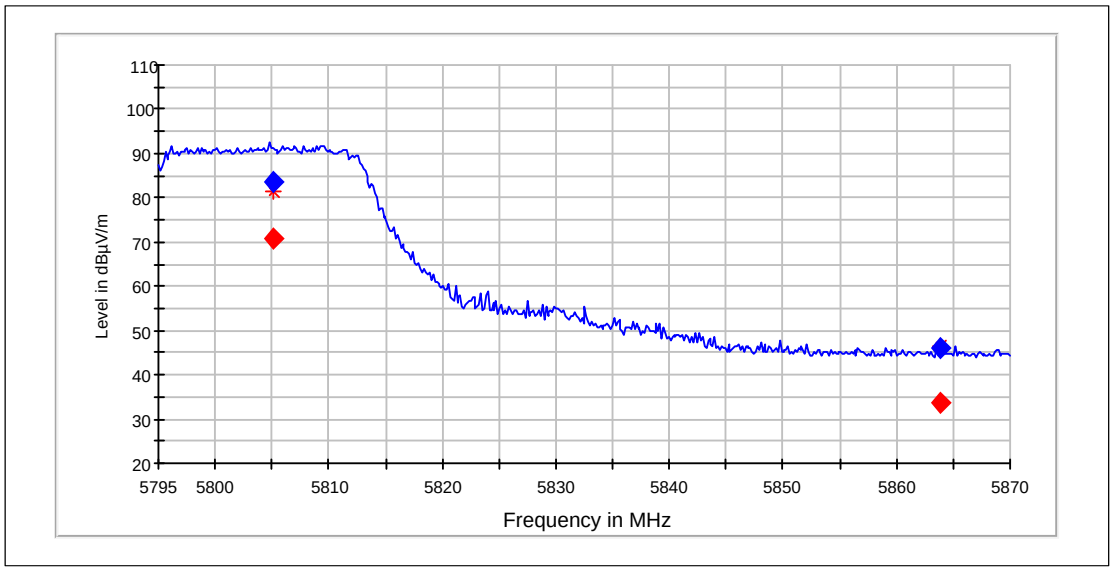
Channel 157+161 / 5795MHz



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

Frequency [MHz]	MaxPeak [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Pol	Azimuth [deg]	Elevation [deg]	Results
5805.06	83.61	200	116.39	170	H	2	0	PASSED
5863.908	45.98	200	154.02	170	V	-5	0	PASSED

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

Frequency [MHz]	Average [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Pol	Azimuth [deg]	Elevation [deg]	Results
5805.06	70.56	---	---	170	H	2	0	PASSED
5863.908	33.59	---	---	170	V	-5	0	PASSED

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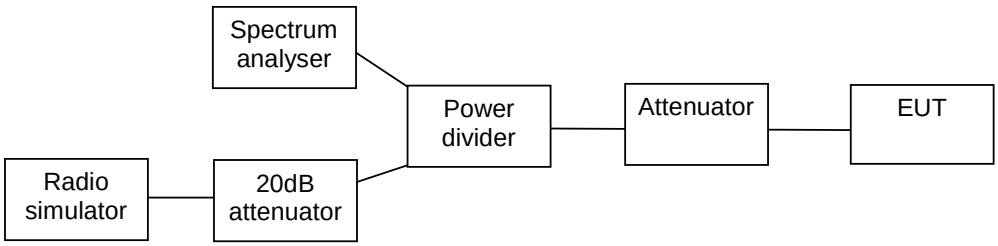
4. Spurious RF conducted emissions
(FCC §15.247(d), RSS-210 A8.5)

EUT with DUT number	RM-983, DUT 43191
Accessories with DUT numbers	BV-L4A, DUT 43188 ; WH-208, DUT 43189 ; AC-60E, DUT 43161 ; CA-190CD, DUT 43162
Operation Voltage [V] / [Hz]	Nominal
Results	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	23 / 50 / 102.1
Date of measurements	10-Jul-2014
Measured by	Timo Raiskio

4.1. Test Setup



4.2. Test method and limit

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

The reference level for the -20 dBc measurement was obtained as instructed in section 11.2 of the KDB 558074, using span of 1.5 times the OBW.

Limits for spurious RF conducted emissions measurements

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

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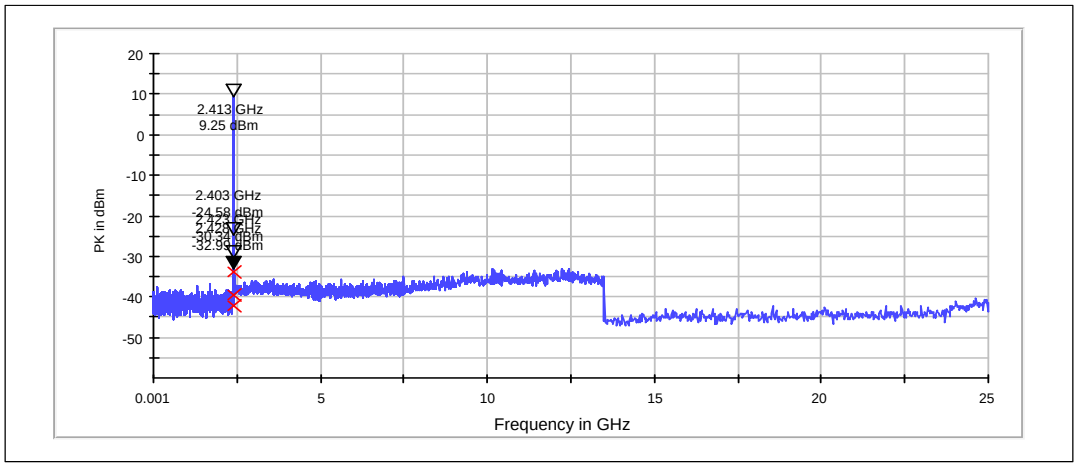
4.3. WLAN Test results

4.3.1 802.11b mode, QPSK modulation, 11 Mbps data rate

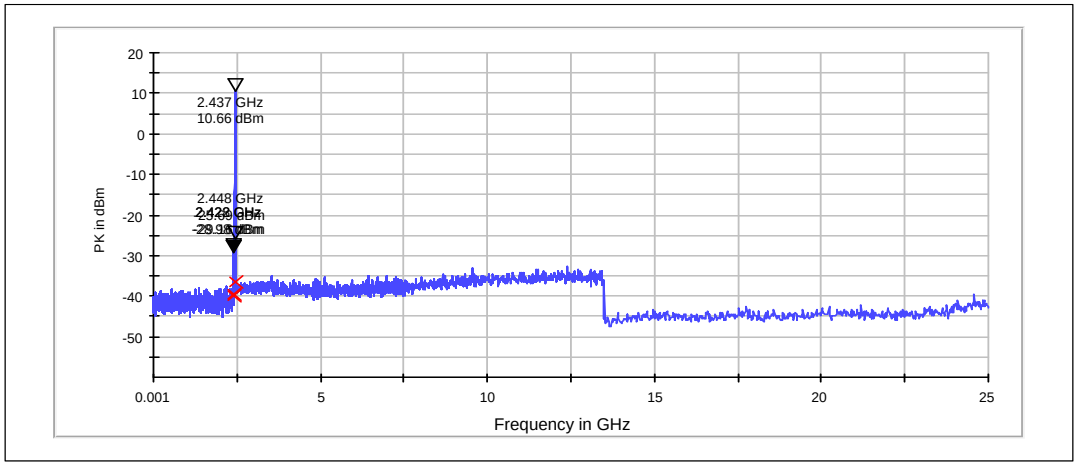
Channel 1 / 2412 MHz



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

Frequency [MHz]	P [dBc]	Result
2403.188	-33.83	PASSED
2422.764	-39.59	PASSED
2427.528	-42.24	PASSED

Channel 6 / 2437 MHz



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

Frequency [MHz]	P [dBc]	Result
2447.714	-36.35	PASSED
2422.414	-39.64	PASSED
2428.138	-39.82	PASSED

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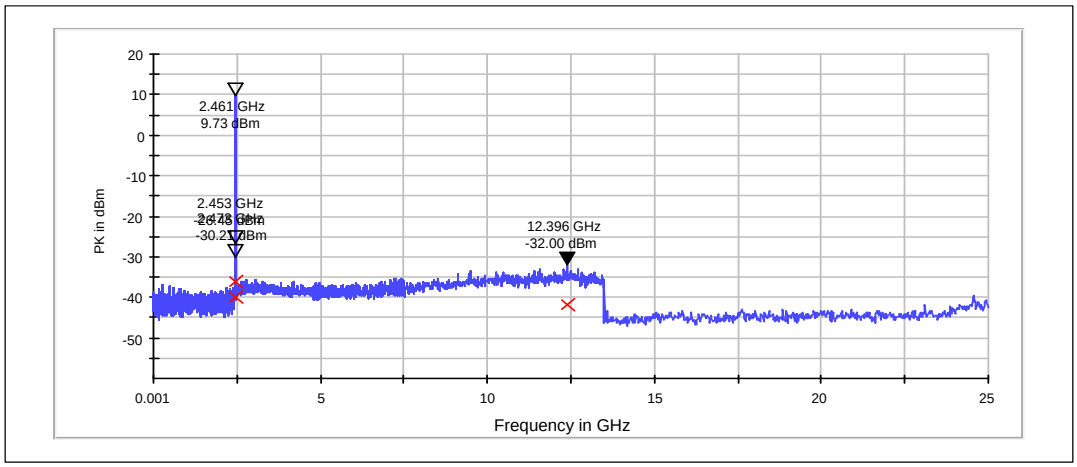
Channel 11 / 2462 MHz

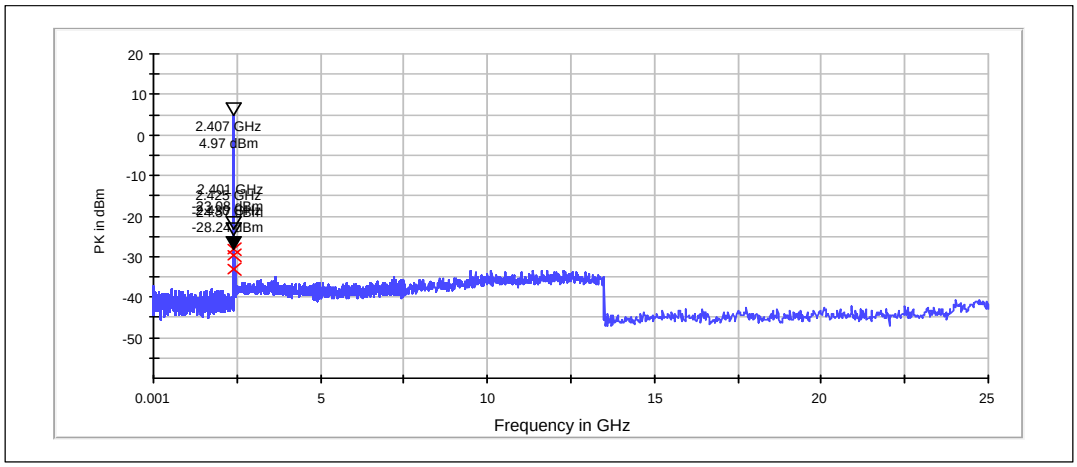


Peak (RBW: 100 kHz, VBW: 300 kHz)

Frequency [MHz]	P [dBc]	Result
2453.088	-36.18	PASSED
2472.664	-39.94	PASSED
12396.000	-41.73	PASSED

4.3.2 802.11g mode, BPSK modulation, 9 Mbps data rate

Channel 1 / 2412 MHz



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

Frequency [MHz]	P [dBc]	Result
2401.192	-28.05	PASSED
2424.760	-29.55	PASSED
2429.520	-33.22	PASSED

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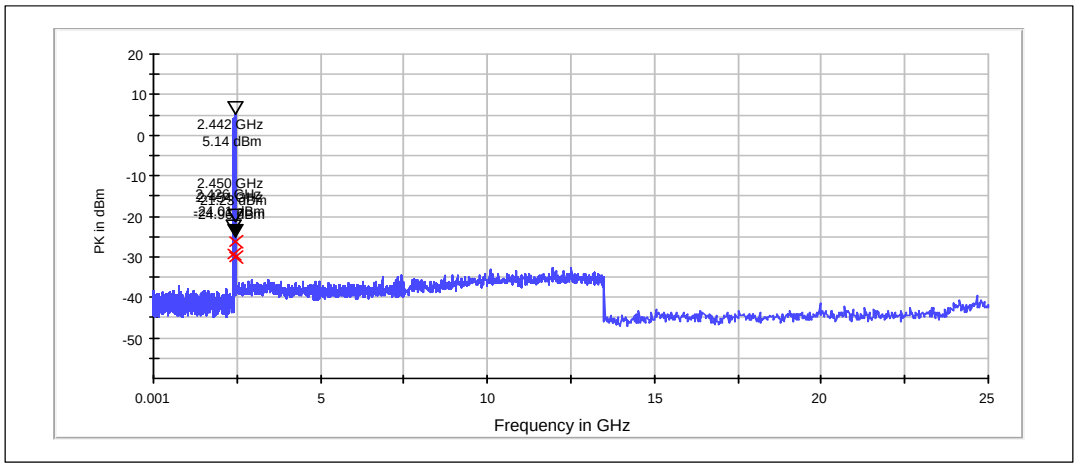
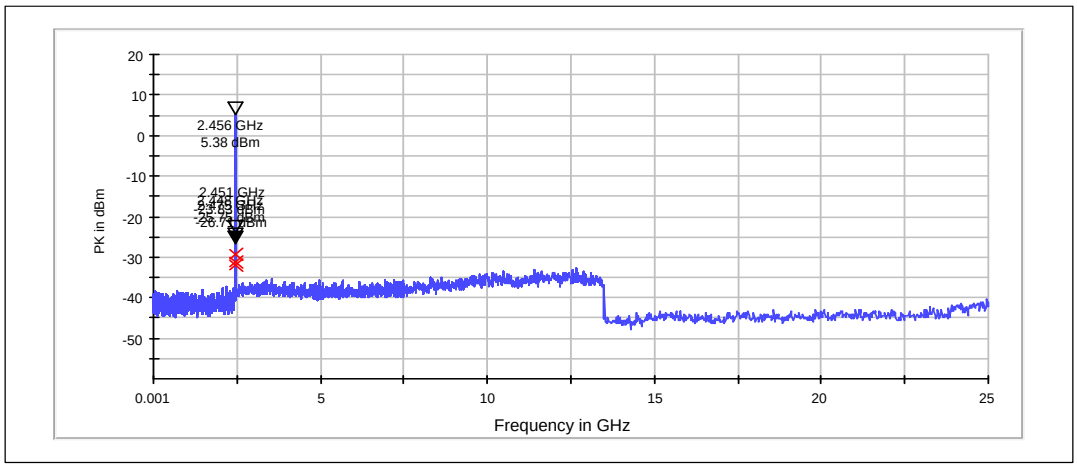
Channel 6 / 2437 MHz



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

Frequency [MHz]	P [dBc]	Result
2449.710	-26.36	PASSED
2426.142	-29.15	PASSED
2454.420	-30.10	PASSED

Channel 11 / 2462 MHz



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

Frequency [MHz]	P [dBc]	Result
2451.092	-29.21	PASSED
2448.184	-31.13	PASSED
2474.660	-32.10	PASSED

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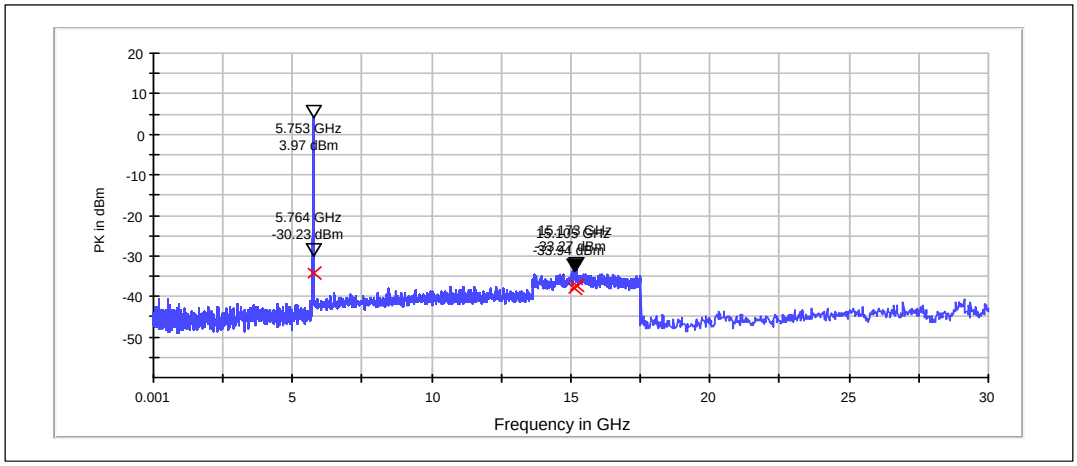
4.3.3 802.11a mode, BPSK modulation, 6 Mbps data rate

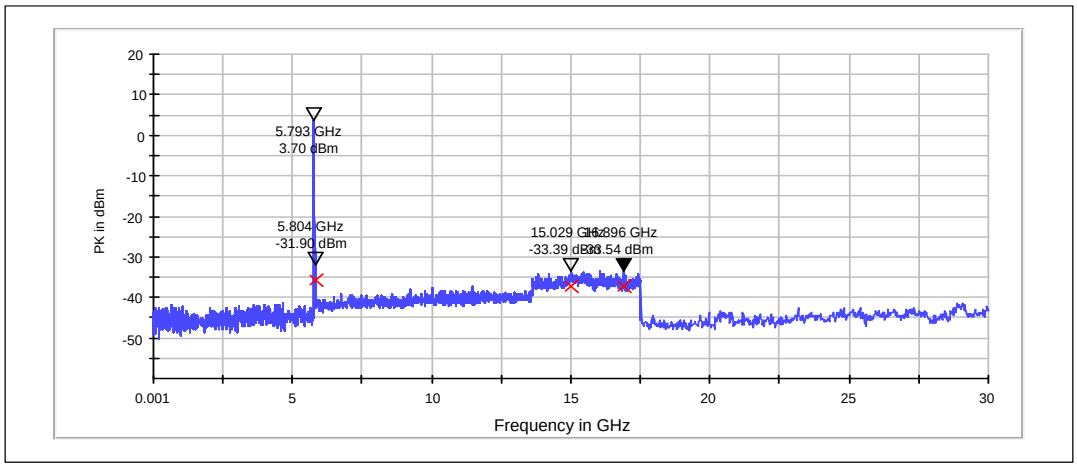
Channel 149 / 5745MHz



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

Frequency [MHz]	P [dBc]	Result
5764.090	-34.20	PASSED
15173.200	-37.24	PASSED
15104.800	-37.91	PASSED

Channel 157 / 5785MHz



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

Frequency [MHz]	P [dBc]	Result
5804.010	-35.60	PASSED
15028.800	-37.09	PASSED
16896.000	-37.24	PASSED

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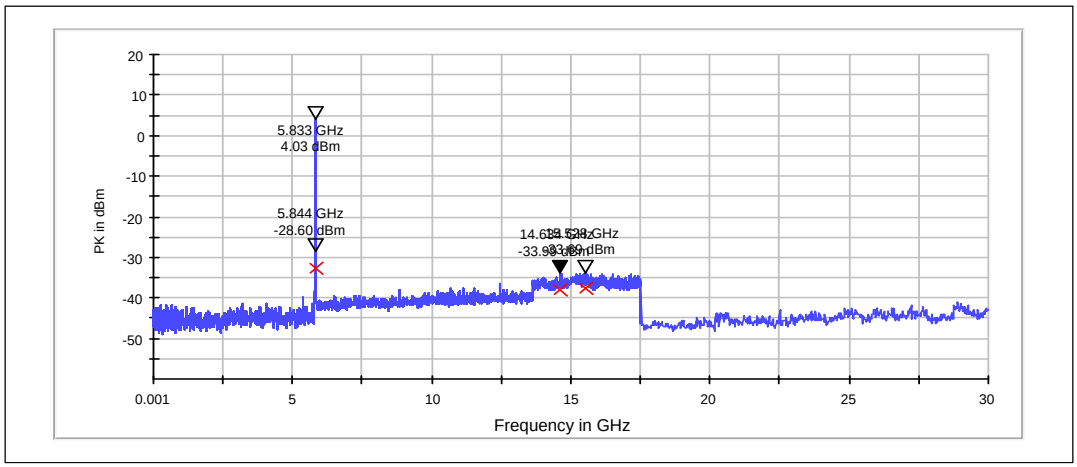
Channel 165 / 5825MHz

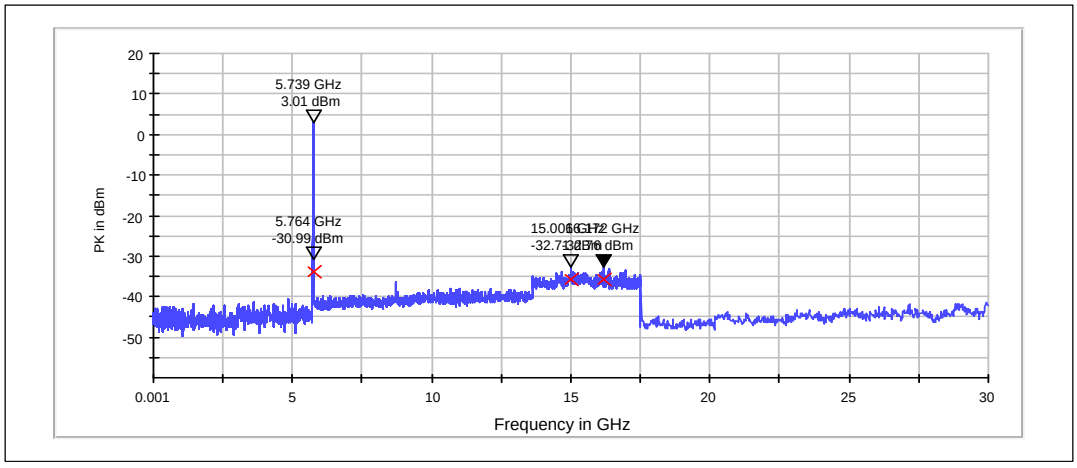


Peak (RBW: 100 kHz, VBW: 300 kHz)

Frequency [MHz]	P [dBc]	Result
5843.930	-32.62	PASSED
15528.000	-37.72	PASSED
14633.600	-38.02	PASSED

4.3.4 802.11a mode, QPSK modulation, 12 Mbps data rate

Channel 149 / 5745MHz



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

Frequency [MHz]	P [dBc]	Result
5764.090	-34.00	PASSED
15006.000	-35.72	PASSED
16172.000	-35.77	PASSED

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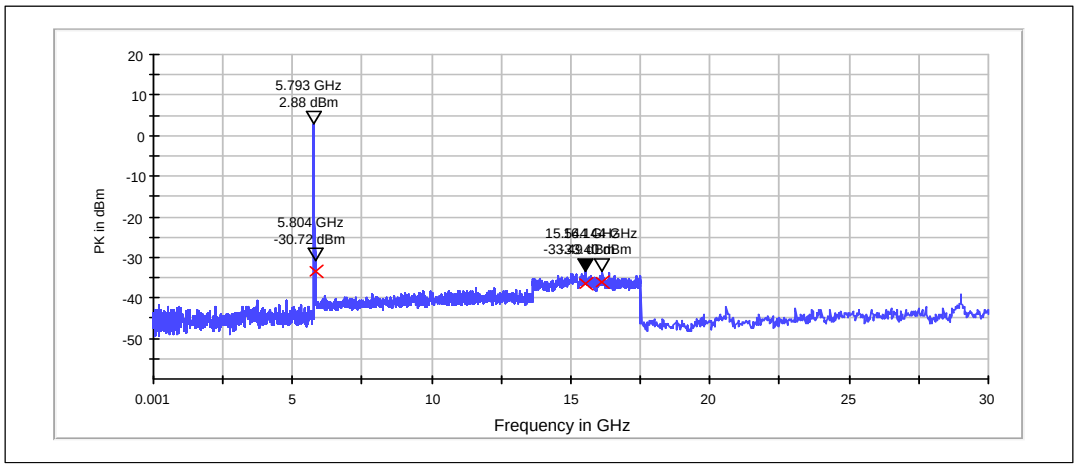
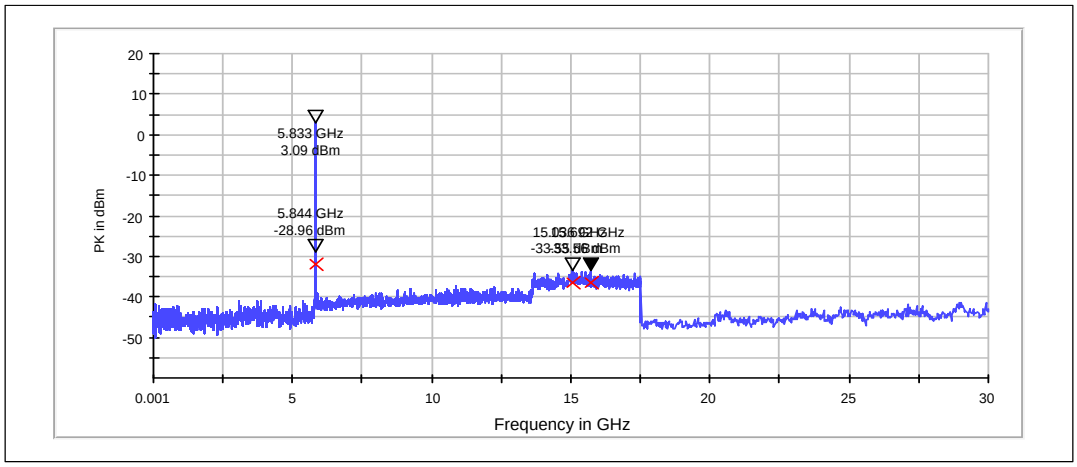
Channel 157 / 5785MHz



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

Frequency [MHz]	P [dBc]	Result
5804.010	-33.60	PASSED
16144.000	-36.29	PASSED
15544.000	-36.38	PASSED

Channel 165 / 5825MHz



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

Frequency [MHz]	P [dBc]	Result
5843.930	-32.04	PASSED
15036.400	-36.64	PASSED
15692.000	-36.64	PASSED

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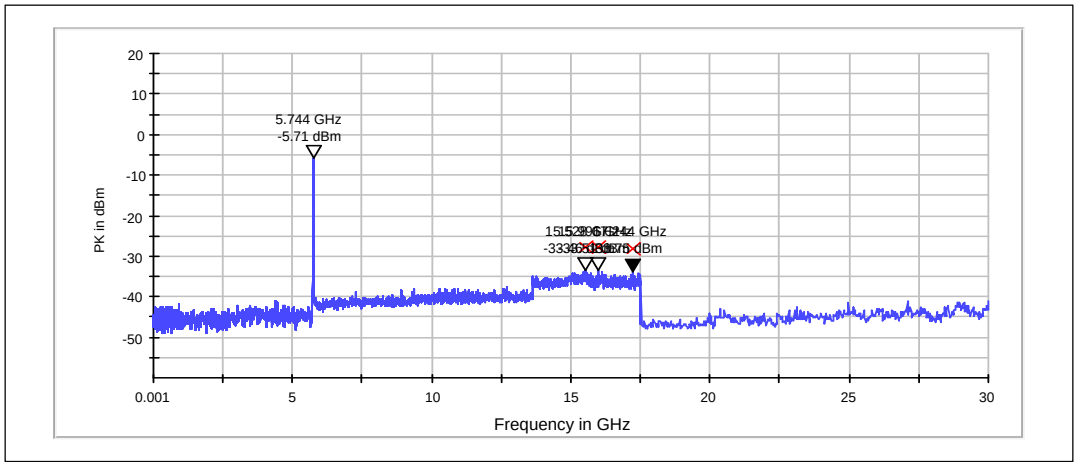
4.3.5 802.11n mode, BPSK modulation, 13.5 / 15.0 Mbps data rate

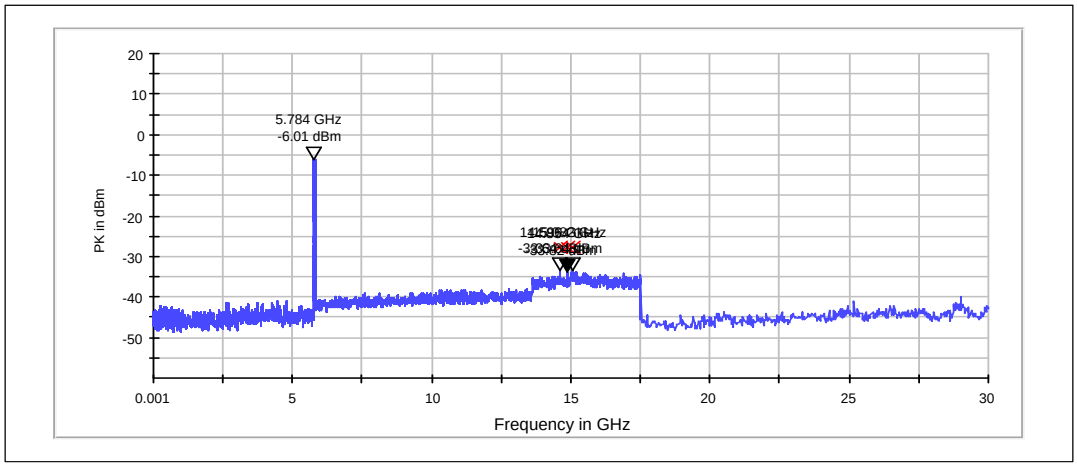
Channel 149+153 / 5755MHz



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

Frequency [MHz]	P [dBc]	Result
15528.000	-27.75	PASSED
15996.000	-27.80	PASSED
17244.000	-28.04	PASSED

Channel 157+161 / 5795MHz



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

Frequency [MHz]	P [dBc]	Result
14595.600	-27.63	PASSED
15082.000	-27.63	PASSED
14854.000	-27.81	PASSED

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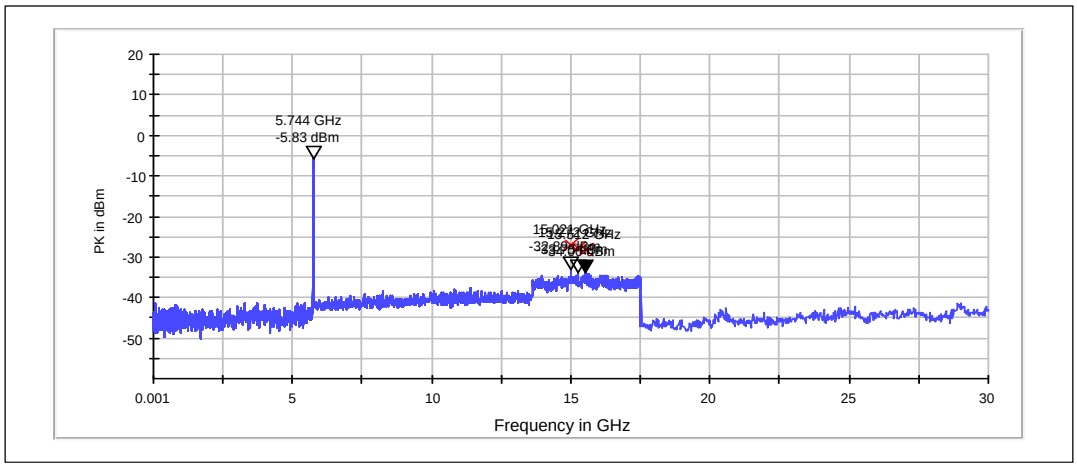
4.3.6 802.11n mode, 64QAM modulation, 108.0 / 120.0 Mbps data rate

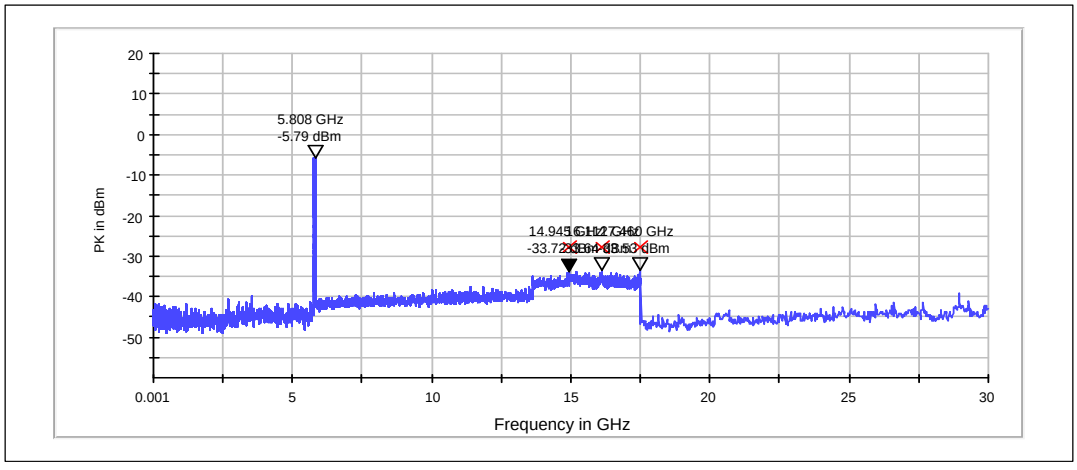
Channel 149+153 / 5755MHz



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

Frequency [MHz]	P [dBc]	Result
15021.200	-27.06	PASSED
15272.000	-27.92	PASSED
15512.000	-28.18	PASSED

Channel 157+161 / 5795MHz



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

Frequency [MHz]	P [dBc]	Result
17460.000	-27.73	PASSED
16112.000	-27.85	PASSED
14945.200	-27.92	PASSED

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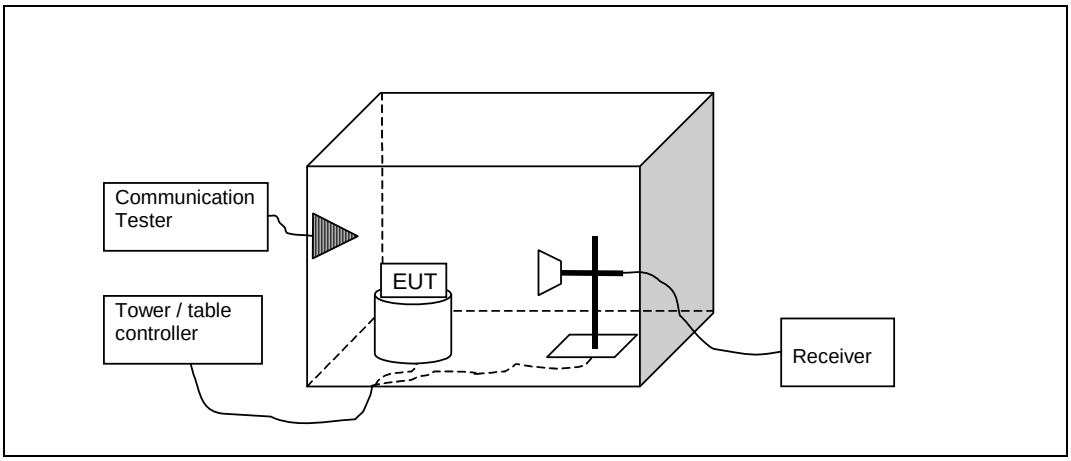
5. Spurious radiated emissions
(FCC 15.247(d), 15.209, RSS-210 A8.5)

EUT with DUT number	RM-983, DUT 43199
Accessories with DUT numbers	BV-L4A, DUT 43188 ; WH-208, DUT 43189 ; AC-60E, DUT 43161 ; CA-190CD, DUT 43162
Operation Voltage [V] / [Hz]	Nominal
Results	PASSED
Remarks	-
Temp [ºC] / Humidity [%RH] / Air Pressure [kPa]	19 / 39 / 101.8
Date of measurements	17-Jul-2014
Measured by	Timo Raiskio

5.1.1 Test setup



5.2. 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.

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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 [µV/m]	Limit [dBµV/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

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5.3. WLAN test results

5.3.1 802.11b, QPSK modulation, 11 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]	Limit [dBµV/m]	Margin	Results
4824.1	61.89	1243.083	66.69	-4.8	74	12.09	PASSED
7237.4	51.99	397.649	51.09	0.9	95	43.24	PASSED

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

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Limit [dBµV/m]	Margin	Results
4824.1	51.18	362.243	55.98	-4.8	54	2.8	PASSED
7237.4	39.76	97.275	38.86	0.9	---	---	PASSED

Channel 6 / 2437 MHz

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

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Limit [dBµV/m]	Margin	Results
75.283	14.51	5.315	45.61	-31.1	40	25.49	PASSED
77.167	13.52	4.742	44.42	-30.9	40	26.48	PASSED
119.999	10.29	3.27	37.99	-27.7	44	33.23	PASSED

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

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Limit [dBµV/m]	Margin	Results
4878.4	42.49	133.199	46.99	-4.5	74	31.49	PASSED
7318.8	47.04	224.905	45.74	1.3	74	26.94	PASSED

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

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Limit [dBµV/m]	Margin	Results
4878.4	29.65	30.374	34.15	-4.5	54	24.33	PASSED
7318.8	34.05	50.408	32.75	1.3	54	19.93	PASSED

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Channel 11 / 2462 MHz

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

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Limit [dBµV/m]	Margin	Results
4924	60.78	1093.956	65.18	-4.4	74	13.2	PASSED
7386.4	53.68	483.059	51.98	1.7	74	20.3	PASSED

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

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Limit [dBµV/m]	Margin	Results
4924	50.25	325.462	54.65	-4.4	54	3.73	PASSED
7386.4	40.93	111.301	39.23	1.7	54	13.05	PASSED

5.3.2 802.11g, BPSK modulation, 9 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]	Limit [dBµV/m]	Margin	Results
4824.4	58.16	809.096	62.96	-4.8	74	15.82	PASSED
7234.4	49.15	286.748	48.25	0.9	95	46.08	PASSED

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

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Limit [dBµV/m]	Margin	Results
4824.4	44.67	171.199	49.47	-4.8	54	9.31	PASSED
7234.4	34.27	51.701	33.37	0.9	---	---	PASSED

Channel 6 / 2437 MHz

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

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Limit [dBµV/m]	Margin	Results
78.487	13.13	4.534	43.83	-30.7	40	26.87	PASSED
129.808	7.8	2.455	35.9	-28.1	44	35.72	PASSED
171.77	8.57	2.682	38.37	-29.8	44	34.95	PASSED

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

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Limit [dBµV/m]	Margin	Results
4879.3	41.99	125.748	46.49	-4.5	74	31.99	PASSED
7318.9	45.75	193.865	44.45	1.3	74	28.23	PASSED

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

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Limit [dBµV/m]	Margin	Results
4879.3	27.93	24.917	32.43	-4.5	54	26.05	PASSED
7318.9	32.62	42.756	31.32	1.3	54	21.36	PASSED

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Channel 11 / 2462 MHz

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

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Limit [dBµV/m]	Margin	Results
4925.3	56.94	703.072	61.34	-4.4	74	17.04	PASSED
7384.5	49.77	307.964	48.17	1.6	74	24.21	PASSED

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

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Limit [dBµV/m]	Margin	Results
4925.3	43.13	143.384	47.53	-4.4	54	10.85	PASSED
7384.5	35.52	59.704	33.92	1.6	54	18.46	PASSED

5.4. 5 GHz RLAN test results

5.4.1 802.11a, BPSK modulation, 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]	Limit [dBµV/m]	Margin	Results
11490.2	50.57	337.676	43.27	7.3	74	23.41	PASSED
17241.2	44.87	175.186	41.77	3.1	95	50.36	PASSED
22973.6	45.99	199.297	40.09	5.9	74	27.99	PASSED

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

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Limit [dBµV/m]	Margin	Results
11490.2	38.19	81.19	30.89	7.3	54	15.79	PASSED
17241.2	31.48	37.497	28.38	3.1	---	---	PASSED
22973.6	33.18	45.604	27.28	5.9	54	20.8	PASSED

Channel 157 / 5785MHz

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

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Limit [dBµV/m]	Margin	Results
103.648	11.49	3.754	40.89	-29.4	44	32.03	PASSED
117.374	8.86	2.773	37.36	-28.5	44	34.66	PASSED
192.017	9.69	3.051	41.19	-31.5	44	33.83	PASSED

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

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Limit [dBµV/m]	Margin	Results
11578.6	48.78	274.789	41.48	7.3	74	25.2	PASSED
17363.8	44.15	161.25	41.05	3.1	95	51.08	PASSED
23136.8	47.38	233.884	41.38	6	95	47.85	PASSED

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

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Limit [dBµV/m]	Margin	Results
11578.6	36.07	63.606	28.77	7.3	54	17.91	PASSED
17363.8	30.73	34.395	27.63	3.1	---	---	PASSED
23136.8	33.92	49.659	27.92	6	---	---	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]	Limit [dBµV/m]	Margin	Results
11650.2	49.84	310.456	42.64	7.2	74	24.14	PASSED
17441.7	43.91	156.856	40.61	3.3	95	51.32	PASSED
23297.5	46.9	221.309	40.7	6.2	95	48.33	PASSED

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

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Limit [dBµV/m]	Margin	Results
11650.2	37.31	73.367	30.11	7.2	54	16.67	PASSED
17441.7	30.82	34.754	27.52	3.3	---	---	PASSED
23297.5	33.87	49.374	27.67	6.2	---	---	PASSED

5.4.2 802.11a, QPSK modulation, 12 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]	Limit [dBµV/m]	Margin	Results
11490.1	51.12	359.749	43.82	7.3	74	22.86	PASSED
17239.2	44.23	162.742	41.13	3.1	95	51	PASSED
22984.6	46	199.526	40.1	5.9	74	27.98	PASSED

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

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Limit [dBµV/m]	Margin	Results
11490.1	39.13	90.469	31.83	7.3	54	14.85	PASSED
17239.2	31.42	37.239	28.32	3.1	---	---	PASSED
22984.6	33.16	45.499	27.26	5.9	54	20.82	PASSED

Channel 157 / 5785MHz

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

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Limit [dBµV/m]	Margin	Results
65.004	21.67	12.12	55.17	-33.5	40	18.33	PASSED
65.676	23.23	14.504	56.53	-33.3	40	16.77	PASSED
66.48	23.01	14.142	56.11	-33.1	40	16.99	PASSED

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

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Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Limit [dBµV/m]	Margin	Results
11561.9	50.77	345.541	43.37	7.4	74	23.21	PASSED
17365	43.6	151.356	40.5	3.1	95	51.63	PASSED
23135.6	46.85	220.039	40.85	6	95	48.38	PASSED

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

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Limit [dBµV/m]	Margin	Results
11561.9	36.22	64.714	28.82	7.4	54	17.76	PASSED
17365	30.76	34.514	27.66	3.1	---	---	PASSED
23135.6	33.89	49.488	27.89	6	---	---	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]	Limit [dBµV/m]	Margin	Results
11649.9	50.24	325.087	43.04	7.2	74	23.74	PASSED
17441.1	43.52	149.968	40.22	3.3	95	51.71	PASSED
23298.7	46.77	218.022	40.57	6.2	95	48.46	PASSED

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

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Limit [dBµV/m]	Margin	Results
11649.9	37.66	76.384	30.46	7.2	54	16.32	PASSED
17441.1	30.77	34.554	27.47	3.3	---	---	PASSED
23298.7	33.86	49.317	27.66	6.2	---	---	PASSED

5.4.3 802.11n, BPSK modulation, 13.5 / 15.0 Mbps data rate.

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]	Limit [dBµV/m]	Margin	Results
11609.7	49.21	288.735	42.01	7.2	74	24.77	PASSED
17376.5	43.63	151.88	40.43	3.2	95	51.6	PASSED
23165.2	47.06	225.424	40.96	6.1	95	48.17	PASSED

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

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Limit [dBµV/m]	Margin	Results
11609.7	36	63.096	28.8	7.2	54	17.98	PASSED
17376.5	30.81	34.714	27.61	3.2	---	---	PASSED
23165.2	33.79	48.922	27.69	6.1	---	---	PASSED

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Channel 149+153 / 5755MHz

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

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Limit [dBµV/m]	Margin	Results
65.658	22.05	12.662	55.35	-33.3	40	17.95	PASSED
65.82	23.01	14.142	56.31	-33.3	40	16.99	PASSED
66.336	22.18	12.853	55.38	-33.2	40	17.82	PASSED

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

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Limit [dBµV/m]	Margin	Results
11508.6	49.08	284.446	41.58	7.5	74	24.9	PASSED
17264.3	43.88	156.315	40.68	3.2	95	51.35	PASSED
23020.1	46.7	216.272	40.6	6.1	74	27.28	PASSED

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

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Limit [dBµV/m]	Margin	Results
11508.6	36.48	66.681	28.98	7.5	54	17.5	PASSED
17264.3	31.07	35.768	27.87	3.2	---	---	PASSED
23020.1	33.32	46.345	27.22	6.1	54	20.66	PASSED

5.4.4 802.11n, 64QAM modulation, 108.0 / 120.0 Mbps data rate.

Channel 149+153 / 5755MHz

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

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Limit [dBµV/m]	Margin	Results
30.15	19.57	9.517	39.57	-20	40	20.43	PASSED
42.511	13.15	4.545	38.55	-25.4	40	26.85	PASSED
60.714	20.11	10.127	53.81	-33.7	40	19.89	PASSED

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

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Limit [dBµV/m]	Margin	Results
11507.4	49.69	305.141	42.29	7.4	74	24.29	PASSED
17268.2	43.87	156.135	40.67	3.2	95	51.36	PASSED
23017.9	46.28	206.063	40.18	6.1	74	27.7	PASSED

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

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Limit [dBµV/m]	Margin	Results
11507.4	36.34	65.615	28.94	7.4	54	17.64	PASSED
17268.2	31.07	35.768	27.87	3.2	---	---	PASSED
23017.9	33.23	45.867	27.13	6.1	54	20.75	PASSED

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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]	Limit [dBµV/m]	Margin	Results
11600	48.8	275.423	41.5	7.3	74	25.18	PASSED
17373.2	43.49	149.451	40.29	3.2	95	51.74	PASSED
23192.3	47	223.872	40.8	6.2	95	48.23	PASSED

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

Frequency [MHz]	E [dBµV/m]	E [µV/m]	U_{RX} [dBµV]	A_{TOT} [dB]	Limit [dBµV/m]	Margin	Results
11600	36.11	63.9	28.81	7.3	54	17.87	PASSED
17373.2	30.8	34.674	27.6	3.2	---	---	PASSED
23192.3	33.56	47.643	27.36	6.2	---	---	PASSED

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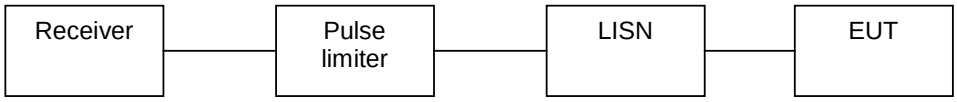
6. AC powerline conducted emissions
(FCC §15.207, RSS-210 7.2.2)

EUT with DUT number	RM-983, DUT 43199
Accessories with DUT numbers	BV-L4A, DUT 43188 ; AC-60E, DUT 43161 ; CA-190CD, DUT 43162 ; WH-208, DUT 43189
Operation Voltage [V] / [Hz]	110V / 60Hz
Results	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	22 / 45 / 102.4
Date of measurements	22-heinä-2014
Measured by	Timo Raiskio

6.1. Test Setup



6.2. Test method and limit

The measurement is made according to procedure KDB 558074 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

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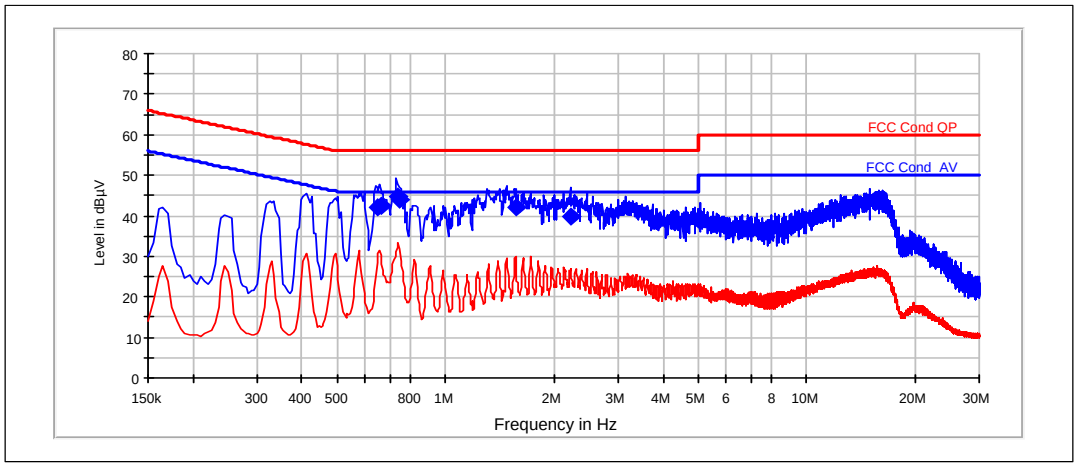
6.3. WLAN Test results

6.3.1 DSSS mode, QPSK modulation, 11 Mbps data rate

Channel 6 / 2437 MHz

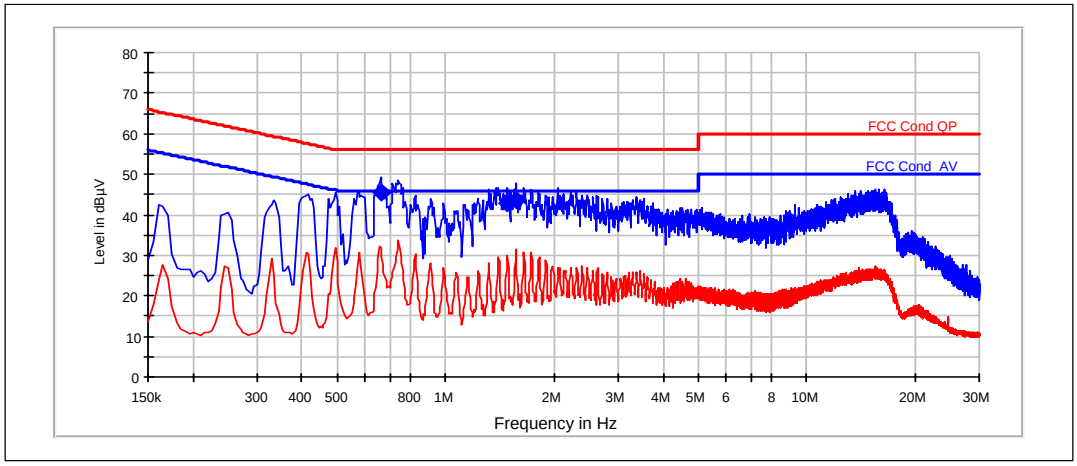


QuasiPeak (RBW: 9 kHz)

Frequency [MHz]	U [dBµV]	Line	Result
0.65	42.26	L1	PASSED
0.66	42.61	L1	PASSED
0.74	44.76	L1	PASSED
0.745	43.8	L1	PASSED
1.565	41.9	L1	PASSED
2.21	39.95	L1	PASSED

6.3.2 OFDM mode, BPSK modulation, 9 Mbps data rate

Channel 6 / 2437 MHz



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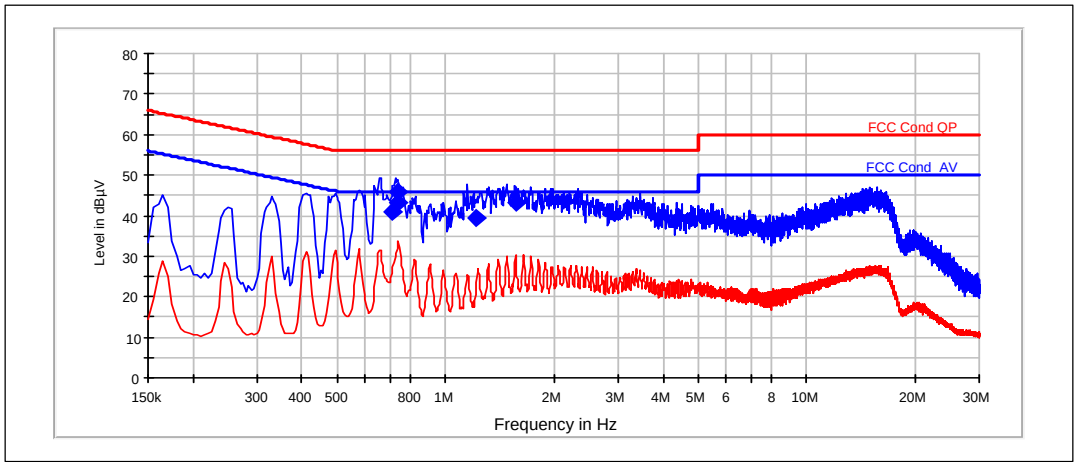
QuasiPeak (RBW: 9 kHz)

Frequency [MHz]	U [dBµV]	Line	Result
0.66	45.55	L1	PASSED
1.485	42.97	L1	PASSED
1.565	43.63	L1	PASSED

6.4. 5 GHz RLAN Test results

6.4.1 OFDM mode, BPSK modulation, 6 Mbps data rate



QuasiPeak (RBW: 9 kHz)

Frequency [MHz]	U [dBµV]	Line	Result
0.715	40.9	L1	PASSED
0.735	43.17	L1	PASSED
0.74	45.98	L1	PASSED
1.22	39.42	L1	PASSED
1.56	43.38	L1	PASSED

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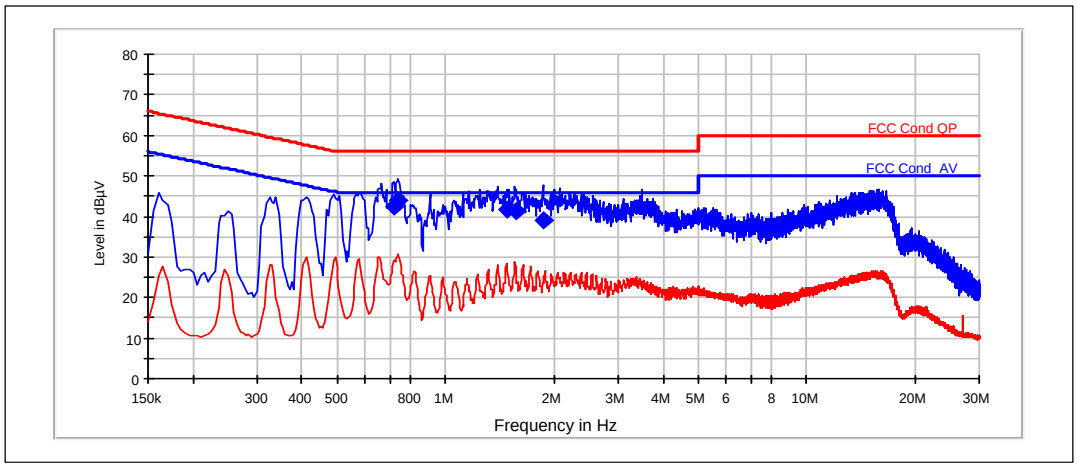
6.4.2 OFDM mode, QPSK modulation, 12 Mbps data rate

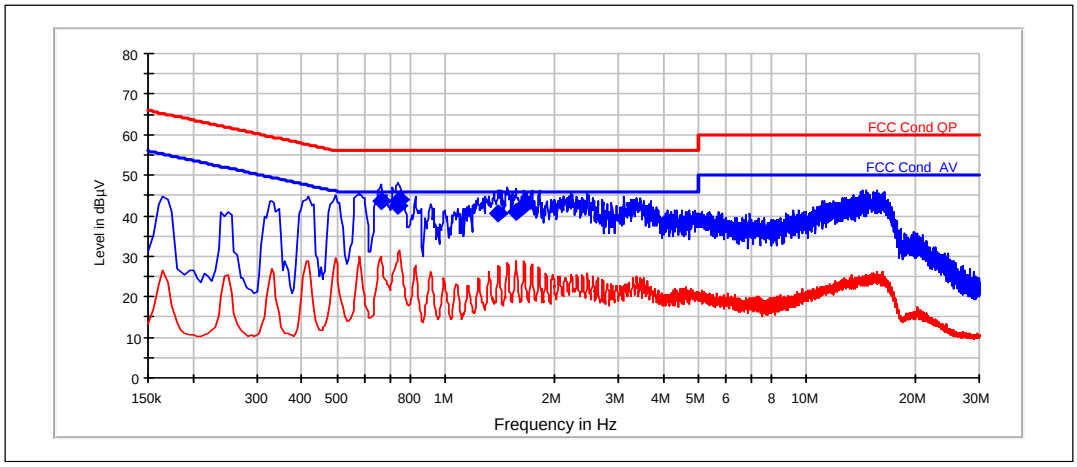


QuasiPeak (RBW: 9 kHz)

Frequency [MHz]	U [dBµV]	Line	Result
0.72	42.42	L1	PASSED
0.74	43.98	L1	PASSED
1.475	41.52	L1	PASSED
1.56	41.14	L1	PASSED
1.86	38.98	L1	PASSED

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

Channel 6 / 2437 MHz



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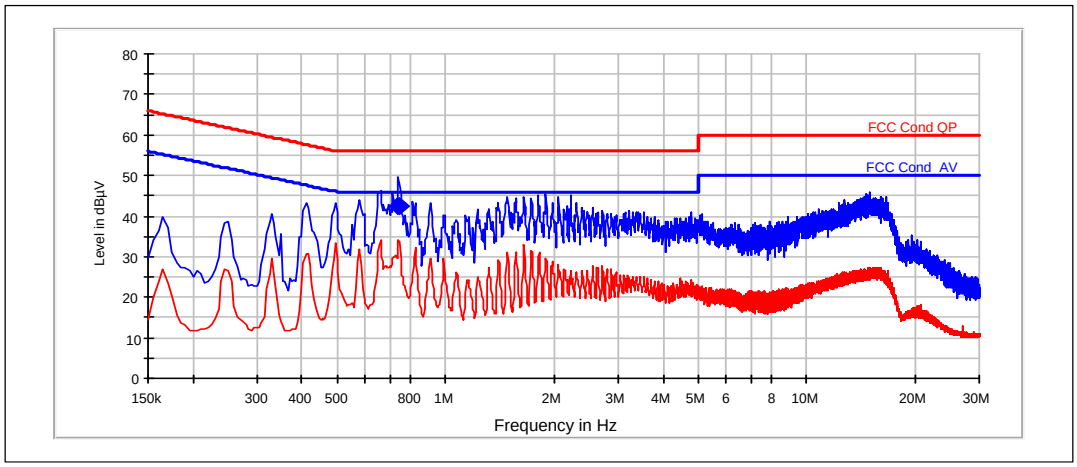
QuasiPeak (RBW: 9 kHz)

Frequency [MHz]	U [dBµV]	Line	Result
0.66	43.68	L1	PASSED
0.735	42.33	L1	PASSED
0.745	43.95	L1	PASSED
1.395	40.52	L1	PASSED
1.56	40.89	L1	PASSED
1.65	42.52	L1	PASSED

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

Channel 6 / 2437 MHz



QuasiPeak (RBW: 9 kHz)

Frequency [MHz]	U [dBµV]	Line	Result
0.74	42.35	L1	PASSED
0.745	42.63	L1	PASSED

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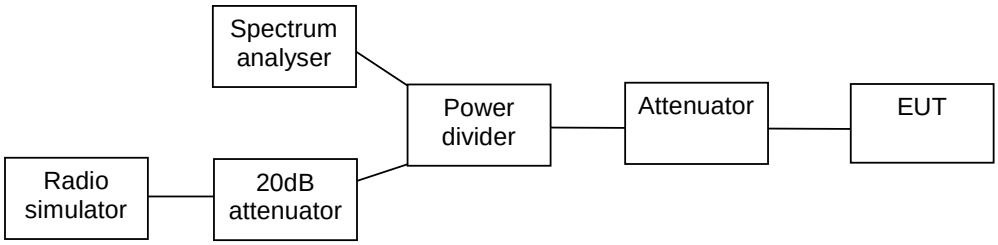
7. 6dB(bandwidth)

(FCC §15.247(a)(2), RSS-210 A8.2(a))

EUT with DUT number	RM-983, DUT 43191
Accessories with DUT numbers	BV-L4A, DUT 43188 ; WH-208, DUT 43189 ; AC-60E, DUT 43161 ; CA-190CD, DUT 43162
Operation Voltage [V] / [Hz]	Nominal
Results	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	23 / 50 / 102.1
Date of measurements	10-Jul-2014
Measured by	Timo Raiskio

7.1. Test Setup



7.2. 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

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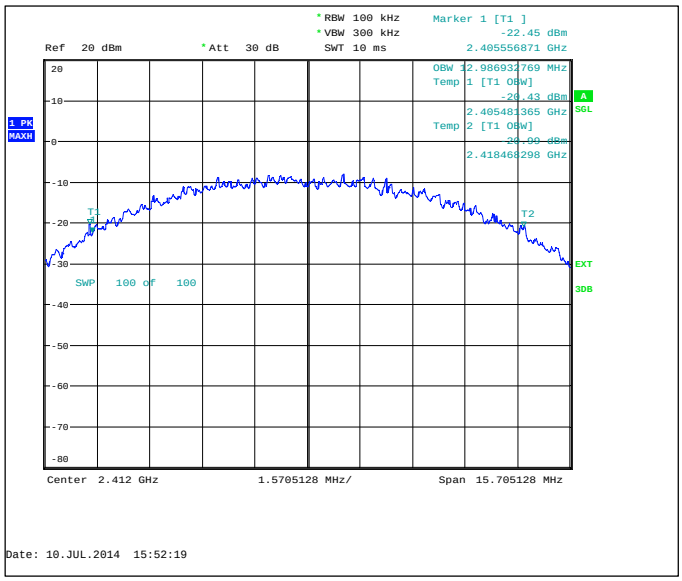
7.3. WLAN Test results

7.3.1 802.11b mode, QPSK modulation, 11 Mbps data rate

Channel / f_C [MHz]	6 dB bandwidth [kHz]	Result
1 / 2412	12986.9	PASSED
6 / 2437	13378	PASSED
11 / 2462	12988.8	PASSED

Channel 1 / 2412 MHz



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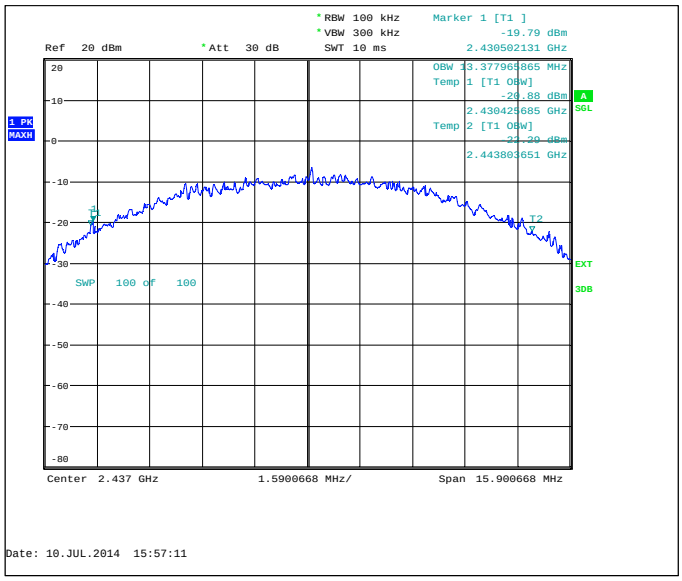
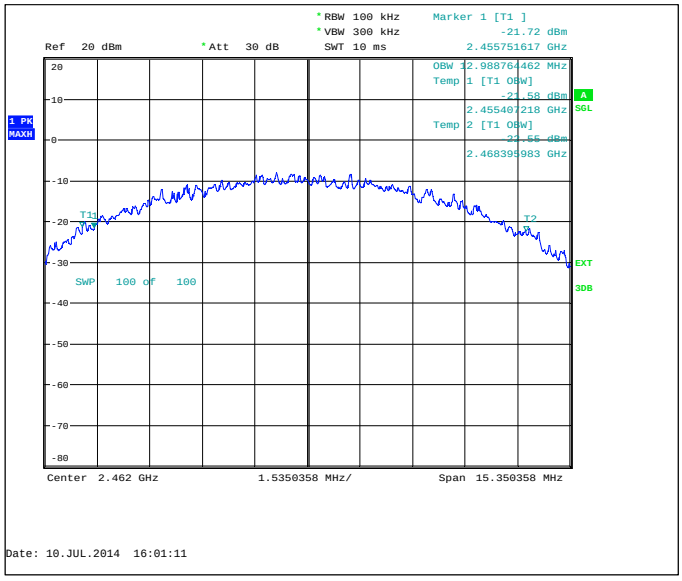
Channel 6 / 2437 MHz



Channel 11 / 2462 MHz



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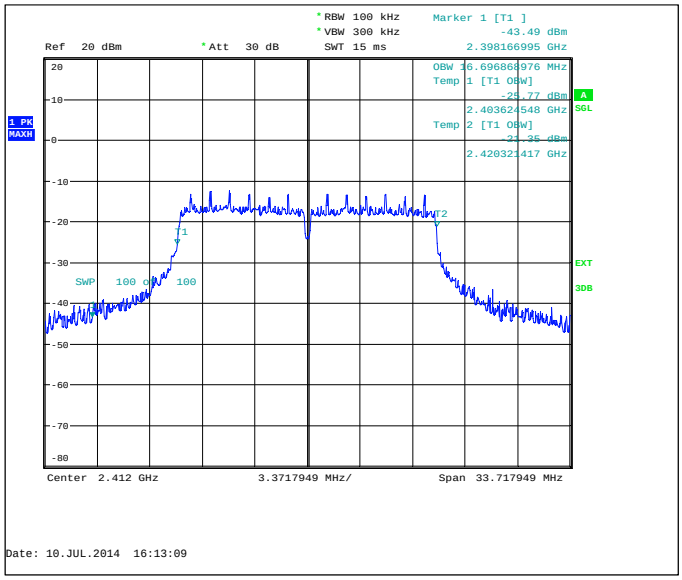
7.3.2 802.11g mode, BPSK modulation, 9 Mbps data rate

Channel / f_C [MHz]	6 dB bandwidth [kHz]	Result
1 / 2412	16696.9	PASSED
6 / 2437	17446.1	PASSED
11 / 2462	16946.4	PASSED

Channel 1 / 2412 MHz



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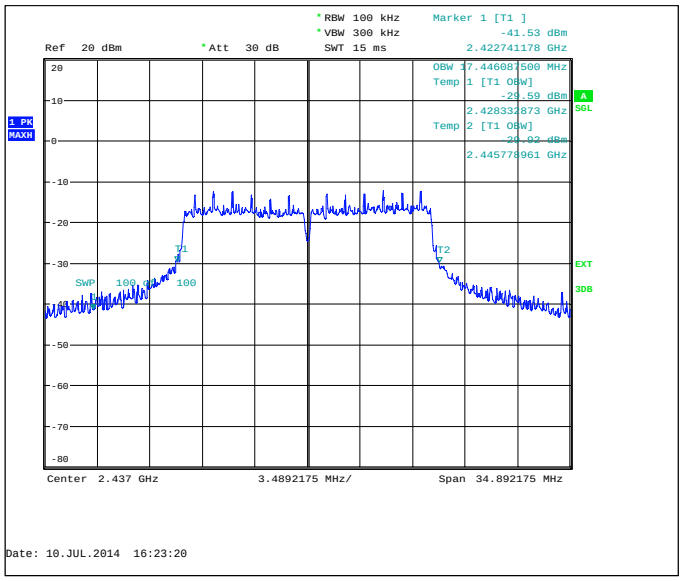
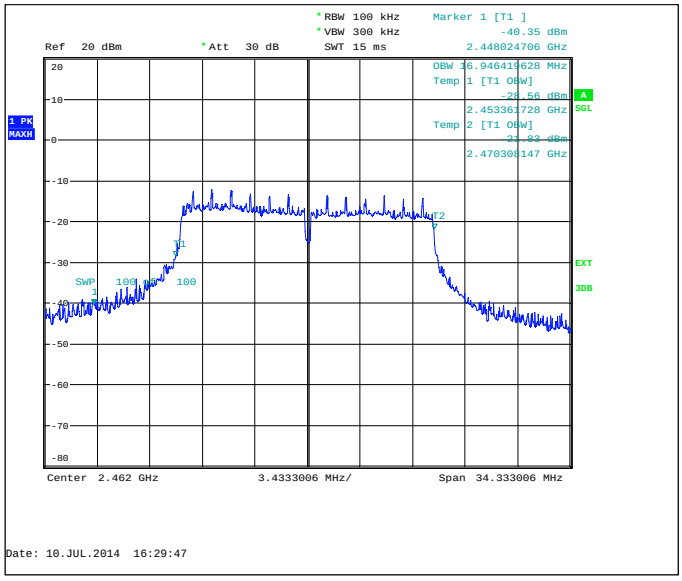
Channel 6 / 2437 MHz



Channel 11 / 2462 MHz



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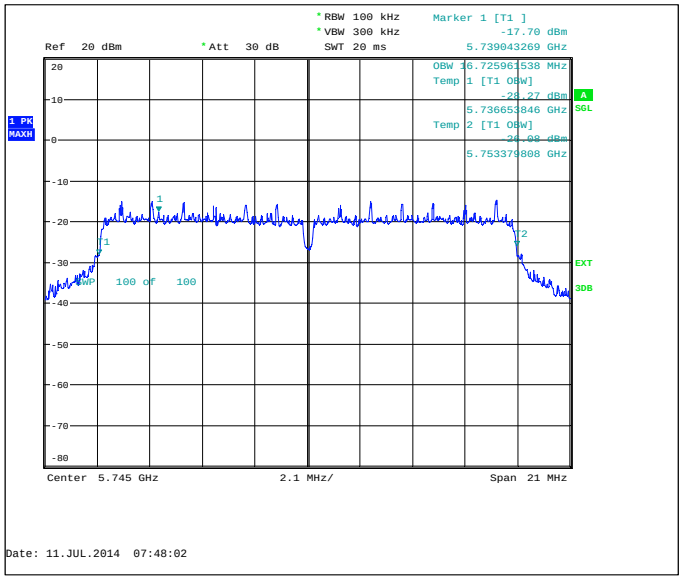
7.4. 5 GHz RLAN Test results

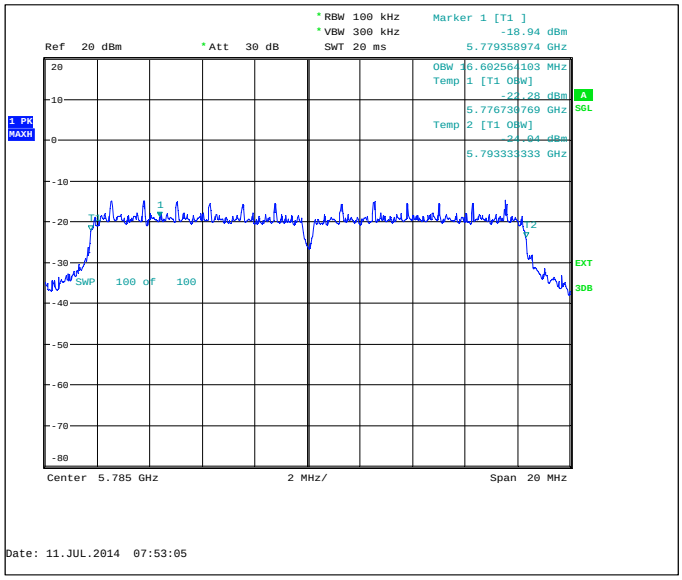
7.4.1 802.11a mode, BPSK modulation, 6 Mbps data rate

Channel / f_C [MHz]	6 dB bandwidth [kHz]	Result
149 / 5745	16726	PASSED
157 / 5785	16602.6	PASSED
165 / 5825	16726	PASSED

Channel 149 / 5745MHz



Channel 157 / 5785MHz



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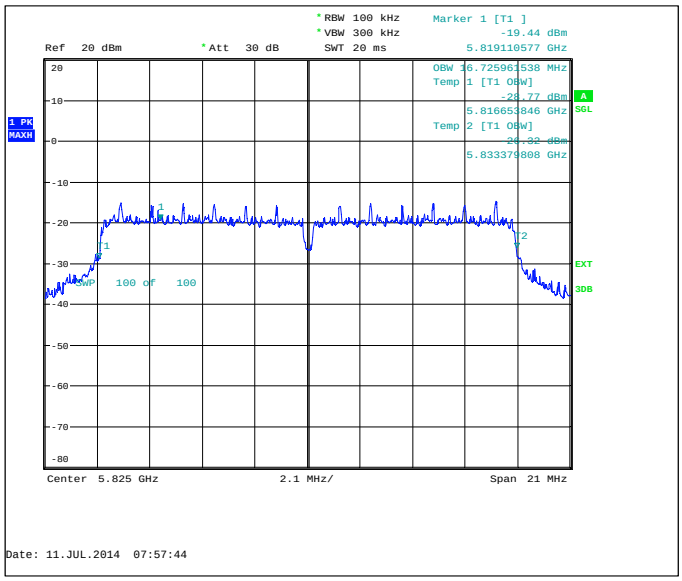
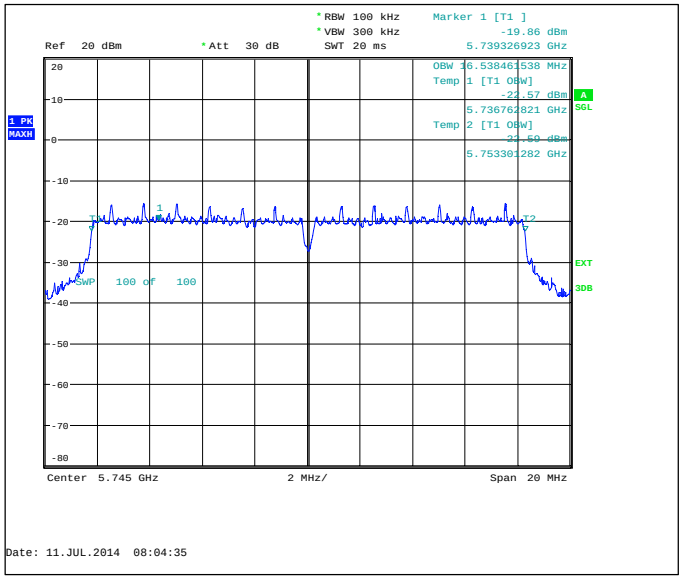
Channel 165 / 5825MHz



7.4.2 802.11a mode, QPSK modulation, 12 Mbps data rate

Channel / f_C [MHz]	6 dB bandwidth [kHz]	Result
149 / 5745	16538.5	PASSED
157 / 5785	16538.5	PASSED
165 / 5825	16538.5	PASSED

Channel 149 / 5745MHz



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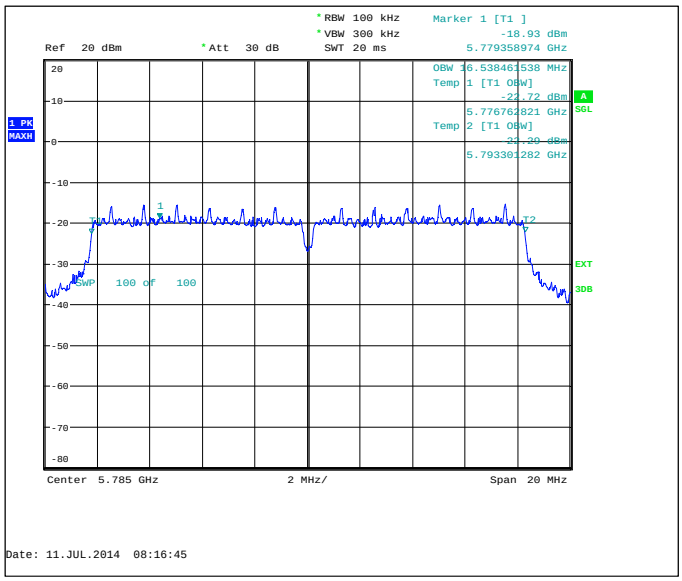
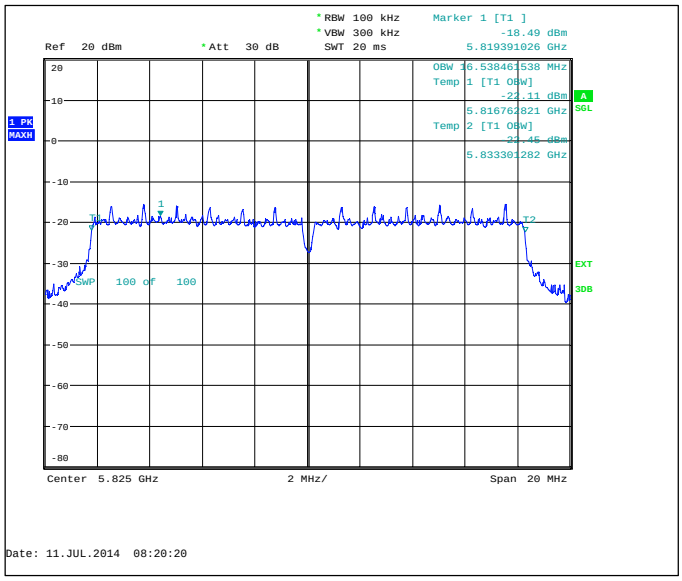
Channel 157 / 5785MHz



Channel 165 / 5825MHz



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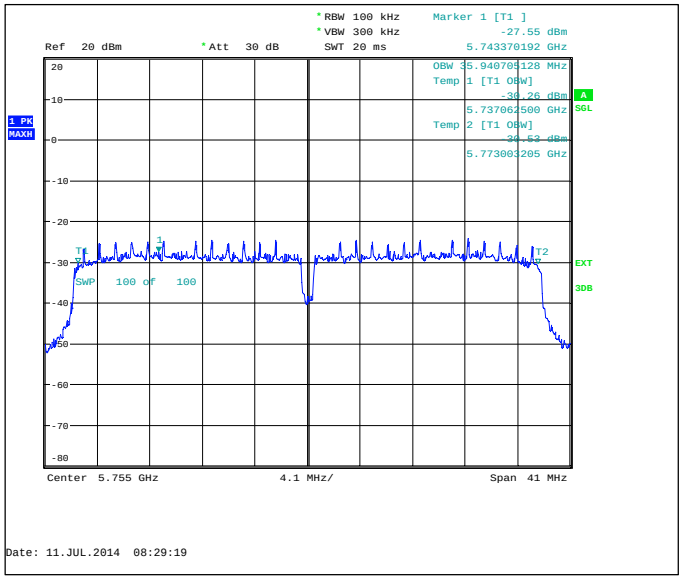
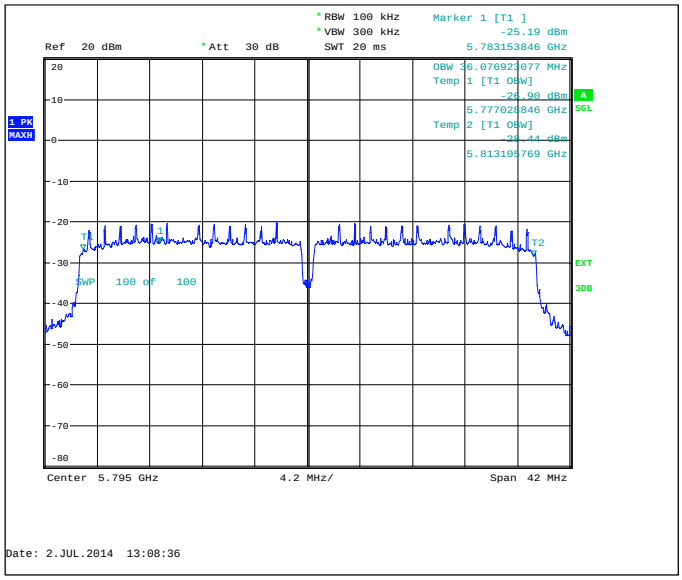
7.4.3 802.11n mode, BPSK modulation, 13.5 / 15.0 Mbps data rate

Channel / f_C [MHz]	6 dB bandwidth [kHz]	Result
149+153 / 5755	35940.7	PASSED
157+161 / 5795	36076.9	PASSED
157+161 / 5795	35940.7	PASSED

Channel 149+153 / 5755MHz



Channel 157+161 / 5795MHz



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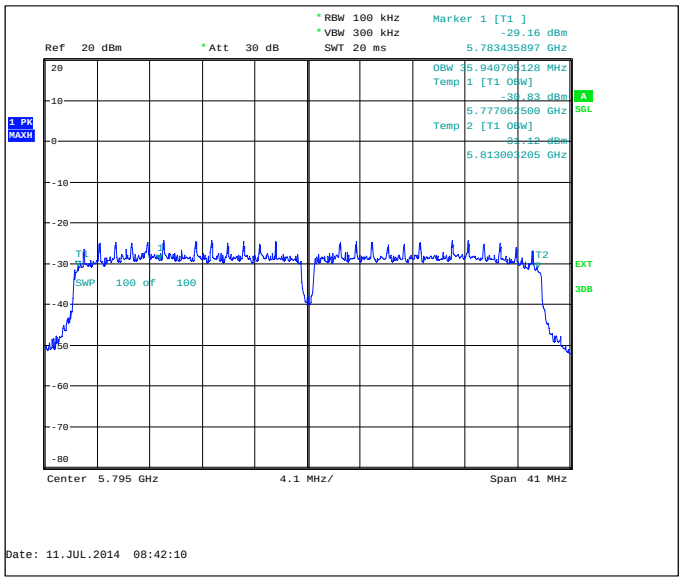
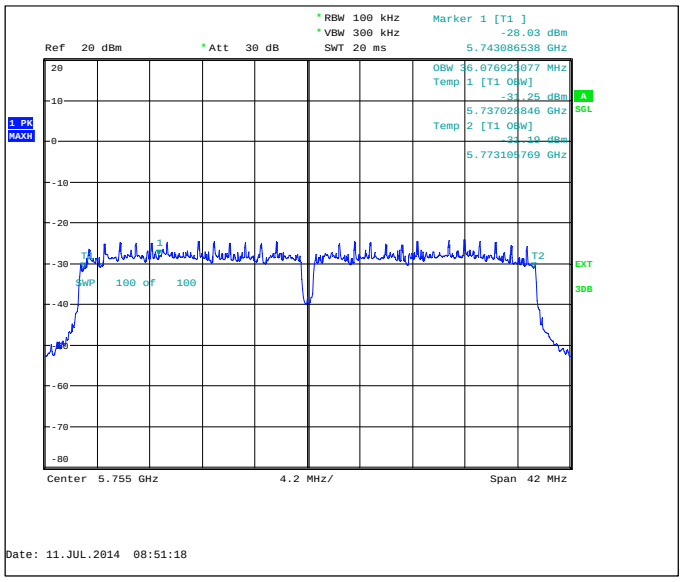
Channel 157+161 / 5795MHz



7.4.4 802.11n mode, 64QAM modulation, 108.0 / 120.0 Mbps data rate

Channel / f_C [MHz]	6 dB bandwidth [kHz]	Result
149+153 / 5755	36076.9	PASSED
157+161 / 5795	36009.6	PASSED

Channel 149+153 / 5755MHz



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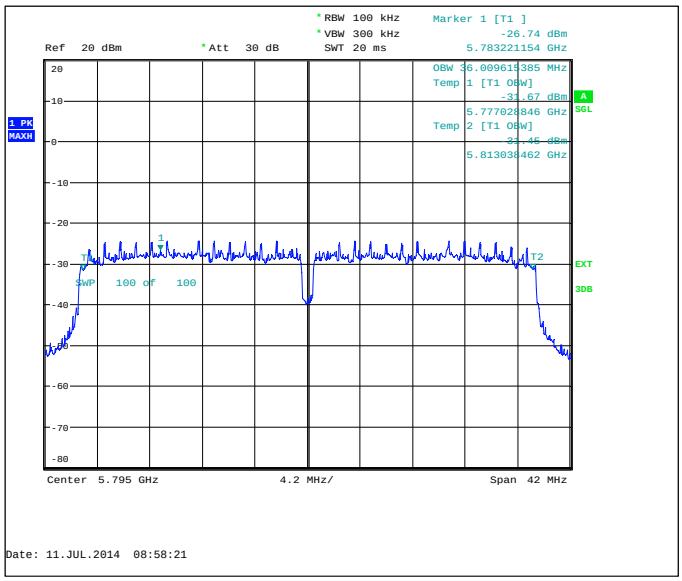
Channel 157+161 / 5795MHz



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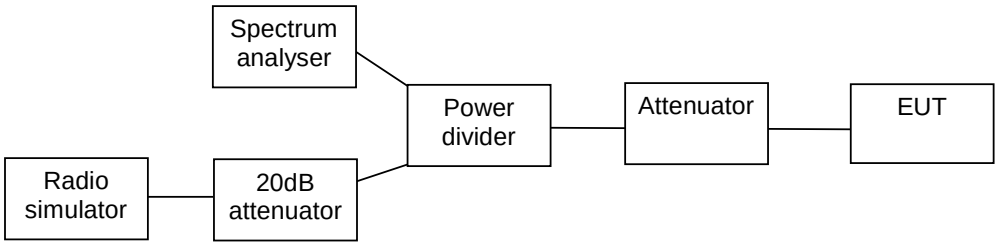
8. Power spectral density
(FCC §15.247(e), RSS-210 A8.2(b))

EUT with DUT number	RM-983, DUT 43191
Accessories with DUT numbers	BV-L4A, DUT 43188 ; WH-208, DUT 43189 ; AC-60E, DUT 43161 ; CA-190CD, DUT 43162
Operation Voltage [V] / [Hz]	Nominal
Results	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	23 / 50 / 102.1
Date of measurements	10-Jul-2014
Measured by	Timo Raiskio

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.

Limits for power spectral density measurements

Limit [dBm] @ 3 kHz
<= 8

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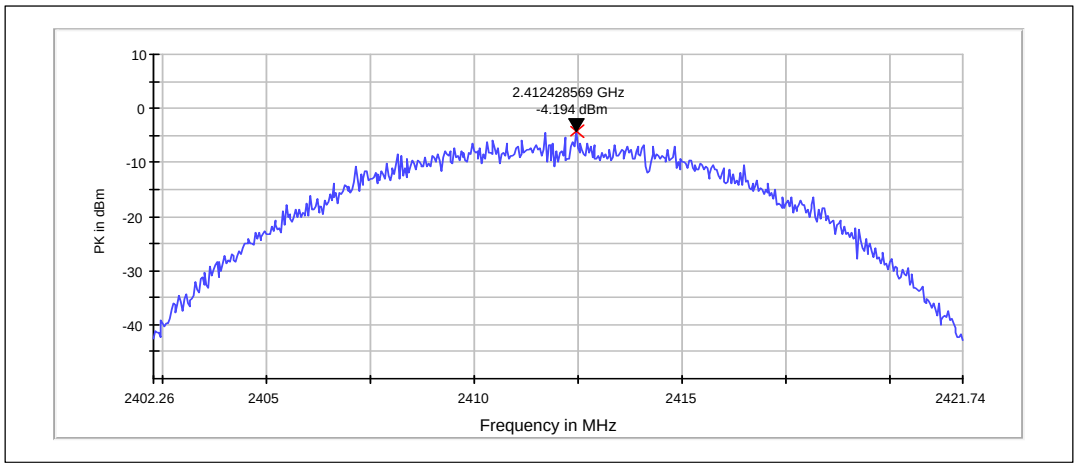
8.3. WLAN Test results

8.3.1 802.11b mode, QPSK modulation, 11 Mbps data rate

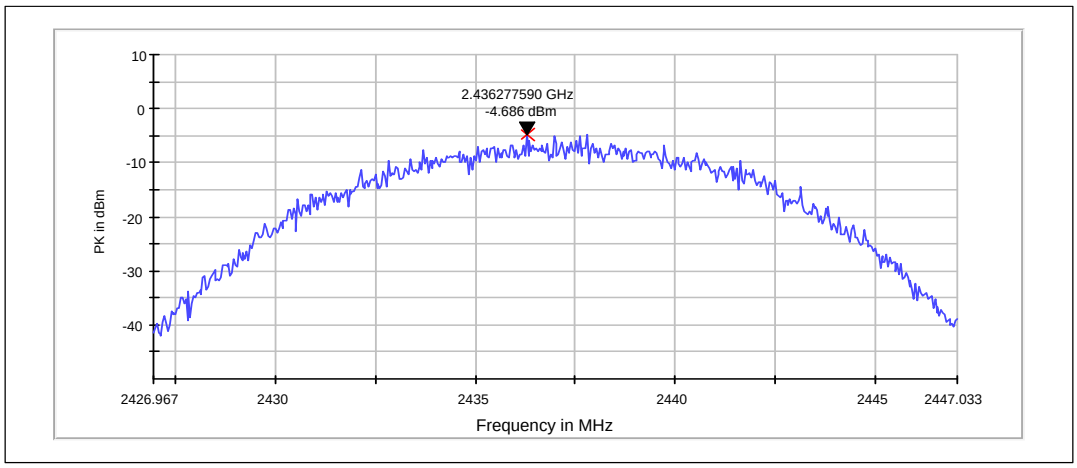
Peak (RBW: 3 kHz, VBW: 10 kHz, Max hold)

Channel / f_C [MHz]	P [dBm]	Result
1 / 2412	-4.19	PASSED
6 / 2437	-4.69	PASSED
11 / 2462	-3.02	PASSED

Channel 1 / 2412 MHz



Channel 6 / 2437 MHz



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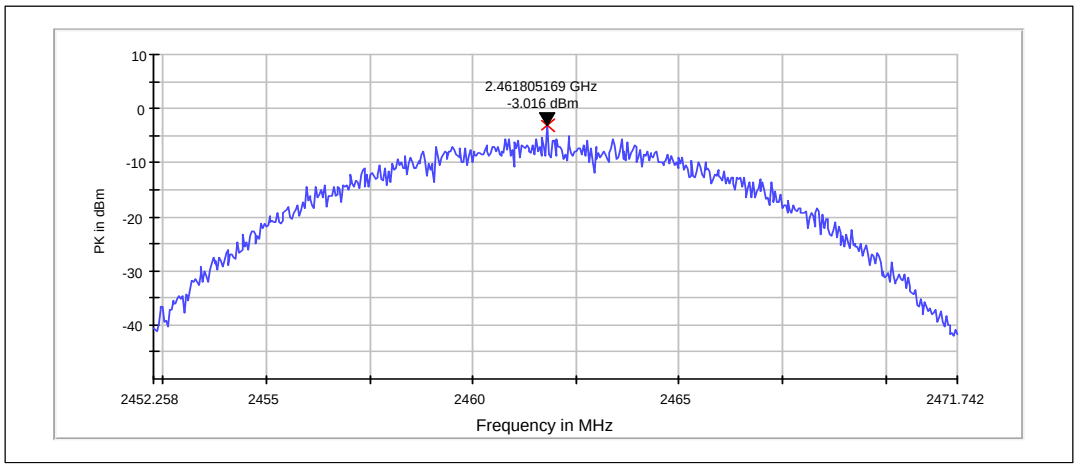
Channel 11 / 2462 MHz

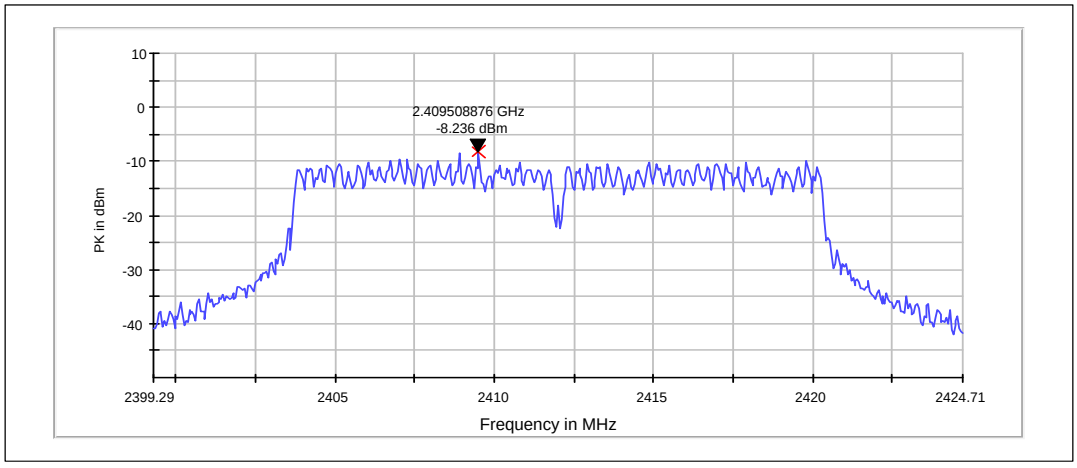


8.3.2 802.11g mode, BPSK modulation, 9 Mbps data rate

Peak (RBW: 3 kHz, VBW: 10 kHz, Max hold)

Channel / f_C [MHz]	P [dBm]	Result
1 / 2412	-8.24	PASSED
6 / 2437	-9.48	PASSED
11 / 2462	-9.07	PASSED

Channel 1 / 2412 MHz



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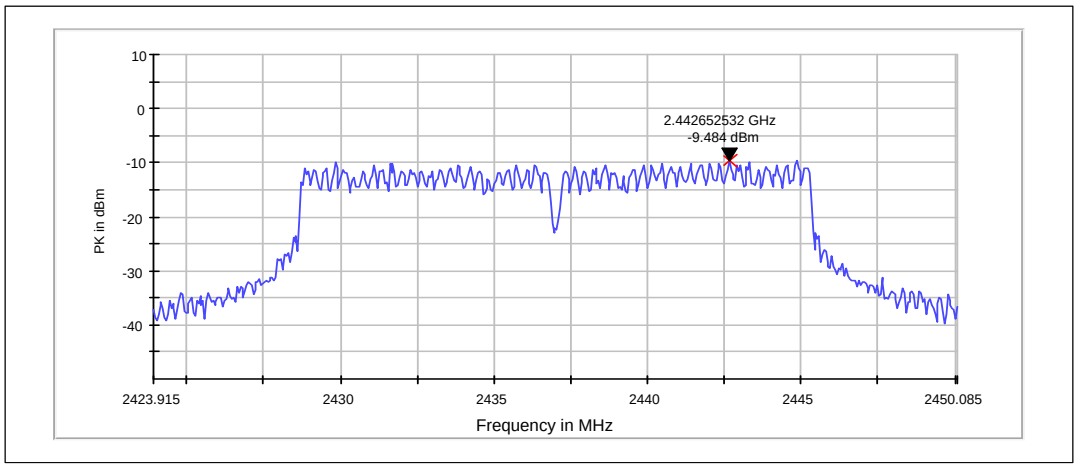
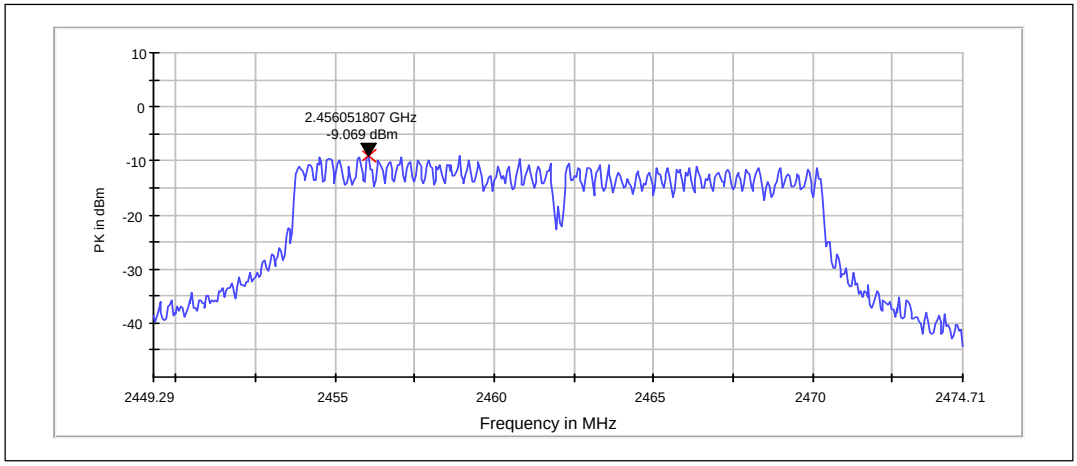
Channel 6 / 2437 MHz



Channel 11 / 2462 MHz



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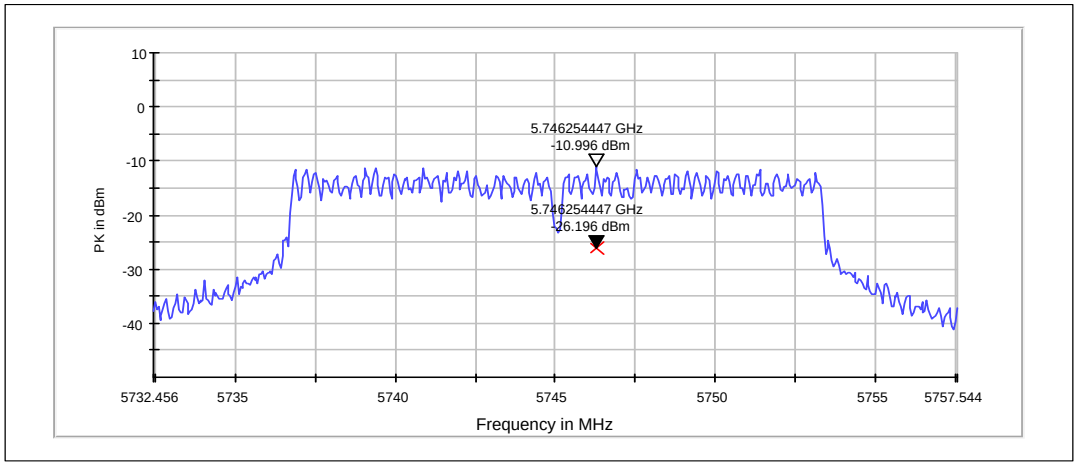
8.4. 5 GHz RLAN Test results

8.4.1 802.11a mode, BPSK modulation, 6 Mbps data rate

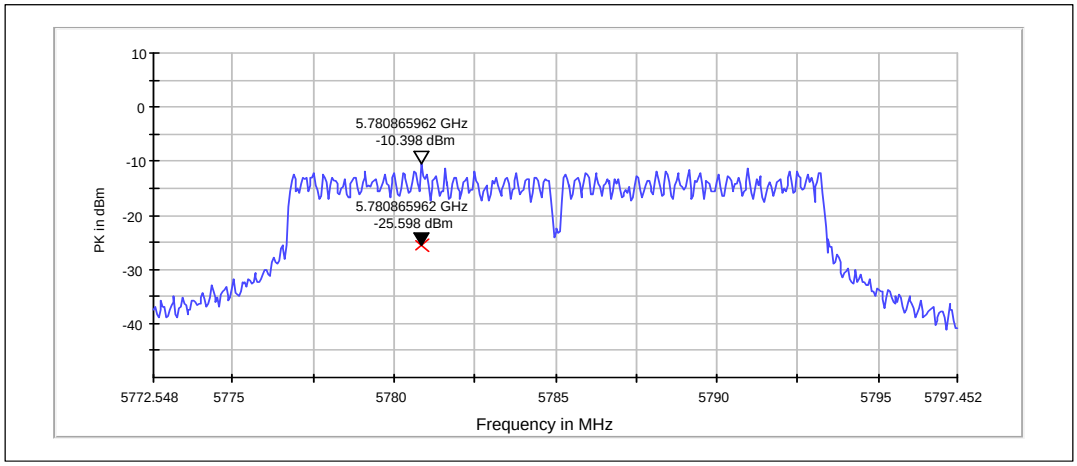
Peak (RBW: 3 kHz, VBW: 10 kHz, Max hold)

Channel / f_C [MHz]	P [dBm]	Result
149 / 5745	-26.2	PASSED
157 / 5785	-25.6	PASSED
165 / 5825	-26.26	PASSED

Channel 149 / 5745MHz



Channel 157 / 5785MHz



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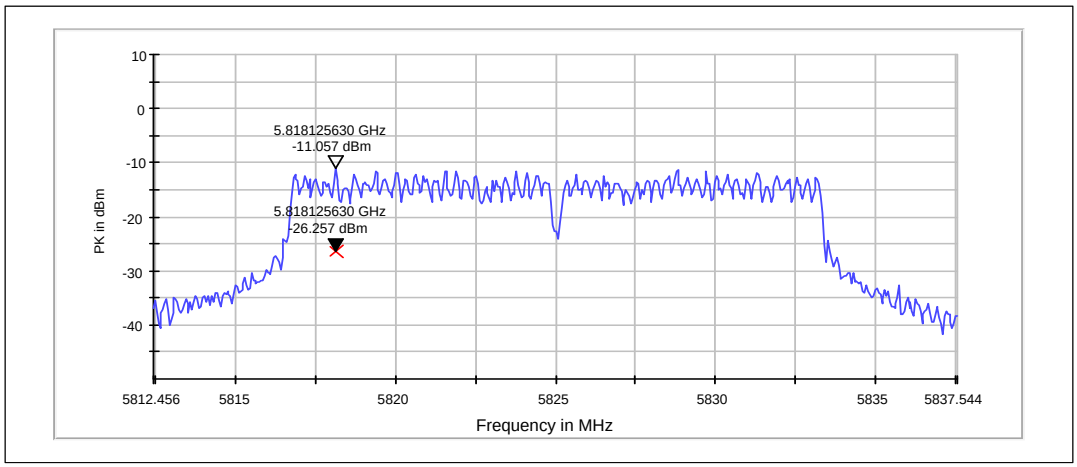
Channel 165 / 5825MHz

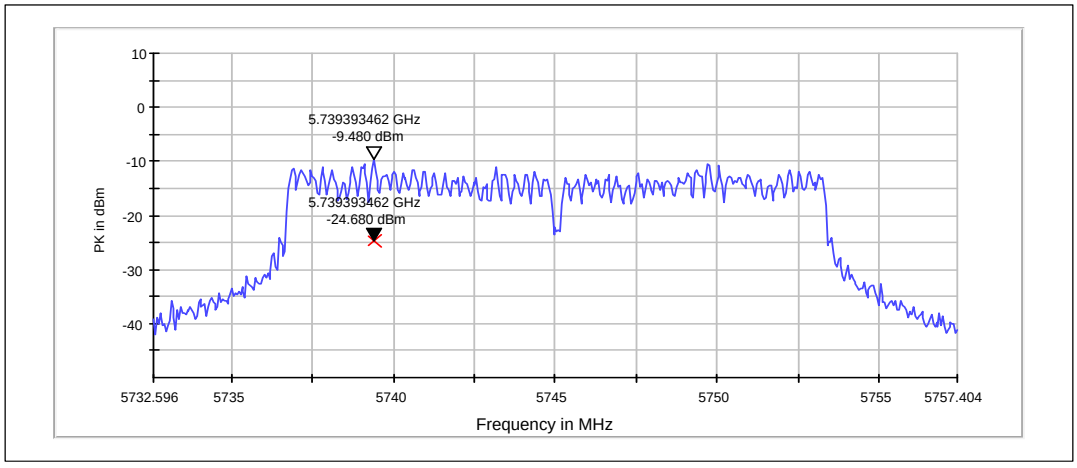


8.4.2 802.11a mode, QPSK modulation, 12 Mbps data rate

Peak (RBW: 3 kHz, VBW: 10 kHz, Max hold)

Channel / f_C [MHz]	P [dBm]	Result
149 / 5745	-24.68	PASSED
157 / 5785	-25.05	PASSED
165 / 5825	-25.53	PASSED

Channel 149 / 5745MHz



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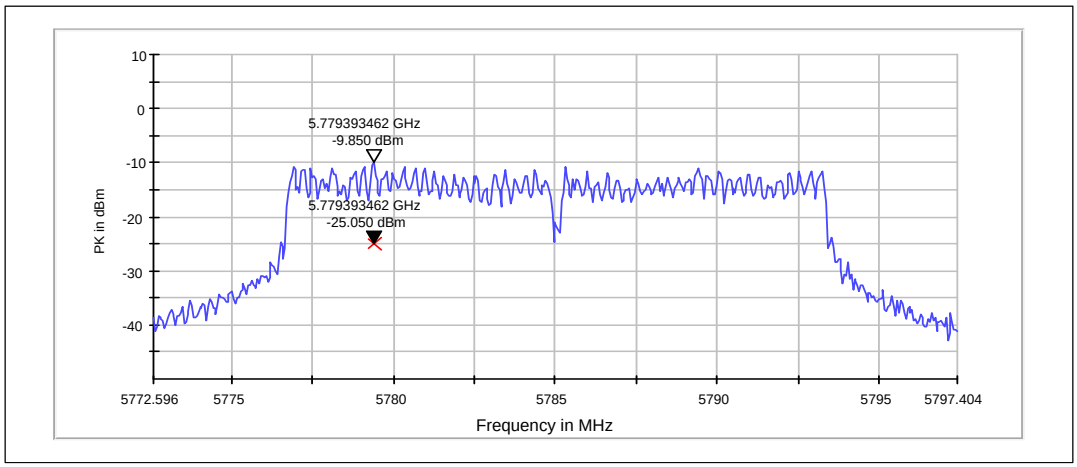
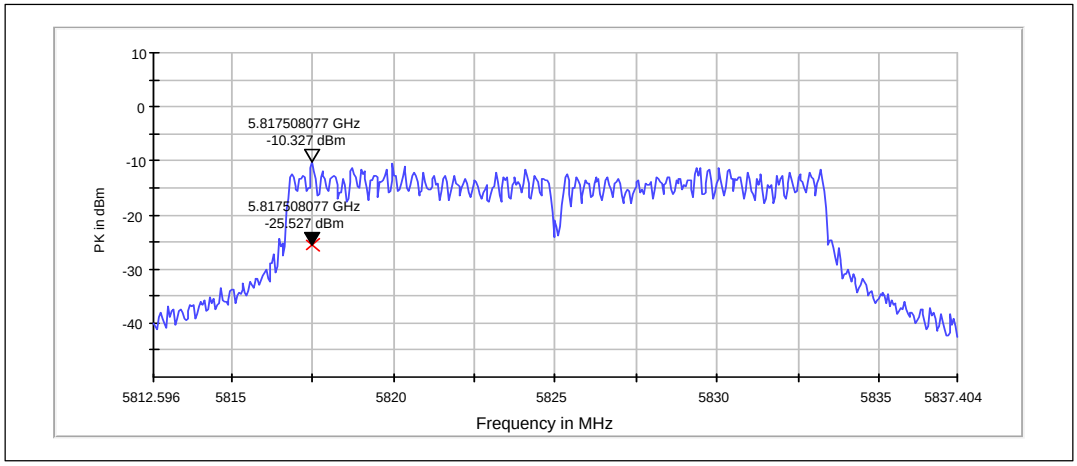
Channel 157 / 5785MHz



Channel 165 / 5825MHz



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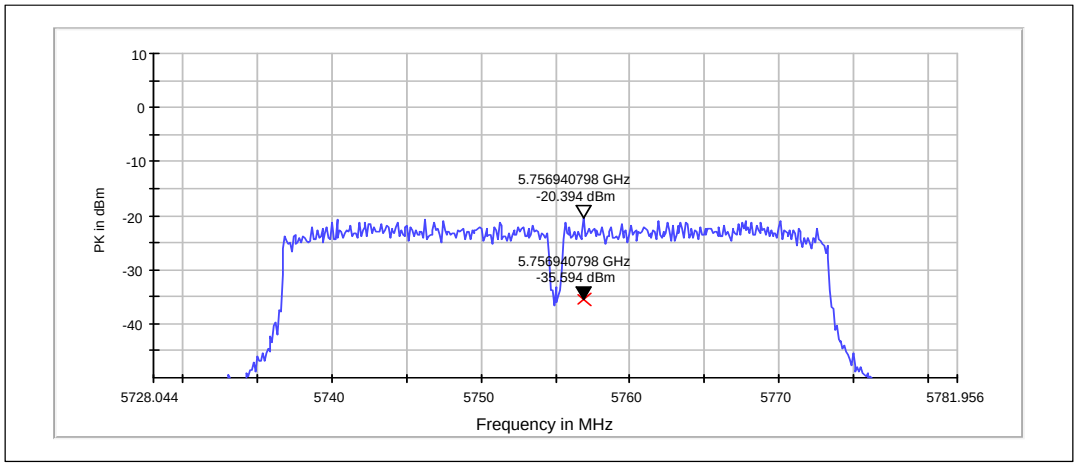
8.4.3 802.11n mode, BPSK modulation, 13.5 / 15.0 Mbps data rate

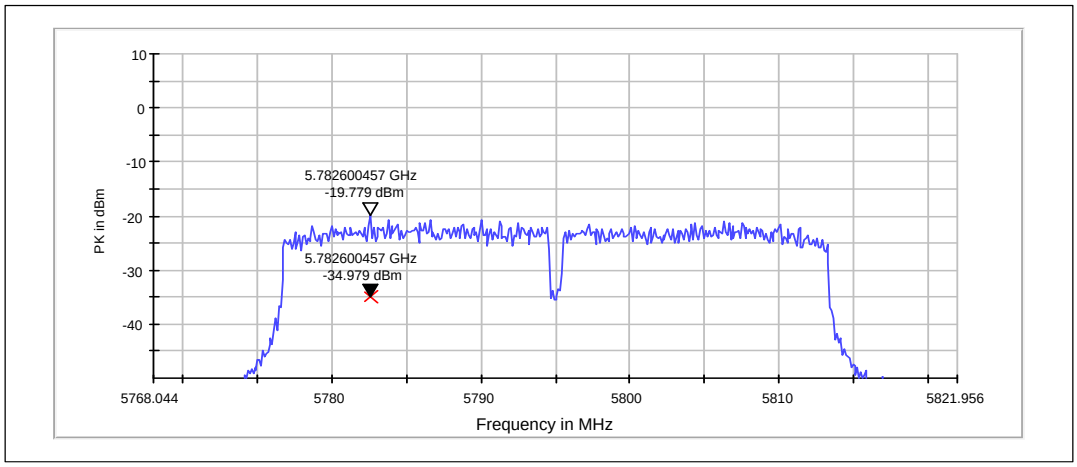
Peak (RBW: 3 kHz, VBW: 10 kHz, Max hold)

Channel / f_C [MHz]	P [dBm]	Result
149+153 / 5755	-35.59	PASSED
157+161 / 5795	-34.98	PASSED

Channel 149+153 / 5755MHz



Channel 157+161 / 5795MHz



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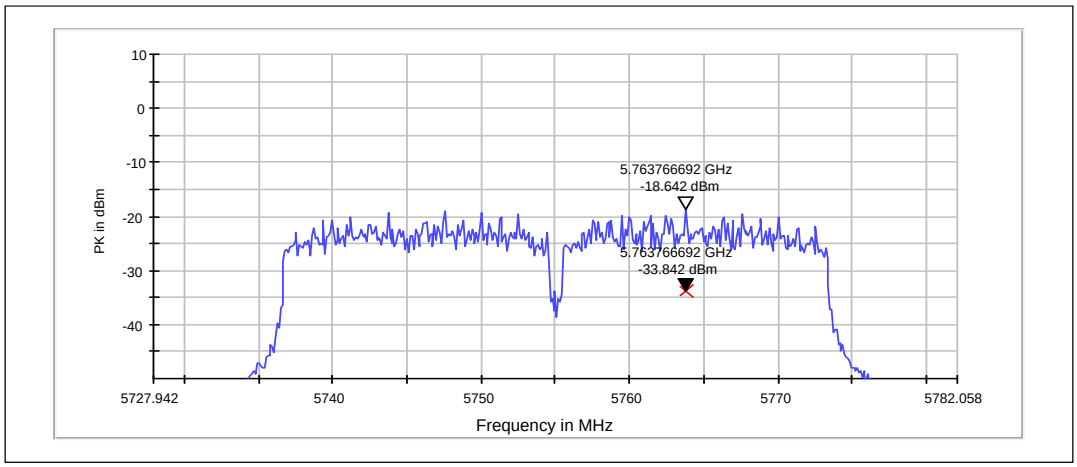
8.4.4 802.11n mode, 64QAM modulation, 108.0 / 120.0 Mbps data rate

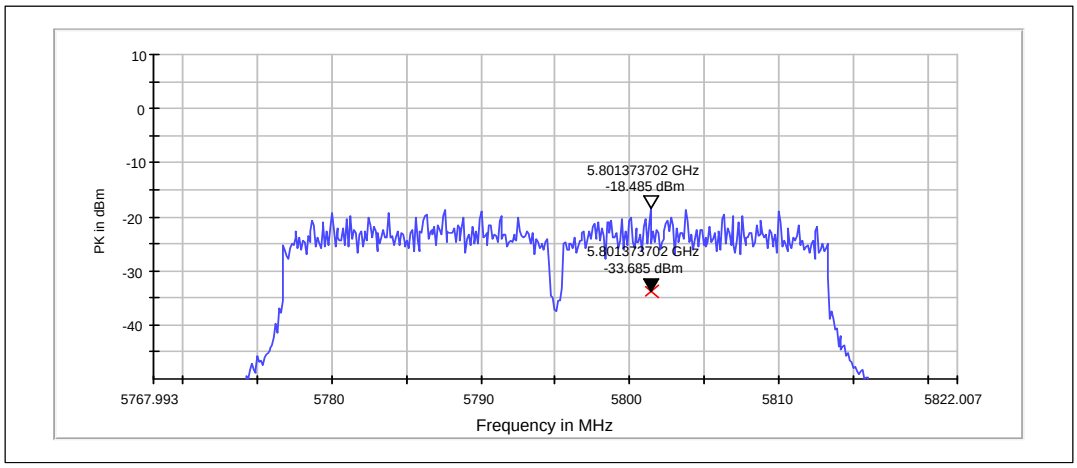
Peak (RBW: 3 kHz, VBW: 10 kHz, Max hold)

Channel / f_C [MHz]	P [dBm]	Result
149+153 / 5755	-33.84	PASSED
157+161 / 5795	-33.68	PASSED

Channel 149+153 / 5755MHz



Channel 157+161 / 5795MHz



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9. Test Equipment

9.1. Conducted measurements

Eq. No	Equipment	Type	Manufacturer	Used in
TM38112	Power supply	6632A	Agilent	22/24/27, 15C, 15E
TM38114	Power supply	6632A	Agilent	22/24/27, 15C, 15E
TM37773	Communication Tester	CMU200	R&S	22/24/27, 15B
TM30600	Impulse limiter	ESH3-Z2	R&S	15C, 15B
TM26490	LISN 50 µH	ESH3-Z5	R&S	15C, 15B
TM26491	LISN 50 µH	ESH3-Z5	R&S	15C, 15B
TM37610	Spectrum Analyzer	FSU26	R&S	22/24/27, 15C, 15E
TM23007	Oscilloscope	TDS684B	Tektronix	15E
TM22806	Battery	BAT 20/E	Fiskars	15C, 15B
TM22805	UPS	PS 20/1.2	Fiskars	15C, 15B
-	Temperature and humidity logger	175-H2	Testo	15C, 15B
-	Temperature and humidity logger	175-H2	Testo	22/24/27, 15C
-	Air pressure and temperature logger	635-2	Testo	22/24/27, 15C, 15B
-	Air pressure sensor	0638-1835	Testo	22/24/27, 15C, 15B
-	Temperature test chamber	VT 4002	Vötsch	22/24/27
2001	Bluetooth tester	CBT	R&S	15C, 15B
2009	LISN 50 µH	ENV216	R&S	15C, 15B
2010	LISN 50 µH	ENV216	R&S	15C, 15B
2012	Power splitter	11667B	Agilent	22/24/27, 15C
2013	Attenuator	8493C	Agilent	22/24/27, 15C
2014	Attenuator	8493C	Agilent	22/24/27, 15C
2019	Power splitter	ZN2PD-9G-S+	Mini-Circuits	15E
2020	Power splitter	ZN2PD-9G-S+	Mini-Circuits	15E
2021	Communication Tester	CMW500	R&S	22/24/27
2022	Communication Tester	CMU200	R&S	22/24/27
2023	Spectrum Analyzer	ESMI-RF	R&S	15B/15C
2024	Analyzer display unit	ESAI-D	R&S	15B/15C
2026	Signal Generator	SMF 100A	R&S	22/24/27, 15C, 15E, 15B
-	Bluetooth tester	CBT	R&S	15C, 15B

9.2. Radiated measurements

Eq. No	Equipment	Type	Manufacturer	Used in
-	Antenna	BBHA 9120 D	Schwarzbeck	22/24/27, 15C
TM37678	Communication Tester	CMU200	R&S	22/24/27, 15B
TM38845	Receiver	ESIB 26	R&S	22/24/27, 15C, 15E, 15B
-	Antenna	HL562	R&S	22/24/27, 15C, 15E, 15B
-	Turntable	2188	EMCO	22/24/27, 15C, 15E, 15B
-	Turntable controller	2090	EMCO	22/24/27, 15C, 15E, 15B
-	RF system panel	OSP130	R&S	22/24/27, 15C, 15E, 15B
-	Mini mast	2075-2	ETS Lindgren	22/24/27, 15C, 15B
TM38843	Mini mast	2075	Emco	22/24/27, 15C, 15B
TM38842	Antenna mast controller	2090	Emco	22/24/27, 15C, 15B
TM30643	LISN 50 µH	LISN-5-20-2	FCC	22/24/27, 15C, 15B
TM30644	LISN 50 µH	LISN-5-20-2	FCC	22/24/27, 15C, 15B

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Eq. No	Equipment	Type	Manufacturer	Used in
-	Temperature and humidity logger	175-H2	Testo	22/24/27, 15C, 15B
-	Air pressure and temperature logger	635-2	Testo	22/24/27, 15C, 15B
-	Air pressure sensor	0638-1835	Testo	22/24/27, 15C, 15B
TM37523	Preamplifier	AMF-4D-10M-3G-25-20P	Miteq	22/24/27, 15C, 15B
TM37498	Preamplifier	AMF-5D-020180-26-10P	Miteq	22/24/27, 15C, 15B
TM30599	Semi anechoic chamber	UNKNOWN	TDK	22/24/27, 15C, 15B
TM22638	Power supply	OL63743-901	-	22/24/27, 15C, 15E, 15B
TM38066	High pass filter	WHKX3.0/18G-12SS	Wainwright	22/24/27, 15C, 15E, 15B
2028	High pass filter	WHKX 1.0/15G-12SS	Wainwright	22/24/27, 15C,15E, 15B
TM37545	Tunable notch filter	800.0/960.0-0.2/40-8SSK	Wainwright	22
TM26512	Tunable notch filter	WRCD1850/1910-0.2/40-10SSK	Wainwright	24
-	Band reject filter	WRCG1877/1883-1870/1890-40/6EE	Wainwright	24
-	Band reject filter	WRCG1729.4/1735.4-1722.4/1742.4-40/6SS	Wainwright	27
TM23892	Controller	G-1000SDX	Yaesu	22/24/27, 15C, 15E
2001	Bluetooth tester	CBT	R&S	15C, 15B
6023	Antenna	VUBA 9117	Schwarzbeck	22/24/27
2021	Communication Tester	CMW500	R&S	22/24/27
2025	Antenna	HFH2-Z2	R&S	15C
2026	Signal Generator	SMF 100A	R&S	22/24/27, 15C, 15E, 15B
2052	Antenna	BBHA 9120 D	Schwarzbeck	22/24/27, 15C, 15B, 15E
-	Antenna	QSH18S20	Q-Par	22/24/27, 15C, 15B, 15E
-	Antenna	QSH20S20	Q-Par	22/24/27, 15C, 15B, 15E
-	Antenna	QSH20S20	Q-Par	22/24/27, 15C, 15B, 15E
-	Bluetooth tester	CBT	R&S	15C, 15B

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