FCC Part 15C Compliance Test Report

Test Report no.:	FCC15CWLAN_RM-1085_05.docx	**Date of Report:**	30-Sep-2015
Number of pages:	87	**Customer's Contact person:**	Tia Melava
Testing laboratory:	TCC Microsoft Salo Laboratory P.O.Box(86) Joensuunkatu 7E FIN-24101 SALO, FINLAND Tel. +358 (0) 7180 08000 Fax. +358 71 80 44122	**Customer:**	Microsoft P.O.Box(86) Joensuunkatu 7E FIN-24101 SALO, FINLAND Tel. +358 (0) 7180 08000 Fax. +358 71 80 44122
FCC listing no.: **IC recognition no.:**	533467 661V-1		
Tested devices/ accessories:	**Phone RM-1085 / Dummy Battery SD-241R / Headset WH-308**		
FCC ID:	PYARM-1085	**IC:**	661X-RM1085
Supplement reports:	-		
Testing has been carried out in accordance with:	**CFR 47, FCC rules Part 15 Subpart C, ANSI C63.4 (2014), 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:	Digitally signed by Timo Raiskio DN: cn=Timo Raiskio, o, ou, email=timo.raiskio@microsoft.com, c=FI Date: 2015.09.30 08:57:07 +03'00'		

Timo Raiskio, System Manager, EMC

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1. Summary for FCC Part 15C Compliance Test Report

Date of receipt	15-Jun-2015
Testing completed	05-Aug-2015
The customer's contact person	Tia Melava
Test Plan referred to	T:\Projects\RM-1085\TestPlan\RS_TestPlan_RM-1085.xlsm
Notes	-
Document name	T:\Projects\RM-1085\EMC\FCC15CWLAN_RM-1085_05.docx

1.1. EUT and Accessory Information

The EUT is a mobile phone with following features:
GSM/WCDMA/WLAN
The EUT is tested with maximum rated TX power.

Devices under tests

Product	Type	SN	HW	MV	SW	DUT
Phone	RM-1085	004402742320777;059W5J6	2111	-	01063.00001.15244.09000	100012
Phone	RM-1085	004402742321478;059W5J6	2111	-	01063.00001.15244.09000	100014
Dummy Battery	SD-241R	-	V2	-	-	100017
Headset	WH-308	51251B1	-	-	-	100029

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	NP
15.247(d)	A8.5	Spurious RF conducted emissions	PASSED
15.247(d), 15.209	A8.5	Spurious radiated emissions	NP
15.207	7.2.4	AC powerline conducted emissions	NP
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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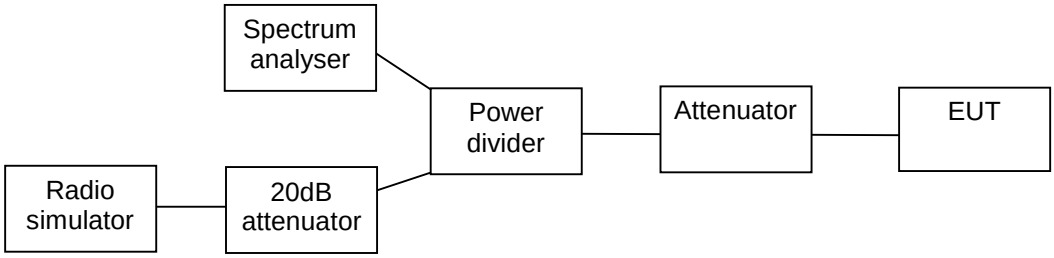
2. Conducted peak output power
(FCC §15.247(b)(1), RSS-210 A8.4(4))

EUT with DUT number	RM-1085, DUT 100012
Accessories with DUT numbers	SD-241R, DUT 100017 ; WH-308, DUT 100029
Operation Voltage [V] / [Hz]	Nominal
Results	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	20 / 47 / 101.9
Date of measurements	23-Jun-2015
Measured by	Jari Keto

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

Channel / f_C [MHz]	Mode	Modulation	Data rate	Level [dBm]
6 / 2437	802.11b MAIN	BPSK	1 Mbps	19.14
6 / 2437	802.11b MAIN	QPSK	2 Mbps	19.41
6 / 2437	802.11b MAIN	QPSK	5.5 Mbps	20.92
6 / 2437	802.11b MAIN	QPSK	11 Mbps	22.3
6 / 2437	802.11g MAIN	BPSK	6 Mbps	24.03
6 / 2437	802.11g MAIN	BPSK	9 Mbps	24.2
6 / 2437	802.11g MAIN	QPSK	12 Mbps	23.89
6 / 2437	802.11g MAIN	QPSK	18 Mbps	24
6 / 2437	802.11g MAIN	16QAM	24 Mbps	25.09
6 / 2437	802.11g MAIN	16QAM	36 Mbps	24.43
6 / 2437	802.11g MAIN	16QAM	48 Mbps	23.64
6 / 2437	802.11g MAIN	16QAM	54 Mbps	23.81
6 / 2437	802.11n MAIN	BPSK	6.5 / 7.25 Mbps	24.55
6 / 2437	802.11n MAIN	QPSK	13.0 / 14.4 Mbps	23.59
6 / 2437	802.11n MAIN	QPSK	19.5 / 21.7 Mbps	23.76
6 / 2437	802.11n MAIN	16QAM	26.0 / 28.9 Mbps	24.75
6 / 2437	802.11n MAIN	16QAM	39.0 / 43.3 Mbps	24.82
6 / 2437	802.11n MAIN	64QAM	52.0 / 57.8 Mbps	23.43
6 / 2437	802.11n MAIN	64QAM	58.5 / 65.0 Mbps	23.53
6 / 2437	802.11n MAIN	64QAM	65.0 / 72.2 Mbps	22.53
4-8 / 2437	802.11n MAIN	BPSK	13.5 / 15.0 Mbps	24.09
4-8 / 2437	802.11n MAIN	QPSK	27.0 / 30.0 Mbps	23.89
4-8 / 2437	802.11n MAIN	QPSK	40.5 / 45.0 Mbps	23.76
4-8 / 2437	802.11n MAIN	16QAM	54.0 / 60.0 Mbps	23.52
4-8 / 2437	802.11n MAIN	16QAM	81.0 / 90.0 Mbps	23.5
4-8 / 2437	802.11n MAIN	64QAM	108.0 / 120.0 Mbps	22.87
4-8 / 2437	802.11n MAIN	64QAM	121.5 / 135.0 Mbps	22.74
4-8 / 2437	802.11n MAIN	64QAM	135.0 / 150.0 Mbps	22.62
6 / 2437	802.11b AUX	BPSK	1 Mbps	19.64
6 / 2437	802.11b AUX	QPSK	2 Mbps	19.92
6 / 2437	802.11b AUX	QPSK	5.5 Mbps	21.41
6 / 2437	802.11b AUX	QPSK	11 Mbps	22.82
6 / 2437	802.11g AUX	BPSK	6 Mbps	24.57
6 / 2437	802.11g AUX	BPSK	9 Mbps	24.68
6 / 2437	802.11g AUX	QPSK	12 Mbps	24.42
6 / 2437	802.11g AUX	QPSK	18 Mbps	24.45
6 / 2437	802.11g AUX	16QAM	24 Mbps	25.48
6 / 2437	802.11g AUX	16QAM	36 Mbps	24.94
6 / 2437	802.11g AUX	16QAM	48 Mbps	24.11
6 / 2437	802.11g AUX	16QAM	54 Mbps	24.3
6 / 2437	802.11n AUX	BPSK	6.5 / 7.25 Mbps	25.07
6 / 2437	802.11n AUX	QPSK	13.0 / 14.4 Mbps	24.11
6 / 2437	802.11n AUX	QPSK	19.5 / 21.7 Mbps	24.27
6 / 2437	802.11n AUX	16QAM	26.0 / 28.9 Mbps	25.11
6 / 2437	802.11n AUX	16QAM	39.0 / 43.3 Mbps	25.22
6 / 2437	802.11n AUX	64QAM	52.0 / 57.8 Mbps	23.86

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6 / 2437	802.11n AUX	64QAM	58.5 / 65.0 Mbps	24.07
6 / 2437	802.11n AUX	64QAM	65.0 / 72.2 Mbps	23.08
4-8 / 2437	802.11n AUX	BPSK	13.5 / 15.0 Mbps	24.68
4-8 / 2437	802.11n AUX	QPSK	27.0 / 30.0 Mbps	24.45
4-8 / 2437	802.11n AUX	QPSK	40.5 / 45.0 Mbps	24.37
4-8 / 2437	802.11n AUX	16QAM	54.0 / 60.0 Mbps	24.03
4-8 / 2437	802.11n AUX	16QAM	81.0 / 90.0 Mbps	24.03
4-8 / 2437	802.11n AUX	64QAM	108.0 / 120.0 Mbps	23.43
4-8 / 2437	802.11n AUX	64QAM	121.5 / 135.0 Mbps	23.35
4-8 / 2437	802.11n AUX	64QAM	135.0 / 150.0 Mbps	23.17
1 / 2412	802.11n Main	BPSK	6.5 / 7.25 Mbps	23.41
11 / 2462	802.11n Main	BPSK	6.5 / 7.25 Mbps	23.54
1 / 2412	802.11g Main	16QAM	24 Mbps	24.08
11 / 2462	802.11g Main	16QAM	24 Mbps	24.1
1-5 / 2422	802.11n Main	BPSK	13.5 / 15.0 Mbps	22.42
7-11 / 2452	802.11n Main	BPSK	13.5 / 15.0 Mbps	22.78
1-5 / 2422	802.11n Main	QPSK	27.0 / 30.0 Mbps	22.17
7-11 / 2452	802.11n Main	QPSK	27.0 / 30.0 Mbps	22.56
1-5 / 2422	802.11n Aux	BPSK	13.5 / 15.0 Mbps	23.84
7-11 / 2452	802.11n Aux	BPSK	13.5 / 15.0 Mbps	23.93
1-5 / 2422	802.11n Aux	QPSK	27.0 / 30.0 Mbps	23.58
7-11 / 2452	802.11n Aux	QPSK	27.0 / 30.0 Mbps	23.69
1 / 2412	802.11n Aux	BPSK	6.5 / 7.25 Mbps	24.28
11 / 2462	802.11n Aux	BPSK	6.5 / 7.25 Mbps	24.2
1 / 2412	802.11g Aux	16QAM	24 Mbps	24.64
11 / 2462	802.11g Aux	16QAM	24 Mbps	24.72

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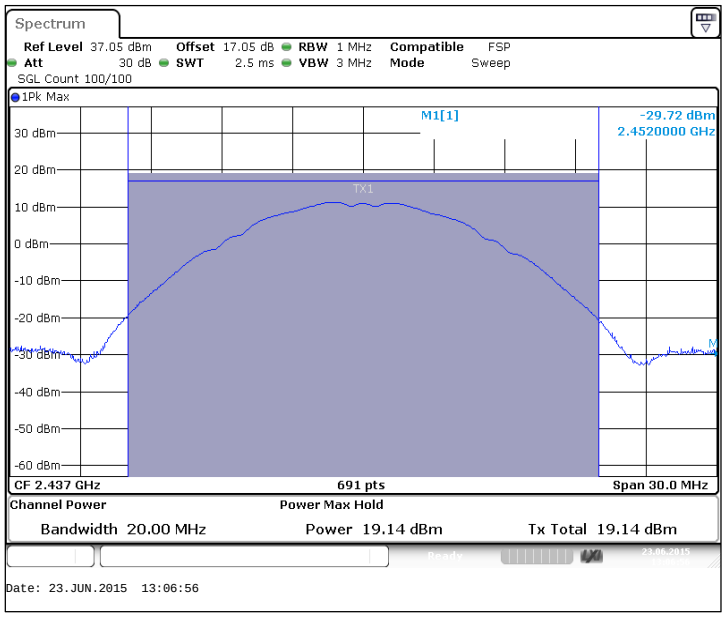
2.4. WLAN Test results

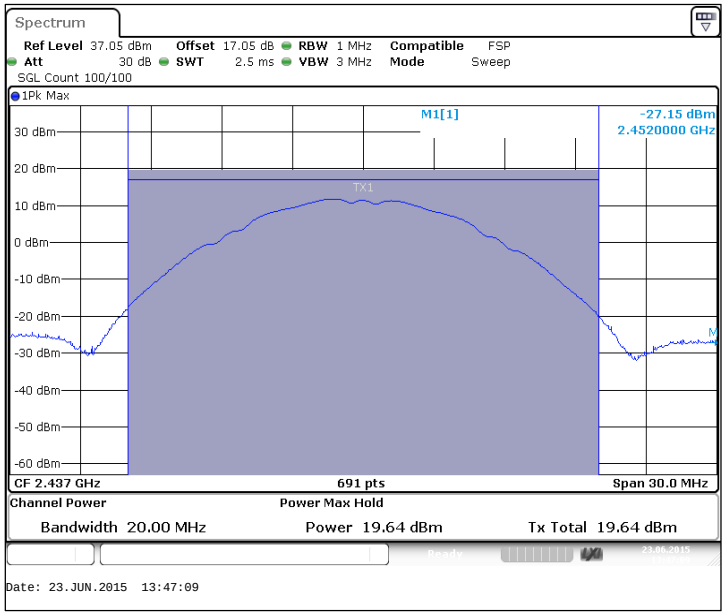
2.4.1 802.11b mode, BPSK modulation, 1 Mbps data rate

Channel / f_C [MHz]	P [dBm]	P [mW]	Result
6 / 2437 MAIN	19.14	82.035	PASSED
6 / 2437 AUX	19.64	92.045	PASSED

Channel 6 / 2437 MHz



Channel 6 / 2437 MHz



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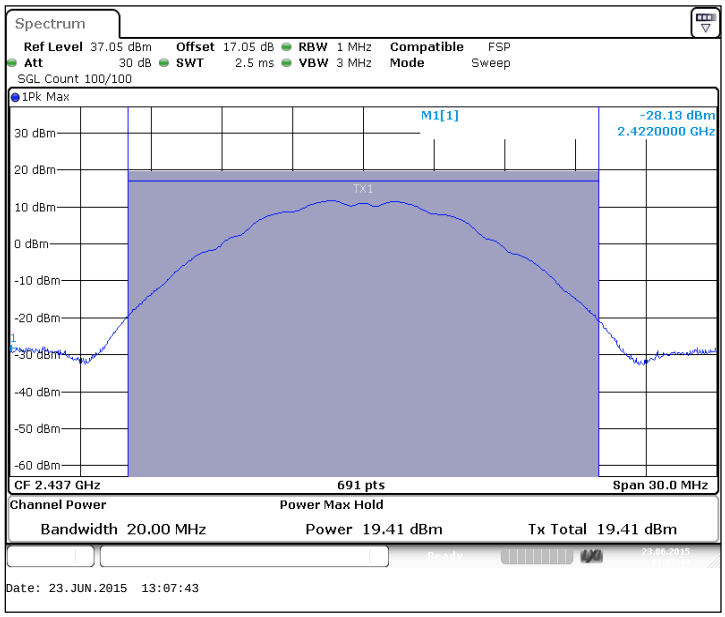
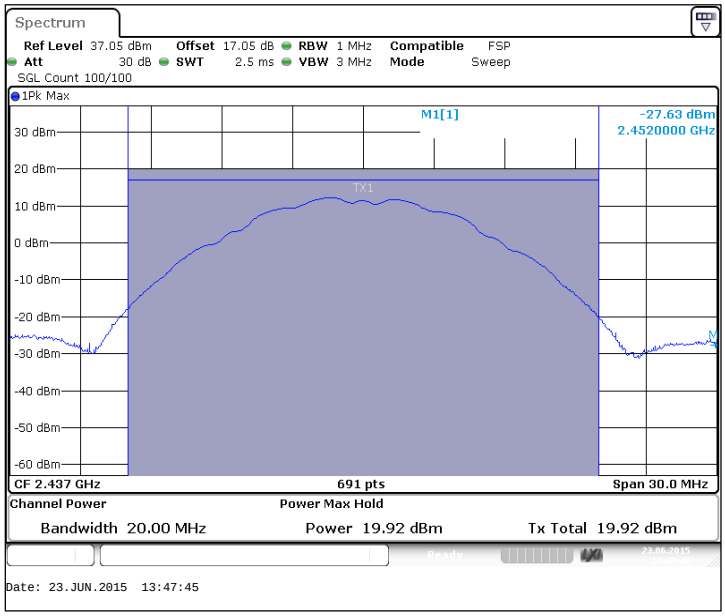
2.4.2 802.11b mode, QPSK modulation, 2 Mbps data rate

Channel / f_C [MHz]	P [dBm]	P [mW]	Result
6 / 2437 MAIN	19.41	87.297	PASSED
6 / 2437 AUX	19.92	98.175	PASSED

Channel 6 / 2437 MHz



Channel 6 / 2437 MHz



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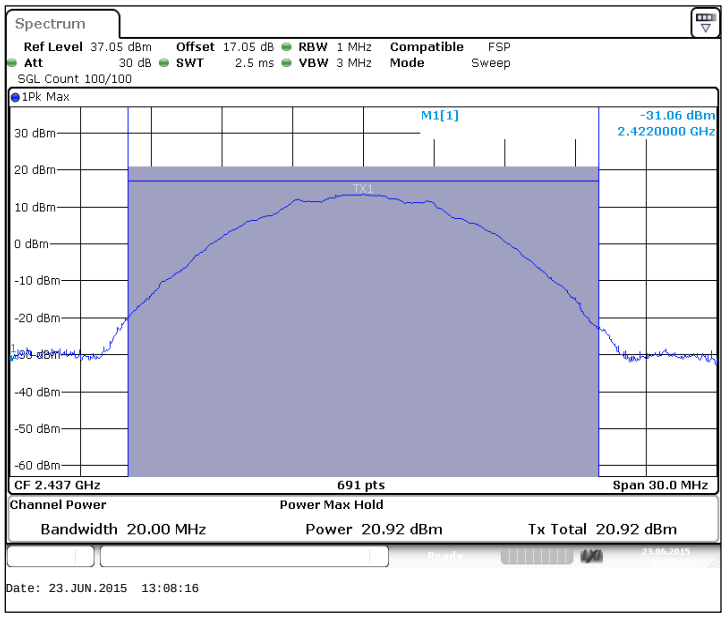
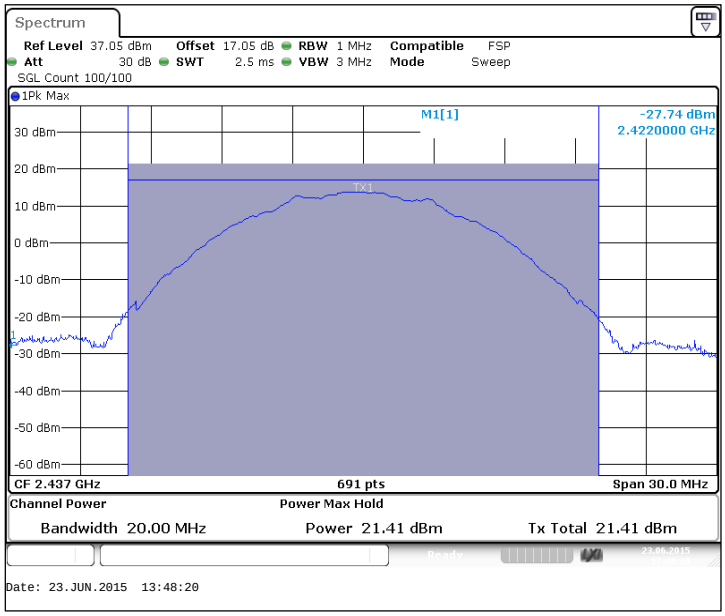
2.4.3 802.11b mode, QPSK modulation, 5.5 Mbps data rate

Channel / f_C [MHz]	P [dBm]	P [mW]	Result
6 / 2437 MAIN	20.92	123.595	PASSED
6 / 2437 AUX	21.41	138.357	PASSED

Channel 6 / 2437 MHz



Channel 6 / 2437 MHz



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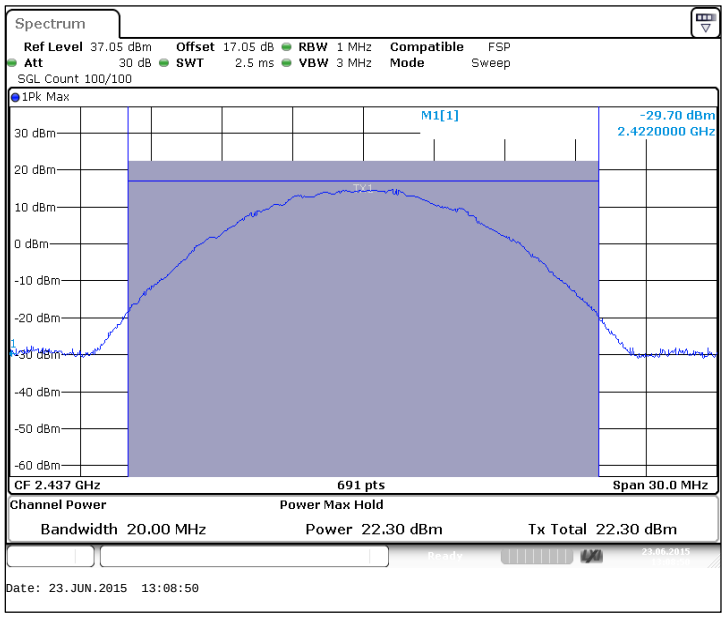
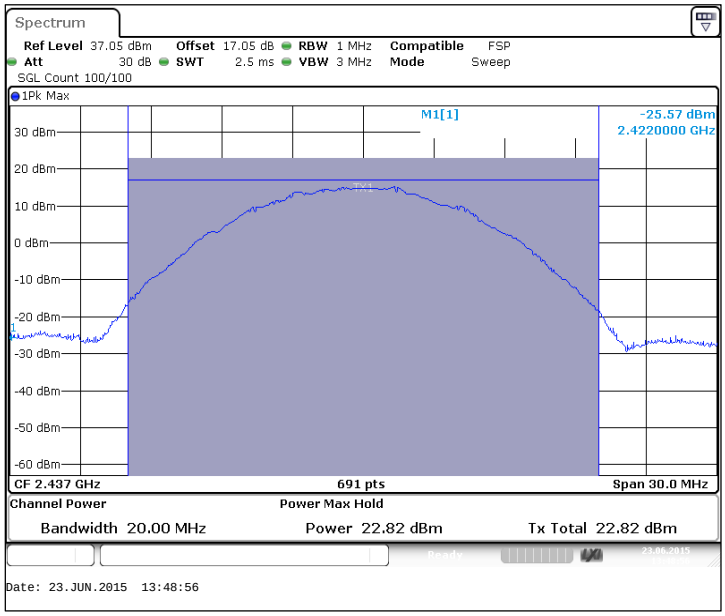
2.4.4 802.11b mode, QPSK modulation, 11 Mbps data rate

Channel / f_C [MHz]	P [dBm]	P [mW]	Result
6 / 2437 MAIN	22.3	169.824	PASSED
6 / 2437 AUX	22.82	191.426	PASSED

Channel 6 / 2437 MHz



Channel 6 / 2437 MHz



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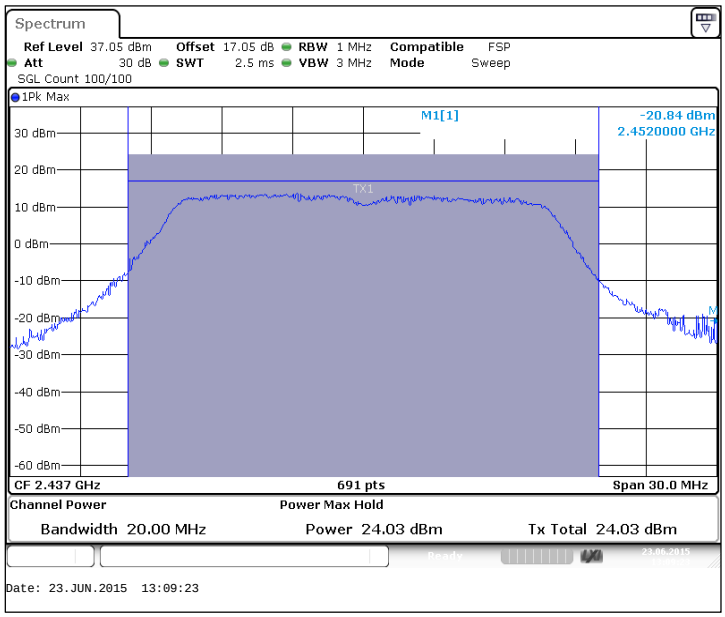
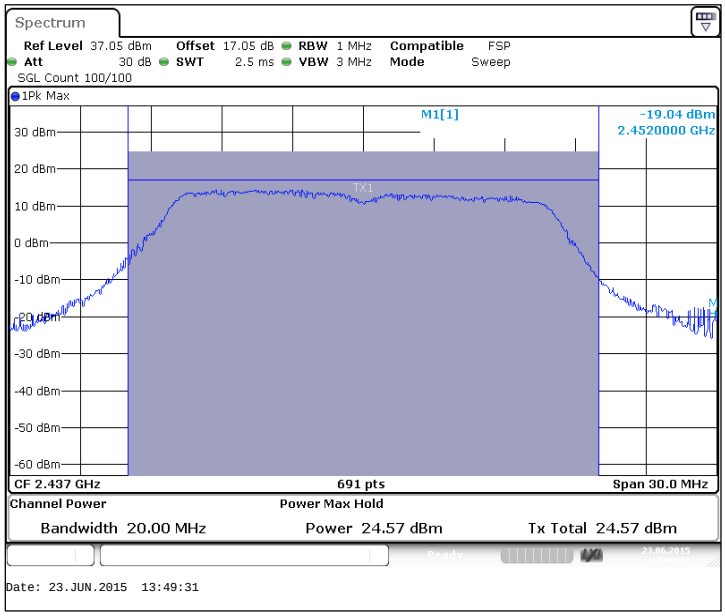
2.4.5 802.11g mode, BPSK modulation, 6 Mbps data rate

Channel / f_C [MHz]	P [dBm]	P [mW]	Result
6 / 2437 MAIN	24.03	252.93	PASSED
6 / 2437 AUX	24.57	286.418	PASSED

Channel 6 / 2437 MHz



Channel 6 / 2437 MHz



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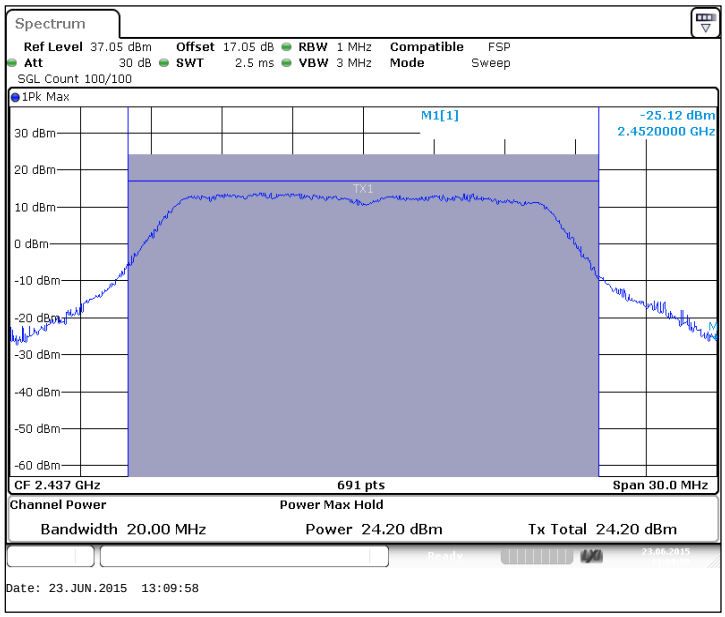
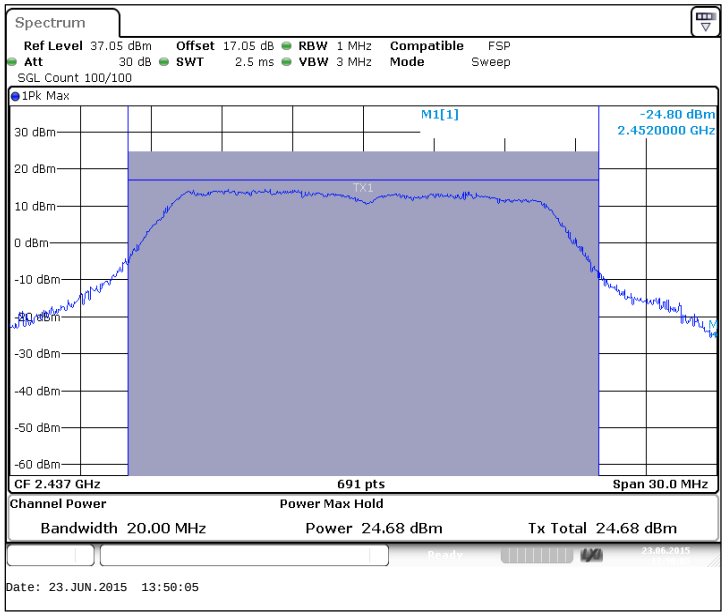
2.4.6 802.11g mode, BPSK modulation, 9 Mbps data rate

Channel / f_C [MHz]	P [dBm]	P [mW]	Result
6 / 2437 MAIN	24.2	263.027	PASSED
6 / 2437 AUX	24.68	293.765	PASSED

Channel 6 / 2437 MHz



Channel 6 / 2437 MHz



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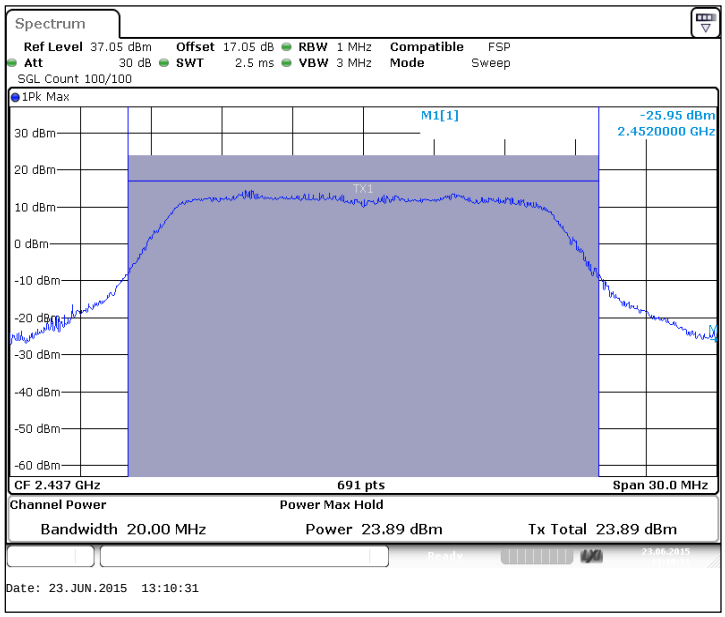
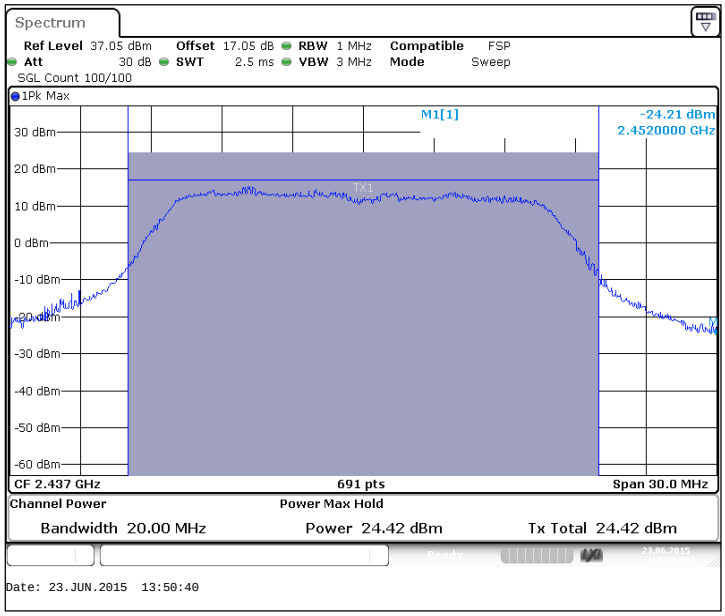
2.4.7 802.11g mode, QPSK modulation, 12 Mbps data rate

Channel / f_C [MHz]	P [dBm]	P [mW]	Result
6 / 2437 MAIN	23.89	244.906	PASSED
6 / 2437 AUX	24.42	276.694	PASSED

Channel 6 / 2437 MHz



Channel 6 / 2437 MHz



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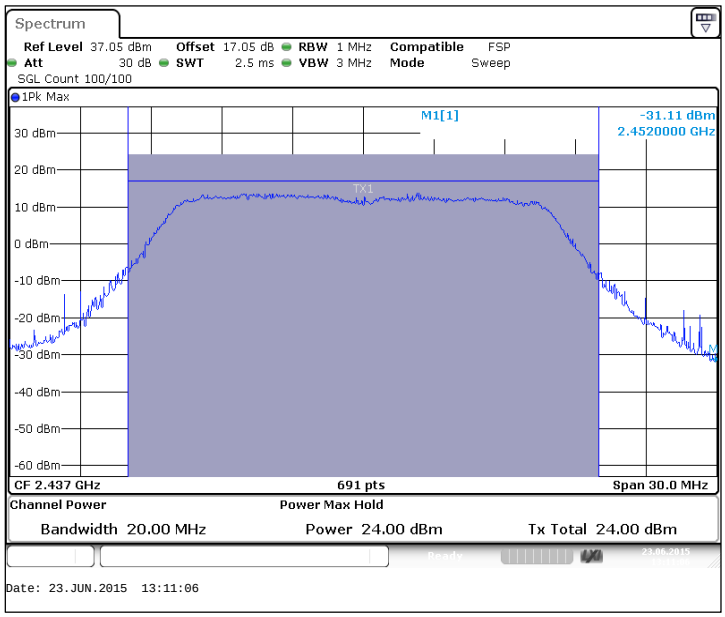
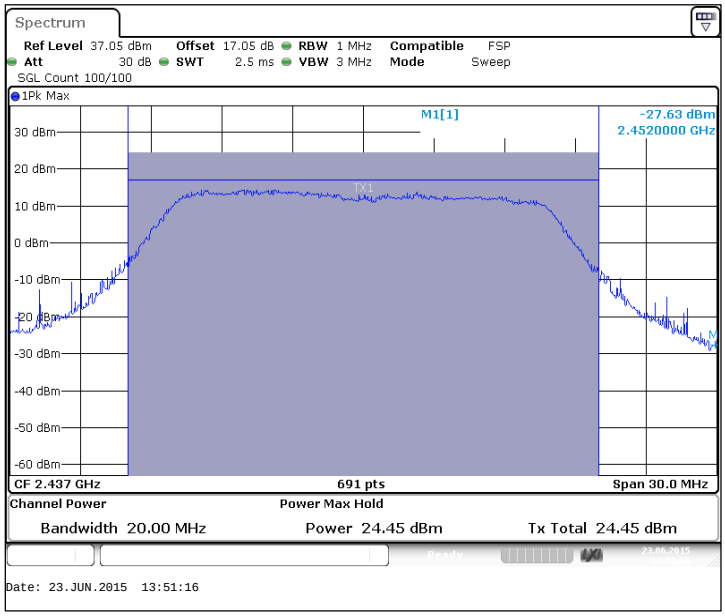
2.4.8 802.11g mode, QPSK modulation, 18 Mbps data rate

Channel / f_C [MHz]	P [dBm]	P [mW]	Result
6 / 2437 MAIN	24	251.189	PASSED
6 / 2437 AUX	24.45	278.612	PASSED

Channel 6 / 2437 MHz



Channel 6 / 2437 MHz



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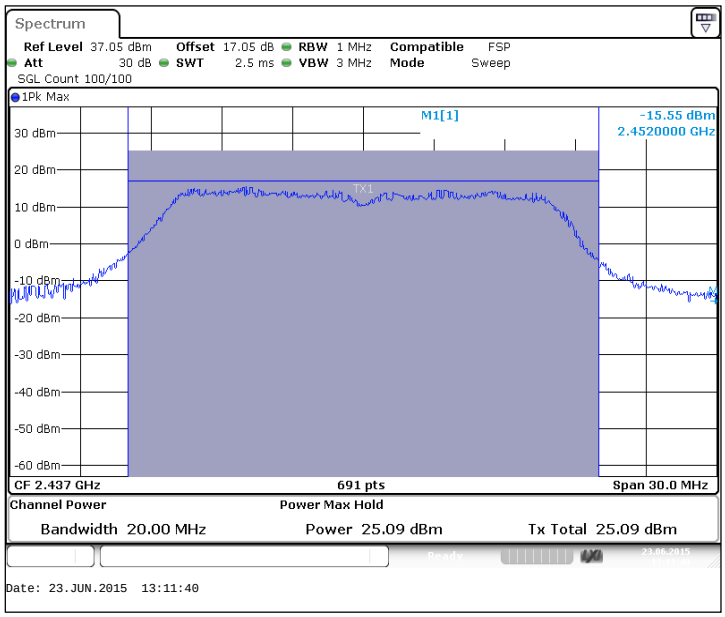
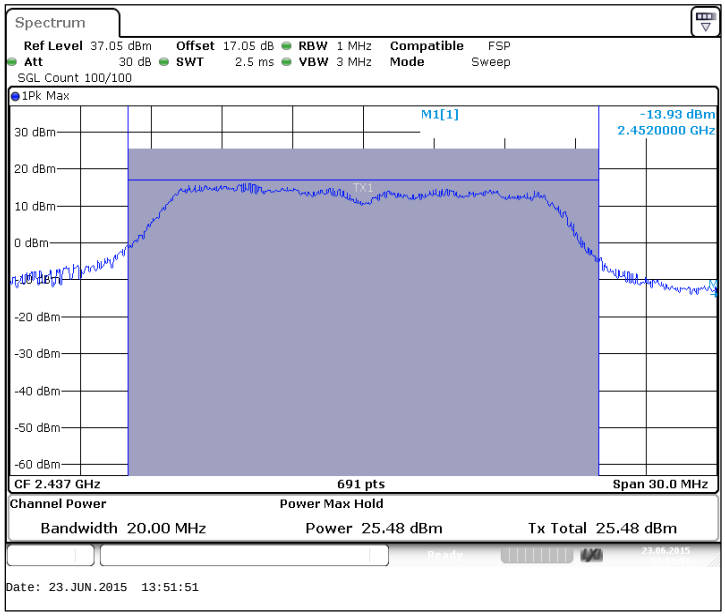
2.4.9 802.11g mode, 16QAM modulation, 24 Mbps data rate

Channel / f_C [MHz]	P [dBm]	P [mW]	Result
6 / 2437 MAIN	25.09	322.849	PASSED
6 / 2437 AUX	25.48	353.183	PASSED

Channel 6 / 2437 MHz



Channel 6 / 2437 MHz



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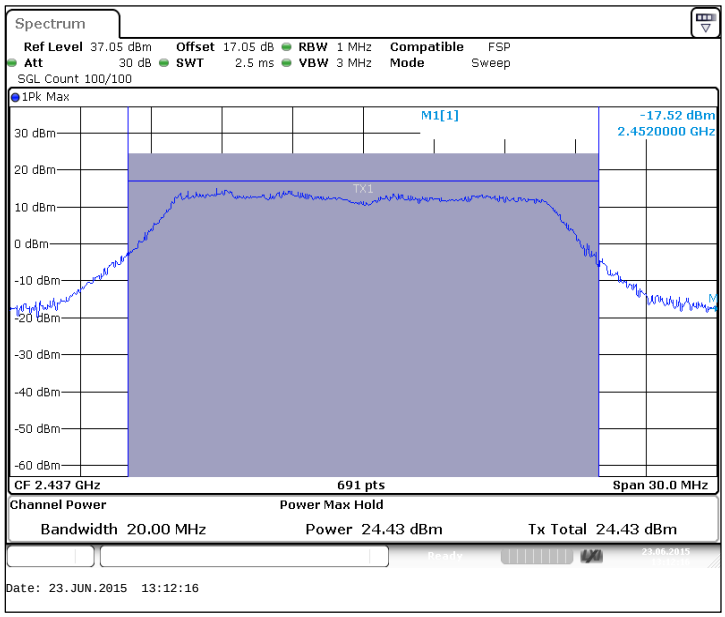
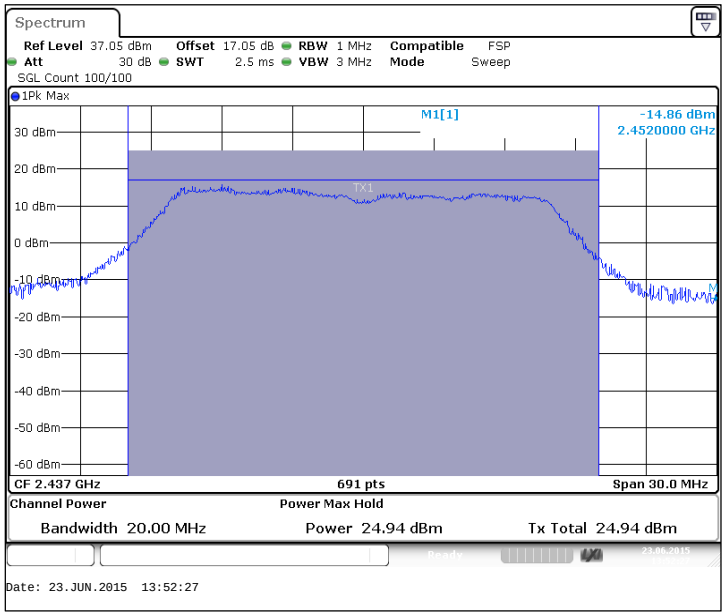
2.4.10 802.11g mode, 16QAM modulation, 36 Mbps data rate

Channel / f_C [MHz]	P [dBm]	P [mW]	Result
6 / 2437 MAIN	24.43	277.332	PASSED
6 / 2437 AUX	24.94	311.889	PASSED

Channel 6 / 2437 MHz



Channel 6 / 2437 MHz



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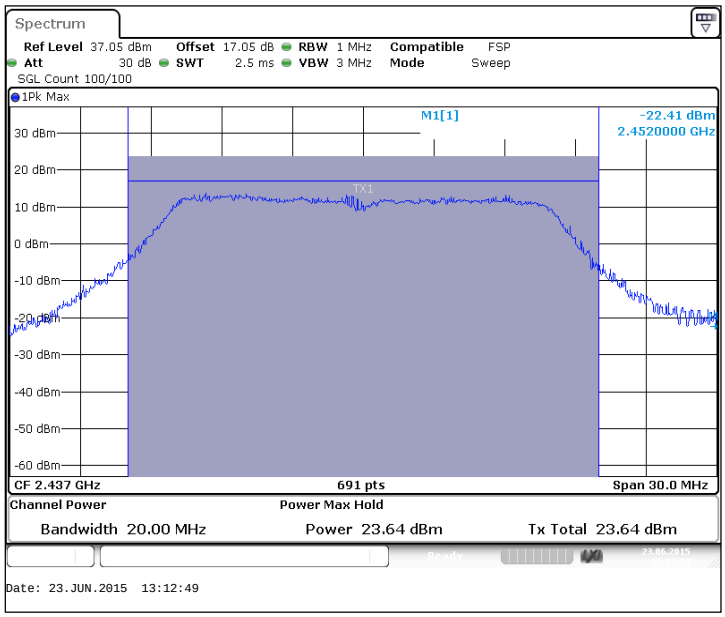
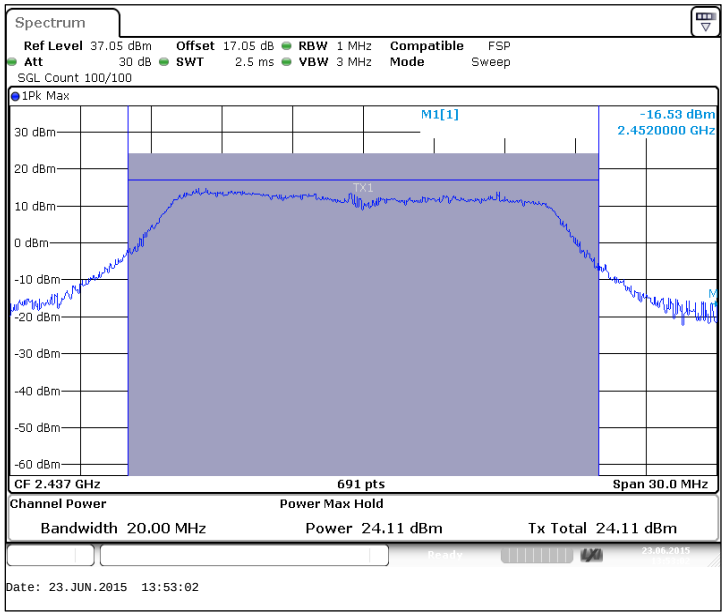
2.4.11 802.11g mode, 16QAM modulation, 48 Mbps data rate

Channel / f_C [MHz]	P [dBm]	P [mW]	Result
6 / 2437 MAIN	23.64	231.206	PASSED
6 / 2437 AUX	24.11	257.632	PASSED

Channel 6 / 2437 MHz



Channel 6 / 2437 MHz



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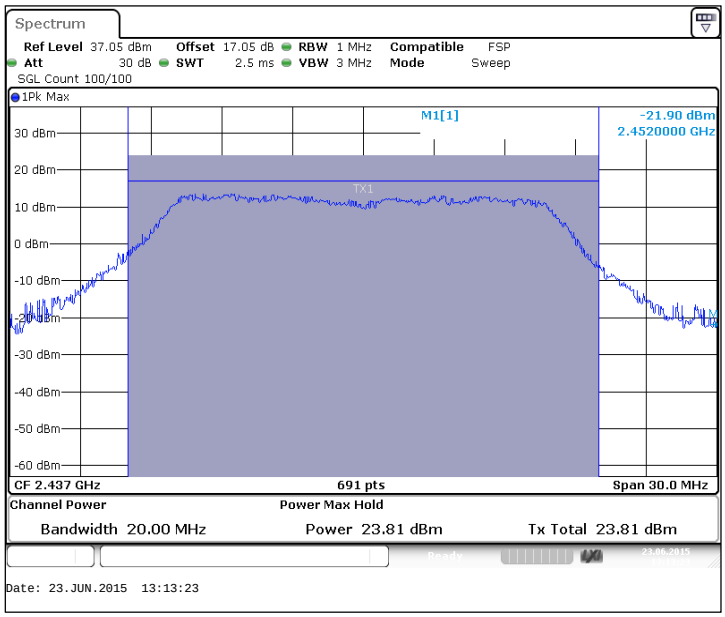
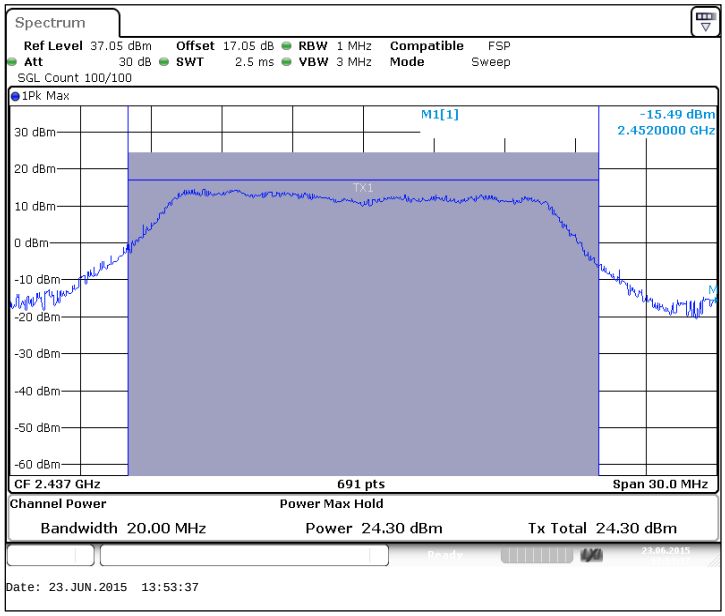
2.4.12 802.11g mode, 16QAM modulation, 54 Mbps data rate

Channel / f_C [MHz]	P [dBm]	P [mW]	Result
6 / 2437 MAIN	23.81	240.436	PASSED
6 / 2437 AUX	24.3	269.153	PASSED

Channel 6 / 2437 MHz



Channel 6 / 2437 MHz



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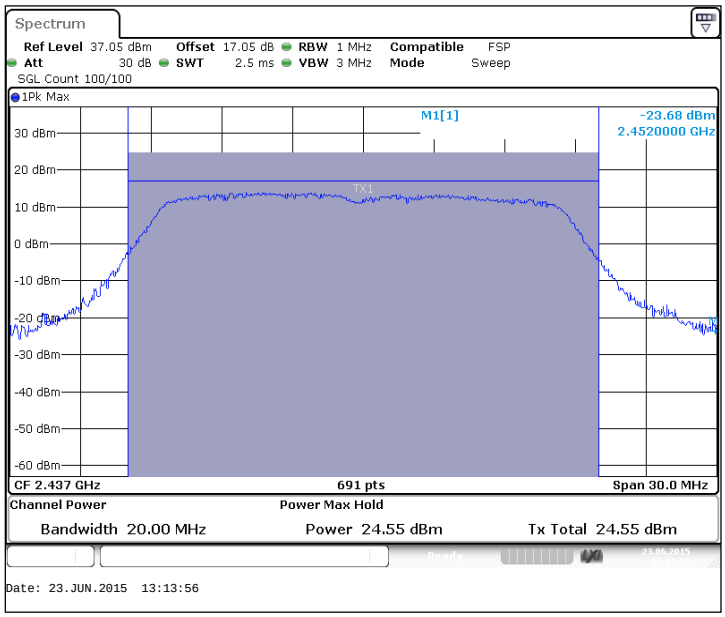
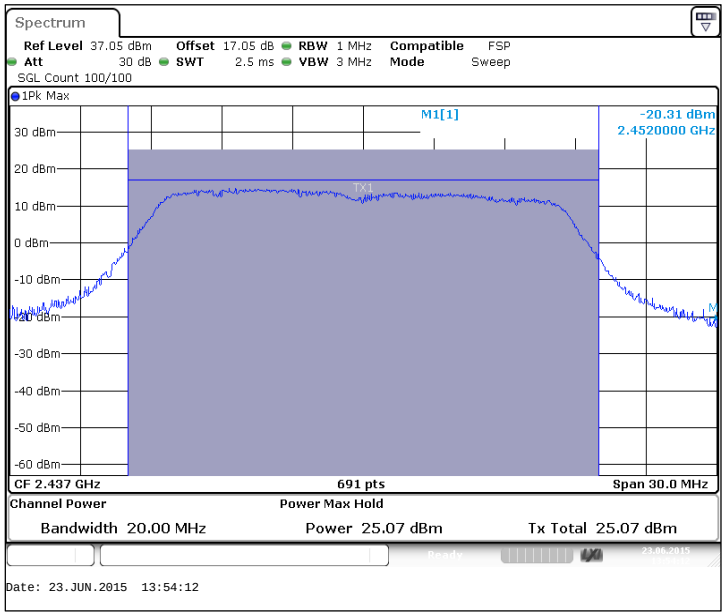
2.4.13 802.11n mode, BPSK modulation, 6.5 / 7.25 Mbps data rate

Channel / f_C [MHz]	P [dBm]	P [mW]	Result
6 / 2437 MAIN	24.55	285.102	PASSED
6 / 2437 AUX	25.07	321.366	PASSED

Channel 6 / 2437 MHz



Channel 6 / 2437 MHz



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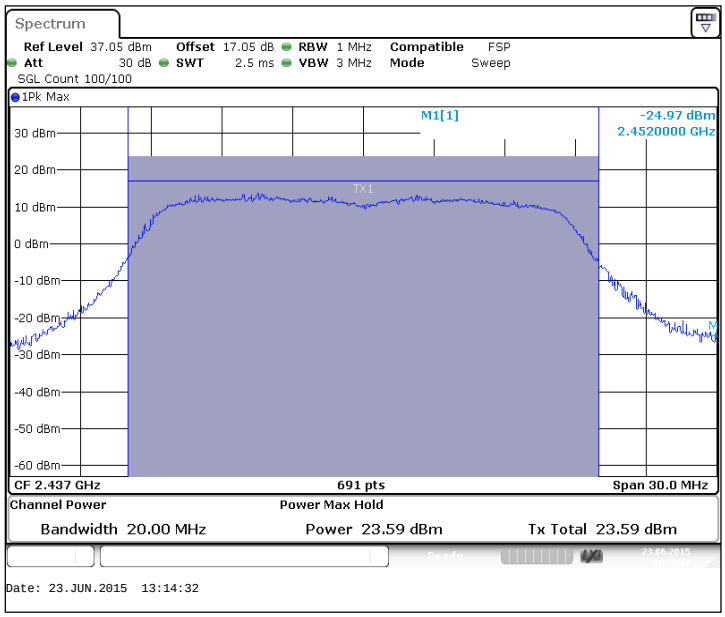
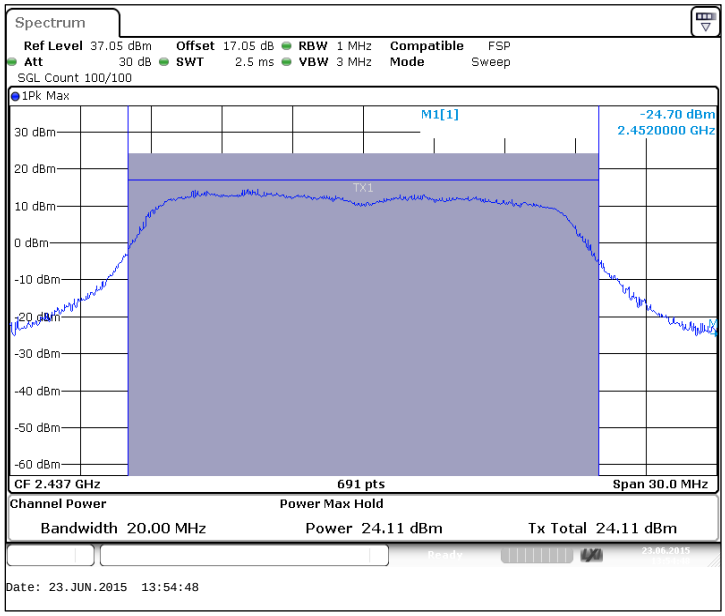
2.4.14 802.11n mode, QPSK modulation, 13.0 / 14.4 Mbps data rate

Channel / f_C [MHz]	P [dBm]	P [mW]	Result
6 / 2437 MAIN	23.59	228.56	PASSED
6 / 2437 AUX	24.11	257.632	PASSED

Channel 6 / 2437 MHz



Channel 6 / 2437 MHz



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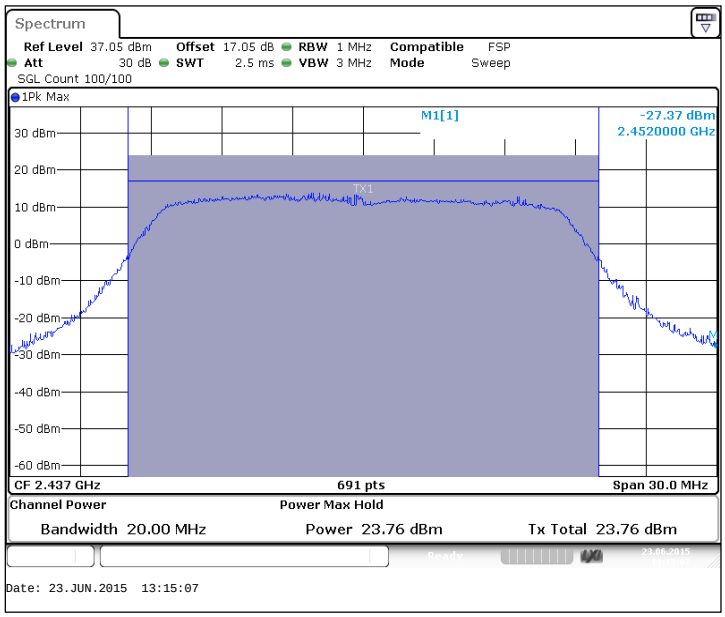
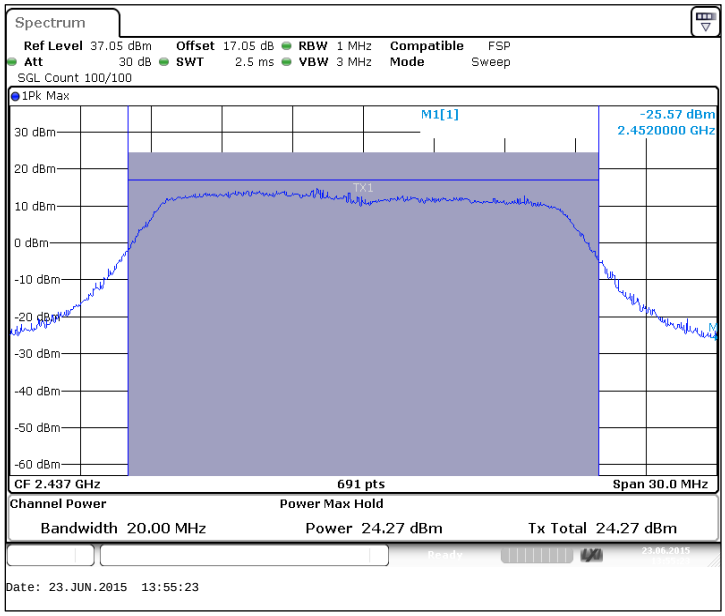
2.4.15 802.11n mode, QPSK modulation, 19.5 / 21.7 Mbps data rate

Channel / f_C [MHz]	P [dBm]	P [mW]	Result
6 / 2437 MAIN	23.76	237.684	PASSED
6 / 2437 AUX	24.27	267.301	PASSED

Channel 6 / 2437 MHz



Channel 6 / 2437 MHz



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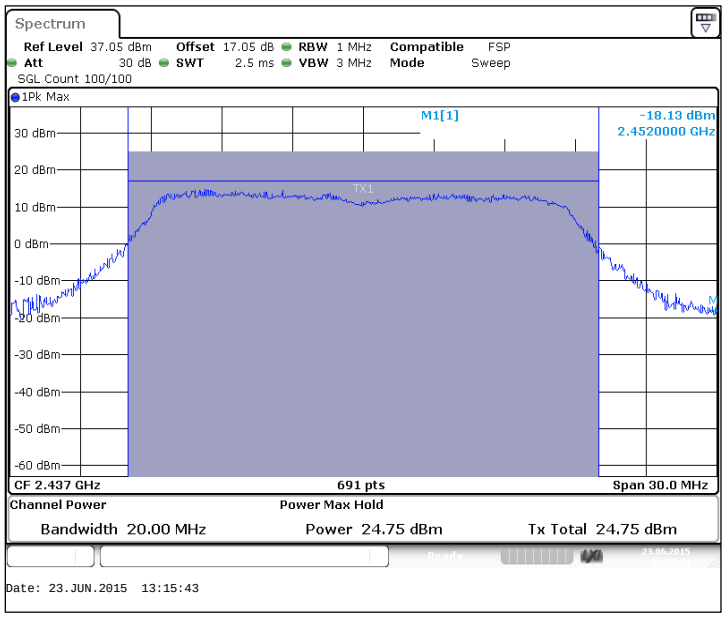
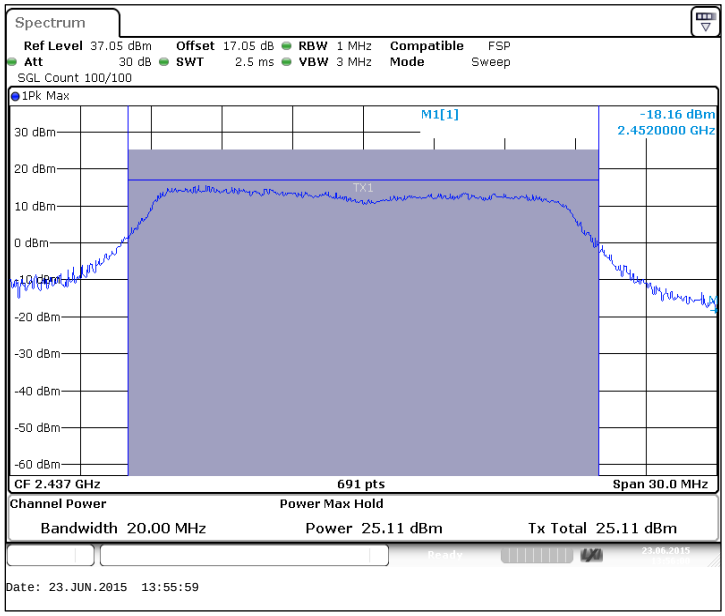
2.4.16 802.11n mode, 16QAM modulation, 26.0 / 28.9 Mbps data rate

Channel / f_C [MHz]	P [dBm]	P [mW]	Result
6 / 2437 MAIN	24.75	298.538	PASSED
6 / 2437 AUX	25.11	324.34	PASSED

Channel 6 / 2437 MHz



Channel 6 / 2437 MHz



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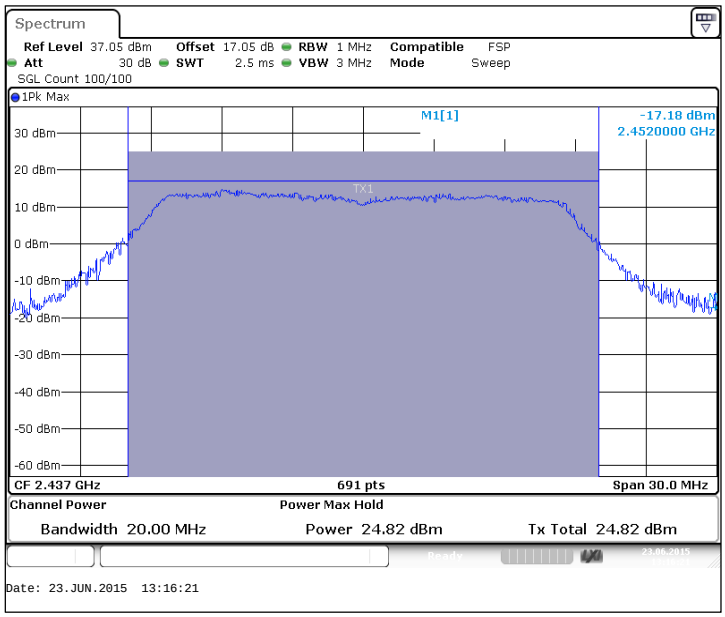
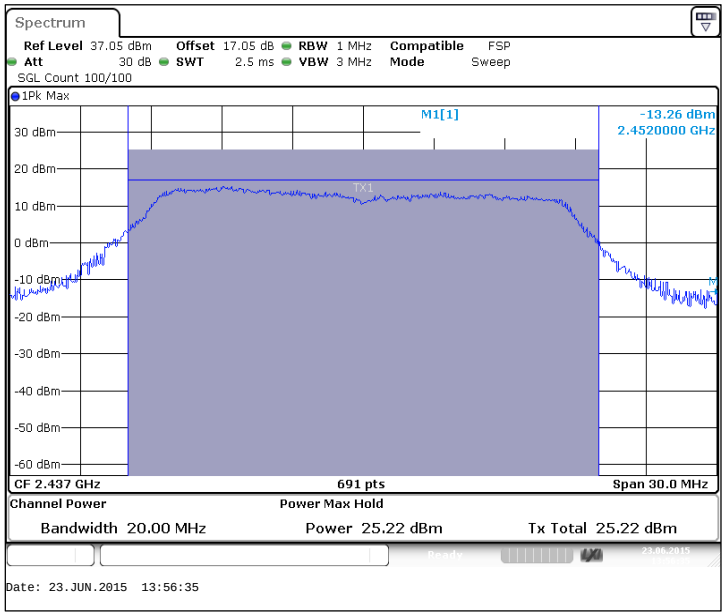
2.4.17 802.11n mode, 16QAM modulation, 39.0 / 43.3 Mbps data rate

Channel / f_C [MHz]	P [dBm]	P [mW]	Result
6 / 2437 MAIN	24.82	303.389	PASSED
6 / 2437 AUX	25.22	332.66	PASSED

Channel 6 / 2437 MHz



Channel 6 / 2437 MHz



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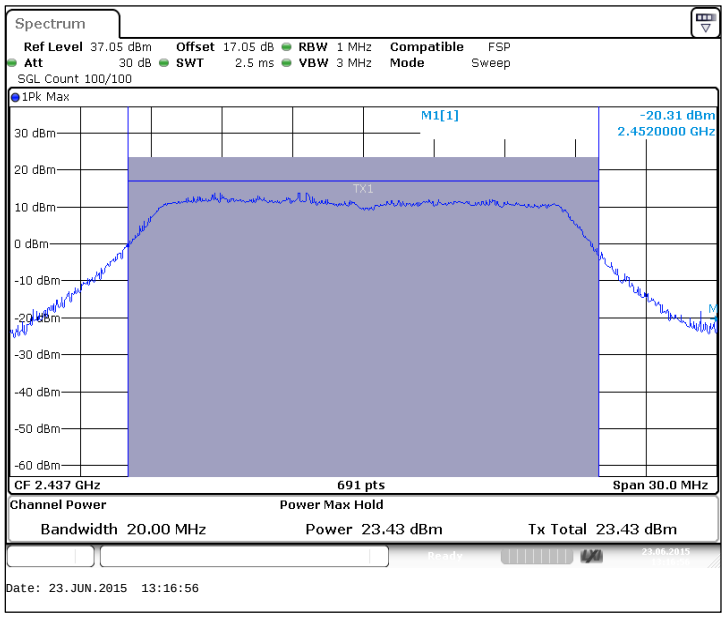
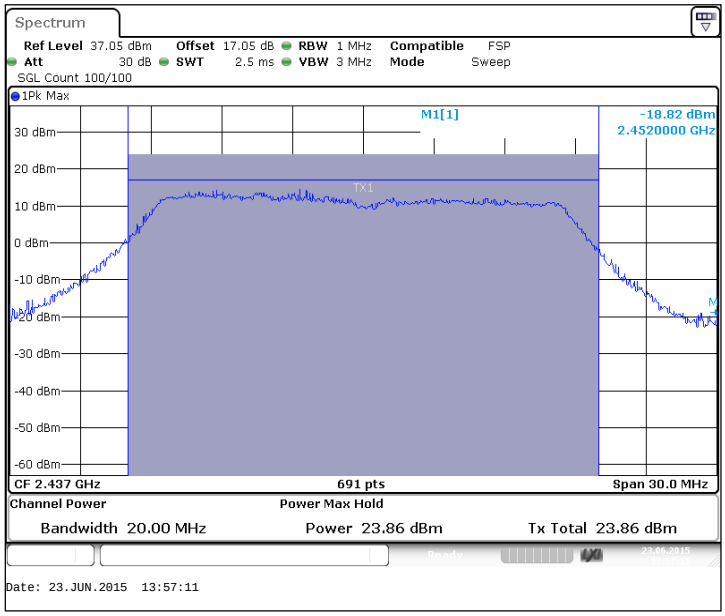
2.4.18 802.11n mode, 64QAM modulation, 52.0 / 57.8 Mbps data rate

Channel / f_C [MHz]	P [dBm]	P [mW]	Result
6 / 2437 MAIN	23.43	220.293	PASSED
6 / 2437 AUX	23.86	243.22	PASSED

Channel 6 / 2437 MHz



Channel 6 / 2437 MHz



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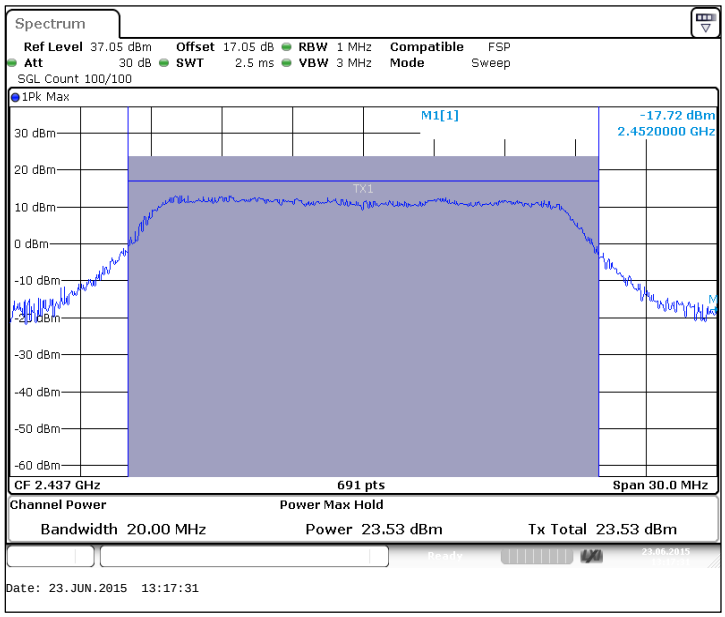
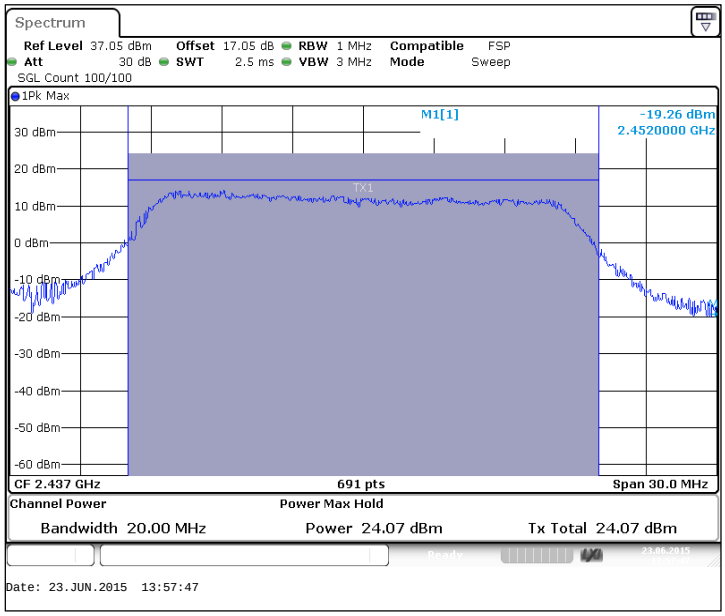
2.4.19 802.11n mode, 64QAM modulation, 58.5 / 65.0 Mbps data rate

Channel / f_C [MHz]	P [dBm]	P [mW]	Result
6 / 2437 MAIN	23.53	225.424	PASSED
6 / 2437 AUX	24.07	255.27	PASSED

Channel 6 / 2437 MHz



Channel 6 / 2437 MHz



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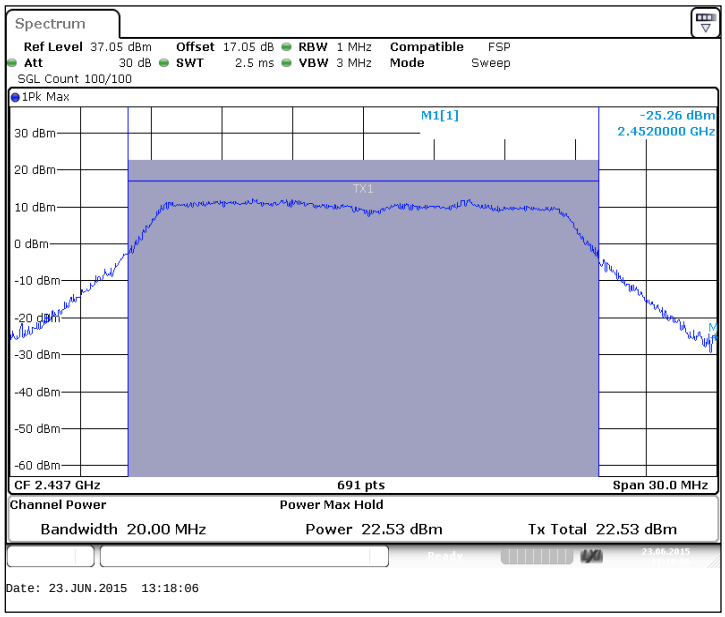
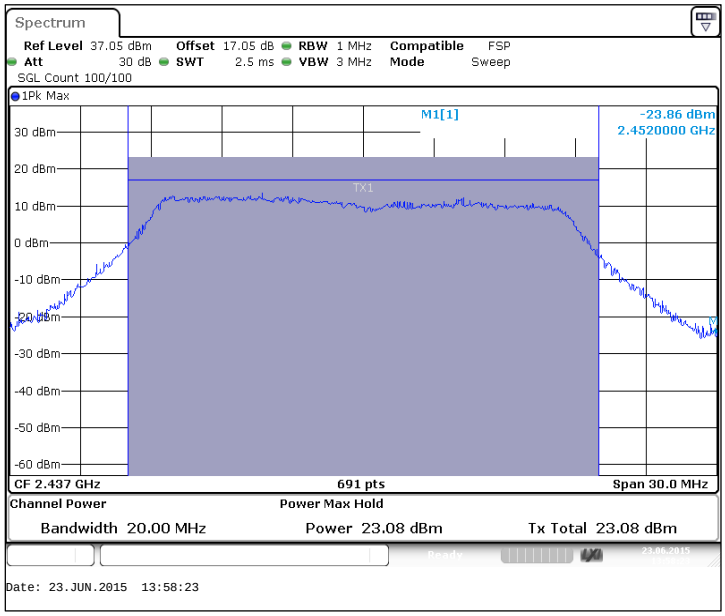
2.4.20 802.11n mode, 64QAM modulation, 65.0 / 72.2 Mbps data rate

Channel / f_C [MHz]	P [dBm]	P [mW]	Result
6 / 2437 MAIN	22.53	179.061	PASSED
6 / 2437 AUX	23.08	203.236	PASSED

Channel 6 / 2437 MHz



Channel 6 / 2437 MHz



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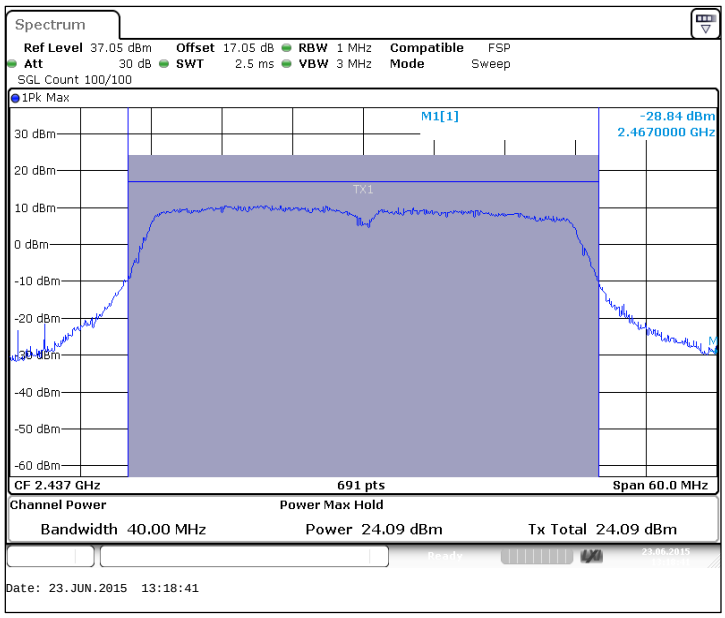
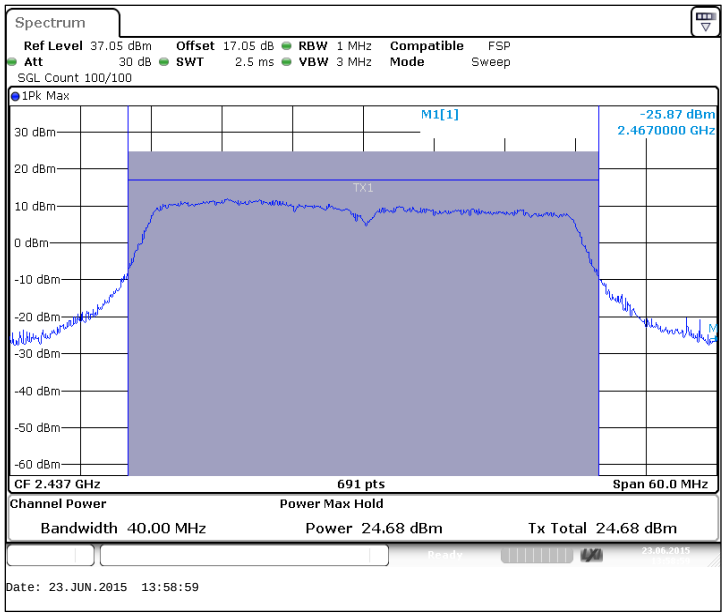
2.4.21 802.11n mode, BPSK modulation, 13.5 / 15.0 Mbps data rate

Channel / f_C [MHz]	P [dBm]	P [mW]	Result
4-8 / 2437 MAIN	24.09	256.448	PASSED
4-8 / 2437 AUX	24.68	293.765	PASSED

Channel 4-8 / 2437 MHz



Channel 4-8 / 2437 MHz



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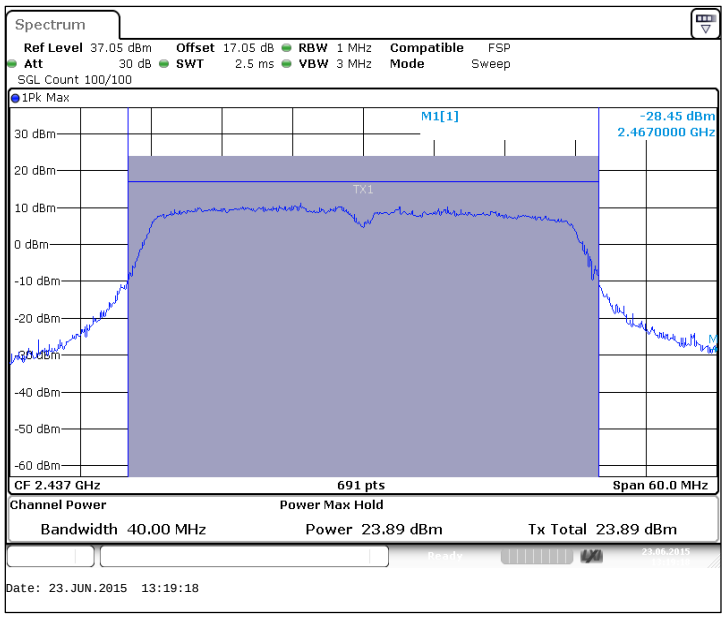
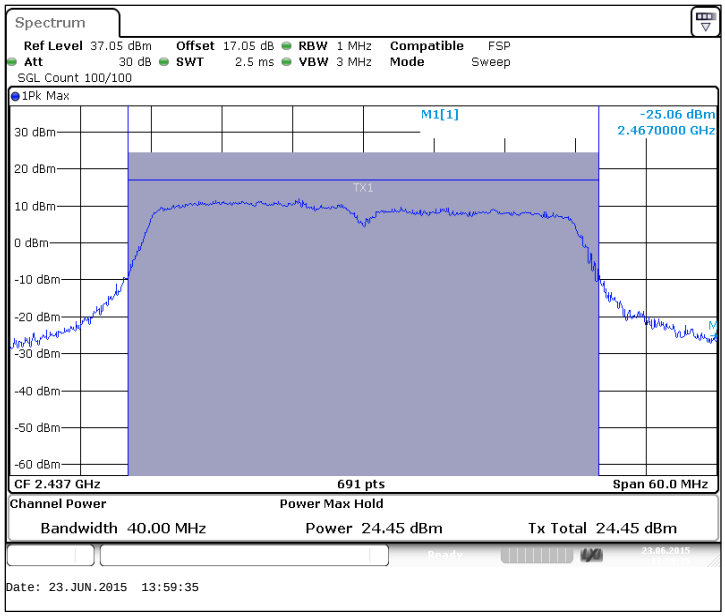
2.4.22 802.11n mode, QPSK modulation, 27.0 / 30.0 Mbps data rate

Channel / f_C [MHz]	P [dBm]	P [mW]	Result
4-8 / 2437 MAIN	23.89	244.906	PASSED
4-8 / 2437 AUX	24.45	278.612	PASSED

Channel 4-8 / 2437 MHz



Channel 4-8 / 2437 MHz



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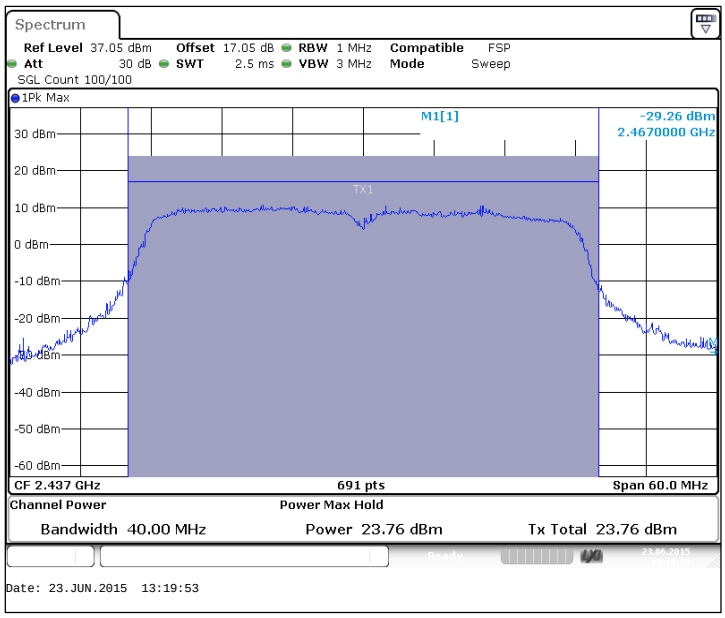
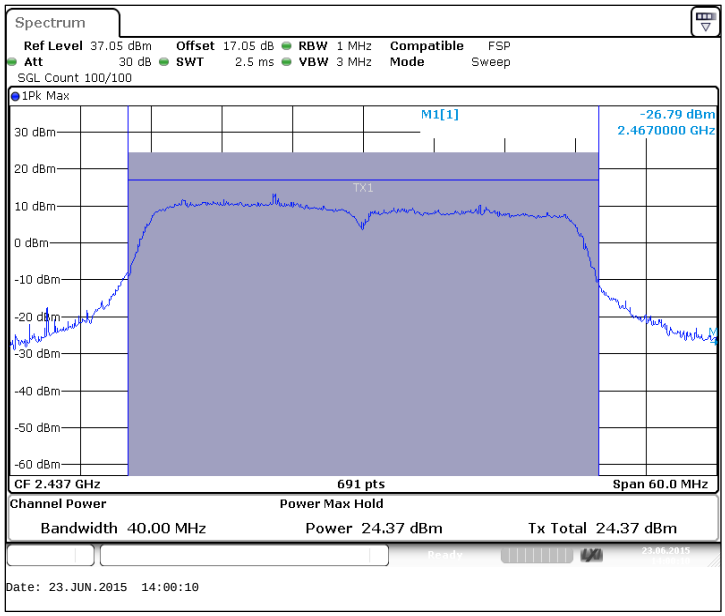
2.4.23 802.11n mode, QPSK modulation, 40.5 / 45.0 Mbps data rate

Channel / f_C [MHz]	P [dBm]	P [mW]	Result
4-8 / 2437 MAIN	23.76	237.684	PASSED
4-8 / 2437 AUX	24.37	273.527	PASSED

Channel 4-8 / 2437 MHz



Channel 4-8 / 2437 MHz



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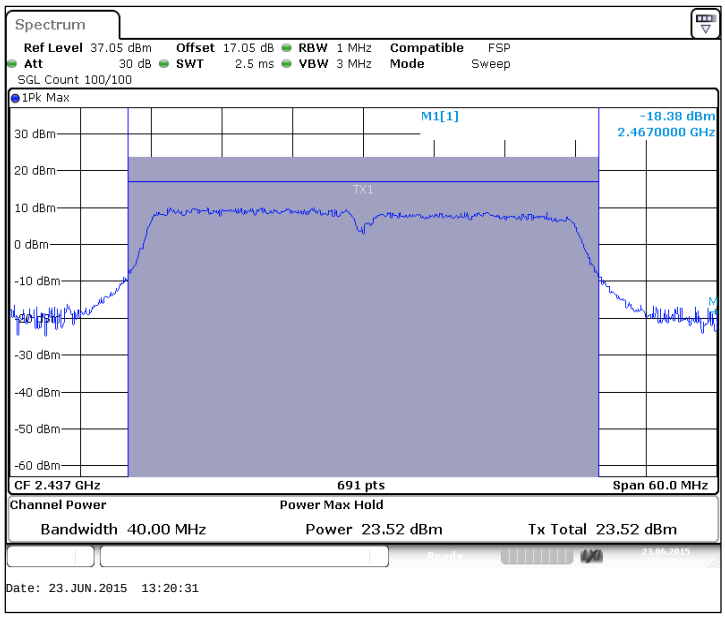
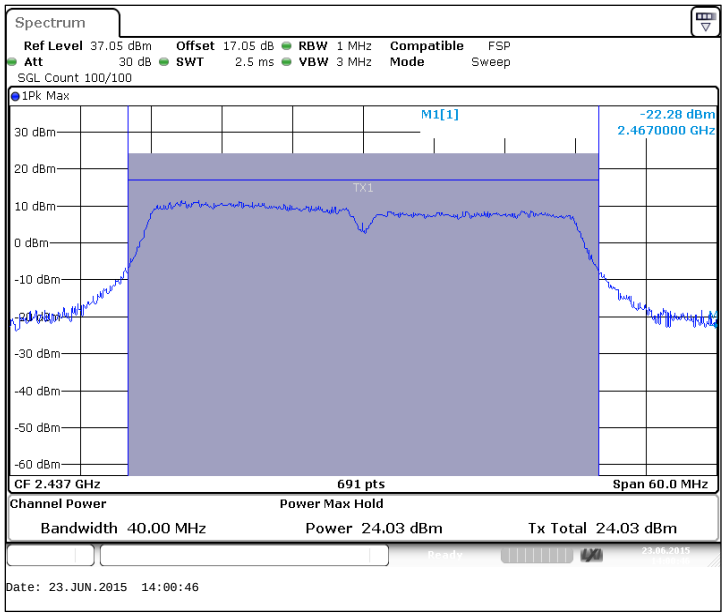
2.4.24 802.11n mode, 16QAM modulation, 54.0 / 60.0 Mbps data rate

Channel / f_C [MHz]	P [dBm]	P [mW]	Result
4-8 / 2437 MAIN	23.52	224.905	PASSED
4-8 / 2437 AUX	24.03	252.93	PASSED

Channel 4-8 / 2437 MHz



Channel 4-8 / 2437 MHz



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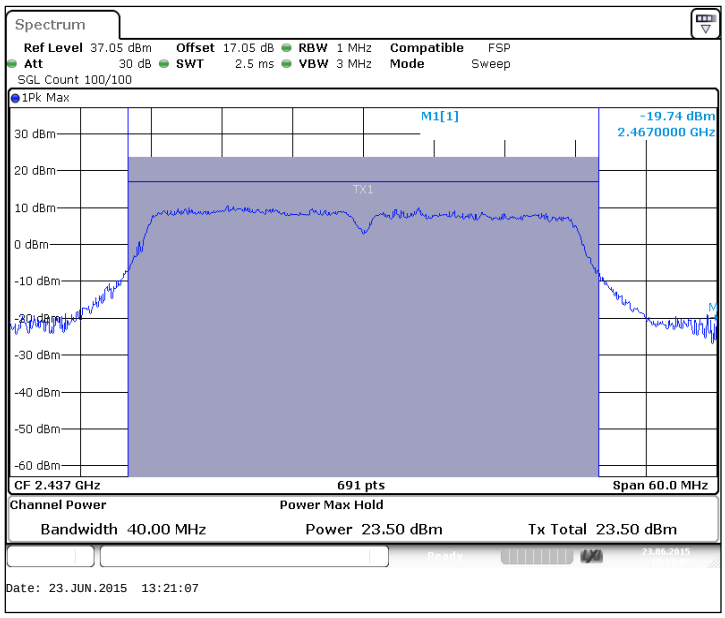
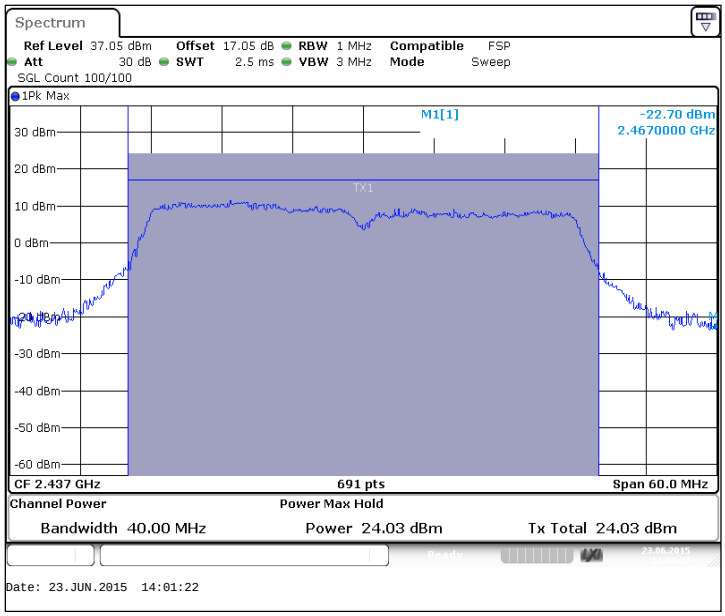
2.4.25 802.11n mode, 16QAM modulation, 81.0 / 90.0 Mbps data rate

Channel / f_C [MHz]	P [dBm]	P [mW]	Result
4-8 / 2437 MAIN	23.5	223.872	PASSED
4-8 / 2437 AUX	24.03	252.93	PASSED

Channel 4-8 / 2437 MHz



Channel 4-8 / 2437 MHz



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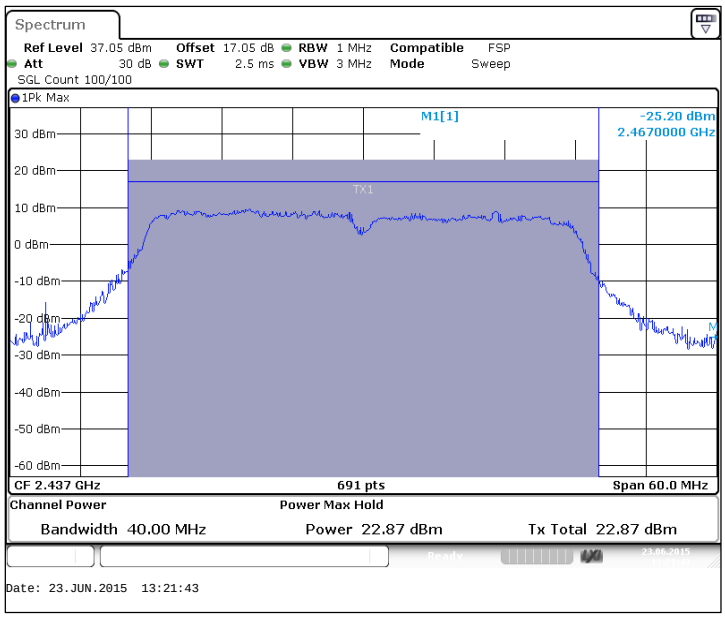
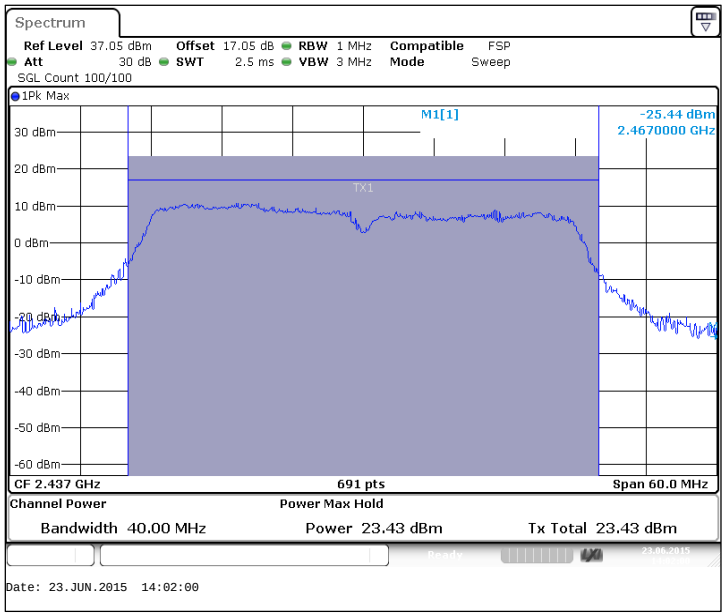
2.4.26 802.11n mode, 64QAM modulation, 108.0 / 120.0 Mbps data rate

Channel / f_C [MHz]	P [dBm]	P [mW]	Result
4-8 / 2437 MAIN	22.87	193.642	PASSED
4-8 / 2437 AUX	23.43	220.293	PASSED

Channel 4-8 / 2437 MHz



Channel 4-8 / 2437 MHz



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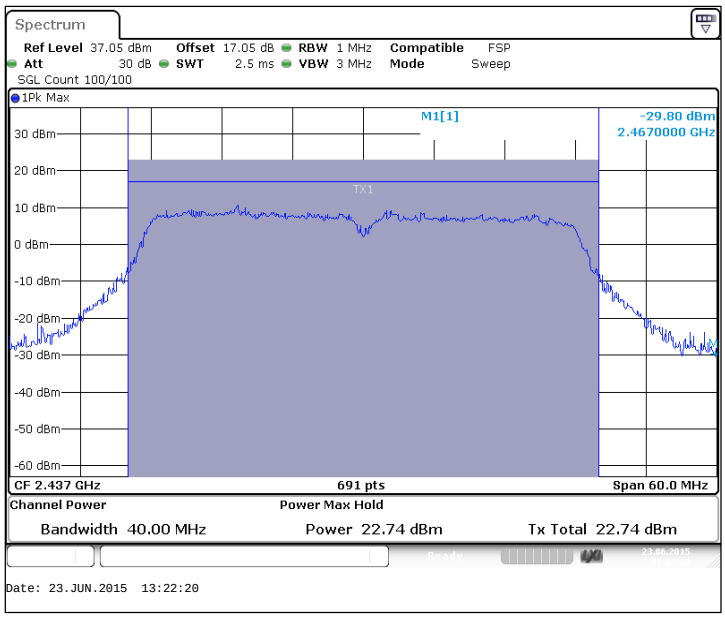
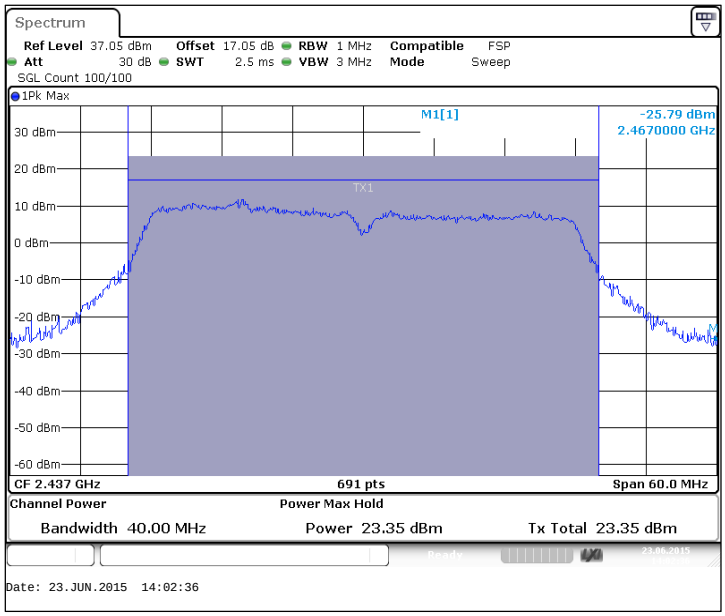
2.4.27 802.11n mode, 64QAM modulation, 121.5 / 135.0 Mbps data rate

Channel / f_C [MHz]	P [dBm]	P [mW]	Result
4-8 / 2437 MAIN	22.74	187.932	PASSED
4-8 / 2437 AUX	23.35	216.272	PASSED

Channel 4-8 / 2437 MHz



Channel 4-8 / 2437 MHz



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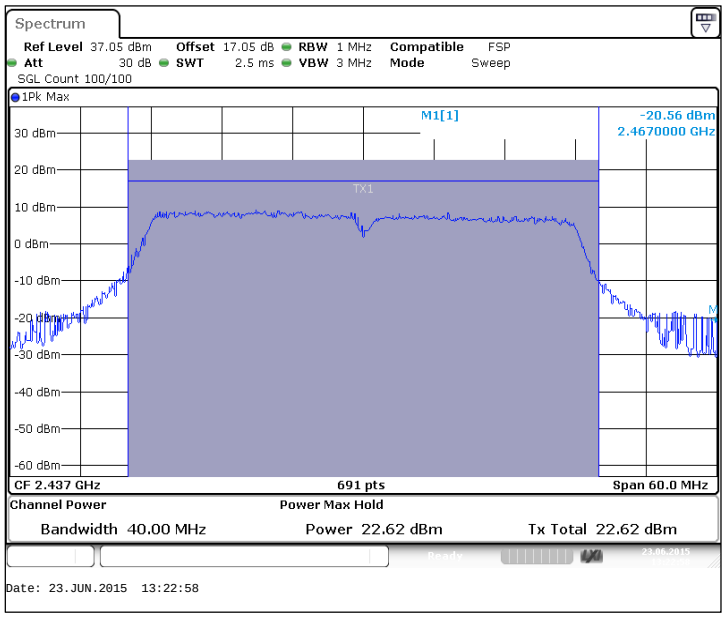
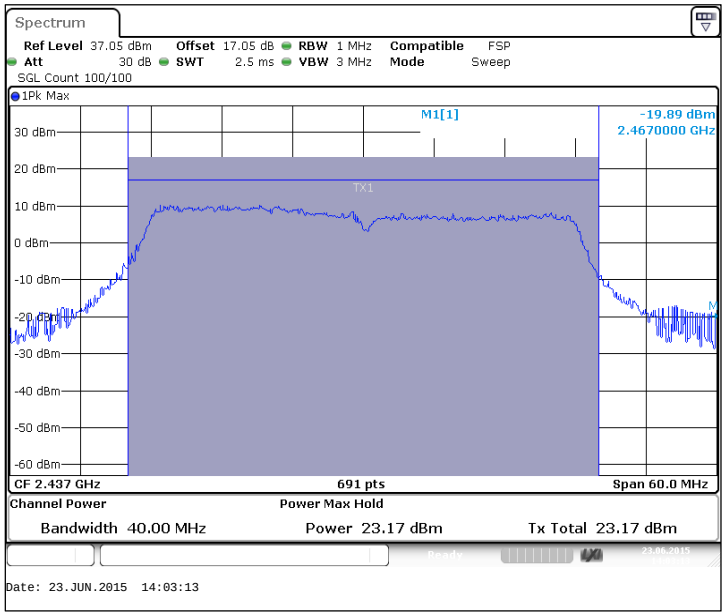
2.4.28 802.11n mode, 64QAM modulation, 135.0 / 150.0 Mbps data rate

Channel / f_C [MHz]	P [dBm]	P [mW]	Result
4-8 / 2437 MAIN	22.62	182.81	PASSED
4-8 / 2437 AUX	23.17	207.491	PASSED

Channel 4-8 / 2437 MHz



Channel 4-8 / 2437 MHz



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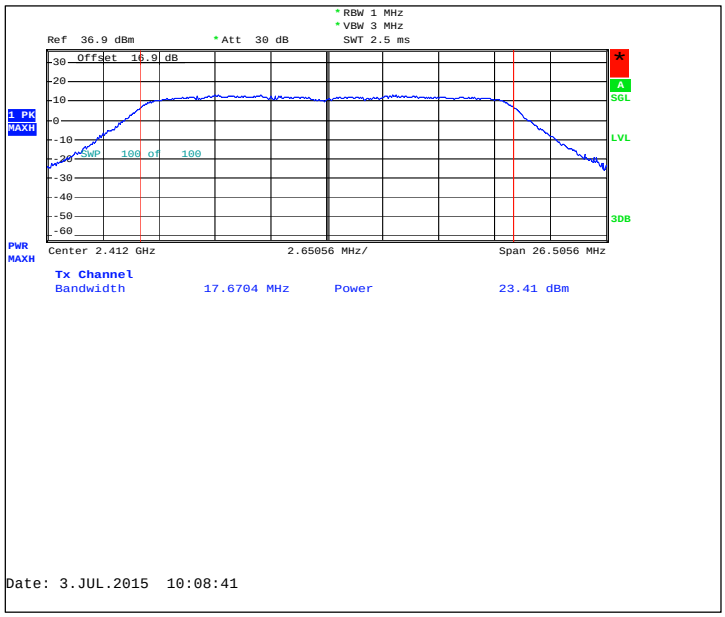
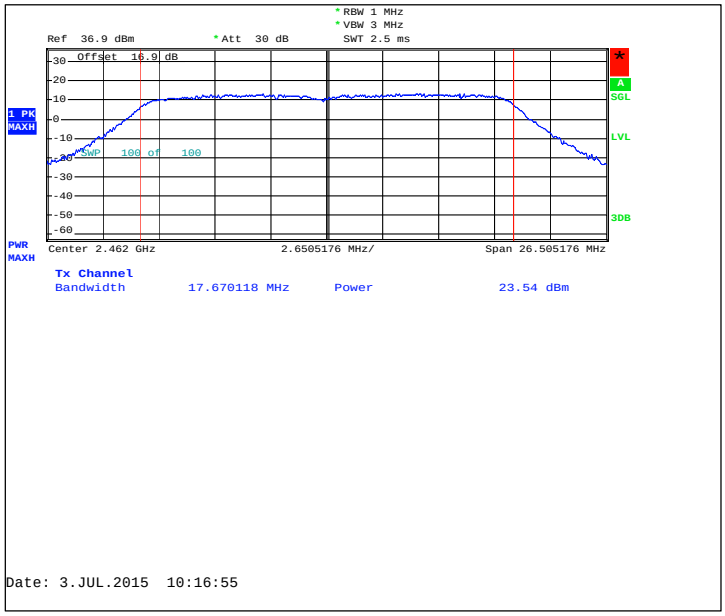
2.4.29 802.11n Main mode, BPSK modulation, 6.5 / 7.25 Mbps data rate

Channel / f_C [MHz]	P [dBm]	P [mW]	Result
1 / 2412	23.41	219.28	PASSED
11 / 2462	23.54	225.944	PASSED

Channel 1 / 2412 MHz



Channel 11 / 2462 MHz



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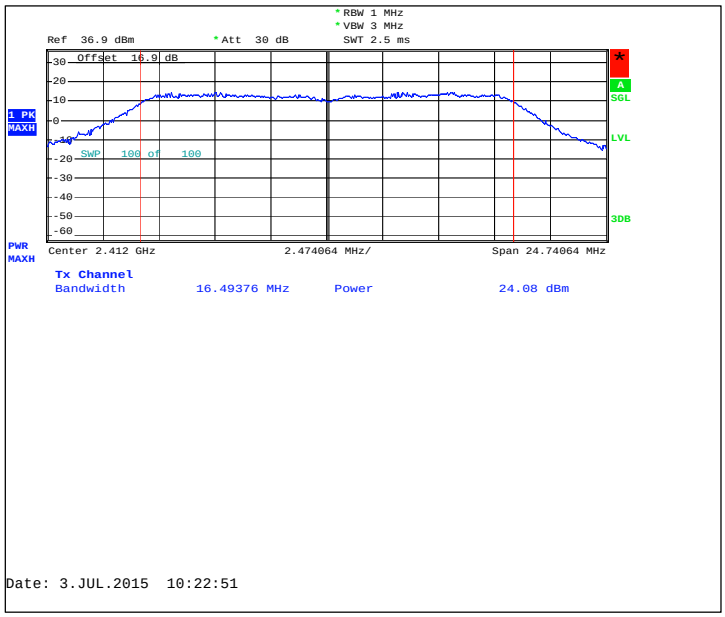
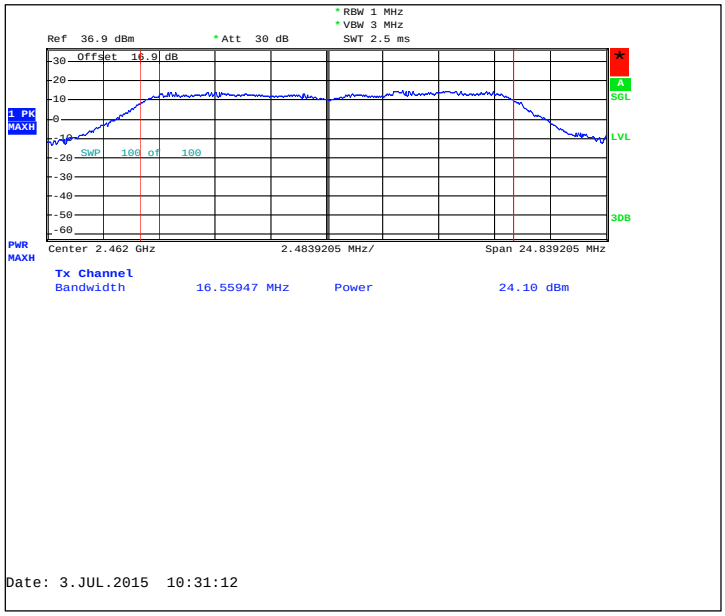
2.4.30 802.11g Main mode, 16QAM modulation, 24 Mbps data rate

Channel / f_C [MHz]	P [dBm]	P [mW]	Result
1 / 2412	24.08	255.859	PASSED
11 / 2462	24.1	257.04	PASSED

Channel 1 / 2412 MHz



Channel 11 / 2462 MHz



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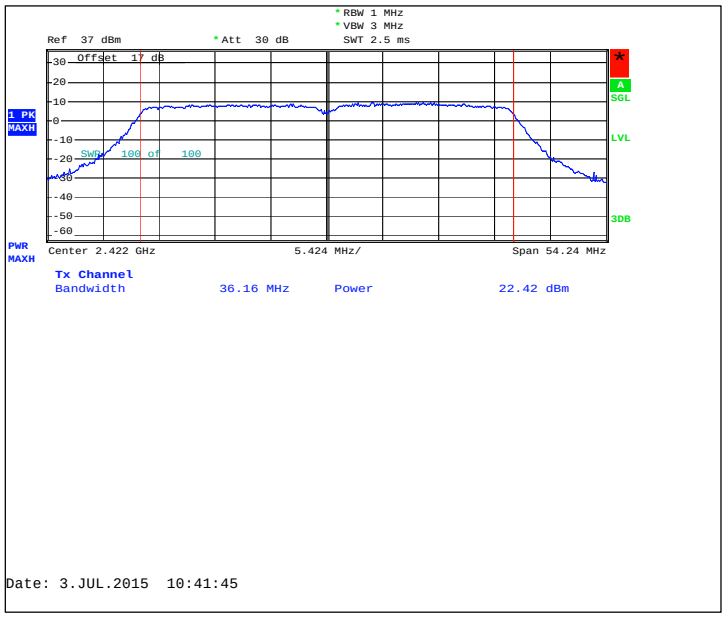
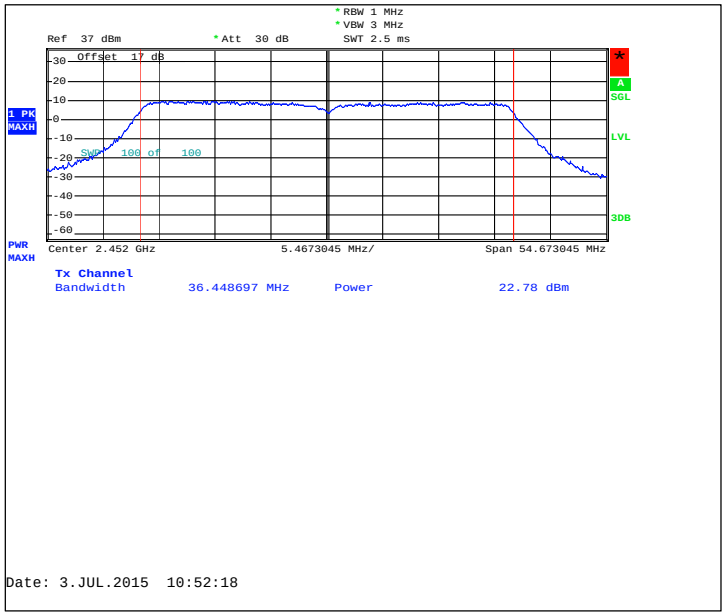
2.4.31 802.11n Main mode, BPSK modulation, 13.5 / 15.0 Mbps data rate

Channel / f_C [MHz]	P [dBm]	P [mW]	Result
1-5 / 2422	22.42	174.582	PASSED
7-11 / 2452	22.78	189.671	PASSED

Channel 1-5 / 2422 MHz



Channel 7-11 / 2452 MHz



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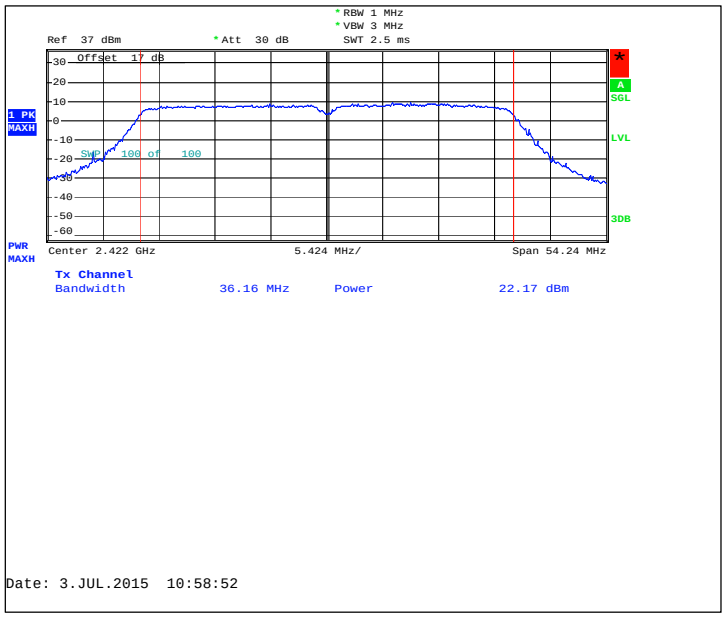
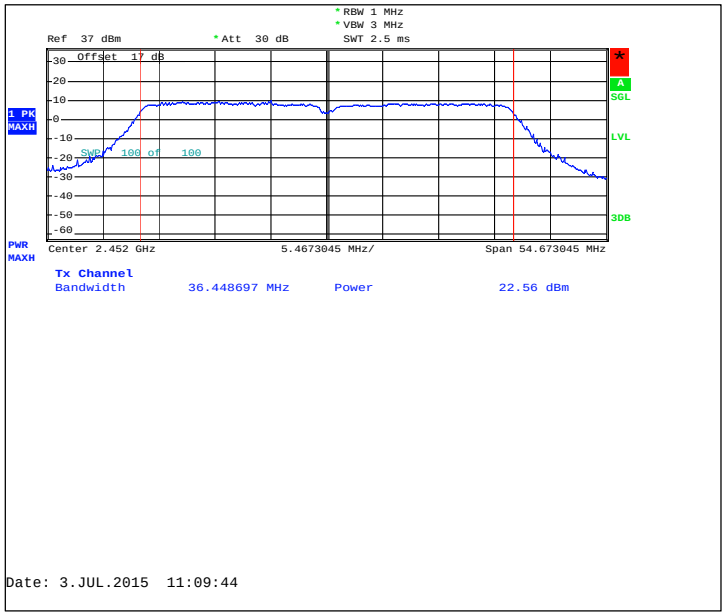
2.4.32 802.11n Main mode, QPSK modulation, 27.0 / 30.0 Mbps data rate

Channel / f_C [MHz]	P [dBm]	P [mW]	Result
1-5 / 2422	22.17	164.816	PASSED
7-11 / 2452	22.56	180.302	PASSED

Channel 1-5 / 2422 MHz



Channel 7-11 / 2452 MHz



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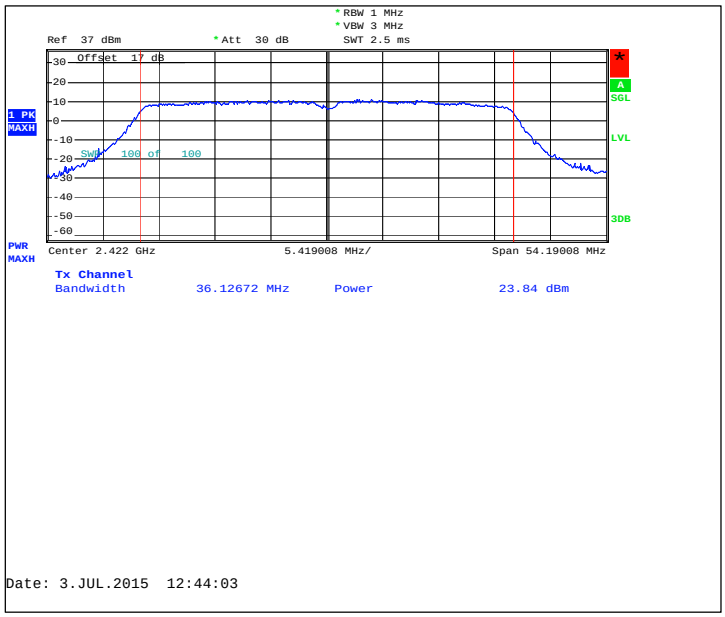
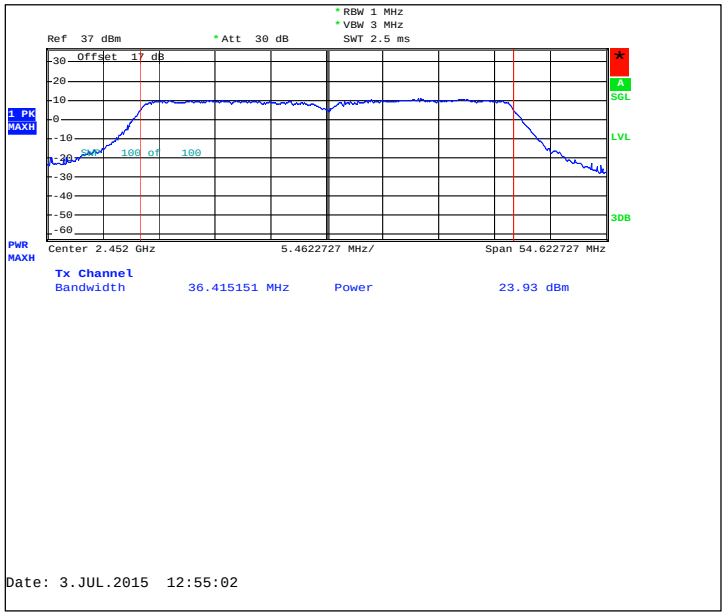
2.4.33 802.11n Aux mode, BPSK modulation, 13.5 / 15.0 Mbps data rate

Channel / f_C [MHz]	P [dBm]	P [mW]	Result
1-5 / 2422	23.84	242.103	PASSED
7-11 / 2452	23.93	247.172	PASSED

Channel 1-5 / 2422 MHz



Channel 7-11 / 2452 MHz



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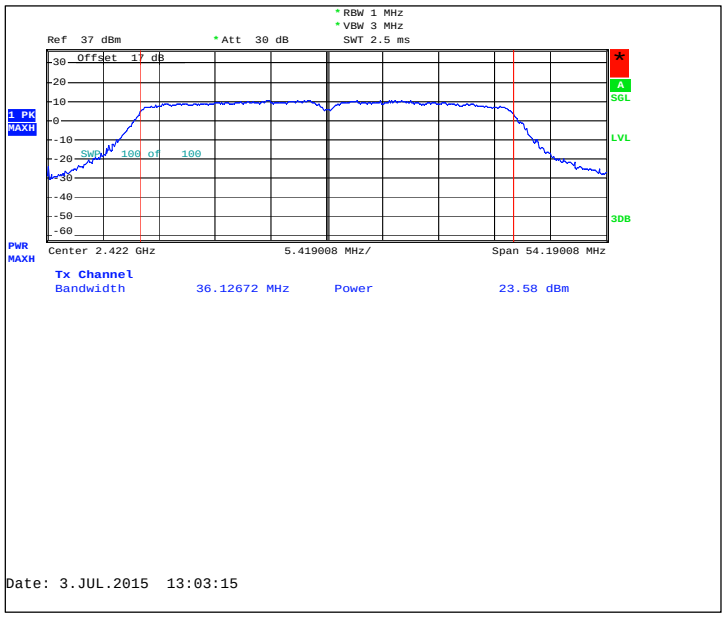
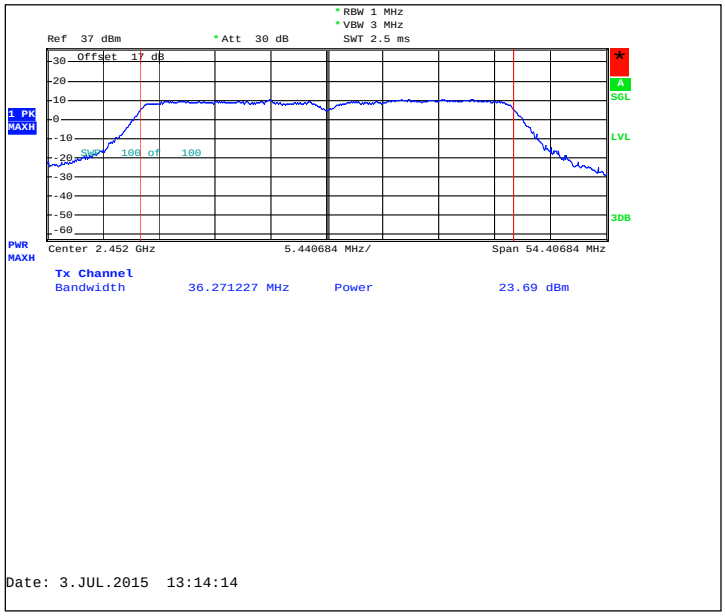
2.4.34 802.11n Aux mode, QPSK modulation, 27.0 / 30.0 Mbps data rate

Channel / f_C [MHz]	P [dBm]	P [mW]	Result
1-5 / 2422	23.58	228.034	PASSED
7-11 / 2452	23.69	233.884	PASSED

Channel 1-5 / 2422 MHz



Channel 7-11 / 2452 MHz



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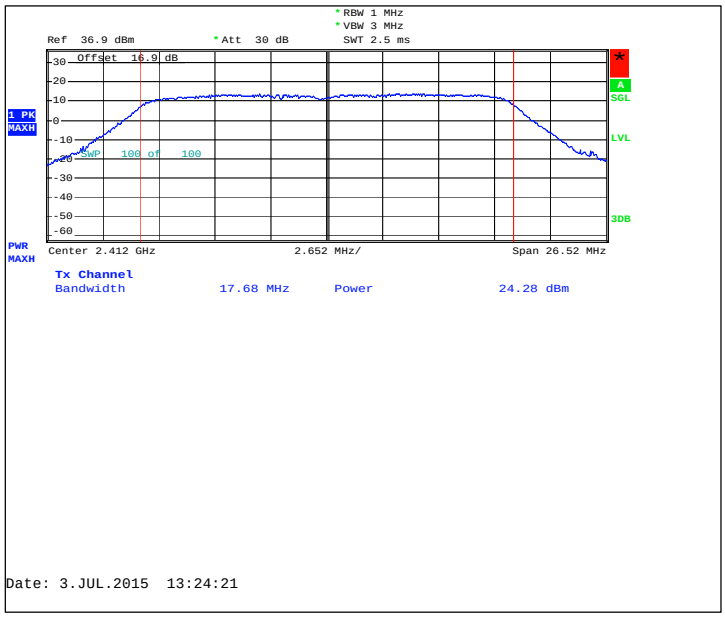
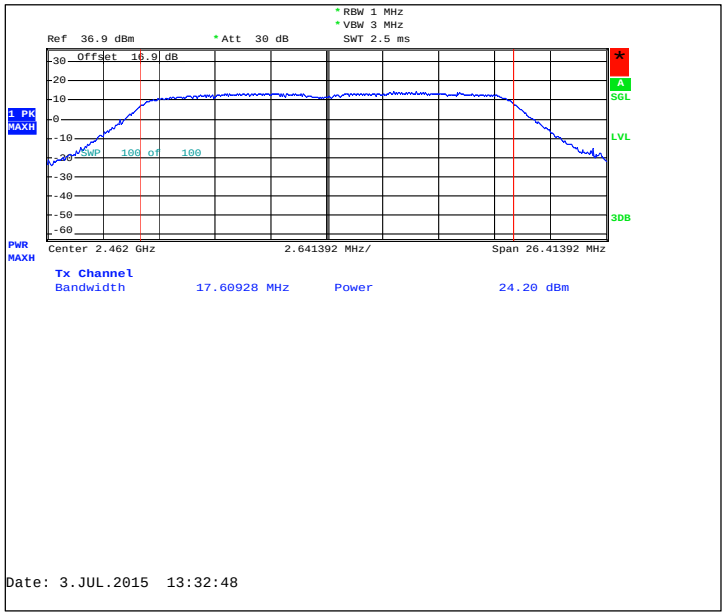
2.4.35 802.11n Aux mode, BPSK modulation, 6.5 / 7.25 Mbps data rate

Channel / f_C [MHz]	P [dBm]	P [mW]	Result
1 / 2412	24.28	267.917	PASSED
11 / 2462	24.2	263.027	PASSED

Channel 1 / 2412 MHz



Channel 11 / 2462 MHz



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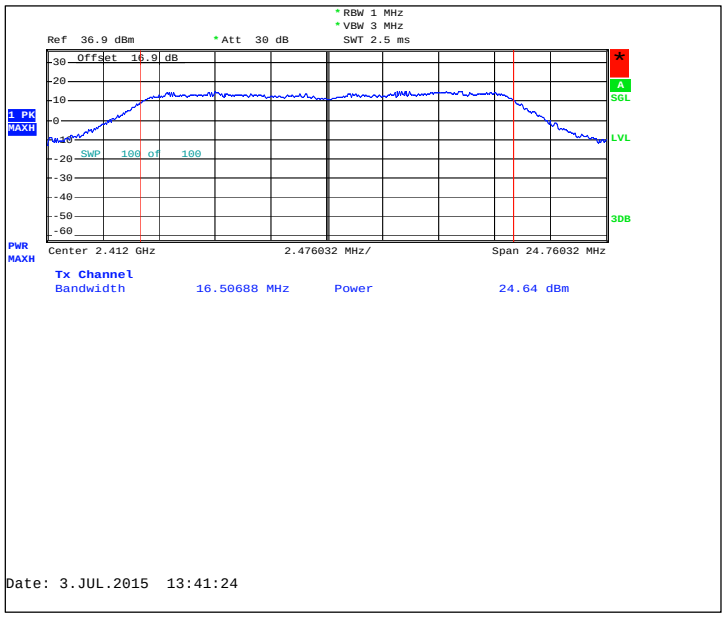
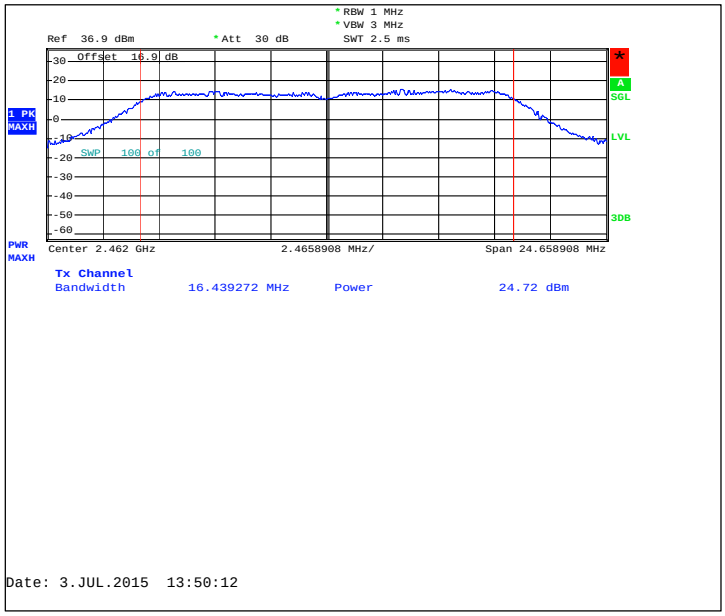
2.4.36 802.11g Aux mode, 16QAM modulation, 24 Mbps data rate

Channel / f_C [MHz]	P [dBm]	P [mW]	Result
1 / 2412	24.64	291.072	PASSED
11 / 2462	24.72	296.483	PASSED

Channel 1 / 2412 MHz



Channel 11 / 2462 MHz



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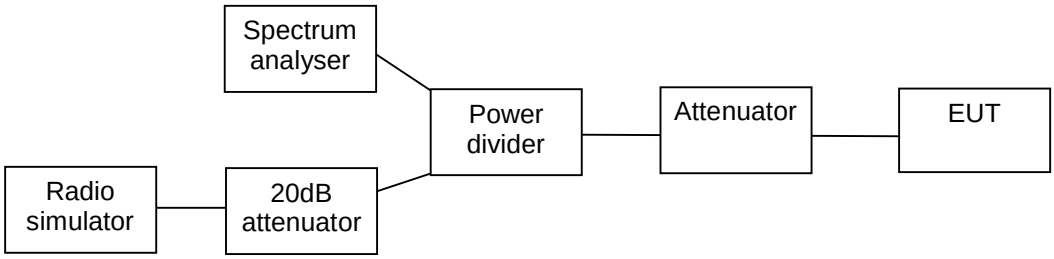
3. Spurious RF conducted emissions
(FCC §15.247(d), RSS-210 A8.5)

EUT with DUT number	RM-1085, DUT 100014
Accessories with DUT numbers	SD-241R, DUT 100017 ; WH-308, DUT 100029
Operation Voltage [V] / [Hz]	Nominal
Results	PASSED
Remarks	-
Temp [ºC] / Humidity [%RH] / Air Pressure [kPa]	20 / 47 / 101.9
Date of measurements	03-Jul-2015
Measured by	Jari Keto

3.1. Test Setup



3.2. 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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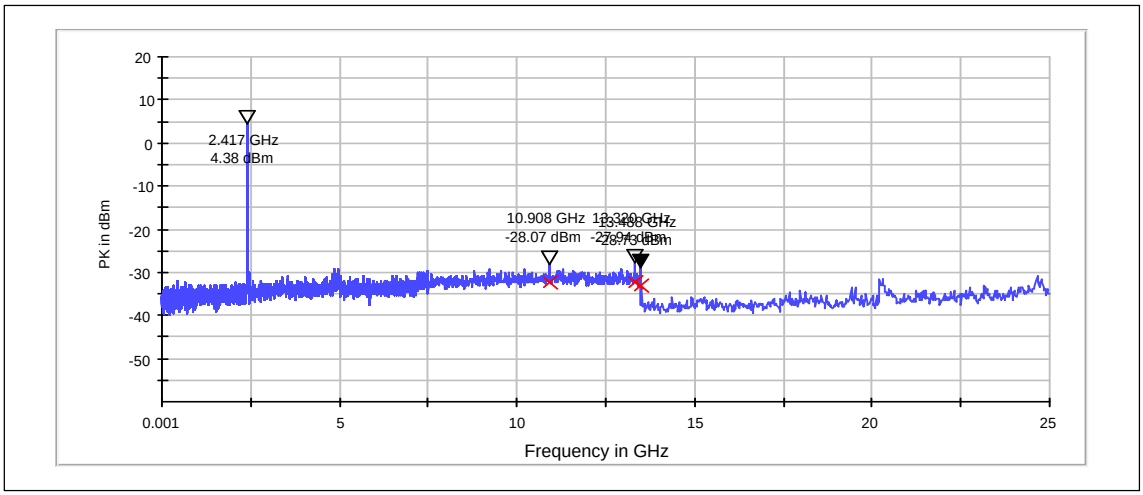
3.3. WLAN Test results

3.3.1 802.11n Main mode, BPSK modulation, 6.5 / 7.25 Mbps data rate

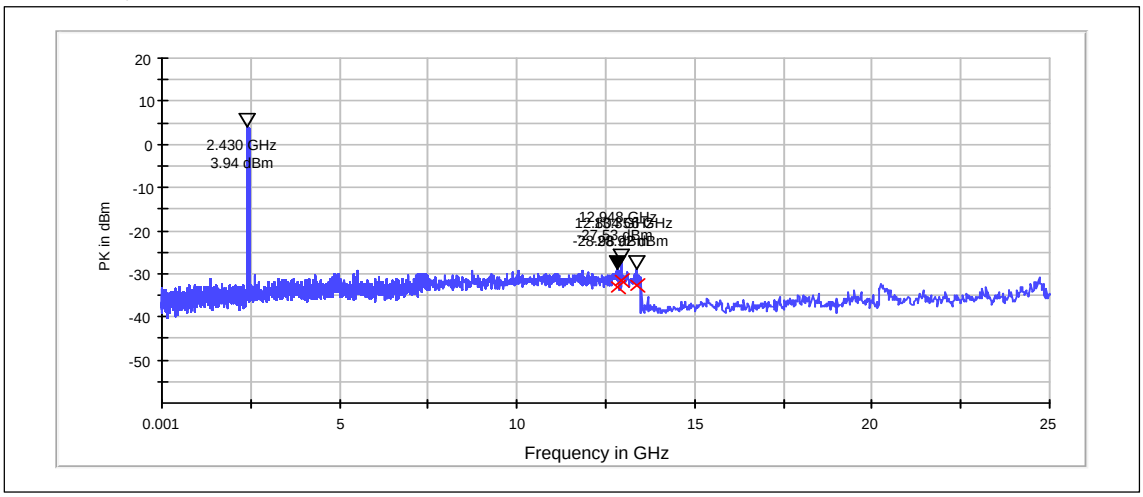
Channel 1 / 2412 MHz



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

Frequency [MHz]	P [dBc]	Result
13320.000	-32.32	PASSED
10908.000	-32.46	PASSED
13488.000	-33.11	PASSED

Channel 6 / 2437 MHz



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

Frequency [MHz]	P [dBc]	Result
12948.000	-31.47	PASSED
13356.000	-32.86	PASSED
12804.000	-32.92	PASSED

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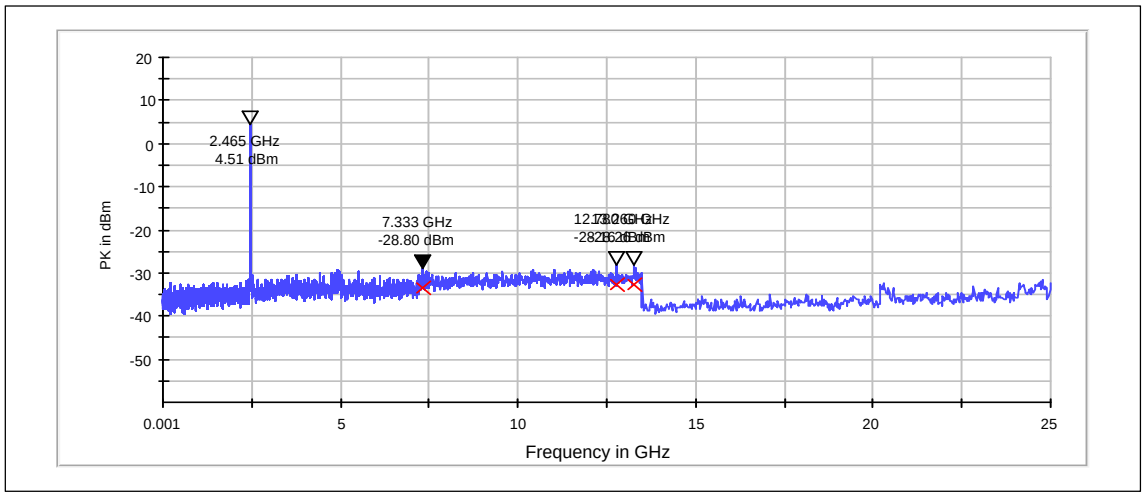
Channel 11 / 2462 MHz



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

Frequency [MHz]	P [dBc]	Result
12780.000	-32.66	PASSED
13260.000	-32.77	PASSED
7332.600	-33.31	PASSED

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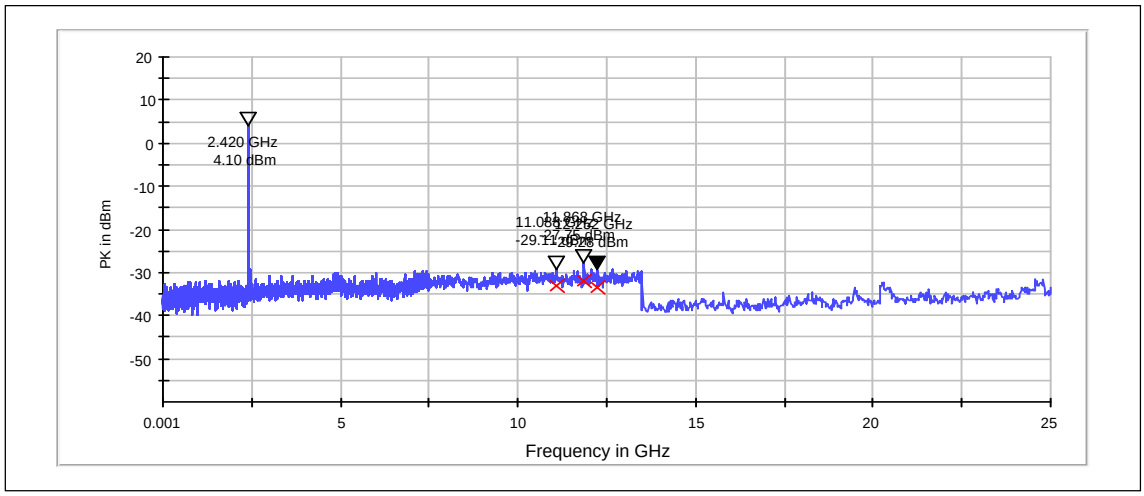
3.3.2 802.11g Main mode, 16QAM modulation, 24 Mbps data rate

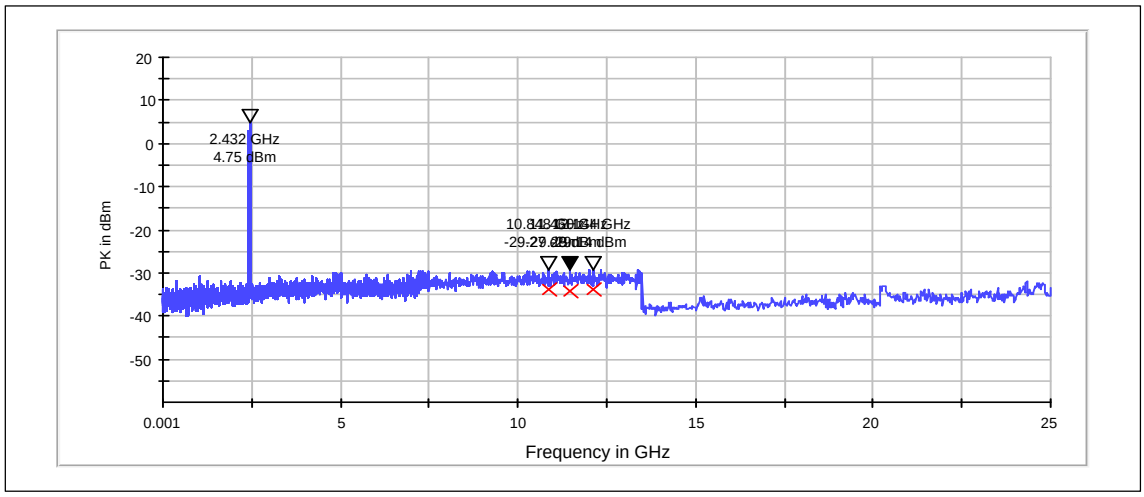
Channel 1 / 2412 MHz



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

Frequency [MHz]	P [dBc]	Result
11868.000	-31.86	PASSED
11088.000	-33.22	PASSED
12252.000	-33.39	PASSED

Channel 6 / 2437 MHz



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

Frequency [MHz]	P [dBc]	Result
12144.000	-33.88	PASSED
10848.000	-34.01	PASSED
11460.000	-34.03	PASSED

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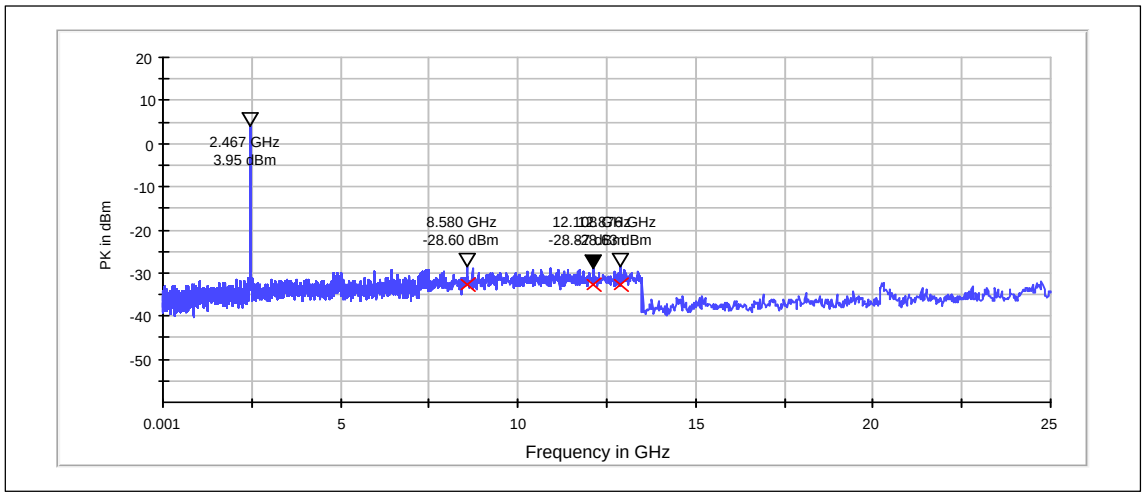
Channel 11 / 2462 MHz



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

Frequency [MHz]	P [dBc]	Result
8580.000	-32.55	PASSED
12876.000	-32.58	PASSED
12108.000	-32.81	PASSED

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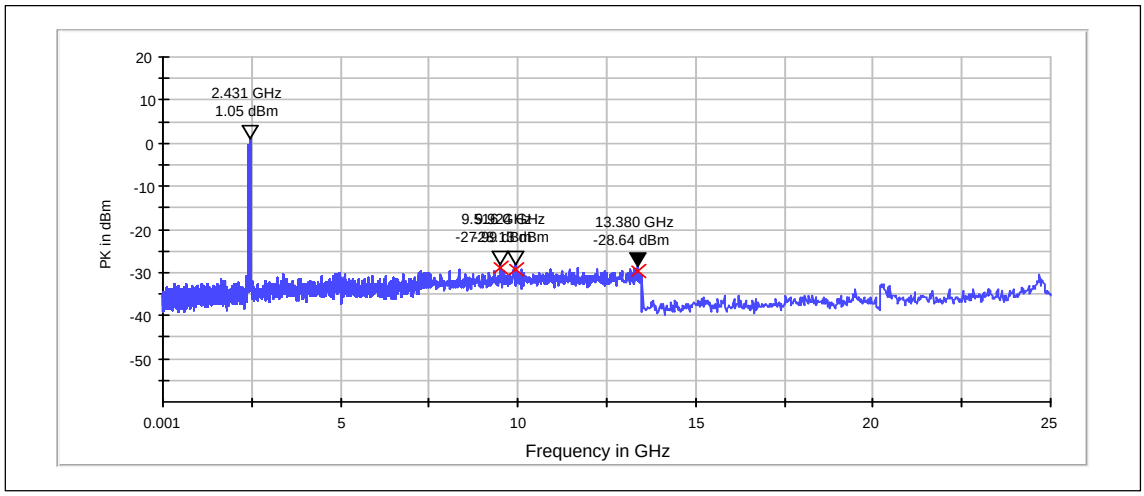
3.3.3 802.11n Main mode, BPSK modulation, 13.5 / 15.0 Mbps data rate

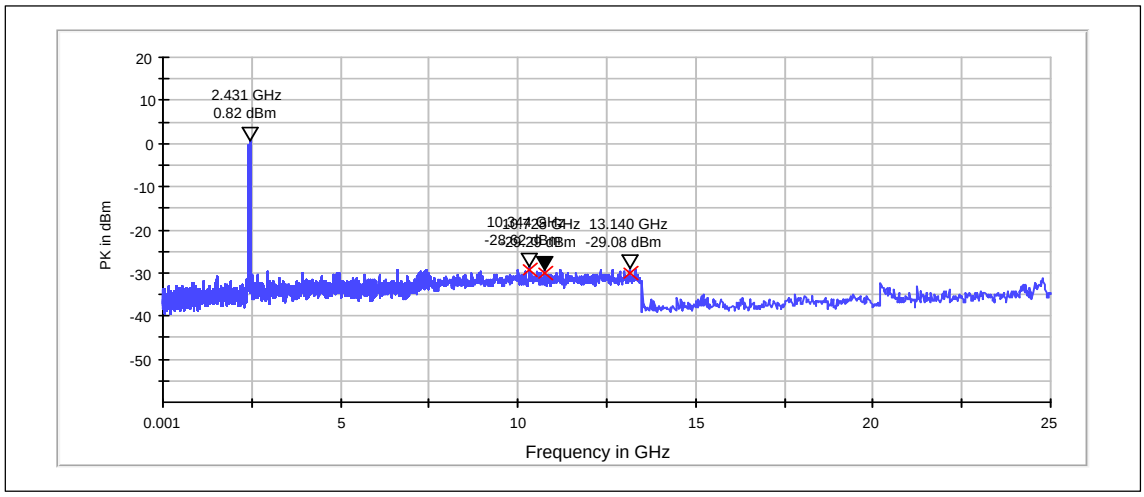
Channel 1-5 / 2422 MHz



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

Frequency [MHz]	P [dBc]	Result
9516.000	-29.04	PASSED
9924.000	-29.19	PASSED
13380.000	-29.69	PASSED

Channel 4-8 / 2437 MHz



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

Frequency [MHz]	P [dBc]	Result
10344.000	-29.44	PASSED
13140.000	-29.90	PASSED
10728.000	-30.11	PASSED

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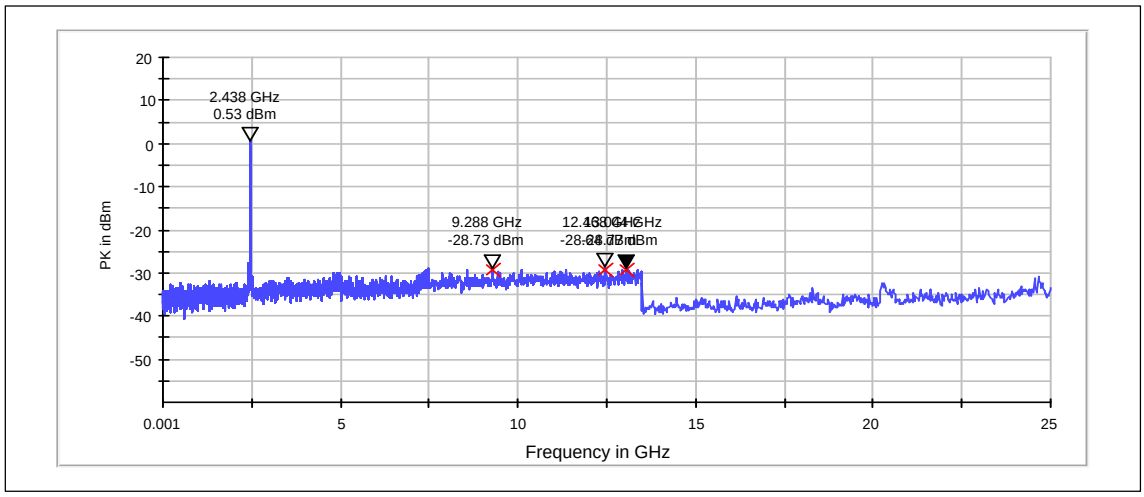
Channel 7-11 / 2452 MHz



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

Frequency [MHz]	P [dBc]	Result
12468.000	-29.17	PASSED
9288.000	-29.26	PASSED
13044.000	-29.30	PASSED

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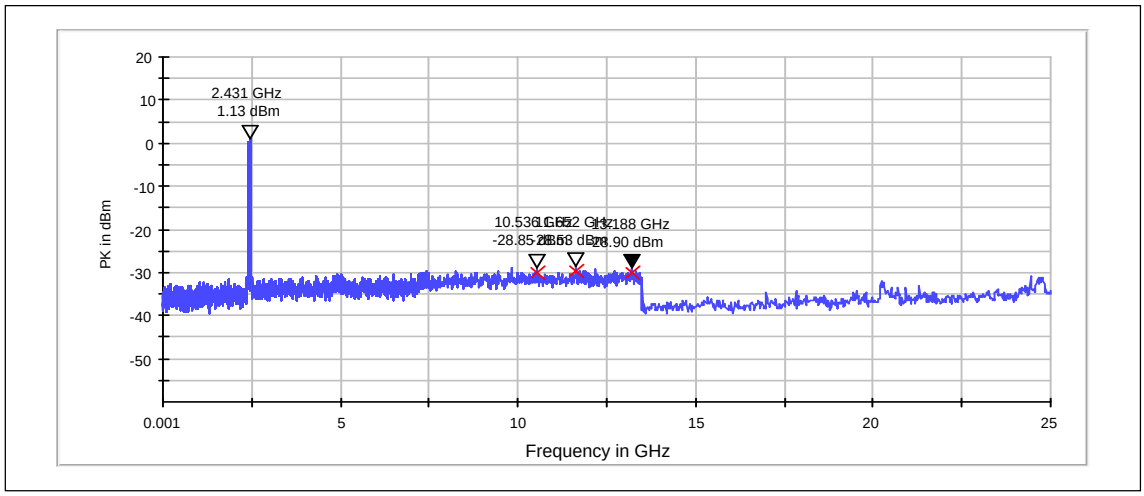
3.3.4 802.11n Main mode, QPSK modulation, 27.0 / 30.0 Mbps data rate

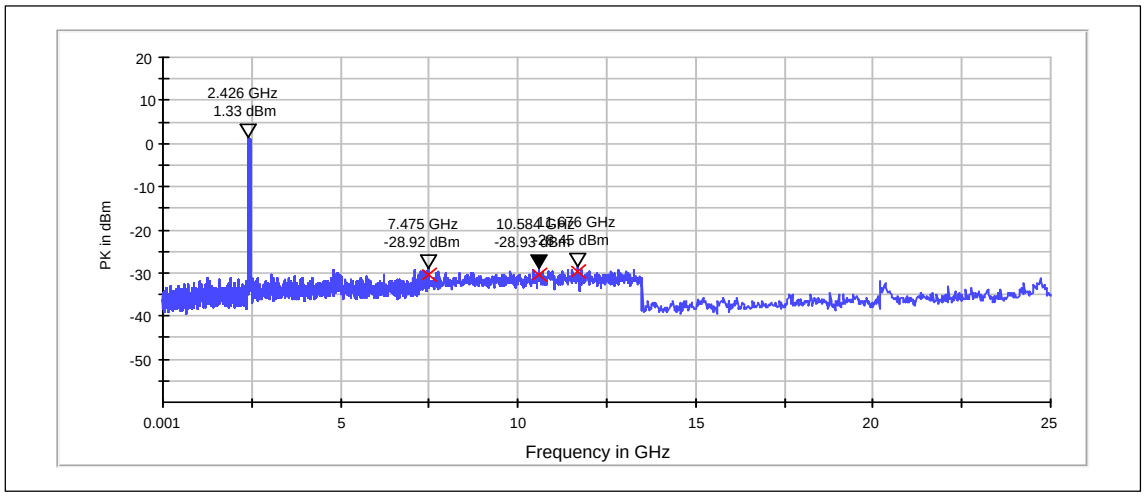
Channel 1-5 / 2422 MHz



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

Frequency [MHz]	P [dBc]	Result
11652.000	-29.66	PASSED
10536.000	-29.98	PASSED
13188.000	-30.03	PASSED

Channel 4-8 / 2437 MHz



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

Frequency [MHz]	P [dBc]	Result
11676.000	-29.79	PASSED
7474.800	-30.25	PASSED
10584.000	-30.26	PASSED

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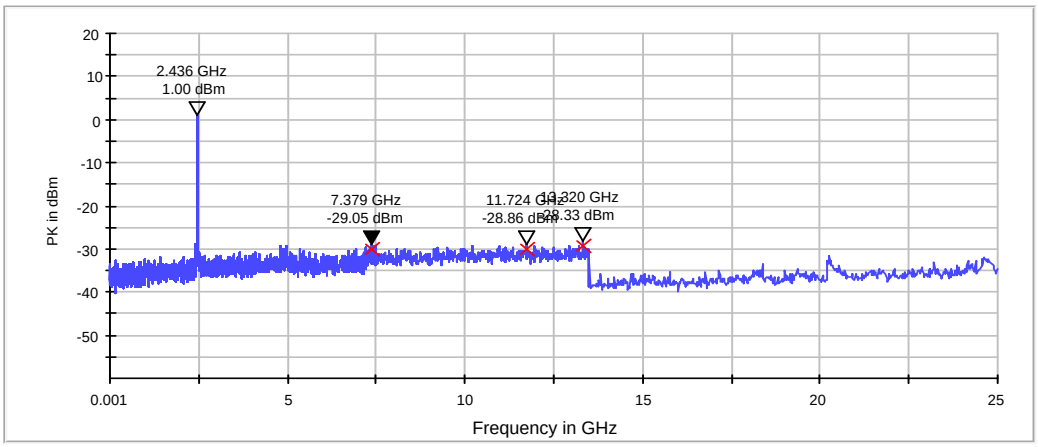
Channel 7-11 / 2452 MHz



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

Frequency [MHz]	P [dBc]	Result
13320.000	-29.34	PASSED
11724.000	-29.87	PASSED
7378.800	-30.05	PASSED

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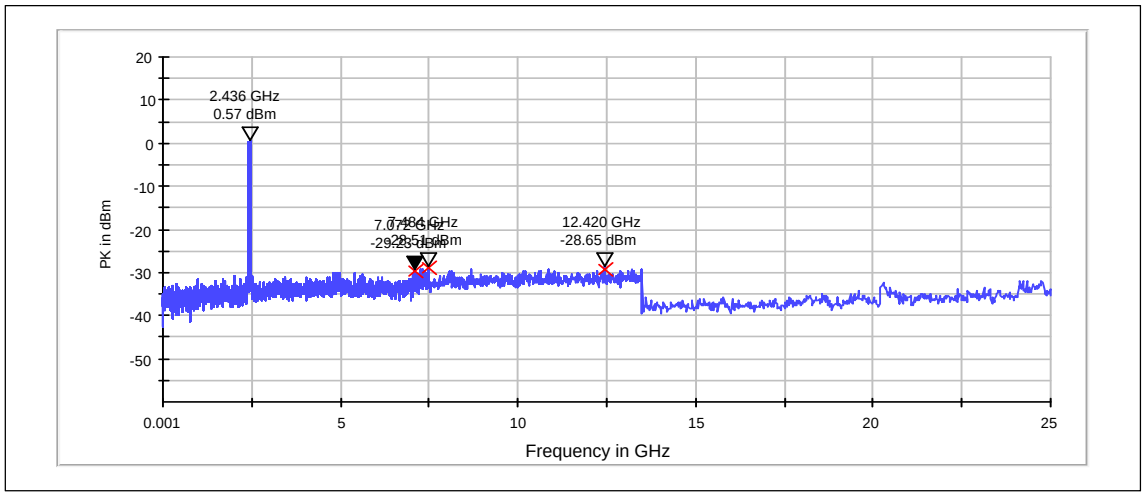
3.3.5 802.11n Aux mode, BPSK modulation, 13.5 / 15.0 Mbps data rate

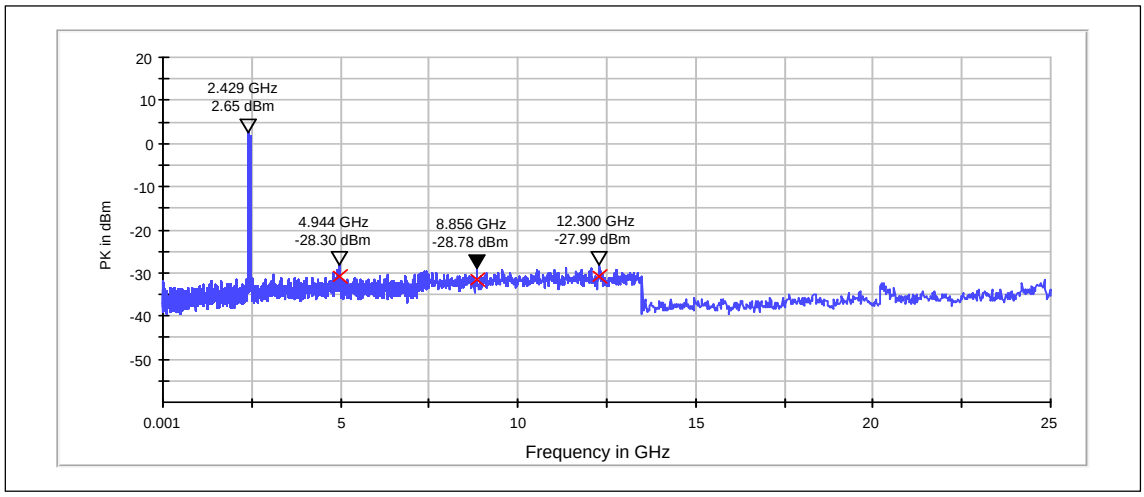
Channel 1-5 / 2422 MHz



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

Frequency [MHz]	P [dBc]	Result
7484.400	-29.09	PASSED
12420.000	-29.22	PASSED
7072.400	-29.81	PASSED

Channel 4-8 / 2437 MHz



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

Frequency [MHz]	P [dBc]	Result
12300.000	-30.64	PASSED
4944.400	-30.95	PASSED
8856.000	-31.43	PASSED

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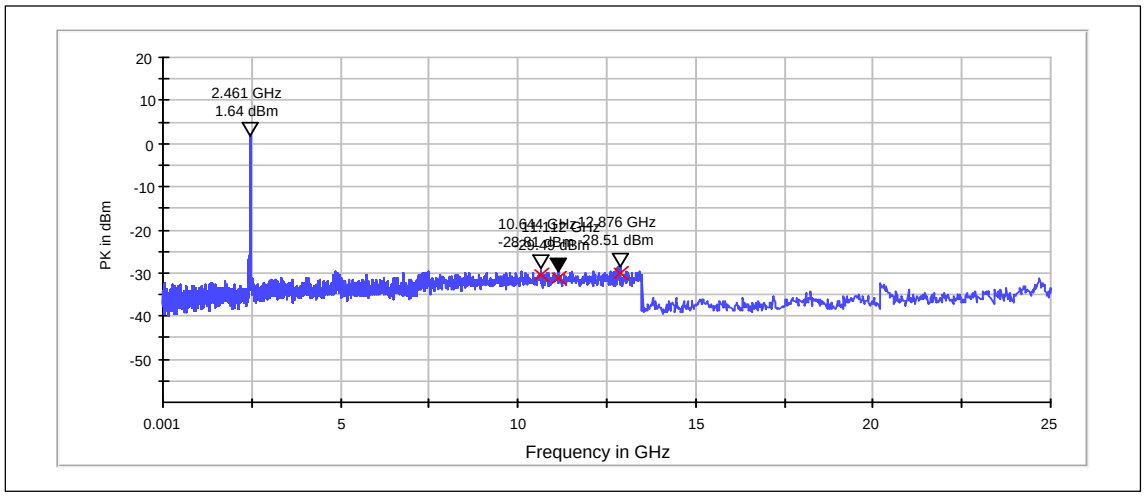
Channel 7-11 / 2452 MHz



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

Frequency [MHz]	P [dBc]	Result
12876.000	-30.16	PASSED
10644.000	-30.46	PASSED
11112.000	-31.13	PASSED

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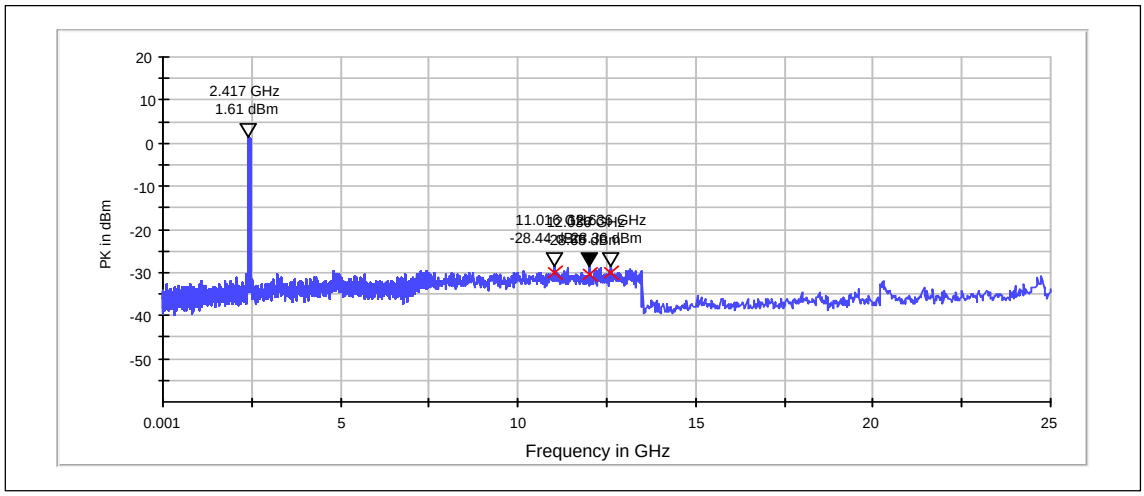
3.3.6 802.11n Aux mode, QPSK modulation, 27.0 / 30.0 Mbps data rate

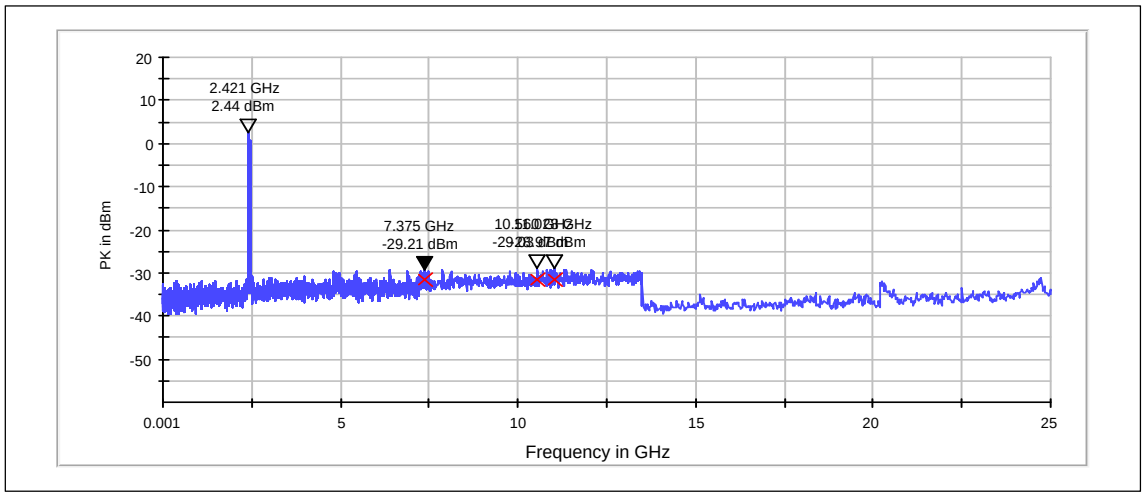
Channel 1-5 / 2422 MHz



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

Frequency [MHz]	P [dBc]	Result
12636.000	-29.97	PASSED
11016.000	-30.05	PASSED
12036.000	-30.25	PASSED

Channel 4-8 / 2437 MHz



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

Frequency [MHz]	P [dBc]	Result
11028.000	-31.42	PASSED
10560.000	-31.47	PASSED
7375.200	-31.65	PASSED

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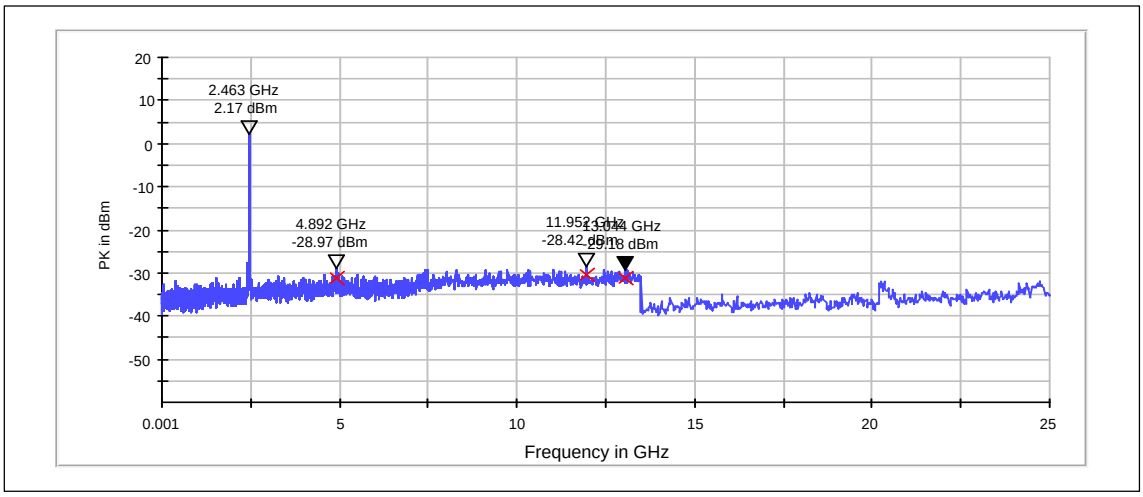
Channel 7-11 / 2452 MHz



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

Frequency [MHz]	P [dBc]	Result
11952.000	-30.58	PASSED
4891.600	-31.14	PASSED
13044.000	-31.34	PASSED

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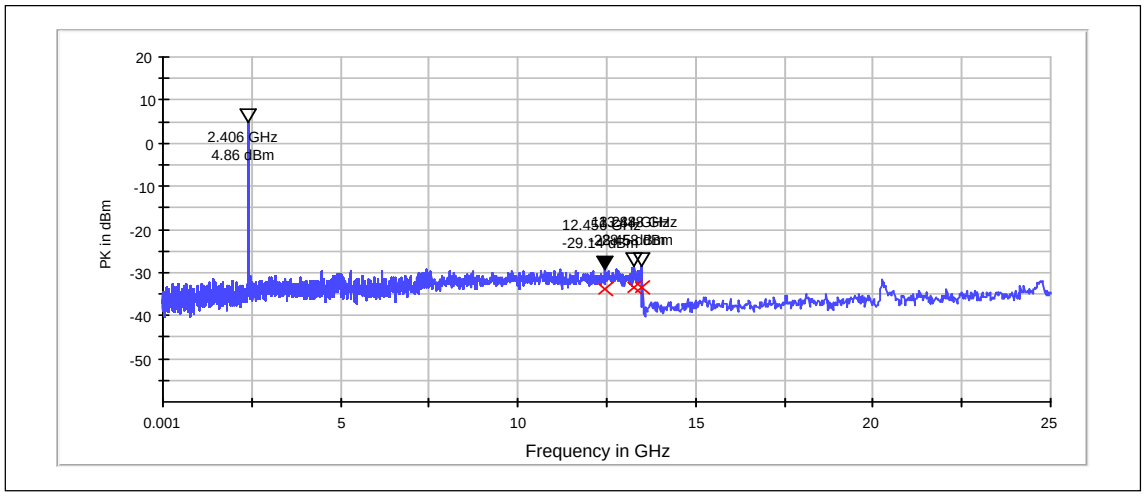
3.3.7 802.11n Aux mode, BPSK modulation, 6.5 / 7.25 Mbps data rate

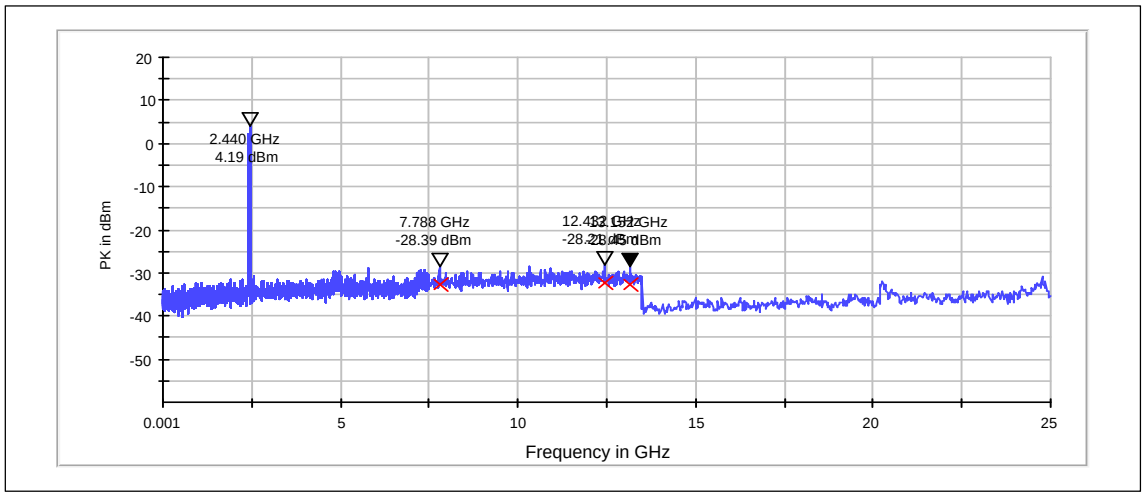
Channel 1 / 2412 MHz



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

Frequency [MHz]	P [dBc]	Result
13284.000	-33.31	PASSED
13488.000	-33.43	PASSED
12456.000	-34.00	PASSED

Channel 6 / 2437 MHz



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

Frequency [MHz]	P [dBc]	Result
12432.000	-32.40	PASSED
7788.000	-32.58	PASSED
13152.000	-32.65	PASSED

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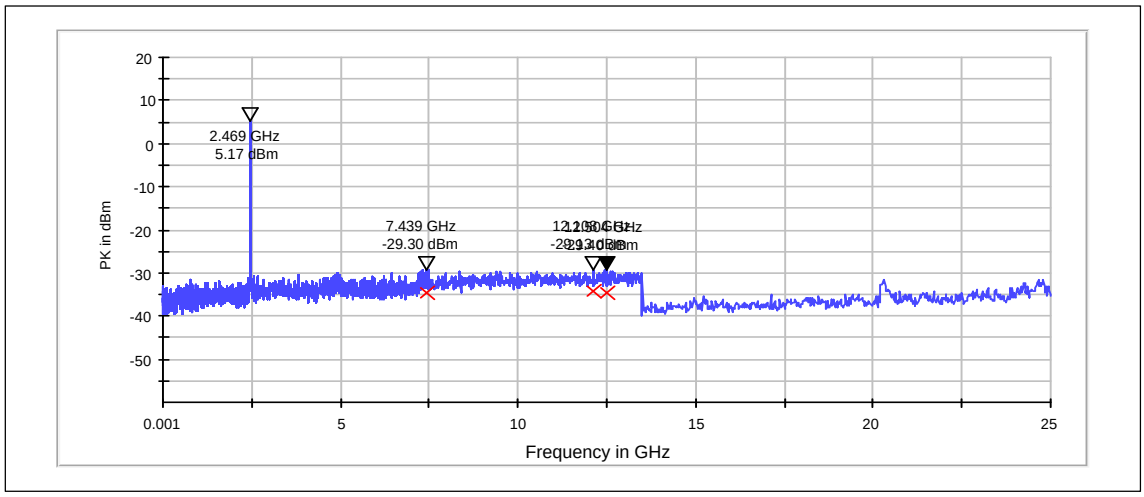
Channel 11 / 2462 MHz



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

Frequency [MHz]	P [dBc]	Result
12108.000	-34.30	PASSED
7438.800	-34.47	PASSED
12504.000	-34.57	PASSED

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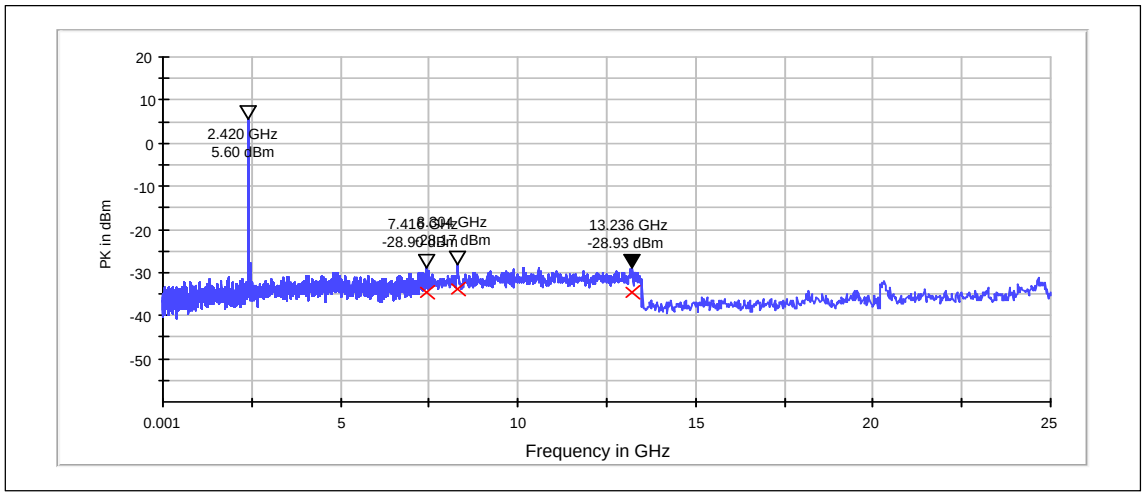
3.3.8 802.11g Aux mode, 16QAM modulation, 24 Mbps data rate

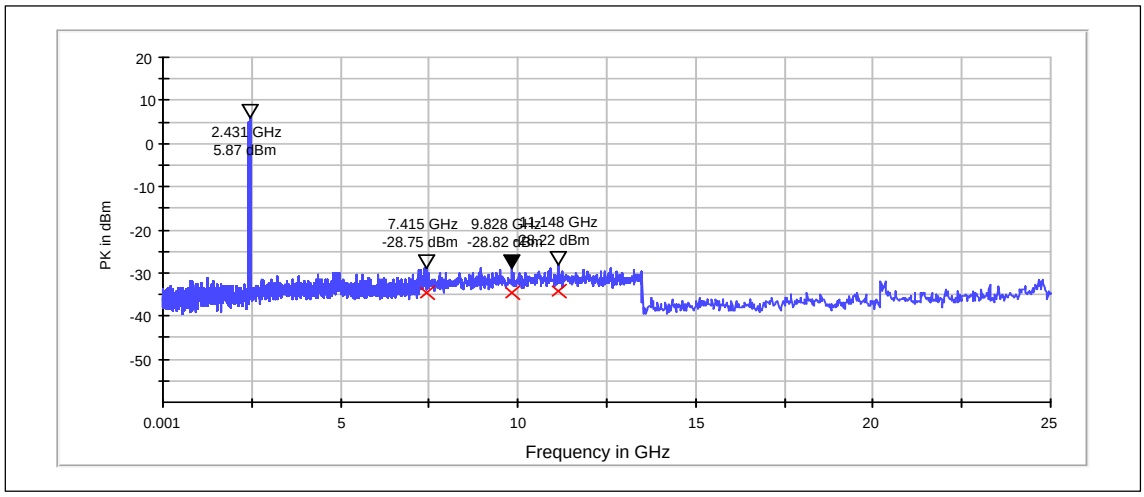
Channel 1 / 2412 MHz



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

Frequency [MHz]	P [dBc]	Result
8304.000	-33.77	PASSED
7416.000	-34.50	PASSED
13236.000	-34.53	PASSED

Channel 6 / 2437 MHz



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

Frequency [MHz]	P [dBc]	Result
11148.000	-34.09	PASSED
7415.400	-34.62	PASSED
9828.000	-34.69	PASSED

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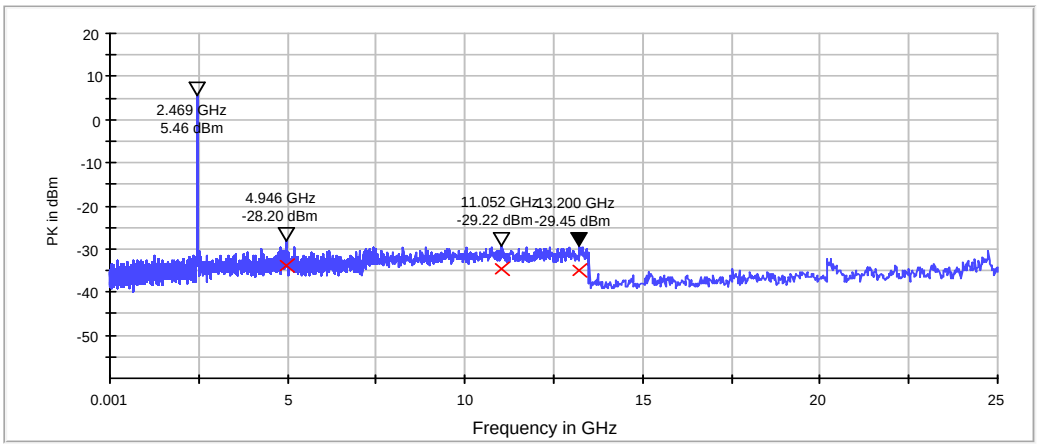
Channel 11 / 2462 MHz



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

Frequency [MHz]	P [dBc]	Result
4946.400	-33.66	PASSED
11052.000	-34.68	PASSED
13200.000	-34.91	PASSED

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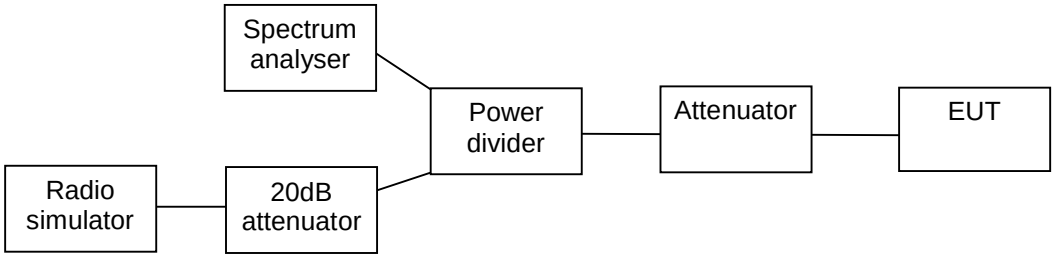
4. 6dB(bandwidth)

(FCC §15.247(a)(2), RSS-210 A8.2(a))

EUT with DUT number	RM-1085, DUT 100014
Accessories with DUT numbers	SD-241R, DUT 100017 ; WH-308, DUT 100029
Operation Voltage [V] / [Hz]	Nominal
Results	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	20 / 47 / 101.9
Date of measurements	03-Jul-2015
Measured by	Jari Keto

4.1. Test Setup



4.2. 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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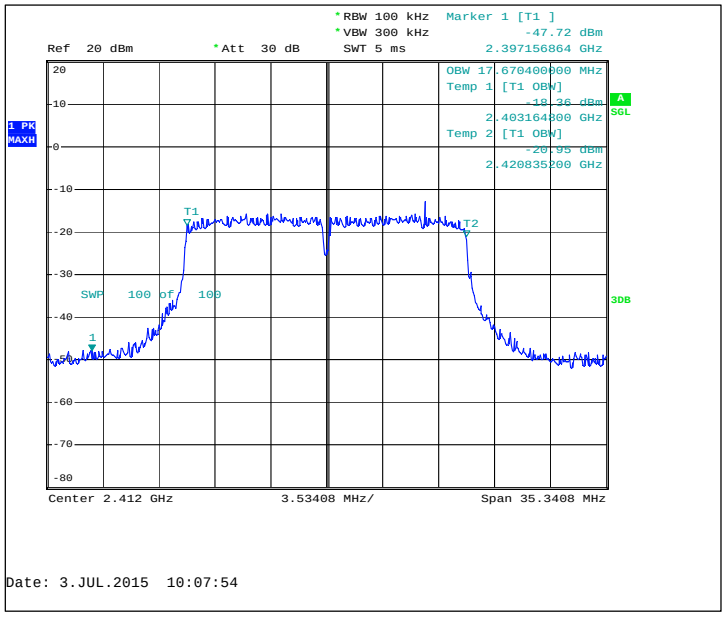
4.3. WLAN Test results

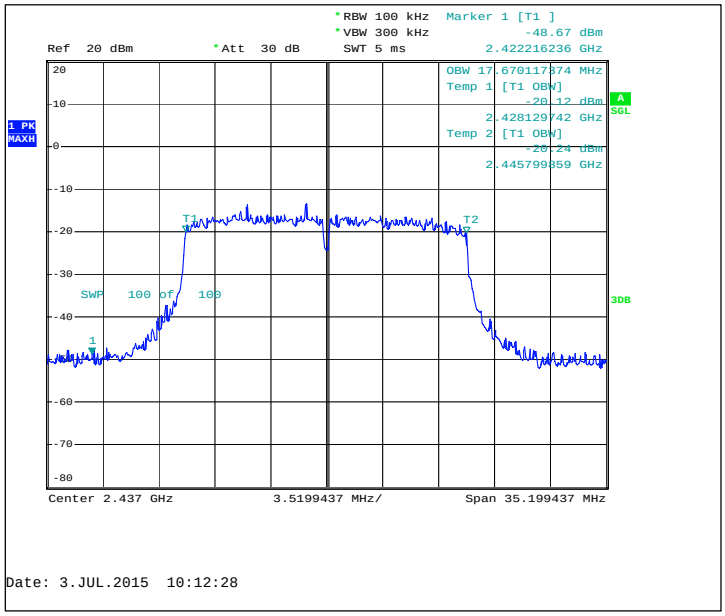
4.3.1 802.11n Main mode, BPSK modulation, 6.5 / 7.25 Mbps data rate

Channel / f_C [MHz]	6 dB bandwidth [kHz]	Result
1 / 2412	17670.4	PASSED
6 / 2437	17670.1	PASSED
11 / 2462	17670.1	PASSED

Channel 1 / 2412 MHz



Channel 6 / 2437 MHz



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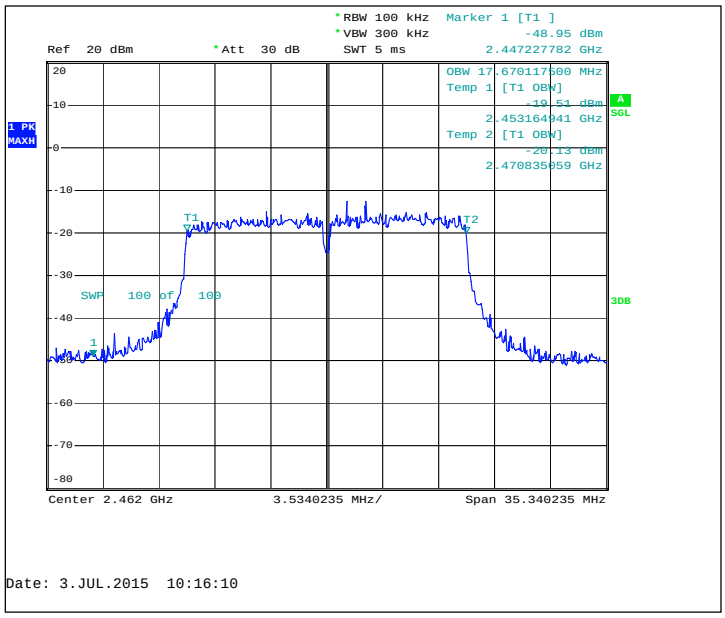
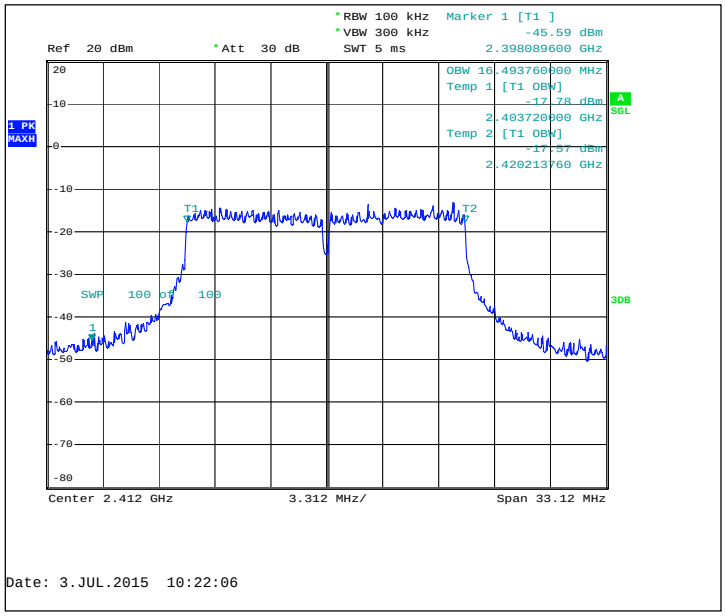
Channel 11 / 2462 MHz



4.3.2 802.11g Main mode, 16QAM modulation, 24 Mbps data rate

Channel / f_C [MHz]	6 dB bandwidth [kHz]	Result
1 / 2412	16493.8	PASSED
6 / 2437	16559.7	PASSED
11 / 2462	16559.5	PASSED

Channel 1 / 2412 MHz



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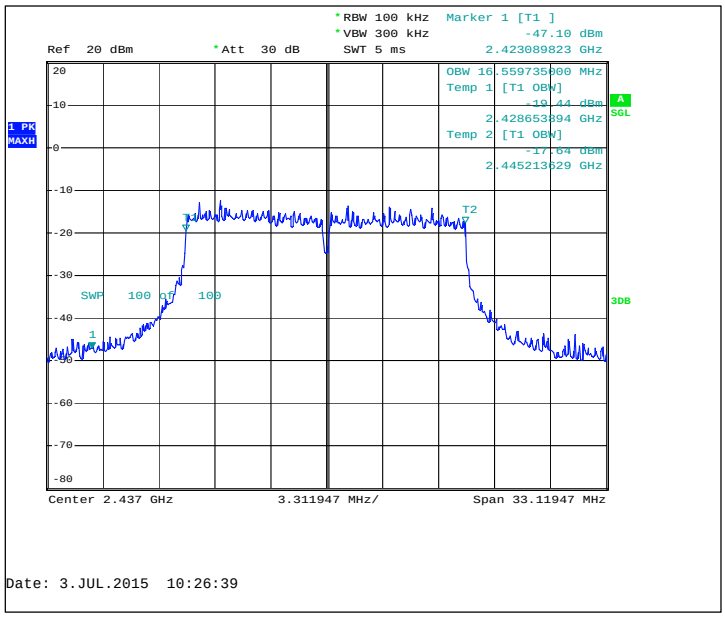
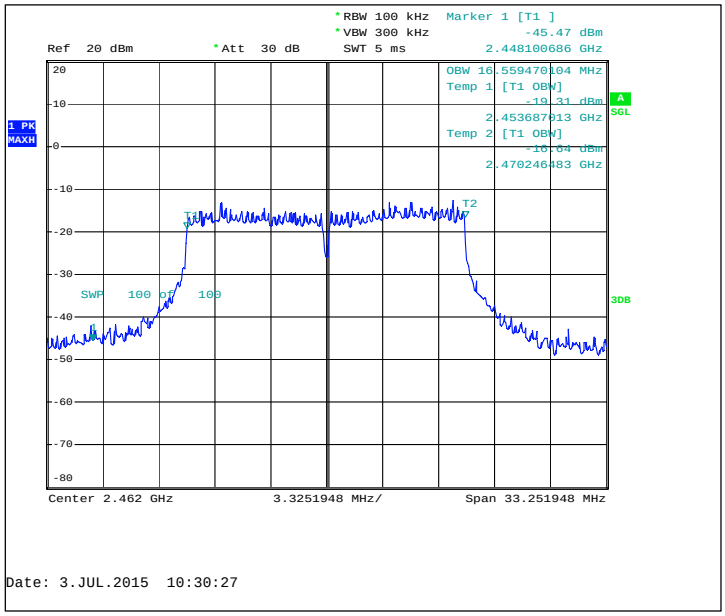
Channel 6 / 2437 MHz



Channel 11 / 2462 MHz



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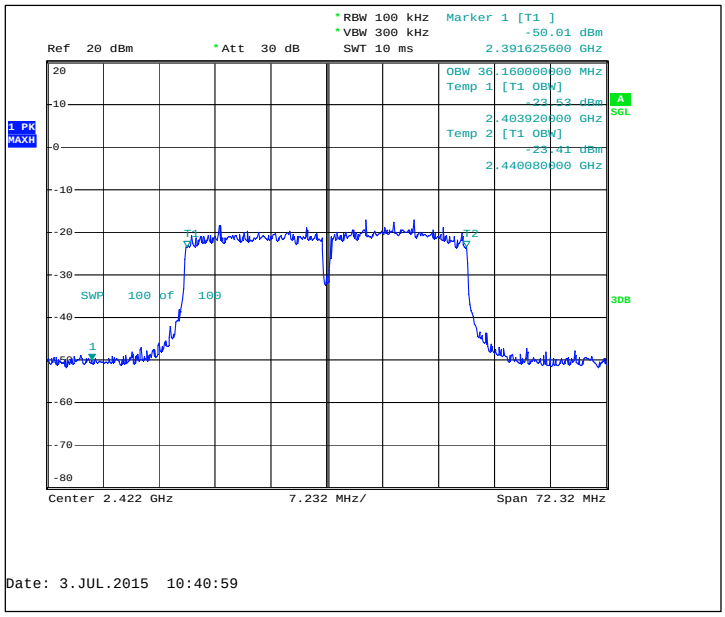
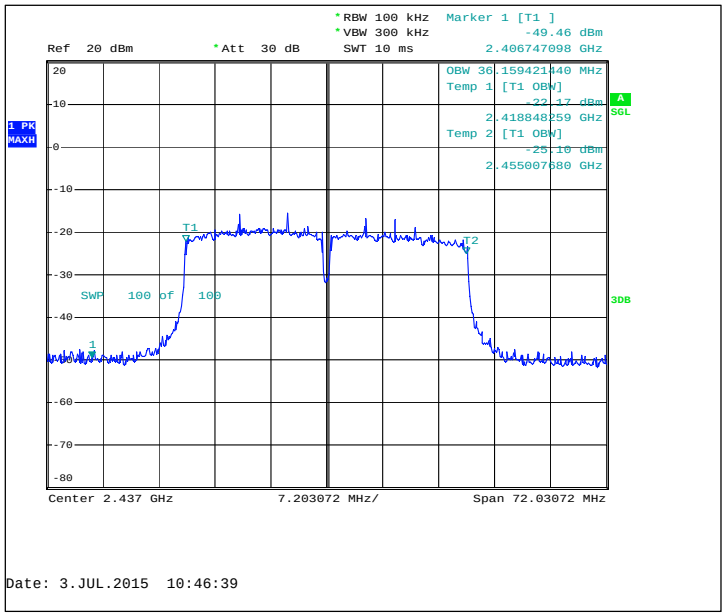
4.3.3 802.11n Main mode, BPSK modulation, 13.5 / 15.0 Mbps data rate

Channel / f_C [MHz]	6 dB bandwidth [kHz]	Result
1-5 / 2422	36160	PASSED
4-8 / 2437	36159.4	PASSED
7-11 / 2452	36448.7	PASSED

Channel 1-5 / 2422 MHz



Channel 4-8 / 2437 MHz



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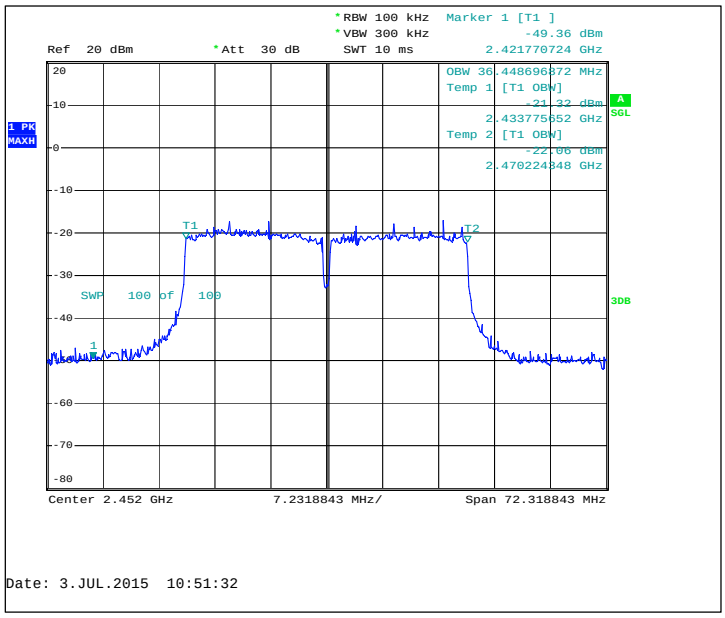
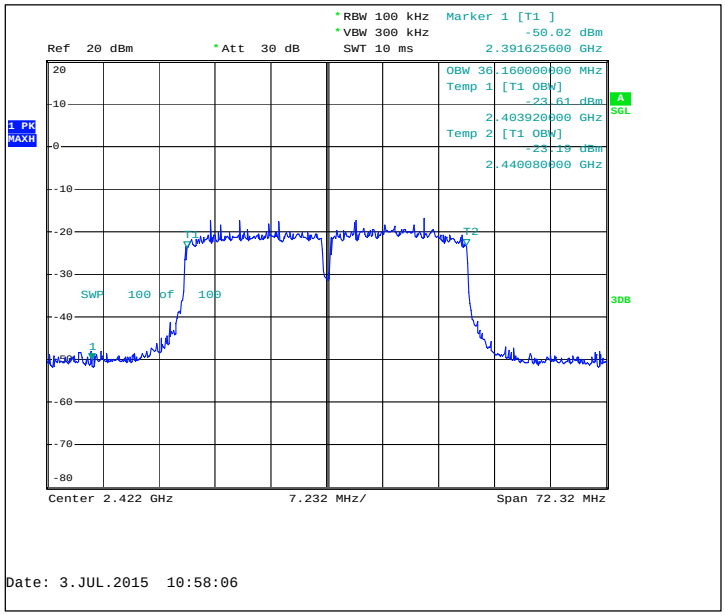
Channel 7-11 / 2452 MHz



4.3.4 802.11n Main mode, QPSK modulation, 27.0 / 30.0 Mbps data rate

Channel / f_C [MHz]	6 dB bandwidth [kHz]	Result
1-5 / 2422	36160	PASSED
4-8 / 2437	36159.4	PASSED
7-11 / 2452	36448.7	PASSED

Channel 1-5 / 2422 MHz



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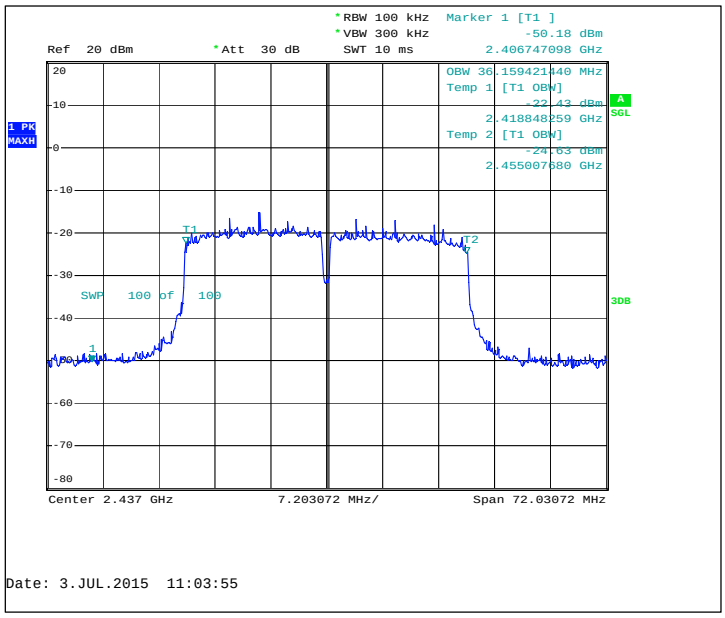
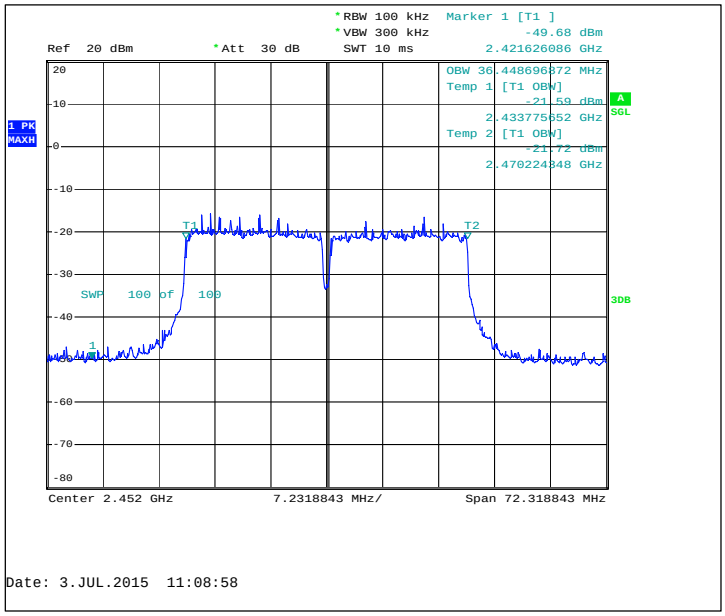
Channel 4-8 / 2437 MHz



Channel 7-11 / 2452 MHz



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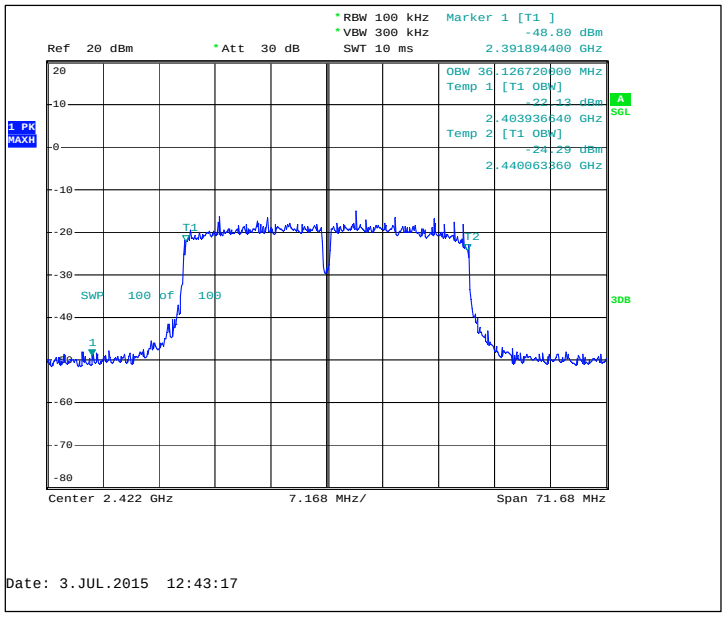
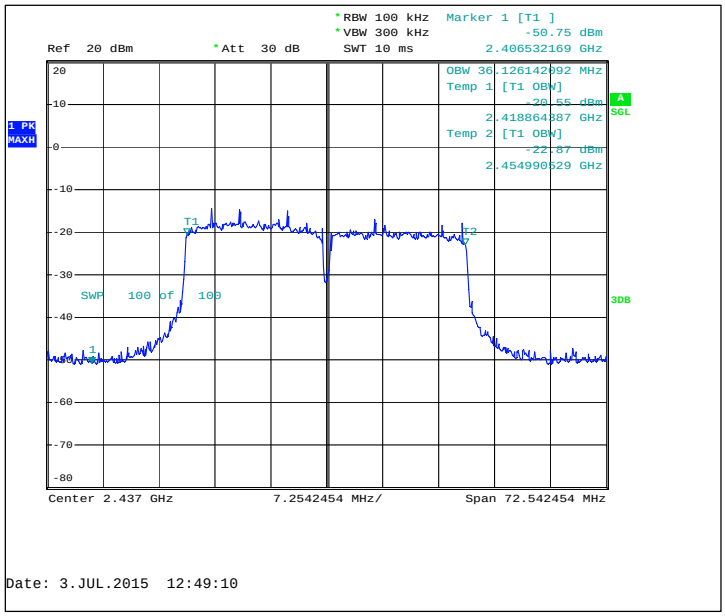
4.3.5 802.11n Aux mode, BPSK modulation, 13.5 / 15.0 Mbps data rate

Channel / f_C [MHz]	6 dB bandwidth [kHz]	Result
1-5 / 2422	36126.7	PASSED
4-8 / 2437	36126.1	PASSED
7-11 / 2452	36415.2	PASSED

Channel 1-5 / 2422 MHz



Channel 4-8 / 2437 MHz



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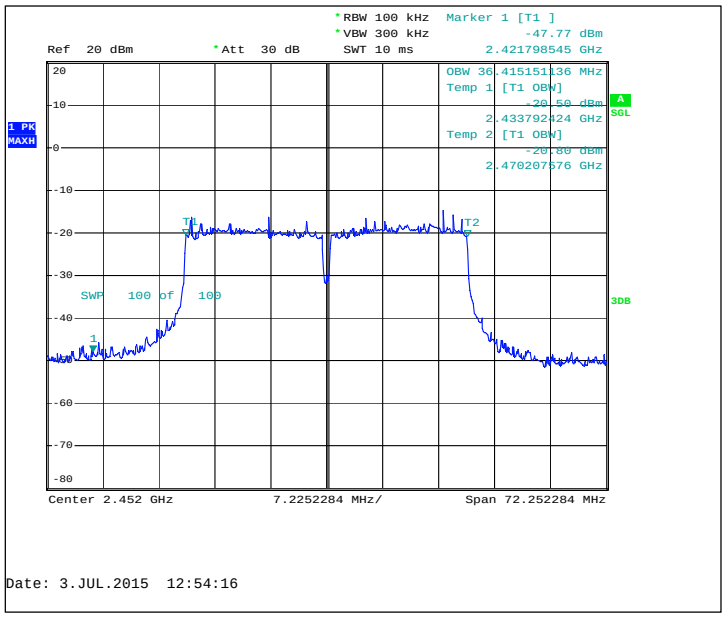
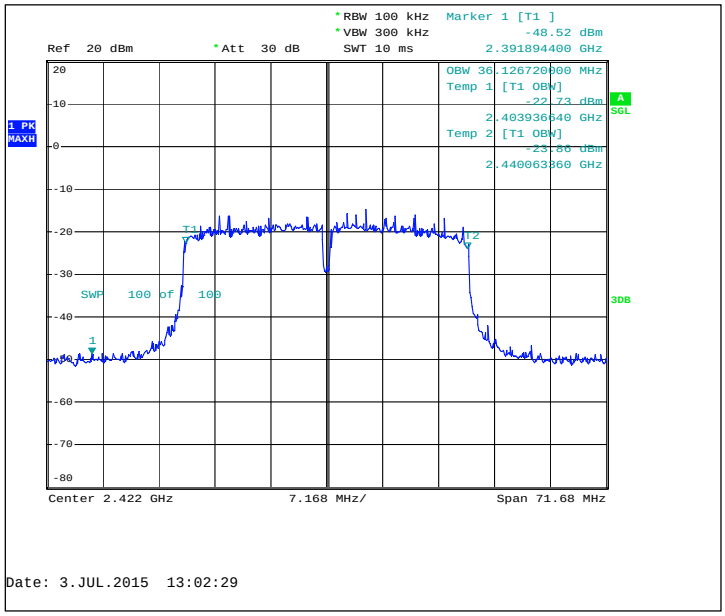
Channel 7-11 / 2452 MHz



4.3.6 802.11n Aux mode, QPSK modulation, 27.0 / 30.0 Mbps data rate

Channel / f_C [MHz]	6 dB bandwidth [kHz]	Result
1-5 / 2422	36126.7	PASSED
4-8 / 2437	36271.2	PASSED
7-11 / 2452	36271.2	PASSED

Channel 1-5 / 2422 MHz



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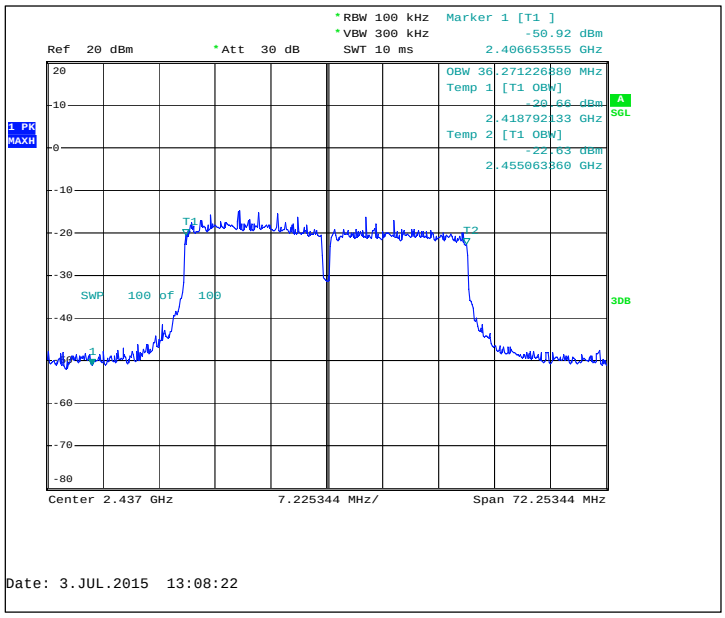
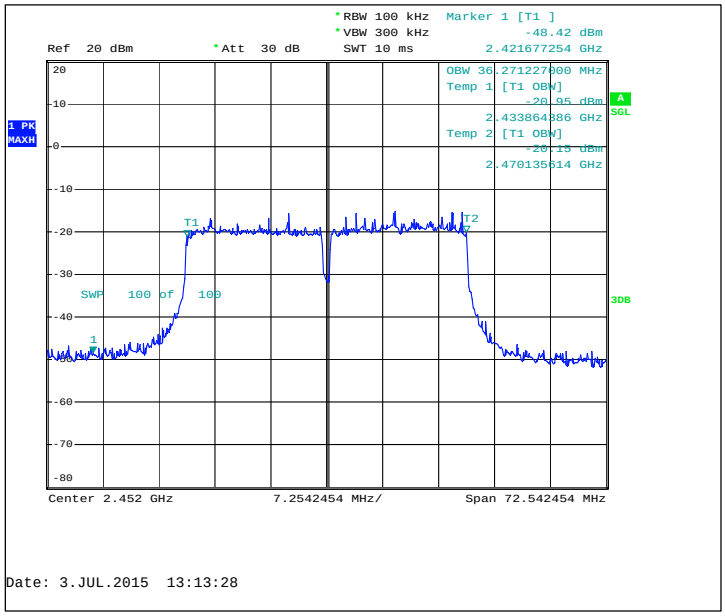
Channel 4-8 / 2437 MHz



Channel 7-11 / 2452 MHz



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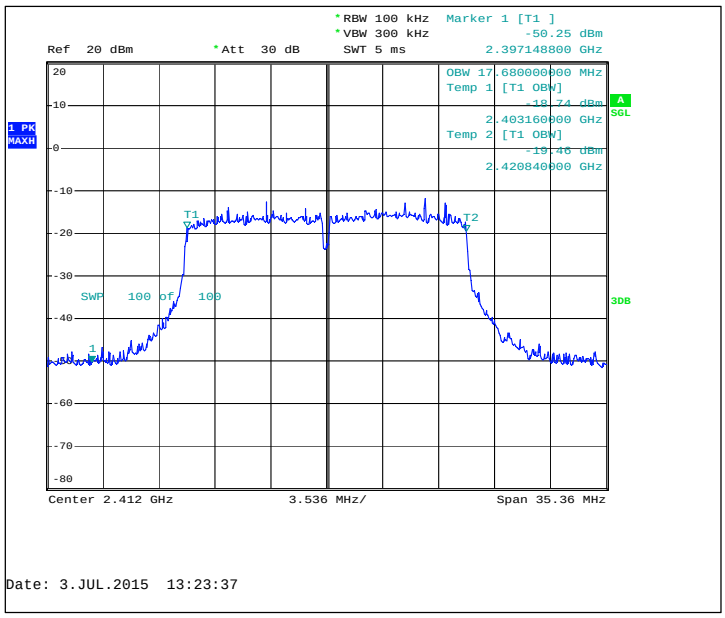
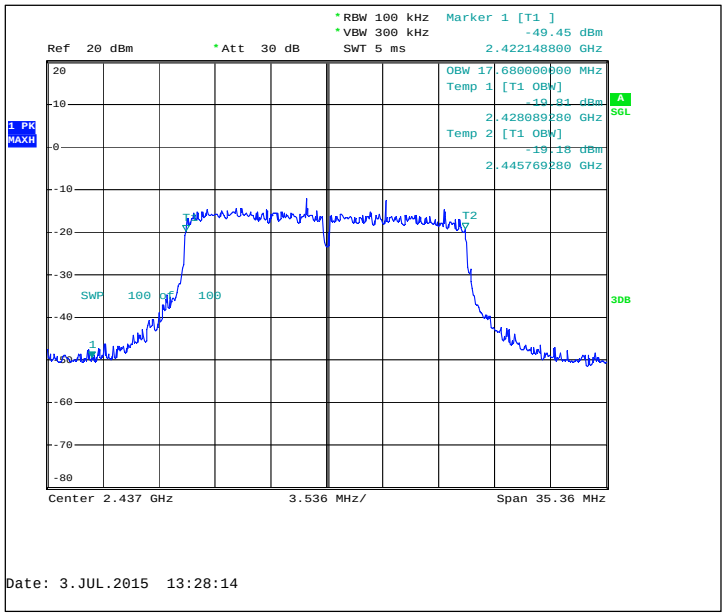
4.3.7 802.11n Aux mode, BPSK modulation, 6.5 / 7.25 Mbps data rate

Channel / f_C [MHz]	6 dB bandwidth [kHz]	Result
1 / 2412	17680	PASSED
6 / 2437	17680	PASSED
11 / 2462	17609.3	PASSED

Channel 1 / 2412 MHz



Channel 6 / 2437 MHz



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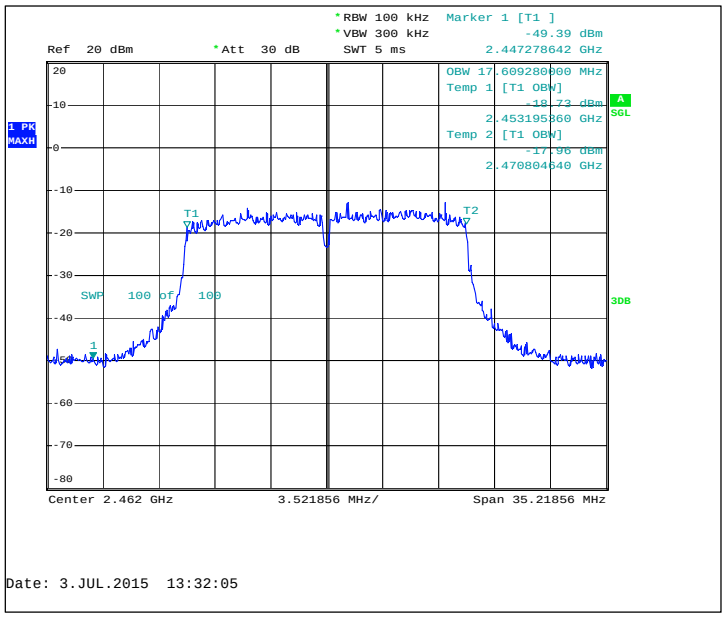
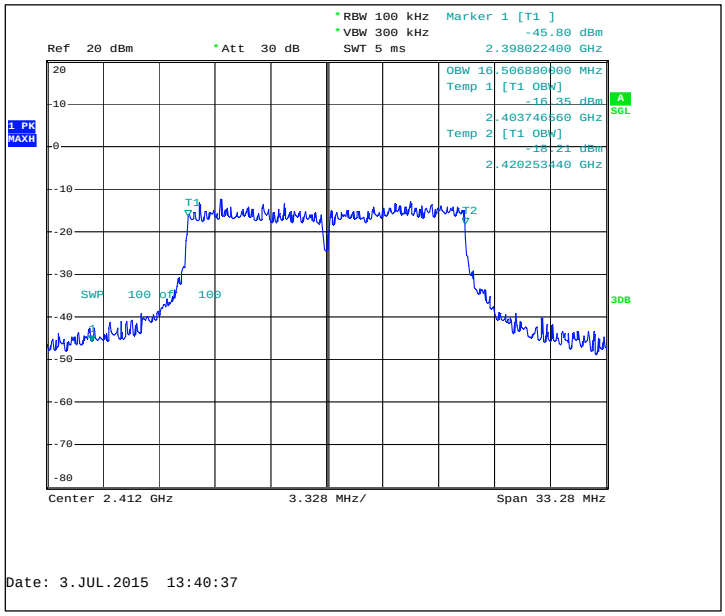
Channel 11 / 2462 MHz



4.3.8 802.11g Aux mode, 16QAM modulation, 24 Mbps data rate

Channel / f_C [MHz]	6 dB bandwidth [kHz]	Result
1 / 2412	16506.9	PASSED
6 / 2437	16505.8	PASSED
11 / 2462	16439.3	PASSED

Channel 1 / 2412 MHz



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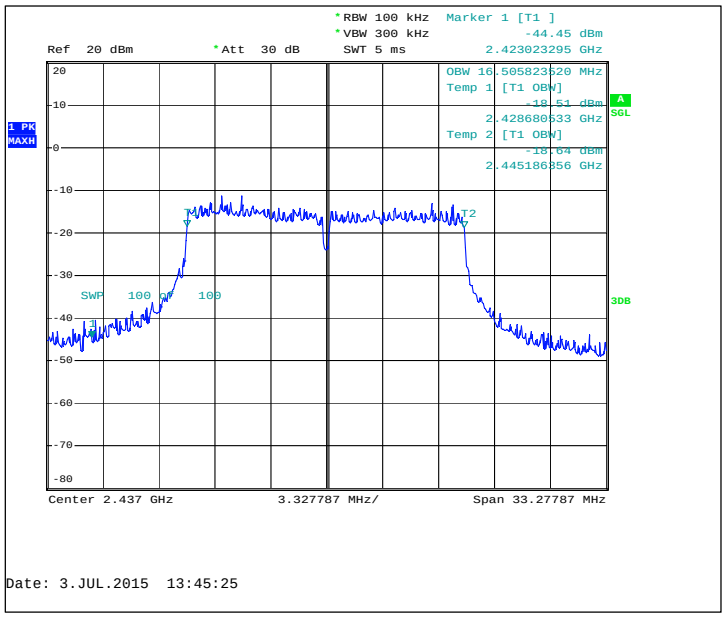
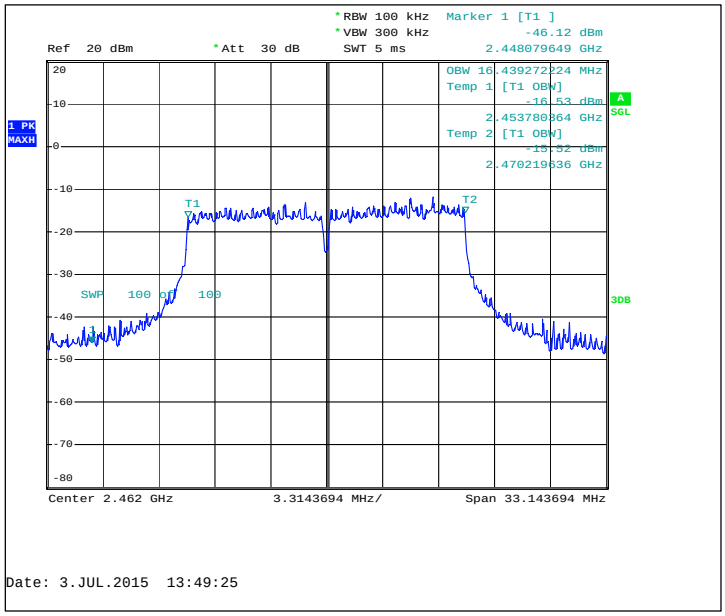
Channel 6 / 2437 MHz



Channel 11 / 2462 MHz



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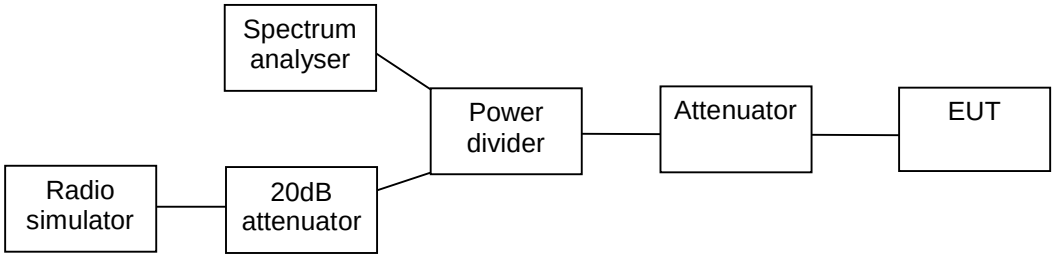
5. Power spectral density
(FCC §15.247(e), RSS-210 A8.2(b))

EUT with DUT number	RM-1085, DUT 100014
Accessories with DUT numbers	SD-241R, DUT 100017 ; WH-308, DUT 100029
Operation Voltage [V] / [Hz]	Nominal
Results	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	20 / 47 / 101.9
Date of measurements	03-Jul-2015
Measured by	Jari Keto

5.1. Test Setup



5.2. 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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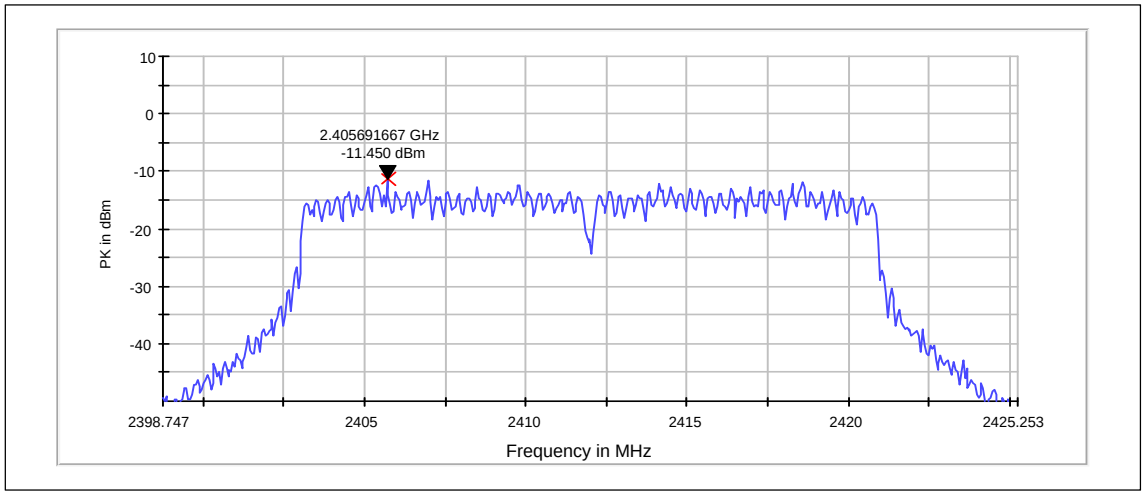
5.3. WLAN Test results

5.3.1 802.11n Main mode, BPSK modulation, 6.5 / 7.25 Mbps data rate

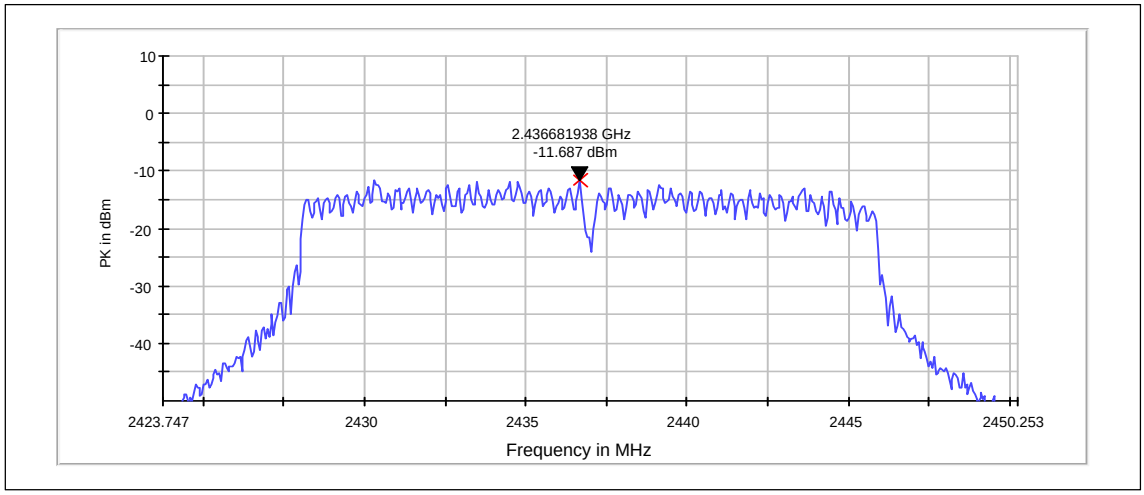
Peak (RBW: 3 kHz, VBW: 10 kHz, Max hold)

Channel / f_C [MHz]	P [dBm]	Result
1 / 2412	-11.45	PASSED
6 / 2437	-11.69	PASSED
11 / 2462	-10.17	PASSED

Channel 1 / 2412 MHz



Channel 6 / 2437 MHz



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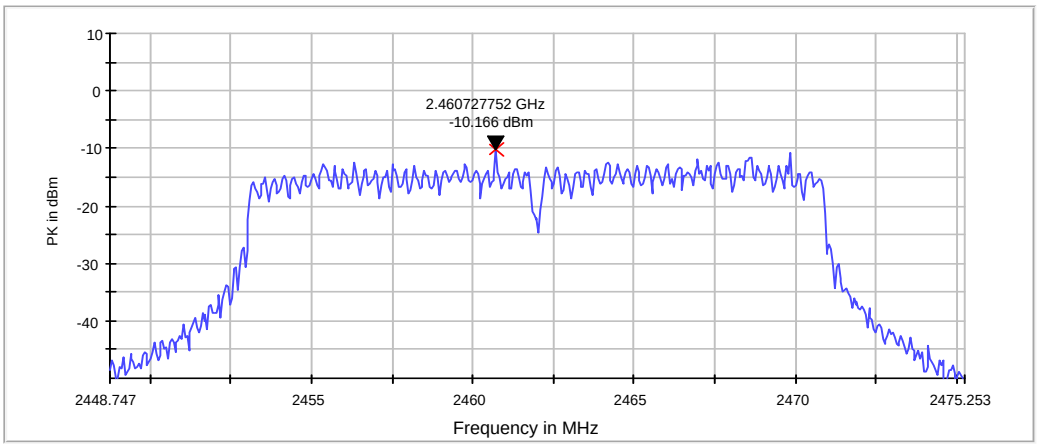
Channel 11 / 2462 MHz

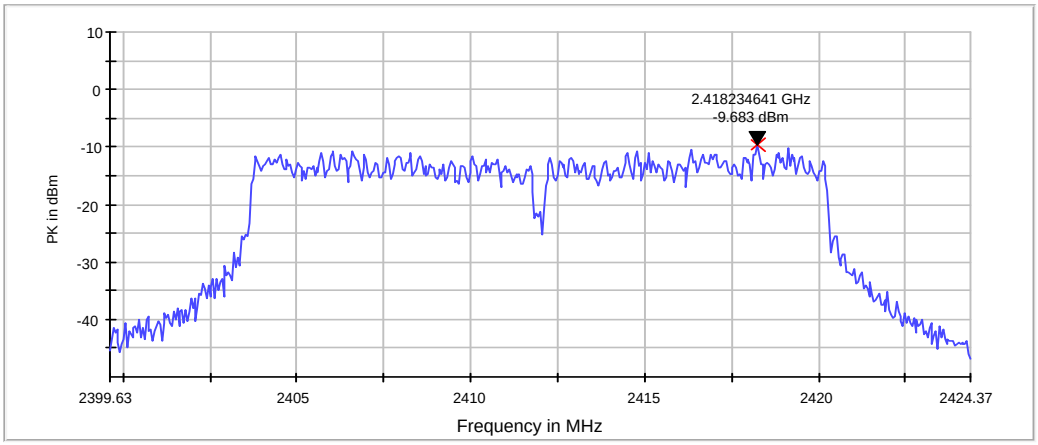


5.3.2 802.11g Main mode, 16QAM modulation, 24 Mbps data rate

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

Channel / f_C [MHz]	P [dBm]	Result
1 / 2412	-9.68	PASSED
6 / 2437	-9.99	PASSED
11 / 2462	-9.6	PASSED

Channel 1 / 2412 MHz



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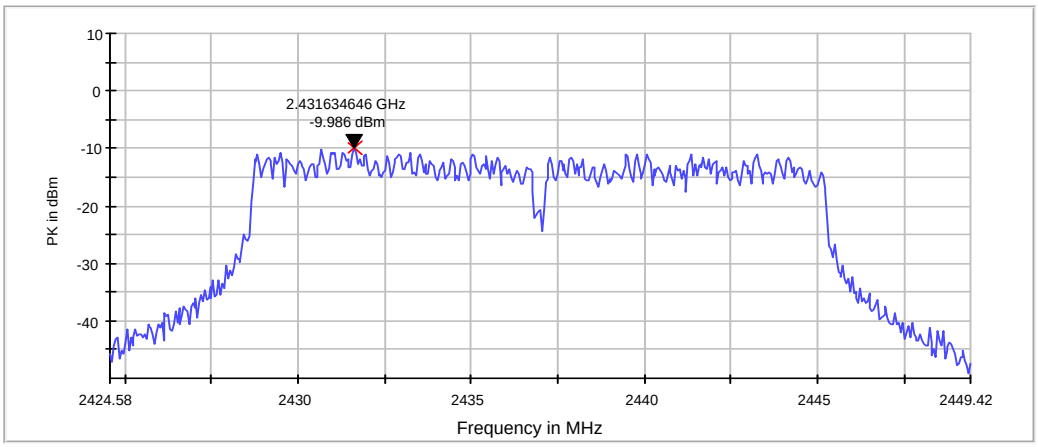
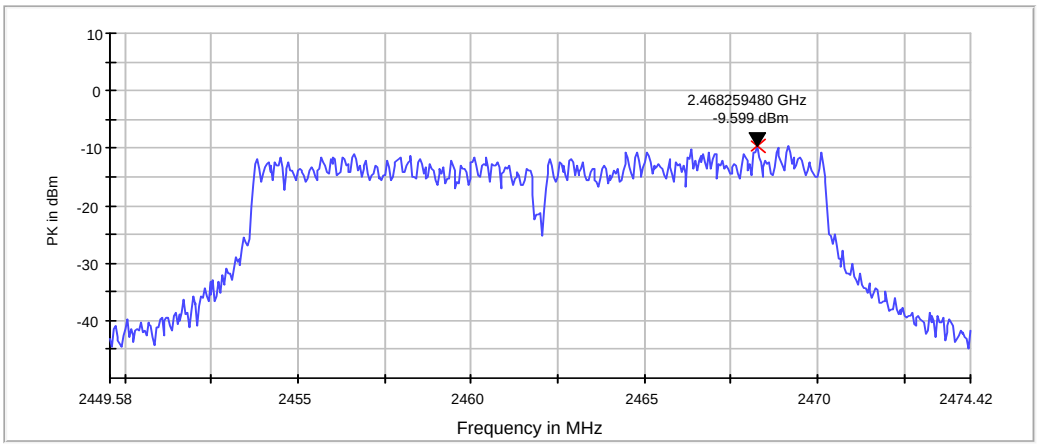
Channel 6 / 2437 MHz



Channel 11 / 2462 MHz



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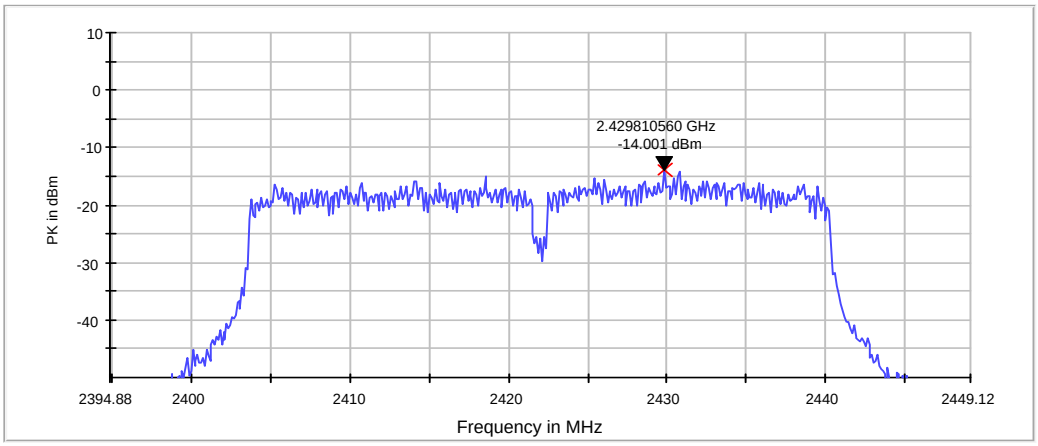
5.3.3 802.11n Main mode, BPSK modulation, 13.5 / 15.0 Mbps data rate

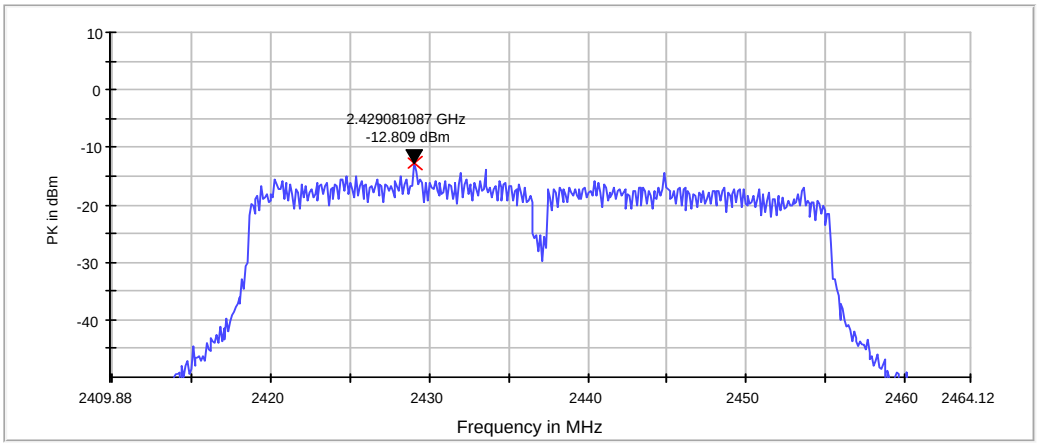
Peak (RBW: 3 kHz, VBW: 10 kHz, Max hold)

Channel / f_C [MHz]	P [dBm]	Result
1-5 / 2422	-14	PASSED
4-8 / 2437	-12.81	PASSED
7-11 / 2452	-14.09	PASSED

Channel 1-5 / 2422 MHz



Channel 4-8 / 2437 MHz



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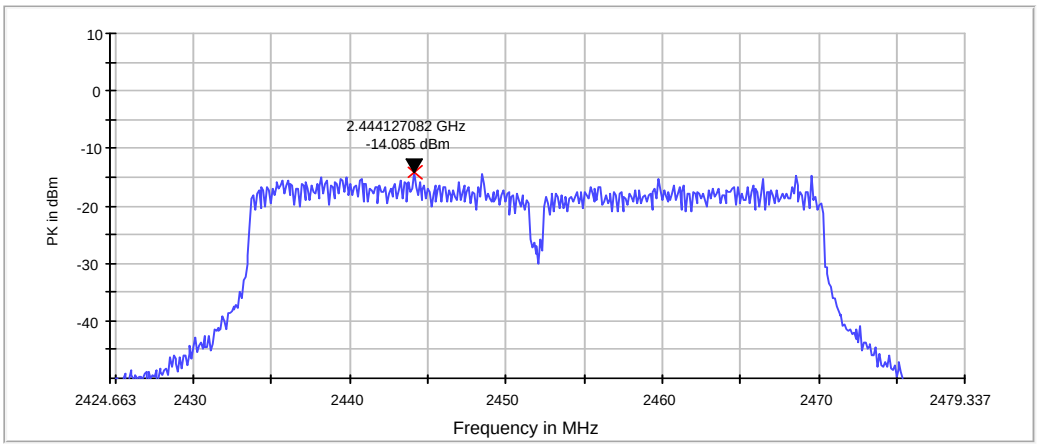
Channel 7-11 / 2452 MHz

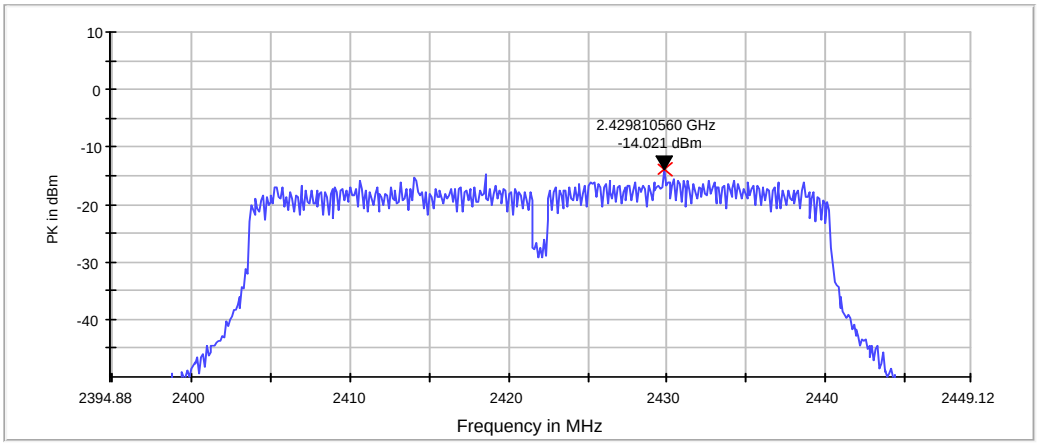


5.3.4 802.11n Main mode, QPSK modulation, 27.0 / 30.0 Mbps data rate

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

Channel / f_C [MHz]	P [dBm]	Result
1-5 / 2422	-14.02	PASSED
4-8 / 2437	-13.92	PASSED
7-11 / 2452	-14.36	PASSED

Channel 1-5 / 2422 MHz



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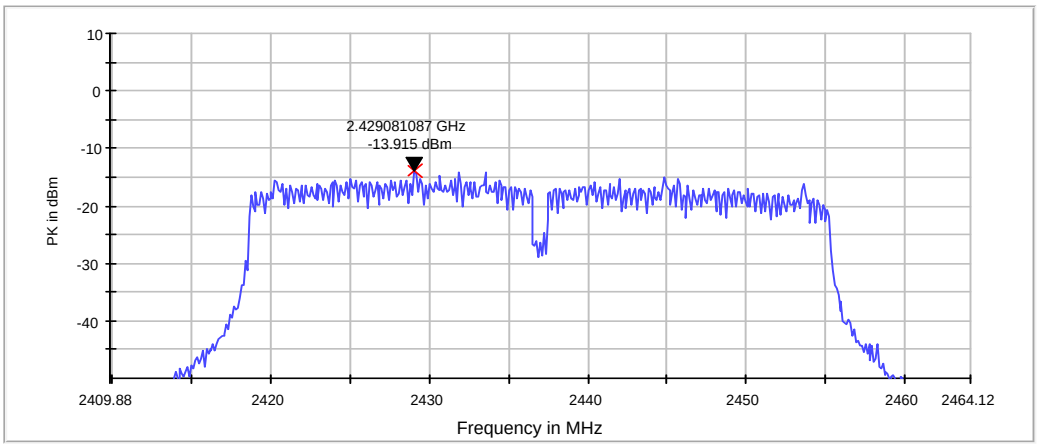
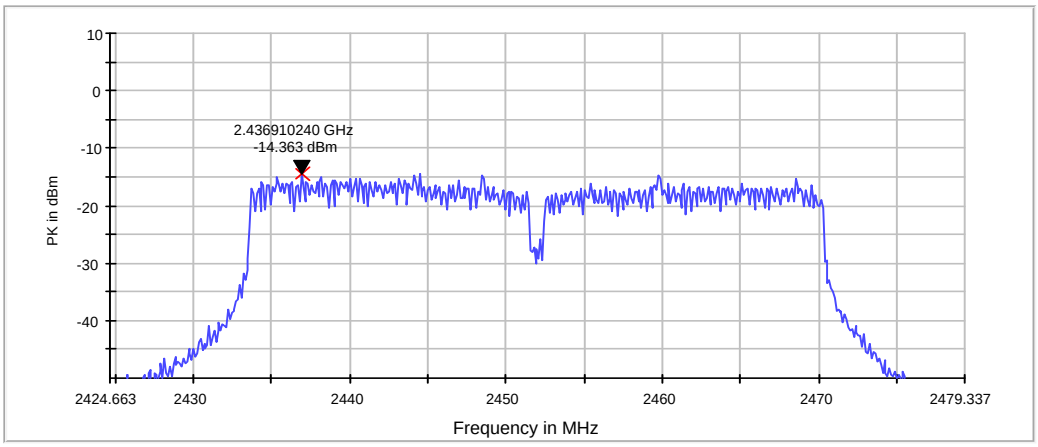
Channel 4-8 / 2437 MHz



Channel 7-11 / 2452 MHz



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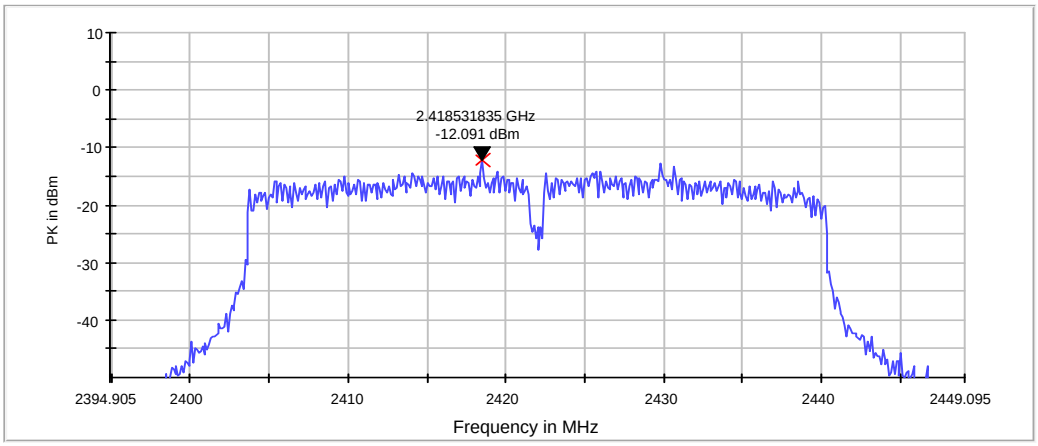
5.3.5 802.11n Aux mode, BPSK modulation, 13.5 / 15.0 Mbps data rate

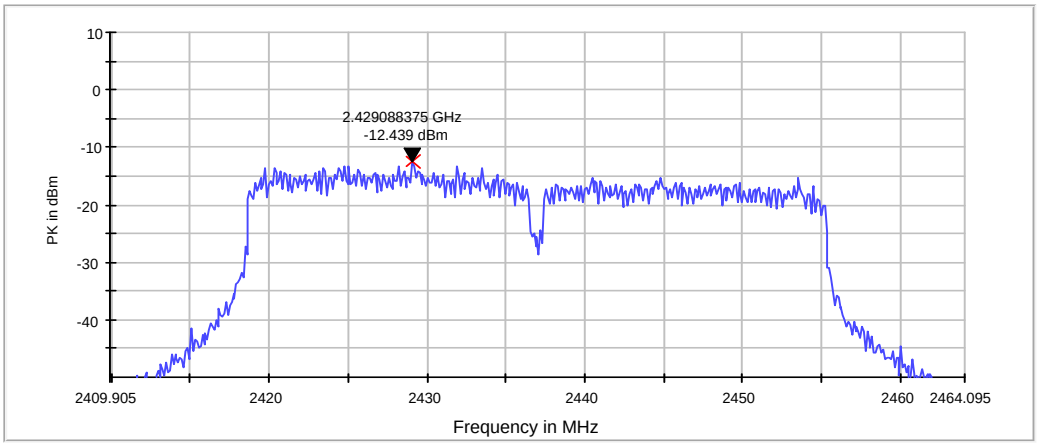
Peak (RBW: 3 kHz, VBW: 10 kHz, Max hold)

Channel / f_C [MHz]	P [dBm]	Result
1-5 / 2422	-12.09	PASSED
4-8 / 2437	-12.44	PASSED
7-11 / 2452	-12.75	PASSED

Channel 1-5 / 2422 MHz



Channel 4-8 / 2437 MHz



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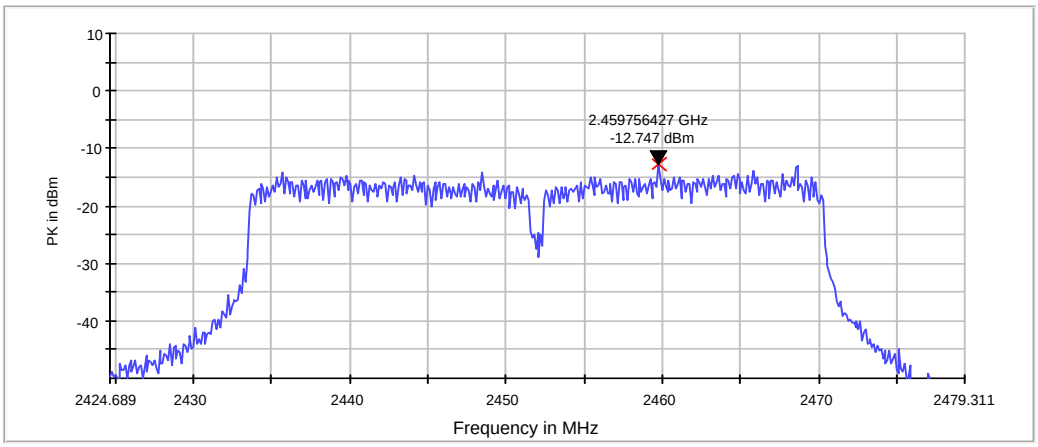
Channel 7-11 / 2452 MHz

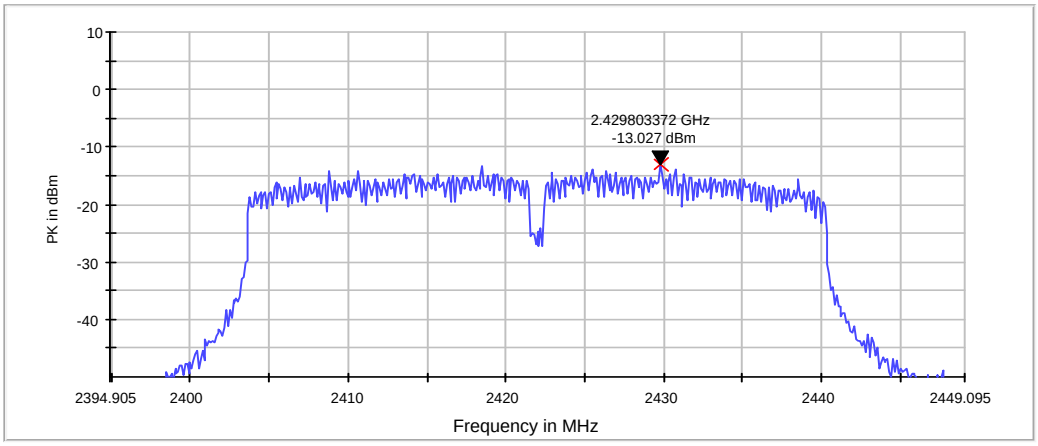


5.3.6 802.11n Aux mode, QPSK modulation, 27.0 / 30.0 Mbps data rate

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

Channel / f_C [MHz]	P [dBm]	Result
1-5 / 2422	-13.03	PASSED
4-8 / 2437	-13.1	PASSED
7-11 / 2452	-13	PASSED

Channel 1-5 / 2422 MHz



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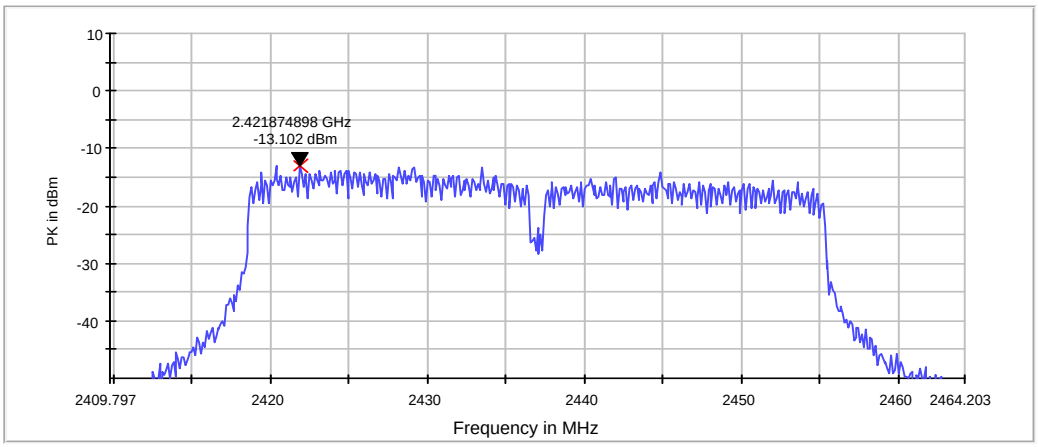
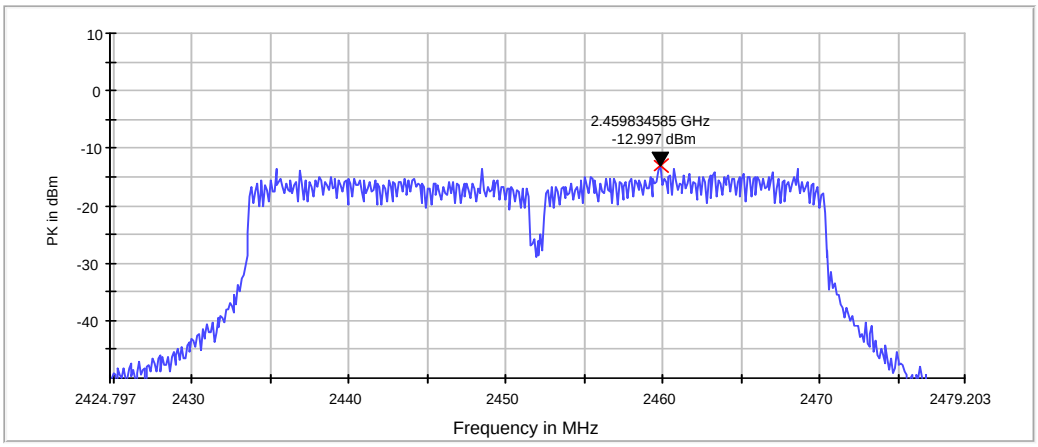
Channel 4-8 / 2437 MHz



Channel 7-11 / 2452 MHz



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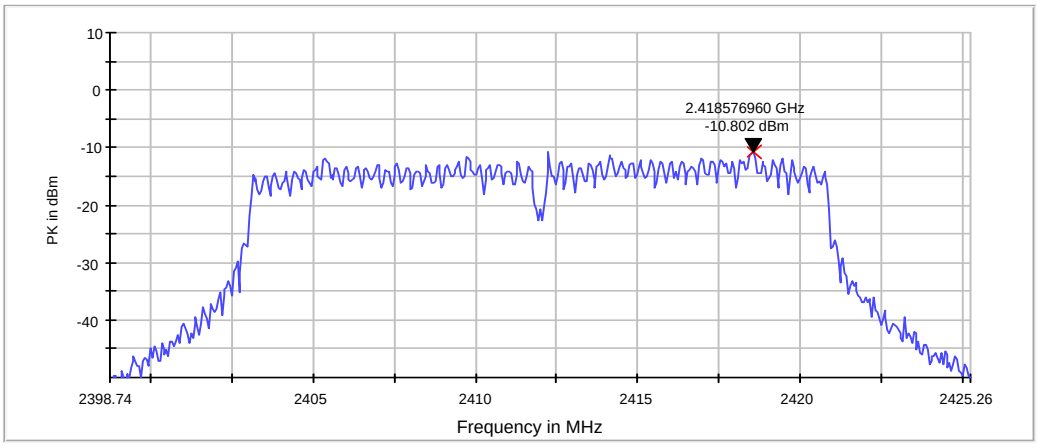
5.3.7 802.11n Aux mode, BPSK modulation, 6.5 / 7.25 Mbps data rate

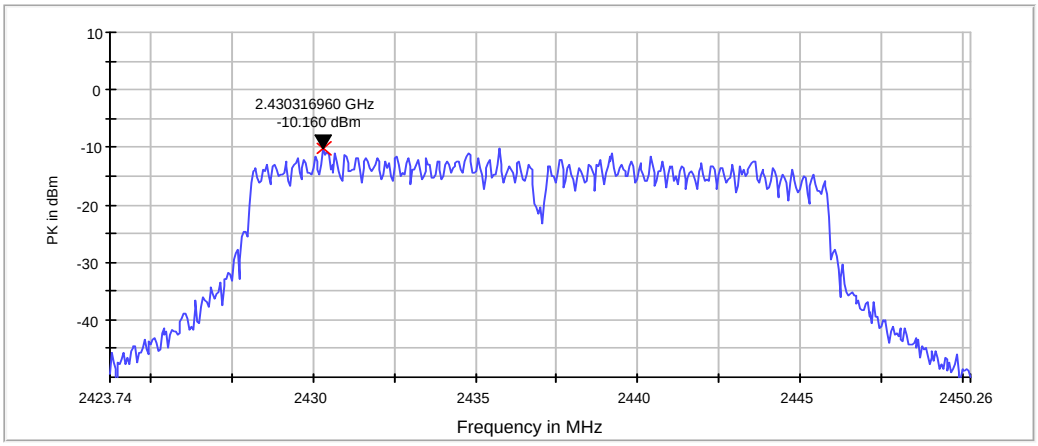
Peak (RBW: 3 kHz, VBW: 10 kHz, Max hold)

Channel / f_C [MHz]	P [dBm]	Result
1 / 2412	-10.8	PASSED
6 / 2437	-10.16	PASSED
11 / 2462	-10.3	PASSED

Channel 1 / 2412 MHz



Channel 6 / 2437 MHz



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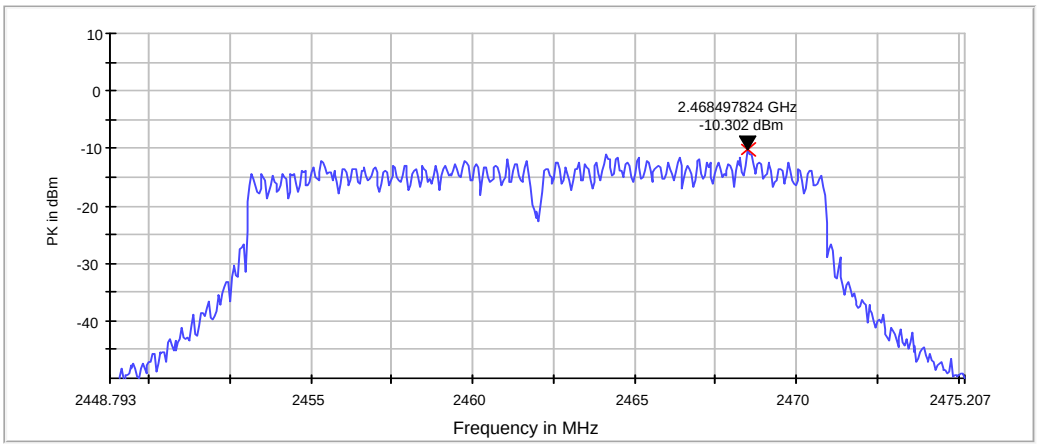
Channel 11 / 2462 MHz

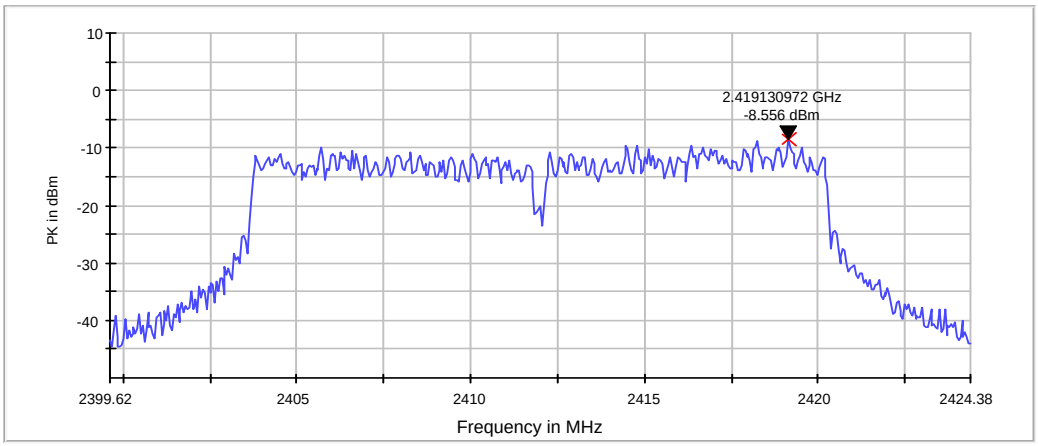


5.3.8 802.11g Aux mode, 16QAM modulation, 24 Mbps data rate

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

Channel / f_C [MHz]	P [dBm]	Result
1 / 2412	-8.56	PASSED
6 / 2437	-9.02	PASSED
11 / 2462	-8.83	PASSED

Channel 1 / 2412 MHz



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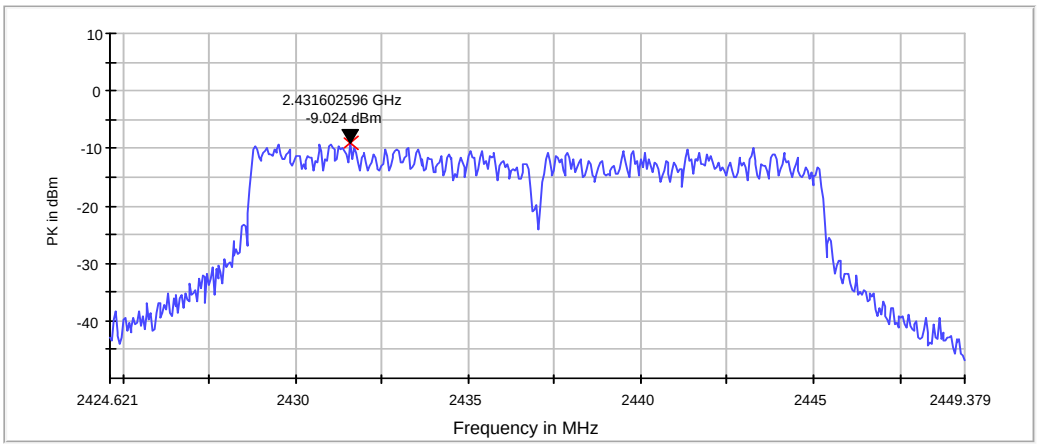
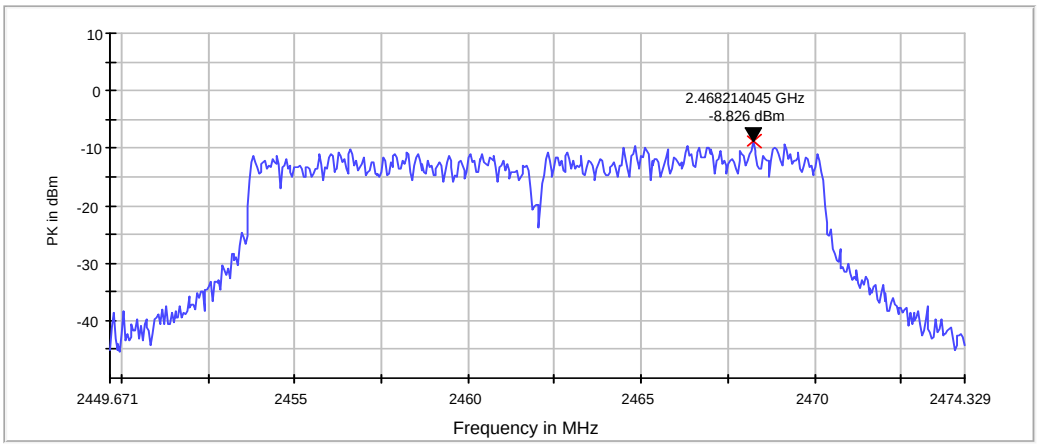
Channel 6 / 2437 MHz



Channel 11 / 2462 MHz



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6. Test Equipment

6.1. Conducted measurements

Eq. No	Equipment	Type	Manufacturer	Used in
6039	USB Interface	5541765	Testo	22/24/27, 15C, 15B
6044	V-network	ESH3-Z6	R&S	-
2059	V-network	ESH3-Z6	R&S	-
1759	LISN 50 µH	ESH3-Z5	R&S	22/24/27, 15C, 15B
2097	Pulse Limiter	ESH3-Z2	R&S	22/24/27, 15C, 15B
1999	Receiver	ESIB26	R&S	22/24/27, 15C, 15B
2180	Communication Tester	CMU200	R&S	22/24/27, 15C, 15B
2390	Directional Coupler	DC2600	AR	-
-	RF immunity / Emission Software	EMC32	R&S	22/24/27, 15C, 15B
2060	LISN 50 µH	ESH3-Z5	R&S	15C, 15B
1759	LISN 50 µH	ESH3-Z5	R&S	15C, 15B
2039	Power Supply	PL330QMD	Thurlby	15C, 15B
6036	Data Logger	175-H2	Testo	22/24/27, 15C, 15B
2359	Temperature Test Chamber	VT4002	Vötsch	22/24/27
2352	Spectrum Analyzer	FSP-30	R&S	22/24/27, 15C
6109	Communication Tester	CMU200	R&S	22/24/27, 15C
6246	Power Supply	66332A	HP	22/24/27, 15C
1992	Signal Generator	83630B	Agilent	15C, 15B
6098	Signal Generator	8648C	Agilent	-
6046	Attenuator 10dB	8493C	Agilent	22/24/27, 15C
6047	Attenuator 20dB	8493C	Agilent	22/24/27, 15C
6045	Power splitter	11667B	Agilent	22/24/27, 15C
6247	Communication Tester	CBT	R&S	22/24/27, 15C 15B
6052	Communication Tester	CMU200	R&S	22/24/27, 15C 15B
6248	Power Supply	6632B	-	22/24/27, 15C 15B
6106	Spectrum Analyzer	FSP-30	R&S	22/24/27, 15C 15B
6113	Signal Generator	SMF100A	R&S	22/24/27, 15C 15B
6202	Temperature Test Chamber	VT4002	Vötsch	22/24/27, 15C 15B
6122	Power Splitter	11667B	Agilent	22/24/27, 15C 15B
6134	Attenuator 10dB	BW-S10-2W263+	Mini-Circuits	22/24/27, 15C
6136	Attenuator 20dB	BW-S20-2W263+	Mini-Circuits	22/24/27, 15C
6103	Bluetooth tester	CBT	R&S	22/24/27, 15C 15B
6250	Power Supply	6651A	Agilent	22/24/27, 15C 15B
6108	Communication Tester	CMU200	R&S	22/24/27, 15C 15B
6105	Spectrum Analyzer	FSV-30	R&S	22/24/27, 15C 15B
6251	Temperature Test Chamber	VT4002	Vötsch	22/24/27, 15C 15B
6243	Power Splitter	1167B	Agilent	22/24/27, 15C 15B
6245	Attenuator 10dB	BW-S10-2W263+	Mini-Circuits	22/24/27, 15C 15B
6244	Attenuator 20dB	BW-S20-2W263+	Mini-Circuits	22/24/27, 15C 15B

6.2. Radiated measurements

Eq. No	Equipment	Type	Manufacturer	Used in
2388	Bluetooth Tester	CBT	R&S	15B
10479	Communication Tester	CMW500	R&S	22/24/27, 15C, 15B
2347	Communication Tester	CMU200	R&S	22/24/27, 15C, 15B
2009	Signal Generator	SMP 22	R&S	22/24/27, 15C, 15B
2348	Controller	G-1000DXC	Yaesu	22/24/27, 15C, 15B
2349	Computer Controller	g-1000DXC	Yaesu	22/24/27, 15C, 15B
2116	Controller	EMCO 2090	ETS	22/24/27, 15C, 15B
2109	Power Supply	PL330QMD	Thurlby	22/24/27, 15C, 15B
2353	Receiver	ESIB26	R&S	22/24/27, 15C, 15B
6115	Open switch and control unit	OSP 130	R&S	22/24/27, 15C 15B
6116	Open switch and control unit	OSP 150	R&S	22/24/27, 15C 15B

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Eq. No	Equipment	Type	Manufacturer	Used in
6117	Open switch and control unit	OSP 150	R&S	22/24/27, 15C 15B
6131	Notch Filter	WRCT902.4-0.4/40-8SS	Wainwright	22/24/27, 15C 15B
6130	Notch Filter	WRCD1880-1.1.25/50-10SS	Wainwright	22/24/27
6159	Band Reject Filter	WRCD1747.8-0.4/40-5SS	Wainwright	22/24/27,15C, 15B
6158	Band Reject Filter	WRCT836.6-0.4/40-8SS	Wainwright	22/24/27,15C, 15B
6197	Band Reject Filter	WRCJV2531/2539-2523/2547-60/12SS	Wainwright	22/24/27,15C, 15B
2231	Band Reject Filter	WRCG1947/1953-1940/1960-40/6SS	Wainwright	22/24/27,15C, 15B
2391	Band Reject Filter	WRCG1729.4/1735.4-1722.4/1742.4-40/6SS	Wainwright	27
2386	Band Reject Filter	WRCG1764.4/1770.4-1760.4/1774.4-40/6SS	Wainwright	22/24/27, 15C, 15B
2385	Band Reject Filter	WRCG1744.4/1750.4-1740.4/1754.4-40/6SS	Wainwright	22/24/27, 15C, 15B
2357	Band Reject Filter	WRCG2400/2483-2390/2493-35/10SS	Wainwright	15C
2188	Preamplifier	AFS4-00100300-20-23P-6	Miteq	22/24/27, 15C, 15B
6195	High Pass Filter	-	Wainwright	22/24/27, 15C, 15B
2364	Band Reject Filter	WRCG1877/1883 - 1870/1890-40/6SS	Wainwright	24
2361	Anechoic Chamber	3 m Semi / Full Anechoic Chamber	Euroshield	22/24/27, 15C, 15B
6212	Antenna Array system	-	TCC	22/24/27, 15C, 15B
-	RF immunity / Emission Software	EMC32	R&S	22/24/27, 15C, 15B
6089	Antenna	HFH2-Z2	R&S	15C, 15B
2027	CDN	M2 (modified) DC1	MEB	22/24/27, 15C, 15B
2028	CDN	M3 (modified) DC2	MEB	22/24/27, 15C, 15B
2176	CDN	CDN 801-M3	Lüthi	22/24/27, 15C, 15B
2135	CDN	CDN 801-M3	Lüthi	22/24/27, 15C, 15B
2029	Power Supply	PL330	Thurlby	22/24/27, 15C
6038	Data Logger	Testo 580	Testo	22/24/27, 15C, 15B
6037	Data Logger	175-H2	Testo	22/24/27, 15C, 15B
6039	USB Interface	5541765	Testo	22/24/27, 15C, 15B

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