TEST REPORT

No. I23N01645-WLAN 2.4GHz

for

unitech electronics co., ltd.

Rugged Tablet

Model Name: RT112

with

Hardware Version: V1.2

Software Version: IRIS_V03.29b01_20230920

FCC ID: HLERT112BWN

ISED Number: 6724A-RT112BWN

Issued Date: 2023-12-20

Designation Number: CN1210

Note:

The test results in this test report relate only to the devices specified in this report. This report shall not be reproduced except in full without the written approval of SAICT.

Test Laboratory:

Shenzhen Academy of Information and Communications Technology

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REPORT HISTORY

Report Number	Revision	Description	Issue Date
I23N01645-WLAN 2.4GHz	Rev.0	1st edition	2023-12-20

Note: the latest revision of the test report supersedes all previous versions.

CONTENTS

1. Summary of Test Report

1.1. Test Items

Description	Rugged Tablet
Model Name	RT112
Applicant's name	unitech electronics co., ltd.
Manufacturer's Name	unitech electronics co., ltd.

1.2. Test Standards

FCC Part15-2021; ANSI C63.10-2013; RSS-247 Issue 3; RSS-Gen Issue 5

1.3. Test Result

Pass

Please refer to 5.2 Test Results.

1.4. Testing Location

Address: Building G, Shenzhen International Innovation Center, No.1006 Shennan Road, Futian District, Shenzhen, Guangdong, P. R. China 518000

1.5. Project data

Testing Start Date:	2023-10-16
Testing End Date:	2023-11-09

1.6. Signature

Lin Kanfeng
(Prepared this test report)

An Ran
(Reviewed this test report)

Zhang Bojun
(Approved this test report)

2. Client Information

2.1. Applicant Information

Company Name:	unitech electronics co., ltd.
Address:	5F., No. 136, Ln. 235, Baoqiao Rd., Xindian Dist., New Taipei City 231028, Taiwan
Contact Person	Ben Chiang
E-Mail	BenC@tw.ute.com
Telephone:	886-2-8912-1122
Fax:	886-2-89121391

2.2. Manufacturer Information

Company Name:	unitech electronics co., ltd.
Address:	5F., No. 136, Ln. 235, Baoqiao Rd., Xindian Dist., New Taipei City 231028, Taiwan
Contact Person	Ben Chiang
E-Mail	BenC@tw.ute.com
Telephone:	886-2-8912-1122
Fax:	886-2-89121391

3. Equipment Under Test (EUT) and Ancillary Equipment (AE)

3.1. About EUT

Description	Rugged Tablet
Model Name	RT112
RF Protocol	IEEE 802.11 b/g/n20/n40
Operating Frequency	2412MHz~2462MHz
Number of Channels	11
Antenna Type	Integrated
Antenna Gain	Antenna 0 = 2.76 dBi; Antenna 1 = 2.36 dBi; Antenna 01 = 5.57 dBi
Power Supply	3.85V DC by Battery
FCC ID	HLERT112BWN
ISED Number	6724A-RT112BWN
Condition of EUT as received	No abnormality in appearance

Note:

Directional gain (correlated) = $10\log[(10^{G1/20}+10^{G2/20}+\ldots+10^{GN/20})^2/NANT]$ dBi $=10\log[(10^{2.76/20}+10^{2.36/20})^2/2]$ dBi = 5.57 dBi.

Components list, please refer to documents of the manufacturer; it is also included in the original test record of Shenzhen Academy of Information and Communications Technology.

3.2. Internal Identification of EUT

EUT ID*	SN or IMEI	HW Version	SW Version	Date of Receipt
UT02aa	A20235230110	V1.2	IRIS_V03.29b01_20230920	2023-10-12
UT04aa	A20235230127	V1.2	IRIS_V03.29b01_20230920	2023-10-10

*EUT ID: is used to identify the test sample in the lab internally.

*UT02aa is used for Conduction test; UT04aa is used for radiation test and AC Power line Conducted Emission test.

3.3. Internal Identification of AE

AE No.	Description	AE ID*
AE1	Battery	1400-900077G
AE2	Charger	ADP-45HG B

*AE ID: is used to identify the test sample in the lab internally.

3.4. General Description

The Equipment under Test (EUT) is a model of Rugged Tablet with integrated antenna and battery. It consists of normal options: Lithium Battery and Charger. Manual and specifications of the EUT were provided to fulfil the test. Samples undergoing test were selected by the client.

4. Reference Documents

4.1. Documents supplied by applicant

EUT feature information is supplied by the applicant or manufacturer, which is the basis of testing.

4.2. Reference Documents for testing

The following documents listed in this section are referred for testing.

Reference	Title	Version
FCC Part15	FCC CFR 47, Part 15, Subpart C: 15.205 Restricted bands of operation; 15.209 Radiated emission limits, general requirements; 15.247 Operation within the bands 902-928MHz, 2400-2483.5 MHz, and 5725-5850 MHz	2021
ANSI C63.10	American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices	2013
RSS-247	Spectrum Management and Telecommunications Radio Standards Specification Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSs) and License-Exempt Local Area Network (LE-LAN) Devices	Issue 3 August, 2023
RSS-Gen	Spectrum Management and Telecommunications Radio Standards Specification General Requirements for Compliance of Radio Apparatus	Issue 5 A2 February, 2021

5. Test Results

5.1. Testing Environment

Normal Temperature: 15~35°C

Relative Humidity: 20~75%

5.2. Test Results

No	Test cases	Sub-clause of Part 15C	Sub-clause of IC	Verdict
0	Antenna Requirement	15.203	/	**P**
1	Maximum Output Power	15.247 (b)	RSS-247 section 5.4	**P**
2	Peak Power Spectral Density	15.247 (e)	RSS-247 section 5.2	**P**
3	6dB Bandwidth	15.247 (a)	RSS-247 section 5.2	**P**
4	Band Edges Compliance	15.247 (d)	RSS-247 section 5.5	**P**
5	Conducted Emission	15.247 (d)	RSS-247 section 5.5/RSS-Gen section 6.13	**P**
6	Radiated Emission	15.247, 15.205, 15.209	RSS-247 section 5.5/RSS-Gen section 6.13	**P**
7	AC Power line Conducted	15.107, 15.207	RSS-Gen section 8.8	**P**
8	99% Occupied Bandwidth	/	RSS-Gen section 6.7	**/**

See **ANNEX A** for details.

5.3. Statements

SAICT has evaluated the test cases requested by the applicant/manufacturer as listed in section 5.2 of this report, for the EUT specified in section 3, according to the standards or reference documents listed in section 4.2.

Disclaimer:

A. After confirmation with the customer, the sample information provided by the customer may affect the validity of the measurement results in this report, and the impact and consequences arising therefrom shall be borne by the customer.

B. The samples in this report are provided by the customer, and the test results are only applicable to the samples received.

6. Test Equipments Utilized

Conducted test system

No.	Equipment	Model	Serial Number	Manufacturer	Calibration Due Date	Calibration Period
1	Vector Signal Analyzer	FSV40	100903	Rohde & Schwarz	2023-12-28	1 year
2	Power Sensor	U2021XA	MY55430013	Keysight	2023-12-28	1 year
3	Data Acquisiton	U2531A	TW55443507	Keysight	/	/
4	Shielding Room	S81	CT000986-1344	ETS-Lindgren	2026-09-12	5 years

Radiated emission test system

No.	Equipment	Model	Serial Number	Manufacturer	Calibration Due Date	Calibration Period
1	Test Receiver	ESR7	101676	ETS-Lindgren	2024-11-22	1 year
2	BiLog Antenna	3142E	0224831	ETS-lindgren	2024-05-27	3 years
3	Horn Antenna	3117	00066577	ETS-lindgren	2025-04-17	1 year
4	Anechoic Chamber	FACT3-2.0	1285	ETS-Lindgren	2025-05-28	2 years
5	Spectrum Analyzer	FSV40	101192	ETS-Lindgren	2024-01-11	1 year
6	Loop Antenna	HLA6120	35779	TESEQ	2025-05-10	3 years
7	Horn Antenna	QSH-SL-18-26-S-20	17013	Q-par	2026-02-01	3 years
8	Test Receiver	ESCI	100702	ETS-Lindgren	2024-01-11	1 year
9	LISN	ENV216	102067	ETS-Lindgren	2024-07-13	1 year

Test software

No.	Equipment	Manufacturer	Version
1	TechMgr Software	CAICT	2.1.1
2	EMC32	Rohde & Schwarz	10.50.40

EUT is engineering software provided by the customer to control the transmitting signal.
The EUT was programmed to be in continuously transmitting mode.

Anechoic chamber

Fully anechoic chamber by ETS-Lindgren

7. Laboratory Environment

Shielded room

Temperature	Min. = 15 ˚C, Max. = 35 ˚C
Relative humidity	Min. = 20 %, Max. = 75 %
Shielding effectiveness	0.014MHz-1MHz> 60 dB; 1MHz-18000MHz>90 dB
Electrical insulation	> 2 MΩ
Ground system resistance	< 4 Ω

Anechoic chamber

Temperature	Min. = 15 ˚C, Max. = 35 ˚C
Relative humidity	Min. = 20 %, Max. = 75 %
Shielding effectiveness	0.014MHz-1MHz> 60 dB; 1MHz-18000MHz>90 dB
Electrical insulation	> 2 MΩ
Ground system resistance	< 4 Ω
Normalised site attenuation (NSA)	< ±4 dB, 3 m distance, from 30 to 1000 MHz
Voltage Standing Wave Ratio (VSWR)	≤ 6 dB, from 1 to 18 GHz, 3 m distance
Uniformity of field strength	Between 0 and 6 dB, from 80 to 6000 MHz

8. Measurement Uncertainty

Test Name	Uncertainty *(k=2)*	
1. RF Output Power - Conducted	1.32dB	
2. Power Spectral Density - Conducted	1.32dBm/MHz	
3. Occupied channel bandwidth - Conducted	4.56kHz	
4. Transmitter Spurious Emission - Conducted	30MHz≤f<1GHz	1.41dB
	1GHz≤f<7GHz	1.92dB
	7GHz≤f<13GHz	2.31dB
	13GHz≤f≤26GHz	2.61dB
5. Transmitter Spurious Emission - Radiated	9kHz≤f<30MHz	1.70dB
	30MHz≤f<1GHz	4.80dB
	1GHz≤f<18GHz	4.62dB
	18GHz≤f≤40GHz	2.36dB
6. AC Power line Conducted Emission	150kHz≤f≤30MHz	2.62dB

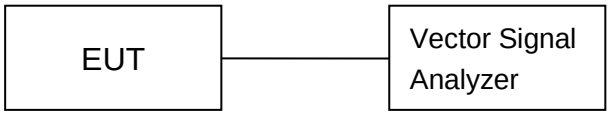
ANNEX A: Detailed Test Results

Test Configuration

The measurement is made according to ANSI C63.10.

1) Conducted Measurements

1. Connect the EUT to the test system correctly.
2. Set the EUT to the required work mode.
3. Set the EUT to the required channel.
4. Set the spectrum analyzer to start measurement.
5. Record the values.

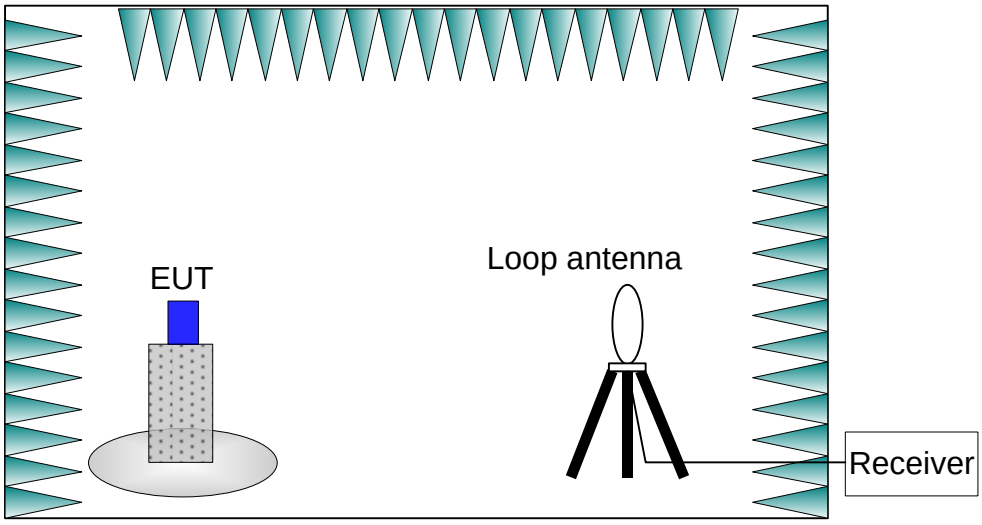


2) Radiated Measurements

Test setup:

9kHz-30MHz:

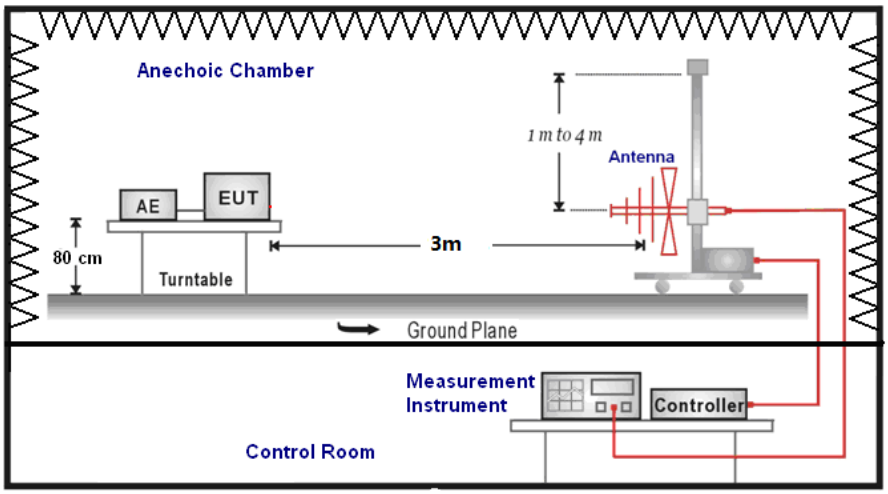
The EUT are measured in a anechoic chamber. The EUT is placed on a non-conductive stand of 80cm high, and at a measurement distance of 3m from the receiving antenna. The center of the receiving loop antenna is 1.0 meter above the ground. The test setup refers to figure below. Detected emissions were maximized at each frequency by rotating the EUT and adjusting the receiver antenna polarization.



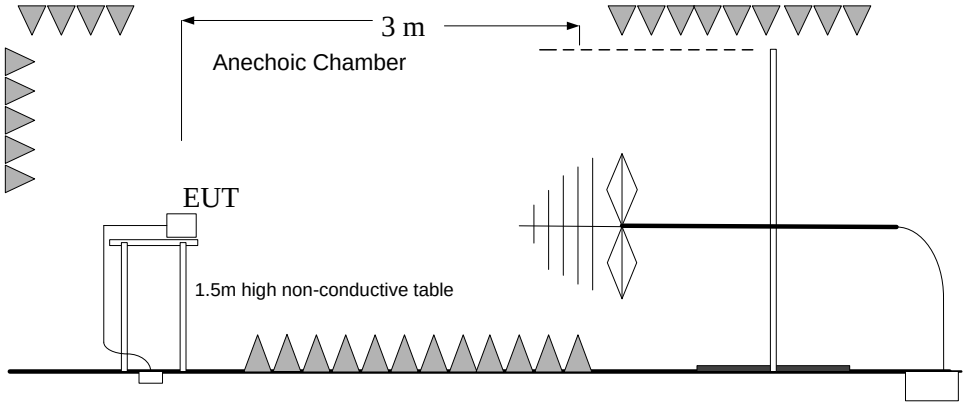
30MHz-26.5GHz:

The EUT are measured in a anechoic chamber. The EUT is placed on a non-conductive stand of 80cm high, and at a measurement distance of 3m from the receiving antenna. The center of the receiving antenna is 1.0 meter to 4.0 meter above the ground. The test setup refers to figure below. Detected emissions were maximized at each frequency by rotating the EUT and adjusting the receiver antenna polarization.

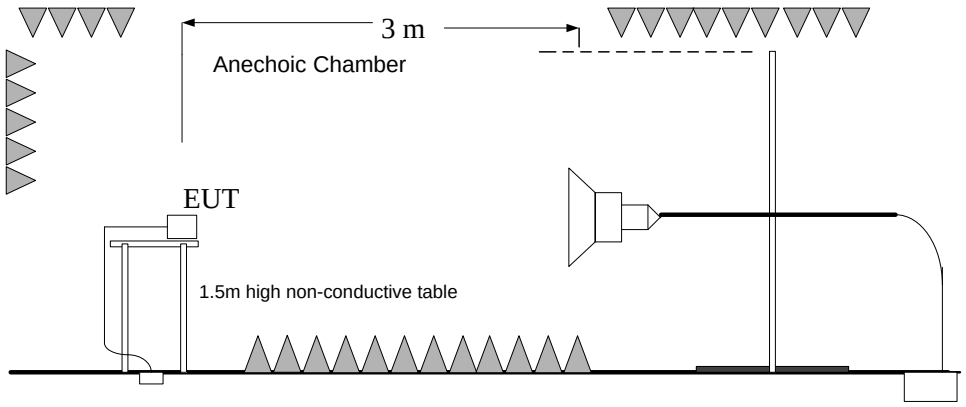
30MHz-1GHz:



1GHz-3GHz:

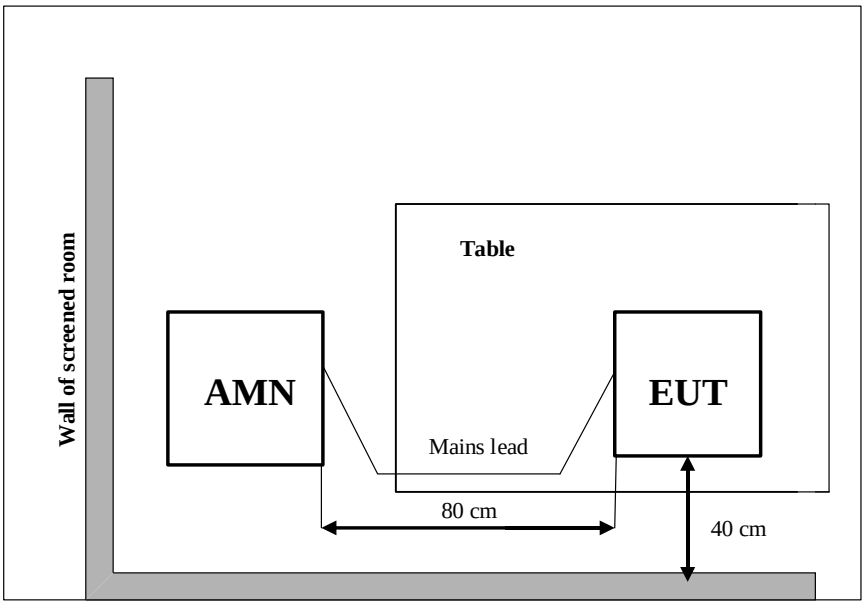


3GHz-26.5GHz:



3) AC Power line Conducted Emission Measurement

For WLAN, the EUT is working under test mode. The EUT is commanded to operate at maximum transmitting power.



A.0 Antenna requirement

Measurement Limit:

Standard	Requirement
FCC CRF Part 15.203	An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of §15.211, §15.213, §15.217, §15.219, or §15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with §15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.

Note: The Directional gains of antenna used for transmitting is 2.76 dBi (Antenna 0), 2.36 dBi (Antenna 1), 5.57 dBi (Antenna 01). The RF transmitter uses an integrate antenna without connector.

A.1 Maximum Output Power

Measurement of method :See ANSI C63.10-Clause 11.9.2.3.2

Method AVGPM-G is a measurement using a gated RF average power meter.

Alternatively, measurements may be performed using a wideband gated RF power meter provided that the gate parameters are adjusted such that the power is measured only when the EUT is transmitting at its maximum power control level. Because the measurement is made only during the ON time of the transmitter, no duty cycle correction factor is required.

Measurement Limit:

Standard	Limit (dBm)	E.I.R.P Limit (dBm)
FCC CRF Part 15.247(b) & RSS-247 section 5.4	< 30	< 36

Measurement Results:

Antenna 0 (SISO)

Mode	Frequency (MHz)	Test Result (dBm)	E.I.R.P (dBm)	Conclusion
802.11b	2412 (CH1)	14.50	17.26	P
	2437 (CH6)	14.95	17.71	P
	2462 (CH11)	14.58	17.34	P
802.11g	2412 (CH1)	12.42	15.18	P
	2437 (CH6)	13.01	15.77	P
	2462 (CH11)	12.47	15.23	P
802.11n HT20	2412 (CH1)	11.56	14.32	P
	2437 (CH6)	12.26	15.02	P
	2462 (CH11)	11.63	14.39	P
802.11n HT40	2422 (CH3)	12.06	14.82	P
	2437 (CH6)	11.76	14.52	P
	2452 (CH9)	11.55	14.31	P
802.11ax HE20	2412 (CH1)	10.76	13.52	P
	2437 (CH6)	11.50	14.26	P
	2462 (CH11)	10.72	13.48	P
802.11ax HE40	2422 (CH3)	10.87	13.63	P
	2437 (CH6)	10.70	13.46	P
	2452 (CH9)	10.23	12.99	P

Antenna 1 (SISO)

Mode	Frequency (MHz)	Test Result (dBm)	E.I.R.P (dBm)	Conclusion
802.11b	2412 (CH1)	12.85	15.21	P
	2437 (CH6)	13.08	15.44	P
	2462 (CH11)	13.19	15.55	P

802.11g	2412 (CH1)	11.93	14.29	**P**
	2437 (CH6)	12.12	14.48	**P**
	2462 (CH11)	12.33	14.69	**P**
802.11n HT20	2412 (CH1)	10.47	12.83	**P**
	2437 (CH6)	10.98	13.34	**P**
	2462 (CH11)	10.93	13.29	**P**
802.11n HT40	2422 (CH3)	11.18	13.54	**P**
	2437 (CH6)	10.81	13.17	**P**
	2452 (CH9)	11.14	13.50	**P**
802.11ax HE20	2412 (CH1)	9.72	12.08	**P**
	2437 (CH6)	10.02	12.38	**P**
	2462 (CH11)	10.35	12.71	**P**
802.11ax HE40	2422 (CH3)	9.96	12.32	**P**
	2437 (CH6)	9.28	11.64	**P**
	2452 (CH9)	9.83	12.19	**P**

Antenna 01 (MIMO)

Mode	Frequency (MHz)	Test Result (dBm)	E.I.R.P (dBm)	Conclusion
802.11n HT20	2412 (CH1)	11.17	16.74	**P**
	2437 (CH6)	11.51	17.08	**P**
	2462 (CH11)	11.61	17.18	**P**
802.11n HT40	2422 (CH3)	11.65	17.22	**P**
	2437 (CH6)	11.31	16.88	**P**
	2452 (CH9)	11.96	17.53	**P**
802.11ax HE20	2412 (CH1)	10.45	16.02	**P**
	2437 (CH6)	10.52	16.09	**P**
	2462 (CH11)	10.63	16.20	**P**
802.11ax HE40	2422 (CH3)	10.76	16.33	**P**
	2437 (CH6)	9.74	15.31	**P**
	2452 (CH9)	10.70	16.27	**P**

Note:

The data rate 1Mbps (11b mode), 6Mbps (11g mode), MCS0 (11n mode) and MCS0 (11ax mode) are selected as the Worst-Case. **Antenna 0** is selected as the worst condition (SISO). The following cases and test graphs are performed with this condition. The EUT was programmed to be in continuously transmitting mode and the transmit duty cycle is not less than 98%.

E.I.R.P value = Conducted values (with conducted samples) + Antenna Gain.

A.2 Peak Power Spectral Density

Method of Measurement: See ANSI C63.10-clause 11.10.2.

Measurement Limit:

Standard	Limit
FCC CRF Part 15.247(e) & RSS-247 section 5.2	< 8 dBm/3 kHz

Measurement Results:

SISO

Mode	Channel	Frequency (MHz)	Test Results (dBm)		Conclusion
802.11b	CH 1	2412	Fig.1	-9.60	**P**
	CH 6	2437	Fig.2	-9.21	**P**
	CH 11	2462	Fig.3	-10.20	**P**
802.11g	CH 1	2412	Fig.4	-10.88	**P**
	CH 6	2437	Fig.5	-10.99	**P**
	CH 11	2462	Fig.6	-11.45	**P**
802.11n HT20	CH 1	2412	Fig.7	-12.65	**P**
	CH 6	2437	Fig.8	-13.37	**P**
	CH 11	2462	Fig.9	-12.71	**P**
802.11n HT40	CH 3	2422	Fig.10	-15.37	**P**
	CH 6	2437	Fig.11	-16.30	**P**
	CH 9	2452	Fig.12	-16.11	**P**
802.11ax HE20	CH 1	2412	Fig.13	-15.23	**P**
	CH 6	2437	Fig.14	-14.59	**P**
	CH 11	2462	Fig.15	-15.63	**P**
802.11ax HE40	CH 3	2422	Fig.16	-18.41	**P**
	CH 6	2437	Fig.17	-17.82	**P**
	CH 9	2452	Fig.18	-18.67	**P**

MIMO

Mode	Channel	Frequency (MHz)	Test Results (dBm)	Conclusion
802.11n HT20	CH 1	2412	-9.81	**P**
	CH 6	2437	-8.80	**P**
	CH 11	2462	-10.04	**P**
802.11n HT40	CH 3	2422	-11.23	**P**
	CH 6	2437	-11.38	**P**
	CH 9	2452	-12.00	**P**
802.11ax HE20	CH 1	2412	-10.81	**P**
	CH 6	2437	-10.04	**P**
	CH 11	2462	-11.02	**P**
802.11ax HE40	CH 3	2422	-13.74	**P**
	CH 6	2437	-12.56	**P**
	CH 9	2452	-13.59	**P**

See below for test graphs.
Conclusion: PASS

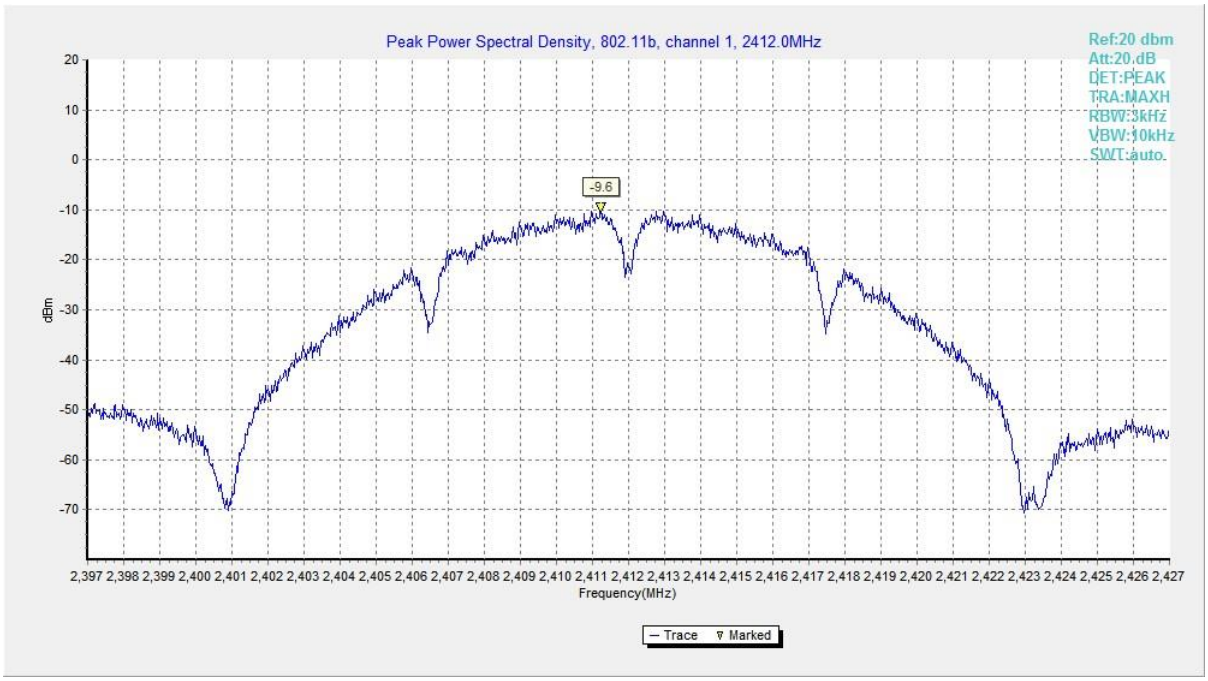


Fig.1 Power Spectral Density (802.11b, CH 1)

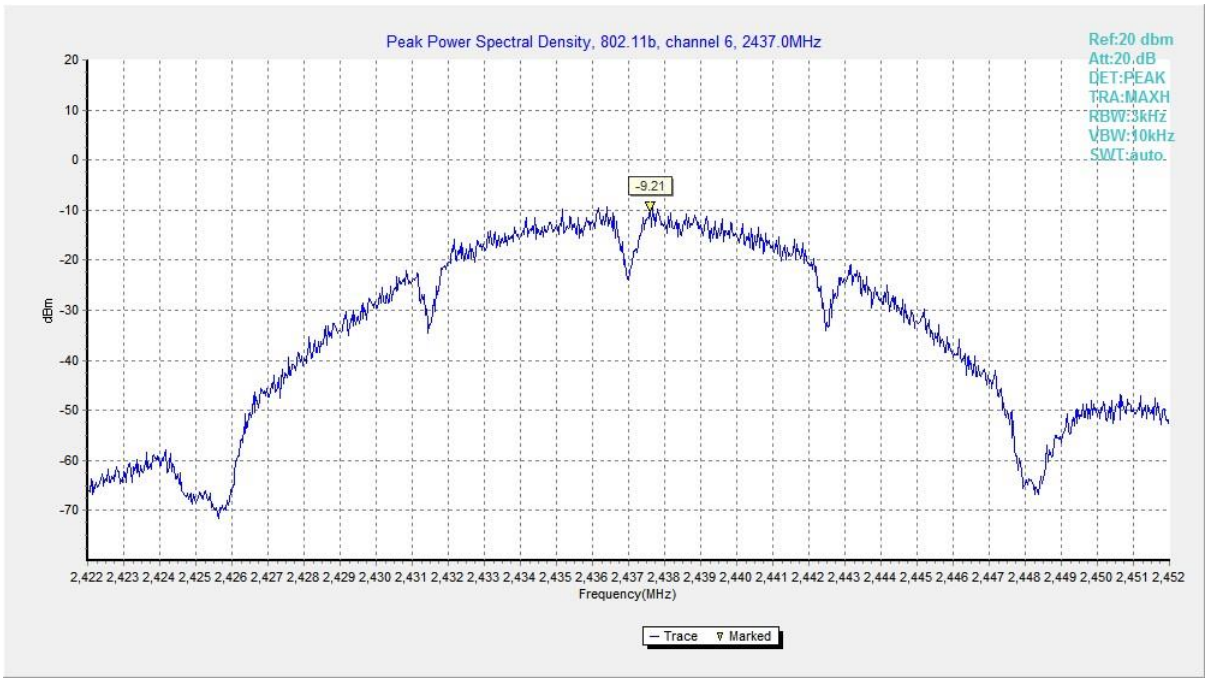


Fig.2 Power Spectral Density (802.11b, CH 6)

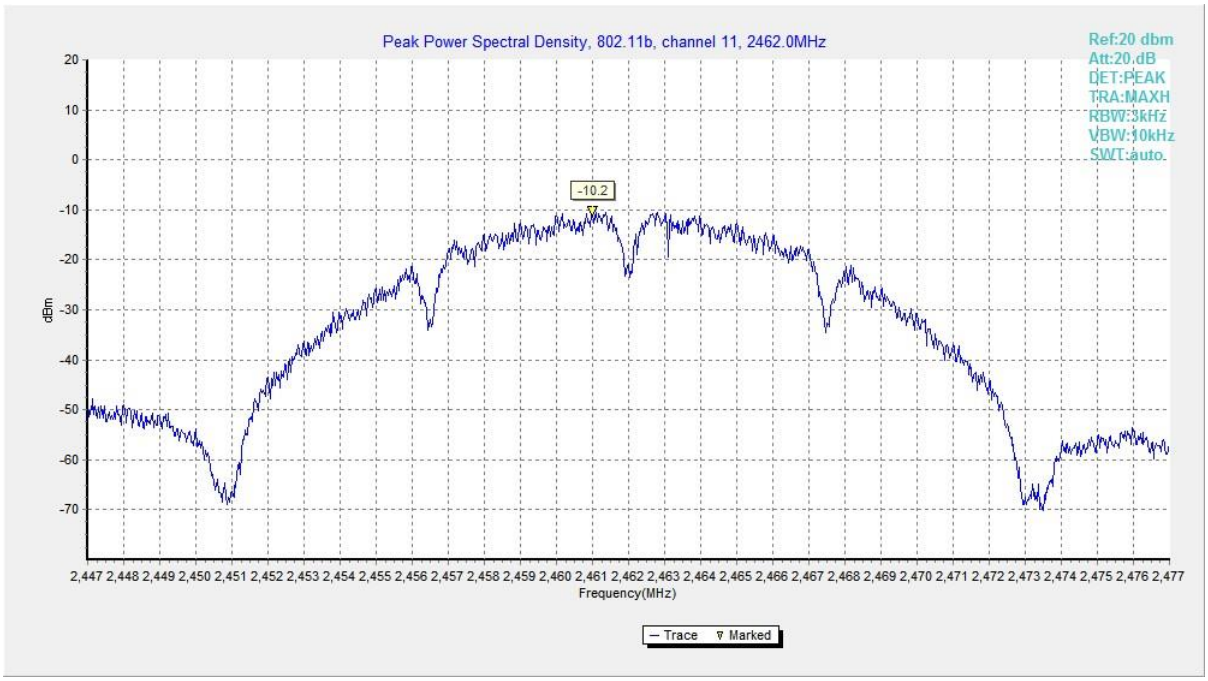


Fig.3 Power Spectral Density (802.11b, CH 11)

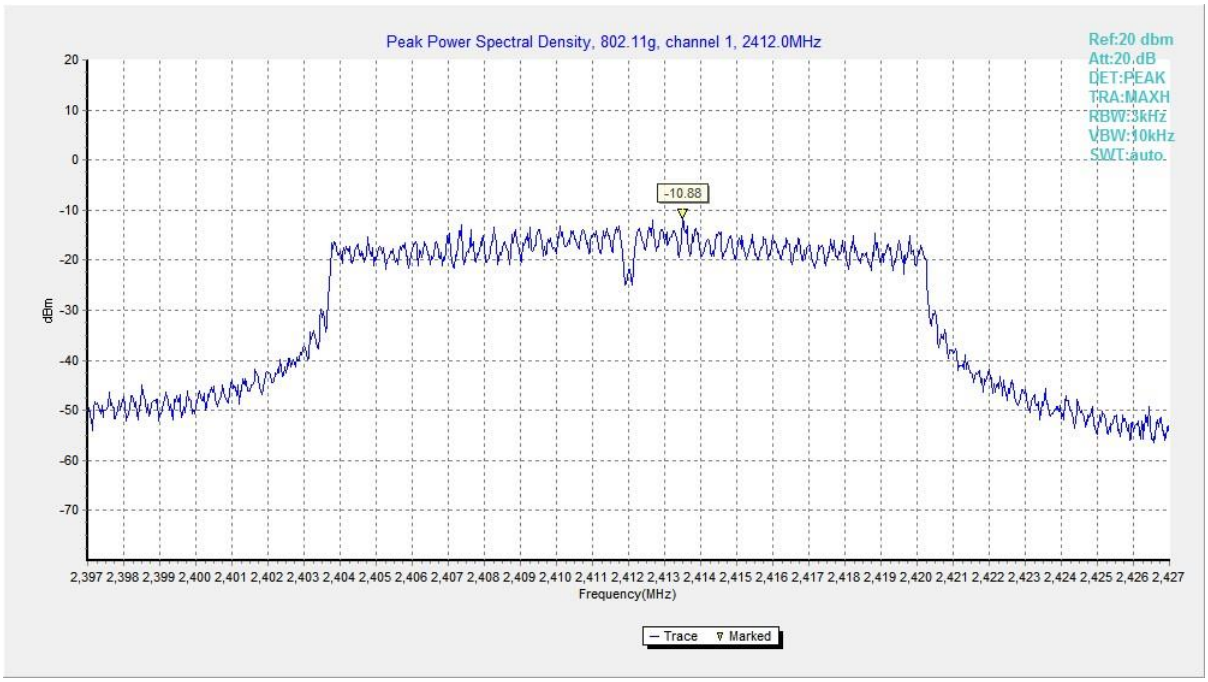


Fig.4 Power Spectral Density (802.11g, CH 1)

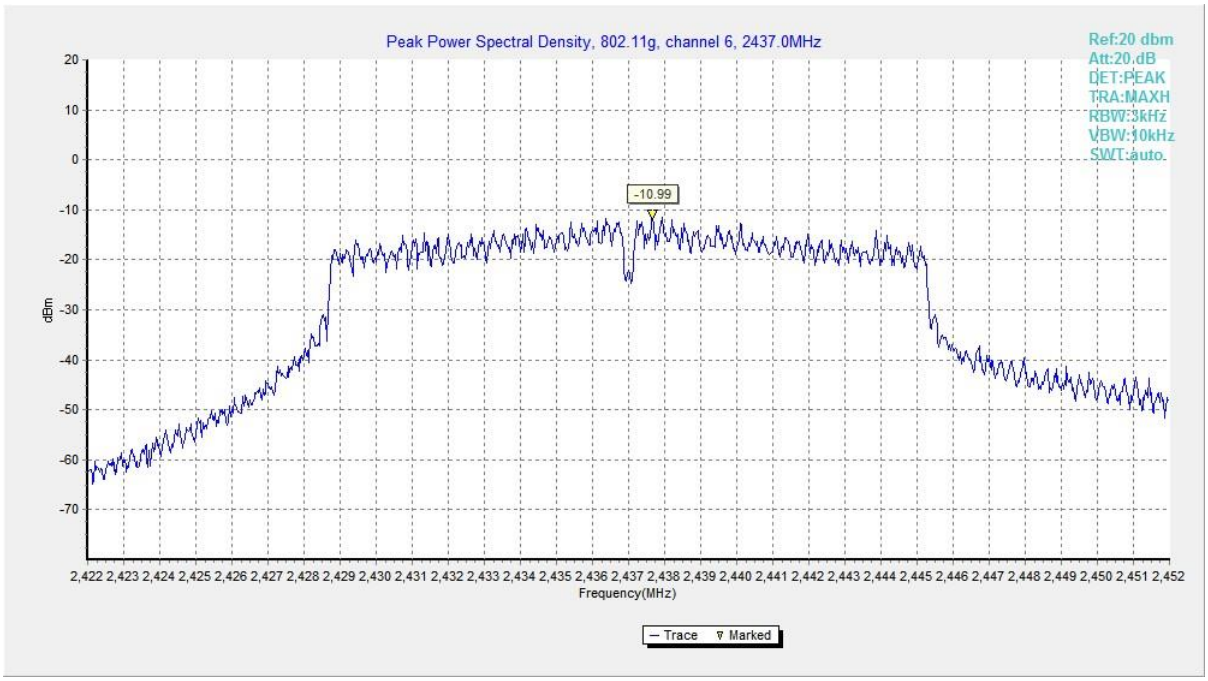


Fig.5 Power Spectral Density (802.11g, CH 6)

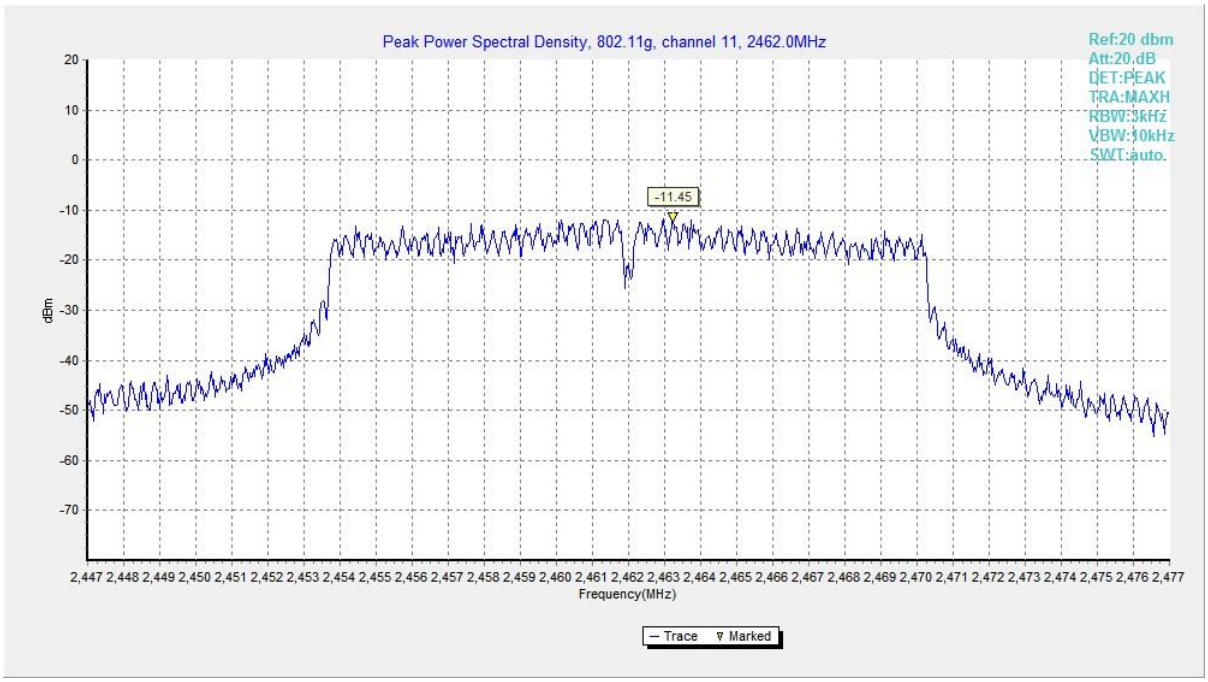


Fig.6 Power Spectral Density (802.11g, CH 11)

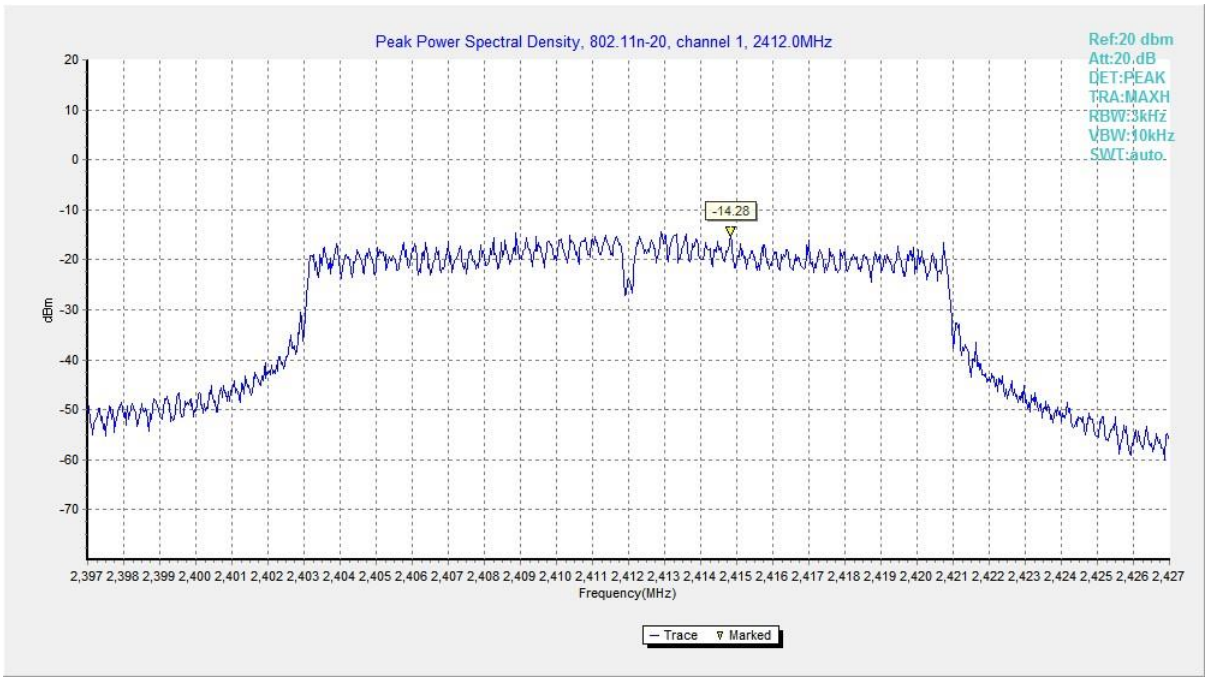


Fig.7 Power Spectral Density (802.11n HT20, CH 1)

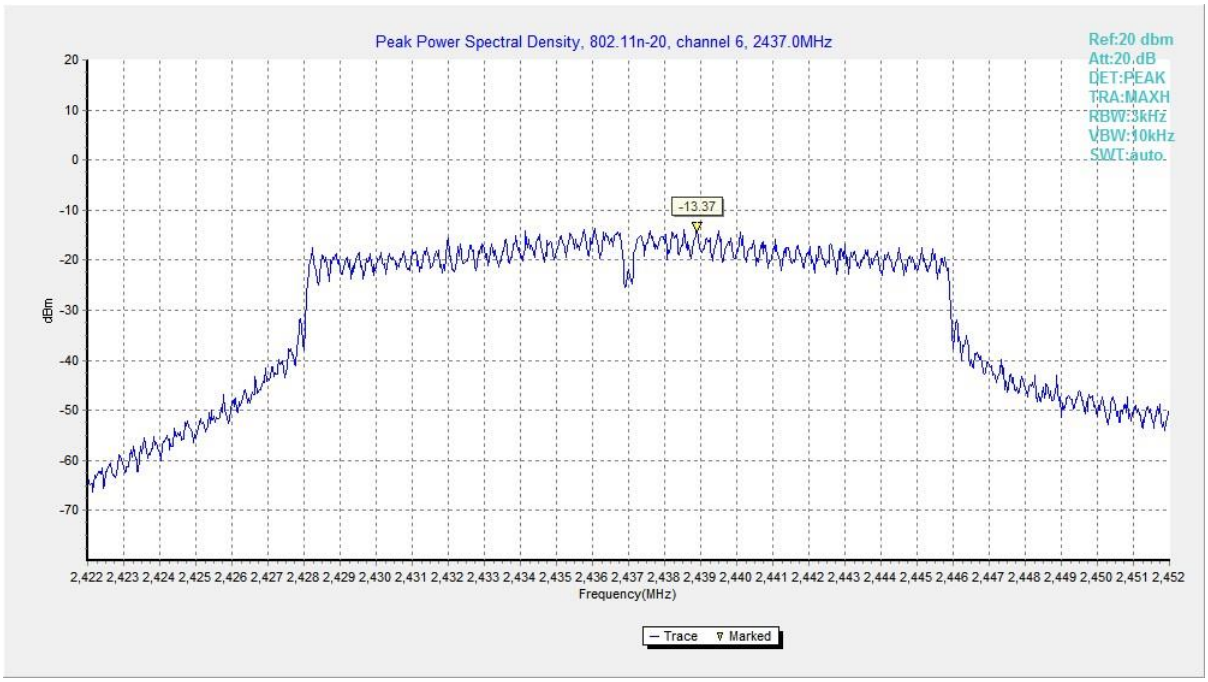


Fig.8 Power Spectral Density (802.11n HT20, CH 6)

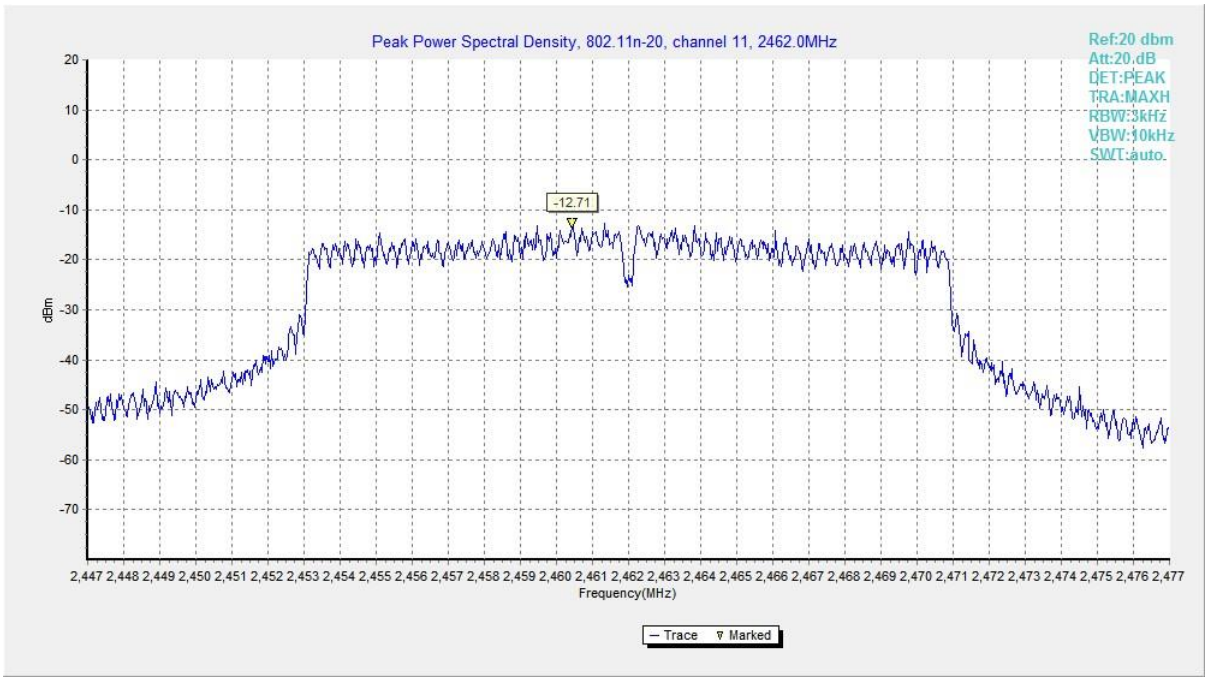


Fig.9 Power Spectral Density (802.11n HT20, CH 11)

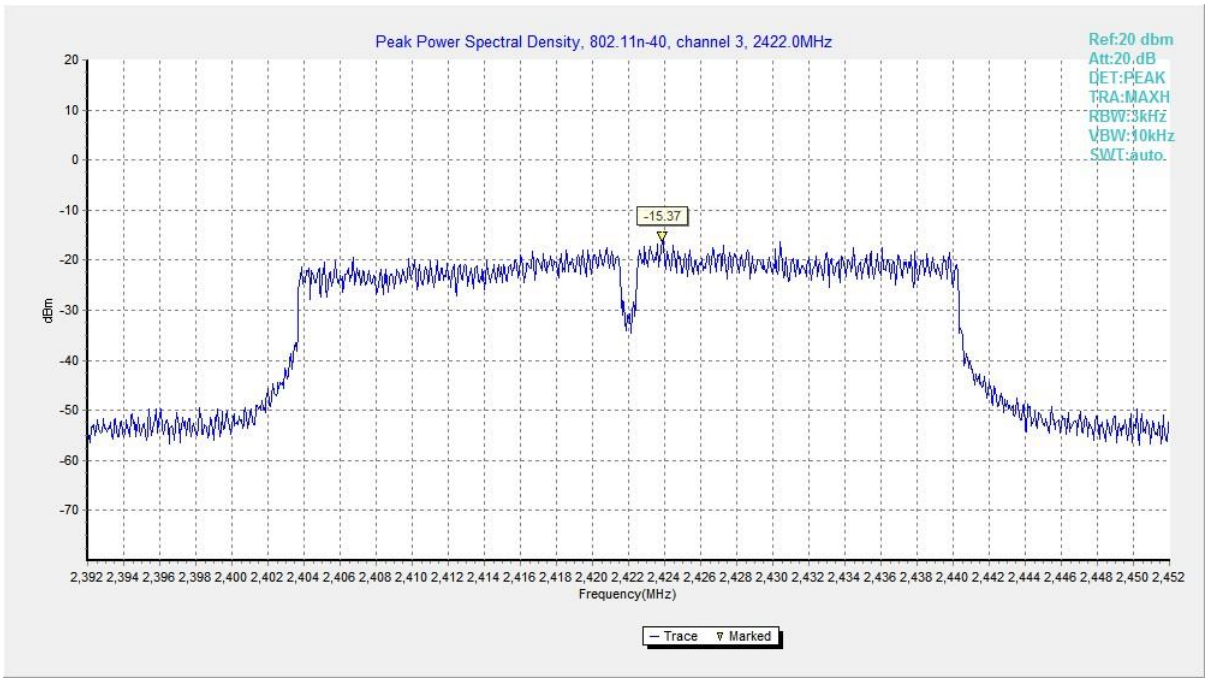


Fig.10 Power Spectral Density (802.11n HT40, CH 3)

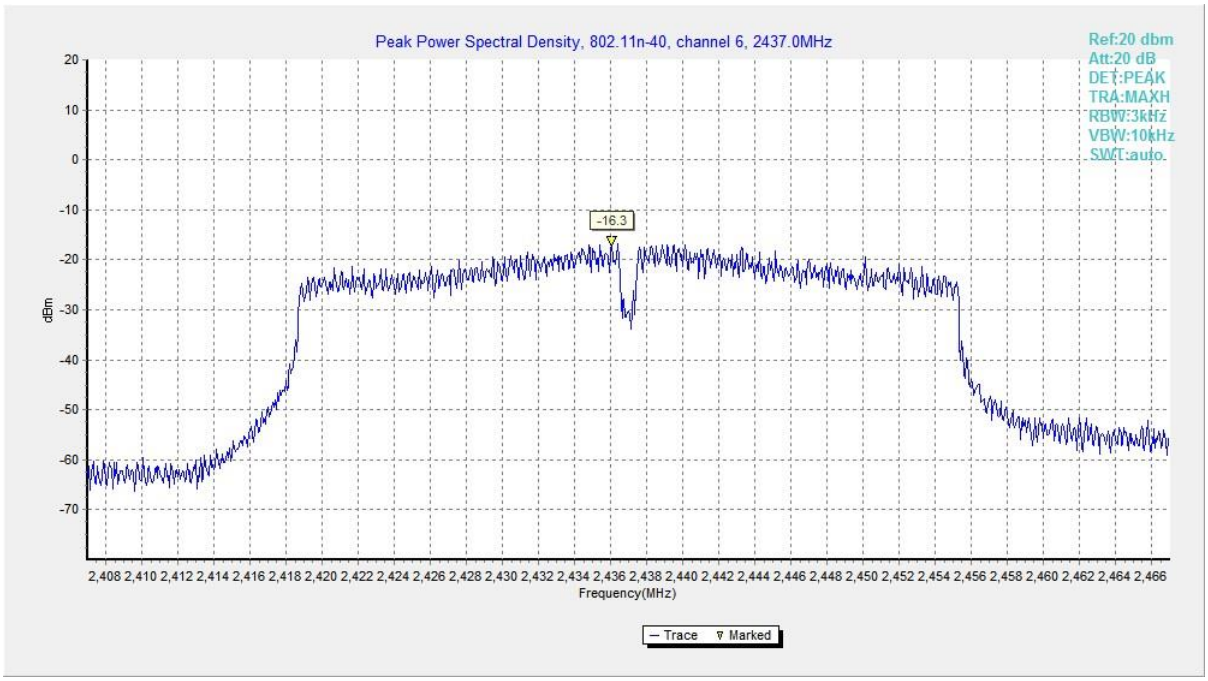


Fig.11 Power Spectral Density (802.11n HT40, CH 6)

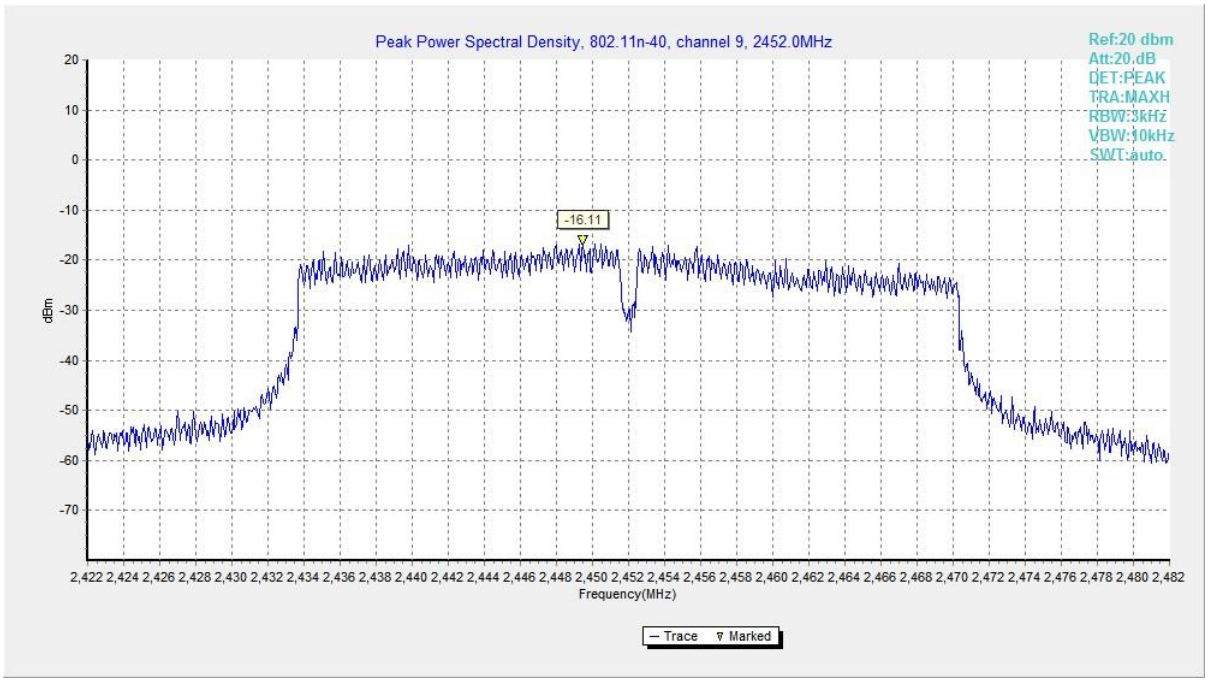


Fig.12 Power Spectral Density (802.11n HT40, CH 9)

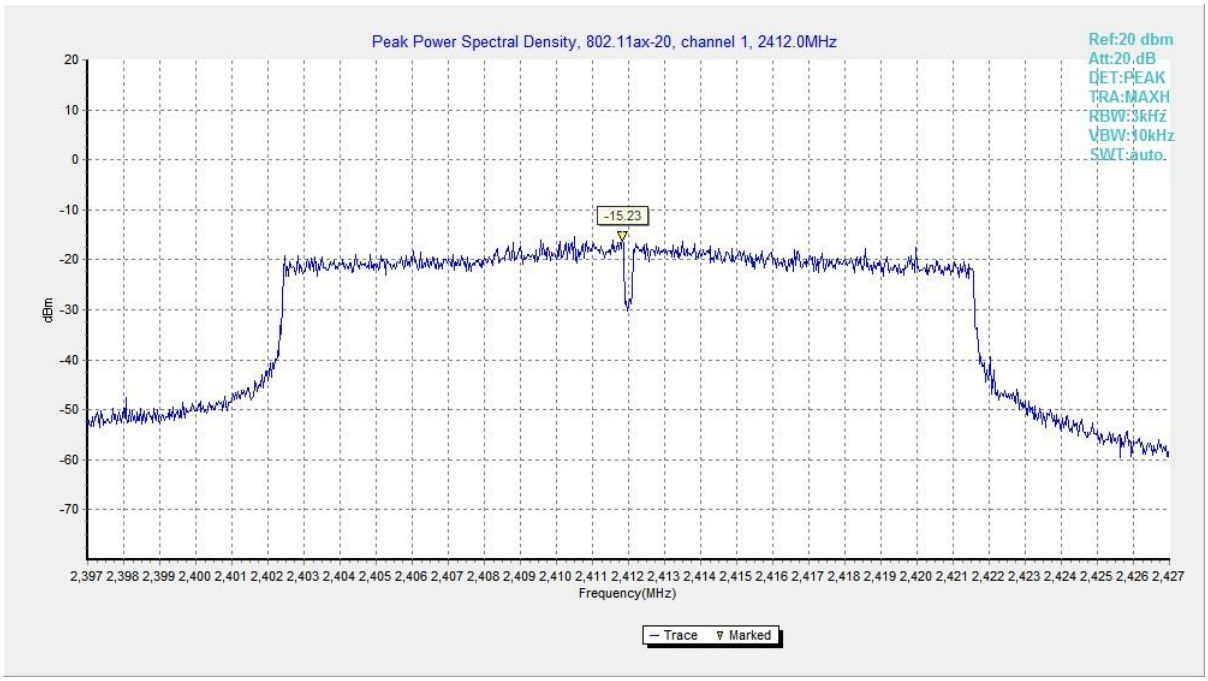


Fig.13 Power Spectral Density (802.11ax HE20, CH 1)

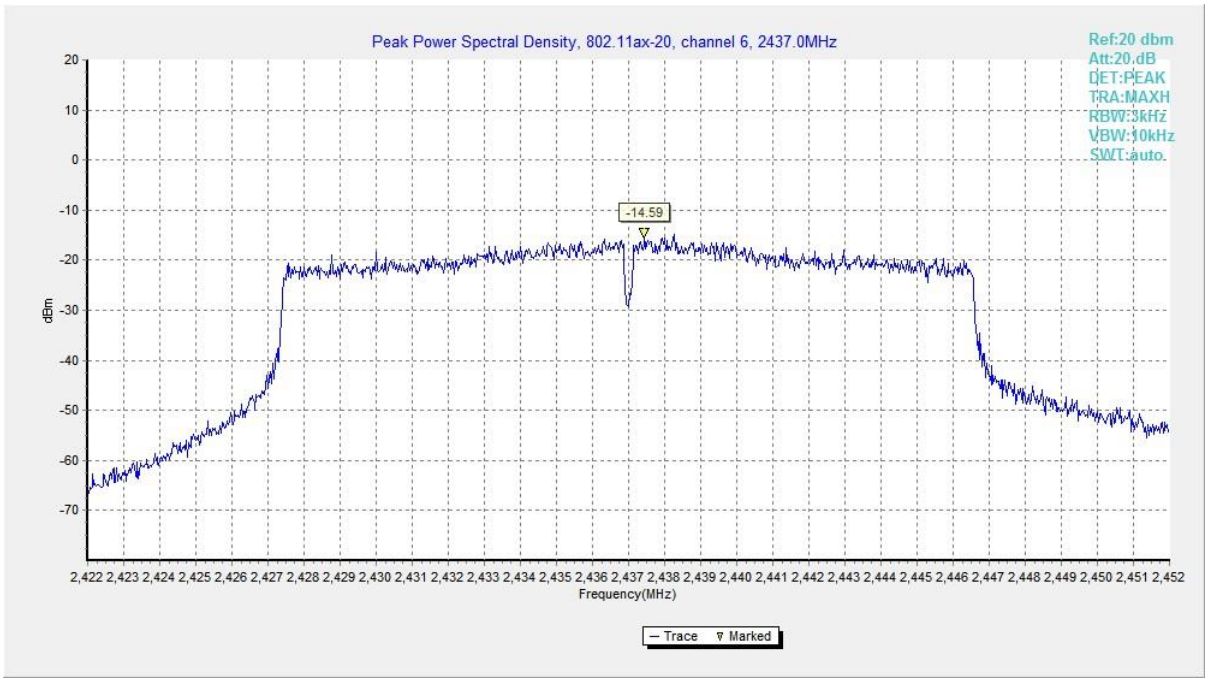


Fig.14 Power Spectral Density (802.11ax HE20, CH 6)

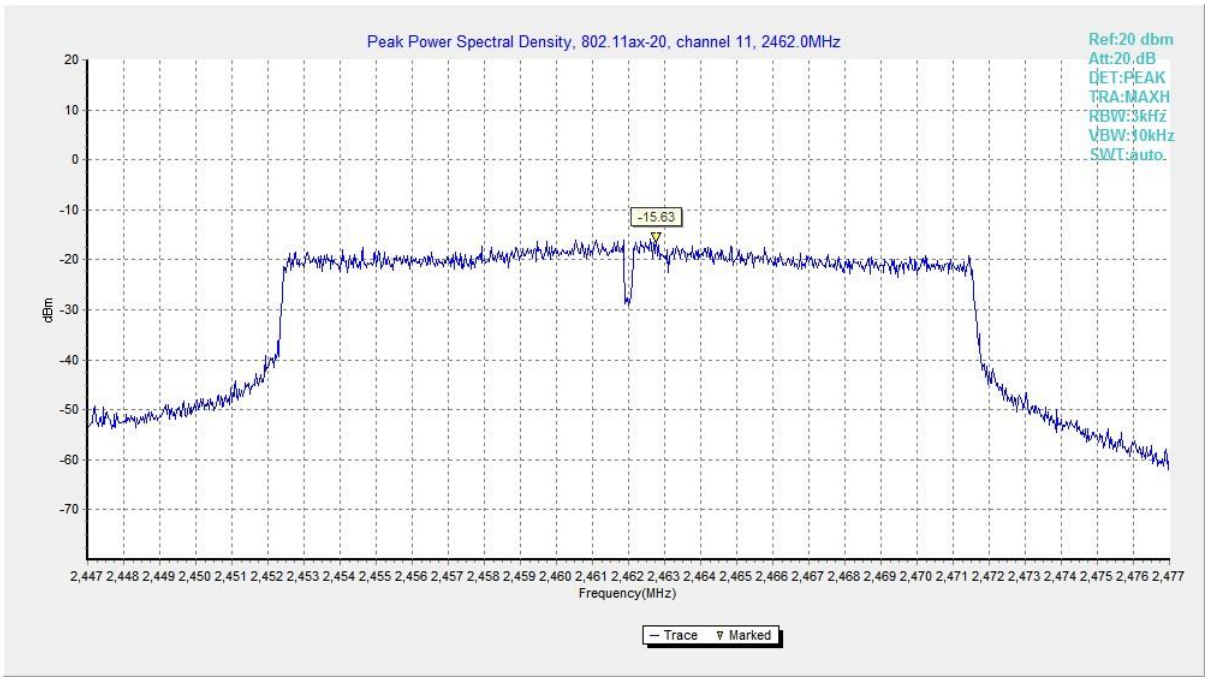


Fig.15 Power Spectral Density (802.11ax HE20, CH 11)

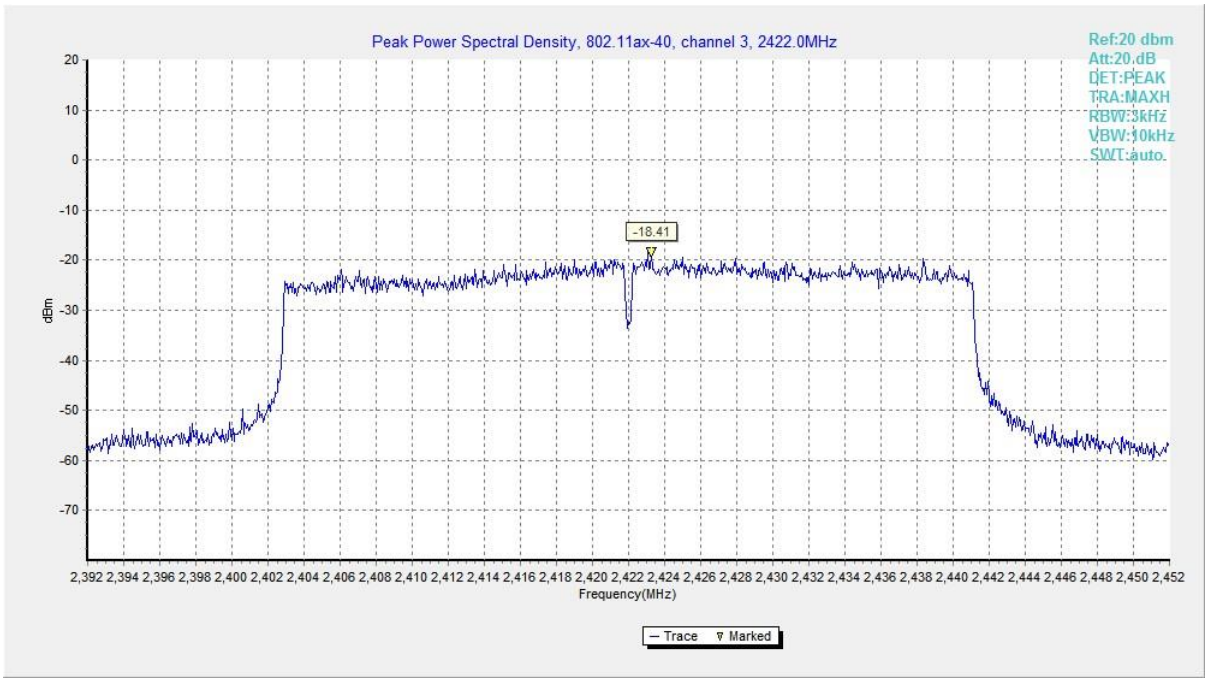


Fig.16 Power Spectral Density (802.11ax HE40, CH 3)

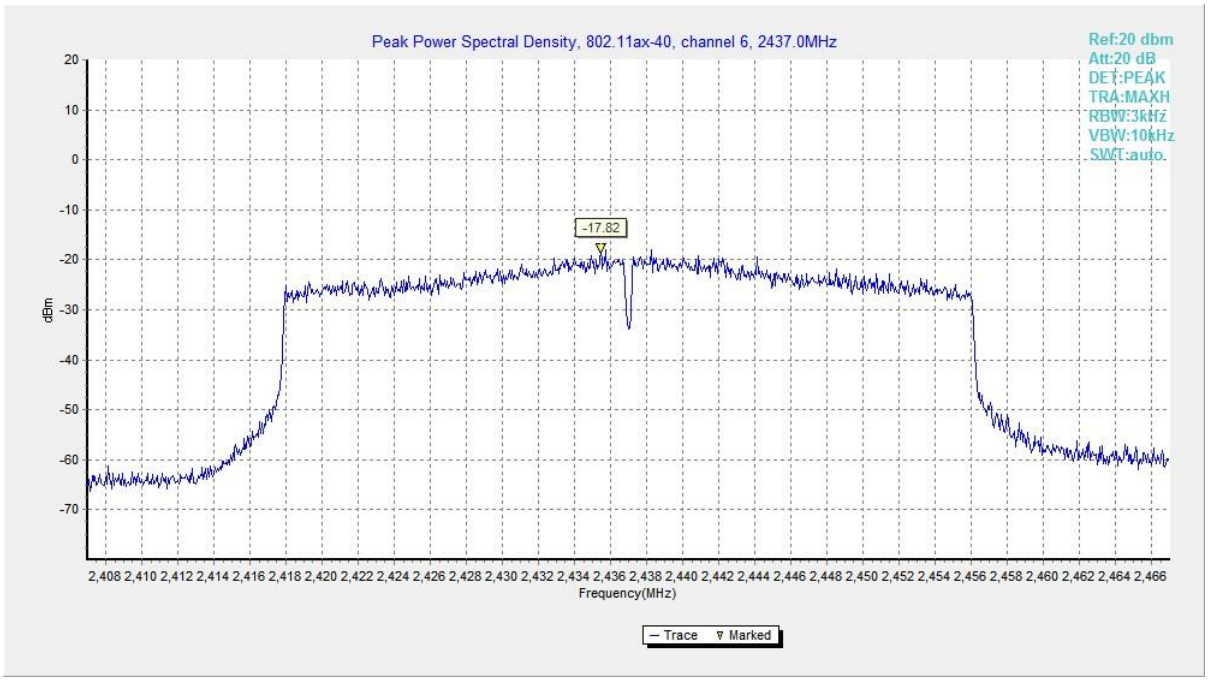


Fig.17 Power Spectral Density (802.11ax HE40, CH 6)

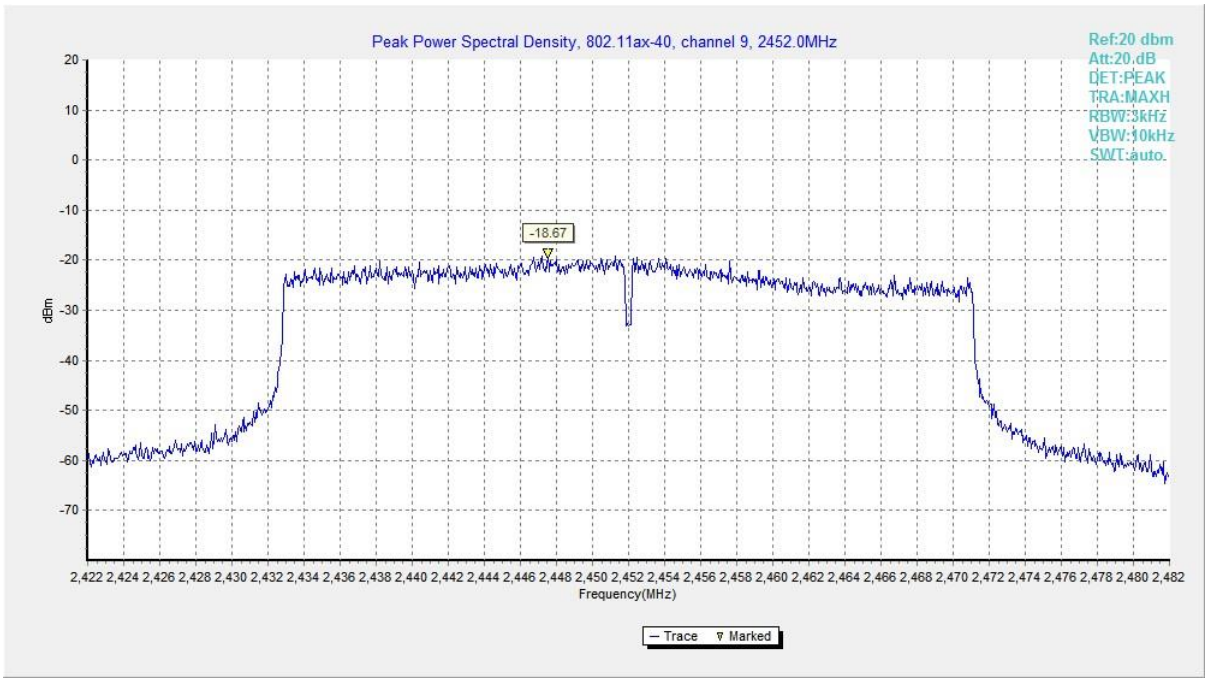


Fig.18 Power Spectral Density (802.11ax HE40, CH 9)

A.3 6dB Bandwidth

Method of Measurement: See ANSI C63.10-clause 11.8.

Measurement Limit:

Standard	Limit (kHz)
FCC 47 CFR Part 15.247 (a) RSS-247 section 5.2	≥ 500

Measurement Result:

Mode	Channel	Frequency (MHz)	Test Results (kHz)		Conclusion
802.11b	CH 1	2412	Fig.19	8050	**P**
	CH 6	2437	Fig.20	8100	**P**
	CH 11	2462	Fig.21	8500	**P**
802.11g	CH 1	2412	Fig.22	15100	**P**
	CH 6	2437	Fig.23	15100	**P**
	CH 11	2462	Fig.24	15450	**P**
802.11n HT20	CH 1	2412	Fig.25	13800	**P**
	CH 6	2437	Fig.26	15100	**P**
	CH 11	2462	Fig.27	15300	**P**
802.11n HT40	CH 3	2422	Fig.28	35520	**P**
	CH 6	2437	Fig.29	32560	**P**
	CH 9	2452	Fig.30	35040	**P**
802.11ax HE20	CH 1	2412	Fig.31	16000	**P**
	CH 6	2437	Fig.32	15050	**P**
	CH 11	2462	Fig.33	16800	**P**
802.11ax HE40	CH 3	2422	Fig.34	37760	**P**
	CH 6	2437	Fig.35	35040	**P**
	CH 9	2452	Fig.36	32800	**P**

See below for test graphs.
Conclusion: PASS

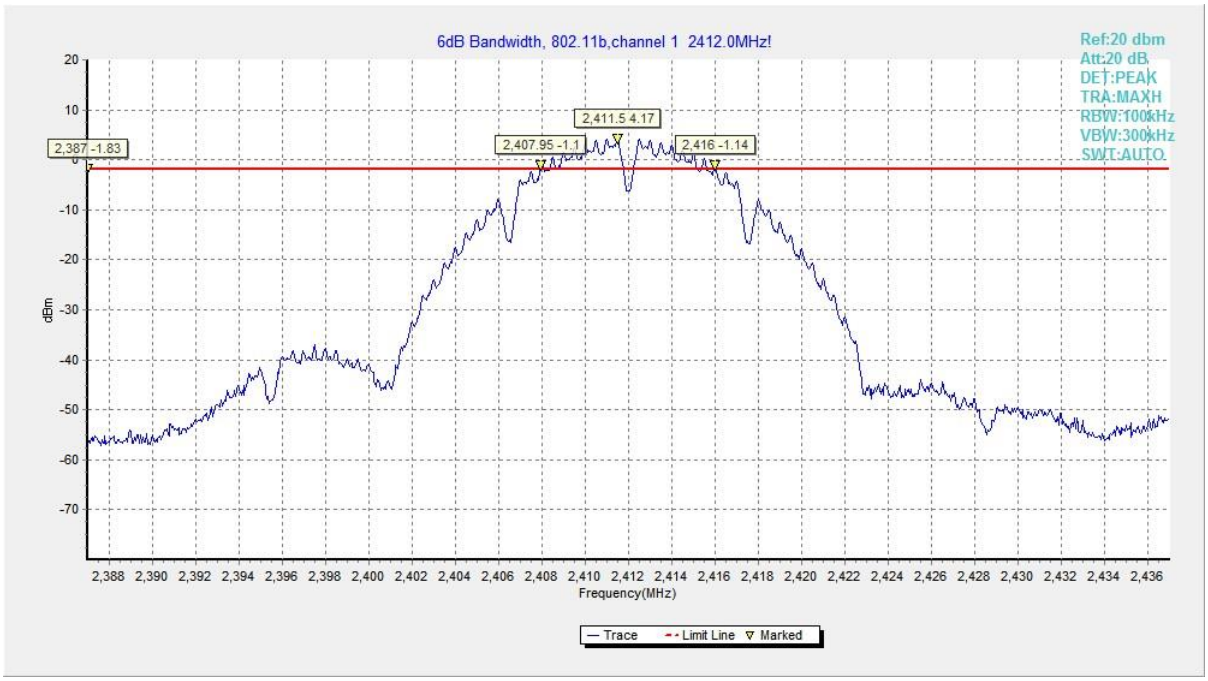


Fig.19 6dB Bandwidth (802.11b, CH 1)

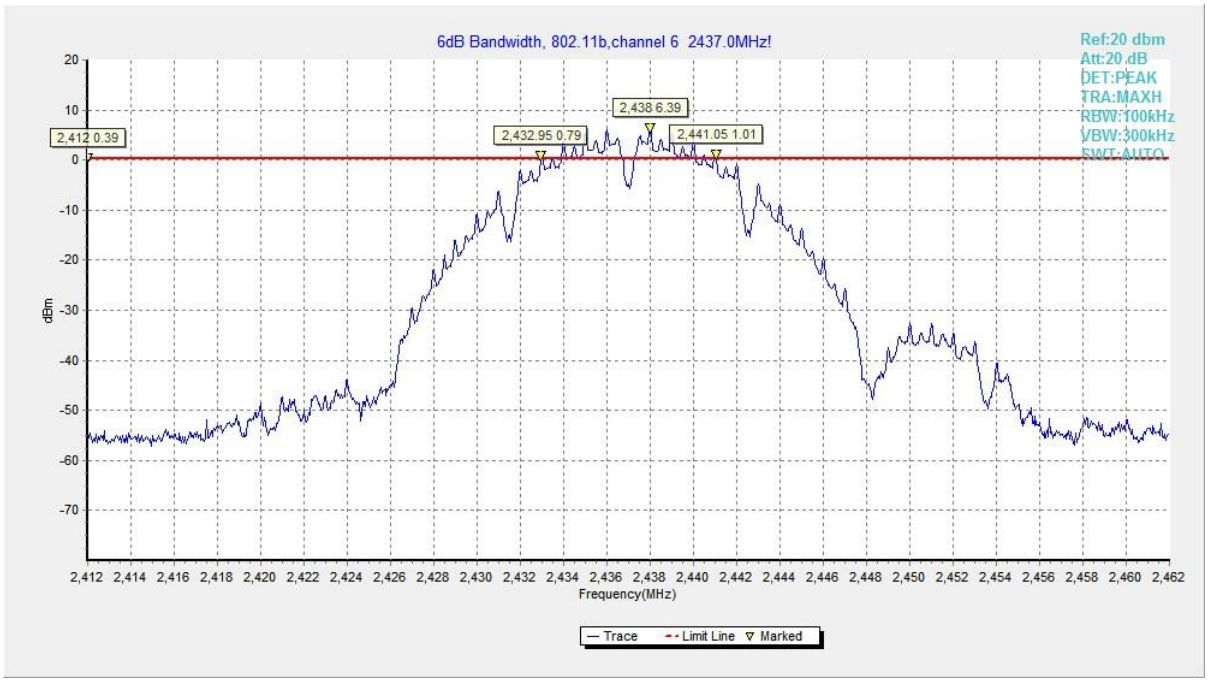


Fig.20 6dB Bandwidth (802.11b, CH 6)

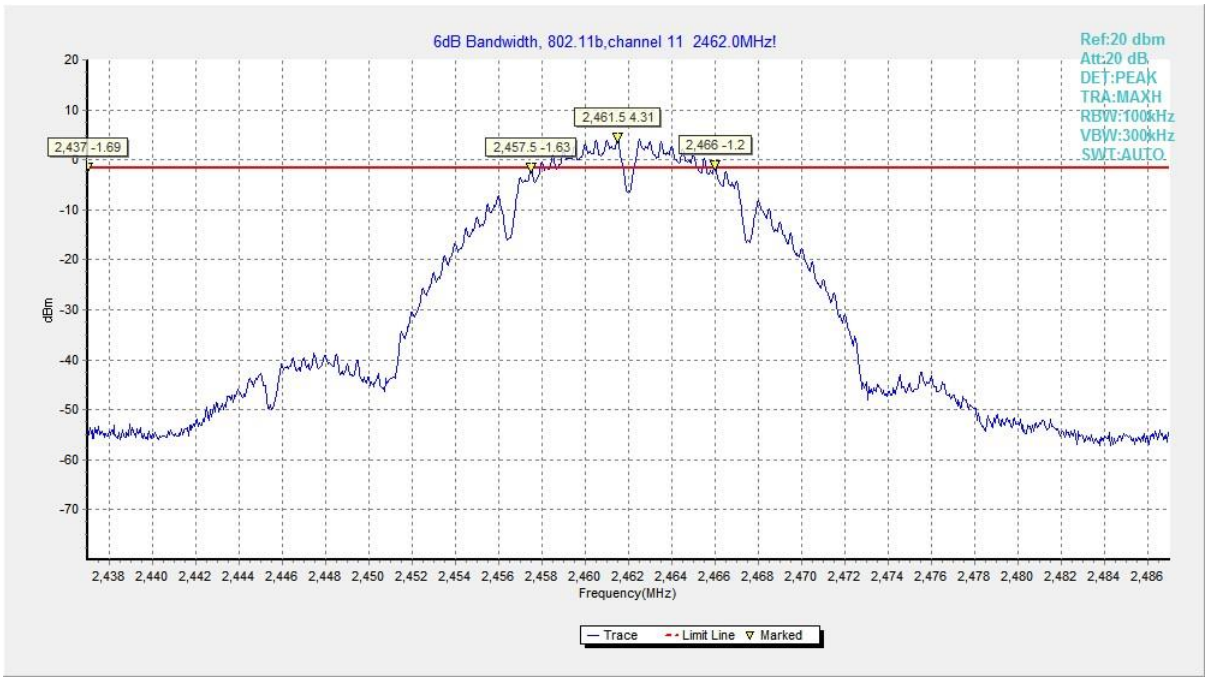


Fig.21 6dB Bandwidth (802.11b, CH 11)

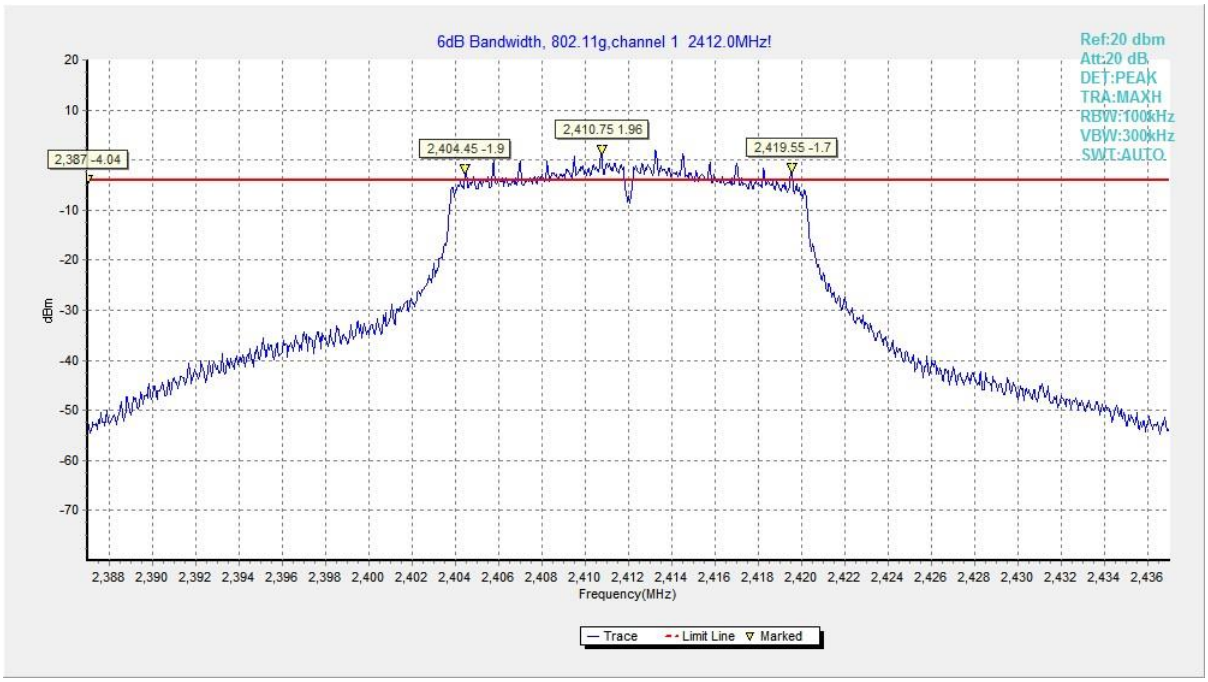


Fig.22 6dB Bandwidth (802.11g, CH 1)

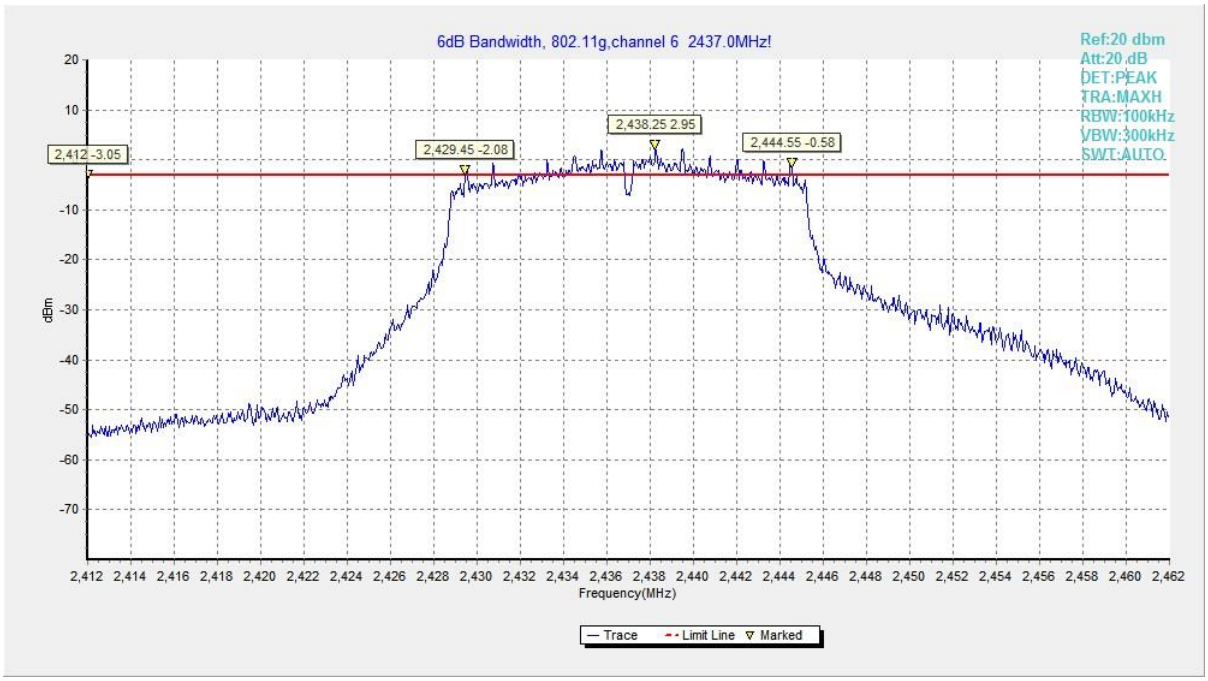


Fig.23 6dB Bandwidth (802.11g, CH 6)

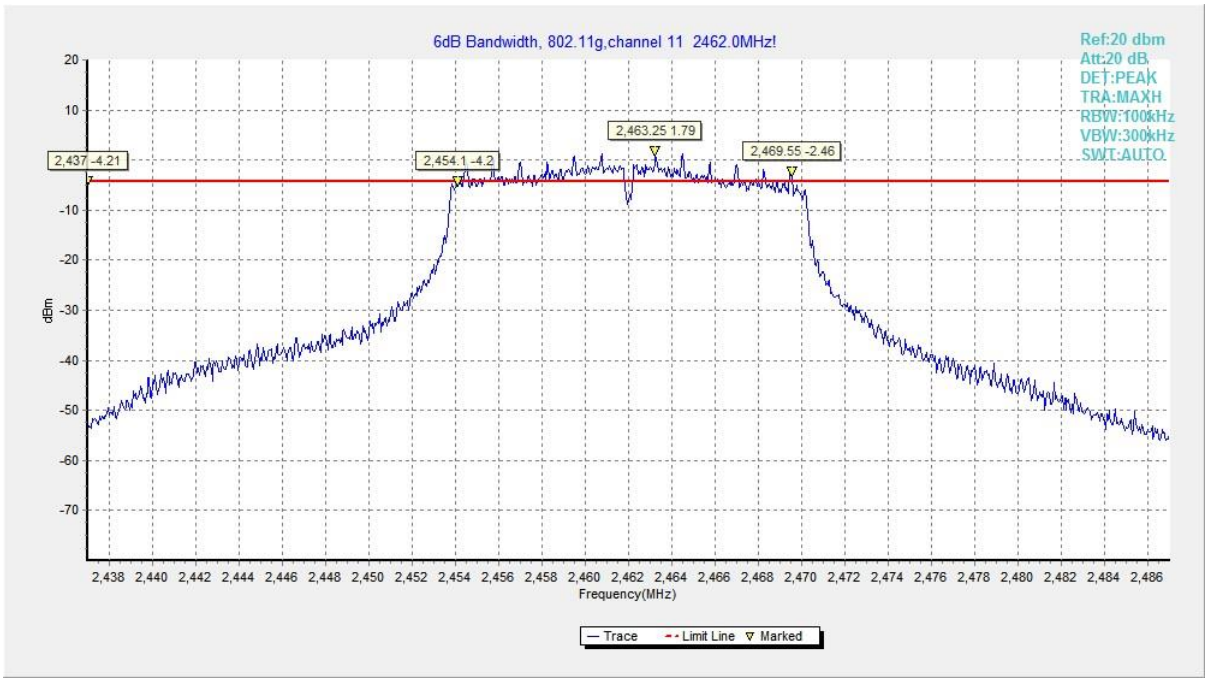


Fig.24 6dB Bandwidth (802.11g, CH 11)

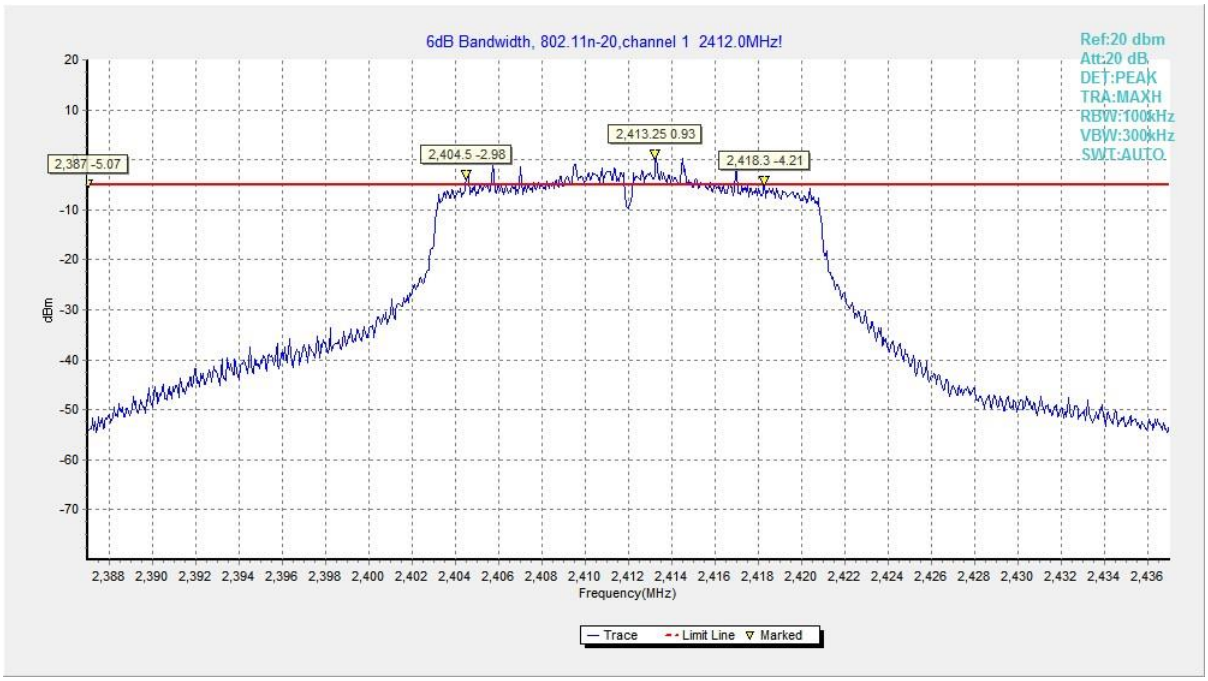


Fig.25 6dB Bandwidth (802.11n HT20, CH 1)

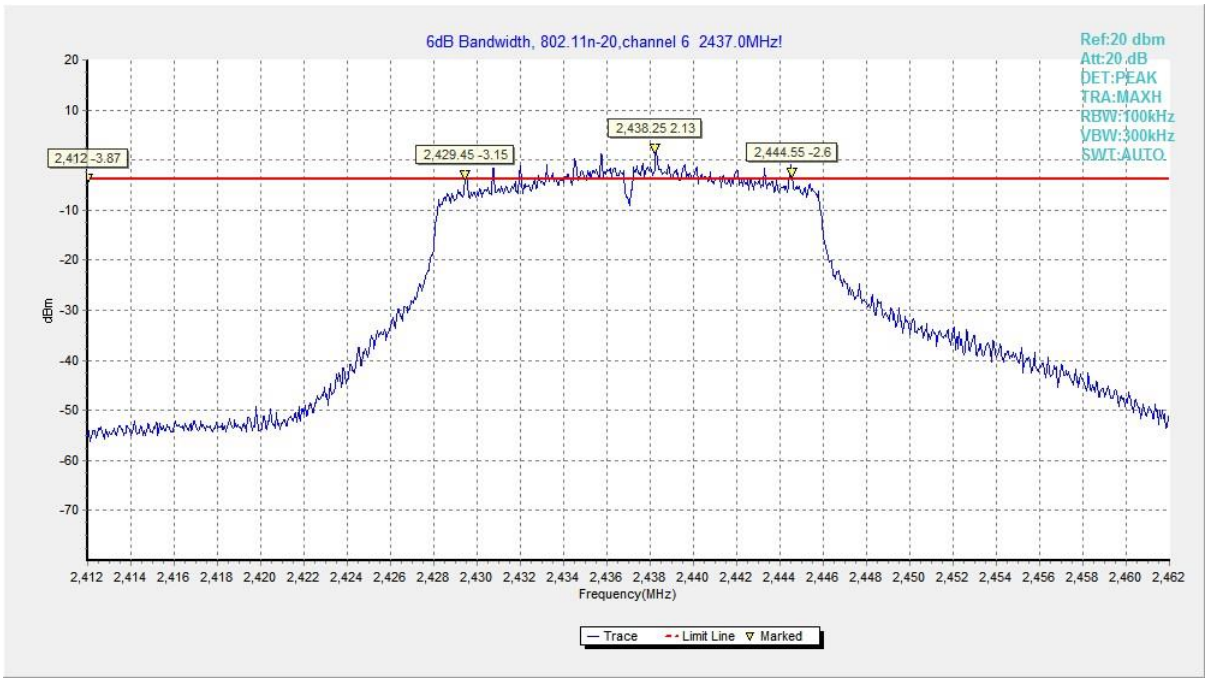


Fig.26 6dB Bandwidth (802.11n HT20, CH 6)

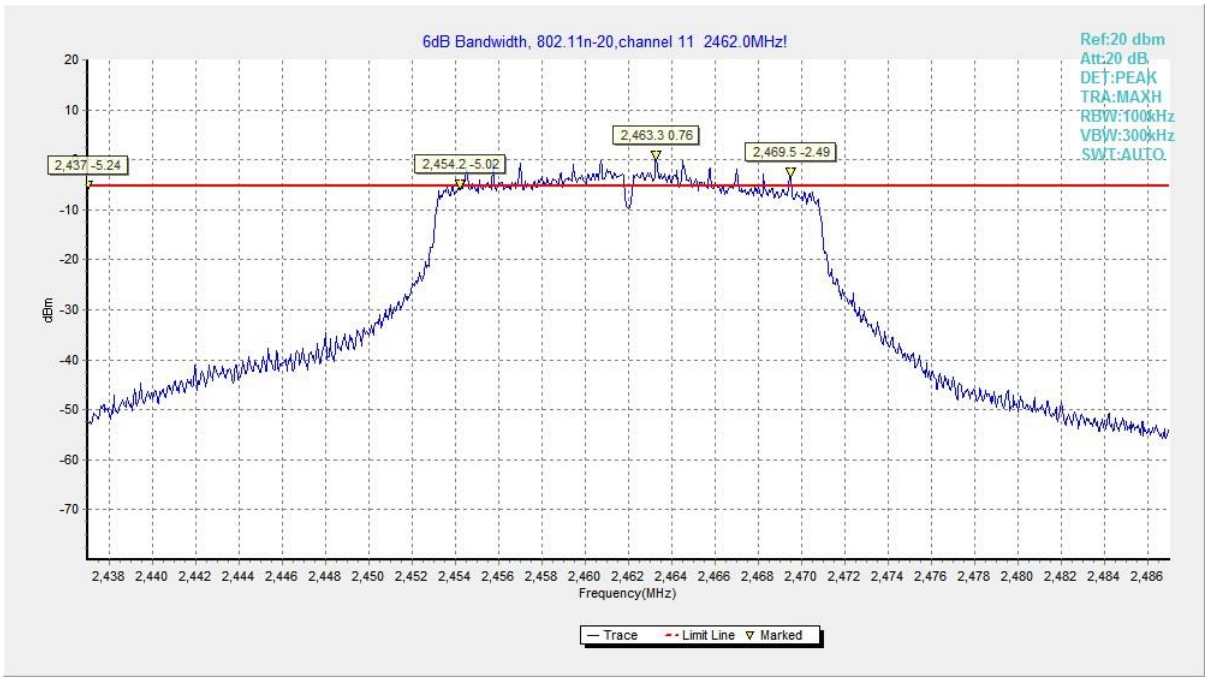


Fig.27 6dB Bandwidth (802.11n HT20, CH 11)

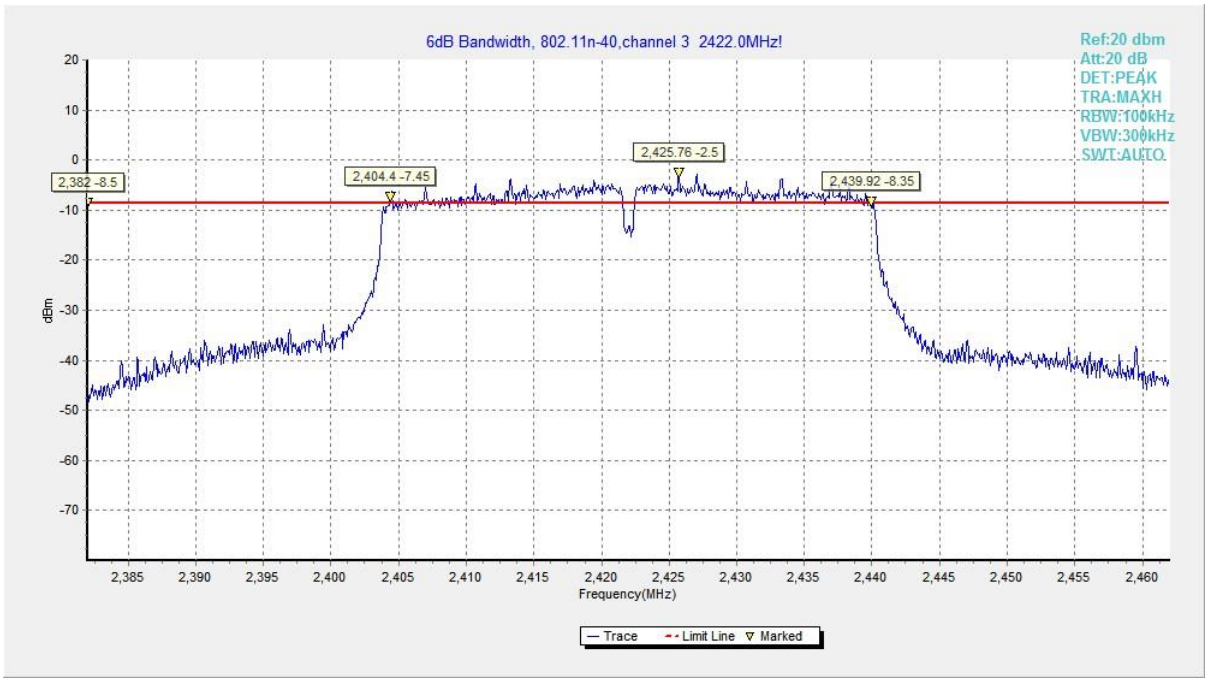


Fig.28 6dB Bandwidth (802.11n HT40, CH 3)

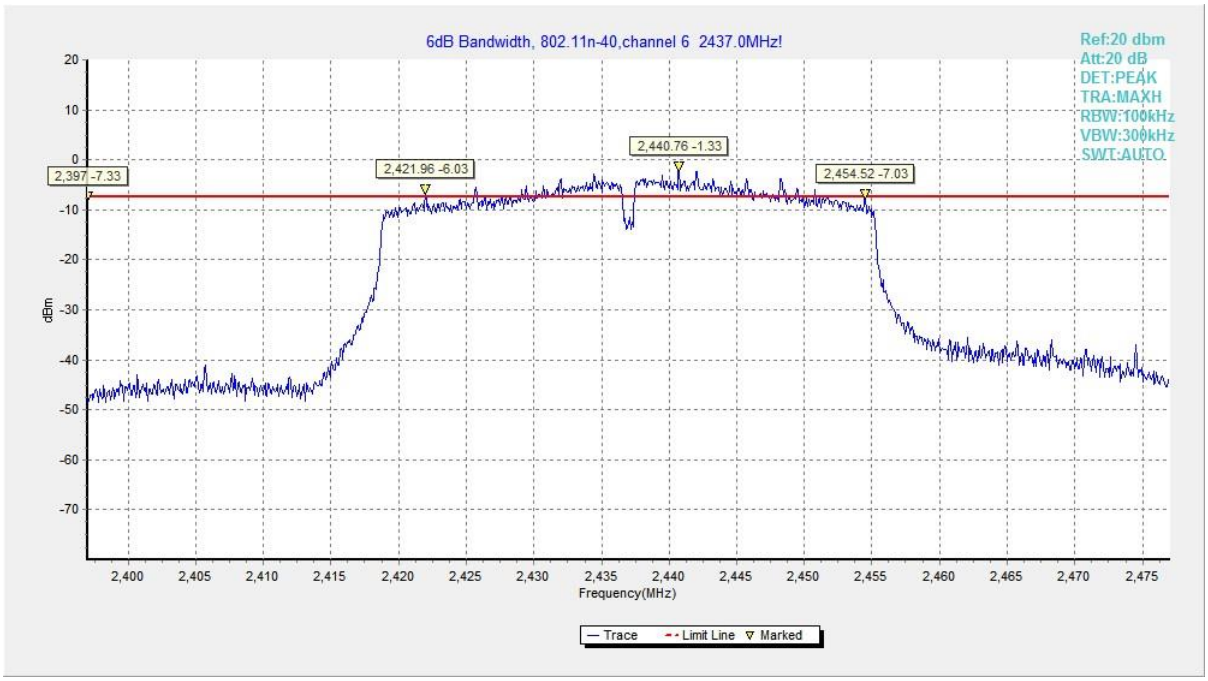


Fig.29 6dB Bandwidth (802.11n HT40, CH 6)

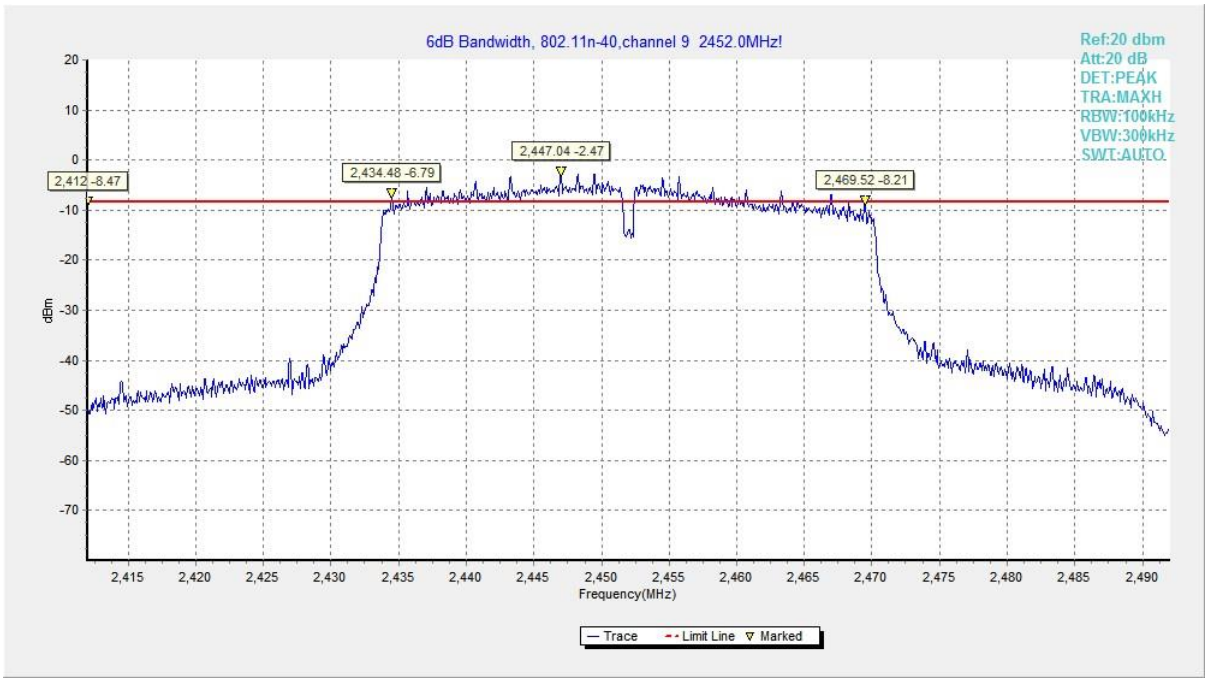


Fig.30 6dB Bandwidth (802.11n HT40, CH 9)

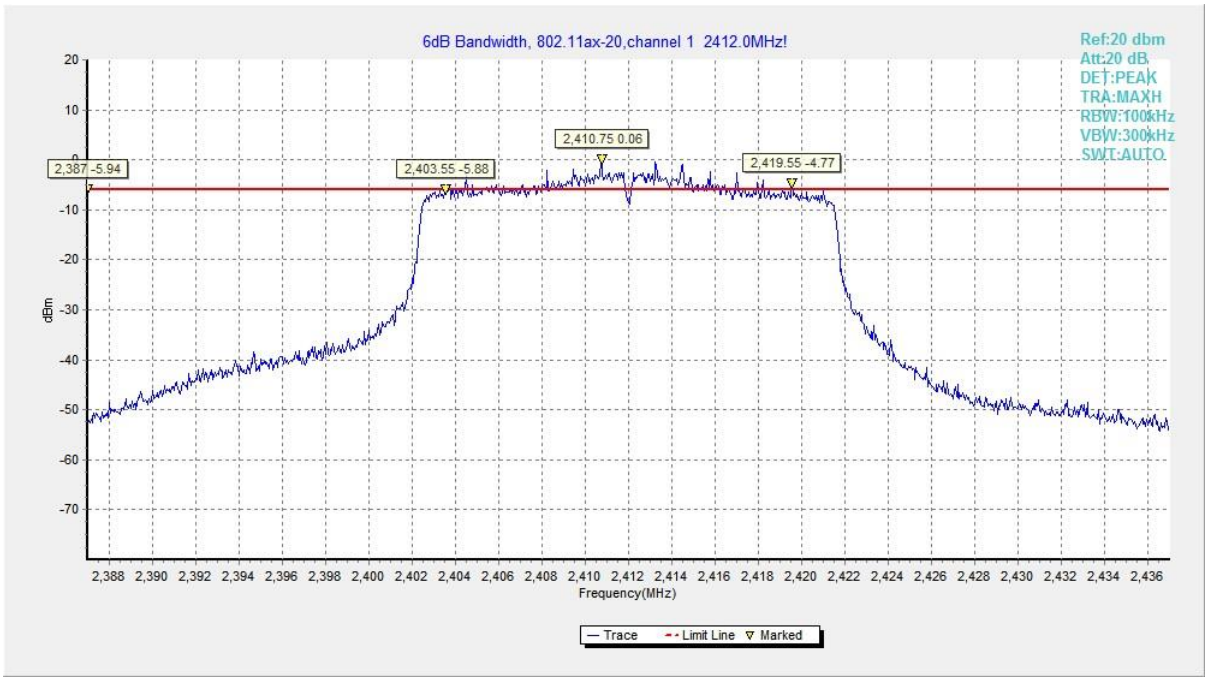


Fig.31 6dB Bandwidth (802.11ax HE20, CH 1)

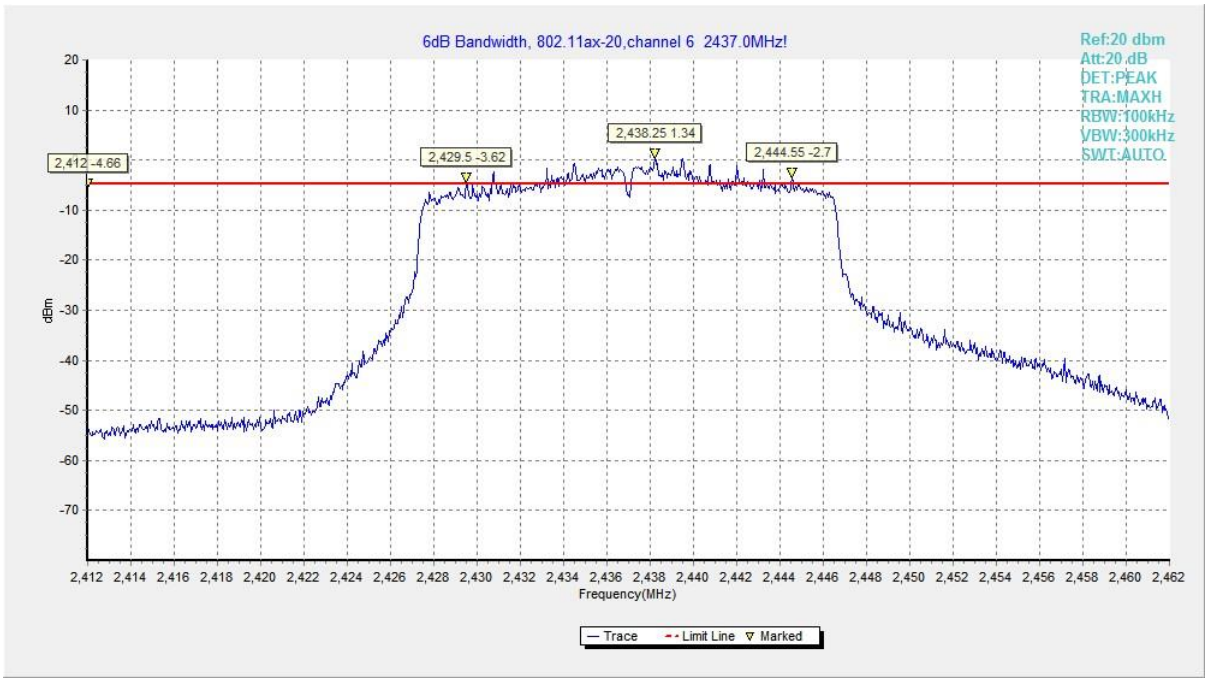


Fig.32 6dB Bandwidth (802.11ax HE20, CH 6)

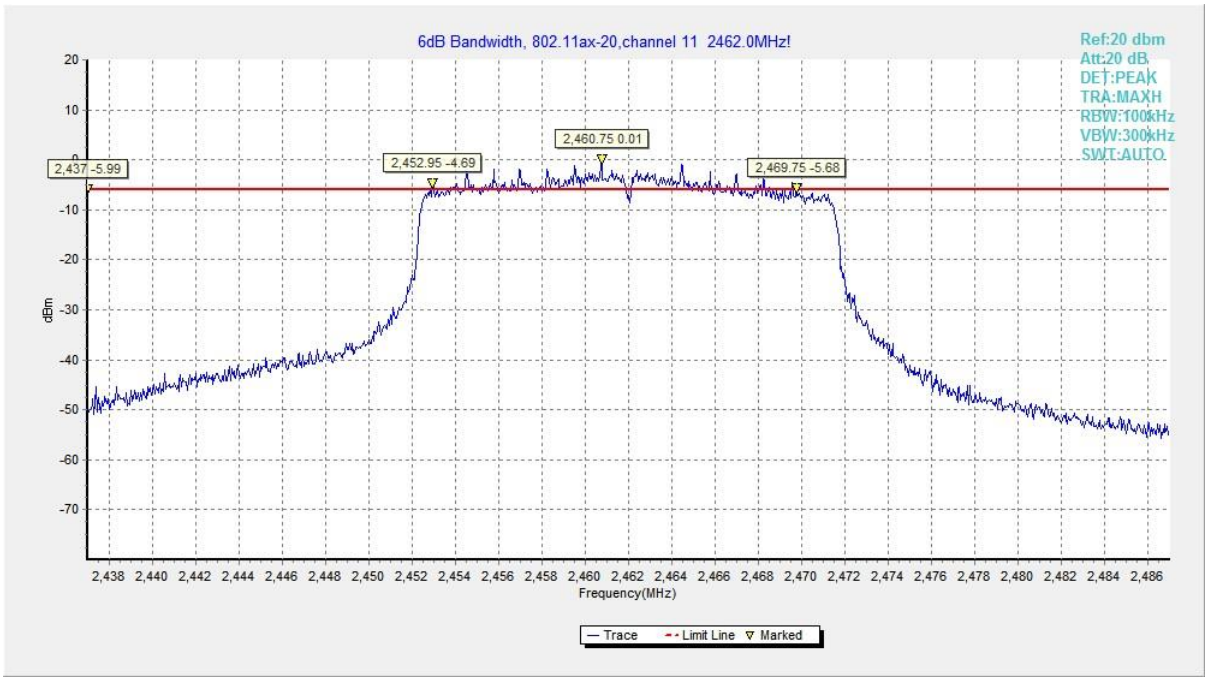


Fig.33 6dB Bandwidth (802.11ax HE20, CH 11)

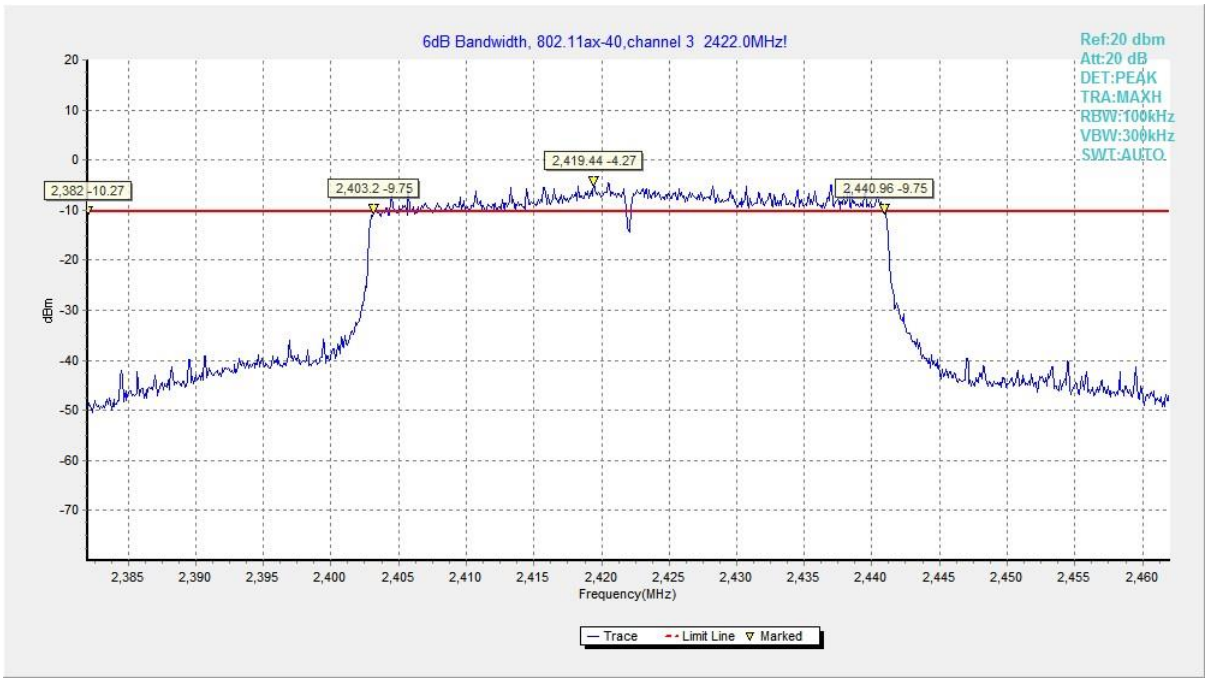


Fig.34 6dB Bandwidth (802.11ax HE40, CH 3)

Fig.35 6dB Bandwidth (802.11ax HE40, CH 6)

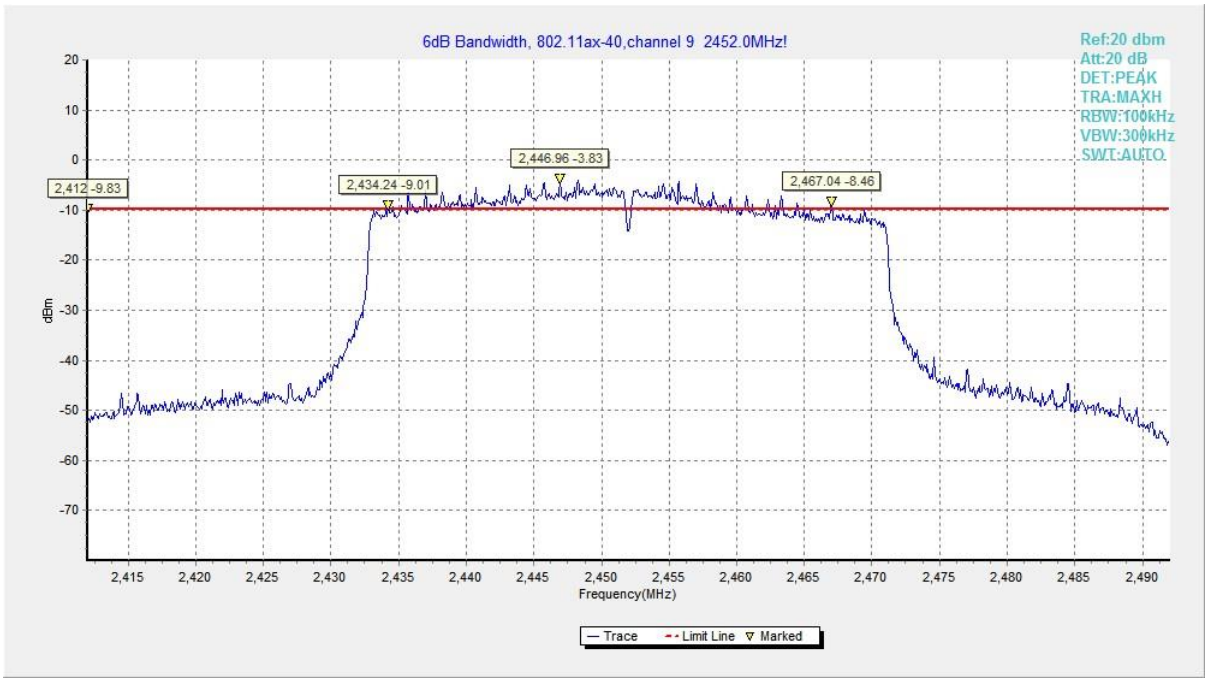


Fig.36 6dB Bandwidth (802.11ax HE40, CH 9)

A.4 Band Edges Compliance

Method of Measurement: See ANSI C63.10-clause 11.13.3.

Measurement Limit:

Standard	Limit (dB)
FCC 47 CFR Part 15.247 (d) & RSS-247 section 5.5	> 20

Measurement Result:

Mode	Channel	Frequency (MHz)	Test Results (dB)		Conclusion
802.11b	CH 1	2412	Fig.37	44.78	**P**
	CH 11	2462	Fig.38	60.07	**P**
802.11g	CH 1	2412	Fig.39	30.18	**P**
	CH 11	2462	Fig.40	51.31	**P**
802.11n HT20	CH 1	2412	Fig.41	35.78	**P**
	CH 11	2462	Fig.42	54.77	**P**
802.11n HT40	CH 3	2422	Fig.43	34.55	**P**
	CH 9	2452	Fig.44	41.58	**P**
802.11ax HT20	CH 1	2412	Fig.45	32.57	**P**
	CH 11	2462	Fig.46	55.92	**P**
802.11ax HT40	CH 3	2422	Fig.47	34.45	**P**
	CH 9	2452	Fig.48	45.35	**P**

See below for test graphs.
Conclusion: PASS

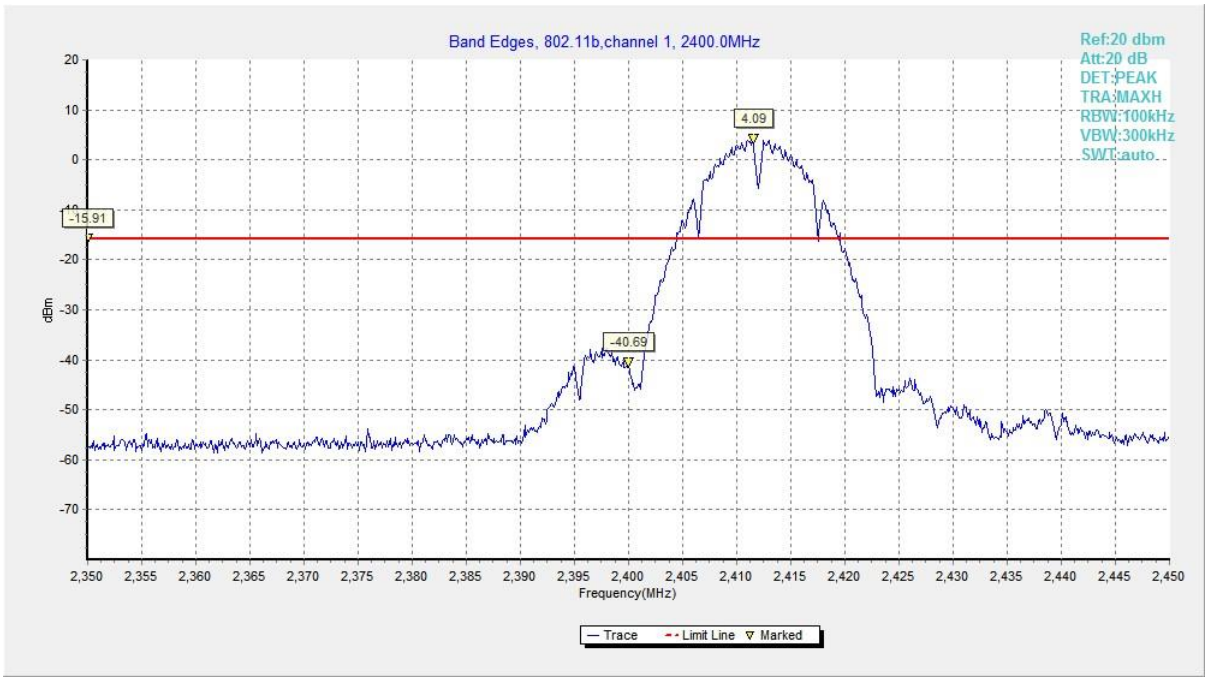


Fig.37 Band Edges (802.11b, CH 1)

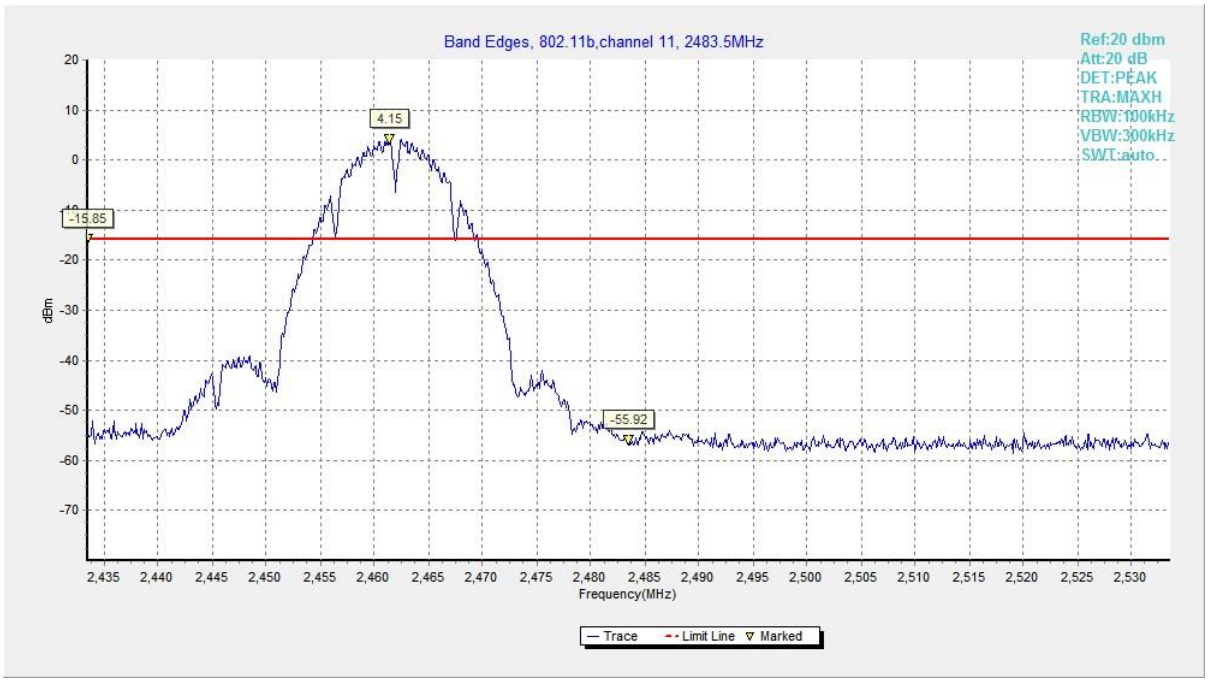


Fig.38 Band Edges (802.11b, CH 11)

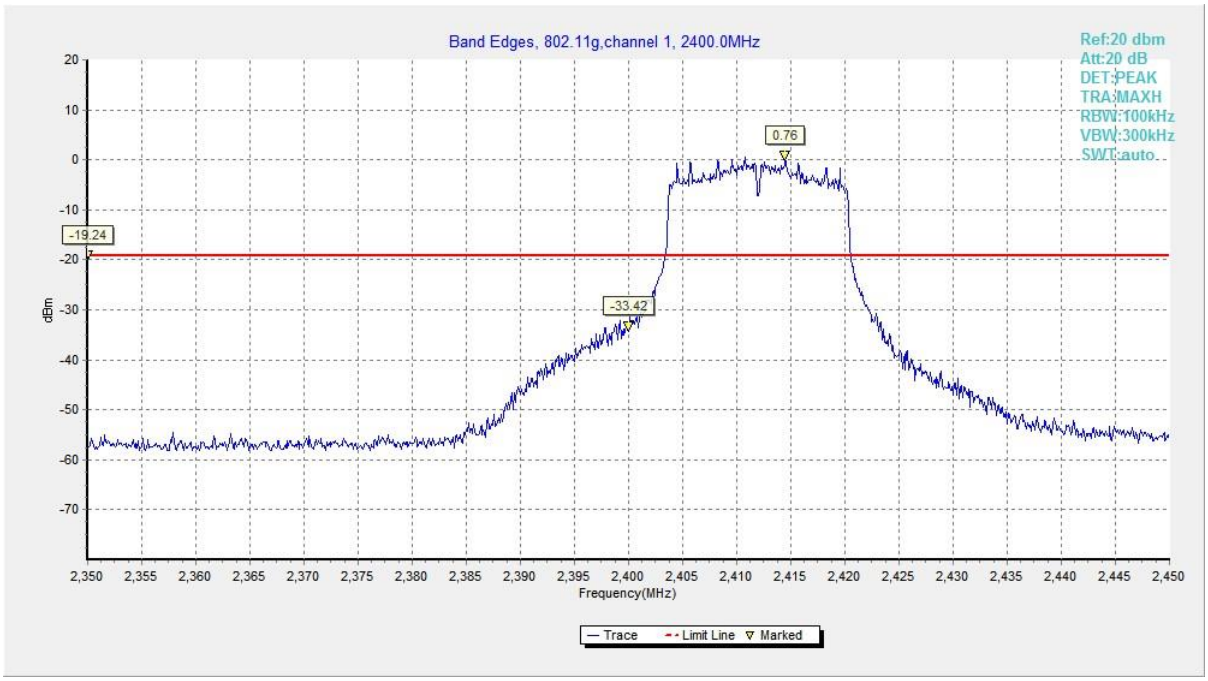


Fig.39 Band Edges (802.11g, CH 1)

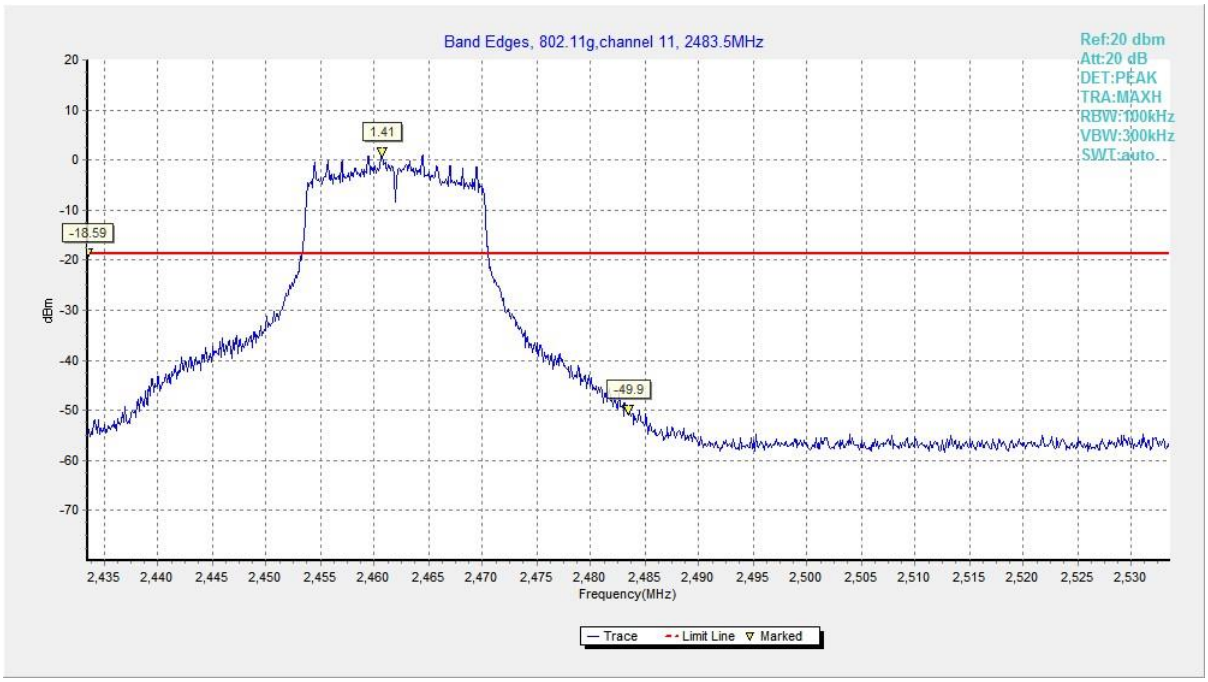


Fig.40 Band Edges (802.11g, CH 11)

Fig.41 Band Edges (802.11n HT20, CH 1)

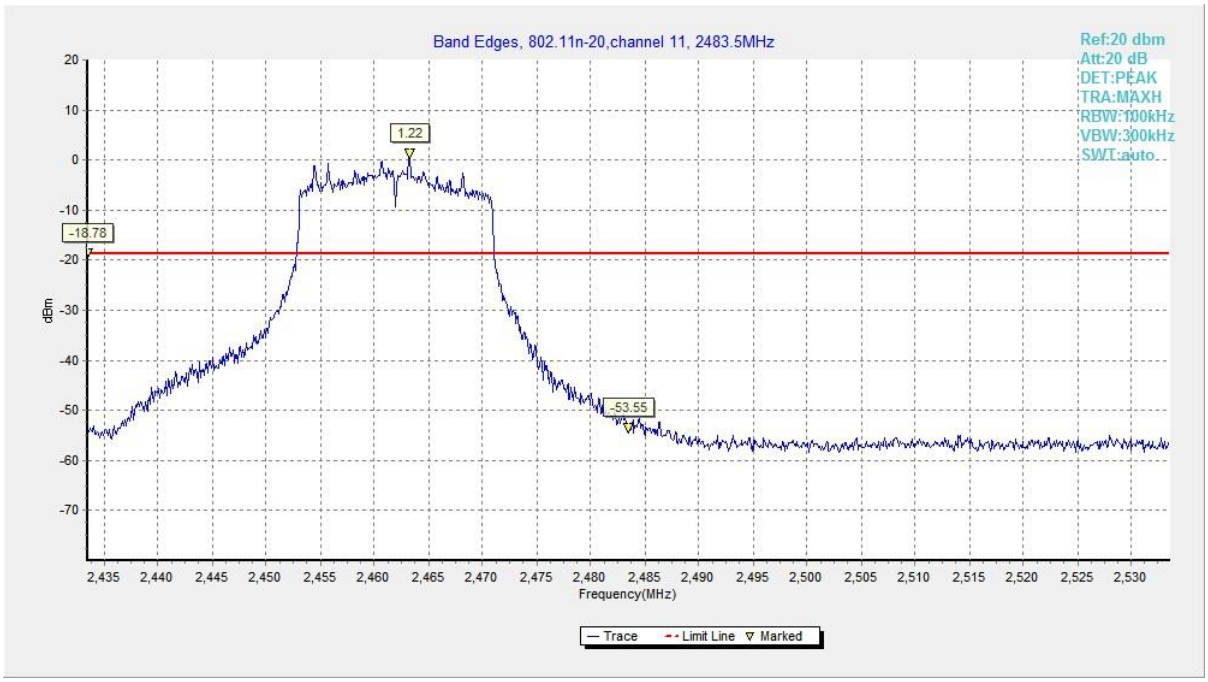


Fig.42 Band Edges (802.11n HT20, CH 11)

Fig.43 Band Edges (802.11n HT40, CH 3)

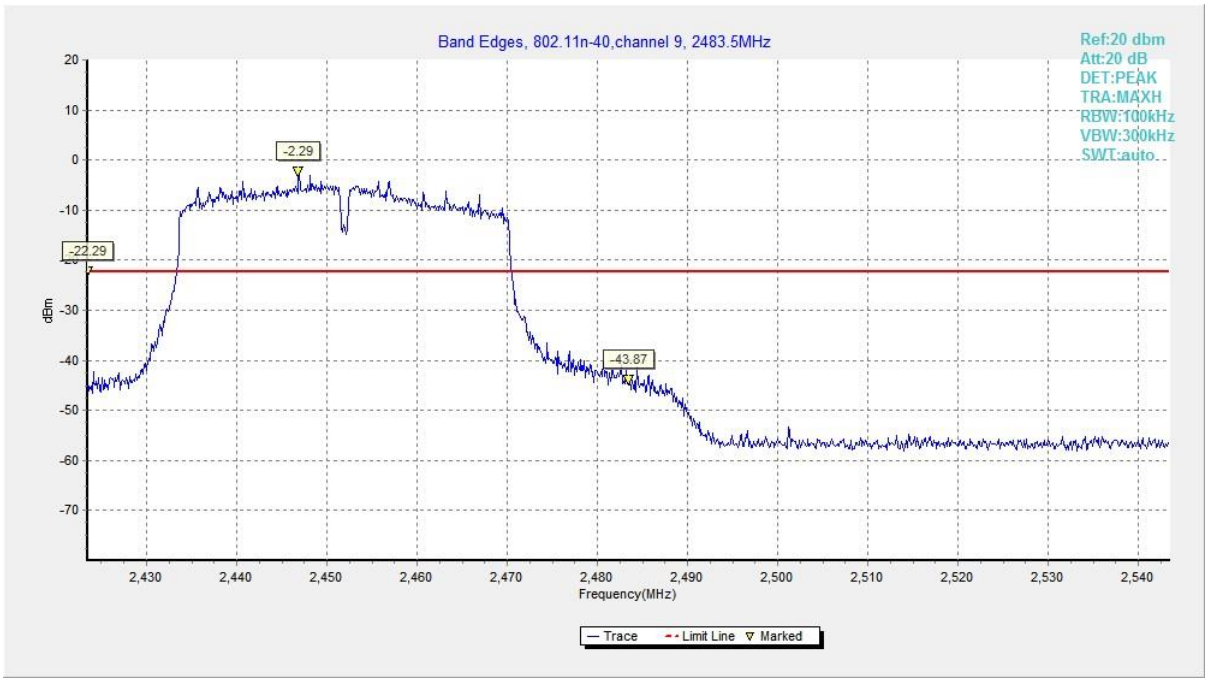


Fig.44 Band Edges (802.11n HT40, CH 9)

Fig.45 Band Edges (802.11ax HE20, CH 1)

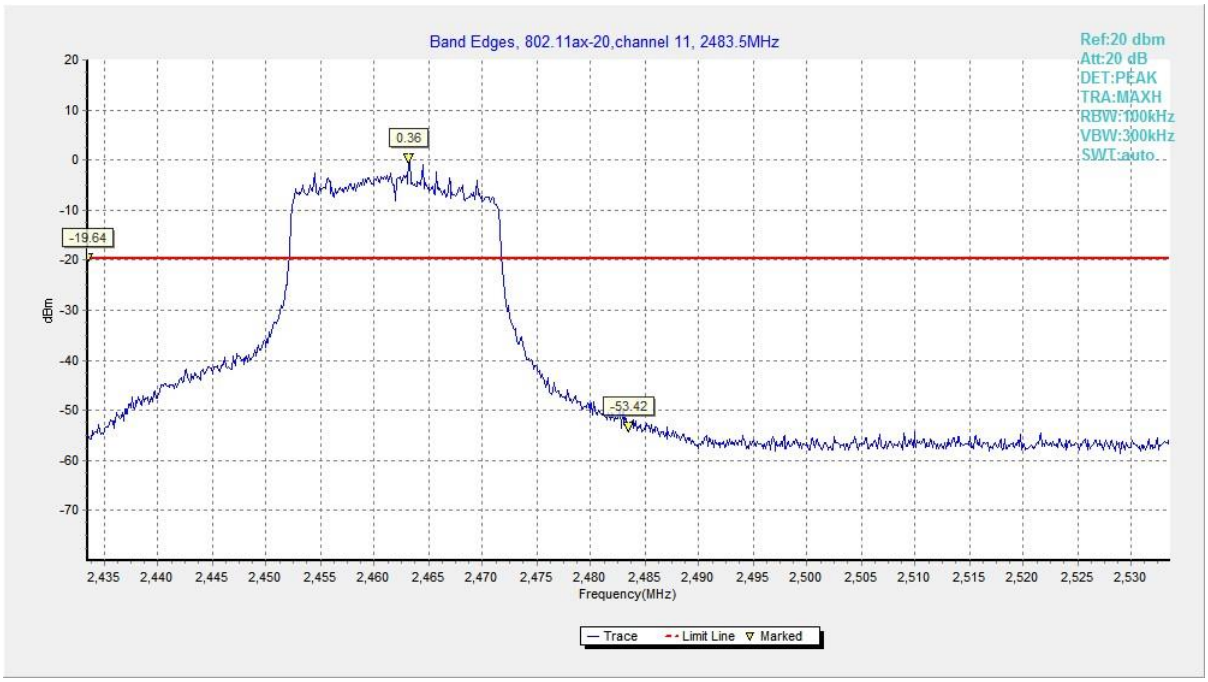


Fig.46 Band Edges (802.11ax HE20, CH 11)

Fig.47 Band Edges (802.11ax HE40, CH 3)

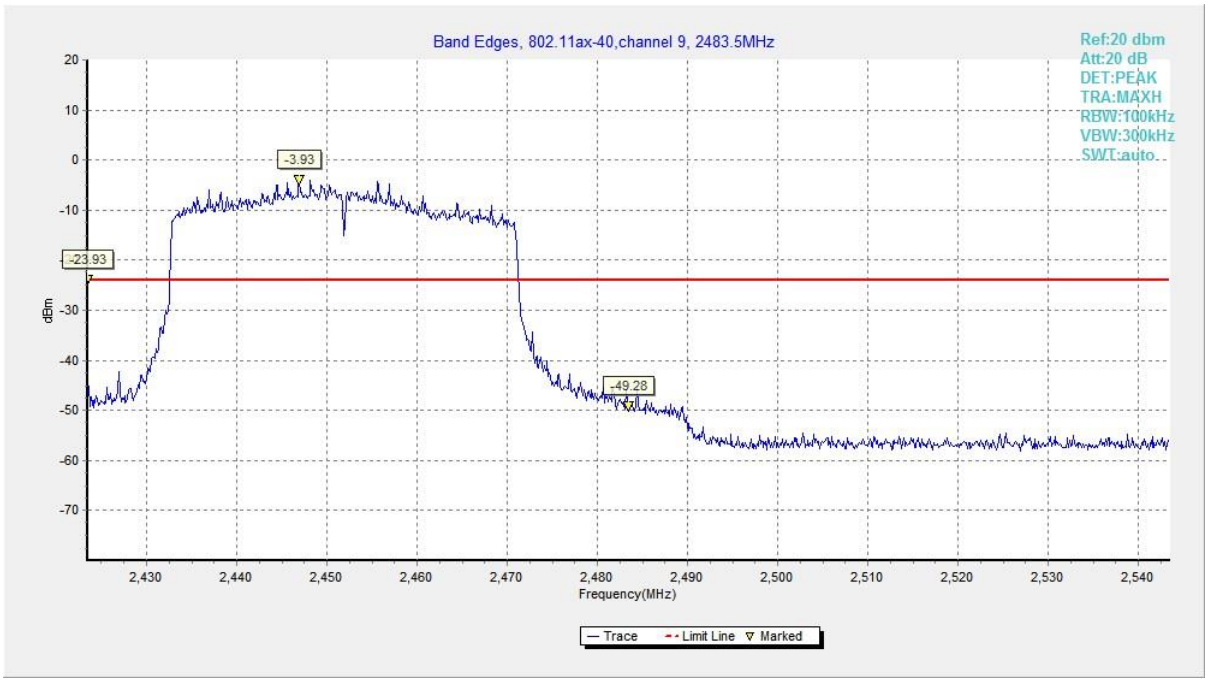


Fig.48 Band Edges (802.11ax HE40, CH 9)

A.5 Conducted Emission

Method of Measurement: See ANSI C63.10-clause 11.11.

Measurement Limit:

Standard	Limit
FCC 47 CFR Part 15.247 (d) & RSS-247 section 5.5/RSS-Gen section 6.13	30dB below peak output power in 100kHz bandwidth

Measurement Results:

Mode	Channel	Frequency (MHz)	Frequency Range	Test Results	Conclusion
802.11b	CH 1	2412	30MHz-26GHz	Fig.49	**P**
	CH 6	2437	30MHz-26GHz	Fig.50	**P**
	CH 11	2462	30MHz-26GHz	Fig.51	**P**
802.11g	CH 1	2412	30MHz-26GHz	Fig.52	**P**
	CH 6	2437	30MHz-26GHz	Fig.53	**P**
	CH 11	2462	30MHz-26GHz	Fig.54	**P**
802.11n HT20	CH 1	2412	30MHz-26GHz	Fig.55	**P**
	CH 6	2437	30MHz-26GHz	Fig.56	**P**
	CH 11	2462	30MHz-26GHz	Fig.57	**P**
802.11n HT40	CH 3	2422	30MHz-26GHz	Fig.58	**P**
	CH 6	2437	30MHz-26GHz	Fig.59	**P**
	CH 9	2452	30MHz-26GHz	Fig.60	**P**
802.11ax HE20	CH 1	2412	30MHz-26GHz	Fig.61	**P**
	CH 6	2437	30MHz-26GHz	Fig.62	**P**
	CH 11	2462	30MHz-26GHz	Fig.63	**P**
802.11ax HE40	CH 3	2422	30MHz-26GHz	Fig.64	**P**
	CH 6	2437	30MHz-26GHz	Fig.65	**P**
	CH 9	2452	30MHz-26GHz	Fig.66	**P**

See below for test graphs.

Conclusion: PASS

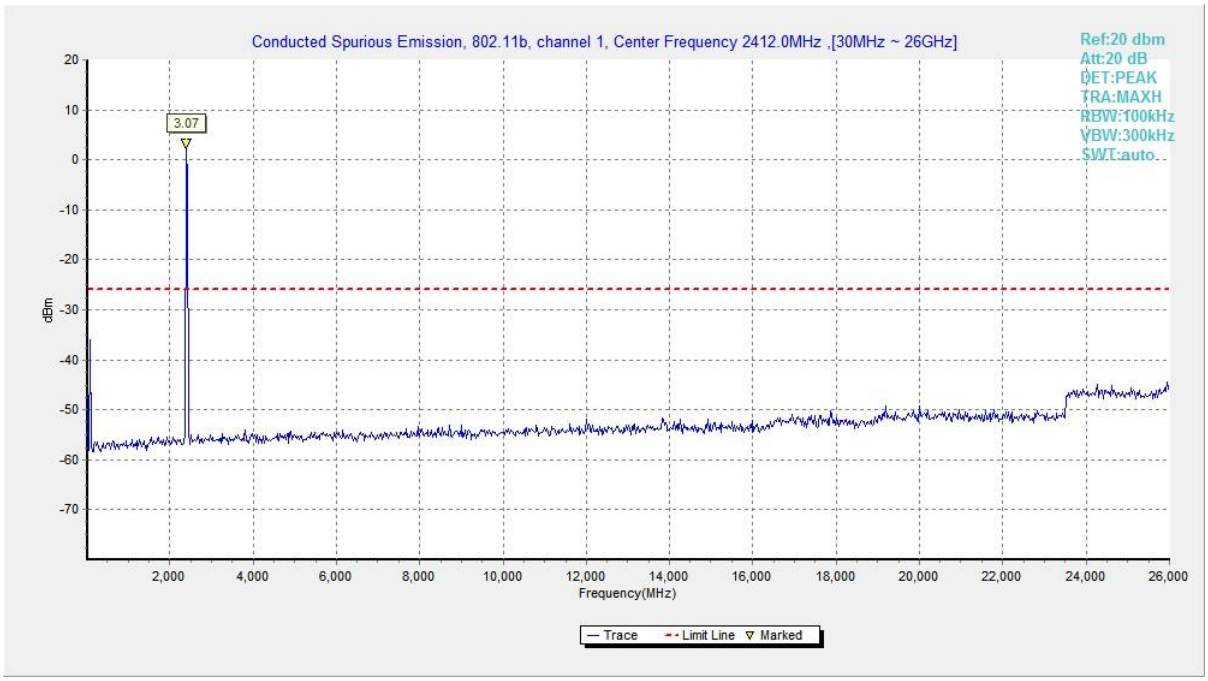


Fig.49 Conducted Spurious Emission (802.11b, CH1)

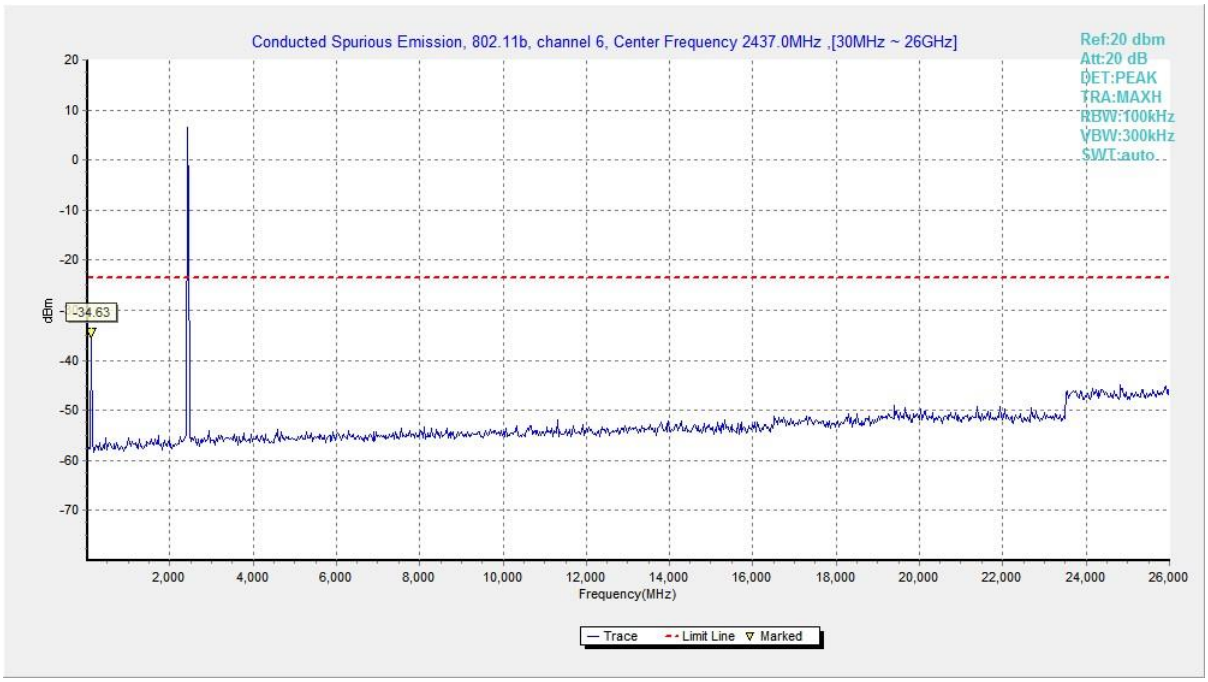


Fig.50 Conducted Spurious Emission (802.11b, CH6)

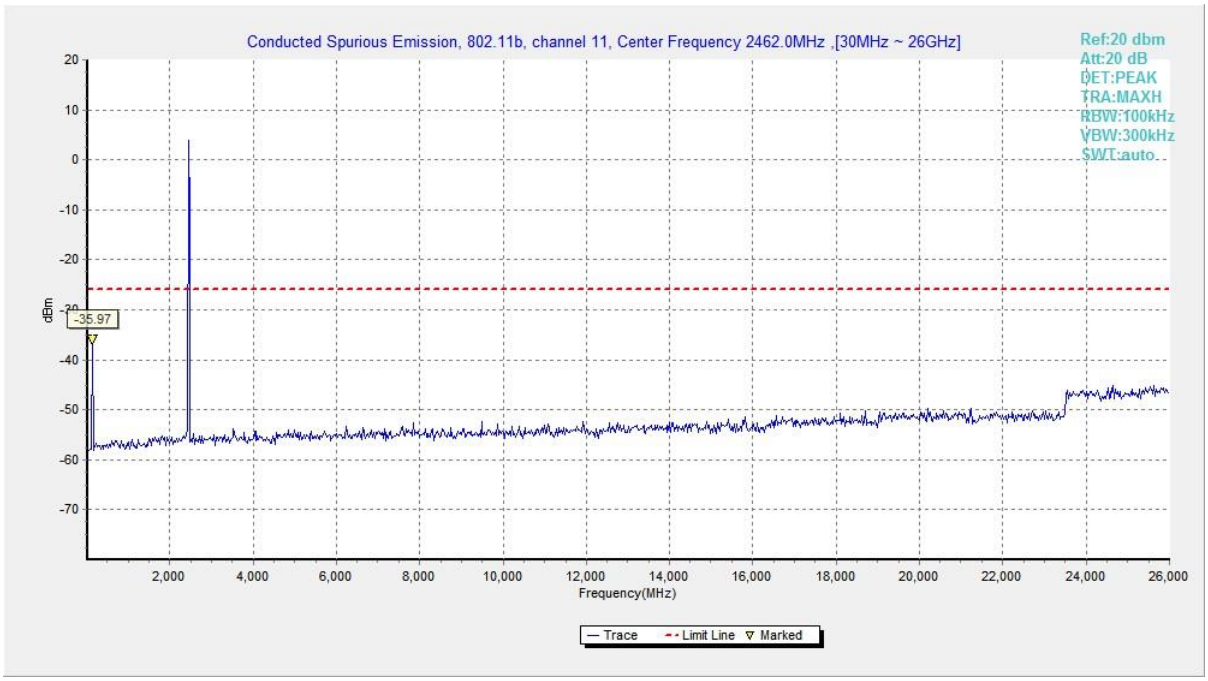


Fig.51 Conducted Spurious Emission (802.11b, CH11)

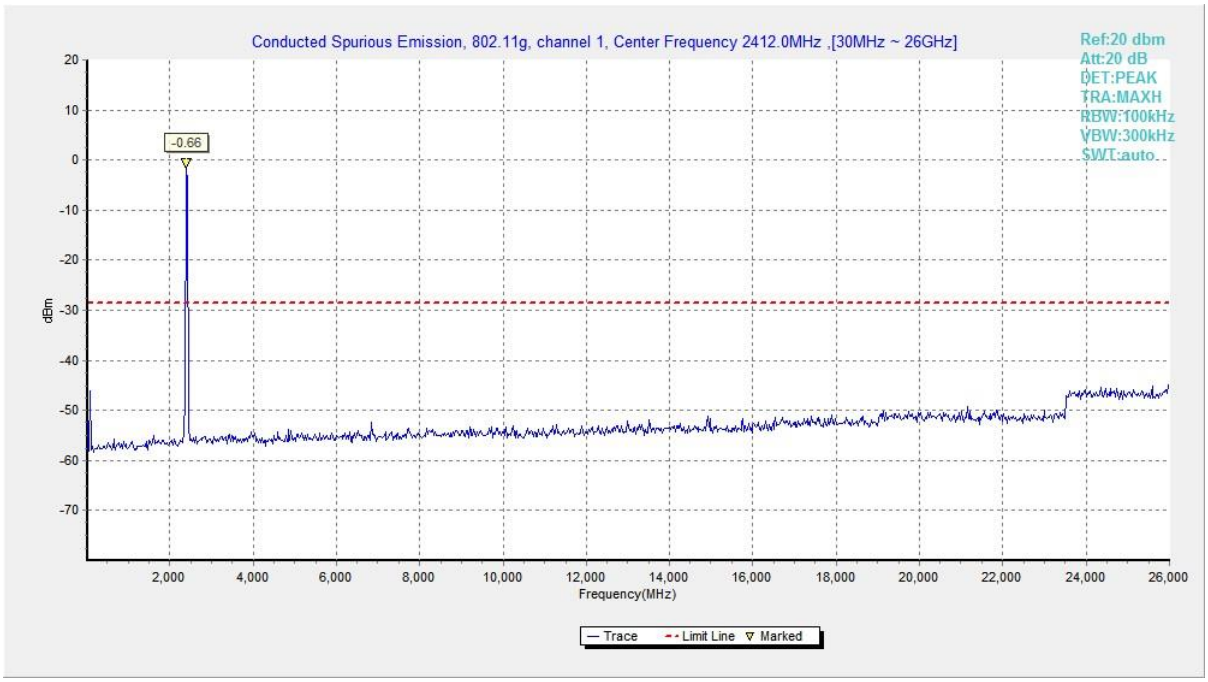


Fig.52 Conducted Spurious Emission (802.11g, CH1)

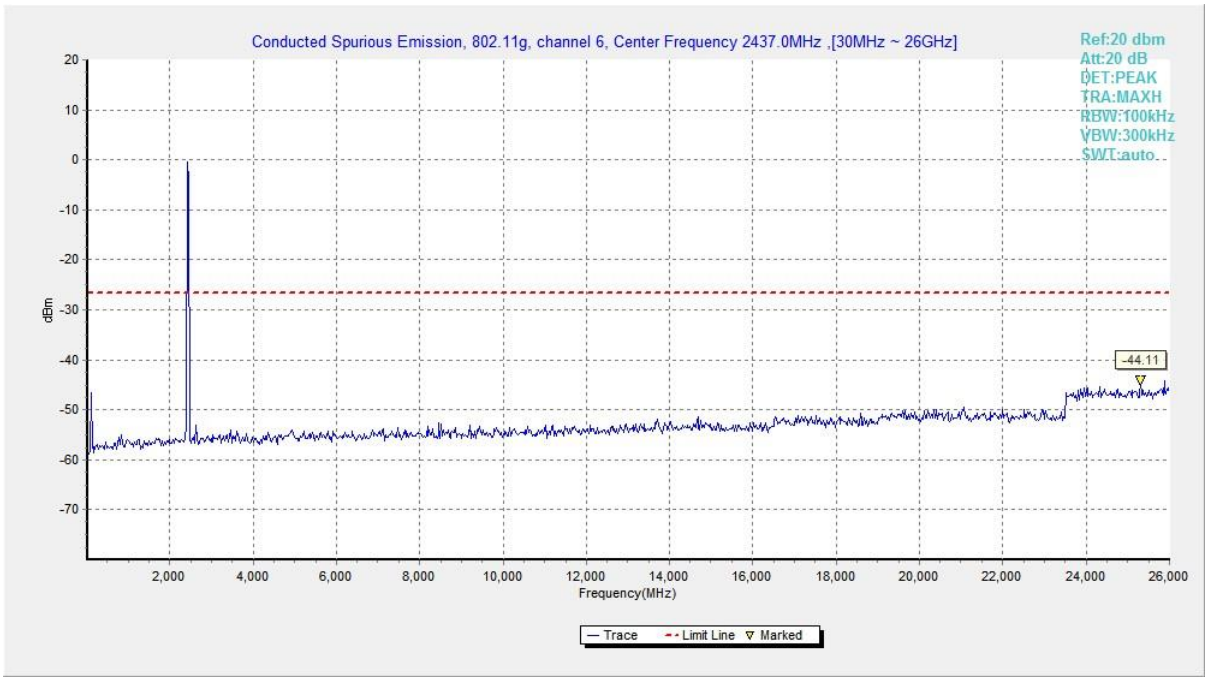


Fig.53 Conducted Spurious Emission (802.11g, CH6)

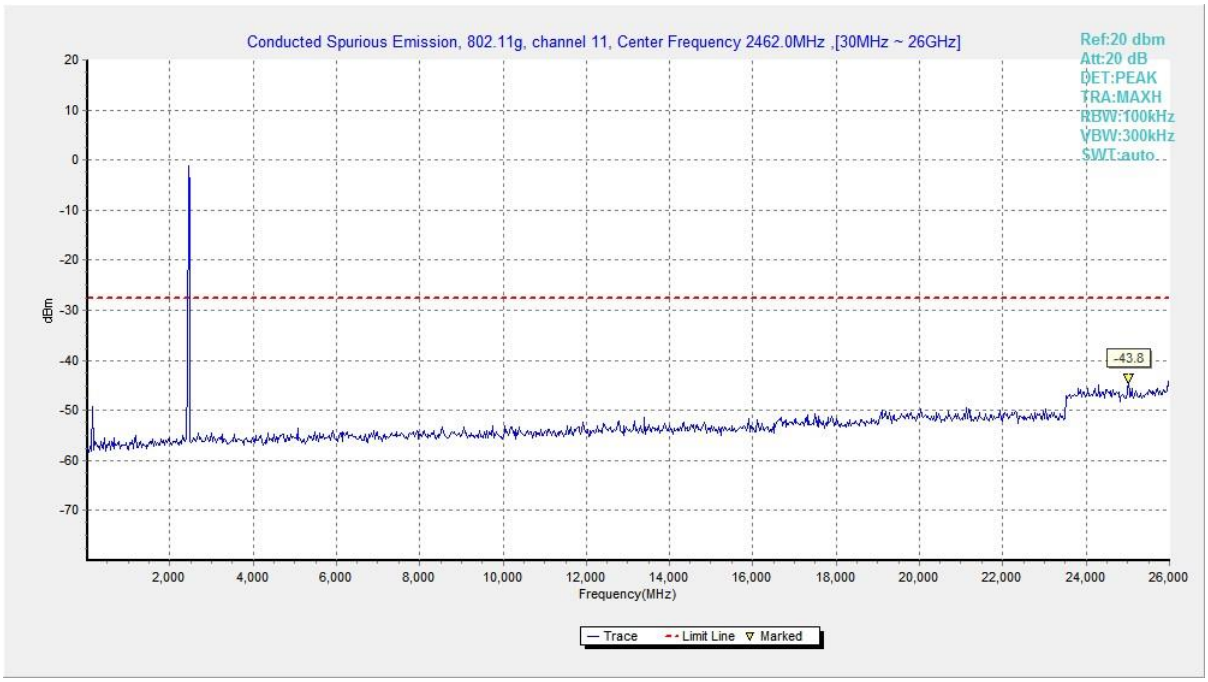


Fig.54 Conducted Spurious Emission (802.11g, CH11)

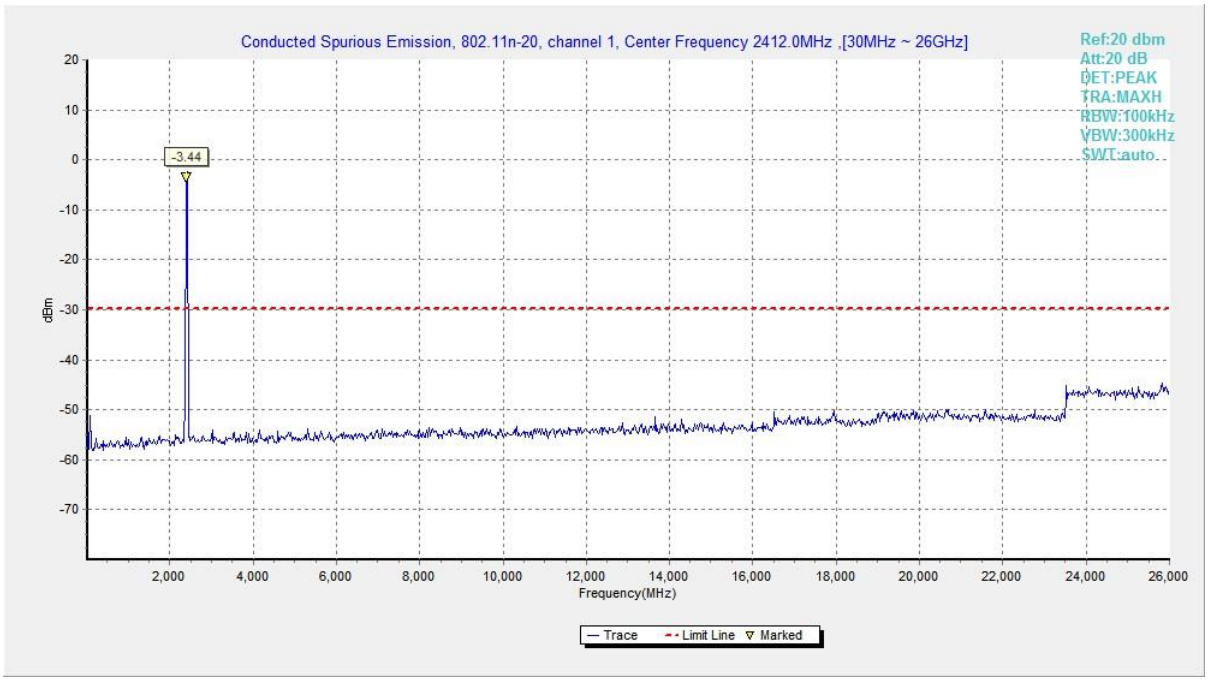


Fig.55 Conducted Spurious Emission (802.11n HT20, CH1)

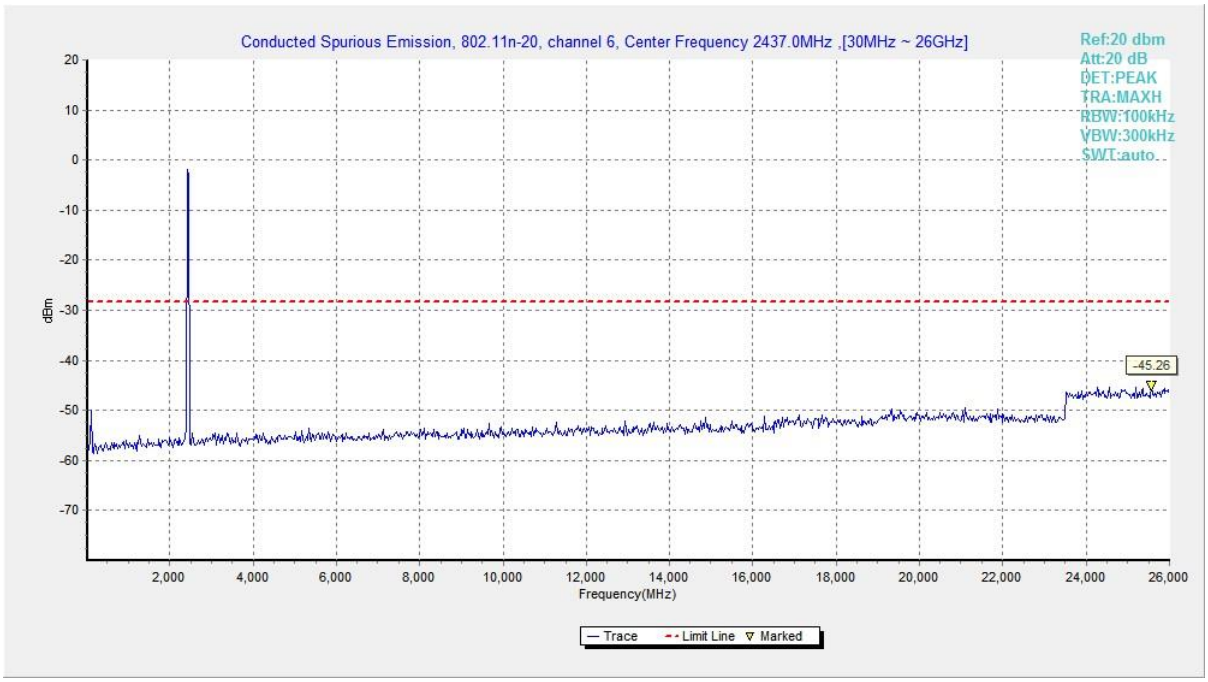


Fig.56 Conducted Spurious Emission (802.11n HT20, CH6)

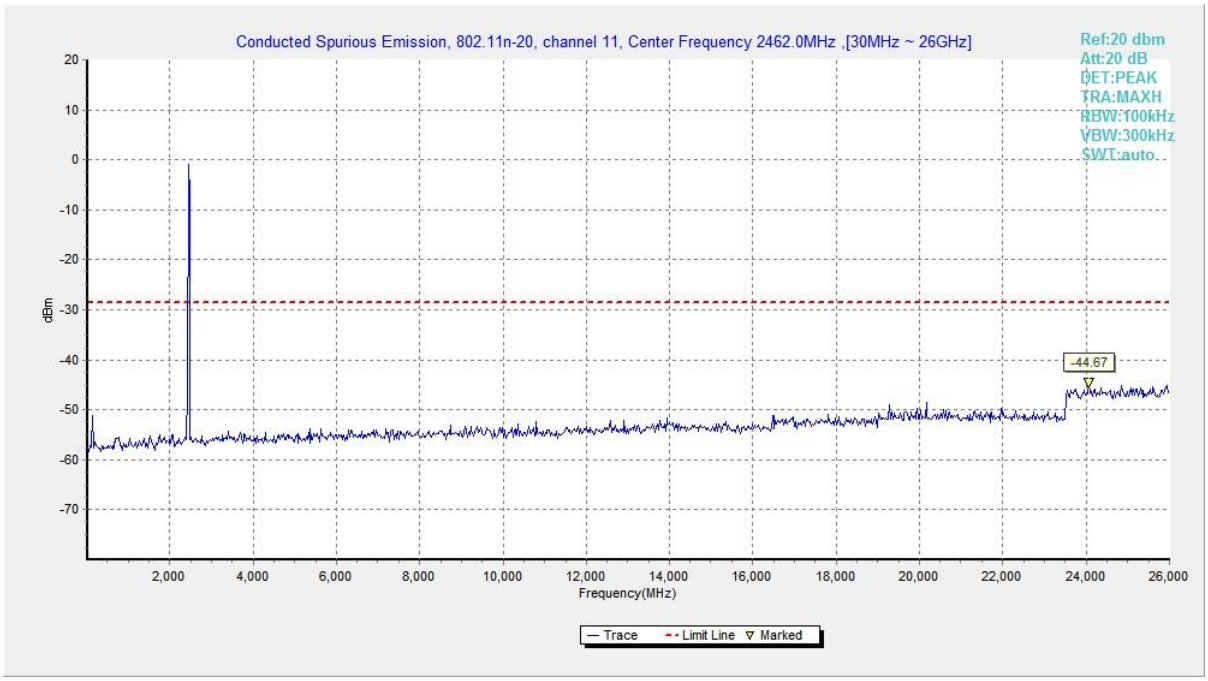


Fig.57 Conducted Spurious Emission (802.11n HT20, CH11)

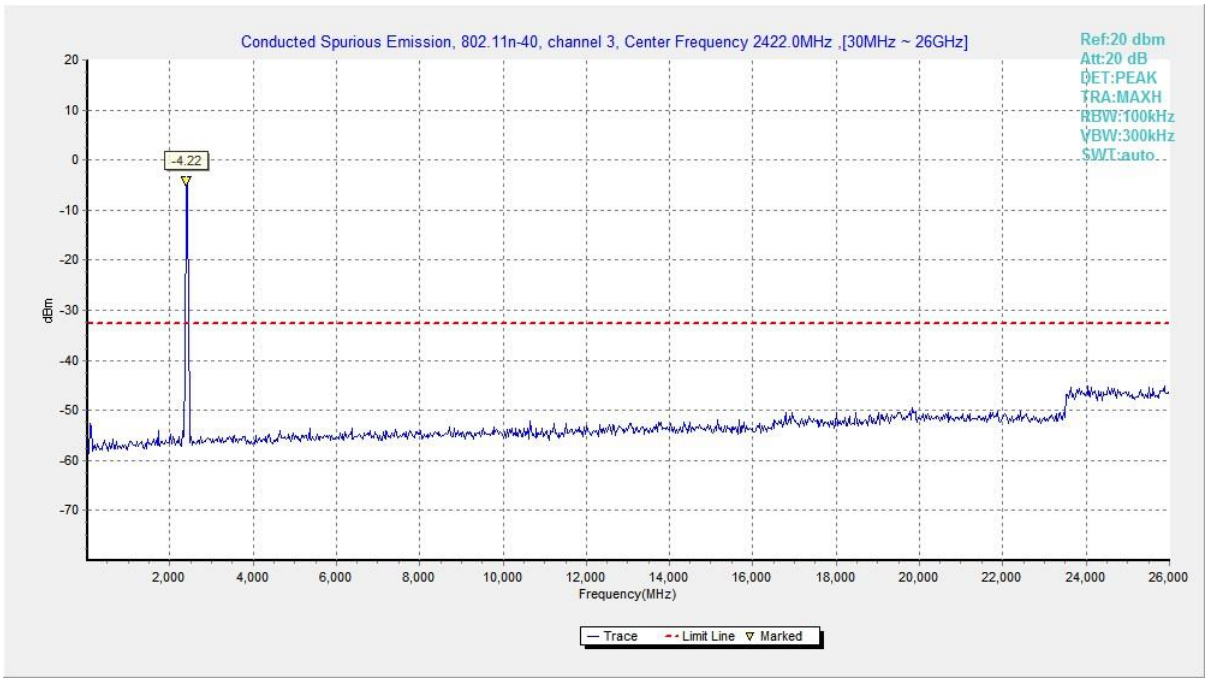


Fig.58 Conducted Spurious Emission (802.11n HT40, CH3)

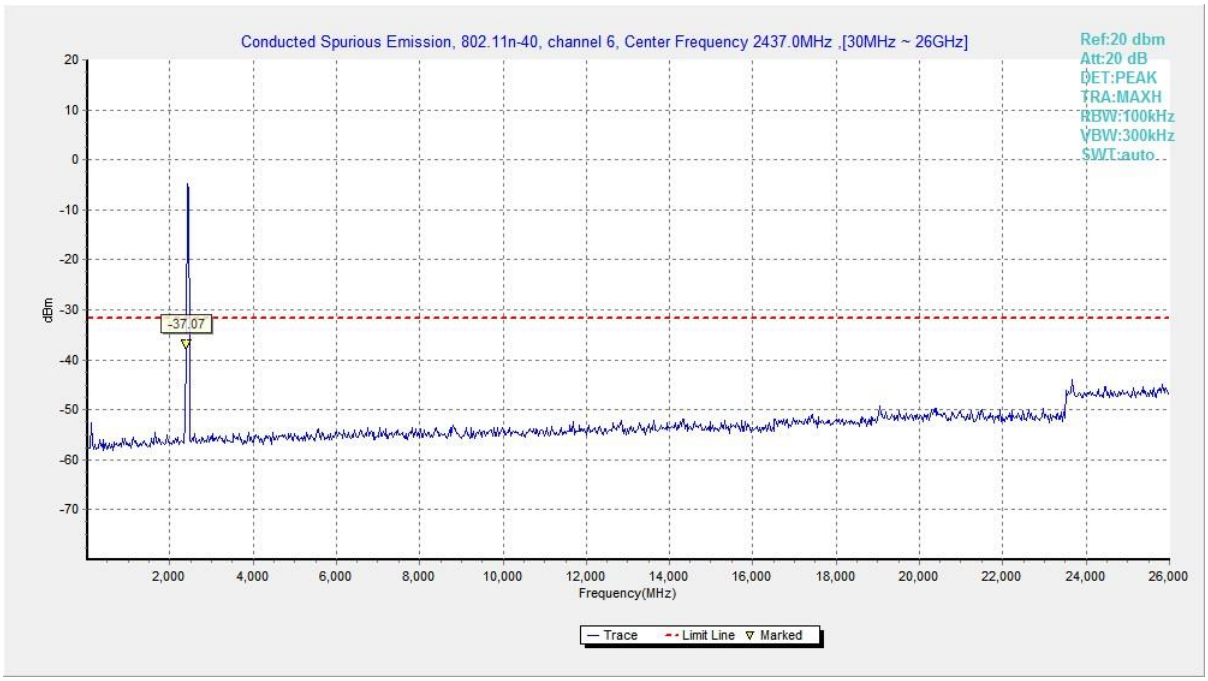


Fig.59 Conducted Spurious Emission (802.11n HT40, CH6)

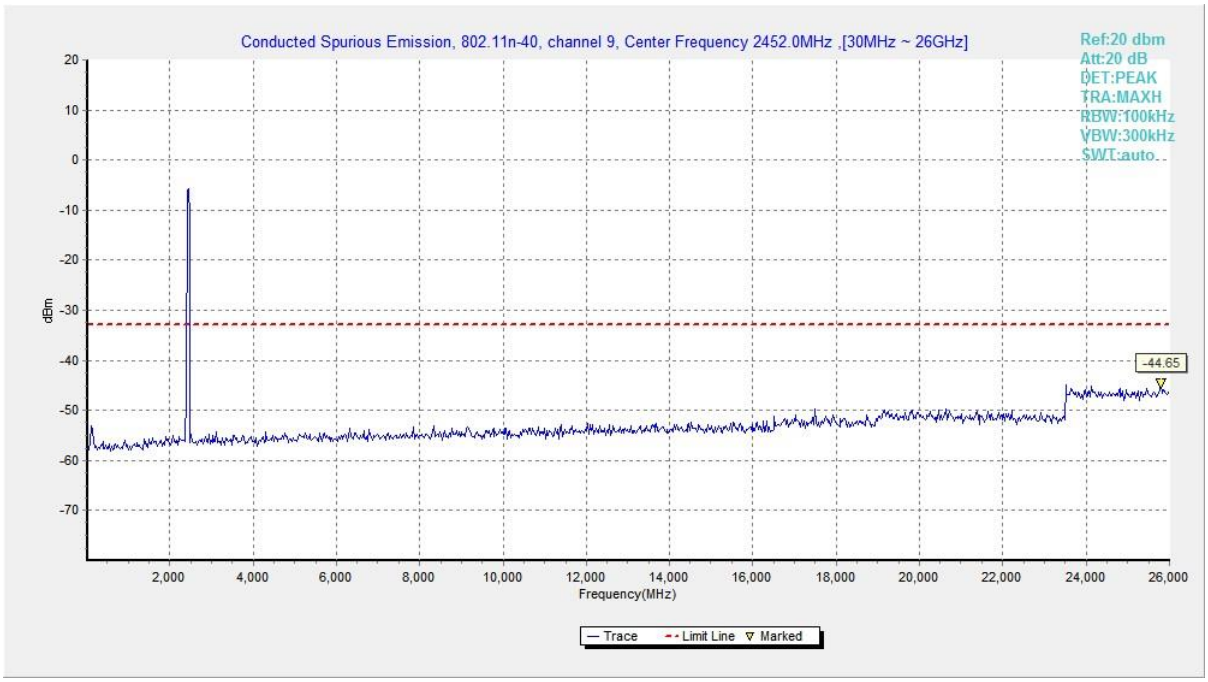


Fig.60 Conducted Spurious Emission (802.11n HT40, CH9)

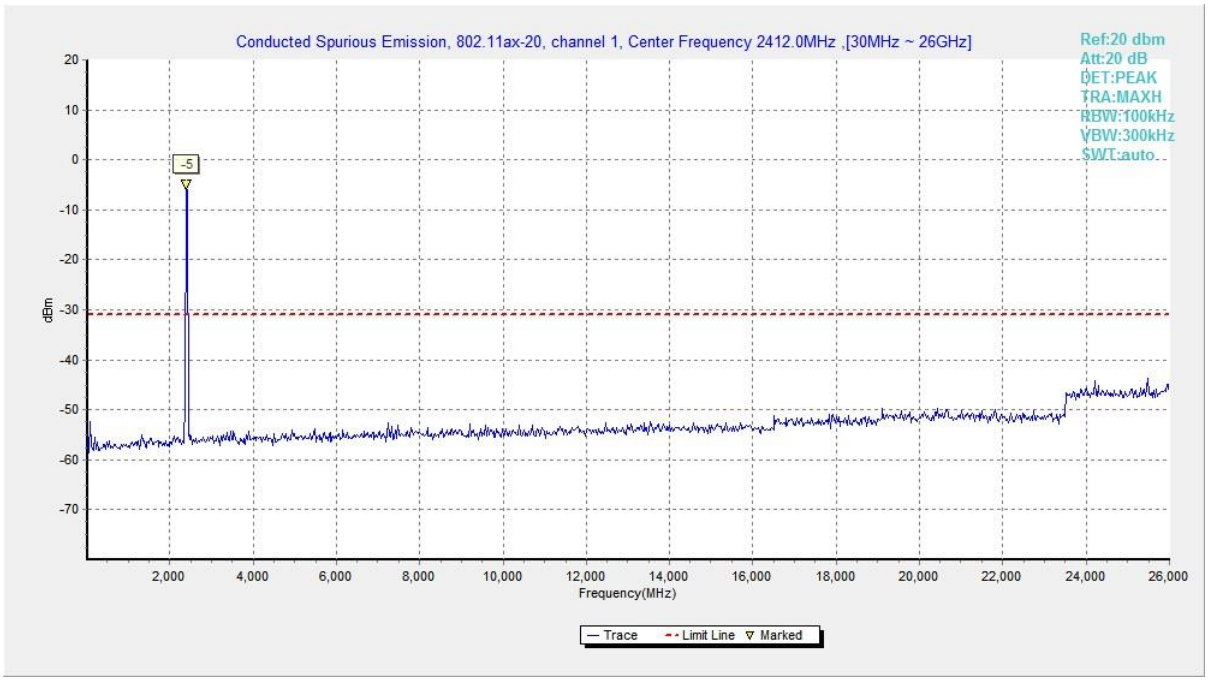


Fig.61 Conducted Spurious Emission (802.11ax HE20, CH1)

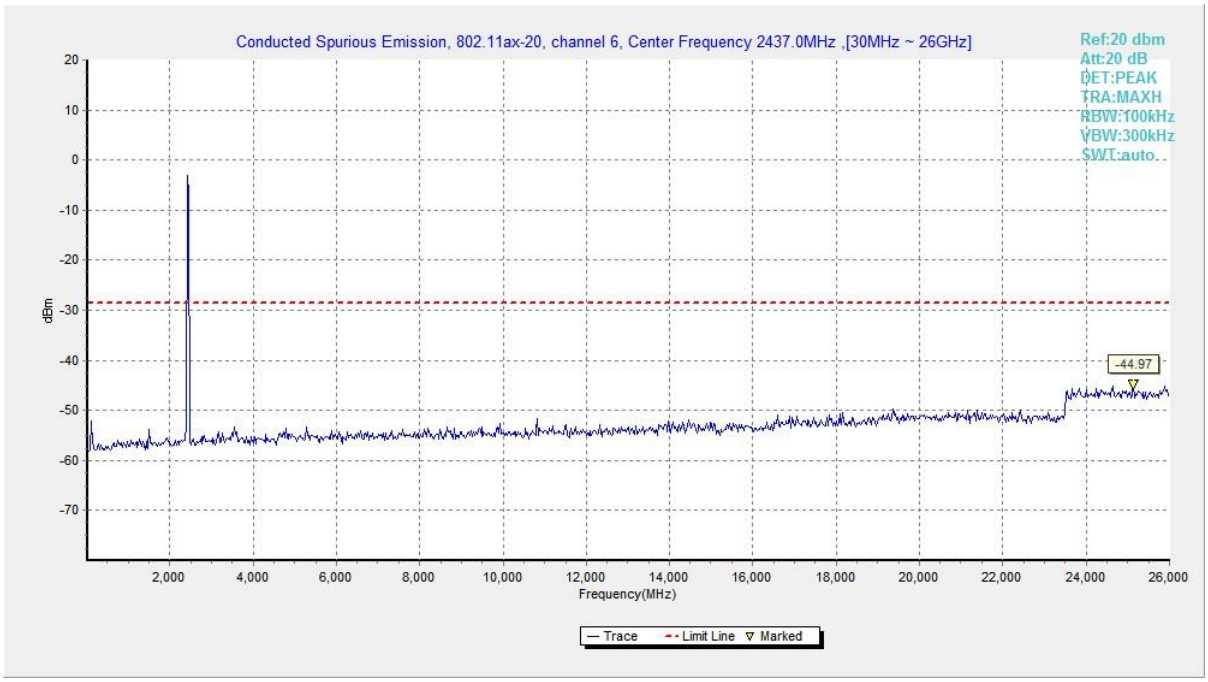


Fig.62 Conducted Spurious Emission (802.11ax HE20, CH6)

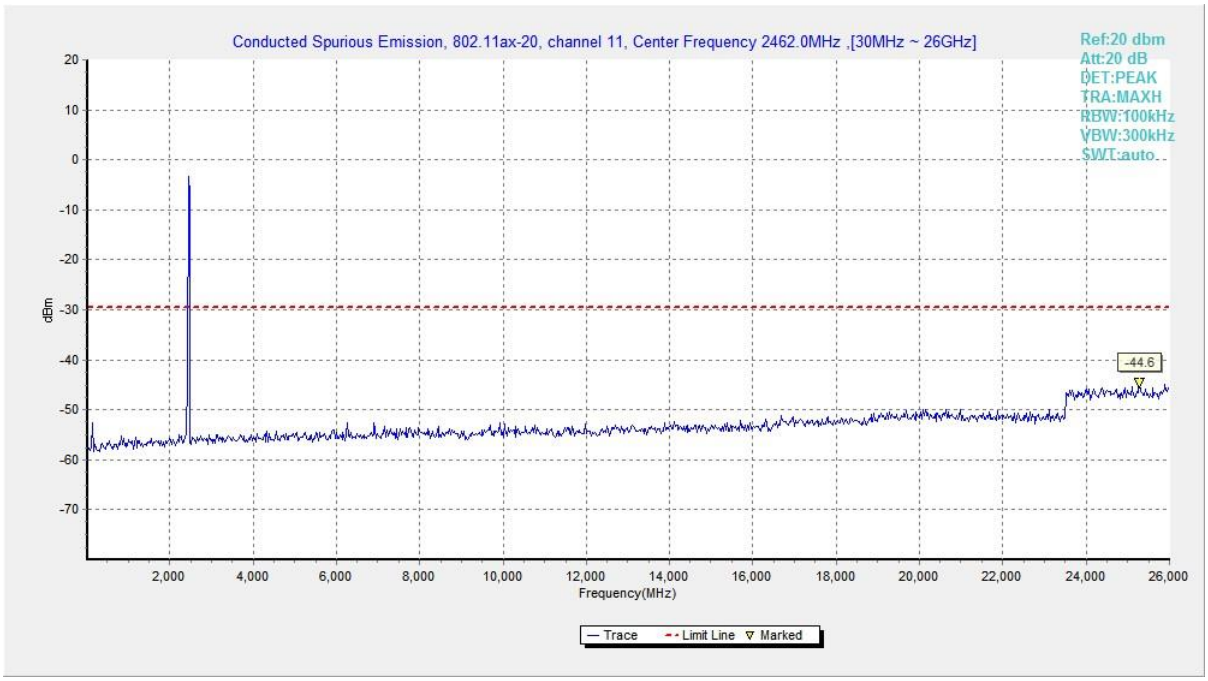


Fig.63 Conducted Spurious Emission (802.11ax HE20, CH11)

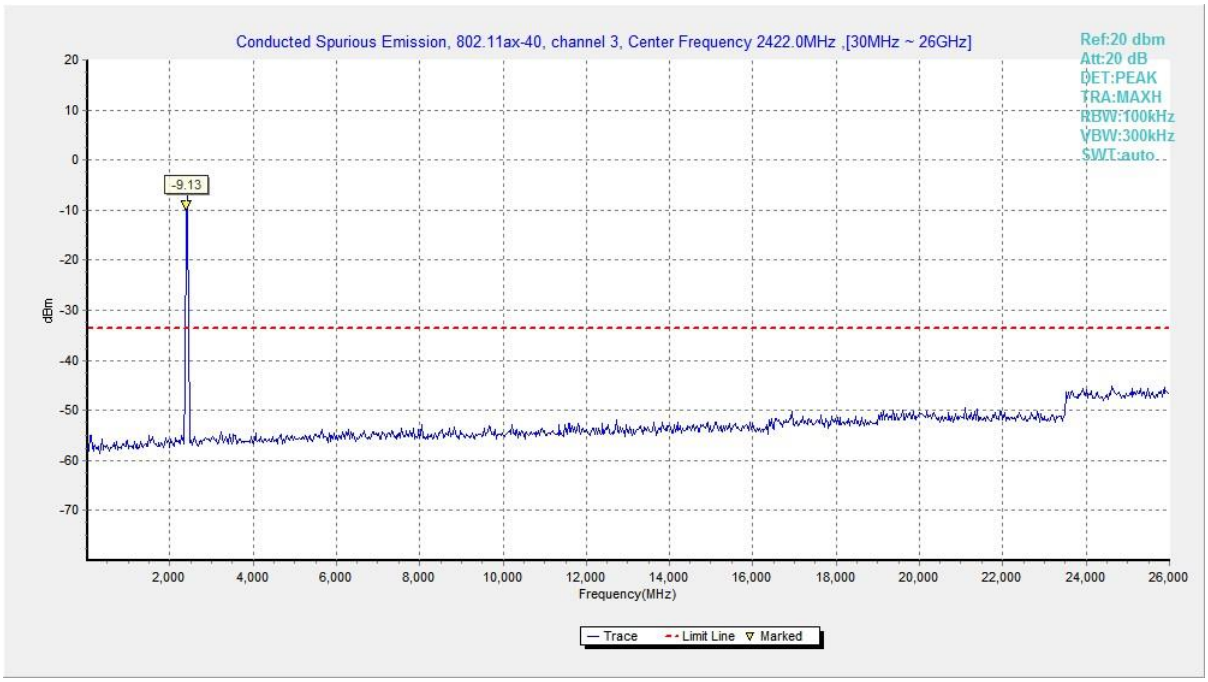


Fig.64 Conducted Spurious Emission (802.11ax HE40, CH3)

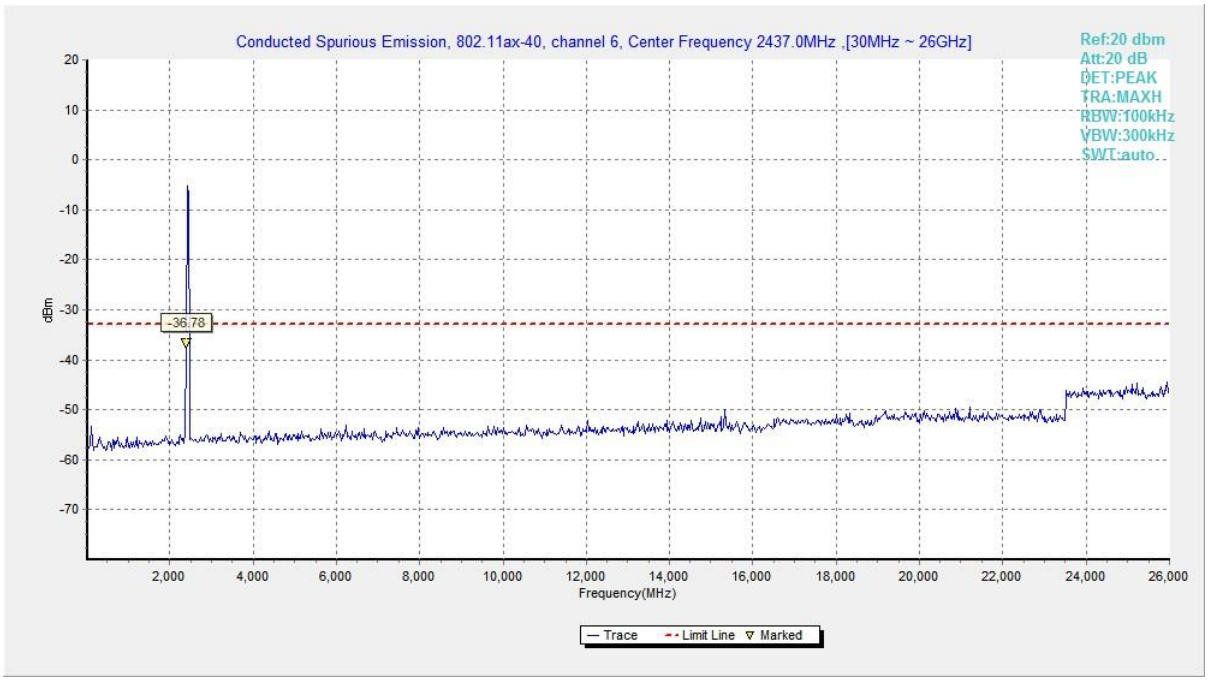


Fig.65 Conducted Spurious Emission (802.11ax HE40, CH6)

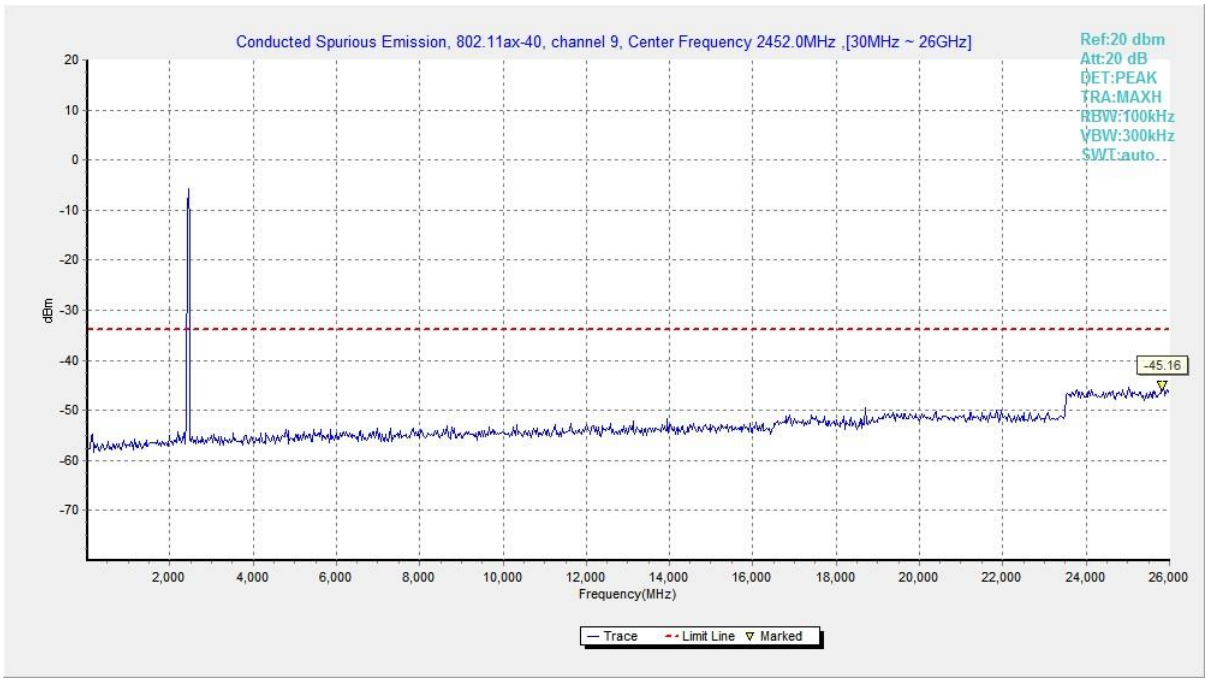


Fig.66 Conducted Spurious Emission (802.11ax HE40, CH9)

A.6 Radiated Emission

Method of Measurement: See ANSI C63.10-clause 11.11&11.12.

Measurement Limit:

Standard	Limit
FCC 47 CFR Part 15.247, 15.205, 15.209 & RSS-247 section 5.5/RSS-Gen section 6.13	20dB below peak output power

In addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a) (see § 15.205(c)).

Limit in restricted band:

Frequency of emission (MHz)	Field strength (μV/m)	Measurement distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Test Condition:

The EUT was placed on a non-conductive table. The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and the EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. This maximization process was repeated with the EUT positioned in each of its three orthogonal orientations.

Frequency of emission (MHz)	RBW/VBW	Sweep Time (s)
30-1000	120kHz/300kHz	5
1000-4000	1MHz/3MHz	15
4000-18000	1MHz/3MHz	40
18000-26500	1MHz/3MHz	20

Note: According to the performance evaluation, the radiated emission margin of EUT is over 20dB in the band from 9kHz to 30MHz.Therefore, the measurement starts from 30MHz to tenth harmonic. The measurement results include the horizontal polarization and vertical polarization measurements. For radiated measurement, pre-scanned in three orthogonal panels, X, Y, Z. The worst cases (Y plane) were recorded in this report.

Measurement Results:

Mode	Channel	Frequency Range	Test Results	Conclusion
802.11b	CH 1	1 GHz ~ 18 GHz	Fig.67	**P**
	CH 6	1 GHz ~ 18 GHz	Fig.68	**P**
	CH 11	1 GHz ~ 18 GHz	Fig.69	**P**
	Restricted Band (CH1)	2.38 GHz ~ 2.45 GHz	Fig.70	**P**
	Restricted Band (CH11)	2.45 GHz ~ 2.5 GHz	Fig.71	**P**
802.11g	CH 1	1 GHz ~ 18 GHz	Fig.72	**P**
	CH 6	1 GHz ~ 18 GHz	Fig.73	**P**
	CH 11	1 GHz ~ 18 GHz	Fig.74	**P**
	Restricted Band (CH1)	2.38 GHz ~ 2.45 GHz	Fig.75	**P**
	Restricted Band (CH11)	2.45 GHz ~ 2.5 GHz	Fig.76	**P**
802.11n HT20	CH 1	1 GHz ~ 18 GHz	Fig.77	**P**
	CH 6	1 GHz ~ 18 GHz	Fig.78	**P**
	CH 11	1 GHz ~ 18 GHz	Fig.79	**P**
	Restricted Band (CH1)	2.38 GHz ~ 2.45 GHz	Fig.80	**P**
	Restricted Band (CH11)	2.45 GHz ~ 2.5 GHz	Fig.81	**P**
802.11n HT40	CH 3	1 GHz ~ 18 GHz	Fig.82	**P**
	CH 6	1 GHz ~ 18 GHz	Fig.83	**P**
	CH 9	1 GHz ~ 18 GHz	Fig.84	**P**
	Restricted Band (CH3)	2.38 GHz ~ 2.45 GHz	Fig.85	**P**
	Restricted Band (CH9)	2.45 GHz ~ 2.5 GHz	Fig.86	**P**
802.11ax HE20	CH 1	1 GHz ~ 18 GHz	Fig.87	**P**
	CH 6	1 GHz ~ 18 GHz	Fig.88	**P**
	CH 11	1 GHz ~ 18 GHz	Fig.89	**P**
	Restricted Band (CH1)	2.38 GHz ~ 2.45 GHz	Fig.90	**P**
	Restricted Band (CH11)	2.45 GHz ~ 2.5 GHz	Fig.91	**P**
802.11ax HE40	CH 3	1 GHz ~ 18 GHz	Fig.92	**P**
	CH 6	1 GHz ~ 18 GHz	Fig.93	**P**
	CH 9	1 GHz ~ 18 GHz	Fig.94	**P**
	Restricted Band (CH3)	2.38 GHz ~ 2.45 GHz	Fig.95	**P**
	Restricted Band (CH9)	2.45 GHz ~ 2.5 GHz	Fig.96	**P**
/	All Channels	9 kHz ~ 30 MHz	Fig.97	**P**
		30 MHz ~ 1 GHz	Fig.98	**P**
		18 GHz ~ 26.5 GHz	Fig.99	**P**

Worst-Case Result:

802.11b CH6 (1-18GHz)

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Pol	Corr. (dB)
4884.000000	55.19	74.00	18.81	H	4.8
7324.714286	47.60	74.00	26.40	V	6.5
10193.571429	47.70	74.00	26.30	H	9.4
12872.571429	51.64	74.00	22.36	V	13.3
14774.142857	52.00	74.00	22.00	H	15.1
17895.428571	57.39	74.00	16.61	V	21.8

Frequency (MHz)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Pol	Corr. (dB)
4884.000000	49.84	54.00	4.16	H	4.8
7324.714286	36.89	54.00	17.11	V	6.5
10193.571429	36.17	54.00	17.83	H	9.4
12872.571429	38.40	54.00	15.60	V	13.3
14774.142857	39.71	54.00	14.29	H	15.1
17895.428571	45.03	54.00	8.97	V	21.8

802.11g CH6 (1-18GHz)

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Pol	Corr. (dB)
4876.200000	50.83	74.00	23.17	H	4.8
5575.800000	48.06	74.00	25.94	V	5.1
6937.714286	46.09	74.00	27.91	V	7.7
9522.857143	47.01	74.00	26.99	H	8.3
15900.857143	53.11	74.00	20.89	H	15.7
17924.142857	58.16	74.00	15.84	V	21.7

Frequency (MHz)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Pol	Corr. (dB)
4876.200000	37.44	54.00	16.56	H	4.8
5575.800000	36.15	54.00	17.85	V	5.1
6937.714286	33.13	54.00	20.87	V	7.7
9522.857143	34.56	54.00	19.44	H	8.3
15900.857143	40.68	54.00	13.32	H	15.7
17924.142857	45.02	54.00	8.98	V	21.7