



FCC Test Report

Report No: FCS2021010014W01

Issued for

Applicant:	Atomrock, LLC.
Address:	22252 SE 64th Place Suite 2288, Issaquah, WA 98027, USA.
Product Name:	Edge Computing Device
Brand Name:	Atomrock
Model Name:	AEC100
Series Model:	AEC1xx - xx is numeric number from 01 to 99
FCC ID:	2A3J5-AEC100
Issued By: Flux Compliance Service Laboratory Add: Room 105 Floor Bao hao Technology Building 1 NO.15 Gong ye West Road Hi-Tech Industrial, Song shan lake Dongguan Tel: 769-27280901 Fax:769-27280901 http://www.FCS-lab.com	

TEST RESULT CERTIFICATION

Applicant's Name.....: Atomrock, LLC.

Address.....: 22252 SE 64th Place Suite 2288, Issaquah, WA 98027, USA.

Manufacture's Name.....: Atomrock, LLC.

Address.....: 22252 SE 64th Place Suite 2288, Issaquah, WA 98027, USA.

Product Description

Product Name.....: Edge Computing Device

Model Name.....: Atomrock

Brand Name.....: AEC100

Series Model.....: AEC1xx - xx is numeric number from 01 to 99

Test Standards.....: FCC Part15.247

Test Procedure.....: ANSI C63.10-2013

This device described above has been tested by Flux Compliance Service Laboratory, the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.

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Date of Test.....:

Date (s) of performance of tests.: 13 Oct, 2021 ~ 18 Oct, 2021

Date of Issue.....: 18 Oct, 2021

Test Result.....: Pass

Tested by : Scott Shen
(Scott Shen)

Reviewed by : Duke Qian
(Duke Qian)

Approved by : Kait Chen
(Kait Chen)



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Revision History

Rev.	Issue Date	Effect Page	Contents
00	18 Oct, 2021	All	Initial Issue

1. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:
KDB 558074 D01 15.247 Meas Guidance v05r02

FCC Part 15.247, Subpart C			
Standard Section	Test Item	Judgment	Remark
FCC 15.247 (a) (2)	6dB Bandwidth	PASS	--
FCC 15.247 (b) (3)	Conducted Output Power	PASS	--
FCC 15.247 (e)	Power Spectral Density	PASS	--
FCC 15.247 (d)	Band-edge and Spurious Emissions (Conducted)	PASS	--
FCC 15.247 (d) FCC 15.209 FCC 15.205	Radiated Spurious Emissions	PASS	--
FCC 15.247 (d) FCC 15.209 FCC 15.205	Radiated Band Edge Compliance	PASS	--
FCC 15.207	Power Line Conducted Emission	PASS	--
FCC 15.203	Antenna requirement	PASS	--
15.205	Restricted Band Edge Emission	PASS	--

NOTE:

- (1) "N/A" denotes test is not applicable in this Test Report
- (2) All tests are according to ANSI C63.10-2013

1.1 TEST FACTORY

Company Name:	Flux Compliance Service Laboratory
Address:	Room 105 Floor Bao hao Technology Building 1 NO.15 Gong ye West Road Hi-Tech Industrial, Song shan lake Dongguan
Telephone:	+86-769-27280901
Fax:	+86-769-27280901
FCC Test Firm Registration Number: 514908 Designation number: CN0127 A2LA accreditation number: 5545.01	

1.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement $y \pm U$, where expanded uncertainty U is based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately **95** %.

No.	Item	Uncertainty
1	RF output power, conducted	± 0.71 dB
2	Unwanted Emissions, conducted	± 2.988 dB
3	Conducted Emission (9KHz-150KHz)	± 4.13 dB
4	Conducted Emission (150KHz-30MHz)	± 4.74 dB
5	All emissions, radiated (<1G) 30MHz-1000MHz	± 5.2 dB
6	All emissions, radiated 1GHz -18GHz	± 4.66 dB
7	All emissions, radiated 18GHz -40GHz	± 4.31 dB

2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF THE EUT

Product Name	Edge Computing Device
Trade Name	Atomrock
Model Name	AEC100
Series Model	AEC1xx - xx is numeric number from 01 to 99
Model Difference	The above product with same circuit, PCB layout, electrical parts, materials and wiring structures, Appearance shape, the materials of decorative accessories is same, only different color
Channel List	Please refer to the Note 2.
Operation frequency	IEEE 802.11b: 2412MHz-2462MHz IEEE 802.11g: 2412MHz-2462MHz IEEE 802.11n HT20: 2412MHz-2462MHz IEEE 802.11n HT40: 2422MHz-2452MHz
Modulation:	IEEE 802.11b: DSSS (CCK, QPSK, BPSK) IEEE 802.11g: OFDM (64QAM, 16QAM, QPSK, BPSK) IEEE 802.11n HT20, HT40: OFDM (64QAM, 16QAM, QPSK, BPSK)
Transmitter rate:	IEEE 802.11b: 1, 2, 5.5, 11 Mbps IEEE 802.11g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps IEEE 802.11n HT20: up to 150 Mbps, HT40: up to 300Mbps
Power supply	Power supply:Input AC 100~240V/50/60Hz 1.0A MAX Output DC 12V 3A
Battery	NA
Hardware version number	V1.10
Software version number	V1.10
Connecting I/O Port(s)	Please refer to the User's Manual

Note:

1. For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.

2.

Channel List					
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
01	2412	05	2432	09	2452
02	2417	06	2437	10	2457
03	2422	07	2442	11	2462
04	2427	08	2447		

3. Table for Filed Antenna

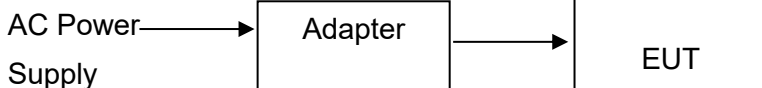
Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)	NOTE
1	N/A	N/A	External antenna	N/A	2.0 dBi	Antenna

2.2 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED

During testing channel & power controlling software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product.

Block diagram of EUT configuration for test

Mode 1:



Test software: the FCC tool

The test software was used to control EUT work in continuous TX mode, and select test channel, Wireless mode as below table

Tested mode, channel, and data rate information				
Mode	Setting Tx Power	data rate (Mbps) (see Note)	Channel	Frequency (MHz)
IEEE 802.11b	8	1	LCH: CH1	2412
	8	1	MCH: CH6	2437
	8	1	HCH: CH11	2462
IEEE 802.11g	20	6	LCH: CH1	2412
	20	6	MCH: CH6	2437
	20	6	HCH: CH11	2462
IEEE 802.11n HT20	20	MCS 8	LCH: CH1	2412
	20	MCS 8	MCH: CH6	2437
	20	MCS 8	HCH: CH11	2462
IEEE 802.11n HT40	20	MCS 8	LCH: CH3	2422
	20	MCS 8	MCH: CH6	2437
	20	MCS 8	HCH: CH9	2452

Note:

(1) According exploratory test, EUT will have maximum output power in those data rate, so those data rate were used for all test,

(2) During the test, the dutycycle>98%, the test voltage was tuned from 85% to 115% of the

Nominal rate supply votage, and found that the worst case was the nominal rated supply condition, So the report just shows that condition's data

2.3 DESCRIPTION OF NECESSARY ACCESSORIES AND SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Necessary accessories

Item	Equipment	Mfr/Brand	Model/Type No.	Serial No.	Note
1	Adapter	DAJIN	ADP-36C2	N/A	Adapters are for product adaptation
2	Macbook	Lenovo	LAPTOP-UBCQBL6S	N/A	For test use only

Support units

Item	Equipment	Mfr/Brand	Model/Type No.	Serial No.	Note

Note:

- (1) The support equipment was authorized by Declaration of Confirmation.
- (2) For detachable type I/O cable should be specified the length in cm in 『Length』 column.
- (3) “YES” is means “shielded” “with core”; “NO” is means “unshielded” “without core”.

2.4 EQUIPMENTS LIST

Radiation Test equipment

Kind of Equipment	Manufacturer	Type No.	Company No.	Last calibration	Calibrated until
EMI Test Receiver	R&S	ESRP 3	FCS-E001	2021. 01.28	2022. 01.27
Signal Analyzer	R&S	FSV40-N	FCS-E012	2021. 01.28	2022. 01.27
Active loop Antenna	ZHINAN	ZN30900C	FCS-E013	2021. 01.28	2022. 01.27
Bilog Antenna	SCHWARZBECK	VULB 9168	FCS-E002	2021. 01.28	2022. 01.27
Horn Antenna	SCHWARZBECK	BBHA 9120D	FCS-E003	2021. 01.28	2022. 01.27
SHF-EHF Horn Antenna (18G-40GHz)	A-INFO	LB-180400-KF	FCS-E018	2021. 01.28	2022. 01.27
Pre-Amplifier(0.1M-3G Hz)	EMCI	EM330N	FCS-E004	2021. 01.28	2022. 01.27
Pre-Amplifier (1G-18GHz)	N/A	TSAMP-0518SE	FCS-E014	2021. 01.28	2022. 01.27
Pre-Amplifier (18G-40GHz)	TERA-MW	TRLA-0400	FCS-E019	2021. 01.28	2022. 01.27
Temperature & Humidity	HTC-1	victor	FCS-E005	2021. 01.28	2022. 01.27

Conduction Test equipment

Kind of Equipment	Manufacturer	Type No.	Company No.	Last calibration	Calibrated until
EMI Test Receiver	R&S	ESPI	FCS-E020	2021. 01.28	2022. 01.27
LISN	R&S	ENV216	FCS-E007	2021. 01.28	2022. 01.27
LISN	ETS	3810/2NM	FCS-E009	2021. 01.28	2022. 01.27
Temperature & Humidity	HTC-1	victor	FCS-E008	2021. 01.28	2022. 01.27

RF Connected Test

Kind of Equipment	Manufacturer	Type No.	Company No.	Last calibration	Calibrated until
MXA SIGNAL Analyzer	Keysight	N9020A	FCS-E015	2021. 01.28	2022. 01.27
Spectrum Analyzer	Agilent	E4447A	MY50180039	2021. 01.28	2022. 01.27
Spectrum Analyzer	R&S	FSV-40	101499	2021. 01.28	2022. 01.27
Power Sensor	Agilent	UX2021XA	FCS-E021	2021. 01.28	2022. 01.27

3. 6DB BANDWIDTH

3.1 Limit

For direct sequence systems, the minimum 6dB bandwidth shall be at least 500 kHz

3.2 Test Procedure

(1) Connect EUT's antenna output to spectrum analyzer by RF cable.

(2) Set the spectrum analyzer as follows

RBW: 100kHz

VBW: 300kHz

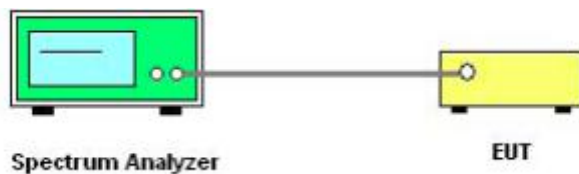
Detector Mode: Peak

Sweep time: auto

Trace mode Max hold

(3) Allow the trace to stabilize, measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission

3.3 Test setup



3.4 Test results

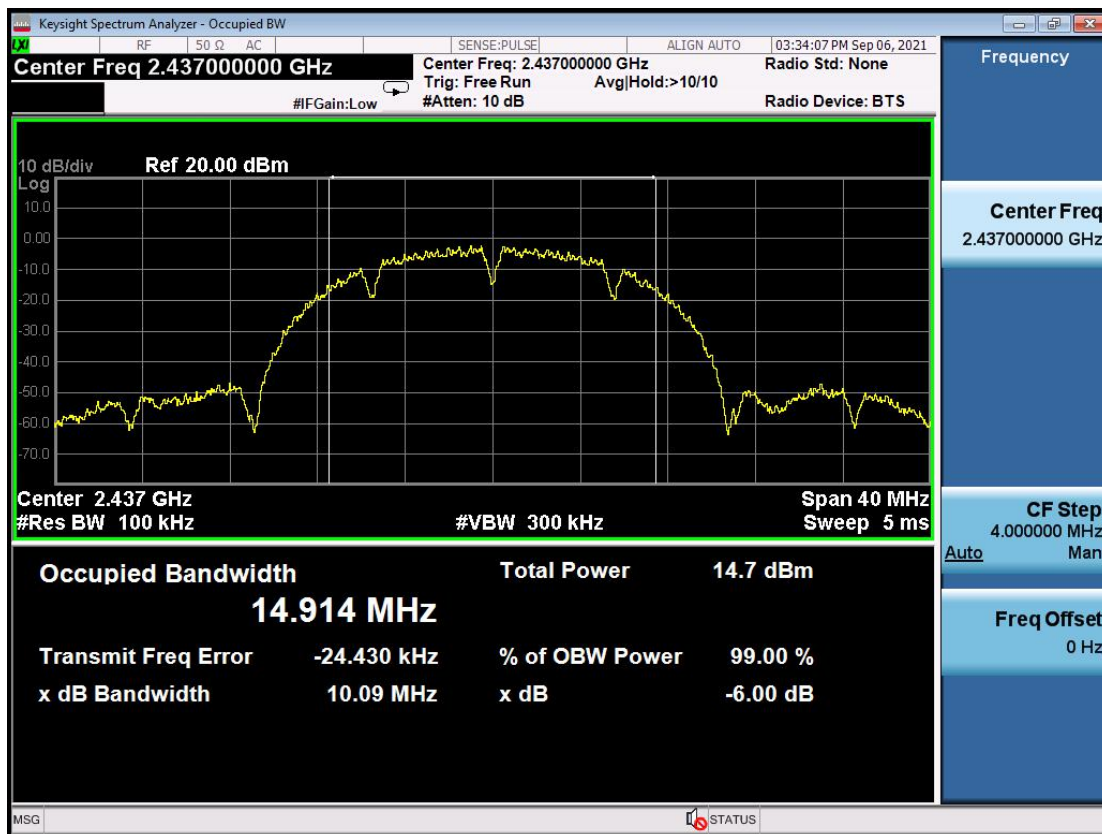
TestMode	Channel (MHz)	6dB Bandwidth (MHz)	Limit [MHz]	Verdict
802.11b	2412MHz	10.11	0.5	Pass
802.11b	2437MHz	10.09	0.5	Pass
802.11b	2462MHz	10.11	0.5	Pass
802.11g	2412MHz	16.54	0.5	Pass
802.11g	2437MHz	16.51	0.5	Pass
802.11g	2462MHz	16.51	0.5	Pass
802.11n 20	2412MHz	17.80	0.5	Pass
802.11n 20	2437MHz	17.67	0.5	Pass
802.11n 20	2462MHz	17.72	0.5	Pass
802.11n 40	2422MHz	36.40	0.5	Pass
802.11n 40	2437MHz	36.43	0.5	Pass
802.11n 40	2452MHz	36.41	0.5	Pass

3.5 Original Test Data

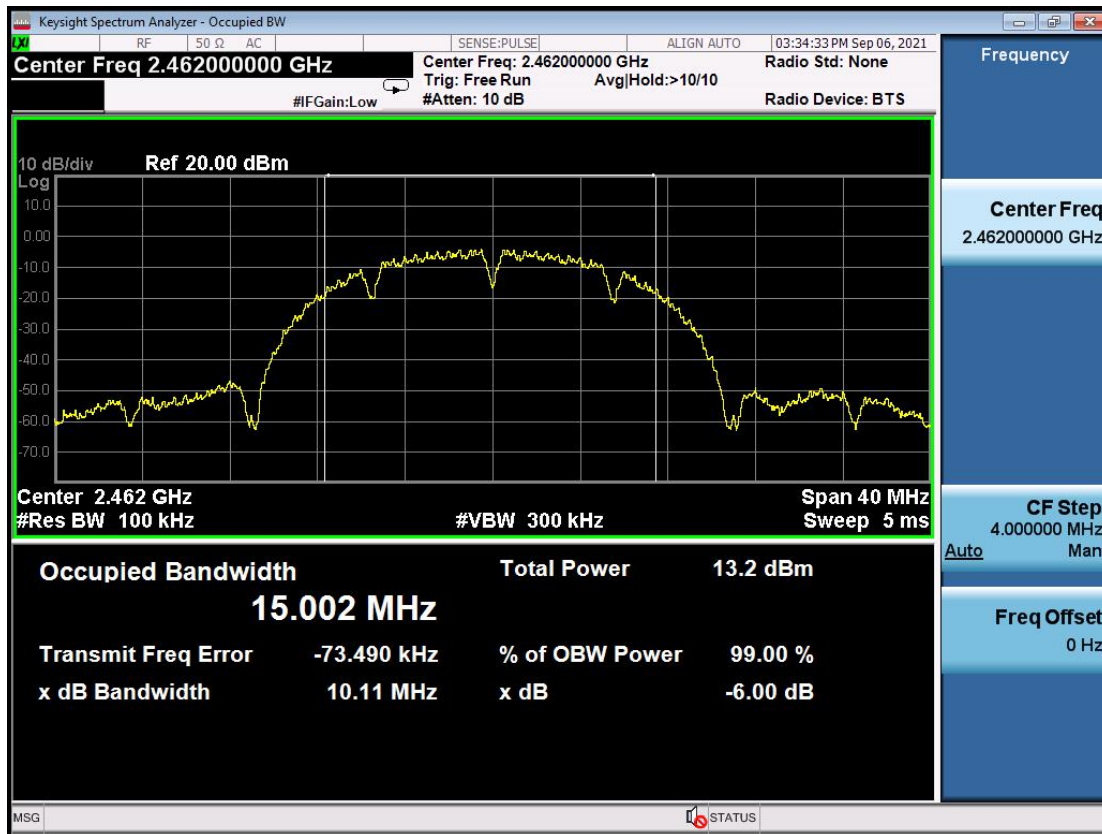
802.11b-CH2412MHZ



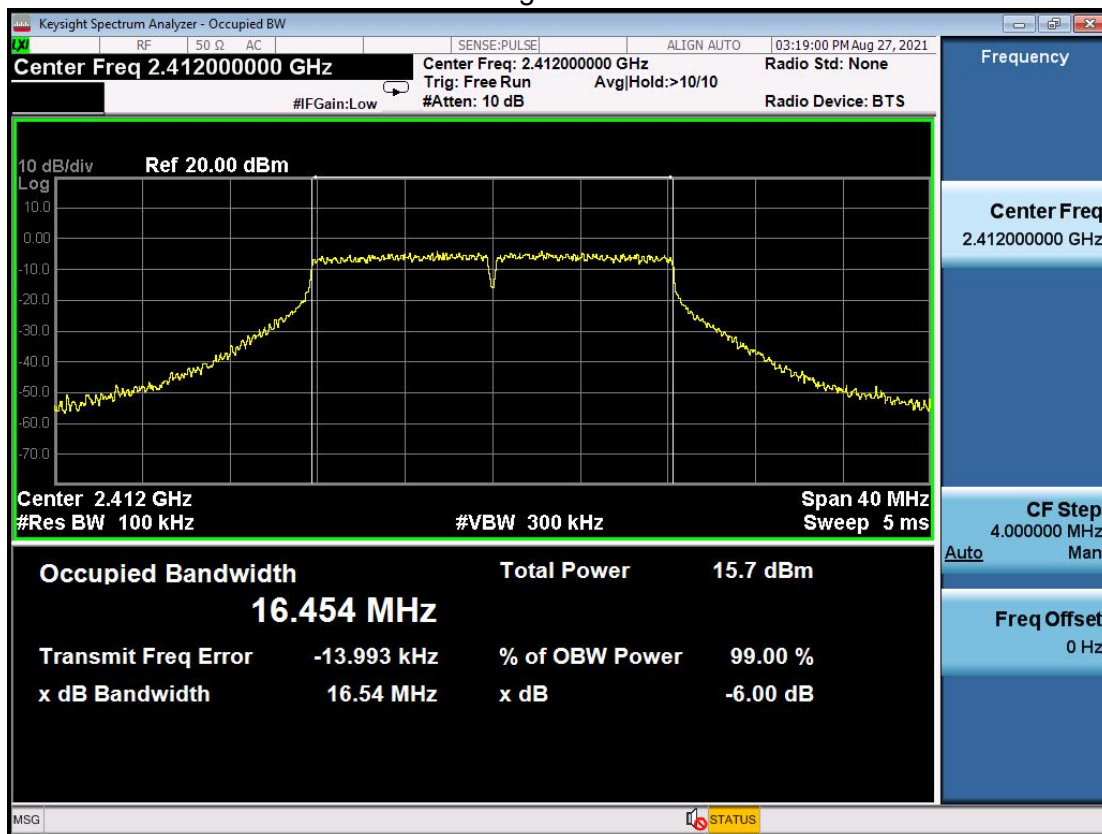
802.11b-CH237MHZ



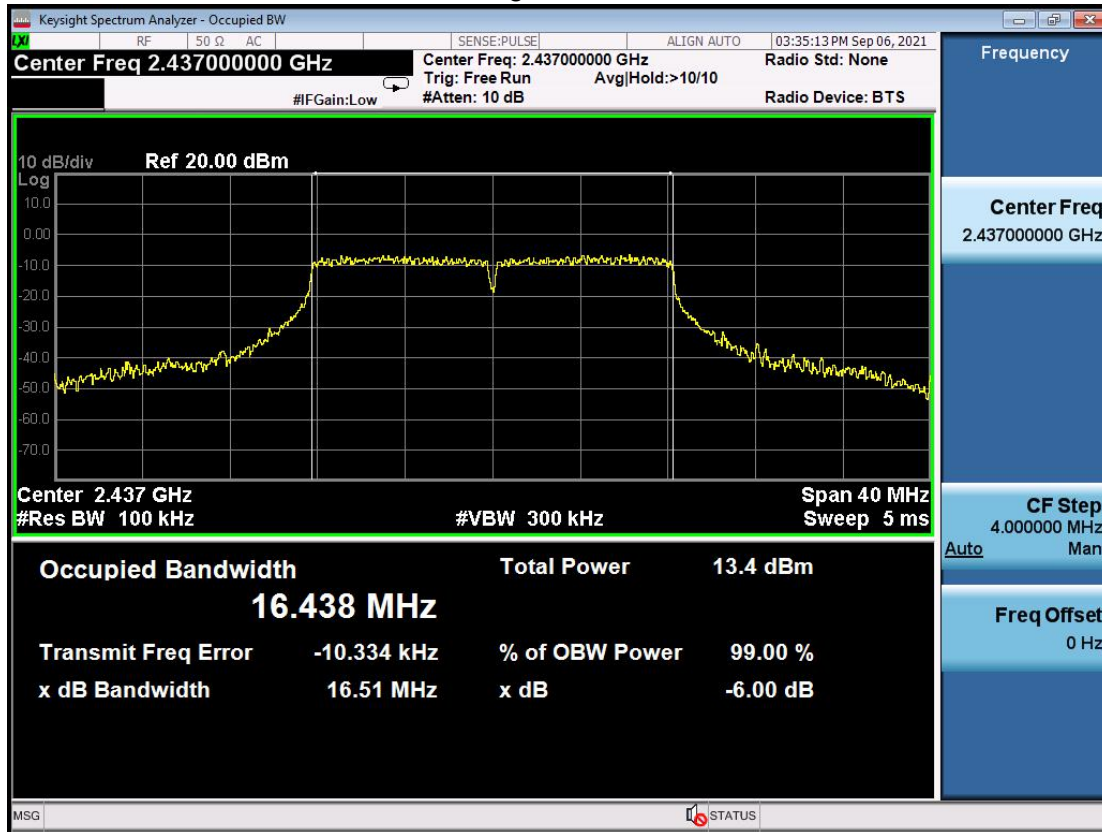
802.11b-CH2462MHZ



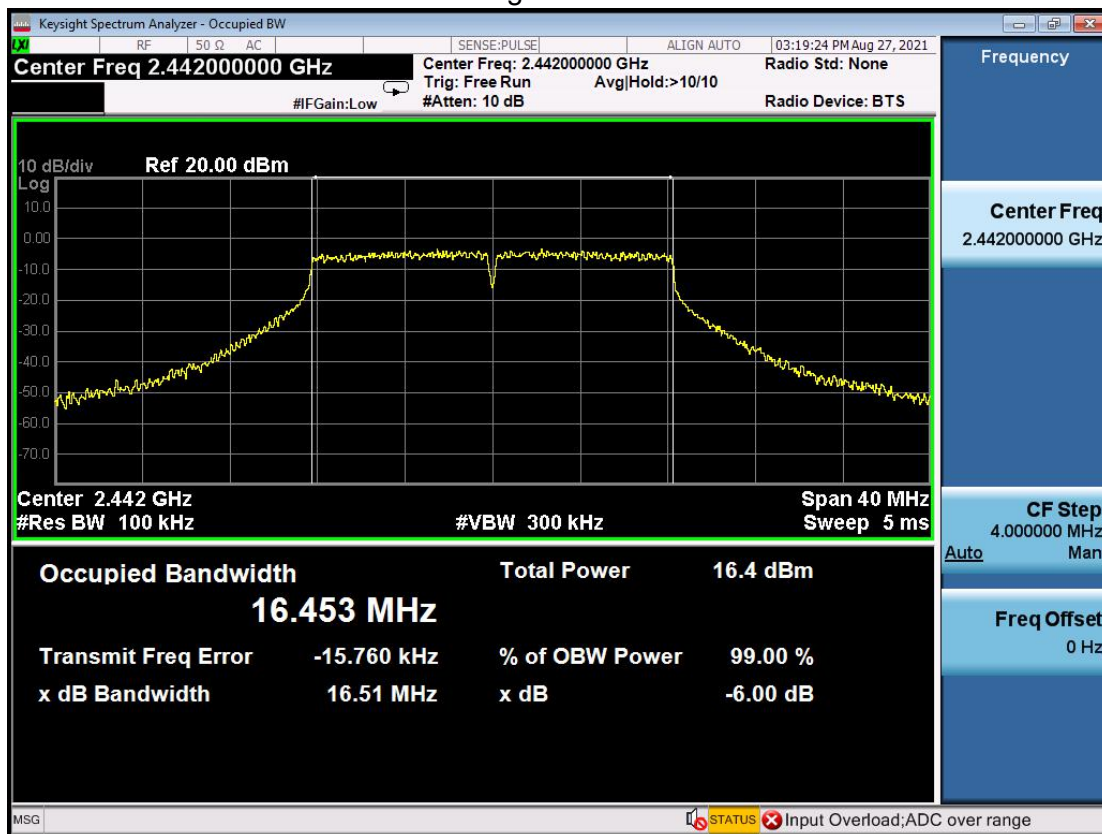
802.11g H2412MHz



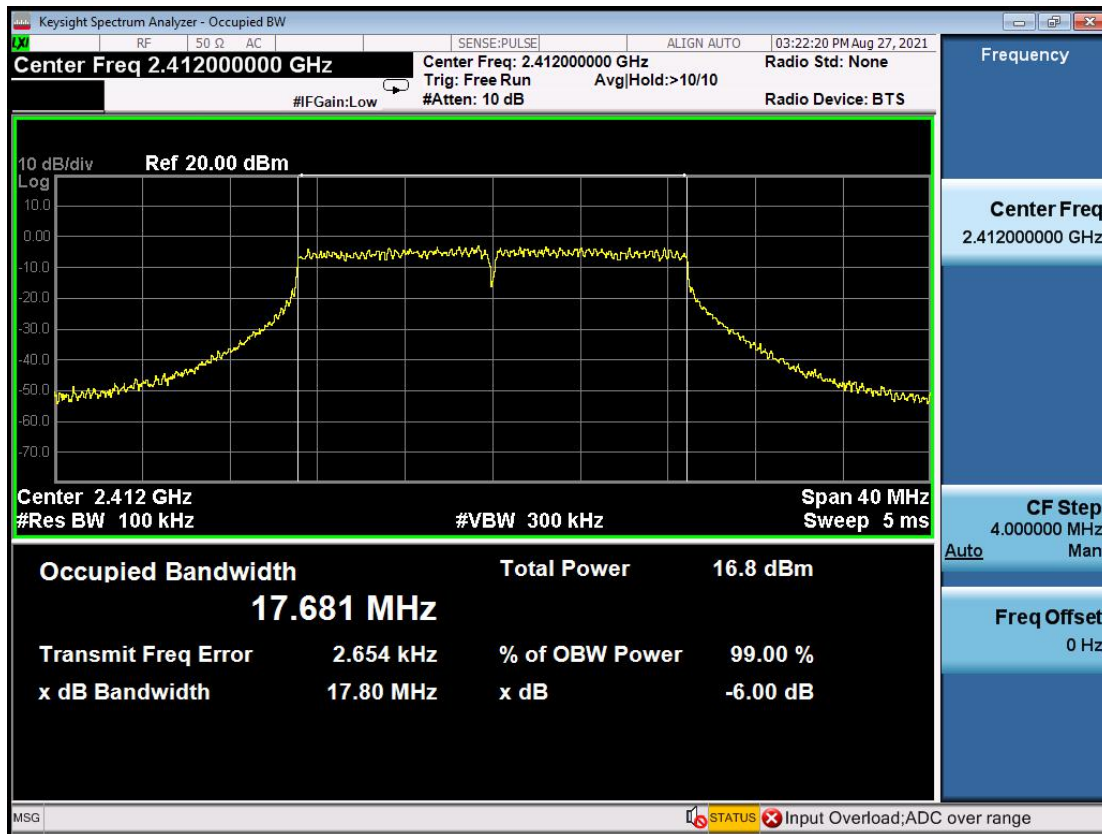
802.11g CH2437MHz



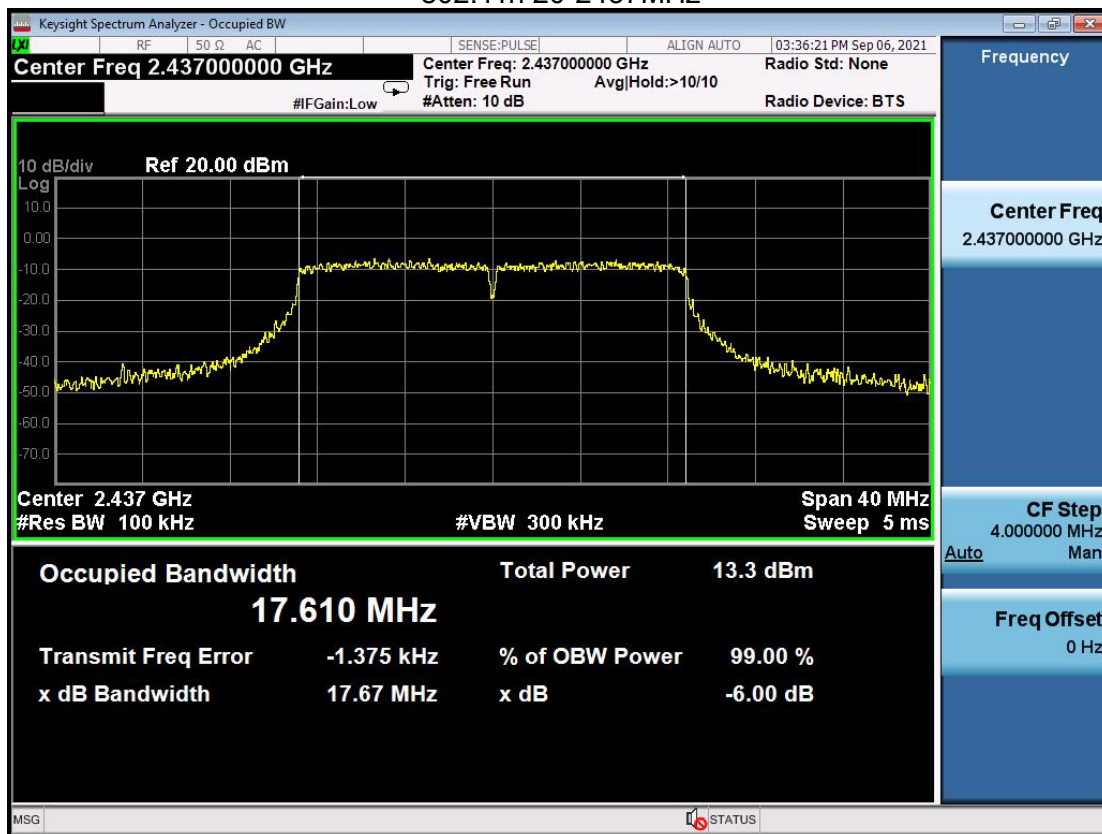
802.11g CH2462MHZ



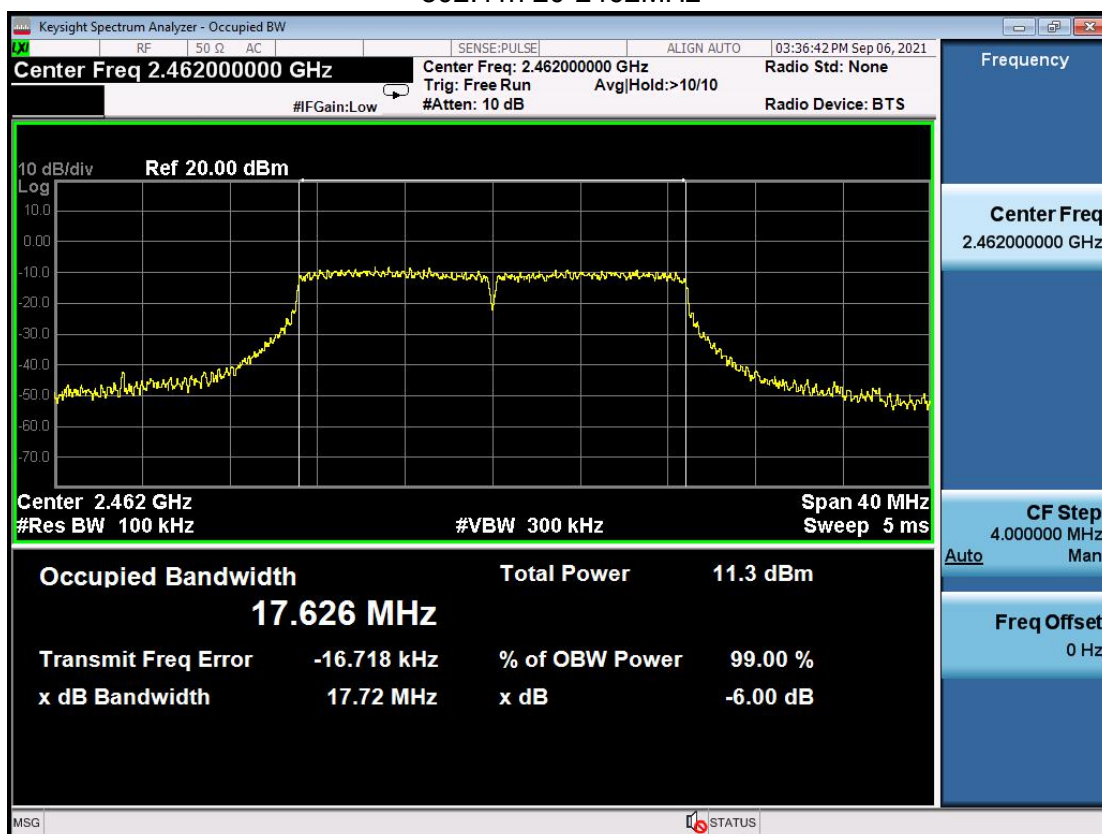
802.11n 20-2412MHz



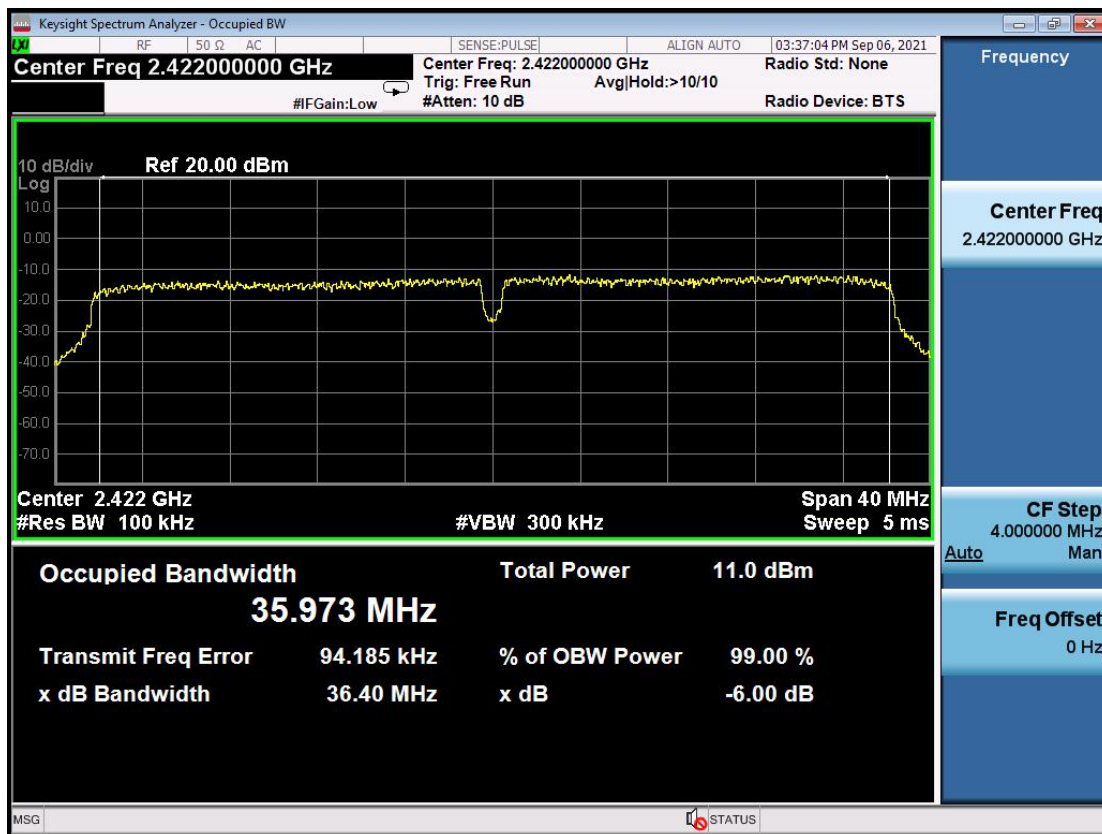
802.11n 20-2437MHz



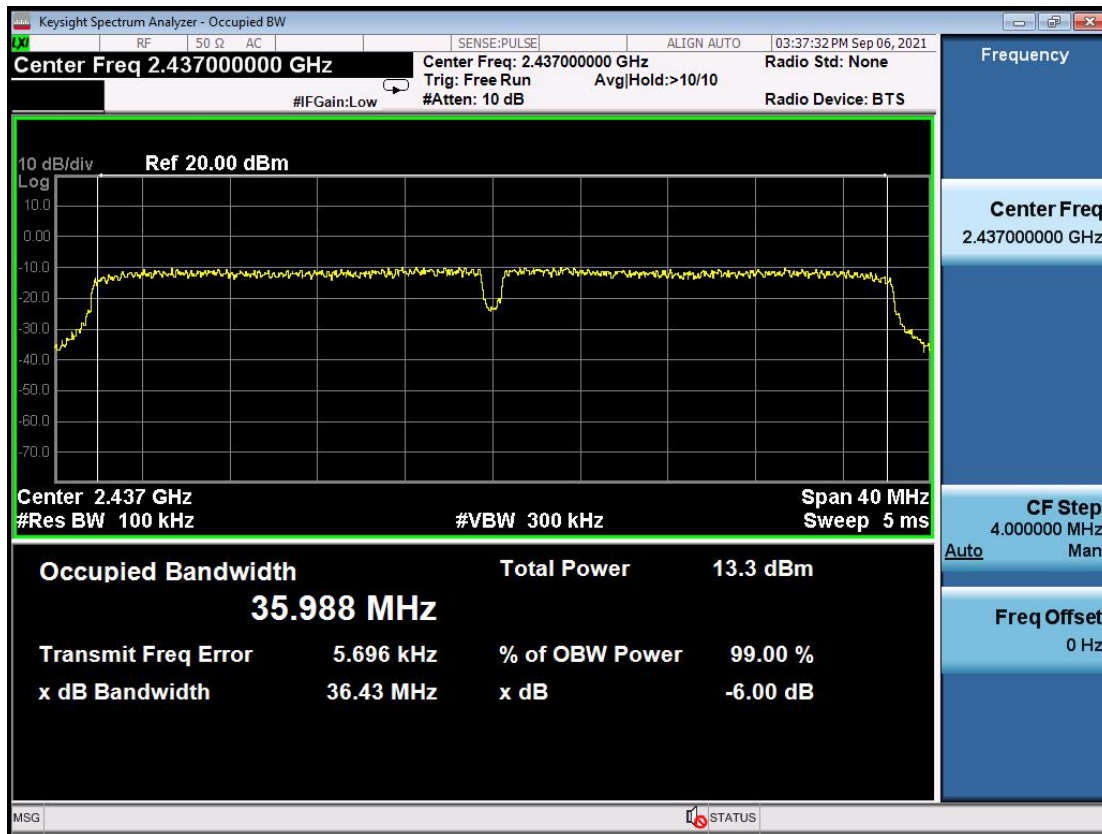
802.11n 20-2462MHz



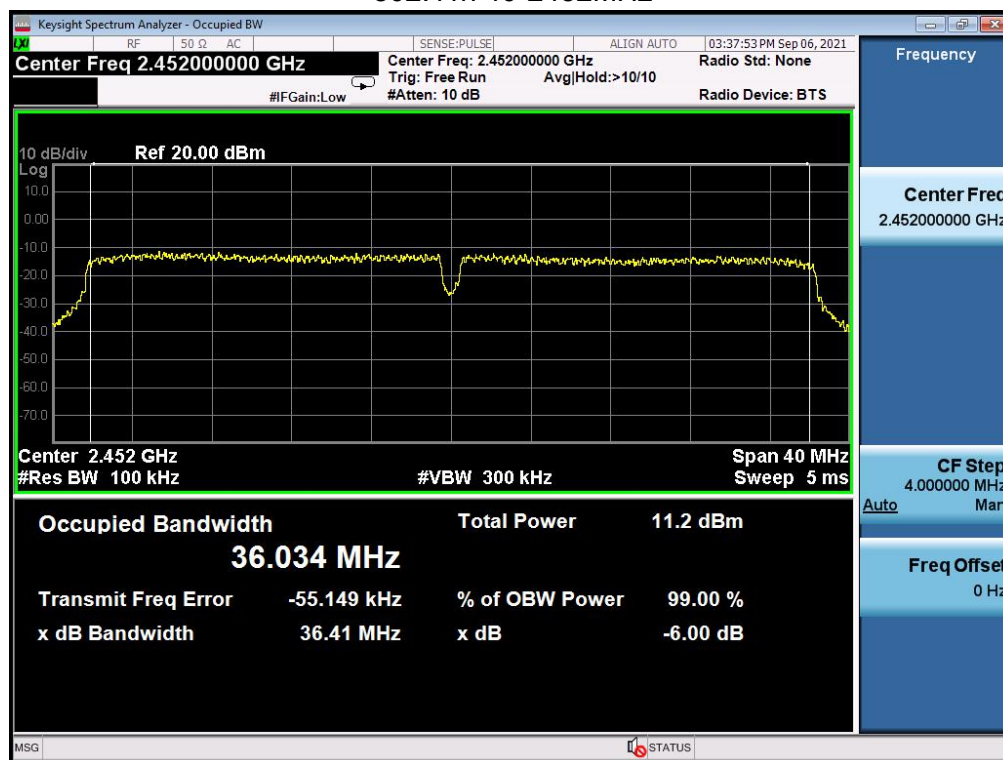
802.11n 40-2422MHz



802.11n 40-2437MHz



802.11n 40-2452MHz



4 CONDUCTED OUTPUT POWER

4.1 limit

For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt. If transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

4.2 test procedure

- Connect each EUT's antenna output to power sensor by RF cable and attenuator
- Measure the PK output power of each antenna port by power sensor.

4.3 TEST SETUP



4.5 test results

TestMode	Channel (MHz)	Result (dBm)	Limit (dBm)	Verdict
802.11b	2412MHz	9.24	30	Pass
802.11b	2437MHz	9.32	30	Pass
802.11b	2462MHz	9.75	30	Pass
802.11g	2412MHz	9.30	30	Pass
802.11g	2437MHz	9.36	30	Pass
802.11g	2462MHz	9.48	30	Pass
802.11n 20	2412MHz	7.56	30	Pass
802.11n 20	2437MHz	7.76	30	Pass
802.11n 20	2462MHz	7.78	30	Pass
802.11n 40	2422MHz	7.85	30	Pass
802.11n 40	2437MHz	7.81	30	Pass
802.11n 40	2452MHz	8.62	30	Pass

5. POWER SPECTRAL DENSITY

5.1 LIMIT

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8dBm in any 3 kHz band during any time interval of continuous transmission.

5.2 TEST PROCEDURE

(1) Connect EUT's antenna output to spectrum analyzer by RF cable.

(2) Set the spectrum analyzer as follows:

Center frequency	DTS Channel center frequency
RBW:	$3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$
VBW:	$\geq 3\text{RBW}$
Span	1.5 times the DTS bandwidth
Detector Mode:	Pake
Sweep time:	auto
Trace mode	Max hold

(3) Allow the trace to stabilize, use the peak marker function to determine the maximum amplitude level within the RBW

(4) If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

5.3 TEST SETUP

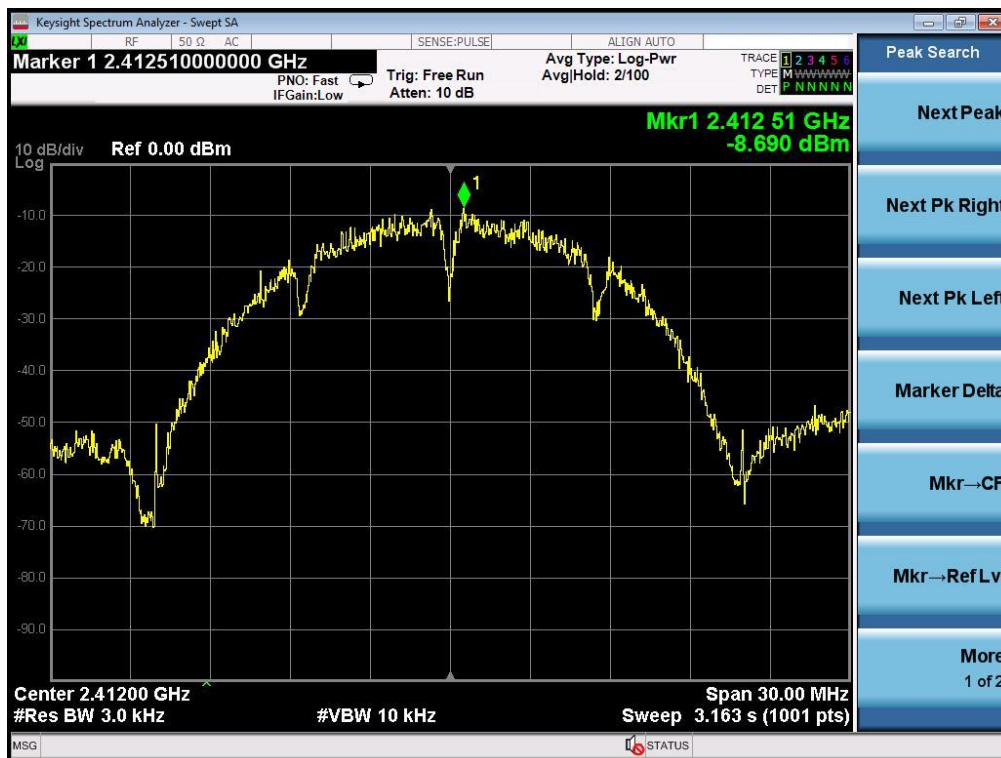


5.4 TEST RESULTS

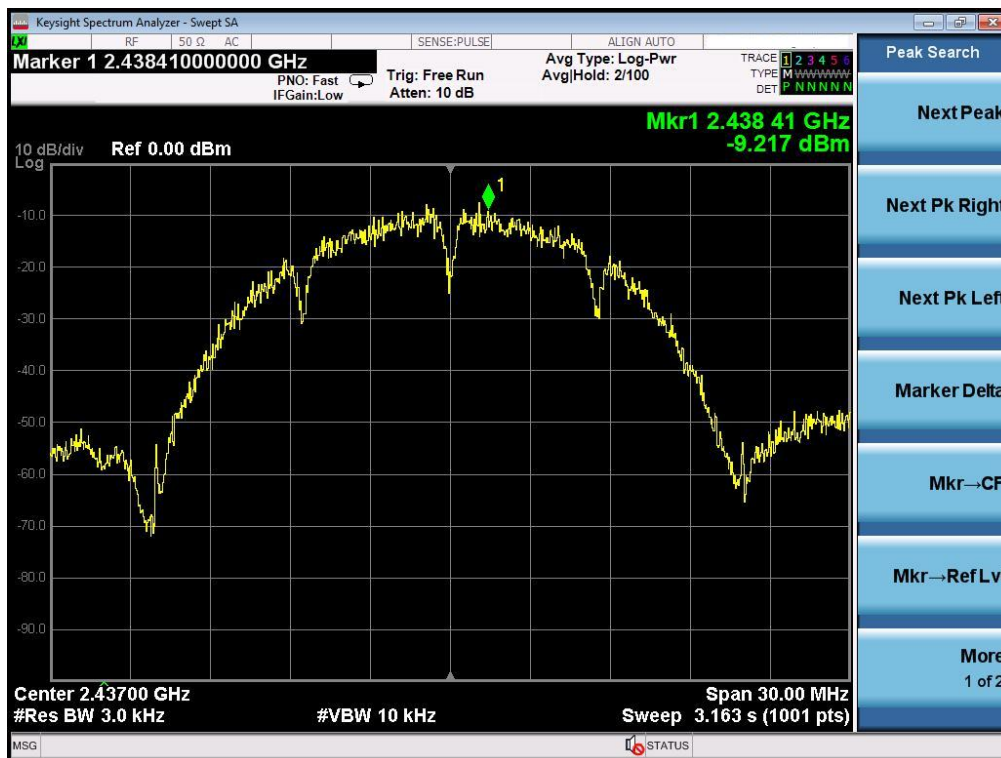
TestMode	Channel (MHz)	Result (dBm/3KHz)	Limit (dBm/3KHz)	Verdict
802.11b	2412MHz	-8.69	8	Pass
802.11b	2437MHz	-9.22	8	Pass
802.11b	2462MHz	-8.20	8	Pass
802.11g	2412MHz	-10.23	8	Pass
802.11g	2437MHz	-9.11	8	Pass
802.11g	2462MHz	-9.95	8	Pass
802.11n 20	2412MHz	-10.24	8	Pass
802.11n 20	2437MHz	-9.33	8	Pass
802.11n 20	2462MHz	-10.96	8	Pass
802.11n 40	2422MHz	-24.43	8	Pass
802.11n 40	2437MHz	-21.25	8	Pass
802.11n 40	2452MHz	-24.17	8	Pass

5.5 original test data

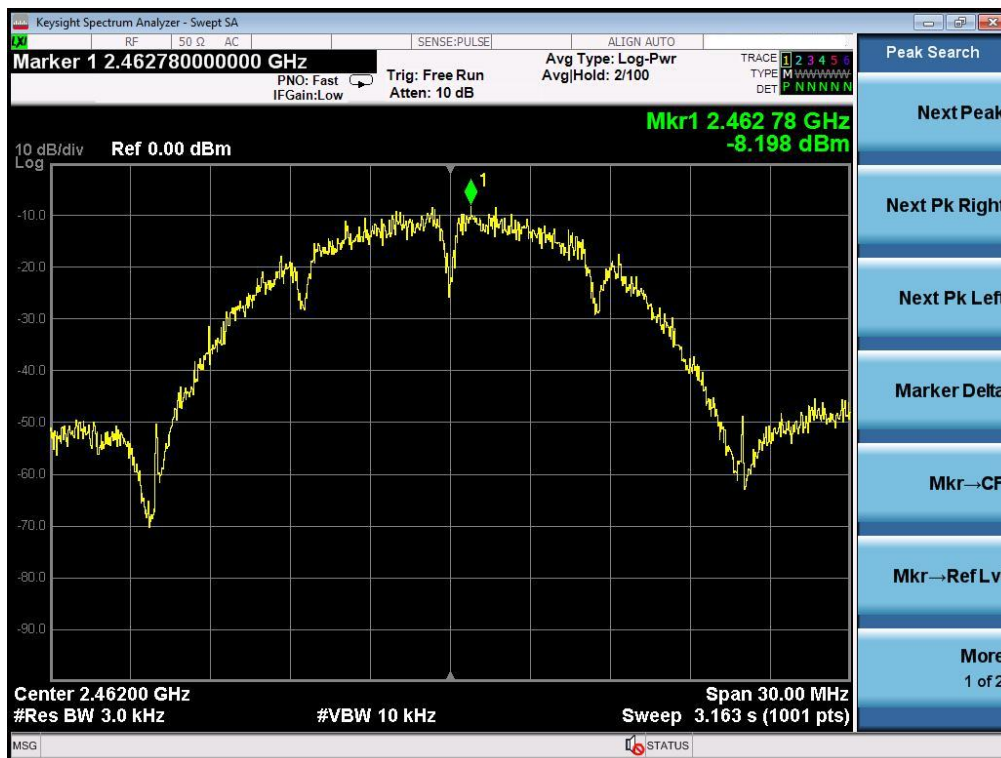
802.11b-2412MHz



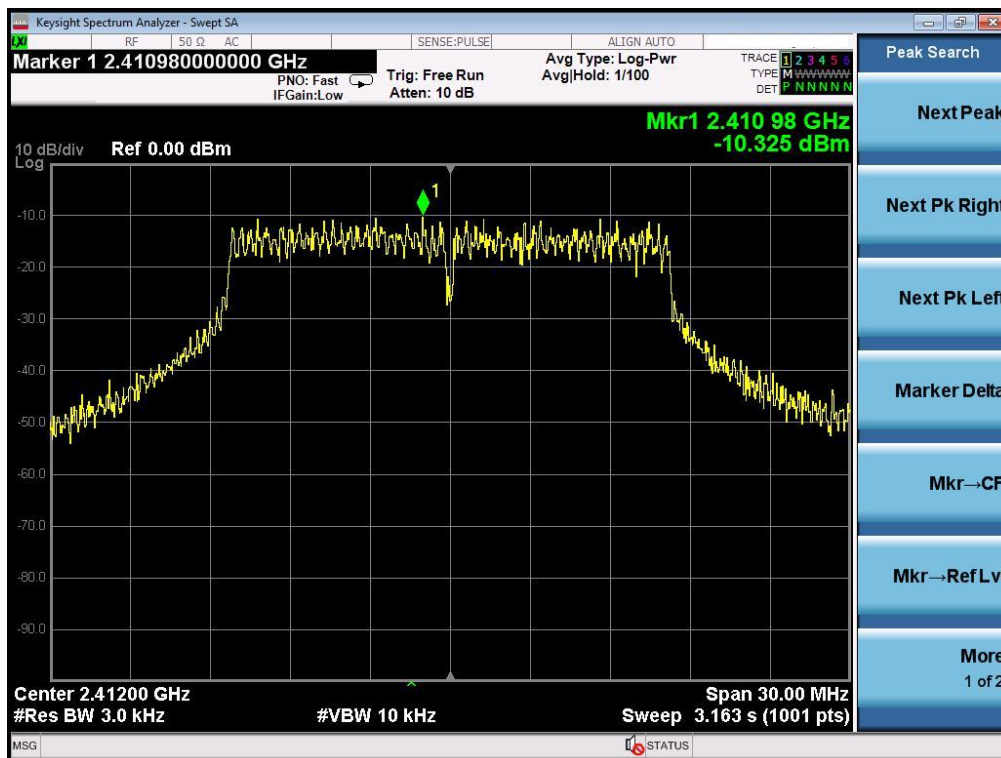
802.11b-2437MHz



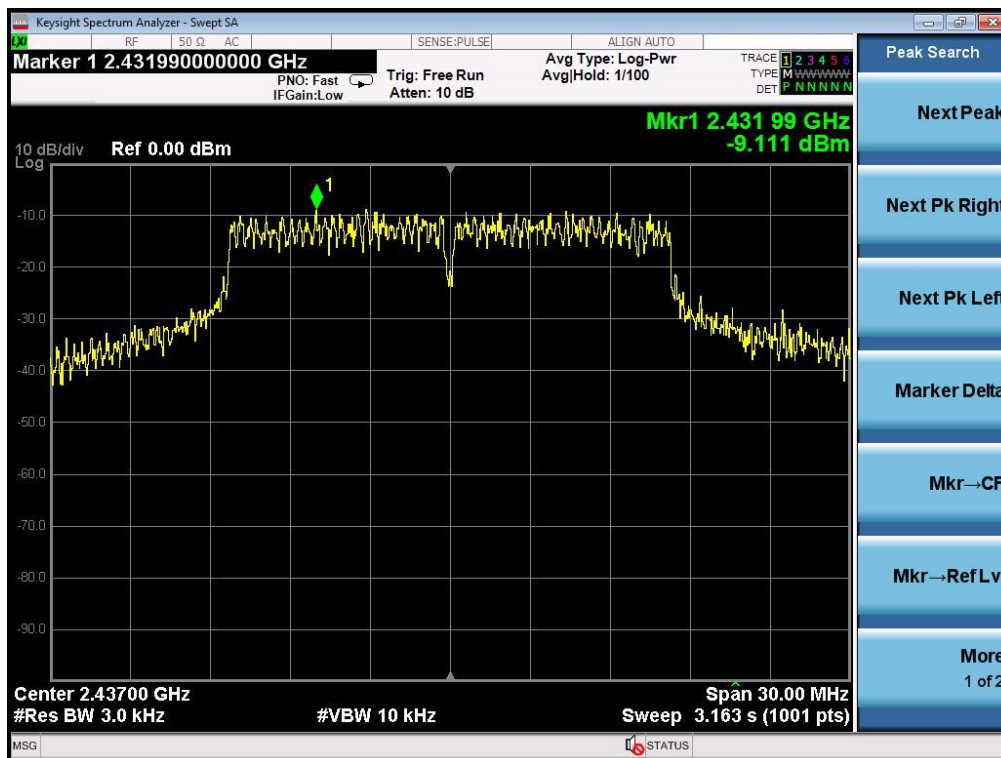
802.11b-2462MHz



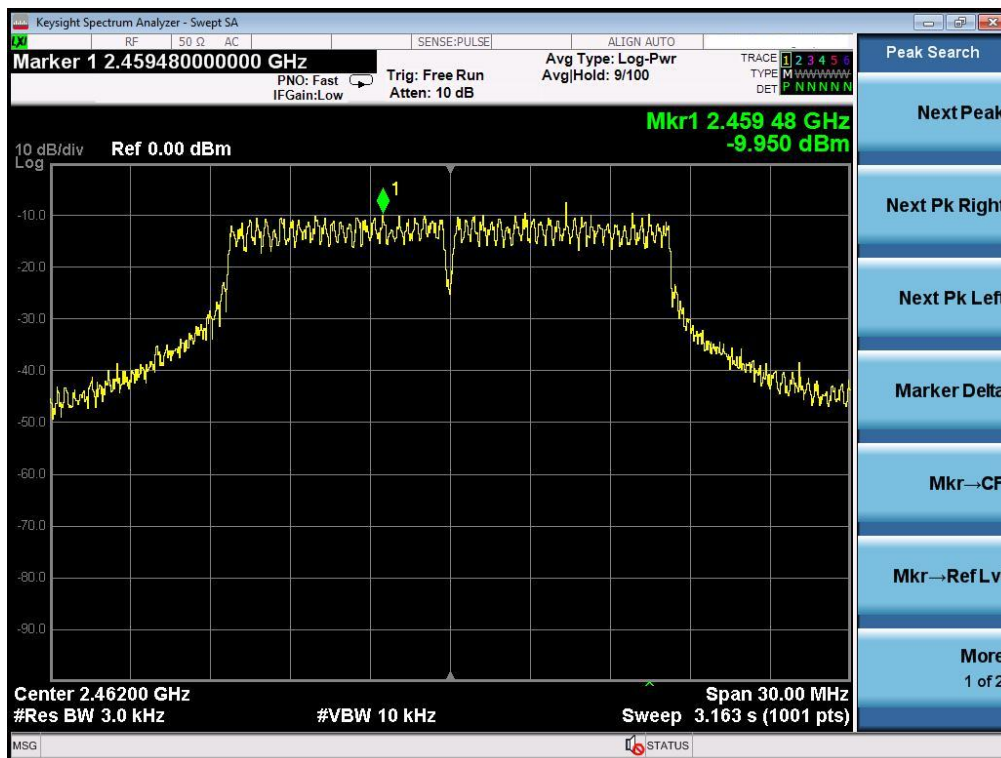
802.11g-2412MHz



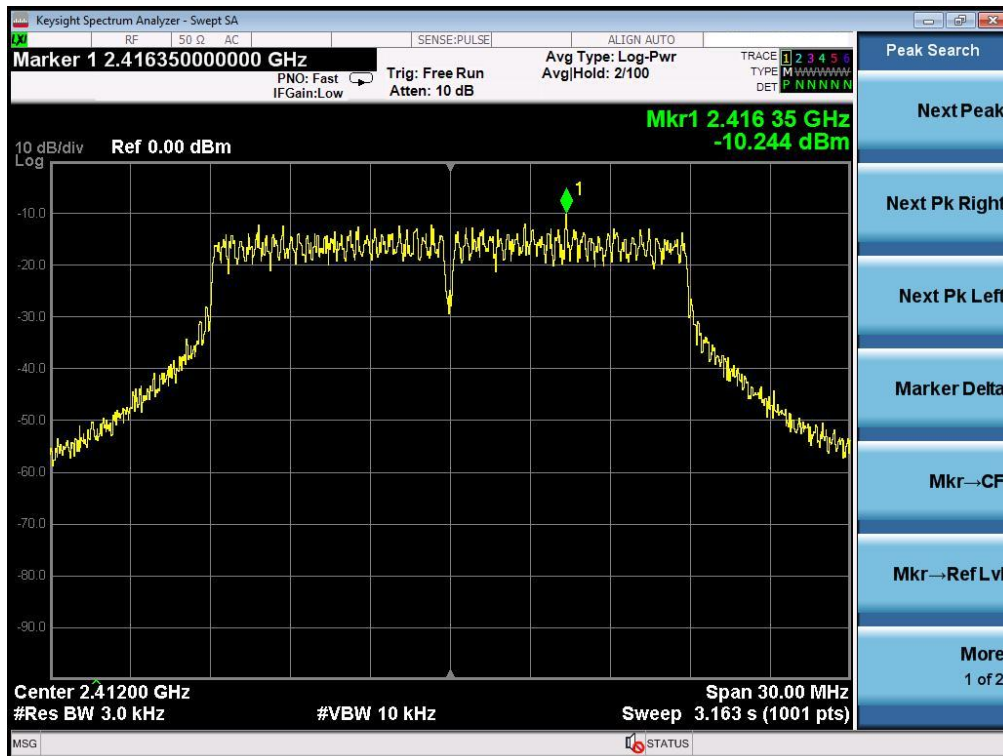
802.11g-2437MHz



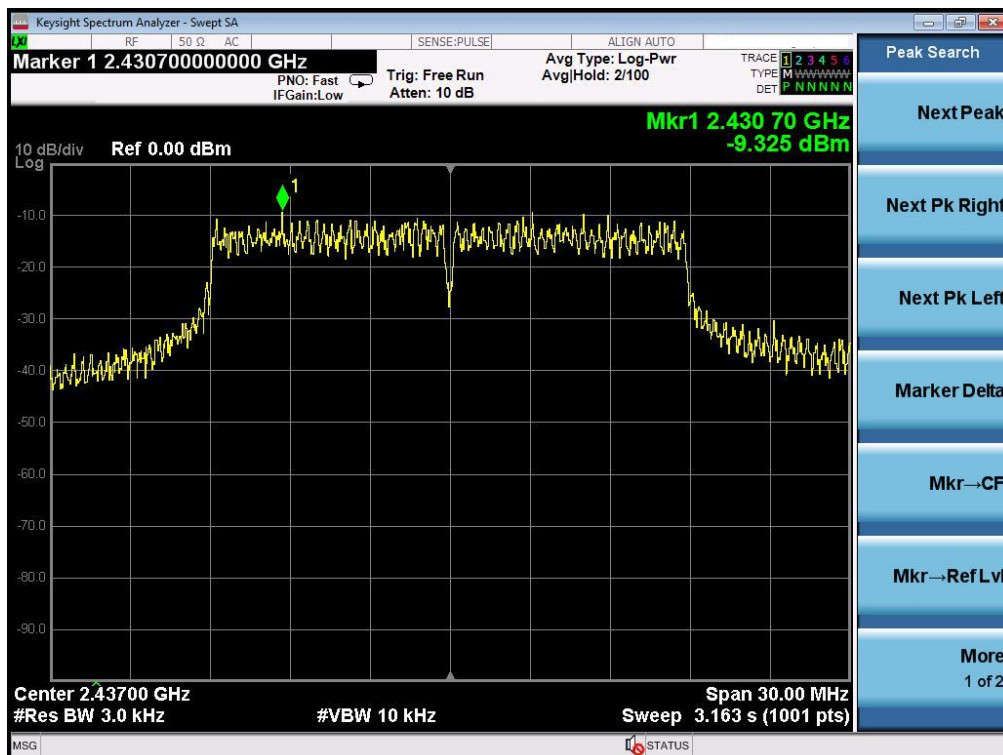
802.11g-2462MHz



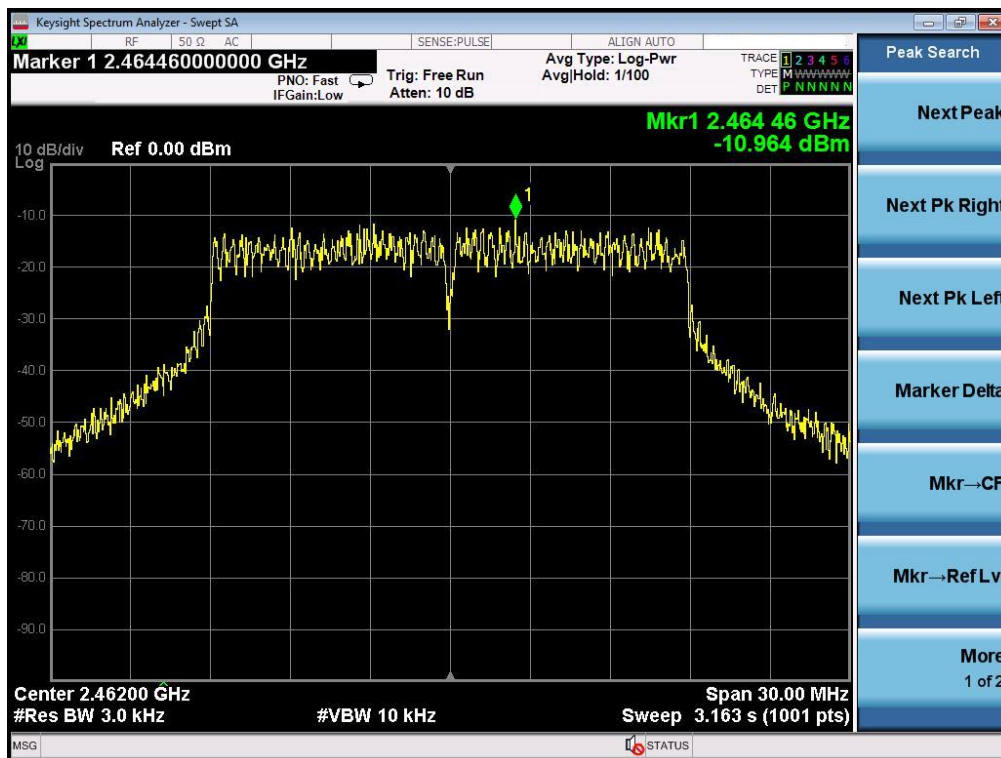
802.11n 20-2412MHz



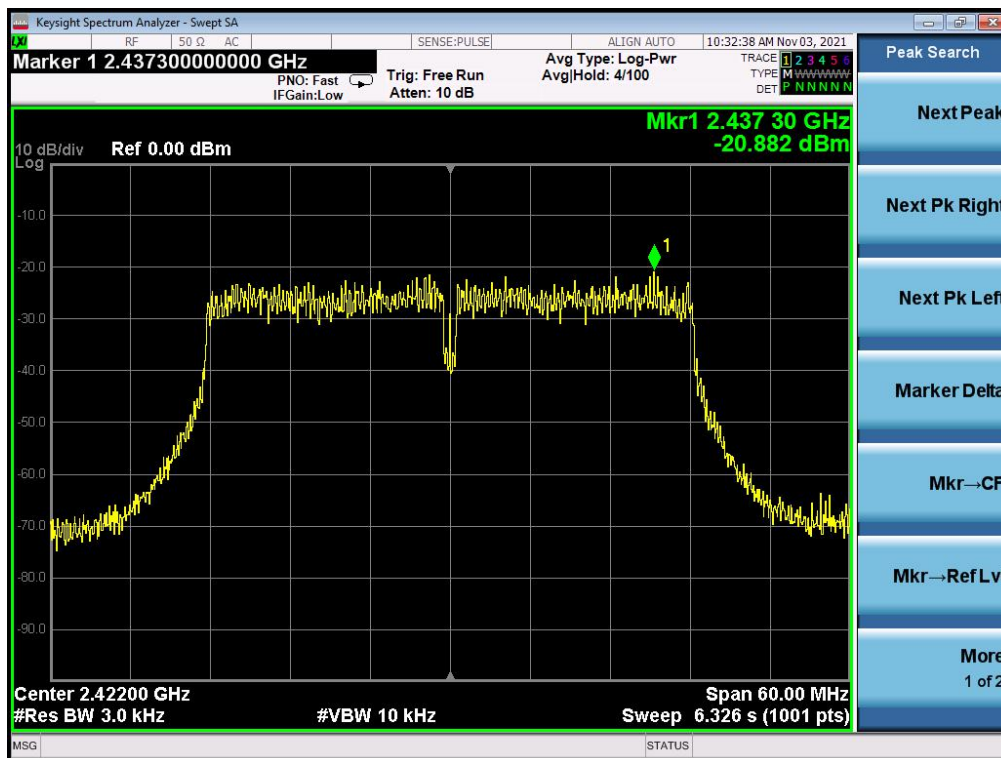
802.11n 20-2437MHz



802.11n 20-2462MHz



802.11n 40-2422MHz



802.11n 40-2437MHz



802.11n 40-2452MHz



6. Band edge and spurious(conducted)

6.1 LIMIT

In any 100kHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 30dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power.

6.2 TEST PROCEDURE

(1) Connect EUT's antenna output to spectrum analyzer by RF cable.

(2) Establish a reference level by using the following procedure:

Center frequency	DTS Channel center frequency
RBW:	100kHz
VBW:	300kHz
Span	1.5times the DTS bandwidth
Detector Mode:	Avg
Sweep time:	auto
Trace mode	Max hold

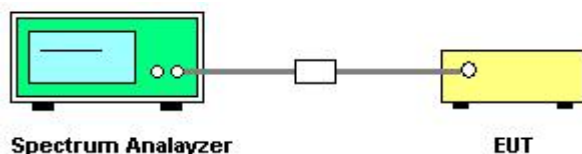
(3) Establish Allow the trace to stabilize, use the peak marker function to determine the maximum peak power level to establish the reference level.

(4) Set the spectrum analyzer as follows:

RBW:	100kHz
VBW:	300kHz
Span	Encompass frequency range to be measured
Number of measurement points	$\geq \text{span/RBW}$
Detector Mode:	Avg
Sweep time:	auto
Trace mode	Max hold

(5) Allow the trace to stabilize, use the peak marker function to determine the maximum amplitude of all unwanted emissions outside of the authorized frequency band

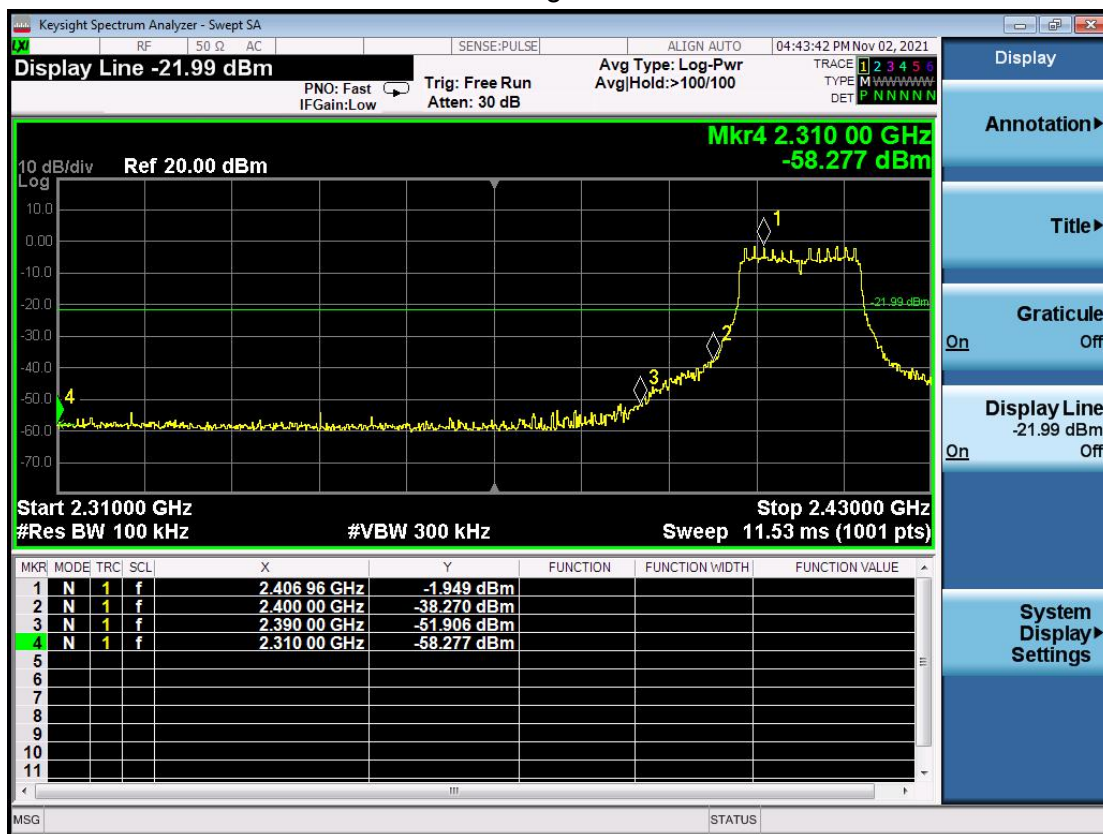
6.3 TEST SETUP



802.11b High CH



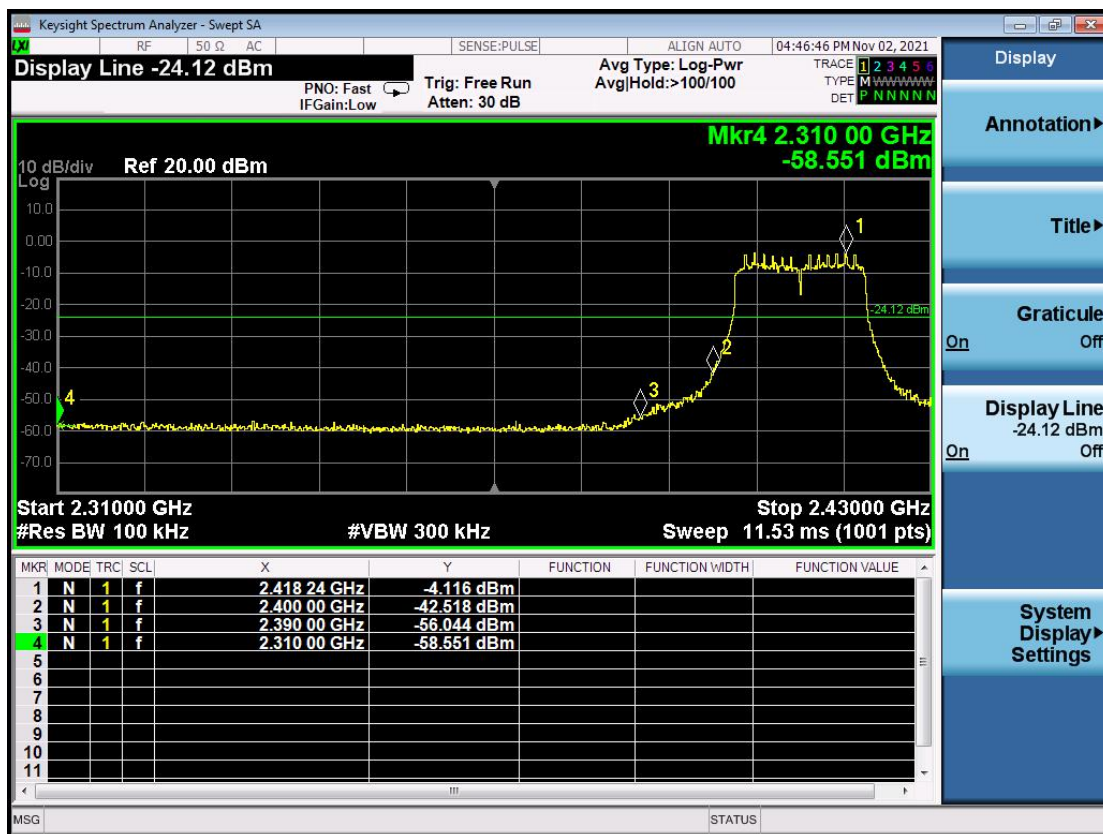
802.11g low CH



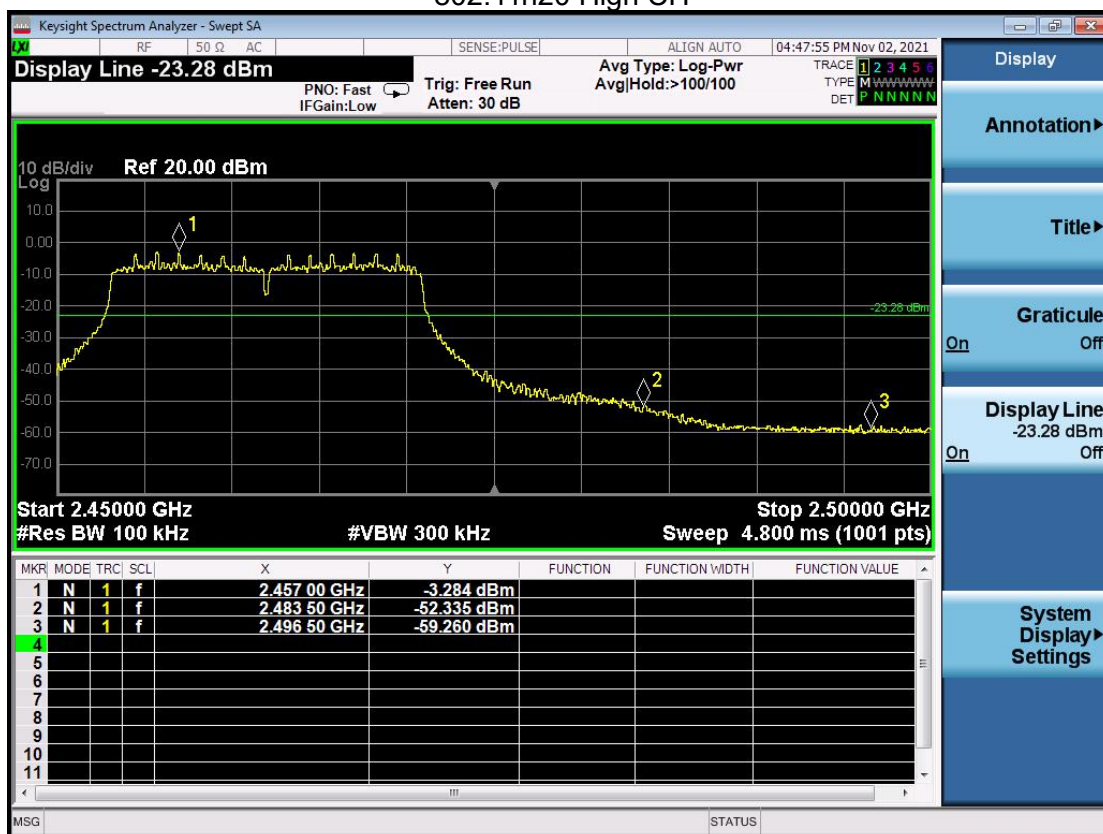
802.11g high CH



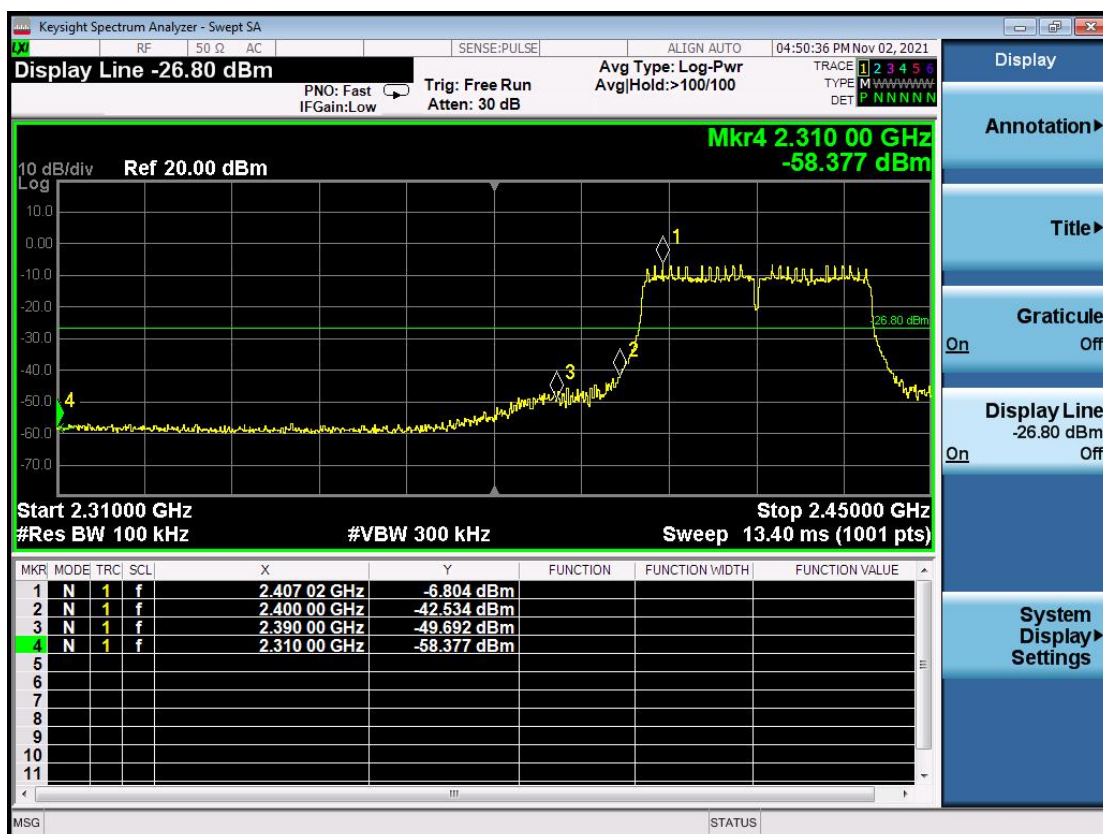
802.11n20 Low CH



802.11n20 High CH



802.11n40 Low CH

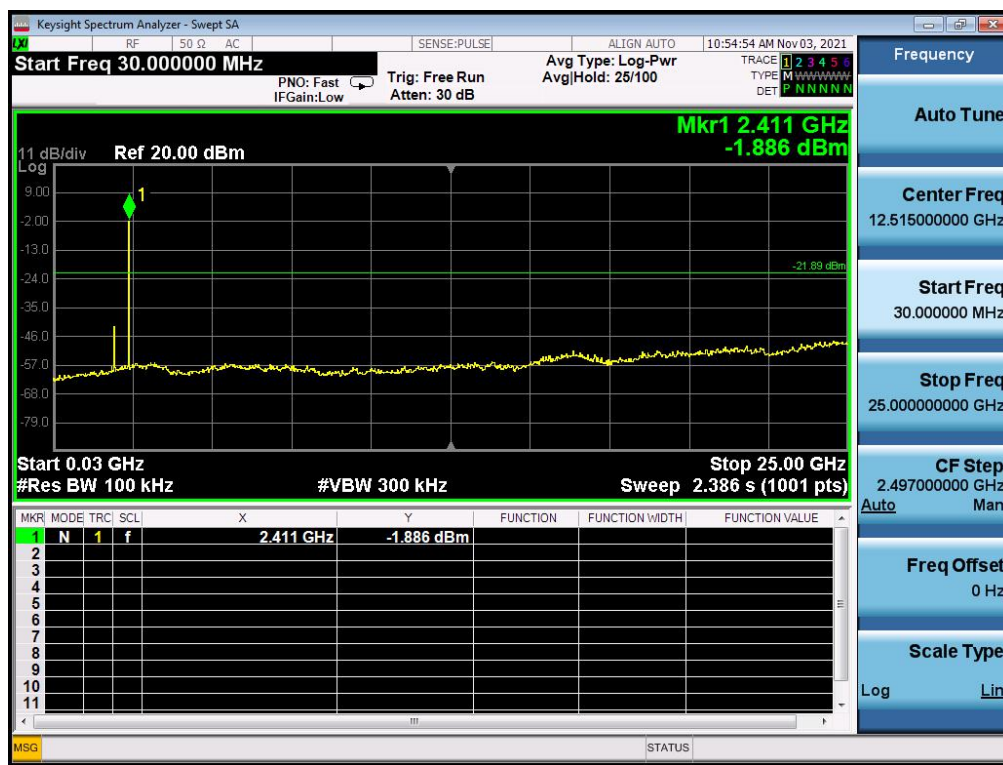


802.11n40 High CH

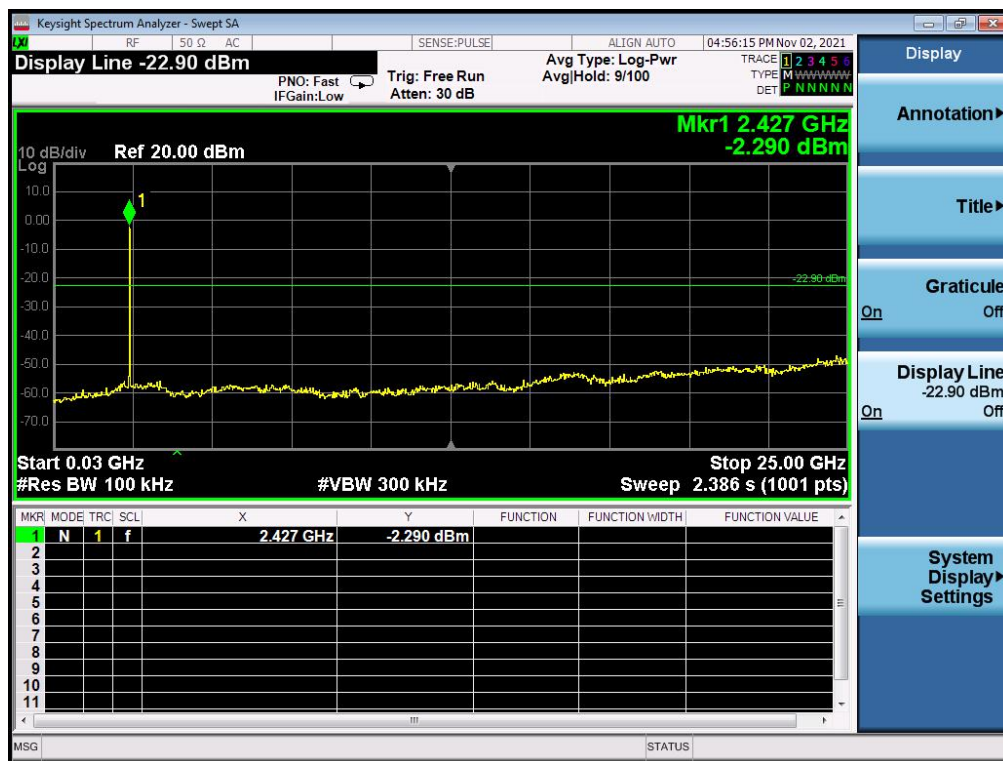


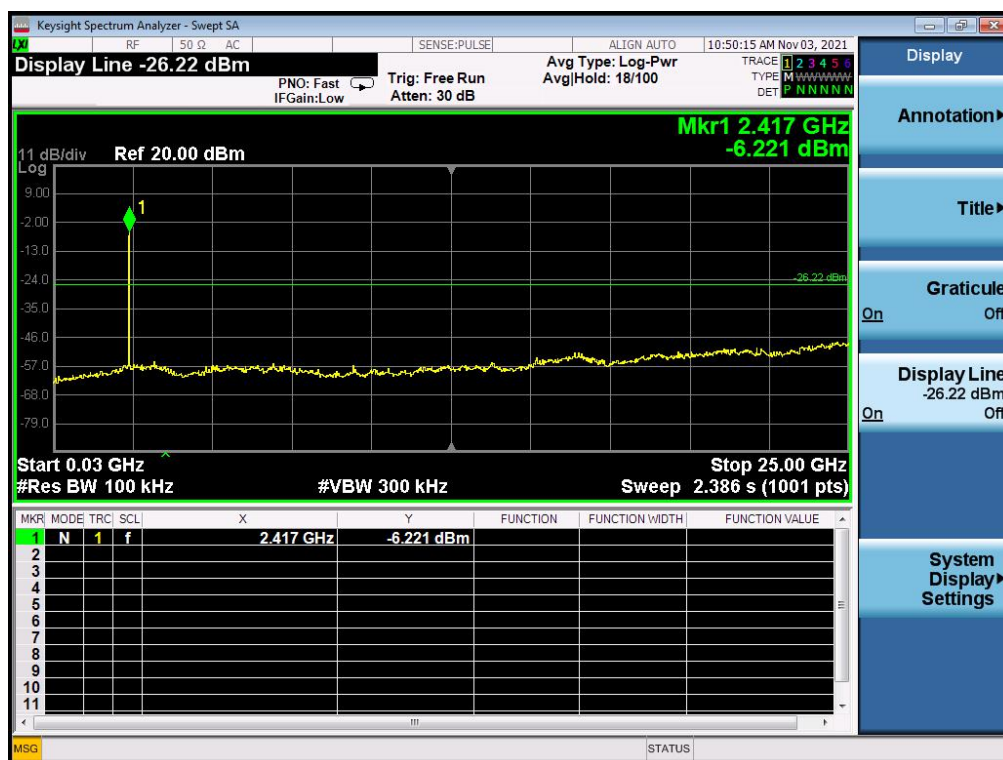
Spurious emissions (802.11b) Lowest channel

30MHz-25GHz

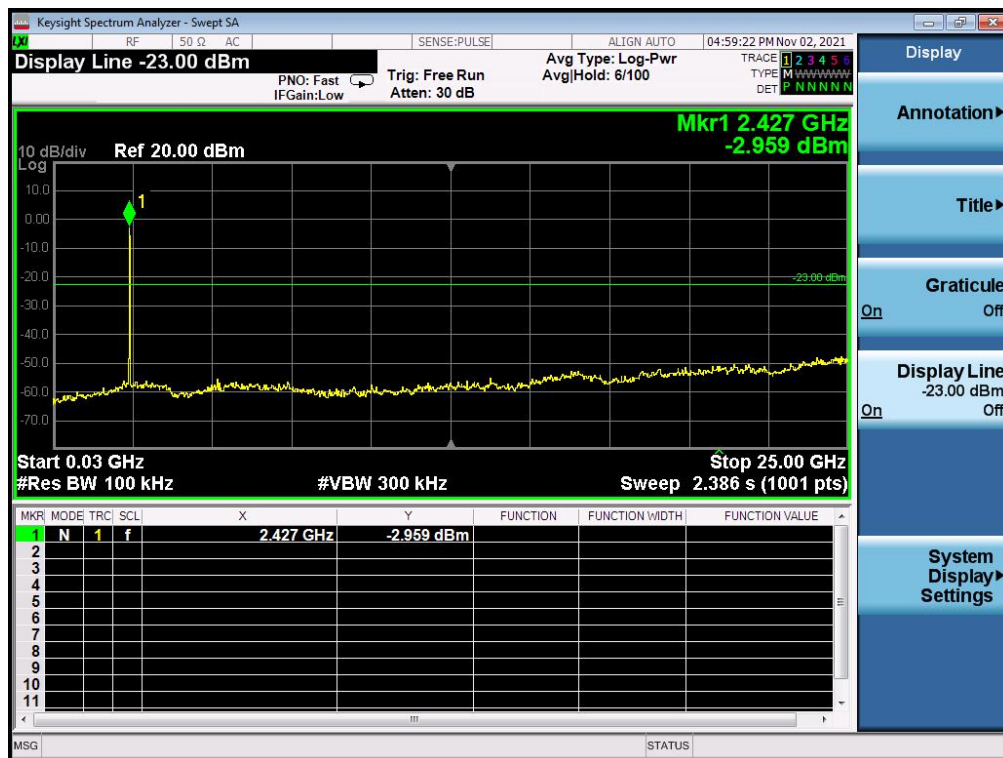


802.11b Middle CH

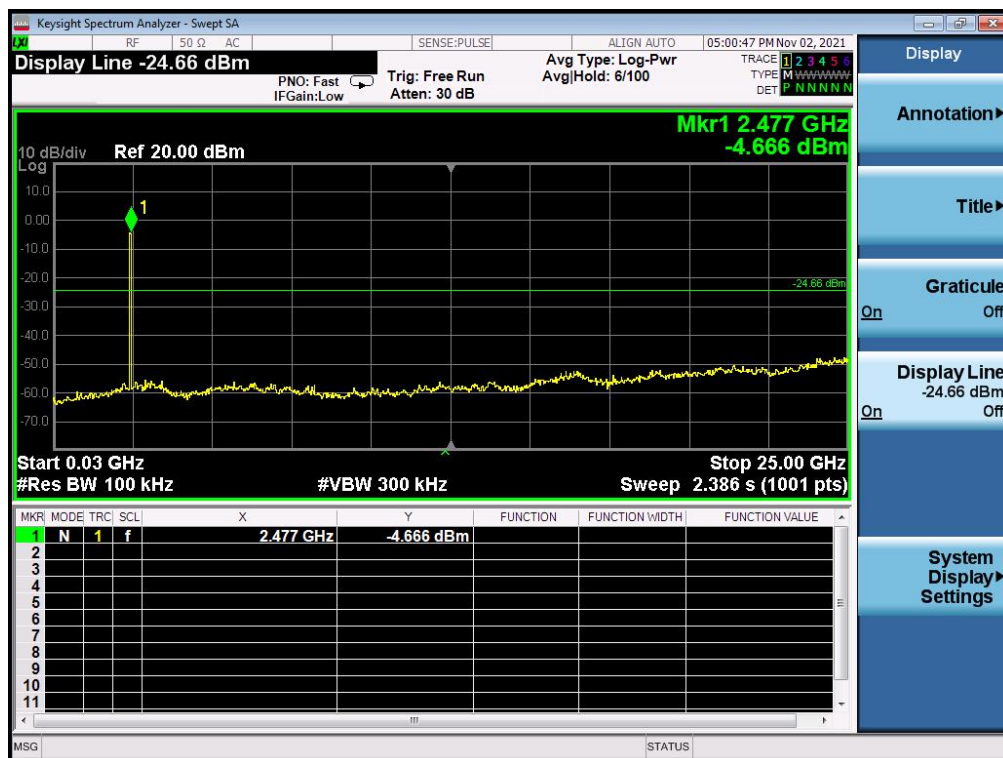




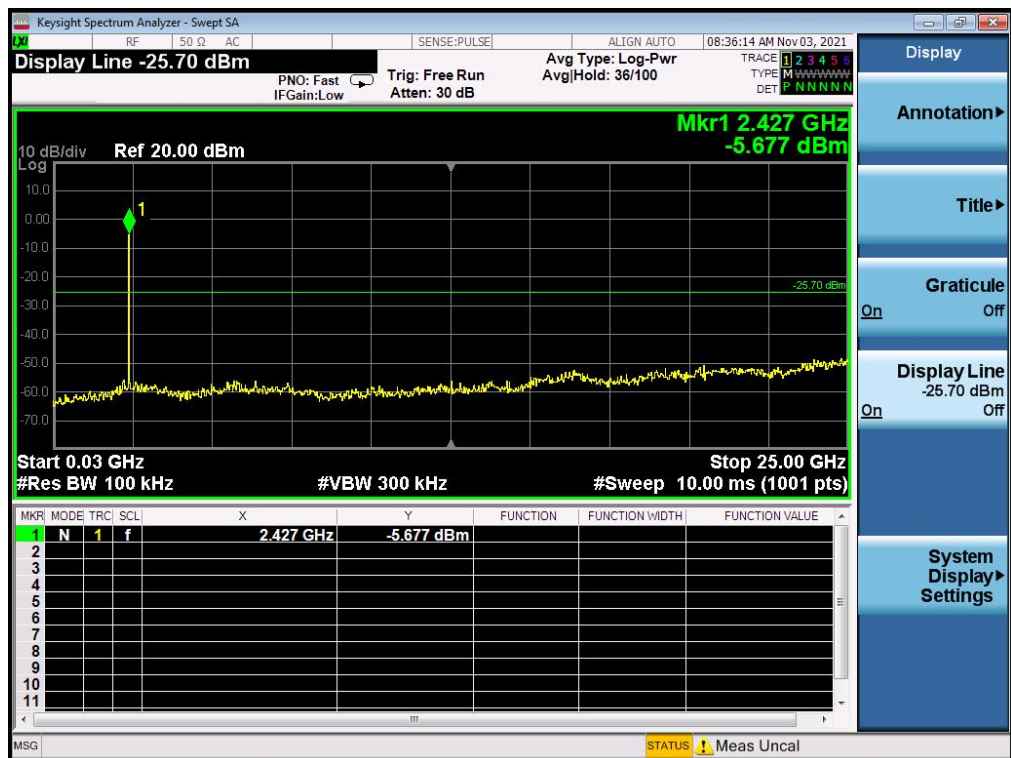
802.11g Middle CH 30MHz-25GHz



802.11g High CH 30MHz-25GHz



802.11n 20 Low CH 30MHz-25GHz



802.11n 20 Middle CH 30MHz-25GHz

