

RF Test Report

Applicant : Wirepath Home Systems, LLC, DBA SnapAV
Product Type : WAVE 2 AC WIRELESS ACCESS POINT
Trade Name : Araknis Networks
Model Number : AN-530-AP-I-AC
Applicable Standard : FCC 47 CFR PART 15 SUBPART C
ANSI C63.10:2013
Received Date : Jun. 11, 2020
Test Period : Jul. 15 ~ Oct. 22, 2020
Issued Date : Oct. 28, 2020

Issued by

A Test Lab Techno Corp.
No. 140-1, Changan Street, Bade District,
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Taiwan Accreditation Foundation accreditation number: 1330

Test Firm MRA designation number: TW0010

Frequency Range : 9 kHz to 40 GHz

Note:

- 1.The test results are valid only for samples provided by customers and under the test conditions described in this report.
- 2.This report shall not be reproduced except in full, without the written approval of A Test Lab Technology Corporation.
- 3.The relevant information is provided by customers in this test report. According to the correctness, appropriateness or completeness of the information provided by the customer, if there is any doubt or error in the information which affects the validity of the test results, the laboratory does not take the responsibility.



Revision History

Rev.	Issued Date	Revisions	Revised By
00	Oct. 28, 2020	Initial Issue	Yu Chiang

Verification of Compliance

Applicant : Wirepath Home Systems, LLC, DBA SnapAV
Product Type : WAVE 2 AC WIRELESS ACCESS POINT
Trade Name : Araknis Networks
Model Number : AN-530-AP-I-AC
FCC ID : 2AJACAN530APIAC
EUT Rated Voltage : DC 12 V, 2 A (DC JACK IN)
DC 48 V, 0.53 A (PoE IN)
Test Voltage : 120 Vac / 60 Hz
Applicable Standard : FCC 47 CFR PART 15 SUBPART C
ANSI C63.10:2013
Test Result : Complied

Performing Lab. : A Test Lab Techno Corp.
No. 140-1, Changan Street, Bade District,
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Tel : +886-3-2710188 / Fax : +886-3-2710190
Taiwan Accreditation Foundation accreditation number: 1330
<http://www.atl-lab.com.tw/e-index.htm>



A Test Lab Techno Corp. tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by A Test Lab Techno Corp. based on interpretations and/or observations of test results. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

Approved By :



(Manager)

(Jeremy Lin)



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1 General Information

1.1. Summary of Test Result

Standard	Item	Result	Remark
15.207	AC Power Conducted Emission	PASS	----
15.247(d)	Transmitter Radiated Emissions	PASS	----
15.247(b)(3)	Max. Output Power	PASS	----
15.247(a)(2)	6 dB RF Bandwidth	PASS	----
15.247(e)	Maximum Power Spectral Density	PASS	----
15.247(d)	Out of Band Conducted Spurious Emission	PASS	----
15.203	Antenna Requirement	PASS	----

Standard	Description
CFR47, Part 15, Subpart C	Intentional Radiators
ANSI C63. 10: 2013	American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices
KDB 558074 D01 15.247 Meas Guidance v05r02	GUIDANCE FOR COMPLIANCE MEASUREMENTS ON DIGITAL TRANSMISSION SYSTEM, FREQUENCY HOPPING SPREAD SPECTRUM SYSTEM, AND HYBRID SYSTEM DEVICES OPERATING UNDER SECTION 15.247 OF THE FCC RULES
KDB 662911 D01 v02r01	Emissions Testing of Transmitters with Multiple Outputs in the Same Band (e.g., MIMO, Smart Antenna, etc)

Decision Rule

- Uncertainty is not included.
- Uncertainty is included.



1.2. Measurement Uncertainty

Test Item	Frequency Range	Uncertainty (dB)
Conducted Emission	150 kHz ~ 30 MHz	2.68
Radiated Emission	9 kHz ~ 30 MHz	2.14
	30 MHz ~ 1000 MHz	4.99
	1000 MHz ~ 18000 MHz	4.99
	18000 MHz ~ 26500 MHz	4.23
	26500 MHz ~ 40000 MHz	4.39
Conducted Output Power	0.92 dB	
RF Bandwidth	4.79 %	
Power Spectral Density	0.92 dB	



2 EUT Description

Applicant	Wirepath Home Systems, LLC, DBA SnapAV 1800 Continental Blvd Suite 200 Charlotte, North Carolina 28273 USA			
Manufacturer	Emplus Technologies Inc. No. 42, Sec. 1, Minsheng N. Rd., Guishan Dist., Taoyuan City 333, Taiwan			
Product Type	WAVE 2 AC WIRELESS ACCESS POINT			
Trade Name	Araknis Networks			
Model Number	AN-530-AP-I-AC			
FCC ID	2AJACAN530APIAC			
Operate Freq. Band	Frequency Range (MHz)	Modulation	Channel Bandwidth	Data Rate 400 GI (ns)
IEEE 802.11b	2412 ~ 2462	DSSS	20 MHz	Up to 11 Mbps
IEEE 802.11g	2412 ~ 2462	OFDM	20 MHz	Up to 54 Mbps
IEEE 802.11n 2.4 GHz 20 MHz	2412 ~ 2462	OFDM (64QAM)	20 MHz	Up to 144.4 Mbps
IEEE 802.11n 2.4 GHz 40 MHz	2422 ~ 2452	OFDM (64QAM)	40 MHz	Up to 300 Mbps
IEEE 802.11n 2.4 GHz 20 MHz	2412 ~ 2462	OFDM (256QAM)	20 MHz	Up to 173.4 Mbps
IEEE 802.11n 2.4 GHz 40 MHz	2422 ~ 2452	OFDM (256QAM)	40 MHz	Up to 400 Mbps
Antenna information	ANT	Model Number	Type	Max. Gain (dBi)
	ANT-0	5718A0539300	PIFA Antenna	2.89
	ANT-1	5718A0540300	PIFA Antenna	2.39
Antenna Delivery	See section 3.1			
Operate Temp. Range	0 ~ +50 °C			

Frequency Band	Max. RF Output Power (W)
IEEE 802.11b	0.422
IEEE 802.11g	0.422
IEEE 802.11n 2.4 GHz 20 MHz	0.381
IEEE 802.11n 2.4 GHz 40 MHz	0.115
IEEE 802.11n 2.4 GHz 20 MHz(256QAM)	0.386
IEEE 802.11n 2.4 GHz 40 MHz(256QAM)	0.116

Beamforming on

Frequency Band	Max. RF Output Power (W)
IEEE 802.11n 2.4 GHz 20 MHz	0.170
IEEE 802.11n 2.4 GHz 40 MHz	0.051

3 Test Methodology

3.1. Mode of Operation

Decision of Test ATL has verified the construction and function in typical operation. All the test modes were carried out with the EUT in normal operation, which was shown in this test report and defined as:

Pre-Test Mode
Mode 1: Transmit mode
Mode 2: IEEE 802.11b Continuous TX mode
Mode 3: IEEE 802.11g Continuous TX mode
Mode 4: IEEE 802.11n 2.4 GHz 20 MHz(64QAM) Continuous TX mode
Mode 5: IEEE 802.11n 2.4 GHz 40 MHz(64QAM) Continuous TX mode
Mode 6: IEEE 802.11n 2.4 GHz 20 MHz(256QAM) Continuous TX mode
Mode 7: IEEE 802.11n 2.4 GHz 40 MHz(256QAM) Continuous TX mode

Final Test Mode
Mode 1: Transmit mode
Mode 2: IEEE 802.11b Continuous TX mode
Mode 3: IEEE 802.11g Continuous TX mode
Mode 4: IEEE 802.11n 2.4 GHz 20 MHz(64QAM) Continuous TX mode
Mode 5: IEEE 802.11n 2.4 GHz 40 MHz(64QAM) Continuous TX mode
Mode 6: IEEE 802.11n 2.4 GHz 20 MHz(256QAM) Continuous TX mode
Mode 7: IEEE 802.11n 2.4 GHz 40 MHz(256QAM) Continuous TX mode

Software used to control the EUT for staying in continuous transmitting mode was programmed.

After verification, all tests were carried out with the worst case test modes.

By preliminary testing and verifying two axis (X and Y) position of EUT transmitted status, it was found that "Y axis" position was the worst, then the final test was executed the worst condition and test data were recorded in this report.



Test Mode	ANT-0	ANT-1	ANT-0+1
Mode 2	V	V	V
Mode 3	V	V	V
Mode 4	V	V	V
Mode 5	V	V	V
Mode 6	V	V	V
Mode 7	V	V	V

Test Mode	Antenna Delivery	Data Rate (Mbps)	Test Channel
Mode 2	2TX / 2RX (CDD)	1	1, 6, 11
Mode 3	2TX / 2RX (CDD)	6	1, 6, 11
Mode 4	2TX / 2RX (CDD)	13	1, 6, 11
Mode 5	2TX / 2RX (CDD)	27	3, 6, 9
Mode 6	2TX / 2RX (CDD/Beamforming on)	13	1, 6, 11
Mode 7	2TX / 2RX (CDD/Beamforming on)	27	3, 6, 9

Duty cycle

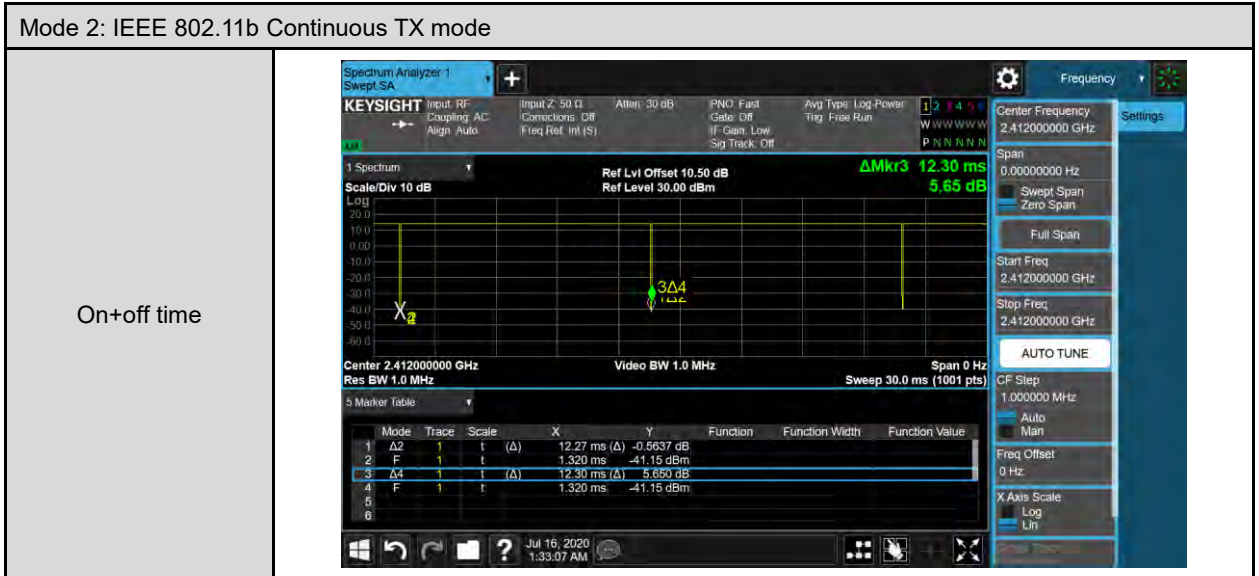
Test Mode	Frequency (MHz)	on time (ms)	on+off time (ms)	Duty cycle	Duty Factor (dB)	1/T Minimum VBW (kHz)
Mode 2	2412	12.270	12.300	0.998	0.011	0.010
Mode 3	2412	2.040	2.135	0.956	0.198	0.490
Mode 6	2412	5.020	5.060	0.992	0.034	0.010
Mode 7	2422	2.440	2.510	0.972	0.123	0.410

Beamforming on

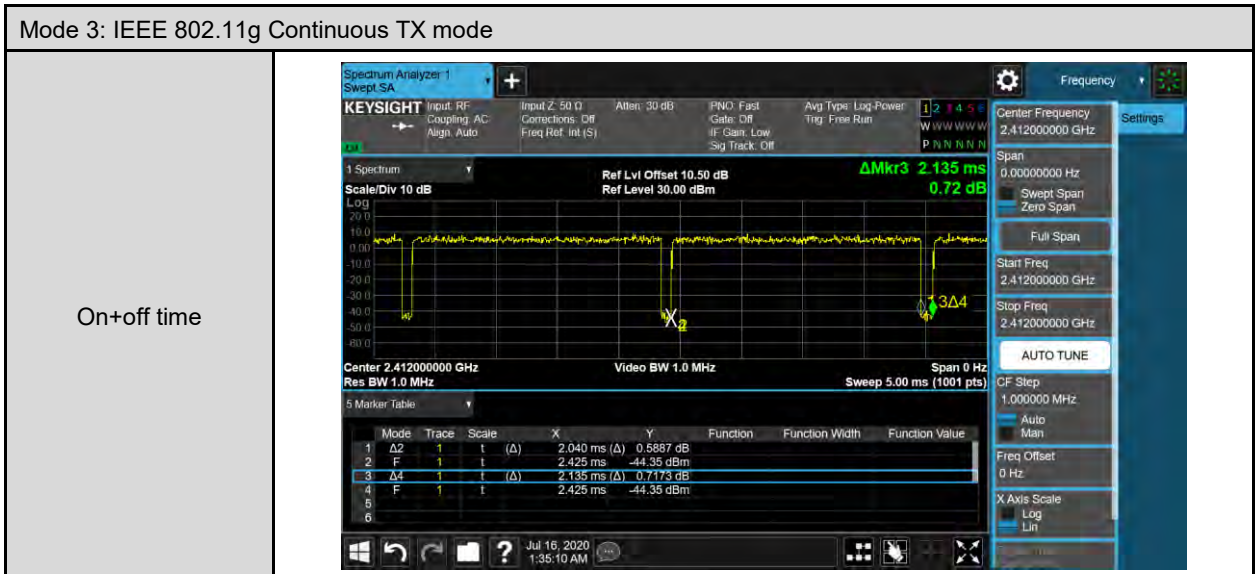
Test Mode	Frequency (MHz)	on time (ms)	on+off time (ms)	Duty cycle	Duty Factor (dB)	1/T Minimum VBW (kHz)
Mode 6	2412	5.020	5.060	0.992	0.034	0.010
Mode 7	2422	2.440	2.510	0.972	0.123	0.410

Duty Cycle Graphs

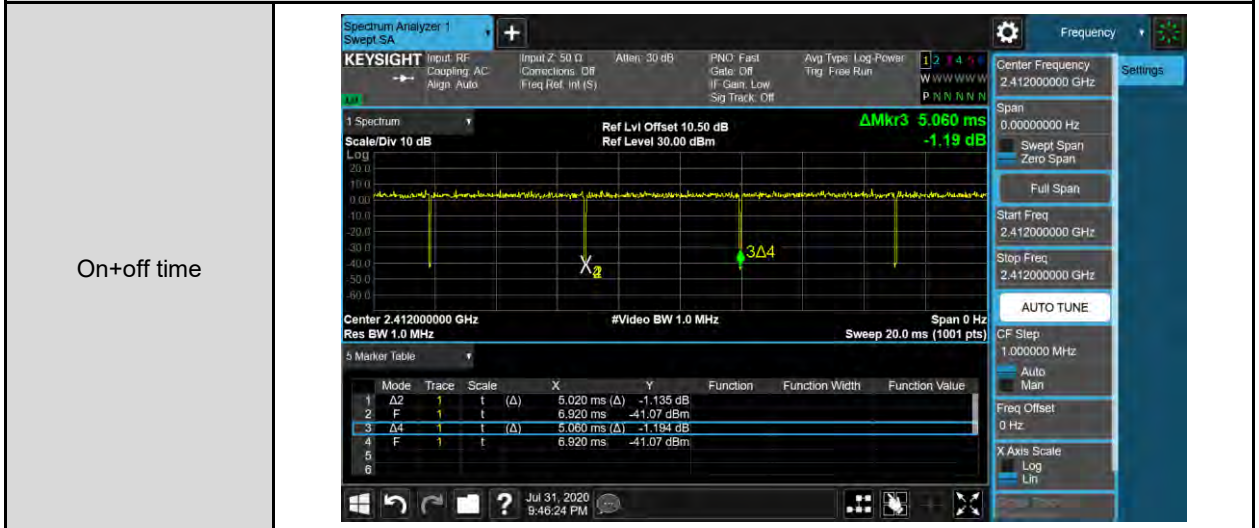
Mode 2: IEEE 802.11b Continuous TX mode



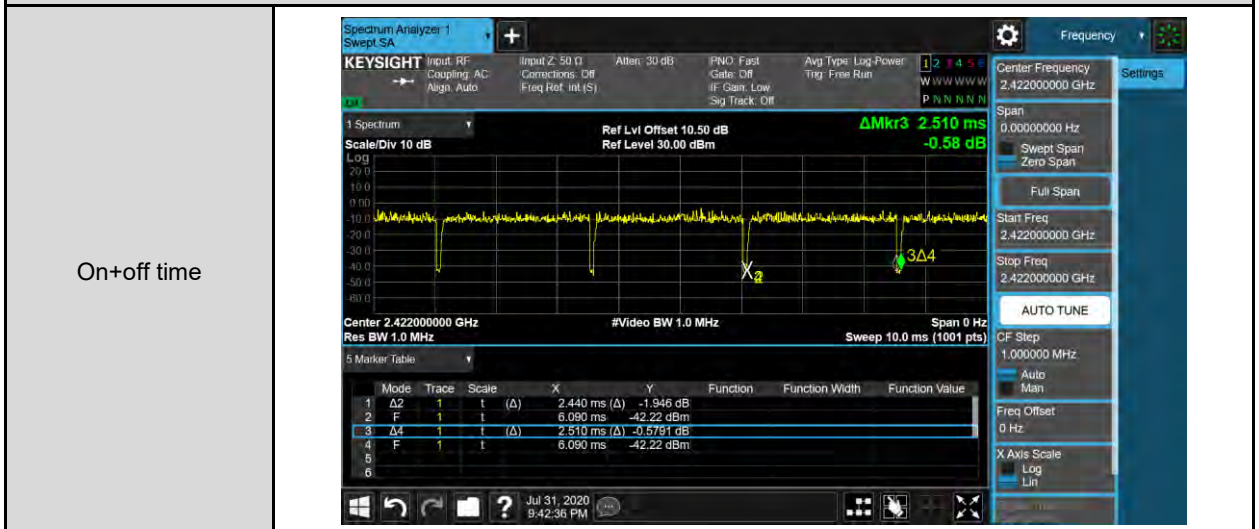
Mode 3: IEEE 802.11g Continuous TX mode



Mode 6: IEEE 802.11n 2.4 GHz 20 MHz(256QAM) Continuous TX mode

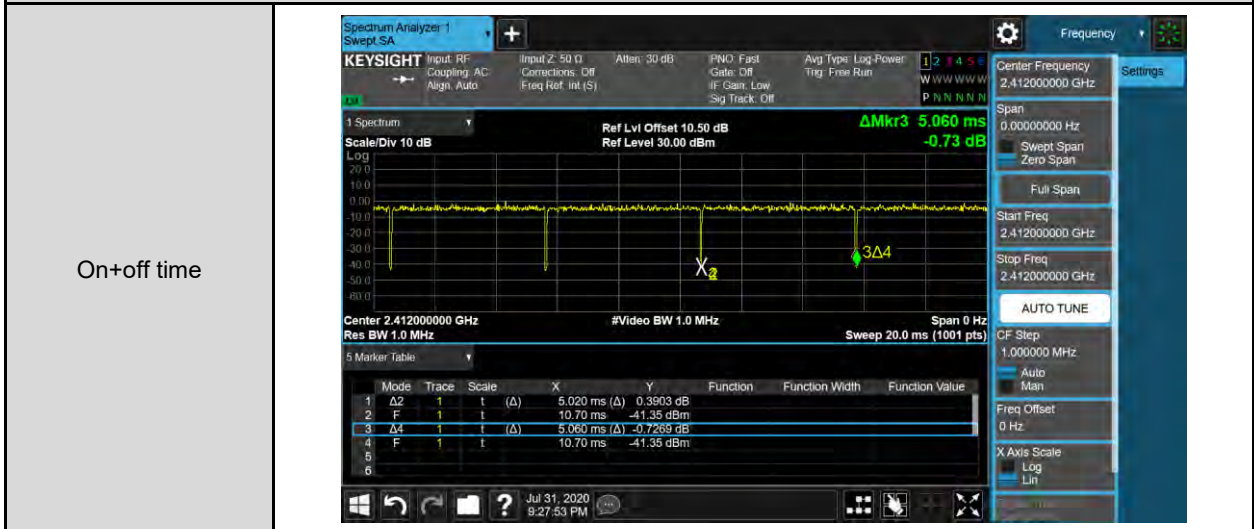


Mode 7: IEEE 802.11n 2.4 GHz 40 MHz(256QAM) Continuous TX mode

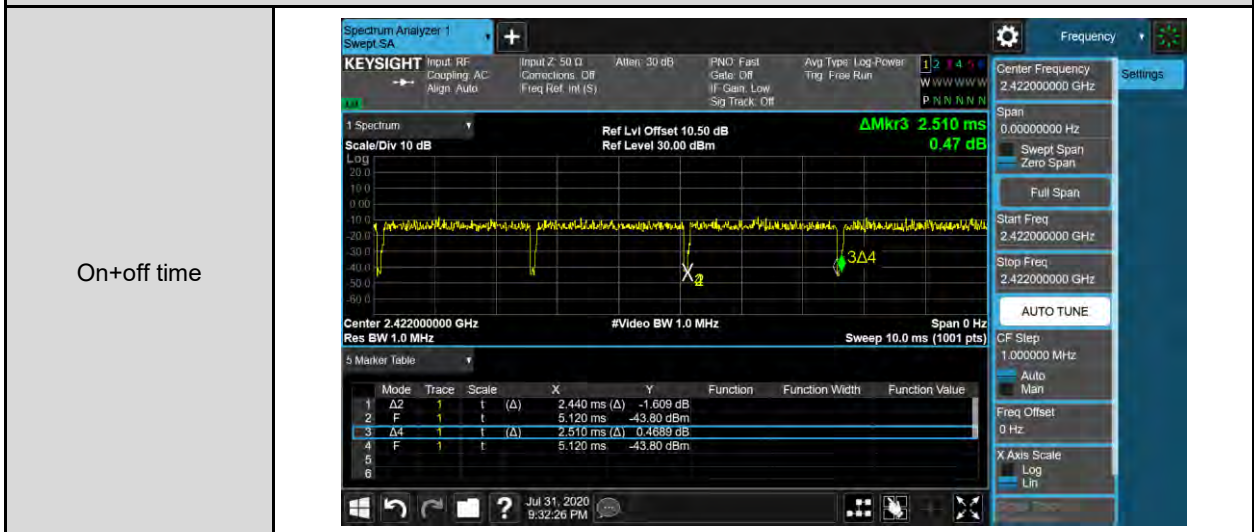


Beamforming on

Mode 6: IEEE 802.11n 2.4 GHz 20 MHz(256QAM) Continuous TX mode



Mode 7: IEEE 802.11n 2.4 GHz 40 MHz(256QAM) Continuous TX mode



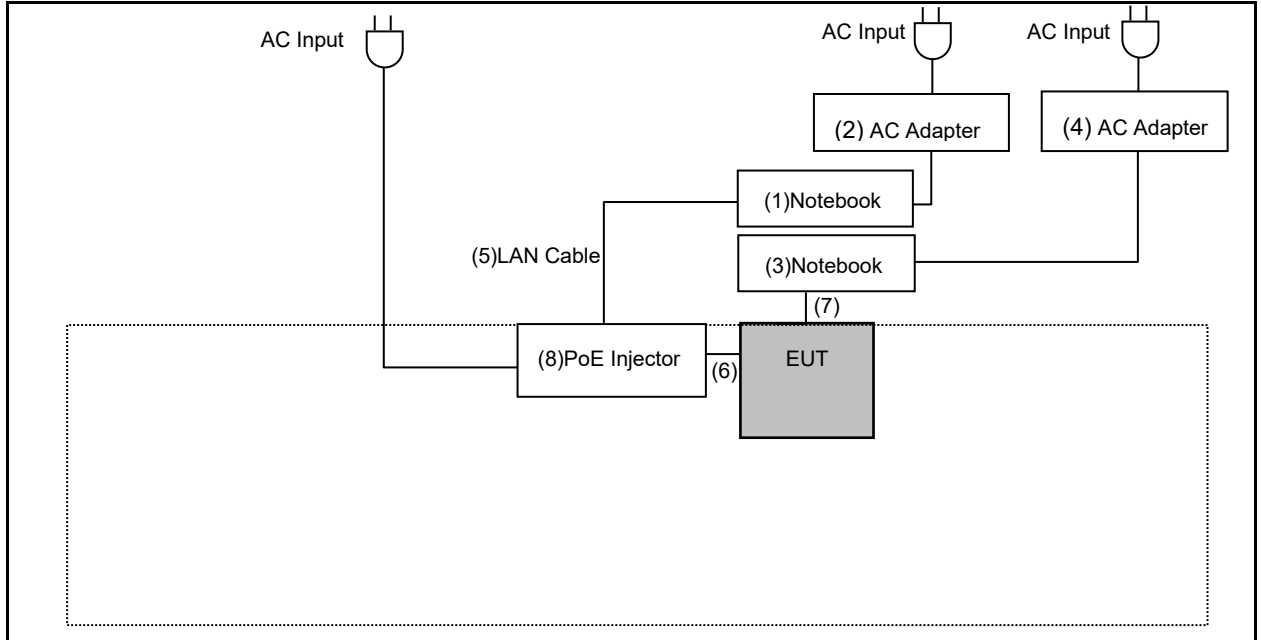
3.2. EUT Test Step

1.	Setup the EUT shown on "Configuration of Test System Details".
2.	Turn on the power of all equipment.
3.	Turn on TX function.
4.	EUT run test program.

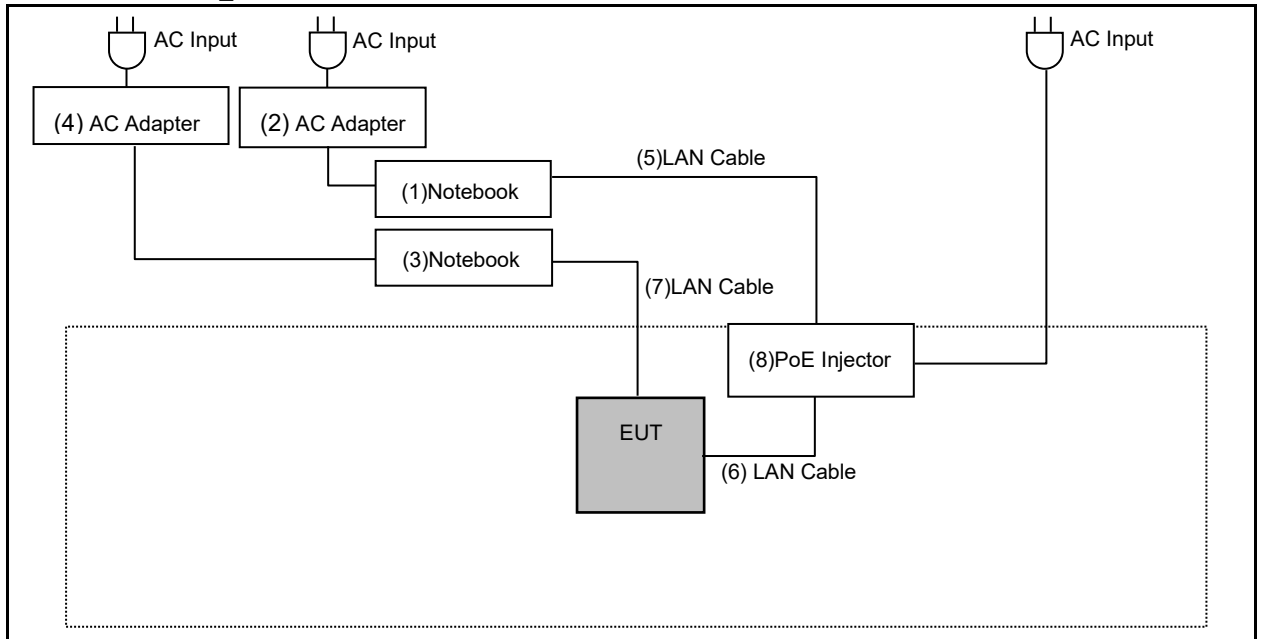
Measurement Software			
No.	Description	Software	Version
1	Conducted Emission	EZ EMC	1.1.4.3
2	Radiated Emission	EZ EMC	1.1.4.4

3.3. Configuration of Test System Details

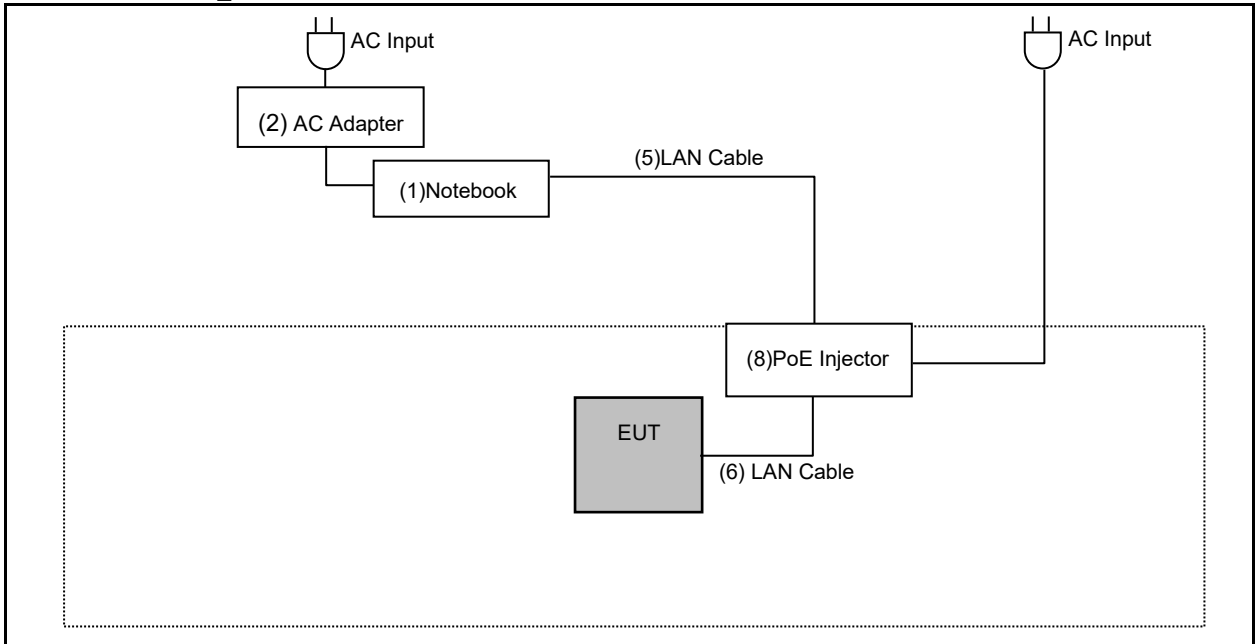
Conducted Emission



Radiated Emissions_Below 1 GHz



Radiated Emissions_Above 1 GHz



Devices Description					
Product	Manufacturer	Model Number	Serial Number	Remark	
(1)	Notebook	ASUS	BU400A	D1NXAS148534020	---
(2)	AC Adapter	ASUS	EXA1203YH	---	INPUT : 100-240 VAC, 50/60 Hz, 1.5 A OUTPUT : 19 VDC, 3.42 A Non-Shielded, 0.8 m
(3)	Notebook	ASUS	P2430U	GANXCV04H86940A	---
(4)	AC Adapter	ASUS	ADP-65GD D	---	INPUT : 100-240 VAC, 50/60 Hz, 1.5 A OUTPUT : 19 VDC, 3.42 A Non-Shielded, 0.8 m
(5)	LAN Cable	HUAWEI	UL2464	---	---
(6)	LAN Cable	HUAWEI	UL2464	---	---
(7)	LAN Cable	HUAWEI	UL2464	---	---
(8)	POE Injector	emplus	EPA5006GAT	---	INPUT : 100-240 VAC, 50-60 Hz, 0.8 A OUTPUT : 54 VDC, 0.6 A
(9)	AC Adapter	SPC	ZZU1588-2001 20-2A	---	INPUT : 100-240 VAC, 50-60 Hz, 1.5 A OUTPUT : 12 VDC, 2 A

Note: The device used (9)AC Adapter and (8)PoE Injector to evaluation, (8)POE Injector is worst case to perform testing.



3.4. Test Instruments

For Conducted Emission

Test Period: Jul. 28, 2020

Testing Engineer: Louis Shen

Equipment	Manufacturer	Model Number	Serial Number	Cal. Date	Cal. Period
Test Receiver	R&S	ESCI	100367	05/25/2020	1 year
LISN	R&S	ENV216	101040	03/23/2020	1 year
LISN	R&S	ENV216	101041	04/06/2020	1 year
RF Cable	Woken	00100D1380194M	TE-02-03	05/26/2020	1 year

For Radiated Emissions

Test Period: Aug. 24 ~ Oct. 22, 2020

Testing Engineer: JS Liao, Ricky Liu

Equipment	Manufacturer	Model Number	Serial Number	Cal. Date	Cal. Period
Spectrum Analyzer (2 Hz~50 GHz)	Keysight	N9030B	MY57143537	04/14/2020	1 year
Pre Amplifier (1~26.5 GHz)	Agilent	8449B	3008A02237	10/18/2019	1 year
Pre Amplifier (100 kHz~1.3 GHz)	Agilent	8447D	2944A11119	01/15/2020	1 year
Broadband Antenna	Schwarzbeck	VULB9168	01146	07/03/2020	1 year
Horn Antenna (1~18 GHz)	SCHWARZBECK MESS-ELEKTRONIK	BBHA9120D	02207	06/30/2020	1 year
Horn Antenna (18~40 GHz)	ETS	3116	00086467	12/13/2019	1 year
Coaxial Cable	Titan	T0710AT327A10A 100	J11005	08/13/2020	1 year
Coaxial Cable	Titan	T0710AT327A10A 900	J11004	08/13/2020	1 year
Coaxial Cable	Titan	T0712AT340A12A 900	J11002	08/13/2020	1 year

Note: N.C.R. = No Calibration Request.



For Conducted

Test Period: Jul. 15 ~ Oct. 19, 2020

Testing Engineer: Paul Chiu, Peter Shui

Equipment	Manufacturer	Model Number	Serial Number	Cal. Date	Cal. Period
Spectrum Analyzer (10 Hz~26.5 GHz)	KEYSIGHT	N9010B	MY5907141	03/16/2020	1 year
Power Sensor	Agilent	N1921A	MY45241957	12/11/2019	1 year
Power Meter	Agilent	N1911A	MY45101619	12/11/2019	1 year

Note: N.C.R. = No Calibration Request.

3.5. Test Site Environment

Items	Required (IEC 60068-1)	Actual
Temperature (°C)	15-35	20-30
Humidity (%RH)	25-75	45-75

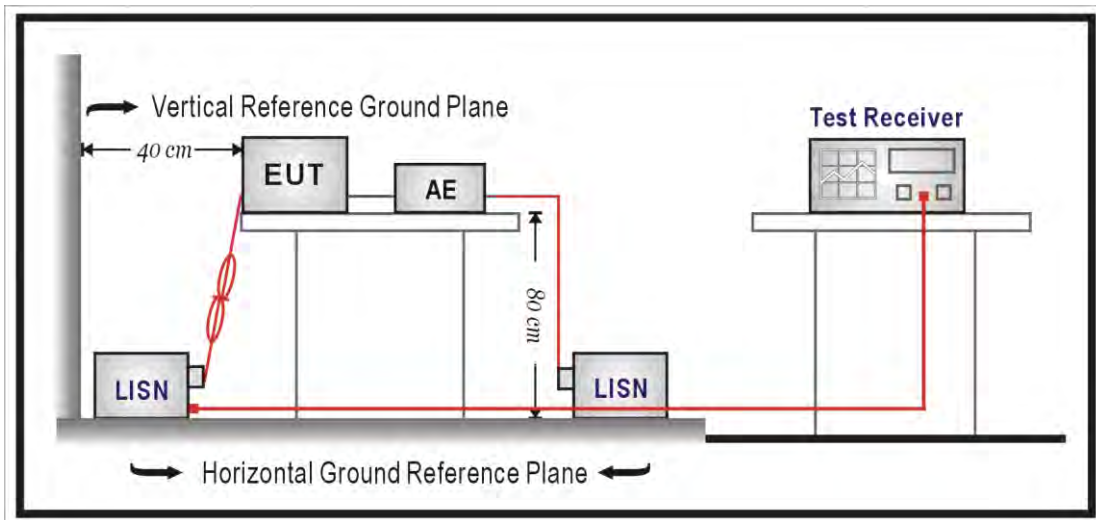
4 Measurement Procedure

4.1. AC Power Line Conducted Emission Measurement

■ Limit

Frequency (MHz)	Quasi-peak	Average
0.15 - 0.5	66 to 56	56 to 46
0.50 - 5.0	56	46
5.0 - 30.0	60	50

■ Test Setup



■ Test Procedure

The EUT and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a $50 \Omega // 50 \mu\text{H}$ coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a $50 \Omega // 50 \mu\text{H}$ coupling impedance with 50 ohm termination.

Tabletop device shall be placed on a non-conducting platform, of nominal size 1 m by 1.5 m, raised 80 cm above the reference ground plane. The wall of screened room shall be located 40 cm to the rear of the EUT. Other surfaces of tabletop or floor standing EUT shall be at least 80 cm from any other ground conducting surface including one or more LISNs. For floor-standing device shall be placed under the EUT with a 12 mm insulating material.

Conducted emissions were investigated over the frequency range from 0.15 MHz to 30 MHz using a resolution bandwidth of 9 kHz. The equipment under test (EUT) shall be meet the limits in section 4.1, as applicable, including the average limit and the quasi-peak limit when using respectively, an average detector and quasi-peak detector measured in accordance with the methods described of related standard. When all of peak value were complied with quasi-peak and average limit from 150 kHz to 30 MHz then quasi-peak and average measurement was unnecessary.

The AMN shall be placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane for AMNs mounted on top of the ground reference plane. This distance is between the closest points of the AMN and the EUT. All other units of the EUT and associated equipment shall be at least 0.8 m from the AMN. If the mains power cable is longer than 1 m then the cable shall be folded back and forth at the centre of the lead to form a bundle no longer than 0.4 m. All of interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 cm to 40 cm long. All of EUT and AE shall be separate place more than 0.1 m. All 50Ω ports of the LISN shall be resistively terminated into 50Ω loads when not connected to the measuring instrument.

If the reading of the measuring receiver shows fluctuations close to the limit, the reading shall be observed for at least 15 s at each measurement frequency; the higher reading shall be recorded with the exception of any brief isolated high reading which shall be ignored.

4.2. Radiated Emission Measurement

■ Limit

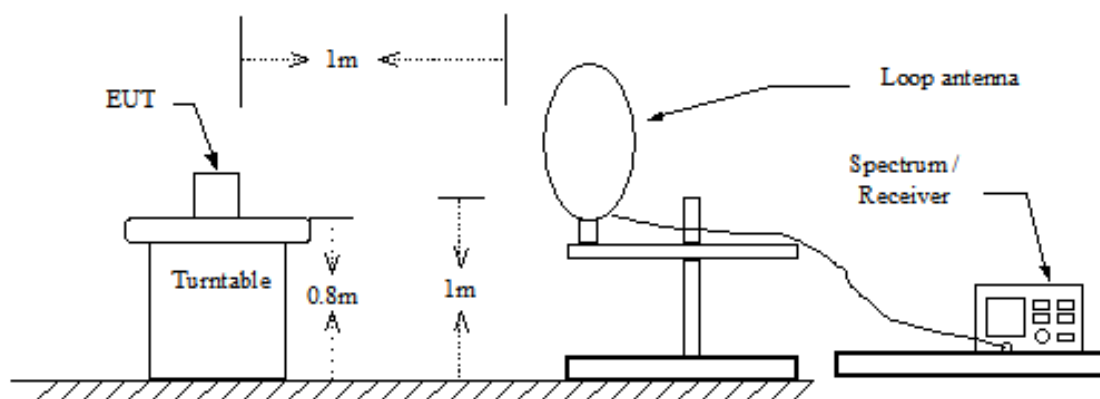
According to §15.209(a), except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field Strength ($\mu\text{V}/\text{m}$ at meter)	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

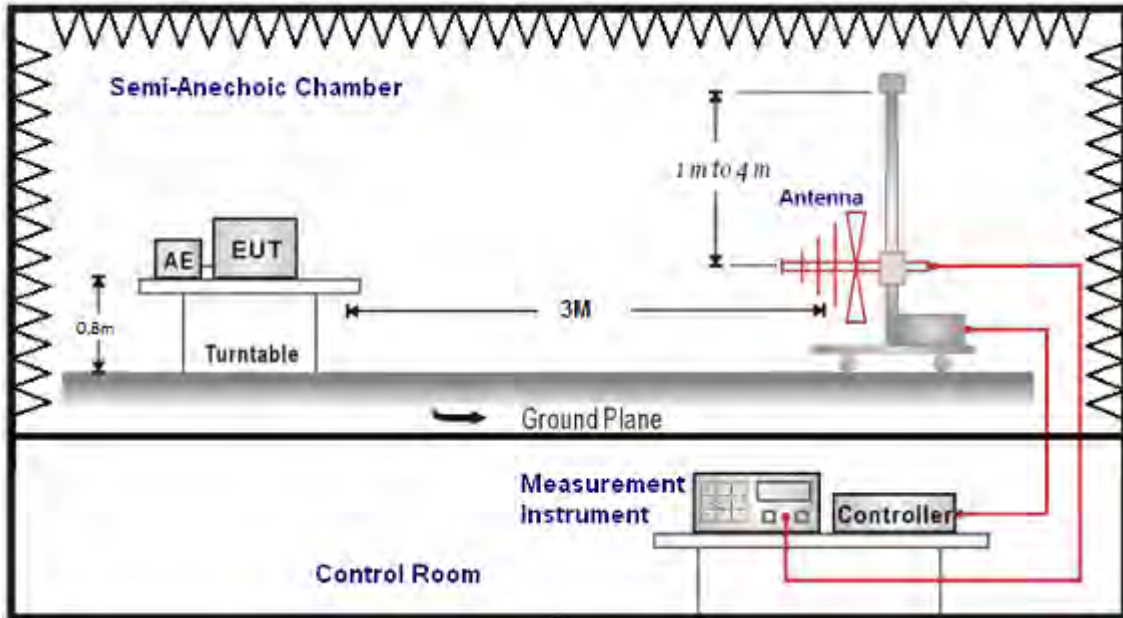
** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.

■ Setup

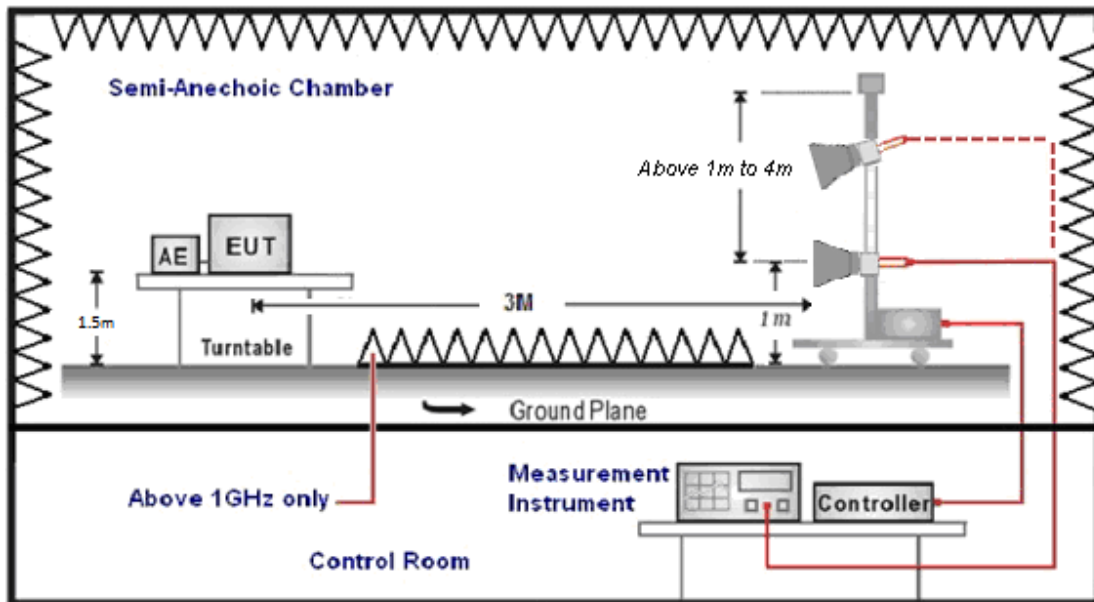
9 kHz ~ 30 MHz



Below 1 GHz



Above 1 GHz





■ Test Procedure

Final radiation measurements were made on a three-meter, Semi Anechoic Chamber. The EUT system was placed on a nonconductive turntable which is 0.8 or 1.5 meters height, top surface 1.0 x 1.5 meter. The spectrum was examined from 250 MHz to 2.5 GHz in order to cover the whole spectrum below 10th harmonic which could generate from the EUT. During the test, EUT was set to transmit continuously & Measurements spectrum range from 9 kHz to 26.5 GHz is investigated.

For measurements below 1 GHz the resolution bandwidth is set to 100 kHz for peak detection measurements or 120 kHz for quasi-peak detection measurements. Peak detection is used unless otherwise noted as quasi-peak.

For measurements above 1 GHz the resolution bandwidth is set to 1 MHz, and then the video bandwidth is set to 3 MHz for peak measurements and 10 Hz for average measurements when Duty cycle >0.98 / 1/T for average measurements when Duty cycle <0.98. A nonconductive material surrounded the EUT to supporting the EUT for standing on three orthogonal planes. At each condition, the EUT was rotated 360 degrees, and the antenna was raised and lowered from one to four meters to find the maximum emission levels. Measurements were taken using both horizontal and vertical antenna polarization.

SCHWARZBECK MESS-ELEKTRONIK Biconilog Antenna at 3 Meter and the SCHWARZBECK Double Ridged Guide Antenna was used in frequencies 1 –26.5 GHz at a distance of 3 meter. The antenna at an angle toward the source of the emission. All test results were extrapolated to equivalent signal at 3 meters utilizing an inverse linear distance extrapolation Factor (20 dB/decade).

For testing above 1 GHz, the emission level of the EUT in peak mode was 20 dB lower than average limit (that means the emission level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.

Appropriate preamplifiers were used for improving sensitivity and precautions were taken to avoid overloading or desensitizing the spectrum analyzer. No post – detector video filters were used in the test.

The spectrum analyzer's 6 dB bandwidth was set to 1 MHz, and the analyzer was operated in the peak detection mode, for frequencies both below and up 1 GHz. The average levels were obtained by subtracting the duty cycle correction factor from the peak readings.

The following procedures were used to convert the emission levels measured in decibels referenced to 1 microvolt (dBuV) into field intensity in micro volts pre meter (uV/m).

The actual field intensity in decibels referenced to 1 microvolt in to field intensity in micro volts per meter (dBuV/m).



The actual field intensity in referenced to 1 microvolt per meter (dBuV/m) is determined by algebraically adding the measured reading in dBuV, the antenna factor (dB), and cable loss (dB) and Subtracting the gain of preamplifier (dB) is auto calculate in spectrum analyzer.

(1) $\text{Amplitude (dBuV/m)} = \text{FI (dBuV)} + \text{AF (dBuV)} + \text{CL (dBuV)} - \text{Gain (dB)}$

FI= Reading of the field intensity.

AF= Antenna factor.

CL= Cable loss.

P.S Amplitude is auto calculate in spectrum analyzer.

(2) $\text{Actual Amplitude (dBuV/m)} = \text{Amplitude (dBuV)} - \text{Dis(dB)}$

The FCC specified emission limits were calculated according the EUT operating frequency and by following linear interpolation equations:

(a) For fundamental frequency : Transmitter Output < +30 dBm

(b) For spurious frequency : Spurious emission limits = fundamental emission limit /10

Data of measurement within this frequency range without mark in the table above means the reading of emissions are attenuated more than 20 dB below the permissible limits or the field strength is too small to be measured.

4.3. Maximum Conducted Output Power Measurement

■ **Limit**

For systems using digital modulation in the 2400-2483.5 MHz, the limit for maximum output power is 30 dBm.

And According to 15.247 (b), if transmitting antennas of directional gain greater than 6 dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

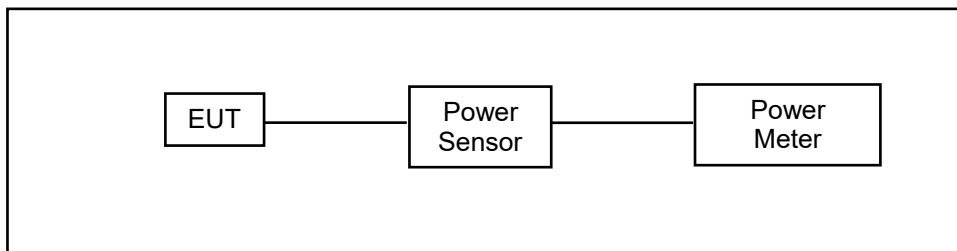
CDD mode:

$$\text{Directional} = G_{\text{ANT}} = 10 \cdot \log\left\{\frac{10^{G1/10} + 10^{G2/10} + \dots + 10^{Gn/10}}{N_{\text{ANT}}}\right\} = 2.65 \text{ dBi} < 6\text{dBi}$$

BF mode:

$$\text{Directional Gain} = 10 \cdot \log\left\{\frac{10^{G1/20} + 10^{G2/20} + \dots + 10^{Gn/20}}{N_{\text{ANT}}}\right\}^2 = 5.65 \text{ dBi} < 6\text{dBi}$$

■ **Test Setup**



■ **Test Procedure**

The testing follows the Measurement Procedure of ANSI C63.10:2013 section 11.9.2.3.2 Method AVGPM.

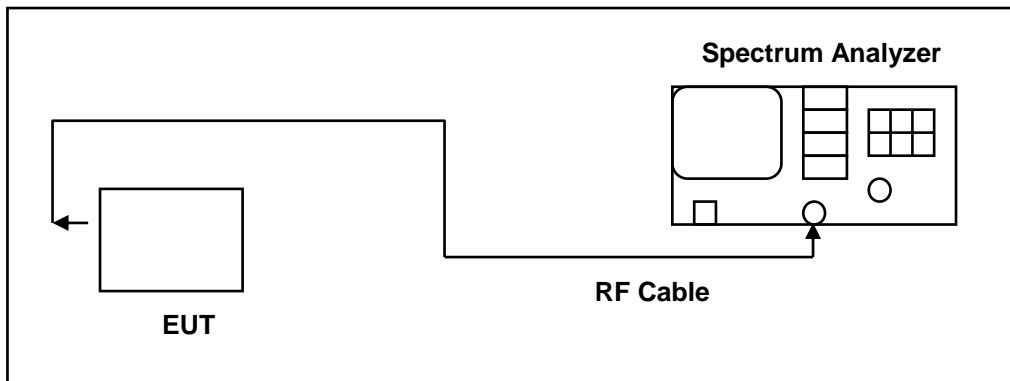
The tests below are run with the EUT's transmitter set at high power in TX mode. The EUT is needed to force selection of output power level and channel number. While testing, EUT was set to transmit continuously. Remove the Subjective device's antenna and connect the RF output port to power sensor.

4.4. 6 dB RF Bandwidth Measurement

■ **Limit**

6 dB RF Bandwidth: Systems using digital modulation techniques may operate in the 2400–2483.5 MHz bands. The minimum 6 dB band-width shall be at least 500 kHz.

■ **Test Setup**



■ **Test Procedure**

The EUT tested to DTS test procedure of ANSI C63.10:2013 section 11.8.2 option2 for compliance to FCC 47CFR 15.247 requirements.

6 dB RF Bandwidth: The antenna port of the EUT was connected to the input of a spectrum analyzer. Analyzer RBW was set to 100 kHz. For each RF output channel investigated, the spectrum analyzer center frequency was set to the channel carrier. A peak output reading was taken, a DISPLAY line was drawn 6 dB lower than peak level. The 6 dB bandwidth was determined from where the channel output spectrum intersected the display line.

The test was performed at 3 channels (Channel low, middle, high)

4.5. Maximum Power Spectral Density Measurement

■ Limit

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

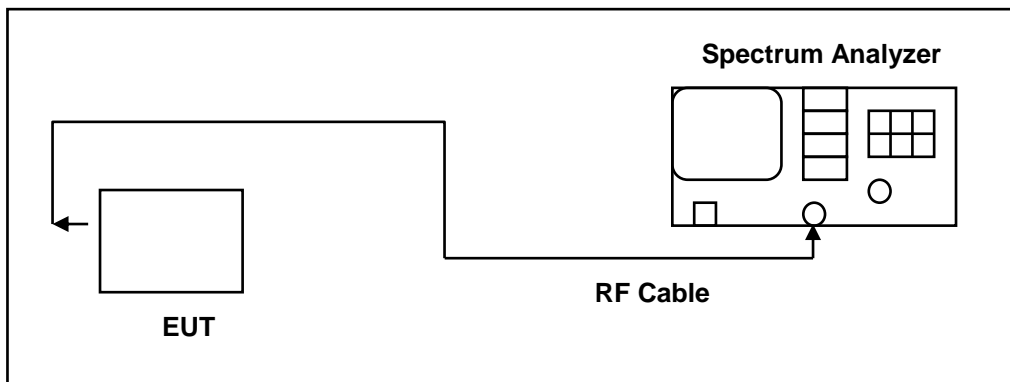
CDD mode:

$$\text{Directional} = 10 \cdot \log\{[10^{(G1/20)} + 10^{(G2/20)} + \dots + 10^{(Gn/20)}]^2 / NANT\} = 5.65 \text{ dBi} < 6 \text{ dBi}$$

BF mode:

$$\text{Directional Gain} = 10 \cdot \log\{[10^{(G1/20)} + 10^{(G2/20)} + \dots + 10^{(Gn/20)}]^2 / NANT\} = 5.65 \text{ dBi} < 6 \text{ dBi}$$

■ Test Setup



■ Test Procedure

The EUT tested to DTS test procedure of ANSI C63.10:2013 section 11.10.2 Method PKPSD for compliance to FCC 47CFR 15.247 requirements.

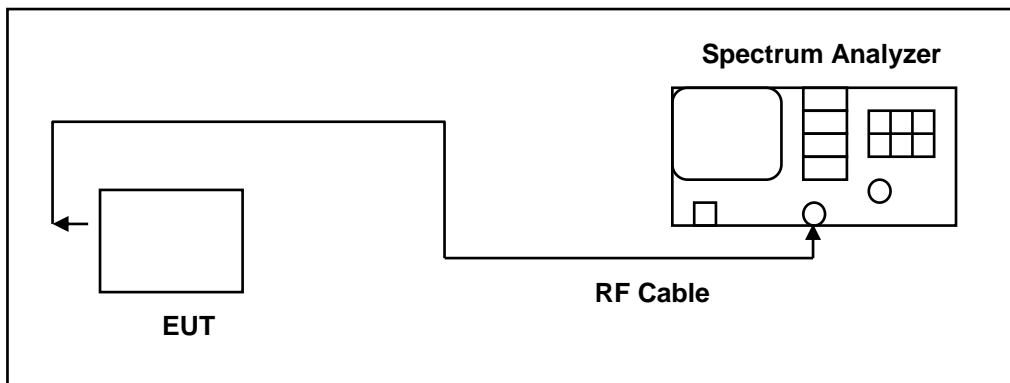
1. Set analyzer center frequency to DTS channel center frequency.
2. Set the span to 1.5 times the DTS bandwidth.
3. Set the RBW to: $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$.
4. Set the VBW $\geq 3 \times \text{RBW}$.
5. Detector = peak.
6. Sweep time = auto couple.
7. Trace mode = max hold.
8. Allow trace to fully stabilize.
9. Use the peak marker function to determine the maximum amplitude level within the RBW.
10. If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

4.6. Out of Band Conducted Emissions Measurement

■ **Limit**

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

■ **Test Setup**



■ **Test Procedure**

In any 100 kHz bandwidth outside the EUT pass band, the RF power produced by the modulation products of the spreading sequence, the information sequence, and the carrier frequency shall be at least 30 dB below that of the maximum in-band 100 kHz emission, antenna output of the EUT was coupled directly to spectrum analyzer; if an external attenuator and/or cable was used, these losses are compensated for with the analyzer OFFSET function. All other types of emissions from the EUT shall meet the general limits for radiated frequencies outside the pass band. The test was performed at 3 channels.



4.7. Antenna Measurement

■ Limit

For intentional device, according to 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.

And According to 15.247 (b), if transmitting antennas of directional gain greater than 6 dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

■ Antenna Description

See section 2 – antenna information.

■ Directional Gain Calculated

Operate Freq. Band	Directional Gain (dBi)
IEEE 802.11b	2.65
IEEE 802.11g	2.65
IEEE 802.11n 2.4 GHz 20 MHz	2.65
IEEE 802.11n 2.4 GHz 40 MHz	2.65
IEEE 802.11n 2.4 GHz 20 MHz(256QAM)	2.65
IEEE 802.11n 2.4 GHz 40 MHz(256QAM)	2.65

Beamforming on

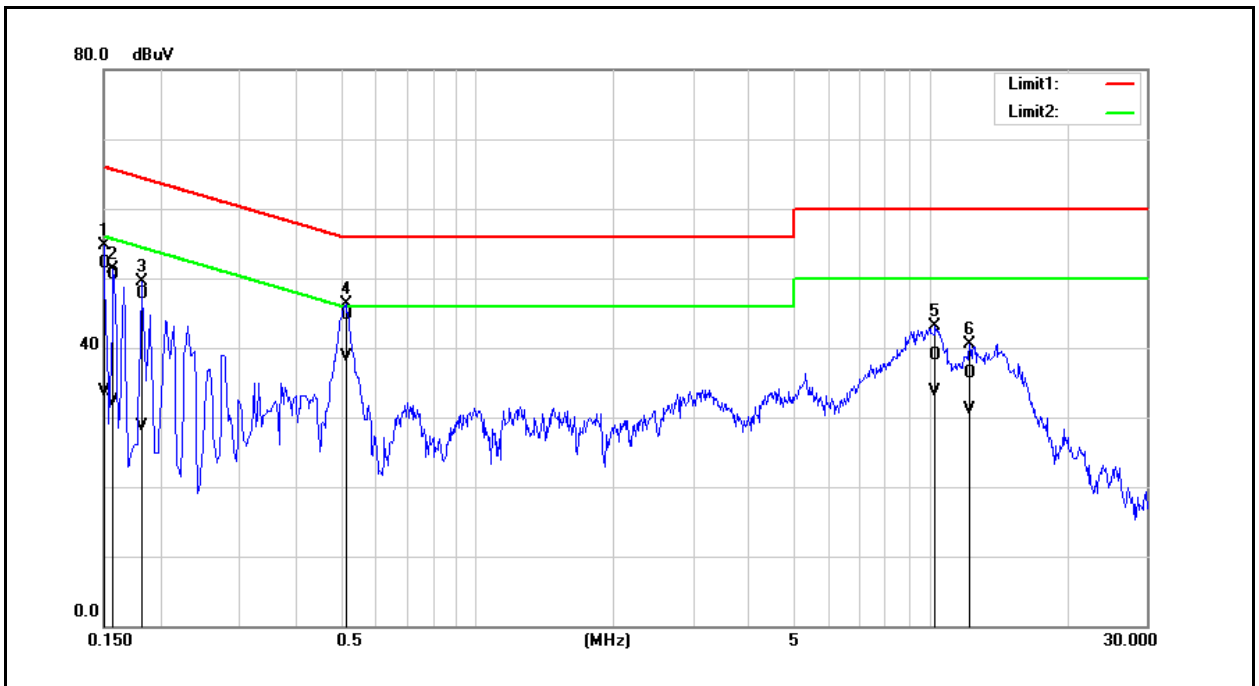
Operate Freq. Band	Directional Gain (dBi)
IEEE 802.11n 2.4 GHz 20 MHz(256QAM)	5.65
IEEE 802.11n 2.4 GHz 40 MHz(256QAM)	5.65



5 Test Results

Annex A. Conducted Emission

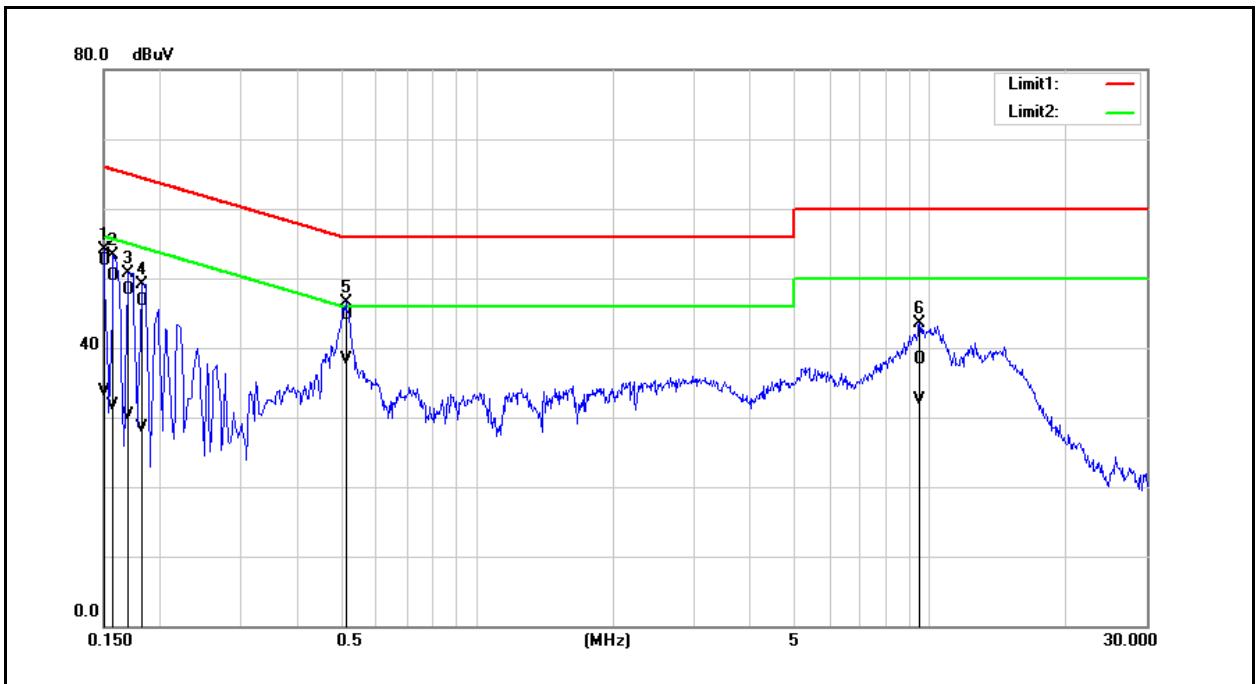
Standard:	FCC Part 15.247	Line:	L1
Test item:	Conducted Emission	Power:	AC 120 V/60 Hz
Mode:	Mode 1		
Description:			



No.	Frequency (MHz)	QP reading (dBuV)	AVG reading (dBuV)	Correction factor (dB)	QP result (dBuV)	AVG result (dBuV)	QP limit (dBuV)	AVG limit (dBuV)	QP margin (dB)	AVG margin (dB)	Remark
1	0.1500	42.48	23.98	9.70	52.18	33.68	66.00	56.00	-13.82	-22.32	Pass
2	0.1580	40.84	22.63	9.70	50.54	32.33	65.57	55.57	-15.03	-23.24	Pass
3	0.1820	38.01	19.01	9.70	47.71	28.71	64.39	54.39	-16.68	-25.68	Pass
4	0.5140	35.05	28.98	9.71	44.76	38.69	56.00	46.00	-11.24	-7.31	Pass
5	10.2420	29.09	23.77	9.88	38.97	33.65	60.00	50.00	-21.03	-16.35	Pass
6	12.2460	26.34	21.25	9.92	36.26	31.17	60.00	50.00	-23.74	-18.83	Pass

Note: 1. Result (dBuV) = Correction factor (dB) + Reading(dBuV).
2. Correction factor (dB) = Cable loss (dB) + L.I.S.N. factor (dB).

Standard:	FCC Part 15.247	Line:	N
Test item:	Conducted Emission	Power:	AC 120 V/60 Hz
Mode:	Mode 1		
Description:			



No.	Frequency (MHz)	QP reading (dBuV)	AVG reading (dBuV)	Correction factor (dB)	QP result (dBuV)	AVG result (dBuV)	QP limit (dBuV)	AVG limit (dBuV)	QP margin (dB)	AVG margin (dB)	Remark
1	0.1500	42.80	24.05	9.69	52.49	33.74	66.00	56.00	-13.51	-22.26	Pass
2	0.1580	40.58	22.10	9.69	50.27	31.79	65.57	55.57	-15.30	-23.78	Pass
3	0.1700	38.62	20.64	9.69	48.31	30.33	64.96	54.96	-16.65	-24.63	Pass
4	0.1820	37.01	18.82	9.69	46.70	28.51	64.39	54.39	-17.69	-25.88	Pass
5	0.5140	34.96	28.56	9.70	44.66	38.26	56.00	46.00	-11.34	-7.74	Pass
6	9.4660	28.42	22.66	9.87	38.29	32.53	60.00	50.00	-21.71	-17.47	Pass

Note: 1. Result (dBuV) = Correction factor (dB) + Reading(dBuV).
2. Correction factor (dB) = Cable loss (dB) + L.I.S.N. factor (dB).

Annex B. Conducted Test Results

Maximum Conducted Output Power Measurement

ANT-0					
Test Mode	Frequency (MHz)	Data Rate	Average Output Power		
			Measurement Results		Limit
			dBm	W	dBm
Mode 2	2412	1 M	20.32	0.108	≤ 30
	2437		23.26	0.212	≤ 30
	2462		23.14	0.206	≤ 30
Mode 3	2412	6 M	17.33	0.054	≤ 30
	2437		23.59	0.229	≤ 30
	2462		17.30	0.054	≤ 30
Mode 4	2412	13 M	16.74	0.047	≤ 30
	2437		23.07	0.203	≤ 30
	2462		17.15	0.052	≤ 30
Mode 5	2422	27 M	13.34	0.022	≤ 30
	2437		17.63	0.058	≤ 30
	2452		15.42	0.035	≤ 30
Mode 6	2412	13 M	16.77	0.048	≤ 30
	2437		23.12	0.205	≤ 30
	2462		17.23	0.053	≤ 30
Mode 7	2422	27 M	13.47	0.022	≤ 30
	2437		17.68	0.059	≤ 30
	2452		15.53	0.036	≤ 30

Note: The relevant measured result has the offset with cable loss already.



ANT-1					
Test Mode	Frequency (MHz)	Data Rate	Average Output Power		
			Measurement Results		Limit
			dBm	W	dBm
Mode 2	2412	1 M	19.93	0.098	≤ 30
	2437		23.23	0.210	≤ 30
	2462		23.21	0.209	≤ 30
Mode 3	2412	6 M	17.31	0.054	≤ 30
	2437		22.86	0.193	≤ 30
	2462		17.35	0.054	≤ 30
Mode 4	2412	13 M	16.73	0.047	≤ 30
	2437		22.52	0.179	≤ 30
	2462		17.14	0.052	≤ 30
Mode 5	2422	27 M	13.41	0.022	≤ 30
	2437		17.54	0.057	≤ 30
	2452		15.67	0.037	≤ 30
Mode 6	2412	13 M	16.80	0.048	≤ 30
	2437		22.57	0.181	≤ 30
	2462		17.26	0.053	≤ 30
Mode 7	2422	27 M	13.54	0.023	≤ 30
	2437		17.62	0.058	≤ 30
	2452		15.69	0.037	≤ 30

Note: The relevant measured result has the offset with cable loss already.



ANT-0+1					
Test Mode	Frequency (MHz)	Data Rate	Average Output Power		
			Measurement Results		Limit
			dBm	W	dBm
Mode 2	2412	1 M	23.14	0.206	≤ 30
	2437		26.26	0.422	≤ 30
	2462		26.19	0.415	≤ 30
Mode 3	2412	6 M	20.33	0.108	≤ 30
	2437		26.25	0.422	≤ 30
	2462		20.34	0.108	≤ 30
Mode 4	2412	13 M	19.75	0.094	≤ 30
	2437		25.81	0.381	≤ 30
	2462		20.16	0.104	≤ 30
Mode 5	2422	27 M	16.39	0.044	≤ 30
	2437		20.60	0.115	≤ 30
	2452		18.56	0.072	≤ 30
Mode 6	2412	13 M	19.80	0.095	≤ 30
	2437		25.86	0.386	≤ 30
	2462		20.26	0.106	≤ 30
Mode 7	2422	27 M	16.52	0.045	≤ 30
	2437		20.66	0.116	≤ 30
	2452		18.62	0.073	≤ 30

Note: The relevant measured result has the offset with cable loss already.

Beamforming on

ANT-0					
Test Mode	Frequency (MHz)	Data Rate	Average Output Power		
			Measurement Results		Limit
			dBm	W	dBm
Mode 6	2412	13 M	13.21	0.021	≤ 30
	2437		19.47	0.089	≤ 30
	2462		13.81	0.024	≤ 30
Mode 7	2422	27 M	9.79	0.010	≤ 30
	2437		14.04	0.025	≤ 30
	2452		12.10	0.016	≤ 30

ANT-1					
Test Mode	Frequency (MHz)	Data Rate	Average Output Power		
			Measurement Results		Limit
			dBm	W	dBm
Mode 6	2412	13 M	13.38	0.022	≤ 30
	2437		19.13	0.082	≤ 30
	2462		13.86	0.024	≤ 30
Mode 7	2422	27 M	9.97	0.010	≤ 30
	2437		14.12	0.026	≤ 30
	2452		12.34	0.017	≤ 30

ANT-0+1					
Test Mode	Frequency (MHz)	Data Rate	Average Output Power		
			Measurement Results		Limit
			dBm	W	dBm
Mode 6	2412	13 M	16.31	0.043	≤ 30
	2437		22.31	0.170	≤ 30
	2462		16.85	0.048	≤ 30
Mode 7	2422	27 M	12.89	0.019	≤ 30
	2437		17.09	0.051	≤ 30
	2452		15.23	0.033	≤ 30

Note: The relevant measured result has the offset with cable loss already.



6 dB RF Bandwidth Measurement

ANT-0			
Test Mode	Frequency (MHz)	Measurement (kHz)	Limit (kHz)
Mode 2	2412	8115	≥ 500
	2437	9017	≥ 500
	2462	8116	≥ 500
Mode 3	2412	16390	≥ 500
	2437	16360	≥ 500
	2462	16390	≥ 500
Mode 6	2412	17630	≥ 500
	2437	17620	≥ 500
	2462	17610	≥ 500
Mode 7	2422	35230	≥ 500
	2437	35130	≥ 500
	2452	35210	≥ 500

ANT-1			
Test Mode	Frequency (MHz)	Measurement (kHz)	Limit (kHz)
Mode 2	2412	8109	≥ 500
	2437	8598	≥ 500
	2462	9088	≥ 500
Mode 3	2412	16390	≥ 500
	2437	16390	≥ 500
	2462	16410	≥ 500
Mode 6	2412	17620	≥ 500
	2437	17610	≥ 500
	2462	17630	≥ 500
Mode 7	2422	35510	≥ 500
	2437	35370	≥ 500
	2452	35200	≥ 500






Beamforming on

ANT-0			
Test Mode	Frequency (MHz)	Measurement (kHz)	Limit (kHz)
Mode 6	2412	17640	≥ 500
	2437	17620	≥ 500
	2462	17610	≥ 500
Mode 7	2422	35360	≥ 500
	2437	35370	≥ 500
	2452	35230	≥ 500

ANT-1			
Test Mode	Frequency (MHz)	Measurement (kHz)	Limit (kHz)
Mode 6	2412	17620	≥ 500
	2437	17610	≥ 500
	2462	17630	≥ 500
Mode 7	2422	35180	≥ 500
	2437	35160	≥ 500
	2452	35340	≥ 500

■ Test Graphs

Mode 2: IEEE 802.11b Continuous TX mode_ANT-0	
2412 MHz	 <p>Center 2.41200 GHz #Res BW 100.00 kHz #Video BW 300.00 kHz Span 40 MHz Sweep 3.87 ms (1001 pts)</p> <p>Occupied Bandwidth: 13.027 MHz Total Power: 27.9 dBm Transmit Freq Error: 19.348 kHz % of OBW Power: 99.00 % x dB Bandwidth: -6.115 MHz x dB</p>
2437 MHz	 <p>Center 2.43700 GHz #Res BW 100.00 kHz #Video BW 300.00 kHz Span 40 MHz Sweep 3.87 ms (1001 pts)</p> <p>Occupied Bandwidth: 13.748 MHz Total Power: 30.4 dBm Transmit Freq Error: 7.383 kHz % of OBW Power: 99.00 % x dB Bandwidth: 9.017 MHz x dB</p>
2462 MHz	 <p>Center 2.46200 GHz #Res BW 100.00 kHz #Video BW 300.00 kHz Span 40 MHz Sweep 3.87 ms (1001 pts)</p> <p>Occupied Bandwidth: 13.847 MHz Total Power: 30.3 dBm Transmit Freq Error: -14.064 kHz % of OBW Power: 99.00 % x dB Bandwidth: 8.116 MHz x dB</p>

Mode 3: IEEE 802.11g Continuous TX mode_ANT-0

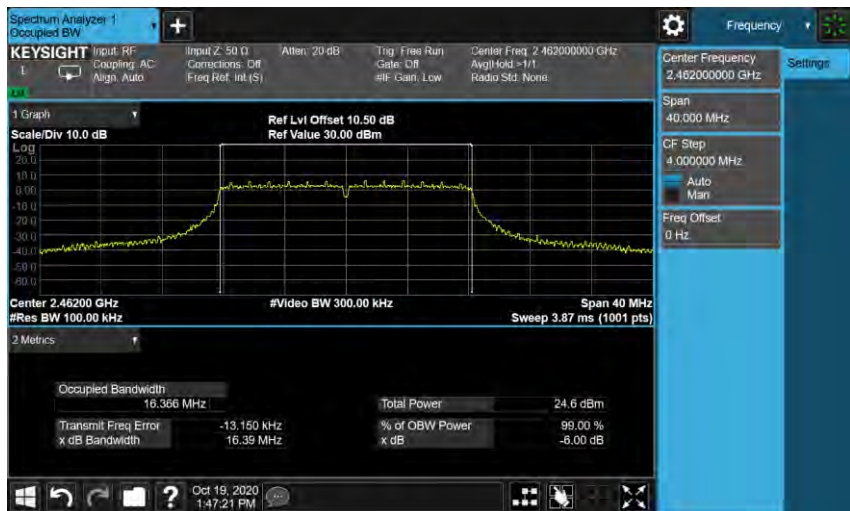
2412 MHz



2437 MHz



2462 MHz



Mode 6: IEEE 802.11n 2.4 GHz 20 MHz(256QAM) Continuous TX mode_ANT-0

<p>2412 MHz</p>	<p>Center 2.41200 GHz #Res BW 100.00 kHz #Video BW 300.00 kHz Span 40 MHz Sweep 3.87 ms (1001 pts)</p> <table border="1"> <tr> <td>Occupied Bandwidth</td> <td>17.587 MHz</td> <td>Total Power</td> <td>23.6 dBm</td> </tr> <tr> <td>Transmitt Freq Error</td> <td>-12.716 kHz</td> <td>% of OBW Power</td> <td>99.00 %</td> </tr> <tr> <td>x dB Bandwidth</td> <td>17.63 MHz</td> <td>x dB</td> <td>-6.00 dB</td> </tr> </table>	Occupied Bandwidth	17.587 MHz	Total Power	23.6 dBm	Transmitt Freq Error	-12.716 kHz	% of OBW Power	99.00 %	x dB Bandwidth	17.63 MHz	x dB	-6.00 dB
Occupied Bandwidth	17.587 MHz	Total Power	23.6 dBm										
Transmitt Freq Error	-12.716 kHz	% of OBW Power	99.00 %										
x dB Bandwidth	17.63 MHz	x dB	-6.00 dB										
<p>2437 MHz</p>	<p>Center 2.43700 GHz #Res BW 100.00 kHz #Video BW 300.00 kHz Span 40 MHz Sweep 3.87 ms (1001 pts)</p> <table border="1"> <tr> <td>Occupied Bandwidth</td> <td>24.522 MHz</td> <td>Total Power</td> <td>31.6 dBm</td> </tr> <tr> <td>Transmitt Freq Error</td> <td>20.208 kHz</td> <td>% of OBW Power</td> <td>99.00 %</td> </tr> <tr> <td>x dB Bandwidth</td> <td>17.62 MHz</td> <td>x dB</td> <td>-6.00 dB</td> </tr> </table>	Occupied Bandwidth	24.522 MHz	Total Power	31.6 dBm	Transmitt Freq Error	20.208 kHz	% of OBW Power	99.00 %	x dB Bandwidth	17.62 MHz	x dB	-6.00 dB
Occupied Bandwidth	24.522 MHz	Total Power	31.6 dBm										
Transmitt Freq Error	20.208 kHz	% of OBW Power	99.00 %										
x dB Bandwidth	17.62 MHz	x dB	-6.00 dB										
<p>2462 MHz</p>	<p>Center 2.46200 GHz #Res BW 100.00 kHz #Video BW 300.00 kHz Span 40 MHz Sweep 3.87 ms (1001 pts)</p> <table border="1"> <tr> <td>Occupied Bandwidth</td> <td>17.593 MHz</td> <td>Total Power</td> <td>24.3 dBm</td> </tr> <tr> <td>Transmitt Freq Error</td> <td>-13.920 kHz</td> <td>% of OBW Power</td> <td>99.00 %</td> </tr> <tr> <td>x dB Bandwidth</td> <td>17.61 MHz</td> <td>x dB</td> <td>-6.00 dB</td> </tr> </table>	Occupied Bandwidth	17.593 MHz	Total Power	24.3 dBm	Transmitt Freq Error	-13.920 kHz	% of OBW Power	99.00 %	x dB Bandwidth	17.61 MHz	x dB	-6.00 dB
Occupied Bandwidth	17.593 MHz	Total Power	24.3 dBm										
Transmitt Freq Error	-13.920 kHz	% of OBW Power	99.00 %										
x dB Bandwidth	17.61 MHz	x dB	-6.00 dB										

Mode 7: IEEE 802.11n 2.4 GHz 40 MHz(256QAM) Continuous TX mode_ANT-0

<p>2422 MHz</p>	<p>Center 2.42200 GHz #Res BW 100.00 kHz #Video BW 300.00 kHz Span 80 MHz Sweep 7.67 ms (1001 pts)</p> <p>Occupied Bandwidth: 35.848 MHz Total Power: 20.8 dBm Transmit Freq Error: -20.918 kHz % of OBW Power: 99.00 % x dB Bandwidth: 35.23 MHz x dB: -6.00 dB</p>
<p>2437 MHz</p>	<p>Center 2.43700 GHz #Res BW 100.00 kHz #Video BW 300.00 kHz Span 80 MHz Sweep 7.67 ms (1001 pts)</p> <p>Occupied Bandwidth: 35.871 MHz Total Power: 25.1 dBm Transmit Freq Error: -23.255 kHz % of OBW Power: 99.00 % x dB Bandwidth: 35.13 MHz x dB: -6.00 dB</p>
<p>2452 MHz</p>	<p>Center 2.45200 GHz #Res BW 100.00 kHz #Video BW 300.00 kHz Span 80 MHz Sweep 7.67 ms (1001 pts)</p> <p>Occupied Bandwidth: 35.867 MHz Total Power: 22.8 dBm Transmit Freq Error: -28.529 kHz % of OBW Power: 99.00 % x dB Bandwidth: 35.21 MHz x dB: -6.00 dB</p>

Mode 2: IEEE 802.11b Continuous TX mode_ANT-1

2412 MHz



2437 MHz

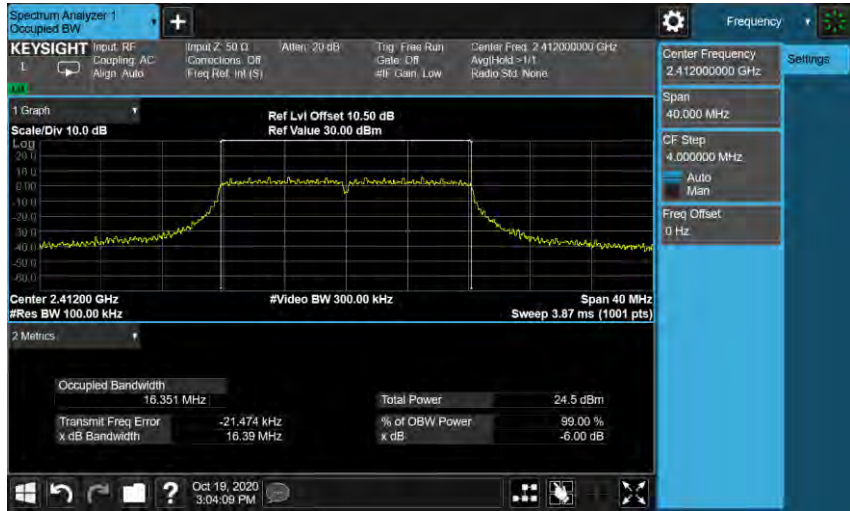


2462 MHz



Mode 3: IEEE 802.11g Continuous TX mode_ANT-1

2412 MHz



2437 MHz



2462 MHz



Mode 6: IEEE 802.11n 2.4 GHz 20 MHz(256QAM) Continuous TX mode_ANT-1

<p>2412 MHz</p>	<p>Center 2.41200 GHz #Res BW 100.00 kHz #Video BW 300.00 kHz Span 40 MHz Sweep 3.87 ms (1001 pts)</p> <p>Occupied Bandwidth: 17.576 MHz Total Power: 24.0 dBm Transmit Freq Error: -19.071 kHz % of OBW Power: 99.00 % x dB Bandwidth: 17.62 MHz x dB: -6.00 dB</p>
<p>2437 MHz</p>	<p>Center 2.43700 GHz #Res BW 100.00 kHz #Video BW 300.00 kHz Span 40 MHz Sweep 3.87 ms (1001 pts)</p> <p>Occupied Bandwidth: 21.862 MHz Total Power: 30.9 dBm Transmit Freq Error: -44.417 kHz % of OBW Power: 99.00 % x dB Bandwidth: 17.61 MHz x dB: -6.00 dB</p>
<p>2462 MHz</p>	<p>Center 2.46200 GHz #Res BW 100.00 kHz #Video BW 300.00 kHz Span 40 MHz Sweep 3.87 ms (1001 pts)</p> <p>Occupied Bandwidth: 17.579 MHz Total Power: 24.5 dBm Transmit Freq Error: -19.700 kHz % of OBW Power: 99.00 % x dB Bandwidth: 17.63 MHz x dB: -6.00 dB</p>

Mode 7: IEEE 802.11n 2.4 GHz 40 MHz(256QAM) Continuous TX mode_ANT-1

<p>2422 MHz</p>	<p>Center 2.42200 GHz #Res BW 100.00 kHz #Video BW 300.00 kHz Span 80 MHz Sweep 7.67 ms (1001 pts)</p> <p>2 Metrics</p> <table border="1"> <tr> <td>Occupied Bandwidth</td> <td>35.847 MHz</td> <td>Total Power</td> <td>21.1 dBm</td> </tr> <tr> <td>Transmit Freq Error</td> <td>-40.320 kHz</td> <td>% of OBW Power</td> <td>99.00 %</td> </tr> <tr> <td>x dB Bandwidth</td> <td>35.51 MHz</td> <td>x dB</td> <td>-6.00 dB</td> </tr> </table>	Occupied Bandwidth	35.847 MHz	Total Power	21.1 dBm	Transmit Freq Error	-40.320 kHz	% of OBW Power	99.00 %	x dB Bandwidth	35.51 MHz	x dB	-6.00 dB
Occupied Bandwidth	35.847 MHz	Total Power	21.1 dBm										
Transmit Freq Error	-40.320 kHz	% of OBW Power	99.00 %										
x dB Bandwidth	35.51 MHz	x dB	-6.00 dB										
<p>2437 MHz</p>	<p>Center 2.43700 GHz #Res BW 100.00 kHz #Video BW 300.00 kHz Span 80 MHz Sweep 7.67 ms (1001 pts)</p> <p>2 Metrics</p> <table border="1"> <tr> <td>Occupied Bandwidth</td> <td>35.941 MHz</td> <td>Total Power</td> <td>25.1 dBm</td> </tr> <tr> <td>Transmit Freq Error</td> <td>-52.241 kHz</td> <td>% of OBW Power</td> <td>99.00 %</td> </tr> <tr> <td>x dB Bandwidth</td> <td>35.37 MHz</td> <td>x dB</td> <td>-6.00 dB</td> </tr> </table>	Occupied Bandwidth	35.941 MHz	Total Power	25.1 dBm	Transmit Freq Error	-52.241 kHz	% of OBW Power	99.00 %	x dB Bandwidth	35.37 MHz	x dB	-6.00 dB
Occupied Bandwidth	35.941 MHz	Total Power	25.1 dBm										
Transmit Freq Error	-52.241 kHz	% of OBW Power	99.00 %										
x dB Bandwidth	35.37 MHz	x dB	-6.00 dB										
<p>2452 MHz</p>	<p>Center 2.45200 GHz #Res BW 100.00 kHz #Video BW 300.00 kHz Span 80 MHz Sweep 7.67 ms (1001 pts)</p> <p>2 Metrics</p> <table border="1"> <tr> <td>Occupied Bandwidth</td> <td>35.900 MHz</td> <td>Total Power</td> <td>23.3 dBm</td> </tr> <tr> <td>Transmit Freq Error</td> <td>-54.988 kHz</td> <td>% of OBW Power</td> <td>99.00 %</td> </tr> <tr> <td>x dB Bandwidth</td> <td>35.20 MHz</td> <td>x dB</td> <td>-6.00 dB</td> </tr> </table>	Occupied Bandwidth	35.900 MHz	Total Power	23.3 dBm	Transmit Freq Error	-54.988 kHz	% of OBW Power	99.00 %	x dB Bandwidth	35.20 MHz	x dB	-6.00 dB
Occupied Bandwidth	35.900 MHz	Total Power	23.3 dBm										
Transmit Freq Error	-54.988 kHz	% of OBW Power	99.00 %										
x dB Bandwidth	35.20 MHz	x dB	-6.00 dB										

Beamforming on

Mode 6: IEEE 802.11n 2.4 GHz 20 MHz(256QAM) Continuous TX mode_ANT-0

2412 MHz	
2437 MHz	
2462 MHz	

Mode 7: IEEE 802.11n 2.4 GHz 40 MHz(256QAM) Continuous TX mode_ANT-0

<p>2422 MHz</p>	<p>Center 2.42200 GHz #Res BW 100.00 kHz #Video BW 300.00 kHz Span 80 MHz Sweep 7.67 ms (1001 pts)</p> <p>Occupied Bandwidth: 35.854 MHz Total Power: 17.5 dBm Transmit Freq Error: -41.010 kHz x dB Bandwidth: 35.36 MHz % of OBW Power: 99.00 % x dB: -6.00 dB</p>
<p>2437 MHz</p>	<p>Center 2.43700 GHz #Res BW 100.00 kHz #Video BW 300.00 kHz Span 80 MHz Sweep 7.67 ms (1001 pts)</p> <p>Occupied Bandwidth: 35.936 MHz Total Power: 21.6 dBm Transmit Freq Error: -52.852 kHz x dB Bandwidth: 35.37 MHz % of OBW Power: 99.00 % x dB: -6.00 dB</p>
<p>2452 MHz</p>	<p>Center 2.45200 GHz #Res BW 100.00 kHz #Video BW 300.00 kHz Span 80 MHz Sweep 7.67 ms (1001 pts)</p> <p>Occupied Bandwidth: 35.887 MHz Total Power: 19.9 dBm Transmit Freq Error: -41.078 kHz x dB Bandwidth: 35.23 MHz % of OBW Power: 99.00 % x dB: -6.00 dB</p>

Mode 6: IEEE 802.11n 2.4 GHz 20 MHz(256QAM) Continuous TX mode_ANT-1

<p>2412 MHz</p>	<p>Center 2.41200 GHz #Res BW 100.00 kHz #Video BW 300.00 kHz Span 40 MHz Sweep 3.87 ms (1001 pts)</p> <p>Occupied Bandwidth: 17.570 MHz Total Power: 20.5 dBm Transmit Freq Error: -20.025 kHz % of OBW Power: 99.00 % x dB Bandwidth: 17.62 MHz x dB: -6.00 dB</p>
<p>2437 MHz</p>	<p>Center 2.43700 GHz #Res BW 100.00 kHz #Video BW 300.00 kHz Span 40 MHz Sweep 3.87 ms (1001 pts)</p> <p>Occupied Bandwidth: 17.591 MHz Total Power: 26.5 dBm Transmit Freq Error: 4.734 kHz % of OBW Power: 99.00 % x dB Bandwidth: 17.61 MHz x dB: -6.00 dB</p>
<p>2462 MHz</p>	<p>Center 2.46200 GHz #Res BW 100.00 kHz #Video BW 300.00 kHz Span 40 MHz Sweep 3.87 ms (1001 pts)</p> <p>Occupied Bandwidth: 17.575 MHz Total Power: 21.2 dBm Transmit Freq Error: -17.535 kHz % of OBW Power: 99.00 % x dB Bandwidth: 17.63 MHz x dB: -6.00 dB</p>

Mode 7: IEEE 802.11n 2.4 GHz 40 MHz(256QAM) Continuous TX mode_ANT-1

<p>2422 MHz</p>	
<p>2437 MHz</p>	
<p>2452 MHz</p>	



Maximum Power Spectral Density Measurement

ANT-0			
Test Mode	Frequency (MHz)	Measurement (dBm/3 kHz)	Limit (dBm/ 3 kHz)
Mode 2	2412	-0.670	≤ 8
	2437	1.000	≤ 8
	2462	1.250	≤ 8
Mode 3	2412	-6.770	≤ 8
	2437	-0.230	≤ 8
	2462	-7.140	≤ 8
Mode 6	2412	-8.690	≤ 8
	2437	-0.910	≤ 8
	2462	-7.640	≤ 8
Mode 7	2422	-14.260	≤ 8
	2437	-10.230	≤ 8
	2452	-12.320	≤ 8

ANT-1			
Test Mode	Frequency (MHz)	Measurement (dBm/3 kHz)	Limit (dBm/ 3 kHz)
Mode 2	2412	-1.090	≤ 8
	2437	1.090	≤ 8
	2462	1.150	≤ 8
Mode 3	2412	-7.960	≤ 8
	2437	-0.430	≤ 8
	2462	-7.200	≤ 8
Mode 6	2412	-8.270	≤ 8
	2437	-1.990	≤ 8
	2462	-8.140	≤ 8
Mode 7	2422	-13.830	≤ 8
	2437	-10.850	≤ 8
	2452	-11.690	≤ 8



ANT-0+1			
Test Mode	Frequency (MHz)	Measurement (dBm/3 kHz)	Limit (dBm/ 3 kHz)
Mode 2	2412	2.135	≤ 8
	2437	4.056	≤ 8
	2462	4.211	≤ 8
Mode 3	2412	-4.314	≤ 8
	2437	2.681	≤ 8
	2462	-4.160	≤ 8
Mode 6	2412	-5.465	≤ 8
	2437	1.594	≤ 8
	2462	-4.873	≤ 8
Mode 7	2422	-11.029	≤ 8
	2437	-7.519	≤ 8
	2452	-8.983	≤ 8



Beamforming on

ANT-0			
Test Mode	Frequency (MHz)	Measurement (dBm/3 kHz)	Limit (dBm/ 3 kHz)
Mode 6	2412	-12.370	≤ 8
	2437	-6.770	≤ 8
	2462	-12.050	≤ 8
Mode 7	2422	-18.420	≤ 8
	2437	-14.010	≤ 8
	2452	-15.140	≤ 8

ANT-1			
Test Mode	Frequency (MHz)	Measurement (dBm/3 kHz)	Limit (dBm/ 3 kHz)
Mode 6	2412	-12.060	≤ 8
	2437	-7.010	≤ 8
	2462	-11.710	≤ 8
Mode 7	2422	-18.410	≤ 8
	2437	-13.930	≤ 8
	2452	-15.450	≤ 8

ANT-0+1			
Test Mode	Frequency (MHz)	Measurement (dBm/3 kHz)	Limit (dBm/ 3 kHz)
Mode 6	2412	-9.202	≤ 8
	2437	-3.878	≤ 8
	2462	-8.866	≤ 8
Mode 7	2422	-15.405	≤ 8
	2437	-10.960	≤ 8
	2452	-12.282	≤ 8



Mode 2: IEEE 802.11b Continuous TX mode_ANT-0

2412 MHz



2437 MHz



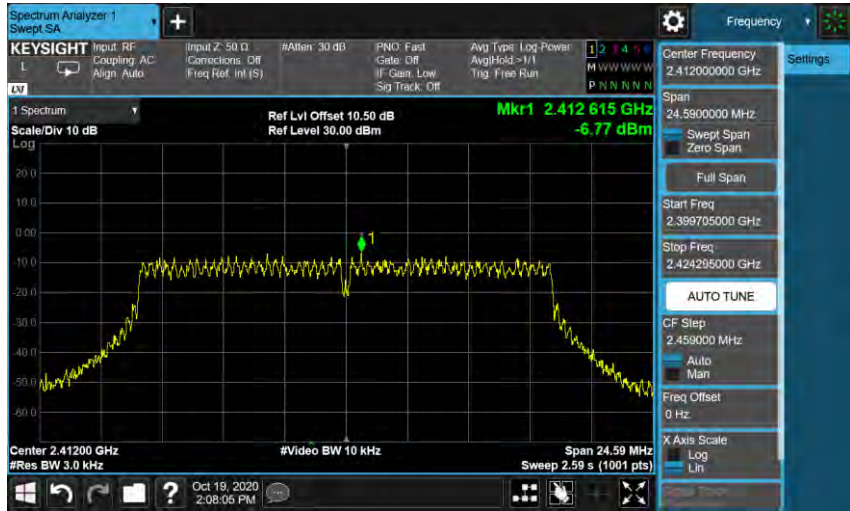
2462 MHz



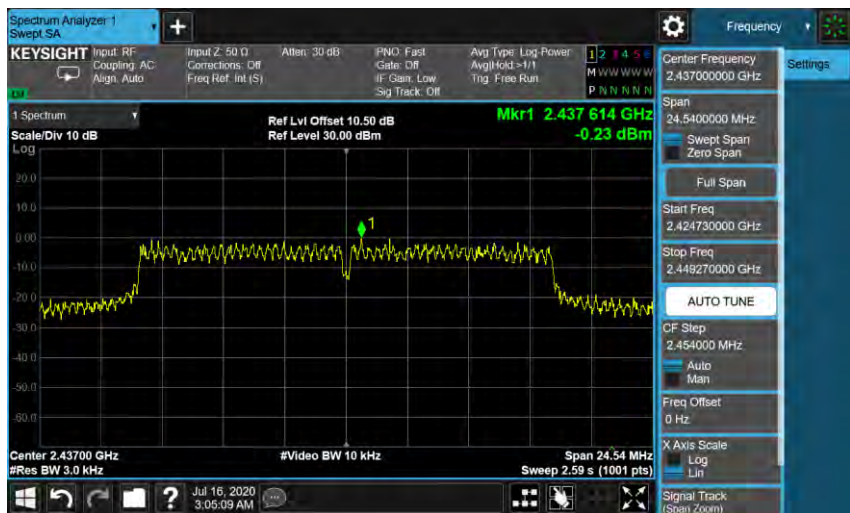


Mode 3: IEEE 802.11g Continuous TX mode_ANT-0

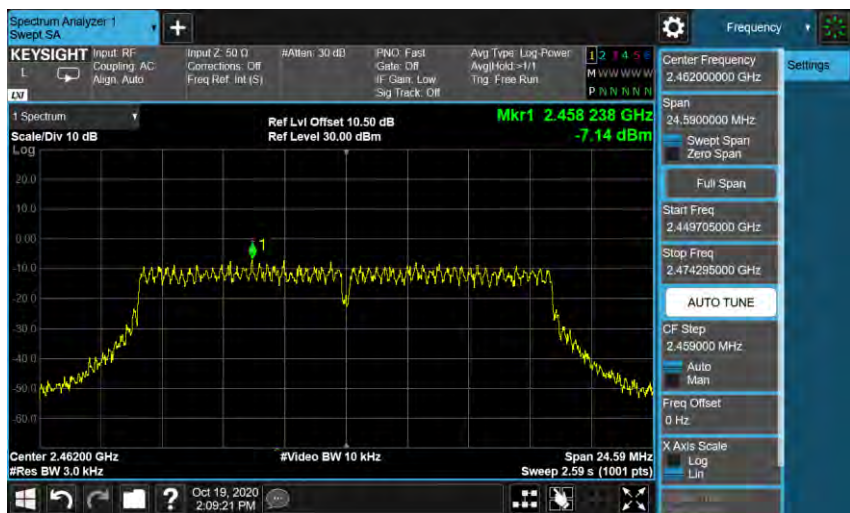
2412 MHz



2437 MHz



2462 MHz



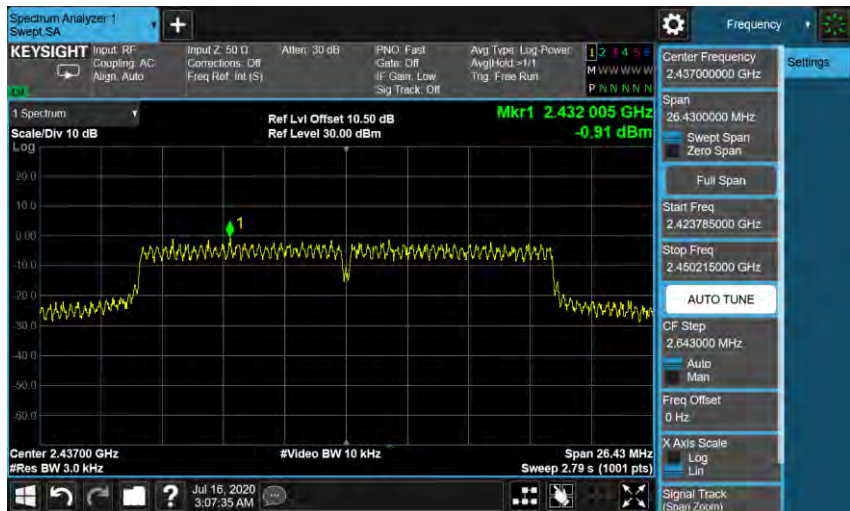


Mode 6: IEEE 802.11n 2.4 GHz 20 MHz(256QAM) Continuous TX mode_ANT-0

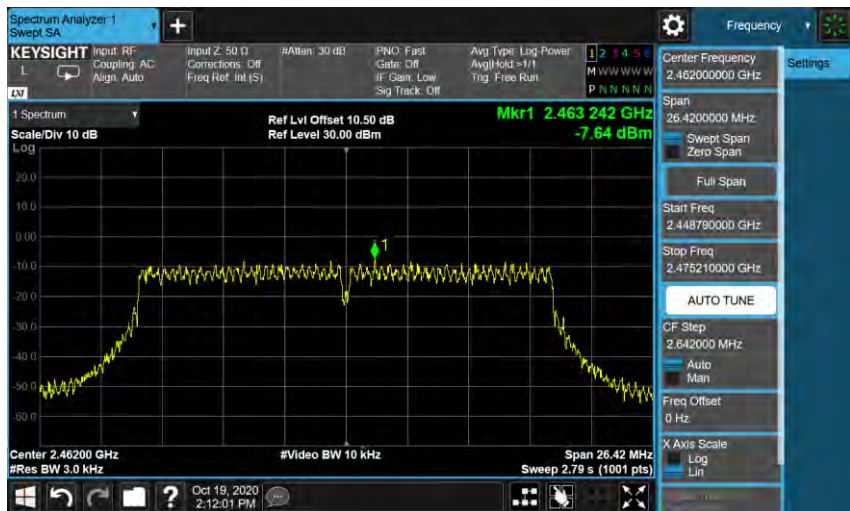
2412 MHz



2437 MHz

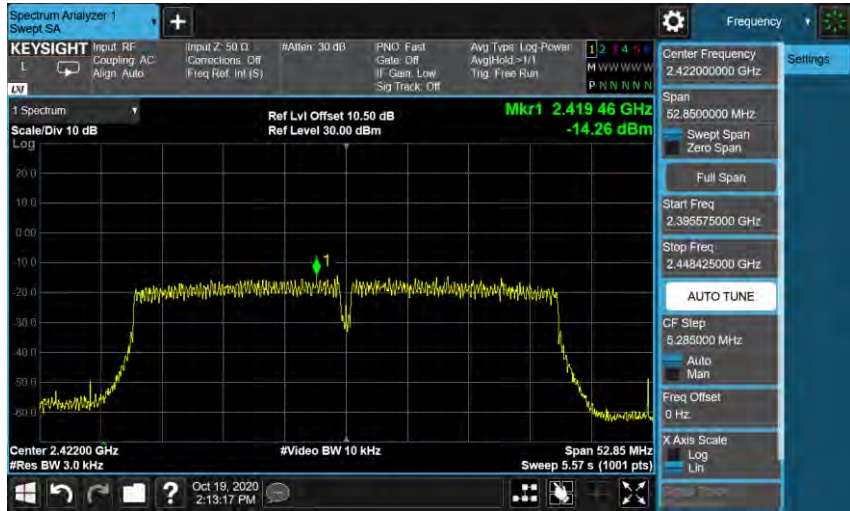


2462 MHz

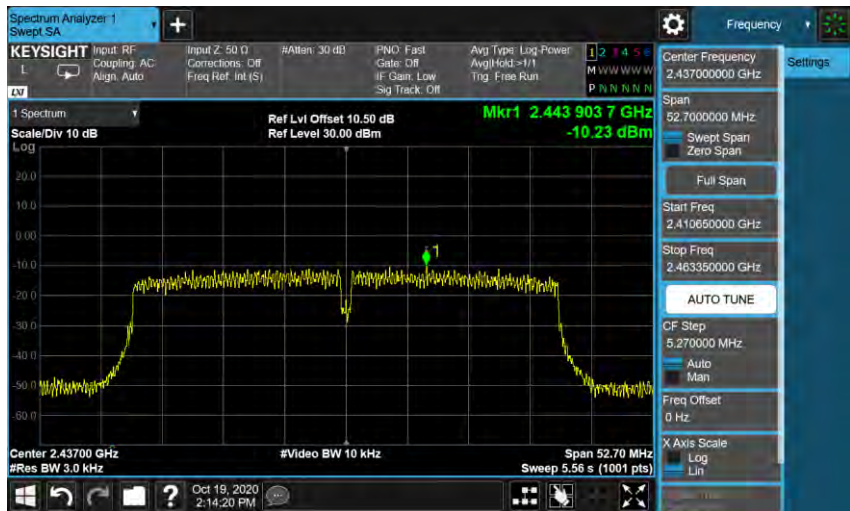


Mode 7: IEEE 802.11n 2.4 GHz 40 MHz(256QAM) Continuous TX mode_ANT-0

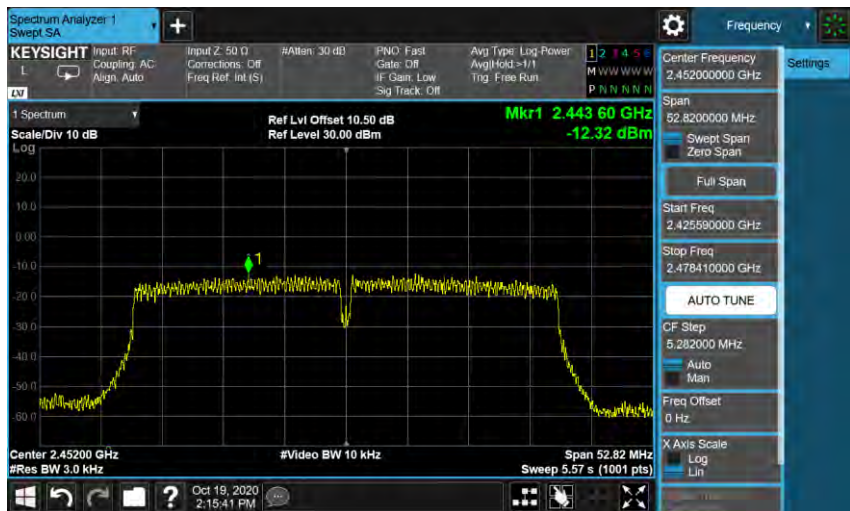
2422 MHz



2437 MHz



2452 MHz



Mode 2: IEEE 802.11b Continuous TX mode_ANT-1

2412 MHz



2437 MHz



2462 MHz



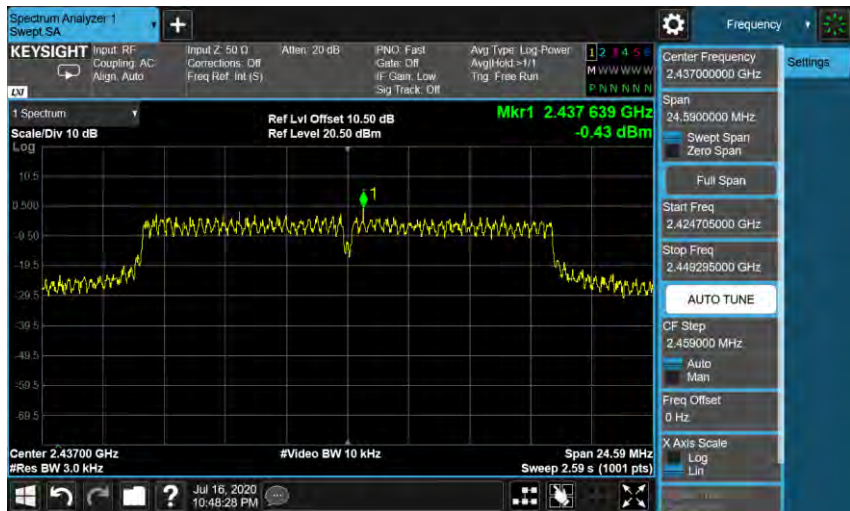


Mode 3: IEEE 802.11g Continuous TX mode_ANT-1

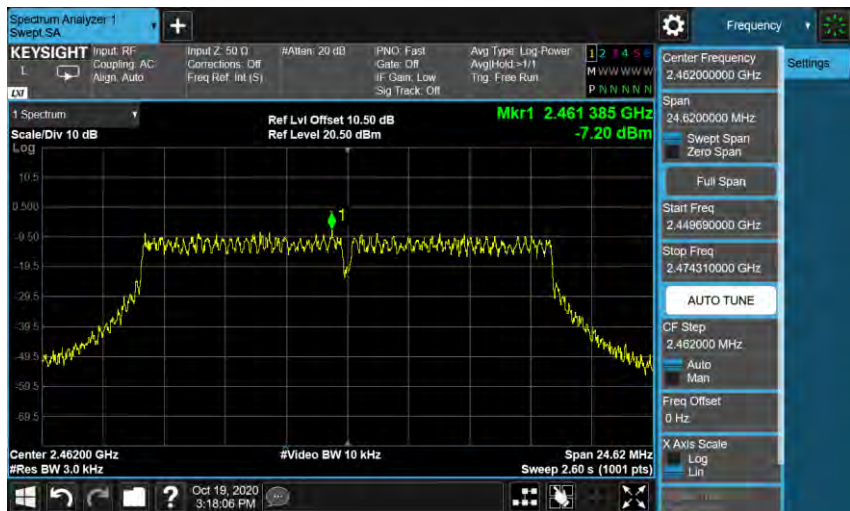
2412 MHz



2437 MHz



2462 MHz





Mode 6: IEEE 802.11n 2.4 GHz 20 MHz(256QAM) Continuous TX mode_ANT-1

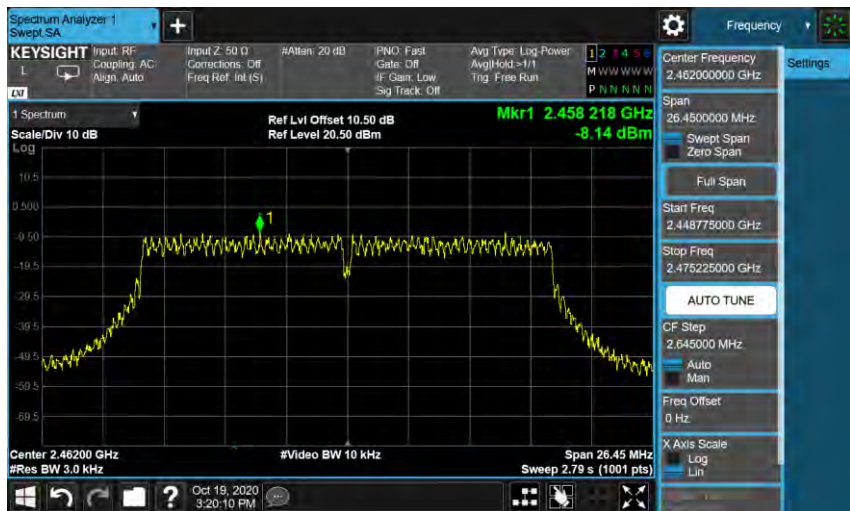
2412 MHz



2437 MHz



2462 MHz

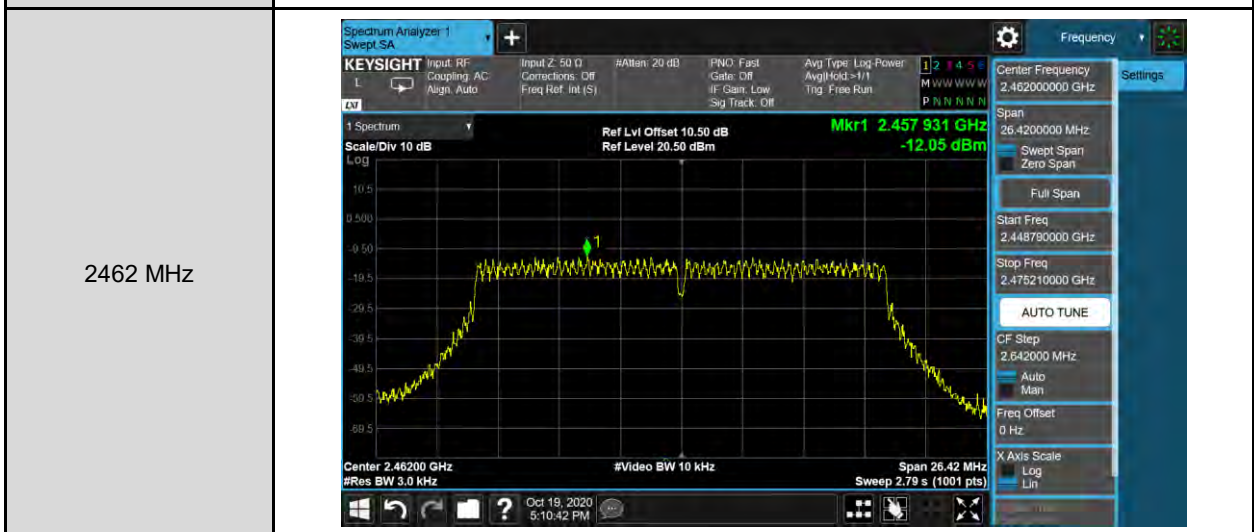
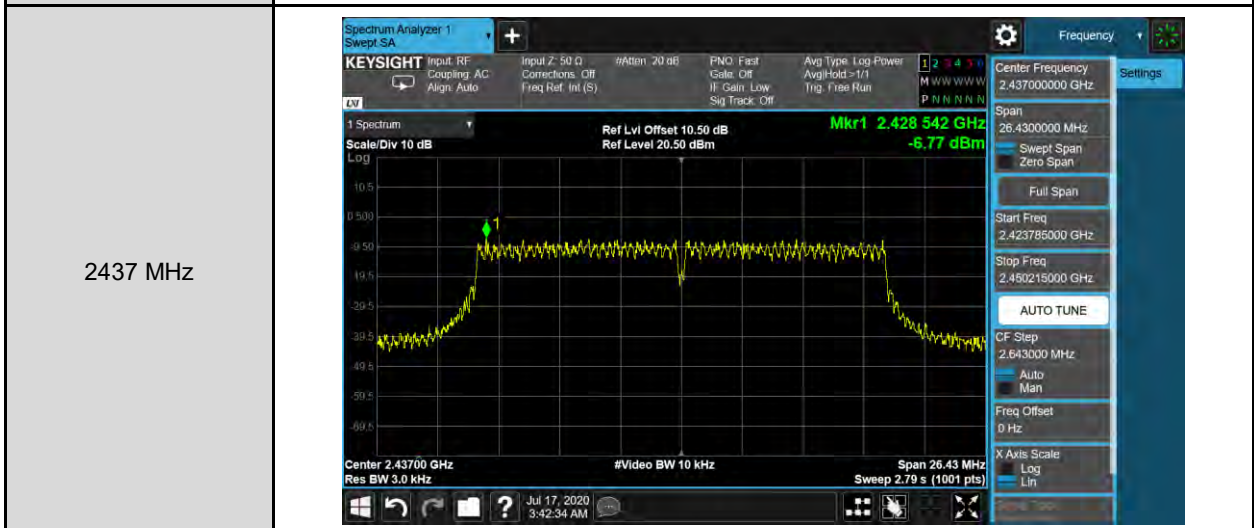
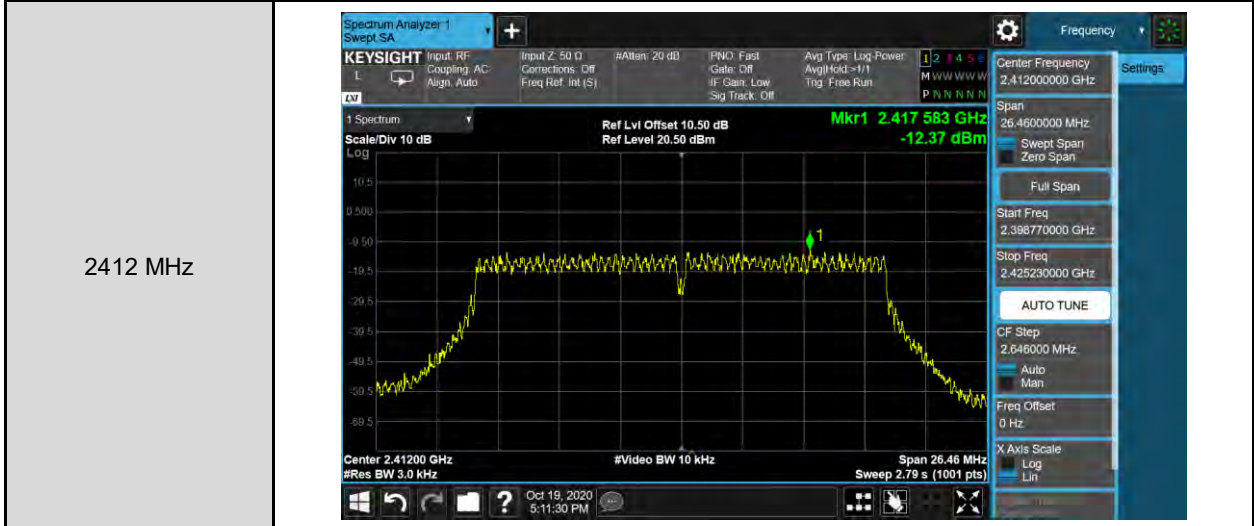


Mode 7: IEEE 802.11n 2.4 GHz 40 MHz(256QAM) Continuous TX mode_ANT-1

<p>2422 MHz</p>	
<p>2437 MHz</p>	
<p>2452 MHz</p>	

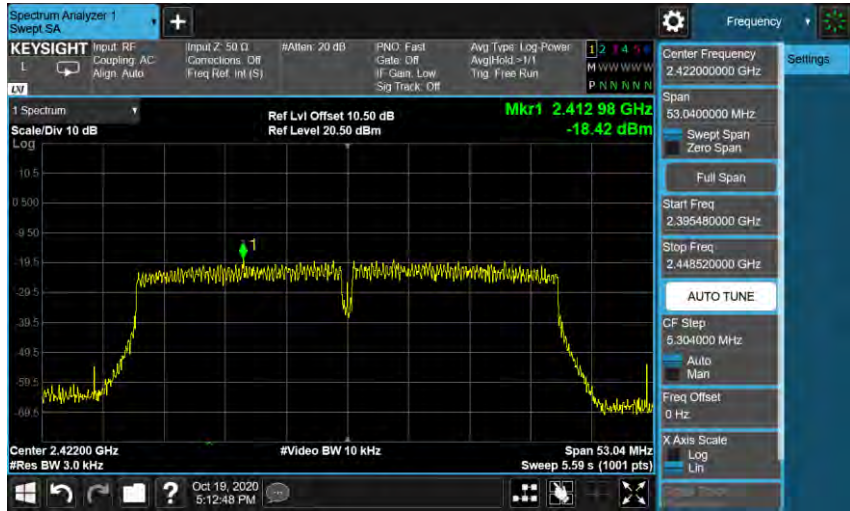
Beamforming on

Mode 6: IEEE 802.11n 2.4 GHz 20 MHz(256QAM) Continuous TX mode_ANT-0

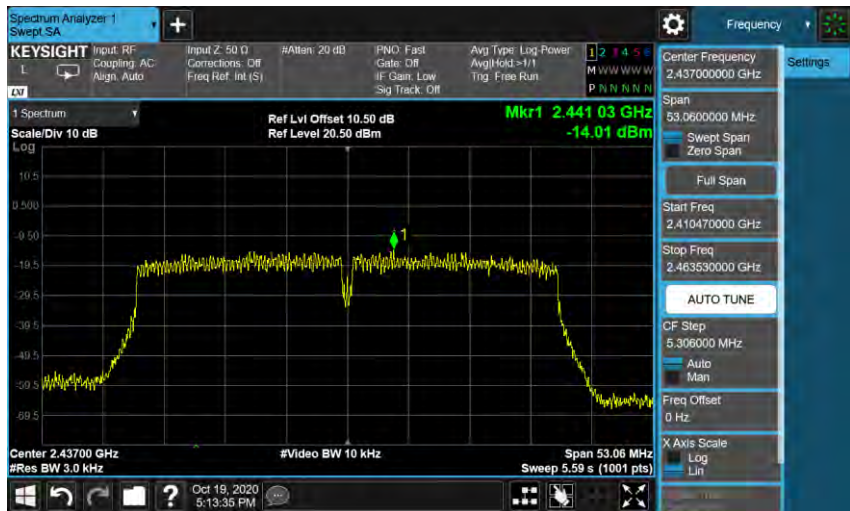


Mode 7: IEEE 802.11n 2.4 GHz 40 MHz(256QAM) Continuous TX mode_ANT-0

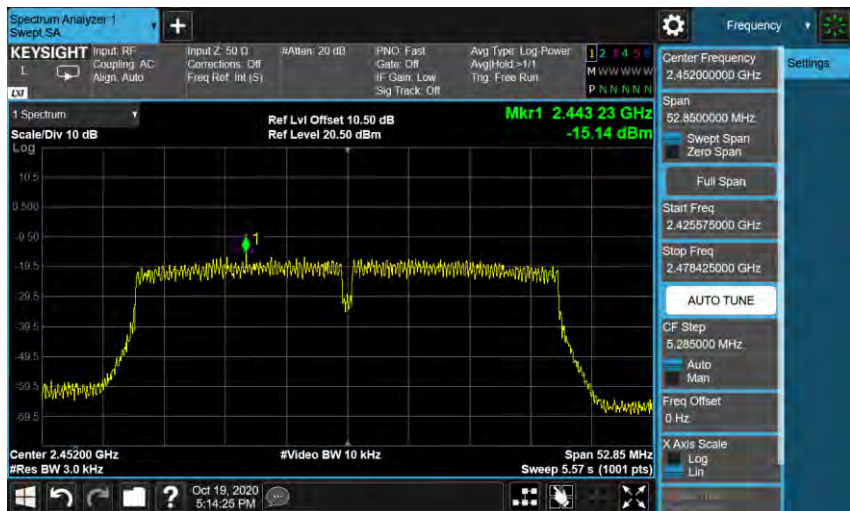
2422 MHz



2437 MHz

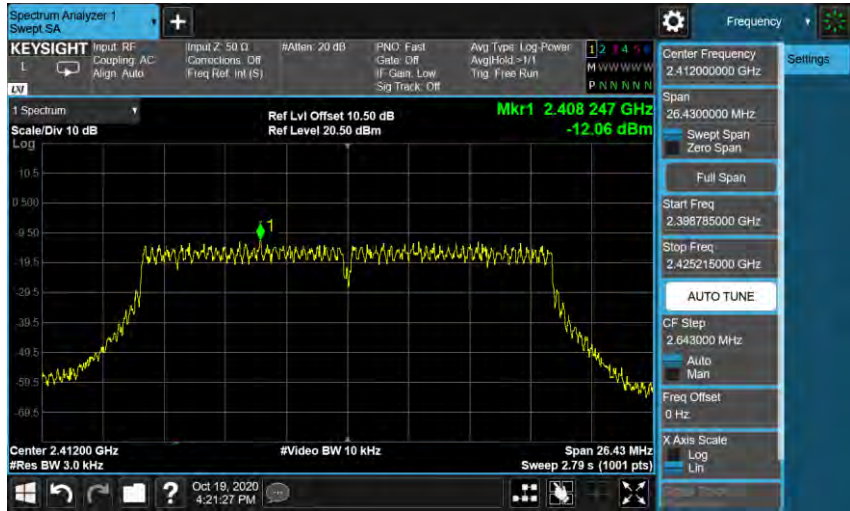


2452 MHz

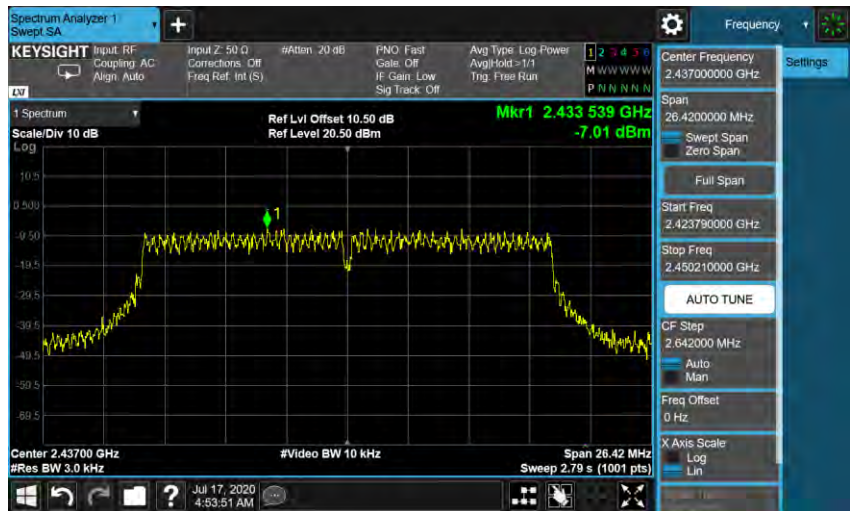


Mode 6: IEEE 802.11n 2.4 GHz 20 MHz(256QAM) Continuous TX mode_ANT-1

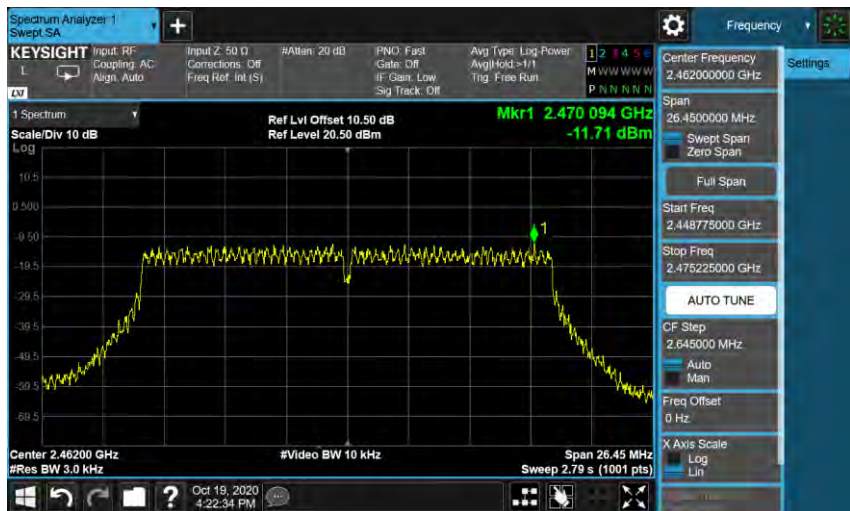
2412 MHz



2437 MHz



2462 MHz

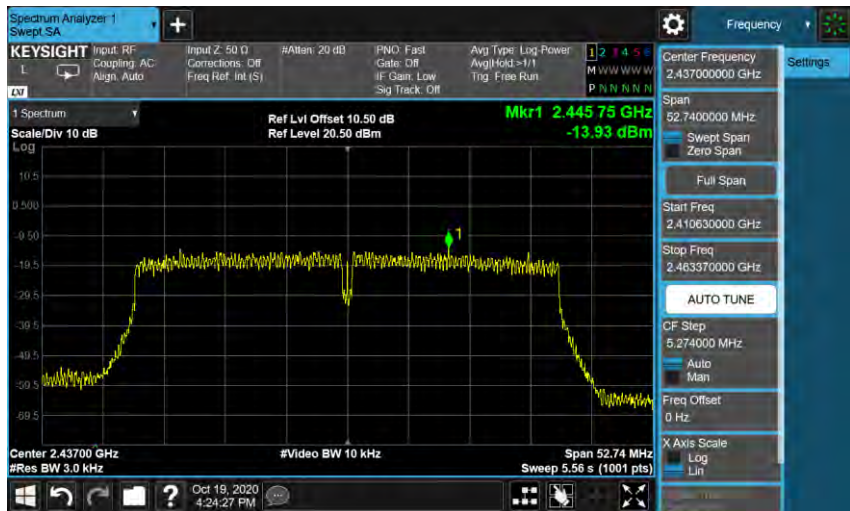


Mode 7: IEEE 802.11n 2.4 GHz 40 MHz(256QAM) Continuous TX mode_ANT-1

2422 MHz



2437 MHz



2452 MHz



Out of Band Conducted Emissions Measurement

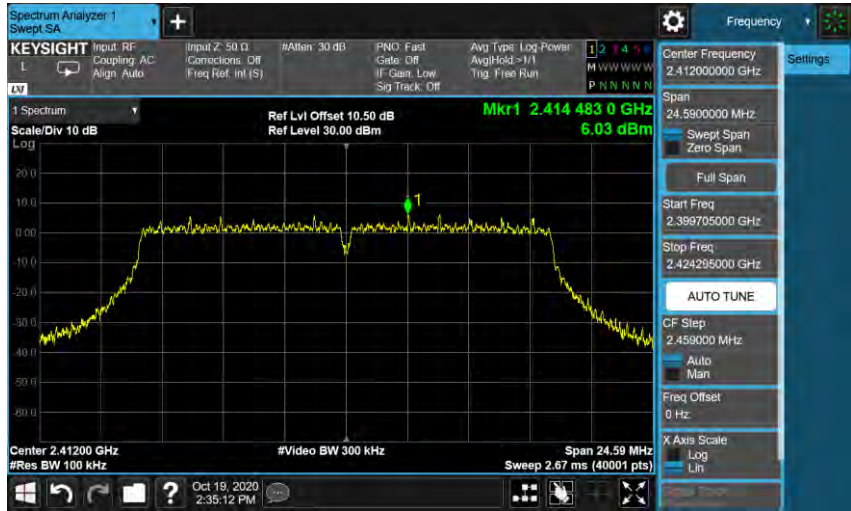
■ Test Graphs

Reference level

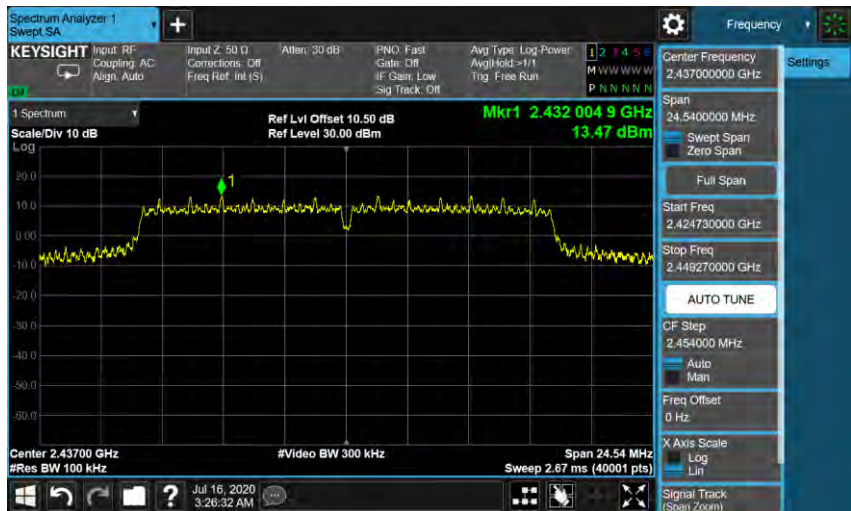
Mode 2: IEEE 802.11b Continuous TX mode_ANT-0	
2412 MHz	
2437 MHz	
2462 MHz	

Mode 3: IEEE 802.11g Continuous TX mode_ANT-0

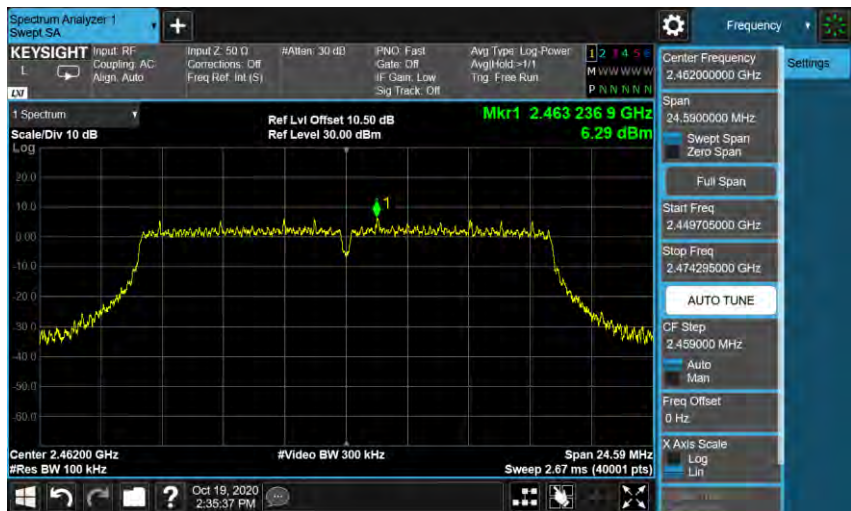
2412 MHz



2437 MHz



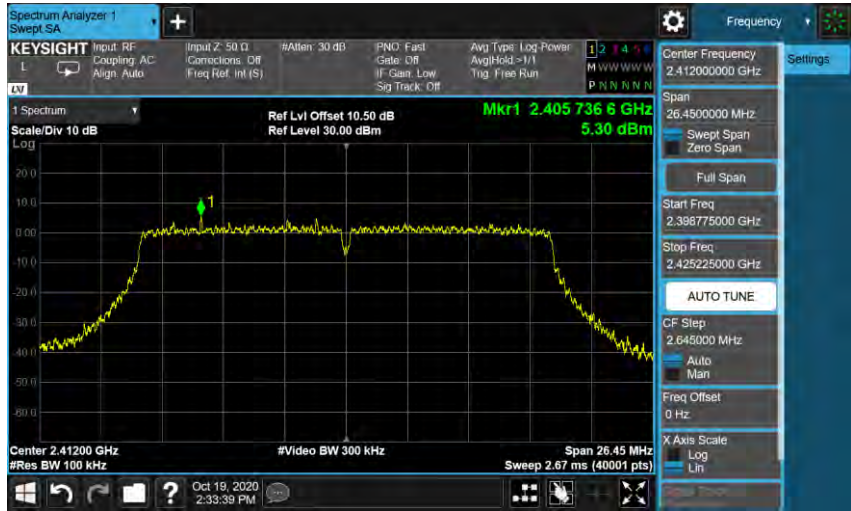
2462 MHz



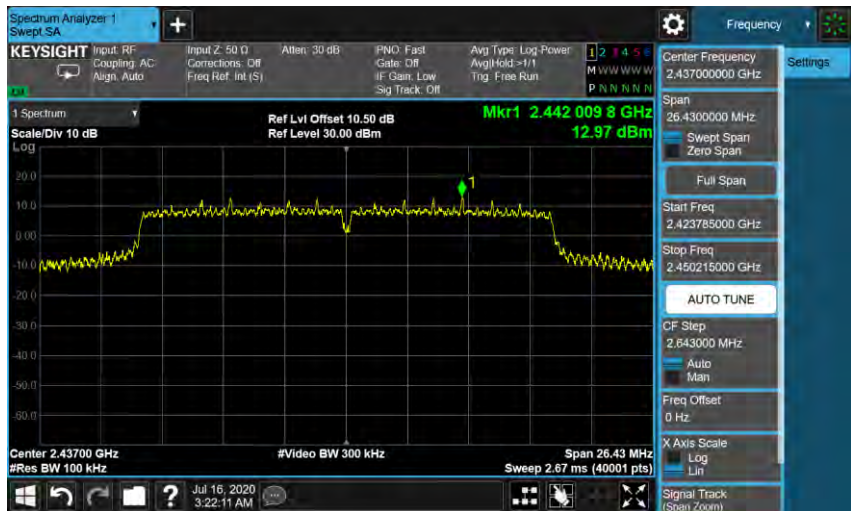


Mode 6: IEEE 802.11n 2.4 GHz 20 MHz(256QAM) Continuous TX mode_ANT-0

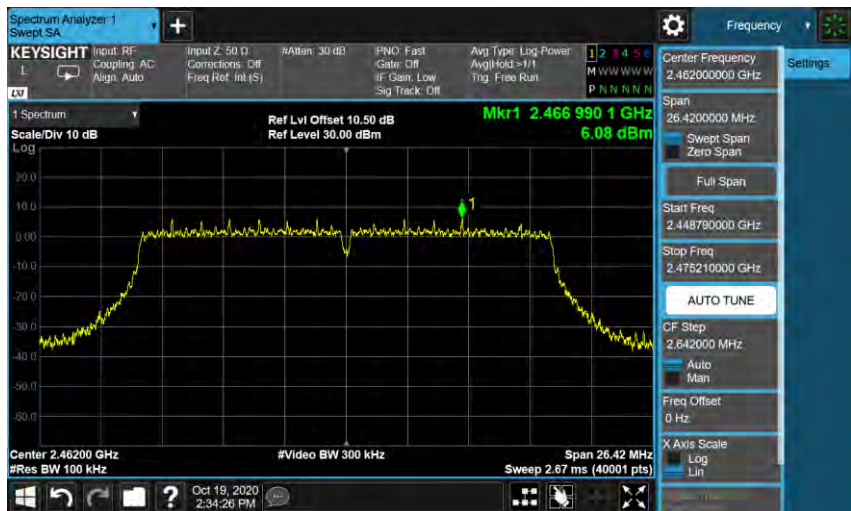
2412 MHz



2437 MHz



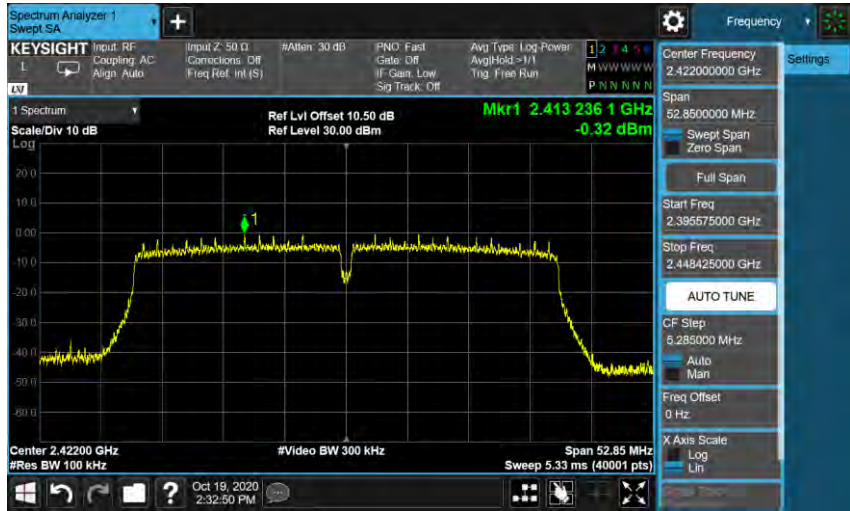
2462 MHz





Mode 7: IEEE 802.11n 2.4 GHz 40 MHz(256QAM) Continuous TX mode_ANT-0

2422 MHz



2437 MHz



2452 MHz





Mode 2: IEEE 802.11b Continuous TX mode_ANT-1

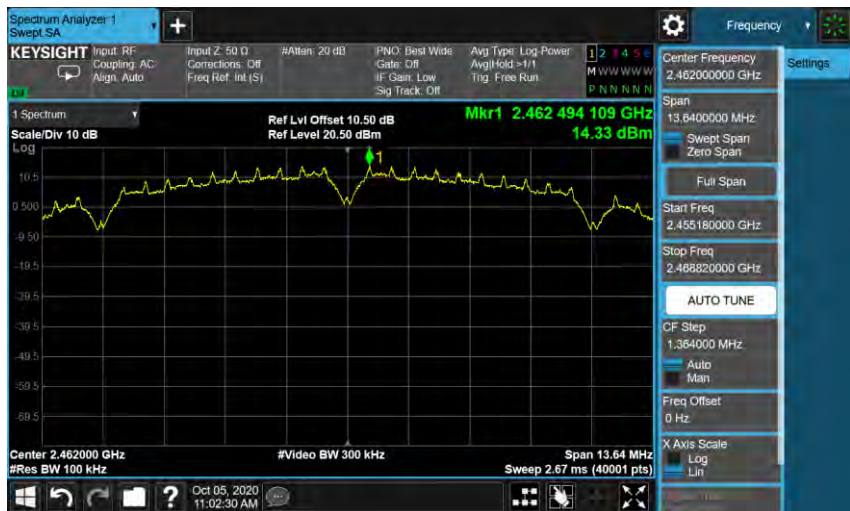
2412 MHz



2437 MHz



2462 MHz



Mode 3: IEEE 802.11g Continuous TX mode_ANT-1

2412 MHz



2437 MHz

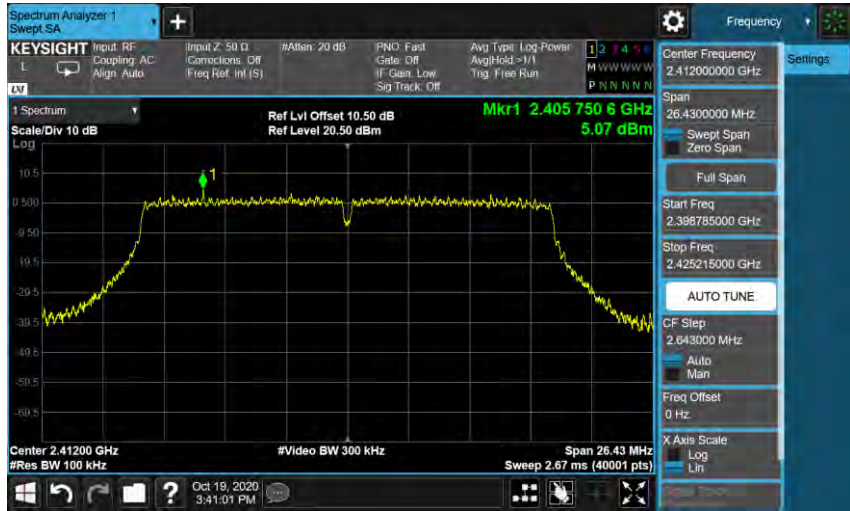


2462 MHz



Mode 6: IEEE 802.11n 2.4 GHz 20 MHz(256QAM) Continuous TX mode_ANT-1

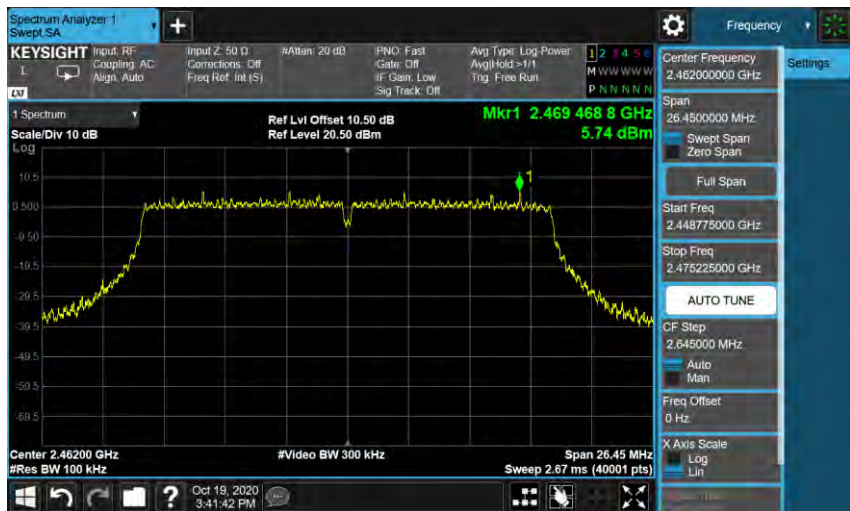
2412 MHz



2437 MHz



2462 MHz



Mode 7: IEEE 802.11n 2.4 GHz 40 MHz(256QAM) Continuous TX mode_ANT-1

2422 MHz



2437 MHz



2452 MHz



Out of Band Conducted Emissions

Mode 2: IEEE 802.11b Continuous TX mode_ANT-0

<p>2412 MHz</p>	
<p>2437 MHz</p>	
<p>2462 MHz</p>	

Mode 3: IEEE 802.11g Continuous TX mode_ANT-0

2412 MHz



2437 MHz



2462 MHz





Mode 6: IEEE 802.11n 2.4 GHz 20 MHz(256QAM) Continuous TX mode_ANT-0

2412 MHz



2437 MHz



2462 MHz



Mode 7: IEEE 802.11n 2.4 GHz 40 MHz(256QAM) Continuous TX mode_ANT-0

<p>2422 MHz</p>	<p>Scale/Div 10 dB</p> <p>Ref Lvl Offset 10.50 dB Ref Level 20.50 dBm</p> <p>Mkr2 26.1109 GHz -39.19 dBm</p> <p>Start 30 MHz #Res BW 100 kHz #Video BW 300 kHz Stop 26.50 GHz Sweep -2.53 s (40001 pts)</p> <table border="1"> <thead> <tr> <th>Mode</th> <th>Trace</th> <th>Scale</th> <th>X</th> <th>Y</th> <th>Function</th> <th>Function Width</th> <th>Function Value</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>N</td> <td>f</td> <td>2.429 5 GHz</td> <td>-1.498 dBm</td> <td></td> <td></td> <td></td> </tr> <tr> <td>2</td> <td>N</td> <td>f</td> <td>26.110 9 GHz</td> <td>-39.19 dBm</td> <td></td> <td></td> <td></td> </tr> </tbody> </table>	Mode	Trace	Scale	X	Y	Function	Function Width	Function Value	1	N	f	2.429 5 GHz	-1.498 dBm				2	N	f	26.110 9 GHz	-39.19 dBm			
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Mode 2: IEEE 802.11b Continuous TX mode_ANT-1

2412 MHz



2437 MHz



2462 MHz





Mode 3: IEEE 802.11g Continuous TX mode_ANT-1

2412 MHz



2437 MHz



2462 MHz



Mode 6: IEEE 802.11n 2.4 GHz 20 MHz(256QAM) Continuous TX mode_ANT-1

2412 MHz



2437 MHz



2462 MHz





Mode 7: IEEE 802.11n 2.4 GHz 40 MHz(256QAM) Continuous TX mode_ANT-1

2422 MHz



2437 MHz



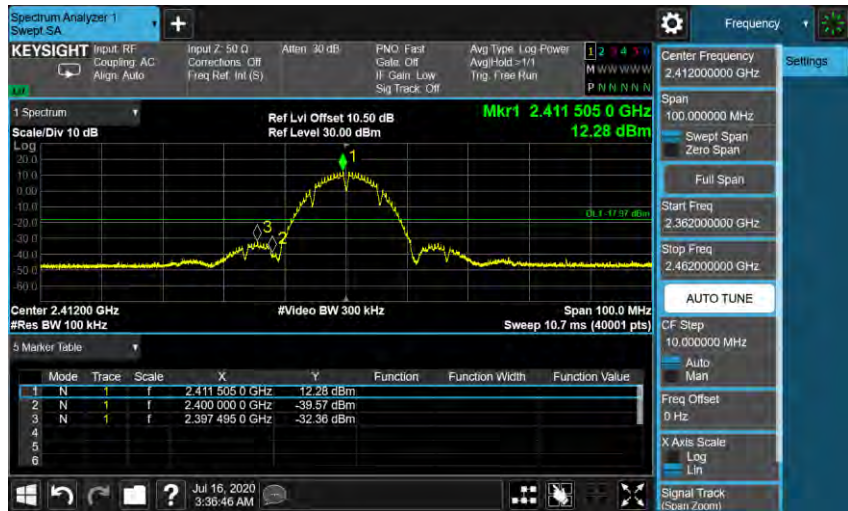
2452 MHz



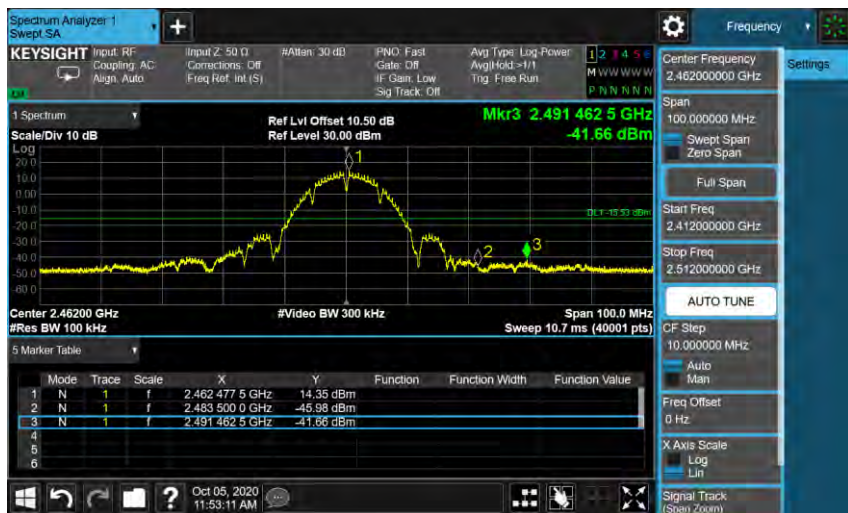
Conducted Band Edge

Mode 2: IEEE 802.11b Continuous TX mode_ANT-0

2412 MHz

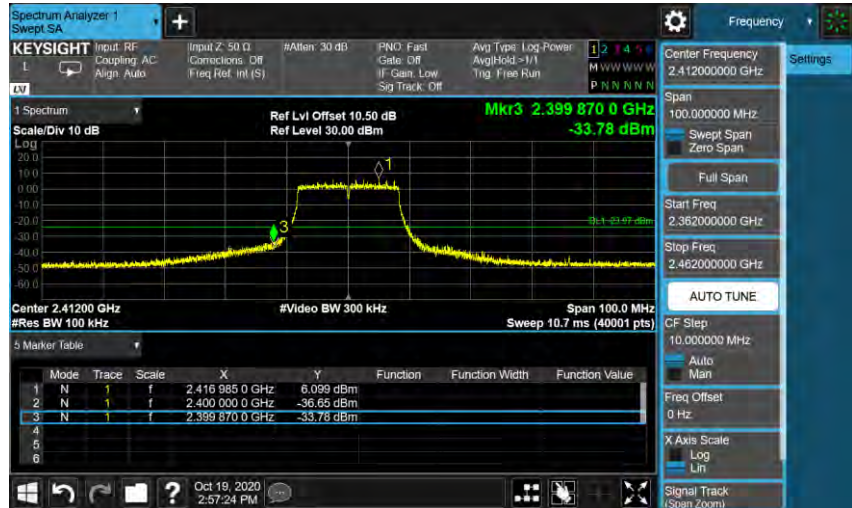


2462 MHz

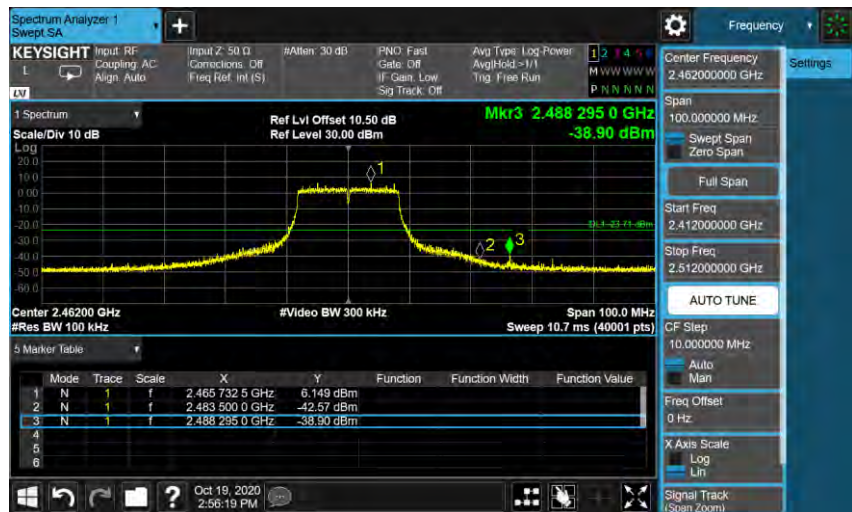


Mode 3: IEEE 802.11g Continuous TX mode_ANT-0

2412 MHz

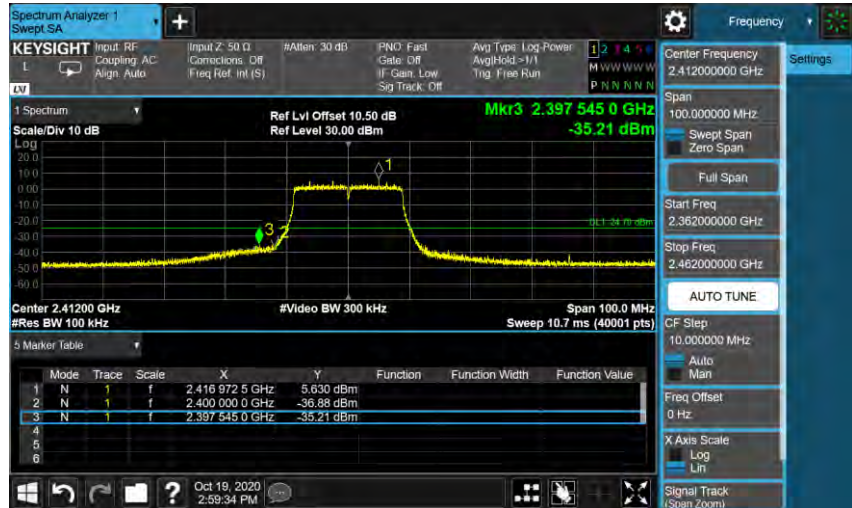


2462 MHz

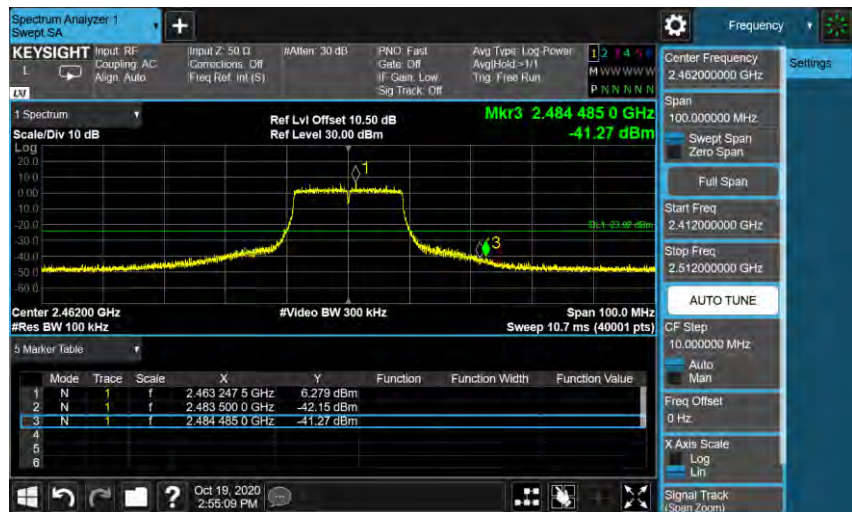


Mode 6: IEEE 802.11n 2.4 GHz 20 MHz(256QAM) Continuous TX mode_ANT-0

2412 MHz

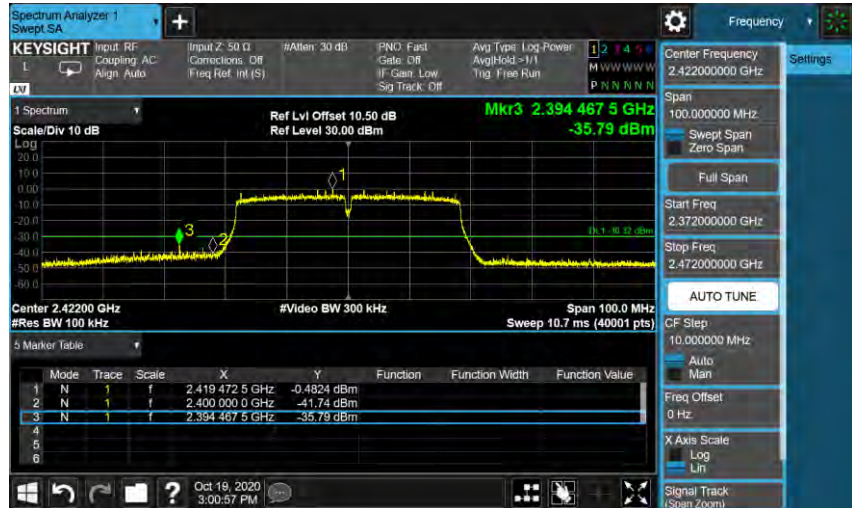


2462 MHz

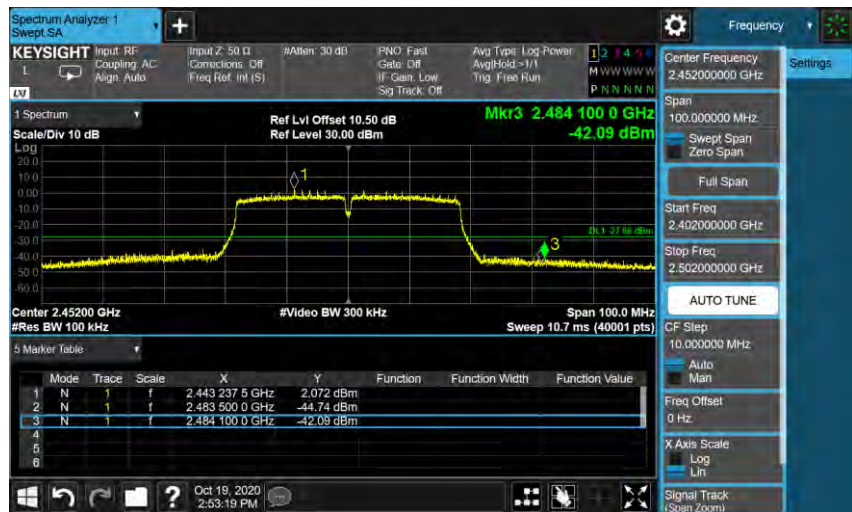


Mode 7: IEEE 802.11n 2.4 GHz 40 MHz(256QAM) Continuous TX mode_ANT-0

2422 MHz



2452 MHz



Mode 2: IEEE 802.11b Continuous TX mode_ANT-1

2412 MHz

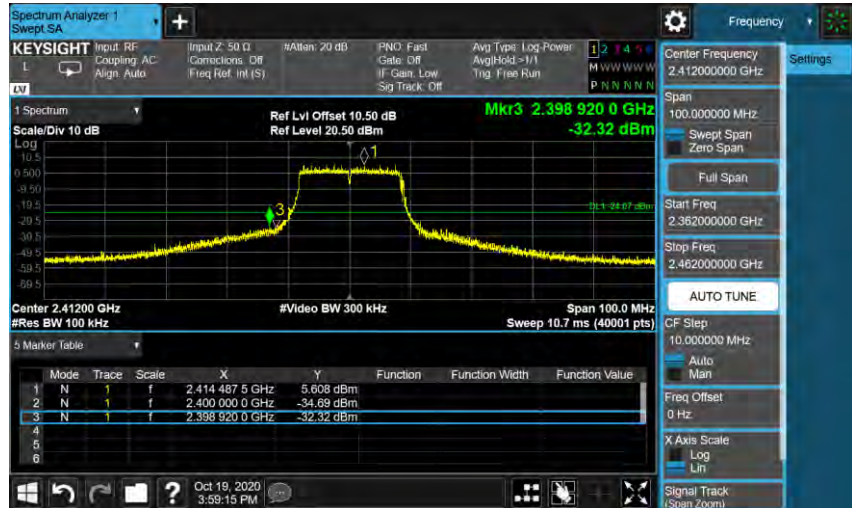


2462 MHz

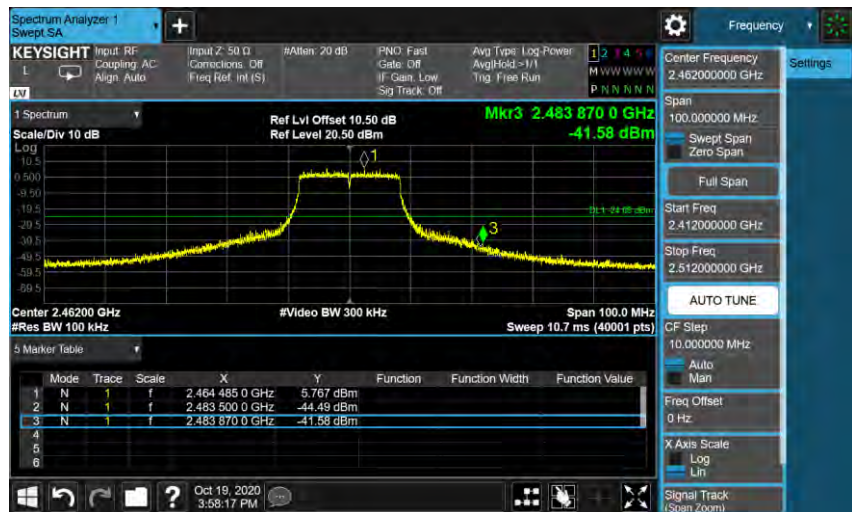


Mode 3: IEEE 802.11g Continuous TX mode_ANT-1

2412 MHz

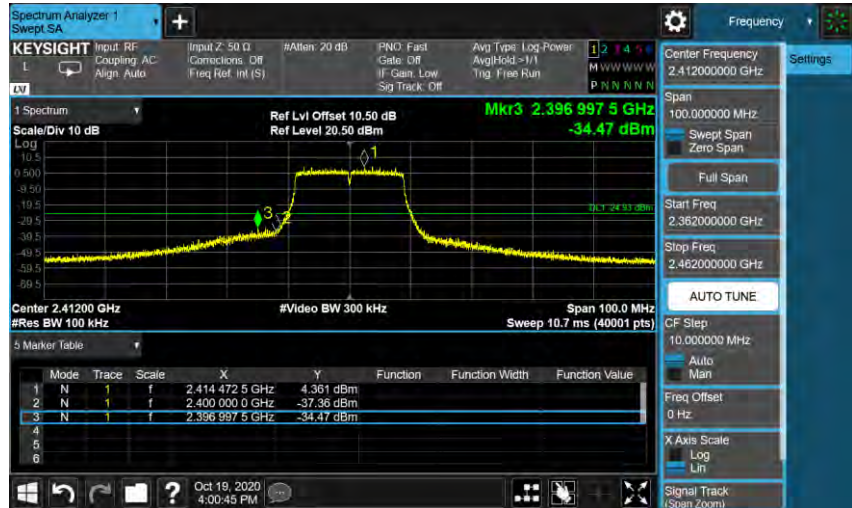


2462 MHz

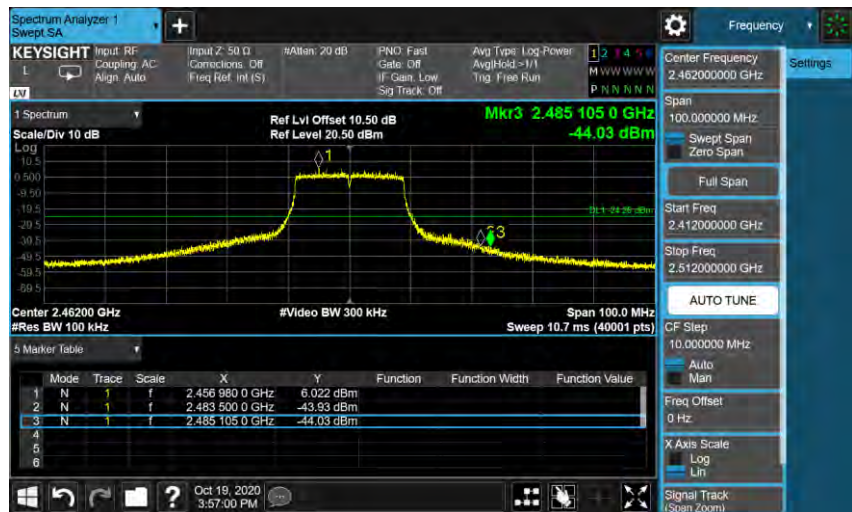


Mode 6: IEEE 802.11n 2.4 GHz 20 MHz(256QAM) Continuous TX mode_ANT-1

2412 MHz

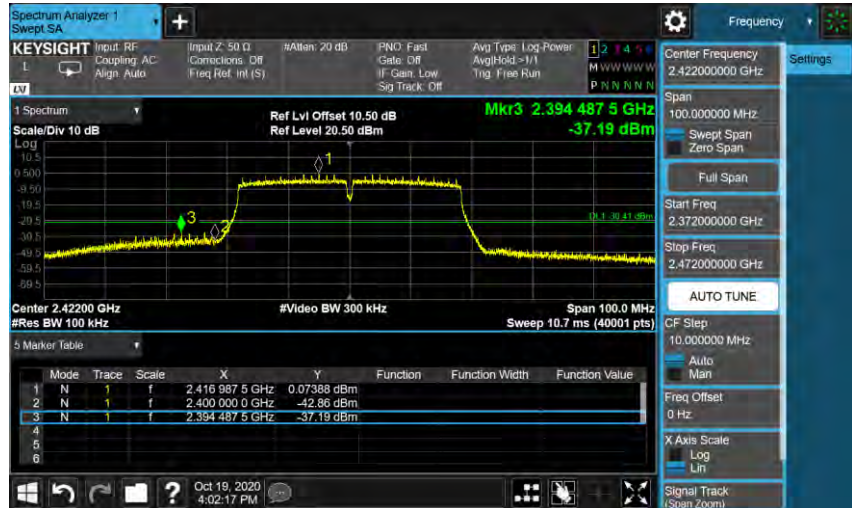


2462 MHz

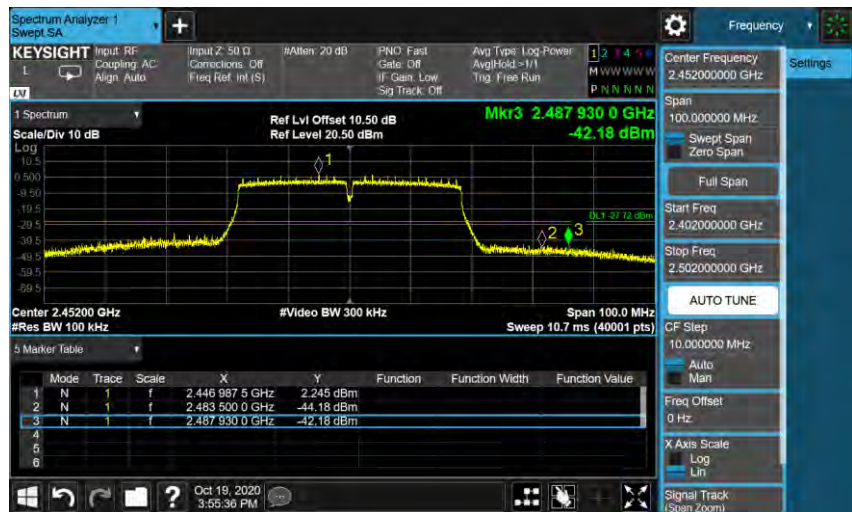


Mode 7: IEEE 802.11n 2.4 GHz 40 MHz(256QAM) Continuous TX mode_ANT-1

2422 MHz



2452 MHz



Beamforming on

Reference level

Mode 6: IEEE 802.11n 2.4 GHz 20 MHz(256QAM) Continuous TX mode_ANT-0

2412 MHz	
2437 MHz	
2462 MHz	

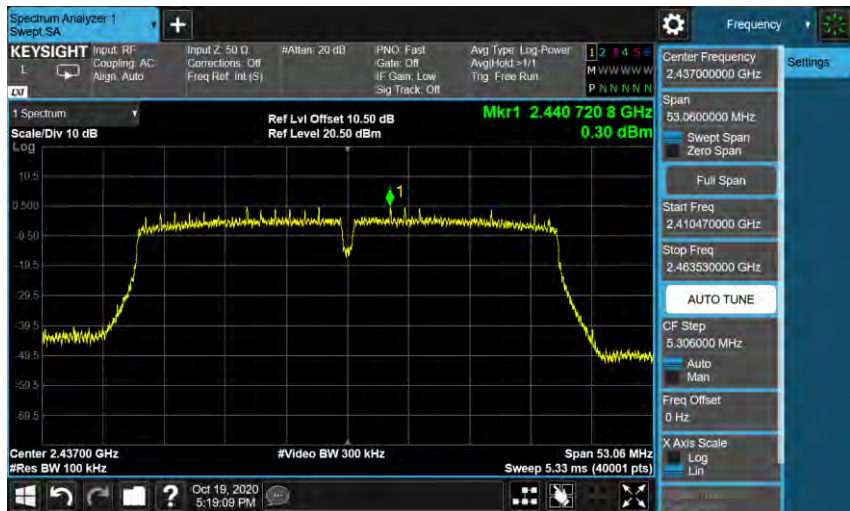


Mode 7: IEEE 802.11n 2.4 GHz 40 MHz(256QAM) Continuous TX mode_ANT-0

2422 MHz



2437 MHz



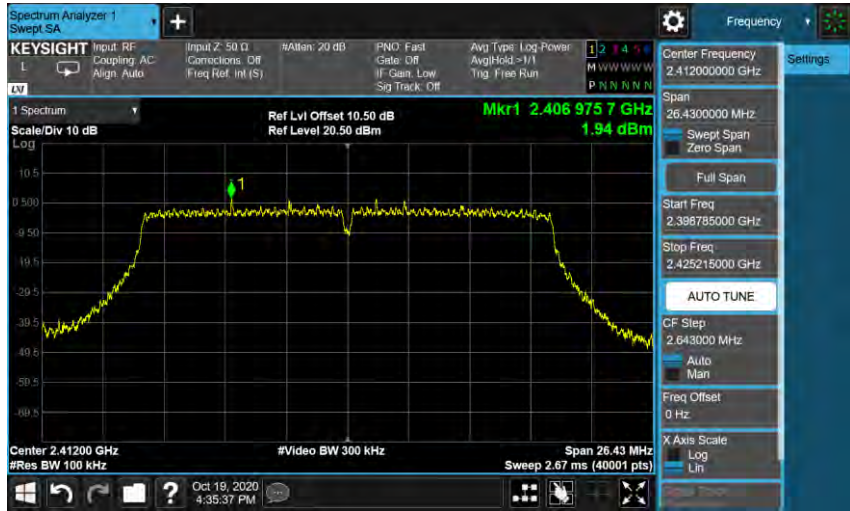
2452 MHz



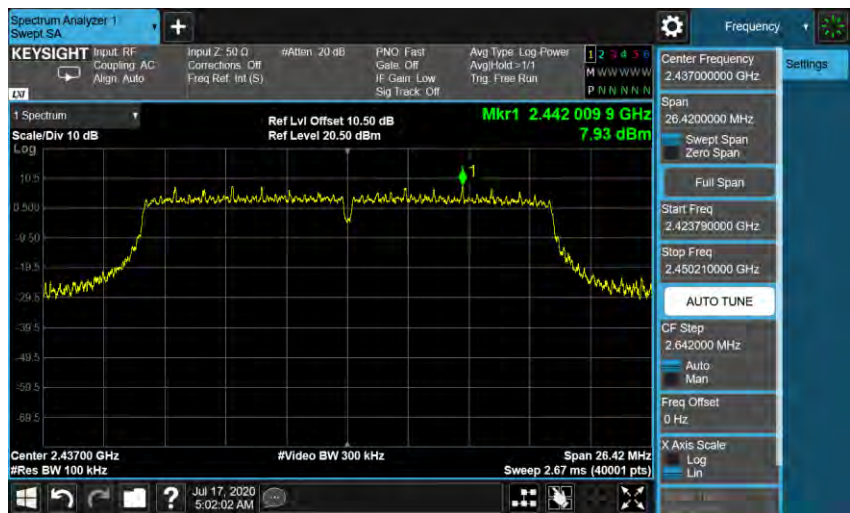


Mode 6: IEEE 802.11n 2.4 GHz 20 MHz(256QAM) Continuous TX mode_ANT-1

2412 MHz



2437 MHz



2462 MHz

