HCT CO.,LTD.
74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, 17383, Rep. of KOREA
TEL: +82-31-645-6300 FAX: +82-31-645-6401

FCC DTS REPORT

Certification

Applicant Name:
SAMSUNG Electronics Co., Ltd.

Address:
129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Rep. of Korea

Date of Issue:
April 09, 2021

Test Site/Location:
74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, 17383 KOREA

Report No.: HCT-RF-2104-FC003

FCC ID:	**A3LNP340XLA**
APPLICANT:	**SAMSUNG Electronics Co., Ltd.**

According to the Evaluation report, all of the data contained herein is reused from the reference FCC ID : A3LNP345XLA report.

Model:	NP340XLA
EUT Type:	Notebook Computer
Average Output Power:	Ant.1(SISO): 802.11b : 14.78 dBm / 802.11g : 15.32 dBm / 802.11n(HT20) : 15.90 dBm / 802.11ac(VHT20) : 15.13 dBm Ant.2(SISO): 802.11b : 15.48 dBm / 802.11g : 15.82 dBm / 802.11n(HT20) : 15.72 dBm / 802.11ac(VHT20) : 15.76 dBm Ant.1&2(MIMO): 802.11b : 18.16 dBm / 802.11g : 18.59 dBm / 802.11n(HT20) : 18.82 dBm / 802.11ac(VHT20) : 18.47 dBm
Frequency Range:	2 412 MHz ~ 2 472 MHz
Modulation type:	CCK/DSSS/OFDM
FCC Classification:	Digital Transmission System(DTS)
FCC Rule Part(s):	Part 15.247

Engineering Statement:

The measurements shown in this report were made in accordance with the procedures indicated, and the emissions from this equipment were found to be within the limits applicable. I assume full responsibility for the accuracy and completeness of these measurements, and for the qualifications of all persons taking them. It is further stated that upon the basis of the measurements made, the equipment tested is capable of operation in accordance with the requirements of the FCC Rules under normal use and maintenance.

REVIEWED BY

Report prepared by : Chang Hee Hwang
Engineer of Telecommunication Testing Center

Report approved by : Jong Seok Lee
Manager of Telecommunication Testing Center

This test results were applied only to the test methods required by the standard.

This laboratory is not accredited for the test results marked *.
The above Test Report is the accredited test result by (KS Q) ISO/IEC 17025 and KOLAS(Korea Laboratory Accreditation Scheme), which signed the ILAC-MRA. (HCT Accreditation No.: KT197)

Version

TEST REPORT NO.	DATE	DESCRIPTION
HCT-RF-2104-FC003	April 09, 2021	- First Approval Report

Table of Contents

1. EUT DESCRIPTION

Model	NP340XLA		
Additional Model	-		
EUT Type	Notebook Computer		
Power Supply	DC 7.72 V		
Frequency Range	2 412 MHz ~ 2 472 MHz		
Max. RF Output Power	Peak Power (For information only)	Ant. 1 (SISO)	802.11b : 20.47 dBm 802.11g : 23.10 dBm 802.11n(HT20) : 22.52 dBm 802.11ac(VHT20) : 22.67 dBm
		Ant.2 (SISO)	802.11b : 21.55 dBm 802.11g : 24.36 dBm 802.11n(HT20) : 23.90 dBm 802.11ac(VHT20) : 23.38 dBm
		Ant.1&2 (MIMO)	802.11b : 24.05 dBm 802.11g : 26.72 dBm 802.11n(HT20) : 26.28 dBm 802.11ac(VHT20) : 25.95 dBm
	Average Power	Ant. 1 (SISO)	802.11b : 14.78 dBm 802.11g : 15.32 dBm 802.11n(HT20) : 15.90 dBm 802.11ac(VHT20) : 15.13 dBm
		Ant.2 (SISO)	802.11b : 15.48 dBm 802.11g : 15.82 dBm 802.11n(HT20) : 15.72 dBm 802.11ac(VHT20) : 15.76 dBm
		Ant.1&2 (MIMO)	802.11b : 18.16 dBm 802.11g : 18.59 dBm 802.11n(HT20) : 18.82 dBm 802.11ac(VHT20) : 18.47 dBm
Modulation Type	DSSS/CCK : 802.11b OFDM : 802.11g, 802.11n, 802.11ac		
Number of Channels	13 Channels		
Date(s) of Tests	March 9, 2021~ March 29, 2021		
Serial number	Radiated: FGCD930R301073T Conducted: FGCD01R2N00050		

ANTENNA CONFIGURATIONS

1. The device employs MIMO technology. Below are the possible configurations

Configurations	SISO		SDM	CDD
	Ant1	Ant2	Ant1 + Ant2	Ant1 + Ant2
802.11b	X	X	X	O
802.11g	X	X	X	O
802.11n(HT20)	X	X	O	O
802.11ac(VHT20)	X	X	O	O

Note:

(1) O = Support, X = Not Support

(2) SISO = Single Input Single Output

(3) SDM = Spatial Diversity Multiplexing

(4) CDD = Cyclic Delay Diversity

2. TEST METHODOLOGY

FCC KDB 558074 D01 15.247 Meas Guidance v05r02 dated April 02, 2019 entitled “guidance for compliance measurements on digital transmission system, frequency hopping spread spectrum system, and hybrid system devices and the measurement procedure described in ANSI C63.10(Version : 2013) ‘the American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices’.

EUT CONFIGURATION

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner that intends to maximize its emission characteristics in a continuous normal application.

EUT EXERCISE

The EUT was operated in the engineering mode to fix the Tx frequency that was for the purpose of the measurements. According to its specifications, the EUT must comply with the requirements of the Section 15.207, 15.209 and 15.247 under the FCC Rules Part 15 Subpart C.

GENERAL TEST PROCEDURES

Conducted Emissions

The EUT is placed on the turntable, which is 0.8 m above ground plane. According to the requirements in Section 6.2 of ANSI C63.10. (Version :2013) Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-peak and average detector modes.

Radiated Emissions

The EUT is placed on a turn table, which is 0.8 m above ground plane below 1GHz. Above 1GHz with 1.5m using absorbers between the EUT and receive antenna. The turntable shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3 m away from the receiving antenna, which varied from 1 m to 4 m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the max. emission, the relative positions of this hand-held transmitter (EUT) was rotated through three orthogonal axes according to the requirements in Section 6.6.5 of ANSI C63.10. (Version: 2013)

DESCRIPTION OF TEST MODES

The EUT has been tested under operating condition. Test program used to control the EUT for staying in continuous transmitting and receiving mode is programmed.

3. INSTRUMENT CALIBRATION

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipment's, which is traceable to recognized national standards.

Especially, all antenna for measurement is calibrated in accordance with the requirements of C63.5 (Version : 2017).

4. FACILITIES AND ACCREDITATIONS

FACILITIES

The SAC(Semi-Anechoic Chamber) and conducted measurement facility used to collect the radiated data are located at the 74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, 17383, Rep. of KOREA. The site is constructed in conformance with the requirements of ANSI C63.4. (Version :2014) and CISPR Publication 22.

Detailed description of test facility was submitted to the Commission and accepted dated April 02, 2018 (Registration Number: KR0032).

EQUIPMENT

Radiated emissions are measured with one or more of the following types of Linearly polarized antennas: tuned dipole, bi-conical, log periodic, bi-log, and/or ridged waveguide, horn. Spectrum analyzers with pre-selectors and quasi-peak detectors are used to perform radiated measurements.

Conducted emissions are measured with Line Impedance Stabilization Networks and EMI Test Receivers. Calibrated wideband preamplifiers, coaxial cables, and coaxial attenuators are also used for making measurements.

All receiving equipment conforms to CISPR Publication 16-1, "Radio Interference Measuring Apparatus and Measurement Methods."

5. ANTENNA REQUIREMENTS

According to FCC 47 CFR §15.203:

"An intentional radiator antenna shall be designed to ensure that no antenna other than that furnished by the responsible party can 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."

(1) The antennas of this E.U.T are permanently attached.

(2) The E.U.T Complies with the requirement of §15.203

6. MEASUREMENT UNCERTAINTY

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI C63.10-2013.

All measurement uncertainty values are shown with a coverage factor of k = 2 to indicate a 95 % level of confidence.

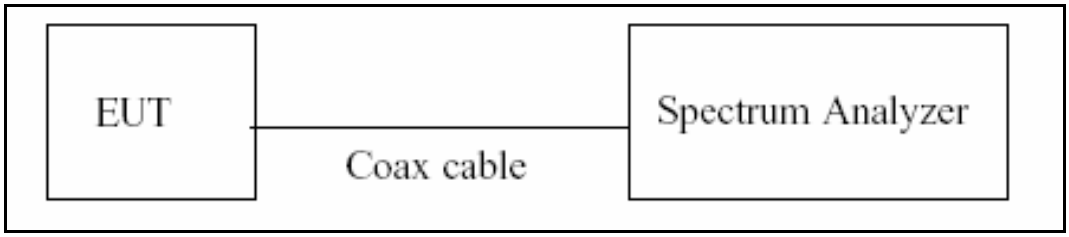
The measurement data shown herein meets or exceeds the U_{CISPR} measurement uncertainty values specified in CISPR 16-4-2 and, thus, can be compared directly to specified limits to determine compliance.

Parameter	Expanded Uncertainty (dB)
Conducted Disturbance (150 kHz ~ 30 MHz)	1.82
Radiated Disturbance (9 kHz ~ 30 MHz)	3.40
Radiated Disturbance (30 MHz ~ 1 GHz)	4.80
Radiated Disturbance (1 GHz ~ 18 GHz)	5.70
Radiated Disturbance (18 GHz ~ 40 GHz)	5.05

7. DESCRIPTION OF TESTS

7.1. Duty Cycle

Test Configuration



Test Procedure

The transmitter output is connected to the Spectrum Analyzer.

We tested according to the zero-span measurement method.

The largest available value of RBW is 8 MHz and VBW is 50 MHz.

The zero-span method of measuring duty cycle shall not be used if T ≤ 6.25 microseconds. (50/6.25 = 8)

The zero-span method was used because all measured T data are > 6.25 microseconds and both RBW and VBW are > 50/*T*.

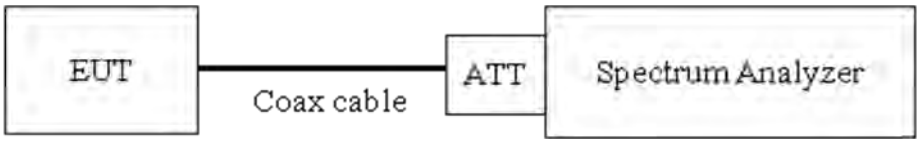
1. RBW = 8 MHz (the largest available value)
2. VBW = 8 MHz (≥ RBW)
3. SPAN = 0 Hz
4. Detector = Peak
5. Number of points in sweep > 100
6. Trace mode = Clear write
7. Measure T_{total} and T_{on}
8. Calculate Duty Cycle = T_{on}/ T_{total} and Duty Cycle Factor = 10log(1/Duty Cycle)

7.2. 6dB Bandwidth

Limit

The minimum permissible 6 dB bandwidth is 500 kHz.

Test Configuration



Test Procedure

The transmitter output is connected to the Spectrum Analyzer.

The Spectrum Analyzer is set to (Procedure 11.8.1 in ANSI 63.10-2013)

1) RBW = 100 kHz
2) VBW ≥ 3 x RBW
3) Detector = Peak
4) Trace mode = max hold
5) Sweep = auto couple
6) Allow the trace to stabilize
7) We tested 6 dB bandwidth using the automatic bandwidth measurement capability of a spectrum analyzer. X dB is set 6 dB.

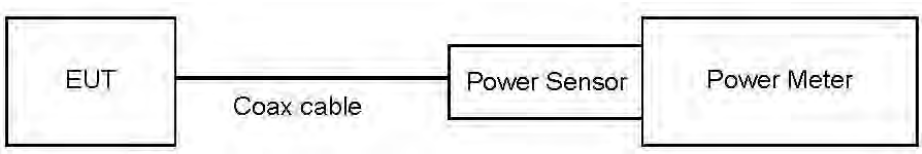
Note : We tested OBW using the automatic bandwidth measurement capability of a spectrum analyzer.

7.3. Output Power

Limit

The maximum permissible conducted output power is 1 Watt.

Test Configuration



Test Procedure

The transmitter output is connected to the Power Meter.

▪ Peak Power (Procedure 11.9.1.3 in ANSI 63.10-2013)

: Measure the peak power of the transmitter.

▪ Average Power (Procedure 11.9.2.3 in ANSI 63.10-2013)

1) Measure the duty cycle.
2) Measure the average power of the transmitter. This measurement is an average over both the on and off periods of the transmitter.
3) Add 10 log (1/x), where x is the duty cycle, to the measured power in order to compute the average power during the actual transmission times.

Sample Calculation

▪ Conducted Output Power(Peak) = Reading Value + ATT loss + Cable loss

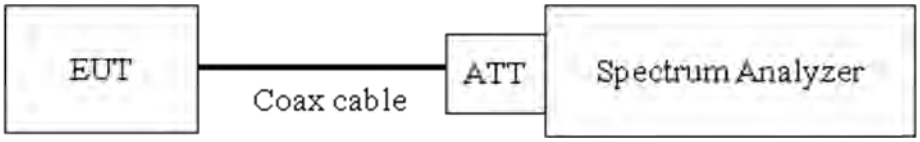
▪ Conducted Output Power(Average) = Reading Value + ATT loss + Cable loss + Duty Cycle Factor

7.4. Power Spectral Density

Limit

The transmitter power density average over 1-second interval shall not be greater than 8 dBm in any 3kHz BW.

Test Configuration



Test Procedure

The transmitter output is connected to the Spectrum Analyzer.

We tested according to Procedure 8.4 in KDB 558074 v05r02, Procedure 11.10 in ANSI 63.10-2013.

The spectrum analyzer is set to :

1) Set analyzer center frequency to DTS channel center frequency.
2) Set span to at least 1.5 times the OBW.
3) RBW = 3 kHz ≤ RBW ≤ 100 kHz.
4) VBW ≥ 3 x RBW.
5) Sweep = auto couple
6) Detector = power averaging (rms) or sample detector (when rms not available).
7) Ensure that the number of measurement points in the sweep ≥ [2 ×span / RBW].
8) Employ trace averaging (rms) mode over a minimum of 100 traces
9) Use the peak marker function to determine the maximum amplitude level.
10) Use the peak marker function to determine the maximum amplitude level within the RBW.
    If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.
11) if then duty factor shall be added to adjust the result if the duty cycle is less than 98%

Sample Calculation

▪ Power Spectral Density = Reading Value + ATT loss + Cable loss

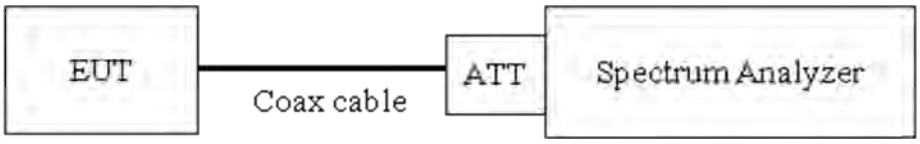
7.5. Conducted Band Edge(Out of Band Emissions) & Conducted Spurious Emissions

Limit

The maximum conducted (Average) output power was used to demonstrate compliance, then the peak power in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least relative to the maximum in-band peak PSD level in 100 kHz.

[Conducted > 30 dBc]

Test Configuration



Test Procedure

The transmitter output is connected to the spectrum analyzer.

(Procedure 11.11 in ANSI 63.10-2013)

1) RBW = 100 kHz
2) VBW ≥ 3 x RBW
3) Set span to encompass the spectrum to be examined
4) Detector = Peak
5) Trace Mode = max hold
6) Sweep time = auto couple
7) Ensure that the number of measurement points ≥ 2 x Span/RBW
8) Allow trace to fully stabilize.
9) Use peak marker function to determine the maximum amplitude level.

Measurements are made over the 30 MHz to 25 GHz range with the transmitter set to the lowest, middle, and highest channels.

Factors for frequency

Freq(MHz)	Factor(dB)
30	10.04
100	10.07
200	10.12
300	10.17
400	10.20
500	10.21
600	10.21
700	10.23
800	10.24
900	10.26
1000	10.27
2000	10.41
2400	10.45
2500	10.47
3000	10.52
4000	10.60
5000	10.71
6000	10.73
7000	10.80
8000	10.85
9000	10.91
10000	10.97
11000	11.02
12000	11.10
13000	11.19
14000	11.16
15000	11.21
16000	11.22
17000	11.25
18000	11.30
19000	11.32
20000	11.36
21000	11.48
22000	11.55
23000	11.55
24000	11.59
25000	11.68
26000	11.69

Note : 1. 2400 ~ 2500 MHz is fundamental frequency range.

2. Factor = Attenuator loss(10 dB) + Cable loss(1ea)

3. EUT Cable loss = 0.35 dB

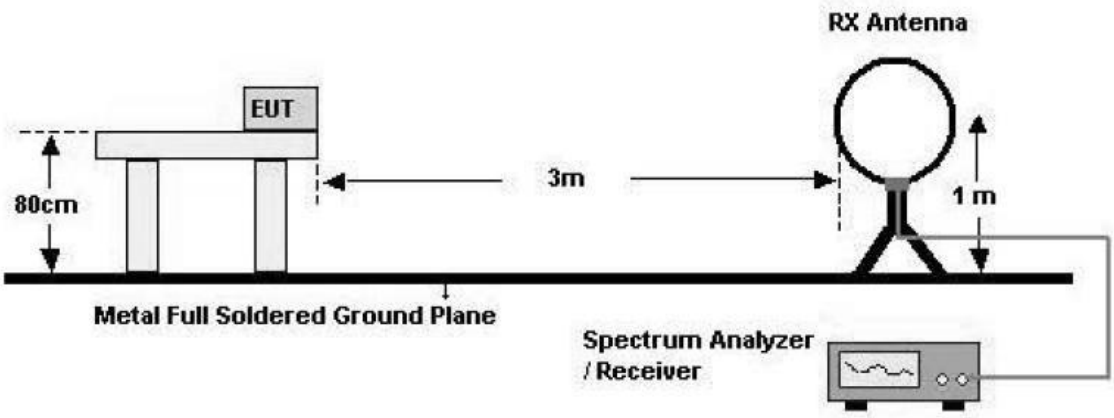
7.6. Radiated Test

Limit

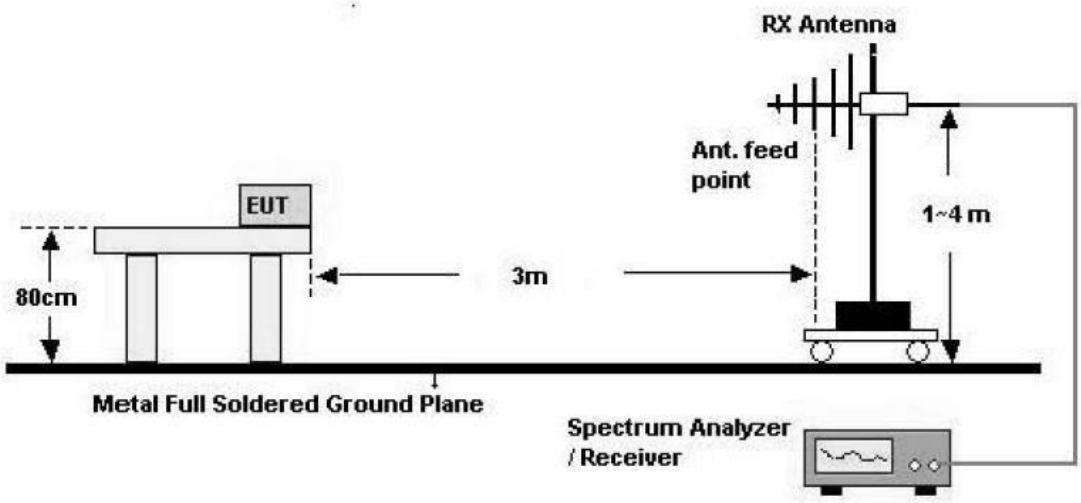
Frequency (MHz)	Field Strength (uV/m)	Measurement Distance (m)
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Test Configuration

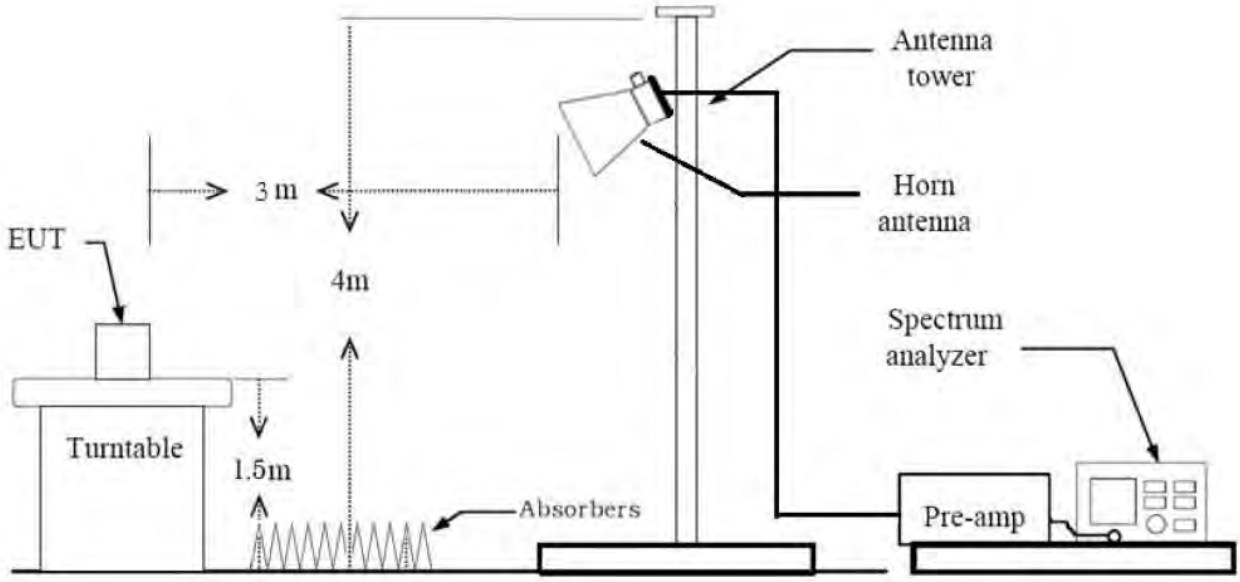
Below 30 MHz



30 MHz - 1 GHz



Above 1 GHz



Test Procedure of Radiated spurious emissions(Below 30 MHz)

1. The EUT was placed on a non-conductive table located on semi-anechoic chamber.
2. The loop antenna was placed at a location 3m from the EUT
3. The EUT is placed on a turntable, which is 0.8m above ground plane.
4. We have done x, y, z planes in EUT and horizontal and vertical polarization and Parallel to the ground plane in detecting antenna.
5. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
6. Distance Correction Factor(0.009 MHz – 0.490 MHz) = 40log(3 m/300 m) = - 80 dB
   Measurement Distance : 3 m
7. Distance Correction Factor(0.490 MHz – 30 MHz) = 40log(3 m/30 m) = - 40 dB
   Measurement Distance : 3 m
8. Spectrum Setting
   - Frequency Range = 9 kHz ~ 30 MHz
   - Detector = Peak
   - Trace = Maxhold
   - RBW = 9 kHz
   - VBW ≥ 3 x RBW
9. Total = Reading Value + Antenna Factor(A.F) + Cable Loss(C.L) + Distance Factor(D.F)
10. Measurement value only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.

KDB 414788 OFS and Chamber Correlation Justification

Base on FCC 15.31 (f) (2): measurements may be performed at a distance closer than that specified in the regulations; however, an attempt should be made to avoid making measurements in the near field.

OFS and chamber correlation testing had been performed and chamber measured test result is the worst case test result.

Test Procedure of Radiated spurious emissions(Below 1GHz)

1. The EUT was placed on a non-conductive table located on semi-anechoic chamber.
2. The EUT is placed on a turntable, which is 0.8m above ground plane.
3. The Hybrid antenna was placed at a location 3m from the EUT, which is varied from 1m to 4m to find out the highest emissions.
4. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
5. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
6. Spectrum Setting
   (1) Measurement Type(Peak):
      - Measured Frequency Range : 30 MHz – 1 GHz
      - Detector = Peak
      - Trace = Maxhold
      - RBW = 100 kHz
      - VBW ≥ 3 x RBW
   (2) Measurement Type(Quasi-peak):
      - Measured Frequency Range : 30 MHz – 1 GHz
      - Detector = Quasi-Peak
      - RBW = 120 kHz

   ※In general, (1) is used mainly
7. Total = Reading Value + Antenna Factor(A.F) + Cable Loss(C.L)
8. Measurement value only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.

Test Procedure of Radiated spurious emissions (Above 1 GHz)

1. The EUT is placed on a turntable, which is 1.5 m above ground plane.
2. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
3. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
4. EUT is set 3 m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
5. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
6. Each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
7. The unit was tested with its standard battery.
8. Spectrum Setting (Method 8.6 in KDB 558074 v05r02, Procedure 11.12 in ANSI 63.10-2013)
   (1) Measurement Type(Peak):
      - Measured Frequency Range : 1 GHz – 25 GHz
      - Detector = Peak
      - Trace = Maxhold

- RBW = 1 MHz
- VBW ≥ 3 x RBW

(2) Measurement Type(Average): Duty cycle ≥ 98%

- Measured Frequency Range : 1 GHz – 25 GHz
- Detector = RMS
- Averaging type = power (*i.e.*, RMS)
- RBW = 1 MHz
- VBW ≥ 3 x RBW
- Sweep time = auto.
- Trace mode = average (at least 100 traces).

(3) Measurement Type(Average): Duty cycle < 98%, duty cycle variations are less than ±2%

- Measured Frequency Range : 1 GHz – 25 GHz
- Detector = RMS
- Averaging type = power (*i.e.*, RMS)
- RBW = 1 MHz
- VBW ≥ 3 x RBW
- Sweep time = auto.
- Trace mode = average (at least 100 traces).
- Correction factor shall be added to the measurement results prior to comparing to the emission limit in order to compute the emission level that would have been measured had the test been performed at 100 percent duty cycle.
- Duty Cycle Factor (dB) : Please refer to the please refer to section 9.1.

9. Measurement value only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
10. Distance extrapolation factor = 20log (test distance / specific distance) (dB)
11. Total(Measurement Type : Peak)
    = Reading Value + Antenna Factor(A.F) + Cable Loss(C.L) - Amp Gain(A.G) + Distance Factor(D.F)

    Total(Measurement Type : Average, Duty cycle ≥ 98%)
    = Reading Value + Antenna Factor(A.F) + Cable Loss(C.L) - Amp Gain(A.G) + Distance Factor(D.F)

    Total(Measurement Type : Average, Duty cycle < 98%)
    = Reading Value + Antenna Factor(A.F) + Cable Loss(C.L) - Amp Gain(A.G) + Distance Factor(D.F)
    + Duty Cycle Factor

Test Procedure of Radiated Restricted Band Edge

1. The EUT is placed on a turntable, which is 1.5 m above ground plane.
2. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
3. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
4. EUT is set 3 m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
5. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
6. Each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
7. The unit was tested with its standard battery.
8. Spectrum Setting
   (1) Measurement Type(Peak):
   - Measured Frequency Range : 2310 MHz ~ 2390 MHz/ 2483.5 MHz ~ 2500 MHz
   - Detector = Peak
   - Trace = Maxhold
   - RBW = 1 MHz
   - VBW ≥ 3 x RBW

   (2) Measurement Type(Average): Duty cycle ≥ 98%,
   - Measured Frequency Range : 2310 MHz ~ 2390 MHz/ 2483.5 MHz ~ 2500 MHz
   - Detector = RMS
   - Averaging type = power (*i.e.*, RMS)
   - RBW = 1 MHz
   - VBW ≥ 3 x RBW
   - Sweep time = auto.
   - Trace mode = average (at least 100 traces).

   (3) Measurement Type(Average): Duty cycle < 98%, duty cycle variations are less than ±2%
   - Measured Frequency Range : 2310 MHz ~ 2390 MHz/ 2483.5 MHz ~ 2500 MHz
   - Detector = RMS
   - Averaging type = power (*i.e.*, RMS)
   - RBW = 1 MHz
   - VBW ≥ 3 x RBW
   - Sweep time = auto.
   - Trace mode = average (at least 100 traces).
   - Correction factor shall be added to the measurement results prior to comparing to the emission limit in order to compute the emission level that would have been measured had the test been performed at 100 percent duty cycle.
   - Duty Cycle Factor (dB) : Please refer to the please refer to section 9.1.

9. Measurement value only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
10. Distance extrapolation factor = 20log (test distance / specific distance) (dB)
11. Total(Measurement Type : Peak)
    = Reading Value + Antenna Factor(A.F) + Cable Loss(C.L) + Distance Factor(D.F)
    Total(Measurement Type : Average, Duty cycle ≥ 98%)
    = Reading Value + Antenna Factor(A.F) + Cable Loss(C.L) + Distance Factor(D.F)
    Total(Measurement Type : Average, Duty cycle < 98%)
    = Reading Value + Antenna Factor(A.F) + Cable Loss(C.L) + Distance Factor(D.F) + Duty Cycle Factor

7.7. AC Power line Conducted Emissions

Limit

For an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 μH/50 ohms line impedance stabilization network (LISN).

Frequency Range (MHz)	Limits (dBμV)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56[a]	56 to 46[a]
0.50 to 5	56	46
5 to 30	60	50

[a]Decreases with the logarithm of the frequency.

Compliance with this provision shall be based on the measurement of the radio frequency voltage between each power line (LINE and NEUTRAL) and ground at the power terminals.

Test Configuration

See test photographs attached in Annex A for the actual connections between EUT and support equipment.

Test Procedure

1. The EUT is placed on a wooden table 80 cm above the reference ground plane.
2. The EUT is connected via LISN to a test power supply.
3. The measurement results are obtained as described below:
4. Detectors : Quasi Peak and Average Detector.

Sample Calculation

Quasi-peak(Final Result) = Reading Value + Correction Factor

7.8. Worst case configuration and mode

Radiated test

1. All modes of operation were investigated and the worst case configuration results are reported.
   - Mode : Stand alone, Stand alone + External accessories(Earphone, etc)
   - Worstcase : Stand alone
2. EUT Axis
   - Radiated Spurious Emissions : Z(0 degree)
   - Radiated Restricted Band Edge : X(180 degree), Z(180 degree)
3. Duty cycle factor applies only 802.11g/n/ac (Duty cycle < 98%).
4. All data rate of operation were investigated and the test results are worst case in lowest Data Rate of each mode.
   - 802.11b : 1 Mbps
   - 802.11g : 6 Mbps
   - 802.11n(HT20), 802.11ac(VHT20) : MCS0
5. All position of loop antenna were investigated and the test result is a no critical peak found at all positions.
   - Position : Horizontal, Vertical, Parallel to the ground plane

AC Power line Conducted Emissions

1. All modes of operation were investigated and the worst case configuration results are reported.
   - Mode : Stand alone + External accessories(Earphone, etc)+Travel Adapter,
     Stand alone + Travel Adapter
   - Worstcase : Stand alone + Travel Adapter

Conducted test

1. The EUT was configured with data rate of highest power.

8. SUMMARY TEST OF RESULTS

Test Description	FCC Part Section(s)	Test Limit	Test Condition	Test Result
6 dB Bandwidth	§15.247(a)(2)	> 500 kHz	Conducted	PASS
Conducted Maximum Output Power	§15.247(b)(3)	< 1 Watt		PASS
Power Spectral Density	§15.247(e)	< 8 dBm / 3 kHz Band		PASS
Band Edge (Out of Band Emissions)	§15.247(d)	Conducted > 30 dBc		PASS
AC Power line Conducted Emissions	§15.207	cf. Section 7.7		PASS
Radiated Spurious Emissions	§15.247(d), 15.205, 15.209	cf. Section 7.6	Radiated	PASS
Radiated Restricted Band Edge	§15.247(d), 15.205, 15.209	cf. Section 7.6		PASS

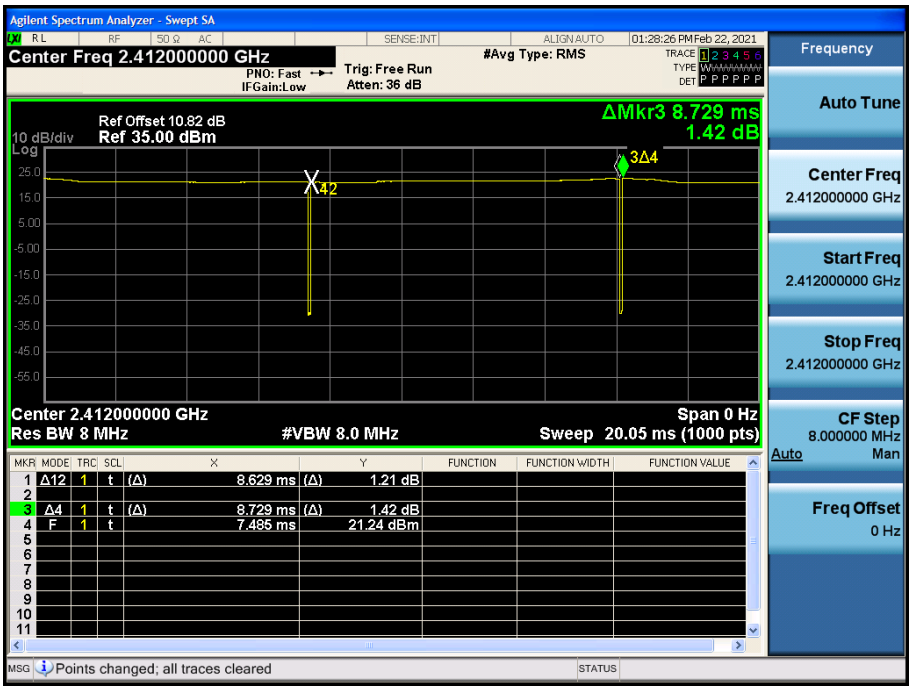
9. TEST RESULT

9.1 DUTY CYCLE

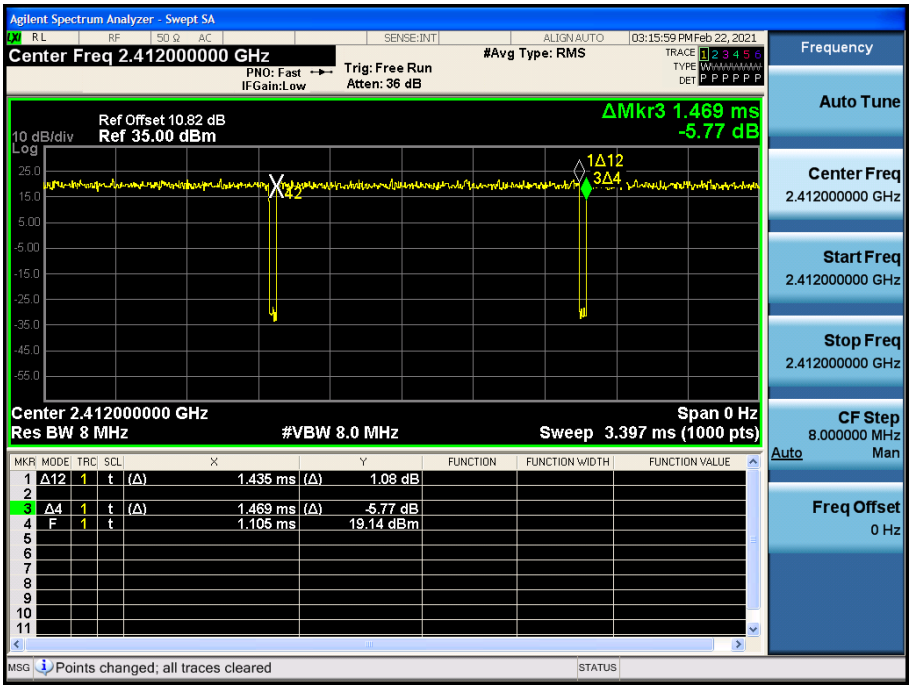
Mode	Data Rate (Mbps)	T_{on} (ms)	T_{total} (ms)	Duty Cycle	Duty Cycle Factor (dB)
802.11b	1	8.629	8.729	0.989	0.050
	2	4.409	4.510	0.978	0.098
	5.5	1.727	1.822	0.948	0.233
	11	0.959	1.052	0.911	0.405
802.11g	6	1.435	1.469	0.977	0.102
	9	0.960	0.997	0.963	0.162
	12	0.729	0.765	0.953	0.211
	18	0.492	0.529	0.929	0.318
	24	0.376	0.413	0.911	0.406
	36	0.257	0.293	0.877	0.572
	48	0.200	0.236	0.847	0.720
	54	0.180	0.216	0.833	0.794
802.11n (HT20)	6.5 (MCS0)	1.339	1.378	0.972	0.122
	13 (MCS1)	0.687	0.725	0.948	0.232
	19.5 (MCS2)	0.472	0.508	0.928	0.323
	26 (MCS3)	0.364	0.401	0.907	0.424
	39 (MCS4)	0.256	0.292	0.877	0.569
	52 (MCS5)	0.200	0.236	0.848	0.716
	58.5 (MCS6)	0.184	0.220	0.837	0.773
	65 (MCS7)	0.168	0.204	0.823	0.844
802.11ac (VHT20)	6.5 (MCS0)	1.350	1.386	0.974	0.113
	13 (MCS1)	0.696	0.732	0.950	0.221
	19.5 (MCS2)	0.476	0.512	0.929	0.320
	26 (MCS3)	0.368	0.406	0.908	0.420
	39 (MCS4)	0.260	0.296	0.879	0.562
	52 (MCS5)	0.204	0.241	0.849	0.712
	58.5 (MCS6)	0.188	0.224	0.839	0.760
	65 (MCS7)	0.172	0.208	0.827	0.824
	78 (MCS8)	0.152	0.188	0.809	0.922

▣ Test Plots

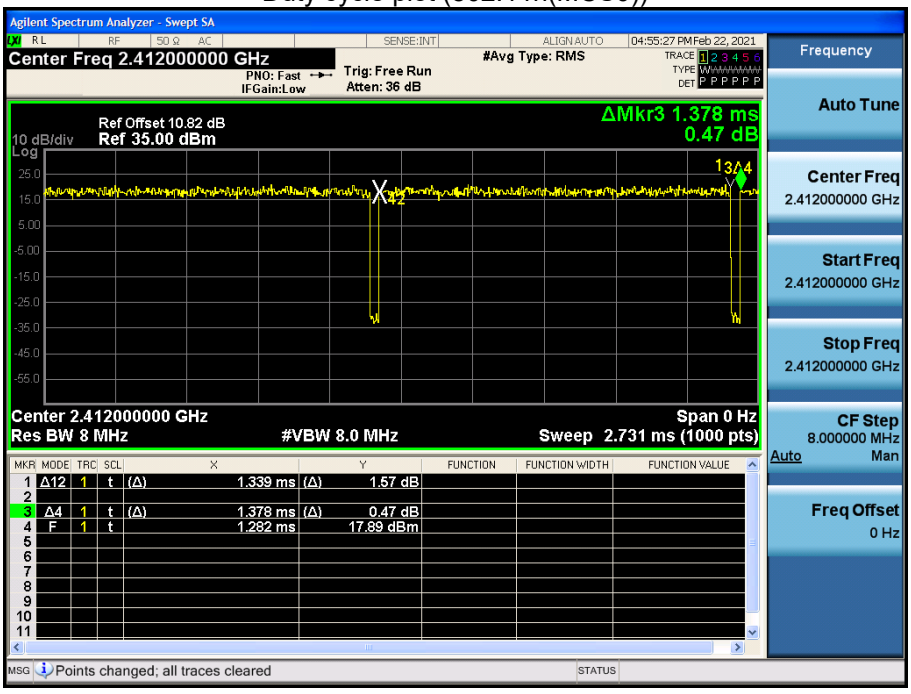
Duty cycle plot (802.11b(1Mbps))



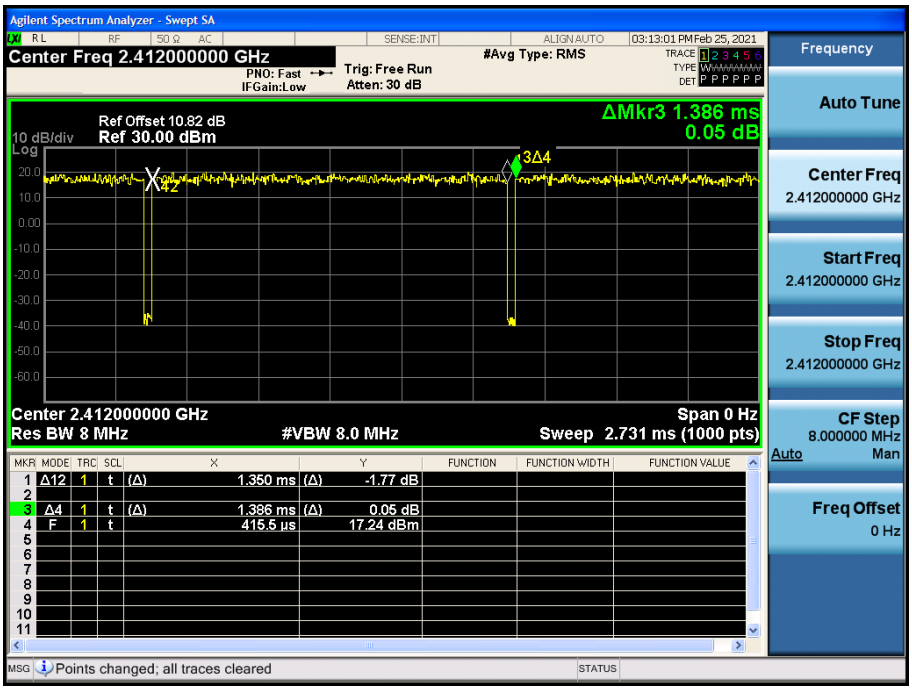
Duty cycle plot (802.11g(6Mbps))



Duty cycle plot (802.11n(MCS0))



Duty cycle plot (802.11ac(MCS0))



Note:

In order to simplify the report, attached plots were only the most lowest data rate.

9.2 6dB BANDWIDTH

[Ant.1]

802.11b Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]
Frequency [MHz]	Channel No.		
2412	1	8.124	0.5
2437	6	8.120	0.5
2462	11	8.118	0.5
2467	12	8.125	0.5
2472	13	9.097	0.5

802.11g Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]
Frequency [MHz]	Channel No.		
2412	1	15.09	0.5
2437	6	13.84	0.5
2462	11	15.11	0.5
2467	12	15.14	0.5
2472	13	15.10	0.5

802.11n(HT20) Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]
Frequency [MHz]	Channel No.		
2412	1	15.03	0.5
2437	6	13.84	0.5
2462	11	12.65	0.5
2467	12	15.13	0.5
2472	13	16.07	0.5

802.11ac(VHT20) Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]
Frequency [MHz]	Channel No.		
2412	1	13.85	0.5
2437	6	13.85	0.5
2462	11	15.11	0.5
2467	12	15.13	0.5
2472	13	15.97	0.5

[Ant.2]

802.11b Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]
Frequency [MHz]	Channel No.		
2412	1	8.122	0.5
2437	6	8.123	0.5
2462	11	8.128	0.5
2467	12	8.125	0.5
2472	13	8.120	0.5

802.11g Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]
Frequency [MHz]	Channel No.		
2412	1	15.11	0.5
2437	6	15.05	0.5
2462	11	15.06	0.5
2467	12	15.05	0.5
2472	13	15.07	0.5

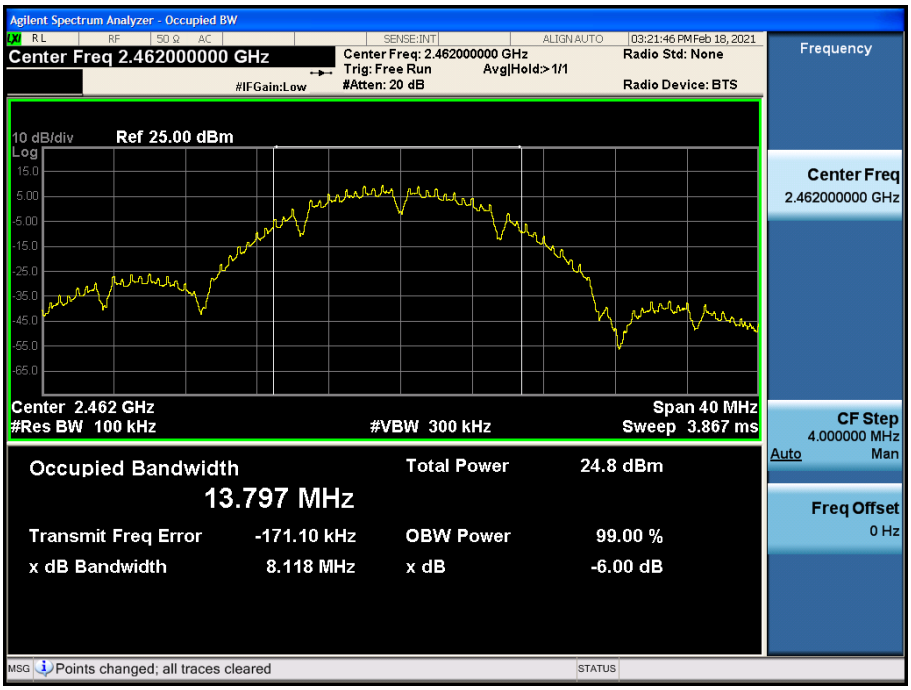
802.11n(HT20) Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]
Frequency [MHz]	Channel No.		
2412	1	15.05	0.5
2437	6	13.82	0.5
2462	11	15.13	0.5
2467	12	13.79	0.5
2472	13	13.83	0.5

802.11ac(VHT20) Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]
Frequency [MHz]	Channel No.		
2412	1	13.78	0.5
2437	6	15.13	0.5
2462	11	13.81	0.5
2467	12	13.79	0.5
2472	13	13.78	0.5

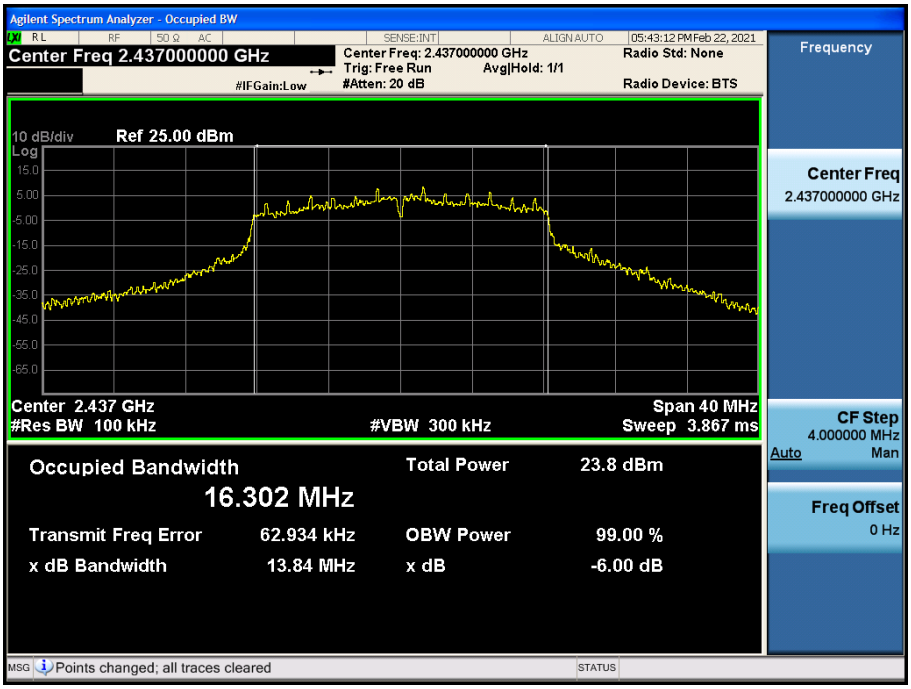
[Ant.1]

▣ Test Plots

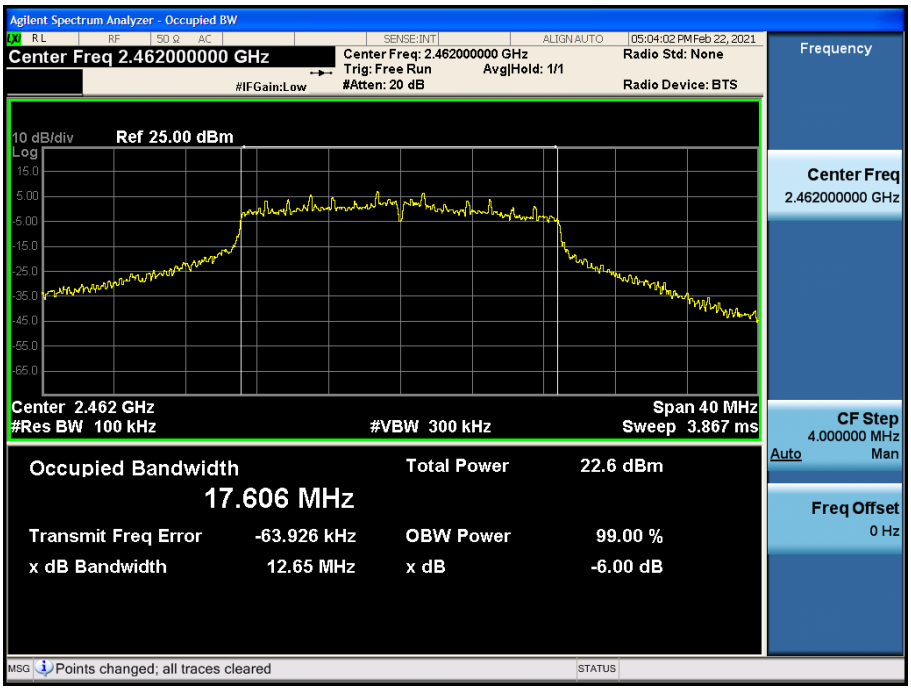
6dB Bandwidth plot (802.11b-CH 11)



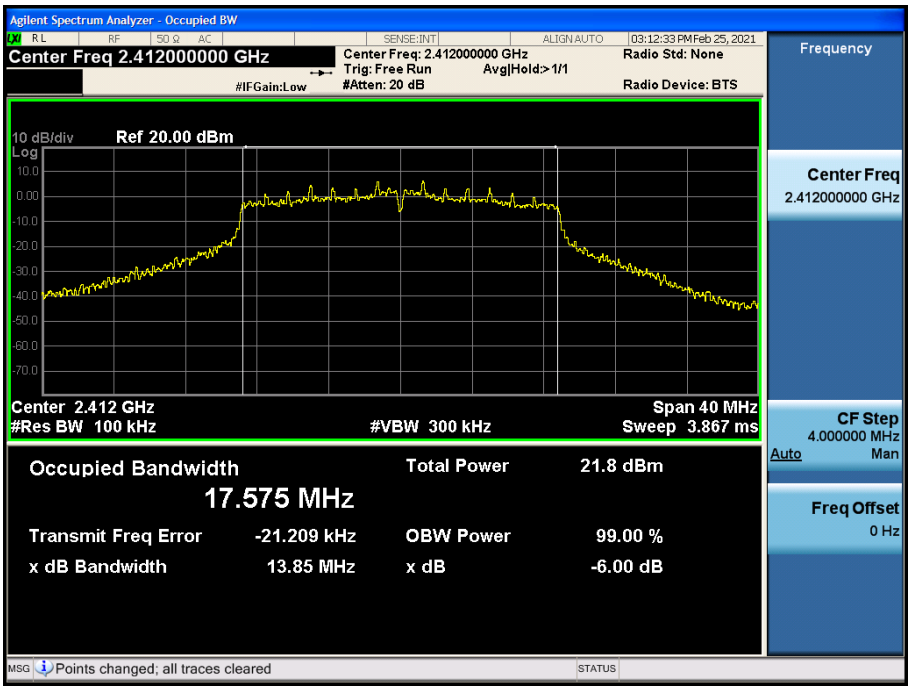
6dB Bandwidth plot (802.11g-CH 6)



6dB Bandwidth plot (802.11n_HT20-CH 11)



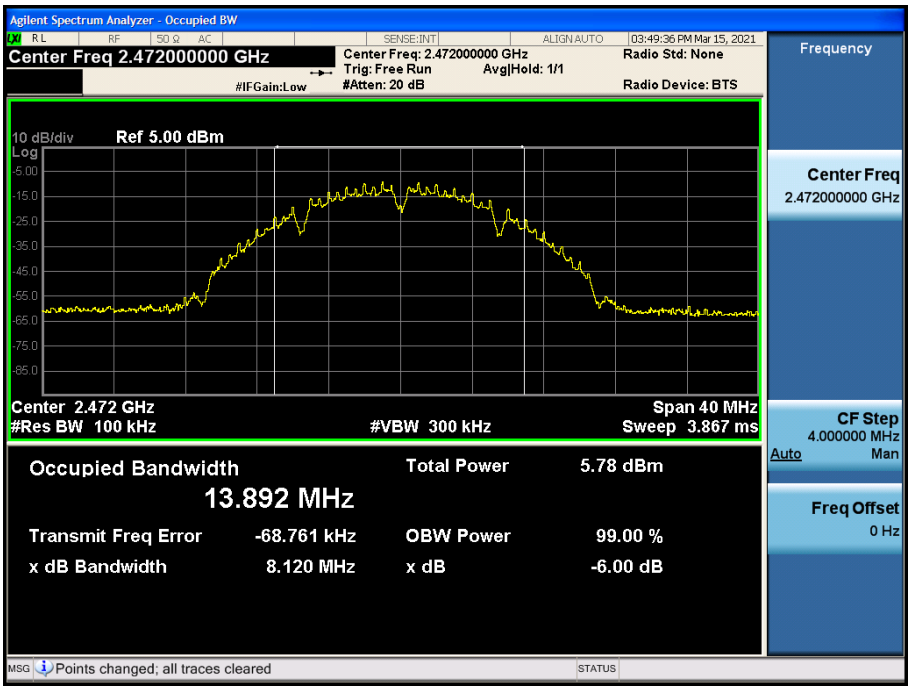
6dB Bandwidth plot (802.11ac_VHT20-CH 1)



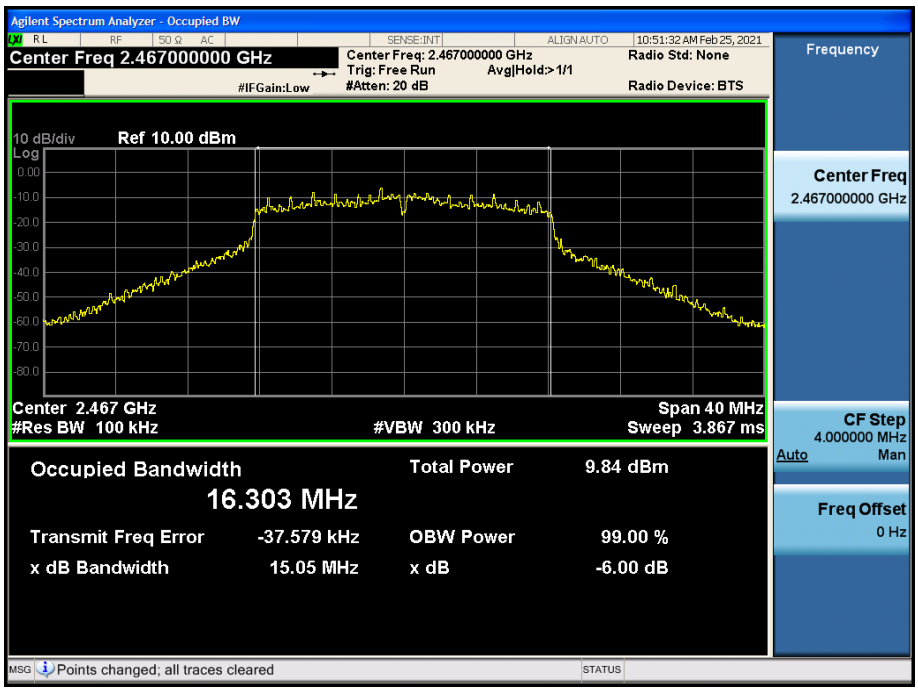
[Ant.2]

▣ Test Plots

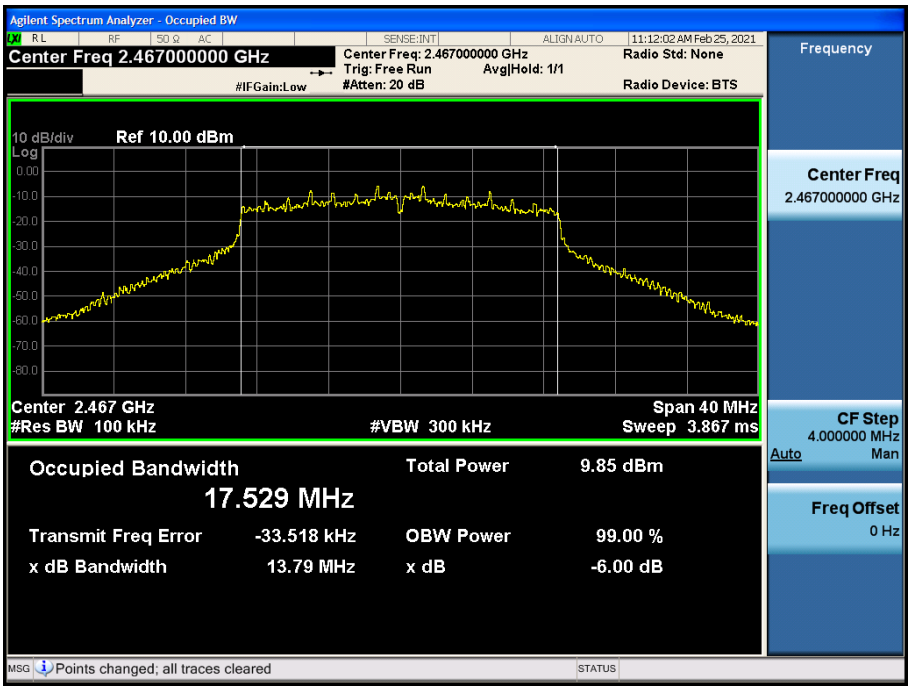
6dB Bandwidth plot (802.11b-CH 13)



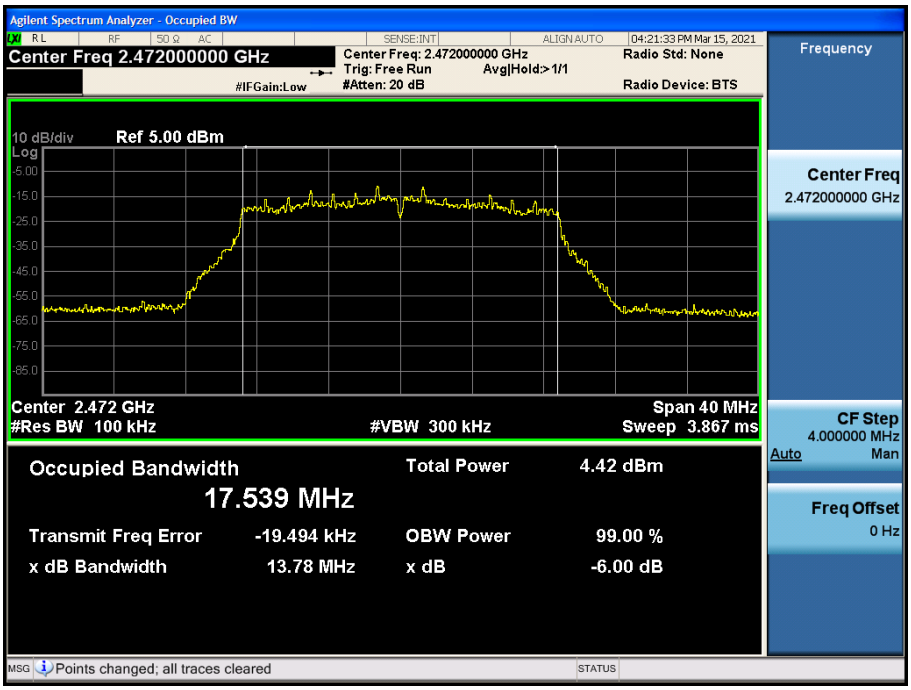
6dB Bandwidth plot (802.11g-CH 12)



6dB Bandwidth plot (802.11n_HT20-CH 12)



6dB Bandwidth plot (802.11ac_VHT20-CH 13)



Note:

In order to simplify the report, attached plots were only the most narrow 6 dB BW channel.

9.3 OUTPUT POWER

Peak Power

1. Power Meter offset = Attenuator loss + Cable loss + EUT Cable loss
2. We apply to the offset in the 2.4 GHz range that was rounded off to the closest tenth dB.
   So, 10.82 dB is offset for 2.4 GHz Band

[Ant.1]

802.11b Mode		Rate (Mbps)	Measured Power(dBm)	Limit (dBm)	Power Level Setting
Frequency[MHz]	Channel No.				
2412	1	1	15.77	30	13
		2	16.02	30	
		5.5	17.35	30	
		11	18.84	30	
2437	6	1	16.61	30	14
		2	16.87	30	
		5.5	18.28	30	
		11	19.74	30	
2462	11	1	17.41	30	15
		2	17.68	30	
		5.5	18.98	30	
		11	20.47	30	
2467	12	1	5.86	30	3
		2	5.87	30	
		5.5	7.18	30	
		11	8.52	30	
2472	13	1	-1.56	30	3
		2	0.11	30	
		5.5	0.58	30	
		11	1.75	30	

802.11g Mode		Rate (Mbps)	Measured Power(dBm)	Limit (dBm)	Power Level Setting
Frequency[MHz]	Channel No.				
2412	1	6	21.40	30	14
		9	21.39	30	
		12	21.20	30	
		18	21.91	30	
		24	22.35	30	
		36	22.19	30	
		48	22.32	30	
		54	22.36	30	
2437	6	6	22.06	30	15
		9	22.06	30	
		12	21.90	30	
		18	22.55	30	
		24	23.01	30	
		36	22.67	30	
		48	22.91	30	
		54	22.87	30	
2462	11	6	22.11	30	15
		9	22.09	30	
		12	21.88	30	
		18	22.58	30	
		24	23.06	30	
		36	22.88	30	
		48	23.03	30	
		54	23.10	30	
2467	12	6	9.84	30	3
		9	9.93	30	
		12	9.71	30	
		18	10.29	30	
		24	10.69	30	
		36	10.55	30	
		48	10.64	30	
		54	10.78	30	
2472	13	6	3.40	30	3
		9	3.45	30	
		12	3.14	30	
		18	3.82	30	
		24	4.23	30	
		36	4.18	30	
		48	4.16	30	
		54	4.34	30	

802.11n(HT20) Mode		MCS Index	Measured Power(dBm)	Limit (dBm)	Power Level Setting
Frequency[MHz]	Channel No.				
2412	1	0	20.98	30	14
		1	20.73	30	
		2	21.56	30	
		3	21.87	30	
		4	21.78	30	
		5	21.76	30	
		6	21.84	30	
		7	21.67	30	
2437	6	0	21.69	30	15
		1	21.45	30	
		2	22.25	30	
		3	22.52	30	
		4	22.24	30	
		5	22.27	30	
		6	22.36	30	
		7	22.20	30	
2462	11	0	21.32	30	15
		1	21.00	30	
		2	21.89	30	
		3	22.12	30	
		4	21.70	30	
		5	21.74	30	
		6	21.82	30	
		7	21.66	30	
2467	12	0	9.60	30	3
		1	9.33	30	
		2	10.06	30	
		3	10.38	30	
		4	10.26	30	
		5	10.27	30	
		6	10.29	30	
		7	10.11	30	
2472	13	0	3.28	30	3
		1	3.12	30	
		2	4.07	30	
		3	4.06	30	
		4	4.11	30	
		5	4.11	30	
		6	4.28	30	
		7	4.00	30	

802.11ac(VHT20) Mode		MCS Index	Measured Power(dBm)	Limit (dBm)	Power Level Setting
Frequency[MHz]	Channel No.				
2412	1	0	20.80	30	14
		1	20.48	30	
		2	21.36	30	
		3	21.56	30	
		4	21.31	30	
		5	21.42	30	
		6	21.43	30	
		7	21.33	30	
		8	21.55	30	
2437	6	0	21.68	30	15
		1	21.37	30	
		2	22.25	30	
		3	22.47	30	
		4	22.26	30	
		5	22.32	30	
		6	22.42	30	
		7	22.27	30	
		8	22.45	30	
2462	11	0	21.77	30	15
		1	21.45	30	
		2	22.35	30	
		3	22.59	30	
		4	22.47	30	
		5	22.44	30	
		6	22.63	30	
		7	22.43	30	
		8	22.67	30	
2467	12	0	9.59	30	3
		1	9.24	30	
		2	10.04	30	
		3	10.29	30	
		4	10.14	30	
		5	10.21	30	
		6	10.29	30	
		7	10.12	30	
		8	10.37	30	
2472	13	0	3.34	30	3
		1	3.12	30	
		2	3.91	30	
		3	3.99	30	
		4	4.05	30	
		5	3.98	30	
		6	4.06	30	
		7	4.05	30	
		8	4.24	30	

[Ant.2]

802.11b Mode		Rate (Mbps)	Measured Power(dBm)	Limit (dBm)	Power Level Setting
Frequency[MHz]	Channel No.				
2412	1	1	16.67	30	13
		2	16.91	30	
		5.5	18.25	30	
		11	19.67	30	
2437	6	1	17.63	30	14
		2	17.84	30	
		5.5	19.15	30	
		11	20.62	30	
2462	11	1	18.44	30	15
		2	18.72	30	
		5.5	20.07	30	
		11	21.55	30	
2467	12	1	6.54	30	3
		2	6.65	30	
		5.5	8.02	30	
		11	9.32	30	
2472	13	1	1.91	30	3
		2	2.07	30	
		5.5	3.05	30	
		11	4.13	30	

802.11g Mode		Rate (Mbps)	Measured Power(dBm)	Limit (dBm)	Power Level Setting
Frequency[MHz]	Channel No.				
2412	1	6	21.93	30	14
		9	21.94	30	
		12	21.78	30	
		18	22.37	30	
		24	22.81	30	
		36	22.67	30	
		48	22.82	30	
		54	22.86	30	
2437	6	6	23.32	30	15
		9	23.33	30	
		12	23.10	30	
		18	23.77	30	
		24	24.31	30	
		36	24.11	30	
		48	24.28	30	
		54	24.36	30	
2462	11	6	22.85	30	15
		9	22.89	30	
		12	22.68	30	
		18	23.25	30	
		24	23.72	30	
		36	23.52	30	
		48	23.71	30	
		54	23.73	30	
2467	12	6	10.63	30	3
		9	10.66	30	
		12	10.44	30	
		18	11.04	30	
		24	11.54	30	
		36	11.33	30	
		48	11.49	30	
		54	11.58	30	
2472	13	6	5.01	30	3
		9	5.03	30	
		12	4.88	30	
		18	5.64	30	
		24	5.90	30	
		36	5.53	30	
		48	5.69	30	
		54	5.73	30	

802.11n(HT20) Mode		MCS Index	Measured Power(dBm)	Limit (dBm)	Power Level Setting
Frequency[MHz]	Channel No.				
2412	1	0	21.58	30	14
		1	21.36	30	
		2	22.10	30	
		3	22.40	30	
		4	22.26	30	
		5	22.32	30	
		6	22.32	30	
		7	22.23	30	
2437	6	0	22.98	30	15
		1	22.73	30	
		2	23.54	30	
		3	23.90	30	
		4	23.72	30	
		5	23.76	30	
		6	23.86	30	
		7	23.67	30	
2462	11	0	22.32	30	15
		1	22.08	30	
		2	22.75	30	
		3	23.07	30	
		4	23.02	30	
		5	22.89	30	
		6	22.80	30	
		7	22.71	30	
2467	12	0	10.10	30	3
		1	9.83	30	
		2	10.57	30	
		3	10.86	30	
		4	10.65	30	
		5	10.64	30	
		6	10.67	30	
		7	10.51	30	
2472	13	0	5.02	30	3
		1	4.76	30	
		2	5.15	30	
		3	5.55	30	
		4	5.65	30	
		5	5.82	30	
		6	6.01	30	
		7	5.80	30	

802.11ac(VHT20) Mode		MCS Index	Measured Power(dBm)	Limit (dBm)	Power Level Setting
Frequency[MHz]	Channel No.				
2412	1	0	21.33	30	14
		1	21.06	30	
		2	21.94	30	
		3	22.21	30	
		4	21.89	30	
		5	22.02	30	
		6	22.08	30	
		7	21.87	30	
		8	22.05	30	
2437	6	0	22.45	30	15
		1	22.11	30	
		2	23.00	30	
		3	23.33	30	
		4	23.09	30	
		5	23.22	30	
		6	23.31	30	
		7	23.19	30	
		8	23.38	30	
2462	11	0	21.96	30	15
		1	21.72	30	
		2	22.44	30	
		3	22.74	30	
		4	22.44	30	
		5	22.57	30	
		6	22.58	30	
		7	22.49	30	
		8	22.55	30	
2467	12	0	9.85	30	3
		1	9.57	30	
		2	10.39	30	
		3	10.65	30	
		4	10.35	30	
		5	10.43	30	
		6	10.46	30	
		7	10.35	30	
		8	10.56	30	
2472	13	0	4.54	30	3
		1	4.07	30	
		2	4.85	30	
		3	5.17	30	
		4	5.26	30	
		5	5.03	30	
		6	5.09	30	
		7	4.93	30	
		8	5.03	30	

[MIMO]

802.11b Mode		Rate (Mbps)	Ant.1 Measured Power(dBm)	Ant.2 Measured Power(dBm)	MIMO Measured Power(dBm)	Limit (dBm)	Power Level Setting
Frequency[MHz]	Channel No.						
2412	1	1	15.77	16.67	19.25	30	13
		2	16.02	16.91	19.50	30	
		5.5	17.35	18.25	20.83	30	
		11	18.84	19.67	22.29	30	
2437	6	1	16.61	17.63	20.16	30	14
		2	16.87	17.84	20.39	30	
		5.5	18.28	19.15	21.75	30	
		11	19.74	20.62	23.21	30	
2462	11	1	17.41	18.44	20.97	30	15
		2	17.68	18.72	21.24	30	
		5.5	18.98	20.07	22.57	30	
		11	20.47	21.55	24.05	30	
2467	12	1	5.86	6.54	9.22	30	3
		2	5.87	6.65	9.29	30	
		5.5	7.18	8.02	10.63	30	
		11	8.52	9.32	11.95	30	
2472	13	1	-1.56	1.91	3.52	30	3
		2	0.11	2.07	4.21	30	
		5.5	0.58	3.05	4.99	30	
		11	1.75	4.13	6.11	30	

802.11g Mode		Rate (Mbps)	Ant.1 Measured Power(dBm)	Ant.2 Measured Power(dBm)	MIMO Measured Power(dBm)	Limit (dBm)	Power Level Setting
Frequency[MHz]	Channel No.						
2412	1	6	21.40	21.93	24.68	30	14
		9	21.39	21.94	24.69	30	
		12	21.20	21.78	24.51	30	
		18	21.91	22.37	25.16	30	
		24	22.35	22.81	25.59	30	
		36	22.19	22.67	25.45	30	
		48	22.32	22.82	25.58	30	
		54	22.36	22.86	25.63	30	
2437	6	6	22.06	23.32	25.75	30	15
		9	22.06	23.33	25.75	30	
		12	21.90	23.10	25.55	30	
		18	22.55	23.77	26.21	30	
		24	23.01	24.31	26.72	30	
		36	22.67	24.11	26.46	30	
		48	22.91	24.28	26.66	30	
		54	22.87	24.36	26.69	30	
2462	11	6	22.11	22.85	25.51	30	15
		9	22.09	22.89	25.52	30	
		12	21.88	22.68	25.31	30	
		18	22.58	23.25	25.94	30	
		24	23.06	23.72	26.41	30	
		36	22.88	23.52	26.22	30	
		48	23.03	23.71	26.39	30	
		54	23.10	23.73	26.44	30	
2467	12	6	9.84	10.63	13.26	30	3
		9	9.93	10.66	13.32	30	
		12	9.71	10.44	13.10	30	
		18	10.29	11.04	13.69	30	
		24	10.69	11.54	14.15	30	
		36	10.55	11.33	13.97	30	
		48	10.64	11.49	14.09	30	
		54	10.78	11.58	14.21	30	
2472	13	6	3.40	5.01	7.29	30	3
		9	3.45	5.03	7.32	30	
		12	3.14	4.88	7.11	30	
		18	3.82	5.64	7.83	30	
		24	4.23	5.90	8.16	30	
		36	4.18	5.53	7.92	30	
		48	4.16	5.69	8.00	30	
		54	4.34	5.73	8.10	30	

802.11n(HT20) Mode		MCS Index	Ant.1 Measured Power(dBm)	Ant.2 Measured Power(dBm)	MIMO Measured Power(dBm)	Limit (dBm)	Power Level Setting
Frequency[MHz]	Channel No.						
2412	1	0	20.98	21.58	24.30	30	14
		1	20.73	21.36	24.07	30	
		2	21.56	22.10	24.85	30	
		3	21.87	22.40	25.16	30	
		4	21.78	22.26	25.04	30	
		5	21.76	22.32	25.06	30	
		6	21.84	22.32	25.10	30	
		7	21.67	22.23	24.97	30	
2437	6	0	21.69	22.98	25.39	30	15
		1	21.45	22.73	25.15	30	
		2	22.25	23.54	25.95	30	
		3	22.52	23.90	26.28	30	
		4	22.24	23.72	26.05	30	
		5	22.27	23.76	26.09	30	
		6	22.36	23.86	26.18	30	
		7	22.20	23.67	26.01	30	
2462	11	0	21.32	22.32	24.86	30	15
		1	21.00	22.08	24.58	30	
		2	21.89	22.75	25.35	30	
		3	22.12	23.07	25.63	30	
		4	21.70	23.02	25.42	30	
		5	21.74	22.89	25.37	30	
		6	21.82	22.80	25.35	30	
		7	21.66	22.71	25.23	30	
2467	12	0	9.60	10.10	12.87	30	3
		1	9.33	9.83	12.60	30	
		2	10.06	10.57	13.33	30	
		3	10.38	10.86	13.64	30	
		4	10.26	10.65	13.47	30	
		5	10.27	10.64	13.47	30	
		6	10.29	10.67	13.50	30	
		7	10.11	10.51	13.32	30	
2472	13	0	3.28	5.02	7.25	30	3
		1	3.12	4.76	7.03	30	
		2	4.07	5.15	7.66	30	
		3	4.06	5.55	7.88	30	
		4	4.11	5.65	7.96	30	
		5	4.11	5.82	8.06	30	
		6	4.28	6.01	8.24	30	
		7	4.00	5.80	8.01	30	

802.11ac(VHT20) Mode		MCS Index	Ant.1 Measured Power(dBm)	Ant.2 Measured Power(dBm)	MIMO Measured Power(dBm)	Limit (dBm)	Power Level Setting
Frequency[MHz]	Channel No.						
2412	1	0	20.80	21.33	24.09	30	14
		1	20.48	21.06	23.79	30	
		2	21.36	21.94	24.67	30	
		3	21.56	22.21	24.91	30	
		4	21.31	21.89	24.62	30	
		5	21.42	22.02	24.74	30	
		6	21.43	22.08	24.78	30	
		7	21.33	21.87	24.62	30	
		8	21.55	22.05	24.82	30	
2437	6	0	21.68	22.45	25.09	30	14
		1	21.37	22.11	24.77	30	
		2	22.25	23.00	25.65	30	
		3	22.47	23.33	25.93	30	
		4	22.26	23.09	25.70	30	
		5	22.32	23.22	25.80	30	
		6	22.42	23.31	25.90	30	
		7	22.27	23.19	25.77	30	
		8	22.45	23.38	25.95	30	
2462	11	0	21.77	21.96	24.88	30	14
		1	21.45	21.72	24.60	30	
		2	22.35	22.44	25.41	30	
		3	22.59	22.74	25.68	30	
		4	22.47	22.44	25.46	30	
		5	22.44	22.57	25.52	30	
		6	22.63	22.58	25.61	30	
		7	22.43	22.49	25.47	30	
		8	22.67	22.55	25.62	30	
2467	12	0	9.59	9.85	12.73	30	14
		1	9.24	9.57	12.42	30	
		2	10.04	10.39	13.23	30	
		3	10.29	10.65	13.48	30	
		4	10.14	10.35	13.26	30	
		5	10.21	10.43	13.33	30	
		6	10.29	10.46	13.38	30	
		7	10.12	10.35	13.25	30	
		8	10.37	10.56	13.48	30	
2472	13	0	3.34	4.54	6.99	30	14
		1	3.12	4.07	6.63	30	
		2	3.91	4.85	7.42	30	
		3	3.99	5.17	7.63	30	
		4	4.05	5.26	7.71	30	
		5	3.98	5.03	7.55	30	
		6	4.06	5.09	7.62	30	
		7	4.05	4.93	7.53	30	
		8	4.24	5.03	7.66	30	

Average Power

1. Power Meter offset = Attenuator loss + Cable loss + EUT Cable loss
2. We apply to the offset in the 2.4 GHz range that was rounded off to the closest tenth dB.
   So, 10.82 dB is offset for 2.4 GHz Band.

[Ant.1]

802.11b Mode		Rate (Mbps)	Measured Power (dBm)	Duty Cycle Factor	Measured Power(dBm) + Duty Cycle Factor	Limit (dBm)	Power Level Setting
Frequency [MHz]	Channel No.						
2412	1	1	13.06	0.050	13.11	30	13
		2	12.97	0.098	13.07	30	
		5.5	12.88	0.233	13.11	30	
		11	12.74	0.405	13.14	30	
2437	6	1	13.91	0.050	13.96	30	14
		2	13.85	0.098	13.95	30	
		5.5	13.80	0.233	14.03	30	
		11	13.64	0.405	14.04	30	
2462	11	1	14.71	0.050	14.76	30	15
		2	14.67	0.098	14.77	30	
		5.5	14.54	0.233	14.77	30	
		11	14.38	0.405	14.78	30	
2467	12	1	2.63	0.050	2.68	30	3
		2	2.59	0.098	2.69	30	
		5.5	2.55	0.233	2.78	30	
		11	2.39	0.405	2.79	30	
2472	13	1	-4.18	0.050	-4.13	30	3
		2	-4.17	0.098	-4.08	30	
		5.5	-4.27	0.233	-4.04	30	
		11	-4.43	0.405	-4.03	30	

802.11g Mode		Rate (Mbps)	Measured Power (dBm)	Duty Cycle Factor	Measured Power(dBm) + Duty Cycle Factor	Limit (dBm)	Power Level Setting
Frequency [MHz]	Channel No.						
2412	1	6	13.45	0.102	13.55	30	14
		9	13.37	0.162	13.53	30	
		12	13.30	0.211	13.51	30	
		18	14.02	0.318	14.34	30	
		24	13.71	0.406	14.12	30	
		36	13.55	0.572	14.12	30	
		48	13.37	0.720	14.09	30	
		54	13.34	0.794	14.13	30	
2437	6	6	14.49	0.102	14.59	30	15
		9	14.36	0.162	14.52	30	
		12	14.32	0.211	14.53	30	
		18	15.00	0.318	15.32	30	
		24	14.71	0.406	15.12	30	
		36	14.51	0.572	15.08	30	
		48	14.39	0.720	15.11	30	
		54	14.32	0.794	15.11	30	
2462	11	6	14.31	0.102	14.41	30	15
		9	14.22	0.162	14.38	30	
		12	14.16	0.211	14.37	30	
		18	14.87	0.318	15.19	30	
		24	14.58	0.406	14.99	30	
		36	14.38	0.572	14.95	30	
		48	14.30	0.720	15.02	30	
		54	14.18	0.794	14.97	30	
2467	12	6	2.10	0.102	2.20	30	3
		9	1.95	0.162	2.11	30	
		12	1.91	0.211	2.12	30	
		18	2.53	0.318	2.84	30	
		24	2.23	0.406	2.63	30	
		36	2.09	0.572	2.66	30	
		48	1.98	0.720	2.70	30	
		54	1.85	0.794	2.64	30	
2472	13	6	-5.01	0.102	-4.91	30	3
		9	-5.12	0.162	-4.96	30	
		12	-5.18	0.211	-4.97	30	
		18	-4.76	0.318	-4.44	30	
		24	-5.00	0.406	-4.59	30	
		36	-5.16	0.572	-4.58	30	
		48	-5.30	0.720	-4.58	30	
		54	-5.32	0.794	-4.52	30	

802.11n(HT20) Mode		MCS Index	Measured Power (dBm)	Duty Cycle Factor	Measured Power(dBm) + Duty Cycle Factor	Limit (dBm)	Power Level Setting
Frequency [MHz]	Channel No.						
2412	1	0	13.28	0.122	13.40	30	14
		1	13.04	0.232	13.27	30	
		2	13.81	0.323	14.13	30	
		3	13.70	0.424	14.12	30	
		4	13.64	0.569	14.21	30	
		5	13.52	0.716	14.24	30	
		6	13.48	0.773	14.25	30	
		7	13.35	0.844	14.19	30	
2437	6	0	15.05	0.122	15.17	30	15
		1	14.81	0.232	15.04	30	
		2	15.56	0.323	15.88	30	
		3	15.47	0.424	15.89	30	
		4	15.27	0.569	15.84	30	
		5	15.13	0.716	15.85	30	
		6	15.13	0.773	15.90	30	
		7	14.98	0.844	15.82	30	
2462	11	0	14.02	0.122	14.14	30	15
		1	13.82	0.232	14.05	30	
		2	14.54	0.323	14.86	30	
		3	14.46	0.424	14.88	30	
		4	14.38	0.569	14.95	30	
		5	14.15	0.716	14.87	30	
		6	14.20	0.773	14.97	30	
		7	14.04	0.844	14.88	30	
2467	12	0	1.93	0.122	2.06	30	3
		1	1.78	0.232	2.01	30	
		2	2.35	0.323	2.67	30	
		3	2.24	0.424	2.66	30	
		4	2.20	0.569	2.77	30	
		5	2.07	0.716	2.79	30	
		6	2.02	0.773	2.79	30	
		7	1.93	0.844	2.77	30	
2472	13	0	-5.04	0.122	-4.92	30	3
		1	-5.12	0.232	-4.89	30	
		2	-4.84	0.323	-4.52	30	
		3	-4.98	0.424	-4.56	30	
		4	-4.94	0.569	-4.37	30	
		5	-5.14	0.716	-4.42	30	
		6	-5.10	0.773	-4.33	30	
		7	-5.23	0.844	-4.39	30	

802.11ac(VHT20) Mode		MCS Index	Measured Power (dBm)	Duty Cycle Factor	Measured Power(dBm) + Duty Cycle Factor	Limit (dBm)	Power Level Setting
Frequency [MHz]	Channel No.						
2412	1	0	13.31	0.113	13.42	30	14
		1	13.10	0.221	13.32	30	
		2	13.83	0.320	14.15	30	
		3	13.69	0.420	14.11	30	
		4	13.67	0.562	14.23	30	
		5	13.49	0.712	14.20	30	
		6	13.48	0.760	14.24	30	
		7	13.36	0.824	14.18	30	
		8	13.30	0.922	14.22	30	
2437	6	0	14.19	0.113	14.30	30	15
		1	13.97	0.221	14.19	30	
		2	14.70	0.320	15.02	30	
		3	14.60	0.420	15.02	30	
		4	14.53	0.562	15.09	30	
		5	14.38	0.712	15.09	30	
		6	14.37	0.760	15.13	30	
		7	14.24	0.824	15.07	30	
		8	14.15	0.922	15.07	30	
2462	11	0	14.08	0.113	14.19	30	15
		1	13.84	0.221	14.06	30	
		2	14.65	0.320	14.97	30	
		3	14.46	0.420	14.88	30	
		4	14.42	0.562	14.98	30	
		5	14.31	0.712	15.03	30	
		6	14.28	0.760	15.04	30	
		7	14.19	0.824	15.01	30	
		8	14.09	0.922	15.01	30	
2467	12	0	1.91	0.113	2.03	30	3
		1	1.67	0.221	1.89	30	
		2	2.38	0.320	2.70	30	
		3	2.24	0.420	2.66	30	
		4	2.19	0.562	2.75	30	
		5	2.05	0.712	2.77	30	
		6	2.04	0.760	2.80	30	
		7	1.91	0.824	2.74	30	
		8	1.83	0.922	2.75	30	
2472	13	0	-5.01	0.113	-4.90	30	3
		1	-5.18	0.221	-4.96	30	
		2	-4.85	0.320	-4.53	30	
		3	-4.98	0.420	-4.56	30	
		4	-4.90	0.562	-4.34	30	
		5	-5.04	0.712	-4.33	30	
		6	-5.08	0.760	-4.32	30	
		7	-5.21	0.824	-4.39	30	
		8	-5.26	0.922	-4.34	30	

[Ant.2]

802.11b Mode		Rate (Mbps)	Measured Power (dBm)	Duty Cycle Factor	Measured Power(dBm) + Duty Cycle Factor	Limit (dBm)	Power Level Setting
Frequency [MHz]	Channel No.						
2412	1	1	13.09	0.050	13.14	30	13
		2	13.05	0.098	13.15	30	
		5.5	12.88	0.233	13.11	30	
		11	12.76	0.405	13.16	30	
2437	6	1	14.54	0.050	14.59	30	14
		2	14.50	0.098	14.60	30	
		5.5	14.35	0.233	14.58	30	
		11	14.21	0.405	14.61	30	
2462	11	1	15.40	0.050	15.45	30	15
		2	15.36	0.098	15.46	30	
		5.5	15.23	0.233	15.46	30	
		11	15.08	0.405	15.48	30	
2467	12	1	3.05	0.050	3.10	30	3
		2	3.04	0.098	3.14	30	
		5.5	2.91	0.233	3.14	30	
		11	2.92	0.405	3.32	30	
2472	13	1	-2.65	0.050	-2.60	30	3
		2	-2.72	0.098	-2.62	30	
		5.5	-2.83	0.233	-2.60	30	
		11	-2.99	0.405	-2.59	30	

802.11g Mode		Rate (Mbps)	Measured Power (dBm)	Duty Cycle Factor	Measured Power(dBm) + Duty Cycle Factor	Limit (dBm)	Power Level Setting
Frequency [MHz]	Channel No.						
2412	1	6	13.46	0.102	13.56	30	14
		9	13.35	0.162	13.51	30	
		12	13.28	0.211	13.49	30	
		18	13.95	0.318	14.27	30	
		24	13.68	0.406	14.09	30	
		36	13.45	0.572	14.02	30	
		48	13.40	0.720	14.12	30	
		54	13.31	0.794	14.10	30	
2437	6	6	14.98	0.102	15.08	30	15
		9	14.85	0.162	15.01	30	
		12	14.80	0.211	15.01	30	
		18	15.50	0.318	15.82	30	
		24	15.28	0.406	15.69	30	
		36	15.04	0.572	15.61	30	
		48	14.86	0.720	15.58	30	
		54	14.85	0.794	15.64	30	
2462	11	6	14.75	0.102	14.85	30	15
		9	14.64	0.162	14.80	30	
		12	14.57	0.211	14.78	30	
		18	15.18	0.318	15.50	30	
		24	14.92	0.406	15.33	30	
		36	14.72	0.572	15.29	30	
		48	14.62	0.720	15.34	30	
		54	14.52	0.794	15.31	30	
2467	12	6	2.43	0.102	2.53	30	3
		9	2.36	0.162	2.52	30	
		12	2.20	0.211	2.41	30	
		18	2.88	0.318	3.20	30	
		24	2.58	0.406	2.99	30	
		36	2.42	0.572	2.99	30	
		48	2.31	0.720	3.03	30	
		54	2.25	0.794	3.04	30	
2472	13	6	-3.59	0.102	-3.49	30	3
		9	-3.79	0.162	-3.62	30	
		12	-3.83	0.211	-3.62	30	
		18	-3.17	0.318	-2.85	30	
		24	-3.49	0.406	-3.08	30	
		36	-3.54	0.572	-2.97	30	
		48	-3.73	0.720	-3.01	30	
		54	-3.83	0.794	-3.04	30	

802.11n(HT20) Mode		MCS Index	Measured Power (dBm)	Duty Cycle Factor	Measured Power(dBm) + Duty Cycle Factor	Limit (dBm)	Power Level Setting
Frequency [MHz]	Channel No.						
2412	1	0	13.25	0.122	13.37	30	14
		1	13.02	0.232	13.25	30	
		2	13.61	0.323	13.93	30	
		3	13.50	0.424	13.92	30	
		4	13.35	0.569	13.92	30	
		5	13.35	0.716	14.07	30	
		6	13.34	0.773	14.11	30	
		7	13.21	0.844	14.05	30	
2437	6	0	14.81	0.122	14.93	30	15
		1	14.63	0.232	14.86	30	
		2	15.38	0.323	15.70	30	
		3	15.25	0.424	15.67	30	
		4	15.15	0.569	15.72	30	
		5	14.99	0.716	15.71	30	
		6	14.95	0.773	15.72	30	
		7	14.84	0.844	15.68	30	
2462	11	0	14.65	0.122	14.77	30	15
		1	14.44	0.232	14.67	30	
		2	15.02	0.323	15.34	30	
		3	14.93	0.424	15.35	30	
		4	14.85	0.569	15.42	30	
		5	14.68	0.716	15.40	30	
		6	14.67	0.773	15.44	30	
		7	14.58	0.844	15.42	30	
2467	12	0	2.26	0.122	2.38	30	3
		1	2.05	0.232	2.28	30	
		2	2.68	0.323	3.00	30	
		3	2.58	0.424	3.00	30	
		4	2.49	0.569	3.06	30	
		5	2.37	0.716	3.09	30	
		6	2.39	0.773	3.16	30	
		7	2.20	0.844	3.04	30	
2472	13	0	-3.79	0.122	-3.66	30	3
		1	-3.98	0.232	-3.74	30	
		2	-3.37	0.323	-3.05	30	
		3	-3.38	0.424	-2.96	30	
		4	-3.49	0.569	-2.92	30	
		5	-3.61	0.716	-2.89	30	
		6	-3.65	0.773	-2.88	30	
		7	-3.73	0.844	-2.89	30	

802.11ac(VHT20) Mode		MCS Index	Measured Power (dBm)	Duty Cycle Factor	Measured Power(dBm) + Duty Cycle Factor	Limit (dBm)	Power Level Setting
Frequency [MHz]	Channel No.						
2412	1	0	13.26	0.113	13.37	30	14
		1	13.06	0.221	13.28	30	
		2	13.75	0.320	14.07	30	
		3	13.60	0.420	14.02	30	
		4	13.55	0.562	14.11	30	
		5	13.37	0.712	14.08	30	
		6	13.36	0.760	14.12	30	
		7	13.26	0.824	14.08	30	
		8	13.20	0.922	14.12	30	
2437	6	0	14.77	0.113	14.88	30	15
		1	14.56	0.221	14.78	30	
		2	15.33	0.320	15.65	30	
		3	15.23	0.420	15.65	30	
		4	15.14	0.562	15.70	30	
		5	15.00	0.712	15.71	30	
		6	15.00	0.760	15.76	30	
		7	14.85	0.824	15.68	30	
		8	14.80	0.922	15.72	30	
2462	11	0	14.61	0.113	14.73	30	15
		1	14.39	0.221	14.61	30	
		2	15.02	0.320	15.34	30	
		3	14.91	0.420	15.33	30	
		4	14.83	0.562	15.39	30	
		5	14.67	0.712	15.38	30	
		6	14.65	0.760	15.41	30	
		7	14.55	0.824	15.38	30	
		8	14.35	0.922	15.27	30	
2467	12	0	2.16	0.113	2.27	30	3
		1	1.95	0.221	2.17	30	
		2	2.65	0.320	2.97	30	
		3	2.51	0.420	2.93	30	
		4	2.46	0.562	3.02	30	
		5	2.35	0.712	3.06	30	
		6	2.32	0.760	3.08	30	
		7	2.20	0.824	3.02	30	
		8	2.12	0.922	3.04	30	
2472	13	0	-3.81	0.113	-3.69	30	3
		1	-3.99	0.221	-3.77	30	
		2	-3.30	0.320	-2.98	30	
		3	-3.44	0.420	-3.02	30	
		4	-3.51	0.562	-2.95	30	
		5	-3.64	0.712	-2.93	30	
		6	-3.62	0.760	-2.86	30	
		7	-3.69	0.824	-2.87	30	
		8	-3.80	0.922	-2.88	30	

[MIMO]

802.11b Mode		Rate (Mbps)	Ant.1 Measured Power(dBm) + Duty Cycle Factor	Ant.2 Measured Power(dBm) + Duty Cycle Factor	MIMO Measured Power(dBm)	Limit (dBm)	Power Level Setting
Frequency [MHz]	Channel No.						
2412	1	1	13.11	13.14	16.14	30	13
		2	13.07	13.15	16.12	30	
		5.5	13.11	13.11	16.12	30	
		11	13.14	13.16	16.16	30	
2437	6	1	13.96	14.59	17.30	30	14
		2	13.95	14.60	17.30	30	
		5.5	14.03	14.58	17.33	30	
		11	14.04	14.61	17.35	30	
2462	11	1	14.76	15.45	18.13	30	15
		2	14.77	15.46	18.14	30	
		5.5	14.77	15.46	18.14	30	
		11	14.78	15.48	18.16	30	
2467	12	1	2.68	3.10	5.90	30	3
		2	2.69	3.14	5.93	30	
		5.5	2.78	3.14	5.98	30	
		11	2.79	3.32	6.08	30	
2472	13	1	-4.13	-2.60	-0.29	30	3
		2	-4.08	-2.62	-0.28	30	
		5.5	-4.04	-2.60	-0.25	30	
		11	-4.03	-2.59	-0.24	30	

802.11g Mode		Rate (Mbps)	Ant.1 Measured Power(dBm) + Duty Cycle Factor	Ant.2 Measured Power(dBm) + Duty Cycle Factor	MIMO Measured Power(dBm)	Limit (dBm)	Power Level Setting
Frequency [MHz]	Channel No.						
2412	1	6	13.55	13.56	16.57	30	14
		9	13.53	13.51	16.53	30	
		12	13.51	13.49	16.51	30	
		18	14.34	14.27	17.31	30	
		24	14.12	14.09	17.11	30	
		36	14.12	14.02	17.08	30	
		48	14.09	14.12	17.12	30	
		54	14.13	14.10	17.13	30	
2437	6	6	14.59	15.08	17.85	30	15
		9	14.52	15.01	17.78	30	
		12	14.53	15.01	17.79	30	
		18	15.32	15.82	18.59	30	
		24	15.12	15.69	18.42	30	
		36	15.08	15.61	18.37	30	
		48	15.11	15.58	18.36	30	
		54	15.11	15.64	18.40	30	
2462	11	6	14.41	14.85	17.65	30	15
		9	14.38	14.80	17.61	30	
		12	14.37	14.78	17.59	30	
		18	15.19	15.50	18.36	30	
		24	14.99	15.33	18.17	30	
		36	14.95	15.29	18.13	30	
		48	15.02	15.34	18.20	30	
		54	14.97	15.31	18.16	30	
2467	12	6	2.20	2.53	5.38	30	3
		9	2.11	2.52	5.33	30	
		12	2.12	2.41	5.28	30	
		18	2.84	3.20	6.04	30	
		24	2.63	2.99	5.82	30	
		36	2.66	2.99	5.84	30	
		48	2.70	3.03	5.88	30	
		54	2.64	3.04	5.86	30	
2472	13	6	-4.91	-3.49	-1.13	30	3
		9	-4.96	-3.62	-1.23	30	
		12	-4.97	-3.62	-1.23	30	
		18	-4.44	-2.85	-0.56	30	
		24	-4.59	-3.08	-0.76	30	
		36	-4.58	-2.97	-0.69	30	
		48	-4.58	-3.01	-0.71	30	
		54	-4.52	-3.04	-0.71	30	

802.11n(HT20) Mode		MCS Index	Ant.1 Measured Power(dBm) + Duty Cycle Factor	Ant.2 Measured Power(dBm) + Duty Cycle Factor	MIMO Measured Power(dBm)	Limit (dBm)	Power Level Setting
Frequency [MHz]	Channel No.						
2412	1	0	13.40	13.37	16.40	30	14
		1	13.27	13.25	16.27	30	
		2	14.13	13.93	17.04	30	
		3	14.12	13.92	17.04	30	
		4	14.21	13.92	17.08	30	
		5	14.24	14.07	17.16	30	
		6	14.25	14.11	17.19	30	
		7	14.19	14.05	17.13	30	
2437	6	0	15.17	14.93	18.06	30	15
		1	15.04	14.86	17.96	30	
		2	15.88	15.70	18.80	30	
		3	15.89	15.67	18.80	30	
		4	15.84	15.72	18.79	30	
		5	15.85	15.71	18.79	30	
		6	15.90	15.72	18.82	30	
		7	15.82	15.68	18.76	30	
2462	6	0	14.14	14.77	17.48	30	15
		1	14.05	14.67	17.38	30	
		2	14.86	15.34	18.12	30	
		3	14.88	15.35	18.14	30	
		4	14.95	15.42	18.20	30	
		5	14.87	15.40	18.15	30	
		6	14.97	15.44	18.23	30	
		7	14.88	15.42	18.17	30	
2467	6	0	2.06	2.38	5.23	30	3
		1	2.01	2.28	5.16	30	
		2	2.67	3.00	5.85	30	
		3	2.66	3.00	5.85	30	
		4	2.77	3.06	5.93	30	
		5	2.79	3.09	5.95	30	
		6	2.79	3.16	5.99	30	
		7	2.77	3.04	5.92	30	
2472	11	0	-4.92	-3.66	-1.24	30	3
		1	-4.89	-3.74	-1.27	30	
		2	-4.52	-3.05	-0.71	30	
		3	-4.56	-2.96	-0.67	30	
		4	-4.37	-2.92	-0.58	30	
		5	-4.42	-2.89	-0.58	30	
		6	-4.33	-2.88	-0.53	30	
		7	-4.39	-2.89	-0.56	30	

802.11ac(VHT20) Mode		MCS Index	Ant.1 Measured Power(dBm) + Duty Cycle Factor	Ant.2 Measured Power(dBm) + Duty Cycle Factor	MIMO Measured Power(dBm)	Limit (dBm)	Power Level Setting
Frequency [MHz]	Channel No.						
2412	1	0	13.42	13.37	16.41	30	14
		1	13.32	13.28	16.31	30	
		2	14.15	14.07	17.12	30	
		3	14.11	14.02	17.08	30	
		4	14.23	14.11	17.18	30	
		5	14.20	14.08	17.15	30	
		6	14.24	14.12	17.19	30	
		7	14.18	14.08	17.14	30	
		8	14.22	14.12	17.18	30	
2437	6	0	14.30	14.88	17.61	30	15
		1	14.19	14.78	17.51	30	
		2	15.02	15.65	18.35	30	
		3	15.02	15.65	18.35	30	
		4	15.09	15.70	18.42	30	
		5	15.09	15.71	18.42	30	
		6	15.13	15.76	18.47	30	
		7	15.07	15.68	18.39	30	
		8	15.07	15.72	18.42	30	
2462	11	0	14.19	14.73	17.48	30	15
		1	14.06	14.61	17.35	30	
		2	14.97	15.34	18.17	30	
		3	14.88	15.33	18.12	30	
		4	14.98	15.39	18.20	30	
		5	15.03	15.38	18.22	30	
		6	15.04	15.41	18.24	30	
		7	15.01	15.38	18.21	30	
		8	15.01	15.27	18.16	30	
2467	12	0	2.03	2.27	5.16	30	3
		1	1.89	2.17	5.04	30	
		2	2.70	2.97	5.85	30	
		3	2.66	2.93	5.81	30	
		4	2.75	3.02	5.90	30	
		5	2.77	3.06	5.93	30	
		6	2.80	3.08	5.95	30	
		7	2.74	3.02	5.89	30	
		8	2.75	3.04	5.91	30	
2472	13	0	-4.90	-3.69	-1.24	30	3
		1	-4.96	-3.77	-1.31	30	
		2	-4.53	-2.98	-0.68	30	
		3	-4.56	-3.02	-0.71	30	
		4	-4.34	-2.95	-0.58	30	
		5	-4.33	-2.93	-0.56	30	
		6	-4.32	-2.86	-0.52	30	
		7	-4.39	-2.87	-0.55	30	
		8	-4.34	-2.88	-0.54	30	

9.4 POWER SPECTRAL DENSITY

[Ant.1]

Mode	Frequency (MHz)	Channel No.	Test Result			
			Measured PSD (dBm)	Duty Cycle Factor	Measured PSD(dBm) + Duty Cycle Factor	Limit (dBm)
802.11b	2412	1	-4.185	0.405	-3.780	8 dBm / 3 kHz
	2437	6	-3.260	0.405	-2.855	
	2462	11	-2.258	0.405	-1.853	
	2467	12	-14.772	0.405	-14.367	
	2472	13	-21.796	0.405	-21.391	
802.11g	2412	1	-3.615	0.318	-3.297	
	2437	6	-2.490	0.318	-2.172	
	2462	11	-3.075	0.318	-2.757	
	2467	12	-16.964	0.318	-16.646	
	2472	13	-23.002	0.318	-22.684	
802.11n(HT20)	2412	1	-5.646	0.773	-4.873	
	2437	6	-3.969	0.773	-3.196	
	2462	11	-4.217	0.773	-3.444	
	2467	12	-16.939	0.773	-16.166	
	2472	13	-22.666	0.773	-21.893	
802.11ac(VHT20)	2412	1	-5.348	0.760	-4.588	
	2437	6	-4.282	0.760	-3.522	
	2462	11	-3.979	0.760	-3.219	
	2467	12	-16.777	0.760	-16.017	
	2472	13	-23.213	0.760	-22.453	

[Ant.2]

Mode	Frequency (MHz)	Channel No.	Test Result			
			Measured PSD (dBm)	Duty Cycle Factor	Measured PSD(dBm) + Duty Cycle Factor	Limit (dBm)
802.11b	2412	1	-3.319	0.405	-2.914	8 dBm / 3 kHz
	2437	6	-2.152	0.405	-1.747	
	2462	11	-1.327	0.405	-0.922	
	2467	12	-13.932	0.405	-13.527	
	2472	13	-20.272	0.405	-19.867	
802.11g	2412	1	-3.206	0.318	-2.888	
	2437	6	-1.633	0.318	-1.315	
	2462	11	-2.264	0.318	-1.946	
	2467	12	-14.685	0.318	-14.367	
	2472	13	-21.246	0.318	-20.928	
802.11n(HT20)	2412	1	-4.766	0.773	-3.993	
	2437	6	-3.514	0.773	-2.741	
	2462	11	-4.135	0.773	-3.362	
	2467	12	-16.333	0.773	-15.560	
	2472	13	-22.764	0.773	-21.991	
802.11ac(VHT20)	2412	1	-5.331	0.760	-4.571	
	2437	6	-4.285	0.760	-3.525	
	2462	11	-4.606	0.760	-3.846	
	2467	12	-16.455	0.760	-15.695	
	2472	13	-22.699	0.760	-21.939	

[MIMO]

Mode	Frequency (MHz)	Channel No.	Test Result			
			Ant.1 Measured Power(dBm) + Duty Cycle Factor	Ant.2 Measured Power(dBm) + Duty Cycle Factor	MIMO Measured Power(dBm)	Limit (dBm)
802.11b	2412	1	-3.780	-2.914	-0.316	8 dBm / 3 kHz
	2437	6	-2.855	-1.747	0.744	
	2462	11	-1.853	-0.922	1.647	
	2467	12	-14.367	-13.527	-10.917	
	2472	13	-21.391	-19.867	-17.553	
802.11g	2412	1	-3.297	-2.888	-0.077	
	2437	6	-2.172	-1.315	1.288	
	2462	11	-2.757	-1.946	0.678	
	2467	12	-16.646	-14.367	-12.348	
	2472	13	-22.684	-20.928	-18.707	
802.11n(HT20)	2412	1	-4.873	-3.993	-1.400	
	2437	6	-3.196	-2.741	0.048	
	2462	11	-3.444	-3.362	-0.392	
	2467	12	-16.166	-15.560	-12.842	
	2472	13	-21.893	-21.991	-18.931	
802.11ac(VHT20)	2412	1	-4.588	-4.571	-1.569	
	2437	6	-3.522	-3.525	-0.513	
	2462	11	-3.219	-3.846	-0.511	
	2467	12	-16.017	-15.695	-12.843	
	2472	13	-22.453	-21.939	-19.178	

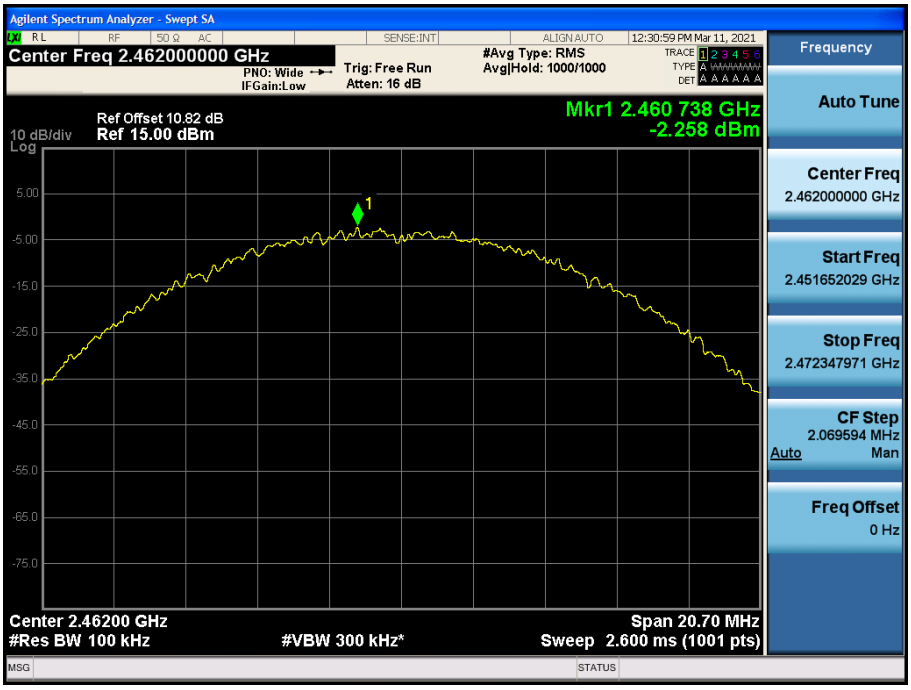
Note :

1. Spectrum reading values are not plot data.
   The PSD results in plot is already including the actual values of loss for the attenuator and cable combination.
2. Spectrum offset = Attenuator loss + Cable loss + EUT Cable loss
3. 10.82 dB is offset for 2.4 GHz Band.

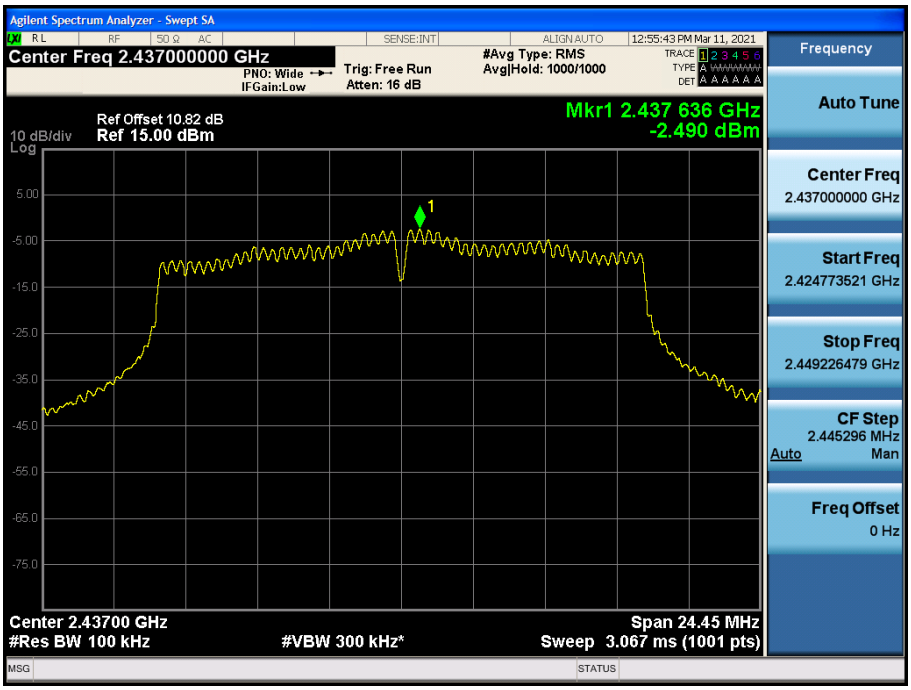
[Ant.1]

▣ Test Plots

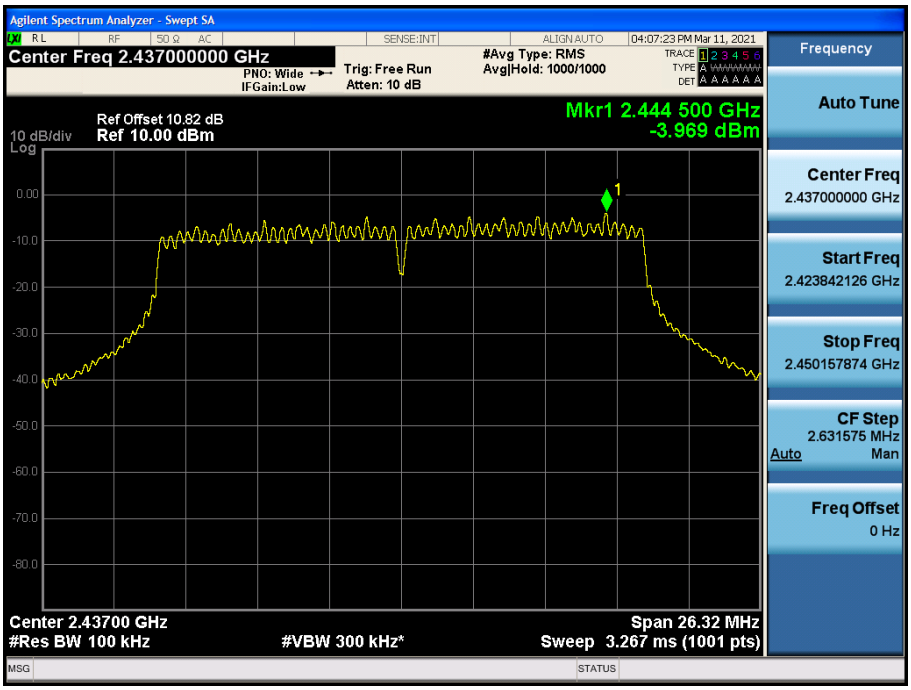
Power Spectral Density (802.11b-CH 11)



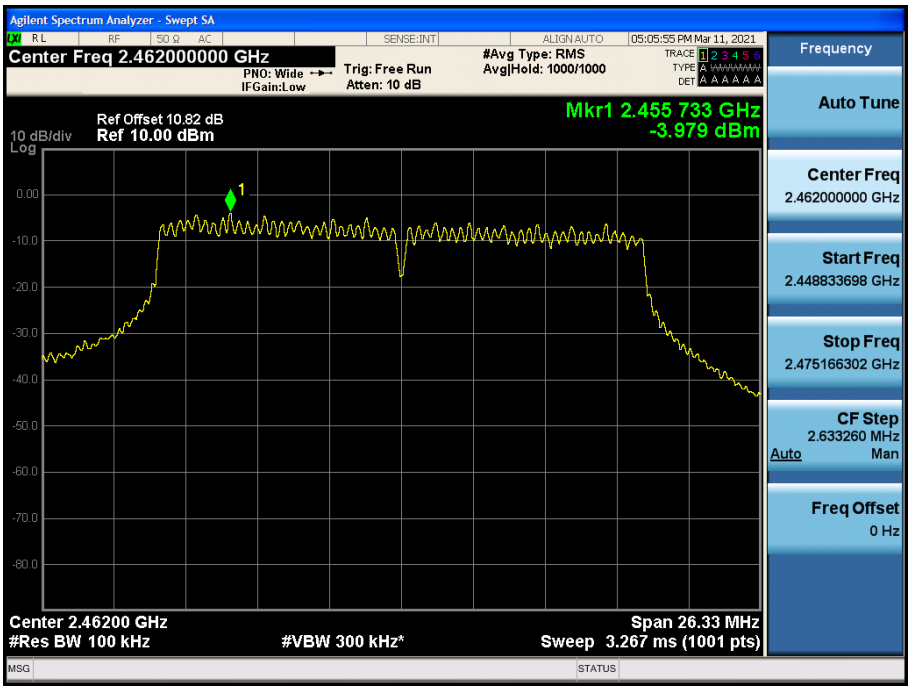
Power Spectral Density (802.11g-CH 6)



Power Spectral Density (802.11n_HT20-CH 6)



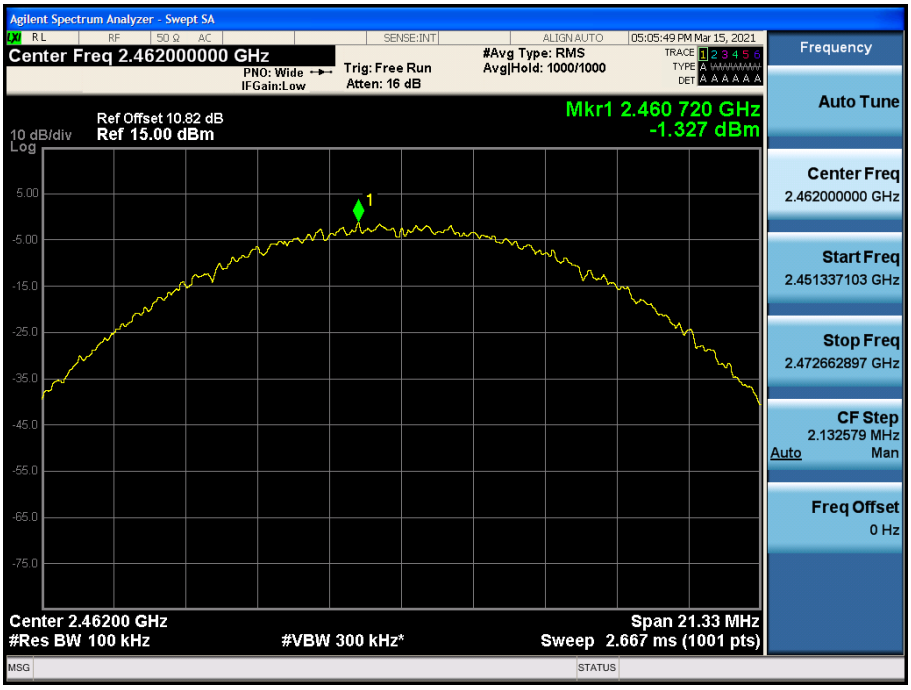
Power Spectral Density (802.11ac_VHT20-CH 11)



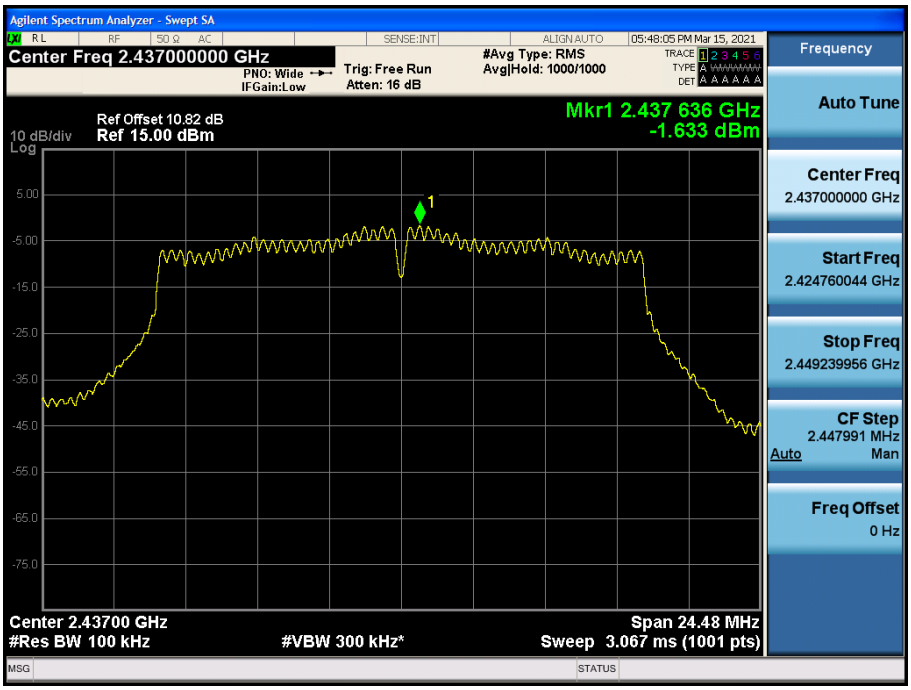
[Ant.2]

▣ Test Plots

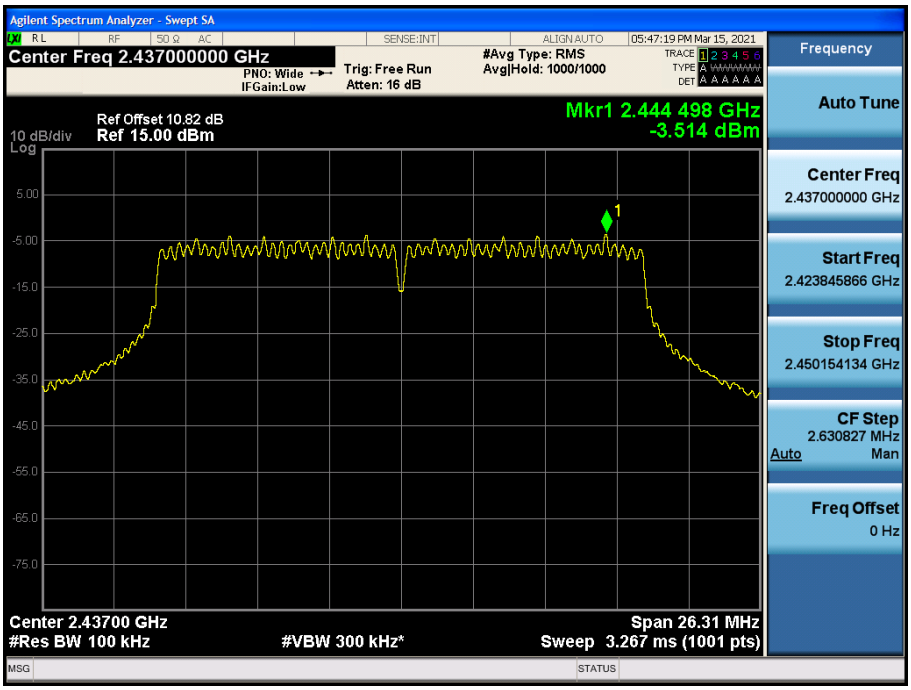
Power Spectral Density (802.11b-CH 11)



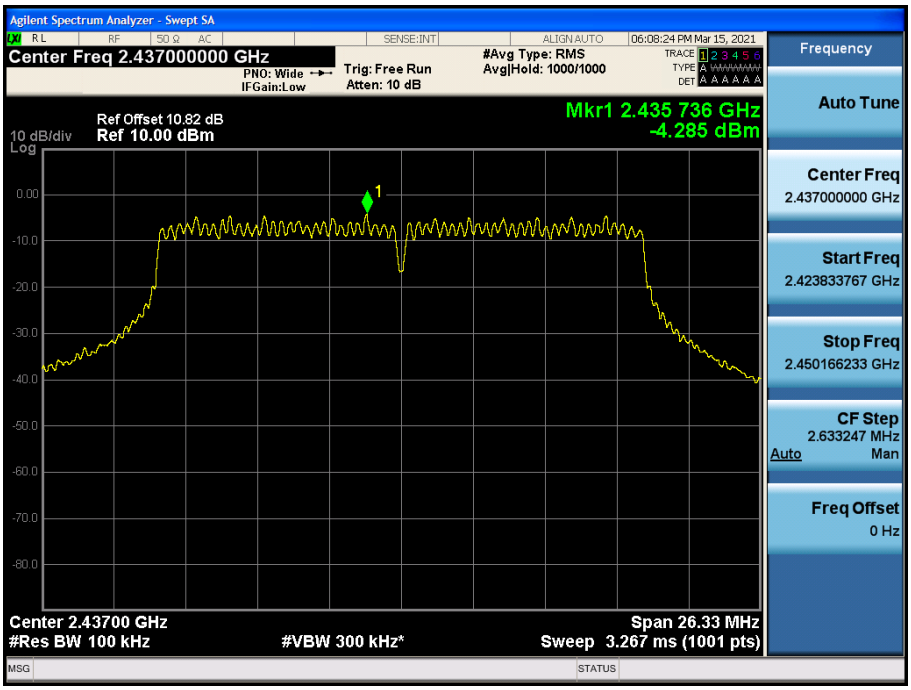
Power Spectral Density (802.11g-CH 6)



Power Spectral Density (802.11n_HT20-CH 6)



Power Spectral Density (802.11ac_VHT20-CH 6)



Note :

In order to simplify the report, attached plots were only the worst case PSD channel.

9.5 BAND EDGE / CONDUCTED SPURIOUS EMISSIONS

Test Result : please refer to the plot below.

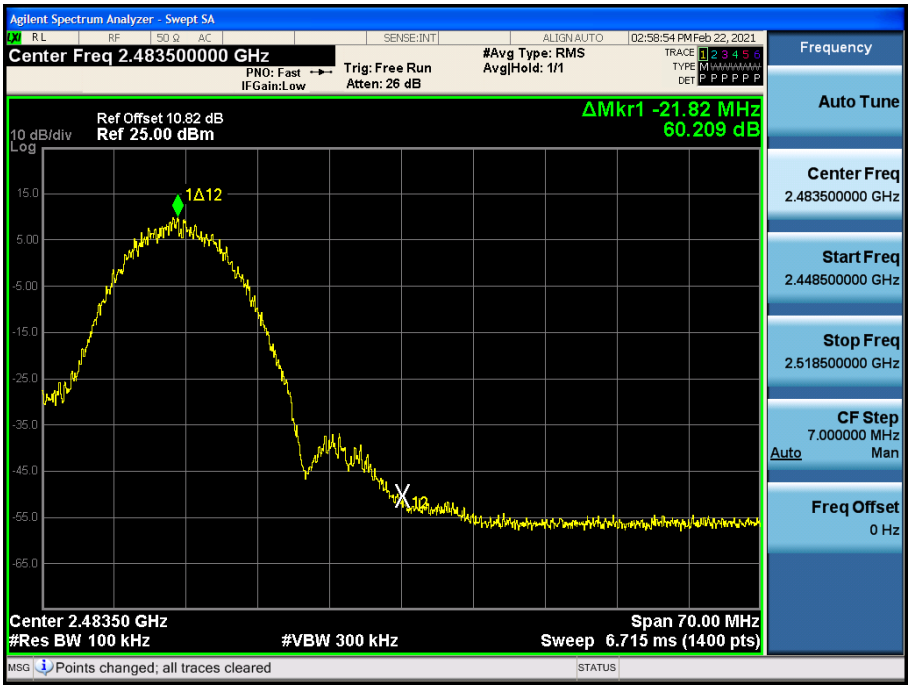
In order to simplify the report, attached plots were only the worst case channel and data rate.

[Ant.1]

▣ Test Plots(BandEdge)

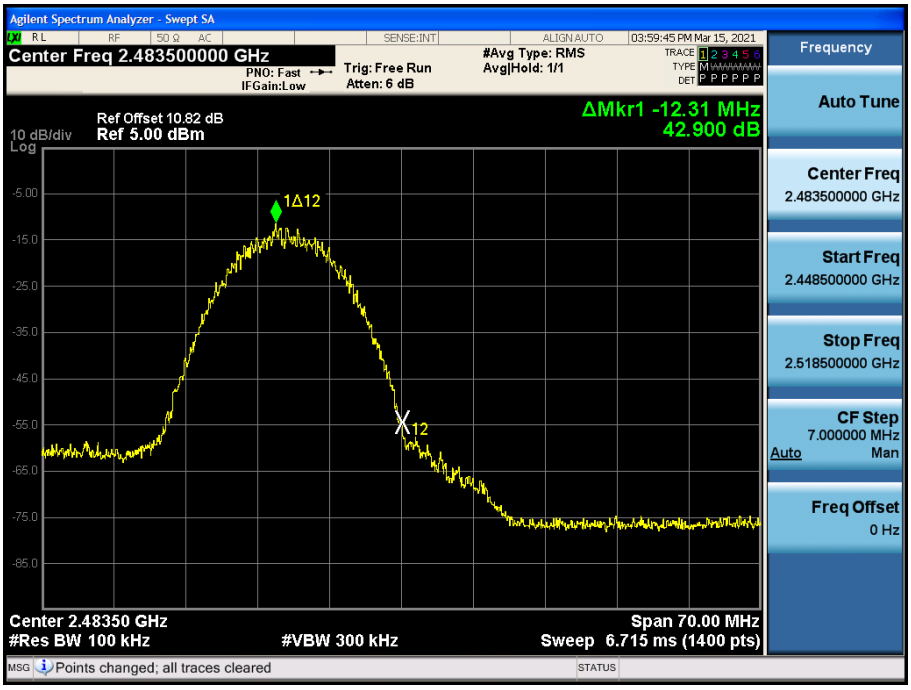
Band Edge (802.11b-CH1)

Band Edge (802.11b-CH11)



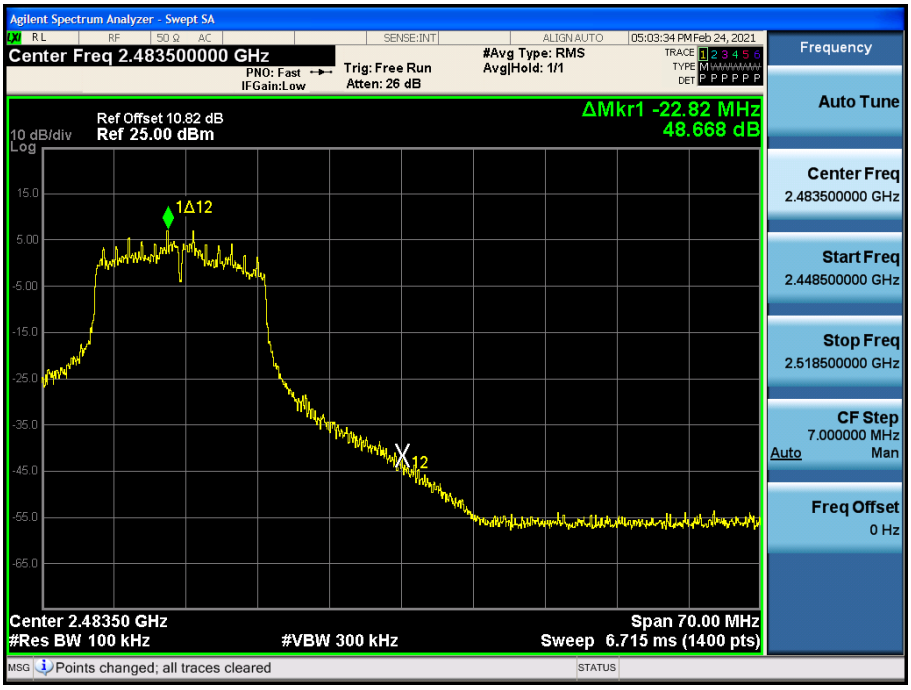
Band Edge (802.11b-CH12)

Band Edge (802.11b-CH13)



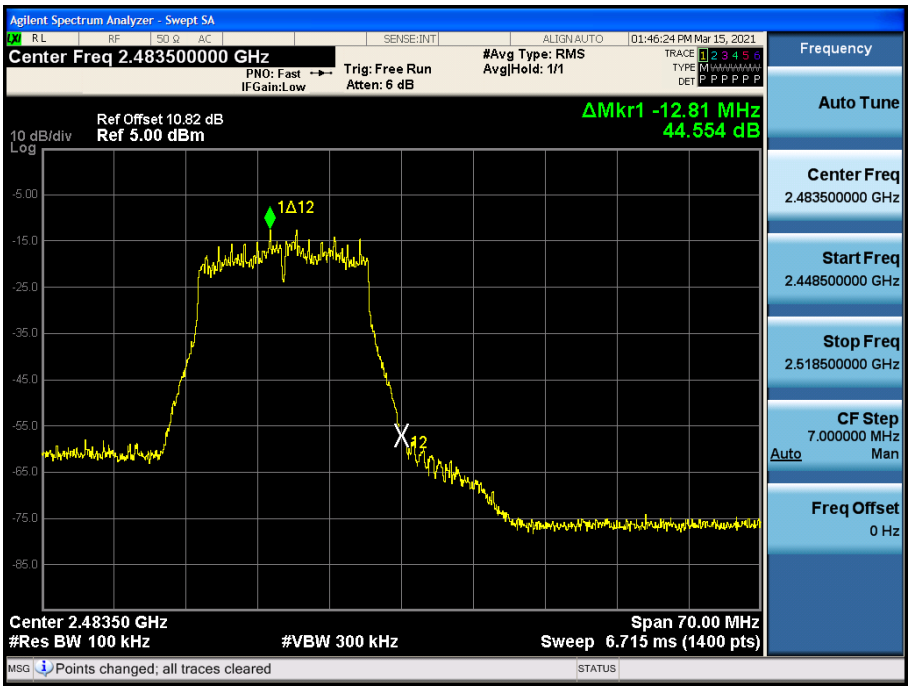
Band Edge (802.11g-CH1)

Band Edge (802.11g-CH11)



Band Edge (802.11g-CH12)

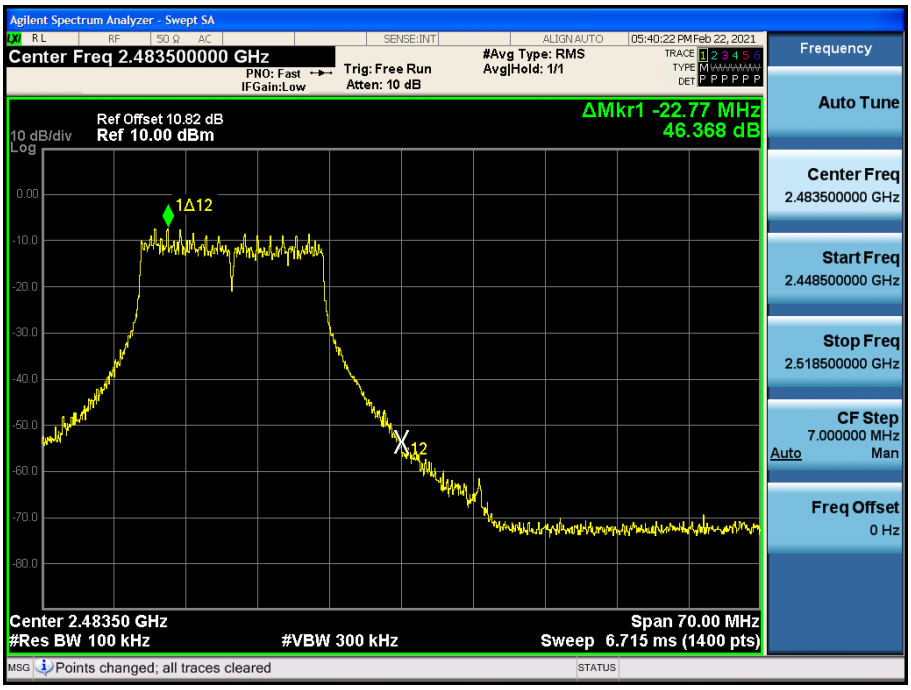
Band Edge (802.11g-CH13)



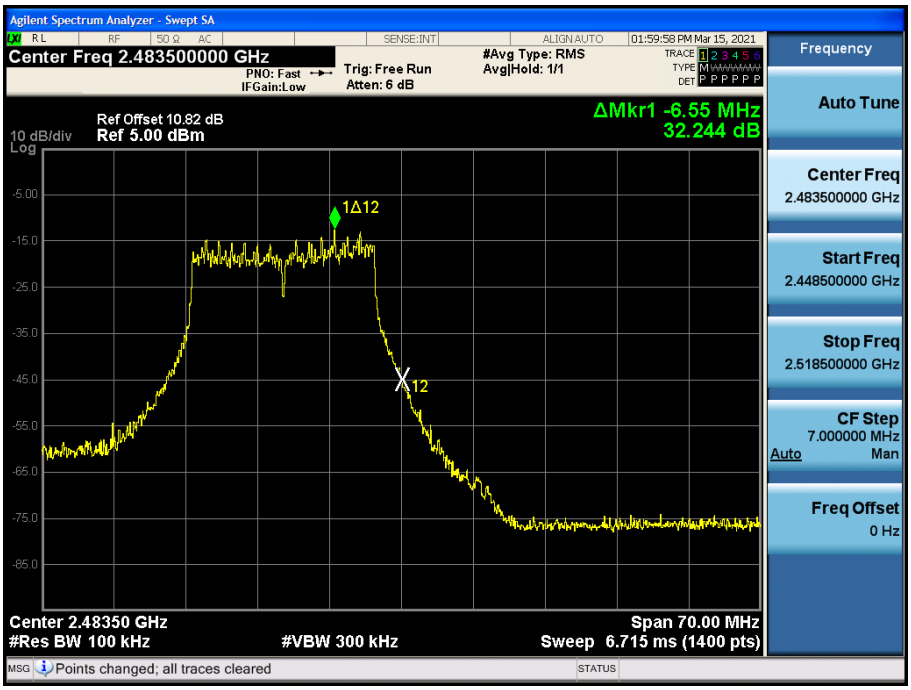
Band Edge (802.11n_HT20 -CH1)

Band Edge (802.11n_HT20 –CH11)

Band Edge (802.11n_HT20 -CH12)

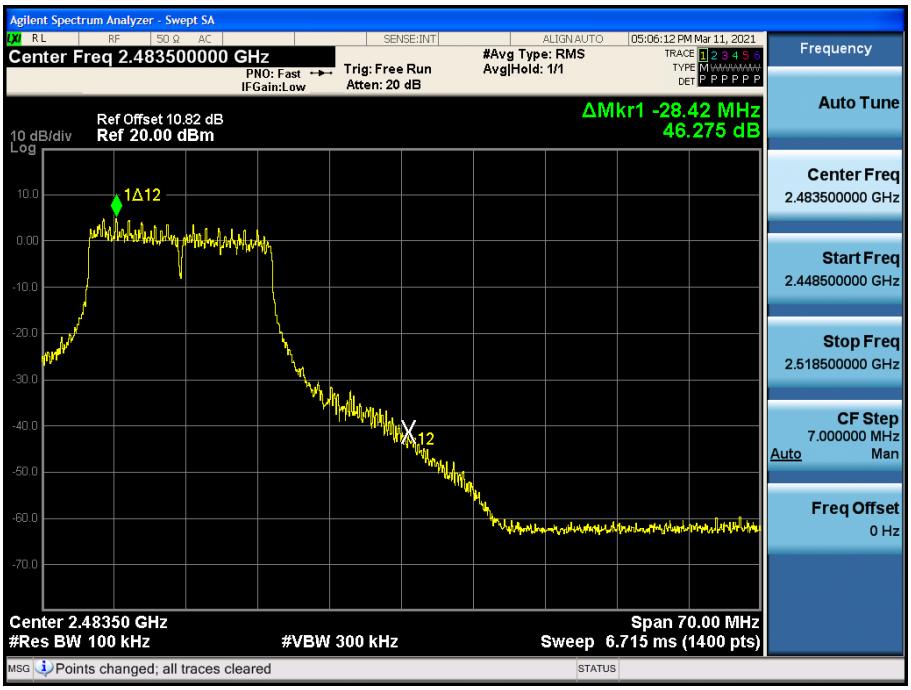


Band Edge (802.11n_HT20 –CH13)

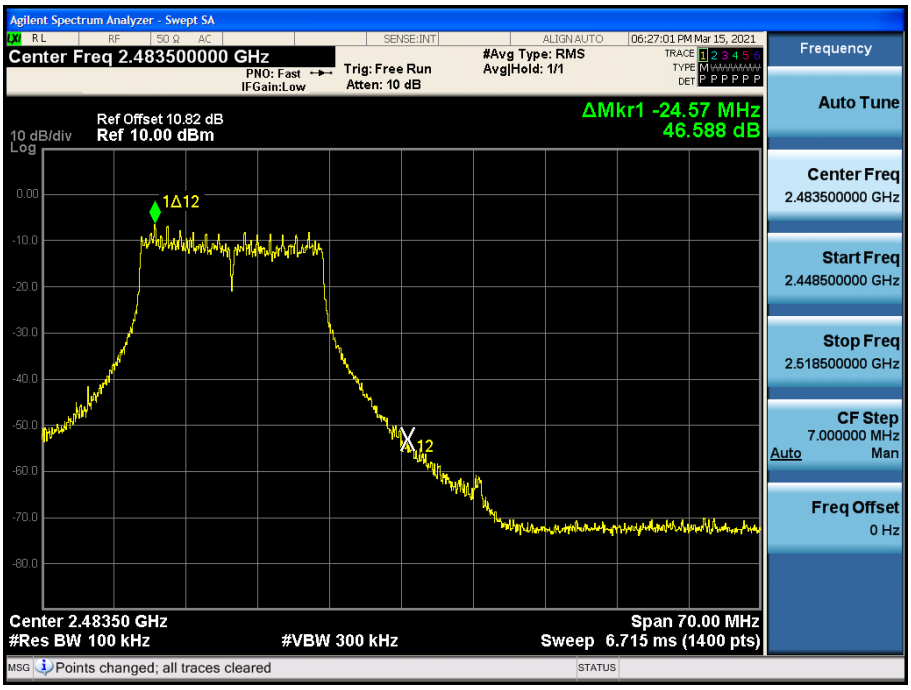


Band Edge (802.11ac_VHT20 -CH1)

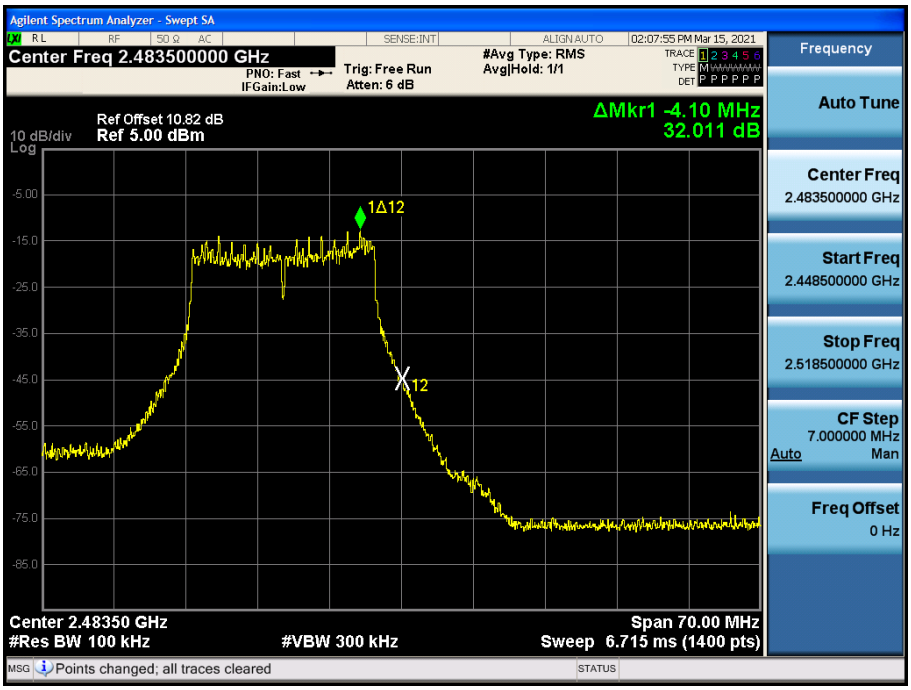
Band Edge (802.11ac_VHT20 –CH11)



Band Edge (802.11ac_VHT20 -CH12)



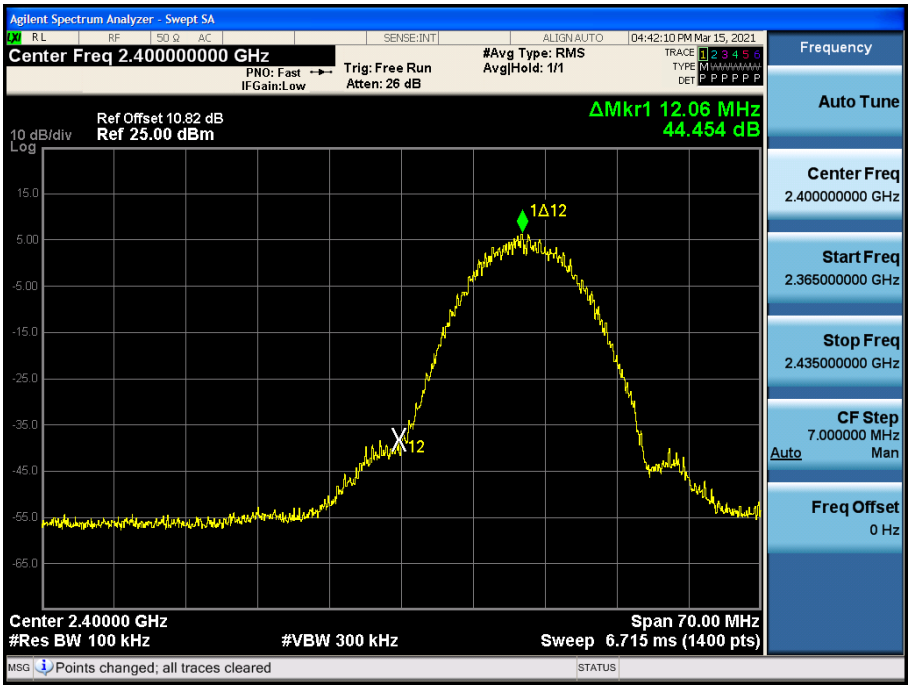
Band Edge (802.11ac_VHT20 –CH13)



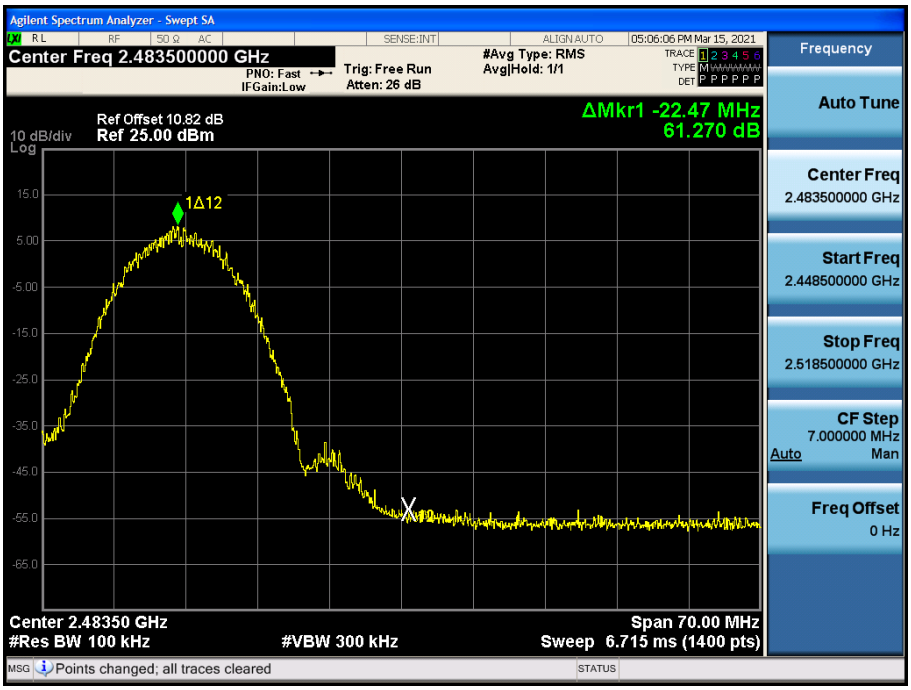
[Ant.2]

▣ Test Plots(BandEdge)

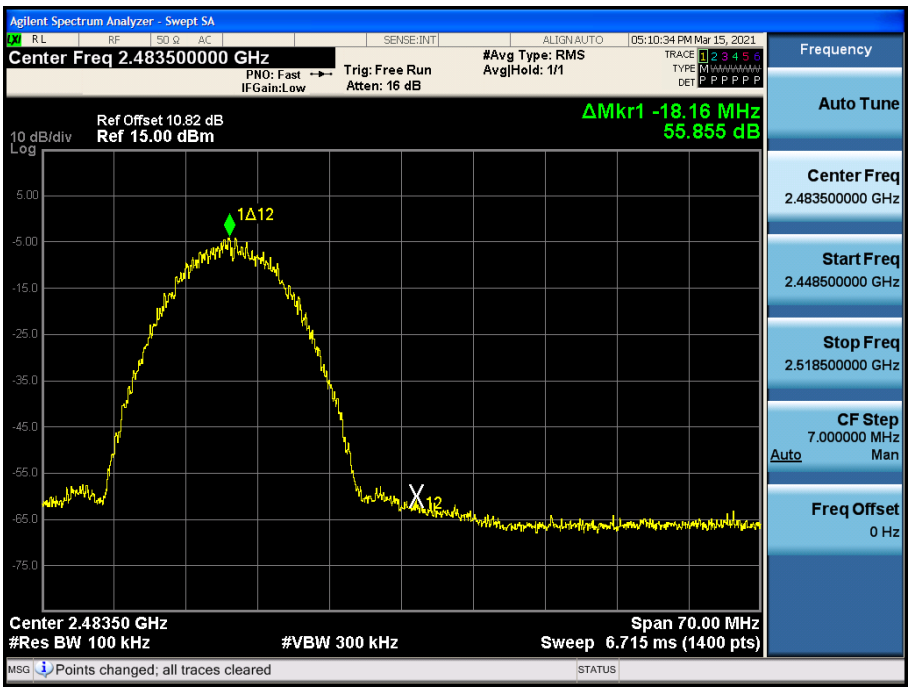
Band Edge (802.11b-CH1)



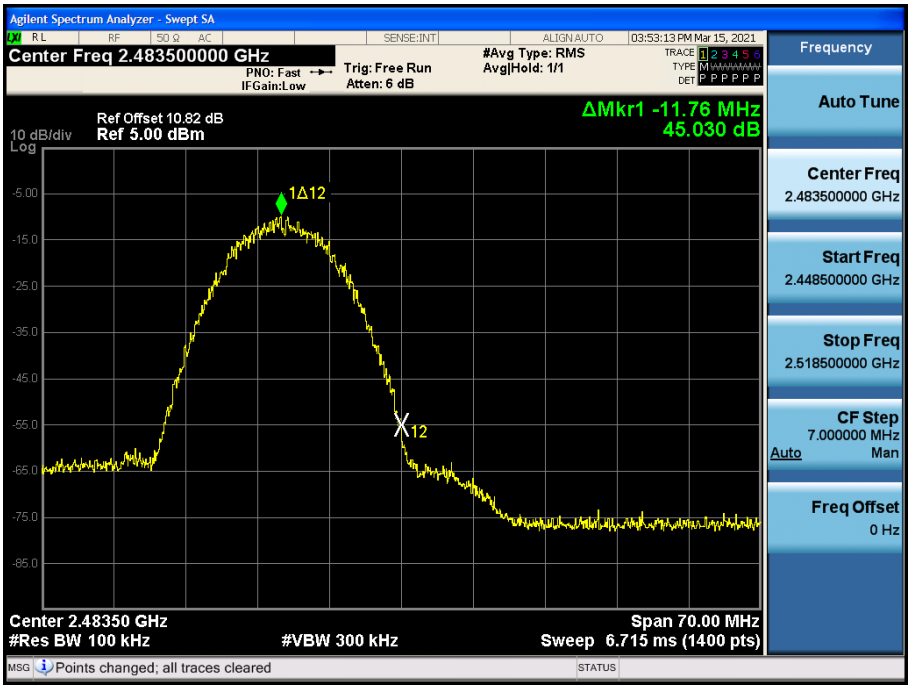
Band Edge (802.11b-CH11)



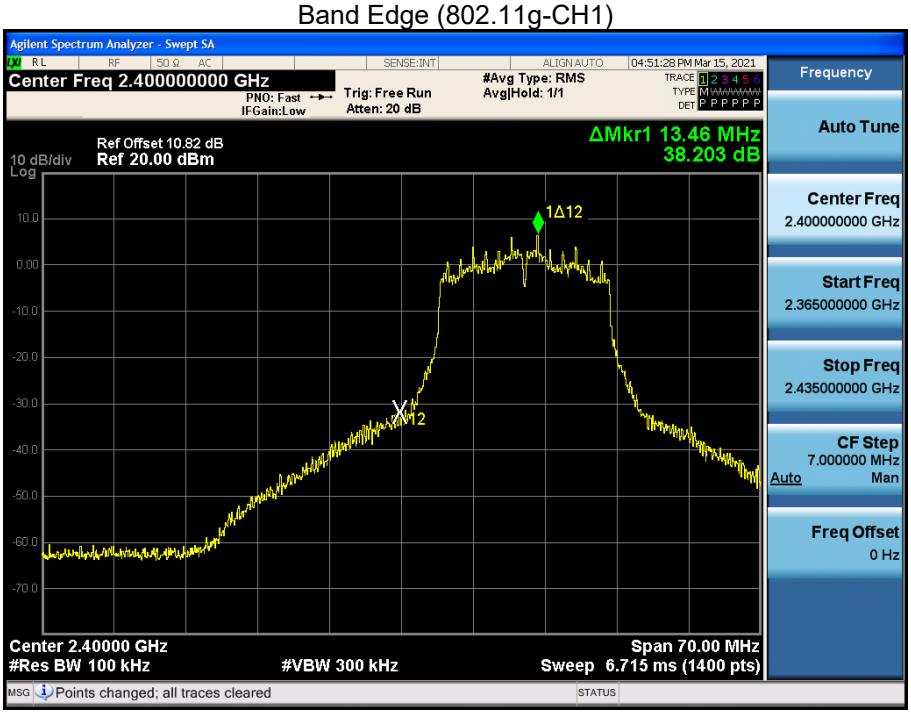
Band Edge (802.11b-CH12)



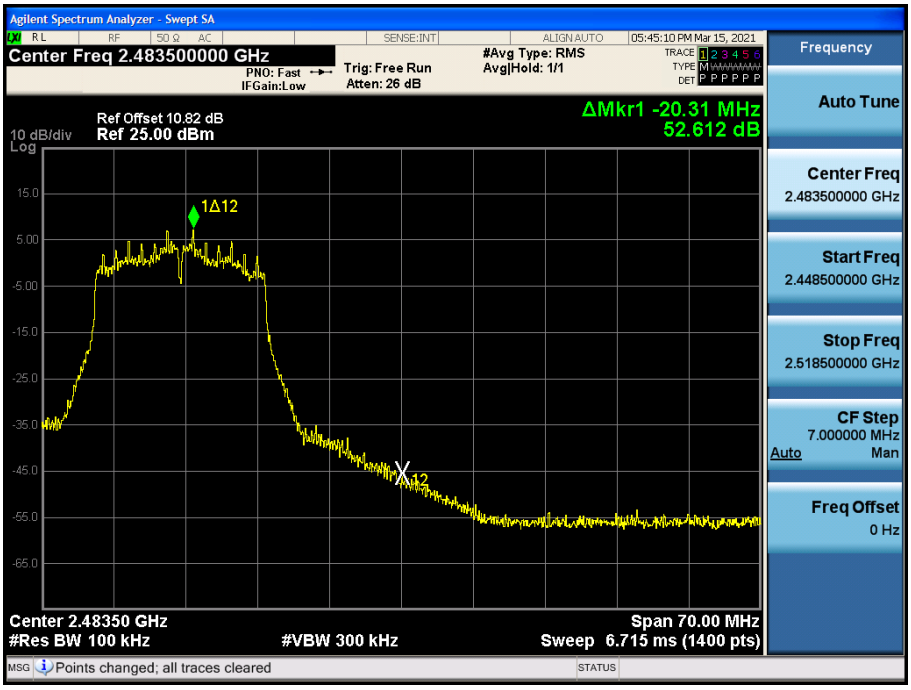
Band Edge (802.11b-CH13)



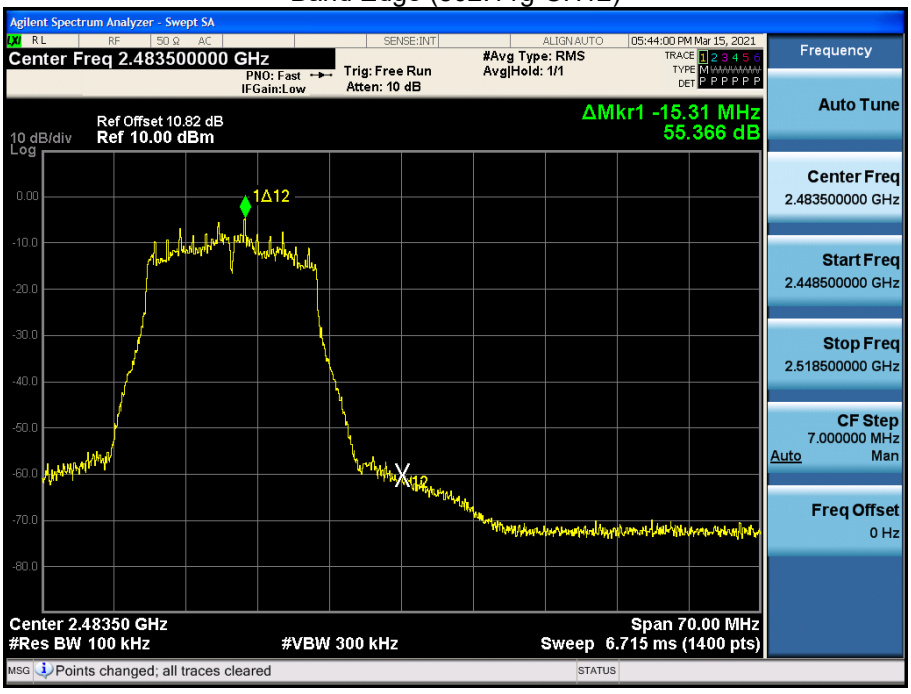
Band Edge (802.11g-CH1)



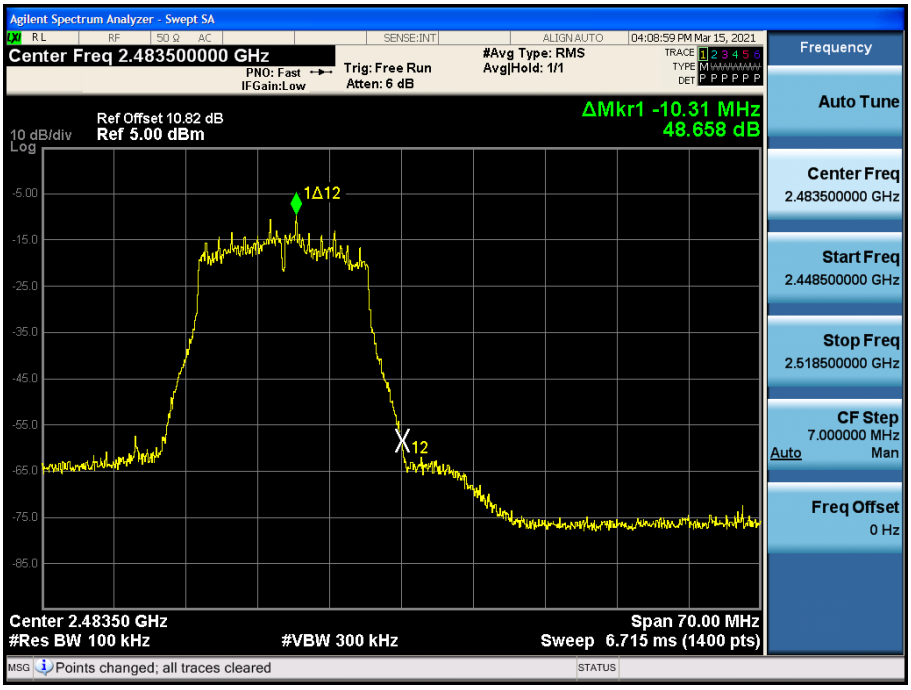
Band Edge (802.11g-CH11)



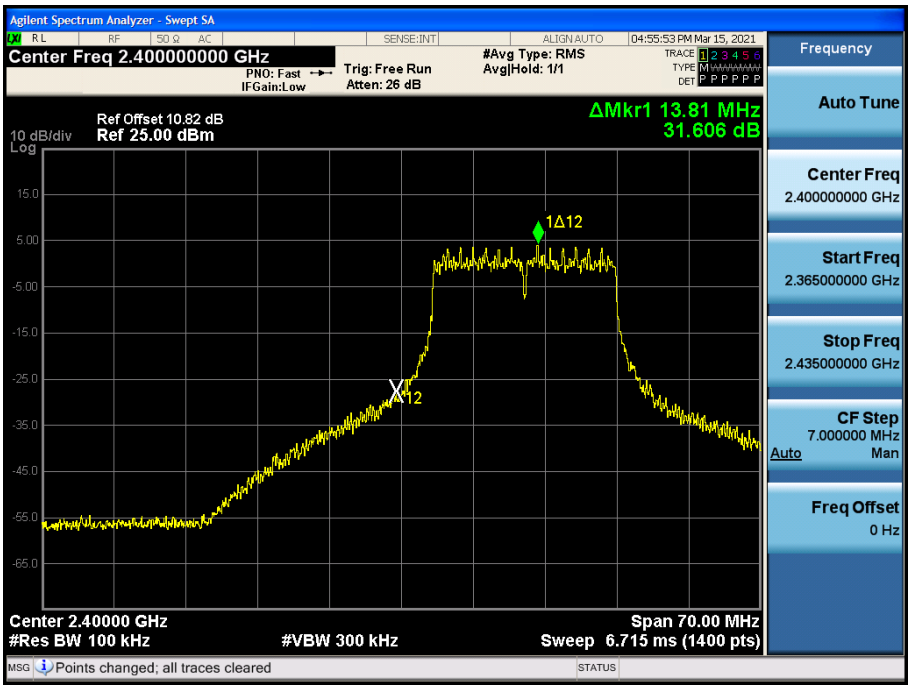
Band Edge (802.11g-CH12)



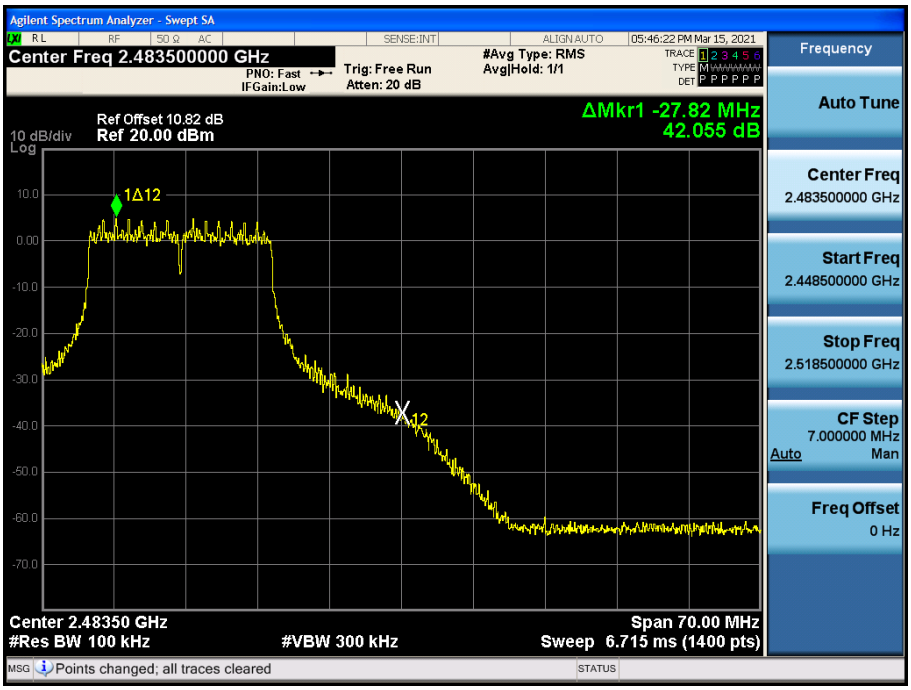
Band Edge (802.11g-CH13)



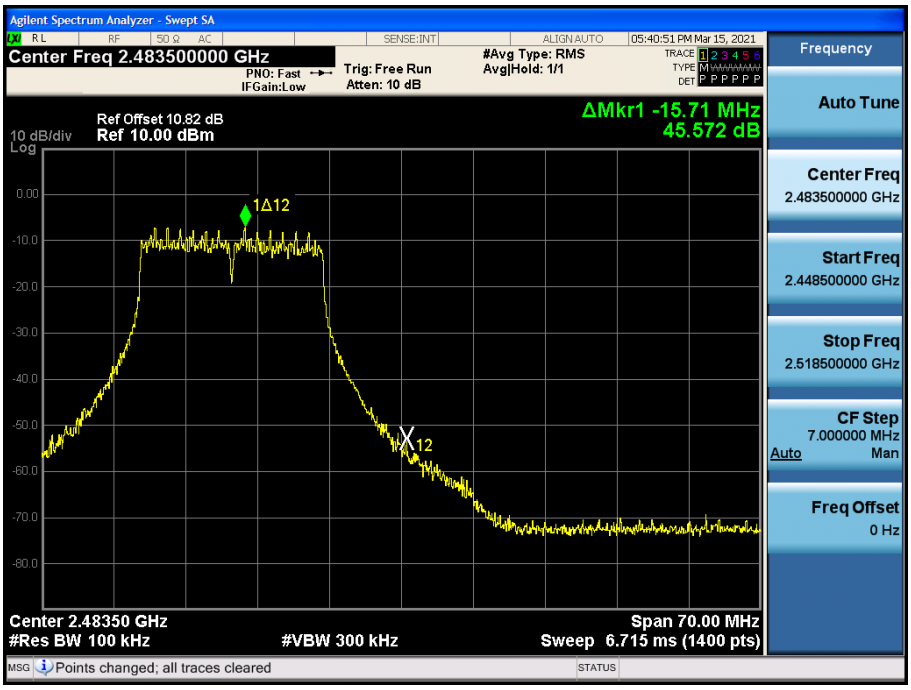
Band Edge (802.11n_HT20 -CH1)



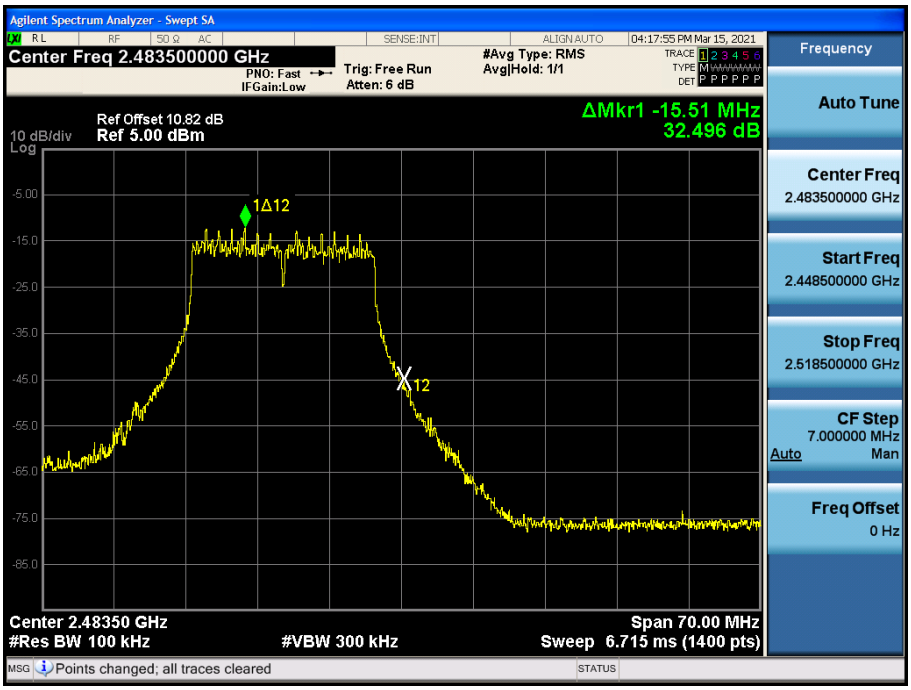
Band Edge (802.11n_HT20 –CH11)



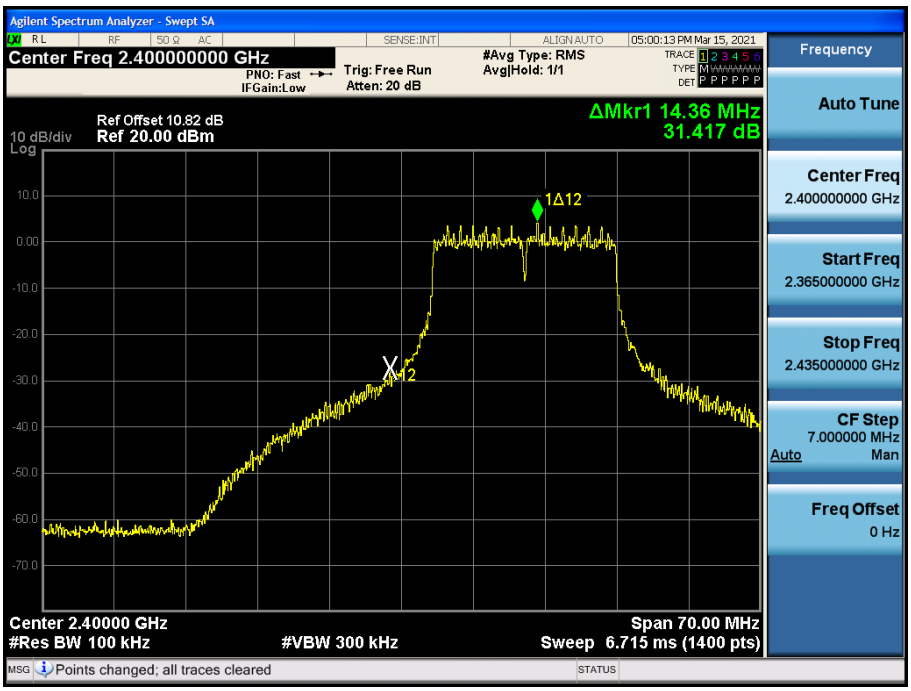
Band Edge (802.11n_HT20 -CH12)



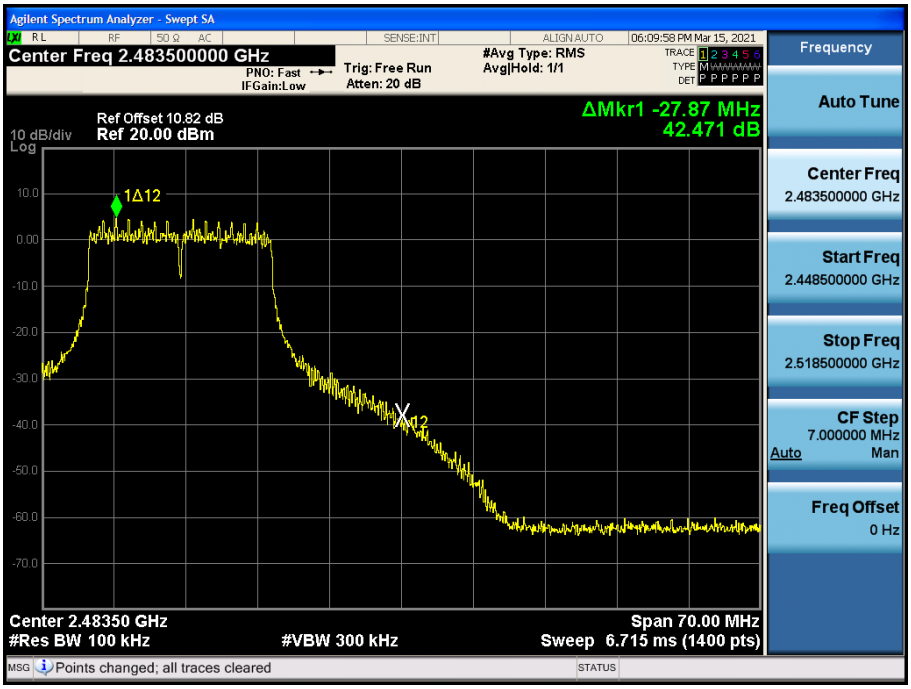
Band Edge (802.11n_HT20 –CH13)



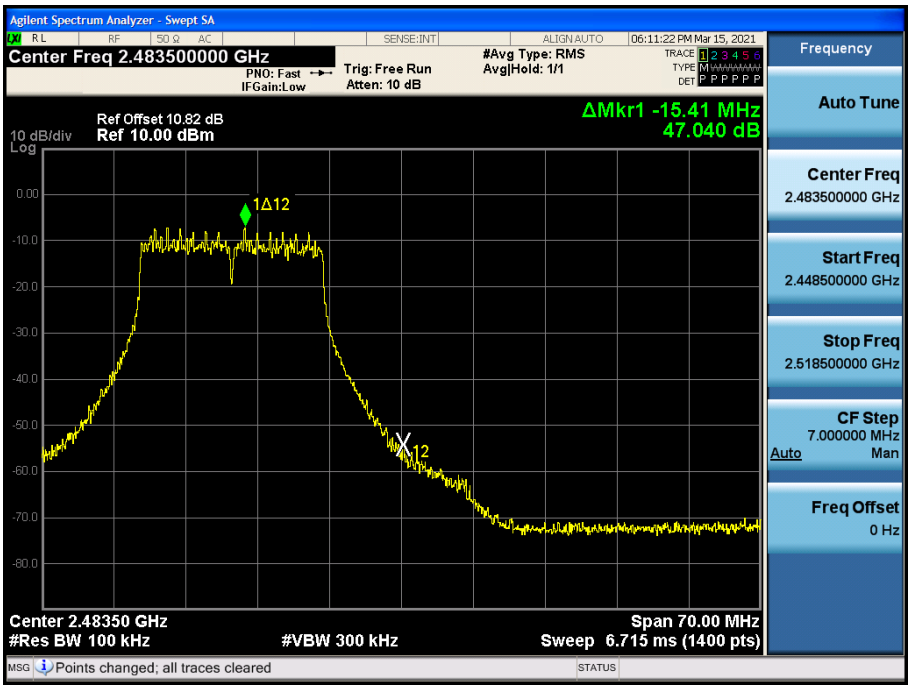
Band Edge (802.11ac_VHT20 -CH1)



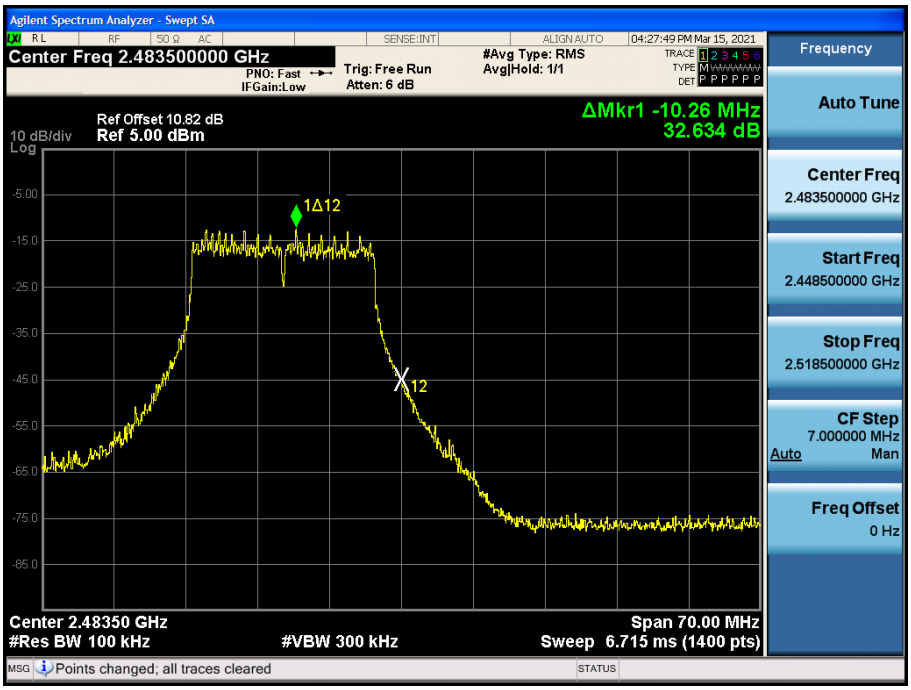
Band Edge (802.11ac_VHT20 –CH11)



Band Edge (802.11ac_VHT20 -CH12)



Band Edge (802.11ac_VHT20 –CH13)

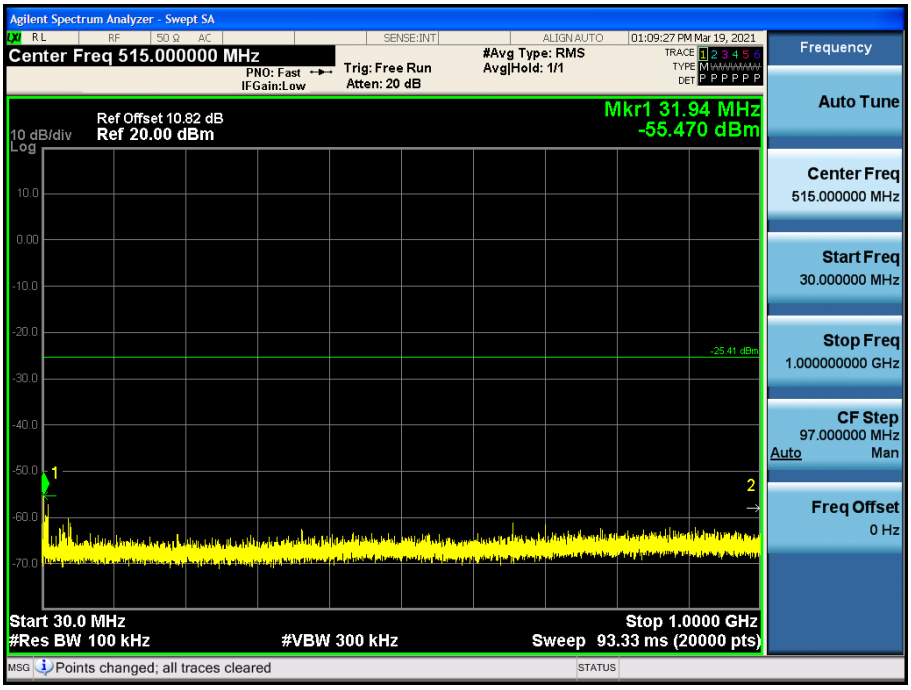


[Ant.1]

▣ Test Plots(Conducted Spurious Emission)

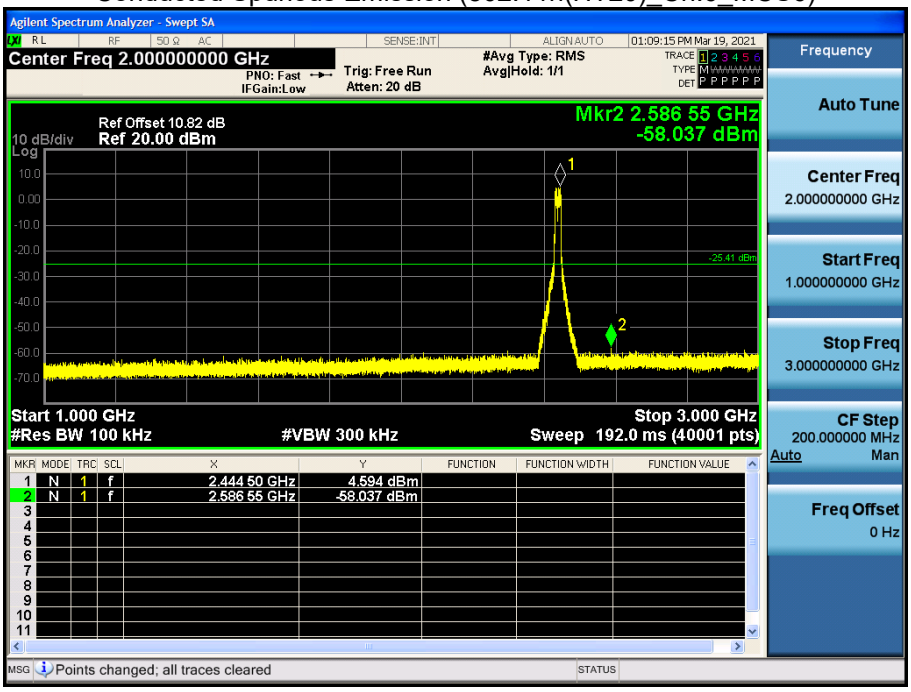
30 MHz ~ 1 GHz

Conducted Spurious Emission (802.11n(HT20)_Ch.6_MCS6)



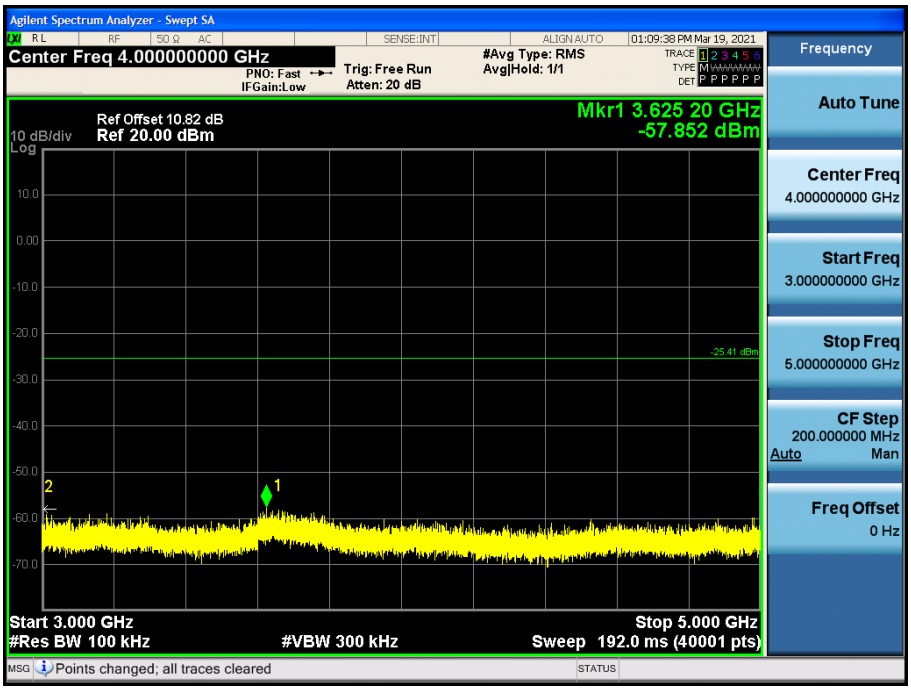
1 GHz ~ 3 GHz

Conducted Spurious Emission (802.11n(HT20)_Ch.6_MCS6)



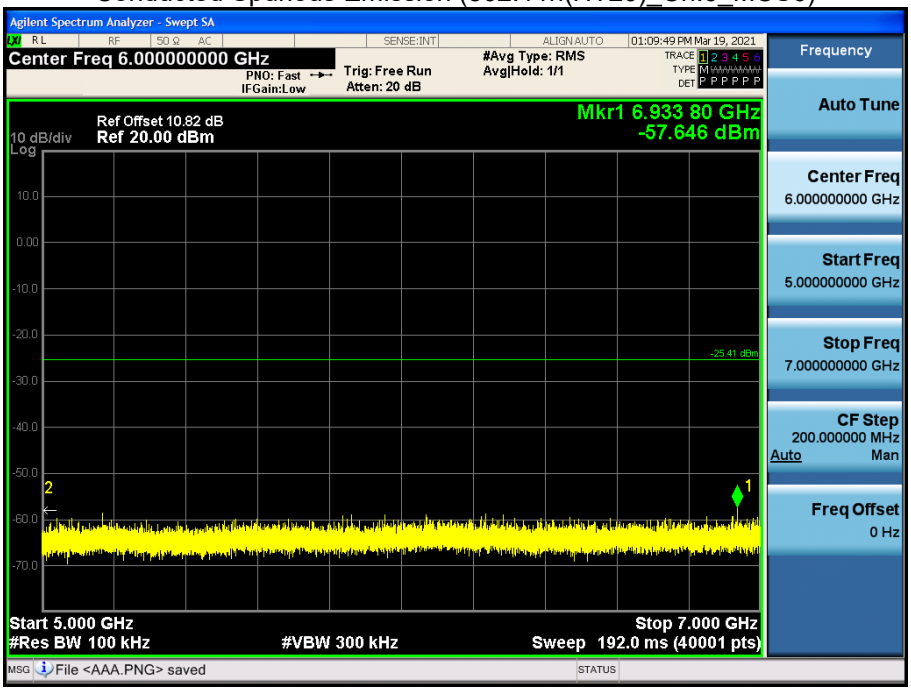
3 GHz ~ 5 GHz

Conducted Spurious Emission (802.11n(HT20)_Ch.6_MCS6)



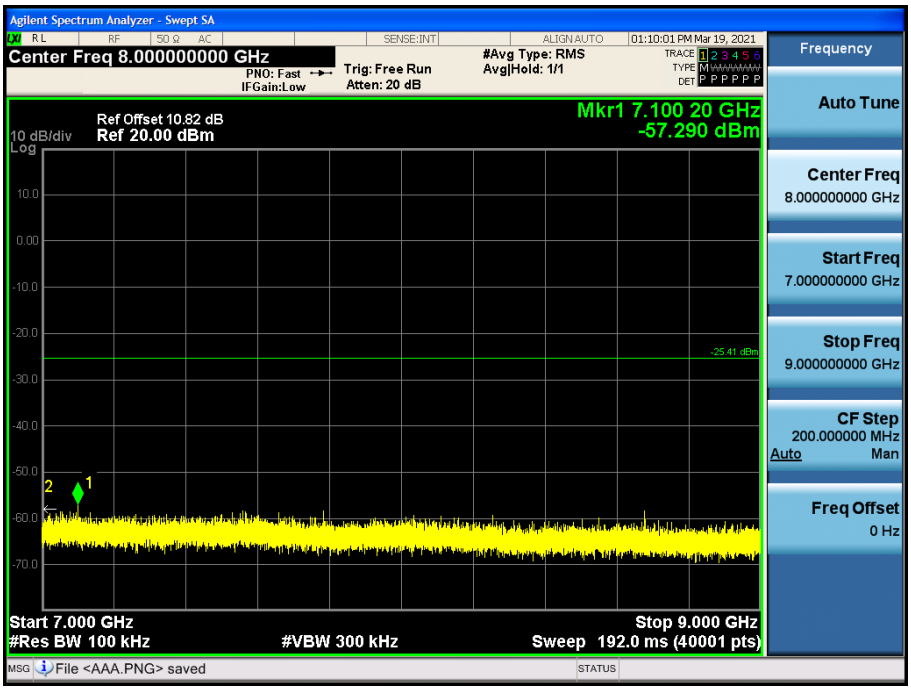
5 GHz ~ 7 GHz

Conducted Spurious Emission (802.11n(HT20)_Ch.6_MCS6)



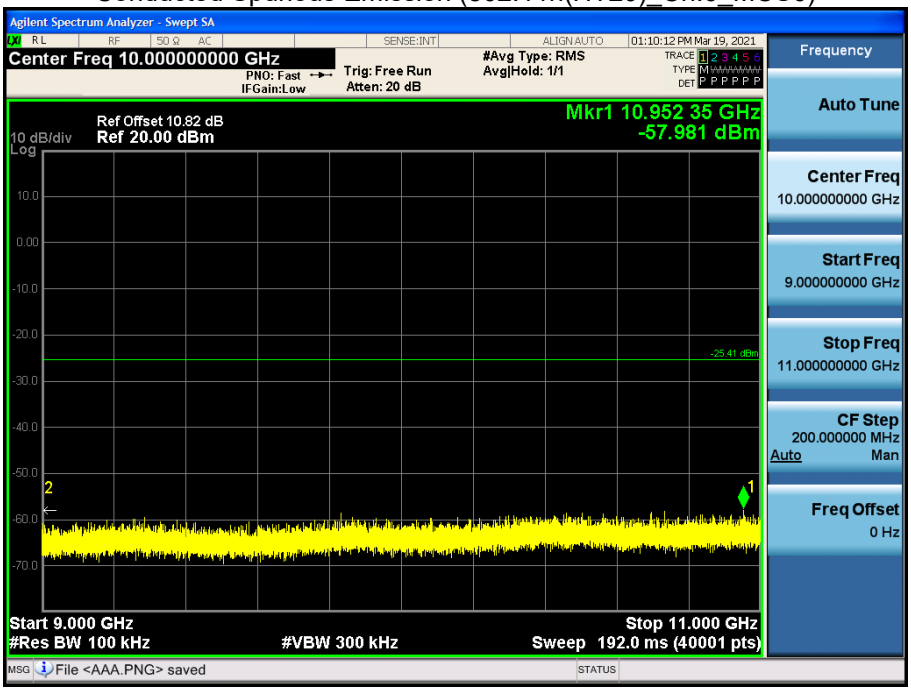
7 GHz ~ 9 GHz

Conducted Spurious Emission (802.11n(HT20)_Ch.6_MCS6)



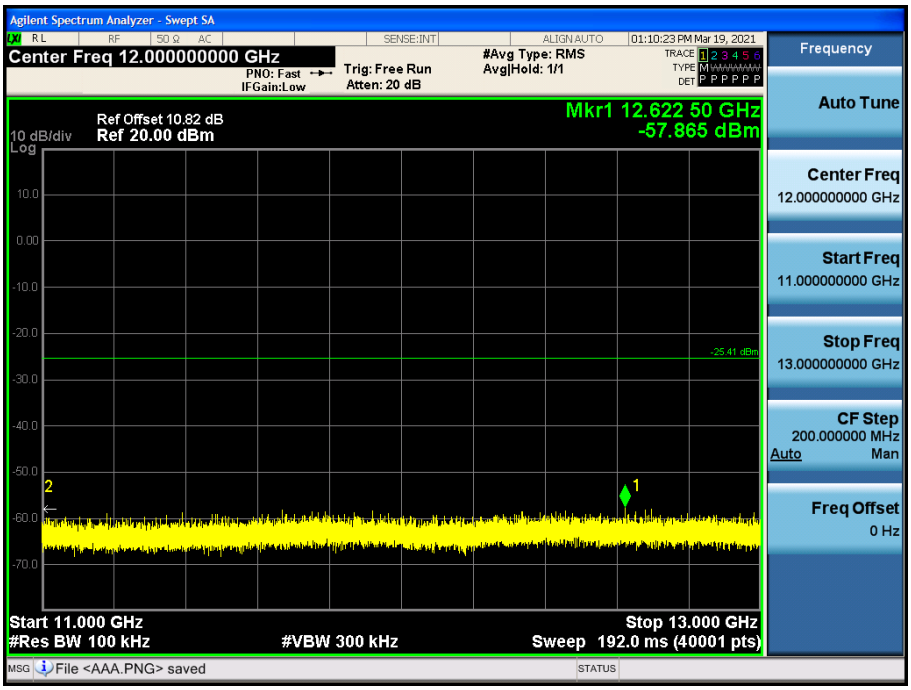
9 GHz ~ 11 GHz

Conducted Spurious Emission (802.11n(HT20)_Ch.6_MCS6)



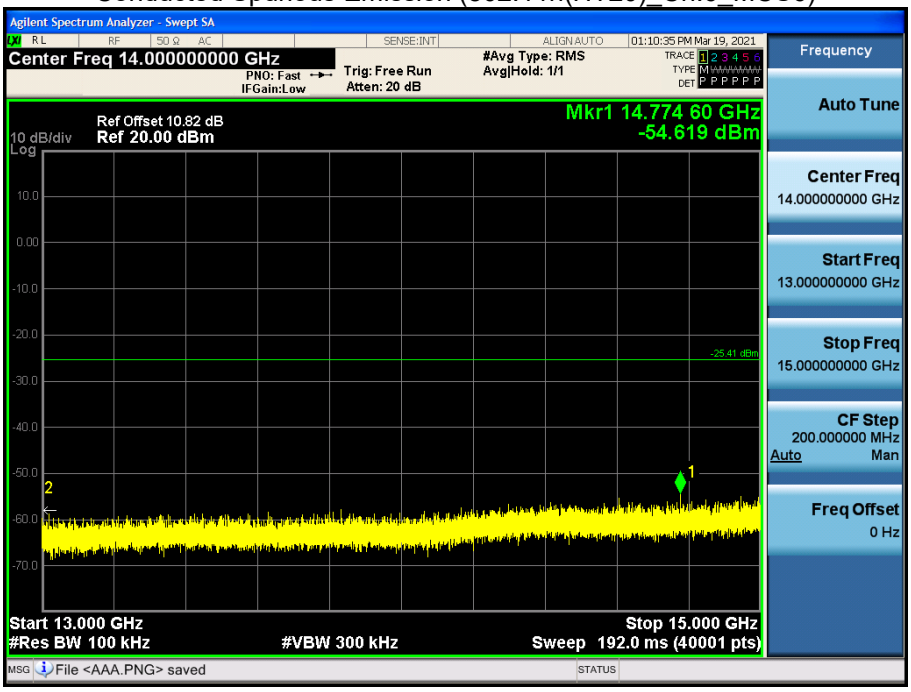
11 GHz ~ 13 GHz

Conducted Spurious Emission (802.11n(HT20)_Ch.6_MCS6)



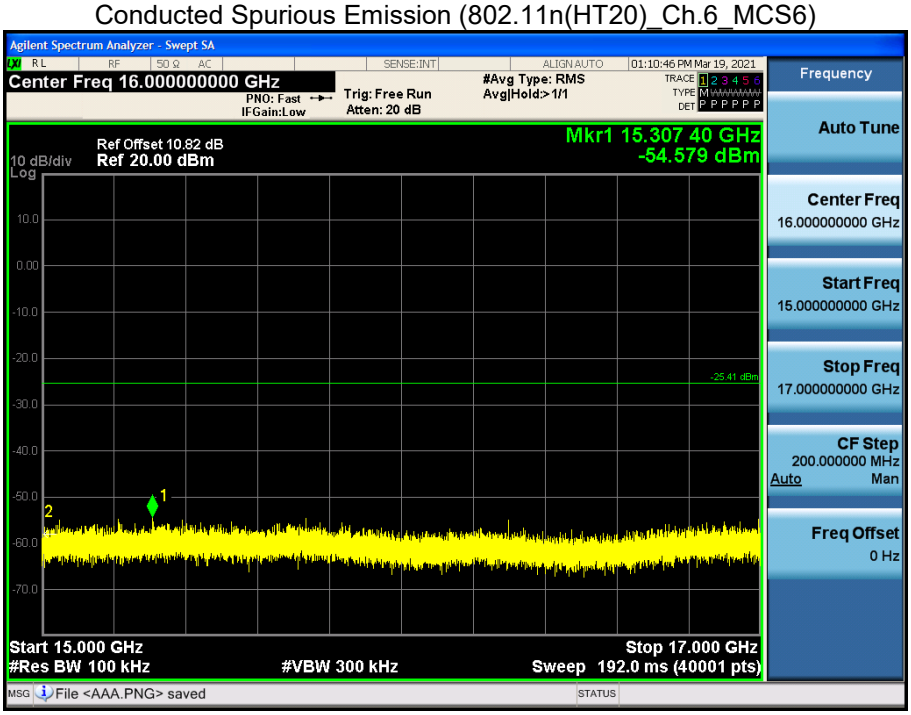
13 GHz ~ 15 GHz

Conducted Spurious Emission (802.11n(HT20)_Ch.6_MCS6)



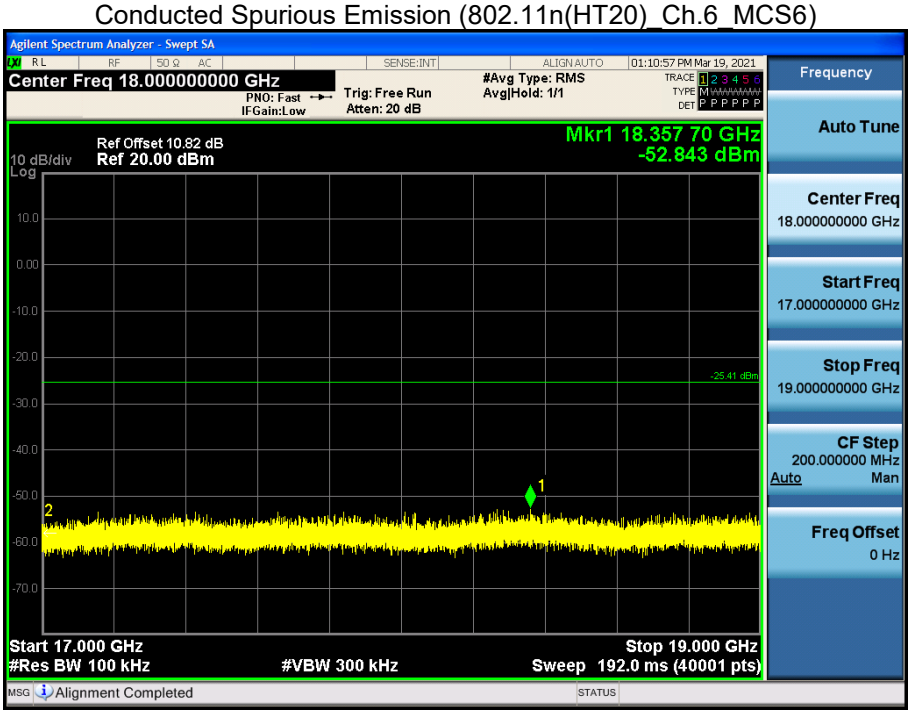
15 GHz ~ 17 GHz

Conducted Spurious Emission (802.11n(HT20)_Ch.6_MCS6)



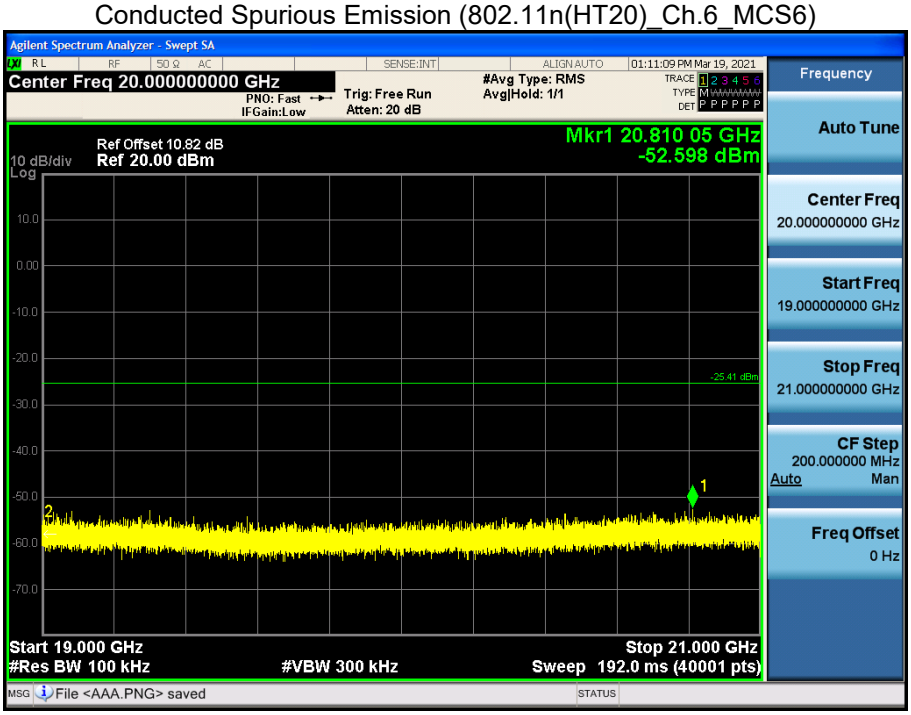
17 GHz ~ 19 GHz

Conducted Spurious Emission (802.11n(HT20)_Ch.6_MCS6)



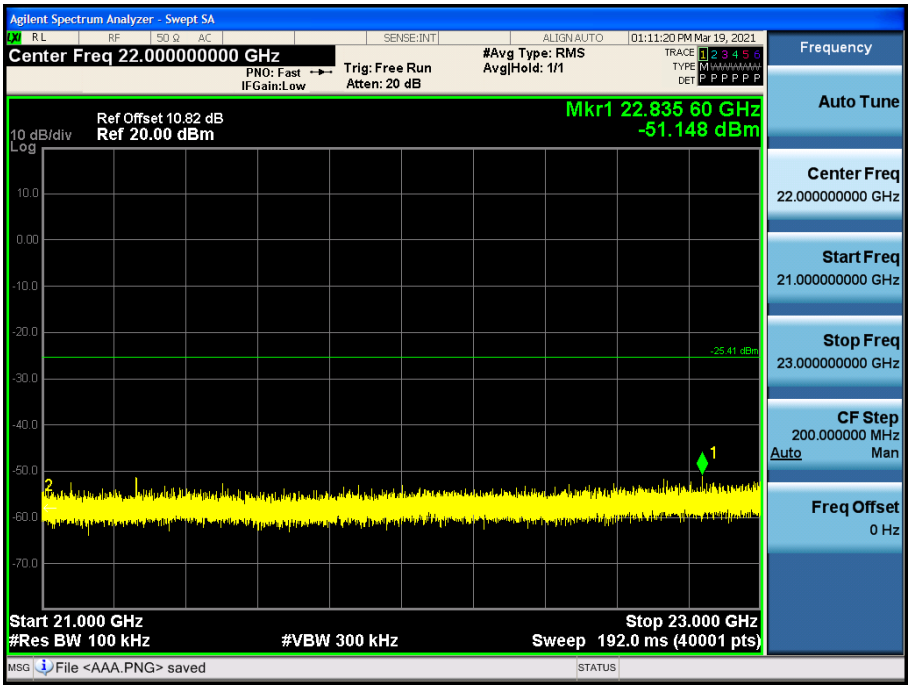
19 GHz ~ 21 GHz

Conducted Spurious Emission (802.11n(HT20)_Ch.6_MCS6)



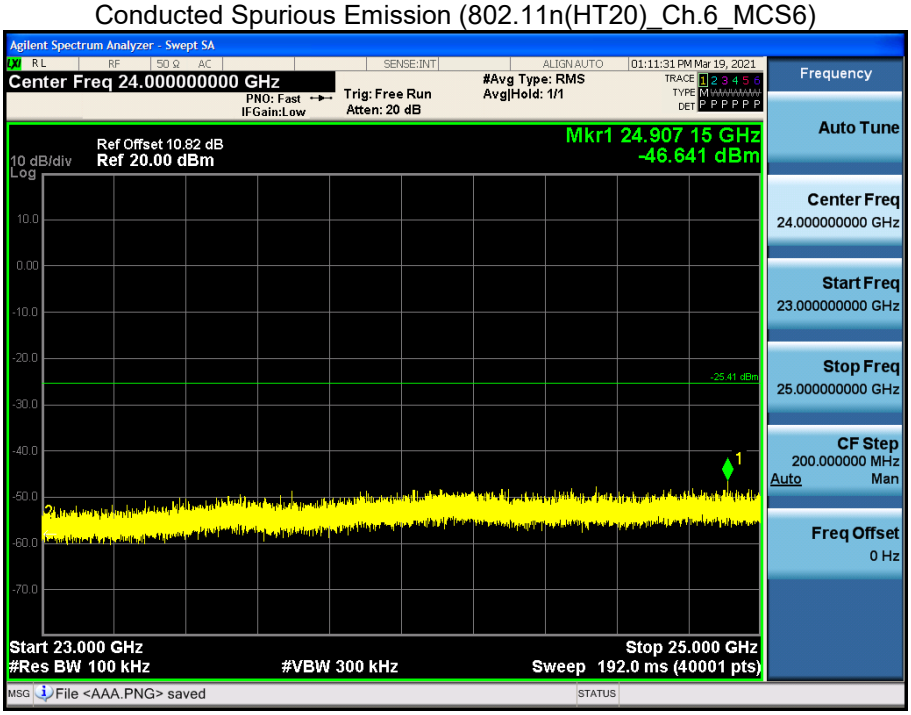
21 GHz ~ 23 GHz

Conducted Spurious Emission (802.11n(HT20)_Ch.6_MCS6)



23 GHz ~ 25 GHz

Conducted Spurious Emission (802.11n(HT20)_Ch.6_MCS6)

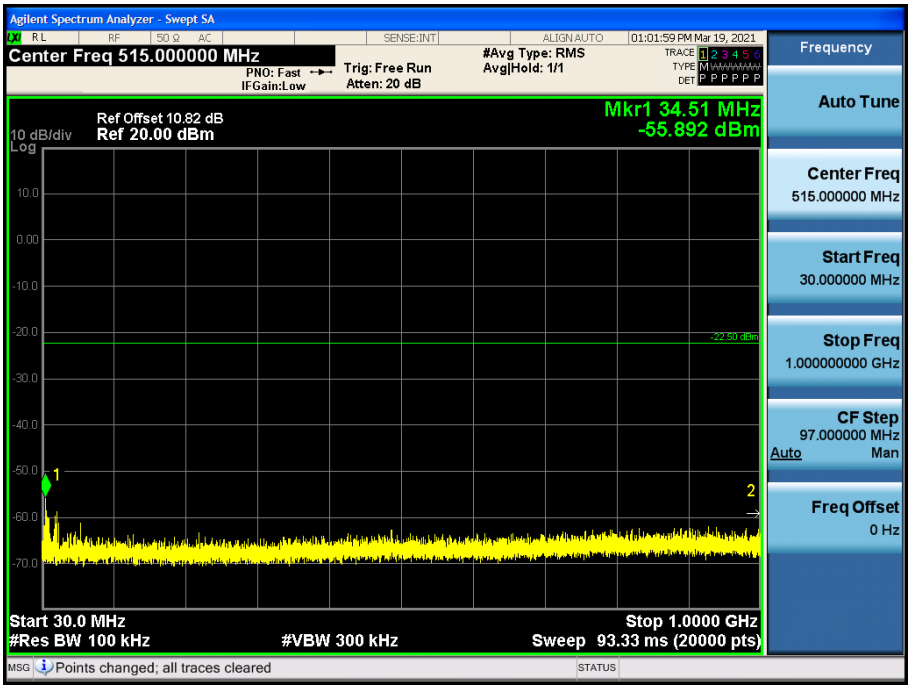


[Ant.2]

▣ Test Plots(Conducted Spurious Emission)

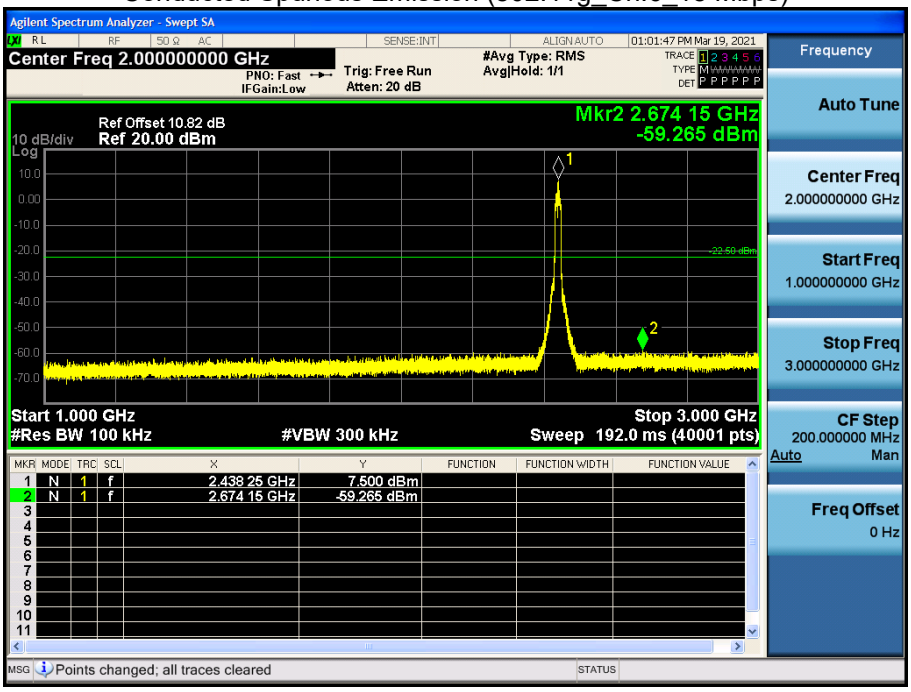
30 MHz ~ 1 GHz

Conducted Spurious Emission (802.11g_Ch.6_18 Mbps)



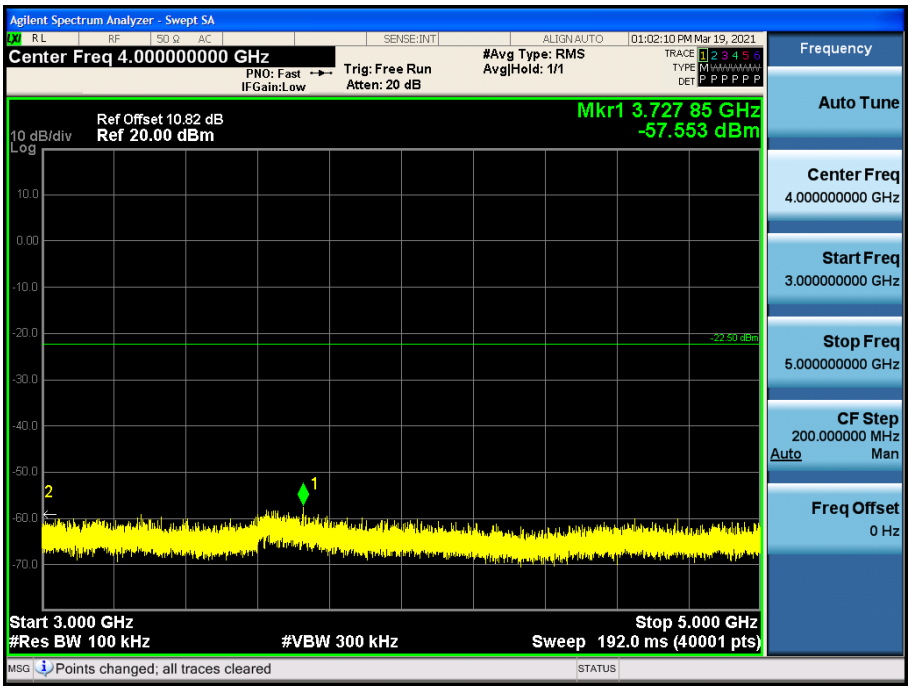
1 GHz ~ 3 GHz

Conducted Spurious Emission (802.11g_Ch.6_18 Mbps)



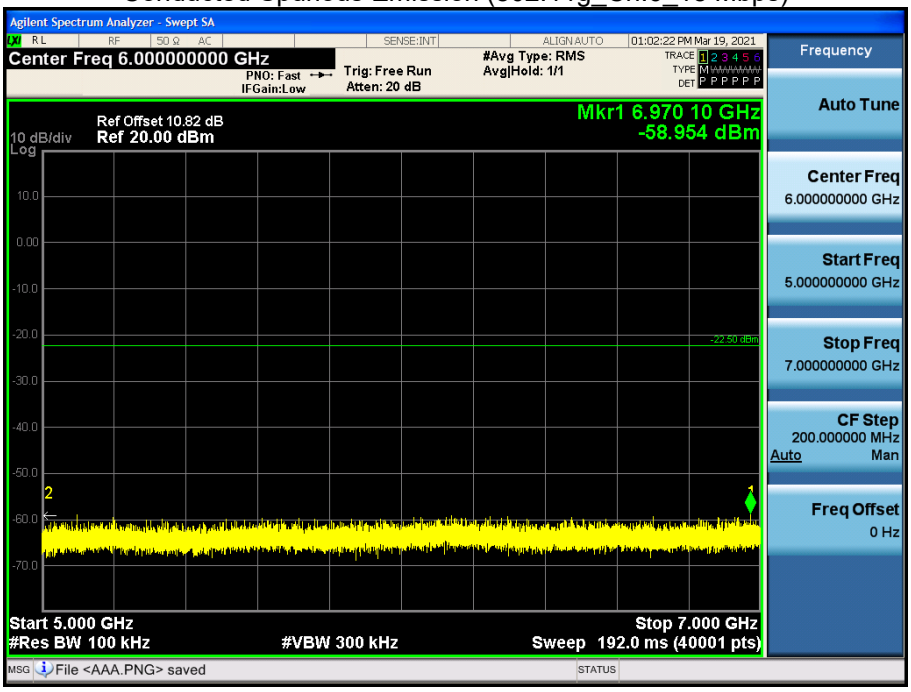
3 GHz ~ 5 GHz

Conducted Spurious Emission (802.11g_Ch.6_18 Mbps)



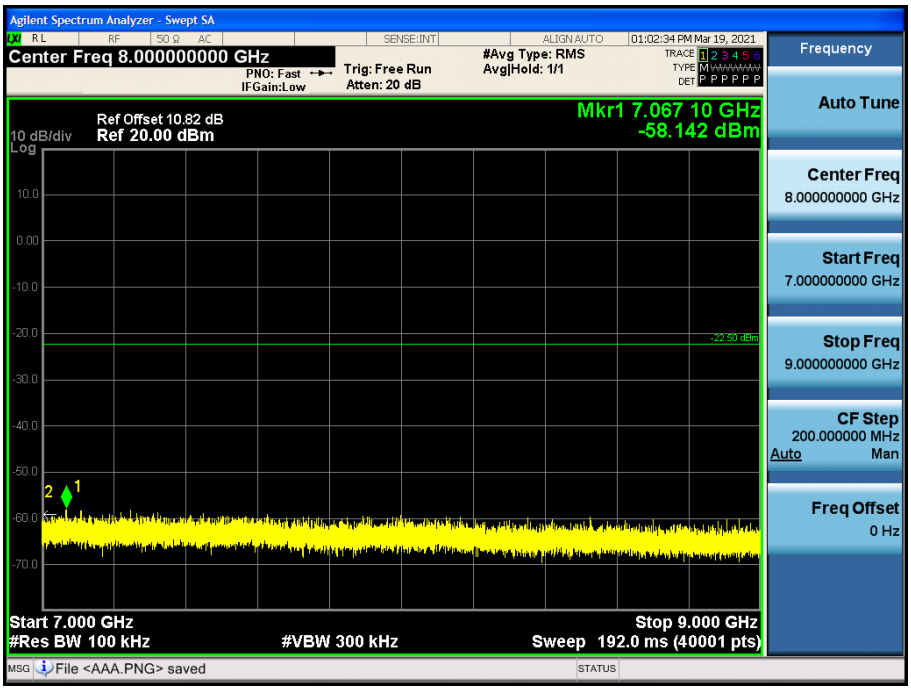
5 GHz ~ 7 GHz

Conducted Spurious Emission (802.11g_Ch.6_18 Mbps)



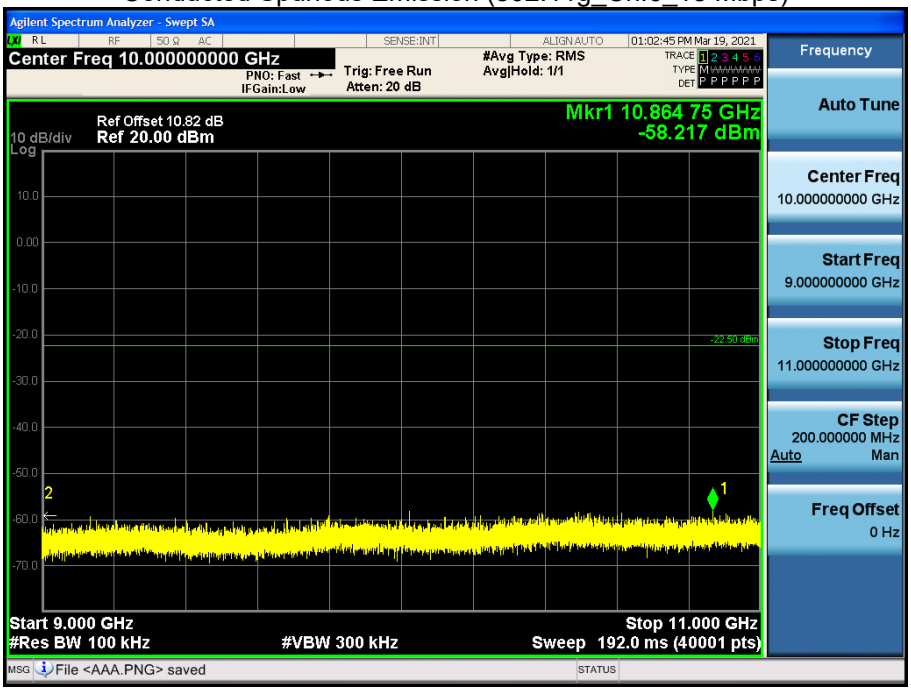
7 GHz ~ 9 GHz

Conducted Spurious Emission (802.11g_Ch.6_18 Mbps)



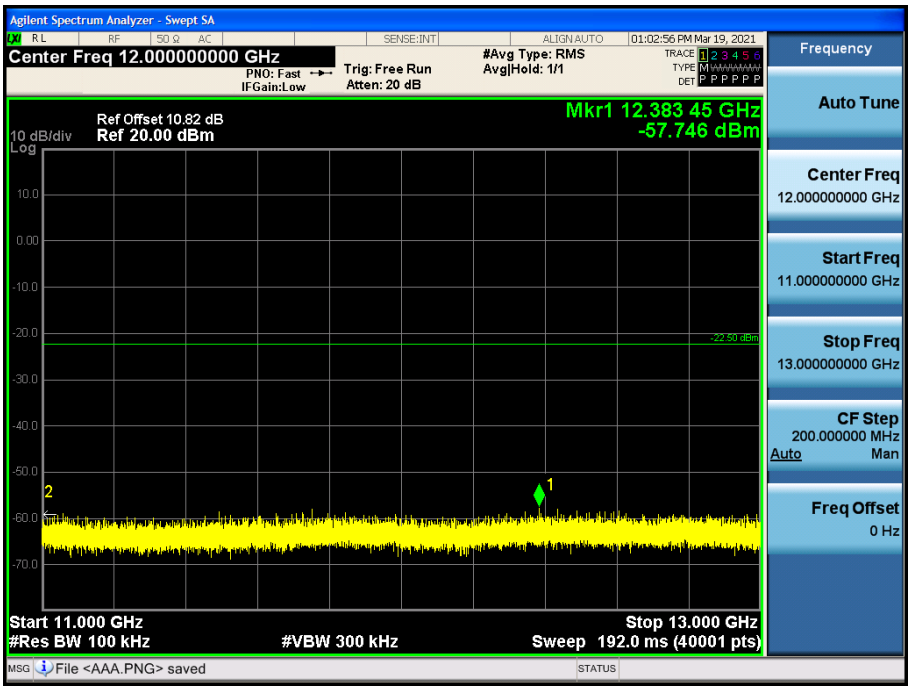
9 GHz ~ 11 GHz

Conducted Spurious Emission (802.11g_Ch.6_18 Mbps)



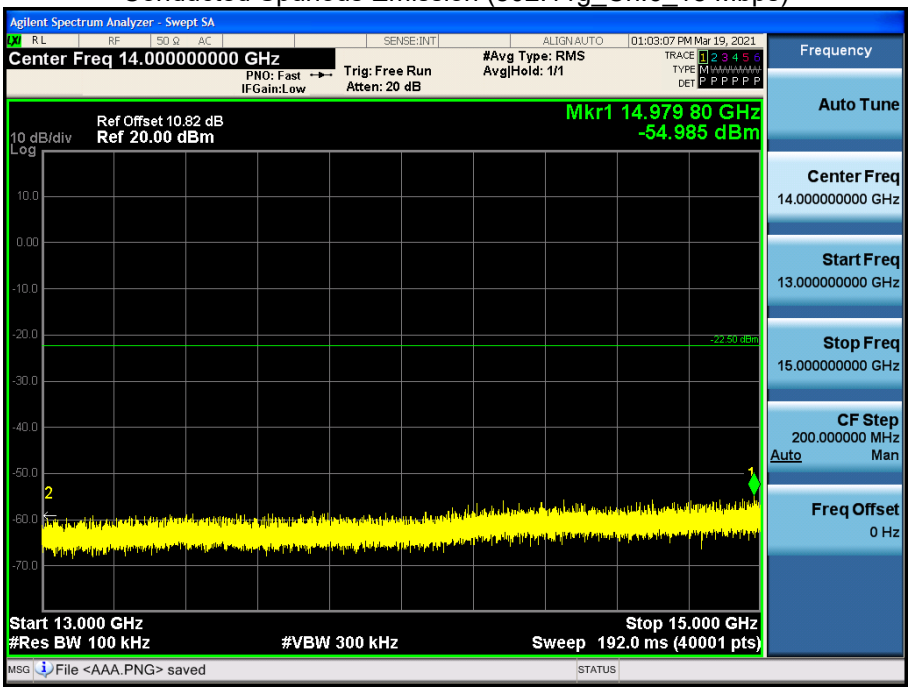
11 GHz ~ 13 GHz

Conducted Spurious Emission (802.11g_Ch.6_18 Mbps)



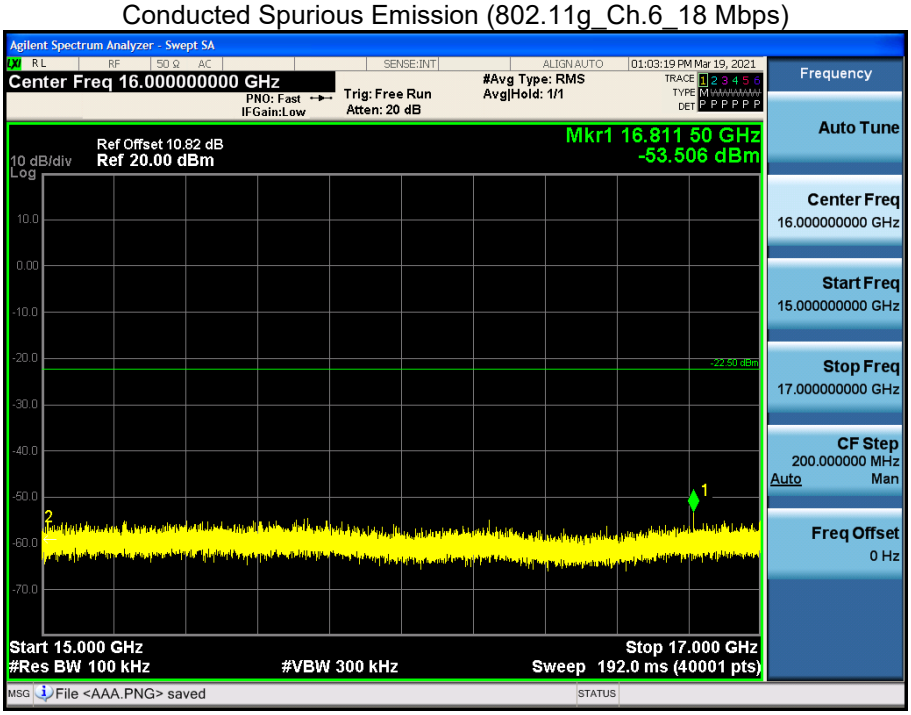
13 GHz ~ 15 GHz

Conducted Spurious Emission (802.11g_Ch.6_18 Mbps)



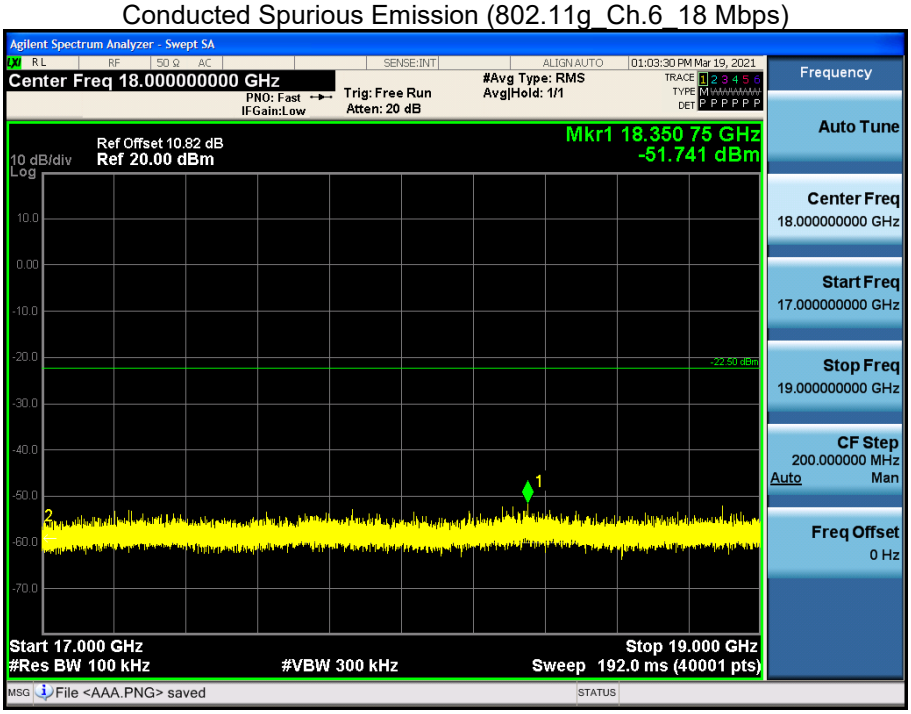
15 GHz ~ 17 GHz

Conducted Spurious Emission (802.11g_Ch.6_18 Mbps)



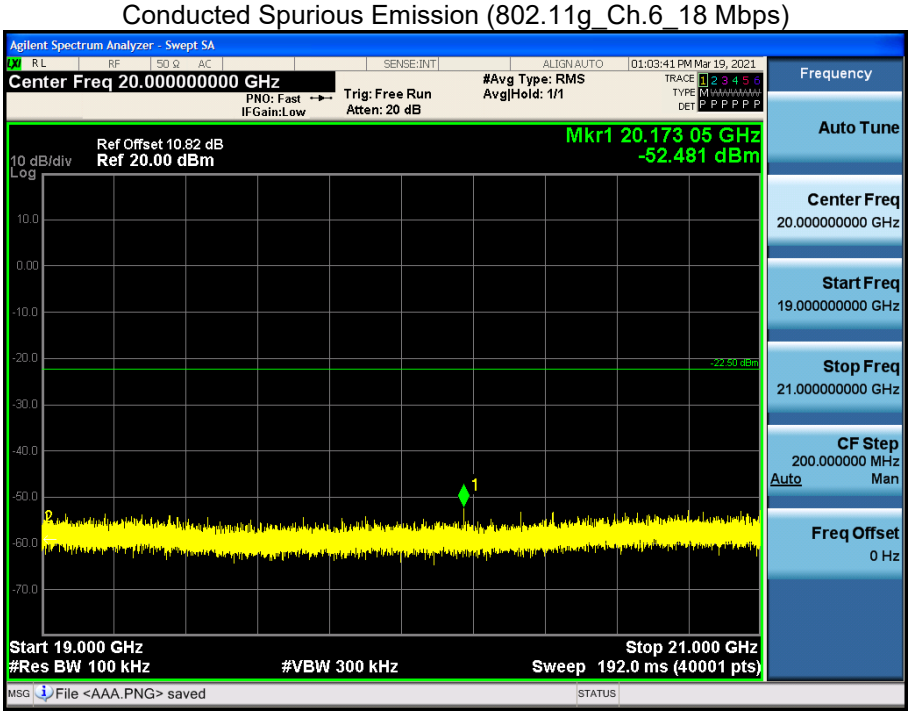
17 GHz ~ 19 GHz

Conducted Spurious Emission (802.11g_Ch.6_18 Mbps)



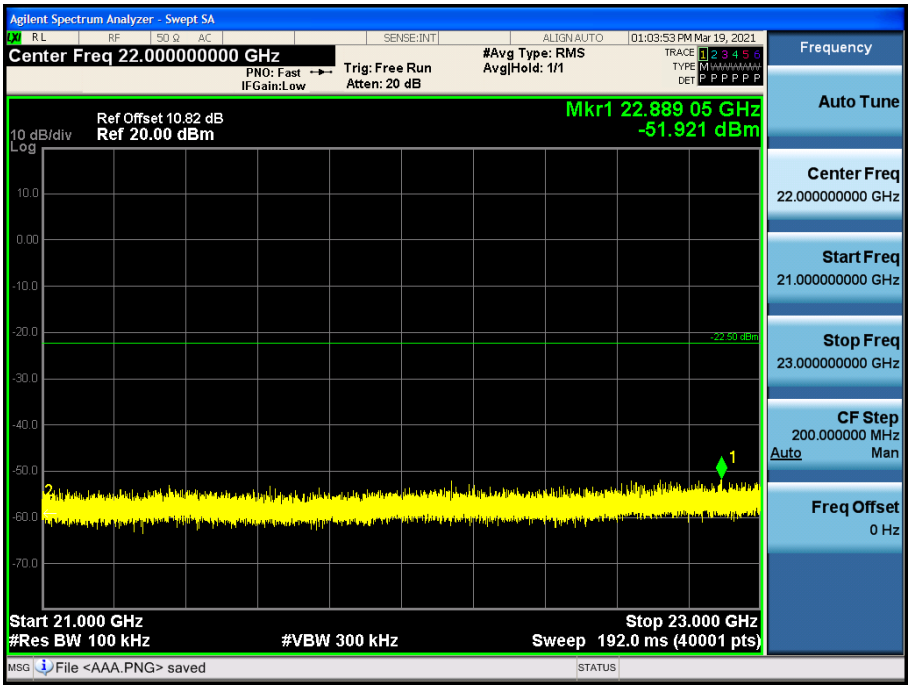
19 GHz ~ 21 GHz

Conducted Spurious Emission (802.11g_Ch.6_18 Mbps)



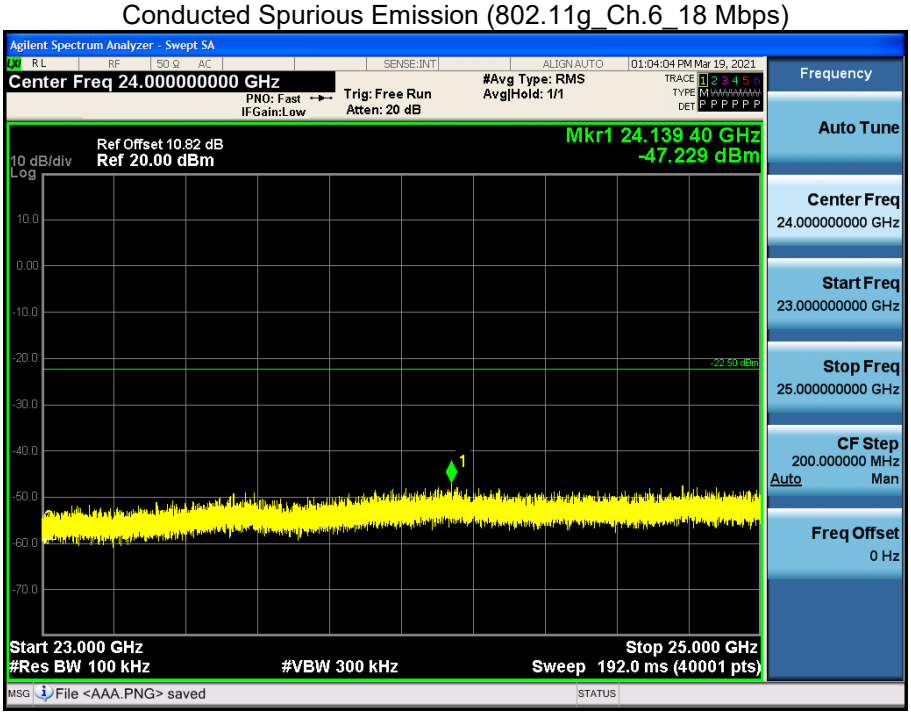
21 GHz ~ 23 GHz

Conducted Spurious Emission (802.11g_Ch.6_18 Mbps)



23 GHz ~ 25 GHz

Conducted Spurious Emission (802.11g_Ch.6_18 Mbps)



9.6 RADIATED SPURIOUS EMISSIONS

Frequency Range : 9 kHz – 30MHz

Frequency	Reading	Ant. factor	Cable loss	Ant. POL	Total	Limit	Margin
MHz	dBuV/m	dBm/m	dBm	(H/V)	dBuV/m	dBuV/m	dB
No Critical peaks found							

Note:

1. The reading of emissions are attenuated more than 20 dB below the permissible limits or the field strength is too small to be measured.
2. Distance extrapolation factor = 40log (specific distance / test distance) (dB)
3. Limit line = specific Limits (dBuV) + Distance extrapolation factor

Frequency Range : Below 1 GHz

Frequency	Reading	Ant. factor	Cable loss	Ant. POL	Total	Limit	Margin
MHz	dBuV/m	dBm/m	dBm	(H/V)	dBuV/m	dBuV/m	dB
No Critical peaks found							

Note:

1. Radiated emissions measured in frequency range from 30 MHz to 1000 MHz were made with an instrument using Quasi peak detector mode.

Frequency Range : Above 1 GHz

[Ant.1&Ant.2_MIMO(CDD)]

Operation Mode:	802.11b
Transfer Rate:	1 Mbps
Operating Frequency	2412 MHz
Channel No.	01 Ch

Frequency [MHz]	Reading [dBuV]	A.F.+C.L.-A.G + D.F [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
4824	50.98	3.46	V	54.44	73.98	19.54	PK
4824	47.32	3.46	V	50.78	53.98	3.20	AV
7236	39.02	12.51	V	51.53	73.98	22.45	PK
7236	26.71	12.51	V	39.22	53.98	14.76	AV
4824	51.12	3.46	H	54.58	73.98	19.40	PK
4824	47.46	3.46	H	50.92	53.98	3.06	AV
7236	39.12	12.51	H	51.63	73.98	22.35	PK
7236	26.82	12.51	H	39.33	53.98	14.65	AV

Operation Mode:	802.11b
Transfer Rate:	1 Mbps
Operating Frequency	2437 MHz
Channel No.	06 Ch

Frequency [MHz]	Reading [dBuV]	A.F.+C.L.-A.G + D.F [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
4874	50.98	3.42	V	54.40	73.98	19.58	PK
4874	46.85	3.42	V	50.27	53.98	3.71	AV
7311	41.02	11.76	V	52.78	73.98	21.20	PK
7311	31.30	11.76	V	43.06	53.98	10.92	AV
4874	51.05	3.42	H	54.47	73.98	19.51	PK
4874	46.95	3.42	H	50.37	53.98	3.61	AV
7311	41.11	11.76	H	52.87	73.98	21.11	PK
7311	31.34	11.76	H	43.10	53.98	10.88	AV

Operation Mode:	802.11b
Transfer Rate:	1 Mbps
Operating Frequency	2462 MHz
Channel No.	11 Ch

Frequency [MHz]	Reading [dBuV]	A.F.+C.L.-A.G + D.F [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
4924	50.71	4.55	V	55.26	73.98	18.72	PK
4924	46.12	4.55	V	50.67	53.98	3.31	AV
7386	38.40	12.13	V	50.53	73.98	23.45	PK
7386	25.81	12.13	V	37.94	53.98	16.04	AV
4924	50.80	4.55	H	55.35	73.98	18.63	PK
4924	46.39	4.55	H	50.94	53.98	3.04	AV
7386	38.48	12.13	H	50.61	73.98	23.37	PK
7386	25.82	12.13	H	37.95	53.98	16.03	AV

Note:

Channel 12 and 13 are less powerful than channel 11 so the test for high channel was performed at channel 11.

Operation Mode:	802.11g
Transfer Rate:	6 Mbps
Operating Frequency	2412 MHz
Channel No.	01 Ch

Frequency [MHz]	Reading [dBuV]	Duty Cycle Factor [dB]	A.F.+C.L. -A.G + D.F [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
4824	51.42	0.00	3.46	V	54.88	73.98	19.10	PK
4824	37.98	0.102	3.46	V	41.54	53.98	12.44	AV
7236	38.02	0.00	12.51	V	50.53	73.98	23.45	PK
7236	26.22	0.102	12.51	V	38.83	53.98	15.15	AV
4824	51.62	0.00	3.46	H	55.08	73.98	18.90	PK
4824	38.02	0.102	3.46	H	41.58	53.98	12.40	AV
7236	38.35	0.00	12.51	H	50.86	73.98	23.12	PK
7236	26.35	0.102	12.51	H	38.96	53.98	15.02	AV

Operation Mode:	802.11g
Transfer Rate:	6 Mbps
Operating Frequency	2437 MHz
Channel No.	06 Ch

Frequency [MHz]	Reading [dBuV]	Duty Cycle Factor [dB]	A.F.+C.L.- A.G + D.F [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
4874	53.01	0.00	3.42	V	56.43	73.98	17.55	PK
4874	41.12	0.102	3.42	V	44.64	53.98	9.34	AV
7311	39.01	0.00	11.76	V	50.77	73.98	23.21	PK
7311	26.85	0.102	11.76	V	38.71	53.98	15.27	AV
4874	53.26	0.00	3.42	H	56.68	73.98	17.30	PK
4874	41.43	0.102	3.42	H	44.95	53.98	9.03	AV
7311	39.06	0.00	11.76	H	50.82	73.98	23.16	PK
7311	26.92	0.102	11.76	H	38.78	53.98	15.20	AV

Operation Mode:	802.11g
Transfer Rate:	6 Mbps
Operating Frequency	2462 MHz
Channel No.	11 Ch

Frequency [MHz]	Reading [dBuV]	Duty Cycle Factor [dB]	A.F.+C.L.-A.G + D.F [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
4924	50.55	0.00	4.55	V	55.10	73.98	18.88	PK
4924	37.98	0.102	4.55	V	42.63	53.98	11.35	AV
7386	38.11	0.00	12.13	V	50.24	73.98	23.74	PK
7386	26.52	0.102	12.13	V	38.75	53.98	15.23	AV
4924	50.81	0.00	4.55	H	55.36	73.98	18.62	PK
4924	38.25	0.102	4.55	H	42.90	53.98	11.08	AV
7386	38.25	0.00	12.13	H	50.38	73.98	23.60	PK
7386	26.69	0.102	12.13	H	38.92	53.98	15.06	AV

Note:

Channel 12 and 13 are less powerful than channel 11 so the test for high channel was performed at channel 11.

Operation Mode:	802.11n (HT20)
Transfer MCS Index:	0
Operating Frequency	2412 MHz
Channel No.	01 Ch

Frequency [MHz]	Reading [dBuV]	Duty Cycle Factor [dB]	A.F.+C.L.-A.G + D.F [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
4824	51.56	0.00	3.46	V	55.02	73.98	18.96	PK
4824	37.89	0.122	3.46	V	41.47	53.98	12.51	AV
7236	38.22	0.00	12.51	V	50.73	73.98	23.25	PK
7236	26.32	0.122	12.51	V	38.95	53.98	15.03	AV
4824	51.85	0.00	3.46	H	55.31	73.98	18.67	PK
4824	38.12	0.122	3.46	H	41.70	53.98	12.28	AV
7236	38.35	0.00	12.51	H	50.86	73.98	23.12	PK
7236	26.42	0.122	12.51	H	39.05	53.98	14.93	AV

Operation Mode:	802.11n (HT20)
Transfer MCS Index:	0
Operating Frequency	2437 MHz
Channel No.	06 Ch

Frequency [MHz]	Reading [dBuV]	Duty Cycle Factor [dB]	A.F.+C.L.-A.G + D.F [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
4874	53.98	0.00	3.42	V	57.40	73.98	16.58	PK
4874	39.62	0.122	3.42	V	43.16	53.98	10.82	AV
7311	38.52	0.00	11.76	V	50.28	73.98	23.70	PK
7311	26.71	0.122	11.76	V	38.59	53.98	15.39	AV
4874	54.11	0.00	3.42	H	57.53	73.98	16.45	PK
4874	39.95	0.122	3.42	H	43.49	53.98	10.49	AV
7311	38.62	0.00	11.76	H	50.38	73.98	23.60	PK
7311	26.89	0.122	11.76	H	38.77	53.98	15.21	AV

Operation Mode:	802.11n (HT20)
Transfer MCS Index:	0
Operating Frequency	2462 MHz
Channel No.	11 Ch

Frequency [MHz]	Reading [dBuV]	Duty Cycle Factor [dB]	A.F.+C.L.-A.G + D.F [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
4924	49.75	0.00	4.55	V	54.30	73.98	19.68	PK
4924	36.12	0.122	4.55	V	40.79	53.98	13.19	AV
7386	38.12	0.00	12.13	V	50.25	73.98	23.73	PK
7386	26.55	0.122	12.13	V	38.80	53.98	15.18	AV
4924	49.95	0.00	4.55	H	54.50	73.98	19.48	PK
4924	36.33	0.122	4.55	H	41.00	53.98	12.98	AV
7386	38.42	0.00	12.13	H	50.55	73.98	23.43	PK
7386	26.65	0.122	12.13	H	38.90	53.98	15.08	AV

Note:

Channel 12 and 13 are less powerful than channel 11 so the test for high channel was performed at channel 11.

Operation Mode:	802.11ac (VHT20)
Transfer MCS Index:	0
Operating Frequency	2412 MHz
Channel No.	01 Ch

Frequency [MHz]	Reading [dBuV]	Duty Cycle Factor [dB]	A.F.+C.L.-A.G + D.F [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
4824	51.22	0.00	3.46	V	54.68	73.98	19.30	PK
4824	37.32	0.113	3.46	V	40.89	53.98	13.09	AV
7236	38.31	0.00	12.51	V	50.82	73.98	23.16	PK
7236	26.22	0.113	12.51	V	38.84	53.98	15.14	AV
4824	51.39	0.00	3.46	H	54.85	73.98	19.13	PK
4824	37.45	0.113	3.46	H	41.02	53.98	12.96	AV
7236	38.51	0.00	12.51	H	51.02	73.98	22.96	PK
7236	26.32	0.113	12.51	H	38.94	53.98	15.04	AV

Operation Mode:	802.11ac (VHT20)
Transfer MCS Index:	0
Operating Frequency	2437 MHz
Channel No.	06 Ch

Frequency [MHz]	Reading [dBuV]	Duty Cycle Factor [dB]	A.F.+C.L.-A.G + D.F [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
4874	49.85	0.00	3.42	V	53.27	73.98	20.71	PK
4874	37.55	0.113	3.42	V	41.08	53.98	12.90	AV
7311	38.88	0.00	11.76	V	50.64	73.98	23.34	PK
7311	26.65	0.113	11.76	V	38.52	53.98	15.46	AV
4874	50.08	0.00	3.42	H	53.50	73.98	20.48	PK
4874	37.65	0.113	3.42	H	41.18	53.98	12.80	AV
7311	38.95	0.00	11.76	H	50.71	73.98	23.27	PK
7311	26.85	0.113	11.76	H	38.72	53.98	15.26	AV

Operation Mode:	802.11ac (VHT20)
Transfer MCS Index:	0
Operating Frequency	2462 MHz
Channel No.	11 Ch

Frequency [MHz]	Reading [dBuV]	Duty Cycle Factor [dB]	A.F.+C.L.-A.G + D.F [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
4924	48.02	0.00	4.55	V	52.57	73.98	21.41	PK
4924	35.98	0.113	4.55	V	40.64	53.98	13.34	AV
7386	38.32	0.00	12.13	V	50.45	73.98	23.53	PK
7386	26.55	0.113	12.13	V	38.79	53.98	15.19	AV
4924	48.25	0.00	4.55	H	52.80	73.98	21.18	PK
4924	36.12	0.113	4.55	H	40.78	53.98	13.20	AV
7386	38.47	0.00	12.13	H	50.60	73.98	23.38	PK
7386	26.65	0.113	12.13	H	38.89	53.98	15.09	AV

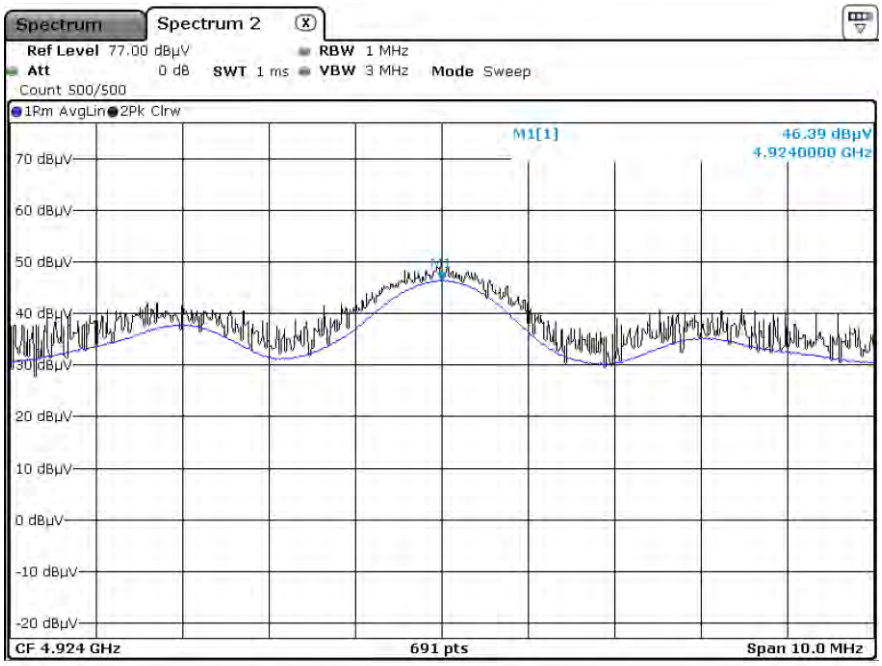
Note:

Channel 12 and 13 are less powerful than channel 11 so the test for high channel was performed at channel 11.

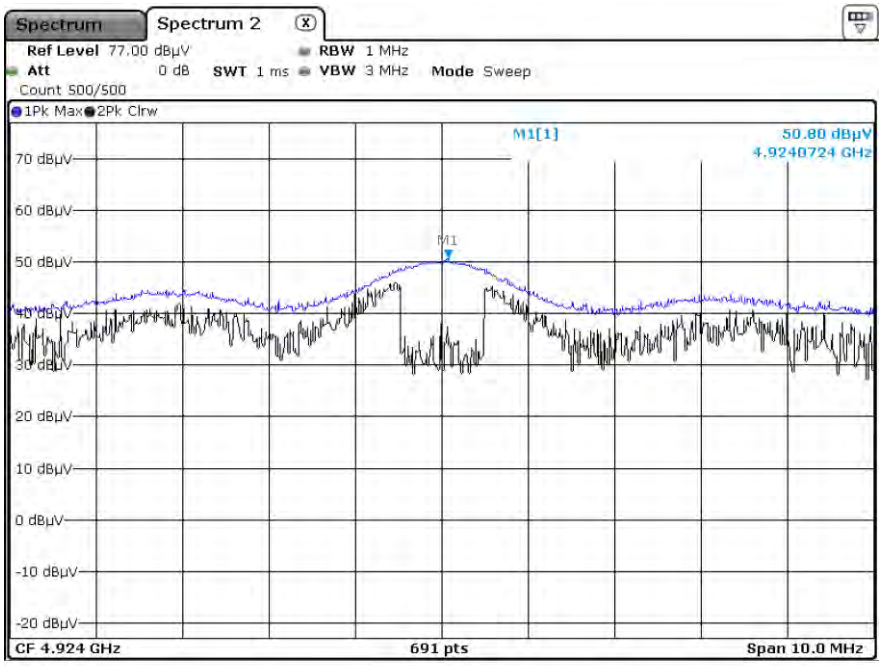
[Ant.1&Ant.2_MIMO(CDD)]

▣ Test Plots (Worst case : Z-H)

Radiated Spurious Emissions plot – Average Reading (802.11b_1 Mbps, Ch.11 2nd Harmonic)



Radiated Spurious Emissions plot – Peak Reading (802.11b_1 Mbps, Ch.11 2nd Harmonic)



Note: Plot of worst case are only reported.

9.7 RADIATED RESTRICTED BAND EDGES

[Ant.1&Ant.2_MIMO(CDD)]

Operation Mode:	802.11b
Transfer Rate:	1 Mbps
Operating Frequency	2412 MHz, 2462 MHz
Channel No.	01 Ch, 11 Ch

Frequency [MHz]	Reading [dBuV]	A.F.+ C.L+ D.F [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
2390.0	24.658	34.04	H	58.70	73.98	15.28	PK
2390.0	15.421	34.04	H	49.46	53.98	4.52	AV
2390.0	24.252	34.04	V	58.29	73.98	15.69	PK
2390.0	15.121	34.04	V	49.16	53.98	4.82	AV
2483.5	25.418	35.00	H	60.42	73.98	13.56	PK
2483.5	14.452	35.00	H	49.45	53.98	4.53	AV
2483.5	24.559	35.00	V	59.56	73.98	14.42	PK
2483.5	13.952	35.00	V	48.95	53.98	5.03	AV

Operation Mode:	802.11b
Transfer Rate:	1 Mbps
Operating Frequency	2467 MHz, 2472 MHz
Channel No.	12 Ch, 13 Ch

Channel No.	Frequency [MHz]	Reading [dBuV]	A.F.+ C.L+ D.F [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
12	2483.5	21.548	35.00	H	56.55	73.98	17.43	PK
	2483.5	8.139	35.00	H	43.14	53.98	10.84	AV
	2483.5	21.025	35.00	V	56.03	73.98	17.96	PK
	2483.5	7.985	35.00	V	42.99	53.98	11.00	AV
13	2483.5	21.438	35.00	H	56.44	73.98	17.54	PK
	2483.5	11.212	35.00	H	46.21	53.98	7.77	AV
	2483.5	21.121	35.00	V	56.12	73.98	17.86	PK
	2483.5	11.021	35.00	V	46.02	53.98	7.96	AV

Operation Mode:	802.11g
Transfer Rate:	6 Mbps
Operating Frequency	2412 MHz, 2462 MHz
Channel No.	01 Ch, 11 Ch

Frequency [MHz]	Reading [dBuV]	Duty Cycle Factor [dB]	A.F.+ C.L+ D.F [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
2390.0	28.393	0.000	34.04	H	62.43	73.98	11.55	PK
2390.0	16.738	0.102	34.04	H	50.88	53.98	3.10	AV
2390.0	27.986	0.000	34.04	V	62.03	73.98	11.95	PK
2390.0	16.012	0.102	34.04	V	50.15	53.98	3.83	AV
2483.5~2500	28.277	0.000	35.00	H	63.28	73.98	10.70	PK
# 2484.0	16.000	0.102	35.00	H	51.10	53.98	2.88	AV
2484.5~2500	15.793	0.102	35.00	H	50.90	53.98	3.09	AV
2483.5~2500	27.650	0.000	35.00	V	62.65	73.98	11.33	PK
# 2484.0	15.780	0.102	35.00	V	50.88	53.98	3.10	AV
2484.5~2500	15.524	0.102	35.00	V	50.63	53.98	3.35	AV

Note : integration method Used (ANSI C63.10 Section11.13.3)

Operation Mode:	802.11g
Transfer Rate:	6 Mbps
Operating Frequency	2467 MHz, 2472 MHz
Channel No.	12 Ch, 13 Ch

Channel No.	Frequency [MHz]	Reading [dBuV]	Duty Cycle Factor [dB]	A.F.+ C.L+ D.F [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
12	2483.5	20.125	0.000	35.00	H	55.13	73.98	18.86	PK
	2483.5	8.752	0.102	35.00	H	43.85	53.98	10.13	AV
	2483.5	19.852	0.000	35.00	V	54.85	73.98	19.13	PK
	2483.5	8.521	0.102	35.00	V	43.62	53.98	10.36	AV
13	2483.5	27.183	0.000	35.00	H	62.18	73.98	11.80	PK
	2483.5	13.714	0.102	35.00	H	48.82	53.98	5.16	AV
	2483.5	26.852	0.000	35.00	V	61.85	73.98	12.13	PK
	2483.5	13.621	0.102	35.00	V	48.72	53.98	5.26	AV

Operation Mode:	802.11n (HT20)
Transfer Rate:	0
Operating Frequency	2412 MHz, 2462 MHz
Channel No.	01 Ch, 11 Ch

Frequency [MHz]	Reading [dBuV]	Duty Cycle Factor [dB]	A.F.+ C.L+ D.F [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
2310~2390	32.725	0.000	34.04	H	66.77	73.98	7.22	PK
# 2389.5	17.330	0.122	34.04	H	51.49	53.98	2.49	AV
2310~2389	16.625	0.122	34.04	H	50.79	53.98	3.19	AV
2310~2390	32.625	0.000	34.04	V	66.67	73.98	7.32	PK
# 2389.5	17.220	0.122	34.04	V	51.38	53.98	2.60	AV
2310~2389	16.527	0.122	34.04	V	50.69	53.98	3.29	AV
2483.5~2500	29.121	0.000	35.00	H	64.12	73.98	9.86	PK
# 2484.0	15.720	0.122	35.00	H	50.84	53.98	3.14	AV
2484.5~2500	15.435	0.122	35.00	H	50.56	53.98	3.42	AV
2483.5~2500	28.946	0.000	35.00	V	63.95	73.98	10.03	PK
# 2484.0	15.560	0.122	35.00	V	50.68	53.98	3.30	AV
2484.5~2500	15.012	0.122	35.00	V	50.13	53.98	3.85	AV

Note : integration method Used (ANSI C63.10 Section11.13.3)

Operation Mode:	802.11n (HT20)
Transfer Rate:	0
Operating Frequency	2467 MHz, 2472 MHz
Channel No.	12 Ch, 13 Ch

Channel No.	Frequency [MHz]	Reading [dBuV]	Duty Cycle Factor [dB]	A.F.+ C.L+ D.F [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
12	2483.5	21.019	0.000	35.00	H	56.02	73.98	17.96	PK
	2483.5	9.025	0.122	35.00	H	44.15	53.98	9.83	AV
	2483.5	20.985	0.000	35.00	V	55.99	73.98	18.00	PK
	2483.5	8.945	0.122	35.00	V	44.07	53.98	9.91	AV
13	2483.5	28.536	0.000	35.00	H	63.54	73.98	10.44	PK
	2483.5	15.129	0.122	35.00	H	50.25	53.98	3.73	AV
	2483.5	28.125	0.000	35.00	V	63.13	73.98	10.86	PK
	2483.5	14.985	0.122	35.00	V	50.11	53.98	3.87	AV

Operation Mode:	802.11ac (VHT20)
Transfer Rate:	0
Operating Frequency	2412 MHz, 2462 MHz
Channel No.	01 Ch, 11 Ch

Frequency [MHz]	Reading [dBuV]	Duty Cycle Factor [dB]	A.F.+ C.L+ D.F [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
2310~2390	32.883	0.000	34.04	H	66.92	73.98	7.06	PK
# 2389.5	17.400	0.113	34.04	H	51.55	53.98	2.43	AV
2310~2389	16.707	0.113	34.04	H	50.86	53.98	3.12	AV
2310~2390	32.771	0.000	34.04	V	66.81	73.98	7.17	PK
# 2389.5	17.320	0.113	34.04	V	51.47	53.98	2.51	AV
2310~2389	16.625	0.113	34.04	V	50.78	53.98	3.20	AV
2483.5	27.274	0.000	35.00	H	62.27	73.98	11.71	PK
2483.5	15.556	0.113	35.00	H	50.67	53.98	3.31	AV
2483.5	26.011	0.000	35.00	V	61.01	73.98	12.97	PK
2483.5	14.819	0.113	35.00	V	49.93	53.98	4.05	AV

Note : integration method Used (ANSI C63.10 Section11.13.3)

Operation Mode:	802.11ac (VHT20)
Transfer Rate:	0
Operating Frequency	2467 MHz, 2472 MHz
Channel No.	12 Ch, 13 Ch

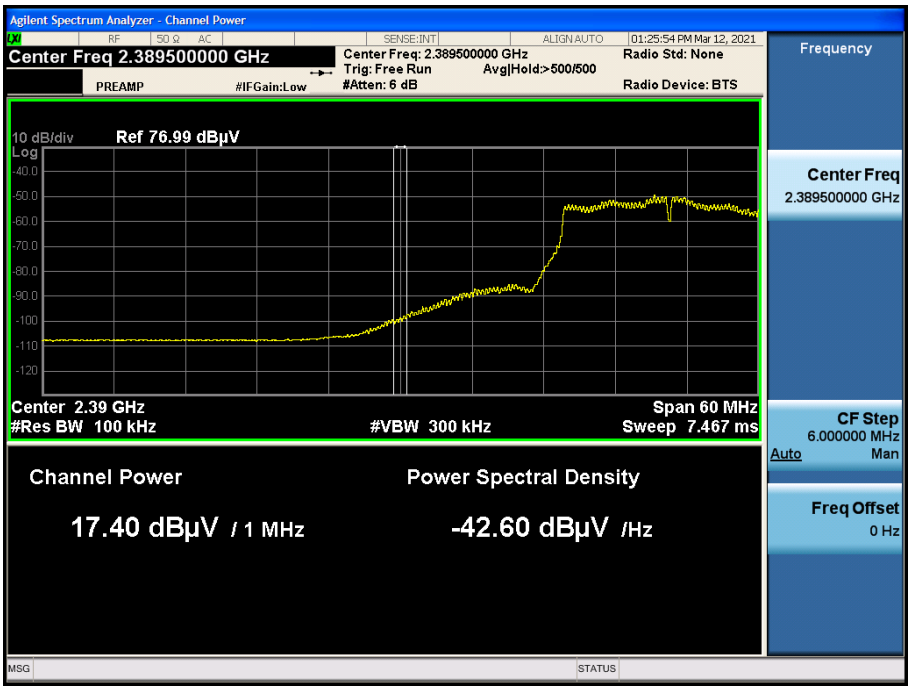
Channel No.	Frequency [MHz]	Reading [dBuV]	Duty Cycle Factor [dB]	A.F.+ C.L+ D.F [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
12	2483.5	20.517	0.000	35.00	H	55.52	73.98	18.46	PK
	2483.5	8.800	0.113	35.00	H	43.91	53.98	10.07	AV
	2483.5	20.352	0.000	35.00	V	55.35	73.98	18.63	PK
	2483.5	8.625	0.113	35.00	V	43.74	53.98	10.24	AV
13	2483.5	25.954	0.000	35.00	H	60.95	73.98	13.03	PK
	2483.5	13.125	0.113	35.00	H	48.24	53.98	5.74	AV
	2483.5	25.758	0.000	35.00	V	60.76	73.98	13.22	PK
	2483.5	12.985	0.113	35.00	V	48.10	53.98	5.88	AV

▣ Test Plots

[Ant.1&Ant.2_MIMO(CDD)] (Worst case : X-H_180 degree)

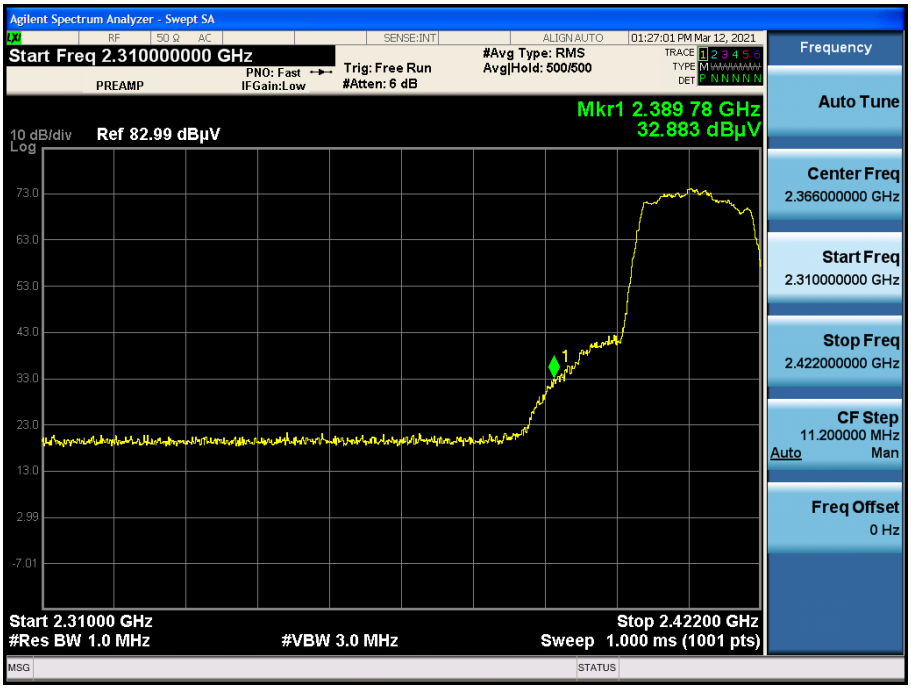
Radiated Restricted Band Edges plot – Average Reading (802.11ac(VHT20)_ MCS0 Ch.1)

Integration method Used_2 389.5 MHz



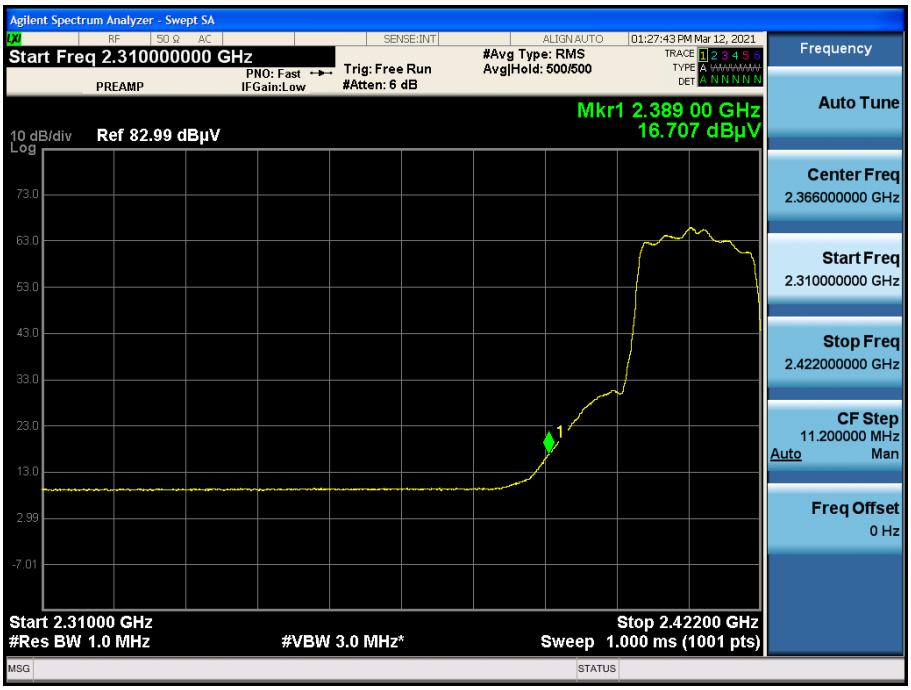
Radiated Restricted Band Edges plot – Peak Reading (802.11ac(VHT20)_ MCS0 Ch.1)

2 310 MHz ~ 2 390 MHz



Radiated Restricted Band Edges plot – Average Reading (802.11ac(VHT20)_ MCS0 Ch.1)

2 310 MHz ~ 2 389 MHz

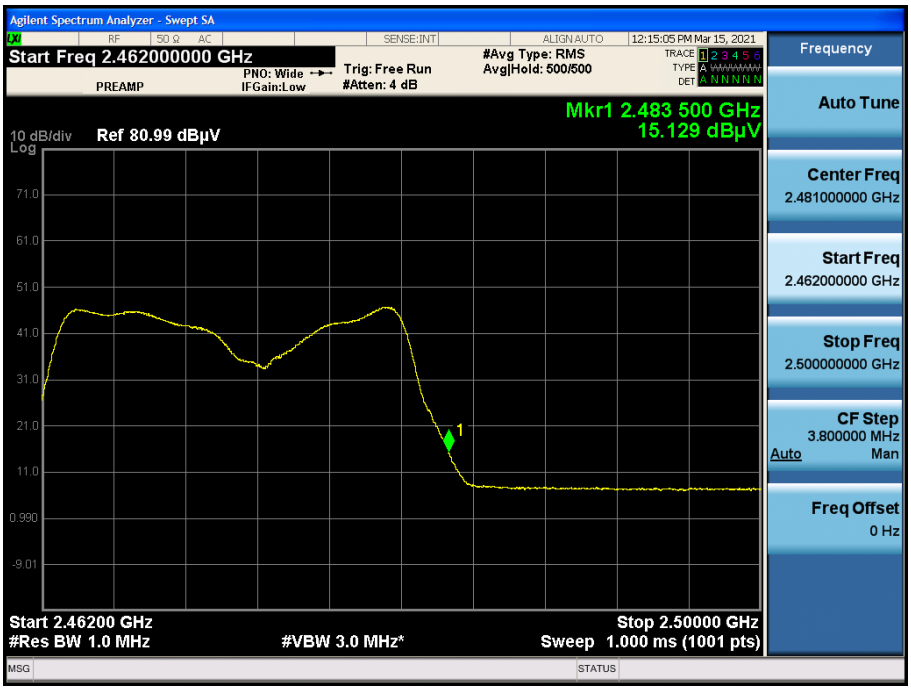


Note:

Plot of worst case are only reported.

(Worst case : Z-H_180 degree)

Radiated Restricted Band Edges plot – Average Reading (802.11n (HT20)_ MCS0 Ch.13)



Radiated Restricted Band Edges plot – Peak Reading (802.11n (HT20)_ MCS0 Ch.13)

Note:

Plot of worst case are only reported.

9.8 POWERLINE CONDUCTED EMISSIONS

Conducted Emissions (Line 1)

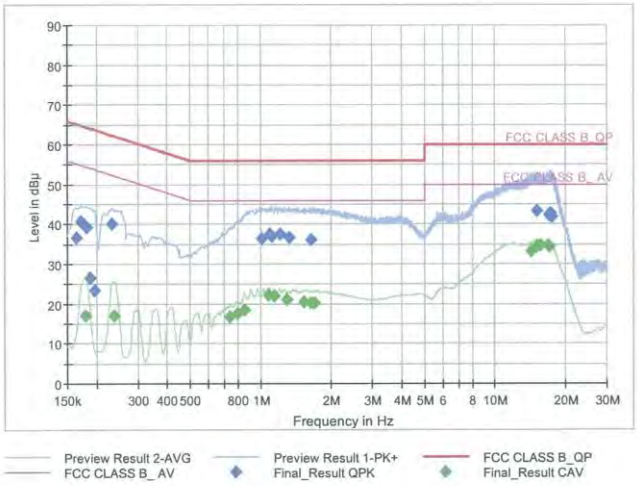
2.4G WLAN L1 1 / 2

Test Report

Common Information

EUT :	NP345XLA
Manufacturer :	SAMSUNG
Test Site:	SHIELD ROOM
Operating Conditions :	WLAN 2.4G L1
Operator Name:	
Comment:	

Full Spectrum



Final_Result_QPK

Frequency (MHz)	QuasiPeak	Limit (dBuV	Margin	Bandwidth	Line	Filter	Corr. (dB)
0.1635	36.63	65.28	28.66	9.000	L1	OFF	9.6
0.1725	40.67	64.84	24.17	9.000	L1	OFF	9.6
0.1815	39.31	64.42	25.11	9.000	L1	OFF	9.6
0.1883	26.51	64.11	37.60	9.000	L1	OFF	9.6
0.1973	23.47	63.73	40.26	9.000	L1	OFF	9.6
0.2333	40.17	62.33	22.17	9.000	L1	OFF	9.6
1.0130	36.38	56.00	19.62	9.000	L1	OFF	9.6
1.0940	37.53	56.00	18.47	9.000	L1	OFF	9.6
1.1210	36.94	56.00	19.06	9.000	L1	OFF	9.6
1.2110	37.42	56.00	18.58	9.000	L1	OFF	9.6
1.3280	36.55	56.00	19.45	9.000	L1	OFF	9.6
1.6453	36.13	56.00	19.87	9.000	L1	OFF	9.6
15.0305	43.15	60.00	16.85	9.000	L1	OFF	9.9
17.0465	42.21	60.00	17.79	9.000	L1	OFF	9.9
17.1163	42.49	60.00	17.51	9.000	L1	OFF	9.9
17.2535	42.64	60.00	17.36	9.000	L1	OFF	9.9
17.3660	42.03	60.00	17.97	9.000	L1	OFF	9.9
17.4223	41.92	60.00	18.08	9.000	L1	OFF	9.9

Final_Result_CAV

2021-03-23 오전 9:00:09

2.4G WLAN L1 2 / 2

Frequency (MHz)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.1793	16.91	54.52	37.61	9.000	L1	OFF	9.6
0.2378	17.08	52.17	35.09	9.000	L1	OFF	9.6
0.7430	16.67	46.00	29.33	9.000	L1	OFF	9.6
0.7993	17.45	46.00	28.55	9.000	L1	OFF	9.6
0.8555	18.47	46.00	27.53	9.000	L1	OFF	9.6
1.0895	22.29	46.00	23.71	9.000	L1	OFF	9.6
1.1503	21.96	46.00	24.04	9.000	L1	OFF	9.6
1.3078	20.96	46.00	25.04	9.000	L1	OFF	9.6
1.5328	20.35	46.00	25.65	9.000	L1	OFF	9.6
1.6453	20.17	46.00	25.83	9.000	L1	OFF	9.6
1.7038	20.24	46.00	25.76	9.000	L1	OFF	9.6
14.3195	33.11	50.00	16.89	9.000	L1	OFF	9.9
15.0283	34.24	50.00	15.76	9.000	L1	OFF	9.9
15.6988	34.51	50.00	15.49	9.000	L1	OFF	9.9
16.8575	34.60	50.00	15.40	9.000	L1	OFF	9.9
17.1185	34.40	50.00	15.60	9.000	L1	OFF	9.9
17.1545	34.45	50.00	15.55	9.000	L1	OFF	9.9
17.1725	34.31	50.00	15.69	9.000	L1	OFF	9.9

2021-03-23 오전 9:00:09

Conducted Emissions (Line 2)

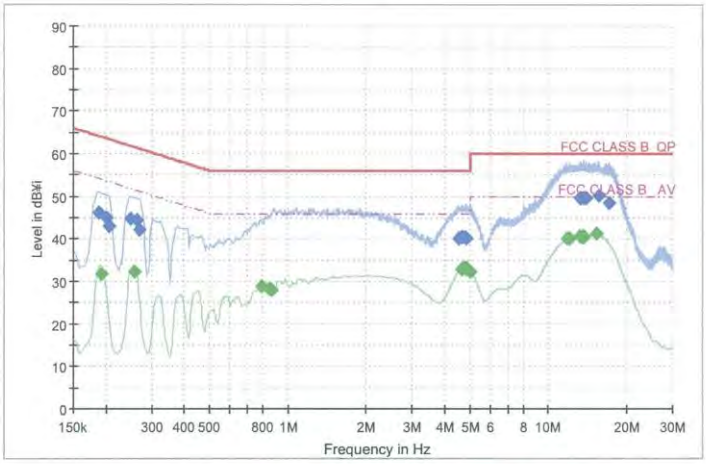
2.4G WLAN 1 / 2

Test Report

Common Information

EUT :	NP345XLA
Manufacturer :	SAMSUNG
Test Site:	SHIELD ROOM
Operating Conditions :	WLAN 2.4G N
Operator Name:	
Comment:	

Full Spectrum



Final_Result_QPK

Frequency (MHz)	QuasiPeak (dBµV)	Limit (dBµV)	Margin (dB)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.1883	46.20	64.11	17.91	9.000	N	OFF	9.6
0.2018	45.12	63.54	18.42	9.000	N	OFF	9.6
0.2063	43.02	63.36	20.33	9.000	N	OFF	9.6
0.2490	44.63	61.79	17.17	9.000	N	OFF	9.6
0.2625	44.42	61.35	16.94	9.000	N	OFF	9.6
0.2693	42.05	61.14	19.10	9.000	N	OFF	9.6
4.5388	40.08	56.00	15.92	9.000	N	OFF	9.7
4.6445	40.43	56.00	15.57	9.000	N	OFF	9.7
4.6693	40.40	56.00	15.60	9.000	N	OFF	9.7
4.7030	40.33	56.00	15.67	9.000	N	OFF	9.7
4.8178	40.45	56.00	15.55	9.000	N	OFF	9.7
4.8245	40.23	56.00	15.77	9.000	N	OFF	9.7
13.1405	49.72	60.00	10.28	9.000	N	OFF	9.8
13.2890	49.53	60.00	10.47	9.000	N	OFF	9.8
13.6265	49.56	60.00	10.44	9.000	N	OFF	9.9
13.9640	49.72	60.00	10.28	9.000	N	OFF	9.9
15.5570	50.11	60.00	9.89	9.000	N	OFF	9.9
17.1163	48.37	60.00	11.63	9.000	N	OFF	9.9

2021-03-23

2.4G WLAN 2 / 2

Final Result CAV

Frequency (MHz)	CAverage (dB¥ì V)	Limit (dB¥ì V)	Margin (dB)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.1928	31.79	53.92	22.13	9.000	N	OFF	9.6
0.2580	32.26	51.50	19.23	9.000	N	OFF	9.6
0.7903	28.81	46.00	17.19	9.000	N	OFF	9.6
0.8510	28.25	46.00	17.75	9.000	N	OFF	9.6
0.8713	27.95	46.00	18.05	9.000	N	OFF	9.6
4.6445	32.97	46.00	13.03	9.000	N	OFF	9.7
4.6963	32.96	46.00	13.04	9.000	N	OFF	9.7
4.7458	33.07	46.00	12.93	9.000	N	OFF	9.7
4.8223	33.08	46.00	12.92	9.000	N	OFF	9.7
4.8358	33.03	46.00	12.97	9.000	N	OFF	9.7
5.0090	32.40	50.00	17.60	9.000	N	OFF	9.7
11.8445	40.06	50.00	9.94	9.000	N	OFF	9.8
12.0358	40.15	50.00	9.85	9.000	N	OFF	9.8
13.1405	40.58	50.00	9.42	9.000	N	OFF	9.8
13.4915	40.52	50.00	9.48	9.000	N	OFF	9.8
13.6265	40.56	50.00	9.44	9.000	N	OFF	9.9
13.7075	40.41	50.00	9.59	9.000	N	OFF	9.9
15.2938	41.12	50.00	8.88	9.000	N	OFF	9.9

2021-03-23

10. LIST OF TEST EQUIPMENT

Conducted Test

Manufacturer	Model / Equipment	Calibration Date	Calibration Interval	Serial No.
Rohde & Schwarz	ENV216 / LISN	09/04/2020	Annual	102245
Rohde & Schwarz	ESR / EMI Test Receiver	09/16/2020	Annual	101910
ESPAC	SU-642 /Temperature Chamber	03/15/2021	Annual	0093008124
Agilent	N9030A / Signal Analyzer	01/11/2021	Annual	MY49431210
Rohde & Schwarz	OSP 120 / Power Measurement Set	07/02/2020	Annual	101231
Agilent	N1911A / Power Meter	04/07/2020	Annual	MY45100523
Keysight	N1921A / Power Sensor	06/08/2020	Annual	MY57820067
Agilent	87300B / Directional Coupler	11/10/2020	Annual	3116A03621
Hewlett Packard	11667B / Power Splitter	05/25/2020	Annual	05001
Hewlett Packard	E3632A / DC Power Supply	06/12/2020	Annual	KR75303960
Agilent	8493C / Attenuator(10 dB)	06/26/2020	Annual	07560
Rohde & Schwarz	EMC32 / Software	N/A	N/A	N/A
HCT CO., LTD.	FCC WLAN&BT&BLE Conducted Test Software v3.0	N/A	N/A	N/A

Note:

1. Equipment listed above that calibrated during the testing period was set for test after the calibration.
2. Equipment listed above that has a calibration due date during the testing period, the testing is completed before equipment expiration date.

Radiated Test

Manufacturer	Model / Equipment	Calibration Date	Calibration Interval	Serial No.
Innco system	CO3000 / Controller(Antenna mast)	N/A	N/A	CO3000-4p
Innco system	MA4640/800-XP-EP / Antenna Position Tower	N/A	N/A	N/A
Audix	EM1000 / Controller	N/A	N/A	060520
Audix	Turn Table	N/A	N/A	N/A
Rohde & Schwarz	Loop Antenna	05/18/2020	Biennial	1513-175
Schwarzbeck	VULB 9168 / Hybrid Antenna	02/22/2021	Biennial	760
Schwarzbeck	BBHA 9120D / Horn Antenna	02/17/2021	Biennial	9120D-937
Schwarzbeck	BBHA9170 / Horn Antenna(15 GHz ~ 40 GHz)	11/29/2019	Biennial	BBHA9170541
Rohde & Schwarz	FSV40-N / Spectrum Analyzer	07/28/2020	Annual	102168
Agilent	N9030A / Signal Analyzer	01/11/2021	Annual	MY49431210
Wainwright Instruments	WRCJV2400/2483.5-2370/2520-60/12SS / Band Reject Filter	01/06/2021	Annual	2
Wainwright Instruments	WRCJV5100/5850-40/50-8EEK / Band Reject Filter	02/08/2021	Annual	1
Wainwright Instruments	WHK3.0/18G-10EF / High Pass Filter	02/03/2021	Annual	8
Wainwright Instruments	WHKX8-6090-7000-18000-40SS/ High Pass Filter	02/03/2021	Annual	25
Api tech.	18B-03 / Attenuator (3 dB)	02/03/2021	Annual	1
Agilent	8493C-10 / Attenuator(10 dB)	02/03/2021	Annual	08285
CERNEX	CBLU1183540 / Power Amplifier	02/03/2021	Annual	22964
CERNEX	CBL06185030 / Power Amplifier	02/03/2021	Annual	22965
CERNEX	CBL18265035 / Power Amplifier	12/04/2020	Annual	22966
CERNEX	CBL26405040 / Power Amplifier	03/23/2021	Annual	25956

Note:

1. Equipment listed above that calibrated during the testing period was set for test after the calibration.
2. Equipment listed above that has a calibration due date during the testing period, the testing is completed before equipment expiration date.
3. Especially, all antenna for measurement is calibrated in accordance with the requirements of C63.5(Version : 2017).

11. ANNEX A_ TEST SETUP PHOTO

Please refer to test setup photo file no. as follows;

No.	Description
1	HCT-RF-2104-FC003-P