

FCC DTS REPORT

Certification

Applicant Name:

SAMSUNG Electronics Co., Ltd.

Date of Issue:

December 08, 2021

Address:

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Report No.: HCT-RF-2111-FC036-R1**FCC ID:** A3LSMX808U**APPLICANT:** SAMSUNG Electronics Co., Ltd.**Model:** SM-X808U**EUT Type:** Tablet**Average Output Power:** Ant.1 - 802.11b : 18.15 dBm, 802.11g : 17.95 dBm, 802.11n(HT20) : 17.95 dBm
Ant.2 - 802.11b : 17.72 dBm, 802.11g : 17.54 dBm, 802.11n(HT20) : 17.32 dBm
Ant.1&2 - 802.11b : 20.91 dBm, 802.11g : 20.74 dBm, 802.11n(HT20) : 20.64 dBm**Frequency Range:** 2 412 MHz ~ 2 462 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.

Report No.: HCT-RF-2111-FC036-R1

REVIEWED BY



Report prepared by : Woong Jin Kim
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)

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HCT CO.,LTD.

Report No.: HCT-RF-2111-FC036-R1

FCC ID: A3LSMX808U

Version

TEST REPORT NO.	DATE	DESCRIPTION
HCT-RF-2111-FC036	November 24, 2021	- First Approval Report
HCT-RF-2111-FC036-R1	December 08, 2021	- Revised Antenna Configurations (Page 6)

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1. EUT DESCRIPTION

Model	SM-X808U		
Additional Model	-		
EUT Type	Tablet		
Power Supply	DC 3.86 V		
Frequency Range	2412 MHz ~ 2462 MHz		
Max. RF Output Power	Peak Power (For information only)	Ant. 1	802.11b : 23.75 dBm 802.11g : 26.19 dBm 802.11n(HT20) : 25.72 dBm
		Ant.2	802.11b : 23.38 dBm 802.11g : 25.91 dBm 802.11n(HT20) : 25.31 dBm
		Ant.1&2 (MIMO)	802.11b : 26.52 dBm 802.11g : 29.06 dBm 802.11n(HT20) : 28.44 dBm
	<u>Average Power</u>	Ant. 1	802.11b : 18.15 dBm 802.11g : 17.95 dBm 802.11n(HT20) : 17.95 dBm
		Ant.2	802.11b : 17.72 dBm 802.11g : 17.54 dBm 802.11n(HT20) : 17.32 dBm
		Ant.1&2 (MIMO)	802.11b : 20.91 dBm 802.11g : 20.74 dBm 802.11n(HT20) : 20.64 dBm
Modulation Type	DSSS/CCK : 802.11b OFDM : 802.11g, 802.11n		
Number of Channels	11 Channels		
Date(s) of Tests	September 13, 2021 ~ November 22, 2021		
Serial number	Radiated: R32R9001HYD Conducted: R32R9001HXE		

ANTENNA CONFIGURATIONS

Configurations	SISO		MIMO	
	Ant1	Ant2	SDM	CDD
802.11b	X	O	X	O
802.11g	X	O	X	O
802.11n(HT20)	X	O	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
- (5) SISO test was performed for the MIMO test result.

2.This device supports simultaneous transmission operation, which allows for two channels to operate independent of one another in the 2.4 GHz and 5 GHz bands simultaneously on each antenna.

RSDB Scenario	2.4 GHz WiFi Ant.1	2.4 GHz WiFi Ant.2	5 GHz WiFi Ant.1	5 GHz WiFi Ant.2	6 GHz WiFi Ant.1	6 GHz WiFi Ant.2	Bluetooth Ant.1	Bluetooth Ant.2	Test case
2.4 GHz WiFi MIMO + 6 GHz WiFi MIMO	on	on			on	on			
2.4 GHz WiFi MIMO + 5 GHz WiFi MIMO	on	on	on	on					<u>Case 1</u>
Bluetooth ANT.1 + 2.4 GHz WiFi ANT.2 + 5 GHz WiFi MIMO		on	on	on			on		
Bluetooth ANT.1 + 2.4 GHz WiFi ANT.2 + 6 GHz WiFi MIMO		on			on	on	on		

Non-DBS	2.4 GHz WiFi Ant.1	2.4 GHz WiFi Ant.2	5 GHz WiFi Ant.1	5 GHz WiFi Ant.2	6 GHz WiFi Ant.1	6 GHz WiFi Ant.2	Bluetooth Ant.1	Bluetooth Ant.2	Test case
Bluetooth ANT.2 + 6 GHz WiFi MIMO					on	on		on	
Bluetooth ANT.2 + 5GHz WiFi MIMO			on	on				on	
Bluetooth ANT.1 + 6 GHz WiFi MIMO					on	on	on		
Bluetooth ANT.1 + 5GHz WiFi MIMO			on	on	-	-	on	-	<u>Case 2</u>

3. Directional Gain Calculation

According to KDB 662911 D01 Multiple Transmitter Output v02r01 F) 2) f) (ii)

Directional gain =

$$DirectionalGain = 10 \cdot \log \left[\frac{\sum_{j=1}^{N_{SS}} \left\{ \sum_{k=1}^{N_{ANT}} g_{j,k} \right\}^2}{N_{ANT}} \right]$$

Ant Gain (dBi)		N _{ANT} / N _{SS}	Directional Gain (dBi)
ANT1(Core 0)	-5.54	2 / 2	-3.05
ANT2(Core 1)	-6.62		

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 30 MHz 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 1 GHz. Above 1 GHz with 1.5 m 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.

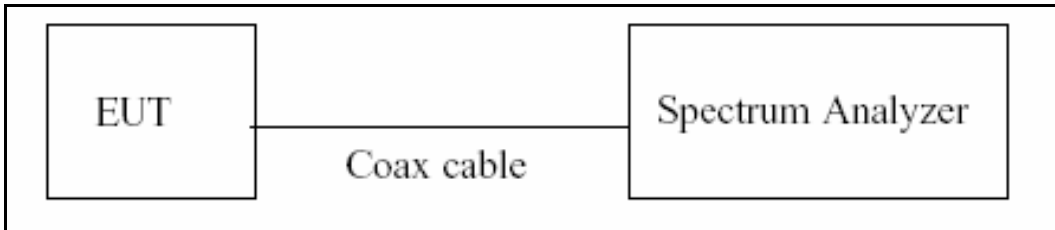
The measurement data shown herein meets or exceeds the U_{CISPR} measurement uncertainty values specified in CISPR 16-4-2 and, thus, can be compared directly to specified limits to determine compliance.

Parameter	Expanded Uncertainty (dB)
Conducted Disturbance (150 kHz ~ 30 MHz)	1.82 (Confidence level about 95 %, $k = 2$)
Radiated Disturbance (9 kHz ~ 30 MHz)	3.40 (Confidence level about 95 %, $k = 2$)
Radiated Disturbance (30 MHz ~ 1 GHz)	4.80 (Confidence level about 95 %, $k = 2$)
Radiated Disturbance (1 GHz ~ 18 GHz)	5.70 (Confidence level about 95 %, $k = 2$)
Radiated Disturbance (18 GHz ~ 40 GHz)	5.05 (Confidence level about 95 %, $k = 2$)

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 $T \leq 6.25$ 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 $> 50/T$.

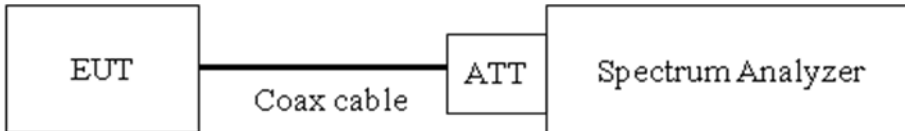
1. RBW = 8 MHz (the largest available value)
2. VBW = 8 MHz ($\geq$ RBW)
3. SPAN = 0 Hz
4. Detector = Peak
5. Number of points in sweep > 100
6. Trace mode = Clear write
7. Measure T_{total} and T_{on}
8. Calculate Duty Cycle = $T_{\text{on}} / T_{\text{total}}$ and Duty Cycle Factor = $10\log(1/\text{Duty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

7.2. 6 dB 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 $\geq 3 \times$ 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.

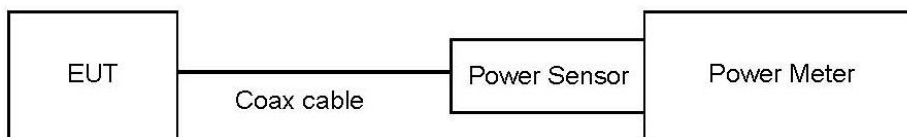
Note : We tested OBW using the automatic bandwidth measurement capability of a spectrum analyzer.

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

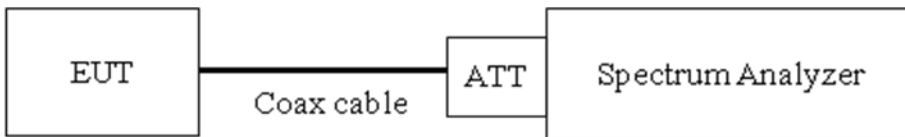
- Conducted Output Power(Peak) = Measured Value + ATT loss + Cable loss
- Conducted Output Power(Average) = Measured Value + ATT loss + Cable loss + Duty Cycle Factor

7.4. Power Spectral Density

Limit

The transmitter power density average over 1-second interval shall not be greater than 8 dBm in any 3 kHz 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) $RBW = 3 \text{ kHz} \leq RBW \leq 100 \text{ kHz}$.
- 4) $VBW \geq 3 \times RBW$.
- 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 $\geq [2 \times \text{span} / RBW]$.
- 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 = Measured Value + ATT loss + Cable loss + Duty Cycle Factor

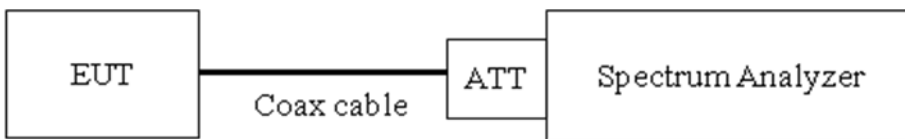
7.5. Conducted Band Edge(Out of Band Emissions) & Conducted Spurious Emissions

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 $\geq 3 \times$ 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 $\geq 2 \times$ 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. 2 400 ~ 2 500 MHz is fundamental frequency range.

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

3. EUT Cable Loss : 0.35 dB

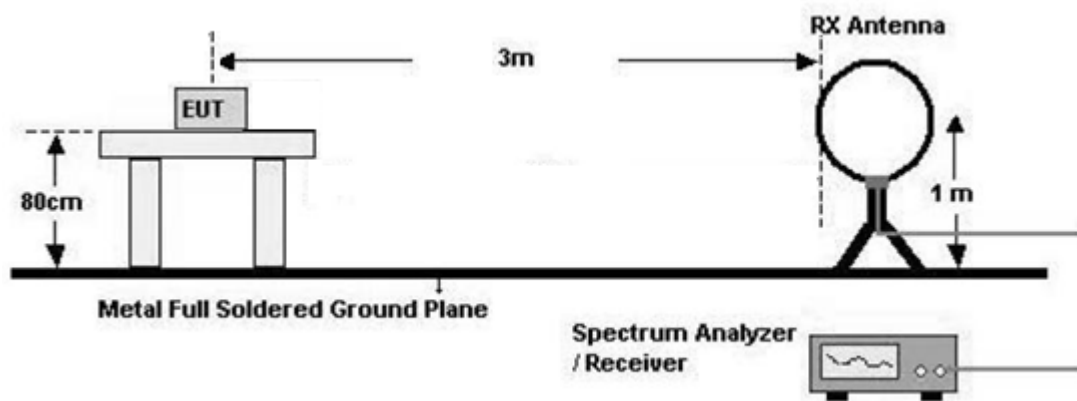
7.6. Radiated Test

Limit

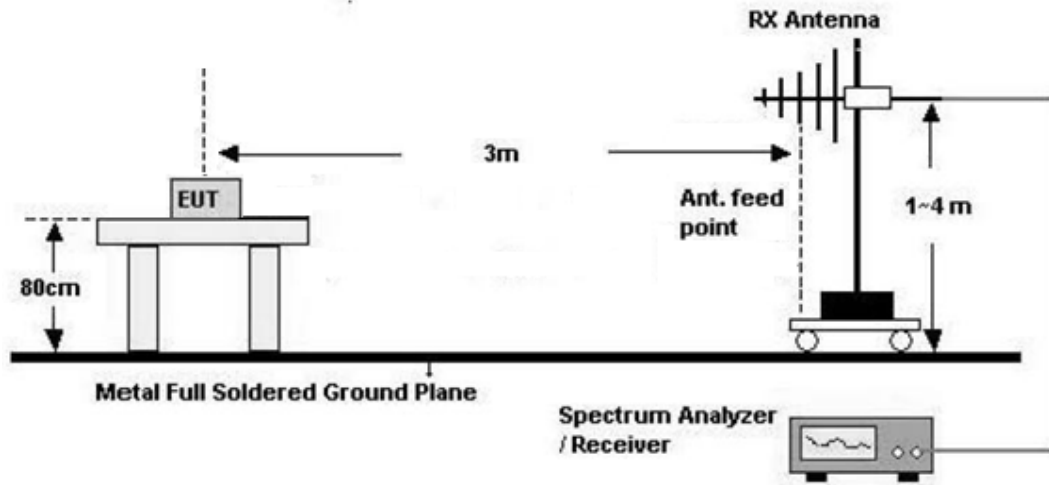
Frequency (MHz)	Field Strength ($\mu\text{V/m}$)	Measurement Distance (m)
0.009 – 0.490	$2400/F(\text{kHz})$	300
0.490 – 1.705	$24000/F(\text{kHz})$	30
1.705 – 30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Test Configuration

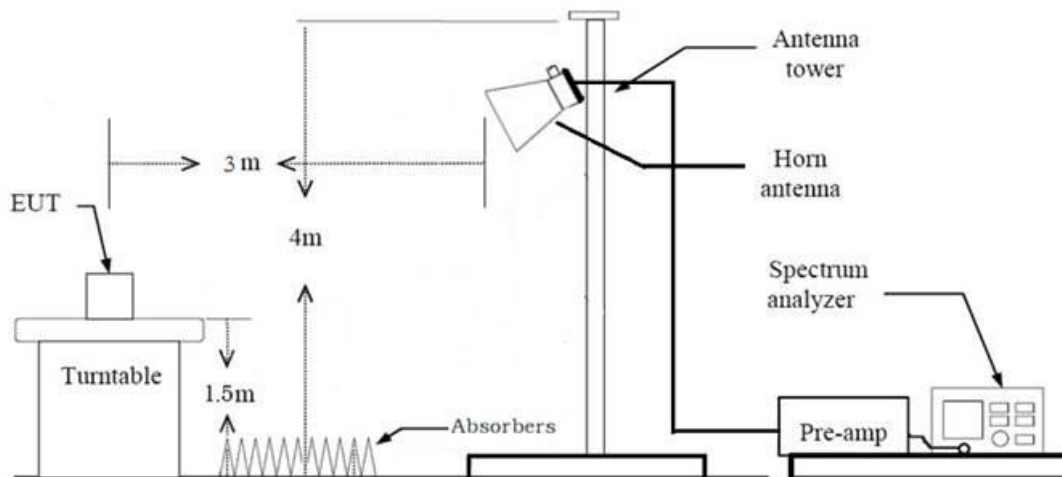
Below 30 MHz



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 3 m from the EUT
3. The EUT is placed on a turntable, which is 0.8 m 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) = $40\log(3\text{ m}/300\text{ m}) = -80\text{ dB}$
Measurement Distance : 3 m
7. Distance Correction Factor(0.490 MHz – 30 MHz) = $40\log(3\text{ m}/30\text{ m}) = -40\text{ dB}$
Measurement Distance : 3 m
8. Spectrum Setting
 - Frequency Range = 9 kHz ~ 30 MHz
 - Detector = Peak
 - Trace = Maxhold
 - RBW = 9 kHz
 - VBW $\geq 3 \times$ RBW
9. Total = Measured 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 1 GHz)

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 0.8 m above ground plane.
3. The Hybrid antenna was placed at a location 3 m from the EUT, which is varied from 1 m to 4 m 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 $\geq 3 \times$ RBW
 - (2) Measurement Type(Quasi-peak):
 - Measured Frequency Range : 30 MHz – 1 GHz
 - Detector = Quasi-Peak
 - RBW = 120 kHzIn general, (1) is used mainly
7. Total = Measured 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 1 m to 4 m 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 $\geq 3 \times$ RBW

(2) Measurement Type(Average): Duty cycle $\geq 98 \%$

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

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

- Measured Frequency Range : 1 GHz – 25 GHz
- Detector = RMS
- Averaging type = power (*i.e.*, RMS)
- RBW = 1 MHz
- VBW $\geq 3 \times$ 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 % 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 = $20\log$ (test distance / specific distance) (dB)

11. Total(Measurement Type : Peak)

= Measured value + Antenna Factor(A.F) + Cable Loss(C.L) - Amp Gain(A.G) + Distance Factor(D.F)

Total(Measurement Type : Average, Duty cycle $\geq 98 \%$)

= Measured value + Antenna Factor(A.F) + Cable Loss(C.L) - Amp Gain(A.G) + Distance Factor(D.F)

Total(Measurement Type : Average, Duty cycle $< 98 \%$)

= Measured 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 1 m to 4 m 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 $\geq 3 \times$ RBW

(2) Measurement Type(Average): Duty cycle $\geq 98 \%$,

- Measured Frequency Range : 2310 MHz ~ 2390 MHz / 2483.5 MHz ~ 2500 MHz
- Detector = RMS
- Averaging type = power (*i.e.*, RMS)
- RBW = 1 MHz
- VBW $\geq 3 \times$ RBW
- Sweep time = auto.
- Trace mode = average (at least 100 traces).

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

- Measured Frequency Range : 2310 MHz ~ 2390 MHz / 2483.5 MHz ~ 2500 MHz
- Detector = RMS
- Averaging type = power (*i.e.*, RMS)
- RBW = 1 MHz
- VBW $\geq 3 \times$ 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 % 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 = $20\log(\text{test distance} / \text{specific distance})$ (dB)

11. Total(Measurement Type : Peak)

= Measured value + Antenna Factor(A.F) + Cable Loss(C.L) + Distance Factor(D.F)

Total(Measurement Type : Average, Duty cycle $\geq 98\%$)

= Measured value + Antenna Factor(A.F) + Cable Loss(C.L) + Distance Factor(D.F)

Total(Measurement Type : Average, Duty cycle < 98 %)

= Measured 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 μ H/50 ohms line impedance stabilization network (LISN).

Frequency Range (MHz)	Limits (dB μ V)	
	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) = Measured 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, Keyboard etc)
 - Worstcase : Stand alone
2. EUT Axis
 - Radiated Spurious Emissions : X, Z
 - Radiated Restricted Band Edge : X
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): 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

Radiated test(RSDB)

1. All modes of operation were investigated and the worst case configuration results are reported.
 - Mode : Stand alone, Stand alone + External accessories(Earphone, keyboard etc)
 - Worstcase : Stand alone
2. EUT Axis
 - Radiated Spurious Emissions : X

3. Test case

RSDB Scenario	2.4 GHz WiFi Ant.1	2.4 GHz WiFi Ant.2	5 GHz WiFi Ant.1	5 GHz WiFi Ant.2	6 GHz WiFi Ant.1	6 GHz WiFi Ant.2	Bluetooth Ant.1	Bluetooth Ant.2	Test case
2.4 GHz WiFi MIMO + 6 GHz WiFi MIMO	on	on			on	on			
2.4 GHz WiFi MIMO + 5 GHz WiFi MIMO	on	on	on	on					<u>Case 1</u>
Bluetooth ANT.1 + 2.4 GHz WiFi ANT.2 + 5 GHz WiFi MIMO		on	on	on			on		
Bluetooth ANT.1 + 2.4 GHz WiFi ANT.2 + 6 GHz WiFi MIMO		on			on	on	on		

Non-DBS	2.4 GHz WiFi Ant.1	2.4 GHz WiFi Ant.2	5 GHz WiFi Ant.1	5 GHz WiFi Ant.2	6 GHz WiFi Ant.1	6 GHz WiFi Ant.2	Bluetooth Ant.1	Bluetooth Ant.2	Test case
Bluetooth ANT.2 + 6 GHz WiFi MIMO					on	on		on	
Bluetooth ANT.2 + 5GHz WiFi MIMO			on	on				on	
Bluetooth ANT.1 + 6 GHz WiFi MIMO					on	on	on		
Bluetooth ANT.1 + 5GHz WiFi MIMO			on	on	-	-	on	-	<u>Case 2</u>

4. The following tables show the worst case configurations determined during testing.

(Worst case: The lowest margin condition the channels and modes were selected for test.)

(Test case 1,2 Result : Please refer to the SM-X808U[BT, DTS, UNII ax] Test Report.)

Case	Description	2.4GHz Emission	5 GHz Emission
1	Antenna	Ant All	Ant All
	Channel	6	144
	Data Rate	6 Mbps	MCS 0
	Mode	802.11g	802.11ax(HE20)_SU

Case	Description	Bluetooth Emission	5 GHz Emission
2	Antenna	ANT1	Ant All
	Channel	0	144
	Data Rate	1 Mbps	MCS 0
	Mode	GFSK	802.11ax(HE20)_SU

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, Keyboard 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

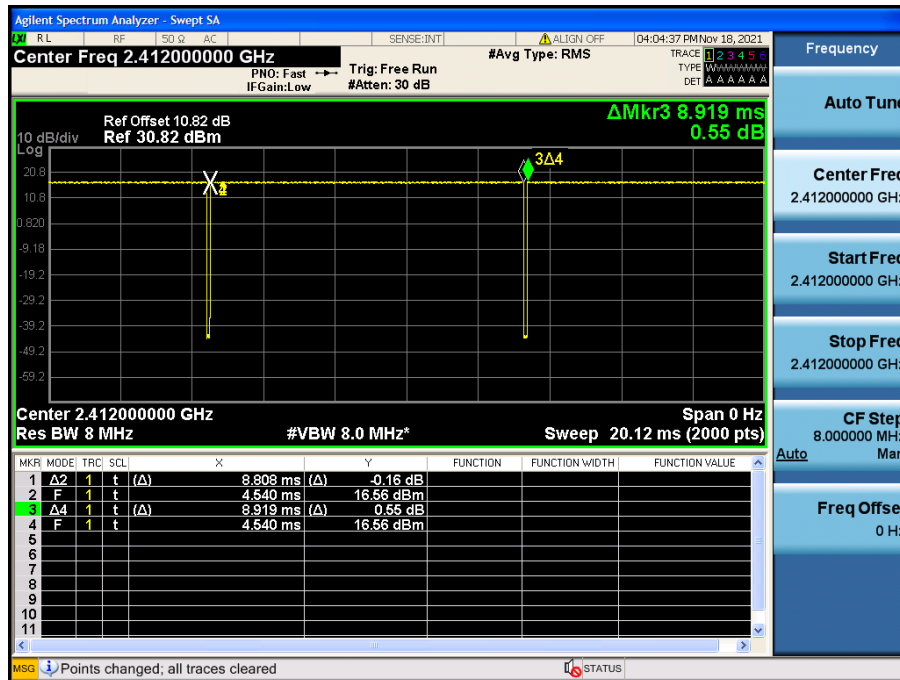
9. TEST RESULT

9.1 DUTY CYCLE

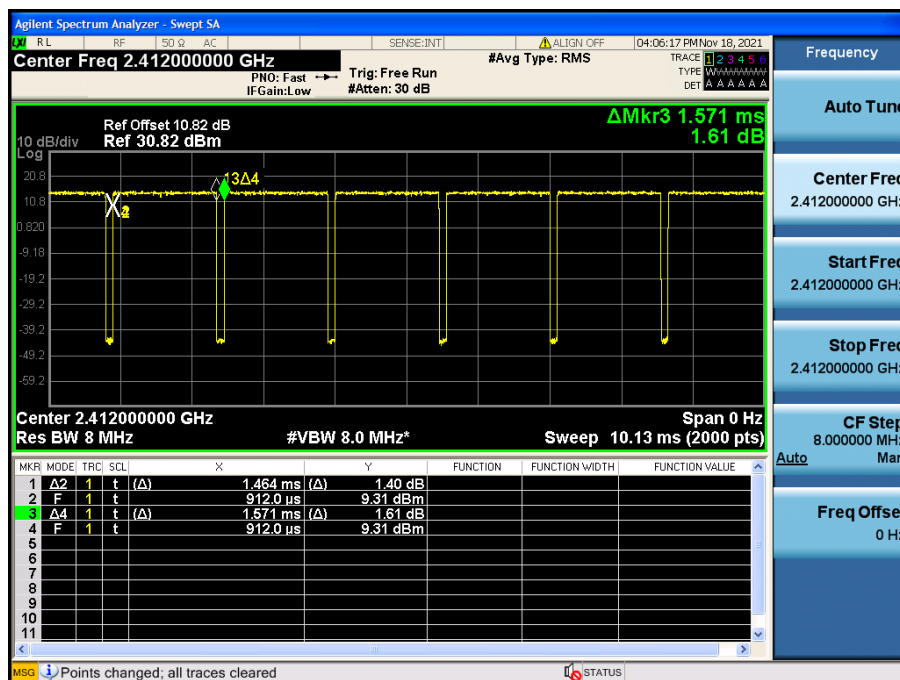
Mode	Data Rate (Mbps)	T _{on} (ms)	T _{total} (ms)	Duty Cycle	Duty Cycle Factor (dB)
802.11b	1	8.808	8.919	0.988	0.054
	2	4.407	4.512	0.977	0.103
	5.5	1.657	1.768	0.937	0.283
	11	0.877	0.983	0.892	0.498
802.11g	6	1.464	1.571	0.932	0.305
	9	0.983	1.089	0.902	0.446
	12	0.740	0.851	0.869	0.610
	18	0.502	0.608	0.825	0.835
	24	0.385	0.491	0.784	1.060
	36	0.263	0.370	0.712	1.473
	48	0.203	0.309	0.656	1.833
	54	0.182	0.294	0.621	2.072
802.11n (HT20)	6.5 (MCS0)	1.251	1.358	0.922	0.354
	13 (MCS1)	0.643	0.750	0.858	0.665
	19.5 (MCS2)	0.436	0.547	0.796	0.989
	26 (MCS3)	0.339	0.446	0.761	1.184
	39 (MCS4)	0.238	0.345	0.691	1.604
	52 (MCS5)	0.187	0.299	0.627	2.026
	58.5 (MCS6)	0.172	0.289	0.596	2.244
	65 (MCS7)	0.157	0.299	0.525	2.795

Test Plots

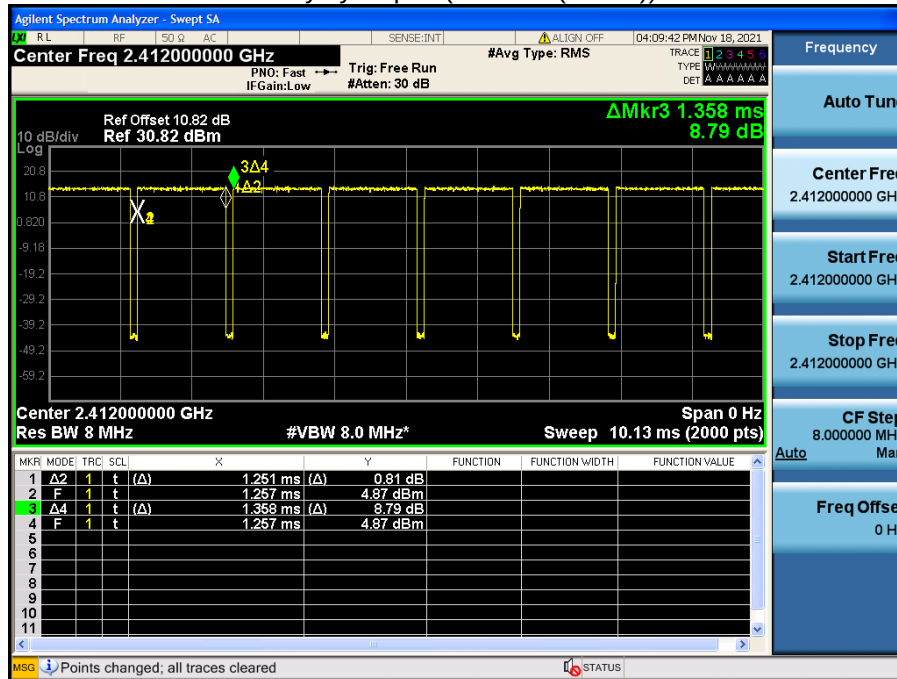
Duty cycle plot (802.11b(1 Mbps))



Duty cycle plot (802.11g(6 Mbps))



Duty cycle plot (802. 11n(MCS0))



Note:

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

9.2 6 dB BANDWIDTH

[Ant.1]

802.11b Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]
Frequency [MHz]	Channel No.		
2412	1	8.101	0.5
2437	6	8.103	0.5
2462	11	7.583	0.5

802.11g Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]
Frequency [MHz]	Channel No.		
2412	1	11.74	0.5
2437	6	15.15	0.5
2462	11	15.70	0.5

802.11n(HT20) Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]
Frequency [MHz]	Channel No.		
2412	1	14.71	0.5
2437	6	15.16	0.5
2462	11	16.09	0.5

[Ant.2]

802.11b Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]
Frequency [MHz]	Channel No.		
2412	1	8.081	0.5
2437	6	8.079	0.5
2462	11	8.097	0.5

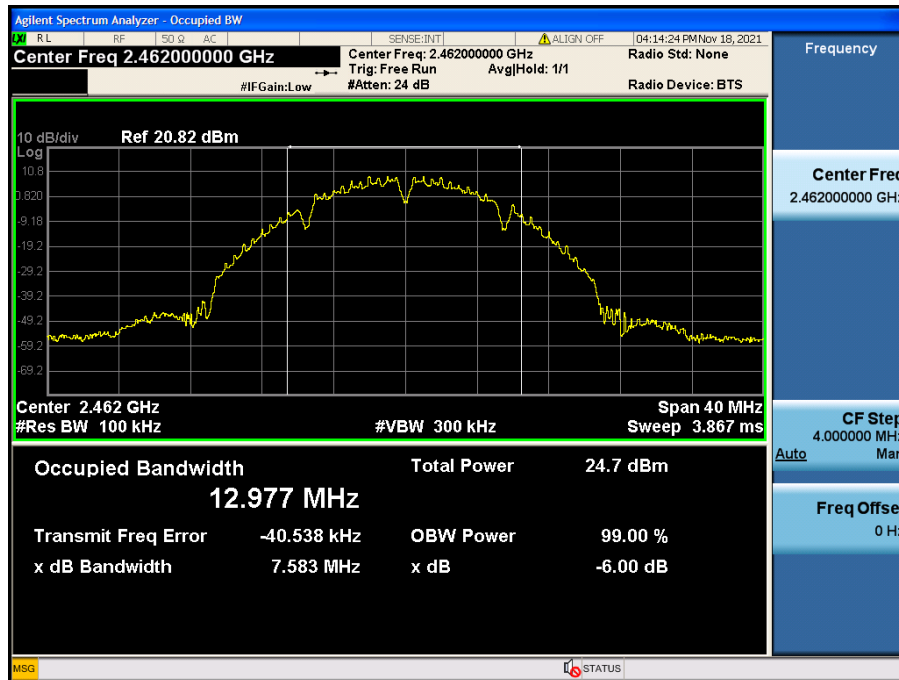
802.11g Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]
Frequency [MHz]	Channel No.		
2412	1	14.46	0.5
2437	6	15.16	0.5
2462	11	15.73	0.5

802.11n(HT20) Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]
Frequency [MHz]	Channel No.		
2412	1	15.92	0.5
2437	6	15.15	0.5
2462	11	16.08	0.5

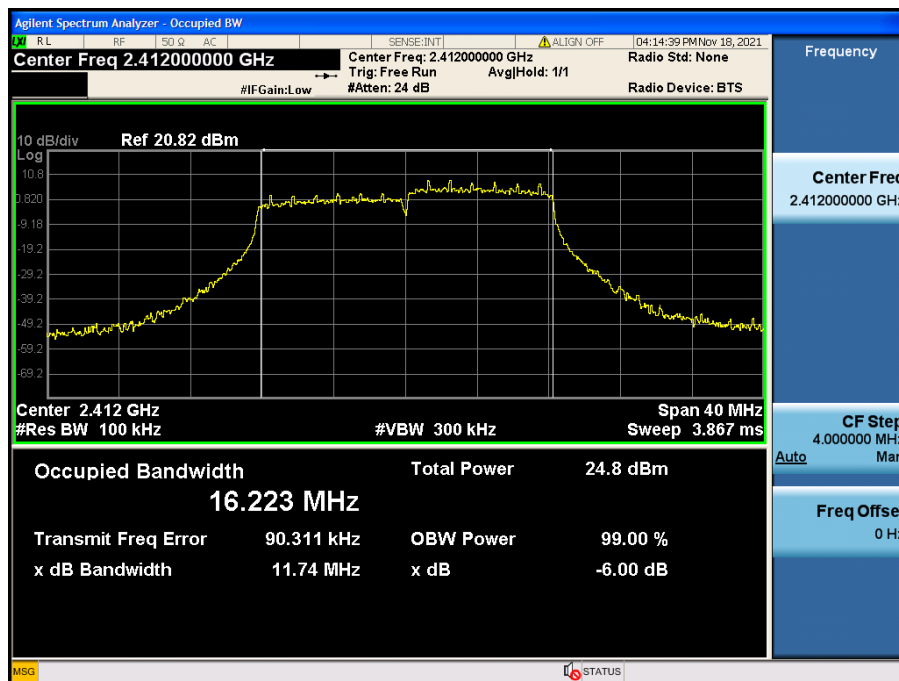
[Ant.1]

▣ Test Plots

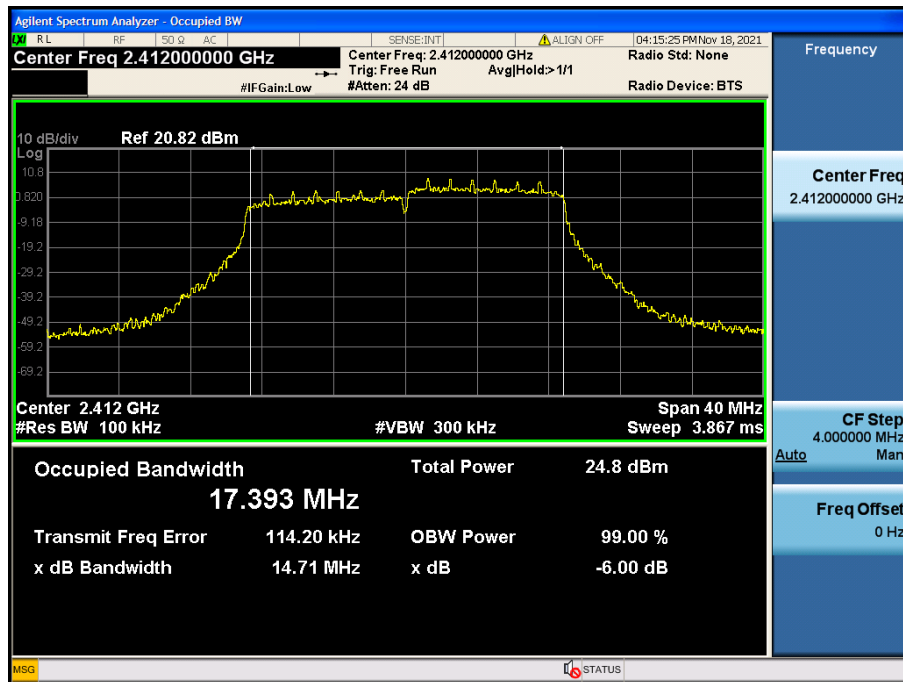
6 dB Bandwidth plot (802.11b-CH 11)



6 dB Bandwidth plot (802.11g-CH 1)



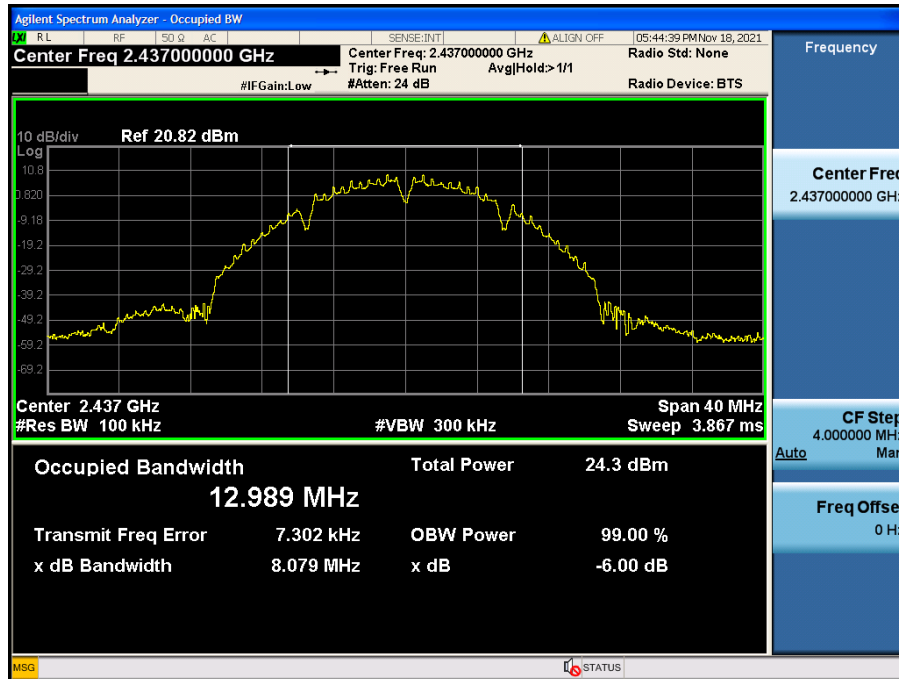
6 dB Bandwidth plot (802.11n_HT20-CH 1)



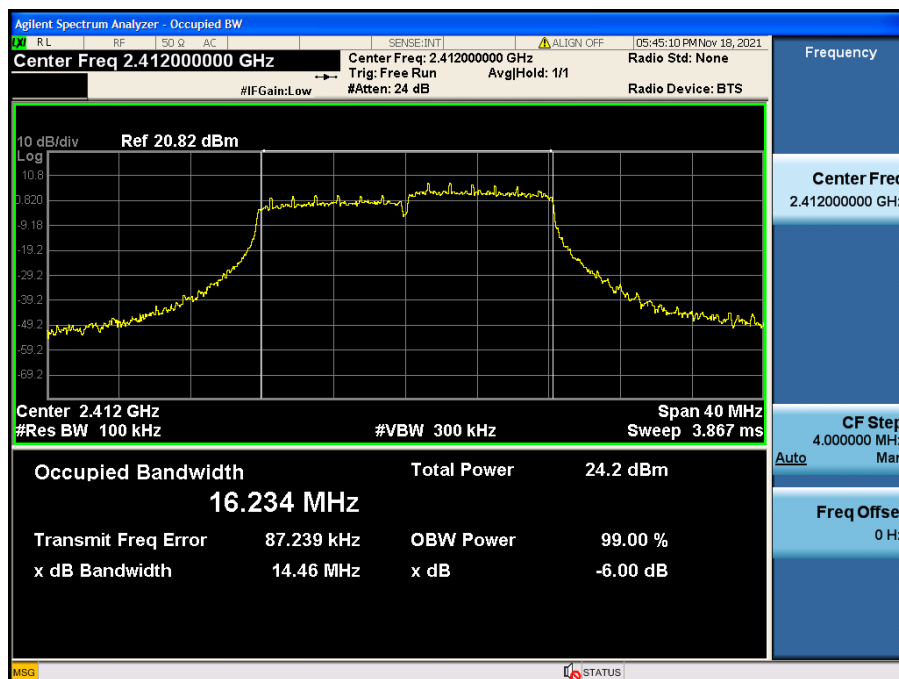
[Ant.2]

☐ Test Plots

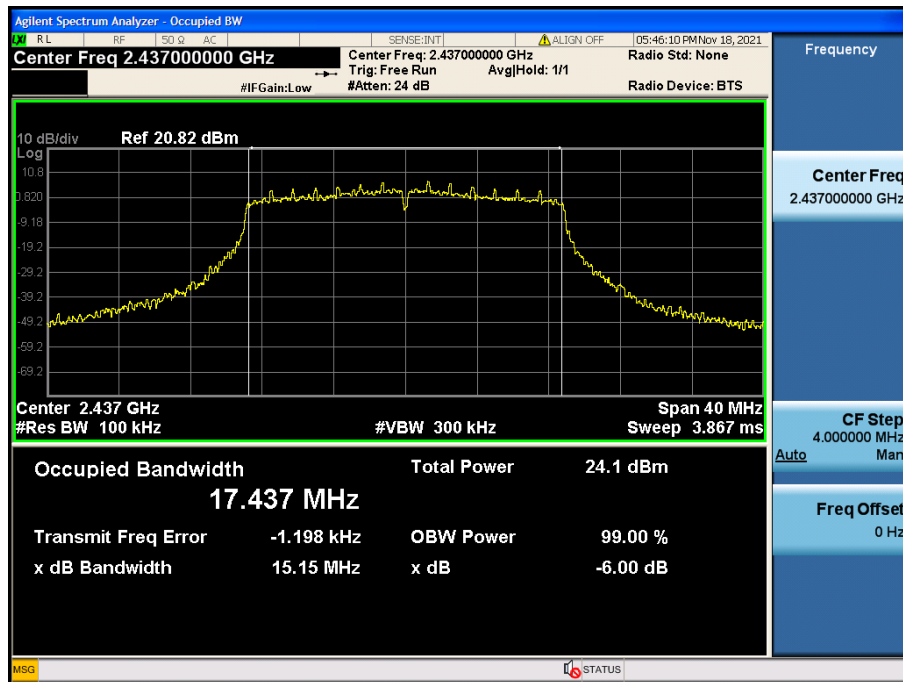
6 dB Bandwidth plot (802.11b-CH 6)



6 dB Bandwidth plot (802.11g-CH 1)



6 dB Bandwidth plot (802.11n_HT20-CH 6)



Note:

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

9.3 OUTPUT POWER

Power Level Setting

Peak Power

Power Meter offset

Attenuator loss(10 dB) + Cable loss + EUT Cable loss

[Ant.1]

802.11b Mode		Rate (Mbps)	Measured Power(dBm)	Limit (dBm)
Frequency[MHz]	Channel No.			
2412	1	1	20.37	30
		2	20.81	30
		5.5	22.28	30
		11	23.75	30
2437	6	1	20.30	30
		2	20.73	30
		5.5	22.22	30
		11	23.66	30
2462	11	1	20.11	30
		2	20.50	30
		5.5	22.09	30
		11	23.45	30

802.11g Mode		Rate (Mbps)	Measured Power(dBm)	Limit (dBm)
Frequency[MHz]	Channel No.			
2412	1	6	24.54	30
		9	24.84	30
		12	25.28	30
		18	25.02	30
		24	25.11	30
		36	24.88	30
		48	24.95	30
		54	25.10	30
2437	6	6	25.46	30
		9	25.72	30
		12	26.12	30
		18	25.72	30
		24	26.08	30
		36	25.88	30
		48	25.91	30
		54	26.10	30
2462	11	6	25.41	30
		9	25.75	30
		12	26.11	30
		18	25.52	30
		24	26.19	30
		36	25.95	30
		48	26.01	30
		54	26.13	30

802.11n(HT20) Mode		MCS Index	Measured Power(dBm)	Limit (dBm)
Frequency[MHz]	Channel No.			
2412	1	0	25.22	30
		1	25.40	30
		2	25.44	30
		3	25.48	30
		4	25.40	30
		5	25.57	30
		6	25.50	30
		7	25.42	30
2437	6	0	25.40	30
		1	25.48	30
		2	25.59	30
		3	25.69	30
		4	25.53	30
		5	25.72	30
		6	25.59	30
		7	25.41	30
2462	11	0	23.25	30
		1	23.33	30
		2	23.37	30
		3	23.53	30
		4	23.52	30
		5	23.66	30
		6	23.67	30
		7	23.56	30

[Ant.2]

802.11b Mode		Rate (Mbps)	Measured Power(dBm)	Limit (dBm)
Frequency[MHz]	Channel No.			
2412	1	1	19.85	30
		2	20.25	30
		5.5	21.77	30
		11	23.25	30
2437	6	1	19.84	30
		2	20.23	30
		5.5	21.75	30
		11	23.18	30
2462	11	1	19.95	30
		2	20.32	30
		5.5	21.84	30
		11	23.38	30

802.11g Mode		Rate (Mbps)	Measured Power(dBm)	Limit (dBm)
Frequency[MHz]	Channel No.			
2412	1	6	24.81	30
		9	25.11	30
		12	25.57	30
		18	25.22	30
		24	25.48	30
		36	25.30	30
		48	25.29	30
		54	25.44	30
2437	6	6	25.03	30
		9	25.25	30
		12	25.68	30
		18	25.31	30
		24	25.66	30
		36	25.41	30
		48	25.50	30
		54	25.66	30
2462	11	6	25.10	30
		9	25.44	30
		12	25.82	30
		18	25.32	30
		24	25.91	30
		36	25.64	30
		48	25.68	30
		54	25.84	30

802.11n(HT20) Mode		MCS Index	Measured Power(dBm)	Limit (dBm)
Frequency[MHz]	Channel No.			
2412	1	0	24.91	30
		1	24.99	30
		2	25.05	30
		3	25.12	30
		4	25.11	30
		5	25.28	30
		6	25.31	30
		7	25.09	30
2437	6	0	24.78	30
		1	24.88	30
		2	24.96	30
		3	25.08	30
		4	24.93	30
		5	25.05	30
		6	24.94	30
		7	24.83	30
2462	11	0	22.79	30
		1	22.82	30
		2	22.93	30
		3	23.03	30
		4	23.11	30
		5	23.21	30
		6	23.22	30
		7	23.00	30

[MIMO]

802.11b Mode		Rate (Mbps)	Ant.1 Measured Power(dBm)	Ant.2 Measured Power(dBm)	MIMO Measured Power(dBm)	Limit (dBm)
Frequency[MHz]	Channel No.					
2412	1	1	20.37	19.85	23.13	30
		2	20.81	20.25	23.55	30
		5.5	22.28	21.77	25.04	30
		11	23.75	23.25	26.52	30
2437	6	1	20.30	19.84	23.09	30
		2	20.73	20.23	23.50	30
		5.5	22.22	21.75	25.00	30
		11	23.66	23.18	26.44	30
2462	11	1	20.11	19.95	23.04	30
		2	20.50	20.32	23.42	30
		5.5	22.09	21.84	24.98	30
		11	23.45	23.38	26.43	30

802.11g Mode		Rate (Mbps)	Ant.1 Measured Power(dBm)	Ant.2 Measured Power(dBm)	MIMO Measured Power(dBm)	Limit (dBm)
Frequency[MHz]	Channel No.					
2412	1	6	24.54	24.81	27.69	30
		9	24.84	25.11	27.99	30
		12	25.28	25.57	28.44	30
		18	25.02	25.22	28.13	30
		24	25.11	25.48	28.31	30
		36	24.88	25.30	28.11	30
		48	24.95	25.29	28.14	30
		54	25.10	25.44	28.28	30
2437	6	6	25.46	25.03	28.26	30
		9	25.72	25.25	28.50	30
		12	26.12	25.68	28.92	30
		18	25.72	25.31	28.53	30
		24	26.08	25.66	28.89	30
		36	25.88	25.41	28.66	30
		48	25.91	25.50	28.72	30
		54	26.10	25.66	28.90	30
2462	11	6	25.41	25.10	28.27	30
		9	25.75	25.44	28.61	30
		12	26.11	25.82	28.98	30
		18	25.52	25.32	28.43	30
		24	26.19	25.91	29.06	30
		36	25.95	25.64	28.81	30
		48	26.01	25.68	28.86	30
		54	26.13	25.84	29.00	30

802.11n(HT20) Mode		MCS Index	Ant.1 Measured Power(dBm)	Ant.2 Measured Power(dBm)	MIMO Measured Power(dBm)	Limit (dBm)
Frequency[MHz]	Channel No.					
2412	1	0	25.22	24.91	28.08	30
		1	25.40	24.99	28.21	30
		2	25.44	25.05	28.26	30
		3	25.48	25.12	28.32	30
		4	25.40	25.11	28.27	30
		5	25.57	25.28	28.44	30
		6	25.50	25.31	28.41	30
		7	25.42	25.09	28.27	30
2437	6	0	25.40	24.78	28.11	30
		1	25.48	24.88	28.20	30
		2	25.59	24.96	28.30	30
		3	25.69	25.08	28.40	30
		4	25.53	24.93	28.25	30
		5	25.72	25.05	28.41	30
		6	25.59	24.94	28.28	30
		7	25.41	24.83	28.14	30
2462	11	0	23.25	22.79	26.04	30
		1	23.33	22.82	26.09	30
		2	23.37	22.93	26.17	30
		3	23.53	23.03	26.30	30
		4	23.52	23.11	26.33	30
		5	23.66	23.21	26.45	30
		6	23.67	23.22	26.46	30
		7	23.56	23.00	26.30	30

Average Power

Power Meter offset Loss = Attenuator loss(10 dB) + Cable loss + EUT Cable loss

[Ant.1]

802.11b Mode		Rate (Mbps)	Measured Power (dBm)	Duty Cycle Factor	Measured Power(dBm) + Duty Cycle Factor	Limit (dBm)
Frequency [MHz]	Channel No.					
2412	1	1	17.95	0.054	18.00	30
		2	18.01	0.103	18.11	30
		5.5	17.81	0.283	18.09	30
		11	17.62	0.498	18.12	30
2437	6	1	17.80	0.054	17.85	30
		2	17.98	0.103	18.08	30
		5.5	17.79	0.283	18.07	30
		11	17.65	0.498	18.15	30
2462	11	1	17.76	0.054	17.81	30
		2	17.92	0.103	18.03	30
		5.5	17.70	0.283	17.98	30
		11	17.59	0.498	18.08	30

802.11g Mode		Rate (Mbps)	Measured Power (dBm)	Duty Cycle Factor	Measured Power(dBm) + Duty Cycle Factor	Limit (dBm)
Frequency [MHz]	Channel No.					
2412	1	6	17.56	0.305	17.86	30
		9	17.41	0.446	17.85	30
		12	17.28	0.610	17.89	30
		18	17.09	0.835	17.93	30
		24	16.73	1.060	17.79	30
		36	16.37	1.473	17.84	30
		48	16.03	1.833	17.86	30
		54	15.57	2.072	17.64	30
2437	6	6	17.50	0.305	17.81	30
		9	17.47	0.446	17.91	30
		12	17.33	0.610	17.94	30
		18	17.11	0.835	17.95	30
		24	16.76	1.060	17.82	30
		36	16.30	1.473	17.77	30
		48	16.06	1.833	17.89	30
		54	15.59	2.072	17.66	30
2462	11	6	17.35	0.305	17.65	30
		9	17.22	0.446	17.67	30
		12	17.08	0.610	17.69	30
		18	16.94	0.835	17.78	30
		24	16.67	1.060	17.73	30
		36	16.23	1.473	17.70	30
		48	15.91	1.833	17.74	30
		54	15.44	2.072	17.51	30

802.11n(HT20) Mode		MCS Index	Measured Power (dBm)	Duty Cycle Factor	Measured Power(dBm) + Duty Cycle Factor	Limit (dBm)
Frequency [MHz]	Channel No.					
2412	1	0	17.38	0.354	17.73	30
		1	16.95	0.665	17.62	30
		2	16.81	0.989	17.80	30
		3	16.62	1.184	17.81	30
		4	16.25	1.604	17.85	30
		5	15.63	2.026	17.66	30
		6	15.24	2.244	17.48	30
		7	14.93	2.795	17.73	30
2437	6	0	17.39	0.354	17.74	30
		1	16.96	0.665	17.62	30
		2	16.87	0.989	17.85	30
		3	16.68	1.184	17.87	30
		4	16.34	1.604	17.95	30
		5	15.67	2.026	17.70	30
		6	15.25	2.244	17.49	30
		7	14.89	2.795	17.68	30
2462	11	0	15.04	0.354	15.40	30
		1	14.66	0.665	15.32	30
		2	14.60	0.989	15.59	30
		3	14.31	1.184	15.49	30
		4	14.05	1.604	15.66	30
		5	13.40	2.026	15.43	30
		6	12.98	2.244	15.22	30
		7	12.73	2.795	15.52	30

[Ant.2]

802.11b Mode		Rate (Mbps)	Measured Power (dBm)	Duty Cycle Factor	Measured Power(dBm) + Duty Cycle Factor	Limit (dBm)
Frequency [MHz]	Channel No.					
2412	1	1	17.24	0.05	17.29	30
		2	17.39	0.10	17.49	30
		5.5	17.18	0.28	17.46	30
		11	16.99	0.50	17.49	30
2437	6	1	17.23	0.05	17.29	30
		2	17.42	0.10	17.52	30
		5.5	17.29	0.28	17.57	30
		11	17.14	0.50	17.63	30
2462	11	1	17.31	0.05	17.37	30
		2	17.48	0.10	17.58	30
		5.5	17.36	0.28	17.64	30
		11	17.22	0.50	17.72	30

802.11g Mode		Rate (Mbps)	Measured Power (dBm)	Duty Cycle Factor	Measured Power(dBm) + Duty Cycle Factor	Limit (dBm)
Frequency [MHz]	Channel No.					
2412	1	6	17.05	0.30	17.35	30
		9	16.97	0.45	17.41	30
		12	16.81	0.61	17.42	30
		18	16.68	0.84	17.51	30
		24	16.34	1.06	17.40	30
		36	15.86	1.47	17.34	30
		48	15.53	1.83	17.36	30
		54	15.07	2.07	17.14	30
2437	6	6	17.08	0.30	17.39	30
		9	16.99	0.45	17.43	30
		12	16.74	0.61	17.35	30
		18	16.65	0.84	17.48	30
		24	16.27	1.06	17.33	30
		36	15.81	1.47	17.28	30
		48	15.61	1.83	17.44	30
		54	15.13	2.07	17.20	30
2462	11	6	17.11	0.30	17.42	30
		9	16.96	0.45	17.40	30
		12	16.85	0.61	17.46	30
		18	16.70	0.84	17.54	30
		24	16.37	1.06	17.43	30
		36	15.92	1.47	17.40	30
		48	15.57	1.83	17.40	30
		54	15.14	2.07	17.21	30

802.11n(HT20) Mode		MCS Index	Measured Power (dBm)	Duty Cycle Factor	Measured Power(dBm) + Duty Cycle Factor	Limit (dBm)
Frequency [MHz]	Channel No.					
2412	1	0	16.76	0.35	17.11	30
		1	16.40	0.66	17.06	30
		2	16.28	0.99	17.27	30
		3	16.07	1.18	17.25	30
		4	15.71	1.60	17.32	30
		5	15.05	2.03	17.07	30
		6	14.62	2.24	16.87	30
		7	14.28	2.79	17.07	30
2437	6	0	16.78	0.35	17.13	30
		1	16.37	0.66	17.03	30
		2	16.24	0.99	17.22	30
		3	16.05	1.18	17.23	30
		4	15.68	1.60	17.29	30
		5	15.02	2.03	17.04	30
		6	14.60	2.24	16.84	30
		7	14.36	2.79	17.15	30
2462	11	0	14.56	0.35	14.91	30
		1	14.20	0.66	14.87	30
		2	14.10	0.99	15.09	30
		3	13.86	1.18	15.04	30
		4	13.60	1.60	15.21	30
		5	12.97	2.03	15.00	30
		6	12.55	2.24	14.79	30
		7	12.17	2.79	14.96	30

[MIMO]

802.11b Mode		Rate (Mbps)	Ant.1 Measured Power(dBm)	Ant.2 Measured Power(dBm)	MIMO Measured Power(dBm)	Limit (dBm)
Frequency[MHz]	Channel No.					
2412	1	1	18.00	17.29	20.67	30
		2	18.11	17.49	20.82	30
		5.5	18.09	17.46	20.80	30
		11	18.12	17.49	20.83	30
2437	6	1	17.85	17.29	20.59	30
		2	18.08	17.52	20.82	30
		5.5	18.07	17.57	20.84	30
		11	18.15	17.63	20.91	30
2462	11	1	17.81	17.37	20.60	30
		2	18.03	17.58	20.82	30
		5.5	17.98	17.64	20.82	30
		11	18.08	17.72	20.91	30

802.11g Mode		Rate (Mbps)	Ant.1 Measured Power(dBm)	Ant.2 Measured Power(dBm)	MIMO Measured Power(dBm)	Limit (dBm)
Frequency[MHz]	Channel No.					
2412	1	6	17.86	17.35	20.63	30
		9	17.85	17.41	20.65	30
		12	17.89	17.42	20.67	30
		18	17.93	17.51	20.74	30
		24	17.79	17.40	20.61	30
		36	17.84	17.34	20.61	30
		48	17.86	17.36	20.63	30
		54	17.64	17.14	20.41	30
2437	6	6	17.81	17.39	20.61	30
		9	17.91	17.43	20.69	30
		12	17.94	17.35	20.66	30
		18	17.95	17.48	20.73	30
		24	17.82	17.33	20.59	30
		36	17.77	17.28	20.55	30
		48	17.89	17.44	20.68	30
		54	17.66	17.20	20.45	30
2462	11	6	17.65	17.42	20.55	30
		9	17.67	17.40	20.55	30
		12	17.69	17.46	20.59	30
		18	17.78	17.54	20.67	30
		24	17.73	17.43	20.59	30
		36	17.70	17.40	20.56	30
		48	17.74	17.40	20.58	30
		54	17.51	17.21	20.37	30

802.11n(HT20) Mode		MCS Index	Ant.1 Measured Power(dBm)	Ant.2 Measured Power(dBm)	MIMO Measured Power(dBm)	Limit (dBm)
Frequency[MHz]	Channel No.					
2412	1	0	17.73	17.11	20.45	30
		1	17.62	17.06	20.36	30
		2	17.80	17.27	20.55	30
		3	17.81	17.25	20.55	30
		4	17.85	17.32	20.61	30
		5	17.66	17.07	20.38	30
		6	17.48	16.87	20.19	30
		7	17.73	17.07	20.42	30
2437	6	0	17.74	17.13	20.46	30
		1	17.62	17.03	20.35	30
		2	17.85	17.22	20.56	30
		3	17.87	17.23	20.57	30
		4	17.95	17.29	20.64	30
		5	17.70	17.04	20.39	30
		6	17.49	16.84	20.19	30
		7	17.68	17.15	20.44	30
2462	11	0	15.40	14.91	18.17	30
		1	15.32	14.87	18.11	30
		2	15.59	15.09	18.36	30
		3	15.49	15.04	18.28	30
		4	15.66	15.21	18.45	30
		5	15.43	15.00	18.23	30
		6	15.22	14.79	18.02	30
		7	15.52	14.96	18.26	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	-2.787	0.498	-2.289	8 dBm / 3 kHz
	2437	6	-2.567	0.498	-2.069	
	2462	11	-2.945	0.498	-2.447	
802.11g	2412	1	-5.182	0.835	-4.347	
	2437	6	-5.487	0.835	-4.652	
	2462	11	-5.692	0.835	-4.857	
802.11n(HT20)	2412	1	-7.096	1.604	-5.492	
	2437	6	-6.982	1.604	-5.378	
	2462	11	-9.356	1.604	-7.752	

[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	-3.151	0.498	-2.653	8 dBm / 3 kHz
	2437	6	-2.835	0.498	-2.337	
	2462	11	-3.023	0.498	-2.525	
802.11g	2412	1	-6.266	0.835	-5.431	
	2437	6	-6.244	0.835	-5.409	
	2462	11	-5.950	0.835	-5.115	
802.11n(HT20)	2412	1	-7.412	1.604	-5.808	
	2437	6	-7.691	1.604	-6.087	
	2462	11	-9.568	1.604	-7.964	

[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	-2.289	-2.653	0.543	8 dBm / 3 kHz
	2437	6	-2.069	-2.337	0.809	
	2462	11	-2.447	-2.525	0.524	
802.11g	2412	1	-4.347	-5.431	-1.845	
	2437	6	-4.652	-5.409	-2.003	
	2462	11	-4.857	-5.115	-1.973	
802.11n(HT20)	2412	1	-5.492	-5.808	-2.637	
	2437	6	-5.378	-6.087	-2.708	
	2462	11	-7.752	-7.964	-4.846	

Note :

1. Spectrum Measured Levels are not plot data.

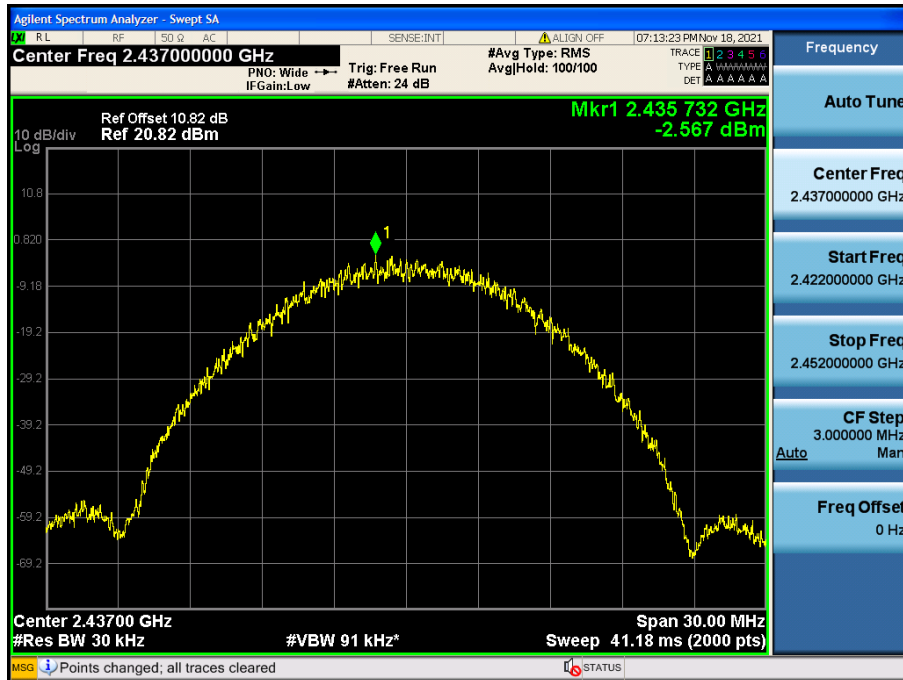
The PSD results in plot is already including the actual values of loss for the attenuator and cable combination.

2. Spectrum offset Loss = Attenuator loss(10 dB) + Cable loss + EUT Cable loss

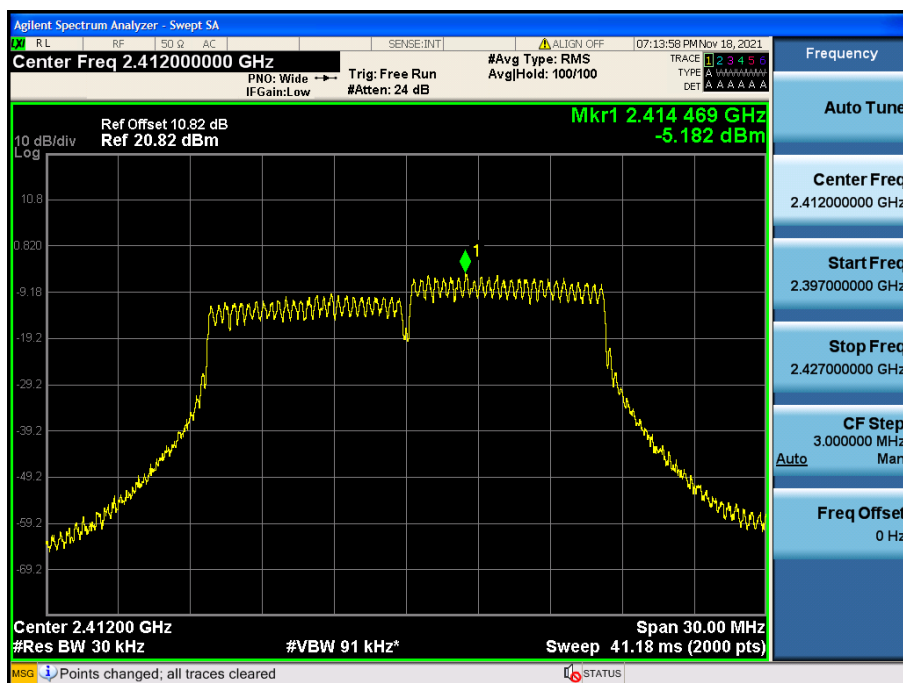
[Ant.1]

Test Plots

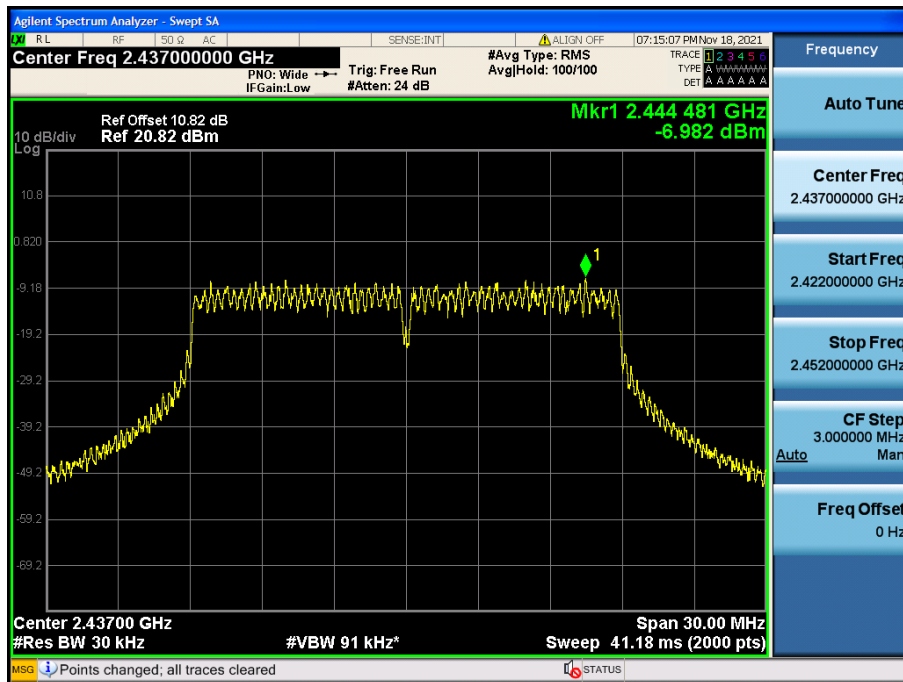
Power Spectral Density (802.11b-CH 6)



Power Spectral Density (802.11g-CH 1)



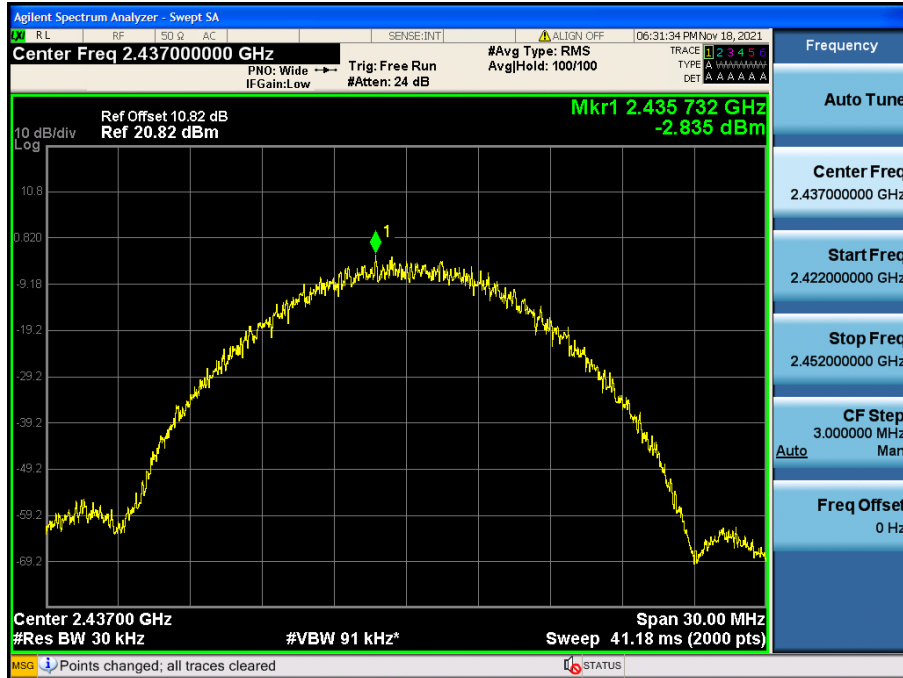
Power Spectral Density (802.11n_HT20-CH 6)



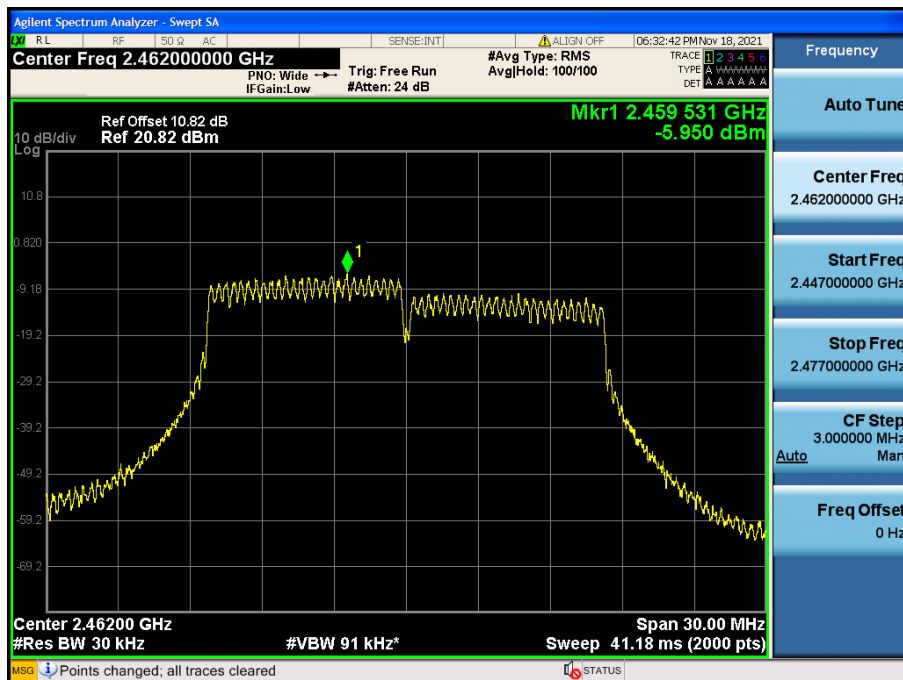
[Ant.2]

▣ Test Plots

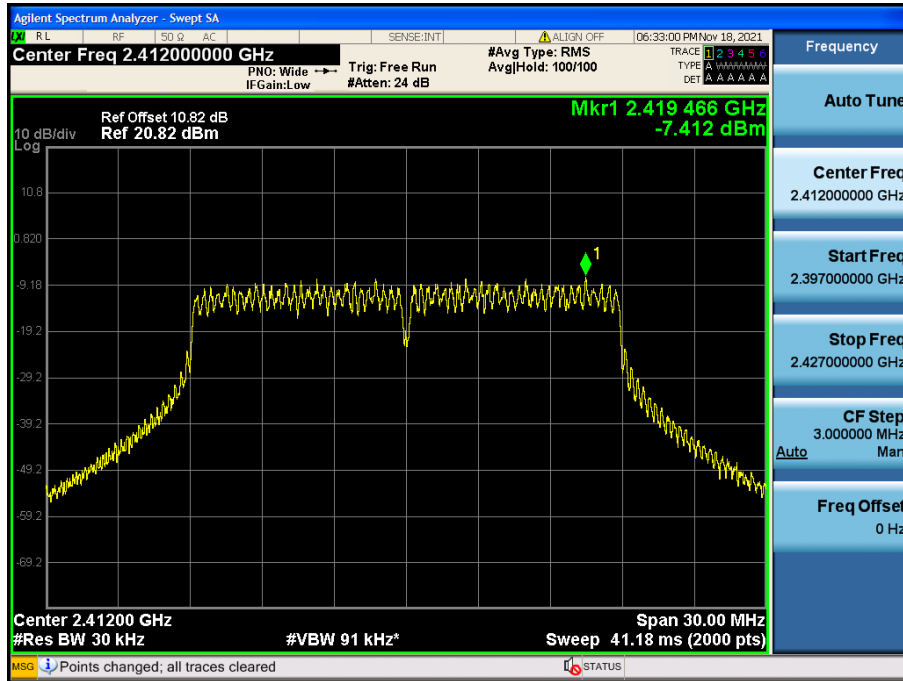
Power Spectral Density (802.11b-CH 6)



Power Spectral Density (802.11g-CH 11)



Power Spectral Density (802.11n_HT20-CH 1)



Note :

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

9.5 BAND EDGE / CONDUCTED SPURIOUS EMISSIONS

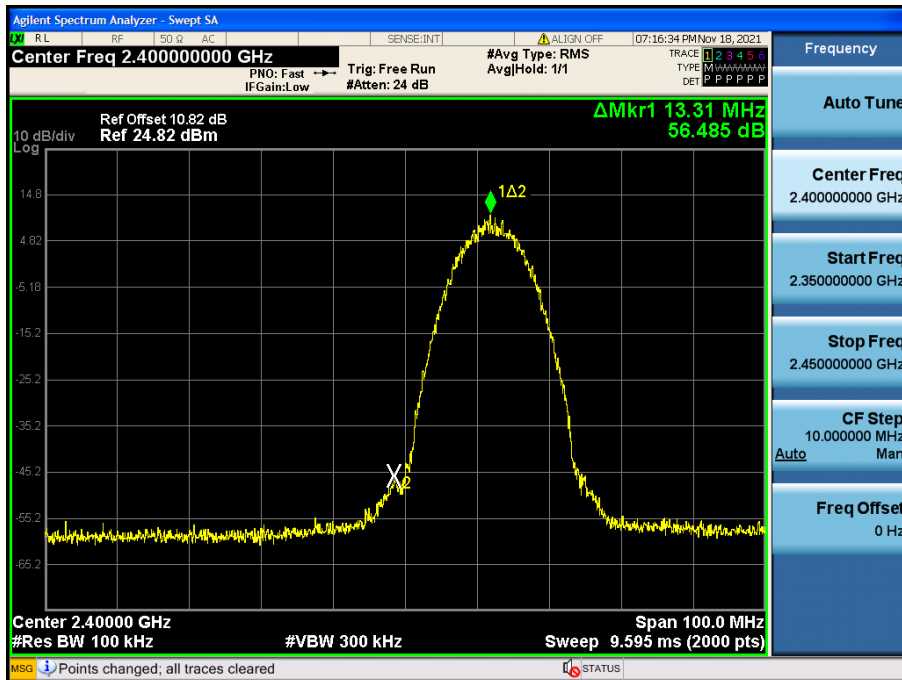
Test Result : please refer to the plot below.

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

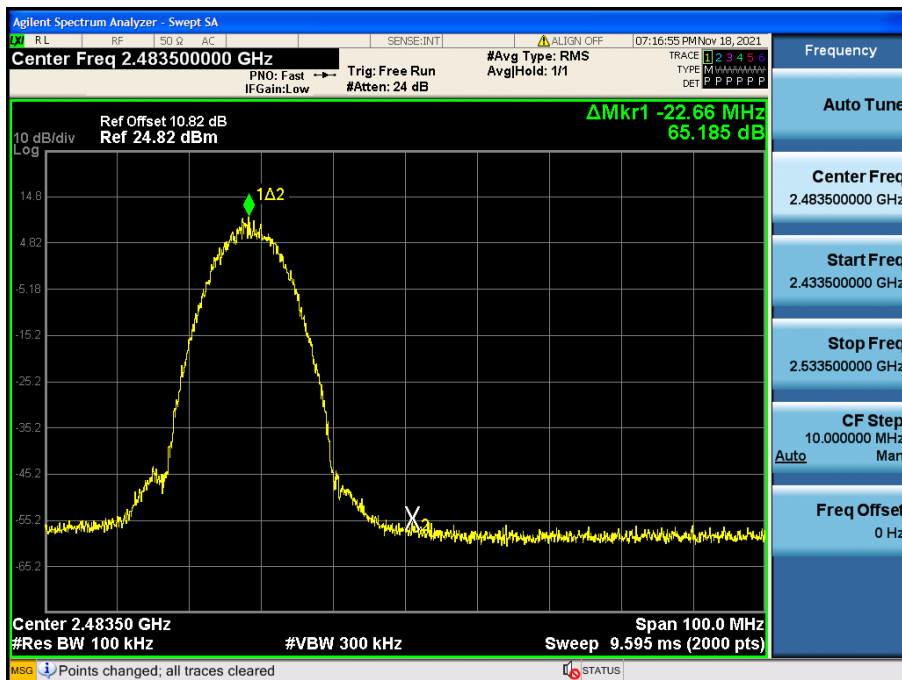
[Ant.1]

Test Plots(Band Edge)

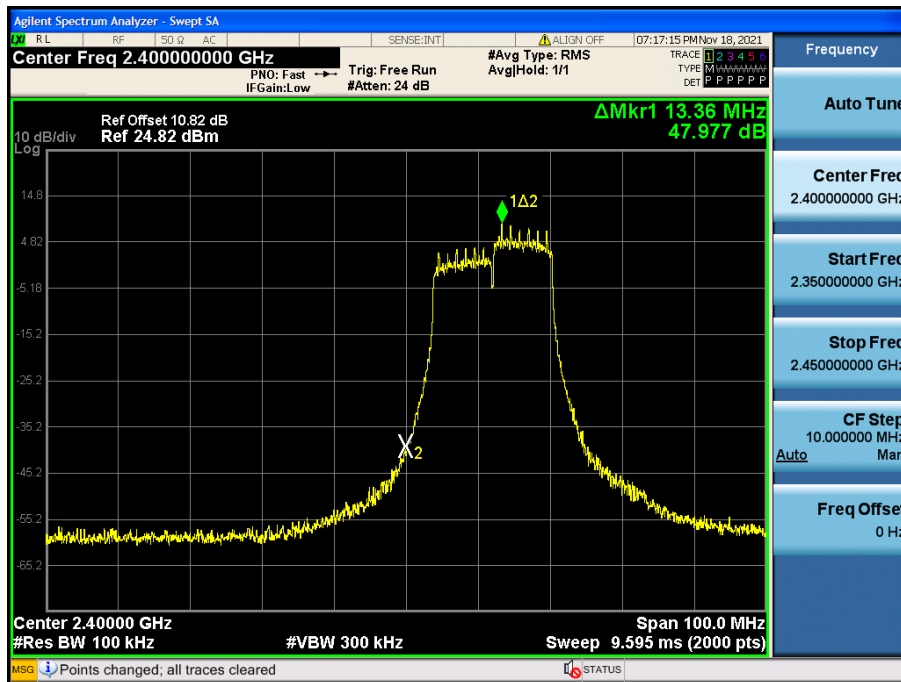
Band Edge (802.11b-CH1)



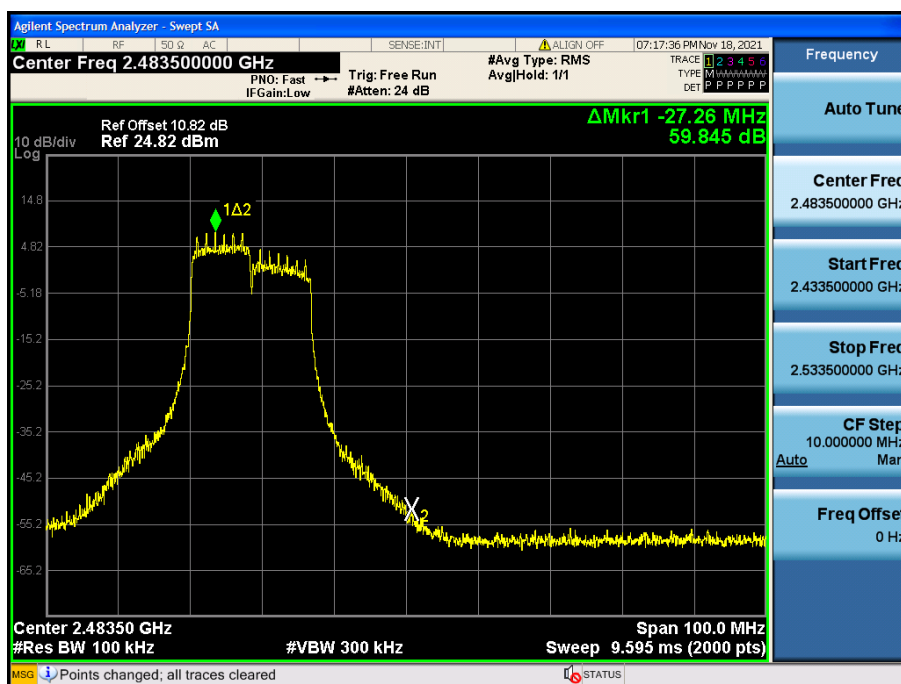
Band Edge (802.11b-CH11)



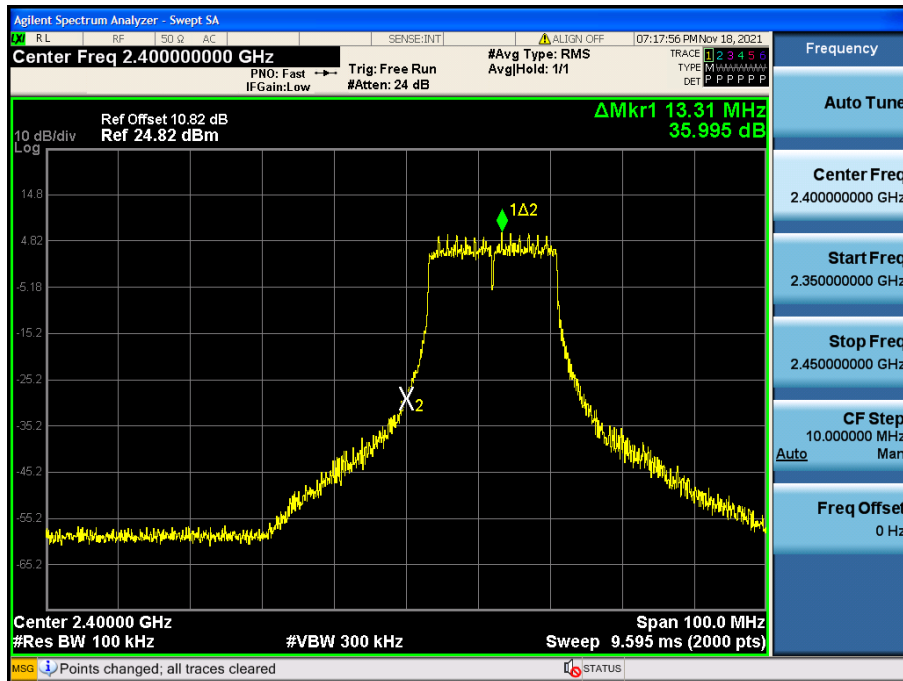
Band Edge (802.11g-CH1)



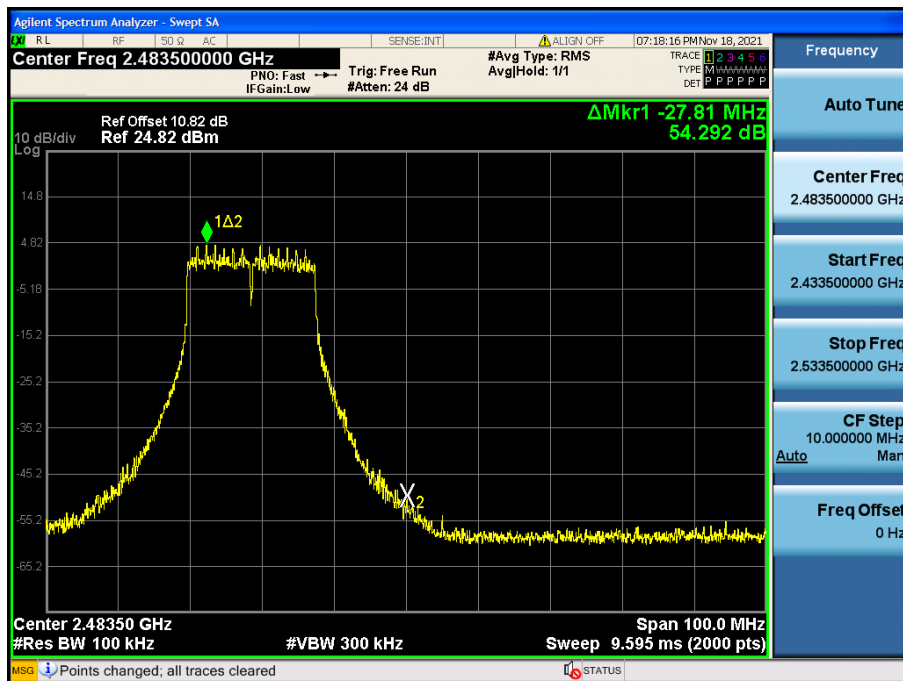
Band Edge (802.11g-CH11)



Band Edge (802.11n_HT20-CH1)



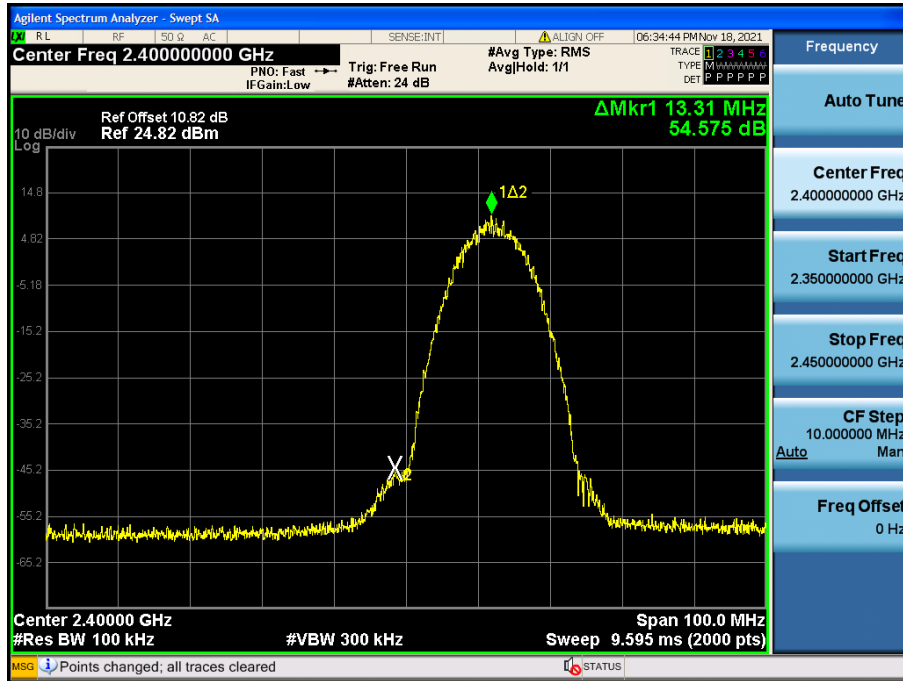
Band Edge (802.11n_HT20-CH11)



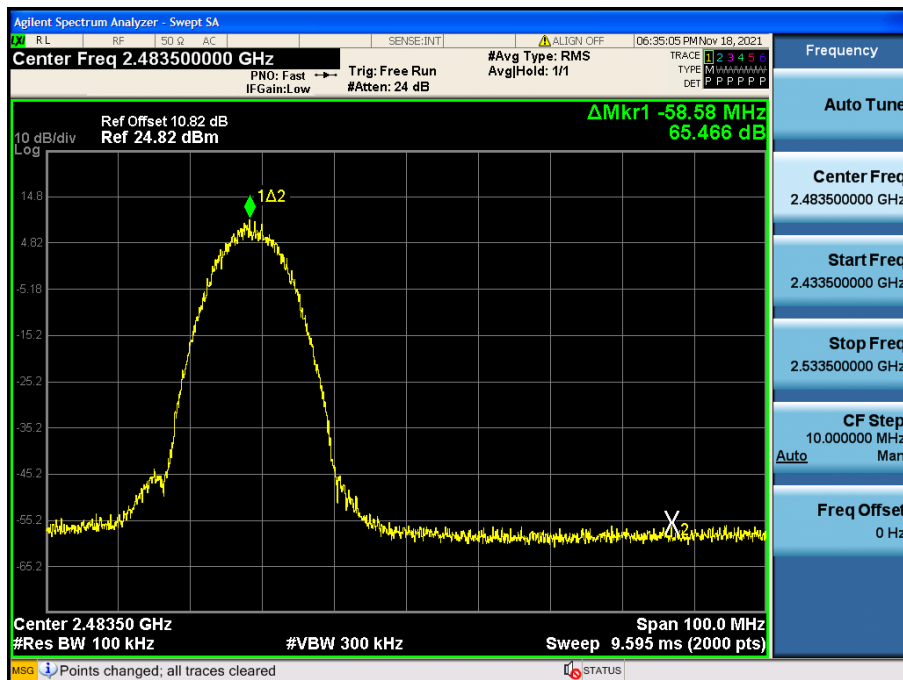
[Ant.2]

Test Plots(Band Edge)

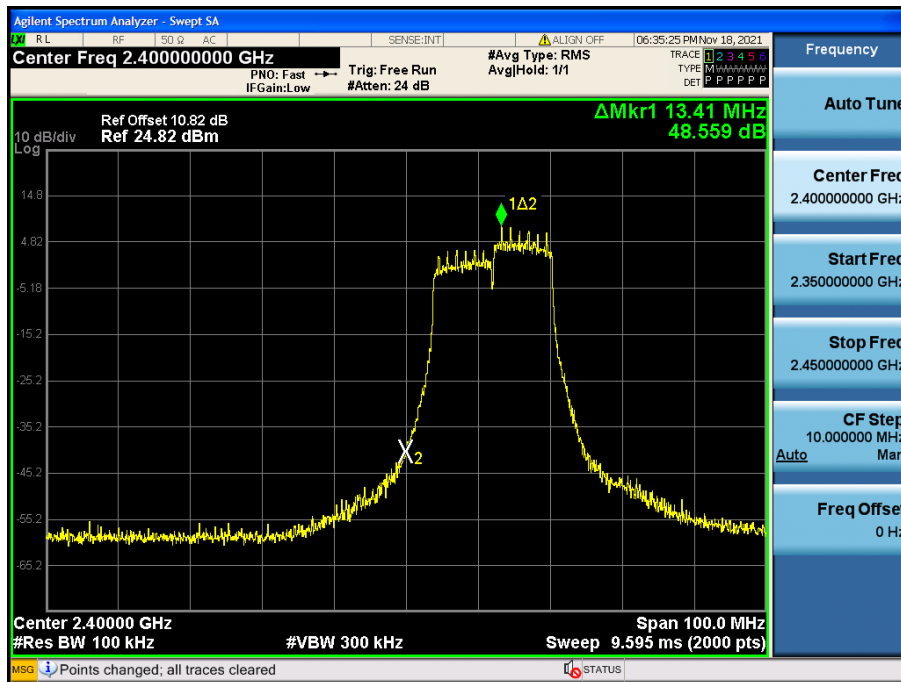
Band Edge (802.11b-CH1)



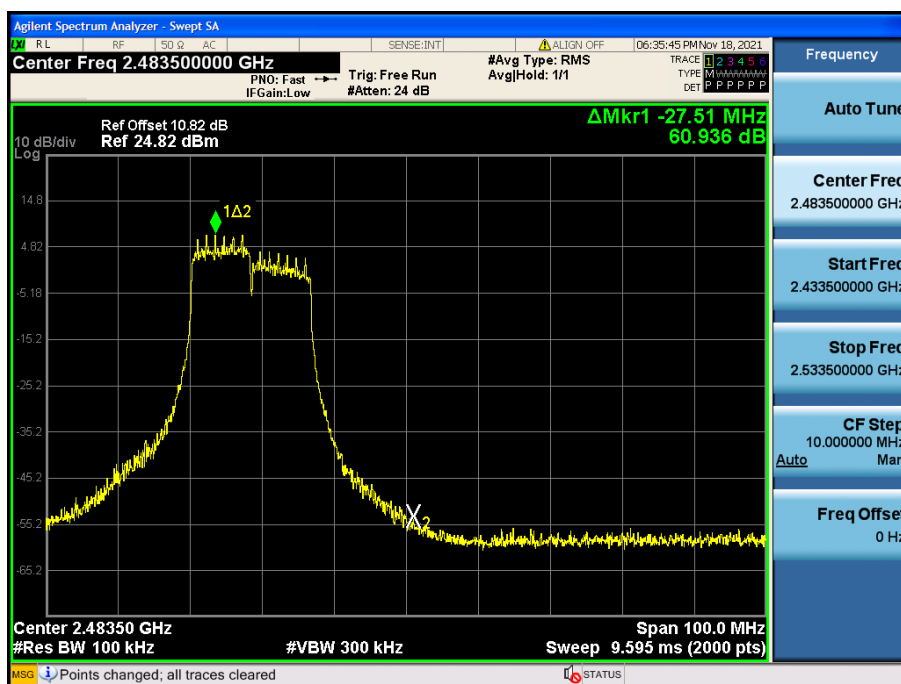
Band Edge (802.11b-CH11)



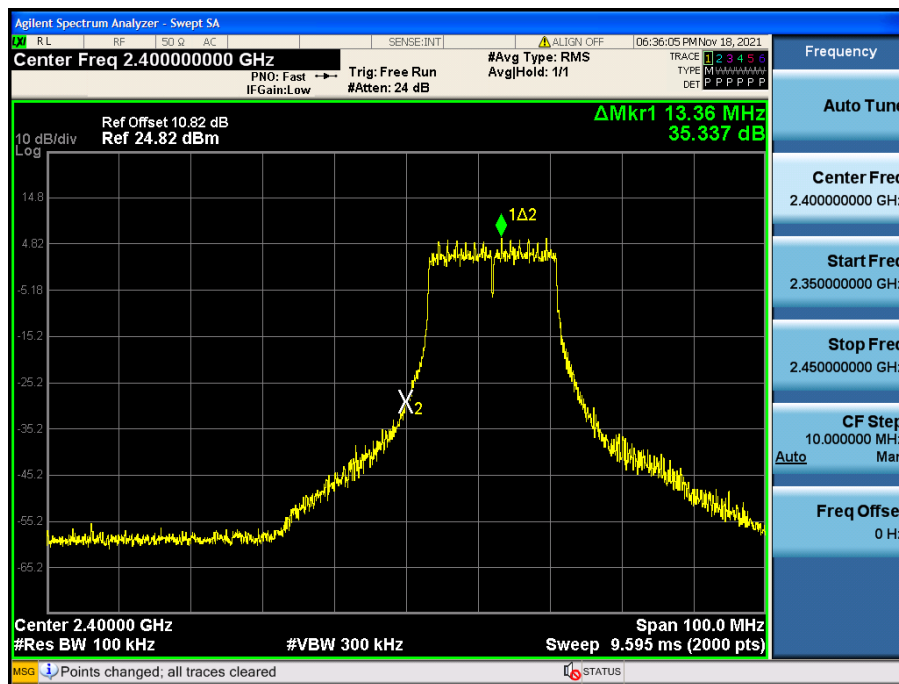
Band Edge (802.11g-CH1)



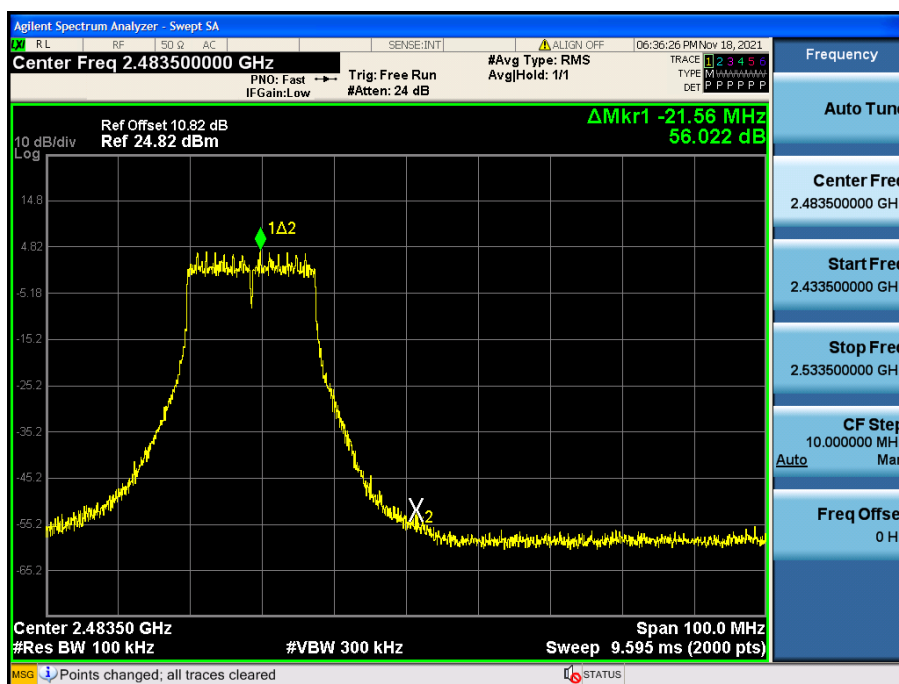
Band Edge (802.11g-CH11)



Band Edge (802.11n_HT20-CH1)



Band Edge (802.11n_HT20-CH11)

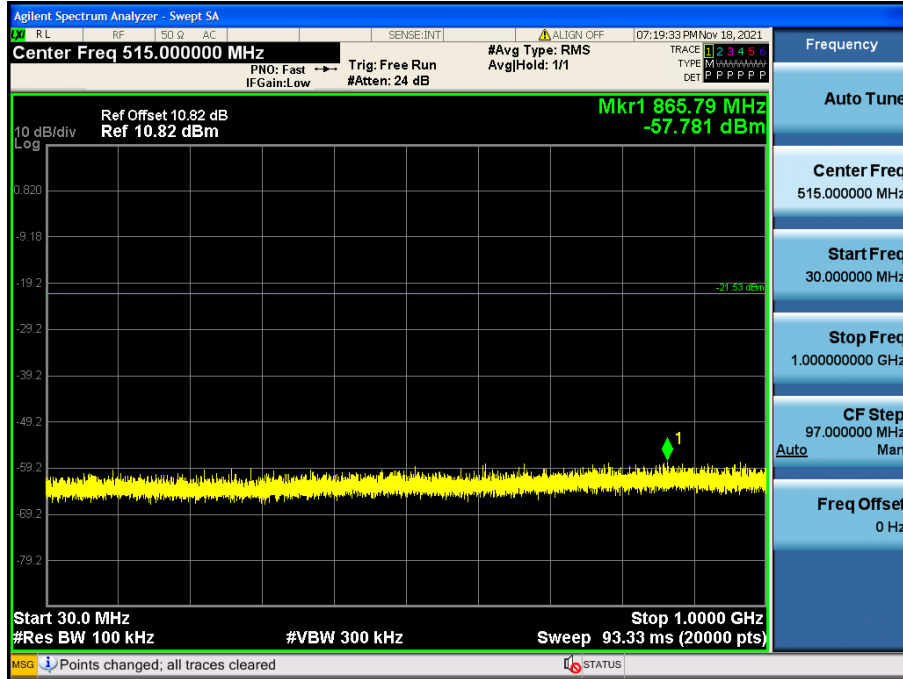


[Ant.1]

Test Plots(Conducted Spurious Emission)

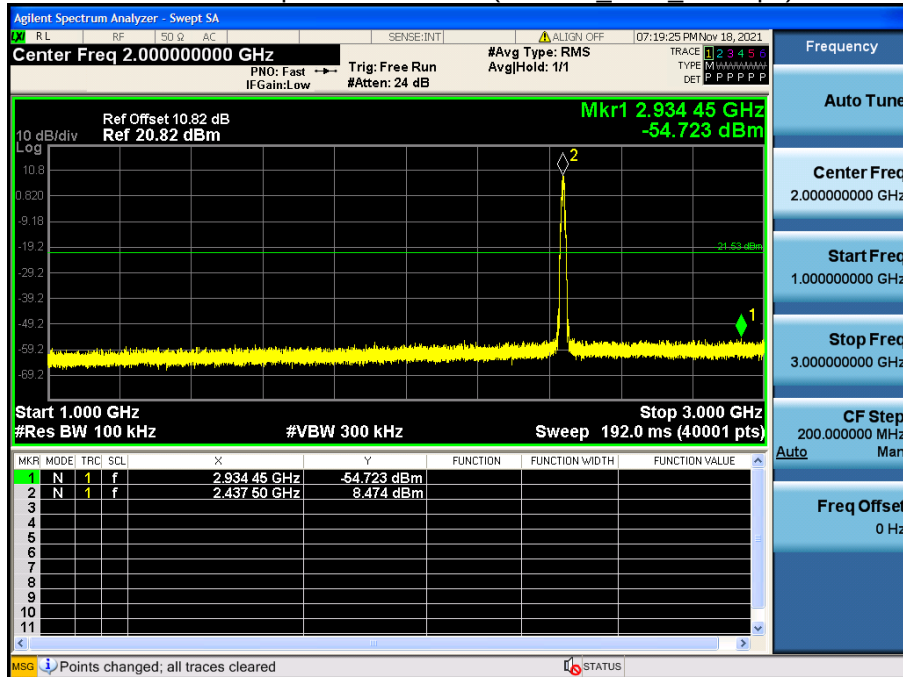
30 MHz ~ 1 GHz

Conducted Spurious Emission (802.11b_Ch.6_11 Mbps)



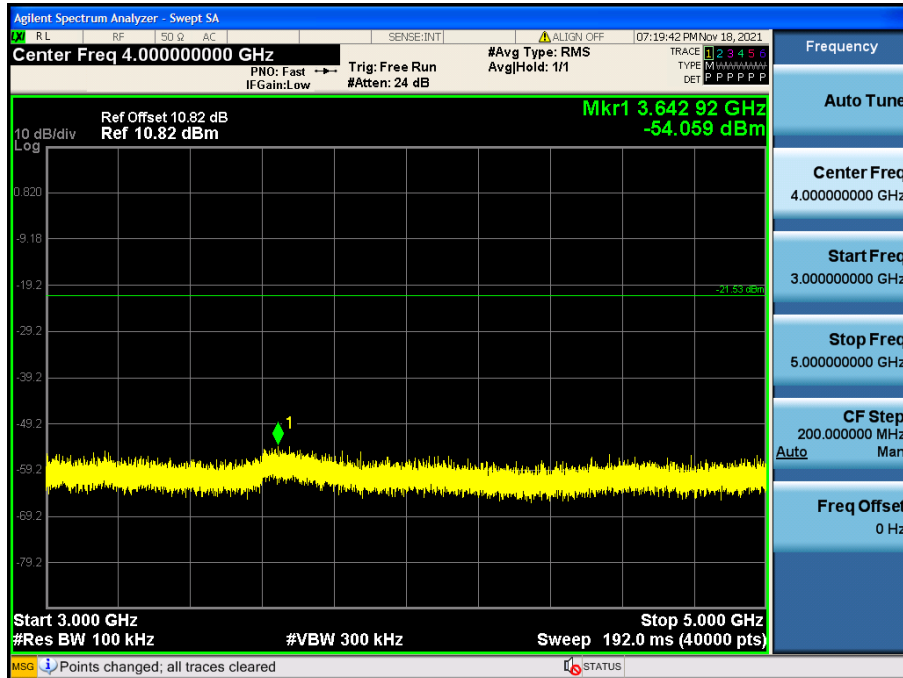
1 GHz ~ 3 GHz

Conducted Spurious Emission (802.11b_Ch.6_11 Mbps)



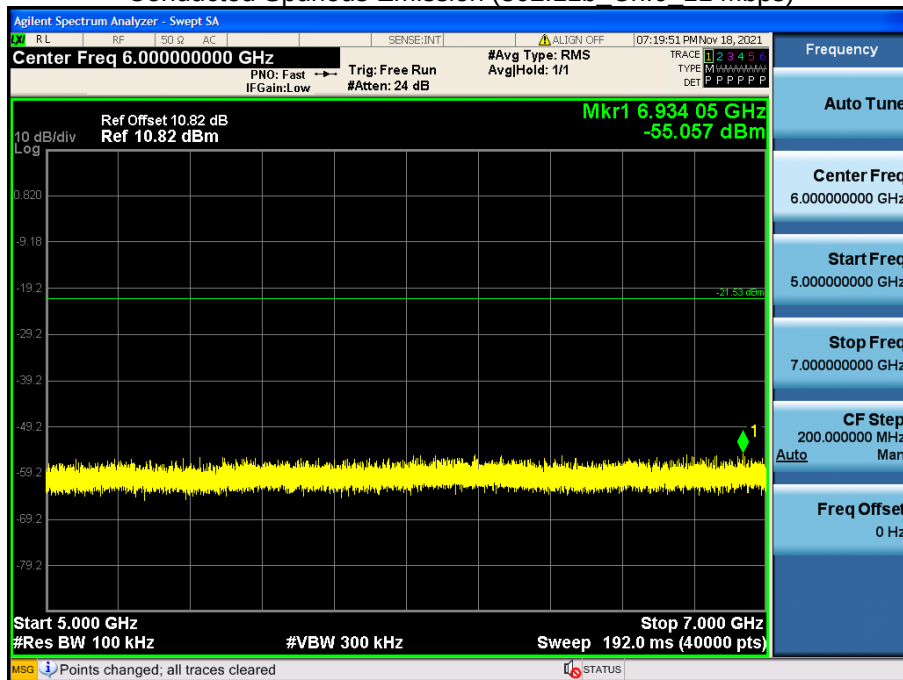
3 GHz ~ 5 GHz

Conducted Spurious Emission (802.11b_Ch.6_11 Mbps)



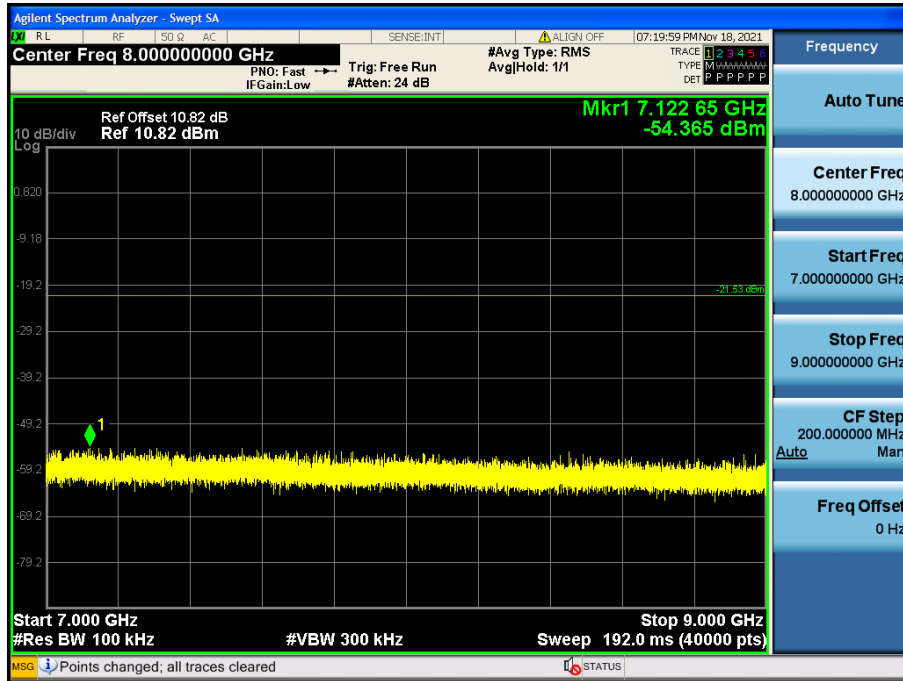
5 GHz ~ 7 GHz

Conducted Spurious Emission (802.11b_Ch.6_11 Mbps)



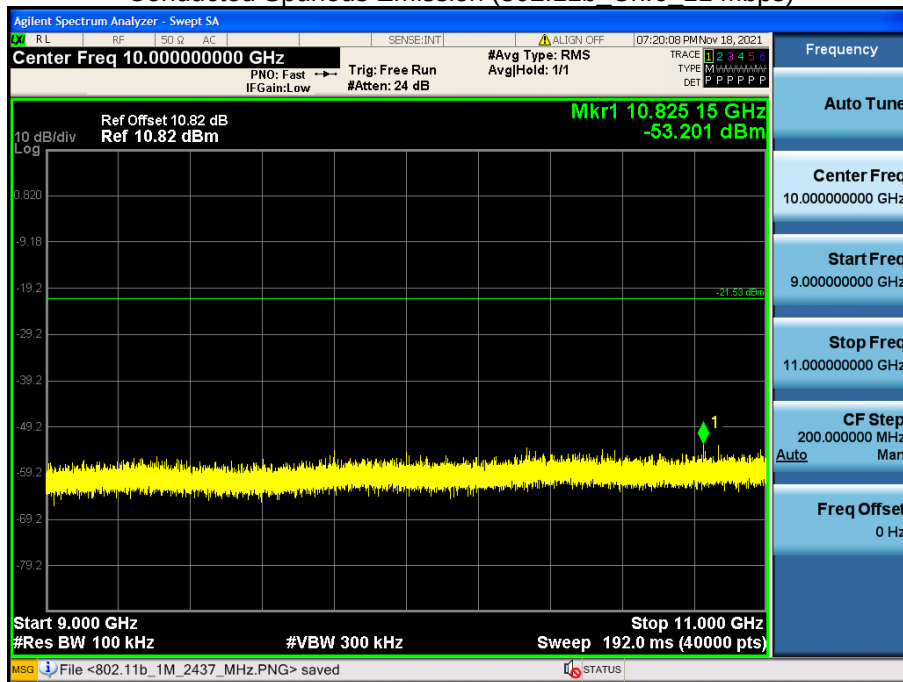
7 GHz ~ 9 GHz

Conducted Spurious Emission (802.11b_Ch.6_11 Mbps)



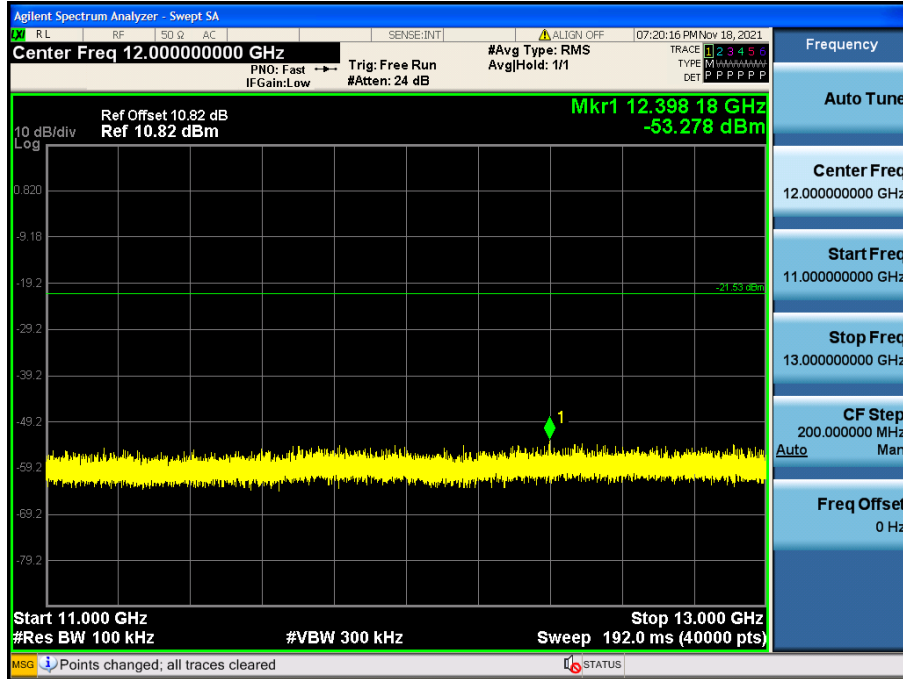
9 GHz ~ 11 GHz

Conducted Spurious Emission (802.11b_Ch.6_11 Mbps)



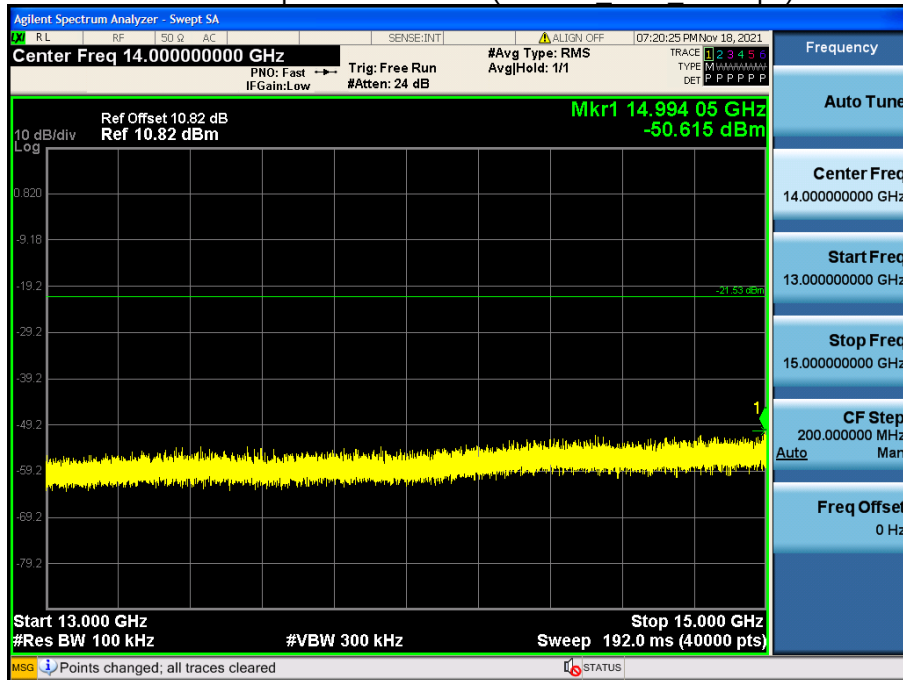
11 GHz ~ 13 GHz

Conducted Spurious Emission (802.11b_Ch.6_11 Mbps)



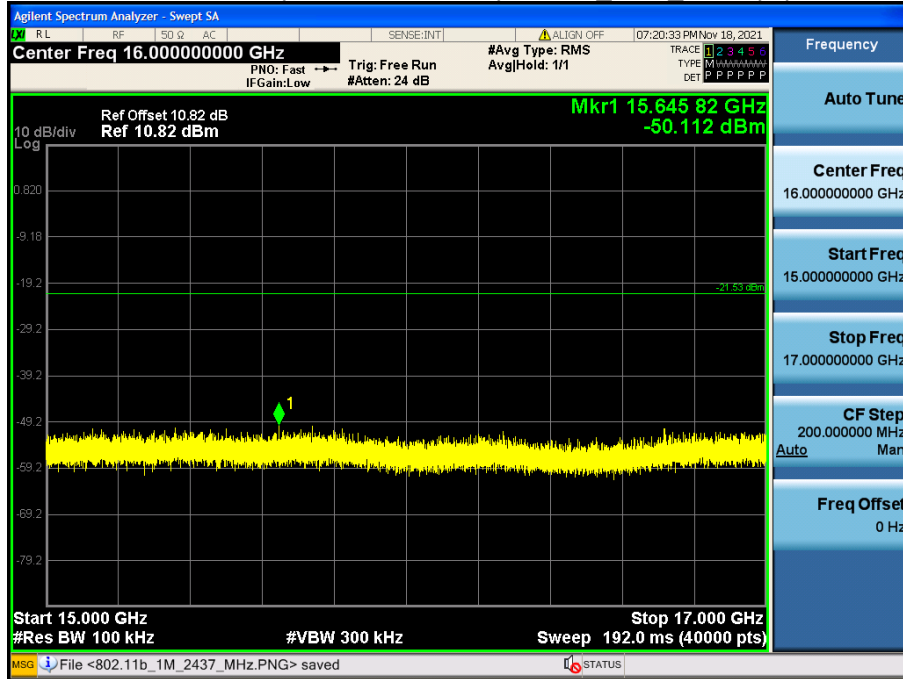
13 GHz ~ 15 GHz

Conducted Spurious Emission (802.11b_Ch.6_11 Mbps)



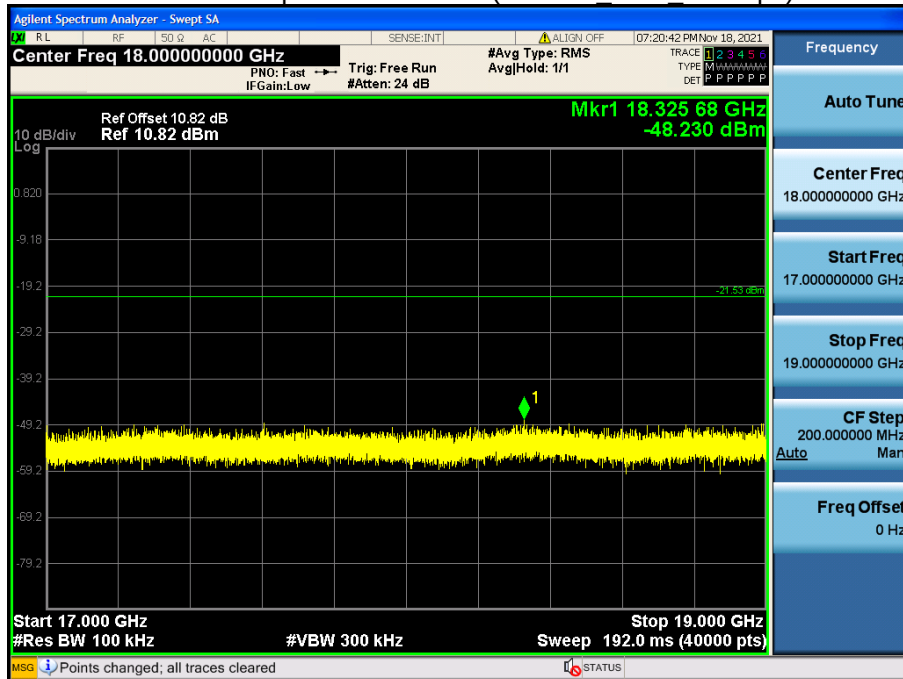
15 GHz ~ 17 GHz

Conducted Spurious Emission (802.11b Ch.6 11 Mbps)



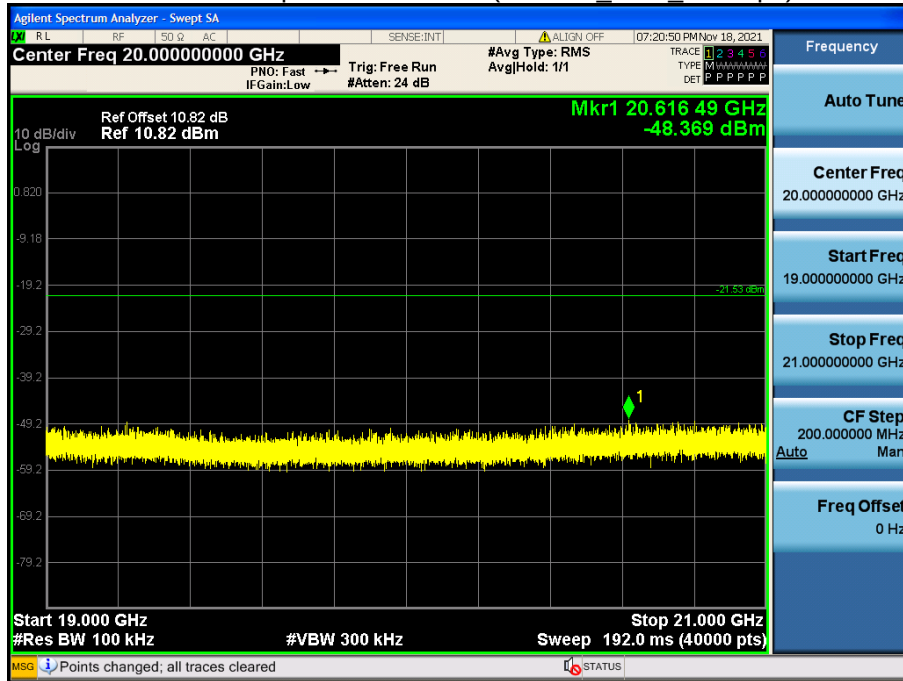
17 GHz ~ 19 GHz

Conducted Spurious Emission (802.11b Ch.6 11 Mbps)



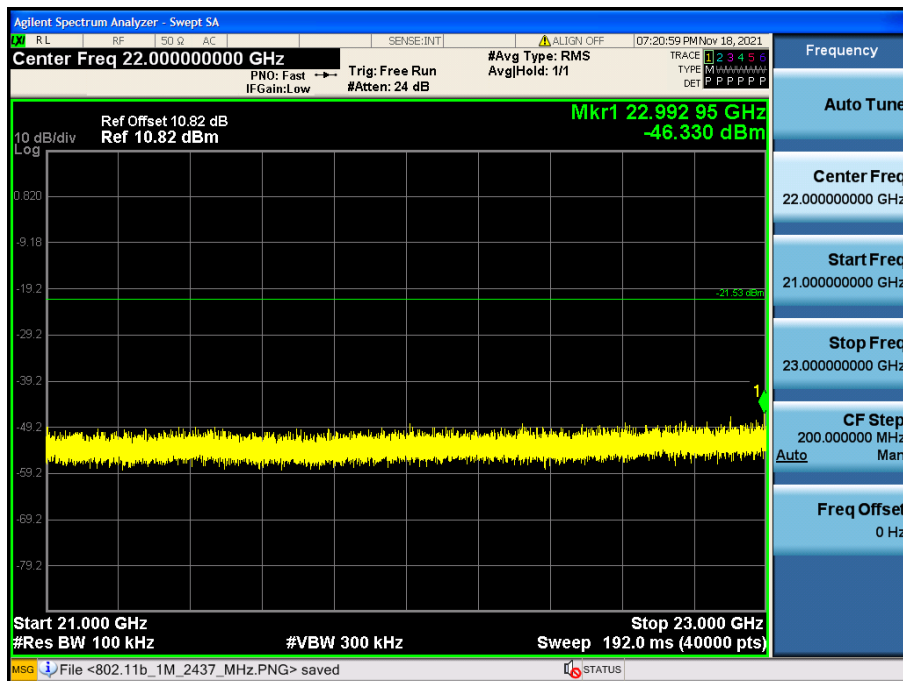
19 GHz ~ 21 GHz

Conducted Spurious Emission (802.11b_Ch.6_11 Mbps)



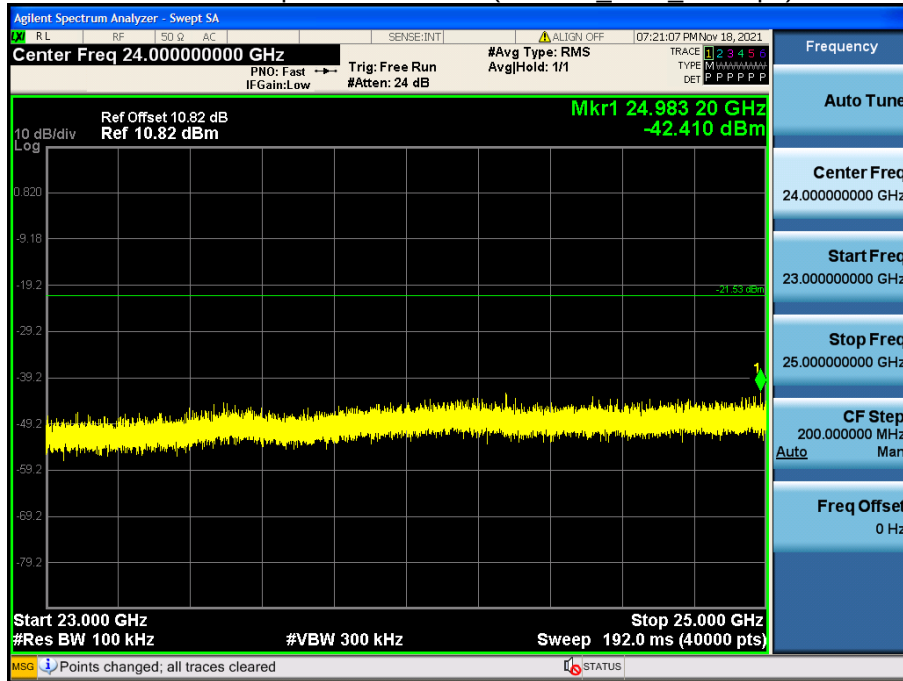
21 GHz ~ 23 GHz

Conducted Spurious Emission (802.11b_Ch.6_11 Mbps)



23 GHz ~ 25 GHz

Conducted Spurious Emission (802.11b Ch.6 11 Mbps)

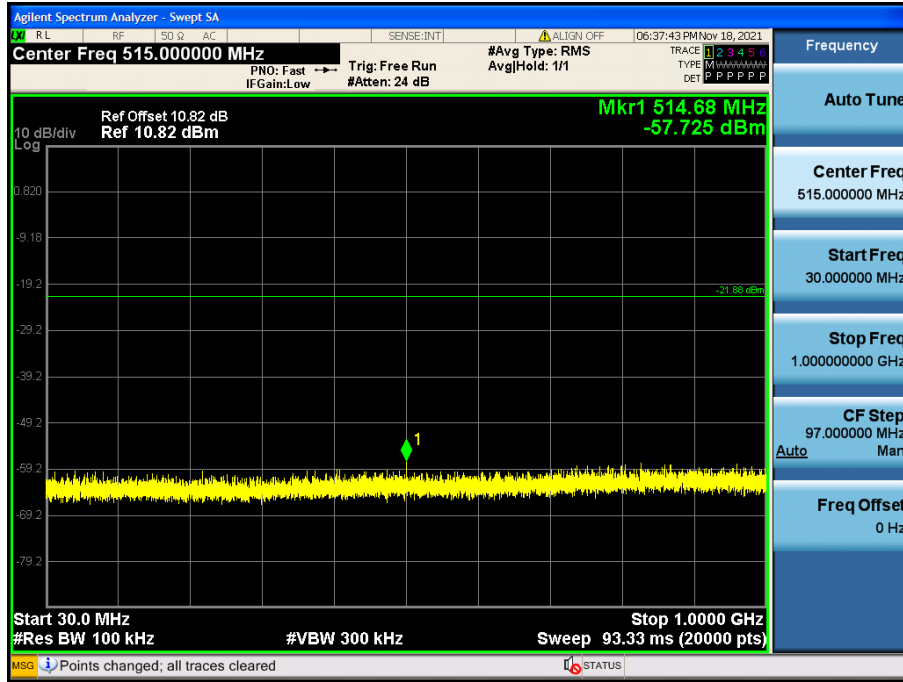


[Ant.2]

Test Plots(Conducted Spurious Emission)

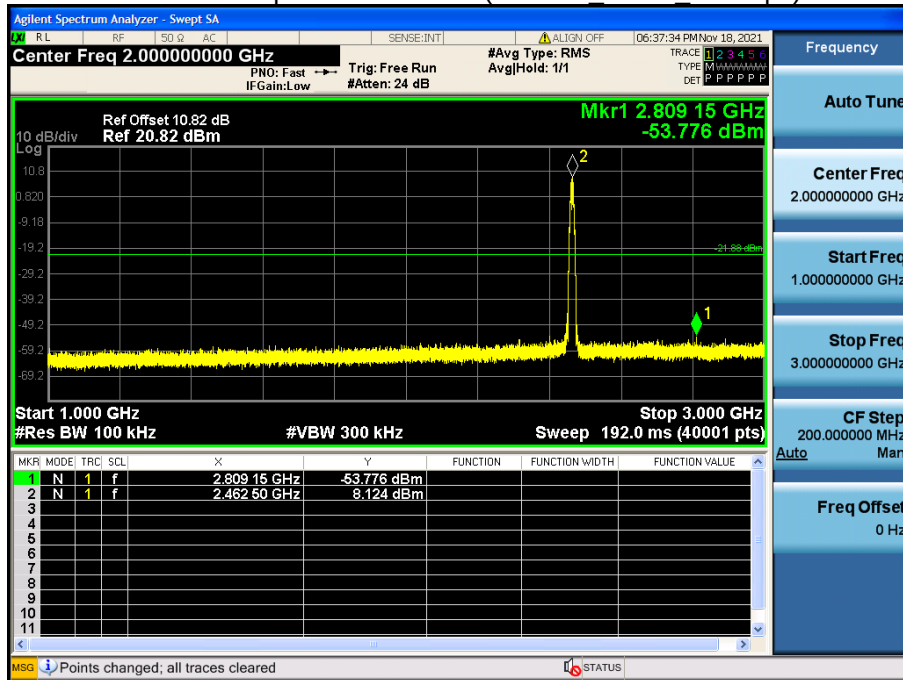
30 MHz ~ 1 GHz

Conducted Spurious Emission (802.11b_Ch.11_11 Mbps)



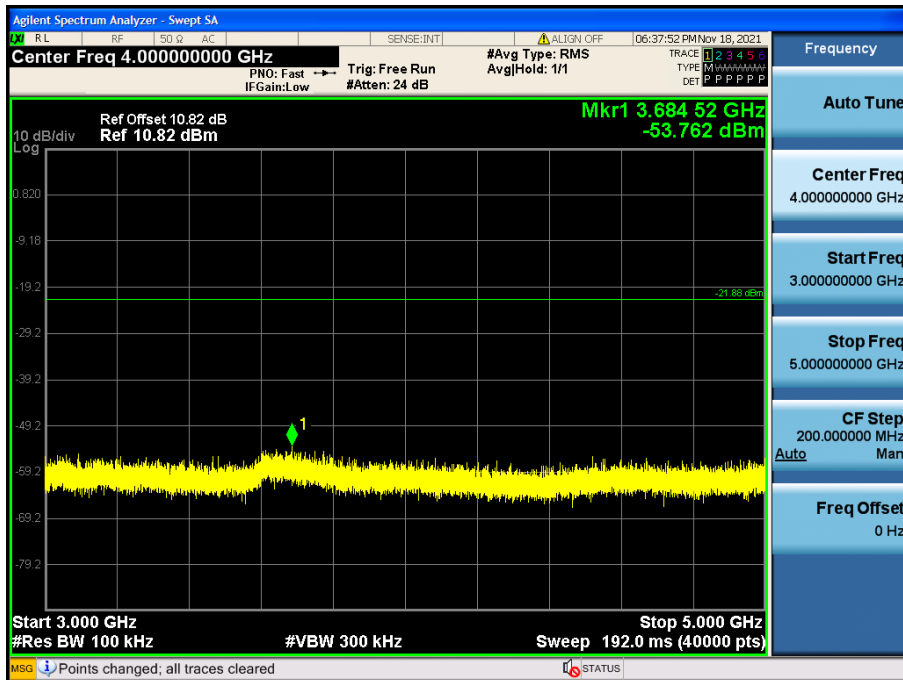
1 GHz ~ 3 GHz

Conducted Spurious Emission (802.11b_Ch.11_11 Mbps)



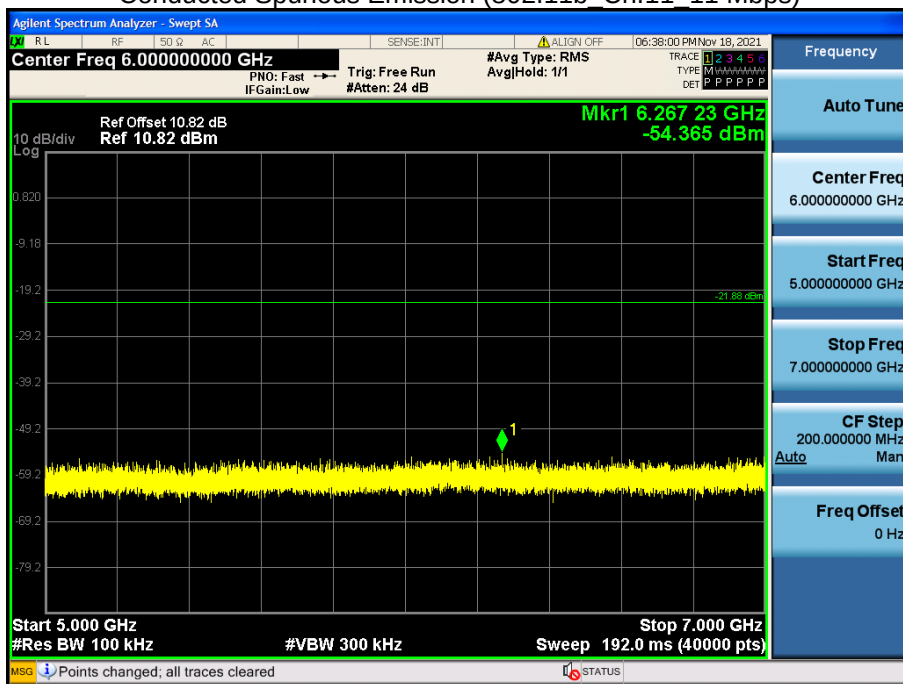
3 GHz ~ 5 GHz

Conducted Spurious Emission (802.11b_Ch.11_11 Mbps)



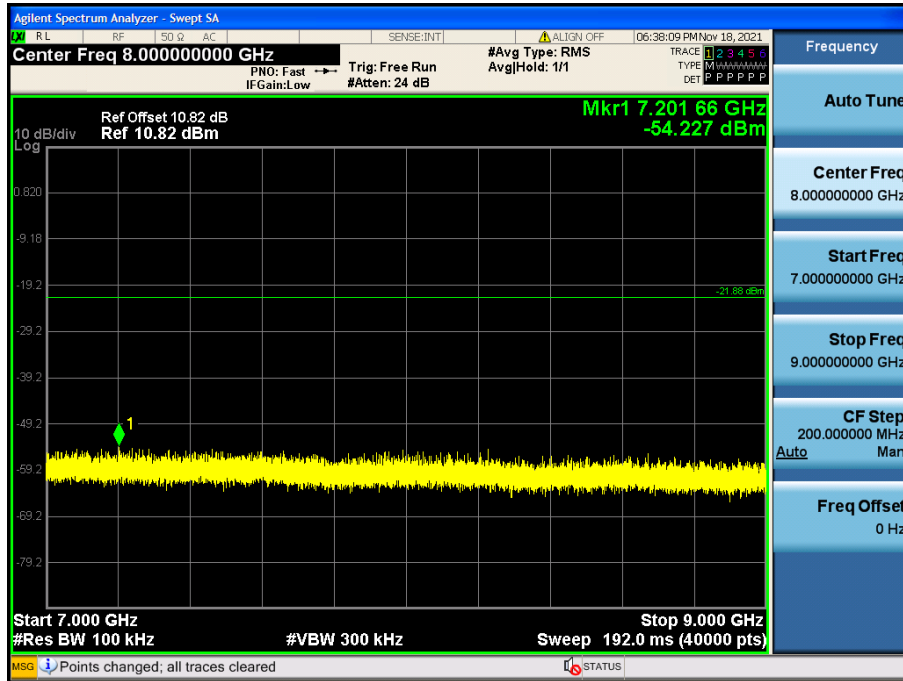
5 GHz ~ 7 GHz

Conducted Spurious Emission (802.11b_Ch.11_11 Mbps)



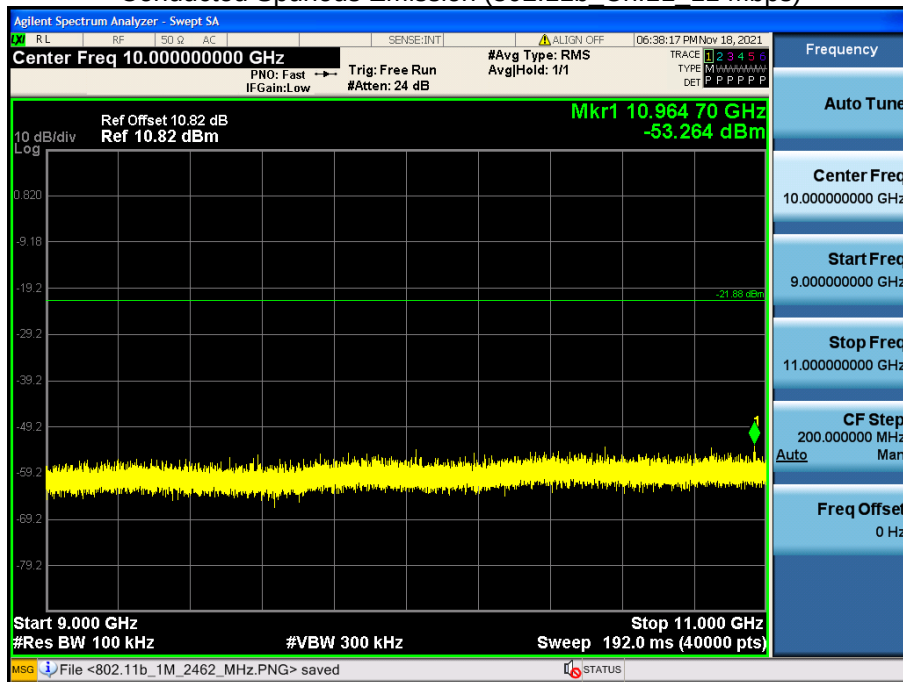
7 GHz ~ 9 GHz

Conducted Spurious Emission (802.11b_Ch.11_11 Mbps)



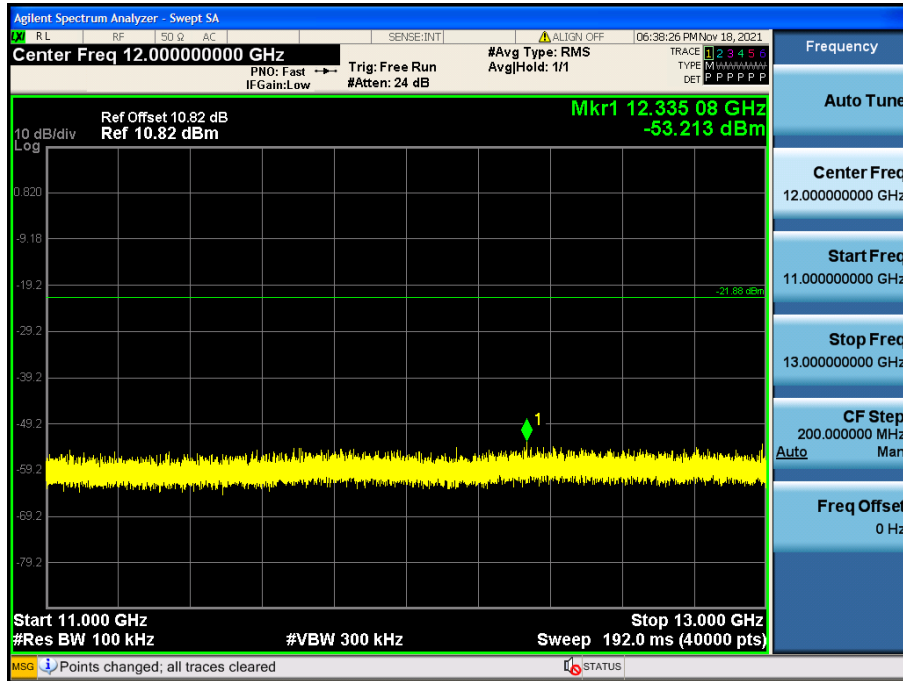
9 GHz ~ 11 GHz

Conducted Spurious Emission (802.11b_Ch.11_11 Mbps)



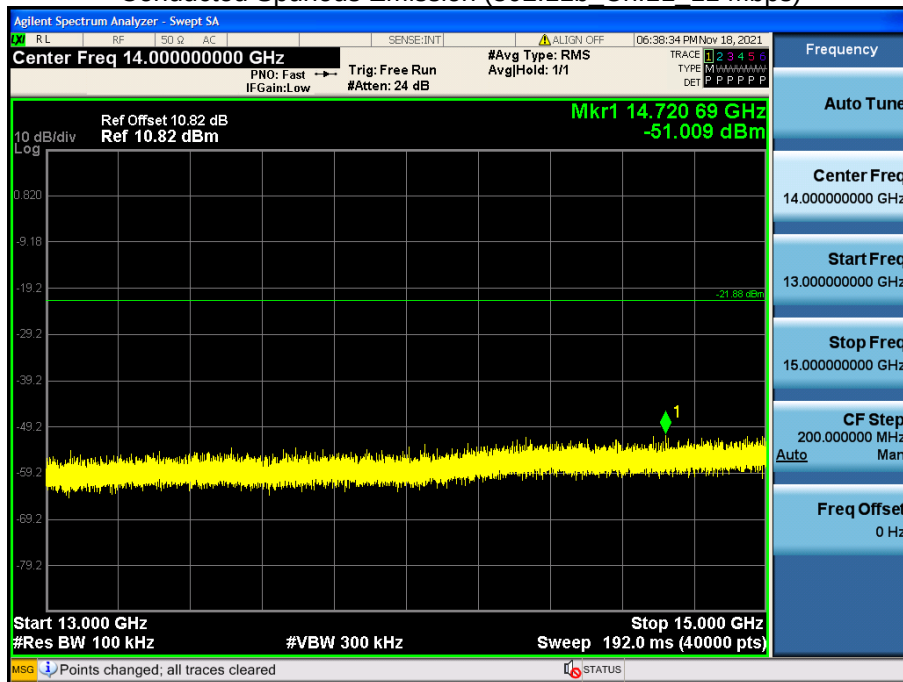
11 GHz ~ 13 GHz

Conducted Spurious Emission (802.11b_Ch.11_11 Mbps)



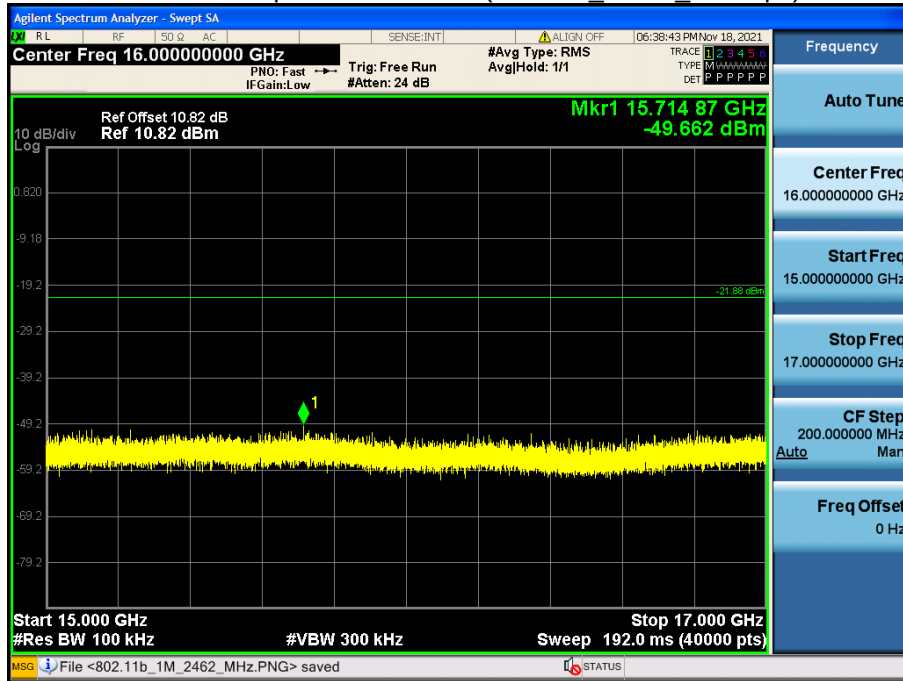
13 GHz ~ 15 GHz

Conducted Spurious Emission (802.11b_Ch.11_11 Mbps)



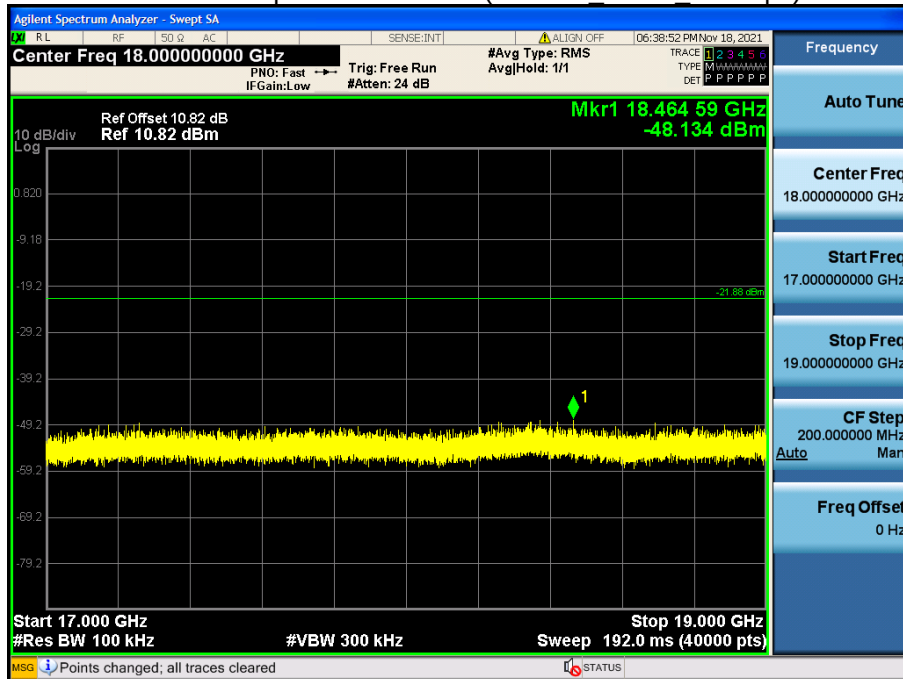
15 GHz ~ 17 GHz

Conducted Spurious Emission (802.11b Ch.11 11 Mbps)



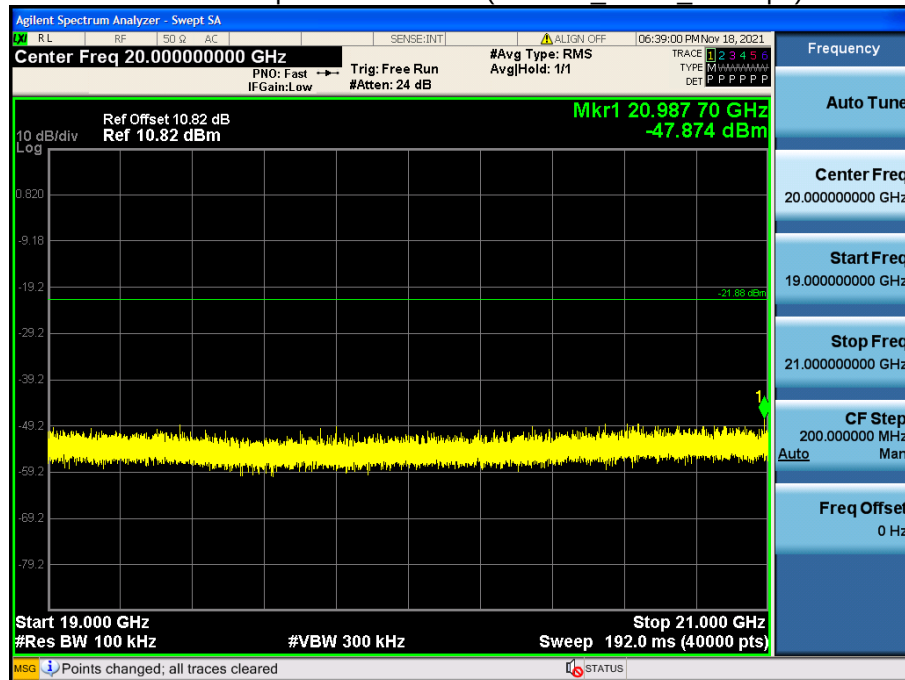
17 GHz ~ 19 GHz

Conducted Spurious Emission (802.11b Ch.11 11 Mbps)



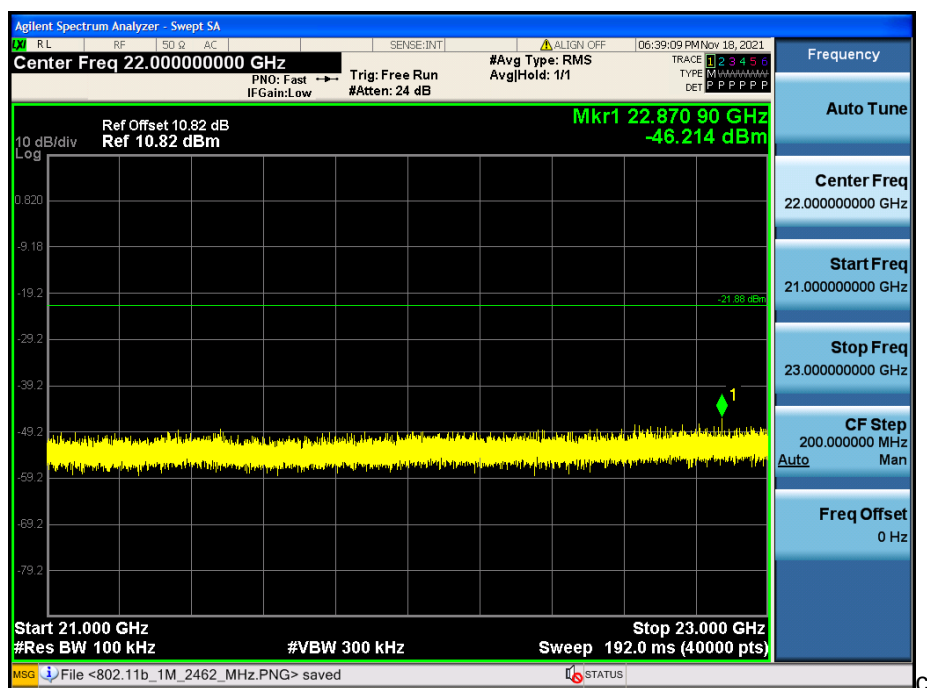
19 GHz ~ 21 GHz

Conducted Spurious Emission (802.11b Ch.11_11 Mbps)



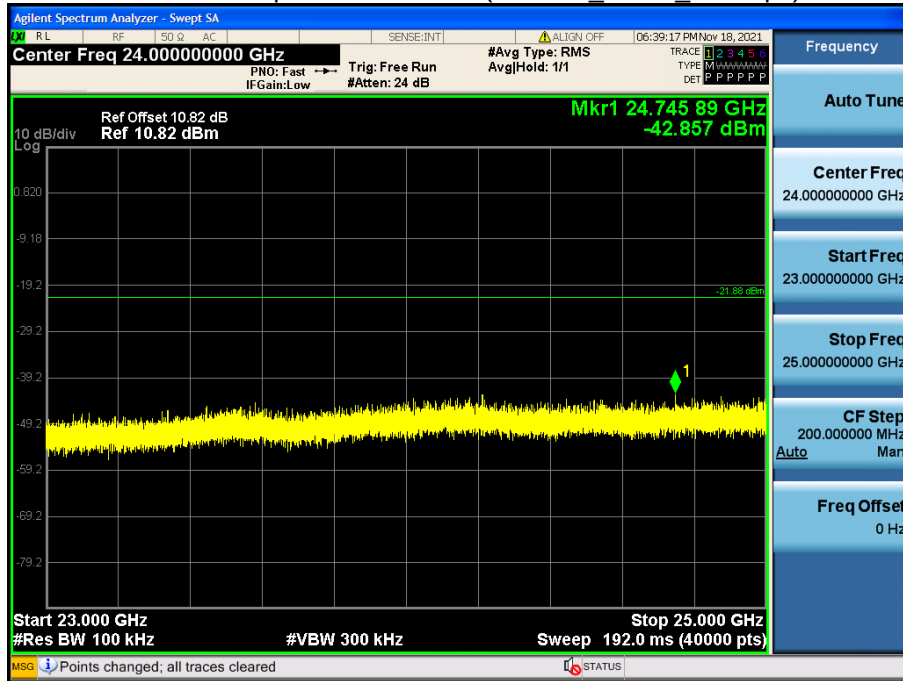
21 GHz ~ 23 GHz

Conducted Spurious Emission (802.11b_Ch.11_11 Mbps)



23 GHz ~ 25 GHz

Conducted Spurious Emission (802.11b Ch.11 11 Mbps)



9.6 RADIATED SPURIOUS EMISSIONS**Frequency Range : 9 kHz – 30 MHz**

Frequency	Measured Value	A.F+C.L+D.F	Ant. POL	Total	Limit	Margin
[MHz]	[dBμV]	[dB/m]	[H/V]	[dBμV/m]	[dBμV/m]	[dB]
No Critical peaks found						

Note:

1. The Measured value 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 = $40\log(\text{specific distance} / \text{test distance})$ (dB)
3. Limit line = specific Limits (dBμV) + Distance extrapolation factor

Frequency Range : Below 1 GHz

Frequency	Measured Value	A.F+C.L	Ant. POL	Total	Limit	Margin
[MHz]	[dBμV]	[dB/m]	[H/V]	[dBμV/m]	[dBμV/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]	Measured Value [dBμV/m]	A.F.+C.L.-A.G + D.F [dB/m]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
4824	44.59	3.46	V	48.05	73.98	25.93	PK
4824	35.82	3.46	V	39.28	53.98	14.70	AV
7236	39.91	12.51	V	52.42	73.98	21.56	PK
7236	27.78	12.51	V	40.29	53.98	13.69	AV
4824	44.74	3.46	H	48.20	73.98	25.78	PK
4824	36.03	3.46	H	39.49	53.98	14.49	AV
7236	40.05	12.51	H	52.56	73.98	21.42	PK
7236	28.00	12.51	H	40.51	53.98	13.47	AV

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

Frequency [MHz]	Measured Value [dBμV/m]	A.F.+C.L.-A.G + D.F [dB/m]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
4874	44.62	3.42	V	48.04	73.98	25.94	PK
4874	35.41	3.42	V	38.83	53.98	15.15	AV
7311	40.69	11.76	V	52.45	73.98	21.53	PK
7311	28.55	11.76	V	40.31	53.98	13.67	AV
4874	44.85	3.42	H	48.27	73.98	25.71	PK
4874	35.62	3.42	H	39.04	53.98	14.94	AV
7311	40.81	11.76	H	52.57	73.98	21.41	PK
7311	28.71	11.76	H	40.47	53.98	13.51	AV

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

Frequency [MHz]	Measured Value [dBμV/m]	A.F.+C.L.-A.G + D.F [dB/m]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
4924	44.48	4.55	V	49.03	73.98	24.95	PK
4924	34.99	4.55	V	39.54	53.98	14.44	AV
7386	39.91	12.13	V	52.04	73.98	21.94	PK
7386	28.12	12.13	V	40.25	53.98	13.73	AV
4924	44.62	4.55	H	49.17	73.98	24.81	PK
4924	35.15	4.55	H	39.70	53.98	14.28	AV
7386	40.01	12.13	H	52.14	73.98	21.84	PK
7386	28.25	12.13	H	40.38	53.98	13.60	AV

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

Frequency [MHz]	Measured Value [dBμV/m]	Duty Cycle Factor [dB]	A.F.+C.L. -A.G+D.F [dB/m]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measure ment Type
4824	43.62	0.000	3.46	V	47.08	73.98	26.90	PK
4824	30.98	0.305	3.46	V	34.75	53.98	19.24	AV
7236	39.89	0.000	12.51	V	52.40	73.98	21.58	PK
7236	27.51	0.305	12.51	V	40.33	53.98	13.66	AV
4824	43.74	0.000	3.46	H	47.20	73.98	26.78	PK
4824	31.15	0.305	3.46	H	34.92	53.98	19.07	AV
7236	40.06	0.000	12.51	H	52.57	73.98	21.41	PK
7236	27.62	0.305	12.51	H	40.44	53.98	13.55	AV

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

Frequency [MHz]	Measured Value [dBμV/m]	Duty Cycle Factor [dB]	A.F.+C.L. -A.G+D.F [dB/m]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measure ment Type
4874	43.91	0.000	3.42	V	47.33	73.98	26.65	PK
4874	31.41	0.305	3.42	V	35.14	53.98	18.85	AV
7311	41.21	0.000	11.76	V	52.97	73.98	21.01	PK
7311	28.32	0.305	11.76	V	40.39	53.98	13.60	AV
4874	44.12	0.000	3.42	H	47.54	73.98	26.44	PK
4874	31.58	0.305	3.42	H	35.31	53.98	18.68	AV
7311	41.32	0.000	11.76	H	53.08	73.98	20.90	PK
7311	28.46	0.305	11.76	H	40.53	53.98	13.46	AV

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

Frequency [MHz]	Measured Value [dBμV/m]	Duty Cycle Factor [dB]	A.F.+C.L. -A.G + D.F [dB/m]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measure ment Type
4924	43.02	0.000	4.55	V	47.57	73.98	26.41	PK
4924	30.59	0.305	4.55	V	35.45	53.98	18.54	AV
7386	39.81	0.000	12.13	V	51.94	73.98	22.04	PK
7386	27.51	0.305	12.13	V	39.95	53.98	14.04	AV
4924	43.28	0.000	4.55	H	47.83	73.98	26.15	PK
4924	30.75	0.305	4.55	H	35.61	53.98	18.38	AV
7386	39.99	0.000	12.13	H	52.12	73.98	21.86	PK
7386	27.68	0.305	12.13	H	40.12	53.98	13.87	AV

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

Frequency [MHz]	Measured Value [dBμV]	Duty Cycle Factor [dB]	A.F.+C.L.- A.G + D.F [dB/m]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measure ment Type
4824	43.41	0.000	3.46	V	46.87	73.98	27.11	PK
4824	30.95	0.354	3.46	V	34.76	53.98	19.22	AV
7236	39.99	0.000	12.51	V	52.50	73.98	21.48	PK
7236	27.51	0.354	12.51	V	40.37	53.98	13.61	AV
4824	43.55	0.000	3.46	H	47.01	73.98	26.97	PK
4824	31.18	0.354	3.46	H	34.99	53.98	18.99	AV
7236	40.05	0.000	12.51	H	52.56	73.98	21.42	PK
7236	27.62	0.354	12.51	H	40.48	53.98	13.50	AV

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

Frequency [MHz]	Measured Value [dBμV]	Duty Cycle Factor [dB]	A.F.+C.L.- A.G + D.F [dB/m]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measure ment Type
4874	44.12	0.000	3.42	V	47.54	73.98	26.44	PK
4874	31.35	0.354	3.42	V	35.12	53.98	18.86	AV
7311	40.79	0.000	11.76	V	52.55	73.98	21.43	PK
7311	28.12	0.354	11.76	V	40.23	53.98	13.75	AV
4874	44.36	0.000	3.42	H	47.78	73.98	26.20	PK
4874	31.48	0.354	3.42	H	35.25	53.98	18.73	AV
7311	40.98	0.000	11.76	H	52.74	73.98	21.24	PK
7311	28.32	0.354	11.76	H	40.43	53.98	13.55	AV

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

Frequency [MHz]	Measured Value [dBμV]	Duty Cycle Factor [dB]	A.F.+C.L.- A.G + D.F [dB/m]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measure ment Type
4924	42.39	0.000	4.55	V	46.94	73.98	27.04	PK
4924	30.02	0.354	4.55	V	34.92	53.98	19.06	AV
7386	39.67	0.000	12.13	V	51.80	73.98	22.18	PK
7386	27.41	0.354	12.13	V	39.89	53.98	14.09	AV
4924	42.56	0.000	4.55	H	47.11	73.98	26.87	PK
4924	30.25	0.354	4.55	H	35.15	53.98	18.83	AV
7386	39.87	0.000	12.13	H	52.00	73.98	21.98	PK
7386	27.52	0.354	12.13	H	40.00	53.98	13.98	AV

[RSDB Mode]**Test case 1 : 802.11g ch.6 6 Mbps Ant All & 802.11ax(HE20) SU ch.144 MCS0 Ant All**

Frequency [MHz]	Measured Value [dBμV]	Duty Cycle Factor [dB]	A.F.+C.L.- A.G + D.F [dB/m]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measure ment Type
4874	43.51	0.000	5.71	V	49.22	73.98	24.76	PK
4874	31.98	0.305	5.71	V	38.00	53.98	15.99	AV
7311	40.44	0.000	13.97	V	54.41	73.98	19.57	PK
7311	28.12	0.305	13.97	V	42.40	53.98	11.59	AV
4874	43.64	0.000	5.71	H	49.35	73.98	24.63	PK
4874	32.12	0.305	5.71	H	38.14	53.98	15.85	AV
7311	40.57	0.000	13.97	H	54.54	73.98	19.44	PK
7311	28.21	0.305	13.97	H	42.49	53.98	11.50	AV

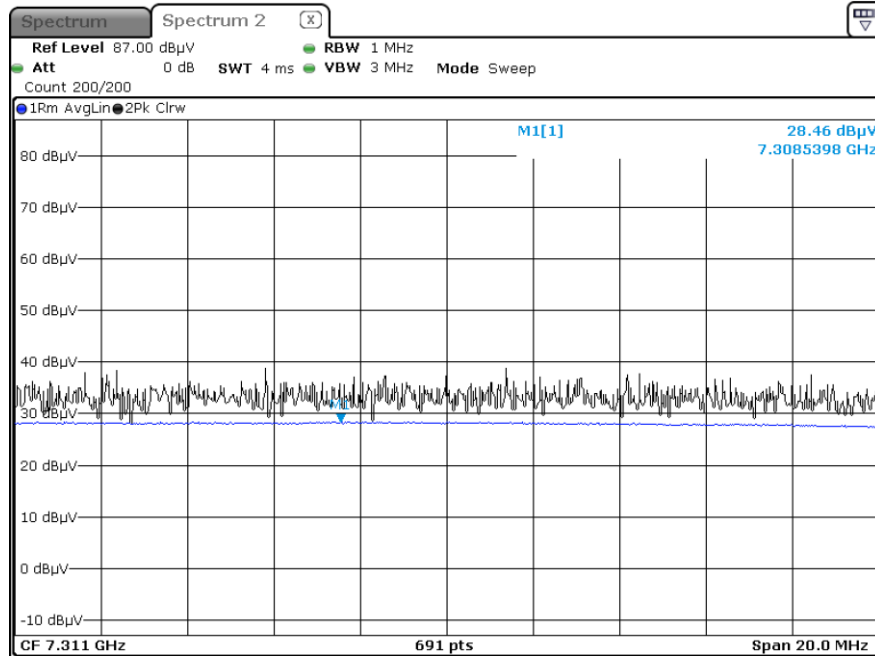
Note :

1. WLAN UNII RSDB Data refer to UNII ax Test Report.

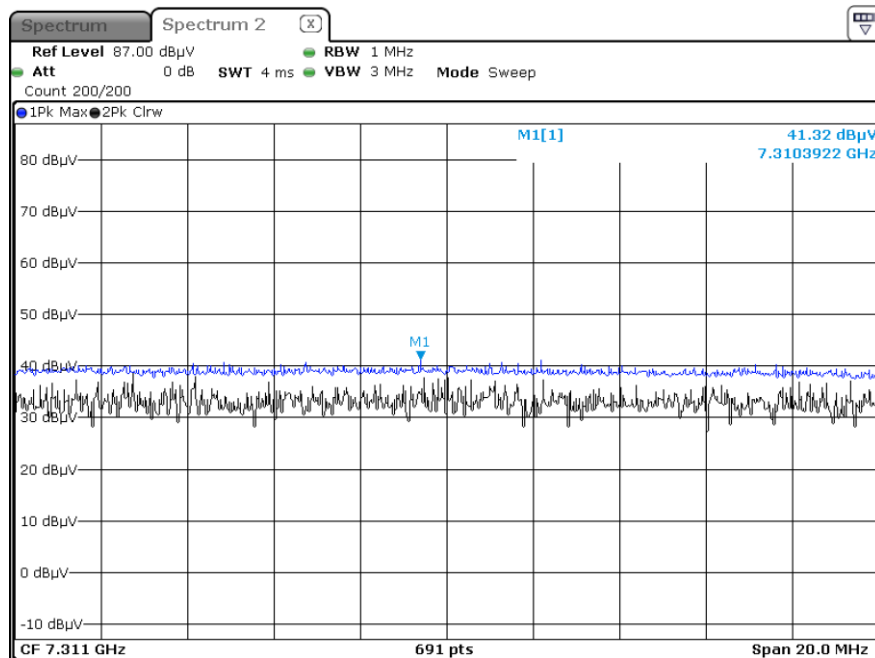
[Ant.1&Ant.2_MIMO(CDD)]

☑ Test Plots (Worst case : X-H)

Radiated Spurious Emissions plot – Average Result (802.11g_6 Mbps, Ch.6 3rd Harmonic)



Radiated Spurious Emissions plot – Peak Result (802.11g_6 Mbps, Ch.6 3rd Harmonic)

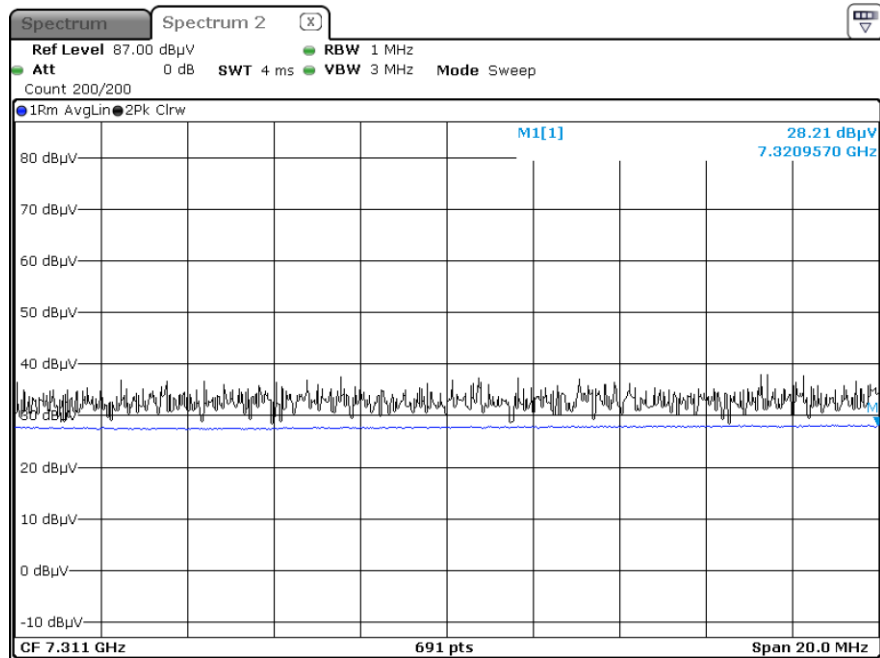


Note: Plot of worst case are only reported.

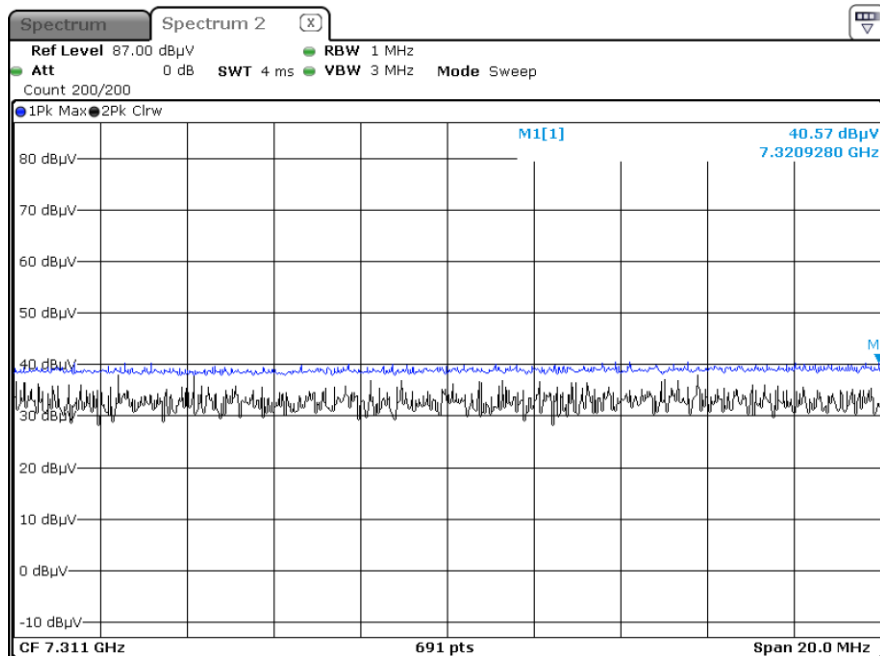
[RSDB]

Test Plots (Worst case : X-H)

Radiated Spurious Emissions plot – Average Result (Test case 1_3rd Harmonic)



Radiated Spurious Emissions plot – Peak Result (Test case 1_3rd 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]	Measured Value [dBμV]	A.F.+ C.L+ D.F [dB/m]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
2390.0	24.982	34.04	H	59.02	73.98	14.96	PK
2390.0	13.516	34.04	H	47.56	53.98	6.42	AV
2390.0	24.785	34.04	V	58.83	73.98	15.16	PK
2390.0	13.402	34.04	V	47.44	53.98	6.54	AV
2483.5	25.072	35.00	H	60.07	73.98	13.91	PK
2483.5	13.621	35.00	H	48.62	53.98	5.36	AV
2483.5	24.899	35.00	V	59.90	73.98	14.08	PK
2483.5	13.512	35.00	V	48.51	53.98	5.47	AV

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

Frequency [MHz]	Measured Value [dBμV]	Duty Cycle Factor [dB]	A.F.+ C.L+ D.F [dB/m]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
2390.0	29.465	0.000	34.04	H	63.51	73.98	10.48	PK
2390.0	15.740	0.305	34.04	H	50.09	53.98	3.90	AV
2390.0	29.025	0.000	34.04	V	63.07	73.98	10.92	PK
2390.0	15.421	0.305	34.04	V	49.77	53.98	4.21	AV
2483.5	28.054	0.000	35.00	H	63.05	73.98	10.93	PK
2483.5	15.027	0.305	35.00	H	50.33	53.98	3.65	AV
2483.5	27.925	0.000	35.00	V	62.93	73.98	11.06	PK
2483.5	14.981	0.305	35.00	V	50.29	53.98	3.69	AV

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

Frequency [MHz]	Measured Level [dBμV]	Duty Cycle Factor [dB]	A.F.+ C.L+ D.F [dB/m]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
2390.0	27.135	0.000	34.04	H	61.18	73.98	12.81	PK
2390.0	14.852	0.354	34.04	H	49.25	53.98	4.73	AV
2390.0	26.984	0.000	34.04	V	61.02	73.98	12.96	PK
2390.0	14.722	0.354	34.04	V	49.12	53.98	4.86	AV
2483.5	25.251	0.000	35.00	H	60.25	73.98	13.73	PK
2483.5	13.812	0.354	35.00	H	49.17	53.98	4.81	AV
2483.5	25.025	0.000	35.00	V	60.03	73.98	13.96	PK
2483.5	13.698	0.354	35.00	V	49.05	53.98	4.93	AV

Test Plots

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

Radiated Restricted Band Edges plot – Average Result (802.11g_6 Mbps Ch.11)



Radiated Restricted Band Edges plot – Peak Result (802.11g_6 Mbps Ch.11)



Note:

Plot of worst case are only reported.

9.8 POWERLINE CONDUCTED EMISSIONS

Conducted Emissions (Line 1)

Test

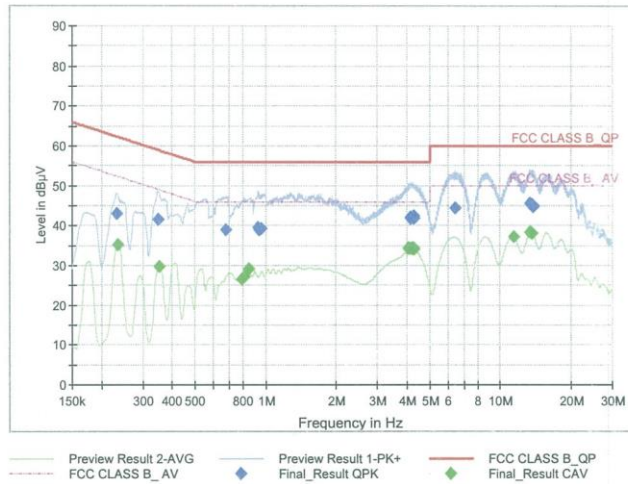
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Test Report

Common Information

EUT : SM-X808U
 Manufacturer : SAMSUNG
 Test Site: SHIELD ROOM
 Operating Conditions : 2.4G WLAN L1
 Operator Name:
 Comment:

Full Spectrum



Final Result QPK

Frequency (MHz)	QuasiPeak (dBμV)	Limit (dBμV)	Margin (dB)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.2333	42.91	62.33	19.42	9.000	L1	OFF	9.6
0.3503	41.65	58.96	17.31	9.000	L1	OFF	9.6
0.6800	38.86	56.00	17.14	9.000	L1	OFF	9.7
0.9320	39.63	56.00	16.37	9.000	L1	OFF	9.7
0.9433	39.07	56.00	16.93	9.000	L1	OFF	9.7
0.9545	39.35	56.00	16.65	9.000	L1	OFF	9.7
4.1203	41.75	56.00	14.25	9.000	L1	OFF	9.8
4.1450	42.24	56.00	13.76	9.000	L1	OFF	9.8
4.2283	42.14	56.00	13.86	9.000	L1	OFF	9.8
4.2418	42.00	56.00	14.00	9.000	L1	OFF	9.8
4.2665	42.33	56.00	13.67	9.000	L1	OFF	9.8
4.2868	41.87	56.00	14.13	9.000	L1	OFF	9.8
6.4513	44.51	60.00	15.49	9.000	L1	OFF	9.9
13.3745	45.46	60.00	14.54	9.000	L1	OFF	10.2
13.4623	45.43	60.00	14.57	9.000	L1	OFF	10.2
13.6738	45.29	60.00	14.71	9.000	L1	OFF	10.2
13.7368	45.13	60.00	14.87	9.000	L1	OFF	10.2
13.7885	44.82	60.00	15.18	9.000	L1	OFF	10.2

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오전 7:53:07

Test

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Final Result CAV

Frequency (MHz)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.2355	35.22	52.25	17.04	9.000	L1	OFF	9.6
0.3525	29.80	48.90	19.11	9.000	L1	OFF	9.6
0.7970	26.66	46.00	19.34	9.000	L1	OFF	9.7
0.8150	27.11	46.00	18.89	9.000	L1	OFF	9.7
0.8488	29.14	46.00	16.86	9.000	L1	OFF	9.7
4.0663	34.30	46.00	11.70	9.000	L1	OFF	9.8
4.1135	34.46	46.00	11.54	9.000	L1	OFF	9.8
4.2013	34.43	46.00	11.57	9.000	L1	OFF	9.8
4.2148	34.41	46.00	11.59	9.000	L1	OFF	9.8
4.2283	34.39	46.00	11.61	9.000	L1	OFF	9.8
4.2868	34.21	46.00	11.79	9.000	L1	OFF	9.8
4.3070	34.14	46.00	11.86	9.000	L1	OFF	9.8
11.4395	37.10	50.00	12.90	9.000	L1	OFF	10.1
13.4218	38.45	50.00	11.55	9.000	L1	OFF	10.2
13.4735	38.44	50.00	11.56	9.000	L1	OFF	10.2
13.5568	38.30	50.00	11.70	9.000	L1	OFF	10.2
13.6693	38.05	50.00	11.95	9.000	L1	OFF	10.2
13.6738	37.95	50.00	12.05	9.000	L1	OFF	10.2

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오전 7:53:07

Conducted Emissions (Line 2)

Test

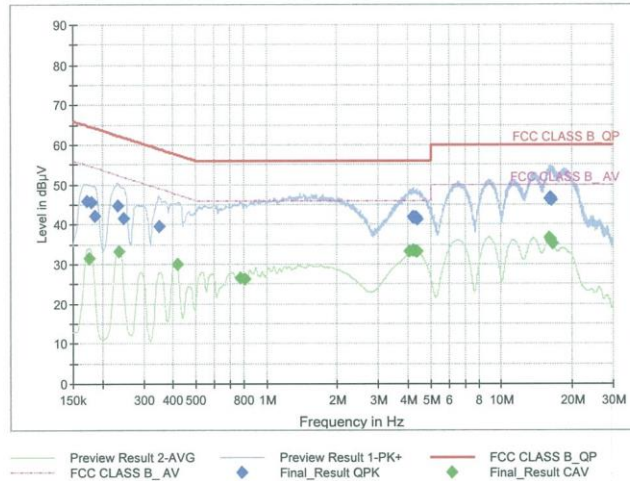
1 / 2

Test Report

Common Information

EUT : SM-X808U
 Manufacturer : SAMSUNG
 Test Site: SHIELD ROOM
 Operating Conditions : 2.4G WLAN N
 Operator Name:
 Comment:

Full Spectrum



Final Result_QPK

Frequency (MHz)	QuasiPeak (dBμV)	Limit (dBμV)	Margin (dB)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.1725	45.86	64.84	18.98	9.000	N	OFF	9.6
0.1793	45.48	64.52	19.04	9.000	N	OFF	9.6
0.1860	42.23	64.21	21.98	9.000	N	OFF	9.6
0.2333	44.82	62.33	17.51	9.000	N	OFF	9.6
0.2468	41.57	61.87	20.29	9.000	N	OFF	9.6
0.3480	39.61	59.01	19.40	9.000	N	OFF	9.6
4.1698	41.82	56.00	14.18	9.000	N	OFF	9.8
4.1900	41.85	56.00	14.15	9.000	N	OFF	9.8
4.2148	41.96	56.00	14.04	9.000	N	OFF	9.8
4.2215	41.91	56.00	14.09	9.000	N	OFF	9.8
4.3205	41.75	56.00	14.25	9.000	N	OFF	9.8
4.3948	41.32	56.00	14.68	9.000	N	OFF	9.8
15.9013	46.47	60.00	13.53	9.000	N	OFF	10.3
15.9395	46.47	60.00	13.53	9.000	N	OFF	10.3
16.1398	46.50	60.00	13.50	9.000	N	OFF	10.3
16.2253	46.66	60.00	13.34	9.000	N	OFF	10.3
16.3333	46.21	60.00	13.79	9.000	N	OFF	10.3
16.3985	46.14	60.00	13.86	9.000	N	OFF	10.3

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Test

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Final Result CAV

Frequency (MHz)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.1748	31.40	54.73	23.33	9.000	N	OFF	9.6
0.2355	33.16	52.25	19.09	9.000	N	OFF	9.6
0.4155	29.98	47.54	17.55	9.000	N	OFF	9.6
0.7745	26.66	46.00	19.34	9.000	N	OFF	9.7
0.8150	26.12	46.00	19.88	9.000	N	OFF	9.7
4.0550	33.04	46.00	12.96	9.000	N	OFF	9.8
4.1675	33.52	46.00	12.48	9.000	N	OFF	9.8
4.1900	33.49	46.00	12.51	9.000	N	OFF	9.8
4.2485	33.49	46.00	12.51	9.000	N	OFF	9.8
4.3183	33.31	46.00	12.69	9.000	N	OFF	9.8
4.3363	33.22	46.00	12.78	9.000	N	OFF	9.8
4.3948	33.06	46.00	12.94	9.000	N	OFF	9.8
15.9013	36.58	50.00	13.42	9.000	N	OFF	10.3
15.9395	36.50	50.00	13.50	9.000	N	OFF	10.3
16.1398	36.23	50.00	13.77	9.000	N	OFF	10.3
16.2208	36.15	50.00	13.85	9.000	N	OFF	10.3
16.4683	35.23	50.00	14.77	9.000	N	OFF	10.3
16.5178	35.10	50.00	14.90	9.000	N	OFF	10.3

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9.9 CONFIRMATION OF GEO-LOCATION MECHANISM

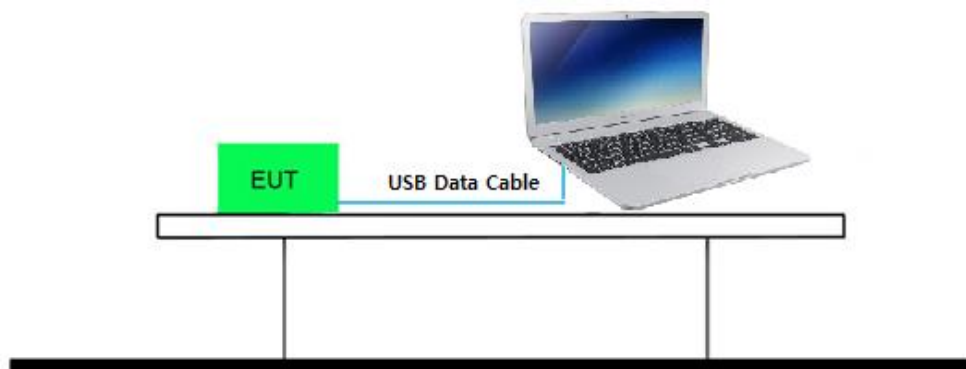
The device uses MCC information obtained from the public cellular carrier to determine that it is operating outside the U.S. and then enable channels 12 and 13 only if a non-US MCC that supports channel 12 and 13 is confirmed.

The device uses a geo-location mechanism based on the Country in order to only enable certain WLAN DTS bands when the device is not in the USA.

WLAN	Country code = US	Country code = KR(Korea)
CH 12	Did not connect	Connected
CH 13	Did not connect	Connected

The verification tests confirmed the operational of the geo-location mechanism.

Test Setup



Test Procedure

In case of Country code

1. Open Command Prompt.
2. Setting the country for product
3. At the Command Prompt, enter the command.

```
>adb root
```

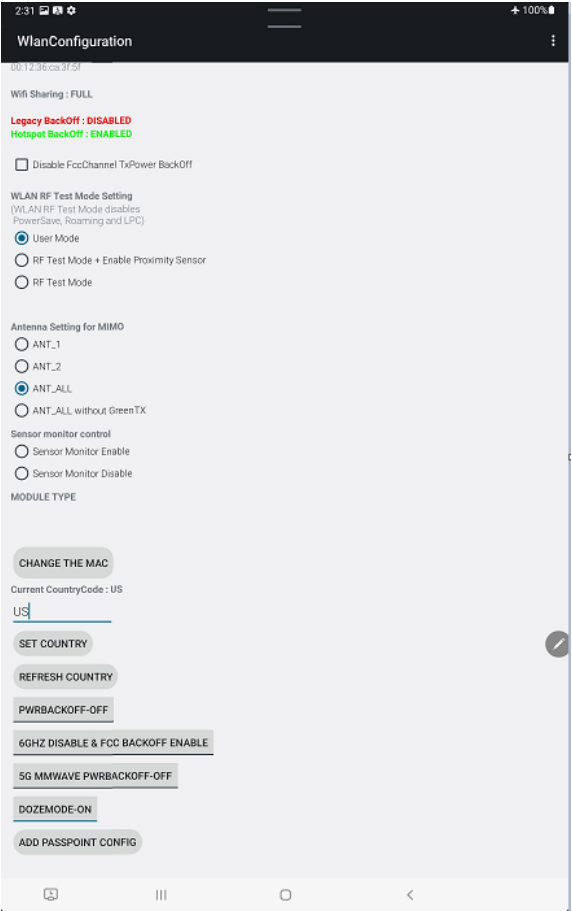
```
>adb remount
```

```
>adb shell iw re get
```

```
>adb shell iw list
```

Setting the country for product

Country code = US

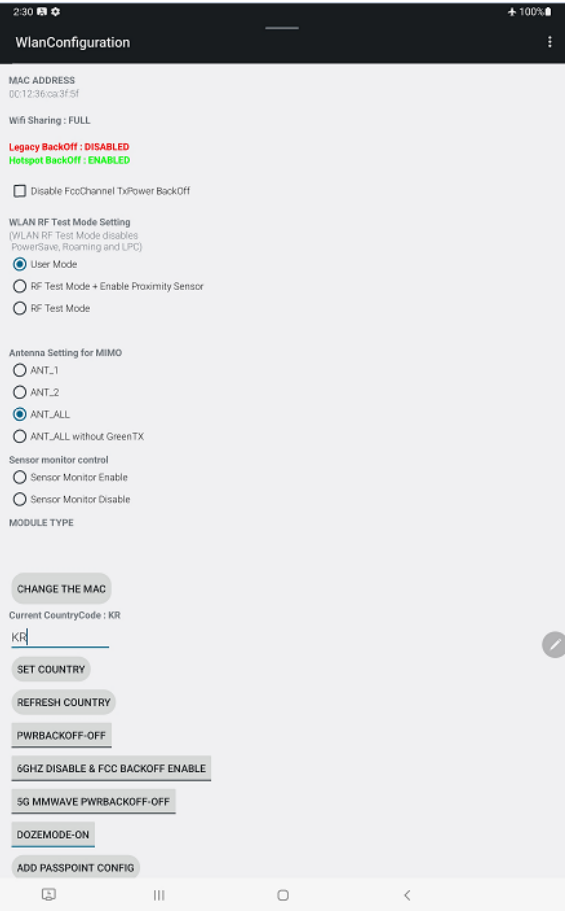


```

gts8p:/ # iw reg get
iw reg get
global
country 00: DFS-UNSET
(2402 - 2472 @ 40), (6, 20), (N/A)
(2457 - 2482 @ 20), (6, 20), (N/A), AUTO-BW, PASSIVE-SCAN
(2474 - 2494 @ 20), (6, 20), (N/A), NO-OFDM, PASSIVE-SCAN
(5170 - 5250 @ 80), (6, 20), (N/A), AUTO-BW, PASSIVE-SCAN
(5250 - 5330 @ 80), (6, 20), (0 ms), DFS, AUTO-BW, PASSIVE-SCAN
(5490 - 5730 @ 160), (6, 20), (0 ms), DFS, PASSIVE-SCAN
(5735 - 5835 @ 80), (6, 20), (N/A), PASSIVE-SCAN
(57240 - 63720 @ 2160), (N/A, 0), (N/A)

phy#0 (self-managed)
country US: DFS-FCC
(2402 - 2472 @ 40), (6, 30), (N/A), AUTO-BW
(5170 - 5250 @ 80), (6, 30), (N/A), AUTO-BW
(5250 - 5330 @ 80), (6, 24), (0 ms), DFS, AUTO-BW
(5490 - 5730 @ 160), (6, 24), (0 ms), DFS, AUTO-BW
(5735 - 5835 @ 160), (6, 30), (N/A), AUTO-BW
(5945 - 7125 @ 160), (N/A, 24), (N/A), NO-OUTDOOR, AUTO-BW
          
```

Country code = KR(Korea)



```

gts8p:/ # iw reg get
iw reg get
global
country 00: DFS-UNSET
(2402 - 2472 @ 40), (6, 20), (N/A)
(2457 - 2482 @ 20), (6, 20), (N/A), AUTO-BW, PASSIVE-SCAN
(2474 - 2494 @ 20), (6, 20), (N/A), NO-OFDM, PASSIVE-SCAN
(5170 - 5250 @ 80), (6, 20), (N/A), AUTO-BW, PASSIVE-SCAN
(5250 - 5330 @ 80), (6, 20), (0 ms), DFS, AUTO-BW, PASSIVE-SCAN
(5490 - 5730 @ 160), (6, 20), (0 ms), DFS, PASSIVE-SCAN
(5735 - 5835 @ 80), (6, 20), (N/A), PASSIVE-SCAN
(57240 - 63720 @ 2160), (N/A, 0), (N/A)

phy#0 (self-managed)
country KR: DFS-UNSET
(2402 - 2482 @ 40), (N/A, 23), (N/A), AUTO-BW
(5170 - 5250 @ 80), (6, 23), (N/A), AUTO-BW
(5250 - 5330 @ 80), (6, 23), (0 ms), DFS, AUTO-BW
(5490 - 5730 @ 160), (6, 23), (0 ms), DFS, AUTO-BW
(5735 - 5835 @ 80), (6, 23), (N/A), AUTO-BW
(5945 - 7125 @ 160), (N/A, 63), (N/A), NO-OUTDOOR, AUTO-BW

gts8p:/ #
          
```

Country code = US

Frequencies:

```
* 2412 MHz [1] (30.0 dBm)
* 2417 MHz [2] (30.0 dBm)
* 2422 MHz [3] (30.0 dBm)
* 2427 MHz [4] (30.0 dBm)
* 2432 MHz [5] (30.0 dBm)
* 2437 MHz [6] (30.0 dBm)
* 2442 MHz [7] (30.0 dBm)
* 2447 MHz [8] (30.0 dBm)
* 2452 MHz [9] (30.0 dBm)
* 2457 MHz [10] (30.0 dBm)
* 2462 MHz [11] (30.0 dBm)
* 2467 MHz [12] (disabled)
* 2472 MHz [13] (disabled)
* 2484 MHz [14] (disabled)
```

Country code = KR(Korea)

Frequencies:

```
* 2412 MHz [1] (23.0 dBm)
* 2417 MHz [2] (23.0 dBm)
* 2422 MHz [3] (23.0 dBm)
* 2427 MHz [4] (23.0 dBm)
* 2432 MHz [5] (23.0 dBm)
* 2437 MHz [6] (23.0 dBm)
* 2442 MHz [7] (23.0 dBm)
* 2447 MHz [8] (23.0 dBm)
* 2452 MHz [9] (23.0 dBm)
* 2457 MHz [10] (23.0 dBm)
* 2462 MHz [11] (23.0 dBm)
* 2467 MHz [12] (23.0 dBm)
* 2472 MHz [13] (23.0 dBm)
* 2484 MHz [14] (disabled)
```

10. LIST OF TEST EQUIPMENT

Conducted Test

Equipment	Model	Manufacturer	Serial No.	Due to Calibration	Calibration Interval
LISN	ENV216	Rohde & Schwarz	102245	08/23/2022	Annual
EMI Test Receiver	ESR	Rohde & Schwarz	101910	06/17/2022	Annual
Temperature Chamber	SU-642	ESPAC	0093008124	03/15/2022	Annual
Signal Analyzer	N9030A	Agilent	MY49431210	01/11/2022	Annual
Power Measurement Set	OSP 120	Rohde & Schwarz	101231	07/02/2022	Annual
BLUETOOTH TESTER	CBT	Rohde & Schwarz	100808	02/23/2022	Annual
Power Meter	N1911A	Agilent	MY45100523	04/08/2022	Annual
Power Sensor	N1921A	Keysight	MY57820067	04/08/2022	Annual
Directional Coupler	87300B	Agilent	3116A03621	11/02/2022	Annual
Power Splitter	11667B	Hewlett Packard	05001	05/20/2022	Annual
DC Power Supply	E3632A	Hewlett Packard	MY50360067	02/16/2022	Annual
Attenuator(10 dB)	8493C	Hewlett Packard	07560	06/18/2022	Annual
Software	EMC32	Rohde & Schwarz	N/A	N/A	N/A
FCC WLAN&BT&BLE Conducted Test Software v3.0	N/A	HCT CO., LTD.	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

Equipment	Model	Manufacturer	Serial No.	Due to Calibration	Calibration Interval
Controller(Antenna mast)	CO3000	Innco system	CO3000-4p	N/A	N/A
Antenna Position Tower	MA4640/800-XP-EP	Innco system	N/A	N/A	N/A
Controller	EM1000	Audix	060520	N/A	N/A
Turn Table	N/A	Audix	N/A	N/A	N/A
Loop Antenna	FMZB 1513	Rohde & Schwarz	1513-333	03/19/2022	Biennial
Hybrid Antenna	VULB 9168	Schwarzbeck	760	02/22/2023	Biennial
Horn Antenna	BBHA 9120D	Schwarzbeck	02299	05/19/2022	Biennial
Horn Antenna (15 GHz ~ 40 GHz)	BBHA9170	Schwarzbeck	BBHA9170541	11/29/2021	Biennial
Spectrum Analyzer	FSV40-N	Rohde & Schwarz	102168	07/05/2022	Annual
Signal Analyzer	N9030A	Agilent	MY49431210	01/11/2022	Annual
Band Reject Filter	WRCJV12-4900-5100-5900-6100-50SS	Wainwright Instruments	5	06/24/2022	Annual
Band Reject Filter	WRCJV12-4900-5100-5900-6100-50SS	Wainwright Instruments	6	06/24/2022	Annual
Band Reject Filter	WRCJV2400/2483.5-2370/2520-60/12SS	Wainwright Instruments	2	01/06/2022	Annual
Band Reject Filter	WRCJV5100/5850-40/50-8EEK	Wainwright Instruments	1	02/08/2022	Annual
High Pass Filter	WHK3.0/18G-10EF	Wainwright Instruments	8	02/03/2022	Annual
High Pass Filter	WHKX8-6090-7000-18000-40SS	Wainwright Instruments	25	02/03/2022	Annual
Attenuator (3 dB)	18B-03	Api tech.	1	02/03/2022	Annual
Attenuator(10 dB)	8493C-10	Agilent	08285	02/03/2022	Annual
Power Amplifier	CBLU1183540	CERNEX	22964	02/03/2022	Annual
Power Amplifier	CBL06185030	CERNEX	22965	02/03/2022	Annual
Power Amplifier	CBL18265035	CERNEX	22966	12/04/2021	Annual
Power Amplifier	CBL26405040	CERNEX	25956	03/23/2022	Annual

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-2111-FC036-P