

FCC DTS REPORT

Certification

Applicant Name: SAMSUNG Electronics Co., Ltd.	Date of Issue: November 08, 2021
Address: 129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Rep. of Korea	Test Site/Location: 74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, 17383 KOREA
	Report No.: HCT-RF-2110-FC068-R2

FCC ID:	A3LSMN980F1
APPLICANT:	SAMSUNG Electronics Co., Ltd.
According to the Evaluation report, all of the data contained herein is reused from the reference FCC ID : A3LSMN981B1 report.	

Model:	SM-N980F/DS
Additional Model:	SM-N980F
EUT Type:	Mobile Phone
Average Output Power:	Ant.1 - 802.11b : 18.96 dBm, 802.11g : 16.92 dBm, 802.11n(HT20) : 16.92 dBm Ant.2 - 802.11b : 19.28 dBm, 802.11g : 16.80 dBm, 802.11n(HT20) : 16.33 dBm Ant.1&2 - 802.11g : 19.87 dBm, 802.11n(HT20) : 19.64 dBm
Frequency Range:	2 412 MHz ~ 2 472 MHz (US Only: 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-2110-FC068-R2

REVIEWED BY



Report prepared by : Jin Gwan Lee
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)

* The report shall not be reproduced except in full(only partly) without approval of the laboratory.

Version

TEST REPORT NO.	DATE	DESCRIPTION
HCT-RF-2110-FC068	October 29, 2021	- First Approval Report
HCT-RF-2110-FC068-R1	November 05, 2021	- Page 47, Chanel 11 power revised - Page 52-54, PSD result table revised - Page 55-58, 91-101 Data rate & Freq revised - Page 60-71, Data rate added - FCC ID revised
HCT-RF-2110-FC068-R2	November 08, 2021	- Page 97, Typo

Table of Contents

REVIEWED BY	2
1. EUT DESCRIPTION	5
ANTENNA CONFIGURATIONS	6
2. TEST METHODOLOGY	8
EUT CONFIGURATION	8
EUT EXERCISE	8
GENERAL TEST PROCEDURES	8
DESCRIPTION OF TEST MODES	8
3. INSTRUMENT CALIBRATION.....	9
4. FACILITIES AND ACCREDITATIONS	9
FACILITIES	9
EQUIPMENT	9
5. ANTENNA REQUIREMENTS	10
6. MEASUREMENT UNCERTAINTY	10
7. DESCRIPTION OF TESTS.....	11
8. SUMMARY TEST OF RESULTS	26
9. TEST RESULT	27
9.1 DUTY CYCLE.....	27
9.2 6 dB BANDWIDTH	30
9.3 OUTPUT POWER	36
9.4 POWER SPECTRAL DENSITY	52
9.5 BAND EDGE / CONDUCTED SPURIOUS EMISSIONS.....	59
9.6 RADIATED SPURIOUS EMISSIONS	86
9.7 RADIATED RESTRICTED BAND EDGES	98
9.8 POWERLINE CONDUCTED EMISSIONS	106
10. LIST OF TEST EQUIPMENT	110
11. ANNEX A_ TEST SETUP PHOTO	112

1. EUT DESCRIPTION

Model	SM-N980F/DS		
Additional Model	SM-N980F		
EUT Type	Mobile Phone		
Power Supply	DC 3.88 V		
Frequency Range	2 412 MHz ~ 2 472 MHz(US Only: 2 412 MHz ~ 2 462 MHz)		
Max. RF Output Power	<u>Peak Power</u> (For information only)	Ant. 1	802.11b : 25.03 dBm (SISO) 802.11g : 25.46 dBm 802.11n(HT20) : 25.72 dBm
		Ant.2	802.11b : 25.42 dBm (SISO) 802.11g : 24.86 dBm 802.11n(HT20) : 25.03 dBm
		Ant.1&2 (MIMO)	802.11g : 28.08 dBm 802.11n(HT20) : 28.37 dBm
	<u>Average Power</u>	Ant. 1	802.11b : 18.96 dBm (SISO) 802.11g : 16.92 dBm 802.11n(HT20) : 16.92 dBm
		Ant.2	802.11b : 19.28 dBm (SISO) 802.11g : 16.80 dBm 802.11n(HT20) : 16.33 dBm
		Ant.1&2 (MIMO)	802.11g : 19.87 dBm 802.11n(HT20) : 19.64 dBm
Modulation Type	DSSS/CCK : 802.11b OFDM : 802.11g, 802.11n		
Number of Channels	13 Channels		
Date(s) of Tests	September 27, 2021 ~ November 04, 2021		
Serial number	Radiated: UIR1409M Conducted: UIR1403M		

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	O	O	X	X
802.11g	O	O	X	O
802.11n(HT20)	O	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

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

	5GHz WIFI		2.4GHz WIFI		Test case
	Ant1	Ant2	Ant1	Ant2	
2.4 GHz + 5 GHz RSDB Only	A			B	-
		A	B		-
	A		B		-
		A		B	-
2.4 GHz + 5 GHz RSDB & MIMO	A	A	B		-
	A	A		B	-
	A		B	B	-
		A	B	B	-
2.4 GHz + 5 GHz RSDB MIMO	A	A	B	B	O

3. Directional Gain Calculation

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

Directional gain =

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

Ant Gain (dBi)		N _{ANT} / N _{SS}	Directional Gain (dBi)
ANT1	-0.63	2 / 2	2.93
ANT2	0.43		

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.

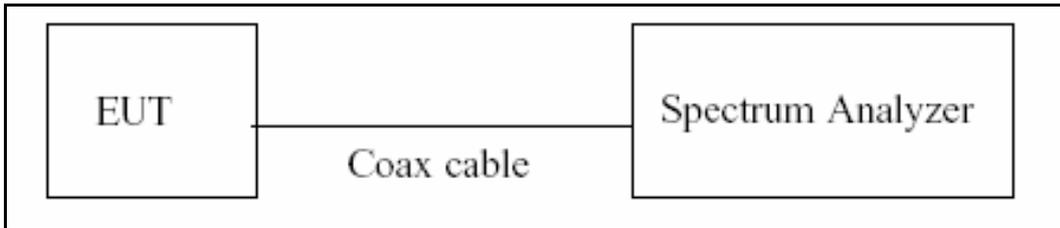
The measurement data shown herein meets or exceeds the U_{CISPR} measurement uncertainty values specified in CISPR 16-4-2 and, thus, can be compared directly to specified limits to determine compliance.

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 $> 50/T$.

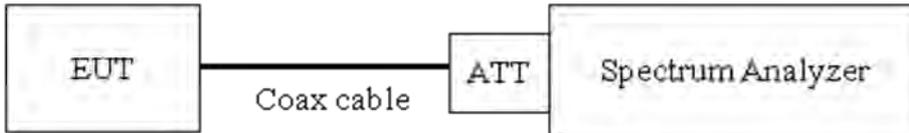
1. RBW = 8 MHz (the largest available value)
2. VBW = 8 MHz (\geq RBW)
3. SPAN = 0 Hz
4. Detector = Peak
5. Number of points in sweep > 100
6. Trace mode = Clear write
7. Measure T_{total} and T_{on}
8. Calculate Duty Cycle = T_{on} / T_{total} and Duty Cycle Factor = $10\log(1/Duty\ Cycle)$

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.

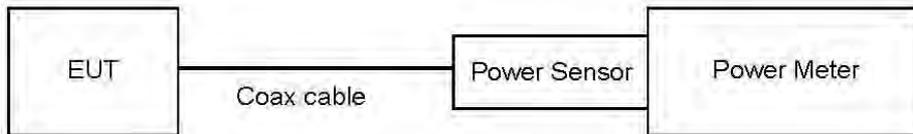
Note : We tested OBW using the automatic bandwidth measurement capability of a spectrum analyzer.

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

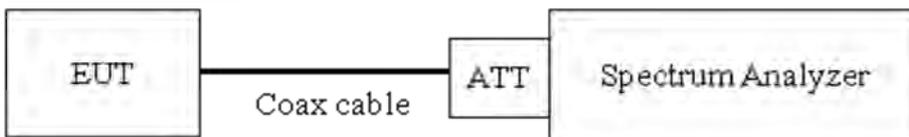
- Conducted Output Power(Peak) = Measured Level + ATT loss + Cable loss
- Conducted Output Power(Average) = Measured Level + ATT loss + Cable loss + Duty Cycle Factor

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 Level 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 Level + ATT loss + Cable loss

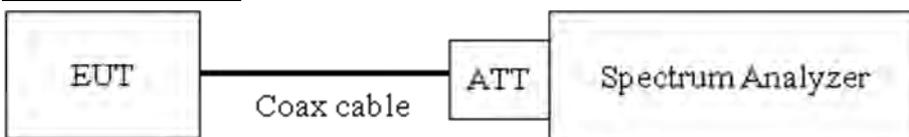
7.5. Conducted Band Edge(Out of Band Emissions) & Conducted Spurious Emissions

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 $\geq 3 \times$ 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	10.10
100	10.15
200	10.19
300	10.24
400	10.30
500	10.30
600	10.31
700	10.32
800	10.33
900	10.35
1000	10.40
2000	10.41
2400	10.44
2412	10.47
2437	10.47
2462	10.47
2500	10.49
3000	10.59
4000	10.67
5000	10.69
5700	10.73
5800	10.73
6000	11.07
7000	11.20
8000	11.20
9000	11.28
10 000	11.38
11 000	11.47
12 000	11.56
13 000	11.57
14 000	11.60
15 000	11.70
16 000	11.78
17 000	11.99
18 000	12.12
19 000	12.04
20 000	11.71
21 000	11.84

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

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

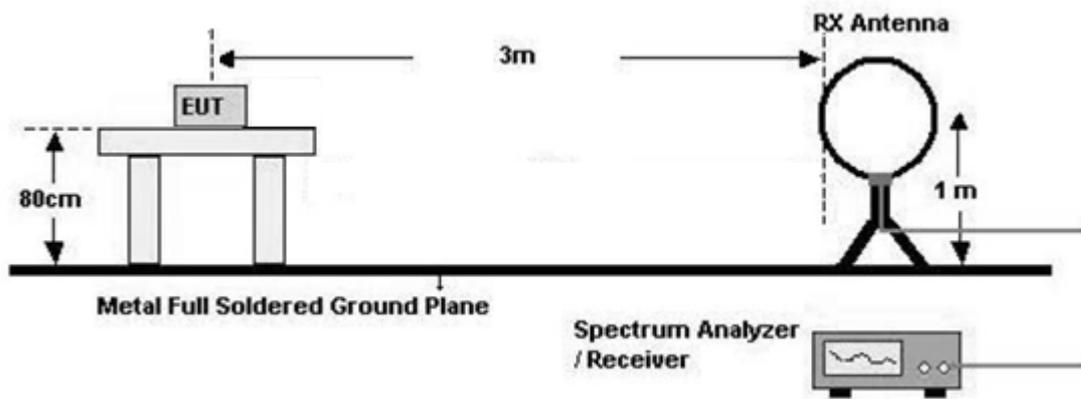
7.6. Radiated Test

Limit

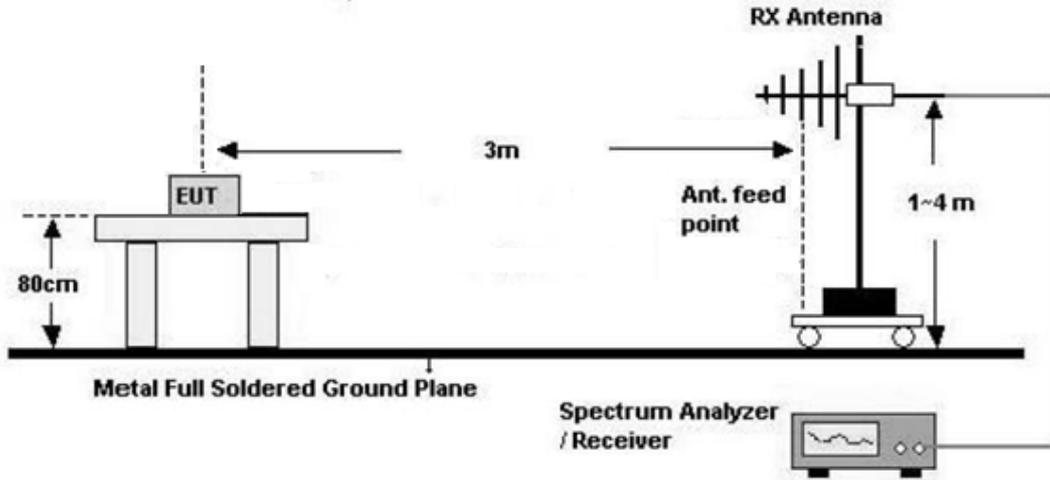
Frequency (MHz)	Field Strength ($\mu\text{V/m}$)	Measurement Distance (m)
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Test Configuration

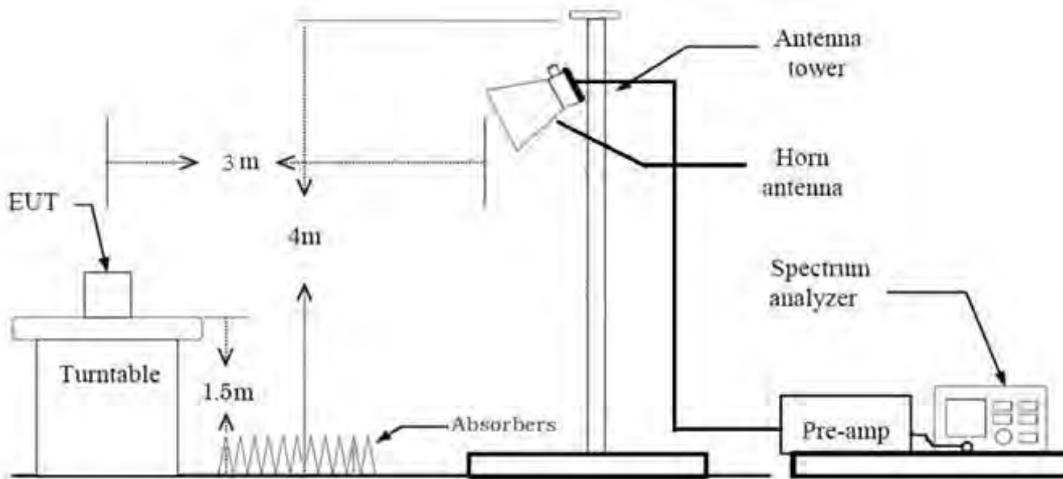
Below 30 MHz



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 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 Level + 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 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 = Measured Level + 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)

$$= \text{Measured Level} + \text{Antenna Factor(A.F)} + \text{Cable Loss(C.L)} - \text{Amp Gain(A.G)} + \text{Distance Factor(D.F)}$$

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

$$= \text{Measured Level} + \text{Antenna Factor(A.F)} + \text{Cable Loss(C.L)} - \text{Amp Gain(A.G)} + \text{Distance Factor(D.F)}$$

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

$$= \text{Measured Level} + \text{Antenna Factor(A.F)} + \text{Cable Loss(C.L)} - \text{Amp Gain(A.G)} + \text{Distance Factor(D.F)} \\ + \text{Duty Cycle Factor}$$

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 Level + Antenna Factor(A.F) + Cable Loss(C.L) + Distance Factor(D.F)

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

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

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

= Measured Level + 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 Level + 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 : X, Z, Y
 - 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
6. SM-N980F/DS, SM-N980F were tested and the worst case results are reported.
(Worst case : SM-N980F/DS)

Radiated test(DBS)

1. Please refer to the SM-N980F/DS [DTS]802.11ax Test Report.

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
2. SM-N980F/DS, SM-N980F were tested and the worst case results are reported.
(Worst case : SM-N980F/DS)

Conducted test

1. The EUT was configured with data rate of highest power.
2. SM-N980F/DS, SM-N980F were tested and the worst case results are reported.
(Worst case : SM-N980F/DS)

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

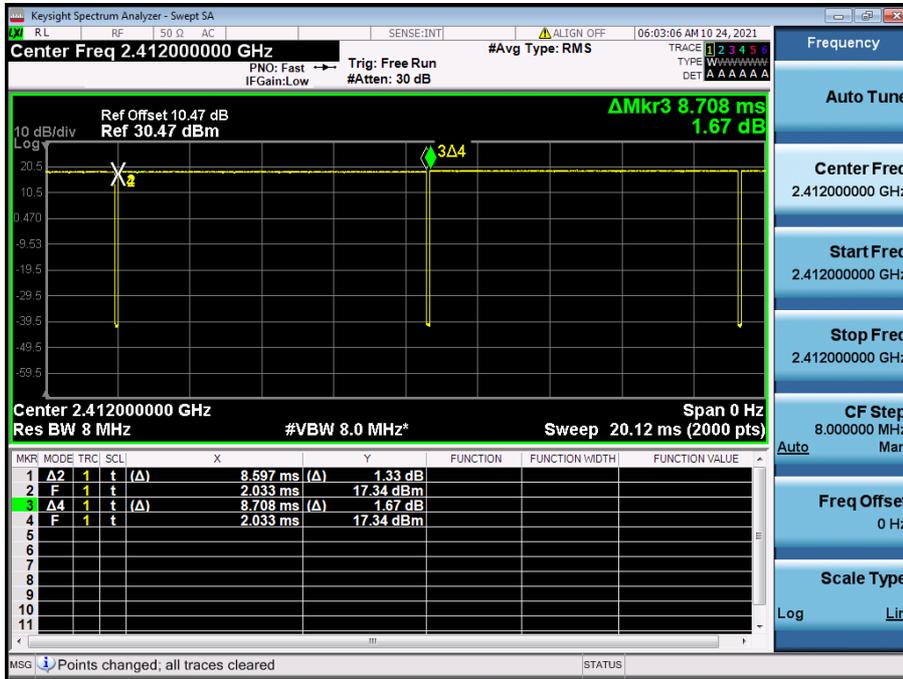
9. TEST RESULT

9.1 DUTY CYCLE

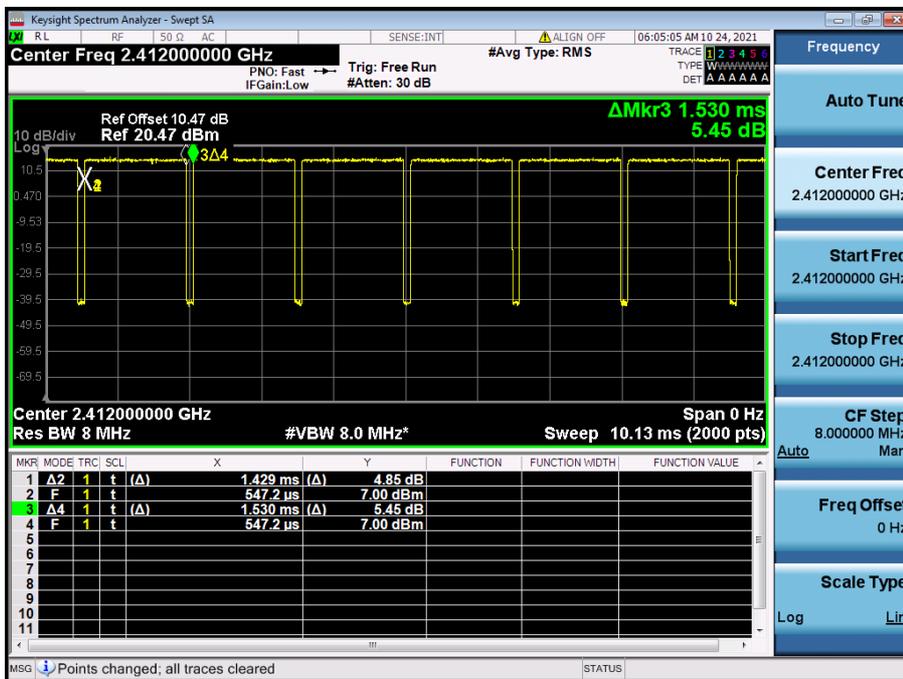
Mode	Data Rate (Mbps)	T _{on} (ms)	T _{total} (ms)	Duty Cycle	Duty Cycle Factor (dB)
802.11b	1	8.597	8.708	0.987	0.056
	2	4.307	4.404	0.978	0.097
	5.5	1.626	1.723	0.944	0.250
	11	0.856	0.958	0.894	0.486
802.11g	6	1.429	1.530	0.934	0.298
	9	0.958	1.059	0.904	0.437
	12	0.725	0.826	0.877	0.569
	18	0.491	0.593	0.829	0.814
	24	0.370	0.471	0.785	1.052
	36	0.258	0.360	0.718	1.437
	48	0.193	0.299	0.644	1.911
	54	0.177	0.279	0.636	1.963
802.11n (HT20)	6.5 (MCS0)	1.333	1.434	0.929	0.318
	13 (MCS1)	0.689	0.790	0.872	0.596
	19.5 (MCS2)	0.471	0.573	0.823	0.846
	26 (MCS3)	0.365	0.466	0.783	1.065
	39 (MCS4)	0.253	0.355	0.714	1.461
	52 (MCS5)	0.198	0.299	0.661	1.798
	58.5 (MCS6)	0.182	0.284	0.643	1.919
	65 (MCS7)	0.167	0.269	0.623	2.058

Test Plots

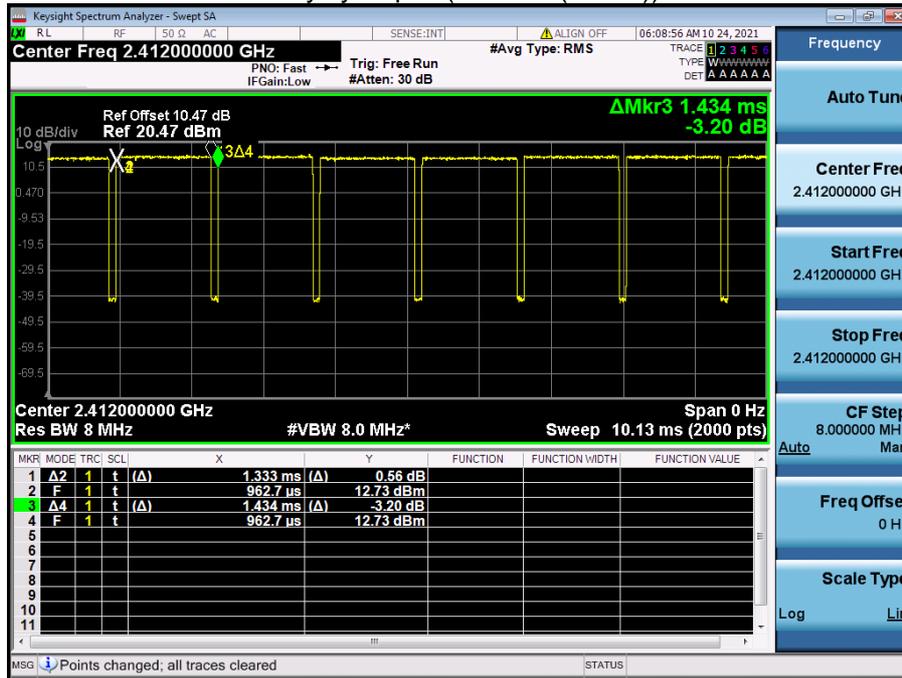
Duty cycle plot (802.11b(1 Mbps))



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	7.565	0.5
2437	6	8.067	0.5
2462	11	7.608	0.5
2467	12	7.579	0.5
2472	13	7.120	0.5

802.11g Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]
Frequency [MHz]	Channel No.		
2412	1	16.35	0.5
2437	6	16.38	0.5
2462	11	16.38	0.5
2467	12	16.40	0.5
2472	13	16.36	0.5

802.11n Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]
Frequency [MHz]	Channel No.		
2412	1	17.57	0.5
2437	6	17.59	0.5
2462	11	17.64	0.5
2467	12	17.63	0.5
2472	13	17.58	0.5

[Ant.2]

802.11b Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]
Frequency [MHz]	Channel No.		
2412	1	7.634	0.5
2437	6	7.558	0.5
2462	11	8.065	0.5
2467	12	7.568	0.5
2472	13	7.131	0.5

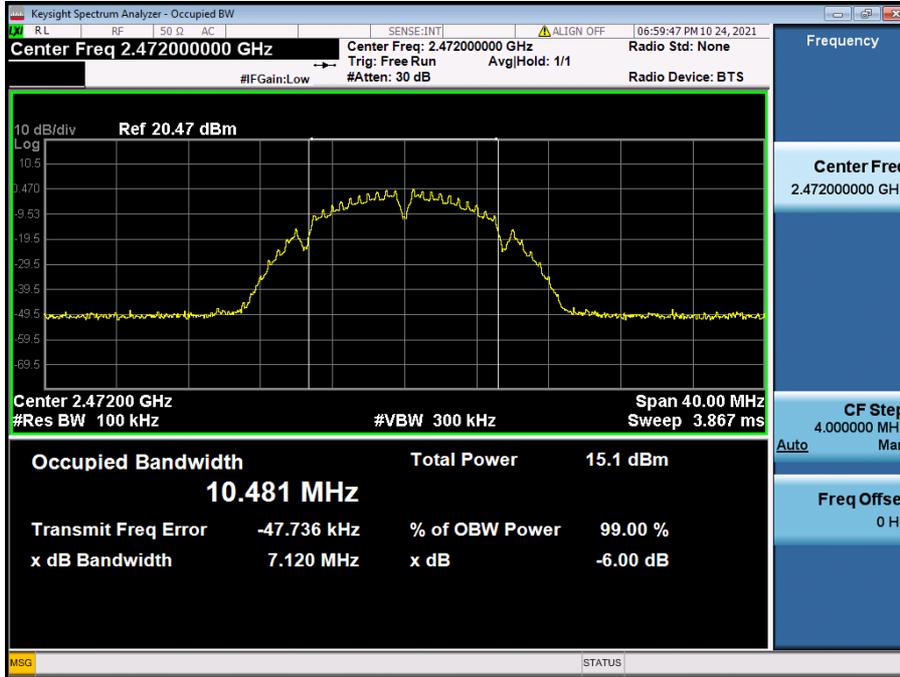
802.11g Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]
Frequency [MHz]	Channel No.		
2412	1	16.40	0.5
2437	6	16.38	0.5
2462	11	16.43	0.5
2467	12	16.39	0.5
2472	13	16.38	0.5

802.11n Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]
Frequency [MHz]	Channel No.		
2412	1	17.64	0.5
2437	6	17.58	0.5
2462	11	17.63	0.5
2467	12	17.64	0.5
2472	13	17.61	0.5

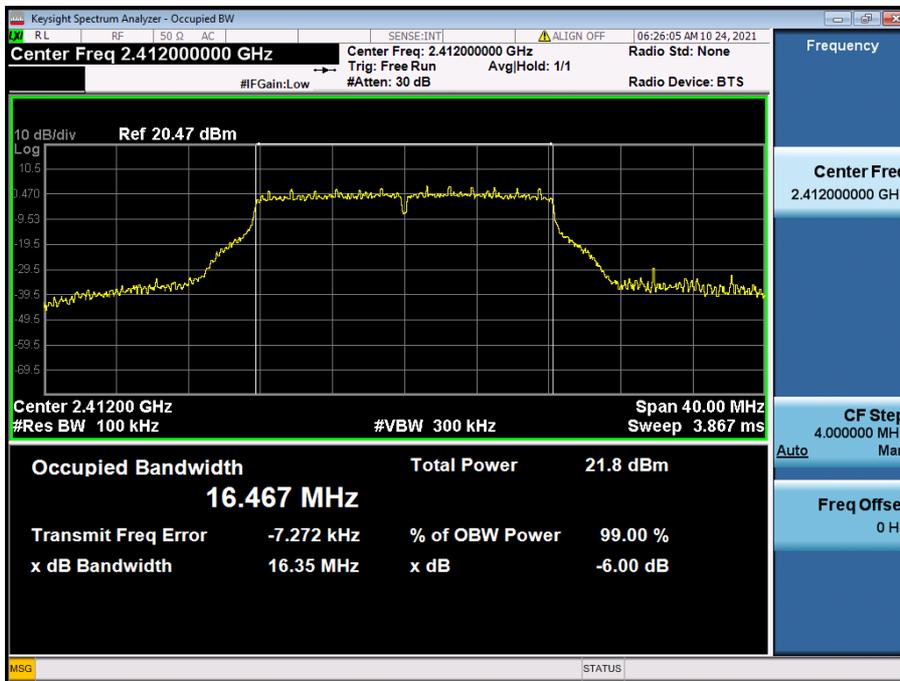
[Ant.1]

▣ Test Plots

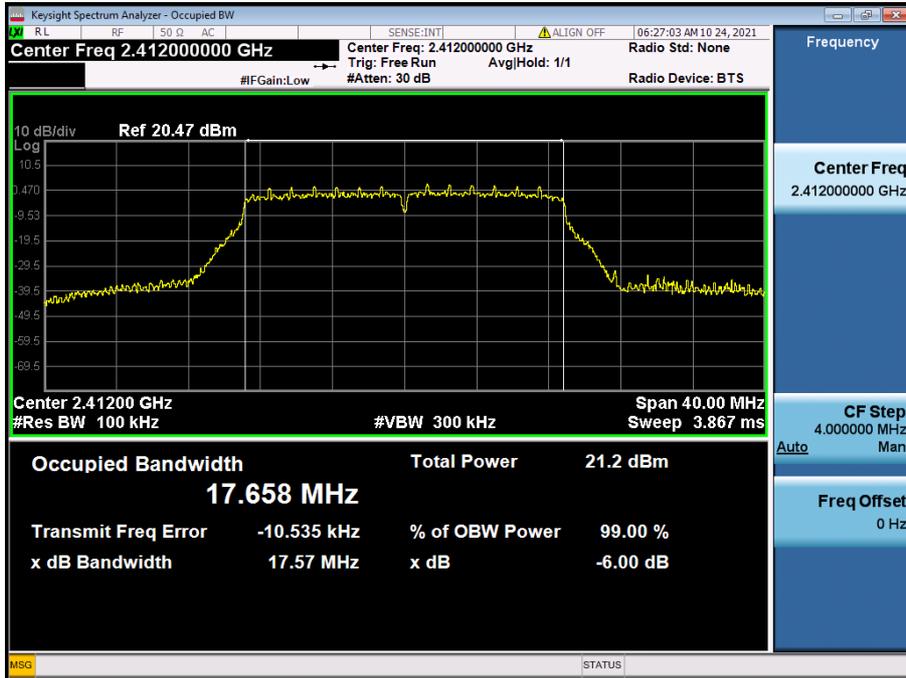
6 dB Bandwidth plot (802.11b-CH 13)



6 dB Bandwidth plot (802.11g-CH 1)



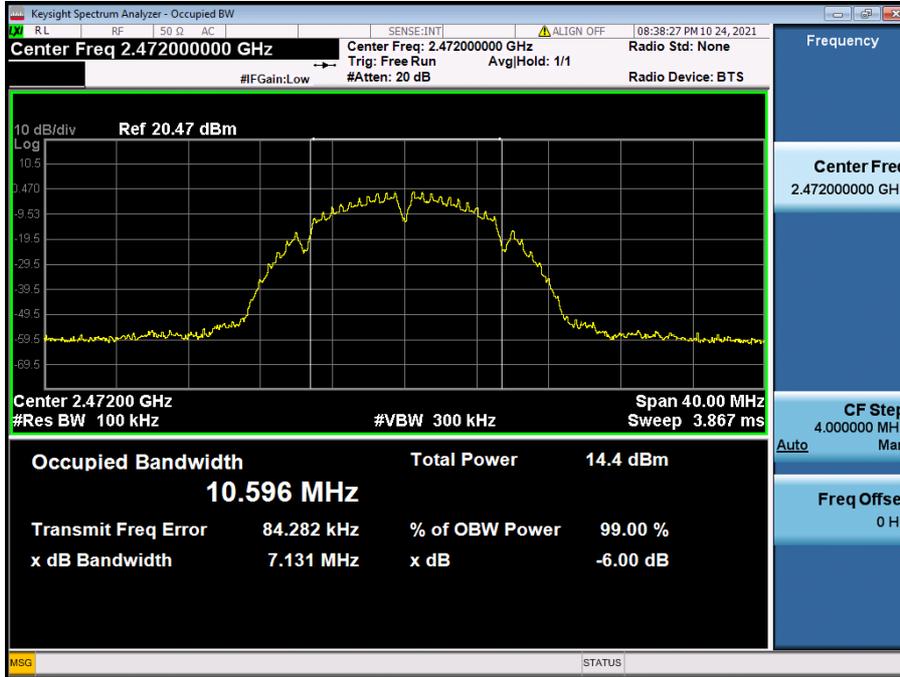
6 dB Bandwidth plot (802.11n_HT20-CH 1)



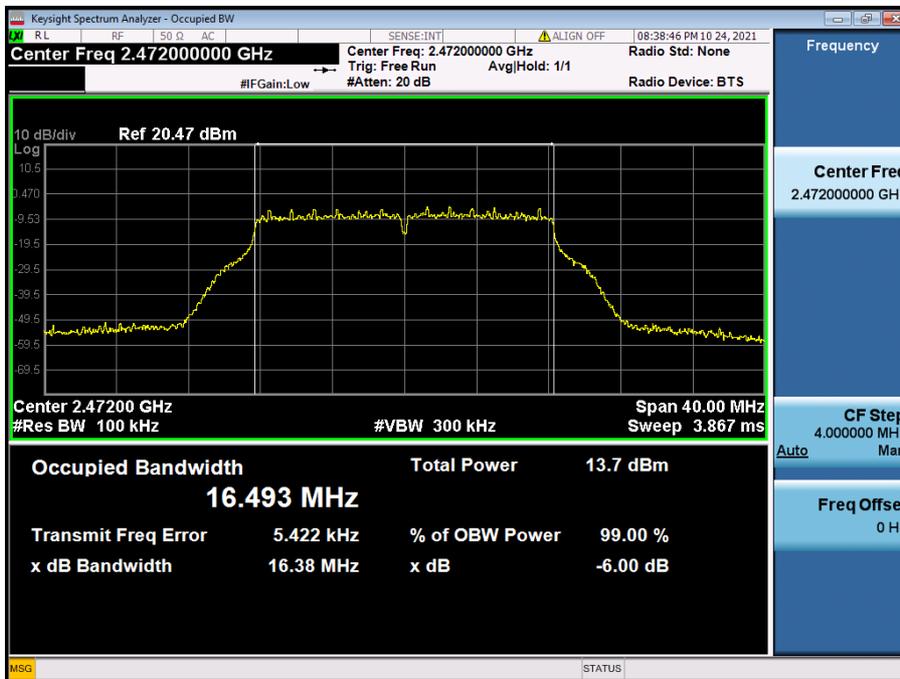
[Ant.2]

▣ Test Plots

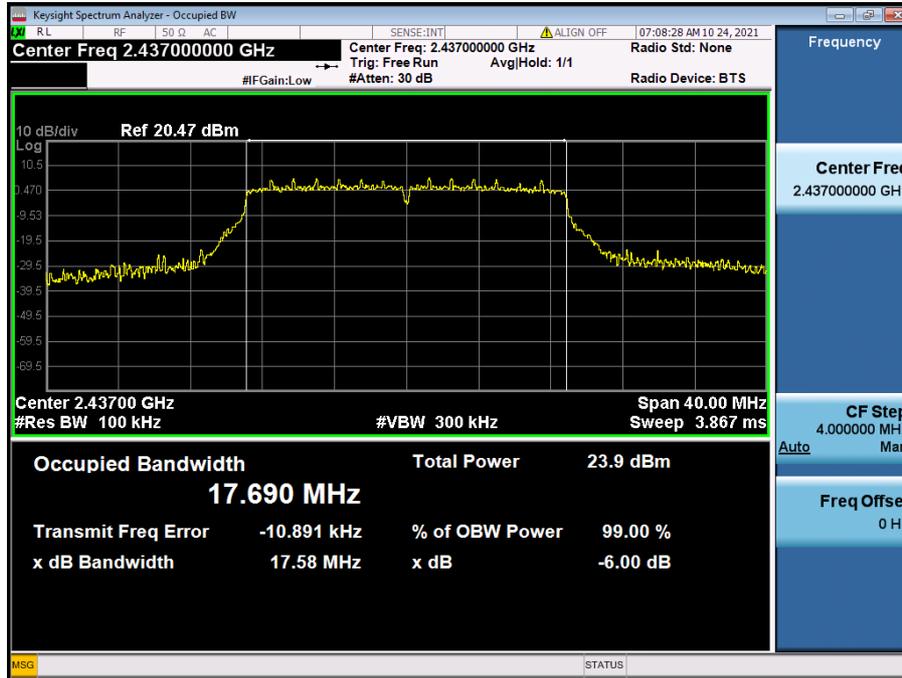
6 dB Bandwidth plot (802.11b-CH 13)



6 dB Bandwidth plot (802.11g-CH 13)



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

Peak Power

1. Power Meter offset = Attenuator loss + Cable loss
2. We apply to the offset in the 2.4 GHz range that was rounded off to the closest tenth dB.
So, 10.47 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.					
2 412	1	1	21.00	30	19	
		2	21.63	30		
		5.5	23.36	30		
		11	24.99	30		
2 437	6	1	20.87	30		
		2	21.17	30		
		5.5	23.27	30		
		11	24.85	30		
2 462	11	1	21.01	30		
		2	21.56	30		
		5.5	23.36	30		
		11	25.03	30		
2 467	12	1	13.16	30		11
		2	13.29	30		
		5.5	15.00	30		
		11	16.84	30		
2 472	13	1	10.01	30		7
		2	10.11	30		
		5.5	11.84	30		
		11	13.60	30		

802.11g Mode		Rate (Mbps)	Measured Power(dBm)	Limit (dBm)	Power Level Setting
Frequency[MHz]	Channel No.				
2412	1	6	23.64	30	15
		9	23.23	30	
		12	23.51	30	
		18	22.83	30	
		24	23.29	30	
		36	23.32	30	
		48	23.43	30	
		54	23.44	30	
2437	6	6	25.33	30	17
		9	25.14	30	
		12	25.46	30	
		18	24.64	30	
		24	25.22	30	
		36	25.11	30	
		48	25.27	30	
		54	25.21	30	
2462	11	6	23.42	30	15
		9	23.25	30	
		12	23.51	30	
		18	23.01	30	
		24	23.27	30	
		36	23.25	30	
		48	23.40	30	
		54	23.29	30	
2467	12	6	18.64	30	11
		9	18.46	30	
		12	18.81	30	
		18	18.16	30	
		24	18.64	30	
		36	18.78	30	
		48	18.71	30	
		54	18.61	30	
2472	13	6	15.03	30	7
		9	15.08	30	
		12	15.44	30	
		18	14.56	30	
		24	15.01	30	
		36	15.17	30	
		48	15.30	30	
		54	14.69	30	

802.11n(HT20) Mode		MCS Index	Measured Power(dBm)	Limit (dBm)	Power Level Setting
Frequency[MHz]	Channel No.				
2412	1	0	22.41	30	14
		1	22.55	30	
		2	22.46	30	
		3	22.92	30	
		4	22.78	30	
		5	22.79	30	
		6	22.79	30	
		7	22.67	30	
2437	6	0	25.21	30	17
		1	25.32	30	
		2	25.31	30	
		3	25.67	30	
		4	25.65	30	
		5	25.71	30	
		6	25.72	30	
		7	25.65	30	
2462	11	0	22.36	30	14
		1	22.49	30	
		2	22.40	30	
		3	22.84	30	
		4	22.69	30	
		5	22.74	30	
		6	22.77	30	
		7	22.61	30	
2467	12	0	18.72	30	11
		1	18.45	30	
		2	18.35	30	
		3	19.39	30	
		4	18.82	30	
		5	18.93	30	
		6	18.96	30	
		7	18.82	30	
2472	13	0	14.59	30	7
		1	15.08	30	
		2	14.75	30	
		3	15.45	30	
		4	15.15	30	
		5	15.24	30	
		6	15.47	30	
		7	15.20	30	

[Ant.2]

802.11b Mode		Rate (Mbps)	Measured Power(dBm)	Limit (dBm)	Power Level Setting	
Frequency[MHz]	Channel No.					
2412	1	1	21.49	30	19	
		2	21.90	30		
		5.5	23.82	30		
		11	25.37	30		
2437	6	1	21.17	30		
		2	21.65	30		
		5.5	23.61	30		
		11	25.08	30		
2462	11	1	21.41	30		
		2	21.86	30		
		5.5	23.84	30		
		11	25.42	30		
2467	12	1	13.90	30		11
		2	14.13	30		
		5.5	15.64	30		
		11	17.44	30		
2472	13	1	9.29	30		7
		2	10.05	30		
		5.5	11.58	30		
		11	13.37	30		

802.11g Mode		Rate (Mbps)	Measured Power(dBm)	Limit (dBm)	Power Level Setting
Frequency[MHz]	Channel No.				
2412	1	6	23.14	30	15
		9	23.05	30	
		12	23.32	30	
		18	22.64	30	
		24	22.99	30	
		36	23.06	30	
		48	23.26	30	
		54	23.16	30	
2437	6	6	24.68	30	17
		9	24.60	30	
		12	24.61	30	
		18	24.17	30	
		24	24.71	30	
		36	24.75	30	
		48	24.86	30	
		54	24.77	30	
2462	11	6	23.31	30	15
		9	23.18	30	
		12	23.36	30	
		18	22.91	30	
		24	23.36	30	
		36	23.26	30	
		48	23.23	30	
		54	23.07	30	
2467	12	6	18.59	30	11
		9	18.39	30	
		12	18.72	30	
		18	18.13	30	
		24	18.29	30	
		36	18.26	30	
		48	18.41	30	
		54	18.34	30	
2472	13	6	14.83	30	7
		9	14.62	30	
		12	14.72	30	
		18	13.80	30	
		24	14.83	30	
		36	14.75	30	
		48	14.51	30	
		54	14.49	30	

802.11n(HT20) Mode		MCS Index	Measured Power(dBm)	Limit (dBm)	Power Level Setting
Frequency[MHz]	Channel No.				
2412	1	0	22.34	30	14
		1	22.30	30	
		2	22.30	30	
		3	22.71	30	
		4	22.52	30	
		5	22.78	30	
		6	22.63	30	
		7	22.48	30	
2437	6	0	24.62	30	17
		1	24.51	30	
		2	24.52	30	
		3	25.03	30	
		4	24.62	30	
		5	24.83	30	
		6	24.70	30	
		7	24.98	30	
2462	11	0	22.10	30	14
		1	22.25	30	
		2	22.16	30	
		3	22.69	30	
		4	22.50	30	
		5	22.48	30	
		6	22.52	30	
		7	22.45	30	
2467	12	0	18.40	30	11
		1	18.66	30	
		2	18.63	30	
		3	18.88	30	
		4	19.06	30	
		5	19.15	30	
		6	18.99	30	
		7	18.63	30	
2472	13	0	14.45	30	7
		1	14.49	30	
		2	14.42	30	
		3	15.15	30	
		4	15.50	30	
		5	14.95	30	
		6	14.97	30	
		7	14.93	30	

[MIMO]

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	23.64	23.14	26.41	30	15
		9	23.23	23.05	26.15	30	
		12	23.51	23.32	26.43	30	
		18	22.83	22.64	25.75	30	
		24	23.29	22.99	26.15	30	
		36	23.32	23.06	26.20	30	
		48	23.43	23.26	26.35	30	
		54	23.44	23.16	26.31	30	
2437	6	6	25.33	24.68	28.03	30	17
		9	25.14	24.60	27.88	30	
		12	25.46	24.61	28.07	30	
		18	24.64	24.17	27.42	30	
		24	25.22	24.71	27.98	30	
		36	25.11	24.75	27.94	30	
		48	25.27	24.86	28.08	30	
		54	25.21	24.77	28.01	30	
2462	11	6	23.42	23.31	26.38	30	15
		9	23.25	23.18	26.23	30	
		12	23.51	23.36	26.45	30	
		18	23.01	22.91	25.97	30	
		24	23.27	23.36	26.33	30	
		36	23.25	23.26	26.27	30	
		48	23.40	23.23	26.33	30	
		54	23.29	23.07	26.20	30	
2467	12	6	18.64	18.59	21.63	30	11
		9	18.46	18.39	21.43	30	
		12	18.81	18.72	21.77	30	
		18	18.16	18.13	21.15	30	
		24	18.64	18.29	21.48	30	
		36	18.78	18.26	21.53	30	
		48	18.71	18.41	21.57	30	
		54	18.61	18.34	21.49	30	
2472	13	6	15.03	14.83	17.94	30	7
		9	15.08	14.62	17.87	30	
		12	15.44	14.72	18.10	30	
		18	14.56	13.80	17.20	30	
		24	15.01	14.83	17.93	30	
		36	15.17	14.75	17.97	30	
		48	15.30	14.51	17.93	30	
		54	14.69	14.49	17.60	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	22.41	22.34	25.38	30	14
		1	22.55	22.30	25.44	30	
		2	22.46	22.30	25.39	30	
		3	22.92	22.71	25.82	30	
		4	22.78	22.52	25.66	30	
		5	22.79	22.78	25.80	30	
		6	22.79	22.63	25.72	30	
		7	22.67	22.48	25.58	30	
2437	6	0	25.21	24.62	27.93	30	17
		1	25.32	24.51	27.95	30	
		2	25.31	24.52	27.94	30	
		3	25.67	25.03	28.37	30	
		4	25.65	24.62	28.18	30	
		5	25.71	24.83	28.30	30	
		6	25.72	24.70	28.25	30	
		7	25.65	24.98	28.34	30	
2462	11	0	22.36	22.10	25.25	30	14
		1	22.49	22.25	25.38	30	
		2	22.40	22.16	25.29	30	
		3	22.84	22.69	25.78	30	
		4	22.69	22.50	25.61	30	
		5	22.74	22.48	25.62	30	
		6	22.77	22.52	25.65	30	
		7	22.61	22.45	25.54	30	
2467	12	0	18.72	18.40	21.57	30	11
		1	18.45	18.66	21.57	30	
		2	18.35	18.63	21.50	30	
		3	19.39	18.88	22.15	30	
		4	18.82	19.06	21.95	30	
		5	18.93	19.15	22.05	30	
		6	18.96	18.99	21.98	30	
		7	18.82	18.63	21.74	30	
2472	13	0	14.59	14.45	17.53	30	7
		1	15.08	14.49	17.81	30	
		2	14.75	14.42	17.60	30	
		3	15.45	15.15	18.31	30	
		4	15.15	15.50	18.34	30	
		5	15.24	14.95	18.11	30	
		6	15.47	14.97	18.24	30	
		7	15.20	14.93	18.07	30	

Average Power

1. Power Meter offset = Attenuator loss + Cable loss
2. We apply to the offset in the 2.4 GHz range that was rounded off to the closest tenth dB.
So, 10.47 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	18.90	0.056	18.96	30	19	
		2	18.60	0.097	18.70	30		
		5.5	18.50	0.250	18.75	30		
		11	18.23	0.486	18.72	30		
2437	6	1	18.58	0.056	18.64	30		
		2	18.33	0.097	18.43	30		
		5.5	18.38	0.250	18.63	30		
		11	18.11	0.486	18.60	30		
2462	11	1	18.76	0.056	18.82	30		
		2	18.47	0.097	18.57	30		
		5.5	18.48	0.250	18.73	30		
		11	18.32	0.486	18.81	30		
2467	12	1	10.65	0.056	10.71	30		11
		2	10.40	0.097	10.50	30		
		5.5	10.38	0.250	10.63	30		
		11	10.18	0.486	10.67	30		
2472	13	1	7.44	0.056	7.50	30		7
		2	7.21	0.097	7.31	30		
		5.5	7.16	0.250	7.41	30		
		11	6.99	0.486	7.48	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	15.17	0.298	15.46	30	15
		9	14.90	0.437	15.34	30	
		12	14.73	0.569	15.29	30	
		18	14.42	0.814	15.23	30	
		24	14.29	1.052	15.34	30	
		36	13.87	1.437	15.31	30	
		48	13.45	1.911	15.36	30	
2437	6	54	13.43	1.963	15.39	30	17
		6	16.62	0.298	16.92	30	
		9	16.39	0.437	16.82	30	
		12	16.28	0.569	16.85	30	
		18	15.92	0.814	16.73	30	
		24	15.80	1.052	16.85	30	
		36	15.26	1.437	16.69	30	
2462	11	48	14.91	1.911	16.82	30	15
		54	14.85	1.963	16.81	30	
		6	15.17	0.298	15.47	30	
		9	14.95	0.437	15.39	30	
		12	14.78	0.569	15.35	30	
		18	14.51	0.814	15.32	30	
		24	14.15	1.052	15.20	30	
2467	12	36	13.78	1.437	15.22	30	11
		48	13.45	1.911	15.36	30	
		54	13.33	1.963	15.30	30	
		6	10.38	0.298	10.68	30	
		9	10.18	0.437	10.61	30	
		12	10.07	0.569	10.64	30	
		18	9.80	0.814	10.62	30	
2472	13	24	9.56	1.052	10.61	30	7
		36	9.20	1.437	10.64	30	
		48	8.75	1.911	10.66	30	
		54	8.61	1.963	10.58	30	
		6	6.85	0.298	7.15	30	
		9	6.62	0.437	7.06	30	
		12	6.50	0.569	7.07	30	
2472	13	18	6.15	0.814	6.96	30	7
		24	5.99	1.052	7.05	30	
		36	5.64	1.437	7.08	30	
		48	5.10	1.911	7.01	30	
		54	4.68	1.963	6.64	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	14.08	0.318	14.40	30	14
		1	13.72	0.596	14.32	30	
		2	13.48	0.846	14.33	30	
		3	13.18	1.065	14.24	30	
		4	12.83	1.461	14.29	30	
		5	12.47	1.798	14.27	30	
		6	12.31	1.919	14.23	30	
		7	12.16	2.058	14.22	30	
2437	6	0	16.60	0.318	16.92	30	17
		1	16.26	0.596	16.86	30	
		2	16.03	0.846	16.88	30	
		3	15.78	1.065	16.84	30	
		4	15.34	1.461	16.81	30	
		5	15.03	1.798	16.82	30	
		6	14.89	1.919	16.81	30	
		7	14.78	2.058	16.84	30	
2462	11	0	14.07	0.318	14.39	30	14
		1	13.64	0.596	14.23	30	
		2	13.36	0.846	14.20	30	
		3	13.16	1.065	14.23	30	
		4	12.71	1.461	14.17	30	
		5	12.41	1.798	14.21	30	
		6	12.27	1.919	14.18	30	
		7	12.10	2.058	14.16	30	
2467	12	0	10.41	0.318	10.73	30	11
		1	9.53	0.596	10.13	30	
		2	9.33	0.846	10.18	30	
		3	9.63	1.065	10.70	30	
		4	8.81	1.461	10.27	30	
		5	8.54	1.798	10.34	30	
		6	8.43	1.919	10.34	30	
		7	8.28	2.058	10.34	30	
2472	13	0	6.36	0.318	6.68	30	7
		1	6.04	0.596	6.64	30	
		2	5.68	0.846	6.52	30	
		3	5.51	1.065	6.57	30	
		4	5.12	1.461	6.58	30	
		5	4.82	1.798	6.62	30	
		6	4.61	1.919	6.53	30	
		7	4.60	2.058	6.66	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	19.22	0.056	19.28	30	19
		2	19.00	0.097	19.10	30	
		5.5	18.89	0.250	19.14	30	
		11	18.74	0.486	19.23	30	
2437	6	1	18.81	0.056	18.87	30	
		2	18.49	0.097	18.59	30	
		5.5	18.54	0.250	18.79	30	
		11	18.29	0.486	18.78	30	
2462	11	1	19.15	0.056	19.21	30	
		2	18.90	0.097	18.99	30	
		5.5	18.93	0.250	19.18	30	
		11	18.65	0.486	19.14	30	
2467	12	1	10.65	0.056	10.71	30	11
		2	10.40	0.097	10.50	30	
		5.5	10.38	0.250	10.63	30	
		11	10.18	0.486	10.67	30	
2472	13	1	7.12	0.056	7.18	30	7
		2	7.04	0.097	7.14	30	
		5.5	6.82	0.250	7.07	30	
		11	6.35	0.486	6.84	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	14.92	0.298	15.22	30	15
		9	14.77	0.437	15.20	30	
		12	14.61	0.569	15.18	30	
		18	14.27	0.814	15.09	30	
		24	14.05	1.052	15.10	30	
		36	13.58	1.437	15.02	30	
		48	13.23	1.911	15.14	30	
		54	13.07	1.963	15.03	30	
2437	6	6	16.50	0.298	16.80	30	17
		9	16.28	0.437	16.72	30	
		12	15.86	0.569	16.43	30	
		18	15.73	0.814	16.55	30	
		24	15.65	1.052	16.71	30	
		36	15.26	1.437	16.69	30	
		48	14.60	1.911	16.51	30	
		54	14.49	1.963	16.45	30	
2462	11	6	14.92	0.298	15.22	30	15
		9	14.60	0.437	15.03	30	
		12	14.47	0.569	15.04	30	
		18	14.27	0.814	15.09	30	
		24	14.04	1.052	15.09	30	
		36	13.59	1.437	15.03	30	
		48	13.26	1.911	15.18	30	
		54	13.03	1.963	14.99	30	
2467	12	6	10.28	0.298	10.58	30	11
		9	10.12	0.437	10.56	30	
		12	10.01	0.569	10.58	30	
		18	9.75	0.814	10.57	30	
		24	9.30	1.052	10.35	30	
		36	8.76	1.437	10.20	30	
		48	8.47	1.911	10.38	30	
		54	8.34	1.963	10.30	30	
2472	13	6	6.57	0.298	6.87	30	7
		9	6.35	0.437	6.79	30	
		12	5.99	0.569	6.56	30	
		18	5.41	0.814	6.23	30	
		24	5.74	1.052	6.79	30	
		36	5.25	1.437	6.69	30	
		48	4.55	1.911	6.46	30	
		54	4.48	1.963	6.44	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	13.91	0.318	14.23	30	14
		1	13.42	0.596	14.01	30	
		2	13.22	0.846	14.07	30	
		3	12.98	1.065	14.04	30	
		4	12.55	1.461	14.02	30	
		5	12.37	1.798	14.16	30	
		6	12.11	1.919	14.03	30	
		7	11.96	2.058	14.02	30	
2437	6	0	16.01	0.318	16.33	30	17
		1	15.63	0.596	16.23	30	
		2	15.47	0.846	16.31	30	
		3	15.18	1.065	16.24	30	
		4	14.64	1.461	16.10	30	
		5	14.42	1.798	16.21	30	
		6	14.21	1.919	16.12	30	
		7	14.25	2.058	16.31	30	
2462	11	0	13.70	0.318	14.02	30	14
		1	13.29	0.596	13.88	30	
		2	13.10	0.846	13.95	30	
		3	12.89	1.065	13.96	30	
		4	12.52	1.461	13.98	30	
		5	12.14	1.798	13.94	30	
		6	12.02	1.919	13.94	30	
		7	11.89	2.058	13.95	30	
2467	12	0	10.12	0.318	10.44	30	11
		1	9.77	0.596	10.37	30	
		2	9.56	0.846	10.40	30	
		3	9.15	1.065	10.21	30	
		4	8.92	1.461	10.38	30	
		5	8.61	1.798	10.41	30	
		6	8.46	1.919	10.38	30	
		7	8.04	2.058	10.10	30	
2472	13	0	6.24	0.318	6.56	30	7
		1	5.56	0.596	6.15	30	
		2	5.37	0.846	6.21	30	
		3	5.40	1.065	6.47	30	
		4	5.07	1.461	6.53	30	
		5	4.53	1.798	6.33	30	
		6	4.42	1.919	6.34	30	
		7	4.32	2.058	6.38	30	

[MIMO]

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	15.46	15.22	18.35	30	15
		9	15.34	15.20	18.28	30	
		12	15.29	15.18	18.25	30	
		18	15.23	15.09	18.17	30	
		24	15.34	15.10	18.23	30	
		36	15.31	15.02	18.18	30	
		48	15.36	15.14	18.26	30	
		54	15.39	15.03	18.23	30	
2437	6	6	16.92	16.80	19.87	30	17
		9	16.82	16.72	19.78	30	
		12	16.85	16.43	19.65	30	
		18	16.73	16.55	19.65	30	
		24	16.85	16.71	19.79	30	
		36	16.69	16.69	19.70	30	
		48	16.82	16.51	19.68	30	
		54	16.81	16.45	19.65	30	
2462	11	6	15.47	15.22	18.35	30	15
		9	15.39	15.03	18.23	30	
		12	15.35	15.04	18.21	30	
		18	15.32	15.09	18.22	30	
		24	15.20	15.09	18.16	30	
		36	15.22	15.03	18.14	30	
		48	15.36	15.18	18.28	30	
		54	15.30	14.99	18.16	30	
2467	12	6	10.68	10.58	13.64	30	11
		9	10.61	10.56	13.60	30	
		12	10.64	10.58	13.62	30	
		18	10.62	10.57	13.60	30	
		24	10.61	10.35	13.49	30	
		36	10.64	10.20	13.43	30	
		48	10.66	10.38	13.53	30	
		54	10.58	10.30	13.45	30	
2472	13	6	7.15	6.87	10.02	30	7
		9	7.06	6.79	9.94	30	
		12	7.07	6.56	9.83	30	
		18	6.96	6.23	9.62	30	
		24	7.05	6.79	9.93	30	
		36	7.08	6.69	9.90	30	
		48	7.01	6.46	9.75	30	
		54	6.64	6.44	9.55	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	14.40	14.23	17.32	30	14
		1	14.32	14.01	17.18	30	
		2	14.33	14.07	17.21	30	
		3	14.24	14.04	17.15	30	
		4	14.29	14.02	17.17	30	
		5	14.27	14.16	17.23	30	
		6	14.23	14.03	17.14	30	
		7	14.22	14.02	17.13	30	
2437	6	0	16.92	16.33	19.64	30	17
		1	16.86	16.23	19.56	30	
		2	16.88	16.31	19.61	30	
		3	16.84	16.24	19.56	30	
		4	16.81	16.10	19.48	30	
		5	16.82	16.21	19.54	30	
		6	16.81	16.12	19.49	30	
		7	16.84	16.31	19.59	30	
2462	11	0	14.39	14.02	17.22	30	14
		1	14.23	13.88	17.07	30	
		2	14.20	13.95	17.09	30	
		3	14.23	13.96	17.11	30	
		4	14.17	13.98	17.08	30	
		5	14.21	13.94	17.09	30	
		6	14.18	13.94	17.07	30	
		7	14.16	13.95	17.06	30	
2467	12	0	10.73	10.44	13.60	30	11
		1	10.13	10.37	13.26	30	
		2	10.18	10.40	13.30	30	
		3	10.70	10.21	13.47	30	
		4	10.27	10.38	13.34	30	
		5	10.34	10.41	13.38	30	
		6	10.34	10.38	13.37	30	
		7	10.34	10.10	13.23	30	
2472	13	0	6.68	6.56	9.63	30	7
		1	6.64	6.15	9.41	30	
		2	6.52	6.21	9.38	30	
		3	6.57	6.47	9.53	30	
		4	6.58	6.53	9.57	30	
		5	6.62	6.33	9.49	30	
		6	6.53	6.34	9.45	30	
		7	6.66	6.38	9.53	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	-1.867	0.056	-1.811	8 dBm / 3 kHz
	2437	6	-1.964	0.056	-1.908	
	2462	11	-1.829	0.056	-1.773	
	2467	12	-12.947	0.056	-12.891	
	2472	13	-13.989	0.056	-13.933	
802.11g	2412	1	-9.425	0.298	-9.127	
	2437	6	-7.493	0.298	-7.195	
	2462	11	-9.547	0.298	-9.249	
	2467	12	-13.869	0.298	-13.571	
	2472	13	-17.334	0.298	-17.036	
802.11n	2412	1	-10.717	0.318	-10.399	
	2437	6	-7.444	0.318	-7.126	
	2462	11	-11.032	0.318	-10.714	
	2467	12	-13.487	0.318	-13.169	
	2472	13	-17.464	0.318	-17.146	

[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	-2.073	0.056	-2.017	8 dBm / 3 kHz
	2437	6	-1.351	0.056	-1.295	
	2462	11	-1.565	0.056	-1.509	
	2467	12	-11.501	0.056	-11.445	
	2472	13	-14.090	0.056	-14.034	
802.11g	2412	1	-9.121	0.298	-8.823	
	2437	6	-7.587	0.298	-7.289	
	2462	11	-9.414	0.298	-9.116	
	2467	12	-13.814	0.298	-13.516	
	2472	13	-17.050	0.298	-16.752	
802.11n	2412	1	-10.772	0.318	-10.454	
	2437	6	-8.315	0.318	-7.997	
	2462	11	-11.037	0.318	-10.719	
	2467	12	-14.107	0.318	-13.789	
	2472	13	-18.907	0.318	-18.589	

[MIMO]

Mode	Frequency (MHz)	Channel No.	Test Result			
			ANT 1 Measured PSD(dBm) + Duty Cycle Factor	ANT 2 Measured PSD(dBm) + Duty Cycle Factor	MIMO Result (dBm)	Limit (dBm)
802.11g	2412	1	-9.127	-8.823	-5.962	8 dBm / 3 kHz
	2437	6	-7.195	-7.289	-4.232	
	2462	11	-9.249	-9.116	-6.172	
	2467	12	-13.571	-13.516	-10.534	
	2472	13	-17.036	-16.752	-13.882	
802.11n	2412	1	-10.399	-10.454	-7.416	
	2437	6	-7.126	-7.997	-4.529	
	2462	11	-10.714	-10.719	-7.706	
	2467	12	-13.169	-13.789	-10.457	
	2472	13	-17.146	-18.589	-14.797	

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 = Attenuator loss(10 dB) + Cable loss(1ea)

3. 10.47 dB is offset for 2.4 GHz Band.

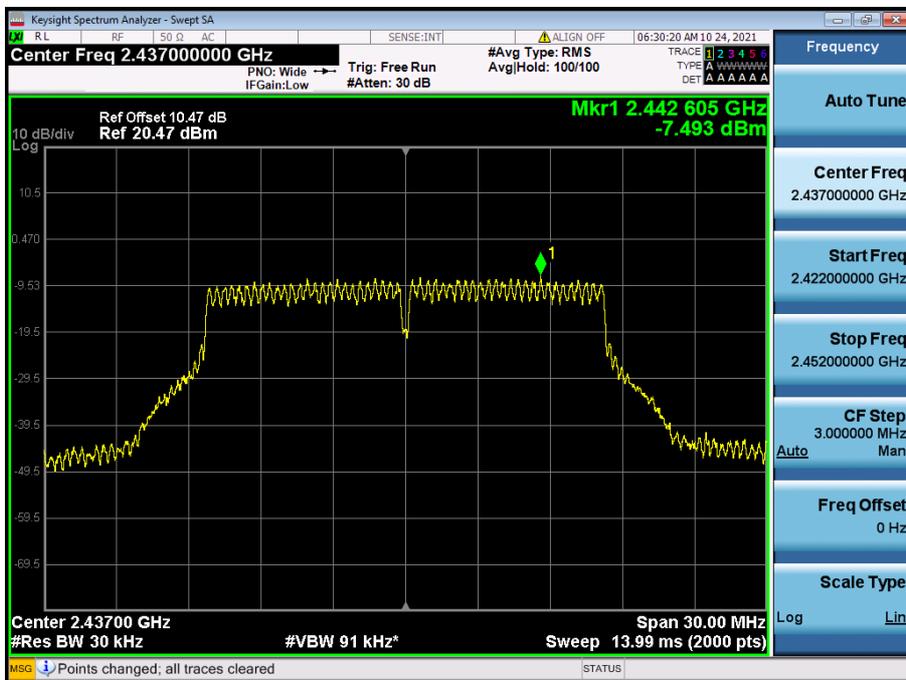
[Ant.1]

☑ Test Plots

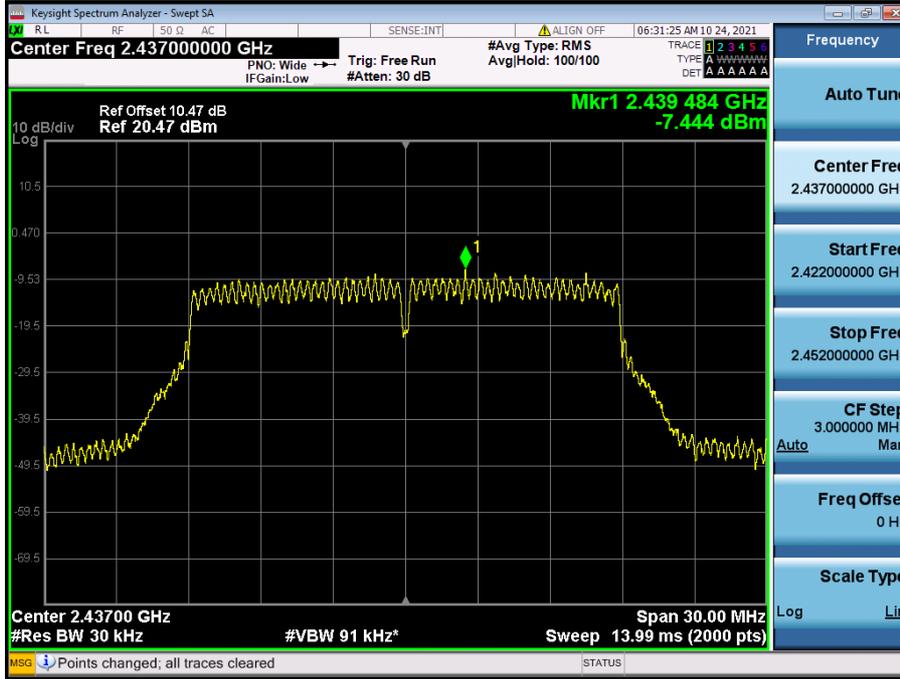
Power Spectral Density (802.11b_1 Mbps-CH 11)



Power Spectral Density (802.11g_6 Mbps -CH 6)



Power Spectral Density (802.11n_HT20_MCS0 -CH 6)



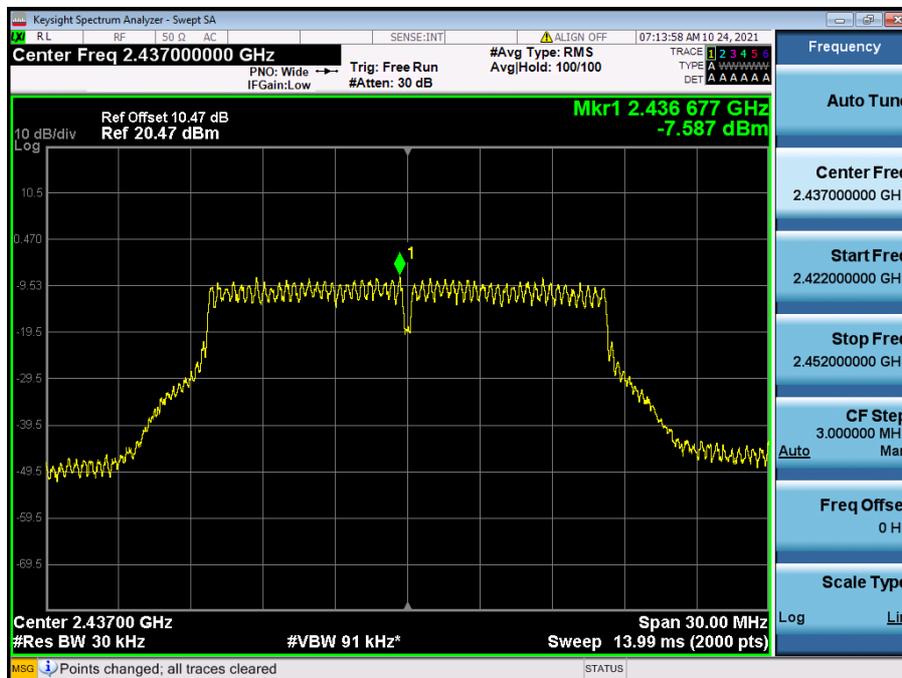
[Ant.2]

▣ Test Plots

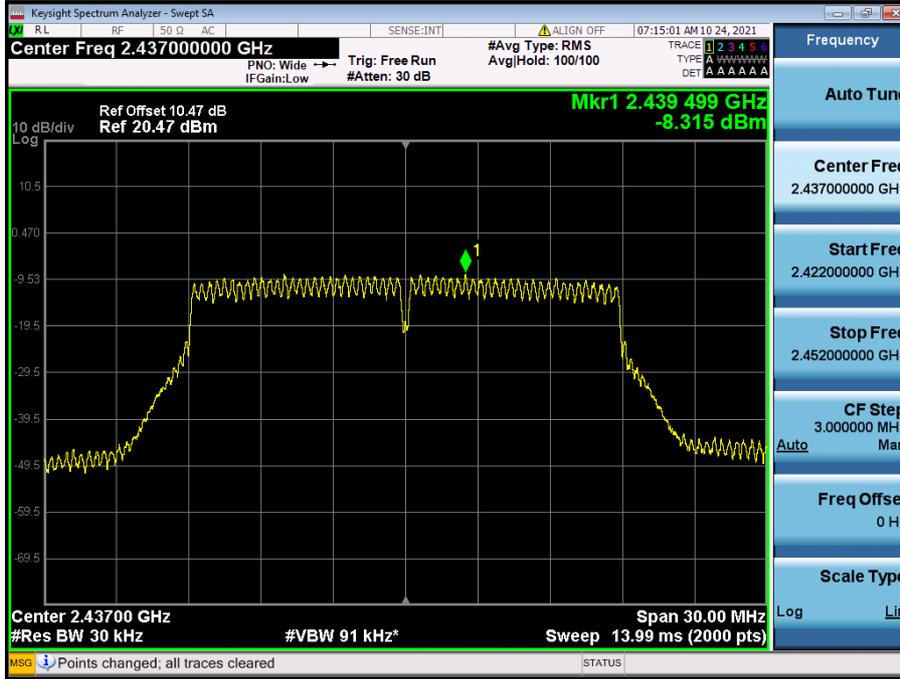
Power Spectral Density (802.11b_1 Mbps -CH 6)



Power Spectral Density (802.11g_6 Mbps -CH 6)



Power Spectral Density (802.11n_HT20_MCS0 -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

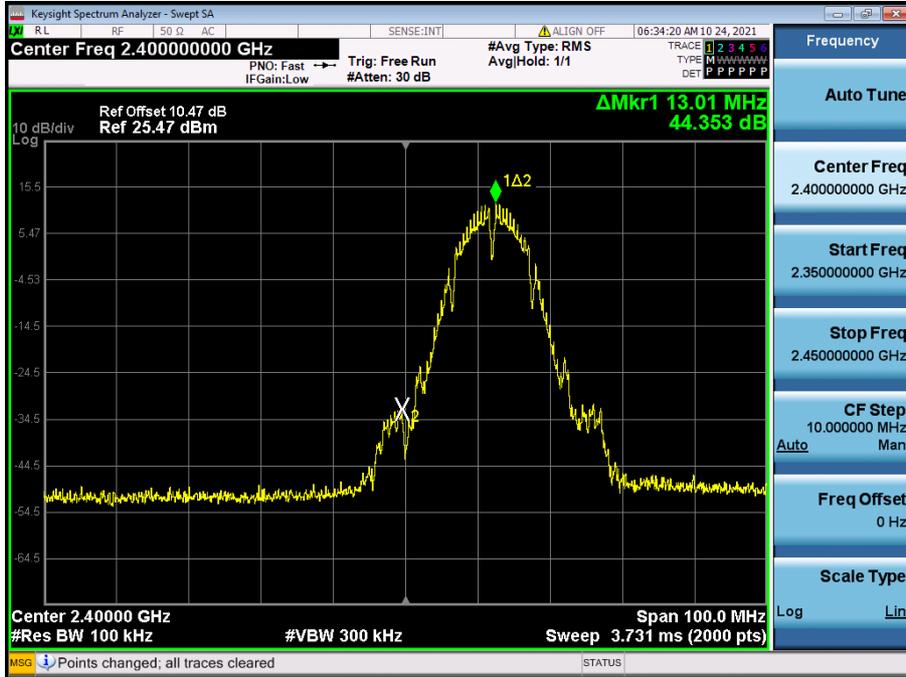
Test Result : please refer to the plot below.

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

[Ant.1]

☑ Test Plots(Band Edge)

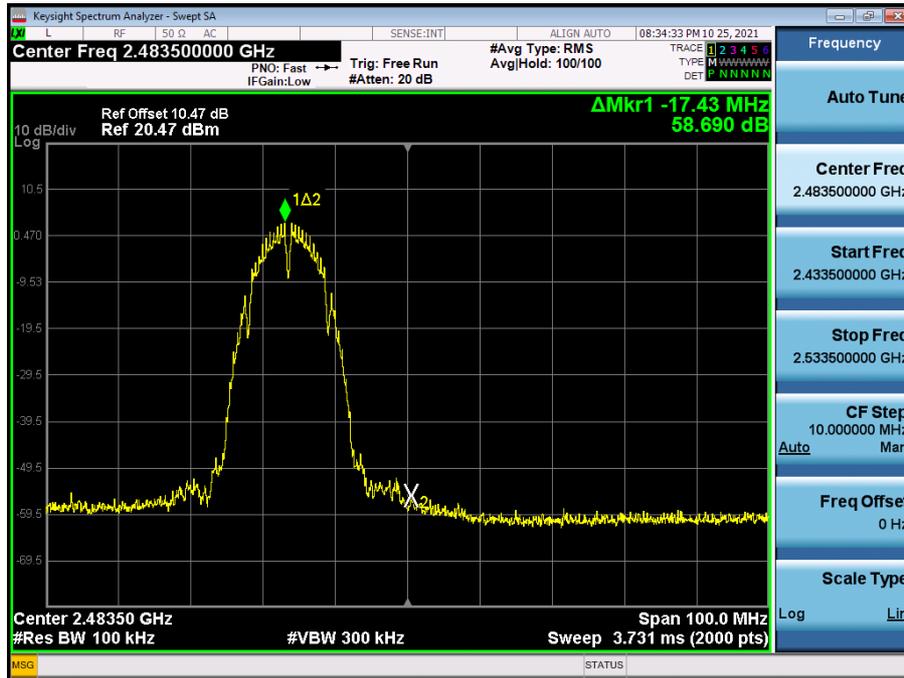
Band Edge (802.11b_1 Mbps -CH1)



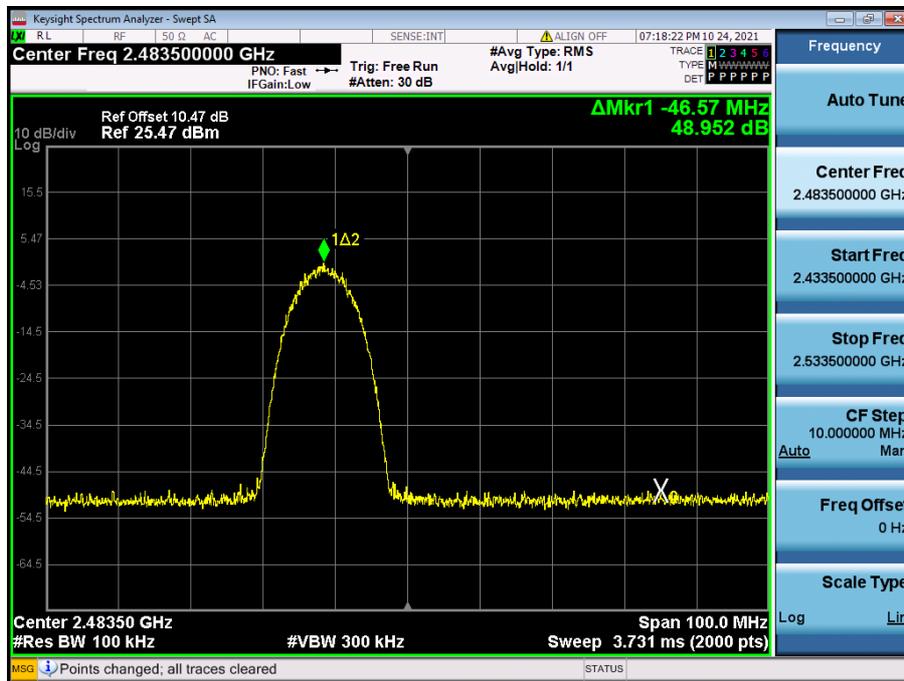
Band Edge (802.11b_1 Mbps -CH11)



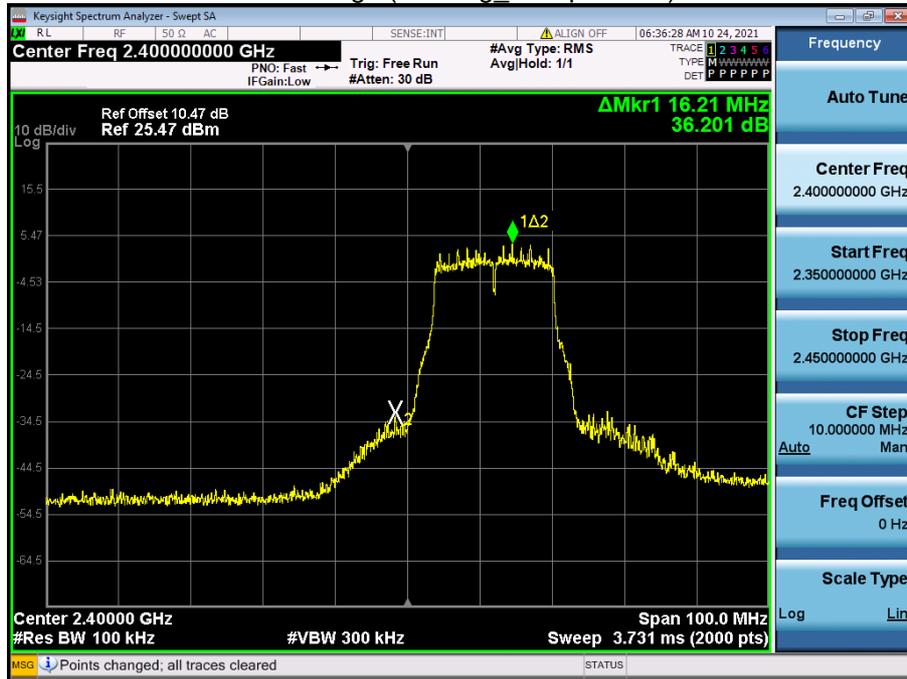
Band Edge (802.11b_1 Mbps -CH12)



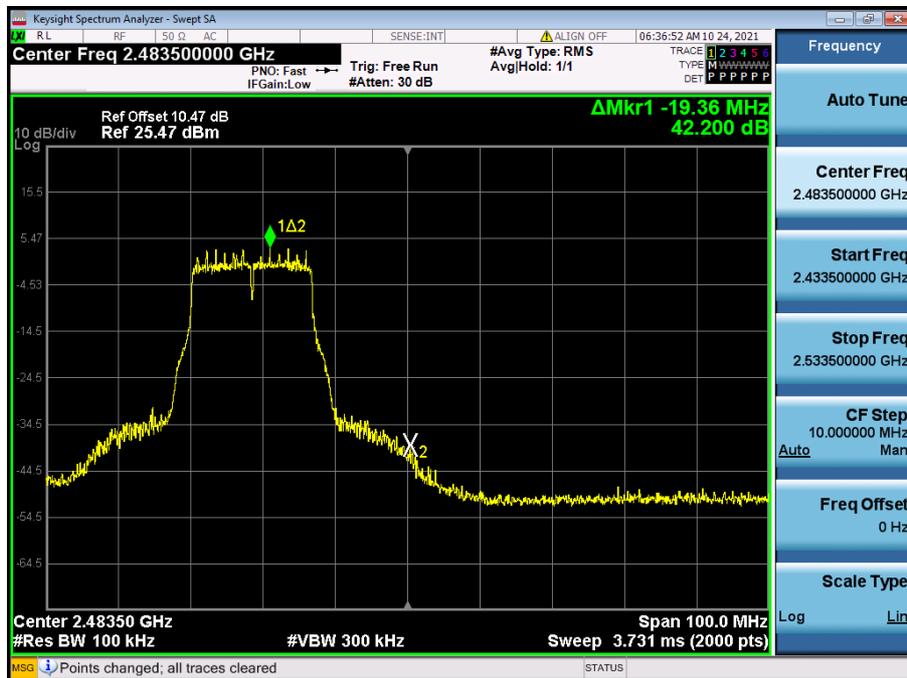
Band Edge (802.11b_1 Mbps -CH13)



Band Edge (802.11g 6 Mbps -CH1)



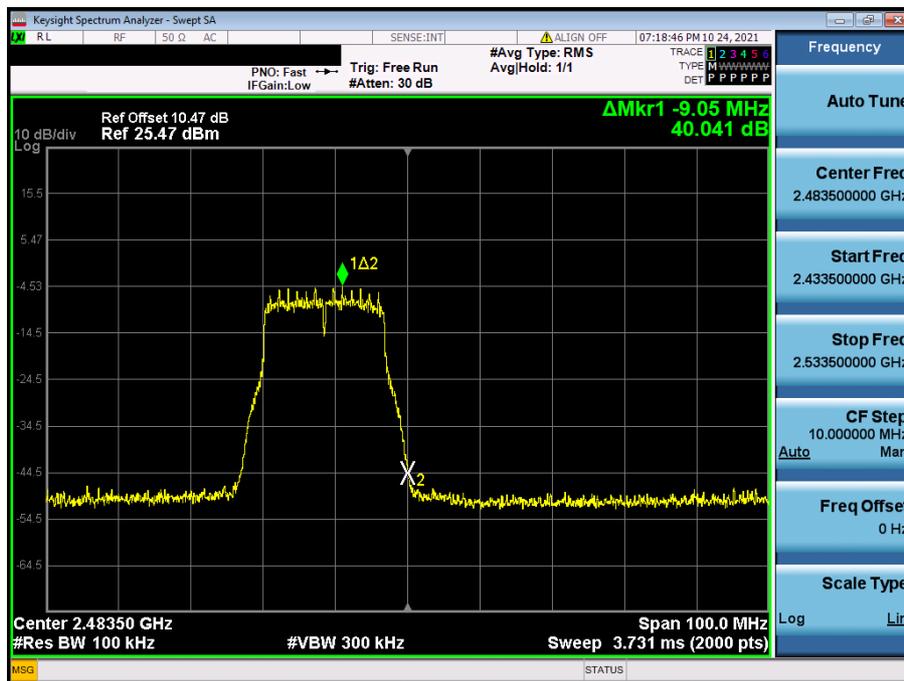
Band Edge (802.11g_6 Mbps -CH11)



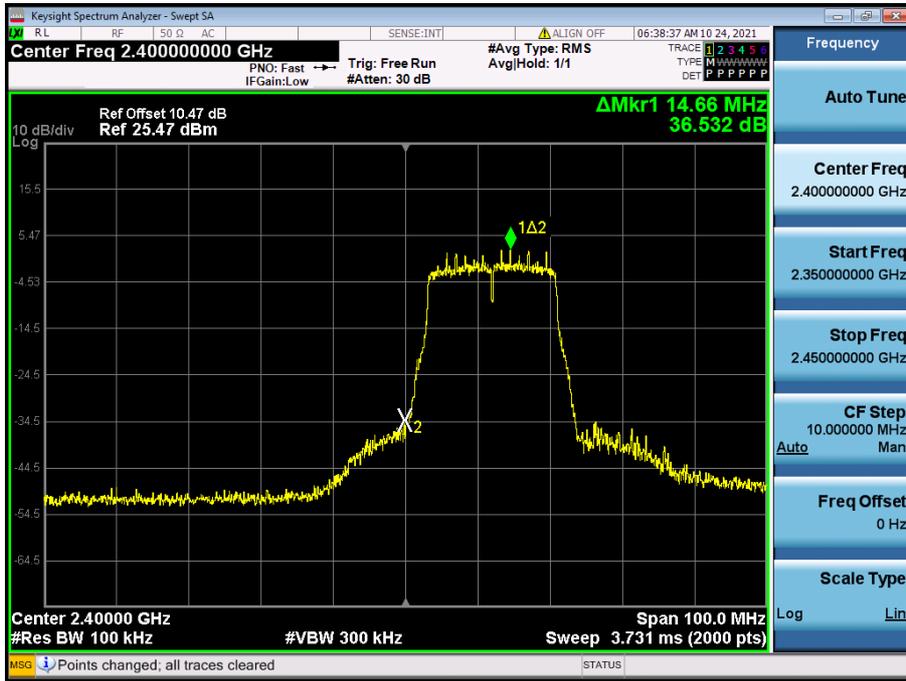
Band Edge (802.11g_6 Mbps -CH12)



Band Edge (802.11g_6 Mbps -CH13)



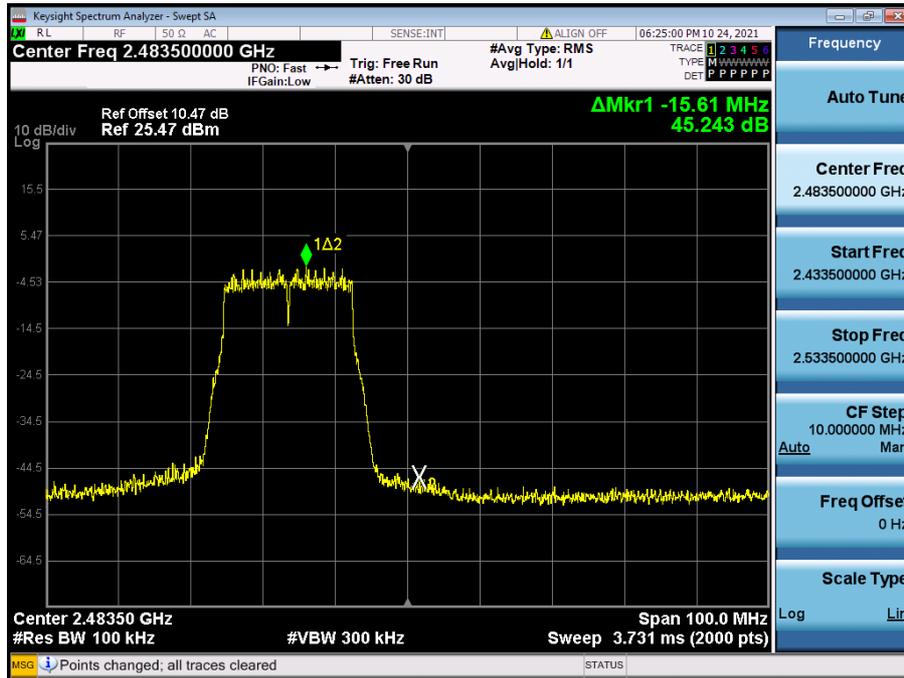
Band Edge (802.11n_HT20_MCS0 -CH1)



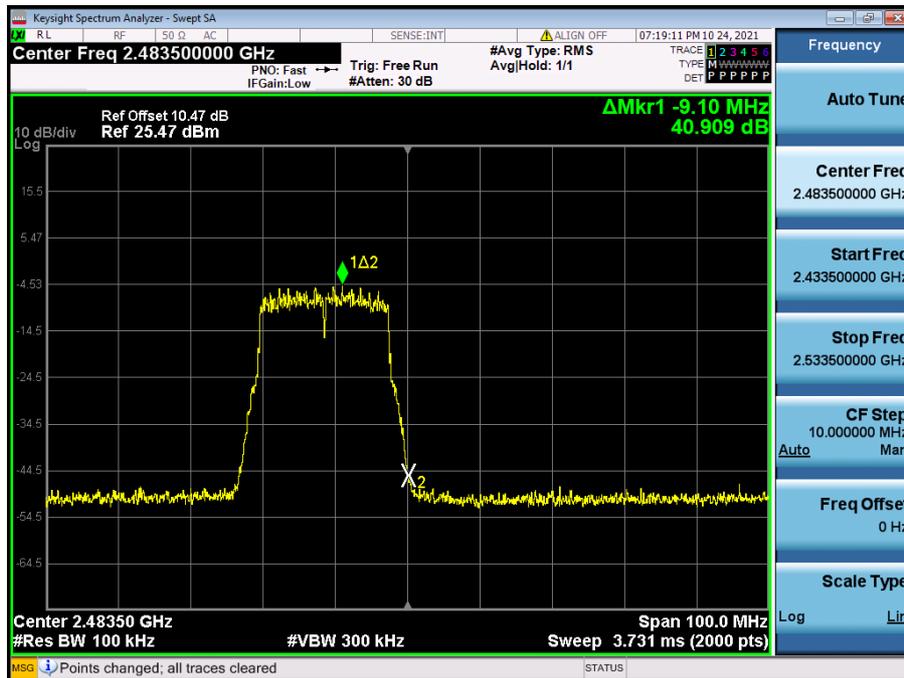
Band Edge (802.11n_HT20_MCS0 -CH11)



Band Edge (802.11n_HT20_MCS0 -CH12)



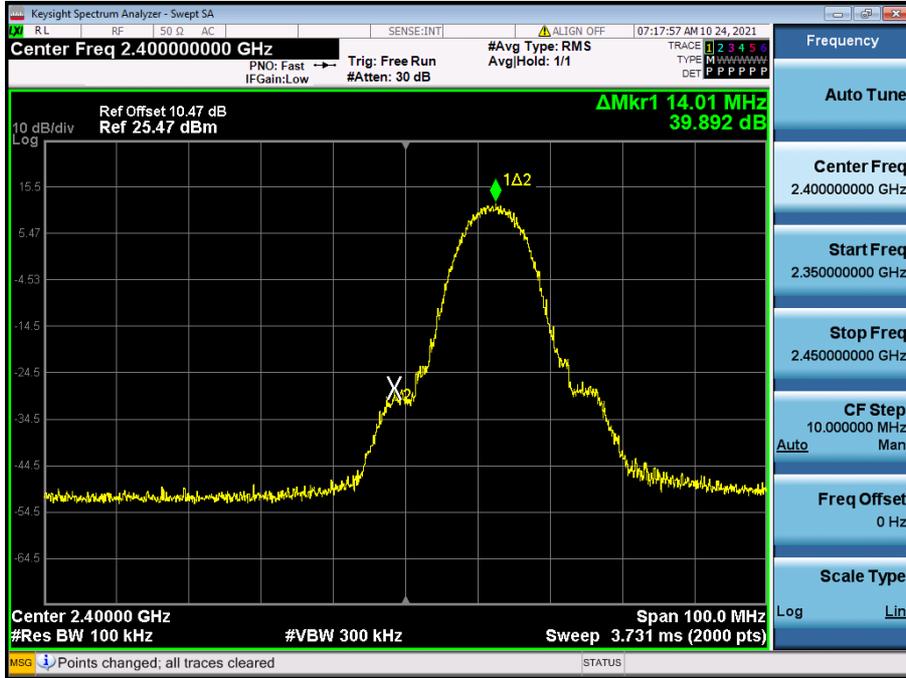
Band Edge (802.11n_HT20_MCS0 -CH13)



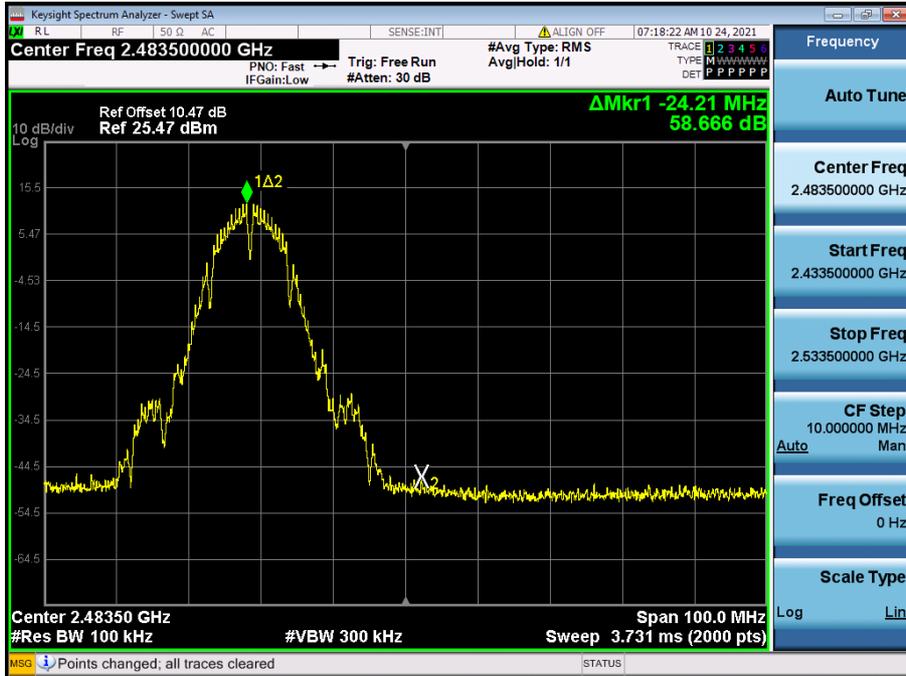
[Ant.2]

☑ Test Plots(Band Edge)

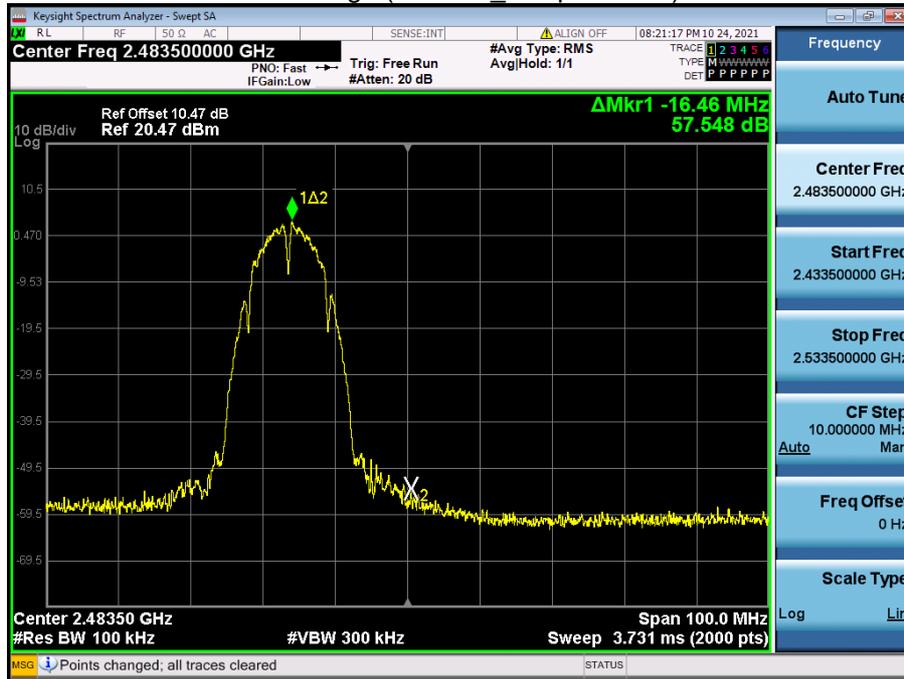
Band Edge (802.11b_1Mbps -CH1)



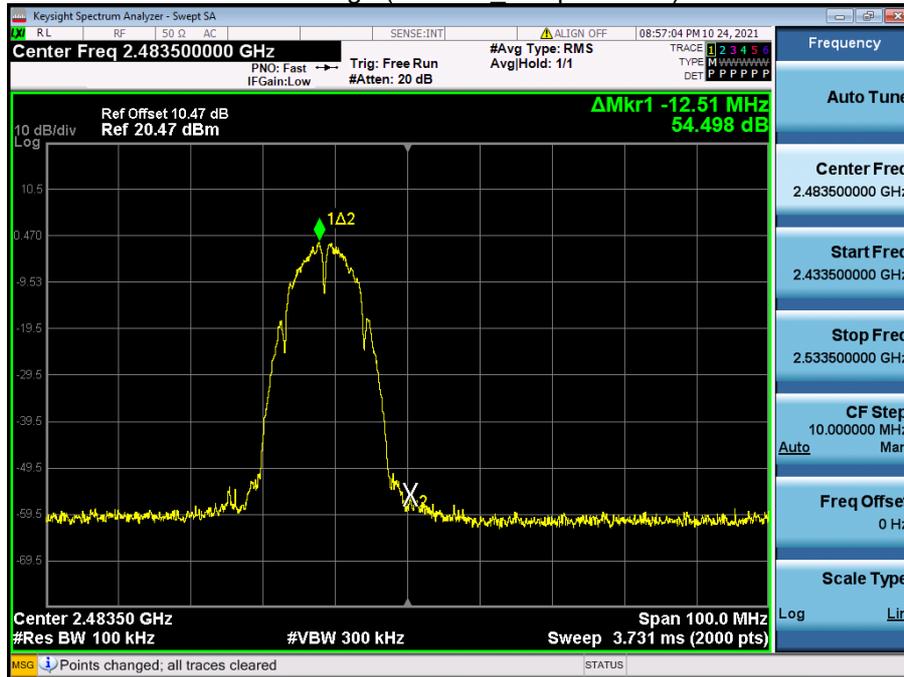
Band Edge (802.11b_1Mbps -CH11)



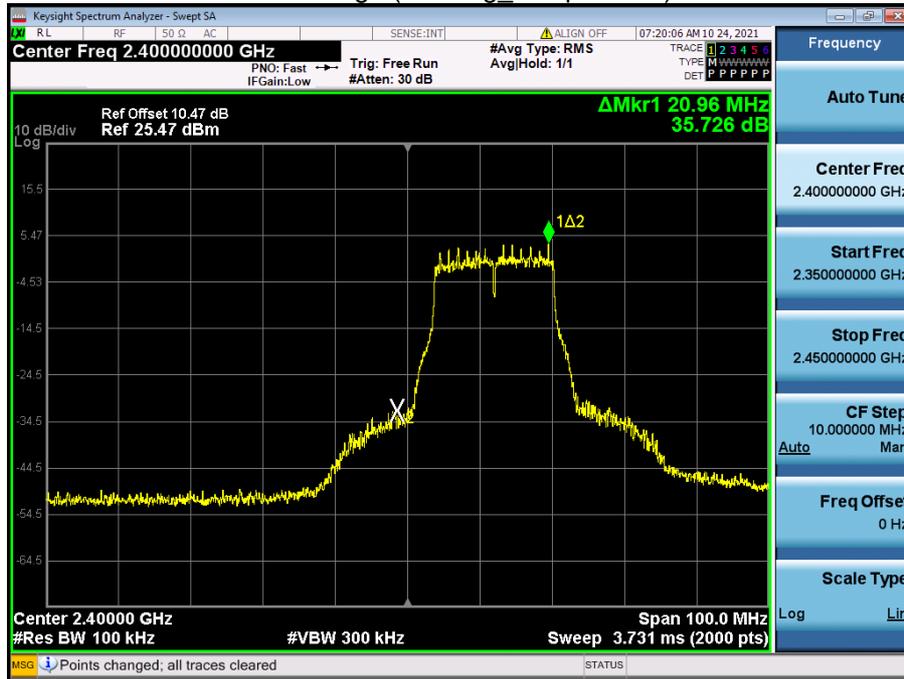
Band Edge (802.11b_1Mbps -CH12)



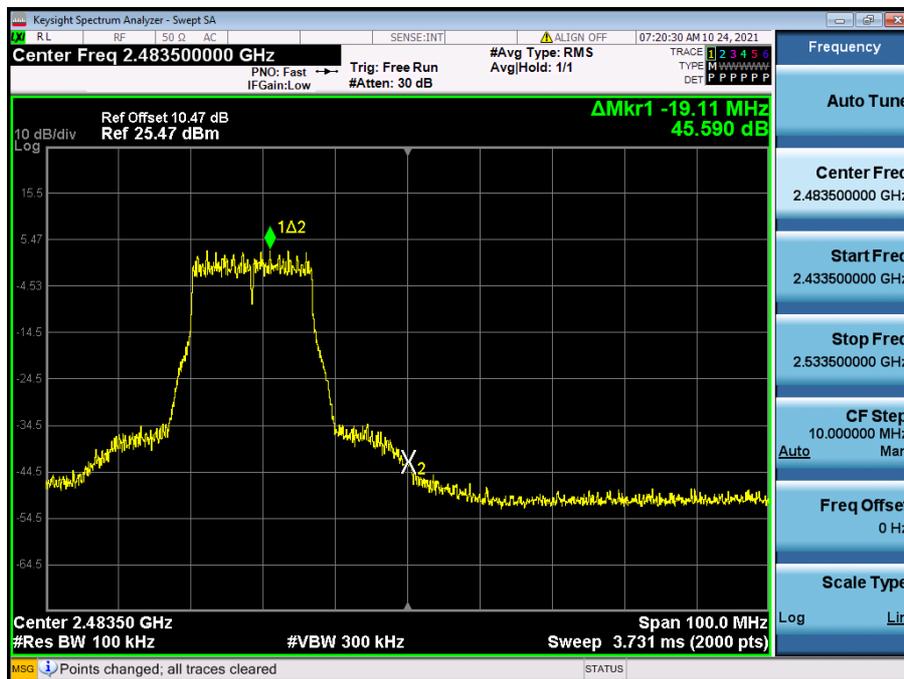
Band Edge (802.11b_1Mbps -CH13)



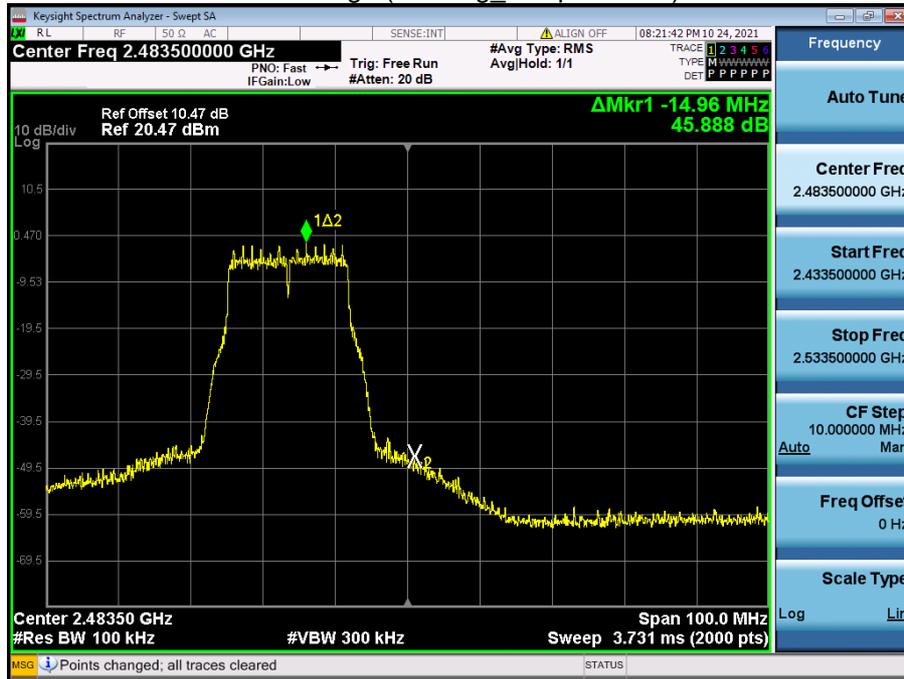
Band Edge (802.11g_6Mbps -CH1)



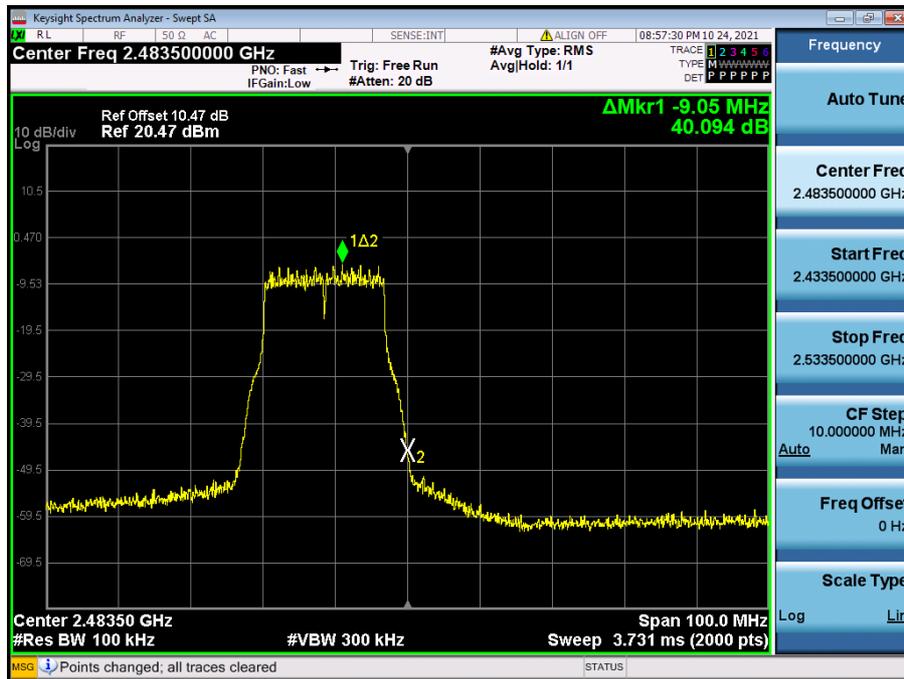
Band Edge (802.11g_6Mbps -CH11)



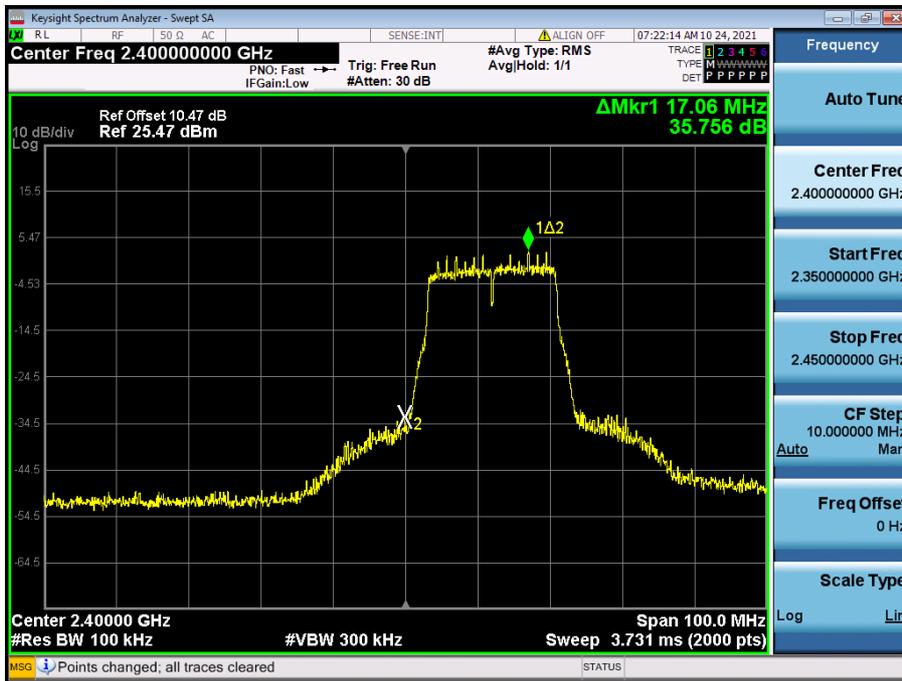
Band Edge (802.11g_6Mbps -CH12)



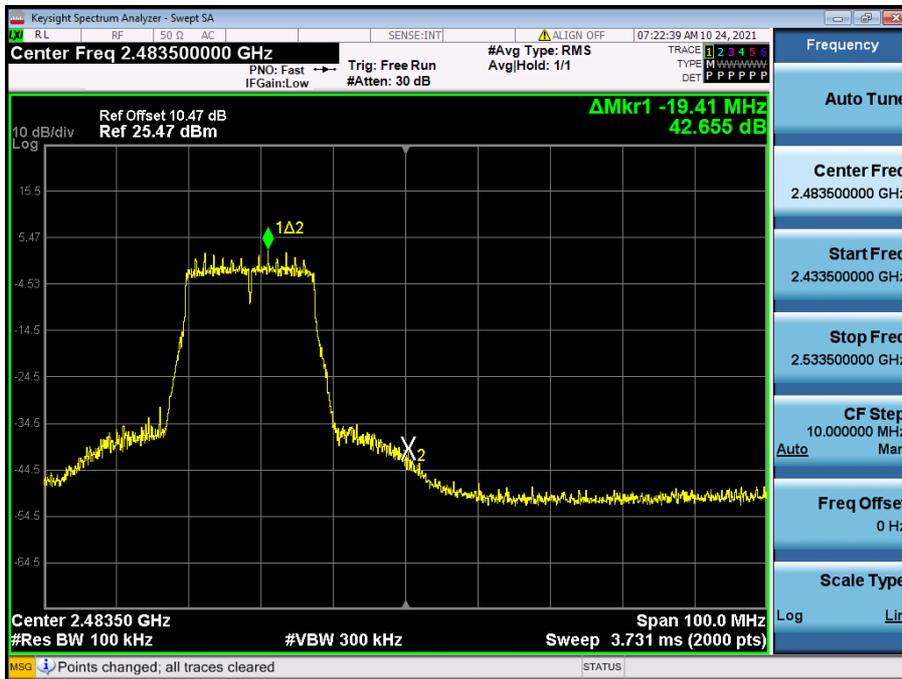
Band Edge (802.11g_6Mbps -CH13)



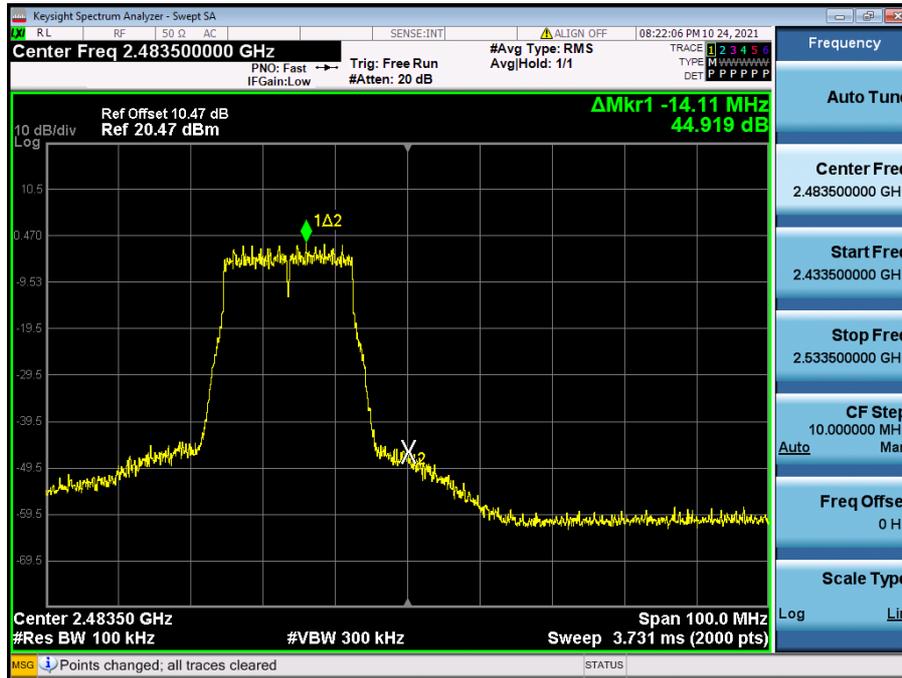
Band Edge (802.11n_HT20_MSC0 -CH1)



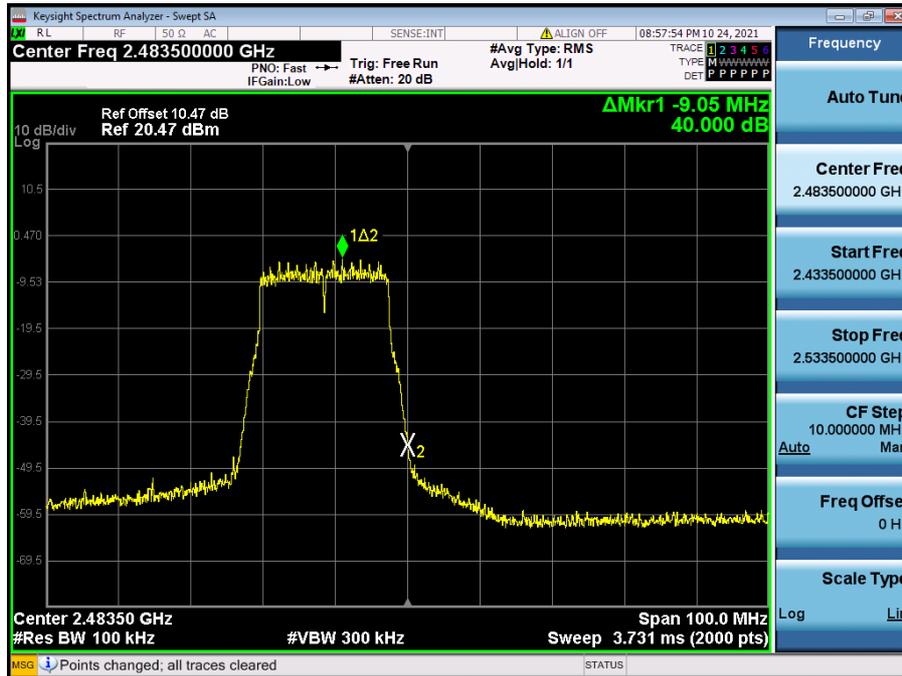
Band Edge (802.11n_HT20_MSC0 -CH11)



Band Edge (802.11n_HT20_MSC0 -CH12)



Band Edge (802.11n_HT20_MSC0 -CH13)

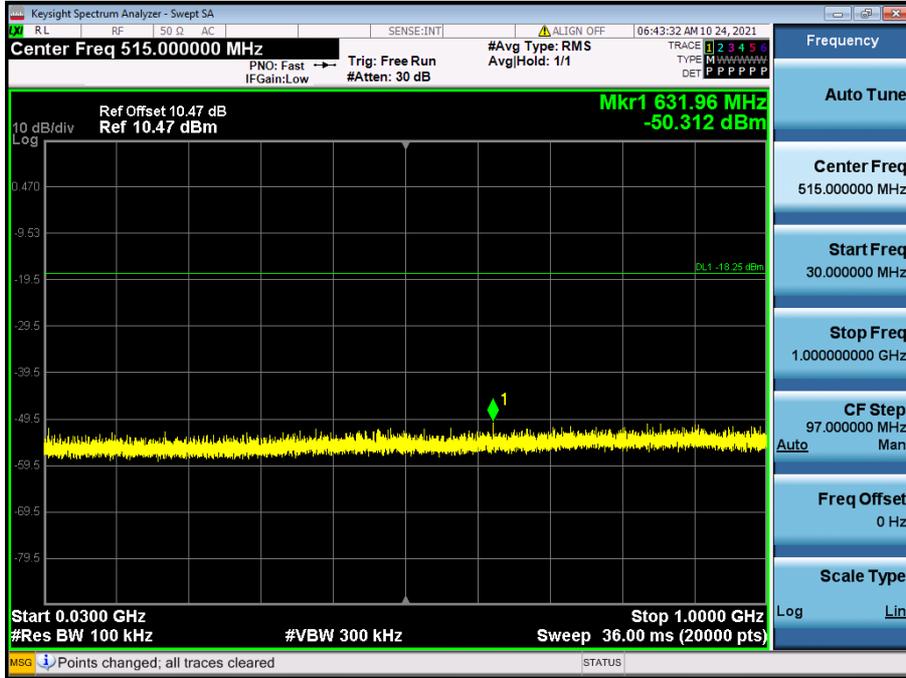


[Ant.1]

☑ Test Plots(Conducted Spurious Emission)

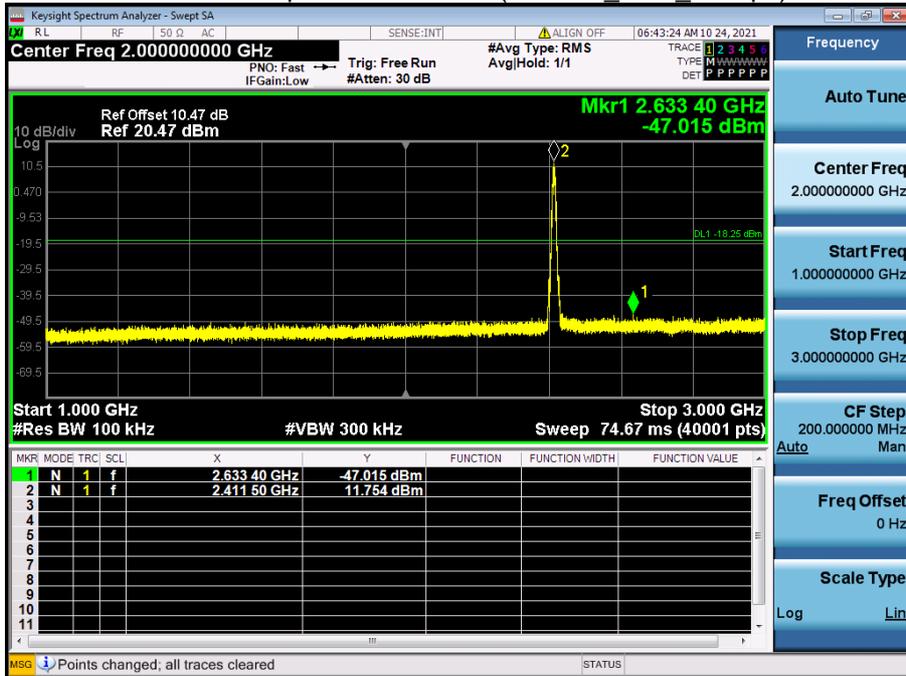
30 MHz ~ 1 GHz

Conducted Spurious Emission (802.11b_Ch.1_1 Mbps)



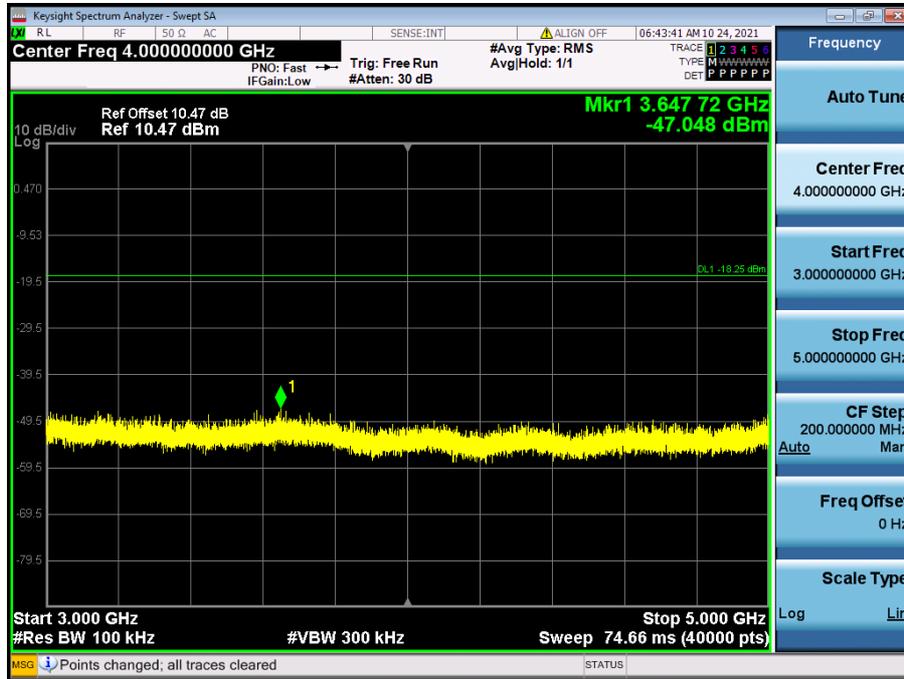
1 GHz ~ 3 GHz

Conducted Spurious Emission (802.11b_Ch.1_1 Mbps)



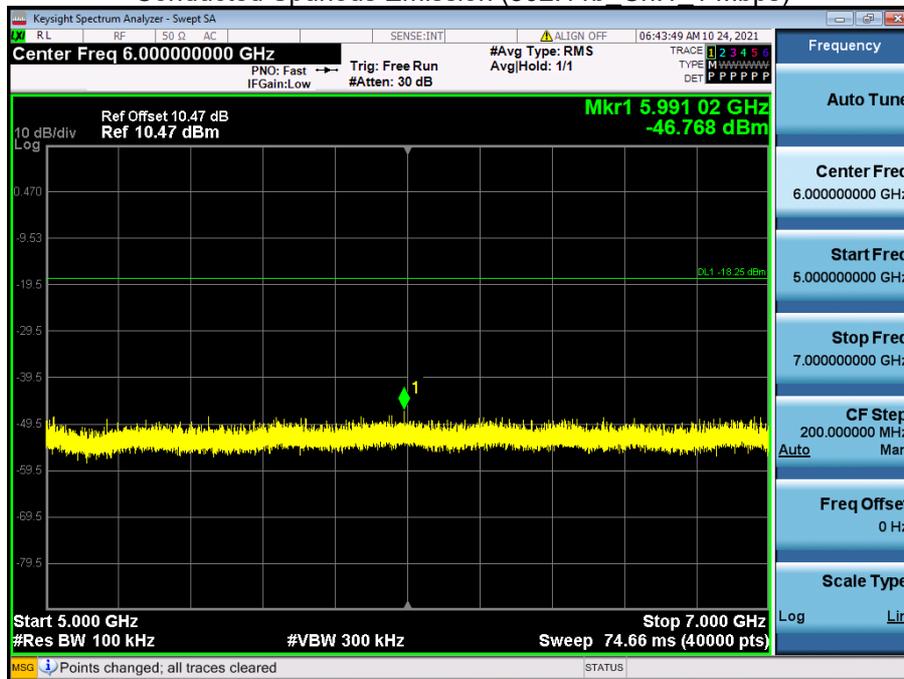
3 GHz ~ 5 GHz

Conducted Spurious Emission (802.11b_Ch.1_1 Mbps)



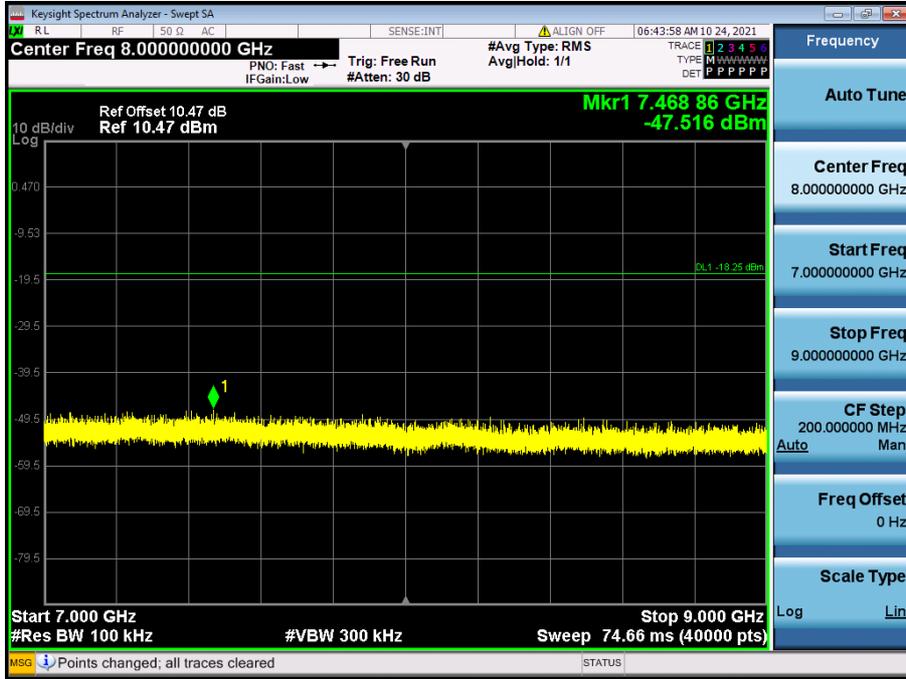
5 GHz ~ 7 GHz

Conducted Spurious Emission (802.11b_Ch.1_1 Mbps)



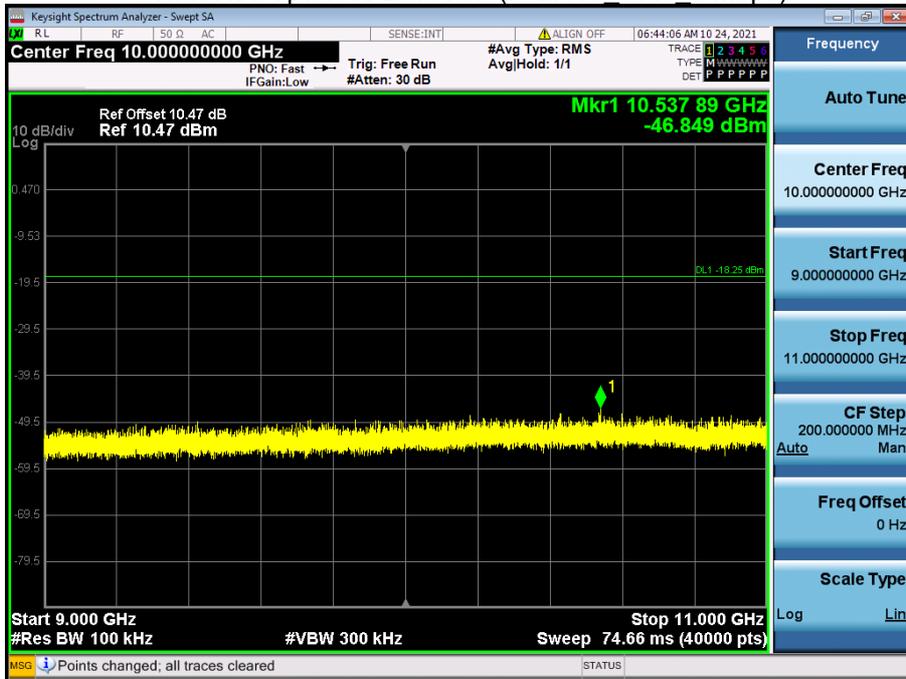
7 GHz ~ 9 GHz

Conducted Spurious Emission (802.11b_Ch.1_1 Mbps)



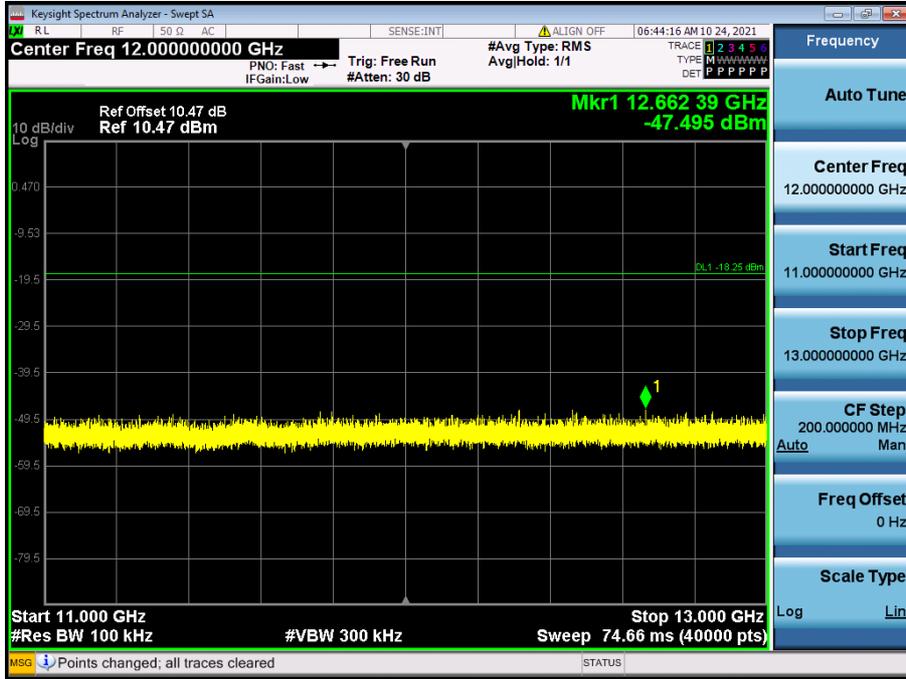
9 GHz ~ 11 GHz

Conducted Spurious Emission (802.11b_Ch.1_1 Mbps)



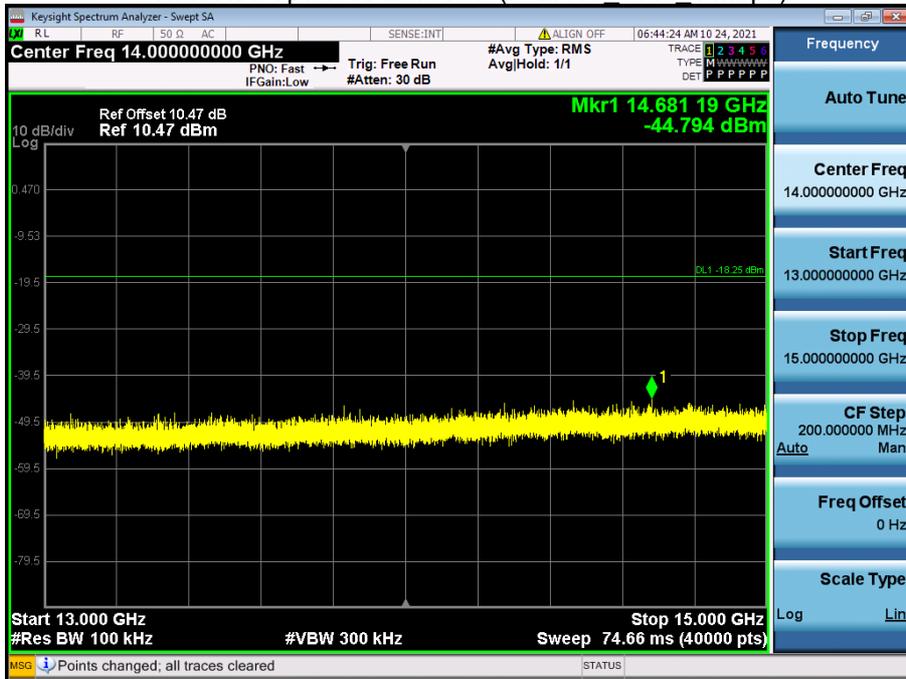
11 GHz ~ 13 GHz

Conducted Spurious Emission (802.11b_Ch.1_1 Mbps)



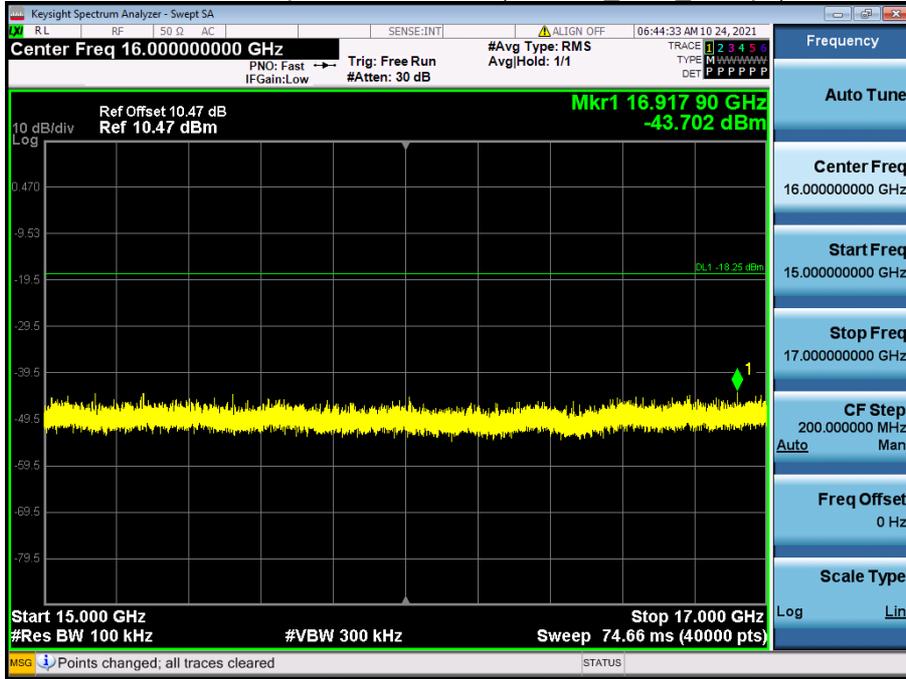
13 GHz ~ 15 GHz

Conducted Spurious Emission (802.11b_Ch.1_1 Mbps)



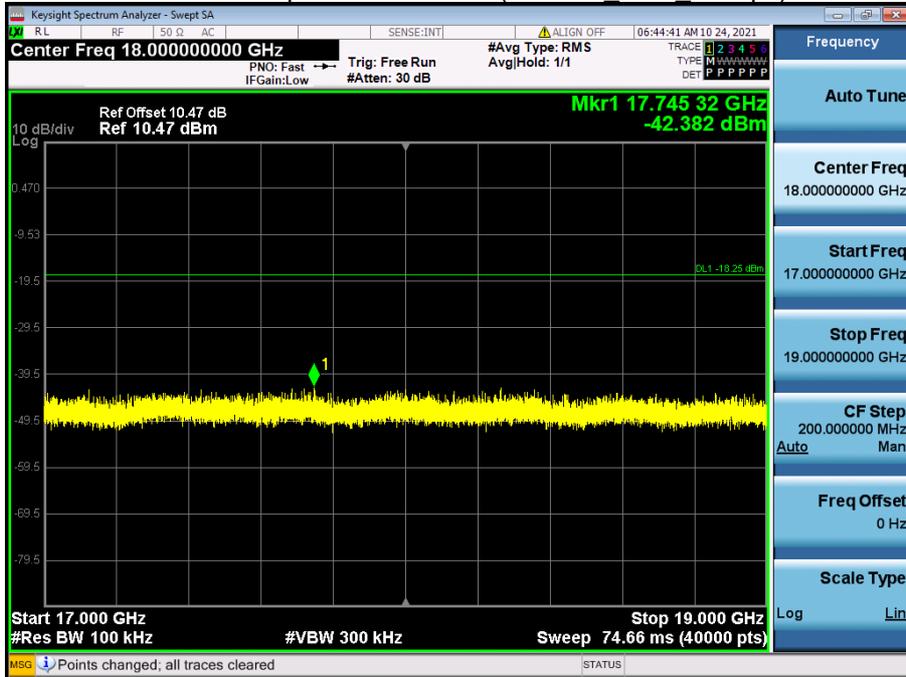
15 GHz ~ 17 GHz

Conducted Spurious Emission (802.11b Ch.1 1 Mbps)



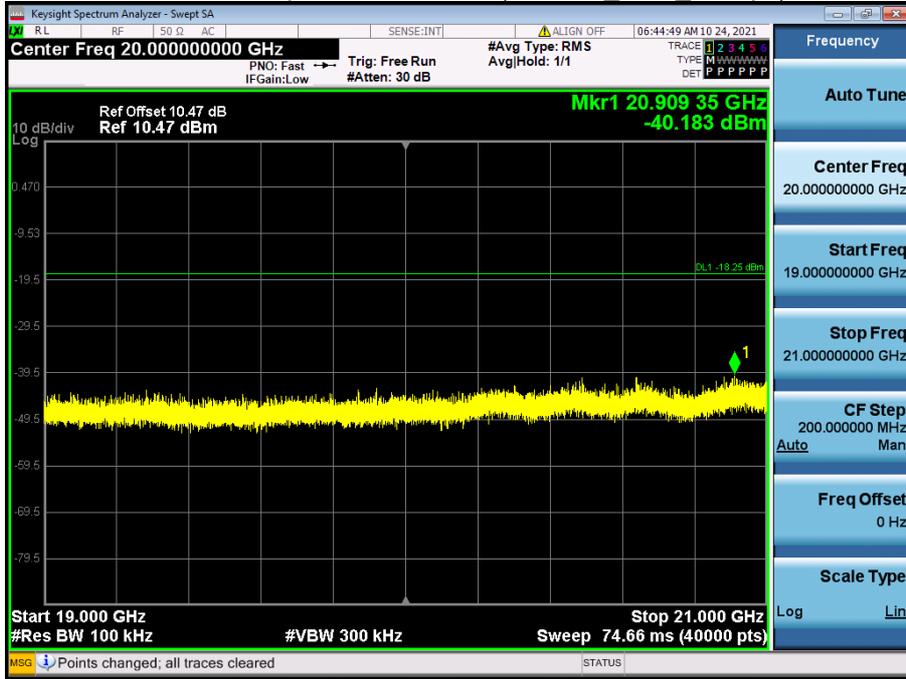
17 GHz ~ 19 GHz

Conducted Spurious Emission (802.11b Ch.1 1 Mbps)



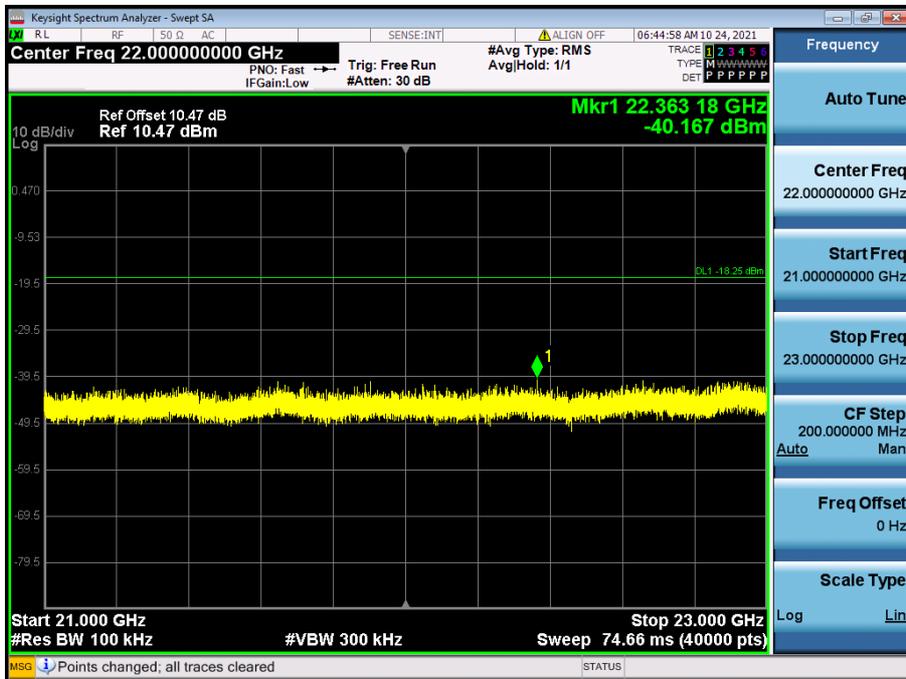
19 GHz ~ 21 GHz

Conducted Spurious Emission (802.11b Ch.1_1 Mbps)



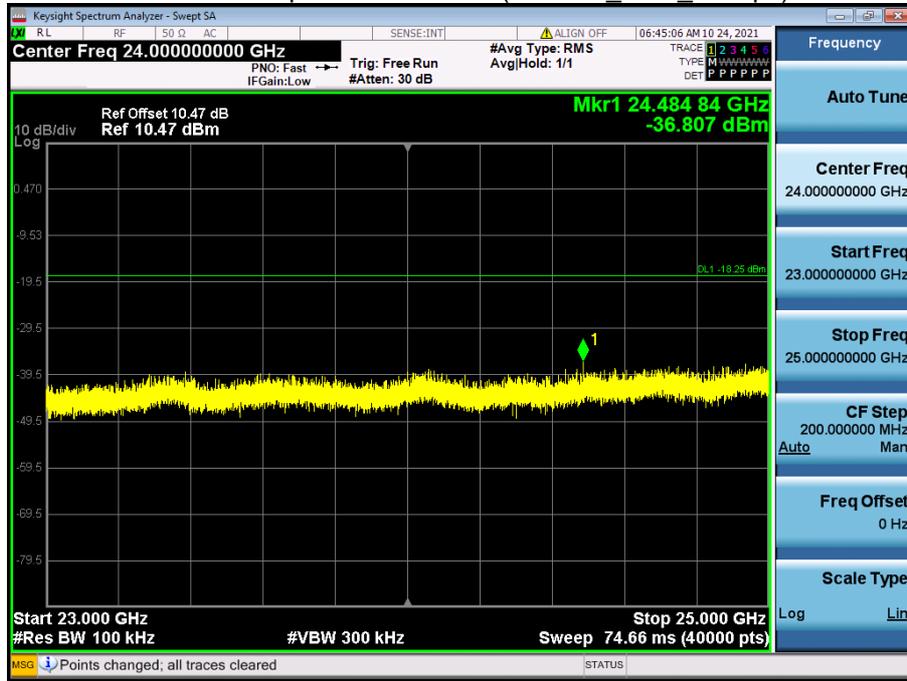
21 GHz ~ 23 GHz

Conducted Spurious Emission (802.11b_Ch.1_1 Mbps)



23 GHz ~ 25 GHz

Conducted Spurious Emission (802.11b Ch.1_1 Mbps)

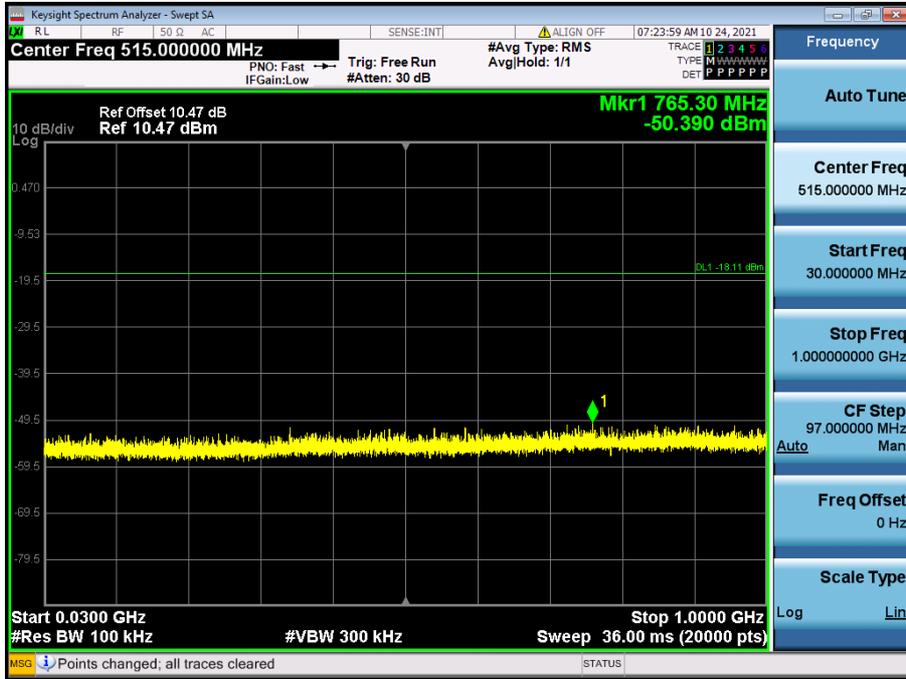


[Ant.2]

☑ Test Plots(Conducted Spurious Emission)

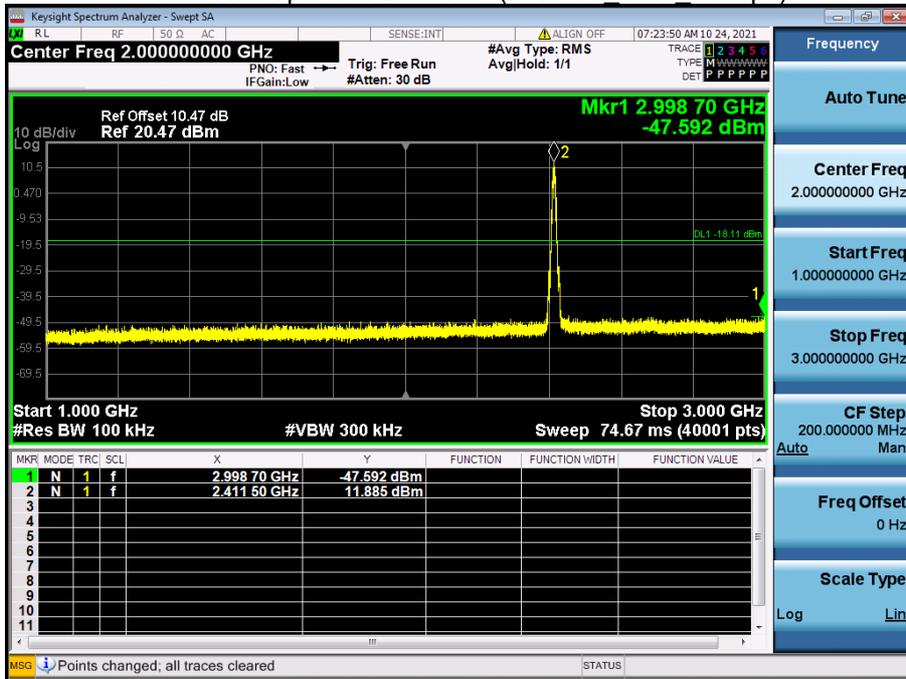
30 MHz ~ 1 GHz

Conducted Spurious Emission (802.11b_Ch.1_1 Mbps)



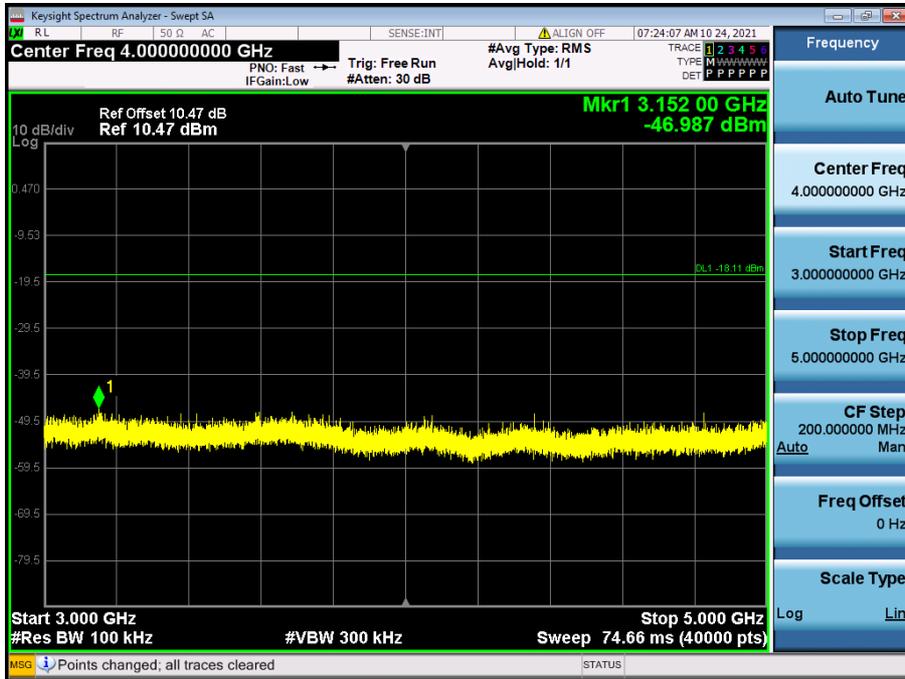
1 GHz ~ 3 GHz

Conducted Spurious Emission (802.11b_Ch.1_1 Mbps)



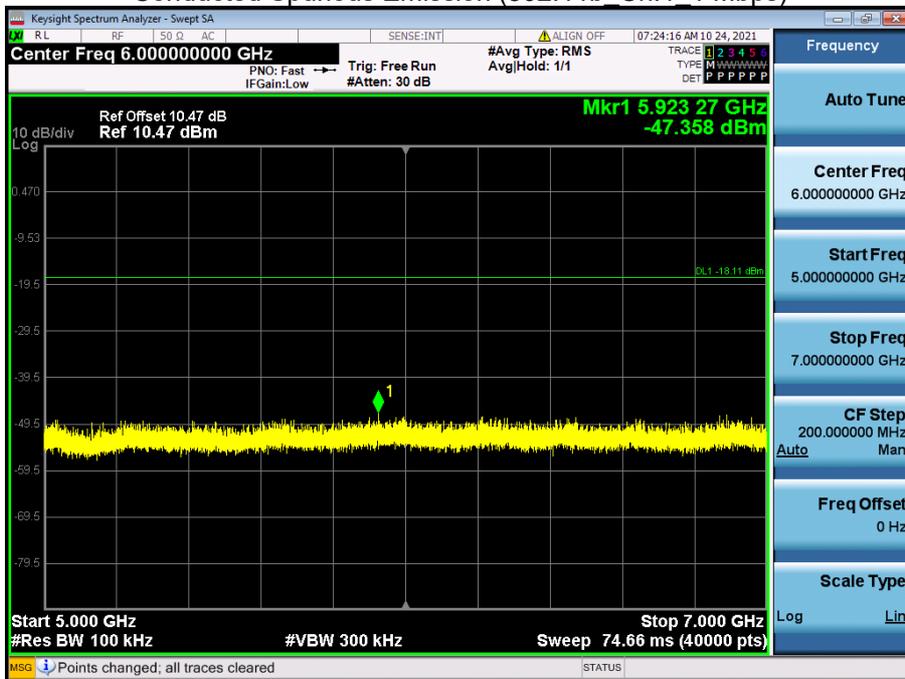
3 GHz ~ 5 GHz

Conducted Spurious Emission (802.11b_Ch.1_1 Mbps)



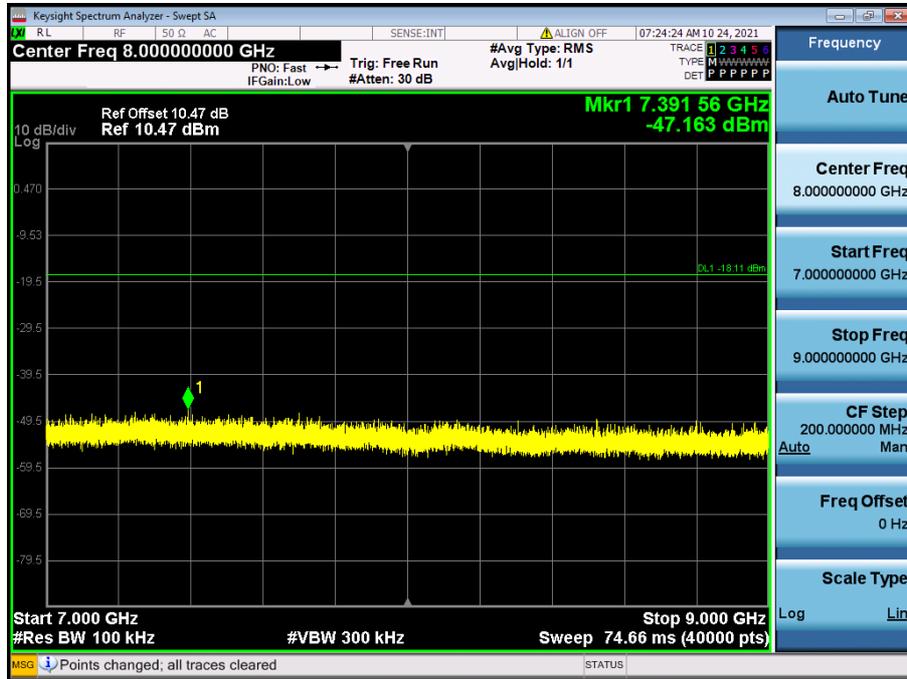
5 GHz ~ 7 GHz

Conducted Spurious Emission (802.11b_Ch.1_1 Mbps)



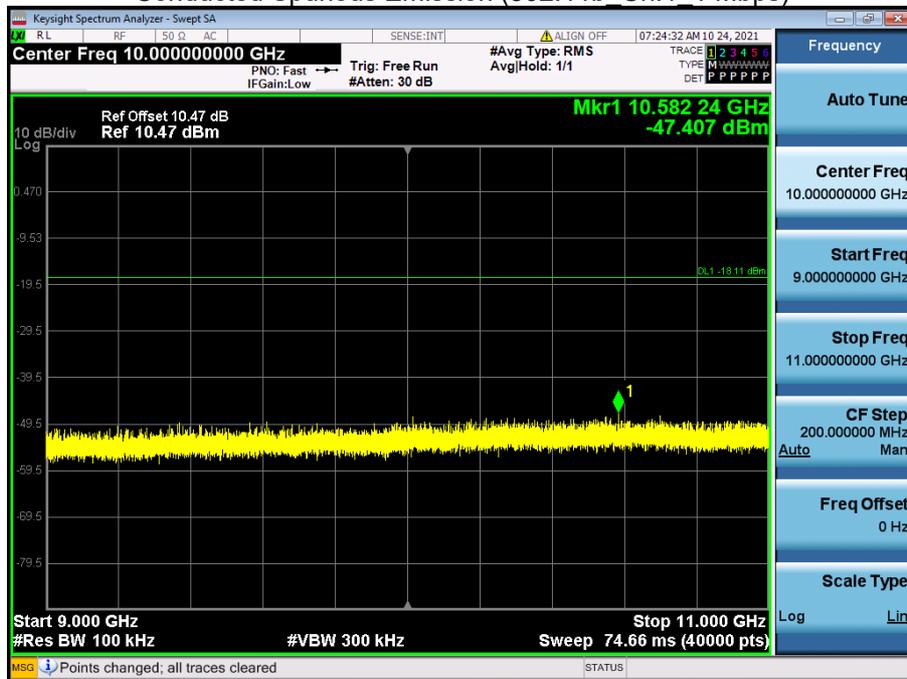
7 GHz ~ 9 GHz

Conducted Spurious Emission (802.11b_Ch.1_1 Mbps)



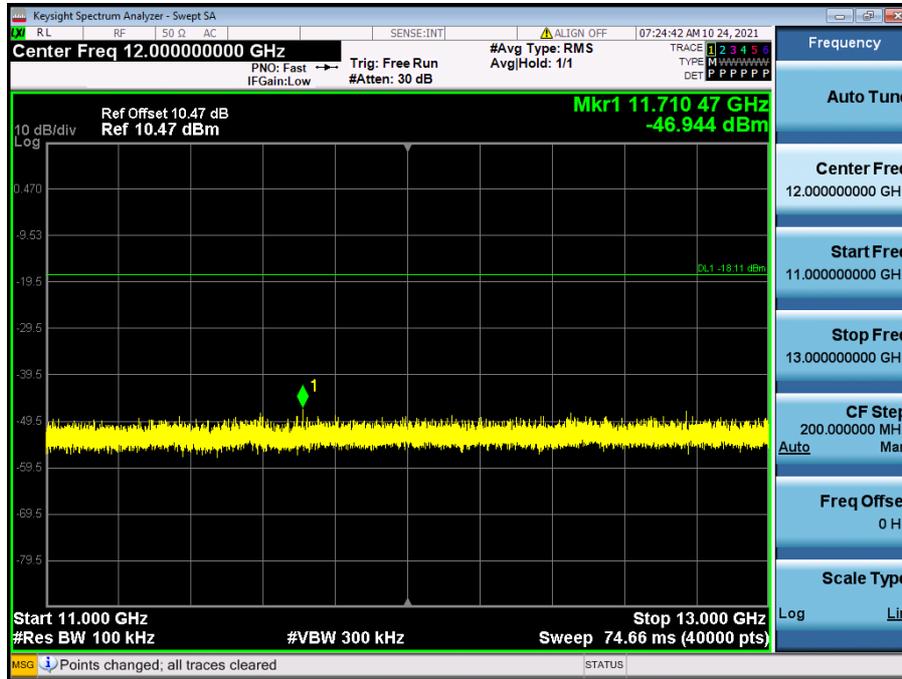
9 GHz ~ 11 GHz

Conducted Spurious Emission (802.11b_Ch.1_1 Mbps)



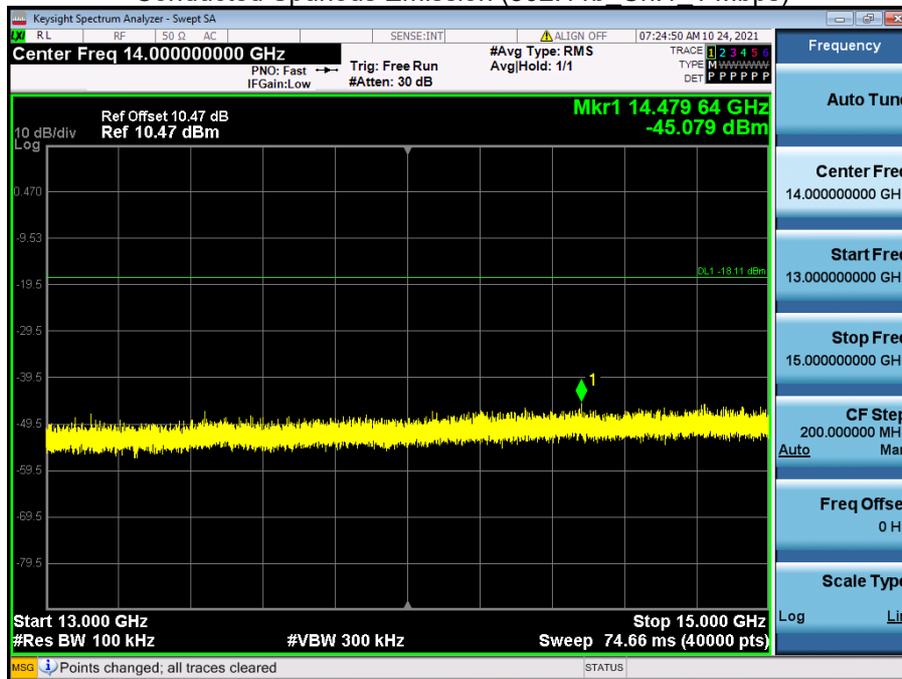
11 GHz ~ 13 GHz

Conducted Spurious Emission (802.11b_Ch.1_1 Mbps)



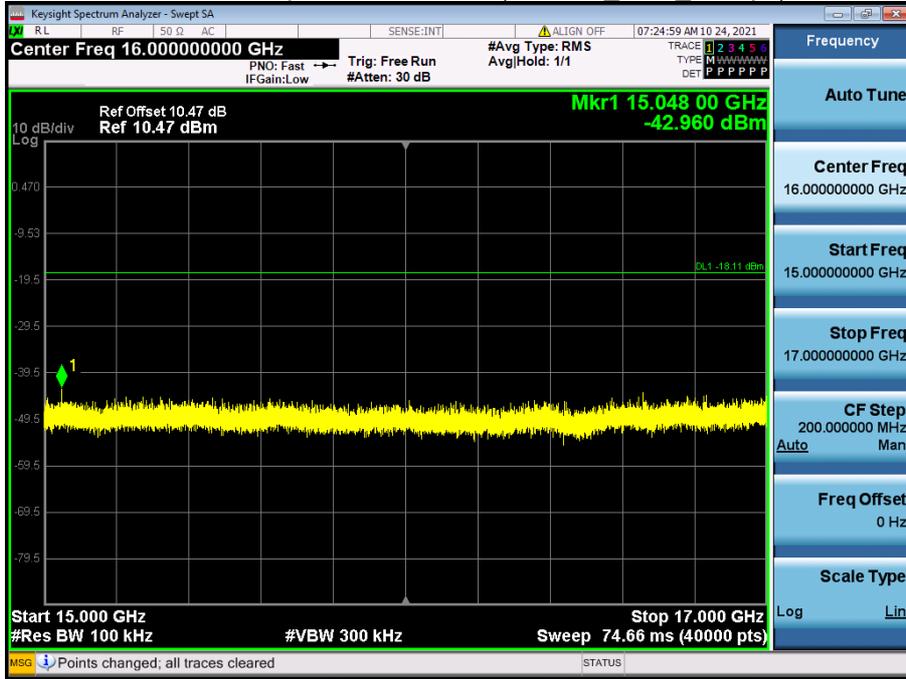
13 GHz ~ 15 GHz

Conducted Spurious Emission (802.11b_Ch.1_1 Mbps)



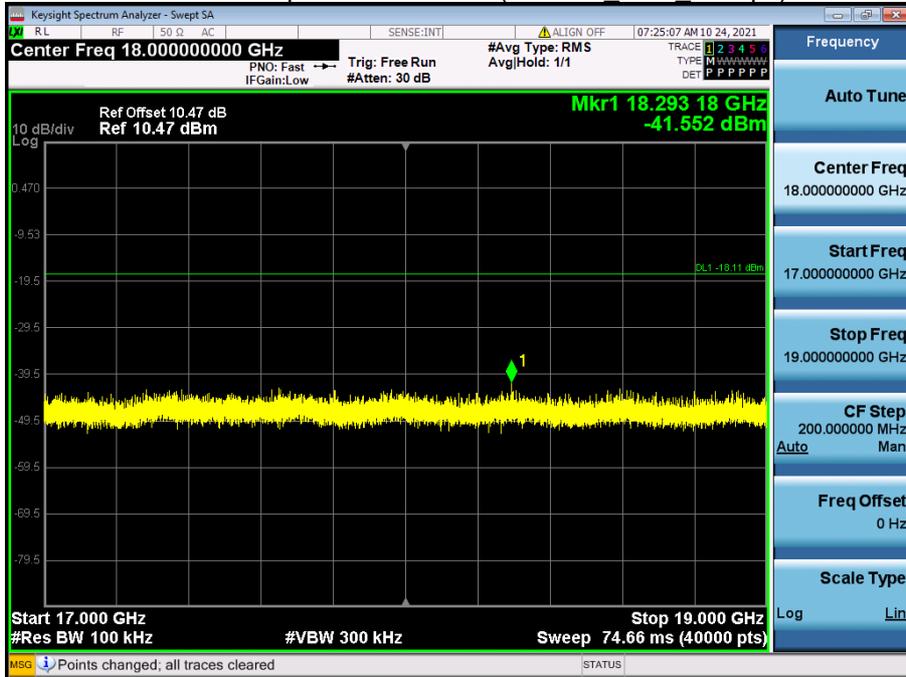
15 GHz ~ 17 GHz

Conducted Spurious Emission (802.11b Ch.1 1 Mbps)



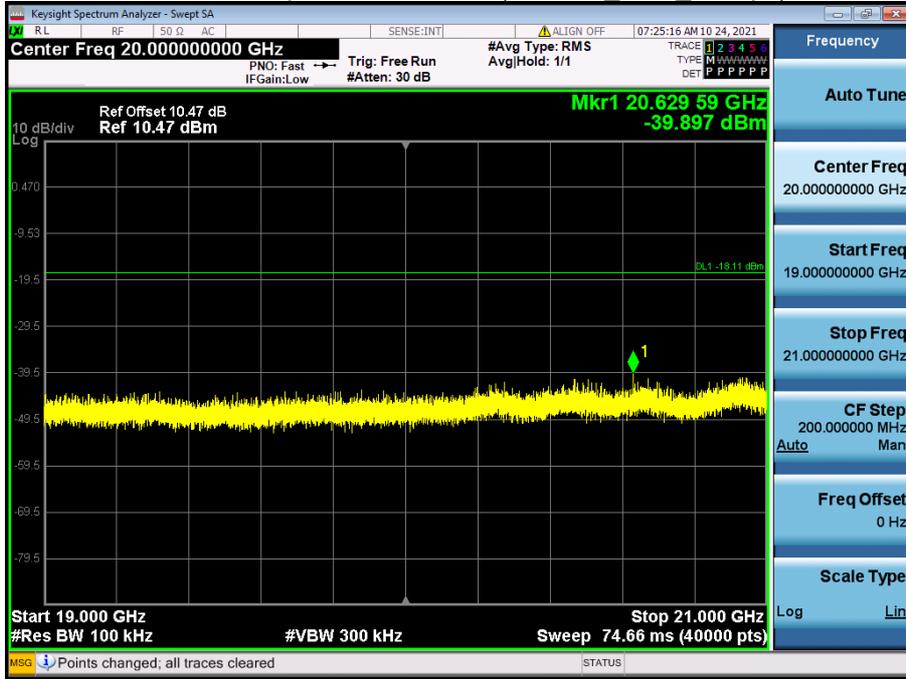
17 GHz ~ 19 GHz

Conducted Spurious Emission (802.11b Ch.1 1 Mbps)



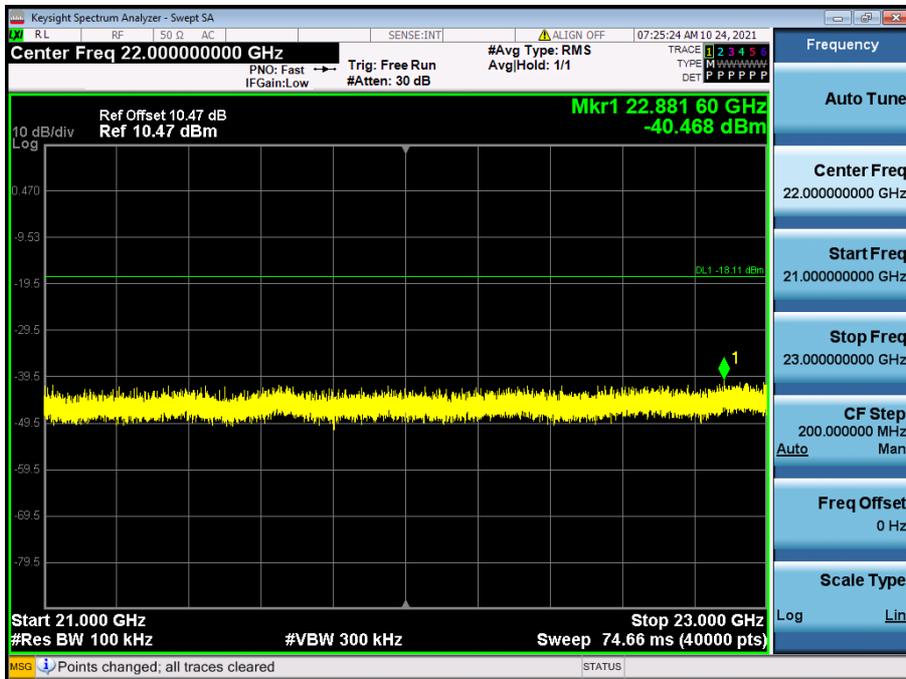
19 GHz ~ 21 GHz

Conducted Spurious Emission (802.11b Ch.1_1 Mbps)



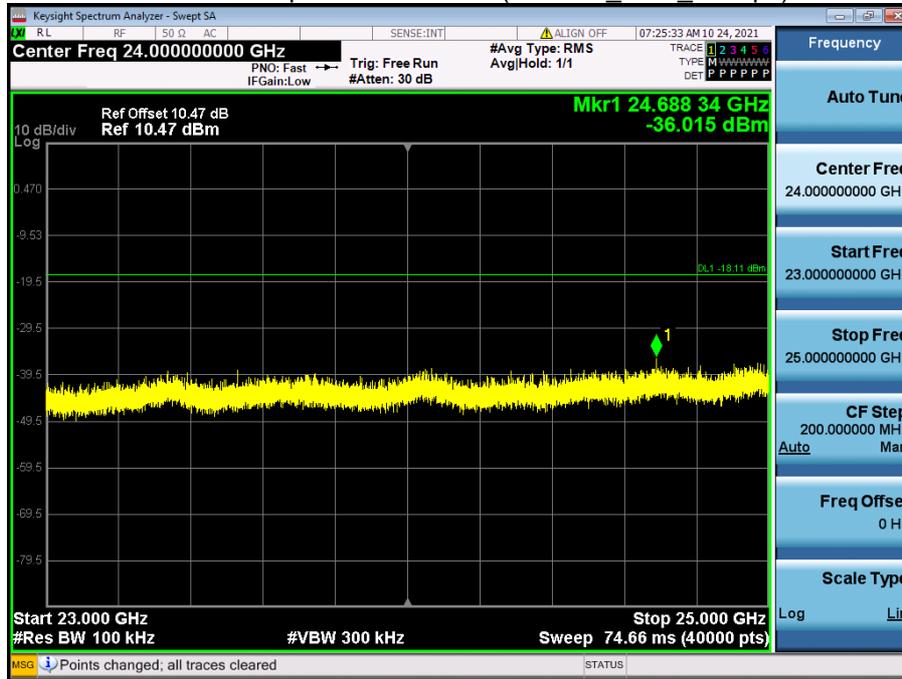
21 GHz ~ 23 GHz

Conducted Spurious Emission (802.11b_Ch.1_1 Mbps)



23 GHz ~ 25 GHz

Conducted Spurious Emission (802.11b Ch.1_1 Mbps)



9.6 RADIATED SPURIOUS EMISSIONS

Frequency Range : 9 kHz – 30 MHz

Frequency	Measured Level	A.F+C.L-A.G+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 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
4. Radiated test is performed with hopping off.

Frequency Range : Below 1 GHz

Frequency	Measured Level	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. Radiated emissions measured in frequency range from 30 MHz to 1000 MHz were made with an instrument using Quasi peak detector mode.
2. Radiated test is performed with hopping off.

Frequency Range : Above 1 GHz**[Ant.1(SISO)]**

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

Frequency [MHz]	Measured Level [dBμV]	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	45.20	3.48	V	48.68	73.98	25.30	PK
4824	32.42	3.48	V	35.90	53.98	18.08	AV
7236	41.64	8.67	V	50.31	73.98	23.67	PK
7236	29.52	8.67	V	38.19	53.98	15.79	AV
4824	43.87	3.48	H	47.35	73.98	26.63	PK
4824	31.22	3.48	H	34.70	53.98	19.28	AV
7236	41.50	8.67	H	50.17	73.98	23.81	PK
7236	29.42	8.67	H	38.09	53.98	15.89	AV

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

Frequency [MHz]	Measured Level [dBμV]	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	42.95	3.19	V	46.14	73.98	27.84	PK
4874	30.81	3.19	V	34.00	53.98	19.98	AV
7311	40.87	9.41	V	50.28	73.98	23.70	PK
7311	28.82	9.41	V	38.23	53.98	15.75	AV
4874	41.87	3.19	H	45.06	73.98	28.92	PK
4874	29.99	3.19	H	33.18	53.98	20.80	AV
7311	40.04	9.41	H	49.45	73.98	24.53	PK
7311	28.75	9.41	H	38.16	53.98	15.82	AV

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

Frequency [MHz]	Measured Level [dB μ V]	A.F+C.L-A.G+D.F [dB/m]	ANT. POL [H/V]	Total [dB μ V/m]	Limit [dB μ V/m]	Margin [dB]	Measurement Type
4924	43.09	2.54	V	45.63	73.98	28.35	PK
4924	31.65	2.54	V	34.19	53.98	19.79	AV
7386	41.22	10.04	V	51.26	73.98	22.72	PK
7386	28.73	10.04	V	38.77	53.98	15.21	AV
4924	42.75	2.54	H	45.29	73.98	28.69	PK
4924	30.87	2.54	H	33.41	53.98	20.57	AV
7386	40.98	10.04	H	51.02	73.98	22.96	PK
7386	28.71	10.04	H	38.75	53.98	15.23	AV

Note:

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

[Ant.2(SISO)]

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

Frequency [MHz]	Measured Level [dB μ V]	A.F+C.L-A.G+D.F [dB/m]	ANT. POL [H/V]	Total [dB μ V/m]	Limit [dB μ V/m]	Margin [dB]	Measurement Type
4824	44.10	3.48	V	47.58	73.98	26.40	PK
4824	32.99	3.48	V	36.47	53.98	17.51	AV
7236	41.86	8.67	V	50.53	73.98	23.45	PK
7236	31.28	8.67	V	39.95	53.98	14.03	AV
4824	43.82	3.48	H	47.30	73.98	26.68	PK
4824	33.24	3.48	H	36.72	53.98	17.26	AV
7236	40.87	8.67	H	49.54	73.98	24.44	PK
7236	31.07	8.67	H	39.74	53.98	14.24	AV

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

Frequency [MHz]	Measured Level [dB μ V]	A.F+C.L-A.G+D.F [dB/m]	ANT. POL [H/V]	Total [dB μ V/m]	Limit [dB μ V/m]	Margin [dB]	Measurement Type
4874	41.58	3.19	V	44.77	73.98	29.21	PK
4874	30.57	3.19	V	33.76	53.98	20.22	AV
7311	41.55	9.41	V	50.96	73.98	23.02	PK
7311	30.91	9.41	V	40.32	53.98	13.66	AV
4874	42.97	3.19	H	46.16	73.98	27.82	PK
4874	31.42	3.19	H	34.61	53.98	19.37	AV
7311	42.45	9.41	H	51.86	73.98	22.12	PK
7311	31.18	9.41	H	40.59	53.98	13.39	AV

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

Frequency [MHz]	Measured Level [dB μ V]	A.F+C.L-A.G+D.F [dB/m]	ANT. POL [H/V]	Total [dB μ V/m]	Limit [dB μ V/m]	Margin [dB]	Measurement Type
4924	44.49	2.54	V	47.03	73.98	26.95	PK
4924	35.75	2.54	V	38.29	53.98	15.69	AV
7386	44.82	10.04	V	54.86	73.98	19.12	PK
7386	34.44	10.04	V	44.48	53.98	9.50	AV
4924	44.67	2.54	H	47.21	73.98	26.77	PK
4924	36.42	2.54	H	38.96	53.98	15.02	AV
7386	44.55	10.04	H	54.59	73.98	19.39	PK
7386	33.43	10.04	H	43.47	53.98	10.51	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)]

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

Frequency [MHz]	Measured Level [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]	Measurement Type
4824	45.14	0.000	3.48	V	48.62	73.98	25.36	PK
4824	32.66	0.298	3.48	V	36.44	53.98	17.54	AV
7236	43.43	0.000	8.67	V	52.10	73.98	21.88	PK
7236	29.94	0.298	8.67	V	38.91	53.98	15.07	AV
4824	45.45	0.000	3.48	H	48.93	73.98	25.05	PK
4824	32.62	0.298	3.48	H	36.40	53.98	17.58	AV
7236	44.44	0.000	8.67	H	53.11	73.98	20.87	PK
7236	29.92	0.298	8.67	H	38.89	53.98	15.09	AV

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

Frequency [MHz]	Measured Level [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]	Measurement Type
4874	43.92	0.000	3.19	V	47.11	73.98	26.87	PK
4874	30.57	0.298	3.19	V	34.06	53.98	19.92	AV
7311	41.76	0.000	9.41	V	51.17	73.98	22.81	PK
7311	29.50	0.298	9.41	V	39.21	53.98	14.77	AV
4874	44.79	0.000	3.19	H	47.98	73.98	26.00	PK
4874	31.82	0.298	3.19	H	35.31	53.98	18.67	AV
7311	42.88	0.000	9.41	H	52.29	73.98	21.69	PK
7311	29.89	0.298	9.41	H	39.60	53.98	14.38	AV

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

Frequency [MHz]	Measure d Level [dB μ V]	Duty Cycle Factor [dB]	A.F+C.L- A.G+D.F [dB/m]	ANT. POL [H/V]	Total [dB μ V/m]	Limit [dB μ V/m]	Margin [dB]	Measure ment Type
4924	44.14	0.000	2.54	V	46.68	73.98	27.30	PK
4924	32.46	0.298	2.54	V	35.30	53.98	18.68	AV
7386	43.99	0.000	10.04	V	54.03	73.98	19.95	PK
7386	29.35	0.298	10.04	V	39.69	53.98	14.29	AV
4924	44.48	0.000	2.54	H	47.02	73.98	26.96	PK
4924	32.59	0.298	2.54	H	35.43	53.98	18.55	AV
7386	42.78	0.000	10.04	H	52.82	73.98	21.16	PK
7386	29.17	0.298	10.04	H	39.51	53.98	14.47	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]	Measured Level [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]	Measurement Type
4824	44.29	0.000	3.48	V	47.77	73.98	26.21	PK
4824	32.55	0.318	3.48	V	36.35	53.98	17.63	AV
7236	42.11	0.000	8.67	V	50.78	73.98	23.20	PK
7236	29.69	0.318	8.67	V	38.68	53.98	15.30	AV
4824	43.78	0.000	3.48	H	47.26	73.98	26.72	PK
4824	31.98	0.318	3.48	H	35.78	53.98	18.20	AV
7236	41.87	0.000	8.67	H	50.54	73.98	23.44	PK
7236	29.57	0.318	8.67	H	38.56	53.98	15.42	AV

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

Frequency [MHz]	Measured Level [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]	Measurement Type
4874	43.29	0.000	3.19	V	46.48	73.98	27.50	PK
4874	31.25	0.318	3.19	V	34.76	53.98	19.22	AV
7311	41.75	0.000	9.41	V	51.16	73.98	22.82	PK
7311	29.97	0.318	9.41	V	39.70	53.98	14.28	AV
4874	44.50	0.000	3.19	H	47.69	73.98	26.29	PK
4874	31.82	0.318	3.19	H	35.33	53.98	18.65	AV
7311	42.41	0.000	9.41	H	51.82	73.98	22.16	PK
7311	30.10	0.318	9.41	H	39.83	53.98	14.15	AV

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

Frequency [MHz]	Measure d Level [dB μ V]	Duty Cycle Factor [dB]	A.F+C.L- A.G+D.F [dB/m]	ANT. POL [H/V]	Total [dB μ V/m]	Limit [dB μ V/m]	Margin [dB]	Measure ment Type
4924	43.85	0.000	2.54	V	46.39	73.98	27.59	PK
4924	31.77	0.318	2.54	V	34.63	53.98	19.35	AV
7386	41.35	0.000	10.04	V	51.39	73.98	22.59	PK
7386	29.19	0.318	10.04	V	39.55	53.98	14.43	AV
4924	42.87	0.000	2.54	H	45.41	73.98	28.57	PK
4924	30.99	0.318	2.54	H	33.85	53.98	20.13	AV
7386	40.90	0.000	10.04	H	50.94	73.98	23.04	PK
7386	29.00	0.318	10.04	H	39.36	53.98	14.62	AV

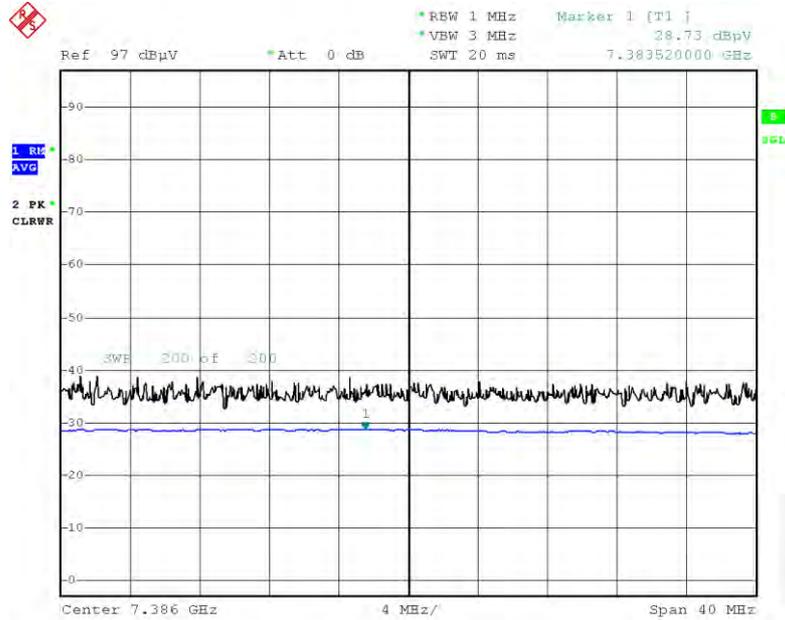
Note:

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

[Ant.1(SISO)]

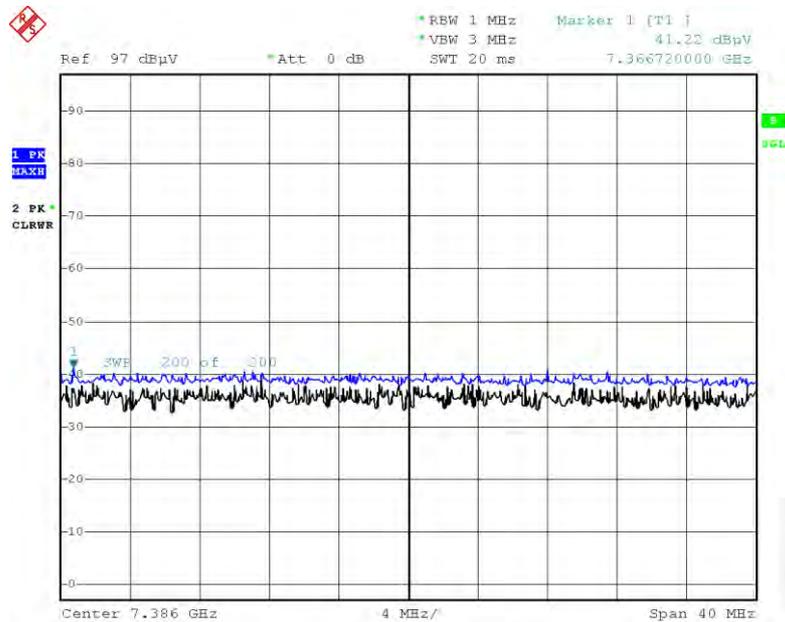
☑ Test Plots (Worst case : Y)

Radiated Spurious Emissions plot – Average Result (802.11b_1 Mbps, Ch.11 3rd Harmonic)



Date: 13.OCT.2021 19:31:42

Radiated Spurious Emissions plot – Peak Result (802.11b_1 Mbps, Ch.11 3rd Harmonic)

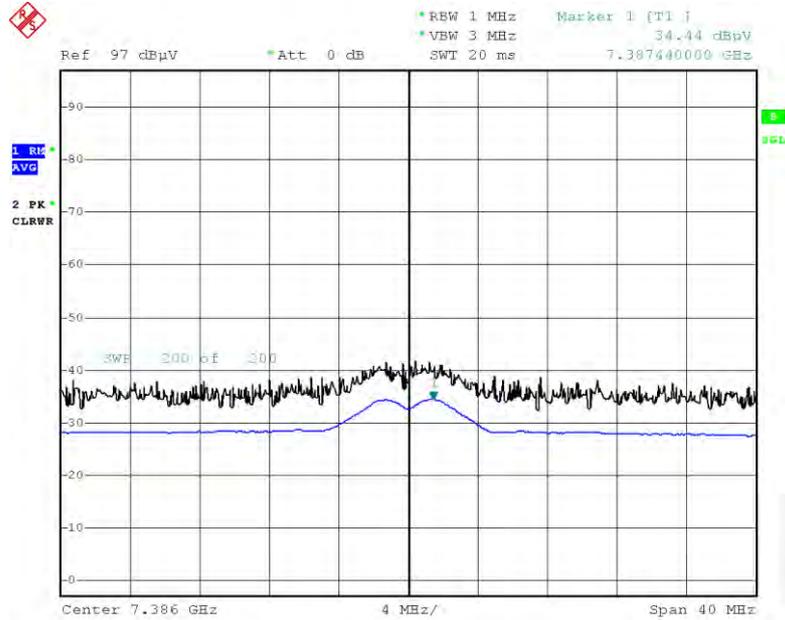


Date: 13.OCT.2021 19:31:52

[Ant.2(SISO)]

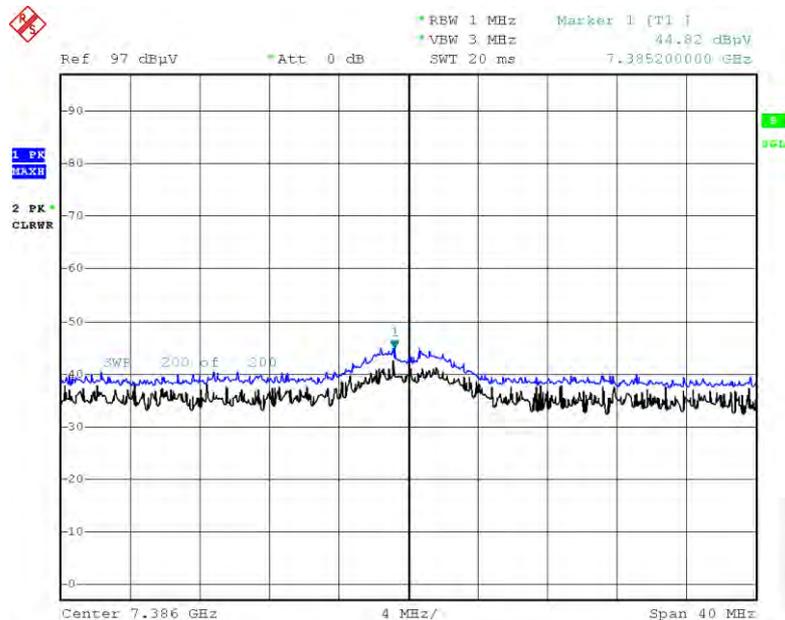
☑ Test Plots (Worst case : X)

Radiated Spurious Emissions plot – Average Result (802.11b_1 Mbps, Ch.11 3rd Harmonic)



Date: 13.OCT.2021 22:14:07

Radiated Spurious Emissions plot – Peak Result (802.11b_1 Mbps, Ch.11 3rd Harmonic)

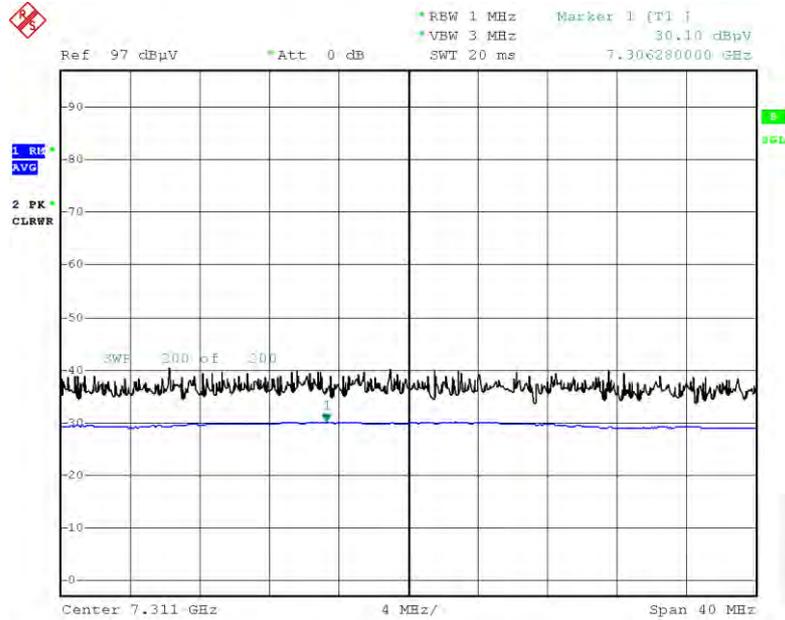


Date: 13.OCT.2021 22:14:20

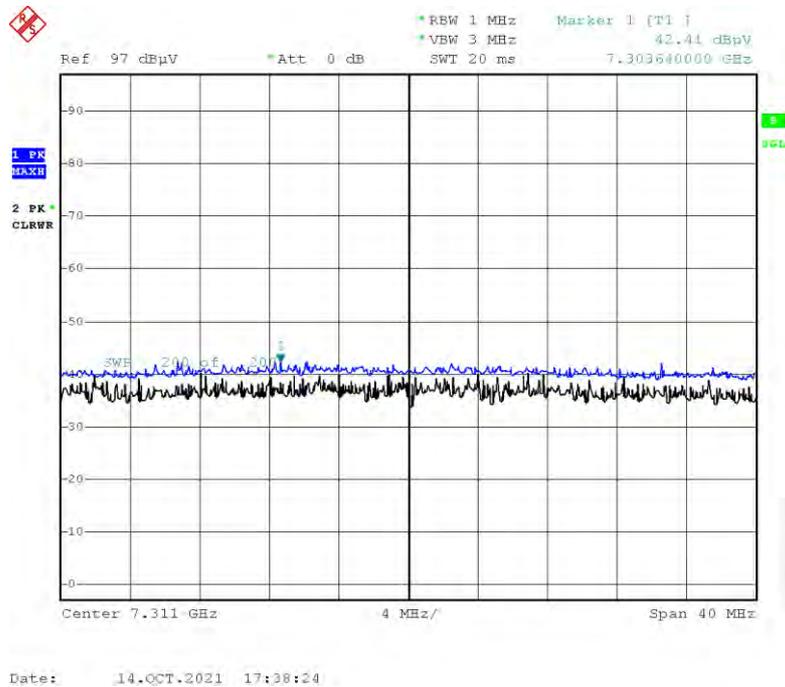
[Ant.1&Ant.2_MIMO(CDD)]

☑ Test Plots (Worst case :Y)

Radiated Spurious Emissions plot – Average Result (802.11n (HT20)_MCS0, Ch.6 3rd Harmonic)



Radiated Spurious Emissions plot – Peak Result (802.11n (HT20)_MCS0, Ch.6 3rd Harmonic)



Note: Plot of worst case are only reported.

9.7 RADIATED RESTRICTED BAND EDGES

[Ant.1(SISO)]

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

Frequency [MHz]	Measured Level [dBμV]	A.F+C.L+D.F [dB/m]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
2300.0 - 2390.0	20.20	33.78	H	53.98	73.98	20.00	PK
2300.0 - 2390.0	8.52	33.78	H	42.30	53.98	11.68	AV
2300.0 - 2390.0	19.78	33.78	V	53.56	73.98	20.42	PK
2300.0 - 2390.0	8.43	33.78	V	42.21	53.98	11.77	AV
2483.5 – 2500.0	27.82	34.10	H	61.91	73.98	12.07	PK
2483.5 – 2500.0	10.14	34.10	H	44.24	53.98	9.74	AV
2483.5 – 2500.0	27.62	34.10	V	61.72	73.98	12.26	PK
2483.5 – 2500.0	9.89	34.10	V	43.98	53.98	10.00	AV

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

Frequency [MHz]	Measured Level [dBμV]	A.F+C.L+D.F [dB/m]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
2483.5 – 2500.0	24.35	34.10	H	58.45	73.98	15.53	PK
2483.5 – 2500.0	8.69	34.10	H	42.79	53.98	11.19	AV
2483.5 – 2500.0	23.68	34.10	V	57.78	73.98	16.20	PK
2483.5 – 2500.0	8.28	34.10	V	42.38	53.98	11.60	AV
2483.5 – 2500.0	25.23	34.10	H	59.33	73.98	14.65	PK
2483.5 – 2500.0	8.61	34.10	H	42.71	53.98	11.27	AV
2483.5 – 2500.0	24.98	34.10	V	59.08	73.98	14.90	PK
2483.5 – 2500.0	8.49	34.10	V	42.59	53.98	11.39	AV

[Ant.2(SISO)]

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

Frequency [MHz]	Measured Level [dBμV]	A.F+C.L+D.F [dB/m]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
2300.0 - 2390.0	19.25	33.78	H	53.03	73.98	20.95	PK
2300.0 - 2390.0	8.49	33.78	H	42.26	53.98	11.72	AV
2300.0 - 2390.0	19.08	33.78	V	52.86	73.98	21.12	PK
2300.0 - 2390.0	8.17	33.78	V	41.94	53.98	12.04	AV
2483.5 – 2500.0	20.46	34.10	H	54.56	73.98	19.42	PK
2483.5 – 2500.0	9.36	34.10	H	43.46	53.98	10.52	AV
2483.5 – 2500.0	19.99	34.10	V	54.09	73.98	19.89	PK
2483.5 – 2500.0	9.27	34.10	V	43.37	53.98	10.61	AV

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

Frequency [MHz]	Measured Level [dBμV]	A.F+C.L+D.F [dB/m]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
2483.5 – 2500.0	20.48	34.10	H	54.57	73.98	19.41	PK
2483.5 – 2500.0	8.69	34.10	H	42.79	53.98	11.19	AV
2483.5 – 2500.0	19.67	34.10	V	53.77	73.98	20.21	PK
2483.5 – 2500.0	8.49	34.10	V	42.59	53.98	11.39	AV
2483.5 – 2500.0	19.85	34.10	H	53.95	73.98	20.03	PK
2483.5 – 2500.0	8.58	34.10	H	42.68	53.98	11.30	AV
2483.5 – 2500.0	19.64	34.10	V	53.74	73.98	20.24	PK
2483.5 – 2500.0	8.42	34.10	V	42.52	53.98	11.46	AV

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

Operation Mode: 802.11g
 Transfer Rate: 6 Mbps
 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
2300.0 - 2390.0	32.17	0.000	33.78	H	65.94	73.98	8.04	PK
2300.0 - 2390.0	16.56	0.298	33.78	H	50.64	53.98	3.34	AV
2300.0 - 2390.0	31.89	0.00	33.78	V	65.67	73.98	8.31	PK
2300.0 - 2390.0	16.27	0.298	33.78	V	50.35	53.98	3.63	AV
#2483.5 -2484.5	29.19	0.000	34.10	H	63.29	73.98	10.69	PK
2484.5 – 2500.0	34.44	0.000	34.10	H	68.54	73.98	5.44	PK
#2483.5 -2484.5	16.13	0.298	34.10	H	50.53	53.98	3.45	AV
2484.5 – 2500.0	16.15	0.298	34.10	H	50.55	53.98	3.43	AV
2483.5 – 2500.0	28.97	0.000	34.10	V	63.07	73.98	10.91	PK
2483.5 – 2500.0	16.04	0.298	34.10	V	50.44	53.98	3.54	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

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
2483.5 – 2500.0	28.42	0.000	34.10	H	62.52	73.98	11.46	PK
2483.5 – 2500.0	12.38	0.298	34.10	H	46.78	53.98	7.20	AV
2483.5 – 2500.0	27.95	0.000	34.10	V	62.05	73.98	11.93	PK
2483.5 – 2500.0	11.88	0.298	34.10	V	46.27	53.98	7.71	AV
2483.5 – 2500.0	33.17	0.000	34.10	H	67.27	73.98	6.71	PK
2483.5 – 2500.0	16.43	0.298	34.10	H	50.83	53.98	3.15	AV
2483.5 – 2500.0	32.79	0.000	34.10	V	66.89	73.98	7.09	PK
2483.5 – 2500.0	16.18	0.298	34.10	V	50.57	53.98	3.41	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
2300.0 - 2390.0	30.95	0.000	33.78	H	64.73	73.98	9.25	PK
2300.0 - 2390.0	13.56	0.318	33.78	H	47.66	53.98	6.32	AV
2300.0 - 2390.0	29.89	0.000	33.78	V	63.66	73.98	10.32	PK
2300.0 - 2390.0	13.27	0.318	33.78	V	47.37	53.98	6.61	AV
#2483.5 -2484.5	28.92	0.000	34.10	H	63.02	73.98	10.96	PK
2484.5 – 2500.0	37.19	0.000	34.10	H	71.29	73.98	2.69	PK
2483.5 – 2500.0	17.07	0.318	34.10	H	51.49	53.98	2.49	AV
2483.5 – 2500.0	32.65	0.000	34.10	V	66.75	73.98	7.23	PK
2483.5 – 2500.0	16.99	0.318	34.10	V	51.41	53.98	2.57	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

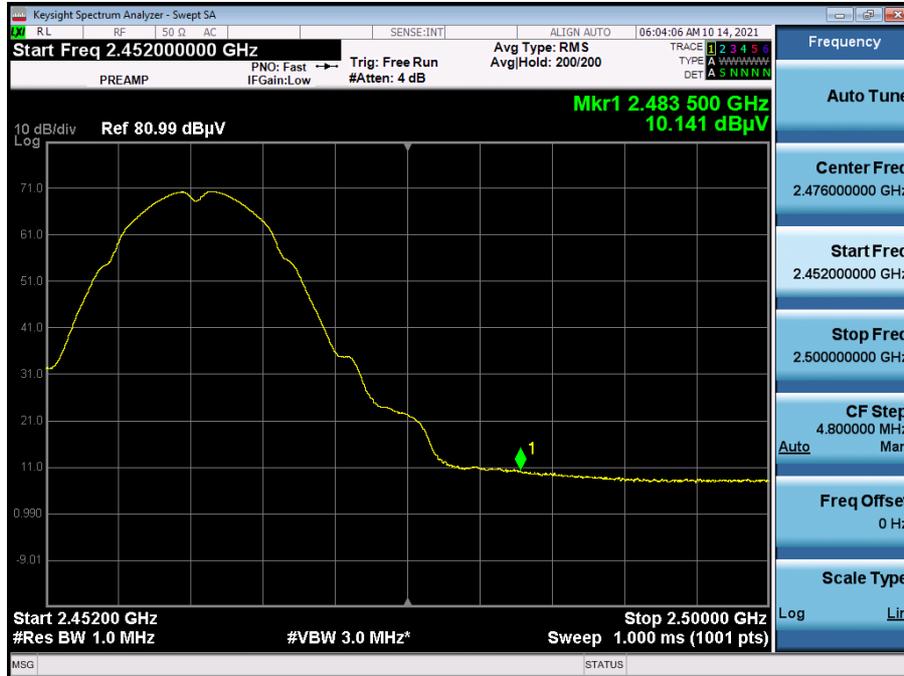
Frequency [MHz]	Measured Level [dBμV]	Duty Cycle Factor [dB]	A.F+C.L+D.F [dB/m]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
2483.5 – 2500.0	31.32	0.000	34.10	H	65.41	73.98	8.57	PK
2483.5 – 2500.0	14.07	0.318	34.10	H	48.48	53.98	5.50	AV
2483.5 – 2500.0	30.81	0.000	34.10	V	64.91	73.98	9.07	PK
2483.5 – 2500.0	13.76	0.318	34.10	V	48.17	53.98	5.81	AV
2483.5 – 2500.0	35.60	0.000	34.10	H	69.70	73.98	4.28	PK
#2483.5 -2484.5	12.33	0.318	34.10	H	46.75	53.98	7.23	AV
2484.5 – 2500.0	11.13	0.318	34.10	H	45.54	53.98	8.44	AV
2483.5 – 2500.0	34.28	0.000	34.10	V	68.38	73.98	5.60	PK
2483.5 – 2500.0	11.87	0.318	34.10	V	46.29	53.98	7.69	AV

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

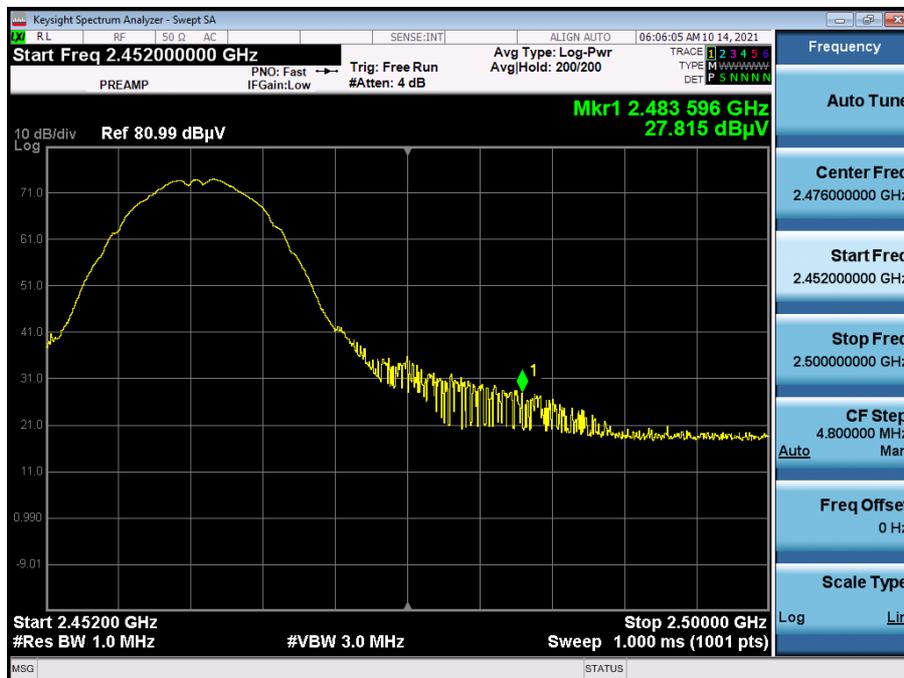
Test Plots

[Ant.1(SISO)] (Worst case : X-H)

Radiated Restricted Band Edges plot – Average Result (802.11b_1 Mbps Ch.11)



Radiated Restricted Band Edges plot – Peak Result (802.11b_1 Mbps Ch.11)

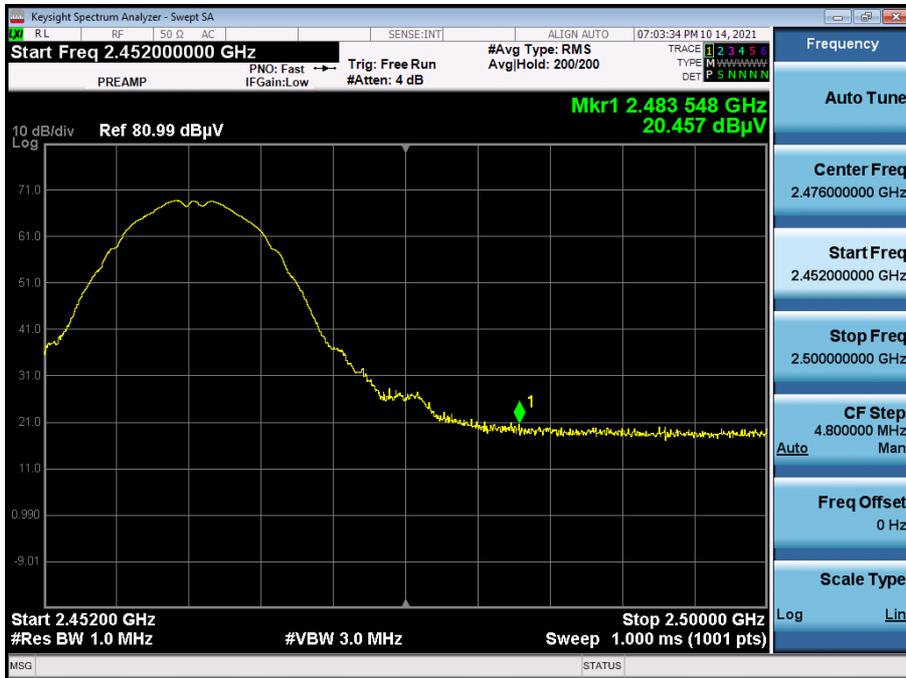


[Ant.2(SISO)] (Worst case : Y-H)

Radiated Restricted Band Edges plot – Average Result (802.11b_1 Mbps Ch.11)

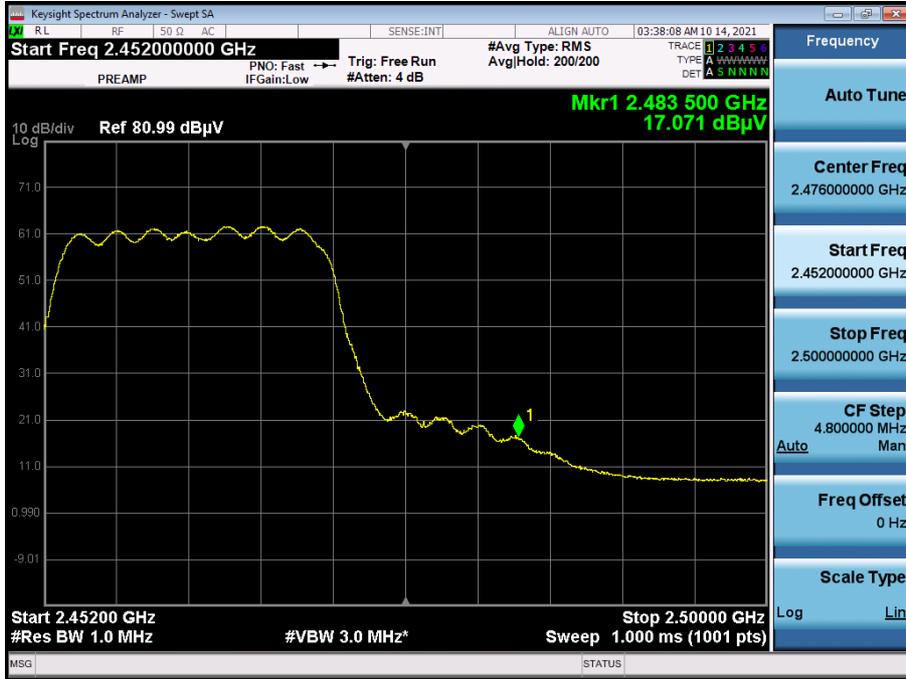


Radiated Restricted Band Edges plot – Peak Result (802.11b_1 Mbps Ch.11)



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

Radiated Restricted Band Edges plot – Average Result (802.11n (HT20)_MCS0, Ch.11)

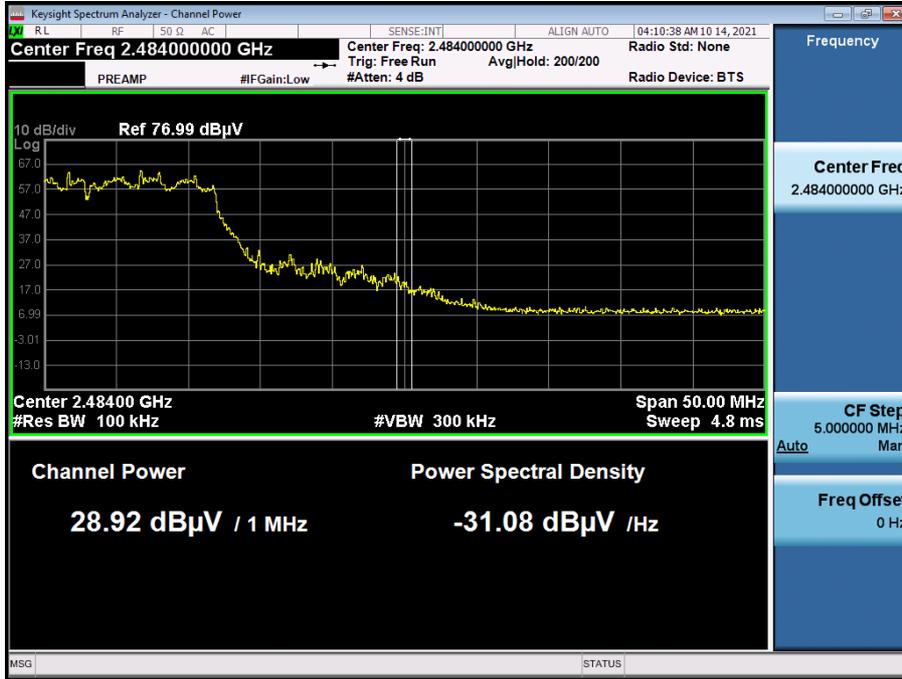


Radiated Restricted Band Edges plot – Peak Result (802.11n (HT20)_MCS0, Ch.11)



Radiated Restricted Band Edges plot – Peak Result (802.11n (HT20)_ MCS0, Ch.11)

Integration method Used_2 483.5 MHz – 2 484.5 MHz



Note:

Plot of worst case are only reported.

9.8 POWERLINE CONDUCTED EMISSIONS

Conducted Emissions (Line 1)

Test

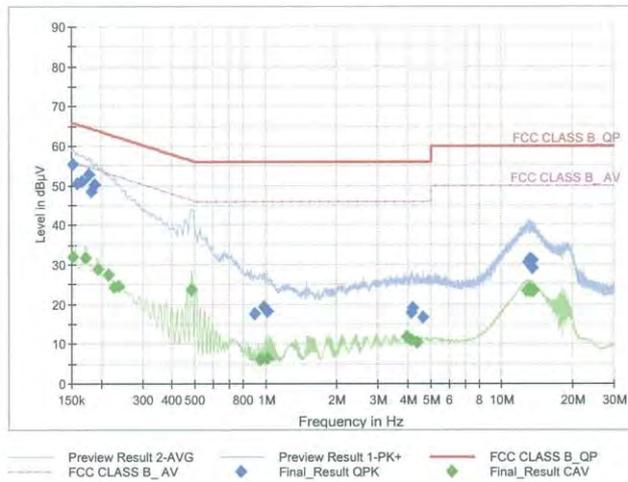
1 / 2

Test Report

Common Information

EUT : SM-N981B/DS
 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)
0.1523	55.40	65.88	10.47	9.000	L1	OFF	9.6
0.1590	50.51	65.52	15.01	9.000	L1	OFF	9.6
0.1658	50.98	65.17	14.19	9.000	L1	OFF	9.6
0.1770	52.78	64.63	11.84	9.000	L1	OFF	9.6
0.1815	48.37	64.42	16.05	9.000	L1	OFF	9.6
0.1883	50.28	64.11	13.83	9.000	L1	OFF	9.6
0.8960	17.49	56.00	38.51	9.000	L1	OFF	9.7
0.9860	19.27	56.00	36.73	9.000	L1	OFF	9.7
1.0153	18.26	56.00	37.74	9.000	L1	OFF	9.7
4.1428	17.90	56.00	38.10	9.000	L1	OFF	9.8
4.1720	19.03	56.00	36.97	9.000	L1	OFF	9.8
4.6468	16.84	56.00	39.16	9.000	L1	OFF	9.9
12.9560	30.68	60.00	29.32	9.000	L1	OFF	10.2
12.9875	30.99	60.00	29.01	9.000	L1	OFF	10.2
13.1360	31.31	60.00	28.69	9.000	L1	OFF	10.2
13.1630	30.57	60.00	29.43	9.000	L1	OFF	10.2
13.4578	31.09	60.00	28.91	9.000	L1	OFF	10.2
13.4893	29.13	60.00	30.87	9.000	L1	OFF	10.2

2021-10-01

오후 6:36:41

Test

2 / 2

Final Result CAV

Frequency (MHz)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.1523	32.15	55.88	23.73	9.000	L1	OFF	9.6
0.1725	31.64	54.84	23.20	9.000	L1	OFF	9.6
0.1950	28.77	53.82	25.05	9.000	L1	OFF	9.6
0.2153	27.28	53.00	25.72	9.000	L1	OFF	9.6
0.2265	24.35	52.58	28.23	9.000	L1	OFF	9.6
0.2378	24.62	52.17	27.55	9.000	L1	OFF	9.6
0.4853	23.65	46.25	22.60	9.000	L1	OFF	9.6
0.9500	6.16	46.00	39.84	9.000	L1	OFF	9.7
1.0130	6.35	46.00	39.65	9.000	L1	OFF	9.7
3.9650	11.80	46.00	34.20	9.000	L1	OFF	9.8
4.1248	11.10	46.00	34.90	9.000	L1	OFF	9.8
4.3948	10.40	46.00	35.60	9.000	L1	OFF	9.8
12.7738	23.50	50.00	26.50	9.000	L1	OFF	10.2
12.9920	23.98	50.00	26.02	9.000	L1	OFF	10.2
13.1293	23.26	50.00	26.74	9.000	L1	OFF	10.2
13.4578	23.24	50.00	26.76	9.000	L1	OFF	10.2
13.5208	23.55	50.00	26.45	9.000	L1	OFF	10.2
13.6063	23.35	50.00	26.65	9.000	L1	OFF	10.2

2021-10-01

오후 6:36:41

Conducted Emissions (Line 2)

Test

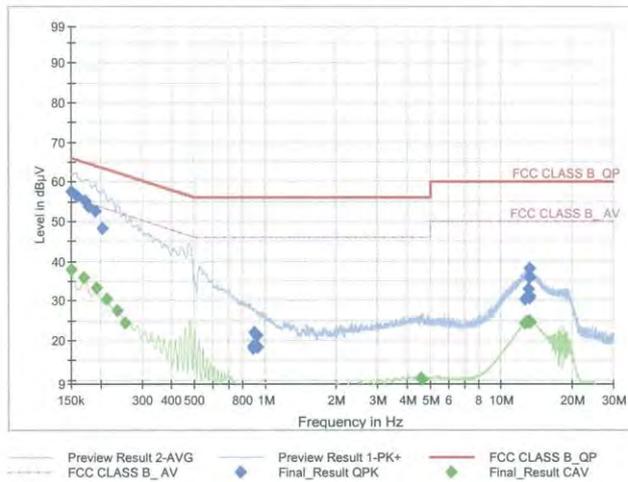
1 / 2

Test Report

Common Information

EUT : SM-N981B/DS
 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)
0.1500	57.36	66.00	8.64	9.000	N	OFF	9.6
0.1590	56.32	65.52	9.19	9.000	N	OFF	9.6
0.1725	55.26	64.84	9.58	9.000	N	OFF	9.6
0.1770	53.66	64.63	10.97	9.000	N	OFF	9.6
0.1905	52.62	64.02	11.40	9.000	N	OFF	9.6
0.2040	48.34	63.45	15.11	9.000	N	OFF	9.6
0.8848	18.06	56.00	37.94	9.000	N	OFF	9.7
0.8893	18.55	56.00	37.45	9.000	N	OFF	9.7
0.9005	21.98	56.00	34.02	9.000	N	OFF	9.7
0.9163	21.15	56.00	34.85	9.000	N	OFF	9.7
0.9208	21.42	56.00	34.58	9.000	N	OFF	9.7
0.9275	18.10	56.00	37.90	9.000	N	OFF	9.7
12.6050	30.37	60.00	29.63	9.000	N	OFF	10.2
13.1113	33.07	60.00	26.93	9.000	N	OFF	10.2
13.1450	30.65	60.00	29.35	9.000	N	OFF	10.2
13.1698	31.08	60.00	28.92	9.000	N	OFF	10.2
13.1743	38.05	60.00	21.95	9.000	N	OFF	10.2
13.1968	35.85	60.00	24.15	9.000	N	OFF	10.2

2021-10-01

오후 6:29:49

Test

2 / 2

Final Result CAV

Frequency (MHz)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.1500	37.77	56.00	18.23	9.000	N	OFF	9.6
0.1703	35.77	54.95	19.18	9.000	N	OFF	9.6
0.1928	33.13	53.92	20.79	9.000	N	OFF	9.6
0.2130	30.23	53.09	22.86	9.000	N	OFF	9.6
0.2355	27.37	52.25	24.89	9.000	N	OFF	9.6
0.2558	24.26	51.57	27.31	9.000	N	OFF	9.6
0.8938	6.94	46.00	39.06	9.000	N	OFF	9.7
0.9163	7.15	46.00	38.85	9.000	N	OFF	9.7
0.9815	8.96	46.00	37.04	9.000	N	OFF	9.7
4.6040	10.41	46.00	35.59	9.000	N	OFF	9.9
4.6085	10.56	46.00	35.44	9.000	N	OFF	9.9
4.6603	10.15	46.00	35.85	9.000	N	OFF	9.9
12.5780	24.30	50.00	25.70	9.000	N	OFF	10.2
12.7805	24.68	50.00	25.32	9.000	N	OFF	10.2
12.9178	24.56	50.00	25.44	9.000	N	OFF	10.2
13.1405	24.61	50.00	25.39	9.000	N	OFF	10.2
13.2575	24.84	50.00	25.16	9.000	N	OFF	10.2
13.3925	24.69	50.00	25.31	9.000	N	OFF	10.2

2021-10-01

오후 6:29:49

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
Test Receiver	ESCI	Rohde & Schwarz	100033	06/15/2022	Annual
Temperature Chamber	SU-642	ESPAC	0093008124	03/15/2022	Annual
Signal Analyzer	N9020A	Agilent	MY47380318	01/28/2022	Annual
Signal Analyzer	N9030A	Agilent	MY55410508	09/07/2022	Annual
Power Meter	N1911A	Agilent	MY45100523	04/08/2022	Annual
Power Sensor	N1921A	Agilent	MY57820067	04/08/2022	Annual
Directional Coupler	87300B	Agilent	3116A03621	11/10/2021	Annual
Power Splitter	11667B	Hewlett Packard	05001	05/20/2022	Annual
DC Power Supply	E3632A	Hewlett Packard	KR75303960	06/10/2022	Annual
Attenuator (10 dB)	8493C-010	Agilent	08285	06/28/2022	Annual
Software	EMC32	Rohde & Schwarz	N/A	N/A	N/A
FCC WLAN&BT&BLE Conducted Test Software v3.0	FCC WLAN&BT&BLE Conducted Test Software v3.0	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	2090	Emco	060520	N/A	N/A
Turn Table	Turn Table	Ets	N/A	N/A	N/A
Loop Antenna	Loop Antenna	Rohde & Schwarz	1513-333	03/19/2022	Biennial
Hybrid Antenna	VULB 9168	Schwarzbeck	9168-0895	09/04/2022	Biennial
Horn Antenna	BBHA 9120D	Schwarzbeck	9120D-1191	11/18/2021	Biennial
Horn Antenna (15 GHz ~ 40 GHz)	BBHA9170	Schwarzbeck	BBHA9170541	11/29/2021	Biennial
Spectrum Analyzer	FSP (9 kHz ~ 30 GHz)	Rohde & Schwarz	836650/016	09/13/2022	Annual
Spectrum Analyzer	FSV40-N	Rohde & Schwarz	101068-SZ	09/15/2022	Annual
Signal Analyzer	N9030A	Agilent	MY55410508	09/07/2022	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
Attenuator (10 dB)	CBLU1183540B-01	CERNEX	N/A	12/23/2021	Annual
56-10	56-10	WEINSCHEL			
Broadband Low Noise Amplifier	CBL06185030	CERNEX	N/A	12/23/2021	Annual
Attenuator (3 dB)	18B-03	Api tech.			
High Pass Filter	WHKX10-2700-3000-18000-40SS	Wainwright Instruments	N/A	12/23/2021	Annual
High Pass Filter	WHKX8-6090-7000-18000-40SS	Wainwright Instruments	N/A	12/23/2021	Annual
Thru	COAXIAL ATTENUATOR	T&M SYSTEM	N/A	12/23/2021	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-2110-FC068-P