

FCC DTS REPORT

Certification

Applicant Name:

SAMSUNG Electronics Co., Ltd.

Date of Issue:

January 18, 2023

Address:

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

Test Site/Location:

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Report No.: HCT-RF-2301-FC054**FCC ID:** A3LSMA546E**APPLICANT:** SAMSUNG Electronics Co., Ltd.**Model:**

SM-A546E/DS

Additional Model:

SM-A546E

EUT Type:

Mobile Phone

Average Output Power:

SISO : 802.11b : 17.90 dBm
802.11g : 15.70 dBm
802.11n(HT20) : 15.65 dBm

MIMO : 802.11b : 21.12 dBm
802.11g : 19.26 dBm
802.11n(HT20) : 19.31 dBm

Frequency Range:

2 412 MHz ~ 2 472 MHz

Modulation type:

CCK/DSSS/OFDM

FCC Classification:

Digital Transmission System(DTS)

FCC Rule Part(s):

Part 15.247

Engineering Statement:

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

Report No.: HCT-RF-2301-FC054

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)

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HCT CO.,LTD.

Report No.: HCT-RF-2301-FC054

FCC ID: A3LSMA546E

Version

TEST REPORT NO.	DATE	DESCRIPTION
HCT-RF-2301-FC054	January 18, 2023	- First Approval Report

Table of Contents

REVIEWED BY	2
1. EUT DESCRIPTION	5
ANTENNA CONFIGURATIONS	6
2. TEST METHODOLOGY	7
EUT CONFIGURATION	7
EUT EXERCISE	7
GENERAL TEST PROCEDURES	7
DESCRIPTION OF TEST MODES	7
3. INSTRUMENT CALIBRATION.....	8
4. FACILITIES AND ACCREDITATIONS	8
FACILITIES	8
EQUIPMENT	8
5. ANTENNA REQUIREMENTS	9
6. MEASUREMENT UNCERTAINTY	9
7. DESCRIPTION OF TESTS.....	10
8. SUMMARY TEST OF RESULTS	25
9. TEST RESULT	26
9.1 DUTY CYCLE.....	26
9.2 6 dB BANDWIDTH	29
9.3 OUTPUT POWER	37
9.4 POWER SPECTRAL DENSITY	61
9.5 BAND EDGE / CONDUCTED SPURIOUS EMISSIONS.....	70
9.6 RADIATED SPURIOUS EMISSIONS	87
9.7 RADIATED RESTRICTED BAND EDGES	91
9.8 POWERLINE CONDUCTED EMISSIONS	99
10. LIST OF TEST EQUIPMENT	101
11. ANNEX A_ TEST SETUP PHOTO	104

1. EUT DESCRIPTION

Model	SM-A546E/DS		
Additional Model	SM-A546E		
EUT Type	Mobile Phone		
Power Supply	DC 3.85 V		
Frequency Range	2 412 MHz ~ 2 472 MHz		
Max. RF Output Power	<u>Average Power</u>	SISO(Ant. 1)	802.11b : 17.90 dBm 802.11g : 15.70 dBm 802.11n(HT20) : 15.65 dBm
		MIMO	802.11b : 21.12 dBm 802.11g : 19.26 dBm 802.11n(HT20) : 19.31 dBm
	<u>Peak Power</u>	SISO(Ant. 1)	802.11b : 23.60 dBm 802.11g : 24.22 dBm 802.11n(HT20) : 24.05 dBm
		MIMO	802.11b : 27.22 dBm 802.11g : 27.57 dBm 802.11n(HT20) : 27.55 dBm
Modulation Type	DSSS/CCK : 802.11b OFDM : 802.11g, 802.11n		
Number of Channels	13 Channels		
Date(s) of Tests	November 30, 2022 ~ January 17, 2023		
Serial number	Radiated: R3CTA04MCRJ Conducted: R3CTA04MCBE		

ANTENNA CONFIGURATIONS

1. Antenna configuration

Configurations	SISO		MIMO	
	Ant1	Ant2	CDD	SDM
802.11b	O	X	O	X
802.11g	O	X	O	X
802.11n(HT20)	O	X	X	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. Directional Gain Calculation

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

$$\text{Directional gain(SDM)} = G_{\max} + 10 \cdot \log(N_{\text{ANT}} / N_{\text{SS}}),$$

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

Ant Gain (dBi)		N _{ANT} / N _{SS}	Directional Gain (dBi)	
			SDM	CDD
ANT1	-4.93	2 / 2	-4.93	-4.03
ANT2	-9.84			

Note

According to Ansi C63.10-2013 section 14.4.3, the directional gain is calculated using the formula, where G_N is the gain of the nth antenna and N_{ANT} is the total number of antennas used.

$$\text{Directional gain(SDM)} = G_{\max} + 10 \cdot \log(N_{\text{ANT}} / N_{\text{SS}}),$$

$$\text{Directional Gain(CDD)} = 10 \cdot \log(((10^{(\text{ANT1 Gain}/20)} + 10^{(\text{ANT2 Gain}/20)})^2 / 2) \text{ dBi})$$

Sample MIMO Calculation:

Ex) Ant 1 : 11.58 dBm Ant 2 : 12.08 dBm

$$\text{Ant1} + \text{Ant 2} = \text{MIMO}$$

$$(11.58 \text{ dBm} + 12.08 \text{ dBm}) = (14.387 \text{ mW} + 16.143 \text{ mW}) = 30.53 \text{ mW} = 14.88 \text{ dBm}$$

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.

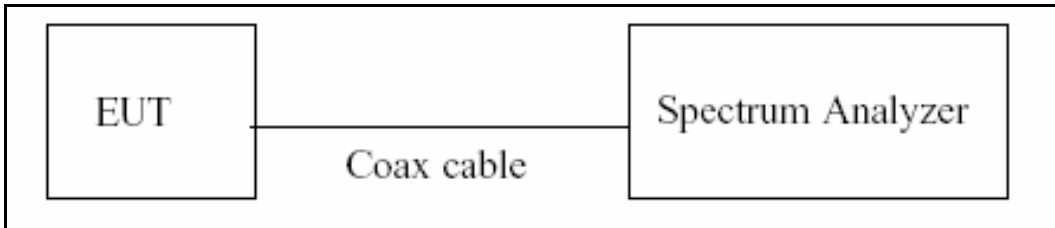
The measurement data shown herein meets or exceeds the U_{CISPR} measurement uncertainty values specified in CISPR 16-4-2 and, thus, can be compared directly to specified limits to determine compliance.

Parameter	Expanded Uncertainty (dB)
Conducted Disturbance (150 kHz ~ 30 MHz)	2.00 (Confidence level about 95 %, $k=2$)
Radiated Disturbance (9 kHz ~ 30 MHz)	4.40 (Confidence level about 95 %, $k=2$)
Radiated Disturbance (30 MHz ~ 1 GHz)	5.74 (Confidence level about 95 %, $k=2$)
Radiated Disturbance (1 GHz ~ 18 GHz)	5.51 (Confidence level about 95 %, $k=2$)
Radiated Disturbance (18 GHz ~ 40 GHz)	5.92 (Confidence level about 95 %, $k=2$)
Radiated Disturbance (Above 40 GHz)	5.48 (Confidence level about 95 %, $k=2$)

7. DESCRIPTION OF TESTS

7.1. Duty Cycle

Test Configuration



Test Procedure

The transmitter output is connected to the Spectrum Analyzer.

We tested according to the zero-span measurement method.

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

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

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

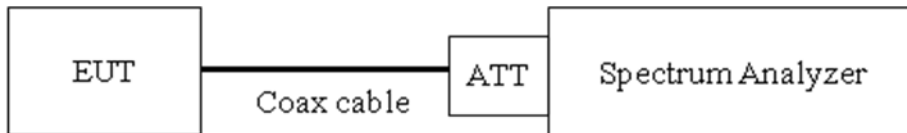
1. RBW = 8 MHz (the largest available value)
2. VBW = 8 MHz ($\geq$ RBW)
3. SPAN = 0 Hz
4. Detector = Peak
5. Number of points in sweep > 100
6. Trace mode = Clear write
7. Measure T_{total} and T_{on}
8. Calculate Duty Cycle = $T_{\text{on}} / T_{\text{total}}$ and Duty Cycle Factor = $10\log(1/\text{Duty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

7.2. 6 dB Bandwidth

Limit

The minimum permissible 6 dB bandwidth is 500 kHz.

Test Configuration



Test Procedure

The transmitter output is connected to the Spectrum Analyzer.

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

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

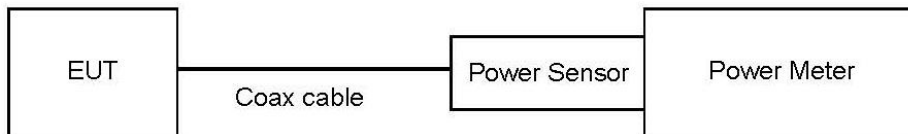
Note : We tested OBW using the automatic bandwidth measurement capability of a spectrum analyzer.

7.3. Output Power

Limit

The maximum permissible conducted output power is 1 Watt.

Test Configuration



Test Procedure

The transmitter output is connected to the Power Meter.

- Peak Power (Procedure 11.9.1.3 in ANSI 63.10-2013)
: Measure the peak power of the transmitter.

- Average Power (Procedure 11.9.2.3 in ANSI 63.10-2013)
 - 1) Measure the duty cycle.
 - 2) Measure the average power of the transmitter. This measurement is an average over both the on and off periods of the transmitter.
 - 3) Add $10 \log (1/x)$, where x is the duty cycle, to the measured power in order to compute the average power during the actual transmission times.

Sample Calculation

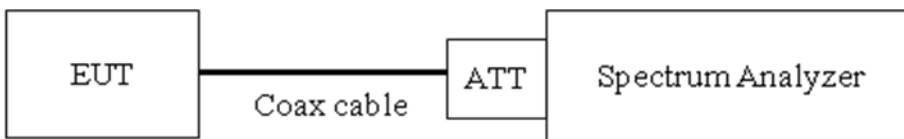
- Conducted Output Power(Peak) = Measured Value + ATT loss + Cable loss
- Conducted Output Power(Average) = Measured Value + ATT loss + Cable loss + Duty Cycle Factor

7.4. Power Spectral Density

Limit

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

Test Configuration



Test Procedure

The transmitter output is connected to the Spectrum Analyzer.

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

The spectrum analyzer is set to :

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

Sample Calculation

- Power Spectral Density = Measured Value + ATT loss + Cable loss + Duty Cycle Factor

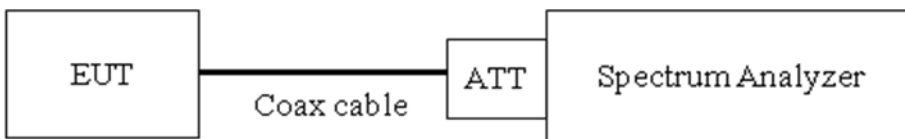
7.5. Conducted Band Edge(Out of Band Emissions) & Conducted Spurious Emissions

Limit

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

[Conducted > 30 dBc]

Test Configuration



Test Procedure

The transmitter output is connected to the spectrum analyzer.

(Procedure 11.11 in ANSI 63.10-2013)

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

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

Factors for frequency

Freq(MHz)	Factor(dB)
30	9.95
100	10.01
200	10.03
300	10.04
400	10.05
500	10.04
600	10.03
700	10.09
800	10.10
900	10.08
1000	10.11
2000	10.25
2400	10.36
2412	10.60
2437	10.60
2462	10.60
2500	10.76
3000	10.89
4000	11.24
5000	11.42
5700	11.87
5800	11.87
6000	11.98
7000	12.07
8000	12.19
9000	12.24
10000	12.38
11000	12.43
12000	12.49
13000	12.66
14000	12.96
15000	13.12
16000	13.15
17000	13.05
18000	13.08
19000	12.97
20000	13.23
21000	13.67

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

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

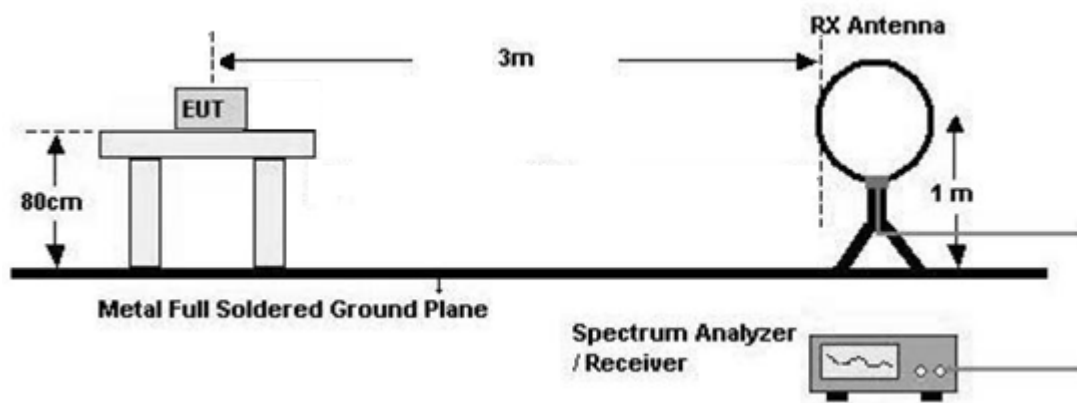
7.6. Radiated Test

Limit

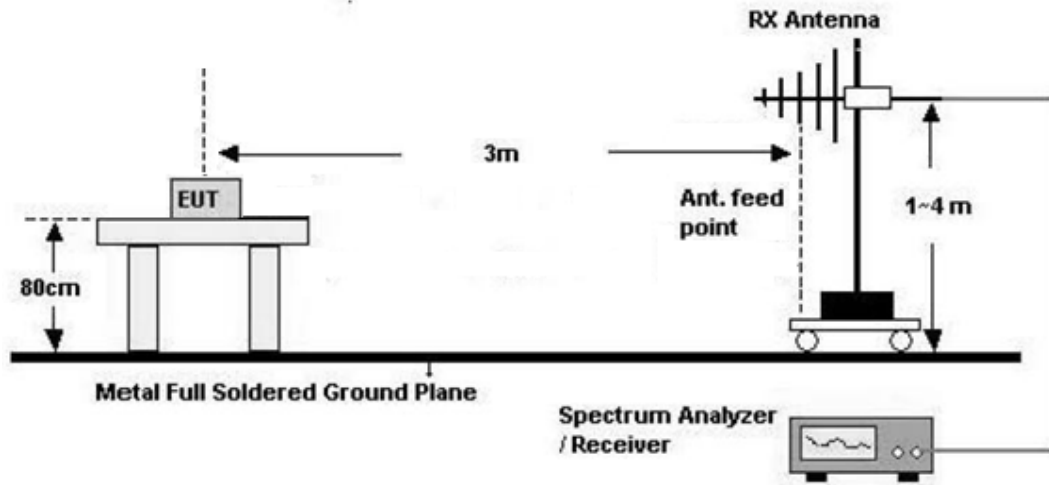
Frequency (MHz)	Field Strength ($\mu\text{V/m}$)	Measurement Distance (m)
0.009 – 0.490	$2400/F(\text{kHz})$	300
0.490 – 1.705	$24000/F(\text{kHz})$	30
1.705 – 30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Test Configuration

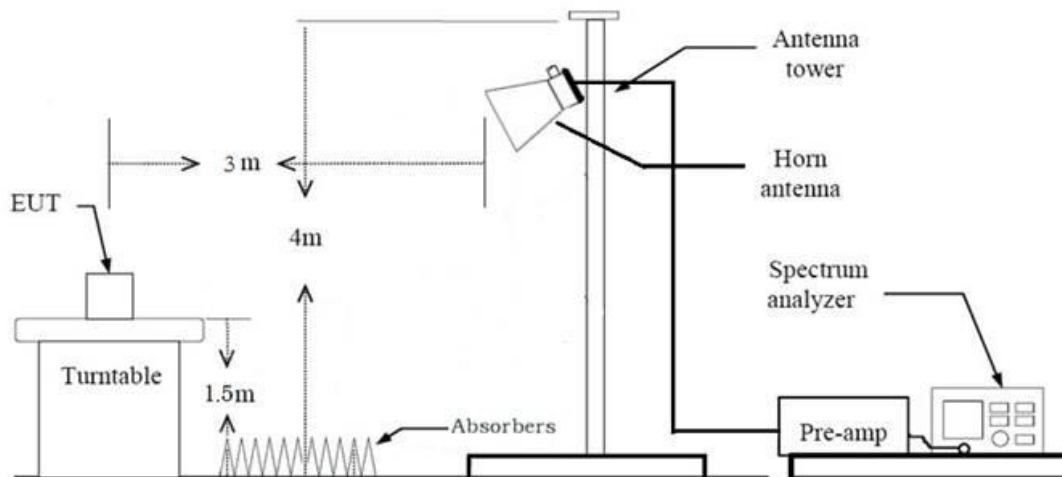
Below 30 MHz



30 MHz - 1 GHz



Above 1 GHz



Test Procedure of Radiated spurious emissions (Below 30 MHz)

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

KDB 414788 OFS and Chamber Correlation Justification

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

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

Test Procedure of Radiated spurious emissions (Below 1 GHz)

1. The EUT was placed on a non-conductive table located on semi-anechoic chamber.
2. The EUT is placed on a turntable, which is 0.8 m above ground plane.
3. The Hybrid antenna was placed at a location 3 m from the EUT, which is varied from 1 m to 4 m to find out the highest emissions.
4. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
5. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
6. Spectrum Setting
 - (1) Measurement Type(Peak):
 - Measured Frequency Range : 30 MHz – 1 GHz
 - Detector = Peak
 - Trace = Maxhold
 - RBW = 100 kHz
 - VBW $\geq 3 \times$ RBW
 - (2) Measurement Type(Quasi-peak):
 - Measured Frequency Range : 30 MHz – 1 GHz
 - Detector = Quasi-Peak
 - RBW = 120 kHzIn general, (1) is used mainly
7. Total = Measured Value + Antenna Factor(A.F) + Cable Loss(C.L)
8. Measurement value only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.

Test Procedure of Radiated spurious emissions (Above 1 GHz)

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

- Trace = Maxhold
- RBW = 1 MHz
- VBW $\geq 3 \times$ RBW

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

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

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

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

9. Measurement value only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.

10. Distance extrapolation factor = $20\log$ (test distance / specific distance) (dB)

11. Total(Measurement Type : Peak)

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

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

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

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

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

Test Procedure of Radiated Restricted Band Edge

1. The EUT is placed on a turntable, which is 1.5 m above ground plane.
2. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
3. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
4. EUT is set 3 m away from the receiving antenna, which is varied from 1 m to 4 m to find out the highest emissions.
5. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
6. Each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
7. The unit was tested with its standard battery.
8. Spectrum Setting

(1) Measurement Type(Peak):

- Measured Frequency Range : 2310 MHz ~ 2390 MHz / 2483.5 MHz ~ 2500 MHz
- Detector = Peak
- Trace = Maxhold
- RBW = 1 MHz
- VBW $\geq 3 \times$ RBW

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

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

9. Measurement value only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.

10. Distance extrapolation factor = $20\log(\text{test distance} / \text{specific distance})$ (dB)

11. Total(Measurement Type : Peak)

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

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

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

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

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

7.7. AC Power line Conducted Emissions

Limit

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

Frequency Range (MHz)	Limits (dB μ V)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56 ^(a)	56 to 46 ^(a)
0.50 to 5	56	46
5 to 30	60	50

^(a)Decreases with the logarithm of the frequency.

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

Test Configuration

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

Test Procedure

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

Sample Calculation

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

7.8. Worst case configuration and mode

Radiated test

1. All modes of operation were investigated and the worst case configuration results are reported.
 - Mode : Stand alone, Stand alone + External accessories(Earphone, etc)
 - Worstcase : Stand alone
2. EUT Axis
 - Radiated Spurious Emissions : Y
 - Radiated Restricted Band Edge : X
3. Duty cycle factor applies only 802.11g/n (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. Radiated Spurious Emission

All Antenna of operation were investigated and the worst case results are reported

 - Antenna Operation Type : SISO(Ant. 1), MIMO
 - Worst case : MIMO
6. 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
7. SM-A546E/DS, SM-A546E were tested and the worst case results are reported.
(Worst case : SM-A546E/DS)

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-A546E/DS, SM-A546E were tested and the worst case results are reported.
(Worst case : SM-A546E/DS)

Conducted test

1. All datarate of operation were investigated and the worst case datarate results are reported.
2. SM-A546E/DS, SM-A546E were tested and the worst case results are reported.
(Worst case : SM-A546E/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	8.610	8.745	0.985	0.068
	2	4.399	4.520	0.973	0.117
	5.5	1.718	1.854	0.926	0.333
	11	0.958	1.089	0.879	0.560
802.11g	6	1.424	1.544	0.922	0.351
	9	0.958	1.079	0.887	0.519
	12	0.725	0.841	0.861	0.648
	18	0.486	0.608	0.800	0.969
	24	0.370	0.486	0.760	1.189
	36	0.253	0.370	0.685	1.644
	48	0.198	0.314	0.629	2.013
	54	0.177	0.294	0.603	2.194
802.11n (HT20) SISO	MCS0	1.338	1.454	0.920	0.361
	MCS1	0.689	0.806	0.855	0.679
	MCS2	0.471	0.588	0.802	0.960
	MCS3	0.365	0.461	0.791	1.017
	MCS4	0.258	0.375	0.689	1.617
	MCS5	0.198	0.319	0.619	2.083
	MCS6	0.182	0.304	0.600	2.218
	MCS7	0.167	0.284	0.589	2.297
802.11n (HT20) MIMO	MCS8	0.690	0.806	0.856	0.673
	MCS9	0.365	0.461	0.791	1.017
	MCS10	0.258	0.380	0.680	1.675
	MCS11	0.203	0.319	0.635	1.973
	MCS12	0.152	0.270	0.562	2.502
	MCS13	0.122	0.238	0.511	2.919
	MCS14	0.117	0.233	0.500	3.010
	MCS15	0.111	0.228	0.489	3.108

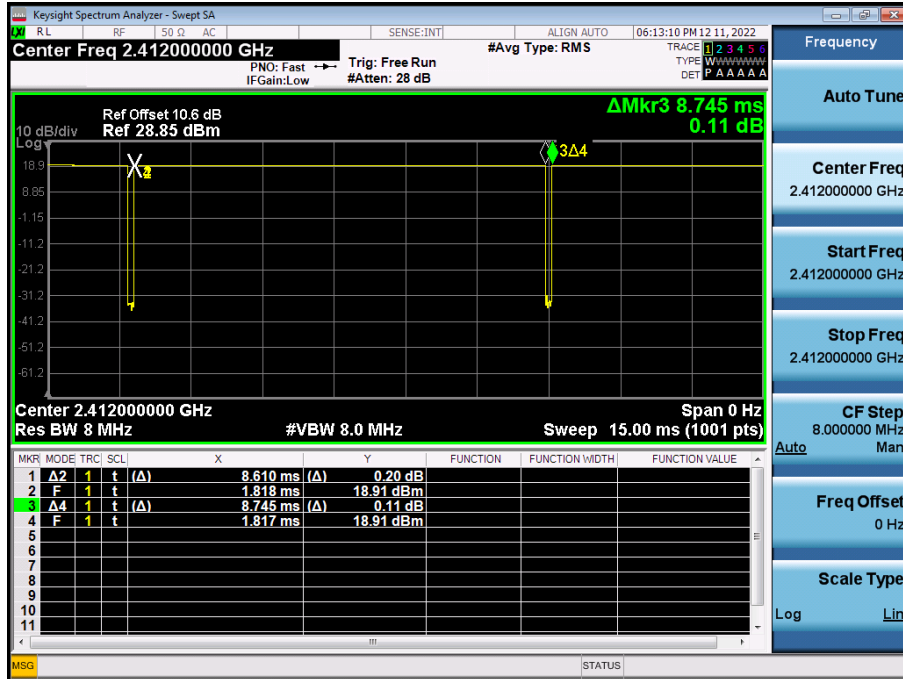
Test Plots

Note:

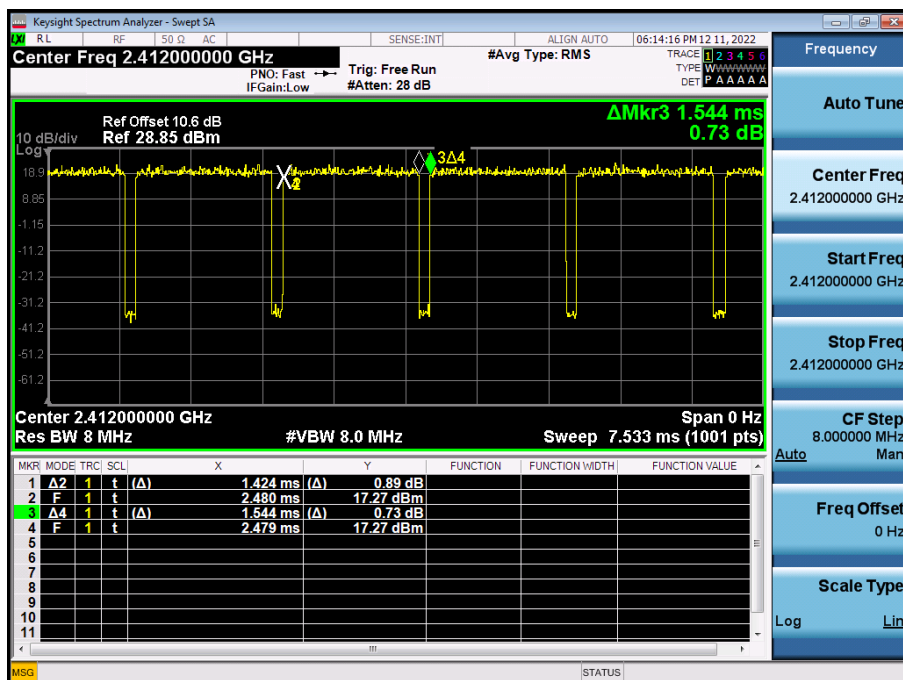
In order to simplify the report, attached plots were only the lowest data rate.

[SISO/MIMO(CDD)]

802.11b_1 Mbps

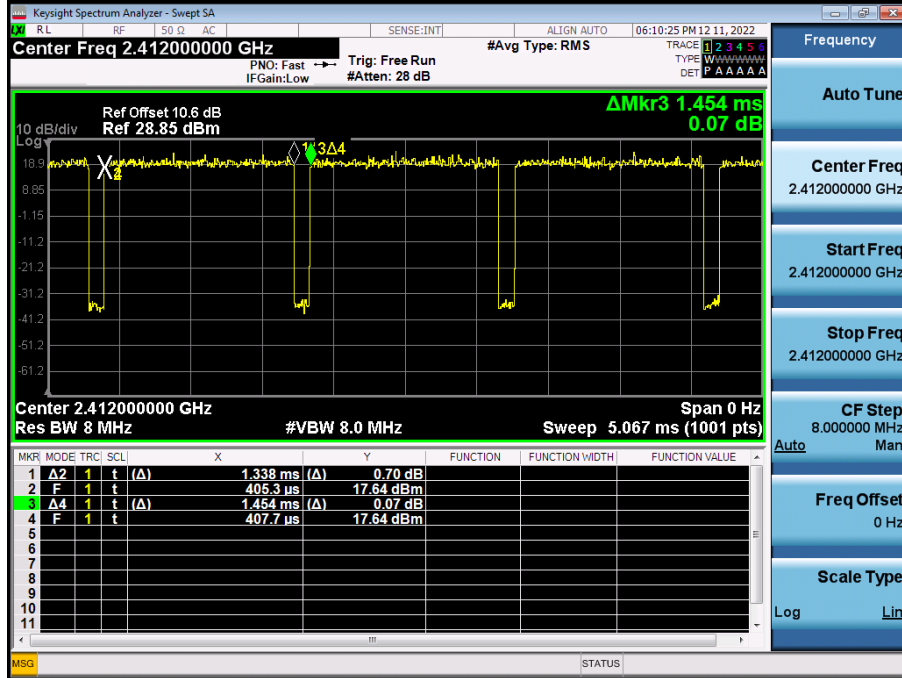


802.11g_6 Mbps



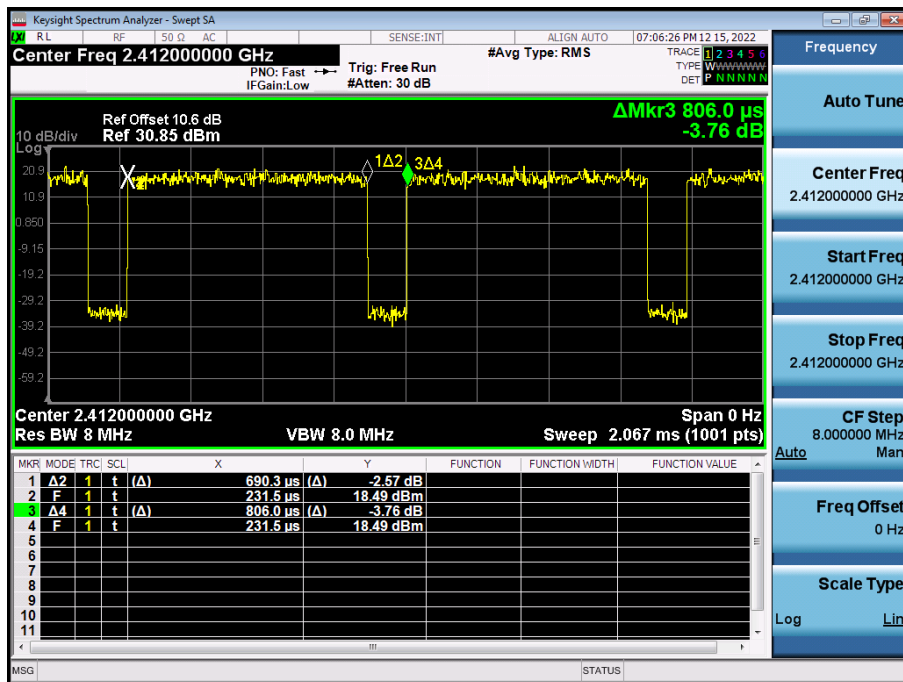
[SISO]

802.11n MCS0



[MIMO(SDM)]

802.11n_MCS8



9.2 6 dB BANDWIDTH

[SISO(Ant. 1)]

Mode	Frequency [MHz]	Channel No.	6dB Bandwidth [MHz]	Limit [MHz]
802.11b	2412	1	8.097	0.50
	2437	6	8.109	0.50
	2462	11	8.116	0.50
	2467	12	8.054	0.50
	2472	13	8.106	0.50
802.11g	2412	1	16.41	0.50
	2437	6	16.43	0.50
	2462	11	16.43	0.50
	2467	12	16.44	0.50
	2472	13	16.45	0.50
802.11n(HT20)	2412	1	17.62	0.50
	2437	6	17.67	0.50
	2462	11	17.65	0.50
	2467	12	17.66	0.50
	2472	13	17.68	0.50

[MIMO Ant. 1]

Mode	Frequency [MHz]	Channel No.	6dB Bandwidth [MHz]	Limit [MHz]
802.11b	2412	1	8.108	0.50
	2437	6	8.115	0.50
	2462	11	8.107	0.50
	2467	12	8.095	0.50
	2472	13	8.109	0.50
802.11g	2412	1	16.43	0.50
	2437	6	16.44	0.50
	2462	11	16.42	0.50
	2467	12	16.44	0.50
	2472	13	16.43	0.50
802.11n(HT20)	2412	1	17.63	0.50
	2437	6	17.66	0.50
	2462	11	17.64	0.50
	2467	12	17.66	0.50
	2472	13	17.65	0.50

[MIMO Ant. 2]

Mode	Frequency [MHz]	Channel No.	6dB Bandwidth [MHz]	Limit [MHz]
802.11b	2412	1	8.103	0.50
	2437	6	8.087	0.50
	2462	11	8.087	0.50
	2467	12	8.122	0.50
	2472	13	8.128	0.50
802.11g	2412	1	16.43	0.50
	2437	6	16.40	0.50
	2462	11	16.40	0.50
	2467	12	16.43	0.50
	2472	13	16.48	0.50
802.11n(HT20)	2412	1	17.66	0.50
	2437	6	17.60	0.50
	2462	11	17.62	0.50
	2467	12	17.66	0.50
	2472	13	17.70	0.50

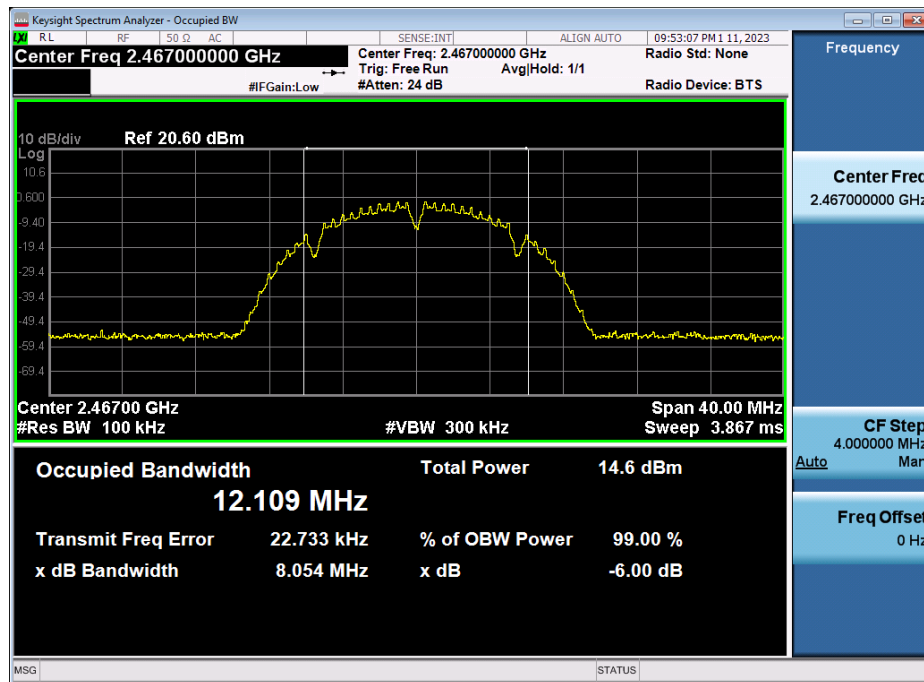
Test Plots

Note:

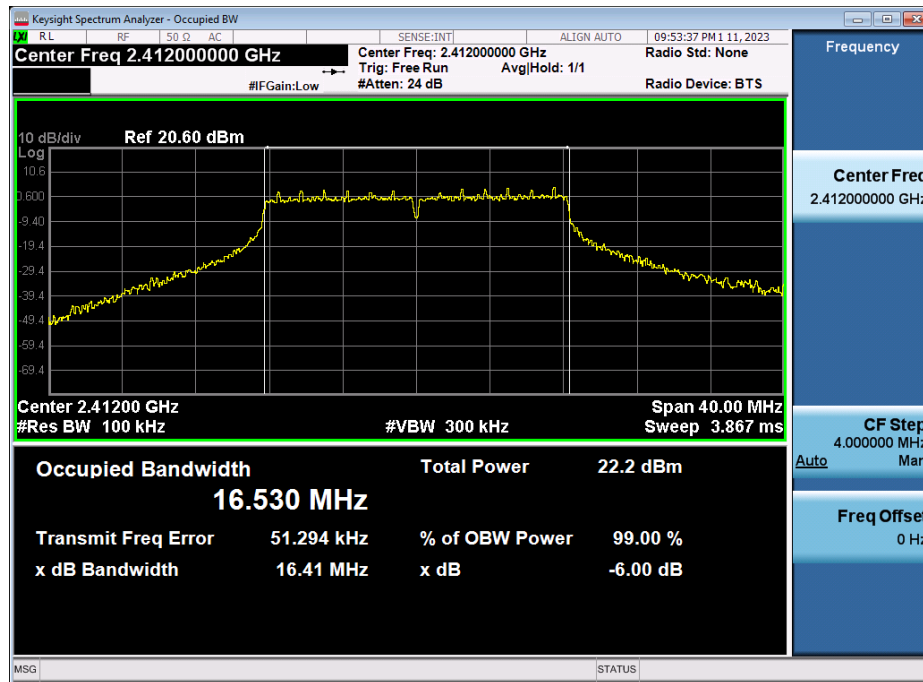
In order to simplify the report, attached plots were only the narrowest 6 dB BW channel.

[SISO(Ant. 1)]

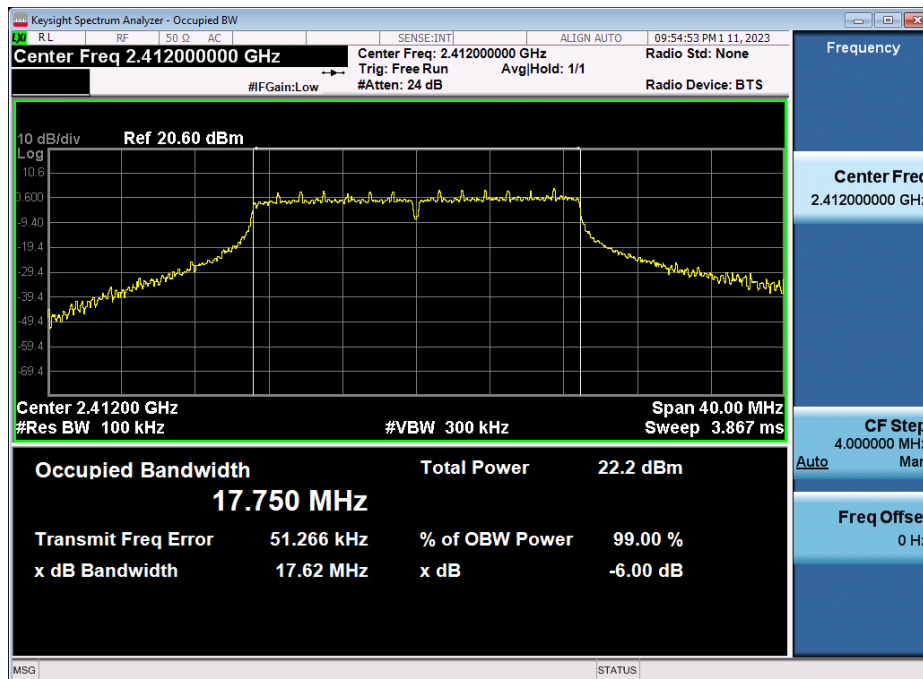
6 dB Bandwidth plot (802.11b-CH 12)



6 dB Bandwidth plot (802.11g-CH 1)

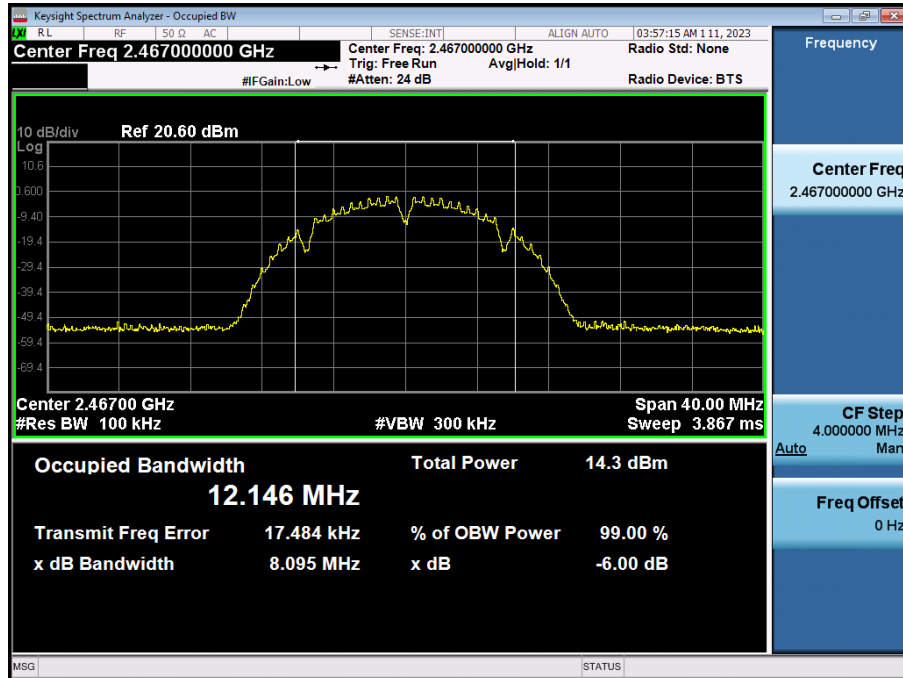


6 dB Bandwidth plot (802.11n_HT20-CH 1)

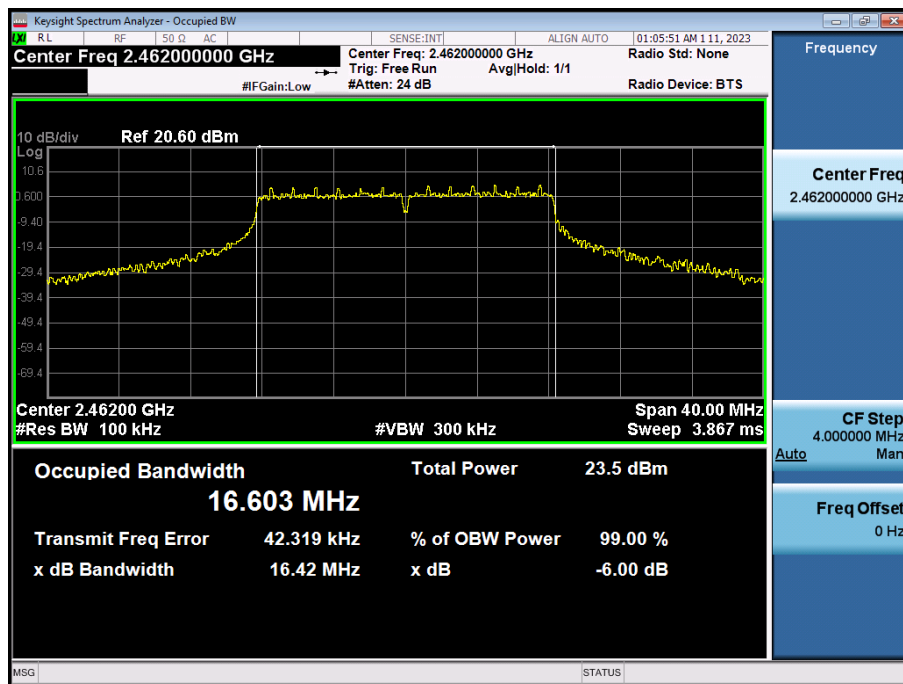


[MIMO Ant. 1]

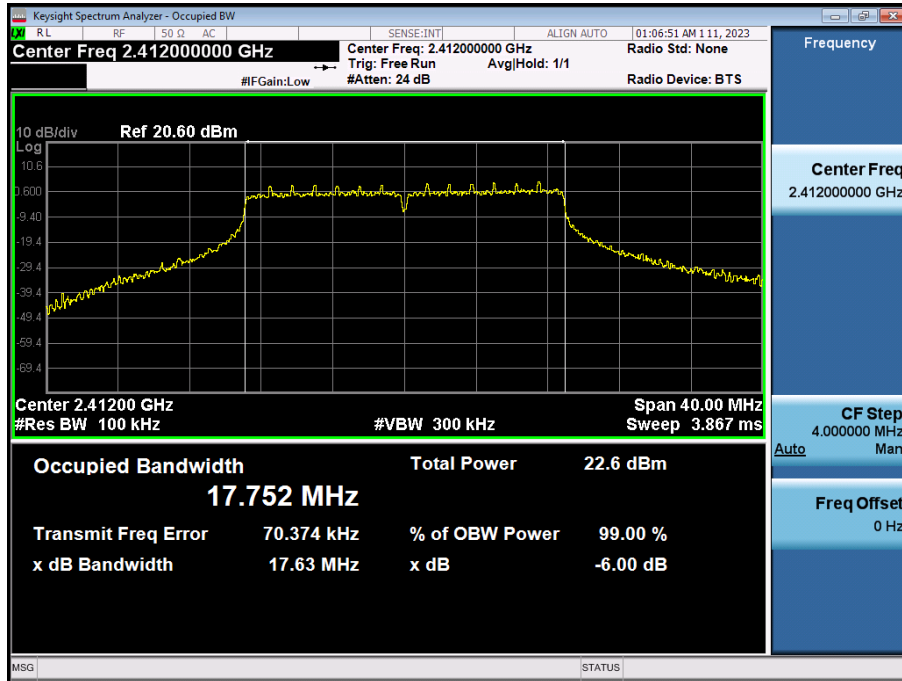
6 dB Bandwidth plot (802.11b-CH 12)



6 dB Bandwidth plot (802.11g-CH 11)

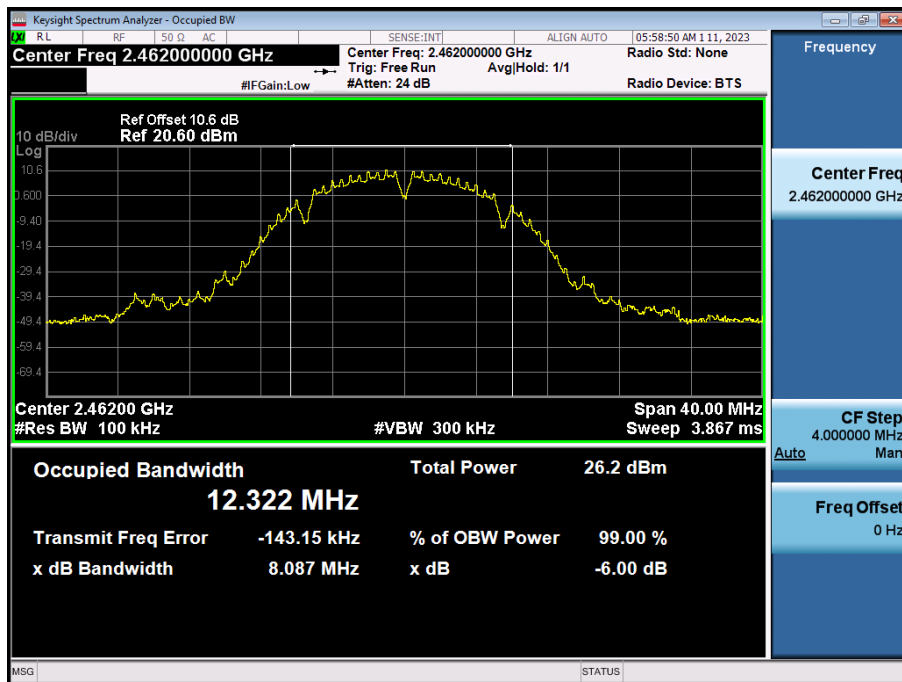


6 dB Bandwidth plot (802.11n_HT20-CH 1)

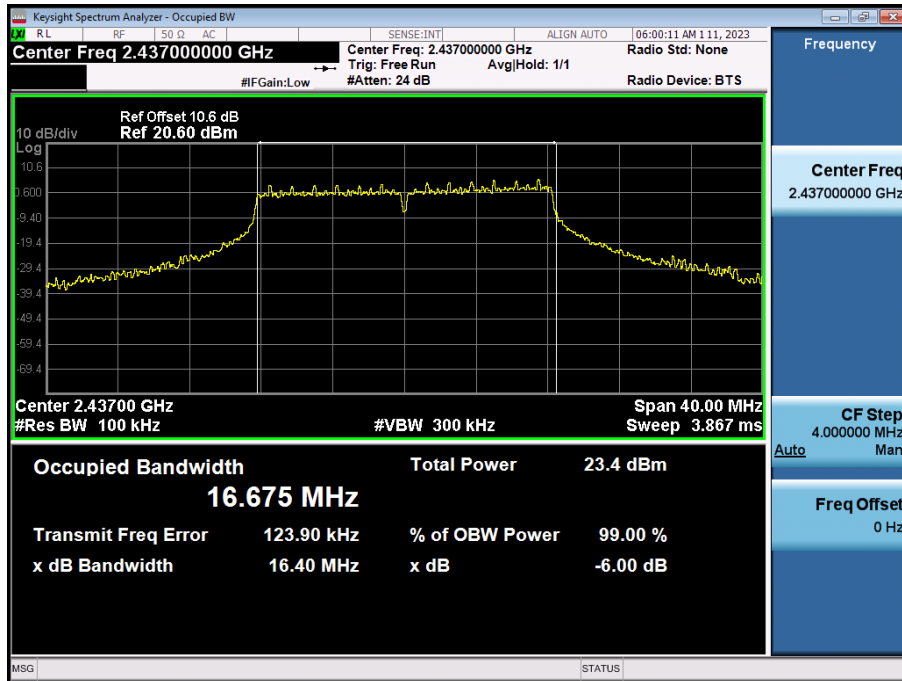


[MIMO Ant. 2]

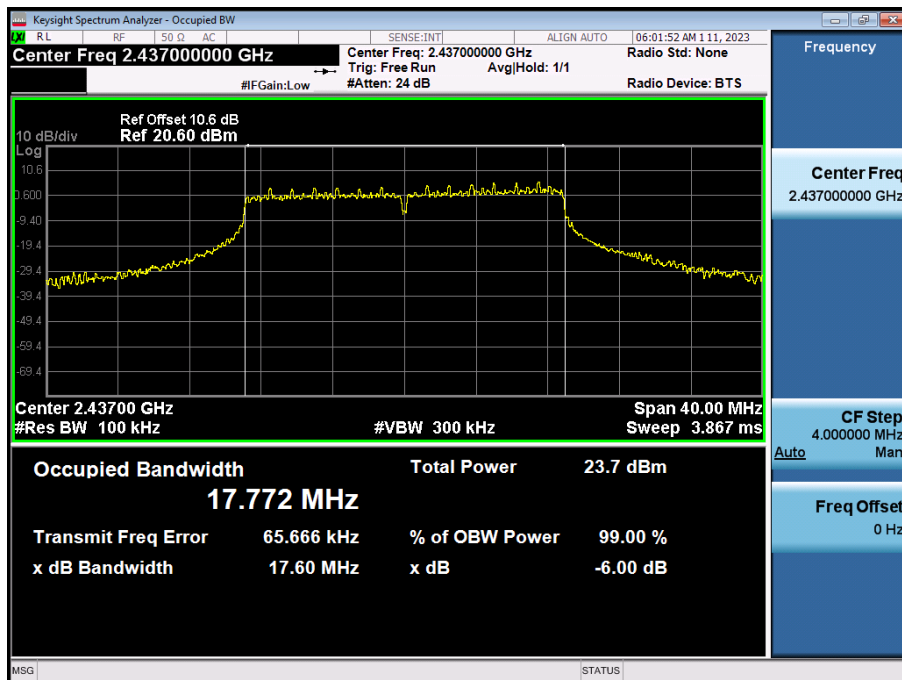
6 dB Bandwidth plot (802.11b-CH 11)



6 dB Bandwidth plot (802.11g-CH 6)



6 dB Bandwidth plot (802.11n_HT20-CH 6)



9.3 OUTPUT POWER

Note :

1. MIMO Power = $10 \cdot \log((10^{(\text{MIMO Ant. 1 power} / 10)} + (10^{(\text{MIMO Ant. 2 power} / 10)}))$

Peak Power

[SISO (Ant. 1)]

802.11b Mode		Rate (Mbps)	Peak Power (dBm)	Limit (dBm)
Frequency [MHz]	Channel No.			
2412	1	1	19.27	30
		2	19.53	30
		5.5	20.99	30
		11	22.47	30
2437	6	1	20.44	30
		2	20.43	30
		5.5	22.00	30
		11	23.48	30
2462	11	1	20.23	30
		2	20.52	30
		5.5	22.14	30
		11	23.60	30
2467	12	1	9.63	30
		2	9.89	30
		5.5	11.40	30
		11	12.90	30
2472	13	1	2.22	30
		2	2.50	30
		5.5	3.99	30
		11	5.47	30

802.11g Mode		Rate (Mbps)	Peak Power (dBm)	Limit (dBm)
Frequency[MHz]	Channel No.			
2412	1	6	23.35	30
		9	23.09	30
		12	22.78	30
		18	22.87	30
		24	23.54	30
		36	23.30	30
		48	22.14	30
		54	22.40	30
2437	6	6	23.36	30
		9	23.02	30
		12	22.72	30
		18	22.80	30
		24	23.31	30
		36	23.19	30
		48	22.28	30
		54	22.56	30
2462	11	6	23.85	30
		9	23.80	30
		12	23.48	30
		18	23.59	30
		24	24.22	30
		36	24.07	30
		48	23.01	30
		54	23.30	30
2467	12	6	15.84	30
		9	15.58	30
		12	15.18	30
		18	15.37	30
		24	15.82	30
		36	15.77	30
		48	15.78	30
		54	15.76	30
2472	13	6	8.61	30
		9	8.60	30
		12	8.27	30
		18	8.37	30
		24	9.07	30
		36	8.79	30
		48	8.77	30
		54	9.07	30

802.11n(HT20) Mode		MCS Index	Peak Power (dBm)	Limit (dBm)
Frequency[MHz]	Channel No.			
2412	1	0	23.20	30
		1	22.90	30
		2	23.11	30
		3	23.15	30
		4	23.10	30
		5	22.15	30
		6	22.48	30
		7	22.38	30
2437	6	0	24.05	30
		1	23.84	30
		2	23.70	30
		3	24.00	30
		4	24.02	30
		5	23.35	30
		6	23.65	30
		7	23.56	30
2462	11	0	23.64	30
		1	23.34	30
		2	23.56	30
		3	23.52	30
		4	23.49	30
		5	22.76	30
		6	23.07	30
		7	22.95	30
2467	12	0	13.59	30
		1	13.46	30
		2	13.62	30
		3	13.98	30
		4	13.99	30
		5	13.83	30
		6	14.15	30
		7	14.04	30
2472	13	0	6.73	30
		1	6.65	30
		2	6.75	30
		3	7.13	30
		4	7.10	30
		5	6.96	30
		6	7.29	30
		7	7.15	30

[MIMO Ant.1]

802.11b Mode		Rate (Mbps)	Peak Power (dBm)	Limit (dBm)
Frequency[MHz]	Channel No.			
2412	1	1	20.05	30
		2	20.31	30
		5.5	21.74	30
		11	23.21	30
2437	6	1	20.32	30
		2	20.59	30
		5.5	22.03	30
		11	23.52	30
2462	11	1	20.86	30
		2	21.12	30
		5.5	22.73	30
		11	24.19	30
2467	12	1	9.90	30
		2	10.14	30
		5.5	11.62	30
		11	13.13	30
2472	13	1	1.86	30
		2	2.12	30
		5.5	3.60	30
		11	5.11	30

802.11g Mode		Rate (Mbps)	Peak Power (dBm)	Limit (dBm)
Frequency[MHz]	Channel No.			
2412	1	6	23.37	30
		9	22.85	30
		12	22.58	30
		18	22.70	30
		24	23.35	30
		36	23.10	30
		48	22.20	30
		54	22.48	30
2437	6	6	23.50	30
		9	23.29	30
		12	23.01	30
		18	23.14	30
		24	23.48	30
		36	23.40	30
		48	22.47	30
		54	22.75	30
2462	11	6	23.87	30
		9	23.60	30
		12	23.32	30
		18	23.42	30
		24	23.80	30
		36	23.84	30
		48	22.49	30
		54	22.81	30
2467	12	6	15.52	30
		9	15.19	30
		12	14.91	30
		18	15.06	30
		24	15.51	30
		36	15.48	30
		48	15.45	30
		54	15.69	30
2472	13	6	7.92	30
		9	7.65	30
		12	7.30	30
		18	7.45	30
		24	7.84	30
		36	7.88	30
		48	7.90	30
		54	7.89	30

802.11n(HT20) Mode		MCS Index	Peak Power (dBm)	Limit (dBm)
Frequency[MHz]	Channel No.			
2412	1	8	23.51	30
		9	23.13	30
		10	22.99	30
		11	23.47	30
		12	22.96	30
		13	22.42	30
		14	22.70	30
		15	22.57	30
2437	6	8	24.22	30
		9	23.84	30
		10	23.71	30
		11	24.21	30
		12	24.19	30
		13	23.38	30
		14	23.63	30
		15	23.48	30
2462	11	8	24.00	30
		9	23.82	30
		10	23.70	30
		11	23.96	30
		12	23.95	30
		13	22.95	30
		14	22.99	30
		15	22.87	30
2467	12	8	12.44	30
		9	12.26	30
		10	12.25	30
		11	12.36	30
		12	12.39	30
		13	12.35	30
		14	12.42	30
		15	12.40	30
2472	13	8	7.31	30
		9	6.93	30
		10	6.86	30
		11	7.25	30
		12	7.27	30
		13	7.26	30
		14	7.25	30
		15	7.23	30

[MIMO Ant. 2]

802.11b Mode		Rate (Mbps)	Peak Power (dBm)	Limit (dBm)
Frequency[MHz]	Channel No.			
2412	1	1	21.28	30
		2	21.46	30
		5.5	22.99	30
		11	24.47	30
2437	6	1	20.02	30
		2	20.28	30
		5.5	21.81	30
		11	23.30	30
2462	11	1	20.90	30
		2	21.20	30
		5.5	22.74	30
		11	24.22	30
2467	12	1	10.52	30
		2	10.61	30
		5.5	12.11	30
		11	13.63	30
2472	13	1	3.26	30
		2	3.50	30
		5.5	4.96	30
		11	6.49	30

802.11g Mode		Rate (Mbps)	Peak Power (dBm)	Limit (dBm)
Frequency[MHz]	Channel No.			
2412	1	6	25.16	30
		9	25.14	30
		12	24.44	30
		18	24.55	30
		24	24.94	30
		36	24.11	30
		48	23.85	30
		54	24.10	30
2437	6	6	24.65	30
		9	14.58	30
		12	23.88	30
		18	23.98	30
		24	24.50	30
		36	24.17	30
		48	23.18	30
		54	23.39	30
2462	11	6	25.15	30
		9	25.05	30
		12	24.38	30
		18	24.52	30
		24	24.89	30
		36	24.61	30
		48	23.69	30
		54	23.98	30
2467	12	6	16.64	30
		9	16.53	30
		12	15.87	30
		18	16.03	30
		24	16.47	30
		36	16.14	30
		48	16.09	30
		54	16.36	30
2472	13	6	9.07	30
		9	9.04	30
		12	8.36	30
		18	8.42	30
		24	8.93	30
		36	8.58	30
		48	8.55	30
		54	8.79	30

802.11n(HT20) Mode		MCS Index	Peak Power (dBm)	Limit (dBm)
Frequency[MHz]	Channel No.			
2412	1	8	25.19	30
		9	24.34	30
		10	24.46	30
		11	24.71	30
		12	24.82	30
		13	23.82	30
		14	24.04	30
		15	23.98	30
2437	6	8	24.74	30
		9	23.93	30
		10	24.04	30
		11	24.26	30
		12	24.36	30
		13	22.88	30
		14	23.11	30
		15	22.99	30
2462	11	8	25.02	30
		9	24.26	30
		10	24.37	30
		11	24.63	30
		12	24.72	30
		13	23.65	30
		14	23.80	30
		15	23.78	30
2467	12	8	14.11	30
		9	13.33	30
		10	13.42	30
		11	13.72	30
		12	13.80	30
		13	13.72	30
		14	13.90	30
		15	13.84	30
2472	13	8	9.16	30
		9	8.38	30
		10	8.50	30
		11	8.76	30
		12	8.83	30
		13	8.57	30
		14	8.87	30
		15	8.79	30

[MIMO]

802.11b Mode		Rate (Mbps)	Ant.1 Peak Power(dBm)	Ant.2 Peak Power(dBm)	MIMO Peak Power (dBm)	Limit (dBm)
Frequency[MHz]	Channel No.					
2412	1	1	20.05	21.28	23.72	30
		2	20.31	21.46	23.93	30
		5.5	21.74	22.99	25.42	30
		11	23.21	24.47	26.89	30
2437	6	1	20.32	20.02	23.18	30
		2	20.59	20.28	23.44	30
		5.5	22.03	21.81	24.93	30
		11	23.52	23.30	26.42	30
2462	11	1	20.86	20.90	23.89	30
		2	21.12	21.20	24.17	30
		5.5	22.73	22.74	25.75	30
		11	24.19	24.22	27.22	30
2467	12	1	9.90	10.52	13.23	30
		2	10.14	10.61	13.39	30
		5.5	11.62	12.11	14.88	30
		11	13.13	13.63	16.39	30
2472	13	1	1.86	3.26	5.63	30
		2	2.12	3.50	5.87	30
		5.5	3.60	4.96	7.35	30
		11	5.11	6.49	8.87	30

802.11g Mode		Rate (Mbps)	Ant.1 Peak Power(dBm)	Ant.2 Peak Power(dBm)	MIMO Peak Power (dBm)	Limit (dBm)
Frequency[MHz]	Channel No.					
2412	1	6	23.37	25.16	27.37	30
		9	22.85	25.14	27.16	30
		12	22.58	24.44	26.62	30
		18	22.70	24.55	26.74	30
		24	23.35	24.94	27.23	30
		36	23.10	24.11	26.65	30
		48	22.20	23.85	26.11	30
		54	22.48	24.10	26.37	30
2437	6	6	23.50	24.65	27.12	30
		9	23.29	14.58	23.84	30
		12	23.01	23.88	26.48	30
		18	23.14	23.98	26.59	30
		24	23.48	24.50	27.03	30
		36	23.40	24.17	26.81	30
		48	22.47	23.18	25.85	30
		54	22.75	23.39	26.09	30
2462	11	6	23.87	25.15	27.57	30
		9	23.60	25.05	27.40	30
		12	23.32	24.38	26.89	30
		18	23.42	24.52	27.02	30
		24	23.80	24.89	27.39	30
		36	23.84	24.61	27.25	30
		48	22.49	23.69	26.14	30
		54	22.81	23.98	26.45	30
2467	12	6	15.52	16.64	19.13	30
		9	15.19	16.53	18.92	30
		12	14.91	15.87	18.43	30
		18	15.06	16.03	18.58	30
		24	15.51	16.47	19.03	30
		36	15.48	16.14	18.84	30
		48	15.45	16.09	18.79	30
		54	15.69	16.36	19.05	30
2472	13	6	7.92	9.07	11.54	30
		9	7.65	9.04	11.41	30
		12	7.30	8.36	10.87	30
		18	7.45	8.42	10.97	30
		24	7.84	8.93	11.43	30
		36	7.88	8.58	11.25	30
		48	7.90	8.55	11.25	30
		54	7.89	8.79	11.37	30

802.11n(HT20) Mode		MCS Index	Ant.1 Peak Power(dBm)	Ant.2 Peak Power(dBm)	MIMO Peak Power (dBm)	Limit (dBm)
Frequency[MHz]	Channel No.					
2412	1	8	23.51	25.19	27.44	30
		9	23.13	24.34	26.79	30
		10	22.99	24.46	26.80	30
		11	23.47	24.71	27.14	30
		12	22.96	24.82	27.00	30
		13	22.42	23.82	26.19	30
		14	22.70	24.04	26.43	30
		15	22.57	23.98	26.34	30
2437	6	8	24.22	24.74	27.50	30
		9	23.84	23.93	26.90	30
		10	23.71	24.04	26.89	30
		11	24.21	24.26	27.25	30
		12	24.19	24.36	27.28	30
		13	23.38	22.88	26.15	30
		14	23.63	23.11	26.39	30
		15	23.48	22.99	26.25	30
2462	11	8	24.00	25.02	27.55	30
		9	23.82	24.26	27.06	30
		10	23.70	24.37	27.06	30
		11	23.96	24.63	27.32	30
		12	23.95	24.72	27.36	30
		13	22.95	23.65	26.33	30
		14	22.99	23.80	26.43	30
		15	22.87	23.78	26.36	30
2467	12	8	12.44	14.11	16.36	30
		9	12.26	13.33	15.84	30
		10	12.25	13.42	15.89	30
		11	12.36	13.72	16.10	30
		12	12.39	13.80	16.16	30
		13	12.35	13.72	16.10	30
		14	12.42	13.90	16.23	30
		15	12.40	13.84	16.19	30
2472	13	8	7.31	9.16	11.34	30
		9	6.93	8.38	10.72	30
		10	6.86	8.50	10.77	30
		11	7.25	8.76	11.08	30
		12	7.27	8.83	11.13	30
		13	7.26	8.57	10.97	30
		14	7.25	8.87	11.14	30
		15	7.23	8.79	11.09	30

Average Power

SISO(Ant. 1)

802.11b Mode Frequency [MHz]	Channel No.	Rate (Mbps)	Measured Power (dBm)	Duty Cycle Factor (dB)	Total Power (dBm)	Limit (dBm)
2412	1	1	16.92	0.000	16.92	30
		2	16.74	0.117	16.86	30
		5.5	16.54	0.333	16.87	30
		11	16.30	0.560	16.86	30
2437	6	1	17.83	0.000	17.83	30
		2	17.67	0.117	17.79	30
		5.5	17.43	0.333	17.76	30
		11	17.23	0.560	17.79	30
2462	11	1	17.90	0.000	17.90	30
		2	17.63	0.117	17.75	30
		5.5	17.46	0.333	17.79	30
		11	17.23	0.560	17.79	30
2467	12	1	7.48	0.068	7.55	30
		2	7.20	0.117	7.32	30
		5.5	7.03	0.333	7.36	30
		11	6.77	0.560	7.33	30
2472	13	1	0.04	0.068	0.11	30
		2	-0.46	0.117	-0.34	30
		5.5	-0.60	0.333	-0.27	30
		11	-0.81	0.560	-0.25	30

802.11g Mode Frequency [MHz]	Channel No.	Rate (Mbps)	Measured Power (dBm)	Duty Cycle Factor	Total Power (dBm)	Limit (dBm)
2412	1	6	14.80	0.351	15.15	30
		9	14.56	0.519	15.08	30
		12	14.38	0.648	15.03	30
		18	14.14	0.969	15.11	30
		24	13.90	1.189	15.09	30
		36	13.43	1.644	15.07	30
		48	11.98	2.013	13.99	30
		54	11.80	2.194	13.99	30
2437	6	6	15.03	0.351	15.38	30
		9	14.74	0.519	15.26	30
		12	14.50	0.648	15.15	30
		18	14.31	0.969	15.28	30
		24	13.90	1.189	15.09	30
		36	13.58	1.644	15.22	30
		48	12.10	2.013	14.11	30
		54	11.92	2.194	14.11	30
2462	11	6	15.35	0.351	15.70	30
		9	15.11	0.519	15.63	30
		12	14.98	0.648	15.63	30
		18	14.67	0.969	15.64	30
		24	14.42	1.189	15.61	30
		36	14.01	1.644	15.65	30
		48	12.61	2.013	14.62	30
		54	12.47	2.194	14.66	30
2467	12	6	7.45	0.351	7.80	30
		9	7.25	0.519	7.77	30
		12	7.04	0.648	7.69	30
		18	6.80	0.969	7.77	30
		24	6.49	1.189	7.68	30
		36	6.03	1.644	7.67	30
		48	5.69	2.013	7.70	30
		54	5.49	2.194	7.68	30
2472	13	6	0.20	0.351	0.55	30
		9	0.03	0.519	0.54	30
		12	-0.11	0.648	0.54	30
		18	-0.45	0.969	0.52	30
		24	-0.68	1.189	0.51	30
		36	-1.13	1.644	0.52	30
		48	-1.50	2.013	0.51	30
		54	-1.66	2.194	0.53	30

802.11n(HT20) Mode		MCS Index	Measured Power (dBm)	Duty Cycle Factor	Total Power (dBm)	Limit (dBm)
Frequency [MHz]	Channel No.					
2412	1	0	14.74	0.361	15.10	30
		1	14.31	0.679	14.99	30
		2	14.09	0.960	15.05	30
		3	13.83	1.017	14.84	30
		4	13.43	1.617	15.05	30
		5	11.93	2.083	14.01	30
		6	11.82	2.218	14.04	30
		7	11.62	2.297	13.92	30
2437	6	0	15.17	0.361	15.53	30
		1	14.72	0.679	15.40	30
		2	14.47	0.960	15.43	30
		3	14.23	1.017	15.25	30
		4	13.74	1.617	15.36	30
		5	12.39	2.083	14.47	30
		6	12.27	2.218	14.49	30
		7	12.08	2.297	14.38	30
2462	11	0	15.29	0.361	15.65	30
		1	14.79	0.679	15.47	30
		2	14.57	0.960	15.53	30
		3	14.32	1.017	15.33	30
		4	13.90	1.617	15.51	30
		5	12.43	2.083	14.52	30
		6	12.30	2.218	14.52	30
		7	12.16	2.297	14.46	30
2467	12	0	5.14	0.361	5.50	30
		1	4.77	0.679	5.45	30
		2	4.48	0.960	5.44	30
		3	4.26	1.017	5.28	30
		4	3.75	1.617	5.37	30
		5	3.29	2.083	5.37	30
		6	3.27	2.218	5.49	30
		7	3.17	2.297	5.47	30
2472	13	0	-1.64	0.361	-1.28	30
		1	-2.08	0.679	-1.40	30
		2	-2.30	0.960	-1.34	30
		3	-2.58	1.017	-1.56	30
		4	-2.97	1.617	-1.35	30
		5	-3.38	2.083	-1.29	30
		6	-3.51	2.218	-1.29	30
		7	-3.67	2.297	-1.37	30

[MIMO Ant. 1]

802.11b Mode		Rate (Mbps)	Measured Power (dBm)	Duty Cycle Factor (dB)	Total Power (dBm)	Limit (dBm)
Frequency [MHz]	Channel No.					
2412	1	1	17.25	0.000	17.25	30
		2	17.07	0.117	17.19	30
		5.5	16.82	0.333	17.15	30
		11	16.64	0.560	17.20	30
2437	6	1	17.74	0.000	17.74	30
		2	17.45	0.117	17.57	30
		5.5	17.24	0.333	17.58	30
		11	17.00	0.560	17.56	30
2462	11	1	17.82	0.000	17.82	30
		2	17.63	0.117	17.75	30
		5.5	17.44	0.333	17.77	30
		11	17.20	0.560	17.76	30
2467	12	1	7.48	0.068	7.55	30
		2	7.19	0.117	7.31	30
		5.5	7.06	0.333	7.39	30
		11	6.83	0.560	7.39	30
2472	13	1	-0.63	0.068	-0.56	30
		2	-0.83	0.117	-0.71	30
		5.5	-1.02	0.333	-0.68	30
		11	-1.22	0.560	-0.66	30

802.11g Mode Frequency [MHz]	Channel No.	Rate (Mbps)	Measured Power (dBm)	Duty Cycle Factor (dB)	Total Power (dBm)	Limit (dBm)
2412	1	6	15.03	0.351	15.38	30
		9	14.59	0.519	15.11	30
		12	14.36	0.648	15.01	30
		18	14.11	0.969	15.08	30
		24	13.84	1.189	15.03	30
		36	13.49	1.644	15.13	30
		48	12.03	2.013	14.04	30
		54	11.86	2.194	14.05	30
2437	6	6	15.10	0.351	15.45	30
		9	14.81	0.519	15.33	30
		12	14.69	0.648	15.33	30
		18	14.45	0.969	15.42	30
		24	14.13	1.189	15.32	30
		36	13.71	1.644	15.36	30
		48	12.28	2.013	14.29	30
		54	12.10	2.194	14.30	30
2462	11	6	15.51	0.351	15.86	30
		9	15.13	0.519	15.65	30
		12	14.99	0.648	15.64	30
		18	14.76	0.969	15.72	30
		24	14.46	1.189	15.65	30
		36	14.03	1.644	15.67	30
		48	12.33	2.013	14.34	30
		54	12.19	2.194	14.38	30
2467	12	6	7.05	0.351	7.40	30
		9	6.67	0.519	7.19	30
		12	6.56	0.648	7.21	30
		18	6.31	0.969	7.28	30
		24	6.03	1.189	7.21	30
		36	5.59	1.644	7.24	30
		48	5.15	2.013	7.16	30
		54	5.00	2.194	7.20	30
2472	13	6	-0.63	0.351	-0.28	30
		9	-1.09	0.519	-0.57	30
		12	-1.23	0.648	-0.58	30
		18	-1.47	0.969	-0.50	30
		24	-1.77	1.189	-0.58	30
		36	-2.23	1.644	-0.59	30
		48	-2.54	2.013	-0.53	30
		54	-2.77	2.194	-0.57	30

802.11n(HT20) Mode		MCS Index	Measured Power (dBm)	Duty Cycle Factor (dB)	Total Power (dBm)	Limit (dBm)
Frequency [MHz]	Channel No.					
2412	1	8	14.86	0.673	15.53	30
		9	14.08	1.017	15.10	30
		10	13.66	1.675	15.34	30
		11	13.35	1.973	15.33	30
		12	12.83	2.502	15.34	30
		13	11.32	2.919	14.24	30
		14	11.22	3.010	14.23	30
		15	11.10	3.108	14.21	30
2437	6	8	15.45	0.673	16.12	30
		9	14.78	1.017	15.80	30
		10	14.43	1.675	16.10	30
		11	14.08	1.973	16.05	30
		12	13.58	2.502	16.08	30
		13	12.31	2.919	15.23	30
		14	12.18	3.010	15.19	30
		15	12.06	3.108	15.16	30
2462	11	8	15.19	0.673	15.86	30
		9	14.56	1.017	15.58	30
		10	14.17	1.675	15.84	30
		11	13.84	1.973	15.81	30
		12	13.30	2.502	15.80	30
		13	11.51	2.919	14.43	30
		14	11.30	3.010	14.31	30
		15	11.18	3.108	14.28	30
2467	12	8	4.81	0.673	5.48	30
		9	4.18	1.017	5.20	30
		10	3.80	1.675	5.47	30
		11	3.50	1.973	5.47	30
		12	2.91	2.502	5.41	30
		13	2.54	2.919	5.46	30
		14	2.40	3.010	5.41	30
		15	2.23	3.108	5.33	30
2472	13	8	-1.53	0.673	-0.86	30
		9	-2.26	1.017	-1.24	30
		10	-2.63	1.675	-0.95	30
		11	-2.97	1.973	-0.99	30
		12	-3.49	2.502	-0.99	30
		13	-4.02	2.919	-1.10	30
		14	-4.10	3.010	-1.09	30
		15	-4.27	3.108	-1.16	30

[MIMO Ant. 2]

802.11b Mode		Rate (Mbps)	Measured Power (dBm)	Duty Cycle Factor (dB)	Total Power (dBm)	Limit (dBm)
Frequency [MHz]	Channel No.					
2412	1	1	18.67	0.000	18.67	30
		2	18.50	0.117	18.62	30
		5.5	18.22	0.333	18.55	30
		11	18.05	0.560	18.61	30
2437	6	1	17.87	0.000	17.87	30
		2	17.54	0.117	17.66	30
		5.5	17.37	0.333	17.70	30
		11	17.15	0.560	17.71	30
2462	11	1	18.38	0.000	18.38	30
		2	18.14	0.117	18.26	30
		5.5	18.01	0.333	18.34	30
		11	17.80	0.560	18.36	30
2467	12	1	7.83	0.068	7.90	30
		2	7.71	0.117	7.82	30
		5.5	7.53	0.333	7.86	30
		11	7.31	0.560	7.87	30
2472	13	1	0.81	0.068	0.88	30
		2	0.60	0.117	0.72	30
		5.5	0.42	0.333	0.75	30
		11	0.23	0.560	0.79	30

802.11g Mode Frequency [MHz]	Channel No.	Rate (Mbps)	Measured Power (dBm)	Duty Cycle Factor (dB)	Total Power (dBm)	Limit (dBm)
2412	1	6	16.24	0.351	16.59	30
		9	15.99	0.519	16.51	30
		12	15.84	0.648	16.49	30
		18	15.51	0.969	16.48	30
		24	15.29	1.189	16.47	30
		36	14.92	1.644	16.56	30
		48	13.60	2.013	15.61	30
		54	13.46	2.194	15.65	30
2437	6	6	15.83	0.351	16.18	30
		9	15.60	0.519	16.12	30
		12	15.45	0.648	16.10	30
		18	15.18	0.969	16.15	30
		24	14.90	1.189	16.09	30
		36	14.49	1.644	16.14	30
		48	13.10	2.013	15.12	30
		54	12.97	2.194	15.16	30
2462	11	6	16.26	0.351	16.61	30
		9	15.92	0.519	16.44	30
		12	15.78	0.648	16.43	30
		18	15.54	0.969	16.51	30
		24	15.22	1.189	16.41	30
		36	14.87	1.644	16.51	30
		48	13.55	2.013	15.57	30
		54	13.45	2.194	15.64	30
2467	12	6	7.60	0.351	7.95	30
		9	7.39	0.519	7.91	30
		12	7.28	0.648	7.93	30
		18	6.94	0.969	7.91	30
		24	6.73	1.189	7.92	30
		36	6.27	1.644	7.91	30
		48	5.86	2.013	7.87	30
		54	5.64	2.194	7.83	30
2472	13	6	0.25	0.351	0.60	30
		9	-0.07	0.519	0.44	30
		12	-0.26	0.648	0.39	30
		18	-0.53	0.969	0.44	30
		24	-0.83	1.189	0.36	30
		36	-1.24	1.644	0.40	30
		48	-1.64	2.013	0.37	30
		54	-1.79	2.194	0.41	30

802.11n(HT20) Mode		MCS Index	Measured Power (dBm)	Duty Cycle Factor (dB)	Total Power (dBm)	Limit (dBm)
Frequency [MHz]	Channel No.					
2412	1	8	15.94	0.673	16.61	30
		9	15.15	1.017	16.17	30
		10	14.87	1.675	16.54	30
		11	14.56	1.973	16.53	30
		12	14.03	2.502	16.54	30
		13	12.88	2.919	15.79	30
		14	12.67	3.010	15.68	30
		15	12.56	3.108	15.66	30
2437	6	8	15.52	0.673	16.19	30
		9	15.02	1.017	16.04	30
		10	14.45	1.675	16.12	30
		11	14.16	1.973	16.13	30
		12	13.59	2.502	16.09	30
		13	11.87	2.919	14.79	30
		14	11.64	3.010	14.65	30
		15	11.58	3.108	14.69	30
2462	11	8	16.03	0.673	16.70	30
		9	15.28	1.017	16.29	30
		10	14.84	1.675	16.52	30
		11	14.58	1.973	16.55	30
		12	14.01	2.502	16.51	30
		13	12.70	2.919	15.62	30
		14	12.51	3.010	15.52	30
		15	12.34	3.108	15.45	30
2467	12	8	5.18	0.673	5.85	30
		9	4.30	1.017	5.31	30
		10	3.85	1.675	5.53	30
		11	3.58	1.973	5.55	30
		12	3.07	2.502	5.57	30
		13	2.69	2.919	5.61	30
		14	2.41	3.010	5.42	30
		15	2.31	3.108	5.42	30
2472	13	8	0.01	0.673	0.68	30
		9	-0.60	1.017	0.41	30
		10	-1.04	1.675	0.63	30
		11	-1.29	1.973	0.68	30
		12	-1.96	2.502	0.54	30
		13	-2.33	2.919	0.59	30
		14	-2.54	3.010	0.47	30
		15	-2.69	3.108	0.42	30

[MIMO]

802.11b Mode		Rate (Mbps)	Ant. 1 Power(dBm)	Ant. 2 Power(dBm)	Total Power (dBm)	Limit (dBm)
Frequency[MHz]	Channel No.					
2412	1	1	17.25	18.67	21.03	30
		2	17.19	18.62	20.97	30
		5.5	17.15	18.55	20.92	30
		11	17.20	18.61	20.97	30
2437	6	1	17.74	17.87	20.82	30
		2	17.57	17.66	20.62	30
		5.5	17.58	17.70	20.65	30
		11	17.56	17.71	20.65	30
2462	11	1	17.82	18.38	21.12	30
		2	17.75	18.26	21.02	30
		5.5	17.77	18.34	21.08	30
		11	17.76	18.36	21.08	30
2467	12	1	7.55	7.90	10.74	30
		2	7.31	7.82	10.58	30
		5.5	7.39	7.86	10.65	30
		11	7.39	7.87	10.65	30
2472	13	1	-0.56	0.88	3.23	30
		2	-0.71	0.72	3.07	30
		5.5	-0.68	0.75	3.11	30
		11	-0.66	0.79	3.14	30

802.11g Mode		Rate (Mbps)	Ant. 1 Power(dBm)	Ant. 2 Power(dBm)	Total Power (dBm)	Limit (dBm)
Frequency[MHz]	Channel No.					
2412	1	6	15.38	16.59	19.04	30
		9	15.11	16.51	18.88	30
		12	15.01	16.49	18.82	30
		18	15.08	16.48	18.85	30
		24	15.03	16.47	18.82	30
		36	15.13	16.56	18.92	30
		48	14.04	15.61	17.91	30
		54	14.05	15.65	17.94	30
2437	6	6	15.45	16.18	18.84	30
		9	15.33	16.12	18.75	30
		12	15.33	16.10	18.75	30
		18	15.42	16.15	18.81	30
		24	15.32	16.09	18.73	30
		36	15.36	16.14	18.77	30
		48	14.29	15.12	17.73	30
		54	14.30	15.16	17.76	30
2462	11	6	15.86	16.61	19.26	30
		9	15.65	16.44	19.07	30
		12	15.64	16.43	19.06	30
		18	15.72	16.51	19.15	30
		24	15.65	16.41	19.06	30
		36	15.67	16.51	19.12	30
		48	14.34	15.57	18.01	30
		54	14.38	15.64	18.07	30
2467	12	6	7.40	7.95	10.70	30
		9	7.19	7.91	10.57	30
		12	7.21	7.93	10.59	30
		18	7.28	7.91	10.62	30
		24	7.21	7.92	10.59	30
		36	7.24	7.91	10.60	30
		48	7.16	7.87	10.54	30
		54	7.20	7.83	10.54	30
2472	13	6	-0.28	0.60	3.19	30
		9	-0.57	0.44	2.98	30
		12	-0.58	0.39	2.94	30
		18	-0.50	0.44	3.00	30
		24	-0.58	0.36	2.93	30
		36	-0.59	0.40	2.94	30
		48	-0.53	0.37	2.96	30
		54	-0.57	0.41	2.95	30

802.11n(HT20) Mode		MCS Index	Ant. 1 Power(dBm)	Ant. 2 Power(dBm)	Total Power (dBm)	Limit (dBm)
Frequency[MHz]	Channel No.					
2412	1	8	15.53	16.61	19.12	30
		9	15.10	16.17	18.68	30
		10	15.34	16.54	18.99	30
		11	15.33	16.53	18.98	30
		12	15.34	16.54	18.99	30
		13	14.24	15.79	18.10	30
		14	14.23	15.68	18.02	30
		15	14.21	15.66	18.01	30
2437	6	8	16.12	16.19	19.17	30
		9	15.80	16.04	18.93	30
		10	16.10	16.12	19.13	30
		11	16.05	16.13	19.10	30
		12	16.08	16.09	19.10	30
		13	15.23	14.79	18.03	30
		14	15.19	14.65	17.94	30
		15	15.16	14.69	17.94	30
2462	11	8	15.86	16.70	19.31	30
		9	15.58	16.29	18.96	30
		10	15.84	16.52	19.20	30
		11	15.81	16.55	19.21	30
		12	15.80	16.51	19.18	30
		13	14.43	15.62	18.08	30
		14	14.31	15.52	17.97	30
		15	14.28	15.45	17.91	30
2467	12	8	5.48	5.85	8.68	30
		9	5.20	5.31	8.27	30
		10	5.47	5.53	8.51	30
		11	5.47	5.55	8.52	30
		12	5.41	5.57	8.50	30
		13	5.46	5.61	8.55	30
		14	5.41	5.42	8.42	30
		15	5.33	5.42	8.39	30
2472	13	8	-0.86	0.68	2.99	30
		9	-1.24	0.41	2.67	30
		10	-0.95	0.63	2.92	30
		11	-0.99	0.68	2.94	30
		12	-0.99	0.54	2.85	30
		13	-1.10	0.59	2.84	30
		14	-1.09	0.47	2.77	30
		15	-1.16	0.42	2.71	30

9.4 POWER SPECTRAL DENSITY

Note :

1. MIMO PSD = $10 \cdot \log((10^{(\text{MIMO Ant. 1 PSD} / 10)} + (10^{(\text{MIMO Ant. 2 PSD} / 10)}))$

SISO(Ant. 1)

Mode	Frequency (MHz)	Channel No.	Test Result			
			Measured PSD (dBm/3 kHz)	Duty Cycle Factor (dB)	Total PSD (dBm/3 kHz)	Limit (dBm/3 kHz)
802.11b	2412	1	-13.978	0.000	-13.978	8
	2437	6	-12.843		-12.843	
	2462	11	-12.408		-12.408	
	2467	12	-23.748		-23.748	
	2472	13	-31.090		-31.090	
802.11g	2412	1	-18.276	0.351	-17.925	
	2437	6	-18.242		-17.891	
	2462	11	-17.598		-17.247	
	2467	12	-25.329		-24.978	
	2472	13	-32.606		-32.255	
802.11n(HT20)	2412	1	-18.525	0.361	-18.164	
	2437	6	-19.163		-18.802	
	2462	11	-18.254		-17.893	
	2467	12	-28.485		-28.124	
	2472	13	-34.691		-34.330	

[MIMO Ant.1]

Mode	Frequency (MHz)	Channel No.	Test Result			
			Measured PSD (dBm/3 kHz)	Duty Cycle Factor (dB)	Total PSD (dBm/3 kHz)	Limit (dBm/ 3 kHz)
802.11b	2412	1	-13.068	0.000	-13.068	8
	2437	6	-12.813		-12.813	
	2462	11	-13.363		-13.363	
	2467	12	-22.471		-22.471	
	2472	13	-31.378		-31.378	
802.11g	2412	1	-17.982	0.351	-17.631	
	2437	6	-17.506		-17.155	
	2462	11	-17.405		-17.054	
	2467	12	-25.392		-25.041	
	2472	13	-34.235		-33.884	
802.11n(HT20)	2412	1	-18.776	0.673	-18.103	
	2437	6	-18.560		-17.887	
	2462	11	-19.412		-18.739	
	2467	12	-29.926		-29.253	
	2472	13	-35.070		-34.397	

[MIMO Ant. 2]

Mode	Frequency (MHz)	Channel No.	Test Result			
			Measured PSD (dBm/3 kHz)	Duty Cycle Factor (dB)	Total PSD (dBm/3 kHz)	Limit (dBm/ 3 kHz)
802.11b	2412	1	-12.176	0.000	-12.176	8
	2437	6	-13.007		-13.007	
	2462	11	-12.468		-12.468	
	2467	12	-22.980		-22.912	
	2472	13	-30.455		-30.387	
802.11g	2412	1	-16.438	0.351	-16.087	
	2437	6	-16.496		-16.145	
	2462	11	-16.596		-16.245	
	2467	12	-24.824		-24.473	
	2472	13	-33.030		-32.679	
802.11n(HT20)	2412	1	-17.013	0.673	-16.340	
	2437	6	-17.837		-17.164	
	2462	11	-17.236		-16.563	
	2467	12	-27.883		-27.210	
	2472	13	-33.201		-32.528	

[MIMO]

Mode	Frequency (MHz)	Channel No.	Test Result			
			Ant. 1 PSD (dBm/3 kHz)	Ant. 2 PSD (dBm/3 kHz)	MIMO PSD (dBm/3 kHz)	Limit (dBm/ 3 kHz)
802.11n(HT20)	2412	1	-13.068	-12.176	-9.589	8
	2437	6	-12.813	-13.007	-9.899	
	2462	11	-13.363	-12.468	-9.882	
	2467	12	-22.471	-22.912	-19.676	
	2472	13	-31.378	-30.387	-27.844	
802.11g	2412	1	-17.631	-16.087	-13.780	
	2437	6	-17.155	-16.145	-13.610	
	2462	11	-17.054	-16.245	-13.620	
	2467	12	-25.041	-24.473	-21.737	
	2472	13	-33.884	-32.679	-30.229	
802.11n(HT20)	2412	1	-18.103	-16.340	-14.122	
	2437	6	-17.887	-17.164	-14.500	
	2462	11	-18.739	-16.563	-14.506	
	2467	12	-29.253	-27.210	-25.102	
	2472	13	-34.397	-32.528	-30.352	

Test Plots

Note :

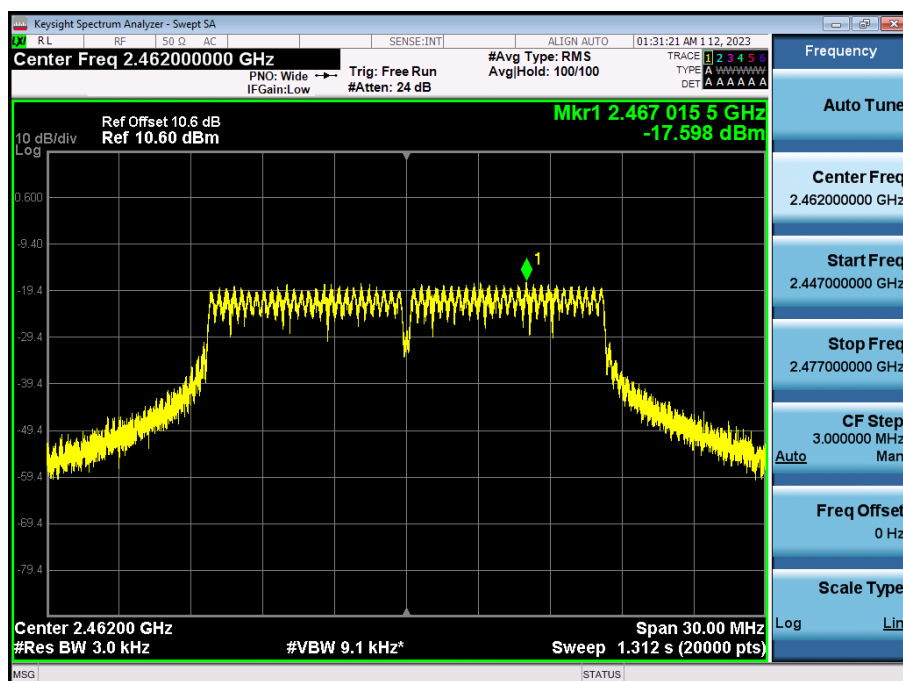
In order to simplify the report, attached plots were only the worst case PSD channel.

SISO(Ant. 1)

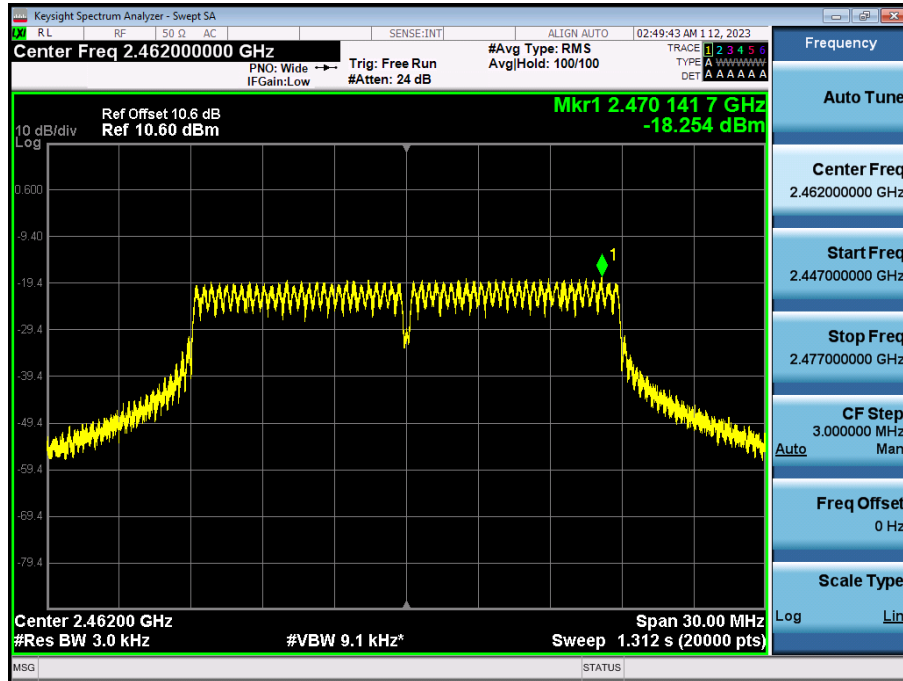
Power Spectral Density (802.11b-Ch. 11)



Power Spectral Density (802.11g-Ch. 11)



Power Spectral Density (802.11n_HT20-Ch. 11)

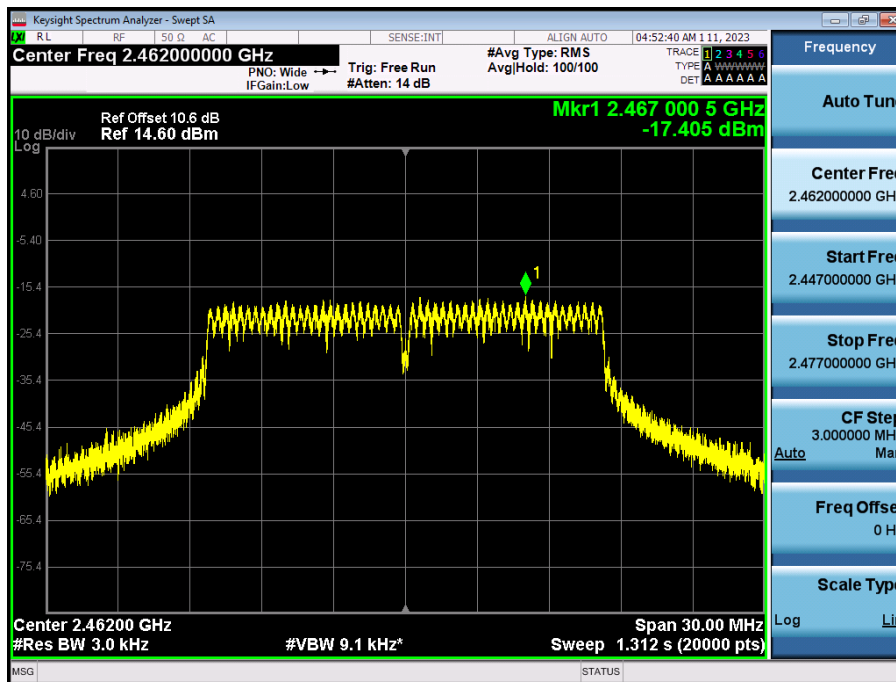


[MIMO Ant. 1]

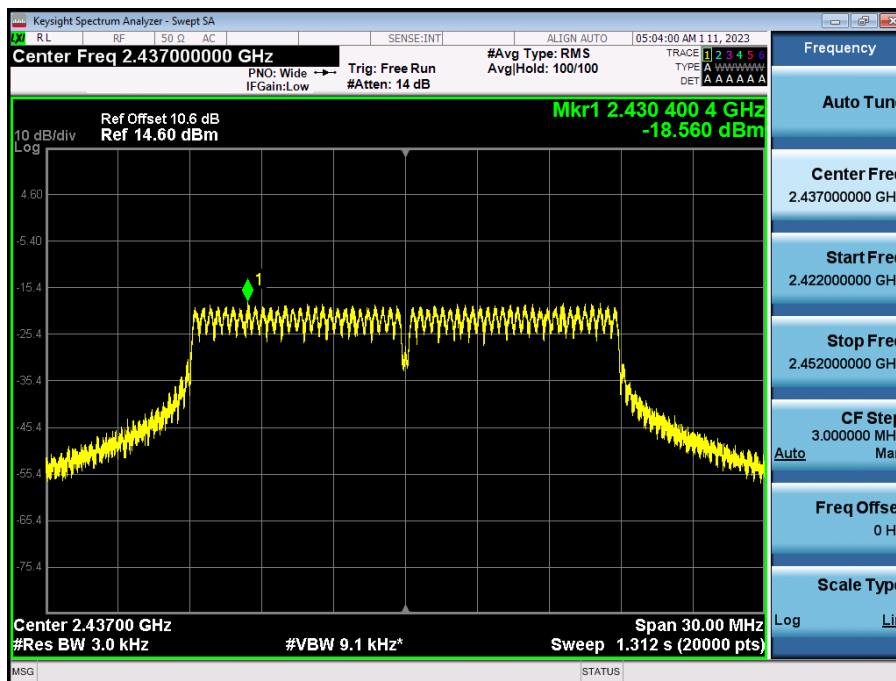
Power Spectral Density (802.11b-Ch. 6)



Power Spectral Density (802.11g-Ch. 11)



Power Spectral Density (802.11n_HT20-Ch. 6)

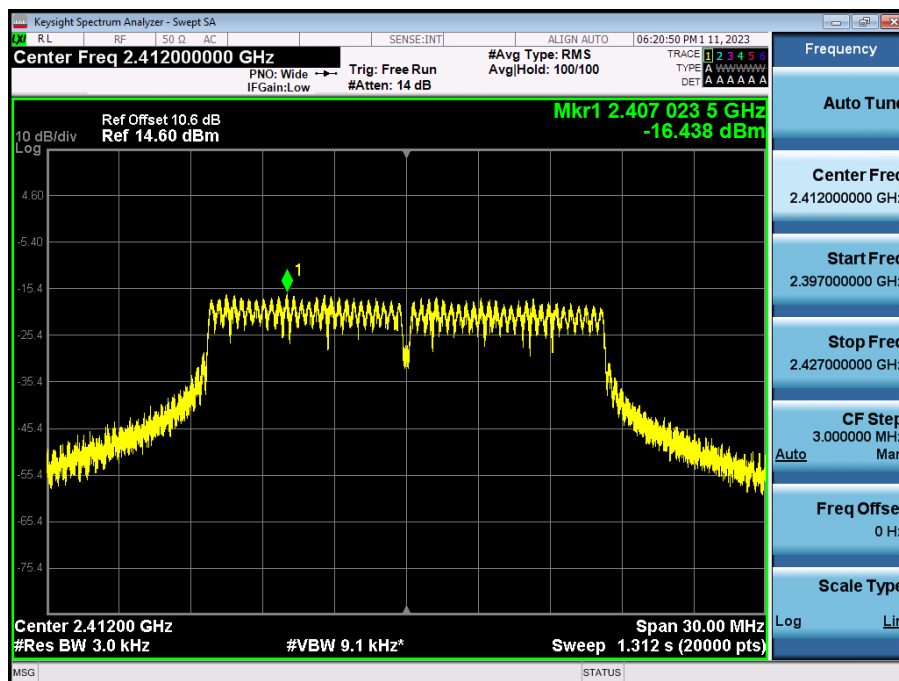


[MIMO Ant. 2]

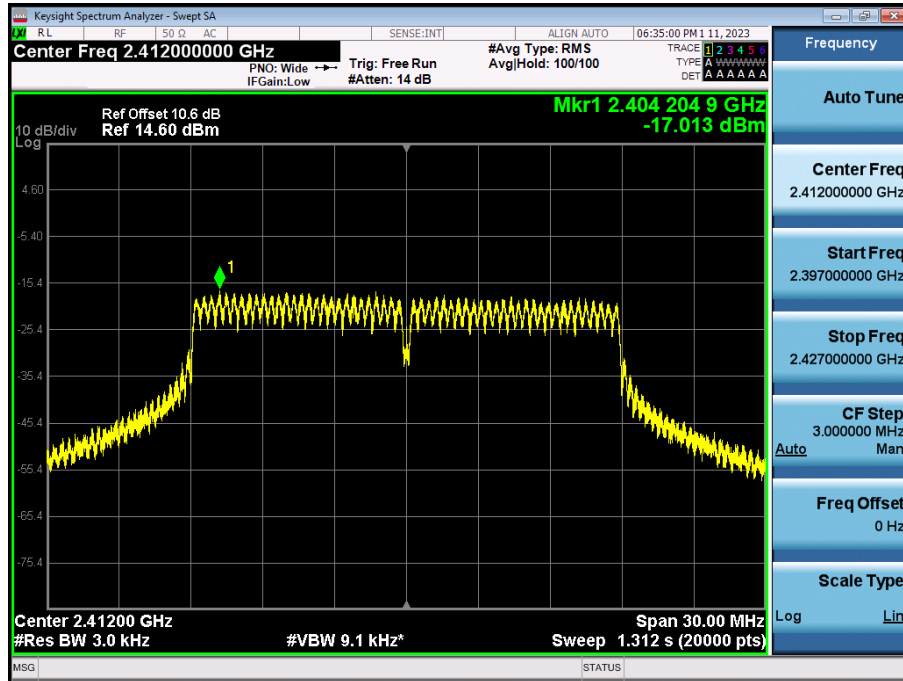
Power Spectral Density (802.11b-Ch. 1)



Power Spectral Density (802.11g-Ch. 1)



Power Spectral Density (802.11n_HT20-Ch. 1)



9.5 BAND EDGE / CONDUCTED SPURIOUS EMISSIONS

BAND EDGE Test Result

[SISO(Ant. 1)]

Frequency [MHz]	Channel No.	Mode	Band Edge Position	Test Result	
				Measured Level (dB)	Limit (dBc)
2412	1	802.11b	Lower	57.195	30
2462	11		Upper	58.188	
2467	12			52.662	
2472	13			44.875	
2412	1	802.11g	Lower	33.783	
2462	11		Upper	44.312	
2467	12			44.637	
2472	13			30.318	
2412	1	802.11n (HT20)	Lower	32.588	
2462	11		Upper	41.488	
2467	12			40.587	
2472	13			30.415	

[MIMO Ant.1]

Frequency [MHz]	Channel No.	Mode	Band Edge Position	Test Result	
				Measured Level (dB)	Limit (dBc)
2412	1	802.11b	Lower	55.164	30
2462	11		Upper	58.726	
2467	12			52.531	
2472	13			43.983	
2412	1	802.11g	Lower	31.991	
2462	11		Upper	44.857	
2467	12			43.530	
2472	13			31.067	
2412	1	802.11n (HT20)	Lower	31.568	
2462	11		Upper	38.969	
2467	12			42.439	
2472	13			30.838	

[MIMO Ant.2]

Frequency [MHz]	Channel No.	Mode	Band Edge Position	Test Result	
				Measured Level (dB)	Limit (dBc)
2412	1	802.11b	Lower	49.776	30
2462	11		Upper	58.791	
2467	12			52.684	
2472	13			45.458	
2412	1	802.11g	Lower	31.930	
2462	11		Upper	42.309	
2467	12			43.435	
2472	13			30.944	
2412	1	802.11n (HT20)	Lower	31.298	
2462	11		Upper	37.663	
2467	12			40.639	
2472	13			30.488	

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

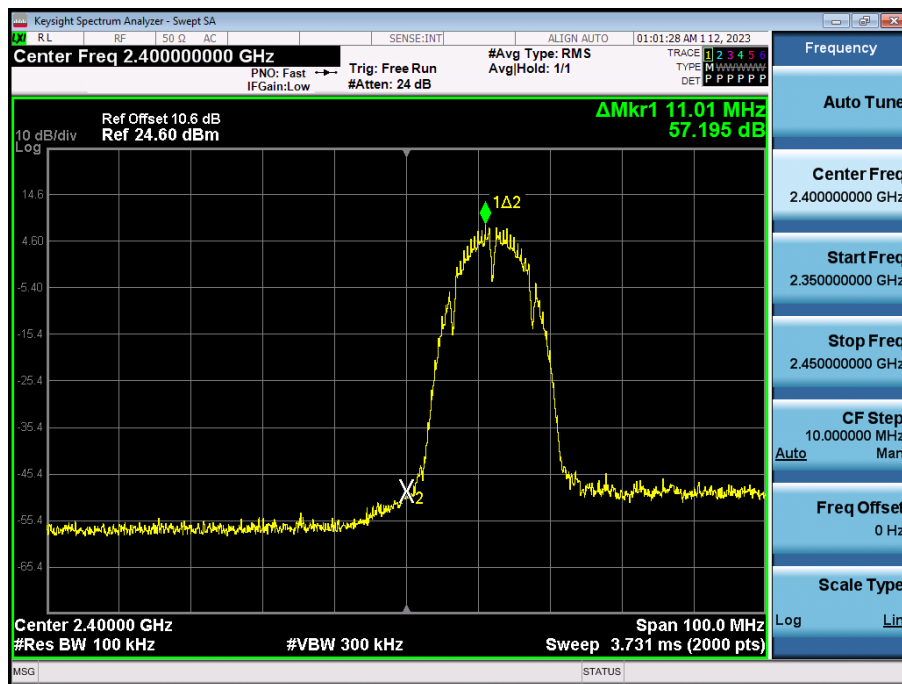
Test Plots(Band Edge)

Note :

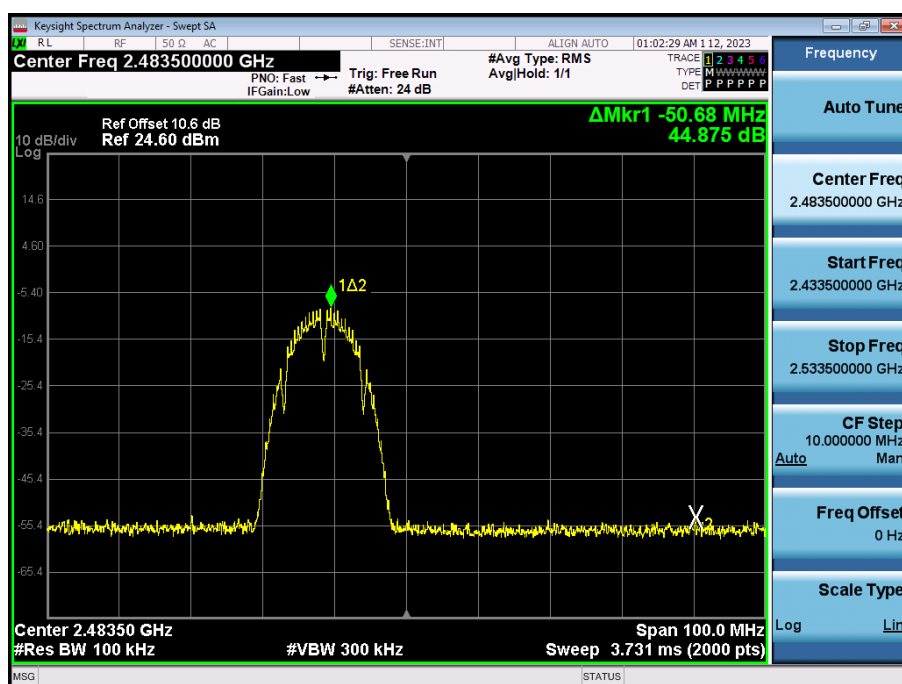
In order to simplify the report, attached plots were only the worst case channel and data rate.

[SISO(Ant. 1)]

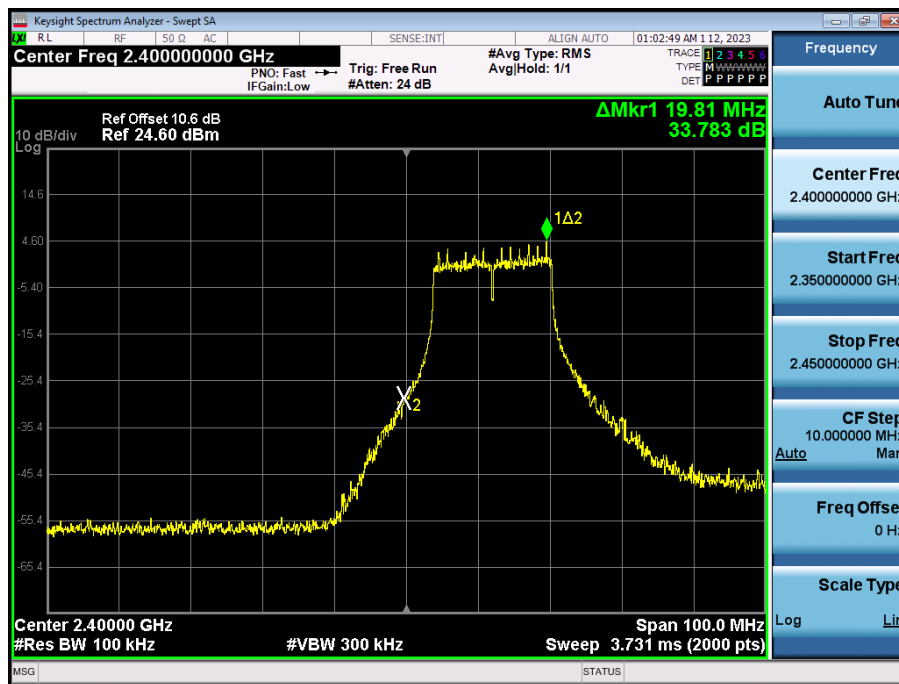
Band Edge (802.11b-CH1)



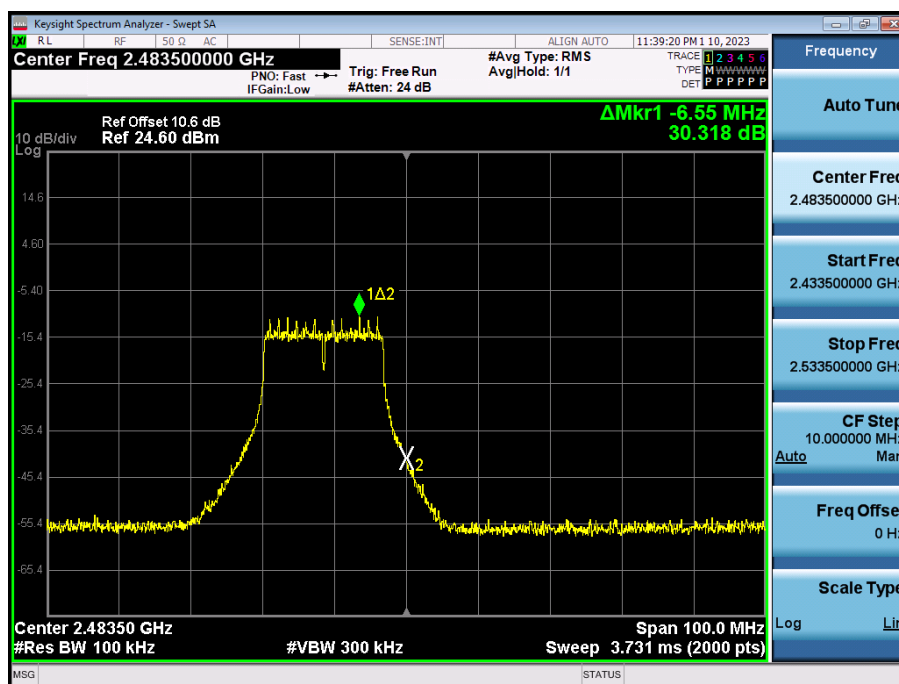
Band Edge (802.11b-CH13)



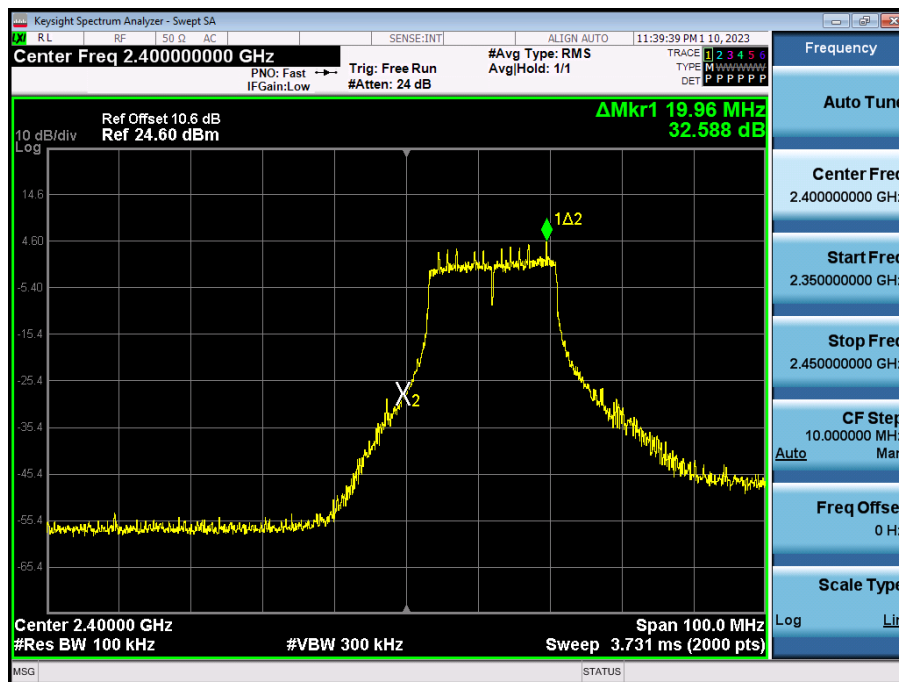
Band Edge (802.11g-Ch. 1)



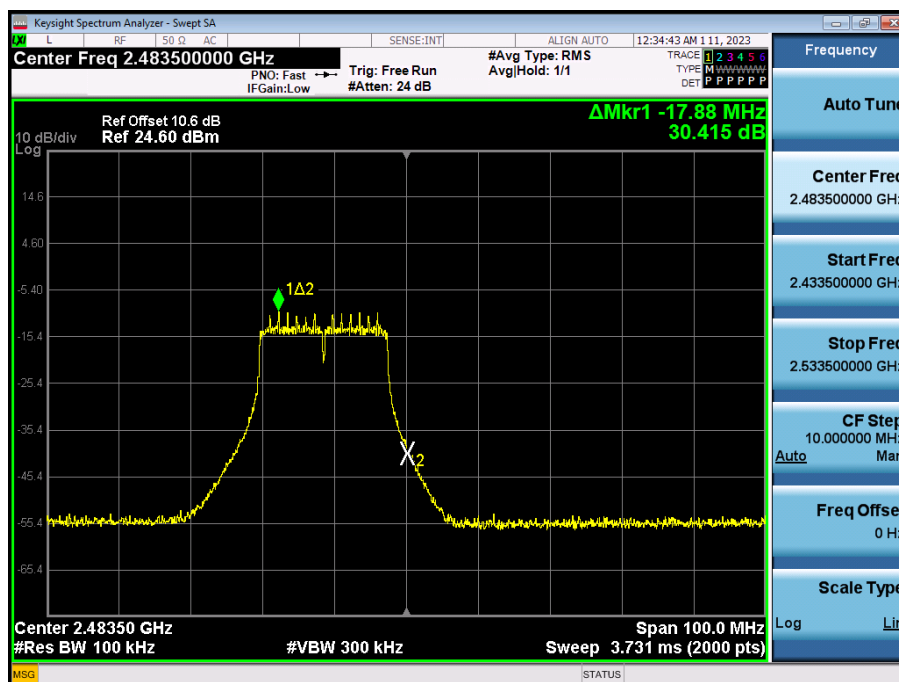
Band Edge (802.11g-Ch. 13)



Band Edge (802.11n_HT20-Ch. 1)

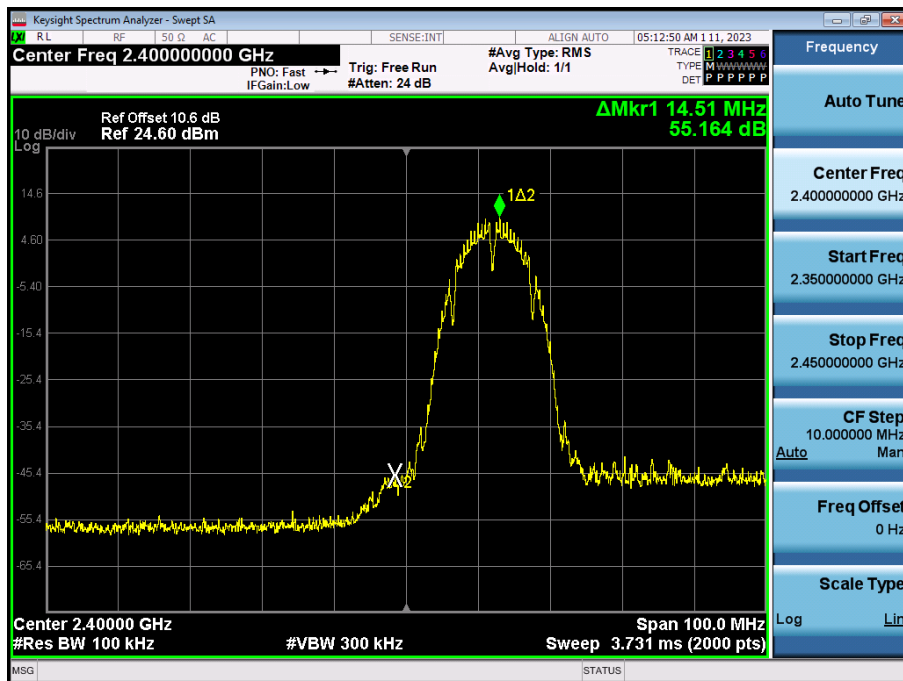


Band Edge (802.11n_HT20-Ch. 13)

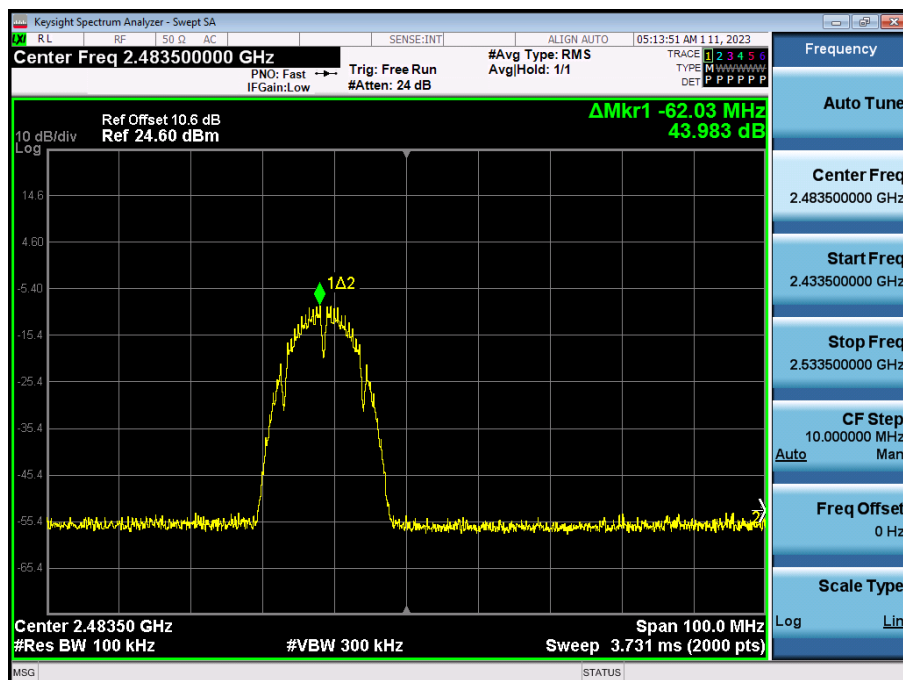


[MIMO Ant.1]

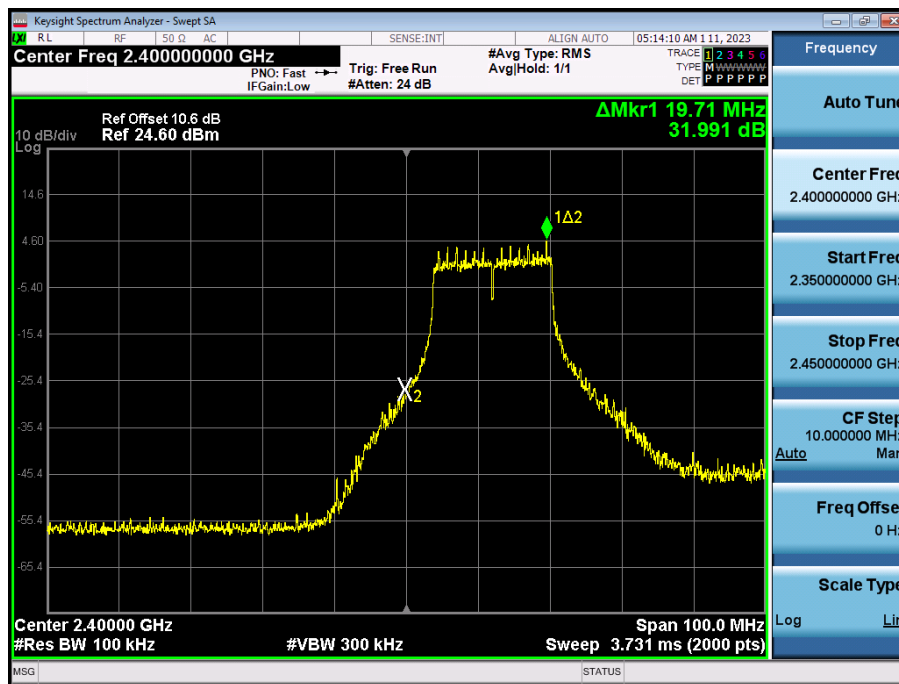
Band Edge (802.11b-Ch. 1)



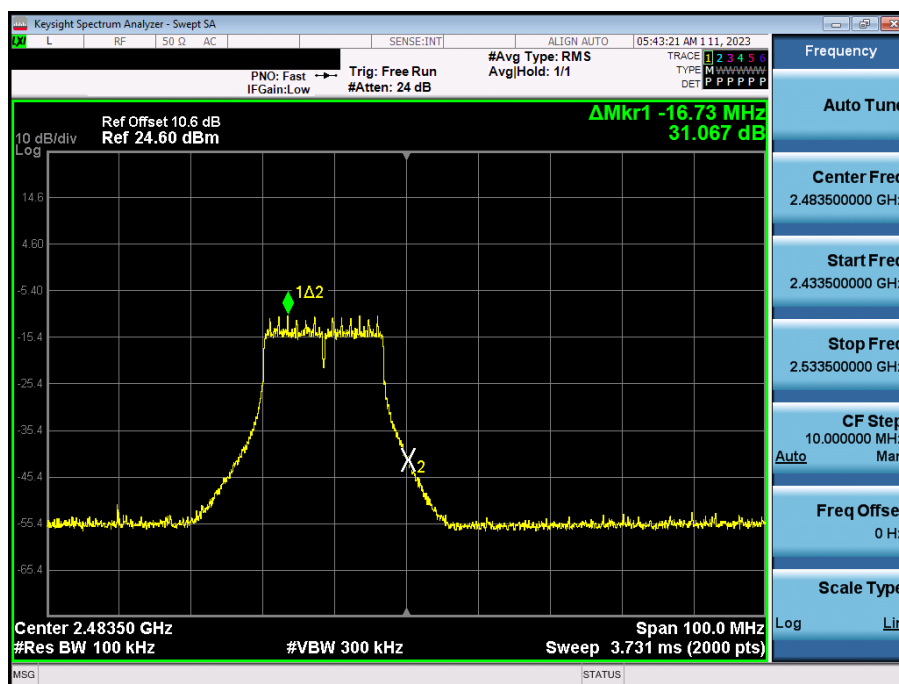
Band Edge (802.11b-Ch. 13)



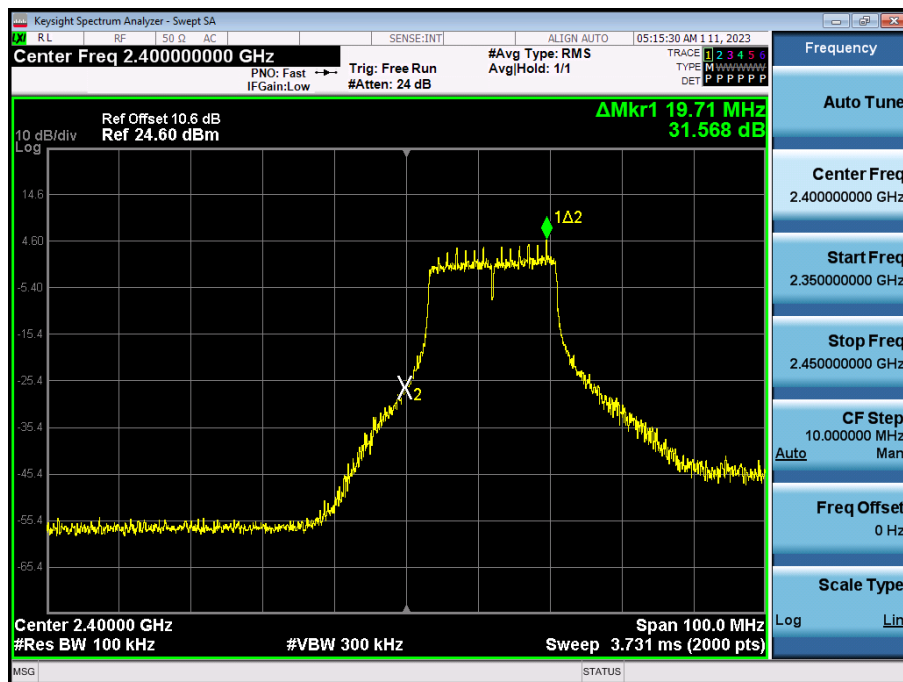
Band Edge (802.11g-Ch. 1)



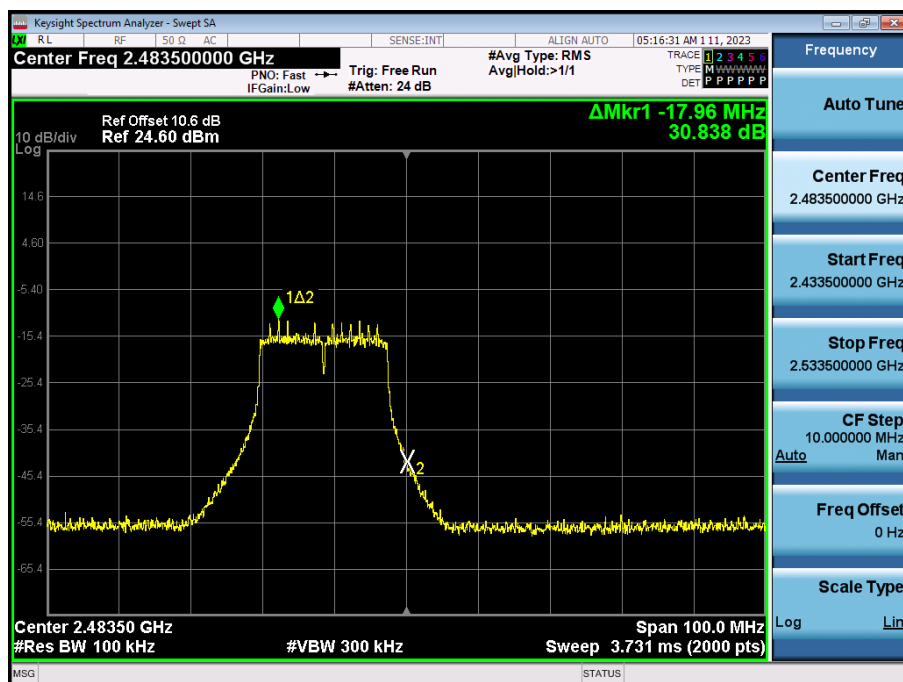
Band Edge (802.11g-Ch. 13)



Band Edge (802.11n_HT20-Ch. 1)

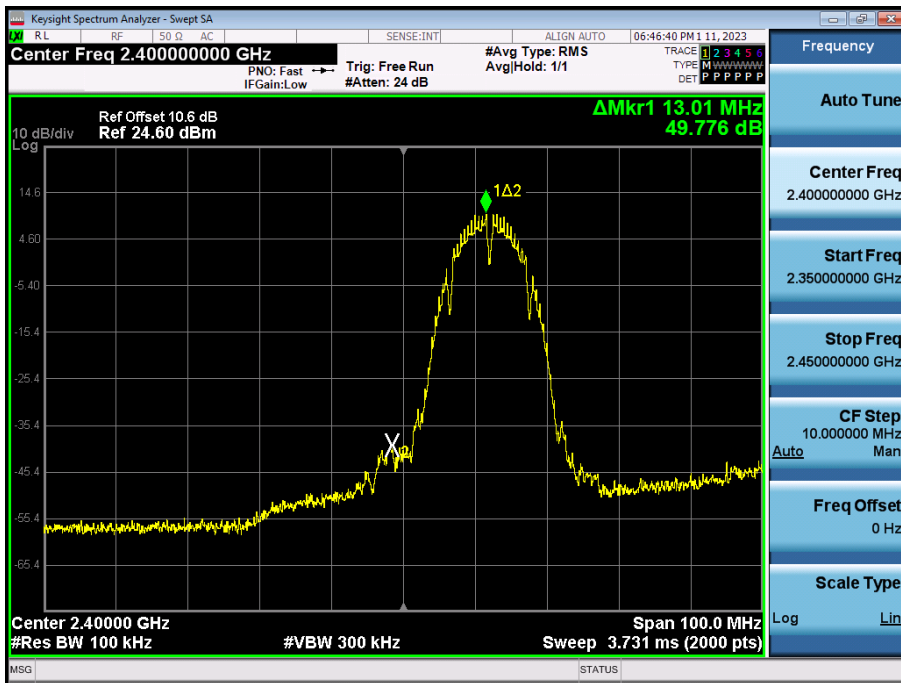


Band Edge (802.11n_HT20-Ch. 13)

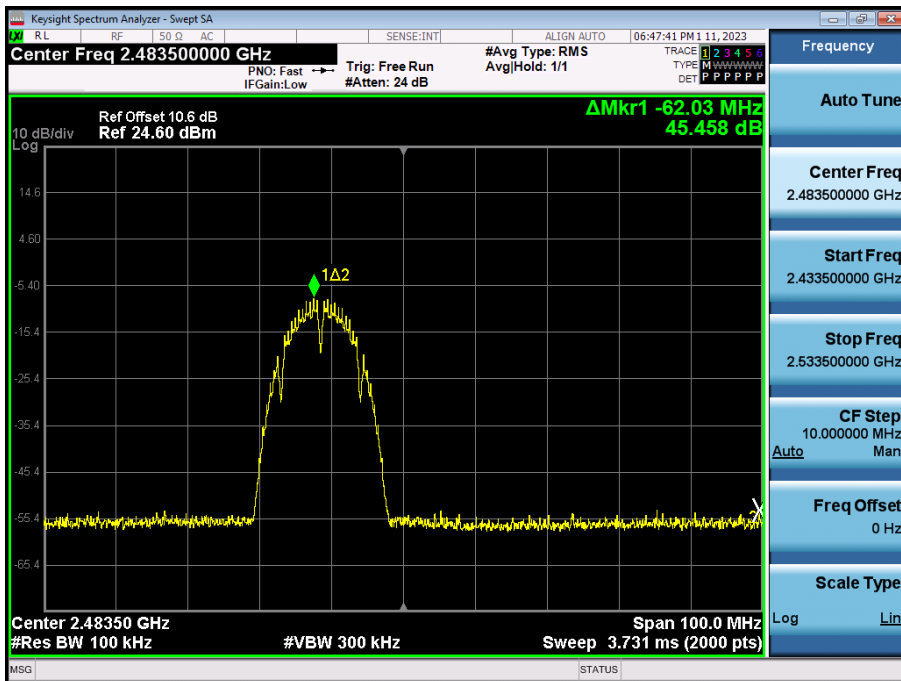


[MIMO Ant.2]

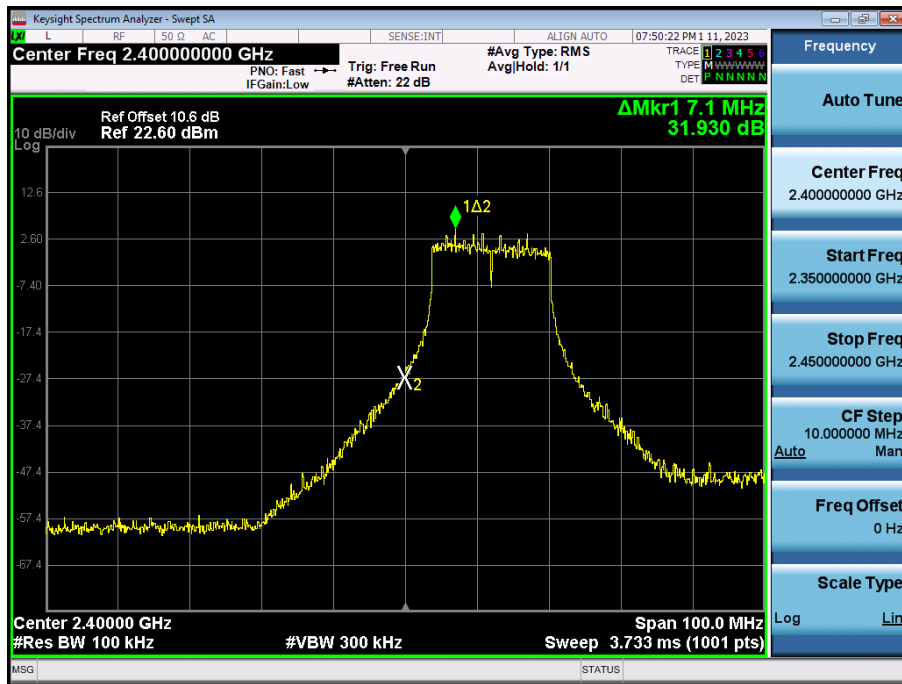
Band Edge (802.11b-Ch. 1)



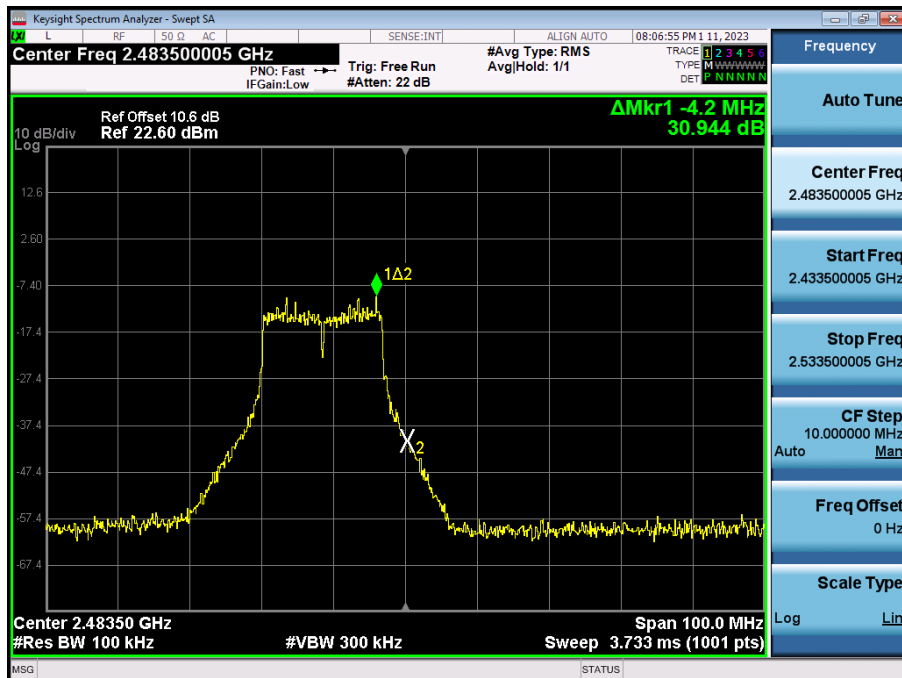
Band Edge (802.11b-Ch. 13)



Band Edge (802.11g-Ch. 1)



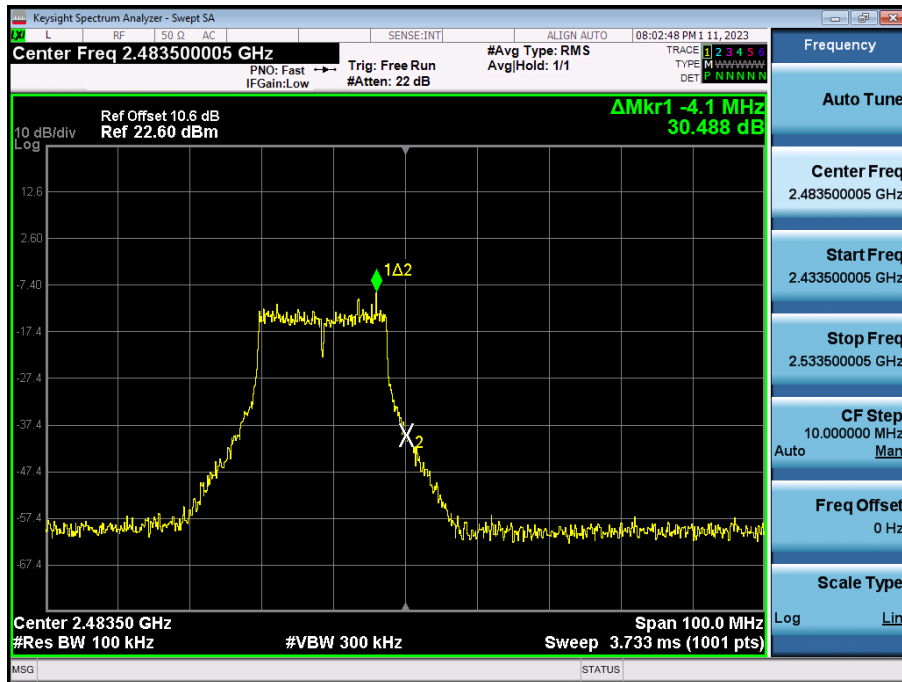
Band Edge (802.11g-Ch. 13)



Band Edge (802.11n_HT20-Ch. 1)



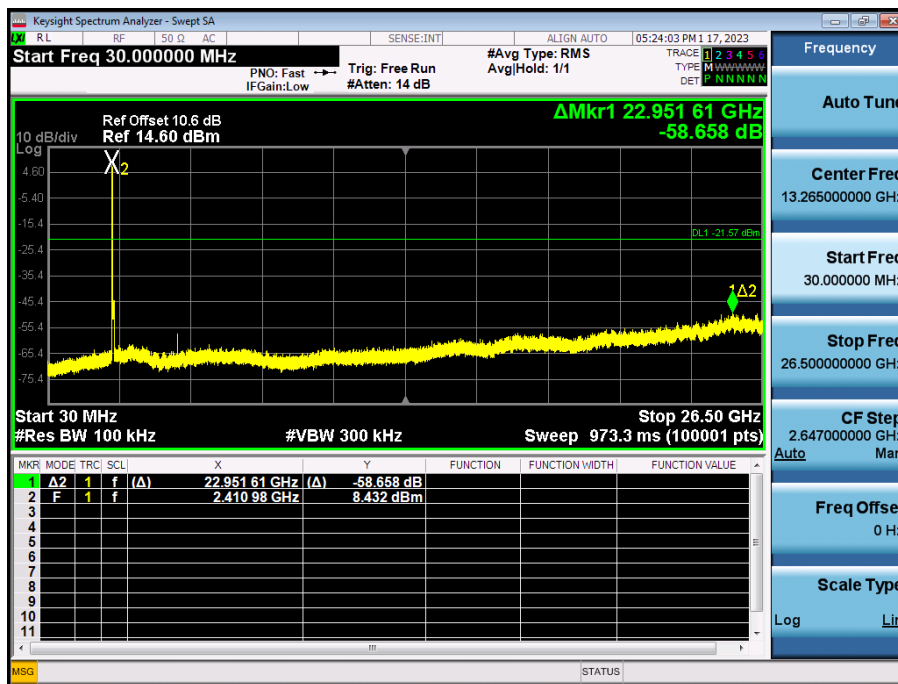
Band Edge (802.11n_HT20-Ch. 13)



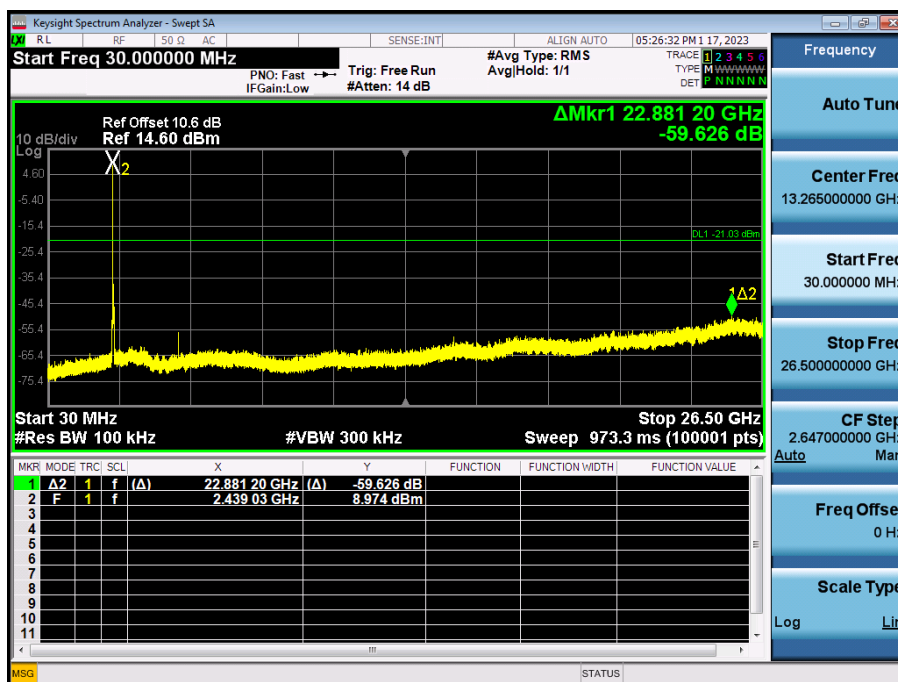
Test Plots(Conducted Spurious Emission, 30 MHz ~ 26.5 GHz)

[SISO(Ant. 1)]

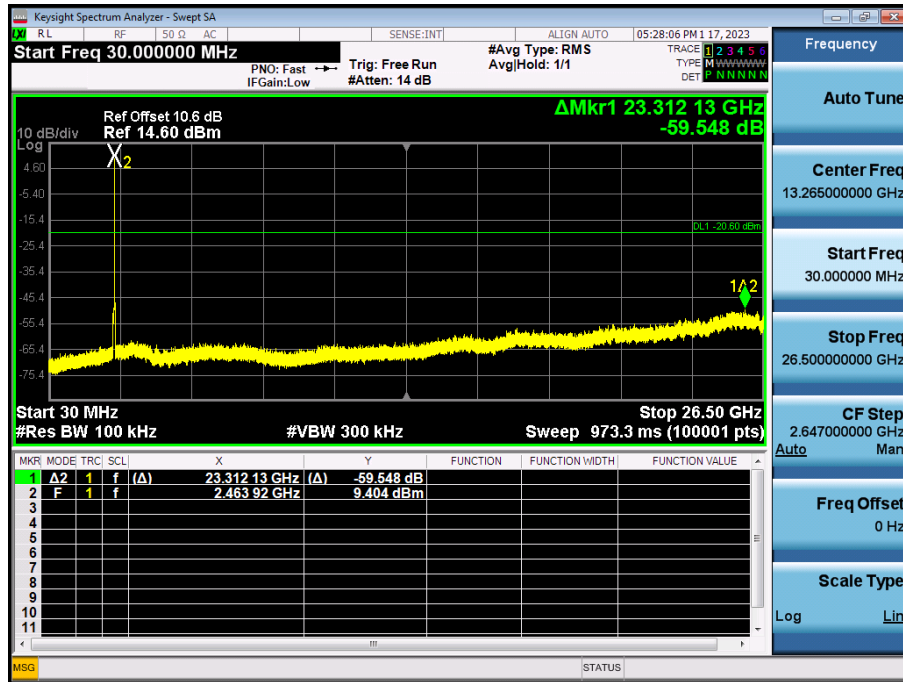
802.11b_Ch.1_1 Mbps



802.11b_Ch.6_1 Mbps

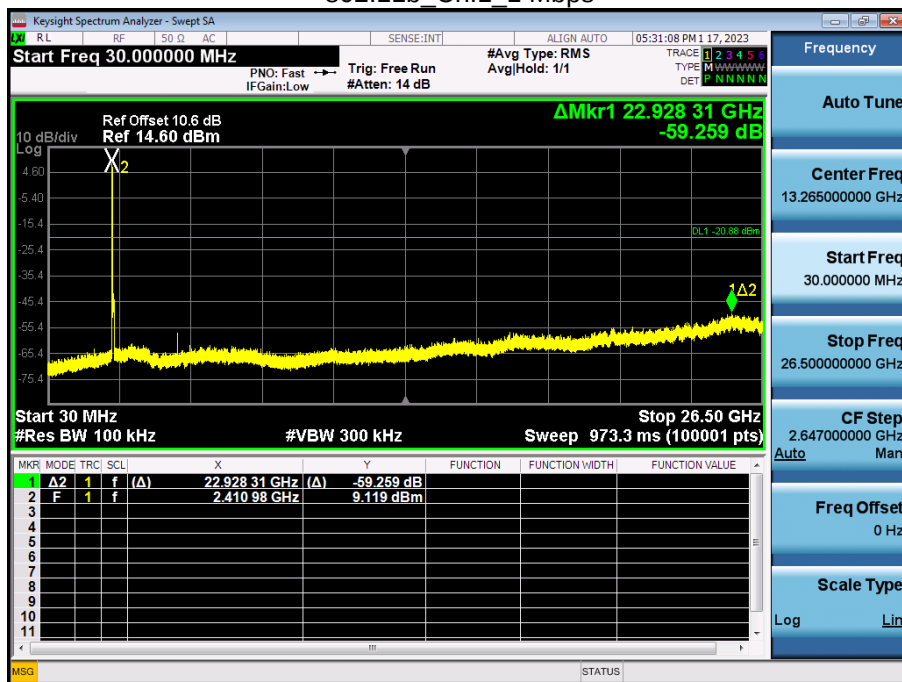


802.11b_Ch.11_1 Mbps

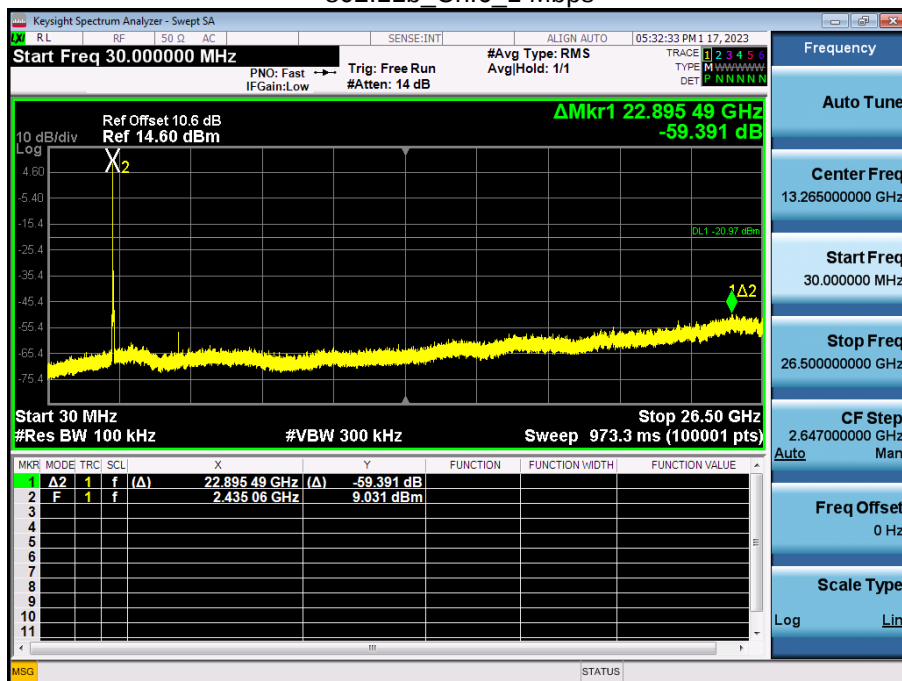


[MIMO Ant.1]

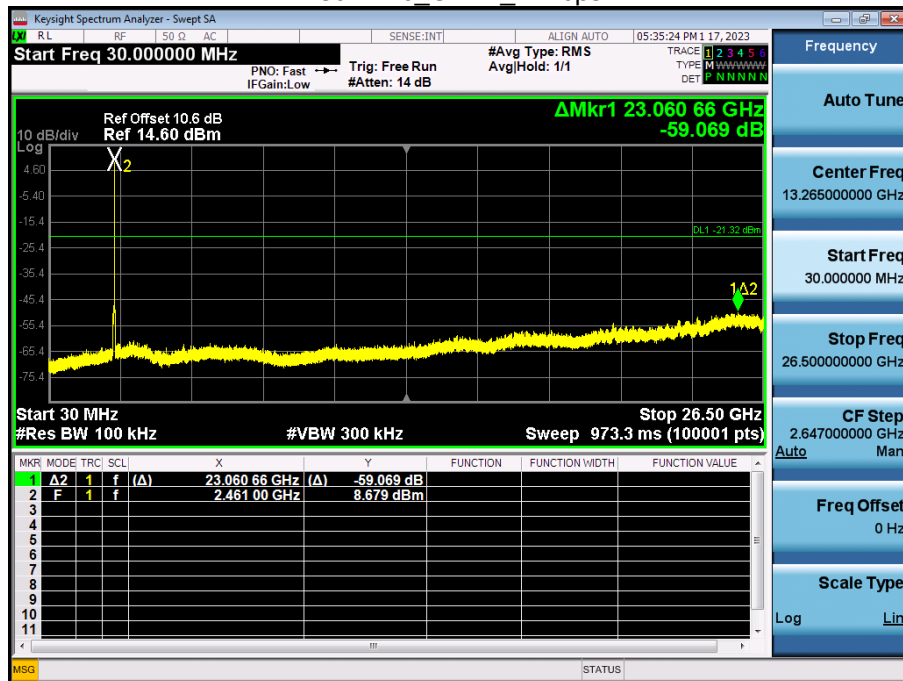
802.11b Ch.1 1 Mbps



802.11b Ch.6 1 Mbps

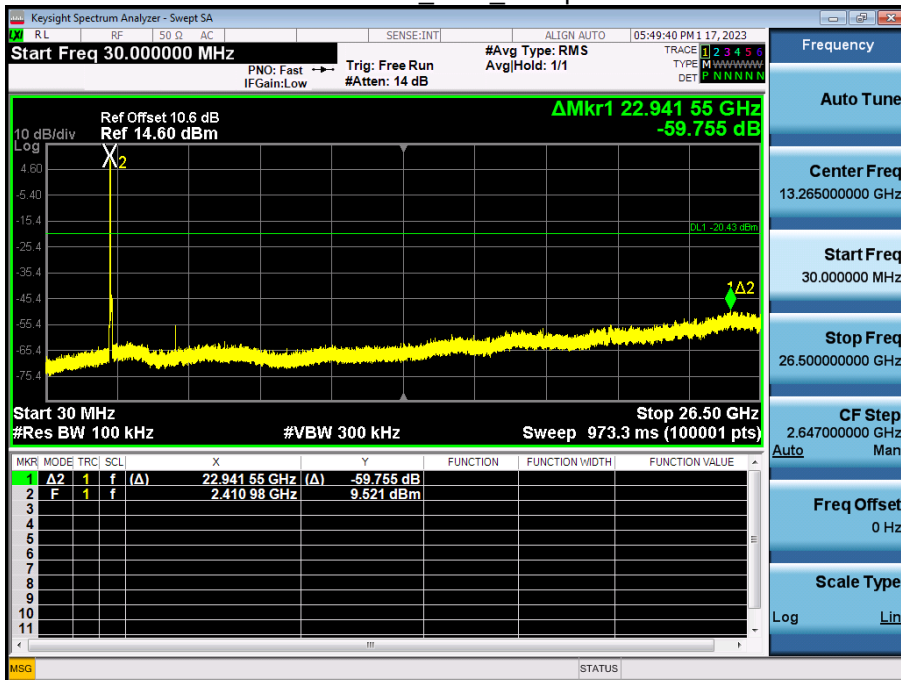


802.11b Ch.11_1 Mbps

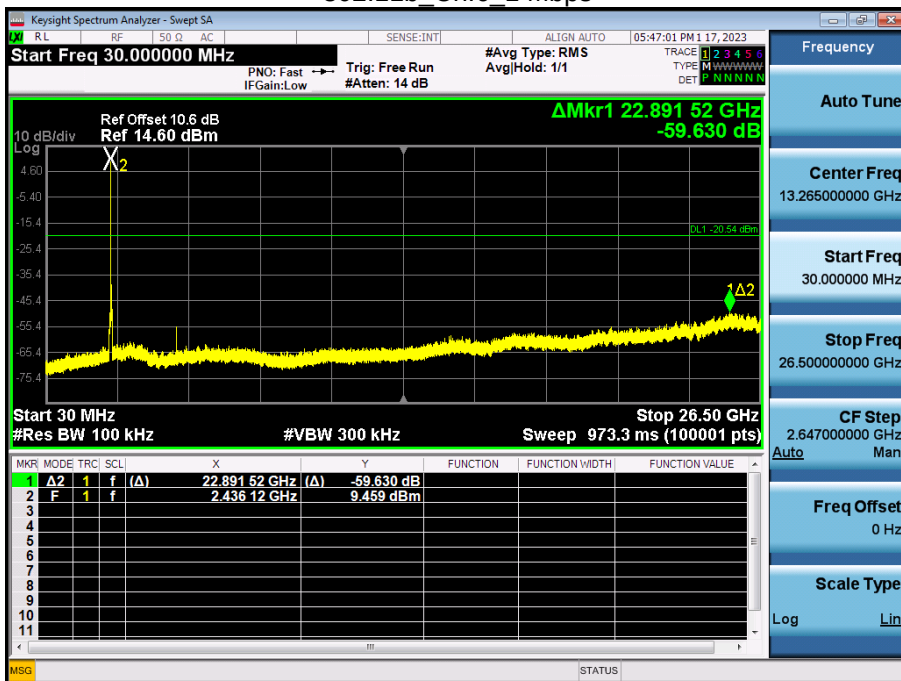


[MIMO Ant.2]

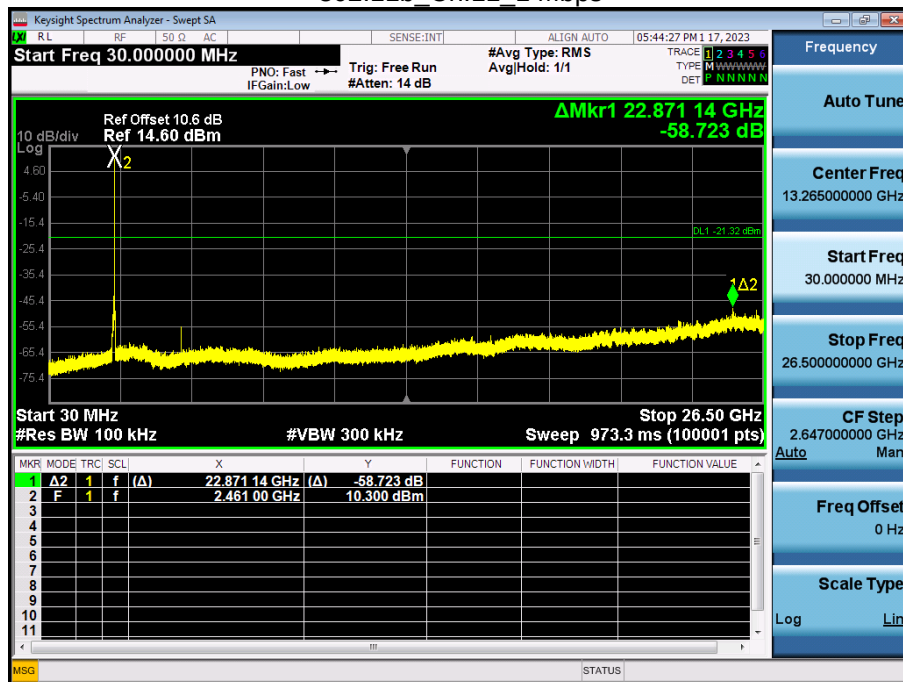
802.11b Ch.1 1 Mbps



802.11b Ch.6 1 Mbps



802.11b Ch.11 1 Mbps



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

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

Note:

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

Frequency Range : Below 1 GHz

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

Note:

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

Frequency Range : Above 1 GHz**[MIMO]**

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

Frequency [MHz]	Measured Value [dBμV/m]	AF+CL+DF-AG [dB/m]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
4824	43.78	3.42	V	47.20	73.98	26.78	PK
4824	33.69	3.42	V	37.11	53.98	16.87	AV
7236	43.09	8.48	V	51.57	73.98	22.41	PK
7236	32.91	8.48	V	41.39	53.98	12.59	AV
4824	44.11	3.42	H	47.53	73.98	26.45	PK
4824	33.99	3.42	H	37.41	53.98	16.57	AV
7236	42.64	8.48	H	51.12	73.98	22.86	PK
7236	31.68	8.48	H	40.16	53.98	13.82	AV

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

Frequency [MHz]	Measured Value [dBμV/m]	AF+CL+DF-AG [dB/m]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
4874	45.33	2.97	V	48.30	73.98	25.68	PK
4874	36.28	2.97	V	39.25	53.98	14.73	AV
7311	41.46	9.43	V	50.89	73.98	23.09	PK
7311	29.18	9.43	V	38.61	53.98	15.37	AV
4874	45.09	2.97	H	48.06	73.98	25.92	PK
4874	34.86	2.97	H	37.83	53.98	16.15	AV
7311	42.36	9.43	H	51.79	73.98	22.19	PK
7311	30.48	9.43	H	39.91	53.98	14.07	AV

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

Frequency [MHz]	Measured Value [dBμV/m]	AF+CL+DF-AG [dB/m]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
4924	45.22	2.47	V	47.69	73.98	26.29	PK
4924	35.29	2.47	V	37.76	53.98	16.22	AV
7386	41.50	10.24	V	51.74	73.98	22.24	PK
7386	29.34	10.24	V	39.58	53.98	14.40	AV
4924	43.47	2.47	H	45.94	73.98	28.04	PK
4924	33.23	2.47	H	35.70	53.98	18.28	AV
7386	41.47	10.24	H	51.71	73.98	22.27	PK
7386	29.10	10.24	H	39.34	53.98	14.64	AV

Note:

Channel 12 and 13 are less powerful than channel 11. So, The test for high channel was performed at channel 11.

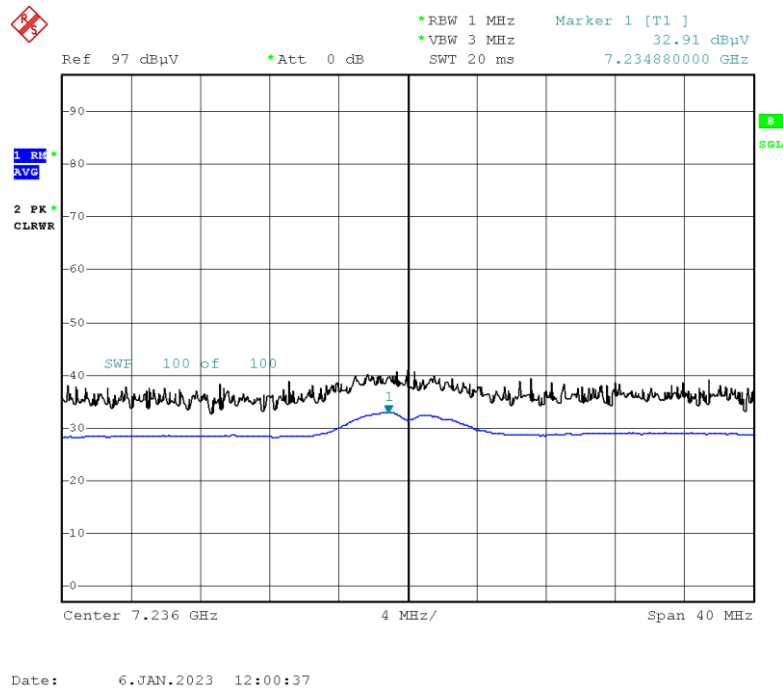
Test Plots

Note:

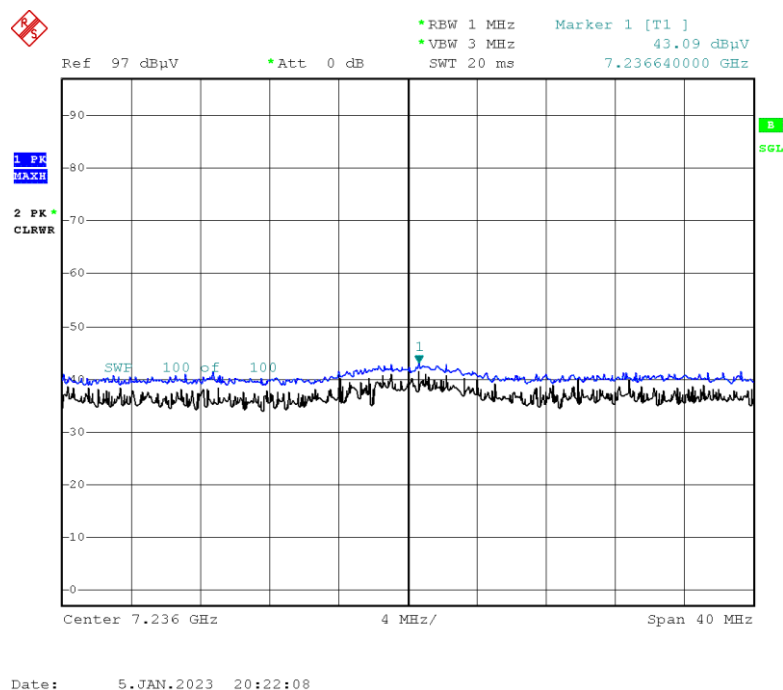
In order to simplify the report, Plot of worst case are only reported.

[MIMO]

Radiated Spurious Emissions plot – Average Result (802.11b_1 Mbps, Ch.1 3rd Harmonic, Z-V)



Radiated Spurious Emissions plot – Peak Result (802.11b_1 Mbps, Ch.1 3rd Harmonic, Y-V)



9.7 RADIATED RESTRICTED BAND EDGES**[MIMO]**

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

Frequency [MHz]	Measured Value [dBμV]	A.F.+C.L+D.F [dB/m]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
2310.0~2390.0	19.74	34.90	H	54.63	73.98	19.35	PK
2310.0~2390.0	3.80	34.90	H	38.69	53.98	15.29	AV
2310.0~2390.0	19.46	34.90	V	54.36	73.98	19.62	PK
2310.0~2390.0	3.64	34.90	V	38.54	53.98	15.44	AV
2483.5~2500.0	25.68	34.90	H	60.58	73.98	13.40	PK
2483.5~2500.0	12.13	34.90	H	47.02	53.98	6.96	AV
2483.5~2500.0	25.48	34.90	V	60.38	73.98	13.60	PK
2483.5~2500.0	12.10	34.90	V	46.99	53.98	6.99	AV
2483.5~2500.0	25.24	35.10	H	60.34	73.98	13.64	PK
2483.5~2500.0	7.83	35.10	H	42.92	53.98	11.06	AV
2483.5~2500.0	25.12	35.10	V	60.21	73.98	13.77	PK
2483.5~2500.0	7.47	35.10	V	42.57	53.98	11.41	AV

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

Frequency [MHz]	Measured Value [dBμV]	A.F.+C.L+D.F [dB/m]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
2483.5~2500.0	21.67	35.10	H	56.76	73.98	17.22	PK
2483.5~2500.0	3.43	35.10	H	38.53	53.98	15.45	AV
2483.5~2500.0	21.53	35.10	V	56.63	73.98	17.35	PK
2483.5~2500.0	3.38	35.10	V	38.47	53.98	15.51	AV
2483.5~2500.0	18.92	35.10	H	54.01	73.98	19.97	PK
2483.5~2500.0	2.28	35.10	H	37.38	53.98	16.60	AV
2483.5~2500.0	18.51	35.10	V	53.61	73.98	20.37	PK
2483.5~2500.0	2.16	35.10	V	37.26	53.98	16.72	AV

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

Frequency [MHz]	Measured Value [dBμV]	Duty Cycle Factor [dB]	A.F.+C.L+D.F [dB/m]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
2310.0~2390.0	26.82	0.00	34.90	H	61.72	73.98	12.26	PK
2310.0~2390.0	9.62	0.35	34.90	H	44.87	53.98	9.11	AV
2310.0~2390.0	26.57	0.00	34.90	V	61.47	73.98	12.51	PK
2310.0~2390.0	9.19	0.35	34.90	V	44.44	53.98	9.54	AV
2483.5~2500.0	26.58	0.00	35.10	H	61.68	73.98	12.30	PK
2483.5~2500.0	10.75	0.35	35.10	H	46.20	53.98	7.78	AV
2483.5~2500.0	26.42	0.00	35.10	V	61.51	73.98	12.47	PK
2483.5~2500.0	10.44	0.35	35.10	V	45.89	53.98	8.09	AV
#2483.5~2484.5	27.00	0.00	35.10	H	62.10	73.98	11.88	PK
#2484.5~2485.5	25.60	0.00	35.10	H	60.69	73.98	13.29	PK
2485.5~2500.0	28.86	0.00	35.10	H	63.96	73.98	10.02	PK
#2483.5~2484.5	16.29	0.35	35.10	H	51.74	53.98	2.24	AV
#2484.5~2485.5	14.05	0.35	35.10	H	49.50	53.98	4.48	AV
2485.5~2500.0	12.55	0.35	35.10	H	47.99	53.98	5.99	AV
#2483.5~2484.5	26.68	0.00	35.10	V	61.77	73.98	12.21	PK
#2484.5~2485.5	25.50	0.00	35.10	V	60.60	73.98	13.38	PK
2485.5~2500.0	28.46	0.00	35.10	V	63.56	73.98	10.42	PK
#2483.5~2484.5	15.94	0.35	35.10	V	51.39	53.98	2.59	AV
#2484.5~2485.5	13.89	0.35	35.10	V	49.33	53.98	4.65	AV
2485.5~2500.0	12.38	0.35	35.10	V	47.83	53.98	6.15	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 Value [dBμV]	Duty Cycle Factor [dB]	A.F.+C.L+D. F [dB/m]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measure ment Type
#2483.5~2484.5	25.97	0.00	35.10	H	61.06	73.98	12.92	PK
#2484.5~2485.5	0.00	0.00	35.10	H	35.10	73.98	38.88	PK
2485.5~2500.0	0.00	0.00	35.10	H	35.10	73.98	38.88	PK
#2483.5~2484.5	9.75	0.35	35.10	H	45.20	53.98	8.78	AV
#2484.5~2485.5	0.00	0.35	35.10	H	35.45	53.98	18.53	AV
2485.5~2500.0	0.00	0.35	35.10	H	35.45	53.98	18.53	AV
#2483.5~2484.5	25.48	0.00	35.10	V	60.57	73.98	13.41	PK
#2484.5~2485.5	0.00	0.00	35.10	V	35.10	73.98	38.88	PK
2485.5~2500.0	0.00	0.00	35.10	V	35.10	73.98	38.88	PK
#2483.5~2484.5	9.66	0.35	35.10	V	45.10	53.98	8.88	AV
#2484.5~2485.5	0.00	0.35	35.10	V	35.45	53.98	18.53	AV
2485.5~2500.0	0.00	0.35	35.10	V	35.45	53.98	18.53	AV
#2483.5~2484.5	25.32	0.00	35.10	H	60.41	73.98	13.57	PK
#2484.5~2485.5	22.77	0.00	35.10	H	57.87	73.98	16.11	PK
2485.5~2500.0	27.67	0.00	35.10	H	62.76	73.98	11.22	PK
#2483.5~2484.5	14.81	0.35	35.10	H	50.26	53.98	3.72	AV
#2484.5~2485.5	11.53	0.35	35.10	H	46.98	53.98	7.00	AV
2485.5~2500.0	10.19	0.35	35.10	H	45.64	53.98	8.34	AV
#2483.5~2484.5	25.04	0.00	35.10	V	60.14	73.98	13.84	PK
#2484.5~2485.5	22.42	0.00	35.10	V	57.51	73.98	16.47	PK
2485.5~2500.0	27.49	0.00	35.10	V	62.59	73.98	11.39	PK
#2483.5~2484.5	14.63	0.35	35.10	V	50.08	53.98	3.90	AV
#2484.5~2485.5	11.15	0.35	35.10	V	46.59	53.98	7.39	AV
2485.5~2500.0	9.88	0.35	35.10	V	45.33	53.98	8.65	AV

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

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

Frequency [MHz]	Measured Value [dBμV]	Duty Cycle Factor [dB]	A.F.+C.L+D.F [dB/m]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
2310.0~2390.0	29.84	0.00	34.90	H	64.74	73.98	9.24	PK
2310.0~2390.0	9.99	0.67	34.90	H	45.56	53.98	8.42	AV
2310.0~2390.0	29.49	0.00	34.90	V	64.38	73.98	9.60	PK
2310.0~2390.0	9.46	0.67	34.90	V	45.03	53.98	8.95	AV
2483.5~2500.0	26.18	0.00	35.10	H	61.28	73.98	12.70	PK
2483.5~2500.0	9.88	0.67	35.10	H	45.65	53.98	8.33	AV
2483.5~2500.0	26.02	0.00	35.10	V	61.12	73.98	12.86	PK
2483.5~2500.0	9.43	0.67	35.10	V	45.20	53.98	8.78	AV
2483.5~2500.0	35.10	0.00	35.10	H	70.19	73.98	3.79	PK
2483.5~2500.0	15.19	0.67	35.10	H	50.95	53.98	3.03	AV
2483.5~2500.0	34.88	0.00	35.10	V	69.98	73.98	4.00	PK
2483.5~2500.0	14.68	0.67	35.10	V	50.45	53.98	3.53	AV

Operation Mode: 802.11n (HT20)

Transfer MCS Index: 0

Operating Frequency: 2467 MHz, 2472 MHz

Channel No. 12 Ch, 13 Ch

Frequency [MHz]	Measured Value [dBμV]	Duty Cycle Factor [dB]	A.F.+C.L+D.F [dB/m]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
#2483.5~2484.5	25.62	0.00	35.10	H	60.72	73.98	13.26	PK
#2484.5~2485.5	0.00	0.00	35.10	H	35.10	73.98	38.88	PK
2485.5~2500.0	0.00	0.00	35.10	H	35.10	73.98	38.88	PK
#2483.5~2484.5	8.34	0.67	35.10	H	44.10	53.98	9.88	AV
#2484.5~2485.5	0.00	0.67	35.10	H	35.77	53.98	18.21	AV
2485.5~2500.0	0.00	0.67	35.10	H	35.77	53.98	18.21	AV
#2483.5~2484.5	25.55	0.00	35.10	V	60.64	73.98	13.34	PK
#2484.5~2485.5	0.00	0.00	35.10	V	35.10	73.98	38.88	PK
2485.5~2500.0	0.00	0.00	35.10	V	35.10	73.98	38.88	PK
#2483.5~2484.5	8.25	0.67	35.10	V	44.02	53.98	9.96	AV
#2484.5~2485.5	0.00	0.67	35.10	V	35.77	53.98	18.21	AV
2485.5~2500.0	0.00	0.67	35.10	V	35.77	53.98	18.21	AV
#2483.5~2484.5	25.33	0.00	35.10	H	60.43	73.98	13.55	PK
#2484.5~2485.5	23.31	0.00	35.10	H	58.41	73.98	15.57	PK
2485.5~2500.0	27.53	0.00	35.10	H	62.63	73.98	11.35	PK
#2483.5~2484.5	14.22	0.67	35.10	H	49.99	53.98	3.99	AV
#2484.5~2485.5	10.98	0.67	35.10	H	46.75	53.98	7.23	AV
2485.5~2500.0	10.17	0.67	35.10	H	45.94	53.98	8.04	AV
#2483.5~2484.5	25.19	0.00	35.10	V	60.29	73.98	13.69	PK
#2484.5~2485.5	23.04	0.00	35.10	V	58.14	73.98	15.84	PK
2485.5~2500.0	26.92	0.00	35.10	V	62.02	73.98	11.96	PK
#2483.5~2484.5	14.02	0.67	35.10	V	49.79	53.98	4.19	AV
#2484.5~2485.5	10.55	0.67	35.10	V	46.32	53.98	7.66	AV
2485.5~2500.0	10.03	0.67	35.10	V	45.80	53.98	8.18	AV

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

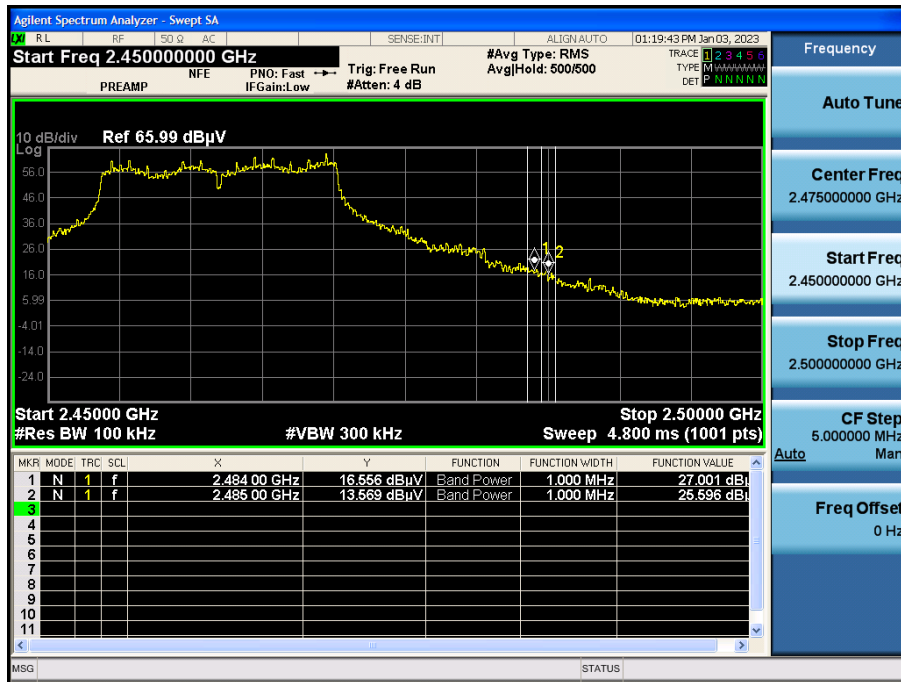
Test Plots

Note:

In order to simplify the report, Plots of worst case are only reported.

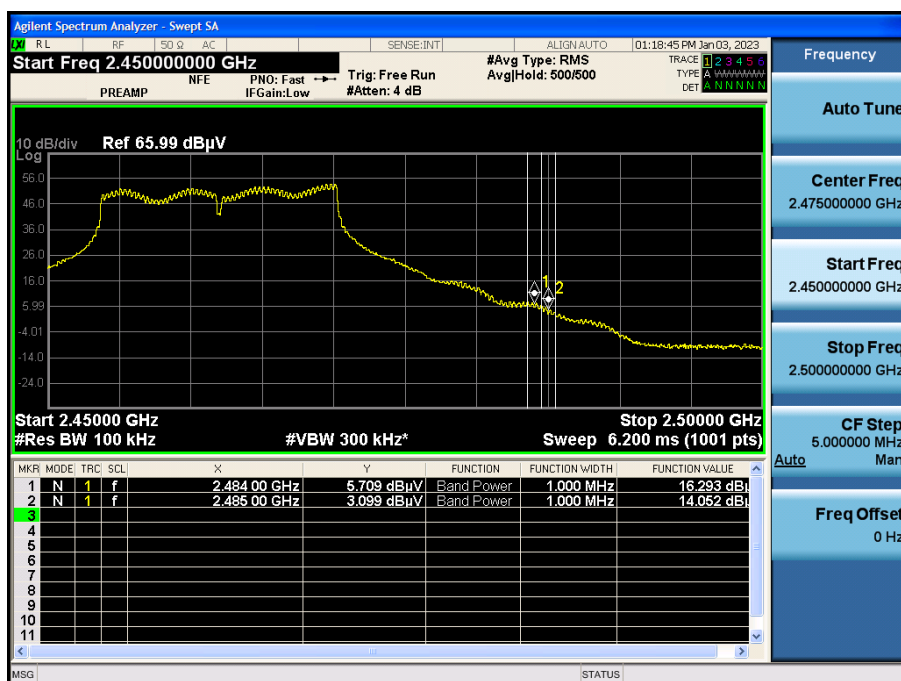
[MIMO]

Radiated Restricted Band Edges plot – Peak Result (802.11g_ 6 Mbps, Ch.11, X-H)



Radiated Restricted Band Edges plot – Average Result (802.11g_ 6 Mbps, Ch.11, X-H)

Integration method Used



Radiated Restricted Band Edges plot – Peak Result (802.11g_ 6 Mbps, Ch.11, X-H)



9.8 POWERLINE CONDUCTED EMISSIONS

Conducted Emissions

Test

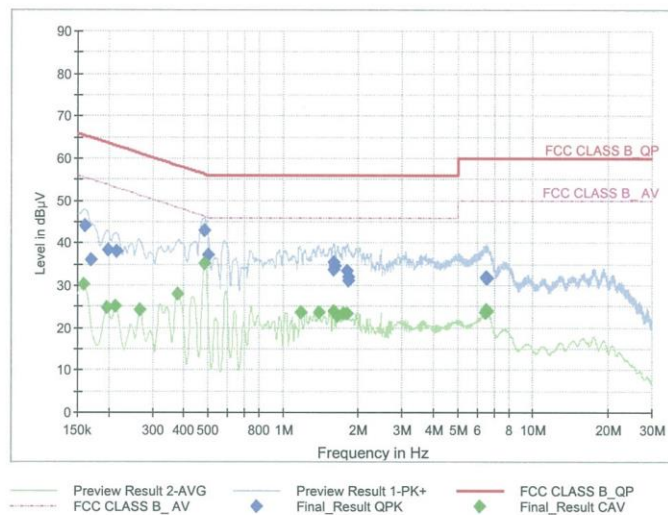
1 / 2

Test Report

Common Information

EUT : SM-A546E/DS
Operating Conditions : 2.4G WLAN Mode
Comment :

Full Spectrum



Final Result QPK

Frequency (MHz)	QuasiPeak (dBμV)	Limit (dBμV)	Margin (dB)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.1613	44.19	65.40	21.21	9.000	N	OFF	9.6
0.1703	36.12	64.95	28.83	9.000	N	OFF	9.6
0.1995	38.43	63.63	25.20	9.000	N	OFF	9.6
0.2153	37.96	63.00	25.04	9.000	L1	OFF	9.7
0.4853	42.87	56.25	13.38	9.000	L1	OFF	9.7
0.5000	37.28	56.00	18.72	9.000	L1	OFF	9.7
1.5868	33.73	56.00	22.27	9.000	L1	OFF	9.7
1.5980	35.34	56.00	20.66	9.000	L1	OFF	9.7
1.6048	34.50	56.00	21.50	9.000	L1	OFF	9.7
1.8050	33.54	56.00	22.46	9.000	L1	OFF	9.7
1.8208	32.05	56.00	23.95	9.000	L1	OFF	9.7
1.8253	31.25	56.00	24.75	9.000	L1	OFF	9.7
6.5030	31.66	60.00	28.34	9.000	L1	OFF	9.9
6.5188	32.02	60.00	27.98	9.000	L1	OFF	9.9
6.5255	32.02	60.00	27.98	9.000	L1	OFF	9.9
6.5300	32.00	60.00	28.00	9.000	L1	OFF	9.9
6.5728	31.80	60.00	28.20	9.000	L1	OFF	9.9
6.5840	31.71	60.00	28.29	9.000	L1	OFF	9.9

Test

2 / 2

Final Result_CAV

Frequency (MHz)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.1590	30.30	55.52	25.22	9.000	L1	OFF	9.7
0.1973	24.68	53.73	29.05	9.000	L1	OFF	9.7
0.2130	25.14	53.09	27.95	9.000	L1	OFF	9.7
0.2670	24.16	51.21	27.05	9.000	L1	OFF	9.7
0.3773	28.09	48.34	20.25	9.000	L1	OFF	9.7
0.4853	35.11	46.25	11.14	9.000	L1	OFF	9.7
1.1705	23.54	46.00	22.46	9.000	L1	OFF	9.7
1.3865	23.60	46.00	22.40	9.000	L1	OFF	9.7
1.5980	23.82	46.00	22.18	9.000	L1	OFF	9.7
1.6520	22.85	46.00	23.15	9.000	L1	OFF	9.7
1.7420	23.51	46.00	22.49	9.000	L1	OFF	9.7
1.7983	23.48	46.00	22.52	9.000	L1	OFF	9.7
6.4108	23.51	50.00	26.49	9.000	L1	OFF	9.9
6.4805	23.64	50.00	26.36	9.000	L1	OFF	9.9
6.5143	24.02	50.00	25.98	9.000	L1	OFF	9.9
6.5188	24.12	50.00	25.88	9.000	L1	OFF	9.9
6.5255	24.01	50.00	25.99	9.000	L1	OFF	9.9
6.5863	24.04	50.00	25.96	9.000	L1	OFF	9.9

10. LIST OF TEST EQUIPMENT

Conducted Test

Equipment	Model	Manufacturer	Serial No.	Due to Calibration	Calibration Interval
LISN	ENV216	Rohde & Schwarz	102245	08/22/2023	Annual
EMI Test Receiver	ESR	Rohde & Schwarz	101910	06/07/2023	Annual
Temperature Chamber	SU-642	ESPEC	0093008124	03/04/2023	Annual
Signal Analyzer	N9030A	Keysight	MY55410508	09/06/2023	Annual
Power Meter	N1911A	Agilent	MY45100523	03/24/2023	Annual
Power Sensor	N1921A	Agilent	MY57820067	03/24/2023	Annual
Directional Coupler	87300B	Agilent	3116A03621	11/02/2023	Annual
Power Splitter	11667B	Hewlett Packard	10545	02/03/2023	Annual
DC Power Supply	E3632A	Agilent	KR75305528	01/03/2024	Annual
Attenuator(10 dB)(DC-26.5 GHz)	8493C-010	Agilent	08285	06/21/2023	Annual
Attenuator(20 dB)	18N-20dB	Rohde & Schwarz	8	03/07/2023	Annual
Software	EMC32	Rohde & Schwarz	N/A	N/A	N/A
FCC WLAN&BT&BLE Conducted Test Software v3.0	N/A	HCT CO., LTD.	N/A	N/A	N/A
Bluetooth Tester	CBT	Rohde & Schwarz	100808	02/22/2023	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.

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	EM2090	Emco	060520	N/A	N/A
Turn Table	N/A	Ets	N/A	N/A	N/A
Loop Antenna	FMZB 1513	Rohde & Schwarz	1513-333	03/17/2024	Biennial
Hybrid Antenna	VULB 9168	Schwarzbeck	9168-0895	08/16/2024	Biennial
Horn Antenna	BBHA 9120D	Schwarzbeck	9120D-1191	11/18/2023	Biennial
Horn Antenna(15 GHz ~ 40 GHz)	BBHA9170	Schwarzbeck	BBHA9170124	04/12/2023	Biennial
Amp & Filter Bank Switch Controller	FBSM-01A	TNM system	0	N/A	N/A
Band Reject Filter	WRCJV2400/2483.5-2370/2520-60/12SS	Wainwright Instruments	2	01/05/2024	Annual
Band Reject Filter	WRCJV12-4900-5100-5900-6100-50SS	Wainwright Instruments	5	06/13/2023	Annual
Band Reject Filter	WRCJV12-4900-5100-5900-6100-50SS	Wainwright Instruments	6	06/13/2023	Annual
Band Reject Filter	WRCJV5100/5850-40/50-8EEK	Wainwright Instruments	1	02/07/2023	Annual
ATT(3 dB) + LNA2(6~18 GHz)	18B-03, CBL06185030	WEINSCHEL CERNEX	N/A	12/05/2023	Annual
ATT(10 dB) + LNA1(0.1~18 GHz)	56-10, CBLU1183540B-01	Api tech, CERNEX	N/A	12/05/2023	Annual
High Pass Filter	WHKX10-2700-3000-18000-40SS	Wainwright Instruments	N/A	12/05/2023	Annual
High Pass Filter	WHKX8-6090-7000-18000-40SS	Wainwright Instruments	N/A	12/05/2023	Annual
Thru	COAXIAL ATTENUATOR	T&M SYSTEM	N/A	12/05/2023	Annual
Power Amplifier	CBL18265035	CERNEX	22966	12/01/2023	Annual
Power Amplifier	CBL26405040	CERNEX	25956	03/11/2023	Annual
Bluetooth Tester	TC-3000C	TESCOM	3000C000175	04/05/2023	Annual
Spectrum Analyzer	FSP(9 kHz ~ 30 GHz)	Rohde & Schwarz	836650/016	09/06/2023	Annual
Spectrum Analyzer	FSV40-N(9 kHz ~ 30 GHz)	Rohde & Schwarz	101068-SZ	09/07/2023	Annual
Signal Analyzer	N9030A	Keysight	MY55410508	09/06/2023	Annual
Signal Analyzer	N9030A	Keysight	MY49431210	12/29/2023	Annual
Signal Analyzer	N9030A	Keysight	MY52350879	01/02/2024	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-2301-FC054-P