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

FCC DTS REPORT

Certification

Applicant Name:
SAMSUNG Electronics Co., Ltd.

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

Date of Issue:
June 28, 2022

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

Report No.: HCT-RF-2206-FC009-R1

FCC ID:	**A3LSMG990B2**
APPLICANT:	**SAMSUNG Electronics Co., Ltd.**
Model:	SM-G990B2/DS
Additional Model:	SM-G990B2
EUT Type:	Mobile Phone
Average Output Power:	Ant.1 - 802.11b : 14.94 dBm, 802.11g : 14.23 dBm, 802.11n(HT20) : 15.08 dBm Ant.2 - 802.11b : 14.72 dBm, 802.11g : 13.93 dBm, 802.11n(HT20) : 14.70 dBm Ant.1&2 - 802.11b : 17.84 dBm, 802.11g : 17.09 dBm, 802.11n(HT20) : 17.91 dBm
Frequency Range:	2 412 MHz ~ 2 462 MHz
Modulation type:	CCK/DSSS/OFDM
FCC Classification:	Digital Transmission System(DTS)
FCC Rule Part(s):	Part 15.247

Engineering Statement:

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

REVIEWED BY

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

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

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

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

Version

TEST REPORT NO.	DATE	DESCRIPTION
HCT-RF-2206-FC009	June 17, 2022	- First Approval Report
HCT-RF-2206-FC009-R1	June 28, 2022	- Added CH.3 Test Data (Page 32-58)

Table of Contents

1. EUT DESCRIPTION

Model	SM-G990B2/DS		
Additional Model	SM-G990B2		
EUT Type	Mobile Phone		
Power Supply	DC 4.20 V		
Frequency Range	2 412 MHz ~ 2 462 MHz		
Max. RF Output Power	Peak Power (For information only)	Ant. 1	802.11b : 20.35 dBm 802.11g : 22.13 dBm 802.11n(HT20) : 22.86 dBm
		Ant.2	802.11b : 20.32 dBm 802.11g : 21.86 dBm 802.11n(HT20) : 22.50 dBm
		Ant.1&2 (MIMO)	802.11b : 23.34 dBm 802.11g : 25.01 dBm 802.11n(HT20) : 25.70 dBm
	Average Power	Ant. 1	802.11b : 14.94 dBm 802.11g : 14.23 dBm 802.11n(HT20) : 15.08 dBm
		Ant.2	802.11b : 14.72 dBm 802.11g : 13.93 dBm 802.11n(HT20) : 14.70 dBm
		Ant.1&2 (MIMO)	802.11b : 17.84 dBm 802.11g : 17.09 dBm 802.11n(HT20) : 17.91 dBm
Modulation Type	DSSS/CCK : 802.11b OFDM : 802.11g, 802.11n		
Number of Channels	11 Channels		
Date(s) of Tests	May 26, 2022 ~ June 28, 2022		
Serial number	Radiated : R3CT40C5N7L Conducted : 6384e630d0197ece		

ANTENNA CONFIGURATIONS

1. Antenna configuration

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

Note:

(1) O = Support, X = Not Support

(2) SISO = Single Input Single Output

(3) SDM = Spatial Diversity Multiplexing

(4) CDD = Cyclic Delay Diversity

(5) SISO test was performed for the MIMO test result.

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

RSDB Scenario	Bluetooth Ant.1	2.4 GHz WiFi Ant.1	2.4 GHz WiFi Ant.2	5GHz WiFi Ant.1	5GHz WiFi Ant.2
Bluetooth + 2.4 GHz WiFi + 5GHz WiFi MIMO	On	-	On	On	On
2.4 GHz WiFi MIMO + 5GHz WiFi MIMO	-	On	On	On	On

DBS	5GHz WiFi Ant.1	5GHz WiFi Ant.2	Bluetooth Ant.1
5GHz WiFi MIMO + Bluetooth	On	On	On

3. Directional Gain Calculation

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

Directional gain =

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

Ant Gain (dBi)		N_{ANT}/ N_{SS}	Directional Gain (dBi)
ANT1	-2.00	2 / 2	0.11
ANT2	-3.90		

Note

According to Ansi C63.10-2013 section 14.4.3, the directional gain is calculated using the formula, where GN is the gain of the nth antenna and NANT is the total number of antennas used.

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

Sample MIMO Calculation:

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

Ant1 + Ant 2 = MIMO

(11.58 dBm + 12.08 dBm) = (14.387 mW + 16.143 mW) = 30.53 mW = 14.88 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.

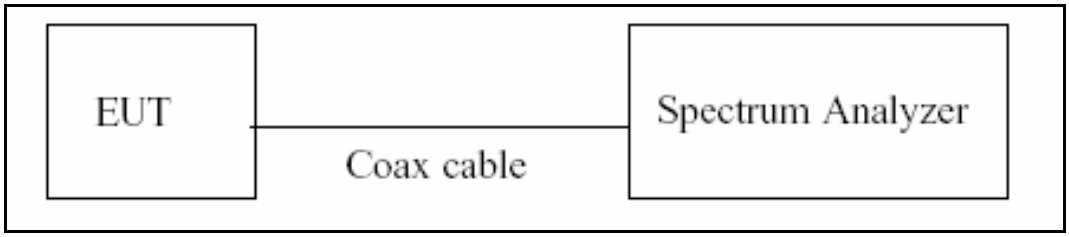
The measurement data shown herein meets or exceeds the U_{CISPR} measurement uncertainty values specified in CISPR 16-4-2 and, thus, can be compared directly to specified limits to determine compliance.

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 ≤ 6.25 microseconds. (50/6.25 = 8)

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

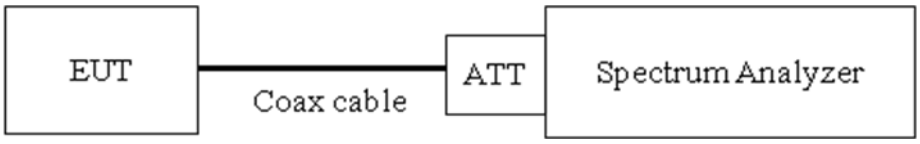
1. RBW = 8 MHz (the largest available value)
2. VBW = 8 MHz (≥ RBW)
3. SPAN = 0 Hz
4. Detector = Peak
5. Number of points in sweep > 100
6. Trace mode = Clear write
7. Measure T_{total} and T_{on}
8. Calculate Duty Cycle = T_{on} / T_{total} and Duty Cycle Factor = 10log(1/Duty Cycle)

7.2. 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 ≥ 3 x RBW
3) Detector = Peak
4) Trace mode = max hold
5) Sweep = auto couple
6) Allow the trace to stabilize
7) We tested 6 dB bandwidth using the automatic bandwidth measurement capability of a spectrum analyzer. X dB is set 6 dB.

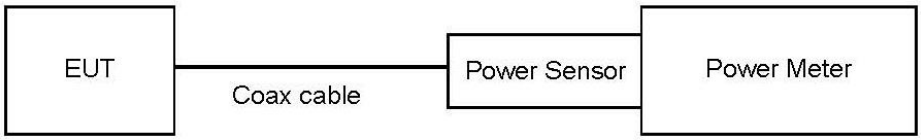
Note : We tested OBW using the automatic bandwidth measurement capability of a spectrum analyzer.

7.3. Output Power

Limit

The maximum permissible conducted output power is 1 Watt.

Test Configuration



Test Procedure

The transmitter output is connected to the Power Meter.

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

: Measure the peak power of the transmitter.

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

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

Sample Calculation

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

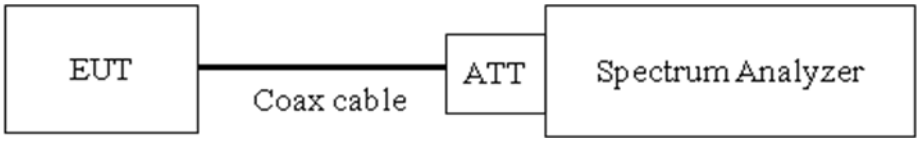
▪ Conducted Output Power(Average) = Measured Value + ATT loss + Cable loss + Duty Cycle Factor

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

Sample Calculation

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

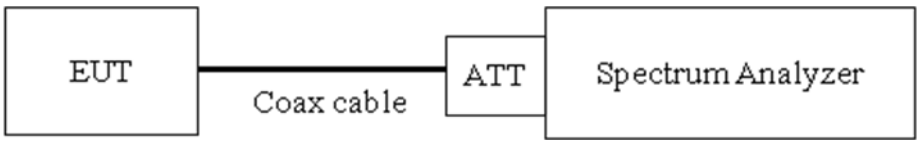
7.5. Conducted Band Edge(Out of Band Emissions) & Conducted Spurious Emissions

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

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

Factors for frequency

Freq(MHz)	Factor(dB)
30	10.04
100	10.07
200	10.12
300	10.17
400	10.20
500	10.21
600	10.21
700	10.23
800	10.24
900	10.26
1000	10.27
2000	10.41
2400	**10.43**
2500	**10.45**
3000	10.52
4000	10.60
5000	10.71
6000	10.73
7000	10.80
8000	10.85
9000	10.91
10000	10.97
11000	11.02
12000	11.10
13000	11.19
14000	11.16
15000	11.21
16000	11.22
17000	11.25
18000	11.30
19000	11.32
20000	11.36
21000	11.48
22000	11.55
23000	11.55
24000	11.59
25000	11.68
26000	11.69

Note : 1. 2 400 ~ 2 500 MHz is fundamental frequency range.

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

3. ANT1 EUT Cable : 0.35 dB ➔Total ANT1 Port offset : 10.80 dB
ANT2 EUT Cable : 0.36 dB ➔Total ANT2 Port offset : 10.81 dB

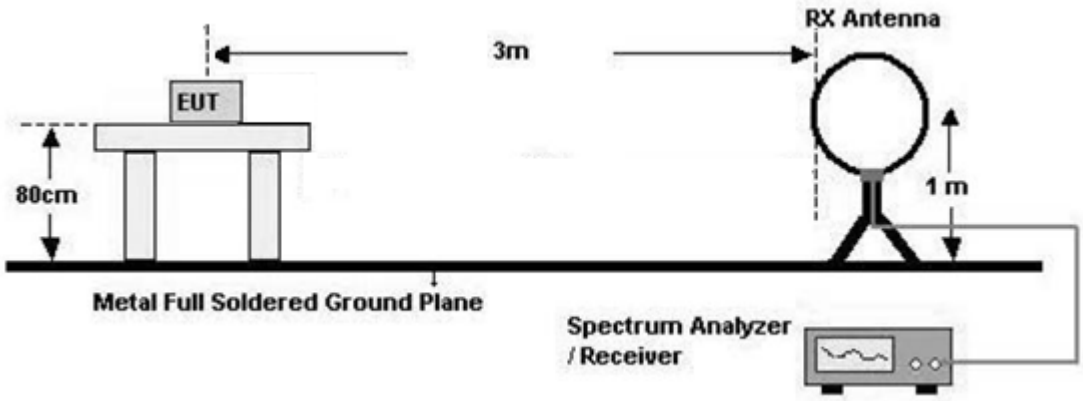
7.6. Radiated Test

Limit

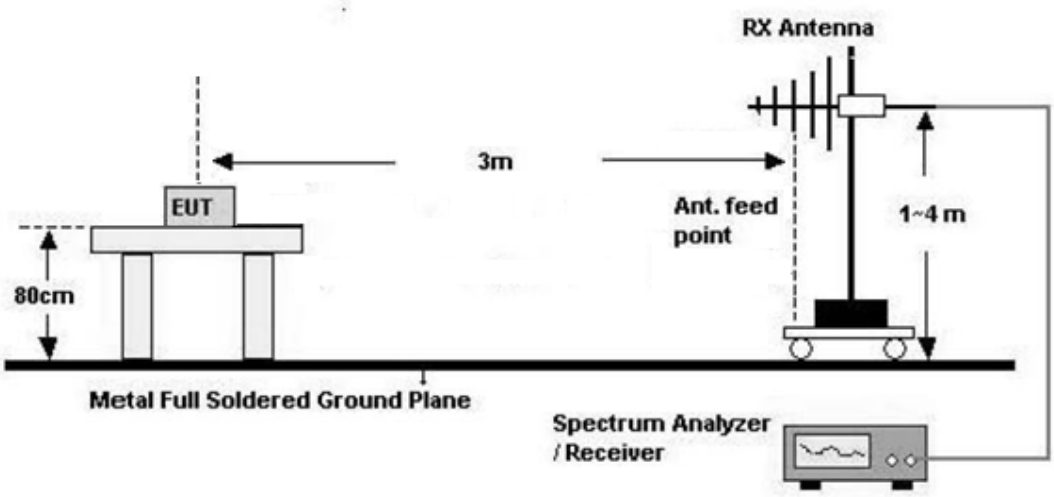
Frequency (MHz)	Field Strength (μV/m)	Measurement Distance (m)
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Test Configuration

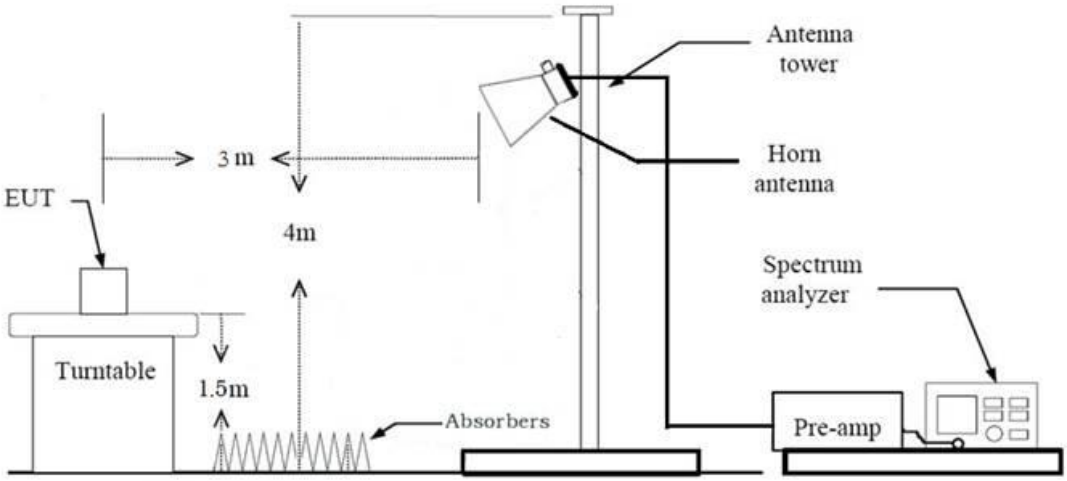
Below 30 MHz



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) = 40log(3 m/300 m) = - 80 dB
   Measurement Distance : 3 m
7. Distance Correction Factor(0.490 MHz – 30 MHz) = 40log(3 m/30 m) = - 40 dB
   Measurement Distance : 3 m
8. Spectrum Setting
   - Frequency Range = 9 kHz ~ 30 MHz
   - Detector = Peak
   - Trace = Maxhold
   - RBW = 9 kHz
   - VBW ≥ 3 x RBW
9. Total = 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 ≥ 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 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 ≥ 3 x RBW

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

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

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

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

9. Measurement value only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
10. Distance extrapolation factor = 20log (test distance / specific distance) (dB)
11. Total(Measurement Type : Peak)
    = 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)

    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 ≥ 3 x RBW

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

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

9. Measurement value only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
10. Distance extrapolation factor = 20log (test distance / specific distance) (dB)
11. Total(Measurement Type : Peak)
    = 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)
    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 μH/50 ohms line impedance stabilization network (LISN).

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

[a]Decreases with the logarithm of the frequency.

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

Test Configuration

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

Test Procedure

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

Sample Calculation

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

7.8. Worst case configuration and mode

Radiated test

1. All modes of operation were investigated and the worst case configuration results are reported.
   - Mode : Stand alone, Stand alone + External accessories(Earphone, Keyboard etc)
   - Worstcase : Stand alone
2. EUT Axis
   - Radiated Spurious Emissions : X
   - 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. 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-G990B2/DS, SM-G990B2 were tested and the worst case results are reported.

(Worst case : SM-G990B2/DS)

Radiated test(RSDB/DBS)

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

DBS	5GHz WiFi Ant.1	5GHz WiFi Ant.2	Bluetooth Ant.1	Test case
5GHz WiFi MIMO + Bluetooth	On	On	On	Case 1

Case 1: Please refer to the SM-G990B2/DS [UNII] & [BT] Test Report.

RSDB Scenario	Bluetooth Ant.1	2.4 GHz WiFi Ant.1	2.4 GHz WiFi Ant.2	5GHz WiFi Ant.1	5GHz WiFi Ant.2	Test case
Bluetooth + 2.4 GHz WiFi + 5GHz WiFi MIMO	On	-	On	On	On	-
2.4 GHz WiFi MIMO + 5GHz WiFi MIMO	-	On	On	On	On	Case 2

Case 2: Please refer to the SM-G990B2/DS [UNII] & [DTS] Test Report.

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

Description	Bluetooth Emission	5 GHz Emission
Antenna	ANT1	ANT ALL
Channel	0	52
Data Rate	1 Mbps	MCS0
Mode	GFSK : DH5	802.11n(HT20)

Description	2.4 GHz Emission	5 GHz Emission
Antenna	ANT ALL	ANT ALL
Channel	6	52
Data Rate	6 Mbps	MCS0
Mode	802.11g	802.11n(HT20)

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-G990B2/DS, SM-G990B2 were tested and the worst case results are reported.

(Worst case : SM-G990B2/DS)

Conducted test

1. The EUT was configured with data rate of highest power.
2. SM-G990B2/DS, SM-G990B2 were tested and the worst case results are reported.

(Worst case : SM-G990B2/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

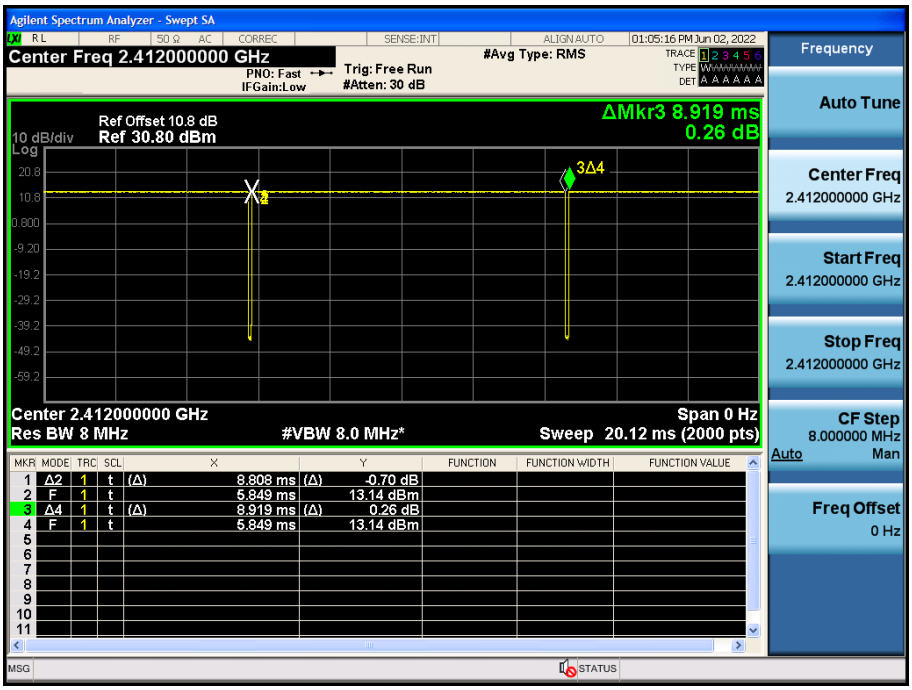
9. TEST RESULT

9.1 DUTY CYCLE

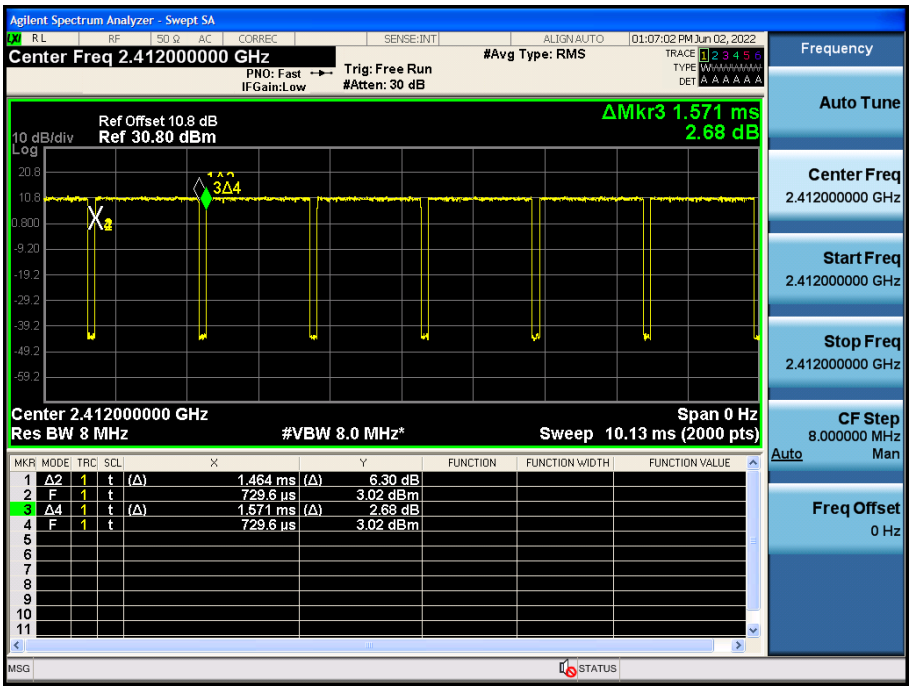
Mode	Data Rate (Mbps)	T_{on} (ms)	T_{total} (ms)	Duty Cycle	Duty Cycle Factor (dB)
802.11b	1	8.808	8.919	0.988	0.054
	2	4.407	4.512	0.977	0.103
	5.5	1.662	1.768	0.940	0.270
	11	0.877	0.983	0.892	0.498
802.11g	6	1.464	1.571	0.932	0.305
	9	0.983	1.089	0.902	0.446
	12	0.745	0.851	0.875	0.580
	18	0.502	0.608	0.825	0.835
	24	0.380	0.486	0.781	1.072
	36	0.263	0.370	0.712	1.473
	48	0.208	0.314	0.661	1.796
	54	0.182	0.314	0.581	2.361
802.11n (HT20)	6.5 (MCS0)	1.246	1.353	0.921	0.356
	13 (MCS1)	0.643	0.750	0.858	0.665
	19.5 (MCS2)	0.441	0.547	0.806	0.939
	26 (MCS3)	0.345	0.446	0.773	1.120
	39 (MCS4)	0.243	0.350	0.696	1.576
	52 (MCS5)	0.187	0.339	0.552	2.579
	58.5 (MCS6)	0.172	0.332	0.519	2.849
	65 (MCS7)	0.162	0.328	0.494	3.060

▣ Test Plots

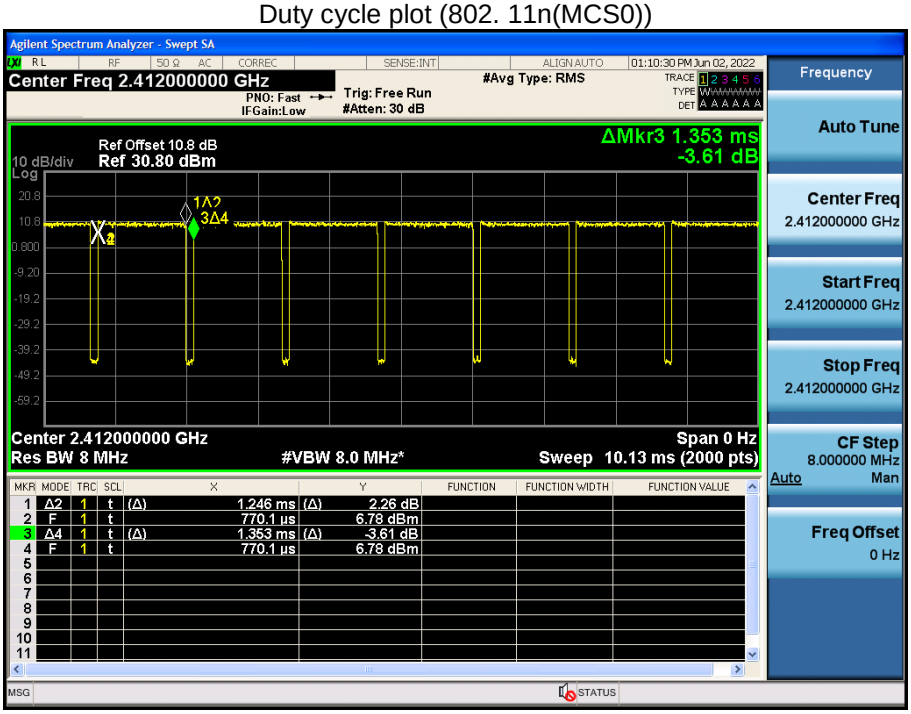
Duty cycle plot (802.11b(1 Mbps))



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	7.128	0.5
2422	3	8.094	0.5
2437	6	7.709	0.5
2462	11	8.079	0.5

802.11g Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]
Frequency [MHz]	Channel No.		
2412	1	15.45	0.5
2422	3	15.15	0.5
2437	6	15.14	0.5
2462	11	14.52	0.5

802.11n(HT20) Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]
Frequency [MHz]	Channel No.		
2412	1	14.74	0.5
2422	3	15.15	0.5
2437	6	15.08	0.5
2462	11	16.33	0.5

[Ant.2]

802.11b Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]
Frequency [MHz]	Channel No.		
2412	1	8.115	0.5
2422	3	7.826	0.5
2437	6	8.122	0.5
2462	11	7.124	0.5

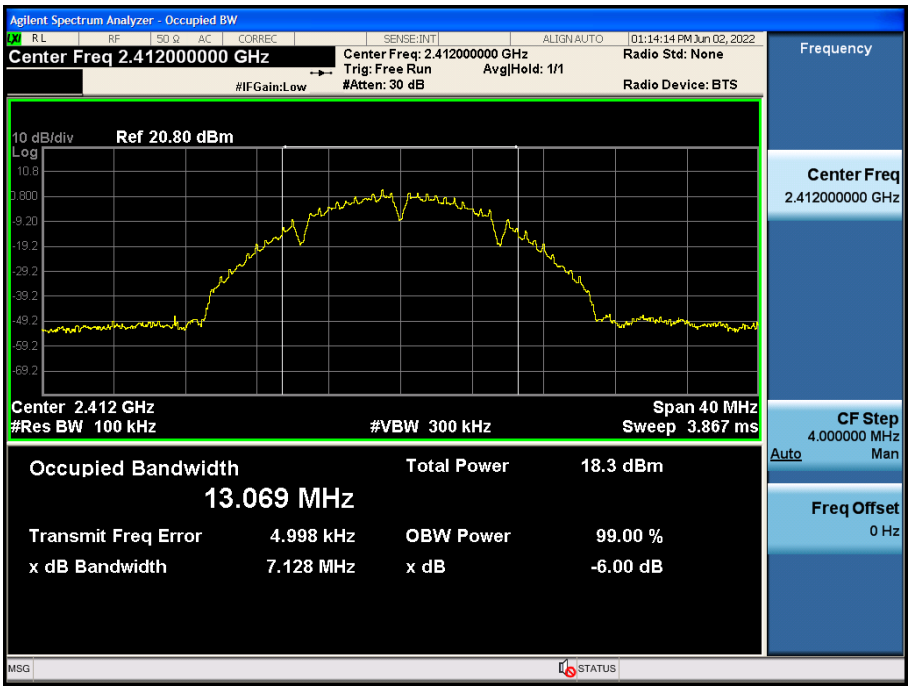
802.11g Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]
Frequency [MHz]	Channel No.		
2412	1	15.46	0.5
2422	3	15.15	0.5
2437	6	15.16	0.5
2462	11	14.45	0.5

802.11n(HT20) Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]
Frequency [MHz]	Channel No.		
2412	1	15.97	0.5
2422	3	15.16	0.5
2437	6	15.14	0.5
2462	11	16.26	0.5

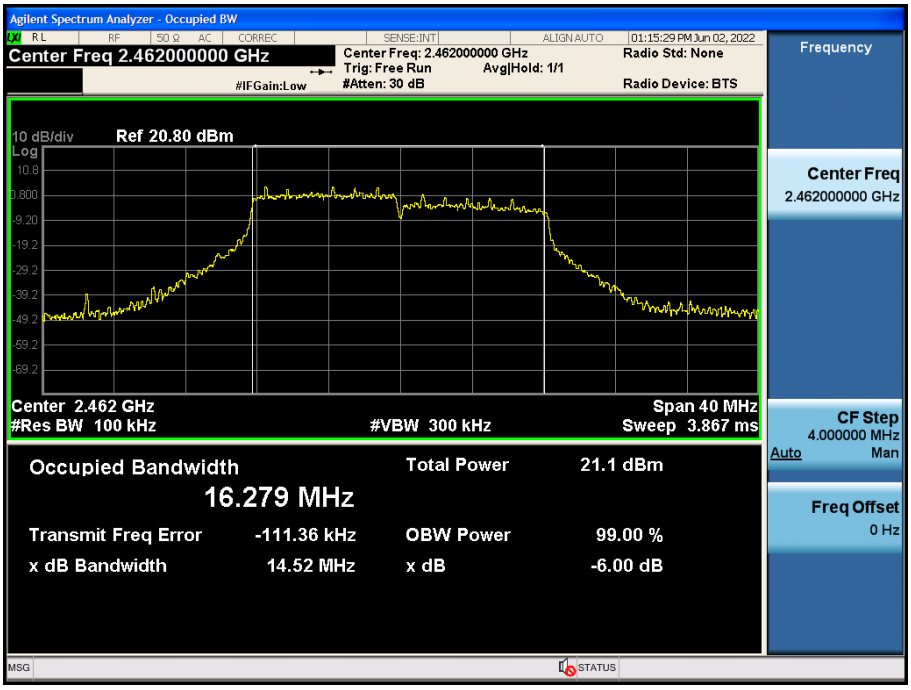
[Ant.1]

▣ Test Plots

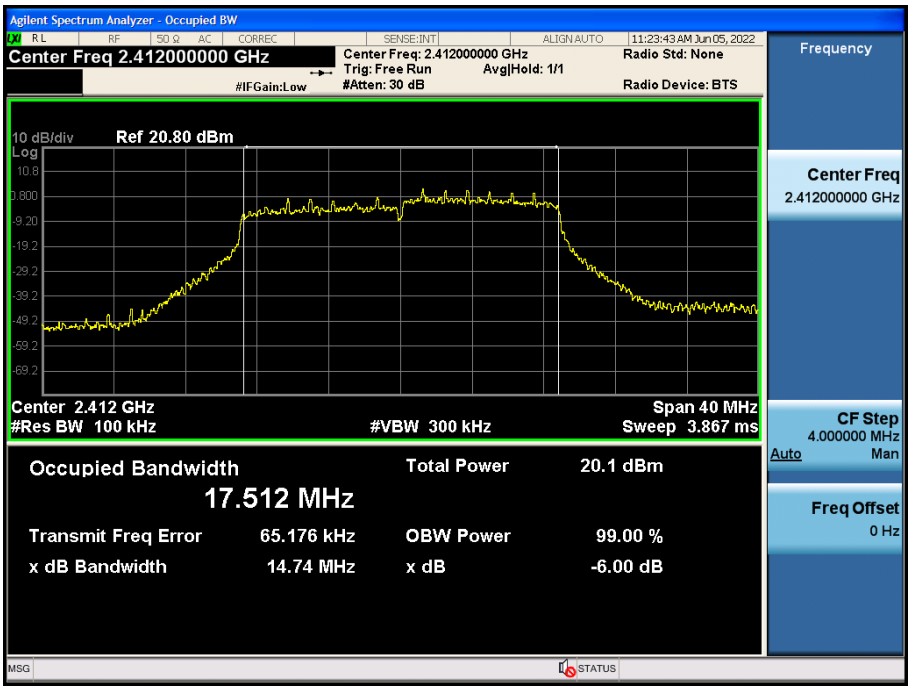
6 dB Bandwidth plot (802.11b-CH 1)



6 dB Bandwidth plot (802.11g-CH 11)



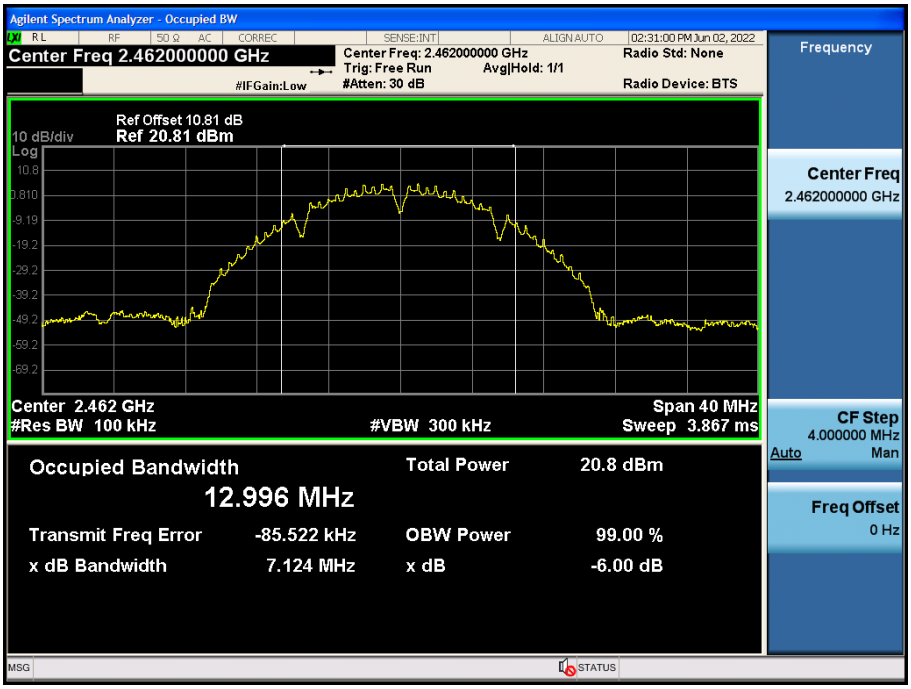
6 dB Bandwidth plot (802.11n_HT20-CH 1)



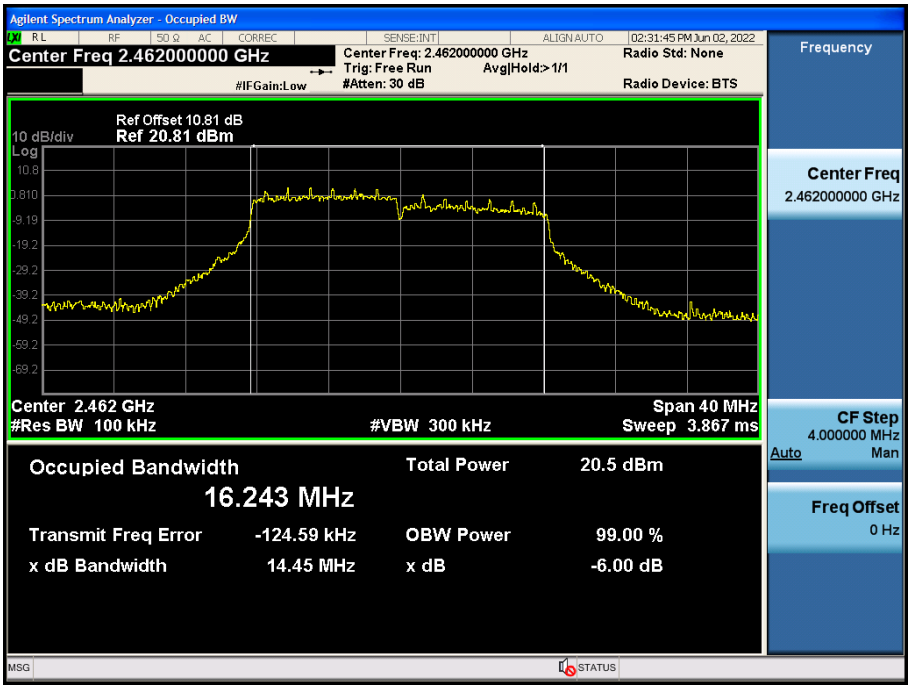
[Ant.2]

▣ Test Plots

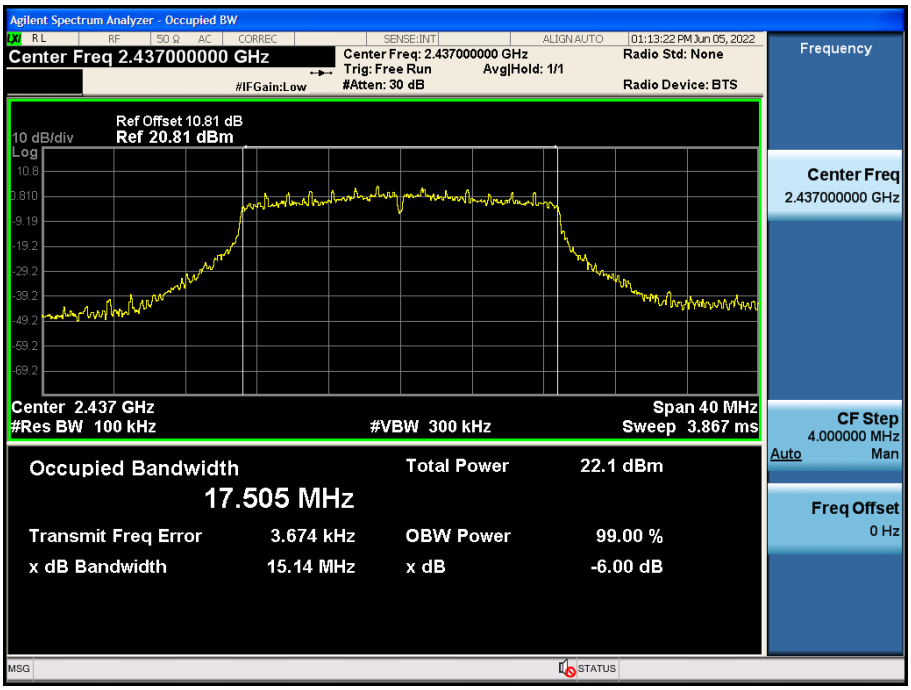
6 dB Bandwidth plot (802.11b-CH 11)



6 dB Bandwidth plot (802.11g-CH 11)



6 dB Bandwidth plot (802.11n_HT20-CH 6)



Note:

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

9.3 OUTPUT POWER

Power Level Setting

Peak Power

Power Meter offset

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

[Ant.1]

802.11b Mode		Rate (Mbps)	Measured Power(dBm)	Limit (dBm)
Frequency[MHz]	Channel No.			
2412	1	1	13.67	30
		2	14.05	30
		5.5	15.62	30
		11	16.98	30
2422	3	1	14.58	30
		2	15.00	30
		5.5	16.48	30
		11	17.83	30
2437	6	1	17.10	30
		2	17.51	30
		5.5	19.08	30
		11	20.35	30
2462	11	1	16.92	30
		2	17.33	30
		5.5	18.97	30
		11	20.24	30

802.11g Mode		Rate (Mbps)	Measured Power(dBm)	Limit (dBm)
Frequency[MHz]	Channel No.			
2412	1	6	18.80	30
		9	18.89	30
		12	18.17	30
		18	18.68	30
		24	19.09	30
		36	18.74	30
		48	18.74	30
		54	18.92	30
2422	3	6	19.24	30
		9	19.35	30
		12	18.28	30
		18	18.64	30
		24	19.16	30
		36	18.77	30
		48	18.76	30
		54	18.92	30
2437	6	6	22.01	30
		9	22.13	30
		12	21.14	30
		18	21.58	30
		24	22.00	30
		36	21.63	30
		48	21.67	30
		54	21.85	30
2462	11	6	21.55	30
		9	21.70	30
		12	20.79	30
		18	21.07	30
		24	21.78	30
		36	21.43	30
		48	21.49	30
		54	21.59	30

802.11n(HT20) Mode		MCS Index	Measured Power(dBm)	Limit (dBm)
Frequency[MHz]	Channel No.			
2412	1	0	20.67	30
		1	20.39	30
		2	20.40	30
		3	20.51	30
		4	20.40	30
		5	20.47	30
		6	20.48	30
		7	20.30	30
2422	3	0	21.09	30
		1	20.98	30
		2	20.72	30
		3	20.87	30
		4	20.69	30
		5	20.70	30
		6	20.64	30
		7	20.53	30
2437	6	0	22.86	30
		1	22.76	30
		2	22.58	30
		3	22.71	30
		4	22.41	30
		5	22.50	30
		6	22.41	30
		7	22.39	30
2462	11	0	22.67	30
		1	22.39	30
		2	22.23	30
		3	22.33	30
		4	22.34	30
		5	22.41	30
		6	22.37	30
		7	22.24	30

[Ant.2]

802.11b Mode		Rate (Mbps)	Measured Power(dBm)	Limit (dBm)
Frequency[MHz]	Channel No.			
2412	1	1	14.40	30
		2	14.77	30
		5.5	16.28	30
		11	17.64	30
2422	3	1	15.39	30
		2	15.88	30
		5.5	17.42	30
		11	18.72	30
2437	6	1	16.97	30
		2	17.43	30
		5.5	18.86	30
		11	20.32	30
2462	11	1	15.94	30
		2	16.34	30
		5.5	17.93	30
		11	19.32	30

802.11g Mode		Rate (Mbps)	Measured Power(dBm)	Limit (dBm)
Frequency[MHz]	Channel No.			
2412	1	6	19.34	30
		9	19.46	30
		12	18.68	30
		18	19.27	30
		24	19.52	30
		36	19.19	30
		48	19.12	30
		54	19.28	30
2422	3	6	20.18	30
		9	20.29	30
		12	19.42	30
		18	19.83	30
		24	20.27	30
		36	19.89	30
		48	19.86	30
		54	20.05	30
2437	6	6	21.72	30
		9	21.86	30
		12	20.91	30
		18	21.35	30
		24	21.72	30
		36	21.39	30
		48	21.43	30
		54	21.59	30
2462	11	6	20.92	30
		9	21.08	30
		12	20.14	30
		18	20.42	30
		24	21.06	30
		36	20.73	30
		48	20.76	30
		54	20.96	30

802.11n(HT20) Mode		MCS Index	Measured Power(dBm)	Limit (dBm)
Frequency[MHz]	Channel No.			
2412	1	0	21.26	30
		1	21.01	30
		2	20.91	30
		3	21.02	30
		4	20.83	30
		5	20.96	30
		6	20.91	30
		7	20.77	30
2422	3	0	21.77	30
		1	21.61	30
		2	21.49	30
		3	21.66	30
		4	21.43	30
		5	21.45	30
		6	21.45	30
		7	21.33	30
2437	6	0	22.50	30
		1	22.32	30
		2	22.28	30
		3	22.33	30
		4	22.08	30
		5	22.20	30
		6	22.14	30
		7	21.99	30
2462	11	0	22.02	30
		1	21.86	30
		2	21.70	30
		3	21.82	30
		4	21.87	30
		5	22.04	30
		6	21.98	30
		7	21.91	30

[MIMO]

802.11b Mode		Rate (Mbps)	Ant.1 Measured Power(dBm)	Ant.2 Measured Power(dBm)	MIMO Measured Power(dBm)	Limit (dBm)
Frequency[MHz]	Channel No.					
2412	1	1	13.67	14.40	17.06	30
		2	14.05	14.77	17.44	30
		5.5	15.62	16.28	18.97	30
		11	16.98	17.64	20.33	30
2422	3	1	14.58	15.39	18.02	30
		2	15.00	15.88	18.47	30
		5.5	16.48	17.42	19.98	30
		11	17.83	18.72	21.31	30
2437	6	1	17.10	16.97	20.04	30
		2	17.51	17.43	20.48	30
		5.5	19.08	18.86	21.98	30
		11	20.35	20.32	23.34	30
2462	11	1	16.92	15.94	19.47	30
		2	17.33	16.34	19.87	30
		5.5	18.97	17.93	21.49	30
		11	20.24	19.32	22.82	30

802.11g Mode		Rate (Mbps)	Ant.1 Measured Power(dBm)	Ant.2 Measured Power(dBm)	MIMO Measured Power(dBm)	Limit (dBm)
Frequency[MHz]	Channel No.					
2412	1	6	18.80	19.34	22.08	30
		9	18.89	19.46	22.20	30
		12	18.17	18.68	21.44	30
		18	18.68	19.27	22.00	30
		24	19.09	19.52	22.32	30
		36	18.74	19.19	21.98	30
		48	18.74	19.12	21.95	30
		54	18.92	19.28	22.11	30
2422	3	6	19.24	20.18	22.75	30
		9	19.35	20.29	22.85	30
		12	18.28	19.42	21.90	30
		18	18.64	19.83	22.29	30
		24	19.16	20.27	22.76	30
		36	18.77	19.89	22.37	30
		48	18.76	19.86	22.36	30
		54	18.92	20.05	22.53	30
2437	6	6	22.01	21.72	24.87	30
		9	22.13	21.86	25.01	30
		12	21.14	20.91	24.04	30
		18	21.58	21.35	24.48	30
		24	22.00	21.72	24.87	30
		36	21.63	21.39	24.52	30
		48	21.67	21.43	24.56	30
		54	21.85	21.59	24.73	30
2462	11	6	21.55	20.92	24.26	30
		9	21.70	21.08	24.41	30
		12	20.79	20.14	23.49	30
		18	21.07	20.42	23.77	30
		24	21.78	21.06	24.45	30
		36	21.43	20.73	24.10	30
		48	21.49	20.76	24.15	30
		54	21.59	20.96	24.29	30

802.11n(HT20) Mode		MCS Index	Ant.1 Measured Power(dBm)	Ant.2 Measured Power(dBm)	MIMO Measured Power(dBm)	Limit (dBm)
Frequency[MHz]	Channel No.					
2412	1	0	20.67	21.26	23.98	30
		1	20.39	21.01	23.72	30
		2	20.40	20.91	23.68	30
		3	20.51	21.02	23.78	30
		4	20.40	20.83	23.64	30
		5	20.47	20.96	23.73	30
		6	20.48	20.91	23.71	30
		7	20.30	20.77	23.55	30
2422	3	0	21.09	21.77	24.45	30
		1	20.98	21.61	24.31	30
		2	20.72	21.49	24.13	30
		3	20.87	21.66	24.29	30
		4	20.69	21.43	24.09	30
		5	20.70	21.45	24.10	30
		6	20.64	21.45	24.07	30
		7	20.53	21.33	23.96	30
2437	6	0	22.86	22.50	25.70	30
		1	22.76	22.32	25.55	30
		2	22.58	22.28	25.45	30
		3	22.71	22.33	25.53	30
		4	22.41	22.08	25.26	30
		5	22.50	22.20	25.36	30
		6	22.41	22.14	25.29	30
		7	22.39	21.99	25.20	30
2462	11	0	22.67	22.02	25.37	30
		1	22.39	21.86	25.14	30
		2	22.23	21.70	24.98	30
		3	22.33	21.82	25.09	30
		4	22.34	21.87	25.12	30
		5	22.41	22.04	25.24	30
		6	22.37	21.98	25.19	30
		7	22.24	21.91	25.09	30

Average Power

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

[Ant.1]

802.11b Mode		Rate (Mbps)	Measured Power (dBm)	Duty Cycle Factor	Measured Power(dBm) + Duty Cycle Factor	Limit (dBm)
Frequency [MHz]	Channel No.					
2412	1	1	11.43	0.054	11.48	30
		2	11.54	0.103	11.64	30
		5.5	11.36	0.270	11.63	30
		11	11.12	0.498	11.62	30
2422	3	1	12.05	0.054	12.11	30
		2	12.25	0.103	12.35	30
		5.5	11.99	0.270	12.26	30
		11	11.79	0.498	12.29	30
2437	6	1	14.73	0.054	14.79	30
		2	14.83	0.103	14.94	30
		5.5	14.65	0.270	14.92	30
		11	14.38	0.498	14.88	30
2462	11	1	14.47	0.054	14.52	30
		2	14.65	0.103	14.75	30
		5.5	14.45	0.270	14.72	30
		11	14.24	0.498	14.74	30

802.11g Mode		Rate (Mbps)	Measured Power (dBm)	Duty Cycle Factor	Measured Power(dBm) + Duty Cycle Factor	Limit (dBm)
Frequency [MHz]	Channel No.					
2412	1	6	10.65	0.305	10.96	30
		9	10.51	0.446	10.95	30
		12	9.54	0.580	10.12	30
		18	9.89	0.835	10.72	30
		24	9.61	1.072	10.68	30
		36	9.10	1.473	10.57	30
		48	8.39	1.796	10.19	30
		54	7.84	2.361	10.20	30
2422	3	6	11.16	0.305	11.46	30
		9	11.00	0.446	11.44	30
		12	9.95	0.580	10.52	30
		18	10.05	0.835	10.89	30
		24	9.70	1.072	10.77	30
		36	9.22	1.473	10.69	30
		48	8.76	1.796	10.55	30
		54	8.22	2.361	10.58	30
2437	6	6	13.92	0.305	14.23	30
		9	13.78	0.446	14.23	30
		12	12.55	0.580	13.13	30
		18	13.00	0.835	13.83	30
		24	12.58	1.072	13.65	30
		36	12.12	1.473	13.59	30
		48	11.37	1.796	13.16	30
		54	10.90	2.361	13.26	30
2462	11	6	13.68	0.305	13.98	30
		9	13.53	0.446	13.98	30
		12	12.37	0.580	12.95	30
		18	12.70	0.835	13.54	30
		24	12.56	1.072	13.64	30
		36	12.09	1.473	13.57	30
		48	11.36	1.796	13.16	30
		54	10.90	2.361	13.27	30

802.11n(HT20) Mode		MCS Index	Measured Power (dBm)	Duty Cycle Factor	Measured Power(dBm) + Duty Cycle Factor	Limit (dBm)
Frequency [MHz]	Channel No.					
2412	1	0	12.35	0.356	12.70	30
		1	11.97	0.665	12.63	30
		2	11.63	0.939	12.57	30
		3	11.39	1.120	12.51	30
		4	10.99	1.576	12.57	30
		5	9.91	2.579	12.49	30
		6	9.58	2.849	12.43	30
		7	9.15	3.060	12.21	30
2422	3	0	13.01	0.356	13.36	30
		1	12.63	0.665	13.29	30
		2	12.10	0.939	13.04	30
		3	11.87	1.120	12.99	30
		4	11.52	1.576	13.10	30
		5	10.37	2.579	12.95	30
		6	10.09	2.849	12.94	30
		7	9.70	3.060	12.76	30
2437	6	0	14.73	0.356	15.08	30
		1	14.35	0.665	15.02	30
		2	13.95	0.939	14.89	30
		3	13.69	1.120	14.81	30
		4	13.24	1.576	14.81	30
		5	12.22	2.579	14.80	30
		6	11.78	2.849	14.63	30
		7	11.56	3.060	14.62	30
2462	11	0	14.53	0.356	14.88	30
		1	14.04	0.665	14.71	30
		2	13.67	0.939	14.61	30
		3	13.33	1.120	14.45	30
		4	13.10	1.576	14.68	30
		5	12.04	2.579	14.62	30
		6	11.66	2.849	14.51	30
		7	11.26	3.060	14.32	30

[Ant.2]

802.11b Mode		Rate (Mbps)	Measured Power (dBm)	Duty Cycle Factor	Measured Power(dBm) + Duty Cycle Factor	Limit (dBm)
Frequency [MHz]	Channel No.					
2412	1	1	11.84	0.054	11.89	30
		2	11.89	0.103	11.99	30
		5.5	11.71	0.270	11.97	30
		11	11.49	0.498	11.99	30
2422	3	1	12.80	0.054	12.85	30
		2	12.88	0.103	12.98	30
		5.5	12.70	0.270	12.97	30
		11	12.43	0.498	12.92	30
2437	6	1	14.47	0.054	14.52	30
		2	14.62	0.103	14.72	30
		5.5	14.41	0.270	14.68	30
		11	14.22	0.498	14.72	30
2462	11	1	13.67	0.054	13.73	30
		2	13.80	0.103	13.90	30
		5.5	13.62	0.270	13.89	30
		11	13.39	0.498	13.89	30

802.11g Mode		Rate (Mbps)	Measured Power (dBm)	Duty Cycle Factor	Measured Power(dBm) + Duty Cycle Factor	Limit (dBm)
Frequency [MHz]	Channel No.					
2412	1	6	11.21	0.305	11.51	30
		9	11.06	0.446	11.50	30
		12	10.08	0.580	10.66	30
		18	10.45	0.835	11.28	30
		24	10.02	1.072	11.09	30
		36	9.53	1.473	11.00	30
		48	8.82	1.796	10.61	30
		54	8.27	2.361	10.63	30
2422	3	6	12.15	0.305	12.45	30
		9	11.95	0.446	12.40	30
		12	10.87	0.580	11.45	30
		18	11.20	0.835	12.03	30
		24	10.83	1.072	11.90	30
		36	10.35	1.473	11.82	30
		48	9.67	1.796	11.46	30
		54	9.18	2.361	11.54	30
2437	6	6	13.63	0.305	13.93	30
		9	13.48	0.446	13.93	30
		12	12.30	0.580	12.88	30
		18	12.71	0.835	13.55	30
		24	12.29	1.072	13.36	30
		36	11.81	1.473	13.28	30
		48	11.15	1.796	12.95	30
		54	10.62	2.361	12.98	30
2462	11	6	13.00	0.305	13.30	30
		9	12.85	0.446	13.30	30
		12	11.95	0.580	12.53	30
		18	12.03	0.835	12.87	30
		24	11.85	1.072	12.93	30
		36	11.35	1.473	12.82	30
		48	10.72	1.796	12.52	30
		54	10.19	2.361	12.55	30

802.11n(HT20) Mode		MCS Index	Measured Power (dBm)	Duty Cycle Factor	Measured Power(dBm) + Duty Cycle Factor	Limit (dBm)
Frequency [MHz]	Channel No.					
2412	1	0	12.95	0.356	13.31	30
		1	12.54	0.665	13.20	30
		2	12.20	0.939	13.14	30
		3	11.93	1.120	13.05	30
		4	11.42	1.576	12.99	30
		5	10.44	2.579	13.02	30
		6	9.93	2.849	12.78	30
		7	9.65	3.060	12.71	30
2422	3	0	13.66	0.356	14.02	30
		1	13.24	0.665	13.91	30
		2	12.92	0.939	13.86	30
		3	12.67	1.120	13.79	30
		4	12.27	1.576	13.84	30
		5	11.20	2.579	13.78	30
		6	10.87	2.849	13.72	30
		7	10.50	3.060	13.56	30
2437	6	0	14.34	0.356	14.70	30
		1	13.94	0.665	14.61	30
		2	13.64	0.939	14.58	30
		3	13.33	1.120	14.45	30
		4	12.84	1.576	14.41	30
		5	11.89	2.579	14.46	30
		6	11.49	2.849	14.34	30
		7	11.08	3.060	14.14	30
2462	11	0	13.63	0.356	13.98	30
		1	13.24	0.665	13.90	30
		2	12.85	0.939	13.79	30
		3	12.56	1.120	13.68	30
		4	12.35	1.576	13.92	30
		5	11.34	2.579	13.92	30
		6	10.93	2.849	13.78	30
		7	10.66	3.060	13.72	30

[MIMO]

802.11b Mode		Rate (Mbps)	Ant.1 Measured Power(dBm)	Ant.2 Measured Power(dBm)	MIMO Measured Power(dBm)	Limit (dBm)
Frequency[MHz]	Channel No.					
2412	1	1	11.48	11.89	14.70	30
		2	11.64	11.99	14.83	30
		5.5	11.63	11.97	14.82	30
		11	11.62	11.99	14.82	30
2422	3	1	12.11	12.85	15.51	30
		2	12.35	12.98	15.69	30
		5.5	12.26	12.97	15.64	30
		11	12.29	12.92	15.63	30
2437	6	1	14.79	14.52	17.67	30
		2	14.94	14.72	17.84	30
		5.5	14.92	14.68	17.81	30
		11	14.88	14.72	17.81	30
2462	11	1	14.52	13.73	17.15	30
		2	14.75	13.90	17.36	30
		5.5	14.72	13.89	17.33	30
		11	14.74	13.89	17.34	30

802.11g Mode		Rate (Mbps)	Ant.1 Measured Power(dBm)	Ant.2 Measured Power(dBm)	MIMO Measured Power(dBm)	Limit (dBm)
Frequency[MHz]	Channel No.					
2412	1	6	10.96	11.51	14.25	30
		9	10.95	11.50	14.25	30
		12	10.12	10.66	13.41	30
		18	10.72	11.28	14.02	30
		24	10.68	11.09	13.90	30
		36	10.57	11.00	13.80	30
		48	10.19	10.61	13.42	30
		54	10.20	10.63	13.43	30
2422	3	6	11.46	12.45	15.00	30
		9	11.44	12.40	14.96	30
		12	10.52	11.45	14.02	30
		18	10.89	12.03	14.51	30
		24	10.77	11.90	14.39	30
		36	10.69	11.82	14.30	30
		48	10.55	11.46	14.04	30
2437	6	54	14.23	13.93	17.09	30
		9	14.23	13.93	17.09	30
		12	13.13	12.88	16.02	30
		18	13.83	13.55	16.70	30
		24	13.65	13.36	16.52	30
		36	13.59	13.28	16.45	30
		48	13.16	12.95	16.07	30
		54	13.26	12.98	16.13	30
2462	11	6	13.98	13.30	16.66	30
		9	13.98	13.30	16.66	30
		12	12.95	12.53	15.76	30
		18	13.54	12.87	16.23	30
		24	13.64	12.93	16.31	30
		36	13.57	12.82	16.22	30
		48	13.16	12.52	15.86	30
		54	13.27	12.55	15.93	30

802.11n(HT20) Mode		MCS Index	Ant.1 Measured Power(dBm)	Ant.2 Measured Power(dBm)	MIMO Measured Power(dBm)	Limit (dBm)
Frequency[MHz]	Channel No.					
2412	1	0	12.70	13.31	16.03	30
		1	12.63	13.20	15.94	30
		2	12.57	13.14	15.87	30
		3	12.51	13.05	15.80	30
		4	12.57	12.99	15.79	30
		5	12.49	13.02	15.77	30
		6	12.43	12.78	15.62	30
		7	12.21	12.71	15.47	30
2422	3	0	13.36	14.02	16.71	30
		1	13.29	13.91	16.62	30
		2	13.04	13.86	16.48	30
		3	12.99	13.79	16.41	30
		4	13.10	13.84	16.50	30
		5	12.95	13.78	16.40	30
		6	12.94	13.72	16.36	30
		7	12.76	13.56	16.18	30
2437	6	0	15.08	14.70	17.91	30
		1	15.02	14.61	17.83	30
		2	14.89	14.58	17.75	30
		3	14.81	14.45	17.64	30
		4	14.81	14.41	17.63	30
		5	14.80	14.46	17.64	30
		6	14.63	14.34	17.50	30
		7	14.62	14.14	17.40	30
2462	11	0	14.88	13.98	17.47	30
		1	14.71	13.90	17.33	30
		2	14.61	13.79	17.23	30
		3	14.45	13.68	17.09	30
		4	14.68	13.92	17.33	30
		5	14.62	13.92	17.29	30
		6	14.51	13.78	17.17	30
		7	14.32	13.72	17.04	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	-8.534	0.103	-8.431	8 dBm / 3 kHz
	2422	3	-7.612	0.103	-7.509	
	2437	**6**	**-5.314**	**0.103**	**-5.211**	
	2462	11	-5.529	0.103	-5.426	
802.11g	2412	1	-12.567	0.305	-12.262	
	2422	3	-11.938	0.305	-11.633	
	2437	**6**	**-9.570**	**0.305**	**-9.265**	
	2462	11	-9.739	0.305	-9.434	
802.11n(HT20)	2412	1	-11.051	0.356	-10.695	
	2422	3	-10.695	0.356	-10.339	
	2437	**6**	**-8.854**	**0.356**	**-8.498**	
	2462	11	-8.724	0.356	-8.368	

[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	-7.357	0.103	-7.254	8 dBm / 3 kHz
	2422	3	-6.503	0.103	-6.400	
	2437	**6**	**-4.987**	**0.103**	**-4.884**	
	2462	11	-5.968	0.103	-5.865	
802.11g	2412	1	-12.058	0.305	-11.753	
	2422	3	-10.656	0.305	-10.351	
	2437	**6**	**-9.617**	**0.305**	**-9.312**	
	2462	11	-9.818	0.305	-9.513	
802.11n(HT20)	2412	1	-10.375	0.356	-10.019	
	2422	3	-9.509	0.356	-9.153	
	2437	**6**	**-8.656**	**0.356**	**-8.300**	
	2462	11	-9.621	0.356	-9.265	

[MIMO]

Mode	Frequency (MHz)	Channel No.	Test Result			Limit (dBm)
			Ant.1 Measured Power(dBm) + Duty Cycle Factor	Ant.2 Measured Power(dBm) + Duty Cycle Factor	MIMO Measured Power(dBm)	
802.11b	2412	1	-8.431	-7.254	-4.793	8 dBm / 3 kHz
	2422	3	-7.509	-6.400	-3.909	
	2437	**6**	**-5.211**	**-4.884**	**-2.034**	
	2462	11	-5.426	-5.865	-2.630	
802.11g	2412	1	-12.262	-11.753	-8.990	
	2422	3	-11.633	-10.351	-7.935	
	2437	**6**	**-9.265**	**-9.312**	**-6.278**	
	2462	11	-9.434	-9.513	-6.463	
802.11n(HT20)	2412	1	-10.695	-10.019	-7.334	
	2422	3	-10.339	-9.153	-6.695	
	2437	**6**	**-8.498**	**-8.300**	**-5.388**	
	2462	11	-8.368	-9.265	-5.783	

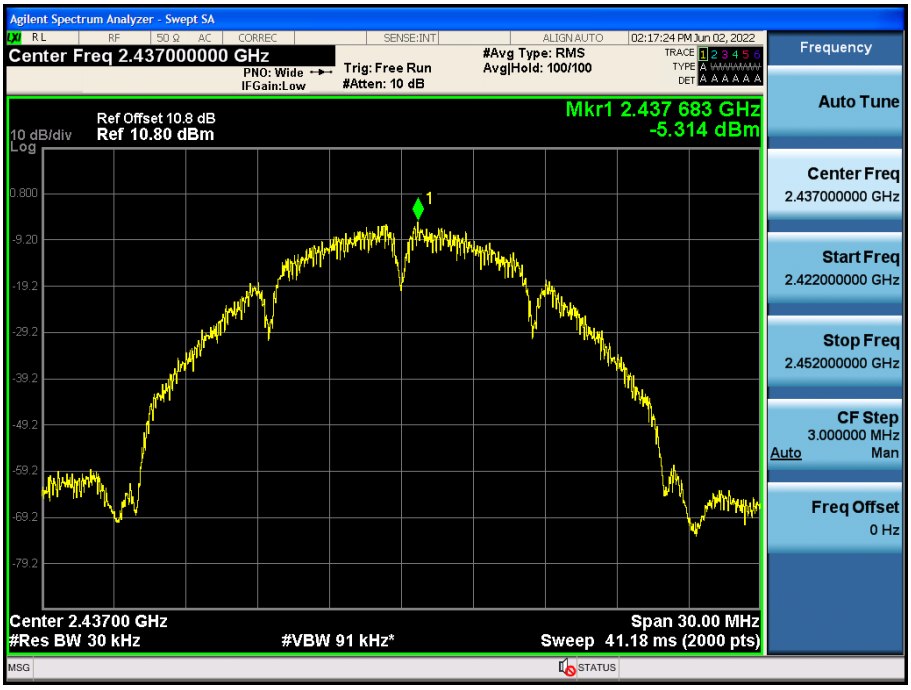
Note :

1. Spectrum Measured Levels are not plot data.
   The PSD results in plot is already including the actual values of loss for the attenuator and cable combination.
2. Spectrum offset Loss = Attenuator loss(10 dB) + Cable loss + EUT Cable loss

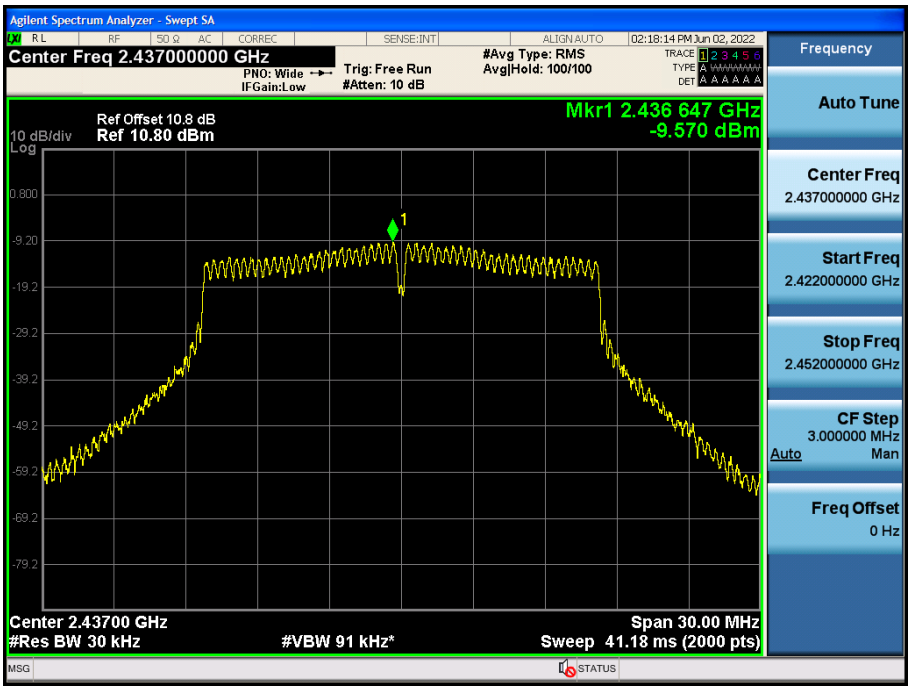
[Ant.1]

▣ Test Plots

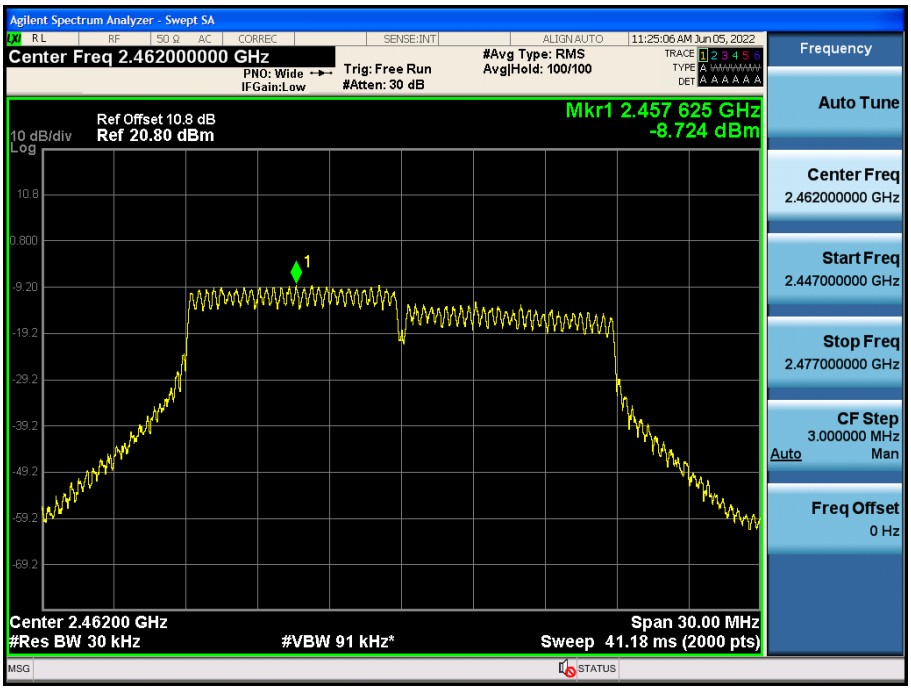
Power Spectral Density (802.11b-CH 6)



Power Spectral Density (802.11g-CH 6)



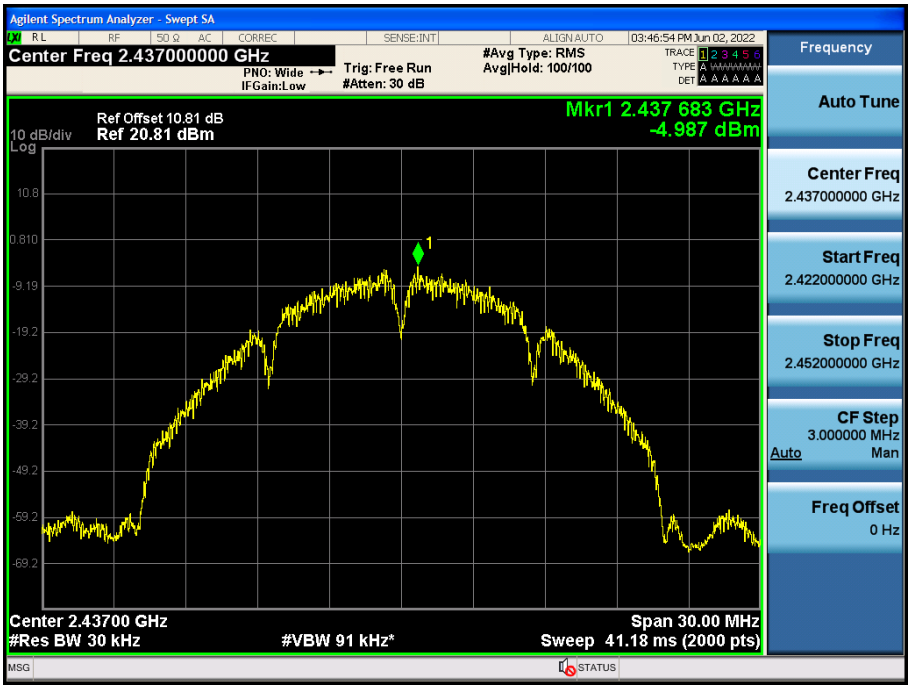
Power Spectral Density (802.11n_HT20-CH 11)



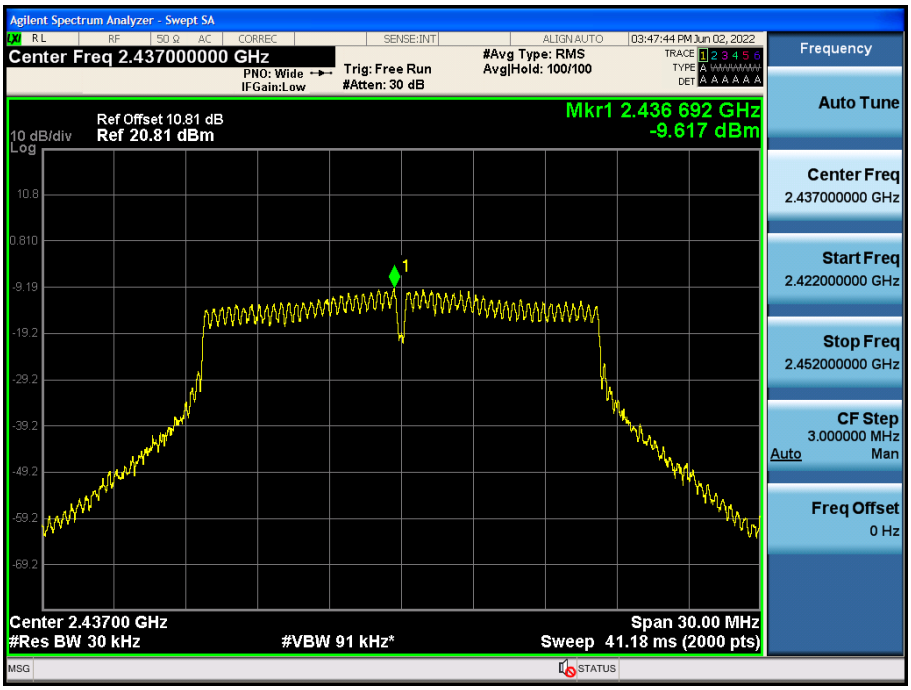
[Ant.2]

▣ Test Plots

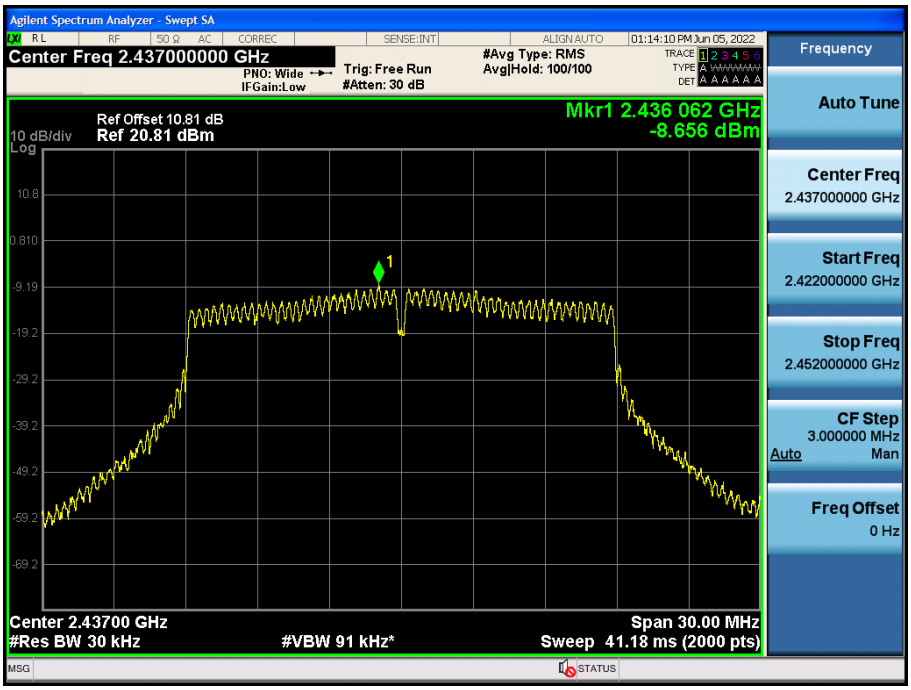
Power Spectral Density (802.11b-CH 6)



Power Spectral Density (802.11g-CH 6)



Power Spectral Density (802.11n_HT20-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]

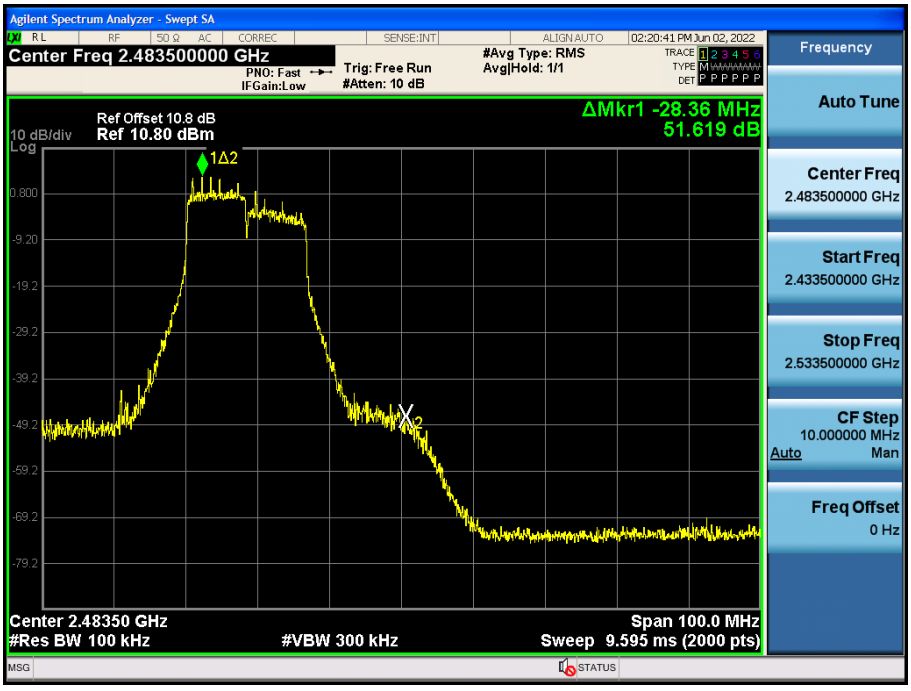
▣ Test Plots(Band Edge)

Band Edge (802.11b-CH1)

Band Edge (802.11b-CH11)

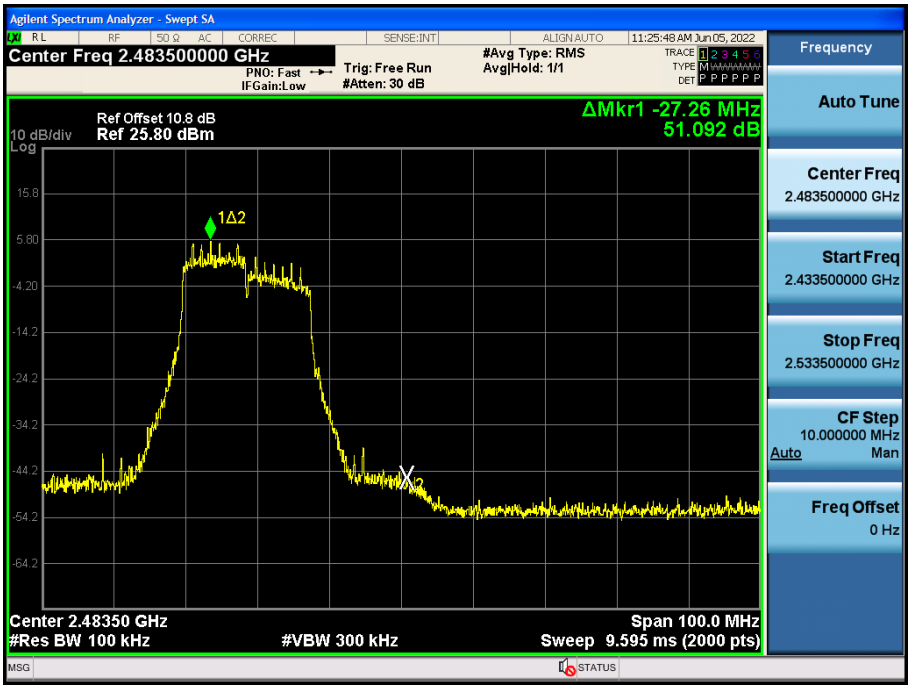
Band Edge (802.11g-CH1)

Band Edge (802.11g-CH11)



Band Edge (802.11n_HT20-CH1)

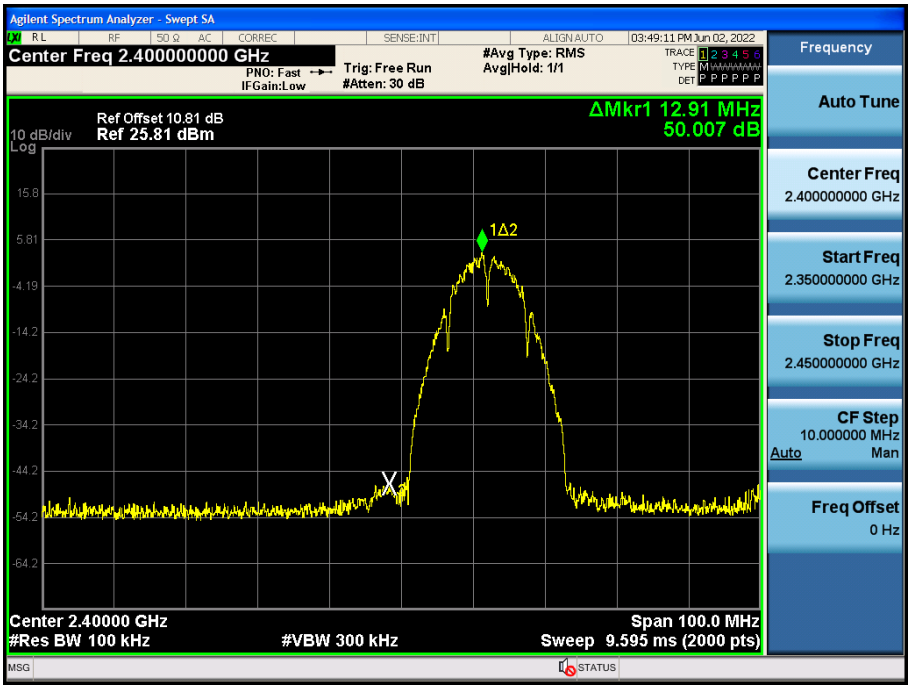
Band Edge (802.11n_HT20-CH11)



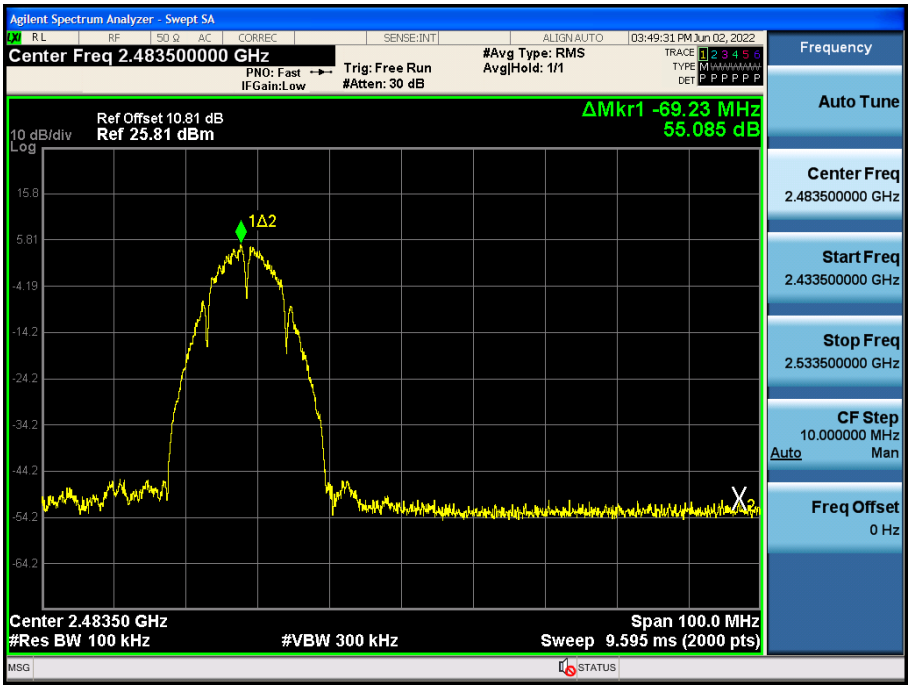
[Ant.2]

▣ Test Plots(Band Edge)

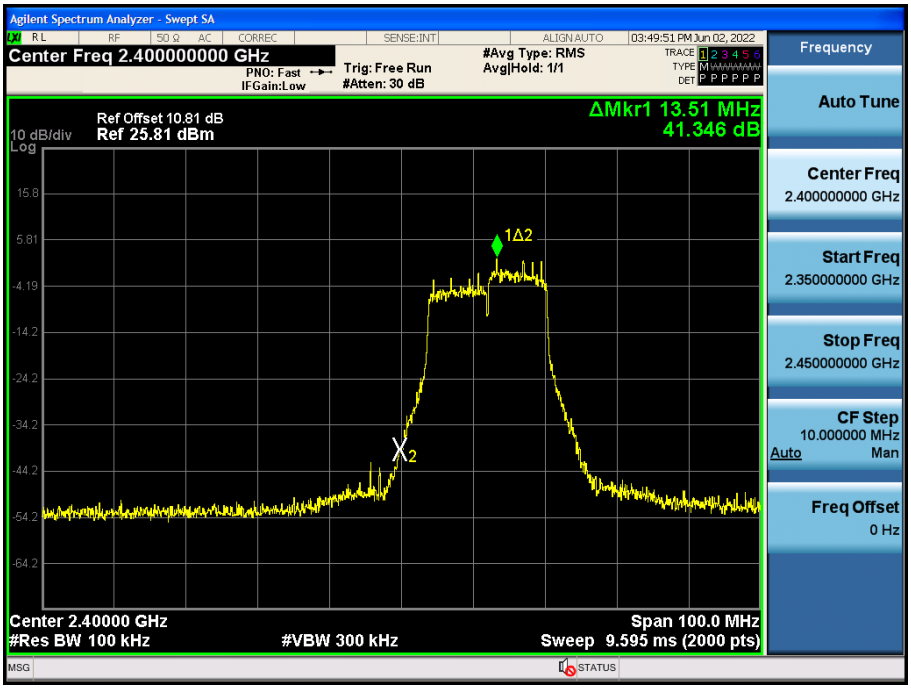
Band Edge (802.11b-CH1)



Band Edge (802.11b-CH11)

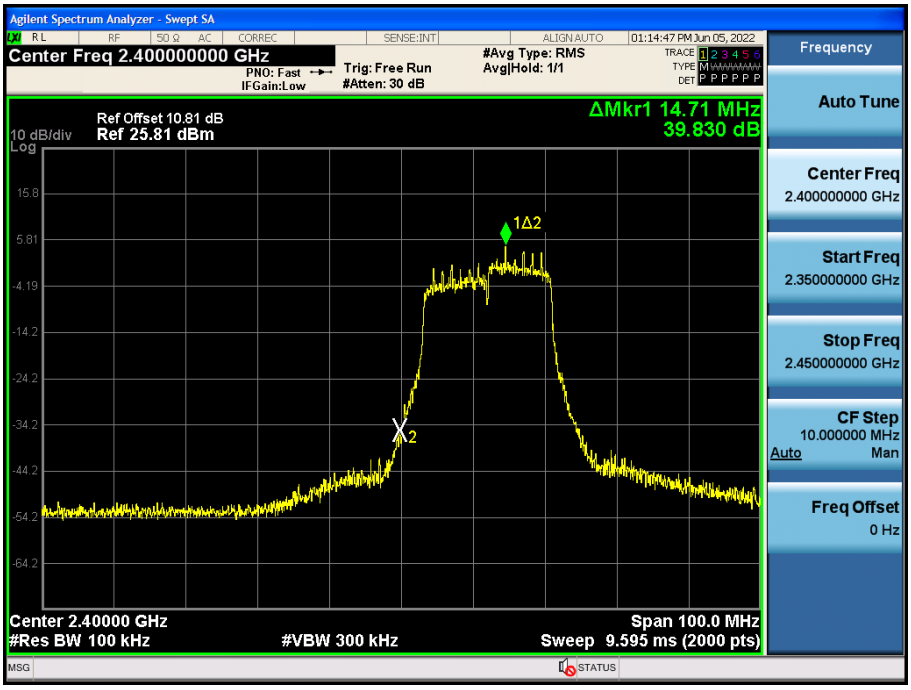


Band Edge (802.11g-CH1)



Band Edge (802.11g-CH11)

Band Edge (802.11n_HT20-CH1)



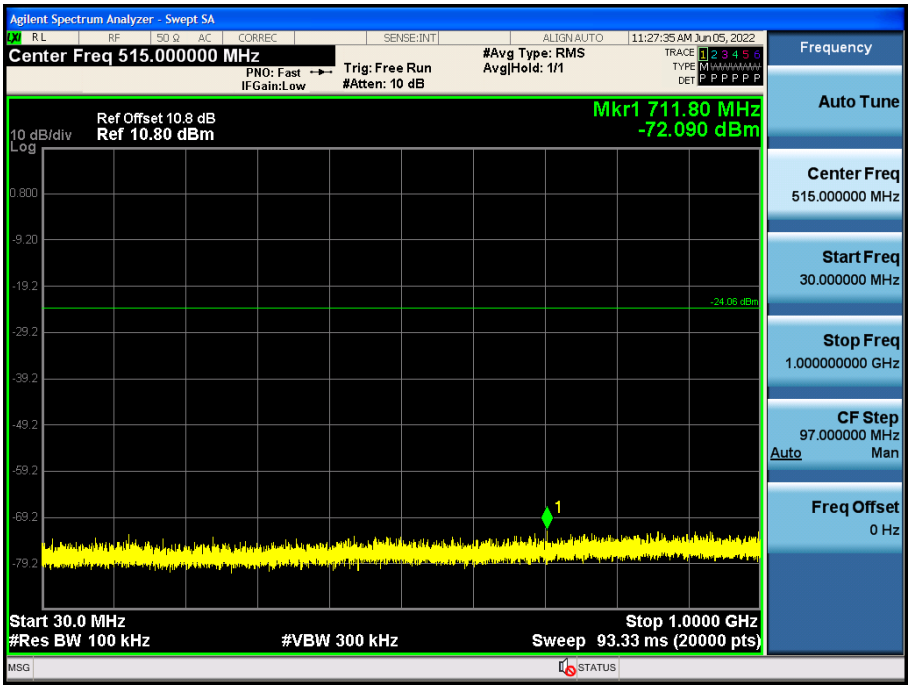
Band Edge (802.11n_HT20-CH11)

[Ant.1]

▣ Test Plots(Conducted Spurious Emission)

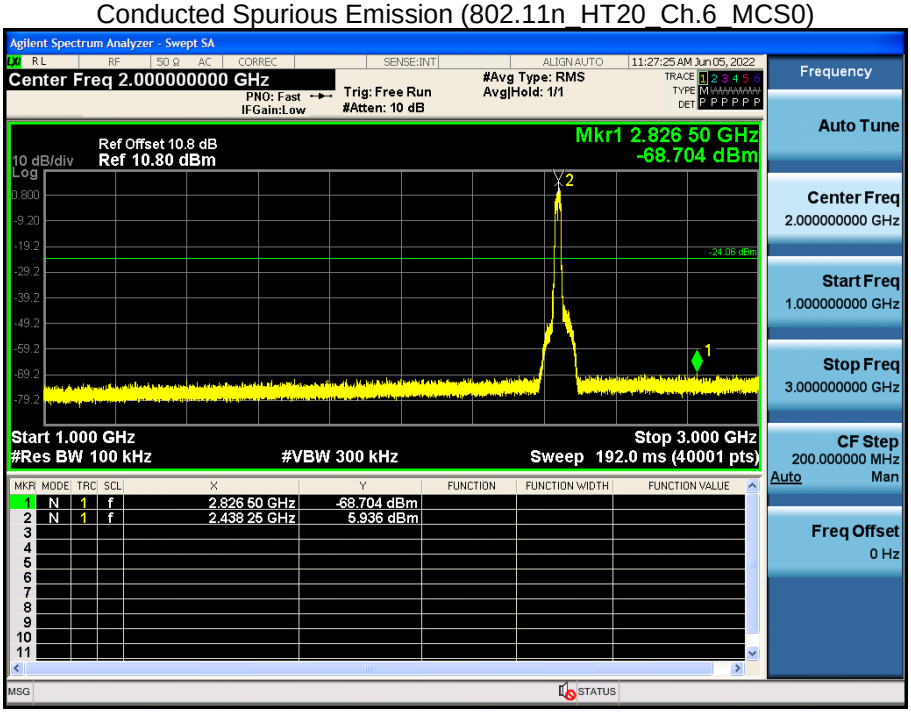
30 MHz ~ 1 GHz

Conducted Spurious Emission (802.11n_HT20_Ch.6_MCS0)



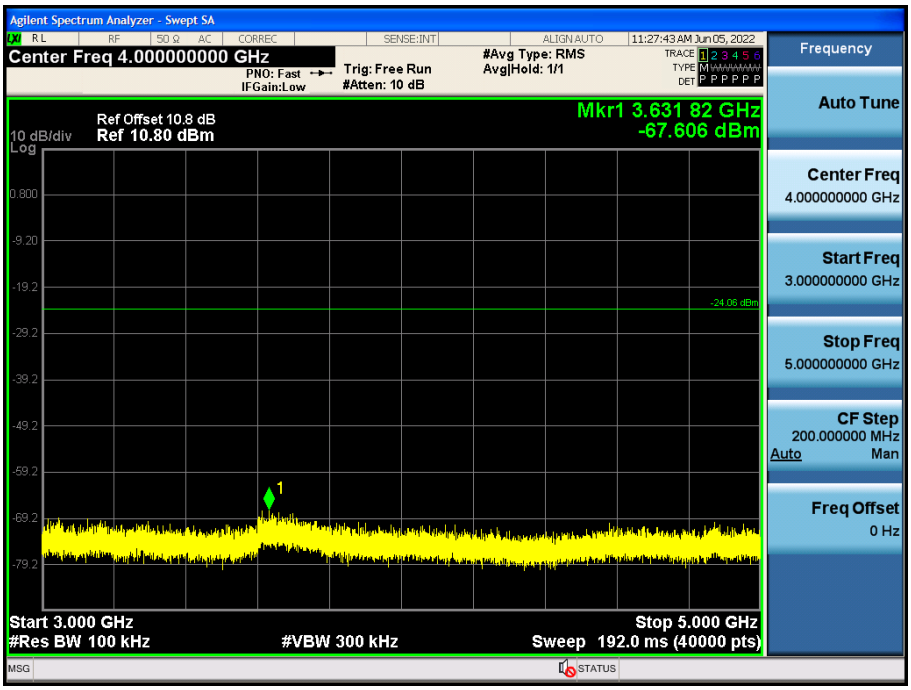
1 GHz ~ 3 GHz

Conducted Spurious Emission (802.11n_HT20_Ch.6_MCS0)



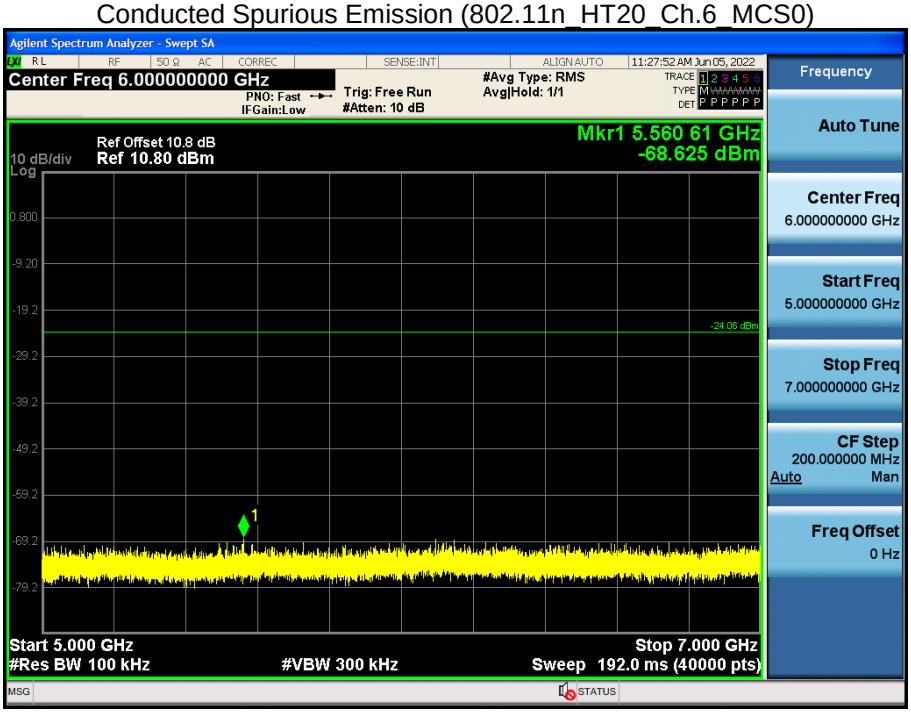
3 GHz ~ 5 GHz

Conducted Spurious Emission (802.11n_HT20_Ch.6_MCS0)



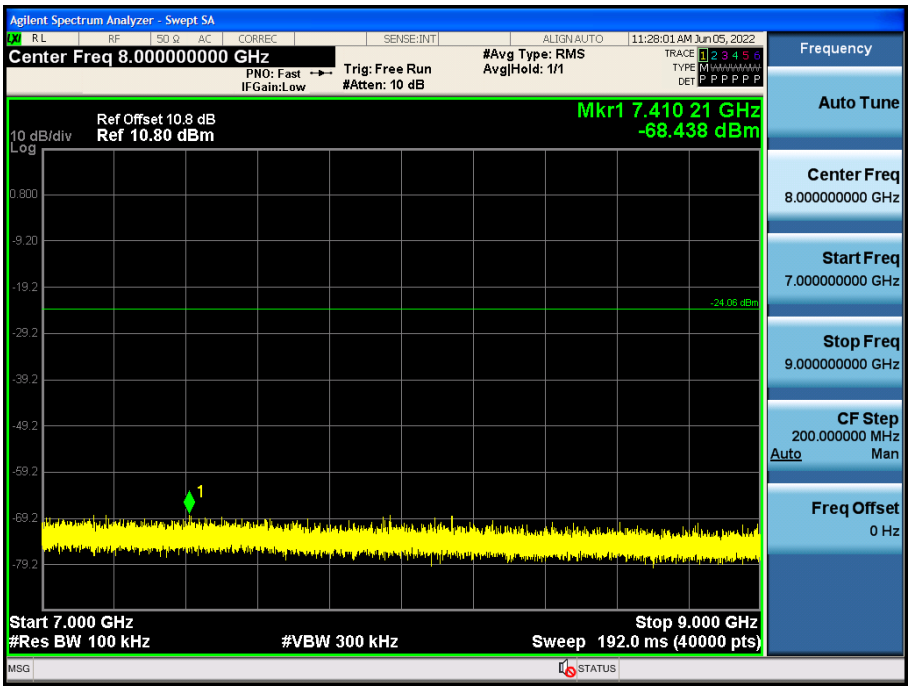
5 GHz ~ 7 GHz

Conducted Spurious Emission (802.11n_HT20_Ch.6_MCS0)



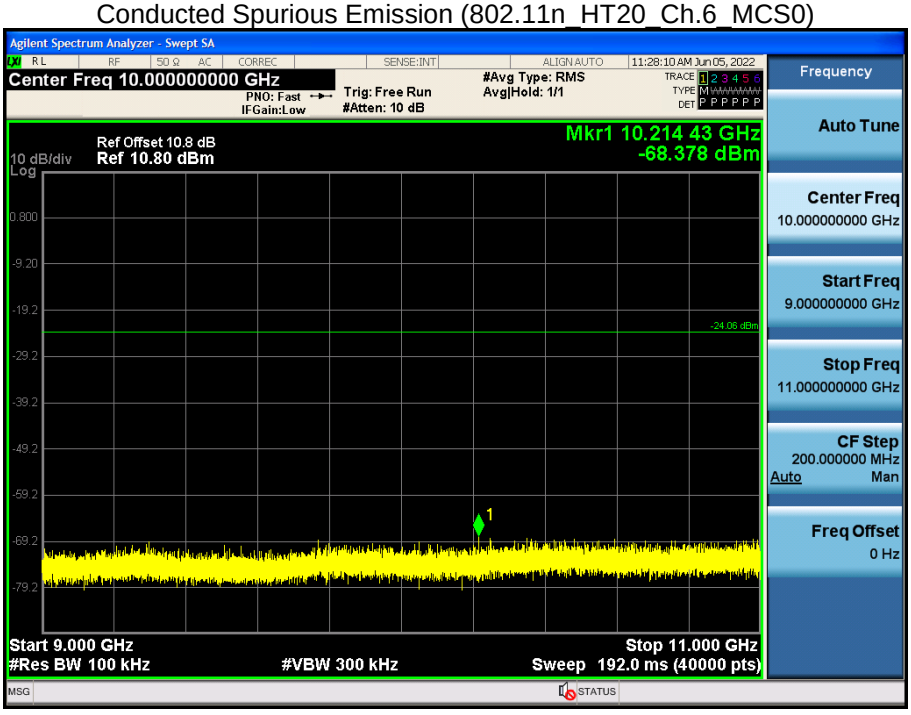
7 GHz ~ 9 GHz

Conducted Spurious Emission (802.11n_HT20_Ch.6_MCS0)



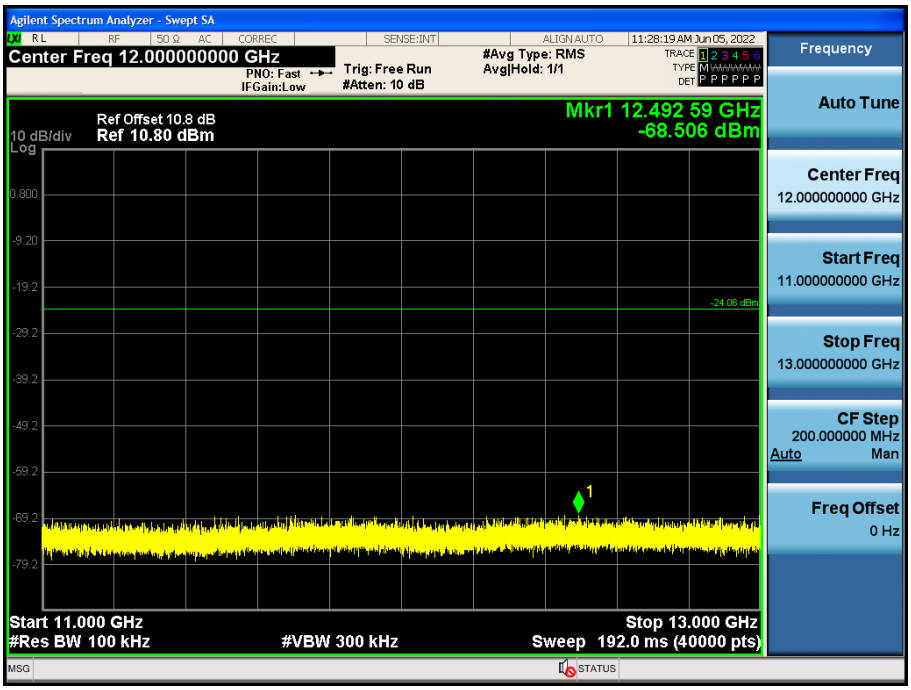
9 GHz ~ 11 GHz

Conducted Spurious Emission (802.11n_HT20_Ch.6_MCS0)



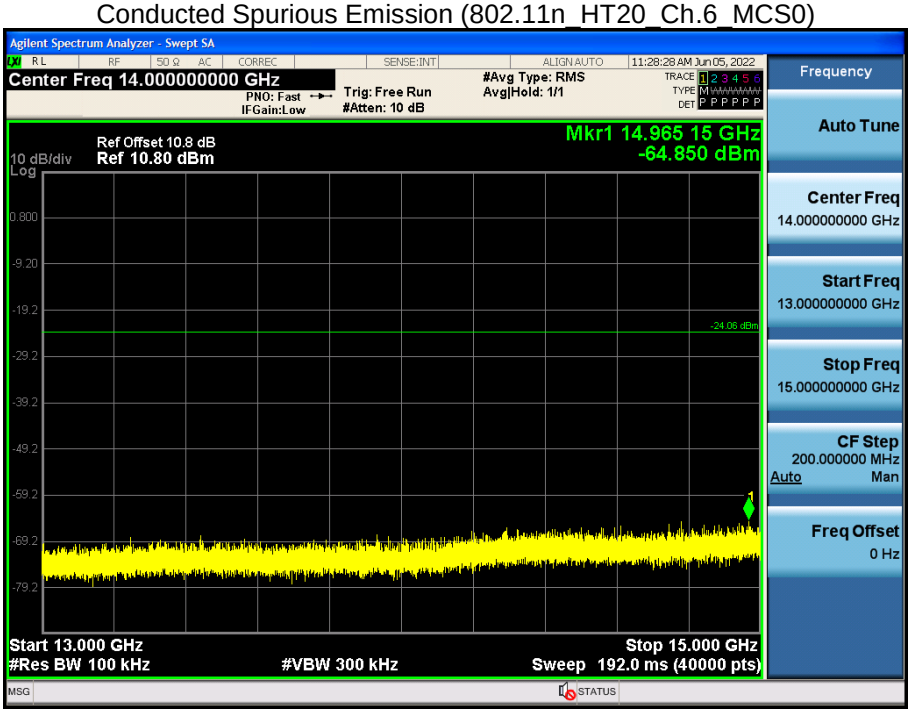
11 GHz ~ 13 GHz

Conducted Spurious Emission (802.11n_HT20_Ch.6_MCS0)



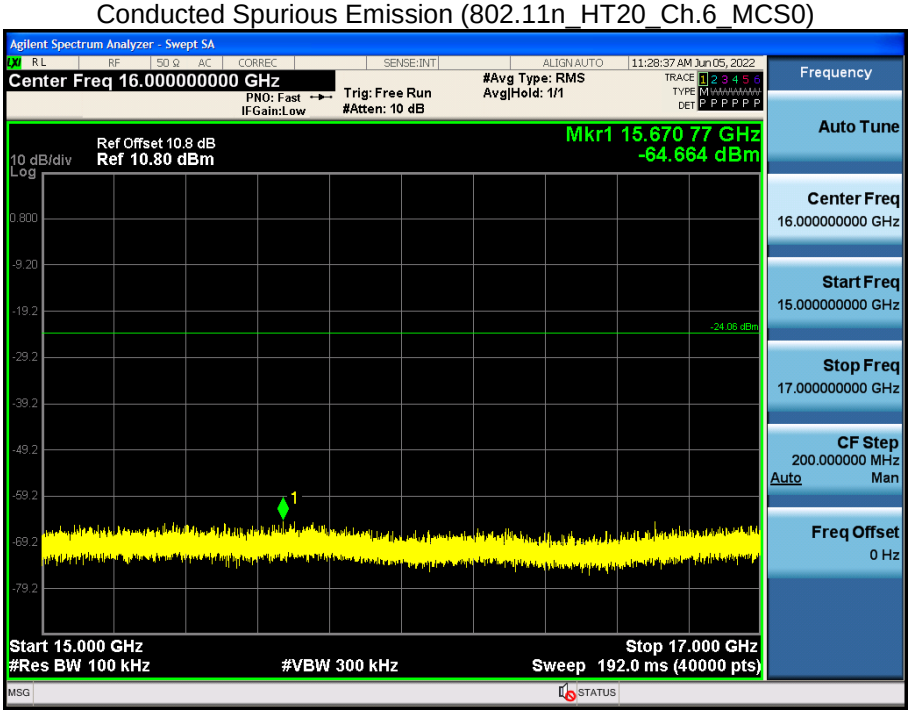
13 GHz ~ 15 GHz

Conducted Spurious Emission (802.11n_HT20_Ch.6_MCS0)



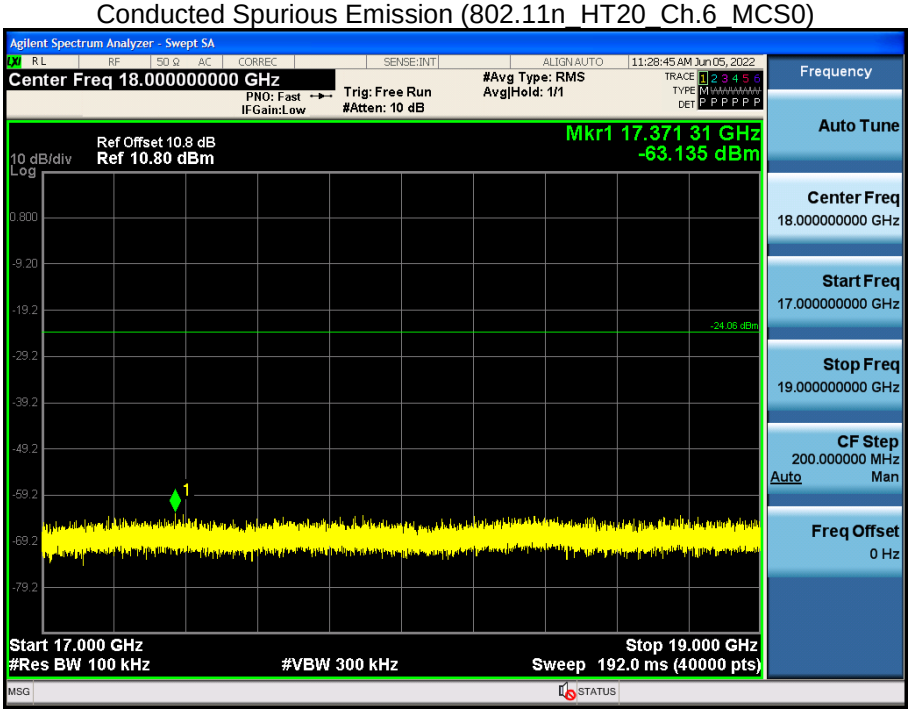
15 GHz ~ 17 GHz

Conducted Spurious Emission (802.11n_HT20_Ch.6_MCS0)



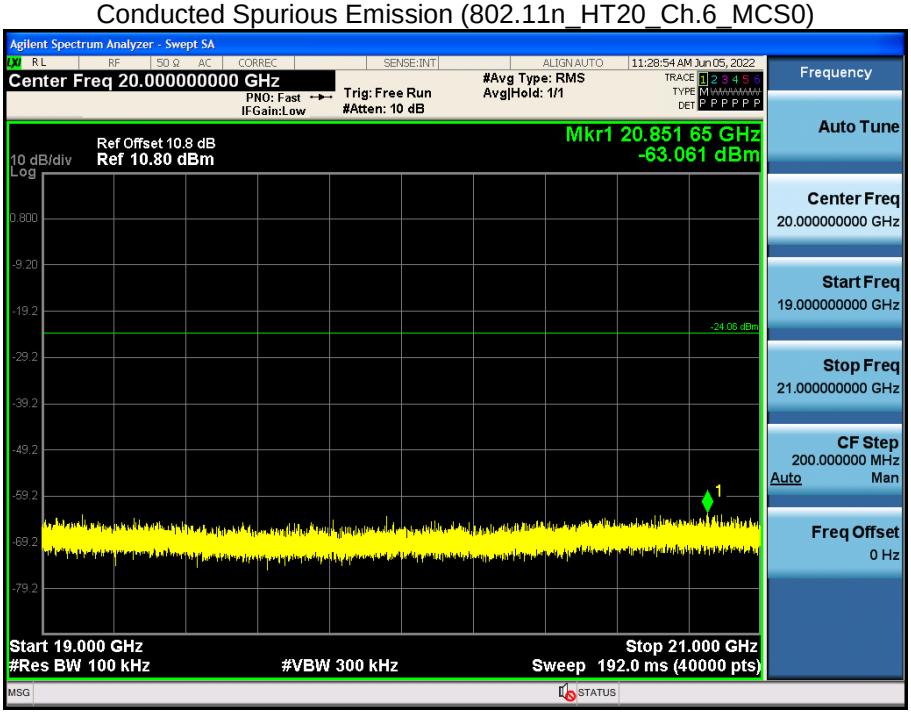
17 GHz ~ 19 GHz

Conducted Spurious Emission (802.11n_HT20_Ch.6_MCS0)



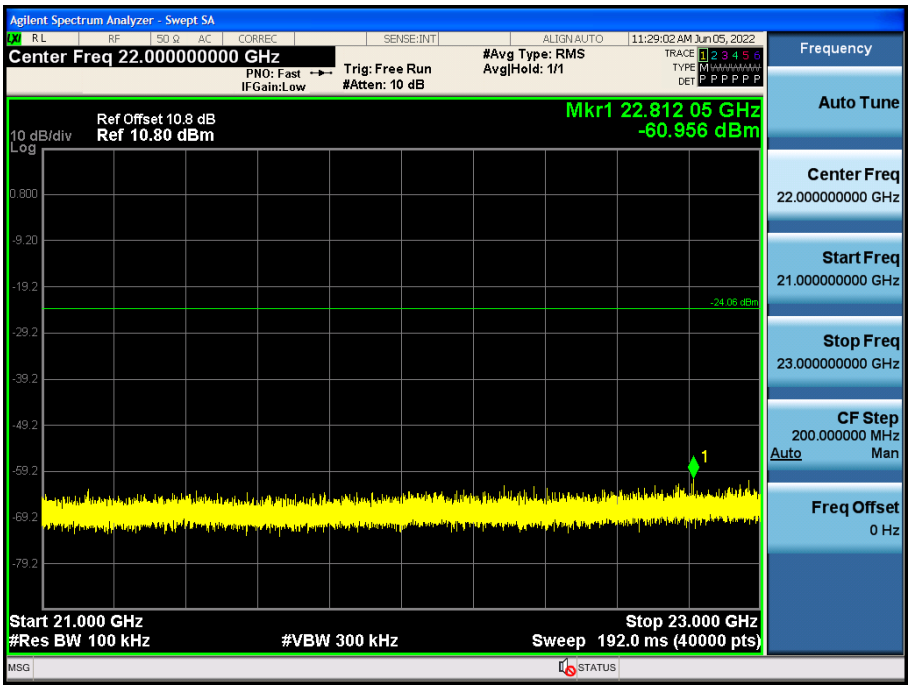
19 GHz ~ 21 GHz

Conducted Spurious Emission (802.11n_HT20_Ch.6_MCS0)



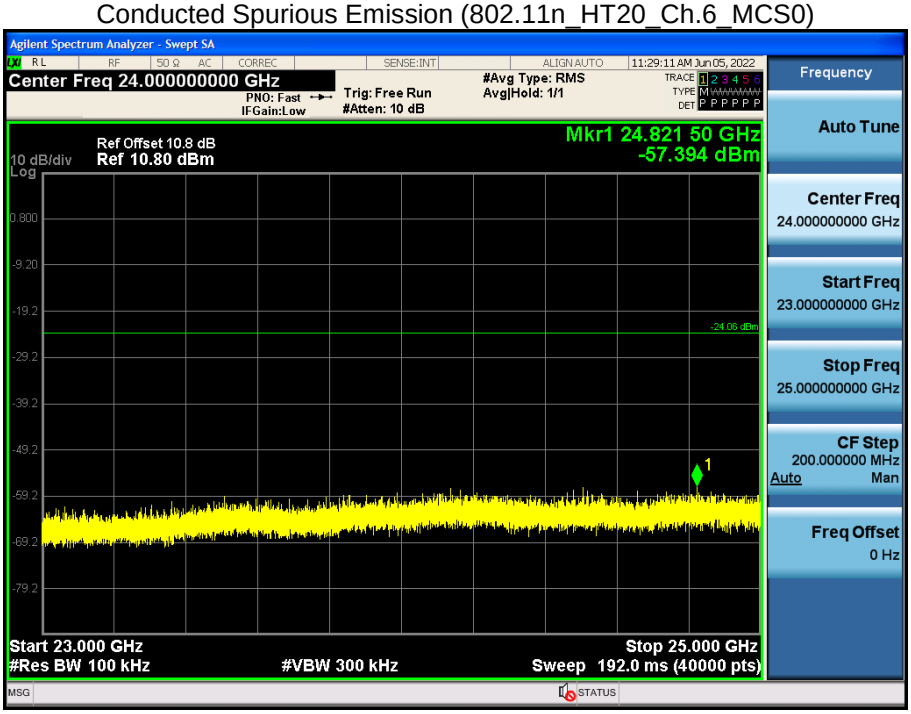
21 GHz ~ 23 GHz

Conducted Spurious Emission (802.11n_HT20_Ch.6_MCS0)



23 GHz ~ 25 GHz

Conducted Spurious Emission (802.11n_HT20_Ch.6_MCS0)

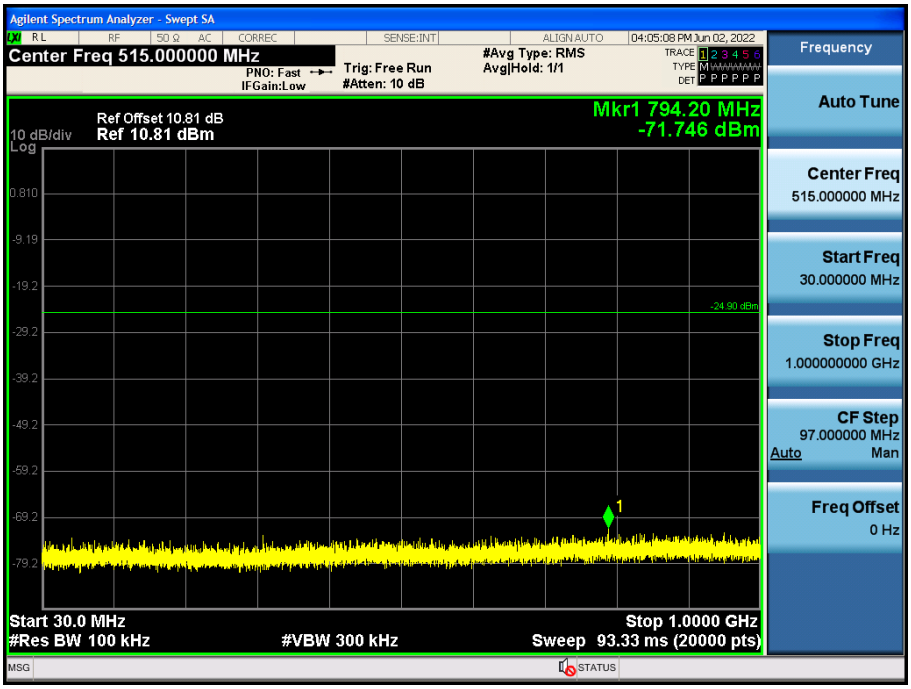


[Ant.2]

▣ Test Plots(Conducted Spurious Emission)

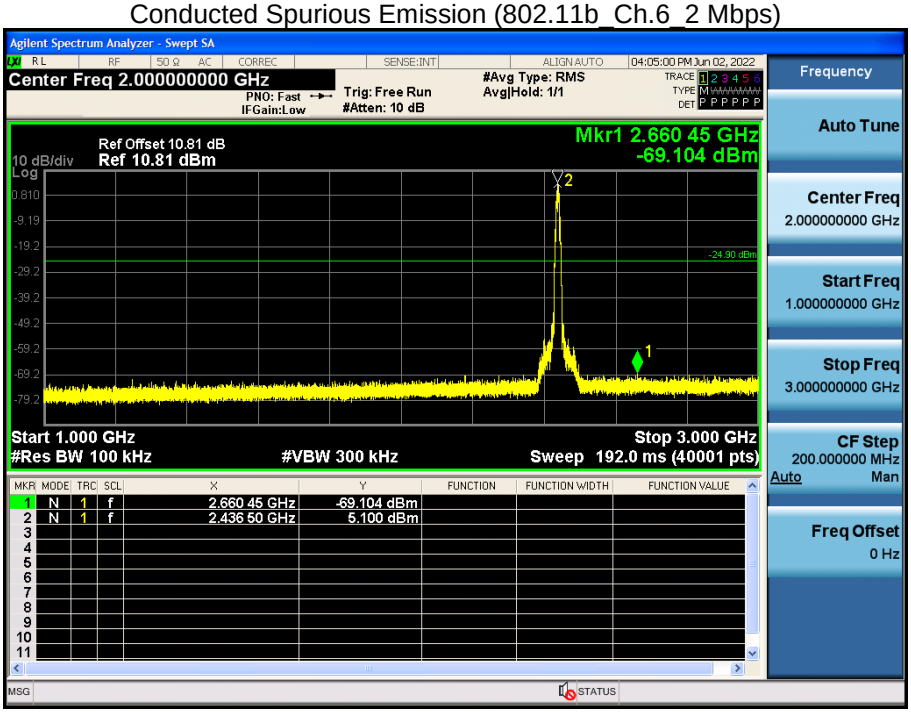
30 MHz ~ 1 GHz

Conducted Spurious Emission (802.11b_Ch.6_2 Mbps)



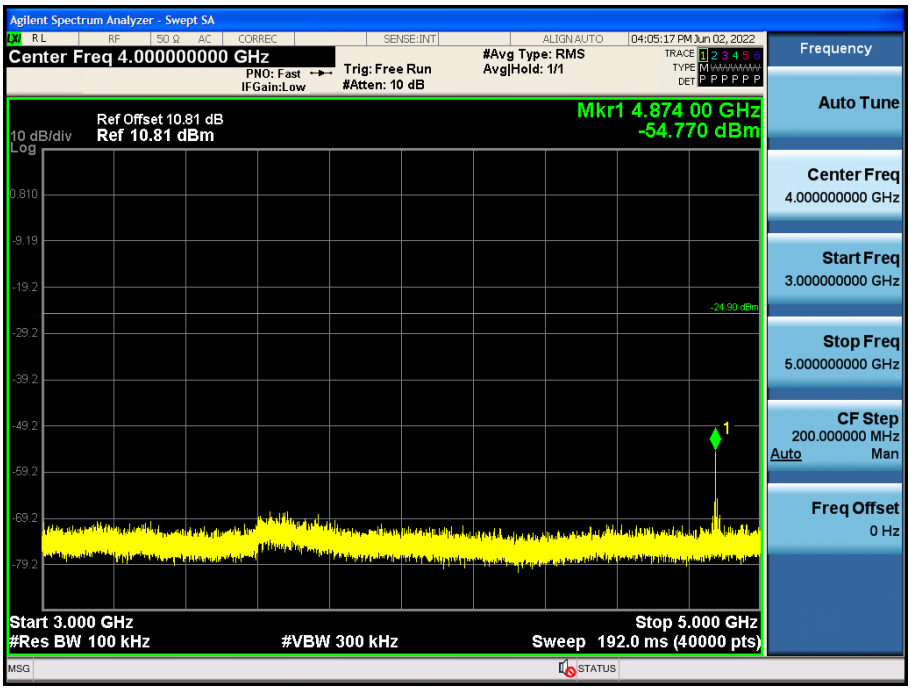
1 GHz ~ 3 GHz

Conducted Spurious Emission (802.11b_Ch.6_2 Mbps)



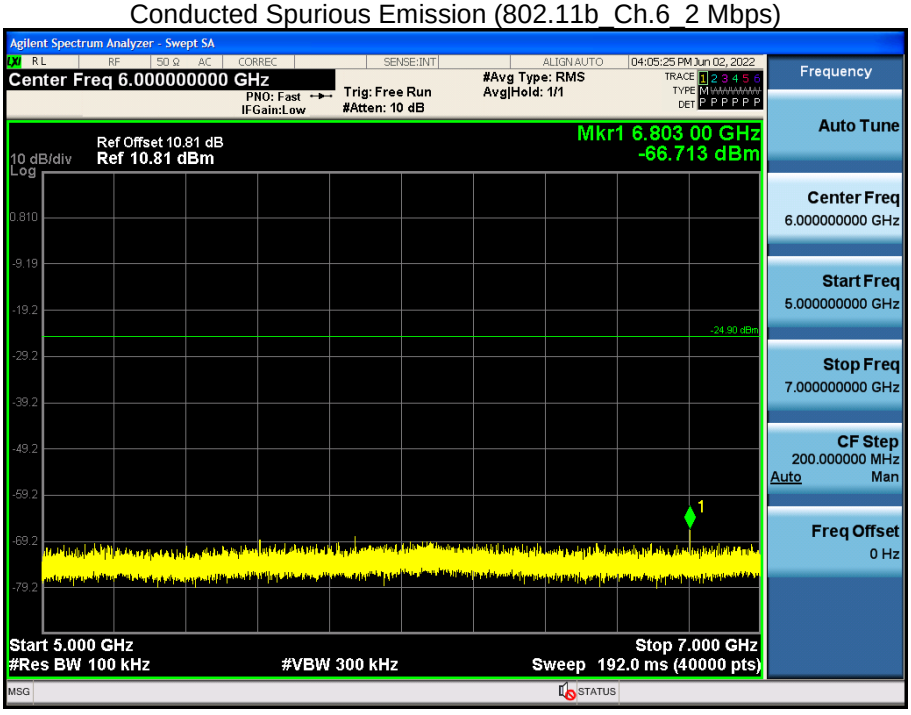
3 GHz ~ 5 GHz

Conducted Spurious Emission (802.11b_Ch.6_2 Mbps)



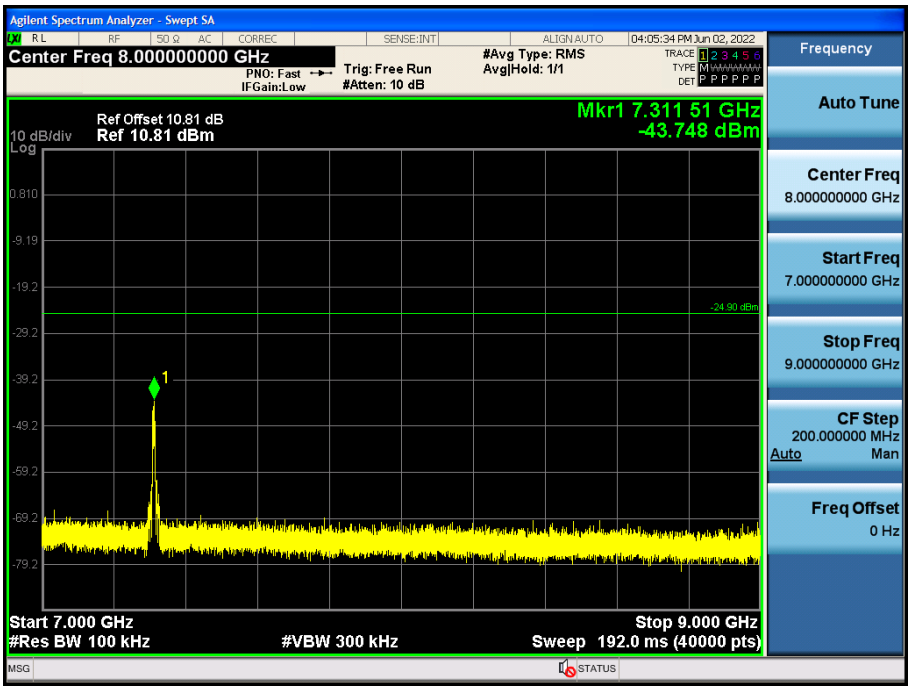
5 GHz ~ 7 GHz

Conducted Spurious Emission (802.11b_Ch.6_2 Mbps)



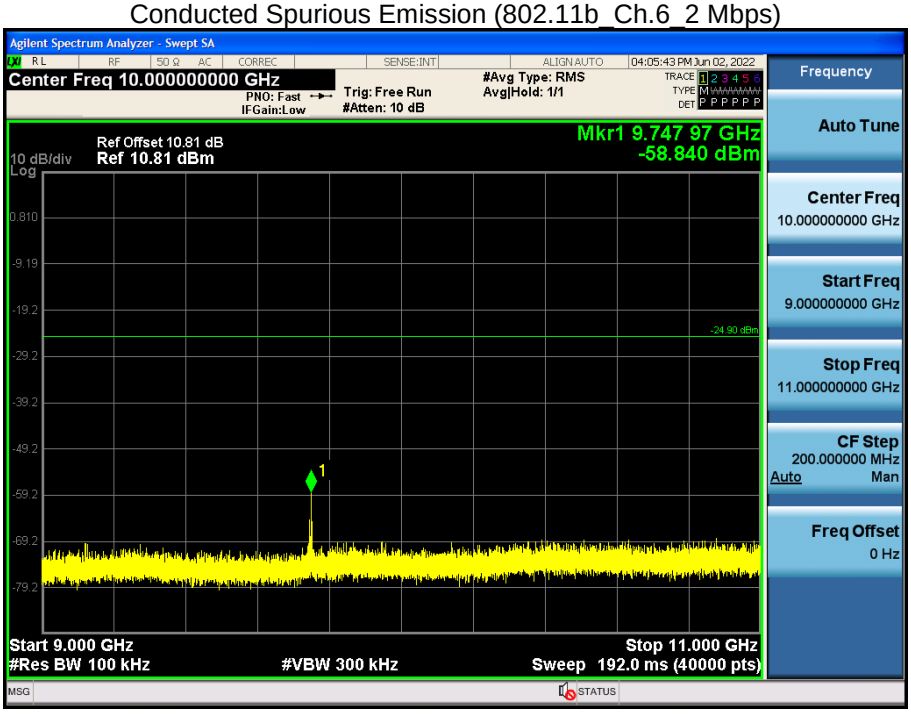
7 GHz ~ 9 GHz

Conducted Spurious Emission (802.11b_Ch.6_2 Mbps)



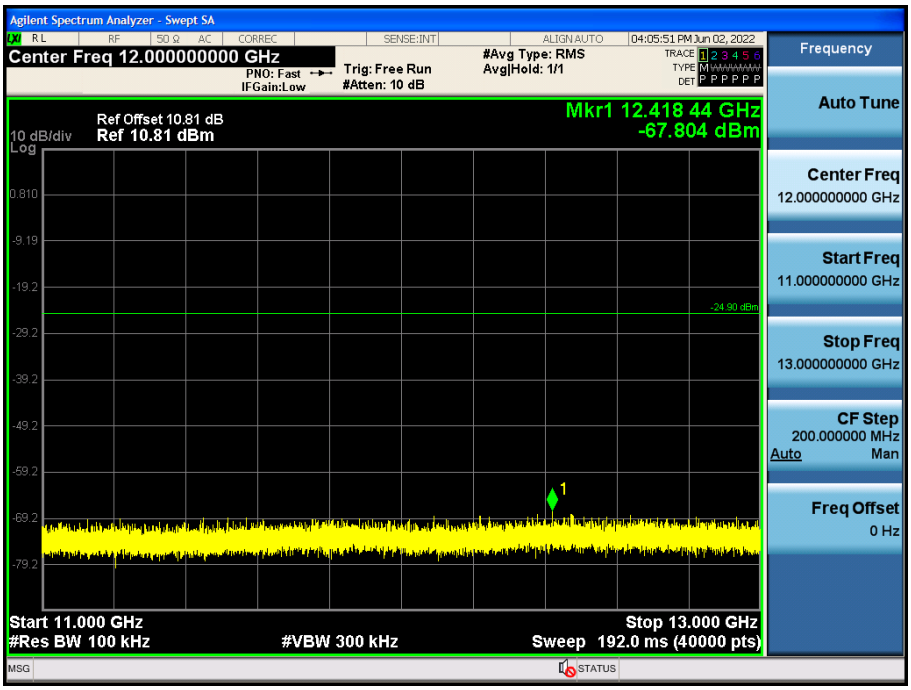
9 GHz ~ 11 GHz

Conducted Spurious Emission (802.11b_Ch.6_2 Mbps)



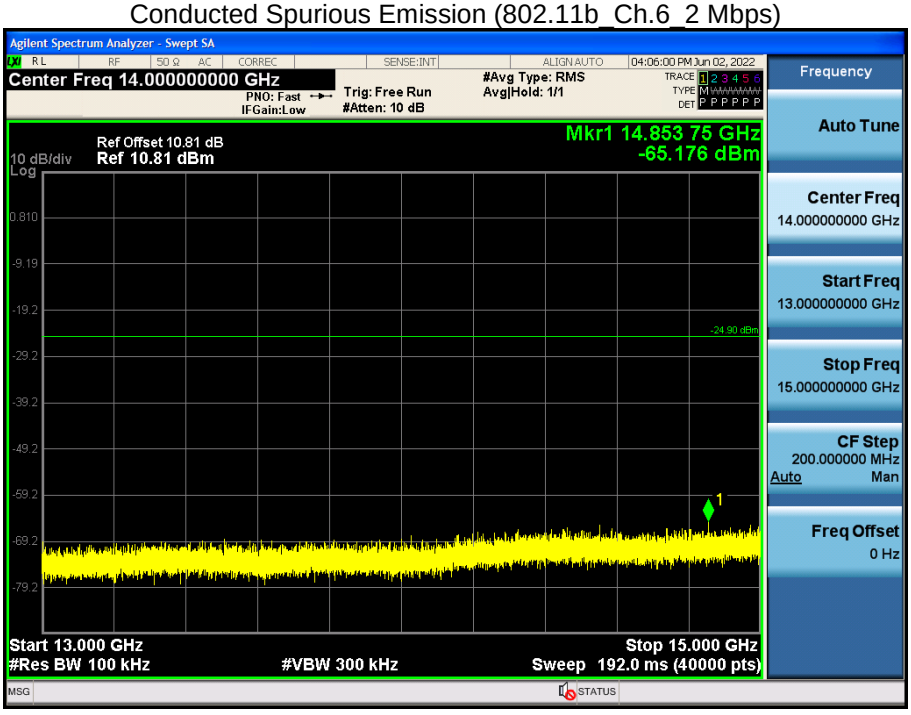
11 GHz ~ 13 GHz

Conducted Spurious Emission (802.11b_Ch.6_2 Mbps)



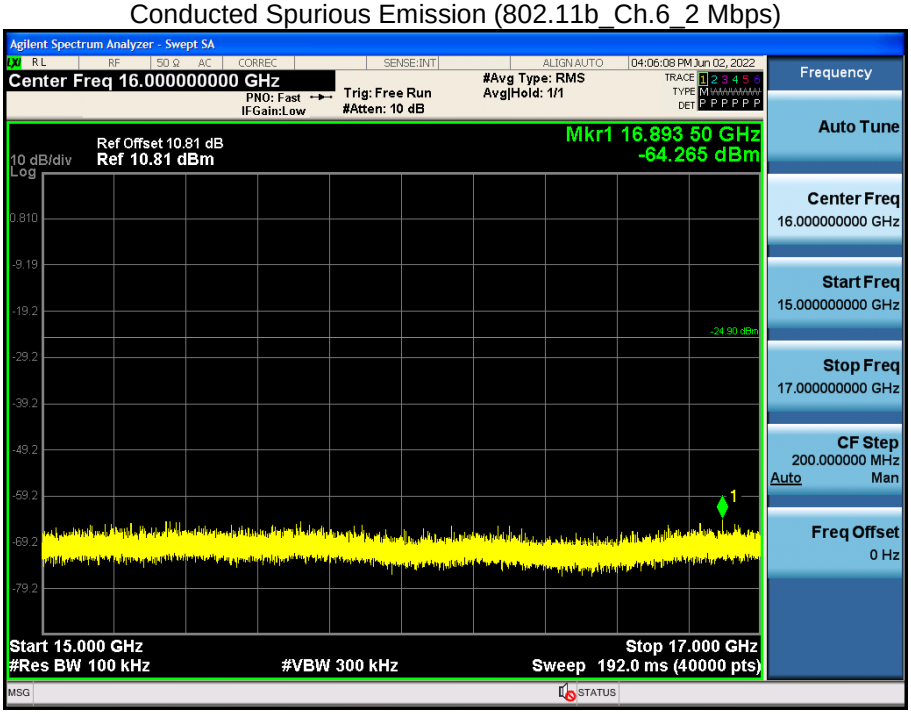
13 GHz ~ 15 GHz

Conducted Spurious Emission (802.11b_Ch.6_2 Mbps)



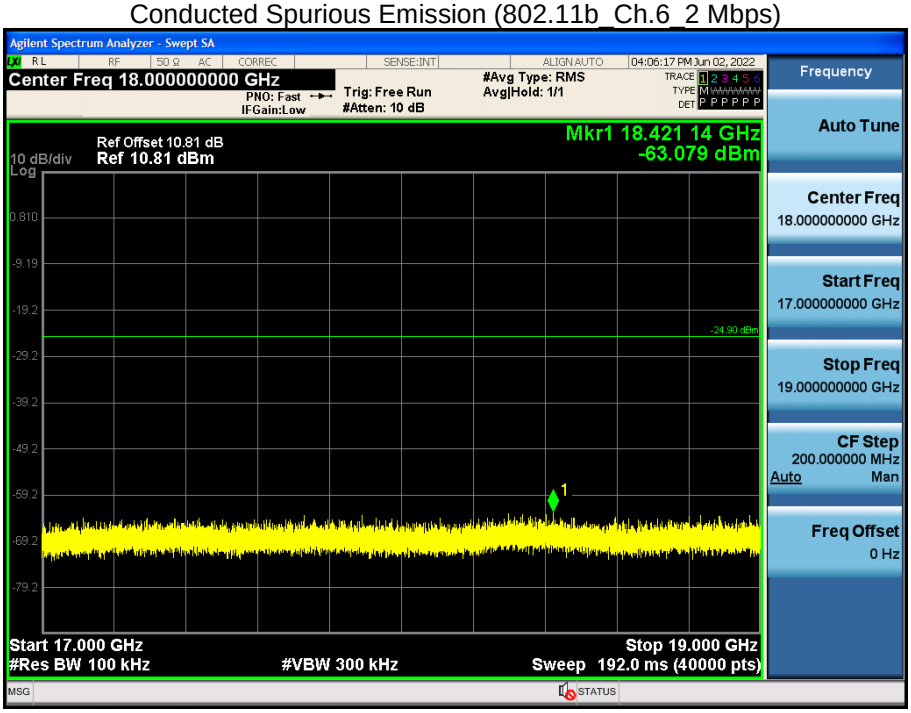
15 GHz ~ 17 GHz

Conducted Spurious Emission (802.11b_Ch.6_2 Mbps)



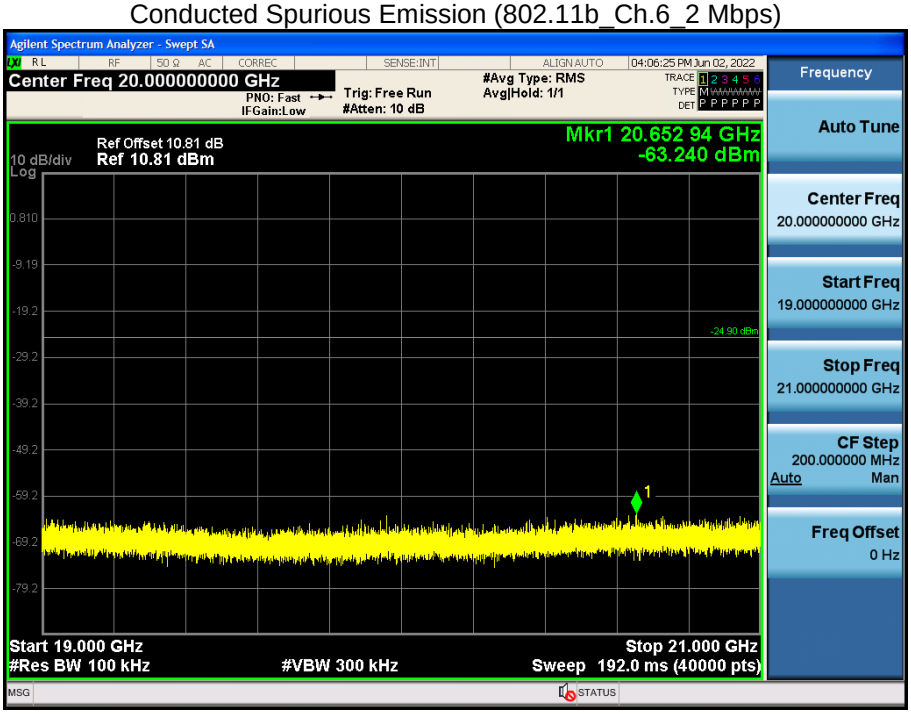
17 GHz ~ 19 GHz

Conducted Spurious Emission (802.11b_Ch.6_2 Mbps)



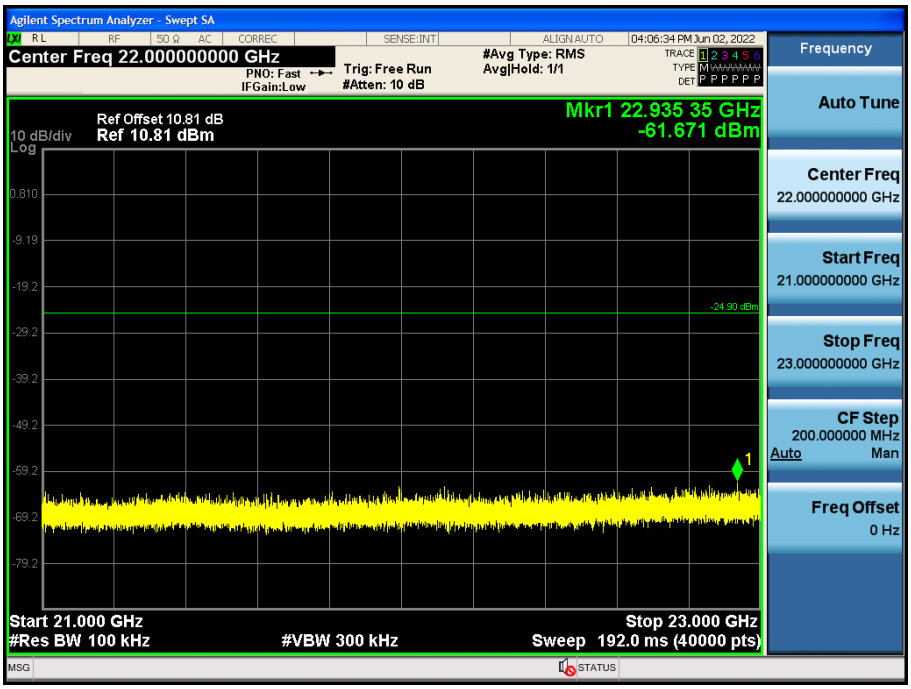
19 GHz ~ 21 GHz

Conducted Spurious Emission (802.11b_Ch.6_2 Mbps)



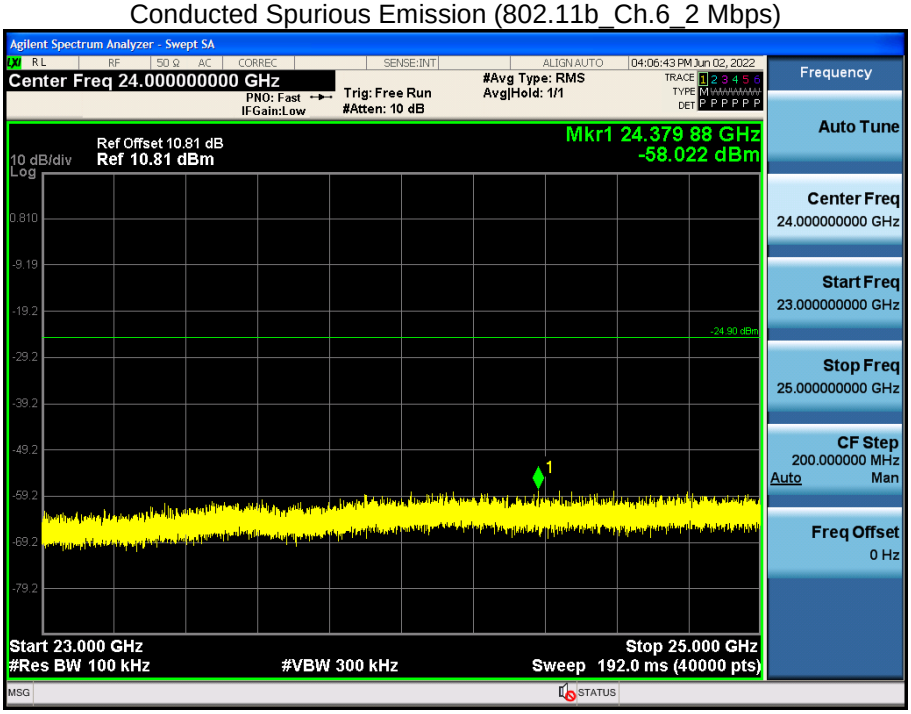
21 GHz ~ 23 GHz

Conducted Spurious Emission (802.11b_Ch.6_2 Mbps)



23 GHz ~ 25 GHz

Conducted Spurious Emission (802.11b_Ch.6_2 Mbps)



9.6 RADIATED SPURIOUS EMISSIONS

Frequency Range : 9 kHz – 30 MHz

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

Note:

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

Frequency Range : Below 1 GHz

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

Note:

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

Frequency Range : Above 1 GHz

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

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

Frequency [MHz]	Measured Value [dBµV/m]	A.F+C.L-A.G + D.F [dB/m]	ANT. POL [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
4824	41.86	3.57	V	45.43	73.98	28.55	PK
4824	31.68	3.57	V	35.25	53.98	18.73	AV
7236	44.92	12.30	V	57.22	73.98	16.77	PK
7236	37.51	12.30	V	49.81	53.98	4.18	AV
4824	42.56	3.57	H	46.13	73.98	27.85	PK
4824	31.71	3.57	H	35.28	53.98	18.70	AV
7236	45.65	12.30	H	57.95	73.98	16.04	PK
7236	38.49	12.30	H	50.79	53.98	3.20	AV

Operation Mode:	802.11b
Transfer Rate:	1 Mbps
Operating Frequency	2417 MHz
Channel No.	02 Ch

Frequency [MHz]	Measured Value [dBµV/m]	A.F+C.L-A.G + D.F [dB/m]	ANT. POL [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
4834	42.11	3.55	V	45.66	73.98	28.32	PK
4834	31.58	3.55	V	35.13	53.98	18.85	AV
7251	45.15	11.70	V	56.85	73.98	17.13	PK
7251	38.22	11.70	V	49.92	53.98	4.06	AV
4834	43.82	3.55	H	47.37	73.98	26.61	PK
4834	32.19	3.55	H	35.74	53.98	18.24	AV
7251	44.94	11.70	H	56.64	73.98	17.34	PK
7251	37.76	11.70	H	49.46	53.98	4.52	AV

Operation Mode:	802.11b
Transfer Rate:	1 Mbps
Operating Frequency	2422 MHz
Channel No.	03 Ch

Frequency [MHz]	Measured Value [dBµV/m]	A.F+C.L-A.G + D.F [dB/m]	ANT. POL [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
4844	43.44	3.11	V	46.55	73.98	27.43	PK
4844	32.29	3.11	V	35.40	53.98	18.58	AV
7266	45.08	12.01	V	57.09	73.98	16.89	PK
7266	37.93	12.01	V	49.94	53.98	4.04	AV
4844	44.51	3.11	H	47.62	73.98	26.36	PK
4844	33.33	3.11	H	36.44	53.98	17.54	AV
7266	45.44	12.01	H	57.45	73.98	16.53	PK
7266	38.01	12.01	H	50.02	53.98	3.96	AV

Operation Mode:	802.11b
Transfer Rate:	1 Mbps
Operating Frequency	2427 MHz
Channel No.	04 Ch

Frequency [MHz]	Measured Value [dBµV/m]	A.F+C.L-A.G + D.F [dB/m]	ANT. POL [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
4854	44.92	3.54	V	48.46	73.98	25.52	PK
4854	33.98	3.54	V	37.52	53.98	16.46	AV
7281	44.91	12.04	V	56.95	73.98	17.03	PK
7281	37.89	12.04	V	49.93	53.98	4.05	AV
4854	45.13	3.54	H	48.67	73.98	25.31	PK
4854	34.32	3.54	H	37.86	53.98	16.12	AV
7281	45.94	12.04	H	57.98	73.98	16.00	PK
7281	38.53	12.04	H	50.57	53.98	3.41	AV

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

Frequency [MHz]	Measured Value [dBµV/m]	A.F+C.L-A.G + D.F [dB/m]	ANT. POL [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
4874	41.76	3.76	V	45.52	73.98	28.47	PK
4874	31.58	3.76	V	35.34	53.98	18.65	AV
7311	44.36	11.51	V	55.87	73.98	18.11	PK
7311	37.99	11.51	V	49.50	53.98	4.48	AV
4874	42.70	3.76	H	46.46	73.98	27.53	PK
4874	32.73	3.76	H	36.49	53.98	17.50	AV
7311	45.53	11.51	H	57.04	73.98	16.94	PK
7311	38.92	11.51	H	50.43	53.98	3.55	AV

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

Frequency [MHz]	Measured Value [dBµV/m]	A.F+C.L-A.G + D.F [dB/m]	ANT. POL [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
4924	41.85	4.78	V	46.63	73.98	27.35	PK
4924	33.76	4.78	V	38.54	53.98	15.44	AV
7386	44.94	12.03	V	56.97	73.98	17.01	PK
7386	37.27	12.03	V	49.30	53.98	4.68	AV
4924	42.94	4.78	H	47.72	73.98	26.26	PK
4924	34.13	4.78	H	38.91	53.98	15.07	AV
7386	45.57	12.03	H	57.60	73.98	16.38	PK
7386	38.25	12.03	H	50.28	53.98	3.70	AV

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

Frequency [MHz]	Measured Value [dBµV/m]	Duty Cycle Factor	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	41.58	0.00	3.57	V	45.15	73.98	28.83	PK
4824	30.26	0.31	3.57	V	34.14	53.98	19.84	AV
7236	50.62	0.00	12.30	V	62.92	73.98	11.07	PK
7236	36.29	0.31	12.30	V	48.89	53.98	5.09	AV
4824	42.29	0.00	3.57	H	45.86	73.98	28.12	PK
4824	30.42	0.31	3.57	H	34.30	53.98	19.68	AV
7236	51.09	0.00	12.30	H	63.39	73.98	10.60	PK
7236	37.72	0.31	12.30	H	50.32	53.98	3.66	AV

Operation Mode:	802.11g
Transfer Rate:	6 Mbps
Operating Frequency	2417 MHz
Channel No.	02 Ch

Frequency [MHz]	Measured Value [dBµV/m]	Duty Cycle Factor	A.F+C.L-A.G + D.F [dB/m]	ANT. POL [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
4834	42.33	0.00	3.55	V	45.88	73.98	28.10	PK
4834	30.92	0.31	3.55	V	34.78	53.98	19.21	AV
7251	50.87	0.00	11.70	V	62.57	73.98	11.41	PK
7251	37.97	0.31	11.70	V	49.98	53.98	4.01	AV
4834	43.25	0.00	3.55	H	46.80	73.98	27.18	PK
4834	31.11	0.31	3.55	H	34.97	53.98	19.02	AV
7251	51.11	0.00	11.70	H	62.81	73.98	11.17	PK
7251	38.58	0.31	11.70	H	50.59	53.98	3.40	AV

Operation Mode:	802.11g
Transfer Rate:	6 Mbps
Operating Frequency	2422 MHz
Channel No.	03 Ch

Frequency [MHz]	Measured Value [dBµV/m]	Duty Cycle Factor	A.F+C.L-A.G + D.F [dB/m]	ANT. POL [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
4844	42.77	0.00	3.11	V	45.88	73.98	28.10	PK
4844	31.32	0.31	3.11	V	34.74	53.98	19.25	AV
7266	49.65	0.00	12.01	V	61.66	73.98	12.32	PK
7266	36.68	0.31	12.01	V	49.00	53.98	4.99	AV
4844	43.13	0.00	3.11	H	46.24	73.98	27.74	PK
4844	31.56	0.31	3.11	H	34.98	53.98	19.01	AV
7266	50.56	0.00	12.01	H	62.57	73.98	11.41	PK
7266	37.85	0.31	12.01	H	50.17	53.98	3.82	AV

Operation Mode:	802.11g
Transfer Rate:	6 Mbps
Operating Frequency	2427 MHz
Channel No.	04 Ch

Frequency [MHz]	Measured Value [dBµV/m]	Duty Cycle Factor	A.F+C.L-A.G + D.F [dB/m]	ANT. POL [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
4854	43.52	0.00	3.54	V	47.06	73.98	26.92	PK
4854	31.42	0.31	3.54	V	35.27	53.98	18.72	AV
7281	50.93	0.00	12.04	V	62.97	73.98	11.01	PK
7281	37.92	0.31	12.04	V	50.27	53.98	3.72	AV
4854	44.08	0.00	3.54	H	47.62	73.98	26.36	PK
4854	31.56	0.31	3.54	H	35.41	53.98	18.58	AV
7281	51.22	0.00	12.04	H	63.26	73.98	10.72	PK
7281	38.54	0.31	12.04	H	50.89	53.98	3.10	AV

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

Frequency [MHz]	Measured Value [dBµV/m]	Duty Cycle Factor	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	42.79	0.00	3.76	V	46.55	73.98	27.44	PK
4874	30.89	0.31	3.76	V	34.95	53.98	19.03	AV
7311	52.28	0.00	11.51	V	63.79	73.98	10.19	PK
7311	38.47	0.31	11.51	V	50.29	53.98	3.70	AV
4874	42.95	0.00	3.76	H	46.71	73.98	27.28	PK
4874	31.16	0.31	3.76	H	35.22	53.98	18.76	AV
7311	**53.28**	**0.00**	**11.51**	**H**	**64.79**	**73.98**	**9.19**	**PK**
7311	**39.14**	**0.31**	**11.51**	**H**	**50.96**	**53.98**	**3.03**	**AV**

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

Frequency [MHz]	Measured Value [dBµV/m]	Duty Cycle Factor	A.F+C.L-A.G + D.F [dB/m]	ANT. POL [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
4924	42.95	0.00	4.78	V	47.73	73.98	26.25	PK
4924	30.09	0.31	4.78	V	35.18	53.98	18.80	AV
7386	49.85	0.00	12.03	V	61.88	73.98	12.10	PK
7386	35.77	0.31	12.03	V	48.10	53.98	5.88	AV
4924	43.30	0.00	4.78	H	48.08	73.98	25.90	PK
4924	31.14	0.31	4.78	H	36.23	53.98	17.75	AV
7386	50.29	0.00	12.03	H	62.32	73.98	11.66	PK
7386	36.22	0.31	12.03	H	48.55	53.98	5.43	AV

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

Frequency [MHz]	Measured Value [dBµV/m]	Duty Cycle Factor	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	41.02	0.00	3.57	V	44.59	73.98	29.39	PK
4824	30.48	0.36	3.57	V	34.41	53.98	19.57	AV
7236	50.26	0.00	12.30	V	62.56	73.98	11.43	PK
7236	36.89	0.36	12.30	V	49.54	53.98	4.44	AV
4824	42.38	0.00	3.57	H	45.95	73.98	28.03	PK
4824	30.52	0.36	3.57	H	34.45	53.98	19.53	AV
7236	51.59	0.00	12.30	H	63.89	73.98	10.10	PK
7236	37.29	0.36	12.30	H	49.94	53.98	4.04	AV

Operation Mode:	802.11n (HT20)
Transfer MCS Index:	0
Operating Frequency	2417 MHz
Channel No.	02 Ch

Frequency [MHz]	Measured Value [dBµV/m]	Duty Cycle Factor	A.F+C.L-A.G + D.F [dB/m]	ANT. POL [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
4834	42.97	0.00	3.55	V	46.52	73.98	27.46	PK
4834	30.52	0.36	3.55	V	34.43	53.98	19.55	AV
7251	52.15	0.00	11.70	V	63.85	73.98	10.13	PK
7251	36.59	0.36	11.70	V	48.65	53.98	5.33	AV
4834	43.09	0.00	3.55	H	46.64	73.98	27.34	PK
4834	30.76	0.36	3.55	H	34.67	53.98	19.31	AV
7251	53.05	0.00	11.70	H	64.75	73.98	9.23	PK
7251	37.34	0.36	11.70	H	49.40	53.98	4.58	AV

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

Frequency [MHz]	Measured Value [dBµV/m]	Duty Cycle Factor	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	41.88	0.00	3.76	V	45.64	73.98	28.35	PK
4874	30.91	0.36	3.76	V	35.02	53.98	18.96	AV
7311	52.46	0.00	11.51	V	63.97	73.98	10.01	PK
7311	37.26	0.36	11.51	V	49.13	53.98	4.85	AV
4874	42.79	0.00	3.76	H	46.55	73.98	27.44	PK
4874	31.06	0.36	3.76	H	35.17	53.98	18.81	AV
7311	53.31	0.00	11.51	H	64.82	73.98	9.16	PK
7311	38.59	0.36	11.51	H	50.46	53.98	3.52	AV

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

Frequency [MHz]	Measured Value [dBµV/m]	Duty Cycle Factor	A.F+C.L-A.G + D.F [dB/m]	ANT. POL [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
4924	42.19	0.00	4.78	V	46.97	73.98	27.01	PK
4924	30.82	0.36	4.78	V	35.96	53.98	18.02	AV
7386	51.55	0.00	12.03	V	63.58	73.98	10.40	PK
7386	35.75	0.36	12.03	V	48.13	53.98	5.85	AV
4924	42.75	0.00	4.78	H	47.53	73.98	26.45	PK
4924	30.85	0.36	4.78	H	35.99	53.98	17.99	AV
7386	52.68	0.00	12.03	H	64.71	73.98	9.27	PK
7386	36.86	0.36	12.03	H	49.24	53.98	4.74	AV

[RSDB Mode]

Mode : 802.11g 6 Mbps ch.6 & 802.11n(HT20) MCS0 ch.52

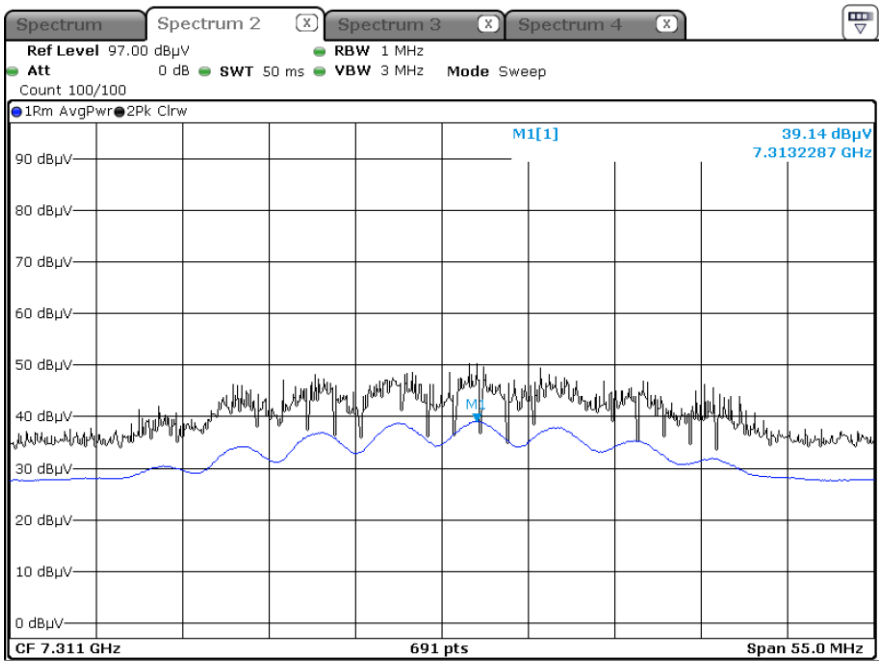
Operation Mode:	802.11g
Transfer Rate:	6 Mbps
Operating Frequency	2437 MHz
Channel No.	6 Ch

Frequency [MHz]	Measured Value [dBµV/m]	Duty Cycle Factor	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	50.94	0.00	3.76	V	54.70	73.98	19.29	PK
4874	38.20	0.31	3.76	V	42.26	53.98	11.72	AV
7311	45.71	0.00	11.51	V	57.22	73.98	16.76	PK
7311	32.63	0.31	11.51	V	44.45	53.98	9.54	AV
4874	49.54	0.00	3.76	H	53.30	73.98	20.69	PK
4874	37.14	0.31	3.76	H	41.20	53.98	12.78	AV
7311	47.85	0.00	11.51	H	59.36	73.98	14.62	PK
7311	34.91	0.31	11.51	H	46.73	53.98	7.26	AV

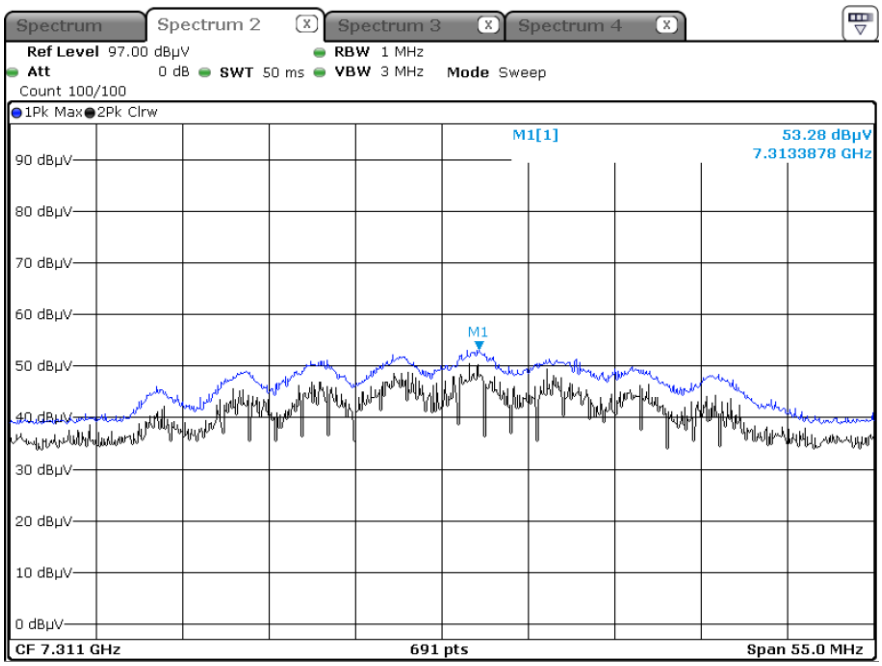
[Ant.1&Ant.2_MIMO(CDD)]

▣ Test Plots (Worst case : X-H)

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



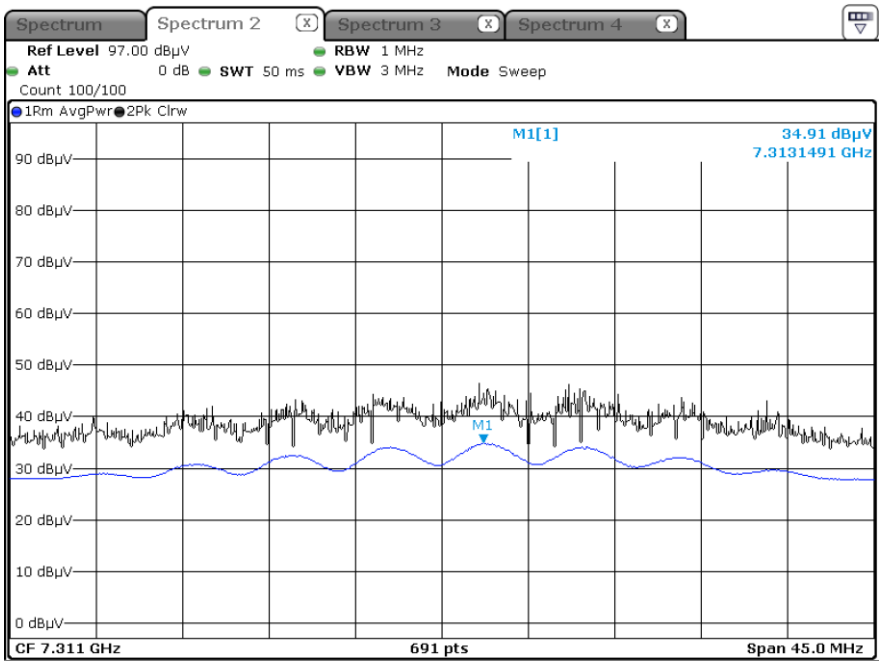
Radiated Spurious Emissions plot – Peak Result (802.11g_6 Mbps, Ch.6 3rd Harmonic)



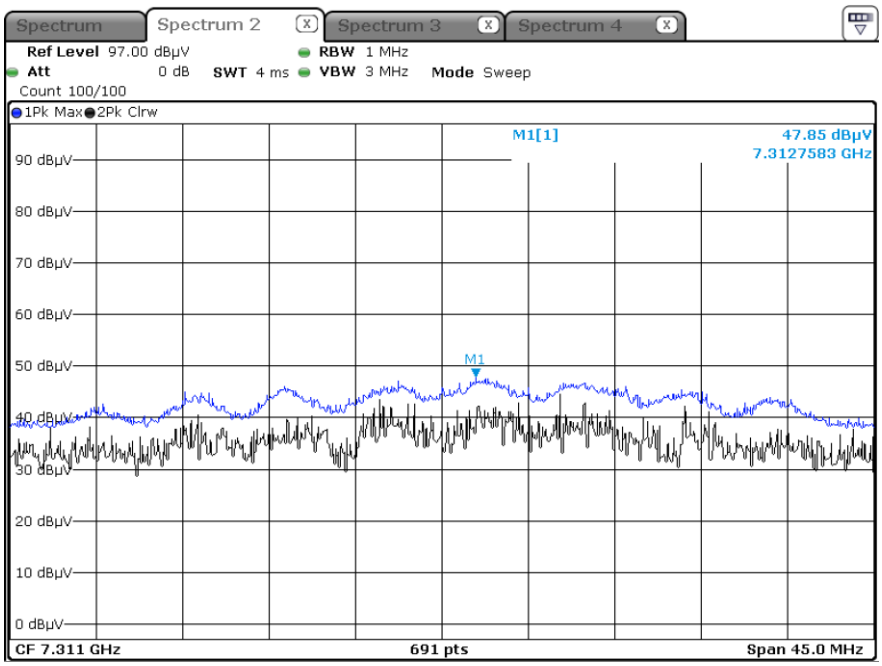
[RSDB Mode]

Mode : (ANT ALL)_802.11g 6 Mbps ch.6 & (ANT ALL)_802.11n(HT20) MCS0 ch.52

Radiated Spurious Emissions plot – Average Result (Spurious Emissions, Harmonic)



Radiated Spurious Emissions plot – Peak Result (Spurious Emissions, Harmonic)



Note: Plot of worst case are only reported.

9.7 RADIATED RESTRICTED BAND EDGES

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

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

Frequency [MHz]	Measured Value [dBµV]	A.F+ C.L+ D.F [dB/m]	ANT. POL [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
2390.0	21.06	34.50	H	55.56	73.98	18.42	PK
2390.0	9.53	34.50	H	44.03	53.98	9.95	AV
2390.0	20.95	34.50	V	55.45	73.98	18.53	PK
2390.0	9.13	34.50	V	43.63	53.98	10.35	AV
2483.5	20.84	34.87	H	55.71	73.98	18.27	PK
2483.5	10.02	34.87	H	44.89	53.98	9.09	AV
2483.5	20.78	34.87	V	55.66	73.98	18.32	PK
2483.5	9.99	34.87	V	44.87	53.98	9.11	AV

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

Frequency [MHz]	Measured Value [dBµV]	Duty Cycle Factor [dB]	A.F+ C.L+ D.F [dB/m]	ANT. POL [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
2390.0	22.53	0.00	34.50	H	57.03	73.98	16.95	PK
2390.0	11.73	0.31	34.50	H	46.54	53.98	7.44	AV
2390.0	22.44	0.00	34.50	V	56.94	73.98	17.04	PK
2390.0	11.63	0.31	34.50	V	46.43	53.98	7.55	AV
2483.5	**22.62**	**0.00**	**34.87**	**H**	**57.49**	**73.98**	**16.49**	**PK**
2483.5	**11.89**	**0.31**	**34.87**	**H**	**47.07**	**53.98**	**6.91**	**AV**
2483.5	22.49	0.00	34.87	V	57.36	73.98	16.62	PK
2483.5	11.82	0.31	34.87	V	47.00	53.98	6.98	AV

Operation Mode:	802.11n (HT20)
Transfer MCS Index:	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
2390.0	21.33	0.00	34.50	H	55.84	73.98	18.14	PK
2390.0	10.99	0.36	34.50	H	45.85	53.98	8.13	AV
2390.0	20.87	0.00	34.50	V	55.37	73.98	18.61	PK
2390.0	10.83	0.36	34.50	V	45.69	53.98	8.29	AV
2483.5	22.71	0.00	34.87	H	57.59	73.98	16.39	PK
2483.5	11.59	0.36	34.87	H	46.82	53.98	7.16	AV
2483.5	21.98	0.00	34.87	V	56.85	73.98	17.13	PK
2483.5	11.49	0.36	34.87	V	46.72	53.98	7.26	AV

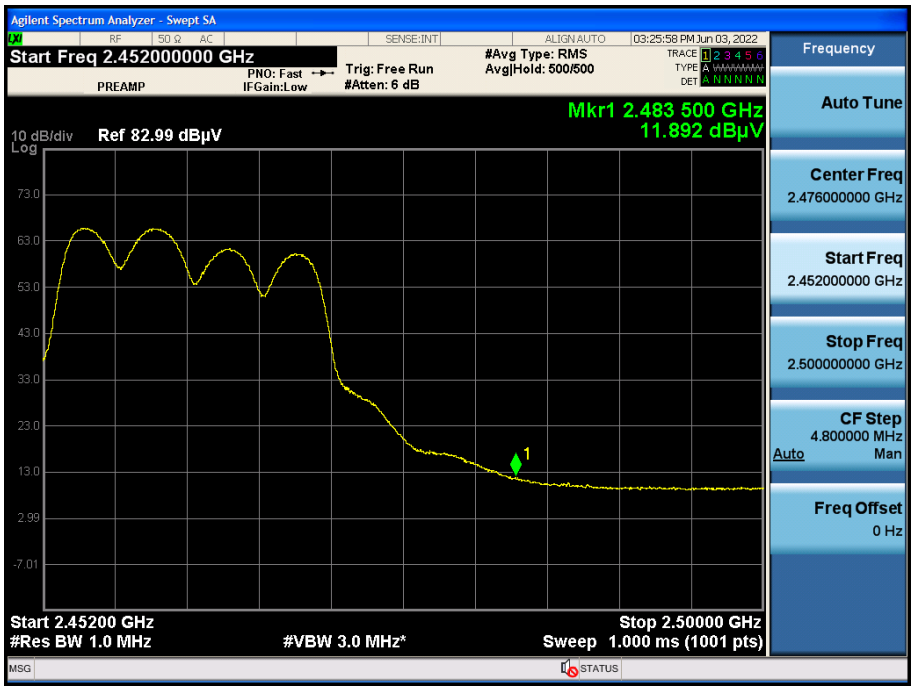
Operation Mode:	802.11n (HT20)
Transfer MCS Index:	0
Operating Frequency	2417 MHz
Channel No.	2 Ch

Frequency [MHz]	Measured Value [dBµV]	Duty Cycle Factor [dB]	A.F+ C.L+ D.F [dB/m]	ANT. POL [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
2390.0	21.92	0.00	34.50	H	56.42	73.98	17.56	PK
2390.0	10.04	0.36	34.50	H	44.90	53.98	9.08	AV
2390.0	20.64	0.00	34.50	V	55.14	73.98	18.84	PK
2390.0	9.83	0.36	34.50	V	44.68	53.98	9.30	AV

▣ Test Plots

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

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



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

Note:

Plot of worst case are only reported.

9.8 POWERLINE CONDUCTED EMISSIONS

Conducted Emissions (Line 1)

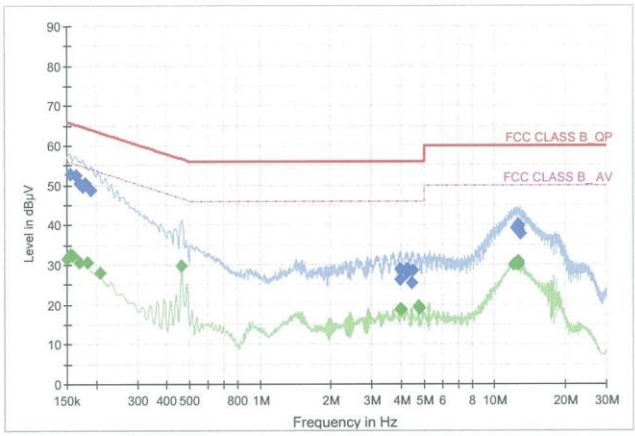
Test 1 / 2

Test Report

Common Information

EUT :	SM-G990B2/DS
Manufacturer :	SAMSUNG Electronics Co., Ltd.
Test Site:	SHIELD ROOM
Operating Conditions :	2.4G WLAN_L1 mode
Operator Name:	
Comment:	

Full Spectrum



Final_Result_QPK

Frequency (MHz)	QuasiPeak (dBµV)	Limit (dBµV)	Margin (dB)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.1545	52.86	65.75	12.89	9.000	L1	OFF	9.6
0.1635	52.37	65.28	12.92	9.000	L1	OFF	9.6
0.1703	50.52	64.95	14.42	9.000	L1	OFF	9.6
0.1748	49.75	64.73	14.98	9.000	L1	OFF	9.6
0.1793	50.45	64.52	14.07	9.000	L1	OFF	9.6
0.1905	48.67	64.02	15.34	9.000	L1	OFF	9.6
3.9718	26.18	56.00	29.82	9.000	L1	OFF	9.8
3.9808	28.80	56.00	27.20	9.000	L1	OFF	9.8
4.2193	28.96	56.00	27.04	9.000	L1	OFF	9.8
4.2463	28.03	56.00	27.97	9.000	L1	OFF	9.8
4.4375	25.50	56.00	30.50	9.000	L1	OFF	9.8
4.4668	28.45	56.00	27.55	9.000	L1	OFF	9.8
12.3463	39.34	60.00	20.66	9.000	L1	OFF	10.1
12.5623	39.96	60.00	20.04	9.000	L1	OFF	10.1
12.5780	38.59	60.00	21.41	9.000	L1	OFF	10.1
12.5893	39.40	60.00	20.60	9.000	L1	OFF	10.1
12.6073	40.10	60.00	19.90	9.000	L1	OFF	10.1
12.8683	37.91	60.00	22.09	9.000	L1	OFF	10.1

2022-06-16 오후 6:46:40

Test 2 / 2

Final_Result_CAV

Frequency (MHz)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.1500	31.51	56.00	24.49	9.000	L1	OFF	9.6
0.1545	32.69	55.75	23.06	9.000	L1	OFF	9.6
0.1590	32.23	55.52	23.28	9.000	L1	OFF	9.6
0.1703	30.55	54.95	24.40	9.000	L1	OFF	9.6
0.1838	30.70	54.31	23.62	9.000	L1	OFF	9.6
0.2085	27.97	53.27	25.29	9.000	L1	OFF	9.6
0.4628	29.81	46.64	16.83	9.000	L1	OFF	9.7
3.9628	18.71	46.00	27.29	9.000	L1	OFF	9.8
3.9875	18.76	46.00	27.24	9.000	L1	OFF	9.8
4.7390	19.44	46.00	26.56	9.000	L1	OFF	9.8
4.7638	19.63	46.00	26.37	9.000	L1	OFF	9.8
4.7885	19.08	46.00	26.92	9.000	L1	OFF	9.8
12.0268	30.07	50.00	19.93	9.000	L1	OFF	10.1
12.2878	30.32	50.00	19.68	9.000	L1	OFF	10.1
12.4138	30.32	50.00	19.68	9.000	L1	OFF	10.1
12.5623	30.74	50.00	19.26	9.000	L1	OFF	10.1
12.6365	30.11	50.00	19.89	9.000	L1	OFF	10.1
12.6613	30.40	50.00	19.60	9.000	L1	OFF	10.1

2022-06-16 오후 6:46:40

Conducted Emissions (Line 2)

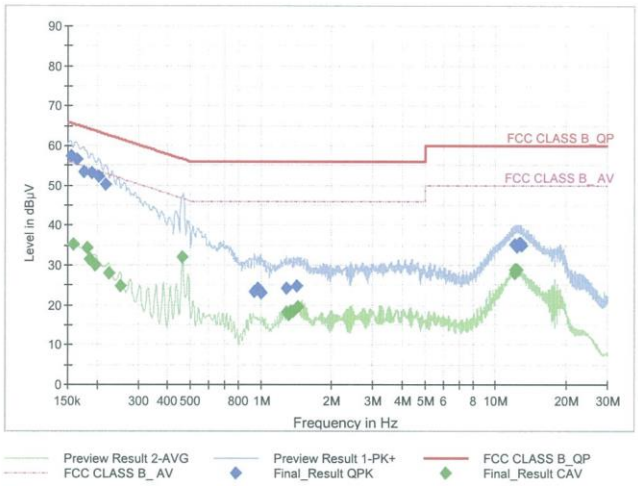
Test 1 / 2

Test Report

Common Information

EUT :	SM-G990B2/DS
Manufacturer :	SAMSUNG Electronics Co., Ltd.
Test Site:	SHIELD ROOM
Operating Conditions :	2.4G WLAN_N mode
Operator Name:	
Comment:	

Full Spectrum



Final_Result_QPK

Frequency (MHz)	QuasiPeak (dBµV)	Limit (dBµV)	Margin (dB)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.1545	57.50	65.75	8.26	9.000	N	OFF	9.6
0.1635	56.52	65.28	8.76	9.000	N	OFF	9.6
0.1748	53.25	64.73	11.48	9.000	N	OFF	9.6
0.1905	53.05	64.02	10.96	9.000	N	OFF	9.6
0.2040	52.12	63.45	11.33	9.000	N	OFF	9.6
0.2175	50.34	62.91	12.58	9.000	N	OFF	9.6
0.9433	23.42	56.00	32.58	9.000	N	OFF	9.7
0.9725	24.23	56.00	31.77	9.000	N	OFF	9.7
0.9905	23.35	56.00	32.65	9.000	N	OFF	9.7
1.0018	23.03	56.00	32.97	9.000	N	OFF	9.7
1.2898	24.28	56.00	31.72	9.000	N	OFF	9.7
1.4293	24.77	56.00	31.23	9.000	N	OFF	9.7
12.1280	35.06	60.00	24.94	9.000	N	OFF	10.1
12.1550	35.02	60.00	24.98	9.000	N	OFF	10.1
12.4003	34.51	60.00	25.49	9.000	N	OFF	10.2
12.6703	35.45	60.00	24.55	9.000	N	OFF	10.2
12.6973	35.47	60.00	24.53	9.000	N	OFF	10.2
12.9403	34.98	60.00	25.02	9.000	N	OFF	10.2

2022-06-16 오후 6:38:08

Test 2 / 2

Final_Result_CAV

Frequency (MHz)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.1590	35.21	55.52	20.31	9.000	N	OFF	9.6
0.1815	34.25	54.42	20.16	9.000	N	OFF	9.6
0.1860	31.54	54.21	22.68	9.000	N	OFF	9.6
0.1973	29.93	53.73	23.80	9.000	N	OFF	9.6
0.2243	28.06	52.66	24.60	9.000	N	OFF	9.6
0.2513	24.91	51.72	26.80	9.000	N	OFF	9.6
0.4628	32.00	46.64	14.64	9.000	N	OFF	9.7
1.2898	18.20	46.00	27.80	9.000	N	OFF	9.7
1.3145	17.68	46.00	28.32	9.000	N	OFF	9.7
1.3505	18.48	46.00	27.52	9.000	N	OFF	9.7
1.3753	18.33	46.00	27.67	9.000	N	OFF	9.7
1.4315	19.48	46.00	26.52	9.000	N	OFF	9.7
12.0583	28.04	50.00	21.96	9.000	N	OFF	10.1
12.0853	27.94	50.00	22.06	9.000	N	OFF	10.1
12.1280	28.78	50.00	21.22	9.000	N	OFF	10.1
12.1550	28.81	50.00	21.19	9.000	N	OFF	10.1
12.3350	28.74	50.00	21.26	9.000	N	OFF	10.2
12.3890	28.83	50.00	21.17	9.000	N	OFF	10.2

2022-06-16 오후 6:38:08

9.9 CONFIRMATION OF GEO-LOCATION MECHANISM

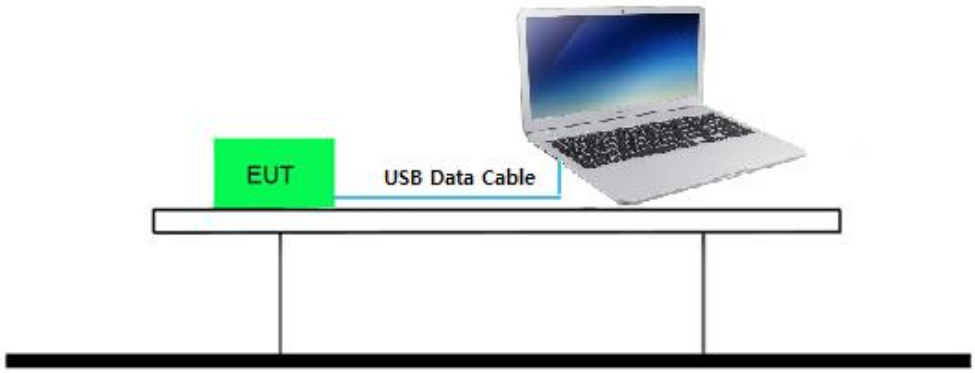
The device uses MCC information obtained from the public cellular carrier to determine that it is operating outside the U.S. and then enable channels 12 and 13 only if a non-US MCC that supports channel 12 and 13 is confirmed.

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

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

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

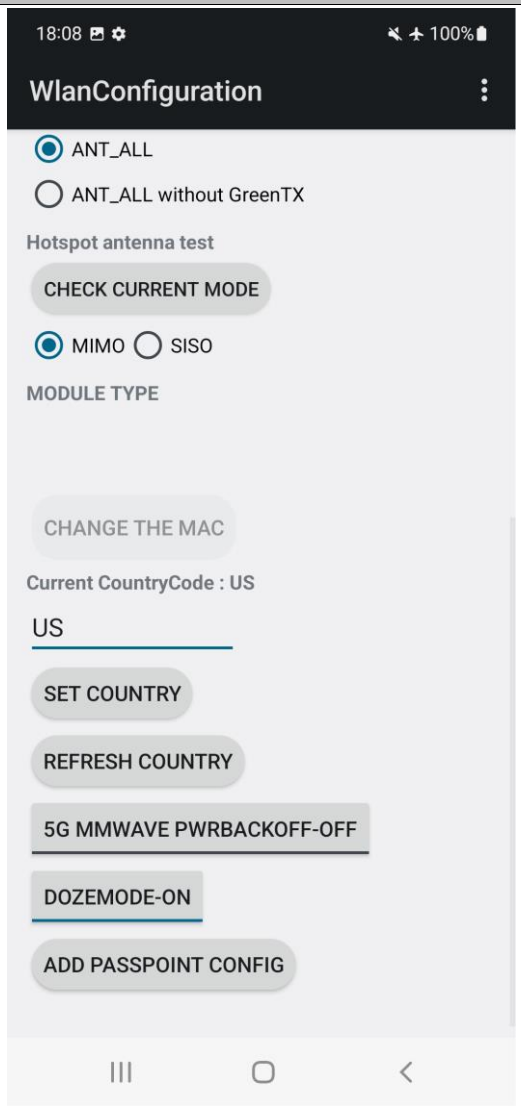
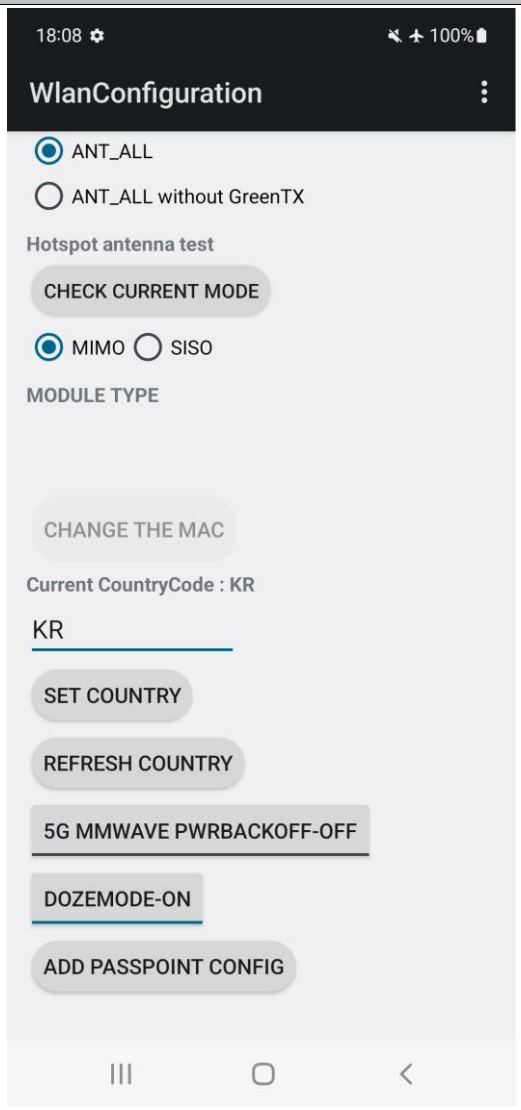
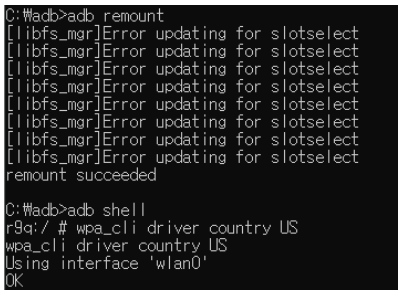
Test Setup

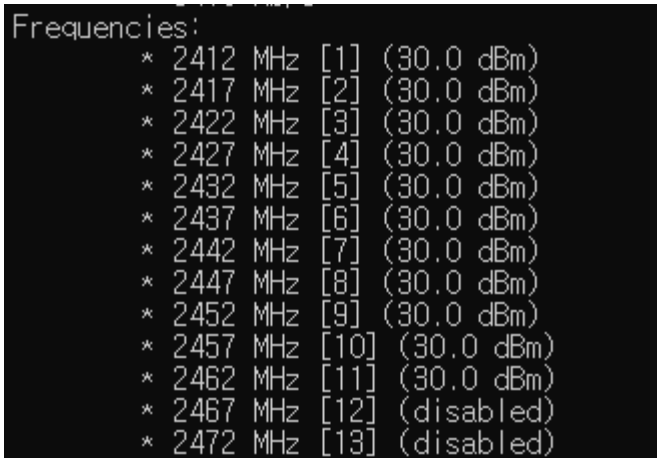
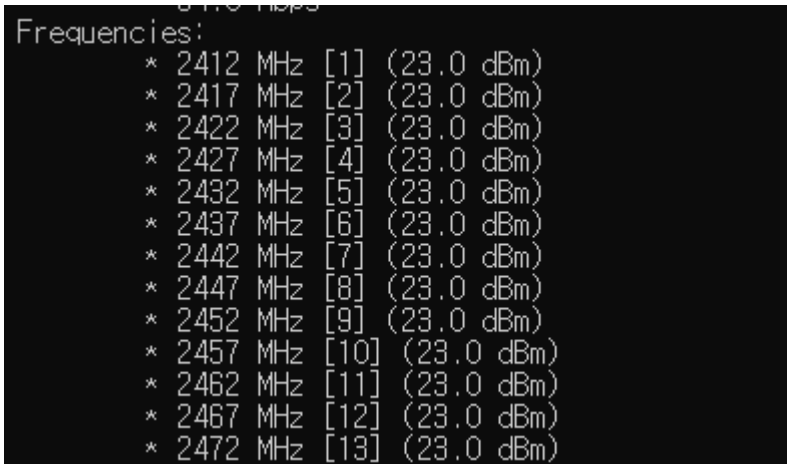


Test Procedure

In case of Country code	In case of airplane mode
1. Open Command Prompt. 2. At the Command Prompt, enter the command. - C:\adb>adb remount - C:\adb>adb shell - gts4lv:/ # wpa_cli driver country US // Setting the country. - gts4lv:/ # iw list // Channel list is obtain.	1. airplane mode on 2. Wifi on 3. Open Command Prompt. 4. At the Command Prompt, enter the command. - C:\adb>adb remount - C:\adb>adb shell - gts4lv:/ # iw list // support band in case of airplane mode

Setting the country for product

Country code = US	Country code = KR(Korea)
	
	

Country code = US

Country code = KR (Korea)


10. LIST OF TEST EQUIPMENT

Conducted Test

Equipment	Model	Manufacturer	Serial No.	Due to Calibration	Calibration Interval
LISN	ENV216	Rohde & Schwarz	102245	08/23/2022	Annual
EMI Test Receiver	ESR	Rohde & Schwarz	101910	06/07/2023	Annual
Temperature Chamber	SU-642	ESPEC	0093008124	03/04/2023	Annual
Signal Analyzer	N9030A	Agilent	MY49431210	01/11/2023	Annual
Power Measurement Set	OSP 120	Rohde & Schwarz	101231	07/02/2022	Annual
Power Meter	N1911A	Agilent	MY45100523	03/24/2023	Annual
Power Sensor	N1921A	Keysight	MY57820067	03/24/2023	Annual
Directional Coupler	87300B	Agilent	3116A03621	11/02/2022	Annual
Power Splitter	11667B	Hewlett Packard	05001	05/18/2023	Annual
DC Power Supply	E3646A	Agilent	MY40002937	12/14/2022	Annual
Attenuator(10 dB)	8493C	Hewlett Packard	07560	06/18/2022	Annual
Software	EMC32	Rohde & Schwarz	N/A	N/A	N/A
FCC WLAN&BT&BLE Conducted Test Software v3.0	N/A	HCT CO., LTD.	N/A	N/A	N/A

Note:

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

Radiated Test

Equipment	Model	Manufacturer	Serial No.	Due to Calibration	Calibration Interval
Controller(Antenna mast)	CO3000	Innco system	CO3000-4p	N/A	N/A
Antenna Position Tower	MA4640/800-XP-EP	Innco system	N/A	N/A	N/A
Controller	EM1000	Audix	060520	N/A	N/A
Turn Table	N/A	Audix	N/A	N/A	N/A
Loop Antenna	FMZB 1513	Rohde & Schwarz	1513-333	03/17/2024	Biennial
Hybrid Antenna	VULB 9168	Schwarzbeck	760	02/22/2023	Biennial
Horn Antenna	BBHA 9120D	Schwarzbeck	02299	03/24/2024	Biennial
Horn Antenna (15 GHz ~ 40 GHz)	BBHA9170	Schwarzbeck	BBHA9170541	11/16/2023	Biennial
Spectrum Analyzer	FSV40-N	Rohde & Schwarz	102168	07/05/2022	Annual
Signal Analyzer	N9030A	Agilent	MY49431210	01/11/2023	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	WRCJV2400/2483.5-2370/2520-60/12SS	Wainwright Instruments	2	01/06/2023	Annual
Band Reject Filter	WRCJV5100/5850-40/50-8EEK	Wainwright Instruments	1	02/072023	Annual
High Pass Filter	WHK3.0/18G-10EF	Wainwright Instruments	8	01/21/2023	Annual
High Pass Filter	WHKX8-6090-7000-18000-40SS	Wainwright Instruments	25	01/21/2023	Annual
Attenuator (3 dB)	18B-03	Api tech.	1	01/21/2023	Annual
Attenuator(10 dB)	8493C-10	Agilent	08285	01/21/2023	Annual
Power Amplifier	CBLU1183540	CERNEX	22964	01/21/2023	Annual
Power Amplifier	CBL06185030	CERNEX	22965	01/21/2023	Annual
Power Amplifier	CBL18265035	CERNEX	22966	12/02/2022	Annual
Power Amplifier	CBL26405040	CERNEX	25956	03/11/2023	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.
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-2206-FC009-P