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TEST REPORT

FCC/ISED DTS Test for WD-MSOII

APPLICANT
EVERINT CO., LTD.

REPORT NO.
HCT-RF-2108-FI004

DATE OF ISSUE
August 3, 2021

Tested by
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Additional Model
-

Applicant	**EVERINT Co., Ltd.** (Yongtan-dong) 129, Chungjusandan 1-ro Chungju-si, Chungcheongbuk-do, Korea
Eut Type Model Name	WLAN Module(Data transmission equipment) WD-MSOII
FCC ID IC	2AKMF-WD-MSOII 22266-WDMSOII
Max. RF Output Power	802.11b : 26.63 dBm / 802.11g : 27.84 dBm / 802.11n(HT20) : 27.12 dBm
Modulation type	CCK/DSSS/OFDM
FCC Classification	Digital Transmission System(DTS)
FCC Rule Part(s) ISED Rule Part(s)	Part 15.247 RSS-247 Issue 2 (February 2017) RSS-Gen Issue 5_Amendment 2 (February 2021)

The result shown in this test report refer only to the sample(s) tested unless otherwise stated.
This test results were applied only to the test methods required by the standard.

REVISION HISTORY

The revision history for this test report is shown in table.

Revision No.	Date of Issue	Description
0	August 03, 2021	Initial Release

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 / ISED Rules under normal use and maintenance

If this report is required to confirmation of authenticity, please contact to www.hct.co.kr

CONTENTS

1. GENERAL INFORMATION

EUT DESCRIPTION

Model	WD-MSOII
Additional Model	-
EUT Type	WLAN Module(Data transmission equipment)
Power Supply	DC 3.30 V
Frequency Range	2 412 MHz ~ 2 462 MHz
Max. RF Output Power	**Peak Power** 802.11b : 26.63 dBm 802.11g : 27.84 dBm 802.11n(HT20) : 27.12 dBm **Average Power** 802.11b : 20.58 dBm 802.11g : 19.87 dBm 802.11n(HT20) : 19.29 dBm
Modulation Type	DSSS/CCK : 802.11b OFDM : 802.11g, 802.11n
Number of Channels	11 Channels
Antenna Specification	Antenna type: WI-FI Dual band Chip antenna Peak Gain : 0.27 dBi
Date(s) of Tests	June 03, 2021 ~ July 29, 2021
PMN (Product Marketing Number)	WD-MSOII
HVIN (Hardware Version Identification Number)	WD-MSOII
FVIN (Firmware Version Identification Number)	V5036
HMN (Host Marketing Name)	N/A
EUT serial numbers	Conducted : 2 Radiated : 2

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 purpse 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. / RSS-Gen issue 5, RSS-247 issue 2.

GENERAL TEST PROCEDURES

Conducted Emissions

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

Radiated Emissions

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

DESCRIPTION OF TEST MODES

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

3. INSTRUMENT CALIBRATION

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipment's, which is traceable to recognized national standards.
Especially, all antenna for measurement is calibrated in accordance with the requirements of C63.5 (Version : 2017).

4. FACILITIES AND ACCREDITATIONS

FACILITIES

The SAC(Semi-Anechoic Chamber) and conducted measurement facility used to collect the radiated data are located at the 74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, 17383, Rep. of KOREA. The site is constructed in conformance with the requirements of ANSI C63.4. (Version :2014) and CISPR Publication 22.
Detailed description of test facility was submitted to the Commission and accepted dated April 02, 2018 (Registration Number: KR0032).
For ISED, test facility was accepted dated February 14, 2019 (CAB identifier: KR0032).

EQUIPMENT

Radiated emissions are measured with one or more of the following types of Linearly polarized antennas: tuned dipole, bi-conical, log periodic, bi-log, and/or ridged waveguide, horn. Spectrum analyzers with pre-selectors and quasi-peak detectors are used to perform radiated measurements. Conducted emissions are measured with Line Impedance Stabilization Networks and EMI Test Receivers. Calibrated wideband preamplifiers, coaxial cables, and coaxial attenuators are also used for making measurements.
All receiving equipment conforms to CISPR Publication 16-1, "Radio Interference Measuring Apparatus and Measurement Methods."

5. ANTENNA REQUIREMENTS

According to FCC 47 CFR § 15.203:

"An intentional radiator antenna shall be designed to ensure that no antenna other than that furnished by the responsible party can be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section."

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

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

6. MEASUREMENT UNCERTAINTY

The measurement uncertainties shown below were calculated in accordance with the requirements of

ANSI C63.10-2013.

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

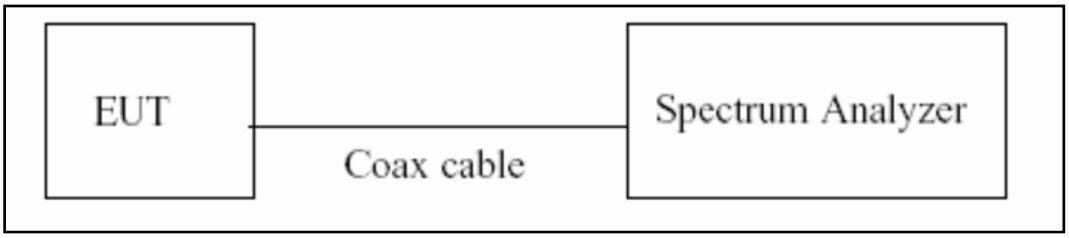
The measurement data shown herein meets or exceeds the U_{CISPR} measurement uncertainty values specified in CISPR 16-4-2 and, thus, can be compared directly to specified limits to determine compliance.

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

7. DESCRIPTION OF TESTS

7.1. Duty Cycle

Test Configuration



Test Procedure

The transmitter output is connected to the Spectrum Analyzer.

We tested according to the zero-span measurement method.

The largest availble 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*.

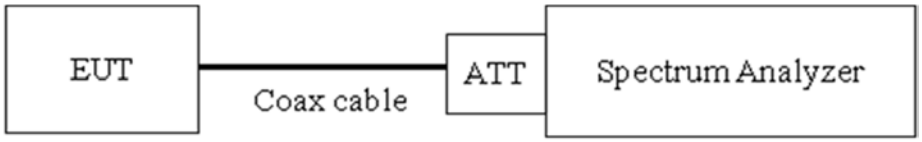
1. RBW = 8 MHz (the largest availble value)
2. VBW = 8 MHz (≥ RBW)
3. SPAN = 0 Hz
4. Detector = Peak
5. Number of points in sweep > 100
6. Trace mode = Clear write
7. Measure T_{total} and T_{on}
8. Calculate Duty Cycle = T_{on}/ T_{total} and Duty Cycle Factor = 10log(1/Duty Cycle)

7.2. 6 dB Bandwidth & 99 % 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.

Test Procedure (99 % Bandwidth for ISED)

The transmitter output is connected to the spectrum analyzer.

RBW = 1% ~ 5% of the occupied bandwidth

VBW ≒ 3 x RBW

Detector = Peak

Trace mode = max hold

Sweep = auto couple

Allow the trace to stabilize

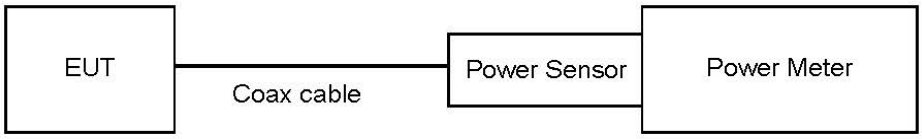
Note : We tested OBW using the automatic bandwidth measurement capability of a spectrum analyzer.

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

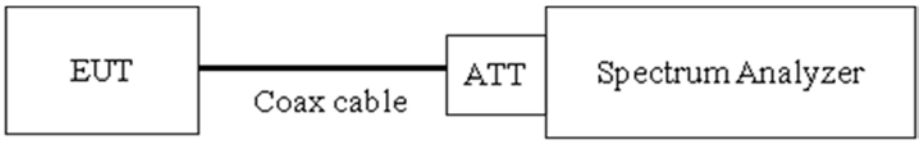
▪ Conducted Output Power(Average) = Measured Value + ATT loss + Cable loss + Duty Cycle Factor

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) Span = 1.5 times the DTS channel bandwidth.
3) RBW = 3 kHz ≤ RBW ≤ 100 kHz.
4) VBW ≥ 3 x RBW.
5) Sweep = auto couple
6) Detector = peak
7) Trace Mode = max hold
8) Allow trace to fully stabilize.
9) 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.

Sample Calculation

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

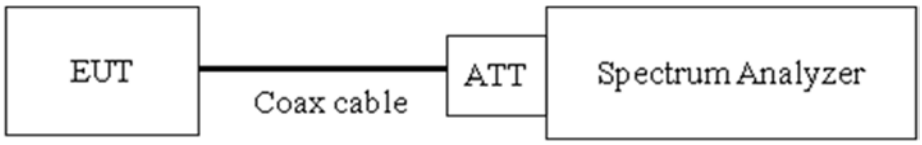
7.5. Conducted Band Edge(Out of Band Emissions) & Conducted Spurious Emissions

Limit

The maximum conducted (Peak) 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 30 dB 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	20.94
100	20.99
200	21.03
300	21.09
400	21.12
500	21.13
600	21.14
700	21.15
800	21.17
900	21.19
1000	21.21
2000	21.36
2400	21.42
2480	21.42
2500	21.52
3000	21.57
4000	21.97
5000	22.05
5150	22.07
5850	22.12
6000	22.12
7000	22.21
8000	22.28
9000	22.35
10000	22.42
11000	22.46
12000	22.54
13000	22.62
14000	22.60
15000	22.62
16000	22.67
17000	22.71
18000	22.77
19000	22.80
20000	22.86
21000	23.07
22000	23.04
23000	23.24
24000	23.07
25000	23.10
26000	23.10

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

2. Factor = Attenuator loss(20 dB) + Cable loss(1ea) + EUT Cable(For Conducted)

7.6. Radiated Test

FCC

Frequency (MHz)	Field Strength (uV/m)	Measurement Distance (m)
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30	30	30

ISED

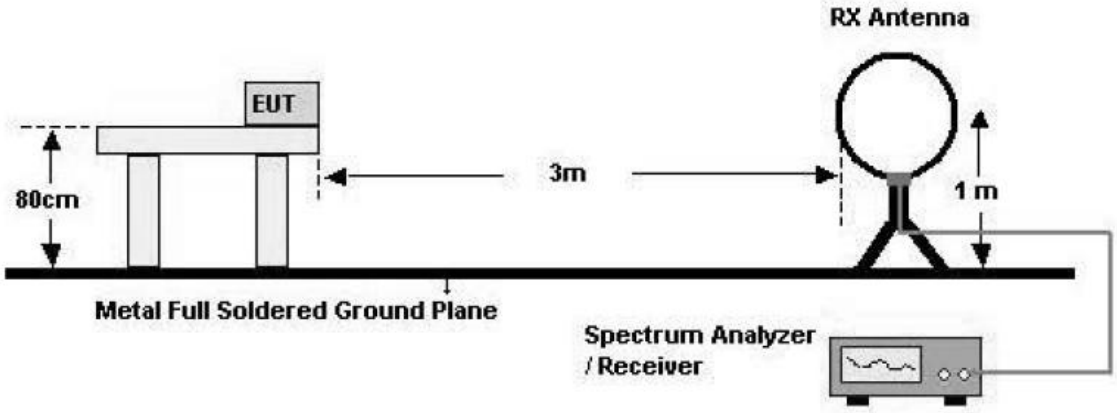
Frequency (MHz)	Field Strength (uA/m)	Measurement Distance (m)
0.009 – 0.490	6.37/F(kHz)	300
0.490 – 1.705	63.7/F(kHz)	30
1.705 – 30	0.08	30

FCC&ISED

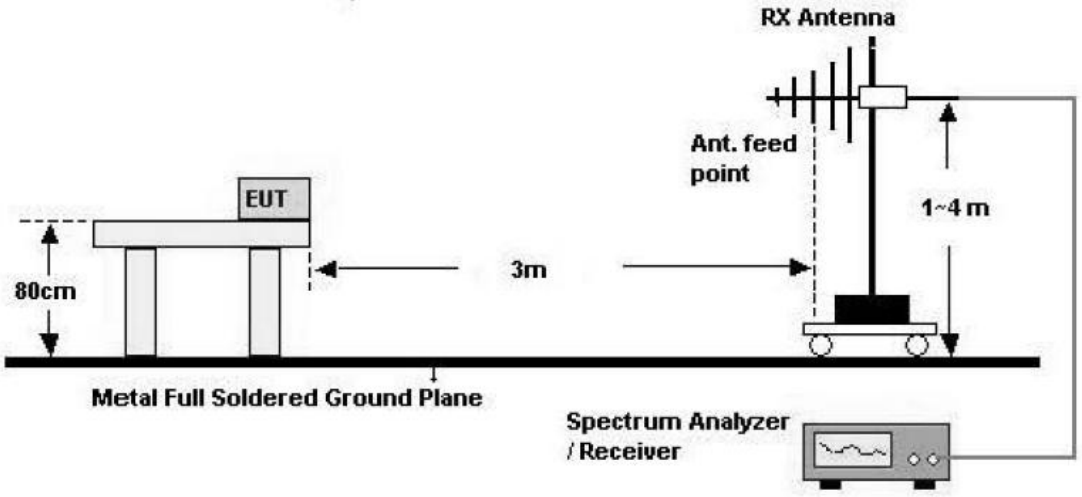
Frequency (MHz)	Field Strength (uV/m)	Measurement Distance (m)
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Test Configuration

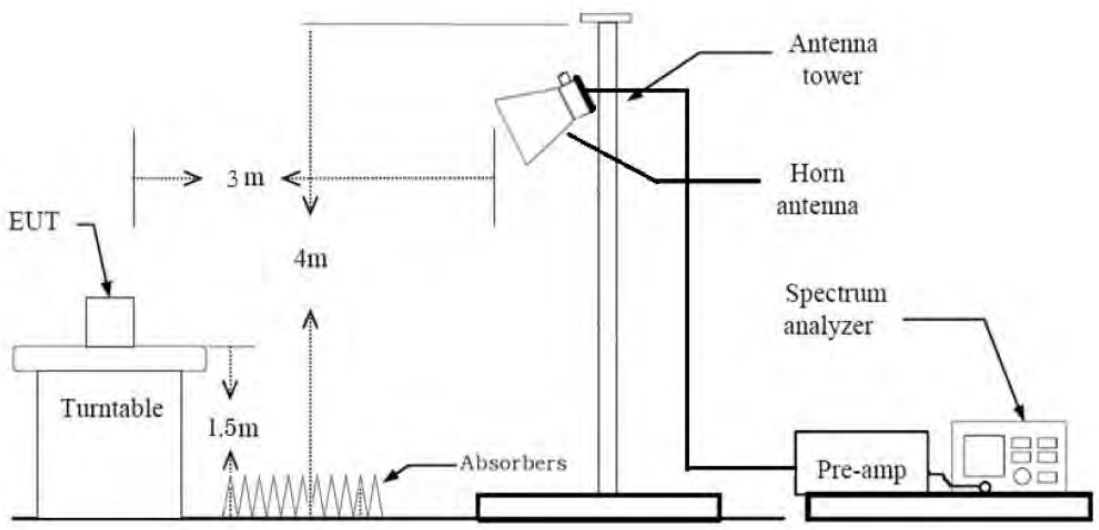
Below 30 MHz



30 MHz - 1 GHz



Above 1 GHz



Test Procedure of Radiated spurious emissions(Below 30 MHz)

1. The EUT was placed on a non-conductive table located on semi-anechoic chamber.
2. The loop antenna was placed at a location 3m from the EUT
3. The EUT is placed on a turntable, which is 0.8m above ground plane.
4. We have done x, y, z planes in EUT and horizontal and vertical polarization and Parallel to the ground plane in detecting antenna.
5. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
6. Distance Correction Factor(0.009 MHz – 0.490 MHz) = 40log(3 m/300 m) = - 80 dB
   Measurement Distance : 3 m
7. Distance Correction Factor(0.490 MHz – 30 MHz) = 40log(3 m/30 m) = - 40 dB
   Measurement Distance : 3 m
8. Spectrum Setting
   - Frequency Range = 9 kHz ~ 30 MHz
   - Detector = Peak
   - Trace = Maxhold
   - RBW = 9 kHz
   - VBW ≥ 3 x RBW
9. Total = 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 1GHz)

1. The EUT was placed on a non-conductive table located on semi-anechoic chamber.
2. The EUT is placed on a turntable, which is 0.8 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 1m to 4m to find out the highest emissions.
5. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
6. Each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
7. The unit was tested with its standard battery.
8. Spectrum Setting (Method 8.6 in KDB 558074 v05r02, Procedure 11.12 in ANSI 63.10-2013)

(1) Measurement Type(Peak):

- Measured Frequency Range : 1 GHz – 25 GHz
- Detector = Peak
- Trace = Maxhold
- RBW = 1 MHz
- VBW ≥ 3 x RBW

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

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

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

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

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

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

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

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

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

Test Procedure of Radiated Restricted Band Edge

1. The EUT is placed on a turntable, which is 1.5 m above ground plane.
2. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
3. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
4. EUT is set 3 m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
5. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
6. Each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
7. The unit was tested with its standard battery.
8. Spectrum Setting
   (1) Measurement Type(Peak):
      - Measured Frequency Range : 2310 MHz ~ 2390 MHz/ 2483.5 MHz ~ 2500 MHz
      - Detector = Peak
      - Trace = Maxhold
      - RBW = 1 MHz
      - VBW ≥ 3 x RBW
   (2) Measurement Type(Average): Duty cycle ≥ 98%,
      - Measured Frequency Range : 2310 MHz ~ 2390 MHz/ 2483.5 MHz ~ 2500 MHz
      - Detector = RMS
      - Averaging type = power (*i.e.*, RMS)
      - RBW = 1 MHz
      - VBW ≥ 3 x RBW
      - Sweep time = auto.
      - Trace mode = average (at least 100 traces).
   (3) Measurement Type(Average): Duty cycle < 98%, duty cycle variations are less than ±2%
      - Measured Frequency Range : 2310 MHz ~ 2390 MHz/ 2483.5 MHz ~ 2500 MHz
      - Detector = RMS

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

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

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

    Total(Measurement Type : Average, Duty cycle < 98%)
    = Measured Value + Antenna Factor(A.F) + Cable Loss(C.L) - Amp Gain(G) + 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. Receiver Spurious Emissions

Limit

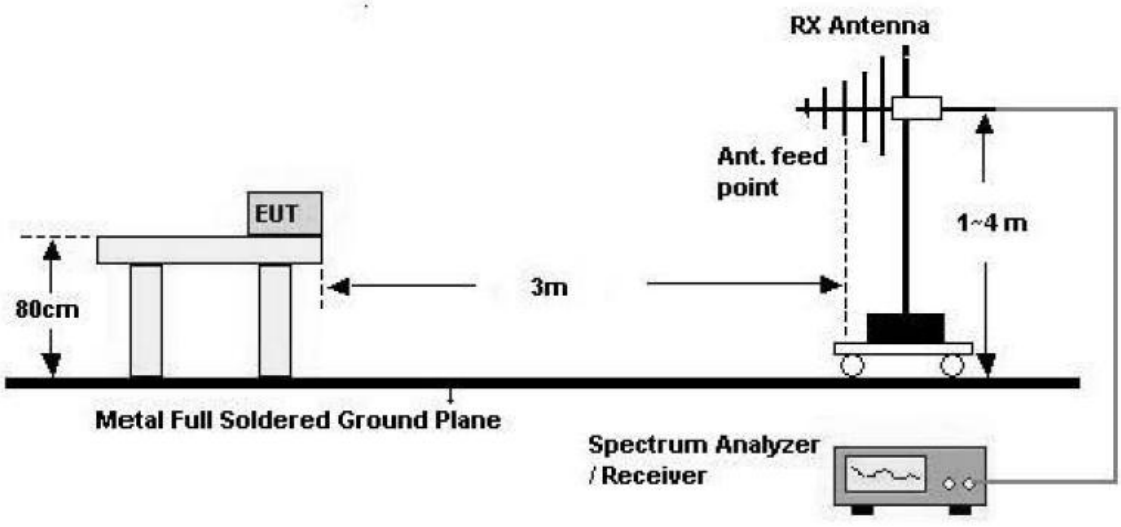
Frequency (MHz)	Field Strength (μV/m)	Measurement Distance (m)
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Note:

Measurements for compliance with the limits in table may be performed at distances other than 3 metres.

Test Configuration

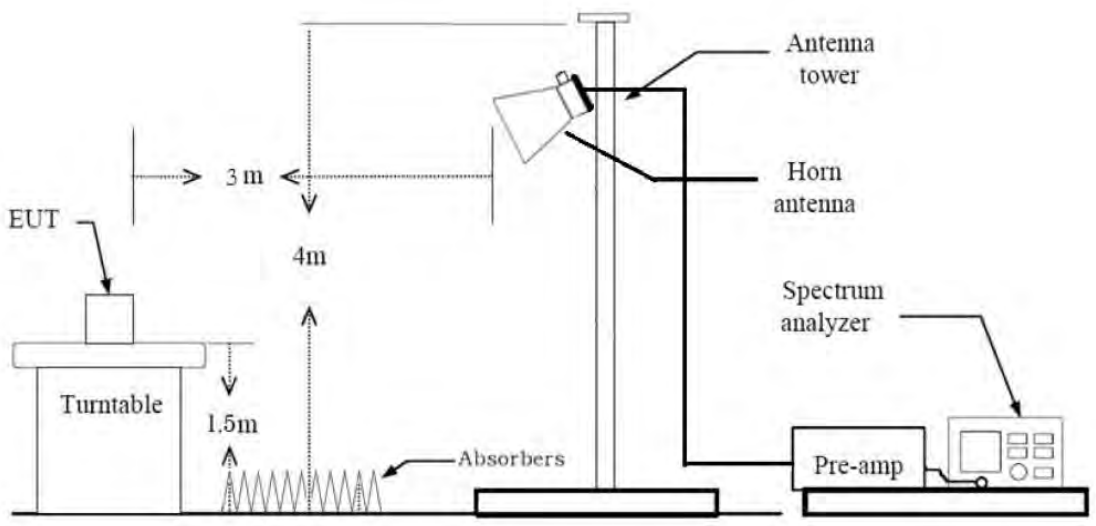
30 MHz - 1 GHz



Test Procedure of Receiver 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
7. Total = Measured Value + Antenna Factor(A.F) + Cable Loss(C.L)

Above 1 GHz



Test Procedure of Radiated spurious emissions (Above 1 GHz)

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

- Measured Frequency Range : 1 GHz – 25 GHz
- Detector = Peak
- Trace = Maxhold
- RBW = 1 MHz
- VBW ≥ 3 x RBW

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.
11. Total = Measured Value + Antenna Factor(A.F) + Cable Loss(C.L) - Amp Gain(G)

7.9. 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
2. EUT Axis
   - Radiated Spurious Emissions : X-H
   - Radiated Restricted Band Edge : Z-H
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 datarate of each mode.
   - 802.11b : 1Mbps
   - 802.11g : 6Mbps
   - 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

AC Power line Conducted Emissions

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

(Note): TA Used Only AC Power line Test. for Module Power supply -this module operating obtaing power through aonther device which is connected to the AC power line. -We tested by supplying DC Voltage to the module using an AC power adapter that is commercially available.

Conducted test

1. All datarate of operation were investigated and the worst case datarate results are reported.
2. For different outputs per channel, test up to the channel with the highest output power setting

8. SUMMARY TEST OF RESULTS

FCC Part

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 > 20 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

ISED Part

Test Description	ISED Part Section(s)	Test Limit	Test Condition	Test Result
6 dB Bandwidth	RSS-247, 5.2	> 500 kHz	Conducted	PASS
99% Bandwidth	RSS-GEN, 6.7	N/A		PASS
Conducted Maximum Peak Output Power And e.i.r.p.	RSS-247, 5.4.	< 1 Watt <4 Watt(e.i.r.p.)		PASS
Power Spectral Density	RSS-247, 5.2	< 8 dBm / 3 kHz Band		PASS
Band Edge(Out of Band Emissions)	RSS-247, 5.5	Conducted > 20 dBc		PASS
AC Power line Conducted Emissions	RSS-GEN, 8.8	cf. Section 7.7		N/A (Note1)
Radiated Spurious Emissions	RSS-GEN, 8.9	cf. Section 7.6	Radiated	PASS
Receiver Spurious Emissions	RSS-GEN, 7	cf. Section 7.8		PASS
Radiated Restricted Band Edge	RSS-GEN, 8.10	cf. Section 7.6		PASS

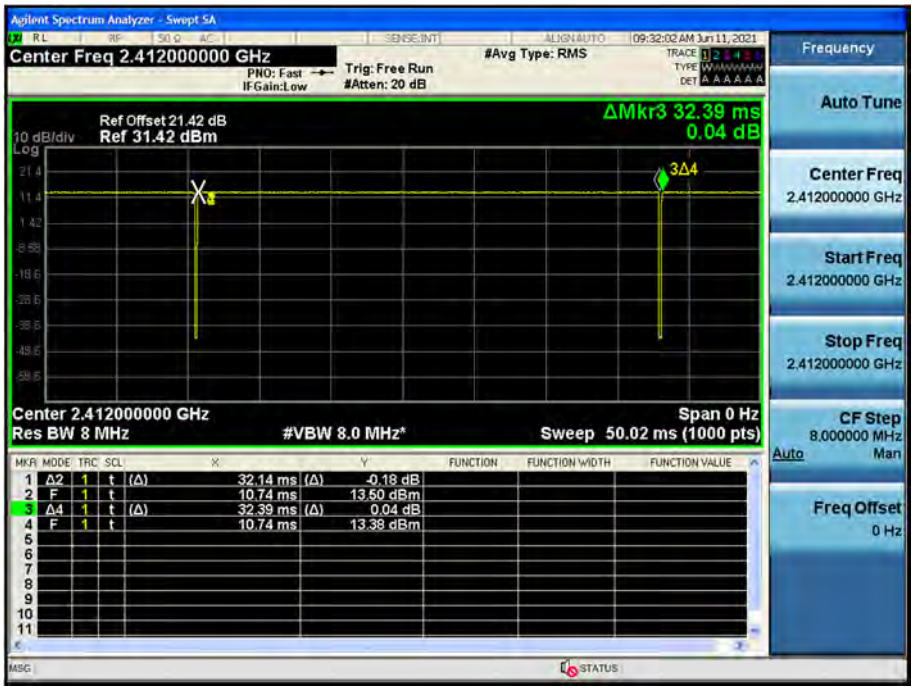
9. TEST RESULT

9.1 DUTY CYCLE

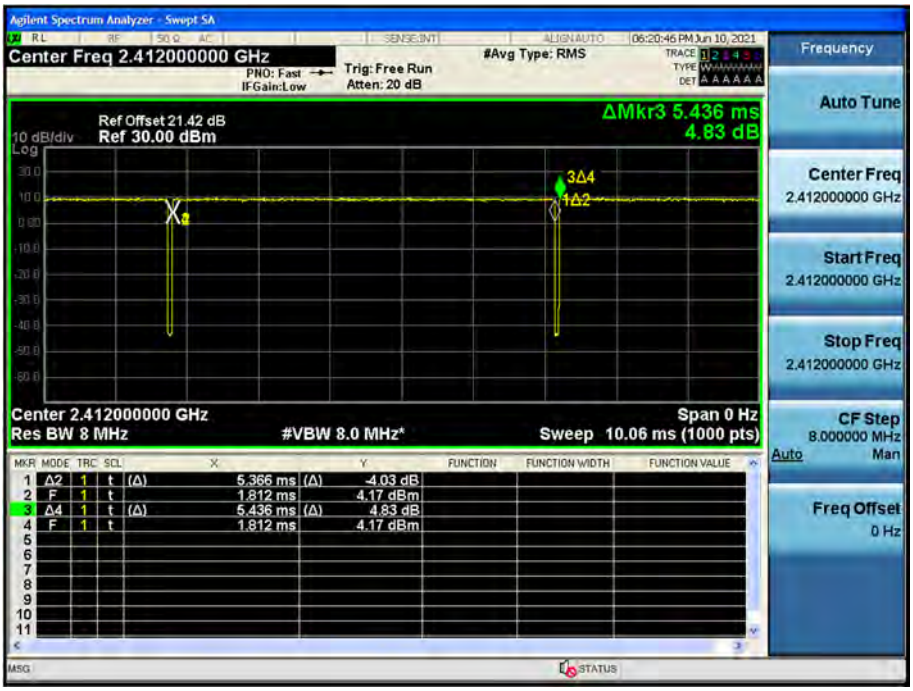
Mode	Data Rate (Mbps)	T_{on} (ms)	T_{total} (ms)	Duty Cycle	Duty Cycle Factor (dB)
802.11b	1	32.140	32.390	0.992	0.034
	2	16.030	16.180	0.991	0.040
	5.5	5.891	6.057	0.973	0.121
	11	2.991	3.134	0.954	0.203
802.11g	6	5.366	5.436	0.987	0.057
	9	3.574	3.644	0.981	0.085
	12	2.695	2.761	0.976	0.105
	18	1.799	1.867	0.964	0.161
	24	1.355	1.423	0.952	0.213
	36	0.911	0.981	0.928	0.323
	48	0.687	0.757	0.907	0.424
	54	0.616	0.685	0.899	0.461
802.11n (HT20)	6.5 (MCS0)	5.084	5.154	0.986	0.060
	13 (MCS1)	2.559	2.631	0.973	0.120
	19.5 (MCS2)	1.719	1.788	0.961	0.171
	26 (MCS3)	1.299	1.371	0.947	0.234
	39 (MCS4)	0.880	0.950	0.926	0.332
	52 (MCS5)	0.668	0.737	0.906	0.429
	58.5 (MCS6)	0.600	0.669	0.896	0.475
	65 (MCS7)	0.543	0.613	0.885	0.532

▣ Test Plots

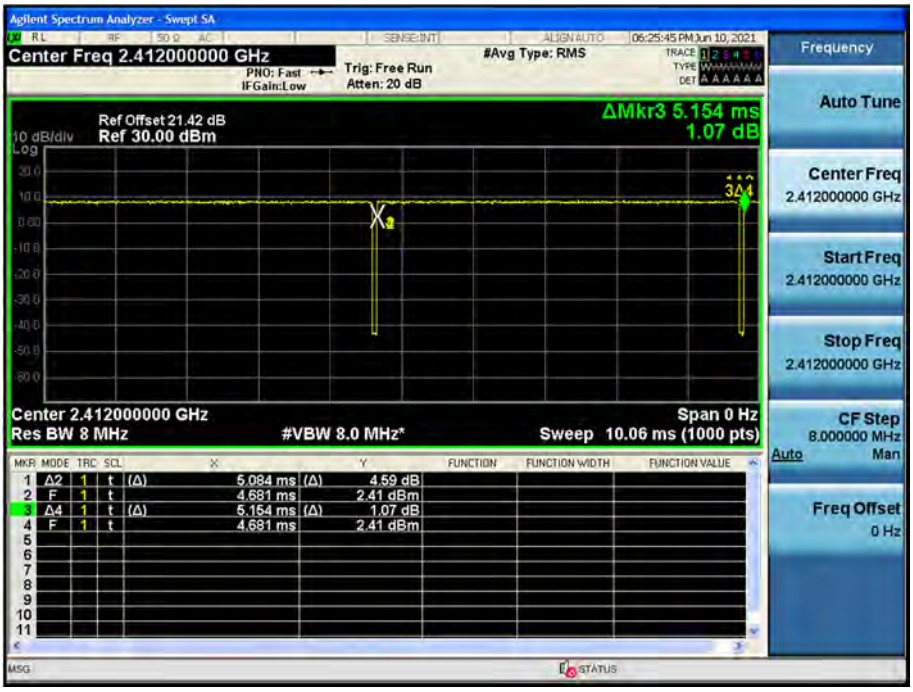
Duty cycle plot (802.11b(1 Mbps))



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 & 99 % BANDWIDTH

FCC

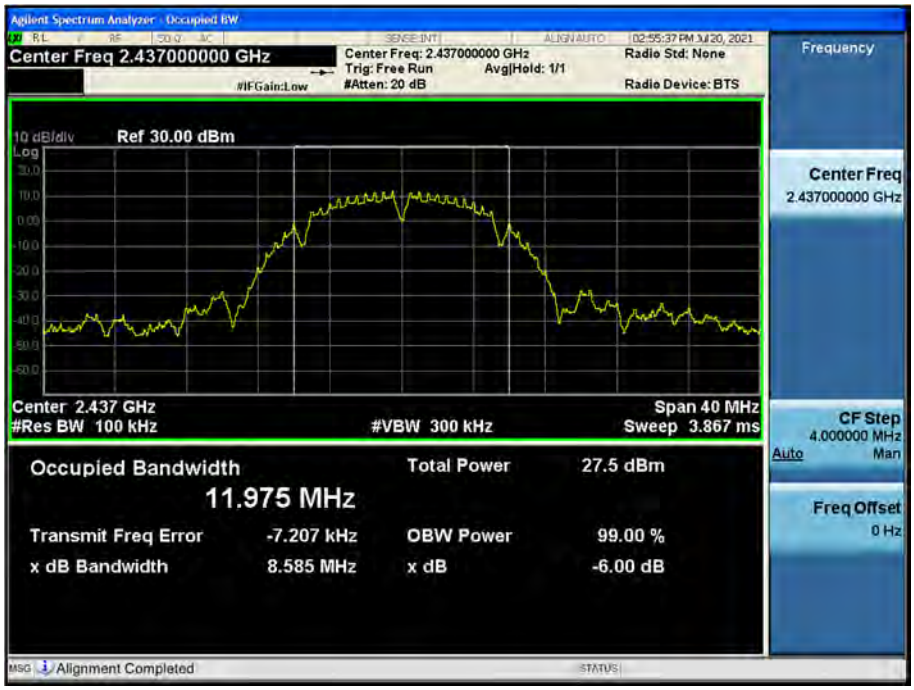
802.11b Mode		Measured Bandwidth (6 dB BW)[MHz]	OBW Bandwidth [MHz]	Minimum Bandwidth [MHz]
Frequency [MHz]	Channel No.			
2412	1	8.592	12.224	0.5
2417	2	9.092	12.231	0.5
2422	3	9.060	12.055	0.5
2437	6	8.585	11.975	0.5
2452	9	9.057	12.369	0.5
2457	10	9.071	12.385	0.5
2462	11	9.075	12.353	0.5

802.11g Mode		Measured Bandwidth (6 dB BW)[MHz]	OBW Bandwidth [MHz]	Minimum Bandwidth [MHz]
Frequency [MHz]	Channel No.			
2412	1	16.33	16.528	0.5
2417	2	16.35	16.524	0.5
2422	3	16.38	16.547	0.5
2427	4	16.33	16.547	0.5
2432	5	16.37	16.593	0.5
2437	6	16.37	16.743	0.5
2452	9	16.34	16.586	0.5
2457	10	16.36	16.555	0.5
2462	11	16.37	16.535	0.5

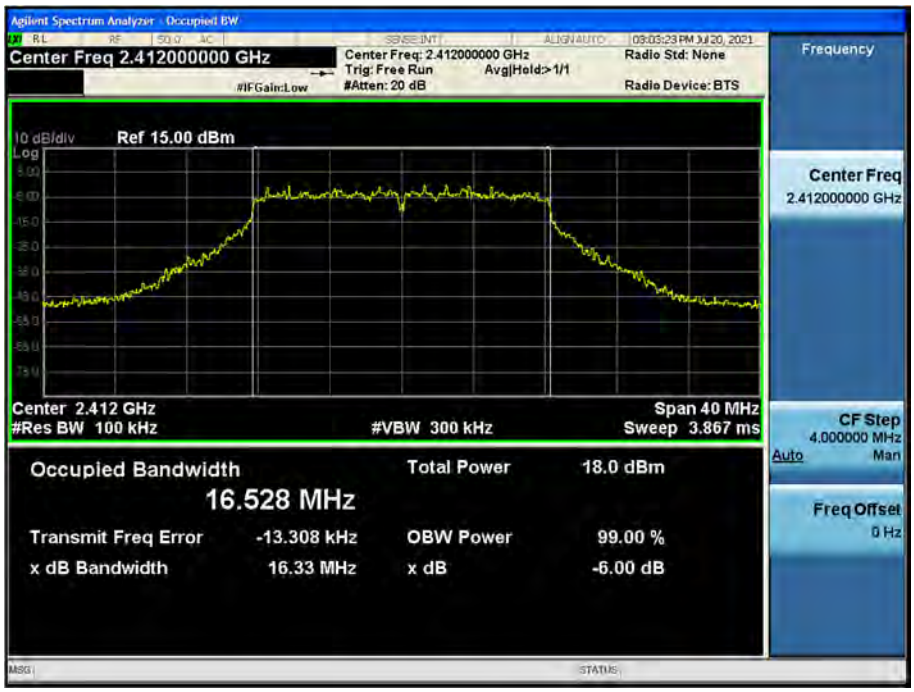
802.11n Mode		Measured Bandwidth (6 dB BW)[MHz]	OBW Bandwidth [MHz]	Minimum Bandwidth [MHz]
Frequency [MHz]	Channel No.			
2412	1	16.29	17.609	0.5
2417	2	16.34	17.608	0.5
2422	3	16.30	17.606	0.5
2427	4	16.35	17.628	0.5
2432	5	16.34	17.623	0.5
2437	6	16.47	17.659	0.5
2452	9	16.35	17.656	0.5
2457	10	16.36	17.625	0.5
2462	11	16.35	17.628	0.5

▣ Test Plots

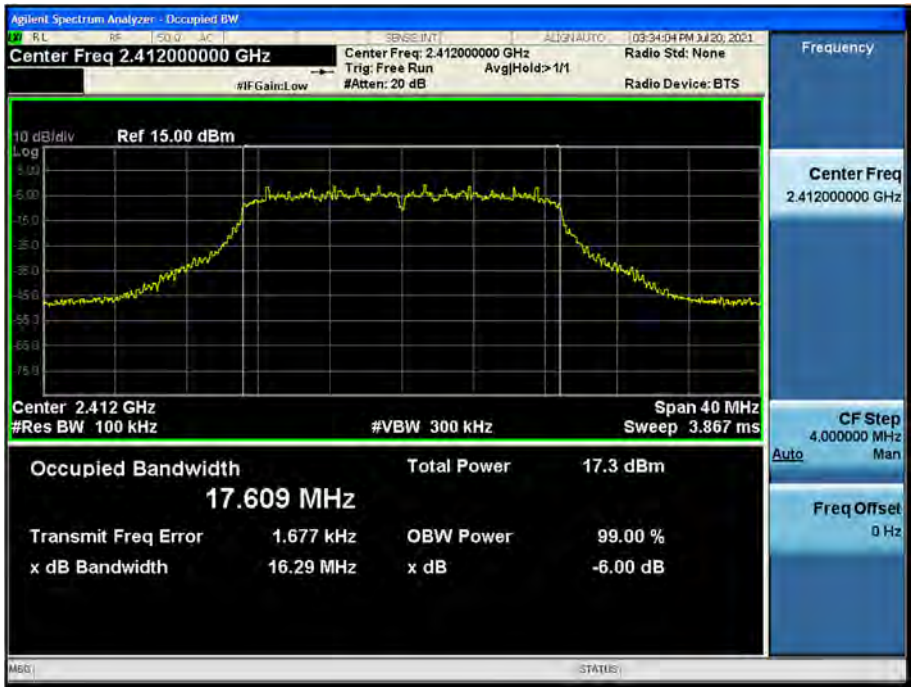
6 dB Bandwidth plot (802.11b-CH 6)



6 dB Bandwidth plot (802.11g-CH 1)



6 dB Bandwidth plot (802.11n_HT20-CH 1)



Note:

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

99% Bandwidth Measurements(ISED)

802.11b Mode		OBW Bandwidth (99% BW)[MHz]	Limit [MHz]
Frequency [MHz]	Channel No.		
2412	1	12.280	N/A
2417	2	12.285	N/A
2422	3	12.099	N/A
2437	6	12.010	N/A
2452	9	12.380	N/A
2457	10	12.400	N/A
2462	11	12.369	N/A

802.11g Mode		OBW Bandwidth (99% BW)[MHz]	Limit [MHz]
Frequency [MHz]	Channel No.		
2412	1	17.294	N/A
2417	2	17.240	N/A
2422	3	17.307	N/A
2427	4	17.265	N/A
2432	5	17.468	N/A
2437	6	17.736	N/A
2452	9	17.428	N/A
2457	10	17.288	N/A
2462	11	17.268	N/A

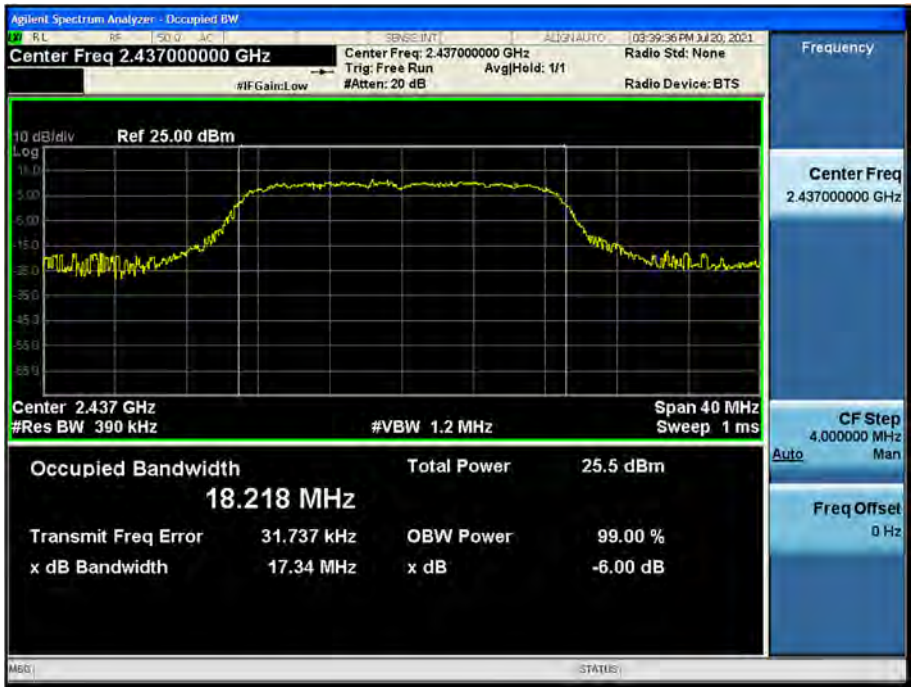
802.11n(HT20) Mode		OBW Bandwidth (99% BW)[MHz]	Limit [MHz]
Frequency [MHz]	Channel No.		
2412	1	18.116	N/A
2417	2	18.118	N/A
2422	3	18.092	N/A
2427	4	18.128	N/A
2432	5	18.141	N/A
2437	6	18.218	N/A
2452	9	18.185	N/A
2457	10	18.117	N/A
2462	11	18.090	N/A

▣ Test Plots

99% Bandwidth plot (802.11b-CH 10)

99% Bandwidth plot (802.11g-CH 6)

99% Bandwidth plot (802.11n_HT20-CH 6)



Note:

In order to simplify the report, attached plots were only the most wide 99% Bandwidth channel.

9.3 OUTPUT POWER

Peak Power

1. Power Meter offset = Attenuator loss(20 dB) + Cable loss(1ea) + EUT Cable(For Conducted)
2. We apply to the offset in the 2.4 GHz range that was rounded off to the closest tenth dB.
So, 21.42 dB is offset for 2.4 GHz Band

802.11b Mode		Rate (Mbps)	Measured Power(dBm)	Limit (dBm)
Frequency[MHz]	Channel No.			
2412	1	1	18.92	30.00
		2	19.20	30.00
		5.5	20.58	30.00
		11	22.42	30.00
2417	2	1	19.04	30.00
		2	19.34	30.00
		5.5	20.69	30.00
		11	22.51	30.00
2422	3	1	22.91	30.00
		2	23.16	30.00
		5.5	24.25	30.00
		11	26.23	30.00
2437	6	1	22.54	30.00
		2	22.78	30.00
		5.5	23.80	30.00
		11	25.79	30.00
2452	9	1	23.19	30.00
		2	23.46	30.00
		5.5	24.71	30.00
		11	26.63	30.00
2457	10	1	20.68	30.00
		2	20.95	30.00
		5.5	22.37	30.00
		11	24.20	30.00
2462	11	1	20.42	30.00
		2	20.70	30.00
		5.5	22.18	30.00
		11	24.00	30.00

802.11g Mode		MCS Index	Measured Power(dBm)	Limit (dBm)
Frequency[MHz]	Channel No.			
2412	1	6	18.78	30.00
		9	18.71	30.00
		12	18.52	30.00
		18	18.65	30.00
		24	19.00	30.00
		36	18.72	30.00
		48	18.97	30.00
		54	19.11	30.00
2417	2	6	18.74	30.00
		9	18.72	30.00
		12	18.53	30.00
		18	18.63	30.00
		24	19.01	30.00
		36	18.67	30.00
		48	18.96	30.00
		54	19.10	30.00
2422	3	6	23.33	30.00
		9	23.28	30.00
		12	23.08	30.00
		18	23.25	30.00
		24	23.57	30.00
		36	23.23	30.00
		48	23.56	30.00
		54	23.72	30.00
2427	4	6	26.16	30.00
		9	26.10	30.00
		12	25.89	30.00
		18	26.03	30.00
		24	26.46	30.00
		36	26.18	30.00
		48	26.11	30.00
		54	25.62	30.00
2432	5	6	26.76	30.00
		9	26.71	30.00
		12	26.47	30.00
		18	26.68	30.00
		24	26.96	30.00
		36	26.29	30.00
		48	25.98	30.00
		54	25.49	30.00
2437	6	6	26.94	30.00
		9	26.70	30.00
		12	26.63	30.00
		18	26.77	30.00
		24	27.12	30.00
		36	26.06	30.00
		48	25.80	30.00
		54	25.21	30.00

802.11g Mode		MCS Index	Measured Power(dBm)	Limit (dBm)
Frequency[MHz]	Channel No.			
2442	7	6	27.68	30.00
		9	27.44	30.00
		12	27.37	30.00
		18	27.54	30.00
		24	27.84	30.00
		36	26.89	30.00
		48	26.70	30.00
		54	26.23	30.00
2447	8	6	27.47	30.00
		9	27.38	30.00
		12	27.20	30.00
		18	27.34	30.00
		24	27.66	30.00
		36	26.87	30.00
		48	26.61	30.00
		54	26.16	30.00
2452	9	6	26.70	30.00
		9	26.62	30.00
		12	26.43	30.00
		18	26.58	30.00
		24	26.89	30.00
		36	26.58	30.00
		48	26.59	30.00
		54	26.04	30.00
2457	10	6	24.44	30.00
		9	24.40	30.00
		12	24.13	30.00
		18	24.32	30.00
		24	24.65	30.00
		36	24.40	30.00
		48	24.77	30.00
		54	24.87	30.00
2462	11	6	19.64	30.00
		9	19.58	30.00
		12	19.39	30.00
		18	19.55	30.00
		24	19.89	30.00
		36	19.54	30.00
		48	19.85	30.00
		54	19.97	30.00

802.11n(HT20) Mode		MCS Index	Measured Power(dBm)	Limit (dBm)
Frequency[MHz]	Channel No.			
2412	1	0	17.91	30.00
		1	17.84	30.00
		2	17.62	30.00
		3	18.15	30.00
		4	18.05	30.00
		5	18.24	30.00
		6	18.04	30.00
		7	18.21	30.00
2417	2	0	17.82	30.00
		1	17.77	30.00
		2	17.60	30.00
		3	18.15	30.00
		4	18.03	30.00
		5	18.23	30.00
		6	18.04	30.00
		7	18.22	30.00
2422	3	0	22.61	30.00
		1	22.55	30.00
		2	22.42	30.00
		3	22.96	30.00
		4	22.68	30.00
		5	22.97	30.00
		6	23.00	30.00
		7	23.19	30.00
2427	4	0	22.61	30.00
		1	22.57	30.00
		2	22.45	30.00
		3	22.94	30.00
		4	22.79	30.00
		5	23.07	30.00
		6	22.98	30.00
		7	23.20	30.00
2432	5	0	22.64	30.00
		1	22.62	30.00
		2	22.46	30.00
		3	22.96	30.00
		4	22.85	30.00
		5	23.11	30.00
		6	22.93	30.00
		7	23.16	30.00
2437	6	0	26.03	30.00
		1	25.95	30.00
		2	25.77	30.00
		3	26.32	30.00
		4	26.16	30.00
		5	25.67	30.00
		6	24.96	30.00

802.11n(HT20) Mode		MCS Index	Measured Power(dBm)	Limit (dBm)
Frequency[MHz]	Channel No.			
		7	24.20	30.00
2442	7	0	26.88	30.00
		1	26.81	30.00
		2	26.66	30.00
		3	27.12	30.00
		4	26.96	30.00
		5	26.57	30.00
		6	25.87	30.00
		7	25.33	30.00
2447	8	0	26.79	30.00
		1	26.74	30.00
		2	26.50	30.00
		3	27.09	30.00
		4	26.86	30.00
		5	27.12	30.00
		6	26.87	30.00
		7	27.06	30.00
2452	9	0	26.36	30.00
		1	26.28	30.00
		2	26.04	30.00
		3	26.65	30.00
		4	26.45	30.00
		5	26.40	30.00
		6	25.67	30.00
		7	25.04	30.00
2457	10	0	23.99	30.00
		1	23.98	30.00
		2	23.78	30.00
		3	24.30	30.00
		4	24.17	30.00
		5	24.46	30.00
		6	24.35	30.00
		7	24.54	30.00
2462	11	0	19.00	30.00
		1	18.94	30.00
		2	18.80	30.00
		3	19.30	30.00
		4	19.18	30.00
		5	19.40	30.00
		6	19.31	30.00
		7	19.54	30.00

Average Power

1. Power Meter offset = Attenuator loss(20 dB) + Cable loss(1ea) + EUT Cable(For Conducted)
2. We apply to the offset in the 2.4 GHz range that was rounded off to the closest tenth dB.
So, 21.42 dB is offset for 2.4 GHz Band

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	16.34	0.034	16.37	30.00
		2	16.32	0.040	16.36	30.00
		5.5	16.27	0.121	16.39	30.00
		11	16.13	0.203	16.33	30.00
2417	2	1	16.32	0.034	16.36	30.00
		2	16.34	0.040	16.38	30.00
		5.5	16.29	0.121	16.41	30.00
		11	16.19	0.203	16.39	30.00
2422	3	1	20.21	0.034	20.24	30.00
		2	20.16	0.040	20.20	30.00
		5.5	19.84	0.121	19.96	30.00
		11	19.94	0.203	20.15	30.00
2437	6	1	19.94	0.034	19.97	30.00
		2	19.90	0.040	19.94	30.00
		5.5	19.44	0.121	19.56	30.00
		11	19.66	0.203	19.86	30.00
2452	9	1	20.54	0.034	20.57	30.00
		2	20.54	0.040	20.58	30.00
		5.5	20.38	0.121	20.50	30.00
		11	20.35	0.203	20.56	30.00
2457	10	1	18.00	0.034	18.03	30.00
		2	17.99	0.040	18.03	30.00
		5.5	17.95	0.121	18.07	30.00
		11	17.89	0.203	18.10	30.00
2462	11	1	17.75	0.034	17.78	30.00
		2	17.76	0.040	17.80	30.00
		5.5	17.79	0.121	17.91	30.00
		11	17.66	0.203	17.86	30.00

802.11g Mode		MCS Index	Measured Power (dBm)	Duty Cycle Factor	Measured Power(dBm) + Duty Cycle Factor	Limit (dBm)
Frequency [MHz]	Channel No.					
2412	1	6	10.82	0.057	10.87	30.00
		9	10.80	0.085	10.89	30.00
		12	10.73	0.105	10.84	30.00
		18	10.72	0.161	10.88	30.00
		24	10.75	0.213	10.96	30.00
		36	10.64	0.323	10.96	30.00
		48	10.47	0.424	10.89	30.00
		54	10.46	0.461	10.92	30.00
2417	2	6	10.78	0.057	10.84	30.00
		9	10.77	0.085	10.85	30.00
		12	10.74	0.105	10.84	30.00
		18	10.72	0.161	10.88	30.00
		24	10.66	0.213	10.87	30.00
		36	10.61	0.323	10.93	30.00
		48	10.41	0.424	10.84	30.00
		54	10.41	0.461	10.87	30.00
2422	3	6	15.34	0.057	15.40	30.00
		9	15.33	0.085	15.41	30.00
		12	15.29	0.105	15.39	30.00
		18	15.27	0.161	15.43	30.00
		24	15.21	0.213	15.42	30.00
		36	15.13	0.323	15.45	30.00
		48	15.07	0.424	15.49	30.00
		54	14.94	0.461	15.40	30.00
2427	4	6	18.16	0.057	18.22	30.00
		9	18.14	0.085	18.22	30.00
		12	18.11	0.105	18.22	30.00
		18	18.10	0.161	18.26	30.00
		24	18.09	0.213	18.30	30.00
		36	18.08	0.323	18.40	30.00
		48	17.57	0.424	18.00	30.00
		54	16.89	0.461	17.35	30.00
2432	5	6	18.81	0.057	18.87	30.00
		9	18.79	0.085	18.87	30.00
		12	18.73	0.105	18.84	30.00
		18	18.74	0.161	18.90	30.00
		24	18.65	0.213	18.86	30.00
		36	18.20	0.323	18.52	30.00
		48	17.49	0.424	17.92	30.00
		54	16.85	0.461	17.31	30.00
2437	6	6	18.93	0.057	18.99	30.00
		9	18.71	0.085	18.80	30.00
		12	18.90	0.105	19.00	30.00
		18	18.86	0.161	19.02	30.00
		24	18.76	0.213	18.97	30.00

802.11g Mode		MCS Index	Measured Power (dBm)	Duty Cycle Factor	Measured Power(dBm) + Duty Cycle Factor	Limit (dBm)
Frequency [MHz]	Channel No.					
		36	17.99	0.323	18.31	30.00
		48	17.27	0.424	17.69	30.00
		54	16.59	0.461	17.05	30.00
2442	7	6	19.77	0.057	19.82	30.00
		9	19.58	0.085	19.66	30.00
		12	19.71	0.105	19.81	30.00
		18	19.71	0.161	19.87	30.00
		24	19.64	0.213	19.86	30.00
		36	18.93	0.323	19.25	30.00
		48	18.31	0.424	18.73	30.00
		54	17.74	0.461	18.20	30.00
2447	8	6	19.53	0.057	19.59	30.00
		9	19.52	0.085	19.60	30.00
		12	19.52	0.105	19.62	30.00
		18	19.47	0.161	19.63	30.00
		24	19.43	0.213	19.65	30.00
		36	18.87	0.323	19.19	30.00
		48	18.20	0.424	18.62	30.00
		54	17.57	0.461	18.03	30.00
2452	9	6	18.72	0.057	18.78	30.00
		9	18.69	0.085	18.77	30.00
		12	18.66	0.105	18.77	30.00
		18	18.66	0.161	18.82	30.00
		24	18.57	0.213	18.78	30.00
		36	18.54	0.323	18.86	30.00
		48	18.06	0.424	18.49	30.00
		54	17.43	0.461	17.89	30.00
2457	10	6	16.42	0.057	16.48	30.00
		9	16.45	0.085	16.53	30.00
		12	16.43	0.105	16.54	30.00
		18	16.37	0.161	16.54	30.00
		24	16.29	0.213	16.50	30.00
		36	16.31	0.323	16.63	30.00
		48	16.23	0.424	16.65	30.00
		54	16.22	0.461	16.68	30.00
2462	11	6	11.66	0.057	11.72	30.00
		9	11.64	0.085	11.72	30.00
		12	11.62	0.105	11.72	30.00
		18	11.58	0.161	11.74	30.00
		24	11.50	0.213	11.71	30.00
		36	11.47	0.323	11.79	30.00
		48	11.31	0.424	11.73	30.00
		54	11.25	0.461	11.72	30.00

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	10.08	0.060	10.14	30.00
		1	9.99	0.120	10.11	30.00
		2	9.93	0.171	10.10	30.00
		3	9.90	0.234	10.13	30.00
		4	9.94	0.332	10.27	30.00
		5	9.78	0.429	10.21	30.00
		6	9.69	0.475	10.16	30.00
		7	9.61	0.532	10.14	30.00
2417	2	0	10.01	0.060	10.07	30.00
		1	9.95	0.120	10.07	30.00
		2	9.93	0.171	10.10	30.00
		3	9.97	0.234	10.21	30.00
		4	9.95	0.332	10.28	30.00
		5	9.73	0.429	10.16	30.00
		6	9.65	0.475	10.13	30.00
		7	9.61	0.532	10.14	30.00
2422	3	0	14.80	0.060	14.86	30.00
		1	14.77	0.120	14.89	30.00
		2	14.74	0.171	14.91	30.00
		3	14.73	0.234	14.97	30.00
		4	14.61	0.332	14.94	30.00
		5	14.57	0.429	15.00	30.00
		6	14.58	0.475	15.06	30.00
		7	14.55	0.532	15.09	30.00
2427	4	0	14.81	0.060	14.87	30.00
		1	14.77	0.120	14.89	30.00
		2	14.72	0.171	14.89	30.00
		3	14.75	0.234	14.98	30.00
		4	14.68	0.332	15.01	30.00
		5	14.60	0.429	15.03	30.00
		6	14.59	0.475	15.06	30.00
		7	14.53	0.532	15.06	30.00
2432	5	0	14.83	0.060	14.89	30.00
		1	14.77	0.120	14.89	30.00
		2	14.77	0.171	14.95	30.00
		3	14.69	0.234	14.93	30.00
		4	14.76	0.332	15.09	30.00
		5	14.63	0.429	15.06	30.00
		6	14.60	0.475	15.08	30.00
		7	14.52	0.532	15.06	30.00
2437	6	0	18.18	0.060	18.23	30.00
		1	18.10	0.120	18.22	30.00
		2	18.04	0.171	18.21	30.00
		3	18.09	0.234	18.32	30.00
		4	18.02	0.332	18.35	30.00

802.11n(HT20) Mode		MCS Index	Measured Power (dBm)	Duty Cycle Factor	Measured Power(dBm) + Duty Cycle Factor	Limit (dBm)
Frequency [MHz]	Channel No.					
		5	17.13	0.429	17.56	30.00
		6	16.48	0.475	16.96	30.00
		7	15.49	0.532	16.02	30.00
2442	7	0	19.10	0.060	19.16	30.00
		1	19.06	0.120	19.18	30.00
		2	18.97	0.171	19.14	30.00
		3	18.97	0.234	19.20	30.00
		4	18.95	0.332	19.29	30.00
		5	18.15	0.429	18.58	30.00
		6	17.60	0.475	18.07	30.00
		7	16.83	0.532	17.36	30.00
2447	8	0	18.98	0.060	19.04	30.00
		1	18.93	0.120	19.05	30.00
		2	18.85	0.171	19.02	30.00
		3	18.93	0.234	19.17	30.00
		4	18.79	0.332	19.12	30.00
		5	18.68	0.429	19.11	30.00
		6	18.68	0.475	19.15	30.00
		7	18.59	0.532	19.12	30.00
2452	9	0	18.52	0.060	18.58	30.00
		1	18.45	0.120	18.57	30.00
		2	18.40	0.171	18.57	30.00
		3	18.51	0.234	18.74	30.00
		4	18.36	0.332	18.69	30.00
		5	17.97	0.429	18.40	30.00
		6	17.37	0.475	17.84	30.00
		7	16.47	0.532	17.01	30.00
2457	10	0	16.20	0.060	16.26	30.00
		1	16.16	0.120	16.28	30.00
		2	16.09	0.171	16.26	30.00
		3	16.11	0.234	16.35	30.00
		4	16.09	0.332	16.43	30.00
		5	15.97	0.429	16.40	30.00
		6	15.99	0.475	16.46	30.00
		7	15.92	0.532	16.45	30.00
2462	11	0	11.16	0.060	11.22	30.00
		1	11.14	0.120	11.26	30.00
		2	11.10	0.171	11.27	30.00
		3	11.06	0.234	11.29	30.00
		4	11.07	0.332	11.40	30.00
		5	10.92	0.429	11.35	30.00
		6	10.98	0.475	11.45	30.00
		7	10.90	0.532	11.43	30.00

9.4 POWER SPECTRAL DENSITY

Mode	Frequency (MHz)	Channel No.	Test Result	
			Measured PSD (dBm)	Limit
802.11b	2412	1	-5.860	8 dBm / 3kHz
	2417	2	-5.873	
	2422	3	-2.593	
	2437	6	-2.336	
	2452	9	-1.679	
	2457	10	-4.771	
	2462	11	-4.941	
802.11g	2412	1	-13.198	
	2417	2	-13.072	
	2422	3	-8.476	
	2427	4	-5.240	
	2432	5	-3.688	
	2437	6	-4.785	
	2452	9	-5.377	
	2457	10	-7.262	
	2462	11	-12.299	
802.11n(HT20)	2412	1	-14.079	
	2417	2	-14.037	
	2422	3	-9.572	
	2427	4	-9.688	
	2432	5	-9.465	
	2437	6	-5.966	
	2452	9	-5.509	
	2457	10	-8.223	
	2462	11	-13.273	

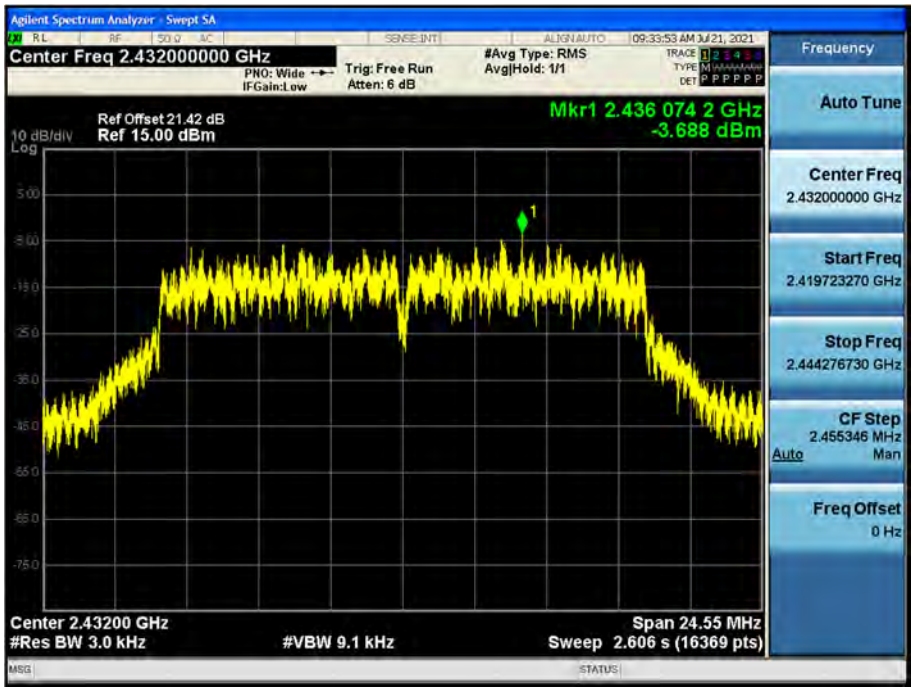
Note :

1. Spectrum Measured values are not plot data.
   The PSD results in plot is already including the actual values of loss for the attenuator and cable combination.
2. Spectrum offset = Attenuator loss(20 dB) + Cable loss(1ea) + EUT Cable(For Conducted)
3. 21.42 dB is offset for 2.4 GHz Band.

▣ Test Plots

Power Spectral Density (802.11b-CH 9)

Power Spectral Density (802.11g-CH 5)



Power Spectral Density (802.11n_HT20 -CH 9)

Note :

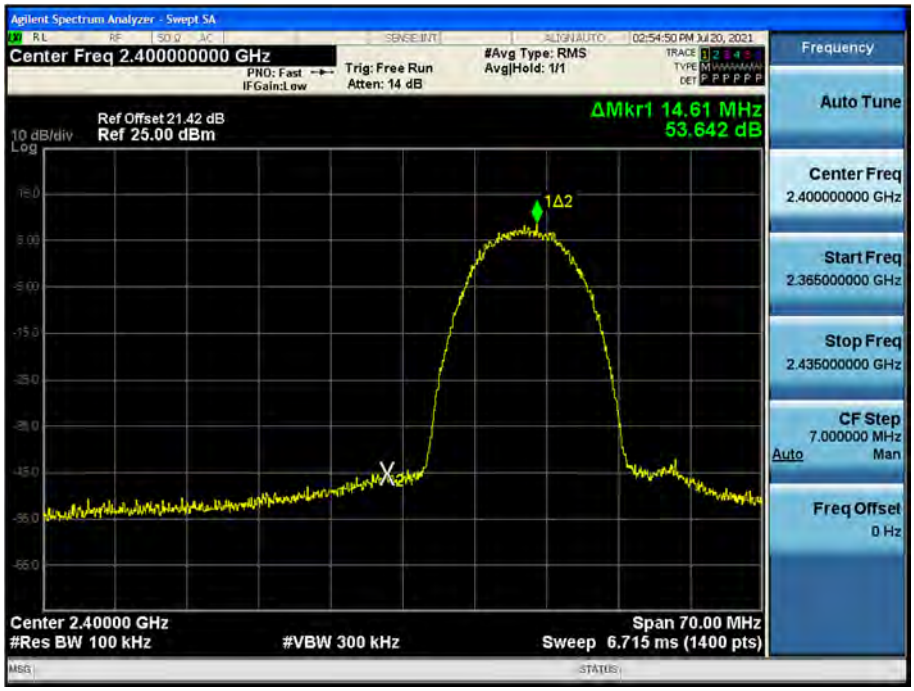
In order to simplify the report, attached plots were only the worstcase PSD channel.

9.5 BAND EDGE/ CONDUCTED SPURIOUS EMISSIONS

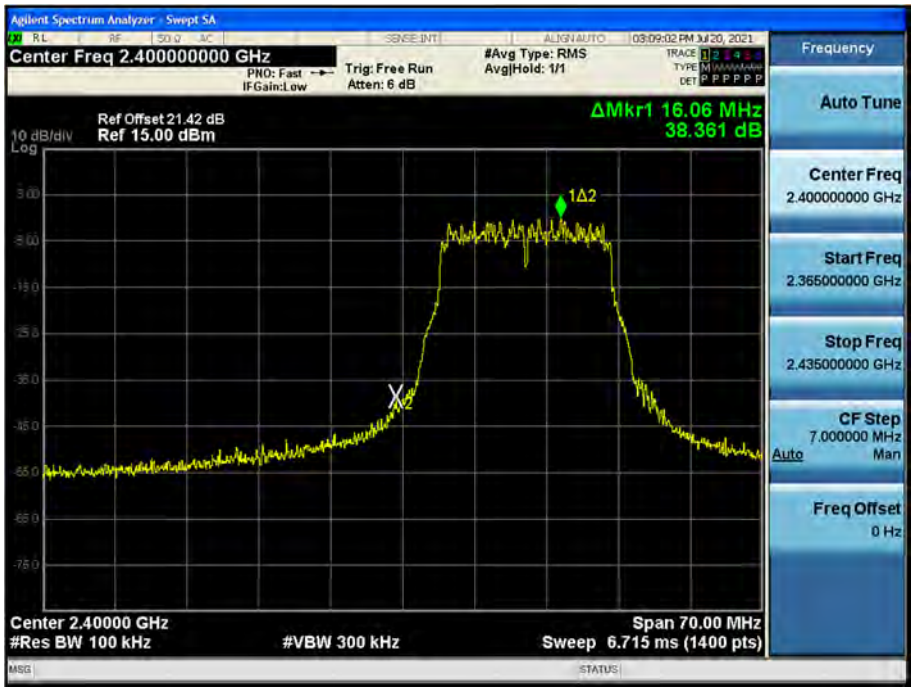
Test Result : please refer to the plot below.
In order to simplify the report, attached plots were only the worst case channel and data rate.

▣ Test Plots(Band Edge)

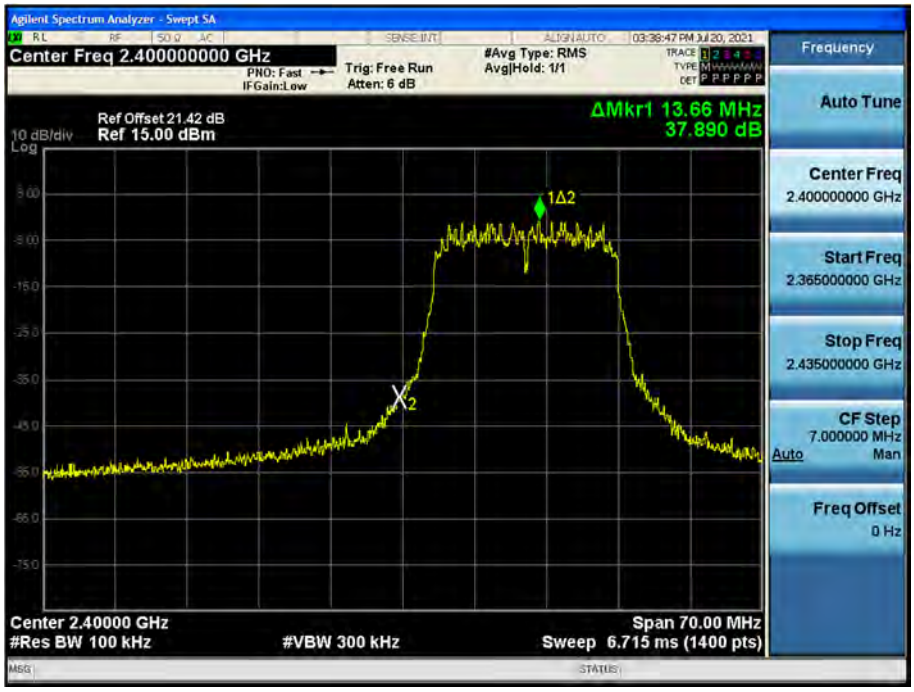
Band Edge (802.11b-CH1)



Band Edge (802.11g-CH1)



Band Edge (802.11n(HT20)-CH1)



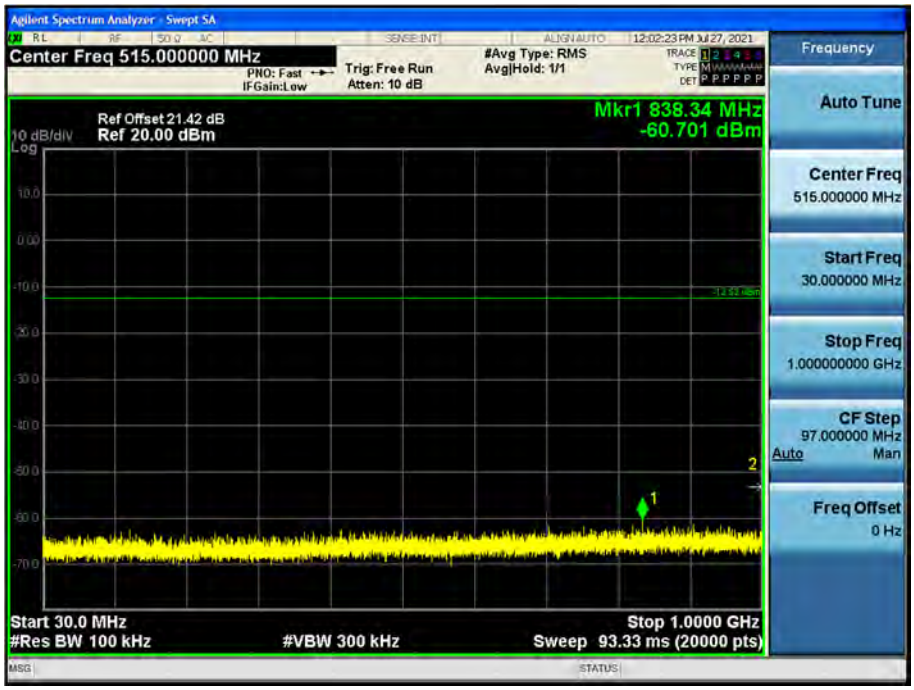
Note :

In order to simplify the report, attached plots were only the worstcase Band Edge channel.

▣ Test Plots(Conducted Spurious Emission)

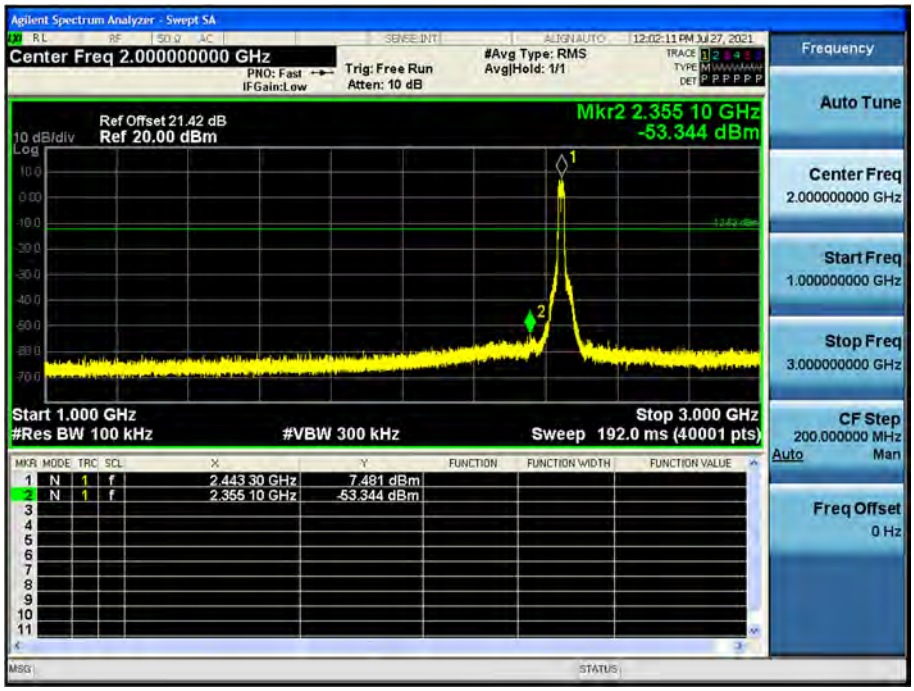
30 MHz ~ 1 GHz

Conducted Spurious Emission (802.11g_Ch.7_24 Mbps)



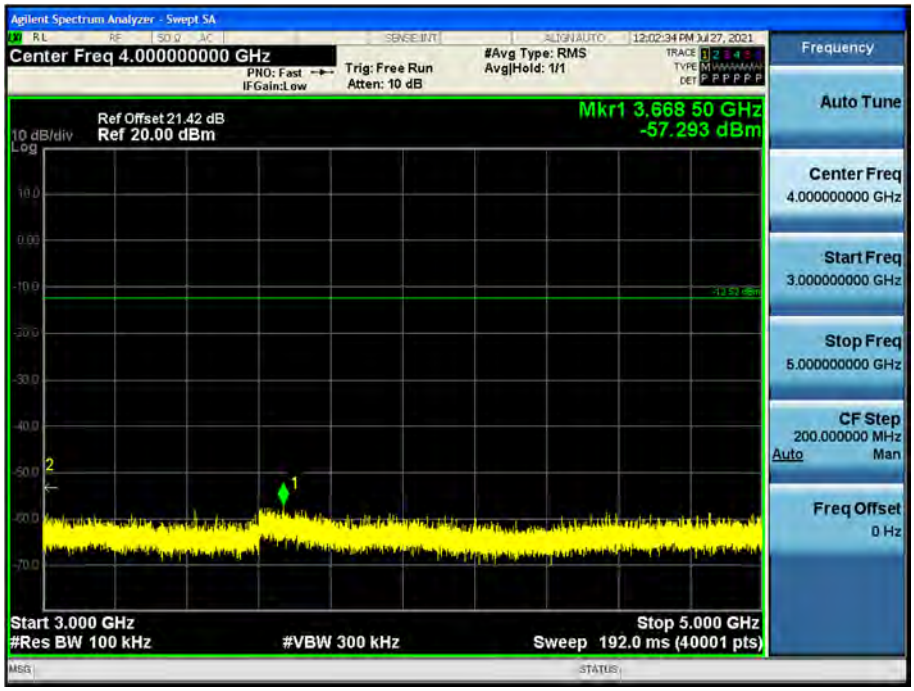
1 GHz ~ 3 GHz

Conducted Spurious Emission (802.11g_Ch.7_24 Mbps)



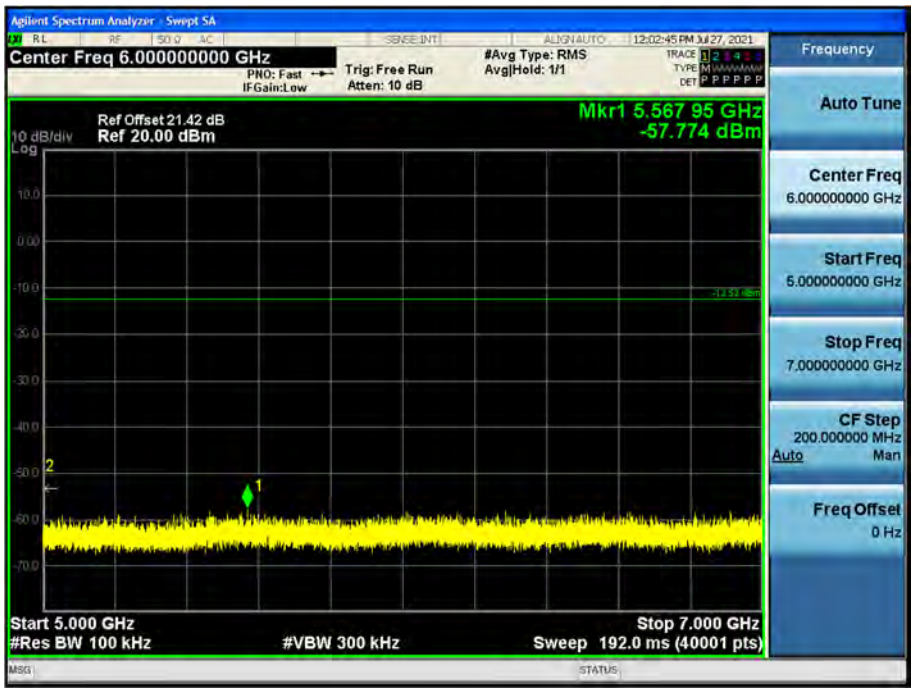
3 GHz ~ 5 GHz

Conducted Spurious Emission (802.11g_Ch.7_24 Mbps)



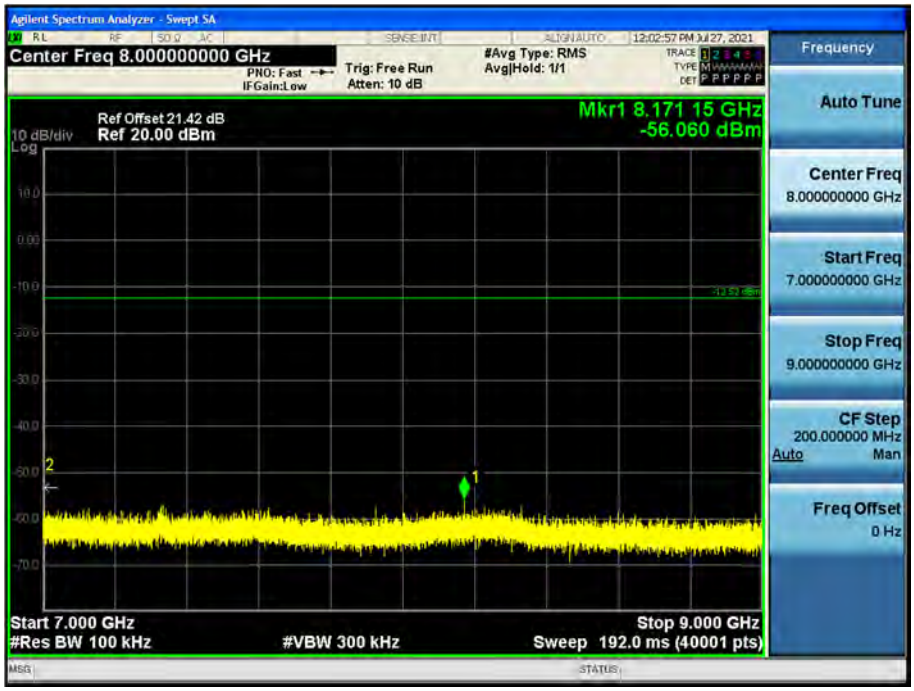
5 GHz ~ 7 GHz

Conducted Spurious Emission (802.11g_Ch.7_24 Mbps)



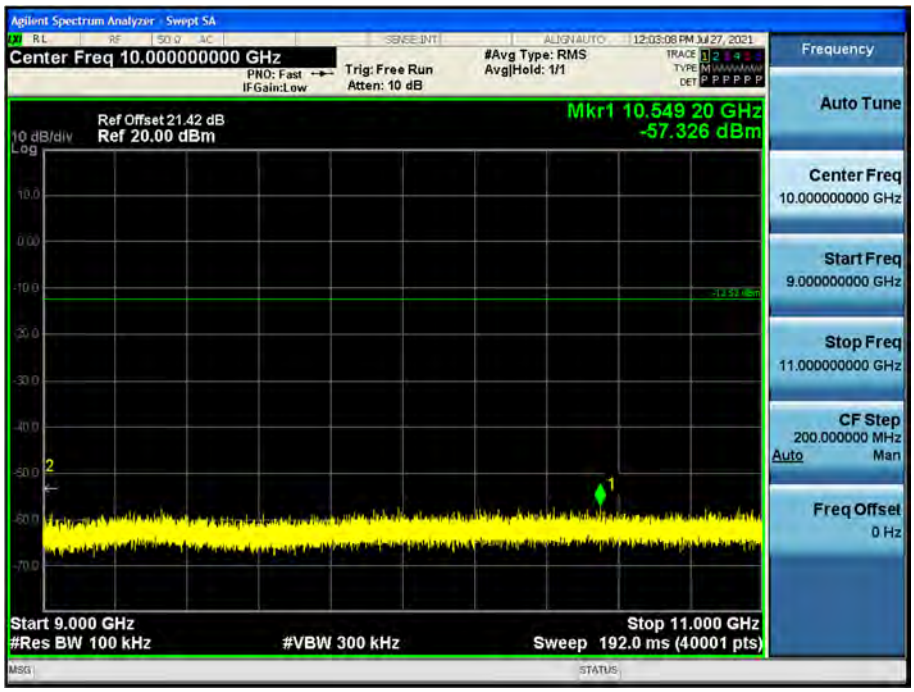
7 GHz ~ 9 GHz

Conducted Spurious Emission (802.11g_Ch.7_24 Mbps)



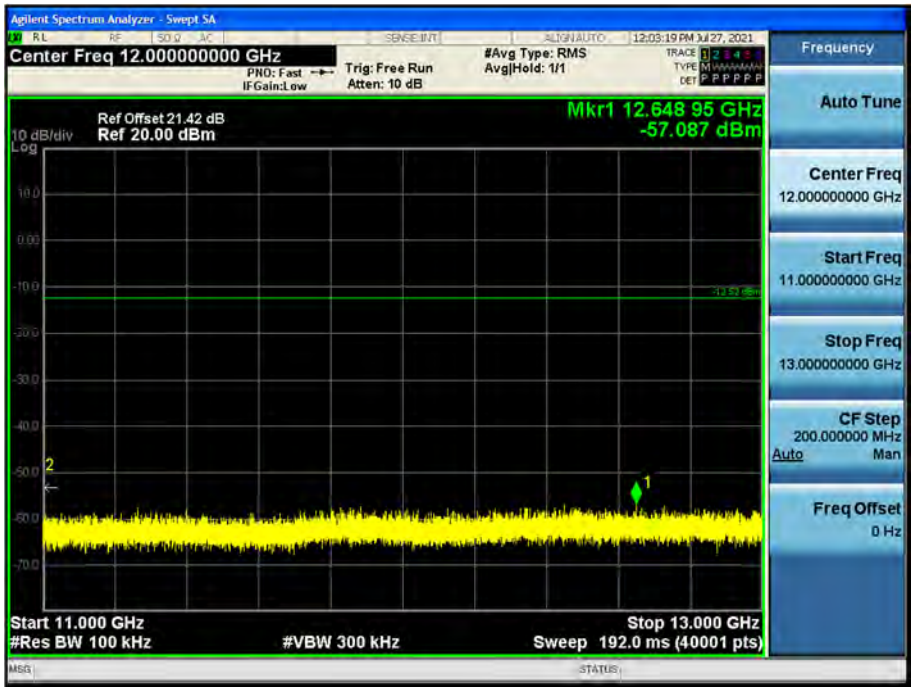
9 GHz ~ 11 GHz

Conducted Spurious Emission (802.11g_Ch.7_24 Mbps)



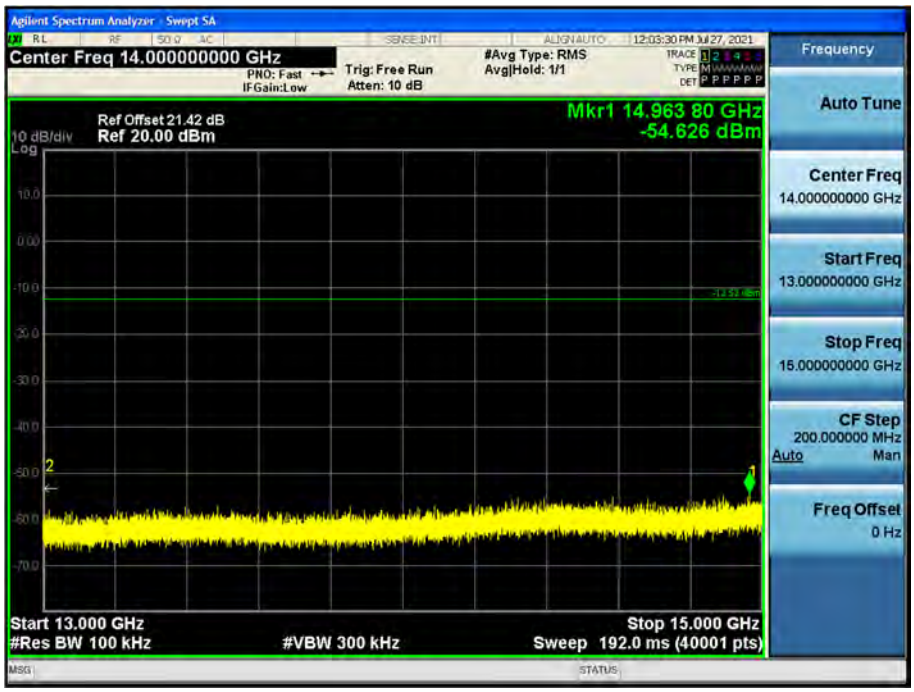
11 GHz ~ 13 GHz

Conducted Spurious Emission (802.11g_Ch.7_24 Mbps)



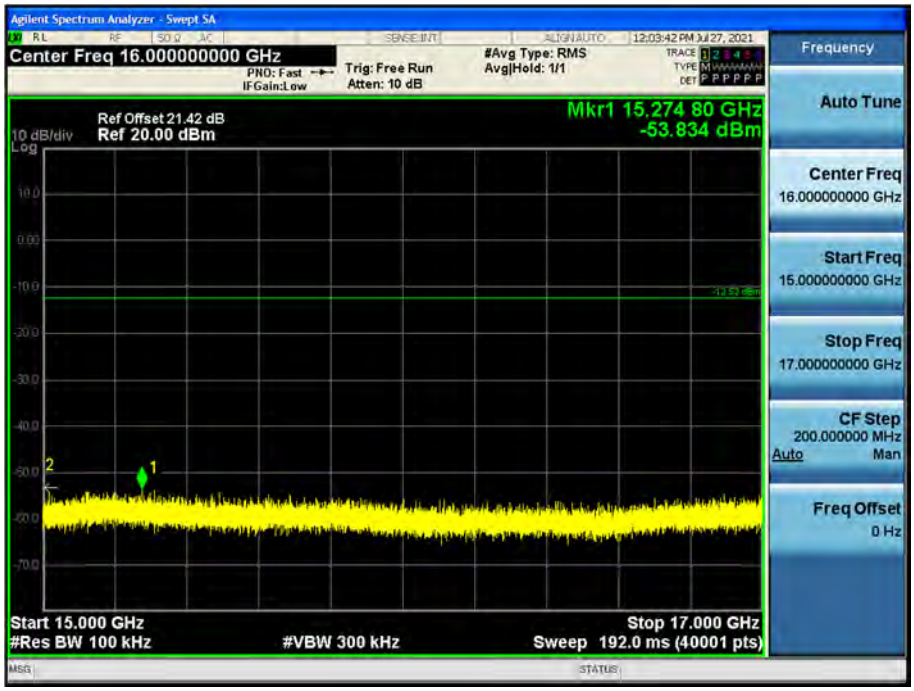
13 GHz ~ 15 GHz

Conducted Spurious Emission (802.11g_Ch.7_24 Mbps)



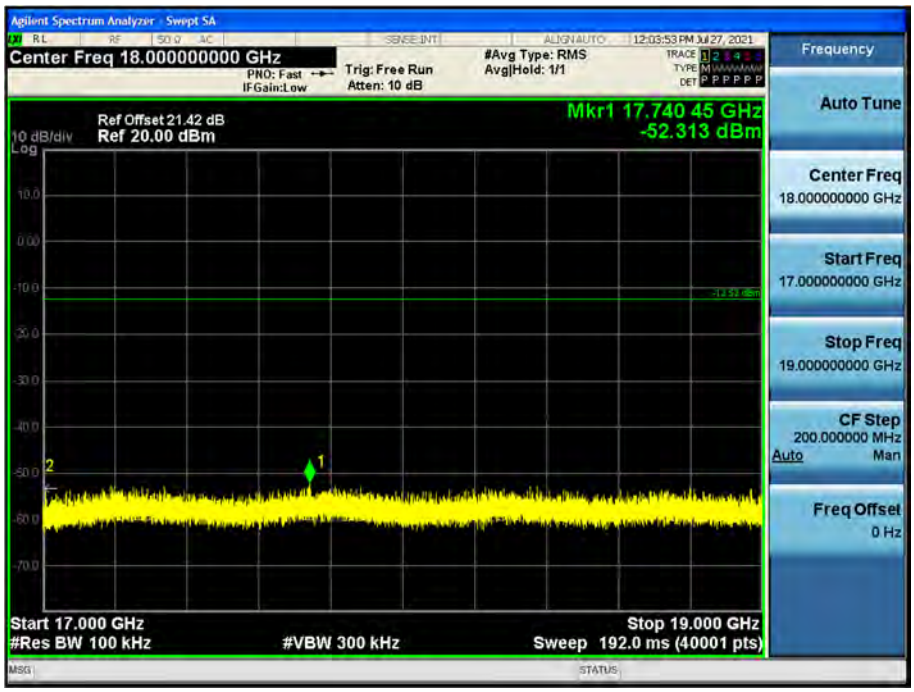
15 GHz ~ 17 GHz

Conducted Spurious Emission (802.11g_Ch.7_24 Mbps)



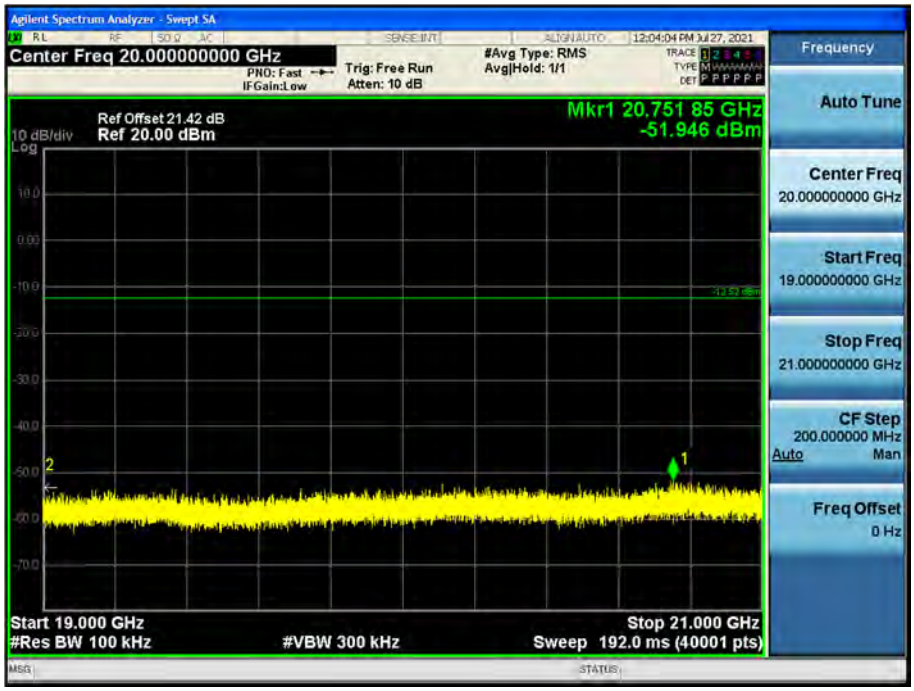
17 GHz ~ 19 GHz

Conducted Spurious Emission (802.11g_Ch.7_24 Mbps)



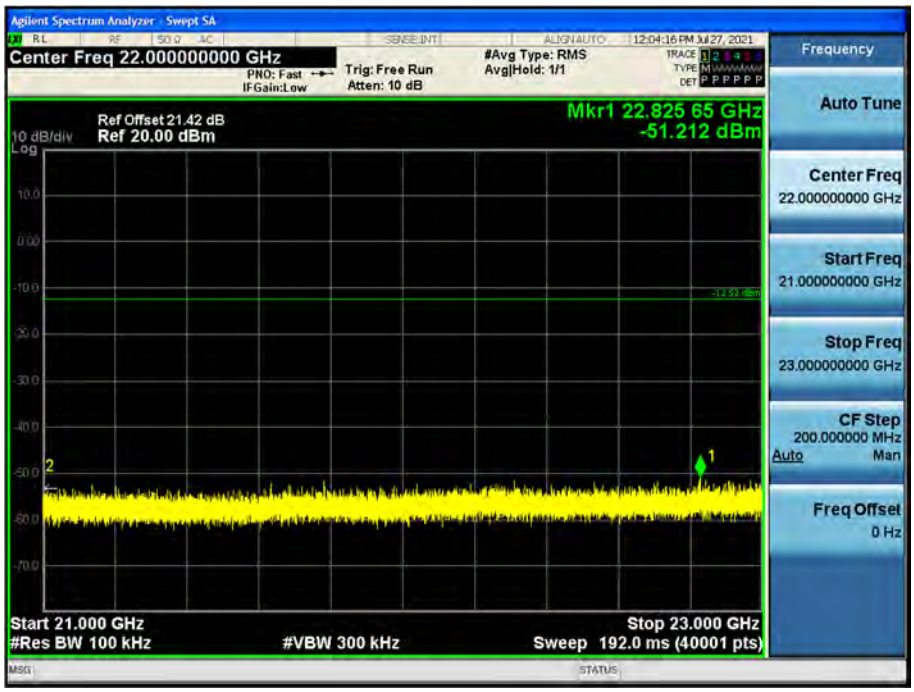
19 GHz ~ 21 GHz

Conducted Spurious Emission (802.11g_Ch.7_24 Mbps)



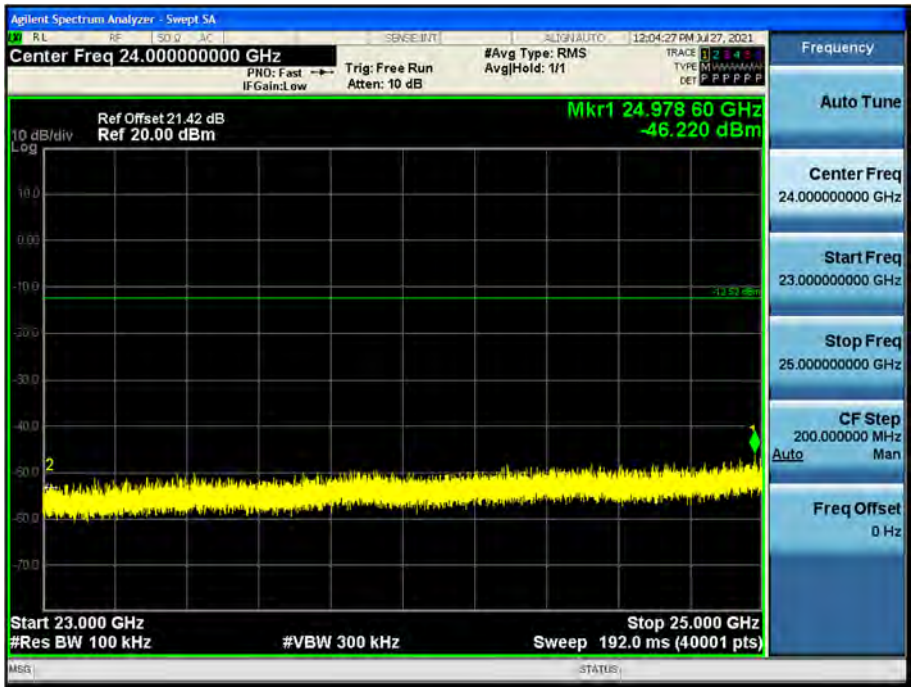
21 GHz ~ 23 GHz

Conducted Spurious Emission (802.11g_Ch.7_24 Mbps)



23 GHz ~ 25 GHz

Conducted Spurious Emission (802.11g_Ch.7_24 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/m	dB/m	(H/V)	dBμV/m	dBμV/m	dB
No Critical peaks found						

Note:

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

Frequency Range : Below 1 GHz

Frequency	Measured Value	A.F+C.L+D.F	Ant. POL	Total	Limit	Margin
MHz	dBμV/m	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

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

Frequency	Measured	A.F+C.L-A.G+D.F	ANT. POL	Total	Limit	Margin	Detect
[MHz]	[dBμV]	[dB]	[H/V]	[dBμV/m]	[dBμV/m]	[dB]	
4824	46.59	4.11	V	50.70	73.98	23.28	PK
4824	41.95	4.11	V	46.06	53.98	7.92	AV
7236	39.52	12.15	V	51.67	73.98	22.31	PK
7236	30.04	12.15	V	42.19	53.98	11.79	AV
4824	47.19	4.11	H	51.30	73.98	22.68	PK
4824	42.86	4.11	H	46.97	53.98	7.01	AV
7236	39.86	12.15	H	52.01	73.98	21.97	PK
7236	30.38	12.15	H	42.53	53.98	11.45	AV

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

Frequency	Measured	A.F+C.L-A.G+D.F	ANT. POL	Total	Limit	Margin	Detect
[MHz]	[dBμV]	[dB]	[H/V]	[dBμV/m]	[dBμV/m]	[dB]	
4874	46.27	4.00	V	50.27	73.98	23.71	PK
4874	42.03	4.00	V	46.03	53.98	7.95	AV
7311	42.98	12.39	V	55.37	73.98	18.61	PK
7311	34.19	12.39	V	46.58	53.98	7.40	AV
4874	47.45	4.00	H	51.45	73.98	22.53	PK
4874	43.58	4.00	H	47.58	53.98	6.40	AV
7311	42.66	12.39	H	55.05	73.98	18.93	PK
7311	34.89	12.39	H	47.28	53.98	6.70	AV

Operation Mode:	802.11b
Transfer Rate:	1 Mbps
Operating Frequency	2452
Channel No.	9 Ch

Frequency	Measured	A.F+C.L-A.G+D.F	ANT. POL	Total	Limit	Margin	Detect
[MHz]	[dBμV]	[dB]	[H/V]	[dBμV/m]	[dBμV/m]	[dB]	
4904	45.50	4.25	V	49.75	73.98	24.23	PK
4904	40.41	4.25	V	44.66	53.98	9.32	AV
7356	43.70	12.48	V	56.18	73.98	17.80	PK
7356	36.89	12.48	V	49.37	53.98	4.61	AV
4904	47.85	4.25	H	52.10	73.98	21.88	PK
4904	43.13	4.25	H	47.38	53.98	6.60	AV
7356	44.63	12.48	H	57.11	73.98	16.87	PK
7356	38.23	12.48	H	50.71	53.98	3.27	AV

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

Frequency	Measured	A.F+C.L-A.G+D.F	ANT. POL	Total	Limit	Margin	Detect
[MHz]	[dBμV]	[dB]	[H/V]	[dBμV/m]	[dBμV/m]	[dB]	
4924	45.77	4.29	V	50.06	73.98	23.92	PK
4924	40.73	4.29	V	45.02	53.98	8.96	AV
7386	40.51	12.44	V	52.95	73.98	21.03	PK
7386	31.01	12.44	V	43.45	53.98	10.53	AV
4924	46.39	4.29	H	50.68	73.98	23.30	PK
4924	41.81	4.29	H	46.10	53.98	7.88	AV
7386	40.24	12.44	H	52.68	73.98	21.30	PK
7386	30.63	12.44	H	43.07	53.98	10.91	AV

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

Frequency	Measured	Duty Cycle	A.F+C.L-A.G+D.F	ANT. POL	Total	Limit	Margin [dB]	Detect
[MHz]	[dBµV]	Factor	[dB]	[H/V]	[dBµV/m]	[dBµV/m]		
4824	42.63	0.00	4.11	V	46.74	73.98	27.24	PK
4824	29.67	0.06	4.11	V	33.84	53.98	20.14	AV
7236	38.37	0.00	12.15	V	50.52	73.98	23.46	PK
7236	25.91	0.06	12.15	V	38.12	53.98	15.86	AV
4824	41.59	0.00	4.11	H	45.70	73.98	28.28	PK
4824	29.82	0.06	4.11	H	33.99	53.98	19.99	AV
7236	37.77	0.00	12.15	H	49.92	73.98	24.06	PK
7236	25.44	0.06	12.15	H	37.65	53.98	16.33	AV

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

Frequency	Measured	Duty Cycle	A.F+C.L-A.G+D.F	ANT. POL	Total	Limit	Margin [dB]	Detect
[MHz]	[dBµV]	Factor	[dB]	[H/V]	[dBµV/m]	[dBµV/m]		
4874	43.15	0.00	4.00	V	47.15	73.98	26.83	PK
4874	31.66	0.06	4.00	V	35.72	53.98	18.26	AV
7311	43.76	0.00	12.39	V	56.15	73.98	17.83	PK
7311	30.64	0.06	12.39	V	43.09	53.98	10.89	AV
4874	44.57	0.00	4.00	H	48.57	73.98	25.41	PK
4874	32.07	0.06	4.00	H	36.13	53.98	17.85	AV
7311	44.72	0.00	12.39	H	57.11	73.98	16.87	PK
7311	31.12	0.06	12.39	H	43.57	53.98	10.41	AV

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

Frequency	Measured	Duty Cycle	A.F+C.L-A.G+D.F	ANT. POL	Total	Limit	Margin [dB]	Detect
[MHz]	[dBμV]	Factor	[dB]	[H/V]	[dBμV/m]	[dBμV/m]		
4924	41.63	0.00	4.29	V	45.92	73.98	28.06	PK
4924	30.30	0.06	4.29	V	34.65	53.98	19.33	AV
7386	37.84	0.00	12.44	V	50.28	73.98	23.70	PK
7386	25.91	0.06	12.44	V	38.41	53.98	15.57	AV
4924	43.78	0.00	4.29	H	48.07	73.98	25.91	PK
4924	30.44	0.06	4.29	H	34.79	53.98	19.19	AV
7386	38.27	0.00	12.44	H	50.71	73.98	23.27	PK
7386	26.15	0.06	12.44	H	38.65	53.98	15.33	AV

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

Frequency	Measured	Duty Cycle	A.F+C.L-A.G+D.F	ANT. POL	Total	Limit	Margin [dB]	Detect
[MHz]	[dBμV]	Factor	[dB]	[H/V]	[dBμV/m]	[dBμV/m]		
4824	40.22	0.00	4.11	V	44.33	73.98	29.65	PK
4824	28.51	0.06	4.11	V	32.68	53.98	21.30	AV
7236	37.34	0.00	12.15	V	49.49	73.98	24.49	PK
7236	25.84	0.06	12.15	V	38.05	53.98	15.93	AV
4824	41.39	0.00	4.11	H	45.50	73.98	28.48	PK
4824	29.46	0.06	4.11	H	33.63	53.98	20.35	AV
7236	37.48	0.00	12.15	H	49.63	73.98	24.35	PK
7236	25.35	0.06	12.15	H	37.56	53.98	16.42	AV

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

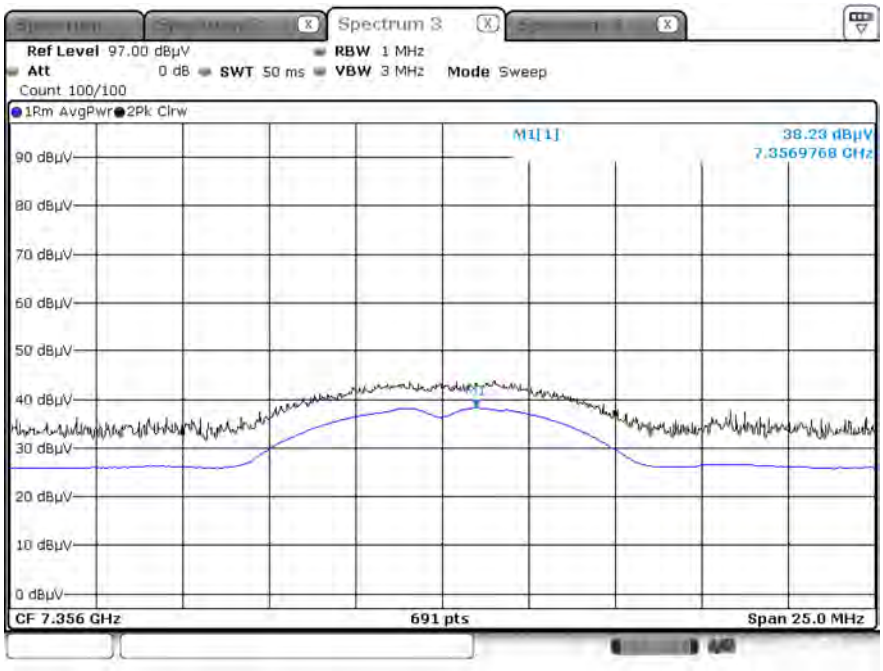
Frequency	Measured	Duty Cycle	A.F+C.L-A.G+D.F	ANT. POL	Total	Limit	Margin [dB]	Detect
[MHz]	[dBμV]	Factor	[dB]	[H/V]	[dBμV/m]	[dBμV/m]		
4874	42.53	0.00	4.00	V	46.53	73.98	27.45	PK
4874	29.92	0.06	4.00	V	33.98	53.98	20.00	AV
7311	42.38	0.00	12.39	V	54.77	73.98	19.21	PK
7311	28.46	0.06	12.39	V	40.91	53.98	13.07	AV
4874	43.02	0.00	4.00	H	47.02	73.98	26.96	PK
4874	30.67	0.06	4.00	H	34.73	53.98	19.25	AV
7311	43.48	0.00	12.39	H	55.87	73.98	18.11	PK
7311	29.98	0.06	12.39	H	42.43	53.98	11.55	AV

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

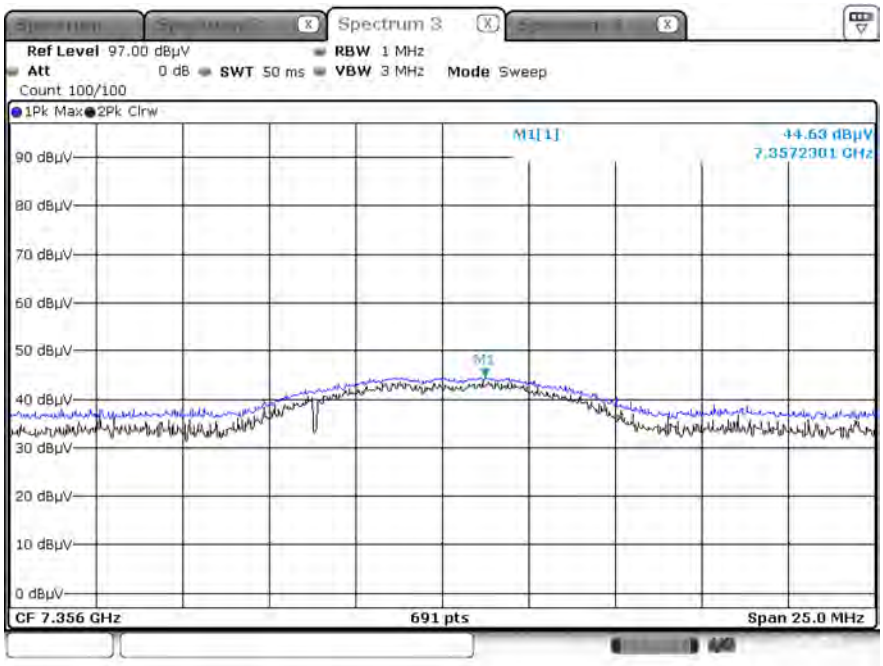
Frequency	Measured	Duty Cycle	A.F+C.L-A.G+D.F	ANT. POL	Total	Limit	Margin [dB]	Detect
[MHz]	[dBμV]	Factor	[dB]	[H/V]	[dBμV/m]	[dBμV/m]		
4924	42.47	0.00	4.29	V	46.76	73.98	27.22	PK
4924	30.07	0.06	4.29	V	34.42	53.98	19.56	AV
7386	38.25	0.00	12.44	V	50.69	73.98	23.29	PK
7386	25.93	0.06	12.44	V	38.43	53.98	15.55	AV
4924	42.80	0.00	4.29	H	47.09	73.98	26.89	PK
4924	30.15	0.06	4.29	H	34.50	53.98	19.48	AV
7386	38.41	0.00	12.44	H	50.85	73.98	23.13	PK
7386	26.08	0.06	12.44	H	38.58	53.98	15.40	AV

▣ Test Plots

Radiated Spurious Emissions plot – Average Measured (802.11b, Ch.9 3rd Harmonic, X-H)



Radiated Spurious Emissions plot – Peak Measured (802.11b, Ch.9 3rd Harmonic, X-H)



Note:

Plot of worst case are only reported.

9.7 RADIATED RESTRICTED BAND EDGES

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

Frequency	Measured	※ A.F+C.L-A.G +ATT+D.F	ANT. POL	Total	Limit	Margin	Detect
[MHz]	[dBμV]	[dB]	[H/V]	[dBμV/m]	[dBμV/m]	[dB]	
2390.0	57.47	3.32	H	60.79	73.98	13.19	PK
2390.0	45.35	3.32	H	48.67	53.98	5.31	AV
2390.0	56.91	3.32	V	60.23	73.98	13.75	PK
2390.0	44.76	3.32	V	48.08	53.98	5.90	AV
2483.5	55.65	3.78	H	59.43	73.98	14.55	PK
2483.5	45.11	3.78	H	48.89	53.98	5.09	AV
2483.5	55.12	3.78	V	58.90	73.98	15.08	PK
2483.5	44.43	3.78	V	48.21	53.98	5.77	AV

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

Frequency	Measured	※ A.F+C.L-A.G +ATT+D.F	ANT. POL	Total	Limit	Margin	Detect
[MHz]	[dBμV]	[dB]	[H/V]	[dBμV/m]	[dBμV/m]	[dB]	
2390.0	54.73	3.32	H	58.05	73.98	15.93	PK
2390.0	43.94	3.32	H	47.26	53.98	6.72	AV
2390.0	54.24	3.32	V	57.56	73.98	16.42	PK
2390.0	43.36	3.32	V	46.68	53.98	7.30	AV

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

Frequency	Measured	※ A.F+C.L-A.G +ATT+D.F	ANT. POL	Total	Limit	Margin	Detect
[MHz]	[dBμV]	[dB]	[H/V]	[dBμV/m]	[dBμV/m]	[dB]	
2390.0	53.90	3.32	H	57.22	73.98	16.76	PK
2390.0	42.78	3.32	H	46.10	53.98	7.88	AV
2390.0	53.38	3.32	V	56.70	73.98	17.28	PK
2390.0	42.17	3.32	V	45.49	53.98	8.49	AV

Operation Mode:	802.11b
Transfer Rate:	1 Mbps
Operating Frequency	2452 MHz
Channel No.	09 Ch

Frequency	Measured	※ A.F+C.L-A.G +ATT+D.F	ANT. POL	Total	Limit	Margin	Detect
[MHz]	[dBμV]	[dB]	[H/V]	[dBμV/m]	[dBμV/m]	[dB]	
2483.5	53.55	3.78	H	57.33	73.98	16.65	PK
2483.5	43.33	3.78	H	47.11	53.98	6.87	AV
2483.5	53.02	3.78	V	56.80	73.98	17.18	PK
2483.5	42.76	3.78	V	46.54	53.98	7.44	AV

Operation Mode:	802.11b
Transfer Rate:	1 Mbps
Operating Frequency	2457 MHz
Channel No.	10 Ch

Frequency	Measured	※ A.F+C.L-A.G +ATT+D.F	ANT. POL	Total	Limit	Margin	Detect
[MHz]	[dBμV]	[dB]	[H/V]	[dBμV/m]	[dBμV/m]	[dB]	
2483.5	54.05	3.78	H	57.83	73.98	16.15	PK
2483.5	43.08	3.78	H	46.86	53.98	7.12	AV
2483.5	53.52	3.78	V	57.30	73.98	16.68	PK
2483.5	42.39	3.78	V	46.17	53.98	7.81	AV

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

Frequency [MHz]	Measured [dBμV]	Duty Cycle Factor	※ A.F+C.L-A.G+ATT+D.F [dB]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Detect
2390.0	61.14	0.00	3.32	H	64.46	73.98	9.52	PK
2390.0	47.06	0.06	3.32	H	50.44	53.98	3.54	AV
2390.0	60.49	0.00	3.32	V	63.81	73.98	10.17	PK
2390.0	46.40	0.06	3.32	V	49.78	53.98	4.20	AV
2483.5	62.55	0.00	3.78	H	66.33	73.98	7.65	PK
2483.5	46.02	0.06	3.78	H	49.86	53.98	4.12	AV
2483.5	61.92	0.00	3.78	V	65.70	73.98	8.28	PK
2483.5	45.36	0.06	3.78	V	49.20	53.98	4.78	AV

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

Frequency [MHz]	Measured [dBμV]	Duty Cycle Factor	※ A.F+C.L-A.G+ATT+D.F [dB]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Detect
2390.0	55.37	0.00	3.32	H	58.69	73.98	15.29	PK
2390.0	44.44	0.06	3.32	H	47.82	53.98	6.16	AV
2390.0	54.84	0.00	3.32	V	58.16	73.98	15.82	PK
2390.0	43.76	0.06	3.32	V	47.14	53.98	6.84	AV

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

Frequency [MHz]	Measured [dBμV]	Duty Cycle Factor	※ A.F+C.L-A.G+ATT+D.F [dB]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Detect
2390.0	56.36	0.00	3.32	H	59.68	73.98	14.30	PK
2390.0	44.13	0.06	3.32	H	47.51	53.98	6.47	AV
2390.0	55.94	0.00	3.32	V	59.26	73.98	14.72	PK
2390.0	43.45	0.06	3.32	V	46.83	53.98	7.15	AV

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

Frequency [MHz]	Measured [dBμV]	Duty Cycle Factor	※ A.F+C.L-A.G+ATT+D.F [dB]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Detect
2390.0	61.60	0.00	3.32	H	64.92	73.98	9.06	PK
2390.0	45.55	0.06	3.32	H	48.93	53.98	5.05	AV
2390.0	61.03	0.00	3.32	V	64.35	73.98	9.63	PK
2390.0	44.98	0.06	3.32	V	48.36	53.98	5.62	AV

Operation Mode:	802.11g
Transfer Rate:	6 Mbps
Operating Frequency	2432 MHz
Channel No.	05 Ch

Frequency [MHz]	Measured	Duty Cycle	※ A.F+C.L-A.G+ATT+D.F	ANT. POL	Total	Limit	Margin	Detect
	[dBμV]	Factor	[dB]	[H/V]	[dBμV/m]	[dBμV/m]	[dB]	
2390.0	61.16	0.00	3.32	H	64.48	73.98	9.50	PK
2390.0	46.74	0.06	3.32	H	50.12	53.98	3.86	AV
2390.0	60.45	0.00	3.32	V	63.77	73.98	10.21	PK
2390.0	46.22	0.06	3.32	V	49.60	53.98	4.38	AV

Operation Mode:	802.11g
Transfer Rate:	6 Mbps
Operating Frequency	2452 MHz
Channel No.	09 Ch

Frequency [MHz]	Measured [dBμV]	Duty Cycle Factor	※ A.F+C.L-A.G+ATT+D.F [dB]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Detect
2483.5	59.39	0.00	3.78	H	63.17	73.98	10.81	PK
2483.5	46.42	0.06	3.78	H	50.26	53.98	3.72	AV
2483.5	58.69	0.00	3.78	V	62.47	73.98	11.51	PK
2483.5	45.83	0.06	3.78	V	49.67	53.98	4.31	AV

Operation Mode:	802.11g
Transfer Rate:	6 Mbps
Operating Frequency	2457 MHz
Channel No.	10 Ch

Frequency [MHz]	Measured [dBμV]	Duty Cycle Factor	※ A.F+C.L-A.G+ATT+D.F [dB]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Detect
2483.5	61.54	0.00	3.78	H	65.32	73.98	8.66	PK
2483.5	45.82	0.06	3.78	H	49.66	53.98	4.32	AV
2483.5	60.95	0.00	3.78	V	64.73	73.98	9.25	PK
2483.5	45.17	0.06	3.78	V	49.01	53.98	4.97	AV

Operation Mode:	802.11n (HT20)
Transfer Rate:	6.5 Mbps
Operating Frequency	2412 MHz, 2462 MHz
Channel No.	01 Ch, 11 Ch

Frequency [MHz]	Measured [dBμV]	Duty Cycle Factor	※ A.F+C.L-A.G+ATT+D.F [dB]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Detect
2390.0	59.79	0.00	3.32	H	63.11	73.98	10.87	PK
2390.0	47.01	0.06	3.32	H	50.39	53.98	3.59	AV
2390.0	59.08	0.00	3.32	V	62.40	73.98	11.58	PK
2390.0	46.35	0.06	3.32	V	49.73	53.98	4.25	AV
2483.5	62.95	0.00	3.78	H	66.73	73.98	7.25	PK
2483.5	46.48	0.06	3.78	H	50.32	53.98	3.66	AV
2483.5	62.31	0.00	3.78	V	66.09	73.98	7.89	PK
2483.5	45.97	0.06	3.78	V	49.81	53.98	4.17	AV

Operation Mode:	802.11n (HT20)
Transfer Rate:	6.5 Mbps
Operating Frequency	2417 MHz
Channel No.	02 Ch

Frequency [MHz]	Measured [dBμV]	Duty Cycle Factor	※ A.F+C.L-A.G+ATT+D.F [dB]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Detect
2390.0	56.05	0.00	3.32	H	59.37	73.98	14.61	PK
2390.0	44.44	0.06	3.32	H	47.82	53.98	6.16	AV
2390.0	55.50	0.00	3.32	V	58.82	73.98	15.16	PK
2390.0	43.81	0.06	3.32	V	47.19	53.98	6.79	AV

Operation Mode:	802.11n (HT20)
Transfer Rate:	6.5 Mbps
Operating Frequency	2422 MHz
Channel No.	03 Ch

Frequency [MHz]	Measured [dBμV]	Duty Cycle Factor	※ A.F+C.L-A.G+ATT+D.F [dB]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Detect
2390.0	56.19	0.00	3.32	H	59.51	73.98	14.47	PK
2390.0	43.73	0.06	3.32	H	47.11	53.98	6.87	AV
2390.0	55.46	0.00	3.32	V	58.78	73.98	15.20	PK
2390.0	43.12	0.06	3.32	V	46.50	53.98	7.48	AV

Operation Mode:	802.11n (HT20)
Transfer Rate:	6.5 Mbps
Operating Frequency	2427 MHz
Channel No.	04 Ch

Frequency [MHz]	Measured [dBμV]	Duty Cycle Factor	※ A.F+C.L-A.G+ATT+D.F [dB]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Detect
2390.0	64.75	0.00	3.32	H	68.07	73.98	5.91	PK
2390.0	46.63	0.06	3.32	H	50.01	53.98	3.97	AV
2390.0	64.09	0.00	3.32	V	67.41	73.98	6.57	PK
2390.0	45.97	0.06	3.32	V	49.35	53.98	4.63	AV

Operation Mode:	802.11n (HT20)
Transfer Rate:	6.5 Mbps
Operating Frequency	2432 MHz
Channel No.	05 Ch

Frequency [MHz]	Measured	Duty Cycle	※ A.F+C.L-A.G+ATT+D.F	ANT. POL	Total	Limit	Margin	Detect
	[dBμV]	Factor	[dB]	[H/V]	[dBμV/m]	[dBμV/m]	[dB]	
2390.0	64.76	0.00	3.32	H	68.08	73.98	5.90	PK
2390.0	45.07	0.06	3.32	H	48.45	53.98	5.53	AV
2390.0	64.28	0.00	3.32	V	67.60	73.98	6.38	PK
2390.0	44.36	0.06	3.32	V	47.74	53.98	6.24	AV

Operation Mode:	802.11n (HT20)
Transfer Rate:	6.5 Mbps
Operating Frequency	2437 MHz
Channel No.	06 Ch

Frequency [MHz]	Measured [dBμV]	Duty Cycle Factor	※ A.F+C.L-A.G+ATT+D.F [dB]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Detect
2390.0	62.12	0.00	3.32	H	65.44	73.98	8.54	PK
2390.0	44.08	0.06	3.32	H	47.46	53.98	6.52	AV
2390.0	61.39	0.00	3.32	V	64.71	73.98	9.27	PK
2390.0	43.53	0.06	3.32	V	46.91	53.98	7.07	AV

Operation Mode:	802.11n (HT20)
Transfer Rate:	6.5 Mbps
Operating Frequency	2452 MHz
Channel No.	09 Ch

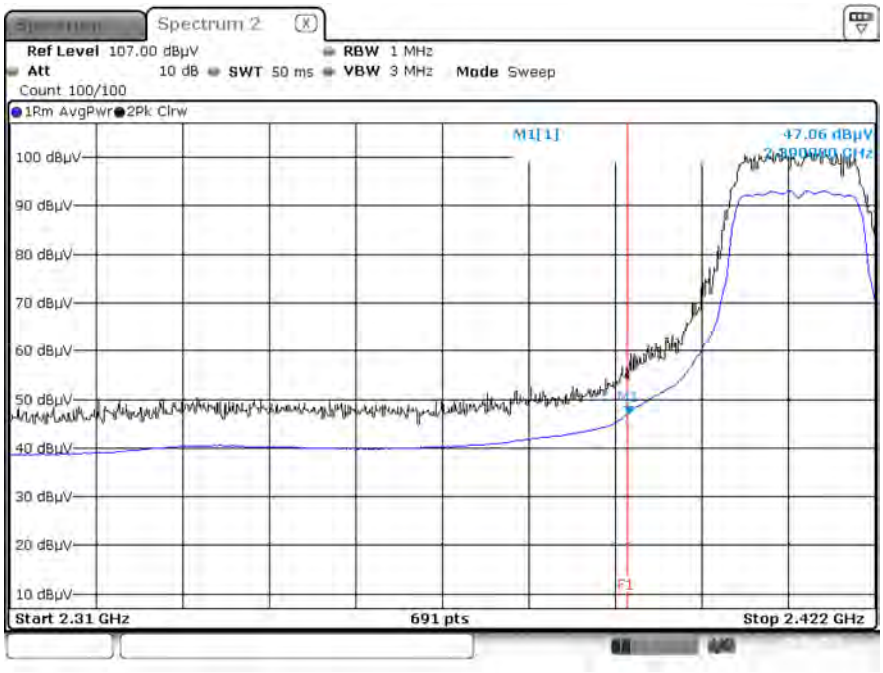
Frequency [MHz]	Measured [dBμV]	Duty Cycle Factor	※ A.F+C.L-A.G+ATT+D.F [dB]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Detect
2483.5	61.05	0.00	3.78	H	64.83	73.98	9.15	PK
2483.5	46.47	0.06	3.78	H	50.31	53.98	3.67	AV
2483.5	60.34	0.00	3.78	V	64.12	73.98	9.86	PK
2483.5	45.88	0.06	3.78	V	49.72	53.98	4.26	AV

Operation Mode:	802.11n (HT20)
Transfer Rate:	6.5 Mbps
Operating Frequency	2457 MHz
Channel No.	10 Ch

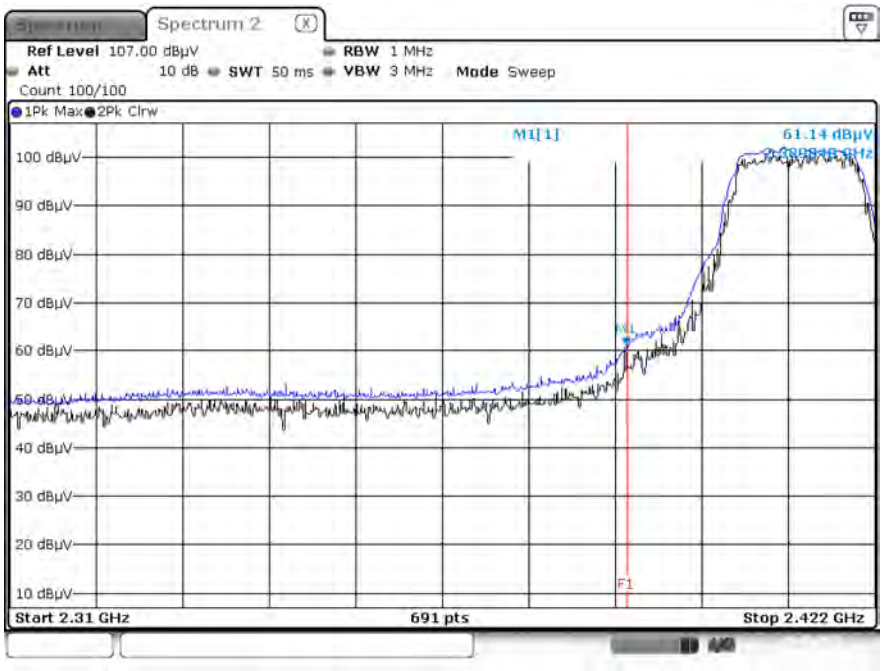
Frequency [MHz]	Measured	Duty Cycle	※ A.F+C.L-A.G+ATT+D.F	ANT. POL	Total	Limit	Margin	Detect
	[dBμV]	Factor	[dB]	[H/V]	[dBμV/m]	[dBμV/m]	[dB]	
2483.5	60.10	0.00	3.78	H	63.88	73.98	10.10	PK
2483.5	46.07	0.06	3.78	H	49.91	53.98	4.07	AV
2483.5	59.58	0.00	3.78	V	63.36	73.98	10.62	PK
2483.5	45.56	0.06	3.78	V	49.40	53.98	4.58	AV

▣ **Test Plots (Worst case : X-H)**

Radiated Restricted Band Edges plot – Average Measured (802.11g Ch.1)



Radiated Restricted Band Edges plot – Peak Measured (802.11g Ch.1)



Note:

Plot of worst case are only reported.

9.8 RECEIVER SPURIOUS EMISSIONS

Frequency Range : Below 1 GHz

Frequency	Measured	Ant. factor	Cable loss	Ant. POL	Total	Limit	Margin
MHz	dBμV/m	dBm/m	dBm	(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

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

9.9 POWERLINE CONDUCTED EMISSIONS

Conducted Emissions (Line 1)

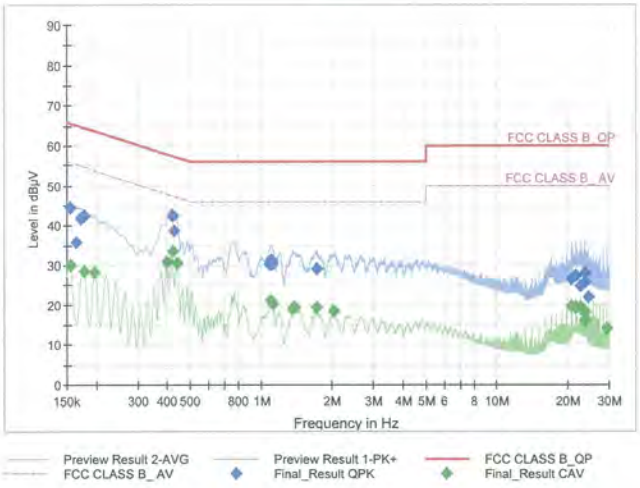
Test 1 / 2

Test Report

Common Information

EUT :	WD-MSOII
Manufacturer :	EVERINT Co.Ltd
Test Site:	SHIELD ROOM
Operating Conditions :	WLAN 2.4G_L1

Full Spectrum



Final_Result_QPK

Frequency (MHz)	QuasiPeak (dBµV)	Limit (dBµV	Margin (dB)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.1545	44.35	65.75	21.40	9.000	L1	OFF	9.6
0.1635	35.84	65.28	29.44	9.000	L1	OFF	9.6
0.1725	41.74	64.84	23.10	9.000	L1	OFF	9.6
0.1770	42.46	64.63	22.17	9.000	L1	OFF	9.6
0.4200	42.44	57.45	15.01	9.000	L1	OFF	9.6
0.4290	38.70	57.27	18.57	9.000	L1	OFF	9.6
1.0850	30.29	56.00	25.71	9.000	L1	OFF	9.7
1.0963	30.69	56.00	25.31	9.000	L1	OFF	9.7
1.1008	31.28	56.00	24.72	9.000	L1	OFF	9.7
1.1098	31.11	56.00	24.89	9.000	L1	OFF	9.7
1.1165	30.25	56.00	25.75	9.000	L1	OFF	9.7
1.7173	29.19	56.00	26.81	9.000	L1	OFF	9.7
20.8130	26.57	60.00	33.43	9.000	L1	OFF	10.4
21.7580	27.49	60.00	32.51	9.000	L1	OFF	10.5
22.7075	24.80	60.00	35.20	9.000	L1	OFF	10.5
23.6525	25.66	60.00	34.34	9.000	L1	OFF	10.5
23.8100	27.97	60.00	32.03	9.000	L1	OFF	10.5
24.5998	21.92	60.00	38.08	9.000	L1	OFF	10.5

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Test 2 / 2

Final_Result_CAV

Frequency (MHz)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.1545	30.07	55.75	25.68	9.000	L1	OFF	9.6
0.1770	28.68	54.63	25.95	9.000	L1	OFF	9.6
0.1973	28.31	53.73	25.41	9.000	L1	OFF	9.6
0.3975	30.83	47.91	17.07	9.000	L1	OFF	9.6
0.4200	33.35	47.45	14.10	9.000	L1	OFF	9.6
0.4403	30.45	47.06	16.60	9.000	L1	OFF	9.6
1.1030	21.10	46.00	24.90	9.000	L1	OFF	9.7
1.1210	20.22	46.00	25.78	9.000	L1	OFF	9.7
1.3663	18.99	46.00	27.01	9.000	L1	OFF	9.7
1.3865	19.24	46.00	26.76	9.000	L1	OFF	9.7
1.7173	19.46	46.00	26.54	9.000	L1	OFF	9.7
2.0503	18.54	46.00	27.46	9.000	L1	OFF	9.7
20.8130	19.67	50.00	30.33	9.000	L1	OFF	10.4
21.7603	19.45	50.00	30.55	9.000	L1	OFF	10.5
22.7053	19.36	50.00	30.64	9.000	L1	OFF	10.5
23.6525	16.20	50.00	33.80	9.000	L1	OFF	10.5
23.8100	18.18	50.00	31.82	9.000	L1	OFF	10.5
29.3293	14.04	50.00	35.96	9.000	L1	OFF	10.7

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Conducted Emissions (Line 2)

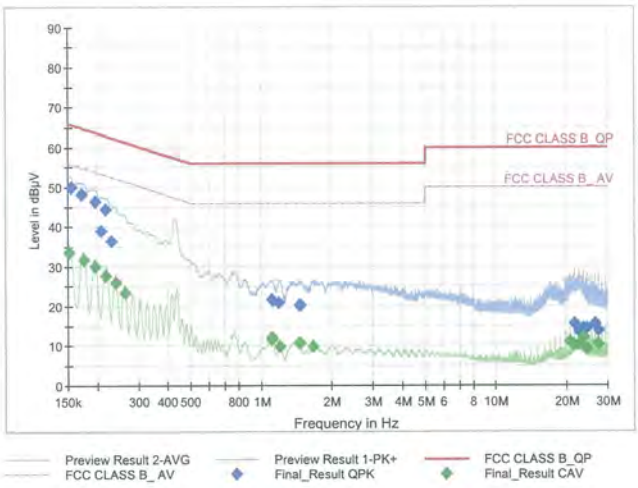
Test 1 / 2

Test Report

Common Information

EUT :	WD-MSOII
Manufacturer :	EVERINT Co.Ltd
Test Site:	SHIELD ROOM
Operating Conditions :	WLAN 2.4G_N

Full Spectrum



Final_Result_QPK

Frequency (MHz)	QuasiPeak (dBuV)	Limit (dBuV	Margin (dB)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.1545	49.84	65.75	15.92	9.000	N	OFF	9.6
0.1725	48.04	64.84	16.80	9.000	N	OFF	9.6
0.1973	46.51	63.73	17.22	9.000	N	OFF	9.6
0.2085	38.95	63.27	24.31	9.000	N	OFF	9.6
0.2175	44.52	62.91	18.39	9.000	N	OFF	9.6
0.2288	36.46	62.50	26.04	9.000	N	OFF	9.6
1.1075	21.77	56.00	34.23	9.000	N	OFF	9.7
1.1143	21.77	56.00	34.23	9.000	N	OFF	9.7
1.1188	21.41	56.00	34.59	9.000	N	OFF	9.7
1.1908	20.70	56.00	35.30	9.000	N	OFF	9.7
1.4585	20.05	56.00	35.95	9.000	N	OFF	9.7
1.4698	20.33	56.00	35.67	9.000	N	OFF	9.7
21.7558	15.55	60.00	44.46	9.000	N	OFF	10.6
22.6985	13.61	60.00	46.39	9.000	N	OFF	10.6
23.6480	14.44	60.00	45.56	9.000	N	OFF	10.7
24.5885	14.37	60.00	45.63	9.000	N	OFF	10.7
26.4785	15.45	60.00	44.55	9.000	N	OFF	10.8
27.4280	13.78	60.00	46.22	9.000	N	OFF	10.8

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Test 2 / 2

Final_Result_CAV

Frequency (MHz)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.1523	33.39	55.88	22.49	9.000	N	OFF	9.6
0.1748	31.71	54.73	23.03	9.000	N	OFF	9.6
0.1973	29.87	53.73	23.85	9.000	N	OFF	9.6
0.2175	27.77	52.91	25.14	9.000	N	OFF	9.6
0.2400	25.86	52.10	26.24	9.000	N	OFF	9.6
0.2625	23.49	51.35	27.86	9.000	N	OFF	9.6
1.1098	11.99	46.00	34.01	9.000	N	OFF	9.7
1.1143	11.68	46.00	34.32	9.000	N	OFF	9.7
1.2065	9.72	46.00	36.28	9.000	N	OFF	9.7
1.4585	10.58	46.00	35.42	9.000	N	OFF	9.7
1.4698	10.54	46.00	35.46	9.000	N	OFF	9.7
1.6655	9.77	46.00	36.23	9.000	N	OFF	9.7
20.8063	10.89	50.00	39.11	9.000	N	OFF	10.6
21.7535	10.13	50.00	39.87	9.000	N	OFF	10.6
22.6985	10.48	50.00	39.52	9.000	N	OFF	10.6
23.6435	12.24	50.00	37.76	9.000	N	OFF	10.7
24.5908	9.28	50.00	40.72	9.000	N	OFF	10.7
27.4280	10.28	50.00	39.72	9.000	N	OFF	10.8

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10. LIST OF TEST EQUIPMENT

Conducted Test

Manufacturer	Model / Equipment	Calibration Date	Calibration Interval	Serial No.
Rohde & Schwarz	ENV216 / LISN	09/04/2020	Annual	102245
Rohde & Schwarz	ESR / EMI Test Receiver	06/17/2021	Annual	101910
ESPEC	SU-642 /Temperature Chamber	07/30/2020	Annual	0093000718
Agilent	N9020A / Signal Analyzer	05/03/2021	Annual	MY51110085
Agilent	N9030A / Signal Analyzer	03/09/2021	Annual	MY49432108
Agilent	N1911A / Power Meter	04/08/2021	Annual	MY45100523
Agilent	N1921A / Power Sensor	04/08/2021	Annual	MY57820067
Agilent	87300B / Directional Coupler	11/10/2020	Annual	3116A03621
Hewlett Packard	11667B / Power Splitter	02/09/2021	Annual	10545
HP	E3632A / DC Power Supply	09/16/2020	Annual	MY40004427
HP	8493C / Attenuator(10 dB)(DC-26.5 GHz)	06/18/2021	Annual	07560
HP	8493C / Attenuator(10 dB)(DC-26.5 GHz)	06/28/2021	Annual	08285
Rohde & Schwarz	18N-20dB / Attenuator(20 dB)	03/08/2021	Annual	8
Rohde & Schwarz	EMC32 / Software	N/A	N/A	N/A
HCT CO., LTD.	FCC WLAN&BT&BLE Conducted Test Software v3.0	N/A	N/A	N/A
Rohde & Schwarz	CBT / Bluetooth Tester	02/23/2021	Annual	100808

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

Radiated Test

Manufacturer	Model / Equipment	Calibration Date	Calibration Interval	Serial No.
Innco system	CO3000 / Controller(Antenna mast)	N/A	N/A	CO3000-4p
Innco system	MA4640/800-XP-EP / Antenna Position Tower	N/A	N/A	N/A
Audix	EM1000 / Controller	N/A	N/A	060520
Audix	Turn Table	N/A	N/A	N/A
TNM system	FBSM-01B / Amp & Filter Bank Switch Controller	N/A	N/A	TM19050002
Schwarzbeck	Loop Antenna	03/19/2020	Biennial	1513-333
Schwarzbeck	VULB 9168 / Hybrid Antenna	08/02/2019	Biennial	9168-1039
Schwarzbeck	BBHA 9120D / Horn Antenna	08/01/2019	Biennial	912D-1151
Schwarzbeck	BBHA9170 / Horn Antenna(15 GHz ~ 40 GHz)	04/12/2021	Biennial	BBHA9170124
Rohde & Schwarz	FSV(10 Hz ~ 40 GHz) / Spectrum Analyzer	05/14/2021	Annual	101055
Wainwright Instruments	WRCJV2400/2483.5-2370/2520-60/12SS / Band Reject Filter	01/06/2021	Annual	2
Wainwright Instruments	WRCJV12-4900-5100-5900-6100-50SS	06/24/2021	Annual	5
Wainwright Instruments	WRCJV12-4900-5100-5900-6100-50SS	06/24/2021	Annual	6
CERNEX	CBL18265035 / Power Amplifier	12/04/2020	Annual	22966
CERNEX	CBL26405040 / Power Amplifier	03/23/2021	Annual	25956
TESCOM	TC-3000C / Bluetooth Tester	04/19/2021	Annual	3000C000175
TNM system	FMSR-05B / HPF(3~18 GHz) + LNA1(1~18 GHz)	01/20/2021	Annual	F6
TNM system	FMSR -05B / ATT(10 dB) + LNA1(1~18 GHz)	01/20/2021	Annual	None
TNM system	FMSR -05B / ATT(3 dB) + LNA1(1~18 GHz)	01/20/2021	Annual	None
TNM system	FMSR -05B / LNA1(1~18 GHz)	01/20/2021	Annual	25540
TNM system	FMSR -05B / HPF(7~18 GHz) + LNA2(6~18 GHz)	01/20/2021	Annual	28550
TNM system	FMSR -05B / Thru(30 MHz ~ 18 GHz)	01/20/2021	Annual	None

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-2108-FI004-P