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TEST REPORT

FCC DTS Test for IML-C6400W

APPLICANT
Infomark Co.,Ltd.

REPORT NO.
HCT-RF-2301-FC086

DATE OF ISSUE
January 31, 2023

Tested by
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Additional Model
-

Applicant	**Infomark Co., Ltd.** 8F, 321, Hwangsaeul-ro, Bundang-gu, Seongnam-si, Gyeonggi-do, 13590, KOREA
Eut Type Model Name	LTE Mobile WiFi IML-C6400W
FCC ID	YCO-IML-C6400W
Max. RF Output Power	802.11b : 14.01 dBm, 802.11g : 16.67 dBm, 802.11n(HT20) : 17.01 dBm, 802.11n(HT40) : 17.14 dBm
Modulation type	CCK/DSSS/OFDM
FCC Classification	Digital Transmission System(DTS)
FCC Rule Part(s)	Part 15.247

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	January 31, 2023	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 Rules under normal use and maintenance

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

CONTENTS

1. EUT DESCRIPTION

Model	IML-C6400W
Additional Model	-
EUT Type	LTE Mobile WiFi
Battery Capacity	3,300mAh
Limited Charging(V)	4.35 V
Rated Voltage (V)	3.80 V
Discharging Cut-off (V)	3.00 V
Charging	DC 5V / 2A with Type-C USB Connector
Frequency Range	2 412 MHz ~ 2 472 MHz
Max. RF Output Power	**Peak Power** 802.11b : 14.01 dBm, 802.11g : 16.67 dBm, 802.11n(HT20) : 17.01 dBm, 802.11n(HT40) : 17.14 dBm **Average Power** 802.11b : 8.26 dBm, 802.11g : 8.26 dBm, 802.11n(HT20) : 8.43 dBm, 802.11n(HT40) : 8.79 dBm
Modulation Type	DSSS/CCK : 802.11b OFDM : 802.11g, 802.11n
Number of Channels	13 Channels
Antenna Specification	Antenna type: Dielectric Chip Antenna Peak Gain : 1.99 dBi
Date(s) of Tests	December 13, 2022 ~ January 31, 2023
EUT serial numbers	Conducted : 980091 Radiated : 980088

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 1.5m 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, 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.

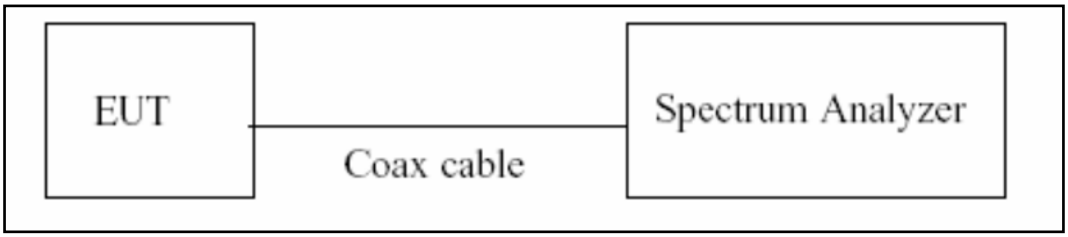
The measurement data shown herein meets or exceeds the U_{CISPR} measurement uncertainty values specified in CISPR 16-4-2 and, thus, can be compared directly to specified limits to determine compliance.

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*.

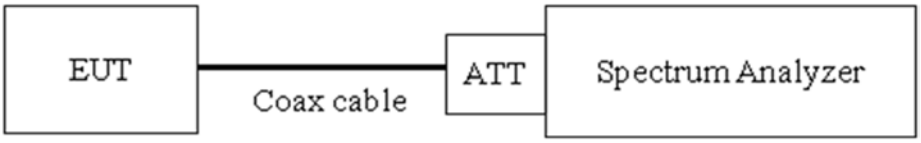
1. RBW = 8 MHz (the largest available value)
2. VBW = 8 MHz (≥ RBW)
3. SPAN = 0 Hz
4. Detector = Peak
5. Number of points in sweep > 100
6. Trace mode = Clear write
7. Measure T_{total} and T_{on}
8. Calculate Duty Cycle = T_{on}/ T_{total} and Duty Cycle Factor = 10log(1/Duty Cycle)

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.

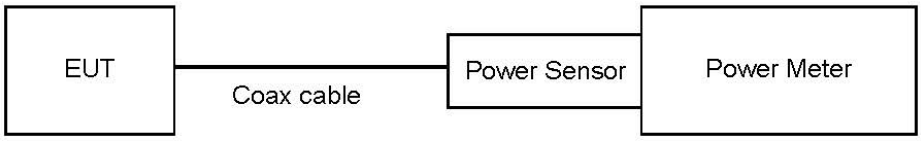
Note : We tested OBW using the automatic bandwidth measurement capability of a spectrum analyzer.

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

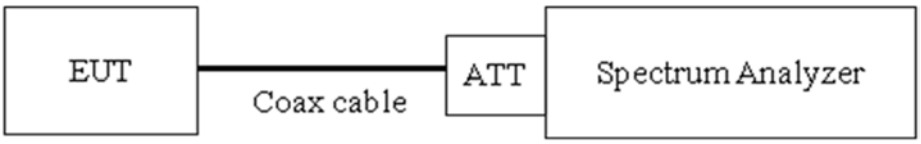
- Conducted Output Power(Peak) = Measured Value + ATT loss + Cable loss
- Conducted Output Power(Average) = Measured Value + ATT loss + Cable loss + Duty Cycle Factor

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 11.10.2 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 Level exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

Sample Calculation

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

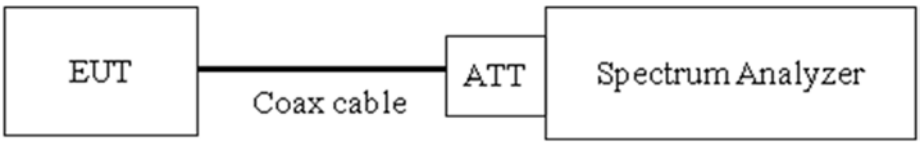
7.5. Conducted Band Edge(Out of Band Emissions) & Conducted Spurious Emissions

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 20 dB relative to the maximum in-band peak PSD level in 100 kHz.

[Conducted > 20 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	10.40
100	10.45
200	10.49
300	10.54
400	10.60
500	10.60
600	10.61
700	10.62
800	10.63
900	10.65
1000	10.70
2000	10.85
2400	10.90
2480	10.90
2500	10.90
3000	10.90
4000	10.95
5000	10.99
5150	11.07
5850	11.14
6000	11.15
7000	11.22
8000	11.23
9000	11.36
10000	11.36
11000	11.44
12000	11.54
13000	11.63
14000	11.72
15000	11.73
16000	11.76
17000	11.86
18000	11.94
19000	12.15
20000	12.28
21000	12.20
22000	11.87
23000	12.00
24000	11.99
25000	12.00
26000	12.01

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

2. Factor = Attenuator loss + Cable loss

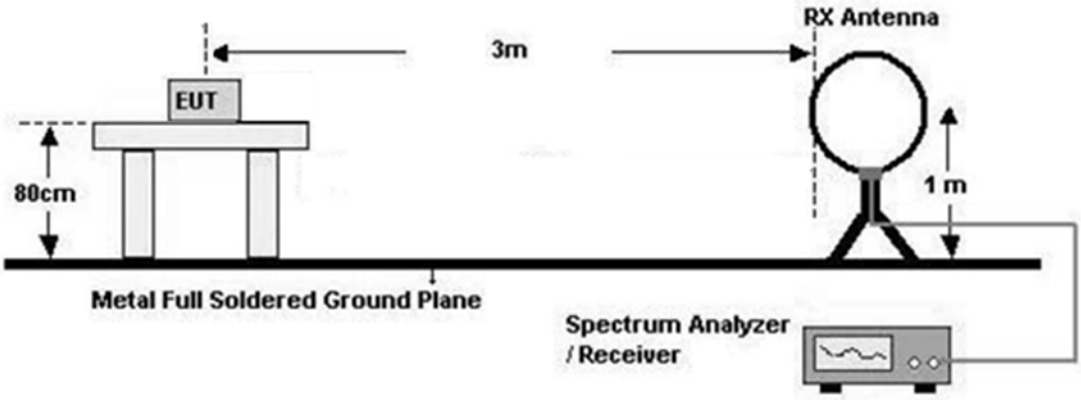
7.6. Radiated Test

Limit

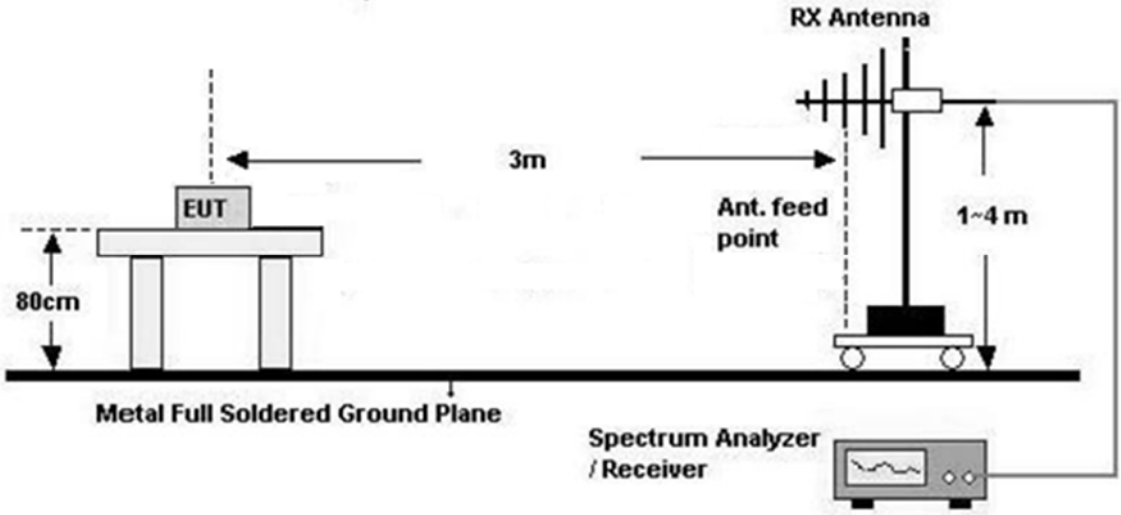
Frequency (MHz)	Field Strength (μV/m)	Measurement Distance (m)
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Test Configuration

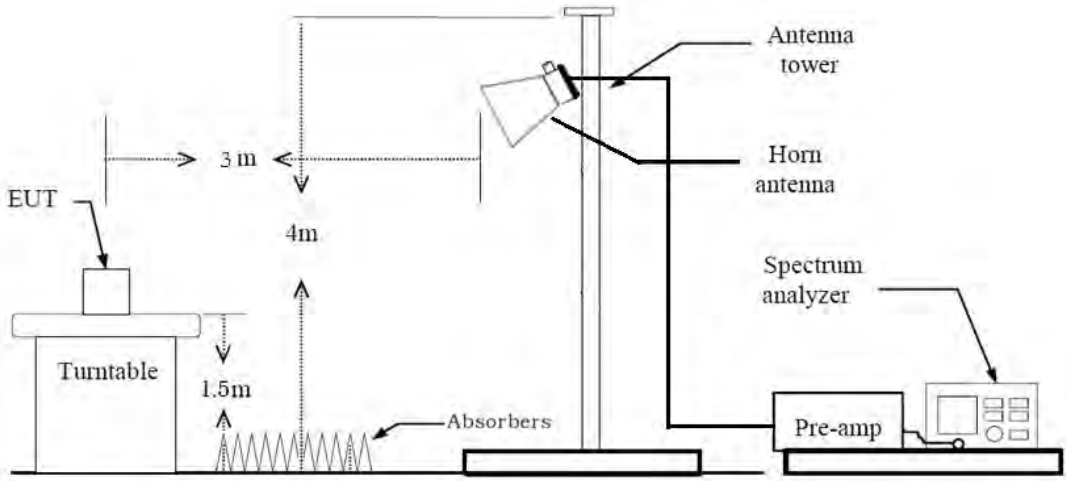
Below 30 MHz



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 = Max hold
   - 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 = Max hold
      - 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. 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 = Max hold
- 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.

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.
9. Distance extrapolation factor = 20log (test distance / specific distance) (dB)
10. 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 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. Spectrum Setting
   (1) Measurement Type(Peak):
      - Measured Frequency Range : 2310 MHz ~ 2390 MHz/ 2483.5 MHz ~ 2500 MHz
      - Detector = Peak
      - Trace = Max hold
      - 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.

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.
9. Distance extrapolation factor = 20log (test distance / specific distance) (dB)
10. Total(Measurement Type : Peak)
    = Measured Value + Antenna Factor(A.F) + Cable Loss(C.L) + Distance Factor(D.F) – Amp Gain(A.G)

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

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

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 Level + Correction Factor

7.8. Worst case configuration and mode

Radiated test

1. All modes of operation were investigated and the worst case configuration results are reported.
   - Mode : Stand alone
   - Mode : Stand alone
2. EUT Axis
   - Radiated Spurious Emissions : Y
   - Radiated Restricted Band Edge : X
3. All data rate of operation were investigated and the worst case data rate results are reported
   - 802.11b : 1 Mbps
   - 802.11g : 6 Mbps
   - 802.11n : MCS0
4. 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

Conducted test

1. The EUT was configured with data rate of the highest power.

8. SUMMARY TEST OF RESULTS

Test Description	FCC Part Section(s)	Test Limit	Test Condition	Test Result
6 dB Bandwidth	§ 15.247(a)(2)	> 500 kHz	Conducted	PASS
Conducted Maximum Output Power	§ 15.247(b)(3)	< 1 Watt		PASS
Power Spectral Density	§ 15.247(e)	< 8 dBm / 3 kHz Band		PASS
Band Edge (Out of Band Emissions)	§ 15.247(d)	Conducted > 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

9. TEST RESULT

9.1 DUTY CYCLE

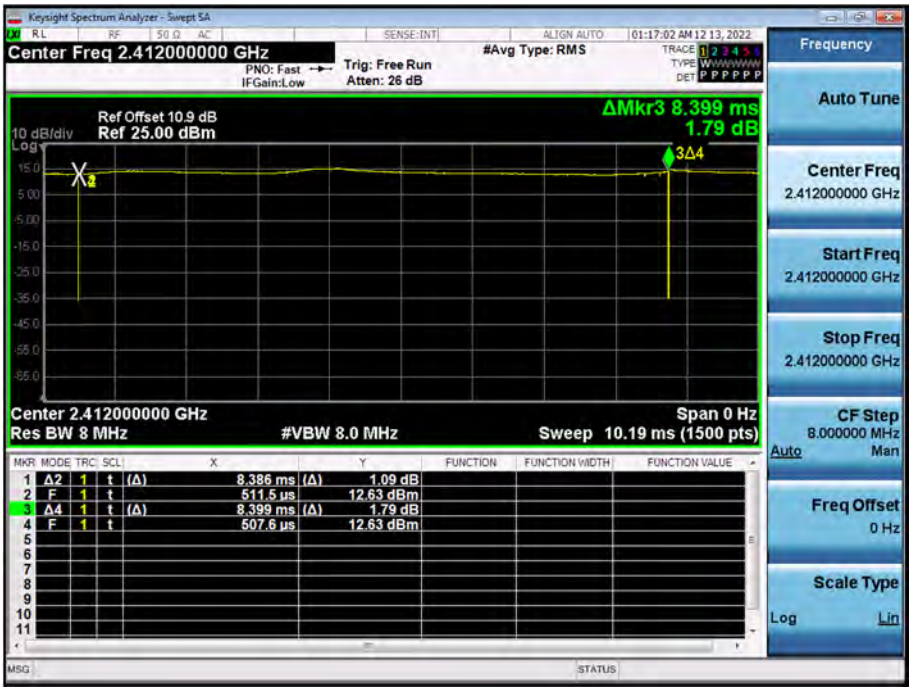
Mode	Data Rate	T_{on} (ms)	T_{total} (ms)	Duty Cycle	Duty Cycle Factor (dB)
802.11b	1 Mbps	8.386	8.399	0.998	0.007
	2 Mbps	4.193	4.200	0.998	0.007
	5.5 Mbps	1.586	1.599	0.992	0.035
	11 Mbps	0.838	0.851	0.985	0.065
802.11g	6 Mbps	1.390	1.409	0.987	0.059
	9 Mbps	0.936	0.951	0.984	0.071
	12 Mbps	0.708	0.725	0.977	0.102
	18 Mbps	0.480	0.495	0.969	0.137
	24 Mbps	0.364	0.380	0.959	0.180
	36 Mbps	0.252	0.268	0.942	0.258
	48 Mbps	0.192	0.208	0.921	0.359
	54 Mbps	0.176	0.192	0.917	0.378
802.11n (HT20)	MCS 0	1.299	1.318	0.986	0.063
	MCS 1	0.667	0.684	0.976	0.107
	MCS 2	0.459	0.475	0.966	0.149
	MCS 3	0.352	0.369	0.955	0.199
	MCS 4	0.248	0.264	0.939	0.272
	MCS 5	0.196	0.212	0.925	0.341
	MCS 6	0.180	0.196	0.918	0.370
	MCS 7	0.164	0.180	0.911	0.404
802.11n (HT40)	MCS 0	0.651	0.665	0.979	0.094
	MCS 1	0.344	0.360	0.956	0.197
	MCS 2	0.240	0.257	0.933	0.299
	MCS 3	0.192	0.208	0.923	0.348
	MCS 4	0.140	0.157	0.895	0.484
	MCS 5	0.116	0.132	0.879	0.561
	MCS 6	0.104	0.120	0.863	0.642
	MCS 7	0.100	0.117	0.858	0.663

Note:

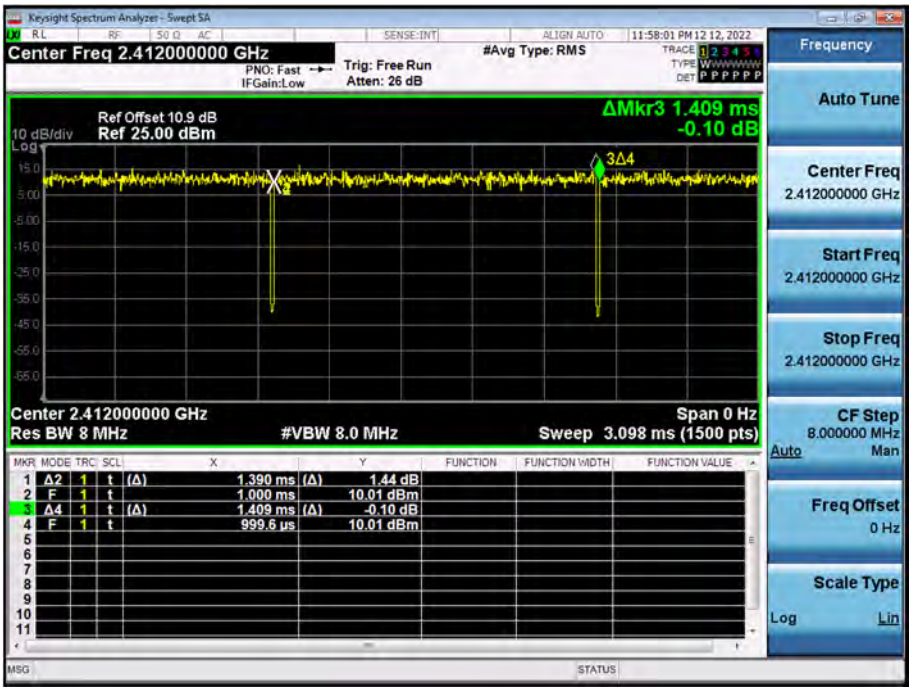
1. Duty Cycle Factor = 10log(1/Duty Cycle). where, Duty Cycle = T_{on} / T_{total}

▣ Test Plots

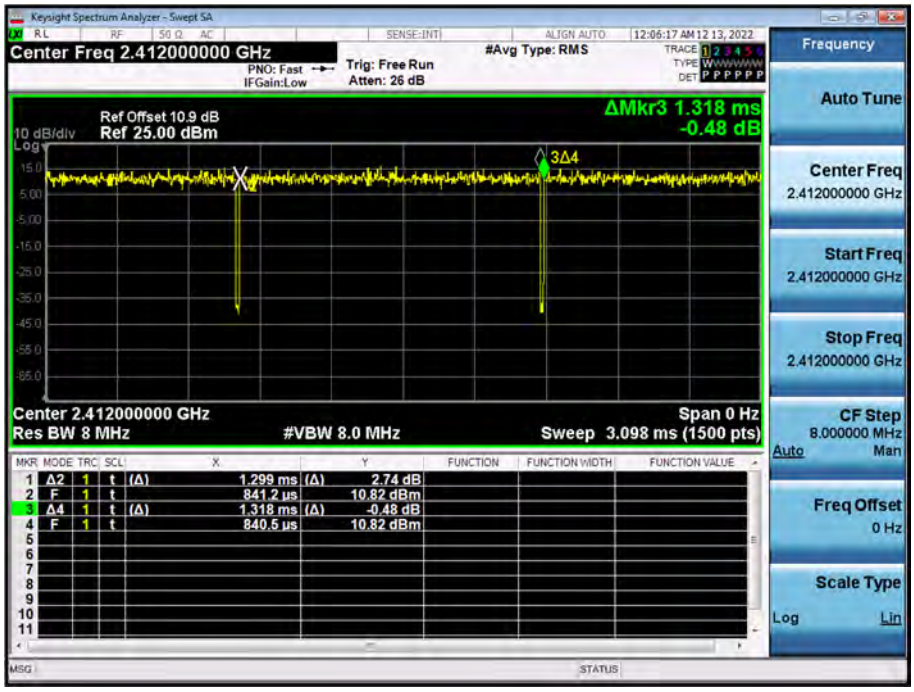
Duty cycle plot (802.11b 1 Mbps)



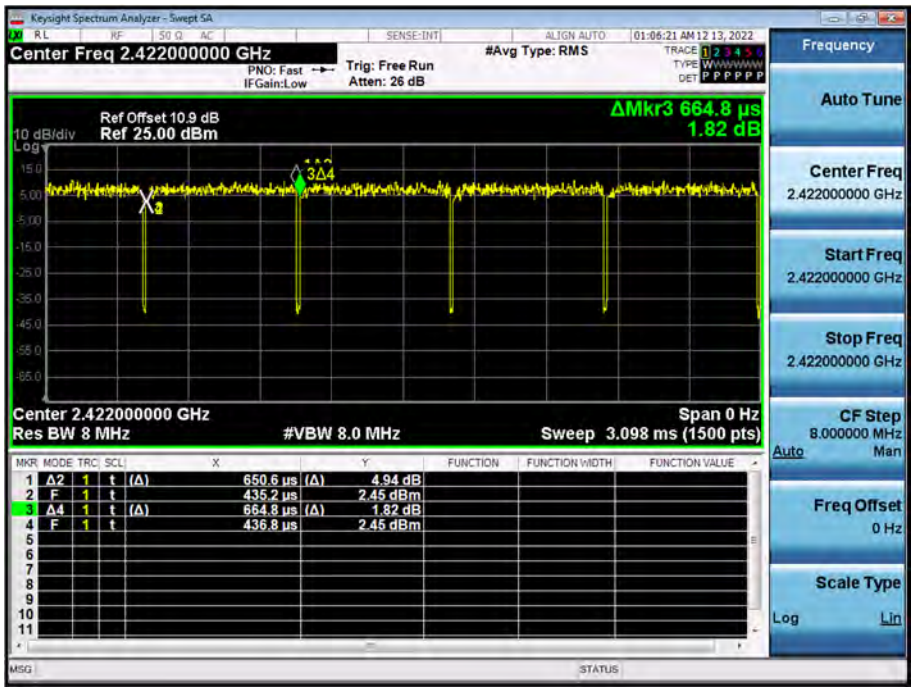
Duty cycle plot (802.11g 6 Mbps)



Duty cycle plot (802.11n(HT20) MCS0)



Duty cycle plot (802.11n(HT40) MCS0)



Note:

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

9.2 6dB BANDWIDTH & 99 % BANDWIDTH

802.11b Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]
Frequency [MHz]	Channel No.		
2412	1	10.10	> 0.5
2437	6	10.11	> 0.5
2462	11	10.11	> 0.5
2467	12	10.06	> 0.5
2472	13	9.993	> 0.5

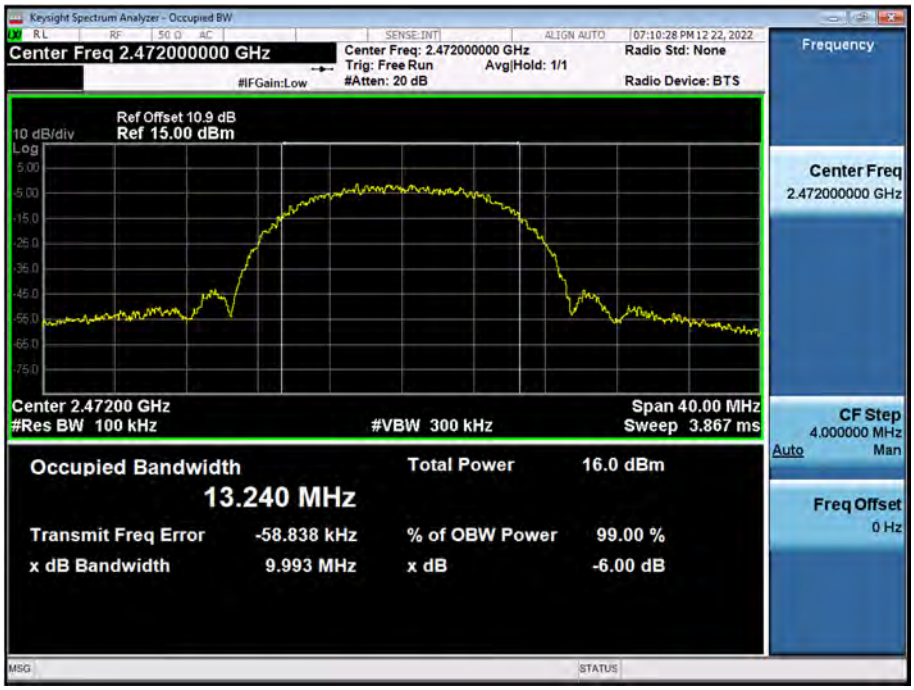
802.11g Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]
Frequency [MHz]	Channel No.		
2412	1	16.37	> 0.5
2437	6	16.42	> 0.5
2462	11	16.38	> 0.5
2467	12	16.51	> 0.5
2472	13	16.52	> 0.5

802.11n(HT20) Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]
Frequency [MHz]	Channel No.		
2412	1	17.34	> 0.5
2437	6	17.61	> 0.5
2462	11	17.35	> 0.5
2467	12	17.72	> 0.5
2472	13	17.73	> 0.5

802.11n(HT40) Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]
Frequency [MHz]	Channel No.		
2422	3	35.19	> 0.5
2437	6	35.80	> 0.5
2452	9	35.49	> 0.5

▣ Test Plots

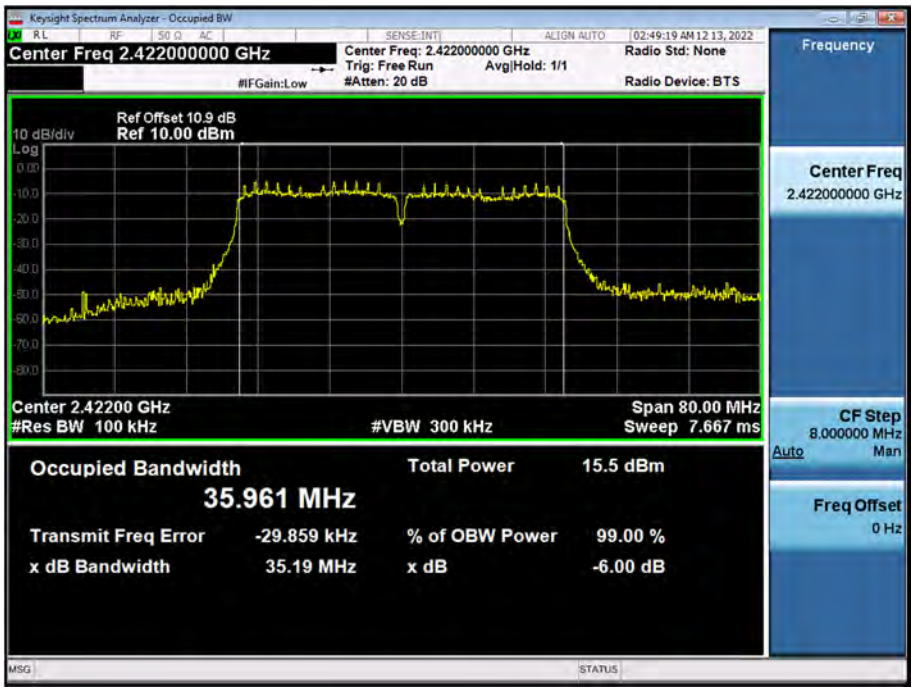
6 dB Bandwidth plot (802.11b-CH 13)



6 dB Bandwidth plot (802.11g-CH 1)

6 dB Bandwidth plot (802.11n_HT20-CH 1)

6 dB Bandwidth plot (802.11n_HT40-CH 3)



Note:

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

9.3 OUTPUT POWER

Peak Power

802.11b Mode		Rate (Mbps)	Measured Power(dBm)	Limit (dBm)
Frequency[MHz]	Channel No.			
2412	1	1	10.73	30.00
		2	11.00	30.00
		5.5	12.40	30.00
		11	13.91	30.00
2437	6	1	10.89	30.00
		2	11.15	30.00
		5.5	12.50	30.00
		11	14.01	30.00
2462	11	1	10.37	30.00
		2	10.63	30.00
		5.5	12.03	30.00
		11	13.50	30.00
2467	12	1	10.26	30.00
		2	10.52	30.00
		5.5	11.90	30.00
		11	13.40	30.00
2472	13	1	10.27	30.00
		2	10.53	30.00
		5.5	11.89	30.00
		11	13.42	30.00

802.11g Mode		Rate (Mbps)	Measured Power(dBm)	Limit (dBm)
Frequency[MHz]	Channel No.			
2412	1	6	15.99	30.00
		9	16.05	30.00
		12	15.94	30.00
		18	16.02	30.00
		24	16.47	30.00
		36	16.49	30.00
		48	16.39	30.00
		54	16.54	30.00
2437	6	6	16.14	30.00
		9	16.14	30.00
		12	16.13	30.00
		18	16.10	30.00
		24	16.58	30.00
		36	16.60	30.00
		48	16.44	30.00
		54	16.67	30.00
2462	11	6	15.63	30.00
		9	15.68	30.00
		12	15.61	30.00
		18	15.62	30.00
		24	16.11	30.00
		36	16.11	30.00
		48	16.01	30.00
		54	16.13	30.00
2467	12	6	15.39	30.00
		9	15.35	30.00
		12	15.33	30.00
		18	15.34	30.00
		24	15.81	30.00
		36	15.81	30.00
		48	15.67	30.00
		54	15.85	30.00
2472	13	6	15.48	30.00
		9	15.51	30.00
		12	15.47	30.00
		18	15.40	30.00
		24	15.91	30.00
		36	15.95	30.00
		48	15.77	30.00
		54	16.00	30.00

802.11n(HT20) Mode		MCS Index	Measured Power(dBm)	Limit (dBm)
Frequency[MHz]	Channel No.			
2412	1	0	16.21	30.00
		1	16.21	30.00
		2	16.22	30.00
		3	16.86	30.00
		4	16.66	30.00
		5	16.78	30.00
		6	16.72	30.00
		7	16.64	30.00
2437	6	0	16.41	30.00
		1	16.42	30.00
		2	16.40	30.00
		3	17.01	30.00
		4	16.93	30.00
		5	16.91	30.00
		6	16.83	30.00
		7	16.87	30.00
2462	11	0	15.86	30.00
		1	15.92	30.00
		2	15.89	30.00
		3	16.50	30.00
		4	16.30	30.00
		5	16.40	30.00
		6	16.34	30.00
		7	16.26	30.00
2467	12	0	15.73	30.00
		1	15.76	30.00
		2	15.74	30.00
		3	16.44	30.00
		4	16.13	30.00
		5	16.29	30.00
		6	16.23	30.00
		7	16.18	30.00
2472	13	0	14.64	30.00
		1	14.67	30.00
		2	14.71	30.00
		3	15.33	30.00
		4	15.11	30.00
		5	15.19	30.00
		6	15.20	30.00
		7	15.08	30.00

802.11n(HT40) Mode		MCS Index	Measured Power(dBm)	Limit (dBm)
Frequency[MHz]	Channel No.			
2422	3	0	16.71	30.00
		1	16.71	30.00
		2	16.74	30.00
		3	17.14	30.00
		4	17.03	30.00
		5	17.07	30.00
		6	17.13	30.00
		7	17.13	30.00
2437	6	0	16.09	30.00
		1	16.10	30.00
		2	16.11	30.00
		3	16.57	30.00
		4	16.45	30.00
		5	16.43	30.00
		6	16.50	30.00
		7	16.53	30.00
2452	9	0	16.45	30.00
		1	16.50	30.00
		2	16.44	30.00
		3	16.88	30.00
		4	16.85	30.00
		5	16.81	30.00
		6	16.86	30.00
		7	16.85	30.00

Average Power

Note :
1. Total Power = Measured Power + Duty Cycle Factor

802.11b Mode		Rate (Mbps)	Measured Power (dBm)	Duty Cycle Factor	Total Power (dBm)	Limit (dBm)
Frequency [MHz]	Channel No.					
2412	1	1	8.08	0.000	8.08	30.00
		2	7.97	0.007	7.98	30.00
		5.5	7.96	0.035	8.00	30.00
		11	7.92	0.065	7.99	30.00
2437	6	1	8.26	0.000	8.26	30.00
		2	8.16	0.007	8.17	30.00
		5.5	8.11	0.035	8.15	30.00
		11	8.09	0.065	8.15	30.00
2462	11	1	7.72	0.000	7.72	30.00
		2	7.60	0.007	7.60	30.00
		5.5	7.56	0.035	7.60	30.00
		11	7.52	0.065	7.59	30.00
2467	12	1	7.68	0.000	7.68	30.00
		2	7.65	0.007	7.65	30.00
		5.5	7.60	0.035	7.64	30.00
		11	7.58	0.065	7.65	30.00
2472	13	1	7.73	0.000	7.73	30.00
		2	7.71	0.007	7.72	30.00
		5.5	7.64	0.035	7.67	30.00
		11	7.61	0.065	7.68	30.00

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	8.06	0.059	8.12	30.00
		9	7.95	0.071	8.02	30.00
		12	7.93	0.102	8.03	30.00
		18	7.88	0.137	8.02	30.00
		24	7.84	0.180	8.02	30.00
		36	7.74	0.258	8.00	30.00
		48	7.67	0.359	8.03	30.00
		54	7.65	0.378	8.03	30.00
2437	6	6	8.20	0.059	8.26	30.00
		9	8.17	0.071	8.24	30.00
		12	8.14	0.102	8.25	30.00
		18	8.10	0.137	8.24	30.00
		24	8.03	0.180	8.21	30.00
		36	7.94	0.258	8.20	30.00
		48	7.86	0.359	8.22	30.00
		54	7.84	0.378	8.22	30.00
2462	11	6	7.71	0.059	7.77	30.00
		9	7.58	0.071	7.65	30.00
		12	7.57	0.102	7.67	30.00
		18	7.52	0.137	7.66	30.00
		24	7.47	0.180	7.65	30.00
		36	7.39	0.258	7.65	30.00
		48	7.29	0.359	7.65	30.00
		54	7.29	0.378	7.67	30.00
2467	12	6	7.67	0.059	7.73	30.00
		9	7.49	0.071	7.57	30.00
		12	7.49	0.102	7.59	30.00
		18	7.43	0.137	7.57	30.00
		24	7.38	0.180	7.56	30.00
		36	7.30	0.258	7.55	30.00
		48	7.21	0.359	7.57	30.00
		54	7.19	0.378	7.57	30.00
2472	13	6	7.70	0.059	7.76	30.00
		9	7.67	0.071	7.74	30.00
		12	7.66	0.102	7.76	30.00
		18	7.60	0.137	7.74	30.00
		24	7.57	0.180	7.75	30.00
		36	7.43	0.258	7.69	30.00
		48	7.39	0.359	7.74	30.00
		54	7.36	0.378	7.74	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	8.22	0.063	8.28	30.00
		1	8.08	0.107	8.19	30.00
		2	8.03	0.149	8.18	30.00
		3	7.98	0.199	8.18	30.00
		4	7.92	0.272	8.19	30.00
		5	7.84	0.341	8.18	30.00
		6	7.80	0.370	8.17	30.00
		7	7.70	0.404	8.10	30.00
2437	6	0	8.37	0.063	8.43	30.00
		1	8.31	0.107	8.41	30.00
		2	8.28	0.149	8.43	30.00
		3	8.20	0.199	8.40	30.00
		4	8.05	0.272	8.32	30.00
		5	8.02	0.341	8.36	30.00
		6	7.99	0.370	8.36	30.00
		7	7.99	0.404	8.39	30.00
2462	11	0	7.90	0.063	7.96	30.00
		1	7.83	0.107	7.94	30.00
		2	7.77	0.149	7.92	30.00
		3	7.73	0.199	7.93	30.00
		4	7.63	0.272	7.90	30.00
		5	7.55	0.341	7.89	30.00
		6	7.53	0.370	7.90	30.00
		7	7.47	0.404	7.88	30.00
2467	12	0	7.86	0.063	7.92	30.00
		1	7.81	0.107	7.92	30.00
		2	7.76	0.149	7.91	30.00
		3	7.71	0.199	7.91	30.00
		4	7.64	0.272	7.91	30.00
		5	7.57	0.341	7.92	30.00
		6	7.53	0.370	7.90	30.00
		7	7.50	0.404	7.90	30.00
2472	13	0	7.82	0.063	7.88	30.00
		1	7.77	0.107	7.87	30.00
		2	7.73	0.149	7.88	30.00
		3	7.67	0.199	7.87	30.00
		4	7.59	0.272	7.86	30.00
		5	7.54	0.341	7.88	30.00
		6	7.48	0.370	7.85	30.00
		7	7.45	0.404	7.85	30.00

802.11n(HT40) Mode		MCS Index	Measured Power (dBm)	Duty Cycle Factor	Measured Power(dBm) + Duty Cycle Factor	Limit (dBm)
Frequency [MHz]	Channel No.					
2422	3	0	8.00	0.094	8.09	30.00
		1	7.80	0.197	8.00	30.00
		2	7.74	0.299	8.04	30.00
		3	7.66	0.348	8.01	30.00
		4	7.52	0.484	8.01	30.00
		5	7.42	0.561	7.98	30.00
		6	7.38	0.642	8.02	30.00
		7	7.37	0.663	8.03	30.00
2437	6	0	8.70	0.094	8.79	30.00
		1	8.52	0.197	8.71	30.00
		2	8.46	0.299	8.76	30.00
		3	8.39	0.348	8.73	30.00
		4	8.27	0.484	8.76	30.00
		5	8.14	0.561	8.70	30.00
		6	8.07	0.642	8.72	30.00
		7	8.06	0.663	8.72	30.00
2452	9	0	8.03	0.094	8.12	30.00
		1	7.84	0.197	8.04	30.00
		2	7.70	0.299	8.00	30.00
		3	7.68	0.348	8.03	30.00
		4	7.56	0.484	8.04	30.00
		5	7.49	0.561	8.05	30.00
		6	7.37	0.642	8.01	30.00
		7	7.36	0.663	8.02	30.00

9.4 POWER SPECTRAL DENSITY

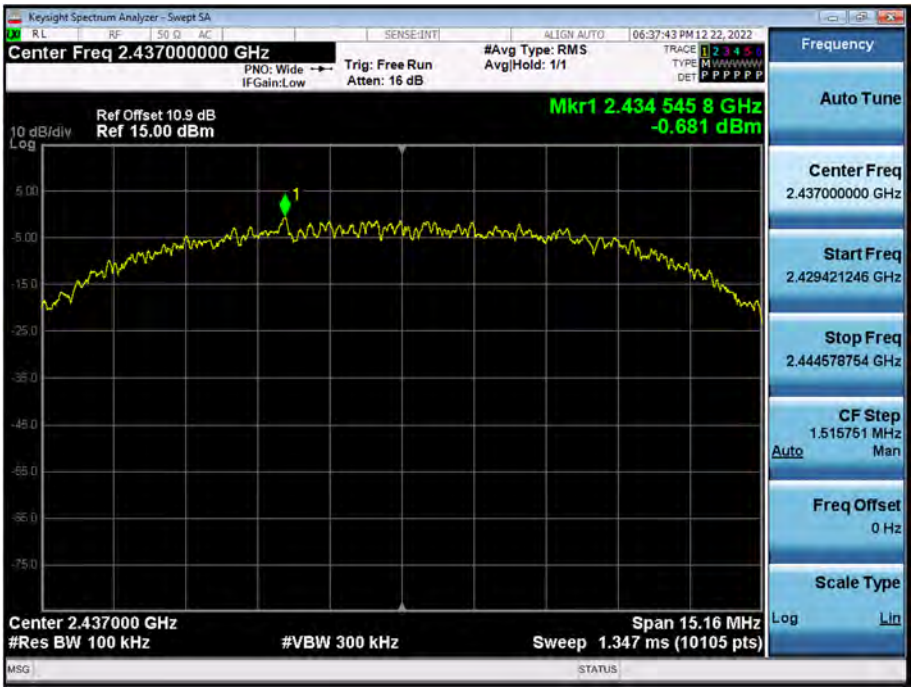
Mode	Frequency (MHz)	Channel No.	Test Result	
			PSD (dBm)	Limit
802.11b	2412	1	-1.161	8 dBm/3 kHz
	2437	6	-0.681	
	2462	11	-1.243	
	2437	12	-1.333	
	2462	13	-1.292	
802.11g	2412	1	-1.760	
	2437	6	-2.191	
	2462	11	-2.658	
	2437	6	-2.612	
	2462	11	-2.608	
802.11n(HT20)	2412	1	-1.799	
	2437	6	-2.234	
	2462	11	-2.694	
	2437	12	-2.585	
	2462	13	-2.572	
802.11n(HT40)	2422	3	-3.808	
	2437	6	-5.088	
	2452	9	-3.678	

Note :

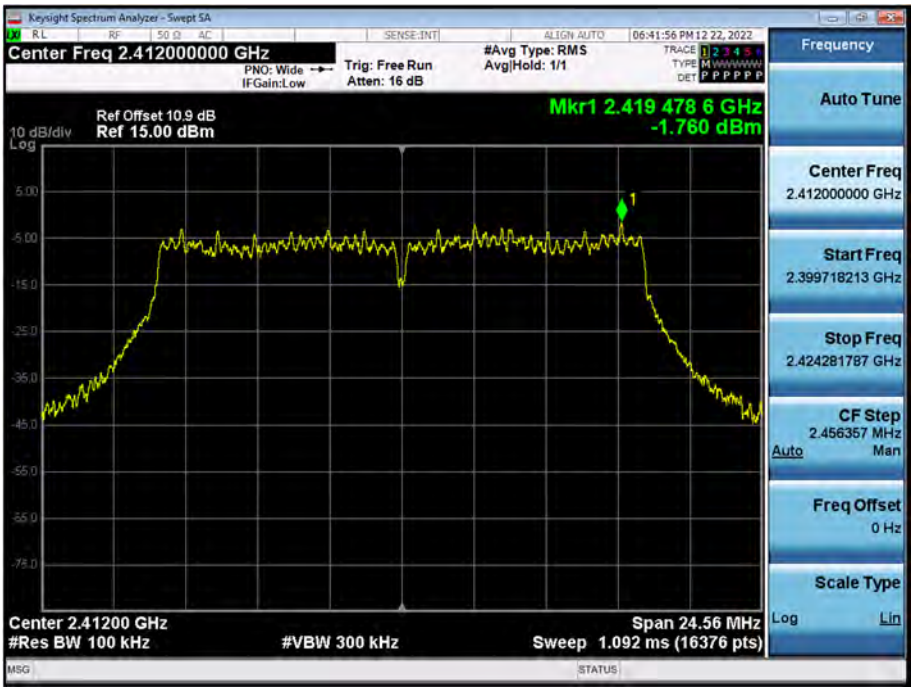
1. Spectrum Measured Levels are not plot data.
   The PSD results in plot is already including the actual values of loss for the attenuator and cable combination.

▣ Test Plots

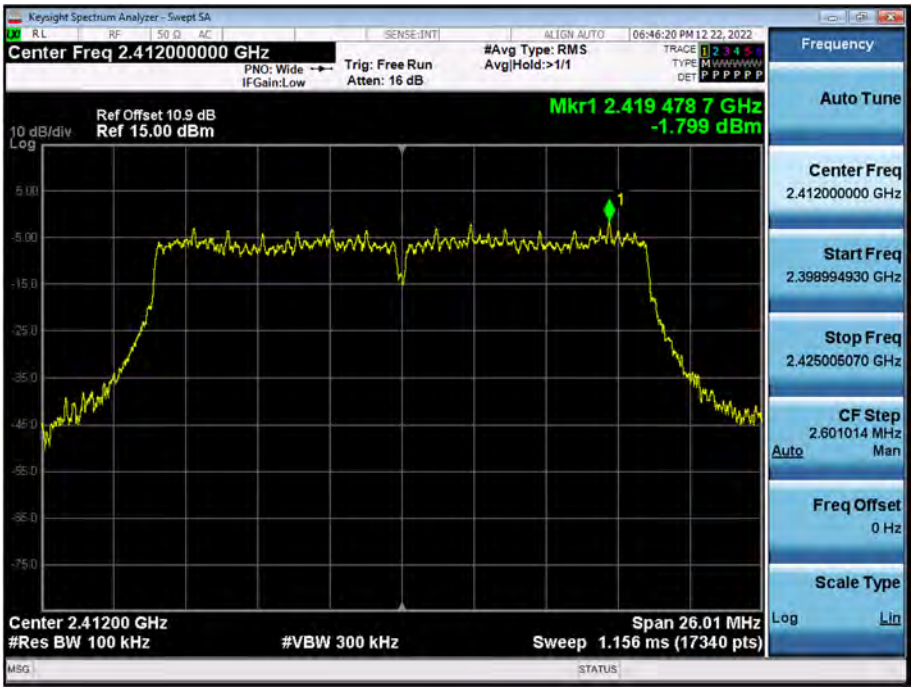
Power Spectral Density (802.11b-CH 6)



Power Spectral Density (802.11g-CH 1)



Power Spectral Density (802.11n_HT20 –CH 1)



Power Spectral Density (802.11n_HT40 –CH 9)

Note :

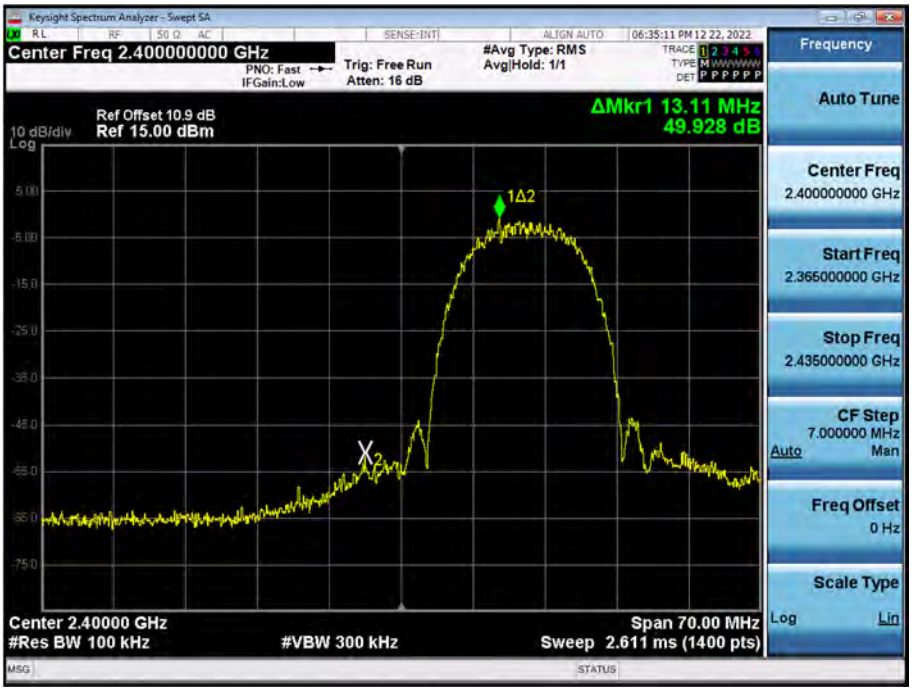
In order to simplify the report, attached plots were only the worst case PSD channel.

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.

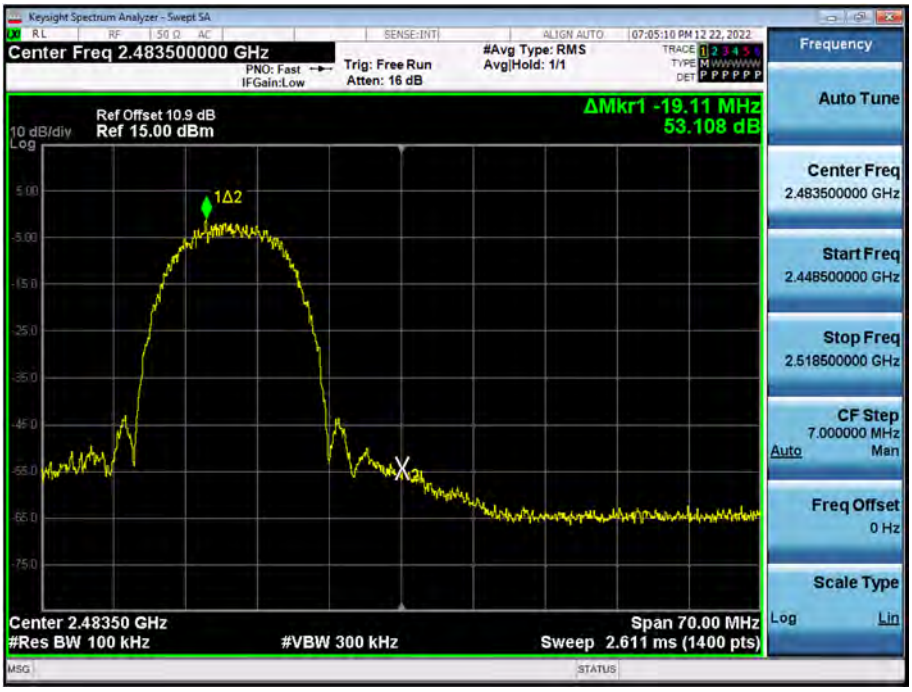
▣ Test Plots(BandEdge)

Band Edge (802.11b-CH1)

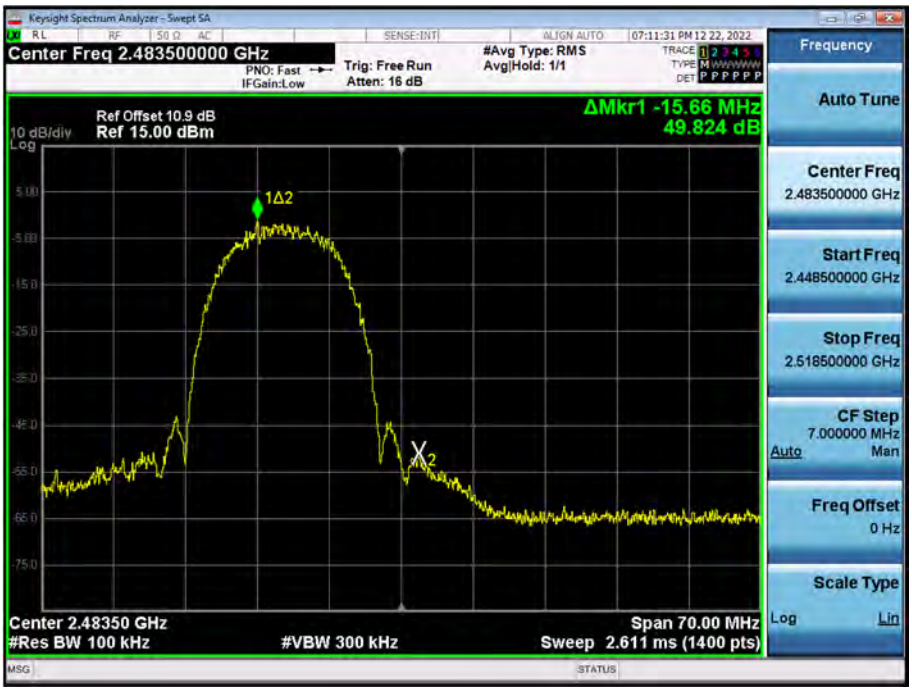


Band Edge (802.11b-CH11)

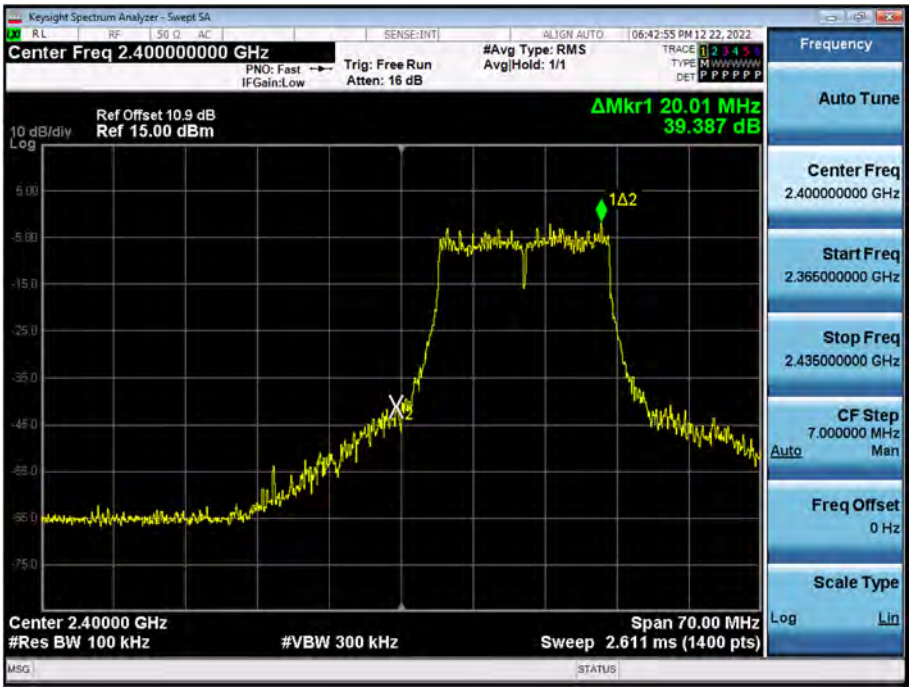
Band Edge (802.11b-CH12)



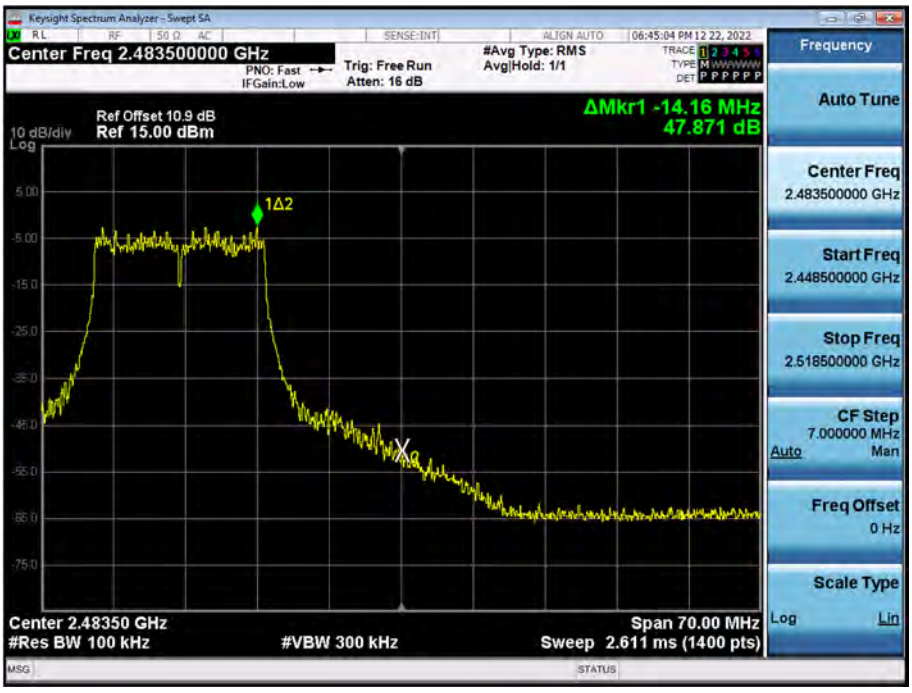
Band Edge (802.11b-CH13)



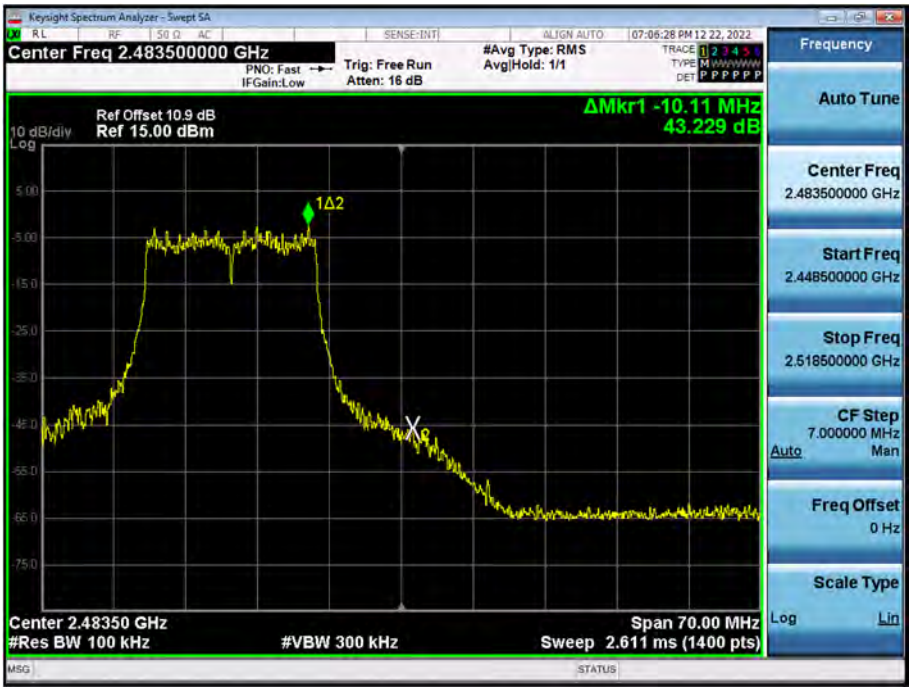
Band Edge (802.11g-CH1)



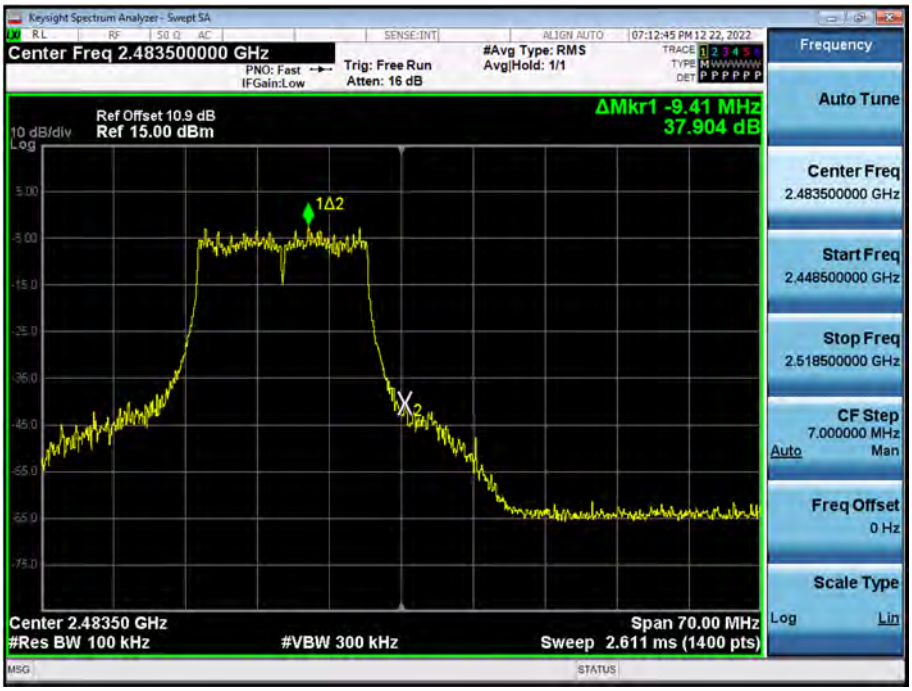
Band Edge (802.11g-CH11)



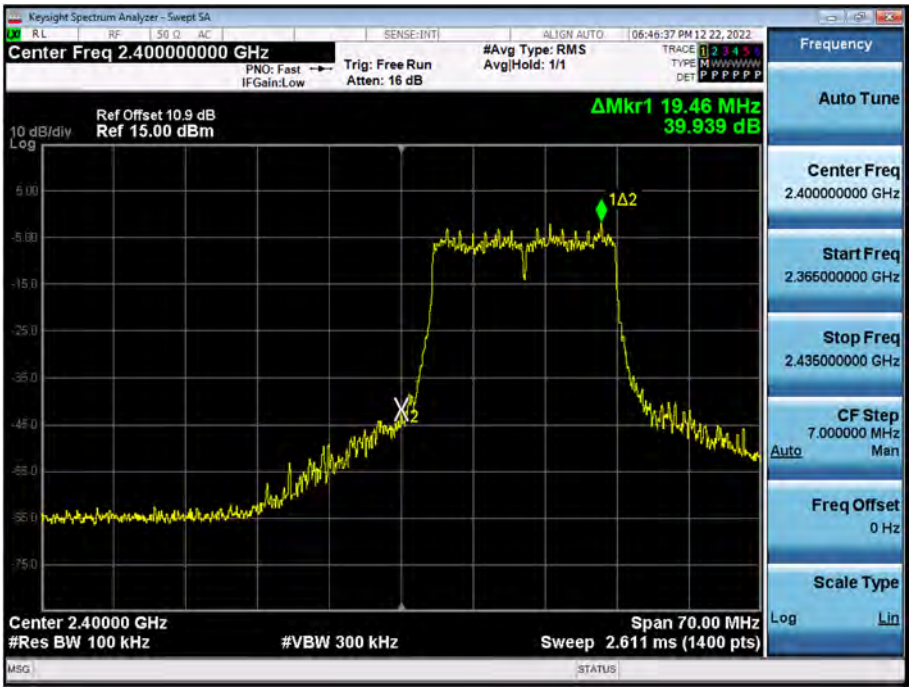
Band Edge (802.11g-CH12)



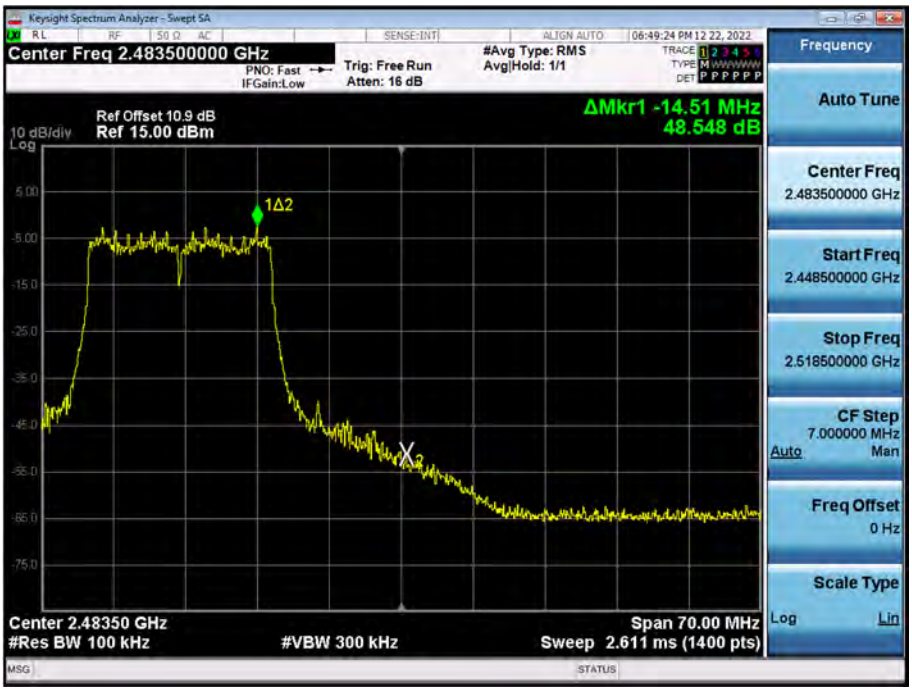
Band Edge (802.11g-CH13)



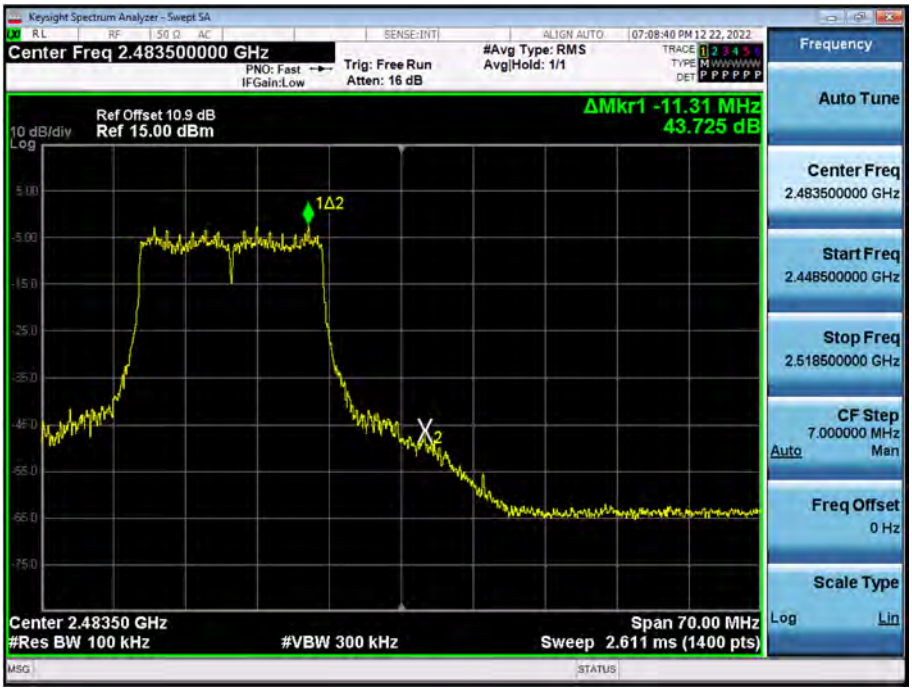
Band Edge (802.11n_HT20 -CH1)



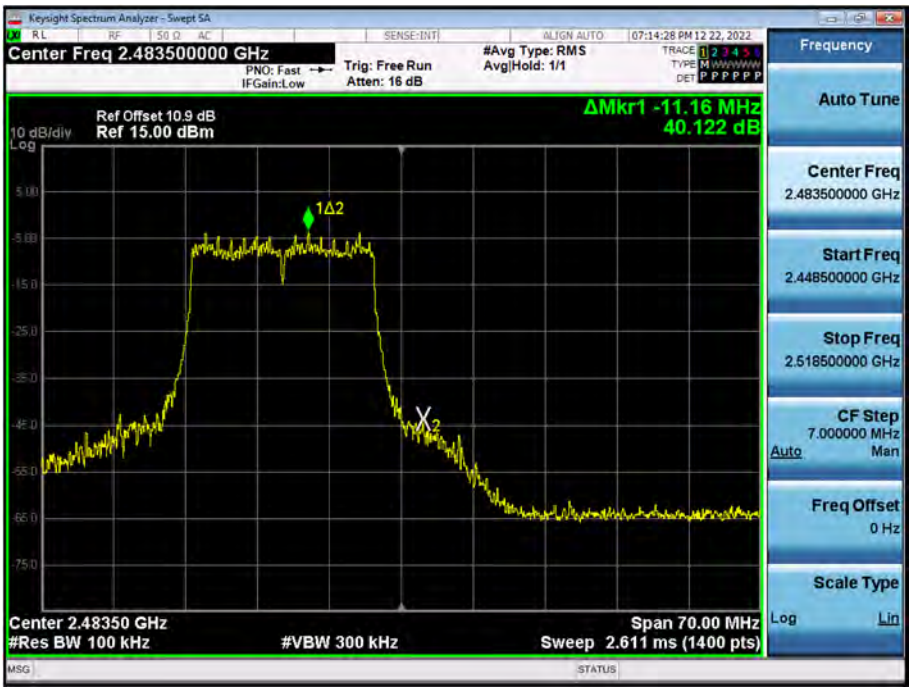
Band Edge (802.11n_HT20 -CH11)



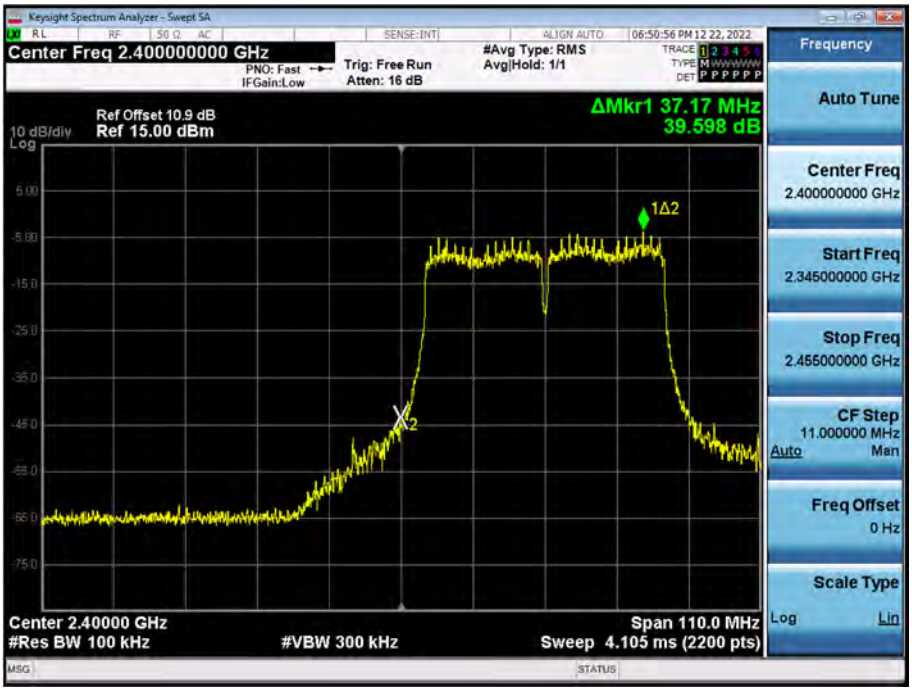
Band Edge (802.11n_HT20 -CH12)



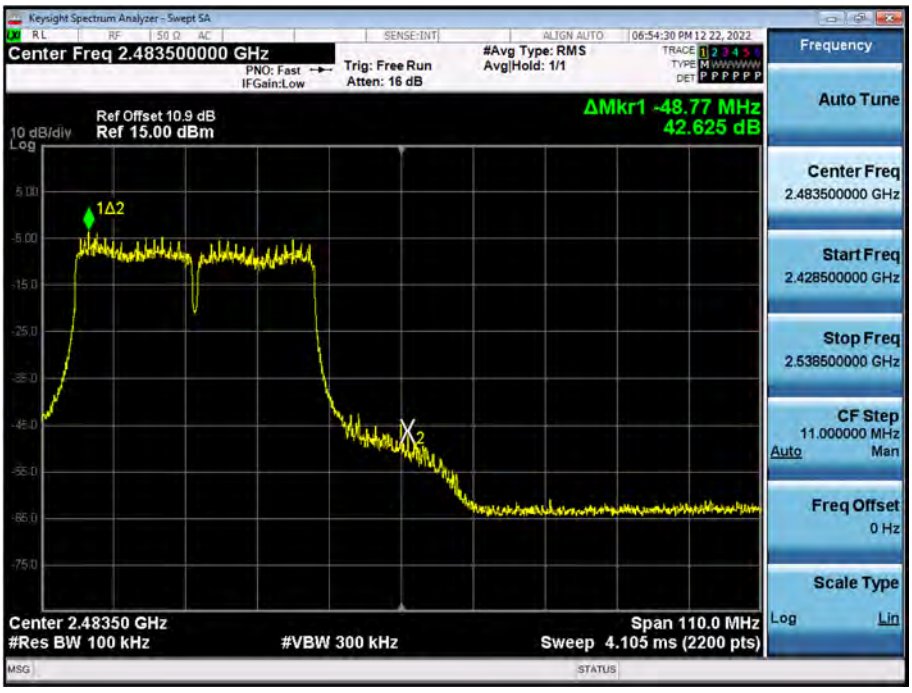
Band Edge (802.11n_HT20 -CH13)



Band Edge (802.11n_HT40 –CH3)

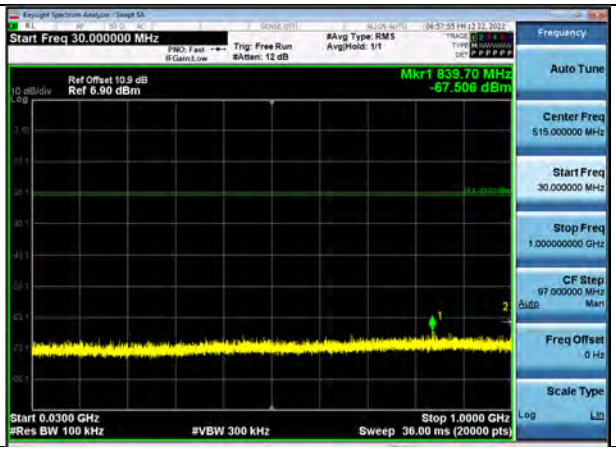
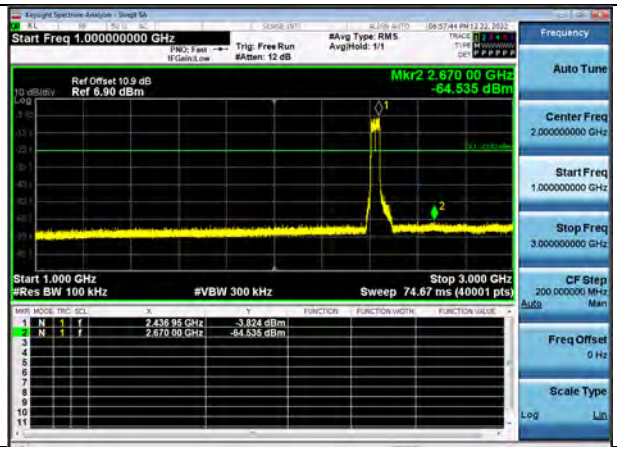
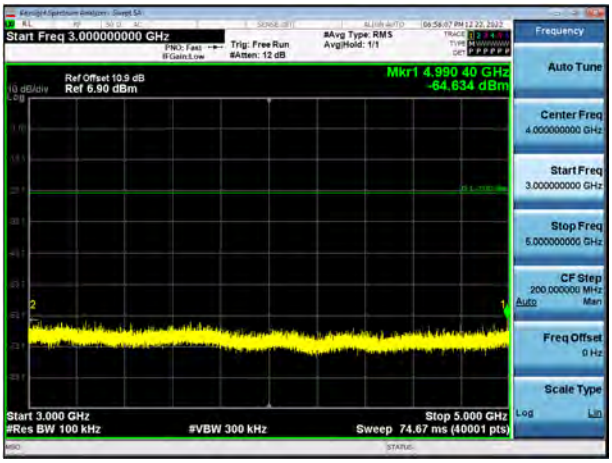
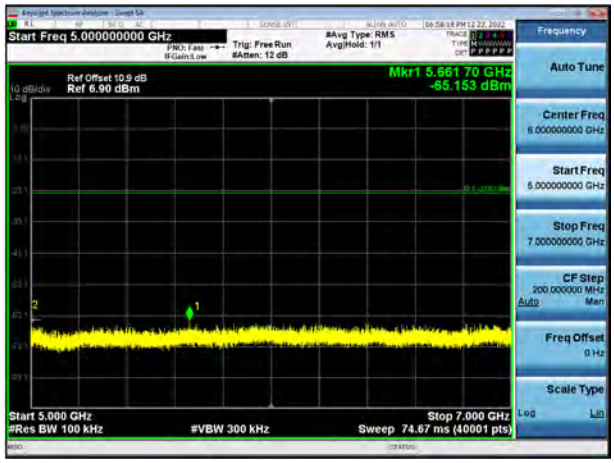
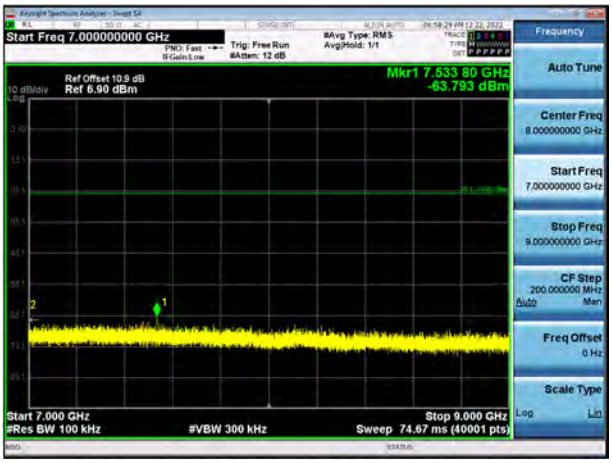
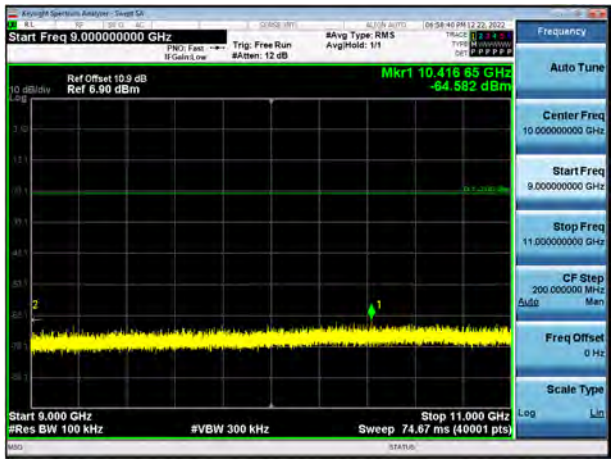


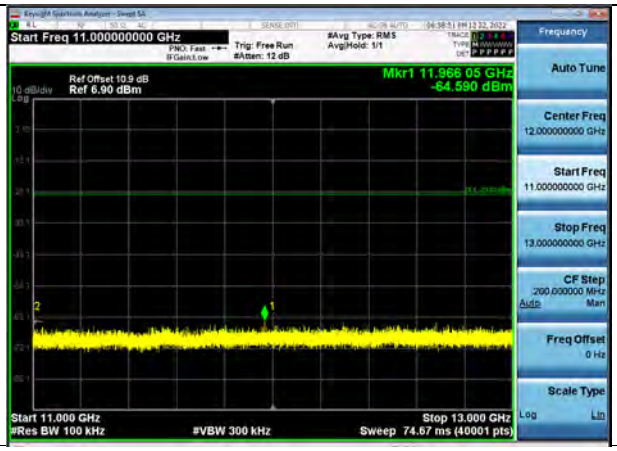
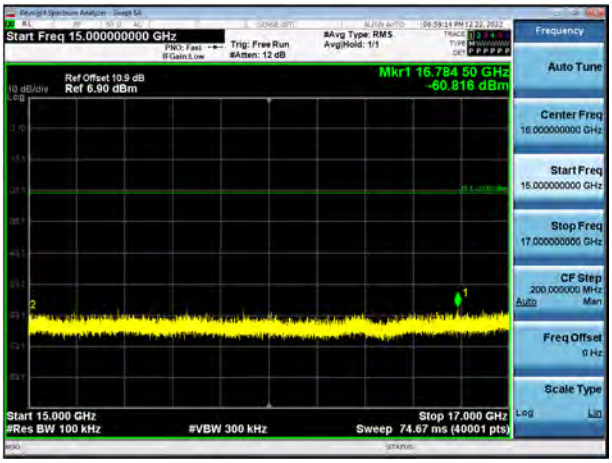
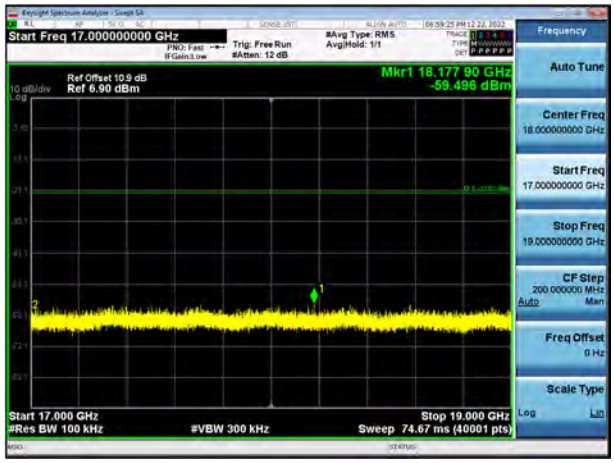
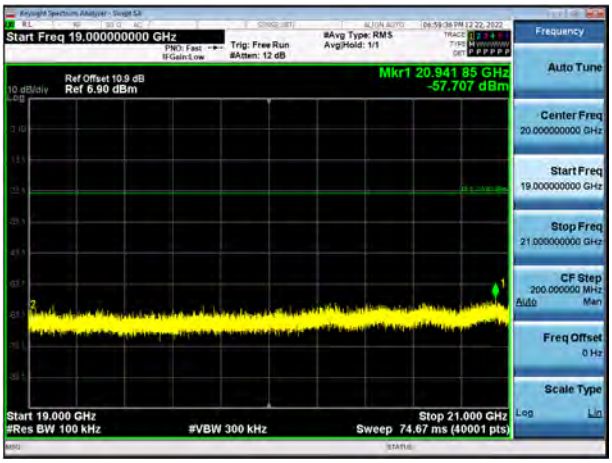
Band Edge (802.11n_HT40 –CH9)



▣ Test Plots(Conducted Spurious Emission)

Worst case Mode : 802.11n_HT40_Ch.3_MCS 3

Spurious Emission (30 MHz - 1 GHz)	Spurious Emission (1 GHz - 3 GHz)
	
Spurious Emission (3 GHz - 5 GHz)	**Spurious Emission (5 GHz - 7 GHz)**
	
Spurious Emission (7 GHz - 9 GHz)	**Spurious Emission (9 GHz - 11 GHz)**
	

Spurious Emission (11 GHz - 13 GHz)	Spurious Emission (13 GHz - 15 GHz)
	
Spurious Emission (15 GHz - 17 GHz)	**Spurious Emission (17 GHz – 19 GHz)**
	
Spurious Emission (19 GHz – 21 GHz)	**Spurious Emission (21 GHz - 23 GHz)**
	

Spurious Emission (23 GHz - 25 GHz)


Note:

Limit : -23.82 dBm

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	dBm/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	dBm/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	2 412 MHz
Channel No.	01 Ch

Frequency	Measured Value	A.F+C.L-A.G+D.F	ANT. POL	Total	Limit	Margin	Measurement Type
[MHz]	[dBµV]	[dB/m]	[H/V]	[dBµV/m]	[dBµV/m]	[dB]	
4824	44.28	3.42	V	47.70	73.98	26.28	PK
4824	32.64	3.42	V	36.06	53.98	17.92	AV
7236	45.56	8.48	V	54.04	73.98	19.94	PK
7236	36.81	8.48	V	45.29	53.98	8.69	AV
4824	44.46	3.42	H	47.88	73.98	26.10	PK
4824	32.70	3.42	H	36.12	53.98	17.86	AV
7236	45.58	8.48	H	54.06	73.98	19.92	PK
7236	37.00	8.48	H	45.48	53.98	8.50	AV

Operation Mode:	802.11b
Transfer Rate:	1 Mbps
Operating Frequency	2 437 MHz
Channel No.	06 Ch

Frequency	Measured Value	A.F+C.L-A.G+D.F	ANT. POL	Total	Limit	Margin	Measurement Type
[MHz]	[dBµV]	[dB/m]	[H/V]	[dBµV/m]	[dBµV/m]	[dB]	
4874	42.50	2.97	V	45.47	73.98	28.51	PK
4874	30.16	2.97	V	33.13	53.98	20.85	AV
7311	43.73	9.43	V	53.16	73.98	20.82	PK
7311	34.85	9.43	V	44.28	53.98	9.70	AV
4874	42.83	2.97	H	45.80	73.98	28.18	PK
4874	30.73	2.97	H	33.70	53.98	20.28	AV
7311	44.15	9.43	H	53.58	73.98	20.40	PK
7311	34.66	9.43	H	44.09	53.98	9.89	AV

Operation Mode:	802.11b
Transfer MCS Index:	1 Mbps
Operating Frequency	2 462 MHz
Channel No.	11 Ch

Frequency	Measured Value	A.F+C.L-A.G+D.F	ANT. POL	Total	Limit	Margin	Measurement
[MHz]	[dBμV]	[dB/m]	[H/V]	[dBμV/m]	[dBμV/m]	[dB]	Type
4924	41.63	2.47	V	44.10	73.98	29.88	PK
4924	29.67	2.47	V	32.14	53.98	21.84	AV
7386	44.23	10.24	V	54.47	73.98	19.51	PK
7386	34.07	10.24	V	44.31	53.98	9.67	AV
4924	42.03	2.47	H	44.50	73.98	29.48	PK
4924	30.60	2.47	H	33.07	53.98	20.91	AV
7386	42.93	10.24	H	53.17	73.98	20.81	PK
7386	33.82	10.24	H	44.06	53.98	9.92	AV

Operation Mode:	802.11b
Transfer MCS Index:	1 Mbps
Operating Frequency	2 467 MHz
Channel No.	12 Ch

Frequency	Measured Value	A.F+C.L-A.G+D.F	ANT. POL	Total	Limit	Margin	Measurement
[MHz]	[dBμV]	[dB/m]	[H/V]	[dBμV/m]	[dBμV/m]	[dB]	Type
4934	42.89	2.27	V	45.16	73.98	28.82	PK
4934	30.32	2.27	V	32.59	53.98	21.39	AV
7401	43.38	10.32	V	53.70	73.98	20.28	PK
7401	34.79	10.32	V	45.11	53.98	8.87	AV
4934	41.63	2.27	H	43.90	73.98	30.08	PK
4934	29.67	2.27	H	31.94	53.98	22.04	AV
7401	43.16	10.32	H	53.48	73.98	20.50	PK
7401	34.51	10.32	H	44.83	53.98	9.15	AV

Operation Mode:	802.11b
Transfer MCS Index:	1 Mbps
Operating Frequency	2 472 MHz
Channel No.	13 Ch

Frequency	Measured Value	A.F+C.L-A.G+D.F	ANT. POL	Total	Limit	Margin	Measurement Type
[MHz]	[dBμV]	[dB/m]	[H/V]	[dBμV/m]	[dBμV/m]	[dB]	
4944	41.56	2.22	V	43.78	73.98	30.20	PK
4944	29.58	2.22	V	31.80	53.98	22.18	AV
7416	43.72	10.01	V	53.73	73.98	20.25	PK
7416	35.42	10.01	V	45.43	53.98	8.55	AV
4944	42.00	2.22	H	44.22	73.98	29.76	PK
4944	30.67	2.22	H	32.89	53.98	21.09	AV
7416	43.16	10.01	H	53.17	73.98	20.81	PK
7416	34.93	10.01	H	44.94	53.98	9.04	AV

Note:

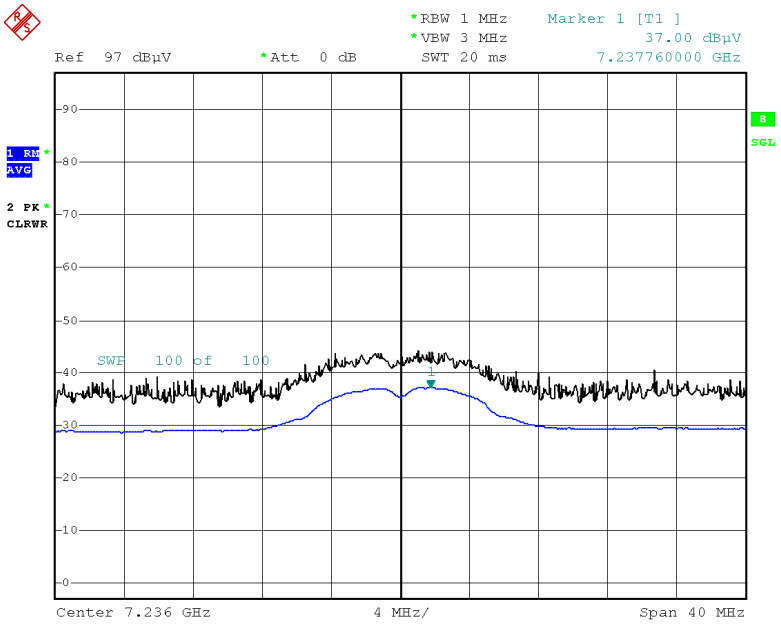
All Modes of operation were investigated and the worst case configuration results are reported.

[Worst case]

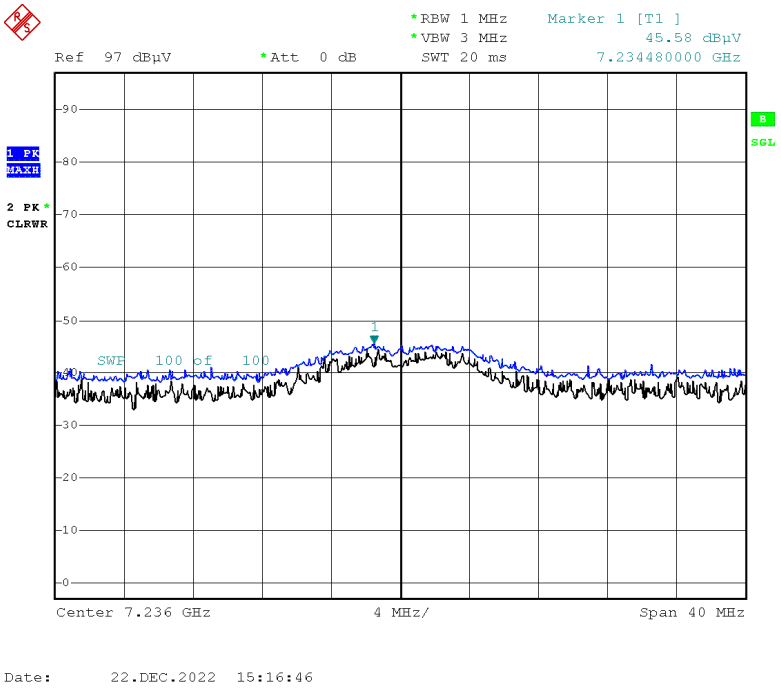
- Worstcase : 802.11b

▣ Test Plots (Worst case : Z-H)

Radiated Spurious Emissions plot – Average Result (802.11b, Ch.1 3rd Harmonic)



Radiated Spurious Emissions plot – Peak Result (802.11b, Ch.1 3rd Harmonic)



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.	Frequency [MHz]	Measured Value [dBμV]	AF+CL+DF [dB/m]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
01	2310.0~2390.0	19.69	34.90	H	54.58	73.98	19.40	PK
	2310.0~2390.0	-4.94	34.90	H	29.96	53.98	24.02	AV
	2310.0~2390.0	19.91	34.90	V	54.81	73.98	19.17	PK
	2310.0~2390.0	-4.78	34.90	V	30.11	53.98	23.87	AV
11	2483.5~2500.0	20.20	35.10	H	55.30	73.98	18.68	PK
	2483.5~2500.0	-2.01	35.10	H	33.09	53.98	20.89	AV
	2483.5~2500.0	20.09	35.10	V	55.19	73.98	18.79	PK
	2483.5~2500.0	-2.43	35.10	V	32.67	53.98	21.31	AV

Operation Mode:	802.11b
Transfer Rate:	1 Mbps
Operating Frequency	2467 MHz, 2472 MHz

Channel No.	Frequency [MHz]	Measured Value [dBμV]	AF+CL+DF [dB/m]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
12	2483.5~2500.0	19.60	35.10	H	54.70	73.98	19.28	PK
	2483.5~2500.0	1.59	35.10	H	36.69	53.98	17.29	AV
	2483.5~2500.0	19.48	35.10	V	54.58	73.98	19.40	PK
	2483.5~2500.0	1.47	35.10	V	36.57	53.98	17.41	AV
13	2483.5~2500.0	20.46	35.10	H	55.56	73.98	18.42	PK
	2483.5~2500.0	3.97	35.10	H	39.06	53.98	14.92	AV
	2483.5~2500.0	20.34	35.10	V	55.43	73.98	18.55	PK
	2483.5~2500.0	3.90	35.10	V	38.99	53.98	14.99	AV

Operation Mode:	802.11g
Transfer Rate:	6 Mbps
Operating Frequency	2412 MHz, 2462 MHz

Channel No.	Frequency [MHz]	Measured Value [dBμV]	AF+CL+DF [dB/m]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
01	2310.0~2390.0	20.20	34.90	H	55.09	73.98	18.89	PK
	2310.0~2390.0	-5.48	34.90	H	29.41	53.98	24.57	AV
	2310.0~2390.0	20.27	34.90	V	55.16	73.98	18.82	PK
	2310.0~2390.0	-5.30	34.90	V	29.59	53.98	24.39	AV
11	2483.5~2500.0	23.48	35.10	H	58.57	73.98	15.41	PK
	2483.5~2500.0	3.81	35.10	H	38.91	53.98	15.07	AV
	2483.5~2500.0	23.26	35.10	V	58.35	73.98	15.63	PK
	2483.5~2500.0	3.68	35.10	V	38.78	53.98	15.20	AV

Operation Mode:	802.11g
Transfer Rate:	6 Mbps
Operating Frequency	2467 MHz, 2472 MHz

Channel No.	Frequency [MHz]	Measured Value [dBμV]	AF+CL+DF [dB/m]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
12	2483.5~2500.0	30.80	35.10	H	65.90	73.98	8.08	PK
	2483.5~2500.0	7.94	35.10	H	43.03	53.98	10.95	AV
	2483.5~2500.0	30.72	35.10	V	65.82	73.98	8.16	PK
	2483.5~2500.0	7.85	35.10	V	42.95	53.98	11.03	AV
13	2483.5~2500.0	31.89	35.10	H	66.98	73.98	7.00	PK
	2483.5~2500.0	10.70	35.10	H	45.79	53.98	8.19	AV
	2483.5~2500.0	31.59	35.10	V	66.69	73.98	7.29	PK
	2483.5~2500.0	10.69	35.10	V	45.78	53.98	8.20	AV

Operation Mode: 802.11n (HT20)
Transfer Rate: MCS0
Operating Frequency 2412 MHz, 2462 MHz

Channel No.	Frequency [MHz]	Measured Value [dBμV]	AF+CL+DF [dB/m]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
01	2310.0~2390.0	19.35	34.90	H	54.24	73.98	19.74	PK
	2310.0~2390.0	-4.98	34.90	H	29.91	53.98	24.07	AV
	2310.0~2390.0	19.67	34.90	V	54.56	73.98	19.42	PK
	2310.0~2390.0	-4.91	34.90	V	29.98	53.98	24.00	AV
11	2483.5~2500.0	23.69	35.10	H	58.78	73.98	15.20	PK
	2483.5~2500.0	2.66	35.10	H	37.76	53.98	16.22	AV
	2483.5~2500.0	23.22	35.10	V	58.31	73.98	15.67	PK
	2483.5~2500.0	2.62	35.10	V	37.71	53.98	16.27	AV

Operation Mode: 802.11n (HT20)
Transfer Rate: MCS0
Operating Frequency 2467 MHz, 2472 MHz

Channel No.	Frequency [MHz]	Measured Value [dBμV]	AF+CL+DF [dB/m]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
12	2483.5~2500.0	31.11	35.10	H	66.20	73.98	7.78	PK
	2483.5~2500.0	8.52	35.10	H	43.62	53.98	10.36	AV
	2483.5~2500.0	31.07	35.10	V	66.17	73.98	7.81	PK
	2483.5~2500.0	8.49	35.10	V	43.59	53.98	10.39	AV
13	#2483.5~2484.5	33.95	35.10	H	69.04	73.98	4.94	PK
	#2484.5~2485.5	25.52	35.10	H	60.62	73.98	13.36	PK
	2485.5~2500.0	24.08	35.10	H	59.18	73.98	14.80	PK
	2483.5~2500.0	12.12	35.10	H	47.22	53.98	6.76	AV
	#2483.5~2484.5	33.19	35.10	V	68.28	73.98	5.70	PK
	#2484.5~2485.5	25.43	35.10	V	60.53	73.98	13.45	PK
	2485.5~2500.0	24.00	35.10	V	59.10	73.98	14.88	PK
	2483.5~2500.0	12.06	35.10	V	47.16	53.98	6.82	AV

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

Operation Mode:	802.11n (HT40)
Transfer Rate:	MCS0
Operating Frequency	2422 MHz, 2452 MHz

Channel No.	Frequency	Measured Value	Duty Cycle Factor	AF+CL+DF	ANT. POL	Total	Limit	Margin	Measurement Type
	[MHz]	[dBμV]	[dB]	[dB/m]	[H/V]	[dBμV/m]	[dBμV/m]	[dB]	
03	2310.0~2390.0	18.56	0.00	34.90	H	53.45	73.98	20.53	PK
	2310.0~2390.0	-2.63	0.09	34.90	H	32.37	53.98	21.61	AV
	2310.0~2390.0	18.91	0.00	34.90	V	53.80	73.98	20.18	PK
	2310.0~2390.0	-2.45	0.09	34.90	V	32.54	53.98	21.44	AV
09	2483.5~2500.0	27.79	0.00	35.10	H	62.88	73.98	11.10	PK
	2483.5~2500.0	6.76	0.09	35.10	H	41.95	53.98	12.03	AV
	2483.5~2500.0	27.39	0.00	35.10	V	62.49	73.98	11.49	PK
	2483.5~2500.0	6.64	0.09	35.10	V	41.83	53.98	12.15	AV

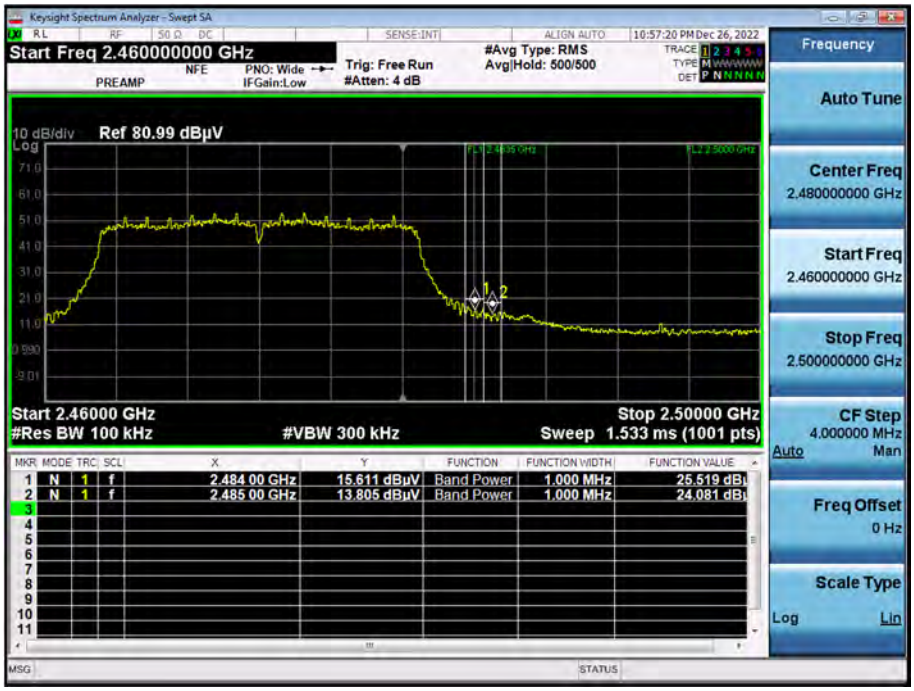
▣ Test Plots

Radiated Restricted Band Edges plot – Average Result (802.11n (HT20) Ch.13, X-H)

Radiated Restricted Band Edges plot – Peak Result (802.11n (HT20) Ch.13, X-H)

Radiated Restricted Band Edges plot – Peak Result (802.11n (HT20) Ch.13, X-H)

Integration method Used



Note:

Plot of worst case are only reported.

9.8 POWERLINE CONDUCTED EMISSIONS

Conducted Emissions

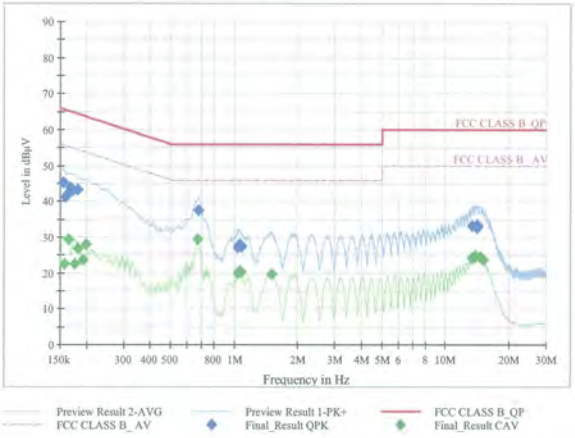
Test 1 / 2

Test Report

Common Information

EUT : IML-C6400W
Operating Conditions : 2.4G WLAN Mode
Comment :

Full Spectrum



Final_Result_QPK

Frequency (MHz)	QuasiPeak (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.1545	45.32	65.75	20.44	1000.0	9.000	L1	OFF	9.6
0.1590	41.34	65.52	24.18	1000.0	9.000	N	OFF	9.5
0.1635	42.52	65.28	22.76	1000.0	9.000	N	OFF	9.5
0.1680	43.88	65.06	21.18	1000.0	9.000	L1	OFF	9.6
0.1725	42.89	64.84	21.95	1000.0	9.000	N	OFF	9.6
0.1815	43.16	64.42	21.26	1000.0	9.000	N	OFF	9.6
0.6755	37.54	56.00	18.46	1000.0	9.000	L1	OFF	9.6
1.0423	27.14	56.00	28.86	1000.0	9.000	L1	OFF	9.6
1.0468	27.58	56.00	28.42	1000.0	9.000	L1	OFF	9.6
1.0670	27.92	56.00	28.08	1000.0	9.000	L1	OFF	9.6
1.0738	27.61	56.00	28.39	1000.0	9.000	L1	OFF	9.6
1.0805	27.30	56.00	28.70	1000.0	9.000	L1	OFF	9.6
13.4195	33.25	60.00	26.75	1000.0	9.000	L1	OFF	9.9
14.1080	32.54	60.00	27.46	1000.0	9.000	L1	OFF	9.9
14.1238	32.90	60.00	27.10	1000.0	9.000	L1	OFF	9.9
14.1350	33.09	60.00	26.91	1000.0	9.000	L1	OFF	9.9
14.1508	33.18	60.00	26.82	1000.0	9.000	L1	OFF	9.9
14.1575	33.48	60.00	26.52	1000.0	9.000	L1	OFF	9.9

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Test 2 / 2

Final_Result_CAV

Frequency (MHz)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.1568	22.60	55.63	33.03	1000.0	9.000	L1	OFF	9.6
0.1635	29.29	55.28	25.99	1000.0	9.000	N	OFF	9.5
0.1748	22.52	54.73	32.21	1000.0	9.000	L1	OFF	9.6
0.1815	26.70	54.42	27.71	1000.0	9.000	N	OFF	9.6
0.1928	23.68	53.92	30.23	1000.0	9.000	L1	OFF	9.6
0.1995	28.08	53.63	25.55	1000.0	9.000	N	OFF	9.6
0.6733	29.55	46.00	16.45	1000.0	9.000	L1	OFF	9.6
1.0423	19.84	46.00	26.16	1000.0	9.000	L1	OFF	9.6
1.0603	20.37	46.00	25.63	1000.0	9.000	L1	OFF	9.6
1.0760	20.06	46.00	25.94	1000.0	9.000	L1	OFF	9.6
1.5035	19.69	46.00	26.31	1000.0	9.000	L1	OFF	9.7
1.5103	19.53	46.00	26.47	1000.0	9.000	L1	OFF	9.7
13.3835	24.28	50.00	25.72	1000.0	9.000	L1	OFF	9.9
13.4150	24.37	50.00	25.63	1000.0	9.000	L1	OFF	9.9
13.8290	24.94	50.00	25.06	1000.0	9.000	L1	OFF	9.9
13.8718	24.53	50.00	25.47	1000.0	9.000	L1	OFF	9.9
14.5760	24.66	50.00	25.34	1000.0	9.000	L1	OFF	9.9
15.0260	23.66	50.00	26.34	1000.0	9.000	L1	OFF	9.9

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10. LIST OF TEST EQUIPMENT

Conducted Test

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

Note:

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

Radiated Test

Equipment	Model	Manufacturer	Serial No.	Due to Calibration	Calibration Interval
Controller(Antenna mast)	CO3000	Innco system	CO3000-4p	N/A	N/A
Antenna Position Tower	MA4640/800-XP-EP	Innco system	N/A	N/A	N/A
Controller	EM2090	Emco	060520	N/A	N/A
Turn Table	N/A	Ets	N/A	N/A	N/A
Loop Antenna	FMZB 1513	Rohde & Schwarz	1513-333	03/17/2024	Biennial
Hybrid Antenna	VULB 9168	Schwarzbeck	9168-0895	08/16/2024	Biennial
Horn Antenna	BBHA 9120D	Schwarzbeck	9120D-1191	11/18/2023	Biennial
Horn Antenna (15 GHz ~ 40 GHz)	BBHA9170	Schwarzbeck	BBHA9170124	04/12/2023	Biennial
Amp & Filter Bank Switch Controller	FBSM-01A	TNM system	0	N/A	N/A
ATT(3 dB) + LNA2 (6~18 GHz)	18B-03, CBL06185030	WEINSCHEL CERNEX	N/A	12/05/2023	Annual
ATT(10 dB) + LNA1 (0.1~18 GHz)	56-10, CBLU1183540B-01	Api tech, CERNEX	N/A	12/05/2023	Annual
High Pass Filter	WHKX10-2700-3000-18000-40SS	Wainwright Instruments	N/A	12/05/2023	Annual
High Pass Filter	WHKX8-6090-7000-18000-40SS	Wainwright Instruments	N/A	12/05/2023	Annual
Thru	COAXIAL ATTENUATOR	T&M SYSTEM	N/A	12/05/2023	Annual
Power Amplifier	CBL18265035	CERNEX	22966	12/01/2023	Annual
Power Amplifier	CBL26405040	CERNEX	25956	03/11/2023	Annual
Bluetooth Tester	TC-3000C	TESCOM	3000C000175	04/05/2023	Annual
Spectrum Analyzer	FSP (9 kHz ~ 30 GHz)	Rohde & Schwarz	836650/016	09/06/2023	Annual
Spectrum Analyzer	FSV40-N (9 kHz ~ 30 GHz)	Rohde & Schwarz	101068-SZ	09/07/2023	Annual

Note:

1. Equipment listed above that calibrated during the testing period was set for test after the calibration.
2. Equipment listed above that has a calibration due date during the testing period, the testing is completed before equipment expiration date.
3. Especially, all antenna for measurement is calibrated in accordance with the requirements of C63.5(Version : 2017).

11. ANNEX A_ TEST SETUP PHOTO

Please refer to test setup photo file no. as follows;

No.	Description
1	HCT-RF-2301-FC086-P