

RF TEST REPORT

FCC / ISED

APPLICANT

eero LLC

MODEL NAME

R010001

FCC ID

2AEM4-41123474

ISED ID

20631-41123474

REPORT NUMBER

HA210810-AER-001-R05

TEST REPORT

Date of Issue

December 9, 2021

Test SiteHyundai C-Tech, Inc. dba HCT America, Inc.
1726 Ringwood Ave, San Jose, CA 95131, USA

Applicant	eero LLC
Applicant Address	660 3 rd Street, 4 th Floor, San Francisco, CA 94107, USA
FCC ID	2AEM4-41123474
ISED ID	20631-41123474
Model Name	R010001
EUT Type	Wireless Router / Access Point
Modulation Type	DSSS / CCK, OFDM / OFDM-A
FCC Classification	Digital Transmission System (DTS)
FCC Rule Part(s)	Part 15.247
ISED Rule Part(s)	RSS-247 Issue 2 (February 2017) RSS-Gen Issue 5 Amd 2 (February 2021)
Test Procedure	ANSI C63.10-2013, KDB 558074 D01 v05r02, KDB 662911 D01

The device bearing the trade name and model specified above, has been shown to comply with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures required. The results of testing in this report apply only to the product which was tested. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties.

I attest to the accuracy of data. All measurements reported herein were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

Hyundai C-Tech, Inc. dba HCT America, Inc. certifies that no party to application has been denied the FCC benefits pursuant to Section 5301 of the Anti-Drug Abuse Act of 1988, 21 U.S.C 862

Tested By

Yongsoo Park

Test Engineer

Reviewed By

Sunwoo Kim

Technical Manager

REVISION HISTORY

The revision history for this document is shown in table.

TEST REPORT NO.	DATE	DESCRIPTION
HA210810-AER-001-R05	December 9, 2021	Initial Issue

TABLE OF CONTENTS

1. GENERAL INFORMATION	4
2. METHODOLOGY	7
3. INSTRUMENT CALIBRATION	7
4. FACILITIES AND ACCREDITATIONS	8
5. ANTENNA REQUIREMENTS	9
6. MEASUREMENT UNCERTAINTY	10
7. DESCRIPTION OF TESTS	11
8. SUMMARY OF TEST RESULTS	23
9. TEST RESULT	28
9.1. DUTY CYCLE	28
9.2. 6 dB BANDWIDTH / 99% BANDWIDTH MEASUREMENT	30
9.3. OUTPUT POWER	34
9.4. POWER SPECTRAL DENSITY	38
9.5. CONDUCTED BAND EDGE & SPURIOUS EMISSIONS	42
9.6. RADIATED SPURIOUS EMISSIONS	53
9.7. RADIATED RESTRICTED BAND EDGES	61
9.8. RECEIVER SPURIOUS EMISSION	67
9.9. POWERLINE CONDUCTED EMISSIONS	69
10. LIST OF TEST EQUIPMENT	71
APPENDIX A. TEST SETUP PHOTOS	72
APPENDIX B. PHOTOGRAPHS OF EUT	73

1. GENERAL INFORMATION

EUT DESCRIPTION

Model	R010001
EUT Type	Wireless Router / Access Point
Serial Number	GGC1-UC01-1304-0B0T : Radiated GGC1-UCD1-1434-0B4B : Conducted
Power Supply	5 V d.c. (USB type C - External adaptor)
RF Specification	WIFI 2.4 GHz : 802.11b/g/n(HT20/40)/ ax(HE20/40) WIFI 5 GHz : 802.11a/n(HT20/40)/ ac(VHT20/40/80/160)/ ax(HE20/40/80/160) Bluetooth 5.0 LE (1M) IEEE 802.15.4
Transmitter Chain	WIFI 2.4 GHz / 5 GHz : 2x2 MIMO Bluetooth LE / IEEE 802.15.4 : SISO
Operating Environment	Indoor
Operating Temperature	0 °C ~ +40 °C

RF SPECIFICATION SUBJECT TO THE REPORT

RF Specification	802.11b/g/n(HT20/40)/ ax(HE20/40)
Transmitter Chain	2 x 2 MIMO
Frequency Range	20 MHz BW : 2412 MHz – 2462 MHz 40 MHz BW : 2422 MHz – 2452 MHz
Max. RF Output Power	25.16 dBm (328.26 mW)
Modulation Type	DSSS/CCK : 802.11b OFDM : 802.11g/n (HT20/40) OFDM-A : 802.11ax (HE20/40)
Number of Channels	20 MHz BW : 11 Channels 40 MHz BW : 7 Channels
Antenna Specification ¹⁾	Antenna Type : Internal PCB Dipole Antenna Peak Gain : 3.39 dBi Uncorrelated / 6.39 dBi Correlated
Firmware Version ²⁾	eeroOS 6.8
Hardware Version ²⁾	Rev. A
Date(s) of Tests	September 22, 2021 ~ October 07, 2021 / December 09, 2021

Note(s) :

1. Antenna information is based on the document provided.
2. Firmware and Hardware Versions are provided by the client.

ANTENNA CONFIGURATION

The device employs 2x2 MIMO technologies with possible configurations below.

Frequency	Configuration	SDM	CDD
		ANT1 + ANT2	ANT1 + ANT2
2.4 GHz	802.11b	X	O
	802.11g	X	O
	802.11n	O	O
	802.11ax	O	O
5 GHz	802.11a	X	O
	802.11n	O	O
	802.11ac	O	O
	802.11ax	O	O

The equipment under test supports Cyclic Diversity mode.

CDD mode was picked as worst case for testing even though the device support both CDD and SDM

ANTENNA DIRECTIONAL GAIN

Antenna Type	Type	RF Technology	Frequency	Gain (Ant 1)	Gain (Ant 2)
PCB	Dipole	802.11b/g/n/ax	2.4 GHz	3.69 dBi	3.06 dBi
PCB	Dipole	802.11a/n/ac/ax	5 GHz	4.50 dBi	4.22 dBi
Metal	Monopole	BLE / IEEE 802.15.4	2.4 GHz	2.90 dBi	

Ant 1 : 2.4 GHz (Chain 0) / 5 GHz (Chain 1)

Ant 2 : 2.4 GHz (Chain 1) / 5 GHz (Chain 0)

Directional Gain (2.4 GHz : Uncorrelated) = $10 \log[(10^{(3.69/10)} + 10^{(3.06/10)}) / 2] = 3.39 \text{ dBi}$

Directional Gain (5 GHz : Uncorrelated) = $10 \log[(10^{(4.50/10)} + 10^{(4.22/10)}) / 2] = 4.36 \text{ dBi}$

Directional Gain (2.4 GHz : Correlated) = $10 \log[(10^{(3.69/20)} + 10^{(3.06/20)})^2 / 2] = 6.39 \text{ dBi}$

Directional Gain (5 GHz : Correlated) = $10 \log[(10^{(4.50/20)} + 10^{(4.22/20)})^2 / 2] = 7.37 \text{ dBi}$

The device does not support beam foaming.

OPERATING FREQUENCY CHANNELS

Frequency (MHz)	Channel	802.11b	802.11g	802.11n HT20	802.11n HT40	802.11ax HE20	802.11ax HE40
2412	1	0	0	0	-	0	-
2417	2	0	0	0	-	0	-
2422	3	0	0	0	0	0	0
2427	4	0	0	0	0	0	0
2432	5	0	0	0	0	0	0
2437	6	0	0	0	0	0	0
2442	7	0	0	0	0	0	0
2447	8	0	0	0	0	0	0
2452	9	0	0	0	0	0	0
2457	10	0	0	0	-	0	-
2462	11	0	0	0	-	0	-

2. METHODOLOGY

FCC KDB 558074 D01 DTS Measurement Guidance v05r02 dated April 2nd, 2019 entitled "Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) 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 Rule Part 15 Subpart C and the Section 2.1091 under the FCC Rule Part 2 / the 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. Also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the maximum emission, the relative positions of this hand-held transmitter (EUT) were rotated through three orthogonal axes according to the requirements in Section 8 of ANSI C63.10. (Version: 2013)

Conducted Antenna Terminal

KDB 558074 D01 v05r02

DESCRIPTION OF TEST MODES

The EUT has been tested at 2.4 G WLAN test mode. Qualcomm Radio Control Tool was used to control the channels, power setting, continuous TX and normal RX mode. The EUT is equipped with 802.11b/g/n(HT20/40)/ ax(HE20/40).

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 1726 Ringwood Avenue, San Jose, California 95131, USA.

The site is constructed in conformance with the requirements of ANSI C63.4. (Version :2014) and CISPR Publication 22.



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 antenna of this E.U.T is permanently attached and there is no provision for connection to an external antenna.
- (2) The E.U.T Complies with the requirement of §15.203

According to RSS-Gen Issue 5 (Section 6.8) :

The applicant for equipment certification shall provide a list of all antenna types that may be used with the transmitter, where applicable (i.e. for transmitters with detachable antenna), indicating the maximum permissible antenna gain (in dBi) and the required impedance for each antenna. The test report shall demonstrate the compliance of the transmitter with the limit for maximum equivalent isotropically radiated power (e.i.r.p.) specified in the applicable RSS, when the transmitter is equipped with any antenna type, selected from this list.

For expediting the testing, measurements may be performed using only the antenna with highest gain of each combination of transmitter and antenna type, with the transmitter output power set at the maximum level. However, the transmitter shall comply with the applicable requirements under all operational conditions and when in combination with any type of antenna from the list provided in the test report (and in the notice to be included in the user manual, provided below).

When measurements at the antenna port are used to determine the RF output power, the effective gain of the device's antenna shall be stated, based on a measurement or on data from the antenna's manufacturer.

The test report shall state the RF power, output power setting and spurious emission measurements with each antenna type that is used with the transmitter being tested.

6. MEASUREMENT UNCERTAINTY

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI C63.10-2013.

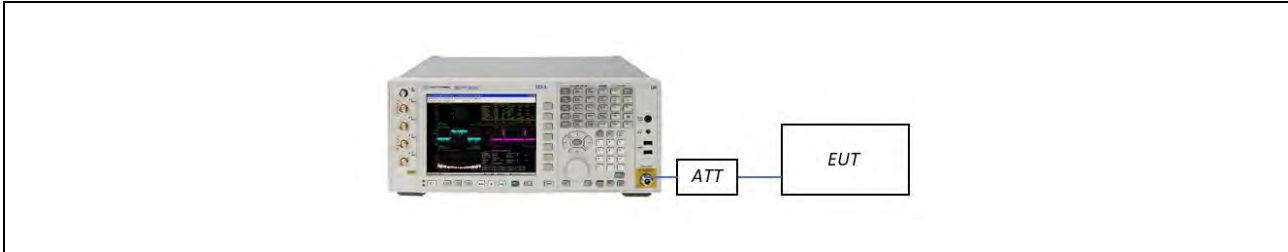
All measurement uncertainty values are shown with a coverage factor of $k = 2$ to indicate a 95 % level of confidence. The measurement data shown herein meets or exceeds the U_{CISPR} measurement uncertainty values specified in CISPR 16-4-2 and, thus, can be compared directly to specified limits to determine compliance.

Parameter	Expanded Uncertainty
Output Power, Conducted	± 0.35 dB
Occupied Bandwidth	± 12.4 kHz
Unwanted Emissions, Conducted	± 0.46 dB
Radiated Emissions (below 1 GHz)	± 6.09 dB
Radiated Emissions (Above 1 GHz)	± 5.23 dB

7. DESCRIPTION OF TESTS

7.1. DUTY CYCLE

TEST SETUP



TEST PROCEDURE

The transmitter output is connected to the Spectrum Analyzer.

We tested according to the zero-span measurement method, 6 (b) in KDB 558074 D01 v05r02.

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

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

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

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

7.2. 6 dB BANDWIDTH / 99 % OCCUPIED BANDWIDTH

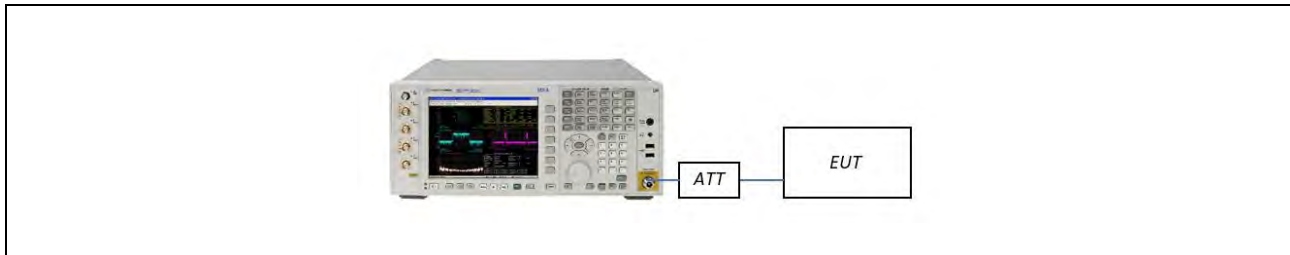
LIMIT

§15.247(a)(2) / RSS-247(Issue 2) Section 5.2

The bandwidth at 6 dB down from the highest in-band spectral density is measured with a spectrum analyzer connected to the receive antenna while the EUT is operating in transmission mode at the appropriate frequencies.

The minimum permissible 6 dB bandwidth is 500 kHz.

TEST SETUP



TEST PROCEDURE (6 dB BANDWIDTH)

Section 8.2 in KDB 558074 D01 v05r02, Subclause 11.8 in ANSI 63.10-2013

The transmitter output is connected to the Spectrum Analyzer.

The Spectrum Analyzer setting :

- RBW = 100 kHz
- VBW $\geq 3 \times$ RBW
- Detector = Peak
- Trace mode = max hold
- Sweep = auto couple
- Allow the trace to stabilize
- We tested 6 dB bandwidth using the automatic bandwidth measurement capability of a spectrum analyzer, setting X dB as 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 $\approx 3 \times$ RBW
- Detector = Peak
- Trace mode = max hold
- Sweep = auto couple
- Allow the trace to stabilize

Note(s) :

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

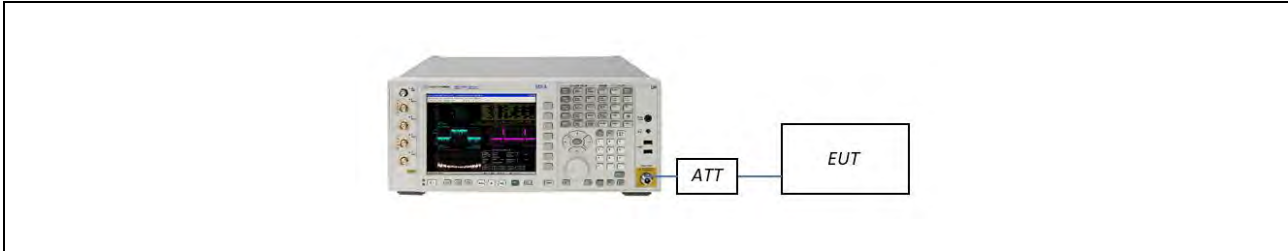
7.3. OUTPUT POWER

LIMIT

\$15.247(b)(3) / RSS-247(Issue2) Section 5.4.4

The maximum permissible conducted output power is 1 Watt.

TEST SETUP



TEST PROCEDURE

The transmitter output is connected to the Spectrum Analyzer.

TX condition of the EUT is the actual operating mode by RF test program.

The Spectrum Analyzer setting :

Peak Power (Section 8.3.1.1 in KDB 558074 D01 v05r02, Subclause 11.9.1.1 in ANSI 63.10-2013)

- $RBW \geq DTS \text{ Bandwidth}$
- $VBW \geq 3 \times RBW$
- $SPAN \geq 3 \times RBW$
- Detector Mode = Peak
- Sweep = auto couple
- Trace Mode = max hold
- Allow trace to fully stabilize.
- Use peak marker function to determine the peak amplitude level

Average Power (Section 8.3.2.2 in KDB 558074 D01 v05r02, Subclause 11.9.2.2 in ANSI 63.10-2013)

- We use the spectrum analyzer's integrated band power measurement function.
- Measure the duty cycle.
- Set span to at least 1.5 times the OBW.
- $RBW = 1-5 \% \text{ of the OBW, not to exceed } 1 \text{ MHz}$
- $VBW \geq 3 \times RBW$
- Number of points in sweep $\geq 2 \times \text{span} / RBW$. (This gives bin-to-bin spacing $\leq RBW/2$, so that narrowband signals are not lost between frequency bins.)
- Sweep time = auto.
- Detector = RMS (i.e., power averaging)
- Do not use sweep triggering. Allow the sweep to "free run".
- Trace average at least 100 traces in power averaging (RMS) mode.
- Compute power by integrating the spectrum across the OBW of the signal using the instrument's band power measurement function with band limits set equal to the OBW band edges.
- 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) = Reading Value + ATT loss + Cable loss
- Conducted Output Power (Average) = Reading Value + ATT loss + Cable loss + Duty Cycle Factor

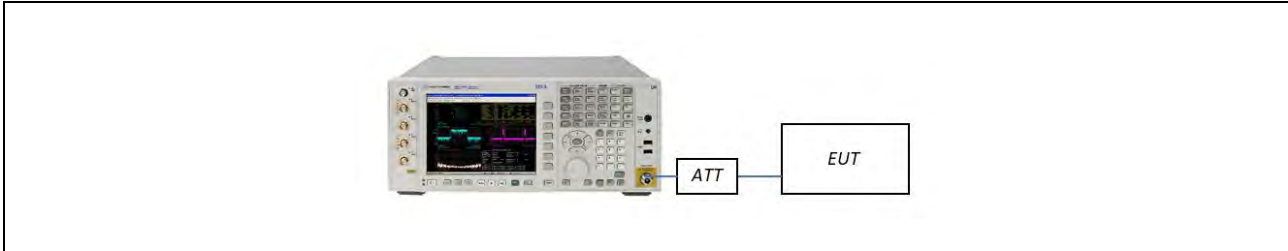
7.4. POWER SPECTRAL DENSITY

LIMIT

§15.247(e) / RSS-247(Issue 2) Section 5.2

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

TEST SETUP



TEST PROCEDURE

The transmitter output is connected to the Spectrum Analyzer.

We tested according to Procedure 8.4 in KDB 558074 D01 v05r02, Procedure 11.10 in ANSI 63.10-2013.

The spectrum analyzer is set to :

- Set analyzer center frequency to DTS channel center frequency.
- Set span to at least 1.5 times the OBW.
- $RBW = 3 \text{ kHz} \leq RBW \leq 100 \text{ kHz}$.
- $VBW \geq 3 \times RBW$.
- Sweep = auto couple
- Detector = power averaging (rms) or sample detector (when rms not available).
- Ensure that the number of measurement points in the sweep $\geq [2 \times \text{span} / RBW]$.
- Employ trace averaging (rms) mode over a minimum of 100 traces
- Use the peak marker function to determine the maximum amplitude level.
- 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.
- if then duty factor shall be added to adjust the result if the duty cycle is less than 98%

7.5. CONDUCTED BAND EDGE / SPURIOUS EMISSIONS

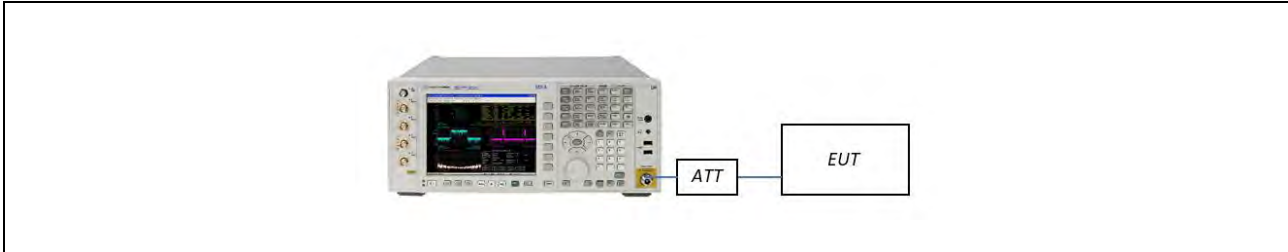
LIMIT

§15.247(d) / RSS-247(Issue 2) Section 5.5

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 SETUP



TEST PROCEDURE

The transmitter output is connected to the spectrum analyzer.

(Procedure 8.5 in KDB 558074 D01 v05r02, Procedure 11.11 in ANSI 63.10-2013)

- RBW = 100 kHz
- VBW $\geq 3 \times$ RBW
- Set span to encompass the spectrum to be examined.
- Detector = Peak
- Trace Mode = max hold
- Sweep time = auto couple
- Ensure that the number of measurement points $\geq 2 \times \text{Span} / \text{RBW}$
- Allow trace to fully stabilize.
- 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.

7.6. RADIATED EMISSIONS

RADIATION EMISSION LIMIT

FCC : 47 CFR § 15.209		
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
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

ISED : RSS-GEN Section 8.9		
Frequency (MHz)	Field Strength (uV/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
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

RECEIVER RADIATED EMISSION LIMIT

ISED : RSS-GEN Section 7.3		
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

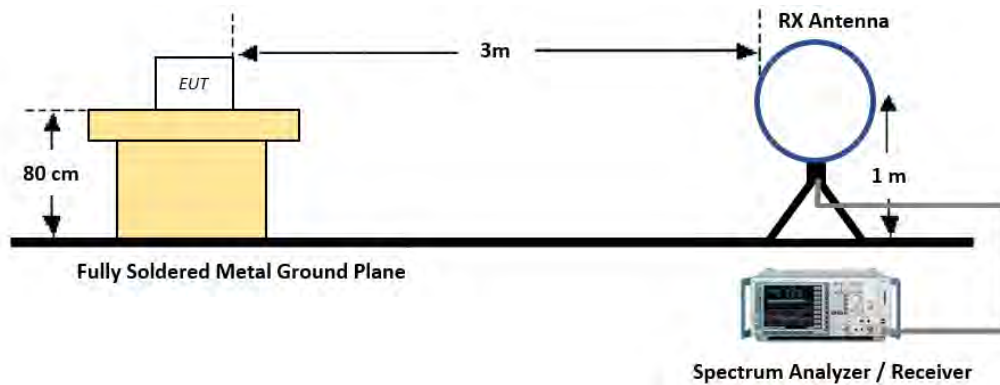
RESTRICTED BANDS OF OPERATION

FCC : 47 CFR § 15.205(a)				
Frequency (MHz)	Frequency (MHz)	Frequency (MHz)	Frequency (MHz)	Frequency (MHz)
0.090 - 0.110	12.29 - 12.293	149.9 - 150.05	1660.0 - 1710.0	8025 - 8500
0.495 - 0.505	12.51975 - 12.52025	156.52475 - 156.52525	1718.8 - 1722.2	9000 - 9200
2.1735 - 2.1905	12.57675 - 12.57725	156.7 - 156.9	2200.0 - 2300.0	9300 - 9500
4.125 - 4.128	13.36 - 13.41	162.0125 - 167.17	2310.0 - 2390.0	10600 - 12700
4.17725 - 4.17775	16.42 - 16.423	167.72 - 173.2	2483.5 - 2500.0	13250 - 13400
4.20725 - 4.20775	16.69475 - 16.69525	240.0 - 285.0	2690.0 - 2900.0	14470 - 14500
6.215 - 6.218	16.80425 - 16.80475	322.0 - 335.4	3260.0 - 3267.0	15350 - 16200
6.26775 - 6.26825	25.5 - 25.67	399.9 - 410.0	3332.0 - 3339.0	17700 - 21400
6.31175 - 6.31225	37.5 - 38.25	608.0 - 614.0	3345.8 - 3358.0	22010 - 23120
8.291 - 8.294	73 - 74.6	960.0 - 1240.0	3600.0 - 4400.0	23600 - 24000
8.362 - 8.366	74.8 - 75.2	1300.0 - 1427.0	4500.0 - 5150.0	31200 - 31800
8.37625 - 8.38675	108 - 121.94	1435.0 - 1626.5	5350.0 - 5460.0	36430 - 36500
8.41425 - 8.41475	123 - 138	1645.5 - 1646.5	7250.0 - 7750.0	Above 38600

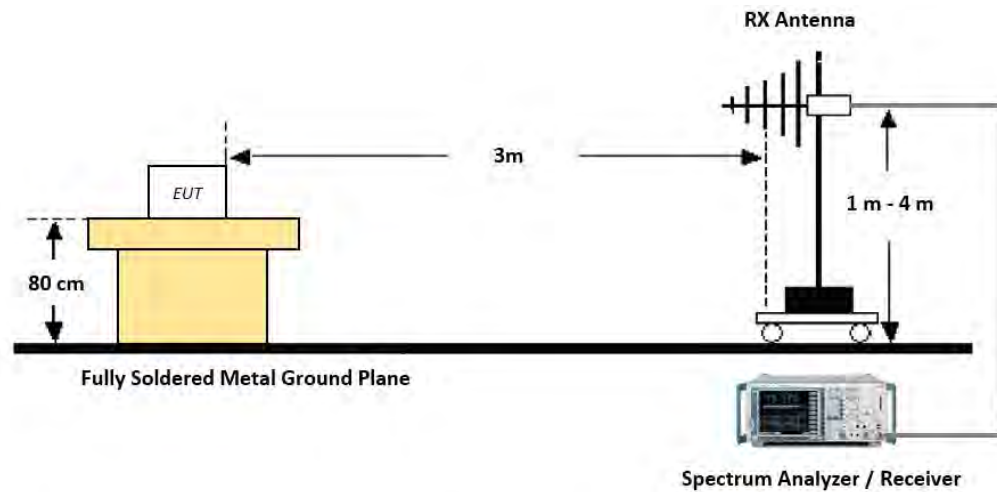
ISED : RSS-GEN Section 8.10				
Frequency (MHz)	Frequency (MHz)	Frequency (MHz)	Frequency (MHz)	Frequency (MHz)
0.090 - 0.110	8.37625 - 8.38675	108 - 138	1660 - 1710	8025 - 8500
0.495 - 0.505	8.41425 - 8.41475	149.9 - 150.05	1718.8 - 1722.2	9000 - 9200
2.1735 - 2.1905	12.29 - 12.293	156.52475 - 156.52525	2200 - 2300	9300 - 9500
3.020 - 3.026	12.51975 - 12.52025	156.7 - 156.9	2310 - 2390	10600 - 12700
4.125 - 4.128	12.57675 - 12.57725	162.0125 - 167.17	2483.5 - 2500	13250 - 13400
4.17725 - 4.17775	13.36 - 13.41	167.72 - 173.2	2655 - 2900	14470 - 14500
4.20725 - 4.20775	16.42 - 16.423	240 - 285	3260 - 3267	15350 - 16200
5.677 - 5.683	16.69475 - 16.69525	322 - 335.4	3332 - 3339	17700 - 21400
6.215 - 6.218	16.80425 - 16.80475	399.9 - 410	3345.8 - 3358	22010 - 23120
6.26775 - 6.26825	25.5 - 25.67	608 - 614	3500 - 4400	23600 - 24000
6.31175 - 6.31225	37.5 - 38.25	960 - 1427	4500 - 5150	31200 - 31800
8.291 - 8.294	73 - 74.6	1435 - 1626.5	5350 - 5460	36430 - 36500
8.362 - 8.366	74.8 - 75.2	1645.5 - 1646.5	7250 - 7750	Above 38600

TEST SETUP

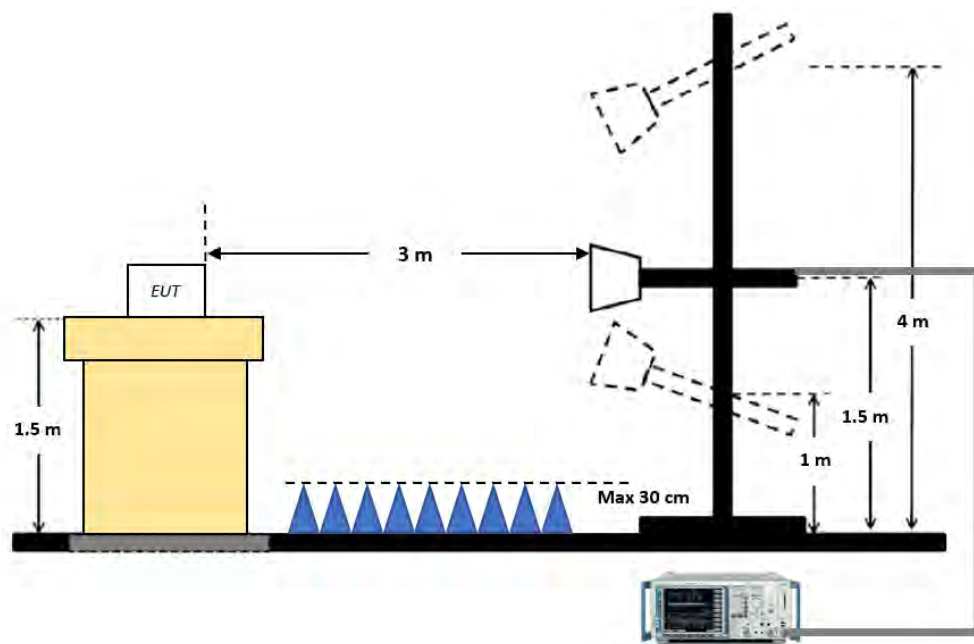
Below 30 MHz



30 MHz - 1 GHz



Above 1 GHz



TEST PROCEDURE OF RADIATED SPURIOUS EMISSION (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 in detecting antenna.
5. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
6. Distance Correction Factor (0.009 MHz – 0.490 MHz) = $40 \cdot \log(3 \text{ m}/300 \text{ m}) = -80 \text{ dB}$
Measurement Distance: 3 m
7. Distance Correction Factor (0.490 MHz – 30 MHz) = $40 \cdot \log(3 \text{ m}/30 \text{ m}) = -40 \text{ dB}$
Measurement Distance: 3 m
8. Spectrum Setting
 - Frequency Range = 9 kHz ~ 30 MHz
 - Detector = Peak
 - Trace = Max hold
 - RBW = 9 kHz
 - VBW $\geq 3 \cdot \text{RBW}$
9. Total = Reading Value + Antenna Factor (A.F) + Cable Loss (C.L)
10. There is a comparison data both open-field test site and alternative test site – semi-Anechoic chamber according to 414788 D01. And the results are properly calibrated.

TEST PROCEDURE OF RADIATED SPURIOUS EMISSION (30 MHz – 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. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
4. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
5. Spectrum Setting
 - (1) Measurement Type (Peak):
 - Measured Frequency Range: 30 MHz – 1 GHz
 - Detector = Peak
 - Trace = Max hold
 - RBW = 100 kHz
 - VBW $\geq 3 \cdot \text{RBW}$
 - (2) Measurement Type(Quasi-peak):
 - Measured Frequency Range: 30 MHz – 1 GHz
 - Detector = Quasi-Peak
 - RBW = 120 kHz
6. Total = Reading Value + Antenna Factor (A.F) + Cable Loss (C.L)

TEST PROCEDURE OF RADIATED SPURIOUS EMISSION (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 = Max hold
- RBW = 1 MHz
- VBW $\geq 3 \times$ RBW

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

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

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

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

10. Measurement value only up to 6 maximum emissions noted or would be lesser if no specific emissions from the EUT are recorded (*i.e.*: margin > 20 dB from the applicable limit) and considered that is already beyond the background noise floor.

11. Sample Calculation

- (1) Total (Peak) = Reading Value + Antenna Factor(A.F) + Cable Loss(C.L) - Amp Gain(G)
- (2) Total (Average, Duty $\geq 98\%$) = Reading Value + Antenna Factor(A.F) + Cable Loss(C.L) - Amp Gain(G)
- (3) Total (Average, Duty $< 98\%$) = Reading Value + Antenna Factor(A.F) + Cable Loss(C.L) - Amp Gain(G) + Duty Cycle Factor
- (4) Alternative Method : Total (Average) = Total (Peak) + $20 \log(\text{Duty Cycle})$

TEST PROCEDURE OF RADIATED RESTRICTED BAND EDGE

1. Radiated test is performed with hopping off (if there is any)
2. The EUT is placed on a turntable, which is 1.5 m above ground plane.
3. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
4. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
5. EUT is set 3 m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
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):

- Detector = Peak
- Trace = Max hold
- RBW = 1 MHz
- VBW $\geq 3 \times$ RBW

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

- Measured Frequency Range : 2310 MHz – 2390 MHz / 2483.5 MHz – 2500 MHz
- Detector = RMS
- Averaging type = power (*i.e.*, RMS)
- RBW = 1 MHz
- VBW $\geq 3 \times$ RBW
- Sweep time = auto.
- Trace mode = average (at least 100 traces).

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

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

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

10. Sample Calculation

- (1) Total (Peak) = Reading Value + Antenna Factor(A.F) + Cable Loss(C.L)
- (2) Total (Average, Duty $\geq 98\%$) = Reading Value + Antenna Factor(A.F) + Cable Loss(C.L) - Amp Gain(G)
- (3) Total (Average, Duty $< 98\%$) = Reading Value + Antenna Factor(A.F) + Cable Loss(C.L) - Amp Gain(G) + Duty Cycle Factor

7.7. AC POWER LINE CONDUCTED EMISSIONS

LIMIT

47 CFR § 15.207, RSS-GEN Section 8.8

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

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

*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 SETUP

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.

According to FCC KDB 174176 D01 Line Conducted FAQ v01r01 :

Devices Operating Above 30 MHz

For a device with a permanent or detachable antenna operating above 30 MHz, measurements must be performed with the antenna connected as specified in clause 6.2 of ANSI C63.10-2013.

Devices Operating Below 30 MHz

For a device with a permanent or detachable antenna operating at or below 30 MHz, the FCC will accept measurements performed with a suitable dummy load in lieu of the antenna under the following conditions:

- (1) Perform the AC power-line conducted tests with the antenna connected to determine compliance with Section 15.207 limits outside the transmitter's fundamental emission band;
- (2) Retest with a dummy load in lieu of the antenna to determine compliance with Section 15.207 limits within the transmitter's fundamental emission band. For a detachable antenna, remove the antenna and connect a suitable dummy load to the antenna connector. For a permanent antenna, remove the antenna and terminate the RF output with a dummy load or network which simulates the antenna in the fundamental frequency band. All measurements must be performed as specified in clause 6.2 of ANSI C63.10-2013.

Sample Calculation

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

8. SUMMARY OF TEST RESULTS

Test Description	FCC Part Section(s)	ISED Part Section(s)	Test Limit	Test Condition	Test Result
6 dB Bandwidth	§15.247(a)(2)	RSS-247, 5.2.(a)	≥ 500 kHz	Conducted	PASS
Occupied Bandwidth	-	RSS-GEN, 6.7	-		-
Conducted Maximum Peak Output Power	§15.247(b)(3)	RSS-247, 5.4.(d)	≤ 1 W		PASS
Maximum e.i.r.p.	-	RSS-247, 5.4.(d)	≤ 4 W e.i.r.p.		PASS
Power Spectral Density	§15.247(e)	RSS-247, 5.2.(b)	≤ 8 dBm / 3 kHz		PASS
Band Edge (Out of Band emissions)	§15.247(d)	RSS-247, 5.5	≥ 20 dBc		PASS
AC Power line Conducted Emissions	§15.207	RSS-GEN, 8.8	cf. Section 7.7		PASS
Radiated Spurious Emissions	§15.247(d) §15.209	RSS-GEN, 8.9	cf. Section 7.6	Radiated	PASS
Radiated Restricted Band Edge	§15.247(d) §15.205(a)	RSS-GEN, 8.10	cf. Section 7.6		PASS
Receiver Spurious Emissions	-	RSS-GEN, 7.3	cf. Section 7.6		PASS

WORST CASE CONFIGURATION

RADIATED TEST

1. EUT Axis

- All X, Y, and Z positions for horizontal / vertical antenna polarization were investigated to find the worst-case position.
- X position was selected for the final evaluation.

2. Operations with all the data rates available were investigated for each different channel BW mode. Test result at the lowest datarate was reported as the worst case.

3. Radiated test was performed at the worst case 2 x TX CDD mode

- Radiated band edge test was conducted for each different mode (802.11b/g/n/ax) and bandwidth (20/40 MHz).
- Radiated spurious emission test was performed for each different bandwidth. 802.11b/g, 802.11n HT40 modes were reported as the worst-case spurious emissions.

CONDUCTED TEST

1. AC line conducted emission test was performed at the worst case transmission mode.

WORST CASE DATA RATE

Mode	Worst Case Data Rate
802.11b	1 Mbps
802.11g	6 Mbps
802.11n	MCS0
802.11ax	MCS0

CHANNEL UNDER TEST

Mode (U-NII 3)	Bandwidth (MHz)	Low Channel (MHz)	Mid Channel (MHz)	High Channel (MHz)
802.11a	20	2412	2437	2462
802.11g	20	2412	2437	2462
802.11n	20	2412	2437	2462
	40	2422	2437	2452
802.11ax	20	2412	2437	2462
	40	2422	2437	2452

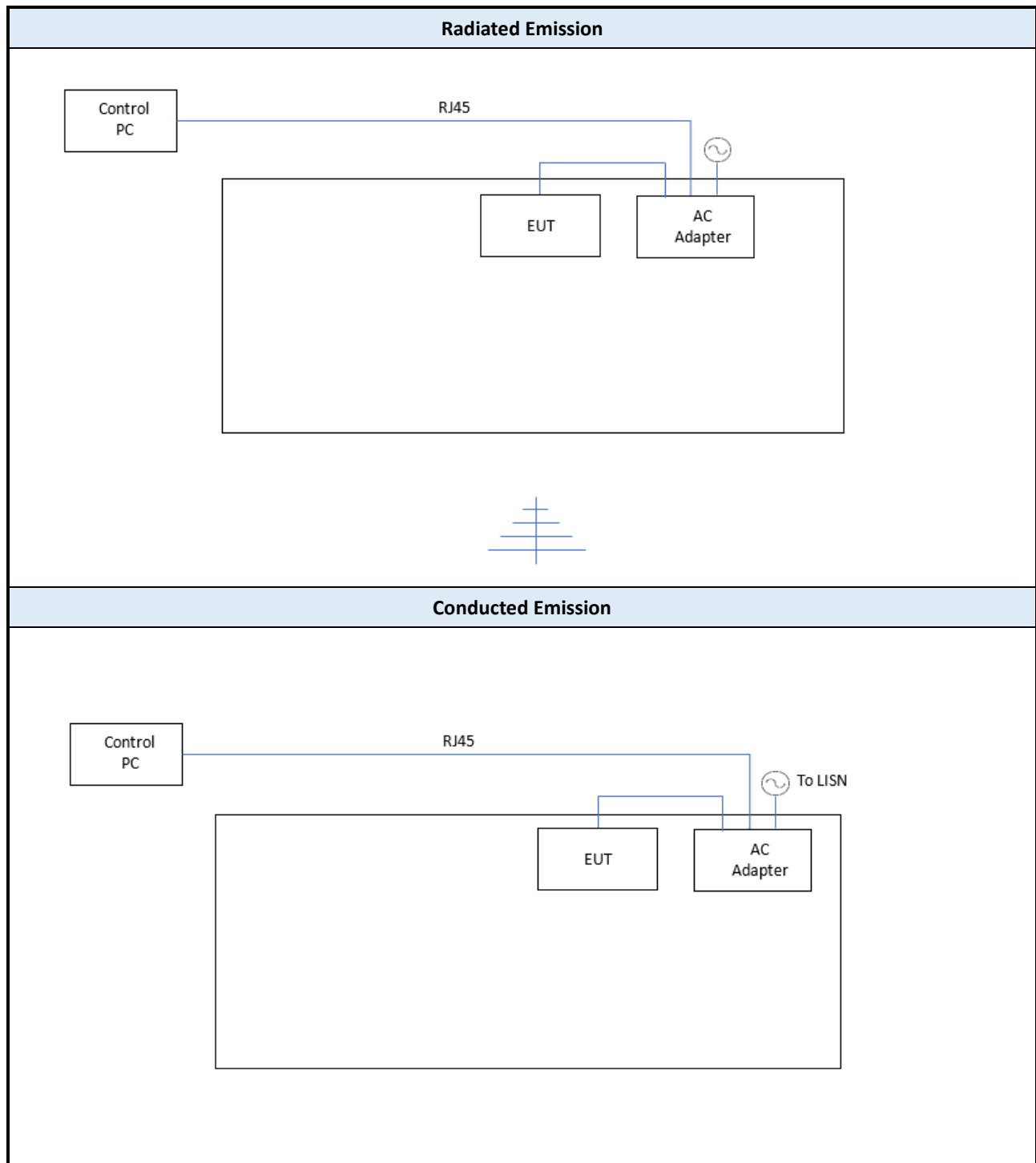
SUMMARY OF OUTPUT POWER

Mode	Max Output Power (dBm)	Max Output Power (mW)	Channel Frequency (MHz)
802.11b	25.16	328.26	2412
802.11g	23.72	235.60	2437
802.11n HT20	23.48	222.86	2437
802.11n HT40	22.32	170.43	2437
802.11ax HE20	23.64	231.07	2437
802.11ax HE40	22.04	159.95	2437

POWER LEVEL SETING

Frequency (MHz)	Channel	Power Level Setting / Chain					
		802.11b	802.11g	802.11n HT20	802.11n HT40	802.11ax HE20	802.11ax HE40
2412	1	21.5	19.5	19.5	-	18.5	-
2417	2	21.5	20	20	-	20	-
2422	3	21.5	20	20	17	20	16.5
2427	4	21.5	20	20	17.5	20	17
2432	5	21.5	20	20	18	20	17.5
2437	6	21.5	20	20	18.5	20	18.5
2442	7	21.5	20	20	18	20	17.5
2447	8	21.5	20	20	18	20	17
2452	9	21.5	20	20	17.5	20	17
2457	10	21.5	20	20	-	20	-
2462	11	21.5	19.5	20	-	19	-

TEST CONFIGURATION



LIST OF SUPPORT EQUIPMENT

Equipment Type	Model No.	Serial Number	Manufacturer	Qty	Note
AC Adapter	C110011	1920L013622	eero	1	100-240 VAC, 0.45 A 50/60Hz (5 VDC)
Laptop	TP00076A	R9-0NUJ14 17/08	Lenovo	1	-

9. TEST RESULT

9.1. DUTY CYCLE

Mode	Data Rate	T _{on} (ms)	T _{total} (ms)	Duty Cycle	Duty Factor (dB)	VBW(1/T) (Hz)
802.11b	1 Mbps	13.14	13.74	0.96	0.19	76.10
802.11g	6 Mbps	1.98	2.35	0.84	0.74	505.05
802.11n HT20	MCS0	5.43	5.93	0.92	0.38	184.16
802.11n HT40	MCS0	5.43	5.88	0.92	0.35	184.16
802.11ax HE20	MCS0	5.44	6.01	0.91	0.43	183.75
802.11ax HE40	MCS0	5.44	5.90	0.92	0.35	183.75

TEST PLOTS

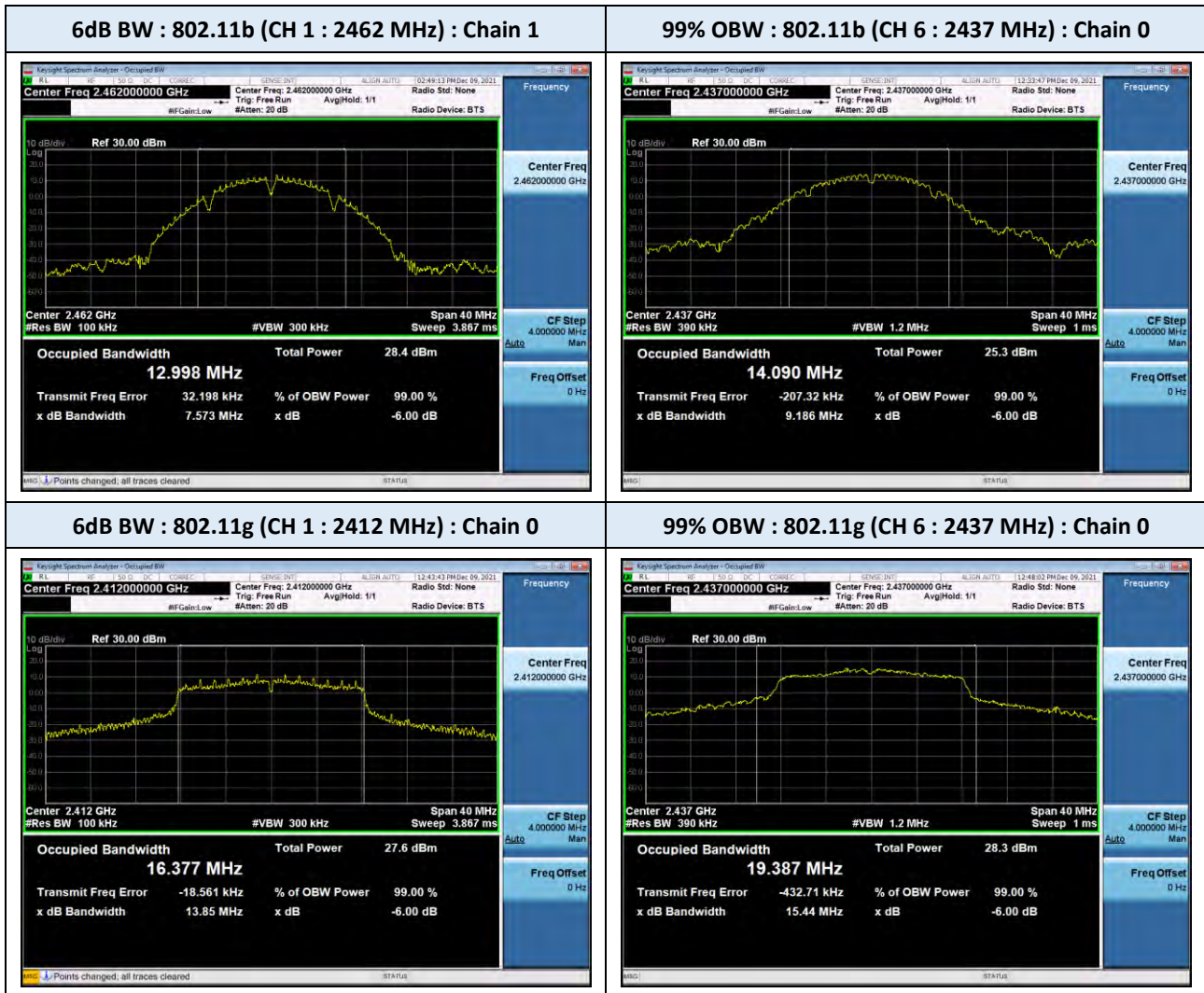


9.2. 6 dB BANDWIDTH / 99% BANDWIDTH MEASUREMENT

20 MHz BW			99% Bandwidth (MHz)		6 dB Bandwidth (MHz)		
Mode	Frequency (MHz)	Channel	Chain 0	Chain 1	Chain 0	Chain 1	Limit
802.11b	2412	1	13.921	13.588	8.549	8.557	≥ 0.5
	2437	6	14.090	13.075	9.082	8.106	
	2462	11	14.057	13.022	9.051	7.573	
802.11g	2412	1	16.713	16.336	13.851	15.125	≥ 0.5
	2437	6	19.387	16.350	15.130	15.120	
	2462	11	16.676	16.334	15.114	15.114	
802.11n HT20	2412	1	17.772	17.513	15.110	13.851	≥ 0.5
	2437	6	18.570	17.500	15.125	13.882	
	2462	11	19.160	17.509	13.878	13.794	
802.11ax HE20	2412	1	18.953	18.803	15.096	14.169	≥ 0.5
	2437	6	22.549	18.846	13.795	14.177	
	2462	11	19.035	18.823	13.865	13.801	

40 MHz BW			99% Bandwidth (MHz)		6 dB Bandwidth (MHz)		
Mode	Frequency (MHz)	Channel	Chain 0	Chain 1	Chain 0	Chain 1	Limit
802.11n HT40	2422	3	35.845	35.797	35.051	33.924	≥ 0.5
	2437	6	36.016	35.849	33.933	35.120	
	2452	9	35.843	35.832	32.264	31.418	
802.11ax HE40	2422	3	37.534	37.553	35.143	35.137	≥ 0.5
	2437	6	37.746	37.590	34.135	31.708	
	2452	9	37.654	37.585	35.119	35.312	

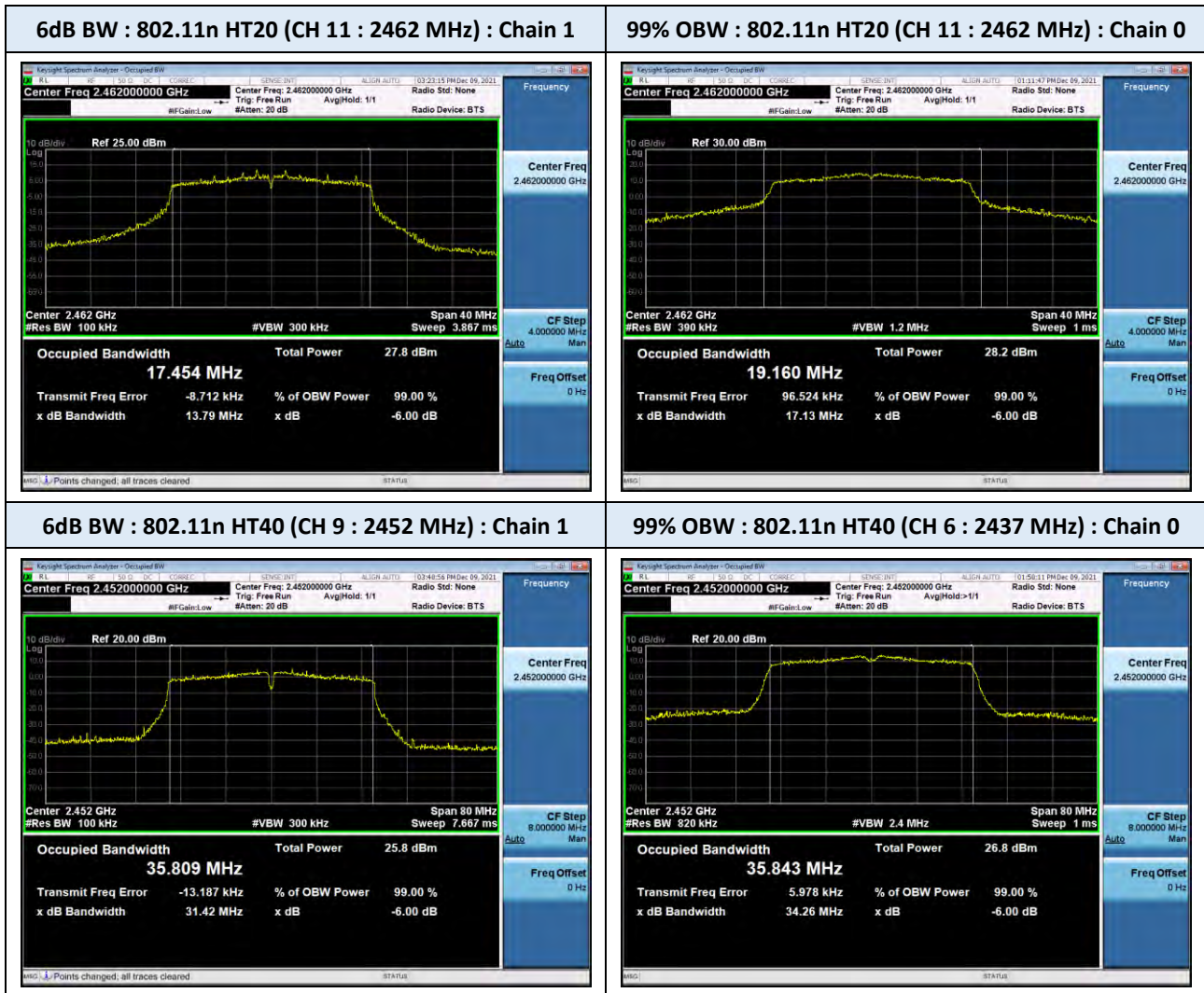
TEST PLOTS



Note(s) :

The worst BW plots are included in this report.

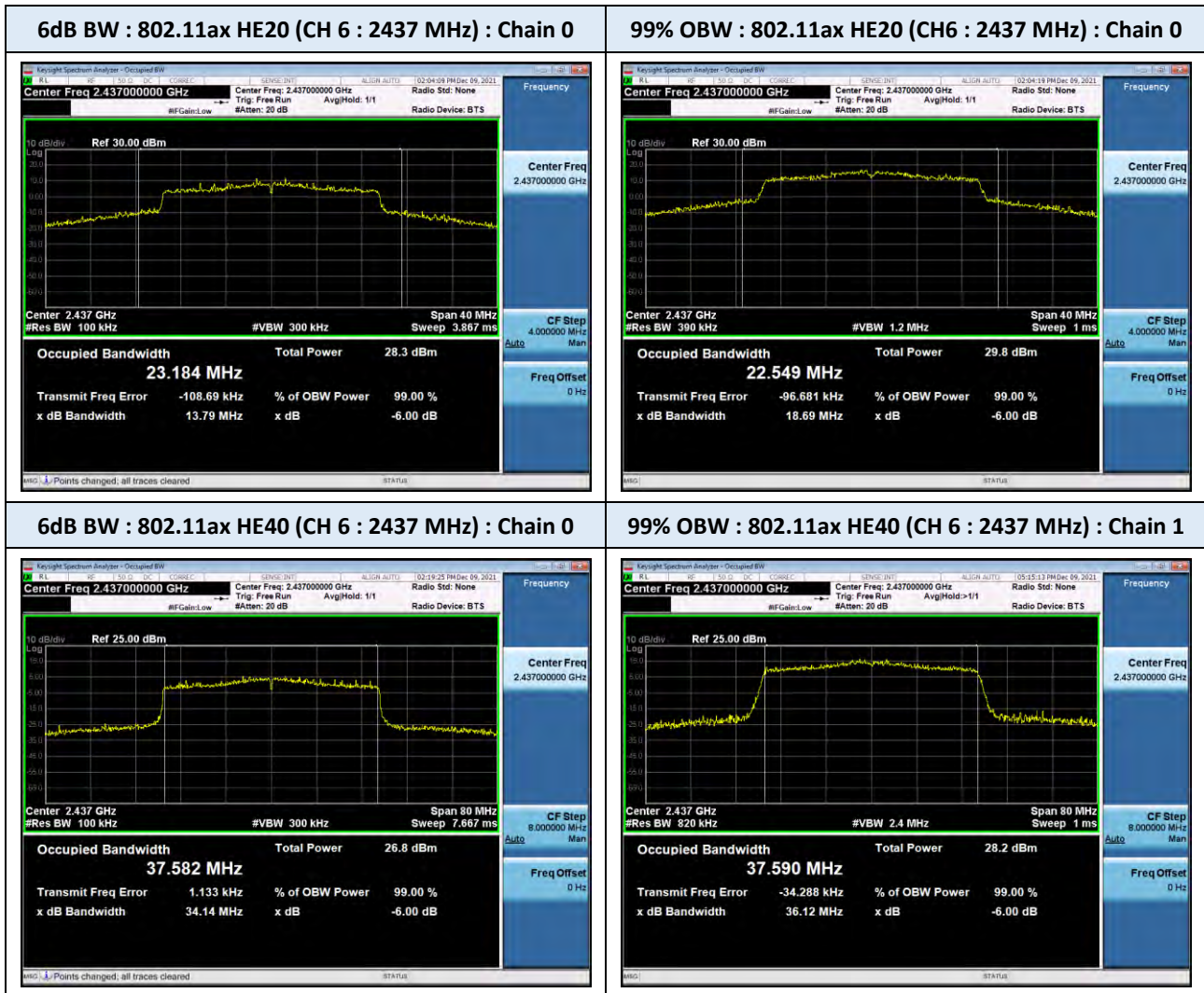
TEST PLOTS



Note(s) :

The worst BW plots are included in this report.

TEST PLOTS



Note(s) :

The worst BW plots are included in this report.

9.3. OUTPUT POWER

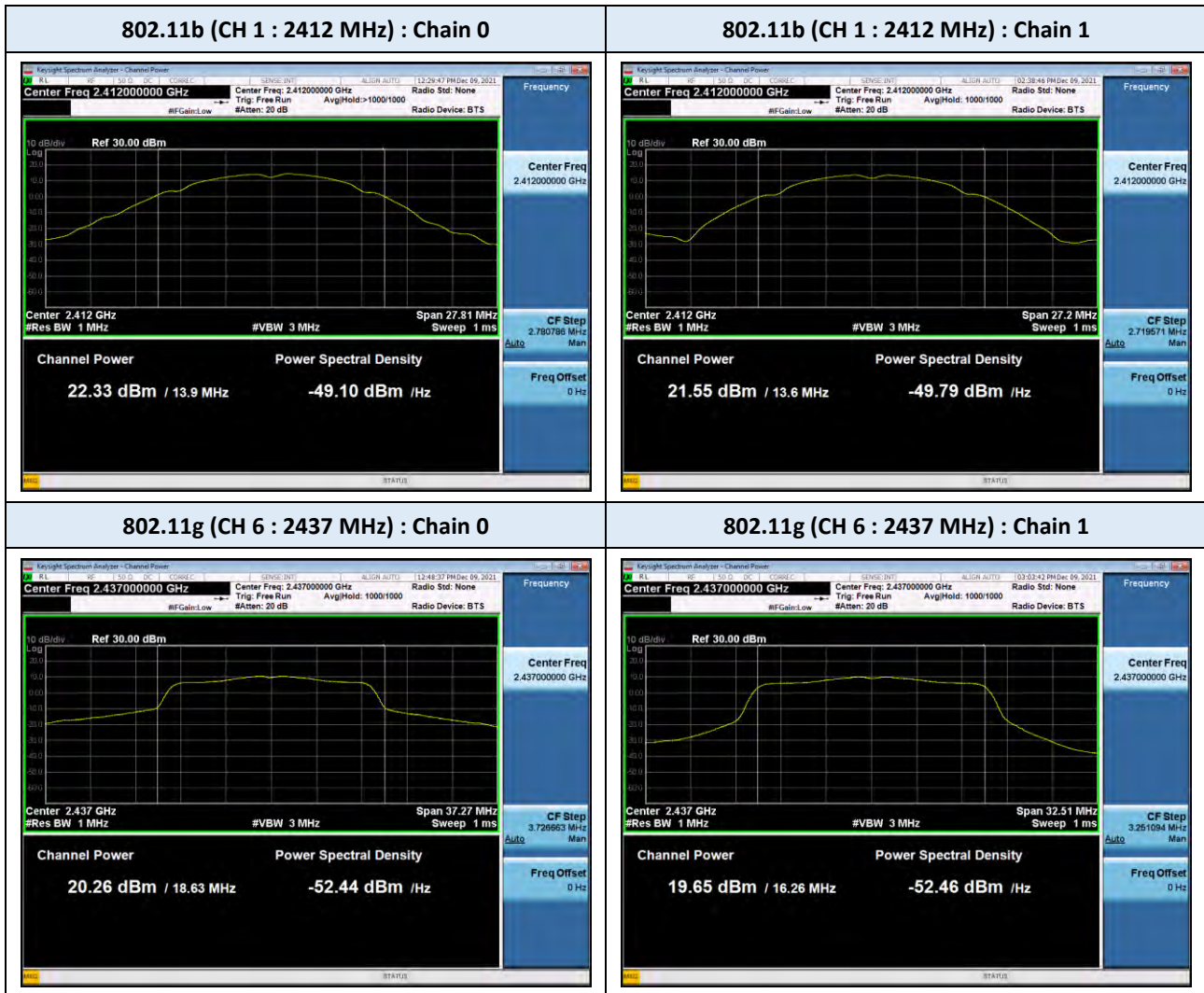
20 MHz BW				Test Result				Limit (dBm)
Mode	Frequency (MHz)	Channel	Data Rate	Measured Power (dBm)		Duty Factor (dB)	Total Power (dBm)	
				Chain 0	Chain 1		Chain 0 + Chain 1	
802.11b	2412	1	1 Mbps	22.33	21.55	0.19	25.16	30
	2437	6	1 Mbps	21.86	21.87	0.19	25.07	30
	2462	11	1 Mbps	21.80	21.90	0.19	25.06	30
802.11g	2412	1	6 Mbps	19.72	19.07	0.74	23.16	30
	2437	6	6 Mbps	20.26	19.65	0.74	23.72	30
	2462	11	6 Mbps	19.31	19.37	0.74	23.10	30
802.11n HT20	2412	1	MCS0	19.99	19.14	0.38	22.98	30
	2437	6	MCS0	20.37	19.78	0.38	23.48	30
	2462	11	MCS0	20.20	19.90	0.38	23.44	30
802.11ax HE20	2412	1	MCS0	19.04	18.24	0.43	22.10	30
	2437	6	MCS0	20.43	19.95	0.43	23.64	30
	2462	11	MCS0	19.06	19.22	0.43	22.58	30

40 MHz BW				Test Result				Limit (dBm)
Mode	Frequency (MHz)	Channel	Data Rate	Measured Power (dBm)		Duty Factor (dB)	Total Power (dBm)	
				Chain 0	Chain 1		Chain 0 + Chain 1	
802.11n HT40	2422	3	MCS0	17.87	17.20	0.35	20.90	30
	2437	6	MCS0	19.05	18.87	0.35	22.32	30
	2452	9	MCS0	18.04	17.98	0.35	21.36	30
802.11ax HE40	2422	3	MCS0	17.06	16.59	0.35	20.19	30
	2437	6	MCS0	18.78	18.58	0.35	22.04	30
	2452	9	MCS0	17.30	17.17	0.35	20.60	30

Note(s) :

1. The output power results in plot include the spectrum offset, which is a combination loss of the attenuator and the cable used for testing

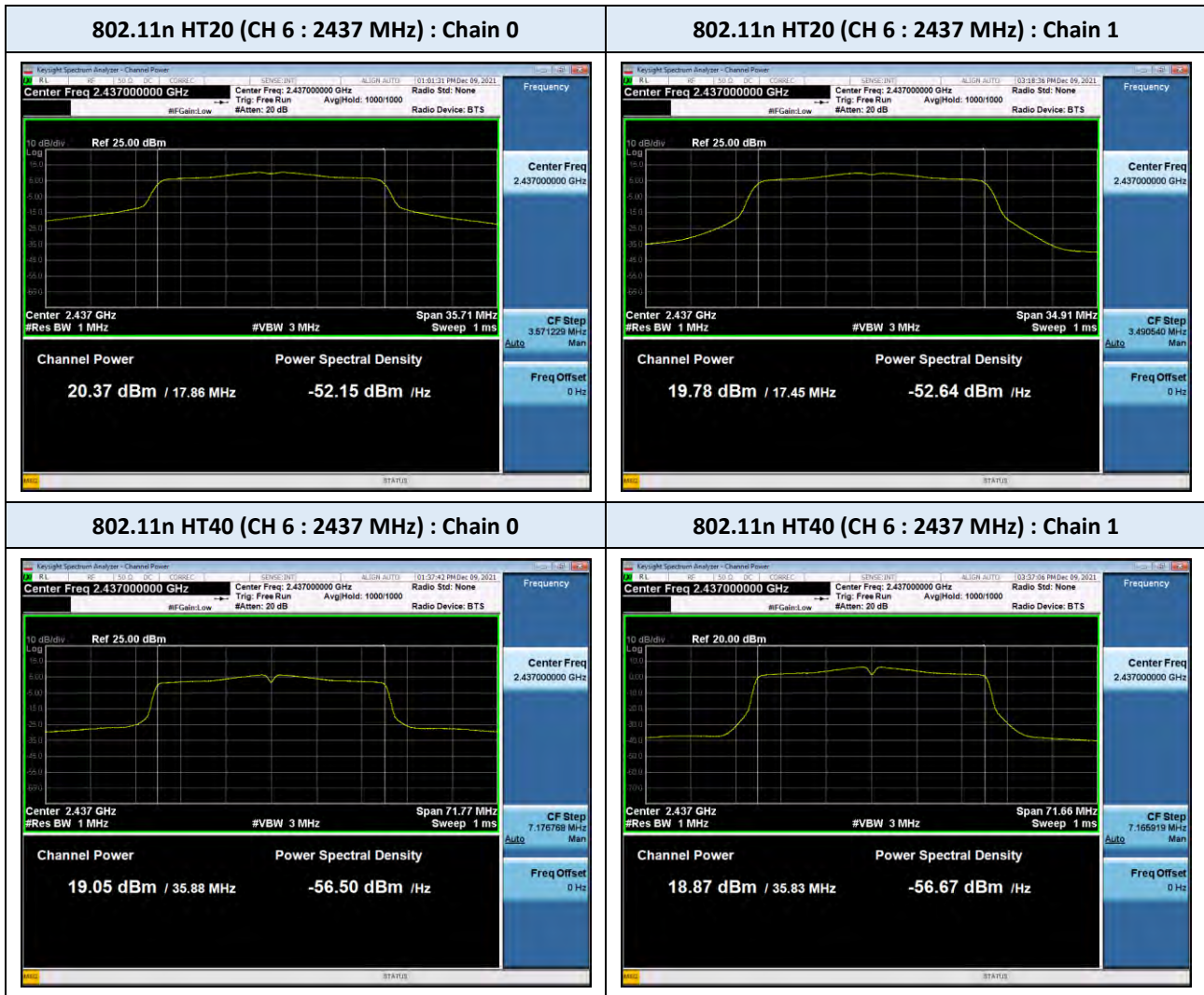
TEST PLOTS



Note(s) :

The worst case plots for each modes are included in this report.

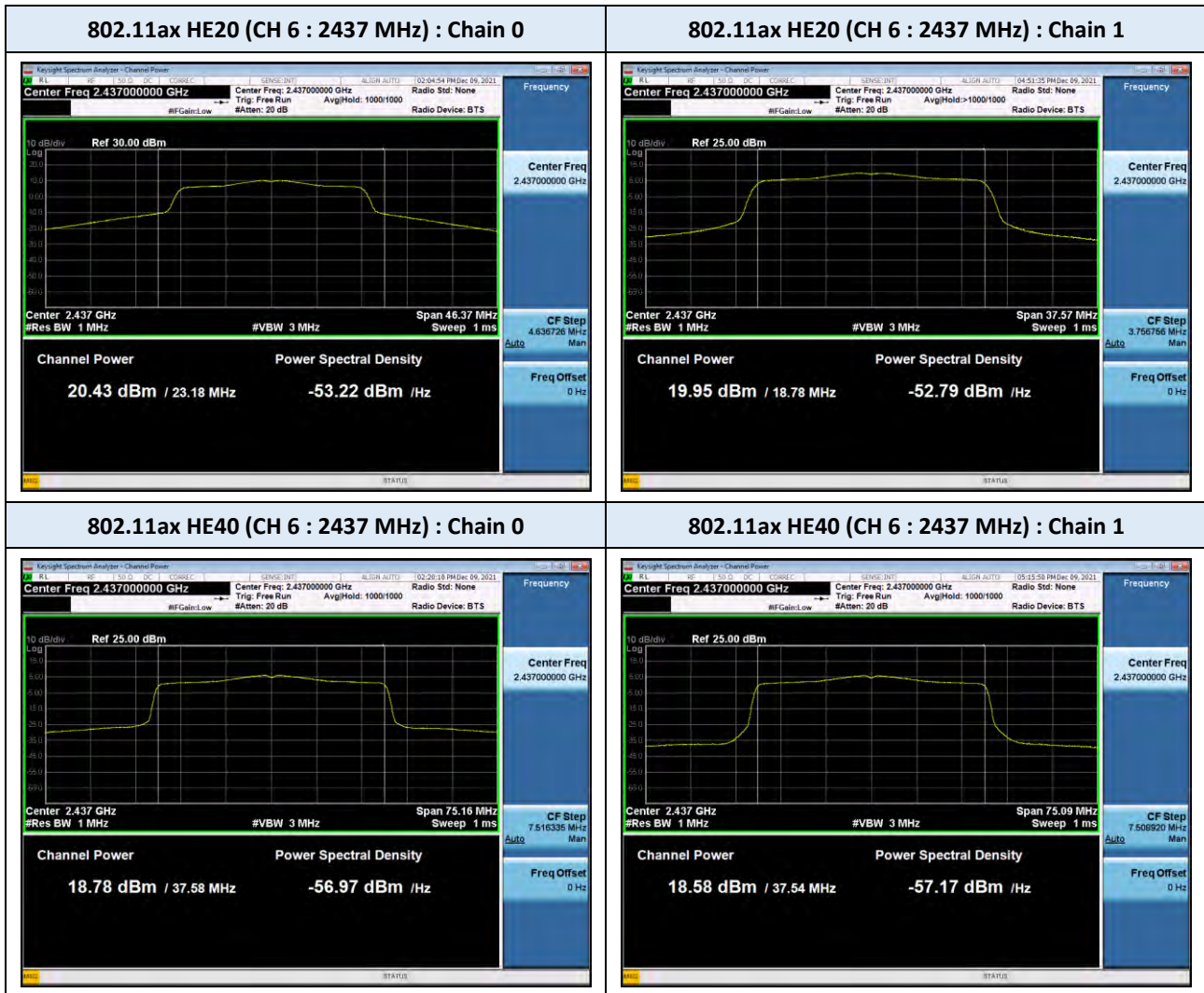
TEST PLOTS



Note(s) :

The worst case plots for each modes are included in this report.

TEST PLOTS



Note(s) :

The worst case plots for each modes are included in this report.

9.4. POWER SPECTRAL DENSITY

20 MHz BW				Test Result				Limit (dBm/3kHz)
Mode	Frequency (MHz)	Channel	Data Rate	Measured PSD (dBm/3kHz)		Duty Factor (dB)	Total PSD (dBm/3kHz)	
				Chain 0	Chain 1		Chain 0 + Chain 1	
802.11b	2412	1	1 Mbps	-3.99	-4.69	0.19	-1.12	7.61
	2437	6	1 Mbps	-4.24	-4.51	0.19	-1.17	7.61
	2462	11	1 Mbps	-4.27	-4.30	0.19	-1.08	7.61
802.11g	2412	1	6 Mbps	-6.86	-7.65	0.74	-3.48	7.61
	2437	6	6 Mbps	-6.26	-7.19	0.74	-2.94	7.61
	2462	11	6 Mbps	-7.49	-7.23	0.74	-3.60	7.61
802.11n HT20	2412	1	MCS0	-7.65	-8.19	0.38	-4.51	7.61
	2437	6	MCS0	-7.26	-7.83	0.38	-4.14	7.61
	2462	11	MCS0	-7.56	-7.59	0.38	-4.18	7.61
802.11ax HE20	2412	1	MCS0	-9.53	-10.61	0.43	-6.59	7.61
	2437	6	MCS0	-8.47	-8.77	0.43	-5.18	7.61
	2462	11	MCS0	-9.69	-9.40	0.43	-6.10	7.61

40 MHz BW				Test Result				Limit (dBm/3kHz)
Mode	Frequency (MHz)	Channel	Data Rate	Measured PSD (dBm/3kHz)		Duty Factor (dB)	Total PSD (dBm/3kHz)	
				Chain 0	Chain 1		Chain 0 + Chain 1	
802.11n HT40	2422	3	MCS0	-16.64	-13.60	0.35	-11.50	7.61
	2437	6	MCS0	-15.29	-11.76	0.35	-9.82	7.61
	2452	9	MCS0	-16.21	-12.85	0.35	-10.86	7.61
802.11ax HE40	2422	3	MCS0	-14.29	-14.76	0.35	-11.16	7.61
	2437	6	MCS0	-11.03	-12.52	0.35	-8.35	7.61
	2452	9	MCS0	-13.04	-14.09	0.35	-10.17	7.61

Note(s) :

1. The PSD results in plot include the spectrum offset, which is a combination loss of the attenuator and the cable used for testing
2. PSD Limit = 8 dBm/3kHz – (6.39 dBi – 6dBi) = 7.61 dBm/3kHz

TEST PLOTS

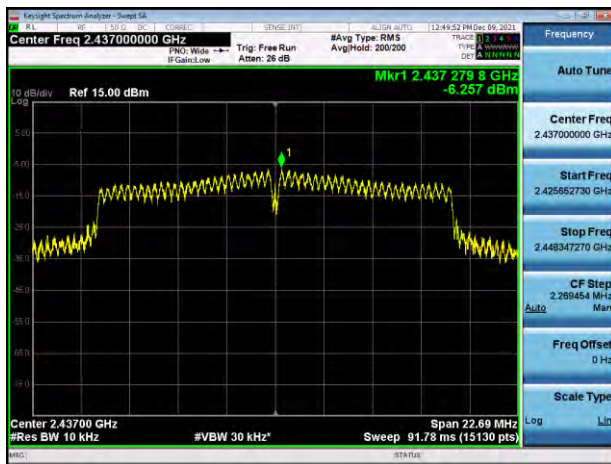
802.11b (CH 11 : 2462 MHz) : Chain 0



802.11b (CH 11 : 2462 MHz) : Chain 1



802.11g (CH 6 : 2437 MHz) : Chain 0



802.11g (CH 6 : 2437 MHz) : Chain 1



TEST PLOTS

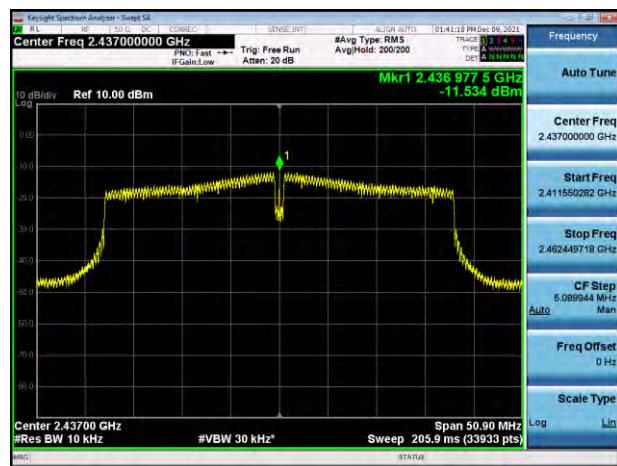
802.11n HT20 (CH 6 : 2437 MHz) : Chain 0



802.11n HT20 (CH 6 : 2437 MHz) : Chain 1



802.11n HT40 (CH 6 : 2437 MHz) : Chain 0



802.11n HT40 (CH 6 : 2437 MHz) : Chain 1



TEST PLOTS

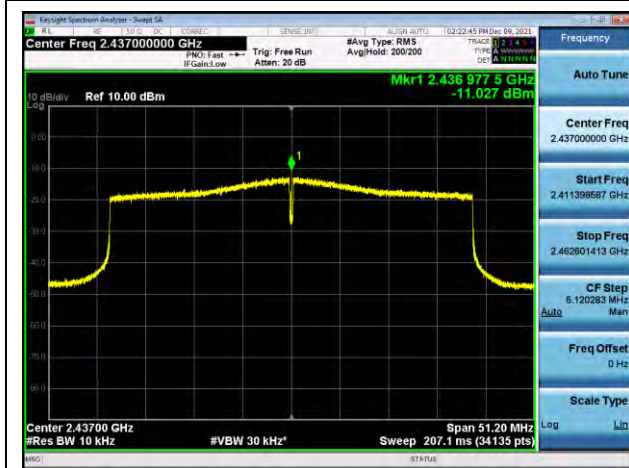
802.11ax HE20 (CH 6 : 2437 MHz) : Chain 0



802.11ax HE20 (CH 6 : 2437 MHz) : Chain 1



802.11ax HE40 (CH 6 : 2437 MHz) : Chain 0



802.11ax HE40 (CH 6 : 2437 MHz) : Chain 1



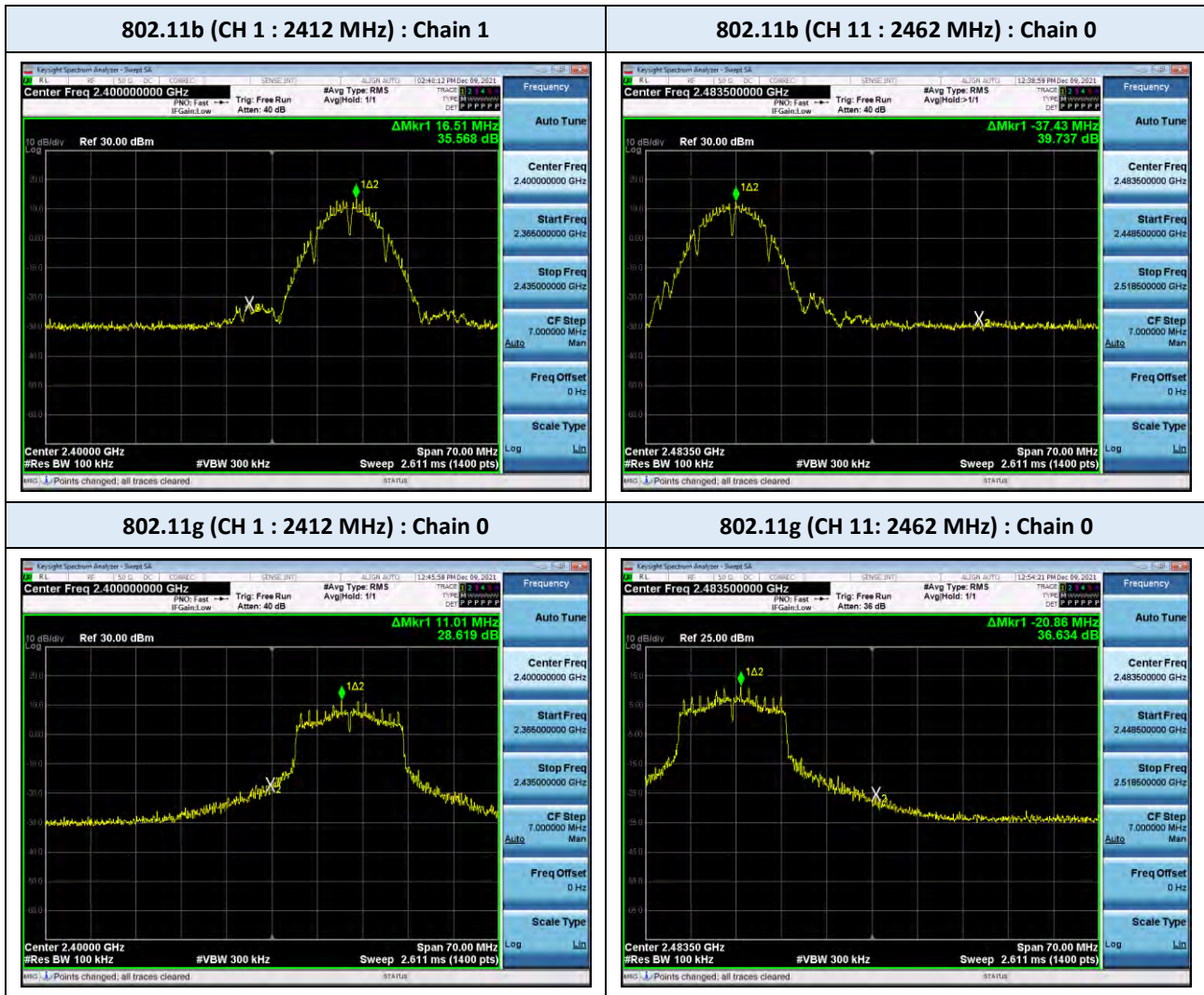
9.5. CONDUCTED BAND EDGE & SPURIOUS EMISSIONS

Out of Band Emissions at the Band Edge

20 MHz BW				Test Result		Limit (dBc)
Mode	Frequency (MHz)	Channel	Position	Measured Level (dBc)		
				Chain 0	Chain 1	
802.11b	2412	1	Low	35.759	35.568	≥ 20
	2462	11	High	39.737	41.820	≥ 20
802.11g	2412	1	Low	28.619	36.746	≥ 20
	2462	11	High	36.634	38.501	≥ 20
802.11n HT20	2412	1	Low	28.785	37.147	≥ 20
	2462	11	High	29.955	43.021	≥ 20
802.11ax HE20	2412	1	Low	28.833	34.018	≥ 20
	2462	11	High	36.469	42.055	≥ 20

40 MHz BW				Test Result		Limit (dBc)
Mode	Frequency (MHz)	Channel	Position	Measured Level (dBc)		
				Chain 0	Chain 1	
802.11n HT40	2422	3	Low	35.532	38.302	≥ 20
	2452	9	High	36.822	41.762	≥ 20
802.11ax HE40	2422	3	Low	36.318	38.771	≥ 20
	2452	9	High	38.843	42.320	≥ 20

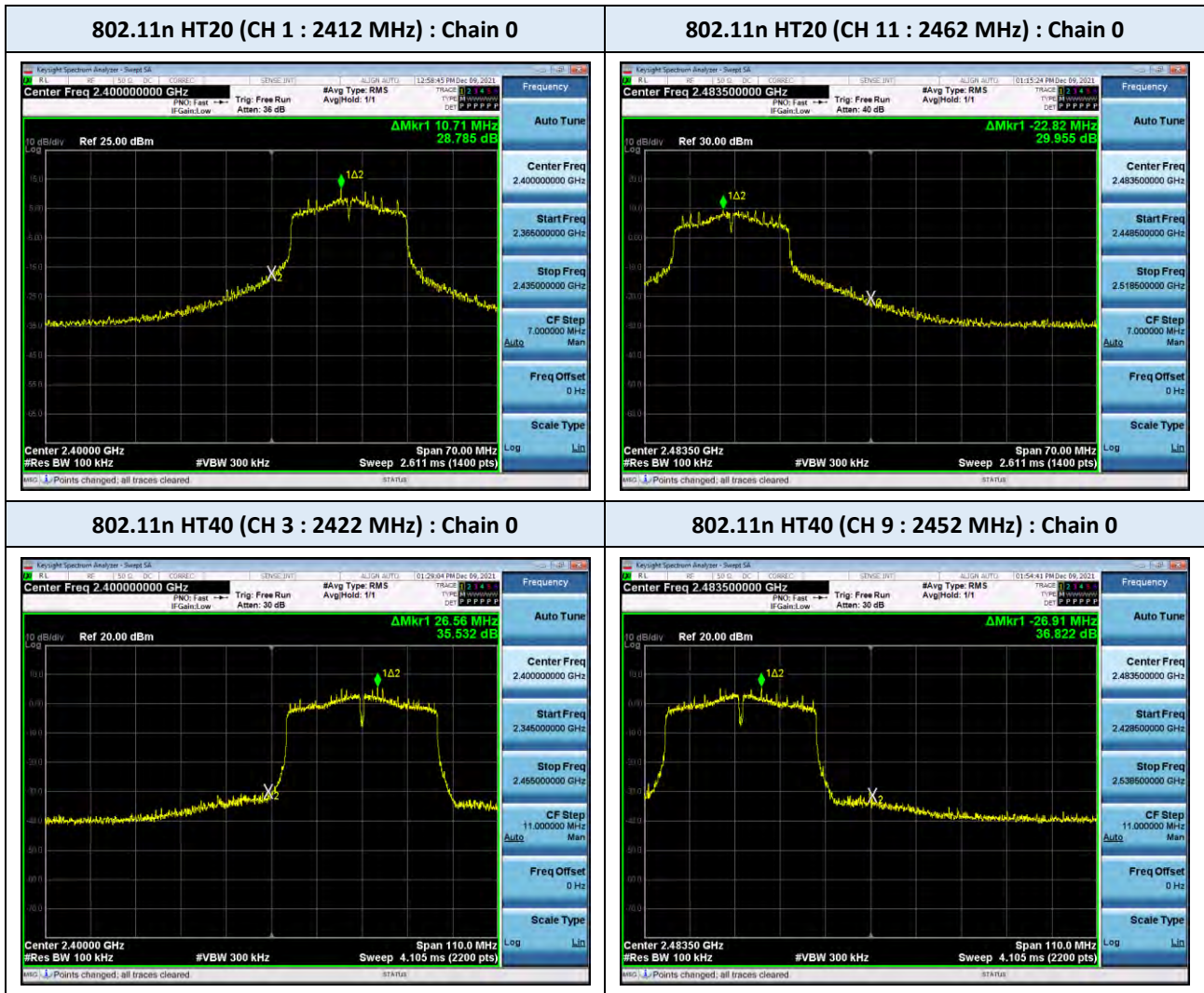
TEST PLOTS (CONDUCTED BAND EDGE)



Note(s) :

The plots included in this report are only at the worst-case channel and chain.

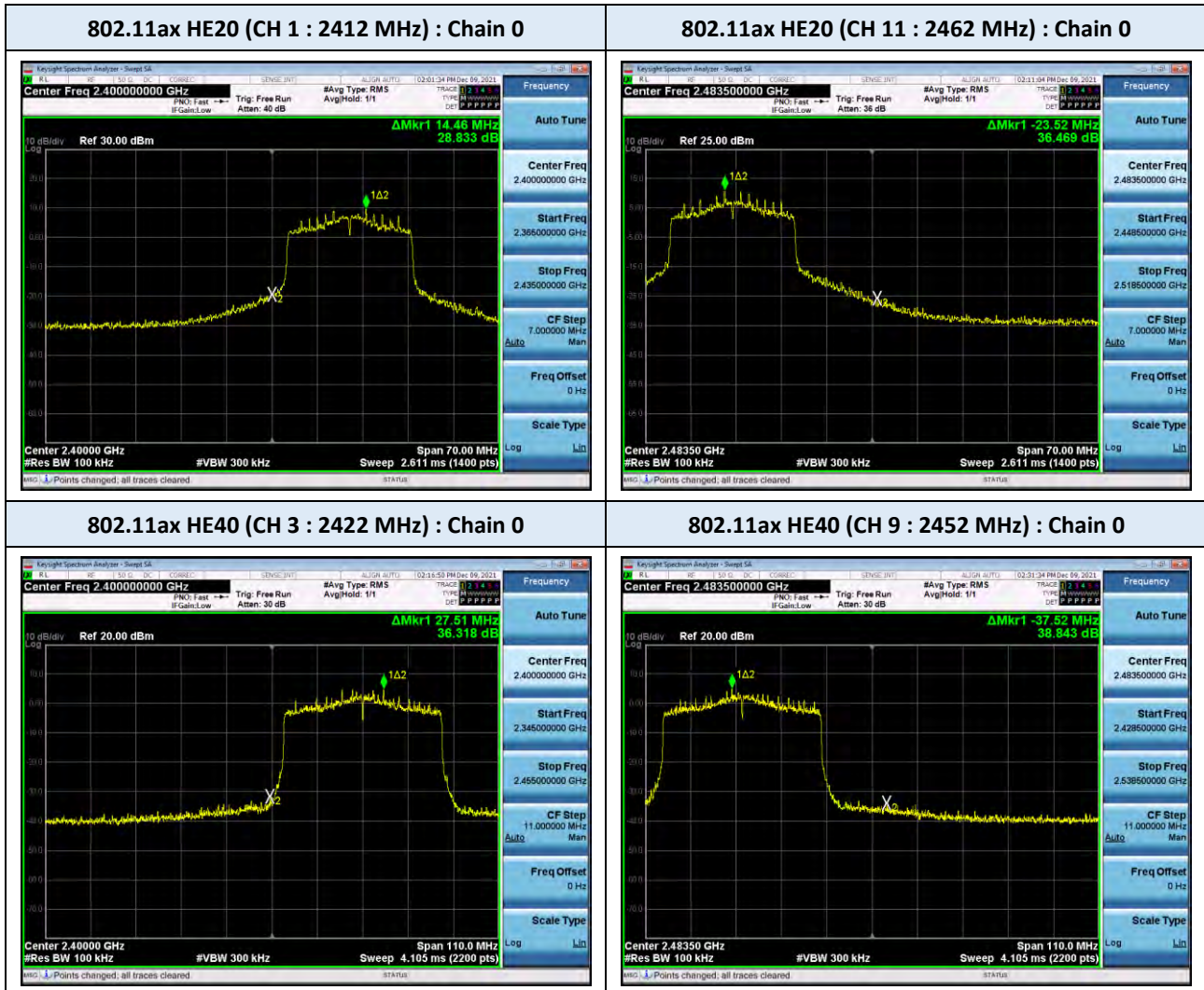
TEST PLOTS (CONDUCTED BAND EDGE)



Note(s) :

The plots included in this report are only at the worst-case channel and chain.

TEST PLOTS (CONDUCTED BAND EDGE)



Note(s) :

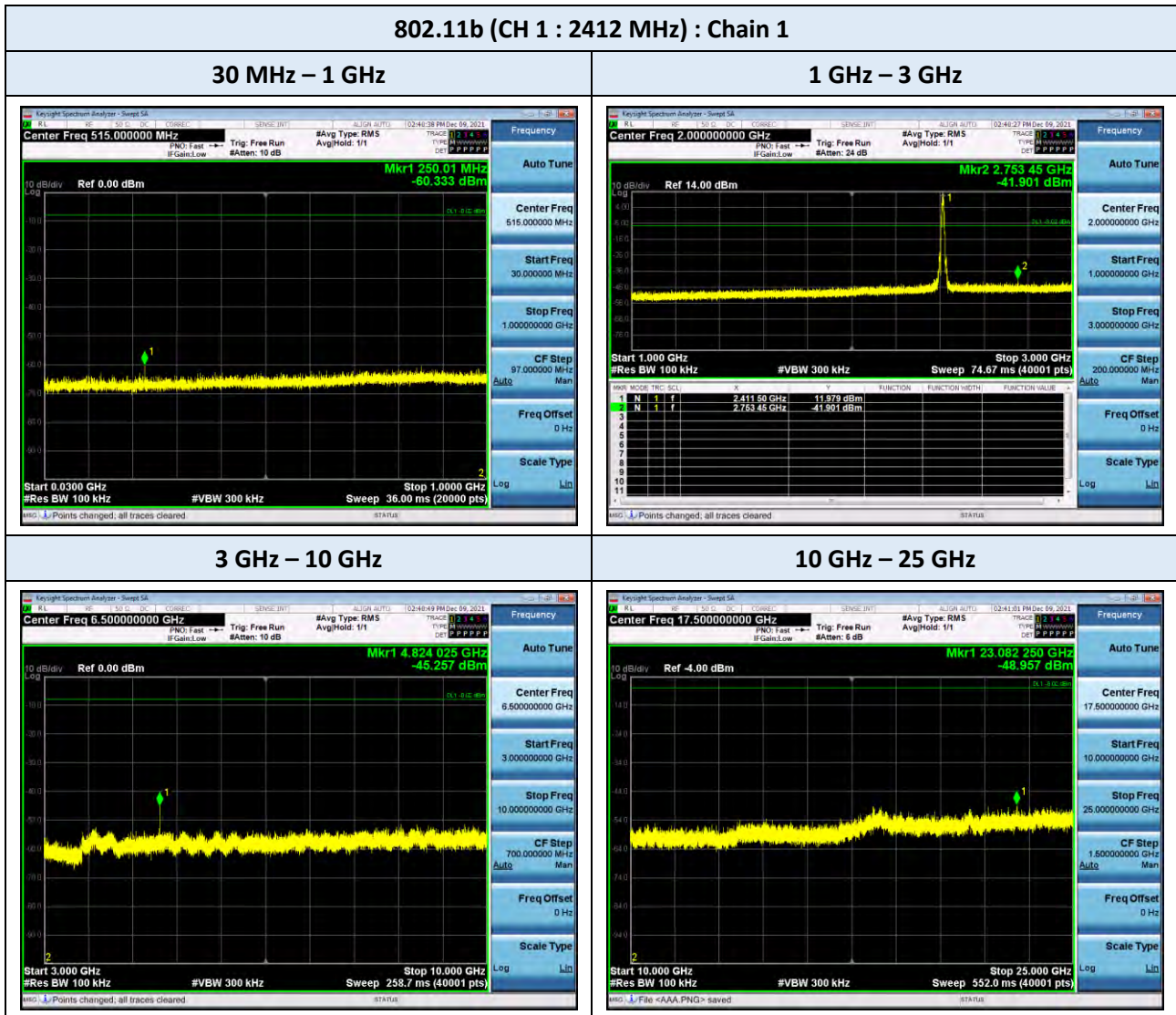
The plots included in this report are only at the worst-case channel and chain.

Conducted Spurious Emissions

20 MHz BW				Test Result		Limit (dBc)
Mode	Frequency (MHz)	Channel	Position	Measured Level (dBc)		
				Chain 0	Chain 1	
802.11b	2412	1	Low	55.504	53.880	≥ 20
	2437	6	Middle	55.892	54.584	≥ 20
	2462	11	High	55.023	55.389	≥ 20
802.11g	2412	1	Low	54.739	53.590	≥ 20
	2437	6	Middle	51.377	50.400	≥ 20
	2462	11	High	50.601	52.450	≥ 20
802.11n HT20	2412	1	Low	52.503	50.221	≥ 20
	2437	6	Middle	51.733	51.037	≥ 20
	2462	11	High	52.781	49.500	≥ 20
802.11ax HE20	2412	1	Low	49.436	48.141	≥ 20
	2437	6	Middle	50.633	50.774	≥ 20
	2462	11	High	50.699	50.967	≥ 20

40 MHz BW				Test Result		Limit (dBc)
Mode	Frequency (MHz)	Channel	Position	Measured Level (dBc)		
				Chain 0	Chain 1	
802.11n HT40	2422	3	Low	46.580	46.385	≥ 20
	2437	6	Middle	45.108	47.067	≥ 20
	2452	9	High	46.605	45.394	≥ 20
802.11ax HE40	2422	3	Low	44.422	44.020	≥ 20
	2437	6	Middle	43.782	48.351	≥ 20
	2452	9	High	47.683	43.775	≥ 20

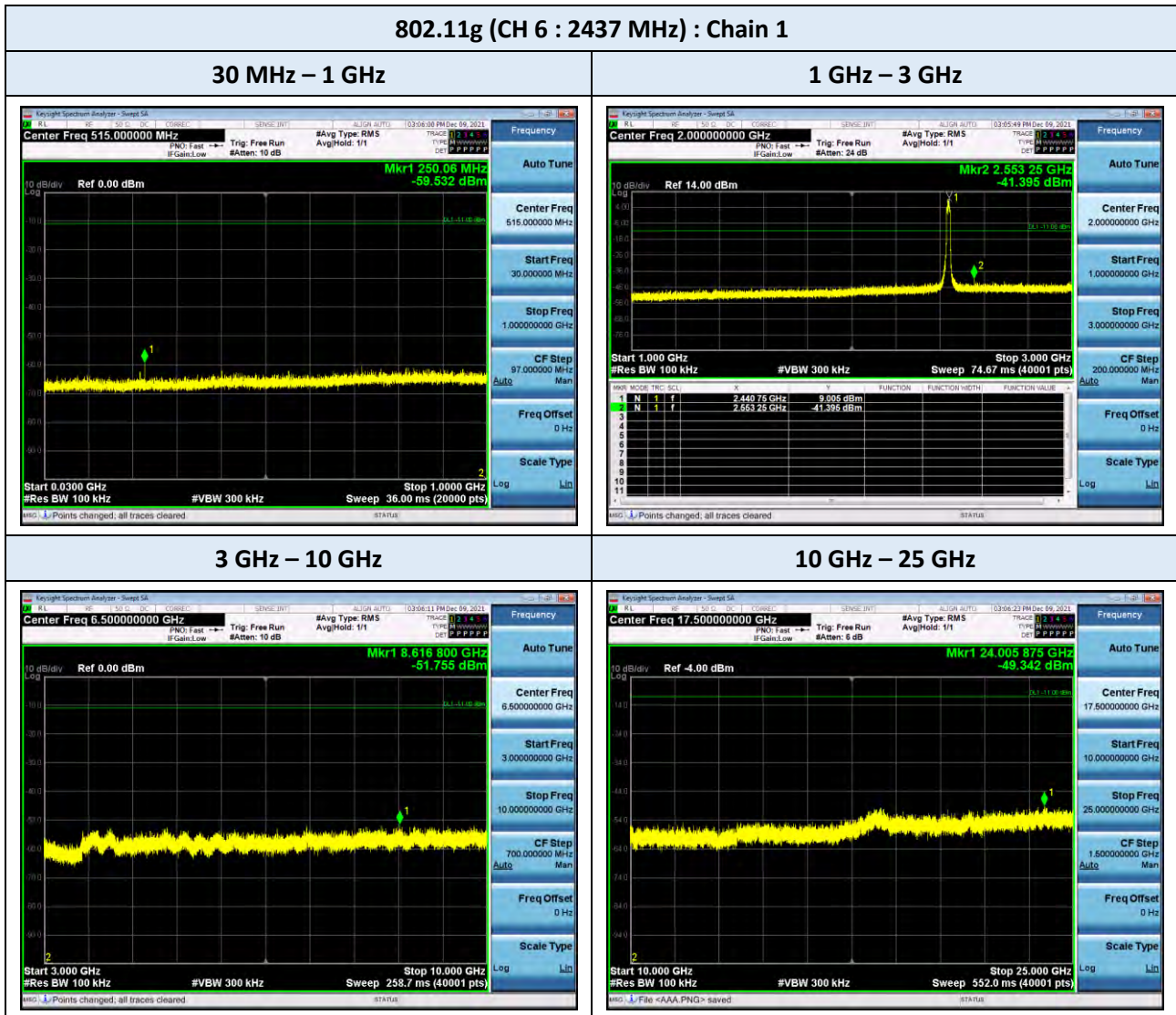
TEST PLOTS



Note(s) :

The plots included in this report are only at the worst-case channel and chain.

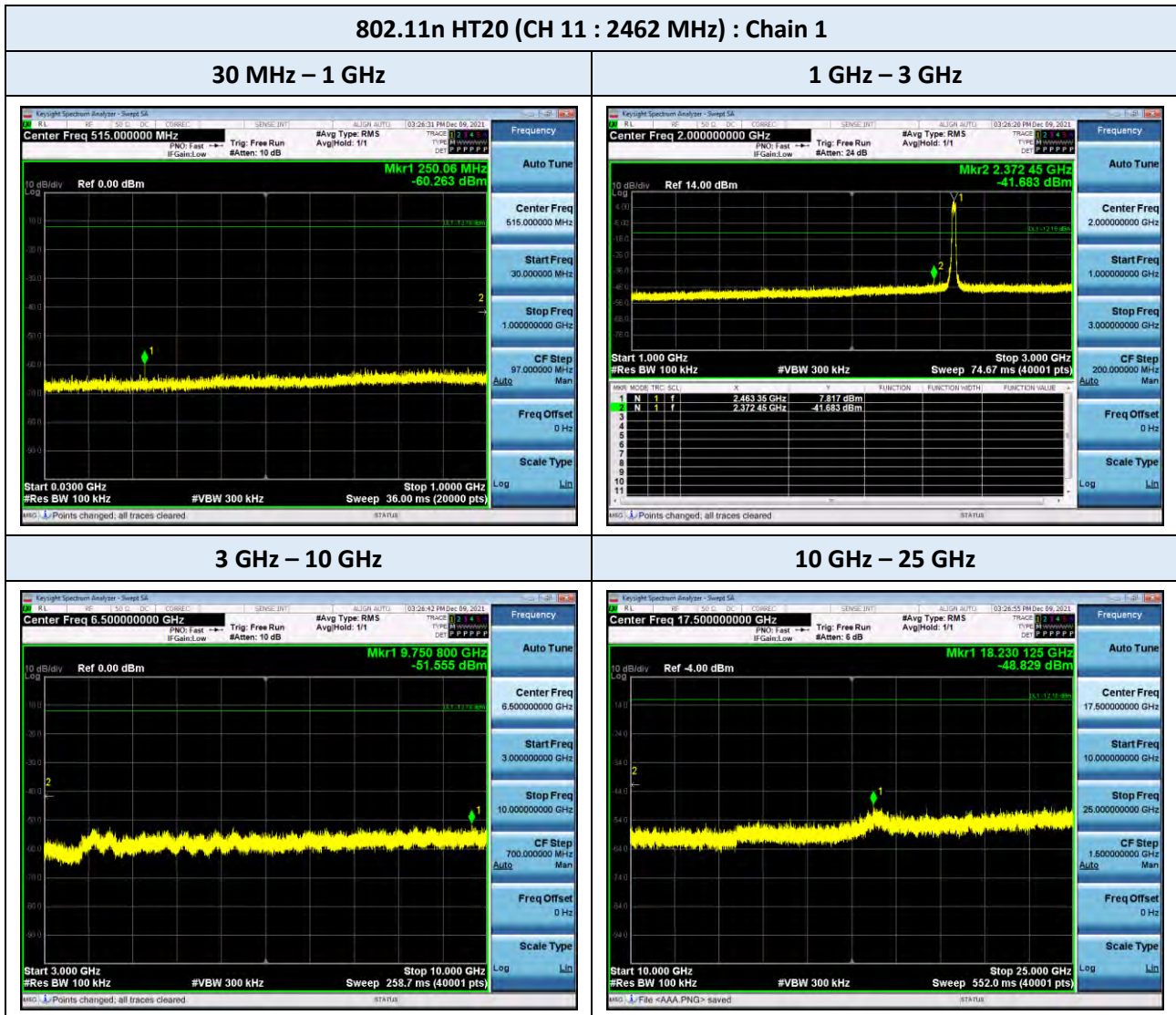
TEST PLOTS



Note(s) :

The plots included in this report are only at the worst-case channel and chain.

TEST PLOTS



Note(s) :

The plots included in this report are only at the worst-case channel and chain.

TEST PLOTS



Note(s) :

The plots included in this report are only at the worst-case channel and chain.

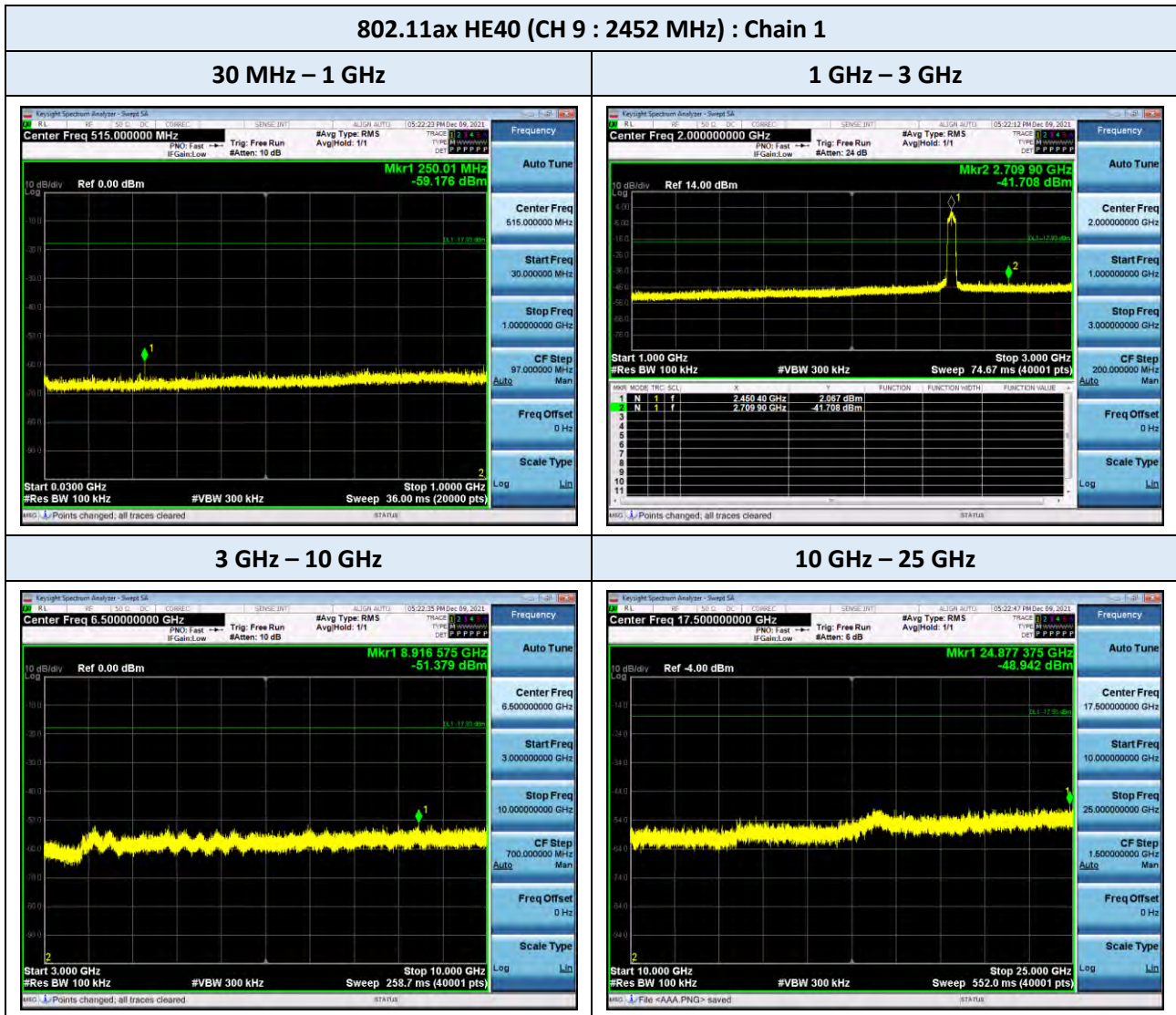
TEST PLOTS



Note(s) :

The plots included in this report are only at the worst-case channel and chain.

TEST PLOTS



Note(s) :

The plots included in this report are only at the worst-case channel and chain.

9.6. RADIATED SPURIOUS EMISSIONS

Frequency Range : Below 1 GHz

Test Mode 802.11b
Operating Frequency 2412 MHz (CH 1)

Frequency (MHz)	Polarization	Reading (dBuV)	Corr. ¹⁾ (dB)	Total (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Measurement Type
62.523	V	43.2	-12.9	30.3	40	9.7	QP
85.352	V	40.9	-13.1	27.8	40	12.2	QP
158.708	V	37.4	-7.0	30.4	43.5	13.1	QP
249.987	V	37.1	-7.9	29.2	46	16.8	QP
250.027	H	33.5	-7.9	25.6	46	20.4	QP

Test Mode 802.11b
Operating Frequency 2437 MHz (CH 6)

Frequency (MHz)	Polarization	Reading (dBuV)	Corr. ¹⁾ (dB)	Total (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Measurement Type
62.344	V	43.9	-12.9	31.0	40	9.0	QP
85.947	V	41.3	-12.9	28.4	40	11.6	QP
158.238	V	38.3	-7.0	31.3	43.5	12.2	QP
249.997	V	34.9	-7.9	27.0	46	19.0	QP
250.027	H	26.8	-7.9	18.9	46	27.1	QP

Test Mode 802.11b
Operating Frequency 2462 MHz (CH 11)

Frequency (MHz)	Polarization	Reading (dBuV)	Corr. ¹⁾ (dB)	Total (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Measurement Type
55.421	V	43.7	-13.5	30.2	40	9.8	QP
62.224	V	44.1	-12.9	31.2	40	8.8	QP
158.843	V	37.4	-7.0	30.4	43.5	13.1	QP
249.979	H	27.0	-7.9	19.1	46	26.9	QP
250.000	V	34.9	-7.9	27.0	46	19.0	QP

Note(s) :

1. Correction Factor: Antenna Factor + Cable loss + Preamplifier Gain
2. The worst-case test result was evaluated for each different modulation.

Frequency Range : Below 1 GHz (CON'T)

Test Mode 802.11n HT20
Operating Frequency 2412 MHz (CH 1)

Frequency (MHz)	Polarization	Reading (dBuV)	Corr. ¹⁾ (dB)	Total (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Measurement Type
62.515	V	44.7	-12.9	31.8	40	8.2	QP
158.335	V	37.4	-7.0	30.4	43.5	13.1	QP
249.992	H	27.5	-7.9	19.6	46	26.4	QP
250.007	V	35.0	-7.9	27.1	46	18.9	QP

Test Mode 802.11n HT20
Operating Frequency 2437 MHz (CH 6)

Frequency (MHz)	Polarization	Reading (dBuV)	Corr. ¹⁾ (dB)	Total (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Measurement Type
62.510	V	44.7	-12.9	31.8	40	8.2	QP
158.171	V	36.7	-7.0	29.7	43.5	13.8	QP
249.997	V	35.0	-7.9	27.1	46	18.9	QP
250.002	H	34.3	-7.9	26.4	46	19.6	QP

Test Mode 802.11n HT20
Operating Frequency 2462 MHz (CH 11)

Frequency (MHz)	Polarization	Reading (dBuV)	Corr. ¹⁾ (dB)	Total (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Measurement Type
62.499	V	44.8	-12.9	31.9	40	8.1	QP
158.099	V	37.5	-7.0	30.5	43.5	13.0	QP
249.993	V	35.1	-7.9	27.2	46	18.8	QP
250.007	H	35.0	-7.9	27.1	46	18.9	QP

Note(s) :

1. Correction Factor: Antenna Factor + Cable loss + Preamplifier Gain
2. The worst-case test result was evaluated for each different modulation.

Frequency Range : Above 1 GHz

Test Mode 802.11b
Operating Frequency 2412 MHz (CH 1)

Frequency (MHz)	Polarization	Reading (dBuV)		Factor (dB)		Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)	
		AV	PK	Corr. ¹⁾	Duty	AV	PK	AV	PK	AV	PK
4823.932	H	56.9	58.3	-5.1	0.2	52.0	53.4	54	74	2.0	20.6
4823.999	V	56.9	58.1	-5.1	0.2	52.0	53.2	54	74	2.0	20.8
12060.557	H	36.8	43.2	4.8	0.2	41.8	48.2	54	74	12.2	25.8
12060.970	V	39.1	44.0	4.8	0.2	44.1	49.0	54	74	9.9	25.0

Test Mode 802.11b
Operating Frequency 2437 MHz (CH 6)

Frequency (MHz)	Polarization	Reading (dBuV)		Factor (dB)		Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)	
		AV	PK	Corr. ¹⁾	Duty	AV	PK	AV	PK	AV	PK
4873.961	H	57.5	58.5	-5.0	0.2	52.7	53.7	54	74	1.3	20.3
4874.004	V	57.4	58.5	-5.0	0.2	52.6	53.7	54	74	1.4	20.3
7311.542	H	42.9	47.0	0.3	0.2	43.4	47.5	54	74	10.6	26.5
7311.893	V	46.5	49.5	0.3	0.2	47.0	50.0	54	74	7.0	24.0
12185.451	H	36.8	42.3	4.9	0.2	41.9	47.4	54	74	12.1	26.6
12185.590	V	38.4	43.7	4.9	0.2	43.5	48.8	54	74	10.5	25.2

Test Mode 802.11b
Operating Frequency 2462 MHz (CH 11)

Frequency (MHz)	Polarization	Reading (dBuV)		Factor (dB)		Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)	
		AV	PK	Corr. ¹⁾	Duty	AV	PK	AV	PK	AV	PK
4923.935	V	53.8	55.9	-4.8	0.2	49.2	51.3	54	74	4.8	22.7
4923.940	H	56.1	57.7	-4.8	0.2	51.5	53.1	54	74	2.5	20.9
7386.359	H	40.6	46.0	0.4	0.2	41.2	46.6	54	74	12.8	27.4
7386.529	V	47.4	51.1	0.4	0.2	48.0	51.7	54	74	6.0	22.3

Note(s) :

1. Correction Factor: Antenna Factor + Cable loss + Preamplifier Gain
2. AV Level = Measured Power(dBm) + Correction Factor(dB) + Duty Cycle Factor(dB).

Frequency Range : Above 1 GHz (CON'T)

Test Mode 802.11g
Operating Frequency 2412 MHz (CH 1)

Frequency (MHz)	Polarization	Reading (dBuV)		Factor (dB)		Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)	
		AV	PK	Corr. ¹⁾	Duty	AV	PK	AV	PK	AV	PK
4822.699	H	41.5	50.7	-5.1	0.7	37.1	46.3	54	74	16.9	27.7
4823.911	V	41.5	49.1	-5.1	0.7	37.1	44.7	54	74	16.9	29.3

Test Mode 802.11g
Operating Frequency 2437 MHz (CH 6)

Frequency (MHz)	Polarization	Reading (dBuV)		Factor (dB)		Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)	
		AV	PK	Corr. ¹⁾	Duty	AV	PK	AV	PK	AV	PK
4874.098	H	44.3	52.4	-5.0	0.7	40.0	48.1	54	74	14.0	25.9
4875.199	V	40.7	49.4	-5.0	0.7	36.4	45.1	54	74	17.6	28.9
7308.794	H	36.7	45.1	0.3	0.7	37.7	46.1	54	74	16.3	27.9
7312.603	V	36.1	44.9	0.3	0.7	37.1	45.9	54	74	16.9	28.1

Test Mode 802.11g
Operating Frequency 2462 MHz (CH 11)

Frequency (MHz)	Polarization	Reading (dBuV)		Factor (dB)		Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)	
		AV	PK	Corr. ¹⁾	Duty	AV	PK	AV	PK	AV	PK
4923.009	H	40.7	49.1	-4.8	0.7	36.6	45.0	54	74	17.4	29.0
4925.292	V	39.3	47.5	-4.8	0.7	35.2	43.4	54	74	18.8	30.6
7385.872	H	34.6	43.2	0.4	0.7	35.7	44.3	54	74	18.3	29.7
7387.209	V	36.1	44.1	0.4	0.7	37.2	45.2	54	74	16.8	28.8

Note(s) :

1. Correction Factor: Antenna Factor + Cable loss + Preamplifier Gain
2. AV Level = Measured Power(dBm) + Correction Factor(dB) + Duty Cycle Factor(dB).

Frequency Range : Above 1 GHz (CON'T)

Test Mode 802.11n HT20
Operating Frequency 2412 MHz (CH 1)

Frequency (MHz)	Polarization	Reading (dBuV)		Factor (dB)		Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)	
		AV	PK	Corr. ¹⁾	Duty	AV	PK	AV	PK	AV	PK
4822.331	H	40.9	49.1	-5.1	0.4	36.2	44.4	54	74	17.8	29.6
4833.682	V	37.7	45.7	-5.1	0.4	33.0	41.0	54	74	21.0	33.0

Test Mode 802.11n HT20
Operating Frequency 2437 MHz (CH 6)

Frequency (MHz)	Polarization	Reading (dBuV)		Factor (dB)		Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)	
		AV	PK	Corr. ¹⁾	Duty	AV	PK	AV	PK	AV	PK
4875.324	V	40.7	49.0	-5.0	0.4	36.1	44.4	54	74	17.9	29.6
4875.391	H	43.6	51.9	-5.0	0.4	39.0	47.3	54	74	15.0	26.7
7306.215	H	36.6	45.3	0.3	0.4	37.3	46.0	54	74	16.7	28.0
7313.328	V	36.1	45.2	0.3	0.4	36.8	45.9	54	74	17.2	28.1

Test Mode 802.11n HT20
Operating Frequency 2462 MHz (CH 11)

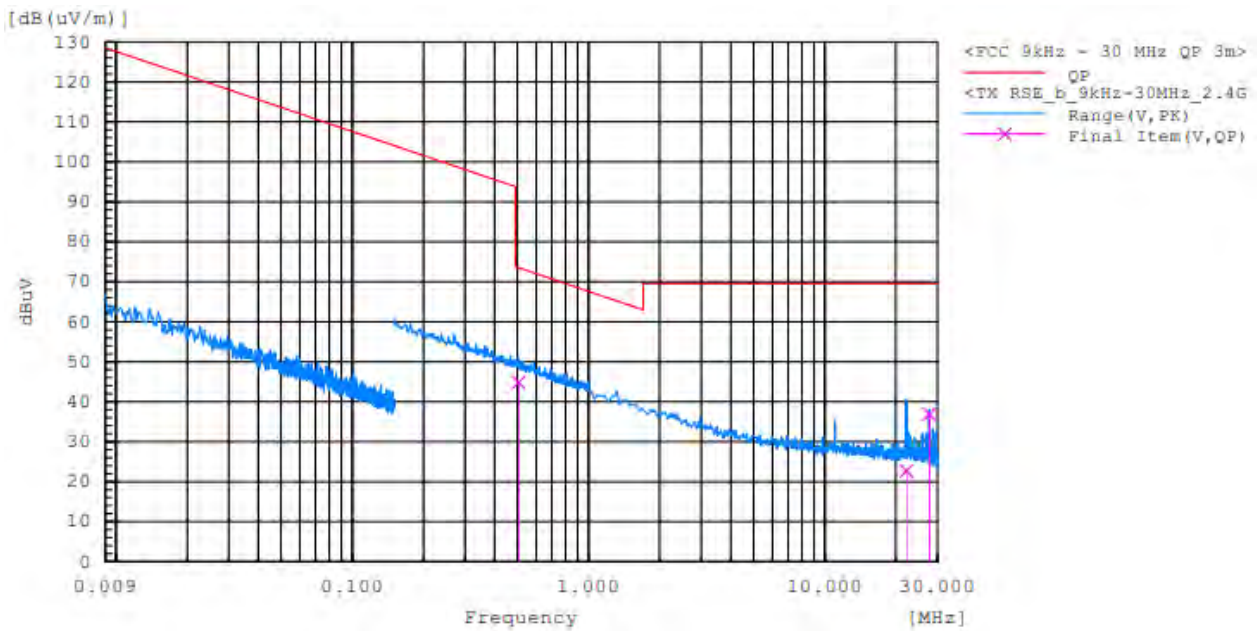
Frequency (MHz)	Polarization	Reading (dBuV)		Factor (dB)		Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)	
		AV	PK	Corr. ¹⁾	Duty	AV	PK	AV	PK	AV	PK
4922.600	H	41.6	49.9	-4.8	0.4	37.2	45.5	54	74	16.8	28.5
4926.465	V	39.6	48.1	-4.8	0.4	35.2	43.7	54	74	18.8	30.3
7383.422	V	36.3	44.5	0.4	0.4	37.1	45.3	54	74	16.9	28.7
7385.543	H	34.6	41.1	0.4	0.4	35.4	41.9	54	74	18.6	32.1

Note(s) :

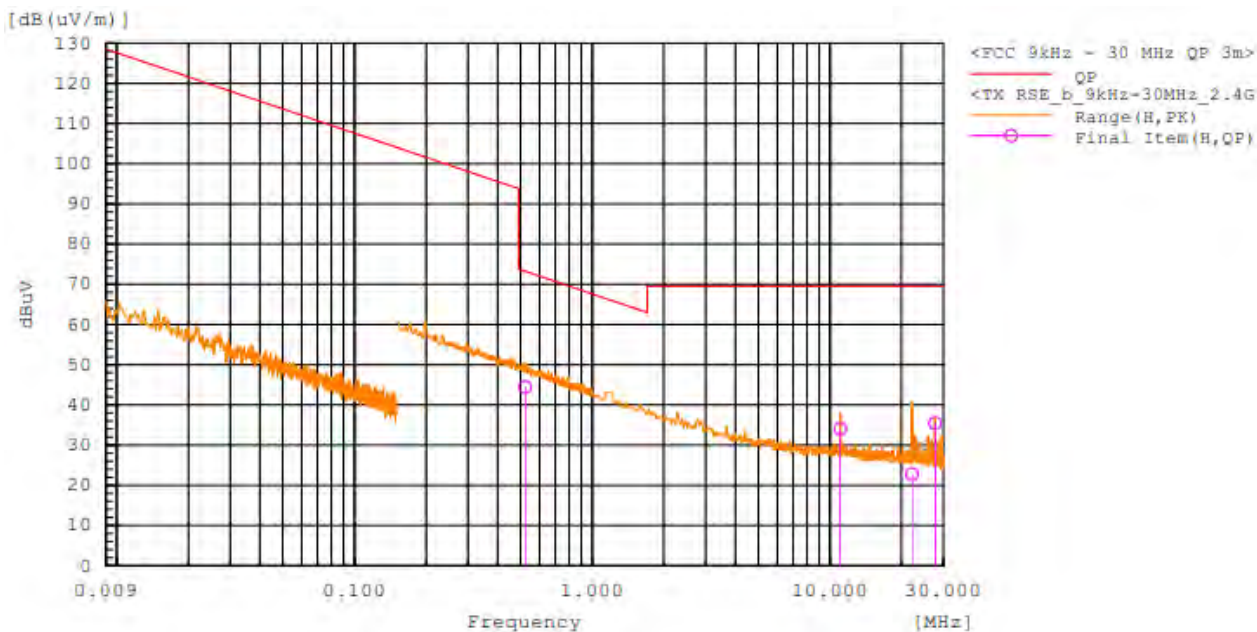
1. Correction Factor: Antenna Factor + Cable loss + Preamplifier Gain
2. AV Level = Measured Power(dBm) + Correction Factor(dB) + Duty Cycle Factor(dB).
3. 802.11n HT20 was reported as the worst case for radiated spurious emissions.

■ TEST PLOTS

Radiated Spurious Emission 9 kHz – 30 MHz (Antenna Position 90°) : 802.11b (CH 6)



Radiated Spurious Emission 9 kHz – 30 MHz (Antenna Position 180°) : 802.11b (CH 6)

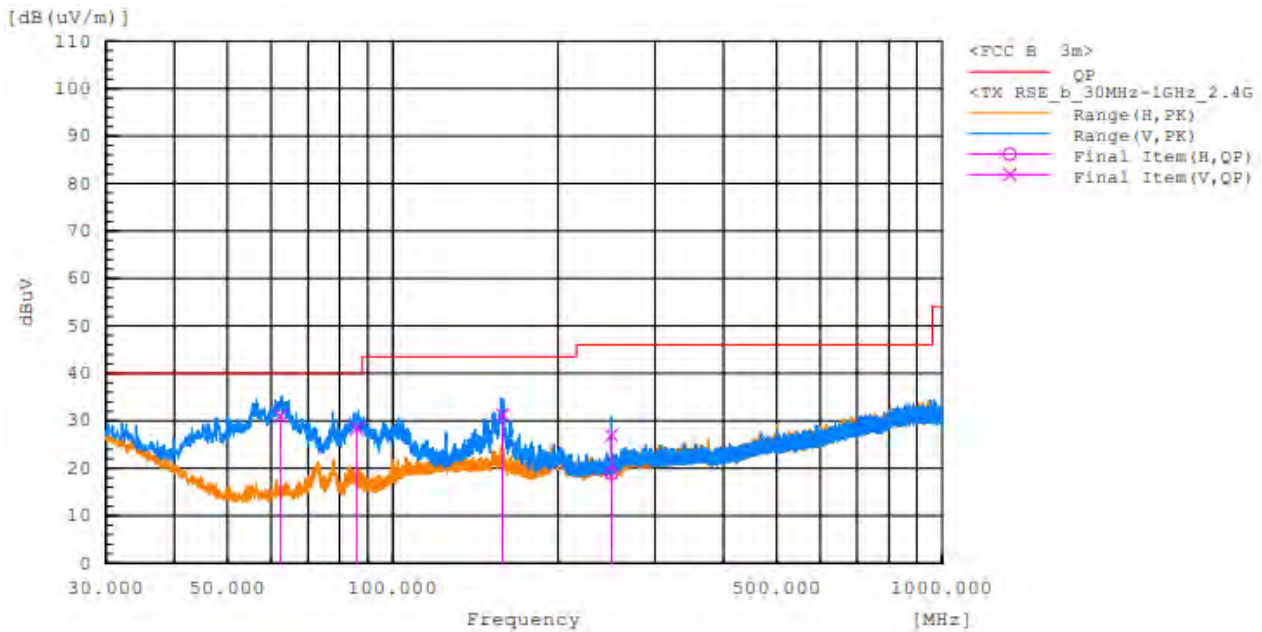


Note(s) :

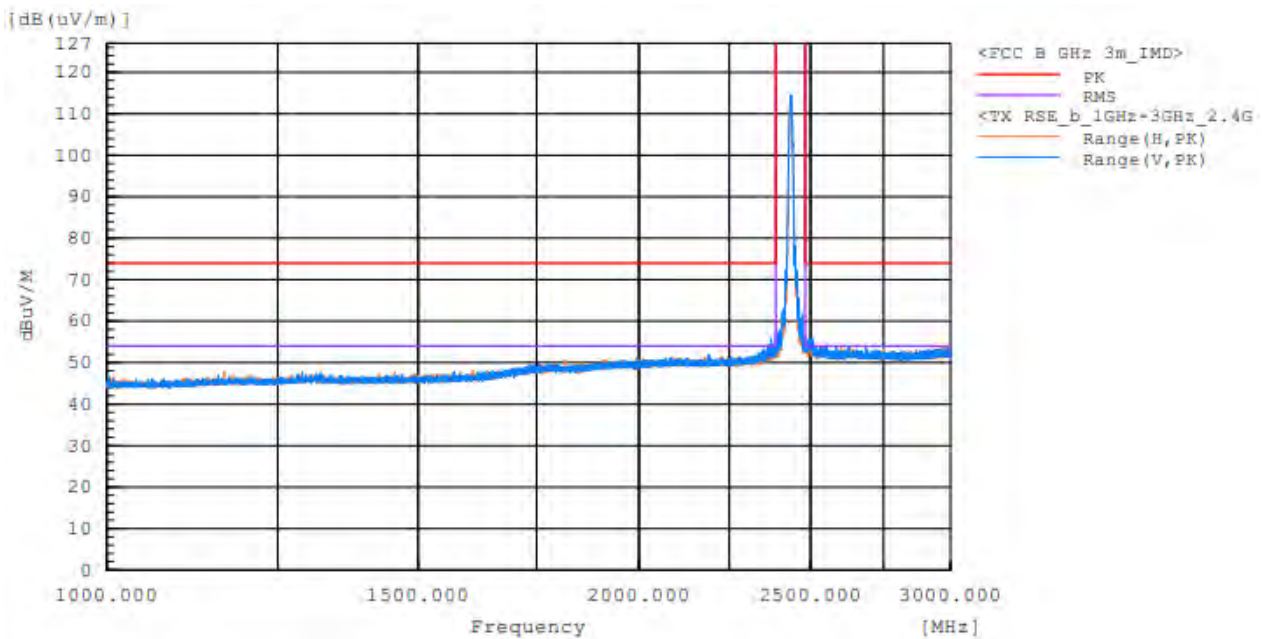
The worst-case plots are included in this report.

■ TEST PLOTS

Radiated Spurious Emission 30 MHz – 1 GHz : 802.11b (CH 6)



Radiated Spurious Emission 1 GHz – 3 GHz : 802.11b (CH 6)

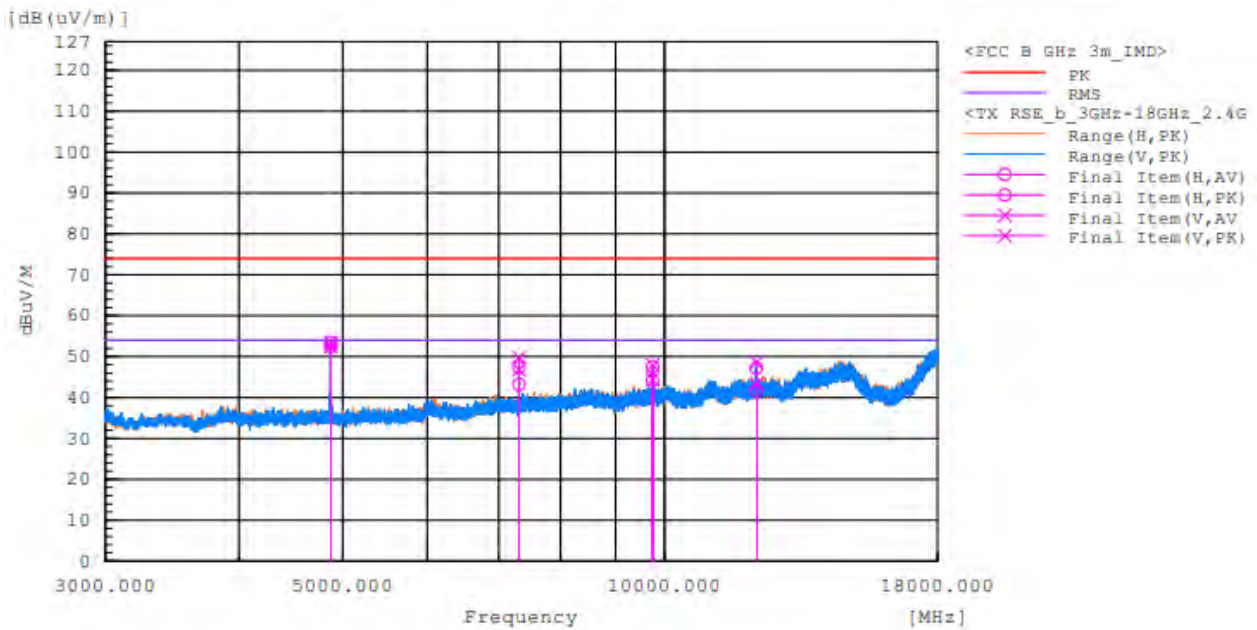


Note(s) :

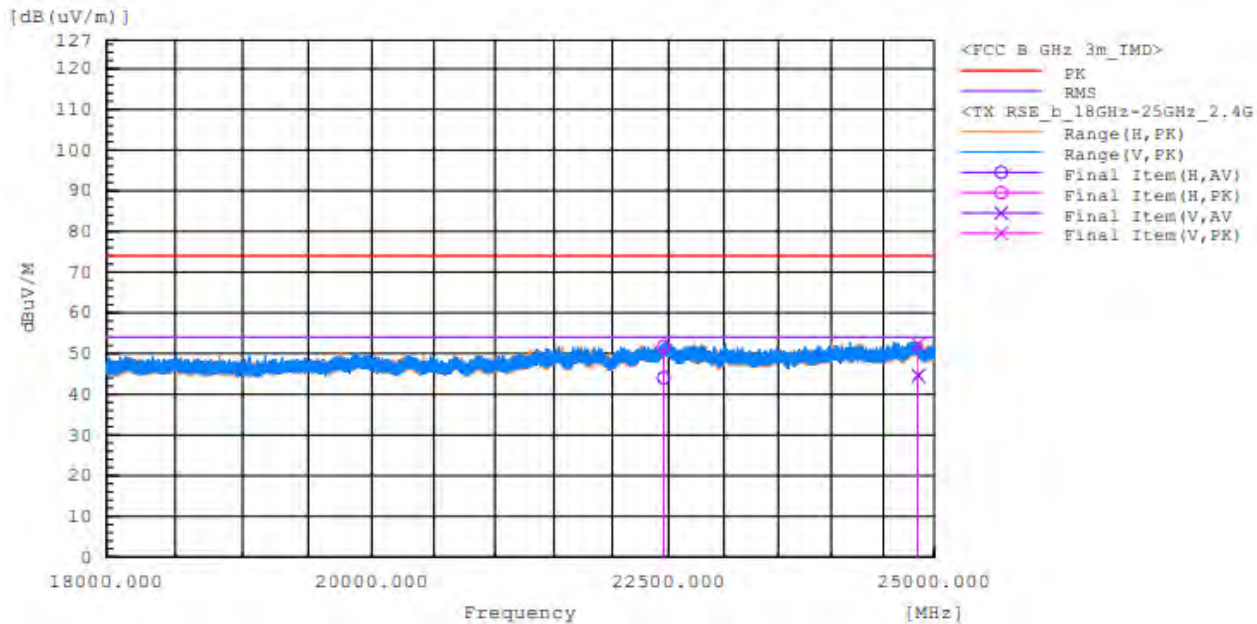
The worst-case plots are included in this report.

■ TEST PLOTS

Radiated Spurious Emission 3 GHz – 18 GHz : 802.11b (CH 6)



Radiated Spurious Emission 18 GHz – 25 GHz : 802.11b (CH 6)



Note(s) :

1. The worst-case plots are included in this report.

9.7. RADIATED RESTRICTED BAND EDGES

Test Mode 802.11b
Operating Frequency 2412 MHz (CH 1)

Frequency (MHz)	Polarization	Reading (dBuV)		Factor (dB)		Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)	
		AV	PK	Corr. ¹⁾	Duty	AV	PK	AV	PK	AV	PK
2362.963	V	16.7	24.1	30.8	0.2	47.7	55.1	54	74	6.3	18.9
2387.008	H	17.3	23.2	31.1	0.2	48.6	54.5	54	74	5.4	19.5
2389.520	V	21.5	26.4	31.1	0.2	52.8	57.7	54	74	1.2	16.3

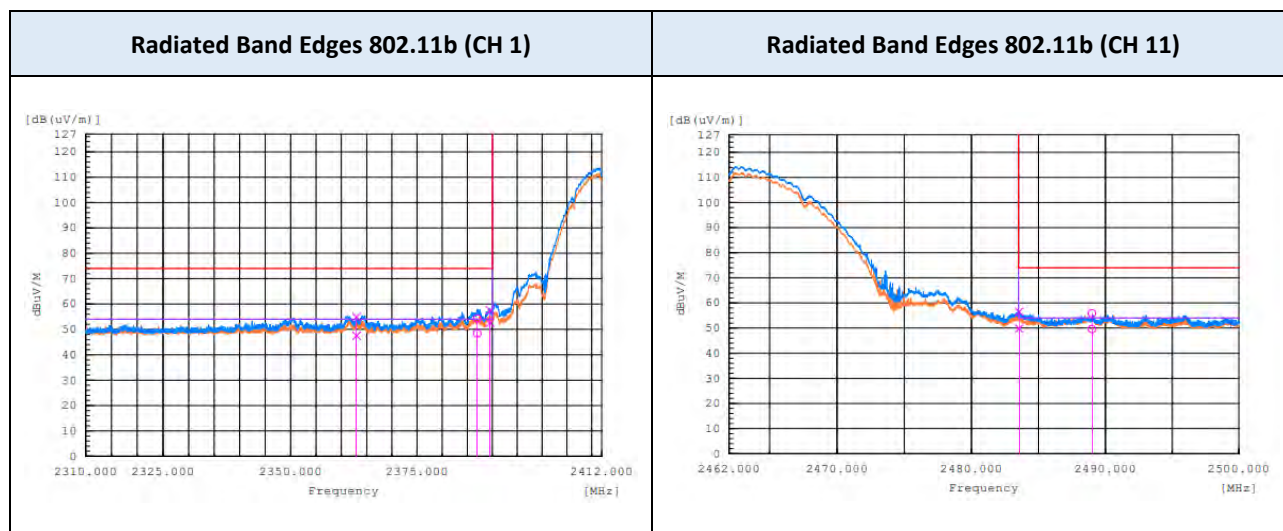
Test Mode 802.11b
Operating Frequency 2462 MHz (CH 11)

Frequency (MHz)	Polarization	Reading (dBuV)		Factor (dB)		Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)	
		AV	PK	Corr. ¹⁾	Duty	AV	PK	AV	PK	AV	PK
2483.550	V	18.3	25.0	31.5	0.2	50.0	56.7	54	74	4.0	17.3
2488.988	H	18.1	24.4	31.5	0.2	49.8	56.1	54	74	4.2	17.9

Note(s) :

1. Correction Factor: Antenna Factor + Cable loss + Preamplifier Gain
2. AV Level = Measured Power(dBm) + Correction Factor(dB) + Duty Cycle Factor(dB).

TEST PLOTS



Test Mode 802.11g
Operating Frequency 2412 MHz (CH 1)

Frequency (MHz)	Polarization	Reading (dBuV)		Factor (dB)		Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)	
		AV	PK	Corr. ¹⁾	Duty	AV	PK	AV	PK	AV	PK
2389.360	H	17.8	25.4	31.1	0.7	49.6	57.2	54	74	4.4	16.8
2389.920	V	20.8	27.4	31.1	0.7	52.6	59.2	54	74	1.4	14.8

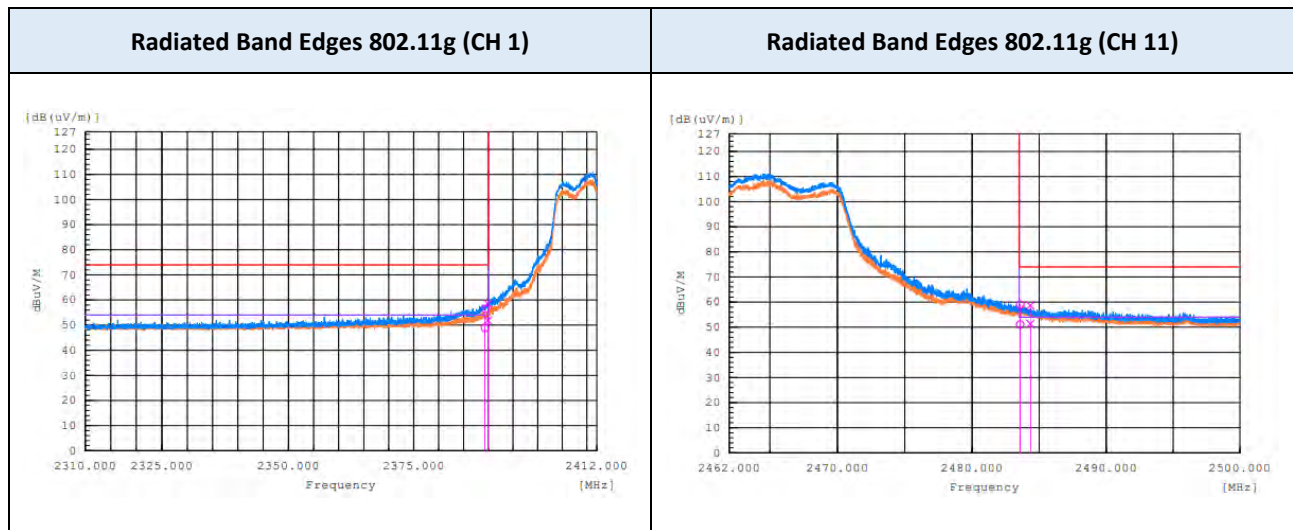
Test Mode 802.11g
Operating Frequency 2462 MHz (CH 11)

Frequency (MHz)	Polarization	Reading (dBuV)		Factor (dB)		Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)	
		AV	PK	Corr. ¹⁾	Duty	AV	PK	AV	PK	AV	PK
2483.583	H	19.6	27.5	31.5	0.7	51.8	59.7	54	74	2.2	14.3
2484.326	V	19.9	27.2	31.5	0.7	52.1	59.4	54	74	1.9	14.6

Note(s) :

1. Correction Factor: Antenna Factor + Cable loss + Preamplifier Gain
2. AV Level = Measured Power(dBm) + Correction Factor(dB) + Duty Cycle Factor(dB).

TEST PLOTS



Test Mode 802.11n HT20
Operating Frequency 2412 MHz (CH 1)

Frequency (MHz)	Polarization	Reading (dBuV)		Factor (dB)		Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)	
		AV	PK	Corr. ¹⁾	Duty	AV	PK	AV	PK	AV	PK
2389.660	V	21.2	28.3	31.1	0.4	52.7	59.8	54	74	1.3	14.2
2389.987	H	18.3	25.7	31.1	0.4	49.8	57.2	54	74	4.2	16.8

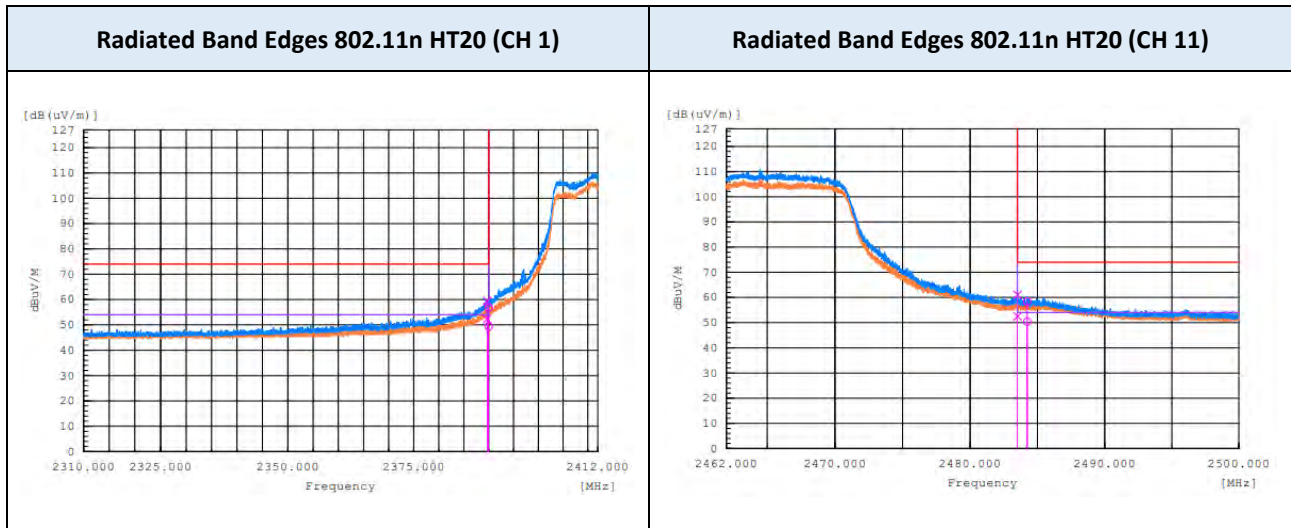
Test Mode 802.11n HT20
Operating Frequency 2462 MHz (CH 11)

Frequency (MHz)	Polarization	Reading (dBuV)		Factor (dB)		Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)	
		AV	PK	Corr. ¹⁾	Duty	AV	PK	AV	PK	AV	PK
2483.517	V	21	29.6	31.5	0.4	52.9	61.5	54	74	1.1	12.5
2484.239	H	18.9	26.9	31.5	0.4	50.8	58.8	54	74	3.2	15.2

Note(s) :

1. Correction Factor: Antenna Factor + Cable loss + Preamplifier Gain
2. AV Level = Measured Power(dBm) + Correction Factor(dB) + Duty Cycle Factor(dB).

TEST PLOTS



Test Mode 802.11ax HE20
Operating Frequency 2412 MHz (CH 1)

Frequency (MHz)	Polarization	Reading (dBuV)		Factor (dB)		Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)	
		AV	PK	Corr. ¹⁾	Duty	AV	PK	AV	PK	AV	PK
2389.953	V	20.7	32.5	31.0	0.4	52.1	63.9	54	74	1.9	10.1
2389.997	H	18.5	32.3	31.0	0.4	49.9	63.7	54	74	4.1	10.3

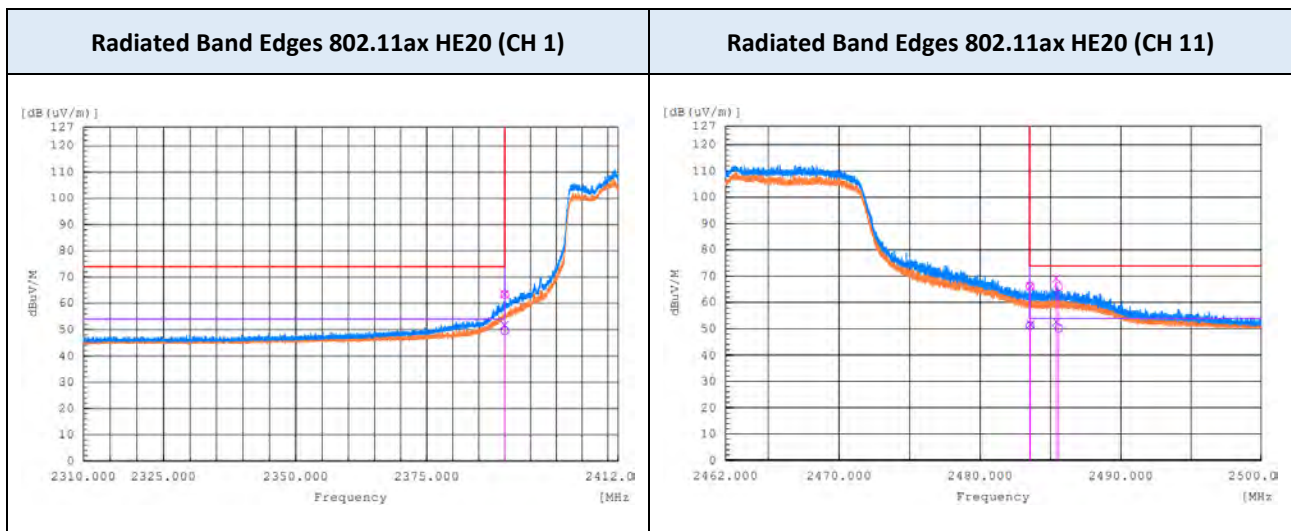
Test Mode 802.11ax HE20
Operating Frequency 2462 MHz (CH 11)

Frequency (MHz)	Polarization	Reading (dBuV)		Factor (dB)		Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)	
		AV	PK	Corr. ¹⁾	Duty	AV	PK	AV	PK	AV	PK
2483.532	H	19.5	34.4	31.6	0.4	51.5	66.4	54	74	2.5	7.6
2483.573	V	20.1	34.6	31.6	0.4	52.1	66.6	54	74	1.9	7.4
2485.404	V	21.0	37.6	31.6	0.4	53.0	69.6	54	74	1.0	4.4
2485.578	H	18.6	34.5	31.6	0.4	50.6	66.5	54	74	3.4	7.5

Note(s) :

1. Correction Factor: Antenna Factor + Cable loss + Preamplifier Gain
2. AV Level = Measured Power(dBm) + Correction Factor(dB) + Duty Cycle Factor(dB).

TEST PLOTS



Test Mode 802.11n HT40
Operating Frequency 2422 MHz (CH 3)

Frequency (MHz)	Polarization	Reading (dBuV)		Factor (dB)		Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)	
		AV	PK	Corr. ¹⁾	Duty	AV	PK	AV	PK	AV	PK
2389.968	V	20.8	28.3	31.1	0.4	52.3	59.8	54	74	1.8	14.3
2390.000	H	18.7	29.1	31.1	0.4	50.2	60.6	54	74	3.8	13.5

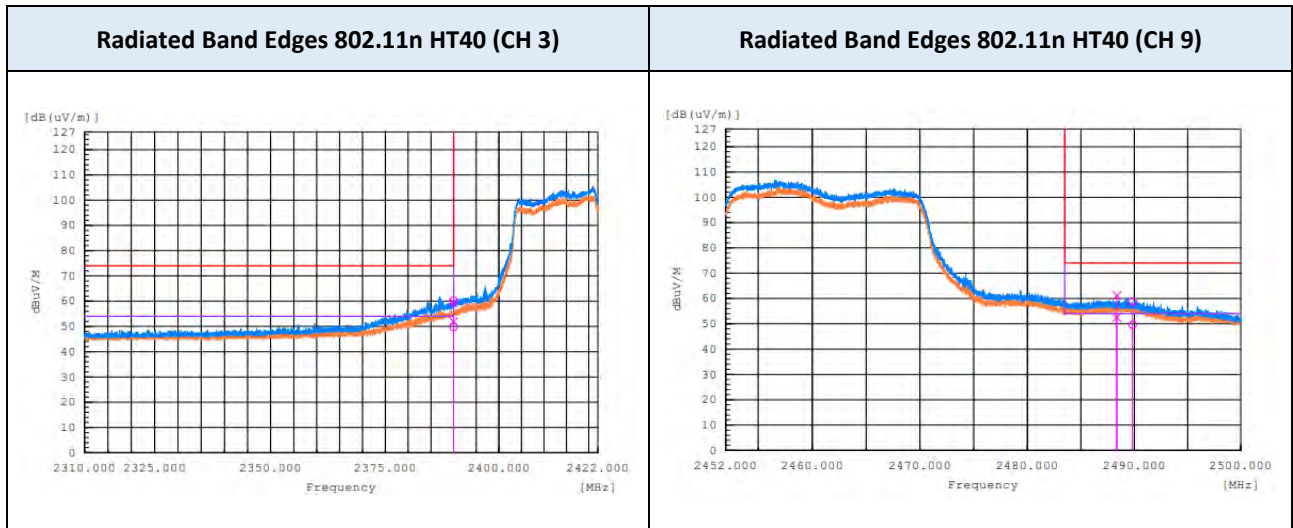
Test Mode 802.11n HT40
Operating Frequency 2452 MHz (CH 9)

Frequency (MHz)	Polarization	Reading (dBuV)		Factor (dB)		Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)	
		AV	PK	Corr. ¹⁾	Duty	AV	PK	AV	PK	AV	PK
2488.354	V	21	29.7	31.5	0.4	52.9	61.6	54	74	1.2	12.5
2489.853	H	18.1	27.3	31.5	0.4	50.0	59.2	54	74	4.1	14.9

Note(s) :

1. Correction Factor: Antenna Factor + Cable loss + Preamplifier Gain
2. AV Level = Measured Power(dBm) + Correction Factor(dB) + Duty Cycle Factor(dB).

TEST PLOTS



Test Mode 802.11ax HE40
Operating Frequency 2422 MHz (CH 3)

Frequency (MHz)	Polarization	Reading (dBuV)		Factor (dB)		Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)	
		AV	PK	Corr. ¹⁾	Duty	AV	PK	AV	PK	AV	PK
2384.536	V	16.2	32.2	30.9	0.4	47.5	63.5	54	74	6.6	10.6
2387.584	H	15.4	29.8	30.9	0.4	46.7	61.1	54	74	7.4	13.0
2389.493	V	20.1	33.9	31.0	0.4	51.5	65.3	54	74	2.6	8.8
2389.495	H	15.4	30.1	31.0	0.4	46.8	61.5	54	74	7.3	12.6

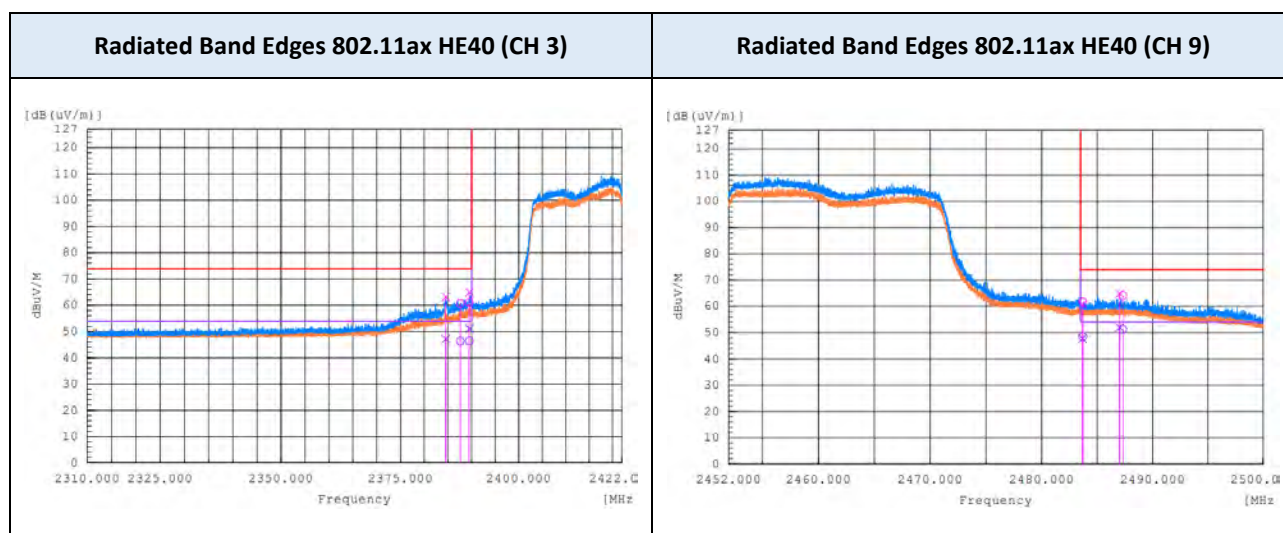
Test Mode 802.11ax HE40
Operating Frequency 2452 MHz (CH 9)

Frequency (MHz)	Polarization	Reading (dBuV)		Factor (dB)		Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)	
		AV	PK	Corr. ¹⁾	Duty	AV	PK	AV	PK	AV	PK
2483.666	V	16.2	29.1	31.6	0.4	48.2	61.1	54	74	5.8	13.0
2483.698	H	16.9	30.1	31.6	0.4	48.9	62.1	54	74	5.2	12.0
2487.030	V	20.4	33.2	31.6	0.4	52.4	65.2	54	74	1.7	8.8
2487.308	H	19.7	32.5	31.6	0.4	51.7	64.5	54	74	2.3	9.6

Note(s) :

1. Correction Factor: Antenna Factor + Cable loss + Preamplifier Gain
2. AV Level = Measured Power(dBm) + Correction Factor(dB) + Duty Cycle Factor(dB).

TEST PLOTS



9.8. RECEIVER SPURIOUS EMISSION

Frequency Range : Below 1 GHz

Test Mode 802.11b
Operating Frequency 2437 MHz (CH 6)

Frequency (MHz)	Polarization	Reading (dBuV)	Corr. ¹⁾ (dB)	Total (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Measurement Type
62.580	V	43.7	-12.9	30.8	40	9.2	QP
158.258	V	37.9	-7.0	30.9	43.5	12.6	QP
249.998	H	35.2	-7.9	27.3	46	18.7	QP
250.025	V	36.7	-7.9	28.8	46	17.2	QP

Frequency Range : Above 1 GHz

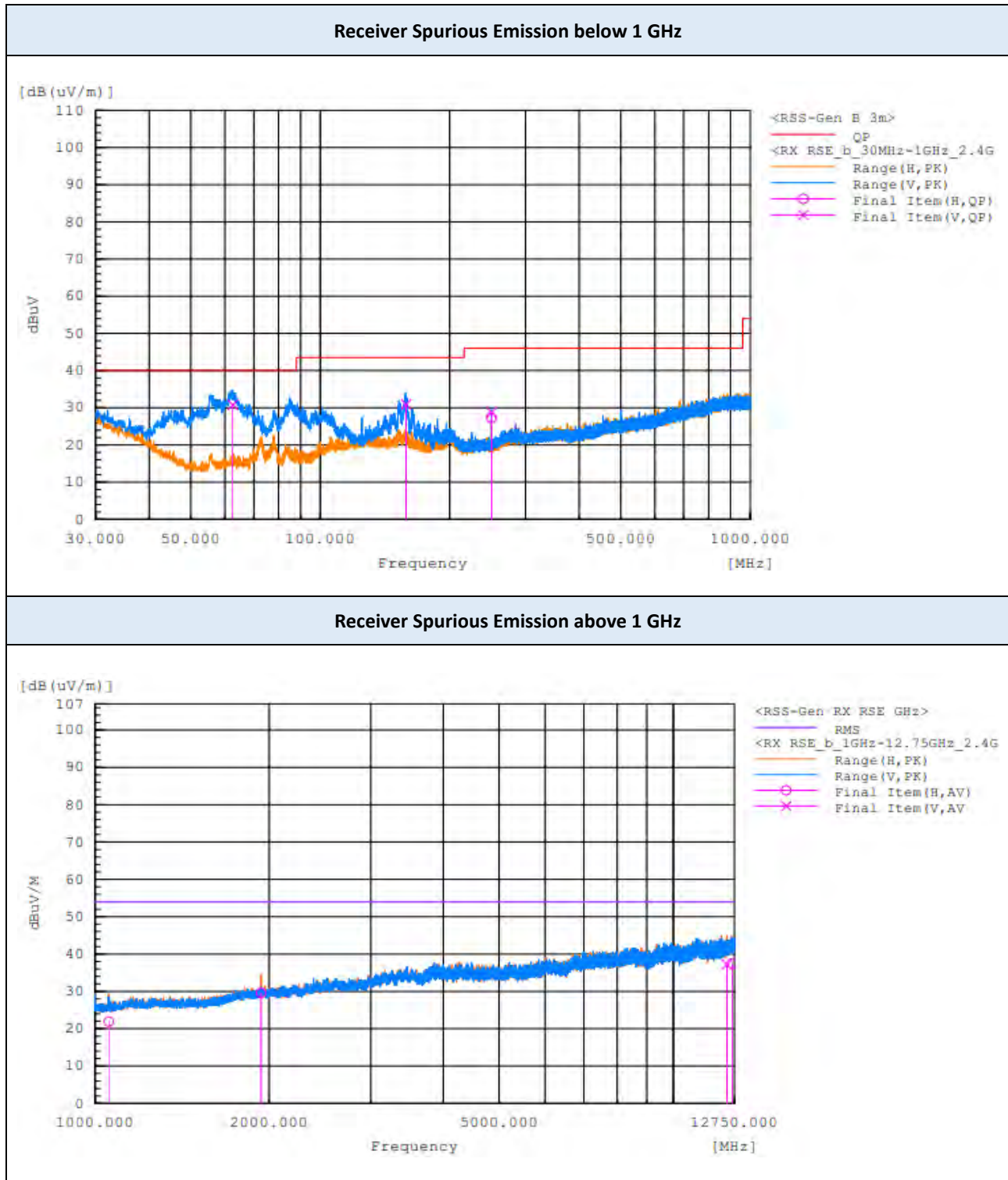
Test Mode 802.11b
Operating Frequency 2437 MHz (CH 6)

Frequency (MHz)	Polarization	Reading (dBuV)	Corr. ¹⁾ (dB)	Total (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Measurement Type
1056.116	H	36.2	-14.3	21.9	54	32.1	RMS
1937.455	H	40.4	-10.8	29.6	54	24.4	RMS
12376.151	V	31.8	5.4	37.2	54	16.8	RMS
12632.247	H	31.6	5.9	37.5	54	16.5	RMS

Note(s) :

1. Correction Factor: Antenna Factor + Cable loss + Preamplifier Gain

■ TEST PLOTS



Note(s) :

1. The worst-case plots are included in this report.

9.9. POWERLINE CONDUCTED EMISSIONS

Frequency (MHz)	Line	Reading (dBμV)		Corr. ¹⁾ (dB)	Level (dBμV)		Limit (dBμV)		Margin (dB)	
		QP	CAV		QP	CAV	QP	CAV	QP	CAV
0.150	L1	28.8	5.6	9.7	38.5	15.3	66.0	56.0	27.5	40.7
0.171	L1	40.3	22.7	9.7	50.0	32.4	64.9	54.9	14.9	22.5
0.527	L1	29.7	15.8	9.6	39.3	25.4	56.0	46.0	16.7	20.6
0.588	L1	20.9	11.6	9.6	30.5	21.2	56.0	46.0	25.5	24.8
5.520	L1	15.8	6.6	9.8	25.6	16.4	60.0	50.0	34.4	33.6
16.796	L1	23.3	16.3	10.2	33.5	26.5	60.0	50.0	26.5	23.5

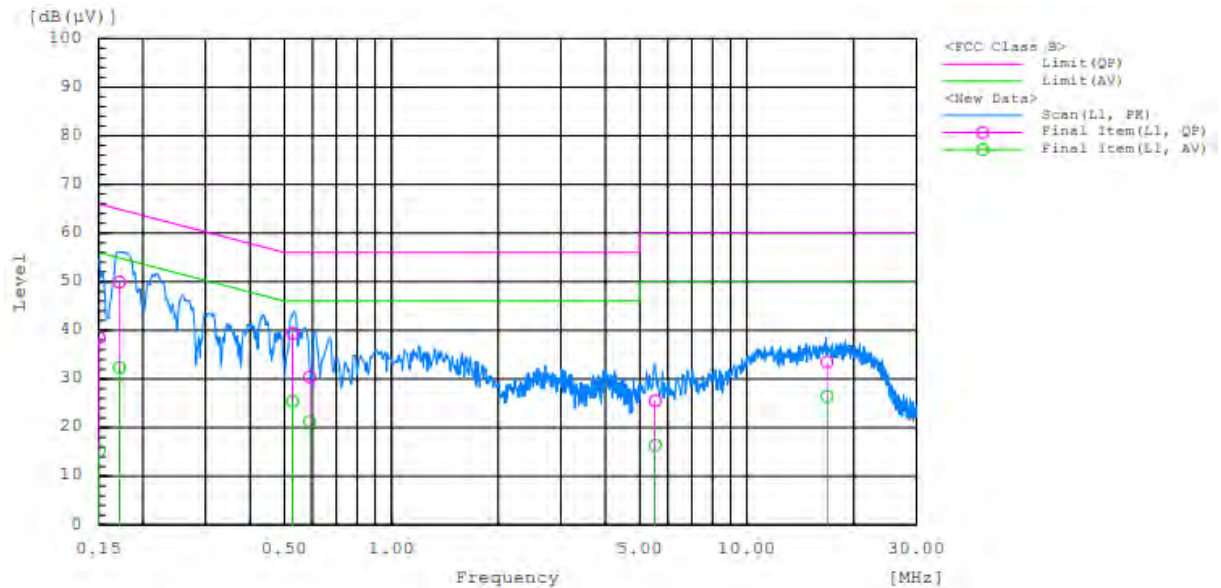
Frequency (MHz)	Line	Reading (dBμV)		Corr. ¹⁾ (dB)	Level (dBμV)		Limit (dBμV)		Margin (dB)	
		QP	CAV		QP	CAV	QP	CAV	QP	CAV
0.171	N	40.8	23.6	9.7	50.5	33.3	64.9	54.9	14.4	21.6
0.219	N	38.6	22.4	9.7	48.3	32.1	62.9	52.9	14.6	20.8
0.573	N	31.9	26.3	9.6	41.5	35.9	56.0	46.0	14.5	10.1
0.836	N	24.9	17.2	9.7	34.6	26.9	56.0	46.0	21.4	19.1
10.745	N	23.8	18.4	10.0	33.8	28.4	60.0	50.0	26.2	21.6
16.609	N	23.0	17.9	10.1	33.1	28.0	60.0	50.0	26.9	22.0

Note(s) :

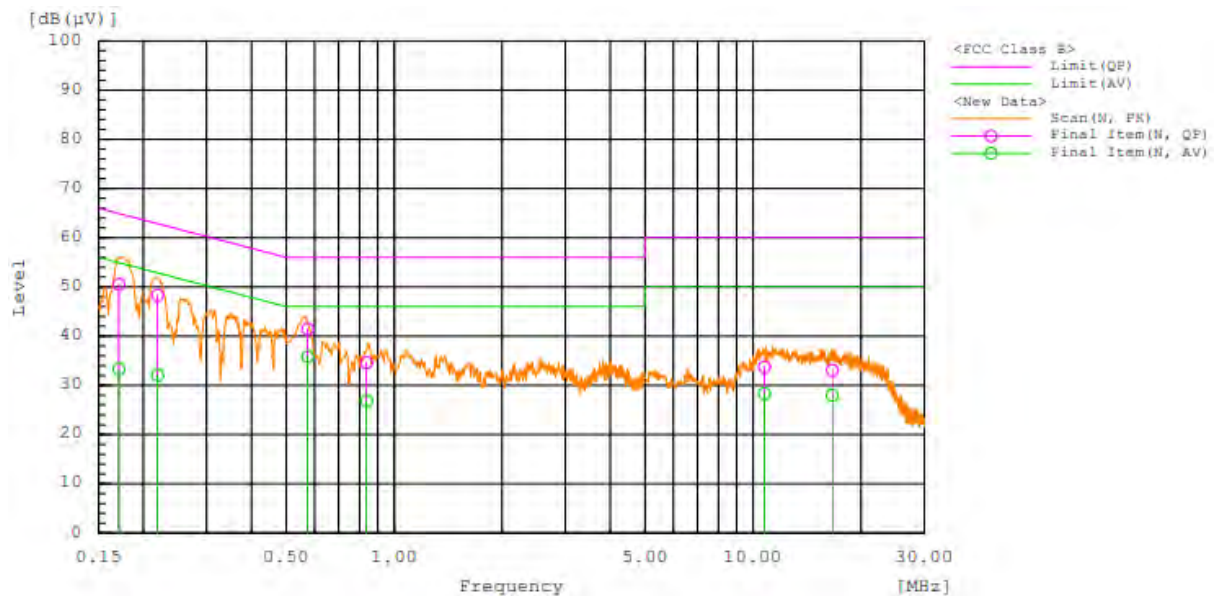
1. Quasi-peak(Final Result) = Reading Value + Correction Factor

■ TEST PLOTS

AC Line Conducted Emission (L1)



AC Line Conducted Emission (N)



10. LIST OF TEST EQUIPMENT

No.	Instrument	Model No.	Calibration Due (mm/dd/yy)	Manufacture	Serial No.
☒	Signal Analyzer (20 Hz ~ 40.0 GHz)	ESU40	12/09/2021	Rohde & Schwarz	100529
☒	Signal Analyzer (10 Hz ~ 40.0 GHz)	FSV40	02/03/2022	Rohde & Schwarz	101424
☒	Signal Analyzer (3 Hz ~ 50 GHz)	N9030A	06/07/2022	Keysight	MY53311083
☒	Attenuator (20 dB, DC ~ 26.5 GHz)	CFADC262002	01/07/2022	CERNEX	-
☐	Attenuator (10 dB, DC ~ 26.5 GHz)	CFAD261002	01/07/2022	CERNEX	-
☒	Loop Antenna (0.009 ~ 30 MHz)	AL-130R	04/16/2023	Com-Power	121082
☒	BI-LOG Antenna (30 MHz ~ 6 GHz)	JB6	10/26/2022	Sunol	A071116
☒	LNA (30 MHz ~ 1GHz)	8447D	07/26/2022	HP	2443A03587
☒	Horn Antenna (1 GHz ~ 18 GHz)	DRH-118	10/21/2022	Sunol	A070516
☒	LNA (1 GHz ~ 18 GHz)	PAM-118A	07/06/2022	Com-Power	18040074
☒	Horn Antenna (18 GHz ~ 40 GHz)	DRH-1840	02/16/2022	Sunol	17121
☒	LNA (18 GHz ~ 40 GHz)	CBL184050-45-01	02/04/2022	CERNEX, Inc.	27973
☐	Power Divider-2way (DC ~ 26.5 GHz)	11636B	12/11/2021	HP	50820
☐	Directional Coupler (1-4GHz)	3022	12/15/2021	Narda	72118
☒	High Pass Filter	WHK10-2520-3000-18000-40EF	01/06/2022	Wainwright	9
☒	EMI Test Receiver	ESR3	12/17/2021	Rohde & Schwarz	102363
☒	LISN	ENV216	01/16/2022	Rohde & Schwarz	101349

Note(s) :

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.

APPENDIX A. TEST SETUP PHOTOS

The setup photos are provided as a separate document.

APPENDIX B. PHOTOGRAPHS OF EUT

B.1. EXTERNAL PHOTOS

The external photos are provided as a separate document.

B.2. INTERNAL PHOTOS

The internal photos are provided as a separate document.

END OF TEST REPORT