

FCC DTS REPORT

Certification

Applicant Name:
SAMSUNG Electronics Co., Ltd.

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Date of Issue:
June 17, 2022

Test Site/Location:
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Report No.: HCT-RF-2206-FC010

FCC ID:	A3LSMG990B2
APPLICANT:	SAMSUNG Electronics Co., Ltd.

Model: SM-G990B2/DS
Additional Model: SM-G990B2
EUT Type: Mobile Phone
Average Output Power: 802.11ax(HE20) SUM (SISO Ant 1 + SISO Ant 2): 17.88 dBm
Frequency Range: 2412 MHz ~ 2462 MHz
Modulation type: OFDM, OFDMA
FCC Classification: Digital Transmission System(DTS)
FCC Rule Part(s): Part 15.247

Engineering Statement:

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

Report No.: HCT-RF-2206-FC010

REVIEWED BY



Report prepared by : Sang Hoon Lee
Engineer of Telecommunication Testing Center

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

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

This laboratory is not accredited for the test results marked *.

The above Test Report is the accredited test result by (KS Q) ISO/IEC 17025 and KOLAS(Korea Laboratory Accreditation Scheme), which signed the ILAC-MRA. (HCT Accreditation No.: KT197)

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Version

TEST REPORT NO.	DATE	DESCRIPTION
HCT-RF-2206-FC010	June 17, 2022	- First Approval Report

Table of Contents

REVIEWED BY	2
1. EUT DESCRIPTION	5
ANTENNA CONFIGURATIONS	6
2. TEST METHODOLOGY	8
EUT CONFIGURATION	8
EUT EXERCISE	8
GENERAL TEST PROCEDURES	8
DESCRIPTION OF TEST MODES	8
3. INSTRUMENT CALIBRATION.....	9
4. FACILITIES AND ACCREDITATIONS	9
FACILITIES	9
EQUIPMENT	9
5. ANTENNA REQUIREMENTS	10
6. MEASUREMENT UNCERTAINTY	10
7. DESCRIPTION OF TESTS.....	11
8. SUMMARY TEST OF RESULTS	28
9. TEST RESULT	29
9.1 DUTY CYCLE.....	29
9.2 6 dB BANDWIDTH	31
9.3 OUTPUT POWER	33
9.4 POWER SPECTRAL DENSITY	37
9.5 BAND EDGE / CONDUCTED SPURIOUS EMISSIONS.....	41
9.6 RADIATED SPURIOUS EMISSIONS	45
10. LIST OF TEST EQUIPMENT	73
11. ANNEX A_ TEST SETUP PHOTO	75

1. EUT DESCRIPTION

Model	SM-G990B2/DS	
Additional Model	SM-G990B2	
EUT Type	Mobile Phone	
Power Supply	DC 4.20 V	
Frequency Range	2412 MHz ~ 2462 MHz	
Max. RF Output Power SUM (SISO Ant 1 + SISO Ant 2)	<u>Peak Power</u> (For information only)	27.22 dBm
	<u>Average Power</u>	17.88 dBm
Modulation Type	OFDM, OFDMA	
Number of Channels	11 Channels	
Date(s) of Tests	May 26, 2022 ~ June 17, 2022	
Serial number	Radiated : R3CT40C5F4H Conducted : 6384e630e2197ece	

ANTENNA CONFIGURATIONS

1. Antenna configuration

Configurations	SISO		MIMO	
	Ant1	Ant2	CDD	SDM
802.11ax(HE20)	X	O	O	O

Note:

- (1) O = Support, X = Not Support
- (2) SISO = Single Input Single Output
- (3) SDM = Spatial Diversity Multiplexing
- (4) CDD = Cyclic Delay Diversity
- (5) SISO test was performed for the MIMO test result.

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

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

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

3. Directional Gain Calculation

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

Directional gain =

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

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

Note

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

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

Sample MIMO Calculation:

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

$$Ant1 + Ant 2 = MIMO$$

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

2. TEST METHODOLOGY

FCC KDB 558074 D01 15.247 Meas Guidance v05r02 dated April 02, 2019 entitled “guidance for compliance measurements on digital transmission system, frequency hopping spread spectrum system, and hybrid system devices and the measurement procedure described in ANSI C63.10(Version : 2013) ‘the American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices’.

EUT CONFIGURATION

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner that intends to maximize its emission characteristics in a continuous normal application.

EUT EXERCISE

The EUT was operated in the engineering mode to fix the Tx frequency that was for the purpose of the measurements. According to its specifications, the EUT must comply with the requirements of the Section 15.207, 15.209 and 15.247 under the FCC Rules Part 15 Subpart C.

GENERAL TEST PROCEDURES

Conducted Emissions

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

Radiated Emissions

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

DESCRIPTION OF TEST MODES

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

3. INSTRUMENT CALIBRATION

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipment's, which is traceable to recognized national standards.

Especially, all antenna for measurement is calibrated in accordance with the requirements of C63.5 (Version : 2017).

4. FACILITIES AND ACCREDITATIONS

FACILITIES

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

EQUIPMENT

Radiated emissions are measured with one or more of the following types of Linearly polarized antennas: tuned dipole, bi-conical, log periodic, bi-log, and/or ridged waveguide, horn. Spectrum analyzers with pre-selectors and quasi-peak detectors are used to perform radiated measurements.

Conducted emissions are measured with Line Impedance Stabilization Networks and EMI Test Receivers. Calibrated wideband preamplifiers, coaxial cables, and coaxial attenuators are also used for making measurements.

All receiving equipment conforms to CISPR Publication 16-1, "Radio Interference Measuring Apparatus and Measurement Methods."

5. ANTENNA REQUIREMENTS

According to FCC 47 CFR §15.203:

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

- (1) The antennas of this E.U.T are permanently attached.
- (2) The E.U.T Complies with the requirement of §15.203

6. MEASUREMENT UNCERTAINTY

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

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

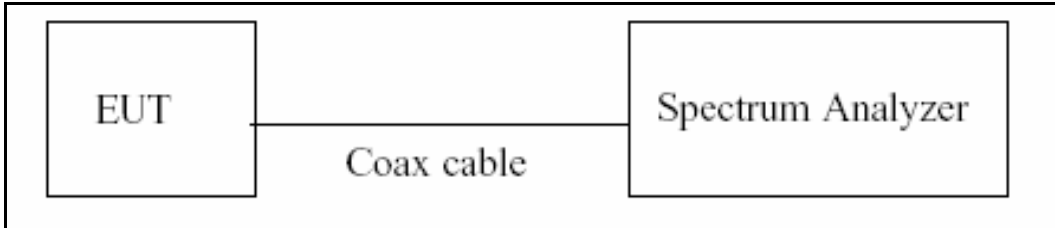
The measurement data shown herein meets or exceeds the U_{CISPR} measurement uncertainty values specified in CISPR 16-4-2 and, thus, can be compared directly to specified limits to determine compliance.

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

7. DESCRIPTION OF TESTS

7.1. Duty Cycle

Test Configuration



Test Procedure

The transmitter output is connected to the Spectrum Analyzer.

We tested according to the zero-span measurement method.

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

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

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

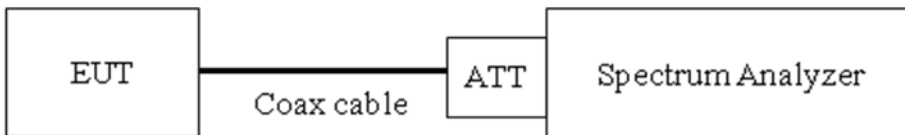
1. RBW = 8 MHz (the largest available value)
2. VBW = 8 MHz (\geq RBW)
3. SPAN = 0 Hz
4. Detector = Peak
5. Number of points in sweep > 100
6. Trace mode = Clear write
7. Measure T_{total} and T_{on}
8. Calculate Duty Cycle = T_{on} / T_{total} and Duty Cycle Factor = $10\log(1/Duty\ Cycle)$

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

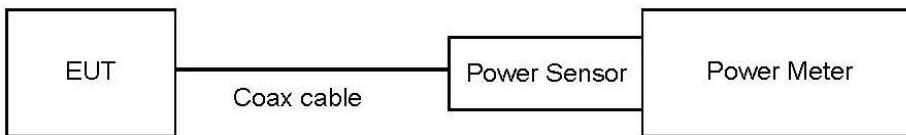
Note : We tested OBW using the automatic bandwidth measurement capability of a spectrum analyzer.

7.3. Output Power

Limit

The maximum permissible conducted output power is 1 Watt.

Test Configuration



Test Procedure

The transmitter output is connected to the Power Meter.

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

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

Sample Calculation

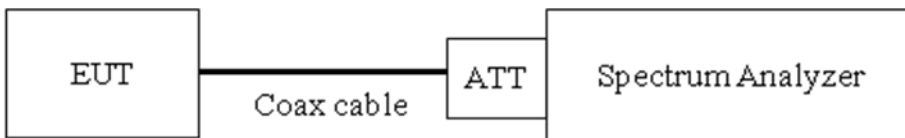
- Conducted Output Power(Peak) = Measured Value + ATT loss + Cable loss
- Conducted Output Power(Average) = Measured Value + ATT loss + Cable loss + Duty Cycle Factor

7.4. Power Spectral Density

Limit

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

Test Configuration



Test Procedure

The transmitter output is connected to the Spectrum Analyzer.

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

The spectrum analyzer is set to :

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

Sample Calculation

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

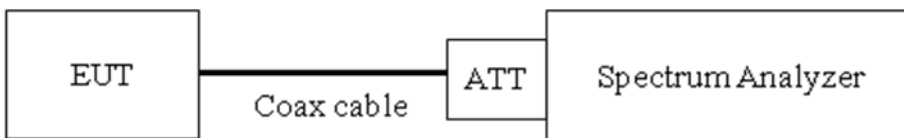
7.5. Conducted Band Edge (Out of Band Emissions) & Conducted Spurious Emissions

Limit

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

[Conducted > 30 dBc]

Test Configuration



Test Procedure

The transmitter output is connected to the spectrum analyzer.

(Procedure 11.11 in ANSI 63.10-2013)

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

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

Factors for frequency

Freq(MHz)	Factor(dB)
30	20.04
100	20.09
200	20.13
300	20.19
400	20.22
500	20.23
600	20.23
700	20.25
800	20.27
900	20.29
1000	20.31
2000	20.46
2400	20.52
2480	20.52
2500	20.52
3000	20.57
4000	20.67
5000	20.75
5150	20.77
5850	20.82
6000	20.82
7000	20.91
8000	20.98
9000	21.05
10000	21.12
11000	21.16
12000	21.24
13000	21.32
14000	21.30
15000	21.32
16000	21.37
17000	21.41
18000	21.47
19000	21.50
20000	21.56
21000	21.77
22000	21.74
23000	21.94

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

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

3. ANT1 EUT Cable : 0.35 dB → Total ANT1 Port offset : 20.87 dB

ANT2 EUT Cable : 0.36 dB → Total ANT2 Port offset : 20.88 dB

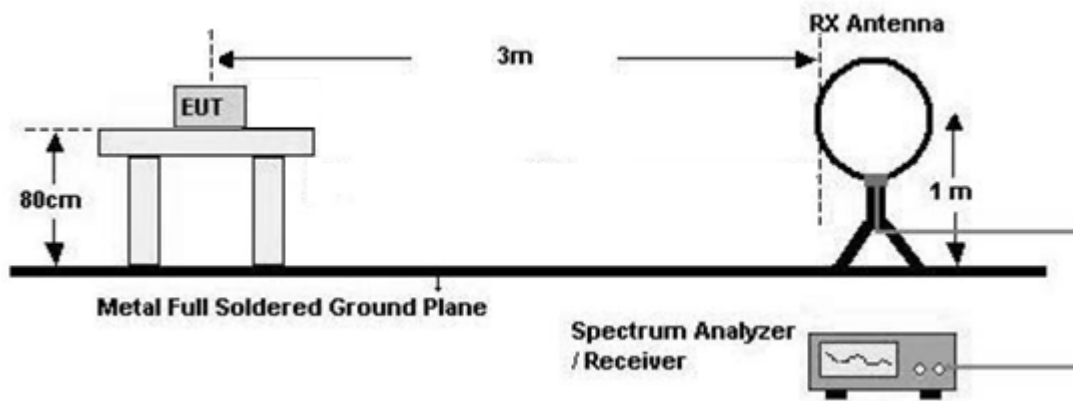
7.6. Radiated Test

Limit

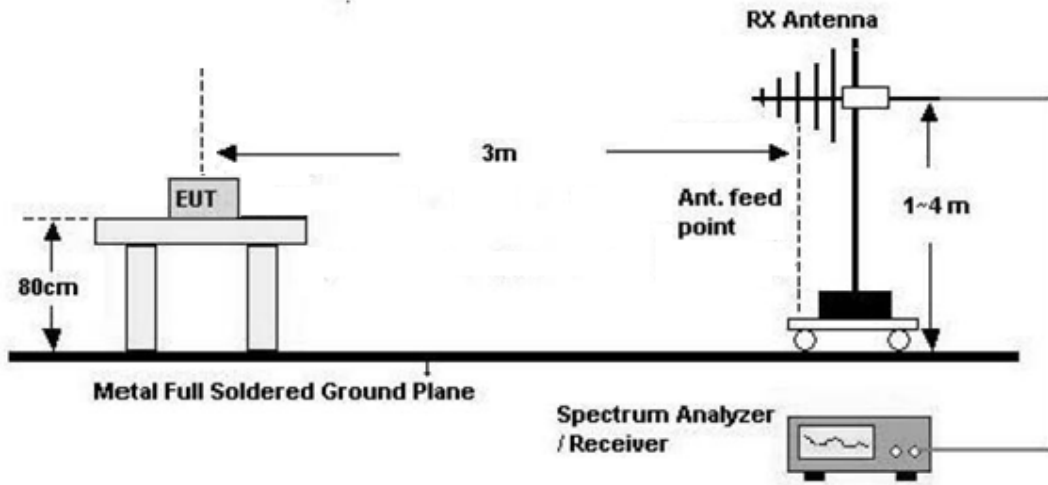
Frequency (MHz)	Field Strength ($\mu\text{V/m}$)	Measurement Distance (m)
0.009 – 0.490	$2400/F(\text{kHz})$	300
0.490 – 1.705	$24000/F(\text{kHz})$	30
1.705 – 30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Test Configuration

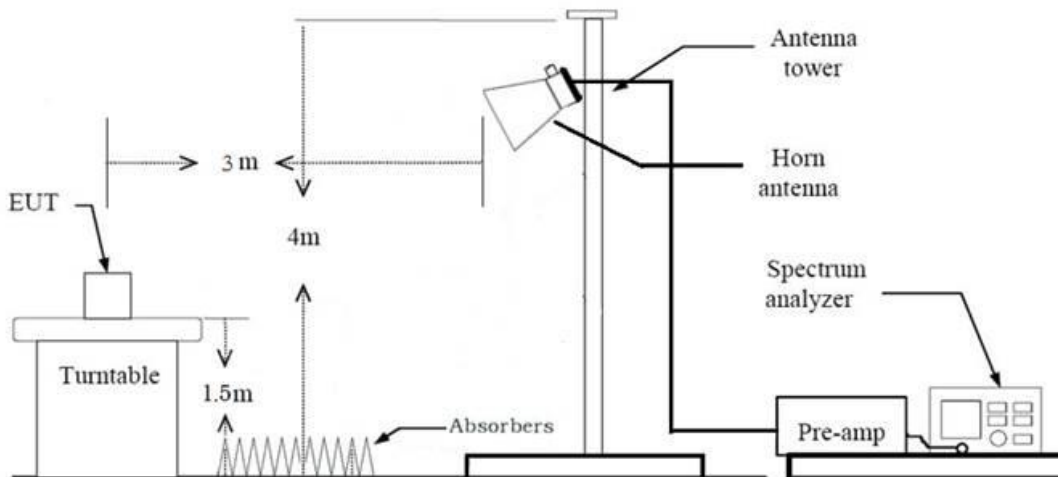
Below 30 MHz



30 MHz - 1 GHz



Above 1 GHz



Test Procedure of Radiated spurious emissions (Below 30 MHz)

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

KDB 414788 OFS and Chamber Correlation Justification

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

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

Test Procedure of Radiated spurious emissions (Below 1 GHz)

1. The EUT was placed on a non-conductive table located on semi-anechoic chamber.
2. The EUT is placed on a turntable, which is 0.8 m above ground plane.
3. The Hybrid antenna was placed at a location 3 m from the EUT, which is varied from 1 m to 4 m to find out the highest emissions.
4. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
5. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
6. Spectrum Setting

(1) Measurement Type(Peak):

- Measured Frequency Range : 30 MHz – 1 GHz
- Detector = Peak
- Trace = Maxhold
- RBW = 100 kHz
- VBW \geq 3 x RBW

(2) Measurement Type(Quasi-peak):

- Measured Frequency Range : 30 MHz – 1 GHz
- Detector = Quasi-Peak
- RBW = 120 kHz

In general, (1) is used mainly

7. Total = Measured Value + Antenna Factor(A.F) + Cable Loss(C.L)
8. Measurement value only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.

Test Procedure of Radiated spurious emissions (Above 1 GHz)

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

(1) Measurement Type(Peak):

- Measured Frequency Range : 1 GHz – 25 GHz
- Detector = Peak

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

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

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

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

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

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

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

11. Total(Measurement Type : Peak)

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

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

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

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

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

Test Procedure of Radiated Restricted Band Edge

1. The EUT is placed on a turntable, which is 1.5 m above ground plane.
2. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
3. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
4. EUT is set 3 m away from the receiving antenna, which is varied from 1 m to 4 m to find out the highest emissions.
5. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
6. Each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
7. The unit was tested with its standard battery.
8. Spectrum Setting
 - (1) Measurement Type(Peak):
 - Measured Frequency Range : 2310 MHz ~ 2390 MHz/ 2483.5 MHz ~ 2500 MHz
 - Detector = Peak
 - Trace = Maxhold
 - RBW = 1 MHz
 - VBW \geq 3 x 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 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 \geq 3 x RBW
 - Sweep time = auto.
 - Trace mode = average (at least 100 traces).
 - Correction factor shall be added to the measurement results prior to comparing to the emission limit in order to compute the emission level that would have been measured had the test been performed at 100 % duty cycle.
 - Duty Cycle Factor (dB) : Please refer to the please refer to section 9.1.

9. Measurement value only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
10. Distance extrapolation factor = $20\log(\text{test distance} / \text{specific distance})$ (dB)
11. Total(Measurement Type : Peak)
= Measured value + Antenna Factor(A.F) + Cable Loss(C.L) + Distance Factor(D.F)
- Total(Measurement Type : Average, Duty cycle \geq 98 %)
= Measured value + Antenna Factor(A.F) + Cable Loss(C.L) + Distance Factor(D.F)
- Total(Measurement Type : Average, Duty cycle < 98 %)
= Measured value + Antenna Factor(A.F) + Cable Loss(C.L) + Distance Factor(D.F) + Duty Cycle Factor

7.7. AC Power line Conducted Emissions

Limit

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

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

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

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

Test Configuration

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

Test Procedure

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

Sample Calculation

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

7.8. Test RU offset for Tones

BW (MHz)	Tones (T)	RU offset	Test RU offset		
			Low	Mid	High
20	26	0~8	0	4	8
	52	37~40	37	38	40
	106	53~54	53	-	54
	242	61	-	61	-

7.9. Worst case configuration and mode

Conducted test

1. All data rate of operation were investigated and the worst case results are reported.
(Worst case : MCS0)
2. Bandedge (Conducted)
: All Mode (Channel, Tone, RU Offset) of operation were investigated and the worst case configuration results are reported.

Tone	Channel	RU Index
26	1, 11	0, 8
52	1, 11	37, 40
106	1, 11	53, 54
242	1, 11	61

3. SM-G990B2/DS, SM-G990B2 were tested and the worst case results are reported.
(Worst case : SM-G990B2/DS)

Radiated test

1. All modes of operation were investigated and the worst case configuration results are reported.
 - Mode : Stand alone, Stand alone + External accessories (Earphone, etc)
 - Worst case : Stand alone
2. EUT Axis
 - Radiated Spurious Emissions : Y, Z
 - Radiated Restricted Band Edge : X
3. All data rate of operation were investigated and the worst case results are reported.
(Worst case : MCS0)
4. All Antenna of operation were investigated and the worst case results are reported
 - Mode : Ant2(SISO), Ant1+Ant2(SDM), Ant1+Ant2(CDD)
 - Worst case : Ant1+Ant2(CDD)
5. All position of loop antenna were investigated and the test result is a no critical peak found at all positions.
 - Position : Horizontal, Vertical, Parallel to the ground plane

6. All mode(Tone, RU Offset) of operation were investigated and the worst case configuration results are reported

Test	STONE	RU OFFSET
RSE	WORST CASE : 52 T	37, 38, 40
	ADDITIONAL TONE : 26T, 106T, 242T, SU	26T : 0, 4, 8 106T : 53, 54 242T : 61 SU : none
Band-Edge	WORST CASE : 242T	Low Edge : 61 High Edge : 61
	ADDITIONAL TONE : 26T, 52T, 106T, SU	Low Edge : 0, 37, 53 High Edge : 8, 40, 54 SU : none

7. SM-G990B2/DS, SM-G990B2 were tested and the worst case results are reported.
(Worst case : SM-G990B2/DS)

Radiated test(DBS / RSDB)

1. Please refer to the SM-G990B2/DS [UNII] & [DTS] & [BT] Test Report.
2. SM-G990B2/DS, SM-G990B2 were tested and the worst case results are reported.
(Worst case : SM-G990B2/DS)

AC Power line Conducted Emissions

1. Please refer to the SM-G990B2/DS [DTS] Test Report.
2. SM-G990B2/DS, SM-G990B2 were tested and the worst case results are reported.
(Worst case : SM-G990B2/DS)

8. SUMMARY TEST OF RESULTS

Test Description	FCC Part Section(s)	Test Limit	Test Condition	Test Result
6 dB Bandwidth	§15.247(a)(2)	> 500 kHz	Conducted	PASS
Conducted Maximum Output Power	§15.247(b)(3)	< 1 Watt		PASS
Power Spectral Density	§15.247(e)	< 8 dBm / 3 kHz Band		PASS
Band Edge (Out of Band Emissions)	§15.247(d)	Conducted > 30 dBc		PASS
AC Power line Conducted Emissions	§15.207	cf. Section 7.7		PASS (Note1)
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

Note1:

1. Please refer to the SM-G990B2/DS [DTS] Test Report.

9. TEST RESULT

9.1 DUTY CYCLE

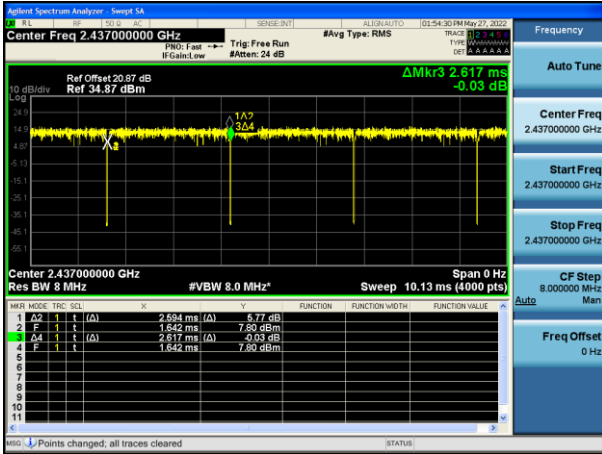
Mode	Tone (T)	Data Rate	On Time (ms)	Total Time (ms)	Duty Cycle	Duty Cycle Factor (dB)
802.11ax (HE20)	26	MCS0	2.594	2.617	0.991	0.038
	52	MCS0	2.592	2.614	0.991	0.038
	106	MCS0	2.435	2.457	0.991	0.040
	242	MCS0	2.389	2.409	0.992	0.037
802.11ax(SU)	BW 20	MCS0	2.386	2.409	0.991	0.041

Test Plots

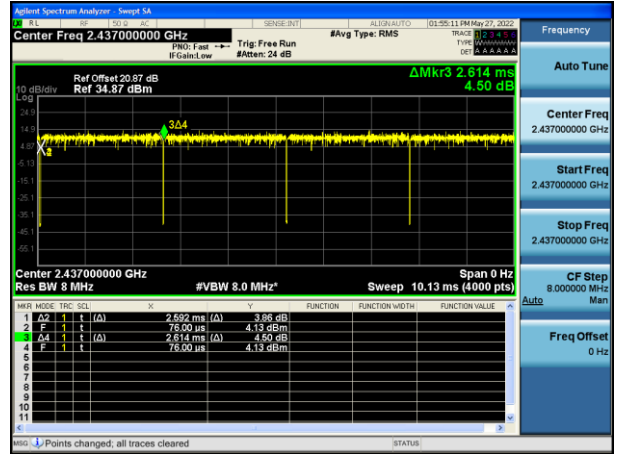
Note:

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

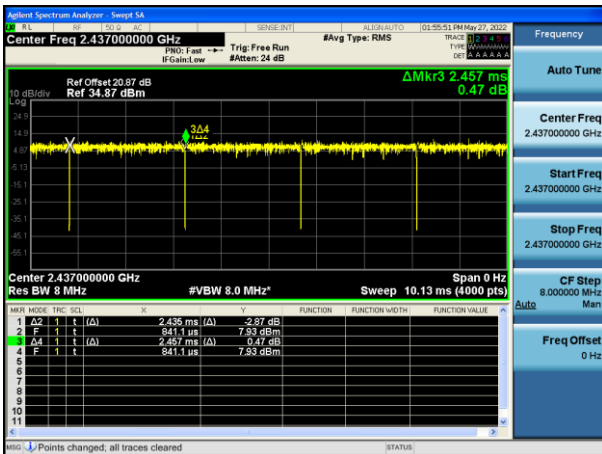
26 Tone MCS0



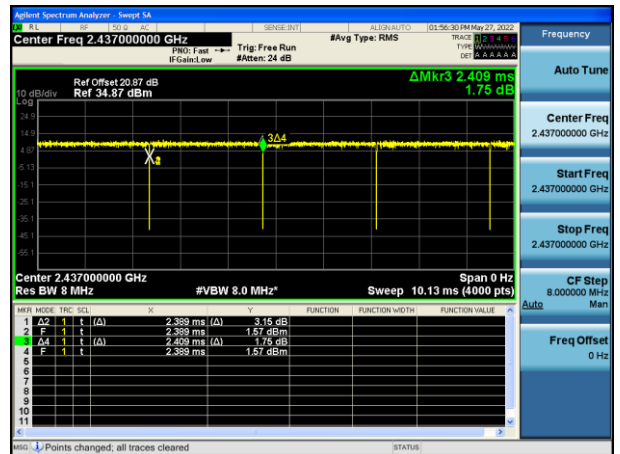
52 Tone MCS0



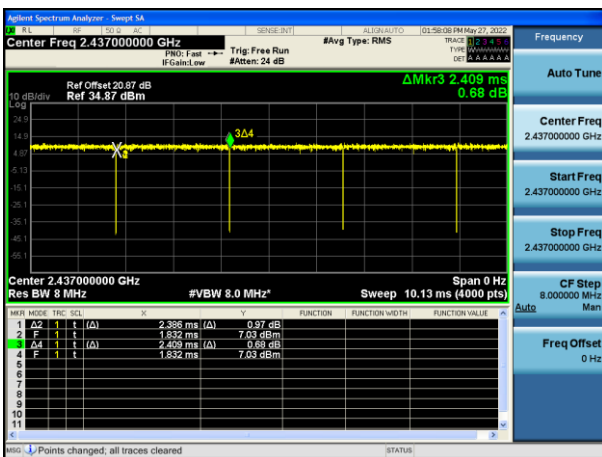
106 Tone MCS0



242 Tone MCS0



SU MCS0



9.2 6 dB BANDWIDTH

[SISO ANT1]

BW	Frequency [MHz]	Channel No.	RU Index	6 dB BW (MHz)				
				26 T	52 T	106 T	242 T	SU
HE20	2412	1	Low	2.156	17.07	18.12	-	-
			Mid	8.877	15.09	-	19.07	19.07
			High	2.152	17.10	17.17	-	-
	2437	6	Low	2.166	17.12	18.17	-	-
			Mid	7.633	15.11	-	19.08	19.08
			High	2.148	17.09	17.15	-	-
	2462	11	Low	2.164	14.58	17.17	-	-
			Mid	7.648	15.10	-	19.07	19.06
			High	15.80	17.09	17.18	-	-

Limit : > 500 kHz

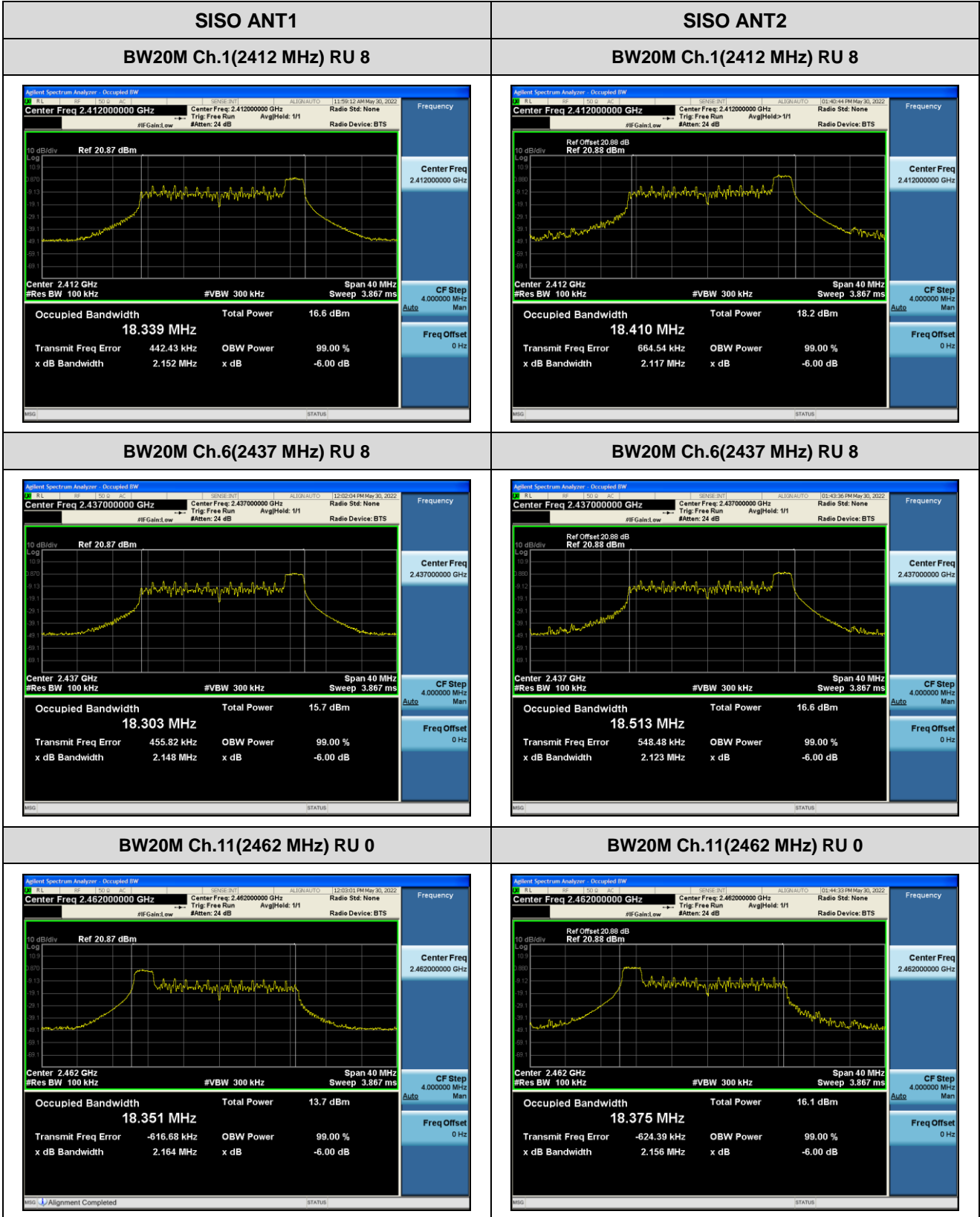
[SISO ANT2]

BW	Frequency [MHz]	Channel No.	RU Index	6 dB BW (MHz)				
				26 T	52 T	106 T	242 T	SU
HE20	2412	1	Low	2.140	17.13	18.18	-	-
			Mid	2.690	15.12	-	19.05	19.05
			High	2.117	17.04	17.16	-	-
	2437	6	Low	2.145	17.07	17.18	-	-
			Mid	2.700	15.11	-	19.09	19.10
			High	2.123	17.09	17.17	-	-
	2462	11	Low	2.156	17.09	17.18	-	-
			Mid	2.695	15.10	-	19.08	19.09
			High	17.06	17.10	18.39	-	-

Limit : > 500 kHz

☐ Test Plots

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



9.3 OUTPUT POWER

Peak Power

Power Meter offset = Attenuator loss (20 dB) + Cable loss + EUT Cable loss

[SISO ANT1]

BW	Frequency [MHz]	Channel No.	RU Index	Total Peak Power (dBm)				
				26 T	52 T	106 T	242 T	SU
HE20	2412	1	Low	18.08	20.47	22.93	-	-
			Mid	17.27	20.21	-	21.88	23.96
			High	19.06	20.91	22.35	-	-
	2437	6	Low	17.34	21.07	22.64	-	-
			Mid	16.84	20.71	-	23.81	23.83
			High	17.51	20.83	22.53	-	-
	2462	11	Low	16.88	20.90	23.78	-	-
			Mid	15.22	20.67	-	19.77	23.94
			High	16.12	20.84	23.67	-	-

Limit : 30 dBm

[SISO ANT2]

BW	Frequency [MHz]	Channel No.	RU Index	Total Peak Power (dBm)				
				26 T	52 T	106 T	242 T	SU
HE20	2412	1	Low	18.65	20.23	22.97	-	-
			Mid	18.67	20.44	-	22.38	24.45
			High	20.20	21.49	22.91	-	-
	2437	6	Low	18.13	20.23	21.88	-	-
			Mid	17.81	20.15	-	23.46	23.43
			High	18.29	20.31	21.90	-	-
	2462	11	Low	18.15	21.22	23.48	-	-
			Mid	17.29	20.79	-	19.21	23.37
			High	17.12	20.60	23.01	-	-

Limit : 30 dBm

[SUM (SISO Ant 1 + SISO Ant 2)]

1. Total peak power for MIMO = $10 \cdot \log((10^{(SISO \text{ Ant1 Total power} / 10)} + 10^{(SISO \text{ Ant2 Total power} / 10)}))$

BW	Frequency [MHz]	Channel No.	RU Index	SUM Peak Power (dBm)				
				26 T	52 T	106 T	242 T	SU
HE20	2412	1	Low	21.38	23.36	25.96	-	-
			Mid	21.04	23.34	-	25.15	27.22
			High	22.68	24.22	25.65	-	-
	2437	6	Low	20.76	23.68	25.29	-	-
			Mid	20.36	23.45	-	26.65	26.64
			High	20.93	23.59	25.24	-	-
	2462	11	Low	20.57	24.07	26.64	-	-
			Mid	19.38	23.74	-	22.51	26.67
			High	19.66	23.73	26.36	-	-

Limit : 30 dBm

Average Power

Power Meter offset = Attenuator loss(20 dB) + Cable loss + EUT Cable

[SISO ANT1]

BW	Frequency [MHz]	Channel No.	RU Index	Total Average Power (dBm)				
				26 T	52 T	106 T	242 T	SU
HE20	2412	1	Low	7.01	9.79	12.67	-	-
			Mid	6.55	9.61	-	12.62	14.50
			High	8.16	10.64	12.23	-	-
	2437	6	Low	7.06	10.73	12.74	-	-
			Mid	6.65	10.29	-	14.55	14.53
			High	6.98	10.22	12.57	-	-
	2462	11	Low	8.97	10.73	13.93	-	-
			Mid	8.00	10.31	-	10.54	14.57
			High	7.86	10.39	13.70	-	-

Limit : 30 dBm

[SISO ANT2]

BW	Frequency [MHz]	Channel No.	RU Index	Total Average Power (dBm)				
				26 T	52 T	106 T	242 T	SU
HE20	2412	1	Low	7.92	9.89	13.15	-	-
			Mid	7.84	9.73	-	13.06	15.20
			High	8.98	10.96	12.96	-	-
	2437	6	Low	8.92	10.00	12.03	-	-
			Mid	8.47	9.80	-	14.17	14.20
			High	8.97	9.78	12.05	-	-
	2462	11	Low	7.74	10.91	13.78	-	-
			Mid	7.54	10.35	-	9.98	14.27
			High	7.12	9.73	12.86	-	-

Limit : 30 dBm

[SUM (SISO Ant 1 + SISO Ant 2)]

1. Total average power for MIMO= $10 \cdot \log(((10^{Ant1 \text{ Total power } / 10}) + (10^{Ant2 \text{ Total power } / 10}))$

BW	Frequency [MHz]	Channel No.	RU Index	SUM Average Power (dBm)				
				26 T	52 T	106 T	242 T	SU
HE20	2412	1	Low	10.50	12.85	15.93	-	-
			Mid	10.25	12.68	-	15.85	17.88
			High	11.60	13.82	15.62	-	-
	2437	6	Low	11.10	13.39	15.41	-	-
			Mid	10.66	13.06	-	17.38	17.38
			High	11.10	13.02	15.33	-	-
	2462	11	Low	11.41	13.83	16.87	-	-
			Mid	10.78	13.34	-	13.28	17.43
			High	10.51	13.08	16.31	-	-

Limit : 30 dBm

9.4 POWER SPECTRAL DENSITY

Note :

1. Spectrum Measured Levels are not plot data.
The PSD results in plot is already including the actual values of loss for the attenuator and cable combination.
2. Spectrum offset
Ant1 & 2 : Attenuator loss(20 dB) + Cable loss + EUT Cable
3. Total PSD = Measured Value + Duty Cycle Factor

[SISO ANT1]

BW	Frequency [MHz]	Channel No.	RU Index	Total PSD (dBm)				
				26 T	52 T	106 T	242 T	SU
HE20	2412	1	Low	-9.402	-9.830	-9.846	-	-
			Mid	-10.006	-9.898	-	-13.054	-11.196
			High	-9.879	-9.069	-10.488	-	-
	2437	6	Low	-10.044	-9.230	-9.895	-	-
			Mid	-10.426	-9.432	-	-11.087	-10.618
			High	-10.144	-9.204	-9.922	-	-
	2462	11	Low	-7.642	-8.601	-8.160	-	-
			Mid	-8.982	-9.040	-	-14.881	-11.107
			High	-9.082	-9.931	-9.226	-	-

Limit : 8 dBm

[SISO ANT2]

BW	Frequency [MHz]	Channel No.	RU Index	Total PSD (dBm)				
				26 T	52 T	106 T	242 T	SU
HE20	2412	1	Low	-9.210	-9.819	-9.551	-	-
			Mid	-9.070	-9.878	-	-12.084	-10.640
			High	-7.694	-8.757	-9.875	-	-
	2437	6	Low	-8.564	-9.808	-10.611	-	-
			Mid	-8.765	-9.569	-	-11.801	-11.863
			High	-8.854	-10.025	-10.638	-	-
	2462	11	Low	-8.183	-8.718	-8.723	-	-
			Mid	-9.577	-9.300	-	-15.473	-11.135
			High	-9.400	-10.240	-9.541	-	-

Limit : 8 dBm

[SUM (SISO Ant 1 + SISO Ant 2)]

BW	Frequency [MHz]	Channel No.	RU Index	SUM Total PSD (dBm)				
				26 T	52 T	106 T	242 T	SU
HE20	2412	1	Low	-6.295	-6.814	-6.685	-	-
			Mid	-6.503	-6.878	-	-9.532	-7.899
			High	-5.640	-5.900	-7.160	-	-
	2437	6	Low	-6.231	-6.499	-7.227	-	-
			Mid	-6.506	-6.490	-	-8.419	-8.185
			High	-6.441	-6.585	-7.254	-	-
	2462	11	Low	-4.894	-5.649	-5.422	-	-
			Mid	-6.259	-6.158	-	-12.157	-8.110
			High	-6.228	-7.072	-6.370	-	-

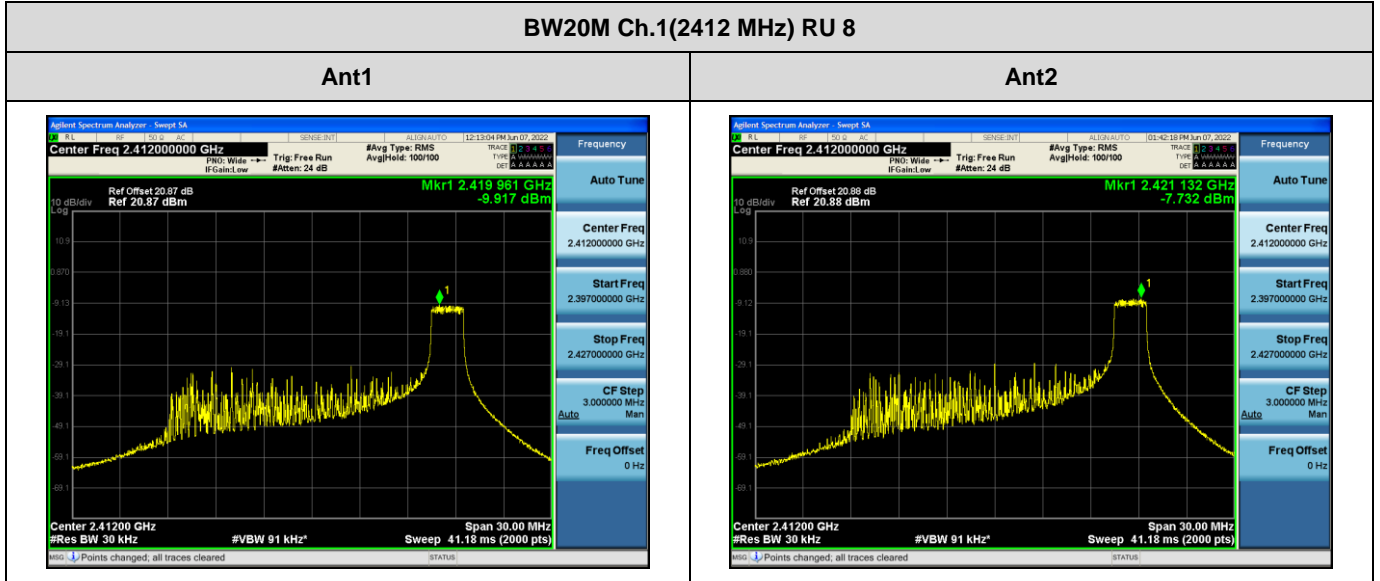
Limit : 8 dBm

Test Plots

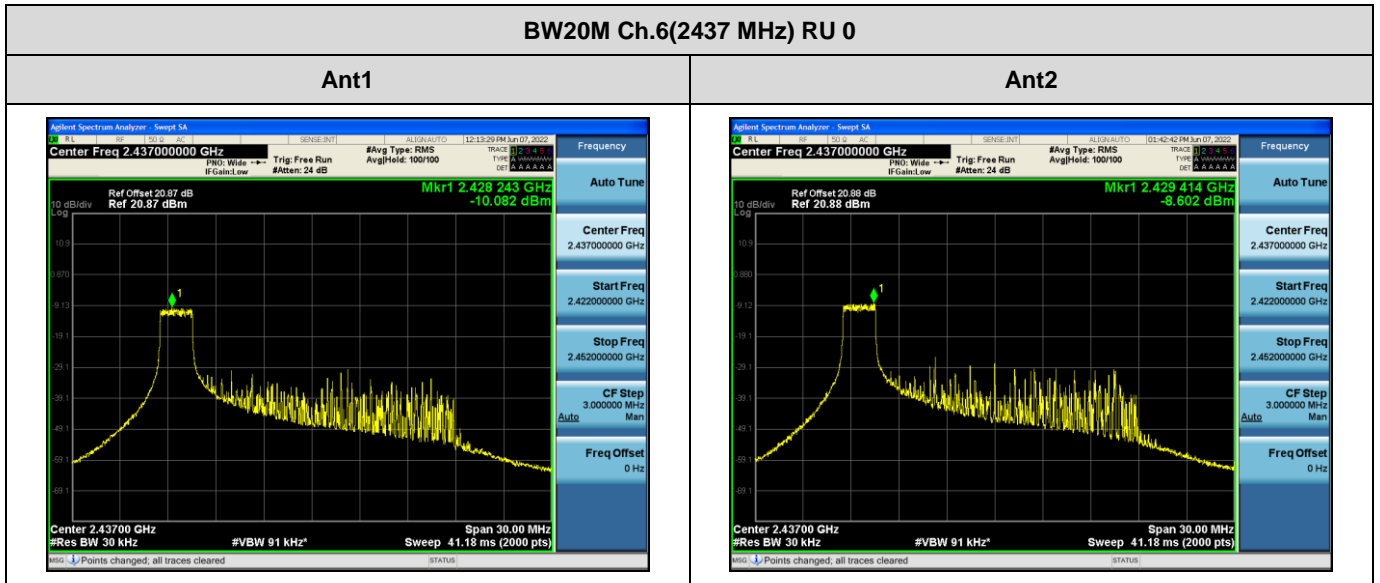
Note:

1. In order to simplify the report, attached plots were only the worst case PSD channel.
2. Total PSD(dBm) = Measured Value + Duty Cycle Factor

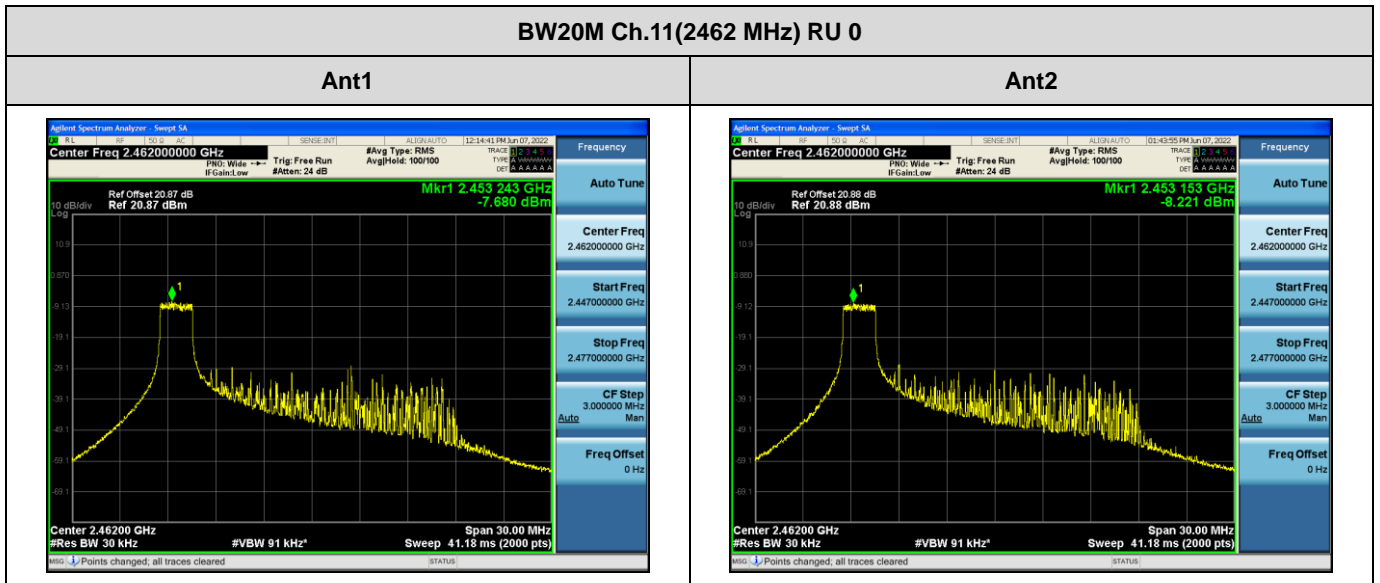
[SUM (SISO Ant 1 + SISO Ant 2)]



SUM PSD (dBm)	Duty Cycle Factor (dB)	Total SUM PSD (dBm)
-5.678	0.038	-5.640



SUM PSD (dBm)	Duty Cycle Factor (dB)	Total SUM PSD (dBm)
-6.269	0.038	-6.231



SUM PSD (dBm)	Duty Cycle Factor (dB)	Total SUM PSD (dBm)
-4.932	0.038	-4.894

9.5 BAND EDGE / CONDUCTED SPURIOUS EMISSIONS

Band Edge

[SISO Ant1]

BW	Frequency [MHz]	Channel No.	RU Index	Measured Position	Result (dB)		
					26 T	52 T	106 T
HE20	2412	1	Low	Lowest Bandedge	33.954	31.286	30.221
	2462	11	High	Lowest Bandedge	49.868	48.151	45.609

BW	Frequency [MHz]	Channel No.	RU Index	Measured Position	Result (dB)	
					242 T	SU
HE20	2412	1	Mid	Lowest Bandedge	32.444	31.765
	2462	11		Lowest Bandedge	41.012	36.328

Limit : 30 dBc

[SISO Ant2]

BW	Frequency [MHz]	Channel No.	RU Index	Measured Position	Result (dB)		
					26 T	52 T	106 T
HE20	2412	1	Low	Lowest Bandedge	32.304	30.099	30.182
	2462	11	High	Lowest Bandedge	46.152	42.093	41.970

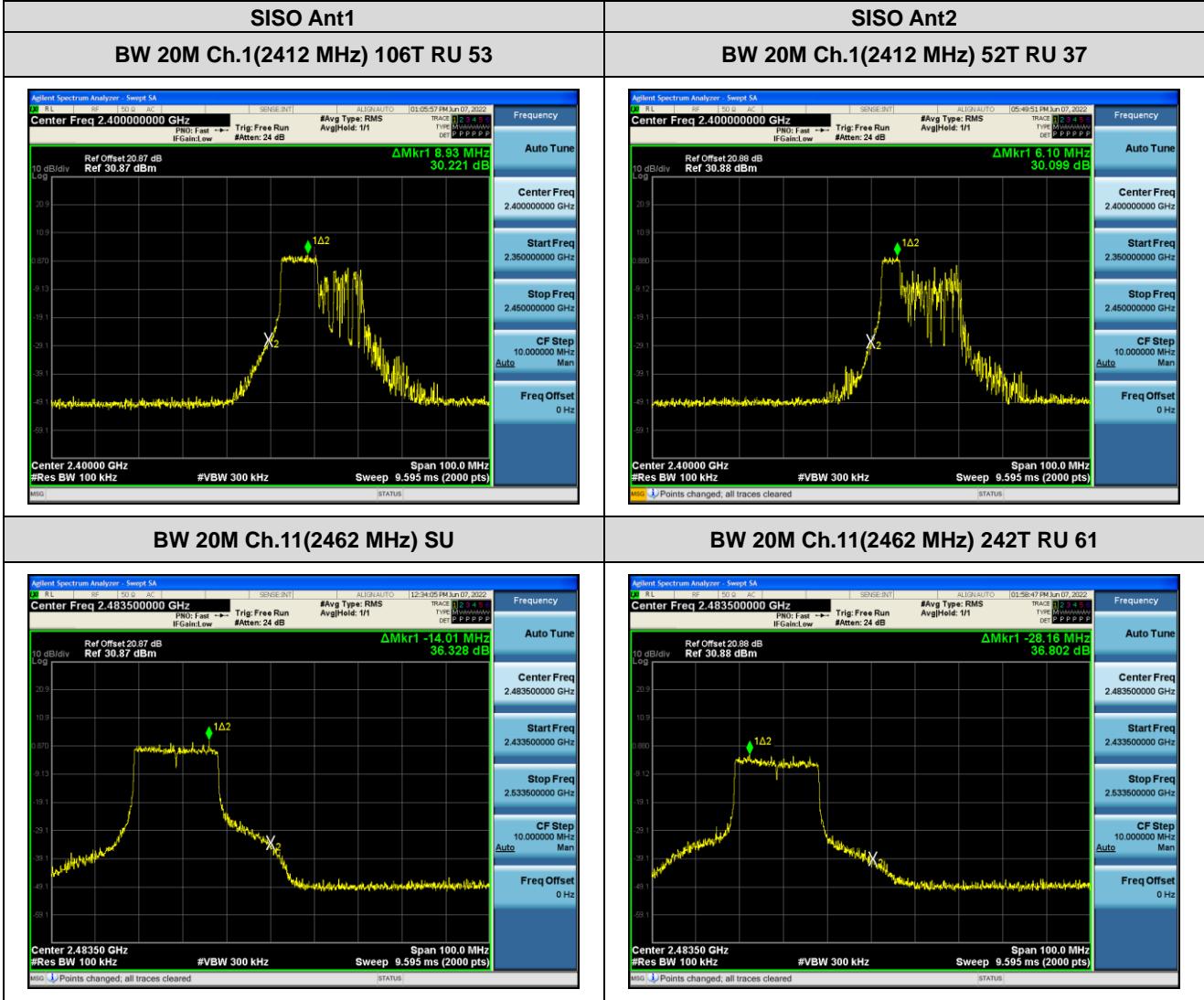
BW	Frequency [MHz]	Channel No.	RU Index	Measured Position	Result (dB)	
					242 T	SU
HE20	2412	1	Mid	Lowest Bandedge	30.140	30.449
	2462	11		Lowest Bandedge	36.802	38.049

Limit : 30 dBc

☐ Test Plots

Note: In order to simplify the report, attached plots were only the worst case.

[SISO Ant1]



Conducted Spurious Emissions

[SISO ANT1]

BW	Frequency [MHz]	Channel No.	RU Index	Result (dB)				
				26 T	52 T	106 T	242 T	SU
HE20	2412	1	Low	47.800	44.245	48.243	-	-
			Mid	47.034	46.993	-	45.344	47.374
			High	47.282	48.886	49.757	-	-
	2437	6	Low	45.842	48.222	48.284	-	-
			Mid	46.151	48.046	-	47.540	46.285
			High	46.805	48.404	49.184	-	-
	2462	11	Low	49.226	48.206	48.667	-	-
			Mid	47.308	48.829	-	43.072	47.373
			High	48.239	47.062	48.279	-	-

[SISO ANT2]

BW	Frequency [MHz]	Channel No.	RU Index	Result (dB)				
				26 T	52 T	106 T	242 T	SU
HE20	2412	1	Low	48.016	46.839	44.100	-	-
			Mid	48.299	46.958	-	44.529	42.454
			High	49.509	49.610	46.440	-	-
	2437	6	Low	48.478	46.828	46.859	-	-
			Mid	48.942	47.433	-	46.674	44.891
			High	48.230	47.285	47.034	-	-
	2462	11	Low	48.230	47.367	46.882	-	-
			Mid	46.448	47.786	-	42.025	46.084
			High	47.038	47.860	47.355	-	-

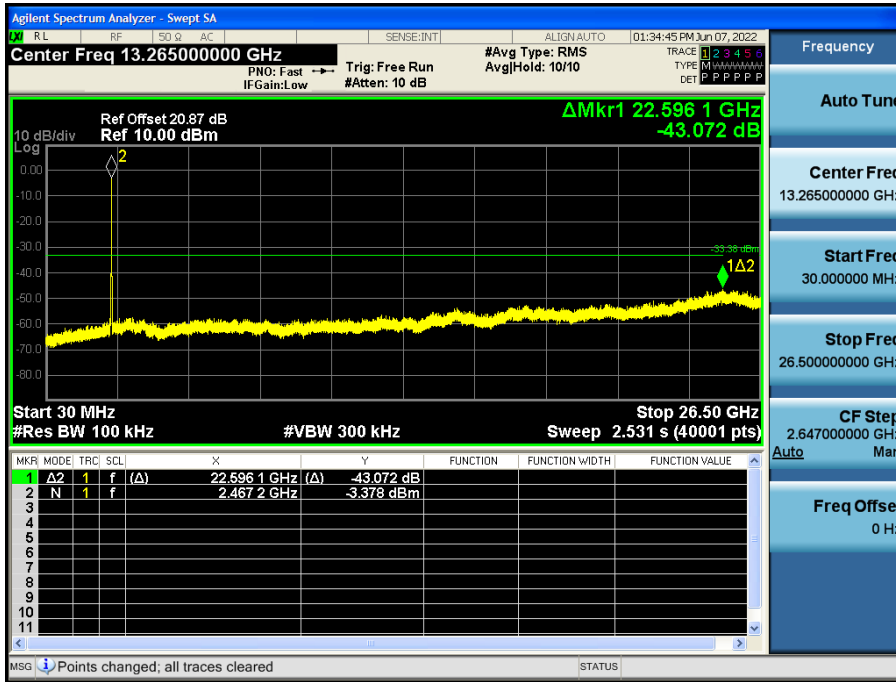
Limit : 30 dBc

▣ Test Plots

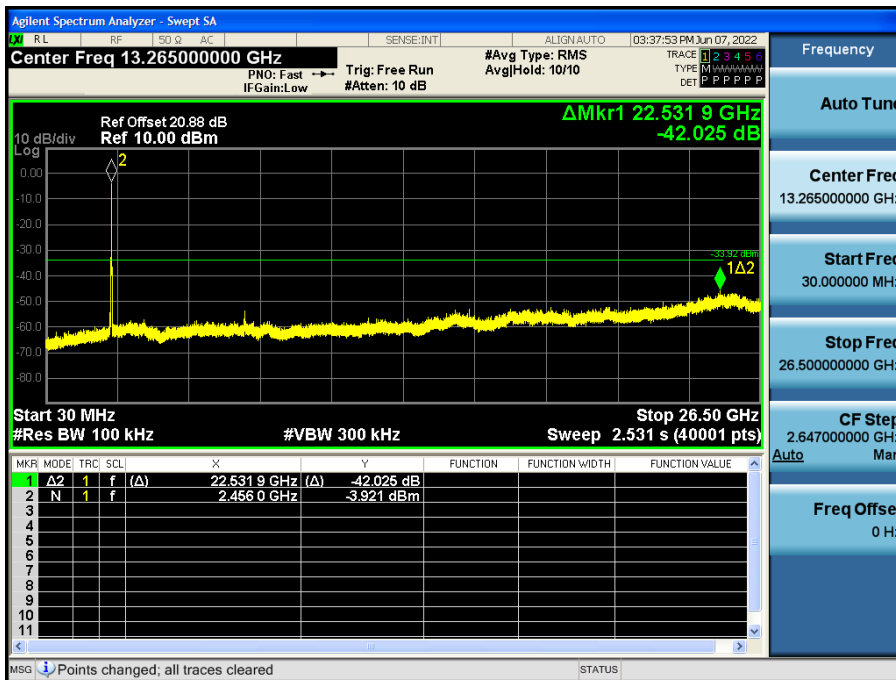
Note:

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

[SISO ANT1] BW20M Ch.11(2462. MHz) 242T RU 61



[SISO ANT2] BW20M Ch.11(2462 MHz) 242T RU 61



9.6 RADIATED SPURIOUS EMISSIONS

Frequency Range : 9 kHz – 30 MHz

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

Note:

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

Frequency Range : Below 1 GHz

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

Note:

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

Frequency Range : Above 1 GHz

[MIMO] Low RU

1. 26 Tone

Operation Mode:	802.11ax(HE20)
Transfer MCS Index:	0
Operating Frequency	2412
Channel No.	01 Ch
RU offset	0

Frequency [MHz]	Measured Value [dBμV]	Duty Cycle Factor [dB]	A.F+C.L -A.G+D.F [dB/m]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
4824	41.23	0.00	4.02	V	45.25	73.98	28.73	PK
4824	29.55	0.04	4.02	V	33.61	53.98	20.37	AV
7236	53.95	0.00	11.57	V	65.52	73.98	8.46	PK
7236	36.02	0.04	11.57	V	47.63	53.98	6.35	AV
4824	41.53	0.00	4.02	H	45.55	73.98	28.43	PK
4824	29.82	0.04	4.02	H	33.88	53.98	20.10	AV
7236	54.02	0.00	11.57	H	65.59	73.98	8.39	PK
7236	36.32	0.04	11.57	H	47.93	53.98	6.05	AV

Operation Mode:	802.11ax(HE20)
Transfer MCS Index:	0
Operating Frequency	2437
Channel No.	06 Ch
RU offset	0

Frequency [MHz]	Measured Value [dBμV]	Duty Cycle Factor [dB]	A.F+C.L -A.G+D.F [dB/m]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
4874	41.02	0.00	4.25	V	45.27	73.98	28.71	PK
4874	29.32	0.04	4.25	V	33.61	53.98	20.37	AV
7311	48.99	0.00	12.01	V	61.00	73.98	12.98	PK
7311	30.89	0.04	12.01	V	42.94	53.98	11.04	AV
4874	41.29	0.00	4.25	H	45.54	73.98	28.44	PK
4874	29.55	0.04	4.25	H	33.84	53.98	20.14	AV
7311	49.22	0.00	12.01	H	61.23	73.98	12.75	PK
7311	31.22	0.04	12.01	H	43.27	53.98	10.71	AV

Operation Mode: 802.11ax(HE20)
 Transfer MCS Index: 0
 Operating Frequency: 2462
 Channel No.: 11 Ch
 RU offset: 0

Frequency [MHz]	Measured Value [dBμV]	Duty Cycle Factor [dB]	A.F+C.L -A.G+D.F [dB/m]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
4924	42.45	0.00	4.41	V	46.86	73.98	27.12	PK
4924	31.02	0.04	4.41	V	35.47	53.98	18.51	AV
7386	53.33	0.00	11.96	V	65.29	73.98	8.69	PK
7386	35.48	0.04	11.96	V	47.48	53.98	6.50	AV
4924	42.73	0.00	4.41	H	47.14	73.98	26.84	PK
4924	31.25	0.04	4.41	H	35.70	53.98	18.28	AV
7386	53.48	0.00	11.96	H	65.44	73.98	8.54	PK
7386	35.62	0.04	11.96	H	47.62	53.98	6.36	AV

2. 52 Tone

Operation Mode:	802.11ax(HE20)
Transfer MCS Index:	0
Operating Frequency	2412
Channel No.	01 Ch
RU offset	37

Frequency [MHz]	Measured Value [dBμV]	Duty Cycle Factor [dB]	A.F+C.L -A.G+D.F [dB/m]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
4824	41.05	0.00	4.02	V	45.07	73.98	28.91	PK
4824	29.55	0.04	4.02	V	33.61	53.98	20.37	AV
7236	54.21	0.00	11.57	V	65.78	73.98	8.20	PK
7236	37.22	0.04	11.57	V	48.83	53.98	5.15	AV
4824	41.37	0.00	4.02	H	45.39	73.98	28.59	PK
4824	29.87	0.04	4.02	H	33.93	53.98	20.05	AV
7236	54.56	0.00	11.57	H	66.13	73.98	7.85	PK
7236	37.42	0.04	11.57	H	49.03	53.98	4.95	AV

Operation Mode:	802.11ax(HE20)
Transfer MCS Index:	0
Operating Frequency	2437
Channel No.	06 Ch
RU offset	37

Frequency [MHz]	Measured Value [dBμV]	Duty Cycle Factor [dB]	A.F+C.L -A.G+D.F [dB/m]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
4874	41.00	0.00	4.25	V	45.25	73.98	28.73	PK
4874	28.95	0.04	4.25	V	33.24	53.98	20.74	AV
7311	50.55	0.00	12.01	V	62.56	73.98	11.42	PK
7311	33.22	0.04	12.01	V	45.27	53.98	8.71	AV
4874	41.22	0.00	4.25	H	45.47	73.98	28.51	PK
4874	29.20	0.04	4.25	H	33.49	53.98	20.49	AV
7311	50.89	0.00	12.01	H	62.90	73.98	11.08	PK
7311	33.54	0.04	12.01	H	45.59	53.98	8.39	AV

Operation Mode:	802.11ax(HE20)
Transfer MCS Index:	0
Operating Frequency	2462
Channel No.	11 Ch
RU offset	37

Frequency [MHz]	Measured Value [dBμV]	Duty Cycle Factor [dB]	A.F+C.L -A.G+D.F [dB/m]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
4924	42.39	0.00	4.41	V	46.80	73.98	27.18	PK
4924	30.51	0.04	4.41	V	34.96	53.98	19.02	AV
7386	54.52	0.00	11.96	V	66.48	73.98	7.50	PK
7386	37.48	0.04	11.96	V	49.48	53.98	4.50	AV
4924	42.65	0.00	4.41	H	47.06	73.98	26.92	PK
4924	30.75	0.04	4.41	H	35.20	53.98	18.78	AV
7386	54.82	0.00	11.96	H	66.78	73.98	7.20	PK
7386	37.64	0.04	11.96	H	49.64	53.98	4.34	AV

3. 106 Tone

Operation Mode:	802.11ax(HE20)
Transfer MCS Index:	0
Operating Frequency	2412
Channel No.	01 Ch
RU offset	53

Frequency [MHz]	Measured Value [dBμV]	Duty Cycle Factor [dB]	A.F+C.L -A.G+D.F [dB/m]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
4824	41.23	0.00	4.02	V	45.25	73.98	28.73	PK
4824	29.08	0.04	4.02	V	33.14	53.98	20.84	AV
7236	50.89	0.00	11.57	V	62.46	73.98	11.52	PK
7236	36.89	0.04	11.57	V	48.50	53.98	5.48	AV
4824	41.51	0.00	4.02	H	45.53	73.98	28.45	PK
4824	29.46	0.04	4.02	H	33.52	53.98	20.46	AV
7236	51.12	0.00	11.57	H	62.69	73.98	11.29	PK
7236	37.12	0.04	11.57	H	48.73	53.98	5.25	AV

Operation Mode:	802.11ax(HE20)
Transfer MCS Index:	0
Operating Frequency	2437
Channel No.	06 Ch
RU offset	53

Frequency [MHz]	Measured Value [dBμV]	Duty Cycle Factor [dB]	A.F+C.L -A.G+D.F [dB/m]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
4874	41.32	0.00	4.25	V	45.57	73.98	28.41	PK
4874	29.02	0.04	4.25	V	33.31	53.98	20.67	AV
7311	53.22	0.00	12.01	V	65.23	73.98	8.75	PK
7311	36.48	0.04	12.01	V	48.53	53.98	5.45	AV
4874	41.46	0.00	4.25	H	45.71	73.98	28.27	PK
4874	29.37	0.04	4.25	H	33.66	53.98	20.32	AV
7311	53.40	0.00	12.01	H	65.41	73.98	8.57	PK
7311	36.78	0.04	12.01	H	48.83	53.98	5.15	AV

Operation Mode:	802.11ax(HE20)
Transfer MCS Index:	0
Operating Frequency	2462
Channel No.	11 Ch
RU offset	53

Frequency [MHz]	Measured Value [dBμV]	Duty Cycle Factor [dB]	A.F+C.L -A.G+D.F [dB/m]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
4924	41.32	0.00	4.41	V	45.73	73.98	28.25	PK
4924	29.68	0.04	4.41	V	34.13	53.98	19.85	AV
7386	52.02	0.00	11.96	V	63.98	73.98	10.00	PK
7386	35.89	0.04	11.96	V	47.89	53.98	6.09	AV
4924	41.50	0.00	4.41	H	45.91	73.98	28.07	PK
4924	29.98	0.04	4.41	H	34.43	53.98	19.55	AV
7386	52.25	0.00	11.96	H	64.21	73.98	9.77	PK
7386	36.12	0.04	11.96	H	48.12	53.98	5.86	AV

[MIMO] Mid RU

1. 26 Tone

Operation Mode: 802.11ax(HE20)
 Transfer MCS Index: 0
 Operating Frequency: 2412
 Channel No.: 01 Ch
 RU offset: 4

Frequency [MHz]	Measured Value [dBμV]	Duty Cycle Factor [dB]	A.F+C.L -A.G+D.F [dB/m]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
4824	40.85	0.00	4.02	V	44.87	73.98	29.11	PK
4824	29.12	0.04	4.02	V	33.18	53.98	20.80	AV
7236	49.51	0.00	11.57	V	61.08	73.98	12.90	PK
7236	31.32	0.04	11.57	V	42.93	53.98	11.05	AV
4824	41.03	0.00	4.02	H	45.05	73.98	28.93	PK
4824	29.23	0.04	4.02	H	33.29	53.98	20.69	AV
7236	49.97	0.00	11.57	H	61.54	73.98	12.44	PK
7236	31.51	0.04	11.57	H	43.12	53.98	10.86	AV

Operation Mode: 802.11ax(HE20)
 Transfer MCS Index: 0
 Operating Frequency: 2437
 Channel No.: 06 Ch
 RU offset: 4

Frequency [MHz]	Measured Value [dBμV]	Duty Cycle Factor [dB]	A.F+C.L -A.G+D.F [dB/m]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
4874	41.02	0.00	4.25	V	45.27	73.98	28.71	PK
4874	28.89	0.04	4.25	V	33.18	53.98	20.80	AV
7311	46.22	0.00	12.01	V	58.23	73.98	15.75	PK
7311	30.02	0.04	12.01	V	42.07	53.98	11.91	AV
4874	41.22	0.00	4.25	H	45.47	73.98	28.51	PK
4874	29.08	0.04	4.25	H	33.37	53.98	20.61	AV
7311	46.66	0.00	12.01	H	58.67	73.98	15.31	PK
7311	30.25	0.04	12.01	H	42.30	53.98	11.68	AV

Operation Mode: 802.11ax(HE20)
 Transfer MCS Index: 0
 Operating Frequency: 2462
 Channel No.: 11 Ch
 RU offset: 4

Frequency [MHz]	Measured Value [dBμV]	Duty Cycle Factor [dB]	A.F+C.L -A.G+D.F [dB/m]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
4924	42.22	0.00	4.41	V	46.63	73.98	27.35	PK
4924	30.89	0.04	4.41	V	35.34	53.98	18.64	AV
7386	48.48	0.00	11.96	V	60.44	73.98	13.54	PK
7386	30.12	0.04	11.96	V	42.12	53.98	11.86	AV
4924	42.70	0.00	4.41	H	47.11	73.98	26.87	PK
4924	31.07	0.04	4.41	H	35.52	53.98	18.46	AV
7386	48.66	0.00	11.96	H	60.62	73.98	13.36	PK
7386	30.55	0.04	11.96	H	42.55	53.98	11.43	AV

2. 52 Tone

Operation Mode: 802.11ax(HE20)
 Transfer MCS Index: 0
 Operating Frequency: 2412
 Channel No.: 01 Ch
 RU offset: 38

Frequency [MHz]	Measured Value [dBμV]	Duty Cycle Factor [dB]	A.F+C.L -A.G+D.F [dB/m]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
4824	41.51	0.00	4.02	V	45.53	73.98	28.45	PK
4824	29.65	0.04	4.02	V	33.71	53.98	20.27	AV
7236	52.12	0.00	11.57	V	63.69	73.98	10.29	PK
7236	35.22	0.04	11.57	V	46.83	53.98	7.15	AV
4824	41.90	0.00	4.02	H	45.92	73.98	28.06	PK
4824	29.84	0.04	4.02	H	33.90	53.98	20.08	AV
7236	52.49	0.00	11.57	H	64.06	73.98	9.92	PK
7236	35.43	0.04	11.57	H	47.04	53.98	6.94	AV

Operation Mode: 802.11ax(HE20)
 Transfer MCS Index: 0
 Operating Frequency: 2437
 Channel No.: 06 Ch
 RU offset: 38

Frequency [MHz]	Measured Value [dBμV]	Duty Cycle Factor [dB]	A.F+C.L -A.G+D.F [dB/m]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
4874	40.51	0.00	4.25	V	44.76	73.98	29.22	PK
4874	28.88	0.04	4.25	V	33.17	53.98	20.81	AV
7311	50.89	0.00	12.01	V	62.90	73.98	11.08	PK
7311	33.22	0.04	12.01	V	45.27	53.98	8.71	AV
4874	40.71	0.00	4.25	H	44.96	73.98	29.02	PK
4874	29.06	0.04	4.25	H	33.35	53.98	20.63	AV
7311	51.15	0.00	12.01	H	63.16	73.98	10.82	PK
7311	33.47	0.04	12.01	H	45.52	53.98	8.46	AV

Operation Mode: 802.11ax(HE20)
 Transfer MCS Index: 0
 Operating Frequency: 2462
 Channel No.: 11 Ch
 RU offset: 38

Frequency [MHz]	Measured Value [dBμV]	Duty Cycle Factor [dB]	A.F+C.L -A.G+D.F [dB/m]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
4924	42.48	0.00	4.41	V	46.89	73.98	27.09	PK
4924	30.62	0.04	4.41	V	35.07	53.98	18.91	AV
7386	52.99	0.00	11.96	V	64.95	73.98	9.03	PK
7386	35.89	0.04	11.96	V	47.89	53.98	6.09	AV
4924	42.67	0.00	4.41	H	47.08	73.98	26.90	PK
4924	30.89	0.04	4.41	H	35.34	53.98	18.64	AV
7386	53.12	0.00	11.96	H	65.08	73.98	8.90	PK
7386	36.12	0.04	11.96	H	48.12	53.98	5.86	AV

3. 242 Tone

Operation Mode: 802.11ax(HE20)
 Transfer MCS Index: 0
 Operating Frequency: 2412
 Channel No.: 01 Ch
 RU offset: 61

Frequency [MHz]	Measured Value [dBμV]	Duty Cycle Factor [dB]	A.F+C.L -A.G+D.F [dB/m]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
4824	40.51	0.00	4.02	V	44.53	73.98	29.45	PK
4824	29.02	0.04	4.02	V	33.08	53.98	20.90	AV
7236	52.78	0.00	11.57	V	64.35	73.98	9.63	PK
7236	36.29	0.04	11.57	V	47.90	53.98	6.08	AV
4824	40.95	0.00	4.02	H	44.97	73.98	29.01	PK
4824	29.33	0.04	4.02	H	33.39	53.98	20.59	AV
7236	53.09	0.00	11.57	H	64.66	73.98	9.32	PK
7236	36.55	0.04	11.57	H	48.16	53.98	5.82	AV

Operation Mode: 802.11ax(HE20)
 Transfer MCS Index: 0
 Operating Frequency: 2437
 Channel No.: 06 Ch
 RU offset: 61

Frequency [MHz]	Measured Value [dBμV]	Duty Cycle Factor [dB]	A.F+C.L -A.G+D.F [dB/m]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
4874	40.98	0.00	4.25	V	45.23	73.98	28.75	PK
4874	28.62	0.04	4.25	V	32.91	53.98	21.07	AV
7311	47.00	0.00	12.01	V	59.01	73.98	14.97	PK
7311	33.48	0.04	12.01	V	45.53	53.98	8.45	AV
4874	41.21	0.00	4.25	H	45.46	73.98	28.52	PK
4874	28.98	0.04	4.25	H	33.27	53.98	20.71	AV
7311	47.33	0.00	12.01	H	59.34	73.98	14.64	PK
7311	33.77	0.04	12.01	H	45.82	53.98	8.16	AV

Operation Mode: 802.11ax(HE20)
 Transfer MCS Index: 0
 Operating Frequency: 2462
 Channel No.: 11 Ch
 RU offset: 61

Frequency [MHz]	Measured Value [dBμV]	Duty Cycle Factor [dB]	A.F+C.L -A.G+D.F [dB/m]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
4924	41.02	0.00	4.41	V	45.43	73.98	28.55	PK
4924	28.62	0.04	4.41	V	33.07	53.98	20.91	AV
7386	46.22	0.00	11.96	V	58.18	73.98	15.80	PK
7386	32.65	0.04	11.96	V	44.65	53.98	9.33	AV
4924	41.22	0.00	4.41	H	45.63	73.98	28.35	PK
4924	28.99	0.04	4.41	H	33.44	53.98	20.54	AV
7386	46.68	0.00	11.96	H	58.64	73.98	15.34	PK
7386	32.85	0.04	11.96	H	44.85	53.98	9.13	AV

4. SU

Operation Mode:	802.11ax(HE20)
Transfer MCS Index:	0
Operating Frequency	2412
Channel No.	01 Ch
RU offset	None

Frequency [MHz]	Measured Value [dBμV]	Duty Cycle Factor [dB]	A.F+C.L -A.G+D.F [dB/m]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
4824	40.98	0.00	4.02	V	45.00	73.98	28.98	PK
4824	29.02	0.04	4.02	V	33.08	53.98	20.90	AV
7236	53.22	0.00	11.57	V	64.79	73.98	9.19	PK
7236	36.51	0.04	11.57	V	48.12	53.98	5.86	AV
4824	41.12	0.00	4.02	H	45.14	73.98	28.84	PK
4824	29.22	0.04	4.02	H	33.28	53.98	20.70	AV
7236	53.52	0.00	11.57	H	65.09	73.98	8.89	PK
7236	36.66	0.04	11.57	H	48.27	53.98	5.71	AV

Operation Mode:	802.11ax(HE20)
Transfer MCS Index:	0
Operating Frequency	2437
Channel No.	06 Ch
RU offset	None

Frequency [MHz]	Measured Value [dBμV]	Duty Cycle Factor [dB]	A.F+C.L -A.G+D.F [dB/m]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
4874	41.09	0.00	4.25	V	45.34	73.98	28.64	PK
4874	28.55	0.04	4.25	V	32.84	53.98	21.14	AV
7311	48.89	0.00	12.01	V	60.90	73.98	13.08	PK
7311	34.32	0.04	12.01	V	46.37	53.98	7.61	AV
4874	41.32	0.00	4.25	H	45.57	73.98	28.41	PK
4874	28.75	0.04	4.25	H	33.04	53.98	20.94	AV
7311	49.05	0.00	12.01	H	61.06	73.98	12.92	PK
7311	34.55	0.04	12.01	H	46.60	53.98	7.38	AV

Operation Mode: 802.11ax(HE20)
 Transfer MCS Index: 0
 Operating Frequency: 2462
 Channel No.: 11 Ch
 RU offset: None

Frequency [MHz]	Measured Value [dBμV]	Duty Cycle Factor [dB]	A.F+C.L -A.G+D.F [dB/m]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
4924	41.32	0.00	4.41	V	45.73	73.98	28.25	PK
4924	29.48	0.04	4.41	V	33.93	53.98	20.05	AV
7386	47.02	0.00	11.96	V	58.98	73.98	15.00	PK
7386	32.51	0.04	11.96	V	44.51	53.98	9.47	AV
4924	41.79	0.00	4.41	H	46.20	73.98	27.78	PK
4924	29.69	0.04	4.41	H	34.14	53.98	19.84	AV
7386	47.41	0.00	11.96	H	59.37	73.98	14.61	PK
7386	32.86	0.04	11.96	H	44.86	53.98	9.12	AV

[MIMO] High RU

1. 26 Tone

Operation Mode:	802.11ax(HE20)
Transfer MCS Index:	0
Operating Frequency	2412
Channel No.	01 Ch
RU offset	8

Frequency [MHz]	Measured Value [dBμV]	Duty Cycle Factor [dB]	A.F+C.L -A.G+D.F [dB/m]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
4824	41.48	0.00	4.02	V	45.50	73.98	28.48	PK
4824	29.22	0.04	4.02	V	33.28	53.98	20.70	AV
7236	48.52	0.00	11.57	V	60.09	73.98	13.89	PK
7236	30.48	0.04	11.57	V	42.09	53.98	11.89	AV
4824	41.77	0.00	4.02	H	45.79	73.98	28.19	PK
4824	29.43	0.04	4.02	H	33.49	53.98	20.49	AV
7236	48.88	0.00	11.57	H	60.45	73.98	13.53	PK
7236	30.88	0.04	11.57	H	42.49	53.98	11.49	AV

Operation Mode:	802.11ax(HE20)
Transfer MCS Index:	0
Operating Frequency	2437
Channel No.	06 Ch
RU offset	8

Frequency [MHz]	Measured Value [dBμV]	Duty Cycle Factor [dB]	A.F+C.L -A.G+D.F [dB/m]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
4874	42.48	0.00	4.25	V	46.73	73.98	27.25	PK
4874	30.12	0.04	4.25	V	34.41	53.98	19.57	AV
7311	51.55	0.00	12.01	V	63.56	73.98	10.42	PK
7311	32.78	0.04	12.01	V	44.83	53.98	9.15	AV
4874	42.62	0.00	4.25	H	46.87	73.98	27.11	PK
4874	30.27	0.04	4.25	H	34.56	53.98	19.42	AV
7311	51.88	0.00	12.01	H	63.89	73.98	10.09	PK
7311	32.99	0.04	12.01	H	45.04	53.98	8.94	AV

Operation Mode:	802.11ax(HE20)
Transfer MCS Index:	0
Operating Frequency	2462
Channel No.	11 Ch
RU offset	8

Frequency [MHz]	Measured Value [dBμV]	Duty Cycle Factor [dB]	A.F+C.L -A.G+D.F [dB/m]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
4924	42.55	0.00	4.41	V	46.96	73.98	27.02	PK
4924	30.48	0.04	4.41	V	34.93	53.98	19.05	AV
7386	45.55	0.00	11.96	V	57.51	73.98	16.47	PK
7386	29.01	0.04	11.96	V	41.01	53.98	12.97	AV
4924	42.74	0.00	4.41	H	47.15	73.98	26.83	PK
4924	30.71	0.04	4.41	H	35.16	53.98	18.82	AV
7386	45.75	0.00	11.96	H	57.71	73.98	16.27	PK
7386	29.25	0.04	11.96	H	41.25	53.98	12.73	AV

2. 52 Tone

Operation Mode: 802.11ax(HE20)
 Transfer MCS Index: 0
 Operating Frequency: 2412
 Channel No.: 01 Ch
 RU offset: 40

Frequency [MHz]	Measured Value [dBμV]	Duty Cycle Factor [dB]	A.F+C.L -A.G+D.F [dB/m]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
4824	41.02	0.00	4.02	V	45.04	73.98	28.94	PK
4824	29.65	0.04	4.02	V	33.71	53.98	20.27	AV
7236	51.48	0.00	11.57	V	63.05	73.98	10.93	PK
7236	33.22	0.04	11.57	V	44.83	53.98	9.15	AV
4824	41.18	0.00	4.02	H	45.20	73.98	28.78	PK
4824	29.83	0.04	4.02	H	33.89	53.98	20.09	AV
7236	51.67	0.00	11.57	H	63.24	73.98	10.74	PK
7236	33.42	0.04	11.57	H	45.03	53.98	8.95	AV

Operation Mode: 802.11ax(HE20)
 Transfer MCS Index: 0
 Operating Frequency: 2437
 Channel No.: 06 Ch
 RU offset: 40

Frequency [MHz]	Measured Value [dBμV]	Duty Cycle Factor [dB]	A.F+C.L -A.G+D.F [dB/m]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
4874	40.85	0.00	4.25	V	45.10	73.98	28.88	PK
4874	29.22	0.04	4.25	V	33.51	53.98	20.47	AV
7311	53.12	0.00	12.01	V	65.13	73.98	8.85	PK
7311	35.22	0.04	12.01	V	47.27	53.98	6.71	AV
4874	41.03	0.00	4.25	H	45.28	73.98	28.70	PK
4874	29.64	0.04	4.25	H	33.93	53.98	20.05	AV
7311	53.26	0.00	12.01	H	65.27	73.98	8.71	PK
7311	35.46	0.04	12.01	H	47.51	53.98	6.47	AV

Operation Mode:	802.11ax(HE20)
Transfer MCS Index:	0
Operating Frequency	2462
Channel No.	11 Ch
RU offset	40

Frequency [MHz]	Measured Value [dBμV]	Duty Cycle Factor [dB]	A.F+C.L -A.G+D.F [dB/m]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
4924	41.89	0.00	4.41	V	46.30	73.98	27.68	PK
4924	30.02	0.04	4.41	V	34.47	53.98	19.51	AV
7386	48.89	0.00	11.96	V	60.85	73.98	13.13	PK
7386	32.01	0.04	11.96	V	44.01	53.98	9.97	AV
4924	42.08	0.00	4.41	H	46.49	73.98	27.49	PK
4924	30.25	0.04	4.41	H	34.70	53.98	19.28	AV
7386	49.25	0.00	11.96	H	61.21	73.98	12.77	PK
7386	32.22	0.04	11.96	H	44.22	53.98	9.76	AV

3. 106 Tone

Operation Mode: 802.11ax(HE20)
 Transfer MCS Index: 0
 Operating Frequency: 2412
 Channel No.: 01 Ch
 RU offset: 54

Frequency [MHz]	Measured Value [dBμV]	Duty Cycle Factor [dB]	A.F+C.L -A.G+D.F [dB/m]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
4824	41.02	0.00	4.02	V	45.04	73.98	28.94	PK
4824	29.12	0.04	4.02	V	33.18	53.98	20.80	AV
7236	51.02	0.00	11.57	V	62.59	73.98	11.39	PK
7236	34.41	0.04	11.57	V	46.02	53.98	7.96	AV
4824	41.19	0.00	4.02	H	45.21	73.98	28.77	PK
4824	29.48	0.04	4.02	H	33.54	53.98	20.44	AV
7236	51.35	0.00	11.57	H	62.92	73.98	11.06	PK
7236	34.66	0.04	11.57	H	46.27	53.98	7.71	AV

Operation Mode: 802.11ax(HE20)
 Transfer MCS Index: 0
 Operating Frequency: 2437
 Channel No.: 06 Ch
 RU offset: 54

Frequency [MHz]	Measured Value [dBμV]	Duty Cycle Factor [dB]	A.F+C.L -A.G+D.F [dB/m]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
4874	41.55	0.00	4.25	V	45.80	73.98	28.18	PK
4874	29.32	0.04	4.25	V	33.61	53.98	20.37	AV
7311	53.22	0.00	12.01	V	65.23	73.98	8.75	PK
7311	36.62	0.04	12.01	V	48.67	53.98	5.31	AV
4874	41.76	0.00	4.25	H	46.01	73.98	27.97	PK
4874	29.57	0.04	4.25	H	33.86	53.98	20.12	AV
7311	53.48	0.00	12.01	H	65.49	73.98	8.49	PK
7311	36.99	0.04	12.01	H	49.04	53.98	4.94	AV

Operation Mode:	802.11ax(HE20)
Transfer MCS Index:	0
Operating Frequency	2462
Channel No.	11 Ch
RU offset	54

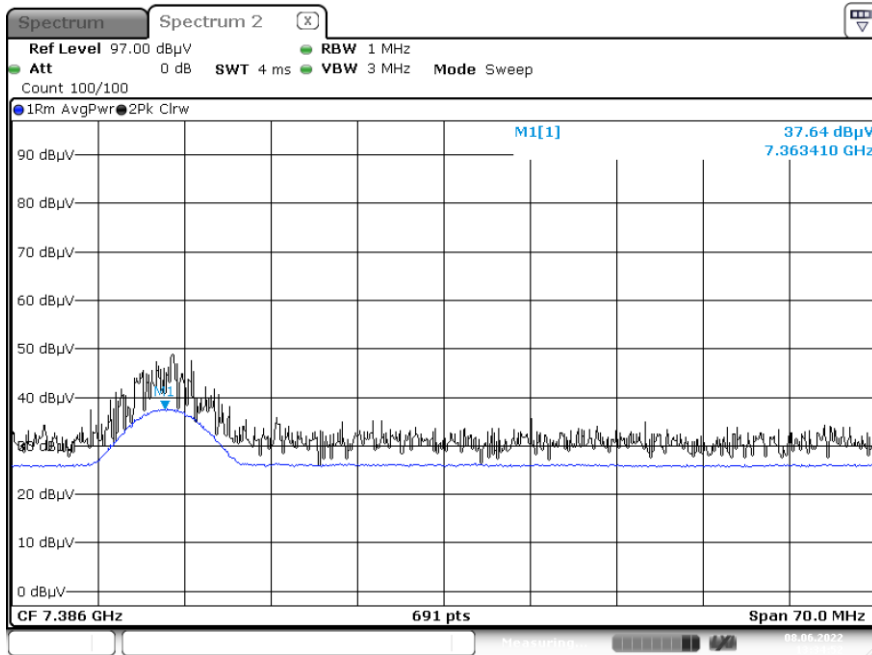
Frequency [MHz]	Measured Value [dBμV]	Duty Cycle Factor [dB]	A.F+C.L -A.G+D.F [dB/m]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
4924	41.48	0.00	4.41	V	45.89	73.98	28.09	PK
4924	29.65	0.04	4.41	V	34.10	53.98	19.88	AV
7386	46.00	0.00	11.96	V	57.96	73.98	16.02	PK
7386	30.57	0.04	11.96	V	42.57	53.98	11.41	AV
4924	41.86	0.00	4.41	H	46.27	73.98	27.71	PK
4924	29.87	0.04	4.41	H	34.32	53.98	19.66	AV
7386	46.22	0.00	11.96	H	58.18	73.98	15.80	PK
7386	30.89	0.04	11.96	H	42.89	53.98	11.09	AV

▣ Test Plots

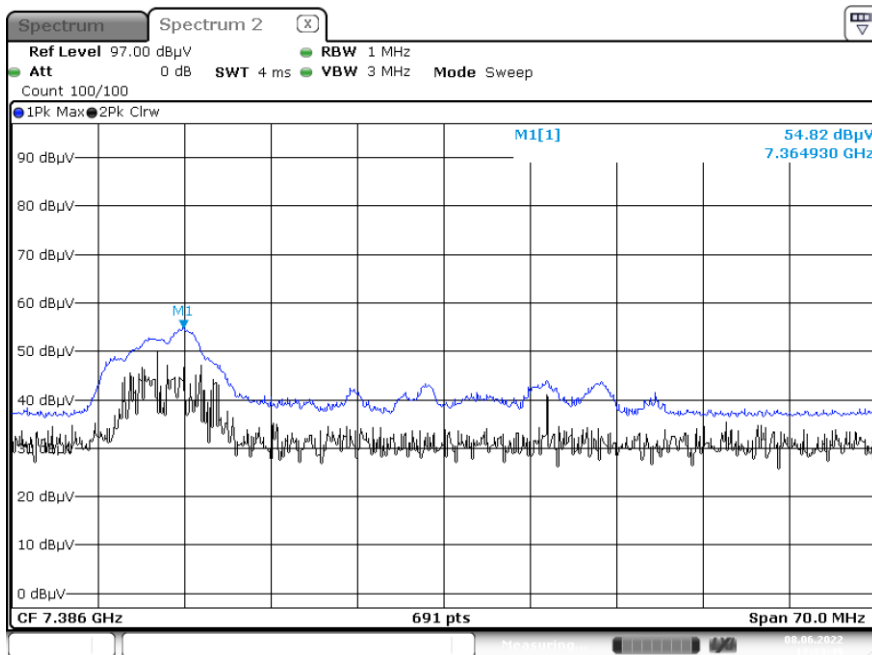
[MIMO]

(52 Tone RU 37) – Z-H

Radiated Spurious Emissions plot – Average result (802.11ax(HE20), Ch.11 3rd Harmonic)



Radiated Spurious Emissions plot – Peak result (802.11ax(HE20), Ch.11 3rd Harmonic)



Note:

Plot of worst case are only reported.

9.7 RADIATED RESTRICTED BAND EDGES

[MIMO]

1. 26 Tone

Operation Mode:	802.11ax(HE20)
Transfer MCS Index:	0
Operating Frequency	2412 MHz, 2462 MHz
Channel No.	01 Ch, 11 Ch

Frequency [MHz]	Measured Value [dBμV]	Duty Cycle Factor [dB]	A.F.+CL+AT T-A.G+D.F [dB/m]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
2390.0	21.587	0.00	35.35	H	56.94	73.98	17.04	PK
2390.0	9.927	0.04	35.35	H	45.32	53.98	8.66	AV
2390.0	21.412	0.00	35.35	V	56.76	73.98	17.22	PK
2390.0	9.758	0.04	35.35	V	45.15	53.98	8.83	AV
2483.5	24.521	0.00	35.28	H	59.80	73.98	14.18	PK
2483.5	10.222	0.04	35.28	H	45.54	53.98	8.44	AV
2483.5	24.212	0.00	35.28	V	59.49	73.98	14.49	PK
2483.5	10.021	0.04	35.28	V	45.34	53.98	8.64	AV

2. 52 Tone

Operation Mode:	802.11ax(HE20)
Transfer MCS Index:	0
Operating Frequency	2412 MHz, 2462 MHz
Channel No.	01 Ch, 11 Ch

Frequency [MHz]	Measured Value [dBμV]	Duty Cycle Factor [dB]	A.F.+CL+AT T-A.G+D.F [dB/m]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
2390.0	23.252	0.00	35.35	H	58.60	73.98	15.38	PK
2390.0	10.752	0.04	35.35	H	46.14	53.98	7.84	AV
2390.0	23.025	0.00	35.35	V	58.38	73.98	15.61	PK
2390.0	10.555	0.04	35.35	V	45.95	53.98	8.04	AV
2483.5	30.811	0.00	35.28	H	66.09	73.98	7.89	PK
2483.5	9.272	0.04	35.28	H	44.59	53.98	9.39	AV
2483.5	30.512	0.00	35.28	V	65.79	73.98	8.19	PK
2483.5	9.025	0.04	35.28	V	44.35	53.98	9.64	AV

3. 106 Tone

Operation Mode: 802.11ax(HE20)
 Transfer MCS Index: 0
 Operating Frequency: 2412 MHz, 2462 MHz
 Channel No. 01 Ch, 11 Ch

Frequency [MHz]	Measured Value [dBμV]	Duty Cycle Factor [dB]	A.F.+CL+AT T-A.G+D.F [dB/m]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
2390.0	28.521	0.00	35.35	H	63.87	73.98	10.11	PK
2390.0	11.581	0.04	35.35	H	46.97	53.98	7.01	AV
2390.0	28.395	0.00	35.35	V	63.75	73.98	10.24	PK
2390.0	11.399	0.04	35.35	V	46.79	53.98	7.19	AV
2483.5	32.555	0.00	35.28	H	67.84	73.98	6.15	PK
2483.5	11.130	0.04	35.28	H	46.45	53.98	7.53	AV
2483.5	32.398	0.00	35.28	V	67.68	73.98	6.30	PK
2483.5	11.005	0.04	35.28	V	46.33	53.98	7.65	AV

4. 242 Tone

Operation Mode: 802.11ax(HE20)
 Transfer MCS Index: 0
 Operating Frequency: 2412 MHz, 2462 MHz
 Channel No.: 01 Ch, 11 Ch

Frequency [MHz]	Measured Value [dBμV]	Duty Cycle Factor [dB]	A.F.+CL+ATT- A.G+D.F [dB/m]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
# 2389.5	29.520	0.00	35.35	H	64.87	73.98	9.11	PK
# 2389.5	14.830	0.04	35.35	H	50.22	53.98	3.76	AV
2389.0	34.703	0.00	35.35	H	70.05	73.98	3.93	PK
2389.0	14.240	0.04	35.35	H	49.63	53.98	4.35	AV
# 2389.5	29.352	0.00	35.35	V	64.70	73.98	9.28	PK
# 2389.5	14.685	0.04	35.35	V	50.08	53.98	3.90	AV
2389.0	34.555	0.00	35.35	V	69.91	73.98	4.08	PK
2389.0	14.025	0.04	35.35	V	49.42	53.98	4.57	AV
2483.5	30.486	0.00	35.28	H	65.77	73.98	8.21	PK
# 2484	15.640	0.04	35.28	H	50.96	53.98	3.02	AV
2484.5	14.884	0.04	35.28	H	50.20	53.98	3.78	AV
2483.5	30.254	0.00	35.28	V	65.53	73.98	8.45	PK
# 2484	15.459	0.04	35.28	V	50.78	53.98	3.20	AV
2484.5	14.685	0.04	35.28	V	50.01	53.98	3.97	AV

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

Operation Mode: 802.11ax(HE20)
 Transfer MCS Index: 0
 Operating Frequency: 2417 MHz
 Channel No.: 2 Ch

Frequency [MHz]	Measured Value [dBμV]	Duty Cycle Factor [dB]	A.F.+CL+AT T-A.G+D.F [dB/m]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
2390.0	29.404	0.00	35.35	H	64.75	73.98	9.23	PK
2390.0	12.953	0.04	35.35	H	48.34	53.98	5.64	AV
2390.0	28.888	0.00	35.35	V	64.24	73.98	9.74	PK
2390.0	12.685	0.04	35.35	V	48.08	53.98	5.90	AV

Operation Mode:	802.11ax(HE20)
Transfer MCS Index:	0
Operating Frequency	2457 MHz
Channel No.	10 Ch

Frequency [MHz]	Measured Value [dBμV]	Duty Cycle Factor [dB]	A.F.+CL+AT T-A.G+D.F [dB/m]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
# 2484	26.950	0.00	35.28	H	62.23	73.98	11.75	PK
# 2484	15.850	0.04	35.28	H	51.17	53.98	2.81	AV
2484.5	33.938	0.00	35.28	H	69.22	73.98	4.76	PK
2484.5	15.735	0.04	35.28	H	51.06	53.98	2.93	AV
# 2484	26.658	0.00	35.28	V	61.94	73.98	12.04	PK
# 2484	15.512	0.04	35.28	V	50.83	53.98	3.15	AV
2484.5	33.722	0.00	35.28	V	69.00	73.98	4.98	PK
2484.5	15.512	0.04	35.28	V	50.83	53.98	3.15	AV

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

5. SU

Operation Mode:	802.11ax(HE20)
Transfer MCS Index:	0
Operating Frequency	2412 MHz, 2462 MHz
Channel No.	01 Ch, 11 Ch

Frequency [MHz]	Measured Value [dBμV]	Duty Cycle Factor [dB]	A.F.+CL+ATT- A.G+D.F [dB/m]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
2390.0	28.999	0.00	35.35	H	64.35	73.98	9.63	PK
2390.0	15.358	0.04	35.35	H	50.75	53.98	3.23	AV
2390.0	28.596	0.00	35.35	V	63.95	73.98	10.03	PK
2390.0	15.020	0.04	35.35	V	50.41	53.98	3.57	AV
2483.5	29.239	0.00	35.28	H	64.52	73.98	9.46	PK
# 2484	14.770	0.04	35.28	H	50.09	53.98	3.89	AV
2484.5	14.304	0.04	35.28	H	49.62	53.98	4.36	AV
2483.5	23.021	0.00	35.28	V	58.30	73.98	15.68	PK
# 2484	14.555	0.04	35.28	V	49.88	53.98	4.11	AV
2484.5	14.021	0.04	35.28	V	49.34	53.98	4.64	AV

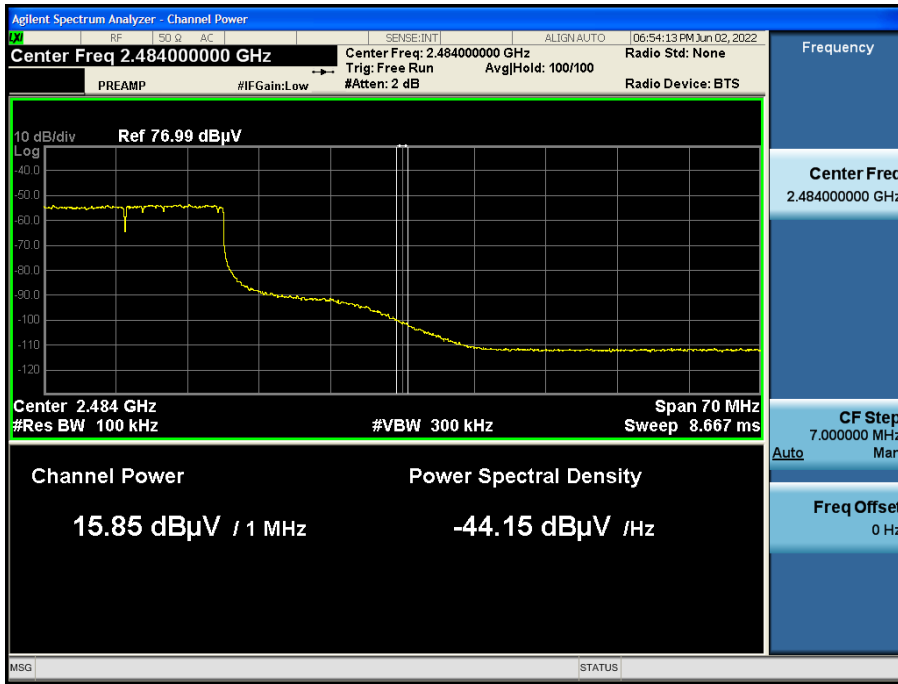
Note : # integration method Used (ANSI C63.10 Section11.13.3)

■ Test Plots (242T RU61) X-H

[MIMO]

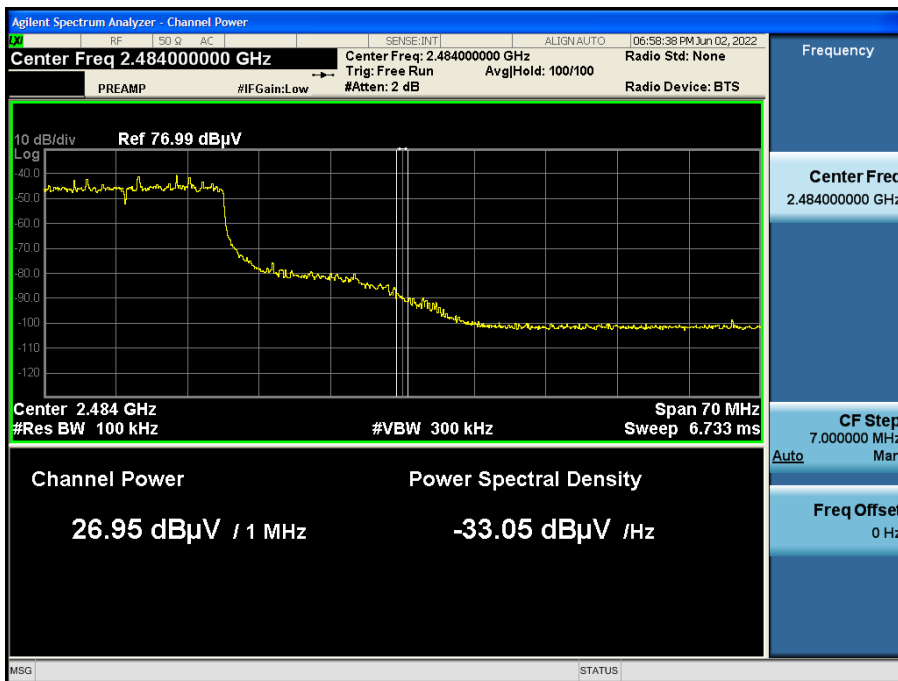
Radiated Restricted Band Edges plot – Average result (802.11ax(HE20), MCS0, Ch.10)

Integration method Used_2484 MHz

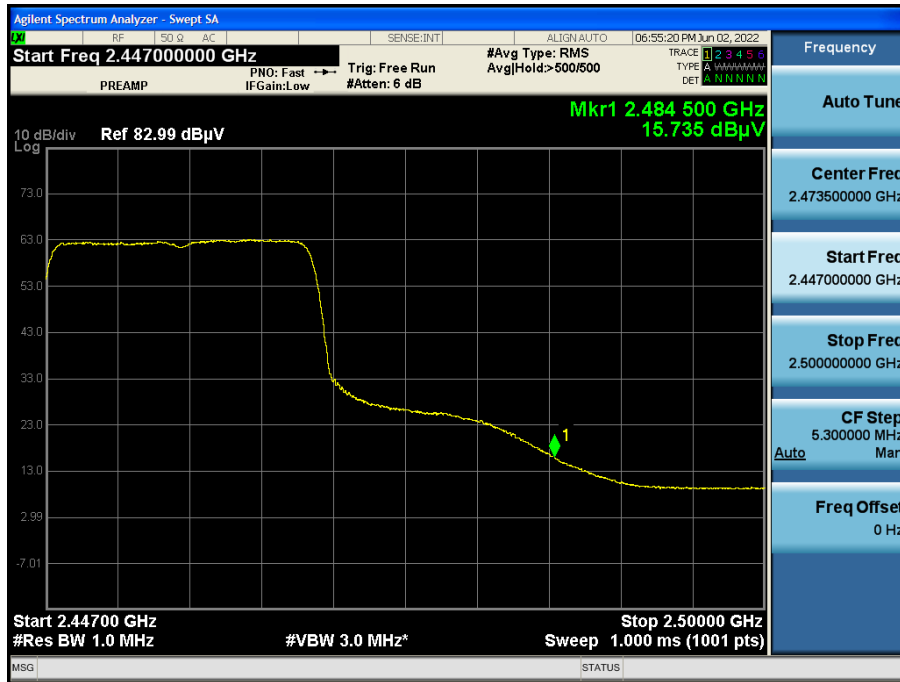


Radiated Restricted Band Edges plot – Peak result (802.11ax(HE20), MCS0, Ch.10)

Integration method Used_2484 MHz



Radiated Restricted Band Edges plot – Average result (802.11ax(HE20), MCS0, Ch.10)



Radiated Restricted Band Edges plot – Peak result (802.11ax(HE20), MCS0, Ch.10)



Note:

Plot of worst case are only reported.

10. LIST OF TEST EQUIPMENT

Conducted Test

Equipment	Model	Manufacturer	Serial No.	Due to Calibration	Calibration Interval
LISN	ENV216	Rohde & Schwarz	102245	08/23/2022	Annual
EMI Test Receiver	ESR	Rohde & Schwarz	101910	06/07/2023	Annual
Temperature Chamber	SU-642	ESPEC	0093008124	03/04/2023	Annual
Signal Analyzer	N9030A	Agilent	MY49432108	03/08/2023	Annual
Power Measurement Set	OSP 120	Rohde & Schwarz	101231	06/14/2023	Annual
Power Meter	N1911A	Agilent	MY45100523	03/24/2023	Annual
Power Sensor	N1921A	Agilent	MY57820067	03/24/2023	Annual
Directional Coupler	87300B	Agilent	3116A03621	11/02/2022	Annual
Power Splitter	11667B	Hewlett Packard	10545	02/03/2023	Annual
DC Power Supply	E3632A	HP	KR75303243	04/25/2023	Annual
Attenuator(10 dB)(DC-26.5 GHz)	8493C	HP	08285	06/28/2022	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

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
EM1000 / Controller	EM1000	Audix	060520	N/A	N/A
Turn Table	N/A	Audix	N/A	N/A	N/A
Amp &Filter Bank Switch Controller	FBSM-01B	TNM system	TM19050002	N/A	N/A
Loop Antenna	FMZB 1513	Rohde & Schwarz	1513-333	03/17/2024	Biennial
Hybrid Antenna	VULB 9168	Schwarzbeck	9168-0895	09/04/2022	Biennial
Horn Antenna	BBHA 9120D	Schwarzbeck	9120D-1300	01/18/2024	Biennial
Horn Antenna(15 GHz ~ 40 GHz)	BBHA9170	Schwarzbeck	BBHA9170124	04/12/2023	Biennial
Spectrum Analyzer	FSV(10 Hz ~ 40 GHz)	Rohde & Schwarz	101055	05/16/2023	Annual
Band Reject Filter	WRCJV2400/2483.5-2370/2520-60/12SS	Wainwright Instruments	2	01/06/2023	Annual
Band Reject Filter	WRCJV12-4900-5100-5900-6100-50SS	Wainwright Instruments	5	06/13/2023	Annual
Band Reject Filter	WRCJV12-4900-5100-5900-6100-50SS	Wainwright Instruments	6	06/13/2023	Annual
High Pass Filter(7 GHz ~ 18 GHz)	WHKX10-7150-8000-18000-50SS	Wainwright Instruments	1	03/11/2023	Annual
Power Amplifier	CBL18265035	CERNEX	22966	12/02/2022	Annual
Power Amplifier	CBL26405040	CERNEX	25956	03/11/2023	Annual
Bluetooth Tester	TC-3000C	TESCOM	3000C000175	04/05/2023	Annual
HPF(3~18GHz)+LNA1(1~18GHz)	FMSR-05B	TNM system	F6	01/19/2023	Annual
ATT(10dB) + LNA1(1~18GHz)	FMSR -05B	TNM system	None	01/19/2023	Annual
ATT(3dB) + LNA1(1~18GHz)	FMSR -05B	TNM system	None	01/19/2023	Annual
LNA1(1~18GHz)	FMSR -05B	TNM system	25540	01/19/2023	Annual
HPF(7~18GHz)+LNA2(6~18GHz)	FMSR -05B	TNM system	28550	01/19/2023	Annual
Thru(30MHz ~ 18GHz)	FMSR -05B	TNM system	None	01/19/2023	Annual

Note:

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

11. ANNEX A_ TEST SETUP PHOTO

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

No.	Description
1	HCT-RF-2206-FC010-P