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FCC DTS REPORT

Certification

pplicant Name:
SAMSUNG Electronics Co., Ltd.

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

Date of Issue:
May 13, 2022

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

Report No.: HCT-RF-2205-FC010

FCC ID:	**A3LSMG990U2**
APPLICANT:	**SAMSUNG Electronics Co., Ltd.**
Model:	SM-G990U2
Additional Model:	SM-G990U3/DS
EUT Type:	Mobile Phone
Average Output Power:	802.11ax(HE20) MIMO: 19.20 dBm
Frequency Range:	2 412 MHz ~ 2 462 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.

REVIEWED BY

Report prepared by : Jin Gwan 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)

Version

TEST REPORT NO.	DATE	DESCRIPTION
HCT-RF-2205-FC010	May 13, 2022	- First Approval Report

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1. EUT DESCRIPTION

Model	SM-G990U2	
Additional Model	SM-G990U3/DS	
EUT Type	Mobile Phone	
Power Supply	DC 3.88 V	
Frequency Range	2 412 MHz ~ 2 462 MHz	
Max. RF Output Power [MIMO]	Peak Power (For information only)	28.78 dBm
	Average Power	19.20 dBm
Modulation Type	OFDM, OFDMA	
Number of Channels	11 Channels	
Date(s) of Tests	April 06, 2022 ~ May 10, 2022	
Serial number	Radiated: R3CT30Q0R8W Conducted : 0e0b0f75a61f032c	

ANTENNA CONFIGURATIONS

1. The device employs MIMO technology. Below are the possible configurations

Configurations	SISO		SDM	CDD
	Ant1	Ant2	Ant1 + Ant2	Ant1 + Ant2
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

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

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

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

3. Directional Gain Calculation

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

Directional gain =

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

Ant Gain (dBi)		N_{ANT}/ N_{SS}	Directional Gain (dBi)
Ant.1	-4.60	2 / 2	CDD : -3.32 SDM : -4.60
Ant.2	-8.50		

Note

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

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

Sample MIMO Calculation:

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

Ant1 + Ant 2 = MIMO

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

2. TEST METHODOLOGY

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

EUT CONFIGURATION

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

EUT EXERCISE

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

GENERAL TEST PROCEDURES

Conducted Emissions

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

Radiated Emissions

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

DESCRIPTION OF TEST MODES

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

3. INSTRUMENT CALIBRATION

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

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

4. FACILITIES AND ACCREDITATIONS

FACILITIES

The SAC(Semi-Anechoic Chamber) and conducted measurement facility used to collect the radiated data are located at the 74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, 17383, Rep. of KOREA. The site is constructed in conformance with the requirements of ANSI C63.4. (Version :2014) and CISPR Publication 22.

Detailed description of test facility was submitted to the Commission and accepted dated April 02, 2018 (Registration Number: KR0032).

EQUIPMENT

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

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

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

5. ANTENNA REQUIREMENTS

According to FCC 47 CFR §15.203:

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

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

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

6. MEASUREMENT UNCERTAINTY

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

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

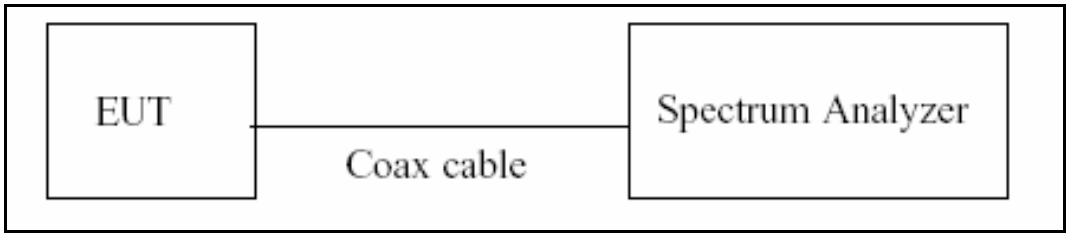
The measurement data shown herein meets or exceeds the U_{CISPR} measurement uncertainty values specified in CISPR 16-4-2 and, thus, can be compared directly to specified limits to determine compliance.

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

7. DESCRIPTION OF TESTS

7.1. Duty Cycle

Test Configuration



Test Procedure

The transmitter output is connected to the Spectrum Analyzer.

We tested according to the zero-span measurement method.

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

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

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

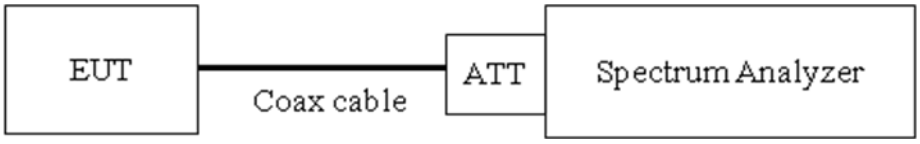
1. RBW = 8 MHz (the largest available value)
2. VBW = 8 MHz (≥ RBW)
3. SPAN = 0 Hz
4. Detector = Peak
5. Number of points in sweep > 100
6. Trace mode = Clear write
7. Measure T_{total} and T_{on}
8. Calculate Duty Cycle = T_{on} / T_{total} and Duty Cycle Factor = 10log(1/Duty Cycle)

7.2. 6 dB Bandwidth

Limit

The minimum permissible 6 dB bandwidth is 500 kHz.

Test Configuration



Test Procedure

The transmitter output is connected to the Spectrum Analyzer.

The Spectrum Analyzer is set to (Procedure 11.8.1 in ANSI 63.10-2013)

1) RBW = 100 kHz
2) VBW ≥ 3 x RBW
3) Detector = Peak
4) Trace mode = max hold
5) Sweep = auto couple
6) Allow the trace to stabilize
7) We tested 6 dB bandwidth using the automatic bandwidth measurement capability of a spectrum analyzer. X dB is set 6 dB.

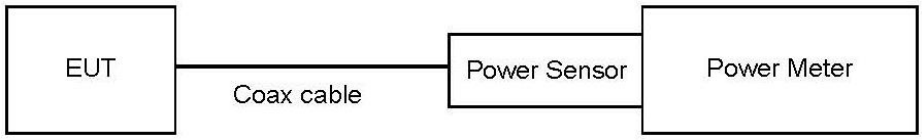
Note : We tested OBW using the automatic bandwidth measurement capability of a spectrum analyzer.

7.3. Output Power

Limit

The maximum permissible conducted output power is 1 Watt.

Test Configuration



Test Procedure

The transmitter output is connected to the Power Meter.

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

: Measure the peak power of the transmitter.

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

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

Sample Calculation

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

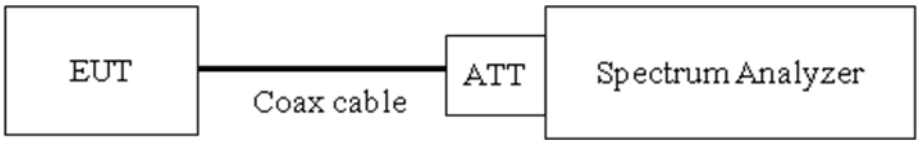
▪ Conducted Output Power(Average) = Measured Value + ATT loss + Cable loss + Duty Cycle Factor

7.4. Power Spectral Density

Limit

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

Test Configuration



Test Procedure

The transmitter output is connected to the Spectrum Analyzer.

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

The spectrum analyzer is set to :

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

Sample Calculation

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

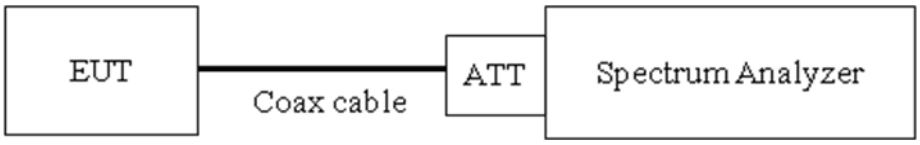
7.5. Conducted Band Edge(Out of Band Emissions) & Conducted Spurious Emissions

Limit

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

[Conducted > 30 dBc]

Test Configuration



Test Procedure

The transmitter output is connected to the spectrum analyzer.

(Procedure 11.11 in ANSI 63.10-2013)

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

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

Factors for frequency

Freq(MHz)	Ant.1 Factor(dB)
30	10.37
100	10.43
200	10.44
300	10.46
400	10.50
500	10.69
600	10.70
700	10.72
800	10.75
900	10.76
1000	10.77
2000	10.86
2400	**10.92**
2480	**10.92**
2500	10.93
3000	11.15
4000	11.21
5000	11.35
5150	11.69
5850	11.69
6000	11.70
7000	11.82
8000	11.81
9000	11.90
10000	12.00
11000	12.09
12000	12.18
13000	12.19
14000	12.23
15000	12.32
16000	12.41
17000	12.60
18000	12.74
19000	12.66
20000	12.33
21000	12.46
22000	12.45
23000	12.42

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

2. Spectrum offset Loss = Attenuator loss(10 dB) + Cable loss + EUT cable Loss

Freq(MHz)	Ant.2 Factor(dB)
30	10.10
100	10.15
200	10.20
300	10.22
400	10.25
500	10.26
600	10.26
700	10.28
800	10.30
900	10.32
1000	10.34
2000	10.49
2400	**10.55**
2480	**10.55**
2500	10.55
3000	10.60
4000	10.70
5000	10.79
5150	10.81
5850	10.87
6000	10.87
7000	10.97
8000	11.03
9000	11.10
10000	11.15
11000	11.18
12000	11.23
13000	11.29
14000	11.30
15000	11.33
16000	11.39
17000	11.40
18000	11.45
19000	11.47
20000	11.51
21000	11.64
22000	11.63
23000	11.60

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

2. Spectrum offset Loss = Attenuator loss(10 dB) + Cable loss

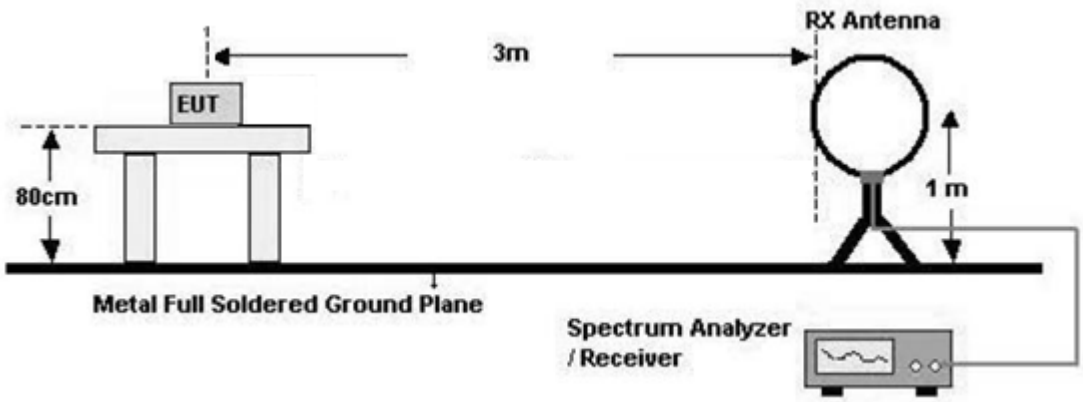
7.6. Radiated Test

Limit

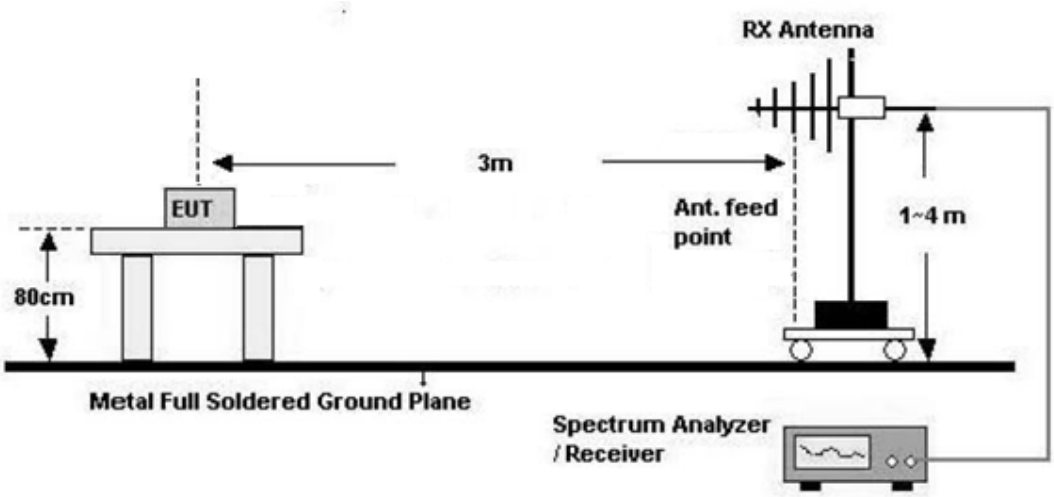
Frequency (MHz)	Field Strength (μV/m)	Measurement Distance (m)
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Test Configuration

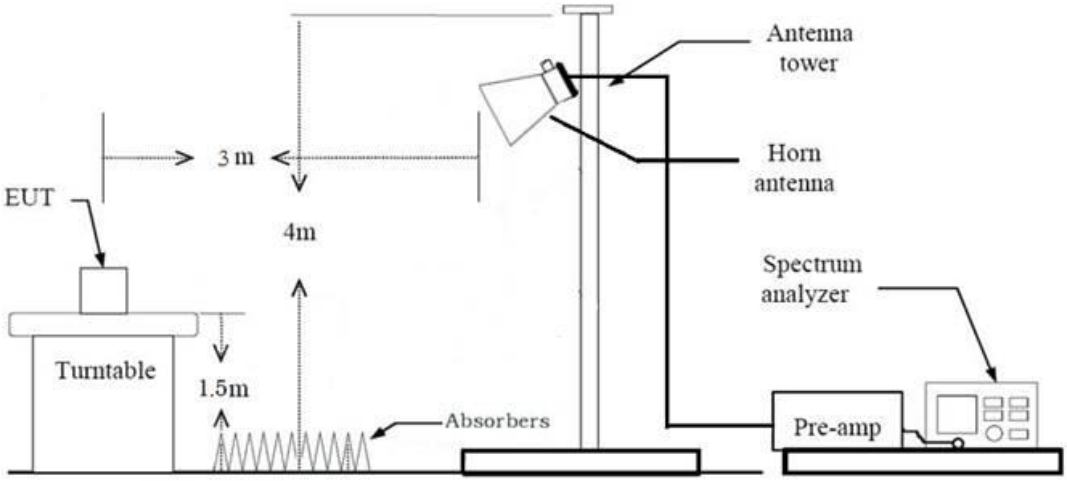
Below 30 MHz



30 MHz - 1 GHz



Above 1 GHz



Test Procedure of Radiated spurious emissions(Below 30 MHz)

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

KDB 414788 OFS and Chamber Correlation Justification

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

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

Test Procedure of Radiated spurious emissions(Below 1 GHz)

1. The EUT was placed on a non-conductive table located on semi-anechoic chamber.
2. The EUT is placed on a turntable, which is 0.8 m above ground plane.
3. The Hybrid antenna was placed at a location 3 m from the EUT, which is varied from 1 m to 4 m to find out the highest emissions.
4. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
5. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
6. Spectrum Setting
   (1) Measurement Type(Peak):
      - Measured Frequency Range : 30 MHz – 1 GHz
      - Detector = Peak
      - Trace = Maxhold
      - RBW = 100 kHz
      - VBW ≥ 3 x RBW
   (2) Measurement Type(Quasi-peak):
      - Measured Frequency Range : 30 MHz – 1 GHz
      - Detector = Quasi-Peak
      - RBW = 120 kHz

      In general, (1) is used mainly
7. Total = Measured Value + Antenna Factor(A.F) + Cable Loss(C.L)
8. Measurement value only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.

Test Procedure of Radiated spurious emissions (Above 1 GHz)

1. The EUT is placed on a turntable, which is 1.5 m above ground plane.
2. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
3. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
4. EUT is set 3 m away from the receiving antenna, which is varied from 1 m to 4 m to find out the highest emissions.
5. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
6. Each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
7. The unit was tested with its standard battery.
8. Spectrum Setting (Method 8.6 in KDB 558074 v05r02, Procedure 11.12 in ANSI 63.10-2013)
   (1) Measurement Type(Peak):
      - Measured Frequency Range : 1 GHz – 25 GHz
      - Detector = Peak

- Trace = Maxhold
- RBW = 1 MHz
- VBW ≥ 3 x RBW

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

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

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

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

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

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

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

Test Procedure of Radiated Restricted Band Edge

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

(1) Measurement Type(Peak):

- Measured Frequency Range : 2310 MHz ~ 2390 MHz/ 2483.5 MHz ~ 2500 MHz
- Detector = Peak
- Trace = Maxhold
- RBW = 1 MHz
- VBW ≥ 3 x RBW

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

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

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

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

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

7.7. AC Power line Conducted Emissions

Limit

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

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

[(a)]Decreases with the logarithm of the frequency.

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

Test Configuration

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

Test Procedure

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

Sample Calculation

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

7.8. 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 and antennas of operation were investigated and the worst case results are reported.
   - Antenna Configuration : Ant1+Ant2(CDD)
   - HE20 : 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-G990U2, SM-G990U3/DS were tested and the worst case results are reported. (Worst case : SM-G990U2)

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
   - Radiated Restricted Band Edge : Z
3. All data rate and antennas of operation were investigated and the worst case results are reported.
   - Antenna Configuration : Ant1+Ant2(CDD)
   - HE20 : MCS0
4. All position of loop antenna were investigated and the test result is a no critical peak found at all positions.
   - Position : Horizontal, Vertical, Parallel to the ground plane

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

Test	Tone	RU Offset
RSE	WORST CASE : 242 T	61
	ADDITIONAL TONE : 26T, 52T,	26T : CH1(RU 0,4,8), CH6(RU 0,4,8), CH11(RU 0,4,8) 52T : CH1(RU37), CH6(RU37), CH11(RU40)
Bandedge	WORST CASE : 242T	61
	ADDITIONAL TONE : 26T, 52T, 106T, SU	Low Edge : 0, 37, 53 High Edge : 8, 40, 54

7. SM-G990U2, SM-G990U3/DS were tested and the worst case results are reported. (Worst case : SM-G990U2)

Radiated test(DBS)

1. Please refer to the SM-G990U2[DTS] Test Report.
2. SM-G990U2, SM-G990U3/DS were tested and the worst case results are reported. (Worst case : SM-G990U2)

AC Power line Conducted Emissions

1. Please refer to the SM-G990U2[DTS] Test Report.
2. SM-G990U2, SM-G990U3/DS were tested and the worst case results are reported. (Worst case : SM-G990U2)

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-G990U2[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	5.087	5.110	0.996	0.02
	52	MCS0	5.077	5.100	0.996	0.02
	106	MCS0	2.769	2.789	0.993	0.03
	242	MCS0	1.249	1.269	0.984	0.07
802.11ax (SU_HE20)	-	MCS0	1.246	1.269	0.982	0.08

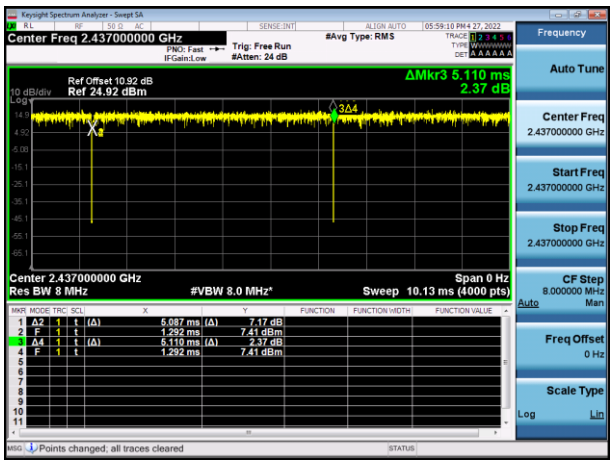
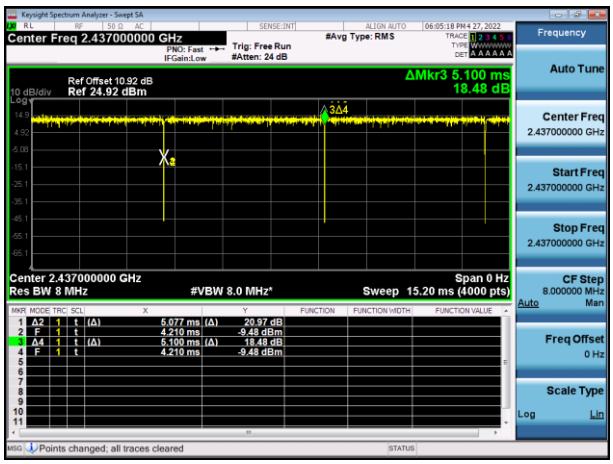
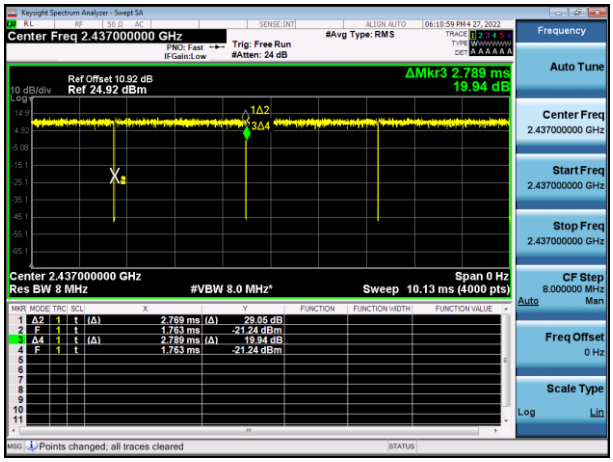
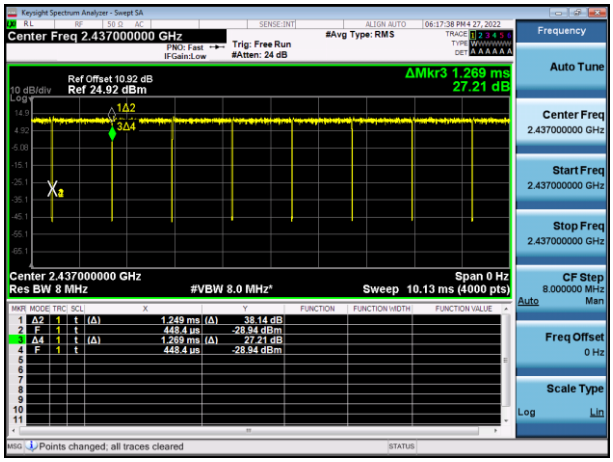
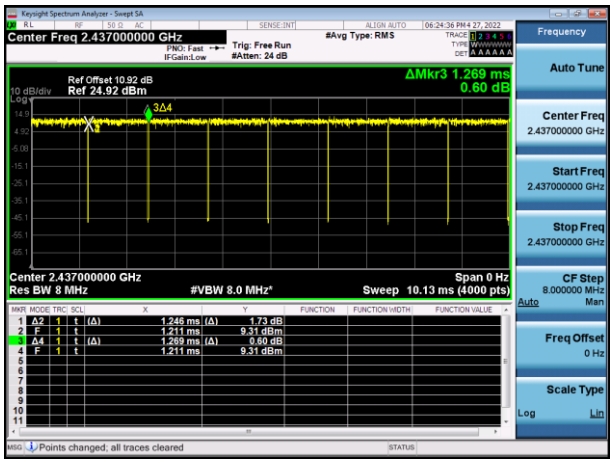
Note :

1. 802.11 ax All Mode transmits continuously(Duty Cycle ≥ 98%)

▣ Test Plots

Note:

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

26 Tone MCS0	52 Tone MCS0
	
106 Tone MCS0	**242 Tone MCS0**
	
SU MCS0	
	

9.2 6 dB BANDWIDTH

[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	2.138	17.11	17.69	-	-
			Mid	2.705	15.05	-	18.48	13.05
			High	**2.128**	15.79	17.14	-	-
	2437	6	Low	**2.129**	17.13	17.17	-	-
			Mid	2.710	15.11	-	19.08	18.10
			High	2.143	17.07	17.15	-	-
	2462	11	Low	**2.135**	17.09	17.19	-	-
			Mid	2.709	15.11	-	19.08	17.03
			High	2.141	17.10	17.34	-	-

Limit : > 500 kHz

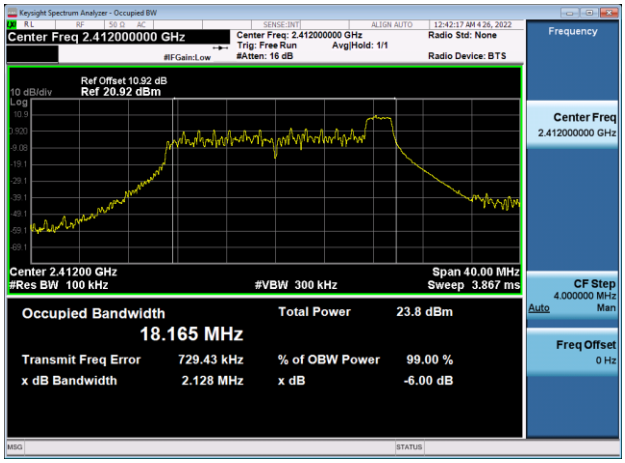
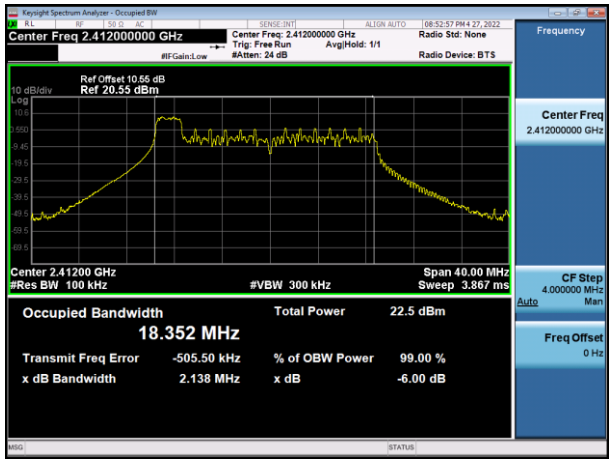
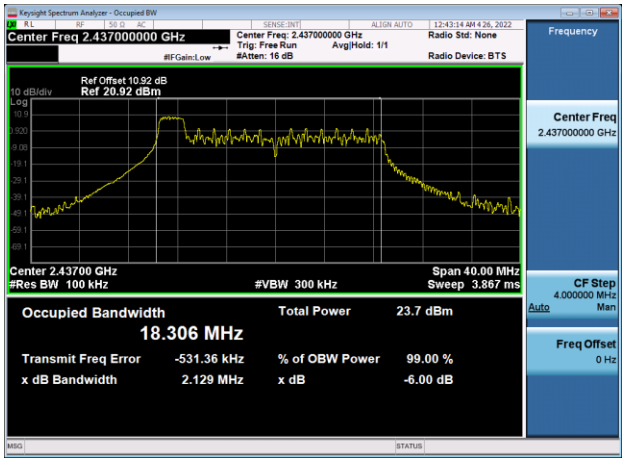
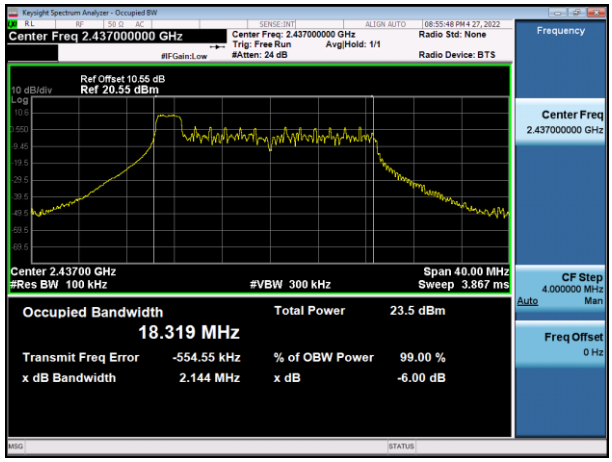
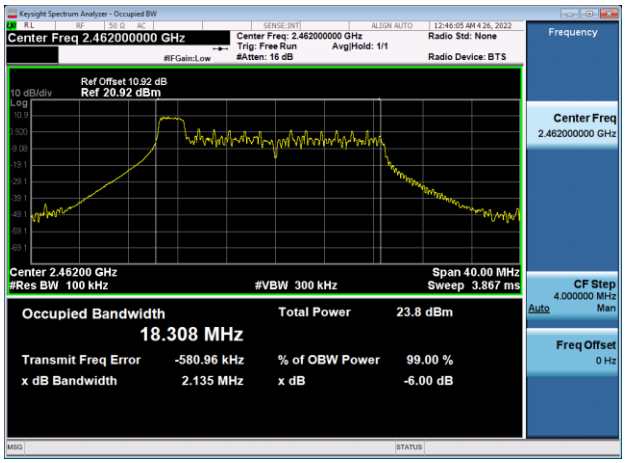
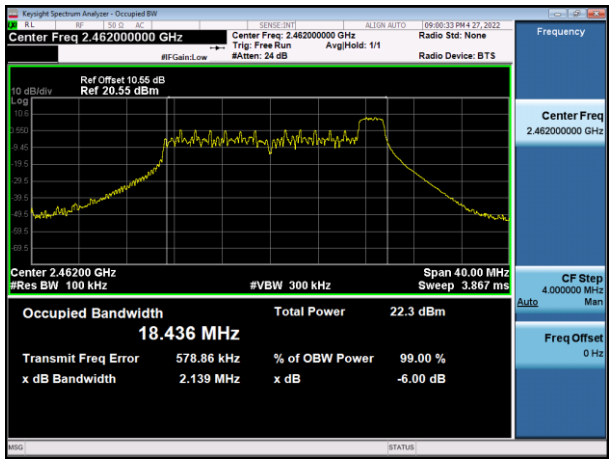
[ANT2]

BW	Frequency [MHz]	Channel No.	RU Index	6 dB BW (MHz)				
				26 T	52 T	106 T	242 T	SU
HE20	2412	1	Low	**2.138**	17.13	17.74	-	-
			Mid	2.707	15.13	-	19.07	16.99
			High	2.147	17.06	17.15	-	-
	2437	6	Low	**2.144**	17.09	17.18	-	-
			Mid	2.706	15.10	-	19.07	17.64
			High	2.148	17.08	17.33	-	-
	2462	11	Low	2.148	17.12	17.74	-	-
			Mid	2.707	15.13	-	19.08	17.06
			High	**2.139**	17.06	17.17	-	-

Limit : > 500 kHz

▣ Test Plots

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

ANT1	ANT2
BW20M Ch.1(2412 MHz) RU 8	**BW20M Ch.1(2412 MHz) RU 0**
	
BW20M Ch.6(2437 MHz) RU 0	**BW20M Ch.6(2437 MHz) RU 0**
	
BW20M Ch.11(2462 MHz) RU 0	**BW20M Ch.11(2462 MHz) RU 8**
	

9.3 OUTPUT POWER

Peak Power

Power Meter offset

Ant.1 Loss : Attenuator loss(10 dB) + Cable loss + EUT cable Loss

Ant.2 Loss : Attenuator loss(10 dB) + Cable loss

[ANT1]

Note:

1. Reporting for MIMO calculation

BW	Frequency [MHz]	Channel No.	RU Index	Total Peak Power (dBm)				
				26 T	52 T	106 T	242 T	SU
HE20	2412	1	Low	23.89	24.58	26.06	-	-
			Mid	24.70	25.14	-	24.81	24.81
			High	25.24	25.38	26.32	-	-
	2437	6	Low	24.91	25.47	26.54	-	-
			Mid	24.80	25.40	-	25.12	25.18
			High	24.97	25.21	26.36	-	-
	2462	11	Low	25.00	25.57	26.35	-	-
			Mid	24.38	25.13	-	24.32	24.79
			High	24.90	25.07	26.01	-	-

Limit : 30 dBm

[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	23.72	24.15	25.34	-	-
			Mid	23.59	24.08	-	24.05	23.98
			High	24.43	24.53	25.49	-	-
	2437	6	Low	24.88	25.49	26.38	-	-
			Mid	24.40	25.15	-	24.67	24.79
			High	24.92	25.12	25.98	-	-
	2462	11	Low	23.45	23.88	25.00	-	-
			Mid	23.25	23.65	-	23.06	23.47
			High	23.83	24.07	24.90	-	-

Limit : 30 dB

[MIMO]

1. Total power for MIMO=10·log((10^(Ant1 Total power /10))+(10^(Ant2 Total power /10)))

BW	Frequency [MHz]	Channel No.	RU Index	MIMO Peak Power (dBm)				
				26 T	52 T	106 T	242 T	SU
HE20	2412	1	Low	26.81	27.38	28.72	-	-
			Mid	27.19	27.65	-	27.46	27.43
			High	27.86	27.99	28.45	-	-
	2437	6	Low	27.91	28.49	28.78	-	-
			Mid	27.62	28.29	-	27.91	28.00
			High	27.96	28.17	28.78	-	-
	2462	11	Low	27.30	27.82	28.55	-	-
			Mid	26.86	27.46	-	26.74	27.19
			High	27.41	27.61	28.50	-	-

Limit : 30 dBm

Average Power

Power Meter offset

Ant.1 Loss : Attenuator loss(10 dB) + Cable loss + EUT cable Loss

Ant.2 Loss : Attenuator loss(10 dB) + Cable loss

[ANT1]

Note:

1. Reporting for MIMO calculation

BW	Frequency [MHz]	Channel No.	RU Index	Total Average Power (dBm)				
				26 T	52 T	106 T	242 T	SU
HE20	2412	1	Low	12.00	12.88	15.40	-	-
			Mid	13.99	14.13	-	16.11	16.02
			High	14.41	14.85	16.41	-	-
	2437	6	Low	13.85	14.51	16.06	-	-
			Mid	14.01	14.51	-	16.19	16.37
			High	14.22	14.68	16.41	-	-
	2462	11	Low	14.27	14.65	16.07	-	-
			Mid	13.41	14.14	-	15.41	15.60
			High	13.69	14.21	15.72	-	-

Limit : 30 dBm

[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	12.67	13.10	14.71	-	-
			Mid	13.00	13.15	-	14.99	15.03
			High	13.50	13.78	15.18	-	-
	2437	6	Low	14.27	14.72	16.00	-	-
			Mid	13.62	14.45	-	15.86	16.01
			High	13.85	14.33	15.74	-	-
	2462	11	Low	12.64	13.01	14.46	-	-
			Mid	12.39	12.93	-	14.08	14.84
			High	12.96	13.29	14.65	-	-

Limit : 30 dBm

[MIMO]

BW	Frequency [MHz]	Channel No.	RU Index	MIMO Average Power (dBm)				
				26 T	52 T	106 T	242 T	SU
HE20	2412	1	Low	15.36	16.00	18.08	-	-
			Mid	16.53	16.68	-	18.60	18.56
			High	16.99	17.36	18.85	-	-
	2437	6	Low	17.08	17.63	19.04	-	-
			Mid	16.83	17.49	-	19.04	19.20
			High	17.05	17.52	19.10	-	-
	2462	11	Low	16.54	16.92	18.35	-	-
			Mid	15.94	16.59	-	17.81	18.25
			High	16.35	16.78	18.23	-	-

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
   Ant.1 Loss : Attenuator loss(10 dB) + Cable loss + EUT cable Loss
   Ant.2 Loss : Attenuator loss(10 dB) + Cable loss
3. Total PSD = Measured Value + Duty Cycle Factor
   Total MIMO PSD =10·log((10^(Ant1 Total PSD(dBm) /10))+(10^(Ant2 Total PSD(dBm) /10)))
4. Duty Cycle factor was applied as 0.000 (See Section Note.1 of 9.1)

[ANT1]

Note:

1. Reporting for MIMO calculation

BW	Frequency [MHz]	Channel No.	RU Index	Total PSD (dBm)				
				26 T	52 T	106 T	242 T	SU
HE20	2412	1	Low	-4.575	-6.222	-6.987	-	-
			Mid	-3.030	-5.530	-	-9.338	-7.504
			High	-2.696	-4.965	-6.335	-	-
	2437	6	Low	-2.753	-5.215	-6.518	-	-
			Mid	-2.984	-5.100	-	-9.671	-7.575
			High	-3.207	-5.396	-6.854	-	-
	2462	11	Low	-2.422	-5.035	-6.407	-	-
			Mid	-3.342	-5.375	-	-10.514	-8.596
			High	-3.049	-5.563	-7.113	-	-

Limit : 8 dBm/3 kHz

[ANT2]

BW	Frequency [MHz]	Channel No.	RU Index	Total PSD (dBm)				
				26 T	52 T	106 T	242 T	SU
HE20	2412	1	Low	-3.994	-6.492	-8.037	-	-
			Mid	-3.913	-6.607	-	-10.110	-8.508
			High	-3.410	-5.908	-7.167	-	-
	2437	6	Low	-2.672	-5.140	-6.913	-	-
			Mid	-3.468	-5.515	-	-9.615	-8.498
			High	-3.194	-5.362	-6.928	-	-
	2462	11	Low	-4.154	-6.742	-8.245	-	-
			Mid	-4.516	-6.689	-	-10.991	-9.784
			High	-4.019	-6.452	-8.172	-	-

Limit : 8 dBm/3 kHz

[MIMO]

BW	Frequency [MHz]	Channel No.	RU Index	Total MIMO PSD (dBm)				
				26 T	52 T	106 T	242 T	SU
HE20	2412	1	Low	-1.264	-3.345	-4.470	-	-
			Mid	-0.439	-3.025	-	-6.697	-4.967
			High	**-0.028**	-2.401	-3.721	-	-
	2437	6	Low	**0.298**	-2.167	-3.701	-	-
			Mid	-0.209	-2.292	-	-6.633	-5.002
			High	-0.190	-2.369	-3.881	-	-
	2462	11	Low	**-0.192**	-2.795	-4.219	-	-
			Mid	-0.879	-2.972	-	-7.736	-6.139
			High	-0.497	-2.974	-4.600	-	-

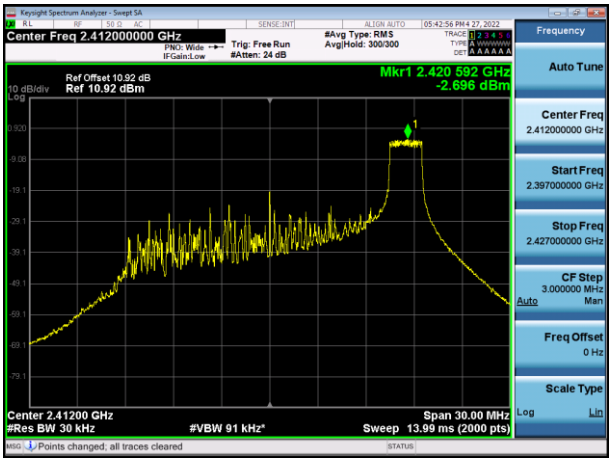
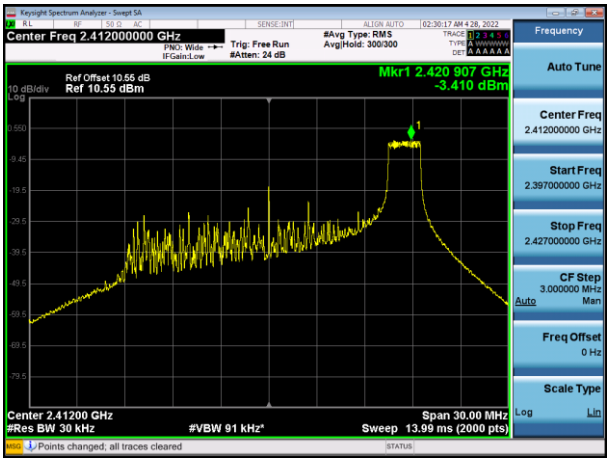
Limit : 8 dBm/ 3 kHz

▣ Test Plots

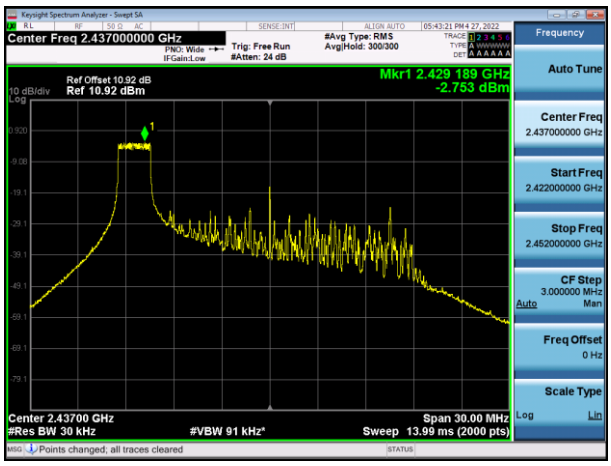
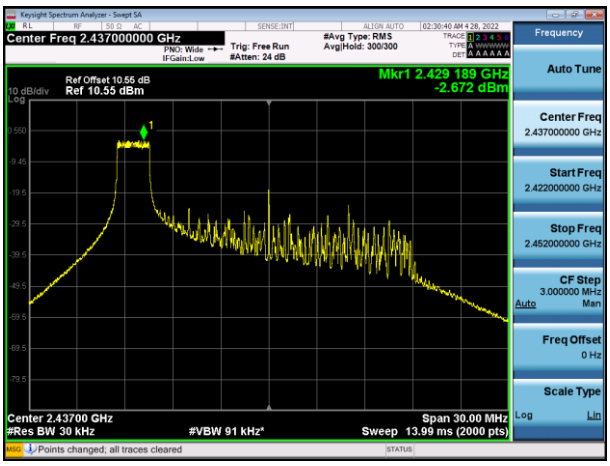
Note:

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

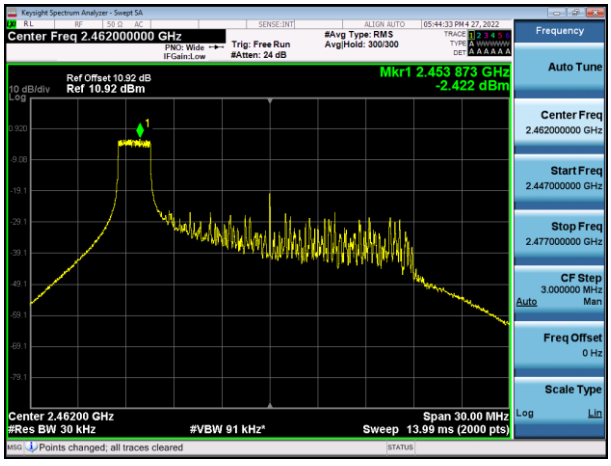
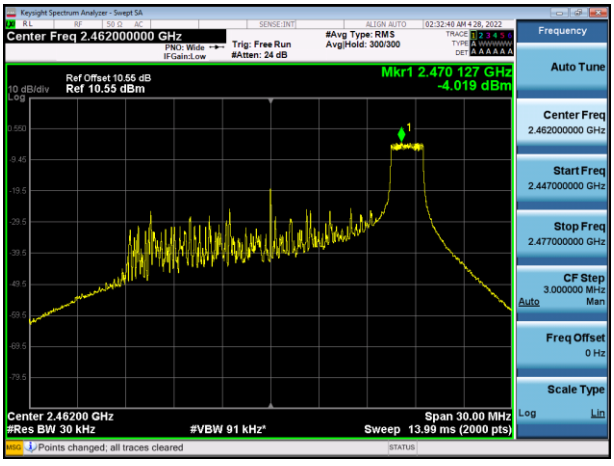
[MIMO]

BW20M Ch.1(2412 MHz) RU 8	
Ant1	**Ant2**
	

MIMO PSD (dBm)	Duty Cycle Factor (dB)	Total MIMO PSD (dBm)
-0.028	0.000	-0.028

BW20M Ch.6(2437 MHz) RU 0	
Ant1	**Ant2**
	

MIMO PSD (dBm)	Duty Cycle Factor (dB)	Total MIMO PSD (dBm)
0.298	0.000	0.298

BW20M Ch.11(2462 MHz) RU 0	
Ant1	**Ant2**
	

MIMO PSD (dBm)	Duty Cycle Factor (dB)	Total MIMO PSD (dBm)
-0.192	0.000	-0.192

9.5 BAND EDGE/ CONDUCTED SPURIOUS EMISSIONS

Band Edge

[Ant1]

BW	Frequency [MHz]	Channel No.	RU Index	Measured Position	Result (dB)		
					26 T	52 T	106 T
HE20	2412	1	Low	Lowest Bandedge	**35.669**	36.010	37.082
	2462	11	Low	Lowest Bandedge	52.018	50.927	47.365

BW	Frequency [MHz]	Channel No.	RU Index	Measured Position	Result (dB)	
					242 T	SU
HE20	2412	1	Mid	Lowest Bandedge	38.581	42.386
	2462	11		Lowest Bandedge	**39.549**	49.182

Limit : 30 dBc

[Ant2]

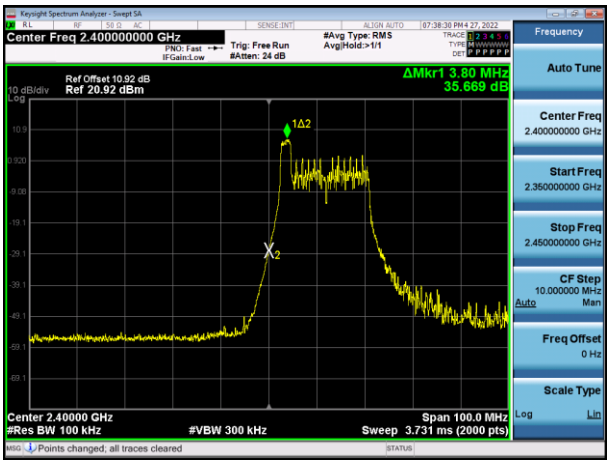
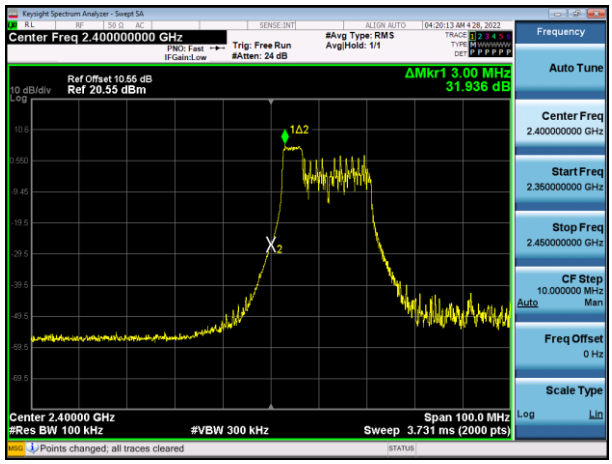
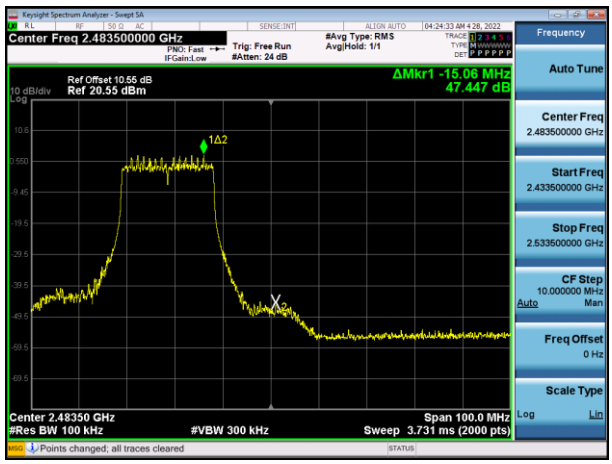
BW	Frequency [MHz]	Channel No.	RU Index	Measured Position	Result (dB)		
					26 T	52 T	106 T
HE20	2412	1	Low	Lowest Bandedge	33.093	**31.936**	32.653
	2462	11	Low	Lowest Bandedge	56.943	51.355	50.894

BW	Frequency [MHz]	Channel No.	RU Index	Measured Position	Result (dB)	
					242 T	SU
HE20	2412	1	Mid	Lowest Bandedge	33.283	38.202
	2462	11		Lowest Bandedge	**47.447**	50.219

Limit : 30 dBc

▣ Test Plots

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

Ant1	Ant2
BW20M Ch.1(2412 MHz) 26T RU 0	**BW20M Ch.1(2412 MHz) 52T RU 37**
	
BW20M Ch.11(2462 MHz) 242T RU 61	**BW20M Ch.11(2462 MHz) 242T RU 61**
	

Conducted Spurious Emissions

[ANT1]

BW	Frequency [MHz]	Channel No.	RU Index	Result (dB)				
				26 T	52 T	106 T	242 T	SU
HE20	2412	1	Low	46.254	44.686	44.440	-	-
			Mid	46.672	46.423	-	**40.516**	44.880
			High	48.514	44.579	45.259	-	-
	2437	6	Low	46.580	45.661	44.810	-	-
			Mid	46.601	46.800	-	43.219	43.210
			High	47.489	46.241	45.178	-	-
	2462	11	Low	47.507	45.294	44.116	-	-
			Mid	45.598	44.889	-	41.597	45.036
			High	46.872	45.233	44.984	-	-

Limit : 30 dBc

[ANT2]

BW	Frequency [MHz]	Channel No.	RU Index	Result (dB)				
				26 T	52 T	106 T	242 T	SU
HE20	2412	1	Low	46.238	44.882	43.619	-	-
			Mid	44.808	43.612	-	39.159	42.600
			High	47.477	45.725	41.870	-	-
	2437	6	Low	47.726	44.632	44.934	-	-
			Mid	46.091	45.094	-	42.175	43.921
			High	47.590	44.544	44.142	-	-
	2462	11	Low	47.407	42.878	42.692	-	-
			Mid	44.349	44.486	-	40.676	**38.774**
			High	47.063	44.001	43.460	-	-

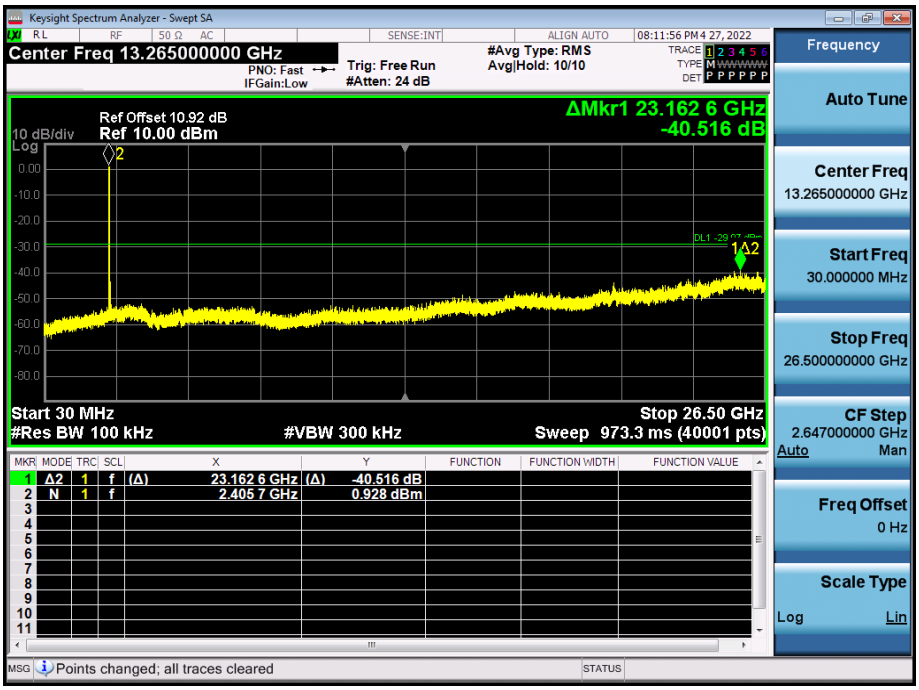
Limit : 30 dBc

▣ Test Plots

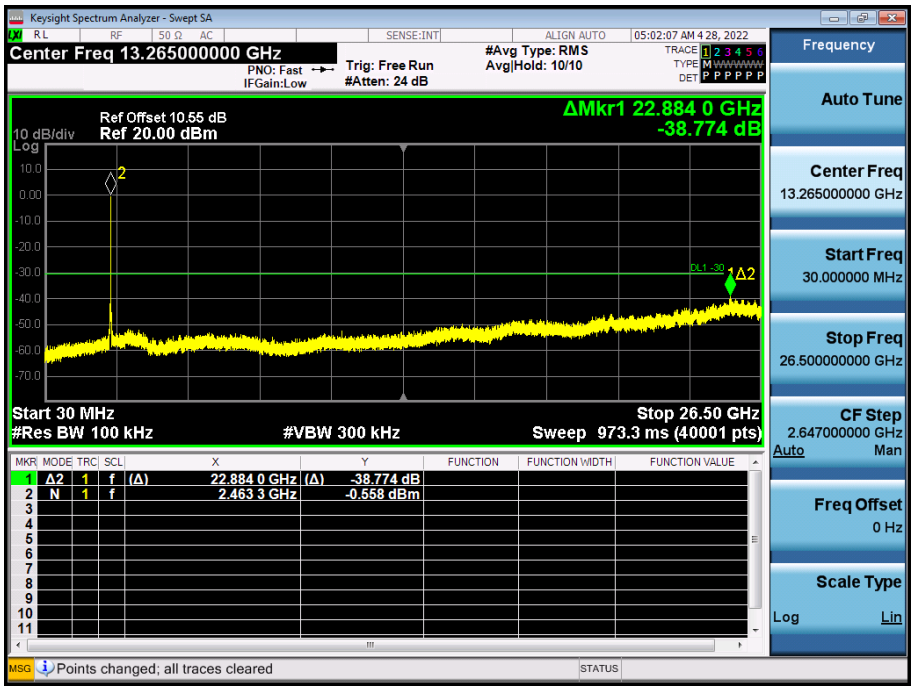
Note:

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

[ANT1] BW20M Ch.1(2 412 MHz) 242T RU 61



[ANT2] BW20M Ch.11(2 462 MHz) SU



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 = 40log (specific distance / test distance) (dB)
3. Limit line = specific Limits (dBμV) + Distance extrapolation factor

Frequency Range : Below 1 GHz

Frequency	Measured Value	A.F+C.L	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]

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	47.63	0.00	3.48	V	51.11	73.98	22.87	PK
4824	36.01	0.00	3.48	V	39.49	53.98	14.49	AV
7236	48.93	0.00	8.67	V	57.60	73.98	16.38	PK
7236	36.14	0.00	8.67	V	44.81	53.98	9.17	AV
4824	47.88	0.00	3.48	H	51.36	73.98	22.62	PK
4824	36.11	0.00	3.48	H	39.59	53.98	14.39	AV
7236	49.63	0.00	8.67	H	58.30	73.98	15.68	PK
7236	36.43	0.00	8.67	H	45.10	53.98	8.88	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	45.85	0.00	3.19	V	49.04	73.98	24.94	PK
4874	34.24	0.00	3.19	V	37.43	53.98	16.55	AV
7311	48.67	0.00	9.41	V	58.08	73.98	15.90	PK
7311	34.27	0.00	9.41	V	43.68	53.98	10.30	AV
4874	46.08	0.00	3.19	H	49.27	73.98	24.71	PK
4874	34.74	0.00	3.19	H	37.93	53.98	16.05	AV
7311	48.95	0.00	9.41	H	58.36	73.98	15.62	PK
7311	34.61	0.00	9.41	H	44.02	53.98	9.96	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	42.21	0.00	2.54	V	44.75	73.98	29.23	PK
4924	30.59	0.00	2.54	V	33.13	53.98	20.85	AV
7386	45.12	0.00	10.04	V	55.16	73.98	18.82	PK
7386	30.54	0.00	10.04	V	40.58	53.98	13.40	AV
4924	41.94	0.00	2.54	H	44.48	73.98	29.50	PK
4924	30.14	0.00	2.54	H	32.68	53.98	21.30	AV
7386	45.40	0.00	10.04	H	55.44	73.98	18.54	PK
7386	30.76	0.00	10.04	H	40.80	53.98	13.18	AV

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]	AF+CL+DF -AG [dB/m]	ANT. POL [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
4824	44.18	0.00	3.48	V	47.66	73.98	26.32	PK
4824	32.65	0.00	3.48	V	36.13	53.98	17.85	AV
7236	44.54	0.00	8.67	V	53.21	73.98	20.77	PK
7236	30.92	0.00	8.67	V	39.59	53.98	14.39	AV
4824	44.75	0.00	3.48	H	48.23	73.98	25.75	PK
4824	32.84	0.00	3.48	H	36.32	53.98	17.66	AV
7236	45.06	0.00	8.67	H	53.73	73.98	20.25	PK
7236	31.54	0.00	8.67	H	40.21	53.98	13.77	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]	AF+CL+DF -AG [dB/m]	ANT. POL [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
4874	44.37	0.00	3.19	V	47.56	73.98	26.42	PK
4874	32.56	0.00	3.19	V	35.75	53.98	18.23	AV
7311	43.54	0.00	9.41	V	52.95	73.98	21.03	PK
7311	30.19	0.00	9.41	V	39.60	53.98	14.38	AV
4874	44.73	0.00	3.19	H	47.92	73.98	26.06	PK
4874	32.96	0.00	3.19	H	36.15	53.98	17.83	AV
7311	43.70	0.00	9.41	H	53.11	73.98	20.87	PK
7311	30.41	0.00	9.41	H	39.82	53.98	14.16	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]	AF+CL+DF -AG [dB/m]	ANT. POL [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
4924	44.65	0.00	2.54	V	47.19	73.98	26.79	PK
4924	33.35	0.00	2.54	V	35.89	53.98	18.09	AV
7386	44.28	0.00	10.04	V	54.32	73.98	19.66	PK
7386	31.21	0.00	10.04	V	41.25	53.98	12.73	AV
4924	45.06	0.00	2.54	H	47.60	73.98	26.38	PK
4924	32.87	0.00	2.54	H	35.41	53.98	18.57	AV
7386	44.74	0.00	10.04	H	54.78	73.98	19.20	PK
7386	31.37	0.00	10.04	H	41.41	53.98	12.57	AV

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]	AF+CL+DF -AG [dB/m]	ANT. POL [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
4824	44.34	0.00	3.48	V	47.82	73.98	26.16	PK
4824	32.93	0.00	3.48	V	36.41	53.98	17.57	AV
7236	48.19	0.00	8.67	V	56.86	73.98	17.12	PK
7236	35.21	0.00	8.67	V	43.88	53.98	10.10	AV
4824	44.93	0.00	3.48	H	48.41	73.98	25.57	PK
4824	33.08	0.00	3.48	H	36.56	53.98	17.42	AV
7236	48.69	0.00	8.67	H	57.36	73.98	16.62	PK
7236	35.44	0.00	8.67	H	44.11	53.98	9.87	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]	AF+CL+DF -AG [dB/m]	ANT. POL [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
4874	41.87	0.00	3.19	V	45.06	73.98	28.92	PK
4874	30.54	0.00	3.19	V	33.73	53.98	20.25	AV
7311	41.09	0.00	9.41	V	50.50	73.98	23.48	PK
7311	28.34	0.00	9.41	V	37.75	53.98	16.23	AV
4874	42.58	0.00	3.19	H	45.77	73.98	28.21	PK
4874	30.79	0.00	3.19	H	33.98	53.98	20.00	AV
7311	41.43	0.00	9.41	H	50.84	73.98	23.14	PK
7311	28.61	0.00	9.41	H	38.02	53.98	15.96	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]	AF+CL+DF -AG [dB/m]	ANT. POL [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
4924	43.21	0.00	2.54	V	45.75	73.98	28.23	PK
4924	31.24	0.00	2.54	V	33.78	53.98	20.20	AV
7386	42.99	0.00	10.04	V	53.03	73.98	20.95	PK
7386	29.42	0.00	10.04	V	39.46	53.98	14.52	AV
4924	43.85	0.00	2.54	H	46.39	73.98	27.59	PK
4924	31.36	0.00	2.54	H	33.90	53.98	20.08	AV
7386	43.31	0.00	10.04	H	53.35	73.98	20.63	PK
7386	29.59	0.00	10.04	H	39.63	53.98	14.35	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]	AF+CL+DF -AG [dB/m]	ANT. POL [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
4824	46.06	0.00	3.48	V	49.54	73.98	24.44	PK
4824	34.49	0.00	3.48	V	37.97	53.98	16.01	AV
7236	48.90	0.00	8.67	V	57.57	73.98	16.41	PK
7236	34.21	0.00	8.67	V	42.88	53.98	11.10	AV
4824	46.88	0.00	3.48	H	50.36	73.98	23.62	PK
4824	34.62	0.00	3.48	H	38.10	53.98	15.88	AV
7236	49.34	0.00	8.67	H	58.01	73.98	15.97	PK
7236	34.56	0.00	8.67	H	43.23	53.98	10.75	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]	AF+CL+DF -AG [dB/m]	ANT. POL [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
4874	45.57	0.00	3.19	V	48.76	73.98	25.22	PK
4874	33.11	0.00	3.19	V	36.30	53.98	17.68	AV
7311	48.52	0.00	9.41	V	57.93	73.98	16.05	PK
7311	33.12	0.00	9.41	V	42.53	53.98	11.45	AV
4874	45.20	0.00	3.19	H	48.39	73.98	25.59	PK
4874	32.97	0.00	3.19	H	36.16	53.98	17.82	AV
7311	48.90	0.00	9.41	H	58.31	73.98	15.67	PK
7311	33.66	0.00	9.41	H	43.07	53.98	10.91	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]	AF+CL+DF -AG [dB/m]	ANT. POL [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
4924	44.03	0.00	2.54	V	46.57	73.98	27.41	PK
4924	32.40	0.00	2.54	V	34.94	53.98	19.04	AV
7386	45.69	0.00	10.04	V	55.73	73.98	18.25	PK
7386	29.68	0.00	10.04	V	39.72	53.98	14.26	AV
4924	43.84	0.00	2.54	H	46.38	73.98	27.60	PK
4924	32.26	0.00	2.54	H	34.80	53.98	19.18	AV
7386	45.74	0.00	10.04	H	55.78	73.98	18.20	PK
7386	30.50	0.00	10.04	H	40.54	53.98	13.44	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]	AF+CL+DF -AG [dB/m]	ANT. POL [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
4824	44.19	0.00	3.48	V	47.67	73.98	26.31	PK
4824	32.48	0.00	3.48	V	35.96	53.98	18.02	AV
7236	43.14	0.00	8.67	V	51.81	73.98	22.17	PK
7236	30.09	0.00	8.67	V	38.76	53.98	15.22	AV
4824	43.89	0.00	3.48	H	47.37	73.98	26.61	PK
4824	32.22	0.00	3.48	H	35.70	53.98	18.28	AV
7236	44.67	0.00	8.67	H	53.34	73.98	20.64	PK
7236	31.43	0.00	8.67	H	40.10	53.98	13.88	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]	AF+CL+DF -AG [dB/m]	ANT. POL [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
4874	43.37	0.00	3.19	V	46.56	73.98	27.42	PK
4874	31.09	0.00	3.19	V	34.28	53.98	19.70	AV
7311	42.09	0.00	9.41	V	51.50	73.98	22.48	PK
7311	29.51	0.00	9.41	V	38.92	53.98	15.06	AV
4874	43.40	0.00	3.19	H	46.59	73.98	27.39	PK
4874	31.20	0.00	3.19	H	34.39	53.98	19.59	AV
7311	42.49	0.00	9.41	H	51.90	73.98	22.08	PK
7311	29.86	0.00	9.41	H	39.27	53.98	14.71	AV

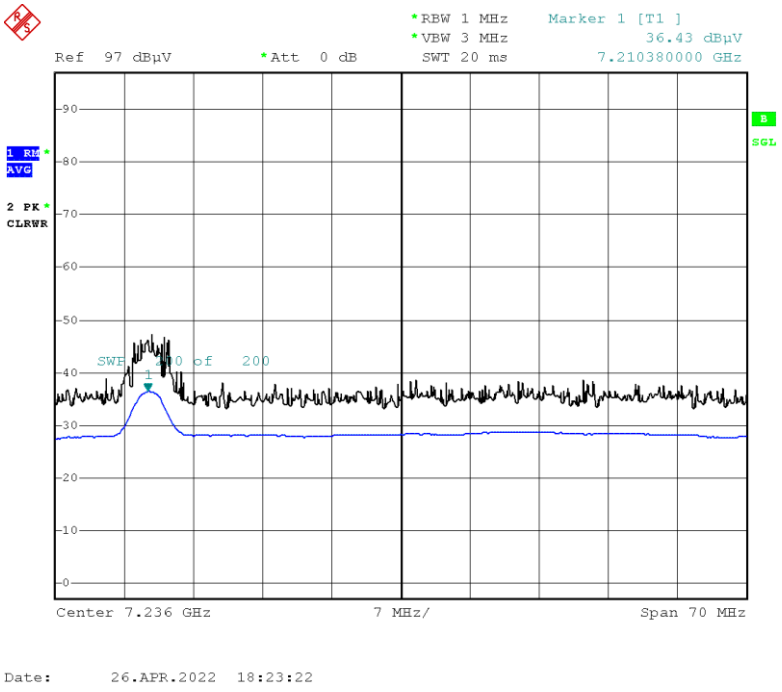
Operation Mode:	802.11ax(HE20)
Transfer MCS Index:	0
Operating Frequency	2462
Channel No.	11 Ch
RU offset	61

Frequency [MHz]	Measured Value [dBµV]	Duty Cycle Factor [dB]	AF+CL+DF -AG [dB/m]	ANT. POL [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
4924	43.59	0.00	2.54	V	46.13	73.98	27.85	PK
4924	30.67	0.00	2.54	V	33.21	53.98	20.77	AV
7386	41.03	0.00	10.04	V	51.07	73.98	22.91	PK
7386	29.07	0.00	10.04	V	39.11	53.98	14.87	AV
4924	42.67	0.00	2.54	H	45.21	73.98	28.77	PK
4924	30.64	0.00	2.54	H	33.18	53.98	20.80	AV
7386	41.14	0.00	10.04	H	51.18	73.98	22.80	PK
7386	29.17	0.00	10.04	H	39.21	53.98	14.77	AV

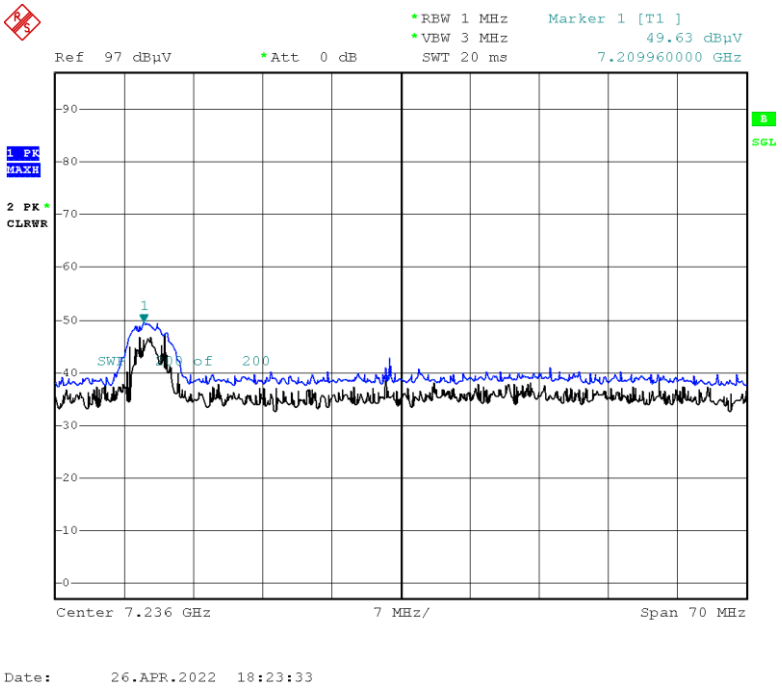
▣ Test Plots

[MIMO] (26 Tone RU 0) – H

Radiated Spurious Emissions plot – Average result (802.11ax(HE20), Ch.1 3rd Harmonic)



Radiated Spurious Emissions plot – Peak result (802.11ax(HE20), Ch.1 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
RU	0, 8

Frequency [MHz]	Measured Value [dBµV]	Duty Cycle Factor [dB]	A.F+C.L +D.F [dB/m]	ANT. POL [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
2310~2390	25.515	0.00	33.78	H	59.29	73.98	14.69	PK
2310~2390	9.213	0.00	33.78	H	42.99	53.98	10.99	AV
2310~2390	25.421	0.00	33.78	V	59.20	73.98	14.78	PK
2310~2390	9.157	0.00	33.78	V	42.94	53.98	11.04	AV
2483.5~2500	23.583	0.00	34.10	H	57.68	73.98	16.30	PK
2483.5~2500	9.288	0.00	34.10	H	43.39	53.98	10.59	AV
2483.5~2500	23.517	0.00	34.10	V	57.62	73.98	16.36	PK
2483.5~2500	9.155	0.00	34.10	V	43.25	53.98	10.73	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
RU	37, 40

Frequency [MHz]	Measured Value [dBµV]	Duty Cycle Factor [dB]	A.F+C.L +D.F [dB/m]	ANT. POL [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
2310~2390	24.949	0.00	33.78	H	58.73	73.98	15.25	PK
2310~2390	10.086	0.00	33.78	H	43.86	53.98	10.12	AV
2310~2390	24.869	0.00	33.78	V	58.65	73.98	15.33	PK
2310~2390	10.001	0.00	33.78	V	43.78	53.98	10.20	AV
2483.5~2500	24.399	0.00	34.10	H	58.50	73.98	15.48	PK
2483.5~2500	9.778	0.00	34.10	H	43.88	53.98	10.10	AV
2483.5~2500	24.328	0.00	34.10	V	58.43	73.98	15.55	PK
2483.5~2500	9.347	0.00	34.10	V	43.45	53.98	10.53	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
RU	53, 54

Frequency [MHz]	Measured Value [dBµV]	Duty Cycle Factor [dB]	A.F+C.L +D.F [dB/m]	ANT. POL [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
2310~2390	33.376	0.00	33.78	H	67.15	73.98	6.83	PK
2310~2390	12.772	0.00	33.78	H	46.55	53.98	7.43	AV
2310~2390	33.175	0.00	33.78	V	66.95	73.98	7.03	PK
2310~2390	12.621	0.00	33.78	V	46.40	53.98	7.58	AV
2483.5~2500	36.703	0.00	34.10	H	70.80	73.98	3.18	PK
2483.5~2500	13.557	0.00	34.10	H	47.66	53.98	6.32	AV
2483.5~2500	35.920	0.00	34.10	V	70.02	73.98	3.96	PK
2483.5~2500	12.581	0.00	34.10	V	46.68	53.98	7.30	AV

4. 242 Tone

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

Frequency [MHz]	Measured Value [dBμV]	Duty Cycle Factor [dB]	A.F+C.L +D.F [dB/m]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
2310~2390	32.840	0.00	33.78	H	66.62	73.98	7.36	PK
2310~2390	15.974	0.00	33.78	H	49.75	53.98	4.23	AV
2310~2390	31.930	0.00	33.78	V	65.71	73.98	8.27	PK
2310~2390	14.384	0.00	33.78	V	48.16	53.98	5.82	AV

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

Frequency [MHz]	Measured Value [dBμV]	Duty Cycle Factor [dB]	A.F+C.L +D.F [dB/m]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
#2483.5~2484.5	28.531	0.00	34.10	H	62.63	73.98	11.35	PK
#2483.5~2484.5	17.220	0.00	34.10	H	51.32	53.98	2.66	AV
#2484.5~2485.5	26.471	0.00	34.10	H	60.57	73.98	13.41	PK
#2484.5~2485.5	15.627	0.00	34.10	H	49.73	53.98	4.25	AV
2485.5~2500	34.275	0.00	34.10	H	68.37	73.98	5.61	PK
2485.5~2500	14.856	0.00	34.10	H	48.96	53.98	5.02	AV
#2483.5~2484.5	27.687	0.00	34.10	V	61.79	73.98	12.19	PK
#2483.5~2484.5	15.294	0.00	34.10	V	49.39	53.98	4.59	AV
#2484.5~2485.5	25.833	0.00	34.10	V	59.93	73.98	14.05	PK
#2484.5~2485.5	13.879	0.00	34.10	V	47.98	53.98	6.00	AV
2485.5~2500	30.950	0.00	34.10	V	65.05	73.98	8.93	PK
2485.5~2500	13.722	0.00	34.10	V	47.82	53.98	6.16	AV

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

5. SU

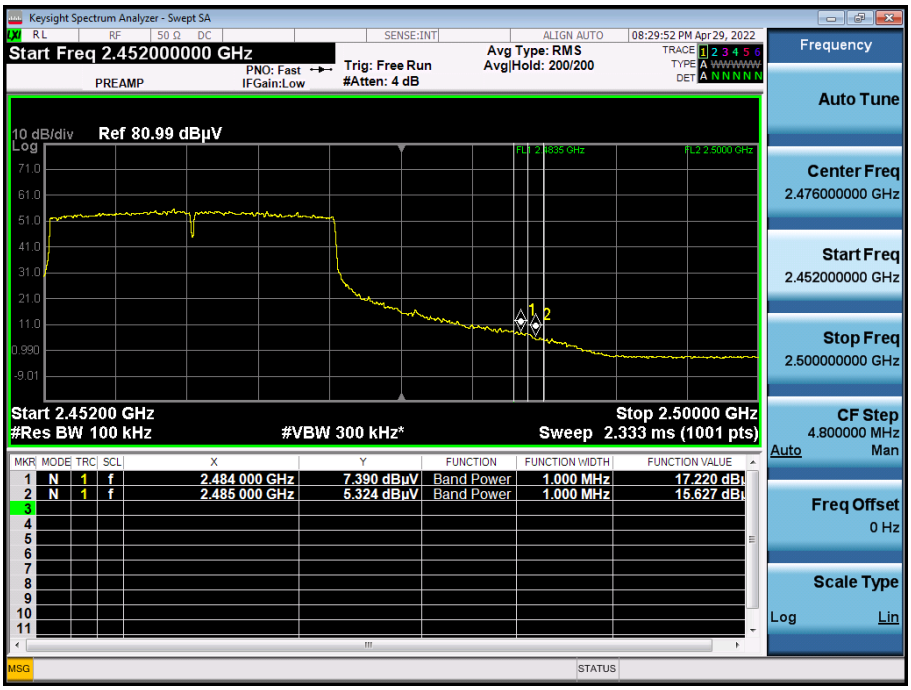
Operation Mode:	802.11ax(HE20)
Transfer MCS Index:	0
Operating Frequency	2412 MHz, 2462 MHz
Channel No.	01 Ch, 11 Ch

Frequency [MHz]	Measured Value [dBµV]	Duty Cycle Factor [dB]	A.F+C.L +D.F [dB/m]	ANT. POL [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
2310~2390	26.750	0.00	33.78	H	60.53	73.98	13.45	PK
2310~2390	15.470	0.00	33.78	H	49.25	53.98	4.73	AV
2310~2390	26.511	0.00	33.78	V	60.29	73.98	13.69	PK
2310~2390	15.317	0.00	33.78	V	49.10	53.98	4.88	AV
2483.5~2500	29.169	0.00	34.10	H	63.27	73.98	10.71	PK
2483.5~2500	16.819	0.00	34.10	H	50.92	53.98	3.06	AV
2483.5~2500	28.671	0.00	34.10	V	62.77	73.98	11.21	PK
2483.5~2500	16.540	0.00	34.10	V	50.64	53.98	3.34	AV

▣ Test Plots (242 Tone, RU 61) H

[MIMO] integration method Used

Radiated Restricted Band Edges plot – Average result (802.11ax(HE20), MCS0, Ch.11)



Radiated Restricted Band Edges plot – Peak result (802.11ax(HE20), MCS0, Ch.11)

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	06/17/2022	Annual
Temperature Chamber	SU-642	ESPEC	0093008124	03/04/2023	Annual
Signal Analyzer	N9030A	Keysight	MY55410508	09/07/2022	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	E3646A	Agilent	MY40002937	12/14/2022	Annual
Attenuator(10 dB)(DC-26.5 GHz)	5910-N-50-010	H+S	00801	10/29/2022	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
Bluetooth Tester	CBT	Rohde & Schwarz	100808	02/22/2023	Annual

Note:

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

Radiated Test

Equipment	Model	Manufacturer	Serial No.	Due to Calibration	Calibration Interval
Controller(Antenna mast)	CO3000	Innco system	CO3000-4p	N/A	N/A
Antenna Position Tower	MA4640/800-XP-EP	Innco system	N/A	N/A	N/A
Controller	EM2090	Emco	060520	N/A	N/A
Turn Table	N/A	Ets	N/A	N/A	N/A
Loop Antenna	FMZB 1513	Rohde & Schwarz	1513-333	03/17/2024	Biennial
Hybrid Antenna	VULB 9168	Schwarzbeck	9168-0895	09/04/2022	Biennial
Horn Antenna	BBHA 9120D	Schwarzbeck	9120D-1191	11/18/2023	Biennial
Horn Antenna(15 GHz ~ 40 GHz)	BBHA9170	Schwarzbeck	BBHA9170124	04/12/2023	Biennial
Amp & Filter Bank Switch Controller	FBSM-01A	TNM system	0	N/A	N/A
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	06/24/2022	Annual
Band Reject Filter	WRCJV12-4900-5100-5900-6100-50SS	Wainwright Instruments	6	06/24/2022	Annual
Band Reject Filter	WRCJV5100/5850-40/50-8EEK	Wainwright Instruments	1	02/07/2023	Annual
ATT(3 dB) + LNA2(6~18 GHz)	18B-03, CBL06185030	WEINSCHEL CERNEX	N/A	12/22/2022	Annual
ATT(10 dB) + LNA1(0.1~18 GHz)	56-10, CBLU1183540B-01	Api tech, CERNEX	N/A	12/22/2022	Annual
High Pass Filter	WHKX10-2700-3000-18000-40SS	Wainwright Instruments	N/A	12/22/2022	Annual
High Pass Filter	WHKX8-6090-7000-18000-40SS	Wainwright Instruments	N/A	12/22/2022	Annual
Thru	COAXIAL ATTENUATOR	T&M SYSTEM	N/A	12/22/2022	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
Spectrum Analyzer	FSP(9 kHz ~ 30 GHz)	Rohde & Schwarz	836650/016	09/13/2022	Annual
Spectrum Analyzer	FSV40-N(9 kHz ~ 30 GHz)	Rohde & Schwarz	101068-SZ	09/15/2022	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-2205-FC010-P