

FCC DTS REPORT

Certification

Applicant Name: SAMSUNG Electronics Co., Ltd.	Date of Issue: February 27, 2023
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	Report No.: HCT-RF-2302-FC024

FCC ID:	A3LSMA546JPN
APPLICANT:	SAMSUNG Electronics Co., Ltd.
Model:	SC-53D
Additional Model:	SCG21
EUT Type:	Mobile Phone
Average Output Power:	802.11ax(HE20) SUM (MIMO Ant 1 + MIMO Ant 2): 19.14 dBm
Frequency Range:	2 412 MHz ~ 2 472 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-2302-FC024

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)

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Version

TEST REPORT NO.	DATE	DESCRIPTION
HCT-RF-2302-FC024	February 27, 2023	- First Approval Report

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1. EUT DESCRIPTION

Model	SC-53D		
Additional Model	SCG21		
EUT Type	Mobile Phone		
Power Supply	DC 3.85 V		
Frequency Range	2 412 MHz ~ 2 472 MHz		
Max. RF Output Power	<u>Peak Power</u>	Ant. 1(SISO)	25.84 dBm
		MIMO	28.95 dBm
	<u>Average Power</u>	Ant. 1(SISO)	16.00 dBm
		MIMO	19.14 dBm
Modulation Type	OFDM, OFDMA		
Number of Channels	13 Channels		
Date(s) of Tests	February 01, 2023 ~ February 27, 2023		
Serial number	Radiated: R3CTC0EE5DJ Conducted: R3CTC0EE5PR		

ANTENNA CONFIGURATIONS

1. Antenna configuration

Configurations	SISO		MIMO	
	Ant1	Ant2	CDD	SDM
802.11ax(HE20)	O	X	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. Directional Gain Calculation

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

$$\text{Directional gain(SDM)} = G_{\max} + 10 \cdot \log(N_{\text{ANT}} / N_{\text{SS}}),$$

$$\text{Directional Gain(CDD)} = 10 \cdot \log \left[\frac{\sum_{j=1}^{N_{\text{SS}}} \left(\sum_{k=1}^{N_{\text{ANT}}} g_{j,k} \right)^2}{N_{\text{ANT}}} \right]$$

Ant Gain (dBi)		N _{ANT} / N _{SS}	Directional Gain (dBi)	
			SDM	CDD
ANT1	-4.93	2 / 2	-4.93	-4.03
ANT2	-9.84			

Note

According to Ansi C63.10-2013 section 14.4.3, the directional gain is calculated using the formula, where G_N is the gain of the nth antenna and N_{ANT} is the total number of antennas used.

$$\text{Directional gain(SDM)} = G_{\max} + 10 \cdot \log(N_{\text{ANT}} / N_{\text{SS}}),$$

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

Sample MIMO Calculation:

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

$$\text{Ant1} + \text{Ant 2} = \text{MIMO}$$

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

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, Republic 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.

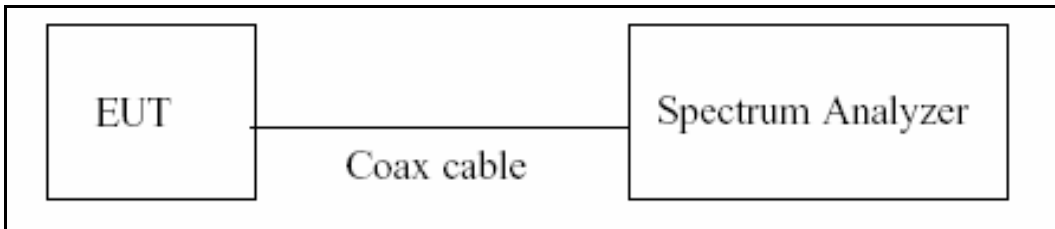
The measurement data shown herein meets or exceeds the U_{CISPR} measurement uncertainty values specified in CISPR 16-4-2 and, thus, can be compared directly to specified limits to determine compliance.

Parameter	Expanded Uncertainty (dB)
Conducted Disturbance (150 kHz ~ 30 MHz)	1.90 (Confidence level about 95 %, $k=2$)
Radiated Disturbance (9 kHz ~ 30 MHz)	4.14 (Confidence level about 95 %, $k=2$)
Radiated Disturbance (30 MHz ~ 1 GHz)	5.82 (Confidence level about 95 %, $k=2$)
Radiated Disturbance (1 GHz ~ 18 GHz)	5.74 (Confidence level about 95 %, $k=2$)
Radiated Disturbance (18 GHz ~ 40 GHz)	5.76 (Confidence level about 95 %, $k=2$)
Radiated Disturbance (Above 40 GHz)	5.52 (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 $> 50/T$.

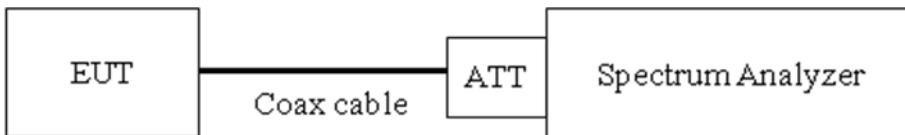
1. RBW = 8 MHz (the largest available value)
2. VBW = 8 MHz (\geq RBW)
3. SPAN = 0 Hz
4. Detector = Peak
5. Number of points in sweep > 100
6. Trace mode = Clear write
7. Measure T_{total} and T_{on}
8. Calculate Duty Cycle = T_{on} / T_{total} and Duty Cycle Factor = $10\log(1/\text{Duty Cycle})$

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.

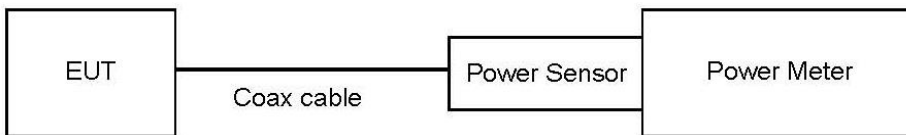
Note : We tested OBW using the automatic bandwidth measurement capability of a spectrum analyzer.

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

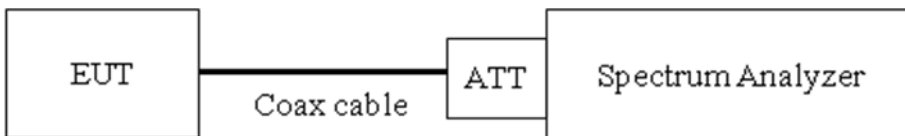
- Conducted Output Power(Peak) = Measured Value + ATT loss + Cable loss
- Conducted Output Power(Average) = Measured Value + ATT loss + Cable loss + Duty Cycle Factor

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

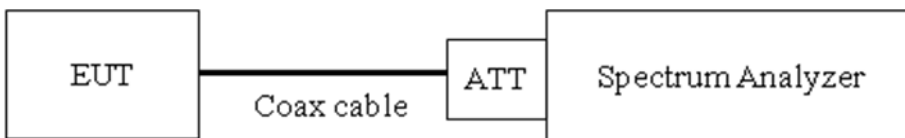
7.5. Conducted Band Edge (Out of Band Emissions) & Conducted Spurious Emissions

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	9.95
100	10.01
200	10.03
300	10.04
400	10.05
500	10.04
600	10.03
700	10.09
800	10.10
900	10.08
1000	10.11
2000	10.25
2400	10.36
2412	10.60
2437	10.60
2462	10.60
2500	10.76
3000	10.89
4000	11.24
5000	11.42
5700	11.87
5800	11.87
6000	11.98
7000	12.07
8000	12.19
9000	12.24
10000	12.38
11000	12.43
12000	12.49
13000	12.66
14000	12.96
15000	13.12
16000	13.15
17000	13.05
18000	13.08
19000	12.97
20000	13.23
21000	13.67

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

2. Factor = Attenuator loss + Cable loss

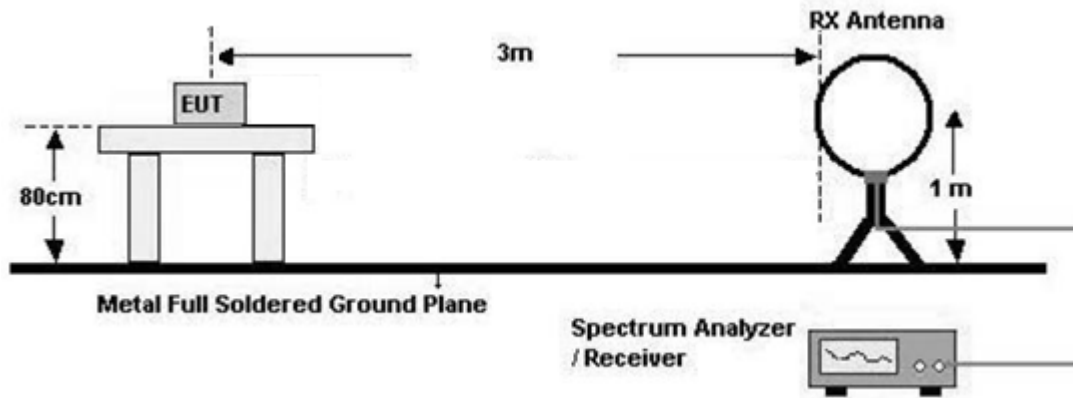
7.6. Radiated Test

Limit

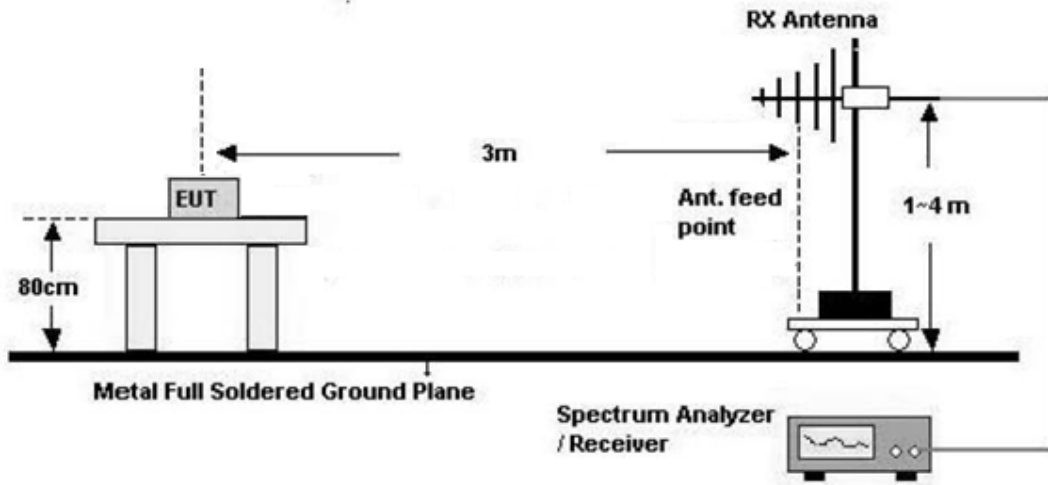
Frequency (MHz)	Field Strength ($\mu\text{V/m}$)	Measurement Distance (m)
0.009 – 0.490	$2400/F(\text{kHz})$	300
0.490 – 1.705	$24000/F(\text{kHz})$	30
1.705 – 30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Test Configuration

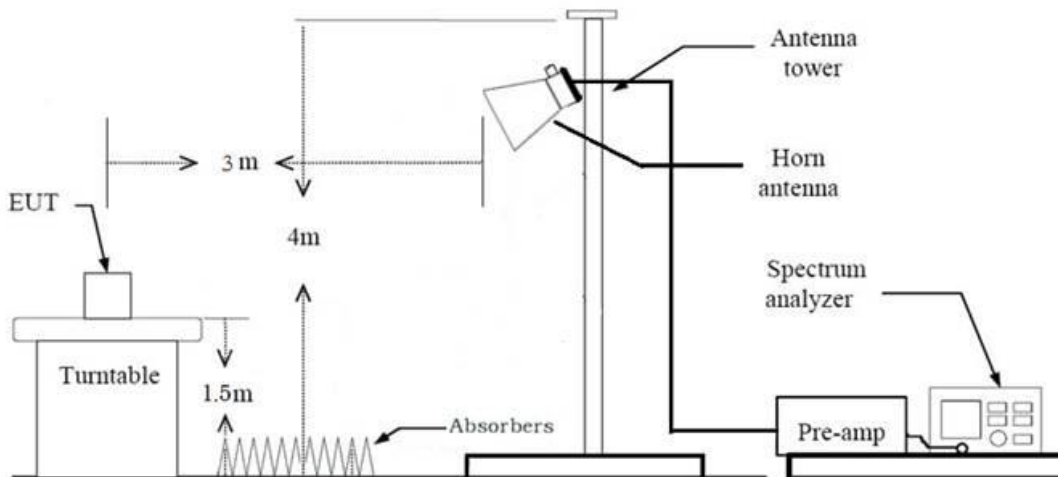
Below 30 MHz



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, Tones, RU Offset) of operation were investigated and the worst case configuration results are reported.

Tones	Channel	RU Index
26	1, 11, 12, 13	0, 8
52	1, 11, 12, 13	37, 40
106	1, 11, 12, 13	53, 54
242	1, 11, 12, 13	61
SU	1, 11, 12, 13	-

3. SC-53D, SCG21 were tested and the worst case results are reported.

(Worst case : SC-53D)

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 : X, Y

- 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 : Ant1(SISO), MIMO(SDM), MIMO(CDD)

- Radiated Bandedge Worst case : Ant. 1(SISO)

- Radiated spurious emissions Worst case : MIMO(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(Tones, RU Offset) of operation were investigated and the worst case configuration results are reported

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

7. SC-53D, SCG21 were tested and the worst case results are reported.
(Worst case : SC-53D)

AC Power line Conducted Emissions

1. Please refer to the SC-53D[DTS] Test Report.
2. SC-53D, SCG21 were tested and the worst case results are reported.
(Worst case : SC-53D)

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 SC-53D[DTS] Test Report.

9. TEST RESULT

9.1 DUTY CYCLE

Note:

In order to simplify the report, Test results were written only in the worst case datarate.

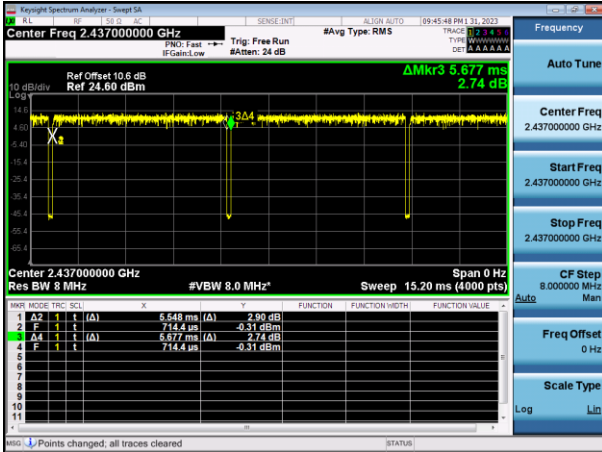
(Wost case datarate : MCS0)

[MIMO]

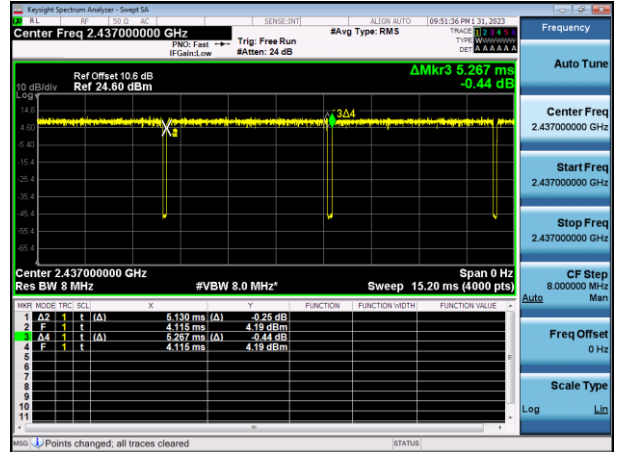
Mode	Tones (T)	Data Rate	On Time (ms)	Total Time (ms)	Duty Cycle	Duty Cycle Factor (dB)
802.11ax (HE20)	26	MCS0	5.548	5.677	0.977	0.100
	52	MCS0	5.130	5.267	0.974	0.114
	106	MCS0	2.437	2.554	0.954	0.203
	242	MCS0	1.099	1.213	0.906	0.428
802.11ax(SU)	BW 20	MCS0	1.097	1.191	0.921	0.356

Test Plots
[MIMO]

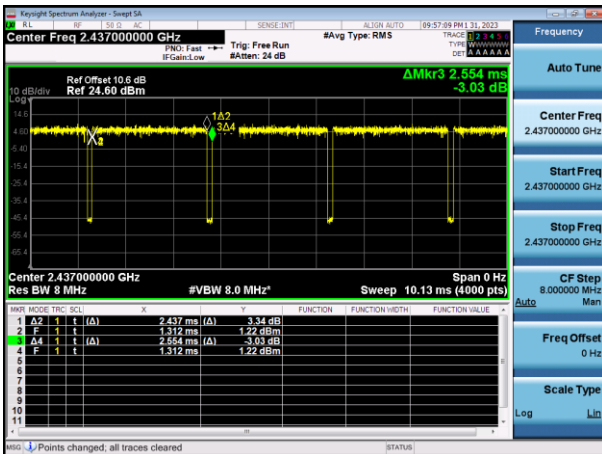
26 Tones MCS0



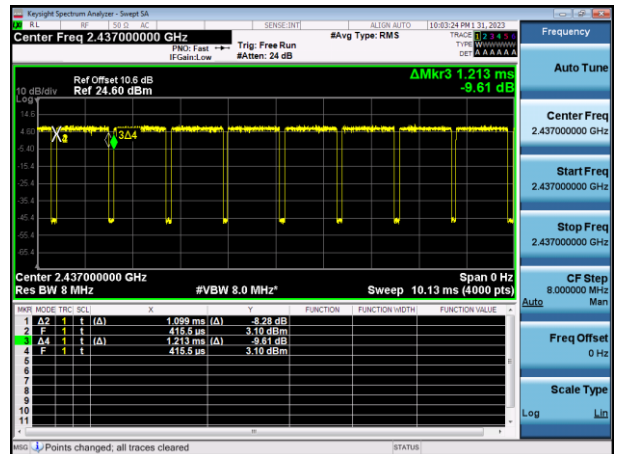
52 Tones MCS0



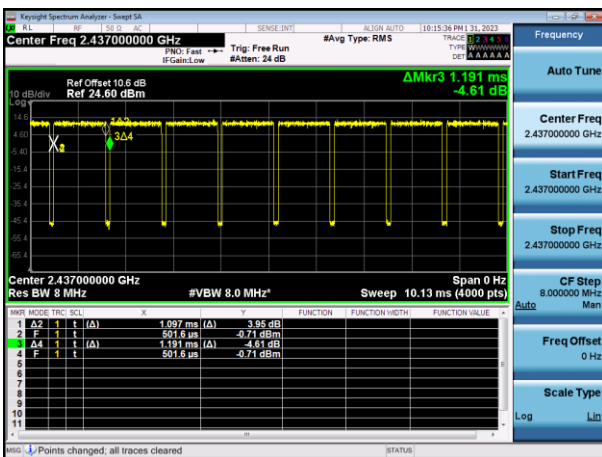
106 Tones MCS0



242 Tones MCS0



SU MCS0



9.2 6 dB BANDWIDTH

[Ant. 1]

BW	Frequency [MHz]	Channel No.	RU Index	6 dB BandWidth (MHz)				
				26 T	52 T	106 T	242 T	SU
HE20	2412	1	Low	2.900	16.913	16.482	-	-
			Mid	2.684	16.420	-	17.354	17.106
			High	2.920	14.484	17.031	-	-
	2437	6	Low	2.087	17.062	17.197	-	-
			Mid	2.706	15.049	-	19.670	19.668
			High	2.118	17.054	17.188	-	-
	2462	11	Low	2.138	17.100	17.204	-	-
			Mid	2.683	12.934	-	19.585	19.412
			High	2.104	15.070	17.153	-	-
	2467	12	Low	2.107	17.064	17.199	-	-
			Mid	2.663	12.903	-	19.505	19.541
			High	2.090	16.050	17.192	-	-
	2472	13	Low	2.770	14.466	16.554	-	-
			Mid	2.691	6.634	-	16.930	16.174
			High	2.780	15.734	16.717	-	-

Limit : > 500 kHz

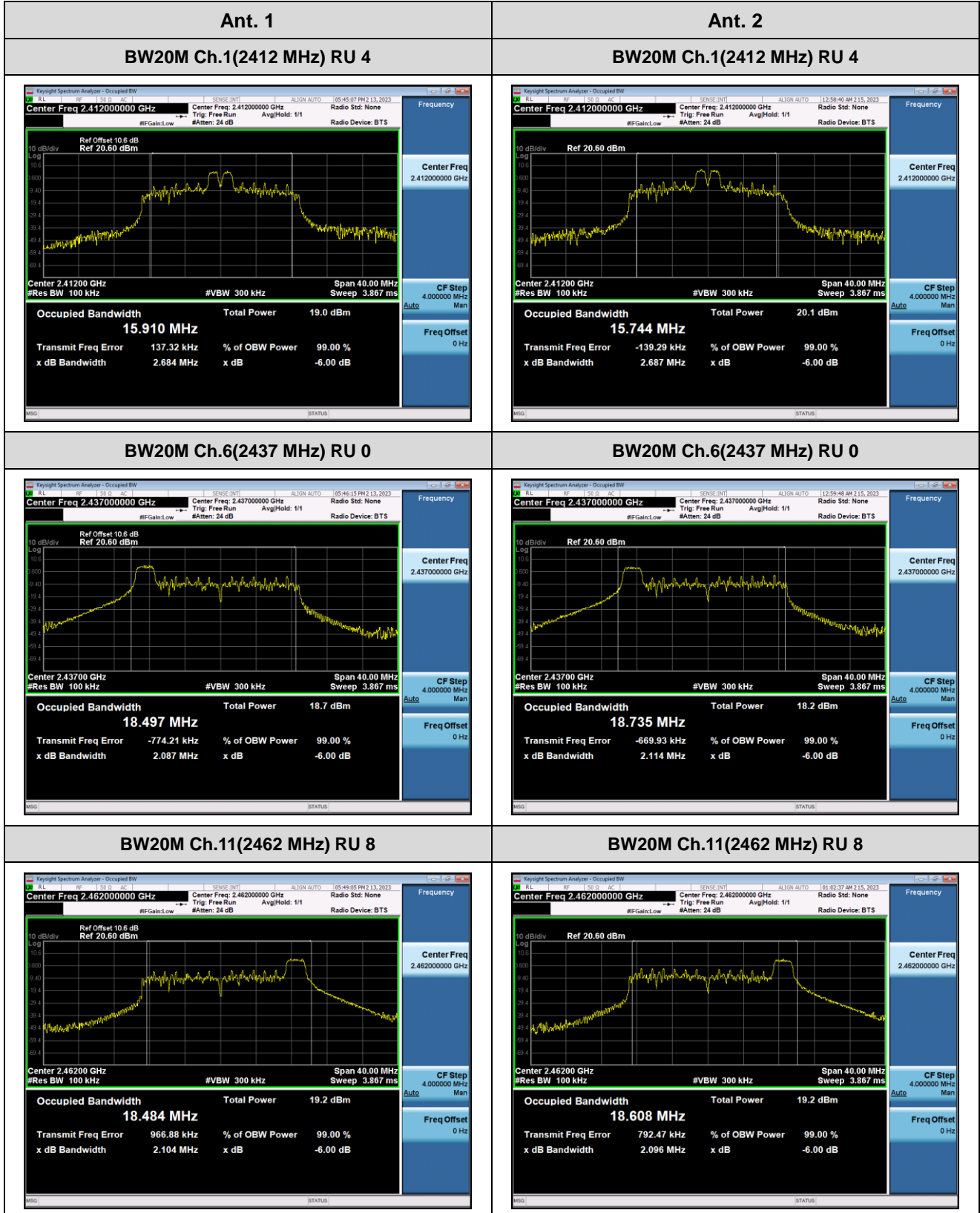
[Ant. 2]

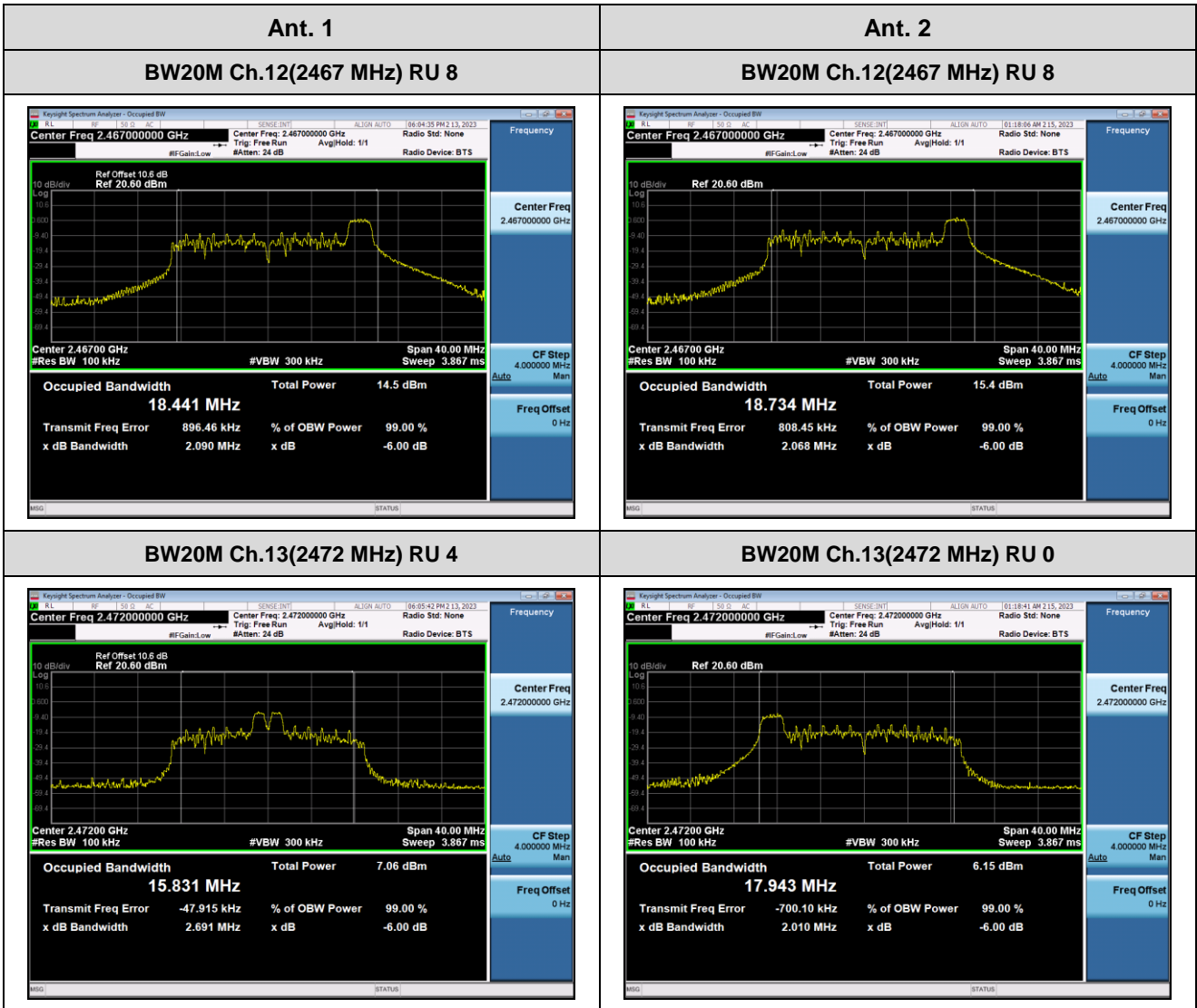
BW	Frequency [MHz]	Channel No.	RU Index	6 dB BandWidth (MHz)				
				26 T	52 T	106 T	242 T	SU
HE20	2412	1	Low	2.730	14.426	15.312	-	-
			Mid	2.687	6.607	-	17.030	16.406
			High	2.760	15.707	16.794	-	-
	2437	6	Low	2.114	17.101	18.141	-	-
			Mid	2.681	12.907	-	19.478	19.293
			High	2.125	17.044	17.130	-	-
	2462	11	Low	2.100	13.010	17.190	-	-
			Mid	2.708	17.260	-	19.624	19.595
			High	2.096	17.109	17.744	-	-
	2467	12	Low	2.110	16.810	17.180	-	-
			Mid	2.709	6.257	-	19.610	19.596
			High	2.068	17.102	17.770	-	-
	2472	13	Low	2.010	14.495	16.979	-	-
			Mid	2.692	6.678	-	18.608	18.459
			High	2.720	15.719	16.967	-	-

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

[Ant. 1]

BW	Frequency [MHz]	Channel No.	RU Index	Peak Power (dBm)				
				26 T	52 T	106 T	242 T	SU
HE20	2412	1	Low	17.84	18.04	19.78	-	-
			Mid	19.85	19.84	-	18.38	24.98
			High	18.57	18.83	19.10	-	-
	2437	6	Low	19.92	19.88	19.58	-	-
			Mid	20.02	19.82	-	18.96	25.84
			High	19.91	19.73	19.53	-	-
	2462	11	Low	19.07	19.06	18.81	-	-
			Mid	19.51	19.07	-	18.65	24.71
			High	20.23	20.00	19.79	-	-
	2467	12	Low	15.11	15.04	15.04	-	-
			Mid	15.74	15.19	-	14.50	14.61
			High	15.86	15.71	15.48	-	-
2472	13	Low	5.43	7.57	8.39	-	-	
		Mid	8.59	9.90	-	8.62	8.46	
		High	5.41	7.46	8.71	-	-	

Limit : 30 dBm

[Ant. 2]

BW	Frequency [MHz]	Channel No.	RU Index	Peak Power (dBm)				
				26 T	52 T	106 T	242 T	SU
HE20	2412	1	Low	18.64	19.22	19.81	-	-
			Mid	20.84	20.54	-	19.13	26.17
			High	18.26	18.61	19.43	-	-
	2437	6	Low	19.13	19.09	18.90	-	-
			Mid	19.53	19.06	-	18.72	26.04
			High	20.85	20.28	19.88	-	-
	2462	11	Low	21.14	20.96	20.73	-	-
			Mid	20.72	20.97	-	19.69	25.62
			High	20.26	20.03	19.99	-	-
	2467	12	Low	17.49	17.26	16.56	-	-
			Mid	16.50	16.66	-	15.67	16.12
			High	16.64	16.12	16.02	-	-
	2472	13	Low	7.57	9.48	9.95	-	-
			Mid	9.48	10.79	-	8.93	9.28
			High	7.28	8.92	9.45	-	-

Limit : 30 dBm

[MIMO]

Note:

1. MIMO Peak Power = $10 \cdot \log((10^{\text{Ant. 1 Peak power / 10}}) + (10^{\text{Ant. 2 Peak power / 10}}))$

BW	Frequency [MHz]	Channel No.	RU Index	Peak Power (dBm)				
				26 T	52 T	106 T	242 T	SU
HE20	2412	1	Low	21.27	21.68	22.80	-	-
			Mid	23.38	23.21	-	21.78	28.63
			High	21.43	21.73	22.28	-	-
	2437	6	Low	22.55	22.51	22.26	-	-
			Mid	22.79	22.47	-	21.85	28.95
			High	23.42	23.02	22.72	-	-
	2462	11	Low	23.24	23.12	22.89	-	-
			Mid	23.17	23.14	-	22.21	28.20
			High	23.25	23.03	22.90	-	-
	2467	12	Low	19.47	19.30	18.88	-	-
			Mid	19.15	19.00	-	18.14	18.44
			High	19.28	18.93	18.77	-	-
	2472	13	Low	9.64	11.64	12.25	-	-
			Mid	12.06	13.38	-	11.79	11.90
			High	9.45	11.26	12.10	-	-

Limit : 30 dBm

Average Power

[Ant. 1]

BW	Frequency [MHz]	Channel No.	RU Index	Average Power (dBm)				
				26 T	52 T	106 T	242 T	SU
HE20	2412	1	Low	5.20	6.38	8.96	-	-
			Mid	9.68	9.50	-	8.44	15.17
			High	6.63	7.46	8.40	-	-
	2437	6	Low	8.90	8.81	8.90	-	-
			Mid	8.83	8.88	-	8.85	16.00
			High	8.64	8.66	8.73	-	-
	2462	11	Low	8.02	7.80	7.97	-	-
			Mid	8.47	8.10	-	8.60	14.45
			High	9.32	9.25	9.10	-	-
	2467	12	Low	3.78	3.93	4.17	-	-
			Mid	4.72	4.37	-	4.50	4.44
			High	4.51	4.66	4.77	-	-
2472	13	Low	-6.72	-3.33	-1.80	-	-	
		Mid	-2.31	-0.59	-	-1.61	-1.70	
		High	-6.82	-3.66	-2.11	-	-	

Limit : 30 dBm

[Ant. 2]

BW	Frequency [MHz]	Channel No.	RU Index	Average Power (dBm)				
				26 T	52 T	106 T	242 T	SU
HE20	2412	1	Low	6.50	7.78	9.30	-	-
			Mid	10.77	10.33	-	9.31	16.18
			High	5.86	7.05	8.72	-	-
	2437	6	Low	7.86	7.86	8.04	-	-
			Mid	8.77	8.11	-	8.80	16.27
			High	10.36	9.94	9.32	-	-
	2462	11	Low	10.20	10.58	10.26	-	-
			Mid	9.92	10.25	-	10.14	15.74
			High	8.93	9.03	9.28	-	-
	2467	12	Low	6.78	6.63	6.02	-	-
			Mid	5.65	6.09	-	5.57	5.80
			High	5.39	5.29	5.17	-	-
	2472	13	Low	-4.37	-1.70	-0.67	-	-
			Mid	-1.13	0.21	-	-0.91	-0.70
			High	-4.55	-2.46	-1.32	-	-

Limit : 30 dBm

[MIMO]

Note:

1. MIMO Average Power = $10 \cdot \log(((10^{\text{Ant. 1 Average power / 10}}) + (10^{\text{Ant. 2 Average power / 10}})))$

BW	Frequency [MHz]	Channel No.	RU Index	Average Power (dBm)				
				26 T	52 T	106 T	242 T	SU
HE20	2412	1	Low	8.91	10.15	12.15	-	-
			Mid	13.27	12.95	-	11.91	18.71
			High	9.27	10.27	11.58	-	-
	2437	6	Low	11.42	11.38	11.50	-	-
			Mid	11.81	11.53	-	11.83	19.14
			High	12.59	12.36	12.05	-	-
	2462	11	Low	12.26	12.42	12.28	-	-
			Mid	12.27	12.32	-	12.45	18.15
			High	12.14	12.16	12.20	-	-
	2467	12	Low	8.55	8.50	8.21	-	-
			Mid	8.22	8.33	-	8.08	8.18
			High	7.98	8.00	7.99	-	-
	2472	13	Low	-2.38	0.58	1.81	-	-
			Mid	1.33	2.84	-	1.76	1.84
			High	-2.53	0.00	1.32	-	-

Limit : 30 dBm

9.4 POWER SPECTRAL DENSITY

Note :

1. Total PSD = Measured Value + Duty Cycle Factor
2. MIMO PSD = $10 \cdot \log(((10^{(\text{Ant. 1 PSD} / 10)})) + (10^{(\text{Ant. 2 PSD} / 10)}))$

[Ant. 1]

BW	Frequency [MHz]	Channel No.	RU Index	Total PSD (dBm)				
				26 T	52 T	106 T	242 T	SU
HE20	2412	1	Low	-11.854	-12.899	-14.298	-	-
			Mid	-7.962	-11.069	-	-17.677	-9.629
			High	-10.357	-12.223	-14.151	-	-
	2437	6	Low	-8.637	-11.470	-14.672	-	-
			Mid	-8.617	-11.503	-	-17.731	-10.043
			High	-8.646	-11.653	-14.668	-	-
	2462	11	Low	-9.472	-12.315	-15.212	-	-
			Mid	-8.594	-12.118	-	-17.452	-11.386
			High	-7.979	-10.841	-14.029	-	-
	2467	12	Low	-13.692	-16.430	-19.192	-	-
			Mid	-12.842	-16.059	-	-22.324	-21.577
			High	-12.915	-15.781	-18.573	-	-
	2472	13	Low	-23.529	-23.191	-24.552	-	-
			Mid	-19.734	-21.337	-	-27.853	-27.471
			High	-23.721	-23.522	-24.677	-	-

[Ant. 2]

BW	Frequency [MHz]	Channel No.	RU Index	Total PSD (dBm)				
				26 T	52 T	106 T	242 T	SU
HE20	2412	1	Low	-10.096	-11.202	-12.855	-	-
			Mid	-6.643	-9.645	-	-16.179	-8.719
			High	-10.823	-12.114	-13.148	-	-
	2437	6	Low	-9.659	-12.550	-15.379	-	-
			Mid	-8.989	-12.242	-	-16.919	-9.674
			High	-7.244	-10.265	-13.198	-	-
	2462	11	Low	-7.206	-10.121	-13.153	-	-
			Mid	-7.360	-9.958	-	-16.547	-10.173
			High	-8.511	-11.355	-13.857	-	-
	2467	12	Low	-10.664	-13.642	-16.821	-	-
			Mid	-11.877	-14.011	-	-20.487	-20.181
			High	-12.243	-15.169	-18.106	-	-
	2472	13	Low	-21.037	-21.118	-23.297	-	-
			Mid	-18.609	-20.164	-	-26.805	-26.041
			High	-21.494	-21.580	-23.505	-	-

[MIMO]

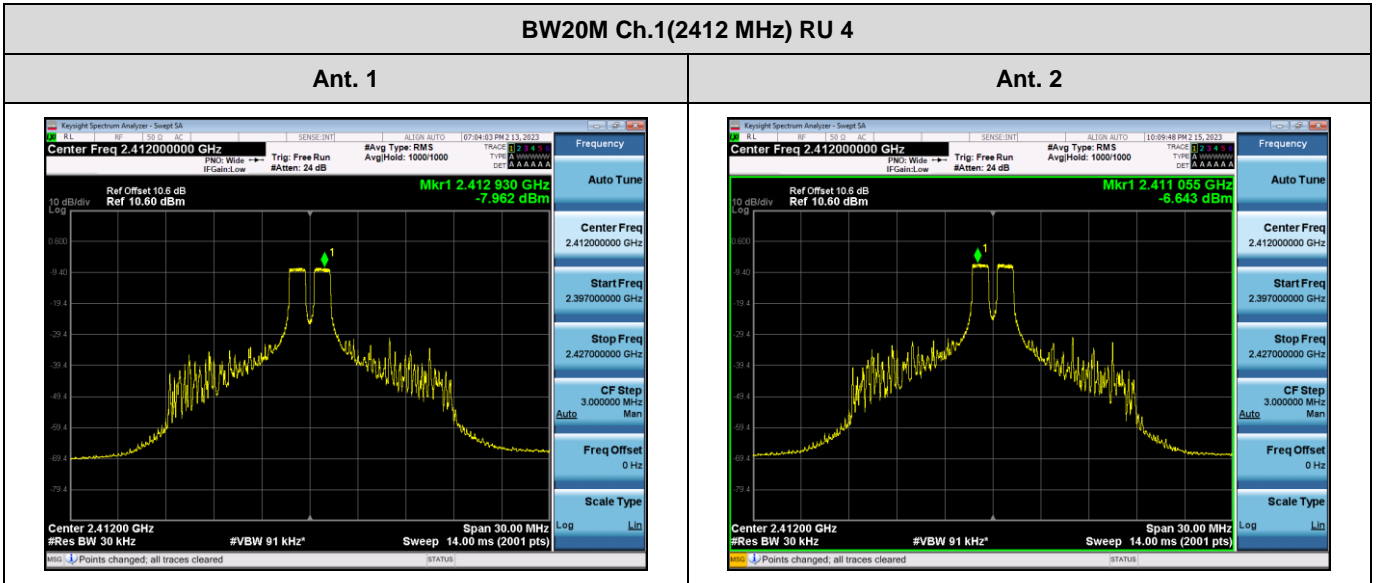
BW	Frequency [MHz]	Channel No.	RU Index	MIMO Total PSD (dBm)				
				26 T	52 T	106 T	242 T	SU
HE20	2412	1	Low	-7.876	-8.958	-10.507	-	-
			Mid	-4.242	-7.289	-	-13.853	-6.140
			High	-7.573	-9.158	-10.610	-	-
	2437	6	Low	-6.108	-8.966	-12.001	-	-
			Mid	-5.789	-8.847	-	-14.296	-6.844
			High	-4.878	-7.893	-10.861	-	-
	2462	11	Low	-5.183	-8.071	-11.051	-	-
			Mid	-4.923	-7.895	-	-13.966	-7.727
			High	-5.227	-8.080	-10.932	-	-
	2467	12	Low	-8.909	-11.806	-14.836	-	-
			Mid	-9.322	-11.905	-	-18.299	-17.813
			High	-9.556	-12.454	-15.323	-	-
	2472	13	Low	-19.096	-19.022	-20.869	-	-
			Mid	-16.125	-17.701	-	-24.287	-23.687
			High	-19.456	-19.433	-21.041	-	-

Test Plots

Note:

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

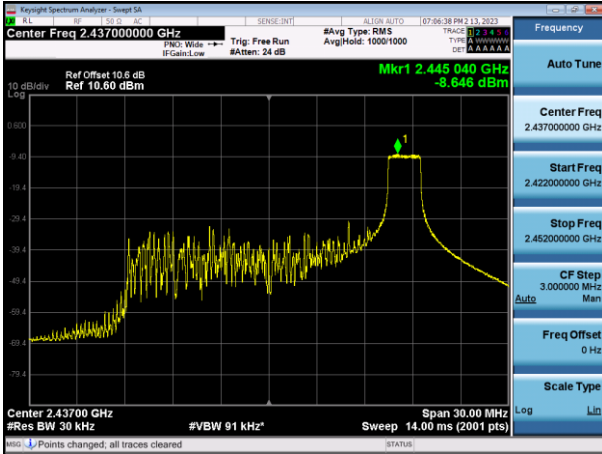
[MIMO]



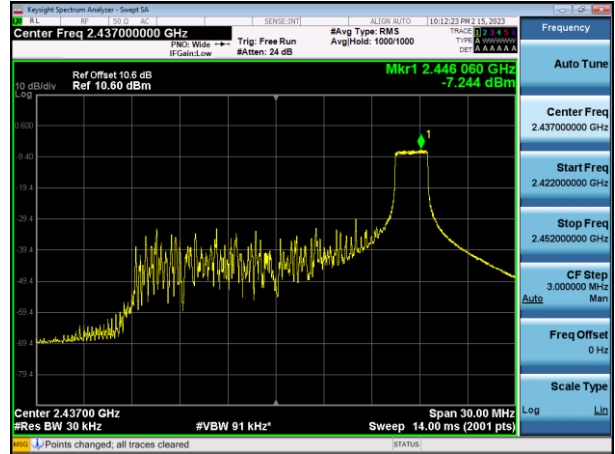
MIMO Measured PSD (dBm)	Duty Cycle Factor (dB)	MIMO Total PSD (dBm)
-4.142	0.100	-4.242

BW20M Ch.6(2437 MHz) RU 8

Ant. 1



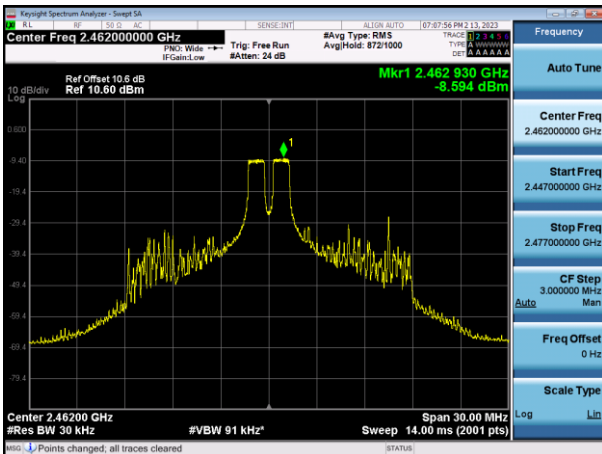
Ant. 2



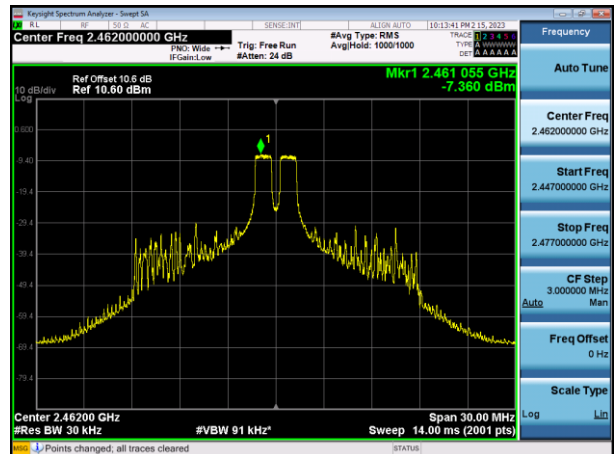
MIMO Measured PSD (dBm)	Duty Cycle Factor (dB)	MIMO Total PSD (dBm)
-4.778	0.100	-4.878

BW20M Ch.11(2462 MHz) RU 4

Ant. 1



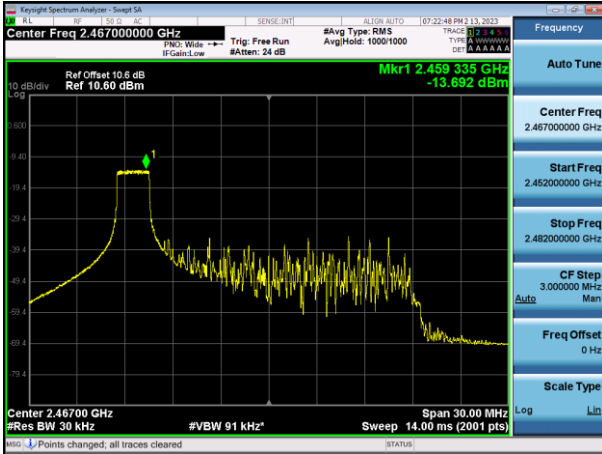
Ant. 2



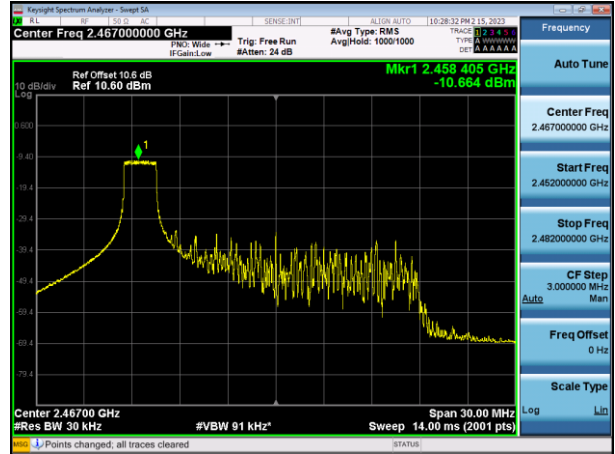
MIMO Measured PSD (dBm)	Duty Cycle Factor (dB)	MIMO Total PSD (dBm)
-4.823	0.100	-4.923

BW20M Ch.12(2467 MHz) RU 0

Ant. 1



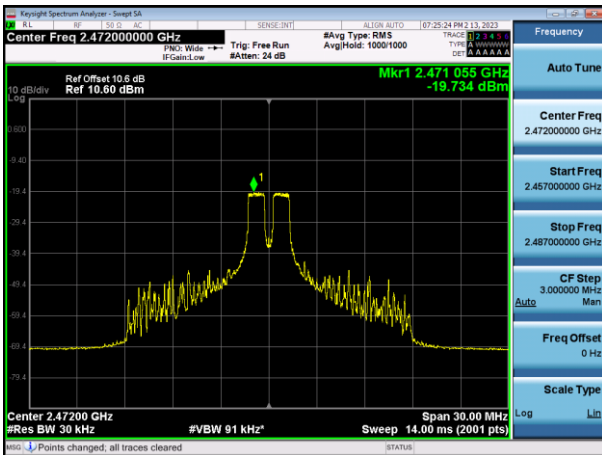
Ant. 2



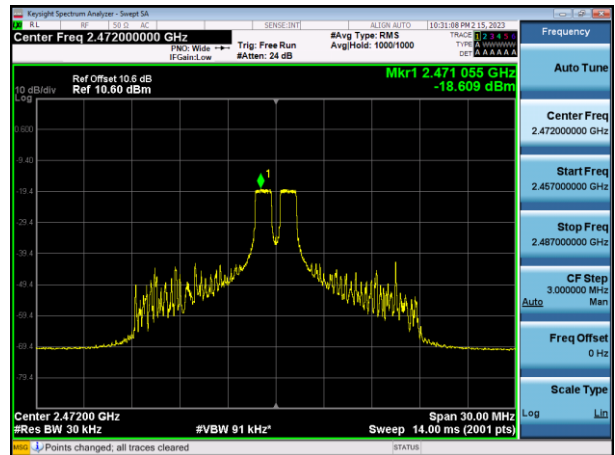
MIMO Measured PSD (dBm)	Duty Cycle Factor (dB)	MIMO Total PSD (dBm)
-8.809	0.100	-8.909

BW20M Ch.13(2472 MHz) RU 4

Ant. 1



Ant. 2



MIMO Measured PSD (dBm)	Duty Cycle Factor (dB)	MIMO Total PSD (dBm)
-16.025	0.100	-16.125

9.5 BAND EDGE / CONDUCTED SPURIOUS EMISSIONS

Band Edge

[Ant. 1]

BW	Frequency [MHz]	Channel No.	RU Index	Measured Position	Result (dB)		
					26 T	52 T	106 T
HE20	2412	1	Low	Lowest Bandedge	35.086	36.120	37.733
	2462	11	High	Highest Bandedge	46.119	53.547	47.781
	2467	12	High	Highest Bandedge	40.377	40.627	40.364
	2472	13	High	Highest Bandedge	31.190	32.644	32.482

BW	Frequency [MHz]	Channel No.	RU Index	Measured Position	Result (dB)	
					242 T	SU
HE20	2412	1	Mid	Lowest Bandedge	35.689	32.781
	2462	11		Highest Bandedge	47.729	39.311
	2467	12		Highest Bandedge	31.666	31.595
	2472	13		Highest Bandedge	32.182	32.089

Limit : 30 dBc

[Ant. 2]

BW	Frequency [MHz]	Channel No.	RU Index	Measured Position	Result (dB)		
					26 T	52 T	106 T
HE20	2412	1	Low	Lowest Bandedge	35.872	35.887	36.482
	2462	11	High	Highest Bandedge	45.739	53.369	44.915
	2467	12	High	Highest Bandedge	39.399	39.164	37.991
	2472	13	High	Highest Bandedge	31.869	31.637	31.071

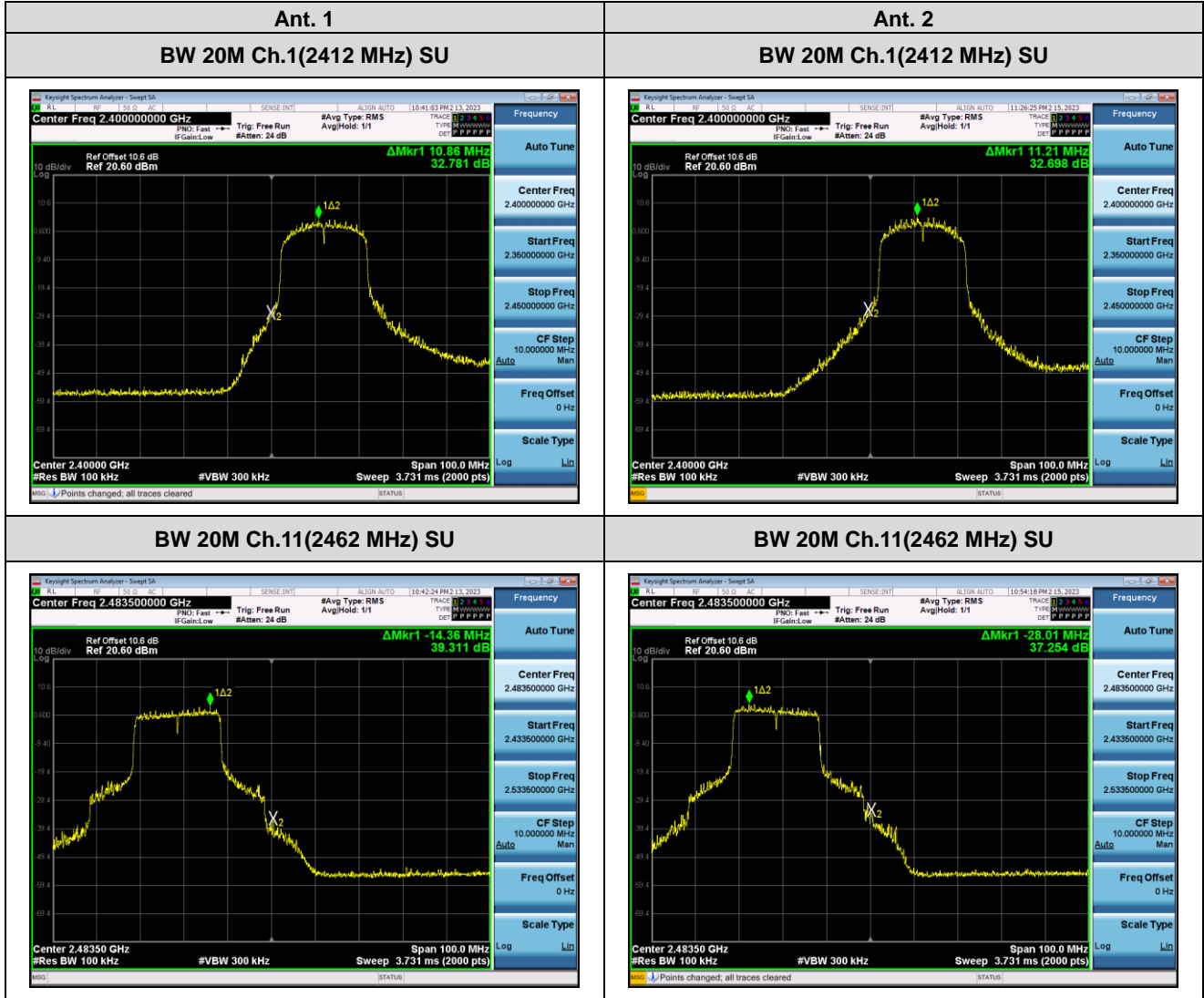
BW	Frequency [MHz]	Channel No.	RU Index	Measured Position	Result (dB)	
					242 T	SU
HE20	2412	1	Mid	Lowest Bandedge	34.826	32.698
	2462	11		Highest Bandedge	46.672	37.254
	2467	12		Highest Bandedge	31.323	31.189
	2472	13		Highest Bandedge	32.112	33.085

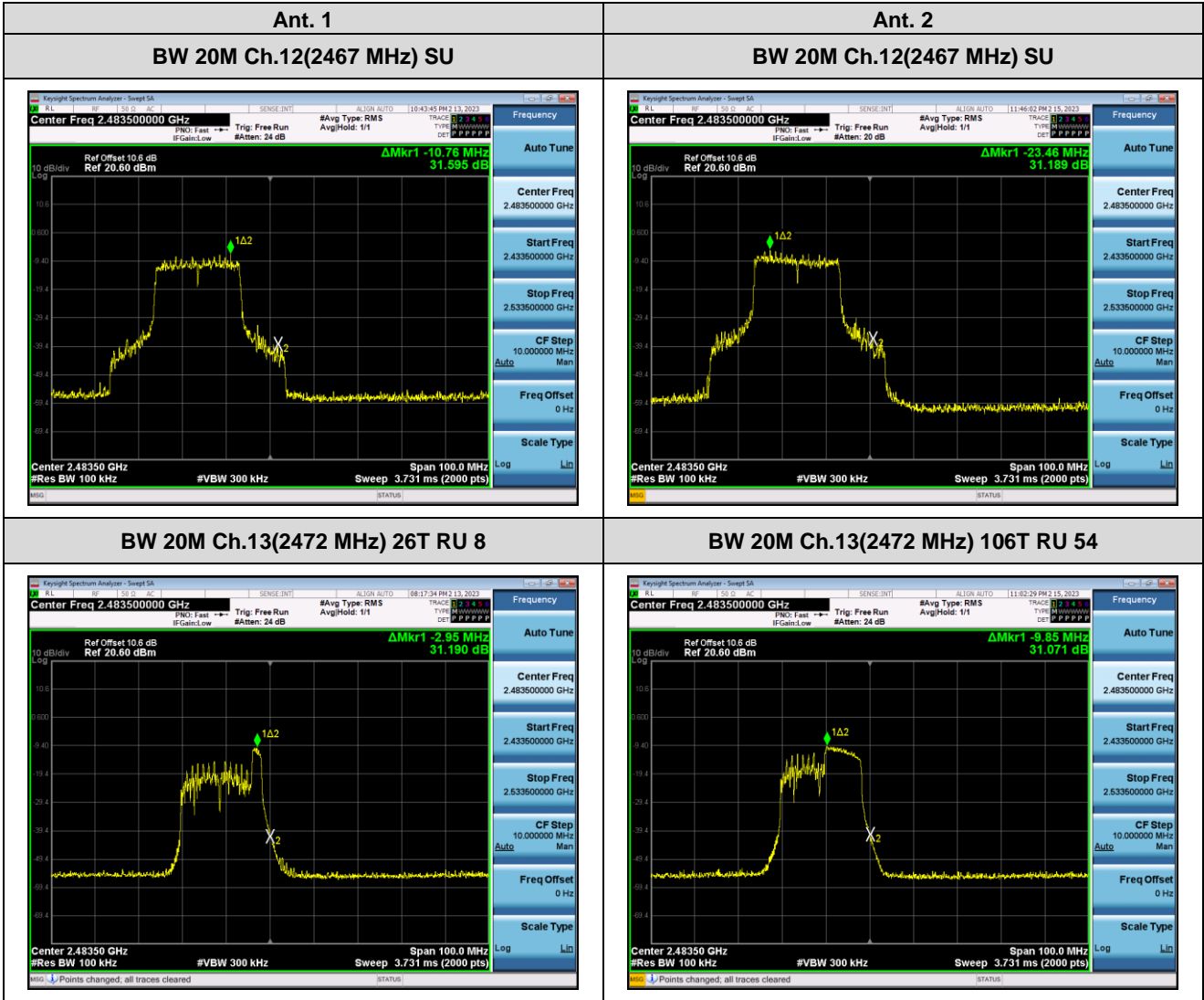
Limit : 30 dBc

☐ Test Plots

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

[Ant. 1]





Conducted Spurious Emissions

Note: Channel 12 and 13 are less powerful than channel 11 so the test for high channel was performed at channel 11.

[Ant. 1]

BW	Frequency [MHz]	Channel No.	RU Index	Result (dB)				
				26 T	52 T	106 T	242 T	SU
HE20	2412	1	Low	39.194	40.170	38.971	-	-
			Mid	43.696	41.078	-	34.914	43.154
			High	40.789	40.423	37.789	-	-
	2437	6	Low	43.234	40.153	35.734	-	-
			Mid	42.792	41.677	-	36.536	43.944
			High	42.771	40.455	37.482	-	-
	2462	11	Low	40.787	39.434	37.619	-	-
			Mid	41.395	41.299	-	34.094	40.112
			High	42.476	42.022	37.848	-	-

[Ant. 2]

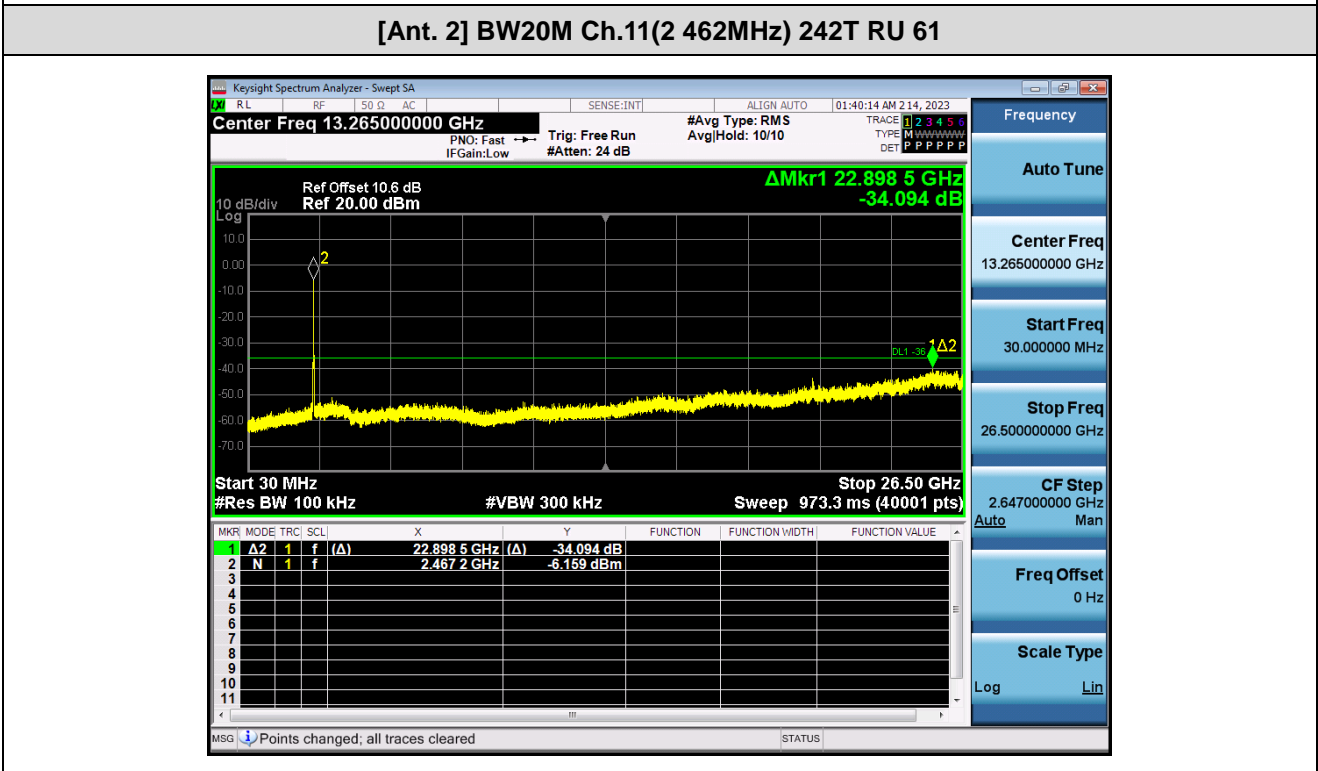
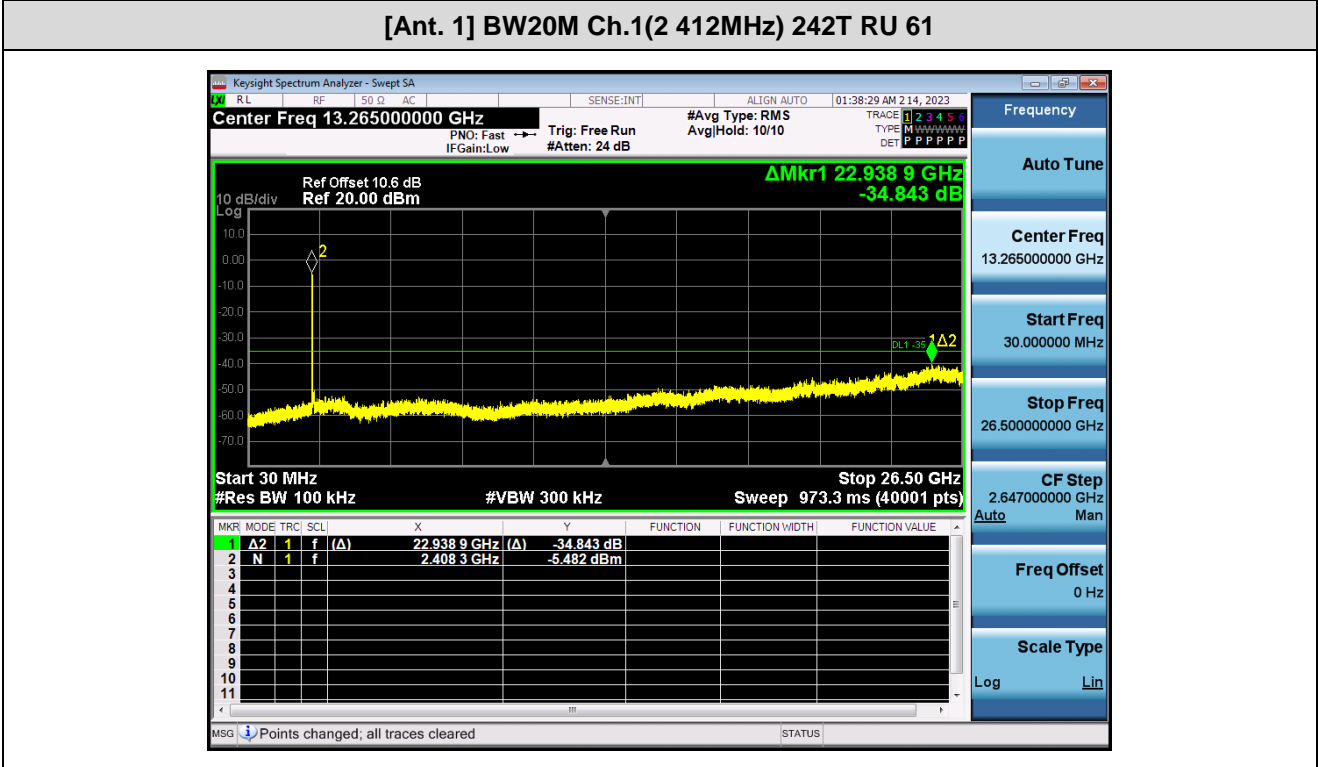
BW	Frequency [MHz]	Channel No.	RU Index	Result (dB)				
				26 T	52 T	106 T	242 T	SU
HE20	2412	1	Low	40.155	40.006	37.952	-	-
			Mid	41.510	41.052	-	34.843	42.108
			High	40.625	40.812	38.154	-	-
	2437	6	Low	39.815	40.621	36.915	-	-
			Mid	38.619	41.080	-	35.105	43.125
			High	40.158	38.910	36.952	-	-
	2462	11	Low	41.650	39.852	38.035	-	-
			Mid	40.056	39.014	-	34.962	42.962
			High	39.813	40.810	37.156	-	-

Limit : 30 dBc

▣ Test Plots

Note:

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



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

1. 26 Tones

Operation Mode:	802.11ax(HE20)
Transfer MCS Index:	0
Operating Frequency	2412 MHz
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	45.19	0.00	3.42	V	48.61	73.98	25.37	PK
4824	32.79	0.10	3.42	V	36.31	53.98	17.67	AV
7236	41.58	0.00	8.48	V	50.06	73.98	23.92	PK
7236	29.79	0.10	8.48	V	38.37	53.98	15.61	AV
4824	44.92	0.00	3.42	H	48.34	73.98	25.64	PK
4824	32.55	0.10	3.42	H	36.07	53.98	17.91	AV
7236	41.98	0.00	8.48	H	50.46	73.98	23.52	PK
7236	29.93	0.10	8.48	H	38.51	53.98	15.47	AV

Operation Mode:	802.11ax(HE20)
Transfer MCS Index:	0
Operating Frequency	2437 MHz
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	43.22	0.00	2.97	V	46.19	73.98	27.79	PK
4874	31.24	0.10	2.97	V	34.31	53.98	19.67	AV
7311	45.19	0.00	9.43	V	54.62	73.98	19.36	PK
7311	30.02	0.10	9.43	V	39.55	53.98	14.43	AV
4874	43.34	0.00	2.97	H	46.31	73.98	27.67	PK
4874	31.31	0.10	2.97	H	34.38	53.98	19.60	AV
7311	45.55	0.00	9.43	H	54.98	73.98	19.00	PK
7311	30.23	0.10	9.43	H	39.76	53.98	14.22	AV

Operation Mode:	802.11ax(HE20)
Transfer MCS Index:	0
Operating Frequency	2462 MHz
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	43.25	0.00	2.47	V	45.72	73.98	28.26	PK
4924	31.37	0.10	2.47	V	33.94	53.98	20.04	AV
7386	41.55	0.00	10.24	V	51.79	73.98	22.19	PK
7386	29.24	0.10	10.24	V	39.58	53.98	14.40	AV
4924	42.97	0.00	2.47	H	45.44	73.98	28.54	PK
4924	31.27	0.10	2.47	H	33.84	53.98	20.14	AV
7386	42.07	0.00	10.24	H	52.31	73.98	21.67	PK
7386	29.31	0.10	10.24	H	39.65	53.98	14.33	AV

Note:

Channel 12 and 13 are less powerful than channel 11. So, The test for high channel was performed at channel 11.

2. SU

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

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	43.99	0.00	3.42	V	47.41	73.98	26.57	PK
4824	32.51	0.36	3.42	V	36.28	53.98	17.70	AV
7236	42.07	0.00	8.48	V	50.55	73.98	23.43	PK
7236	30.05	0.36	8.48	V	38.88	53.98	15.10	AV
4824	44.70	0.00	3.42	H	48.12	73.98	25.86	PK
4824	32.71	0.36	3.42	H	36.48	53.98	17.50	AV
7236	42.29	0.00	8.48	H	50.77	73.98	23.21	PK
7236	30.14	0.36	8.48	H	38.97	53.98	15.01	AV

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

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	43.44	0.00	2.97	V	46.41	73.98	27.57	PK
4874	31.69	0.36	2.97	V	35.02	53.98	18.96	AV
7311	49.71	0.00	9.43	V	59.14	73.98	14.84	PK
7311	34.17	0.36	9.43	V	43.96	53.98	10.02	AV
4874	42.69	0.00	2.97	H	45.66	73.98	28.32	PK
4874	31.51	0.36	2.97	H	34.84	53.98	19.14	AV
7311	49.52	0.00	9.43	H	58.95	73.98	15.03	PK
7311	34.09	0.36	9.43	H	43.88	53.98	10.10	AV

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

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	43.41	0.00	2.47	V	45.88	73.98	28.10	PK
4924	31.67	0.36	2.47	V	34.49	53.98	19.49	AV
7386	46.92	0.00	10.24	V	57.16	73.98	16.82	PK
7386	31.45	0.36	10.24	V	42.05	53.98	11.93	AV
4924	43.22	0.00	2.47	H	45.69	73.98	28.29	PK
4924	31.57	0.36	2.47	H	34.39	53.98	19.59	AV
7386	46.50	0.00	10.24	H	56.74	73.98	17.24	PK
7386	31.54	0.36	10.24	H	42.14	53.98	11.84	AV

Note:

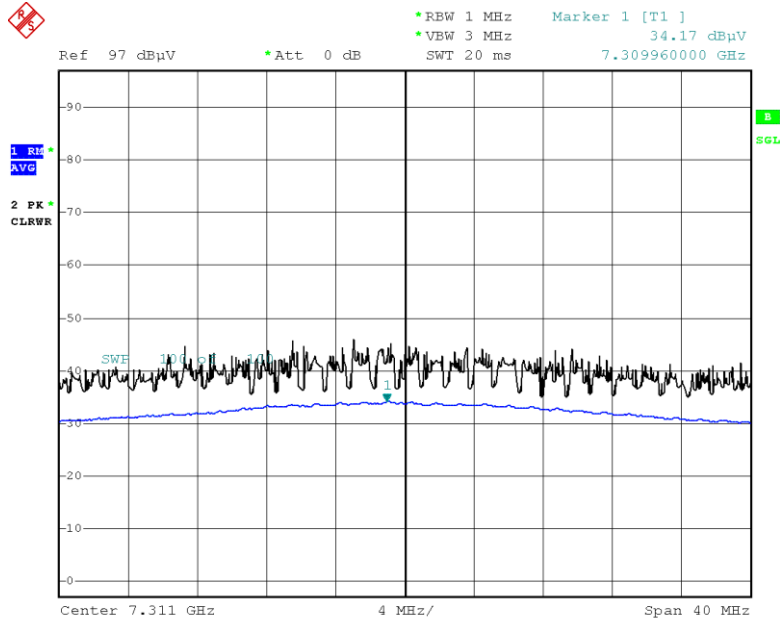
Channel 12 and 13 are less powerful than channel 11. So, The test for high channel was performed at channel 11.

▣ Test Plots

Note:

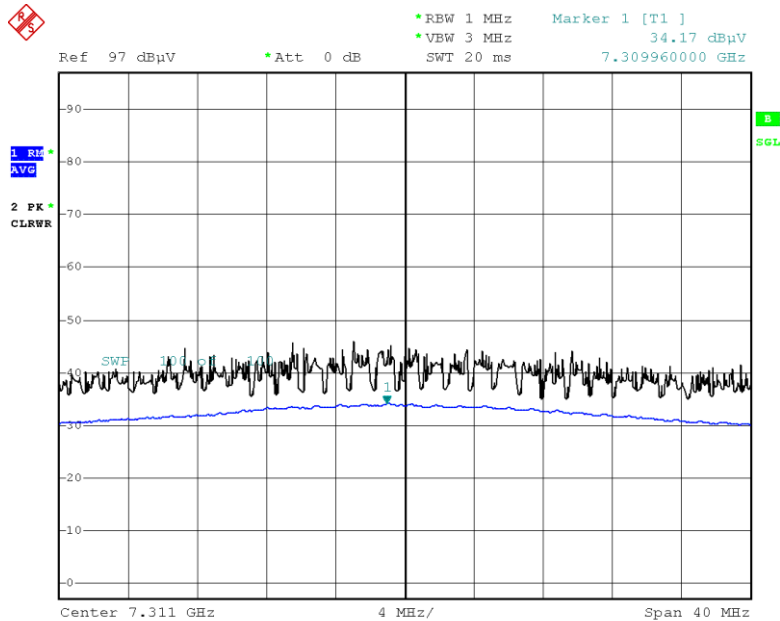
In order to simplify, Plots of worst case are only reported.

Radiated Spurious Emissions plot – Average result (802.11ax(HE20)_SU, Ch.6 3rd Harmonic, X-V)



Date: 8.FEB.2023 15:23:00

Radiated Spurious Emissions plot – Peak result (802.11ax(HE20)_SU, Ch.6 3rd Harmonic, X-V)



Date: 8.FEB.2023 15:23:00

9.7 RADIATED RESTRICTED BAND EDGES

[SISO]

1. 26 Tones

Operation Mode:	802.11ax(HE20)
Transfer MCS Index:	0
RU Index:	0
Operating Frequency	2412 MHz
Channel No.	01 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
2483.5~2500	27.008	0.00	35.10	H	62.10	73.98	11.88	PK
2483.5~2500	4.536	0.10	35.10	H	39.73	53.98	14.25	AV
2483.5~2500	26.573	0.00	35.10	V	61.67	73.98	12.31	PK
2483.5~2500	4.119	0.10	35.10	V	39.32	53.98	14.66	AV

Operation Mode:	802.11ax(HE20)
Transfer MCS Index:	0
RU Index:	0
Operating Frequency	2462 MHz
Channel No.	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
#2483.5	27.778	0.00	35.10	H	62.87	73.98	11.11	PK
2490.0	21.379	0.00	35.10	H	56.48	73.98	17.50	PK
2483.5	0.857	0.10	35.10	H	36.05	53.98	17.93	AV
#2483.5	27.258	0.00	35.10	V	62.35	73.98	11.63	PK
2490.0	21.097	0.00	35.10	V	56.19	73.98	17.79	PK
2483.5	0.785	0.10	35.10	V	35.98	53.98	18.00	AV

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

Operation Mode: 802.11ax(HE20)
 Transfer MCS Index: 0
 RU Index: 4
 Operating Frequency: 2462 MHz
 Channel No. 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
2483.5	31.491	0.00	35.10	H	66.59	73.98	7.39	PK
2483.5	-1.271	0.10	35.10	H	33.93	53.98	20.05	AV
2483.5	31.094	0.00	35.10	V	66.19	73.98	7.79	PK
2483.5	-1.369	0.10	35.10	V	33.83	53.98	20.15	AV

Operation Mode: 802.11ax(HE20)
 Transfer MCS Index: 0
 RU Index: 8
 Operating Frequency: 2462 MHz
 Channel No. 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
2483.5	34.170	0.00	35.10	H	69.27	73.98	4.71	PK
2483.5	-0.339	0.10	35.10	H	34.86	53.98	19.12	AV
2483.5	33.975	0.00	35.10	V	69.07	73.98	4.91	PK
2483.5	-0.469	0.10	35.10	V	34.73	53.98	19.25	AV

Operation Mode: 802.11ax(HE20)
 Transfer MCS Index: 0
 Operating Frequency: 2467 MHz
 RU Index: 0
 Channel No. 12 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
#2483.5	24.944	0.00	35.10	H	60.04	73.98	13.94	PK
2493.5	27.203	0.00	35.10	H	62.30	73.98	11.68	PK
2483.5	-2.476	0.10	35.10	H	32.72	53.98	21.26	AV
#2483.5	23.940	0.00	35.10	V	59.04	73.98	14.94	PK
2493.5	26.782	0.00	35.10	V	61.88	73.98	12.10	PK
2483.5	-2.524	0.10	35.10	V	32.67	53.98	21.31	AV

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

Operation Mode: 802.11ax(HE20)
 Transfer MCS Index: 0
 Operating Frequency: 2467 MHz
 RU Index: 4
 Channel No. 12 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
2483.5	31.612	0.00	35.10	H	66.71	73.98	7.27	PK
2483.5	-1.108	0.10	35.10	H	34.09	53.98	19.89	AV
2483.5	30.875	0.00	35.10	V	65.97	73.98	8.01	PK
2483.5	-1.531	0.10	35.10	V	33.67	53.98	20.31	AV

Operation Mode: 802.11ax(HE20)
 Transfer MCS Index: 0
 Operating Frequency: 2467 MHz
 RU Index: 8
 Channel No. 12 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
2483.5	34.052	0.00	35.10	H	69.15	73.98	4.83	PK
2483.5	12.464	0.10	35.10	H	47.66	53.98	6.32	AV
2483.5	33.579	0.00	35.10	V	68.68	73.98	5.30	PK
2483.5	12.421	0.10	35.10	V	47.62	53.98	6.36	AV

Operation Mode: 802.11ax(HE20)
 Transfer MCS Index: 0
 RU Index: 8
 Operating Frequency: 2472 MHz
 Channel No. 13 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
2483.5	27.617	0.00	35.10	H	62.71	73.98	11.27	PK
2483.5	12.346	0.10	35.10	H	47.54	53.98	6.44	AV
2483.5	27.541	0.00	35.10	V	62.64	73.98	11.34	PK
2483.5	12.069	0.10	35.10	V	47.27	53.98	6.71	AV

2. 52 Tones

Operation Mode:	802.11ax(HE20)
Transfer MCS Index:	0
RU Index:	37
Operating Frequency	2412 MHz
Channel No.	01 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
2483.5	23.091	0.00	35.10	H	58.19	73.98	15.79	PK
2483.5	5.029	0.11	35.10	H	40.24	53.98	13.74	AV
2483.5	22.782	0.00	35.10	V	57.88	73.98	16.10	PK
2483.5	4.975	0.11	35.10	V	40.19	53.98	13.79	AV

Operation Mode:	802.11ax(HE20)
Transfer MCS Index:	0
RU Index:	37
Operating Frequency	2462 MHz
Channel No.	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
2483.5	25.583	0.00	35.10	H	60.68	73.98	13.30	PK
2483.5	2.716	0.11	35.10	H	37.93	53.98	16.05	AV
2483.5	24.993	0.00	35.10	V	60.09	73.98	13.89	PK
2483.5	2.497	0.11	35.10	V	37.71	53.98	16.27	AV

Operation Mode: 802.11ax(HE20)
 Transfer MCS Index: 0
 RU Index: 40
 Operating Frequency: 2462 MHz
 Channel No. 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
2483.5	20.730	0.00	35.10	H	55.83	73.98	18.15	PK
2483.5	0.898	0.11	35.10	H	36.11	53.98	17.87	AV
2483.5	20.450	0.00	35.10	V	55.55	73.98	18.43	PK
2483.5	0.725	0.11	35.10	V	35.94	53.98	18.04	AV

Operation Mode: 802.11ax(HE20)
 Transfer MCS Index: 0
 Operating Frequency: 2467 MHz
 RU Index: 37
 Channel No. 12 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
2483.5	33.748	0.00	35.10	H	68.84	73.98	5.14	PK
2483.5	-0.889	0.11	35.10	H	34.32	53.98	19.66	AV
2483.5	32.599	0.00	35.10	V	67.70	73.98	6.28	PK
2483.5	-0.967	0.11	35.10	V	34.24	53.98	19.74	AV

Operation Mode: 802.11ax(HE20)
 Transfer MCS Index: 0
 Operating Frequency: 2467 MHz
 RU Index: 40
 Channel No.: 12 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
2483.5	33.141	0.00	35.10	H	68.24	73.98	5.74	PK
2483.5	10.219	0.11	35.10	H	45.43	53.98	8.55	AV
2483.5	32.967	0.00	35.10	V	68.06	73.98	5.92	PK
2483.5	10.024	0.11	35.10	V	45.24	53.98	8.74	AV

Operation Mode: 802.11ax(HE20)
 Transfer MCS Index: 0
 RU Index: 40
 Operating Frequency: 2472 MHz
 Channel No.: 13 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
2483.5	34.299	0.00	35.10	H	69.40	73.98	4.58	PK
2483.5	12.887	0.11	35.10	H	48.10	53.98	5.88	AV
2483.5	34.025	0.00	35.10	V	69.12	73.98	4.86	PK
2483.5	12.645	0.11	35.10	V	47.86	53.98	6.12	AV

3. 106 Tones

Operation Mode:	802.11ax(HE20)
Transfer MCS Index:	0
RU Index:	53
Operating Frequency	2412 MHz
Channel No.	01 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
2483.5	24.070	0.00	35.10	H	59.17	73.98	14.81	PK
2483.5	5.449	0.20	35.10	H	40.75	53.98	13.23	AV
2483.5	23.578	0.00	35.10	V	58.67	73.98	15.31	PK
2483.5	4.972	0.20	35.10	V	40.27	53.98	13.71	AV

Operation Mode:	802.11ax(HE20)
Transfer MCS Index:	0
RU Index:	54
Operating Frequency	2462 MHz
Channel No.	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
2483.5	20.442	0.00	35.10	H	55.54	73.98	18.44	PK
2483.5	1.375	0.20	35.10	H	36.68	53.98	17.30	AV
2483.5	20.178	0.00	35.10	V	55.27	73.98	18.71	PK
2483.5	1.297	0.20	35.10	V	36.60	53.98	17.38	AV

Operation Mode: 802.11ax(HE20)
 Transfer MCS Index: 0
 Operating Frequency: 2467 MHz
 RU Index: 54
 Channel No. 12 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
2483.5	32.207	0.00	35.10	H	67.30	73.98	6.68	PK
2483.5	7.786	0.20	35.10	H	43.09	53.98	10.89	AV
2483.5	32.104	0.00	35.10	V	67.20	73.98	6.78	PK
2483.5	7.593	0.20	35.10	V	42.89	53.98	11.09	AV

Operation Mode: 802.11ax(HE20)
 Transfer MCS Index: 0
 RU Index: 54
 Operating Frequency: 2472 MHz
 Channel No. 13 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
2483.5	32.804	0.00	35.10	H	67.90	73.98	6.08	PK
2483.5	8.953	0.20	35.10	H	44.25	53.98	9.73	AV
2483.5	32.427	0.00	35.10	V	67.52	73.98	6.46	PK
2483.5	8.649	0.20	35.10	V	43.95	53.98	10.03	AV

4. 242 Tones

Operation Mode: 802.11ax(HE20)
 Transfer MCS Index: 0
 RU Index: 61
 Operating Frequency: 2412 MHz
 Channel No. 01 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
2483.5	25.143	0.00	35.10	H	60.24	73.98	13.74	PK
2483.5	5.387	0.43	35.10	H	40.91	53.98	13.07	AV
2483.5	24.940	0.00	35.10	V	60.04	73.98	13.94	PK
2483.5	5.048	0.43	35.10	V	40.57	53.98	13.41	AV

Operation Mode: 802.11ax(HE20)
 Transfer MCS Index: 0
 RU Index: 61
 Operating Frequency: 2462 MHz
 Channel No. 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
2483.5	25.846	0.00	35.10	H	60.94	73.98	13.04	PK
2483.5	1.739	0.43	35.10	H	37.26	53.98	16.72	AV
2483.5	25.446	0.00	35.10	V	60.54	73.98	13.44	PK
2483.5	1.349	0.43	35.10	V	36.87	53.98	17.11	AV

Operation Mode: 802.11ax(HE20)
 Transfer MCS Index: 0
 Operating Frequency: 2467 MHz
 RU Index: 61
 Channel No. 12 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
2483.5	35.314	0.00	35.10	H	70.41	73.98	3.57	PK
2483.5	12.167	0.43	35.10	H	47.69	53.98	6.29	AV
2483.5	34.680	0.00	35.10	V	69.78	73.98	4.20	PK
2483.5	12.096	0.43	35.10	V	47.62	53.98	6.36	AV

Operation Mode: 802.11ax(HE20)
 Transfer MCS Index: 0
 RU Index: 61
 Operating Frequency: 2472 MHz
 Channel No. 13 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
2483.5	28.081	0.00	35.10	H	63.18	73.98	10.80	PK
2483.5	7.025	0.43	35.10	H	42.55	53.98	11.43	AV
2483.5	27.932	0.00	35.10	V	63.03	73.98	10.95	PK
2483.5	6.544	0.43	35.10	V	42.07	53.98	11.91	AV

5. SU

Operation Mode: 802.11ax(HE20)
 Transfer MCS Index: 0
 Operating Frequency: 2412 MHz
 Channel No.: 01 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
2483.5	27.568	0.00	35.10	H	62.66	73.98	11.32	PK
2483.5	10.897	0.36	35.10	H	46.35	53.98	7.63	AV
2483.5	27.096	0.00	35.10	V	62.19	73.98	11.79	PK
2483.5	10.598	0.36	35.10	V	46.05	53.98	7.93	AV

Operation Mode: 802.11ax(HE20)
 Transfer MCS Index: 0
 Operating Frequency: 2462 MHz
 Channel No.: 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
2483.5	36.062	0.00	35.10	H	71.16	73.98	2.82	PK
2483.5	11.930	0.36	35.10	H	47.38	53.98	6.60	AV
2483.5	35.428	0.00	35.10	V	70.52	73.98	3.46	PK
2483.5	11.632	0.36	35.10	V	47.09	53.98	6.89	AV

Operation Mode: 802.11ax(HE20)
 Transfer MCS Index: 0
 Operating Frequency: 2467 MHz
 Channel No.: 12 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
#2483.5	28.011	0.00	35.10	H	63.11	73.98	10.87	PK
2485.5	36.157	0.00	35.10	H	71.25	73.98	2.73	PK
2483.5	12.579	0.36	35.10	H	48.03	53.98	5.95	AV
#2483.5	27.931	0.00	35.10	V	63.03	73.98	10.95	PK
2485.5	35.940	0.00	35.10	V	71.04	73.98	2.94	PK
2483.5	12.463	0.36	35.10	V	47.92	53.98	6.06	AV

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

Operation Mode: 802.11ax(HE20)
 Transfer MCS Index: 0
 Operating Frequency: 2472 MHz
 Channel No.: 13 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
2483.5	29.563	0.00	35.10	H	64.66	73.98	9.32	PK
2483.5	7.130	0.36	35.10	H	42.58	53.98	11.40	AV
2483.5	29.227	0.00	35.10	V	64.32	73.98	9.66	PK
2483.5	7.054	0.36	35.10	V	42.51	53.98	11.47	AV

■ Test Plots [SISO]

Note:

In order to simplify the report, Plots of worst case are only reported.

Worst case : 802.11ax(HE20) Ch. 12 SU Mode MCS 0 – X-H

Average result



Peak result(Integration method Used)



Peak result



10. LIST OF TEST EQUIPMENT

Conducted Test

Equipment	Model	Manufacturer	Serial No.	Due to Calibration	Calibration Interval
LISN	ENV216	Rohde & Schwarz	102245	08/22/2023	Annual
EMI Test Receiver	ESR	Rohde & Schwarz	101910	06/07/2023	Annual
Temperature Chamber	SU-642	ESPEC	0093008124	03/04/2023	Annual
Signal Analyzer	N9030A	Keysight	MY55410508	09/06/2023	Annual
Power Meter	N1911A	Agilent	MY45100523	03/24/2023	Annual
Power Sensor	N1921A	Agilent	MY57820067	03/24/2023	Annual
Directional Coupler	87300B	Agilent	3116A03621	11/02/2023	Annual
Power Splitter	11667B	Hewlett Packard	10545	02/06/2024	Annual
DC Power Supply	E3632A	Agilent	KR75305528	01/03/2024	Annual
Attenuator(10 dB)(DC-26.5 GHz)	8493C-010	Agilent	08285	06/21/2023	Annual
Attenuator(20 dB)	18N-20dB	Rohde & Schwarz	8	03/07/2023	Annual
Software	EMC32	Rohde & Schwarz	N/A	N/A	N/A
FCC WLAN&BT&BLE Conducted Test Software v3.0	N/A	HCT CO., LTD.	N/A	N/A	N/A
Bluetooth Tester	CBT	Rohde & Schwarz	100808	02/16/2024	Annual

Note:

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

Radiated Test

Equipment	Model	Manufacturer	Serial No.	Due to Calibration	Calibration Interval
Controller(Antenna mast)	CO3000	Innco system	CO3000-4p	N/A	N/A
Antenna Position Tower	MA4640/800-XP-EP	Innco system	N/A	N/A	N/A
Controller	EM2090	Emco	060520	N/A	N/A
Turn Table	N/A	Ets	N/A	N/A	N/A
Loop Antenna	FMZB 1513	Rohde & Schwarz	1513-333	03/17/2024	Biennial
Hybrid Antenna	VULB 9168	Schwarzbeck	9168-0895	08/16/2024	Biennial
Horn Antenna	BBHA 9120D	Schwarzbeck	9120D-1191	11/18/2023	Biennial
Horn Antenna(15 GHz ~ 40 GHz)	BBHA9170	Schwarzbeck	BBHA9170124	04/12/2023	Biennial
Amp & Filter Bank Switch Controller	FBSM-01A	TNM system	0	N/A	N/A
Band Reject Filter	WRCJV2400/2483.5-2370/2520-60/12SS	Wainwright Instruments	2	01/05/2024	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
Band Reject Filter	WRCJV5100/5850-40/50-8EEK	Wainwright Instruments	1	02/09/2024	Annual
ATT(3 dB) + LNA2(6~18 GHz)	18B-03, CBL06185030	WEINSCHEL CERNEK	N/A	12/05/2023	Annual
ATT(10 dB) + LNA1(0.1~18 GHz)	56-10, CBLU1183540B-01	Api tech, CERNEK	N/A	12/05/2023	Annual
High Pass Filter	WHKX10-2700-3000-18000-40SS	Wainwright Instruments	N/A	12/05/2023	Annual
High Pass Filter	WHKX8-6090-7000-18000-40SS	Wainwright Instruments	N/A	12/05/2023	Annual
Thru	COAXIAL ATTENUATOR	T&M SYSTEM	N/A	12/05/2023	Annual
Power Amplifier	CBL18265035	CERNEK	22966	12/01/2023	Annual
Power Amplifier	CBL26405040	CERNEK	25956	03/11/2023	Annual
Bluetooth Tester	TC-3000C	TESCOM	3000C000175	04/05/2023	Annual
Spectrum Analyzer	FSP(9 kHz ~ 30 GHz)	Rohde & Schwarz	836650/016	09/06/2023	Annual
Spectrum Analyzer	FSV40-N(9 kHz ~ 30 GHz)	Rohde & Schwarz	101068-SZ	09/07/2023	Annual

Note:

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

11. ANNEX A_ TEST SETUP PHOTO

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

No.	Description
1	HCT-RF-2302-FC024-P