TEST REPORT

FCC DTS ax Test for SM-M356B/DS
Certification

APPLICANT
SAMSUNG Electronics Co., Ltd.

REPORT NO.
HCT-RF-2403-FC020

DATE OF ISSUE
March 21, 2024

Tested by
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Applicant	**SAMSUNG Electronics Co., Ltd.** 129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Rep. of Korea
Product Name Model Name	Mobile Phone SM-M356B/DS
FCC ID	A3LSMM356B
FCC Classification	Digital Transmission System(DTS)
Test Standard Used	FCC Rule Part(s): Part 15.247
Test Results	PASS
Location of Test	■ Permanent Testing Lab ☐ On Site Testing Lab (Address: 74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, Republic of Korea)

REVISION HISTORY

The revision history for this test report is shown in table.

Revision No.	Date of Issue	Description
0	March 21, 2024	Initial Release

Notice

Content
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. The laboratory is not accredited for the test results marked *. Information provided by the applicant is marked **. Test results provided by external providers are marked ***. The results shown in this test report only apply to the sample(s), as received, provided by the applicant, unless otherwise stated. The test results have only been applied with the test methods required by the standard(s). When confirmation of authenticity of this test report is required, please contact www.hct.co.kr The test results in this test report are not associated with the ((KS Q) ISO/IEC 17025) accreditation by KOLAS (Korea Laboratory Accreditation Scheme) / A2LA (American Association for Laboratory Accreditation) that are under the ILAC (International Laboratory Accreditation Cooperation) Mutual Recognition Agreement (MRA).

CONTENTS

1. EUT DESCRIPTION

Model	SM-M356B/DS		
Additional Model	-		
EUT Type	Mobile Phone		
Power Supply	DC 3.85 V		
Frequency Range	2 412 MHz ~ 2 472 MHz		
Max. RF Output Power	Peak Power	SISO(Ant.1)	24.50 dBm
		MIMO_SDM(Ant.1+ Ant.2)	27.66 dBm
	Average Power	SISO(Ant.1)	14.64 dBm
		MIMO_SDM(Ant.1+ Ant.2)	17.66 dBm
Modulation Type	OFDM, OFDMA		
Number of Channels	13 Channels		
Antenna Specification	Type: PIFA		
Date(s) of Tests	February 16, 2024 ~ March 21, 2024		
Serial number	Conducted : R3CX2042SRT Radiated : R3CX20420GF		

ANTENNA CONFIGURATIONS

1. Antenna configuration

Configurations	SISO		MIMO	
	ANT.1	ANT.2	CDD	SDM
802.11ax	O	X	X	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)

Directional gain(CDD) =

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

Directional gain(SDM) = Gmax + 10·log(N_{ANT}/ N_{ss}),

Ant Gain (dBi)		N_{ANT}/ N_{ss}	Directional Gain (dBi)	
			CDD	SDM
ANT.1	-3.17	CDD 2 / 1 SDM 2 / 2	-2.06	-3.17
ANT.2	-7.50			

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.

Directional gain(CDD) = 10·log(((10$^{(ANT.0\ Gain/20)}$+10$^{(ANT.1\ Gain/20)}$)^2)/2) dBi

Directional gain(SDM) = Gmax + 10·log(N_{ANT}/ N_{ss})

Sample MIMO Calculation:

Ex) ANT.1 : 11.58 dBm ANT.2 : 12.08 dBm

MIMO = ANT.0 + ANT.1

(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 March 11, 2024 (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.

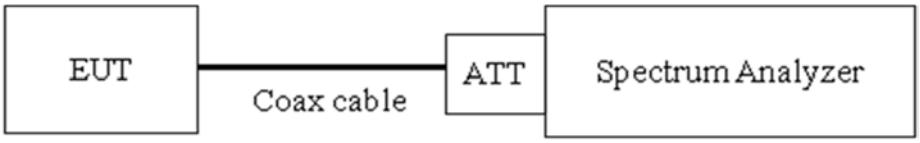
The measurement data shown herein meets or exceeds the U_{CISPR} measurement uncertainty values specified in CISPR 16-4-2 and, thus, can be compared directly to specified limits to determine compliance.

Parameter	Expanded Uncertainty (dB)
Conducted Disturbance (150 kHz ~ 30 MHz)	1.98 (Confidence level about 95 %, k=2)
Radiated Disturbance (9 kHz ~ 30 MHz)	4.36 (Confidence level about 95 %, k=2)
Radiated Disturbance (30 MHz ~ 1 GHz)	5.70 (Confidence level about 95 %, k=2)
Radiated Disturbance (1 GHz ~ 18 GHz)	5.52 (Confidence level about 95 %, k=2)
Radiated Disturbance (18 GHz ~ 40 GHz)	5.66 (Confidence level about 95 %, k=2)
Radiated Disturbance (Above 40 GHz)	5.58 (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*.

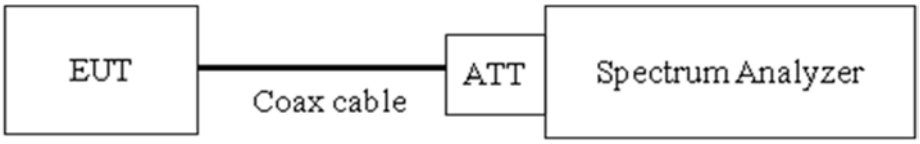
1. RBW = 8 MHz (the largest available value)
2. VBW = 8 MHz (≥ RBW)
3. SPAN = 0 Hz
4. Detector = Peak
5. Number of points in sweep > 100
6. Trace mode = Clear write
7. Measure T_{total} and T_{on}
8. Calculate Duty Cycle = T_{on} / T_{total} and Duty Cycle Factor = 10log(1/Duty Cycle)

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.

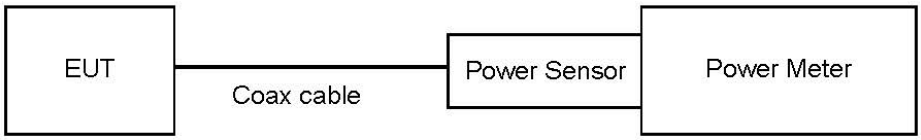
Note : We tested OBW using the automatic bandwidth measurement capability of a spectrum analyzer.

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

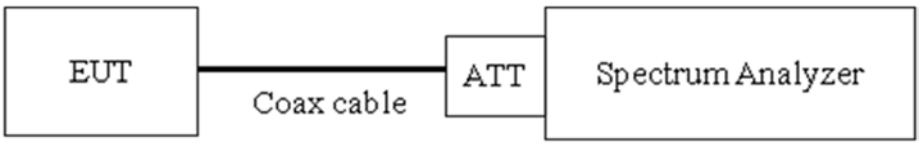
- Conducted Output Power(Peak) = Measured Value + ATT loss + Cable loss
- Conducted Output Power(Average) = Measured Value + ATT loss + Cable loss + Duty Cycle Factor

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

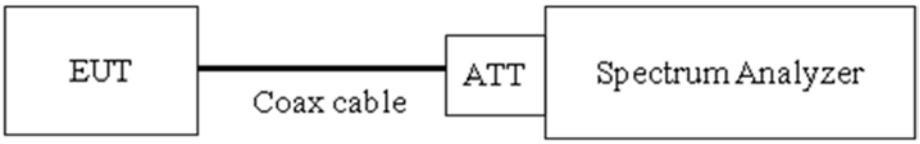
7.5. Conducted Band Edge (Out of Band Emissions) & Conducted Spurious Emissions

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)	Factor(dB)
30	10.13
100	10.18
200	10.23
300	10.26
400	10.29
500	10.31
600	10.33
700	10.35
800	10.42
900	10.50
1000	10.56
2000	10.65
2400	10.74
2500	10.74
3000	11.22
4000	11.48
5000	11.79
5150	11.87
5850	11.87
6000	11.89
7000	12.01
8000	12.04
9000	12.11
10000	12.16
11000	12.30
12000	12.35
13000	12.41
14000	12.58
15000	12.88
16000	13.04
17000	13.07
18000	12.97
19000	13.00
20000	12.89
21000	13.15
22000	13.59
23000	13.41
24000	13.54

Note : 1. 2400 ~ 2500 MHz is fundamental frequency range.
2. Factor = Attenuator loss + Cable loss

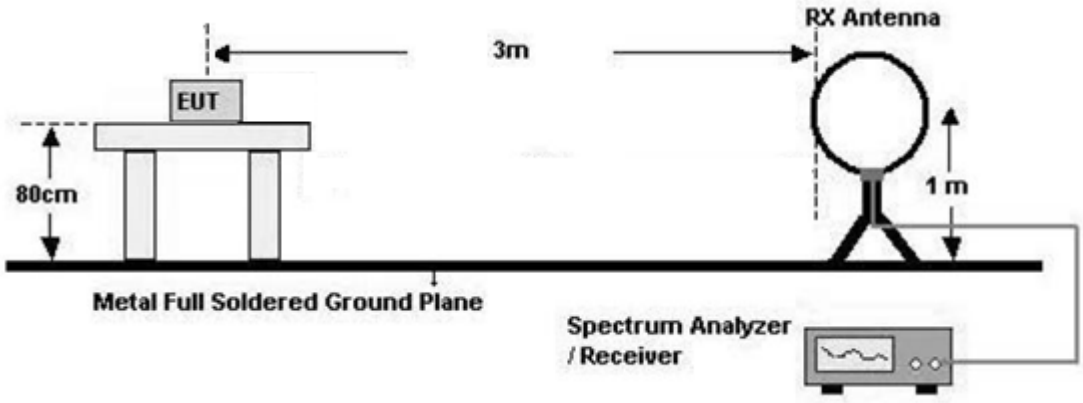
7.6. Radiated Test

Limit

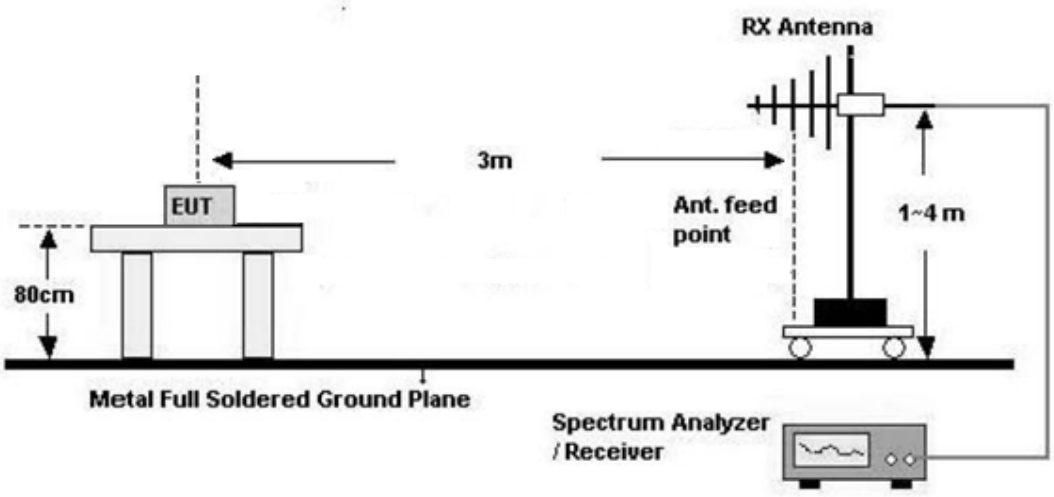
Frequency (MHz)	Field Strength (μV/m)	Measurement Distance (m)
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Test Configuration

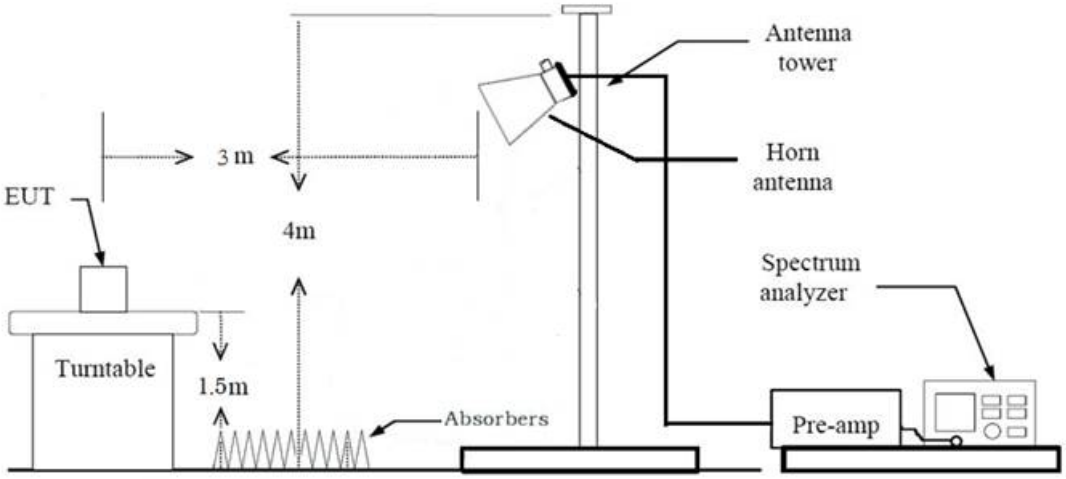
Below 30 MHz



30 MHz - 1 GHz



Above 1 GHz



Test Procedure of Radiated spurious emissions (Below 30 MHz)

1. The EUT was placed on a non-conductive table located on semi-anechoic chamber.
2. The loop antenna was placed at a location 3 m from the EUT
3. The EUT is placed on a turntable, which is 0.8 m above ground plane.
4. We have done x, y, z planes in EUT and horizontal and vertical polarization and Parallel to the ground plane in detecting antenna.
5. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
6. Distance Correction Factor(0.009 MHz – 0.490 MHz) = 40log(3 m/300 m) = - 80 dB
   Measurement Distance : 3 m
7. Distance Correction Factor(0.490 MHz – 30 MHz) = 40log(3 m/30 m) = - 40 dB
   Measurement Distance : 3 m
8. Spectrum Setting
   - Frequency Range = 9 kHz ~ 30 MHz
   - Detector = Peak
   - Trace = 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)
= Peak Measured Value + Antenna Factor(A.F) + Cable Loss(C.L) + Distance Factor(D.F) - Amp.Gain(A.G)
Total(Measurement Type : Average, Duty cycle ≥ 98 %)
= Average Measured Value + Antenna Factor(A.F) + Cable Loss(C.L) + Distance Factor(D.F) - Amp.Gain(A.G)
Total(Measurement Type : Average, Duty cycle < 98 %)
= Average Measured Value + Duty Cycle Factor + Antenna Factor(A.F) + Cable Loss(C.L) + Distance Factor(D.F) - Amp.Gain(A.G)

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)
    = Peak Measured Value
    Total(Measurement Type : Average, Duty cycle ≥ 98 %)
    = Average Measured Value
    Total(Measurement Type : Average, Duty cycle < 98 %)
    = Average Measured Value + Duty Cycle Factor
    - We apply to the offset in range 1 GHz - 18 GHz
    - The offset = Antenna Factor(A.F) + Cable Loss(C.L) + Distance Factor(D.F)

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	0, 8
	12 ,13	8
52	1, 11	37, 40
	12 ,13	40
106	1, 11, 12, 13	53, 54
242	1, 11, 12, 13	61
SU	1, 11, 12, 13	-

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
   - Radiated Restricted Band Edge : X
3. All data rate of operation were investigated and the worst case results are reported.
   (Worst case : MCS 0)
4. All Antenna of operation were investigated and the worst case results are reported
   - Antenna Operation Type : SISO_Ant.1, MIMO_SDM(Ant.1+Ant.2)
   - Worstcase: MIMO_SDM(Ant.1+Ant.2)
5. All position of loop antenna were investigated and the test result is a no critical peak found at all positions.
   - Position : Horizontal, Vertical, Parallel to the ground plane

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

TEST	TONE	RU OFFSET
RSE	WORST CASE : 242T	242T : 61
	ADDITIONAL TONE : 26T, 52T	26T : 4 52T : 38
Band-Edge	WORST CASE : 52T	40
	ADDITIONAL TONE : 26T, 52T, 106T, 242T, SU	Low Edge : 0, 37, 53, 61 High Edge : 8, 40, 54, 61 SU: -

AC Power line Conducted Emissions

1. Please refer to the [DTS] Test Report.

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 [DTS] Test Report.

9. TEST RESULT

9.1 DUTY CYCLE

[SISO_Ant.1]

Mode	Tone (T)	Data Rate	On Time (ms)	Total Time (ms)	Duty Cycle	Duty Cycle Factor (dB)
802.11ax (HE20)	26	MCS0	5.545	5.748	0.965	0.156
		MCS1	5.130	5.248	0.978	0.099
		MCS2	3.444	3.545	0.971	0.126
		MCS3	2.597	2.713	0.957	0.191
		MCS4	1.748	1.862	0.939	0.274
		MCS5	1.327	1.447	0.918	0.373
		MCS6	1.186	1.284	0.923	0.348
		MCS7	1.072	1.170	0.916	0.383
		MCS8	0.897	1.002	0.895	0.483
		MCS9	0.826	0.926	0.892	0.497
		MCS10	0.739	0.837	0.883	0.541
		MCS11	0.666	0.783	0.851	0.700
	52	MCS0	5.125	5.234	0.979	0.091
		MCS1	2.597	2.713	0.957	0.191
		MCS2	1.748	1.865	0.938	0.280
		MCS3	1.327	1.449	0.916	0.381
		MCS4	0.897	1.013	0.885	0.531
		MCS5	0.694	0.795	0.873	0.592
		MCS6	0.623	0.722	0.863	0.639
		MCS7	0.567	0.666	0.852	0.697
		MCS8	0.479	0.596	0.803	0.951
		MCS9	0.438	0.555	0.790	1.024
		MCS10	0.394	0.511	0.771	1.132
		MCS11	0.365	0.481	0.758	1.204
	106	MCS0	2.436	2.537	0.960	0.176
		MCS1	1.244	1.360	0.914	0.389
		MCS2	0.854	0.970	0.880	0.556
		MCS3	0.654	0.770	0.849	0.713
		MCS4	0.451	0.567	0.795	0.998

Mode	Tone (T)	Data Rate	On Time (ms)	Total Time (ms)	Duty Cycle	Duty Cycle Factor (dB)
		MCS5	0.349	0.466	0.749	1.257
		MCS6	0.322	0.441	0.730	1.367
		MCS7	0.291	0.408	0.714	1.461
		MCS8	0.250	0.366	0.682	1.661
		MCS9	0.236	0.352	0.669	1.745
		MCS10	0.221	0.337	0.655	1.836
		MCS11	0.205	0.322	0.638	1.953
	242	MCS0	1.097	1.214	0.904	0.440
		MCS1	0.583	0.697	0.836	0.776
		MCS2	0.408	0.524	0.778	1.091
		MCS3	0.322	0.438	0.734	1.342
		MCS4	0.233	0.350	0.667	1.761
		MCS5	0.192	0.308	0.624	2.045
		MCS6	0.177	0.294	0.603	2.194
		MCS7	0.165	0.279	0.591	2.285
		MCS8	0.149	0.265	0.561	2.507
		MCS9	0.134	0.251	0.535	2.714
		MCS10	0.135	0.251	0.537	2.701
		MCS11	0.119	0.236	0.505	2.964
802.11ax(SU)	BW 20	MCS0	1.097	1.195	0.918	0.372
		MCS1	0.578	0.676	0.854	0.686
		MCS2	0.405	0.522	0.777	1.097
		MCS3	0.319	0.418	0.764	1.171
		MCS4	0.233	0.347	0.672	1.729
		MCS5	0.192	0.288	0.667	1.761
		MCS6	0.172	0.268	0.643	1.919
		MCS7	0.160	0.258	0.618	2.093
		MCS8	0.149	0.248	0.600	2.218
		MCS9	0.129	0.228	0.567	2.467
		MCS10	0.134	0.250	0.536	2.708
		MCS11	0.117	0.233	0.500	3.010

[MIMO_SDM(Ant.1+Ant.2)]

Mode	Tone (T)	Data Rate	On Time (ms)	Total Time (ms)	Duty Cycle	Duty Cycle Factor (dB)
802.11ax (HE20)	26	MCS0	5.133	5.264	0.975	0.109
		MCS1	2.607	2.721	0.958	0.186
		MCS2	1.756	1.875	0.936	0.285
		MCS3	1.335	1.454	0.918	0.371
		MCS4	0.904	1.021	0.886	0.526
		MCS5	0.704	0.803	0.877	0.570
		MCS6	0.631	0.747	0.844	0.736
		MCS7	0.573	0.689	0.831	0.805
		MCS8	0.486	0.605	0.804	0.946
		MCS9	0.446	0.556	0.802	0.959
		MCS10	0.400	0.517	0.773	1.116
		MCS11	0.372	0.489	0.762	1.182
	52	MCS0	2.599	2.721	0.955	0.199
		MCS1	1.338	1.454	0.920	0.363
		MCS2	0.904	1.001	0.904	0.439
		MCS3	0.702	0.803	0.874	0.586
		MCS4	0.486	0.583	0.835	0.784
		MCS5	0.388	0.486	0.797	0.986
		MCS6	0.345	0.441	0.782	1.070
		MCS7	0.314	0.410	0.765	1.161
		MCS8	0.282	0.389	0.725	1.396
		MCS9	0.258	0.380	0.680	1.675
		MCS10	0.229	0.345	0.664	1.780
		MCS11	0.213	0.331	0.643	1.921
	106	MCS0	1.251	1.350	0.927	0.331
		MCS1	0.661	0.757	0.873	0.590
		MCS2	0.459	0.555	0.826	0.828
		MCS3	0.357	0.474	0.754	1.226
		MCS4	0.256	0.372	0.687	1.630
		MCS5	0.214	0.313	0.683	1.656
		MCS6	0.200	0.299	0.669	1.743
		MCS7	0.185	0.284	0.652	1.859
		MCS8	0.157	0.272	0.576	2.392

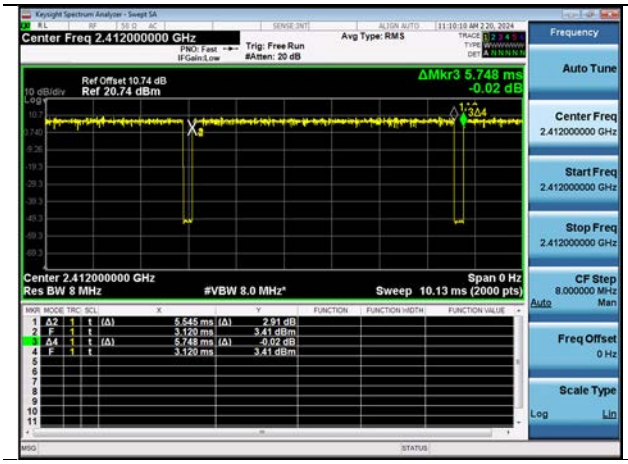
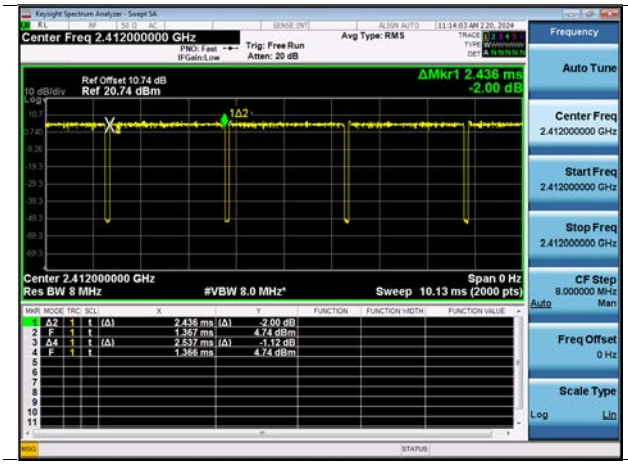
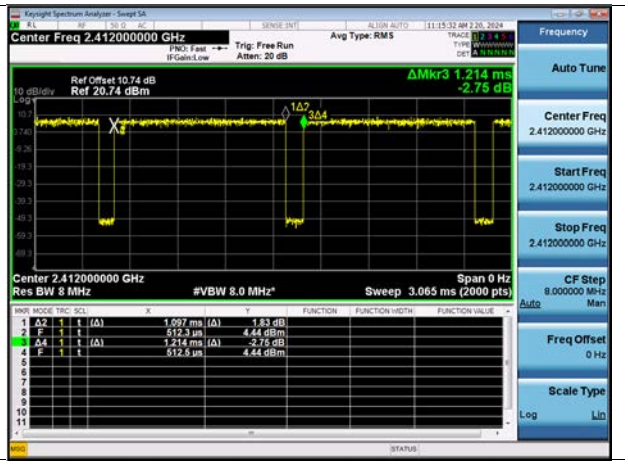
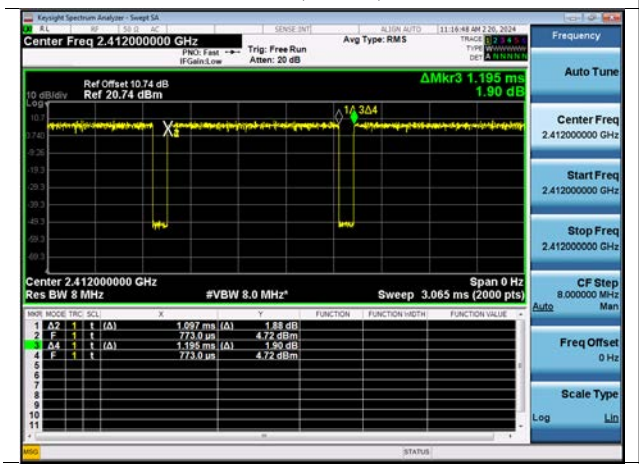
Mode	Tone (T)	Data Rate	On Time (ms)	Total Time (ms)	Duty Cycle	Duty Cycle Factor (dB)
		MCS9	0.157	0.273	0.575	2.401
		MCS10	0.142	0.259	0.550	2.593
		MCS11	0.142	0.258	0.549	2.604
	242	MCS0	0.587	0.702	0.836	0.777
		MCS1	0.329	0.426	0.774	1.114
		MCS2	0.243	0.360	0.676	1.700
		MCS3	0.200	0.317	0.632	1.993
		MCS4	0.157	0.253	0.620	2.076
		MCS5	0.128	0.229	0.559	2.522
		MCS6	0.127	0.223	0.568	2.455
		MCS7	0.117	0.213	0.548	2.615
		MCS8	0.113	0.229	0.495	3.058
		MCS9	0.099	0.200	0.494	3.067
		MCS10	0.099	0.215	0.461	3.366
		MCS11	0.099	0.216	0.458	3.395
802.11ax(SU)	BW 20	MCS0	0.583	0.699	0.833	0.792
		MCS1	0.329	0.428	0.769	1.139
		MCS2	0.243	0.360	0.676	1.700
		MCS3	0.200	0.299	0.669	1.743
		MCS4	0.157	0.274	0.574	2.410
		MCS5	0.124	0.240	0.516	2.876
		MCS6	0.120	0.235	0.511	2.919
		MCS7	0.114	0.232	0.491	3.086
		MCS8	0.109	0.226	0.483	3.157
		MCS9	0.101	0.211	0.480	3.185
		MCS10	0.134	0.250	0.536	2.708
		MCS11	0.096	0.195	0.494	3.067

▣ Test Plots

Note:

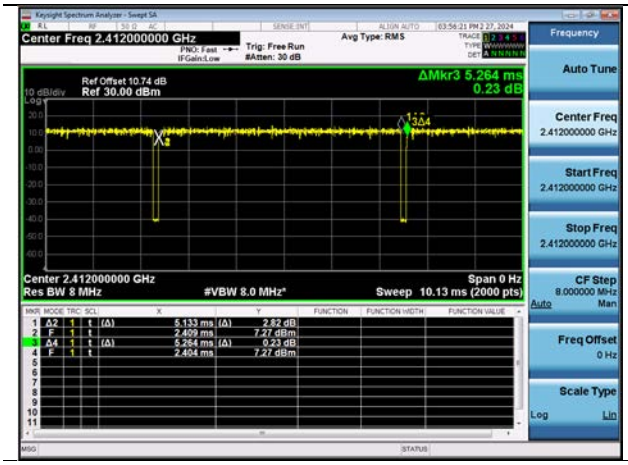
In order to simplify the report, attached plots were only the lowest data rate.

[SISO_Ant.1]

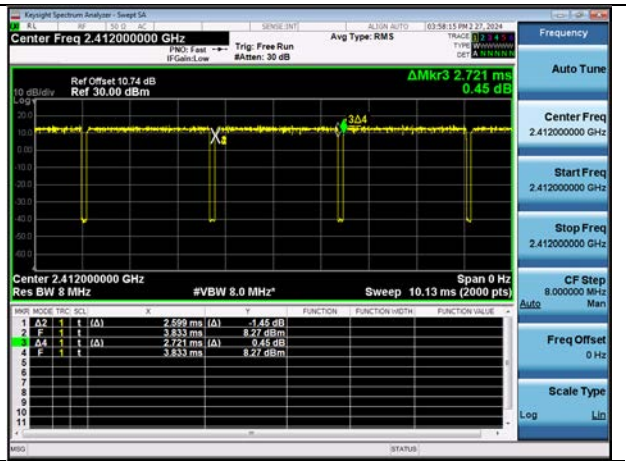
26 Tones (MCS 0)	52 Tones (MCS 0)
	
106 Tones (MCS 0)	**242 Tones (MCS 0)**
	
SU (MCS 0)	
	

[MIMO_SDM(Ant.1+Ant.2)]

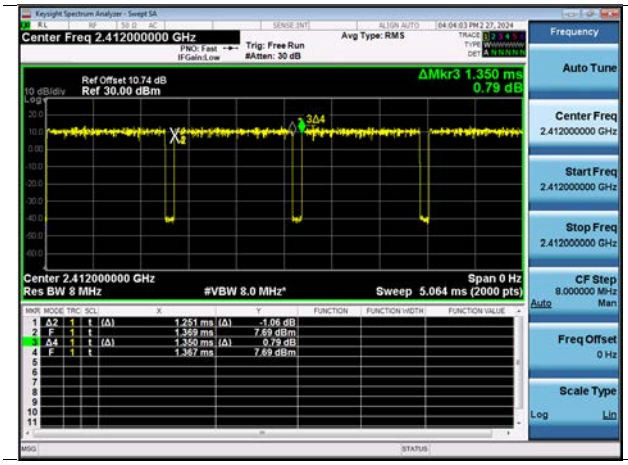
26 Tones (MCS 0)



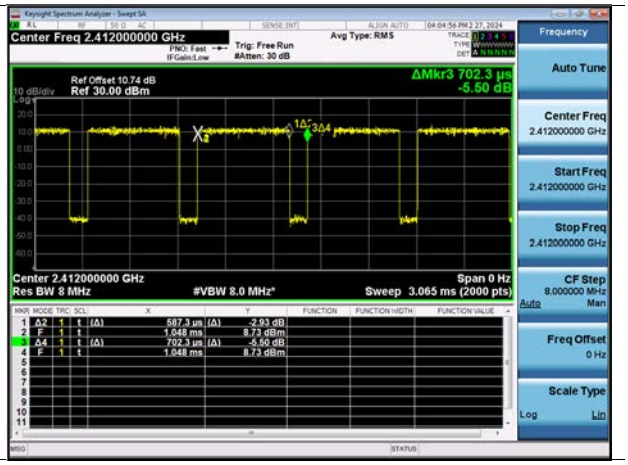
52 Tones (MCS 0)



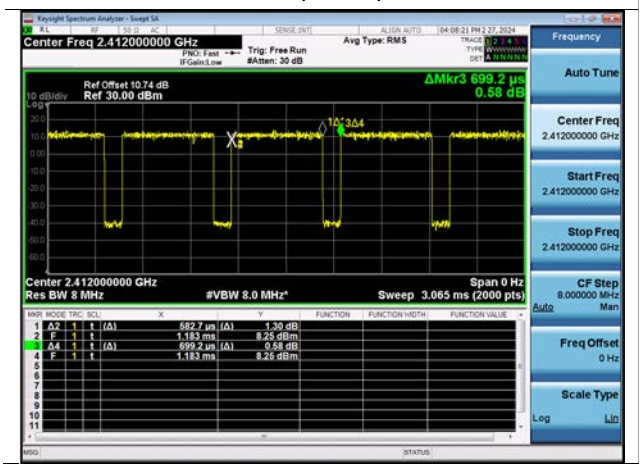
106 Tones (MCS 0)



242 Tones (MCS 0)



SU (MCS 0)



9.2 6 dB BANDWIDTH

Limit : > 500 kHz

[SISO ANT.1]

Mode	Freq. [MHz]	CH.	6dB Bandwidth [MHz]			99% Occupied Bandwidth [MHz]		
			RU Index : Low	RU Index : Mid	RU Index : High	RU Index : Low	RU Index : Mid	RU Index : High
			ANT1	ANT1	ANT1	ANT1	ANT1	ANT1
HE20 26T	2412	1	2.048	2.677	14.515	17.862	16.047	18.047
	2437	6	16.982	2.680	2.088	18.185	16.084	17.885
	2462	11	2.076	2.683	15.785	17.793	16.095	18.139
	2467	12	2.103	2.700	8.262	17.952	16.270	18.100
	2472	13	10.757	2.699	2.068	18.086	16.285	17.979
HE20 52T	2412	1	14.47	6.68	16.92	17.721	16.174	17.794
	2437	6	16.97	10.39	10.74	18.025	16.321	17.521
	2462	11	11.96	6.66	16.99	17.651	16.101	17.899
	2467	12	14.48	6.65	16.97	17.819	16.321	17.848
	2472	13	16.95	6.65	14.46	17.975	16.364	17.732
HE20 106T	2412	1	15.68	-	16.84	17.663	-	17.720
	2437	6	16.92	-	15.78	17.961	-	17.471
	2462	11	15.72	-	16.98	17.622	-	17.808
	2467	12	17.03	-	17.05	17.789	-	17.811
	2472	13	17.07	-	17.05	17.929	-	17.690
HE20 242T	2412	1	-	17.99	-	-	19.092	-
	2437	6	-	17.18	-	-	19.083	-
	2462	11	-	18.65	-	-	19.089	-
	2467	12	-	18.75	-	-	19.148	-
	2472	13	-	18.64	-	-	19.121	-
HE20 SU	2412	1	-	18.46	-	-	19.062	-
	2437	6	-	18.46	-	-	19.015	-
	2462	11	-	18.45	-	-	19.077	-
	2467	12	-	18.68	-	-	19.171	-
	2472	13	-	18.22	-	-	19.085	-

[MIMO_SDM(Ant. 1)]

Mode	Freq. [MHz]	CH.	6dB Bandwidth [MHz]			99% Occupied Bandwidth [MHz]		
			RU Index : Low	RU Index : Mid	RU Index : High	RU Index : Low	RU Index : Mid	RU Index : High
HE20 26T	2412	1	10.790	2.687	14.535	17.916	16.065	18.000
	2437	6	16.999	2.696	2.120	18.194	16.008	17.825
	2462	11	2.049	2.693	14.501	17.866	16.091	18.108
	2467	12	2.095	2.690	2.034	18.045	16.272	18.057
	2472	13	14.503	2.694	2.044	18.177	16.263	17.928
HE20 52T	2412	1	14.49	6.65	16.96	17.713	16.176	17.803
	2437	6	17.01	10.38	10.72	18.034	16.397	17.579
	2462	11	11.98	4.12	16.98	17.652	16.173	17.941
	2467	12	14.47	7.86	16.97	17.835	16.368	17.861
	2472	13	16.97	10.42	11.92	17.961	16.446	17.767
HE20 106T	2412	1	16.95	-	16.96	17.698	-	17.767
	2437	6	16.93	-	15.81	17.969	-	17.588
	2462	11	17.01	-	16.89	17.684	-	17.884
	2467	12	17.02	-	17.05	17.922	-	17.861
	2472	13	17.09	-	16.99	17.967	-	17.743
HE20 242T	2412	1	-	18.25	-	-	18.962	-
	2437	6	-	17.75	-	-	19.035	-
	2462	11	-	18.07	-	-	19.010	-
	2467	12	-	18.65	-	-	18.997	-
	2472	13	-	17.71	-	-	19.045	-
HE20 SU	2412	1	-	18.17	-	-	18.966	-
	2437	6	-	17.04	-	-	18.956	-
	2462	11	-	18.17	-	-	18.956	-
	2467	12	-	18.66	-	-	19.078	-
	2472	13	-	18.58	-	-	19.002	-

[MIMO_SDM(Ant. 2)]

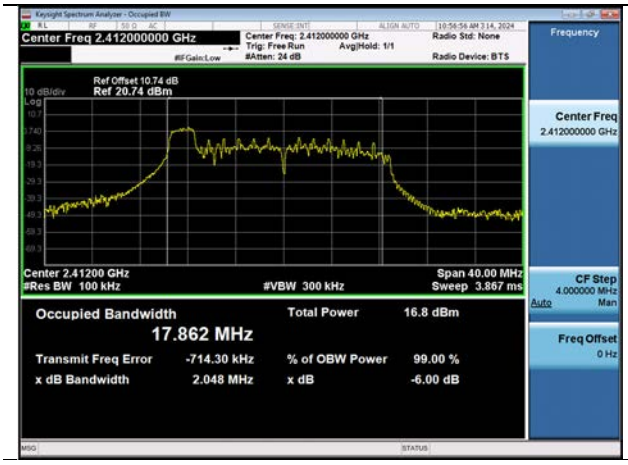
Mode	Freq. [MHz]	CH.	6dB Bandwidth [MHz]			99% Occupied Bandwidth [MHz]		
			RU Index : Low	RU Index : Mid	RU Index : High	RU Index : Low	RU Index : Mid	RU Index : High
HE20 26T	2412	1	17.013	2.680	8.230	18.101	15.872	17.697
	2437	6	10.784	2.682	8.254	17.934	16.070	17.934
	2462	11	17.013	2.680	8.233	18.049	15.834	17.710
	2467	12	14.524	2.686	8.240	17.998	15.953	17.760
	2472	13	14.538	2.648	10.764	17.917	15.991	17.842
HE20 52T	2412	1	16.96	10.40	13.24	17.970	16.229	17.542
	2437	6	15.75	7.86	15.74	17.787	16.278	17.766
	2462	11	16.97	10.39	13.22	17.930	16.297	17.614
	2467	12	16.94	10.40	13.22	17.849	16.261	17.638
	2472	13	15.68	10.37	15.73	17.787	16.229	17.714
HE20 106T	2412	1	16.34	-	15.72	17.935	-	17.544
	2437	6	16.95	-	17.04	17.838	-	17.721
	2462	11	16.67	-	15.77	17.933	-	17.619
	2467	12	16.42	-	16.95	17.867	-	17.619
	2472	13	16.91	-	16.88	17.783	-	17.637
HE20 242T	2412	1	-	16.77	-	-	19.011	-
	2437	6	-	18.23	-	-	18.927	-
	2462	11	-	17.21	-	-	19.040	-
	2467	12	-	16.82	-	-	18.909	-
	2472	13	-	17.85	-	-	18.853	-
HE20 SU	2412	1	-	16.73	-	-	18.948	-
	2437	6	-	18.30	-	-	18.961	-
	2462	11	-	17.19	-	-	19.024	-
	2467	12	-	17.54	-	-	18.840	-
	2472	13	-	17.62	-	-	18.865	-

▣ Test Plots

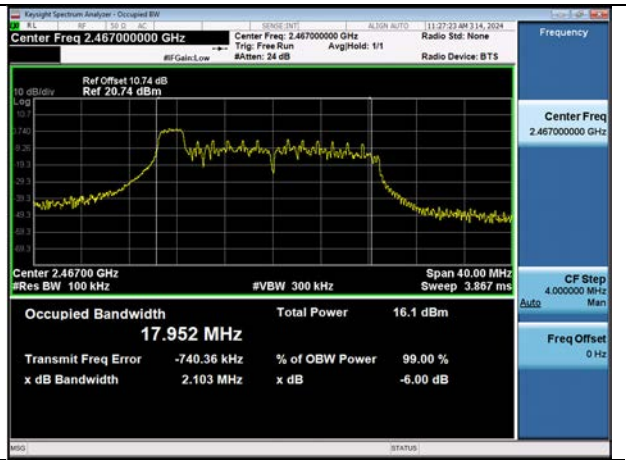
Note: In order to simplify the report, attached plots were only the most narrow 6 dB BW channel.

[SISO ANT.1]

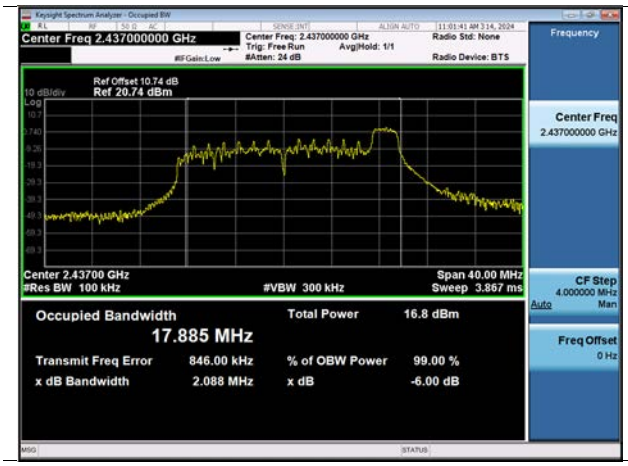
BW20M Ch.1(2412 MHz) RU 0



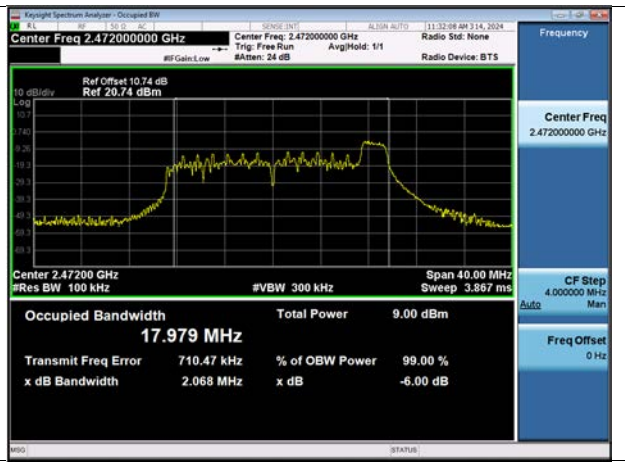
BW20M Ch.12(2467 MHz) RU 0



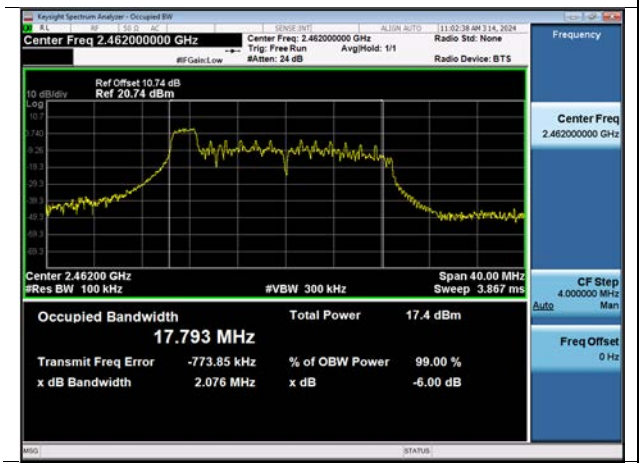
BW20M Ch.6(2437 MHz) RU 8



BW20M Ch.13(2472 MHz) RU 8

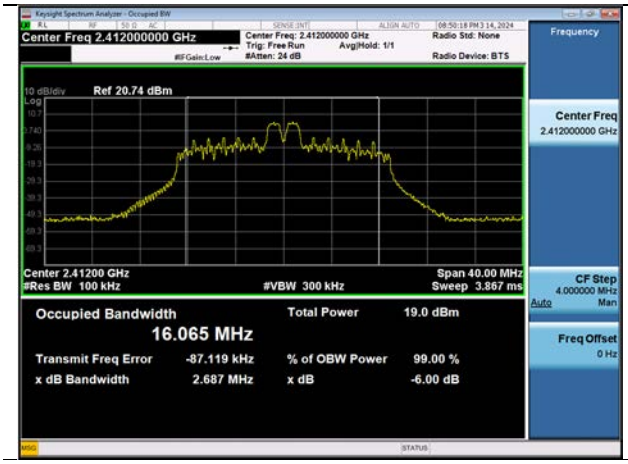


BW20M Ch.11(2462 MHz) RU 0

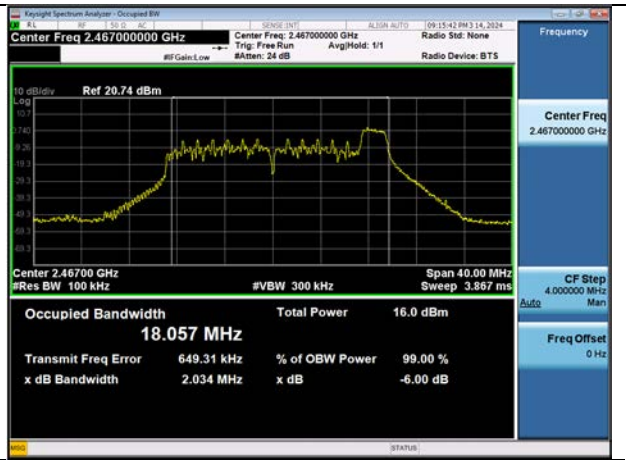


[MIMO_SDM(Ant. 1)]

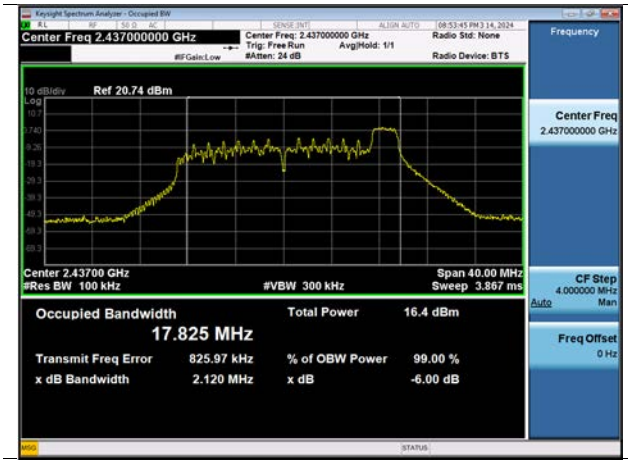
BW20M Ch.1(2412 MHz) RU 4



BW20M Ch.12(2467 MHz) RU 8

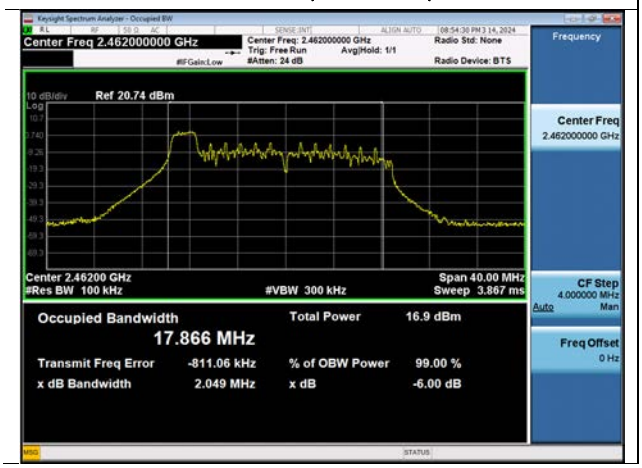


BW20M Ch.6(2437 MHz) RU 8



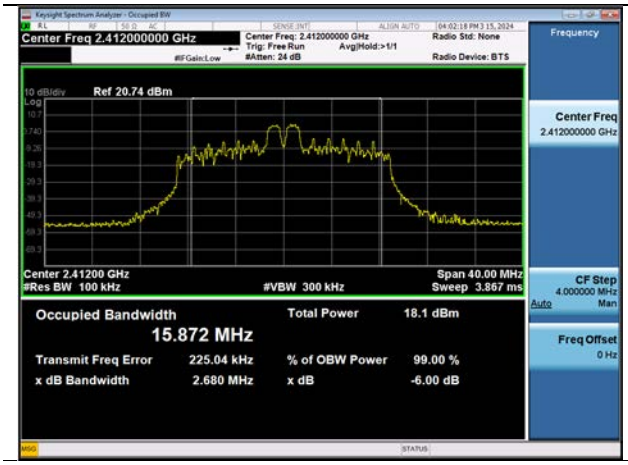
BW20M Ch.13(2472 MHz) RU 8

BW20M Ch.11(2462 MHz) RU 0

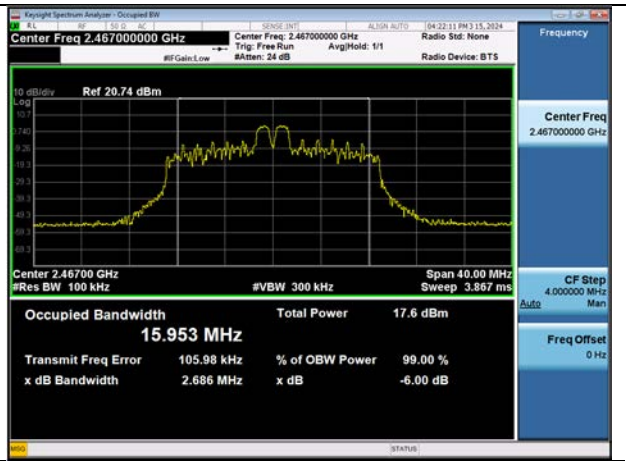


[MIMO_SDM(Ant. 2)]

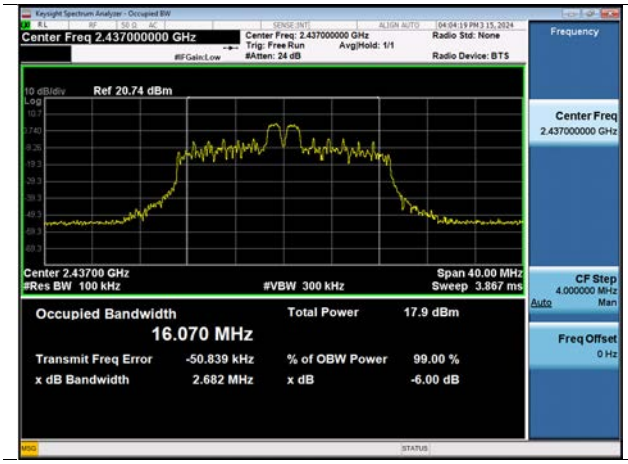
BW20M Ch.1(2412 MHz) RU 4



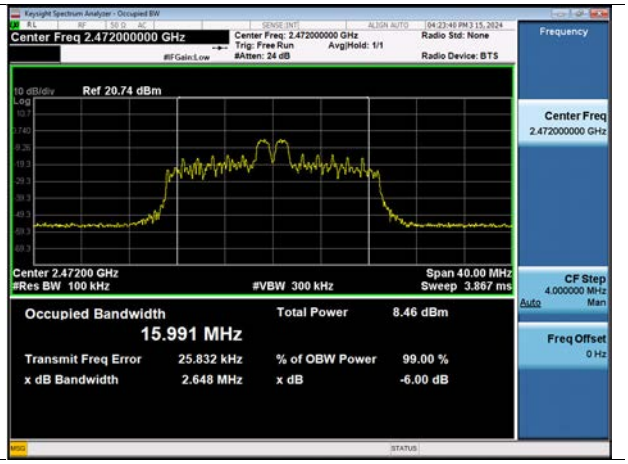
BW20M Ch.12(2467 MHz) RU 4



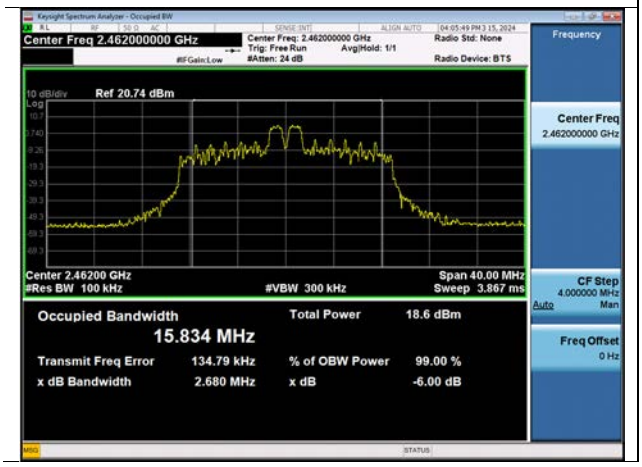
BW20M Ch.6(2437 MHz) RU 4



BW20M Ch.13(2472 MHz) RU 4



BW20M Ch.11(2462 MHz) RU 4



9.3 OUTPUT POWER

Note :

1. MIMO Power = 10·log((10^(Ant.1 power /10))+(10^(Ant.2 power /10)))

Peak Power

[SISO Ant.1]

Mode	Freq. [MHz]	CH.	Total Peak Power [dBm]		
			RU Index : Low	RU Index : Mid	RU Index : High
			ANT1	ANT1	ANT1
HE20 26T	2412	1	17.38	19.41	17.44
	2437	6	17.37	18.92	17.64
	2462	11	17.54	18.95	16.75
	2467	12	16.21	17.69	15.90
	2472	13	6.05	8.17	6.36
HE20 52T	2412	1	20.50	21.74	19.70
	2437	6	18.54	20.45	19.82
	2462	11	20.88	21.70	19.74
	2467	12	16.82	17.82	16.49
	2472	13	9.52	10.55	9.65
HE20 106T	2412	1	24.50	-	24.03
	2437	6	23.06	-	24.23
	2462	11	24.45	-	23.58
	2467	12	17.06	-	16.58
	2472	13	9.83	-	10.09
HE20 242T	2412	1	-	23.76	-
	2437	6	-	23.35	-
	2462	11	-	22.82	-
	2467	12	-	16.33	-
	2472	13	-	9.48	-
HE20 SU	2412	1	-	23.97	-
	2437	6	-	23.22	-
	2462	11	-	22.87	-
	2467	12	-	16.32	-
	2472	13	-	9.57	-

[MIMO_SDM(Ant.1+Ant.2)]

Mode	Freq. [MHz]	CH.	Total Peak Power [dBm]								
			RU Index : Low			RU Index : Mid			RU Index : High		
			ANT1	ANT2	MIMO	ANT1	ANT2	MIMO	ANT1	ANT2	MIMO
HE20 26T	2412	1	17.36	16.12	19.79	19.01	19.36	22.20	17.05	17.65	20.37
	2437	6	16.01	16.50	19.28	18.88	18.73	21.82	17.22	16.42	19.85
	2462	11	17.53	17.13	20.34	19.22	19.16	22.20	16.60	17.98	20.35
	2467	12	16.34	15.57	18.99	17.65	17.95	20.81	15.86	16.15	19.02
	2472	13	5.90	6.80	9.39	8.32	8.50	11.42	6.63	7.10	9.88
HE20 52T	2412	1	20.85	19.68	23.31	21.75	21.18	24.49	20.32	20.81	23.58
	2437	6	19.61	19.75	22.69	20.91	21.37	24.16	21.57	19.84	23.80
	2462	11	21.12	20.29	23.73	21.63	21.71	24.68	20.02	21.13	23.62
	2467	12	16.93	16.22	19.60	17.60	17.71	20.67	16.09	16.68	19.41
	2472	13	9.57	9.61	12.60	10.44	11.16	13.83	9.68	9.85	12.78
HE20 106T	2412	1	24.84	23.99	27.45	-	-	-	24.47	24.63	27.56
	2437	6	23.51	23.78	26.66	-	-	-	24.21	23.76	27.00
	2462	11	24.71	24.60	27.66	-	-	-	24.02	25.10	27.60
	2467	12	17.24	16.89	20.08	-	-	-	16.86	17.42	20.16
	2472	13	9.88	10.43	13.18	-	-	-	10.16	10.71	13.45
HE20 242T	2412	1	-	-	-	23.98	23.77	26.89	-	-	-
	2437	6	-	-	-	23.31	23.34	26.34	-	-	-
	2462	11	-	-	-	22.88	23.86	26.41	-	-	-
	2467	12	-	-	-	16.24	16.67	19.47	-	-	-
	2472	13	-	-	-	9.11	9.42	12.28	-	-	-
HE20 SU	2412	1	-	-	-	23.97	23.91	26.95	-	-	-
	2437	6	-	-	-	23.22	23.32	26.28	-	-	-
	2462	11	-	-	-	22.88	23.79	26.37	-	-	-
	2467	12	-	-	-	16.42	16.61	19.52	-	-	-
	2472	13	-	-	-	9.04	9.50	12.29	-	-	-

Average Power

[SISO ANT.1]

Mode	Freq. [MHz]	CH.	Total Average Power [dBm]		
			RU Index : Low	RU Index : Mid	RU Index : High
			ANT1	ANT1	ANT1
HE20 26T	2412	1	5.90	8.91	5.69
	2437	6	5.02	8.22	6.18
	2462	11	6.83	8.94	5.19
	2467	12	5.57	7.90	4.75
	2472	13	-4.93	-1.87	-4.41
HE20 52T	2412	1	9.93	11.83	9.21
	2437	6	7.49	10.44	9.47
	2462	11	10.47	11.89	8.68
	2467	12	6.33	7.85	5.62
	2472	13	-1.23	0.53	-0.77
HE20 106T	2412	1	14.53	-	14.02
	2437	6	12.74	-	14.31
	2462	11	14.57	-	13.20
	2467	12	7.08	-	6.40
	2472	13	-0.28	-	0.06
HE20 242T	2412	1	-	14.62	-
	2437	6	-	14.07	-
	2462	11	-	13.65	-
	2467	12	-	7.06	-
	2472	13	-	0.22	-
HE20 SU	2412	1	-	14.64	-
	2437	6	-	13.93	-
	2462	11	-	13.56	-
	2467	12	-	7.00	-
	2472	13	-	0.19	-

[MIMO_SDM(Ant.1+Ant.2)]

Mode	Freq. [MHz]	CH.	Total Average Power [dBm]								
			RU Index : Low			RU Index : Mid			RU Index : High		
			ANT1	ANT2	MIMO	ANT1	ANT2	MIMO	ANT1	ANT2	MIMO
HE20 26T	2412	1	6.36	4.13	8.40	8.96	8.90	11.94	5.66	6.59	9.16
	2437	6	4.12	5.19	7.70	8.71	8.54	11.64	6.25	5.26	8.79
	2462	11	6.81	5.22	9.10	8.94	8.97	11.96	4.92	6.77	8.95
	2467	12	5.52	3.97	7.82	7.57	7.86	10.73	4.52	4.97	7.76
	2472	13	-5.30	-4.88	-2.08	-2.04	-1.50	1.25	-4.40	-4.38	-1.38
HE20 52T	2412	1	10.40	8.23	12.46	11.95	10.95	14.49	9.46	10.32	12.92
	2437	6	8.28	8.90	11.61	10.77	11.30	14.05	11.10	8.87	13.14
	2462	11	10.62	8.92	12.86	11.96	11.52	14.76	8.85	10.51	12.77
	2467	12	6.34	4.92	8.70	7.68	7.46	10.58	5.41	5.92	8.68
	2472	13	-1.32	-1.39	1.65	0.34	0.97	3.68	-0.88	-0.98	2.08
HE20 106T	2412	1	14.79	13.35	17.14	-	-	-	14.18	14.61	17.41
	2437	6	12.94	13.45	16.21	-	-	-	14.23	13.35	16.82
	2462	11	14.87	14.01	17.47	-	-	-	13.54	14.91	17.29
	2467	12	7.21	6.38	9.83	-	-	-	6.56	7.05	9.82
	2472	13	-0.45	-0.02	2.78	-	-	-	-0.03	0.25	3.12
HE20 242T	2412	1	-	-	-	14.90	14.29	17.61	-	-	-
	2437	6	-	-	-	14.08	13.91	17.00	-	-	-
	2462	11	-	-	-	13.79	14.32	17.07	-	-	-
	2467	12	-	-	-	7.13	6.99	10.07	-	-	-
	2472	13	-	-	-	-0.04	0.36	3.17	-	-	-
HE20 SU	2412	1	-	-	-	14.94	14.34	17.66	-	-	-
	2437	6	-	-	-	14.05	13.93	17.00	-	-	-
	2462	11	-	-	-	13.75	14.28	17.03	-	-	-
	2467	12	-	-	-	7.16	7.09	10.14	-	-	-
	2472	13	-	-	-	-0.10	-0.04	2.94	-	-	-

9.4 POWER SPECTRAL DENSITY

Limit : 8 dBm

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. MIMO PSD = 10·log((10^(Ant.1 PSD /10))+(10^(Ant.2 PSD/10)))

[SISO ANT.1]

Mode	Freq. [MHz]	CH.	Total Power Spectral Density [dBm/MHz]		
			RU Index : Low	RU Index : Mid	RU Index : High
			ANT1	ANT1	ANT1
HE20 26T	2412	1	-5.735	-3.159	-6.566
	2437	6	-8.255	-4.051	-5.840
	2462	11	-4.999	-3.148	-6.753
	2467	12	-6.568	-4.670	-7.400
	2472	13	-16.667	-14.066	-16.056
HE20 52T	2412	1	-4.304	-3.075	-5.111
	2437	6	-6.772	-4.781	-5.090
	2462	11	-4.069	-3.345	-5.806
	2467	12	-8.579	-7.749	-9.321
	2472	13	-16.018	-14.784	-15.278
HE20 106T	2412	1	-2.888	-	-3.112
	2437	6	-4.196	-	-3.739
	2462	11	-2.854	-	-3.396
	2467	12	-10.766	-	-11.029
	2472	13	-17.881	-	-17.510
HE20 242T	2412	1	-	-5.945	-
	2437	6	-	-6.778	-
	2462	11	-	-6.541	-
	2467	12	-	-13.917	-
	2472	13	-	-20.829	-
HE20 SU	2412	1	-	-6.005	-
	2437	6	-	-6.764	-
	2462	11	-	-7.071	-
	2467	12	-	-14.154	-
	2472	13	-	-21.105	-

[MIMO_SDM(Ant.1+Ant.2)]

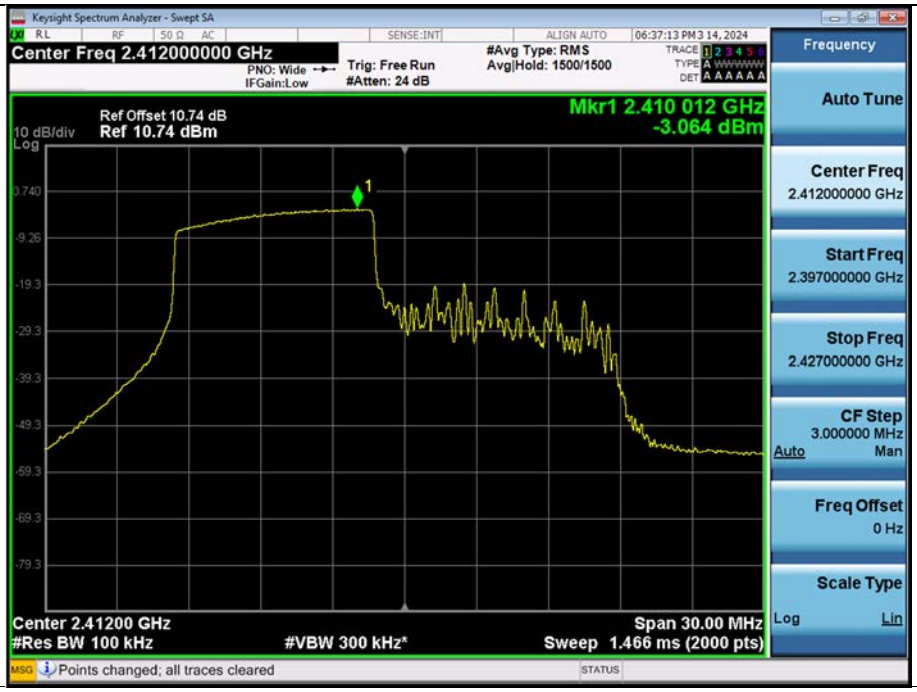
Mode	Freq. [MHz]	CH.	Total Power Spectral Density [dBm/MHz]								
			RU Index : Low			RU Index : Mid			RU Index : High		
			ANT1	ANT2	MIMO	ANT1	ANT2	MIMO	ANT1	ANT2	MIMO
HE20 26T	2412	1	-5.657	-7.602	-3.511	-3.292	-2.962	-0.113	-6.763	-5.032	-2.801
	2437	6	-8.692	-7.014	-4.762	-4.405	-4.181	-1.281	-6.126	-6.888	-3.480
	2462	11	-5.735	-7.223	-3.405	-3.900	-3.125	-0.484	-7.465	-5.424	-3.315
	2467	12	-6.879	-8.017	-4.400	-4.928	-4.261	-1.571	-7.447	-6.911	-4.160
	2472	13	-17.275	-16.917	-14.082	-14.489	-13.432	-10.918	-16.416	-16.319	-13.356
HE20 52T	2412	1	-4.482	-5.760	-2.064	-3.294	-3.600	-0.434	-5.463	-3.853	-1.573
	2437	6	-6.900	-5.672	-3.232	-4.913	-4.228	-1.546	-5.018	-5.691	-2.331
	2462	11	-4.576	-5.356	-1.938	-3.843	-3.401	-0.606	-6.200	-3.957	-1.925
	2467	12	-8.765	-9.357	-6.040	-7.915	-7.553	-4.720	-9.404	-8.468	-5.900
	2472	13	-16.366	-15.737	-13.030	-15.156	-14.105	-11.588	-15.623	-15.289	-12.442
HE20 106T	2412	1	-3.156	-3.222	-0.179	-	-	-	-3.410	-2.489	0.085
	2437	6	-4.390	-3.916	-1.136	-	-	-	-3.817	-4.016	-0.905
	2462	11	-3.752	-2.934	-0.314	-	-	-	-4.222	-2.399	-0.205
	2467	12	-10.930	-10.673	-7.790	-	-	-	-11.234	-10.374	-7.773
	2472	13	-18.319	-17.101	-14.657	-	-	-	-17.961	-17.076	-14.486
HE20 242T	2412	1	-	-	-	-5.926	-5.224	-2.551	-	-	-
	2437	6	-	-	-	-6.776	-6.905	-3.830	-	-	-
	2462	11	-	-	-	-7.044	-5.869	-3.407	-	-	-
	2467	12	-	-	-	-13.933	-13.171	-10.525	-	-	-
	2472	13	-	-	-	-20.773	-19.963	-17.339	-	-	-
HE20 SU	2412	1	-	-	-	-5.790	-5.382	-2.571	-	-	-
	2437	6	-	-	-	-6.743	-6.703	-3.713	-	-	-
	2462	11	-	-	-	-6.941	-5.682	-3.256	-	-	-
	2467	12	-	-	-	-13.762	-13.268	-10.498	-	-	-
	2472	13	-	-	-	-20.906	-20.288	-17.576	-	-	-

▣ Test Plots

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

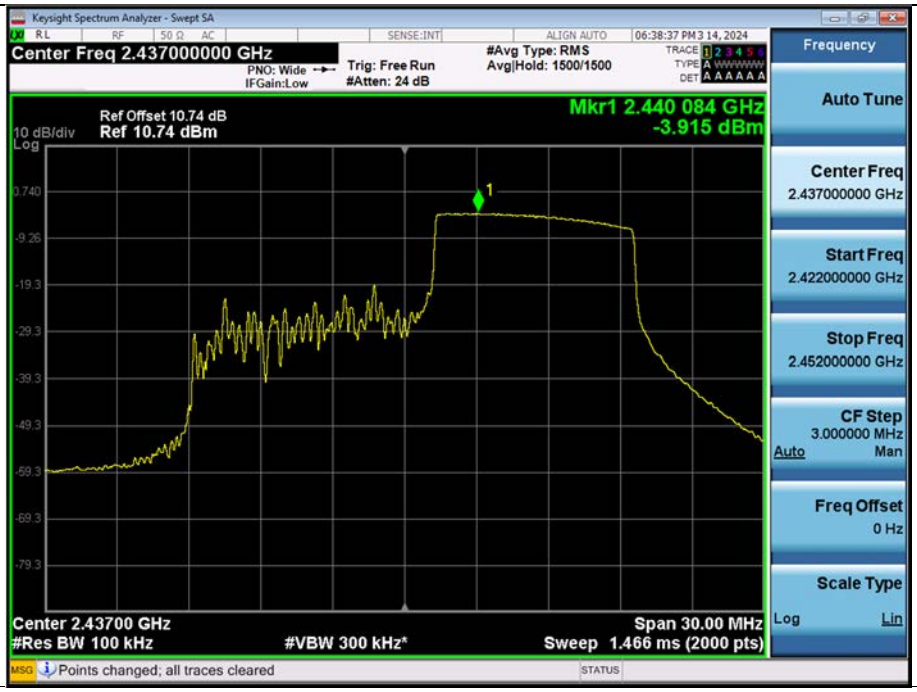
[SISO ANT.1]

BW20M Ch.1(2412 MHz) 106T RU 53



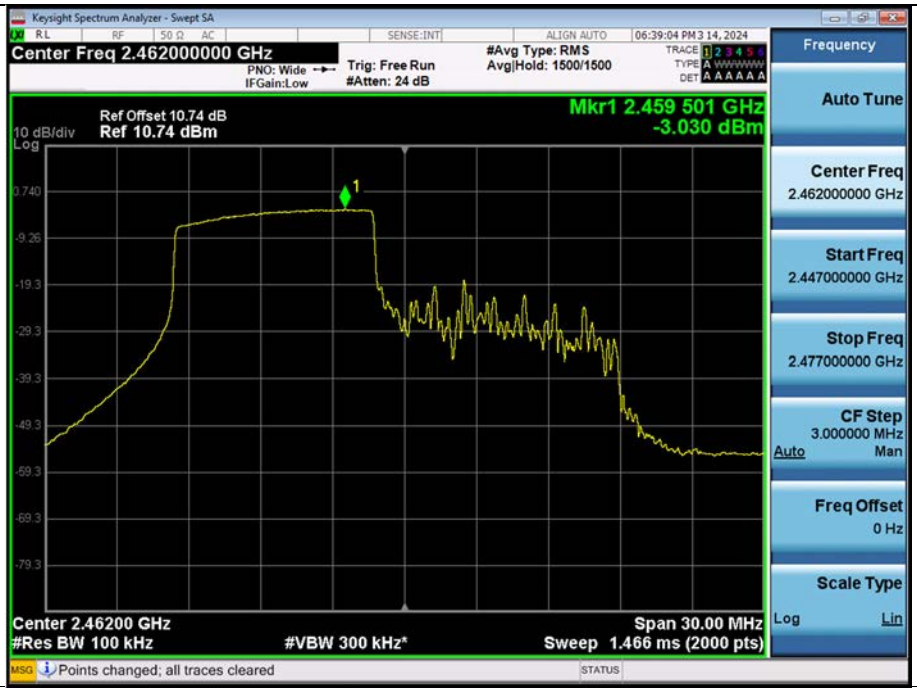
Measured PSD (dBm)	Duty Cycle Factor (dB)	Total PSD (dBm)
-3.064	0.176	-2.888

BW20M Ch.6(2437 MHz) 106T RU 54



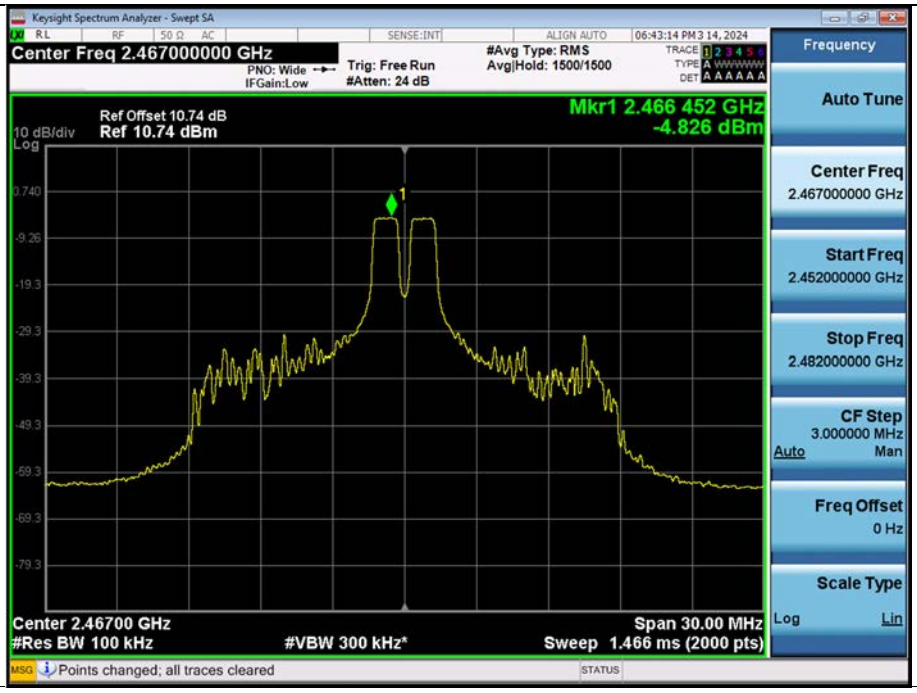
Measured PSD (dBm)	Duty Cycle Factor (dB)	Total PSD (dBm)
-3.915	0.176	-3.739

BW20M Ch.11(2462 MHz) 106T RU 53



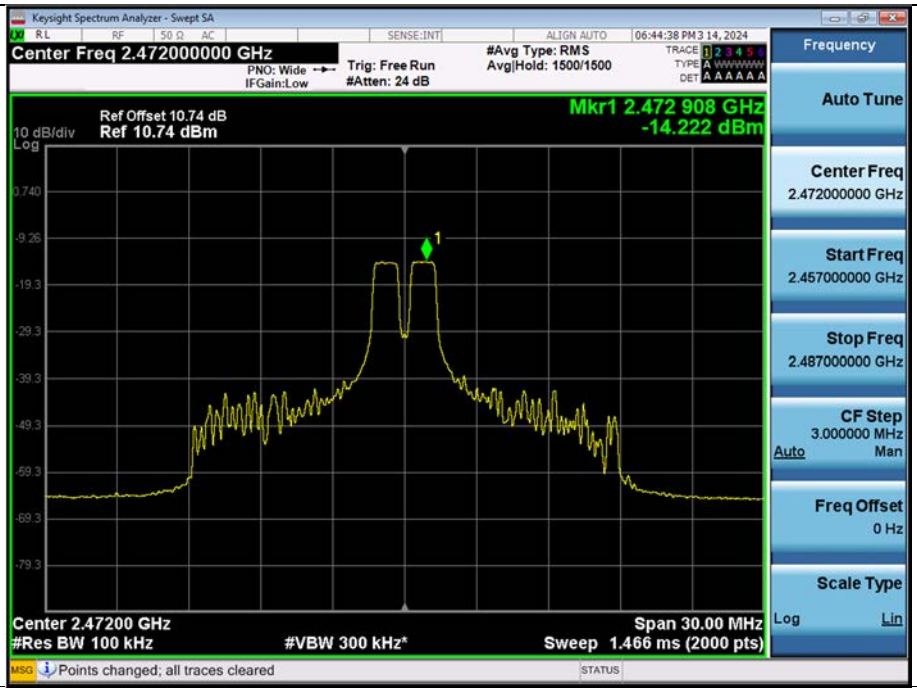
Measured PSD (dBm)	Duty Cycle Factor (dB)	Total PSD (dBm)
-3.030	0.176	-2.854

BW20M Ch.12(2467 MHz) 26T RU 4



Measured PSD (dBm)	Duty Cycle Factor (dB)	Total PSD (dBm)
-4.826	0.156	-4.670

BW20M Ch.13(2472 MHz) 26T RU 4

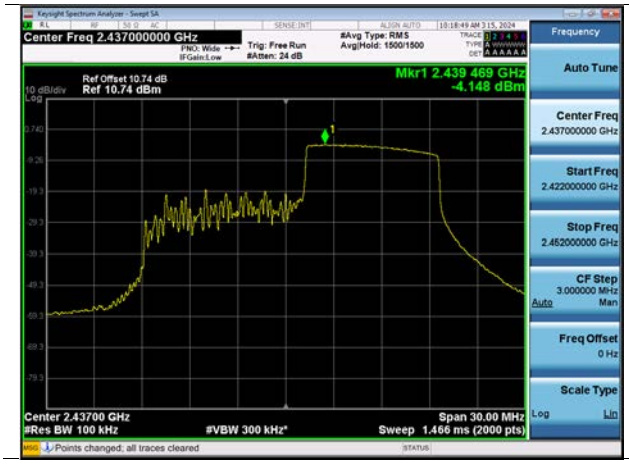


Measured PSD (dBm)	Duty Cycle Factor (dB)	Total PSD (dBm)
-14.222	0.156	-14.066

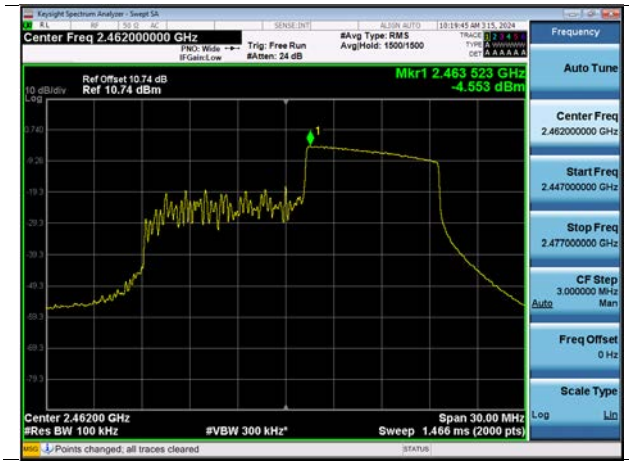
[MIMO_SDM(Ant.1+Ant.2)]

BW20M Ch.1(2412 MHz) 106T RU 54	
ANT.1	ANT.2
	

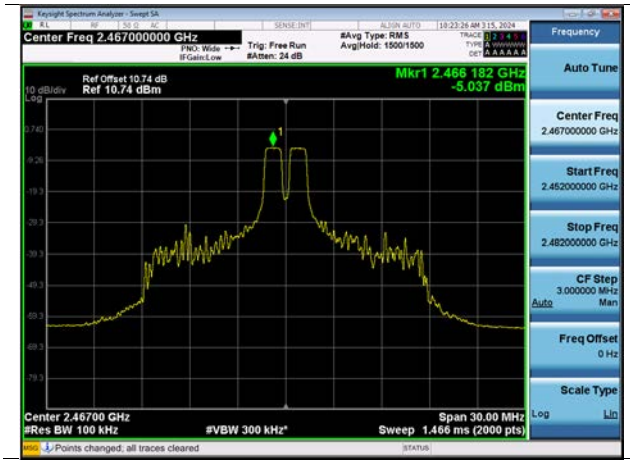
MIMO Measured PSD (dBm)	Duty Cycle Factor (dB)	MIMO Total PSD (dBm)
-0.246	0.331	0.085

BW20M Ch.6(2437 MHz) 106T RU 54	
ANT.1	ANT.2
	

MIMO Measured PSD (dBm)	Duty Cycle Factor (dB)	MIMO Total PSD (dBm)
-1.236	0.331	-0.905

BW20M Ch.11(2462 MHz) 106T RU 54	
ANT.1	ANT.2
	

MIMO Measured PSD (dBm)	Duty Cycle Factor (dB)	MIMO Total PSD (dBm)
-0.536	0.331	-0.205

BW20M Ch.12(2467 MHz) 26T RU 4	
ANT.1	ANT.2
	

MIMO Measured PSD (dBm)	Duty Cycle Factor (dB)	MIMO Total PSD (dBm)
-1.680	0.109	-1.571

BW20M Ch.13(2472 MHz) 26T RU 4	
ANT.1	ANT.2
	

MIMO Measured PSD (dBm)	Duty Cycle Factor (dB)	MIMO Total PSD (dBm)
-11.027	0.109	-10.918

9.5 BAND EDGE / CONDUCTED SPURIOUS EMISSIONS

Band Edge

Limit : 30 dBc

[SISO Ant.1]

Mode	Freq. [MHz]	CH.	RU Index	Measured Position	Band edge [dB]
HE20 26T	2412	1	Low	Lowest Bandedge	33.276
	2462	11	High	Highest Bandedge	45.772
	2467	12	High	Highest Bandedge	43.505
	2472	13	High	Highest Bandedge	31.716
HE20 52T	2412	1	Low	Lowest Bandedge	35.004
	2462	11	High	Highest Bandedge	54.238
	2467	12	High	Highest Bandedge	50.648
	2472	13	High	Highest Bandedge	32.519
HE20 106T	2412	1	Low	Lowest Bandedge	34.644
	2462	11	High	Highest Bandedge	52.066
	2467	12	High	Highest Bandedge	49.167
	2472	13	High	Highest Bandedge	32.530
HE20 242T	2412	1	Low	Lowest Bandedge	33.509
	2462	11	High	Highest Bandedge	51.102
	2467	12	High	Highest Bandedge	47.078
	2472	13	High	Highest Bandedge	31.321
HE20 SU	2412	1	Low	Lowest Bandedge	31.946
	2462	11	High	Highest Bandedge	51.291
	2467	12	High	Highest Bandedge	47.141
	2472	13	High	Highest Bandedge	33.353

MIMO_SDM(Ant. 1)

Mode	Freq. [MHz]	CH.	RU Index	Measured Position	Band edge [dB]
HE20 26T	2412	1	Low	Lowest Bandedge	32.812
	2462	11	High	Highest Bandedge	52.624
	2467	12	High	Highest Bandedge	53.648
	2472	13	High	Highest Bandedge	32.257
HE20 52T	2412	1	Low	Lowest Bandedge	34.413
	2462	11	High	Highest Bandedge	51.957
	2467	12	High	Highest Bandedge	52.077
	2472	13	High	Highest Bandedge	31.661
HE20 106T	2412	1	Low	Lowest Bandedge	34.578
	2462	11	High	Highest Bandedge	51.828
	2467	12	High	Highest Bandedge	49.744
	2472	13	High	Highest Bandedge	33.677
HE20 242T	2412	1	Low	Lowest Bandedge	31.082
	2462	11	High	Highest Bandedge	48.394
	2467	12	High	Highest Bandedge	46.580
	2472	13	High	Highest Bandedge	34.720
HE20 SU	2412	1	Low	Lowest Bandedge	31.542
	2462	11	High	Highest Bandedge	49.627
	2467	12	High	Highest Bandedge	47.025
	2472	13	High	Highest Bandedge	31.922

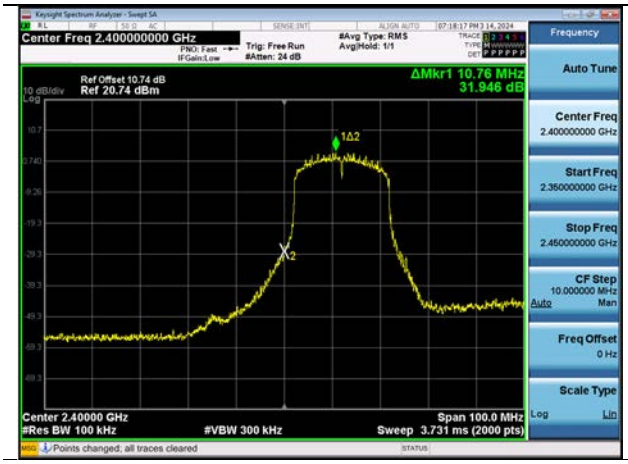
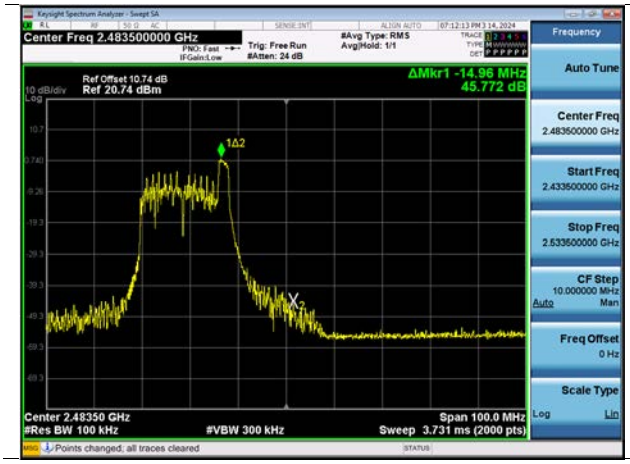
MIMO_SDM(Ant. 2)

Mode	Freq. [MHz]	CH.	RU Index	Measured Position	Band edge [dB]
HE20 26T	2412	1	Low	Lowest Bandedge	34.065
	2462	11	High	Highest Bandedge	56.033
	2467	12	High	Highest Bandedge	54.485
	2472	13	High	Highest Bandedge	31.700
HE20 52T	2412	1	Low	Lowest Bandedge	35.003
	2462	11	High	Highest Bandedge	50.722
	2467	12	High	Highest Bandedge	52.811
	2472	13	High	Highest Bandedge	32.296
HE20 106T	2412	1	Low	Lowest Bandedge	32.395
	2462	11	High	Highest Bandedge	44.136
	2467	12	High	Highest Bandedge	51.347
	2472	13	High	Highest Bandedge	33.828
HE20 242T	2412	1	Low	Lowest Bandedge	33.015
	2462	11	High	Highest Bandedge	37.372
	2467	12	High	Highest Bandedge	48.188
	2472	13	High	Highest Bandedge	32.362
HE20 SU	2412	1	Low	Lowest Bandedge	32.860
	2462	11	High	Highest Bandedge	38.007
	2467	12	High	Highest Bandedge	48.132
	2472	13	High	Highest Bandedge	32.712

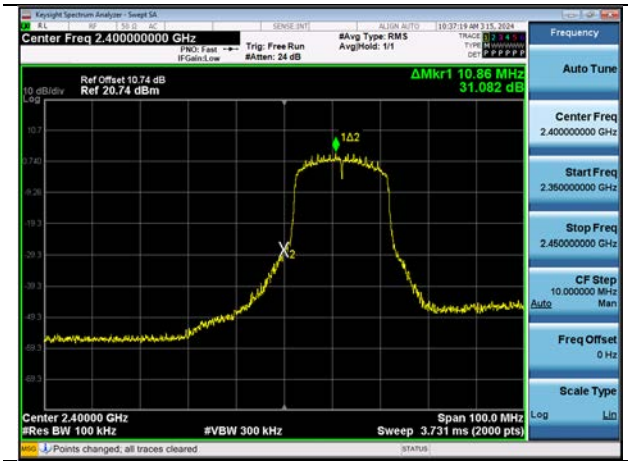
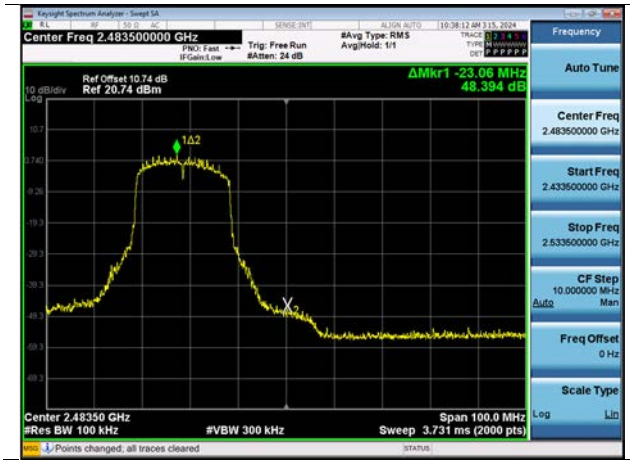
▣ Test Plots

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

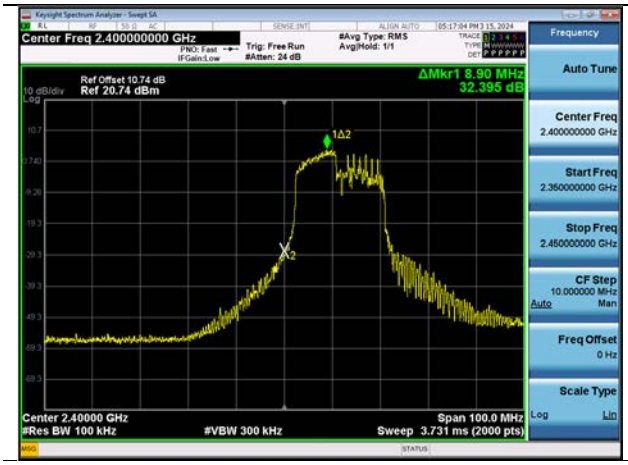
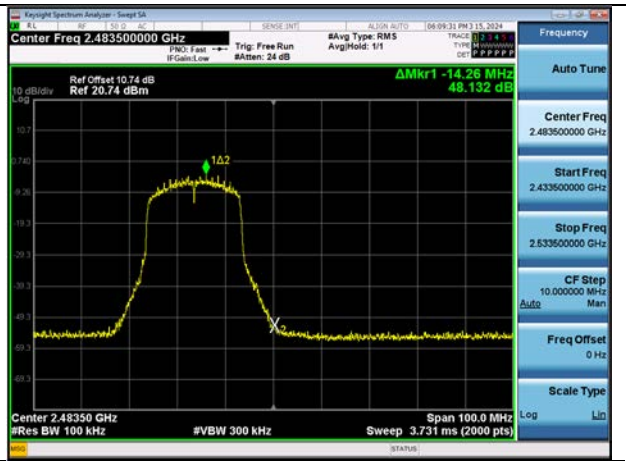
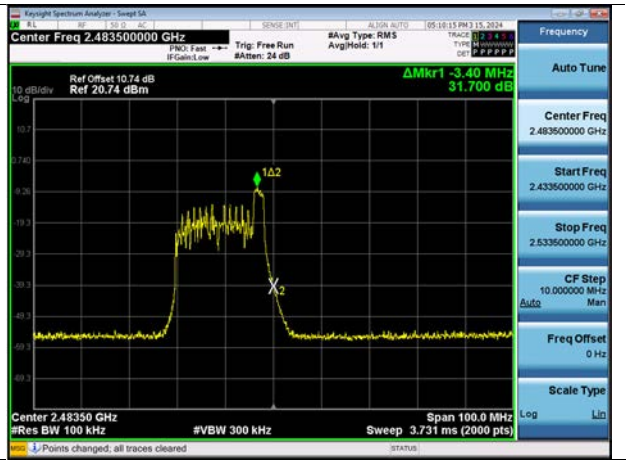
[SISO ANT.1]

BW 20M Ch.1(2412 MHz) SU	BW 20M Ch.12(2467 MHz) 26T RU 8
	
BW 20M Ch.11(2462 MHz) 26T RU 8	**BW 20M Ch.13(2472 MHz) 242T RU 61**
	

[MIMO_SDM(Ant. 1)]

BW 20M Ch.1(2412 MHz) 242T RU 61	BW 20M Ch.12(2467 MHz) 242T RU 61
	
BW 20M Ch.11(2462 MHz) 242T RU 61	**BW 20M Ch.13(2472 MHz) 52T RU 40**
	

[MIMO_SDM(Ant. 2)]

BW 20M Ch.1(2412 MHz) 106T RU 53	BW 20M Ch.12(2467 MHz) SU
	
BW 20M Ch.11(2462 MHz) 242T RU 61	**BW 20M Ch.13(2472 MHz) 26T RU 8**
	

Conducted Spurious Emissions

Limit : 30 dBc

[SISO ANT.1]

Mode	Freq. [MHz]	CH.	Conducted Spurious Emissions [dB]		
			RU Index : Low	RU Index : Mid	RU Index : High
			ANT1	ANT1	ANT1
HE20 26T	2412	1	39.693	43.204	38.647
	2437	6	38.395	42.210	41.032
	2462	11	40.117	40.944	38.753
	2467	12	39.209	41.536	38.050
	2472	13	38.841	41.497	39.397
HE20 52T	2412	1	42.137	42.960	41.216
	2437	6	38.571	40.299	39.338
	2462	11	41.789	42.022	40.224
	2467	12	38.441	38.861	38.431
	2472	13	39.965	36.805	41.655
HE20 106T	2412	1	44.241	-	42.508
	2437	6	41.905	-	43.410
	2462	11	43.338	-	42.320
	2467	12	36.477	-	34.270
	2472	13	39.757	-	40.884
HE20 242T	2412	1	-	40.340	-
	2437	6	-	39.317	-
	2462	11	-	42.711	-
	2467	12	-	34.117	-
	2472	13	-	37.073	-
HE20 SU	2412	1	-	39.944	-
	2437	6	-	39.967	-
	2462	11	-	40.681	-
	2467	12	-	42.799	-
	2472	13	-	36.266	-

[MIMO_SDM(Ant. 1)]

Mode	Freq. [MHz]	CH.	Conducted Spurious Emissions [dB]		
			RU Index : Low	RU Index : Mid	RU Index : High
			ANT1	ANT1	ANT1
HE20 26T	2412	1	39.291	43.157	37.475
	2437	6	37.722	43.448	39.426
	2462	11	40.998	42.098	37.224
	2467	12	38.797	41.151	37.445
	2472	13	39.808	43.091	39.972
HE20 52T	2412	1	42.220	42.855	40.748
	2437	6	38.955	40.886	42.117
	2462	11	41.080	42.197	40.070
	2467	12	38.970	38.690	36.537
	2472	13	39.887	43.115	40.269
HE20 106T	2412	1	43.211	-	43.389
	2437	6	42.001	-	42.431
	2462	11	43.076	-	42.512
	2467	12	36.432	-	34.890
	2472	13	37.181	-	39.887
HE20 242T	2412	1	-	42.232	-
	2437	6	-	41.538	-
	2462	11	-	40.859	-
	2467	12	-	33.554	-
	2472	13	-	35.111	-
HE20 SU	2412	1	-	40.921	-
	2437	6	-	42.038	-
	2462	11	-	40.576	-
	2467	12	-	33.704	-
	2472	13	-	37.957	-

[MIMO_SDM(Ant. 2)]

Mode	Freq. [MHz]	CH.	Conducted Spurious Emissions [dB]		
			RU Index : Low	RU Index : Mid	RU Index : High
			ANT2	ANT2	ANT2
HE20 26T	2412	1	38.066	44.013	40.793
	2437	6	40.495	41.559	37.607
	2462	11	38.365	43.669	42.175
	2467	12	37.153	41.507	37.730
	2472	13	39.175	41.240	40.423
HE20 52T	2412	1	39.052	41.933	40.481
	2437	6	40.995	42.831	41.694
	2462	11	39.456	41.535	41.952
	2467	12	35.873	39.506	36.798
	2472	13	40.711	41.778	41.352
HE20 106T	2412	1	43.959	-	42.939
	2437	6	41.928	-	43.717
	2462	11	45.347	-	43.784
	2467	12	35.579	-	35.479
	2472	13	38.925	-	38.980
HE20 242T	2412	1	-	42.433	-
	2437	6	-	41.851	-
	2462	11	-	42.008	-
	2467	12	-	42.145	-
	2472	13	-	36.934	-
HE20 SU	2412	1	-	41.592	-
	2437	6	-	41.931	-
	2462	11	-	40.430	-
	2467	12	-	39.883	-
	2472	13	-	36.022	-

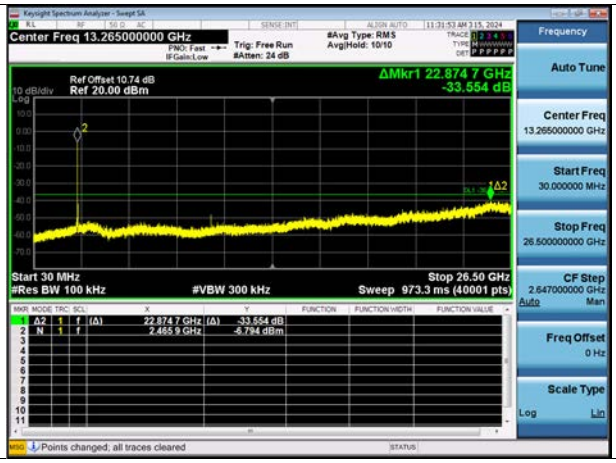
▣ Test Plots

Note:

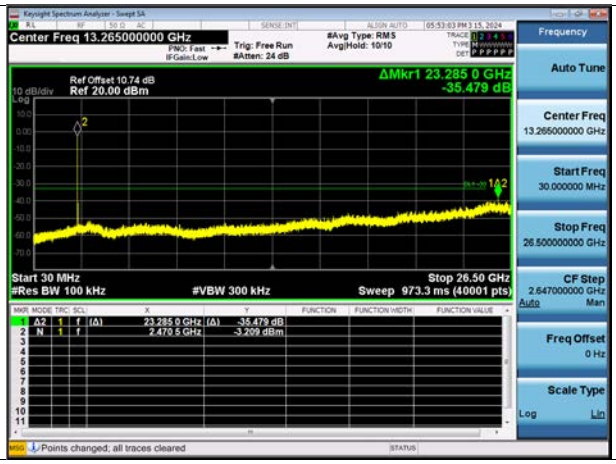
In order to simplify the report, attached plots were only the worst case.

[SISO Ant.1] BW20M Ch.12(2 467 MHz) 242T RU 61

MIMO_SDM(Ant. 1) BW20M Ch.12(2 467 MHz) 242T RU 61



MIMO_SDM(Ant. 2) BW20M Ch.12(2 467 MHz) 106T RU 54



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_SDM(Ant.1+Ant.2)]

Band :	DTS			Operation Mode : 802.11ax HE20			RU Tone&offset	
CH.1	2412		MHz	Transfer Rate : MCS 0			**26T**	**4**
Frequency [MHz]	Measured value [dBµV]	Duty Cycle Factor	CL+AF+DF-AG [dB/m]	ANT. POL [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
4824	43.18	0.00	3.87	V	47.05	68.20	21.15	PK
4824	32.63	0.11	3.87	V	36.61	68.20	31.59	AV
7236	41.20	0.00	9.57	V	50.77	73.98	23.21	PK
7236	29.98	0.11	9.57	V	39.66	53.98	14.32	AV
4824	43.96	0.00	3.87	H	47.83	68.20	20.37	PK
4824	33.06	0.11	3.87	H	37.04	68.20	31.16	AV
7236	41.32	0.00	9.57	H	50.89	73.98	23.09	PK
7236	29.90	0.11	9.57	H	39.58	53.98	14.40	AV

Band :	DTS			Operation Mode : 802.11ax HE20			RU Tone&offset	
CH.6	2437		MHz	Transfer Rate : MCS 0			**26T**	**4**
Frequency [MHz]	Measured value [dBµV]	Duty Cycle Factor	CL+AF+DF-AG [dB/m]	ANT. POL [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
4874	42.88	0.00	3.84	V	46.72	73.98	27.26	PK
4874	31.49	0.11	3.84	V	35.44	53.98	18.54	AV
7311	41.50	0.00	10.11	V	51.61	73.98	22.37	PK
7311	30.24	0.11	10.11	V	40.45	53.98	13.53	AV
4874	43.47	0.00	3.84	H	47.31	73.98	26.67	PK
4874	32.21	0.11	3.84	H	36.16	53.98	17.82	AV
7311	41.43	0.00	10.11	H	51.54	73.98	22.44	PK
7311	30.13	0.11	10.11	H	40.34	53.98	13.64	AV

Band :	DTS			Operation Mode : 802.11ax HE20			RU Tone&offset	
CH.11	2462		MHz	Transfer Rate : MCS 0			**26T**	**4**
Frequency [MHz]	Measured value [dBµV]	Duty Cycle Factor	CL+AF+DF-AG [dB/m]	ANT. POL [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
4924	42.42	0.00	3.27	V	45.69	73.98	28.29	PK
4924	31.50	0.11	3.27	V	34.88	53.98	19.10	AV
7386	41.73	0.00	11.01	V	52.74	68.20	15.46	PK
7386	30.01	0.11	11.01	V	41.13	53.98	12.85	AV
4924	44.33	0.00	3.27	H	47.60	73.98	26.38	PK
4924	33.75	0.11	3.27	H	37.13	53.98	16.85	AV
7386	42.05	0.00	11.01	H	53.06	68.20	15.14	PK
7386	29.90	0.11	11.01	H	41.02	53.98	12.96	AV

Band :	DTS			Operation Mode : 802.11ax HE20			RU Tone&offset	
CH.1	2412		MHz	Transfer Rate : MCS 0			**52T**	**38**
Frequency [MHz]	Measured value [dBµV]	Duty Cycle Factor	CL+AF+DF-AG [dB/m]	ANT. POL [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
4824	43.80	0.00	3.87	V	47.67	68.20	20.53	PK
4824	32.62	0.20	3.87	V	36.69	68.20	31.51	AV
7236	45.19	0.00	9.57	V	54.76	73.98	19.22	PK
7236	29.99	0.20	9.57	V	39.76	53.98	14.22	AV
4824	44.50	0.00	3.87	H	48.37	68.20	19.83	PK
4824	33.83	0.20	3.87	H	37.90	68.20	30.30	AV
7236	41.95	0.00	9.57	H	51.52	73.98	22.46	PK
7236	29.92	0.20	9.57	H	39.69	53.98	14.29	AV

Band :	DTS			Operation Mode : 802.11ax HE20			RU Tone&offset	
CH.6	2437		MHz	Transfer Rate : MCS 0			**52T**	**38**
Frequency [MHz]	Measured value [dBµV]	Duty Cycle Factor	CL+AF+DF-AG [dB/m]	ANT. POL [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
4874	42.80	0.00	3.84	V	46.64	73.98	27.34	PK
4874	31.50	0.20	3.84	V	35.54	53.98	18.44	AV
7311	41.48	0.00	10.11	V	51.59	73.98	22.39	PK
7311	30.35	0.20	10.11	V	40.65	53.98	13.33	AV
4874	43.92	0.00	3.84	H	47.76	73.98	26.22	PK
4874	32.85	0.20	3.84	H	36.89	53.98	17.09	AV
7311	41.88	0.00	10.11	H	51.99	73.98	21.99	PK
7311	30.14	0.20	10.11	H	40.44	53.98	13.54	AV

Band :	DTS			Operation Mode : 802.11ax HE20			RU Tone&offset	
CH.11	2462		MHz	Transfer Rate : MCS 0			**52T**	**38**
Frequency [MHz]	Measured value [dBµV]	Duty Cycle Factor	CL+AF+DF-AG [dB/m]	ANT. POL [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
4924	43.56	0.00	3.27	V	46.83	73.98	27.15	PK
4924	31.57	0.20	3.27	V	35.04	53.98	18.94	AV
7386	41.25	0.00	11.01	V	52.26	68.20	15.94	PK
7386	29.98	0.20	11.01	V	41.19	53.98	12.79	AV
4924	45.28	0.00	3.27	H	48.55	73.98	25.43	PK
4924	33.76	0.20	3.27	H	37.23	53.98	16.75	AV
7386	41.90	0.00	11.01	H	52.91	68.20	15.29	PK
7386	29.93	0.20	11.01	H	41.14	53.98	12.84	AV

Band :	DTS			Operation Mode : 802.11ax HE20			RU Tone&offset	
CH.1	2412		MHz	Transfer Rate : MCS 0			**242T**	**61**
Frequency [MHz]	Measured value [dBµV]	Duty Cycle Factor	CL+AF+DF-AG [dB/m]	ANT. POL [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
4824	44.02	0.00	3.87	V	47.89	68.20	20.31	PK
4824	32.93	0.78	3.87	V	37.57	68.20	30.63	AV
7236	48.09	0.00	9.57	V	57.66	73.98	16.32	PK
7236	30.38	0.78	9.57	V	40.73	53.98	13.25	AV
4824	45.42	0.00	3.87	H	49.29	68.20	18.91	PK
4824	33.15	0.78	3.87	H	37.79	68.20	30.41	AV
7236	48.63	0.00	9.57	H	58.20	73.98	15.78	PK
7236	30.57	0.78	9.57	H	40.92	53.98	13.06	AV

Band :	DTS			Operation Mode : 802.11ax HE20			RU Tone&offset	
CH.6	2437		MHz	Transfer Rate : MCS 0			**242T**	**61**
Frequency [MHz]	Measured value [dBµV]	Duty Cycle Factor	CL+AF+DF-AG [dB/m]	ANT. POL [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
4874	43.61	0.00	3.84	V	47.45	73.98	26.53	PK
4874	32.25	0.78	3.84	V	36.87	53.98	17.11	AV
7311	42.41	0.00	10.11	V	52.52	73.98	21.46	PK
7311	30.40	0.78	10.11	V	41.28	53.98	12.70	AV
4874	43.81	0.00	3.84	H	47.65	73.98	26.33	PK
4874	32.34	0.78	3.84	H	36.96	53.98	17.02	AV
7311	42.12	0.00	10.11	H	52.23	73.98	21.75	PK
7311	30.39	0.78	10.11	H	41.27	53.98	12.71	AV

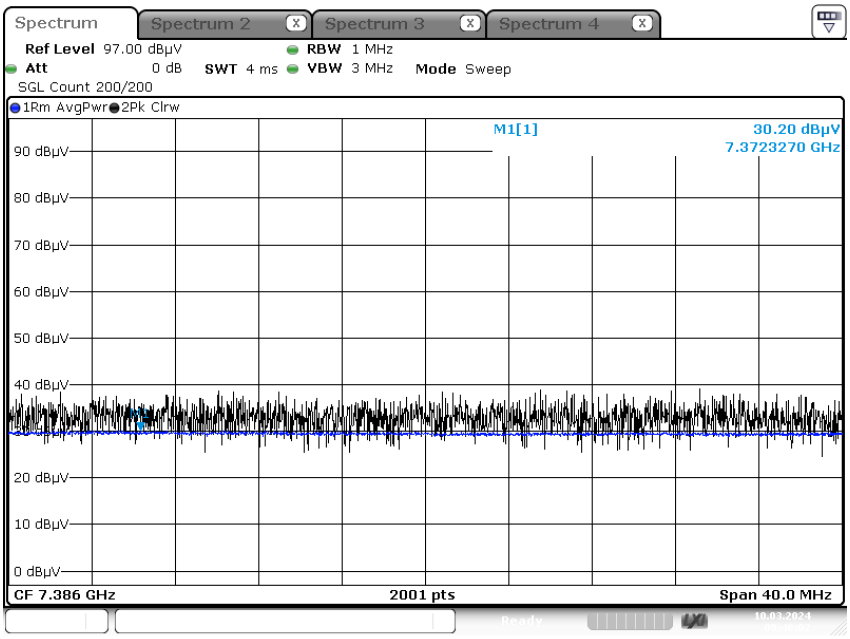
Band :	DTS			Operation Mode : 802.11ax HE20			RU Tone&offset	
CH.11	2462		MHz	Transfer Rate : MCS 0			**242T**	**61**
Frequency [MHz]	Measured value [dBµV]	Duty Cycle Factor	CL+AF+DF-AG [dB/m]	ANT. POL [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
4924	43.33	0.00	3.27	V	46.60	73.98	27.38	PK
4924	32.62	0.78	3.27	V	36.67	53.98	17.31	AV
7386	42.05	0.00	11.01	V	53.06	68.20	15.14	PK
7386	30.20	0.78	11.01	V	41.99	53.98	11.99	AV
4924	44.11	0.00	3.27	H	47.38	73.98	26.60	PK
4924	32.90	0.78	3.27	H	36.95	53.98	17.03	AV
7386	41.57	0.00	11.01	H	52.58	68.20	15.62	PK
7386	30.07	0.78	11.01	H	41.86	53.98	12.12	AV

▣ Test Plots(242T RU 61)

Note:

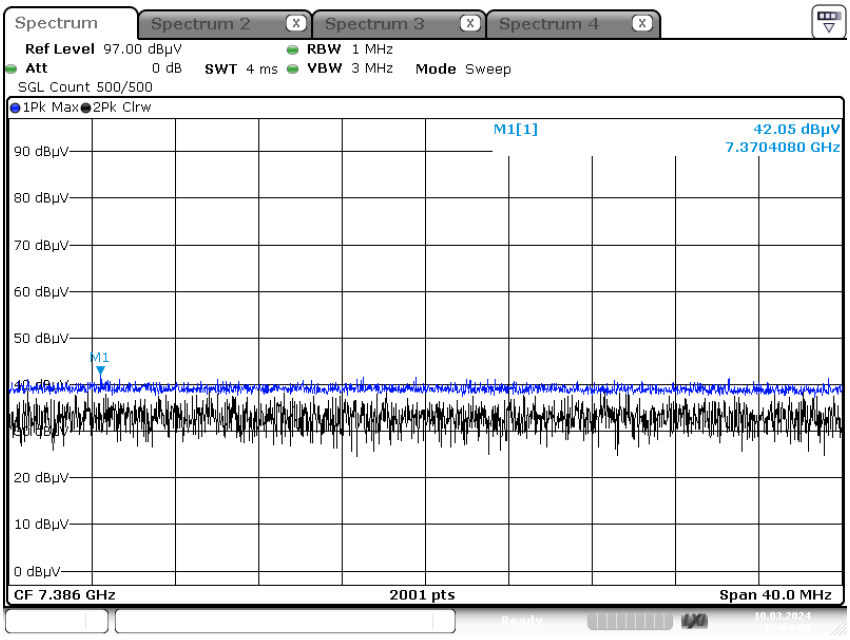
In order to simplify, Plots of worst case are only reported.

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



Date: 10.MAR.2024 09:46:02

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



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9.7 RADIATED RESTRICTED BAND EDGES

[MIMO_SDM(Ant.1+Ant.2)]

[26 Tones]

Channel	RU index	Frequency [MHz]	Measured Value [dBμV]	Duty Cycle Factor	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
1	0	2390.0	56.77	0.00	H	56.77	73.98	17.21	PK
		2390.0	43.51	0.11	H	43.62	53.98	10.36	AV
		2390.0	56.82	0.00	V	56.82	73.98	17.16	PK
		2390.0	43.54	0.11	V	43.65	53.98	10.33	AV
	8	2390.0	56.79	0.00	H	56.79	73.98	17.19	PK
		2390.0	43.55	0.11	H	43.66	53.98	10.32	AV
		2390.0	56.91	0.00	V	56.91	73.98	17.07	PK
		2390.0	43.56	0.11	V	43.67	53.98	10.31	AV
11	0	2483.5	63.24	0.00	H	63.24	73.98	10.74	PK
		2483.5	44.94	0.11	H	45.05	53.98	8.93	AV
		2483.5	62.90	0.00	V	62.90	73.98	11.08	PK
		2483.5	44.68	0.11	V	44.79	53.98	9.19	AV
	8	2483.5	63.73	0.00	H	63.73	73.98	10.25	PK
		2483.5	44.45	0.11	H	44.56	53.98	9.42	AV
		2483.5	63.27	0.00	V	63.27	73.98	10.71	PK
		2483.5	44.25	0.11	V	44.36	53.98	9.62	AV
12	8	2483.5	60.21	0.00	H	60.21	73.98	13.77	PK
		2483.5	44.38	0.11	H	44.49	53.98	9.49	AV
		2483.5	59.99	0.00	V	59.99	73.98	13.99	PK
		2483.5	43.69	0.11	V	43.80	53.98	10.18	AV
13	8	#2483.5	65.65	0.00	H	65.65	73.98	8.33	PK
		#2483.5	51.32	0.11	H	51.43	53.98	2.55	AV
		#2483.5	64.97	0.00	V	64.97	73.98	9.01	PK
		#2483.5	50.91	0.11	V	51.02	53.98	2.96	AV

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

[52 Tones]

Channel	RU index	Frequency [MHz]	Measured Value [dBμV]	Duty Cycle Factor	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
1	37	2390.0	59.67	0.00	H	59.67	73.98	14.31	PK
		2390.0	43.57	0.20	H	43.77	53.98	10.21	AV
		2390.0	59.89	0.00	V	59.89	73.98	14.09	PK
		2390.0	43.89	0.20	V	44.09	53.98	9.89	AV
	40	2390.0	59.28	0.00	H	59.28	73.98	14.70	PK
		2390.0	44.58	0.20	H	44.78	53.98	9.20	AV
		2390.0	59.49	0.00	V	59.49	73.98	14.49	PK
		2390.0	44.68	0.20	V	44.88	53.98	9.10	AV
11	37	2483.5	68.73	0.00	H	68.73	73.98	5.25	PK
		2483.5	49.09	0.20	H	49.29	53.98	4.69	AV
		2483.5	67.93	0.00	V	67.93	73.98	6.05	PK
		2483.5	48.25	0.20	V	48.45	53.98	5.53	AV
	40	2483.5	64.40	0.00	H	64.40	73.98	9.58	PK
		2483.5	45.26	0.20	H	45.46	53.98	8.52	AV
		2483.5	63.58	0.00	V	63.58	73.98	10.40	PK
		2483.5	44.90	0.20	V	45.10	53.98	8.88	AV
12	40	2483.5	60.14	0.00	H	60.14	73.98	13.84	PK
		2483.5	44.04	0.20	H	44.24	53.98	9.74	AV
		2483.5	59.76	0.00	V	59.76	73.98	14.22	PK
		2483.5	43.76	0.20	V	43.96	53.98	10.02	AV
13	40	#2483.5	65.04	0.00	H	65.04	73.98	8.94	PK
		#2483.5	51.68	0.20	H	51.88	53.98	2.10	AV
		#2483.5	63.67	0.00	V	63.67	73.98	10.31	PK
		#2483.5	51.00	0.20	V	51.20	53.98	2.78	AV

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

[106 Tones]

Channel	RU index	Frequency [MHz]	Measured Value [dBμV]	Duty Cycle Factor	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
1	53	2390.0	63.87	0.00	H	63.87	73.98	10.11	PK
		2390.0	44.57	0.33	H	44.90	53.98	9.08	AV
		2390.0	64.35	0.00	V	64.35	73.98	9.63	PK
		2390.0	45.02	0.33	V	45.35	53.98	8.63	AV
	54	2390.0	63.81	0.00	H	63.81	73.98	10.17	PK
		2390.0	45.26	0.33	H	45.59	53.98	8.39	AV
		2390.0	64.40	0.00	V	64.40	73.98	9.58	PK
		2390.0	45.95	0.33	V	46.28	53.98	7.70	AV
11	53	2483.5	67.77	0.00	H	67.77	73.98	6.21	PK
		2483.5	50.13	0.33	H	50.46	53.98	3.52	AV
		2483.5	65.91	0.00	V	65.91	73.98	8.07	PK
		2483.5	49.64	0.33	V	49.97	53.98	4.01	AV
	54	2483.5	68.18	0.00	H	68.18	73.98	5.80	PK
		2483.5	48.20	0.33	H	48.53	53.98	5.45	AV
		2483.5	67.63	0.00	V	67.63	73.98	6.35	PK
		2483.5	47.69	0.33	V	48.02	53.98	5.96	AV
12	53	2483.5	62.49	0.00	H	62.49	73.98	11.49	PK
		2483.5	44.41	0.33	H	44.74	53.98	9.24	AV
		2483.5	62.14	0.00	V	62.14	73.98	11.84	PK
		2483.5	44.26	0.33	V	44.59	53.98	9.39	AV
	54	2483.5	61.54	0.00	H	61.54	73.98	12.44	PK
		2483.5	43.91	0.33	H	44.24	53.98	9.74	AV
		2483.5	61.23	0.00	V	61.23	73.98	12.75	PK
		2483.5	43.25	0.33	V	43.58	53.98	10.40	AV
13	53	2483.5	66.18	0.00	H	66.18	73.98	7.80	PK
		2483.5	44.21	0.33	H	44.54	53.98	9.44	AV
		2483.5	66.15	0.00	V	66.15	73.98	7.83	PK
		2483.5	43.98	0.33	V	44.31	53.98	9.67	AV
	54	#2483.5	63.04	0.00	H	63.04	73.98	10.94	PK
		#2483.5	49.50	0.33	H	49.83	53.98	4.15	AV
		#2483.5	62.25	0.00	V	62.25	73.98	11.73	PK
		#2483.5	48.65	0.33	V	48.98	53.98	5.00	AV

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

[242 Tones]

Channel	RU index	Frequency [MHz]	Measured Value [dBμV]	Duty Cycle Factor	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
1	61	2390.0	64.08	0.00	H	64.08	73.98	9.90	PK
		2390.0	46.02	0.78	H	46.80	53.98	7.18	AV
		2390.0	64.13	0.00	V	64.13	73.98	9.85	PK
		2390.0	46.21	0.78	V	46.99	53.98	6.99	AV
11	61	2483.5	70.13	0.00	H	70.13	73.98	3.85	PK
		#2483.5	50.12	0.78	H	50.90	53.98	3.08	AV
		2483.5	69.58	0.00	V	69.58	73.98	4.40	PK
		#2483.5	49.65	0.78	V	50.43	53.98	3.55	AV
12	61	2483.5	62.29	0.00	H	62.29	73.98	11.69	PK
		2483.5	44.33	0.78	H	45.11	53.98	8.87	AV
		2483.5	62.02	0.00	V	62.02	73.98	11.96	PK
		2483.5	44.28	0.78	V	45.06	53.98	8.92	AV
13	61	#2483.5	61.16	0.00	H	61.16	73.98	12.82	PK
		2483.5	50.66	0.78	H	51.44	53.98	2.54	AV
		#2483.5	60.22	0.00	V	60.22	73.98	13.76	PK
		2483.5	50.25	0.78	V	51.03	53.98	2.95	AV

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

[SU]

Channel	Frequency	Measured Value	Duty Cycle	ANT. POL	Total	Limit	Margin	Measurement
	[MHz]	[dBμV]	Factor	[H/V]	[dBμV/m]	[dBμV/m]	[dB]	Type
1	2390.0	63.94	0.00	H	63.94	73.98	10.04	PK
	2390.0	46.22	0.80	H	47.02	53.98	6.96	AV
	2390.0	64.15	0.00	V	64.15	73.98	9.83	PK
	2390.0	46.32	0.80	V	47.12	53.98	6.86	AV
11	2483.5	68.49	0.00	H	68.49	73.98	5.49	PK
	#2483.5	50.13	0.80	H	50.93	53.98	3.05	AV
	2483.5	68.14	0.00	V	68.14	73.98	5.84	PK
	#2483.5	49.56	0.80	V	50.36	53.98	3.62	AV
12	2483.5	63.00	0.00	H	63.00	73.98	10.98	PK
	2483.5	44.36	0.80	H	45.16	53.98	8.82	AV
	2483.5	62.50	0.00	V	62.50	73.98	11.48	PK
	2483.5	44.25	0.80	V	45.05	53.98	8.93	AV
13	2483.5	61.27	0.00	H	61.27	73.98	12.71	PK
	#2483.5	51.00	0.80	H	51.80	53.98	2.18	AV
	2483.5	60.25	0.00	V	60.25	73.98	13.73	PK
	#2483.5	48.65	0.80	V	49.45	53.98	4.53	AV

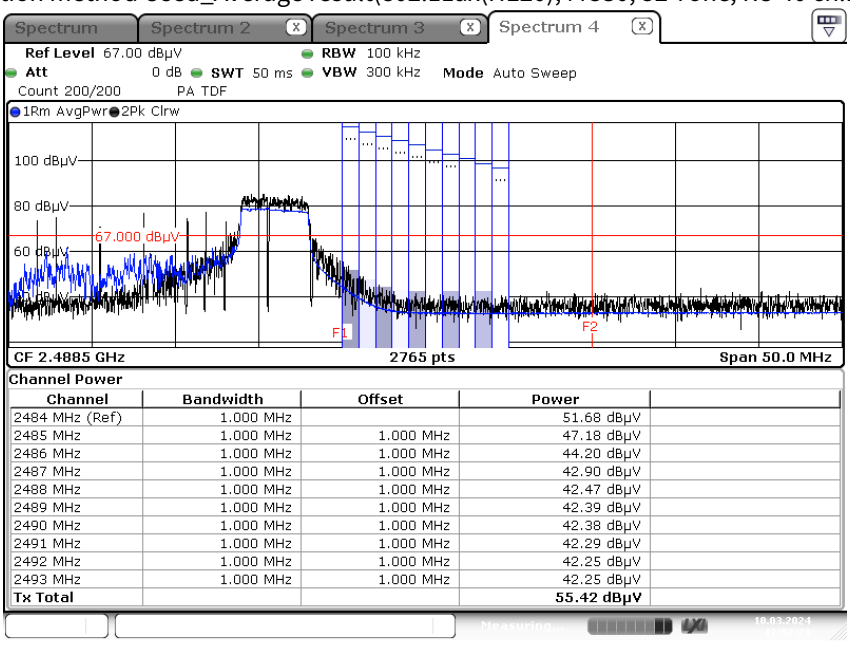
Note : # integration method Used (ANSI C63.10 Section11.13.3)

▣ Test Plots [MIMO_SDM(Ant.1+Ant.2)]

Note:

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

Integration method Used_Average result(802.11ax(HE20), MCS0, 52 Tone, RU 40 ch.13, X-H)



Channel	Bandwidth	Offset	Power
2484 MHz (Ref)	1.000 MHz		51.68 dBµV
2485 MHz	1.000 MHz	1.000 MHz	47.18 dBµV
2486 MHz	1.000 MHz	1.000 MHz	44.20 dBµV
2487 MHz	1.000 MHz	1.000 MHz	42.90 dBµV
2488 MHz	1.000 MHz	1.000 MHz	42.47 dBµV
2489 MHz	1.000 MHz	1.000 MHz	42.39 dBµV
2490 MHz	1.000 MHz	1.000 MHz	42.38 dBµV
2491 MHz	1.000 MHz	1.000 MHz	42.29 dBµV
2492 MHz	1.000 MHz	1.000 MHz	42.25 dBµV
2493 MHz	1.000 MHz	1.000 MHz	42.25 dBµV
Tx Total			55.42 dBµV

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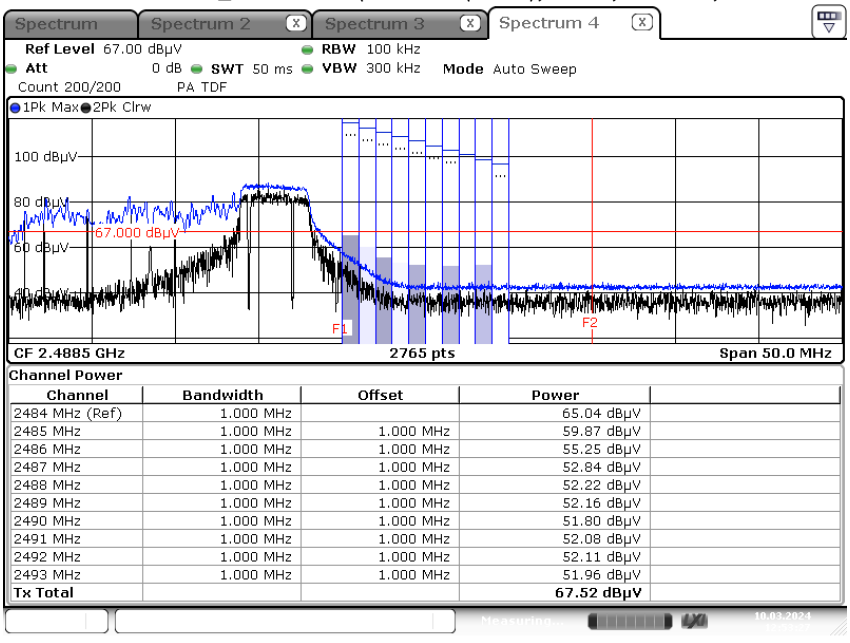
Integration method Used_Peak result(802.11ax(HE20), MCS0, 52 Tone, RU 40 ch.13, X-H)



Channel	Bandwidth	Offset	Power
2484 MHz (Ref)	1.000 MHz		65.04 dBµV
2485 MHz	1.000 MHz	1.000 MHz	59.87 dBµV
2486 MHz	1.000 MHz	1.000 MHz	55.25 dBµV
2487 MHz	1.000 MHz	1.000 MHz	52.84 dBµV
2488 MHz	1.000 MHz	1.000 MHz	52.22 dBµV
2489 MHz	1.000 MHz	1.000 MHz	52.16 dBµV
2490 MHz	1.000 MHz	1.000 MHz	51.80 dBµV
2491 MHz	1.000 MHz	1.000 MHz	52.08 dBµV
2492 MHz	1.000 MHz	1.000 MHz	52.11 dBµV
2493 MHz	1.000 MHz	1.000 MHz	51.96 dBµV
Tx Total			67.52 dBµV

Date: 10.MAR.2024 12:53:28

10. LIST OF TEST EQUIPMENT

Conducted Test

Equipment	Model	Manufacturer	Serial No.	Due to Calibration	Calibration Interval
LISN	ENV216	Rohde & Schwarz	102245	08/02/2024	Annual
EMI Test Receiver	ESR	Rohde & Schwarz	101910	05/26/2024	Annual
Temperature Chamber	SU-642	ESPEC	93008124	02/19/2025	Annual
Signal Analyzer	N9030A	Keysight	MY55410508	09/04/2024	Annual
Power Meter	N1911A	Agilent	MY45100523	02/28/2025	Annual
Power Sensor	N1921A	Agilent	MY57820067	02/22/2025	Annual
Directional Coupler	87300B	Agilent	3116A03621	10/30/2024	Annual
Power Splitter	11667B	Hewlett Packard	10545	02/06/2025	Annual
DC Power Supply	E3632A	Agilent	KR75305528	01/02/2025	Annual
Attenuator(10 dB)(DC-26.5 GHz)	8493C-010	Agilent	08285	06/02/2024	Annual
Attenuator(20 dB)	18N-20dB	Rohde & Schwarz	8	02/20/2025	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	02/15/2025	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	S3AM	08/03/2025	Biennial
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	03/07/2026	Biennial
Hybrid Antenna	VULB 9168	Schwarzbeck	9168-0895	08/16/2024	Biennial
Horn Antenna	BBHA 9120D	Schwarzbeck	9120D-1191	11/07/2025	Biennial
Horn Antenna(15 GHz ~ 40 GHz)	BBHA9170	Schwarzbeck	BBHA9170124	03/28/2025	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	01/02/2025	Annual
Band Reject Filter	WRCJV12-4900-5100-5900-6100-50SS	Wainwright Instruments	5	06/12/2024	Annual
Band Reject Filter	WRCJV12-4900-5100-5900-6100-50SS	Wainwright Instruments	6	06/12/2024	Annual
Band Reject Filter	WRCJV5100/5850-40/50-8EEK	Wainwright Instruments	1	02/14/2025	Annual
RF Switching System	FBSR-03A (3G HPF+LNA)	T&M SYSTEM	S3L1	11/17/2024	Annual
RF Switching System	FBSR-03A (10dB ATT+LNA)	T&M SYSTEM	S3L2	11/17/2024	Annual
RF Switching System	FBSR-03A (7G HPF+LNA)	T&M SYSTEM	S3L3	11/17/2024	Annual
RF Switching System	FBSR-03A (3dB ATT+LNA)	T&M SYSTEM	S3L4	11/17/2024	Annual
Power Amplifier	CBL18265035	CERNEX	22966	11/17/2024	Annual
Power Amplifier	CBL26405040	CERNEX	25956	02/26/2025	Annual
Bluetooth Tester	TC-3000C	TESCOM	3000C000175	03/28/2024	Annual
Spectrum Analyzer	FSV40 (9 kHz ~ 40 GHz)	Rohde & Schwarz	100900	12/06/2024	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.
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-2403-FC020-P