

TEST REPORT

FCC DTS Test for SM-S731B/DS
Certification

APPLICANT
SAMSUNG Electronics Co., Ltd.

REPORT NO.
HCT-RF-2507-FC054

DATE OF ISSUE
July 15, 2025

Tested by
Kyung Jun Woo



Technical Manager
Jong Seok Lee



HCT CO., LTD.
Bongjai Huh
BongJai Huh / CEO



HCT CO.,LTD.

2-6, 73, 74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, Republic of Korea
Tel. +82 31 645 6300 Fax. +82 31 645 6401

TEST REPORT

REPORT NO.

HCT-RF-2507-FC054

DATE OF ISSUE

July 15, 2025

Additional Model

SM-S731B

Applicant

SAMSUNG Electronics Co., Ltd.

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

Product Name

Mobile Phone

Model Name

SM-S731B/DS

FCC ID

A3LSMS731B

Date of Test

May 26, 2025 ~ July 14, 2025

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	July 15, 2025	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 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).

Data referencing: DTS Report (Ch.1~Ch.11) (FCC ID: A3LSMS731U, Report No. HCT-RF-2507-FC009)
Full test: Ch.12~Ch.13.

CONTENTS

1. EUT DESCRIPTION	5
ANTENNA CONFIGURATIONS	6
2. TEST METHODOLOGY	8
EUT CONFIGURATION	8
EUT EXERCISE	8
GENERAL TEST PROCEDURES	8
DESCRIPTION OF TEST MODES	9
3. INSTRUMENT CALIBRATION	9
4. FACILITIES AND ACCREDITATIONS	9
FACILITIES	9
EQUIPMENT	9
5. ANTENNA REQUIREMENTS	10
6. MEASUREMENT UNCERTAINTY	10
7. DESCRIPTION OF TESTS	11
8. SUMMARY OF TEST RESULTS & DATA REFERENCING	28
9. TEST RESULT	30
9.1 DUTY CYCLE	30
9.2 6 dB BANDWIDTH	32
9.3 OUTPUT POWER	36
9.4 POWER SPECTRAL DENSITY	38
9.5 BAND EDGE / CONDUCTED SPURIOUS EMISSIONS	41
9.6 RADIATED SPURIOUS EMISSIONS	47
9.7 RADIATED RESTRICTED BAND EDGES	52
9.7.1 Channel 1, 11	52
9.7.2 Channel 12, 13	54
9.8 POWERLINE CONDUCTED EMISSIONS	57
10. LIST OF TEST EQUIPMENT	58
11. ANNEX A_ TEST SETUP PHOTO	60

1. EUT DESCRIPTION

Model	SM-S731B/DS		
Additional Model	SM-S731B		
EUT Type	Mobile Phone		
Power Supply	DC 3.88 V		
Frequency Range	2 412 MHz ~ 2 472 MHz		
Max. RF Output Power	<u>Average Power</u>	SISO (Ant.1) :	20.92 dBm
		SISO (Ant.2) :	20.48 dBm
		MIMO_CDD (Ant.1+ Ant.2) :	23.72 dBm
	<u>Peak Power</u>	SISO (Ant.1) :	25.79 dBm
		SISO (Ant.2) :	25.90 dBm
		MIMO_CDD (Ant.1+ Ant.2) :	28.85 dBm
Modulation Type	DSSS/CCK : 802.11b OFDM : 802.11g, 802.11n, 802.11ac		
Number of Channels	13 Channels		
Antenna Specification	Type: Metal		
Serial number	Conducted : R3CY40XC7ET Radiated : R3CY40DEF7H		
Serial number(Ch. 12, 13)	Conducted : R3CY40QL8FV Radiated : R3CY40QLNVA		

ANTENNA CONFIGURATIONS

1. Antenna configuration

Configurations	SISO		MIMO	
	Ant1	Ant2	CDD	SDM
802.11b	O	O	O	X
802.11g	O	O	O	X
802.11n(HT20)	O	O	O	O
802.11ac(VHT20)	O	O	O	O

Note:

- (1) O = Support, X = Not Support
- (2) SISO = Single Input Single Output
- (3) SDM = Spatial Diversity Multiplexing
- (4) CDD = Cyclic Delay Diversity

2.This device supports simultaneous transmission operation, which allows for two channels to operate independent of one another in the 2.4 GHz and 5 GHz or 6GHz Bands simultaneously on each antenna.

Simultaneous transmission Scenario	2.4 GHz WiFi Ant.1	2.4 GHz WiFi Ant.2	5 GHz WiFi Ant.1	5 GHz WiFi Ant.2	6 GHz WiFi Ant.1	6 GHz WiFi Ant.2	BTLE Ant.1	BTLE Ant.2	Test Case
2.4 GHz WiFi MIMO + 5 GHz WiFi MIMO	on	on	on	on	-	-	-	-	Scenario 1
2.4 GHz WiFi MIMO + 6 GHz WiFi MIMO	on	on	-	-	on	on	-	-	
BTLE ANT.1 + 5 GHz WiFi MIMO	-	-	on	on	-	-	on	-	Scenario 2
BTLE ANT.1 + 6 GHz WiFi MIMO	-	-			on	on	on	-	Scenario 3

3. Directional Gain Calculation

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

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

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

Ant Gain (dBi)		N_{ANT}/N_{SS}	Directional Gain (dBi)	
			CDD	SDM
ANT.1	-5.12	2/2	-2.18	-5.12
ANT.2	-5.26			

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.

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

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

Sample MIMO Calculation:

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

$$\text{MIMO} = \text{ANT.1} + \text{ANT.2}$$

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

2. TEST METHODOLOGY

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

EUT CONFIGURATION

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

EUT EXERCISE

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

GENERAL TEST PROCEDURES

Conducted Emissions

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

Radiated Emissions

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

DESCRIPTION OF TEST MODES

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

3. INSTRUMENT CALIBRATION

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

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

4. FACILITIES AND ACCREDITATIONS

FACILITIES

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

Detailed description of test facility was submitted to the Commission and accepted dated 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.

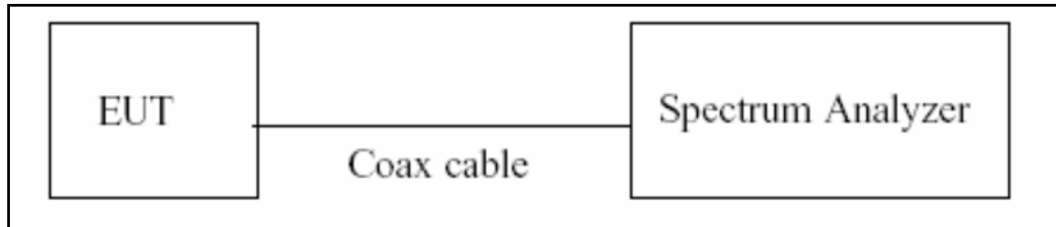
Parameter	Expanded Uncertainty ($\pm$ kHz)
X dB, 99% Bandwidth	95 (Confidence level about 95 %, $k=2$)
Frequency stability	28 (Confidence level about 95 %, $k=2$)

Parameter	Expanded Uncertainty ($\pm$ dB)
Conducted Disturbance (150 kHz ~ 30 MHz)	1.54 (Confidence level about 95 %, $k=2$)
Conducted Output Power(Power Meter)	0.54 (Confidence level about 95 %, $k=2$)
Conducted Output Power(Signal Analyzer)	0.68 (Confidence level about 95 %, $k=2$)
Power Spectral Density	1.03 (Confidence level about 95 %, $k=2$)
Band Edge (Out of Band Emissions)	0.70 (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)	5.68 (Confidence level about 95 %, $k=2$)
Radiated Disturbance (1 GHz ~ 18 GHz)	5.75 (Confidence level about 95 %, $k=2$)
Radiated Disturbance (18 GHz ~ 40 GHz)	5.82 (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 $> 50/T$.

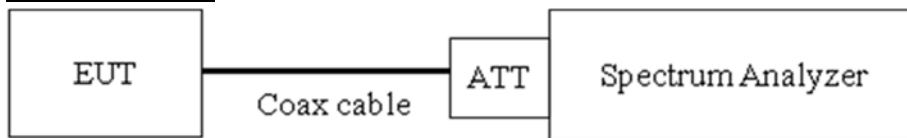
1. RBW = 8 MHz (the largest available value)
2. VBW = 8 MHz or 50 MHz ($\geq$ RBW)
3. SPAN = 0 Hz
4. Detector = Average
5. Number of points in sweep > 100
6. Trace mode = Clear write
7. Measure T_{total} and T_{on}
8. Calculate Duty Cycle = T_{on} / T_{total} and Duty Cycle Factor = $10\log(1/\text{Duty Cycle})$

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.

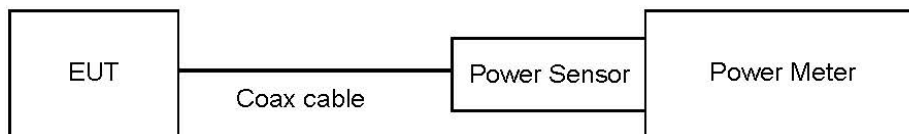
Note : We tested OBW using the automatic bandwidth measurement capability of a spectrum analyzer.

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

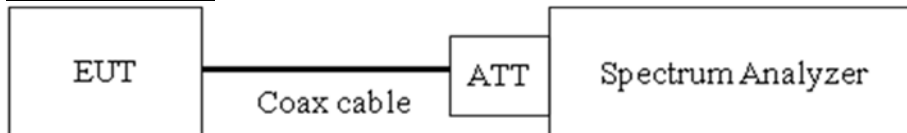
- Conducted Output Power(Peak) = Measured Value + ATT loss + Cable loss
- Conducted Output Power(Average) = Measured Value + ATT loss + Cable loss + Duty Cycle Factor

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 DTS bandwidth.
- 3) $RBW = 3 \text{ kHz} \leq RBW \leq 100 \text{ kHz}$.
- 4) $VBW \geq 3 \times RBW$.
- 5) Sweep = auto couple.
- 6) Detector = Peak.
- 7) Trace mode = max hold.
- 8) Allow trace to fully stabilize.
- 9) Use the peak marker function to determine the maximum amplitude level within the RBW.
- 10) If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

Sample Calculation

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

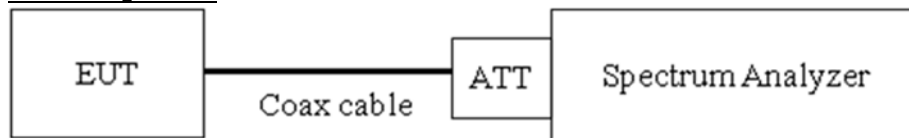
7.5. Conducted Band Edge(Out of Band Emissions) & Conducted Spurious Emissions

Limit

The maximum conducted (Peak) output power was used to demonstrate compliance, then the peak power in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 20 dB relative to the maximum in-band peak PSD level in 100 kHz.

[Conducted > 20 dBc]

Test 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	10.26
100	10.33
200	10.36
300	10.34
400	10.45
500	10.53
600	10.56
700	10.70
800	10.82
900	10.92
1000	10.94
2000	10.94
2400	10.99
2500	10.99
3000	11.25
4000	11.33
5000	12.02
6000	12.02
7000	12.20
8000	12.21
9000	12.25
10000	12.32
11000	12.31
12000	12.34
13000	12.36
14000	12.49
15000	12.44
16000	12.50
17000	12.54
18000	12.98
19000	13.04
20000	13.08
21000	13.10
22000	13.14
23000	13.31
24000	13.41
25000	13.45
26000	13.46

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

2. Factor = Attenuator loss + Cable loss

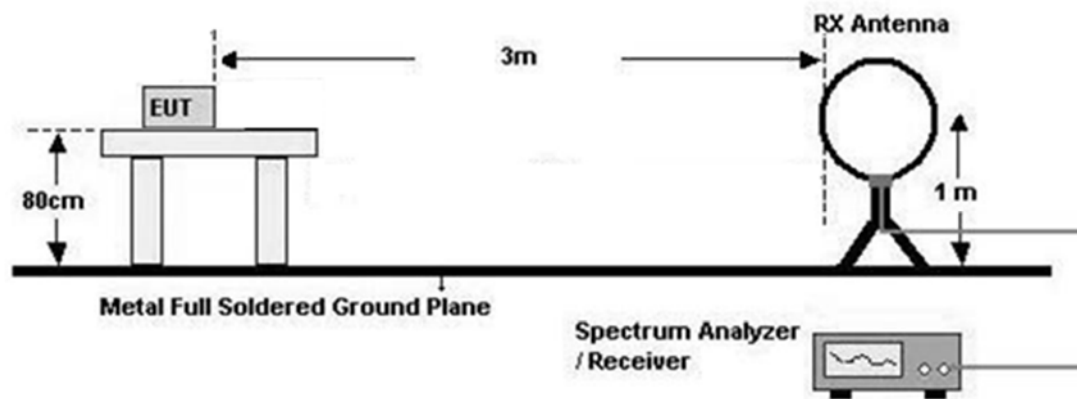
7.6. Radiated Test

Limit

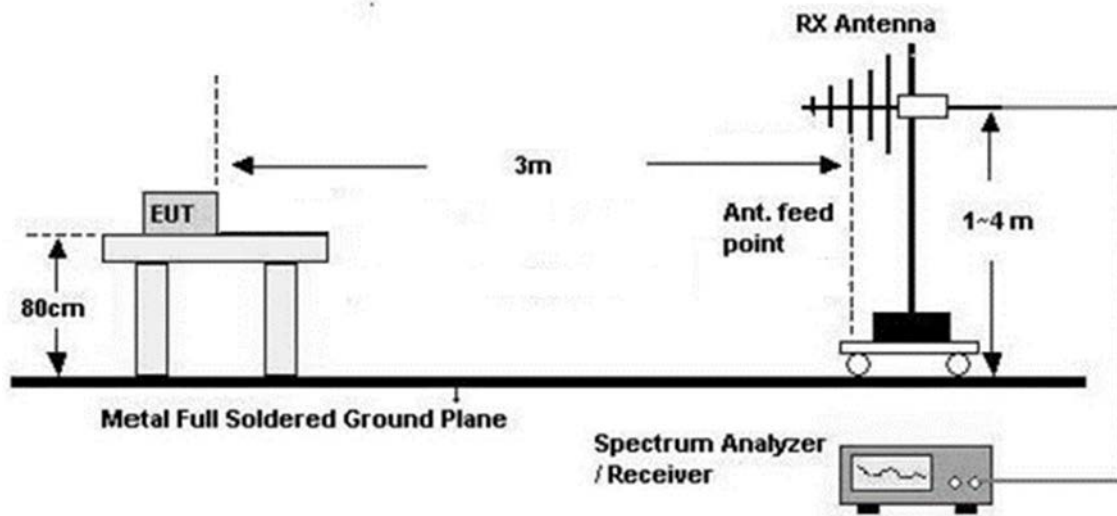
Frequency (MHz)	Field Strength ($\mu\text{V/m}$)	Measurement Distance (m)
0.009 – 0.490	$2400/F(\text{kHz})$	300
0.490 – 1.705	$24000/F(\text{kHz})$	30
1.705 – 30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Test Configuration

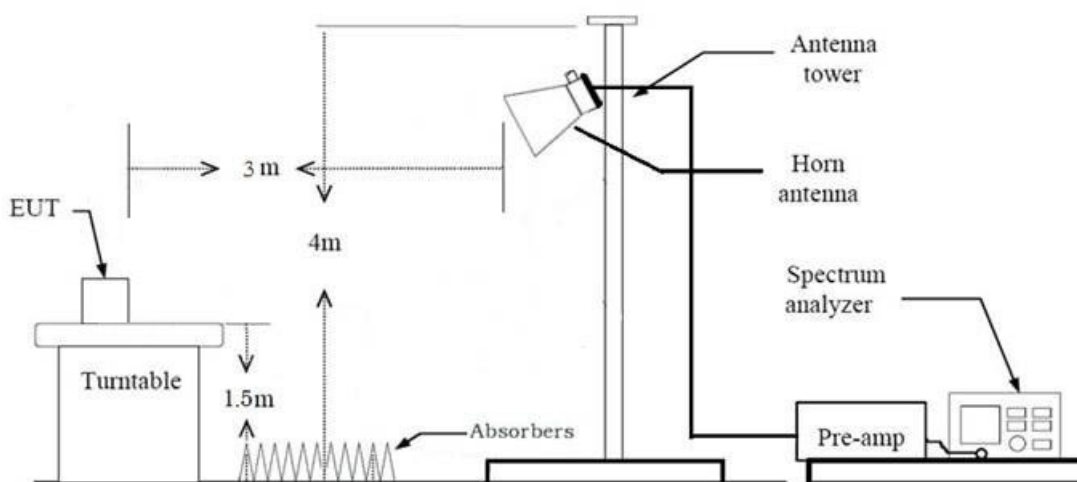
Below 30 MHz



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 = Max hold
 - 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 = Max hold
 - RBW = 100 kHz
 - VBW $\geq 3 \times$ 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)

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

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

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

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

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

Test Procedure of Radiated Restricted Band Edge

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

(1) Measurement Type(Peak):

- Measured Frequency Range : 2310 MHz ~ 2390 MHz / 2483.5 MHz ~ 2500 MHz
- Detector = Peak
- Trace = Maxhold
- RBW = 1 MHz
- VBW $\geq 3 \times$ RBW

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

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

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

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

- Duty Cycle Factor (dB) : Please refer to the please refer to section 9.1.
- 9. Measurement value only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (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)
 - = Peak Measured Value
 - Total(Measurement Type : Average, Duty cycle $\geq 98\%$)
 - = Average Measured Value
 - Total(Measurement Type : Average, Duty cycle < 98 %)
 - = Average Measured Value + Duty Cycle Factor
 - We apply to the offset in the 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 μ H/50 ohms line impedance stabilization network (LISN).

Frequency Range (MHz)	Limits (dB μ V)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56 ^(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. Worst case configuration and mode

Radiated test

1. All modes of operation were investigated and the worst case configuration results are reported.
 - Mode : Stand alone, Stand alone + External accessories
 - Worstcase : Stand alone
2. All Antennas of operation were investigated and the worst case results are reported
 - Antenna Operation Type : SISO, MIMO_CDD(Ant.1+Ant.2), MIMO_SDM(Ant.1+Ant.2)
 - Worstcase : MIMO_CDD(Ant.1+Ant.2)
3. EUT Axis
 - Radiated Spurious Emissions : Z
 - Radiated Restricted Band Edge : X
4. Duty cycle factor applies only 802.11g/n/ac (Duty cycle < 98 %).
5. All data rate of operation were investigated and the test results are worst case in lowest Data Rate of each mode.
 - 802.11b : 1 Mbps
 - 802.11g : 6 Mbps
 - 802.11n(HT20): MCS0
 - 802.11ac(VHT20): MCS0
6. 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
7. Radiated Spurious Emission
 - All modes of operation were investigated and the worst case results are reported.
 - Mode: 802.11b, 802.11g, 802.11n(HT20), 802.11ac(VHT20)
 - Worst case: 802.11b
8. SM-S731B/DS, SM-S731B were tested and the worst case results are reported.
(Worst case: SM-S731B/DS)

Radiated test(Simultaneous transmission Scenario)

1. All modes of operation were investigated and the worst case configuration results are reported.

- Mode : Stand alone, Stand alone + External accessories

- Worstcase : Stand alone

2. EUT Axis

- Radiated Spurious Emissions : Z

3. All of Simultaneous transmission Scenario were investigated and the worst case configuration results are reported.

Simultaneous transmission Scenario	2.4 GHz WiFi Ant.1	2.4 GHz WiFi Ant.2	5 GHz WiFi Ant.1	5 GHz WiFi Ant.2	6 GHz WiFi Ant.1	6 GHz WiFi Ant.2	BTLE Ant.1	BTLE Ant.2	Test Case
2.4 GHz WiFi MIMO + 5 GHz WiFi MIMO	on	on	on	on	-	-	-	-	Scenario 1
2.4 GHz WiFi MIMO + 6 GHz WiFi MIMO	on	on	-	-	on	on	-	-	
BTLE ANT.1 + 5 GHz WiFi MIMO	-	-	on	on	-	-	on	-	Scenario 2
BTLE ANT.1 + 6 GHz WiFi MIMO	-	-			on	on	on	-	Scenario 3

4. The Simultaneous transmission Scenario mode test investigated both intermodulation and radiated spurious emissions.

- Worst result: Radiated spurious emissions(cf. Section 9.6)

- Intermodulation: No signals are generated.

5. The following tables show the worst case configurations determined during testing.

(Worst case: The lowest margin condition the channels and modes were selected for test.)

Scenario 1	Description	2.4GHz Emission	5 GHz Emission
2.4 GHz WiFi MIMO + 5 GHz WiFi MIMO	Antenna	ANT ALL	ANT ALL
	Channel	11	36
	Data Rate	1 Mbps	6 Mbps
	Mode	802.11b	802.11a

Note : UNII Simultaneous transmission Data refer to [UNII] Test Report

6. SM-S731B/DS, SM-S731B were tested and the worst case results are reported.

(Worst case: SM-S731B/DS)

AC Power line Conducted Emissions

1. All modes of operation were investigated and the worst case configuration results are reported.

- Mode : Stand alone + External accessories + Travel Adapter

Stand alone + Travel Adapter

- Worstcase : Stand alone + Travel Adapter

2. SM-S731B/DS, SM-S731B were tested and the worst case results are reported.

(Worst case: SM-S731B/DS)

Conducted test

1. The EUT was configured with data rate of highest power.

2. SM-S731B/DS, SM-S731B were tested and the worst case results are reported.

(Worst case: SM-S731B/DS)

8. SUMMARY OF TEST RESULTS & DATA REFERENCING

8.1. Test result

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 > 20 dBc		PASS
AC Power line Conducted Emissions	§ 15.207	cf. Section 7.7		PASS
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

Note. The decision rule applies 'simple acceptance'

8.2. Data Referencing

Equipment Class	Rule Part	Test item	Data Referencing	Comments
DTS (WLAN 2.4GHz)	15.247(a)(2)	6 dB Bandwidth	Y	-
	15.247(b)(3)	Conducted Maximum output power	Y	Spot-check
	15.247(e).	Power Spectral Density	Y	-
	15.247(d)	Band Edge (Out of Band Emissions)	Y	-
	15.207	AC Power line conducted Emissions	Y	-
	15.247(d) 15.205 15.209	Radiated Spurious Emissions	Y	Spot-check
	15.247(d) 15.205 15.209	Radiated Restricted Band Edge	Y	Spot-check

Spot-Check Result

1. Data was leveraged from model SM-S731U for the certification of SM-S731B/DS.
2. Please refer to the [FCC Evaluation] Report.

9. TEST RESULT

9.1 DUTY CYCLE

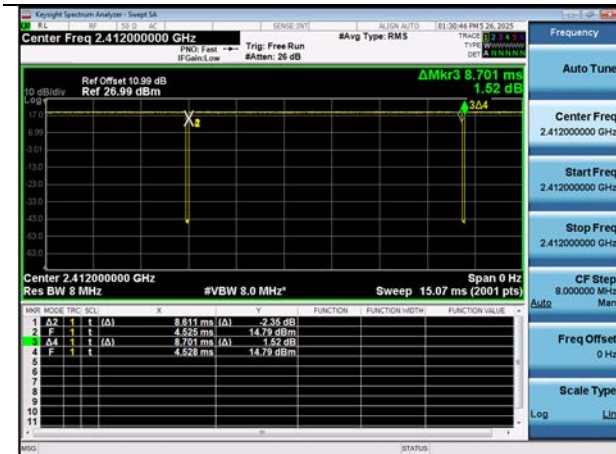
Mode	Data Rate	T _{on} (ms)	T _{total} (ms)	Duty Cycle	Duty Cycle Factor (dB)
802.11b	1 Mbps	8.611	8.701	0.990	0.045
802.11g	6 Mbps	1.426	1.523	0.936	0.286
802.11n (HT20)	MCS0	1.333	1.431	0.932	0.308
802.11ac (VHT20)	MCS0	1.340	1.439	0.931	0.310

Test Plots

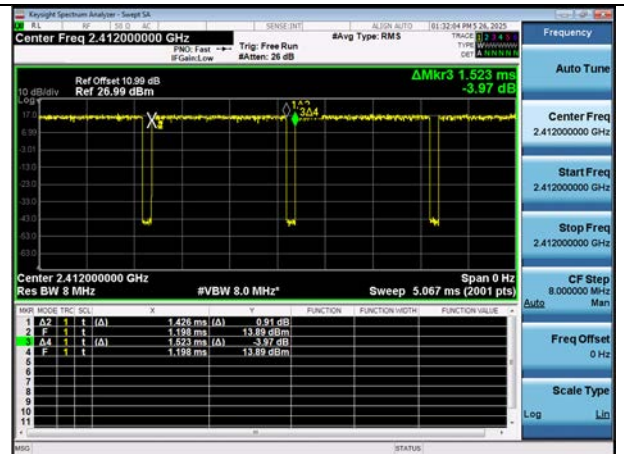
Note:

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

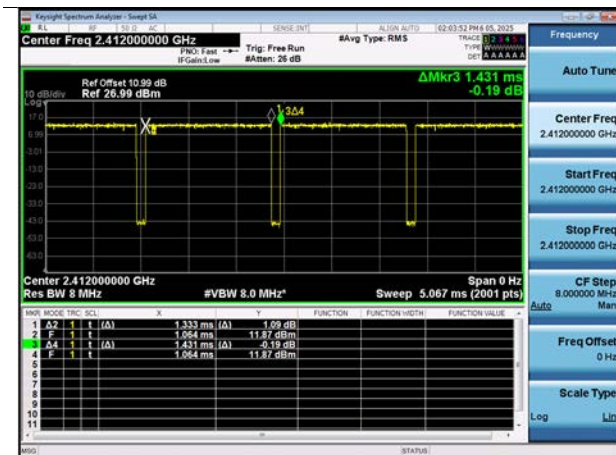
802.11b (1 Mbps)



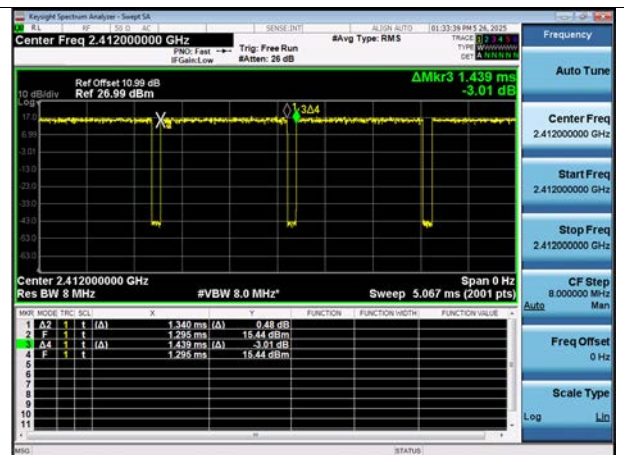
802.11g (6 Mbps)



802.11n (MCS0)



802.11ac (MCS0)



9.2 6 dB BANDWIDTH

[ANT. 1]

Mode	Frequency [MHz]	Channel No.	6 dB Bandwidth [MHz]	Minimum Bandwidth [MHz]
802.11b	2412	1	10.12	0.50
	2437	6	10.13	0.50
	2462	11	10.10	0.50
	2467	12	10.20	0.50
	2472	13	10.21	0.50
802.11g	2412	1	16.43	0.50
	2437	6	16.43	0.50
	2462	11	16.42	0.50
	2467	12	16.41	0.50
	2472	13	16.41	0.50
802.11n(HT20)	2412	1	17.67	0.50
	2437	6	17.67	0.50
	2462	11	17.66	0.50
	2467	12	17.66	0.50
	2472	13	17.64	0.50
802.11ac(VHT20)	2412	1	17.65	0.50
	2437	6	17.67	0.50
	2462	11	17.64	0.50
	2467	12	17.65	0.50
	2472	13	17.66	0.50

[ANT. 2]

Mode	Frequency [MHz]	Channel No.	6 dB Bandwidth [MHz]	Minimum Bandwidth [MHz]
802.11b	2412	1	10.11	0.50
	2437	6	10.12	0.50
	2462	11	9.615	0.50
	2467	12	10.21	0.50
	2472	13	10.22	0.50
802.11g	2412	1	16.46	0.50
	2437	6	16.43	0.50
	2462	11	16.39	0.50
	2467	12	16.41	0.50
	2472	13	16.40	0.50
802.11n(HT20)	2412	1	17.66	0.50
	2437	6	17.68	0.50
	2462	11	17.28	0.50
	2467	12	17.41	0.50
	2472	13	17.65	0.50
802.11ac(VHT20)	2412	1	17.67	0.50
	2437	6	17.65	0.50
	2462	11	17.41	0.50
	2467	12	17.61	0.50
	2472	13	17.63	0.50

Test Plots

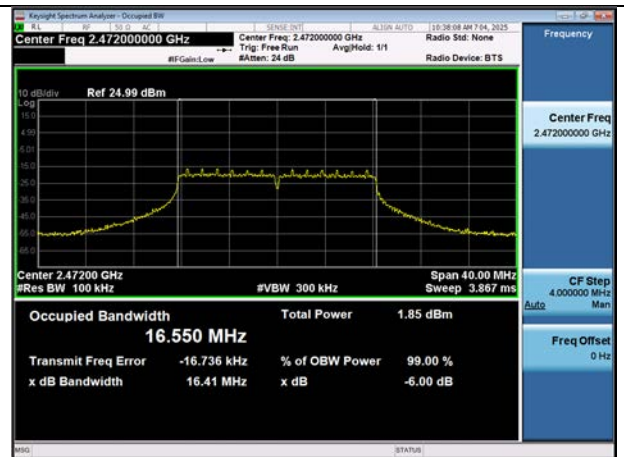
[ANT. 1]

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

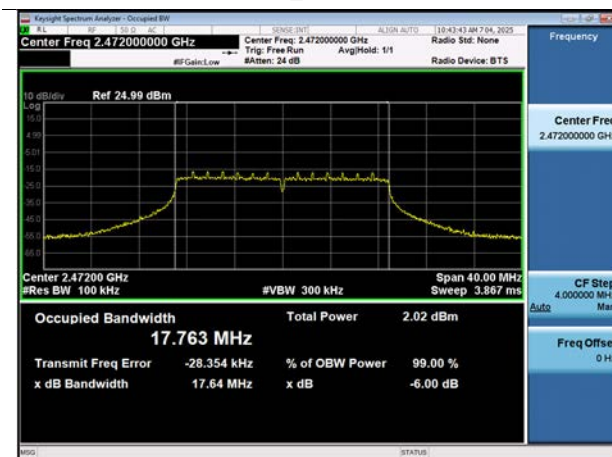
802.11b-CH 11



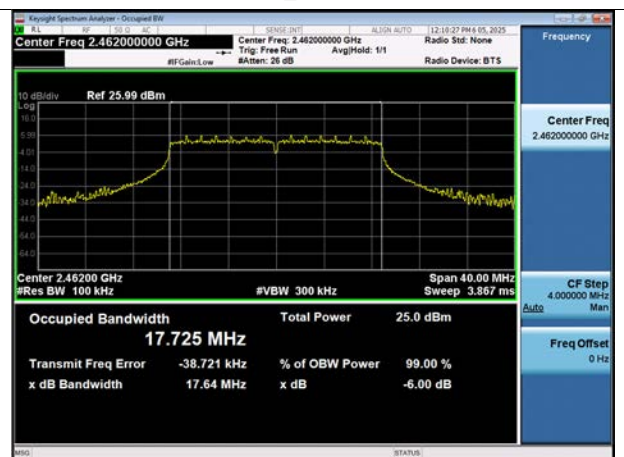
802.11g-CH 13



802.11n_HT20-CH 13



802.11ac_VHT20-CH 11



[ANT. 2]

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

802.11b-CH 11



802.11g-CH 11



802.11n_HT20-CH 11



802.11ac_VHT20-CH 11



9.3 OUTPUT POWER

Note :

1. MIMO_CDD(Ant1+Ant2) Power = $10 \cdot \log((10^{(\text{Ant. 1 power}/10)}) + (10^{(\text{Ant. 2 power}/10)}))$

Peak Power

[MIMO_CDD(Ant1+Ant2)]

Mode	Frequency [MHz]	Channel No.	Data Rate	Conducted Peak Power [dBm]			Limit [dBm]
				ANT1	ANT2	MIMO	
802.11b	2412	1	11M	25.74	25.67	28.72	30
	2437	6	11M	25.33	25.90	28.64	30
	2462	11	11M	25.79	25.90	28.85	30
	2467	12	11M	8.96	6.57	10.94	30
	2472	13	11M	9.49	7.03	11.44	30
802.11g	2412	1	6M	24.57	23.41	27.04	30
	2437	6	6M	24.78	25.03	27.92	30
	2462	11	6M	24.41	24.94	27.69	30
	2467	12	6M	11.02	9.89	13.50	30
	2472	13	6M	2.75	0.78	4.88	30
802.11n	2412	1	MCS0	24.47	23.67	27.10	30
	2437	6	MCS0	24.92	25.31	28.13	30
	2462	11	MCS0	24.45	25.06	27.78	30
	2467	12	MCS0	10.98	9.86	13.46	30
	2472	13	MCS0	2.71	0.90	4.91	30
802.11ac	2412	1	MCS0	24.50	23.64	27.10	30
	2437	6	MCS0	24.93	25.30	28.13	30
	2462	11	MCS0	24.56	25.01	27.80	30
	2467	12	MCS0	10.91	9.59	13.31	30
	2472	13	MCS0	2.79	0.74	4.89	30

Average Power

Note :

1. Total Power [dBm] = Measured Power [dBm] + Duty Cycle Factor [dB]

[MIMO_CDD(Ant1+Ant2)]

Mode	Frequency [MHz]	Channel No.	Data Rate	Conducted Average Power [dBm]			Limit [dBm]
				ANT1	ANT2	MIMO	
802.11b	2412	1	1M	20.92	20.48	23.72	30
	2437	6	1M	19.83	20.14	23.00	30
	2462	11	1M	20.15	20.03	23.10	30
	2467	12	1M	2.49	0.25	4.52	30
	2472	13	1M	2.82	0.37	4.78	30
802.11g	2412	1	6M	17.32	16.57	19.97	30
	2437	6	6M	17.95	18.32	21.15	30
	2462	11	6M	17.44	17.81	20.64	30
	2467	12	6M	2.82	1.35	5.15	30
	2472	13	6M	-5.47	-7.52	-3.37	30
802.11n	2412	1	MCS0	17.23	16.61	19.94	30
	2437	6	MCS0	17.72	18.37	21.07	30
	2462	11	MCS0	17.66	17.76	20.72	30
	2467	12	MCS0	2.82	1.23	5.11	30
	2472	13	MCS0	-5.42	-7.45	-3.31	30
802.11ac	2412	1	MCS0	17.31	16.63	19.99	30
	2437	6	MCS0	17.92	18.35	21.15	30
	2462	11	MCS0	17.45	17.75	20.61	30
	2467	12	MCS0	2.67	1.30	5.05	30
	2472	13	MCS0	-5.40	-7.37	-3.26	30

9.4 POWER SPECTRAL DENSITY

Note :

1. MIMO_CDD(Ant1+Ant2) PSD = $10 \cdot \log((10^{(\text{Ant. 1 PSD} / 10)}) + (10^{(\text{Ant. 2 PSD} / 10)}))$

[MIMO_CDD(Ant1+Ant2)]

Mode	Frequency [MHz]	Channel No.	Data Rate	Power Spectral Density [dBm]			Limit
				ANT1	ANT2	MIMO	
802.11b	2412	1	11M	1.005	1.013	4.019	8 dBm / 3 kHz
	2437	6	11M	0.640	0.415	3.539	
	2462	11	11M	0.437	0.409	3.433	
	2467	12	11M	-11.320	-13.572	-9.291	
	2472	13	11M	-11.114	-13.184	-9.017	
802.11g	2412	1	6M	-2.654	-4.142	-0.324	
	2437	6	6M	-2.200	-2.716	0.560	
	2462	11	6M	-3.541	-1.026	0.906	
	2467	12	6M	-13.438	-14.837	-11.071	
	2472	13	6M	-21.371	-23.466	-19.283	
802.11n	2412	1	MCS0	-1.988	-2.556	0.748	
	2437	6	MCS0	-1.127	-1.110	1.892	
	2462	11	MCS0	-2.130	-0.692	1.659	
	2467	12	MCS0	-13.121	-14.433	-10.717	
	2472	13	MCS0	-21.120	-22.615	-18.793	
802.11ac	2412	1	MCS0	-2.493	-1.968	0.788	
	2437	6	MCS0	-1.232	-1.174	1.807	
	2462	11	MCS0	-2.129	0.078	2.124	
	2467	12	MCS0	-13.062	-14.166	-10.569	
	2472	13	MCS0	-21.006	-23.321	-19.001	

Test Plots

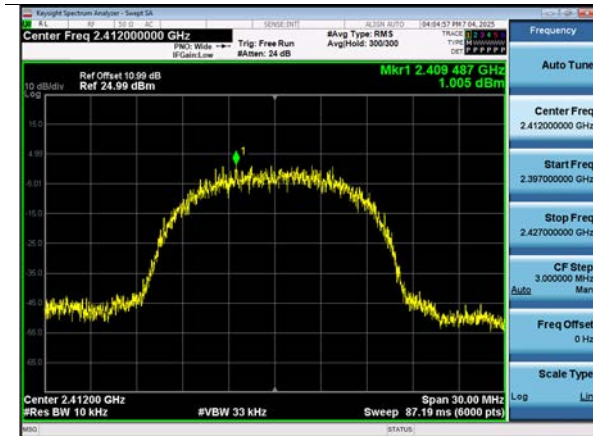
Note :

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

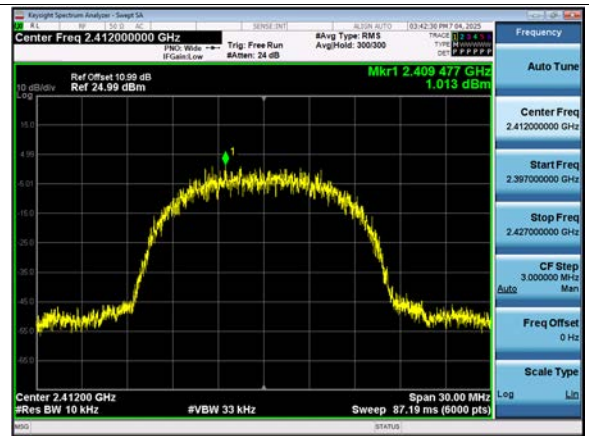
[MIMO_CDD(Ant1+Ant2)]

Power Spectral Density (802.11b-CH 1)

ANT. 1

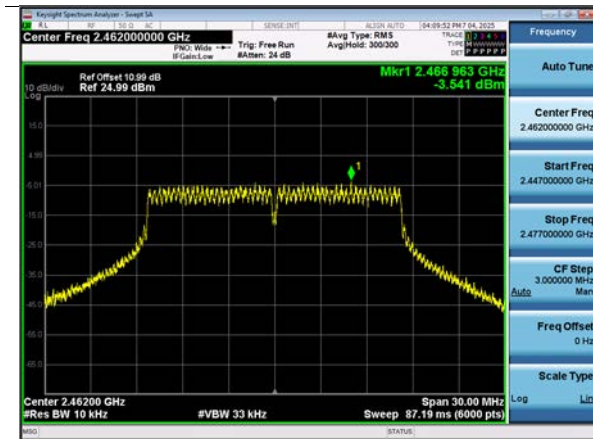


ANT. 2

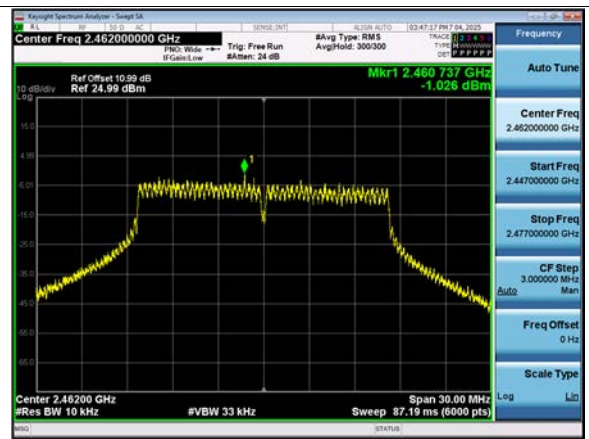


Power Spectral Density (802.11g-CH 11)

ANT. 1

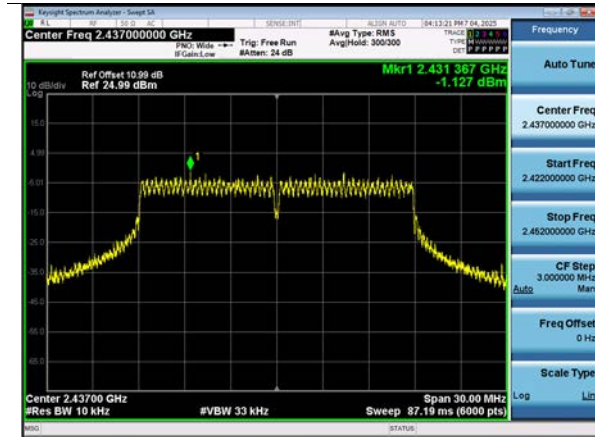


ANT. 2

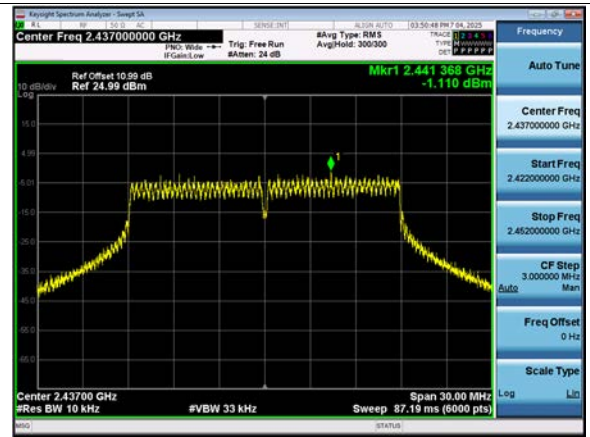


Power Spectral Density (802.11n-CH 6)

ANT. 1

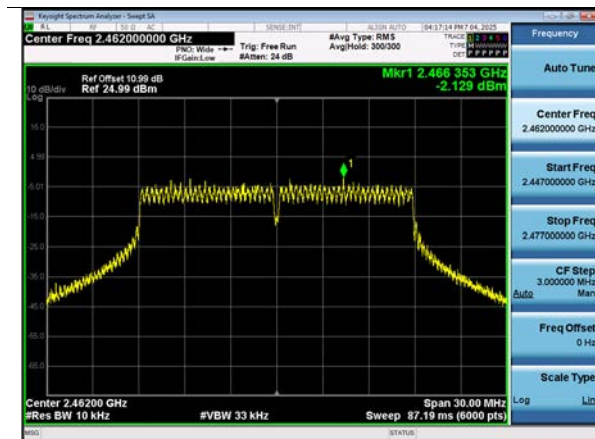


ANT. 2

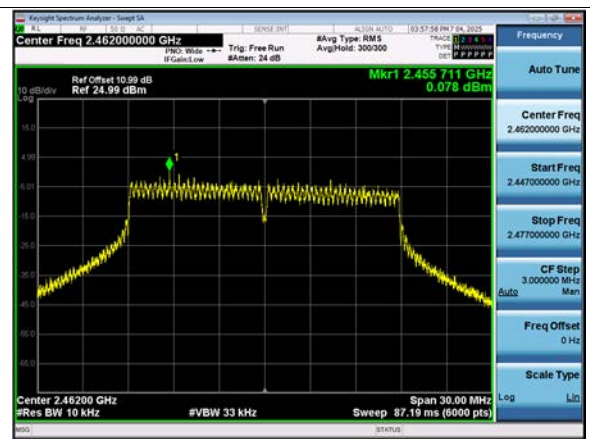


Power Spectral Density (802.11ac-CH 11)

ANT. 1



ANT. 2



9.5 BAND EDGE / CONDUCTED SPURIOUS EMISSIONS

Band Edge

Limit : 20 dBc

[ANT. 1]

Mode	Freq. [MHz]	CH.	Measured Position	Band edge[dB]
802.11b	2412	1	Lowest Bandedge	42.954
	2462	11	Highest Bandedge	58.762
	2467	12	Highest Bandedge	47.542
	2472	13	Highest Bandedge	47.640
802.11g	2412	1	Lowest Bandedge	31.727
	2462	11	Highest Bandedge	44.060
	2467	12	Highest Bandedge	43.671
	2472	13	Highest Bandedge	28.420
802.11n	2412	1	Lowest Bandedge	31.525
	2462	11	Highest Bandedge	39.391
	2467	12	Highest Bandedge	42.174
	2472	13	Highest Bandedge	29.034
802.11ac	2412	1	Lowest Bandedge	31.139
	2462	11	Highest Bandedge	39.600
	2467	12	Highest Bandedge	42.459
	2472	13	Highest Bandedge	29.368

[ANT. 2]

Mode	Freq. [MHz]	CH.	Measured Position	Band edge[dB]
802.11b	2412	1	Lowest Bandedge	45.105
	2462	11	Highest Bandedge	57.846
	2467	12	Highest Bandedge	44.757
	2472	13	Highest Bandedge	44.992
802.11g	2412	1	Lowest Bandedge	31.219
	2462	11	Highest Bandedge	47.353
	2467	12	Highest Bandedge	43.177
	2472	13	Highest Bandedge	28.451
802.11n	2412	1	Lowest Bandedge	31.560
	2462	11	Highest Bandedge	42.242
	2467	12	Highest Bandedge	42.317
	2472	13	Highest Bandedge	28.144
802.11ac	2412	1	Lowest Bandedge	31.750
	2462	11	Highest Bandedge	42.686
	2467	12	Highest Bandedge	42.272
	2472	13	Highest Bandedge	28.351

Conducted Spurious Emission

Limit : 20 dBc

[ANT. 1]

Mode	Frequency [MHz]	Channel No.	Conducted Spurious Emission [dBc]
802.11b	2412	1	49.398
	2437	6	47.666
	2462	11	48.228
	2467	12	46.609
	2472	13	46.548
802.11g	2412	1	39.811
	2437	6	44.786
	2462	11	41.073
	2467	12	43.447
	2472	13	37.445
802.11n HT20	2412	1	43.746
	2437	6	44.685
	2462	11	43.541
	2467	12	43.477
	2472	13	36.398
802.11ac VHT20	2412	1	40.851
	2437	6	41.900
	2462	11	40.564
	2467	12	44.367
	2472	13	38.098

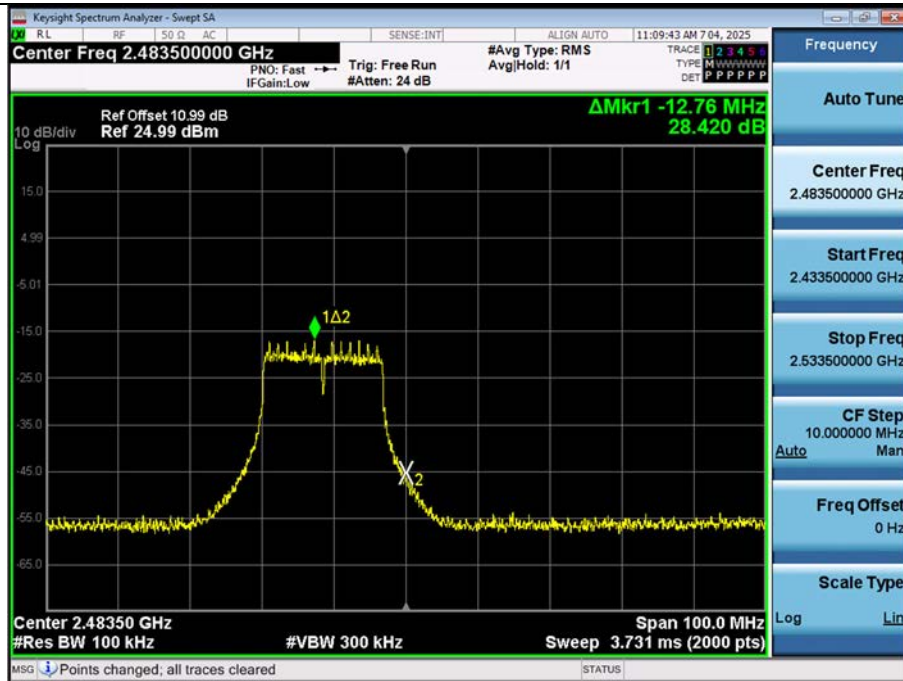
[ANT. 2]

Mode	Frequency [MHz]	Channel No.	Conducted Spurious Emission [dBc]
802.11b	2412	1	47.988
	2437	6	47.003
	2462	11	48.812
	2467	12	43.885
	2472	13	44.265
802.11g	2412	1	40.388
	2437	6	44.223
	2462	11	41.437
	2467	12	41.650
	2472	13	33.576
802.11n HT20	2412	1	41.522
	2437	6	42.135
	2462	11	43.058
	2467	12	42.171
	2472	13	33.682
802.11ac VHT20	2412	1	39.823
	2437	6	41.703
	2462	11	41.569
	2467	12	44.020
	2472	13	35.455

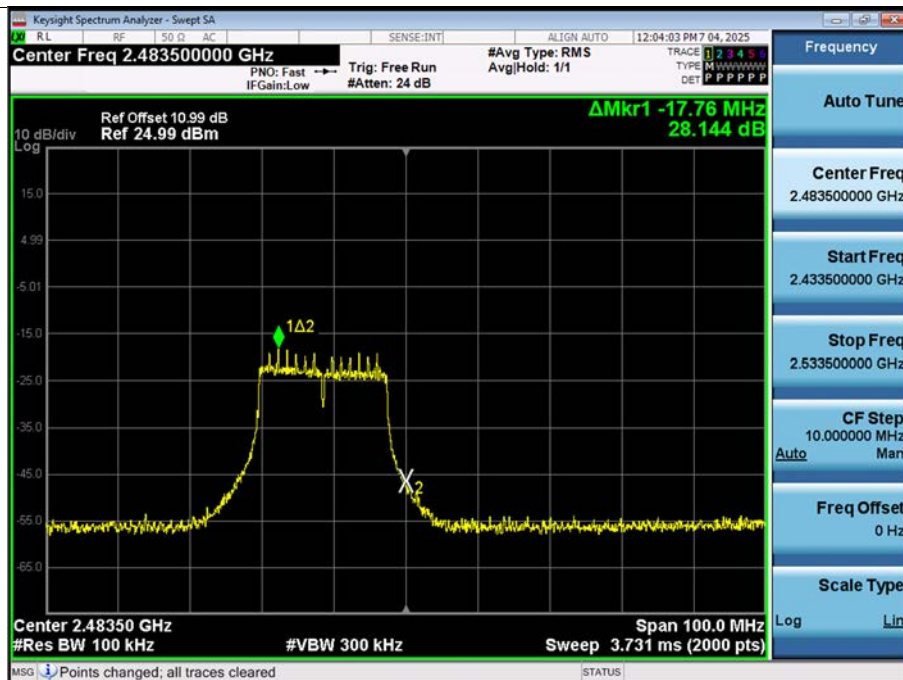
Test Plots

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

[ANT. 1] 802.11g - CH 13



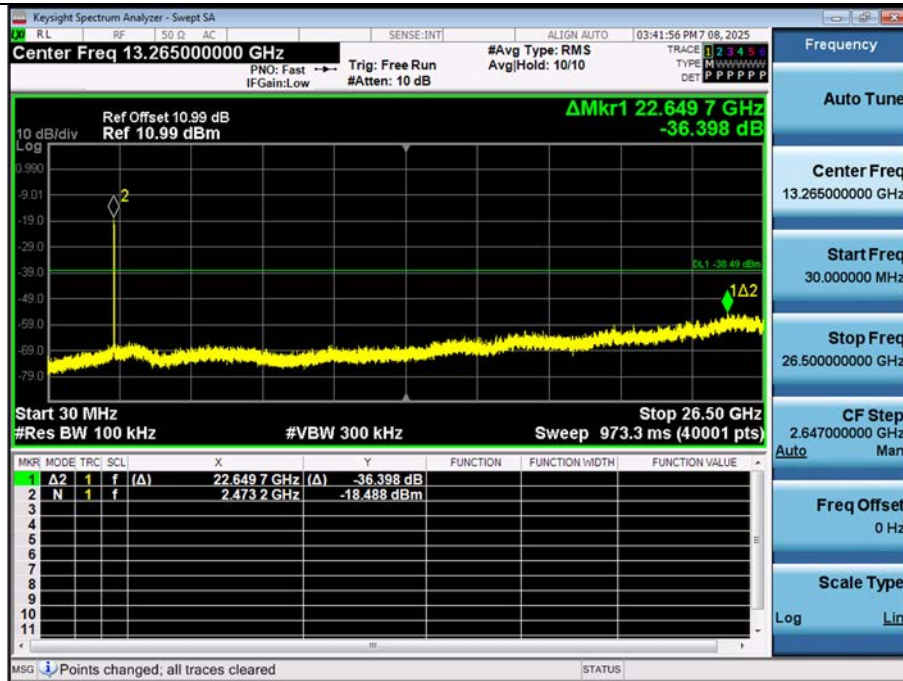
[ANT. 2] 802.11n - CH 13



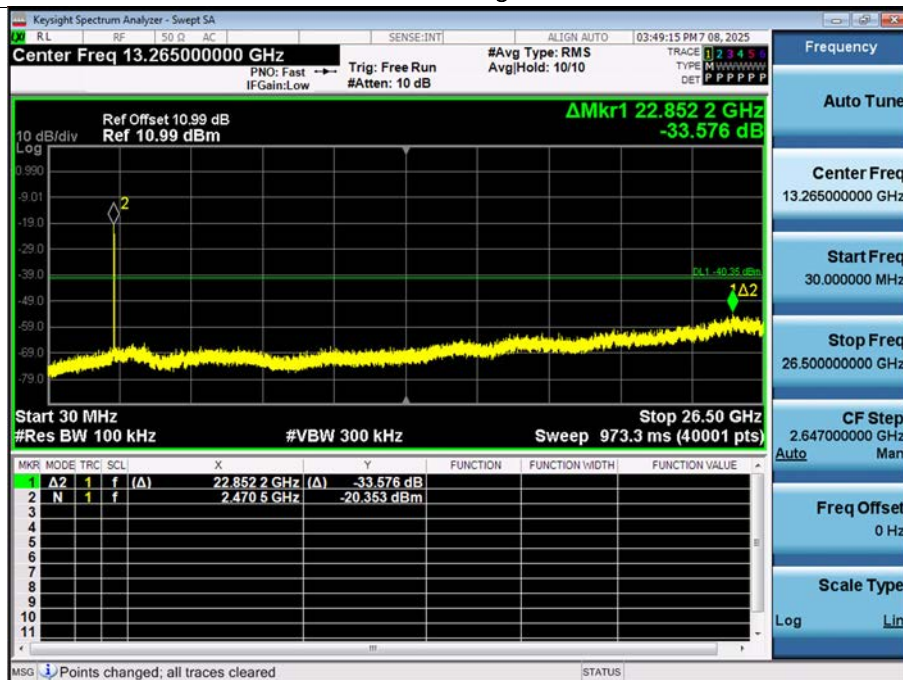
Test Plots(Conducted Spurious Emission)

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

[ANT. 1] 802.11n- CH 13



[ANT. 2] 802.11g - CH 13



Limit

ANT.1 : -38.488 dBm, ANT.2 : -40.353 dBm

9.6 RADIATED SPURIOUS EMISSIONS

Frequency Range : 9 kHz – 30 MHz

Frequency	Measured Value	A.F+C.L+D.F	Ant. POL	Total	Limit	Margin
[MHz]	[dB μ V/m]	[dB/m]	[H/V]	[dB μ V/m]	[dB μ V/m]	[dB]

No Critical peaks found

Note:

1. The Measured value 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 (dB μ V) + Distance extrapolation factor

Frequency Range : Below 1 GHz

Frequency	Measured Value	A.F+C.L	Ant. POL	Total	Limit	Margin
[MHz]	[dB μ V/m]	[dB/m]	[H/V]	[dB μ V/m]	[dB μ V/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_CDD(Ant1+Ant2)]

Band : DTS		Operation Mode :		802.11b			
CH.1 2412		Transfer Rate :		1 Mbps			
Frequency [MHz]	Measured value [dBμV]	CL+AF+DF-AG [dB/m]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
4824	43.74	3.91	V	47.65	73.98	26.33	PK
4824	33.56	3.91	V	37.47	53.98	16.51	AV
7236	42.24	9.99	V	52.23	73.98	21.75	PK
7236	29.59	9.99	V	39.58	53.98	14.40	AV
4824	43.25	3.91	H	47.16	73.98	26.82	PK
4824	33.16	3.91	H	37.07	53.98	16.91	AV
7236	42.19	9.99	H	52.18	73.98	21.80	PK
7236	29.28	9.99	H	39.27	53.98	14.71	AV

Band : DTS		Operation Mode :		802.11b			
CH.6 2437		Transfer Rate :		1 Mbps			
Frequency [MHz]	Measured value [dBμV]	CL+AF+DF-AG [dB/m]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
4874	42.60	4.16	V	46.76	73.98	27.22	PK
4874	30.87	4.16	V	35.03	53.98	18.95	AV
7311	41.73	10.47	V	52.20	73.98	21.78	PK
7311	29.63	10.47	V	40.10	53.98	13.88	AV
4874	42.25	4.16	H	46.41	73.98	27.57	PK
4874	30.59	4.16	H	34.75	53.98	19.23	AV
7311	41.69	10.47	H	52.16	73.98	21.82	PK
7311	29.58	10.47	H	40.05	53.98	13.93	AV

Band : DTS		Operation Mode :		802.11b			
CH.11 2462		Transfer Rate :		1 Mbps			
Frequency [MHz]	Measured value [dBμV]	CL+AF+DF-AG [dB/m]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
4924	42.87	3.45	V	46.32	73.98	27.66	PK
4924	32.93	3.45	V	36.38	53.98	17.60	AV
7386	41.89	11.22	V	53.11	73.98	20.87	PK
7386	29.39	11.22	V	40.61	53.98	13.37	AV
4924	42.12	3.45	H	45.57	73.98	28.41	PK
4924	32.28	3.45	H	35.73	53.98	18.25	AV
7386	41.59	11.22	H	52.81	73.98	21.17	PK
7386	29.35	11.22	H	40.57	53.98	13.41	AV

[Simultaneous transmission]

Scenario 1

ANT ALL(MIMO)_2.4 GHz 802.11b Ch. 11_1 Mbps + ANT ALL(MIMO) 5 GHz 802.11a Ch. 36_6 Mbps

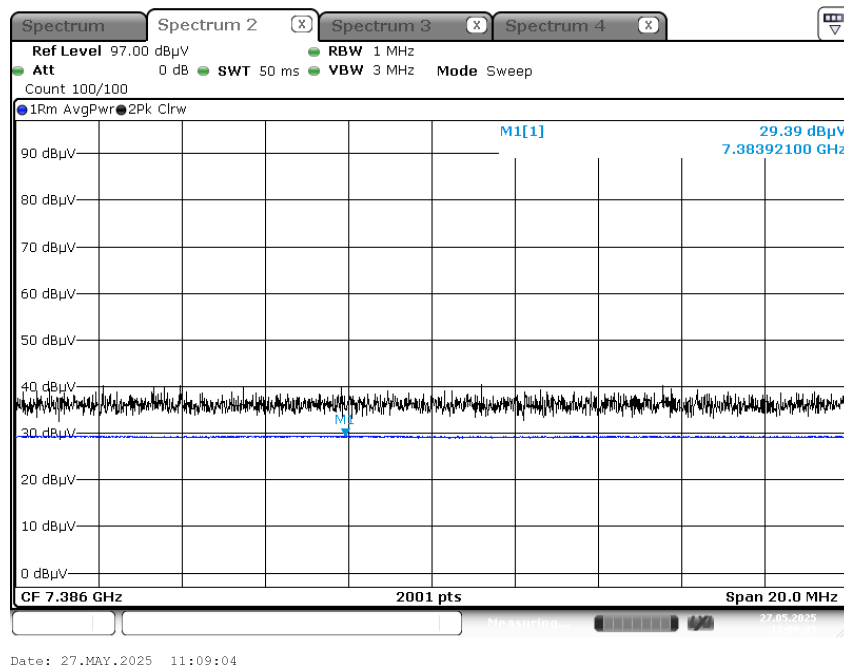
Frequency	Measured value	CL+AF+DF-AG	ANT. POL	Total	Limit	Margin	Measurement Type
[MHz]	[dBμV]	[dB/m]	[H/V]	[dBμV/m]	[dBμV/m]	[dB]	
4924	46.81	3.45	V	50.26	73.98	23.72	PK
4924	39.14	3.45	V	42.59	53.98	11.39	AV
7386	42.12	11.22	V	53.34	73.98	20.64	PK
7386	29.79	11.22	V	41.01	53.98	12.97	AV
4924	45.88	3.45	H	49.33	73.98	24.65	PK
4924	39.03	3.45	H	42.48	53.98	11.50	AV
7386	41.71	11.22	H	52.93	73.98	21.05	PK
7386	26.75	11.22	H	37.97	53.98	16.01	AV

Test Plots

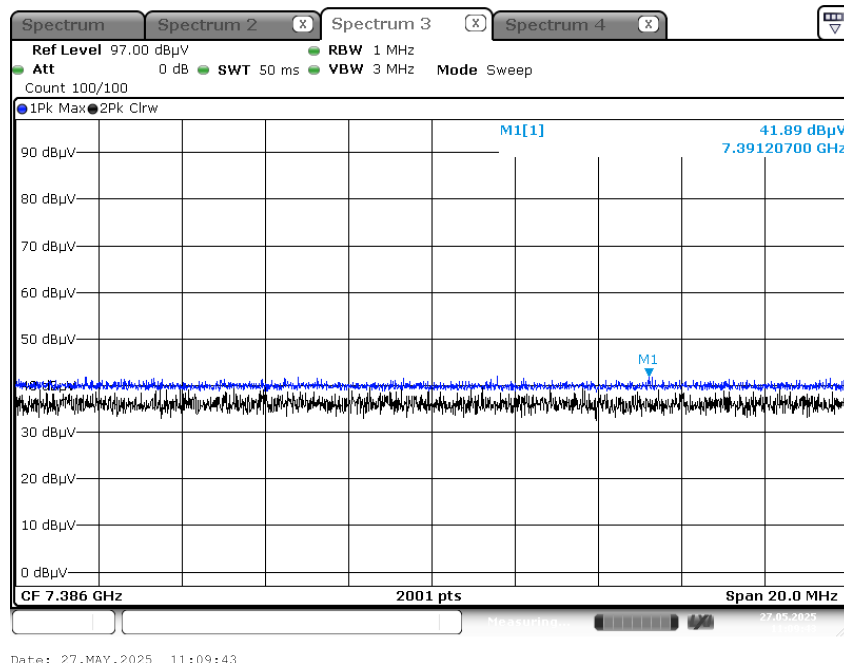
Note: In order to simplify the report, Plots of worst case are only reported.

[MIMO_CDD(Ant1+Ant2)]

Radiated Spurious Emissions plot – Average Result (802.11b_1 Mbps, Ch.11 3rd Harmonic, Z-V)



Radiated Spurious Emissions plot – Peak Result (802.11b_1 Mbps, Ch.11 3rd Harmonic, Z-V)

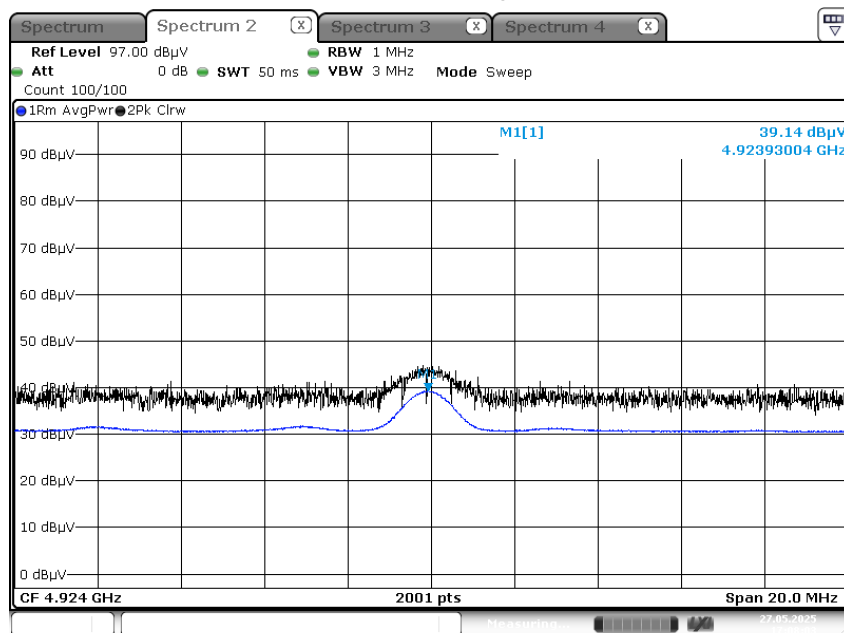


[Simultaneous transmission]

Scenario 1

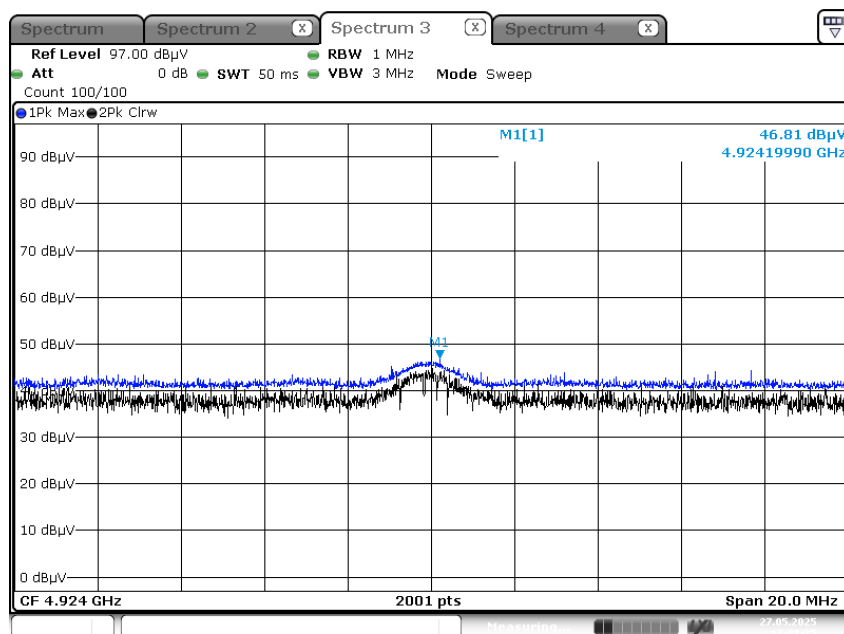
ANT ALL(MIMO)_2.4 GHz 802.11b Ch. 11_1 Mbps + ANT ALL(MIMO) 5 GHz 802.11a Ch. 36_6 Mbps

Radiated Spurious Emissions plot – Average Result (2nd Harmonic, Z-V)



Date: 27.MAY.2025 17:08:03

Radiated Spurious Emissions plot – Peak Result (2nd Harmonic, Z-V)



Date: 27.MAY.2025 17:08:35

9.7 RADIATED RESTRICTED BAND EDGES

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

[MIMO_CDD(Ant1+Ant2)]

9.7.1 Channel 1, 11

802.11b	Channel	01 Ch	Freq	2412 MHz		Transfer Rate	1 Mbps
Frequency	Measured Value	A.F.+C.L+D.F	ANT. POL	Total	Limit	Margin	Measurement
[MHz]	[dBμV]	[dB/m]	[H/V]	[dBμV/m]	[dBμV/m]	[dB]	Type
2390.0	59.56	-	H	59.56	73.98	14.42	PK
2390.0	49.64	-	H	49.64	53.98	4.34	AV

802.11b	Channel	11 Ch	Freq	2462 MHz		Transfer Rate	1 Mbps
Frequency	Measured Value	A.F.+C.L+D.F	ANT. POL	Total	Limit	Margin	Measurement
[MHz]	[dBμV]	[dB/m]	[H/V]	[dBμV/m]	[dBμV/m]	[dB]	Type
2483.5	57.95	-	H	57.95	73.98	16.03	PK
2483.5	47.21	-	H	47.21	53.98	6.77	AV

802.11g		Channel	01 Ch	Freq	2412 MHz		Transfer Rate	6 Mbps
Frequency	Measured Value	Duty Cycle Factor	A.F.+C.L+D.F	ANT. POL	Total	Limit	Margin	Measurement Type
[MHz]	[dBμV]	[dB]	[dB/m]	[H/V]	[dBμV/m]	[dBμV/m]	[dB]	
#2390	63.04	0.00	-	H	63.04	73.98	10.94	PK
#2390	51.02	0.29	-	H	51.31	53.98	2.67	AV

802.11g		Channel	11 Ch	Freq	2462 MHz		Transfer Rate	6 Mbps
Frequency	Measured Value	Duty Cycle Factor	A.F.+C.L+D.F	ANT. POL	Total	Limit	Margin	Measurement Type
[MHz]	[dBμV]	[dB]	[dB/m]	[H/V]	[dBμV/m]	[dBμV/m]	[dB]	
#2483.5	62.24	0.00	-	H	62.24	73.98	11.74	PK
#2483.5	50.02	0.29	-	H	50.31	53.98	3.67	AV

802.11n (HT20)		Channel	01 Ch	Freq	2412 MHz		Transfer MCS Index	MCS0
Frequency	Measured Value	Duty Cycle Factor	A.F.+C.L+D.F	ANT. POL	Total	Limit	Margin	Measurement Type
[MHz]	[dBμV]	[dB]	[dB/m]	[H/V]	[dBμV/m]	[dBμV/m]	[dB]	
#2390	65.20	0.00	-	H	65.20	73.98	8.78	PK
#2390	51.27	0.31	-	H	51.58	53.98	2.40	AV

802.11n (HT20)		Channel	11 Ch	Freq	2462 MHz		Transfer MCS Index	MCS0
Frequency	Measured Value	Duty Cycle Factor	A.F.+C.L+D.F	ANT. POL	Total	Limit	Margin	Measurement Type
[MHz]	[dBμV]	[dB]	[dB/m]	[H/V]	[dBμV/m]	[dBμV/m]	[dB]	
#2483.5	68.82	0.00	-	H	68.82	73.98	5.16	PK
#2483.5	51.44	0.31	-	H	51.75	53.98	2.23	AV

802.11ac (VHT20)		Channel	01 Ch	Freq	2412 MHz		Transfer MCS Index	MCS0
Frequency	Measured Value	Duty Cycle Factor	A.F.+C.L+D.F	ANT. POL	Total	Limit	Margin	Measurement Type
[MHz]	[dBμV]	[dB]	[dB/m]	[H/V]	[dBμV/m]	[dBμV/m]	[dB]	
#2390	64.65	0.00	-	H	64.65	73.98	9.33	PK
#2390	51.37	0.31	-	H	51.68	53.98	2.30	AV

802.11ac (VHT20)		Channel	11 Ch	Freq	2462 MHz		Transfer MCS Index	MCS0
Frequency	Measured Value	Duty Cycle Factor	A.F.+C.L+D.F	ANT. POL	Total	Limit	Margin	Measurement Type
[MHz]	[dBμV]	[dB]	[dB/m]	[H/V]	[dBμV/m]	[dBμV/m]	[dB]	
#2483.5	68.73	0.00	-	H	68.73	73.98	5.25	PK
#2483.5	51.46	0.31	-	H	51.77	53.98	2.21	AV

9.7.2 Channel 12, 13

802.11b	Channel	12 Ch	Freq	2467 MHz		Transfer Rate	1 Mbps
Frequency	Measured Value	A.F.+C.L+D.F	ANT. POL	Total	Limit	Margin	Measurement
[MHz]	[dBμV]	[dB/m]	[H/V]	[dBμV/m]	[dBμV/m]	[dB]	Type
2483.5	55.48	-	H	55.48	73.98	18.50	PK
2483.5	43.63	-	H	43.63	53.98	10.35	AV

802.11b	Channel	13 Ch	Freq	2472 MHz		Transfer Rate	1 Mbps
Frequency	Measured Value	A.F.+C.L+D.F	ANT. POL	Total	Limit	Margin	Measurement
[MHz]	[dBμV]	[dB/m]	[H/V]	[dBμV/m]	[dBμV/m]	[dB]	Type
2483.5	56.04	-	H	56.04	73.98	17.94	PK
2483.5	44.04	-	H	44.04	53.98	9.94	AV

802.11g		Channel	12 Ch	Freq	2467 MHz		Transfer Rate	6 Mbps
Frequency	Measured Value	Duty Cycle Factor	A.F.+C.L+D.F	ANT. POL	Total	Limit	Margin	Measurement Type
[MHz]	[dBμV]	[dB]	[dB/m]	[H/V]	[dBμV/m]	[dBμV/m]	[dB]	
2483.5	61.74	0.00	-	H	61.74	73.98	12.24	PK
2483.5	45.91	0.29	-	H	46.20	53.98	7.78	AV

802.11g		Channel	13 Ch	Freq	2472 MHz		Transfer Rate	6 Mbps
Frequency	Measured Value	Duty Cycle Factor	A.F.+C.L+D.F	ANT. POL	Total	Limit	Margin	Measurement Type
[MHz]	[dBμV]	[dB]	[dB/m]	[H/V]	[dBμV/m]	[dBμV/m]	[dB]	
#2483.5	57.51	0.00	-	H	57.51	73.98	16.47	PK
#2483.5	48.05	0.29	-	H	48.34	53.98	5.64	AV

802.11n (HT20)		Channel	12 Ch	Freq	2467 MHz		Transfer MCS Index	MCS0
Frequency	Measured Value	Duty Cycle Factor	A.F.+C.L+D.F	ANT. POL	Total	Limit	Margin	Measurement Type
[MHz]	[dBμV]	[dB]	[dB/m]	[H/V]	[dBμV/m]	[dBμV/m]	[dB]	
2483.5	63.25	0.00	-	H	63.25	73.98	10.73	PK
2483.5	46.78	0.31	-	H	47.09	53.98	6.89	AV

802.11n (HT20)		Channel	13 Ch	Freq	2472 MHz		Transfer MCS Index	MCS0
Frequency	Measured Value	Duty Cycle Factor	A.F.+C.L+D.F	ANT. POL	Total	Limit	Margin	Measurement Type
[MHz]	[dBμV]	[dB]	[dB/m]	[H/V]	[dBμV/m]	[dBμV/m]	[dB]	
#2483.5	58.44	0.00	-	H	58.44	73.98	15.54	PK
#2483.5	49.13	0.31	-	H	49.44	53.98	4.54	AV

802.11ac (VHT20)		Channel	12 Ch	Freq	2467 MHz		Transfer MCS Index	MCS0
Frequency	Measured Value	Duty Cycle Factor	A.F.+C.L+D.F	ANT. POL	Total	Limit	Margin	Measurement Type
[MHz]	[dBμV]	[dB]	[dB/m]	[H/V]	[dBμV/m]	[dBμV/m]	[dB]	
2483.5	63.18	0.00	-	H	63.18	73.98	10.80	PK
2483.5	46.74	0.31	-	H	47.05	53.98	6.93	AV

802.11ac (VHT20)		Channel	13 Ch	Freq	2472 MHz		Transfer MCS Index	MCS0
Frequency	Measured Value	Duty Cycle Factor	A.F.+C.L+D.F	ANT. POL	Total	Limit	Margin	Measurement Type
[MHz]	[dBμV]	[dB]	[dB/m]	[H/V]	[dBμV/m]	[dBμV/m]	[dB]	
#2483.5	58.68	0.00	-	H	58.68	73.98	15.30	PK
#2483.5	49.16	0.31	-	H	49.47	53.98	4.51	AV

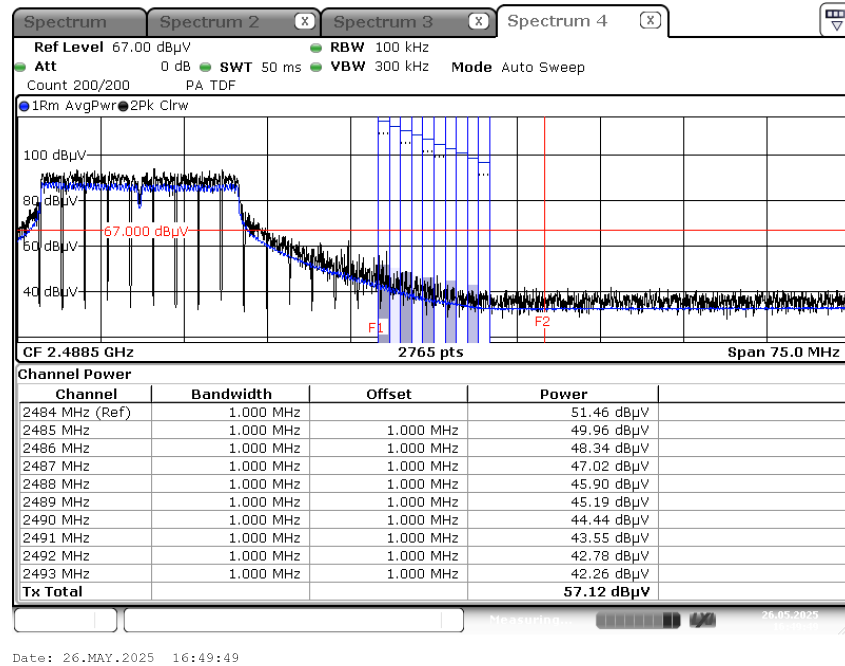
Test Plots

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

[MIMO_CDD(Ant1+Ant2)]

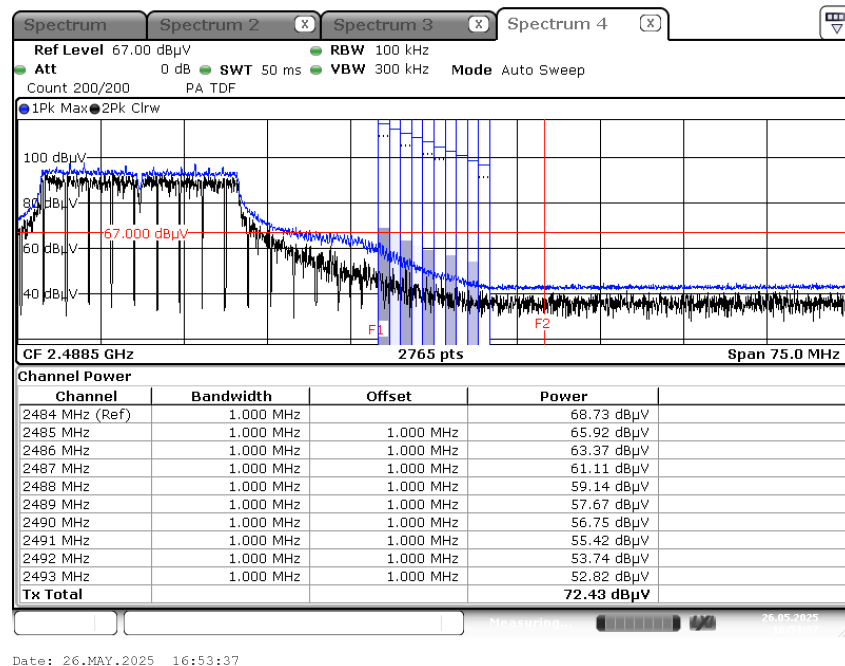
Radiated Restricted Band Edges plot – Average Result (802.11ac (VHT20)_ MCS0, Ch.11, X-H)

(Integration method Used)



Radiated Restricted Band Edges plot – Peak Result (802.11ac (VHT20)_ MCS0, Ch.11, X-H)

(Integration method Used)



9.8 POWERLINE CONDUCTED EMISSIONS

Conducted Emissions

Test

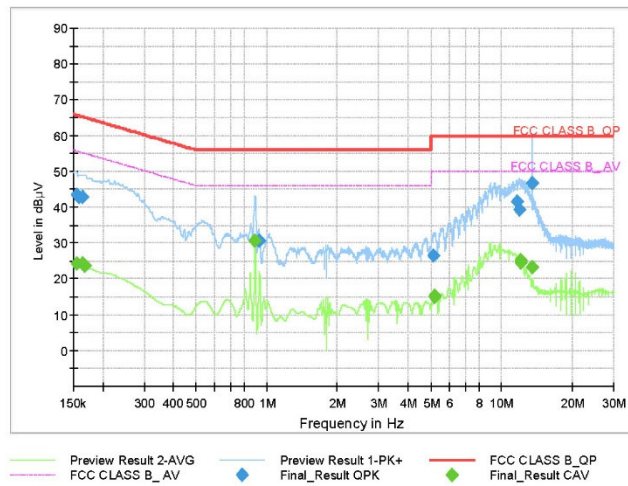
1 / 1

Test Report

Common Information

EUT : SM-S731U
Operating Conditions : 2.4G WLAN Mode
Comment :

Full Spectrum



Final Result QPK

Frequency (MHz)	QuasiPeak (dBµV)	Limit (dBµV)	Margin (dB)	Bandwidth (kHz)	Line	Corr. (dB)
0.1545	43.58	65.75	22.17	9.000	L1	9.6
0.1590	42.99	65.52	22.53	9.000	N	9.6
0.1635	42.86	65.28	22.42	9.000	N	9.6
0.9253	30.76	56.00	25.24	9.000	N	9.7
5.1395	26.44	60.00	33.56	9.000	L1	9.9
5.1575	26.64	60.00	33.36	9.000	L1	9.9
11.6578	41.57	60.00	18.43	9.000	L1	10.1
11.9660	39.34	60.00	20.66	9.000	L1	10.1
13.5590	46.68	60.00	13.32	9.000	L1	10.2

Final Result CAV

Frequency (MHz)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Bandwidth (kHz)	Line	Corr. (dB)
0.1545	24.33	55.75	31.43	9.000	N	9.6
0.1635	24.25	55.28	31.04	9.000	N	9.6
0.1680	23.75	55.06	31.31	9.000	L1	9.6
0.8915	30.65	46.00	15.35	9.000	L1	9.7
5.1620	15.12	50.00	34.88	9.000	L1	9.9
5.1800	15.21	50.00	34.79	9.000	L1	9.9
11.9975	25.26	50.00	24.74	9.000	L1	10.1
12.0965	24.73	50.00	25.27	9.000	L1	10.1
13.5590	23.33	50.00	26.67	9.000	L1	10.2

2025-07-09

오전 9:44:33

10. LIST OF TEST EQUIPMENT

Conducted Test

Equipment	Model	Manufacturer	Serial No.	Due to Calibration	Calibration Interval
LISN	ENV216	Rohde & Schwarz	102245	07/17/2025	Annual
EMI Test Receiver	ESR	Rohde & Schwarz	101910	08/27/2025	Annual
Temperature Chamber	SU-642	ESPEC	93022487	06/26/2026	Annual
Signal Analyzer	N9030A	Keysight	MY55410508	08/23/2025	Annual
Power Measurement Set	OSP 120	Rohde & Schwarz	100935	08/01/2025	Annual
Power Meter	N1911A	Agilent	MY45100523	02/21/2026	Annual
Power Sensor	N1921A	Agilent	MY57820067	02/04/2026	Annual
Directional Coupler	87300B	Agilent	3116A03621	10/21/2025	Annual
Power Splitter	11667B	Hewlett Packard	10545	01/23/2026	Annual
DC Power Supply	E3632A	Agilent	KR75305528	12/24/2025	Annual
Attenuator(10 dB)(DC-26.5 GHz)	8493C-010	Agilent	08285	05/19/2026	Annual
Attenuator(20 dB)	18N-20dB	Rohde & Schwarz	8	02/18/2026	Annual
Software	EMC32	Rohde & Schwarz	N/A	N/A	N/A
Bluetooth Tester	CBT	Rohde & Schwarz	100752	12/27/2025	Annual
Automation Software	FCC WLAN Conducted	HCT CO., LTD	-	-	-
Automation Software	FCC BT Conducted	HCT CO., LTD	-	-	-

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	CO3000	Innco system	CO3000-4p	N/A	N/A
Antenna Position Tower	MA4640/800-XP-EP	Innco system	S3AM	07/30/2025	Annual
Turn Table	DS1500-S-1t	Innco system	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	08/28/2026	Biennial
Horn Antenna	BBHA 9120D	Schwarzbeck	9120D-1191	11/07/2025	Biennial
Horn Antenna(15 GHz ~ 40 GHz)	BBHA9170	Schwarzbeck	BBHA9170124	03/23/2027	Biennial
Band Reject Filter	WRCJV2400/2483.5-2370/2520-60/12SS	Wainwright Instruments	2	12/26/2025	Annual
Band Reject Filter	WRCJV12-4900-5100-5900-6100-50SS	Wainwright Instruments	5	05/27/2026	Annual
Band Reject Filter	WRCJV12-4900-5100-5900-6100-50SS	Wainwright Instruments	6	05/27/2026	Annual
Band Reject Filter	WRCJV5100/5850-40/50-8EEK	Wainwright Instruments	1	01/09/2026	Annual
Amp & Filter Bank Switch Controller	FBSM-01A	TNM system	0	N/A	N/A
RF Switching System	FBSR-03A (3G HPF+LNA)	T&M SYSTEM	S3L1	10/31/2025	Annual
RF Switching System	FBSR-03A (10dB ATT+LNA)	T&M SYSTEM	S3L2	10/31/2025	Annual
RF Switching System	FBSR-03A (7G HPF+LNA)	T&M SYSTEM	S3L3	10/31/2025	Annual
RF Switching System	FBSR-03A (3dB ATT+LNA)	T&M SYSTEM	S3L4	10/31/2025	Annual
Automation Software	FCC WLAN Radiated	HCT CO., LTD.	-	-	-
Power Amplifier	CBL18265035	CERNEX	22966	11/07/2025	Annual
Power Amplifier	CBL26405040	CERNEX	25956	02/19/2026	Annual
Bluetooth Tester	TC-3000C	TESCOM	3000C000175	03/12/2026	Annual
Spectrum Analyzer	FSV40 (9 kHz ~ 40 GHz)	Rohde & Schwarz	100900	08/27/2025	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.
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-2507-FC054-P