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TEST REPORT

FCC DTS Test for SM-P620
Certification

APPLICANT
SAMSUNG Electronics Co., Ltd.

REPORT NO.
HCT-RF-2402-FC036

DATE OF ISSUE
February 20, 2024

Tested by
Woong Jin Kim

Technical Manager
Jong Seok Lee

HCT CO., LTD.
BongJai Huh / CEO

HCT CO., LTD. 74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, 17383 KOREA Tel. +82 31 645 6300 Fax. +82 31 645 6401

HCT Co., Ltd.
74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, 17383 KOREA
Tel. +82 31 634 6300 Fax. +82 31 645 6401

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Applicant	**SAMSUNG Electronics Co., Ltd.** 129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Rep. of Korea
Eut Type Model Name	Tablet SM-P620
FCC ID	A3LSMP620
FCC Classification	Digital Transmission System(DTS)
FCC Rule Part(s)	Part 15.247
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	February 20, 2024	Initial Release

Notice

Content
According to the Evaluation report, all of the data contained herein is reused from the reference FCC ID : A3LSMP625 report.
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).

CONTENTS

1. EUT DESCRIPTION

Model	SM-P620		
Additional Model	-		
EUT Type	Tablet		
Power Supply	DC 3.85 V		
Frequency Range	2 412 MHz ~ 2 472 MHz		
Max. RF Output Power	Average Power	SISO_ANT.0	802.11b : 14.49 dBm 802.11g : 13.53 dBm 802.11n(HT20) : 14.43 dBm
		MIMO_SDM(ANT.0+ANT.1)	802.11n(HT20) : 16.68 dBm
	Peak Power	SISO_ANT.0	802.11b : 20.14 dBm 802.11g : 21.81 dBm 802.11n(HT20) : 22.35 dBm
		MIMO_SDM(ANT.0+ANT.1)	802.11n(HT20) : 24.66 dBm
Modulation Type	DSSS/CCK : 802.11b OFDM : 802.11g, 802.11n		
Number of Channels	13 Channels		
Antenna Specification	Type: Metal frame		
Date(s) of Tests	January 18, 2024 ~ February 19, 2024		
Serial number	Conducted : R32WC003BDA Radiated : R32WC0037EE		

ANTENNA CONFIGURATIONS

1. Antenna configuration

Configurations	SISO		MIMO	
	ANT.0	ANT.1	CDD	SDM
802.11b	O	X	X	X
802.11g	O	X	X	X
802.11n(HT20)	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)
			SDM
ANT.0	-3.85	CDD 2 / 1 SDM 2 / 2	-3.68
ANT.1	-3.68		

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.0 : 11.58 dBm ANT.1 : 12.08 dBm

ANT.0 + ANT.1 = MIMO

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

2. TEST METHODOLOGY

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

EUT CONFIGURATION

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

EUT EXERCISE

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

GENERAL TEST PROCEDURES

Conducted Emissions

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

Radiated Emissions

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

DESCRIPTION OF TEST MODES

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

3. INSTRUMENT CALIBRATION

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipment's, which is traceable to recognized national standards.
Especially, all antenna for measurement is calibrated in accordance with the requirements of C63.5 (Version : 2017).

4. FACILITIES AND ACCREDITATIONS

FACILITIES

The SAC(Semi-Anechoic Chamber) and conducted measurement facility used to collect the radi ated 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 A NSI C63.4. (Version :2014) and CISPR Publication 22.
Detailed description of test facility was submitted to the Commission and accepted dated March 31, 2022 (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.

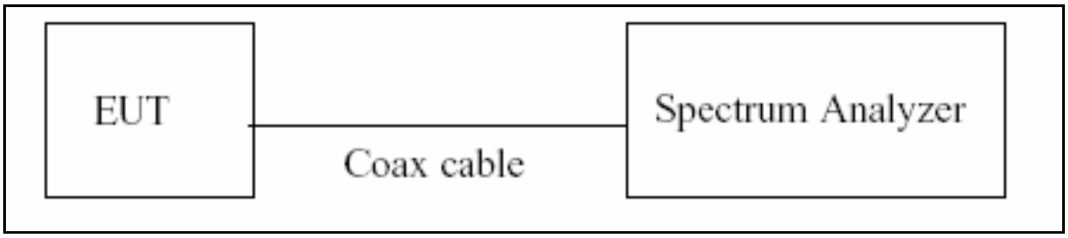
The measurement data shown herein meets or exceeds the U_{CISPR} measurement uncertainty values specified in CISPR 16-4-2 and, thus, can be compared directly to specified limits to determine compliance.

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*.

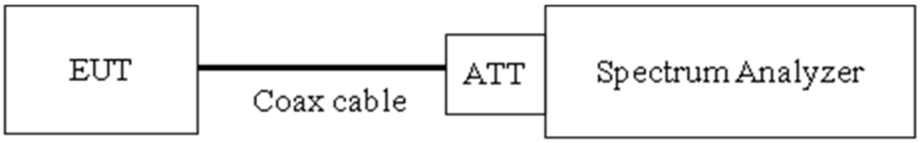
1. RBW = 8 MHz (the largest available value)
2. VBW = 8 MHz or 50 MHz (≥ RBW)
3. SPAN = 0 Hz
4. Detector = Average
5. Number of points in sweep > 100
6. Trace mode = Clear write
7. Measure T_{total} and T_{on}
8. Calculate Duty Cycle = T_{on} / T_{total} and Duty Cycle Factor = 10log(1/Duty Cycle)

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.

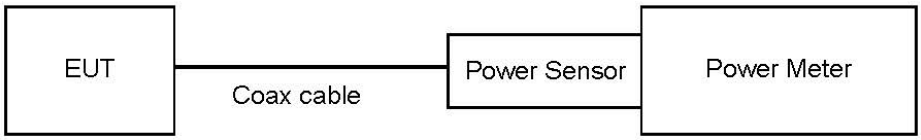
Note : We tested OBW using the automatic bandwidth measurement capability of a spectrum analyzer.

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

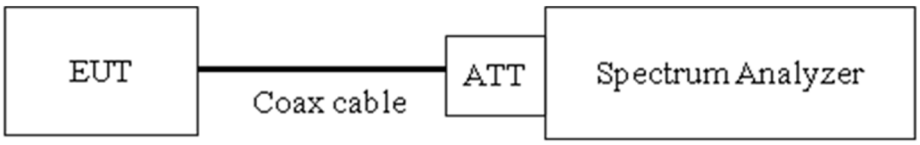
▪ Conducted Output Power(Average) = Measured Value + ATT loss + Cable loss + Duty Cycle Factor

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

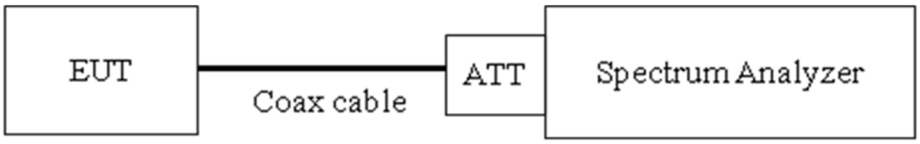
7.5. Conducted Band Edge(Out of Band Emissions) & Conducted Spurious Emissions

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	20.06
100	20.14
200	20.17
300	20.21
400	20.28
500	20.28
600	20.28
700	20.28
800	20.30
900	20.31
1000	20.35
2000	20.55
2400	20.62
3000	20.67
4000	20.74
5000	20.86
5850	20.84
6000	20.83
7000	20.93
8000	20.97
9000	21.09
10000	21.18
11000	21.27
12000	21.33
13000	21.33
14000	21.40
15000	21.49
16000	21.52
17000	21.55
18000	21.63
19000	21.65
20000	21.66
21000	21.76
22000	21.82
23000	21.86
24000	21.90
25000	21.92

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

2. Factor = Attenuator loss + Cable loss

3. Total Port offest = Attenuator loss + Cable loss + EUT cable loss(0.5 dB) = 21.12 dB

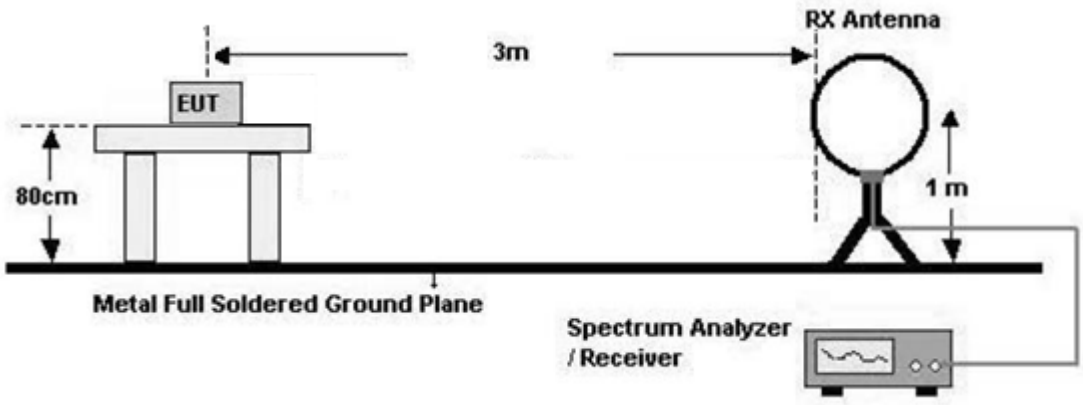
7.6. Radiated Test

Limit

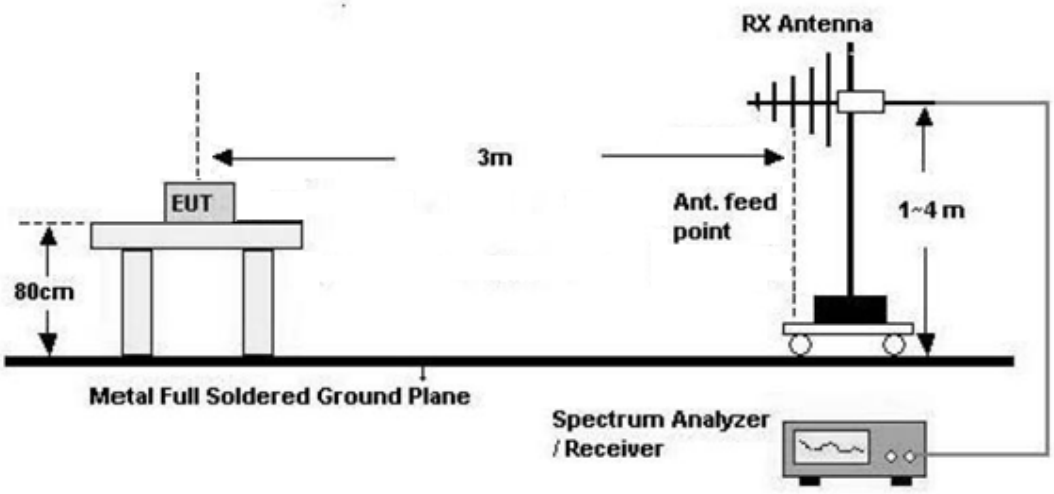
Frequency (MHz)	Field Strength (μV/m)	Measurement Distance (m)
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Test Configuration

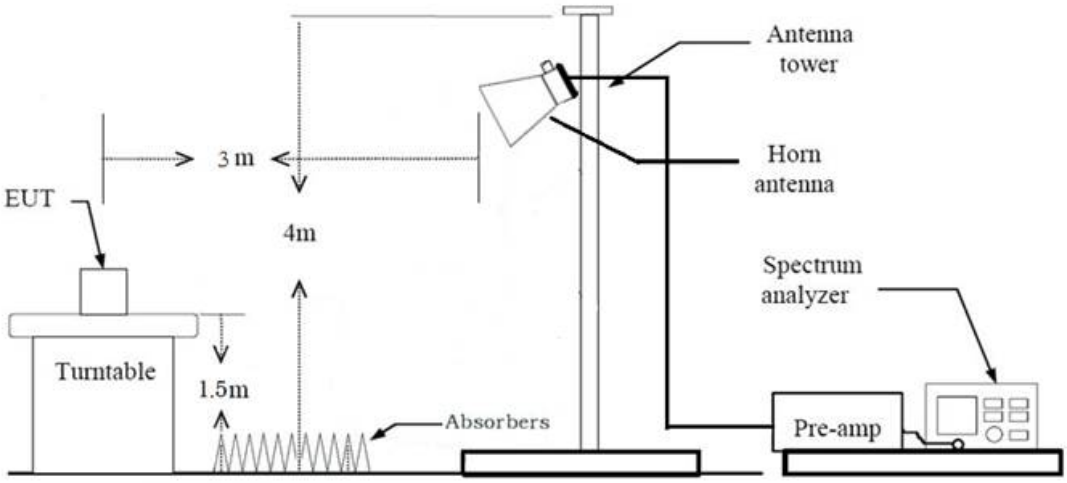
Below 30 MHz



30 MHz - 1 GHz



Above 1 GHz



Test Procedure of Radiated spurious emissions (Below 30 MHz)

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

KDB 414788 OFS and Chamber Correlation Justification

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

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

Test Procedure of Radiated spurious emissions (Below 1 GHz)

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

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

Test Procedure of Radiated spurious emissions (Above 1 GHz)

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

- Measured Frequency Range : 1 GHz – 25 GHz
- Detector = Peak
- Trace = Maxhold
- RBW = 1 MHz
- VBW ≥ 3 x RBW

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

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

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

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

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

Test Procedure of Radiated Restricted Band Edge

1. The EUT is placed on a turntable, which is 1.5 m above ground plane.
2. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
3. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
4. EUT is set 3 m away from the receiving antenna, which is varied from 1 m to 4 m to find out the highest emissions.
5. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
6. Each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
7. The unit was tested with its standard battery.
8. Spectrum Setting
   (1) Measurement Type(Peak):
      - Measured Frequency Range : 2310 MHz ~ 2390 MHz/ 2483.5 MHz ~ 2500 MHz
      - Detector = Peak
      - Trace = Maxhold
      - RBW = 1 MHz
      - VBW ≥ 3 x RBW

   (2) Measurement Type(Average): Duty cycle ≥ 98 %,
      - Measured Frequency Range : 2310 MHz ~ 2390 MHz / 2483.5 MHz ~ 2500 MHz
      - Detector = RMS
      - Averaging type = power (*i.e.*, RMS)
      - RBW = 1 MHz
      - VBW ≥ 3 x RBW
      - Sweep time = auto.
      - Trace mode = average (at least 100 traces).

   (3) Measurement Type(Average): Duty cycle < 98 %, duty cycle variations are less than ±2 %
      - Measured Frequency Range : 2310 MHz ~ 2390 MHz / 2483.5 MHz ~ 2500 MHz
      - Detector = RMS
      - Averaging type = power (*i.e.*, RMS)
      - RBW = 1 MHz
      - VBW ≥ 3 x RBW
      - Sweep time = auto.
      - Trace mode = average (at least 100 traces).
      - Correction factor shall be added to the measurement results prior to comparing to the emission limit in order to compute the emission level that would have been measured had the test been performed at 100 % duty cycle.

- Duty Cycle Factor (dB) : Please refer to the please refer to section 9.1.

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

7.7. AC Power line Conducted Emissions

Limit

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

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

[a]Decreases with the logarithm of the frequency.

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

Test Configuration

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

Test Procedure

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

Sample Calculation

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

7.8. 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(Earphone, etc)
   - Worstcase : Stand alone
2. All Antenna of operation were investigated and the worst case results are reported
   - Mode : SISO(ANT.0), MIMO_SDM(ANT.0+ANT.1)
   - Worst case : SISO(ANT.0), MIMO_SDM(ANT.0+ANT.1)
3. EUT Axis
   - Radiated Spurious Emissions : Z
   - Radiated Restricted Band Edge : Z
4. Duty cycle factor applies only 802.11g/n (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 : 1Mbps [SISO(ANT.0)]
   - 802.11g : 6Mbps [SISO(ANT.0)]
   - 802.11n(HT20): MCS8 [MIMO_SDM(ANT.0+ANT.1)]
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 mode of operation were investigated and the worst case results are reported.
   - Mode: 802.11b[SISO(ANT.0)], 802.11g[SISO(ANT.0)], 802.11n(HT20)[MIMO_SDM(ANT.0+ANT.1)]

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(Earphone,etc) + Travel Adapter
     Stand alone + Travel Adapter
   - Worstcase : Stand alone + Travel Adapter

Conducted test

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

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
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

9. TEST RESULT

9.1 DUTY CYCLE

[SISO_ANT.0]

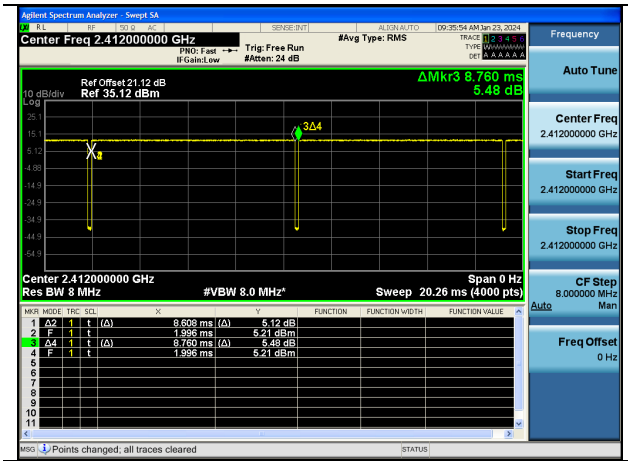
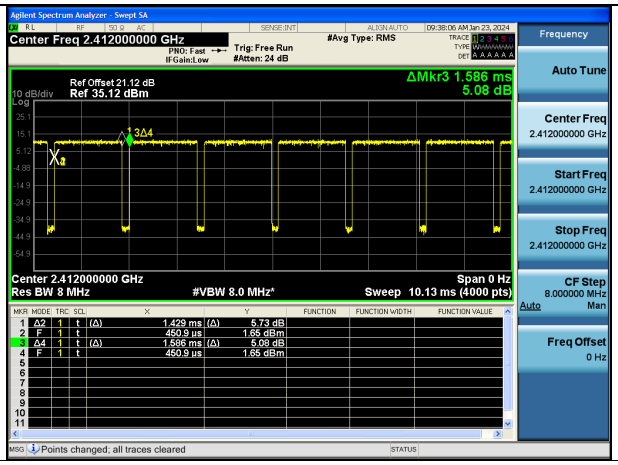
Mode	Data Rate	T_{on} (ms)	T_{total} (ms)	Duty Cycle	Duty Cycle Factor (dB)
802.11b	1 Mbps	8.608	8.760	0.983	0.076
	2 Mbps	4.302	4.473	0.962	0.169
	5.5 Mbps	1.626	1.756	0.926	0.332
	11 Mbps	0.859	1.031	0.833	0.794
802.11g	6 Mbps	1.429	1.586	0.901	0.453
	9 Mbps	0.960	1.115	0.861	0.648
	12 Mbps	0.725	0.882	0.822	0.852
	18 Mbps	0.491	0.646	0.761	1.187
	24 Mbps	0.370	0.527	0.702	1.537
	36 Mbps	0.256	0.410	0.623	2.052
	48 Mbps	0.198	0.355	0.557	2.540
	54 Mbps	0.180	0.337	0.534	2.726
802.11n (HT20)	MCS0	1.335	1.490	0.896	0.476
	MCS1	0.689	0.846	0.814	0.892
	MCS2	0.471	0.628	0.750	1.249
	MCS3	0.365	0.519	0.702	1.534
	MCS4	0.253	0.413	0.613	2.122
	MCS5	0.200	0.355	0.564	2.485
	MCS6	0.185	0.339	0.545	2.638
	MCS7	0.167	0.327	0.512	2.910

[MIMO_SDM(ANT.0+ANT.1)]

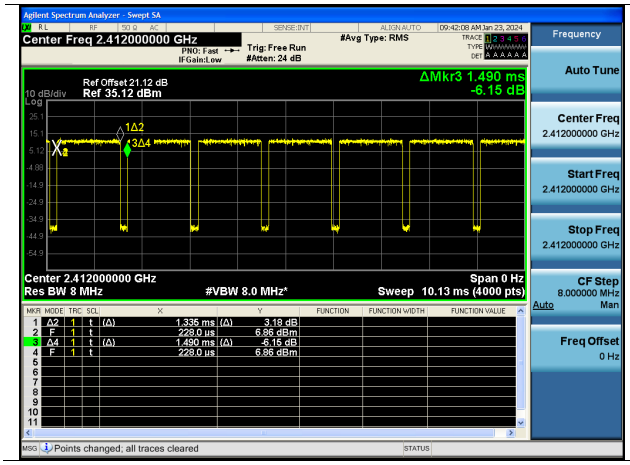
Mode	Data Rate	T_{on} (ms)	T_{total} (ms)	Duty Cycle	Duty Cycle Factor (dB)
802.11n (HT20)	MCS8	0.692	0.849	0.815	0.889
	MCS9	0.367	0.527	0.697	1.567
	MCS10	0.261	0.418	0.624	2.046
	MCS11	0.205	0.362	0.566	2.469
	MCS12	0.152	0.309	0.492	3.082
	MCS13	0.124	0.281	0.441	3.551
	MCS14	0.114	0.274	0.417	3.802
	MCS15	0.109	0.263	0.413	3.836

[SISO_ANT.0]

▣ Test Plots

Duty cycle plot (802.11b(1 Mbps))	Duty cycle plot (802.11g(6 Mbps))
	

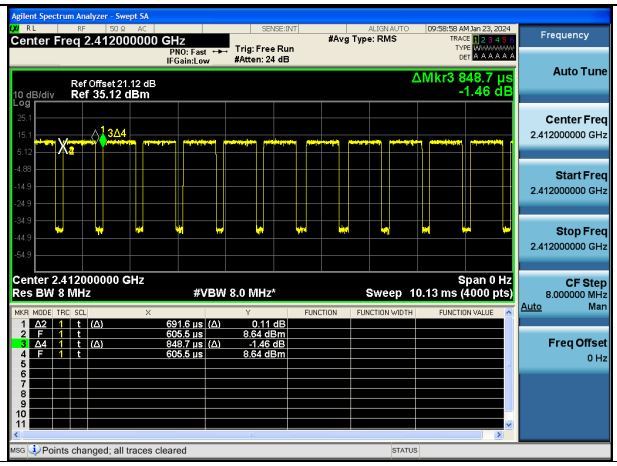
Duty cycle plot (802.11n(MCS0))



[MIMO_SDM(ANT.0+ANT.1)]

▣ Test Plots

Duty cycle plot (802.11n(MCS8))



Note:

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

9.2 6 dB BANDWIDTH

[SISO_ANT.0]

Mode	Frequency [MHz]	Channel No.	6dB Bandwidth [MHz]	Limit [MHz]
802.11b	2 412	1	8.102	0.50
	2 437	6	8.109	0.50
	2 462	11	8.097	0.50
	2 467	12	8.121	0.50
	2 472	13	8.128	0.50
802.11g	2 412	1	15.14	0.50
	2 422	3	15.73	0.50
	2 437	6	15.65	0.50
	2 462	11	15.15	0.50
	2 467	12	15.37	0.50
	2 472	13	15.93	0.50
802.11n(HT20)	2 412	1	15.16	0.50
	2 422	3	15.81	0.50
	2 437	6	15.52	0.50
	2 462	11	15.18	0.50
	2 467	12	15.49	0.50
	2 472	13	16.00	0.50

[MIMO_SDM(ANT.0)]

Mode	Frequency [MHz]	Channel No.	6dB Bandwidth [MHz]	Limit [MHz]
802.11n(HT20)	2 412	1	15.15	0.50
	2 422	3	15.77	0.50
	2 437	6	16.11	0.50
	2 462	11	15.12	0.50
	2 467	12	15.48	0.50
	2 472	13	15.97	0.50

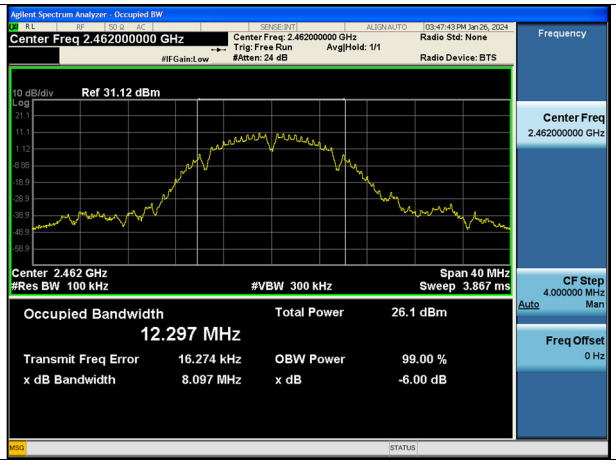
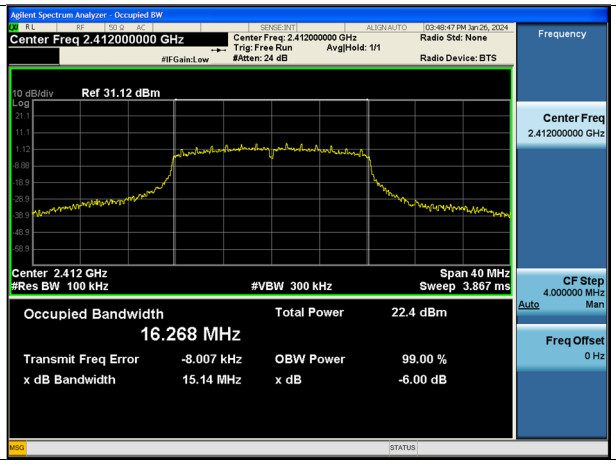
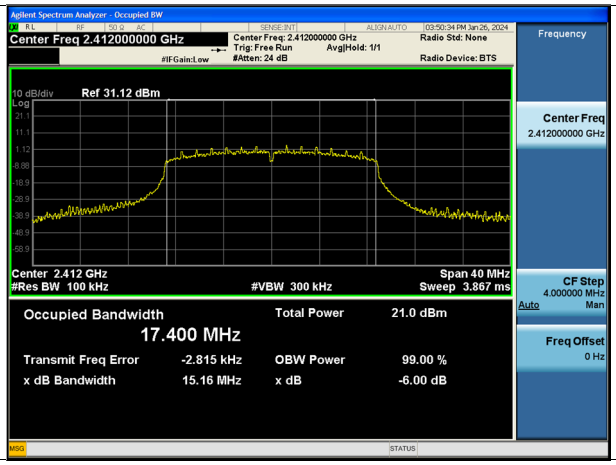
[MIMO_SDM(ANT.1)]

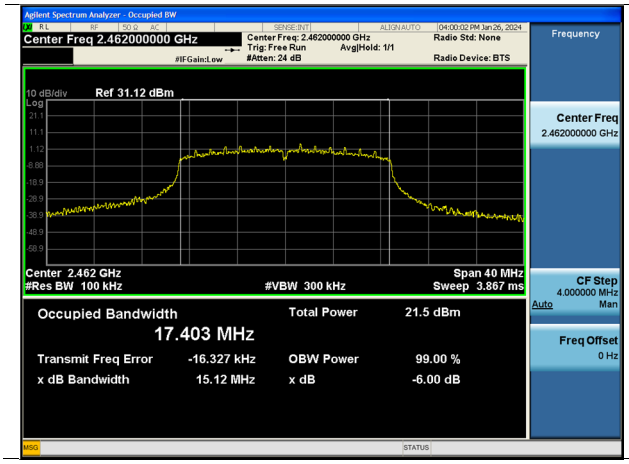
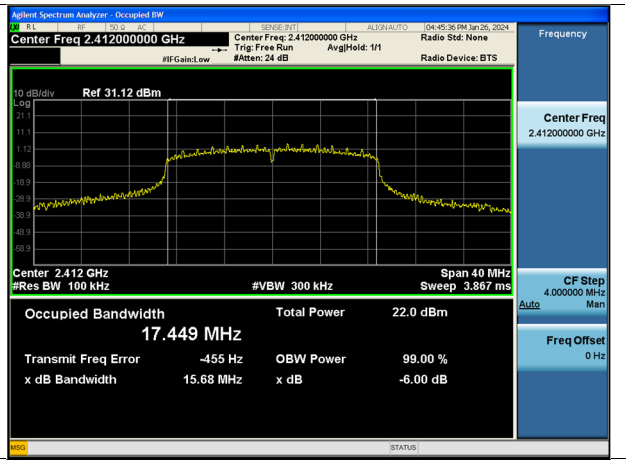
Mode	Frequency [MHz]	Channel No.	6dB Bandwidth [MHz]	Limit [MHz]
802.11n(HT20)	2 412	1	15.68	0.50
	2 422	3	15.99	0.50
	2 437	6	16.34	0.50
	2 462	11	15.92	0.50
	2 467	12	16.31	0.50
	2 472	13	16.34	0.50

▣ **Test Plots**(6 dB Bandwidth)

Note:

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

[SISO_ANT.0]
802.11b-CH 11

802.11g-CH 1

802.11n_HT20-CH 1


[MIMO_SDM(ANT.0)]	[MIMO_SDM(ANT.1)]
802.11n_HT20-CH 11	802.11n_HT20-CH 1
	

9.3 OUTPUT POWER

Note :

1. MIMO(ANT.0+ANT.1) Power = 10·log((10^(ANT.0 power /10))+(10^(ANT.1 power /10)))

Peak Power

[SISO_ANT.0]

Mode	Frequency [MHz]	Channel No.	Data Rate	Conducted Peak Power [dBm]	Limit [dBm]
802.11b	2 412	1	11M	20.14	30
	2 437	6	11M	18.98	30
	2 462	11	11M	19.93	30
	2 467	12	11M	8.96	30
	2 472	13	11M	8.95	30
802.11g	2 412	1	24M	17.74	30
	2 422	3	24M	10.29	30
	2 437	6	24M	21.81	30
	2 462	11	24M	16.96	30
	2 467	12	24M	11.58	30
	2 472	13	24M	10.33	30
802.11n	2 412	1	MCS4	17.86	30
	2 422	3	MCS6	10.38	30
	2 437	6	MCS4	22.35	30
	2 462	11	MCS6	18.26	30
	2 467	12	MCS4	11.57	30
	2 472	13	MCS4	10.38	30

[MIMO_SDM(ANT.0+ANT.1)]

Mode	Frequency [MHz]	Channel No.	Data Rate	Conducted Peak Power [dBm]			Limit [dBm]
				ANT.0	ANT.1	MIMO	
802.11n	2 412	1	MCS12	17.09	17.61	20.37	30
	2 422	3	MCS12	9.72	9.39	12.57	30
	2 437	6	MCS12	21.77	21.53	24.66	30
	2 462	11	MCS14	17.54	17.39	20.47	30
	2 467	12	MCS12	10.94	11.95	14.49	30
	2 472	13	MCS12	9.67	9.34	12.52	30

Average Power

Note :

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

[SISO_ANT.0]

Mode	Frequency [MHz]	Channel No.	Data Rate	Conducted Average Power [dBm]			Limit [dBm]
				Measured Value	D.C.F	Summed	
802.11b	2 412	1	11M	13.70	0.79	14.49	30
	2 437	6	11M	12.57	0.79	13.37	30
	2 462	11	11M	13.48	0.79	14.27	30
	2 467	12	11M	2.52	0.79	3.32	30
	2 472	13	11M	2.50	0.79	3.29	30
802.11g	2 412	1	36M	7.45	2.05	9.51	30
	2 422	3	36M	0.004	2.05	2.06	30
	2 437	6	36M	11.47	2.05	13.53	30
	2 462	11	36M	6.68	2.05	8.73	30
	2 467	12	36M	1.18	2.05	3.23	30
	2 472	13	36M	-0.02	2.05	2.04	30
802.11n	2 412	1	MCS4	7.79	2.12	9.91	30
	2 422	3	MCS4	0.25	2.12	2.38	30
	2 437	6	MCS4	12.30	2.12	14.43	30
	2 462	11	MCS4	8.06	2.12	10.18	30
	2 467	12	MCS4	1.47	2.12	3.59	30
	2 472	13	MCS4	0.25	2.12	2.37	30

[MIMO_SDM(ANT.0+ANT.1)]

Mode	Frequency [MHz]	Channel No.	Data Rate	Conducted Average Power [dBm]			Limit [dBm]
				ANT.0	ANT.1	MIMO	
802.11n	2 412	1	MCS12	9.22	9.69	12.47	30
	2 422	3	MCS12	1.78	1.48	4.65	30
	2 437	6	MCS12	13.76	13.58	16.68	30
	2 462	11	MCS12	9.57	9.51	12.55	30
	2 467	12	MCS12	3.06	3.98	6.56	30
	2 472	13	MCS12	1.80	1.42	4.62	30

9.4 POWER SPECTRAL DENSITY

Note :

1. MIMO(ANT.0+ANT.1) PSD = 10·log((10^(ANT.0 PSD /10))+(10^(ANT.1 PSD /10)))
2. Total PSD = Measured Value + Duty Cycle Factor

[SISO_ANT.0]

BW	Frequency [MHz]	Channel No.	Data Rate	Power Spectral Density [dBm]			Limit [dBm/kHz]
				Measured Value	D.C.F	Summed	
802.11b	2 412	1	11M	-6.824	0.79	-6.030	8 dBm /3 kHz
	2 437	6	11M	-7.945	0.79	-7.151	
	2 462	11	11M	-6.692	0.79	-5.898	
	2 467	12	11M	-17.688	0.79	-16.894	
	2 472	13	11M	-17.431	0.79	-16.637	
802.11g	2 412	1	36M	-14.838	2.05	-12.786	
	2 422	3	36M	-23.585	2.05	-21.533	
	2 437	6	36M	-11.843	2.05	-9.791	
	2 462	11	36M	-16.369	2.05	-14.317	
	2 467	12	36M	-21.740	2.05	-19.688	
	2 472	13	36M	-23.267	2.05	-21.215	
802.11n	2 412	1	MCS4	-14.650	2.12	-12.528	
	2 422	3	MCS4	-22.182	2.12	-20.060	
	2 437	6	MCS4	-10.565	2.12	-8.443	
	2 462	11	MCS4	-14.746	2.12	-12.624	
	2 467	12	MCS4	-21.221	2.12	-19.099	
	2 472	13	MCS4	-22.303	2.12	-20.181	

[MIMO_SDM(ANT.0+ANT.1)]

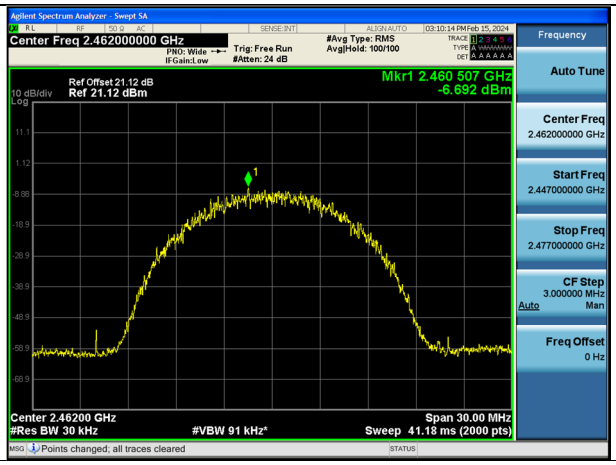
BW	Frequency [MHz]	Channel No.	Power Spectral Density [dBm]			Limit [dBm/kHz]
			ANT.0	ANT.1	Summed	
802.11n	2 412	1	-12.195	-11.300	-8.714	8 dBm/3 kHz
	2 422	3	-20.286	-19.032	-16.604	
	2 437	6	-8.212	-5.878	-3.880	
	2 462	11	-11.837	-11.229	-8.512	
	2 467	12	-18.062	-18.179	-15.110	
	2 472	13	-20.044	-18.762	-16.345	

▣ Test Plots

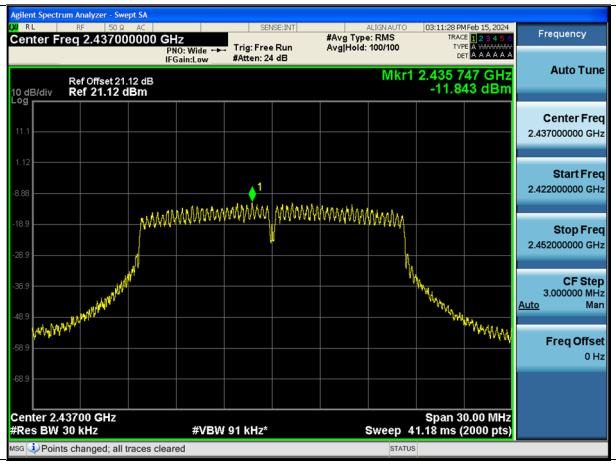
Note : In order to simplify the report, attached plots were only the worst case PSD channel.

[SISO_ANT.0]

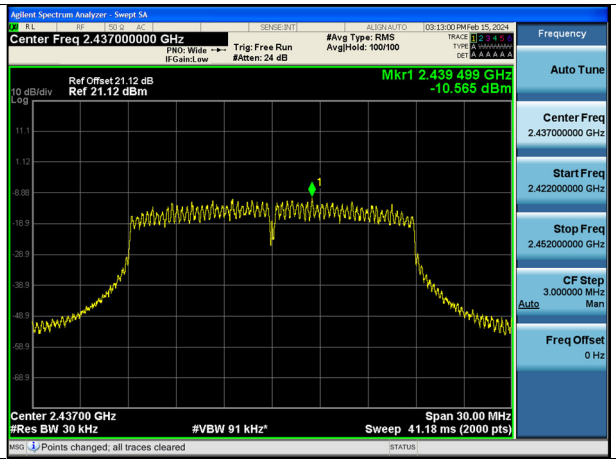
Power Spectral Density (802.11b-CH 11)



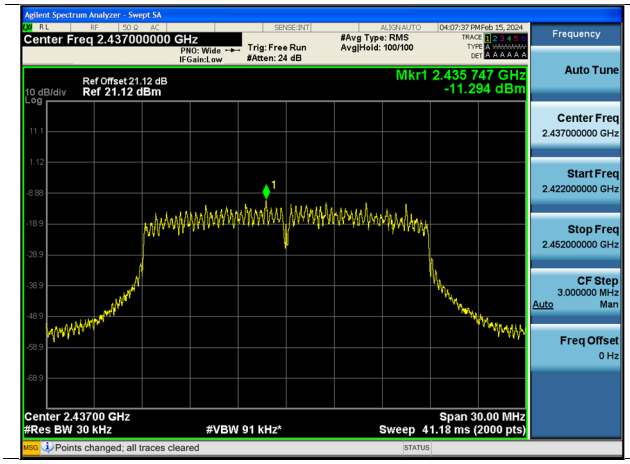
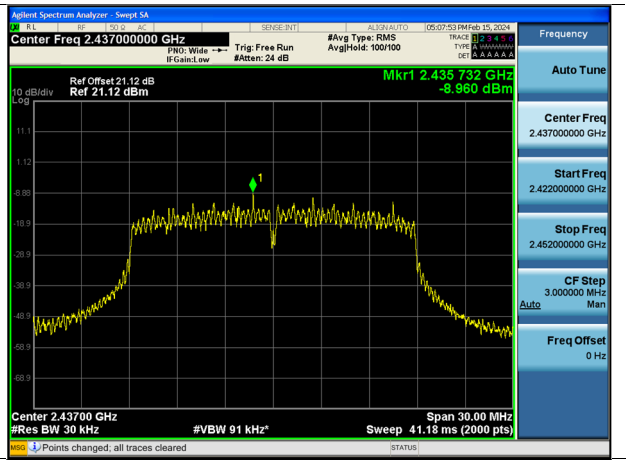
Power Spectral Density (802.11g-CH 6)



Power Spectral Density (802.11n-CH 6)



[MIMO_SDM(ANT.0+ANT.1)]

Power Spectral Density (802.11n-CH 6)	
ANT.0	ANT.1
	

9.5 BAND EDGE / CONDUCTED SPURIOUS EMISSIONS

Band Edge

Limit : 30 dBc

[SISO_ANT.0]

Mode	Freq. [MHz]	CH.	Measured Position	Band edge[dB]
802.11b	2 412	1	Lowest Bandedge	52.027
	2 462	11	Highest Bandedge	59.815
	2 467	12	Highest Bandedge	55.719
	2 472	13	Highest Bandedge	54.858
802.11g	2 412	1	Lowest Bandedge	41.073
	2 422	3	Lowest Bandedge	47.387
	2 462	11	Highest Bandedge	50.168
	2 467	12	Highest Bandedge	44.916
	2 472	13	Highest Bandedge	38.072
802.11n	2 412	1	Lowest Bandedge	38.972
	2 422	3	Lowest Bandedge	48.655
	2 462	11	Highest Bandedge	45.130
	2 467	12	Highest Bandedge	45.771
	2 472	13	Highest Bandedge	35.572

[MIMO_SDM(ANT.0)]

Mode	Freq. [MHz]	CH.	Measured Position	Band edge[dB]
802.11n	2 412	1	Lowest Bandedge	36.819
	2 422	3	Lowest Bandedge	48.202
	2 462	11	Highest Bandedge	45.825
	2 467	12	Highest Bandedge	45.632
	2 472	13	Highest Bandedge	34.786

[MIMO_SDM(ANT.1)]

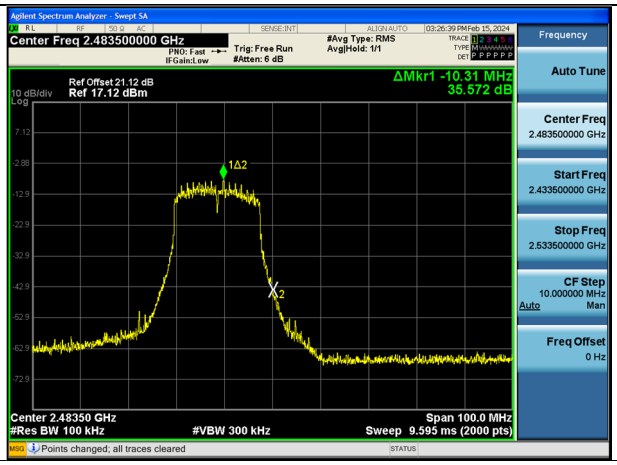
Mode	Freq. [MHz]	CH.	Measured Position	Band edge[dB]
802.11n	2 412	1	Lowest Bandedge	40.523
	2 422	3	Lowest Bandedge	50.586
	2 462	11	Highest Bandedge	50.532
	2 467	12	Highest Bandedge	47.637
	2 472	13	Highest Bandedge	37.395

▣ **Test Plots**(Band Edge)

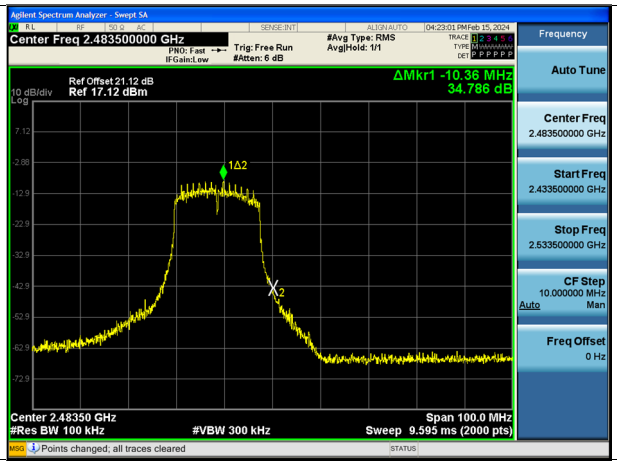
Note:

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

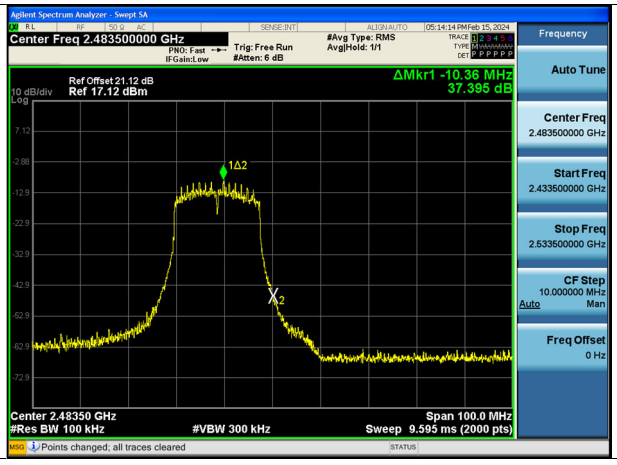
[SISO_ANT.0] 802.11n_HT20-CH 13



[MIMO_SDM(ANT.0)] 802.11n_HT20-CH 13



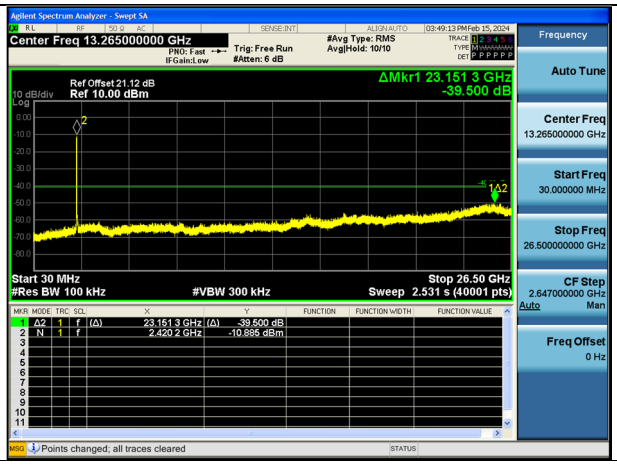
[MIMO_SDM(ANT.1)] 802.11n_HT20-CH 13



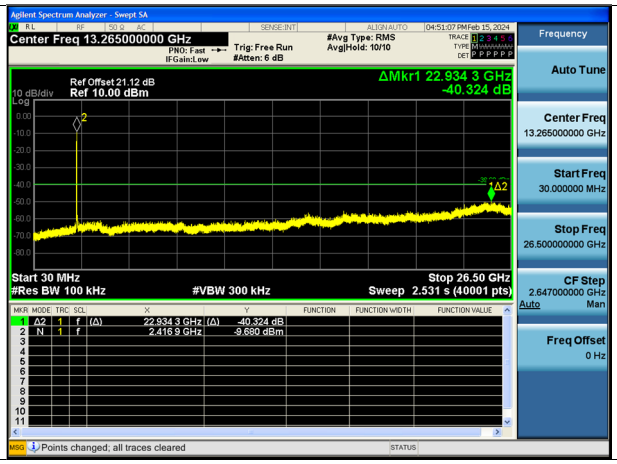
▣ Test Plots(Conducted Spurious Emission)

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

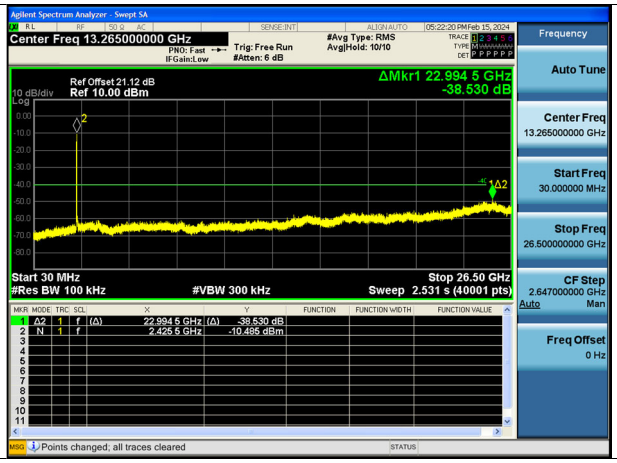
[SISO_ANT.0] 802.11g-CH 3



[MIMO_SDM(ANT.0)] 802.11n_HT20-CH 3



[MIMO_SDM(ANT.1)] 802.11n_HT20-CH 3



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

[SISO_ANT.0]

Band :	DTS		Operation Mode : 802.11b				
CH.1	2412 MHz		Transfer Rate : 1Mbps				
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	48.88	4.83	V	53.71	73.98	20.27	PK
4824	42.11	4.83	V	46.94	53.98	7.04	AV
7236	44.66	12.62	V	57.28	73.98	16.70	PK
7236	37.92	12.62	V	50.54	53.98	3.44	AV
4824	49.07	4.83	H	53.90	73.98	20.08	PK
4824	45.25	4.83	H	50.08	53.98	3.90	AV
7236	44.41	12.62	H	57.03	73.98	16.95	PK
7236	37.55	12.62	H	50.17	53.98	3.81	AV

Band :	DTS		Operation Mode : 802.11b				
CH.6	2437 MHz		Transfer Rate : 1Mbps				
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	48.88	5.20	V	54.08	73.98	19.90	PK
4874	45.02	5.20	V	50.22	53.98	3.76	AV
7311	40.99	12.63	V	53.62	73.98	20.36	PK
7311	32.03	12.63	V	44.66	53.98	9.32	AV
4874	49.04	5.20	H	54.24	73.98	19.74	PK
4874	45.37	5.20	H	50.57	53.98	3.41	AV
7311	40.75	12.63	H	53.38	73.98	20.60	PK
7311	31.89	12.63	H	44.52	53.98	9.46	AV

Band :	DTS		Operation Mode : 802.11b				
CH.11	2462 MHz		Transfer Rate : 1Mbps				
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	48.51	5.29	V	53.80	73.98	20.18	PK
4924	44.32	5.29	V	49.61	53.98	4.37	AV
7386	41.55	12.51	V	54.06	73.98	19.92	PK
7386	33.51	12.51	V	46.02	53.98	7.96	AV
4924	48.80	5.29	H	54.09	73.98	19.89	PK
4924	44.88	5.29	H	50.17	53.98	3.81	AV
7386	43.47	12.51	H	55.98	73.98	18.00	PK
7386	36.55	12.51	H	49.06	53.98	4.92	AV

Band :		DTS		Operation Mode : 802.11g				
CH.1	2412		MHz	Transfer Rate : 6Mbps				
Frequency [MHz]	Measured value [dBµV]	Duty Cycle Factor [dB]	CL+AF+DF-AG [dB/m]	ANT. POL [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
4824	43.60	0.00	4.83	V	48.43	73.98	25.55	PK
4824	32.18	0.45	4.83	V	37.46	53.98	16.52	AV
7236	41.98	0.00	12.62	V	54.60	73.98	19.38	PK
7236	27.62	0.45	12.62	V	40.69	53.98	13.29	AV
4824	43.62	0.00	4.83	H	48.45	73.98	25.53	PK
4824	32.49	0.45	4.83	H	37.77	53.98	16.21	AV
7236	41.82	0.00	12.62	H	54.44	73.98	19.54	PK
7236	27.32	0.45	12.62	H	40.39	53.98	13.59	AV

Band :		DTS		Operation Mode : 802.11g				
CH.6	2437		MHz	Transfer Rate : 6Mbps				
Frequency [MHz]	Measured value [dBµV]	Duty Cycle Factor [dB]	CL+AF+DF-AG [dB/m]	ANT. POL [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
4874	45.22	0.00	5.20	V	50.42	73.98	23.56	PK
4874	33.67	0.45	5.20	V	39.32	53.98	14.66	AV
7311	44.88	0.00	12.63	V	57.51	73.98	16.47	PK
7311	29.51	0.45	12.63	V	42.59	53.98	11.39	AV
4874	46.18	0.00	5.20	H	51.38	73.98	22.60	PK
4874	34.63	0.45	5.20	H	40.28	53.98	13.70	AV
7311	42.62	0.00	12.63	H	55.25	73.98	18.73	PK
7311	27.59	0.45	12.63	H	40.67	53.98	13.31	AV

Band :		DTS		Operation Mode : 802.11g				
CH.11	2462		MHz	Transfer Rate : 6Mbps				
Frequency [MHz]	Measured value [dBµV]	Duty Cycle Factor [dB]	CL+AF+DF-AG [dB/m]	ANT. POL [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
4924	44.59	0.00	5.29	V	49.88	73.98	24.10	PK
4924	32.75	0.45	5.29	V	38.49	53.98	15.49	AV
7386	44.69	0.00	12.51	V	57.20	73.98	16.78	PK
7386	28.65	0.45	12.51	V	41.61	53.98	12.37	AV
4924	44.79	0.00	5.29	H	50.08	73.98	23.90	PK
4924	33.50	0.45	5.29	H	39.24	53.98	14.74	AV
7386	42.75	0.00	12.51	H	55.26	73.98	18.72	PK
7386	28.11	0.45	12.51	H	41.07	53.98	12.91	AV

Note:

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

[MIMO_SDM(ANT.0+ANT.1)]

Band :	DTS			Operation Mode : 802.11n_HT20				
CH.1	2412		MHz	Transfer Rate : MCS 8				
Frequency [MHz]	Measured value [dBµV]	Duty Cycle Factor [dB]	CL+AF+DF-AG [dB/m]	ANT. POL [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
4824	42.19	0.00	4.83	V	47.02	73.98	26.96	PK
4824	31.12	0.89	4.83	V	36.84	53.98	17.14	AV
7236	39.35	0.00	12.62	V	51.97	73.98	22.01	PK
7236	26.37	0.89	12.62	V	39.88	53.98	14.10	AV
4824	42.56	0.00	4.83	H	47.39	73.98	26.59	PK
4824	31.00	0.89	4.83	H	36.72	53.98	17.26	AV
7236	39.76	0.00	12.62	H	52.38	73.98	21.60	PK
7236	26.35	0.89	12.62	H	39.86	53.98	14.12	AV

Band :	DTS			Operation Mode : 802.11n_HT20				
CH.6	2437		MHz	Transfer Rate : MCS 8				
Frequency [MHz]	Measured value [dBµV]	Duty Cycle Factor [dB]	CL+AF+DF-AG [dB/m]	ANT. POL [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
4874	44.34	0.00	5.20	V	49.54	73.98	24.44	PK
4874	33.09	0.89	5.20	V	39.18	53.98	14.80	AV
7311	43.57	0.00	12.63	V	56.20	73.98	17.78	PK
7311	29.12	0.89	12.63	V	42.64	53.98	11.34	AV
4874	45.78	0.00	5.20	H	50.98	73.98	23.00	PK
4874	33.54	0.89	5.20	H	39.63	53.98	14.35	AV
7311	43.02	0.00	12.63	H	55.65	73.98	18.33	PK
7311	28.85	0.89	12.63	H	42.37	53.98	11.61	AV

Band :	DTS			Operation Mode : 802.11n_HT20				
CH.11	2462		MHz	Transfer Rate : MCS 8				
Frequency [MHz]	Measured value [dBµV]	Duty Cycle Factor [dB]	CL+AF+DF-AG [dB/m]	ANT. POL [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
4924	42.69	0.00	5.29	V	47.98	73.98	26.00	PK
4924	30.77	0.89	5.29	V	36.95	53.98	17.03	AV
7386	41.71	0.00	12.51	V	54.22	73.98	19.76	PK
7386	26.71	0.89	12.51	V	40.11	53.98	13.87	AV
4924	43.22	0.00	5.29	H	48.51	73.98	25.47	PK
4924	31.41	0.89	5.29	H	37.59	53.98	16.39	AV
7386	40.99	0.00	12.51	H	53.50	73.98	20.48	PK
7386	26.56	0.89	12.51	H	39.96	53.98	14.02	AV

Note:

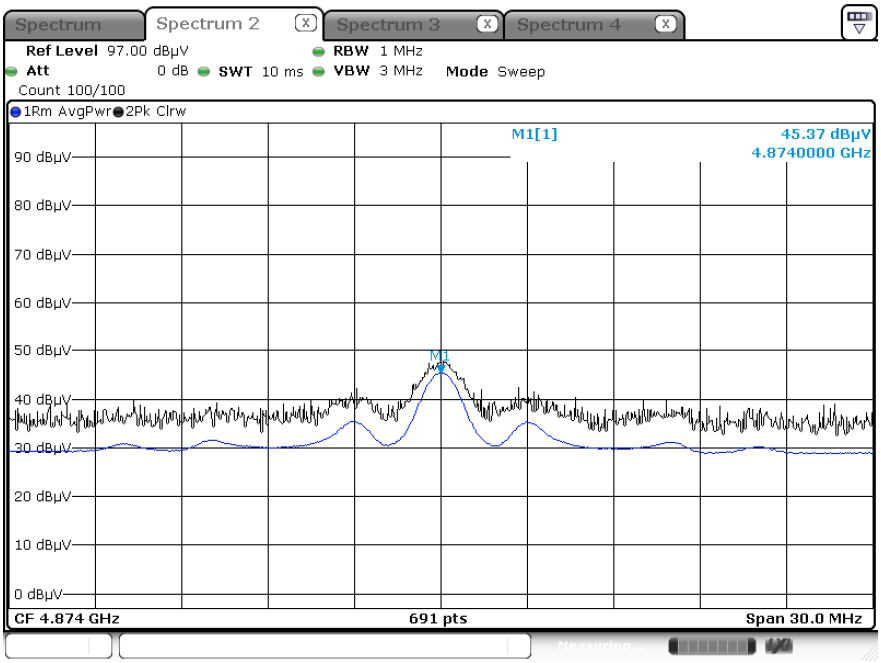
Channel 12 and 13 are less powerful than channel 11. So, The test for high channel was performed at channel 11.

▣ Test Plots

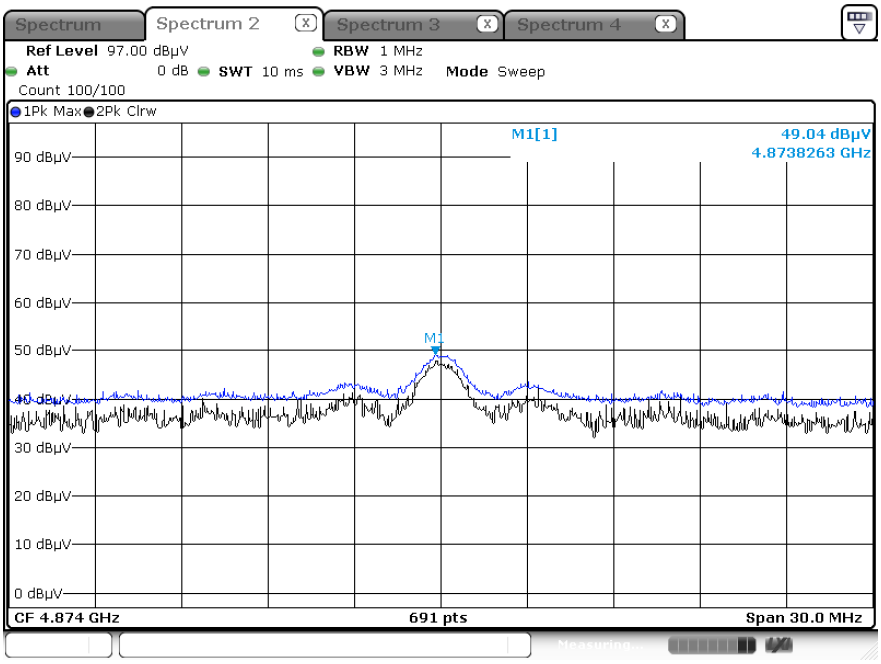
Note: In order to simplify the report, Plot of worst case are only reported.

[SISO_ANT.0]

Radiated Spurious Emissions plot – Average Result (802.11b_1 Mbps, Ch.6 2nd Harmonic, Z-H)



Radiated Spurious Emissions plot – Peak Result (802.11b_1 Mbps, Ch.6 2nd Harmonic, Z-H)



9.7 RADIATED RESTRICTED BAND EDGES

[SISO_ANT.0]

Operation Mode:	802.11b
Transfer Rate:	1 Mbps
Operating Frequency	2412 MHz, 2462 MHz
Channel No.	01 Ch, 11 Ch

Frequency	Measured Value	A.F.+C.L+D.F	ANT. POL	Total	Limit	Margin	Measurement Type
[MHz]	[dBμV]	[dB]	[H/V]	[dBμV/m]	[dBμV/m]	[dB]	
2390.0	21.52	35.41	H	56.93	73.98	17.05	PK
2390.0	10.85	35.41	H	46.26	53.98	7.72	AV
2390.0	21.32	35.41	V	56.73	73.98	17.25	PK
2390.0	10.62	35.41	V	46.03	53.98	7.95	AV
2483.5	24.08	35.99	H	60.07	73.98	13.91	PK
2483.5	11.90	35.99	H	47.89	53.98	6.09	AV
2483.5	23.95	35.99	V	59.94	73.98	14.04	PK
2483.5	11.71	35.99	V	47.70	53.98	6.28	AV

Operation Mode:	802.11b
Transfer Rate:	1 Mbps
Operating Frequency	2467 MHz, 2472 MHz
Channel No.	12 Ch, 13 Ch

Frequency	Measured Value	A.F.+C.L+D.F	ANT. POL	Total	Limit	Margin	Measurement Type
[MHz]	[dBμV]	[dB]	[H/V]	[dBμV/m]	[dBμV/m]	[dB]	
2483.5	17.68	35.99	H	53.67	73.98	20.31	PK
2483.5	5.85	35.99	H	41.84	53.98	12.14	AV
2483.5	17.42	35.99	V	53.41	73.98	20.57	PK
2483.5	5.65	35.99	V	41.64	53.98	12.34	AV
2483.5	18.28	35.99	H	54.27	73.98	19.71	PK
2483.5	5.95	35.99	H	41.94	53.98	12.04	AV
2483.5	18.02	35.99	V	54.01	73.98	19.97	PK
2483.5	5.85	35.99	V	41.84	53.98	12.14	AV

Operation Mode:	802.11g
Transfer Rate:	6 Mbps
Operating Frequency	2412 MHz, 2462 MHz
Channel No.	01 Ch, 11 Ch

Frequency	Measured Value	Duty Cycle	A.F.+C.L+D.F	ANT. POL	Total	Limit	Margin	Measurement Type
[MHz]	[dBμV]	Factor [dB]	[dB]	[H/V]	[dBμV/m]	[dBμV/m]	[dB]	
# 2390	26.41	0.00	35.41	H	61.82	73.98	12.16	PK
# 2390	12.90	0.45	35.41	H	48.76	53.98	5.22	AV
# 2390	26.01	0.00	35.41	V	61.42	73.98	12.56	PK
# 2390	12.51	0.45	35.41	V	48.37	53.98	5.61	AV
# 2483.5	24.00	0.00	35.99	H	59.99	73.98	13.99	PK
# 2483.5	14.02	0.45	35.99	H	50.46	53.98	3.52	AV
# 2483.5	23.95	0.00	35.99	V	59.94	73.98	14.04	PK
# 2483.5	13.85	0.45	35.99	V	50.29	53.98	3.69	AV

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

Operation Mode:	802.11g
Transfer Rate:	6 Mbps
Operating Frequency	2467 MHz, 2472 MHz
Channel No.	12 Ch, 13 Ch

Frequency	Measured Value	Duty Cycle	A.F.+C.L+D.F	ANT. POL	Total	Limit	Margin	Measurement Type
[MHz]	[dBμV]	Factor [dB]	[dB]	[H/V]	[dBμV/m]	[dBμV/m]	[dB]	
# 2483.5	18.30	0.00	35.99	H	54.29	73.98	19.69	PK
# 2483.5	8.67	0.45	35.99	H	45.11	53.98	8.87	AV
# 2483.5	18.02	0.00	35.99	V	54.01	73.98	19.97	PK
# 2483.5	8.42	0.45	35.99	V	44.86	53.98	9.12	AV
# 2483.5	22.89	0.00	35.99	H	58.88	73.98	15.10	PK
# 2483.5	13.11	0.45	35.99	H	49.55	53.98	4.43	AV
# 2483.5	22.55	0.00	35.99	V	58.54	73.98	15.44	PK
# 2483.5	12.95	0.45	35.99	V	49.39	53.98	4.59	AV

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

[MIMO_SDM(ANT.0+ANT.1)]

Operation Mode:	802.11n (HT20)
Transfer MCS Index:	8
Operating Frequency	2462 MHz
Channel No.	01 Ch, 11 Ch

Frequency	Measured Value	Duty Cycle	A.F.+C.L+D.F	ANT. POL	Total	Limit	Margin	Measurement Type
[MHz]	[dBμV]	Factor [dB]	[dB]	[H/V]	[dBμV/m]	[dBμV/m]	[dB]	
# 2390	25.70	0.00	35.41	H	61.11	73.98	12.87	PK
# 2390	13.92	0.89	35.41	H	50.22	53.98	3.76	AV
# 2390	25.32	0.00	35.41	V	60.73	73.98	13.25	PK
# 2390	13.51	0.89	35.41	V	49.81	53.98	4.17	AV
# 2483.5	24.67	0.89	35.99	H	61.55	73.98	12.43	PK
# 2483.5	13.76	0.89	35.99	H	50.64	53.98	3.34	AV
# 2483.5	24.12	0.89	35.99	V	61.00	73.98	12.98	PK
# 2483.5	13.22	0.89	35.99	V	50.10	53.98	3.88	AV

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

Operation Mode:	802.11n (HT20)
Transfer MCS Index:	8
Operating Frequency	2467 MHz, 2472 MHz
Channel No.	12 Ch, 13 Ch

Frequency	Measured Value	Duty Cycle	A.F.+C.L+D.F	ANT. POL	Total	Limit	Margin	Measurement Type
[MHz]	[dBμV]	Factor [dB]	[dB]	[H/V]	[dBμV/m]	[dBμV/m]	[dB]	
# 2483.5	22.84	0.00	35.99	H	58.83	73.98	15.15	PK
# 2483.5	12.39	0.89	35.99	H	49.27	53.98	4.71	AV
# 2483.5	22.52	0.00	35.99	V	58.51	73.98	15.47	PK
# 2483.5	12.02	0.89	35.99	V	48.90	53.98	5.08	AV
# 2483.5	23.70	0.00	35.99	H	59.69	73.98	14.29	PK
# 2483.5	14.24	0.89	35.99	H	51.12	53.98	2.86	AV
# 2483.5	23.51	0.00	35.99	V	59.50	73.98	14.48	PK
# 2483.5	13.95	0.89	35.99	V	50.83	53.98	3.15	AV

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

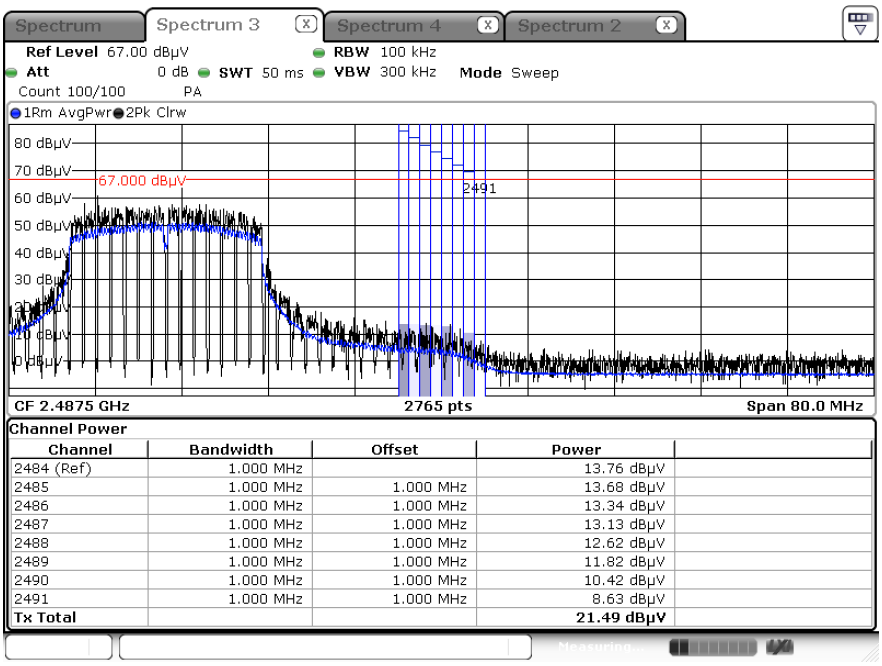
▣ Test Plots

Note:

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

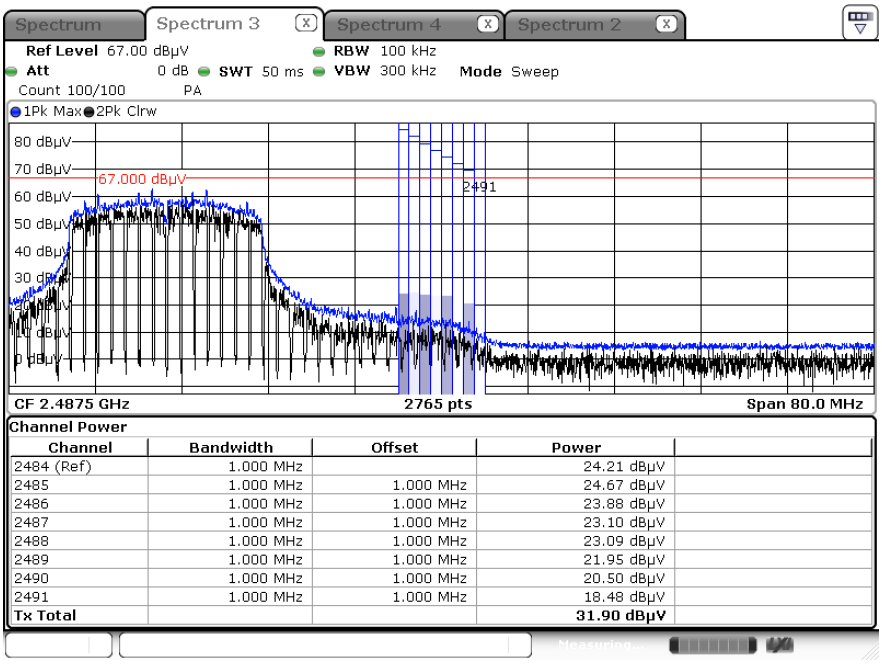
[MIMO_SDM(ANT.0+ANT.1)]

Radiated Restricted Band Edges plot – Average Result (802.11n (HT20)_ MCS8, Ch.11, Z-H)



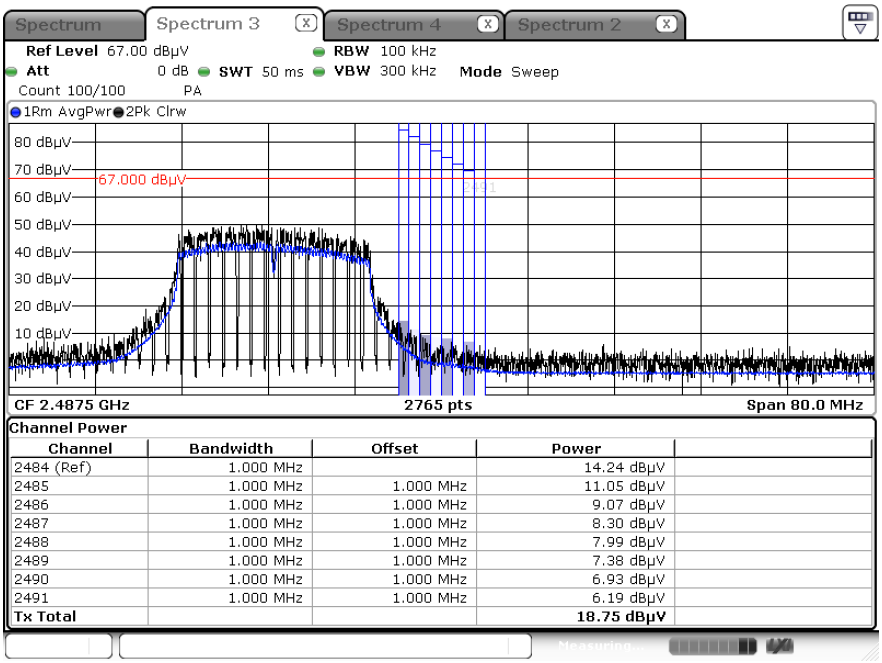
Channel	Bandwidth	Offset	Power
2484 (Ref)	1.000 MHz		13.76 dBµV
2485	1.000 MHz	1.000 MHz	13.68 dBµV
2486	1.000 MHz	1.000 MHz	13.34 dBµV
2487	1.000 MHz	1.000 MHz	13.13 dBµV
2488	1.000 MHz	1.000 MHz	12.62 dBµV
2489	1.000 MHz	1.000 MHz	11.82 dBµV
2490	1.000 MHz	1.000 MHz	10.42 dBµV
2491	1.000 MHz	1.000 MHz	8.63 dBµV
Tx Total			**21.49 dBµV**

Radiated Restricted Band Edges plot – Peak Result (802.11n (HT20)_ MCS8, Ch.11, Z-H)

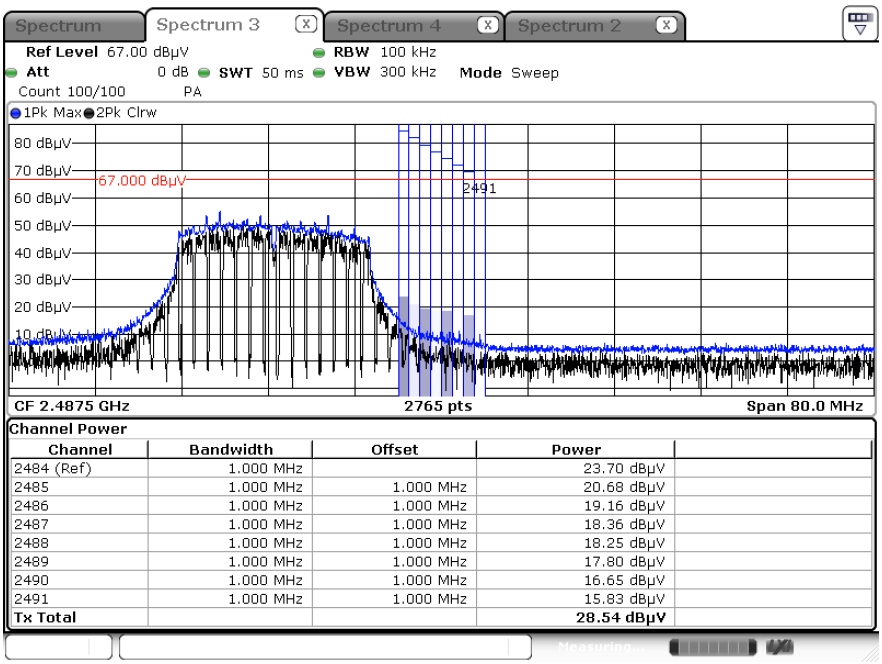


Channel	Bandwidth	Offset	Power
2484 (Ref)	1.000 MHz		24.21 dBµV
2485	1.000 MHz	1.000 MHz	24.67 dBµV
2486	1.000 MHz	1.000 MHz	23.88 dBµV
2487	1.000 MHz	1.000 MHz	23.10 dBµV
2488	1.000 MHz	1.000 MHz	23.09 dBµV
2489	1.000 MHz	1.000 MHz	21.95 dBµV
2490	1.000 MHz	1.000 MHz	20.50 dBµV
2491	1.000 MHz	1.000 MHz	18.48 dBµV
Tx Total			**31.90 dBµV**

Radiated Restricted Band Edges plot – Average Result (802.11n (HT20)_ MCS8, Ch.13, Z-H)



Radiated Restricted Band Edges plot – Peak Result (802.11n (HT20)_ MCS8, Ch.13, Z-H)



9.8 POWERLINE CONDUCTED EMISSIONS

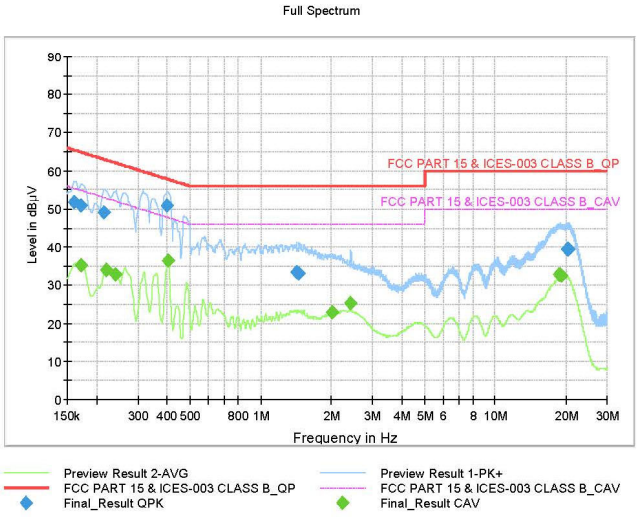
Conducted Emissions

Test 1 / 2

Test Report

Common Information

EUT : SM-P625
Operating Conditions : 2.4G WLAN_Mode
Comment :



Final_Result_QPK

Frequency (MHz)	QuasiPeak (dBµV)	Limit (dBµV)	Margin (dB)	Bandwidth (kHz)	Line	Corr. (dB)
0.1613	51.80	65.40	13.60	9.000	N	9.6
0.1725	50.86	64.84	13.98	9.000	N	9.6
0.2153	49.17	63.00	13.83	9.000	L1	9.6
0.3998	50.94	57.86	6.92	9.000	L1	9.6
1.4203	33.27	56.00	22.73	9.000	L1	9.7
1.4563	33.12	56.00	22.88	9.000	L1	9.7
20.3113	39.34	60.00	20.66	9.000	L1	10.4
20.3788	39.48	60.00	20.52	9.000	L1	10.4
20.4665	39.37	60.00	20.63	9.000	L1	10.4

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Final_Result_CAV

Frequency (MHz)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Bandwidth (kHz)	Line	Corr. (dB)
0.1725	35.11	54.84	19.73	9.000	N	9.6
0.2198	34.09	52.83	18.74	9.000	N	9.6
0.2400	32.72	52.10	19.38	9.000	N	9.6
0.4020	36.33	47.81	11.48	9.000	N	9.7
2.0188	22.76	46.00	23.24	9.000	N	9.7
2.4238	25.24	46.00	20.76	9.000	N	9.8
18.7610	32.69	50.00	17.31	9.000	N	10.5
19.0198	32.77	50.00	17.23	9.000	N	10.5
19.1075	32.62	50.00	17.38	9.000	N	10.5

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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	0093008124	02/22/2024	Annual
Signal Analyzer	N9030A	Agilent	MY49432108	03/02/2024	Annual
Power Measurement Set	OSP 120	Rohde & Schwarz	101231	06/09/2024	Annual
Power Meter	N1911A	Agilent	MY45100523	03/06/2024	Annual
Power Sensor	N1921A	Agilent	MY57820067	03/06/2024	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	KR75303243	04/24/2024	Annual
Attenuator(10 dB)(DC-26.5 GHz)	8493C	HP	07560	06/12/2024	Annual
Attenuator(10 dB)(DC-26.5 GHz)	8493C	HP	08285	06/02/2024	Annual
Attenuator(20 dB)	18N-20dB	Rohde & Schwarz	8	03/08/2024	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	100752	01/03/2025	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	S1AM	08/03/2025	Biennial
EM1000 / Controller	EM1000	Audix	060520	N/A	N/A
Turn Table	N/A	Audix	N/A	N/A	N/A
Amp & Filter Bank Switch Controller	FBSM-01B	T&M system	TM19050002	N/A	N/A
Loop Antenna	1513	Schwarzbeck	1513-333	03/17/2024	Biennial
Hybrid Antenna	VULB 9168	Schwarzbeck	9168-0895	08/16/2024	Biennial
Horn Antenna	BBHA 9120D	Schwarzbeck	9120D-1300	01/03/2026	Biennial
Horn Antenna	BBHA 9120D	Schwarzbeck	9120D-2296	05/18/2024	Biennial
Horn Antenna(15 GHz ~ 40 GHz)	BBHA9170	Schwarzbeck	BBHA9170342	09/29/2024	Biennial
Spectrum Analyzer	FSV(10 Hz ~ 40 GHz)	Rohde & Schwarz	101055	05/12/2024	Annual
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
High Pass Filter(7 GHz ~ 18 GHz)	WHKX10-7150-8000-18000-50SS	Wainwright Instruments	1	03/02/2024	Annual
Power Amplifier	CBL18265035	CERNEX	22966	11/17/2024	Annual
Power Amplifier	CBL26405040	CERNEX	25956	03/02/2024	Annual
Bluetooth Tester	TC-3000C	TESCOM	3000C000175	03/28/2024	Annual
RF Switching System	FMSR-05B (HPF(3~18GHz) + LNA1(1~18GHz))	T&M system	S1L1	01/02/2025	Annual
RF Switching System	FMSR -05B (ATT(10dB) + LNA1(1~18GHz))	T&M system	S1L2	01/02/2025	Annual
RF Switching System	FMSR -05B (ATT(3dB) + LNA1(1~18GHz))	T&M system	S1L3	01/02/2025	Annual
RF Switching System	FMSR -05B (LNA1(1~18GHz))	T&M system	S1L4	01/02/2025	Annual
RF Switching System	FMSR -05B (HPF(7~18GHz) + LNA2(6~18GHz))	T&M system	S1L5	01/02/2025	Annual
RF Switching System	FMSR -05B (Thru(30MHz ~ 18GHz))	T&M system	S1L6	01/02/2025	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-2402-FC036-P