

FCC DTS REPORT

Certification

Applicant Name: SAMSUNG Electronics Co., Ltd.	Date of Issue: March 03, 2021
Address: 129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Rep. of Korea	Test Site/Location: 74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, 17383 KOREA
	Report No.: HCT-RF-2102-FC038-R1

FCC ID:	A3LSMA526U
APPLICANT:	SAMSUNG Electronics Co., Ltd.
Model:	SM-A526U
Additional Model:	SM-A526U1
EUT Type:	Mobile Phone
Average Output Power:	802.11b : 20.79 dBm / 802.11g : 17.77 dBm / 802.11n(HT20) : 17.78 dBm
Frequency Range:	2 412 MHz ~ 2 462 MHz
Modulation type:	CCK/DSSS/OFDM
FCC Classification:	Digital Transmission System(DTS)
FCC Rule Part(s):	Part 15.247

Engineering Statement:

The measurements shown in this report were made in accordance with the procedures indicated, and the emissions from this equipment were found to be within the limits applicable. I assume full responsibility for the accuracy and completeness of these measurements, and for the qualifications of all persons taking them. It is further stated that upon the basis of the measurements made, the equipment tested is capable of operation in accordance with the requirements of the FCC Rules under normal use and maintenance.

Report No.: HCT-RF-2102-FC038-R1

REVIEWED BY



Report prepared by : Jeong Ho Kim
Engineer of Telecommunication Testing Center

Report approved by : Jong Seok Lee
Manager of Telecommunication Testing Center

This test results were applied only to the test methods required by the standard.

This laboratory is not accredited for the test results marked *.

The above Test Report is the accredited test result by (KS Q) ISO/IEC 17025 and KOLAS(Korea Laboratory Accreditation Scheme), which signed the ILAC-MRA. (HCT Accreditation No.: KT197)

* The report shall not be reproduced except in full(only partly) without approval of the laboratory.

Version

TEST REPORT NO.	DATE	DESCRIPTION
HCT-RF-2102-FC038	February 25, 2021	- First Approval Report
HCT-RF-2102-FC038-R1	March 03, 2021	- On Page 37. Revised Limit column.

Table of Contents

REVIEWED BY	2
1. EUT DESCRIPTION	5
2. TEST METHODOLOGY	6
EUT CONFIGURATION	6
EUT EXERCISE	6
GENERAL TEST PROCEDURES	6
DESCRIPTION OF TEST MODES	6
3. INSTRUMENT CALIBRATION.....	7
4. FACILITIES AND ACCREDITATIONS	7
FACILITIES	7
EQUIPMENT	7
5. ANTENNA REQUIREMENTS	8
6. MEASUREMENT UNCERTAINTY	8
7. DESCRIPTION OF TESTS.....	9
8. SUMMARY TEST OF RESULTS	24
9. TEST RESULT	25
9.1 DUTY CYCLE.....	25
9.2 6dB BANDWIDTH.....	28
9.3 OUTPUT POWER	31
9.4 POWER SPECTRAL DENSITY	37
9.5 BAND EDGE / CONDUCTED SPURIOUS EMISSIONS.....	40
9.6 RADIATED SPURIOUS EMISSIONS	51
9.7 RADIATED RESTRICTED BAND EDGES	59
9.8 POWERLINE CONDUCTED EMISSIONS	65
9.9 CONFIRMATION OF GEO-LOCATION MECHANISM	69
10. LIST OF TEST EQUIPMENT	71
11. ANNEX A_ TEST SETUP PHOTO	73

1. EUT DESCRIPTION

Model	SM-A526U	
Additional Model	SM-A526U1	
EUT Type	Mobile Phone	
Power Supply	DC 3.86 V	
Frequency Range	2 412 MHz ~ 2 462 MHz	
Max. RF Output Power	<u>Peak Power</u> (For information only)	802.11b : 24.66 dBm 802.11g : 25.54 dBm 802.11n(HT20) : 25.87 dBm
	<u>Average Power</u>	802.11b : 20.79 dBm 802.11g : 17.77 dBm 802.11n(HT20) : 17.78 dBm
Modulation Type	DSSS/CCK : 802.11b OFDM : 802.11g, 802.11n	
Number of Channels	11 Channels	
Date(s) of Tests	January 20, 2021 ~ February 19, 2021	
Serial number	Radiated: R3CR10D8NKP Conducted: R3CR10BBHNB	

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 30MHz 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 1GHz. Above 1GHz with 1.5m using absorbers between the EUT and receive antenna. The turntable shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3 m away from the receiving antenna, which varied from 1 m to 4 m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the max. emission, the relative positions of this hand-held transmitter (EUT) was rotated through three orthogonal axes according to the requirements in Section 6.6.5 of ANSI C63.10. (Version: 2013)

DESCRIPTION OF TEST MODES

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

3. INSTRUMENT CALIBRATION

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

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

4. FACILITIES AND ACCREDITATIONS

FACILITIES

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

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

EQUIPMENT

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

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

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

5. ANTENNA REQUIREMENTS

According to FCC 47 CFR §15.203:

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

- (1) The antennas of this E.U.T are permanently attached.
- (2) The E.U.T Complies with the requirement of §15.203

6. MEASUREMENT UNCERTAINTY

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

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

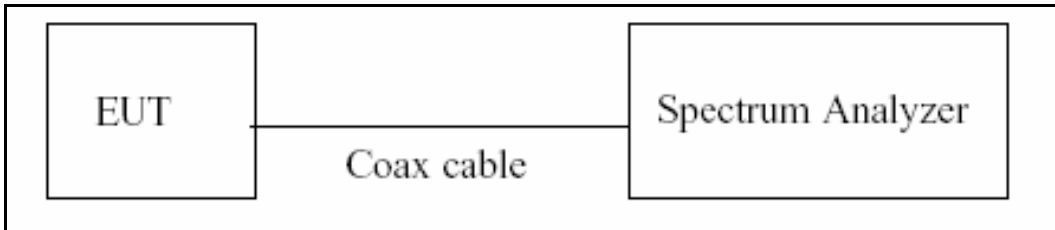
The measurement data shown herein meets or exceeds the U_{CISPR} measurement uncertainty values specified in CISPR 16-4-2 and, thus, can be compared directly to specified limits to determine compliance.

Parameter	Expanded Uncertainty (dB)
Conducted Disturbance (150 kHz ~ 30 MHz)	1.82
Radiated Disturbance (9 kHz ~ 30 MHz)	3.40
Radiated Disturbance (30 MHz ~ 1 GHz)	4.80
Radiated Disturbance (1 GHz ~ 18 GHz)	5.70
Radiated Disturbance (18 GHz ~ 40 GHz)	5.05

7. DESCRIPTION OF TESTS

7.1. Duty Cycle

Test Configuration



Test Procedure

The transmitter output is connected to the Spectrum Analyzer.

We tested according to the zero-span measurement method.

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

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

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

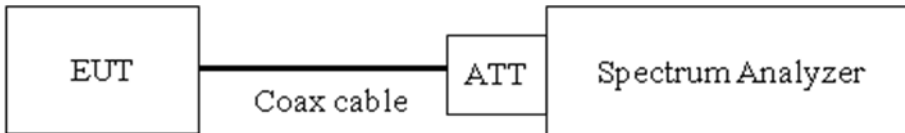
1. RBW = 8 MHz (the largest available value)
2. VBW = 8 MHz (\geq RBW)
3. SPAN = 0 Hz
4. Detector = Peak
5. Number of points in sweep > 100
6. Trace mode = Clear write
7. Measure T_{total} and T_{on}
8. Calculate Duty Cycle = T_{on} / T_{total} and Duty Cycle Factor = $10\log(1/\text{Duty Cycle})$

7.2. 6dB 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.

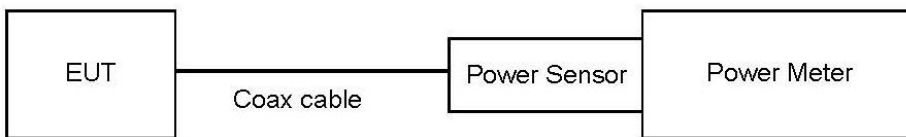
Note : We tested OBW using the automatic bandwidth measurement capability of a spectrum analyzer.

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

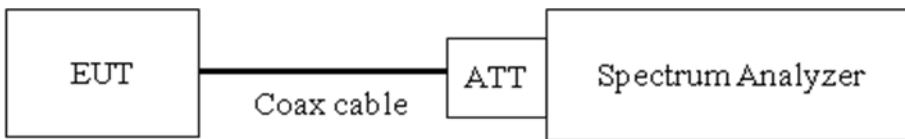
- Conducted Output Power(Peak) = Reading Value + ATT loss + Cable loss
- Conducted Output Power(Average) = Reading Value + ATT loss + Cable loss + Duty Cycle Factor

7.4. Power Spectral Density

Limit

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

Test Configuration



Test Procedure

The transmitter output is connected to the Spectrum Analyzer.

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

The spectrum analyzer is set to :

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

Sample Calculation

- Power Spectral Density = Reading Value + ATT loss + Cable loss

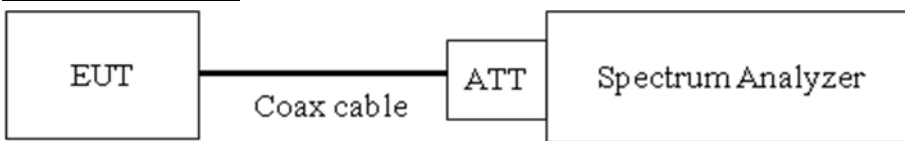
7.5. Conducted Band Edge(Out of Band Emissions) & Conducted Spurious Emissions

Limit

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

[Conducted > 30 dBc]

Test Configuration



Test Procedure

The transmitter output is connected to the spectrum analyzer.

(Procedure 11.11 in ANSI 63.10-2013)

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

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

Factors for frequency

Freq(MHz)	Factor(dB)
30	20.25
100	20.28
200	20.33
300	20.38
400	20.41
500	20.44
600	20.44
700	20.47
800	20.48
900	20.52
1000	20.55
2000	20.79
2400	20.83
2480	20.87
2500	20.87
3000	20.96
4000	21.13
5000	21.38
5150	21.42
5850	21.60
6000	21.63
7000	21.71
8000	21.77
9000	21.84
10000	21.91
11000	21.97
12000	22.06
13000	22.16
14000	22.14
15000	22.20
16000	22.22
17000	22.26
18000	22.32
19000	22.35
20000	22.40
21000	22.53
22000	22.70
23000	22.80
24000	22.84
25000	22.93
26000	23.04

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

2. Factor = Attenuator loss(20 dB) + Cable loss(1ea) + EUT Cable loss

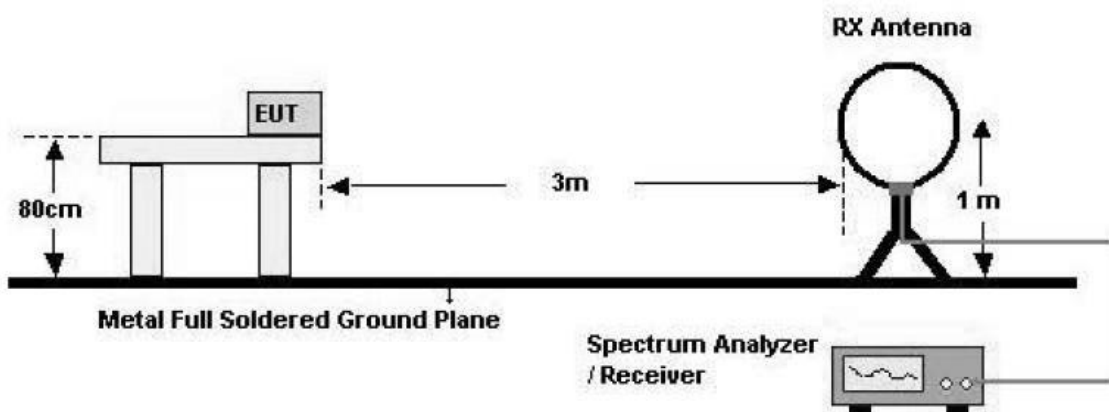
7.6. Radiated Test

Limit

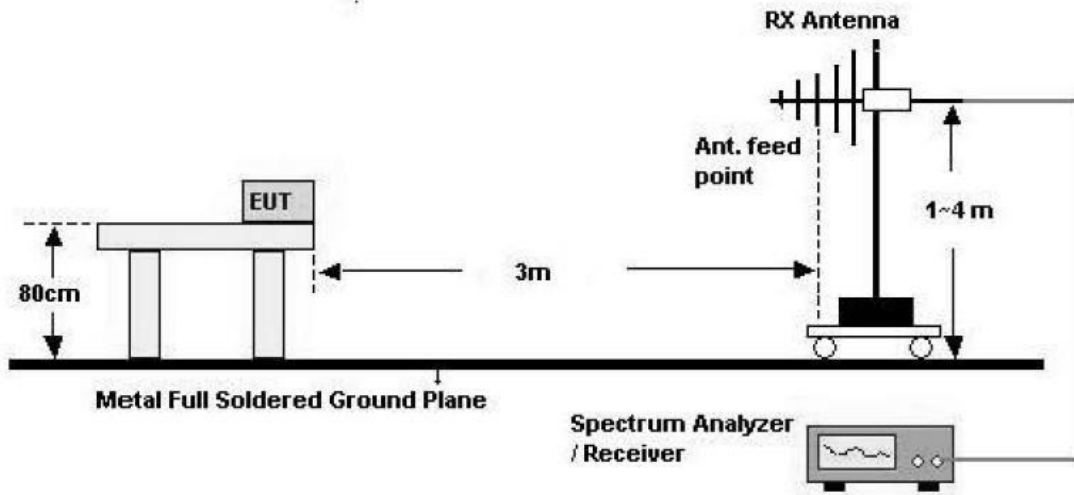
Frequency (MHz)	Field Strength (uV/m)	Measurement Distance (m)
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Test Configuration

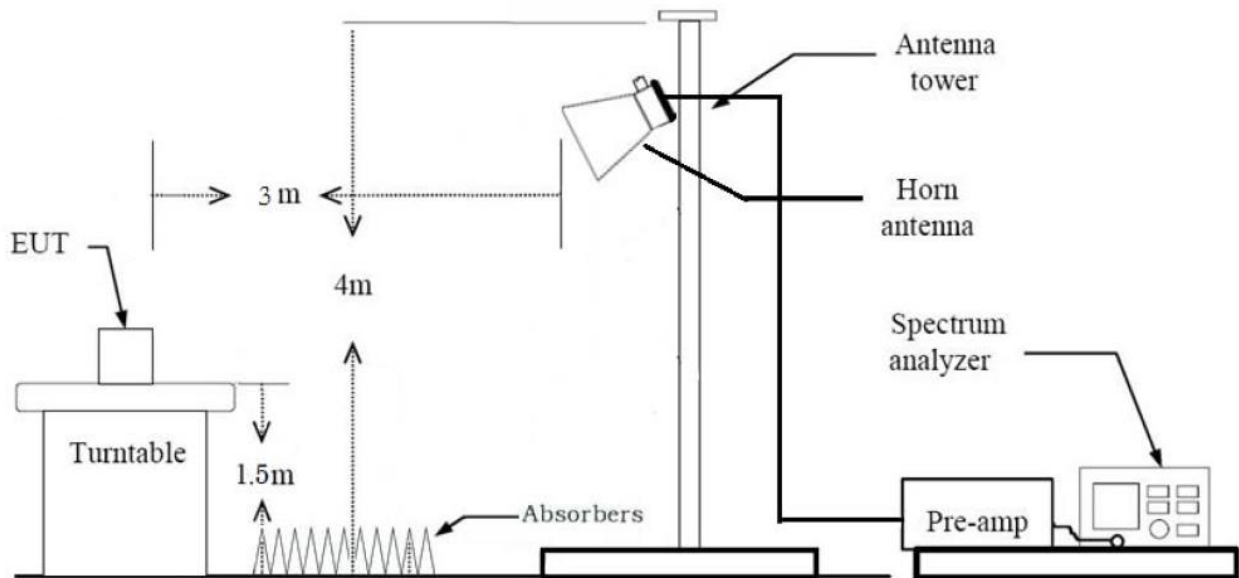
Below 30 MHz



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 3m from the EUT
3. The EUT is placed on a turntable, which is 0.8m above ground plane.
4. We have done x, y, z planes in EUT and horizontal and vertical polarization and Parallel to the ground plane in detecting antenna.
5. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
6. Distance Correction Factor(0.009 MHz – 0.490 MHz) = $40\log(3\text{ m}/300\text{ m}) = - 80\text{ dB}$
Measurement Distance : 3 m
7. Distance Correction Factor(0.490 MHz – 30 MHz) = $40\log(3\text{ m}/30\text{ m}) = - 40\text{ dB}$
Measurement Distance : 3 m
8. Spectrum Setting
 - Frequency Range = 9 kHz ~ 30 MHz
 - Detector = Peak
 - Trace = Maxhold
 - RBW = 9 kHz
 - VBW $\geq 3 \times$ RBW
9. Total = Reading 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 1GHz)

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 0.8m above ground plane.
3. The Hybrid antenna was placed at a location 3m from the EUT, which is varied from 1m to 4m to find out the highest emissions.
4. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
5. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
6. Spectrum Setting

(1) Measurement Type(Peak):

- Measured Frequency Range : 30 MHz – 1 GHz
- Detector = Peak
- Trace = Maxhold
- RBW = 100 kHz
- VBW \geq 3 x RBW

(2) Measurement Type(Quasi-peak):

- Measured Frequency Range : 30 MHz – 1 GHz
- Detector = Quasi-Peak
- RBW = 120 kHz

※ In general, (1) is used mainly

7. Total = Reading 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 1m to 4m 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 percent 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)

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

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

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

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

= Reading 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 1m to 4m 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 percent 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)
= Reading Value + Antenna Factor(A.F) + Cable Loss(C.L) + Distance Factor(D.F)
- Total(Measurement Type : Average, Duty cycle $\geq 98\%$)
= Reading Value + Antenna Factor(A.F) + Cable Loss(C.L) + Distance Factor(D.F)
- Total(Measurement Type : Average, Duty cycle < 98%)
= Reading 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) = Reading 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. EUT Axis
 - Radiated Spurious Emissions : X
 - Radiated Restricted Band Edge : X
3. Duty cycle factor applies only 802.11g/n (Duty cycle < 98%).
4. All data rate of operation were investigated and the test results are worst case in lowest datarate of each mode.
 - 802.11b : 1 Mbps
 - 802.11g : 6 Mbps
 - 802.11n_HT20 : MCS0
5. All position of loop antenna were investigated and the test result is a no critical peak found at all positions.
 - Position : Horizontal, Vertical, Parallel to the ground plane
6. SM-A526U, SM-A526U1 were tested and the worst case results are reported.
 - Worst case : SM-A526U

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
2. SM-A526U, SM-A526U1 were tested and the worst case results are reported.
 - Worst case : SM-A526U

Conducted test

1. The EUT was configured with data rate of highest power.
2. SM-A526U, SM-A526U1 were tested and the worst case results are reported.
 - Worst case : SM-A526U

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

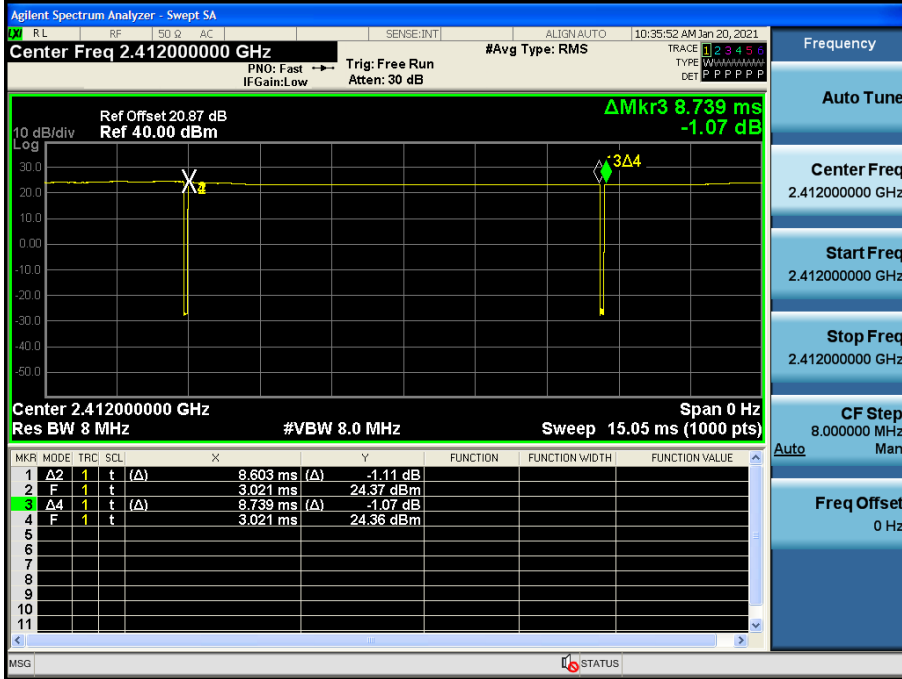
9. TEST RESULT

9.1 DUTY CYCLE

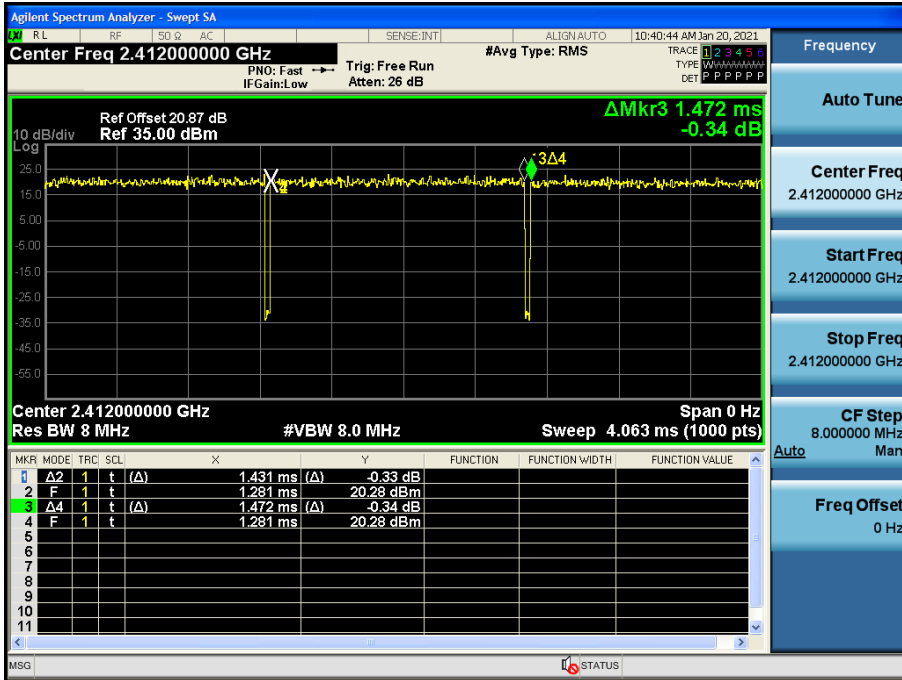
Mode	Data Rate (Mbps)	T _{on} (ms)	T _{total} (ms)	Duty Cycle	Duty Cycle Factor (dB)
802.11b	1	8.603	8.739	0.984	0.068
	2	4.309	4.339	0.993	0.030
	5.5	1.629	1.659	0.982	0.081
	11	0.863	0.894	0.966	0.152
802.11g	6	1.431	1.472	0.972	0.122
	9	0.959	0.996	0.963	0.165
	12	0.728	0.766	0.951	0.220
	18	0.493	0.529	0.931	0.309
	24	0.376	0.413	0.910	0.411
	36	0.256	0.292	0.878	0.565
	48	0.200	0.236	0.849	0.710
	54	0.180	0.216	0.834	0.790
802.11n (HT20)	6.5 (MCS0)	1.339	1.378	0.972	0.125
	13 (MCS1)	0.689	0.726	0.949	0.229
	19.5 (MCS2)	0.471	0.509	0.927	0.331
	26 (MCS3)	0.364	0.401	0.907	0.424
	39 (MCS4)	0.257	0.293	0.877	0.569
	52 (MCS5)	0.200	0.236	0.848	0.717
	58.5 (MCS6)	0.184	0.220	0.837	0.774
	65 (MCS7)	0.168	0.204	0.824	0.843

Test Plots

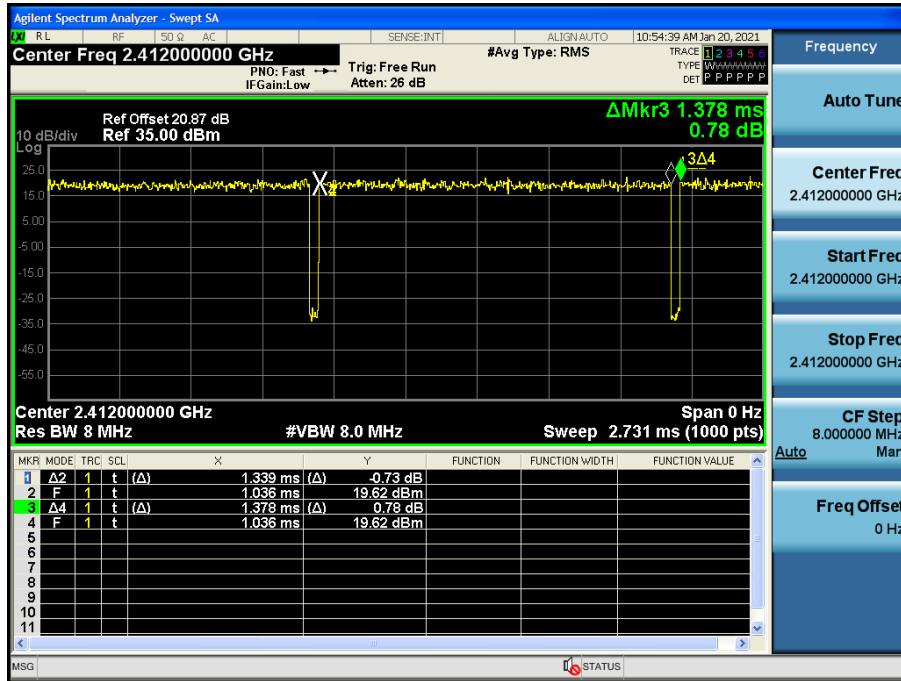
Duty cycle plot (802.11b(1Mbps))



Duty cycle plot (802.11g(6Mbps))



Duty cycle plot (802.11n(MCS0))



Note:

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

9.2 6dB BANDWIDTH

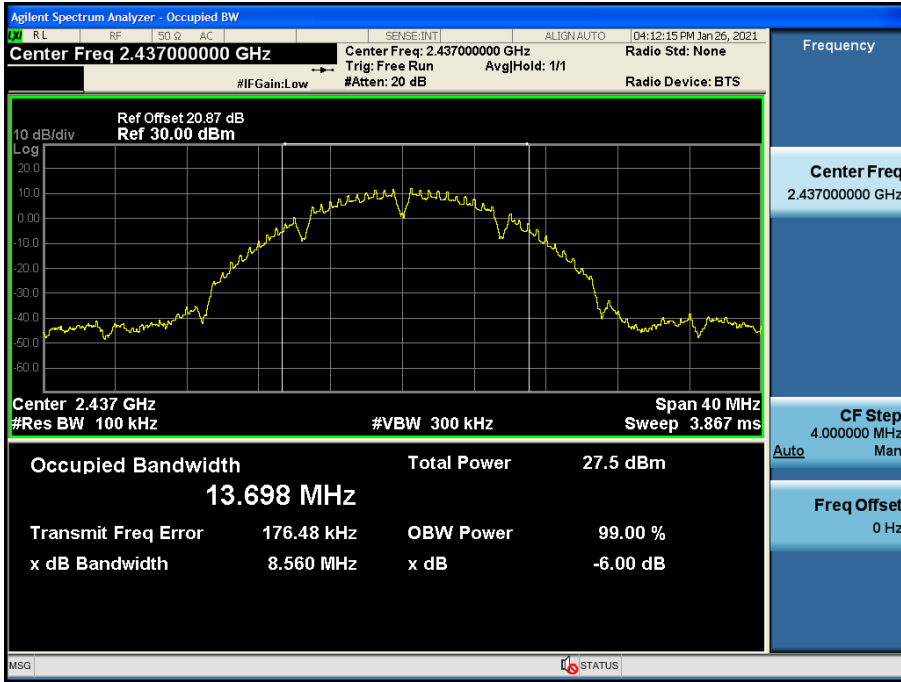
802.11b Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]
Frequency [MHz]	Channel No.		
2412	1	9.073	0.5
2437	6	8.560	0.5
2462	11	8.584	0.5

802.11g Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]
Frequency [MHz]	Channel No.		
2412	1	16.51	0.5
2437	6	15.15	0.5
2462	11	15.76	0.5

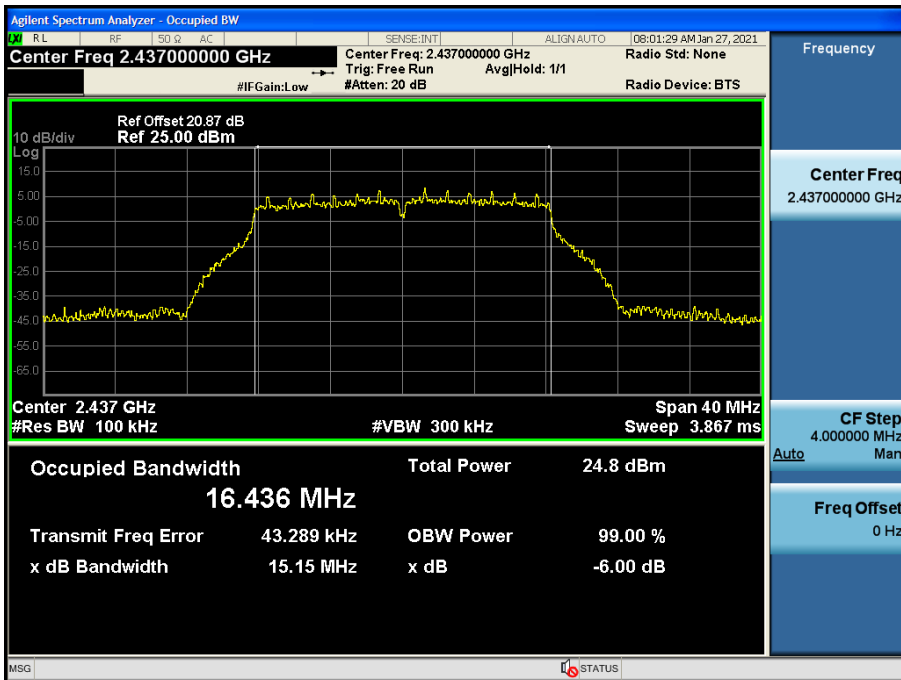
802.11n(HT20) Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]
Frequency [MHz]	Channel No.		
2412	1	15.17	0.5
2437	6	15.71	0.5
2462	11	16.93	0.5

▣ Test Plots

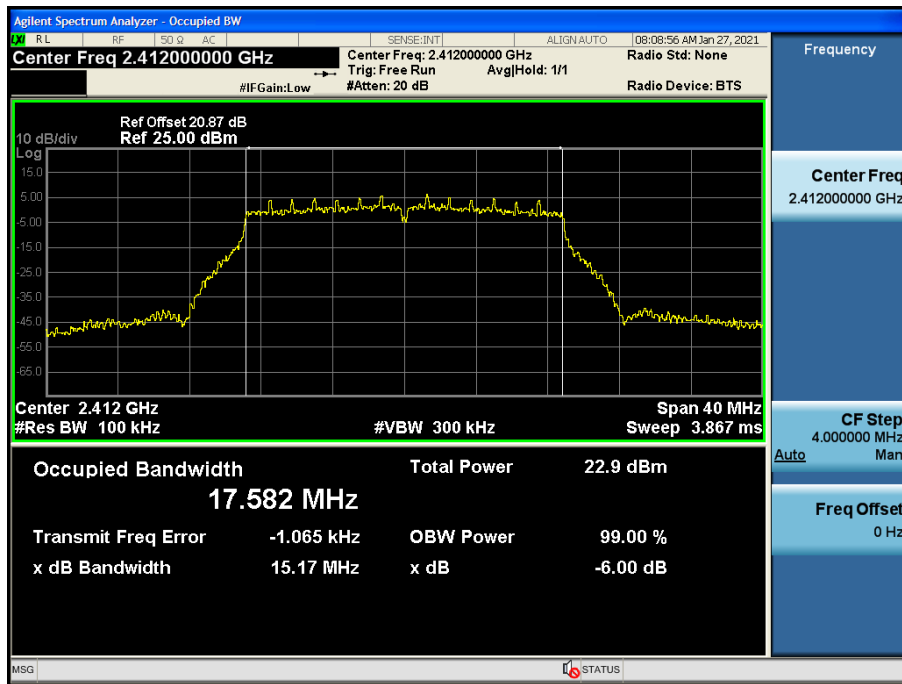
6dB Bandwidth plot (802.11b-CH 6)



6dB Bandwidth plot (802.11g-CH 6)



6dB Bandwidth plot (802.11n_HT20-CH 1)



Note:

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

9.3 OUTPUT POWER

Peak Power

1. Power Meter offset = Attenuator loss + Cable loss + EUT Cable loss
2. We apply to the offset in the 2.4 GHz range that was rounded off to the closest tenth dB.
So, 20.87 dB is offset for 2.4 GHz Band

802.11b Mode		Rate (Mbps)	Measured Power (dBm)	Limit (dBm)	Power Level Setting
Frequency [MHz]	Channel No.				
2412	1	1	23.78	30	20
		2	23.69	30	
		5.5	23.79	30	
		11	23.96	30	
2437	6	1	23.47	30	
		2	23.45	30	
		5.5	23.42	30	
		11	23.46	30	
2462	11	1	24.54	30	
		2	24.66	30	
		5.5	24.63	30	
		11	24.62	30	

802.11g Mode		Rate (Mbps)	Measured Power (dBm)	Limit (dBm)	Power Level Setting
Frequency [MHz]	Channel No.				
2412	1	6	24.19	30	17
		9	24.13	30	
		12	23.77	30	
		18	24.42	30	
		24	24.08	30	16
		36	24.23	30	
		48	24.35	30	
		54	24.41	30	
2437	6	6	25.05	30	18
		9	25.13	30	
		12	24.91	30	
		18	25.50	30	
		24	25.07	30	17
		36	25.17	30	
		48	25.54	30	
		54	25.53	30	
2462	11	6	24.61	30	17
		9	24.79	30	
		12	24.36	30	
		18	24.48	30	
		24	24.67	30	16
		36	24.87	30	
		48	24.99	30	
		54	24.81	30	

802.11n(HT20) Mode		MCS Index	Measured Power (dBm)	Limit (dBm)	Power Level Setting
Frequency [MHz]	Channel No.				
2412	1	0	22.73	30	16
		1	22.37	30	
		2	23.08	30	
		3	23.56	30	
		4	22.62	30	15
		5	22.70	30	
		6	22.65	30	
		7	22.70	30	
2437	6	0	24.86	30	18
		1	24.69	30	
		2	25.36	30	
		3	25.87	30	
		4	25.14	30	17
		5	25.43	30	
		6	25.43	30	
		7	25.43	30	
2462	11	0	23.33	30	16
		1	23.42	30	
		2	24.12	30	
		3	24.56	30	
		4	23.87	30	15
		5	23.90	30	
		6	23.82	30	
		7	23.75	30	

Average Power

1. Power Meter offset = Attenuator loss + Cable loss + EUT Cable loss
2. We apply to the offset in the 2.4 GHz range that was rounded off to the closest tenth dB.
So, 20.87 dB is offset for 2.4 GHz Band.

802.11b Mode		Rate (Mbps)	Measured Power (dBm)	Duty Cycle Factor (dB)	Result (dBm)	Limit (dBm)	Power Level Setting
Frequency [MHz]	Channel No.						
2412	1	1	20.42	0.068	20.49	30	20
		2	20.61	0.030	20.64	30	
		5.5	20.60	0.081	20.68	30	
		11	20.50	0.152	20.65	30	
2437	6	1	20.25	0.068	20.32	30	
		2	20.38	0.030	20.41	30	
		5.5	20.31	0.081	20.39	30	
		11	20.28	0.152	20.43	30	
2462	11	1	20.64	0.068	20.71	30	
		2	20.76	0.030	20.79	30	
		5.5	20.43	0.081	20.51	30	
		11	20.52	0.152	20.67	30	

802.11g Mode		Rate (Mbps)	Measured Power (dBm)	Duty Cycle Factor (dB)	Result (dBm)	Limit (dBm)	Power Level Setting
Frequency [MHz]	Channel No.						
2412	1	6	15.91	0.122	16.03	30	17
		9	15.68	0.165	15.84	30	
		12	15.66	0.220	15.88	30	
		18	16.23	0.309	16.54	30	
		24	15.23	0.411	15.65	30	16
		36	15.24	0.565	15.80	30	
		48	15.09	0.710	15.80	30	
		54	15.13	0.790	15.92	30	
2437	6	6	16.92	0.122	17.05	30	18
		9	16.88	0.165	17.04	30	
		12	16.88	0.220	17.10	30	
		18	17.46	0.309	17.77	30	
		24	16.43	0.411	16.84	30	17
		36	16.39	0.565	16.96	30	
		48	16.41	0.710	17.12	30	
		54	16.39	0.790	17.18	30	
2462	11	6	16.05	0.122	16.18	30	17
		9	15.94	0.165	16.10	30	
		12	15.92	0.220	16.14	30	
		18	16.39	0.309	16.70	30	
		24	15.55	0.411	15.96	30	16
		36	15.59	0.565	16.15	30	
		48	15.35	0.710	16.06	30	
		54	15.38	0.790	16.17	30	

802.11n(HT20) Mode		MCS Index	Measured Power (dBm)	Duty Cycle Factor (dB)	Result (dBm)	Limit (dBm)	Power Level Setting
Frequency [MHz]	Channel No.						
2412	1	0	14.85	0.125	14.98	30	16
		1	14.70	0.229	14.93	30	
		2	15.28	0.331	15.61	30	
		3	15.26	0.424	15.69	30	
		4	14.35	0.569	14.92	30	15
		5	14.20	0.717	14.92	30	
		6	14.13	0.774	14.90	30	
		7	14.09	0.843	14.93	30	
2437	6	0	16.77	0.125	16.90	30	18
		1	16.72	0.229	16.95	30	
		2	17.36	0.331	17.70	30	
		3	17.36	0.424	17.78	30	
		4	16.40	0.569	16.97	30	17
		5	16.35	0.717	17.07	30	
		6	16.56	0.774	17.34	30	
		7	16.37	0.843	17.21	30	
2462	11	0	14.91	0.125	15.04	30	16
		1	14.82	0.229	15.05	30	
		2	15.56	0.331	15.89	30	
		3	15.63	0.424	16.05	30	
		4	14.56	0.569	15.13	30	15
		5	14.40	0.717	15.11	30	
		6	14.50	0.774	15.28	30	
		7	14.48	0.843	15.32	30	

9.4 POWER SPECTRAL DENSITY

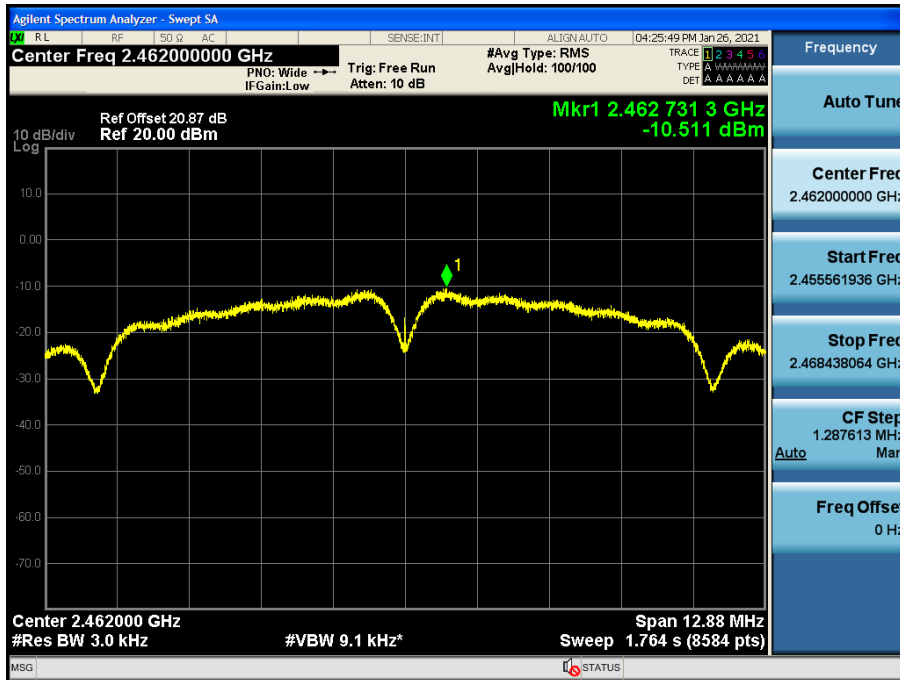
Mode	Frequency (MHz)	Channel No.	Test Result			Limit (dBm)
			Measured PSD (dBm)	Duty Cycle Factor	Measured PSD(dBm) + Duty Cycle Factor	
802.11b	2412	1	-10.821	0.081	-10.740	8 dBm / 3 kHz
	2437	6	-10.699	0.152	-10.547	
	2462	11	-10.511	0.030	-10.481	
802.11g	2412	1	-16.592	0.309	-16.283	
	2437	6	-15.204	0.309	-14.895	
	2462	11	-16.241	0.309	-15.932	
802.11n	2412	1	-15.629	0.569	-15.060	
	2437	6	-12.880	0.424	-12.456	
	2462	11	-14.697	0.717	-13.980	

Note :

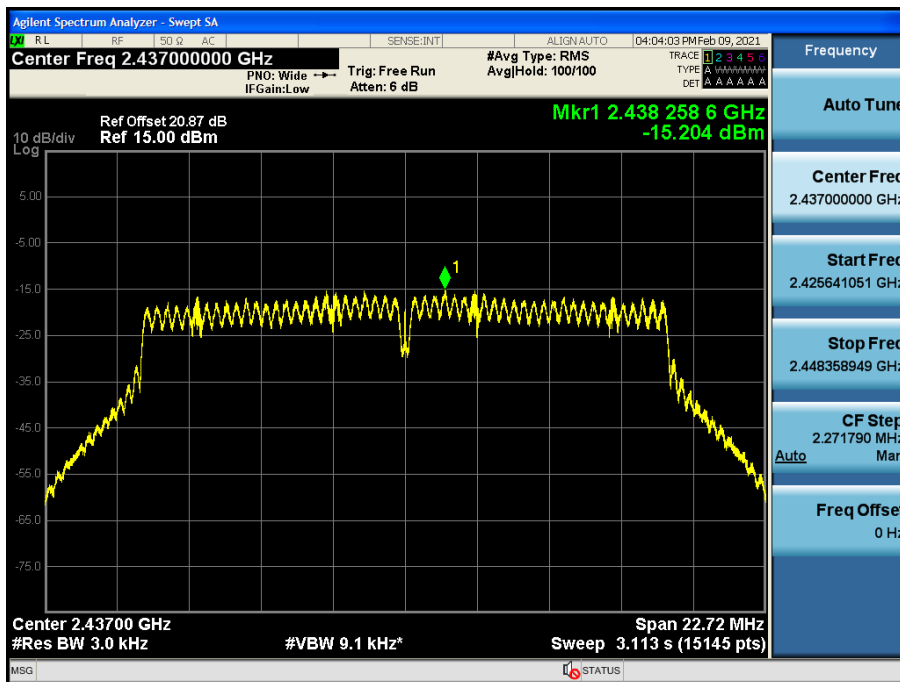
1. Spectrum reading values are not plot data.
The PSD results in plot is already including the actual values of loss for the attenuator and cable combination.
2. Spectrum offset = Attenuator loss + Cable loss + EUT Cable loss
3. 20.87 dB is offset for 2.4 GHz Band.

▣ Test Plots

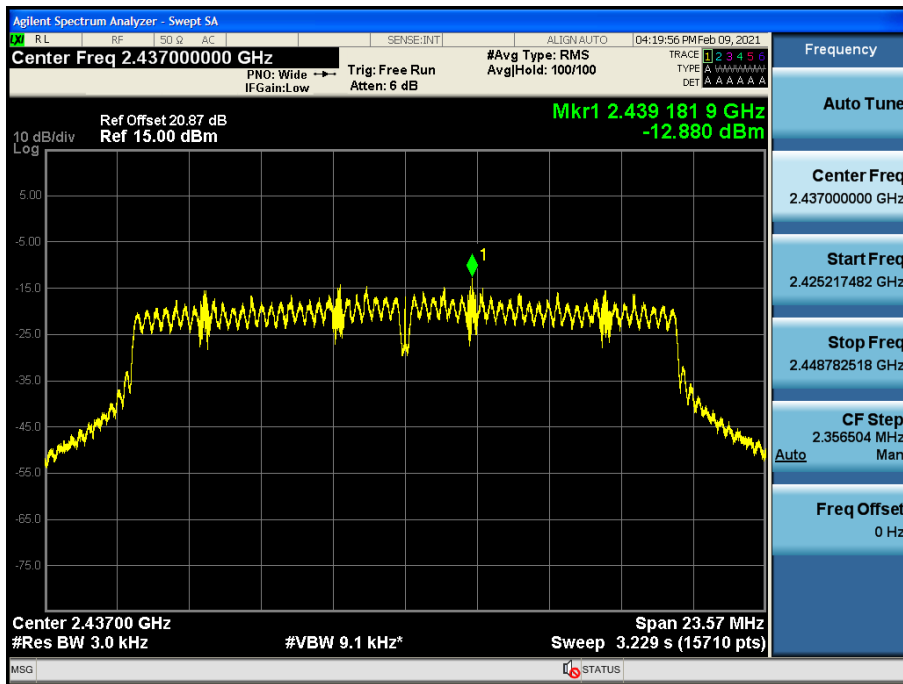
Power Spectral Density (802.11b-CH 11)



Power Spectral Density (802.11g-CH 6)



Power Spectral Density (802.11n_HT20-CH 6)



Note :

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

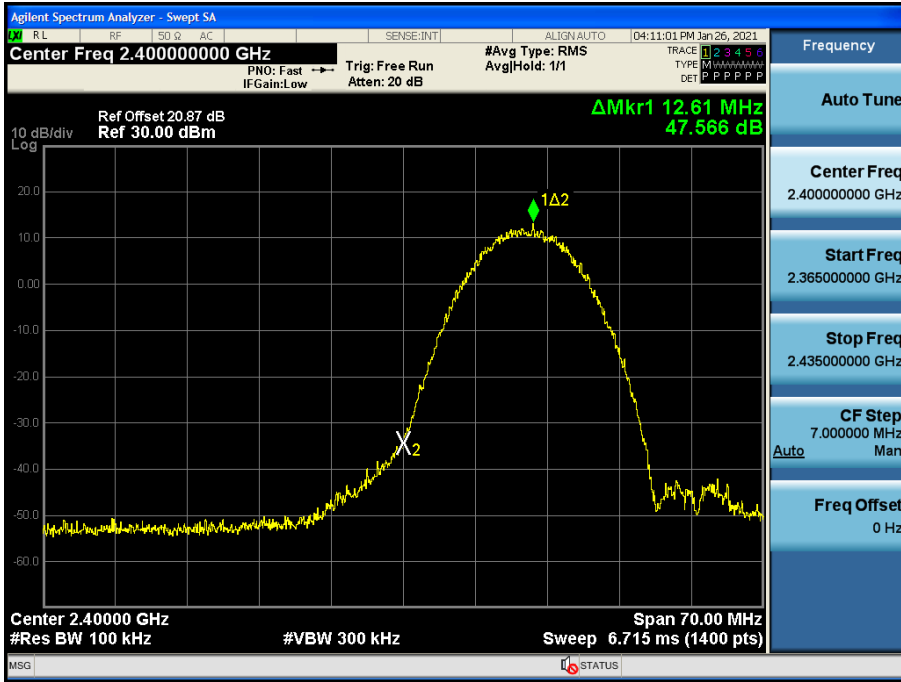
9.5 BAND EDGE / CONDUCTED SPURIOUS EMISSIONS

Test Result : please refer to the plot below.

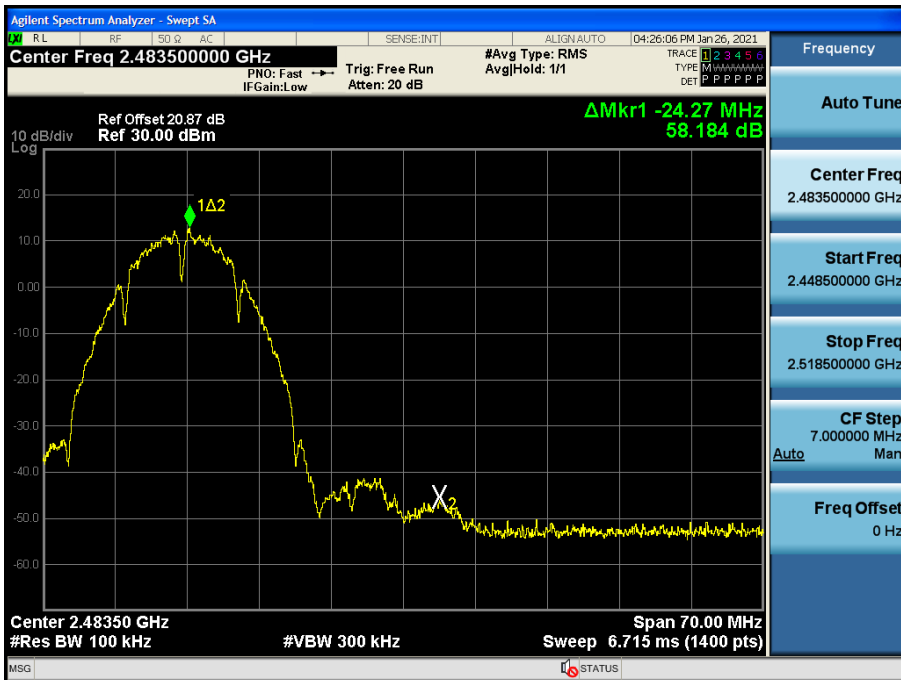
In order to simplify the report, attached plots were only the worst case channel and data rate.

▣ Test Plots(BandEdge)

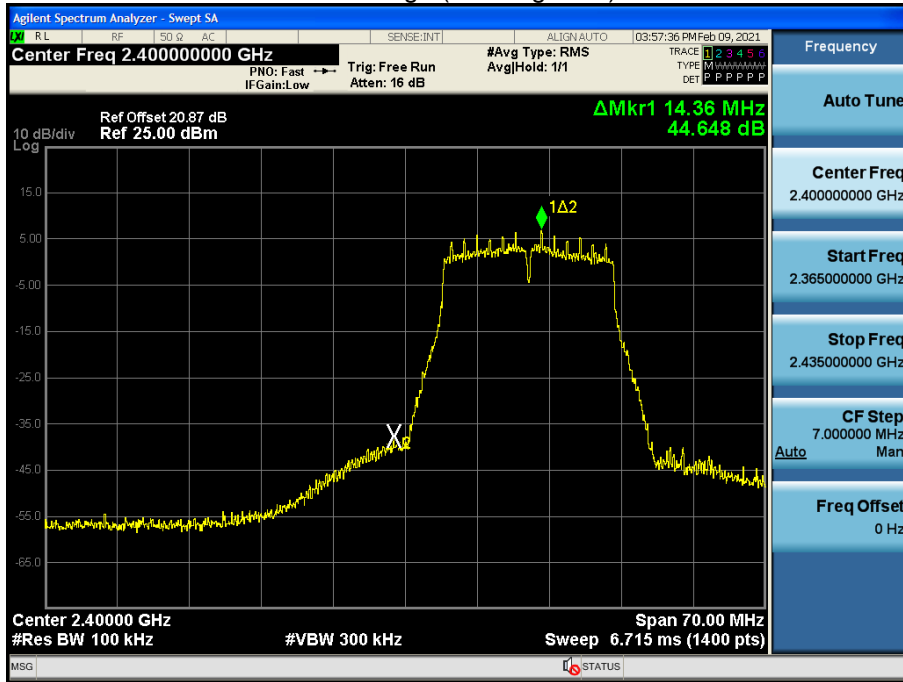
Band Edge (802.11b-CH1)



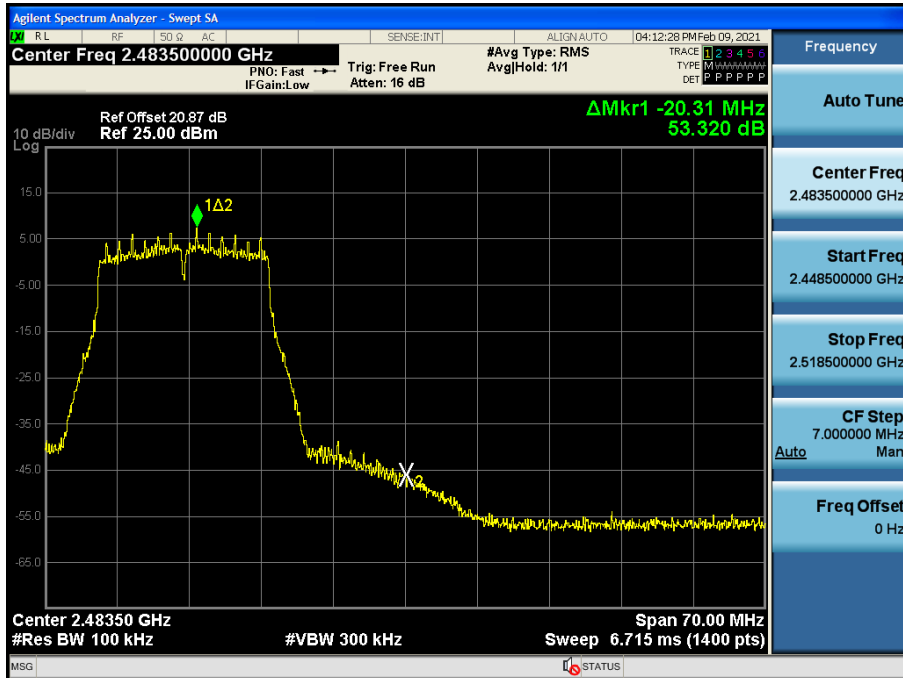
Band Edge (802.11b-CH11)



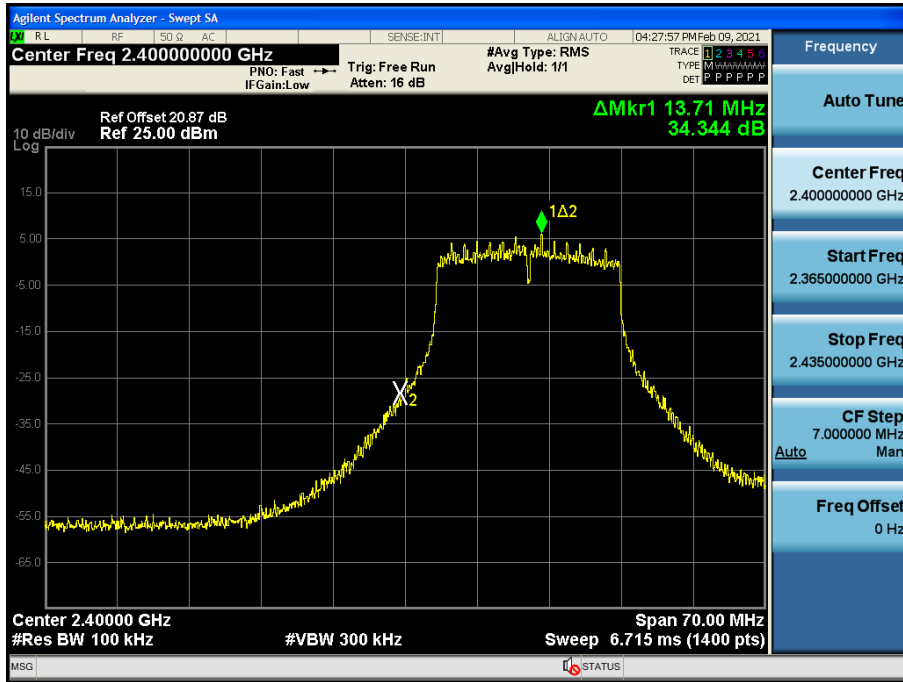
Band Edge (802.11g-CH1)



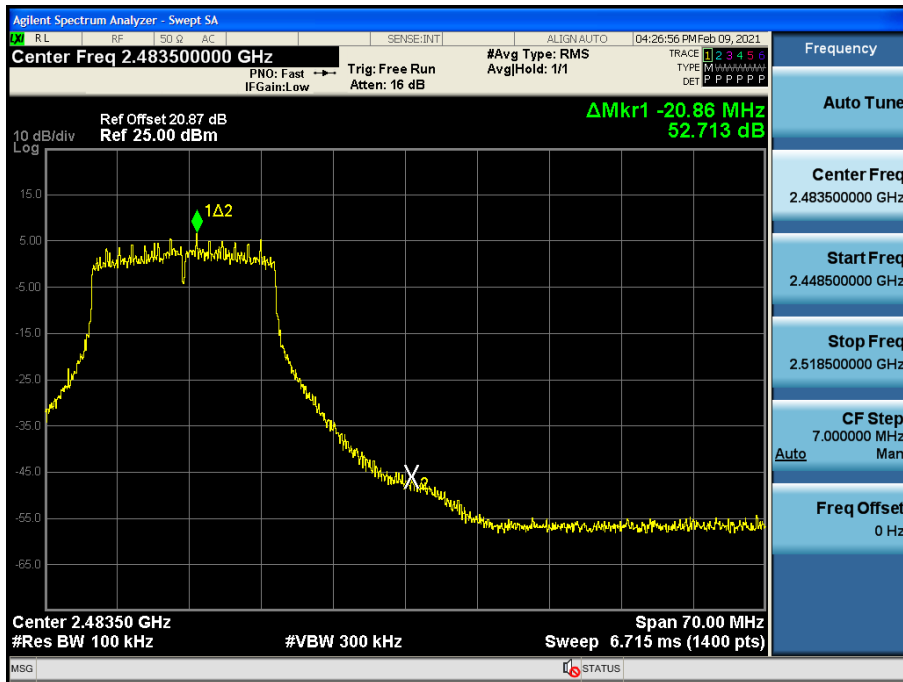
Band Edge (802.11g-CH11)



Band Edge (802.11n_HT20 -CH1)



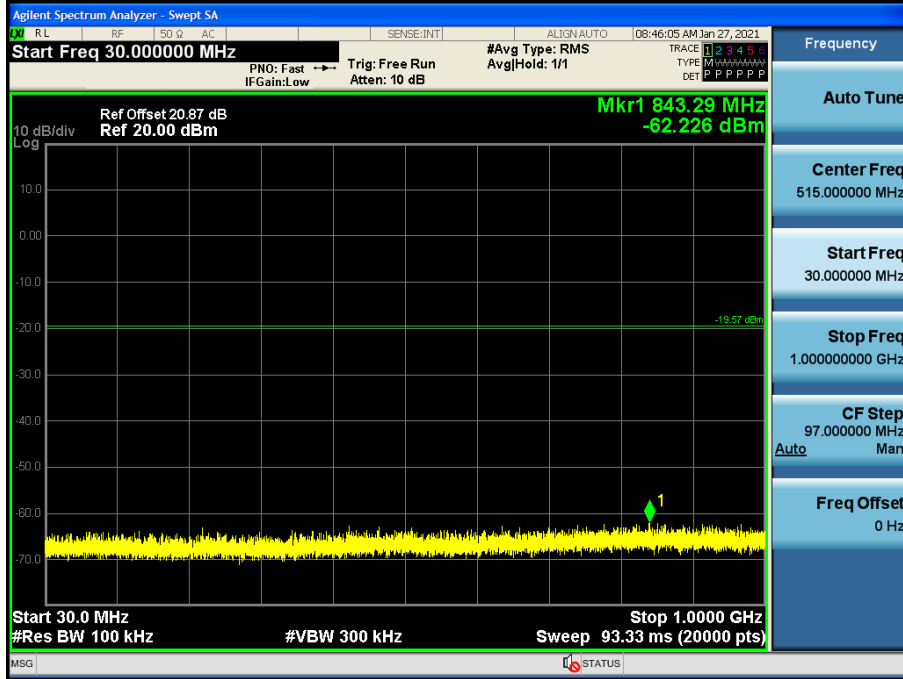
Band Edge (802.11n_HT20 -CH11)



Test Plots(Conducted Spurious Emission)

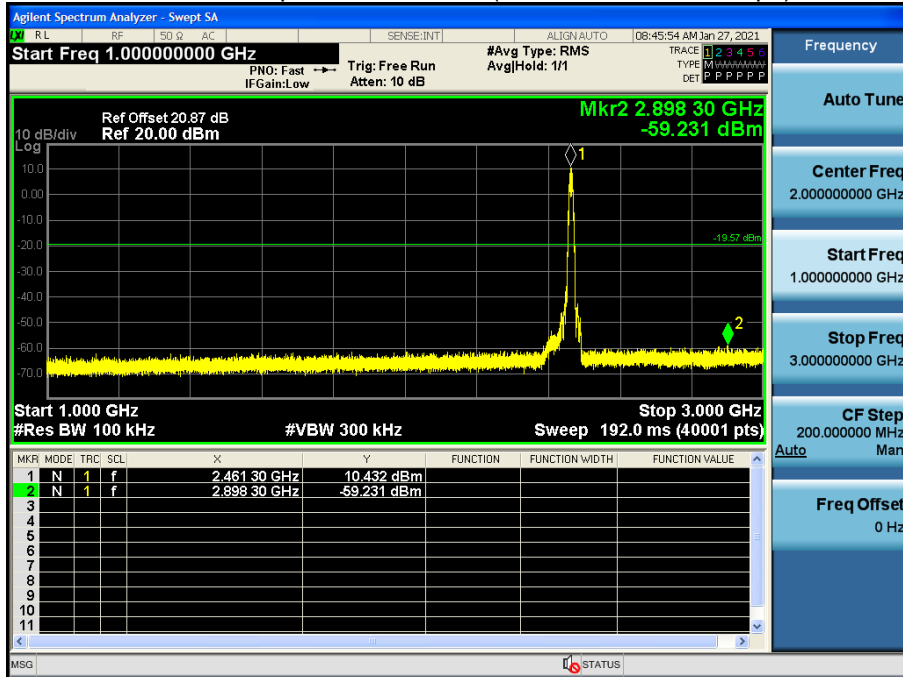
30 MHz ~ 1 GHz

Conducted Spurious Emission (802.11b_Ch.11_2 Mbps)



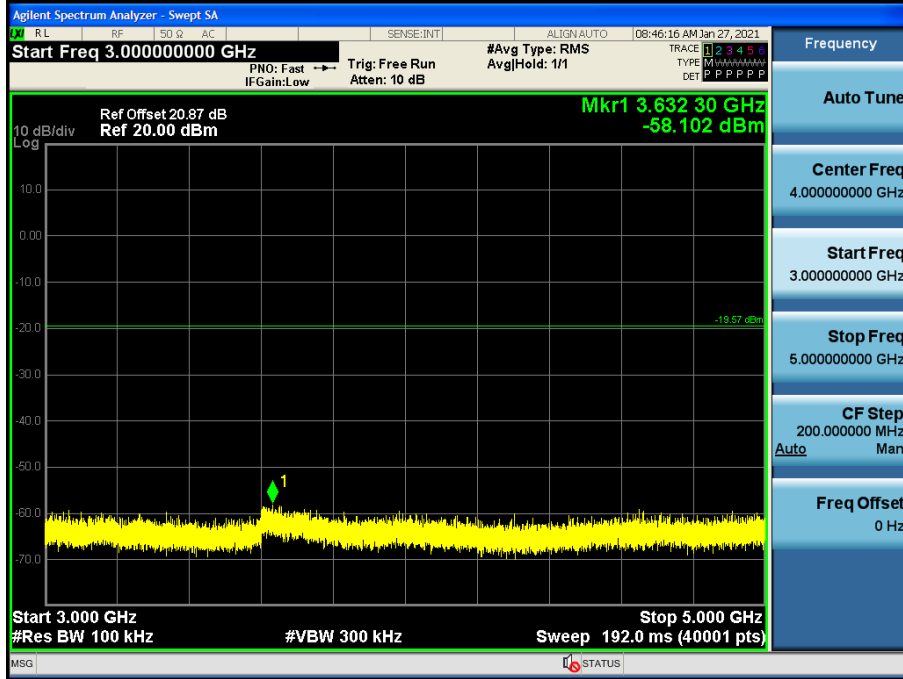
1 GHz ~ 3 GHz

Conducted Spurious Emission (802.11b_Ch.11_2 Mbps)



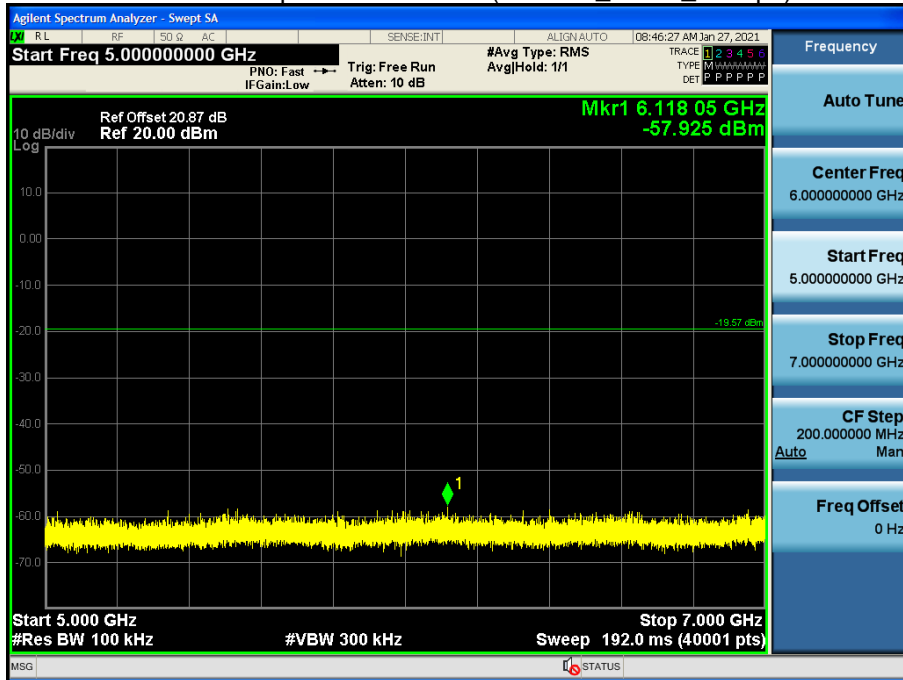
3 GHz ~ 5 GHz

Conducted Spurious Emission (802.11b_Ch.11_2 Mbps)



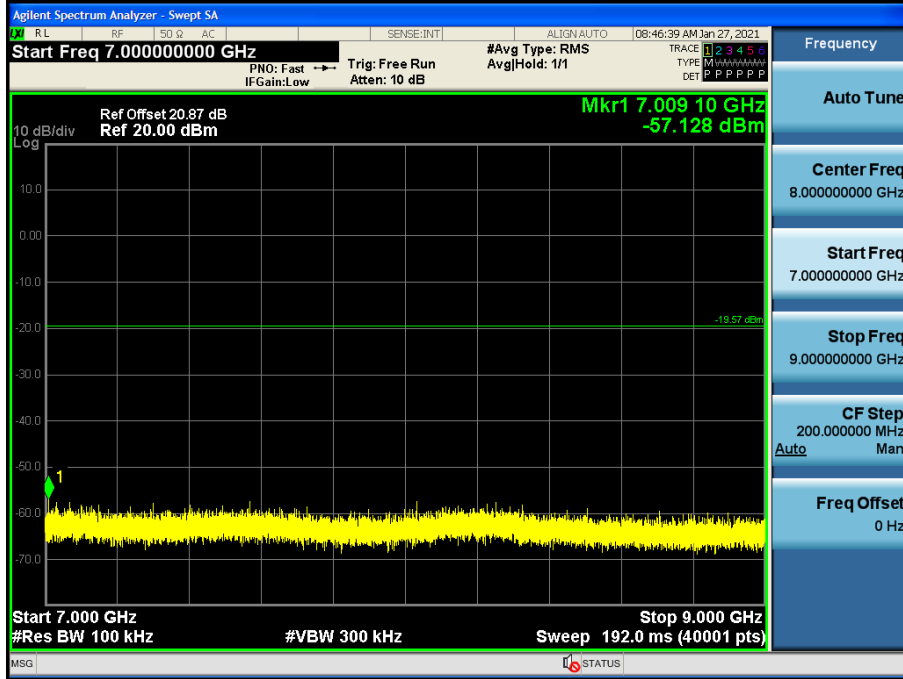
5 GHz ~ 7 GHz

Conducted Spurious Emission (802.11b_Ch.11_2 Mbps)



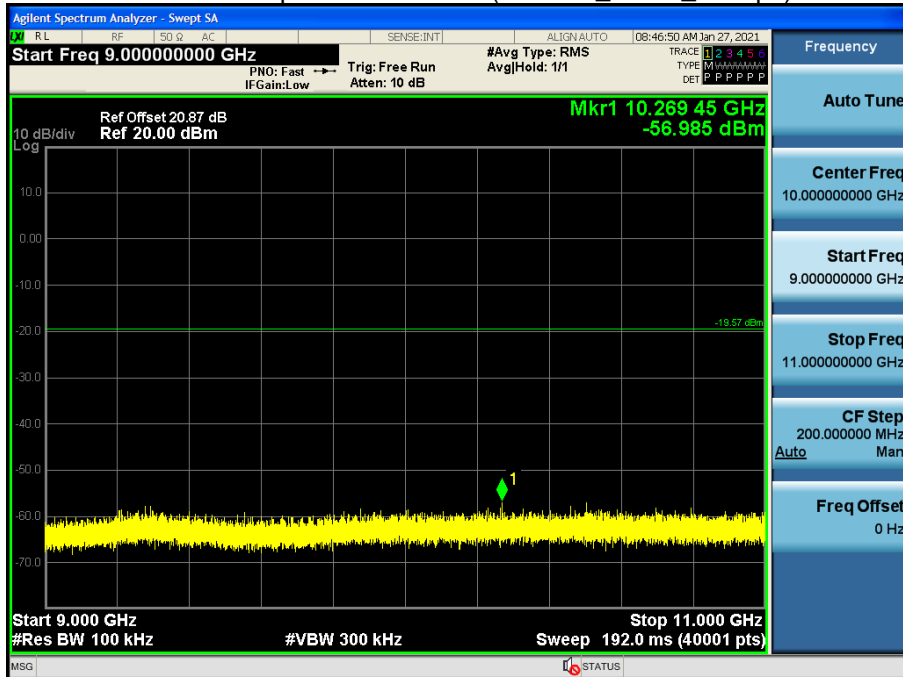
7 GHz ~ 9 GHz

Conducted Spurious Emission (802.11b_Ch.11_2 Mbps)



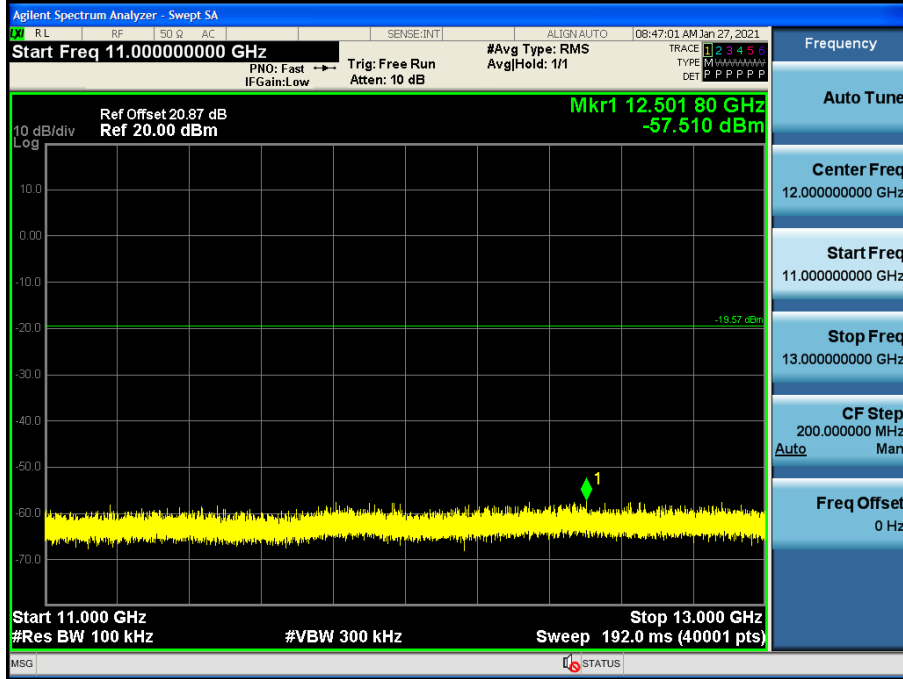
9 GHz ~ 11 GHz

Conducted Spurious Emission (802.11b_Ch.11_2 Mbps)



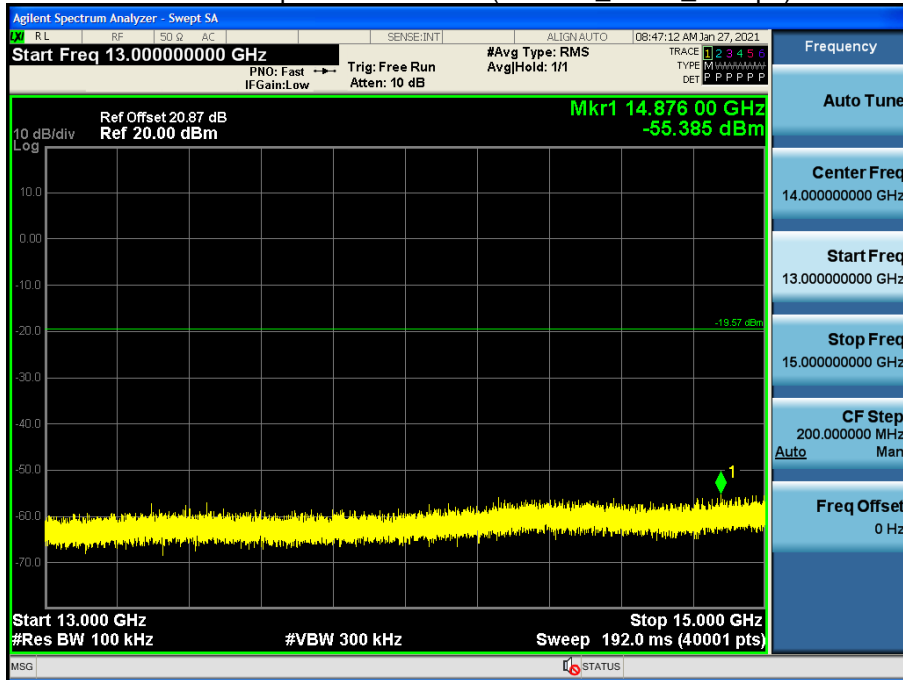
11 GHz ~ 13 GHz

Conducted Spurious Emission (802.11b_Ch.11_2 Mbps)



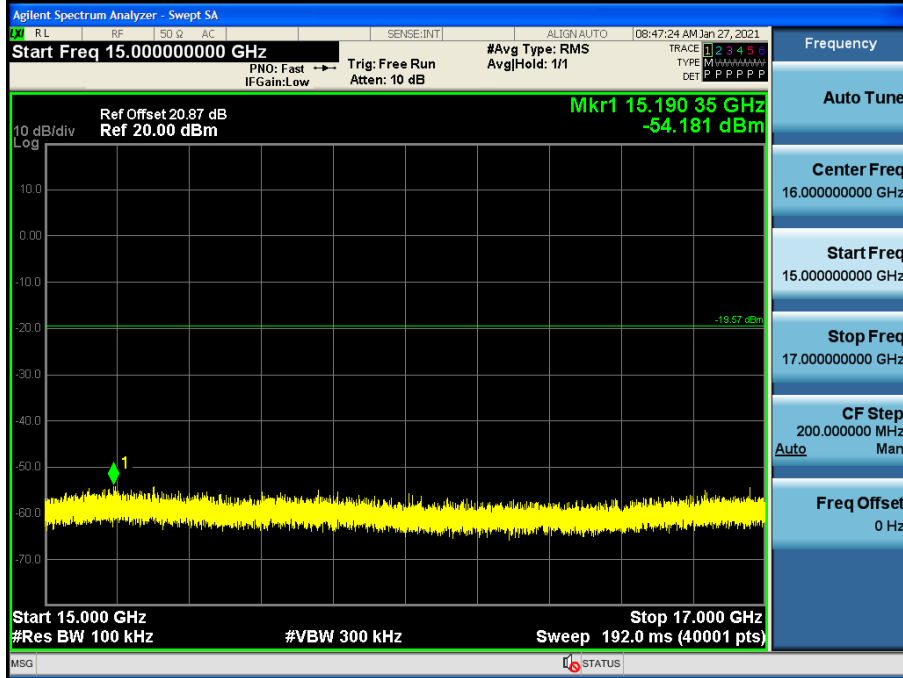
13 GHz ~ 15 GHz

Conducted Spurious Emission (802.11b_Ch.11_2 Mbps)



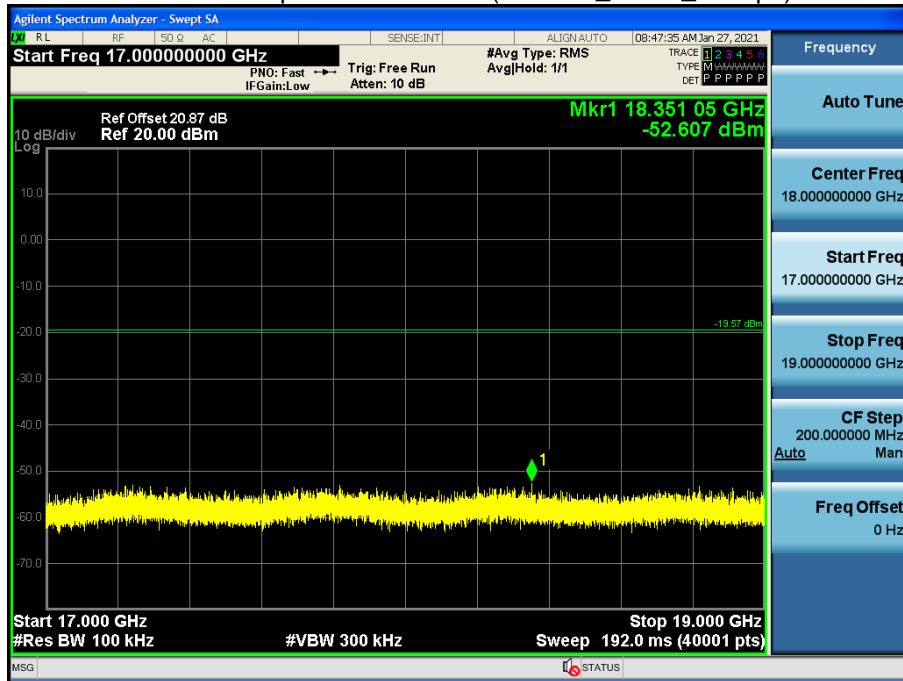
15 GHz ~ 17 GHz

Conducted Spurious Emission (802.11b_Ch.11_2 Mbps)



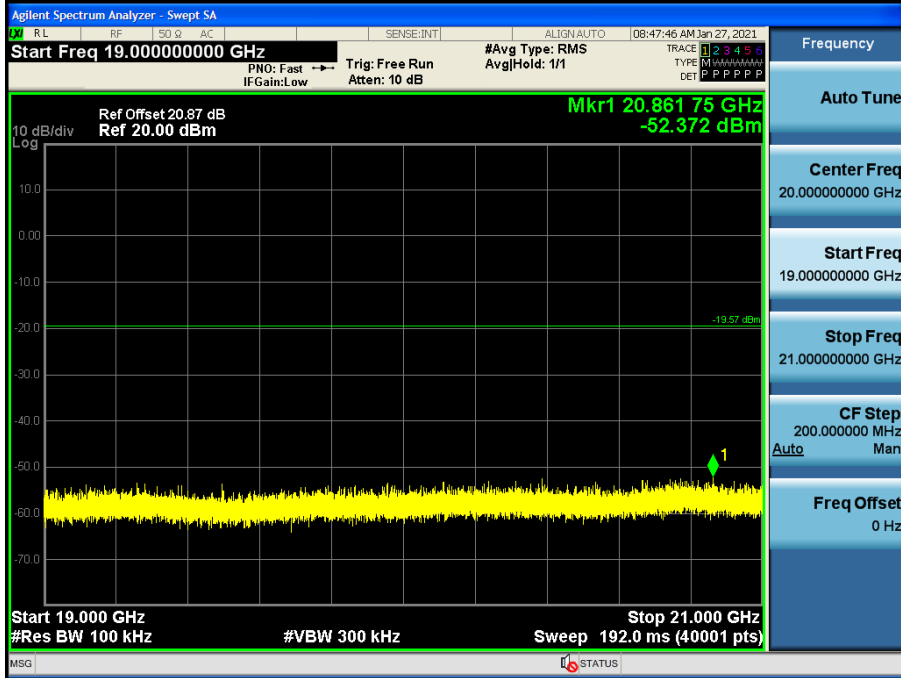
17 GHz ~ 19 GHz

Conducted Spurious Emission (802.11b_Ch.11_2 Mbps)



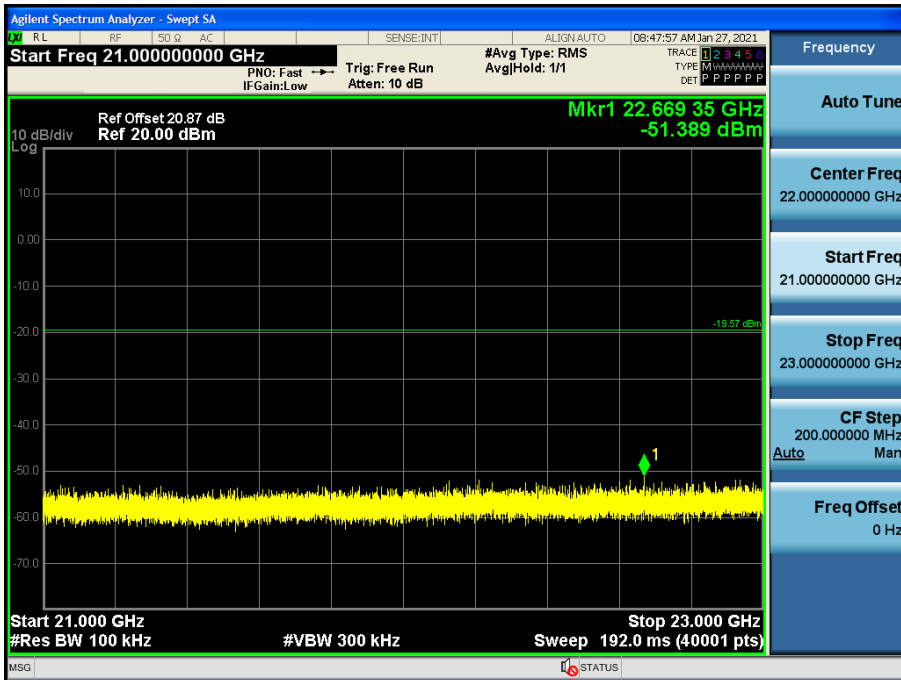
19 GHz ~ 21 GHz

Conducted Spurious Emission (802.11b_Ch.11_2 Mbps)



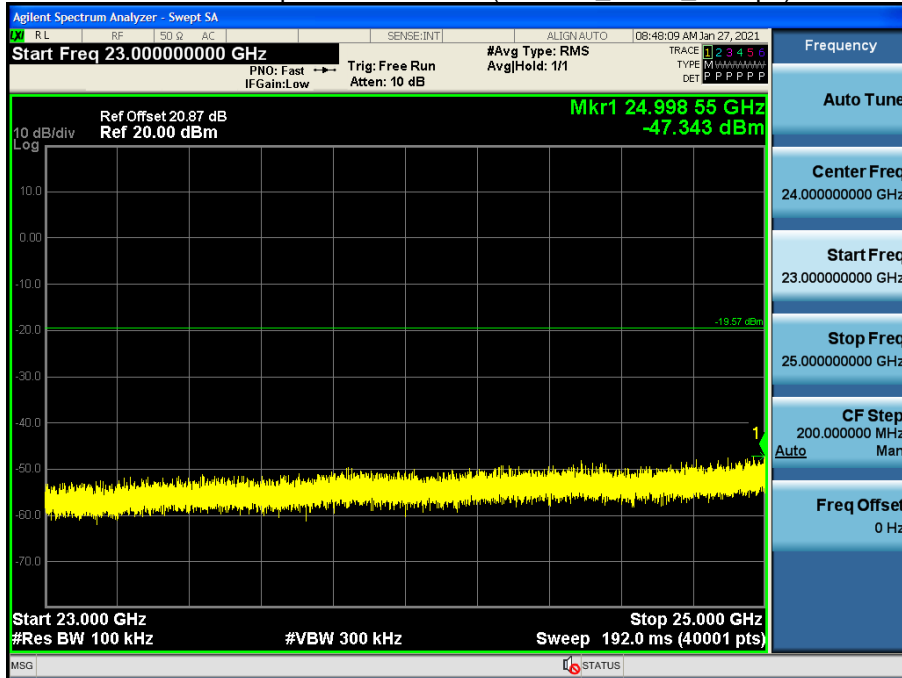
21 GHz ~ 23 GHz

Conducted Spurious Emission (802.11b_Ch.11_2 Mbps)



23 GHz ~ 25 GHz

Conducted Spurious Emission (802.11b_Ch.11_2 Mbps)



9.6 RADIATED SPURIOUS EMISSIONS

Frequency Range : 9 kHz – 30MHz

Frequency	Reading	Ant. factor	Cable loss	Ant. POL	Total	Limit	Margin
MHz	dBuV/m	dBm/m	dBm	(H/V)	dBuV/m	dBuV/m	dB
No Critical peaks found							

Note:

1. The reading 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 (dBuV) + Distance extrapolation factor

Frequency Range : Below 1 GHz

Frequency	Reading	Ant. factor	Cable loss	Ant. POL	Total	Limit	Margin
MHz	dBuV/m	dBm/m	dBm	(H/V)	dBuV/m	dBuV/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

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

Frequency [MHz]	Reading [dBuV]	A.F.+C.L.-A.G + D.F [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
4824	43.97	4.11	V	48.08	73.98	25.90	PK
4824	37.52	4.11	V	41.63	53.98	12.35	AV
7236	37.89	12.15	V	50.04	73.98	23.94	PK
7236	25.43	12.15	V	37.58	53.98	16.40	AV
4824	45.00	4.11	H	49.11	73.98	24.87	PK
4824	37.83	4.11	H	41.94	53.98	12.04	AV
7236	38.04	12.15	H	50.19	73.98	23.79	PK
7236	25.58	12.15	H	37.73	53.98	16.25	AV

Operation Mode: 802.11b
 Transfer Rate: 1 Mbps
 Operating Frequency: 2437 MHz
 Channel No. 06 Ch

Frequency [MHz]	Reading [dBuV]	A.F.+C.L.-A.G + D.F [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
4874	43.34	4.00	V	47.34	73.98	26.64	PK
4874	35.25	4.00	V	39.25	53.98	14.73	AV
7311	38.29	12.39	V	50.68	73.98	23.30	PK
7311	26.14	12.39	V	38.53	53.98	15.45	AV
4874	42.95	4.00	H	46.95	73.98	27.03	PK
4874	34.87	4.00	H	38.87	53.98	15.11	AV
7311	38.12	12.39	H	50.51	73.98	23.47	PK
7311	26.08	12.39	H	38.47	53.98	15.51	AV

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

Frequency [MHz]	Reading [dBuV]	A.F.+C.L.-A.G + D.F [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
4924	43.98	4.29	V	48.27	73.98	25.71	PK
4924	36.73	4.29	V	41.02	53.98	12.96	AV
7386	38.48	12.44	V	50.92	73.98	23.06	PK
7386	26.29	12.44	V	38.73	53.98	15.25	AV
4924	44.57	4.29	H	48.86	73.98	25.12	PK
4924	37.26	4.29	H	41.55	53.98	12.43	AV
7386	38.59	12.44	H	51.03	73.98	22.95	PK
7386	26.35	12.44	H	38.79	53.98	15.19	AV

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

Frequency [MHz]	Reading [dBuV]	Duty Cycle Factor [dB]	A.F.+C.L.-A.G + D.F [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
4824	41.26	0.00	4.11	V	45.37	73.98	28.61	PK
4824	29.13	0.12	4.11	V	33.36	53.98	20.62	AV
7236	37.63	0.00	12.15	V	49.78	73.98	24.20	PK
7236	25.52	0.12	12.15	V	37.79	53.98	16.19	AV
4824	41.48	0.00	4.11	H	45.59	73.98	28.39	PK
4824	29.25	0.12	4.11	H	33.48	53.98	20.50	AV
7236	38.25	0.00	12.15	H	50.40	73.98	23.58	PK
7236	25.61	0.12	12.15	H	37.88	53.98	16.10	AV

Operation Mode: 802.11g
 Transfer Rate: 6 Mbps
 Operating Frequency: 2437 MHz
 Channel No.: 06 Ch

Frequency [MHz]	Reading [dBuV]	Duty Cycle Factor [dB]	A.F.+C.L.-A.G + D.F [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
4874	41.73	0.00	4.00	V	45.73	73.98	28.25	PK
4874	29.01	0.12	4.00	V	33.13	53.98	20.85	AV
7311	38.74	0.00	12.39	V	51.13	73.98	22.85	PK
7311	26.16	0.12	12.39	V	38.67	53.98	15.31	AV
4874	41.15	0.00	4.00	H	45.15	73.98	28.83	PK
4874	28.99	0.12	4.00	H	33.11	53.98	20.87	AV
7311	38.52	0.00	12.39	H	50.91	73.98	23.07	PK
7311	26.05	0.12	12.39	H	38.56	53.98	15.42	AV

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

Frequency [MHz]	Reading [dBuV]	Duty Cycle Factor [dB]	A.F.+C.L.-A.G + D.F [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measure ment Type
4924	41.05	0.00	4.29	V	45.34	73.98	28.64	PK
4924	29.16	0.12	4.29	V	33.57	53.98	20.41	AV
7386	38.51	0.00	12.44	V	50.95	73.98	23.03	PK
7386	26.18	0.12	12.44	V	38.74	53.98	15.24	AV
4924	41.23	0.00	4.29	H	45.52	73.98	28.46	PK
4924	29.20	0.12	4.29	H	33.61	53.98	20.37	AV
7386	38.63	0.00	12.44	H	51.07	73.98	22.91	PK
7386	26.22	0.12	12.44	H	38.78	53.98	15.20	AV

Operation Mode: 802.11n (HT20)
 Transfer MCS Index: 0
 Operating Frequency: 2412 MHz
 Channel No.: 01 Ch

Frequency [MHz]	Reading [dBuV]	Duty Cycle Factor [dB]	A.F.+C.L.-A.G + D.F [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
4824	41.43	0.00	4.11	V	45.54	73.98	28.44	PK
4824	28.87	0.13	4.11	V	33.11	53.98	20.88	AV
7236	37.42	0.00	12.15	V	49.57	73.98	24.41	PK
7236	25.58	0.13	12.15	V	37.86	53.98	16.13	AV
4824	41.93	0.00	4.11	H	46.04	73.98	27.94	PK
4824	29.15	0.13	4.11	H	33.39	53.98	20.60	AV
7236	37.95	0.00	12.15	H	50.10	73.98	23.88	PK
7236	25.66	0.13	12.15	H	37.94	53.98	16.05	AV

Operation Mode: 802.11n (HT20)
 Transfer MCS Index: 0
 Operating Frequency: 2437 MHz
 Channel No.: 06 Ch

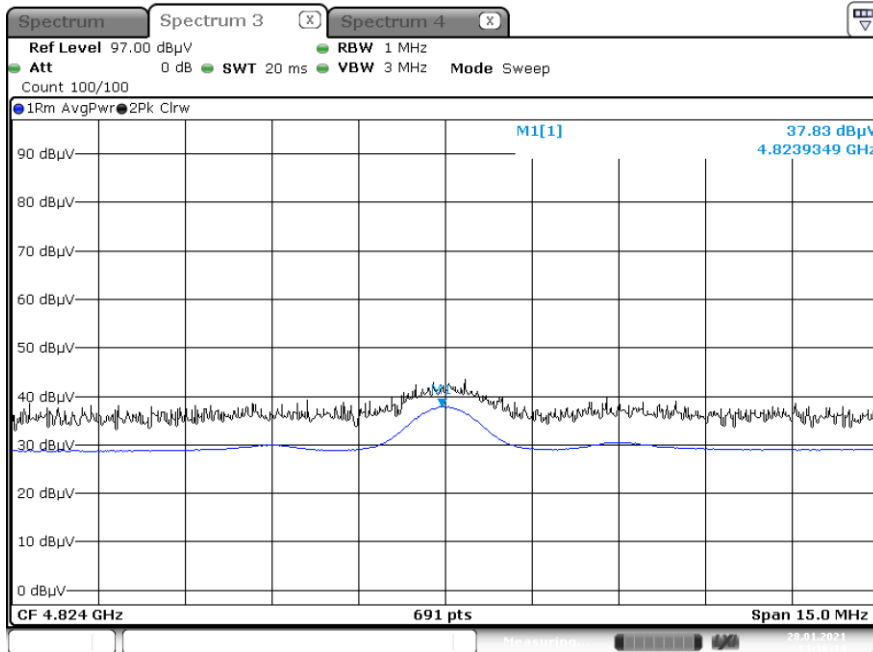
Frequency [MHz]	Reading [dBuV]	Duty Cycle Factor [dB]	A.F.+C.L.-A.G + D.F [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
4874	41.44	0.00	4.00	V	45.44	73.98	28.54	PK
4874	29.02	0.13	4.00	V	33.15	53.98	20.84	AV
7311	38.72	0.00	12.39	V	51.11	73.98	22.87	PK
7311	26.15	0.13	12.39	V	38.67	53.98	15.32	AV
4874	40.90	0.00	4.00	H	44.90	73.98	29.08	PK
4874	28.97	0.13	4.00	H	33.10	53.98	20.89	AV
7311	38.42	0.00	12.39	H	50.81	73.98	23.17	PK
7311	26.03	0.13	12.39	H	38.55	53.98	15.44	AV

Operation Mode: 802.11n (HT20)
 Transfer MCS Index: 0
 Operating Frequency: 2462 MHz
 Channel No.: 11 Ch

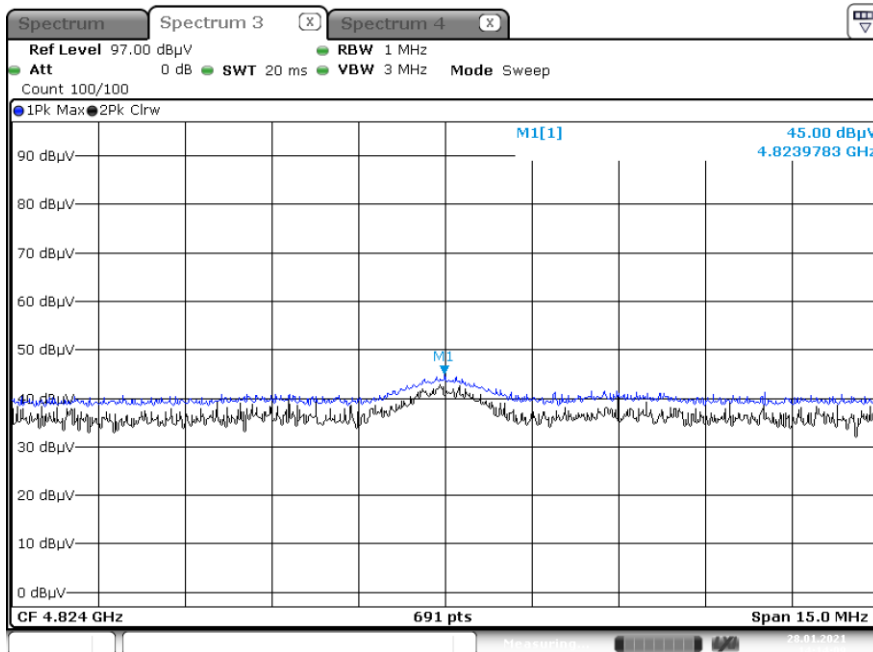
Frequency [MHz]	Reading [dBuV]	Duty Cycle Factor [dB]	A.F.+C.L.- A.G + D.F [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measure ment Type
4924	41.31	0.00	4.29	V	45.60	73.98	28.38	PK
4924	29.03	0.13	4.29	V	33.45	53.98	20.54	AV
7386	38.49	0.00	12.44	V	50.93	73.98	23.05	PK
7386	26.19	0.13	12.44	V	38.76	53.98	15.23	AV
4924	41.97	0.00	4.29	H	46.26	73.98	27.72	PK
4924	29.05	0.13	4.29	H	33.47	53.98	20.52	AV
7386	38.59	0.00	12.44	H	51.03	73.98	22.95	PK
7386	26.22	0.13	12.44	H	38.79	53.98	15.20	AV

☑ Test Plots (Worst case : X-H)

Radiated Spurious Emissions plot – Average Reading (802.11b_1 Mbps, Ch.1 2nd Harmonic)



Radiated Spurious Emissions plot – Peak Reading (802.11b_1 Mbps, Ch.1 2nd Harmonic)



Note: Plot of worst case are only reported.

9.7 RADIATED RESTRICTED BAND EDGES

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

Frequency [MHz]	Reading [dBuV]	A.F.+ C.L-A.G +ATT+ D.F [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
2390.0	56.92	3.32	H	60.24	73.98	13.74	PK
2390.0	43.35	3.32	H	46.67	53.98	7.31	AV
2390.0	54.54	3.32	V	57.86	73.98	16.12	PK
2390.0	42.72	3.32	V	46.04	53.98	7.94	AV
2483.5	57.33	3.78	H	61.11	73.98	12.87	PK
2483.5	41.56	3.78	H	45.34	53.98	8.64	AV
2483.5	56.11	3.78	V	59.89	73.98	14.09	PK
2483.5	40.92	3.78	V	44.70	53.98	9.28	AV

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

Frequency [MHz]	Reading [dBuV]	Duty Cycle Factor [dB]	A.F.+ C.L-A.G +ATT+ D.F [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
#2390(2388.5)	54.45	0.00	3.32	H	57.77	73.98	16.21	PK
#2390(2388.5)	43.26	0.12	3.32	H	46.70	53.98	7.28	AV
#2390(2389.5)	58.12	0.00	3.32	H	61.44	73.98	12.54	PK
#2390(2389.5)	47.22	0.12	3.32	H	50.66	53.98	3.32	AV
2310~2388	56.46	0.00	3.32	H	59.78	73.98	14.20	PK
2310~2388	42.10	0.12	3.32	H	45.54	53.98	8.44	AV

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

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

Frequency [MHz]	Reading [dBuV]	Duty Cycle Factor [dB]	A.F.+ C.L-A.G +ATT+ D.F [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
#2483.5(2484)	56.80	0.00	3.78	H	60.58	73.98	13.40	PK
#2483.5(2484)	45.65	0.12	3.78	H	49.55	53.98	4.43	AV
#2483.5(2485)	54.08	0.00	3.78	H	57.86	73.98	16.12	PK
#2483.5(2485)	43.16	0.12	3.78	H	47.06	53.98	6.92	AV
2485.5~2500	56.63	0.00	3.78	H	60.41	73.98	13.57	PK
2485.5~2500	42.09	0.12	3.78	H	45.99	53.98	7.99	AV

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

Operation Mode: 802.11n (HT20)
 Transfer Rate: 0
 Operating Frequency: 2412 MHz
 Channel No.: 01 Ch

Frequency [MHz]	Reading [dBuV]	Duty Cycle Factor [dB]	A.F.+ C.L-A.G +ATT+ D.F [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
#2390(2388.5)	56.75	0.00	3.32	H	60.07	73.98	13.91	PK
#2390(2388.5)	45.20	0.13	3.32	H	48.65	53.98	5.33	AV
#2390(2389.5)	58.73	0.00	3.32	H	62.05	73.98	11.93	PK
#2390(2389.5)	47.22	0.13	3.32	H	50.67	53.98	3.31	AV
2310~2388	60.18	0.00	3.32	H	63.50	73.98	10.48	PK
2310~2388	44.52	0.13	3.32	H	47.97	53.98	6.01	AV

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

Operation Mode:	802.11n (HT20)
Transfer Rate:	0
Operating Frequency	2462 MHz
Channel No.	11 Ch

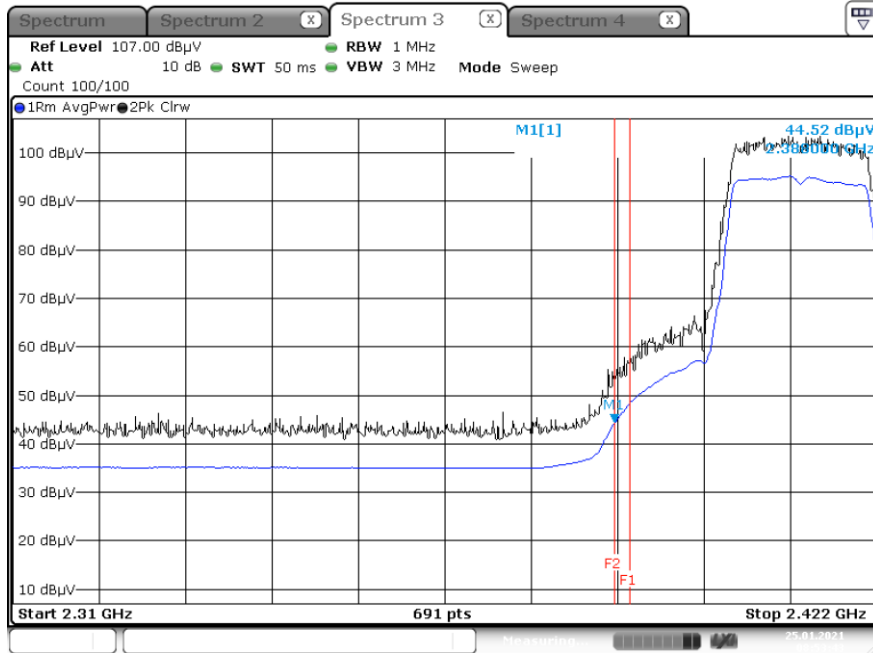
Frequency [MHz]	Reading [dBuV]	Duty Cycle Factor [dB]	A.F.+ C.L-A.G +ATT+ D.F [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
#2483.5(2484)	57.37	0.00	3.78	H	61.15	73.98	12.83	PK
#2483.5(2484)	46.05	0.13	3.78	H	49.96	53.98	4.02	AV
#2483.5(2485)	55.69	0.00	3.78	H	59.47	73.98	14.51	PK
#2483.5(2485)	44.30	0.13	3.78	H	48.21	53.98	5.77	AV
2485.5~2500	60.09	0.00	3.78	H	63.87	73.98	10.11	PK
2485.5~2500	43.64	0.13	3.78	H	47.55	53.98	6.43	AV

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

■ Test Plots (Worst case : X-H)

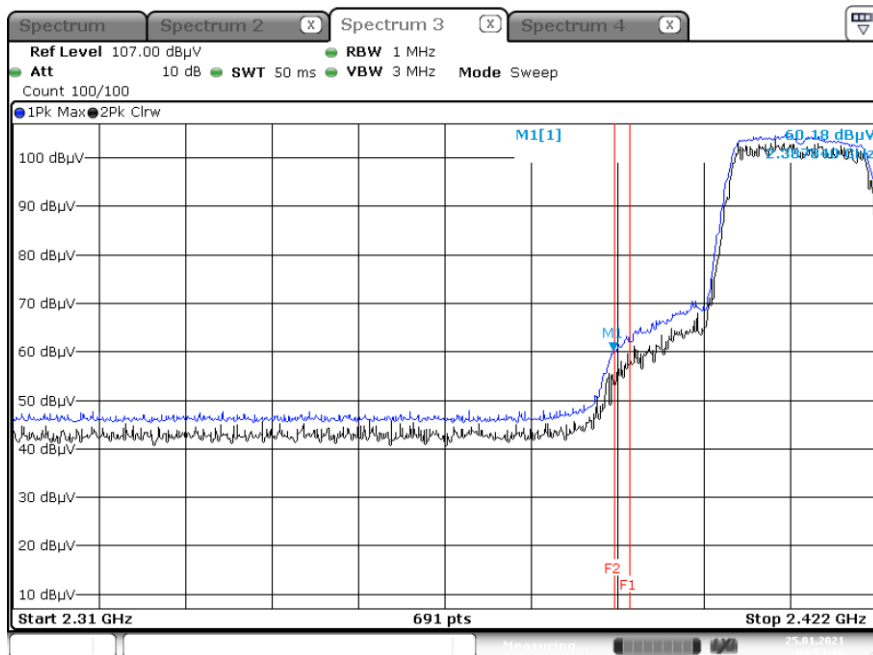
Radiated Restricted Band Edges plot – Average Reading (802.11n (HT20)_ MCS0 Ch.1)

2 310 MHz ~ 2 388 MHz



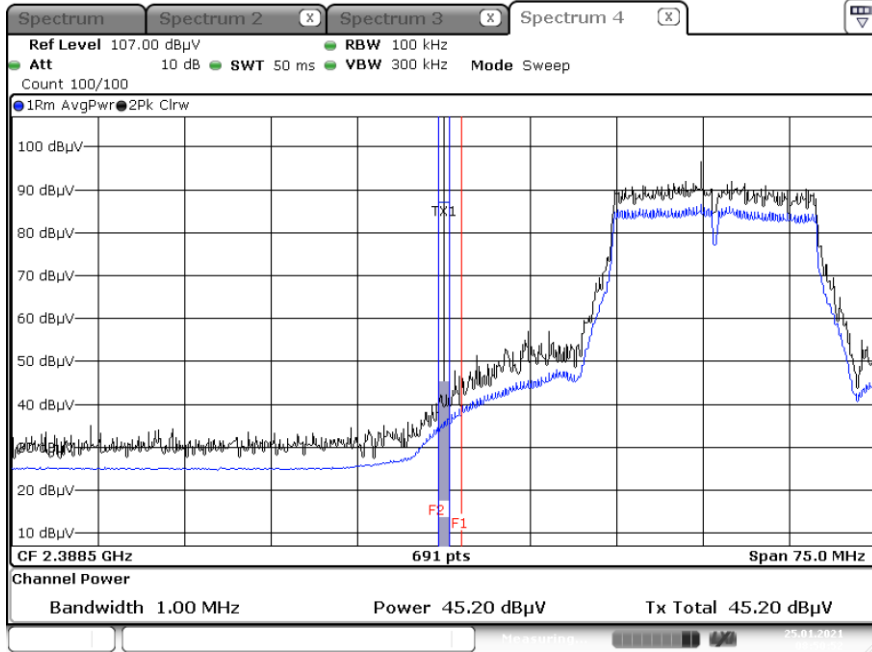
Radiated Restricted Band Edges plot – Peak Reading (802.11n (HT20)_ MCS0 Ch.1)

2 310 MHz ~ 2 388 MHz



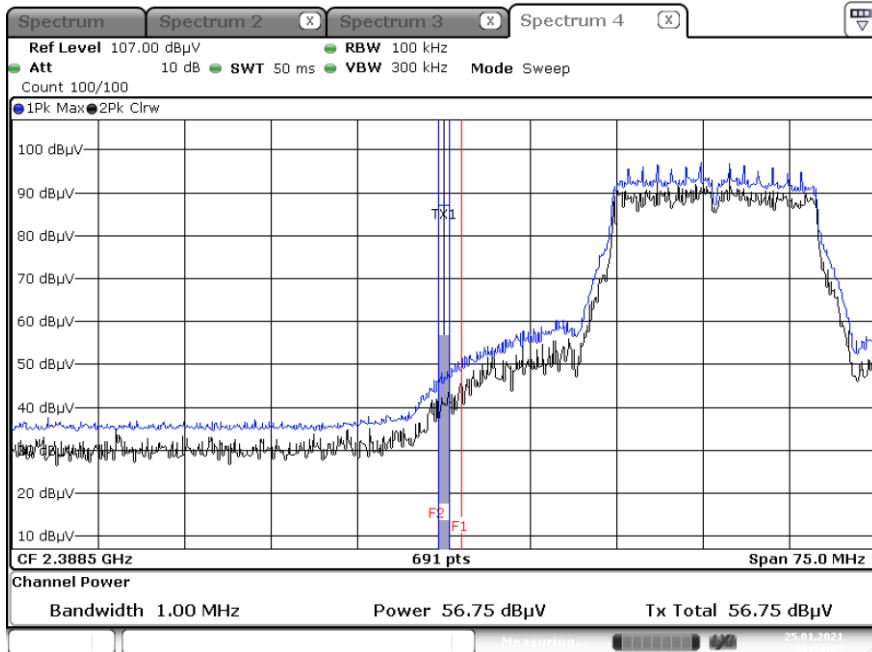
Radiated Restricted Band Edges plot – Average Reading (802.11n (HT20)_ MCS0 Ch.1)

Integration method Used_2 388 MHz ~ 2 389 MHz



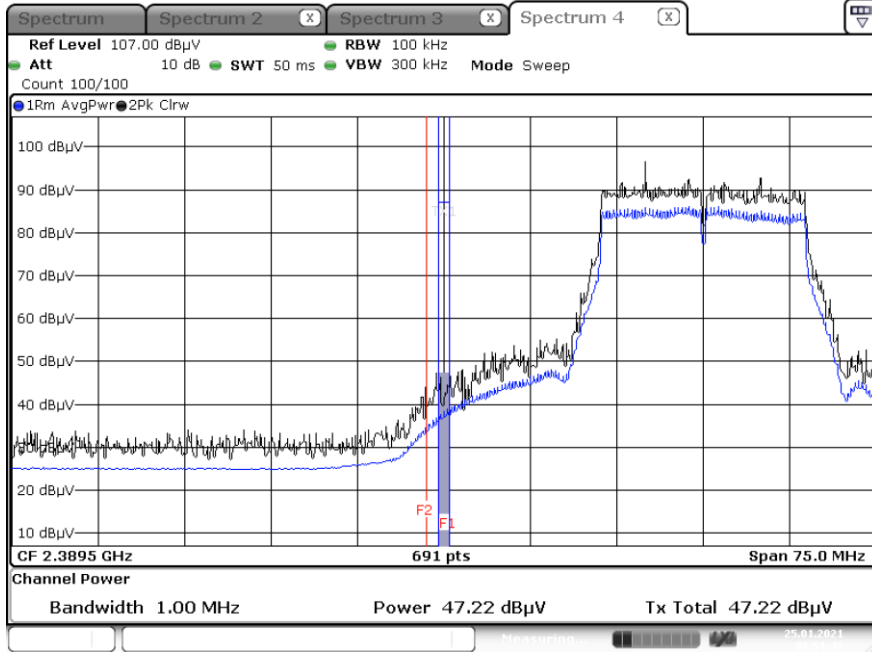
Radiated Restricted Band Edges plot – Peak Reading (802.11n (HT20)_ MCS0 Ch.1)

Integration method Used_2 388 MHz ~ 2 389 MHz



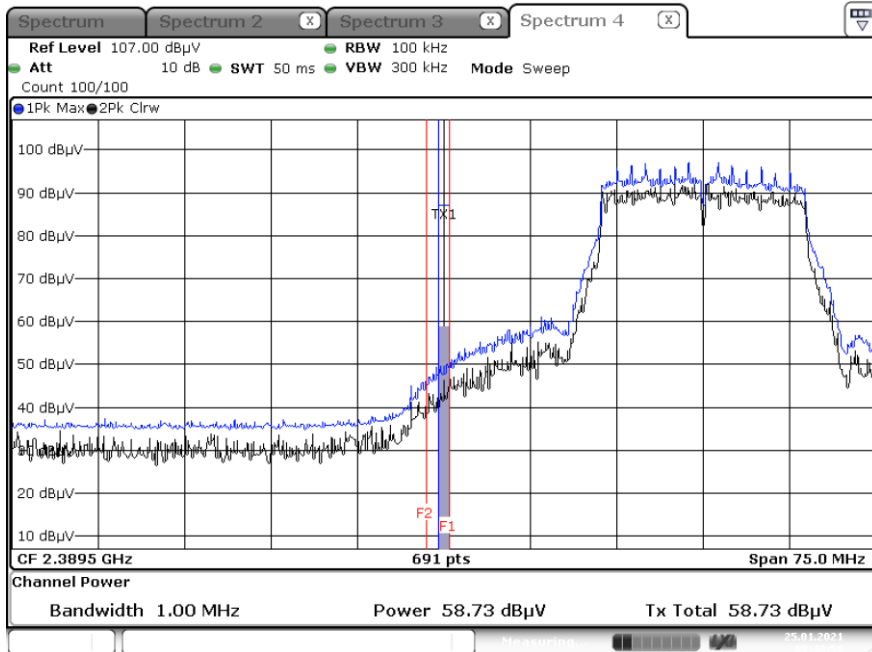
Radiated Restricted Band Edges plot – Average Reading (802.11n (HT20)_ MCS0 Ch.1)

Integration method Used_2 389 MHz ~ 2 390 MHz



Radiated Restricted Band Edges plot – Peak Reading (802.11n (HT20)_ MCS0 Ch.1)

Integration method Used_2 389 MHz ~ 2 390 MHz



Note:

Plot of worst case are only reported.

9.8 POWERLINE CONDUCTED EMISSIONS

Conducted Emissions (Line 1)

Test

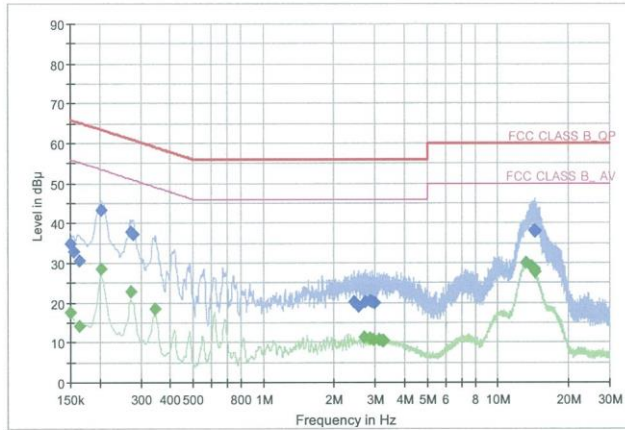
1 / 2

Test Report

Common Information

EUT : SM-A526U
 Manufacturer : SAMSUNG
 Test Site: SHIELD ROOM
 Operating Conditions : 2.4G WLAN_L1 MODE

Full Spectrum



Preview Result 2-AVG Final_Result CAV (Green line)
 Preview Result 1-PK+ Final_Result QPK (Blue diamonds)
 FCC CLASS B_QP (Red line)
 FCC CLASS B_AV (Red line)

Final Result QPK

Frequency (MHz)	QuasiPeak	Limit (dBμV)	Margin	Bandwidth	Line	Filter	Corr. (dB)
0.150000	34.83	66.00	31.17	9.000	L1	OFF	9.7
0.154500	33.02	65.75	32.74	9.000	L1	OFF	9.6
0.163500	30.60	65.28	34.69	9.000	L1	OFF	9.6
0.204000	43.37	63.45	20.07	9.000	L1	OFF	9.6
0.271500	37.83	61.07	23.25	9.000	L1	OFF	9.6
0.278250	37.18	60.87	23.69	9.000	L1	OFF	9.6
2.444000	20.10	56.00	35.90	9.000	L1	OFF	9.8
2.540750	18.92	56.00	37.08	9.000	L1	OFF	9.8
2.718500	20.30	56.00	35.70	9.000	L1	OFF	9.8
2.855750	20.50	56.00	35.50	9.000	L1	OFF	9.8
2.925500	20.10	56.00	35.90	9.000	L1	OFF	9.8
2.993000	19.88	56.00	36.12	9.000	L1	OFF	9.8
14.202500	38.08	60.00	21.92	9.000	L1	OFF	10.2
14.270000	38.10	60.00	21.90	9.000	L1	OFF	10.2
14.339750	38.12	60.00	21.88	9.000	L1	OFF	10.2
14.407250	37.85	60.00	22.15	9.000	L1	OFF	10.2
14.425250	38.02	60.00	21.98	9.000	L1	OFF	10.2
14.495000	37.66	60.00	22.34	9.000	L1	OFF	10.2

2021-01-26

오후 2:17:03

Test

2 / 2

Final Result CAV

Frequency (MHz)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.150000	17.65	56.00	38.35	9.000	L1	OFF	9.7
0.163500	14.20	55.28	41.09	9.000	L1	OFF	9.6
0.204000	28.66	53.45	24.79	9.000	L1	OFF	9.6
0.271500	22.84	51.07	28.24	9.000	L1	OFF	9.6
0.345750	18.46	49.06	30.61	9.000	L1	OFF	9.6
2.716250	11.30	46.00	34.70	9.000	L1	OFF	9.8
2.855750	10.92	46.00	35.08	9.000	L1	OFF	9.8
2.948000	10.70	46.00	35.30	9.000	L1	OFF	9.8
3.116750	10.77	46.00	35.23	9.000	L1	OFF	9.8
3.233750	10.48	46.00	35.52	9.000	L1	OFF	9.8
3.278750	10.48	46.00	35.52	9.000	L1	OFF	9.8
13.255250	30.03	50.00	19.97	9.000	L1	OFF	10.2
13.995500	29.19	50.00	20.81	9.000	L1	OFF	10.2
14.018000	29.15	50.00	20.85	9.000	L1	OFF	10.2
14.202500	28.51	50.00	21.49	9.000	L1	OFF	10.2
14.270000	28.27	50.00	21.73	9.000	L1	OFF	10.2
14.423000	27.70	50.00	22.30	9.000	L1	OFF	10.2
14.492750	27.68	50.00	22.32	9.000	L1	OFF	10.2

2021-01-26

오후 2:17:03

Conducted Emissions (Line 2)

Test

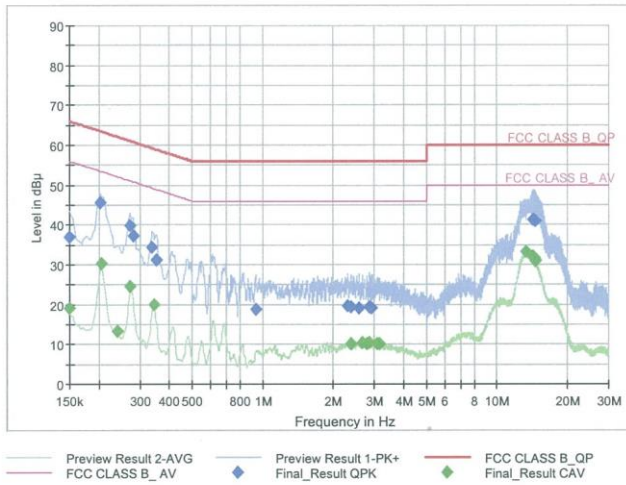
1 / 2

Test Report

Common Information

EUT : SM-A526U
 Manufacturer : SAMSUNG
 Test Site: SHIELD ROOM
 Operating Conditions : 2.4G WLAN_N MODE

Full Spectrum



Final Result QPK

Frequency (MHz)	QuasiPeak	Limit (dBuV)	Margin	Bandwidth	Line	Filter	Corr. (dB)
0.150000	36.86	66.00	29.14	9.000	N	OFF	9.6
0.204000	45.57	63.45	17.87	9.000	N	OFF	9.6
0.271500	39.82	61.07	21.26	9.000	N	OFF	9.6
0.280500	37.18	60.80	23.62	9.000	N	OFF	9.6
0.339000	34.37	59.23	24.86	9.000	N	OFF	9.6
0.352500	31.11	58.90	27.79	9.000	N	OFF	9.6
0.934250	18.70	56.00	37.30	9.000	N	OFF	9.7
2.318000	19.64	56.00	36.36	9.000	N	OFF	9.7
2.387750	19.29	56.00	36.71	9.000	N	OFF	9.8
2.592500	19.15	56.00	36.85	9.000	N	OFF	9.8
2.871500	19.25	56.00	36.75	9.000	N	OFF	9.8
2.939000	18.97	56.00	37.03	9.000	N	OFF	9.8
14.225000	41.17	60.00	18.83	9.000	N	OFF	10.3
14.294750	41.31	60.00	18.69	9.000	N	OFF	10.3
14.362250	41.34	60.00	18.66	9.000	N	OFF	10.3
14.432000	41.33	60.00	18.67	9.000	N	OFF	10.3
14.501750	41.16	60.00	18.84	9.000	N	OFF	10.3
14.569250	41.02	60.00	18.98	9.000	N	OFF	10.3

2021-01-26

오후 2:02:48

Test

2 / 2

Final Result_CAV

Frequency (MHz)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.150000	19.11	56.00	36.89	9.000	N	OFF	9.6
0.206250	30.23	53.36	23.12	9.000	N	OFF	9.6
0.240000	13.15	52.10	38.94	9.000	N	OFF	9.6
0.273750	24.59	51.00	26.42	9.000	N	OFF	9.6
0.343500	19.81	49.12	29.31	9.000	N	OFF	9.6
2.385500	10.05	46.00	35.95	9.000	N	OFF	9.8
2.664500	10.25	46.00	35.75	9.000	N	OFF	9.8
2.799500	10.23	46.00	35.77	9.000	N	OFF	9.8
2.873750	10.35	46.00	35.65	9.000	N	OFF	9.8
3.078500	10.21	46.00	35.79	9.000	N	OFF	9.8
3.146000	10.14	46.00	35.86	9.000	N	OFF	9.8
13.397000	33.14	50.00	16.86	9.000	N	OFF	10.3
14.292500	32.04	50.00	17.96	9.000	N	OFF	10.3
14.362250	31.74	50.00	18.26	9.000	N	OFF	10.3
14.432000	31.67	50.00	18.33	9.000	N	OFF	10.3
14.501750	31.38	50.00	18.62	9.000	N	OFF	10.3
14.569250	31.24	50.00	18.76	9.000	N	OFF	10.3
14.636750	30.87	50.00	19.13	9.000	N	OFF	10.3

2021-01-26

오후 2:02:48

9.9 CONFIRMATION OF GEO-LOCATION MECHANISM

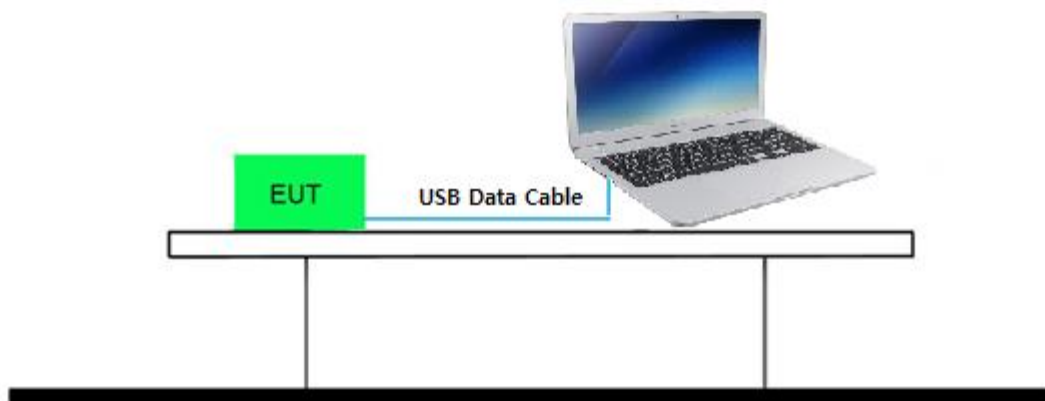
The device uses MCC information obtained from the public cellular carrier to determine that it is operating outside the U.S. and then enable channels 12 and 13 only if a non-US MCC that supports channel 12 and 13 is confirmed.

The device uses a geo-location mechanism based on the Country in order to only enable certain WLAN DTS bands when the device is not in the USA.

WLAN	Country code = US	Country code = KR(Korea)
CH 12	Did not connect	Connected
CH 13	Did not connect	Connected

The verification tests confirmed the operational of the geo-location mechanism.

Test Setup



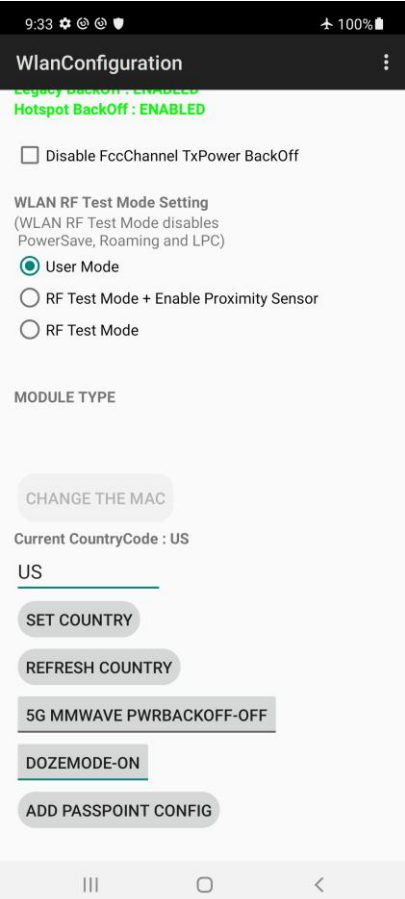
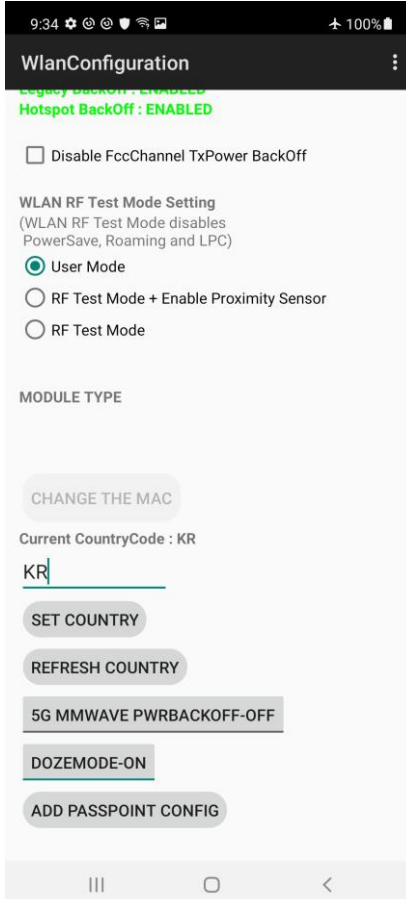
Test Procedure

In case of Country code

1. Open Command Prompt.
2. At the Command Prompt, enter the command.


```
>adb root
>adb remount
>adb push C:\adb\iwpriv /system/bin
>adb shell "chmod 777 /system/bin/iwpriv"
>adb shell cmd wifi force-country-code enabled [country-code]
>adb shell cmd wifi get-country-code
>adb shell iwpriv wlan0 get_ch_list
```

Setting the country for product

Country code = US	Country code = KR(Korea)
 <p>WlanConfiguration Legacy BackOff : ENABLED Hotspot BackOff : ENABLED</p> <p><input type="checkbox"/> Disable FccChannel TxPower BackOff</p> <p>WLAN RF Test Mode Setting (WLAN RF Test Mode disables PowerSave, Roaming and LPC)</p> <p><input checked="" type="radio"/> User Mode <input type="radio"/> RF Test Mode + Enable Proximity Sensor <input type="radio"/> RF Test Mode</p> <p>MODULE TYPE</p> <p>CHANGE THE MAC</p> <p>Current CountryCode : US US</p> <p>SET COUNTRY REFRESH COUNTRY 5G MMWAVE PWRBACKOFF-OFF DOZEMODE-ON ADD PASSPOINT CONFIG</p>	 <p>WlanConfiguration Legacy BackOff : ENABLED Hotspot BackOff : ENABLED</p> <p><input type="checkbox"/> Disable FccChannel TxPower BackOff</p> <p>WLAN RF Test Mode Setting (WLAN RF Test Mode disables PowerSave, Roaming and LPC)</p> <p><input checked="" type="radio"/> User Mode <input type="radio"/> RF Test Mode + Enable Proximity Sensor <input type="radio"/> RF Test Mode</p> <p>MODULE TYPE</p> <p>CHANGE THE MAC</p> <p>Current CountryCode : KR KR</p> <p>SET COUNTRY REFRESH COUNTRY 5G MMWAVE PWRBACKOFF-OFF DOZEMODE-ON ADD PASSPOINT CONFIG</p>

Country code = US
<pre>a52xq:/system/bin # iwpriv wlan0 getChannelList iwpriv wlan0 getChannelList wlan0 getChannelList:47 US 1 2 3 4 5 6 7 8 9 10 11 1 11 2 3 4 5 6 7 8 9 10 3 6 40 44 48 52 56 60 64 100 104 108 112 116 120 124 128 132 136 140 144 149 153 1</pre>
Country code = KR(Korea)
<pre>a52xq:/system/bin # iwpriv wlan0 getChannelList iwpriv wlan0 getChannelList wlan0 getChannelList:38 KR 1 2 3 4 5 6 7 8 9 10 11 12 13 36 40 44 48 52 56 6 0 64 100 104 108 112 116 120 124 128 132 136 140 144 149 153 157 161 165 a52xq:/system/bin #</pre>

Airplane on
<pre>wlan0 getChannelList:47 US 1 2 3 4 5 6 7 8 9 10 11 1 11 2 3 4 5 6 7 8 9 10 3 6 40 44 48 52 56 60 64 100 104 108 112 116 120 124 128 132 136 140 144 149 153 1</pre>

10. LIST OF TEST EQUIPMENT

Conducted Test

Manufacturer	Model / Equipment	Calibration Date	Calibration Interval	Serial No.
Rohde & Schwarz	ENV216 / LISN	09/04/2020	Annual	102245
Rohde & Schwarz	ESR / EMI Test Receiver	09/16/2020	Annual	101910
ESPEC	SU-642 / Temperature Chamber	07/30/2020	Annual	0093000718
Agilent	N9020A / Signal Analyzer	05/11/2020	Annual	MY51110085
Agilent	N9030A / Signal Analyzer	03/23/2020	Annual	MY49432108
Agilent	N1911A / Power Meter	04/07/2020	Annual	MY45100523
Agilent	N1921A / Power Sensor	06/08/2020	Annual	MY57820067
Agilent	87300B / Directional Coupler	11/10/2020	Annual	3116A03621
Hewlett Packard	11667B / Power Splitter	04/27/2020	Annual	11275
HP	E3632A / DC Power Supply	09/16/2020	Annual	MY40004427
HP	8493C / Attenuator(10 dB)(DC-26.5 GHz)	06/26/2020	Annual	07560
HP	8493C / Attenuator(10 dB)(DC-26.5 GHz)	07/03/2020	Annual	08285
Rohde & Schwarz	18N-20dB / Attenuator(20 dB)	03/23/2020	Annual	8
Rohde & Schwarz	EMC32 / Software	N/A	N/A	N/A
HCT CO., LTD.	FCC WLAN&BT&BLE Conducted Test Software v3.0	N/A	N/A	N/A

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

Manufacturer	Model / Equipment	Calibration Date	Calibration Interval	Serial No.
Innco system	CO3000 / Controller(Antenna mast)	N/A	N/A	CO3000-4p
Innco system	MA4640/800-XP-EP / Antenna Position Tower	N/A	N/A	N/A
Audix	EM1000 / Controller	N/A	N/A	060520
Audix	Turn Table	N/A	N/A	N/A
TNM system	FBSM-01B / Amp & Filter Bank Switch Controller	N/A	N/A	N/A
Schwarzbeck	Loop Antenna	05/18/2020	Biennial	1513-175
Schwarzbeck	VULB 9168 / Hybrid Antenna	08/02/2019	Biennial	01039
Schwarzbeck	BBHA 9120D / Horn Antenna	08/01/2019	Biennial	912D-1151
Schwarzbeck	BBHA9170 / Horn Antenna(15 GHz ~ 40 GHz)	04/29/2019	Biennial	BBHA9170342
Rohde & Schwarz	FSP(10 Hz ~ 40 GHz) / Spectrum Analyzer	05/13/2020	Annual	101055
Wainwright Instruments	WRCJV2400/2483.5-2370/2520-60/12SS / Band Reject Filter	01/06/2021	Annual	2
Wainwright Instruments	WRCJV12-4900-5100-5900-6100-50SS	06/24/2021	Annual	5
Wainwright Instruments	WRCJV12-4900-5100-5900-6100-50SS	06/24/2021	Annual	6
CERNEX	CBL18265035 / Power Amplifier	12/04/2020	Annual	22966
CERNEX	CBL26405040 / Power Amplifier	03/23/2020	Annual	25956
TNM system	FBSM-05B / HPF(3~18GHz) + LNA1(1~18GHz)	01/20/2021	Annual	F6
TNM system	FBSM-05B / ATT(10dB) + LNA1(1~18GHz)	01/20/2021	Annual	None
TNM system	FBSM-05B / ATT(3dB) + LNA1(1~18GHz)	01/20/2021	Annual	None
TNM system	FBSM-05B / LNA1(1~18GHz)	01/20/2021	Annual	25540
TNM system	FBSM-05B / HPF(7~18GHz) + LNA2(6~18GHz)	01/20/2021	Annual	28550
TNM system	FBSM-05B / Thru(30MHz ~ 18GHz)	01/20/2021	Annual	None
Weinschel	2-3 / Attenuator (3 dB)	10/07/2020	Annual	BR0617
H+S	5910-N-50-010 / Attenuator(10 dB)	10/28/2020	Annual	None
Rohde & Schwarz	ESCI / Test Receiver	06/10/2020	Annual	100584

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-2102-FC038-P