

FCC/IC DTS REPORT

Certification

Applicant Name:
SAMSUNG Electronics Co., Ltd.

Date of Issue:
13 January 2020

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Report No.: HCT-RF-2001-FI008

FCC ID:	A3LSMG715U
IC:	649E-SMG715W
APPLICANT:	SAMSUNG Electronics Co., Ltd.

According to the Evaluation report, all of the data contained herein is reused from the reference FCC ID : A3LSMG715FN report.

Model:	SM-G715U1
Additional Model:	SM-G715W
EUT Type:	Mobile Phone
Peak Output Power:	802.11b : 26.24 dBm / 802.11g : 26.24 dBm / 802.11n(HT20) : 26.32 dBm
Frequency Range:	2 412 MHz ~ 2 472 MHz
Modulation type:	CCK/DSSS/OFDM
FCC Classification:	Digital Transmission System(DTS)
FCC Rule Part(s):	Part 15.247
IC Rule Part(s):	RSS-247 Issue 2 (February 2017), RSS-Gen Issue 5_Amendment 1 (March 2019)

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/IC Rules under normal use and maintenance.



Report prepared by : Jeong Ho Kim
Engineer of Telecommunication testing center



Approved by : Kwon Jeong
Manager of Telecommunication testing center

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Version

TEST REPORT NO.	DATE	DESCRIPTION
HCT-RF-2001-FI008	13 January 2020	- First Approval Report

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 KOLAS(Korea Laboratory Accreditation Scheme), which signed the ILAC-MRA. (HCT Accreditation No.: KT197)

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1. EUT DESCRIPTION

Model	SM-G715U1
Additional Model	SM-G715W
EUT Type	Mobile Phone
Power Supply	DC 3.85 V
Battery Information	Model: EB-BG15BBE Type: Li-ion Battery
Travel Adapter Information	Model : TA-200 Manufacture: SOLUM
Data Cable Information	Model : EP-DR140AWE Manufacture: KSD
Ear-jack Information	Model : EHS61ASFBE Manufacture: ALMUS
Frequency Range	2 412 MHz ~ 2 472 MHz
Max. RF Output Power	Peak Power 802.11b : 26.24 dBm 802.11g : 26.24 dBm 802.11n(HT20) : 26.32 dBm Average Power 802.11b : 20.33 dBm 802.11g : 18.43 dBm 802.11n(HT20) : 18.27 dBm
Modulation Type	DSSS/CCK : 802.11b OFDM : 802.11g, 802.11n
Number of Channels	13 Channels
Antenna Specification	Antenna type: LDS Peak Gain : -3.31 dBi
Date(s) of Tests	November 21, 2019 ~ December 11, 2019
PMN (Product Marketing Number)	Galaxy XCover Pro
HVIN (Hardware Version Identification Number)	SM-G715W
FVIN (Firmware Version Identification Number)	N/A
HMN (Host Marketing Name)	N/A

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. / RSS-Gen issue 5, RSS-247 issue 2.

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 3.75 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).

For ISED, test facility was accepted dated February 14, 2019 (CAB identifier: KR0032).

EQUIPMENT

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

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

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

5. ANTENNA REQUIREMENTS

According to FCC 47 CFR §15.203:

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

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

6. MEASUREMENT UNCERTAINTY

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

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

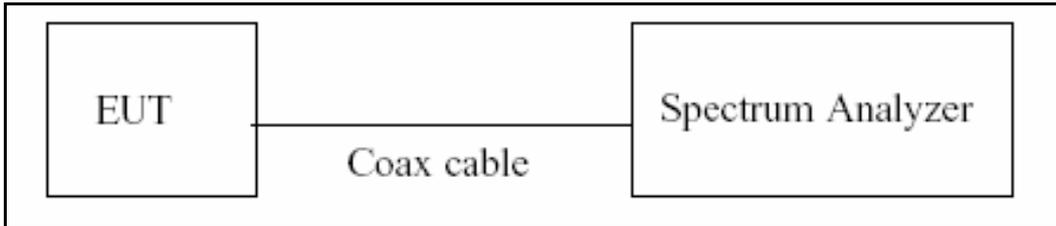
The measurement data shown herein meets or exceeds the U_{CISPR} measurement uncertainty values specified in CISPR 16-4-2 and, thus, can be compared directly to specified limits to determine compliance.

Parameter	Expanded Uncertainty (\pm 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 $> 50/T$.

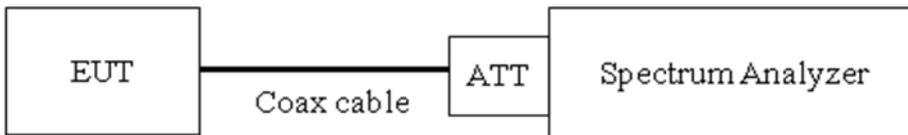
1. RBW = 8 MHz (the largest available value)
2. VBW = 8 MHz (\geq RBW)
3. SPAN = 0 Hz
4. Detector = Peak
5. Number of points in sweep > 100
6. Trace mode = Clear write
7. Measure T_{total} and T_{on}
8. Calculate Duty Cycle = T_{on} / T_{total} and Duty Cycle Factor = $10\log(1/\text{Duty Cycle})$

7.2. 6dB Bandwidth & 99 % 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.

Test Procedure (99 % Bandwidth for IC)

The transmitter output is connected to the spectrum analyzer.

RBW = 1% ~ 5% of the occupied bandwidth

VBW $\approx 3 \times$ RBW

Detector = Peak

Trace mode = max hold

Sweep = auto couple

Allow the trace to stabilize

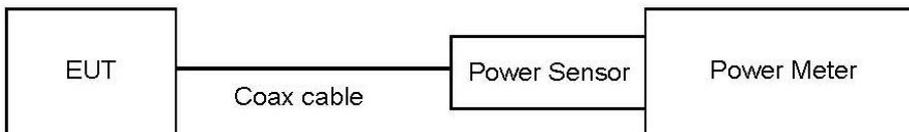
Note : We tested OBW using the automatic bandwidth measurement capability of a spectrum analyzer.

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

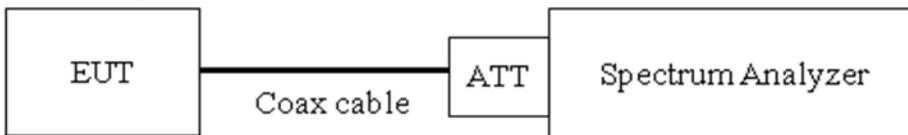
- Conducted Output Power(Peak) = Reading Value + ATT loss + Cable loss
- Conducted Output Power(Average) = Reading Value + ATT loss + Cable loss + Duty Cycle Factor

7.4. Power Spectral Density

Limit

The transmitter power density average over 1-second interval shall not be greater than 8dBm 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.

Sample Calculation

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

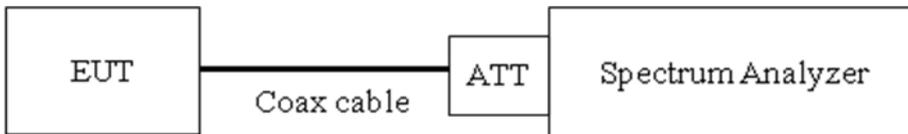
7.5. Conducted Band Edge(Out of Band Emissions) & Conducted Spurious Emissions

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 30 dB 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	20.54
100	20.62
200	20.70
300	20.80
400	20.86
500	20.89
600	20.89
700	20.93
800	20.95
900	20.99
1000	21.01
2000	21.28
2400	21.37
2480	21.39
2500	21.39
3000	21.49
4000	21.65
5000	21.84
5150	21.85
5850	21.91
6000	21.91
7000	22.06
8000	22.18
9000	22.30
10000	22.44
11000	22.52
12000	22.68
13000	22.87
14000	22.81
15000	22.91
16000	22.96
17000	23.03
18000	23.15
19000	23.21
20000	23.29
21000	23.58
22000	23.64
23000	23.67
24000	23.75
25000	23.88
26000	23.98

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

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

7.6. Radiated Test

FCC

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

IC

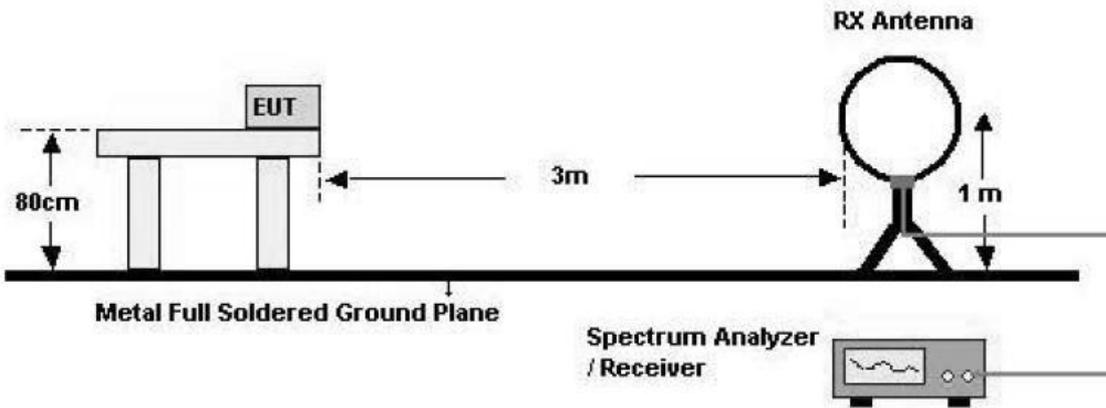
Frequency (MHz)	Field Strength (uA/m)	Measurement Distance (m)
0.009 – 0.490	6.37/F(kHz)	300
0.490 – 1.705	63.7/F(kHz)	30
1.705 – 30	0.08	30

FCC&IC

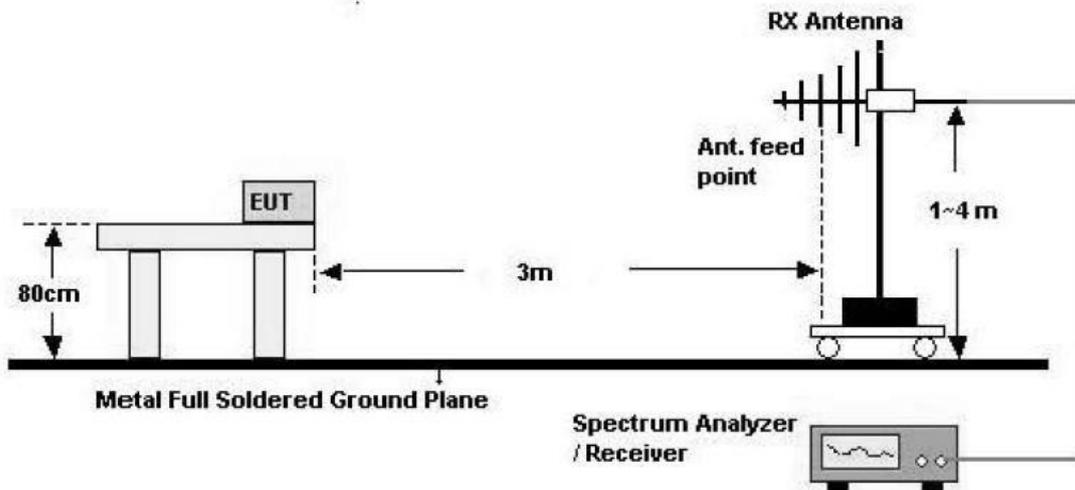
Frequency (MHz)	Field Strength (uV/m)	Measurement Distance (m)
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Test Configuration

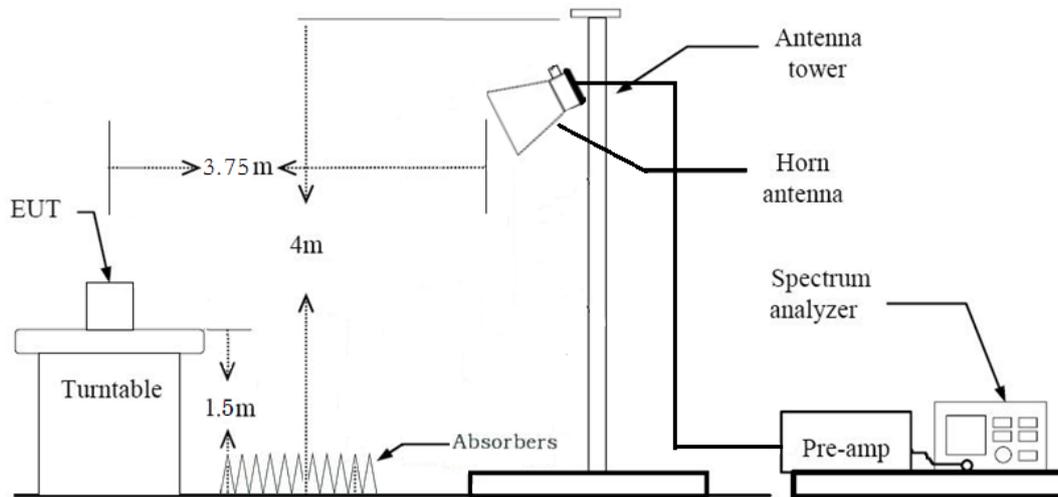
Below 30 MHz



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. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
4. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.

5. 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

6. Total = Reading Value + Antenna Factor(A.F) + Cable Loss(C.L)
7. 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 3.75 m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
5. According to SVSWR requirement in ANSI 63.4-2014, We performed the radiated test at 3.75 m distance from center of turn table. So, we applied the distance factor(reference distance : 3 m).
 - ◆ Distance extrapolation factor = $20\log(\text{test distance} / \text{specific distance})$ (dB)
6. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
7. Each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
8. The unit was tested with its standard battery.
9. 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.

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.

11. Total(Measurement Type : Peak)

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

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

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

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

$$= \text{Reading Value} + \text{Antenna Factor(A.F)} + \text{Cable Loss(C.L)} - \text{Amp Gain(G)} + \text{Distance Factor(D.F)} \\ + \text{Duty Cycle Factor}$$

Test Procedure of Radiated Restricted Band Edge

1. The EUT is placed on a turntable, which is 1.5 m above ground plane.
2. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
3. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
4. EUT is set 3.75 m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
5. According to SVSWR requirement in ANSI 63.4-2014, We performed the radiated test at 3.75 m distance from center of turn table. So, we applied the distance factor(reference distance : 3 m).
 - ◆ Distance extrapolation factor = $20\log(\text{test distance} / \text{specific distance})$ (dB)
6. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
7. Each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
8. The unit was tested with its standard battery.
9. 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.

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.

11. Total(Measurement Type : Peak)

= Reading Value + Antenna Factor(A.F) + Cable Loss(C.L) + Distance Factor(D.F) – AMP Gain (A.G)
+Attenuator(ATT)

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

= Reading Value + Antenna Factor(A.F) + Cable Loss(C.L) + Distance Factor(D.F) – AMP Gain (A.G)
+Attenuator(ATT)

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

= Reading Value + Antenna Factor(A.F) + Cable Loss(C.L) + Distance Factor(D.F) – AMP Gain (A.G)
+Attenuator(ATT) + 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. Receiver Spurious Emissions

Limit

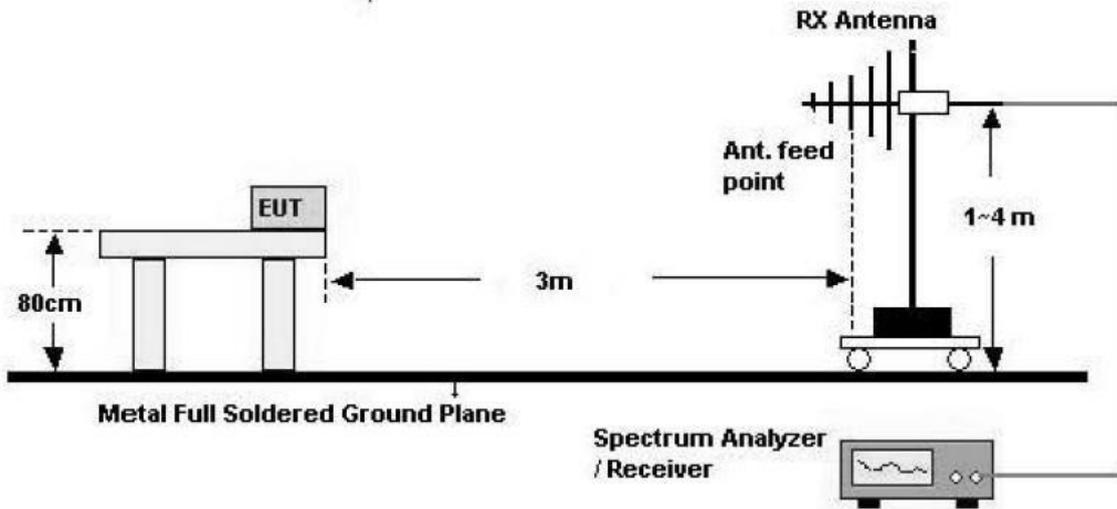
Frequency (MHz)	Field Strength (uV/m)	Measurement Distance (m)
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Note:

Measurements for compliance with the limits in table may be performed at distances other than 3 metres.

Test Configuration

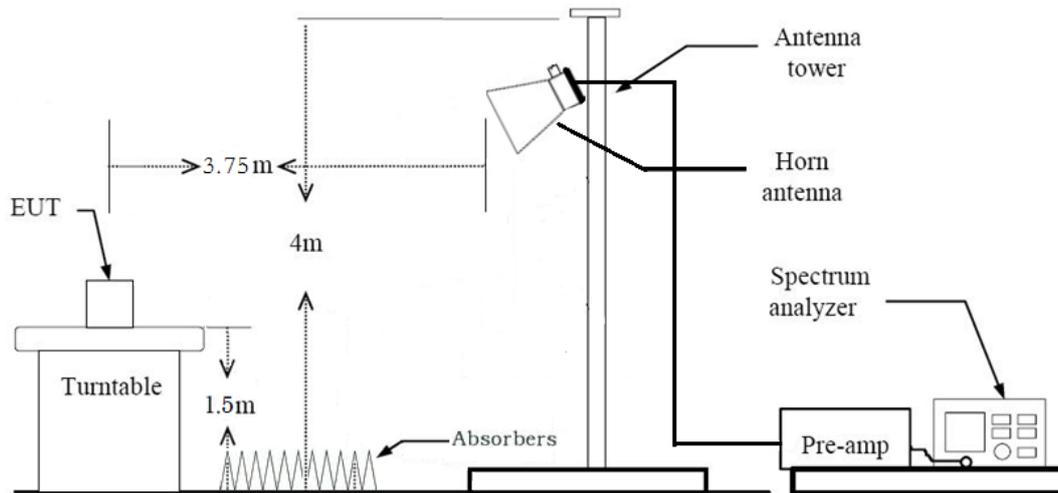
30 MHz - 1 GHz



Test Procedure of Receiver 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. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
4. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
5. 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
6. Total = Reading Value + Antenna Factor(A.F) + Cable Loss(C.L)

Above 1 GHz

**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 3.75 m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
5. According to SVSWR requirement in ANSI 63.4-2014, We performed the radiated test at 3.75 m distance from center of turn table. So, we applied the distance factor(reference distance : 3 m).

◆ Distance extrapolation factor = $20 \log (\text{test distance} / \text{specific distance})$ (dB)

6. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
7. Each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
8. The unit was tested with its standard battery.
9. Spectrum Setting

(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):

- We performed using a reduced video BW method was done with the analyzer in linear mode
- Measured Frequency Range : 1 GHz – 25 GHz
- Detector = Peak
- Trace = Maxhold
- RBW = 1 MHz
- VBW $\geq 1/\tau$ Hz, where τ = pulse width in seconds

The actual setting value of VBW = 1 kHz

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

7.9. 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,Y
 - Radiated Restricted Band Edge : Y
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 data rate of each mode.
 - 802.11b : 1Mbps
 - 802.11g : 6Mbps
 - 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-G715U1, SM-G715W were tested and the worst case results are reported.
(Worst case : SM-G715U1)

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(Normal),
Stand alone + Travel Adapter(Normal),
 - Worstcase : Stand alone + Travel Adapter(Normal)
2. SM-G715U1, SM-G715W were tested and the worst case results are reported.
(Worst case : SM-G715U1)

Conducted test

1. The EUT was configured with data rate of highest power.
2. SM-G715U1, SM-G715W were tested and the worst case results are reported.
(Worst case : SM-G715U1)

8. SUMMARY TEST OF RESULTS

FCC Part

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
Radiated Restricted Band Edge	§15.247(d), 15.205, 15.209	cf. Section 7.6	PASS	

IC Part

Test Description	IC Part Section(s)	Test Limit	Test Condition	Test Result
6 dB Bandwidth	RSS-247, 5.2	> 500 kHz	Conducted	PASS
99% Bandwidth	RSS-GEN, 6.7	N/A		PASS
Conducted Maximum Peak Output Power And e.i.r.p.	RSS-247, 5.4.	< 1 Watt <4 Watt(e.i.r.p.)		PASS
Power Spectral Density	RSS-247, 5.2	< 8 dBm / 3 kHz Band		PASS
Band Edge(Out of Band Emissions)	RSS-247, 5.5	Conducted > 30 dBc		PASS
AC Power line Conducted Emissions	RSS-GEN, 8.8	cf. Section 7.7		N/A (Note1)
Radiated Spurious Emissions	RSS-GEN, 8.9	cf. Section 7.6	Radiated	PASS
Receiver Spurious Emissions	RSS-GEN, 7	cf. Section 7.8		PASS
Radiated Restricted Band Edge	RSS-GEN, 8.10	cf. Section 7.6		PASS

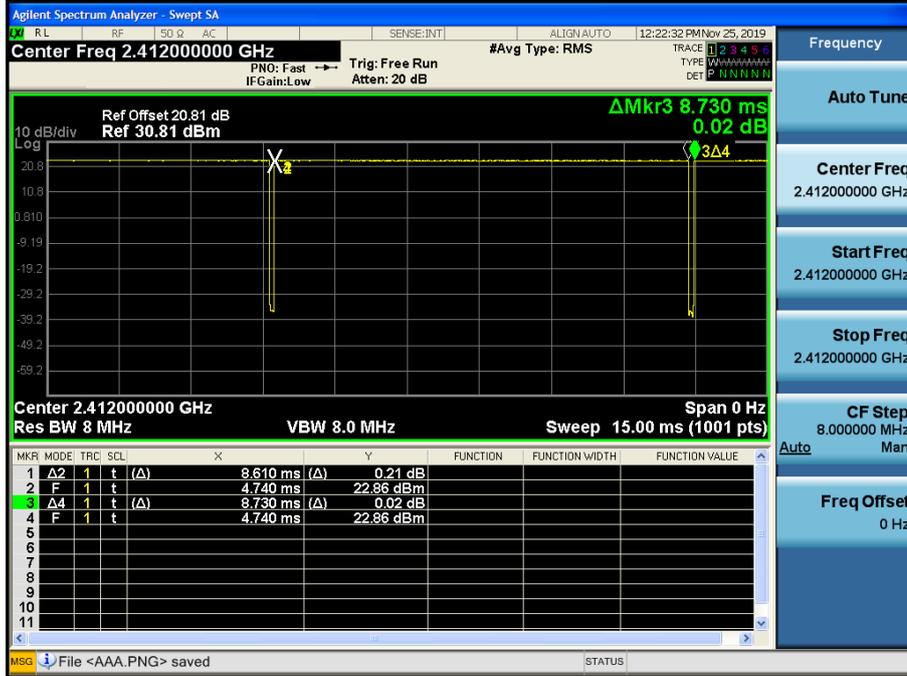
9. TEST RESULT

9.1 DUTY CYCLE

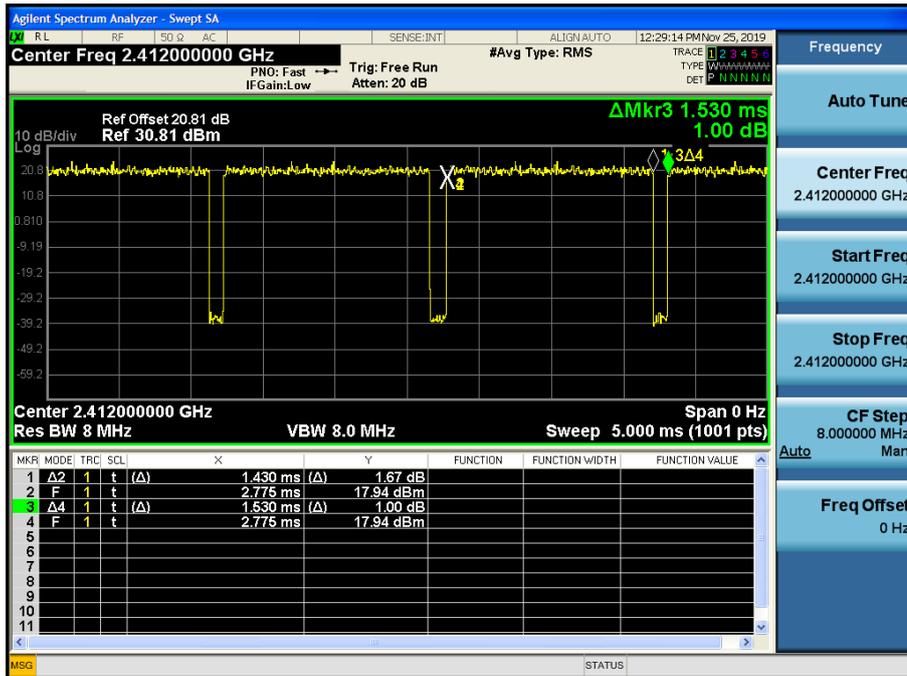
Mode	Data Rate (Mbps)	T _{on} (ms)	T _{total} (ms)	Duty Cycle	Duty Cycle Factor (dB)
802.11b	1	8.610	8.730	0.986	0.060
	2	4.305	4.425	0.973	0.119
	5.5	1.627	1.740	0.935	0.292
	11	0.865	0.955	0.906	0.430
802.11g	6	1.430	1.530	0.935	0.294
	9	0.957	1.059	0.904	0.440
	12	0.726	0.843	0.861	0.649
	18	0.492	0.612	0.804	0.948
	24	0.372	0.492	0.756	1.214
	36	0.256	0.355	0.721	1.420
	48	0.195	0.315	0.619	2.083
	54	0.180	0.300	0.600	2.218
802.11n (HT20)	6.5 (MCS0)	1.335	1.437	0.929	0.320
	13 (MCS1)	0.687	0.789	0.871	0.601
	19.5 (MCS2)	0.471	0.570	0.825	0.834
	26 (MCS3)	0.363	0.463	0.785	1.053
	39 (MCS4)	0.256	0.356	0.720	1.427
	52 (MCS5)	0.200	0.320	0.625	2.041
	58.5 (MCS6)	0.183	0.303	0.604	2.188
	65 (MCS7)	0.168	0.288	0.583	2.341

☐ Test Plots

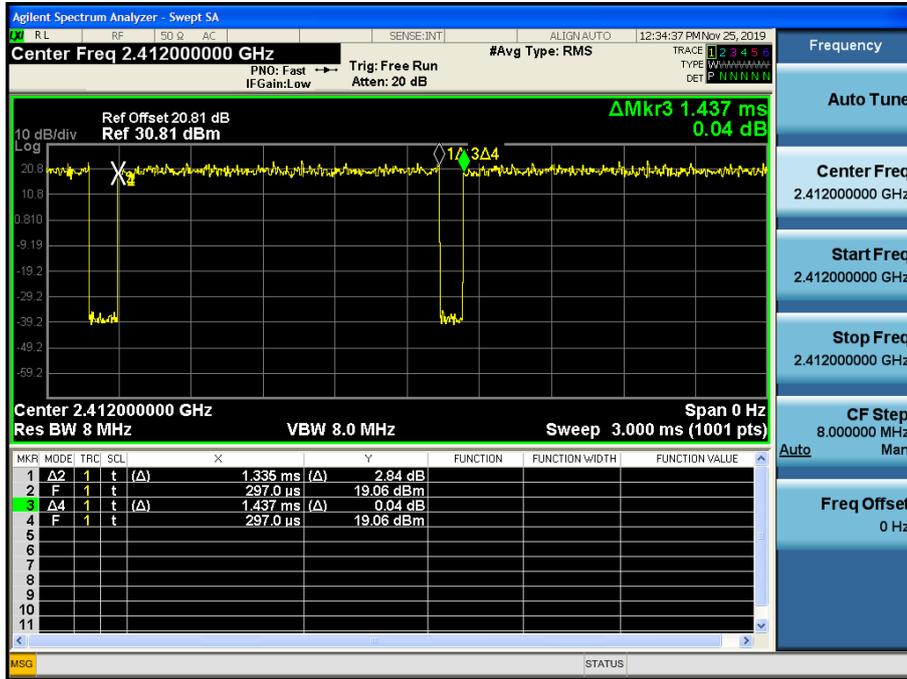
Duty cycle plot (802.11b(1Mbps))



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

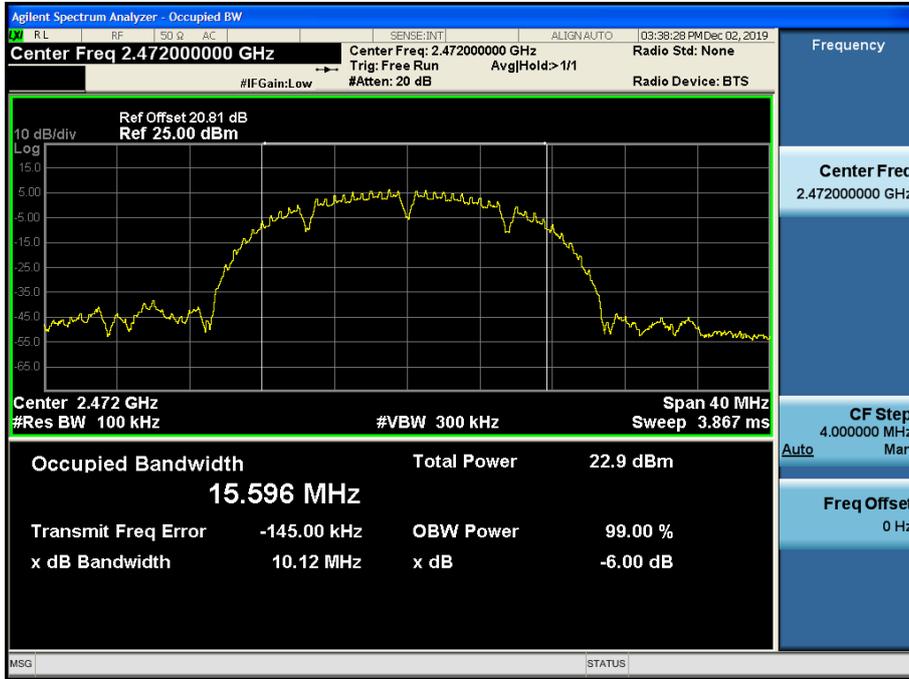
802.11b Mode		Measured Bandwidth [MHz]	OBW Bandwidth [MHz]	Minimum Bandwidth [MHz]
Frequency [MHz]	Channel No.			
2412	1	10.129	15.719	0.5
2437	6	11.068	15.740	0.5
2462	11	11.080	15.758	0.5
2467	12	10.132	15.691	0.5
2472	13	10.123	15.596	0.5

802.11g Mode		Measured Bandwidth [MHz]	OBW Bandwidth [MHz]	Minimum Bandwidth [MHz]
Frequency [MHz]	Channel No.			
2412	1	16.356	17.873	0.5
2437	6	16.358	17.888	0.5
2462	11	16.358	17.964	0.5
2467	12	16.362	17.889	0.5
2472	13	16.353	17.812	0.5

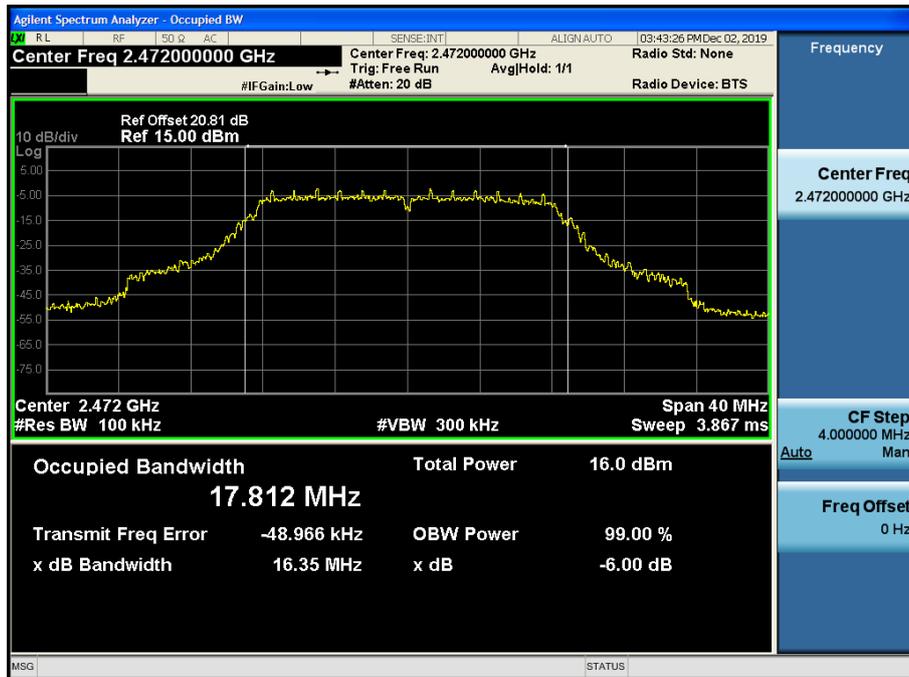
802.11n Mode		Measured Bandwidth [MHz]	OBW Bandwidth [MHz]	Minimum Bandwidth [MHz]
Frequency [MHz]	Channel No.			
2412	1	17.349	18.919	0.5
2437	6	17.593	18.919	0.5
2462	11	17.612	18.921	0.5
2467	12	17.602	18.720	0.5
2472	13	17.231	18.584	0.5

☐ Test Plots

6dB Bandwidth plot (802.11b-CH 13)



6dB Bandwidth plot (802.11g-CH 13)



6dB Bandwidth plot (802.11n_HT20-CH 13)



Note:

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

99% Bandwidth Measurements(IC)

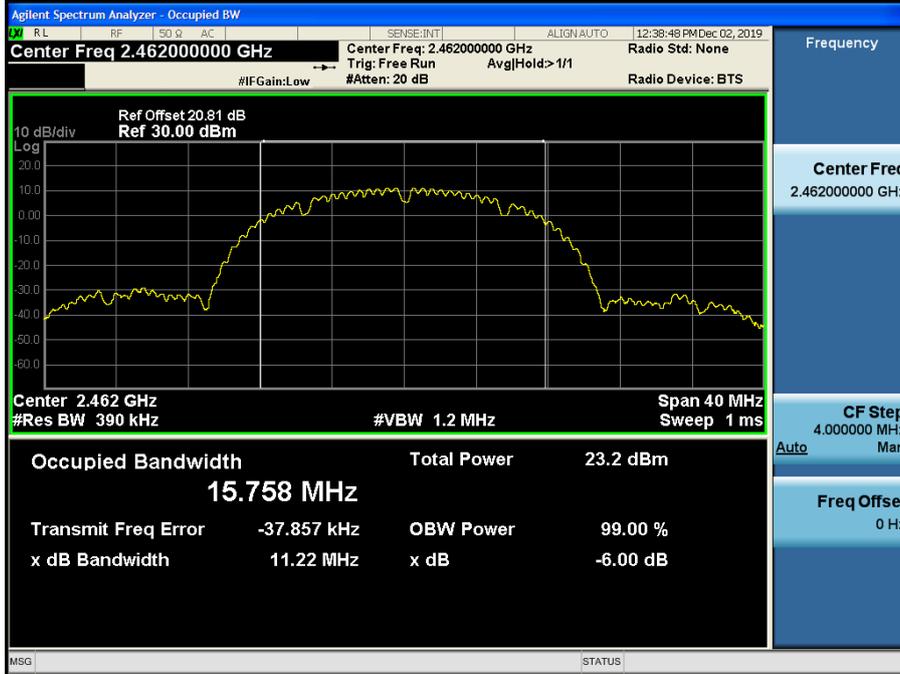
802.11b Mode		OBW Bandwidth [MHz]	Limit [MHz]
Frequency [MHz]	Channel No.		
2412	1	15.714	N/A
2437	6	15.749	N/A
2462	11	15.758	N/A
2467	12	15.674	N/A
2472	13	15.609	N/A

802.11g Mode		OBW Bandwidth [MHz]	Limit [MHz]
Frequency [MHz]	Channel No.		
2412	1	18.481	N/A
2437	6	18.490	N/A
2462	11	18.515	N/A
2467	12	18.475	N/A
2472	13	18.362	N/A

802.11n(HT20) Mode		OBW Bandwidth [MHz]	Limit [MHz]
Frequency [MHz]	Channel No.		
2412	1	20.056	N/A
2437	6	19.955	N/A
2462	11	20.152	N/A
2467	12	19.951	N/A
2472	13	19.789	N/A

■ Test Plots

99% Bandwidth plot (802.11b-CH 11)



99% Bandwidth plot (802.11g-CH 11)



99% Bandwidth plot (802.11n_HT20-CH 11)



Note:

In order to simplify the report, attached plots were only the most wide 99% Bandwidth channel.

9.3 OUTPUT POWER

Peak Power

1. Power Meter offset = Attenuator loss + Cable loss
 2. We apply to the offset in the 2.4 GHz range that was rounded off to the closest tenth dB.
- So, 20.81 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	22.20	30	20
		2	22.77	30	
		5.5	24.17	30	
		11	25.81	30	
2437	6	1	22.54	30	
		2	22.98	30	
		5.5	24.45	30	
		11	26.05	30	
2462	11	1	22.57	30	
		2	23.10	30	
		5.5	24.60	30	
		11	26.24	30	
2467	12	1	18.78	30	16
		2	19.20	30	
		5.5	20.70	30	
		11	22.33	30	
2472	13	1	17.75	30	15
		2	18.23	30	
		5.5	19.69	30	
		11	21.30	30	

802.11g Mode		Rate (Mbps)	Measured Power(dBm)	Limit (dBm)	Power Level Setting
Frequency[MHz]	Channel No.				
2412	1	6	25.36	30	18
		9	25.55	30	
		12	24.94	30	
		18	24.90	30	
		24	25.68	30	
		36	25.70	30	
		48	24.27	30	
		54	24.33	30	
2437	6	6	25.53	30	
		9	25.79	30	
		12	25.09	30	
		18	25.05	30	
		24	25.84	30	
		36	25.86	30	
		48	24.70	30	
		54	24.59	30	
2462	11	6	25.89	30	
		9	26.10	30	
		12	25.51	30	
		18	25.47	30	
		24	26.24	30	
		36	26.23	30	
		48	24.82	30	
		54	24.89	30	
2467	12	6	19.64	30	
		9	19.90	30	
		12	19.21	30	
		18	19.28	30	
		24	20.11	30	
		36	19.98	30	
		48	19.77	30	
		54	19.65	30	
2472	13	6	16.85	30	
		9	17.14	30	
		12	16.50	30	
		18	16.45	30	
		24	17.16	30	
		36	17.08	30	
		48	16.90	30	
		54	17.04	30	

802.11n(HT20) Mode		MCS Index	Measured Power(dBm)	Limit (dBm)	Power Level Setting
Frequency[MHz]	Channel No.				
2412	1	0	25.21	30	18
		1	25.14	30	
		2	25.16	30	
		3	25.74	30	
		4	25.51	30	
		5	24.30	30	
		6	24.34	30	
		7	24.41	30	
2437	6	0	25.38	30	
		1	25.27	30	
		2	25.37	30	
		3	25.90	30	
		4	25.64	30	
		5	24.41	30	
		6	24.52	30	
		7	24.66	30	
2462	11	0	25.69	30	
		1	25.57	30	
		2	25.68	30	
		3	26.32	30	
		4	25.99	30	
		5	24.85	30	
		6	24.77	30	
		7	24.93	30	
2467	12	0	18.86	30	10
		1	18.79	30	
		2	18.75	30	
		3	19.30	30	
		4	19.10	30	
		5	18.84	30	
		6	18.85	30	
		7	18.89	30	
2472	13	0	15.55	30	3
		1	15.35	30	
		2	15.19	30	
		3	15.87	30	
		4	15.40	30	
		5	14.92	30	
		6	14.68	30	
		7	15.15	30	

Average Power

1. Power Meter offset = Attenuator loss + Cable loss
2. We apply to the offset in the 2.4 GHz range that was rounded off to the closest tenth dB.
So, 20.81 dB is offset for 2.4 GHz Band.

802.11b Mode		Rate (Mbps)	Measured Power (dBm)	Duty Cycle Factor	Measured Power(dBm) + Duty Cycle Factor	Limit (dBm)	Power Level Setting	
Frequency [MHz]	Channel No.							
2412	1	1	19.76	0.060	19.82	30	20	
		2	19.91	0.119	20.03	30		
		5.5	19.80	0.292	20.10	30		
		11	19.62	0.430	20.05	30		
2437	6	1	19.95	0.060	20.01	30		
		2	20.04	0.119	20.16	30		
		5.5	19.87	0.292	20.16	30		
		11	19.77	0.430	20.20	30		
2462	11	1	19.98	0.060	20.04	30		
		2	20.16	0.119	20.28	30		
		5.5	20.04	0.292	20.33	30		
		11	19.89	0.430	20.32	30		
2467	12	1	16.41	0.060	16.47	30		16
		2	16.44	0.119	16.56	30		
		5.5	16.40	0.292	16.70	30		
		11	16.22	0.430	16.65	30		
2472	13	1	15.38	0.060	15.44	30	15	
		2	15.51	0.119	15.63	30		
		5.5	15.37	0.292	15.67	30		
		11	15.18	0.430	15.61	30		

802.11g Mode		Rate (Mbps)	Measured Power (dBm)	Duty Cycle Factor	Measured Power(dBm) + Duty Cycle Factor	Limit (dBm)	Power Level Setting
Frequency [MHz]	Channel No.						
2412	1	6	17.28	0.294	17.57	30	18
		9	17.20	0.440	17.64	30	
		12	17.07	0.649	17.72	30	
		18	16.88	0.948	17.82	30	
		24	16.58	1.214	17.79	30	
		36	16.29	1.420	17.71	30	
		48	14.69	2.083	16.78	30	
54	14.57	2.218	16.79	30			
2437	6	6	17.41	0.294	17.70	30	
		9	17.30	0.440	17.74	30	
		12	17.24	0.649	17.89	30	
		18	16.96	0.948	17.91	30	
		24	16.75	1.214	17.97	30	
		36	16.40	1.420	17.82	30	
		48	14.95	2.083	17.03	30	
54	14.81	2.218	17.03	30			
2462	11	6	17.84	0.294	18.13	30	
		9	17.80	0.440	18.24	30	
		12	17.76	0.649	18.41	30	
		18	17.48	0.948	18.43	30	
		24	17.14	1.214	18.36	30	
		36	16.85	1.420	18.27	30	
		48	15.26	2.083	17.34	30	
54	15.14	2.218	17.36	30			
2467	12	6	11.59	0.294	11.89	30	11
		9	11.61	0.440	12.05	30	
		12	11.36	0.649	12.01	30	
		18	11.28	0.948	12.23	30	
		24	11.03	1.214	12.24	30	
		36	10.62	1.420	12.04	30	
		48	10.20	2.083	12.29	30	
54	9.91	2.218	12.13	30			
2472	13	6	8.78	0.294	9.07	30	7
		9	8.83	0.440	9.27	30	
		12	8.68	0.649	9.33	30	
		18	8.48	0.948	9.42	30	
		24	8.08	1.214	9.29	30	
		36	7.71	1.420	9.13	30	
		48	7.39	2.083	9.47	30	
54	7.30	2.218	9.52	30			

802.11n(HT20) Mode		MCS Index	Measured Power (dBm)	Duty Cycle Factor	Measured Power(dBm) + Duty Cycle Factor	Limit (dBm)	Power Level Setting
Frequency [MHz]	Channel No.						
2412	1	0	17.18	0.320	17.50	30	18
		1	17.12	0.601	17.72	30	
		2	16.82	0.834	17.65	30	
		3	16.62	1.053	17.67	30	
		4	16.38	1.427	17.80	30	
		5	14.75	2.041	16.79	30	
		6	14.73	2.188	16.92	30	
7	14.53	2.341	16.87	30			
2437	6	0	17.30	0.320	17.62	30	
		1	17.23	0.601	17.83	30	
		2	17.02	0.834	17.85	30	
		3	16.72	1.053	17.77	30	
		4	16.47	1.427	17.90	30	
		5	14.75	2.041	16.79	30	
		6	14.84	2.188	17.03	30	
7	14.74	2.341	17.08	30			
2462	11	0	17.63	0.320	17.95	30	
		1	17.54	0.601	18.15	30	
		2	17.38	0.834	18.21	30	
		3	17.18	1.053	18.24	30	
		4	16.84	1.427	18.27	30	
		5	15.28	2.041	17.33	30	
		6	15.16	2.188	17.35	30	
7	15.03	2.341	17.37	30			
2467	12	0	10.79	0.320	11.11	30	10
		1	10.75	0.601	11.35	30	
		2	10.45	0.834	11.29	30	
		3	10.22	1.053	11.27	30	
		4	9.99	1.427	11.41	30	
		5	9.27	2.041	11.31	30	
		6	9.24	2.188	11.43	30	
7	9.04	2.341	11.38	30			
2472	13	0	7.51	0.320	7.83	30	3
		1	7.35	0.601	7.95	30	
		2	6.90	0.834	7.73	30	
		3	6.82	1.053	7.87	30	
		4	6.37	1.427	7.80	30	
		5	5.38	2.041	7.42	30	
		6	5.15	2.188	7.34	30	
7	5.36	2.341	7.70	30			

9.4 POWER SPECTRAL DENSITY

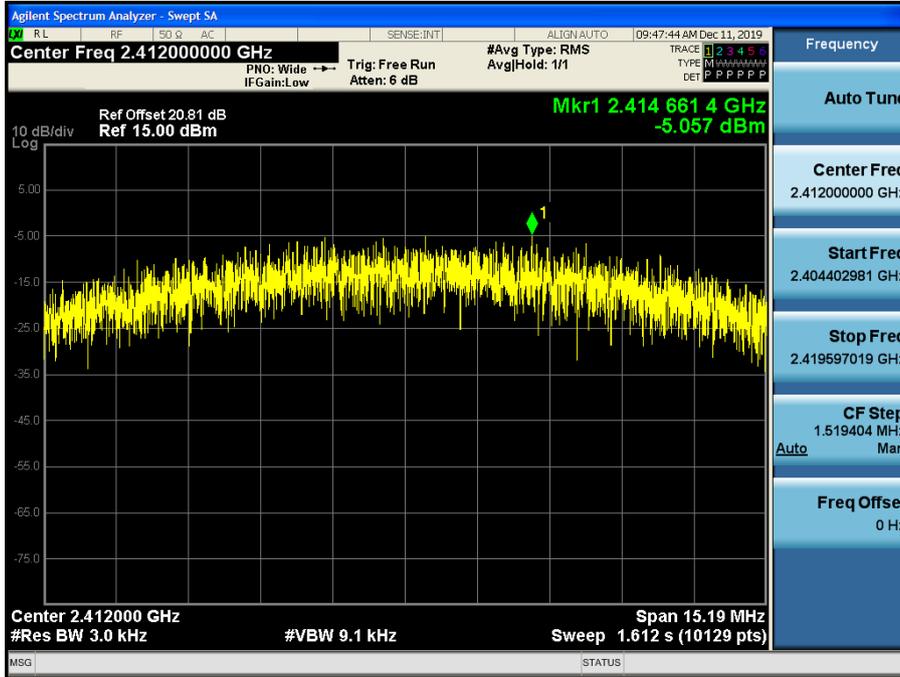
Mode	Frequency (MHz)	Channel No.	Test Result	
			Measured PSD (dBm)	Limit (dBm)
802.11b	2412	1	-5.057	8
	2437	6	-5.246	8
	2462	11	-5.111	8
	2467	12	-8.566	8
	2472	13	-9.847	8
802.11g	2412	1	-9.592	8
	2437	6	-9.198	8
	2462	11	-7.959	8
	2467	12	-14.016	8
	2472	13	-17.642	8
802.11n	2412	1	-9.059	8
	2437	6	-8.949	8
	2462	11	-9.234	8
	2467	12	-15.426	8
	2472	13	-21.567	8

Note :

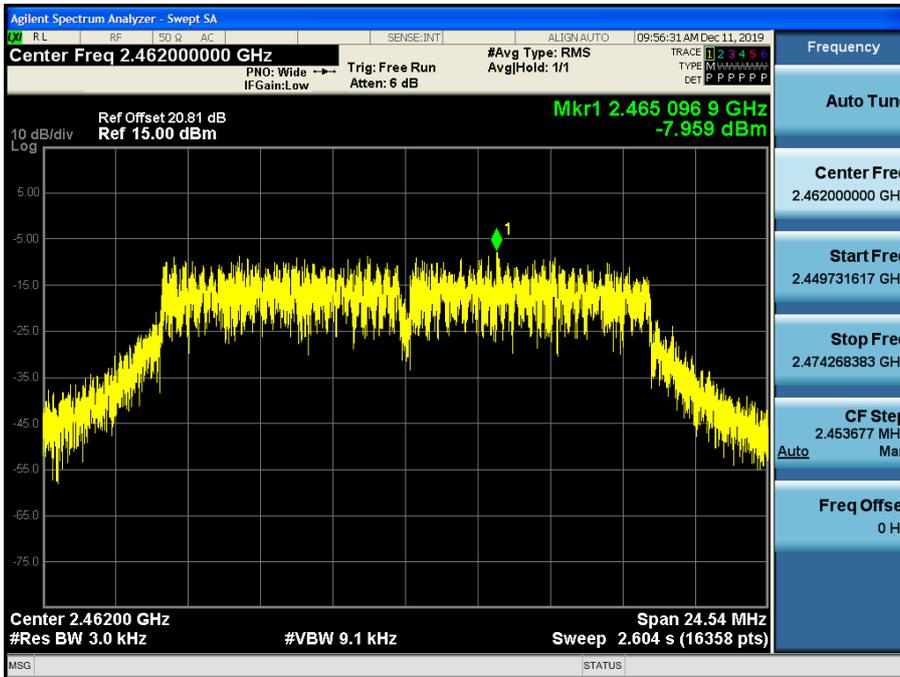
- Spectrum reading values are not plot data.
The PSD results in plot is already including the actual values of loss for the attenuator and cable combination.
- Spectrum offset = Attenuator loss(20 dB) + Cable loss(1ea)
- 20.81 dB is offset for 2.4 GHz Band.

☐ Test Plots

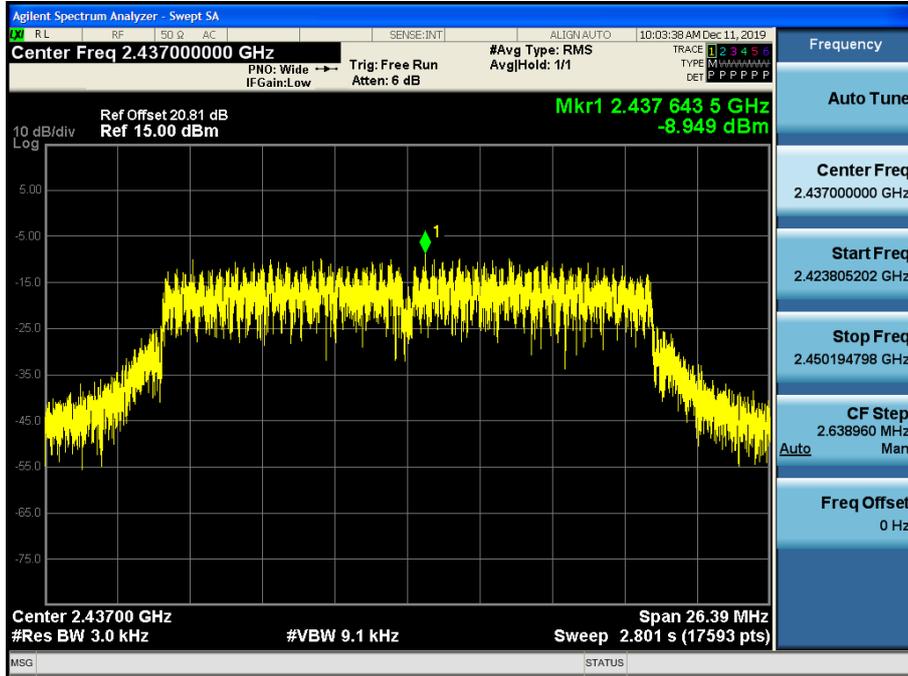
Power Spectral Density (802.11b-CH 1)



Power Spectral Density (802.11g-CH 11)



Power Spectral Density (802.11n_HT20 -CH 6)



Note :

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

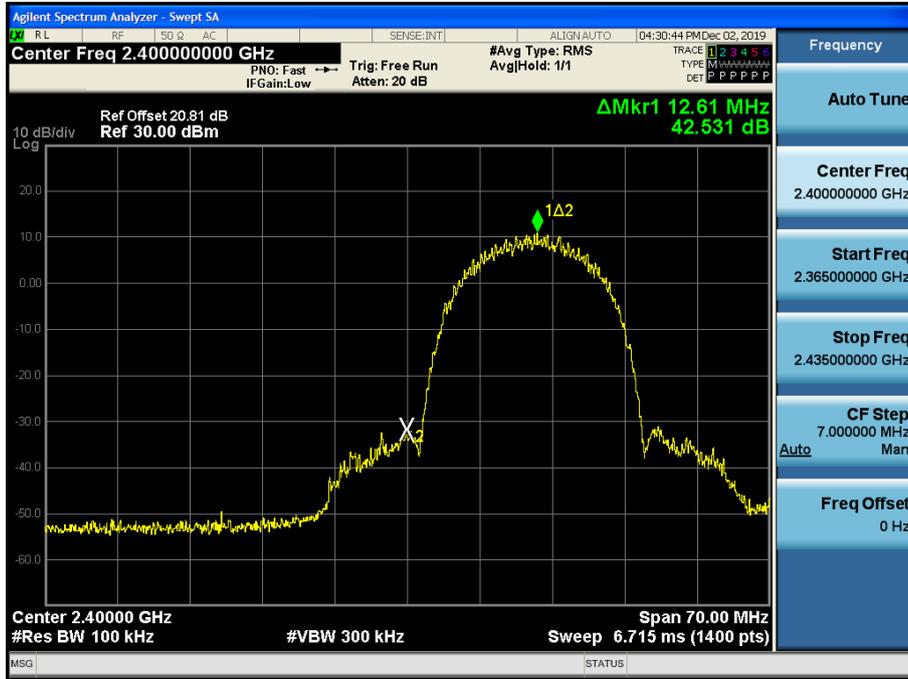
9.5 BAND EDGE/ CONDUCTED SPURIOUS EMISSIONS

Test Result : please refer to the plot below.

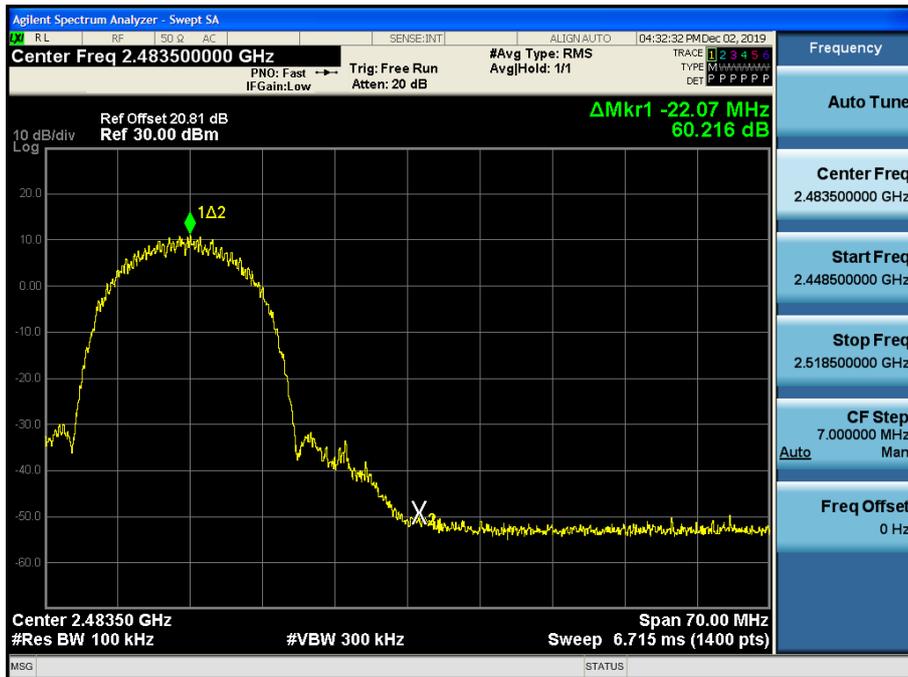
In order to simplify the report, attached plots were only the worst case channel and data rate.

☐ Test Plots(BandEdge)

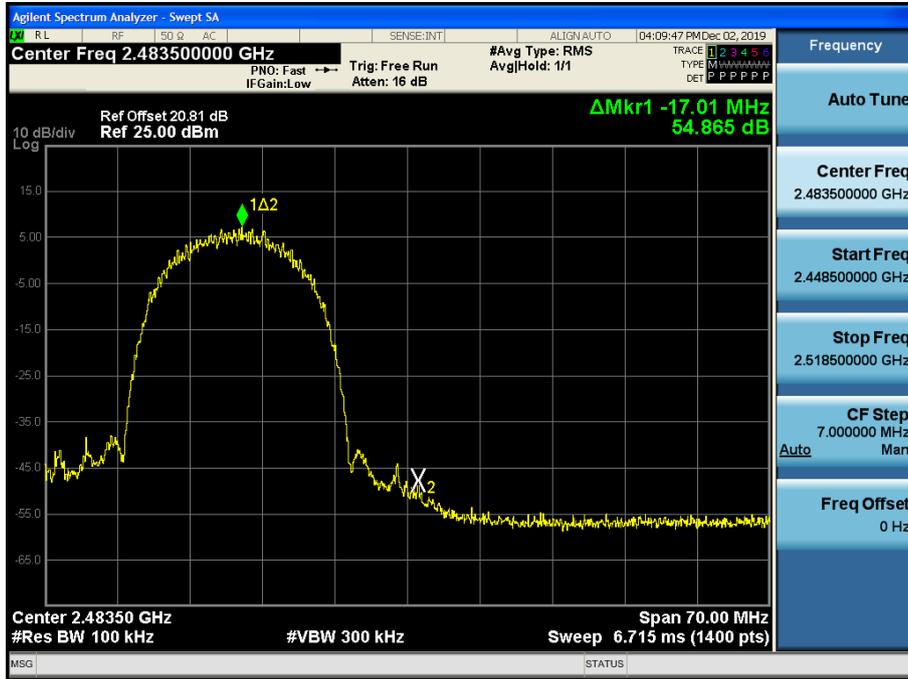
Band Edge (802.11b-CH1)



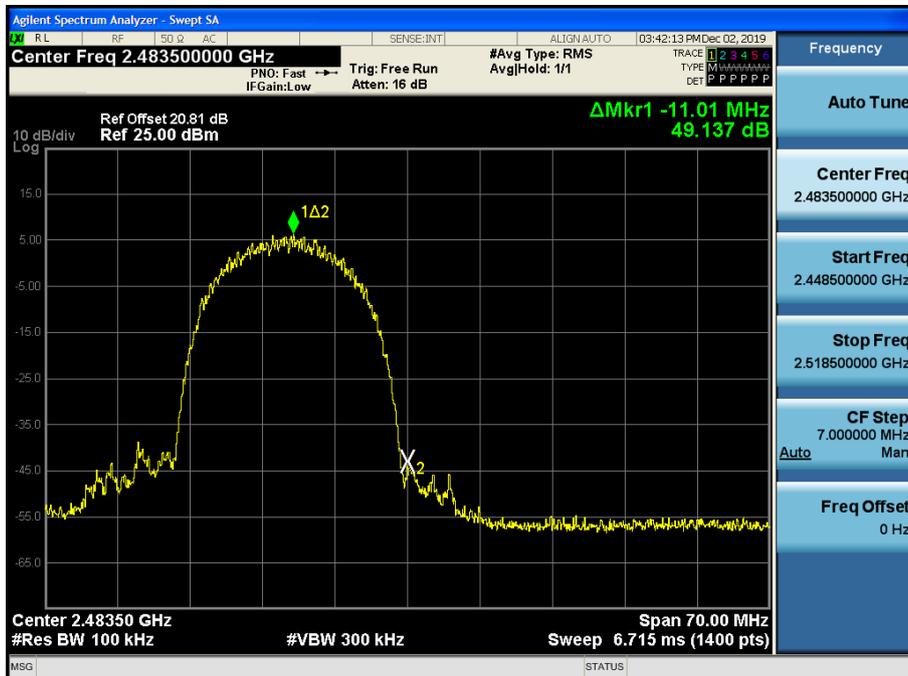
Band Edge (802.11b-CH11)



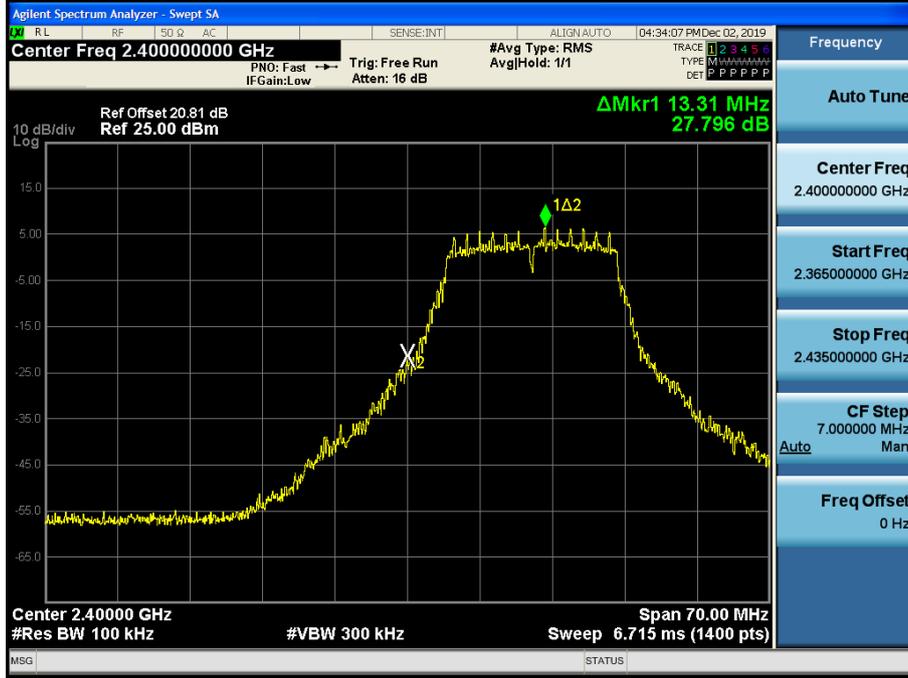
Band Edge (802.11b-CH12)



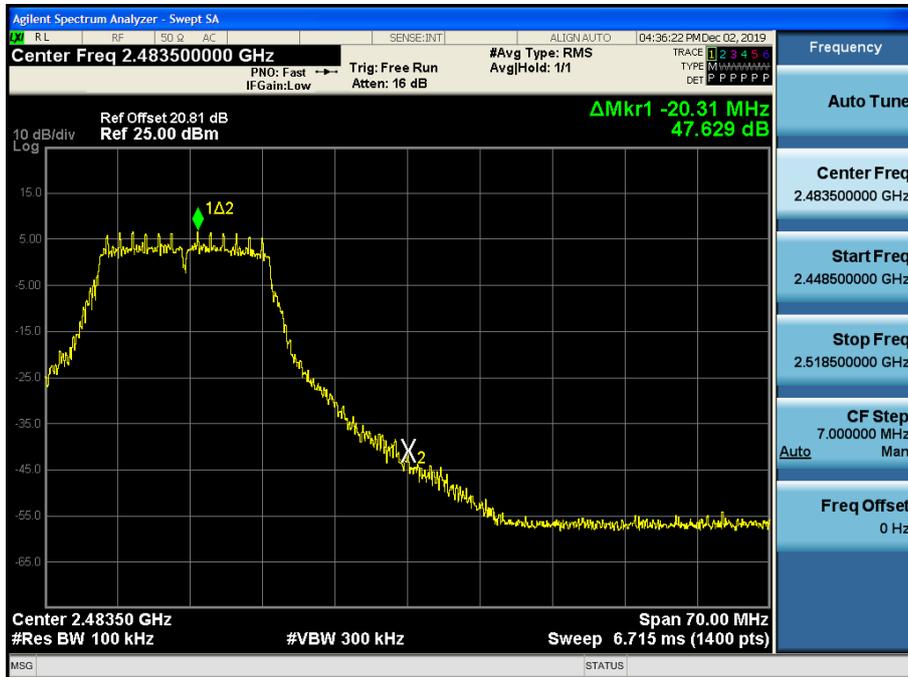
Band Edge (802.11b-CH13)



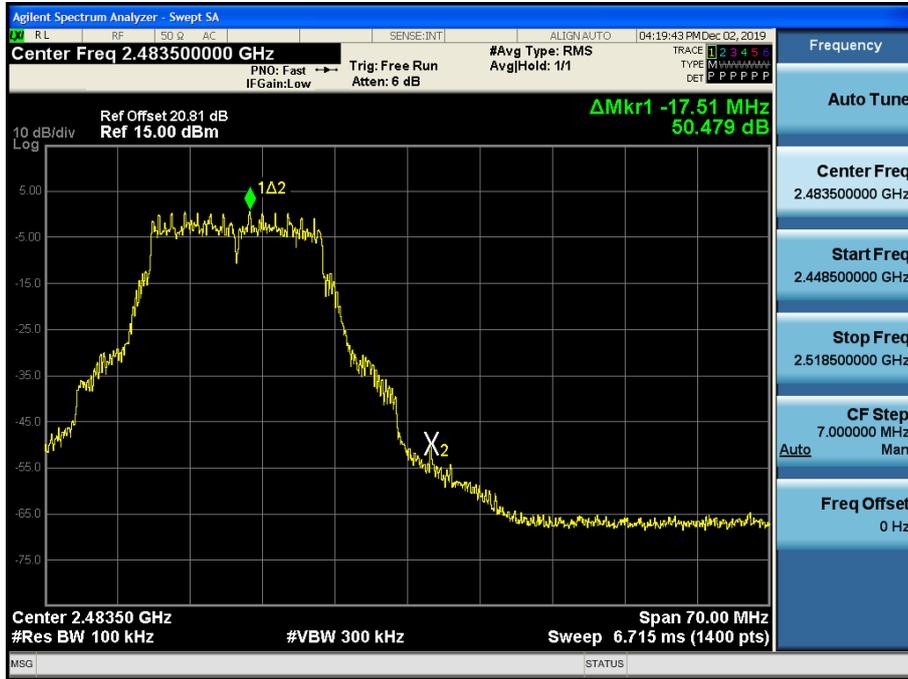
Band Edge (802.11g-CH1)



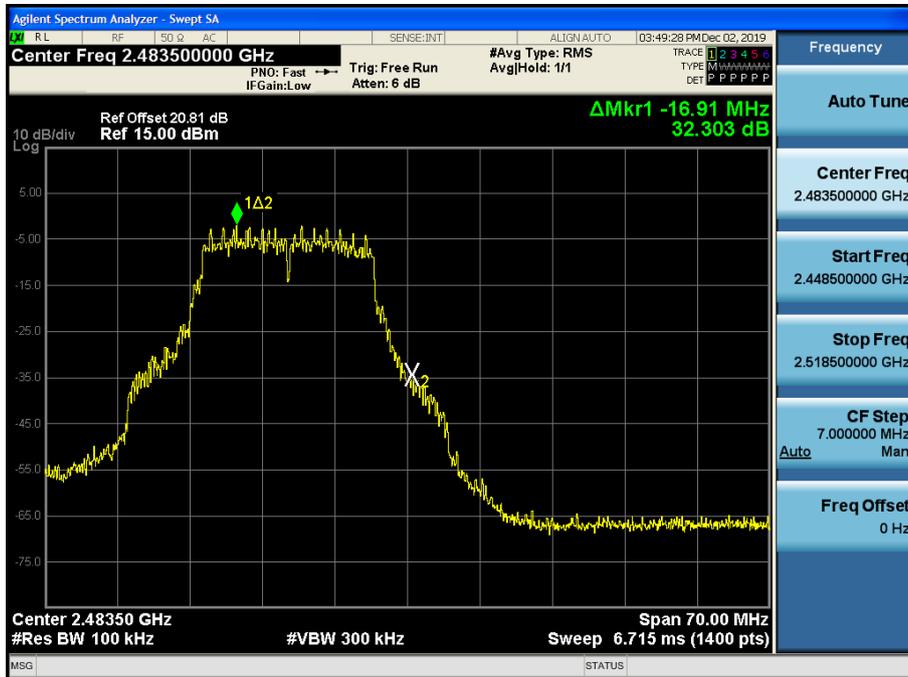
Band Edge (802.11g-CH11)



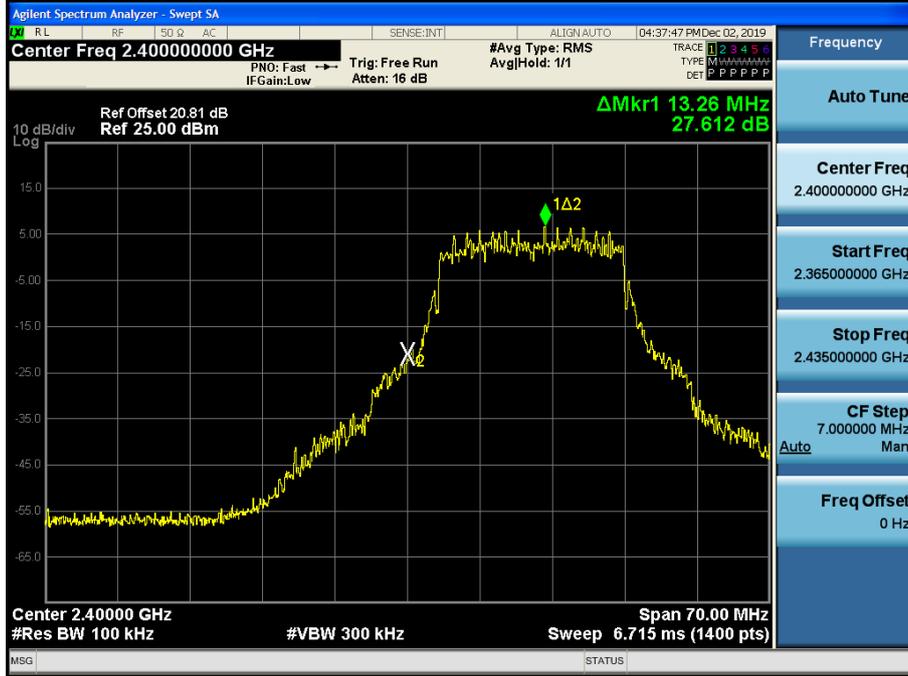
Band Edge (802.11g-CH12)



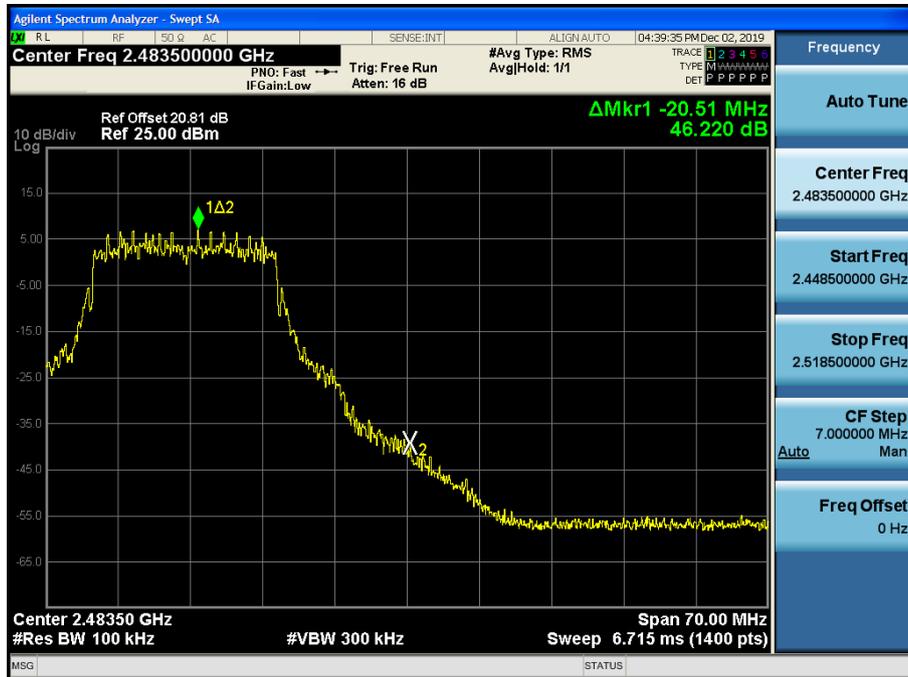
Band Edge (802.11g-CH13)



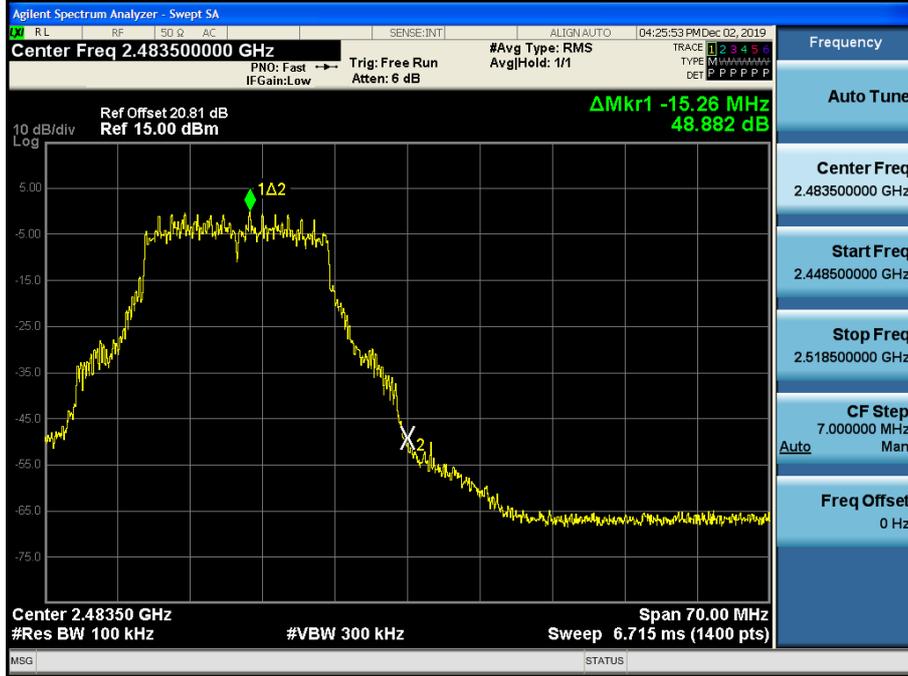
Band Edge (802.11n_HT20 -CH1)



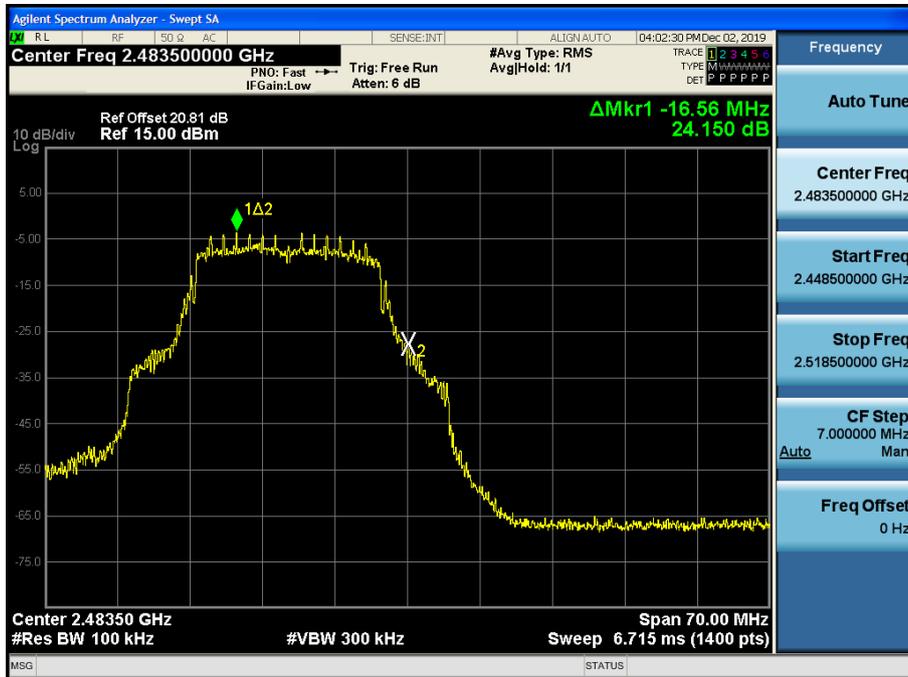
Band Edge (802.11n_HT20 -CH11)



Band Edge (802.11n_HT20 -CH12)



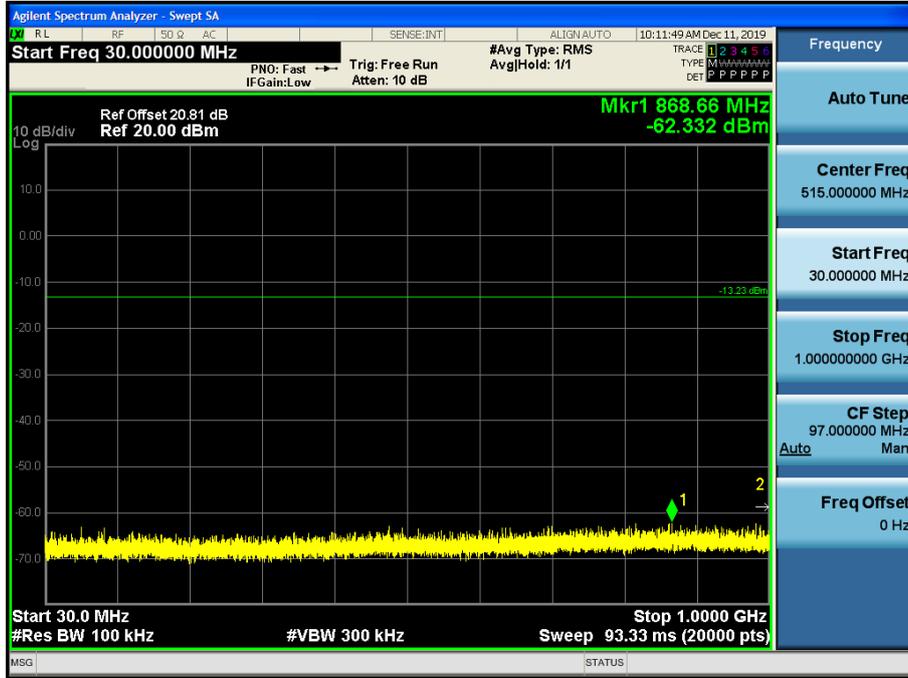
Band Edge (802.11n_HT20 -CH13)



Test Plots(Conducted Spurious Emission)

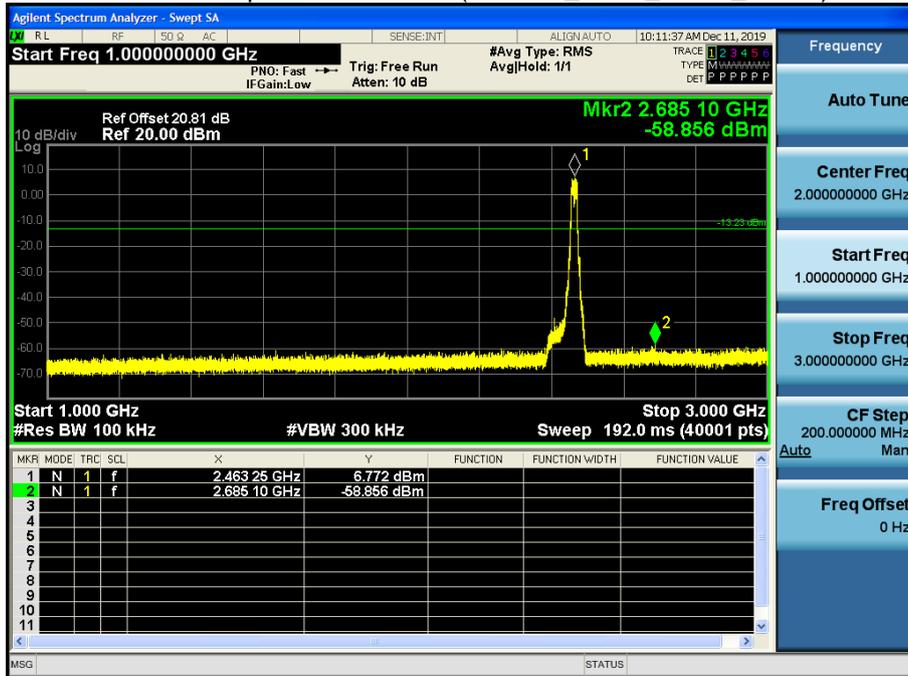
30 MHz ~ 1 GHz

Conducted Spurious Emission (802.11n_HT20_Ch.11_MCS3)



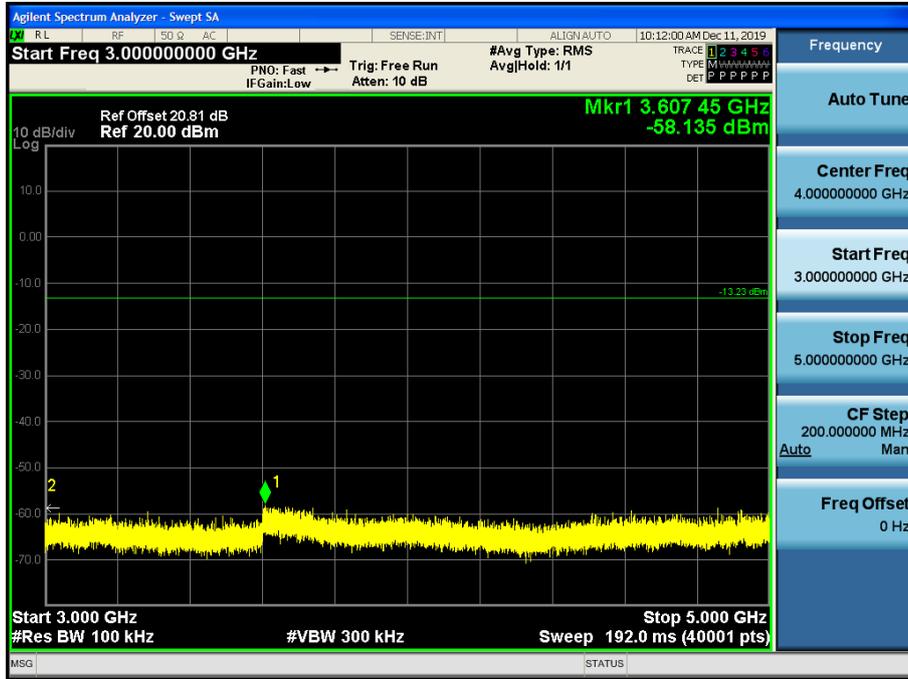
1 GHz ~ 3 GHz

Conducted Spurious Emission (802.11n_HT20_Ch.11_MCS3)



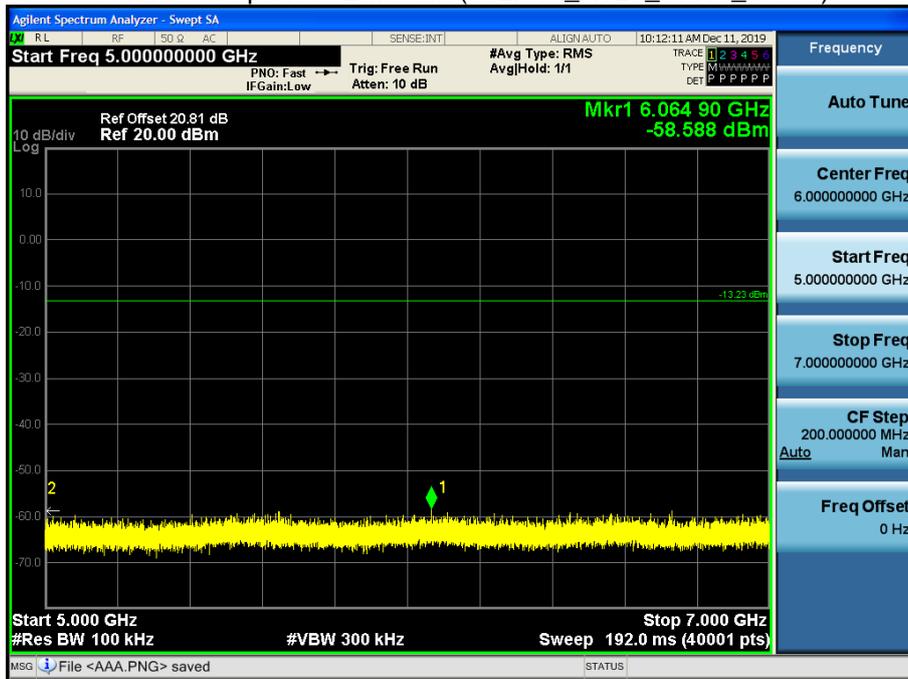
3 GHz ~ 5 GHz

Conducted Spurious Emission (802.11n_HT20_Ch.11_MCS3)



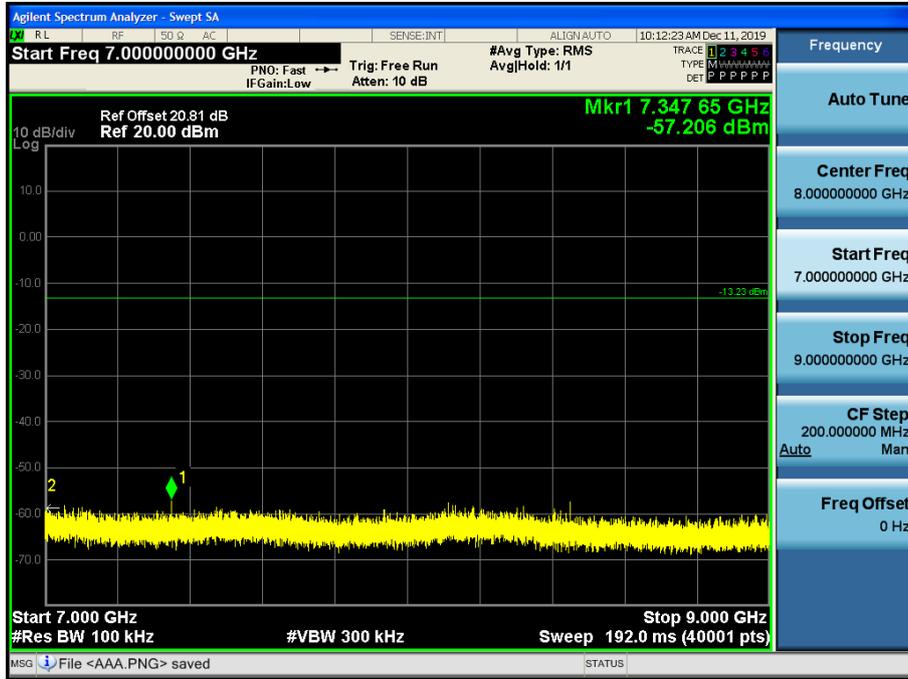
5 GHz ~ 7 GHz

Conducted Spurious Emission (802.11n_HT20_Ch.11_MCS3)



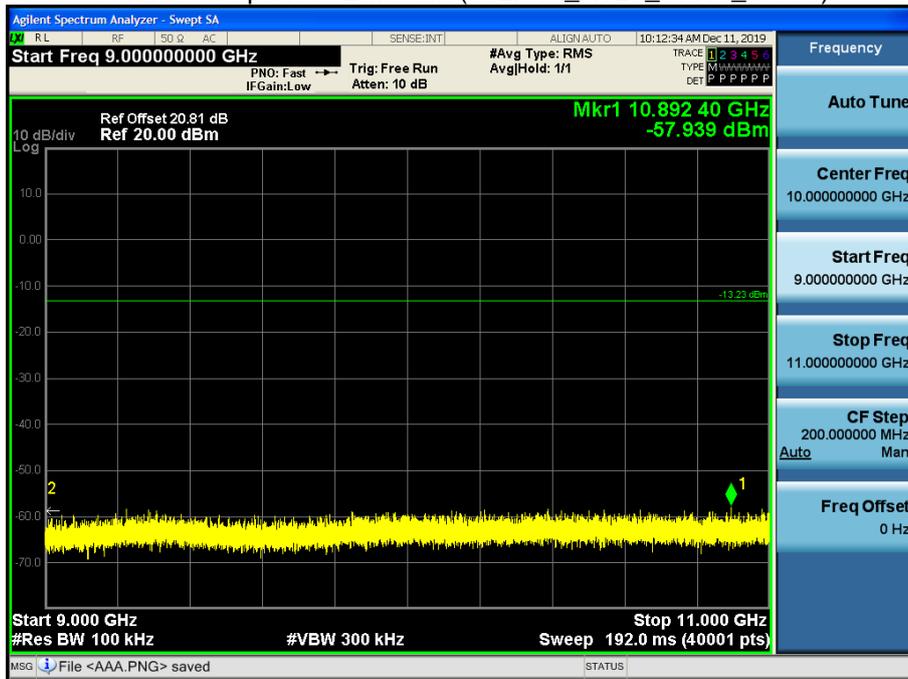
7 GHz ~ 9 GHz

Conducted Spurious Emission (802.11n_HT20_Ch.11_MCS3)



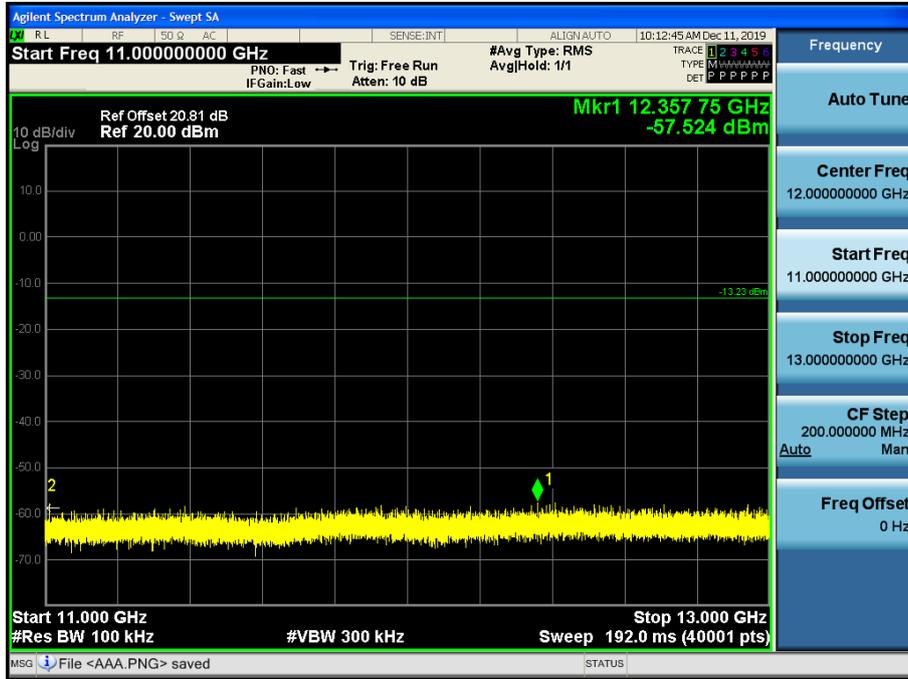
9 GHz ~ 11 GHz

Conducted Spurious Emission (802.11n_HT20_Ch.11_MCS3)



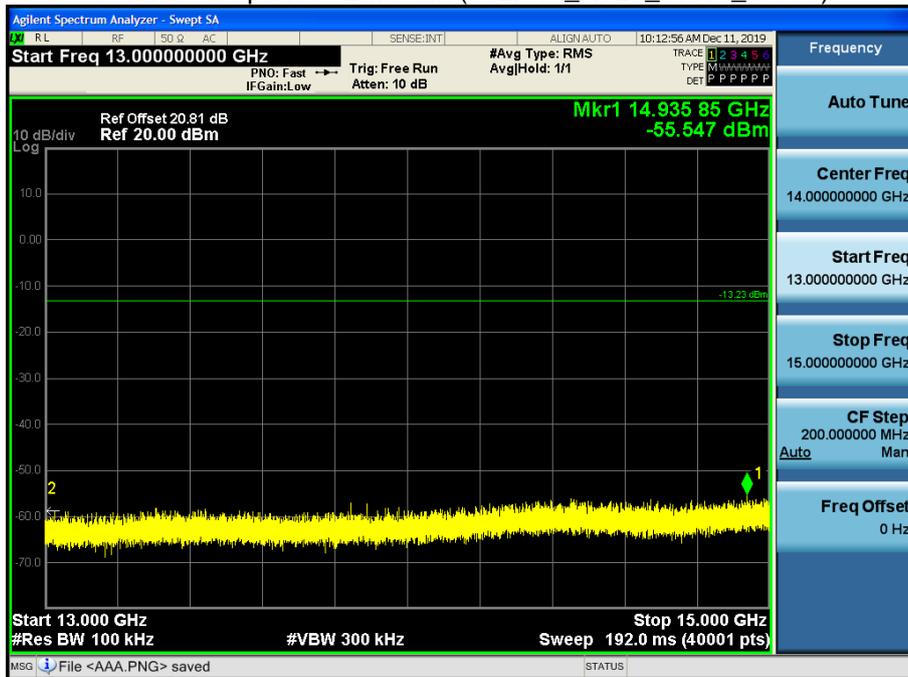
11 GHz ~ 13 GHz

Conducted Spurious Emission (802.11n_HT20_Ch.11_MCS3)



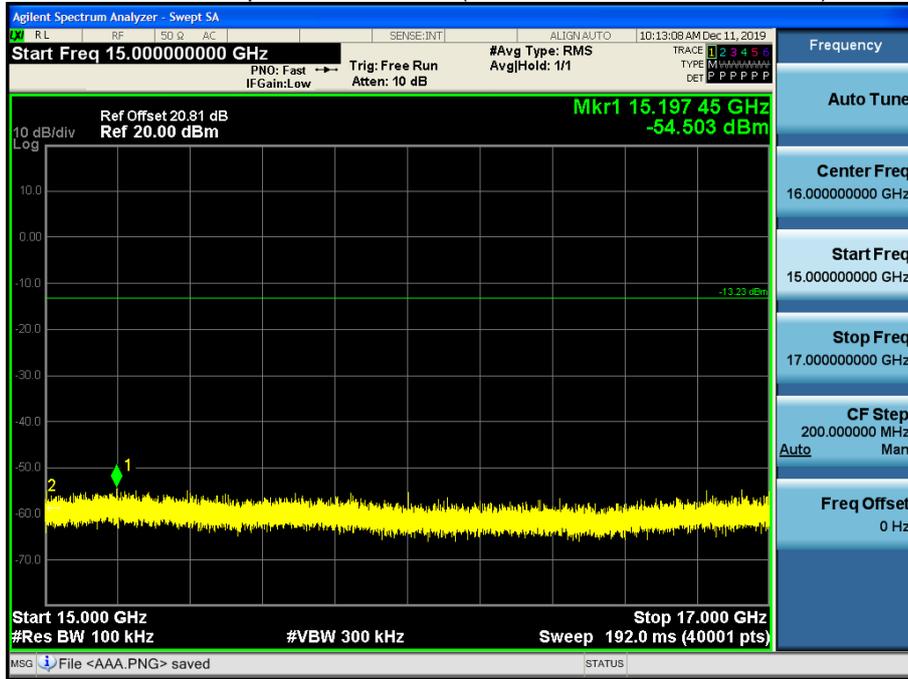
13 GHz ~ 15 GHz

Conducted Spurious Emission (802.11n_HT20_Ch.11_MCS3)



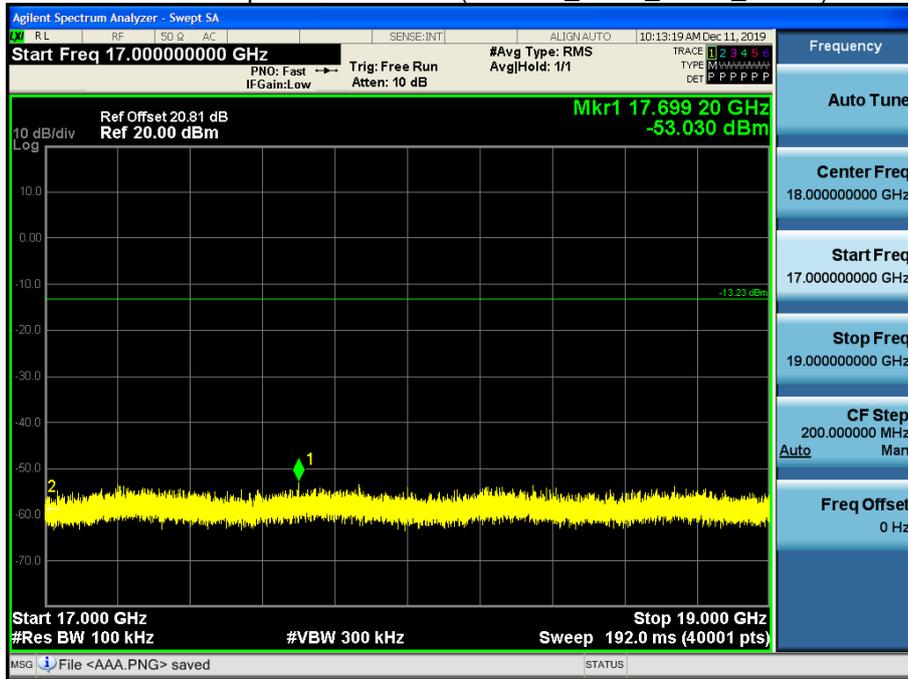
15 GHz ~ 17 GHz

Conducted Spurious Emission (802.11n_HT20_Ch.11_MCS3)



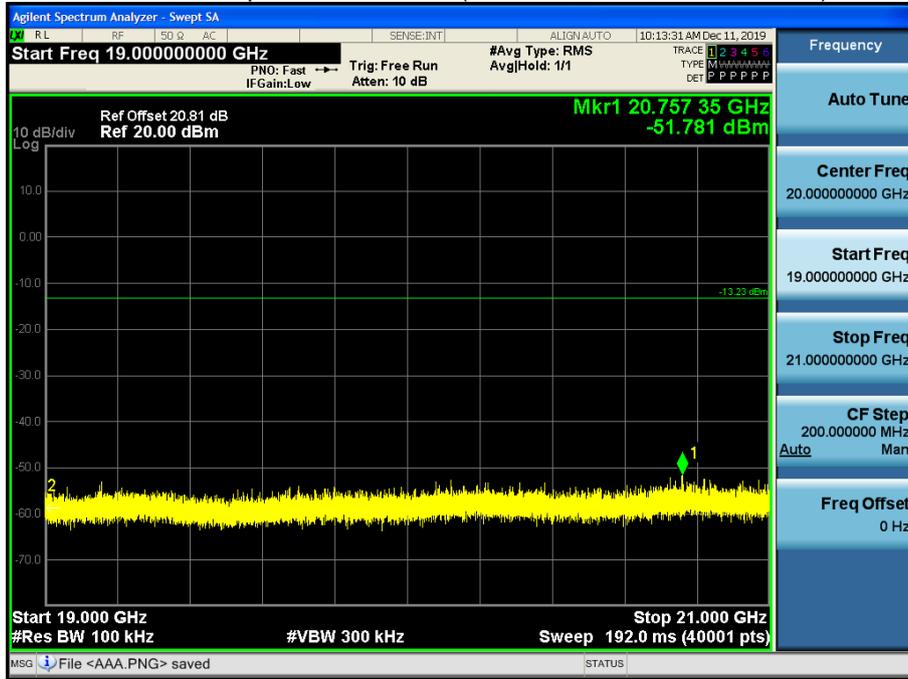
17 GHz ~ 19 GHz

Conducted Spurious Emission (802.11n_HT20_Ch.11_MCS3)



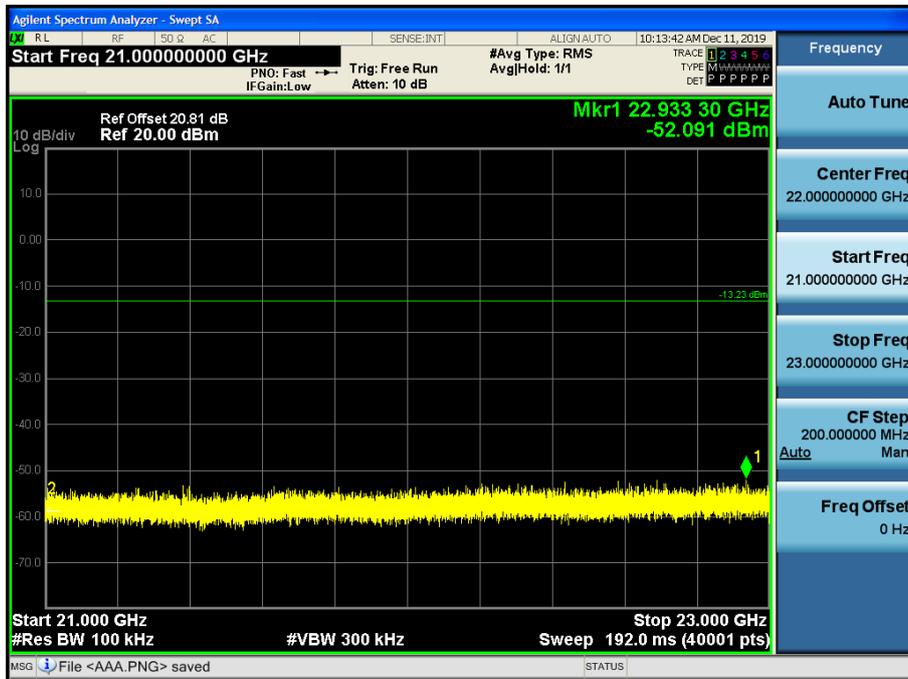
19 GHz ~ 21 GHz

Conducted Spurious Emission (802.11n_HT20_Ch.11_MCS3)



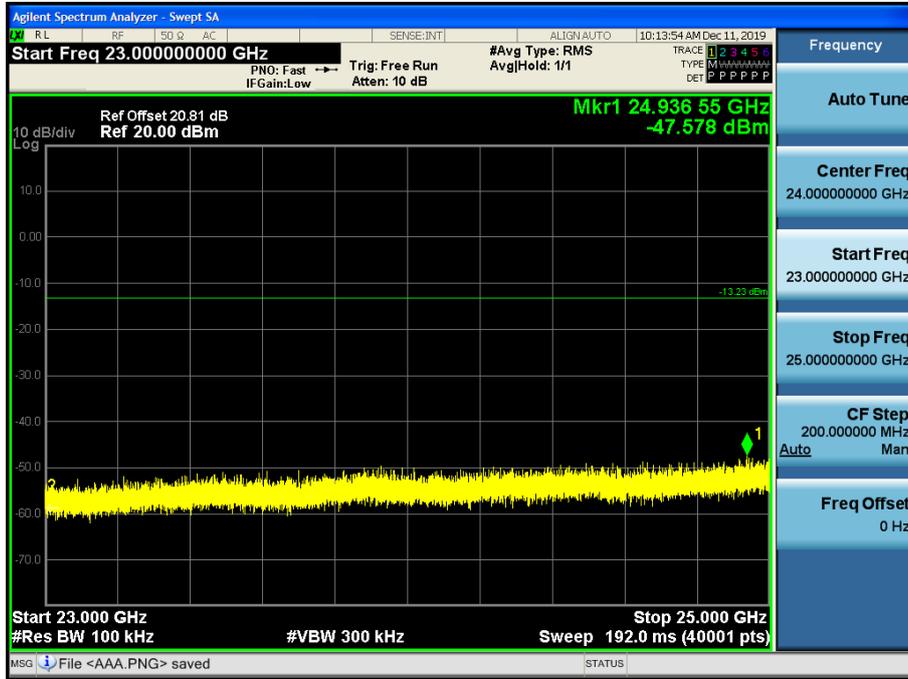
21 GHz ~ 23 GHz

Conducted Spurious Emission (802.11n_HT20_Ch.11_MCS3)



23 GHz ~ 25 GHz

Conducted Spurious Emission (802.11n_HT20_Ch.11_MCS3)



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
4. Radiated test is performed with hopping off.

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
 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	51.75	1.95	V	53.70	73.98	20.28	PK
4824	40.85	1.95	V	42.80	53.98	11.18	AV
7236	49.82	9.86	V	59.68	73.98	14.30	PK
7236	37.99	9.86	V	47.85	53.98	6.13	AV
4824	52.10	1.95	H	54.05	73.98	19.93	PK
4824	41.33	1.95	H	43.28	53.98	10.70	AV
7236	50.16	9.86	H	60.02	73.98	13.96	PK
7236	38.04	9.86	H	47.90	53.98	6.08	AV

Operation Mode: 802.11b
 Transfer Rate: 1 Mbps
 Operating Frequency 2437
 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	51.41	2.33	V	53.74	73.98	20.24	PK
4874	40.23	2.33	V	42.56	53.98	11.42	AV
7311	50.12	10.14	V	60.26	73.98	13.72	PK
7311	38.11	10.14	V	48.25	53.98	5.73	AV
4874	51.64	2.33	H	53.97	73.98	20.01	PK
4874	41.28	2.33	H	43.61	53.98	10.37	AV
7311	50.59	10.14	H	60.73	73.98	13.25	PK
7311	38.18	10.14	H	48.32	53.98	5.66	AV

Operation Mode: 802.11b
 Transfer Rate: 1 Mbps
 Operating Frequency: 2462
 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	50.32	2.28	V	52.60	73.98	21.38	PK
4924	40.43	2.28	V	42.71	53.98	11.27	AV
7386	49.47	9.81	V	59.28	73.98	14.70	PK
7386	37.17	9.81	V	46.98	53.98	7.00	AV
4924	51.21	2.28	H	53.49	73.98	20.49	PK
4924	41.45	2.28	H	43.73	53.98	10.25	AV
7386	49.99	9.81	H	59.80	73.98	14.18	PK
7386	37.21	9.81	H	47.02	53.98	6.96	AV

Operation Mode: 802.11b
 Transfer Rate: 1 Mbps
 Operating Frequency: 2467
 Channel No.: 12 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
4934	49.91	2.21	V	52.12	73.98	21.86	PK
4934	38.12	2.21	V	40.33	53.98	13.65	AV
7401	49.03	9.78	V	58.81	73.98	15.17	PK
7401	36.49	9.78	V	46.27	53.98	7.71	AV
4934	50.06	2.21	H	52.27	73.98	21.71	PK
4934	39.93	2.21	H	42.14	53.98	11.84	AV
7401	49.51	9.78	H	59.29	73.98	14.69	PK
7401	37.52	9.78	H	47.30	53.98	6.68	AV

Operation Mode: 802.11b
 Transfer Rate: 1 Mbps
 Operating Frequency: 2472
 Channel No.: 13 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
4944	50.80	2.35	V	53.15	73.98	20.83	PK
4944	38.15	2.35	V	40.50	53.98	13.48	AV
7416	49.22	9.80	V	59.02	73.98	14.96	PK
7416	36.88	9.80	V	46.68	53.98	7.30	AV
4944	51.22	2.35	H	53.57	73.98	20.41	PK
4944	38.95	2.35	H	41.30	53.98	12.68	AV
7416	49.78	9.80	H	59.58	73.98	14.40	PK
7416	37.68	9.80	H	47.48	53.98	6.50	AV

Operation Mode: 802.11g
 Transfer Rate: 6 Mbps
 Operating Frequency: 2412
 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]	Measure ment Type
4824	50.49	0.00	1.95	V	52.44	73.98	21.54	PK
4824	38.15	0.29	1.95	V	40.39	53.98	13.59	AV
7236	49.73	0.00	9.86	V	59.59	73.98	14.39	PK
7236	38.05	0.29	9.86	V	48.20	53.98	5.78	AV
4824	51.70	0.00	1.95	H	53.65	73.98	20.33	PK
4824	38.97	0.29	1.95	H	41.21	53.98	12.77	AV
7236	50.77	0.00	9.86	H	60.63	73.98	13.35	PK
7236	38.21	0.29	9.86	H	48.36	53.98	5.62	AV

Operation Mode: 802.11g
 Transfer Rate: 6 Mbps
 Operating Frequency: 2437
 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]	Measure ment Type
4874	50.20	0.00	2.33	V	52.53	73.98	21.45	PK
4874	38.72	0.29	2.33	V	41.34	53.98	12.64	AV
7311	49.64	0.00	10.14	V	59.78	73.98	14.20	PK
7311	37.41	0.29	10.14	V	47.84	53.98	6.14	AV
4874	51.21	0.00	2.33	H	53.54	73.98	20.44	PK
4874	38.88	0.29	2.33	H	41.50	53.98	12.48	AV
7311	50.51	0.00	10.14	H	60.65	73.98	13.33	PK
7311	37.99	0.29	10.14	H	48.42	53.98	5.56	AV

Operation Mode: 802.11g
 Transfer Rate: 6 Mbps
 Operating Frequency: 2462
 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	48.93	0.00	2.28	V	51.21	73.98	22.77	PK
4924	38.11	0.29	2.28	V	40.68	53.98	13.30	AV
7386	49.26	0.00	9.81	V	59.07	73.98	14.91	PK
7386	36.41	0.29	9.81	V	46.51	53.98	7.47	AV
4924	50.27	0.00	2.28	H	52.55	73.98	21.43	PK
4924	38.23	0.29	2.28	H	40.80	53.98	13.18	AV
7386	49.65	0.00	9.81	H	59.46	73.98	14.52	PK
7386	37.32	0.29	9.81	H	47.42	53.98	6.56	AV

Operation Mode: 802.11g
 Transfer Rate: 6 Mbps
 Operating Frequency: 2467
 Channel No.: 12 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
4934	49.91	0.00	2.21	V	52.12	73.98	21.86	PK
4934	38.12	0.29	2.21	V	40.62	53.98	13.36	AV
7401	49.03	0.00	9.78	V	58.81	73.98	15.17	PK
7401	36.49	0.29	9.78	V	46.56	53.98	7.42	AV
4934	50.06	0.00	2.21	H	52.27	73.98	21.71	PK
4934	39.93	0.29	2.21	H	42.43	53.98	11.55	AV
7401	49.51	0.00	9.78	H	59.29	73.98	14.69	PK
7401	37.52	0.29	9.78	H	47.59	53.98	6.39	AV

Operation Mode: 802.11g
 Transfer Rate: 6 Mbps
 Operating Frequency: 2472
 Channel No.: 13 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
4944	50.80	0.00	2.35	V	53.15	73.98	20.83	PK
4944	38.15	0.29	2.35	V	40.79	53.98	13.19	AV
7416	49.22	0.00	9.80	V	59.02	73.98	14.96	PK
7416	36.88	0.29	9.80	V	46.97	53.98	7.01	AV
4944	51.22	0.00	2.35	H	53.57	73.98	20.41	PK
4944	38.95	0.29	2.35	H	41.59	53.98	12.39	AV
7416	49.78	0.00	9.80	H	59.58	73.98	14.40	PK
7416	37.68	0.29	9.80	H	47.77	53.98	6.21	AV

Operation Mode: 802.11n (HT20)
 Transfer MCS Index: 0
 Operating Frequency: 2412
 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]	Measure ment Type
4824	50.60	0.00	1.95	V	52.55	73.98	21.43	PK
4824	38.54	0.32	1.95	V	40.81	53.98	13.17	AV
7236	49.75	0.00	9.86	V	59.61	73.98	14.37	PK
7236	38.10	0.32	9.86	V	48.28	53.98	5.70	AV
4824	51.62	0.00	1.95	H	53.57	73.98	20.41	PK
4824	38.96	0.32	1.95	H	41.23	53.98	12.75	AV
7236	50.98	0.00	9.86	H	60.84	73.98	13.14	PK
7236	38.23	0.32	9.86	H	48.41	53.98	5.57	AV

Operation Mode: 802.11n (HT20)
 Transfer MCS Index: 0
 Operating Frequency: 2437
 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]	Measure ment Type
4874	50.21	0.00	2.33	V	52.54	73.98	21.44	PK
4874	38.40	0.32	2.33	V	41.05	53.98	12.93	AV
7311	49.53	0.00	10.14	V	59.67	73.98	14.31	PK
7311	37.71	0.32	10.14	V	48.17	53.98	5.81	AV
4874	51.22	0.00	2.33	H	53.55	73.98	20.43	PK
4874	38.87	0.32	2.33	H	41.52	53.98	12.46	AV
7311	51.31	0.00	10.14	H	61.45	73.98	12.53	PK
7311	37.97	0.32	10.14	H	48.43	53.98	5.55	AV

Operation Mode: 802.11n (HT20)
 Transfer MCS Index: 0
 Operating Frequency: 2462
 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]	Measurement Type
4924	50.09	0.00	2.28	V	52.37	73.98	21.61	PK
4924	38.10	0.32	2.28	V	40.70	53.98	13.28	AV
7386	48.79	0.00	9.81	V	58.60	73.98	15.38	PK
7386	37.02	0.32	9.81	V	47.15	53.98	6.83	AV
4924	50.27	0.00	2.28	H	52.55	73.98	21.43	PK
4924	38.16	0.32	2.28	H	40.76	53.98	13.22	AV
7386	49.36	0.00	9.81	H	59.17	73.98	14.81	PK
7386	37.29	0.32	9.81	H	47.42	53.98	6.56	AV

Operation Mode: 802.11n (HT20)
 Transfer MCS Index: 0
 Operating Frequency: 2467
 Channel No.: 12 Ch

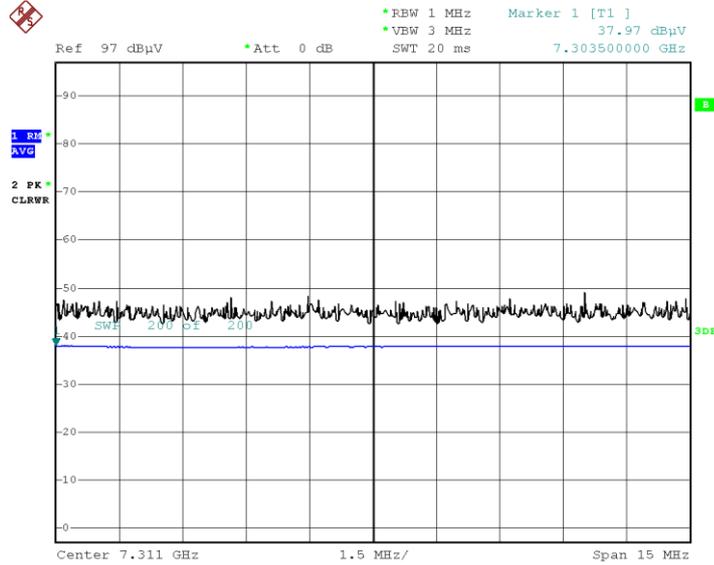
Frequency [MHz]	Reading [dBuV]	Duty Cycle Factor [dB]	A.F.+C.L.-A.G+D.F. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
4934	50.09	0.00	2.21	V	52.30	73.98	21.68	PK
4934	38.02	0.32	2.21	V	40.55	53.98	13.43	AV
7401	49.11	0.00	9.78	V	58.89	73.98	15.09	PK
7401	37.51	0.32	9.78	V	47.61	53.98	6.37	AV
4934	50.62	0.00	2.21	H	52.83	73.98	21.15	PK
4934	38.27	0.32	2.21	H	40.80	53.98	13.18	AV
7401	49.74	0.00	9.78	H	59.52	73.98	14.46	PK
7401	37.78	0.32	9.78	H	47.88	53.98	6.10	AV

Operation Mode: 802.11n (HT20)
 Transfer MCS Index: 0
 Operating Frequency: 2472
 Channel No. 13 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
4944	49.58	0.00	2.35	V	51.93	73.98	22.05	PK
4944	38.21	0.32	2.35	V	40.88	53.98	13.10	AV
7416	49.11	0.00	9.80	V	58.91	73.98	15.07	PK
7416	37.54	0.32	9.80	V	47.66	53.98	6.32	AV
4944	50.36	0.00	2.35	H	52.71	73.98	21.27	PK
4944	38.56	0.32	2.35	H	41.23	53.98	12.75	AV
7416	50.28	0.00	9.80	H	60.08	73.98	13.90	PK
7416	37.94	0.32	9.80	H	48.06	53.98	5.92	AV

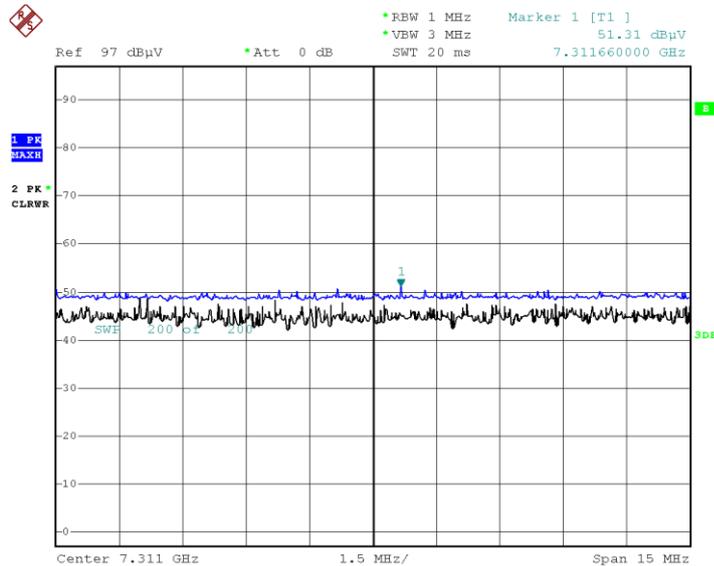
Test Plots (Worst case : Y-H)

Radiated Spurious Emissions plot – Average Reading (802.11n (HT20)_MCS0, Ch.6 3rd Harmonic)



Date: 1.DEC.2019 13:53:21

Radiated Spurious Emissions plot – Peak Reading (802.11n (HT20)_MCS0, Ch.6 3rd Harmonic)



Date: 1.DEC.2019 13:54:53

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.+D.F. -A.G+ATT [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
2390.0	52.98	0.85	H	53.83	73.98	20.15	PK
2390.0	41.85	0.85	H	42.70	53.98	11.28	AV
2390.0	52.05	0.85	V	52.90	73.98	21.08	PK
2390.0	41.54	0.85	V	42.39	53.98	11.59	AV
2483.5	55.96	1.13	H	57.09	73.98	16.89	PK
2483.5	44.53	1.13	H	45.66	53.98	8.32	AV
2483.5	54.27	1.13	V	55.40	73.98	18.58	PK
2483.5	41.91	1.13	V	43.04	53.98	10.94	AV

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

Frequency [MHz]	Reading [dBuV]	A.F.+C.L.+D.F. -A.G+ATT [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
2483.5	54.50	1.13	H	55.63	73.98	18.35	PK
2483.5	42.36	1.13	H	43.49	53.98	10.49	AV
2483.5	53.43	1.13	V	54.56	73.98	19.42	PK
2483.5	41.95	1.13	V	43.08	53.98	10.90	AV

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

Frequency [MHz]	Reading [dBuV]	A.F.+C.L.+D.F. -A.G+ATT [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
2483.5	57.45	1.13	H	58.58	73.98	15.40	PK
2483.5	48.65	1.13	H	49.78	53.98	4.20	AV
2483.5	56.31	1.13	V	57.44	73.98	16.54	PK
2483.5	48.57	1.13	V	49.70	53.98	4.28	AV

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

Frequency [MHz]	Reading [dBuV]	Duty Cycle Factor [dB]	A.F.+C.L.+D.F -A.G+ATT. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
2390.0	57.99	0.00	0.85	H	58.84	73.98	15.14	PK
2390.0	44.43	0.29	0.85	H	45.57	53.98	8.41	AV
2390.0	57.58	0.00	0.85	V	58.43	73.98	15.55	PK
2390.0	43.55	0.29	0.85	V	44.69	53.98	9.29	AV
2483.5	68.21	0.00	1.13	H	69.34	73.98	4.64	PK
2483.5	48.49	0.29	1.13	H	49.91	53.98	4.07	AV
2483.5	67.46	0.00	1.13	V	68.59	73.98	5.39	PK
2483.5	48.03	0.29	1.13	V	49.45	53.98	4.53	AV

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

Frequency [MHz]	Reading [dBuV]	Duty Cycle Factor [dB]	A.F.+C.L.+D.F -A.G+ATT. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
2483.5	57.53	0.00	1.13	V	58.66	73.98	15.32	PK
2483.5	43.18	0.29	1.13	V	44.60	53.98	9.38	AV
2483.5	56.71	0.00	1.13	H	57.84	73.98	16.14	PK
2483.5	42.99	0.29	1.13	H	44.41	53.98	9.57	AV

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

Frequency [MHz]	Reading [dBuV]	Duty Cycle Factor [dB]	A.F.+C.L.+D.F -A.G+ATT. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
2483.5※(2484)	61.86	0.00	1.13	V	62.99	73.98	10.99	PK
2483.5※(2484)	50.36	0.29	1.13	V	51.78	53.98	2.20	AV
2483.5※(2485)	59.20	0.00	1.13	H	60.33	73.98	13.65	PK
2483.5※(2485)	47.81	0.29	1.13	H	49.23	53.98	4.75	AV
2485.5~2500	64.87	0.00	1.13	H	66.00	73.98	7.98	PK
2485.5~2500	47.32	0.29	1.13	H	48.74	53.98	5.24	AV

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

Operation Mode: 802.11n (HT20)
 Transfer Rate: 0
 Operating Frequency: 2412 MHz, 2462 MHz
 Channel No.: 01 Ch, 11 Ch

Frequency [MHz]	Reading [dBuV]	Duty Cycle Factor [dB]	A.F.+C.L.+D.F -A.G+ATT [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
2390.0	59.41	0.00	0.85	H	60.26	73.98	13.72	PK
2390.0	46.32	0.32	0.85	H	47.49	53.98	6.49	AV
2390.0	58.20	0.00	0.85	V	59.05	73.98	14.93	PK
2390.0	45.40	0.32	0.85	V	46.57	53.98	7.41	AV
2483.5	56.11	0.00	1.13	H	57.24	73.98	16.74	PK
2483.5	43.04	0.32	1.13	H	44.49	53.98	9.49	AV
2483.5	54.98	0.00	1.13	V	56.11	73.98	17.87	PK
2483.5	42.74	0.32	1.13	V	44.19	53.98	9.79	AV

Operation Mode: 802.11n (HT20)
 Transfer Rate: 0
 Operating Frequency: 2467 MHz
 Channel No.: 12 Ch

Frequency [MHz]	Reading [dBuV]	Duty Cycle Factor [dB]	A.F.+C.L.+D.F -A.G+ATT [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
2483.5	58.53	0.00	1.13	H	59.66	73.98	14.32	PK
2483.5	43.72	0.32	1.13	H	45.17	53.98	8.81	AV
2483.5	57.63	0.00	1.13	V	58.76	73.98	15.22	PK
2483.5	43.15	0.32	1.13	V	44.60	53.98	9.38	AV

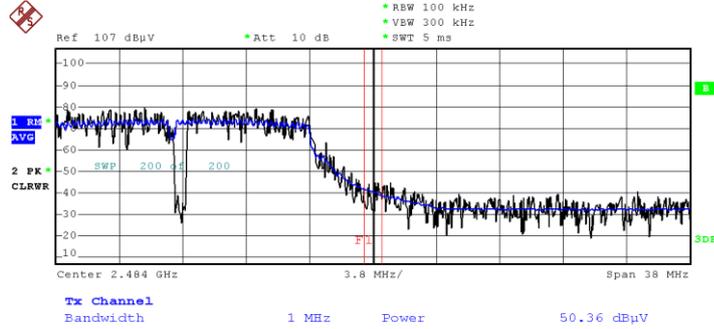
Operation Mode: 802.11n (HT20)
 Transfer Rate: 0
 Operating Frequency: 2472 MHz
 Channel No.: 13 Ch

Frequency [MHz]	Reading [dBuV]	Duty Cycle Factor [dB]	A.F.+C.L.+D.F -A.G+ATT. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
2483.5*(2484)	61.77	0.00	1.13	V	62.90	73.98	11.08	PK
2483.5*(2484)	48.73	0.32	1.13	V	50.18	53.98	3.80	AV
2483.5*(2485)	60.37	0.00	1.13	H	61.50	73.98	12.48	PK
2483.5*(2485)	46.67	0.32	1.13	H	48.12	53.98	5.86	AV
2485.5~2500	65.75	0.00	1.13	H	66.88	73.98	7.10	PK
2485.5~2500	45.83	0.32	1.13	H	47.28	53.98	6.70	AV

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

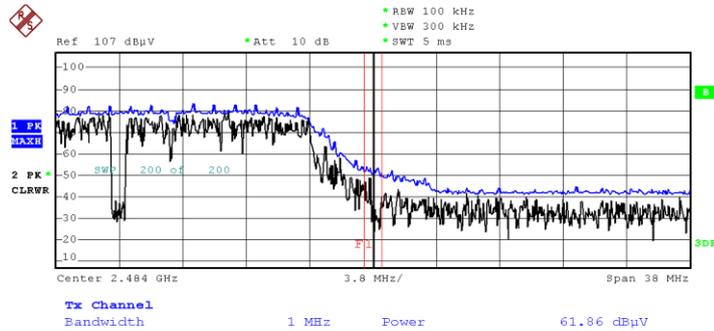
■ Test Plots (Worst case : X-H)

Radiated Restricted Band Edges plot – Average Reading (802.11g_6 Mbps Ch.13) - 2 484 MHz



Date: 21.NOV.2019 13:34:25

Radiated Restricted Band Edges plot – Peak Reading (802.11g_6 Mbps Ch.13) - 2 484 MHz



Date: 21.NOV.2019 13:36:03

Radiated Restricted Band Edges plot – Average Reading (802.11g_6 Mbps Ch.13) - 2 485 MHz



Date: 21.NOV.2019 13:37:29

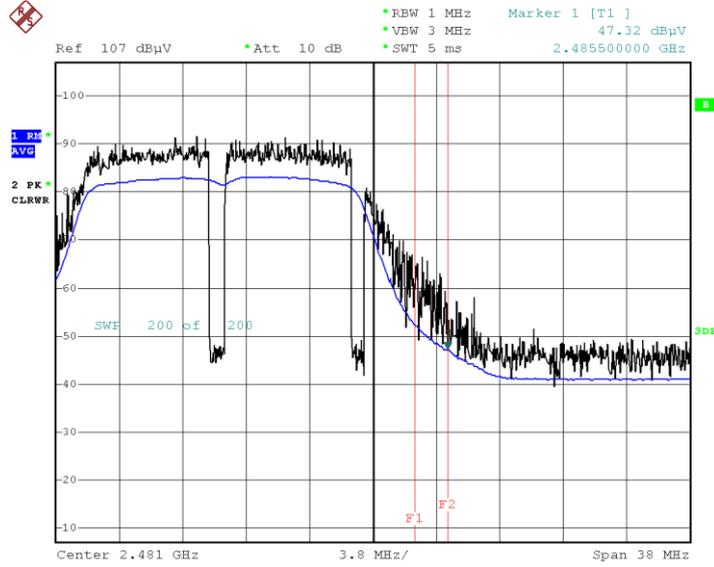
Radiated Restricted Band Edges plot – Peak Reading (802.11g_6 Mbps Ch.13) - 2 485 MHz



Date: 21.NOV.2019 13:37:03

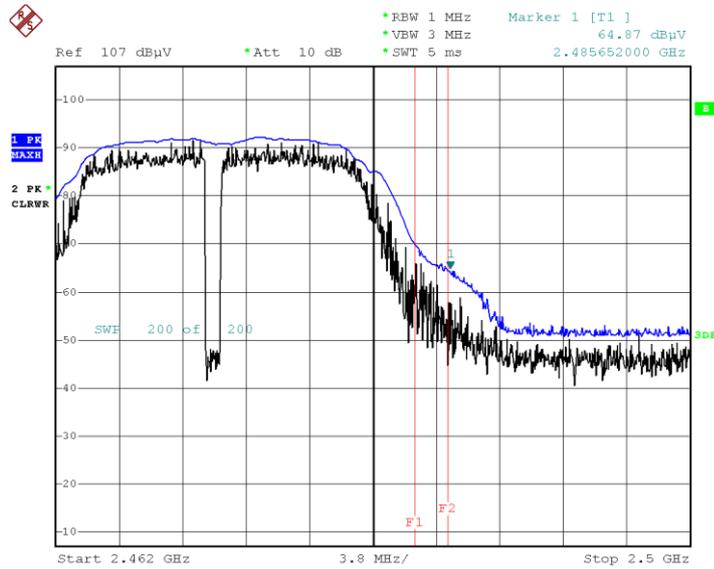
Radiated Restricted Band Edges plot – Average Reading (802.11g_6 Mbps Ch.13) – 2 485.5 MHz ~ 2 500

MHz



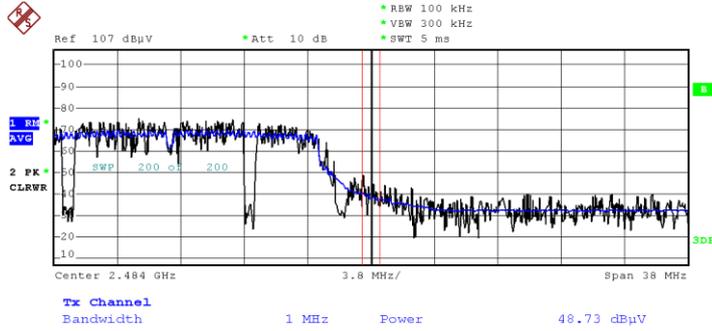
Date: 21.NOV.2019 13:40:41

Radiated Restricted Band Edges plot – Peak Reading (802.11g_6 Mbps Ch.13) - 2 485.5 MHz ~ 2 500 MHz



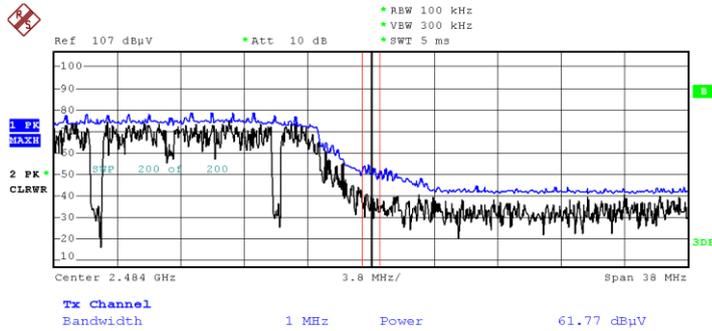
Date: 21.NOV.2019 13:41:41

Radiated Restricted Band Edges plot – Average Reading (802.11n (HT20)_ MCS0 Ch.13) - 2 484 MHz



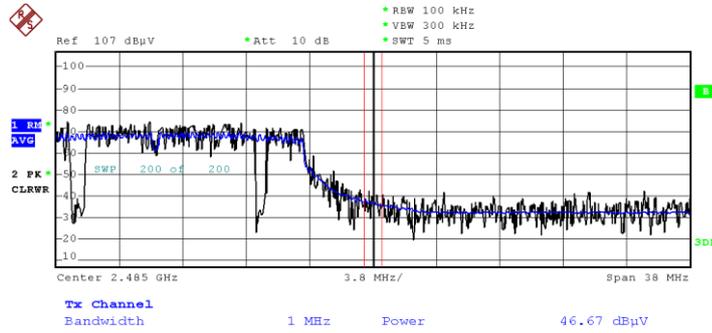
Date: 21.NOV.2019 13:52:53

Radiated Restricted Band Edges plot – Peak Reading (802.11n (HT20)_ MCS0 Ch.13) - 2 484 MHz



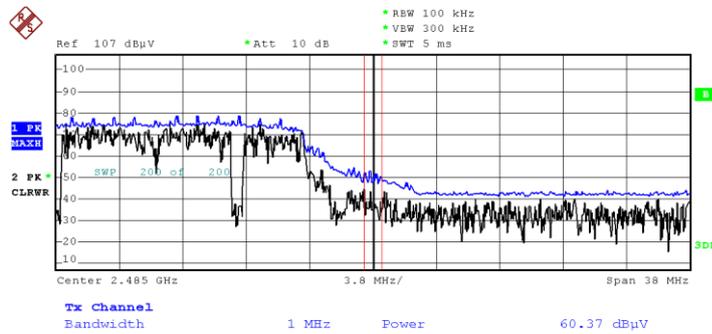
Date: 21.NOV.2019 13:55:05

Radiated Restricted Band Edges plot – Average Reading (802.11n (HT20)_ MCS0 Ch.13) - 2 485 MHz



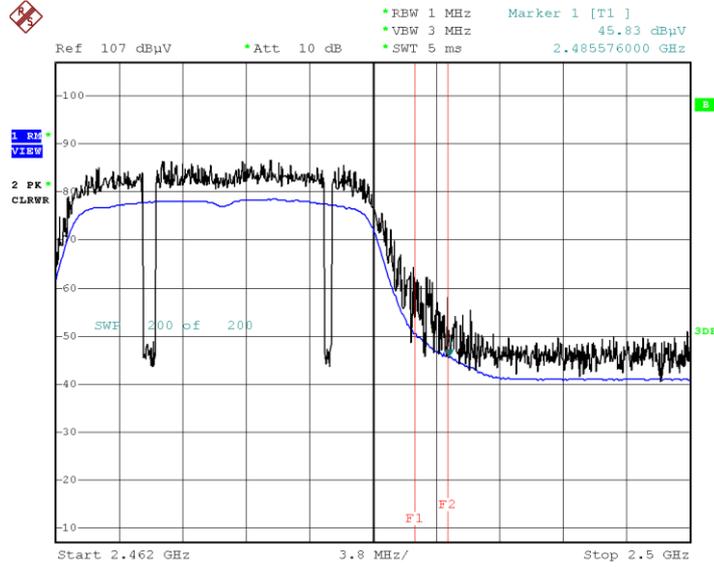
Date: 21.NOV.2019 13:55:39

Radiated Restricted Band Edges plot – Peak Reading (802.11n (HT20)_ MCS0 Ch.13) - 2 485 MHz



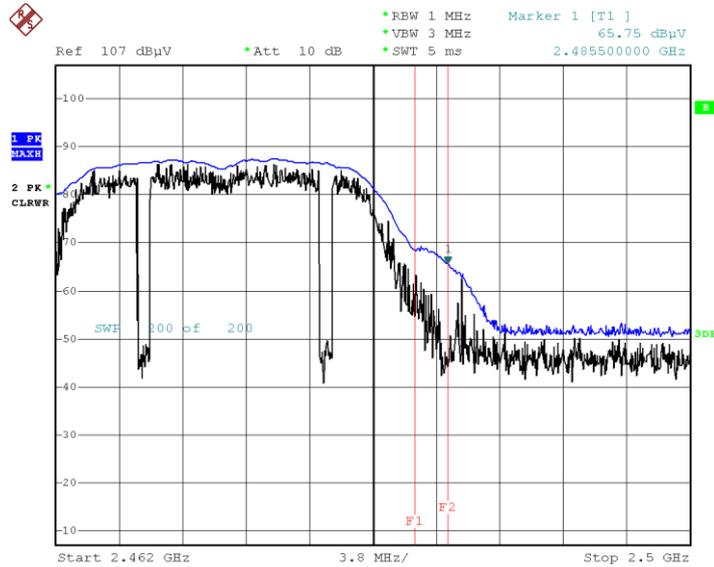
Date: 21.NOV.2019 13:58:48

Radiated Restricted Band Edges plot – Average Reading (802.11n (HT20)_ MCS0 Ch.13) – 2 485.5 MHz ~ 2 500 MHz



Date: 21.NOV.2019 14:00:57

Radiated Restricted Band Edges plot – Peak Reading (802.11n (HT20)_ MCS0 Ch.13) - 2 485.5 MHz ~ 2 500 MHz



Date: 21.NOV.2019 14:00:18

Note:

Plot of worst case are only reported.

9.8 RECEIVER SPURIOUS EMISSIONS

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

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							

9.9 POWERLINE CONDUCTED EMISSIONS

Conducted Emissions (Line 1)

Test

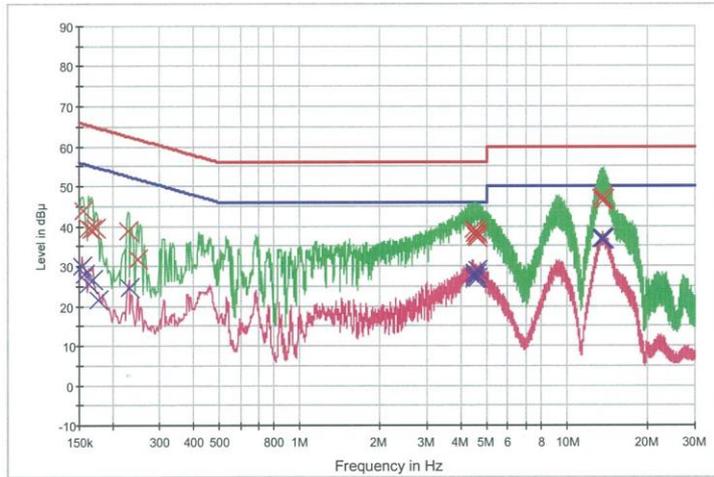
1 / 2

HCT TEST Report

Common Information

EUT: SM-G715FN/DS
 Manufacturer: SAMSUNG
 Test Site: SHIELD ROOM
 Operating Conditions: WLAN_2.4G_L1

FCC CLASS B_Exten Cable



— FCC CLASS B_QP — FCC CLASS B_AV — Preview Result 1-PK+
 — Preview Result 2-AVG x Final Result 1-QPK x Final Result 2-CAV

Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.156000	44.0	9.000	Off	L1	9.8	21.6	65.7
0.162000	39.3	9.000	Off	L1	9.8	26.0	65.4
0.166000	39.0	9.000	Off	L1	9.8	26.1	65.2
0.172000	39.5	9.000	Off	L1	9.8	25.4	64.9
0.228000	38.8	9.000	Off	L1	9.8	23.7	62.5
0.248000	31.8	9.000	Off	L1	9.8	30.0	61.8
4.470000	39.1	9.000	Off	L1	10.0	16.9	56.0
4.494000	38.0	9.000	Off	L1	10.0	18.0	56.0
4.550000	37.4	9.000	Off	L1	10.0	18.6	56.0
4.588000	38.8	9.000	Off	L1	10.0	17.2	56.0
4.620000	38.2	9.000	Off	L1	10.0	17.8	56.0
4.634000	37.1	9.000	Off	L1	10.0	18.9	56.0
13.396000	47.0	9.000	Off	L1	10.4	13.0	60.0
13.522000	46.2	9.000	Off	L1	10.4	13.8	60.0
13.548000	46.3	9.000	Off	L1	10.4	13.7	60.0
13.590000	47.2	9.000	Off	L1	10.4	12.8	60.0
13.638000	46.7	9.000	Off	L1	10.4	13.3	60.0
13.674000	46.4	9.000	Off	L1	10.4	13.6	60.0

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Test

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Final Result 2

Frequency (MHz)	CAverage (dBuV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.154000	30.0	9.000	Off	L1	9.8	25.8	55.8
0.158000	28.0	9.000	Off	L1	9.8	27.6	55.6
0.162000	25.5	9.000	Off	L1	9.8	29.9	55.4
0.168000	26.7	9.000	Off	L1	9.8	28.4	55.1
0.176000	21.6	9.000	Off	L1	9.8	33.1	54.7
0.230000	24.6	9.000	Off	L1	9.8	27.8	52.4
4.494000	27.0	9.000	Off	L1	10.0	19.0	46.0
4.504000	27.7	9.000	Off	L1	10.0	18.3	46.0
4.514000	28.3	9.000	Off	L1	10.0	17.7	46.0
4.588000	27.8	9.000	Off	L1	10.0	18.2	46.0
4.620000	29.0	9.000	Off	L1	10.0	17.0	46.0
4.634000	26.9	9.000	Off	L1	10.0	19.1	46.0
13.396000	36.7	9.000	Off	L1	10.4	13.3	50.0
13.522000	36.8	9.000	Off	L1	10.4	13.2	50.0
13.548000	37.2	9.000	Off	L1	10.4	12.8	50.0
13.638000	36.7	9.000	Off	L1	10.4	13.3	50.0
13.656000	36.6	9.000	Off	L1	10.4	13.4	50.0
13.674000	36.6	9.000	Off	L1	10.4	13.4	50.0

2019-12-09

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Conducted Emissions (Line 2)

Test

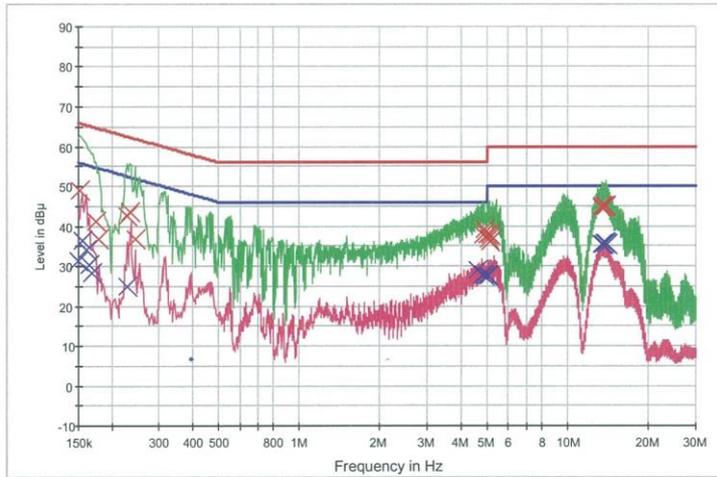
1 / 2

HCT TEST Report

Common Information

EUT: SM-G715FN/DS
 Manufacturer: SAMSUNG
 Test Site: SHIELD ROOM
 Operating Conditions: WLAN_2.4G_N

FCC CLASS B_Exten Cable



— FCC CLASS B_QP — FCC CLASS B_AV — Preview Result 1-PK+
 — Preview Result 2-AVG × Final Result 1-QPK × Final Result 2-CAV

Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.152000	49.1	9.000	Off	N	9.8	16.8	65.9
0.174000	41.2	9.000	Off	N	9.8	23.5	64.8
0.178000	36.6	9.000	Off	N	9.8	28.0	64.6
0.228000	42.7	9.000	Off	N	9.8	19.8	62.5
0.234000	43.5	9.000	Off	N	9.8	18.8	62.3
0.244000	36.7	9.000	Off	N	9.8	25.3	62.0
4.830000	37.8	9.000	Off	N	10.1	18.2	56.0
4.910000	39.2	9.000	Off	N	10.1	16.8	56.0
5.016000	37.9	9.000	Off	N	10.1	22.1	60.0
5.076000	36.9	9.000	Off	N	10.1	23.1	60.0
5.124000	37.7	9.000	Off	N	10.1	22.3	60.0
5.152000	36.0	9.000	Off	N	10.1	24.0	60.0
13.372000	44.5	9.000	Off	N	10.5	15.5	60.0
13.400000	44.9	9.000	Off	N	10.5	15.1	60.0
13.416000	44.9	9.000	Off	N	10.5	15.1	60.0
13.668000	44.9	9.000	Off	N	10.5	15.1	60.0
13.802000	44.9	9.000	Off	N	10.5	15.1	60.0
13.878000	44.9	9.000	Off	N	10.5	15.1	60.0

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Test

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Final Result 2

Frequency (MHz)	CAverage (dBuV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.150000	31.2	9.000	Off	N	9.8	24.8	56.0
0.156000	36.5	9.000	Off	N	9.8	19.2	55.7
0.160000	34.0	9.000	Off	N	9.8	21.4	55.5
0.164000	30.5	9.000	Off	N	9.8	24.8	55.3
0.168000	28.5	9.000	Off	N	9.8	26.6	55.1
0.228000	24.9	9.000	Off	N	9.8	27.6	52.5
4.622000	28.8	9.000	Off	N	10.0	17.2	46.0
4.626000	28.9	9.000	Off	N	10.0	17.1	46.0
4.832000	27.8	9.000	Off	N	10.1	18.2	46.0
4.914000	27.6	9.000	Off	N	10.1	18.4	46.0
5.016000	27.6	9.000	Off	N	10.1	22.4	50.0
5.076000	27.7	9.000	Off	N	10.1	22.3	50.0
13.400000	35.3	9.000	Off	N	10.5	14.7	50.0
13.472000	35.6	9.000	Off	N	10.5	14.4	50.0
13.668000	35.9	9.000	Off	N	10.5	14.1	50.0
13.802000	35.8	9.000	Off	N	10.5	14.2	50.0
13.878000	35.8	9.000	Off	N	10.5	14.2	50.0
13.976000	35.5	9.000	Off	N	10.5	14.5	50.0

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10. LIST OF TEST EQUIPMENT

Conducted Test

Manufacturer	Model / Equipment	Calibration Date	Calibration Interval	Serial No.
Rohde & Schwarz	ENV216 / LISN	09/11/2019	Annual	102245
Rohde & Schwarz	ESCI / Test Receiver	06/18/2019	Annual	100584
EXP	EX-TH064 /Temperature Chamber	03/12/2019	Annual	NONE
Agilent	N9020A / Signal Analyzer	05/23/2019	Annual	MY51110085
Agilent	N9030A / Signal Analyzer	05/09/2019	Annual	MY49432108
Agilent	N1911A / Power Meter	04/10/2019	Annual	MY45100523
Agilent	N1921A / Power Sensor	04/10/2019	Annual	MY52260025
Agilent	87300B / Directional Coupler	11/11/2019	Annual	3116A03621
Hewlett Packard	11667B / Power Splitter	05/24/2019	Annual	05001
Hewlett Packard	E3632A / DC Power Supply	06/18/2019	Annual	KR75303960
Agilent	8493C / Attenuator(10 dB)	07/02/2019	Annual	07560
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
Rohde & Schwarz	CBT / Bluetooth Tester	05/16/2019	Annual	100422

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
Rohde & Schwarz	Loop Antenna	08/23/2018	Biennial	1513-175
Schwarzbeck	VULB 9168 / Hybrid Antenna	08/31/2018	Biennial	00895
Schwarzbeck	VULB 9168 / Hybrid Antenna	08/09/2018	Biennial	3368
Schwarzbeck	BBHA 9120D / Horn Antenna	06/28/2019	Biennial	1300
Schwarzbeck	BBHA9170 / Horn Antenna(15 GHz ~ 40 GHz)	04/29/2019	Biennial	BBHA9170342
Rohde & Schwarz	FSP(9 kHz ~ 40 GHz) / Spectrum Analyzer	07/16/2019	Annual	100843
Wainwright Instruments	WHK3.0/18G-10EF / High Pass Filter	01/03/2019	Annual	F6
Wainwright Instruments	WHFX7.0/18G-8SS / High Pass Filter	05/03/2019	Annual	29
Wainwright Instruments	WRCJV2400/2483.5-2370/2520-60/12SS / Band Reject Filter	06/19/2019	Annual	2
Wainwright Instruments	WRCJV5100/5850-40/50-8EEK / Band Reject Filter	01/03/2019	Annual	2
Weinschel	2-3 / Attenuator (3 dB)	10/08/2019	Annual	BR0617
H+S	5910-N-50-010 / Attenuator(10 dB)	10/29/2019	Annual	None
CERNEX	CBLU1183540B-01 / Power Amplifier	12/21/2018	Annual	25540
CERNEX	CBL06185030 / Power Amplifier	03/26/2019	Annual	28550
CERNEX	CBL18265035 / Power Amplifier	01/03/2019	Annual	22966
CERNEX	CBL26405040 / Power Amplifier	06/18/2019	Annual	25956
TESCOM	TC-3000C / Bluetooth Tester	03/26/2019	Annual	3000C000276

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-2001-FI008-P