

FCC DTS REPORT

Certification

Applicant Name:
SAMSUNG Electronics Co., Ltd.

Date of Issue:
November 22, 2018

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

Test Site/Location:
HCT CO., LTD., 74,Seoicheon-ro 578beon-gil,Majang-myeo,Icheon-si, Gyeonggi-do, 17383, Rep. of KOREA

Report No.: HCT-RF-1811-FC020

FCC ID: A3LSMG8870

APPLICANT: SAMSUNG Electronics Co., Ltd.

Model: SM-G8870

EUT Type: Mobile Phone

Average Output Power:

Mode	Ant.1(SISO)	Ant.2(SISO)	Ant.1 & 2 (MIMO)
802.11b	18.19 dBm	18.19 dBm	-
802.11g	14.89 dBm	14.54 dBm	17.73 dBm
802.11n_HT20	13.79 dBm	13.43 dBm	16.61 dBm

Frequency Range: 2412 MHz - 2462 MHz

Modulation type: CCK/DSSS/OFDM

FCC Classification: Digital Transmission System(DTS)

FCC Rule Part(s): Part 15.247

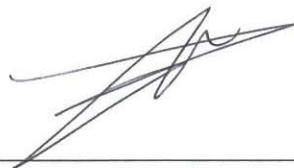
Engineering Statement:

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.

HCT CO., LTD. Certifies that no party to this application has subject to a denial of Federal benefits that includes FCC benefits pursuant to section 5301 of the Anti-Drug Abuse Act of 1998,21 U.S. C.853(a)



Report prepared by : Jung Ki Lim
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Manager of Telecommunication testing center

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Version

TEST REPORT NO.	DATE	DESCRIPTION
HCT-RF-1811-FC020	November 22, 2018	- First Approval Report

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1. EUT DESCRIPTION

Model	SM-G8870		
EUT Type	Mobile Phone		
Power Supply	DC 3.85 V		
Battery Information	Model: EB-BA750ABU Type: Li-ion Battery		
Travel Adapter Information	Model : EP-TA200 Manufacture: SOLUM		
Frequency Range	2412 MHz - 2462 MHz		
Max. RF Output Power	Peak	Ant. 1 (SISO)	Wi-Fi 802.11b (20.75 dBm) Wi-Fi 802.11g (24.82 dBm) Wi-Fi 802.11n_HT20 (24.45 dBm)
		Ant.2 (SISO)	Wi-Fi 802.11b (20.40 dBm) Wi-Fi 802.11g (24.19 dBm) Wi-Fi 802.11n_HT20 (23.99 dBm)
		Ant.1&2 (MIMO)	Wi-Fi 802.11g (27.47 dBm) Wi-Fi 802.11n_HT20 (27.20 dBm)
	Average	Ant. 1 (SISO)	Wi-Fi 802.11b (18.19 dBm) Wi-Fi 802.11g (14.89 dBm) Wi-Fi 802.11n_HT20 (13.79 dBm)
		Ant.2 (SISO)	Wi-Fi 802.11b (18.19 dBm) Wi-Fi 802.11g (14.54 dBm) Wi-Fi 802.11n_HT20 (13.43 dBm)
		Ant.1&2 (MIMO)	Wi-Fi 802.11g (17.73 dBm) Wi-Fi 802.11n_HT20 (16.61 dBm)
Modulation Type	DSSS/CCK : 802.11b OFDM : 802.11g, 802.11n		
Number of Channels	11 Channels		
Antenna	Ant 1 : BT/WLAN antenna / Ant 2: WLAN 2nd antenna		
Antenna Specification	Type : [Ant 1] Metal Frame Antenna Peak Gain : -0.35 dBi Type : [Ant 2] FPCB Peak Gain : -9.45 dBi		
Date(s) of Tests	October 29, 2018 ~ November 19, 2018		

2. TEST METHODOLOGY

FCC KDB 558074 D01 15.247 Meas Guidance v05 dated August 24, 2018 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 3.75 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 8 of ANSI C63.10. (Version: 2013)

Conducted Antenna Terminal

See Section from 8.3.(KDB 558074 v05)

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."

* The antennas of this E.U.T are permanently attached.

* 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.

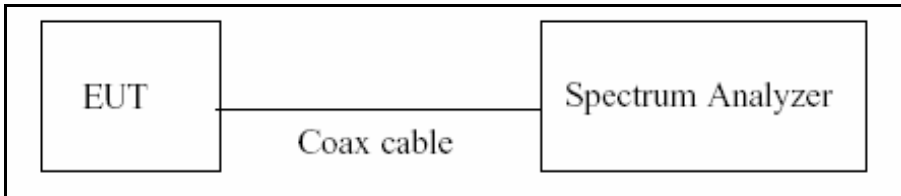
The measurement data shown herein meets or exceeds the U_{CISPR} measurement uncertainty values specified in CISPR 16-4-2 and, thus, can be compared directly to specified limits to determine compliance.

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)	5.71

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, 6.0)b) in KDB 558074 v05.

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 $> 50/T$.

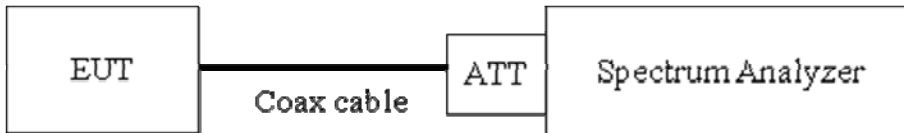
1. RBW = 8 MHz (the largest available value)
2. VBW = 8 MHz (\geq RBW)
3. SPAN = 0 Hz
4. Detector = Peak
5. Number of points in sweep > 100
6. Trace mode = Clear write
7. Measure T_{total} and T_{on}
8. Calculate Duty Cycle = T_{on} / T_{total} and Duty Cycle Factor = $10 \cdot \log(1/\text{Duty Cycle})$

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 8.2 in KDB 558074 v05, Procedure 11.8.1 in ANSI 63.10-2013)

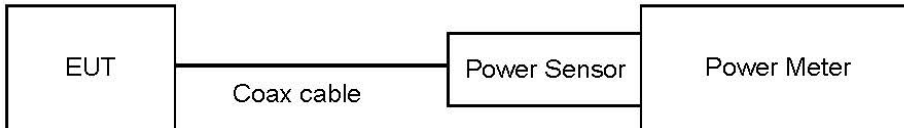
- 1) RBW = 100 kHz
- 2) VBW $\geq 3 \times$ RBW
- 3) Detector = Peak
- 4) Trace mode = max hold
- 5) Sweep = auto couple
- 6) Allow the trace to stabilize
- 7) We tested 6 dB bandwidth using the automatic bandwidth measurement capability of a spectrum analyzer. X dB is set 6 dB.

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 8.3.1.3 in KDB 558074 v05, Procedure 11.9.1.3 in ANSI 63.10-2013)
: Measure the peak power of the transmitter.

- Average Power (Procedure 8.3.2.3 in KDB 558074 v05, 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

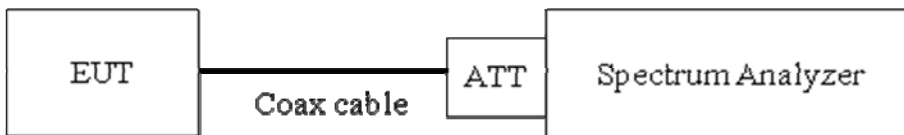
- Conducted Output Power(Peak) = Reading Value + ATT loss + Cable loss
- Conducted Output Power(Average) = Reading Value + ATT loss + Cable loss + Duty Cycle Factor

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 in KDB 558074 v05, Procedure 11.10.3 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

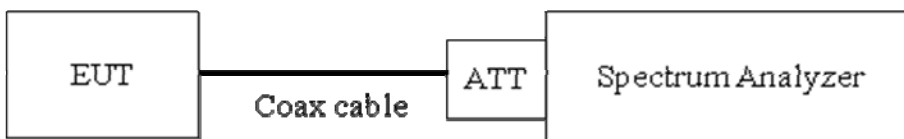
7.5. Conducted Band Edge(Out of Band Emissions) & Conducted Spurious Emissions

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 8.5 in KDB 558074 v05, 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	11.30
100	9.83
200	10.19
300	10.13
400	10.23
500	10.25
600	10.32
700	10.35
800	10.35
900	10.34
1000	10.39
2000	10.64
2400*	10.65
2500*	10.67
3000	10.68
4000	10.89
5000	11.07
6000	11.06
7000	11.35
8000	11.32
9000	11.48
10000	11.56
11000	11.56
12000	11.68
13000	11.83
14000	11.90
15000	11.98
16000	12.04
17000	12.02
18000	12.08
19000	12.07
20000	12.14
21000	12.17
22000	12.31
23000	12.60
24000	12.34
25000	12.53
26000	12.02

Note : 1. '*' is fundamental frequency range.
 2. Factor = Attenuator loss + Cable loss

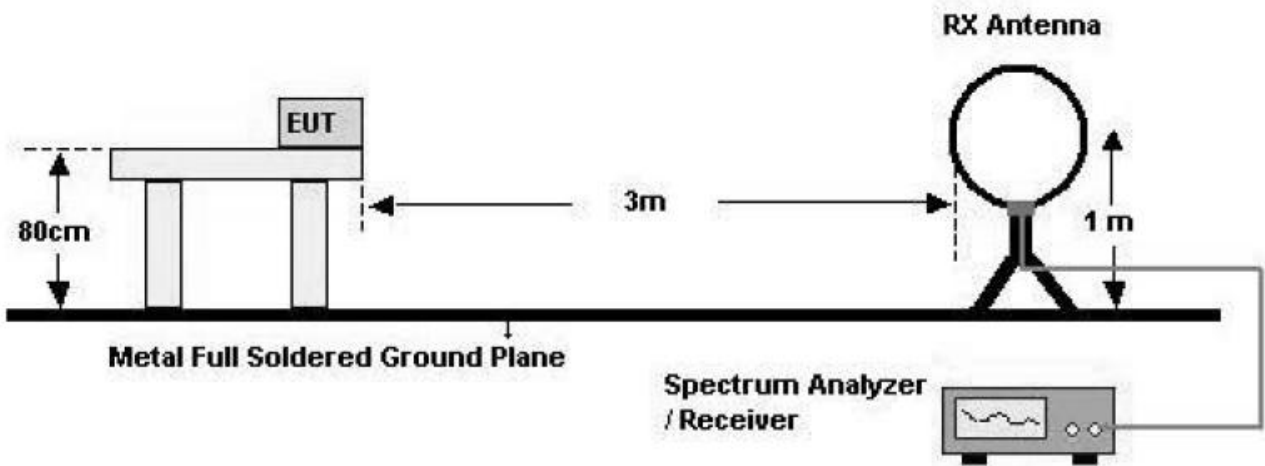
7.6. Radiated Test

Limit

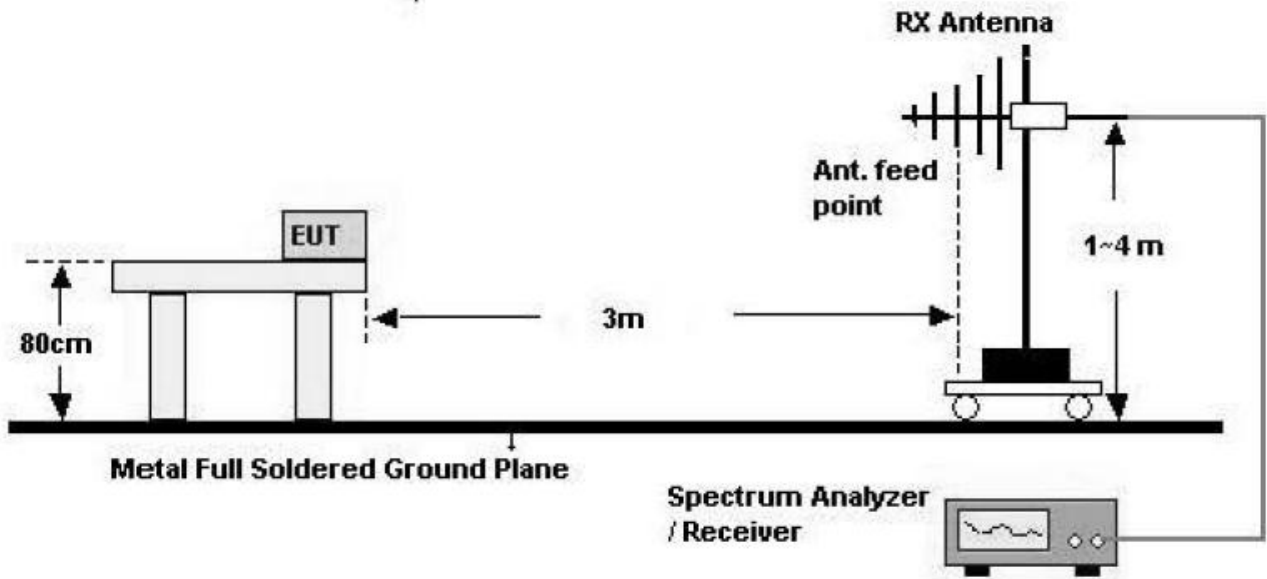
Frequency (MHz)	Field Strength (uV/m)	Measurement Distance (m)
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Test Configuration

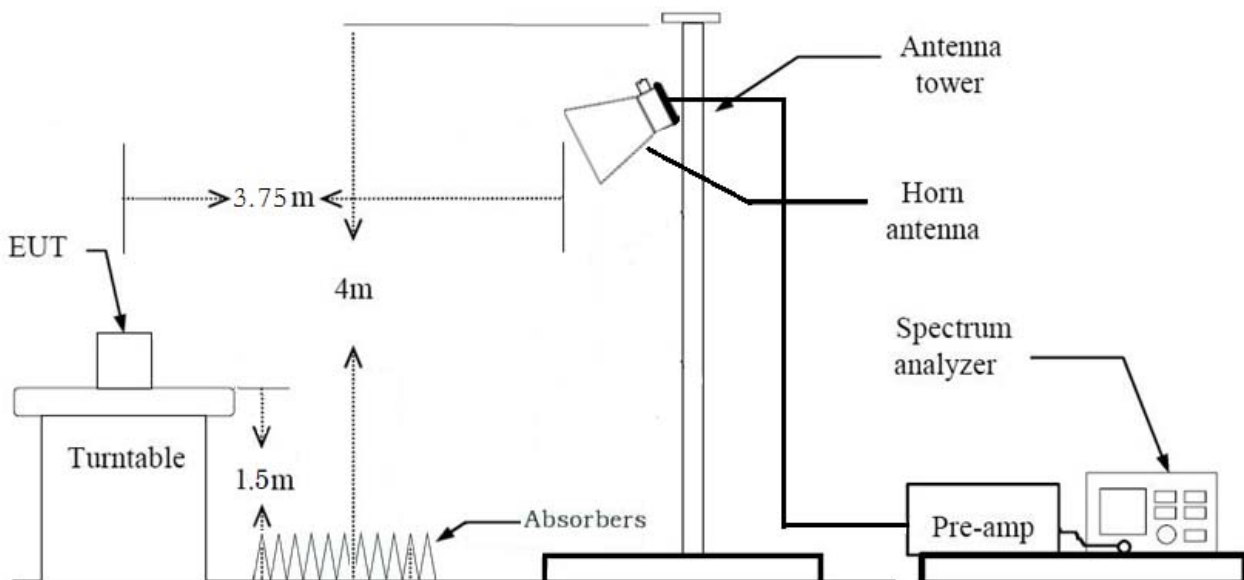
Below 30 MHz



30 MHz - 1 GHz



Above 1 GHz



Test Procedure of Radiated spurious emissions (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 = $20 \cdot \log(\text{test distance} / \text{specific distance})$ (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 v05, 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*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*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)

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

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

= Reading Value + Antenna Factor(A.F) + Cable Loss(C.L) - Amp Gain(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 3.75 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 = $20 \cdot \log(\text{test distance} / \text{specific distance})$ (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*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*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) - Amp Gain(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(G) + Distance Factor(D.F)

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

= Reading Value + Antenna Factor(A.F) + Cable Loss(C.L) - Amp Gain(G) + 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 μ H/50 ohms line impedance stabilization network (LISN).

Frequency Range (MHz)	Limits (dB μ V)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56*	56 to 46*
0.50 to 5	56	46
5 to 30	60	50

*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

■ Operating mode

Mode	Operating Mode	Operating Ant.
802.11b/g/n	SISO	Ant. 1
		Ant. 2
802.11g/n	MIMO	Ant. 1 & 2

Note : We have done all test case. Worst case is MIMO(CDD) for 802.11g/n_HT20 mode.

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 : 802.11b Ant1: X, 802.11b Ant2: Y / 802.11g,n, RSDB, MIMO: 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 : 1Mbps
 - 802.11g : 6Mbps
 - 802.11n : MCS0

AC Power line Conducted Emissions

1. All modes of operation were investigated and the worst case configuration results are reported.
 - Mode : Stand alone+Earphone+Travel Adapter, Stand alone+Travel Adapter
 - Worstcase : Stand alone+Travel Adapter

Conducted test

The EUT was configured with data rate of highest power.

8. SUMMARY TEST OF RESULTS

Test Description	FCC Part Section(s)	Test Limit	Test Condition	Test Result
6 dB Bandwidth	§15.247(a)(2)	> 500 kHz	Conducted	PASS
Conducted Maximum Peak Output Power	§15.247(b)(3)	< 1 Watt		N/A
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

[Ant1]

Mode	Data Rate (Mbps)	T _{on} (ms)	T _{total} (ms)	Duty Cycle	Duty Cycle Factor (dB)
802.11b	1	8.618	8.724	0.98790981	0.053
	2	4.319	4.349	0.99305556	0.030
	5.5	1.629	1.661	0.98112810	0.083
	11	0.864	0.893	0.96759297	0.143
802.11g	6	1.432	1.469	0.97468354	0.111
	9	0.959	0.996	0.96265559	0.165
	12	0.728	0.764	0.95238095	0.212
	18	0.491	0.528	0.93103448	0.310
	24	0.376	0.413	0.91118932	0.404
	36	0.256	0.292	0.87656063	0.572
	48	0.200	0.236	0.84748817	0.719
	54	0.180	0.216	0.83333102	0.792
802.11n (HT20)	6.5 (MCS0)	1.342	1.378	0.97420877	0.113
	13 (MCS1)	0.689	0.725	0.94980695	0.224
	19.5 (MCS2)	0.472	0.510	0.92674058	0.330
	26 (MCS3)	0.364	0.400	0.90909091	0.414
	39 (MCS4)	0.256	0.292	0.87694704	0.570
	52 (MCS5)	0.200	0.236	0.84778420	0.717
	58.5 (MCS6)	0.184	0.220	0.83677686	0.774
	65 (MCS7)	0.168	0.204	0.82405345	0.840

[Ant2]

Mode	Data Rate (Mbps)	T _{on} (ms)	T _{total} (ms)	Duty Cycle	Duty Cycle Factor (dB)
802.11b	1	8.629	8.709	0.99078417	0.040
	2	4.315	4.342	0.99382716	0.027
	5.5	1.631	1.660	0.98264642	0.076
	11	0.862	0.893	0.96572581	0.151
802.11g	6	1.433	1.471	0.97380138	0.115
	9	0.961	0.997	0.96363702	0.161
	12	0.728	0.765	0.95190379	0.214
	18	0.492	0.529	0.93043478	0.313
	24	0.376	0.413	0.91085271	0.406
	36	0.256	0.292	0.87671233	0.571
	48	0.200	0.236	0.84727830	0.720
	54	0.180	0.216	0.83295374	0.794
802.11n (HT20)	6.5 (MCS0)	1.339	1.376	0.97291424	0.119
	13 (MCS1)	0.688	0.725	0.94939361	0.226
	19.5 (MCS2)	0.472	0.509	0.92730845	0.328
	26 (MCS3)	0.365	0.402	0.90822611	0.418
	39 (MCS4)	0.257	0.292	0.87826143	0.564
	52 (MCS5)	0.200	0.236	0.84677300	0.722
	58.5 (MCS6)	0.184	0.220	0.83622705	0.777
	65 (MCS7)	0.168	0.204	0.82157914	0.854

9.2 6dB BANDWIDTH

[Ant1]

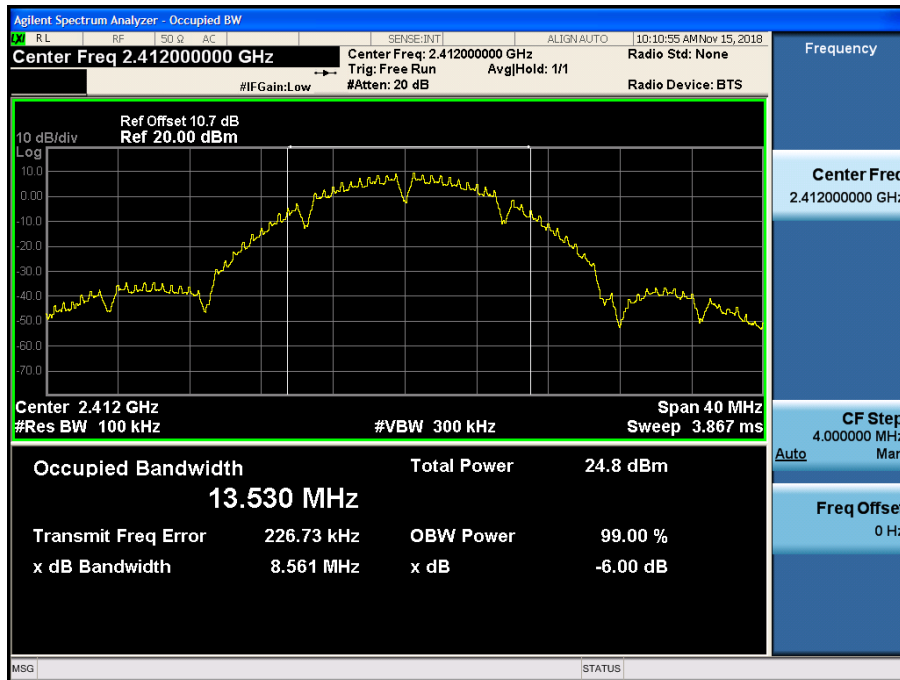
802.11b Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]
Frequency [MHz]	Channel No.		
2412	1	8.561	0.5
2437	6	8.572	0.5
2462	11	8.589	0.5

802.11g Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]
Frequency [MHz]	Channel No.		
2412	1	15.16	0.5
2437	6	15.51	0.5
2462	11	15.15	0.5

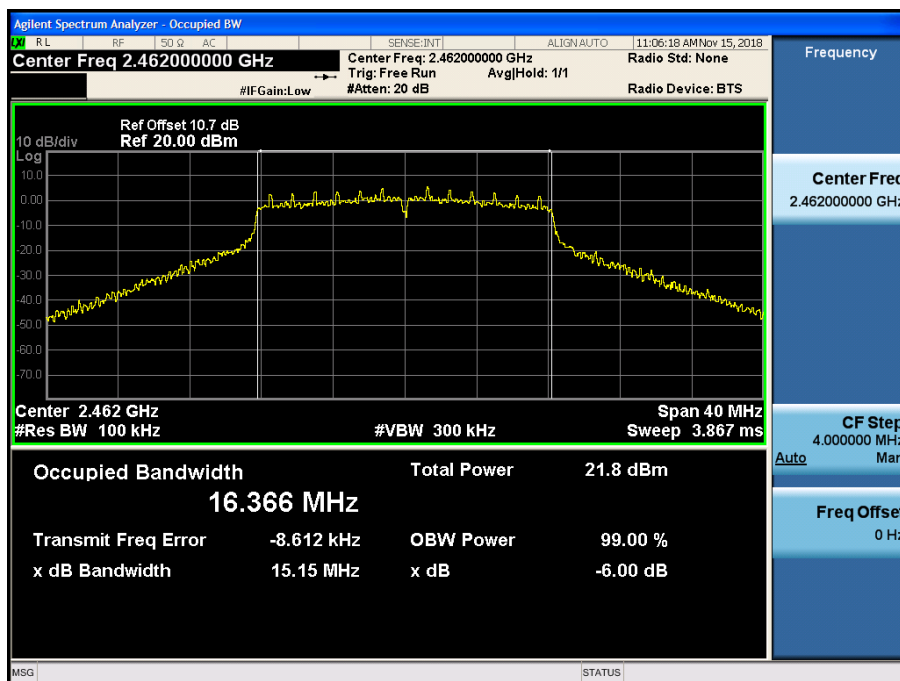
802.11n Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]
Frequency [MHz]	Channel No.		
2412	1	15.21	0.5
2437	6	16.68	0.5
2462	11	15.10	0.5

■ Test Plots [Ant1]

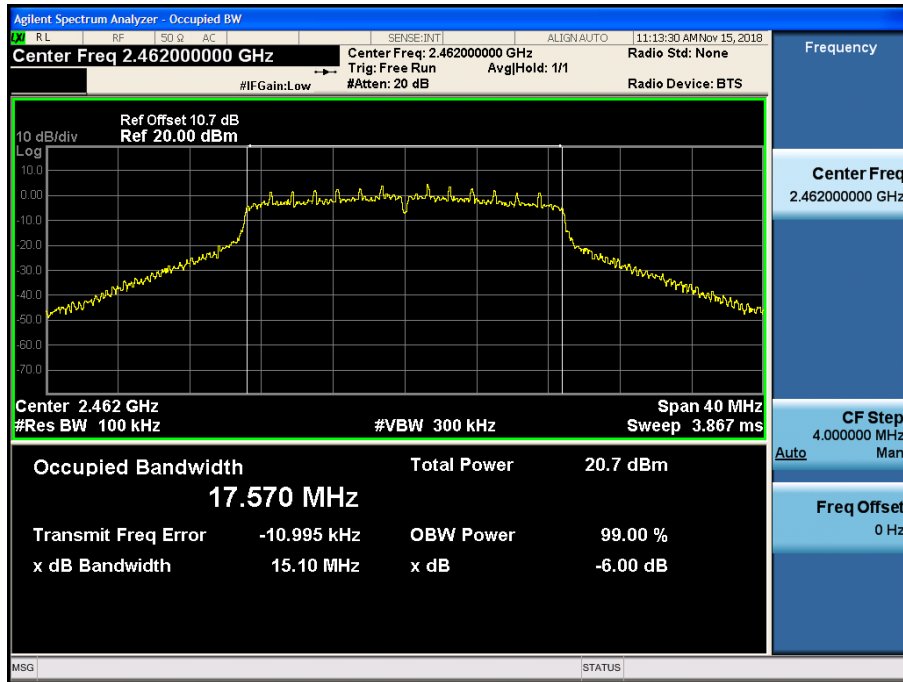
6dB Bandwidth plot (802.11b-CH 1)



6dB Bandwidth plot (802.11g-CH 11)



6dB Bandwidth plot (802.11n_HT20-CH 11)



Note:

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

[Ant2]

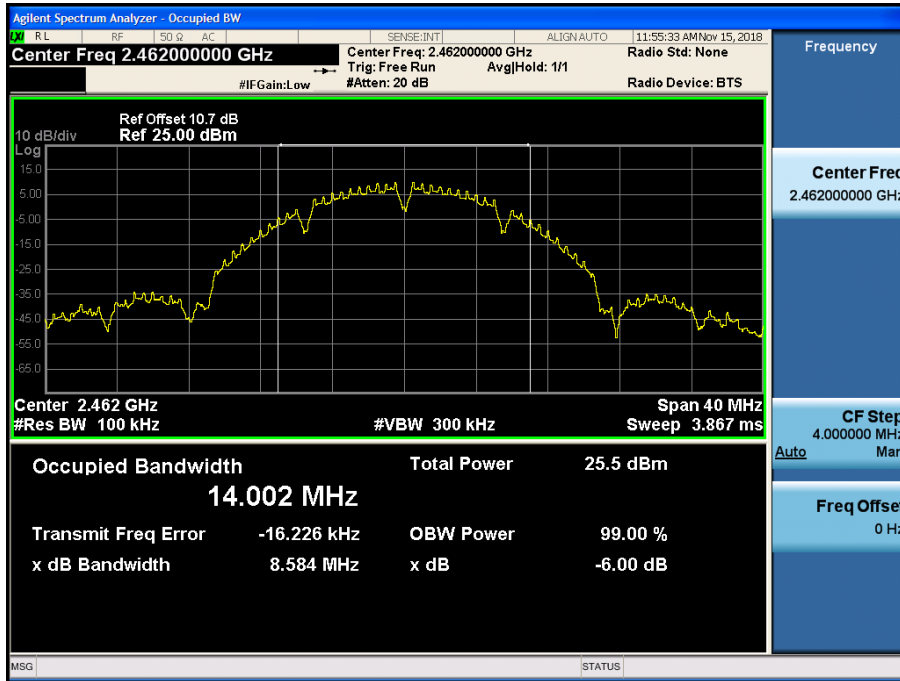
802.11b Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]
Frequency [MHz]	Channel No.		
2412	1	9.105	0.5
2437	6	9.057	0.5
2462	11	8.584	0.5

802.11g Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]
Frequency [MHz]	Channel No.		
2412	1	15.82	0.5
2437	6	15.18	0.5
2462	11	15.18	0.5

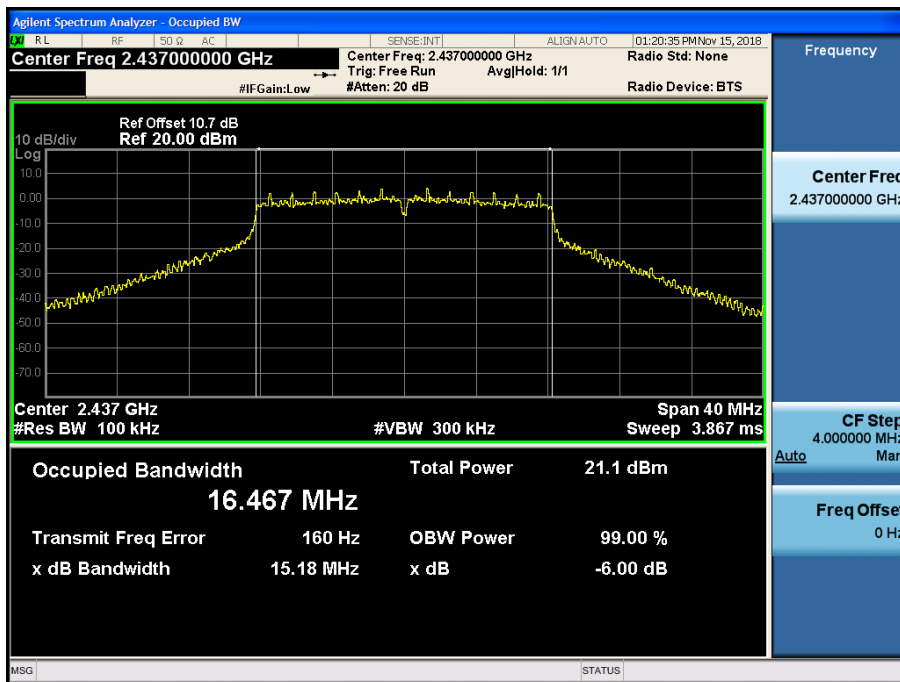
802.11n Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]
Frequency [MHz]	Channel No.		
2412	1	15.12	0.5
2437	6	15.48	0.5
2462	11	15.99	0.5

■ Test Plots [Ant2]

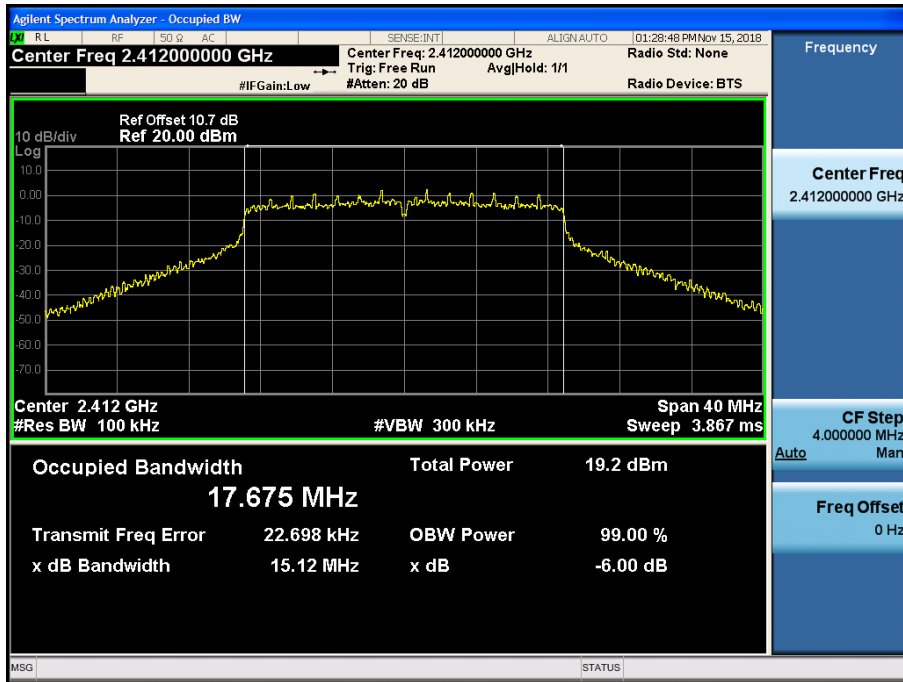
6dB Bandwidth plot (802.11b-CH 11)



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
2. We apply to the offset in the 2.4 GHz range that was rounded off to the closest tenth dB.
So, 10.7 dB is offset for 2.4 GHz Band.

[Ant1]

802.11b Mode		Power Level Setting	Data Rate [Mbps]	Measured Power[dBm]	Limit [dBm]
Frequency [MHz]	Channel No.				
2412	1	18	1	19.99	30
			2	20.26	30
			5.5	20.24	30
			11	20.15	30
2437	6	18	1	20.19	30
			2	20.43	30
			5.5	20.42	30
			11	20.39	30
2462	11	18	1	20.52	30
			2	20.74	30
			5.5	20.75	30
			11	20.69	30

[Ant2]

802.11b Mode		Power Level Setting	Data Rate [Mbps]	Measured Power[dBm]	Limit [dBm]
Frequency [MHz]	Channel No.				
2412	1	18	1	20.06	30
			2	20.17	30
			5.5	20.18	30
			11	20.20	30
2437	6	18	1	20.13	30
			2	20.32	30
			5.5	20.26	30
			11	20.32	30
2462	11	18	1	20.30	30
			2	20.36	30
			5.5	20.40	30
			11	20.39	30

[Ant1]

802.11g Mode		Power Level Setting	Data Rate [Mbps]	Measured Power[dBm]	Limit [dBm]
Frequency[M Hz]	Channel No.				
2412	1	14	6	17.85	30
			9	17.92	30
			12	17.79	30
			18	19.92	30
			24	20.04	30
			36	23.54	30
			48	24.28	30
			54	24.02	30
2437	6	15	6	18.87	30
			9	18.85	30
			12	18.90	30
			18	21.22	30
			24	21.34	30
			36	24.50	30
			48	24.82	30
			54	24.74	30
2462	11	15	6	19.24	30
			9	19.25	30
			12	19.16	30
			18	21.38	30
			24	21.42	30
			36	24.64	30
			48	24.72	30
			54	24.67	30

[Ant2]

802.11g Mode		Power Level Setting	Data Rate [Mbps]	Measured Power[dBm]	Limit [dBm]
Frequency[M Hz]	Channel No.				
2412	1	14	6	17.73	30
			9	17.77	30
			12	17.74	30
			18	20.18	30
			24	20.19	30
			36	23.24	30
			48	23.35	30
			54	23.22	30
2437	6	15	6	18.56	30
			9	18.67	30
			12	18.63	30
			18	21.07	30
			24	21.01	30
			36	23.83	30
			48	23.79	30
			54	23.78	30
2462	11	15	6	18.68	30
			9	18.66	30
			12	18.55	30
			18	21.15	30
			24	21.13	30
			36	23.94	30
			48	24.19	30
			54	24.01	30

▣ Sum Data of Ant.1 and Ant.2

802.11g Mode		Power Level Setting	Rate (Mbps)	ANT 1	ANT 2	SUM (CDD)
Frequency [MHz]	Channel No.					
2412	1	14	6 Mbps	17.85	17.73	20.80
			9 Mbps	17.92	17.77	20.86
			12 Mbps	17.79	17.74	20.78
			18 Mbps	19.92	20.18	23.06
			24 Mbps	20.04	20.19	23.13
			36 Mbps	23.54	23.24	26.40
			48 Mbps	24.28	23.35	26.85
			54 Mbps	24.02	23.22	26.65
2437	6	15	6 Mbps	18.87	18.56	21.73
			9 Mbps	18.85	18.67	21.77
			12 Mbps	18.90	18.63	21.78
			18 Mbps	21.22	21.07	24.16
			24 Mbps	21.34	21.01	24.19
			36 Mbps	24.50	23.83	27.19
			48 Mbps	24.82	23.79	27.35
			54 Mbps	24.74	23.78	27.30
2462	11	15	6 Mbps	19.24	18.68	21.98
			9 Mbps	19.25	18.66	21.98
			12 Mbps	19.16	18.55	21.88
			18 Mbps	21.38	21.15	24.28
			24 Mbps	21.42	21.13	24.29
			36 Mbps	24.64	23.94	27.31
			48 Mbps	24.72	24.19	27.47
			54 Mbps	24.67	24.01	27.36

[Ant1]

802.11n Mode		Power Level Setting	MCS Index	Measured Power[dBm]	Limit [dBm]
Frequency[M Hz]	Channel No.				
2412	1	13	0	16.96	30
			1	16.85	30
			2	16.82	30
			3	19.02	30
			4	23.03	30
			5	22.26	30
			6	23.17	30
			7	22.91	30
2437	6	14	0	17.87	30
			1	17.81	30
			2	20.13	30
			3	20.21	30
			4	24.45	30
			5	23.85	30
			6	24.38	30
			7	23.89	30
2462	11	14	0	18.33	30
			1	18.25	30
			2	20.49	30
			3	20.48	30
			4	24.29	30
			5	23.69	30
			6	24.39	30
			7	23.92	30

[Ant2]

802.11n Mode		Power Level Setting	MCS Index	Measured Power[dBm]	Limit [dBm]
Frequency[M Hz]	Channel No.				
2412	1	13	0	16.61	30
			1	16.52	30
			2	18.82	30
			3	18.89	30
			4	22.86	30
			5	22.67	30
			6	22.73	30
			7	22.29	30
2437	6	14	0	17.53	30
			1	17.43	30
			2	19.82	30
			3	19.69	30
			4	23.14	30
			5	23.26	30
			6	23.25	30
			7	23.12	30
2462	11	14	0	17.74	30
			1	17.63	30
			2	20.04	30
			3	20.01	30
			4	23.98	30
			5	23.39	30
			6	23.99	30
			7	23.57	30

▣ Sum Data of Ant.1 and Ant.2

802.11n Mode		Power Level Setting	Rate (Mbps)	ANT 1	ANT 2	SUM (CDD)
Frequency [MHz]	Channel No.					
2412	1	13	MCS0_6.5 Mbps	16.96	16.61	19.80
			MCS1_13 Mbps	16.85	16.52	19.70
			MCS2_19.5 Mbps	16.82	18.82	20.94
			MCS3_26 Mbps	19.02	18.89	21.97
			MCS4_39 Mbps	23.03	22.86	25.96
			MCS5_52 Mbps	22.26	22.67	25.48
			MCS6_58.5 Mbps	23.17	22.73	25.97
			MCS7_65 Mbps	22.91	22.29	25.62
2437	6	14	MCS0_6.5 Mbps	17.87	17.53	20.71
			MCS1_13 Mbps	17.81	17.43	20.63
			MCS2_19.5 Mbps	20.13	19.82	22.99
			MCS3_26 Mbps	20.21	19.69	22.97
			MCS4_39 Mbps	24.45	23.14	26.85
			MCS5_52 Mbps	23.85	23.26	26.58
			MCS6_58.5 Mbps	24.38	23.25	26.86
			MCS7_65 Mbps	23.89	23.12	26.53
2462	11	14	MCS0_6.5 Mbps	18.33	17.74	21.06
			MCS1_13 Mbps	18.25	17.63	20.96
			MCS2_19.5 Mbps	20.49	20.04	23.28
			MCS3_26 Mbps	20.48	20.01	23.26
			MCS4_39 Mbps	24.29	23.98	27.15
			MCS5_52 Mbps	23.69	23.39	26.55
			MCS6_58.5 Mbps	24.39	23.99	27.20
			MCS7_65 Mbps	23.92	23.57	26.76

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, 10.7 dB is offset for 2.4 GHz Band.

[Ant1]

802.11b Mode		Power Level Setting	Data Rate [Mbps]	Measured Power[dBm]	Duty Cycle Factor [dB]	Measured Power(dBm) + Duty Cycle Factor[dB]	Limit [dBm]
Frequency [MHz]	Channel No.						
2412	1	18	1	17.32	0.053	17.37	30
			2	17.57	0.030	17.60	30
			5.5	17.49	0.083	17.57	30
			11	17.45	0.143	17.59	30
2437	6	18	1	17.62	0.053	17.67	30
			2	17.85	0.030	17.88	30
			5.5	17.79	0.083	17.87	30
			11	17.73	0.143	17.87	30
2462	11	18	1	17.88	0.053	17.93	30
			2	18.11	0.030	18.14	30
			5.5	18.10	0.083	18.18	30
			11	18.05	0.143	18.19	30

[Ant2]

802.11b Mode		Power Level Setting	Data Rate [Mbps]	Measured Power[dBm]	Duty Cycle Factor [dB]	Measured Power(dBm) + Duty Cycle Factor[dB]	Limit [dBm]
Frequency [MHz]	Channel No.						
2412	1	18	1	17.74	0.040	17.78	30
			2	17.94	0.027	17.97	30
			5.5	18.09	0.076	18.17	30
			11	17.93	0.151	18.08	30
2437	6	18	1	17.70	0.040	17.74	30
			2	17.86	0.027	17.89	30
			5.5	17.90	0.076	17.98	30
			11	17.80	0.151	17.95	30
2462	11	18	1	17.84	0.040	17.88	30
			2	18.02	0.027	18.05	30
			5.5	18.11	0.076	18.19	30
			11	17.96	0.151	18.11	30

[Ant1]

802.11g Mode		Power Level Setting	Data Rate [Mbps]	Measured Power[dBm]	Duty Cycle Factor [dB]	Measured Power(dBm) + Duty Cycle Factor[dB]	Limit [dBm]
Frequency [MHz]	Channel No.						
2412	1	14	6	12.72	0.111	12.83	30
			9	12.63	0.165	12.80	30
			12	12.57	0.212	12.78	30
			18	13.26	0.310	13.57	30
			24	13.01	0.404	13.41	30
			36	12.57	0.572	13.14	30
			48	12.46	0.719	13.18	30
			54	12.38	0.792	13.17	30
2437	6	15	6	13.99	0.111	14.10	30
			9	13.93	0.165	14.10	30
			12	13.89	0.212	14.10	30
			18	14.58	0.310	14.89	30
			24	14.35	0.404	14.75	30
			36	13.89	0.572	14.46	30
			48	13.76	0.719	14.48	30
			54	13.68	0.792	14.47	30
2462	11	15	6	14.02	0.111	14.13	30
			9	13.94	0.165	14.11	30
			12	13.89	0.212	14.10	30
			18	14.56	0.310	14.87	30
			24	14.35	0.404	14.75	30
			36	13.87	0.572	14.44	30
			48	13.76	0.719	14.48	30
			54	13.66	0.792	14.45	30

[Ant2]

802.11g Mode		Power Level Setting	Data Rate [Mbps]	Measured Power[dBm]	Duty Cycle Factor [dB]	Measured Power(dBm) + Duty Cycle Factor[dB]	Limit [dBm]
Frequency [MHz]	Channel No.						
2412	1	14	6	12.82	0.115	12.94	30
			9	12.74	0.161	12.90	30
			12	12.71	0.214	12.92	30
			18	13.38	0.313	13.69	30
			24	13.18	0.406	13.59	30
			36	12.66	0.571	13.23	30
			48	12.47	0.720	13.19	30
			54	12.42	0.794	13.21	30
2437	6	15	6	13.65	0.115	13.77	30
			9	13.59	0.161	13.75	30
			12	13.53	0.214	13.74	30
			18	14.23	0.313	14.54	30
			24	13.99	0.406	14.40	30
			36	13.42	0.571	13.99	30
			48	13.31	0.720	14.03	30
			54	13.21	0.794	14.00	30
2462	11	15	6	13.65	0.115	13.77	30
			9	13.58	0.161	13.74	30
			12	13.42	0.214	13.63	30
			18	14.23	0.313	14.54	30
			24	14.00	0.406	14.41	30
			36	13.51	0.571	14.08	30
			48	13.41	0.720	14.13	30
			54	13.31	0.794	14.10	30

▣ Sum Data of Ant.1 and Ant.2

802.11g Mode		Power Level Setting	Rate (Mbps)	ANT 1	ANT 2	SUM (CDD)
Frequency [MHz]	Channel No.					
2412	1	14	6 Mbps	12.83	12.94	15.89
			9 Mbps	12.80	12.90	15.86
			12 Mbps	12.78	12.92	15.86
			18 Mbps	13.57	13.69	16.64
			24 Mbps	13.41	13.59	16.51
			36 Mbps	13.14	13.23	16.20
			48 Mbps	13.18	13.19	16.19
			54 Mbps	13.17	13.21	16.20
2437	6	15	6 Mbps	14.10	13.77	16.95
			9 Mbps	14.10	13.75	16.94
			12 Mbps	14.10	13.74	16.94
			18 Mbps	14.89	14.54	17.73
			24 Mbps	14.75	14.40	17.59
			36 Mbps	14.46	13.99	17.24
			48 Mbps	14.48	14.03	17.27
			54 Mbps	14.47	14.00	17.25
2462	11	15	6 Mbps	14.13	13.77	16.96
			9 Mbps	14.11	13.74	16.94
			12 Mbps	14.10	13.63	16.88
			18 Mbps	14.87	14.54	17.72
			24 Mbps	14.75	14.41	17.59
			36 Mbps	14.44	14.08	17.28
			48 Mbps	14.48	14.13	17.32
			54 Mbps	14.45	14.10	17.29

[Ant1]

802.11n Mode		Power Level Setting	MCS Index	Measured Power[dBm]	Duty Cycle Factor [dB]	Measured Power(dBm) + Duty Cycle Factor[dB]	Limit [dBm]
Frequency [MHz]	Channel No.						
2412	1	13	0	11.52	0.113	11.63	30
			1	11.36	0.224	11.58	30
			2	12.08	0.330	12.41	30
			3	11.98	0.414	12.39	30
			4	11.64	0.570	12.21	30
			5	11.49	0.717	12.21	30
			6	11.47	0.774	12.24	30
			7	11.36	0.840	12.20	30
2437	6	14	0	12.78	0.113	12.89	30
			1	12.61	0.224	12.83	30
			2	13.46	0.330	13.79	30
			3	13.36	0.414	13.77	30
			4	12.92	0.570	13.49	30
			5	12.77	0.717	13.49	30
			6	12.74	0.774	13.51	30
			7	12.63	0.840	13.47	30
2462	11	14	0	12.88	0.113	12.99	30
			1	12.71	0.224	12.93	30
			2	13.44	0.330	13.77	30
			3	13.33	0.414	13.74	30
			4	12.88	0.570	13.45	30
			5	12.74	0.717	13.46	30
			6	12.71	0.774	13.48	30
			7	12.60	0.840	13.44	30

[Ant2]

802.11n Mode		Power Level Setting	MCS Index	Measured Power[dBm]	Duty Cycle Factor [dB]	Measured Power(dBm) + Duty Cycle Factor[dB]	Limit [dBm]
Frequency [MHz]	Channel No.						
2412	1	13	0	11.43	0.119	11.55	30
			1	11.26	0.226	11.49	30
			2	11.99	0.328	12.32	30
			3	11.90	0.418	12.32	30
			4	11.36	0.564	11.92	30
			5	11.19	0.722	11.91	30
			6	11.18	0.777	11.96	30
			7	11.07	0.854	11.92	30
2437	6	14	0	12.32	0.119	12.44	30
			1	12.12	0.226	12.35	30
			2	12.86	0.328	13.19	30
			3	12.78	0.418	13.20	30
			4	12.20	0.564	12.76	30
			5	12.15	0.722	12.87	30
			6	12.13	0.777	12.91	30
			7	11.91	0.854	12.76	30
2462	11	14	0	12.49	0.119	12.61	30
			1	12.34	0.226	12.57	30
			2	13.10	0.328	13.43	30
			3	13.00	0.418	13.42	30
			4	12.63	0.564	13.19	30
			5	12.48	0.722	13.20	30
			6	12.45	0.777	13.23	30
			7	12.34	0.854	13.19	30

▣ Sum Data of Ant.1 and Ant.2

802.11n Mode		Power Level Setting	Rate (Mbps)	ANT 1	ANT 2	SUM (CDD)
Frequency [MHz]	Channel No.					
2412	1	13	MCS0_6.5 Mbps	11.63	11.55	14.60
			MCS1_13 Mbps	11.58	11.49	14.55
			MCS2_19.5 Mbps	12.41	12.32	15.37
			MCS3_26 Mbps	12.39	12.32	15.37
			MCS4_39 Mbps	12.21	11.92	15.08
			MCS5_52 Mbps	12.21	11.91	15.07
			MCS6_58.5 Mbps	12.24	11.96	15.11
			MCS7_65 Mbps	12.20	11.92	15.07
2437	6	14	MCS0_6.5 Mbps	12.89	12.44	15.68
			MCS1_13 Mbps	12.83	12.35	15.61
			MCS2_19.5 Mbps	13.79	13.19	16.51
			MCS3_26 Mbps	13.77	13.20	16.51
			MCS4_39 Mbps	13.49	12.76	16.15
			MCS5_52 Mbps	13.49	12.87	16.20
			MCS6_58.5 Mbps	13.51	12.91	16.23
			MCS7_65 Mbps	13.47	12.76	16.14
2462	11	14	MCS0_6.5 Mbps	12.99	12.61	15.82
			MCS1_13 Mbps	12.93	12.57	15.76
			MCS2_19.5 Mbps	13.77	13.43	16.61
			MCS3_26 Mbps	13.74	13.42	16.59
			MCS4_39 Mbps	13.45	13.19	16.33
			MCS5_52 Mbps	13.46	13.20	16.34
			MCS6_58.5 Mbps	13.48	13.23	16.37
			MCS7_65 Mbps	13.44	13.19	16.33

9.4 POWER SPECTRAL DENSITY

[Ant1]

Mode	Frequency (MHz)	Channel No.	Test Result			
			Measured PSD (dBm)	Duty Cycle Factor	Measured PSD(dBm) + Duty Cycle Factor	Limit (dBm)
802.11b	2412	1	-7.192	0.030	-7.162	8
	2437	6	-6.786	0.030	-6.756	8
	2462	11	-8.161	0.143	-8.018	8
802.11g	2412	1	-18.415	0.310	-18.105	8
	2437	6	-17.618	0.310	-17.308	8
	2462	11	-16.879	0.310	-16.569	8
802.11n (HT20)	2412	1	-19.143	0.330	-18.813	8
	2437	6	-18.213	0.330	-17.883	8
	2462	11	-17.016	0.330	-16.686	8

[Ant2]

Mode	Frequency (MHz)	Channel No.	Test Result			
			Measured PSD (dBm)	Duty Cycle Factor	Measured PSD(dBm) + Duty Cycle Factor	Limit (dBm)
802.11b	2412	1	-8.348	0.076	-8.272	8
	2437	6	-8.611	0.076	-8.535	8
	2462	11	-8.194	0.076	-8.118	8
802.11g	2412	1	-18.765	0.313	-18.452	8
	2437	6	-17.396	0.313	-17.083	8
	2462	11	-17.375	0.313	-17.062	8
802.11n (HT20)	2412	1	-18.517	0.418	-18.099	8
	2437	6	-17.758	0.418	-17.340	8
	2462	11	-17.739	0.328	-17.411	8

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

3. We apply to the offset in the 2.4 GHz range that was rounded off to the closest tenth dB.

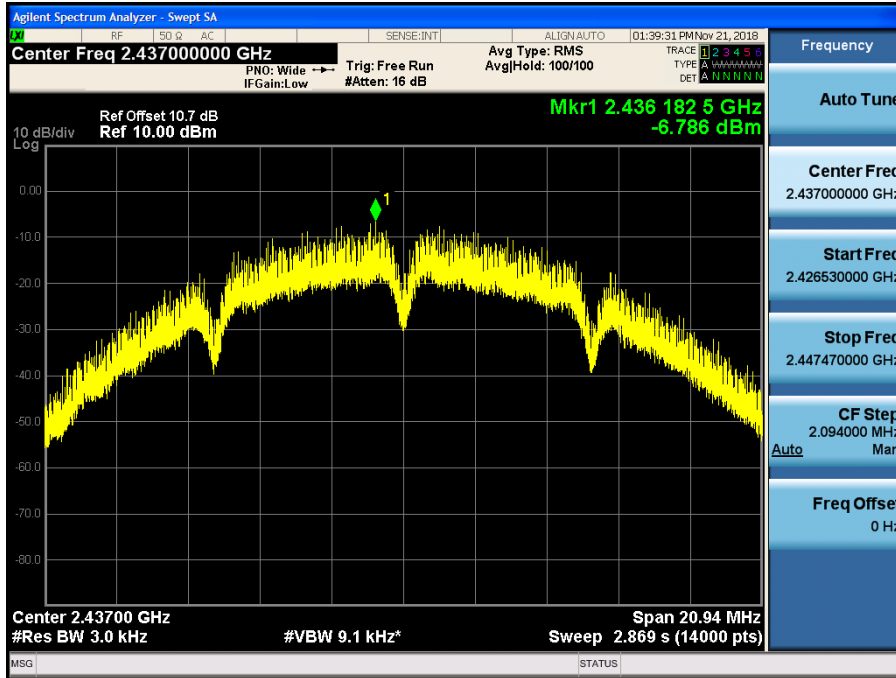
So, 10.7 dB is offset for 2.4 GHz Band.

☐ Sum Data of Ant.1 and Ant.2

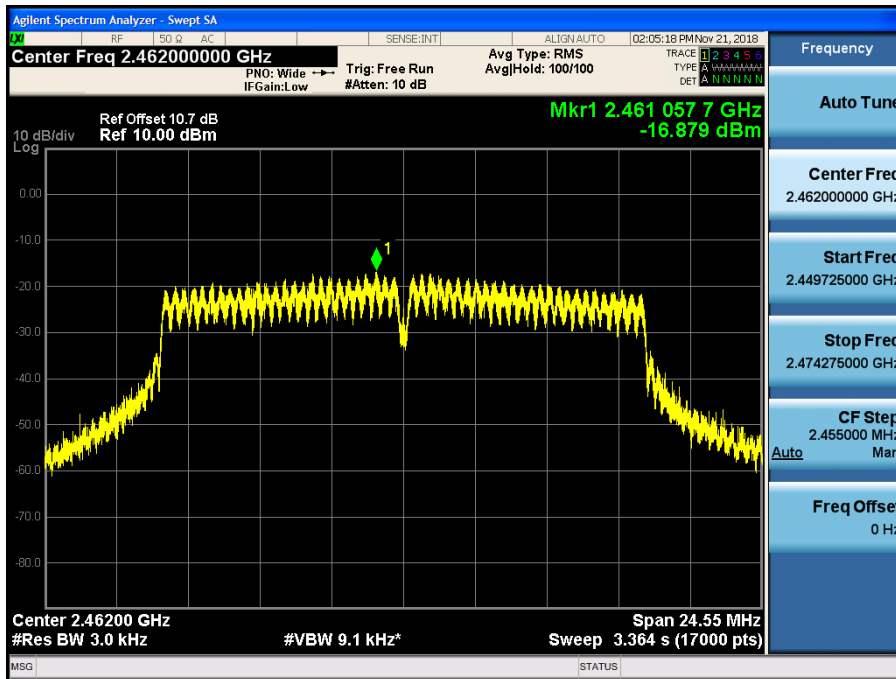
Frequency (MHz)	Channel No.	Mode	ANT 1 Measured PSD(dBm) + Duty Cycle Factor	ANT 2 Measured PSD(dBm) + Duty Cycle Factor	MIMO Result (dBm)	Limit (dBm)
2412	1	802.11g	-18.105	-18.452	-15.26	8
2437	6		-17.308	-17.083	-14.18	8
2462	11		-16.569	-17.062	-13.80	8
2412	1	802.11n(20M) 2.4 GHz Band	-18.813	-18.099	-15.43	8
2437	6		-17.883	-17.340	-14.59	8
2462	11		-16.686	-17.411	-14.02	8

■ Test Plots [Ant1]

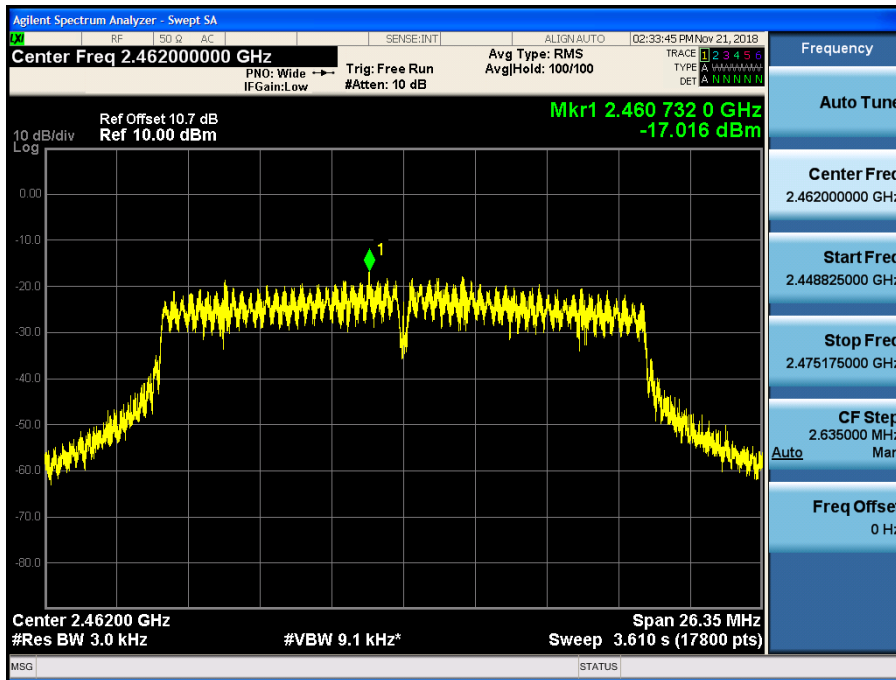
Power Spectral Density (802.11b-CH 6)



Power Spectral Density (802.11g-CH 11)

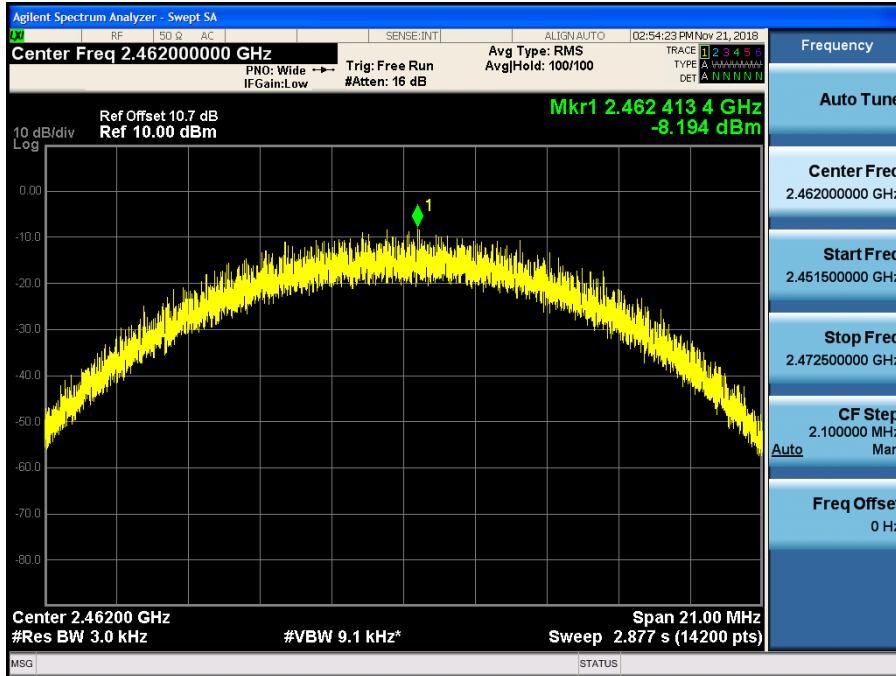


Power Spectral Density (802.11n_HT20 -CH 11)

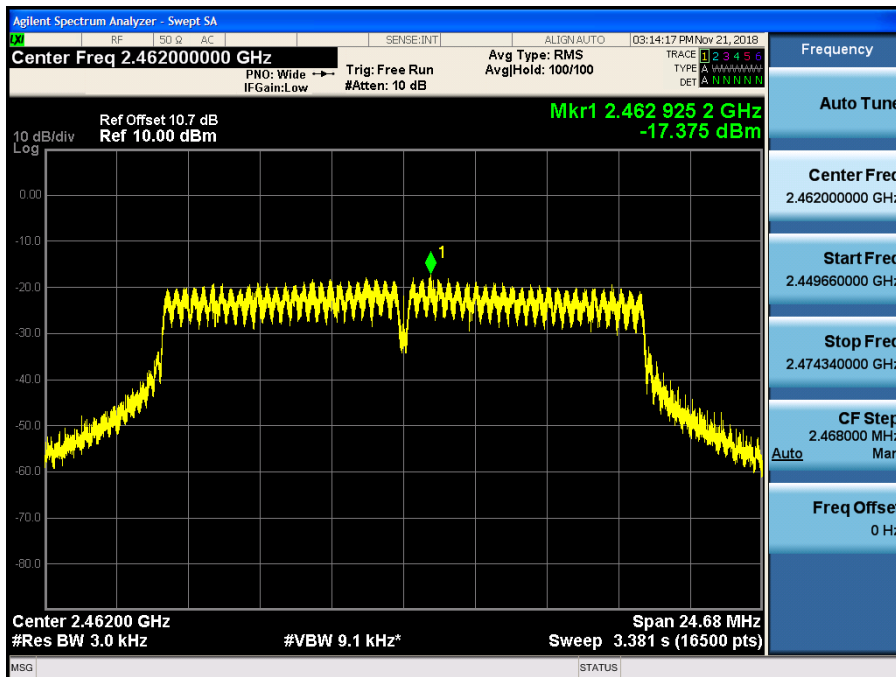


■ Test Plots [Ant2]

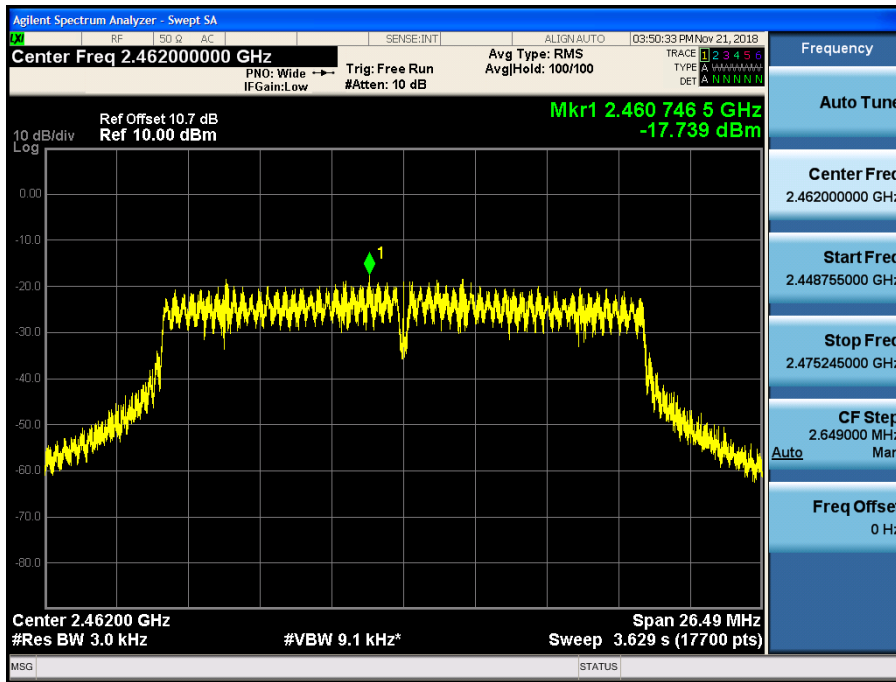
Power Spectral Density (802.11b-CH 11)



Power Spectral Density (802.11g-CH 11)



Power Spectral Density (802.11n_HT20 -CH 11)



Note :

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

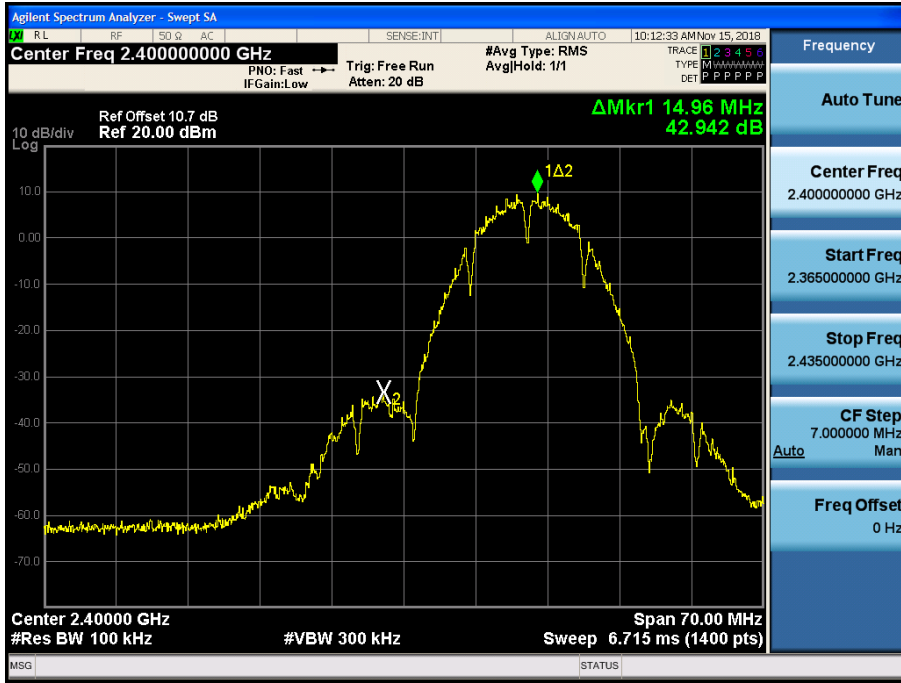
9.5 BAND EDGE/ CONDUCTED SPURIOUS EMISSIONS

Test Result : please refer to the plot below.

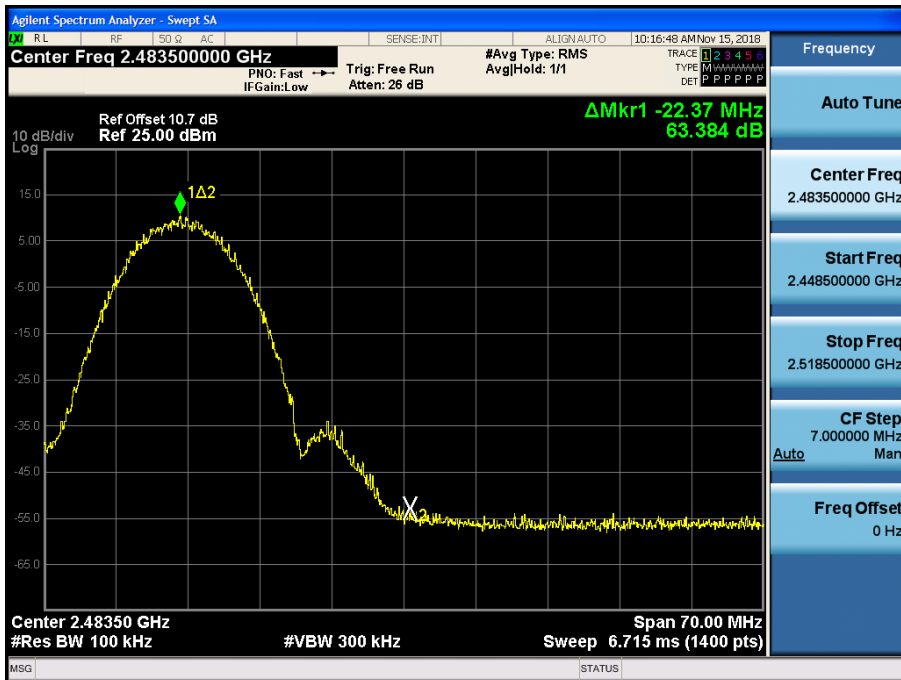
In order to simplify the report, attached plots were only the worst case channel and data rate.

■ Test Plots(BandEdge) [Ant1]

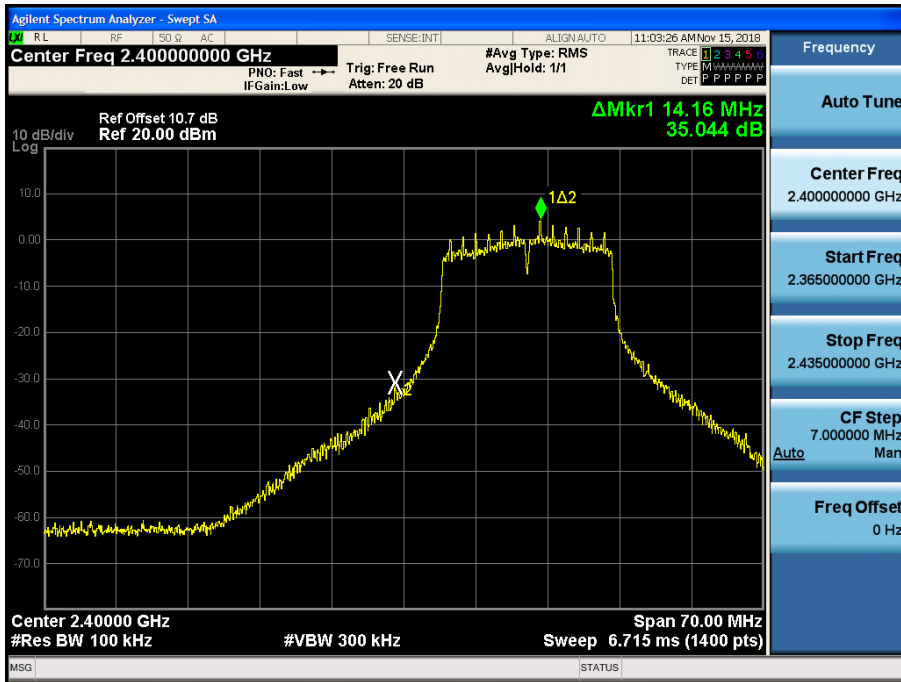
Band Edge (802.11b-CH1)



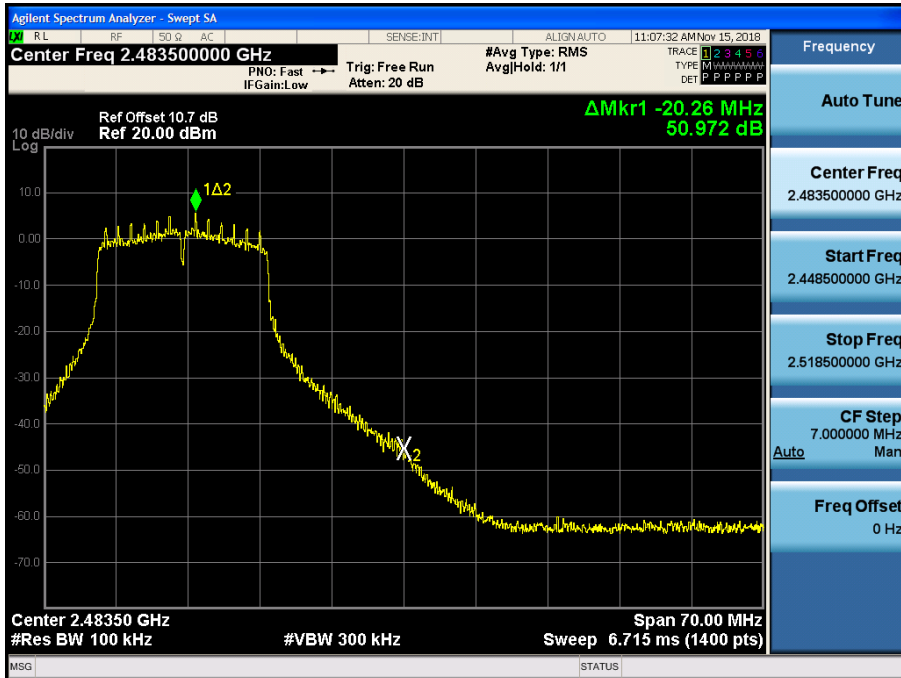
Band Edge (802.11b-CH11)



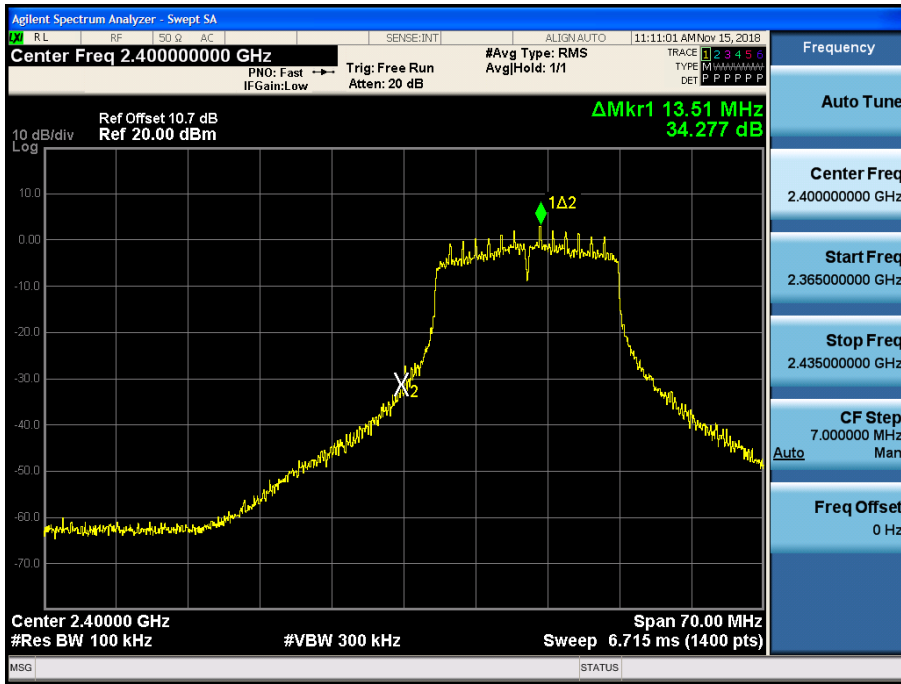
Band Edge (802.11g-CH1)



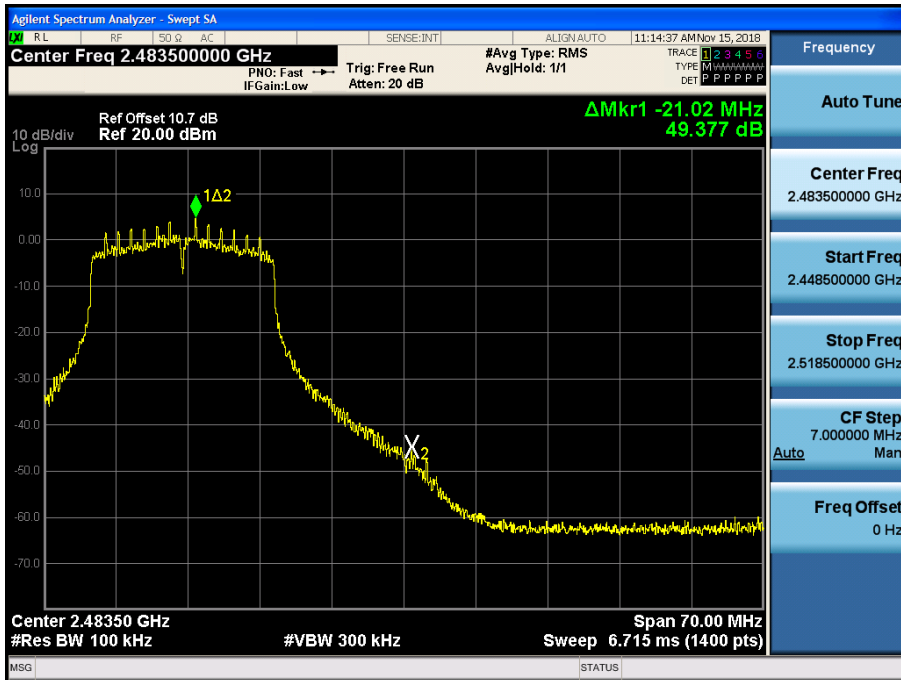
Band Edge (802.11g-CH11)



Band Edge (802.11n_HT20-CH1)



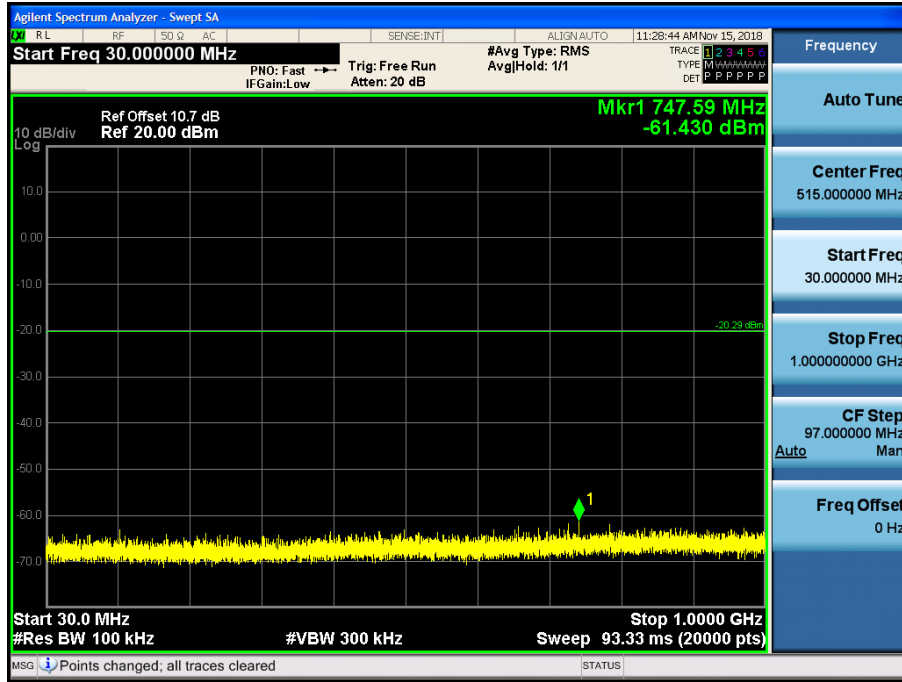
Band Edge (802.11n_HT20-CH11)



■ Test Plots(Conducted Spurious Emission) [Ant1]

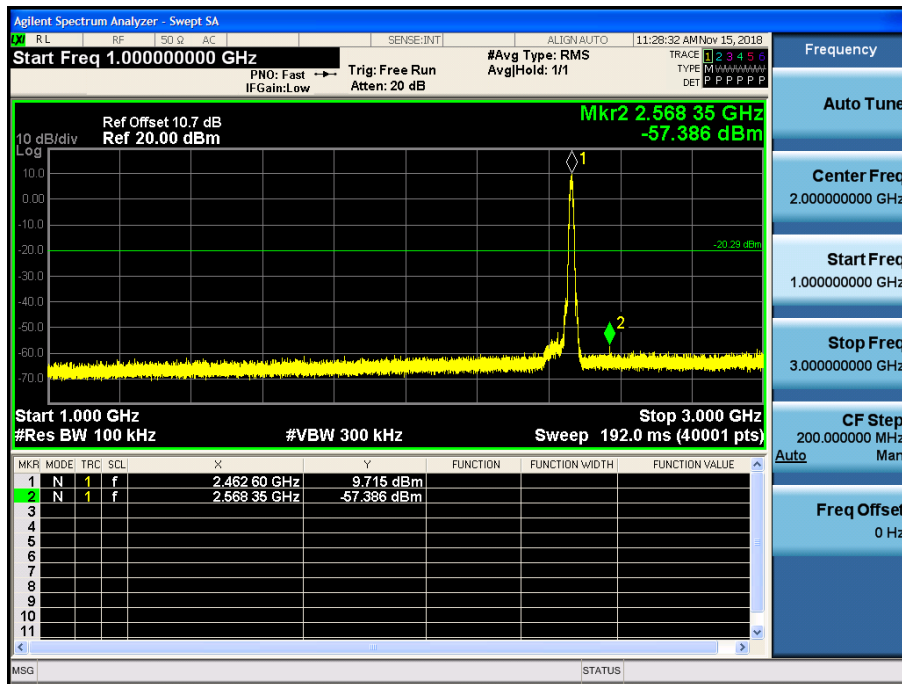
30 MHz ~ 1 GHz

Conducted Spurious Emission (802.11b_Ch.11_11 Mbps)



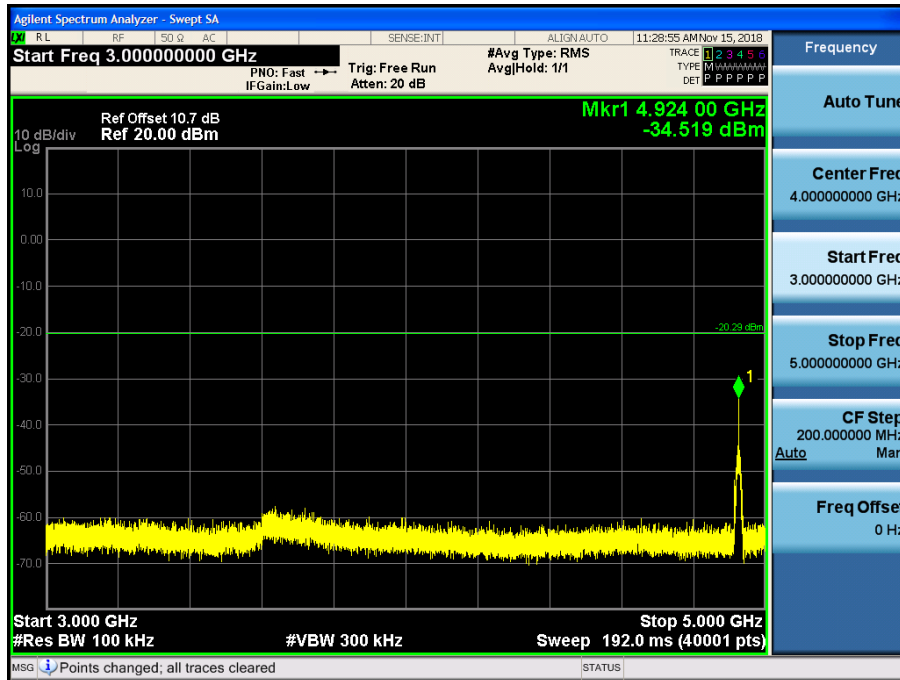
1 GHz ~ 3 GHz

Conducted Spurious Emission (802.11b_Ch.11_11 Mbps)



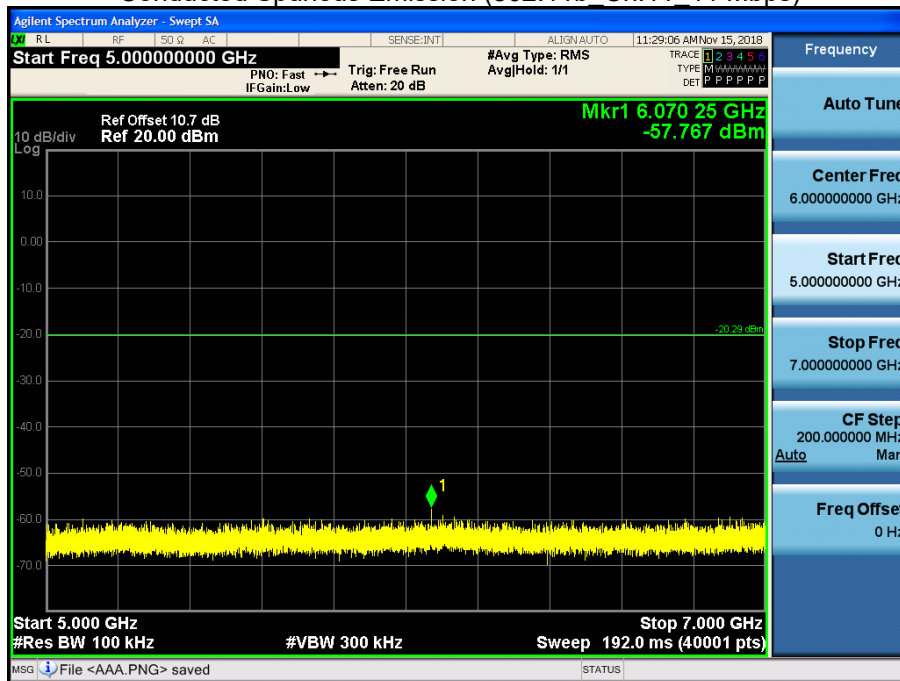
3 GHz ~ 5 GHz

Conducted Spurious Emission (802.11b_Ch.11_11 Mbps)



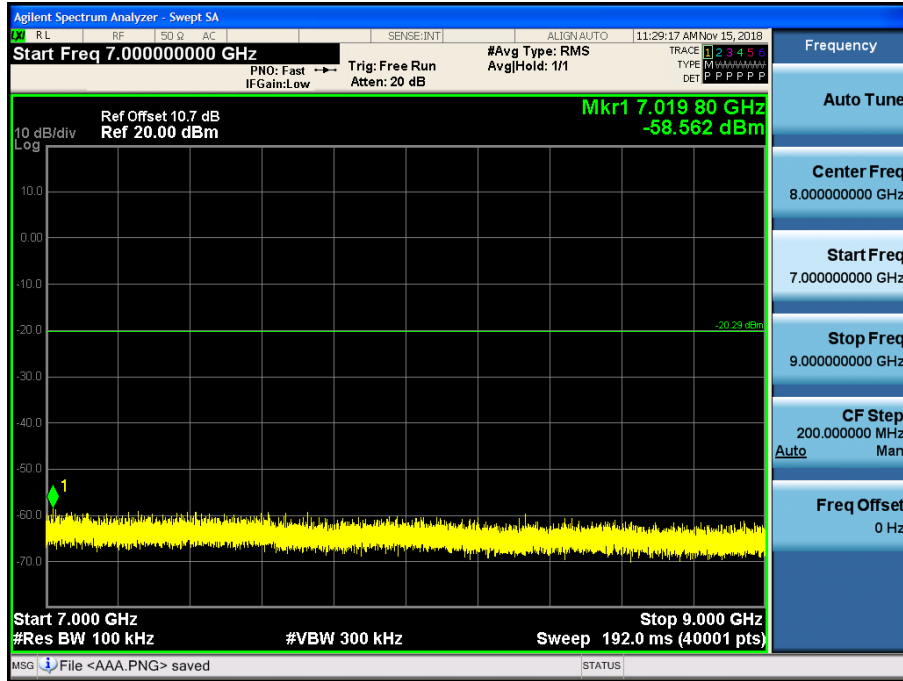
5 GHz ~ 7 GHz

Conducted Spurious Emission (802.11b_Ch.11_11 Mbps)



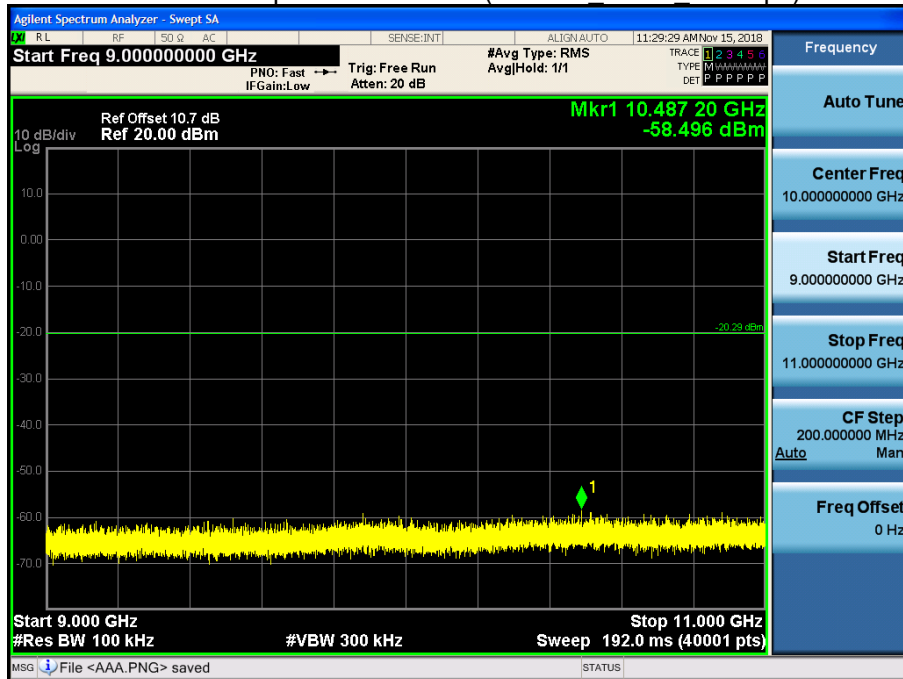
7 GHz ~ 9 GHz

Conducted Spurious Emission (802.11b_Ch.11_11 Mbps)



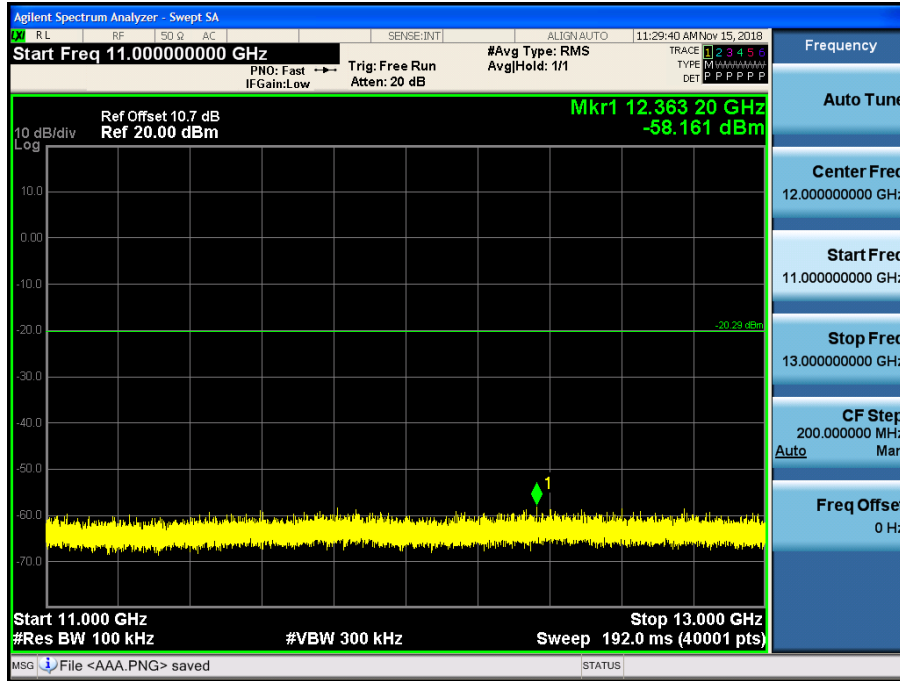
9 GHz ~ 11 GHz

Conducted Spurious Emission (802.11b_Ch.11_11 Mbps)



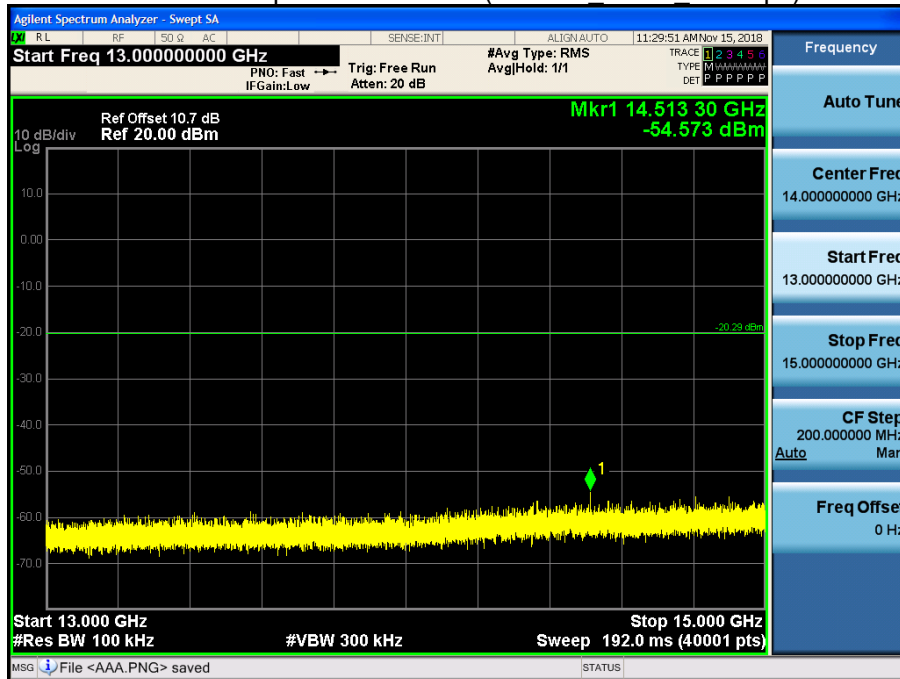
11 GHz ~ 13 GHz

Conducted Spurious Emission (802.11b_Ch.11_11 Mbps)



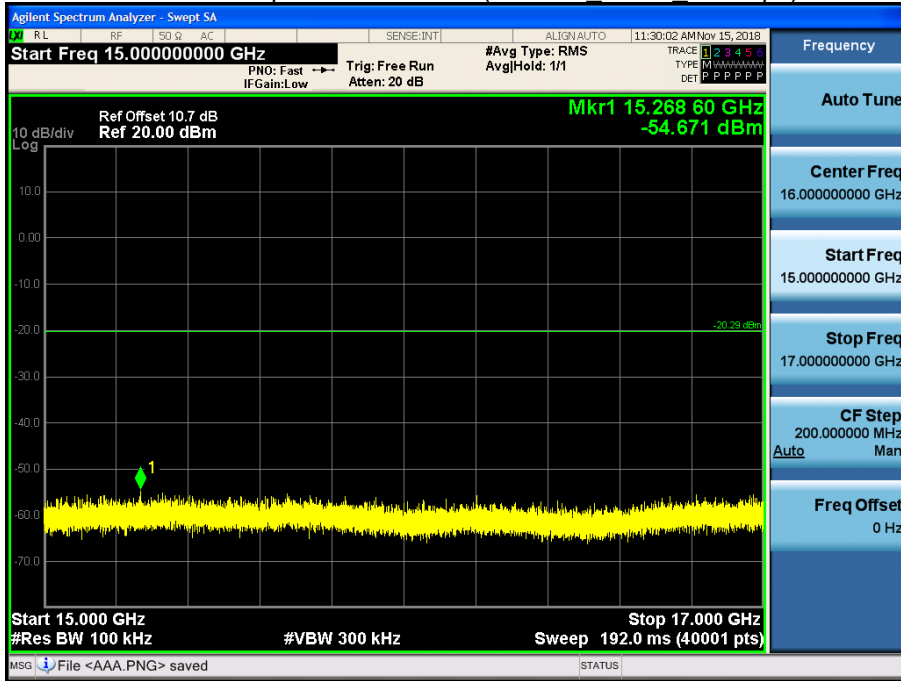
13 GHz ~ 15 GHz

Conducted Spurious Emission (802.11b_Ch.11_11 Mbps)



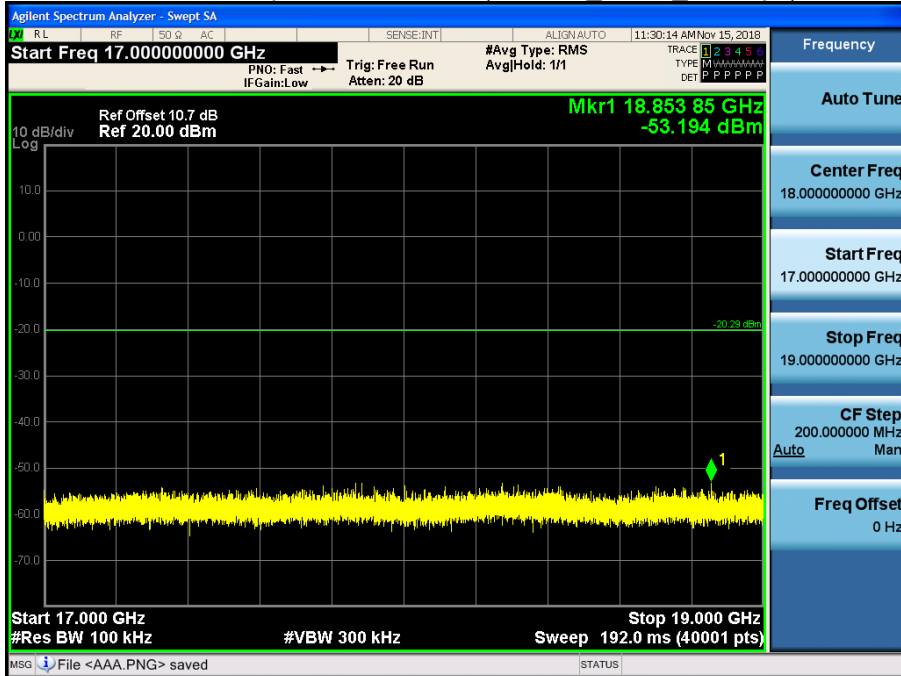
15 GHz ~ 17 GHz

Conducted Spurious Emission (802.11b Ch.11 11 Mbps)



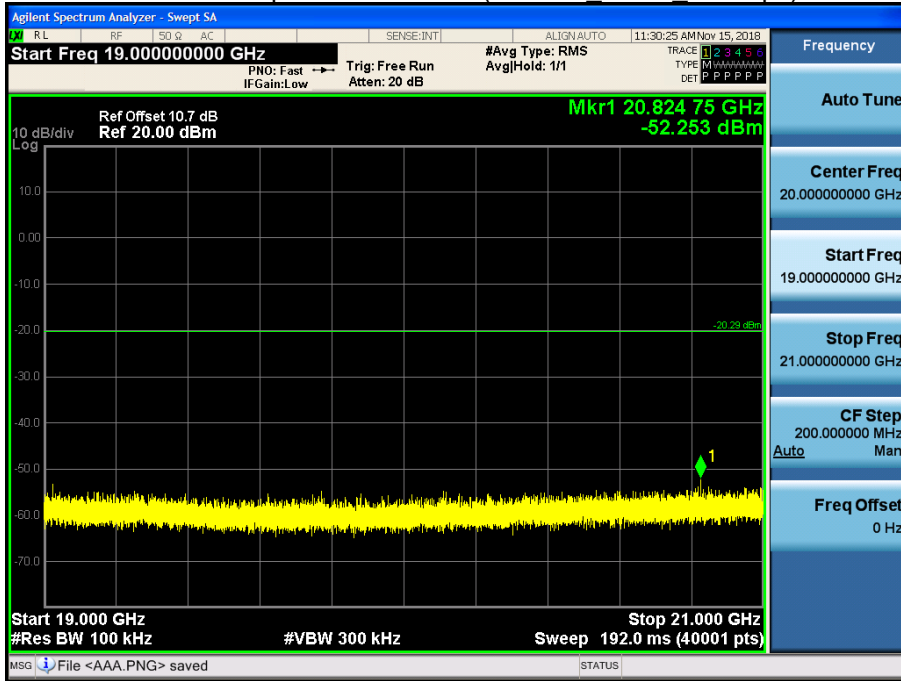
17 GHz ~ 19 GHz

Conducted Spurious Emission (802.11b Ch.11 11 Mbps)



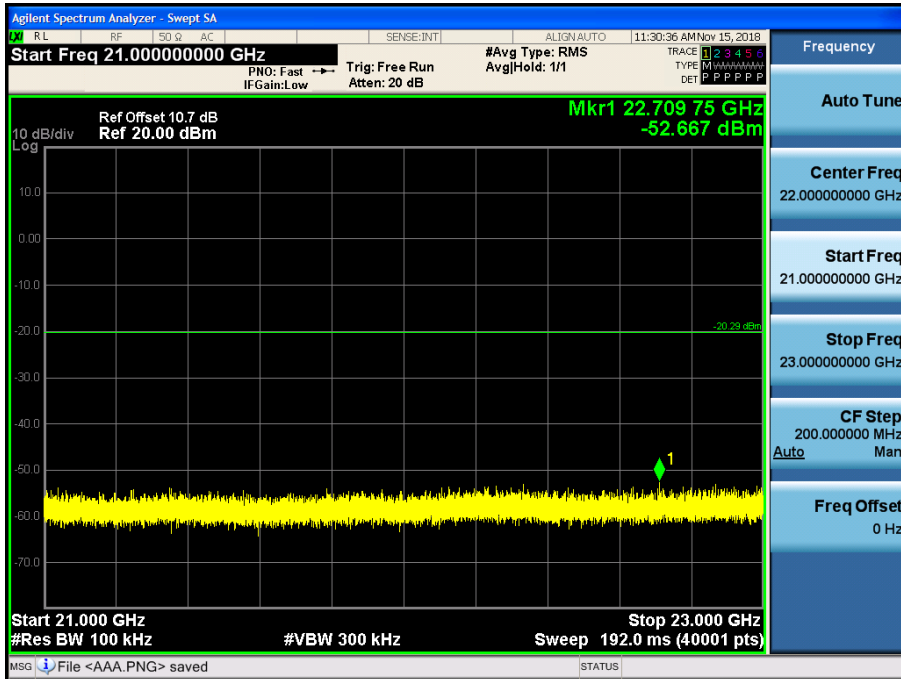
19 GHz ~ 21 GHz

Conducted Spurious Emission (802.11b Ch.11 11 Mbps)



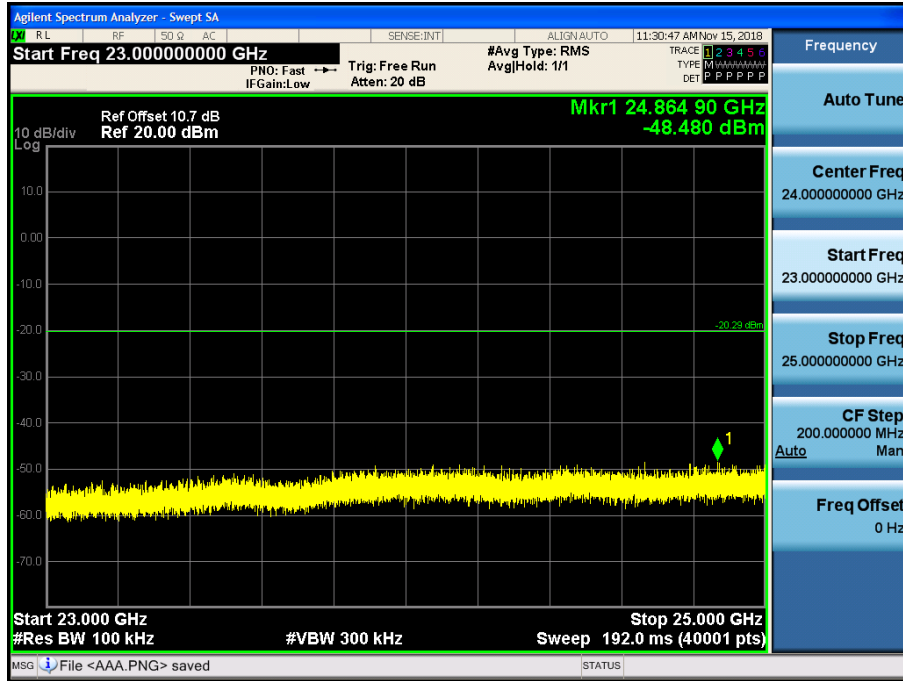
21 GHz ~ 23 GHz

Conducted Spurious Emission (802.11b_Ch.11_11 Mbps)



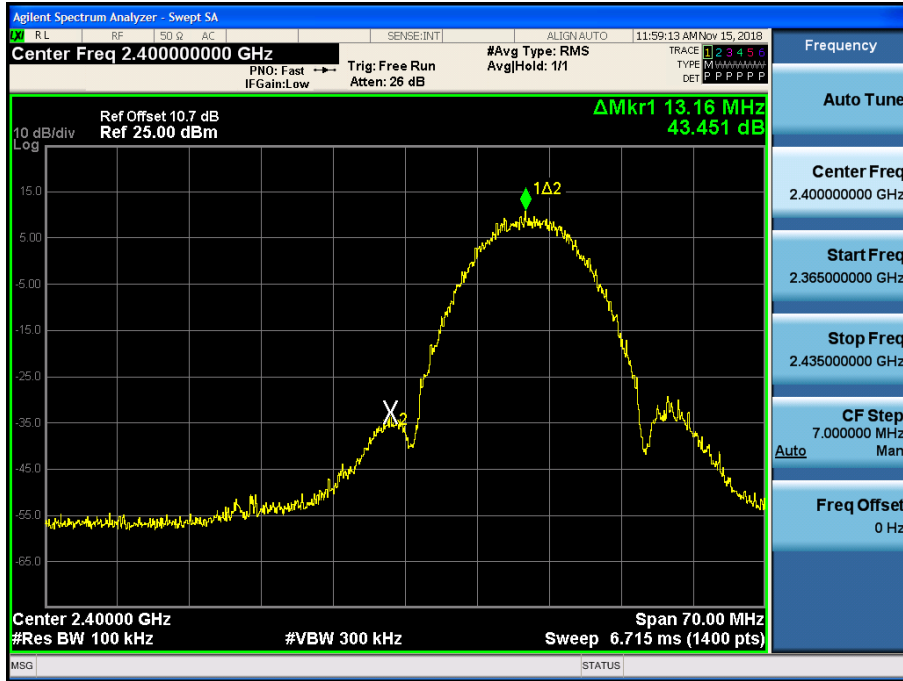
23 GHz ~ 25 GHz

Conducted Spurious Emission (802.11b_Ch.11_11 Mbps)

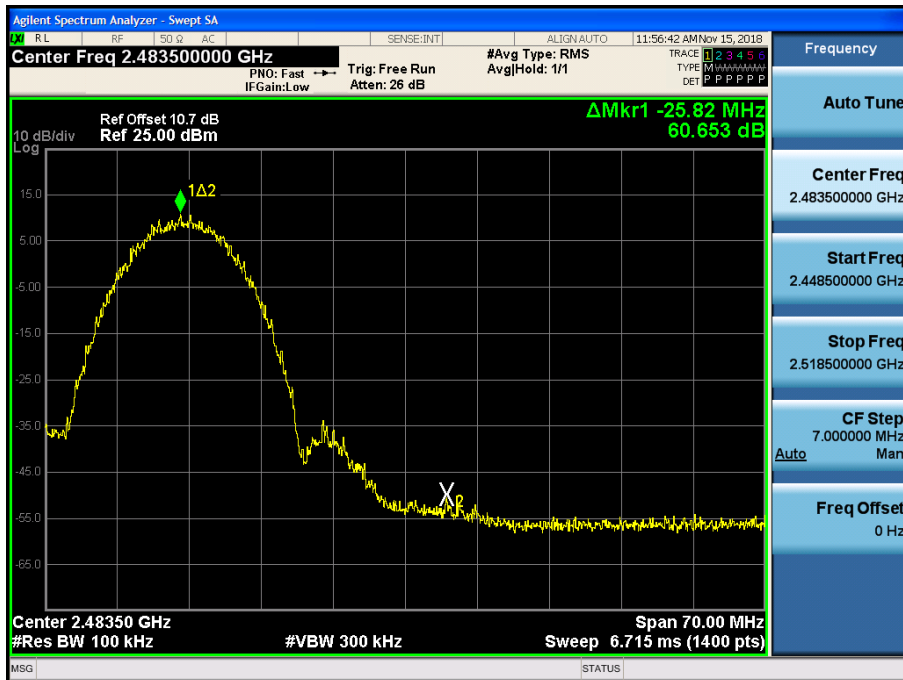


■ Test Plots(BandEdge) [Ant2]

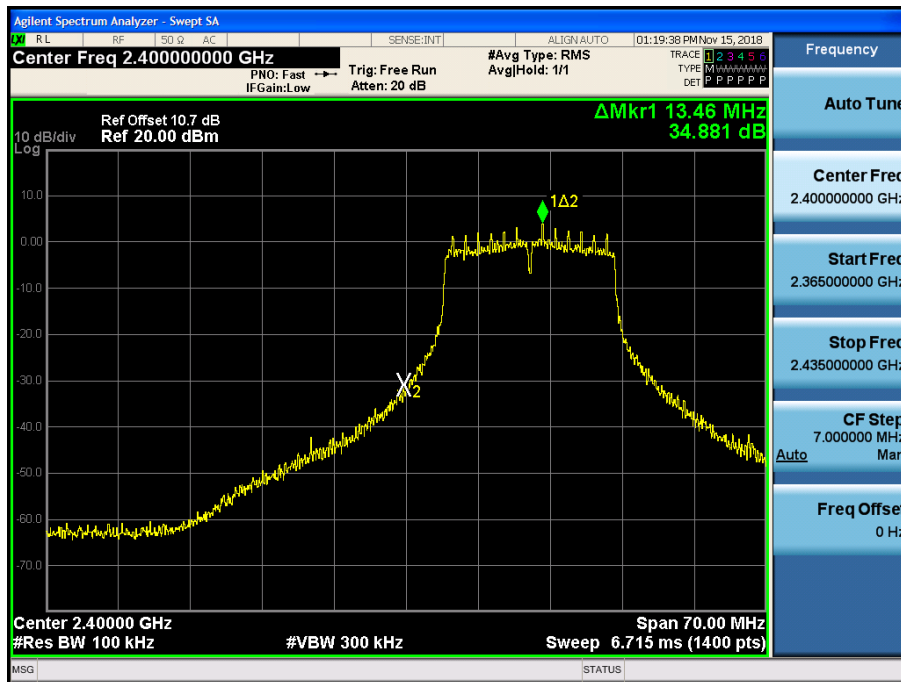
Band Edge (802.11b-CH1)



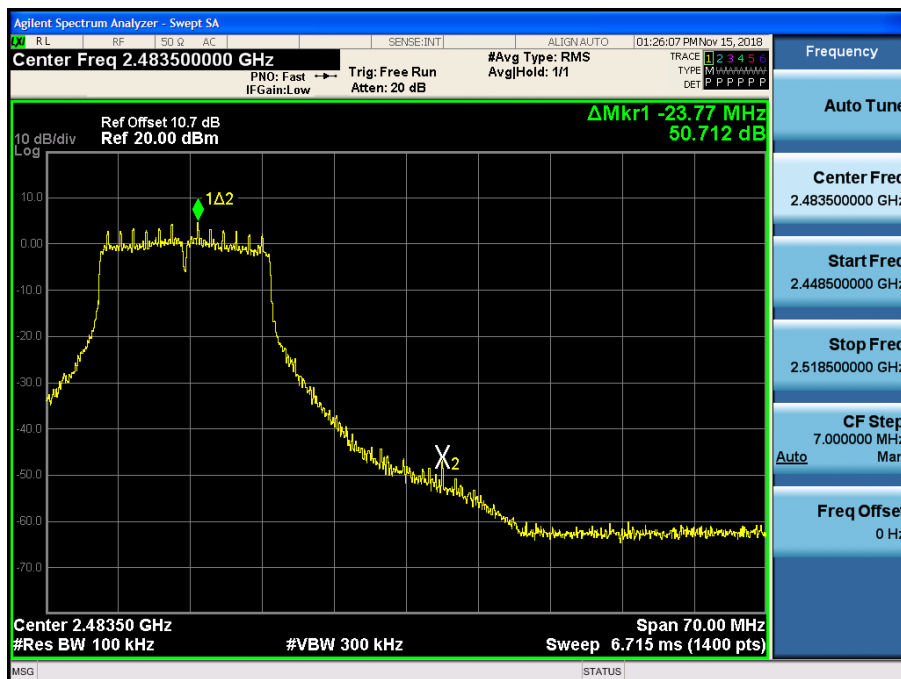
Band Edge (802.11b-CH11)



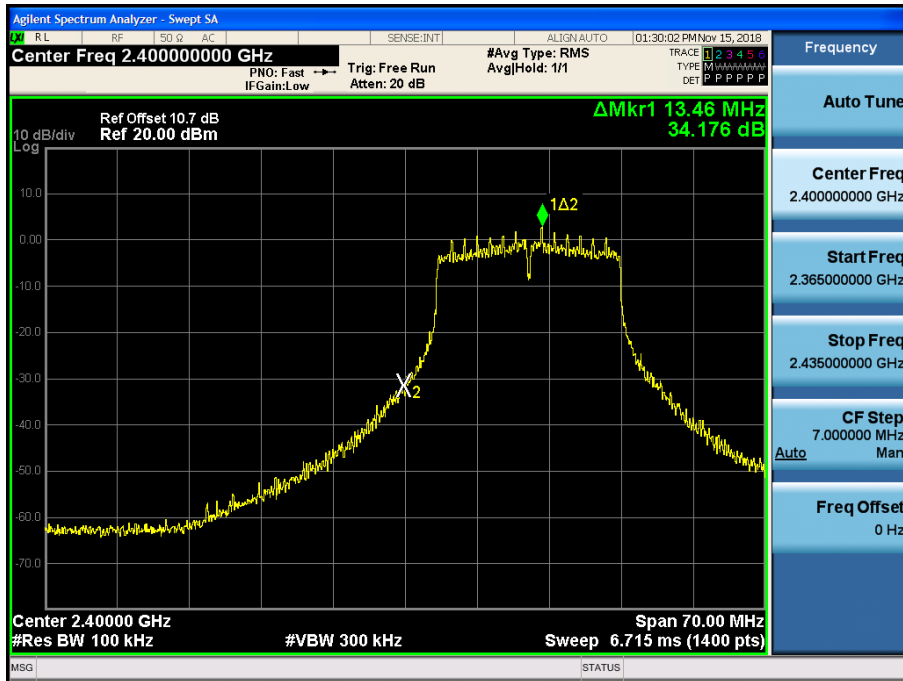
Band Edge (802.11g-CH1)



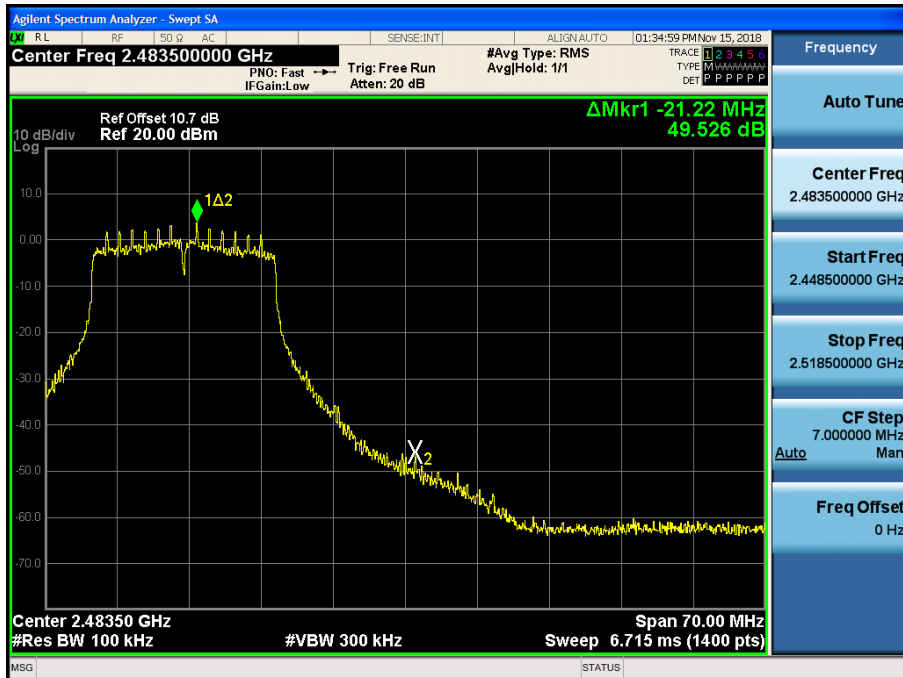
Band Edge (802.11g-CH11)



Band Edge (802.11n_HT20-CH1)



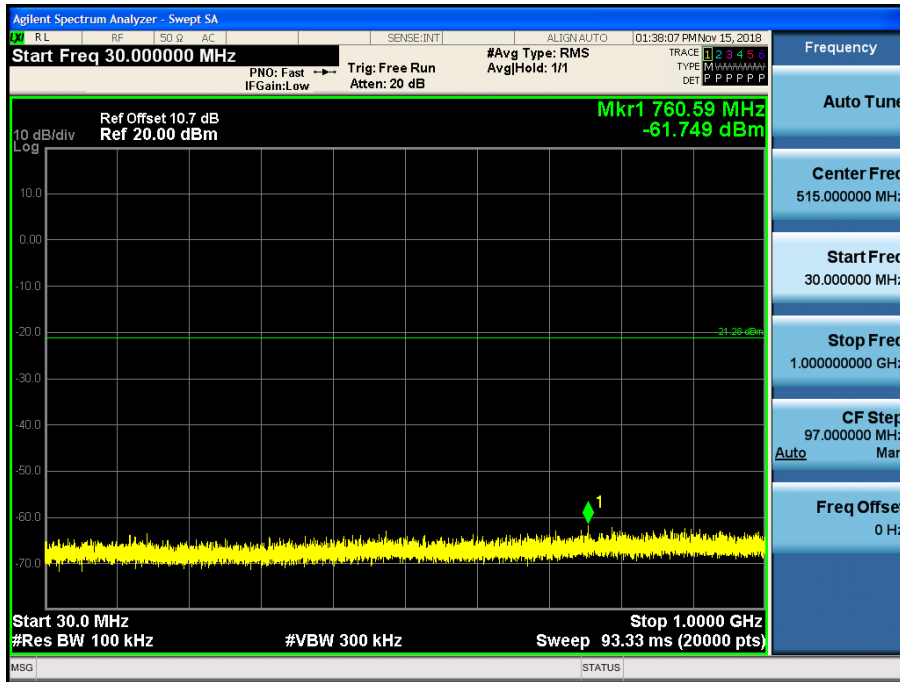
Band Edge (802.11n_HT20-CH11)



■ Test Plots(Conducted Spurious Emission) [Ant2]

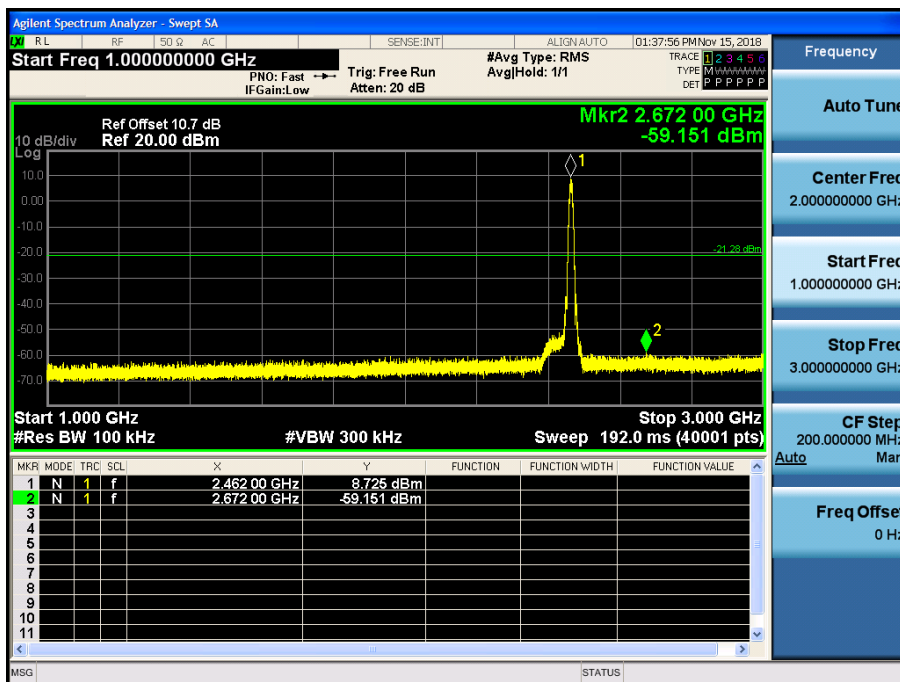
30 MHz ~ 1 GHz

Conducted Spurious Emission (802.11b_Ch.11_5.5 Mbps)



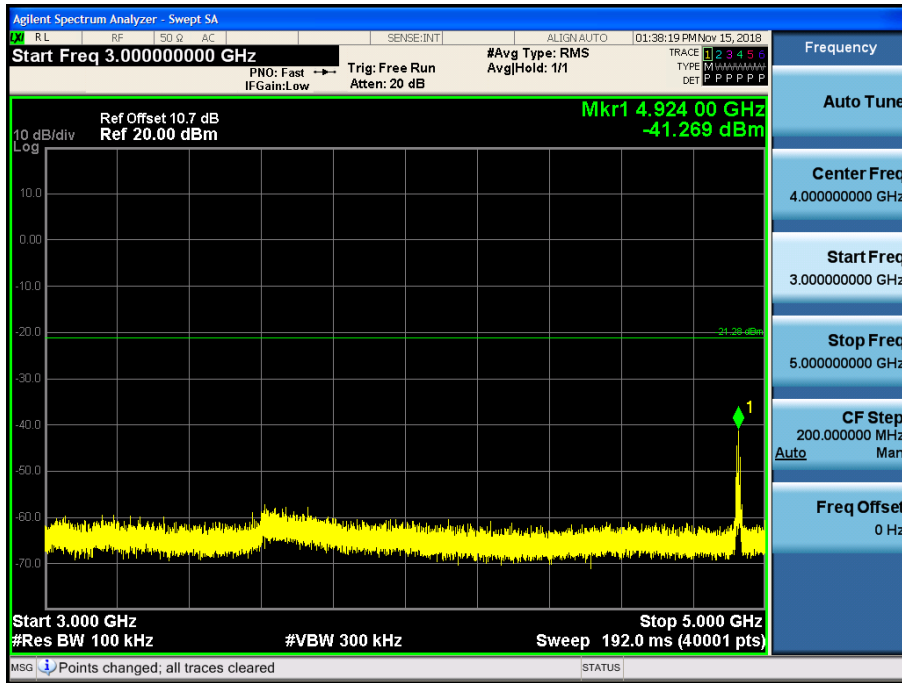
1 GHz ~ 3 GHz

Conducted Spurious Emission (802.11b_Ch.11_5.5 Mbps)



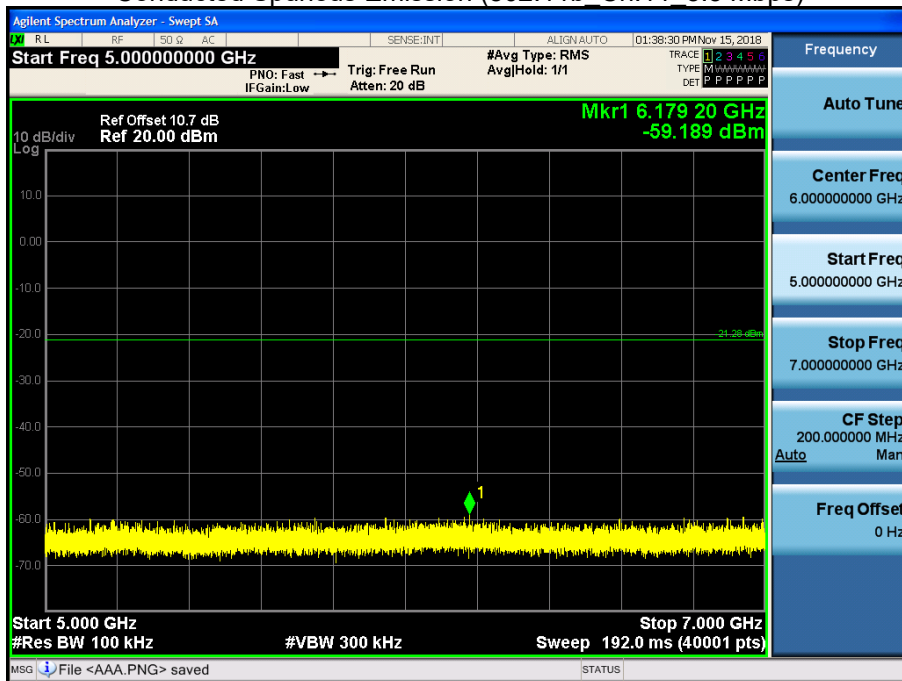
3 GHz ~ 5 GHz

Conducted Spurious Emission (802.11b_Ch.11_5.5 Mbps)



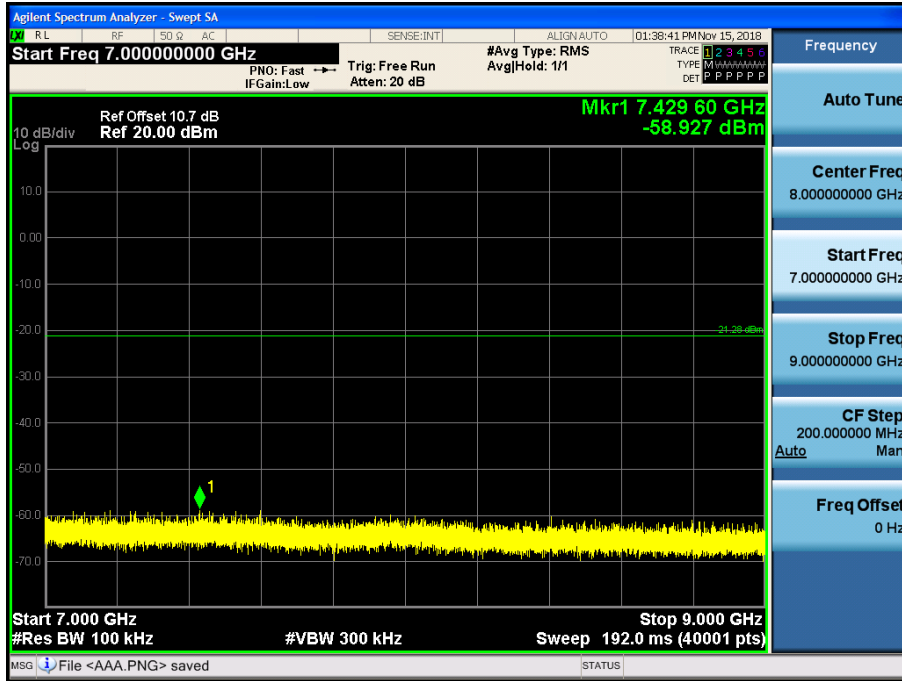
5 GHz ~ 7 GHz

Conducted Spurious Emission (802.11b_Ch.11_5.5 Mbps)



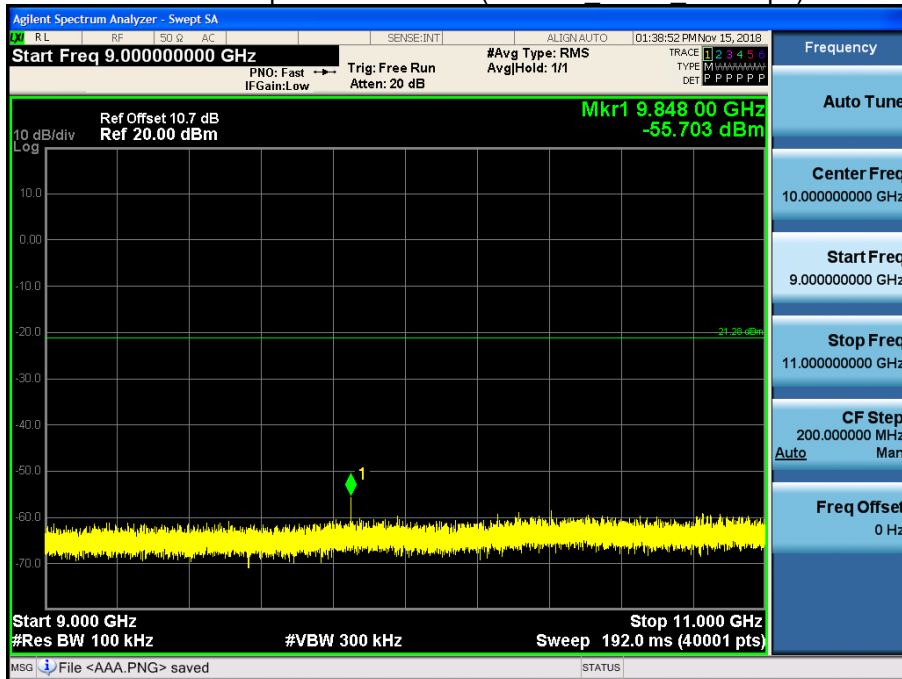
7 GHz ~ 9 GHz

Conducted Spurious Emission (802.11b_Ch.11_5.5 Mbps)



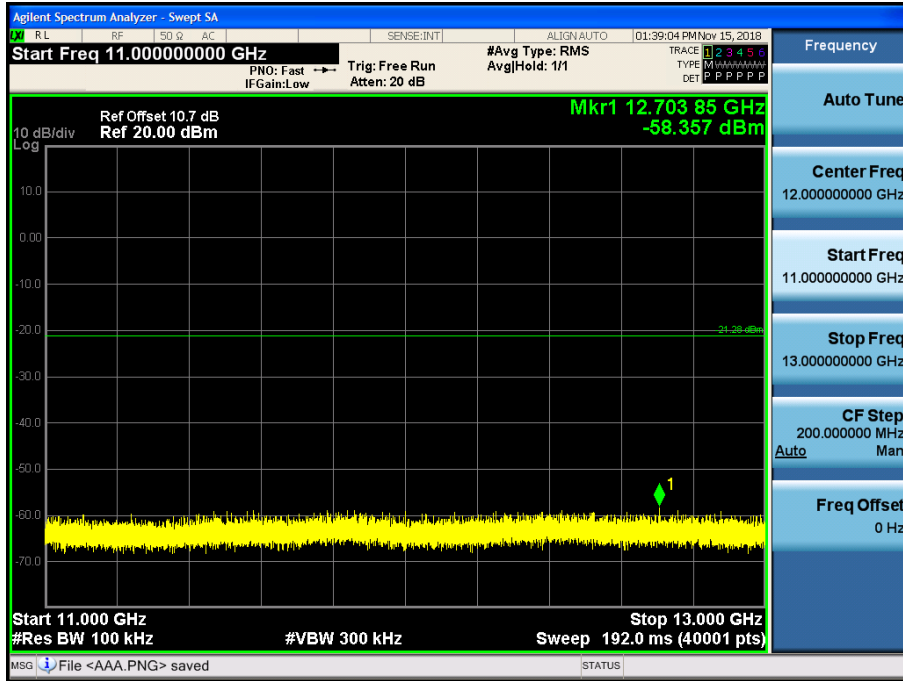
9 GHz ~ 11 GHz

Conducted Spurious Emission (802.11b_Ch.11_5.5 Mbps)



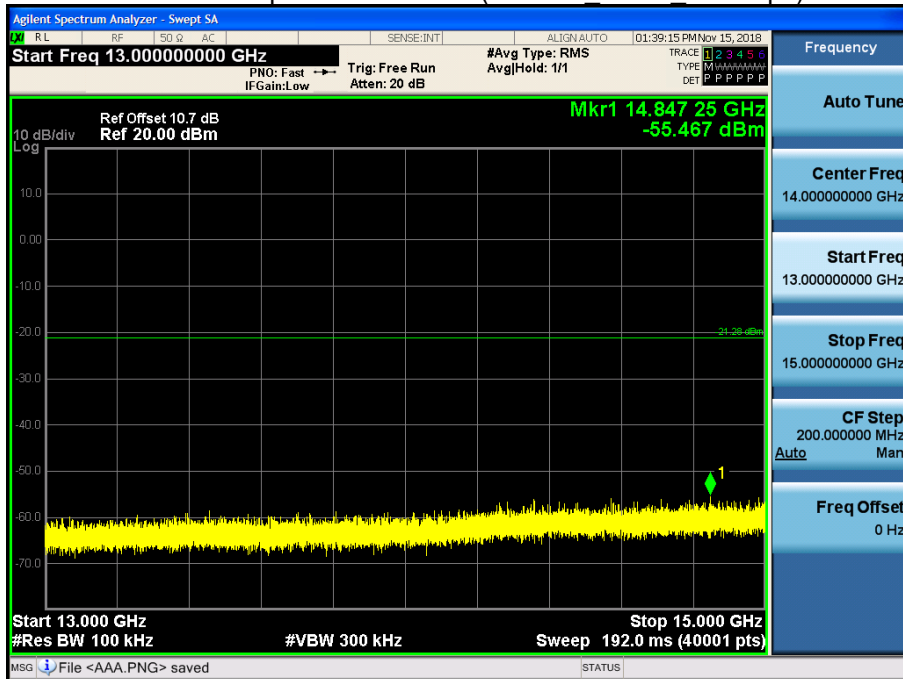
11 GHz ~ 13 GHz

Conducted Spurious Emission (802.11b_Ch.11_5.5 Mbps)



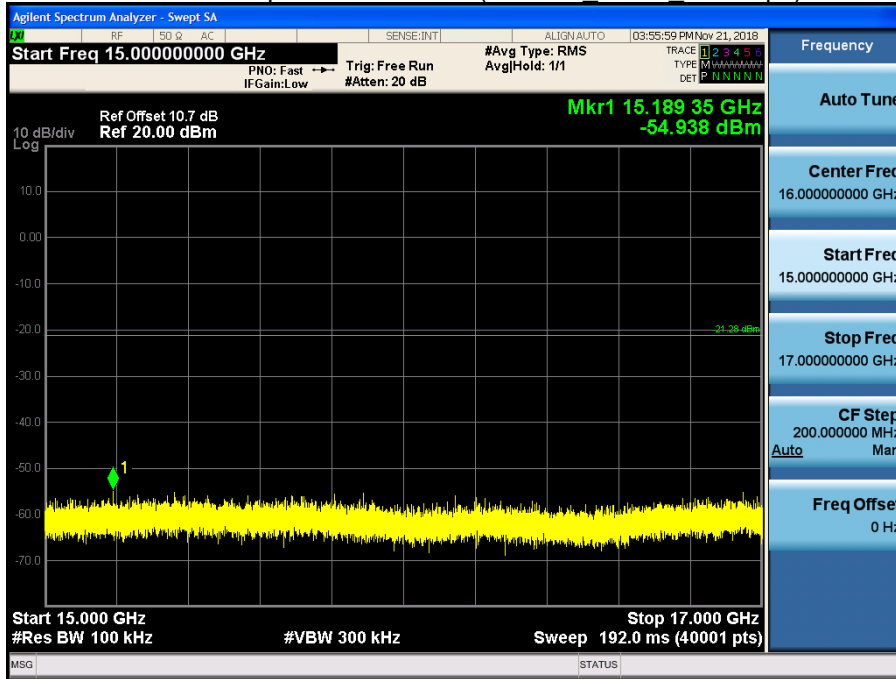
13 GHz ~ 15 GHz

Conducted Spurious Emission (802.11b_Ch.11_5.5 Mbps)



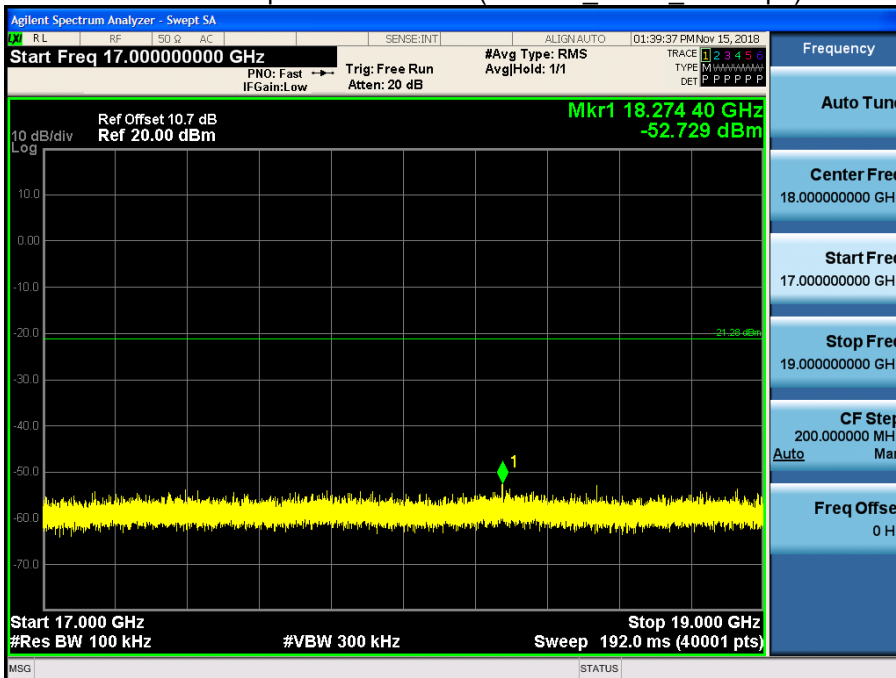
15 GHz ~ 17 GHz

Conducted Spurious Emission (802.11b Ch.11 5.5 Mbps)



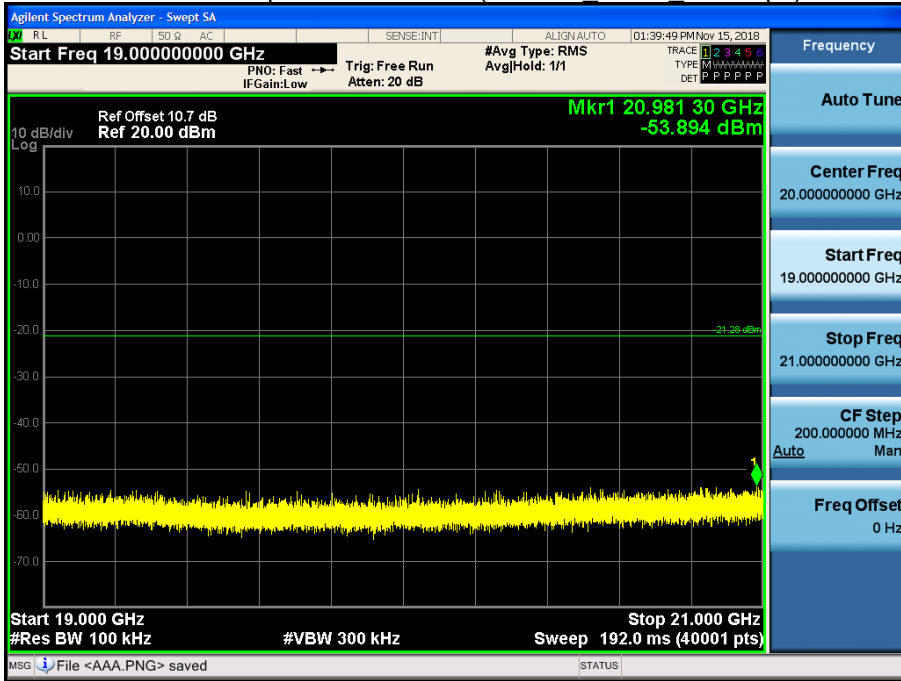
17 GHz ~ 19 GHz

Conducted Spurious Emission (802.11b Ch.11 5.5 Mbps)



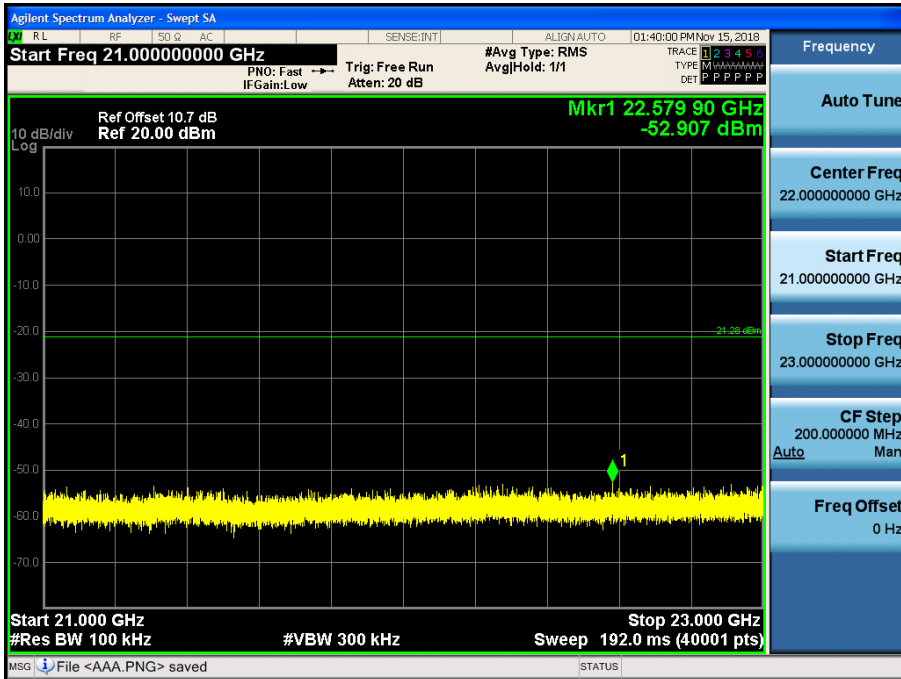
19 GHz ~ 21 GHz

Conducted Spurious Emission (802.11b Ch.11 5.5 Mbps)



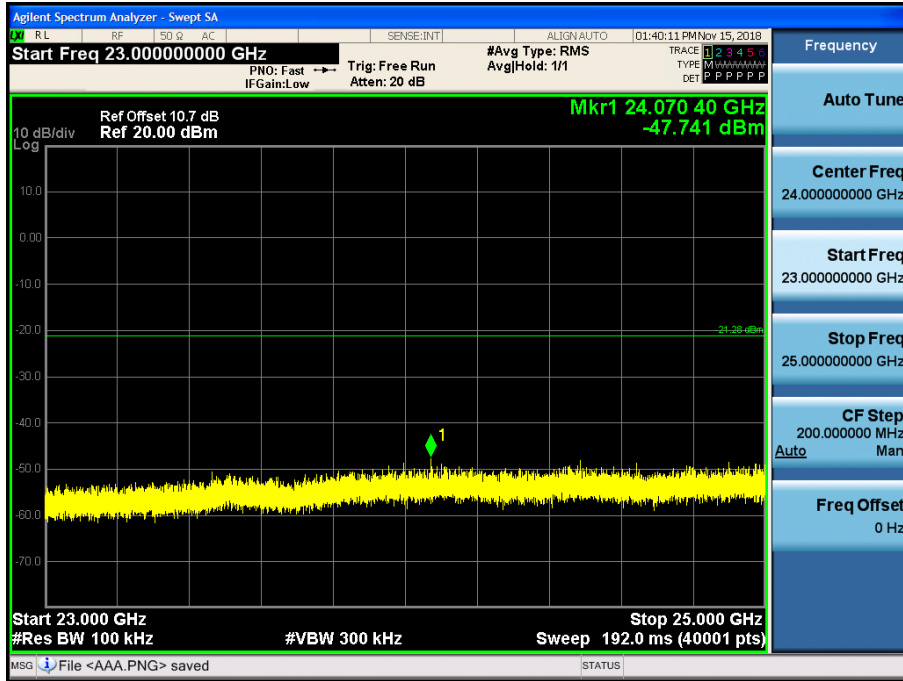
21 GHz ~ 23 GHz

Conducted Spurious Emission (802.11b_Ch.11_5.5 Mbps)



23 GHz ~ 25 GHz

Conducted Spurious Emission (802.11b_Ch.11_5.5 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 = $40 \cdot \log(\text{specific distance} / \text{test distance})$ (dB)
3. Limit line = specific Limits (dBuV) + Distance extrapolation factor
4. The test results for below 30 MHz is correlated to an open site.
The result on OATS is about 2 dB higher than semi-anechoic chamber(10 m chamber)

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

[Ant1]

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	50.12	1.45	V	51.57	73.98	22.41	PK
4824	40.32	1.45	V	41.77	53.98	12.21	AV
7236	44.88	11.43	V	56.31	73.98	17.67	PK
7236	33.30	11.43	V	44.73	53.98	9.25	AV
4824	51.20	1.45	H	52.65	73.98	21.33	PK
4824	41.95	1.45	H	43.40	53.98	10.58	AV
7236	45.81	11.43	H	57.24	73.98	16.74	PK
7236	33.42	11.43	H	44.85	53.98	9.13	AV

[Ant2]

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	49.97	1.45	V	51.42	73.98	22.56	PK
4824	40.31	1.45	V	41.76	53.98	12.22	AV
7236	44.68	11.43	V	56.11	73.98	17.87	PK
7236	33.31	11.43	V	44.74	53.98	9.24	AV
4824	51.00	1.45	H	52.45	73.98	21.53	PK
4824	41.71	1.45	H	43.16	53.98	10.82	AV
7236	45.63	11.43	H	57.06	73.98	16.92	PK
7236	33.36	11.43	H	44.79	53.98	9.19	AV

[MIMO]

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]	Measurement Type
4824	57.37	0.00	1.45	V	58.82	73.98	15.16	PK
4824	43.36	0.12	1.45	V	44.93	53.98	9.05	AV
7236	45.61	0.00	11.43	V	57.04	73.98	16.94	PK
7236	33.05	0.12	11.43	V	44.60	53.98	9.38	AV
4824	60.55	0.00	1.45	H	62.00	73.98	11.98	PK
4824	46.07	0.12	1.45	H	47.64	53.98	6.34	AV
7236	45.58	0.00	11.43	H	57.01	73.98	16.97	PK
7236	33.13	0.12	11.43	H	44.68	53.98	9.30	AV

[MIMO]

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]	Measurement Type
4824	52.72	0.00	1.45	V	54.17	73.98	19.81	PK
4824	40.01	0.12	1.45	V	41.58	53.98	12.40	AV
7236	45.95	0.00	11.43	V	57.38	73.98	16.60	PK
7236	33.09	0.12	11.43	V	44.64	53.98	9.34	AV
4824	54.51	0.00	1.45	H	55.96	73.98	18.02	PK
4824	41.69	0.12	1.45	H	43.26	53.98	10.72	AV
7236	46.25	0.00	11.43	H	57.68	73.98	16.30	PK
7236	33.18	0.12	11.43	H	44.73	53.98	9.25	AV

[Ant1]

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	51.38	1.66	V	53.04	73.98	20.94	PK
4874	45.18	1.66	V	46.84	53.98	7.14	AV
7311	45.68	10.10	V	55.78	73.98	18.20	PK
7311	33.95	10.10	V	44.05	53.98	9.93	AV
4874	52.19	1.66	H	53.85	73.98	20.13	PK
4874	46.02	1.66	H	47.68	53.98	6.30	AV
7311	45.69	10.10	H	55.79	73.98	18.19	PK
7311	34.03	10.10	H	44.13	53.98	9.85	AV

[Ant2]

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	49.11	1.66	V	50.77	73.98	23.21	PK
4874	36.86	1.66	V	38.52	53.98	15.46	AV
7311	45.30	10.10	V	55.40	73.98	18.58	PK
7311	33.98	10.10	V	44.08	53.98	9.90	AV
4874	48.04	1.66	H	49.70	73.98	24.28	PK
4874	37.18	1.66	H	38.84	53.98	15.14	AV
7311	45.74	10.10	H	55.84	73.98	18.14	PK
7311	34.02	10.10	H	44.12	53.98	9.86	AV

[MIMO]

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]	Measurement Type
4874	54.76	0.00	1.66	V	56.42	73.98	17.56	PK
4874	42.20	0.12	1.66	V	43.98	53.98	10.00	AV
7311	45.61	0.00	10.10	V	55.71	73.98	18.27	PK
7311	33.61	0.12	10.10	V	43.83	53.98	10.15	AV
4874	56.71	0.00	1.66	H	58.37	73.98	15.61	PK
4874	44.13	0.12	1.66	H	45.91	53.98	8.07	AV
7311	45.50	0.00	10.10	H	55.60	73.98	18.38	PK
7311	33.65	0.12	10.10	H	43.87	53.98	10.11	AV

[MIMO]

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]	Measurement Type
4874	53.87	0.00	1.66	V	55.53	73.98	18.45	PK
4874	41.35	0.12	1.66	V	43.13	53.98	10.85	AV
7311	44.85	0.00	10.10	V	54.95	73.98	19.03	PK
7311	33.62	0.12	10.10	V	43.84	53.98	10.14	AV
4874	56.53	0.00	1.66	H	58.19	73.98	15.79	PK
4874	43.30	0.12	1.66	H	45.08	53.98	8.90	AV
7311	46.74	0.00	10.10	H	56.84	73.98	17.14	PK
7311	33.68	0.12	10.10	H	43.90	53.98	10.08	AV

[Ant1]

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	51.64	1.00	V	52.64	73.98	21.34	PK
4924	44.02	1.00	V	45.02	53.98	8.96	AV
7386	44.79	11.10	V	55.89	73.98	18.09	PK
7386	33.40	11.10	V	44.50	53.98	9.48	AV
4924	52.28	1.00	H	53.28	73.98	20.70	PK
4924	44.98	1.00	H	45.98	53.98	8.00	AV
7386	45.41	11.10	H	56.51	73.98	17.47	PK
7386	33.47	11.10	H	44.57	53.98	9.41	AV

[Ant2]

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	49.48	1.00	V	50.48	73.98	23.50	PK
4924	39.74	1.00	V	40.74	53.98	13.24	AV
7386	45.12	11.10	V	56.22	73.98	17.76	PK
7386	33.48	11.10	V	44.58	53.98	9.40	AV
4924	49.96	1.00	H	50.96	73.98	23.02	PK
4924	39.88	1.00	H	40.88	53.98	13.10	AV
7386	45.52	11.10	H	56.62	73.98	17.36	PK
7386	33.53	11.10	H	44.63	53.98	9.35	AV

[RSDB]

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

Operation Mode Antenna 2: 802.11a
 Transfer Rate: 6 Mbps
 Operating Frequency: 5825 MHz
 Channel No.: 165 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	50.72	1.00	H	51.72	73.98	22.26	PK
4924	42.99	1.00	H	43.99	53.98	9.99	AV
7386	45.73	11.10	H	56.83	73.98	17.15	PK
7386	33.54	11.10	H	44.64	53.98	9.34	AV

[MIMO]

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]	Measurement Type
4924	57.30	0.00	1.00	V	58.30	73.98	15.68	PK
4924	43.25	0.12	1.00	V	44.37	53.98	9.61	AV
7386	46.14	0.00	11.10	V	57.24	73.98	16.74	PK
7386	33.38	0.12	11.10	V	44.60	53.98	9.38	AV
4924	59.55	0.00	1.00	H	60.55	73.98	13.43	PK
4924	45.75	0.12	1.00	H	46.87	53.98	7.11	AV
7386	46.00	0.00	11.10	H	57.10	73.98	16.88	PK
7386	33.40	0.12	11.10	H	44.62	53.98	9.36	AV

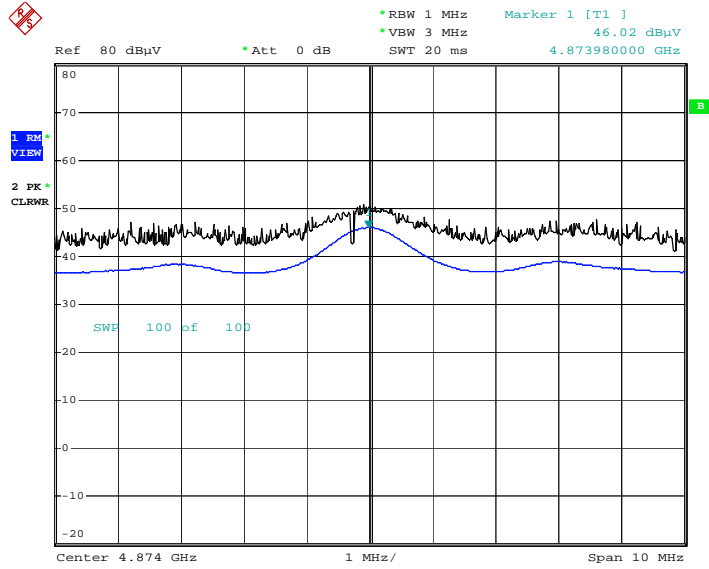
[MIMO]

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	54.12	0.00	1.00	V	55.12	73.98	18.86	PK
4924	41.03	0.12	1.00	V	42.15	53.98	11.83	AV
7386	45.85	0.00	11.10	V	56.95	73.98	17.03	PK
7386	33.45	0.12	11.10	V	44.67	53.98	9.31	AV
4924	56.11	0.00	1.00	H	57.11	73.98	16.87	PK
4924	43.05	0.12	1.00	H	44.17	53.98	9.81	AV
7386	45.14	0.00	11.10	H	56.24	73.98	17.74	PK
7386	33.35	0.12	11.10	H	44.57	53.98	9.41	AV

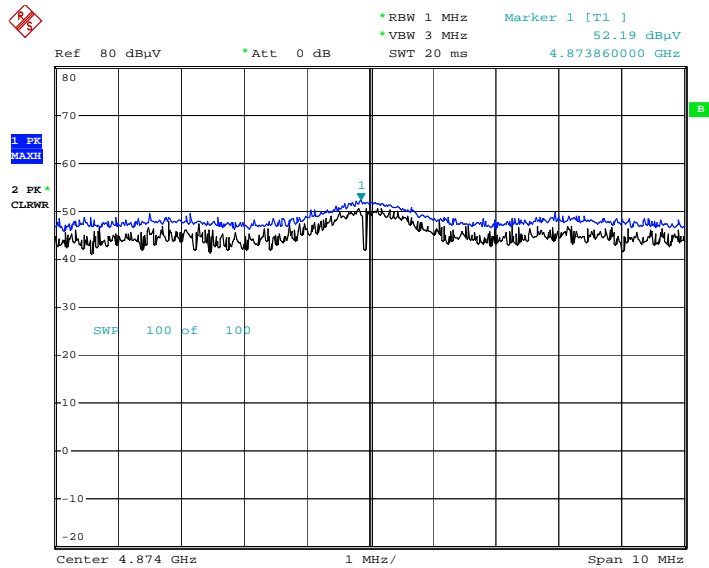
■ Test Plots (Worst case : X-H)

Radiated Spurious Emissions plot – Average Reading (802.11b, Ch.6 2nd Harmonic) [Ant1]



Date: 13.NOV.2018 14:12:58

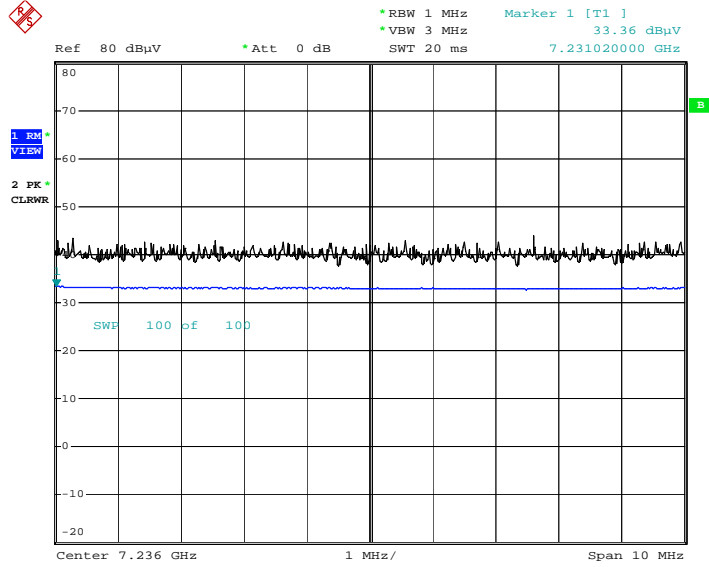
Radiated Spurious Emissions plot – Peak Reading (802.11b, Ch.6 2nd Harmonic) [Ant1]



Date: 13.NOV.2018 14:12:05

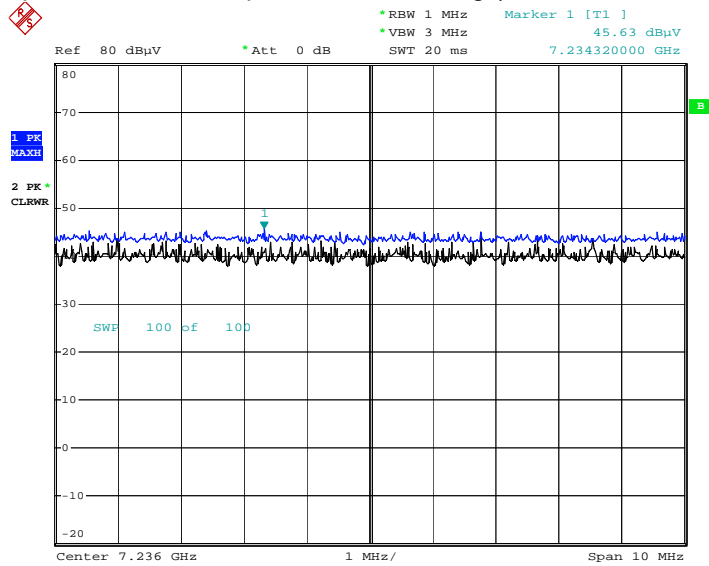
■ Test Plots (Worst case : Y-H)

Radiated Spurious Emissions plot – Average Reading (802.11b, Ch.1 3rd Harmonic) [Ant2]



Date: 13.NOV.2018 15:03:19

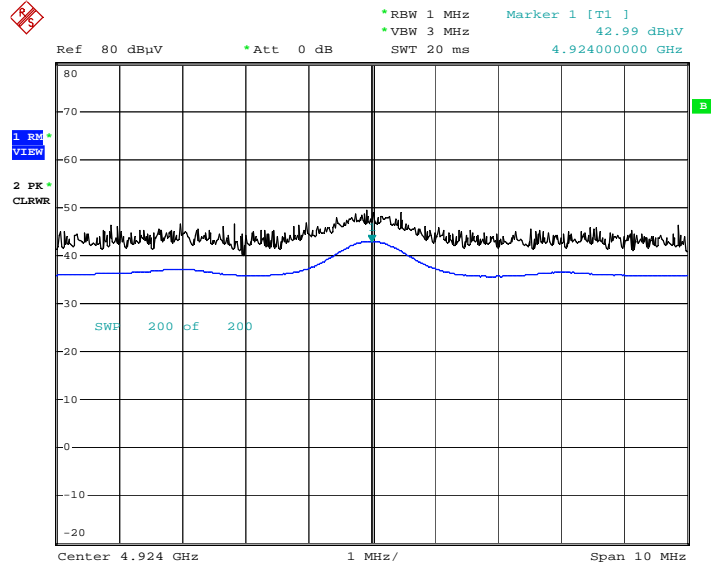
Radiated Spurious Emissions plot – Peak Reading (802.11b, Ch.1 3rd Harmonic) [Ant2]



Date: 13.NOV.2018 15:03:56

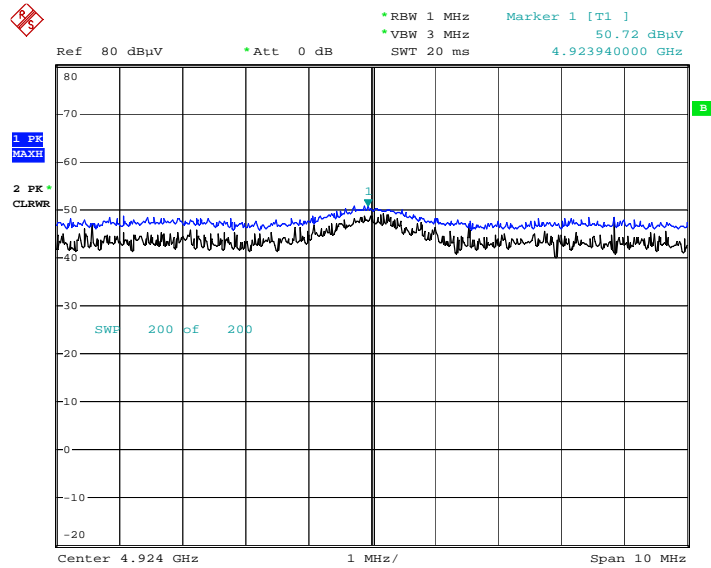
■ Test Plots (Worst case : X-H)

Radiated Spurious Emissions plot – Average Reading (802.11b, Ch.11 2nd Harmonic) [RSDB]



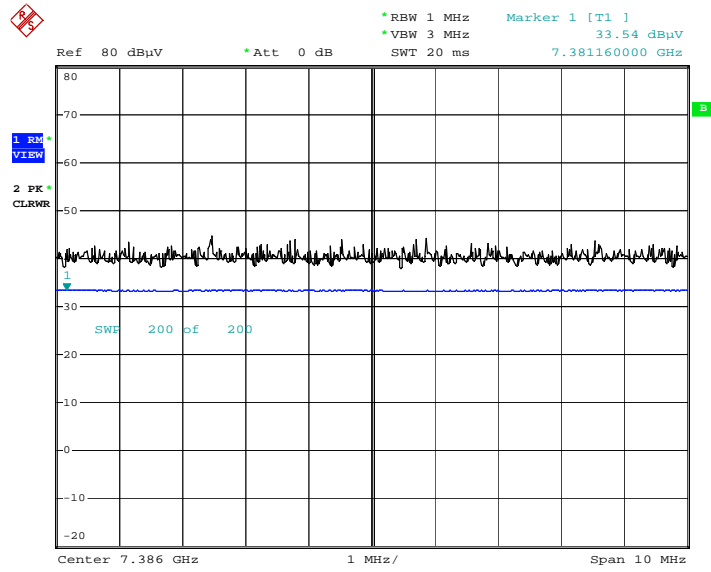
Date: 19.NOV.2018 15:52:46

Radiated Spurious Emissions plot – Peak Reading (802.11b, Ch.11 2nd Harmonic) [RSDB]



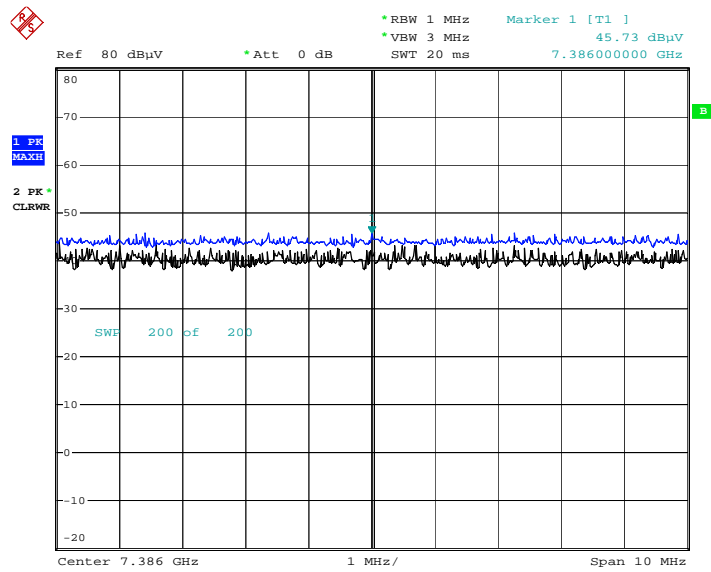
Date: 19.NOV.2018 15:53:43

Radiated Spurious Emissions plot – Average Reading (802.11b, Ch.11 3rd Harmonic) [RSDB]



Date: 19.NOV.2018 15:54:59

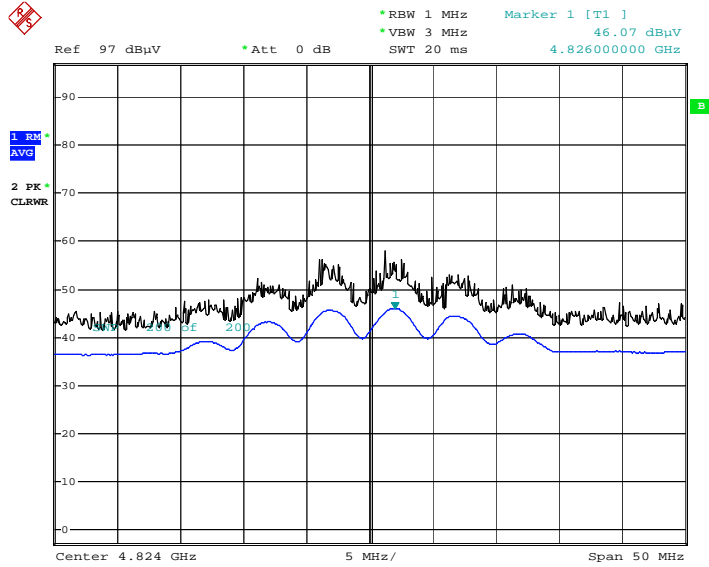
Radiated Spurious Emissions plot – Peak Reading (802.11b, Ch.11 3rd Harmonic) [RSDB]



Date: 19.NOV.2018 15:55:18

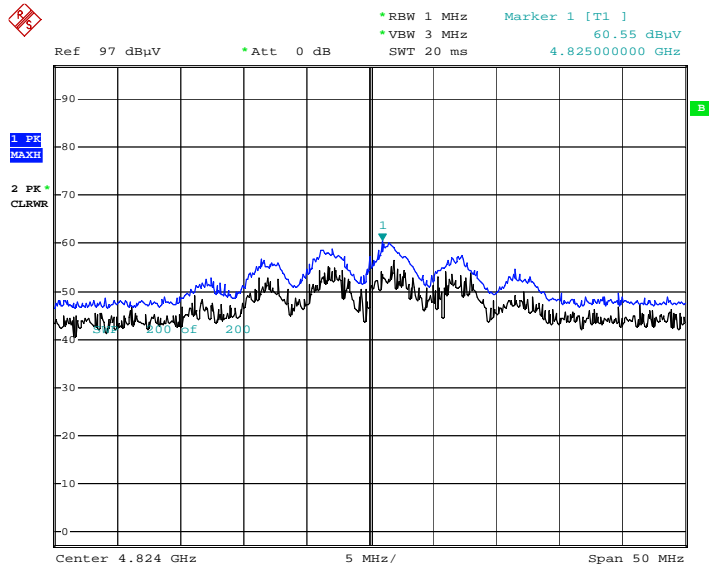
■ Test Plots (Worst case : X-H)

Radiated Spurious Emissions plot – Average Reading (802.11g, Ch.1 2nd Harmonic) [MIMO]



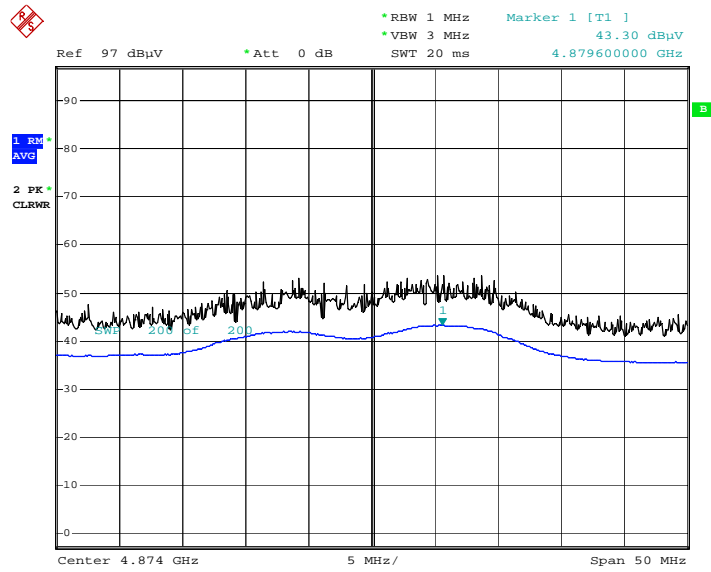
Date: 31.OCT.2018 14:50:06

Radiated Spurious Emissions plot – Peak Reading (802.11g, Ch.1 2nd Harmonic) [MIMO]



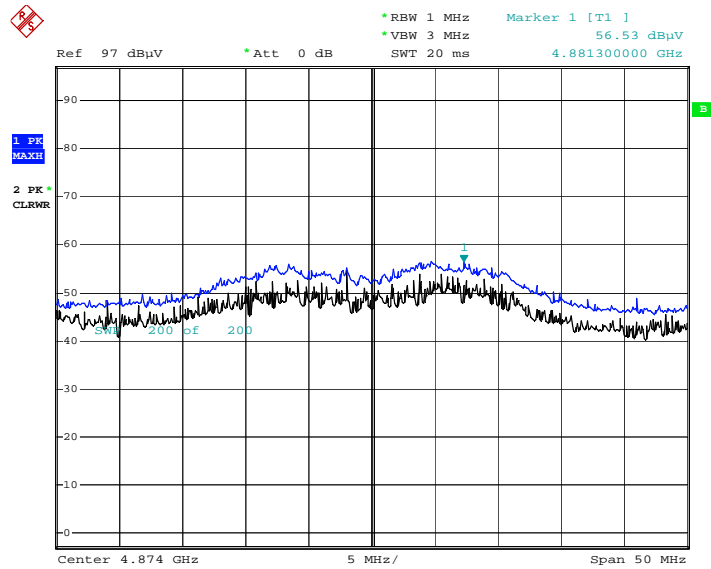
Date: 31.OCT.2018 14:49:22

Radiated Spurious Emissions plot – Average Reading (802.11n, Ch.6 2nd Harmonic) [MIMO]



Date: 31.OCT.2018 15:05:42

Radiated Spurious Emissions plot – Peak Reading (802.11n, Ch.6 2nd Harmonic) [MIMO]



Date: 31.OCT.2018 15:05:04

Note:

Plot of worst case are only reported.

9.7 RADIATED RESTRICTED BAND EDGES

[Ant1]

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. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
2390.0	51.64	1.14	H	52.78	73.98	21.20	PK
2390.0	39.80	1.14	H	40.94	53.98	13.04	AV
2390.0	51.04	1.14	V	52.18	73.98	21.80	PK
2390.0	39.65	1.14	V	40.79	53.98	13.19	AV
2483.5	51.14	0.78	H	51.92	73.98	22.06	PK
2483.5	39.70	0.78	H	40.48	53.98	13.50	AV
2483.5	50.94	0.78	V	51.72	73.98	22.26	PK
2483.5	39.61	0.78	V	40.39	53.98	13.59	AV

[Ant2]

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. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
2390.0	51.61	1.14	H	52.75	73.98	21.23	PK
2390.0	39.48	1.14	H	40.62	53.98	13.36	AV
2390.0	50.84	1.14	V	51.98	73.98	22.00	PK
2390.0	39.25	1.14	V	40.39	53.98	13.59	AV
2483.5	49.15	0.78	H	49.93	73.98	24.05	PK
2483.5	39.10	0.78	H	39.88	53.98	14.10	AV
2483.5	48.74	0.78	V	49.52	73.98	24.46	PK
2483.5	38.65	0.78	V	39.43	53.98	14.55	AV

[MIMO]

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. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
2390.0	66.54	0.00	1.14	H	67.68	73.98	6.30	PK
2390.0	50.30	0.12	1.14	H	51.56	53.98	2.42	AV
2390.0	64.14	0.00	1.14	V	65.28	73.98	8.70	PK
2390.0	49.86	0.12	1.14	V	51.12	53.98	2.86	AV
2483.5	66.16	0.00	0.78	H	66.94	73.98	7.04	PK
2483.5	50.74	0.12	0.78	H	51.64	53.98	2.34	AV
2483.5	64.78	0.00	0.78	V	65.56	73.98	8.42	PK
2483.5	48.80	0.12	0.78	V	49.70	53.98	4.28	AV

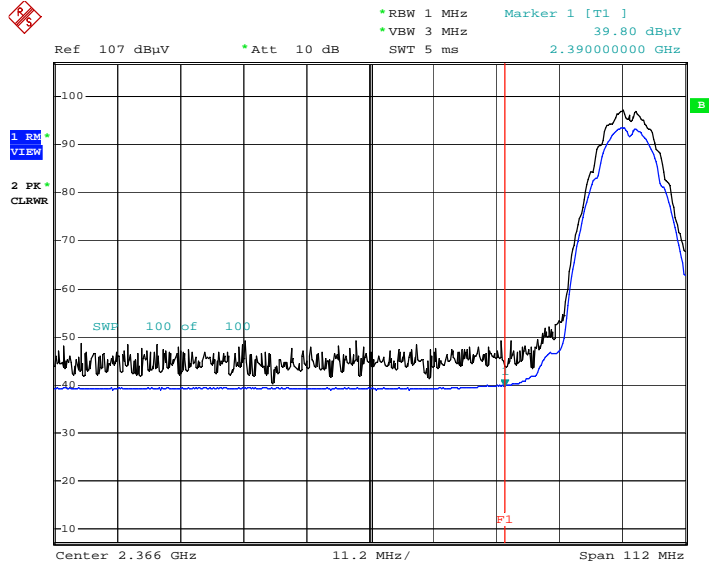
[MIMO]

Operation Mode: 802.11n (HT20)
 Transfer MCS Index: 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. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
2390.0	63.92	0.00	1.14	H	65.06	73.98	8.92	PK
2390.0	50.43	0.12	1.14	H	51.69	53.98	2.29	AV
2390.0	63.19	0.00	1.14	V	64.33	73.98	9.65	PK
2390.0	49.90	0.12	1.14	V	51.16	53.98	2.82	AV
2483.5	63.72	0.00	0.78	H	64.50	73.98	9.48	PK
2483.5	50.21	0.12	0.78	H	51.11	53.98	2.87	AV
2483.5	61.34	0.00	0.78	V	62.12	73.98	11.86	PK
2483.5	48.62	0.12	0.78	V	49.52	53.98	4.46	AV

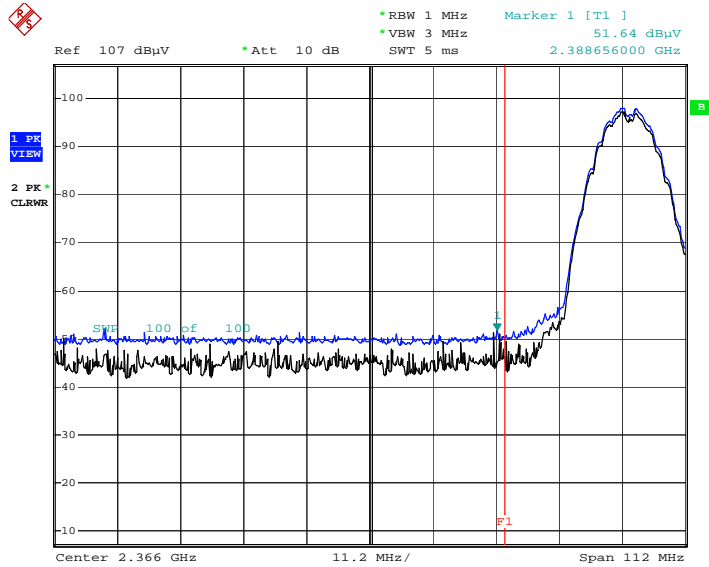
■ Test Plots (Worst case : X-H)

Radiated Restricted Band Edges plot – Average Reading (802.11b Ch.1) [Ant1]



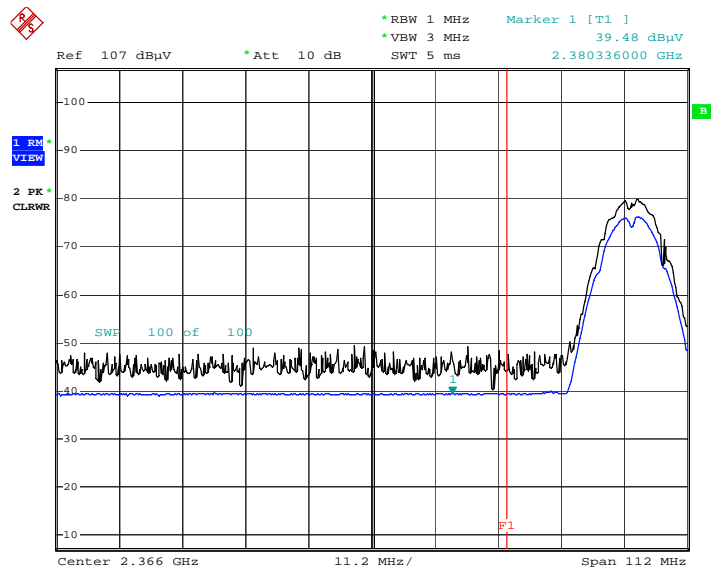
Date: 13.NOV.2018 15:51:04

Radiated Restricted Band Edges plot – Peak Reading (802.11b Ch.1) [Ant1]



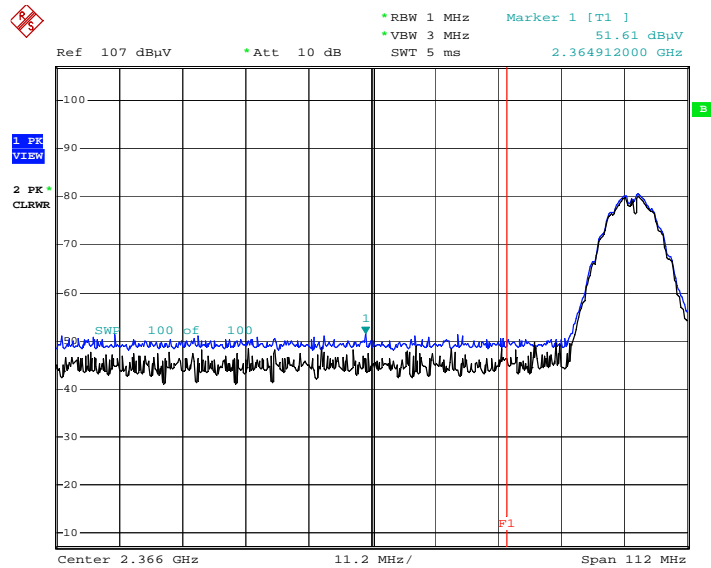
Date: 13.NOV.2018 15:51:52

Radiated Restricted Band Edges plot – Average Reading (802.11b Ch.1) [Ant2]



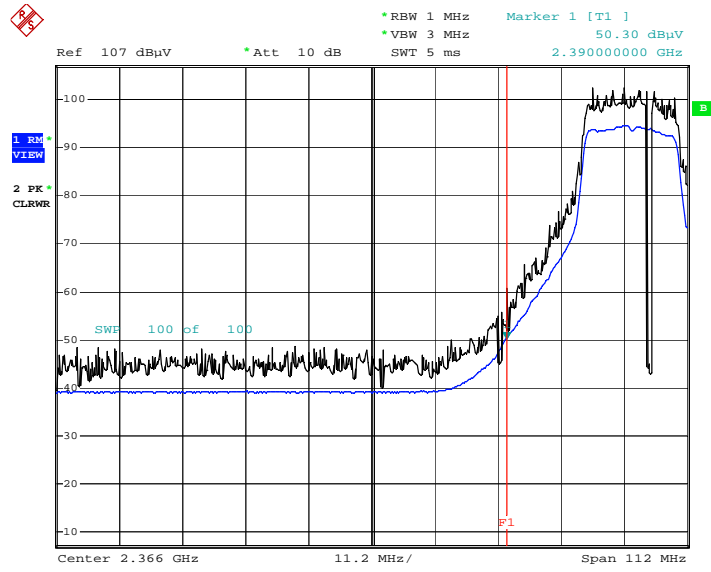
Date: 13.NOV.2018 15:45:19

Radiated Restricted Band Edges plot – Peak Reading (802.11b Ch.1) [Ant2]



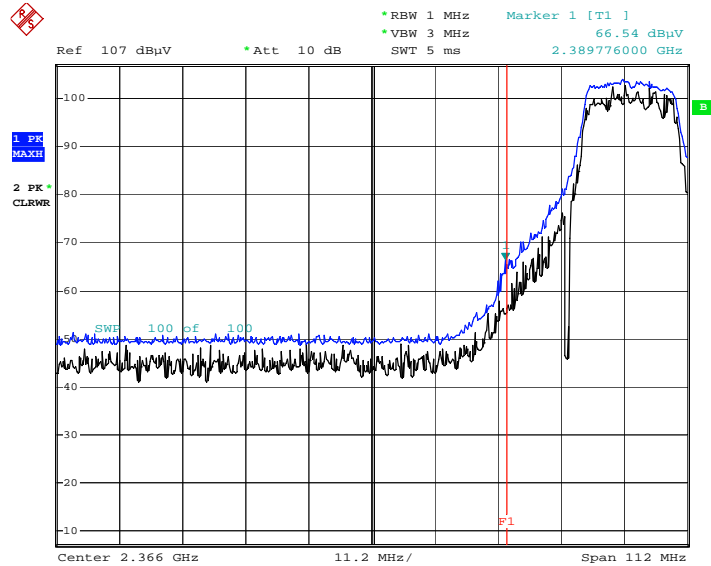
Date: 13.NOV.2018 15:46:17

Radiated Restricted Band Edges plot – Average Reading (802.11g Ch.1) [MIMO]



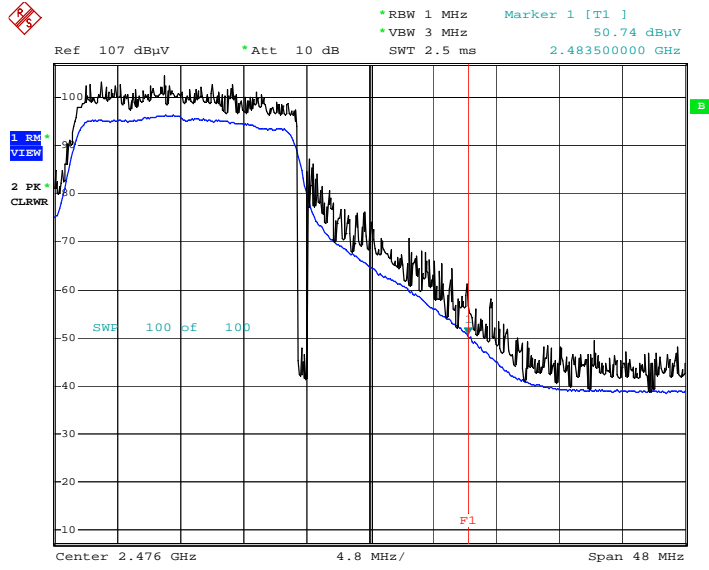
Date: 13.NOV.2018 16:33:24

Radiated Restricted Band Edges plot – Peak Reading (802.11g Ch.1) [MIMO]



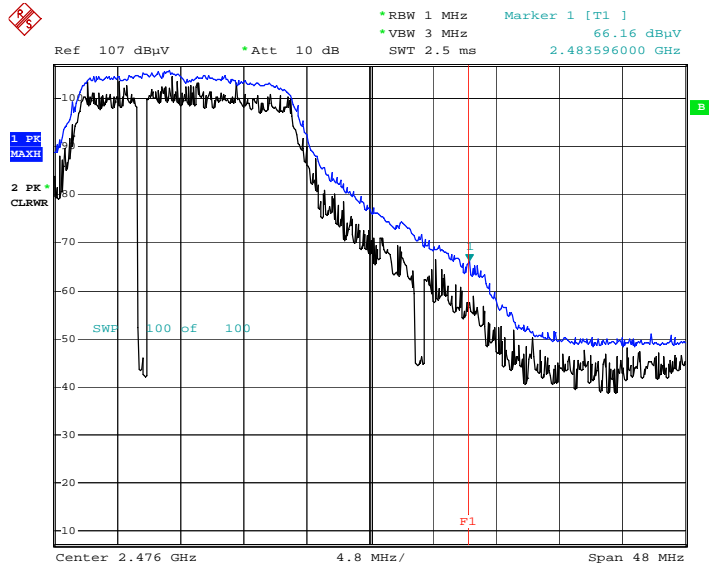
Date: 13.NOV.2018 16:34:01

Radiated Restricted Band Edges plot – Average Reading (802.11g Ch.11) [MIMO]



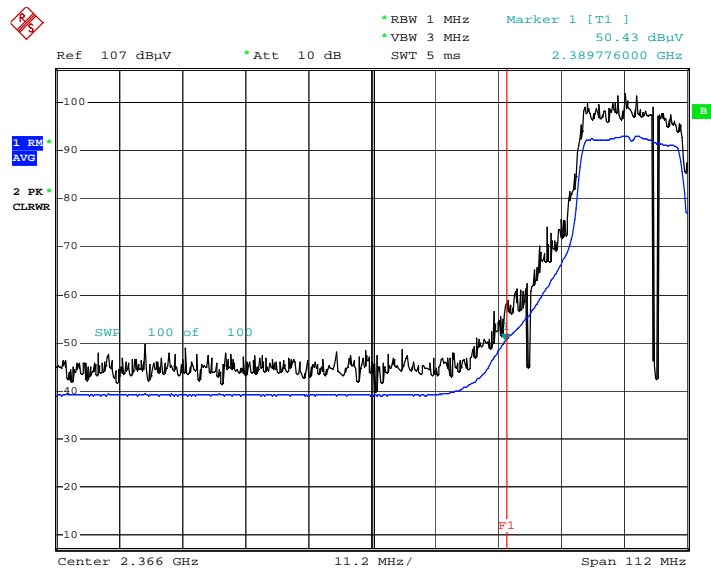
Date: 13.NOV.2018 16:27:08

Radiated Restricted Band Edges plot – Peak Reading (802.11g Ch.11) [MIMO]



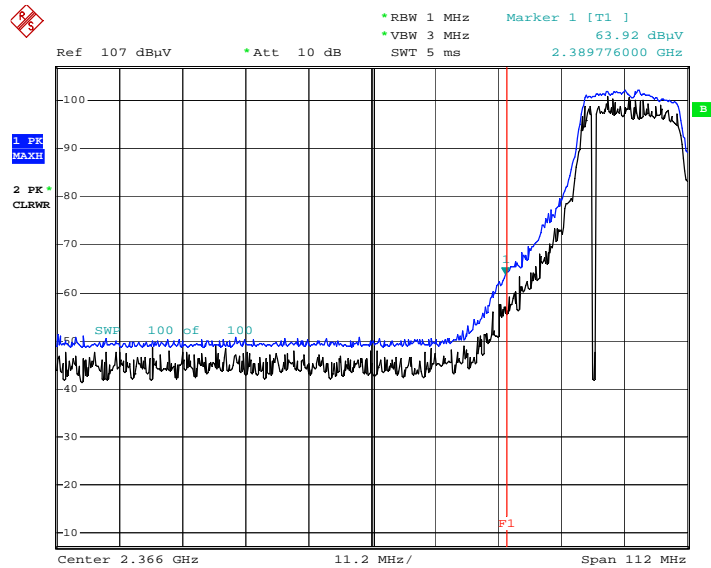
Date: 13.NOV.2018 16:28:07

Radiated Restricted Band Edges plot – Average Reading (802.11n Ch.1) [MIMO]



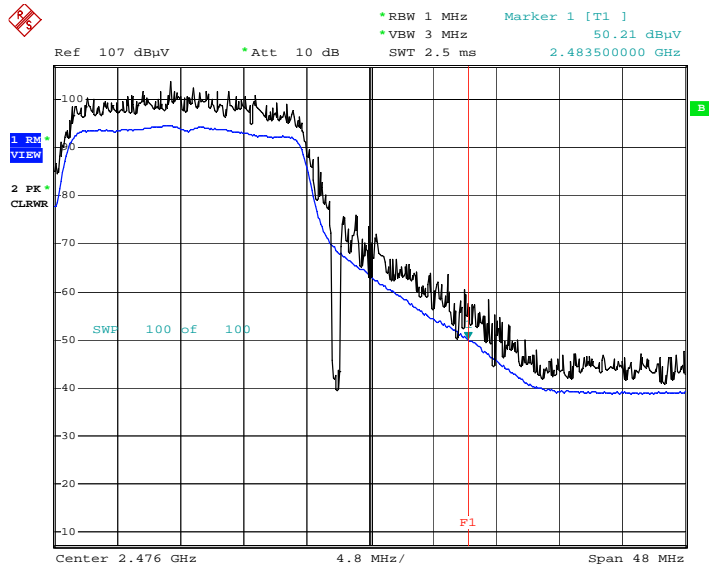
Date: 13.NOV.2018 16:35:52

Radiated Restricted Band Edges plot – Peak Reading (802.11n Ch.1) [MIMO]



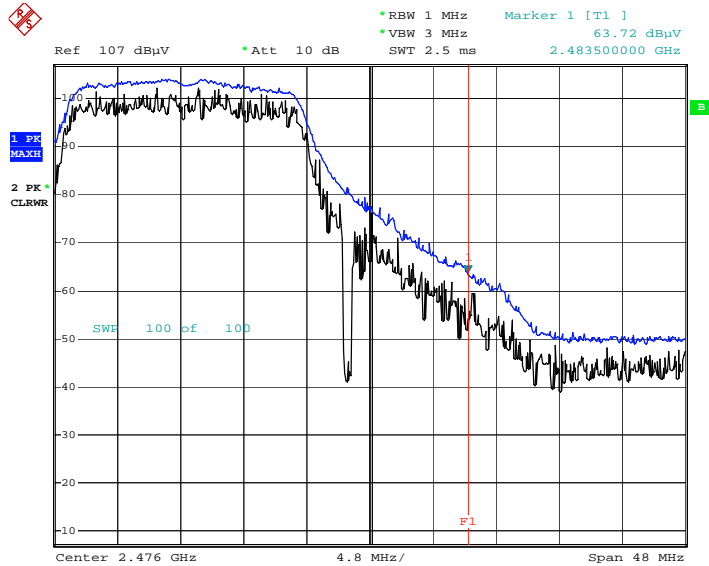
Date: 13.NOV.2018 16:36:27

Radiated Restricted Band Edges plot – Average Reading (802.11n Ch.11) [MIMO]



Date: 13.NOV.2018 16:23:35

Radiated Restricted Band Edges plot – Peak Reading (802.11n Ch.11) [MIMO]



Date: 13.NOV.2018 16:25:32

Note:

Plot of worst case are only reported.

9.8 POWERLINE CONDUCTED EMISSIONS

Conducted Emissions (Line 1)

EMI Auto Test(5)

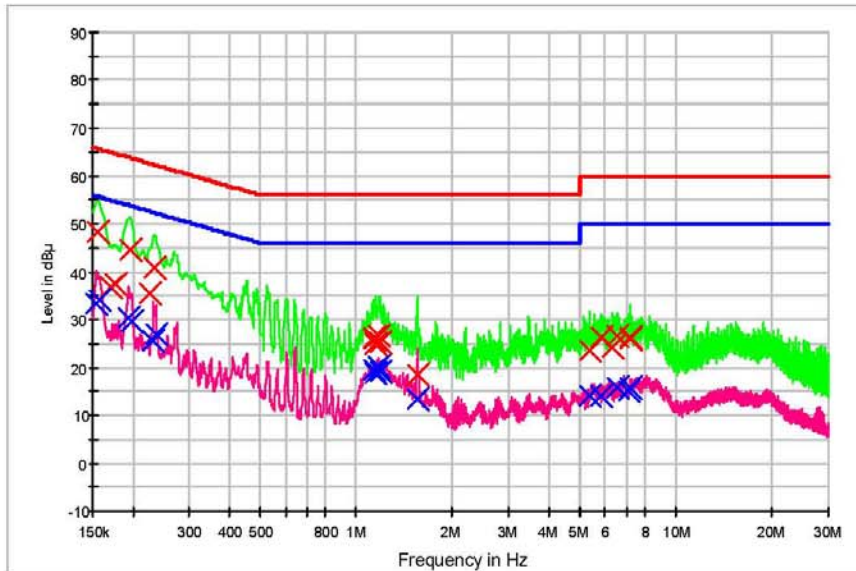
1 / 2

HCT TEST Report

Common Information

EUT: SM-G8870
 Manufacturer: SAMSUNG
 Test Site: SHIELD ROOM
 Operating Conditions: WLAN 2.4G MODE

FCC CLASS B_Exten Cable



— FCC CLASS B_OP — FCC CLASS B_AV — Preview Result 1-PK+
— Preview Result 2-AVG X Final Result 1-OPK X Final Result 2-CAV

Final Result 1

Frequency (MHz)	QuasiPeak (dBuV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.156000	48.4	9.000	Off	N	9.7	17.3	65.7
0.170000	36.9	9.000	Off	N	9.7	28.0	65.0
0.176000	37.3	9.000	Off	N	9.7	27.4	64.7
0.196000	44.4	9.000	Off	N	9.7	19.4	63.8
0.226000	35.3	9.000	Off	N	9.7	27.3	62.6
0.234000	40.8	9.000	Off	N	9.7	21.5	62.3
1.134000	26.0	9.000	Off	N	9.8	30.0	56.0
1.140000	26.3	9.000	Off	N	9.8	29.7	56.0
1.154000	25.0	9.000	Off	N	9.8	31.0	56.0
1.176000	26.4	9.000	Off	N	9.8	29.6	56.0
1.184000	25.4	9.000	Off	N	9.8	30.6	56.0
1.550000	18.6	9.000	Off	N	9.9	37.4	56.0
5.348000	23.5	9.000	Off	N	10.0	36.5	60.0
5.846000	26.3	9.000	Off	N	10.1	33.7	60.0
6.366000	24.2	9.000	Off	N	10.1	35.8	60.0
6.556000	26.7	9.000	Off	N	10.1	33.3	60.0
7.226000	26.2	9.000	Off	N	10.1	33.8	60.0
7.238000	25.9	9.000	Off	N	10.1	34.1	60.0

EMI Auto Test(5)

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Final Result 2

Frequency (MHz)	CAverage (dBuV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.154000	33.3	9.000	Off	N	9.7	22.5	55.8
0.158000	34.2	9.000	Off	N	9.7	21.4	55.6
0.194000	30.4	9.000	Off	N	9.7	23.4	53.9
0.198000	29.6	9.000	Off	N	9.7	24.1	53.7
0.232000	25.4	9.000	Off	N	9.7	26.9	52.4
0.236000	27.1	9.000	Off	N	9.7	25.1	52.2
1.134000	19.6	9.000	Off	N	9.8	26.4	46.0
1.140000	19.6	9.000	Off	N	9.8	26.4	46.0
1.154000	18.9	9.000	Off	N	9.8	27.1	46.0
1.176000	20.0	9.000	Off	N	9.8	26.0	46.0
1.184000	19.1	9.000	Off	N	9.8	26.9	46.0
1.552000	13.5	9.000	Off	N	9.9	32.5	46.0
5.348000	14.1	9.000	Off	N	10.0	35.9	50.0
5.868000	14.1	9.000	Off	N	10.1	35.9	50.0
6.558000	15.8	9.000	Off	N	10.1	34.2	50.0
7.122000	15.1	9.000	Off	N	10.1	34.9	50.0
7.170000	15.9	9.000	Off	N	10.1	34.1	50.0
7.238000	15.9	9.000	Off	N	10.1	34.1	50.0

2018-11-05

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Conducted Emissions (Line 2)

EMI Auto Test(5)

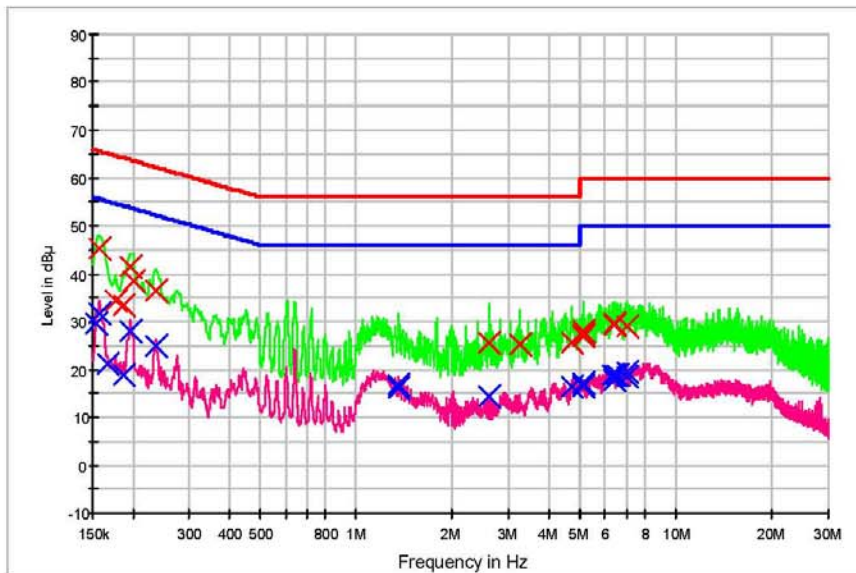
1 / 2

HCT TEST Report

Common Information

EUT: SM-G8870
 Manufacturer: SAMSUNG
 Test Site: SHIELD ROOM
 Operating Conditions: WLAN 2.4G MODE

FCC CLASS B_Exten Cable



— FCC CLASS B_OP — 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 (dBuV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.158000	45.2	9.000	Off	L1	9.7	20.4	65.6
0.176000	34.5	9.000	Off	L1	9.7	30.1	64.7
0.188000	33.4	9.000	Off	L1	9.7	30.7	64.1
0.196000	41.4	9.000	Off	L1	9.7	22.3	63.8
0.200000	38.4	9.000	Off	L1	9.7	25.3	63.6
0.238000	36.4	9.000	Off	L1	9.7	25.7	62.2
2.606000	25.6	9.000	Off	L1	9.9	30.4	56.0
3.234000	25.2	9.000	Off	L1	9.9	30.8	56.0
4.718000	25.6	9.000	Off	L1	10.0	30.4	56.0
5.114000	27.8	9.000	Off	L1	10.0	32.2	60.0
5.146000	27.2	9.000	Off	L1	10.0	32.8	60.0
5.150000	27.1	9.000	Off	L1	10.0	32.9	60.0
6.392000	29.6	9.000	Off	L1	10.1	30.4	60.0
6.398000	29.7	9.000	Off	L1	10.1	30.3	60.0
6.436000	29.5	9.000	Off	L1	10.1	30.5	60.0
7.020000	28.9	9.000	Off	L1	10.1	31.1	60.0
7.034000	29.1	9.000	Off	L1	10.1	30.9	60.0
7.062000	28.9	9.000	Off	L1	10.1	31.2	60.0

EMI Auto Test(5)

2 / 2

Final Result 2

Frequency (MHz)	CAverage (dBuV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.154000	29.7	9.000	Off	L1	9.7	26.0	55.8
0.158000	31.6	9.000	Off	L1	9.7	23.9	55.6
0.166000	21.3	9.000	Off	L1	9.7	33.9	55.2
0.188000	18.8	9.000	Off	L1	9.7	35.3	54.1
0.196000	28.1	9.000	Off	L1	9.7	25.7	53.8
0.236000	24.9	9.000	Off	L1	9.7	27.4	52.2
1.352000	16.1	9.000	Off	L1	9.8	29.9	46.0
1.356000	16.9	9.000	Off	L1	9.8	29.1	46.0
2.606000	14.3	9.000	Off	L1	9.9	31.7	46.0
4.718000	16.5	9.000	Off	L1	10.0	29.5	46.0
5.114000	17.0	9.000	Off	L1	10.0	33.0	50.0
5.150000	16.6	9.000	Off	L1	10.0	33.4	50.0
6.360000	18.7	9.000	Off	L1	10.1	31.3	50.0
6.398000	18.7	9.000	Off	L1	10.1	31.3	50.0
6.436000	17.9	9.000	Off	L1	10.1	32.1	50.0
6.576000	18.9	9.000	Off	L1	10.1	31.1	50.0
7.020000	19.6	9.000	Off	L1	10.1	30.4	50.0
7.062000	18.5	9.000	Off	L1	10.1	31.5	50.0

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9.9 CONFIRMATION OF GEO-LOCATION MECHANISM

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.

Setting the channel for Access point

- SSID : ap_2g_ht20

- Ch.12 setting

```

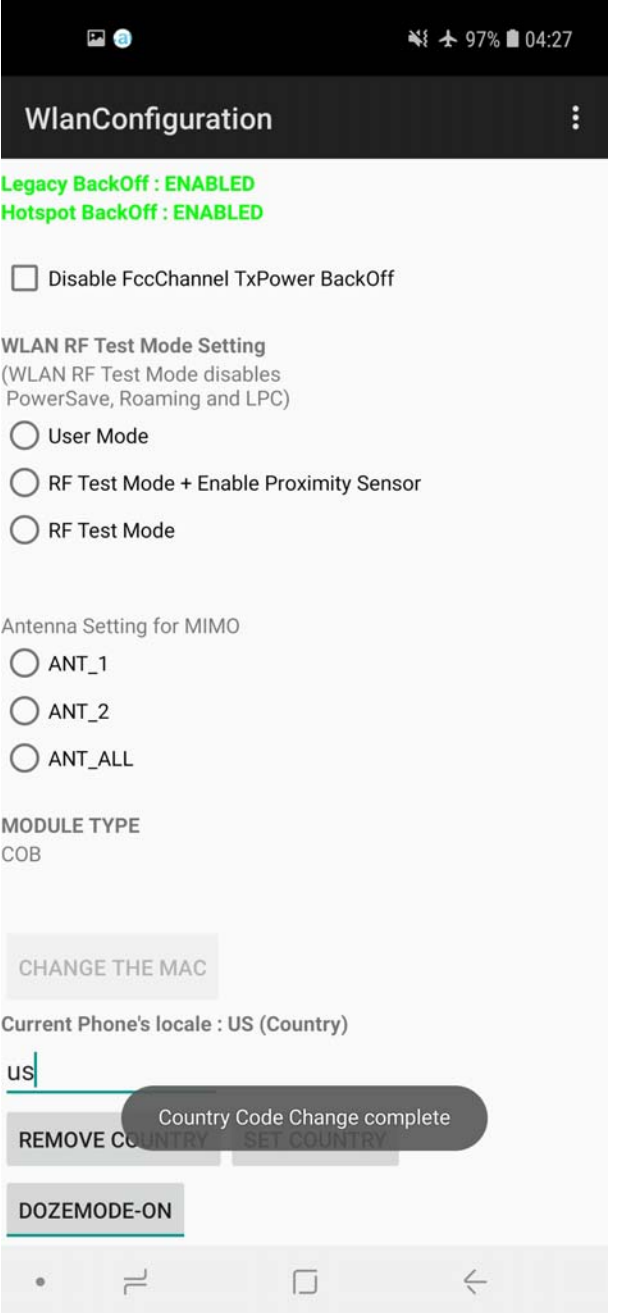
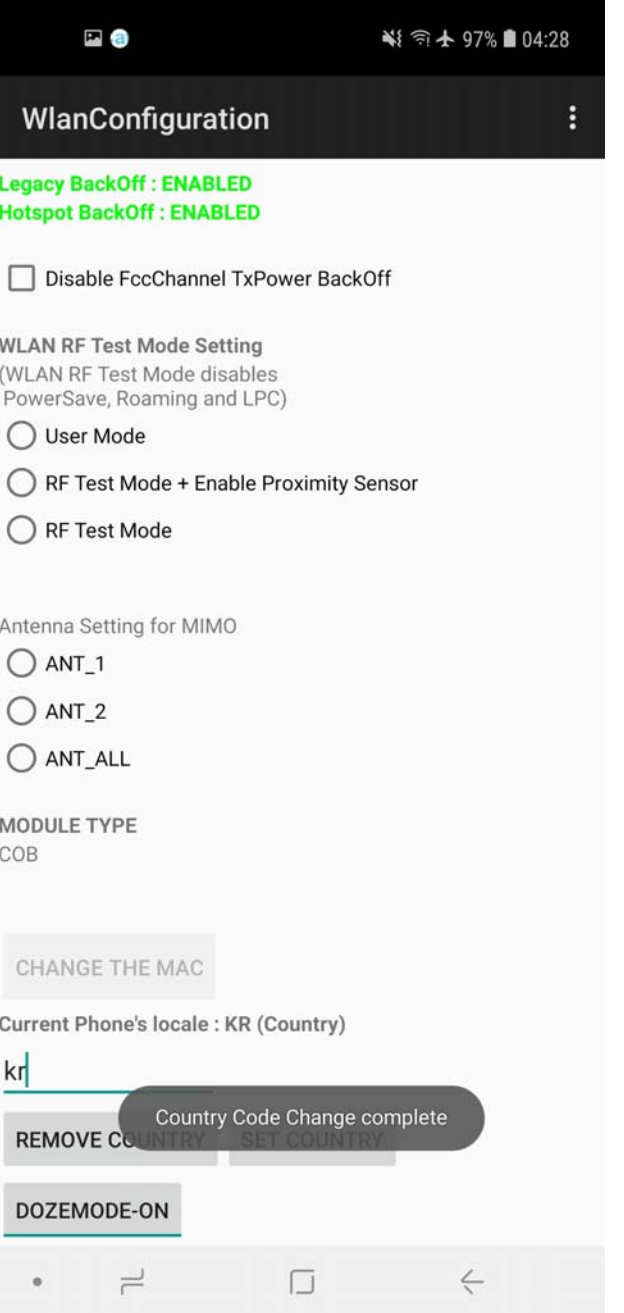
Debug:~> wl -i radio_1 down
Debug:~> wl -i radio_1 chanspec 12
Chanspec set to 0x100c
Debug:~> wl -i radio_1 up
  
```

- Ch.13 setting

```

Debug:~> wl -i radio_1 down
Debug:~> wl -i radio_1 chanspec 13
Chanspec set to 0x100d
Debug:~> wl -i radio_1 up
  
```

Setting the country for product

Country code = US	Country code = KR(Korea)
 <p>WlanConfiguration</p> <p>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 type="radio"/> User Mode <input type="radio"/> RF Test Mode + Enable Proximity Sensor <input type="radio"/> RF Test Mode</p> <p>Antenna Setting for MIMO</p> <p><input type="radio"/> ANT_1 <input type="radio"/> ANT_2 <input type="radio"/> ANT_ALL</p> <p>MODULE TYPE COB</p> <p>CHANGE THE MAC</p> <p>Current Phone's locale : US (Country)</p> <p>us</p> <p>Country Code Change complete</p> <p>REMOVE COUNTRY SET COUNTRY</p> <p>DOZEMODE-ON</p>	 <p>WlanConfiguration</p> <p>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 type="radio"/> User Mode <input type="radio"/> RF Test Mode + Enable Proximity Sensor <input type="radio"/> RF Test Mode</p> <p>Antenna Setting for MIMO</p> <p><input type="radio"/> ANT_1 <input type="radio"/> ANT_2 <input type="radio"/> ANT_ALL</p> <p>MODULE TYPE COB</p> <p>CHANGE THE MAC</p> <p>Current Phone's locale : KR (Country)</p> <p>kr</p> <p>Country Code Change complete</p> <p>REMOVE COUNTRY SET COUNTRY</p> <p>DOZEMODE-ON</p>

Verification test

<p style="text-align: center;">Did not connect (Country code = US)</p>	<p style="text-align: center;">Connected (Country code = KR)</p>
<p> 97% 04:27 Wi-Fi 다이렉트 Wi-Fi 사용 중 <input type="checkbox"/> 사용 가능한 네트워크 Wi-Fi 네트워크 찾는 중... + 네트워크 추가 </p>	<p> 97% 04:28 Wi-Fi 다이렉트 Wi-Fi 사용 중 <input checked="" type="checkbox"/> 현재 네트워크 ap_2g_ht20 <small>인터넷 연결 확실치 않음</small> + 네트워크 추가 </p>

10. LIST OF TEST EQUIPMENT

Conducted Test

Manufacturer	Model / Equipment	Calibration Date	Calibration Interval	Serial No.
Rohde & Schwarz	ENV216 / LISN	12/20/2017	Annual	102245
Rohde & Schwarz	ESCI / Test Receiver	06/27/2018	Annual	100033
ESPAC	SU-642 /Temperature Chamber	03/30/2018	Annual	0093008124
Agilent	N9020A / Signal Analyzer	06/08/2018	Annual	MY51110085
Agilent	N9030A / Signal Analyzer	11/22/2017	Annual	MY49431210
Agilent	N1911A / Power Meter	04/16/2018	Annual	MY45100523
Agilent	N1921A / Power Sensor	04/16/2018	Annual	MY52260025
Agilent	87300B / Directional Coupler	11/20/2017	Annual	3116A03621
Hewlett Packard	11667B / Power Splitter	06/07/2018	Annual	05001
Hewlett Packard	E3632A / DC Power Supply	06/26/2018	Annual	KR75303960
Agilent	8493C / Attenuator(10 dB)	07/10/2018	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

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	04/19/2017	Biennial	1513-175
Schwarzbeck	VULB 9168 / Hybrid Antenna	04/06/2017	Biennial	760
Schwarzbeck	VULB 9160 / TRILOG Antenna	08/09/2018	Biennial	9160-3368
Schwarzbeck	BBHA 9120D / Horn Antenna	05/02/2017	Biennial	9120D-937
Schwarzbeck	BBHA9170 / Horn Antenna(15 GHz ~ 40 GHz)	12/04/2017	Biennial	BBHA9170541
Rohde & Schwarz	FSP(9 kHz ~ 30 GHz) / Spectrum Analyzer	09/03/2018	Annual	100688
Rohde & Schwarz	FSV40-N / Spectrum Analyzer	09/28/2018	Annual	101068-SZ
Wainwright Instruments	WHK3.0/18G-10EF / High Pass Filter	06/07/2018	Annual	8
Wainwright Instruments	WHKX7.0/18G-8SS / High Pass Filter	05/09/2018	Annual	29
Wainwright Instruments	WRCJV2400/2483.5-2370/2520-60/12SS / Band Reject Filter	06/29/2018	Annual	2
Wainwright Instruments	WRCJV5100/5850-40/50-8EEK / Band Reject Filter	01/03/2018	Annual	2
Api tech.	18B-03 / Attenuator (3 dB)	06/07/2018	Annual	1
Agilent	8493C-10 / Attenuator(10 dB)	07/17/2018	Annual	08285
CERNEX	CBLU1183540 / Power Amplifier	07/10/2018	Annual	22964
CERNEX	CBL06185030 / Power Amplifier	07/10/2018	Annual	22965
CERNEX	CBL18265035 / Power Amplifier	01/10/2018	Annual	22966
CERNEX	CBL26405040 / Power Amplifier	06/29/2018	Annual	25956
TESCOM	TC-3000C / Bluetooth Tester	03/27/2018	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.

11. ANNEX A_ TEST SETUP PHOTO

Please refer to test setup photo file no. as follows;

No.	Description
1	HCT-RF-1811-FC016-P
2	HCT-RF-1811-FC017-P
3	HCT-RF-1811-FC018-P
4	HCT-RF-1811-FC019-P
5	HCT-RF-1811-FC020-P
6	HCT-RF-1811-FC021-P
7	HCT-RF-1811-FC022-P