

FCC DTS REPORT

FCC Certification

Applicant Name:
SAMSUNG Electronics Co., Ltd.**Address:**
129, Samsung-ro, Yeongtong-gu, Suwon-si,
Gyeonggi-do, 16677, Rep. of Korea**Date of Issue:**
June 02, 2017**Test Site/Location:**
HCT CO., LTD., 74, Seoicheon-ro 578beon-gil, Majang-
myeo, Icheon-si, Gyeonggi-do, 17383, Rep. of KOREA**Report No.:** HCT-R-1706-F023**HCT FRN:** 0005866421

FCC ID	: A3LSMW728Y
APPLICANT	: SAMSUNG Electronics Co., Ltd.

Model: SM-W728Y**Additional model:** SM-W727Y**EUT Type:** Tablet**Average Output Power:**

Mode	Ant.0(SISO)	Ant.1(SISO)	Ant.0 & 1 (MIMO)
802.11b	14.15 dBm	13.87 dBm	-
802.11g	12.11 dBm	11.75 dBm	14.85 dBm
802.11n_HT20	12.29 dBm	11.88 dBm	14.96 dBm

Frequency Range: 2412 MHz - 2472 MHz (2.4 GHz Band)**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)

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Engineer of Telecommunication testing center**Approved by : Jong Seok Lee**
Manager of Telecommunication testing center

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Version

TEST REPORT NO.	DATE	DESCRIPTION
HCT-R-1706-Fxxx	June 02, 2017	- First Approval Report

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1. GENERAL INFORMATION

Applicant: SAMSUNG Electronics Co.,Ltd.
Address: 129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Rep. of Korea
FCC ID: A3LSMW728Y
EUT Type: Tablet
Model: SM-W728Y
Additional model: SM-W727Y
Date(s) of Tests: May 02, 2017 ~ June 02, 2017
Place of Tests: HCT Co., Ltd.
 74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, Korea

2. EUT DESCRIPTION

Model	SM-W728Y		
Additional model:	SM-W727Y		
EUT Type	Tablet		
Power Supply	DC 7.7 V		
Battery Information	Model: EB-BW720ABE Type: Li-ion Battery		
Frequency Range	TX: 2412 MHz ~ 2472 MHz RX: 2412 MHz ~ 2472 MHz		
Max. RF Output Power	Peak	Ant. 0 (SISO)	Wi-Fi 802.11b(19.75 dBm) / Wi-Fi 802.11g (20.81 dBm) / Wi-Fi 802.11n_HT20 (20.18 dBm)
		Ant.1 (SISO)	Wi-Fi 802.11b(19.48 dBm) / Wi-Fi 802.11g (20.34 dBm) / Wi-Fi 802.11n_HT20 (19.80 dBm)
		Ant.0 & 1 (MIMO)	Wi-Fi 802.11g (23.53 dBm) / Wi-Fi 802.11n_HT20 (23.00 dBm)
	Average	Ant.0 (SISO)	Wi-Fi 802.11b(14.15 dBm) / Wi-Fi 802.11g (12.11 dBm) / Wi-Fi 802.11n_HT20 (12.29 dBm)
		Ant.1 (SISO)	Wi-Fi 802.11b(13.87 dBm) / Wi-Fi 802.11g (11.75 dBm) / Wi-Fi 802.11n_HT20 (11.88 dBm)
		Ant.0 & 1 (MIMO)	Wi-Fi 802.11g (14.85 dBm) / Wi-Fi 802.11n_HT20 (14.96 dBm)
Modulation Type	DSSS/CCK(802.11b), OFDM(802.11g, 802.11n)		
Antenna Specification	Manufacturer: Ethertronics, Inc. Antenna type: INTERNAL ANTENNA Peak Gain : cf. Section 6		

2.1 EUT OPERATING MODE

■ Operating mode

Mode	Operating Mode	Operating Ant.
802.11b/g/n	SISO	Ant. 0
		Ant. 1
802.11g/n	MIMO	Ant. 0 & 1

Note : In case of radiation test, we have done all test case. Worst case is MIMO(CDD) for 802.11g/n_HT20 mode and Ant.0(SISO) for 802.11b mode. So, we attached the result of MIMO for 802.11g/n mode and Ant.0(SISO) for 802.11b mode.

3. TEST METHODOLOGY

FCC KDB 558074 D01 DTS Meas Guidance v04 dated April 05, 2017 entitled "Guidance for Performing Compliance Measurements on Digital Transmission Systems(DTS) and the measurement procedure described in ANSI C63.10(Version : 2013) 'the American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices'.

3.1 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.

3.2 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.

3.3 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 9.1 to 9.2.(KDB 558074 v04)

3.4 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.

Channel low, mid and high with highest data rate (worst case) is chosen for full testing.

4. 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 equipments, which is traceable to recognized national standards.

Especially, all antenna for measurement is calibrated in accordance with the requirements of C63.5 (Version : 2006).

5. FACILITIES AND ACCREDITATIONS

5.1 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, 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 July 07, 2015 (Registration Number: 90661)

5.2 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."

6. 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

▣ Directional Gain Calculations

▪ If any transmit signals are correlated with each other(802.11g/n_HT20),

$$\text{Directional gain} = 10 \cdot \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / N] \text{ dBi}$$

▣ Antenna Gain

2.4 GHz Band

Antenna Gain	802.11b/g/n	Ant 0	-0.75 dBi
		Ant 1	-1.28 dBi
Directional Antenna Gain	802.11g/n_HT20	Ant 0 & 1	2.00 dBi

7. MEASUREMENT UNCERTAINTY

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI C63.4:2014.

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

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

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		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 9.7		PASS
Radiated Spurious Emissions	§15.205, 15.209	cf. Section 9.6.1	RADIATED	PASS
Radiated Restricted Band Edge	§15.247(d), 15.205, 15.209	cf. Section 9.6.2		PASS

9. TEST RESULT

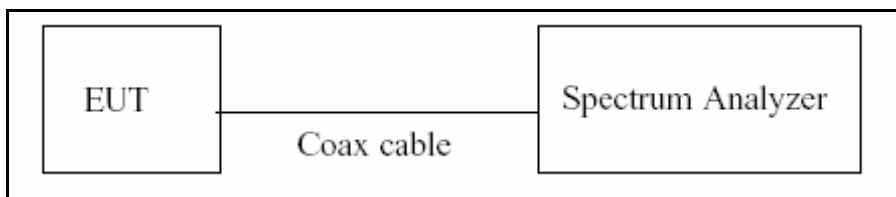
9.1 DUTY CYCLE

■ TEST PROCEDURE

According to Section 6.0)b) in KDB 558074 v04.

The zero-span mode on a spectrum analyzer or EMI receiver if the response time and spacing between bins on the sweep are sufficient to permit accurate measurements of the on and off times of the transmitted signal. Set the center frequency of the instrument to the center frequency of the transmission. Set $RBW \geq OBW$ if possible; otherwise, set RBW to the largest available value. Set $VBW \geq RBW$. Set detector = peak or average. The zero-span measurement method shall not be used unless both RBW and VBW are $> 50/T$ and the number of sweep points across duration T exceeds 100. (For example, if VBW and/or RBW are limited to 3 MHz, then the zero-span method of measuring duty cycle shall not be used if $T \leq 16.7$ microseconds.)

■ 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 v04.

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}

Calculate Duty Cycle = T_{on}/T_{total} and Duty Cycle Factor = $10 \cdot \log(1/\text{Duty Cycle})$

■ Duty Cycle Factor for Ant 0

Mode	Data Rate	T _{on} (ms)	T _{total} (ms)	Duty Cycle	Duty Cycle Factor (dB)
b	1 Mbps	12.448	12.538	0.99280576	0.031
	2 Mbps	6.313	6.418	0.98356756	0.072
	5.5 Mbps	2.417	2.528	0.95591056	0.196
	11 Mbps	1.304	1.416	0.92105245	0.357
g	6 Mbs	2.063	2.175	0.94821016	0.231
	9 Mbs	1.385	1.496	0.92528736	0.337
	12 Mbs	1.043	1.155	0.90322609	0.442
	18 Mbs	0.704	0.815	0.86330900	0.638
	24 Mbs	0.531	0.642	0.82648350	0.828
	36 Mbs	0.363	0.475	0.76421053	1.168
	48 Mbs	0.276	0.387	0.71317829	1.468
	54 Mbs	0.249	0.362	0.68596367	1.637
n_HT20	MCS 0	1.924	2.033	0.94599991	0.241
	MCS 1	0.982	1.091	0.89962152	0.459
	MCS 2	0.668	0.778	0.85791367	0.666
	MCS 3	0.508	0.659	0.77070064	1.131
	MCS 4	0.352	0.462	0.76161688	1.183
	MCS 5	0.273	0.384	0.71046142	1.485
	MCS 6	0.247	0.359	0.68831140	1.622
	MCS 7	0.228	0.339	0.67217532	1.725

Note : Duty Cycle Factor = $10 \cdot \log(1/\text{Duty Cycle})$. where, Duty Cycle = $T_{\text{on}} / T_{\text{total}}$

■ Duty Cycle Factor for Ant 1

Mode	Data Rate	T _{on} (ms)	T _{total} (ms)	Duty Cycle	Duty Cycle Factor (dB)
b	1 Mbps	12.441	12.542	0.99199471	0.035
	2 Mbps	6.312	6.423	0.98275913	0.076
	5.5 Mbps	2.417	2.528	0.95591056	0.196
	11 Mbps	1.305	1.409	0.92626355	0.333
g	6 Mbs	2.066	2.176	0.94953279	0.225
	9 Mbs	1.387	1.492	0.92915100	0.319
	12 Mbs	1.044	1.151	0.90736315	0.422
	18 Mbs	0.704	0.810	0.86931818	0.608
	24 Mbs	0.532	0.639	0.83213481	0.798
	36 Mbs	0.364	0.469	0.77499984	1.107
	48 Mbs	0.276	0.381	0.72500151	1.397
	54 Mbs	0.248	0.353	0.70124510	1.541
n_HT20	MCS 0	1.924	2.041	0.94222790	0.258
	MCS 1	0.980	1.091	0.89772727	0.469
	MCS 2	0.668	0.784	0.85178571	0.697
	MCS 3	0.507	0.619	0.81900452	0.867
	MCS 4	0.352	0.463	0.76008191	1.191
	MCS 5	0.272	0.383	0.70975548	1.489
	MCS 6	0.247	0.359	0.68831140	1.622
	MCS 7	0.228	0.339	0.67217532	1.725

Note : Duty Cycle Factor = 10*log(1/Duty Cycle). where, Duty Cycle = T_{on} / T_{total}

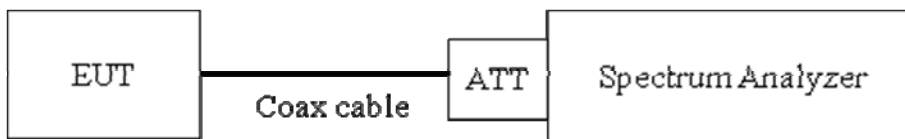
9.2 6dB BANDWIDTH

Test Requirements and limit, §15.247(a)(2)

The bandwidth at 6dB down from the highest in-band spectral density is measured with a spectrum analyzer connected to the receive antenna while the EUT is operating in transmission mode at the appropriate frequencies.

The minimum permissible 6dB bandwidth is 500 kHz.

■ TEST CONFIGURATION



■ TEST PROCEDURE

The transmitter output is connected to the Spectrum Analyzer.

The Spectrum Analyzer is set to (Procedure 8.1 in KDB 558074 v04)

RBW = 100 kHz

VBW $\geq 3 \times$ RBW

Detector = Peak

Trace mode = max hold

Sweep = auto couple

Allow the trace to stabilize

Note : We tested 6 dB bandwidth using the automatic bandwidth measurement capability of a spectrum analyzer. X dB is set 6 dB.

■ TEST RESULTS_Ant.0

Conducted 6dB Bandwidth Measurements for 802.11b

802.11b Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
2412	1	8.079	0.500	Pass
2437	6	8.102	0.500	Pass
2462	11	7.580	0.500	Pass
2467	12	8.079	0.500	Pass
2472	13	8.109	0.500	Pass

Conducted 6dB Bandwidth Measurements for 802.11g

802.11g Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
2412	1	15.91	0.500	Pass
2437	6	16.36	0.500	Pass
2462	11	15.74	0.500	Pass
2467	12	15.95	0.500	Pass
2472	13	16.13	0.500	Pass

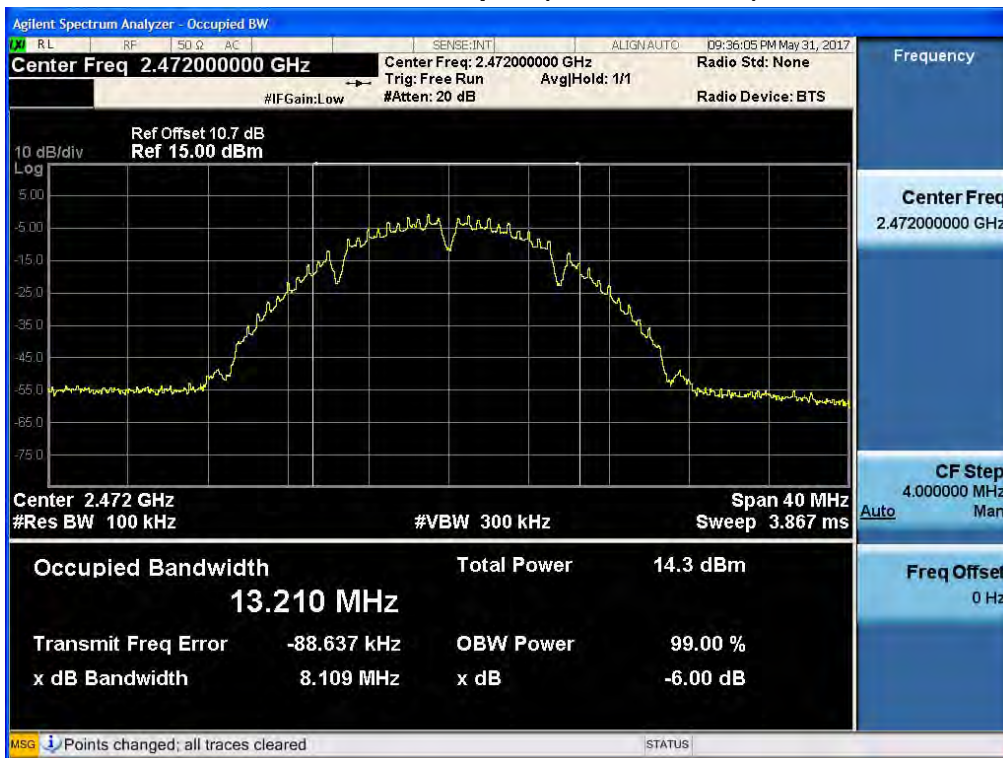
Conducted 6dB Bandwidth Measurements for 802.11n_HT20

802.11n Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
2412	1	16.32	0.500	Pass
2437	6	17.56	0.500	Pass
2462	11	16.00	0.500	Pass
2467	12	16.35	0.500	Pass
2472	13	16.94	0.500	Pass

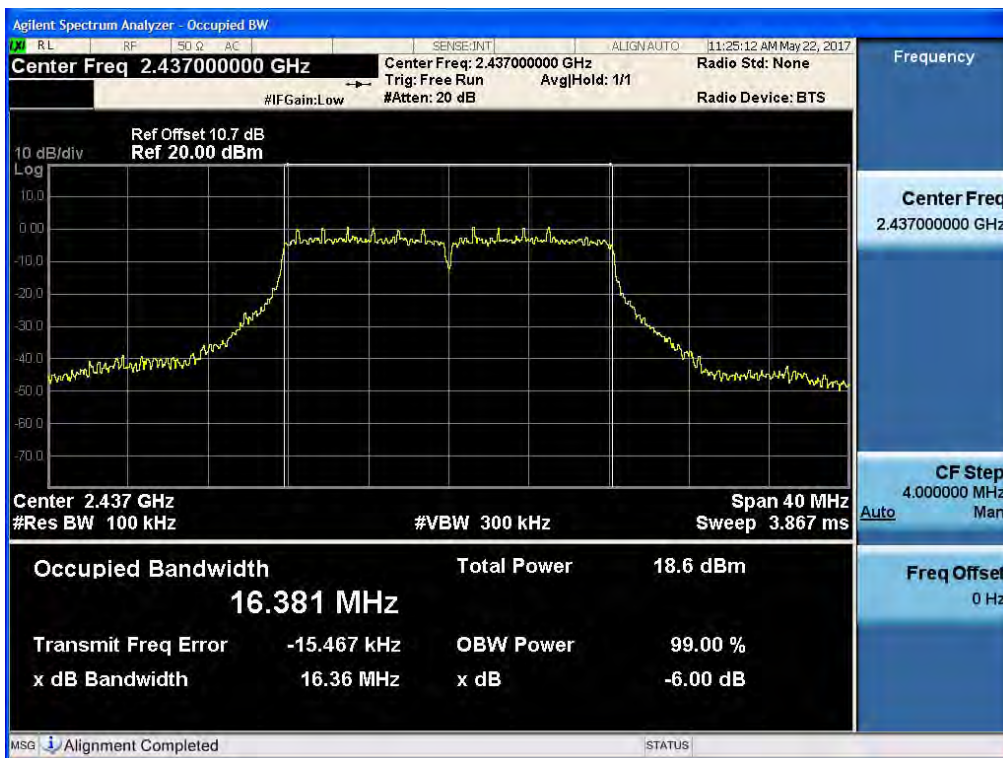
Note : In order to simplify the report, attached plots were only the most wide 6 dB BW channel.

RESULT PLOTS

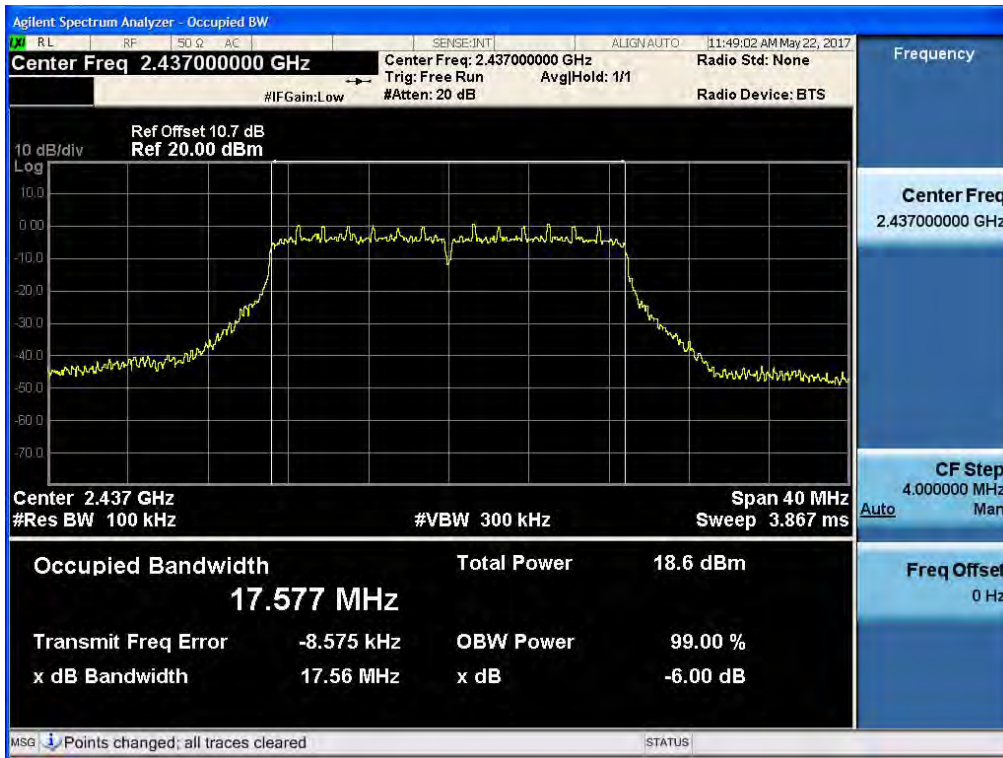
6dB Bandwidth plot (802.11b-CH 13)



6dB Bandwidth plot (802.11g-CH 6)



6dB Bandwidth plot (802.11n_HT20-CH 6)



■ TEST RESULTS_Ant.1

Conducted 6dB Bandwidth Measurements for 802.11b

802.11b Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
2412	1	8.096	0.500	Pass
2437	6	8.100	0.500	Pass
2462	11	8.086	0.500	Pass
2467	12	8.100	0.500	Pass
2472	13	8.107	0.500	Pass

Conducted 6dB Bandwidth Measurements for 802.11g

802.11g Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
2412	1	15.73	0.500	Pass
2437	6	16.33	0.500	Pass
2462	11	15.93	0.500	Pass
2467	12	15.97	0.500	Pass
2472	13	16.12	0.500	Pass

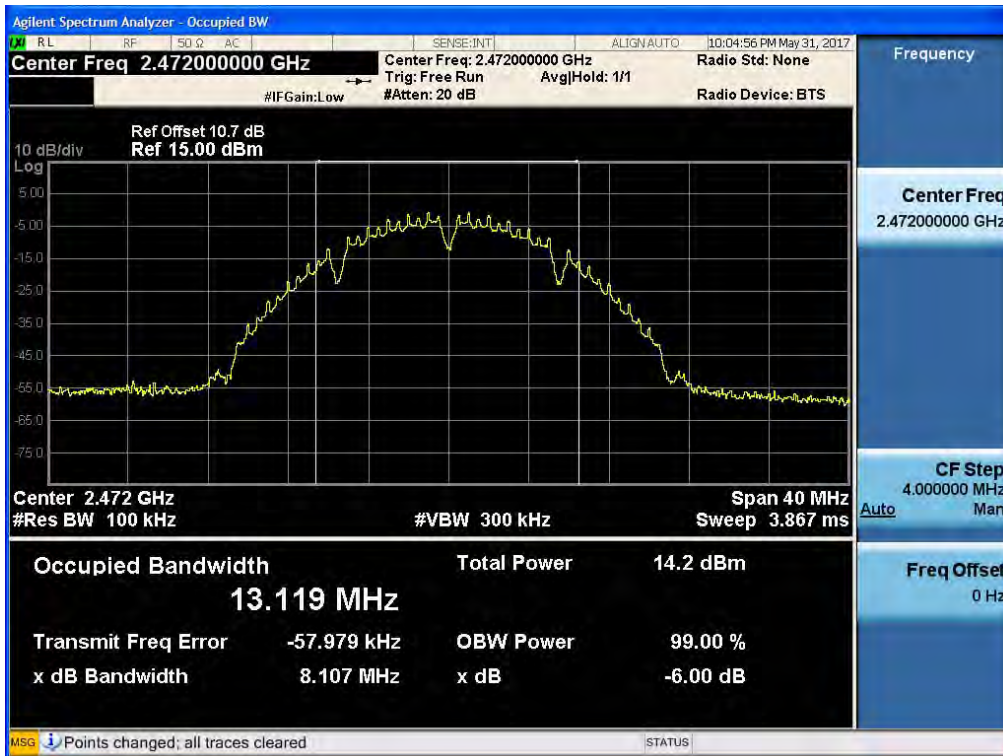
Conducted 6dB Bandwidth Measurements for 802.11n_HT20

802.11n Mode		Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
2412	1	16.35	0.500	Pass
2437	6	16.86	0.500	Pass
2462	11	16.02	0.500	Pass
2467	12	16.01	0.500	Pass
2472	13	17.19	0.500	Pass

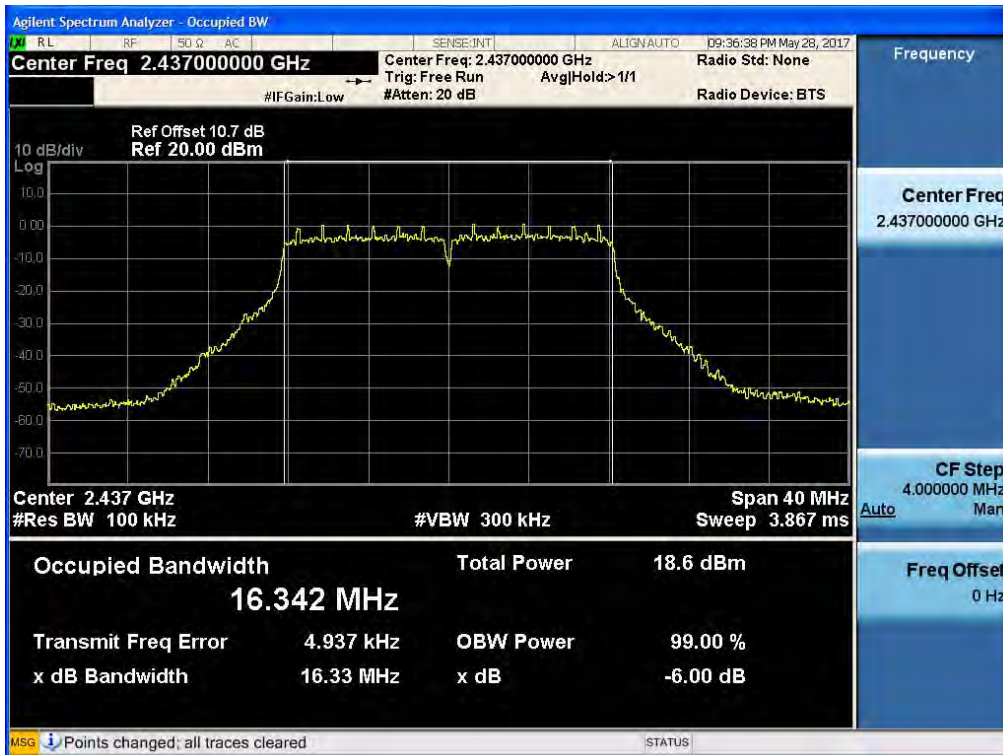
Note : In order to simplify the report, attached plots were only the most wide 6 dB BW channel.

RESULT PLOTS

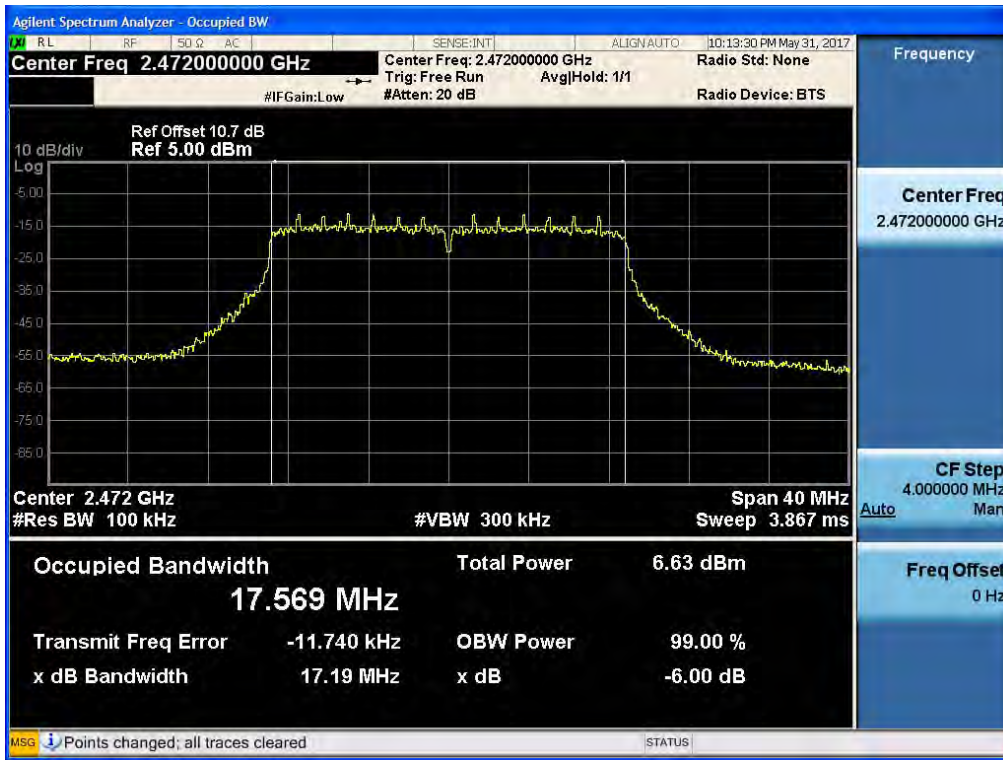
6dB Bandwidth plot (802.11b-CH 13)



6dB Bandwidth plot (802.11g-CH 6)



6dB Bandwidth plot (802.11n_HT20-CH 13)



9.3 OUTPUT POWER (802.11b/g/n)

Test Requirements and limit, §15.247(b)(3)

The transmitter output is connected to the input of an RF power sensor. Measurement is made using a broadband power meter capable of making peak and average measurements while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies.

The maximum permissible conducted output power is 1 Watt.

■ Limit(CDD)

Maximum Conducted Output Power

Operating Mode	Band	Mode	Ant. Port	Ant. Gain (dBi)	Limit (dBm)
SISO	2.4 GHz	802.11b/g/n	0	-0.75	30.0
			1	-1.28	30.0
MIMO(2 TX)		802.11g/n_HT20	0 & 1	2.00	30.0

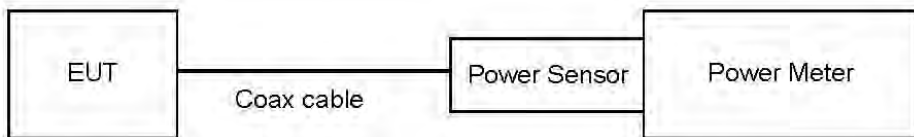
Note : 1. If all antenna gains are not equal,

$$\text{Directional gain} = 10 \cdot \log\left[\frac{10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20}}{N}\right] \text{ dBi (802.11g/n_HT20)}$$

(according to KDB662911 D01 v02r01)

2. Limit is calculated by antenna gain.

■ **TEST CONFIGURATION(20 MHz BW)**



■ **TEST PROCEDURE(20 MHz BW)**

- Peak Power (Procedure 9.1.2 in KDB 558074 v04)
 1. Measure the peak power of the transmitter.
- Average Power (Procedure 9.2.3.1 in KDB 558074 v04)
 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.

Note :

1. 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.

Actual value of loss for the attenuator and cable combination is below table.

Band	Frequency(MHz)	Loss(dB)
2.4 GHz	2412	10.65
	2437	10.65
	2462	10.66

(Actual value of loss for the attenuator and cable combination)

■ Sample Calculation

Output Power = Reading Value + ATT loss + Cable loss(1 ea) + Duty Cycle Factor

Ex) Output Power = 10 dBm + 20 dB + 0.8 dB + 0.2 dB = 31.0 dBm

Note :

1. Spectrum reading values are not plot data. The power 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 and

Actual value of loss for the attenuator and cable combination is below table.

Band	Frequency(MHz)	Loss(dB)
2.4 GHz	2412	10.65
	2437	10.65
	2462	10.66

(Actual value of loss for the attenuator and cable combination)

■ TEST RESULTS-Peak

■ TEST RESULTS-Ant.0

Conducted Output Power Measurements (802.11b Mode)

802.11b Mode		Rate (Mbps)	Measured Power(dBm)	Limit (dBm)
Frequency[MHz]	Channel No.			
2412	1	1 Mbps	16.60	30
		2 Mbps	16.84	30
		5.5 Mbps	18.20	30
		11 Mbps	19.75	30
2437	6	1 Mbps	16.59	30
		2 Mbps	16.83	30
		5.5 Mbps	18.12	30
		11 Mbps	19.65	30
2462	11	1 Mbps	16.57	30
		2 Mbps	16.82	30
		5.5 Mbps	18.20	30
		11 Mbps	19.69	30
2467	12	1 Mbps	9.83	30
		2 Mbps	10.43	30
		5.5 Mbps	11.62	30
		11 Mbps	12.96	30
2472	13	1 Mbps	9.93	30
		2 Mbps	10.25	30
		5.5 Mbps	11.42	30
		11 Mbps	12.80	30

■ TEST RESULTS-Ant.1

Conducted Output Power Measurements (802.11b Mode)

802.11b Mode		Rate (Mbps)	Measured Power(dBm)	Limit (dBm)
Frequency[MHz]	Channel No.			
2412	1	1 Mbps	16.08	30
		2 Mbps	16.33	30
		5.5 Mbps	17.71	30
		11 Mbps	19.24	30
2437	6	1 Mbps	16.36	30
		2 Mbps	16.55	30
		5.5 Mbps	17.92	30
		11 Mbps	19.46	30
2462	11	1 Mbps	16.37	30
		2 Mbps	16.61	30
		5.5 Mbps	17.99	30
		11 Mbps	19.48	30
2467	12	1 Mbps	10.74	30
		2 Mbps	11.03	30
		5.5 Mbps	12.26	30
		11 Mbps	13.66	30
2472	13	1 Mbps	9.77	30
		2 Mbps	10.00	30
		5.5 Mbps	11.33	30
		11 Mbps	12.77	30

■ TEST RESULTS-Ant.0

Conducted Output Power Measurements (802.11g Mode)

802.11g Mode		Rate (Mbps)	Measured Power(dBm)	Limit (dBm)
Frequency[MHz]	Channel No.			
2412	1	6 Mbps	19.51	30
		9 Mbps	19.63	30
		12 Mbps	19.59	30
		18 Mbps	19.38	30
		24 Mbps	20.73	30
		36 Mbps	20.23	30
		48 Mbps	20.37	30
		54 Mbps	20.49	30
2437	6	6 Mbps	19.38	30
		9 Mbps	19.50	30
		12 Mbps	19.46	30
		18 Mbps	19.26	30
		24 Mbps	20.64	30
		36 Mbps	20.18	30
		48 Mbps	20.28	30
		54 Mbps	20.39	30
2462	11	6 Mbps	19.60	30
		9 Mbps	19.69	30
		12 Mbps	19.71	30
		18 Mbps	19.46	30
		24 Mbps	20.81	30
		36 Mbps	20.32	30
		48 Mbps	20.42	30
		54 Mbps	20.52	30

2467	12	6 Mbps	14.58	30
		9 Mbps	14.64	30
		12 Mbps	14.58	30
		18 Mbps	14.41	30
		24 Mbps	15.58	30
		36 Mbps	15.22	30
		48 Mbps	15.31	30
		54 Mbps	15.42	30
2472	13	6 Mbps	9.58	30
		9 Mbps	9.70	30
		12 Mbps	9.59	30
		18 Mbps	9.38	30
		24 Mbps	10.65	30
		36 Mbps	10.21	30
		48 Mbps	10.34	30
		54 Mbps	10.46	30

■ TEST RESULTS-Ant.1

Conducted Output Power Measurements (802.11g Mode)

802.11g Mode		Rate (Mbps)	Measured Power(dBm)	Limit (dBm)
Frequency[MHz]	Channel No.			
2412	1	6 Mbps	18.83	30
		9 Mbps	18.92	30
		12 Mbps	18.91	30
		18 Mbps	18.70	30
		24 Mbps	19.95	30
		36 Mbps	19.48	30
		48 Mbps	19.64	30
		54 Mbps	19.74	30
2437	6	6 Mbps	19.19	30
		9 Mbps	19.29	30
		12 Mbps	19.27	30
		18 Mbps	19.07	30
		24 Mbps	20.34	30
		36 Mbps	19.88	30
		48 Mbps	20.02	30
		54 Mbps	20.14	30
2462	11	6 Mbps	19.18	30
		9 Mbps	19.28	30
		12 Mbps	19.26	30
		18 Mbps	19.02	30
		24 Mbps	20.22	30
		36 Mbps	19.85	30
		48 Mbps	19.96	30
		54 Mbps	20.08	30

2467	12	6 Mbps	15.58	30
		9 Mbps	15.54	30
		12 Mbps	15.24	30
		18 Mbps	15.06	30
		24 Mbps	16.16	30
		36 Mbps	15.60	30
		48 Mbps	15.76	30
		54 Mbps	15.74	30
2472	13	6 Mbps	9.33	30
		9 Mbps	9.51	30
		12 Mbps	9.43	30
		18 Mbps	9.22	30
		24 Mbps	10.41	30
		36 Mbps	9.99	30
		48 Mbps	10.11	30
		54 Mbps	10.19	30

■ TEST RESULTS- _Sum Data of Ant.0 and Ant.1

Conducted Output Power Measurements (802.11g Mode)

802.11g Mode		Rate (Mbps)	Measured Power(dBm)	Limit (dBm)
Frequency[MHz]	Channel No.			
2412	1	6 Mbps	22.19	30
		9 Mbps	22.29	30
		12 Mbps	22.27	30
		18 Mbps	22.06	30
		24 Mbps	23.36	30
		36 Mbps	22.87	30
		48 Mbps	23.02	30
		54 Mbps	23.13	30
2437	6	6 Mbps	22.30	30
		9 Mbps	22.41	30
		12 Mbps	22.38	30
		18 Mbps	22.18	30
		24 Mbps	23.50	30
		36 Mbps	23.04	30
		48 Mbps	23.16	30
		54 Mbps	23.28	30
2462	11	6 Mbps	22.40	30
		9 Mbps	22.50	30
		12 Mbps	22.50	30
		18 Mbps	22.25	30
		24 Mbps	23.53	30
		36 Mbps	23.10	30
		48 Mbps	23.20	30
		54 Mbps	23.31	30

2467	12	6 Mbps	18.10	30
		9 Mbps	18.11	30
		12 Mbps	17.93	30
		18 Mbps	17.75	30
		24 Mbps	18.89	30
		36 Mbps	18.42	30
		48 Mbps	18.55	30
		54 Mbps	18.59	30
2472	13	6 Mbps	12.47	30
		9 Mbps	12.62	30
		12 Mbps	12.52	30
		18 Mbps	12.31	30
		24 Mbps	13.54	30
		36 Mbps	13.11	30
		48 Mbps	13.24	30
		54 Mbps	13.34	30

■ TEST RESULTS-Ant.0

Conducted Output Power Measurements (802.11n_HT20 Mode)

802.11n Mode		MCS Index	Measured Power(dBm)	Limit (dBm)
Frequency[MHz]	Channel No.			
2412	1	0	19.36	30
		1	19.04	30
		2	19.23	30
		3	19.87	30
		4	19.82	30
		5	19.90	30
		6	19.98	30
		7	19.84	30
2437	6	0	19.39	30
		1	19.05	30
		2	19.26	30
		3	20.02	30
		4	19.99	30
		5	20.04	30
		6	20.18	30
		7	20.03	30
2462	11	0	19.45	30
		1	19.08	30
		2	19.30	30
		3	19.95	30
		4	19.92	30
		5	19.98	30
		6	20.06	30
		7	19.92	30

2467	12	0	14.49	30
		1	14.10	30
		2	14.29	30
		3	14.91	30
		4	14.89	30
		5	14.95	30
		6	15.00	30
		7	14.87	30
2472	13	0	7.55	30
		1	7.18	30
		2	7.39	30
		3	8.05	30
		4	8.01	30
		5	8.09	30
		6	8.14	30
		7	8.01	30

■ TEST RESULTS-Ant.1

Conducted Output Power Measurements (802.11n_HT20 Mode)

802.11n Mode		MCS Index	Measured Power(dBm)	Limit (dBm)
Frequency[MHz]	Channel No.			
2412	1	0	18.75	30
		1	18.41	30
		2	18.61	30
		3	19.22	30
		4	19.20	30
		5	19.28	30
		6	19.38	30
		7	19.21	30
2437	6	0	19.13	30
		1	18.82	30
		2	19.01	30
		3	19.67	30
		4	19.65	30
		5	19.75	30
		6	19.80	30
		7	19.64	30
2462	11	0	19.01	30
		1	18.70	30
		2	18.90	30
		3	19.47	30
		4	19.43	30
		5	19.56	30
		6	19.57	30
		7	19.42	30

2467	12	0	15.19	30
		1	14.82	30
		2	15.14	30
		3	15.69	30
		4	15.76	30
		5	15.44	30
		6	15.52	30
		7	15.32	30
2472	13	0	7.30	30
		1	6.92	30
		2	7.09	30
		3	7.80	30
		4	7.81	30
		5	7.85	30
		6	7.87	30
		7	7.79	30

■ TEST RESULTS- _Sum Data of Ant.0 and Ant.1

Conducted Output Power Measurements (802.11n_HT20 Mode)

802.11g Mode		Rate (Mbps)	Measured Power(dBm)	Limit (dBm)
Frequency[MHz]	Channel No.			
2412	1	0	22.07	30
		1	21.74	30
		2	21.94	30
		3	22.56	30
		4	22.53	30
		5	22.61	30
		6	22.70	30
		7	22.54	30
2437	6	0	22.27	30
		1	21.95	30
		2	22.15	30
		3	22.86	30
		4	22.83	30
		5	22.91	30
		6	23.00	30
		7	22.85	30
2462	11	0	22.24	30
		1	21.90	30
		2	22.11	30
		3	22.72	30
		4	22.69	30
		5	22.78	30
		6	22.83	30
		7	22.68	30

2467	12	0	17.86	30
		1	17.48	30
		2	17.74	30
		3	18.32	30
		4	18.35	30
		5	18.21	30
		6	18.27	30
		7	18.11	30
2472	13	0	10.44	30
		1	10.06	30
		2	10.25	30
		3	10.94	30
		4	10.92	30
		5	10.98	30
		6	11.02	30
		7	10.91	30

■ TEST RESULTS-Average

■ TEST RESULTS_Ant.0

Conducted Output Power Measurements (802.11b Mode)

802.11b Mode		Rate (Mbps)	Measured Power(dBm)	Duty Cycle Factor (dB)	Measured Power(dBm) + Duty Cycle Factor(dB)	Limit (dBm)
Frequency [MHz]	Channel No.					
2412	1	1 Mbps	14.06	0.031	14.09	30
		2 Mbps	14.01	0.072	14.08	30
		5.5 Mbps	13.87	0.196	14.07	30
		11 Mbps	13.73	0.357	14.09	30
2437	6	1 Mbps	14.02	0.031	14.05	30
		2 Mbps	13.94	0.072	14.02	30
		5.5 Mbps	13.78	0.196	13.98	30
		11 Mbps	13.67	0.357	14.02	30
2462	11	1 Mbps	14.12	0.031	14.15	30
		2 Mbps	14.07	0.072	14.15	30
		5.5 Mbps	13.92	0.196	14.12	30
		11 Mbps	13.79	0.357	14.15	30
2467	12	1 Mbps	7.13	0.031	7.16	30
		2 Mbps	7.07	0.072	7.14	30
		5.5 Mbps	6.92	0.196	7.12	30
		11 Mbps	6.76	0.357	7.12	30
2472	13	1 Mbps	6.96	0.031	6.99	30
		2 Mbps	6.88	0.072	6.95	30
		5.5 Mbps	6.81	0.196	7.01	30
		11 Mbps	6.67	0.357	7.03	30

■ TEST RESULTS_Ant.1

Conducted Output Power Measurements (802.11b Mode)

802.11b Mode		Rate (Mbps)	Measured Power(dBm)	Duty Cycle Factor (dB)	Measured Power(dBm) + Duty Cycle Factor(dB)	Limit (dBm)
Frequency [MHz]	Channel No.					
2412	1	1 Mbps	13.53	0.035	13.57	30
		2 Mbps	13.47	0.076	13.55	30
		5.5 Mbps	13.37	0.196	13.57	30
		11 Mbps	13.19	0.333	13.52	30
2437	6	1 Mbps	13.78	0.035	13.81	30
		2 Mbps	13.79	0.076	13.87	30
		5.5 Mbps	13.59	0.196	13.79	30
		11 Mbps	13.46	0.333	13.79	30
2462	11	1 Mbps	13.76	0.035	13.80	30
		2 Mbps	13.71	0.076	13.78	30
		5.5 Mbps	13.64	0.196	13.83	30
		11 Mbps	13.42	0.333	13.76	30
2467	12	1 Mbps	7.08	0.035	7.12	30
		2 Mbps	6.80	0.076	6.88	30
		5.5 Mbps	6.36	0.195	6.56	30
		11 Mbps	6.54	0.333	6.87	30
2472	13	1 Mbps	6.75	0.035	6.79	30
		2 Mbps	6.66	0.076	6.74	30
		5.5 Mbps	6.52	0.195	6.72	30
		11 Mbps	6.36	0.333	6.69	30

■ TEST RESULTS_Ant.0

Conducted Output Power Measurements (802.11g Mode)

802.11g Mode		Rate (Mbps)	Measured Power(dBm)	Duty Cycle Factor (dB)	Measured Power(dBm) + Duty Cycle Factor(dB)	Limit (dBm)
Frequency [MHz]	Channel No.					
2412	1	6 Mbps	11.44	0.231	11.67	30
		9 Mbps	11.33	0.337	11.66	30
		12 Mbps	11.14	0.442	11.59	30
		18 Mbps	11.10	0.638	11.74	30
		24 Mbps	11.16	0.828	11.98	30
		36 Mbps	10.76	1.168	11.93	30
		48 Mbps	10.51	1.468	11.97	30
		54 Mbps	10.31	1.637	11.95	30
2437	6	6 Mbps	11.34	0.231	11.57	30
		9 Mbps	11.14	0.337	11.47	30
		12 Mbps	11.01	0.442	11.45	30
		18 Mbps	10.94	0.638	11.58	30
		24 Mbps	11.02	0.828	11.85	30
		36 Mbps	10.61	1.168	11.78	30
		48 Mbps	10.28	1.468	11.75	30
		54 Mbps	10.07	1.637	11.71	30
2462	11	6 Mbps	11.57	0.231	11.80	30
		9 Mbps	11.40	0.337	11.74	30
		12 Mbps	11.25	0.442	11.69	30
		18 Mbps	11.25	0.638	11.89	30
		24 Mbps	11.28	0.828	12.11	30
		36 Mbps	10.83	1.168	12.00	30
		48 Mbps	10.58	1.468	12.05	30
		54 Mbps	10.46	1.637	12.09	30

2467	12	6 Mbps	6.45	0.231	6.68	30
		9 Mbps	6.31	0.337	6.65	30
		12 Mbps	6.18	0.442	6.62	30
		18 Mbps	6.14	0.638	6.78	30
		24 Mbps	6.16	0.828	6.99	30
		36 Mbps	5.72	1.168	6.89	30
		48 Mbps	5.46	1.468	6.93	30
		54 Mbps	5.29	1.637	6.93	30
2472	13	6 Mbps	1.41	0.231	1.64	30
		9 Mbps	1.27	0.337	1.61	30
		12 Mbps	1.15	0.442	1.59	30
		18 Mbps	1.05	0.638	1.69	30
		24 Mbps	1.10	0.828	1.93	30
		36 Mbps	0.70	1.168	1.87	30
		48 Mbps	0.43	1.468	1.90	30
		54 Mbps	0.29	1.637	1.93	30

■ TEST RESULTS_Ant.1

Conducted Output Power Measurements (802.11g Mode)

802.11g Mode		Rate (Mbps)	Measured Power(dBm)	Duty Cycle Factor (dB)	Measured Power(dBm) + Duty Cycle Factor(dB)	Limit (dBm)
Frequency [MHz]	Channel No.					
2412	1	6 Mbps	10.74	0.225	10.96	30
		9 Mbps	10.64	0.319	10.96	30
		12 Mbps	10.52	0.422	10.94	30
		18 Mbps	10.45	0.608	11.06	30
		24 Mbps	10.51	0.798	11.30	30
		36 Mbps	10.09	1.107	11.20	30
		48 Mbps	9.78	1.397	11.18	30
		54 Mbps	9.60	1.541	11.14	30
2437	6	6 Mbps	10.97	0.225	11.20	30
		9 Mbps	10.93	0.319	11.25	30
		12 Mbps	10.85	0.422	11.27	30
		18 Mbps	10.73	0.608	11.34	30
		24 Mbps	10.79	0.798	11.59	30
		36 Mbps	10.38	1.107	11.49	30
		48 Mbps	10.12	1.397	11.51	30
		54 Mbps	10.21	1.541	11.75	30
2462	11	6 Mbps	11.04	0.225	11.27	30
		9 Mbps	10.98	0.319	11.30	30
		12 Mbps	10.87	0.422	11.29	30
		18 Mbps	10.77	0.608	11.38	30
		24 Mbps	10.78	0.798	11.57	30
		36 Mbps	10.39	1.107	11.50	30
		48 Mbps	10.11	1.397	11.51	30
		54 Mbps	9.99	1.541	11.53	30

2467	12	6 Mbps	6.13	0.225	6.36	30
		9 Mbps	6.22	0.317	6.54	30
		12 Mbps	6.11	0.424	6.53	30
		18 Mbps	5.91	0.609	6.52	30
		24 Mbps	5.90	0.796	6.70	30
		36 Mbps	5.56	1.101	6.66	30
		48 Mbps	5.21	1.400	6.61	30
		54 Mbps	4.95	1.533	6.48	30
2472	13	6 Mbps	1.25	0.225	1.48	30
		9 Mbps	1.13	0.317	1.45	30
		12 Mbps	0.93	0.424	1.35	30
		18 Mbps	0.82	0.609	1.43	30
		24 Mbps	0.87	0.796	1.67	30
		36 Mbps	0.34	1.101	1.44	30
		48 Mbps	0.15	1.400	1.55	30
		54 Mbps	-0.11	1.533	1.42	30

■ TEST RESULTS_Sum Data of Ant.0 and Ant.1

Conducted Output Power Measurements (802.11g Mode)

802.11g Mode		Rate (Mbps)	Sum Power of Ant.0 & 1 (dBm)	Limit (dBm)
Frequency[MHz]	Channel No.			
2412	1	6 Mbps	14.33	30
		9 Mbps	14.33	30
		12 Mbps	14.28	30
		18 Mbps	14.42	30
		24 Mbps	14.66	30
		36 Mbps	14.58	30
		48 Mbps	14.59	30
		54 Mbps	14.56	30
2437	6	6 Mbps	14.40	30
		9 Mbps	14.37	30
		12 Mbps	14.37	30
		18 Mbps	14.47	30
		24 Mbps	14.73	30
		36 Mbps	14.65	30
		48 Mbps	14.64	30
		54 Mbps	14.74	30
2462	11	6 Mbps	14.55	30
		9 Mbps	14.53	30
		12 Mbps	14.50	30
		18 Mbps	14.65	30
		24 Mbps	14.85	30
		36 Mbps	14.76	30
		48 Mbps	14.79	30
		54 Mbps	14.82	30

2467	12	6 Mbps	9.53	30
		9 Mbps	9.61	30
		12 Mbps	9.59	30
		18 Mbps	9.66	30
		24 Mbps	9.86	30
		36 Mbps	9.79	30
		48 Mbps	9.78	30
		54 Mbps	9.72	30
2472	13	6 Mbps	4.57	30
		9 Mbps	4.54	30
		12 Mbps	4.48	30
		18 Mbps	4.57	30
		24 Mbps	4.81	30
		36 Mbps	4.67	30
		48 Mbps	4.74	30
		54 Mbps	4.69	30

■ TEST RESULTS_Ant.0

Conducted Output Power Measurements (802.11n_HT20 Mode)

802.11n Mode		MCS Index	Measured Power(dBm)	Duty Cycle Factor (dB)	Measured Power(dBm) + Duty Cycle Factor(dB)	Limit (dBm)
Frequency [MHz]	Channel No.					
2412	1	0	11.21	0.241	11.45	30
		1	10.80	0.459	11.26	30
		2	10.84	0.666	11.50	30
		3	11.05	1.131	12.18	30
		4	10.70	1.183	11.88	30
		5	10.43	1.485	11.91	30
		6	10.32	1.622	11.94	30
		7	10.15	1.725	11.87	30
2437	6	0	11.04	0.241	11.28	30
		1	10.50	0.459	10.96	30
		2	10.69	0.666	11.35	30
		3	10.98	1.131	12.11	30
		4	10.62	1.183	11.80	30
		5	10.31	1.485	11.79	30
		6	10.21	1.622	11.83	30
		7	10.06	1.725	11.79	30
2462	11	0	11.32	0.241	11.56	30
		1	10.98	0.459	11.44	30
		2	10.89	0.666	11.56	30
		3	11.16	1.131	12.29	30
		4	10.81	1.183	12.00	30
		5	10.51	1.485	11.99	30
		6	10.43	1.622	12.05	30
		7	10.28	1.725	12.01	30

2467	12	0	6.26	0.241	6.50	30
		1	5.89	0.459	6.35	30
		2	5.85	0.666	6.52	30
		3	6.11	1.131	7.24	30
		4	5.71	1.183	6.89	30
		5	5.45	1.485	6.93	30
		6	5.36	1.622	6.98	30
		7	5.21	1.725	6.94	30
2472	13	0	-0.75	0.241	-0.51	30
		1	-1.11	0.459	-0.65	30
		2	-1.12	0.666	-0.45	30
		3	-0.88	1.131	0.25	30
		4	-1.23	1.183	-0.05	30
		5	-1.53	1.485	-0.05	30
		6	-1.65	1.622	-0.03	30
		7	-1.79	1.725	-0.06	30

■ TEST RESULTS_Ant.1

Conducted Output Power Measurements (802.11n_HT20 Mode)

802.11n Mode		MCS Index	Measured Power(dBm)	Duty Cycle Factor (dB)	Measured Power(dBm) + Duty Cycle Factor(dB)	Limit (dBm)
Frequency [MHz]	Channel No.					
2412	1	0	10.62	0.258	10.87	30
		1	10.17	0.469	10.64	30
		2	10.17	0.697	10.87	30
		3	10.39	0.867	11.26	30
		4	10.08	1.191	11.28	30
		5	9.78	1.489	11.27	30
		6	9.87	1.622	11.49	30
		7	9.59	1.725	11.31	30
2437	6	0	10.92	0.258	11.18	30
		1	10.64	0.469	11.11	30
		2	10.55	0.697	11.25	30
		3	10.78	0.867	11.64	30
		4	10.48	1.191	11.67	30
		5	10.15	1.489	11.64	30
		6	10.26	1.622	11.88	30
		7	9.89	1.725	11.61	30
2462	11	0	10.95	0.258	11.21	30
		1	10.60	0.469	11.07	30
		2	10.58	0.697	11.27	30
		3	10.73	0.867	11.59	30
		4	10.43	1.191	11.62	30
		5	10.10	1.489	11.59	30
		6	9.99	1.622	11.61	30
		7	9.83	1.725	11.56	30

2467	12	0	6.14	0.256	6.40	30
		1	5.73	0.466	6.20	30
		2	5.83	0.695	6.53	30
		3	5.94	0.867	6.81	30
		4	5.49	1.190	6.68	30
		5	5.25	1.486	6.74	30
		6	5.12	1.624	6.74	30
		7	5.04	1.723	6.76	30
2472	13	0	-1.11	0.256	-0.85	30
		1	-1.52	0.466	-1.05	30
		2	-1.53	0.695	-0.83	30
		3	-1.32	0.867	-0.45	30
		4	-1.64	1.190	-0.45	30
		5	-1.98	1.486	-0.49	30
		6	-2.07	1.624	-0.45	30
		7	-2.23	1.723	-0.51	30

■ TEST RESULTS_Sum Data of Ant.0 and Ant.1

Conducted Output Power Measurements (802.11n_HT20 Mode)

802.11n Mode		MCS Index	Sum Power of Ant.0 & 1 (dBm)	Limit (dBm)
Frequency[MHz]	Channel No.			
2412	1	0	14.18	30
		1	13.97	30
		2	14.20	30
		3	14.74	30
		4	14.60	30
		5	14.61	30
		6	14.73	30
		7	14.60	30
2437	6	0	14.24	30
		1	14.05	30
		2	14.31	30
		3	14.89	30
		4	14.75	30
		5	14.73	30
		6	14.87	30
		7	14.71	30
2462	11	0	14.40	30
		1	14.27	30
		2	14.43	30
		3	14.96	30
		4	14.82	30
		5	14.80	30
		6	14.84	30
		7	14.80	30

2467	12	0	9.46	30
		1	9.29	30
		2	9.54	30
		3	10.04	30
		4	9.80	30
		5	9.85	30
		6	9.87	30
		7	9.86	30
2472	13	0	2.33	30
		1	2.16	30
		2	2.37	30
		3	2.92	30
		4	2.76	30
		5	2.74	30
		6	2.77	30
		7	2.73	30

9.4 POWER SPECTRAL DENSITY (802.11b/g/n)

Test Requirements and limit, §15.247(e)

The peak power spectral density is measured with a spectrum analyzer connected to the antenna terminal while the EUT is operating in transmission mode at the appropriate frequencies.

Minimum Standard – the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

■ **Limit**

Operating Mode	Band	Mode	Ant. Port	Ant. Gain (dBi)	Limit (dBm)
SISO	2.4 GHz	802.11b/g/n	0	-0.75	8.0
			1	-1.28	8.0
MIMO(2 TX)		802.11g/n_HT20	0 & 1	2.00	8.0

Note : 1. If all antenna gains are not equal,

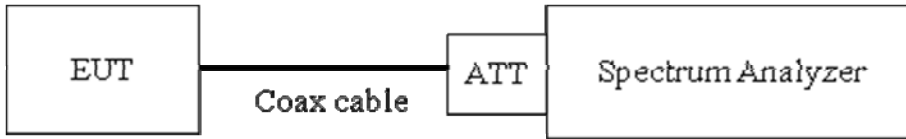
$$\text{Directional gain} = 10 \cdot \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / N] \text{ dBi}$$

$$\text{Directional gain} = 10 \cdot \log[(10^{G1/10} + 10^{G2/10} + \dots + 10^{GN/10}) / N] \text{ dBi}$$

(according to KDB662911 D01 v02r01)

2. Limit is calculated by antenna gain.

■ **TEST CONFIGURATION**



■ **TEST PROCEDURE**

We tested according to Procedure 10.2 in KDB 558074 v04

The spectrum analyzer is set to :

Set analyzer center frequency to DTS channel center frequency.

Span = 1.5 times the DTS channel bandwidth.

RBW = 3 kHz ≤ RBW ≤ 100 kHz.

VBW ≥ 3 x RBW.

Sweep = auto couple

Detector = peak

Trace Mode = max hold

Allow trace to fully stabilize.

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**

$$PSD = \text{Reading Value} + \text{ATT loss} + \text{Cable loss}(1 \text{ ea})$$

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.

Actual value of loss for the attenuator and cable combination is below table.

Band	Frequency(MHz)	Loss(dB)
2.4 GHz	2412	10.65
	2437	10.65
	2462	10.66

(Actual value of loss for the attenuator and cable combination)

■ TEST RESULTS_Ant.0

Conducted Power Density Measurements

Frequency (MHz)	Channel No.	Mode	Test Result		
			PSD (dBm)	Limit (dBm)	Pass/Fail
2412	1	802.11b	3.850	8	Pass
2437	6		3.066	8	Pass
2462	11		-0.907	8	Pass
2467	12		-8.319	8	Pass
2472	13		-4.012	8	Pass
2412	1	802.11g	-13.472	8	Pass
2437	6		-13.971	8	Pass
2462	11		-13.754	8	Pass
2467	12		-17.755	8	Pass
2472	13		-23.546	8	Pass
2412	1	802.11n HT20	-12.218	8	Pass
2437	6		-13.273	8	Pass
2462	11		-12.963	8	Pass
2467	12		-18.251	8	Pass
2472	13		-25.480	8	Pass

■ TEST RESULTS_Ant.1

Conducted Power Density Measurements

Frequency (MHz)	Channel No.	Mode	Test Result		
			PSD (dBm)	Limit (dBm)	Pass/Fail
2412	1	802.11b	-1.221	8	Pass
2437	6		-0.266	8	Pass
2462	11		0.278	8	Pass
2467	12		0.074	8	Pass
2472	13		-0.987	8	Pass
2412	1	802.11g	-14.168	8	Pass
2437	6		-13.929	8	Pass
2462	11		-13.132	8	Pass
2467	12		-17.687	8	Pass
2472	13		-23.591	8	Pass
2412	1	802.11n HT20	-14.145	8	Pass
2437	6		-13.551	8	Pass
2462	11		-12.954	8	Pass
2467	12		-18.732	8	Pass
2472	13		-25.900	8	Pass

■ TEST RESULTS_Sum Data of Ant.0 and Ant.1

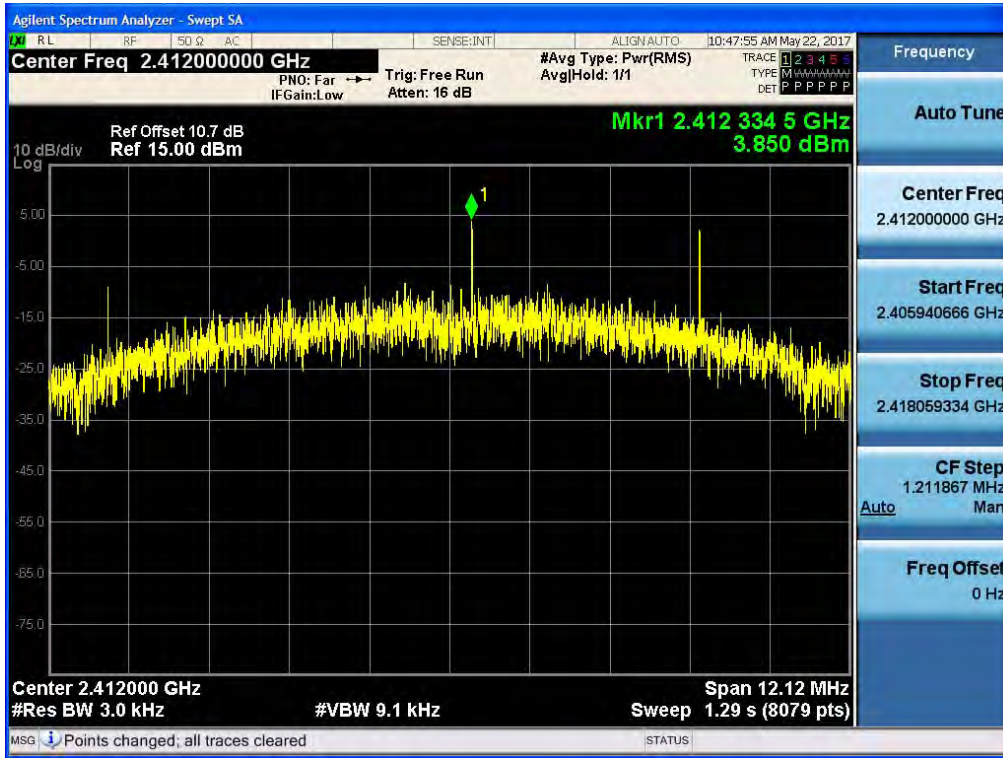
Conducted Power Density Measurements

Frequency (MHz)	Channel No.	Mode	Test Result		
			PSD (dBm)	Limit (dBm)	Pass/Fail
2412	1	802.11g	-10.80	8	Pass
2437	6		-10.94		Pass
2462	11		-10.43		Pass
2467	12		-14.71		Pass
2472	13		-20.56		Pass
2412	1	802.11n HT20	-10.12	8	Pass
2437	6		-10.40		Pass
2462	11		-9.95		Pass
2467	12		-15.48		Pass
2472	13		-22.68		Pass

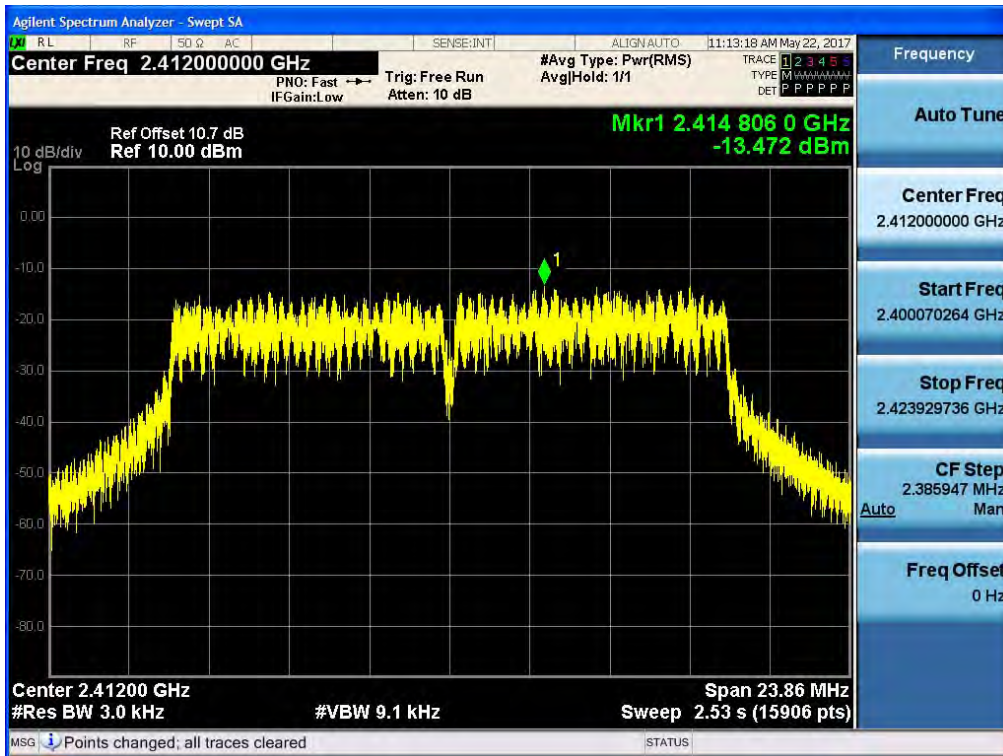
Note : In order to simplify the report, attached plots were only the highest PSD channel.

RESULT PLOTS_Ant.0

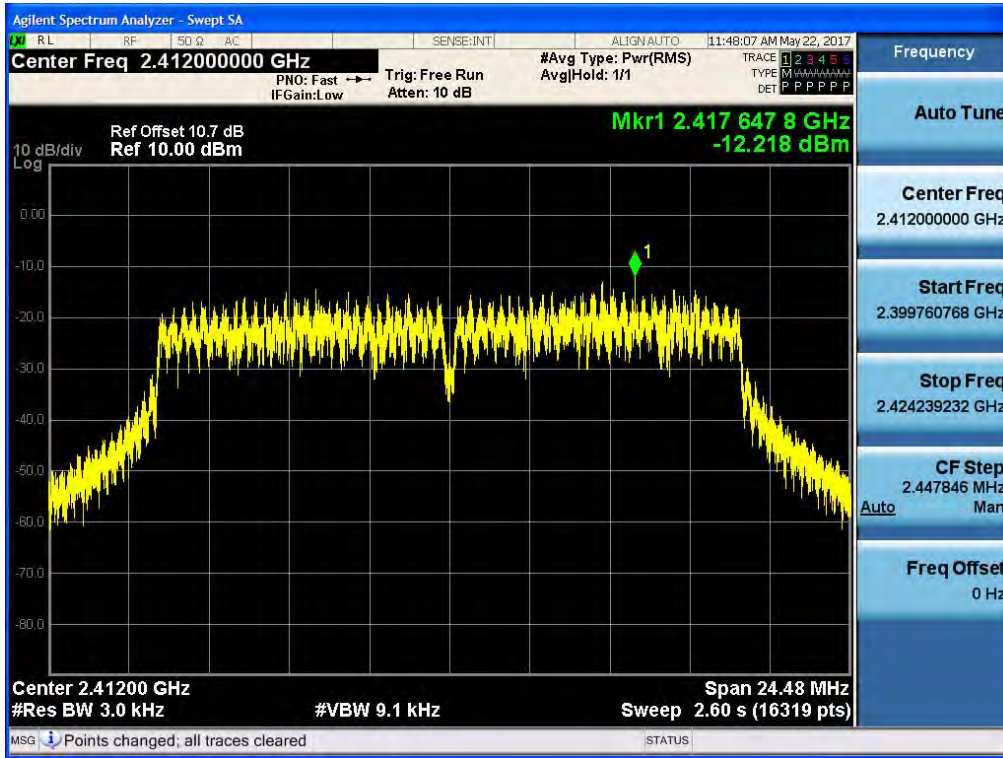
Power Spectral Density (802.11b-CH 1)



Power Spectral Density (802.11g-CH 1)

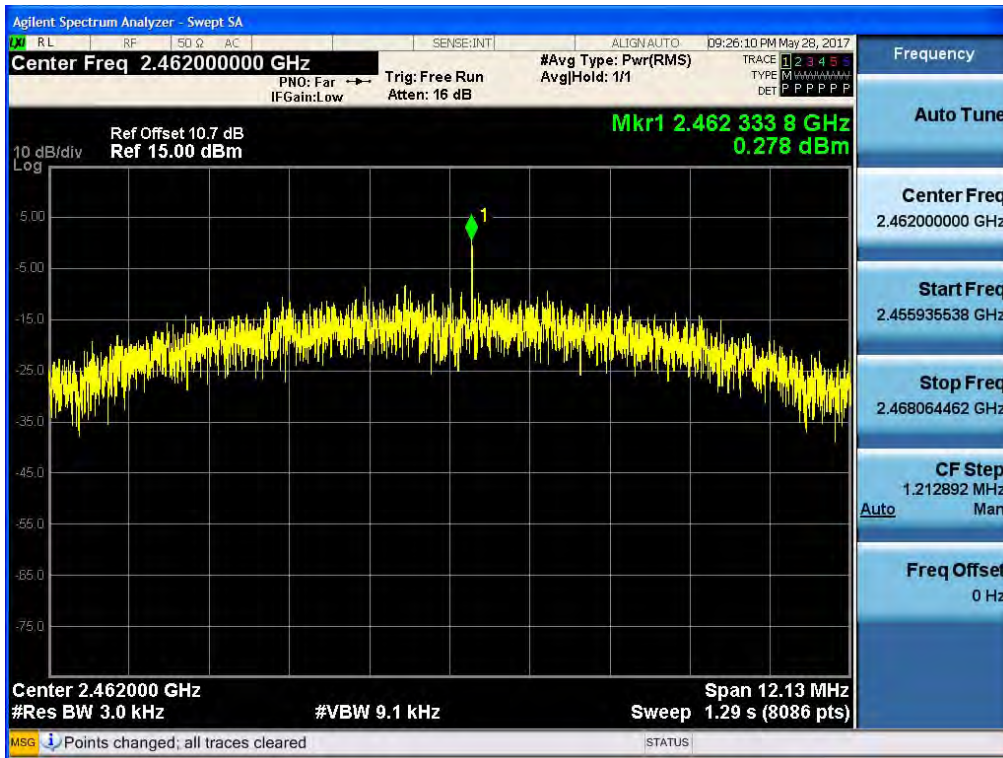


Power Spectral Density (802.11n_HT20 -CH 1)

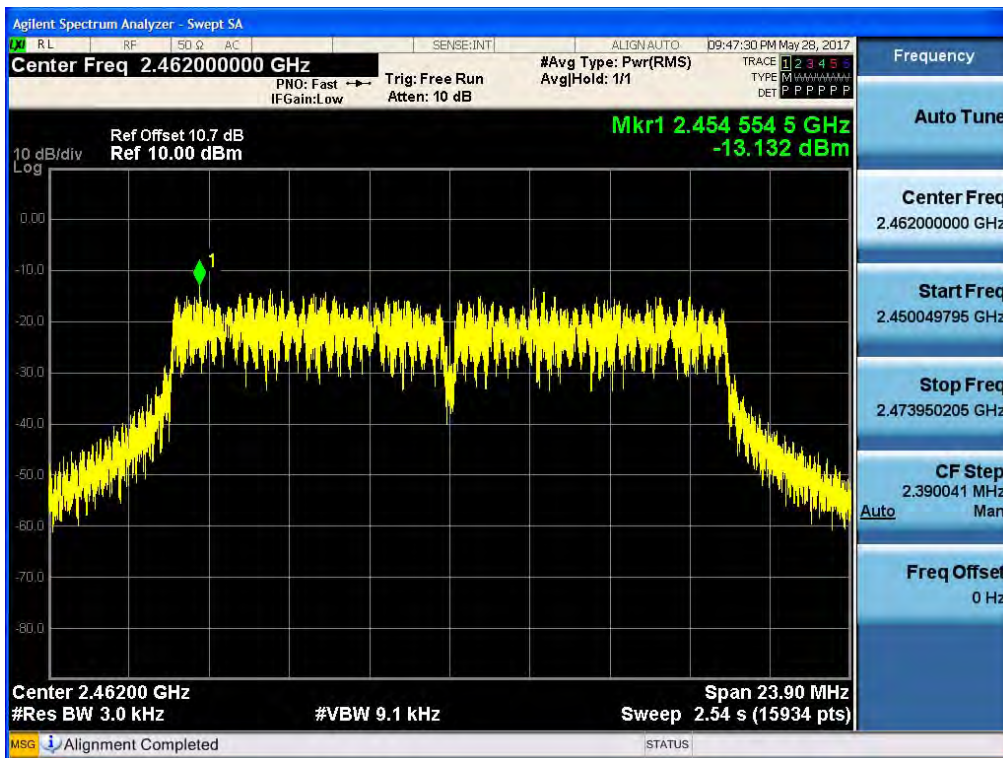


RESULT PLOTS_Ant.1

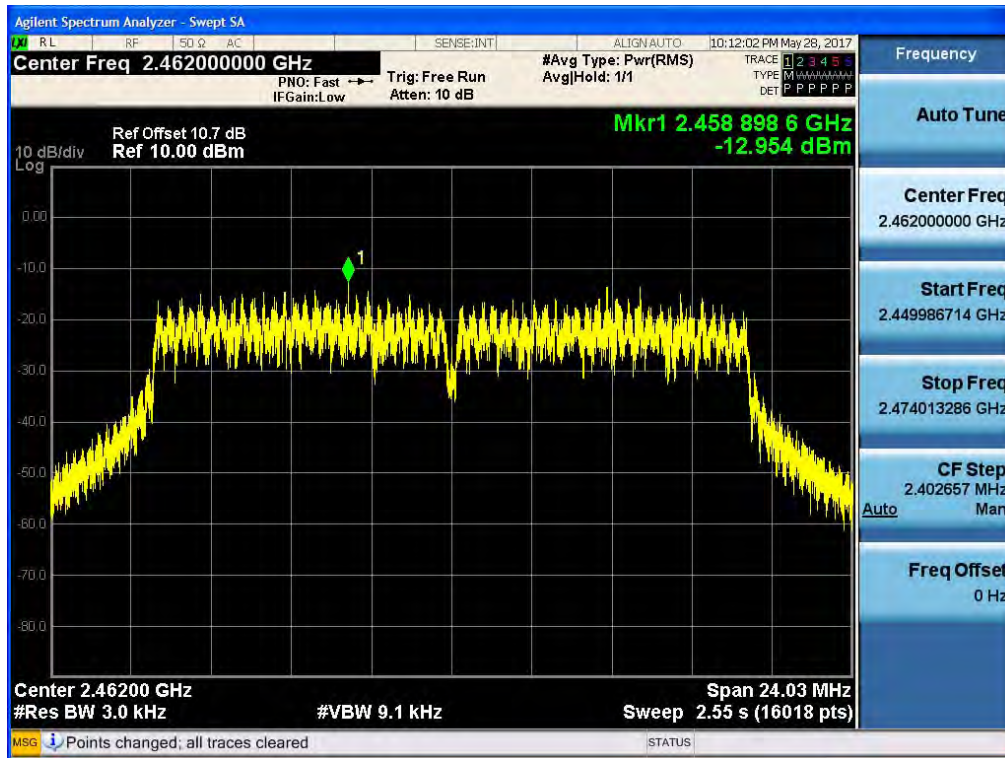
Power Spectral Density (802.11b-CH 11)



Power Spectral Density (802.11g-CH 11)



Power Spectral Density (802.11n_HT20 -CH 11)



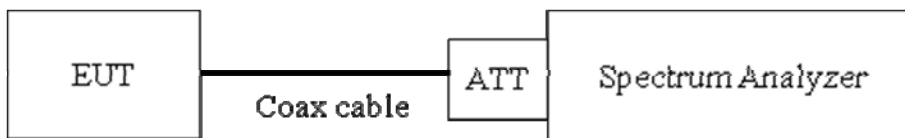
9.5 OUT OF BAND EMISSIONS AT THE BAND EDGE/ CONDUCTED SPURIOUS EMISSIONS

Test Requirements and limit, §15.247(d)

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in § 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a) (see § 15.205(c)).

Limit : 30 dBc

■ TEST CONFIGURATION



■ TEST PROCEDURE

The transmitter output is connected to the spectrum analyzer. (Procedure 11.0 in KDB 558074 v04)

RBW = 100 kHz

VBW $\geq 3 \times$ RBW

Set span to encompass the spectrum to be examined

Detector = Peak

Trace Mode = max hold

Sweep time = auto couple

Ensure that the number of measurement points \geq Span/RBW

Allow trace to fully stabilize.

Use peak marker function to determine the maximum amplitude level.

Measurements are made over the 30 MHz to 10th harmonic range with the transmitter set to the lowest, middle, and highest channels.

Note :

1. The band edge 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. Actual value of loss for the attenuator and cable combination is below table.

Band	Frequency(MHz)	Loss(dB)
2.4 GHz	2412	10.65
	2437	10.65
	2462	10.66

(Actual value of loss for the attenuator and cable combination)

- 4. In case of conducted spurious emissions test, please check factors blow table.
- 5. In order to simplify the report, attached plots were only the worst case channel.

■ 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

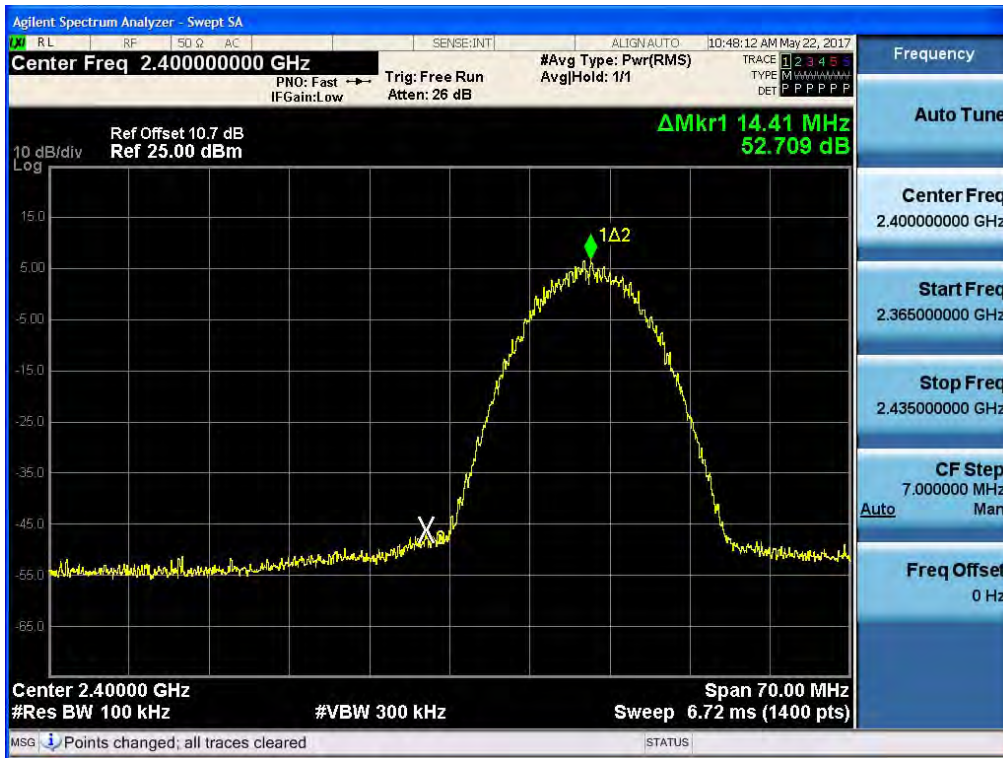
16000	12.04
17000	12.02
18000	12.08
19000	12.07
20000	12.14
21000	12.17
22000	12.31
23000	12.60
24000	12.34
25000	12.53

Note : 1. ** is fundamental frequency range.

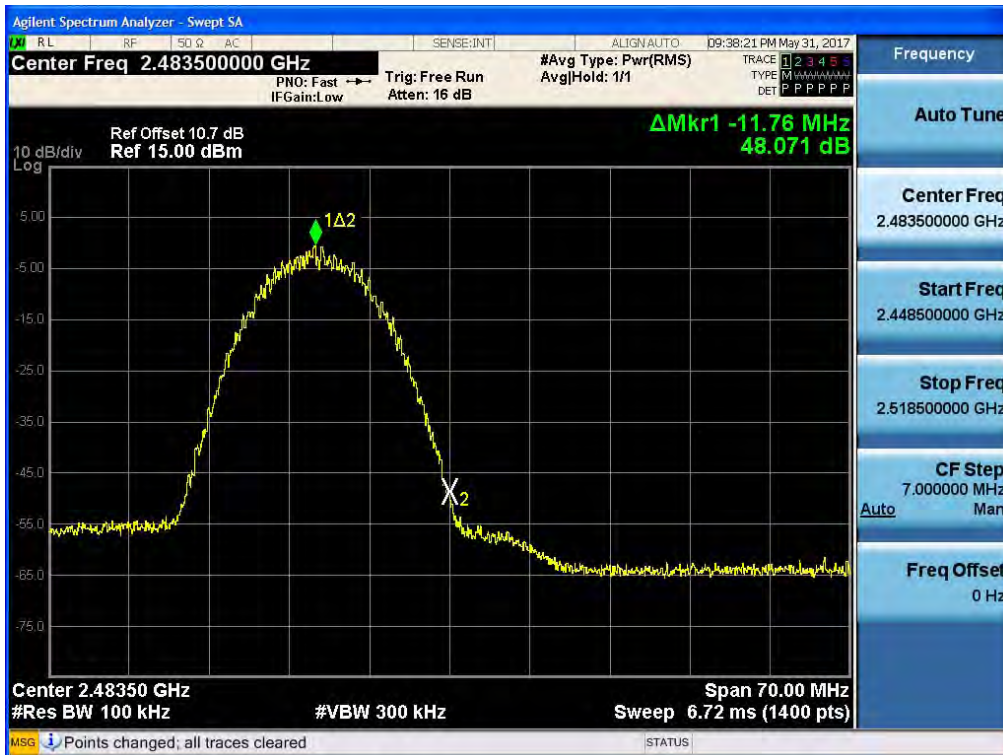
2. Factor = Cable loss + Attenuator loss

RESULT PLOTS_Ant.0

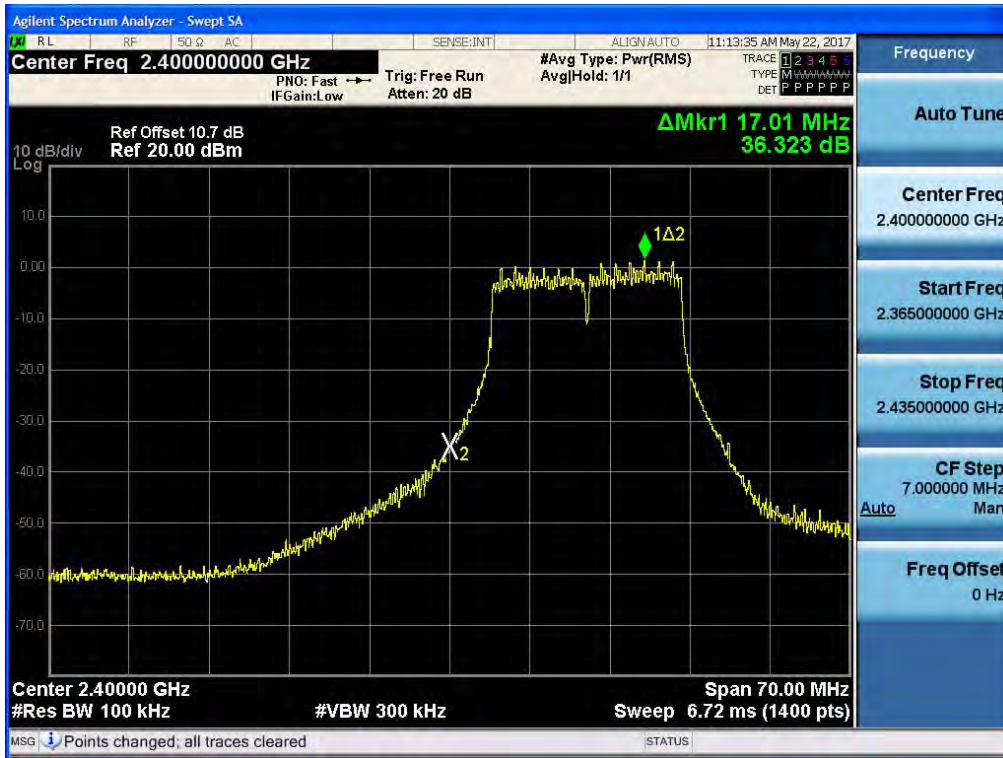
BandEdge (802.11b-CH1)



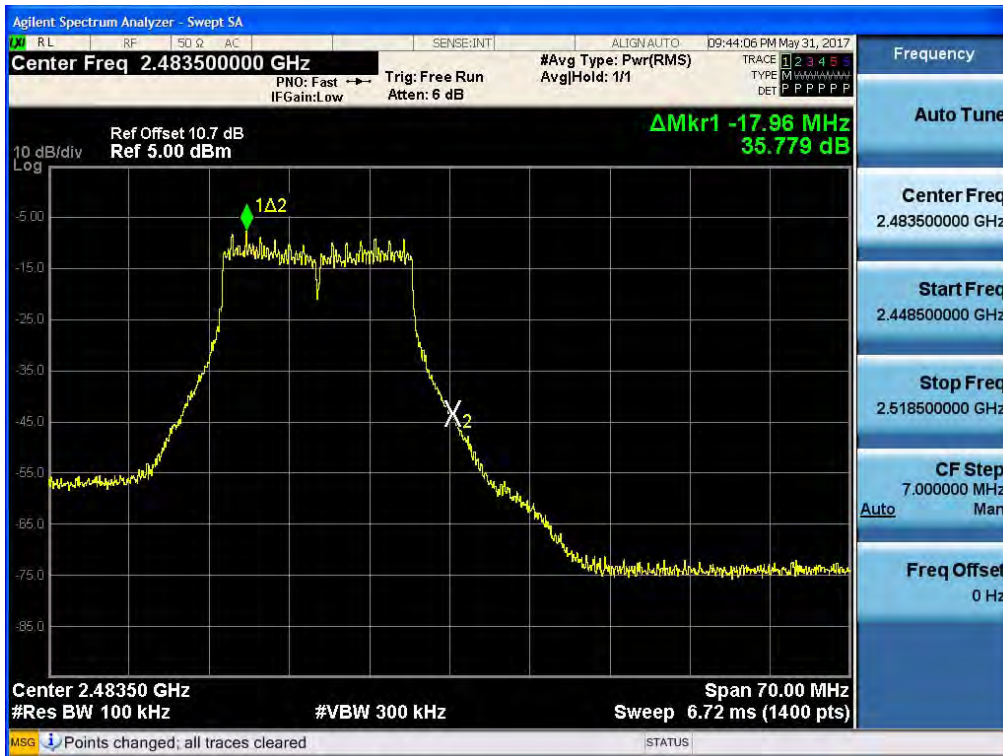
BandEdge (802.11b-CH13)



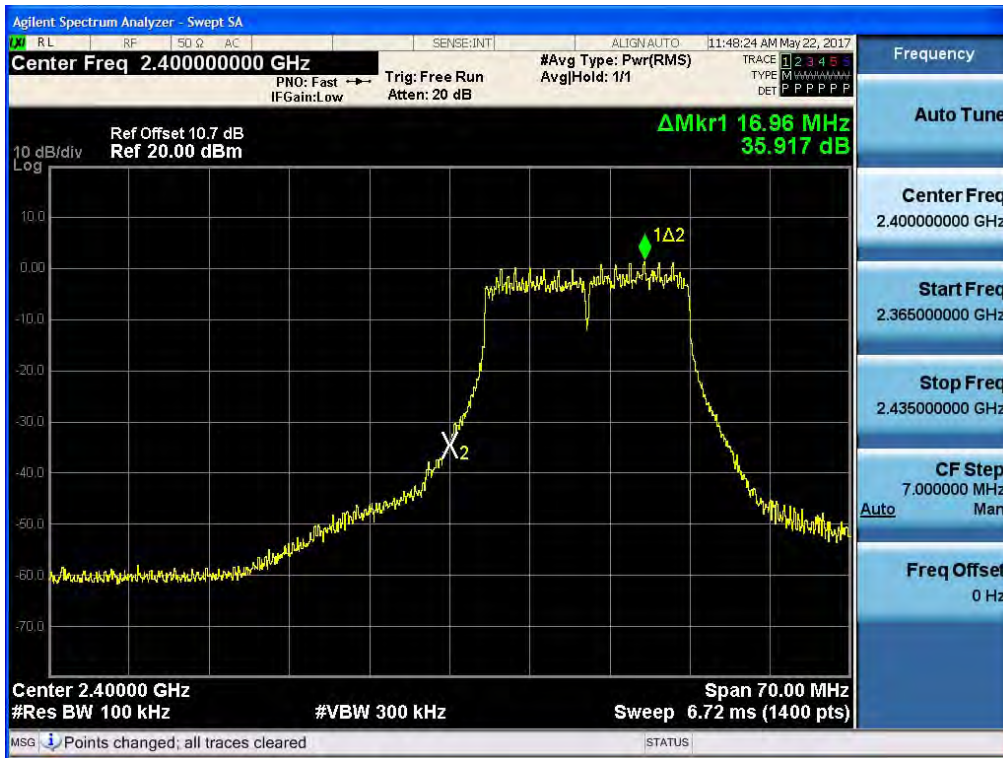
BandEdge (802.11g-CH1)



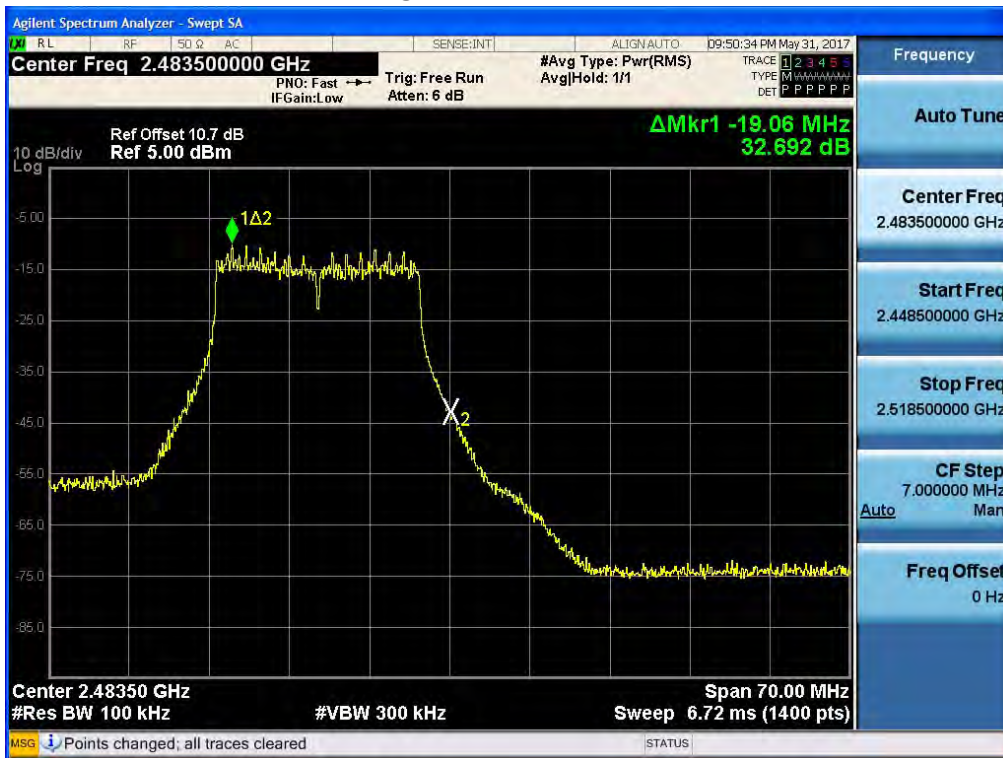
BandEdge (802.11g-CH13)



Band Edge (802.11n_HT20-CH1)

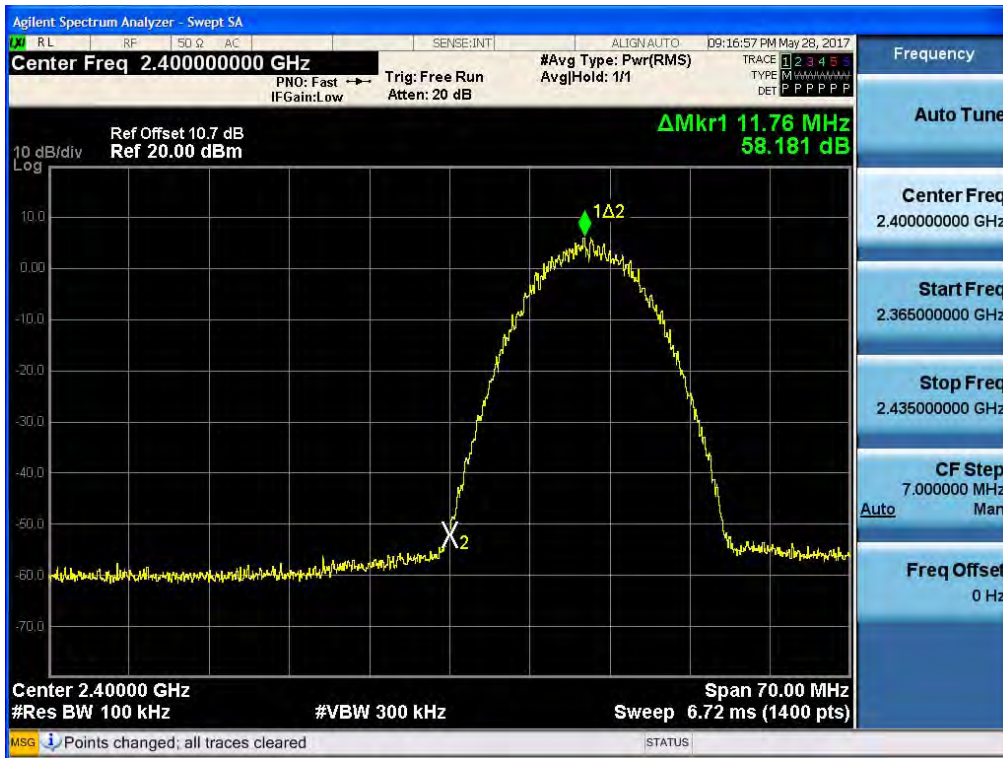


Band Edge (802.11n_HT20-CH13)

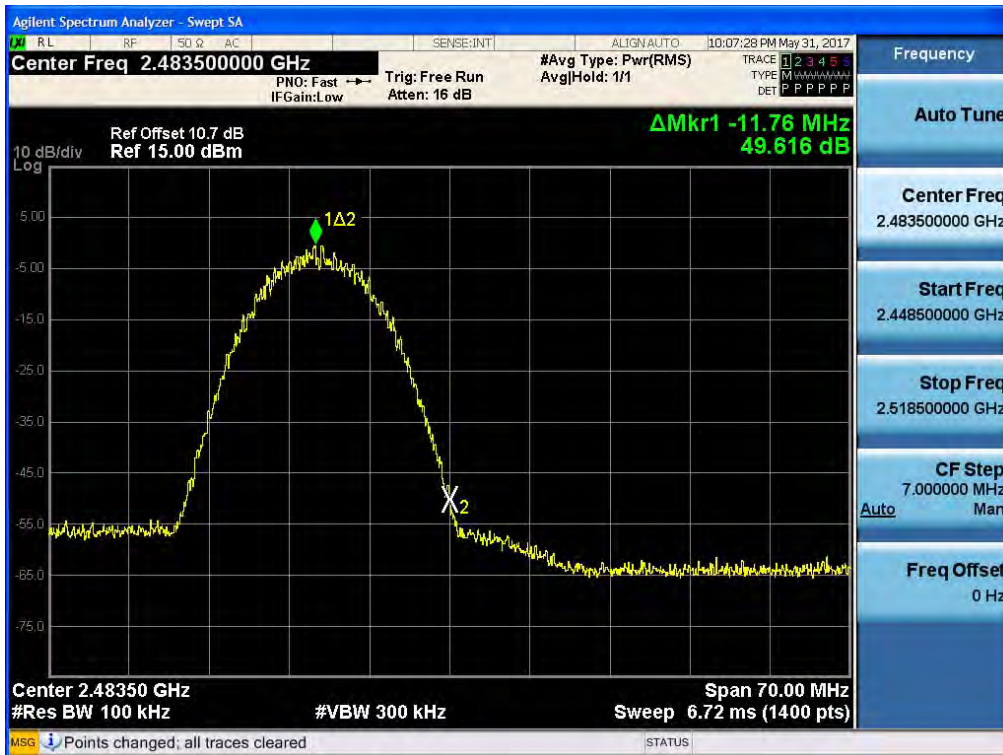


RESULT PLOTS_Ant.1

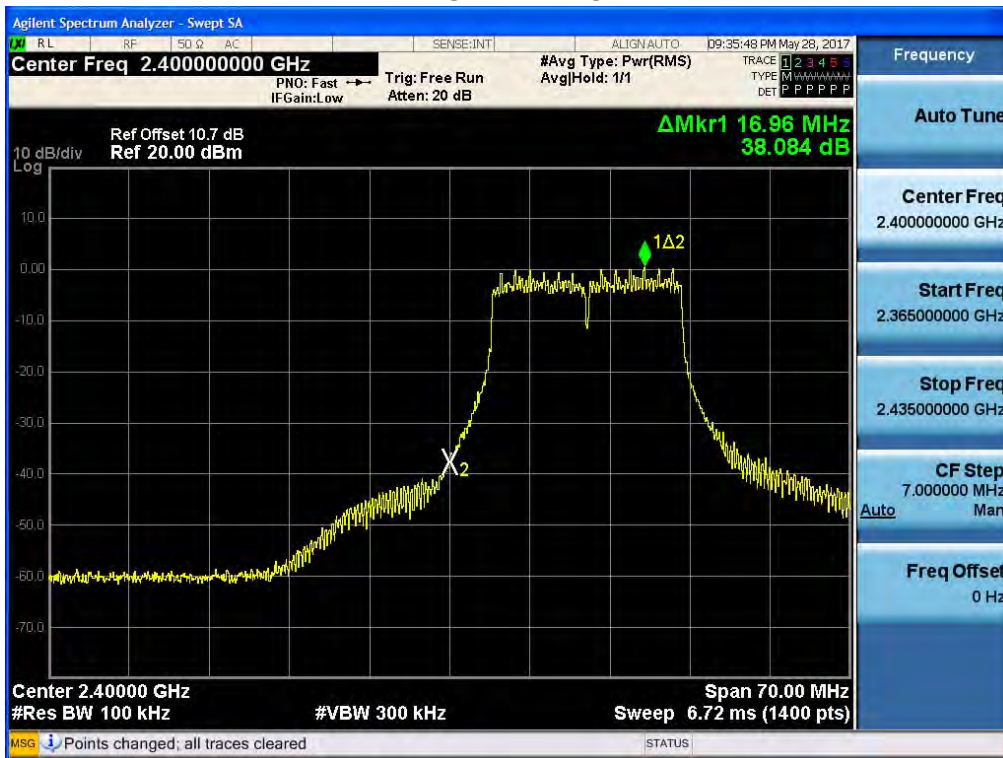
BandEdge (802.11b-CH1)



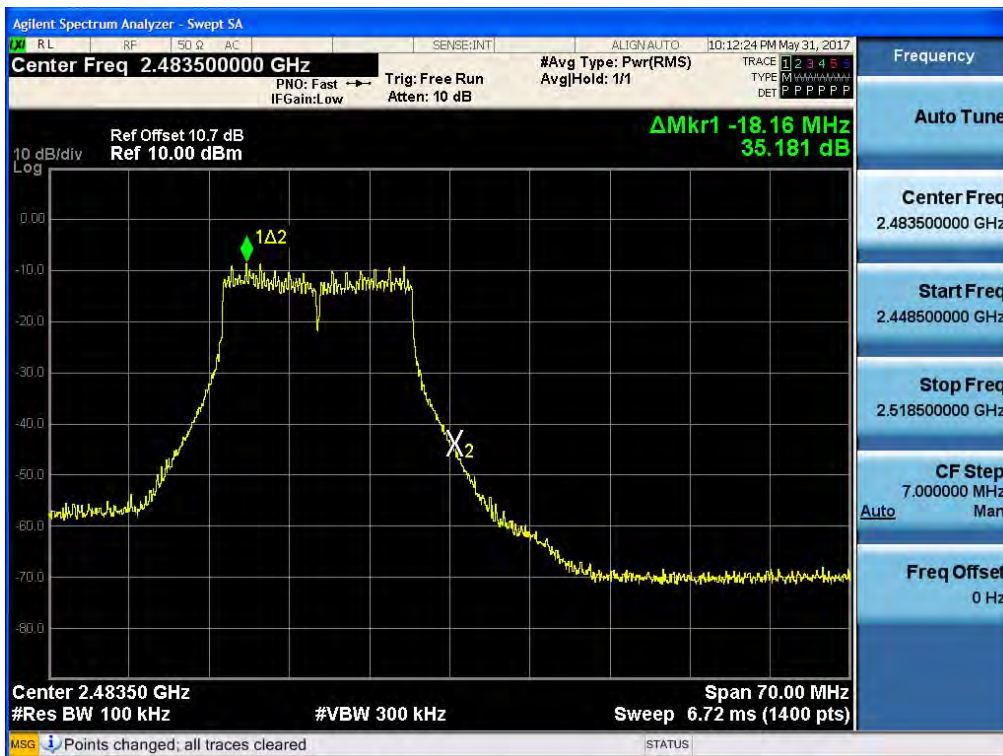
BandEdge (802.11b-CH13)



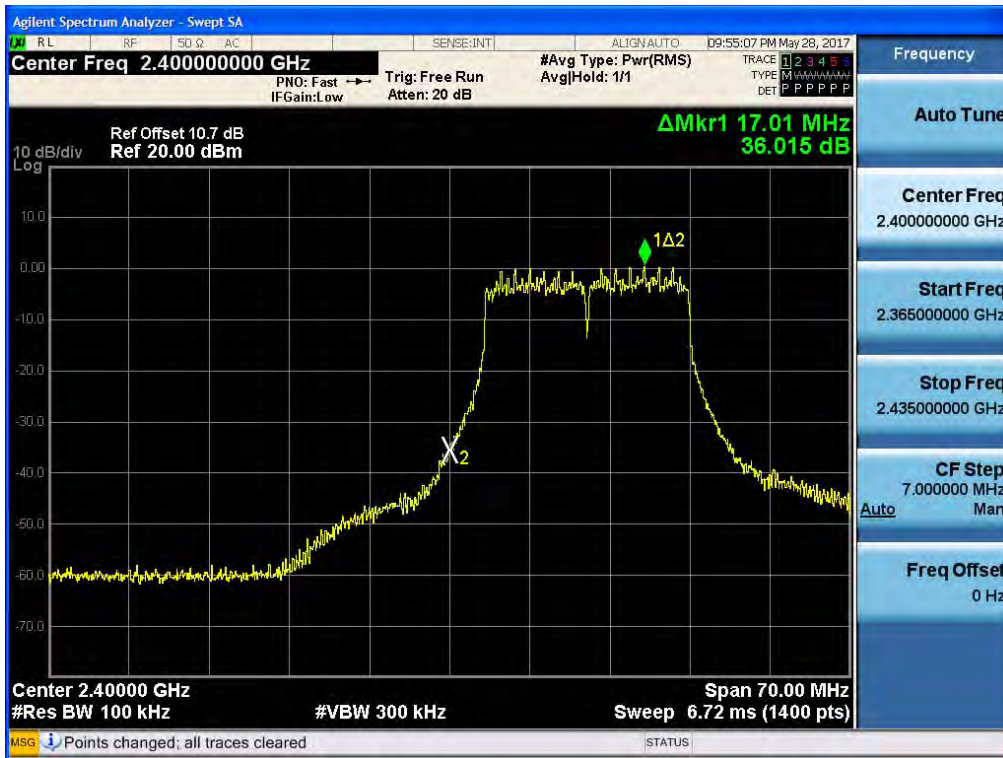
BandEdge (802.11g-CH1)



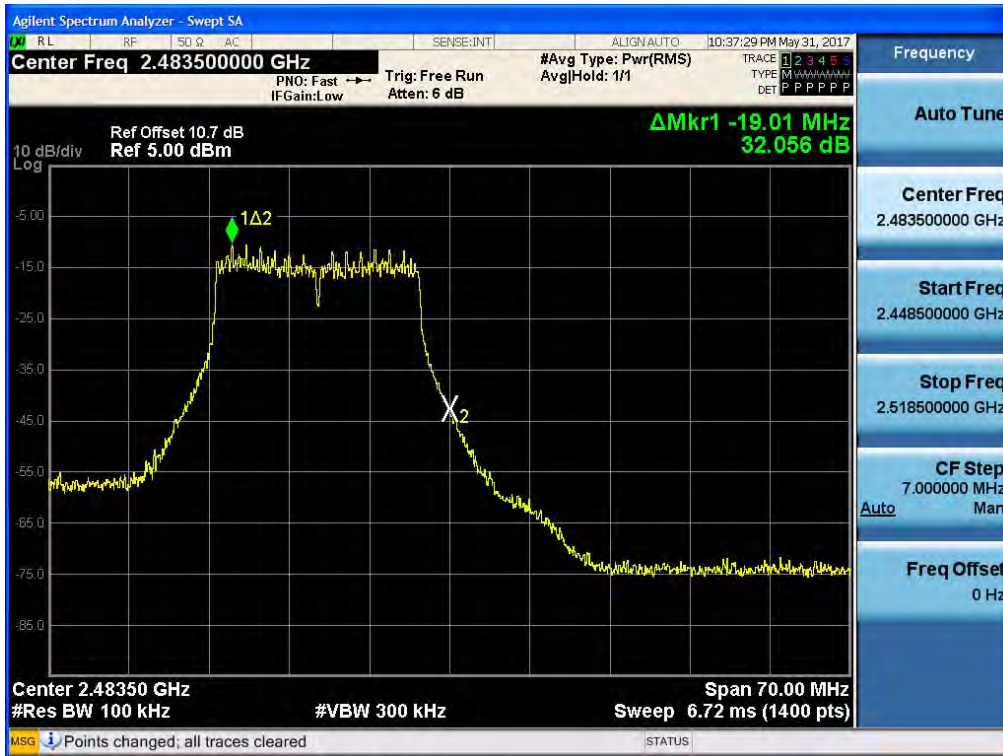
BandEdge (802.11g-CH13)



Band Edge (802.11n_HT20-CH1)



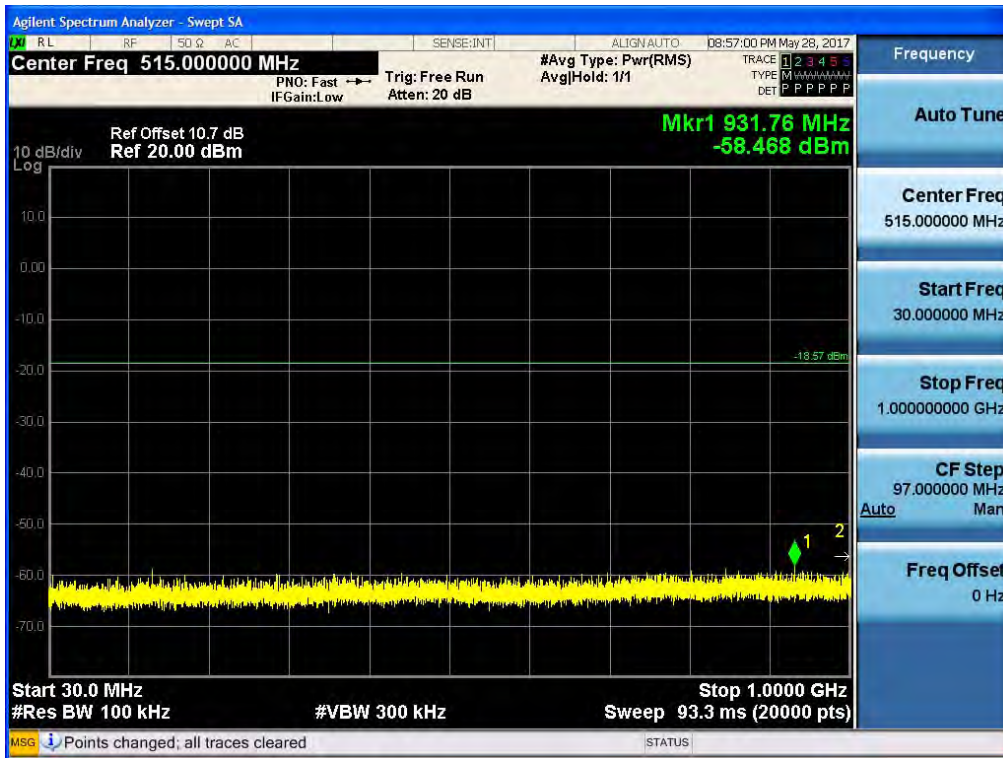
Band Edge (802.11n_HT20-CH13)



Ant.0

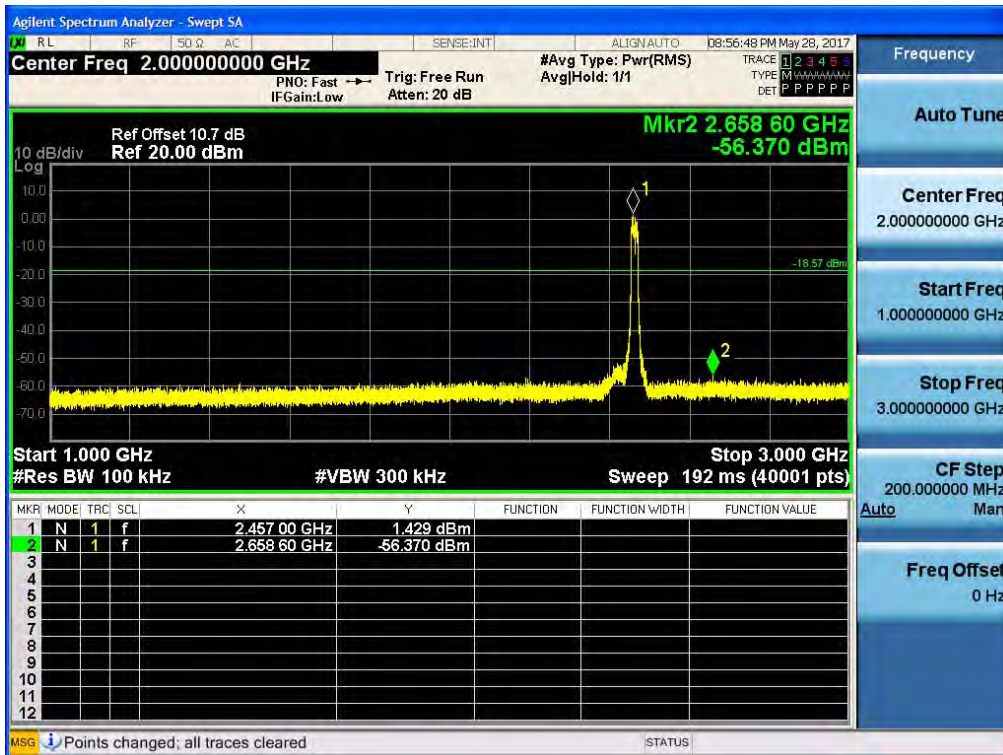
30 MHz ~ 1 GHz

Conducted Spurious Emission (802.11g_Ch.11_24 Mbps)



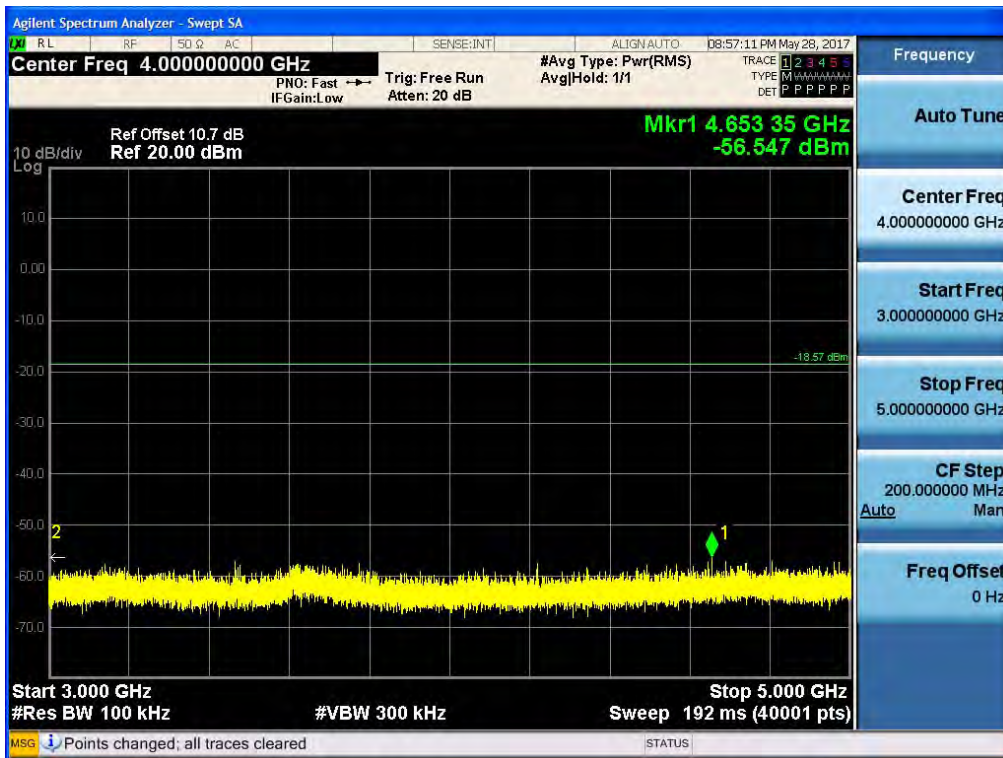
1 GHz ~ 3 GHz

Conducted Spurious Emission (802.11g_Ch.11_24 Mbps)



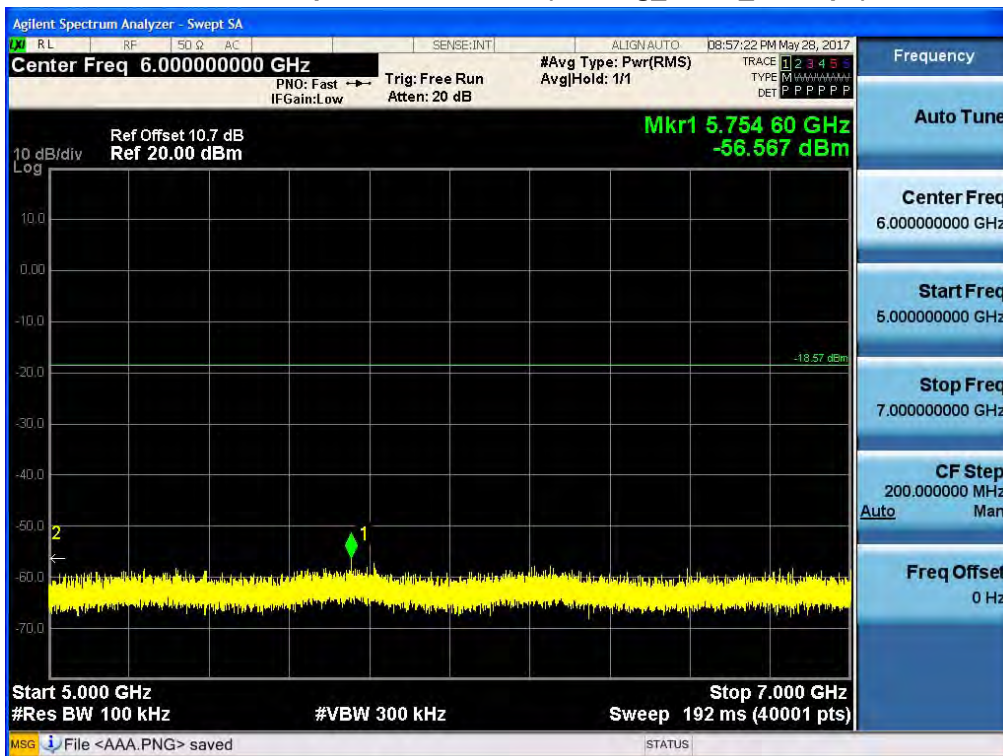
3 GHz ~ 5 GHz

Conducted Spurious Emission (802.11g_Ch.11_24 Mbps)



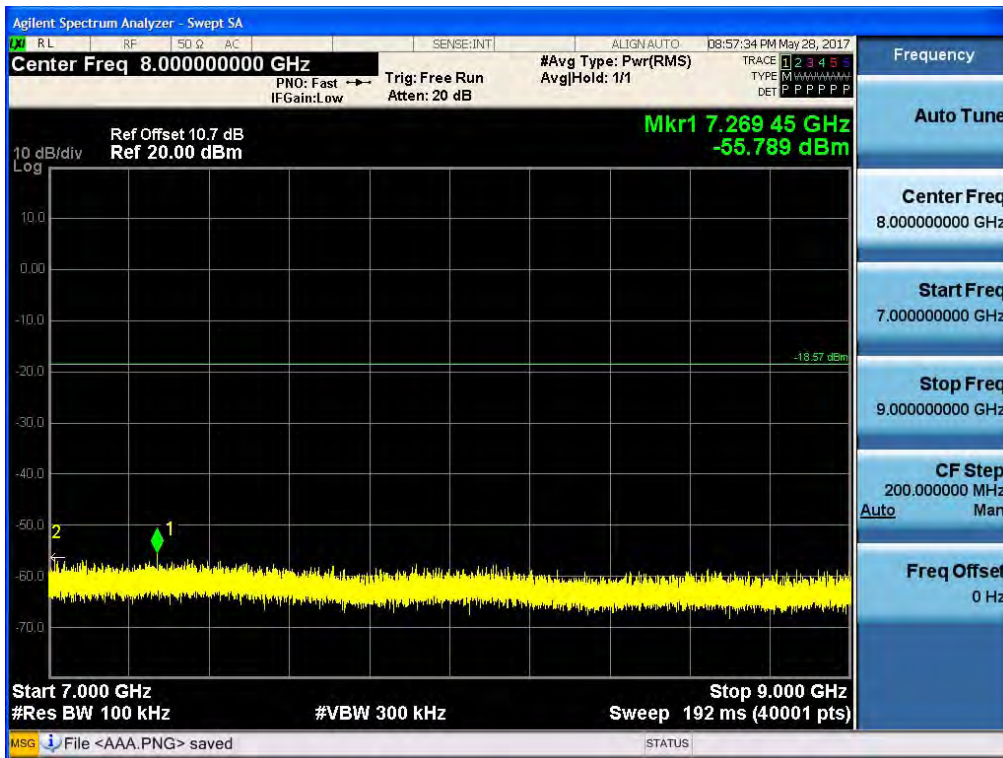
5 GHz ~ 7 GHz

Conducted Spurious Emission (802.11g_Ch.11_24 Mbps)



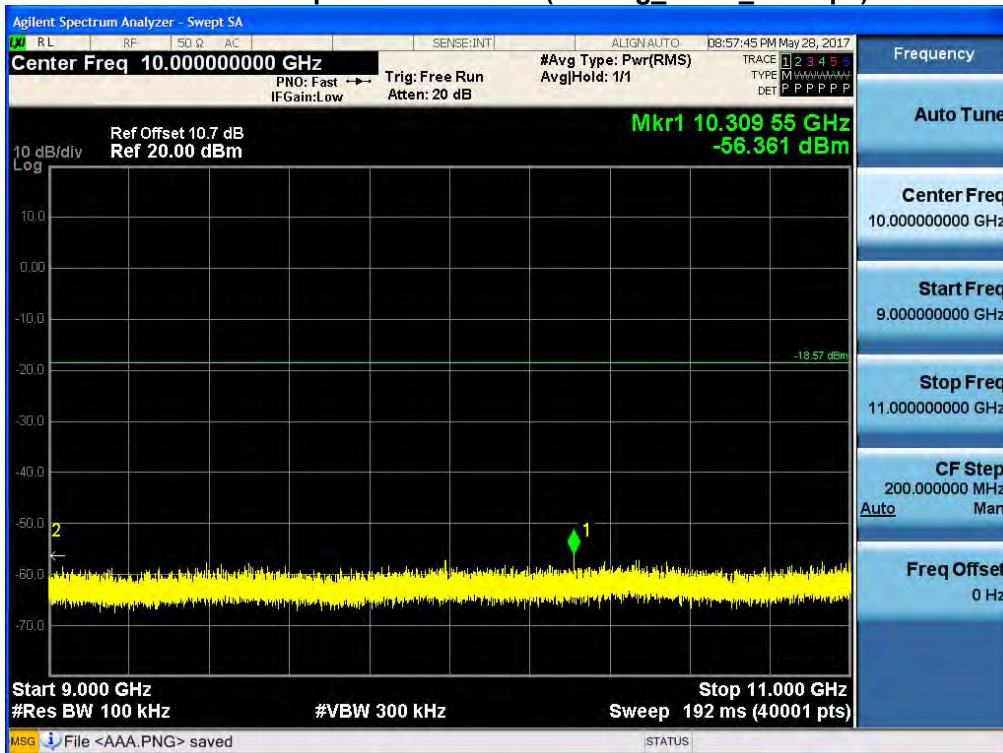
7 GHz ~ 9 GHz

Conducted Spurious Emission (802.11g_Ch.11_24 Mbps)



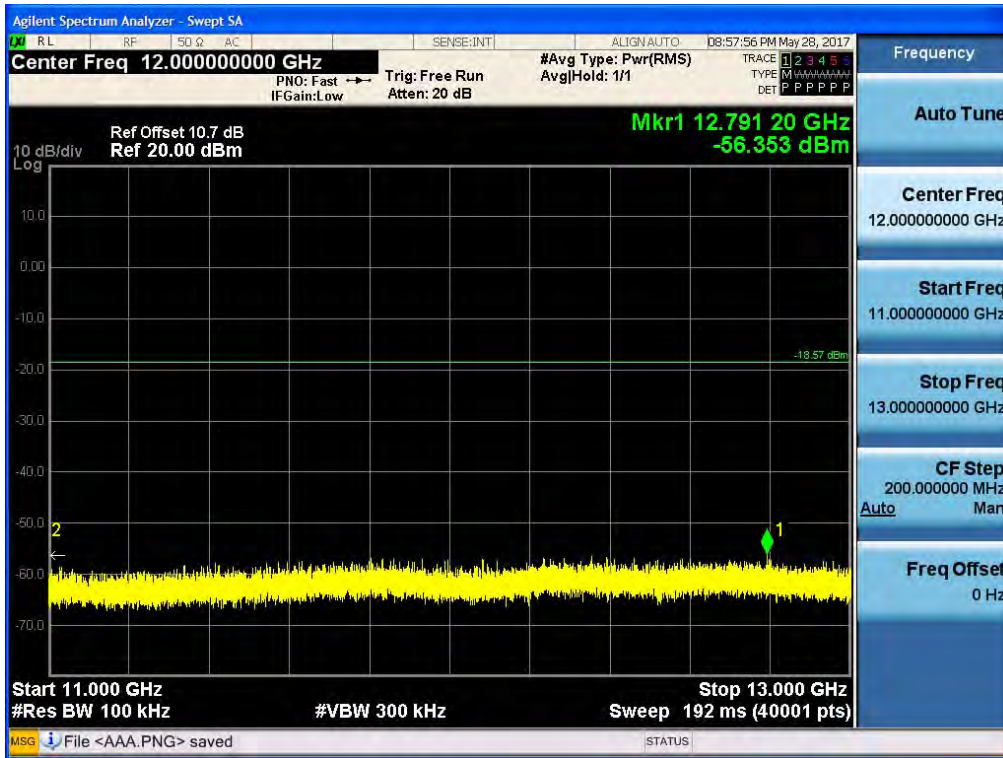
9 GHz ~ 11 GHz

Conducted Spurious Emission (802.11g_Ch.11_24 Mbps)



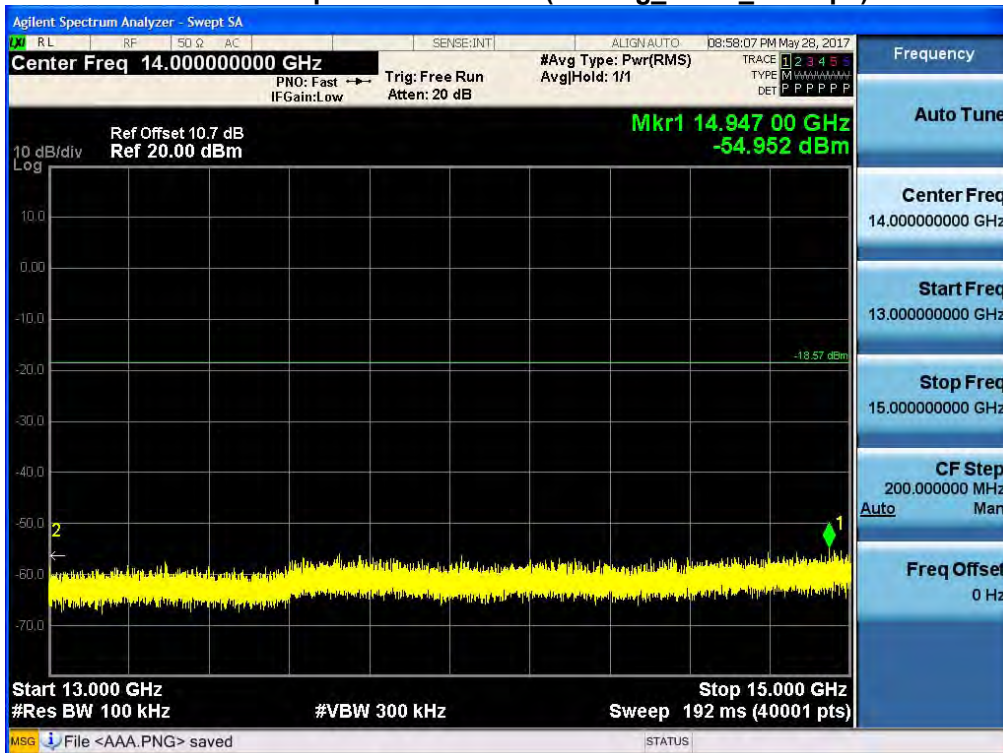
11 GHz ~ 13 GHz

Conducted Spurious Emission (802.11g_Ch.11_24 Mbps)



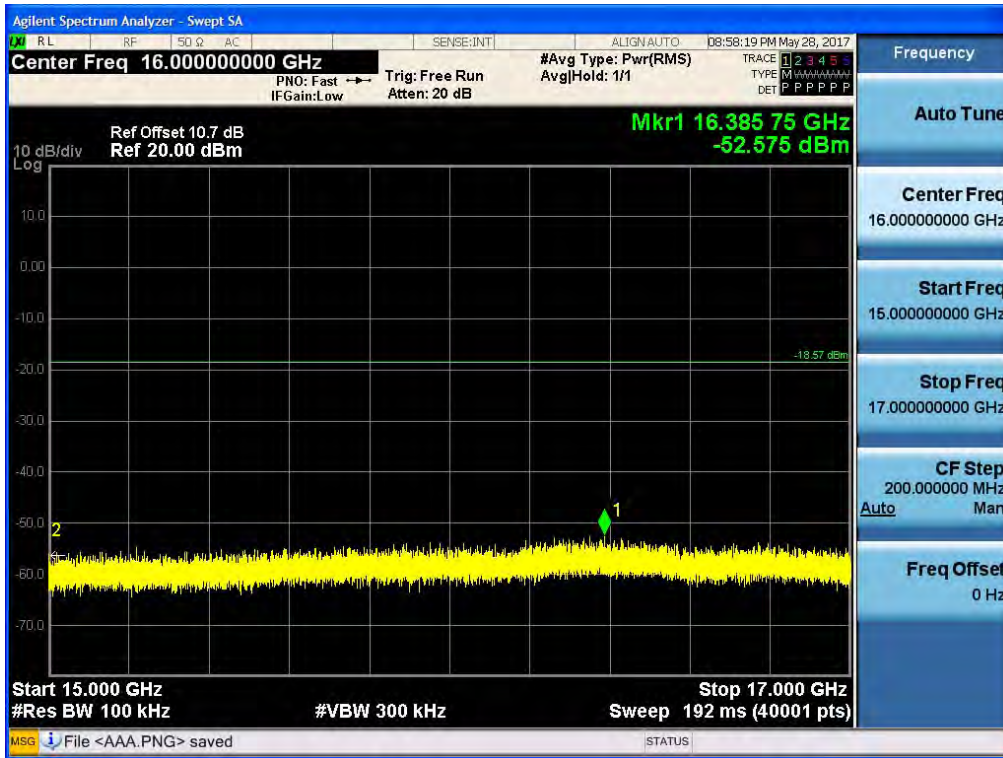
13 GHz ~ 15 GHz

Conducted Spurious Emission (802.11g_Ch.11_24 Mbps)



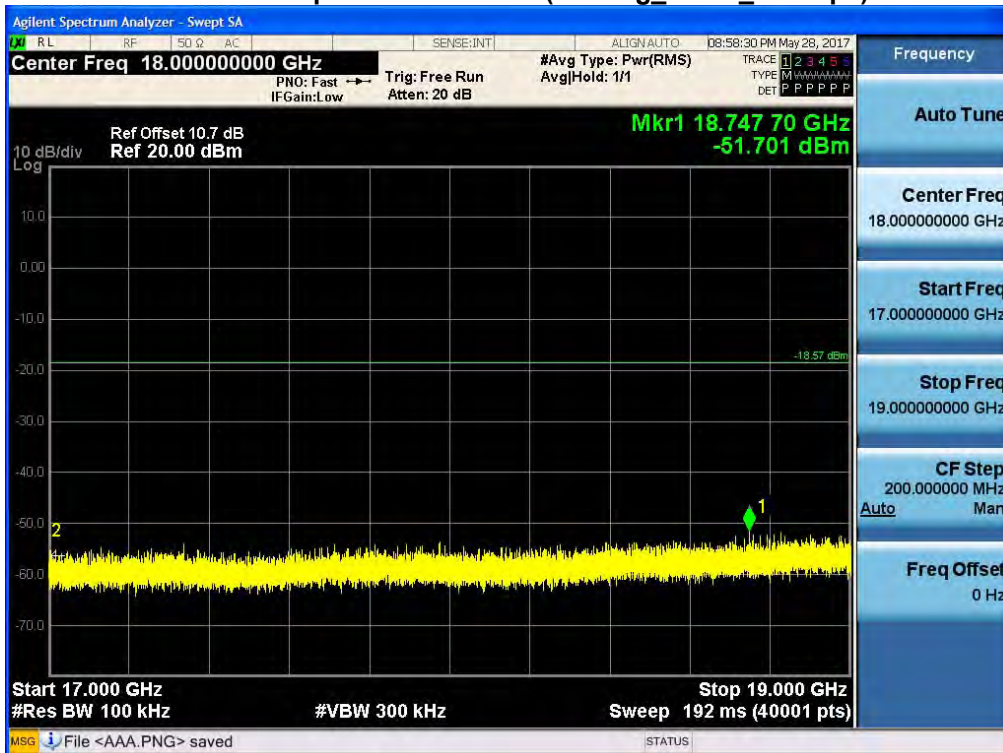
15 GHz ~ 17 GHz

Conducted Spurious Emission (802.11g_Ch.11_24 Mbps)



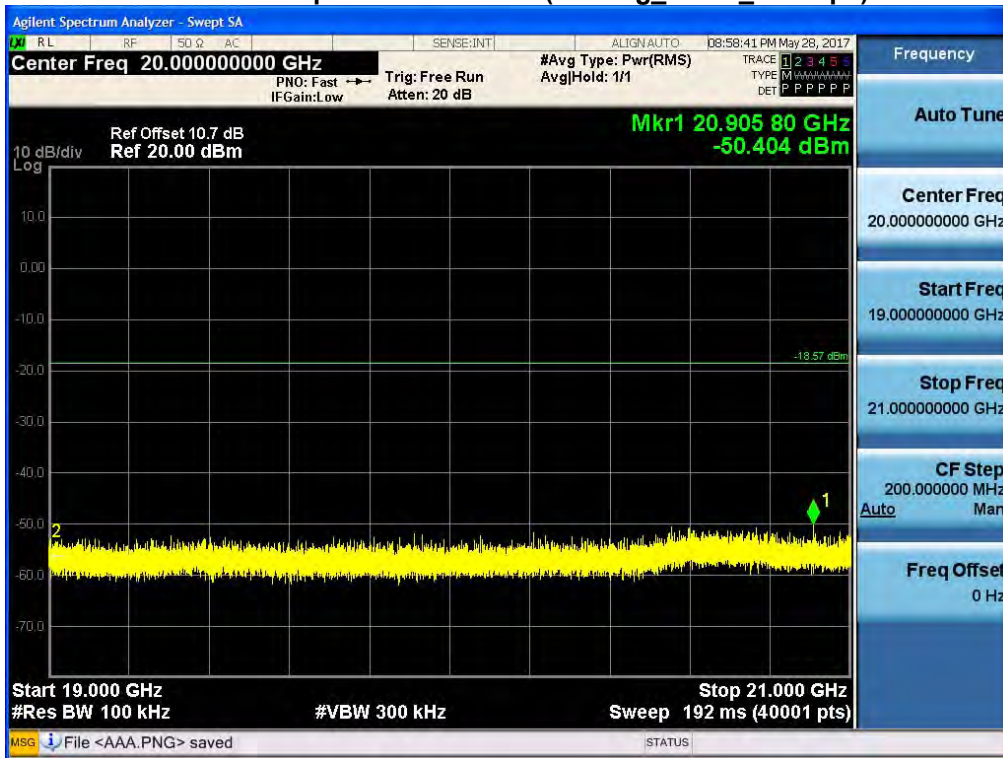
17 GHz ~ 19 GHz

Conducted Spurious Emission (802.11g_Ch.11_24 Mbps)



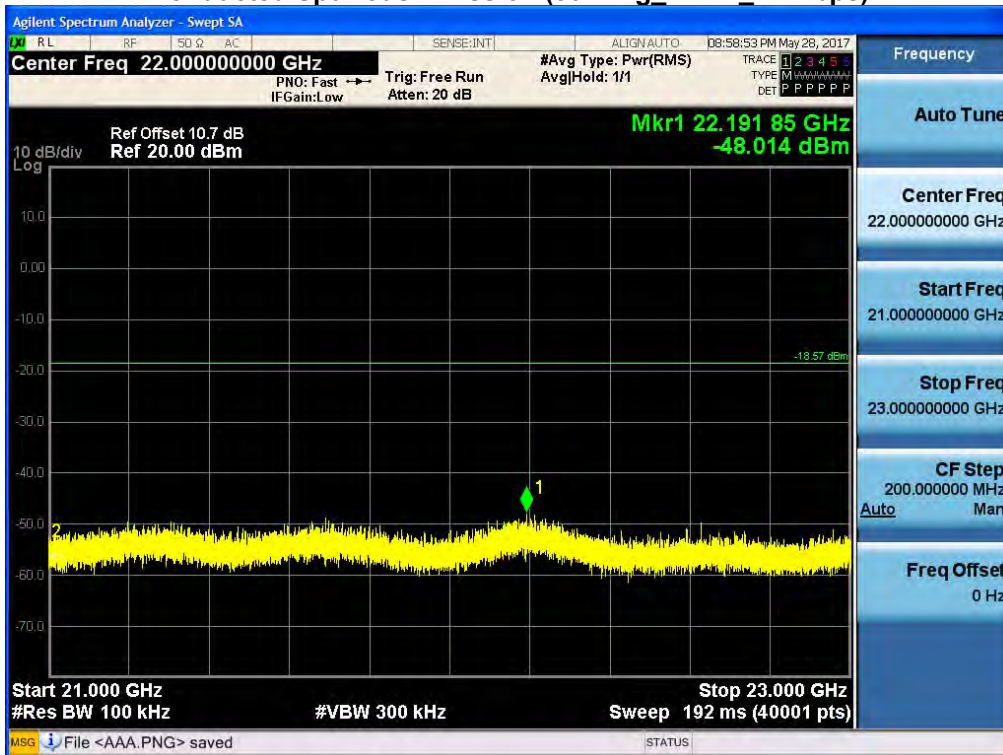
19 GHz ~ 21 GHz

Conducted Spurious Emission (802.11g_Ch.11_24 Mbps)



21 GHz ~ 23 GHz

Conducted Spurious Emission (802.11g_Ch.11_24 Mbps)



23 GHz ~ 25 GHz

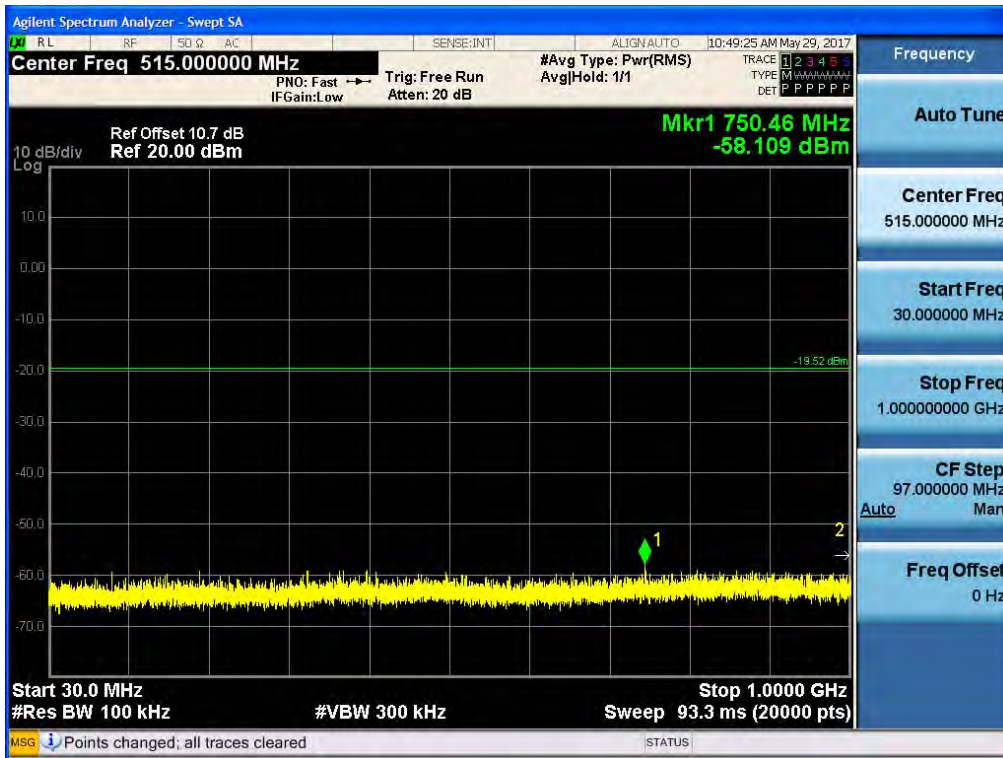
Conducted Spurious Emission (802.11g_Ch.11_24 Mbps)



Ant.1

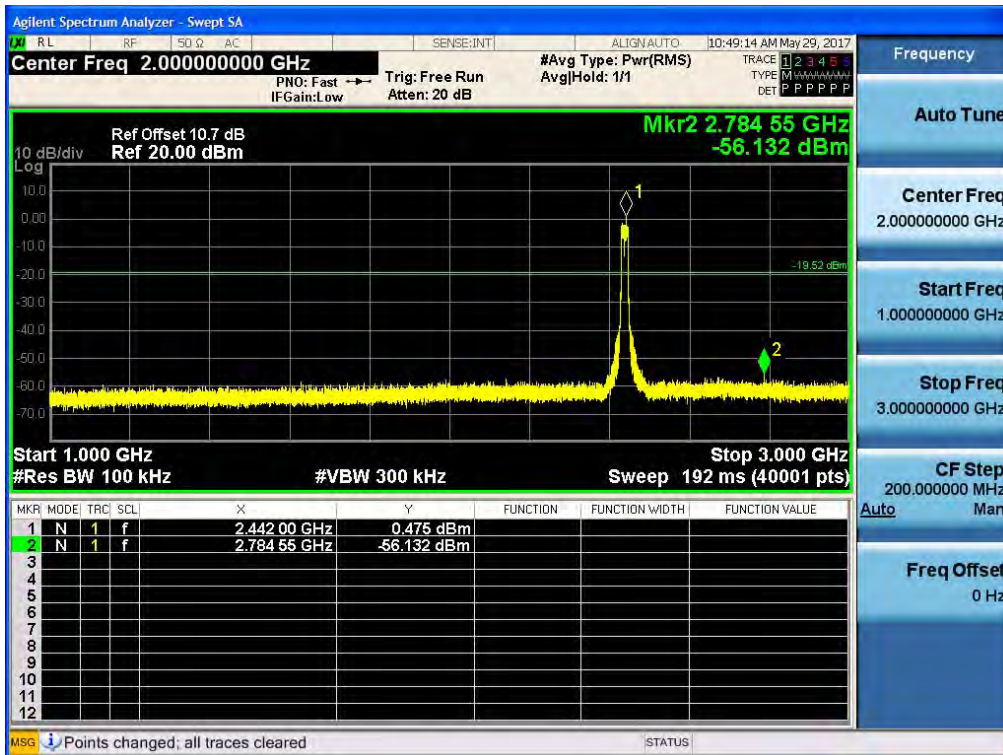
30 MHz ~ 1 GHz

Conducted Spurious Emission (802.11g_Ch.6_24 Mbps)



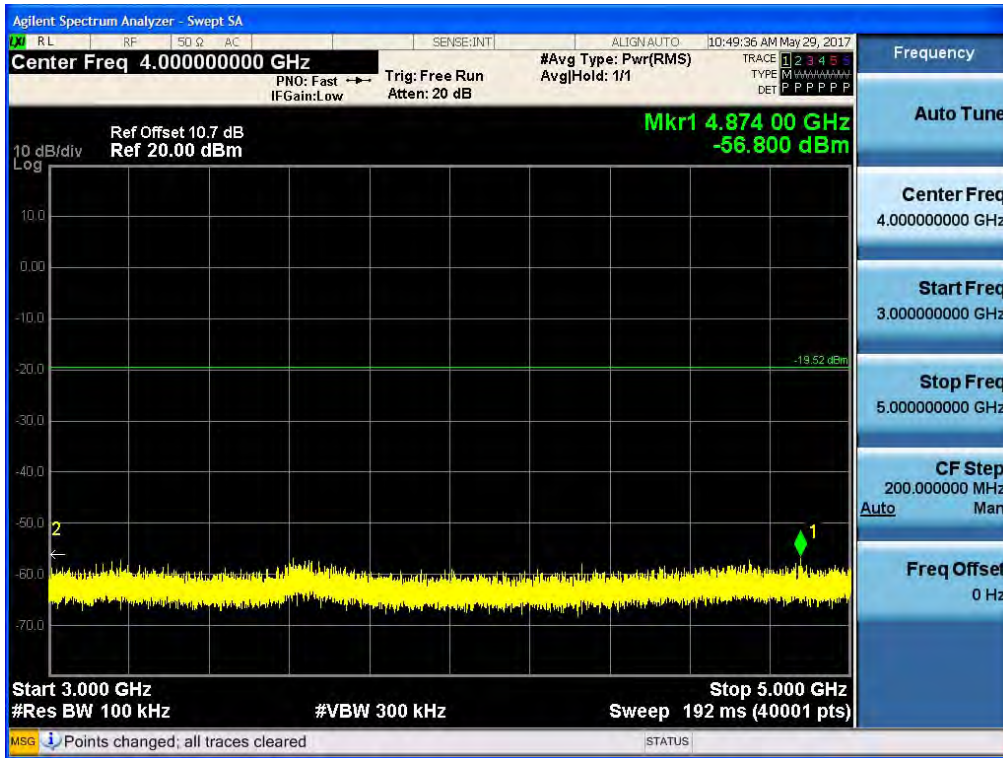
1 GHz ~ 3 GHz

Conducted Spurious Emission (802.11g_Ch.6_24 Mbps)



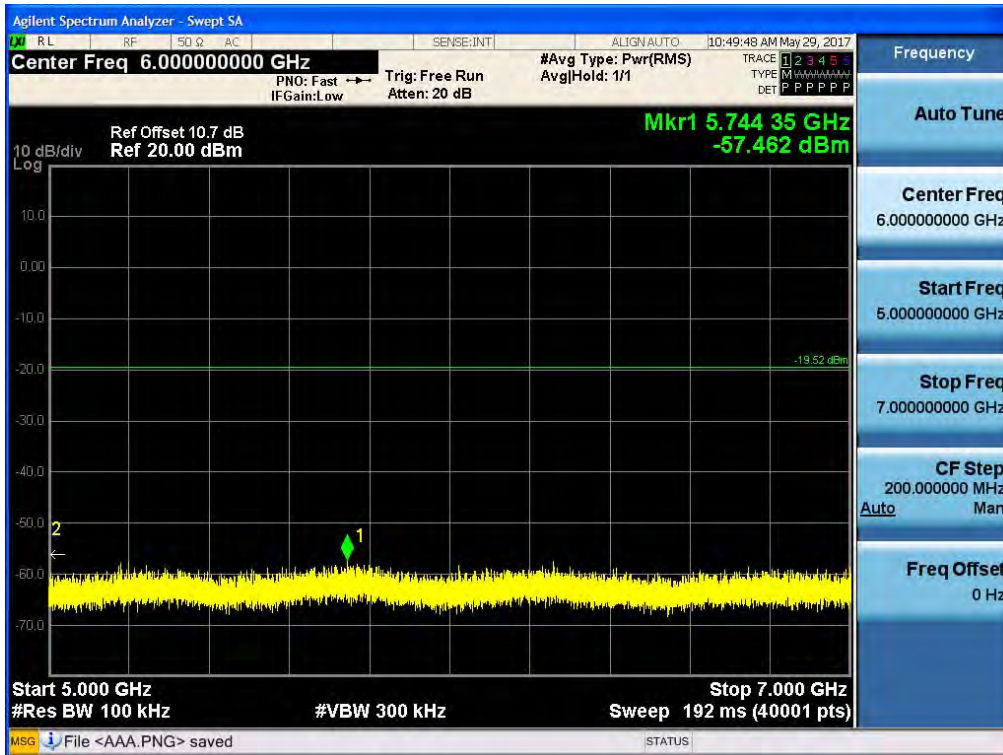
3 GHz ~ 5 GHz

Conducted Spurious Emission (802.11g_Ch.6_24 Mbps)



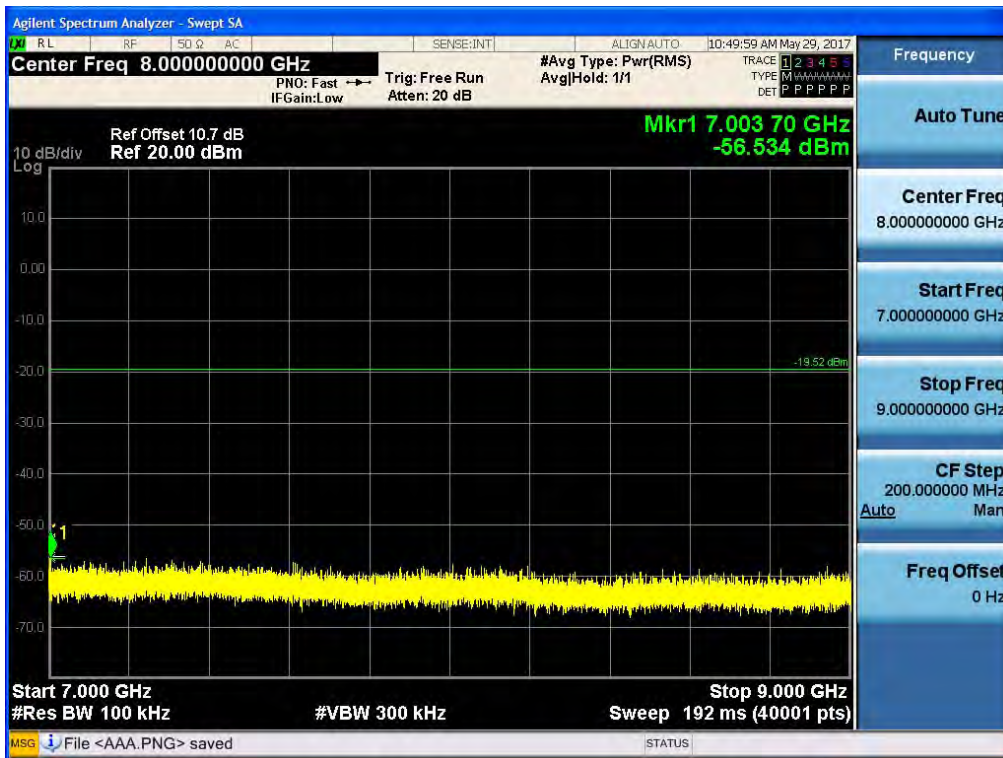
5 GHz ~ 7 GHz

Conducted Spurious Emission (802.11g_Ch.6_24 Mbps)



7 GHz ~ 9 GHz

Conducted Spurious Emission (802.11g_Ch.6_24 Mbps)



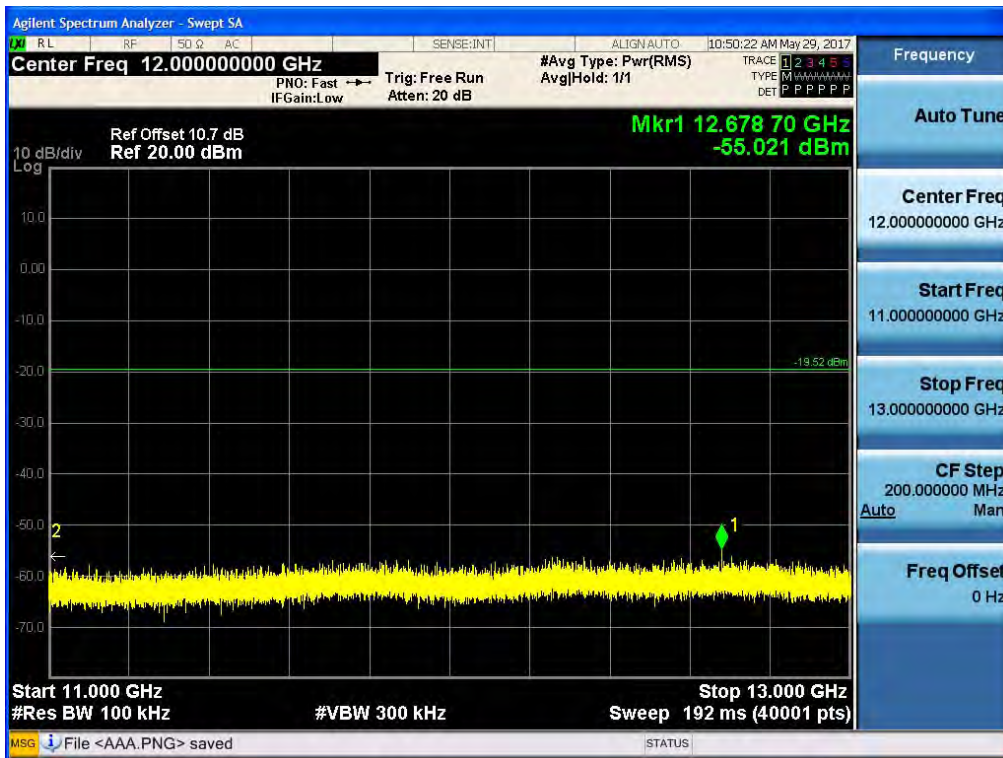
9 GHz ~ 11 GHz

Conducted Spurious Emission (802.11g_Ch.6_24 Mbps)



11 GHz ~ 13 GHz

Conducted Spurious Emission (802.11g_Ch.6_24 Mbps)



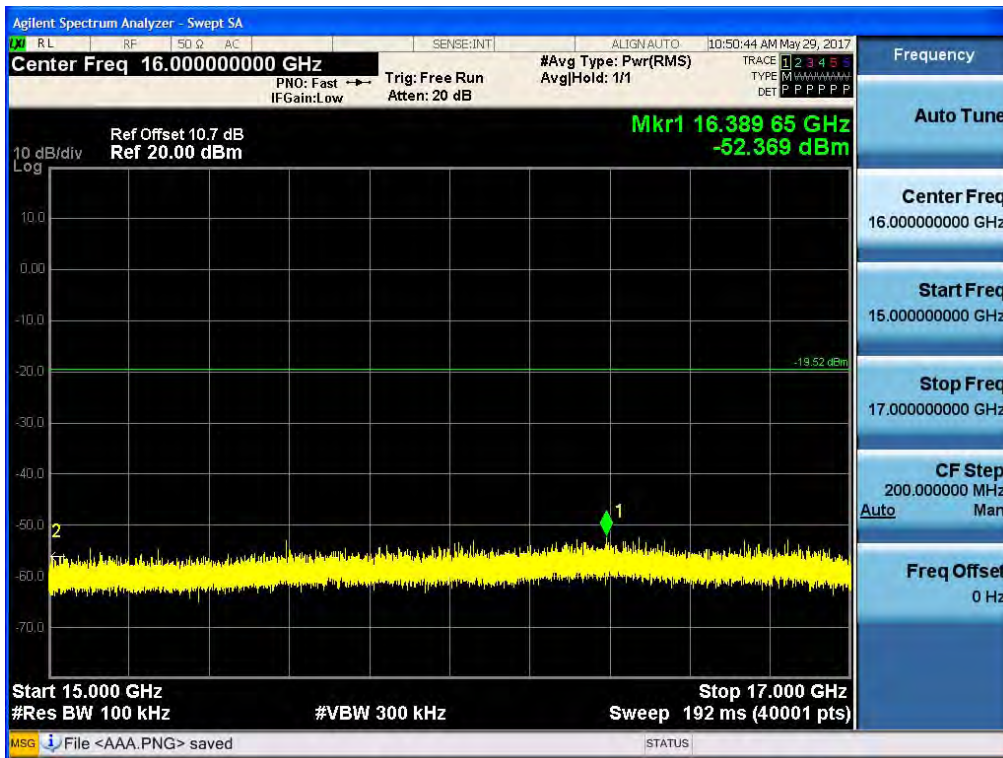
13 GHz ~ 15 GHz

Conducted Spurious Emission (802.11g_Ch.6_24 Mbps)



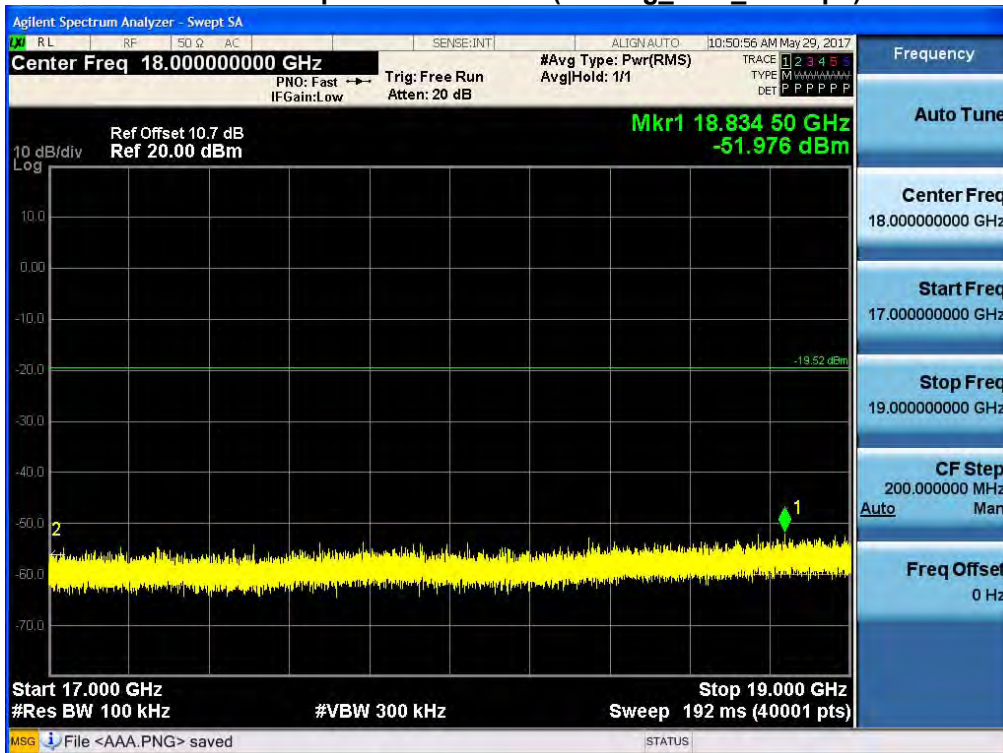
15 GHz ~ 17 GHz

Conducted Spurious Emission (802.11g_Ch.6_24 Mbps)



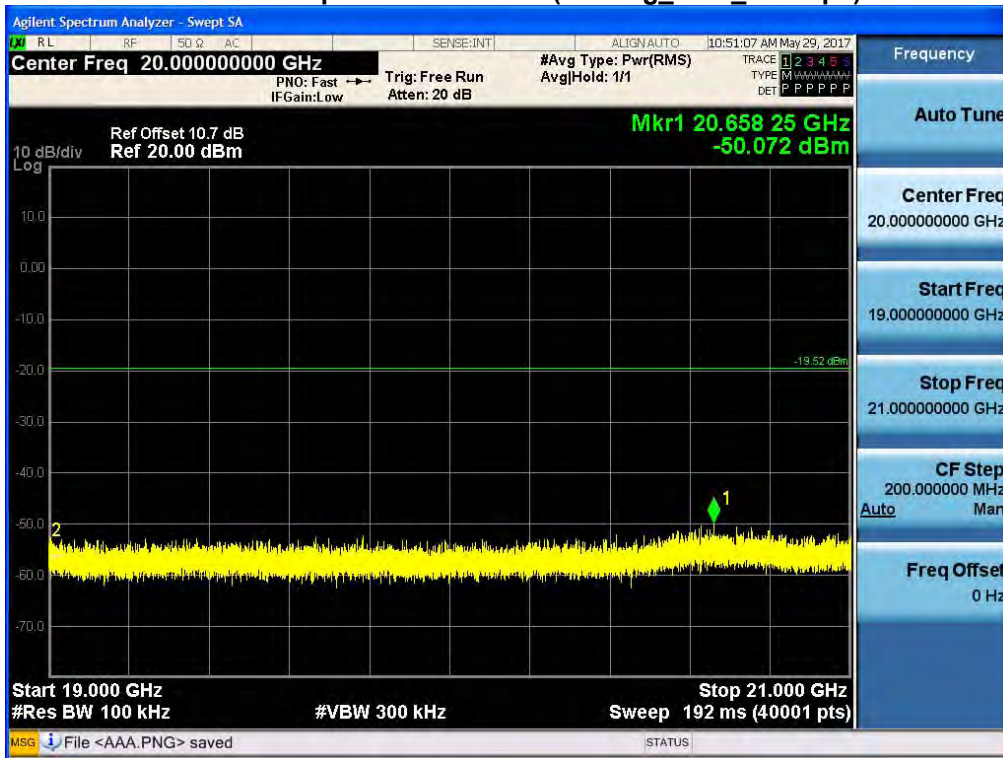
17 GHz ~ 19 GHz

Conducted Spurious Emission (802.11g_Ch.6_24 Mbps)



19 GHz ~ 21 GHz

Conducted Spurious Emission (802.11g_Ch.6_24 Mbps)



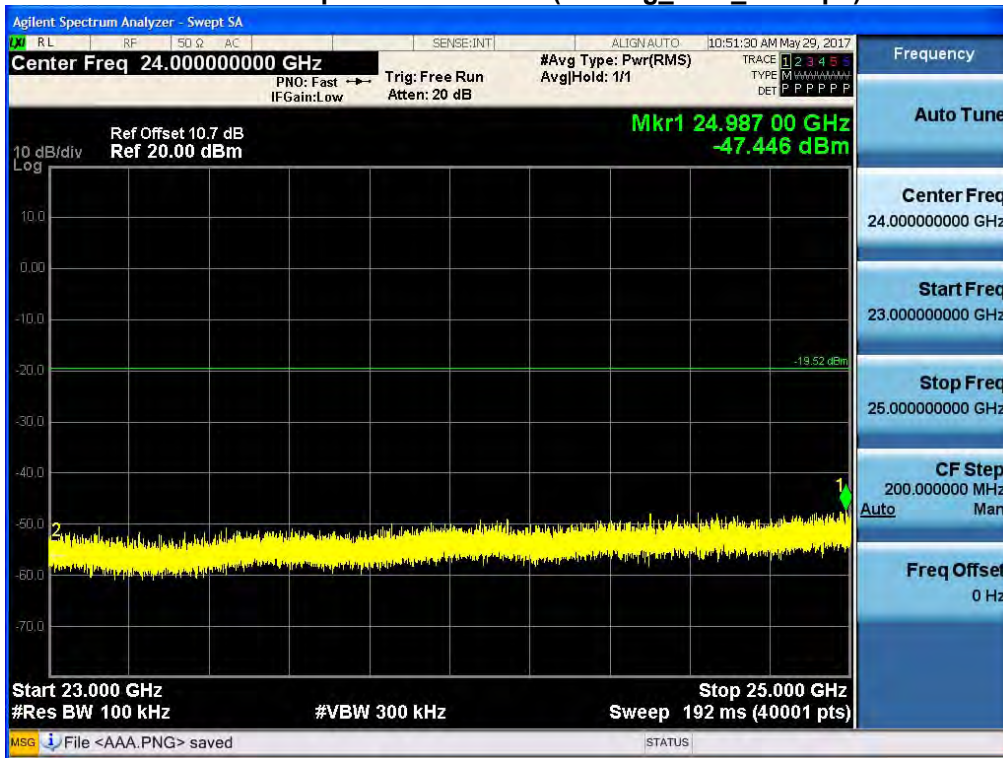
21 GHz ~ 23 GHz

Conducted Spurious Emission (802.11g_Ch.6_24 Mbps)



23 GHz ~ 25 GHz

Conducted Spurious Emission (802.11g_Ch.6_24 Mbps)



9.6 RADIATED MEASUREMENT.

9.6.1 RADIATED SPURIOUS EMISSIONS.

Test Requirements and limit, §15.205, §15.209

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 case**

Mode	Operating Mode	Operating Ant.	Configuration	
802.11b/g/n	SISO	Ant 0	Only Tablet	Tablet+keyboard cover (kickstand)
		Ant 1		
802.11g/n	MIMO	Ant 0 & 1		

Note :

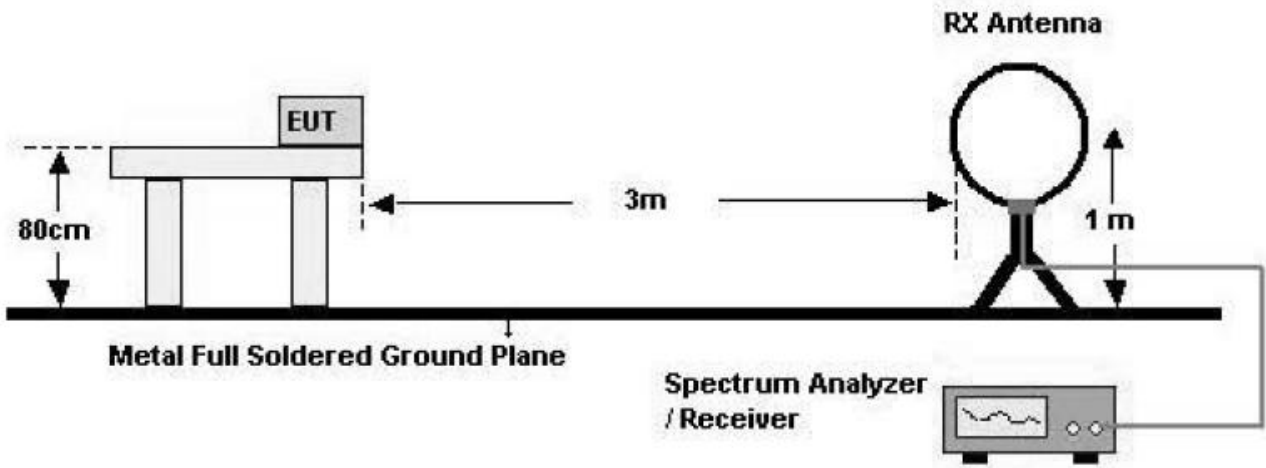
1. In case of radiation test, we have done all test case. Worst case is MIMO(CDD) for 802.11g/n_HT20 mode and Ant.0(SISO) for 802.11b mode.

Worst configuration case is Only Tablet.

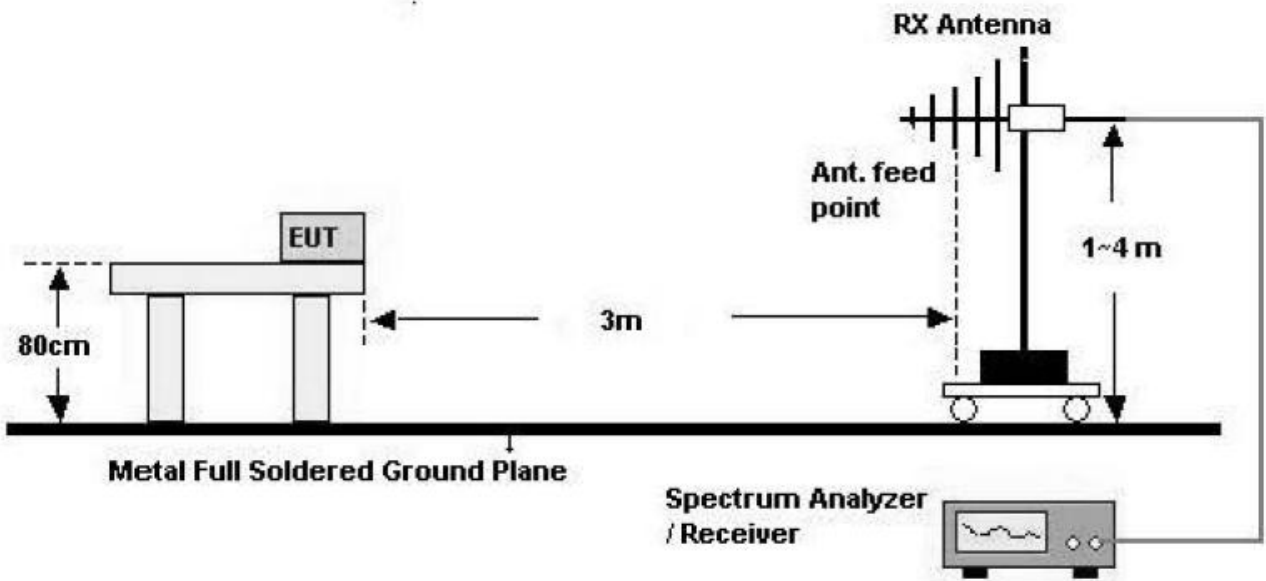
So, we attached the result of MIMO for 802.11g/n mode(Only Tablet) and Ant.0(SISO) for 802.11b mode(Only Tablet) and worst case of Table+keyboard cover (kickstand).

Test Configuration

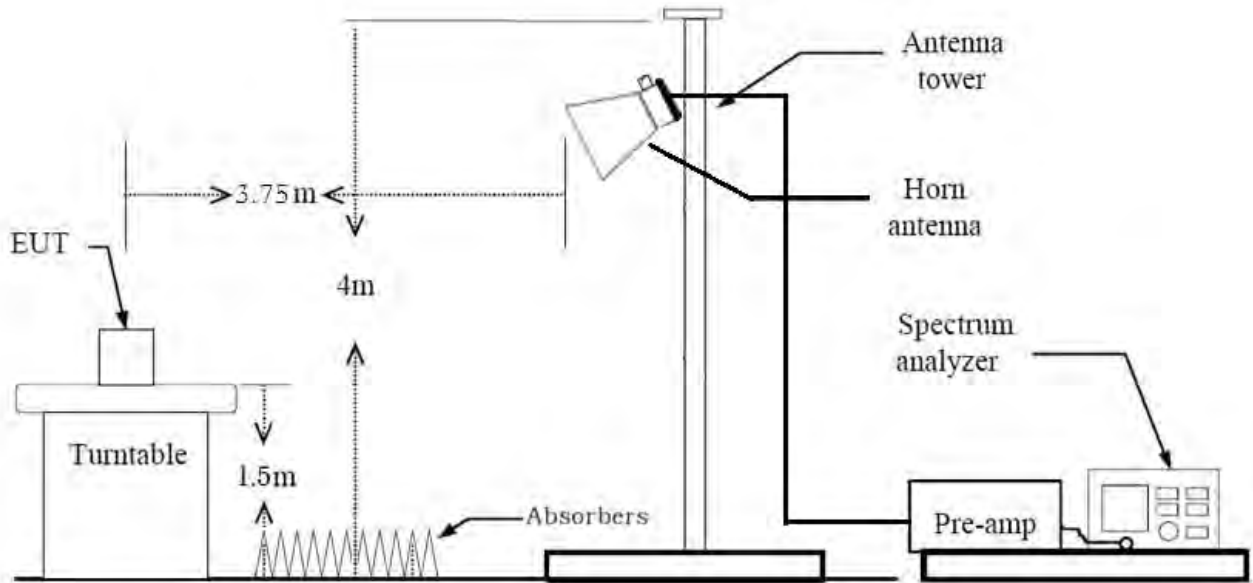
Below 30 MHz



30 MHz - 1 GHz



Above 1 GHz



TEST PROCEDURE USED

Method 12.1 in KDB 558074 v04

Spectrum Setting

- Peak

Peak emission levels are measured by setting the instrument as follows:

RBW = cf. Table 1.

VBW \geq 3 x RBW.

Detector = Peak.

Sweep time = auto.

Trace mode = max hold.

Allow sweeps to continue until the trace stabilizes.

(Note that the required measurement time may be longer for low duty cycle applications).

Table 1 —RBW as a function of frequency

Frequency	RBW
9-150 kHz	200-300 Hz
0.15-30 MHz	9-10 kHz
30-1000 MHz	100-120 kHz
> 1000 MHz	1 MHz

- Average (duty cycle $\geq 98\%$)

Set RBW = 1 MHz

Set VBW $\geq 3 \times$ RBW

Detector = RMS

Averaging type = power (*i.e.*, RMS).

Sweep time = auto.

Trace mode = average (at least 100 traces).

- Average (duty cycle $< 98\%$, duty cycle variations are less than $\pm 2\%$)

Set RBW = 1 MHz

Set VBW $\geq 3 \times$ RBW

Detector = RMS.

Averaging type = power (*i.e.*, RMS).

Sweep time = auto.

Trace mode = average (at least 100 traces).

A 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.

- Average (duty cycle $< 98\%$, duty cycle variations exceed $\pm 2\%$)

Set RBW = 1 MHz

Set VBW $\geq 1/T$. (at least 100 times less than the resolution bandwidth, but no less than 10 Hz.)

Select spectrum analyzer linear display mode.

Detector = Peak.

Sweep time = auto.

Trace mode = max hold.

Note :

1. 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).

2. The duty cycle factor for 802.11 b/g/n_HT20

[Ant 0]

Mode	Worst Data rate (Mbps)	T _{on} (ms)	T _{total} (ms)	Duty Cycle (%)	Duty Cycle Factor (dB)	VBW(1/T) (Hz)
b	1	12.448	12.538	99.28	0.031	80
g	6	2.063	2.175	94.82	0.231	485
n_HT20	MCS 0	1.924	2.033	94.60	0.241	520

[Ant 1]

Mode	Worst Data rate (Mbps)	T _{on} (ms)	T _{total} (ms)	Duty Cycle (%)	Duty Cycle Factor (dB)	VBW(1/T) (Hz)
b	1	12.441	12.542	99.20	0.035	80
g	6	2.066	2.176	94.95	0.225	484
n_HT20	MCS 0	1.924	2.041	94.22	0.258	520

TEST RESULTS**9 kHz – 30MHz****Operation Mode:** Normal Mode

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

Notes:

1. Measuring frequencies from 9 kHz to the 30MHz.
2. The reading of emissions are attenuated more than 20 dB below the permissible limits or the field strength is too small to be measured.
3. Distance extrapolation factor = $40 \log$ (specific distance / test distance) (dB)
4. Limit line = specific Limits (dB μ V) + Distance extrapolation factor
5. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
6. 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)

TEST RESULTS**Below 1 GHz****Operation Mode:** Normal Mode

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

Notes:

1. Measuring frequencies from 30 MHz to the 1 GHz.
2. Radiated emissions measured in frequency range from 30 MHz to 1000 MHz were made with an instrument using Quasi peak detector mode.
3. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

Above 1 GHz

[Only tablet]

Operation Mode:	802.11 b
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	49.34	-0.64	V	48.70	73.98	25.28	PK
4824	37.09	-0.64	V	36.45	53.98	17.53	AV
7236	46.98	8.49	V	55.47	73.98	18.51	PK
7236	35.00	8.49	V	43.49	53.98	10.49	AV
4824	49.45	-0.64	H	48.81	73.98	25.17	PK
4824	37.27	-0.64	H	36.63	53.98	17.35	AV
7236	47.27	8.49	H	55.76	73.98	18.22	PK
7236	35.16	8.49	H	43.65	53.98	10.33	AV

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

Frequency [MHz]	Reading [dBuV]	Ducy 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	49.52	0.00	-0.64	V	48.88	73.98	25.10	PK
4824	36.86	0.23	-0.64	V	36.45	53.98	17.53	AV
7236	47.98	0.00	8.49	V	56.47	73.98	17.51	PK
7236	34.99	0.23	8.49	V	43.71	53.98	10.27	AV
4824	49.87	0.00	-0.64	H	49.23	73.98	24.75	PK
4824	36.95	0.23	-0.64	H	36.54	53.98	17.44	AV
7236	48.02	0.00	8.49	H	56.51	73.98	17.47	PK
7236	35.08	0.23	8.49	H	43.80	53.98	10.18	AV

Operation Mode:	802.11 n_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	49.54	0.00	-0.64	V	48.90	73.98	25.08	PK
4824	36.83	0.26	-0.64	V	36.45	53.98	17.53	AV
7236	47.96	0.00	8.49	V	56.45	73.98	17.53	PK
7236	35.01	0.26	8.49	V	43.76	53.98	10.22	AV
4824	49.83	0.00	-0.64	H	49.19	73.98	24.79	PK
4824	36.92	0.26	-0.64	H	36.54	53.98	17.44	AV
7236	48.05	0.00	8.49	H	56.54	73.98	17.44	PK
7236	35.09	0.26	8.49	H	43.84	53.98	10.14	AV

* A.F.: Ant. Factor / C.L.: Cable Loss / A.G.: Amp. Gain / D.F: Distance Factor

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show 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.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain + Distance Factor(802.11b)
5. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain + Distance Factor + Duty Cycle Factor(802.11g/n)
6. We have done 802.11b/g/n mode and all data rate. Worst data rate is the lowest data of each mode.
7. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

Operation Mode: 802.11 b
 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	50.01	0.01	V	50.02	73.98	23.96	PK
4874	37.85	0.01	V	37.86	53.98	16.12	AV
7311	47.79	8.94	V	56.73	73.98	17.25	PK
7311	35.23	8.94	V	44.17	53.98	9.81	AV
4874	50.18	0.01	H	50.19	73.98	23.79	PK
4874	37.92	0.01	H	37.93	53.98	16.05	AV
7311	47.91	8.94	H	56.85	73.98	17.13	PK
7311	35.30	8.94	H	44.24	53.98	9.74	AV

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

Frequency [MHz]	Reading [dBuV]	Ducy 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	49.98	0.00	0.01	V	49.99	73.98	23.99	PK
4874	38.01	0.23	0.01	V	38.25	53.98	15.73	AV
7311	47.75	0.00	8.94	V	56.69	73.98	17.29	PK
7311	35.22	0.23	8.94	V	44.39	53.98	9.59	AV
4874	50.15	0.00	0.01	H	50.16	73.98	23.82	PK
4874	38.18	0.23	0.01	H	38.42	53.98	15.56	AV
7311	47.88	0.00	8.94	H	56.82	73.98	17.16	PK
7311	35.30	0.23	8.94	H	44.47	53.98	9.51	AV

Operation Mode:	802.11 n_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	49.95	0.00	0.01	V	49.96	73.98	24.02	PK
4874	37.93	0.26	0.01	V	38.20	53.98	15.78	AV
7311	47.79	0.00	8.94	V	56.73	73.98	17.25	PK
7311	35.24	0.26	8.94	V	44.44	53.98	9.54	AV
4874	50.13	0.00	0.01	H	50.14	73.98	23.84	PK
4874	38.14	0.26	0.01	H	38.41	53.98	15.57	AV
7311	48.30	0.00	8.94	H	57.24	73.98	16.74	PK
7311	35.57	0.26	8.94	H	44.77	53.98	9.21	AV

* A.F.: Ant. Factor / C.L.: Cable Loss / A.G.: Amp. Gain / D.F: Distance Factor

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show 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.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain + Distance Factor(802.11b)
5. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain + Distance Factor + Duty Cycle Factor(802.11g/n)
6. We have done 802.11b/g/n mode and all data rate. Worst data rate is the lowest data of each mode.
7. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

Operation Mode: 802.11 b
 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	49.24	0.38	V	49.62	73.98	24.36	PK
4924	36.92	0.38	V	37.30	53.98	16.68	AV
7386	46.77	9.02	V	55.79	73.98	18.19	PK
7386	34.35	9.02	V	43.37	53.98	10.61	AV
4924	49.40	0.38	H	49.78	73.98	24.20	PK
4924	37.00	0.38	H	37.38	53.98	16.60	AV
7386	46.82	9.02	H	55.84	73.98	18.14	PK
7386	34.43	9.02	H	43.45	53.98	10.53	AV

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

Frequency [MHz]	Reading [dBuV]	Ducy 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	49.19	0.00	0.38	V	49.57	73.98	24.41	PK
4924	37.13	0.23	0.38	V	37.74	53.98	16.24	AV
7386	46.72	0.00	9.02	V	55.74	73.98	18.24	PK
7386	34.46	0.23	9.02	V	43.71	53.98	10.27	AV
4924	49.36	0.00	0.38	H	49.74	73.98	24.24	PK
4924	37.30	0.23	0.38	H	37.91	53.98	16.07	AV
7386	46.80	0.00	9.02	H	55.82	73.98	18.16	PK
7386	34.54	0.23	9.02	H	43.79	53.98	10.19	AV

Operation Mode:	802.11 n_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	49.21	0.00	0.38	V	49.59	73.98	24.39	PK
4924	37.16	0.26	0.38	V	37.80	53.98	16.18	AV
7386	46.65	0.00	9.02	V	55.67	73.98	18.31	PK
7386	34.44	0.26	9.02	V	43.72	53.98	10.26	AV
4924	49.33	0.00	0.38	H	49.71	73.98	24.27	PK
4924	37.33	0.26	0.38	H	37.97	53.98	16.01	AV
7386	46.78	0.00	9.02	H	55.80	73.98	18.18	PK
7386	34.52	0.26	9.02	H	43.80	53.98	10.18	AV

* A.F.: Ant. Factor / C.L.: Cable Loss / A.G.: Amp. Gain / D.F: Distance Factor

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show 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.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain + Distance Factor(802.11b)
5. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain + Distance Factor + Duty Cycle Factor(802.11g/n)
6. We have done 802.11b/g/n mode and all data rate. Worst data rate is the lowest data of each mode.
7. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

Operation Mode: 802.11 b
 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	49.36	-0.64	V	48.72	73.98	25.26	PK
4934	36.81	-0.64	V	36.17	53.98	17.81	AV
7401	47.90	8.49	V	56.39	73.98	17.59	PK
7401	34.92	8.49	V	43.41	53.98	10.57	AV
4934	49.74	-0.64	H	49.10	73.98	24.88	PK
4934	36.87	-0.64	H	36.23	53.98	17.75	AV
7401	47.99	8.49	H	56.48	73.98	17.50	PK
7401	35.00	8.49	H	43.49	53.98	10.49	AV

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

Frequency [MHz]	Reading [dBuV]	Ducy 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	49.18	0.00	-0.40	V	48.78	73.98	25.20	PK
4934	37.04	0.23	-0.40	V	36.87	53.98	17.11	AV
7401	46.90	0.00	8.69	V	55.59	73.98	18.39	PK
7401	34.93	0.23	8.69	V	43.85	53.98	10.13	AV
4934	49.32	0.00	-0.40	H	48.92	73.98	25.06	PK
4934	37.19	0.23	-0.40	H	37.02	53.98	16.96	AV
7401	47.24	0.00	8.69	H	55.93	73.98	18.05	PK
7401	35.08	0.23	8.69	H	44.00	53.98	9.98	AV

Operation Mode: 802.11 n_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	49.38	0.00	-0.40	V	48.98	73.98	25.00	PK
4934	36.78	0.26	-0.40	V	36.64	53.98	17.34	AV
7401	47.88	0.00	8.69	V	56.57	73.98	17.41	PK
7401	34.94	0.26	8.69	V	43.89	53.98	10.09	AV
4934	49.70	0.00	-0.40	H	49.30	73.98	24.68	PK
4934	36.84	0.26	-0.40	H	36.70	53.98	17.28	AV
7401	48.02	0.00	8.69	H	56.71	73.98	17.27	PK
7401	35.01	0.26	8.69	H	43.96	53.98	10.02	AV

* A.F.: Ant. Factor / C.L.: Cable Loss / A.G.: Amp. Gain / D.F: Distance Factor

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show 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.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain + Distance Factor(802.11b)
5. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain + Distance Factor + Duty Cycle Factor(802.11g/n)
6. We have done 802.11b/g/n mode and all data rate. Worst data rate is the lowest data of each mode.
7. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

Operation Mode:	802.11 b
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	49.82	0.01	V	49.83	73.98	24.15	PK
4944	37.96	0.01	V	37.97	53.98	16.01	AV
7416	47.67	8.94	V	56.61	73.98	17.37	PK
7416	35.15	8.94	V	44.09	53.98	9.89	AV
4944	50.02	0.01	H	50.03	73.98	23.95	PK
4944	38.10	0.01	H	38.11	53.98	15.87	AV
7416	47.85	8.94	H	56.79	73.98	17.19	PK
7416	35.22	8.94	H	44.16	53.98	9.82	AV

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

Frequency [MHz]	Reading [dBuV]	Ducy 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
4944	49.85	0.00	0.01	V	49.86	73.98	24.12	PK
4944	37.80	0.23	0.01	V	38.04	53.98	15.94	AV
7416	47.71	0.00	8.94	V	56.65	73.98	17.33	PK
7416	35.16	0.23	8.94	V	44.33	53.98	9.65	AV
4944	50.05	0.00	0.01	H	50.06	73.98	23.92	PK
4944	37.84	0.23	0.01	H	38.08	53.98	15.90	AV
7416	47.88	0.00	8.94	H	56.82	73.98	17.16	PK
7416	35.22	0.23	8.94	H	44.39	53.98	9.59	AV

Operation Mode:	802.11 n_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]	Measurement Type
4944	49.79	0.00	0.01	V	49.80	73.98	24.18	PK
4944	37.88	0.26	0.01	V	38.15	53.98	15.83	AV
7416	47.71	0.00	8.94	V	56.65	73.98	17.33	PK
7416	35.17	0.26	8.94	V	44.37	53.98	9.61	AV
4944	50.00	0.00	0.01	H	50.01	73.98	23.97	PK
4944	38.06	0.26	0.01	H	38.33	53.98	15.65	AV
7416	47.88	0.00	8.94	H	56.82	73.98	17.16	PK
7416	35.24	0.26	8.94	H	44.44	53.98	9.54	AV

* A.F.: Ant. Factor / C.L.: Cable Loss / A.G.: Amp. Gain / D.F: Distance Factor

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show 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.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain + Distance Factor(802.11b)
5. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain + Distance Factor + Duty Cycle Factor(802.11g/n)
6. We have done 802.11b/g/n mode and all data rate. Worst data rate is the lowest data of each mode.
7. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

[Tablet+keyboard cover(kickstand)]

Operation Mode:	802.11 n_HT20
Transfer MCS Index:	0
Operating Frequency	2437
Channel No.	06 Ch

Frequency [MHz]	Reading [dBuV]	Ducy 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
7311	48.11	0.00	8.94	H	57.05	73.98	16.93	PK
7311	35.48	0.26	8.94	H	44.68	53.98	9.30	AV

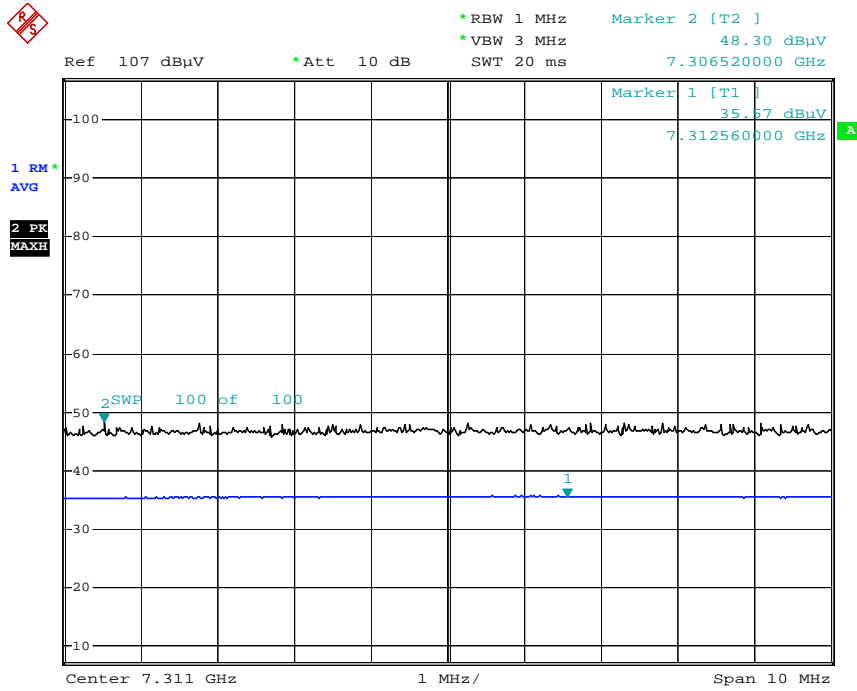
* A.F.: Ant. Factor / C.L.: Cable Loss / A.G.: Amp. Gain / D.F: Distance Factor

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show 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.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain + Distance Factor
+ Duty Cycle Factor
5. We have done 802.11b/g/n mode and all data rate. Worst data rate is the lowest data of each mode.
6. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

■ **RESULT PLOTS (Worst Case: X-H, Only tablet)**

**Radiated Spurious Emissions plot – Average, Peak Reading
(802.11n_HT20, Ch.6 3rd Harmonic)**



Date: 29.MAY.2017 04:51:55

Note : Only the worst case plots for Radiated Spurious Emissions.

9.6.2 RADIATED RESTRICTED BAND EDGES

Test Requirements and limit, §15.247(d) §15.205, §15.209

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in section 15.209(a) (See section 15.205(c)).

[Only tablet]

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	65.40	0.00	0.32	H	65.72	73.98	8.26	PK
2390.0	48.80	0.23	0.32	H	49.35	53.98	4.63	AV
2390.0	64.18	0.00	0.32	V	64.50	73.98	9.48	PK
2390.0	47.42	0.23	0.32	V	47.97	53.98	6.01	AV
2483.5	63.77	0.00	0.92	H	64.69	73.98	9.29	PK
2483.5	48.36	0.23	0.92	H	49.51	53.98	4.47	AV
2483.5	62.34	0.00	0.92	V	63.26	73.98	10.72	PK
2483.5	46.88	0.23	0.92	V	48.03	53.98	5.95	AV

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	54.51	0.32	H	54.83	73.98	19.15	PK
2390.0	44.04	0.32	H	44.36	53.98	9.62	AV
2390.0	53.48	0.32	V	53.80	73.98	20.18	PK
2390.0	43.10	0.32	V	43.42	53.98	10.56	AV
2483.5	55.20	0.92	H	56.12	73.98	17.86	PK
2483.5	44.96	0.92	H	45.88	53.98	8.10	AV
2483.5	54.12	0.92	V	55.04	73.98	18.94	PK
2483.5	44.05	0.92	V	44.97	53.98	9.01	AV

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	65.36	0.00	0.32	H	65.68	73.98	8.30	PK
2390.0	49.51	0.26	0.32	H	50.09	53.98	3.89	AV
2390.0	64.53	0.00	0.32	V	64.85	73.98	9.13	PK
2390.0	48.42	0.26	0.32	V	49.00	53.98	4.98	AV
2483.5	63.80	0.00	0.92	H	64.72	73.98	9.26	PK
2483.5	49.91	0.26	0.92	H	51.09	53.98	2.89	AV
2483.5	62.77	0.00	0.92	V	63.69	73.98	10.29	PK
2483.5	48.68	0.26	0.92	V	49.86	53.98	4.12	AV

Notes:

1. Total = Reading Value + Antenna Factor + Cable Loss + Distance Factor + Duty Cycle Factor(802.11g/n)
2. We have done 802.11b/g/n mode and all data rate. Worst data rate is the lowest data of each mode.
3. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

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. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
2483.5	55.71	0.00	0.92	H	56.63	73.98	17.35	PK
2483.5	44.60	0.23	0.92	H	45.75	53.98	8.23	AV
2483.5	54.68	0.00	0.92	V	55.60	73.98	18.38	PK
2483.5	43.88	0.23	0.92	V	45.03	53.98	8.95	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. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
2483.5	56.05	0.00	0.92	H	56.97	73.98	17.01	PK
2483.5	44.15	0.26	0.92	H	45.33	53.98	8.65	AV
2483.5	55.61	0.00	0.92	V	56.53	73.98	17.45	PK
2483.5	43.65	0.26	0.92	V	44.83	53.98	9.15	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. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
2483.5	55.58	0.92	H	56.50	73.98	17.48	PK
2483.5	43.44	0.92	H	44.36	53.98	9.62	AV
2483.5	55.03	0.92	V	55.95	73.98	18.03	PK
2483.5	42.86	0.92	V	43.78	53.98	10.20	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. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
2483.5	62.83	0.00	0.92	H	63.75	73.98	10.23	PK
2483.5	50.34	0.23	0.92	H	51.50	53.98	2.48	AV
2483.5	62.11	0.00	0.92	V	63.03	73.98	10.95	PK
2483.5	49.74	0.23	0.92	V	50.90	53.98	3.08	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. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
2483.5	66.36	0.00	0.92	H	67.28	73.98	6.70	PK
2483.5	50.64	0.26	0.92	H	51.82	53.98	2.16	AV
2483.5	66.10	0.00	0.92	V	67.02	73.98	6.96	PK
2483.5	50.17	0.26	0.92	V	51.35	53.98	2.63	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. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
2483.5	56.87	0.92	H	57.79	73.98	16.19	PK
2483.5	48.00	0.92	H	48.92	53.98	5.06	AV
2483.5	55.03	0.92	V	55.95	73.98	18.03	PK
2483.5	42.86	0.92	V	43.78	53.98	10.20	AV

[Tablet+keyboard cover(kickstand)]

Operation Mode:	802.11n_HT20
Transfer MCS Index:	0
Operating Frequency	2462 MHz
Channel No.	11 Ch

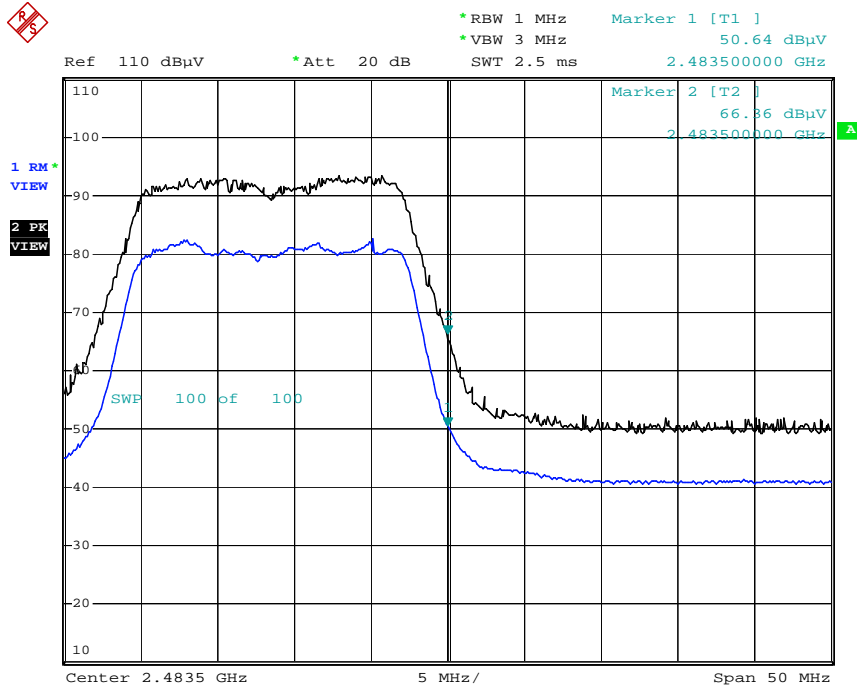
Frequency [MHz]	Reading [dBuV]	Duty Cycle Factor [dB]	A.F.+C.L.+D.F. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
2483.5	64.60	0.00	0.92	H	65.52	73.98	8.46	PK
2483.5	49.40	0.26	0.92	H	50.58	53.98	3.40	AV

Notes:

1. Total = Reading Value + Antenna Factor + Cable Loss +Distance Factor + Duty Cycle Factor(802.11g/n)
2. We have done 802.11b/g/n mode and all data rate. Worst data rate is the lowest data of each mode.
3. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

■ RESULT PLOTS(Worst Case: X-H, Only tablet)

Radiated Restricted Band Edges plot – Average, Peak Reading (802.11n, Ch.13)



Date: 31.MAY.2017 08:30:01

Note : Only the worst case plots for Radiated Restricted Band Edges.

9.7 POWERLINE CONDUCTED EMISSIONS

Test Requirements and limit, §15.207

For an intentional radiator which 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 250 microvolts (The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz). The limits at specific frequency range is listed as follows:

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

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 Appendix 1 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.
5. We are performed the AC Power Line Conducted Emission test for worst data rate, channel, operation mode.

Sample Calculation

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

RESULT PLOTS (Only tablet)
Conducted Emissions (Line 1)

EMI Auto Test(12)

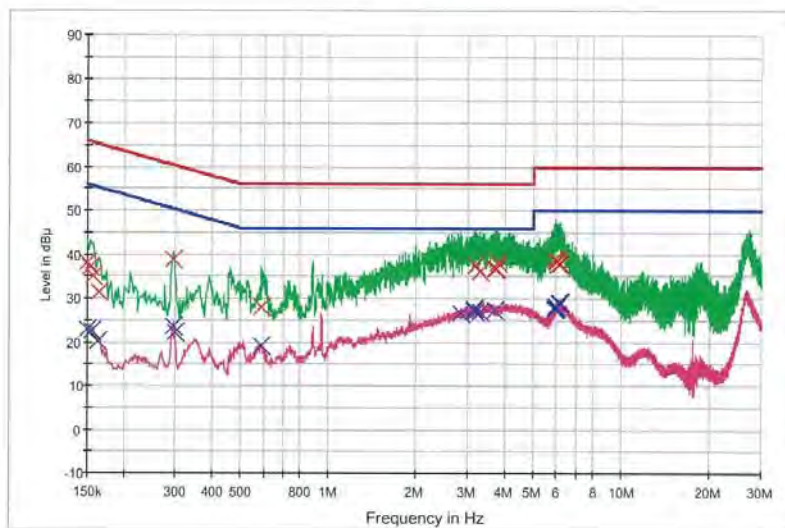
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HCT TEST Report

Common Information

EUT: SM-W728Y
 Manufacturer: SAMSUNG
 Test Site: SHIELD ROOM
 Operating Conditions: WLAN 2.4GHz MODE_L1

FCC CLASS B



— 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 (dBuV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.150000	38.2	9.000	Off	L1	9.6	27.8	66.0
0.154000	37.1	9.000	Off	L1	9.6	28.7	65.8
0.158000	35.0	9.000	Off	L1	9.6	30.6	65.6
0.164000	31.4	9.000	Off	L1	9.6	33.8	65.3
0.296000	38.9	9.000	Off	L1	9.7	21.5	60.4
0.590000	27.9	9.000	Off	L1	9.7	28.1	56.0
3.164000	37.6	9.000	Off	L1	9.8	18.4	56.0
3.176000	37.4	9.000	Off	L1	9.8	18.6	56.0
3.278000	36.1	9.000	Off	L1	9.8	19.9	56.0
3.708000	36.7	9.000	Off	L1	9.8	19.3	56.0
3.746000	36.8	9.000	Off	L1	9.8	19.2	56.0
3.770000	38.0	9.000	Off	L1	9.8	18.0	56.0
5.924000	38.9	9.000	Off	L1	9.9	21.1	60.0
5.958000	38.4	9.000	Off	L1	9.9	21.6	60.0
5.966000	38.3	9.000	Off	L1	9.9	21.7	60.0
6.056000	38.5	9.000	Off	L1	10.0	21.5	60.0
6.088000	38.0	9.000	Off	L1	10.0	22.0	60.0
6.154000	37.9	9.000	Off	L1	10.0	22.1	60.0

2017-05-29

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EMI Auto Test(12)

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Final Result 2

Frequency (MHz)	CAverage (dBuV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.150000	22.7	9.000	Off	L1	9.6	33.3	56.0
0.156000	22.4	9.000	Off	L1	9.6	33.2	55.7
0.162000	20.1	9.000	Off	L1	9.6	35.2	55.4
0.294000	23.6	9.000	Off	L1	9.7	26.8	50.4
0.298000	22.1	9.000	Off	L1	9.7	28.2	50.3
0.590000	19.3	9.000	Off	L1	9.7	26.7	46.0
2.822000	26.7	9.000	Off	L1	9.8	19.3	46.0
3.140000	27.3	9.000	Off	L1	9.8	18.7	46.0
3.150000	27.6	9.000	Off	L1	9.8	18.4	46.0
3.176000	26.8	9.000	Off	L1	9.8	19.2	46.0
3.278000	27.0	9.000	Off	L1	9.8	19.0	46.0
3.708000	27.3	9.000	Off	L1	9.8	18.7	46.0
5.924000	27.7	9.000	Off	L1	9.9	22.3	50.0
5.958000	27.9	9.000	Off	L1	9.9	22.1	50.0
5.966000	27.7	9.000	Off	L1	9.9	22.3	50.0
5.994000	28.4	9.000	Off	L1	9.9	21.6	50.0
6.088000	28.9	9.000	Off	L1	10.0	21.1	50.0
6.154000	29.0	9.000	Off	L1	10.0	21.0	50.0

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Conducted Emissions (Line 2)

EMI Auto Test(12)

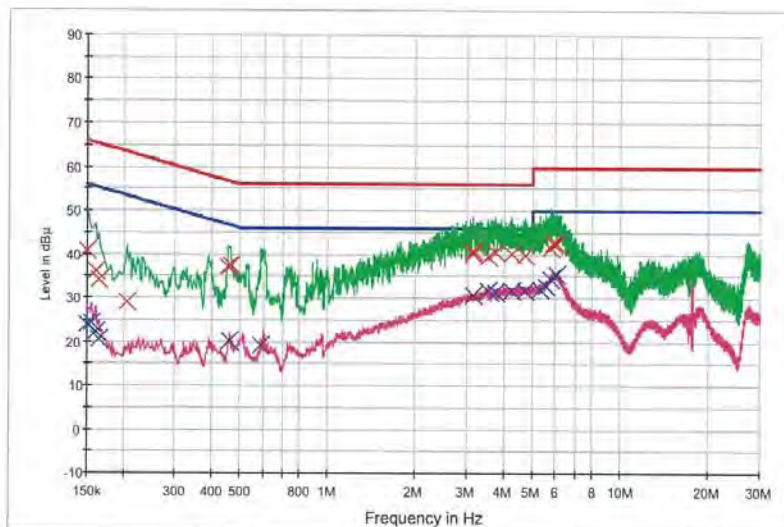
1 / 2

HCT TEST Report

Common Information

EUT: SM-W728Y
 Manufacturer: SAMSUNG
 Test Site: SHIELD ROOM
 Operating Conditions: WLAN 2.4GHz MODE_N

FCC CLASS B



— 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)
0.150000	40.8	9.000	Off	N	9.6	25.2	66.0
0.160000	36.2	9.000	Off	N	9.6	29.3	65.5
0.164000	33.9	9.000	Off	N	9.6	31.3	65.3
0.206000	29.0	9.000	Off	N	9.6	34.3	63.4
0.458000	37.0	9.000	Off	N	9.7	19.7	56.7
0.464000	37.3	9.000	Off	N	9.7	19.3	56.6
3.140000	40.2	9.000	Off	N	9.8	15.8	56.0
3.150000	41.0	9.000	Off	N	9.8	15.0	56.0
3.508000	39.4	9.000	Off	N	9.8	16.6	56.0
3.758000	40.5	9.000	Off	N	9.8	15.5	56.0
4.256000	40.2	9.000	Off	N	9.9	15.8	56.0
4.738000	39.8	9.000	Off	N	9.9	16.2	56.0
5.790000	41.6	9.000	Off	N	9.9	18.4	60.0
5.888000	42.6	9.000	Off	N	9.9	17.4	60.0
5.894000	42.6	9.000	Off	N	9.9	17.4	60.0
5.902000	42.5	9.000	Off	N	9.9	17.5	60.0
6.024000	42.4	9.000	Off	N	9.9	17.6	60.0
6.058000	42.4	9.000	Off	N	9.9	17.6	60.0

2017-05-29

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EMI Auto Test(12)

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Final Result 2

Frequency (MHz)	CAverage (dBuV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.150000	24.1	9.000	Off	N	9.6	31.9	56.0
0.156000	24.3	9.000	Off	N	9.6	31.3	55.7
0.160000	22.3	9.000	Off	N	9.6	33.2	55.5
0.164000	20.6	9.000	Off	N	9.6	34.6	55.3
0.462000	20.3	9.000	Off	N	9.7	26.4	46.7
0.592000	19.0	9.000	Off	N	9.7	27.0	46.0
3.140000	30.7	9.000	Off	N	9.8	15.3	46.0
3.150000	30.7	9.000	Off	N	9.8	15.3	46.0
3.508000	31.6	9.000	Off	N	9.8	14.4	46.0
3.756000	31.3	9.000	Off	N	9.8	14.7	46.0
4.256000	31.5	9.000	Off	N	9.9	14.5	46.0
4.738000	31.6	9.000	Off	N	9.9	14.4	46.0
5.336000	31.9	9.000	Off	N	9.9	18.1	50.0
5.590000	32.9	9.000	Off	N	9.9	17.1	50.0
5.740000	34.3	9.000	Off	N	9.9	15.7	50.0
6.024000	35.3	9.000	Off	N	9.9	14.7	50.0
6.058000	35.4	9.000	Off	N	9.9	14.6	50.0
6.064000	35.5	9.000	Off	N	9.9	14.5	50.0

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RESULT PLOTS (Tablet+keyboard cover(kickstand))
Conducted Emissions (Line 1)

EMI Auto Test(12)

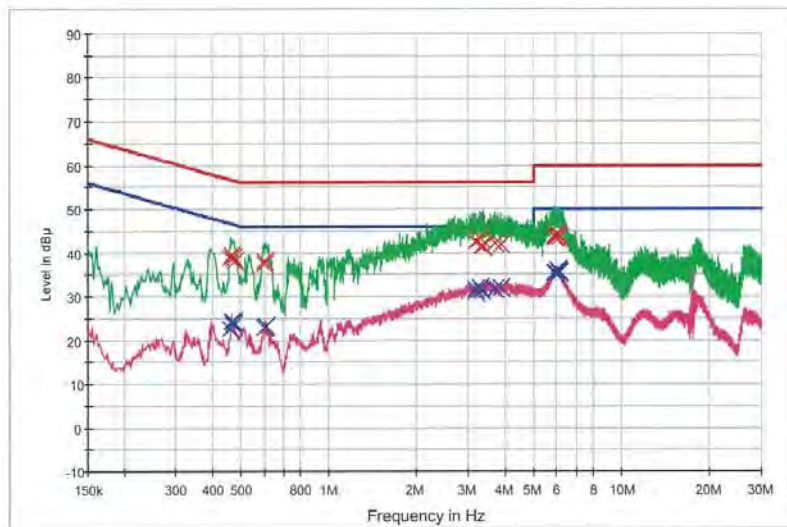
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HCT TEST Report

Common Information

EUT: SM-W728Y
 Manufacturer: SAMSUNG
 Test Site: SHIELD ROOM
 Operating Conditions: WLAN 2.4GHz MODE_L1

FCC CLASS B



— 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)
0.462000	38.9	9.000	Off	L1	9.7	17.7	56.7
0.466000	39.6	9.000	Off	L1	9.7	17.0	56.6
0.474000	38.9	9.000	Off	L1	9.7	17.6	56.4
0.478000	38.1	9.000	Off	L1	9.7	18.3	56.4
0.600000	37.3	9.000	Off	L1	9.7	18.7	56.0
0.606000	38.0	9.000	Off	L1	9.7	18.0	56.0
3.190000	42.6	9.000	Off	L1	9.8	13.4	56.0
3.302000	43.1	9.000	Off	L1	9.8	12.9	56.0
3.330000	41.4	9.000	Off	L1	9.8	14.6	56.0
3.386000	41.5	9.000	Off	L1	9.8	14.5	56.0
3.702000	42.4	9.000	Off	L1	9.8	13.6	56.0
3.872000	41.7	9.000	Off	L1	9.9	14.3	56.0
5.886000	43.8	9.000	Off	L1	9.9	16.2	60.0
5.892000	44.0	9.000	Off	L1	9.9	16.0	60.0
5.906000	43.6	9.000	Off	L1	9.9	16.4	60.0
5.998000	43.5	9.000	Off	L1	9.9	16.5	60.0
6.014000	44.1	9.000	Off	L1	10.0	15.9	60.0
6.096000	43.5	9.000	Off	L1	10.0	16.5	60.0

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EMI Auto Test(12)

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Final Result 2

Frequency (MHz)	CAverage (dBuV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.462000	22.6	9.000	Off	L1	9.7	24.0	46.7
0.466000	24.1	9.000	Off	L1	9.7	22.5	46.6
0.470000	24.4	9.000	Off	L1	9.7	22.1	46.5
0.474000	23.6	9.000	Off	L1	9.7	22.8	46.4
0.604000	22.7	9.000	Off	L1	9.7	23.3	46.0
0.608000	23.1	9.000	Off	L1	9.7	22.9	46.0
3.164000	31.7	9.000	Off	L1	9.8	14.3	46.0
3.190000	31.0	9.000	Off	L1	9.8	15.0	46.0
3.302000	32.0	9.000	Off	L1	9.8	14.0	46.0
3.330000	31.3	9.000	Off	L1	9.8	14.7	46.0
3.700000	31.5	9.000	Off	L1	9.8	14.5	46.0
3.872000	32.1	9.000	Off	L1	9.9	13.9	46.0
5.886000	35.5	9.000	Off	L1	9.9	14.5	50.0
5.906000	35.3	9.000	Off	L1	9.9	14.7	50.0
5.958000	35.5	9.000	Off	L1	9.9	14.5	50.0
6.014000	36.1	9.000	Off	L1	10.0	13.9	50.0
6.096000	35.6	9.000	Off	L1	10.0	14.4	50.0
6.100000	35.5	9.000	Off	L1	10.0	14.5	50.0

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Conducted Emissions (Line 2)

EMI Auto Test(12)

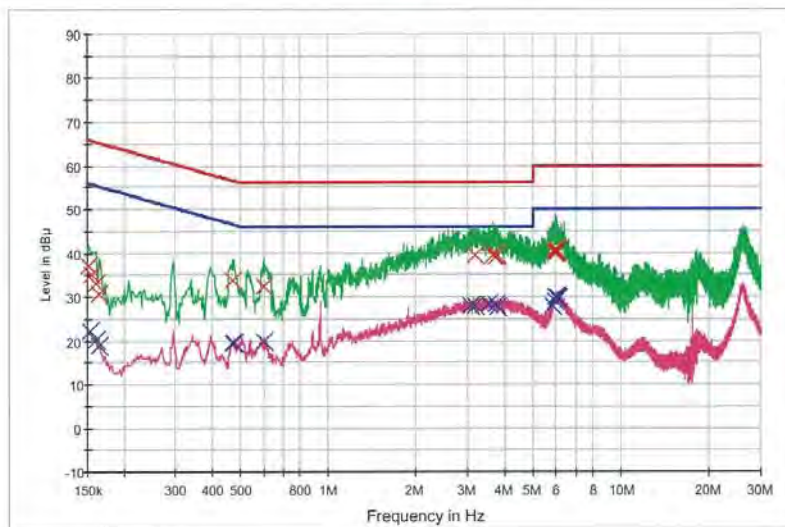
1 / 2

HCT TEST Report

Common Information

EUT: SM-W728Y
 Manufacturer: SAMSUNG
 Test Site: SHIELD ROOM
 Operating Conditions: WLAN 2.4GHz MODE_N

FCC CLASS B



— 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 (dBuV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.152000	37.1	9.000	Off	N	9.6	28.8	65.9
0.156000	35.1	9.000	Off	N	9.6	30.6	65.7
0.160000	33.0	9.000	Off	N	9.6	32.5	65.5
0.164000	30.6	9.000	Off	N	9.6	34.7	65.3
0.474000	33.7	9.000	Off	N	9.7	22.7	56.4
0.600000	32.4	9.000	Off	N	9.7	23.6	56.0
3.164000	39.5	9.000	Off	N	9.8	16.5	56.0
3.168000	39.5	9.000	Off	N	9.8	16.5	56.0
3.178000	39.5	9.000	Off	N	9.8	16.5	56.0
3.672000	39.3	9.000	Off	N	9.8	16.7	56.0
3.744000	39.1	9.000	Off	N	9.8	16.9	56.0
3.806000	39.4	9.000	Off	N	9.8	16.6	56.0
5.906000	40.2	9.000	Off	N	9.9	19.8	60.0
5.972000	40.0	9.000	Off	N	9.9	20.0	60.0
5.976000	40.3	9.000	Off	N	9.9	19.7	60.0
5.990000	40.7	9.000	Off	N	9.9	19.3	60.0
6.018000	40.2	9.000	Off	N	9.9	19.8	60.0
6.034000	40.4	9.000	Off	N	9.9	19.6	60.0

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EMI Auto Test(12)

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Final Result 2

Frequency (MHz)	CAverage (dBuV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.154000	22.1	9.000	Off	N	9.6	33.7	55.8
0.160000	20.2	9.000	Off	N	9.6	35.2	55.5
0.164000	18.7	9.000	Off	N	9.6	36.6	55.3
0.474000	19.4	9.000	Off	N	9.7	27.1	46.4
0.478000	19.3	9.000	Off	N	9.7	27.0	46.4
0.600000	19.7	9.000	Off	N	9.7	26.3	46.0
3.082000	28.0	9.000	Off	N	9.8	18.0	46.0
3.164000	28.0	9.000	Off	N	9.8	18.0	46.0
3.168000	27.8	9.000	Off	N	9.8	18.2	46.0
3.548000	28.4	9.000	Off	N	9.8	17.6	46.0
3.744000	28.4	9.000	Off	N	9.8	17.6	46.0
3.782000	27.8	9.000	Off	N	9.8	18.2	46.0
5.840000	27.9	9.000	Off	N	9.9	22.1	50.0
5.956000	29.1	9.000	Off	N	9.9	20.9	50.0
5.990000	30.0	9.000	Off	N	9.9	20.0	50.0
6.034000	29.8	9.000	Off	N	9.9	20.2	50.0
6.072000	30.1	9.000	Off	N	9.9	19.9	50.0
6.124000	29.6	9.000	Off	N	9.9	20.4	50.0

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10. LIST OF TEST EQUIPMENT

10.1 LIST OF TEST EQUIPMENT(Conducted Test)

Manufacturer	Model / Equipment	Calibration Date	Calibration Interval	Serial No.
Rohde & Schwarz	ENV216 / LISN	12/23/2016	Annual	100073
Rohde & Schwarz	ESCI / Test Receiver	12/23/2016	Annual	100584
Agilent	N9020A / Signal Analyzer	06/24/2016	Annual	MY51110085
Agilent	N9030A / Signal Analyzer	11/30/2016	Annual	MY49431210
Agilent	N1911A / Power Meter	04/17/2017	Annual	MY45100523
Agilent	N1921A / Power Sensor	04/17/2017	Annual	MY52260025
Agilent	87300B / Directional Coupler	11/23/2016	Annual	3116A03621
Hewlett Packard	11667B / Power Splitter	06/14/2016	Annual	05001
Hewlett Packard	E3632A / DC Power Supply	07/07/2016	Annual	KR75303960
Agilent	8493C / Attenuator(10 dB)	07/15/2016	Annual	07560

10.2 LIST OF TEST EQUIPMENT(Radiated Test)

Manufacturer	Model / Equipment	Calibration Date	Calibration Interval	Serial No.
Audix	AM4000 / Antenna Position Tower	N/A	N/A	N/A
Audix	Turn Table	N/A	N/A	N/A
Audix	EM1000 / Controller	N/A	N/A	060520
Rohde & Schwarz	Loop Antenna	04/19/2017	Biennial	1513-175
Schwarzbeck	VULB 9168 / Hybrid Antenna	04/06/2017	Biennial	760
Schwarzbeck	BBHA 9120D / Horn Antenna	08/25/2016	Biennial	9120D-1300
Schwarzbeck	BBHA9170 / Horn Antenna(15 GHz ~ 40 GHz)	09/04/2015	Biennial	BBHA9170541
Rohde & Schwarz	FSP / Spectrum Analyzer	09/10/2016	Annual	100688
Rohde & Schwarz	FSV40-N / Spectrum Analyzer	09/23/2016	Annual	101068-SZ
Wainwright Instruments	WHK3.0/18G-10EF / High Pass Filter	06/24/2016	Annual	8
Wainwright Instruments	WHFX7.0/18G-8SS / High Pass Filter	05/15/2017	Annual	29
Wainwright Instruments	WRCJV2400/2483.5-2370/2520-60/12SS / Band Reject Filter	07/06/2016	Annual	2
Wainwright Instruments	WRCJV5100/5850-40/50-8EEK / Band Reject Filter	01/24/2017	Annual	2
Agilent	8493C-10 / Attenuator(10 dB)	08/11/2016	Annual	76649
CERNEX	CBLU1183540 / Power Amplifier	07/15/2016	Annual	22964
CERNEX	CBL06185030 / Power Amplifier	07/15/2016	Annual	22965
CERNEX	CBL18265035 / Power Amplifier	01/23/2017	Annual	22966
CERNEX	CBL26405040 / Power Amplifier	07/11/2016	Annual	25956