TEST REPORT

DT&C Co., Ltd.
42, Yurim-ro, 154Beon-gil, Cheoin-gu, Yongin-si, Gyeonggi-do, Korea, 17042
Tel : 031-321-2664, Fax : 031-321-1664

1. Report No : DRTFCC1905-0181
2. Customer
   - Name (FCC) : Janam Technologies LLC / Name (IC) : JANAM TECHNOLOGIES LLC
   - Address : 100 Crossways Park West Suite 105, Woodbury, New York, 11797, United States
3. Use of Report : FCC & IC Original Grant
4. Product Name / Model Name : Mobile Computer / XT2WE
   FCC ID : UTWXT2WE / IC : 6914A-XT2WE
5. Test Method Used : KDB 558074, ANSI C63.10-2013
   Test Specification : FCC Part 15 Subpart C.247
   RSS-247 Issue 2, RSS-GEN Issue 5
6. Date of Test : 2017.03.20 ~ 2017.07.03(Original test), 2019.02.07 ~ 2019.02.10(Spot check test)
7. Testing Environment : See appended test report.
8. Test Result : Refer to the attached test result.

Affirmation	Tested by Name : SunGeun Lee (Signature)	Technical Manager Name : GeunKi Son (Signature)

The test results presented in this test report are limited only to the sample supplied by applicant and the use of this test report is inhibited other than its purpose. This test report shall not be reproduced except in full, without the written approval of DT&C Co., Ltd.

2019 . 05 . 03 .

DT&C Co., Ltd.

If this report is required to confirmation of authenticity, please contact to report@dtnc.net

Test Report Version

Test Report No.	Date	Description
DRTFCC1905-0181	May. 03, 2019	Initial issue

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1. GENERAL INFORMATION

1.1 Testing Laboratory

DT&C Co., Ltd.		
The 3 m test site and conducted measurement facility used to collect the radiated data are located at the 42, Yurim-ro, 154beon-gil, Cheoin-gu, Yongin-si, Gyeonggi-do, Korea 17042. The test site complies with the requirements of § 2.948 according to ANSI C63.4-2014. **- FCC MRA Accredited Test Firm No. : KR0034** **- IC Test site No. : 5740A**		
www.dtnc.net		
Telephone	:	+ 82-31-321-2664
FAX	:	+ 82-31-321-1664

1.2 Test Environment

Ambient Condition	Original test	Spot check test
▪ Temperature	+21 ~ +25 ℃	+22 ~ 23 ℃
▪ Relative Humidity	41 % ~ 45 %	35 ~ 38 %

1.3 Measurement Uncertainty

Test items	Measurement uncertainty
Transmitter Output Power	0.7 dB (The confidence level is about 95 %, k = 2)
Conducted spurious emission	1.0 dB (The confidence level is about 95 %, k = 2)
AC conducted emission	2.4 dB (The confidence level is about 95 %, k = 2)
Radiated spurious emission (1 GHz Below)	5.1 dB (The confidence level is about 95 %, k = 2)
Radiated spurious emission (1 GHz ~ 18 GHz)	5.4 dB (The confidence level is about 95 %, k = 2)
Radiated spurious emission (18 GHz Above)	5.3 dB (The confidence level is about 95 %, k = 2)

1.4 Details of Applicant

Applicant (FCC) : Janam Technologies LLC
Applicant (IC) : JANAM TECHNOLOGIES LLC
Address : 100 Crossways Park West Suite 105, Woodbury, New York, 11797, United States
Contact person (FCC) : Harry Lerner
Contact person (IC) : Scott Leung

1.5 Description of EUT

EUT	Mobile computer
Model Name(FCC, IC)	XT2WE
Add Model Name(FCC, IC)	NA
Power Supply	DC 3.8 V
Hardware version	MP
Software version	71.xx
Frequency Range	2.4GHz Band ▪ 802.11b/g/n(HT20) : 2412 MHz ~ 2462 MHz
Max. RF Output Power	2.4GHz Band ▪ 802.11b : 18.81 dBm ▪ 802.11g : 21.33 dBm ▪ 802.11n (HT20) : 21.29 dBm
Modulation Type	802.11b : DSSS/CCK 802.11g/n : OFDM
Antenna Specification	Internal Antenna ▪ 2.4GHz Band Max. peak gain : -0.37 dBi

1.6 Reference test data explanations

- **Introduction**

  This report includes the test data of FCC ID: V2X-PM80W1/ IC: 10664A-PM80W1 with reference to KDB 484596 D01v01.
  The applicant takes full responsibility that the test data as reference section below represents compliance for FCC ID: UTWX2WE /IC: 6914A-XT2WE.

Reference FCC ID/ IC	Exhibit type	Separated FCC ID/ IC
FCC ID: V2X-PM80W1 / IC: 10664A-PM80W1	Original Grant / Certification	**NA**
FCC ID: UTWXT2WD / IC: 6914A-XT2WD	Change in FCC ID / Multiple listing	FCC ID: UTWXT2WE / IC: 6914A-XT2WE

- **Explain the differences**

  FCC ID: UTWXT2WE/ IC: 6914A-XT2WE is same the internal printed circuit board with FCC ID: UTWXT2WD / IC: 6914A-XT2WD. The only difference between the two products is that the NFC chipset was changed.
  Where, FCC ID: UTWXT2WD/ IC: 6914A-XT2WD was performed the change-in-FCC ID application to FCC ID: V2X-PM80W1/ IC: 10664A-PM80W1.

- **Spot check verification data**

Equipment Class	FCC Part/ RSS Std.	Technology	Mode	Tx Freq. (MHz)	Test item	Detector Mode	Reference FCC ID: V2X-PM80W1 IC: 10664A-PM80W1		FCC ID: UTWXT2WE IC: 6914A-XT2WE		Limit (dBuV/m)	Deviation (dB)
							Frequency (MHz)	Result (dBuV/m)	Frequency (MHz)	Result (dBuV/m)		
DTS	15C/ RSS-247	WLAN	802.11g	2462	Radiated Band edge	Peak	2483.72	64.33	2483.58	63.87	74.00	-0.46
						Average	2483.51	50.65	2483.57	49.36	54.00	-1.29
			802.11b	2412	Radiated Spurious emission	Peak	4823.97	56.16	4824.13	54.52	74.00	-1.64
						Average	4824.04	50.65	4823.97	48.82	54.00	-1.83

Note1: The spot check were performed based on worst-case results reported in the original FCC/IC report.
The spot check test results are within 3dB and two products shows a good correlation. It also complies with the FCC/IC limit.

- **Reference section**

  Reference FCC ID: V2X-PM80W1 / Reference IC: 10664A-PM80W1

Equipment Class	FCC Part/ RSS Std.	Technology	Frequency range(MHz)	Exhibit type	Report title	Reference Sections
DSS	15C/ RSS-247	Bluetooth	2402 ~ 2480	Original Grant	DSS	All
DTS	15C/ RSS-247	BLE	2402 ~ 2480	Original Grant	DTS LE	All
DTS	15C/ RSS-247	WLAN	2412 ~ 2462	Original Grant	DTS WLAN	All
NII	15E/ RSS-247	WLAN	5180 ~ 5240 5260 ~ 5320 5500 ~ 5700 5745 ~ 5825	Original Grant	NII, DFS	All
DXX	15C/ RSS-210	NFC	13.56	Original Grant	Not Applicable	Not Applicable

2. SUMMARY OF TESTS

FCC Part	RSS Std.	Parameter	Limit	Test Condition	Status Note 1
15.247(a)	RSS-247 [5.2]	6 dB Bandwidth	> 500 kHz	Conducted	C
15.247(b)	RSS-247 [5.4]	Transmitter Output Power	< 1 Watt		C
15.247(d)	RSS-247 [5.5]	Out of Band Emissions / Band Edge	20 dBc in any 100 kHz BW		C
15.247(e)	RSS-247 [5.2]	Transmitter Power Spectral Density	< 8 dBm/3 kHz		C
-	RSS-Gen [6.7]	Occupied Bandwidth (99 %)	RSS-Gen(6.7)		C
15.247(d) 15.205 15.209	RSS-247 [5.5] RSS-GEN [8.9] RSS-GEN [8.10]	General Field Strength Limits (Restricted Bands and Radiated Emission Limits)	FCC 15.209 limits	Radiated	C Note 3
15.207	RSS-Gen [8.8]	AC Line Conducted Emissions	FCC 15.207 limits	AC Line Conducted	C
15.203	RSS-Gen [8.3]	Antenna Requirements	FCC 15.203	-	C

Note 1: **C**=Comply **NC**=Not Comply **NT**=Not Tested **NA**=Not Applicable

Note 2: For radiated emission tests below 30 MHz were performed on semi-anechoic chamber which is correlated with OATS.

Note 3: This test item was performed in each axis and the worst case data was reported.

3. TEST METHODOLOGY

The measurement procedures described in the ANSI C63.10-2013 and the guidance provided in KDB558074 D01v05 were used in measurement of the EUT.

The EUT was tested per the guidance of KDB558074 D01v05. And ANSI C63.10-2013 was used to reference appropriate EUT setup and maximizing procedures of radiated spurious emission and AC line conducted emission testing.

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 test 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 power-line conducted emission test procedure is not described on the KDB558074 D01v05.

So this test was fulfilled with the requirements in Section 6.2 of ANSI C63.10-2013.

The EUT is placed on the wooden table, which is 0.8 m above ground plane and the conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30 MHz using CISPR Quasi-peak and Average detector

Radiated Emissions

Basically the radiated tests were performed with KDB558074 D01v05. But some requirements and procedures like test site requirements, EUT setup and maximizing procedure were fulfilled with the requirements in Section 5 and 6 of the ANSI C63.10-2013.

The EUT is placed on a non-conductive table. For emission measurements at or below 1 GHz, the table height is 80 cm. For emission measurements above 1 GHz, the table height is 1.5 m. The turntable shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3 m away from the receiving antenna, which varied from 1 m to 4 m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the highest emission, the relative positions of the EUT were rotated through three orthogonal axes.

3.4 DESCRIPTION OF TEST MODES

The EUT has been tested with all modes of operating conditions to determine the worst case emission characteristics.

A test program is used to control the EUT for staying in continuous transmitting mode.

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.

5. ANTENNA REQUIREMENTS

5.1 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 internal antenna is attached on the main PCB using the special spring tension. (Refer to Internal Photo file.) Therefore this E.U.T Complies with the requirement of §15.203.

6. TEST RESULT

6.1 6 dB Bandwidth

Test Requirements and limit, §15.247(a)

The bandwidth at 6 dB 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 6 dB bandwidth is 500 kHz.

▣ TEST CONFIGURATION

Refer to the APPENDIX I.

▣ TEST PROCEDURE

- **KDB558074 D01v05 - Section 8.2**
- **ANSI C63.10-2013 – Section 11.8.2**

1. Set resolution bandwidth (RBW) = 100 kHz.
2. Set the video bandwidth (VBW) ≥ 3 x RBW.
   (RBW : 100 kHz / VBW : 300 kHz)
3. Detector = **Peak**.
4. Trace mode = **Max hold**.
5. Sweep = **Auto couple**.
6. Allow the trace to stabilize.
7. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

▣ TEST RESULTS: Comply

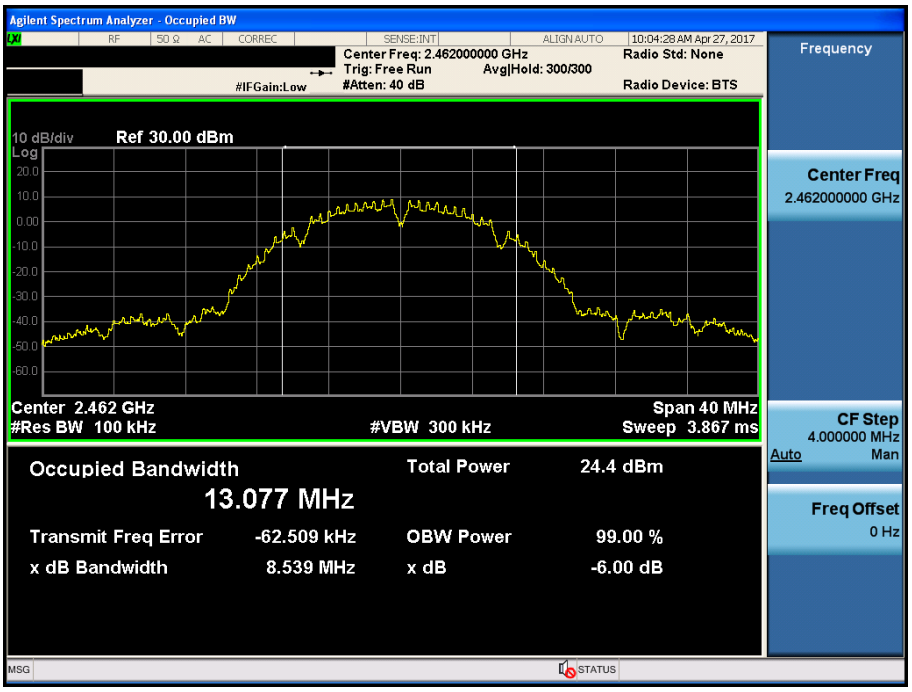
Test Mode	Data Rate	Frequency [MHz]	Test Results [MHz]
802.11b	1 Mbps	2412	9.063
		2437	9.078
		2462	8.539
802.11g	6 Mbps	2412	16.390
		2437	16.380
		2462	16.120
802.11n (HT20)	MCS 0	2412	17.620
		2437	17.380
		2462	16.950

▣ RESULT PLOTS

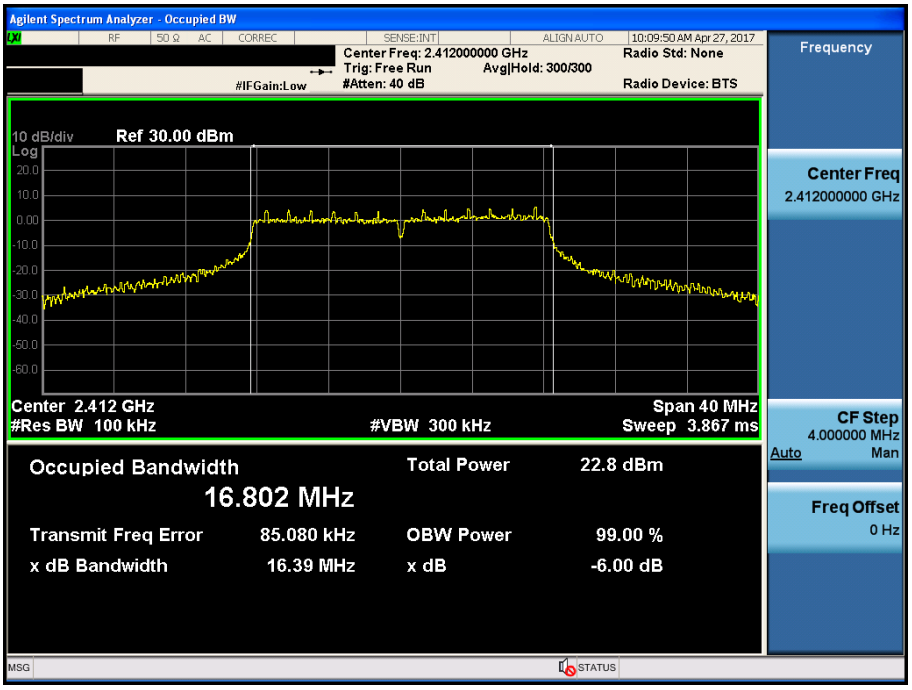
6 dB Bandwidth Test Mode: 802.11b & 1 Mbps & 2412 MHz

6 dB Bandwidth Test Mode: 802.11b & 1 Mbps & 2437 MHz

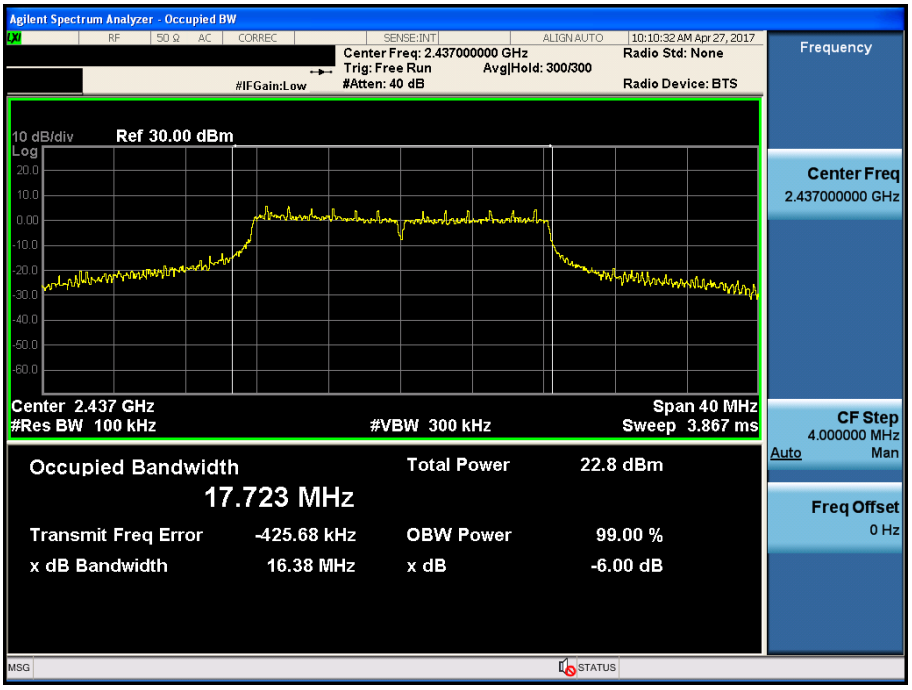
6 dB Bandwidth Test Mode: 802.11b & 1 Mbps & 2462 MHz



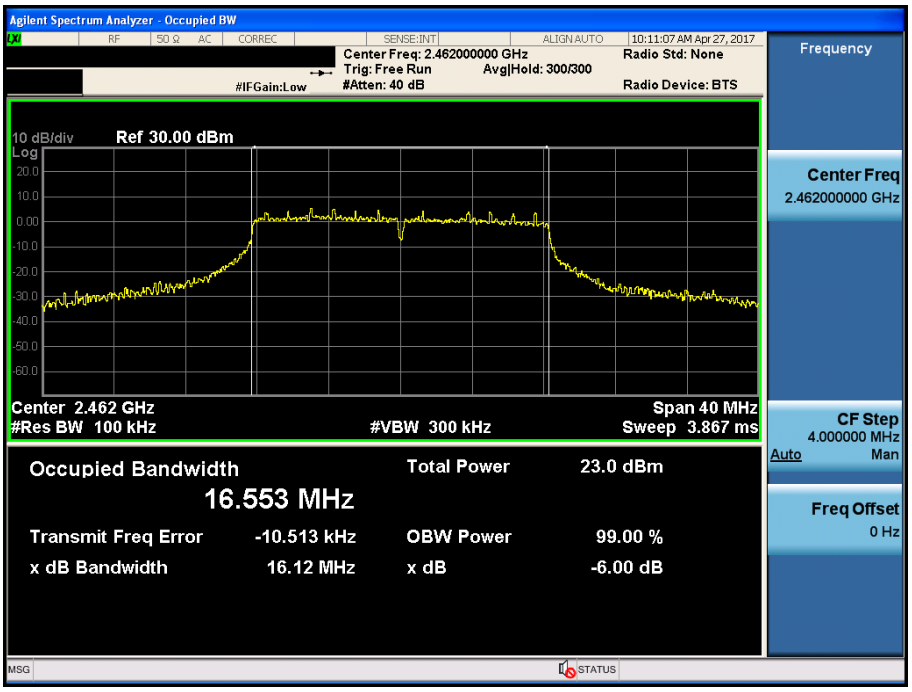
6 dB Bandwidth Test Mode: 802.11g & 6 Mbps & 2412 MHz



6 dB Bandwidth Test Mode: 802.11g & 6 Mbps & 2437 MHz

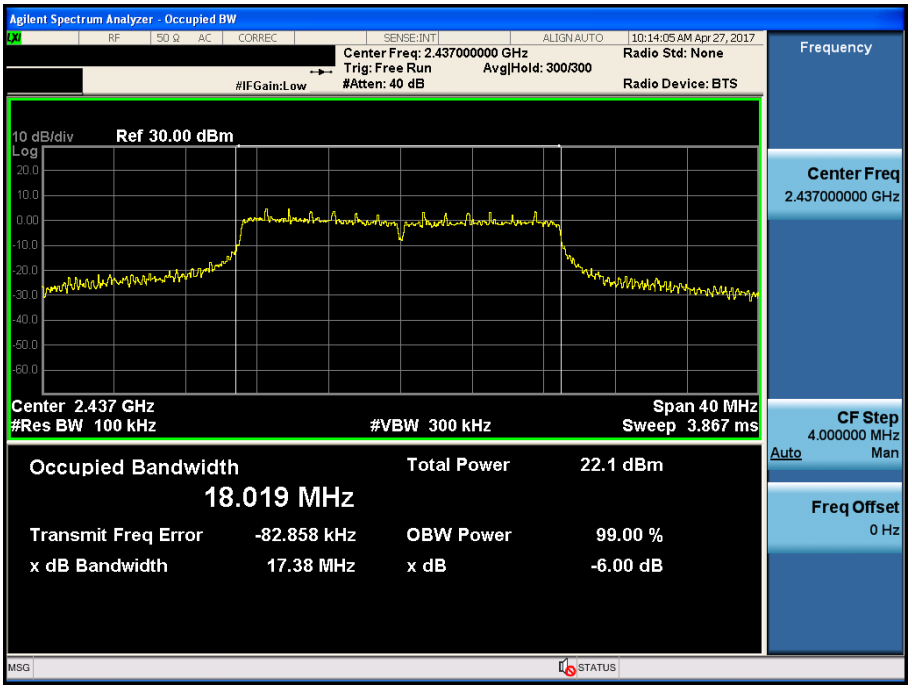


6 dB Bandwidth Test Mode: 802.11g & 6 Mbps & 2462 MHz

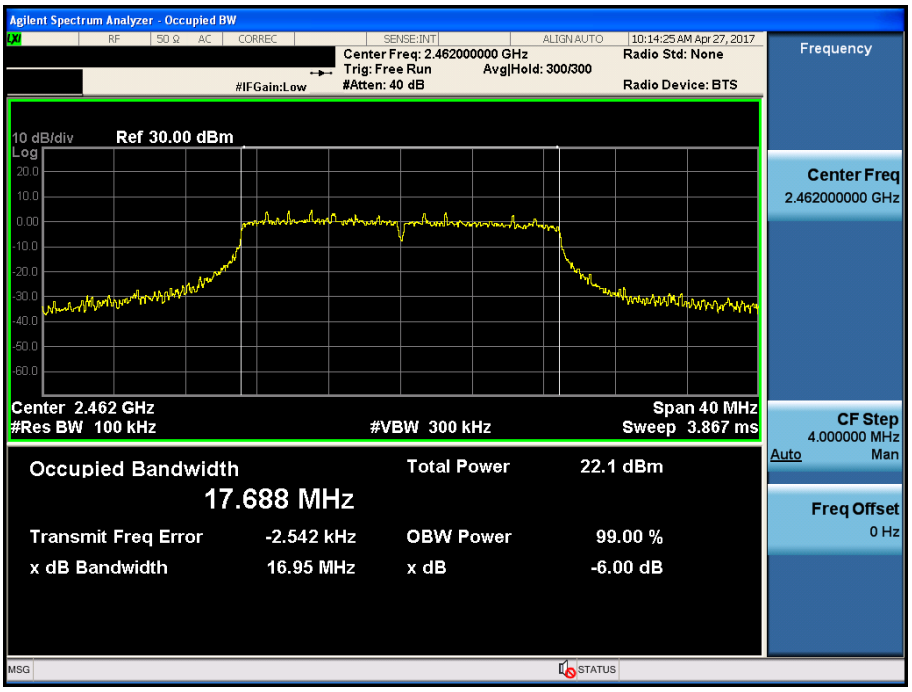


6 dB Bandwidth Test Mode: 802.11n(HT20) & MCS 0 & 2412 MHz

6 dB Bandwidth Test Mode: 802.11n(HT20) & MCS 0 & 2437 MHz



6 dB Bandwidth Test Mode: 802.11n(HT20) & MCS 0 & 2462 MHz

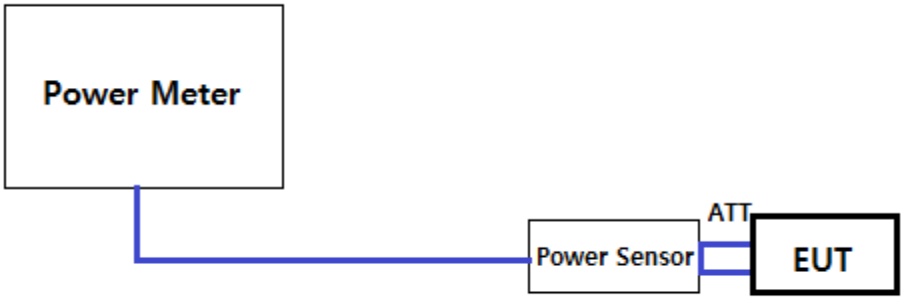


6.2 Maximum Peak Conducted Output Power

Test Requirements and limit, §15.247(b)

The maximum permissible conducted output power is **1 Watt**.

▣ TEST CONFIGURATION



▣ TEST PROCEDURE

1. **PKPM1 Peak power meter method of KDB558074 D01v05**

   The maximum conducted output powers were measured using a broadband peak RF power meter which has greater video bandwidth than DUT's DTS bandwidth and utilize a fast-responding diode detector.

2. **Method AVGPM-G (Measurement using a gated RF average power meter) of KDB558074 D01v05**

   The average conducted output powers were measured using a wideband gated RF power meter provided that the gate parameters are adjusted such that the power is measured only when the EUT is transmitting at its maximum power control level. Since this measurement is made only during the ON time of the transmitter, no duty cycle correction is required.

▣ TEST RESULTS: Comply

- Measurement Data:

- Test Results

Mode	Channel	Frequency [MHz]	Detector	Test Result [dBm]							
				DATA RATE [Mbps]							
				1	2	5.5	11	NA	NA	NA	NA
802.11b	1	2412	PK	17.82	17.80	17.77	17.76	-	-	-	-
			AV	15.33	15.31	15.28	15.30	-	-	-	-
	6	2437	PK	18.22	18.16	18.18	18.20	-	-	-	-
			AV	15.71	15.66	15.70	15.62	-	-	-	-
	11	2462	PK	**18.81**	18.77	18.76	18.78	-	-	-	-
			AV	15.91	15.88	15.82	15.84	-	-	-	-

Mode	Channel	Frequency [MHz]	Detector	Test Result [dBm]							
				DATA RATE [Mbps]							
				6	9	12	18	24	36	48	54
802.11g	1	2412	PK	21.23	21.15	21.10	21.08	21.16	21.18	21.19	21.21
			AV	13.81	13.77	13.69	13.71	13.75	13.79	13.69	13.68
	6	2437	PK	**21.33**	21.28	21.22	21.31	21.23	21.25	21.26	21.22
			AV	14.15	14.05	14.11	14.06	14.02	14.09	14.13	14.08
	11	2462	PK	21.31	21.26	21.19	21.26	21.21	21.22	21.24	21.19
			AV	14.11	14.05	14.09	14.06	14.02	14.08	14.07	14.05

Mode	Channel	Frequency [MHz]	Detector	Test Result [dBm]							
				DATA RATE [MCS]							
				0	1	2	3	4	5	6	7
802.11n (HT20)	1	2412	PK	20.97	20.91	20.88	20.85	20.87	20.92	20.83	20.85
			AV	12.94	12.90	12.88	12.91	12.79	12.86	12.82	12.83
	6	2437	PK	20.98	20.89	20.90	20.90	20.91	20.95	20.86	20.91
			AV	13.32	13.25	13.21	13.19	13.26	13.27	13.22	13.25
	11	2462	PK	**21.29**	21.22	21.19	21.25	21.19	21.24	21.25	21.20
			AV	13.15	13.11	13.08	13.06	13.09	13.07	13.05	13.06

6.3 Maximum Power Spectral Density

Test requirements and limit, §15.247(e)

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.

▣ TEST CONFIGURATION

Refer to the APPENDIX I.

▣ Test Procedure

- **KDB558074 D01v05 - Section 8.4**
- **ANSI C63.10-2013 – Section 11.10.2**

Method PKPSD (peak PSD)

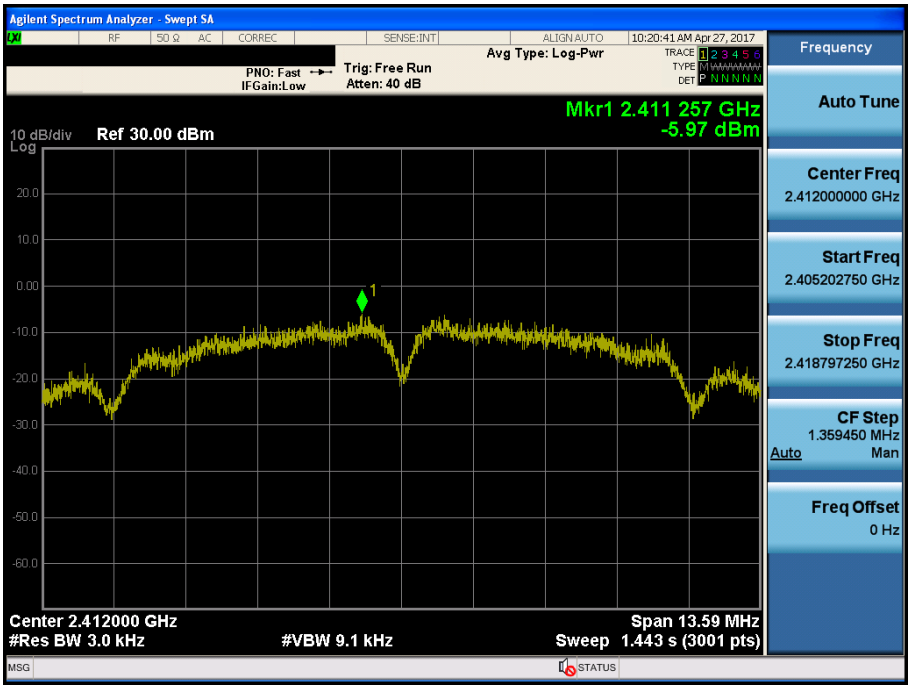
1. Set analyzer center frequency to DTS channel center frequency.
2. Set the span to **1.5 times** the DTS bandwidth.
3. Set the RBW to : **3 kHz** ≤ RBW ≤ **100 kHz**
4. Set the VBW ≥ **3 x RBW**
5. Detector = **Peak**
6. Sweep time = **Auto couple**
7. Trace mode = **Max hold.**
8. Allow trace to fully stabilize.
9. Use the **peak marker function** to determine the maximum amplitude level within the RBW.
10. If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

▣ TEST RESULTS: Comply

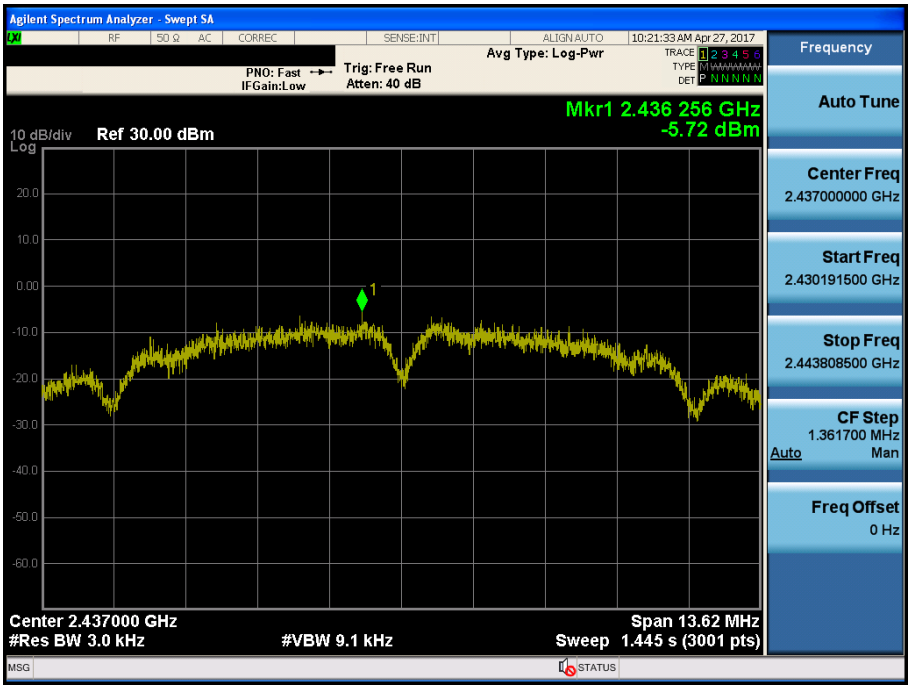
Test Mode	Data Rate	Frequency [MHz]	RBW	PKPSD [dBm]
802.11b	1 Mbps	2412	3 kHz	-5.97
		2437	3 kHz	-5.72
		2462	3 kHz	-5.09
802.11g	6 Mbps	2412	3 kHz	-8.40
		2437	3 kHz	-10.00
		2462	3 kHz	-8.55
802.11n HT20	MCS 0	2412	3 kHz	-10.89
		2437	3 kHz	-9.46
		2462	3 kHz	-9.58

▣ RESULT PLOTS

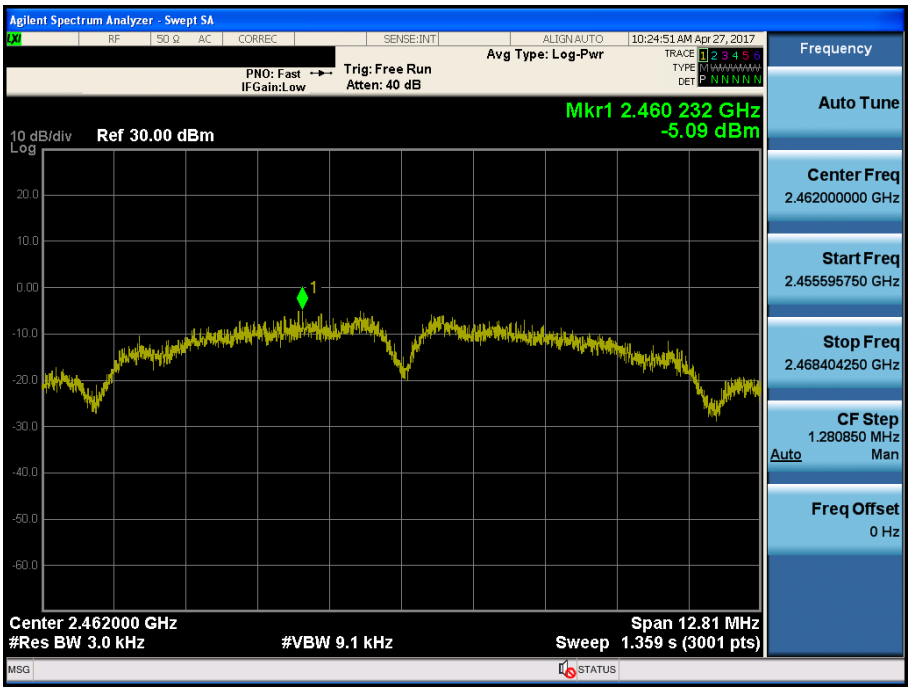
Maximum PKPSD Test Mode: 802.11b & 1 Mbps & 2412 MHz



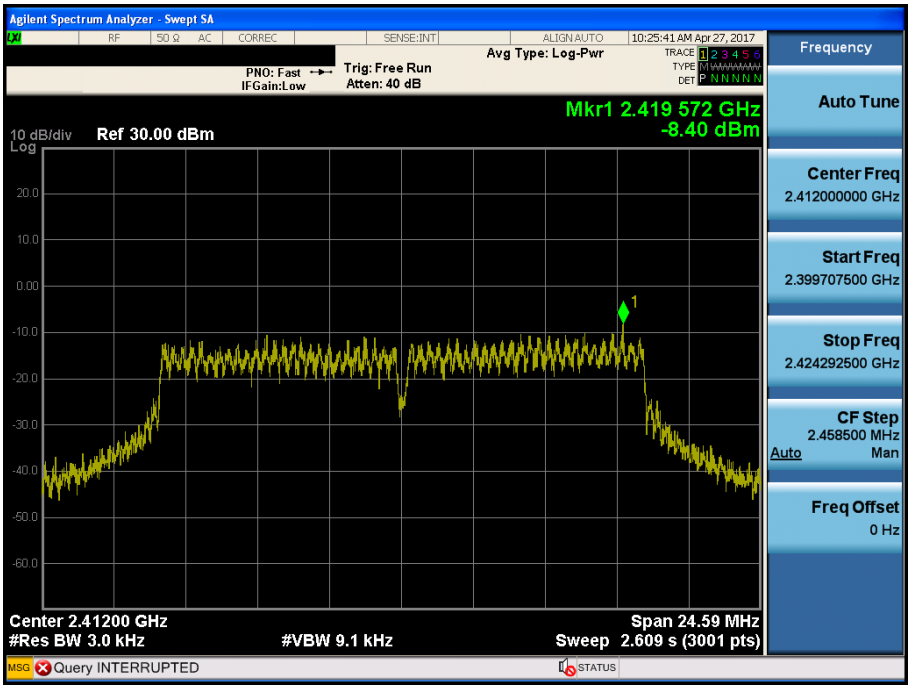
Maximum PKPSD Test Mode: 802.11b & 1 Mbps & 2437 MHz



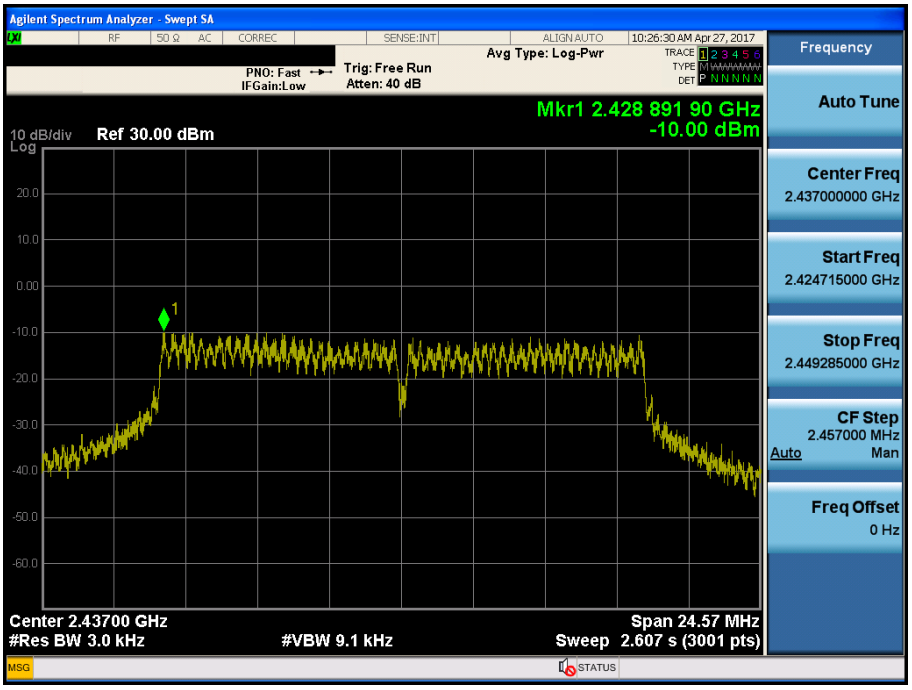
Maximum PKPSD Test Mode: 802.11b & 1 Mbps & 2462 MHz



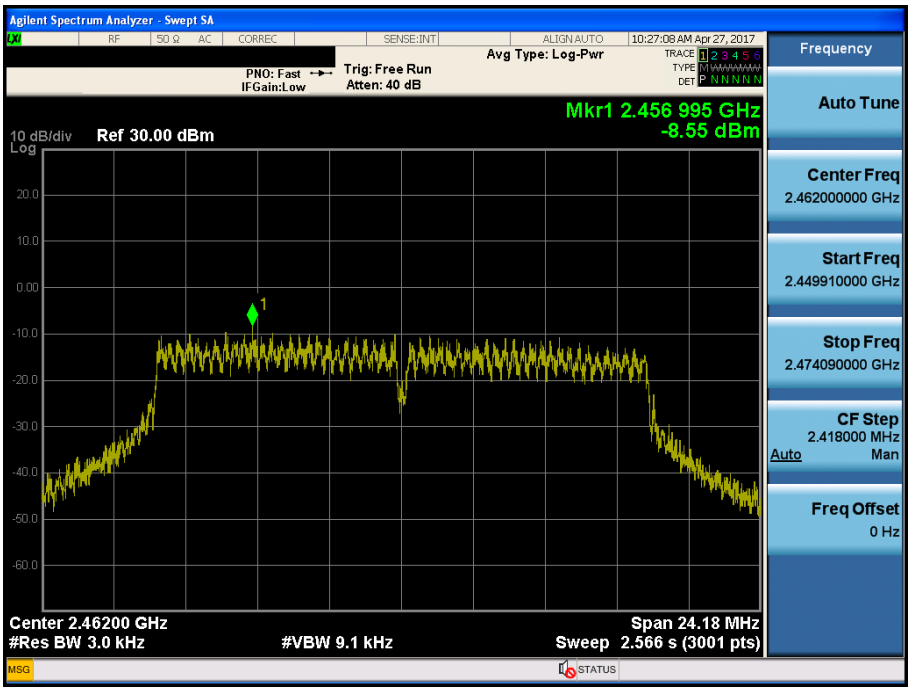
Maximum PKPSD Test Mode: 802.11g & 6 Mbps & 2412 MHz



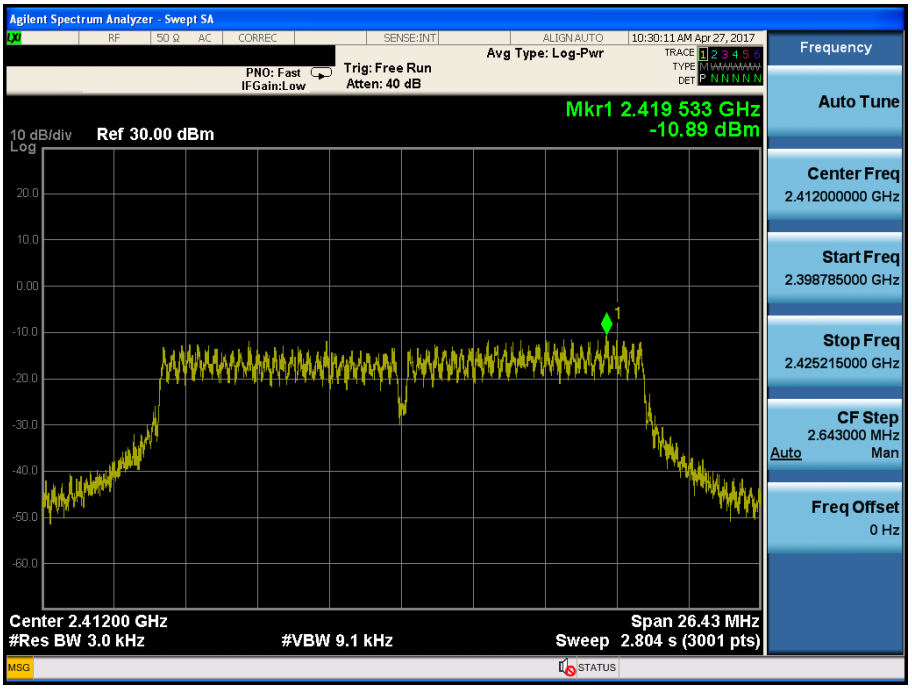
Maximum PKPSD Test Mode: 802.11g & 6 Mbps & 2437 MHz



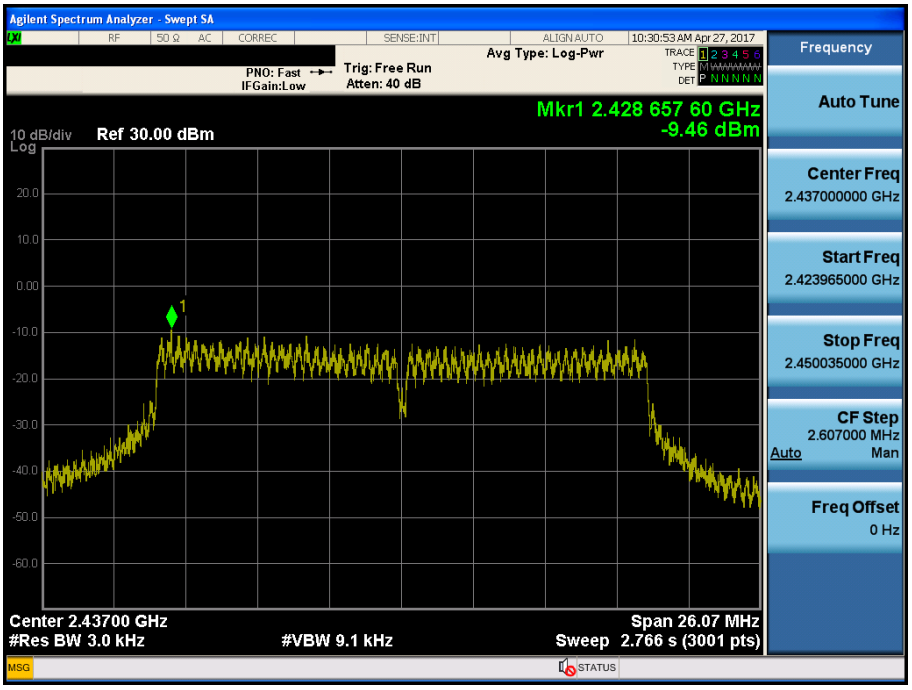
Maximum PKPSD Test Mode: 802.11g & 6 Mbps & 2462 MHz



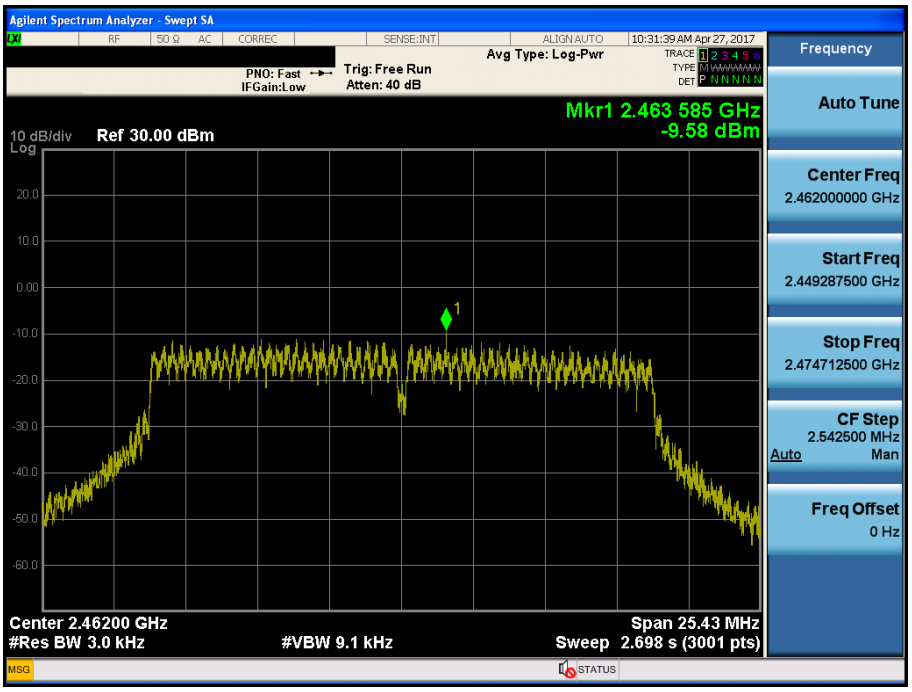
Maximum PKPSD Test Mode: 802.11n(HT20) & MCS 0 & 2412 MHz



Maximum PKPSD Test Mode: 802.11n(HT20) & MCS 0 & 2437 MHz



Maximum PKPSD Test Mode: 802.11n(HT20) & MCS 0 & 2462 MHz



6.4 Out of Band Emissions at the Band Edge / Conducted Spurious Emissions

▣ Test requirements and limit, §15.247(d)

§15.247(d) specifies that in any 100 kHz bandwidth outside of the authorized frequency band, the power shall be attenuated according to the following conditions:

If **the peak output power procedure** is used to measure the fundamental emission power to demonstrate compliance to **15.247(b)(3)** requirements, then the peak conducted output power measured within any 100 kHz outside the authorized frequency band shall be attenuated **by at least 20 dB** relative to the maximum measured in-band peak PSD level.

If the average output power procedure is used to measure the fundamental emission power to demonstrate compliance to **15.247(b)(3)** requirements, then the power in any 100 kHz outside of the authorized frequency band shall be attenuated by at least 30 dB relative to the maximum measured in band average PSD level.
In either case, attenuation to levels below the general emission limits specified in **§15.209(a)** is not required.

▣ Test Configuration:

Refer to the APPENDIX I.

▣ Test Procedure

- **KDB558074 D01v05 - Section 8.5**
- **ANSI C63.10-2013 – Section 11.11**

- Reference level measurement

1. Set instrument center frequency to DTS channel center frequency.
2. Set the span to ≥ 1.5 times the DTS bandwidth.
3. Set the RBW = **100 kHz.**
4. Set the VBW ≥ **3 x RBW.**
5. Detector = **Peak.**
6. Sweep time = **Auto couple.**
7. Trace mode = **Max hold.**
8. **Allow trace to fully stabilize.**
9. Use the peak marker function to determine the maximum PSD level.

- Emission level measurement

1. Set the center frequency and span to encompass frequency range to be measured.
2. Set the RBW = **100 kHz. (Actual 1 MHz , See below note)**
3. Set the VBW ≥ **3 x RBW. (Actual 3 MHz, See below note)**
4. Detector = **Peak**.
5. Ensure that the number of measurement points ≥ Span / RBW.
6. Sweep time = **Auto couple.**
7. Trace mode = **Max hold.**
8. **Allow the trace to stabilize.** (this may take some time, depending on the extent of the span)
9. Use the peak marker function to determine the maximum amplitude level.

Note : The conducted spurious emission was tested with below settings.
Frequency range: 9 kHz ~ 30 MHz
RBW = 100 kHz, VBW = 300 kHz, SWEEP TIME = AUTO, DETECTOR = PEAK, TRACE = MAX HOLD, SWEEP POINT : 40001

Frequency range: 30 MHz ~ 10 GHz, 10 GHz ~25 GHz
RBW = 1 MHz, VBW = 3 MHz, SWEEP TIME = AUTO, DETECTOR = PEAK, TRACE = MAX HOLD, SWEEP POINT : 40001

LIMIT LINE = 20 dB below of the reference level of above measurement procedure Step 2. (RBW = 100 kHz, VBW = 300 kHz)

If the emission level with above setting was close to the limit (ie, less than 3 dB margin) then zoom scan is required using RBW = 100 kHz, VBW = 300 kHz, SPAN = 100 MHz and BINS = 2001 to get accurate emission level within 100 kHz BW.

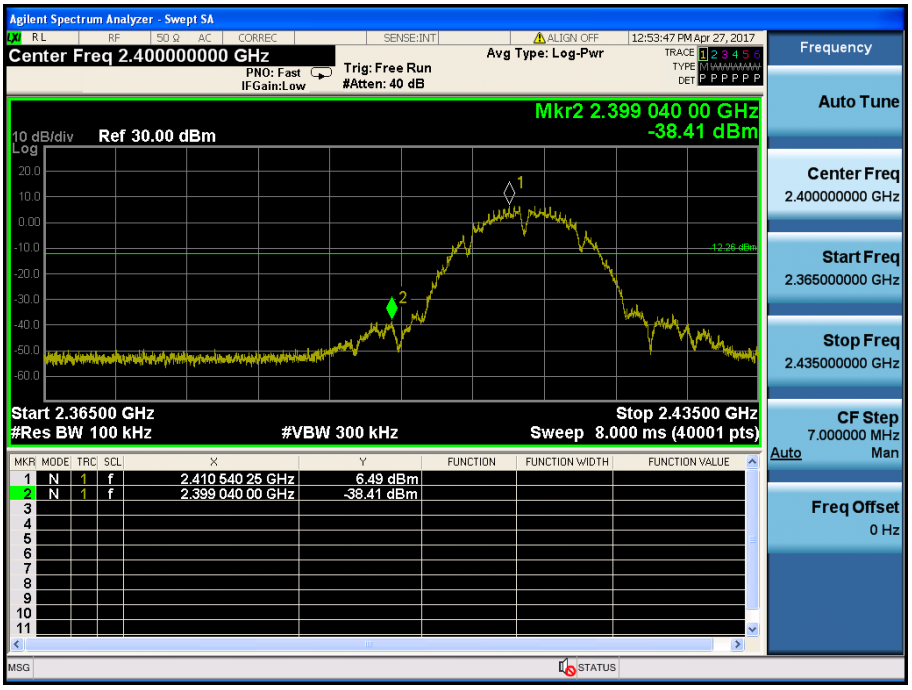
Also the path loss for conducted measurement setup was used as described on the Appendix I of this test report.

▣ RESULT PLOTS

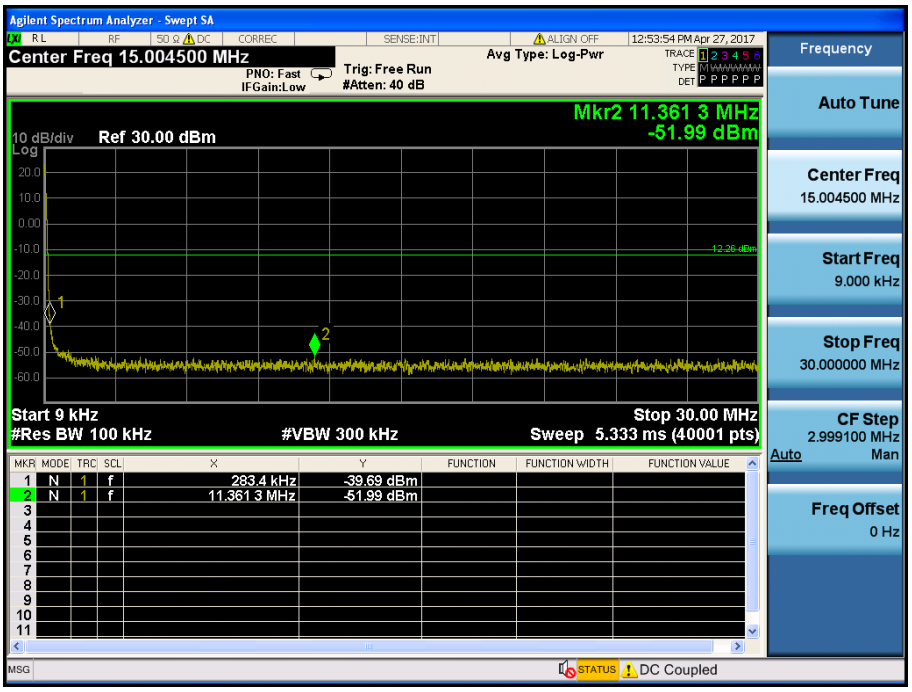
802.11b & 1 Mbps & 2412 MHz

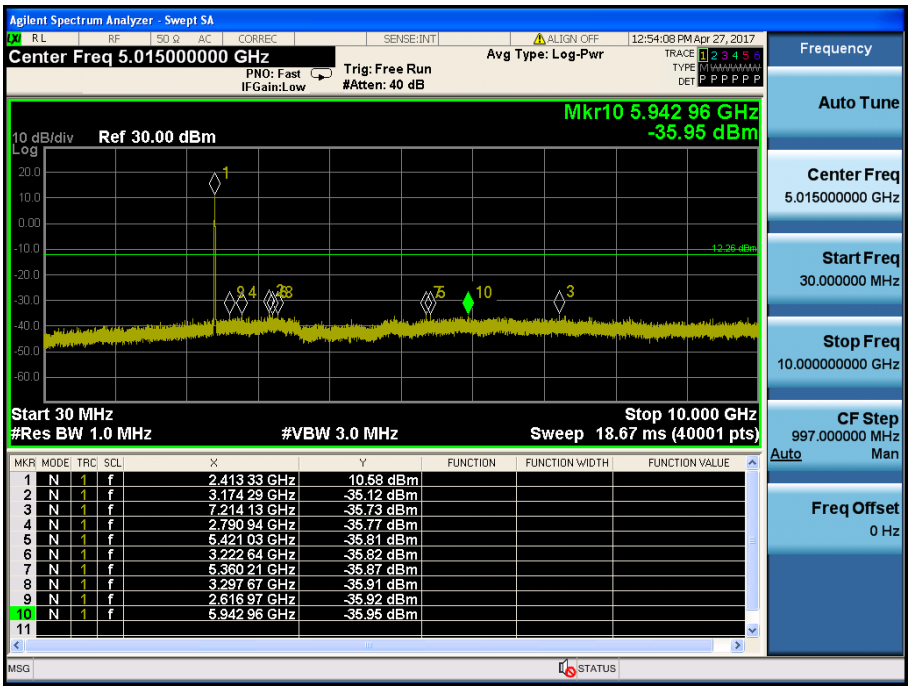
Reference

Low Band-edge

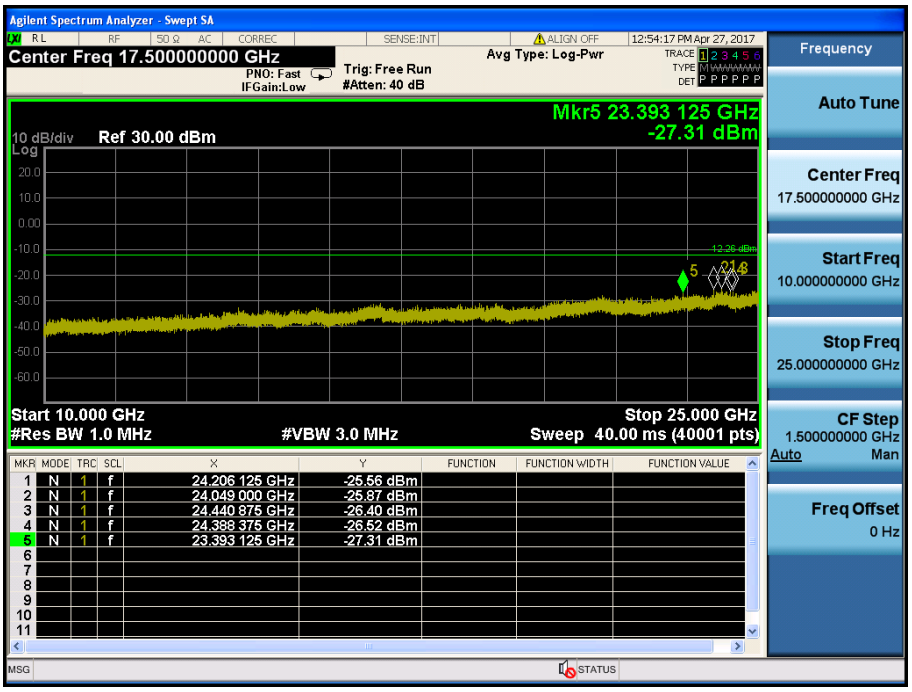


Conducted Spurious Emissions





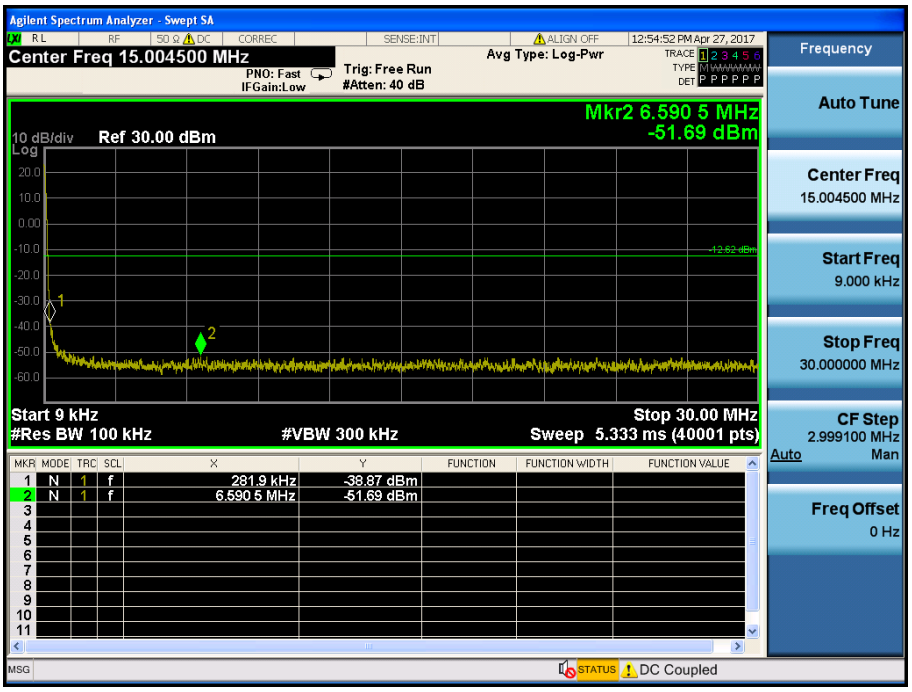
Conducted Spurious Emissions



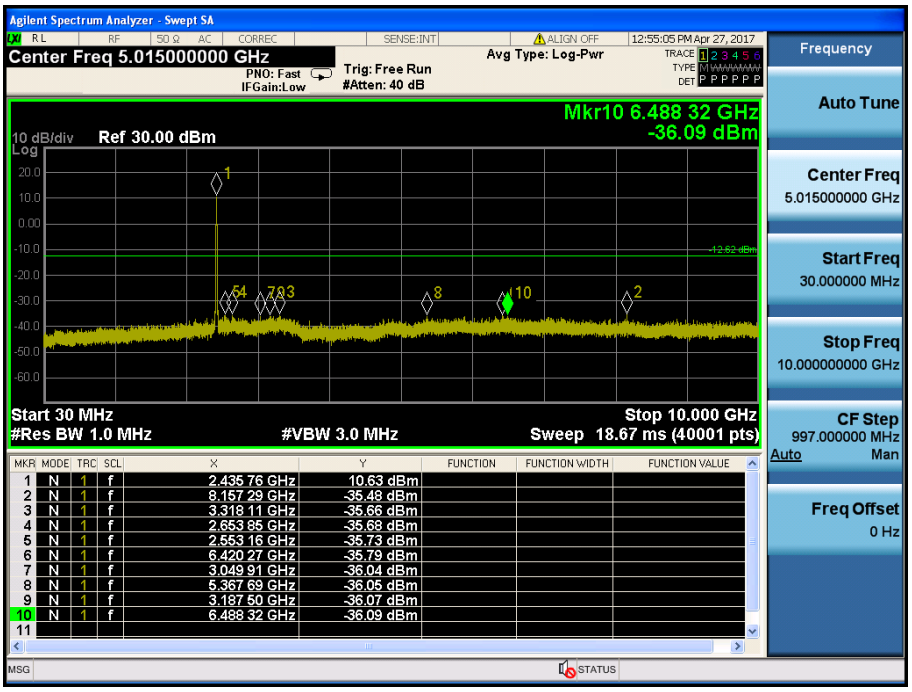
802.11b & 1 Mbps & 2437 MHz

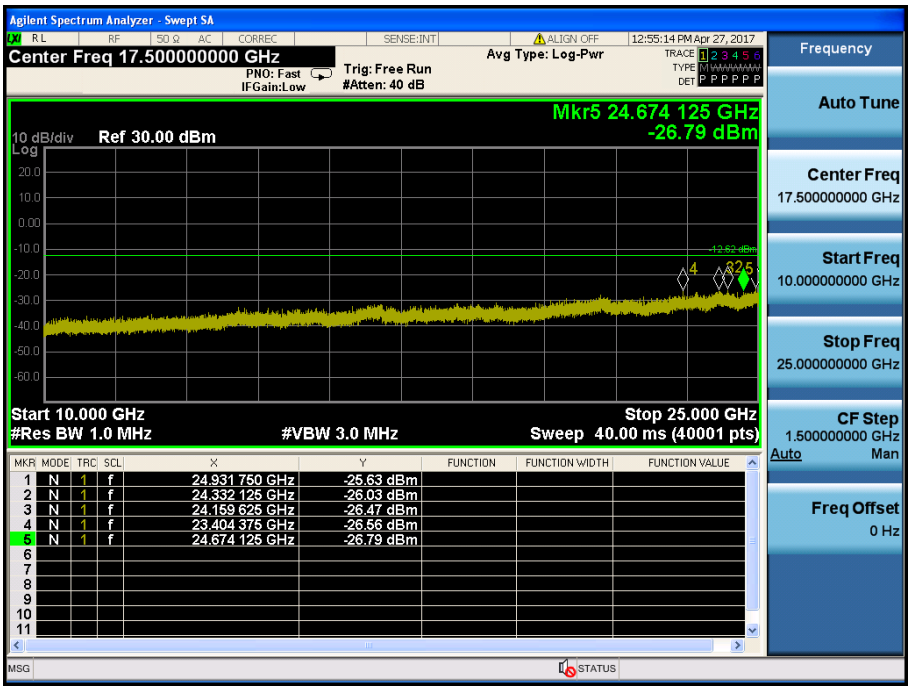
Reference

Conducted Spurious Emissions



Conducted Spurious Emissions

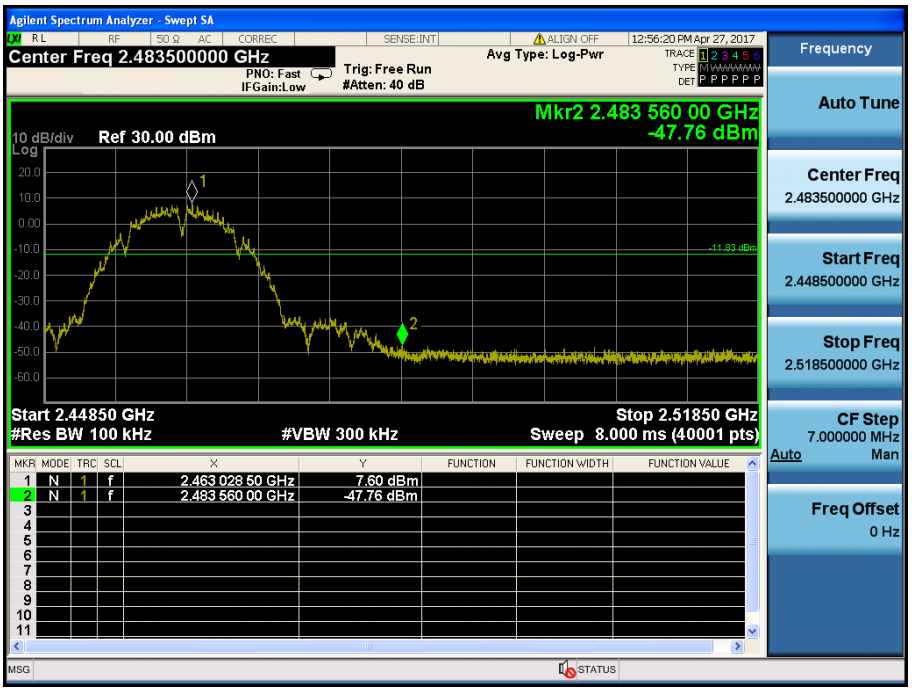




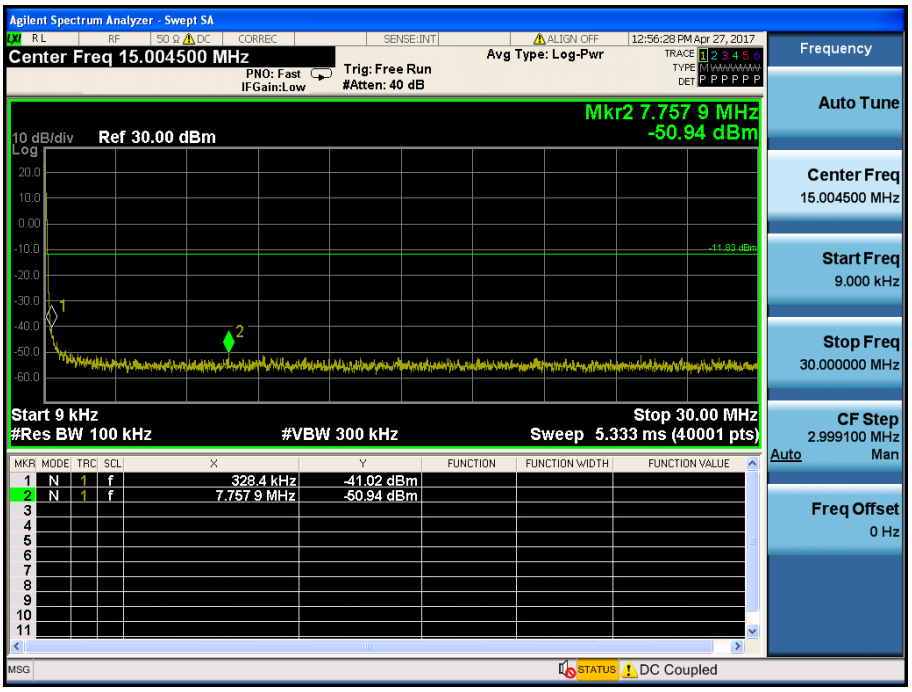
802.11b & 1 Mbps & 2462 MHz

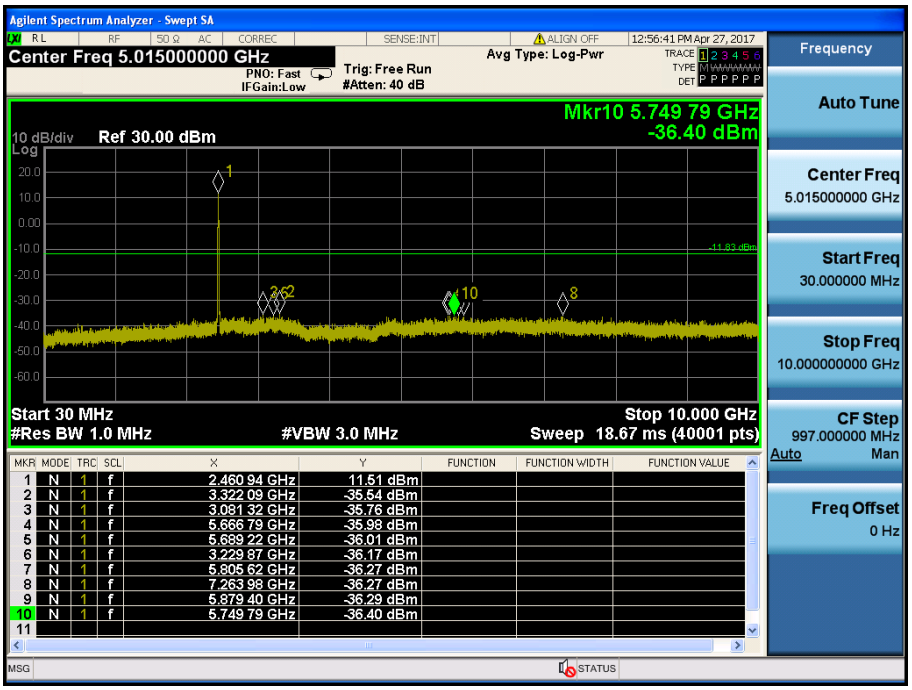
Reference

High Band-edge

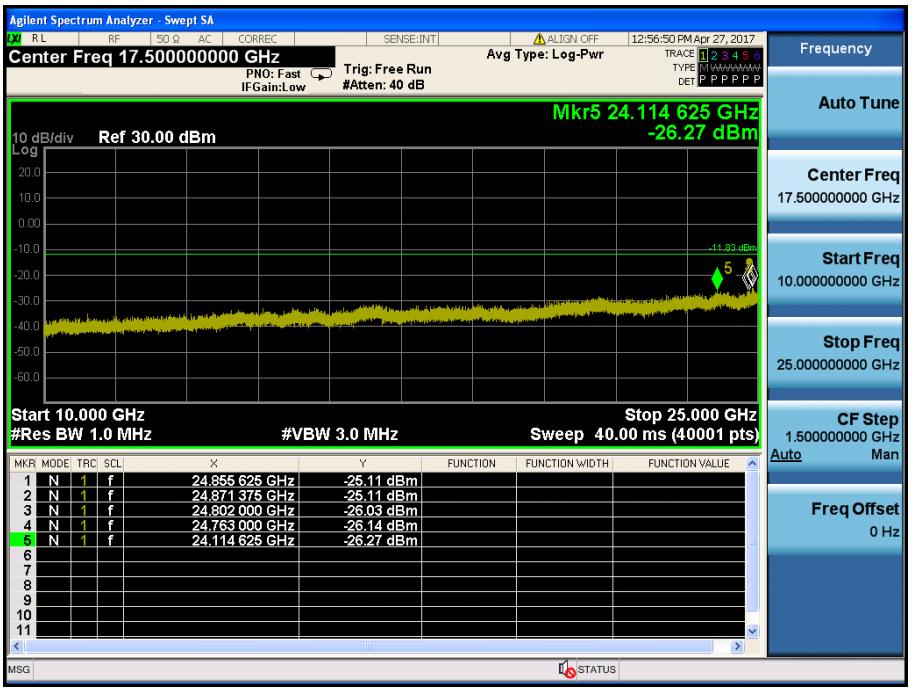


Conducted Spurious Emissions



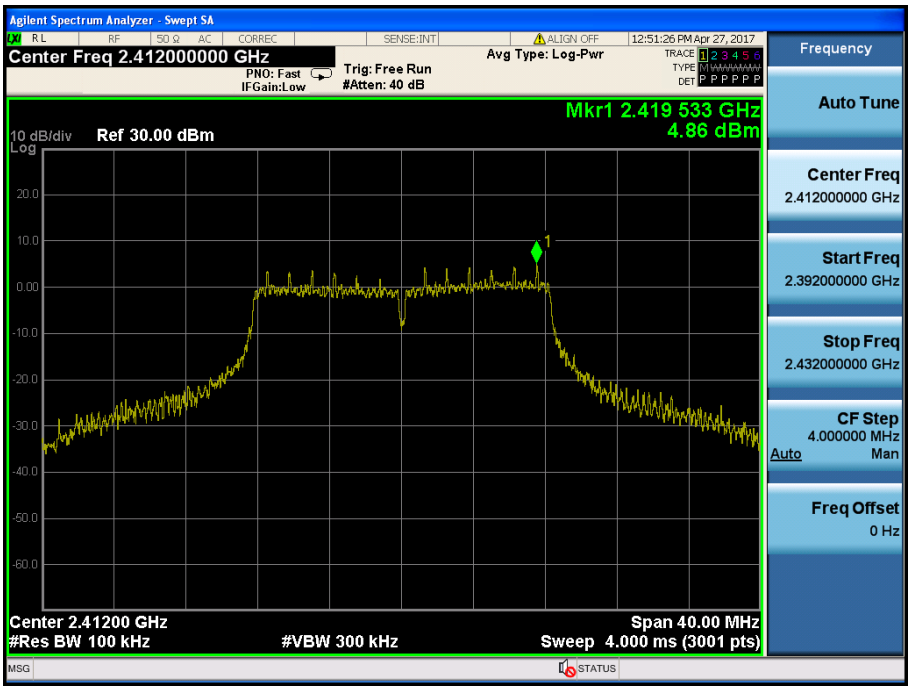


Conducted Spurious Emissions

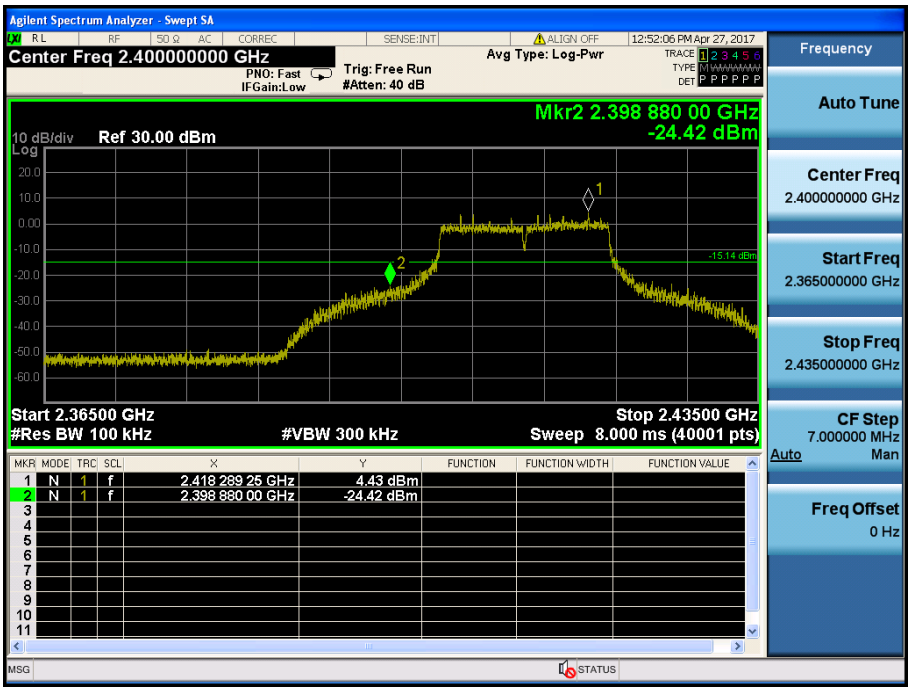


802.11g & 6 Mbps & 2412 MHz

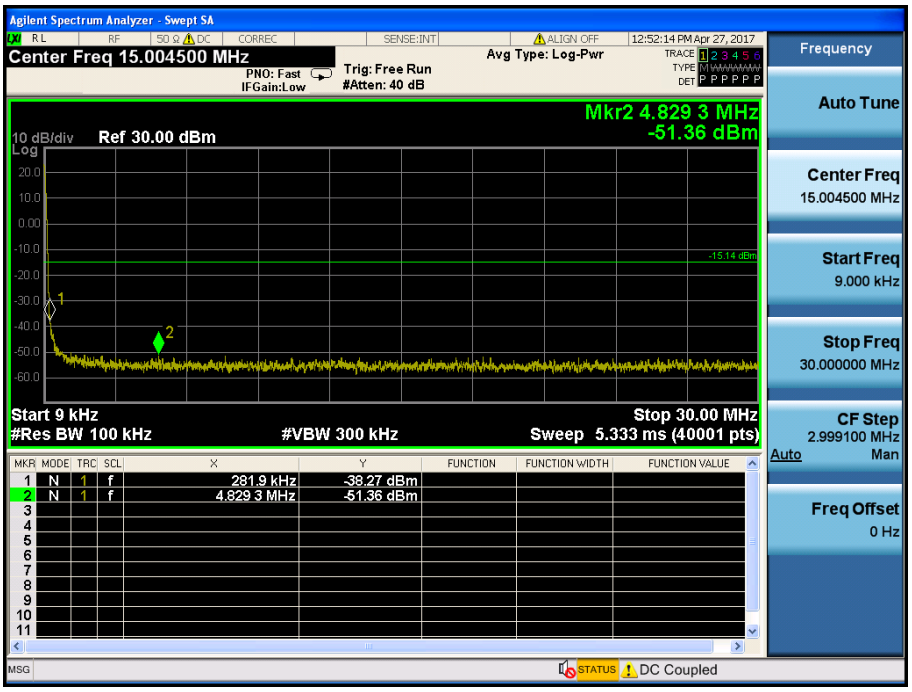
Reference

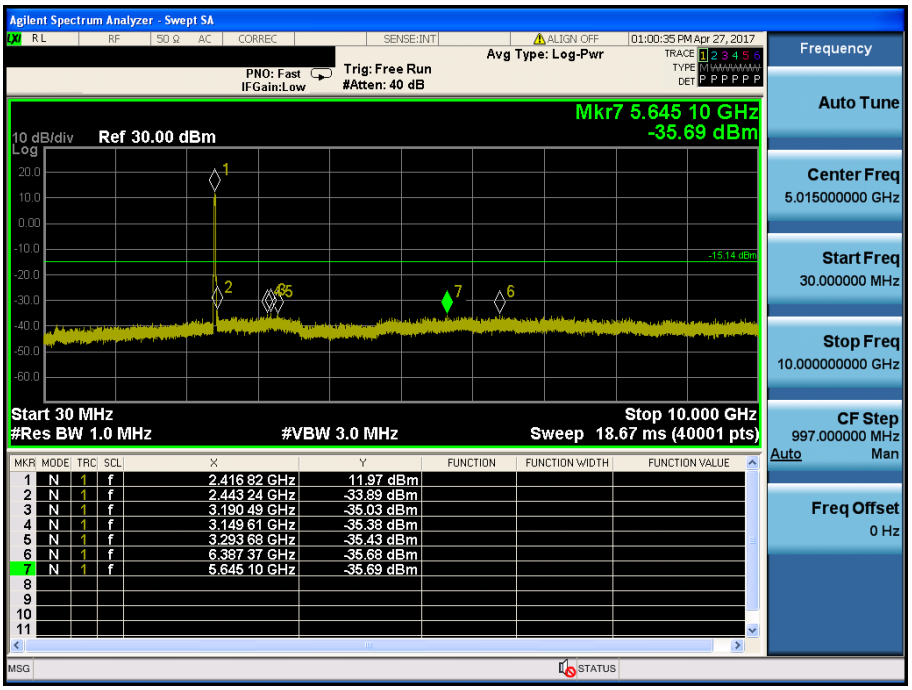
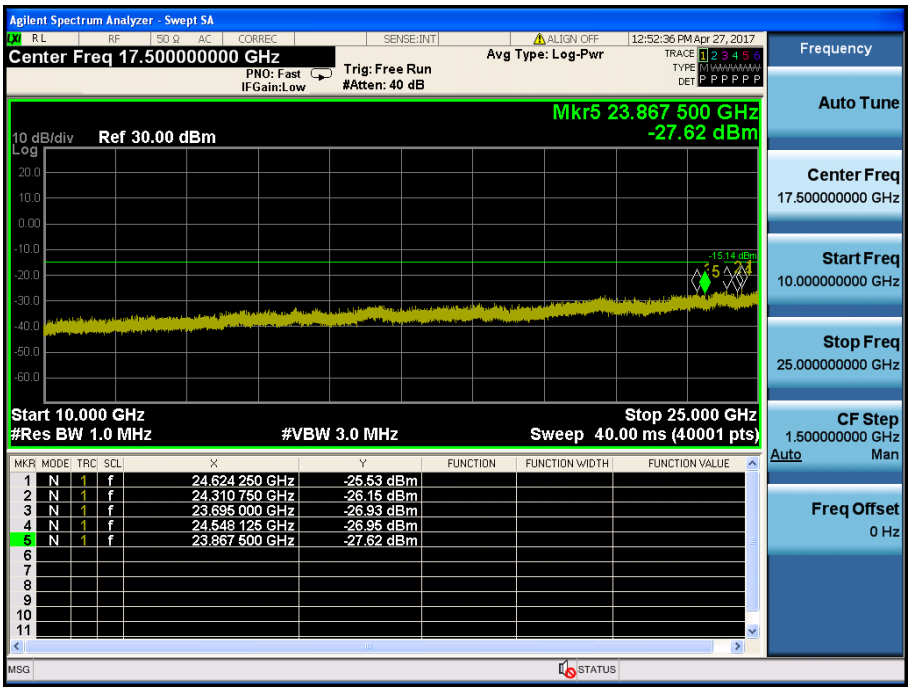


Low Band-edge



Conducted Spurious Emissions





Conducted Spurious Emissions