

RF TEST REPORT

Test item : Wi-Fi Transmitter
Model No. : WCH730B
Order No. : DTNC1410-04550, DTNC1411-04824
Date of receipt : 2014-10-17, 2014-11-04
Test duration : 2014-11-17 ~ 2014-12-03
Date of issue : 2015-01-13
Use of report : FCC & IC Original Grant

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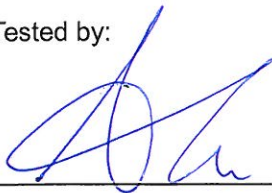
Test specification : FCC Part 15 Subpart C 247
RSS-210 Issue 8: 2010

Test environment : See appended test report

Test result : Pass Fail

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.

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Test Report Version

Test Report No.	Date	Description
DRTFCC1501-0003	Jan. 13, 2015	Initial issue

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1. EUT DESCRIPTION

FCC Equipment Class	Digital Transmission System(DTS)
Product	Wi-Fi Transmitter
Model Name	WCH730B
Add Model Name	NA
Power Supply	DC 5 V
Frequency Range	2.4 GHz Band <ul style="list-style-type: none"> ▪ 802.11b/g/n(HT20): 2412 MHz ~ 2462 MHz ▪ 802.11n(HT40): 2422 MHz ~ 2452 MHz
Modulation Type	<ul style="list-style-type: none"> ▪ 802.11b: CCK/DSSS ▪ 802.11g/n: OFDM
Transmissions category	Completely uncorrelated signal
Antenna Specification	<p>Antenna type: Internal Antenna</p> <p>Antenna gain</p> <ul style="list-style-type: none"> ▪ 2.4 GHz Band: ANT 1 : 2.200 dBi & ANT 2 : 1.900 dBi <p>Antenna configuration</p> <ul style="list-style-type: none"> ▪ 802.11b/g: Single Transmitting (ANT 1) ▪ 802.11n(MCS0 ~ 7) : Single Transmitting (ANT 1 or ANT 2) ▪ 802.11n(MCS8 ~ 15): Multiple Transmitting (ANT 1 and ANT 2)

2. INFORMATION ABOUT TESTING

2.1 Test mode

Transmitting Mode	Test mode	Worst case data rate	Tested Frequency(MHz)		
			Lowest	Middle	Highest
Single	TM 1	802.11b 1 Mbps	2412	2437	2462
	TM 2	802.11g 6 Mbps	2412	2437	2462
	TM 3	802.11n(HT20) MCS 0	2412	2437	2462
	TM 4	802.11n(HT40) MCS 0	2422	2437	2452
Multiple	TM 5	802.11n(HT20) MCS 8	2412	2437	2462
	TM 6	802.11n(HT40) MCS 8	2422	2437	2452

Note 1: The worst case data rate is determined as above test mode. And all tests conducted in this report were made at the worst case data rate.

Note 2: The test mode 5(TM 5) and 6(TM 6) are tested for measure-and-sum technique of multiple transmitting mode.

2.3 Auxiliary equipment

Equipment	Model No.	Serial No.	Manufacturer	Note
Notebook PC	20095	WB06116969	Lenovo	DOC
-	-	-	-	-

2.4 Tested environment

Temperature	: 22 ~ 24 °C
Relative humidity content	: 43 ~ 46 % R.H.
Details of power supply	: DC 5.0 V

2.5 EMI suppression Device(s) / Modifications

EMI suppression device(s) added and/or modifications made during testing
→ None

3. SUMMARY OF TESTS

FCC Part Section(s)	RSS Section(s)	Parameter	Limit	Test Condition	Status Note 1
I. Transmitter Mode (TX)					
15.247(a)	RSS-210 [A8.2]	6 dB Bandwidth	> 500 kHz	Conducted	C
15.247(b)	RSS-210 [A8.4]	Transmitter Output Power	< 1 Watt		C
15.247(d)	RSS-210 [A8.5]	Out of Band Emissions / Band Edge	20 dBc in any 100 kHz BW		C
15.247(e)	RSS-210 [A8.2]	Transmitter Power Spectral Density	< 8 dBm / 3 kHz		C
-	RSS Gen [6.6]	Occupied Bandwidth (99%)	RSS-Gen		C
15.205 15.209	RSS-210 [A8.5]	General Field Strength Limits (Restricted Bands and Radiated Emission Limits)	FCC 15.209 limits	Radiated	C Note 2
15.207	RSS-Gen [8.8]	AC Conducted Emissions	FCC 15.207 limits	AC Line Conducted	C
15.203	RSS-Gen [6.7]	Antenna Requirements	FCC 15.203 limits	-	C
<p>Note 1: C=Comply NC=Not Comply NT=Not Tested NA=Not Applicable</p> <p>Note 2: This test item was performed in each axis and the worst case data was reported.</p>					

4. TEST METHODOLOGY

Generally the tests were performed according to the KDB 558074 D01 DTS Meas. Guidance v03r2 and KDB 662911 D01 v02r01 for the measure-and-sum technique. And ANSI C63.10-2009 was used to reference appropriate EUT setup and maximizing procedures of radiated spurious emission and AC line conducted emission testing

4.1 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.

4.2 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.

4.3 General test procedures

Conducted Emissions

The power-line conducted emission test procedure is not described on the KDB 558074 D01 DTS Meas. Guidance v03r2. So this test was fulfilled with the requirements in Section 6.2 of ANSI C63.10.

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

Radiated Emissions

Basically the radiated tests were performed with KDB 558074 D01 DTS Meas. Guidance v03r2. 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 as stated on section 12.1 of the KDB 558074 D01 DTS Meas. Guidance v03r2.

The EUT is placed on a non-conductive table, which is 0.8 m above ground plane. The turn table 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 axis.

4.4 Description of test modes

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

5. 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.

6. FACILITIES AND ACCREDITATIONS

6.1 Facilities

The open area test site(OATS) or semi anechoic chamber and conducted measurement facility used to collect the radiated and conducted test data are located at the 42, Yurim-ro, 154beon-gil, Cheoin-gu, Yongin-si, Gyeonggi-do, Korea 449-935 The site is constructed in conformance with the requirements.

- Semi anechoic chamber registration Number: 678747

6.2 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 peak, 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."

7. ANTENNA REQUIREMENTS

7.1 According to FCC 47 CFR §15.203& RSS-Gen [6.7]:

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 of this E.U.T is permanently attached on the main PCB.(Refer to Internal Photo.) Therefore this module Complies with the requirement of §15.203

7.2 Directional antenna gain(worst case):

Bands	ANT 1 [dBi]	ANT 2 [dBi]	Directional Gain [dBi]
2.4 GHz	2.200	1.900	5.062 ^{Note 1.}

Note 1. Directional gain(correlated signal with unequal antenna gain and equal transmit power)

$$10 \log [(10^{G_1/20} + 10^{G_2/20} + \dots + 10^{G_N/20})^2 / N^{ANT}] \text{ dBi}$$

Note 2. Directional gain(completely uncorrelated signal with unequal antenna gain and equal transmit power)

$$10 \log [(10^{G_1/10} + 10^{G_2/10} + \dots + 10^{G_N/10}) / N^{ANT}] \text{ dBi}$$

Note 3. Directional gain(spatial multiplexing)

$$G_{ANT \text{ MAX}} + 10 \log (N_{ANT} / N_{SS}) \text{ dBi}$$

8. TEST RESULT

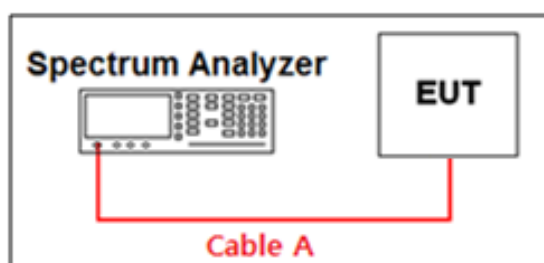
8.1 6dB bandwidth

■ Test Requirements and limit, §15.247(a) & RSS-210 [A8.2]

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: KDB 558074 D01 DTS Meas. Guidance v03r2

1. Set resolution bandwidth (RBW) = 100 kHz & video bandwidth (VBW) $\geq 3 \times$ RBW.
(RBW: 100kHz & VBW: 300 kHz)
2. Detector = **Peak**.
3. Trace mode = **max hold**.
4. Sweep = **auto couple**.
5. Allow the trace to stabilize.
6. 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.

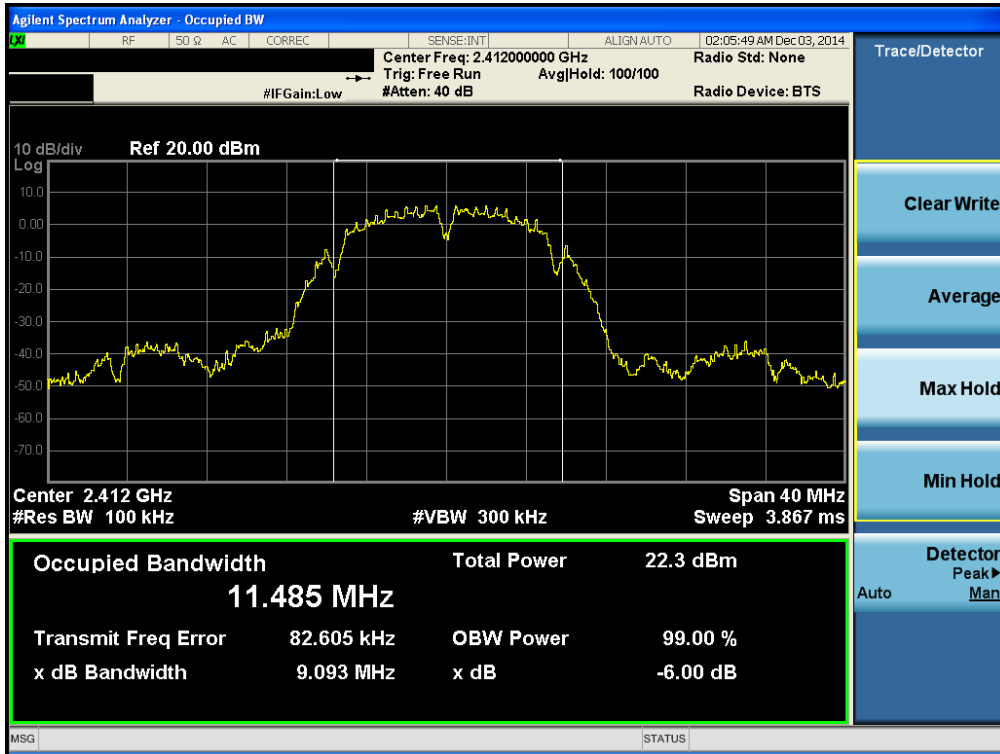
■ **Test Results: Comply**

Test Mode	Frequency	Test Results[MHz]	
		ANT 1	ANT 2
TM 1	Lowest	9.093	-
	Middle	8.578	-
	Highest	8.606	-
TM 2	Lowest	16.430	-
	Middle	16.370	-
	Highest	16.350	-
TM 3	Lowest	17.390	17.600
	Middle	17.630	17.600
	Highest	17.600	17.610
TM 4	Lowest	35.790	36.070
	Middle	36.150	36.350
	Highest	36.120	36.340
TM 5	Lowest	17.570	17.650
	Middle	17.640	17.640
	Highest	17.640	17.640
TM 6	Lowest	35.830	36.400
	Middle	36.370	36.410
	Highest	36.370	36.420

Result Plots

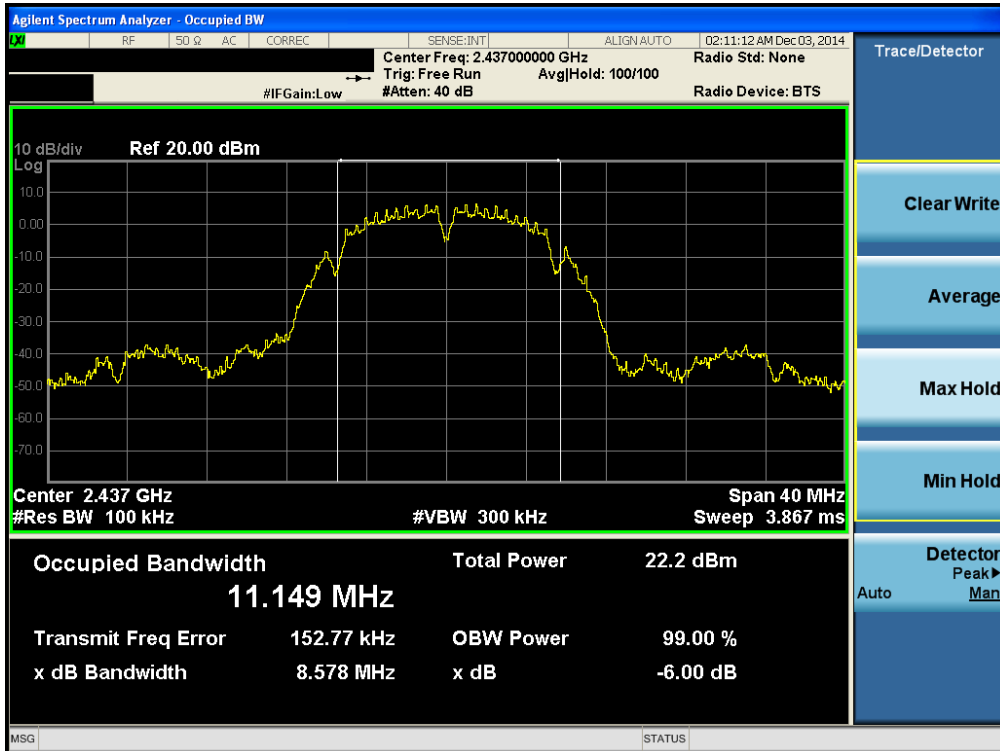
6 dB Bandwidth

TM 1 & ANT 1 & Lowest



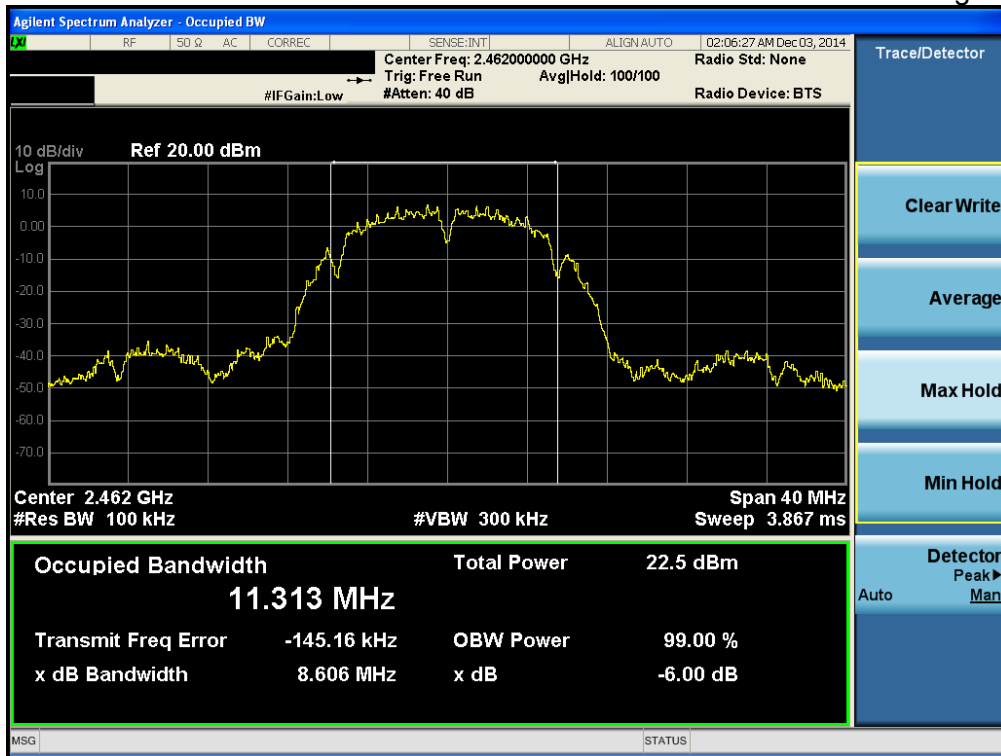
6 dB Bandwidth

TM 1 & ANT 1 & Middle



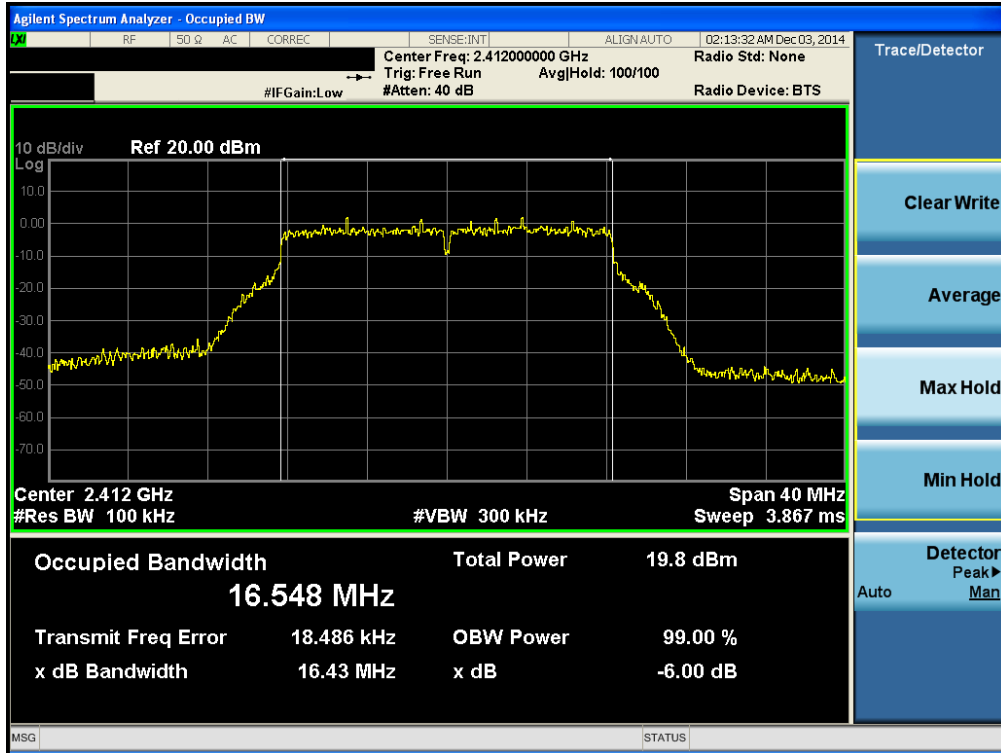
6 dB Bandwidth

TM 1 & ANT 1 & Highest



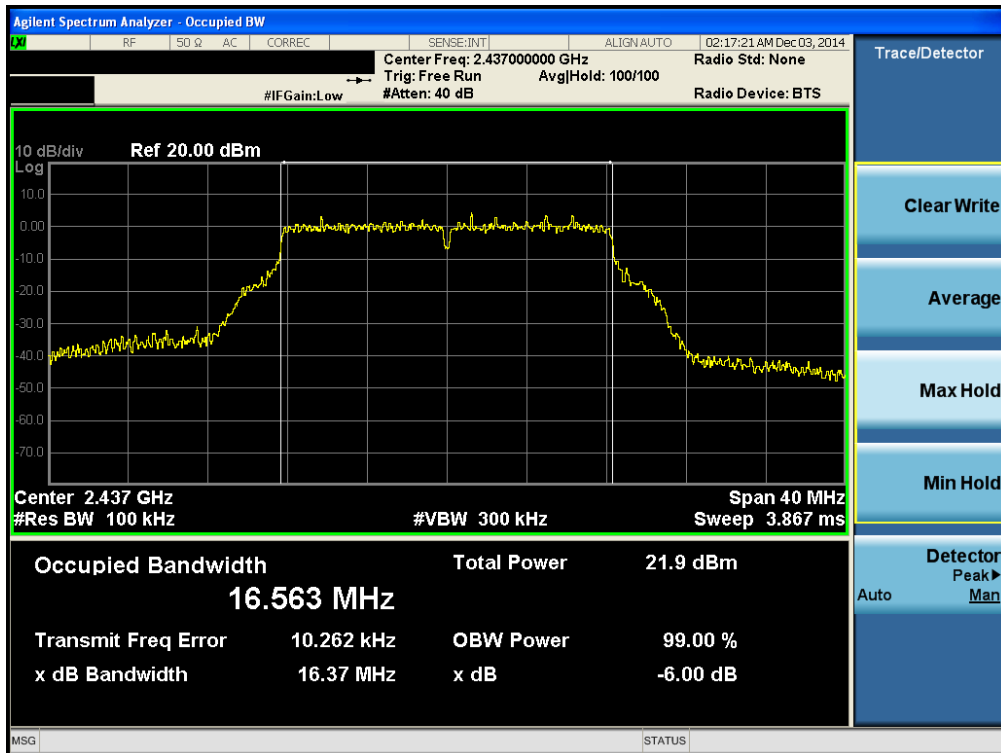
6 dB Bandwidth

TM 2 & ANT 1 & Lowest



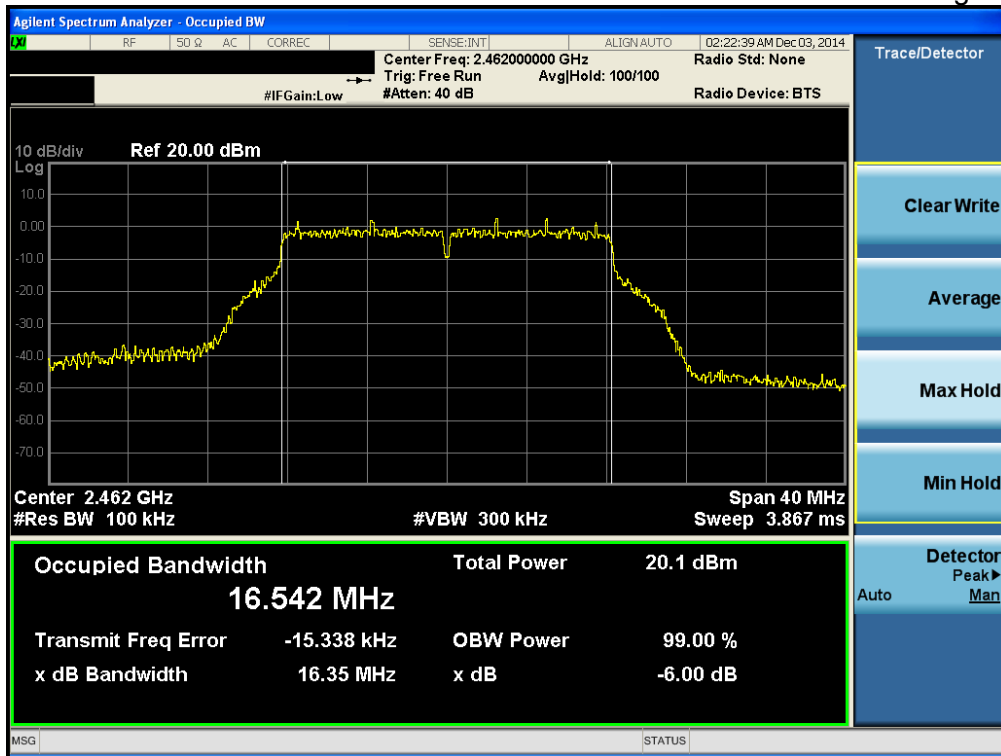
6 dB Bandwidth

TM 2 & ANT 1 & Middle



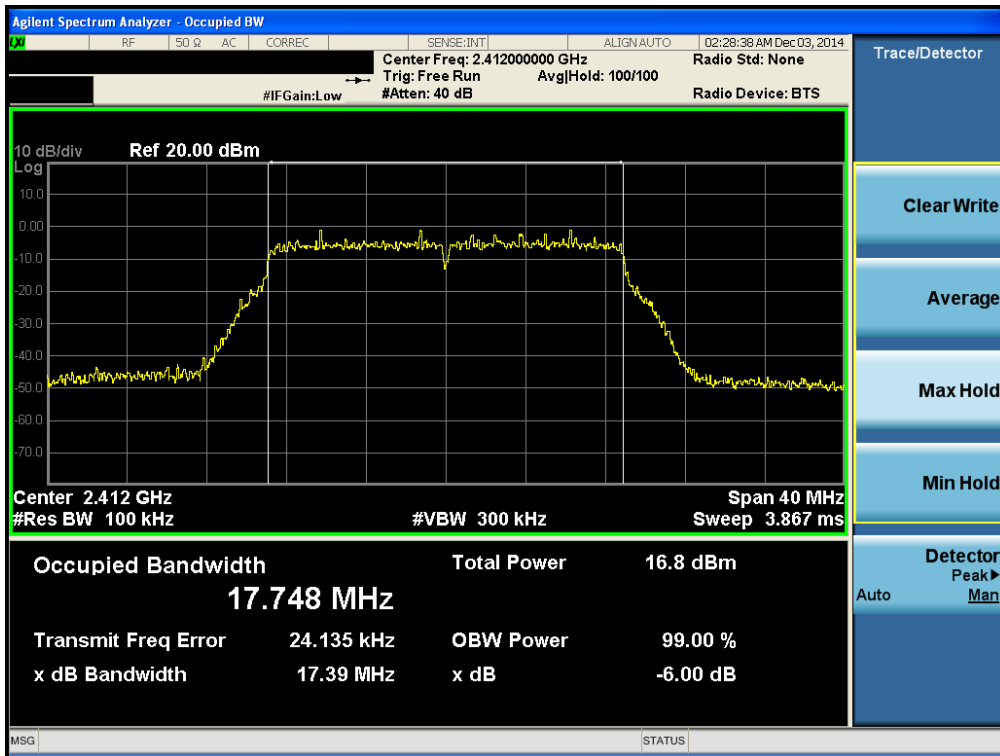
6 dB Bandwidth

TM 2 & ANT 1 & Highest



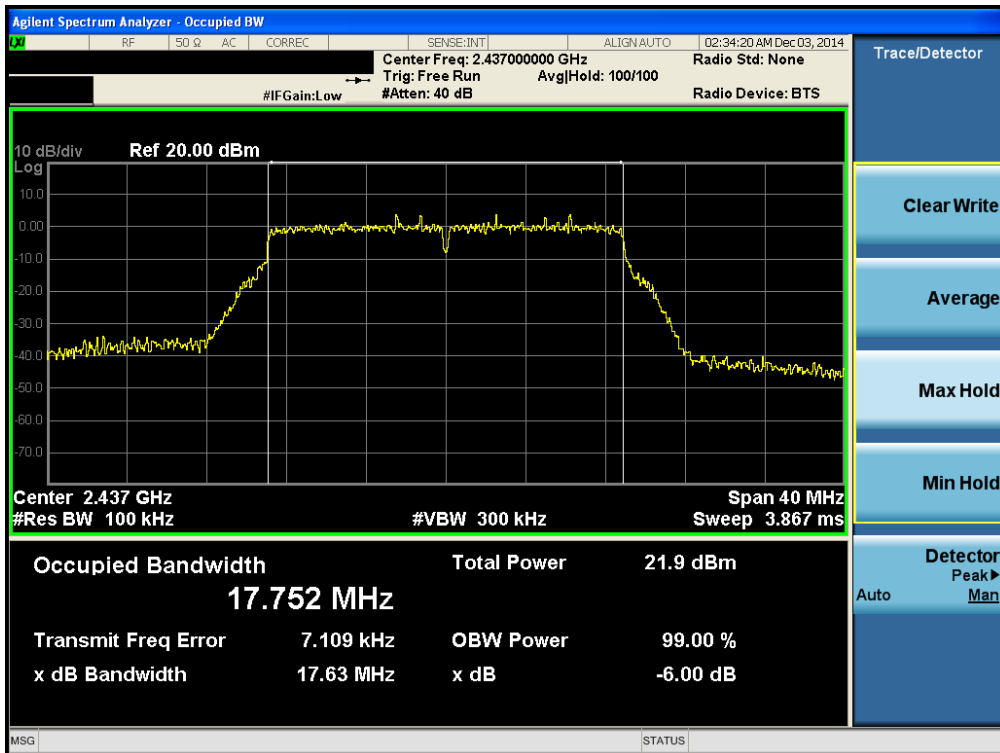
6 dB Bandwidth

TM 3 & ANT 1 & Lowest



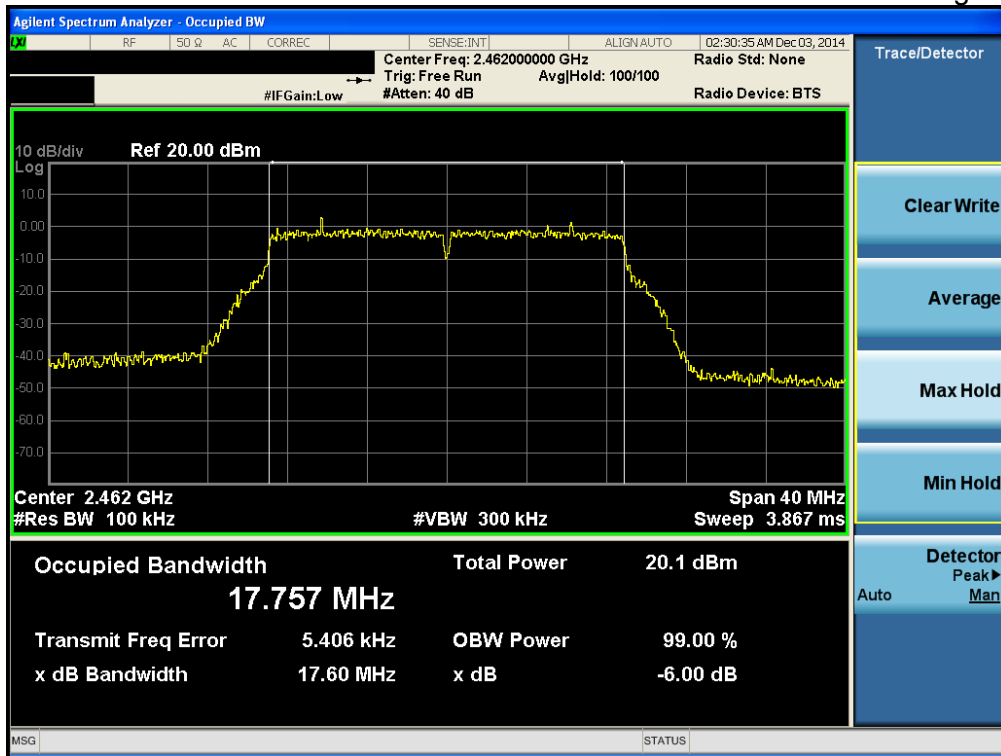
6 dB Bandwidth

TM 3 & ANT 1 & Middle



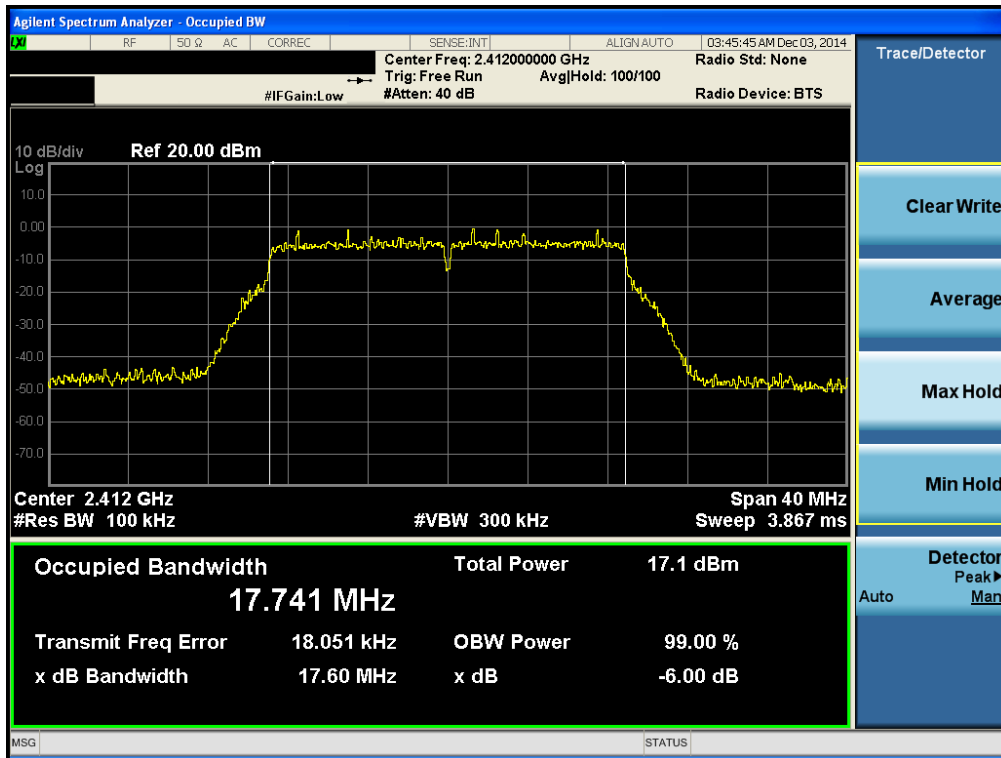
6 dB Bandwidth

TM 3 & ANT 1 & Highest



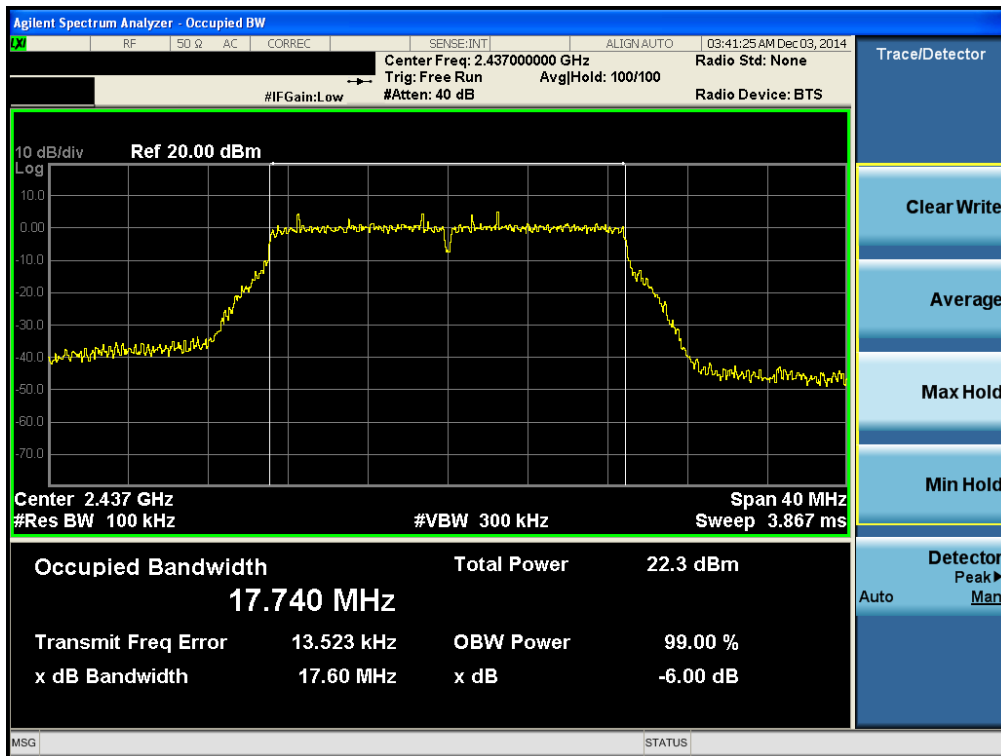
6 dB Bandwidth

TM 3 & ANT 2 & Lowest



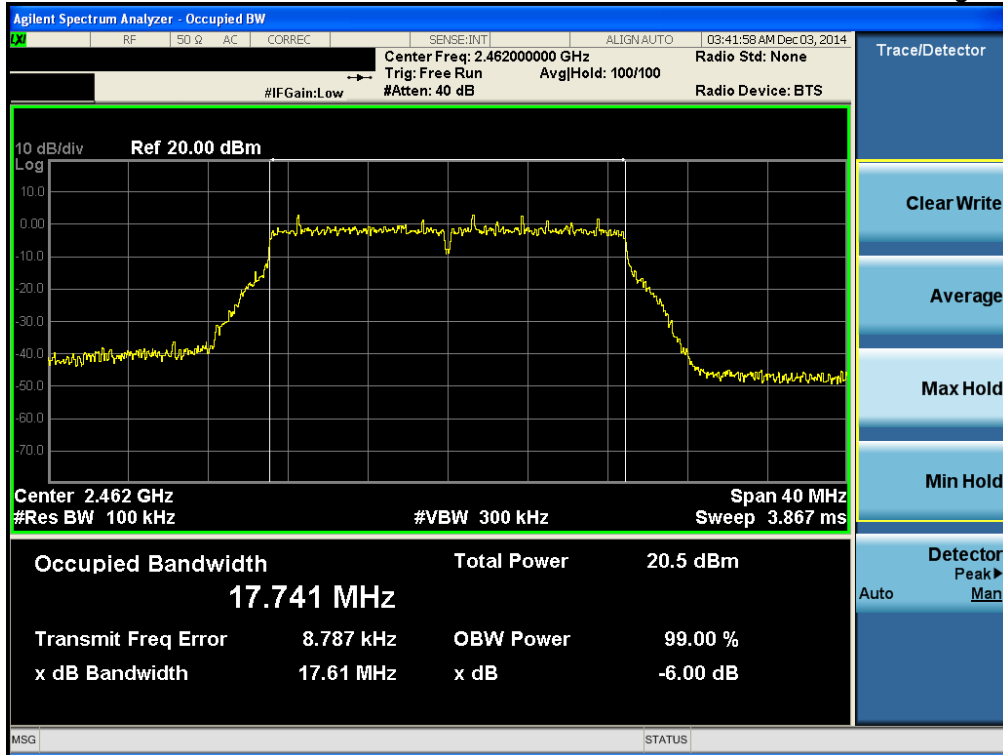
6 dB Bandwidth

TM 3 & ANT 2 & Middle



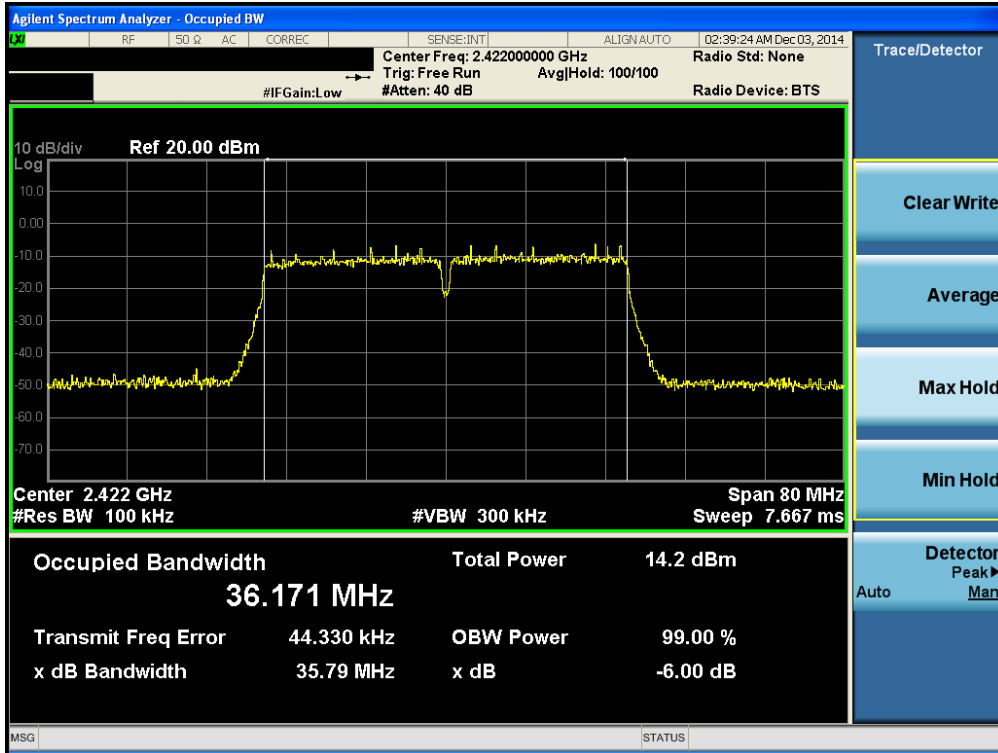
6 dB Bandwidth

TM 3 & ANT 2 & Highest



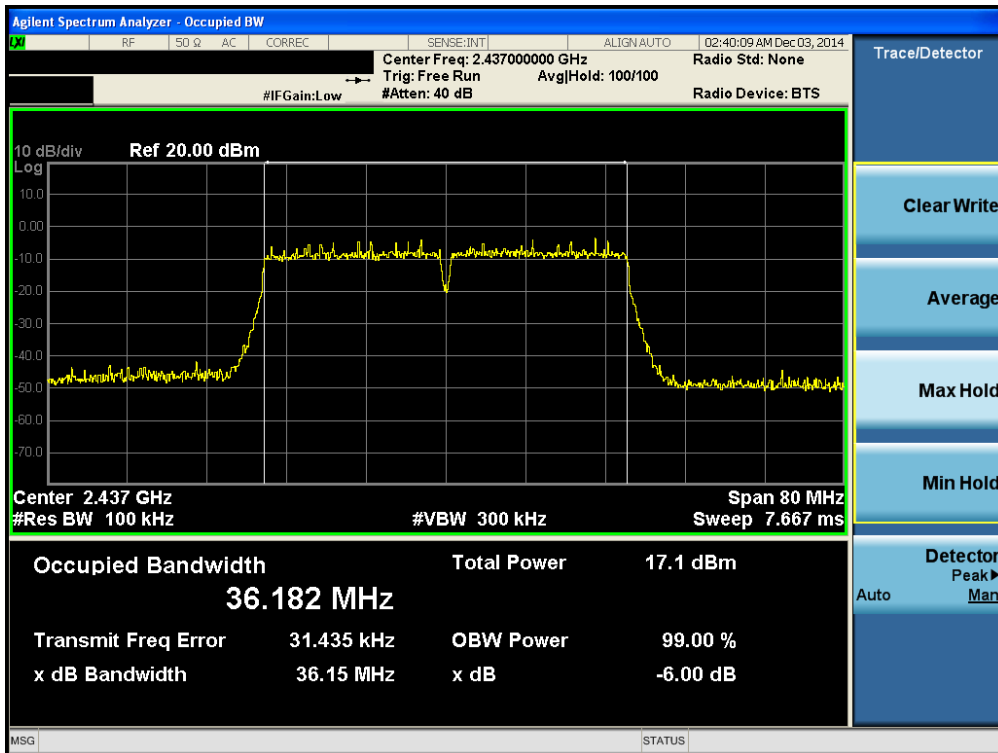
6 dB Bandwidth

TM 4 & ANT 1 & Lowest



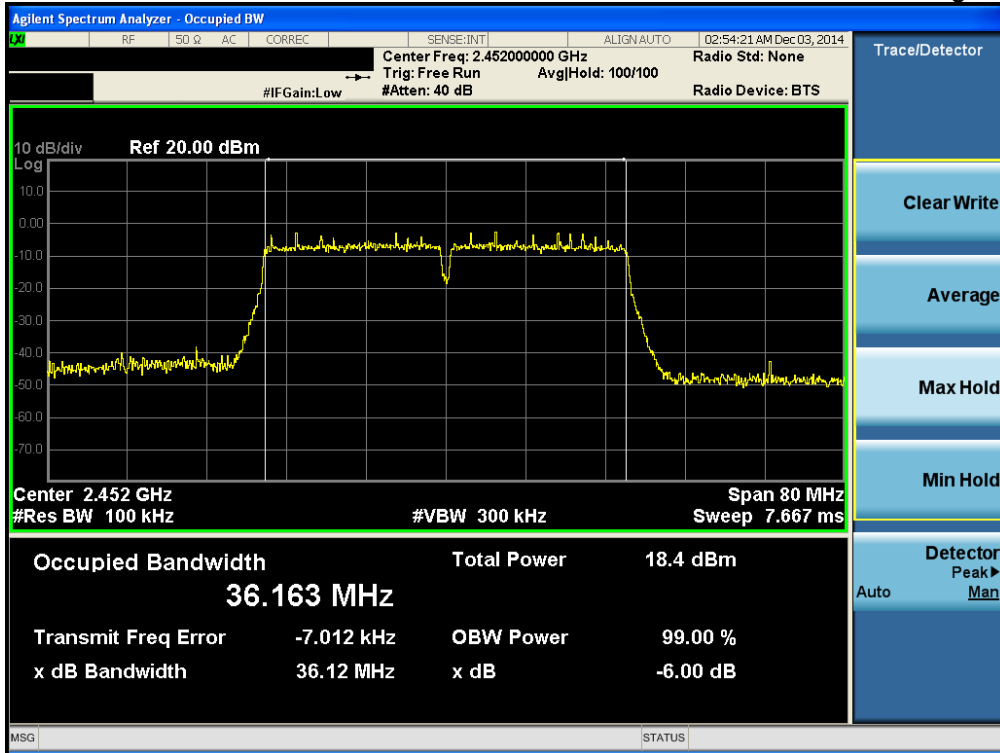
6 dB Bandwidth

TM 4 & ANT 1 & Middle



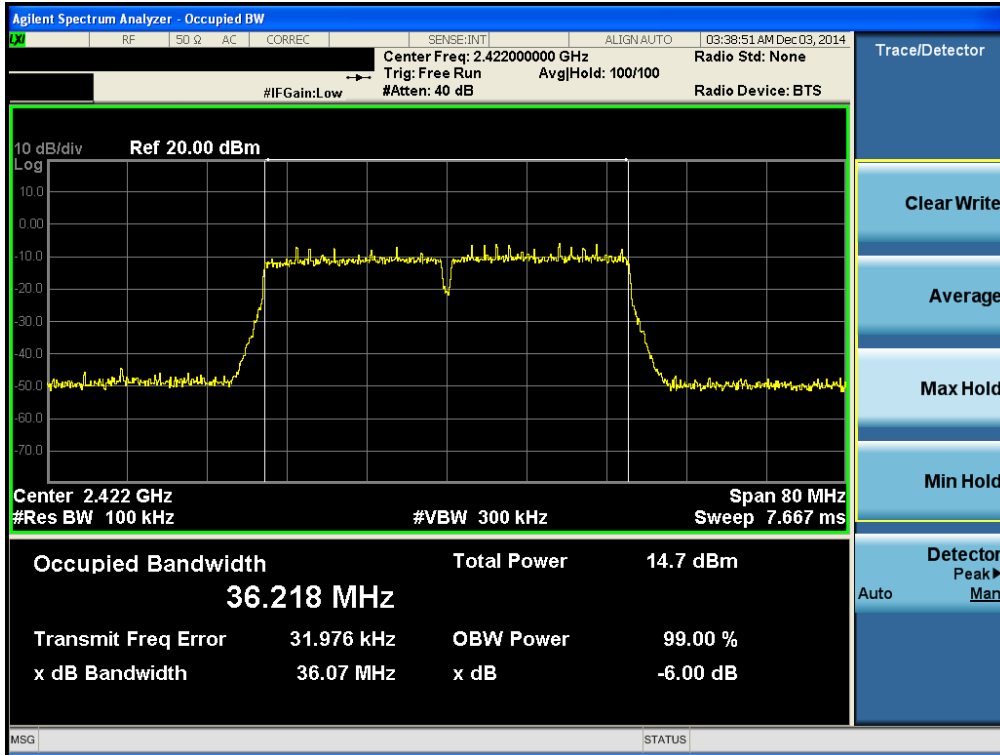
6 dB Bandwidth

TM 4 & ANT 1 & Highest



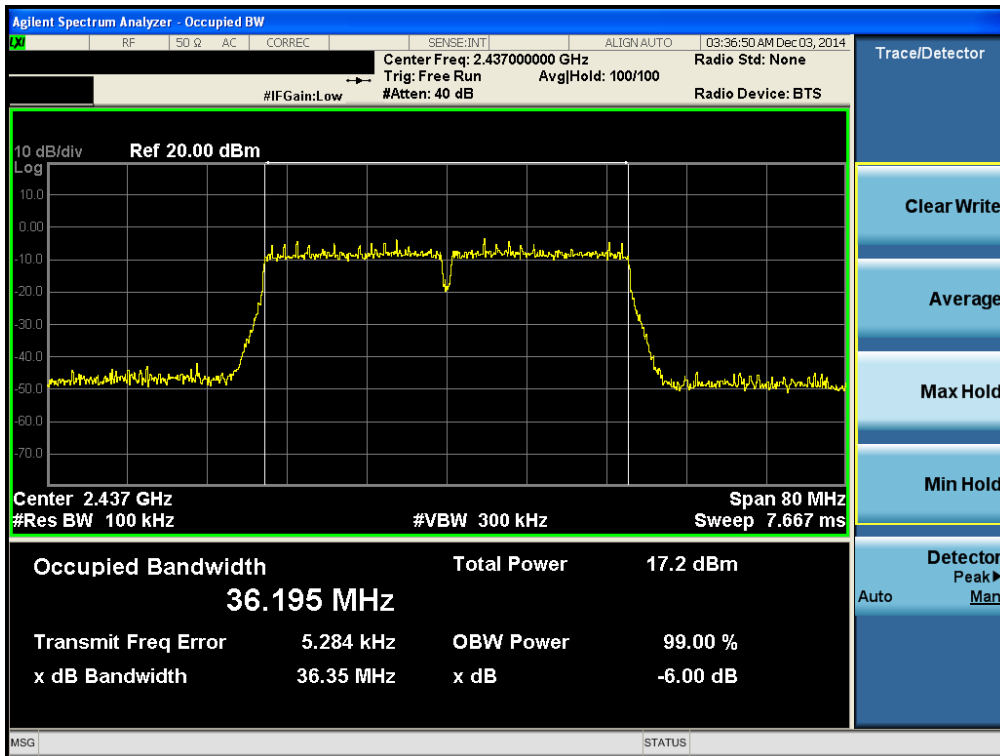
6 dB Bandwidth

TM 4 & ANT 2 & Lowest



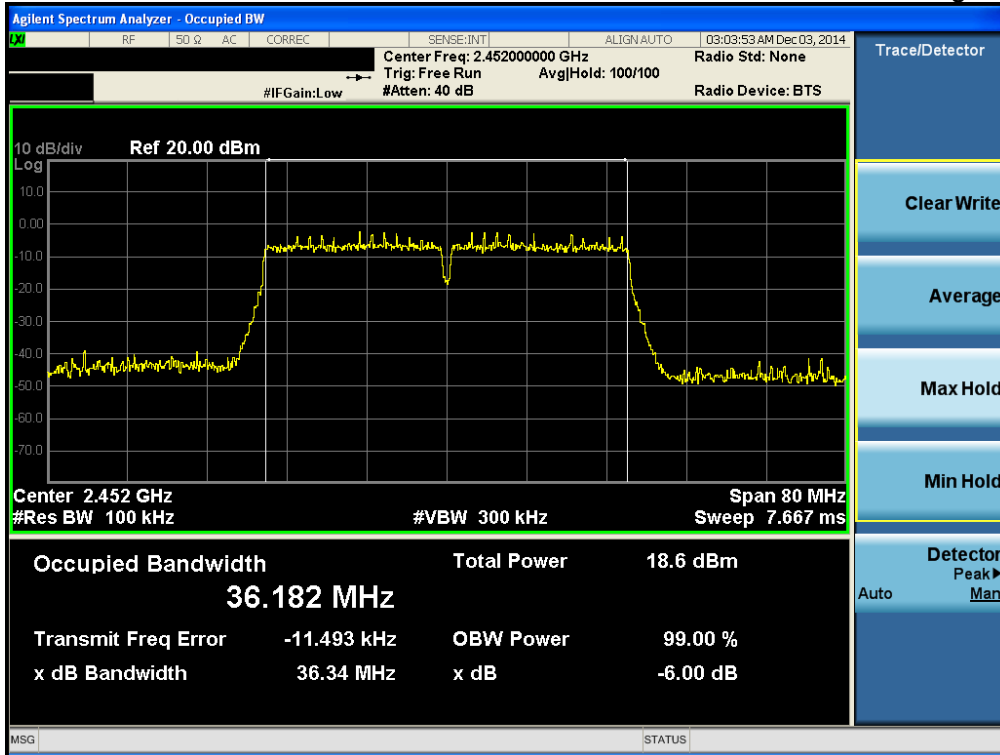
6 dB Bandwidth

TM 4 & ANT 2 & Middle



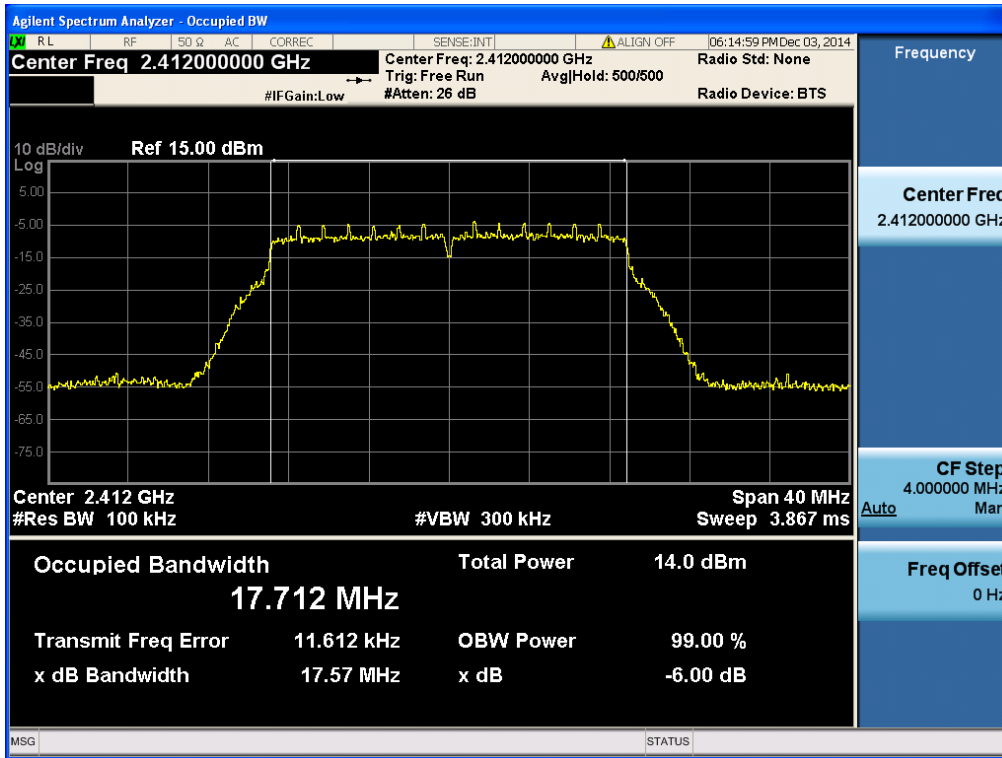
6 dB Bandwidth

TM 4 & ANT 2 & Highest



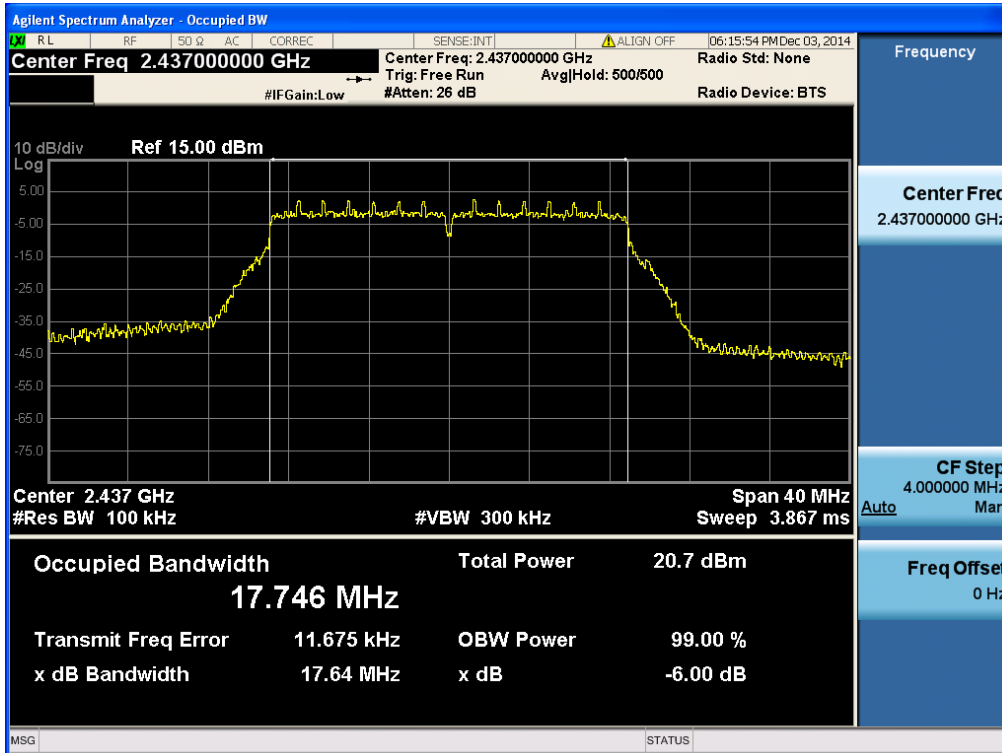
6 dB Bandwidth

TM 5 & ANT 1 & Lowest



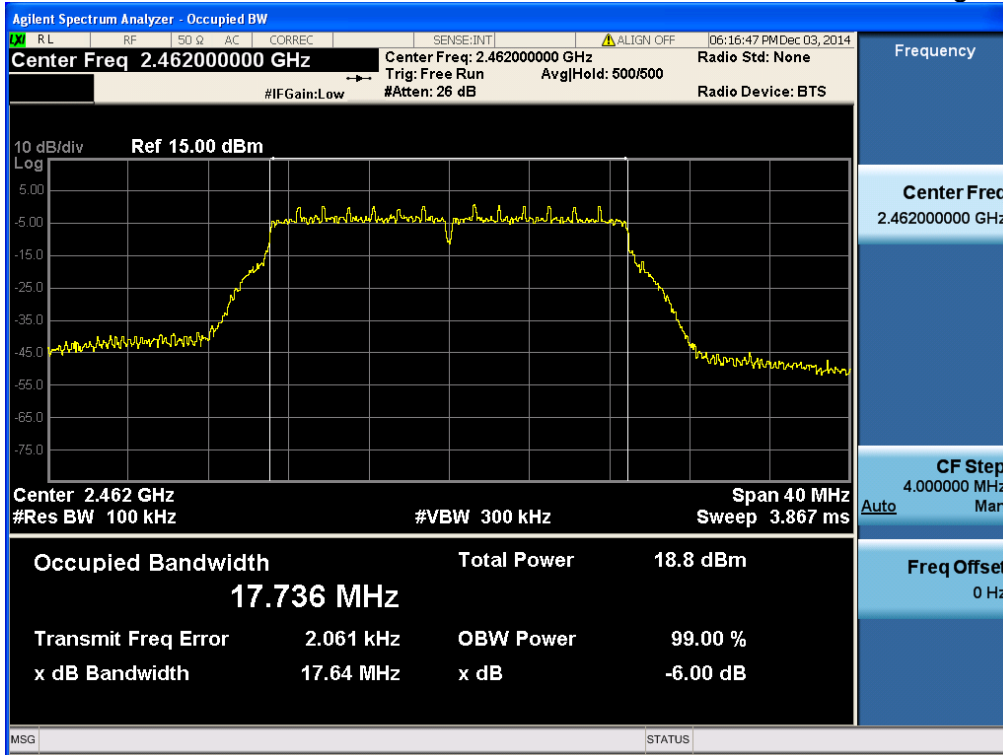
6 dB Bandwidth

TM 5 & ANT 1 & Middle



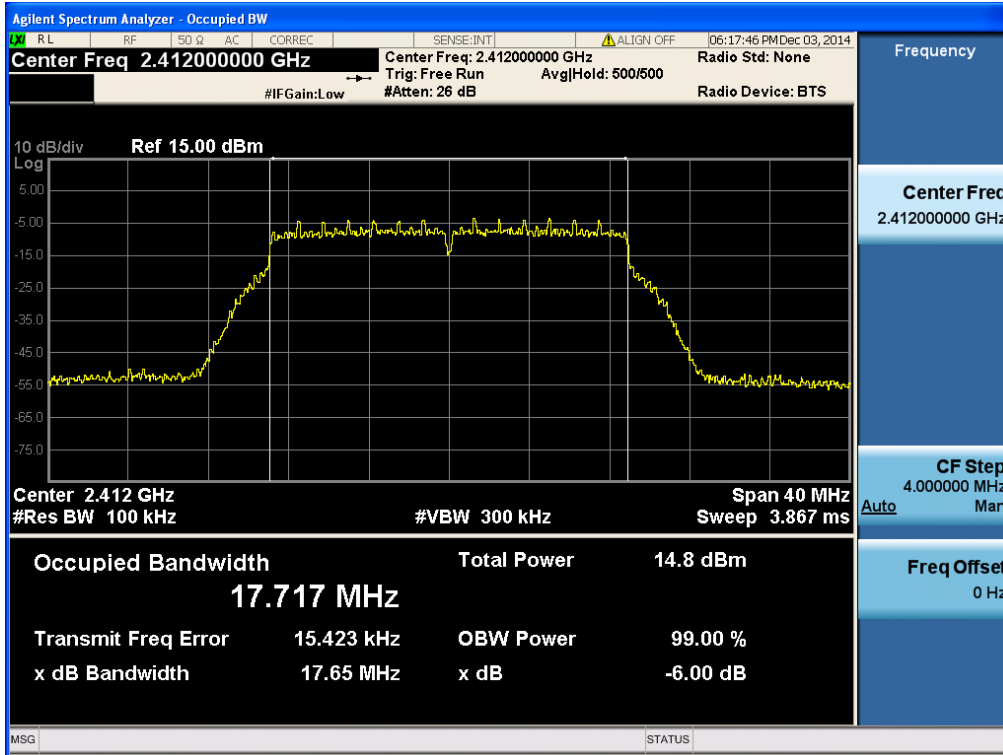
6 dB Bandwidth

TM 5 & ANT 1 & Highest



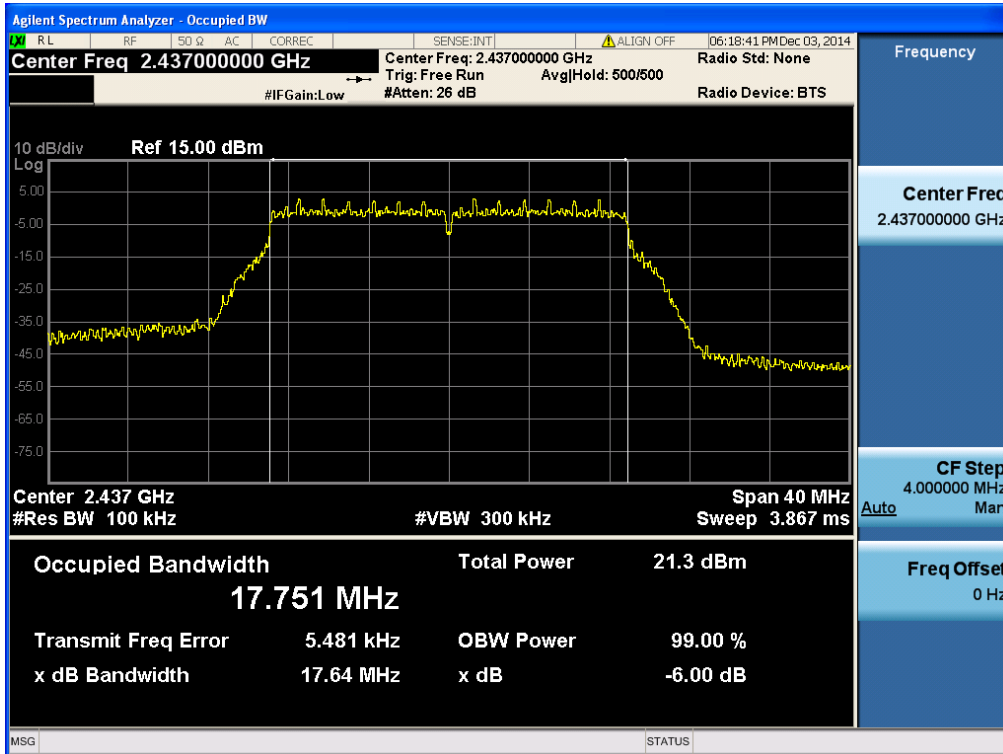
6 dB Bandwidth

TM 5 & ANT 2 & Lowest



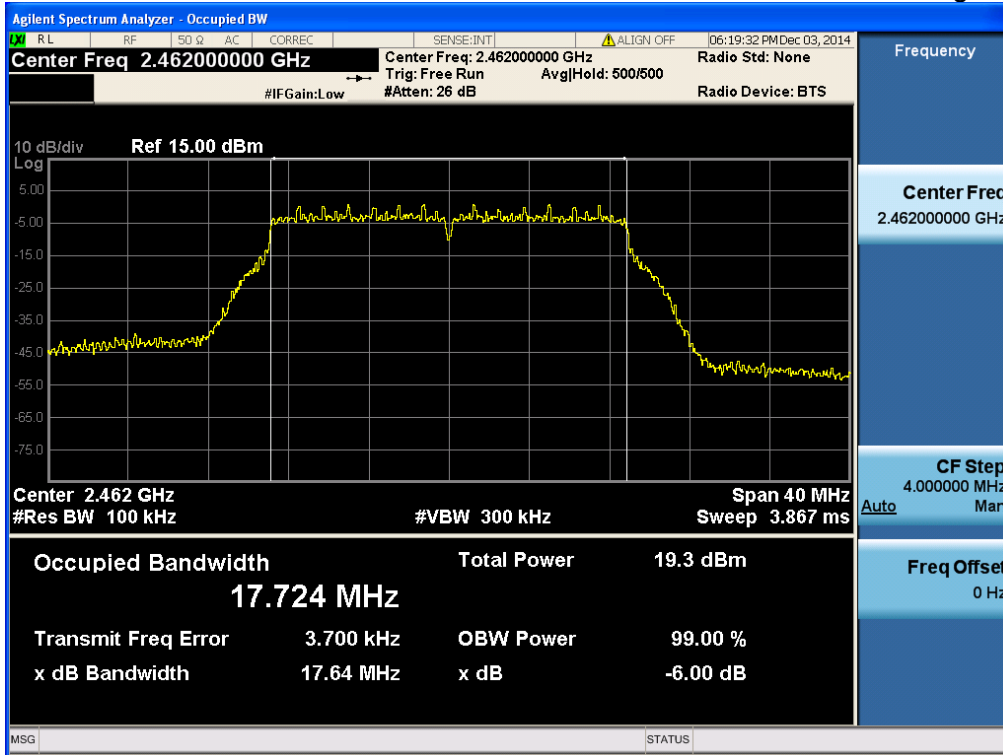
6 dB Bandwidth

TM 5 & ANT 2 & Middle



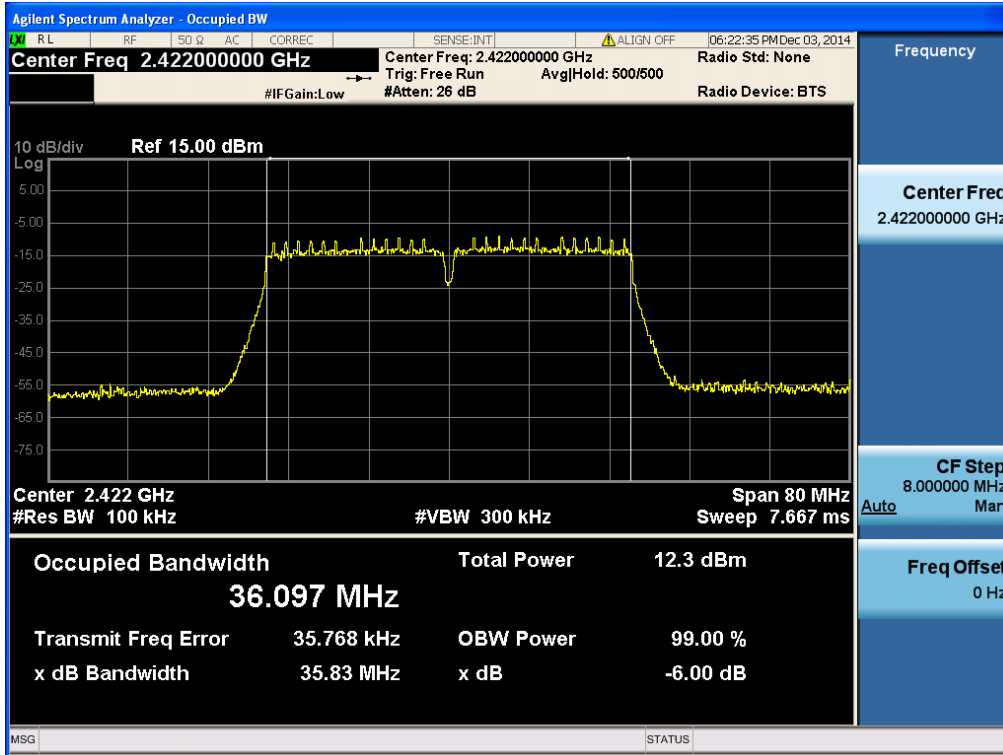
6 dB Bandwidth

TM 5 & ANT 2 & Highest



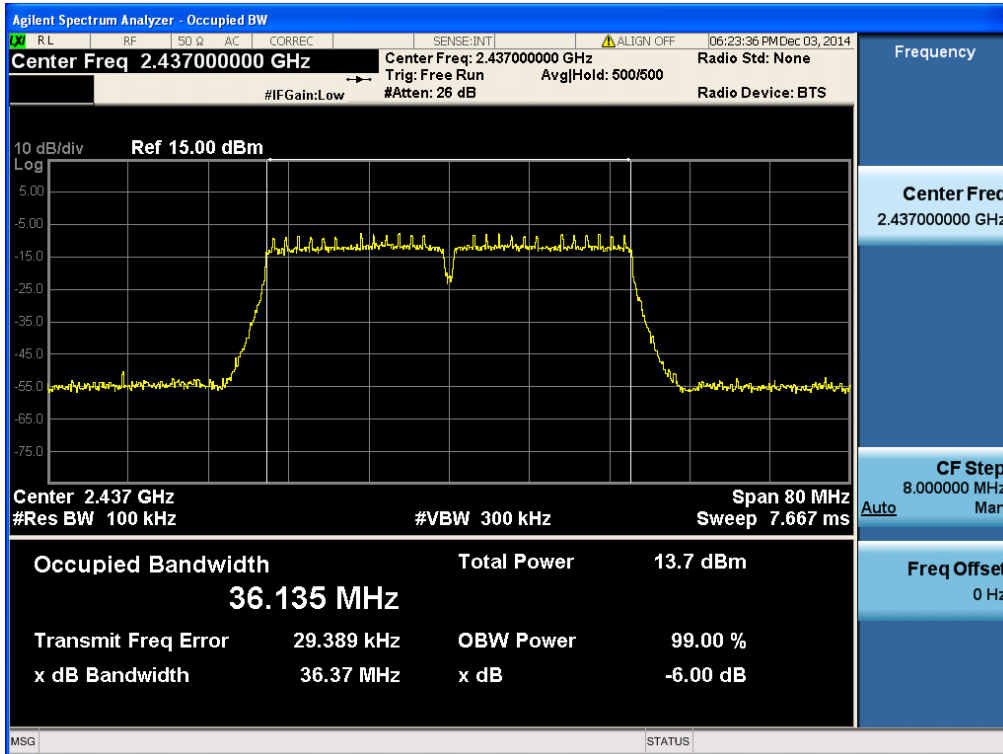
6 dB Bandwidth

TM 6 & ANT 1 & Lowest



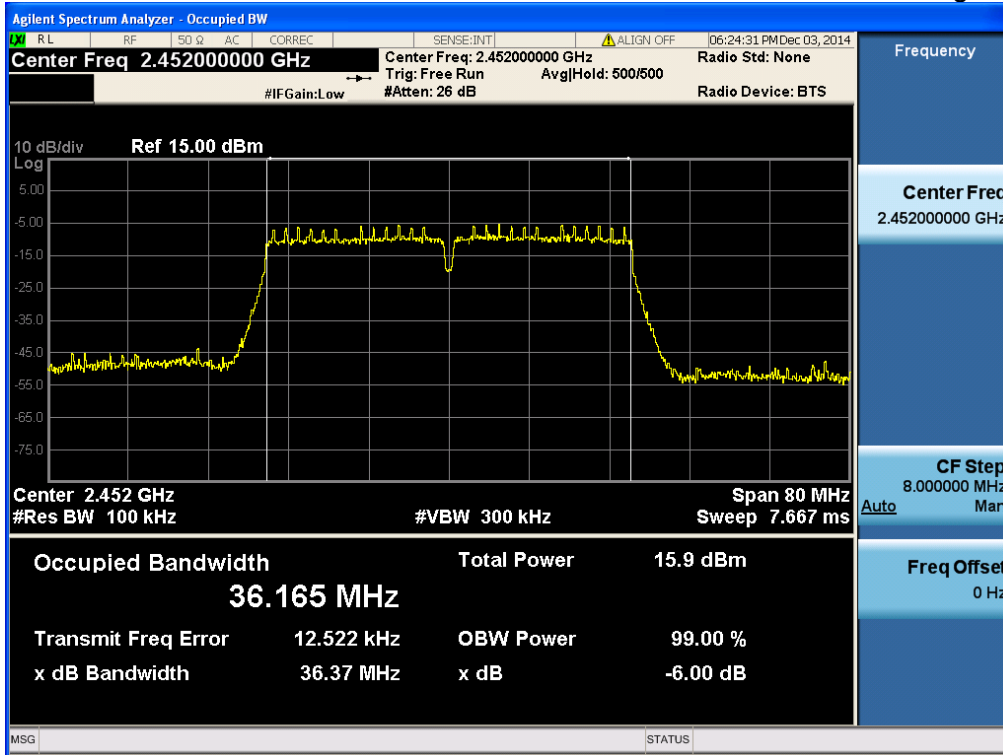
6 dB Bandwidth

TM 6 & ANT 1 & Middle



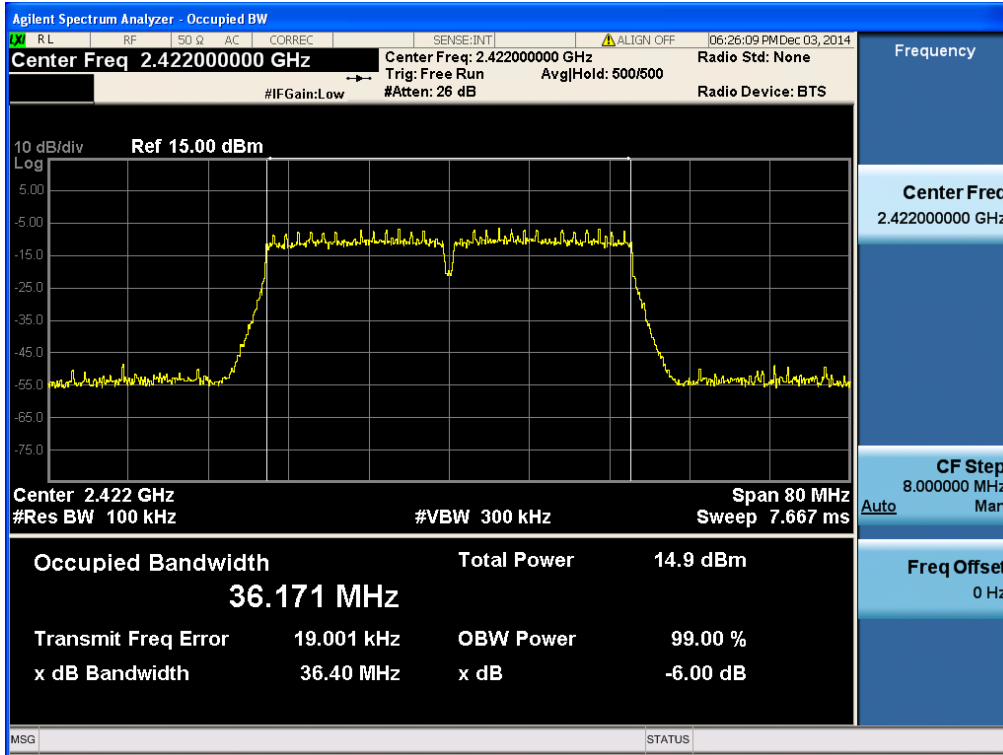
6 dB Bandwidth

TM 6 & ANT 1 & Highest



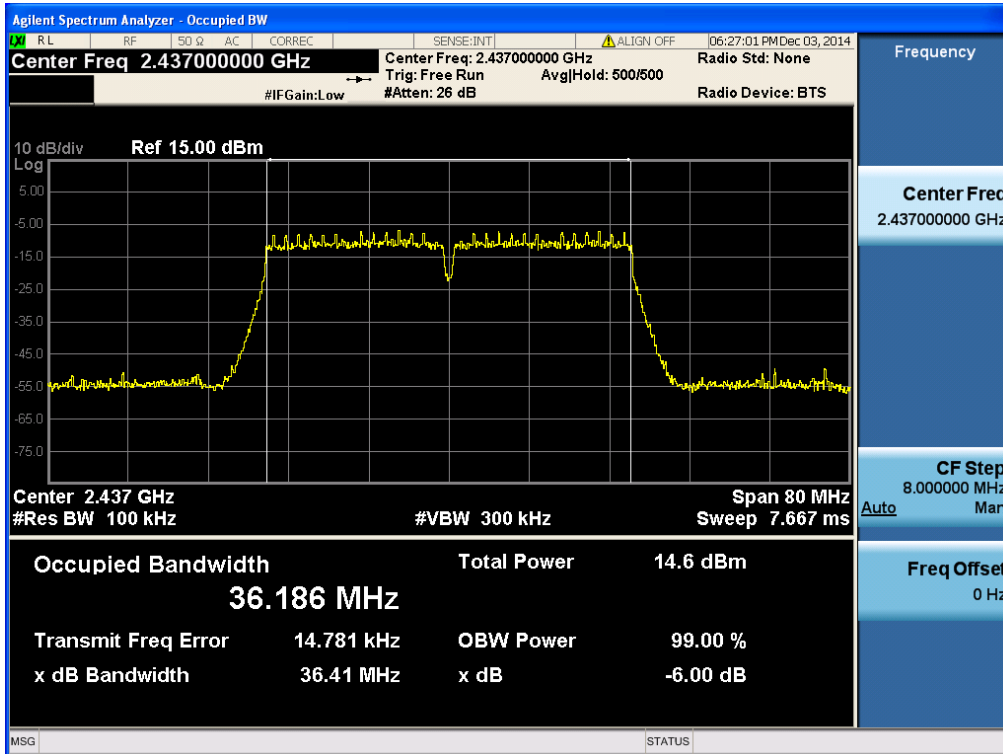
6 dB Bandwidth

TM 6 & ANT 2 & Lowest



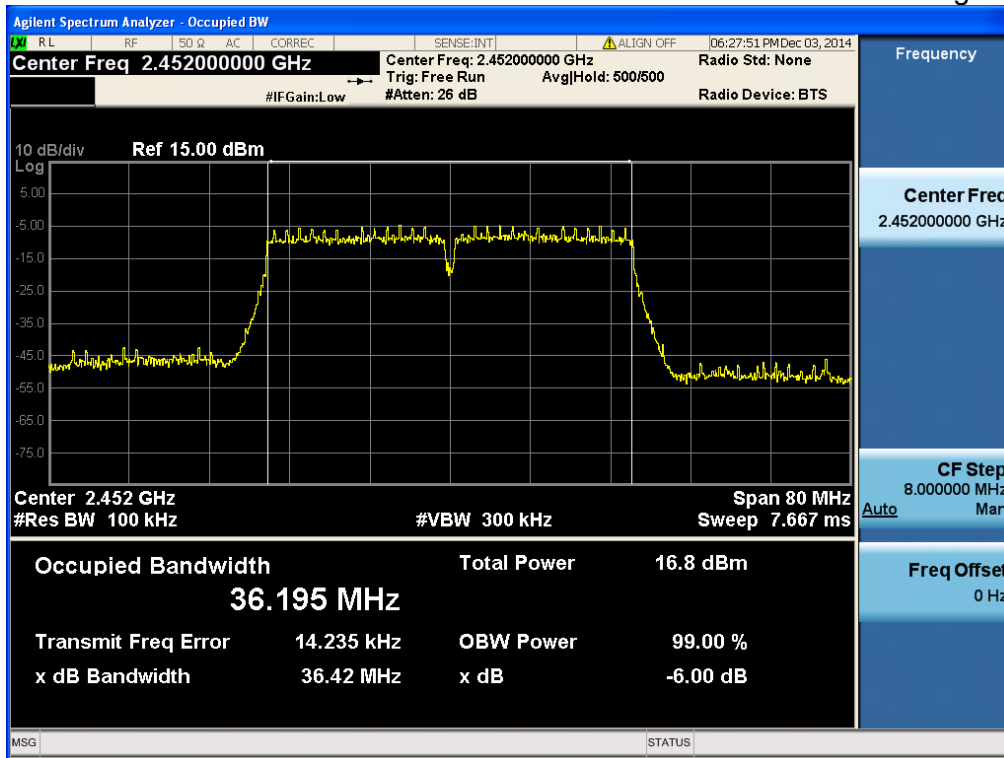
6 dB Bandwidth

TM 6 & ANT 2 & Middle



6 dB Bandwidth

TM 6 & ANT 2 & Highest

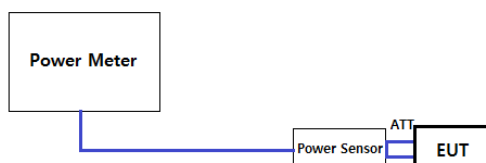


8.2 Maximum peak conducted output power

■ Test Requirements and limit, §15.247(b) & RSS-210 [A8.4]

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

■ Test Configuration



■ Test Procedure: KDB 558074 D01 DTS Meas. Guidance v03r2

1. PKPM1 Peak power meter method

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)

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**

▪ Single transmitting mode

ANT	Freq. (MHz)	Det.	Test Results (dBm) for 802.11b			
			Data Rate [Mbps]			
			1	2	5.5	11
ANT 1	2412	PK	18.821	18.734	18.760	18.766
		AV	14.682	14.620	14.627	14.591
	2437	PK	18.718	18.626	18.628	18.637
		AV	14.609	14.548	14.549	14.534
	2462	PK	18.540	18.453	18.467	18.457
		AV	14.437	14.378	14.365	14.340

ANT	Freq. (MHz)	Det.	Test Result(dBm) for 802.11g							
			Data Rate [Mbps]							
			6	9	12	18	24	36	48	54
ANT 1	2412	PK	20.350	20.254	20.256	20.260	20.250	20.265	20.257	20.255
		AV	13.007	12.952	12.936	12.918	12.940	12.937	12.934	12.948
	2437	PK	21.931	21.834	21.879	21.834	21.841	21.879	21.860	21.878
		AV	14.783	14.698	14.715	14.724	14.710	14.727	14.697	14.687
	2462	PK	20.652	20.595	20.594	20.588	20.581	20.575	20.585	20.598
		AV	13.426	13.349	13.348	13.364	13.336	13.367	13.329	13.354

ANT	Freq. (MHz)	Det.	Test Results (dBm) for 802.11n(HT20)							
			Modulation and Coding Scheme [MCS]							
			0	1	2	3	4	5	6	7
ANT 1	2412	PK	17.775	17.703	17.688	17.717	17.721	17.712	17.689	17.703
		AV	10.019	9.956	9.940	9.934	9.940	9.925	9.943	9.935
	2437	PK	22.225	22.126	22.145	22.140	22.162	22.150	22.161	22.167
		AV	15.181	15.116	15.101	15.126	15.111	15.103	15.110	15.129
	2462	PK	20.618	20.542	20.551	20.526	20.563	20.522	20.563	20.531
		AV	13.203	13.114	13.117	13.139	13.141	13.104	13.150	13.104
ANT 2	2412	PK	17.865	17.810	17.795	17.786	17.793	17.769	17.797	17.781
		AV	10.329	10.276	10.256	10.233	10.254	10.258	10.235	10.266
	2437	PK	22.390	22.295	22.295	22.314	22.306	22.335	22.327	22.324
		AV	15.173	15.109	15.103	15.084	15.114	15.118	15.074	15.121
	2462	PK	20.721	20.668	20.655	20.651	20.662	20.659	20.663	20.642
		AV	13.406	13.345	13.330	13.338	13.313	13.335	13.308	13.352

ANT	Freq. (MHz)	Det.	Test Results (dBm) for 802.11n(HT40)							
			Modulation and Coding Scheme [MCS]							
			0	1	2	3	4	5	6	7
ANT 1	2422	PK	14.806	14.712	14.716	14.747	14.730	14.732	14.730	14.754
		AV	7.248	7.162	7.190	7.155	7.192	7.162	7.164	7.148
	2437	PK	17.417	17.338	17.360	17.325	17.346	17.345	17.357	17.335
		AV	9.764	9.678	9.675	9.690	9.678	9.699	9.664	9.684
	2452	PK	18.215	18.123	18.119	18.133	18.123	18.117	18.163	18.153
		AV	10.913	10.837	10.838	10.813	10.858	10.827	10.857	10.837
ANT 2	2422	PK	15.261	15.184	15.172	15.179	15.207	15.201	15.174	15.187
		AV	7.781	7.726	7.710	7.708	7.724	7.714	7.700	7.730
	2437	PK	17.306	17.240	17.253	17.249	17.229	17.225	17.255	17.253
		AV	9.847	9.785	9.766	9.757	9.757	9.792	9.764	9.796
	2452	PK	18.743	18.690	18.649	18.690	18.670	18.680	18.673	18.682
		AV	11.443	11.386	11.392	11.391	11.371	11.365	11.348	11.370

▪ Multiple transmitting mode

ANT	Freq. (MHz)	Det.	Test Results (dBm) for 802.11n(HT20)							
			Modulation and Coding Scheme [MCS]							
			8	9	10	11	12	13	14	15
ANT 1	2412	PK	13.406	13.322	13.310	13.330	13.327	13.323	13.308	13.343
		AV	7.017	6.959	6.967	6.917	6.944	6.921	6.918	6.961
	2437	PK	19.048	18.977	18.993	18.971	18.970	18.953	18.973	18.994
		AV	12.873	12.802	12.814	12.799	12.804	12.812	12.800	12.777
	2462	PK	17.005	16.947	16.943	16.926	16.910	16.928	16.941	16.954
		AV	10.845	10.790	10.784	10.786	10.778	10.760	10.757	10.784
ANT 2	2412	PK	14.042	13.973	13.976	13.965	13.963	13.957	13.973	13.961
		AV	7.251	7.154	7.191	7.200	7.175	7.197	7.197	7.168
	2437	PK	19.362	19.288	19.276	19.269	19.278	19.282	19.286	19.286
		AV	13.073	13.022	12.989	13.019	13.022	12.991	12.975	12.985
	2462	PK	17.875	17.820	17.821	17.779	17.796	17.791	17.794	17.799
		AV	11.308	11.217	11.253	11.233	11.252	11.212	11.215	11.250
Sum (ANT 1+2)	2412	PK	16.746	16.670	16.667	16.670	16.667	16.662	16.664	16.674
	2437	PK	22.219	22.146	22.148	22.133	22.138	22.131	22.143	22.153
	2462	PK	20.473	20.416	20.415	20.384	20.386	20.392	20.399	20.408

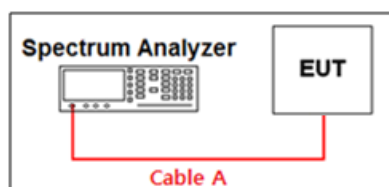
ANT	Freq. (MHz)	Det.	Test Results (dBm) for 802.11n(HT40)							
			Modulation and Coding Scheme [MCS]							
			8	9	10	11	12	13	14	15
ANT 1	2422	PK	11.675	11.593	11.576	11.599	11.588	11.620	11.594	11.591
		AV	4.846	4.792	4.787	4.760	4.789	4.792	4.771	4.753
	2437	PK	12.522	12.433	12.430	12.464	12.460	12.427	12.458	12.430
		AV	5.876	5.795	5.790	5.815	5.798	5.792	5.803	5.814
	2452	PK	14.984	14.928	14.933	14.922	14.911	14.897	14.920	14.929
		AV	8.112	8.036	8.062	8.046	8.035	8.040	8.017	8.058
ANT 2	2422	PK	11.743	11.676	11.684	11.655	11.679	11.651	11.676	11.679
		AV	5.714	5.626	5.647	5.661	5.627	5.647	5.628	5.616
	2437	PK	13.551	13.491	13.465	13.489	13.472	13.455	13.468	13.488
		AV	6.737	6.678	6.673	6.659	6.671	6.671	6.645	6.661
	2452	PK	15.325	15.244	15.230	15.226	15.244	15.239	15.231	15.252
		AV	8.655	8.578	8.581	8.587	8.582	8.564	8.603	8.558
Sum (ANT 1+2)	2422	PK	14.720	14.645	14.641	14.638	14.645	14.646	14.646	14.646
	2437	PK	16.078	16.005	15.989	16.017	16.006	15.982	16.003	16.002
	2452	PK	18.169	18.100	18.095	18.087	18.091	18.082	18.089	18.104

8.3 Maximum power spectral density

■ Test requirements and limit, §15.247(e) & RSS-210 [A8.2]

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



■ Test Procedure: *KDB 558074 D01 DTS Meas. Guidance v03r2*

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.

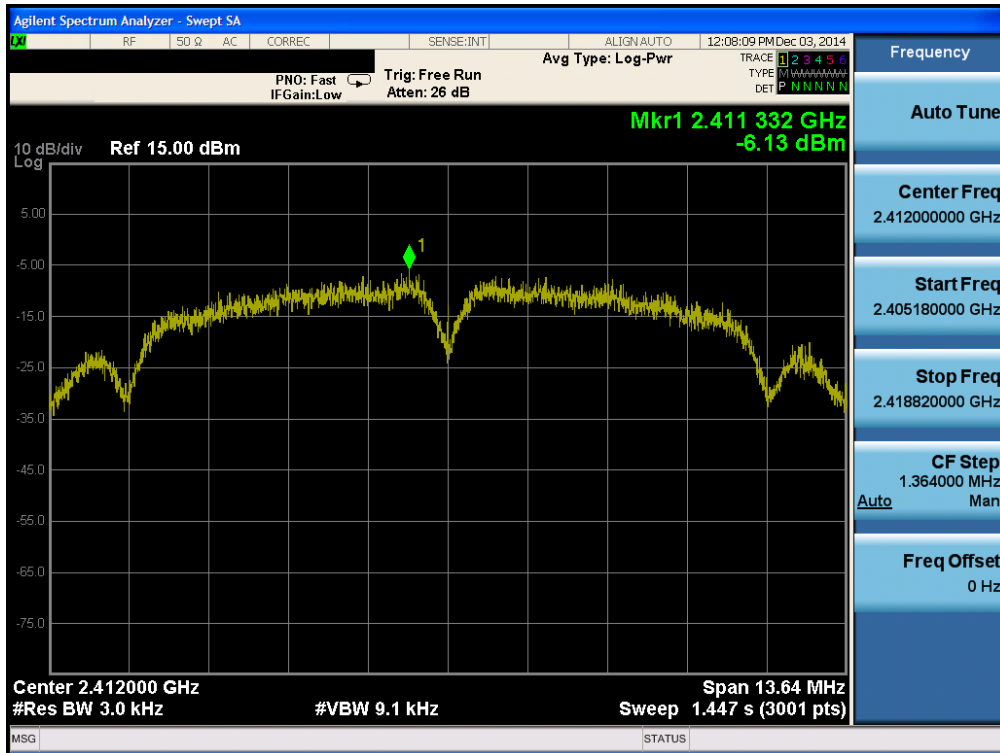
■ Test Results: **Comply**

Test Mode	Frequency	RBW	PKPSD [dBm]		
			ANT 1	ANT 2	SUM (ANT 1 + ANT 2)
TM 1	Lowest	3 kHz	-6.130	-	-
	Middle	3 kHz	-6.560	-	-
	Highest	3 kHz	-6.240	-	-
TM 2	Lowest	3 kHz	-11.220	-	-
	Middle	3 kHz	-9.000	-	-
	Highest	3 kHz	-10.890	-	-
TM 3	Lowest	3 kHz	-14.930	-14.040	-
	Middle	3 kHz	-9.870	-9.280	-
	Highest	3 kHz	-11.060	-10.780	-
TM 4	Lowest	3 kHz	-20.290	-20.080	-
	Middle	3 kHz	-16.740	-17.170	-
	Highest	3 kHz	-17.030	-16.140	-
TM 5	Lowest	3 kHz	-18.500	-18.130	-15.301
	Middle	3 kHz	-13.870	-13.710	-10.779
	Highest	3 kHz	-14.800	-14.380	-11.575
TM 6	Lowest	3 kHz	-24.690	-25.250	-21.951
	Middle	3 kHz	-23.450	-22.920	-20.167
	Highest	3 kHz	-22.340	-21.510	-18.895

Result Plots

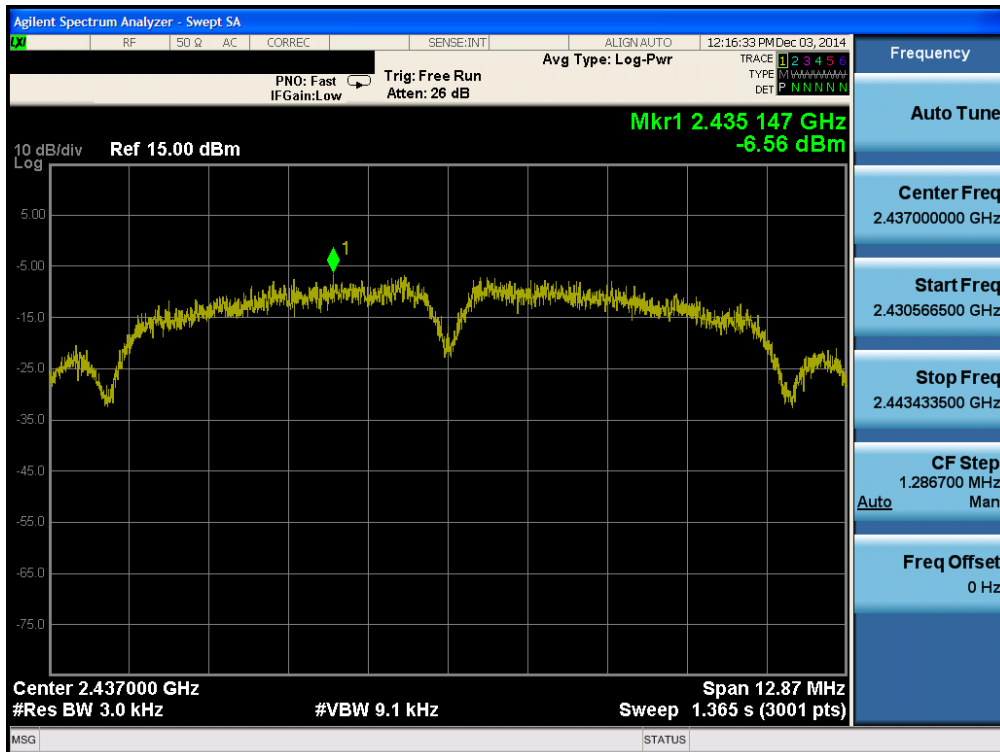
Maximum PPSD

TM 1 & ANT 1 & Lowest



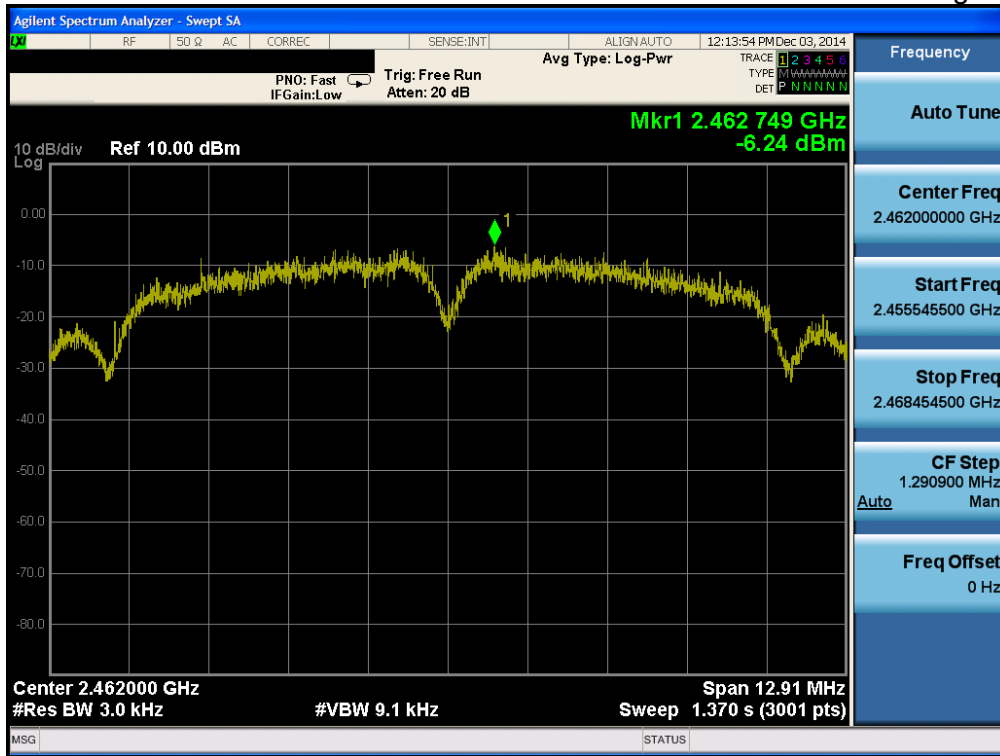
Maximum PPSD

TM 1 & ANT 1 & Middle



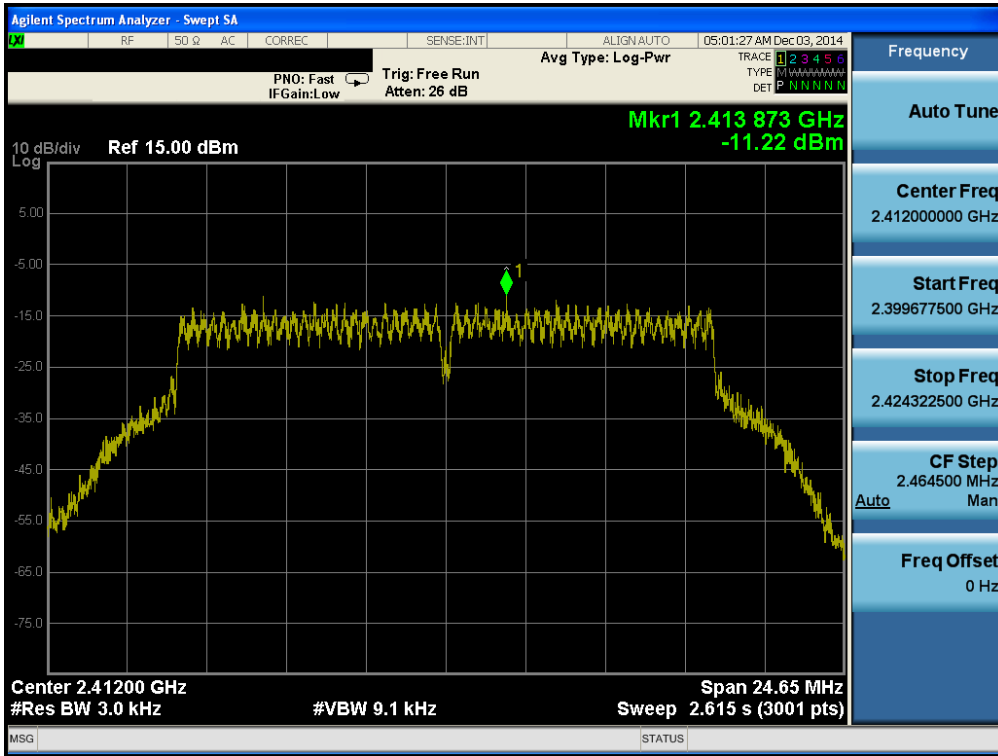
Maximum PPSD

TM 1 & ANT 1 & Highest



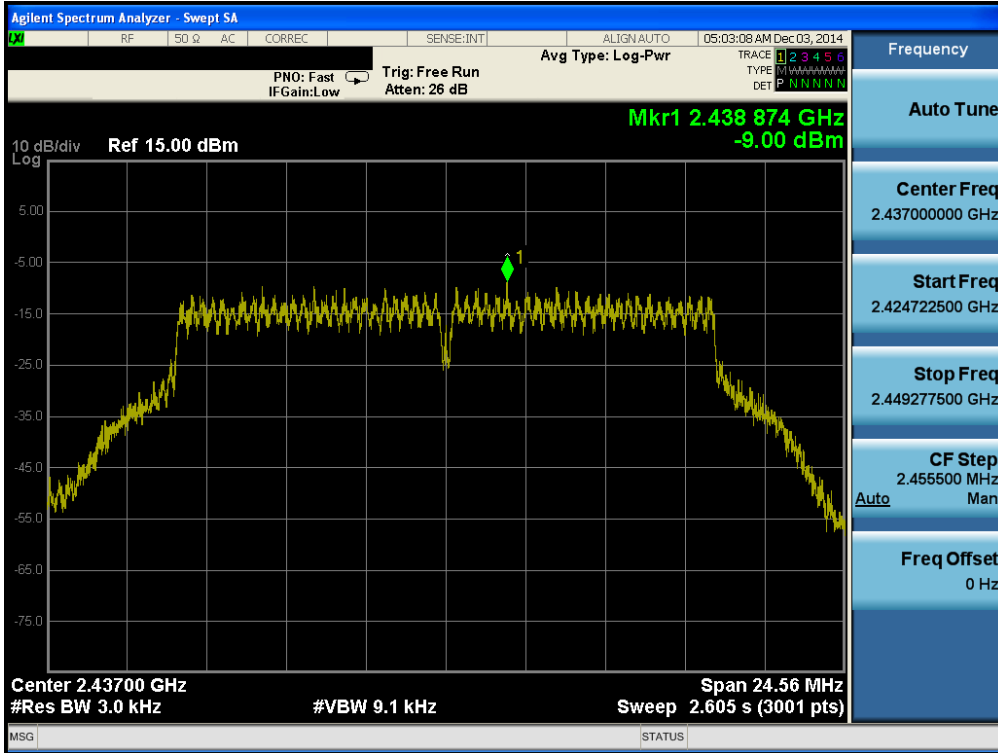
Maximum PPSD

TM 2 & ANT 1 & Lowest



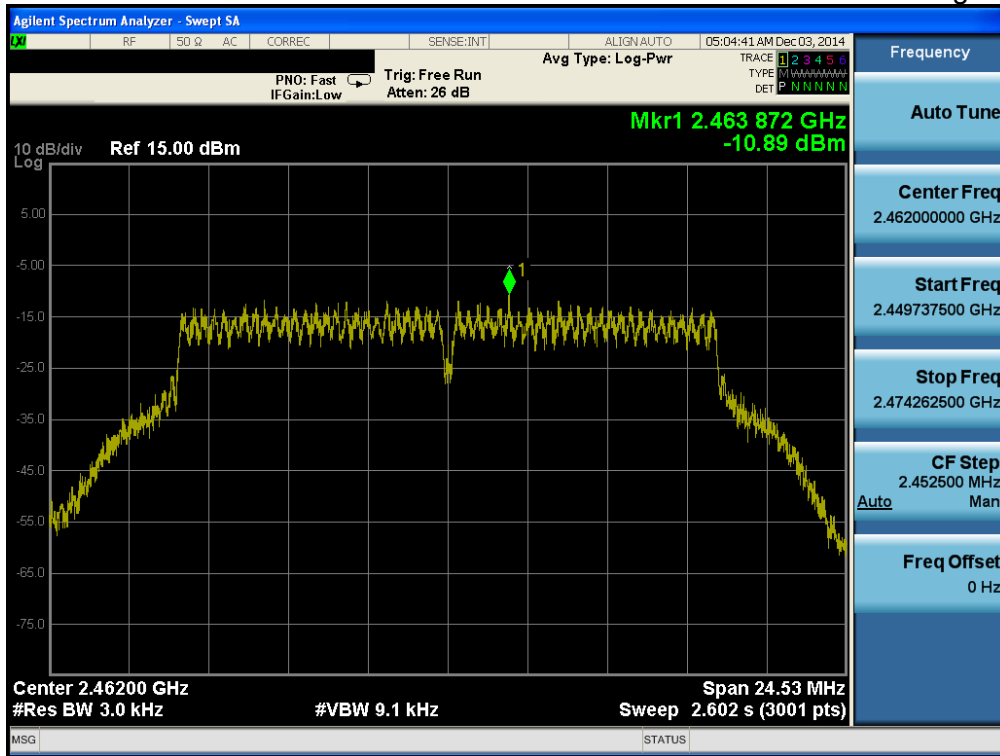
Maximum PPSD

TM 2 & ANT 1 & Middle



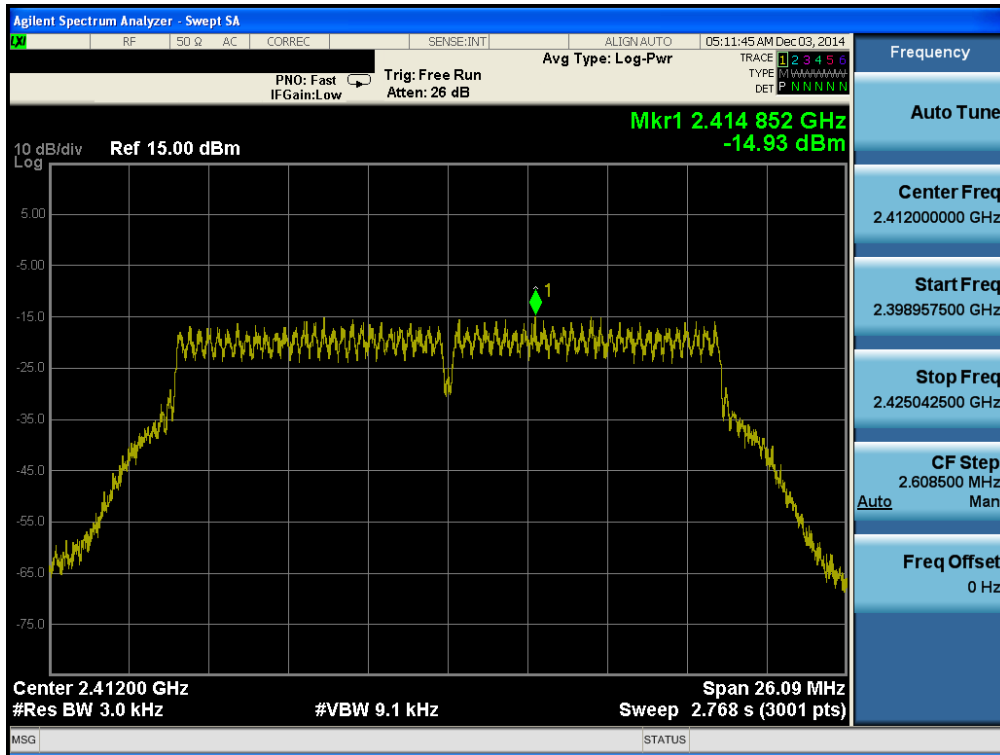
Maximum PPSD

TM 2 & ANT 1 & Highest



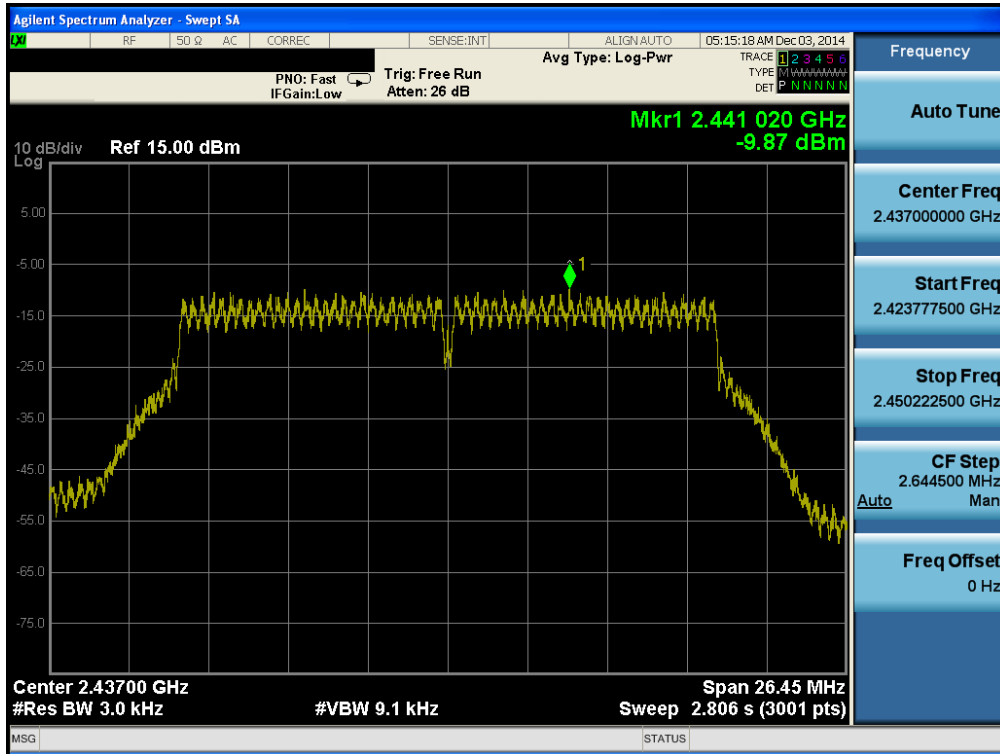
Maximum PPSD

TM 3 & ANT 1 & Lowest



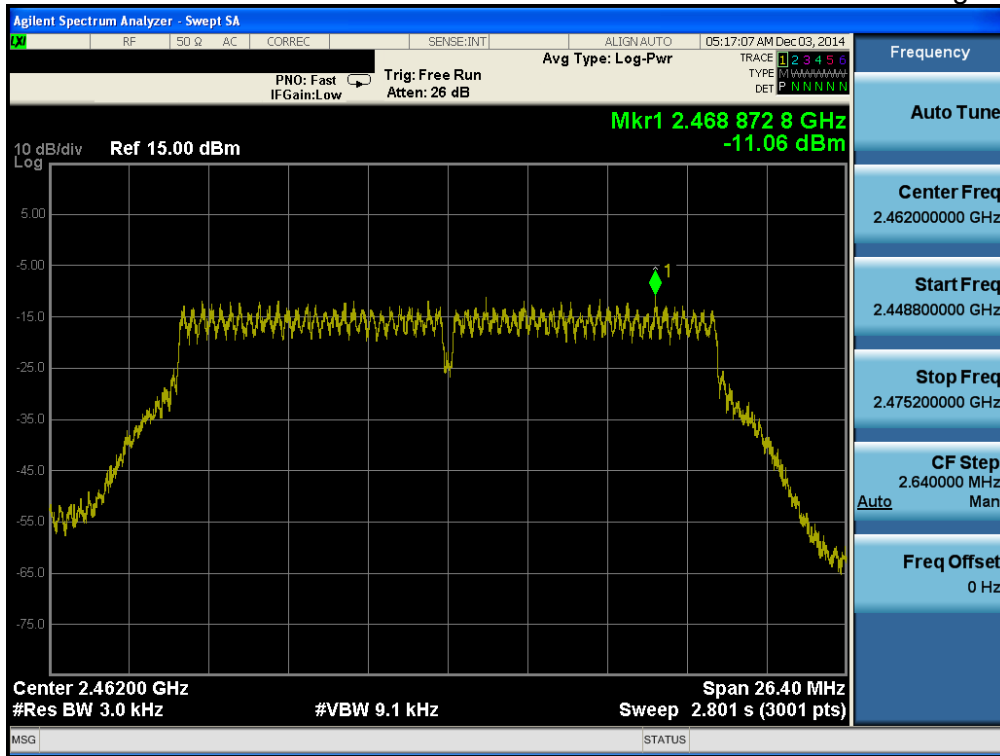
Maximum PPSD

TM 3 & ANT 1 & Middle



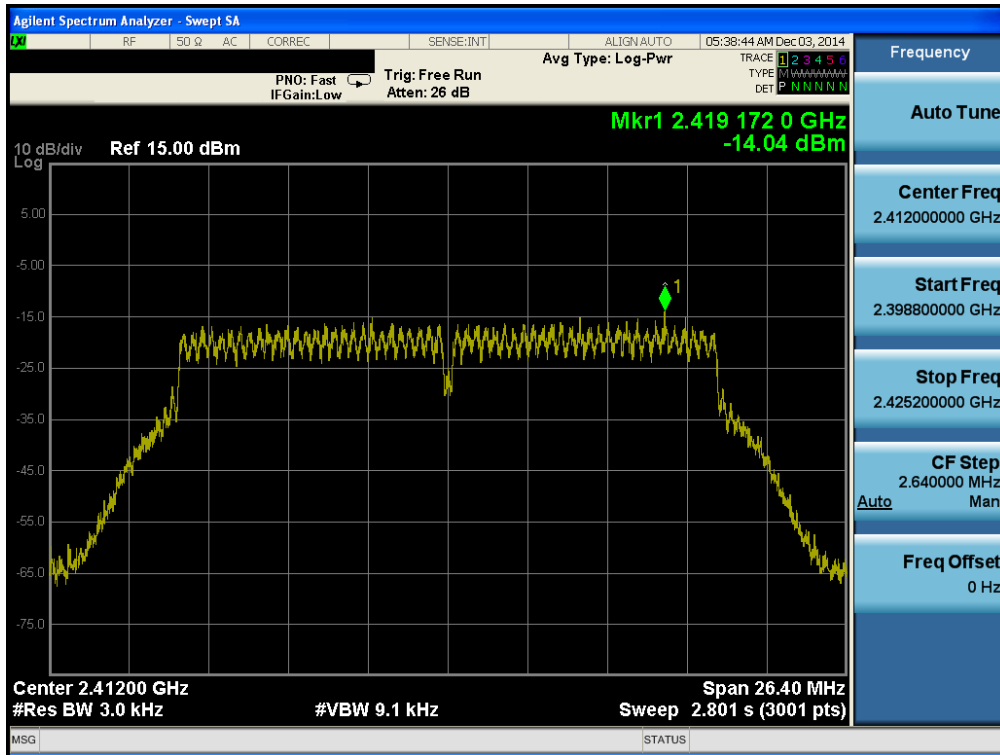
Maximum PPSD

TM 3 & ANT 1 & Highest



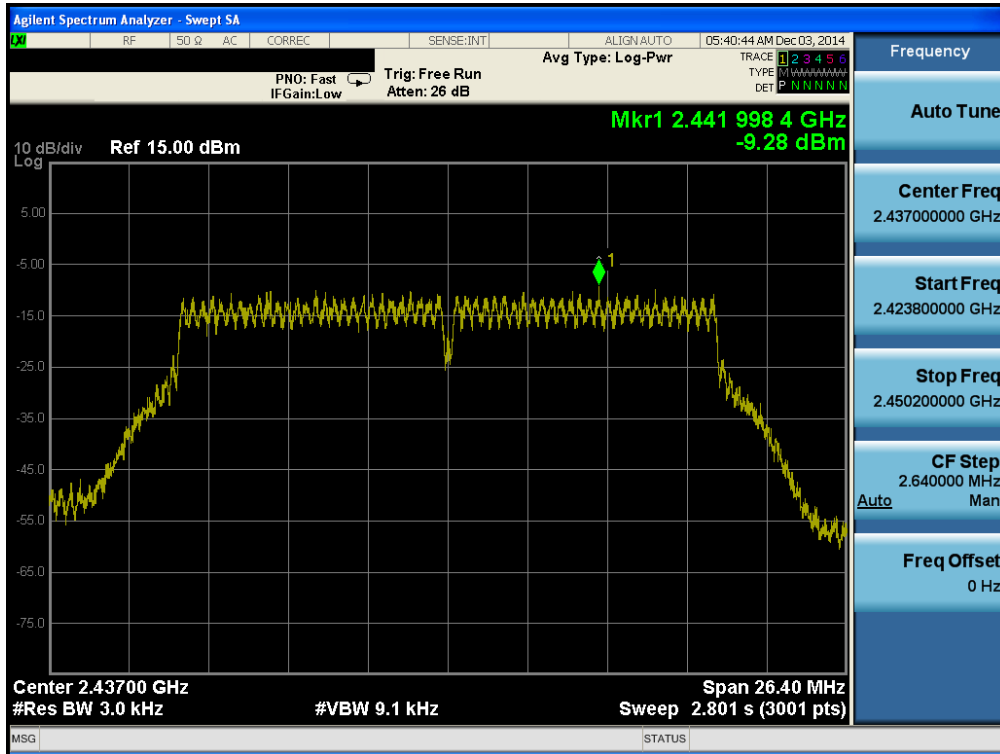
Maximum PPSD

TM 3 & ANT 2 & Lowest



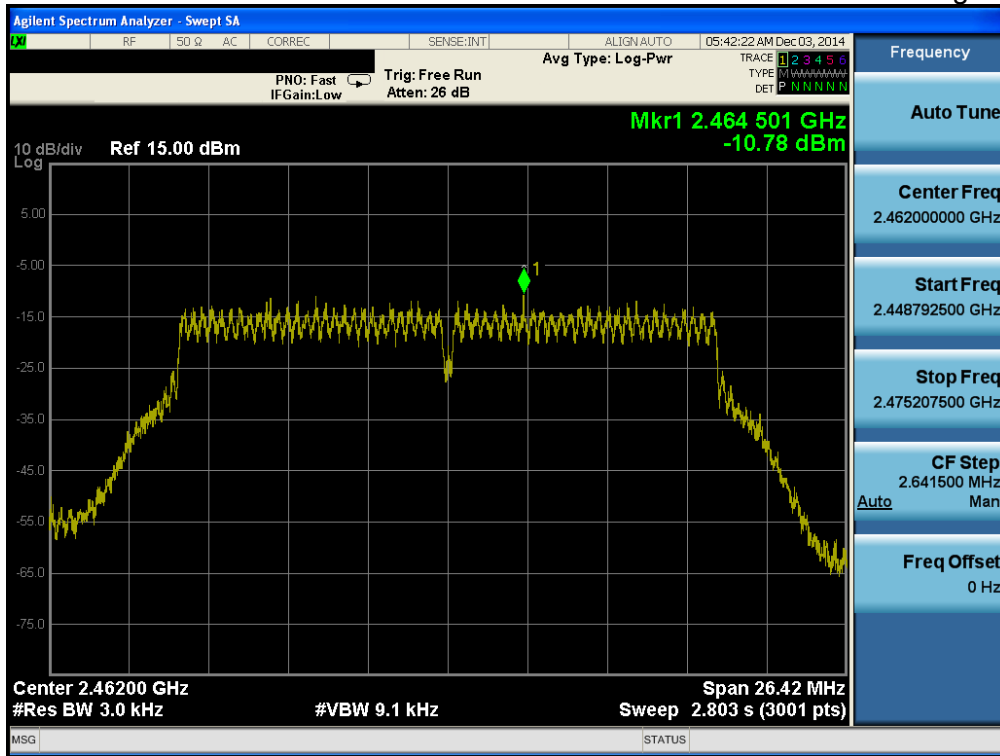
Maximum PPSD

TM 3 & ANT 2 & Middle



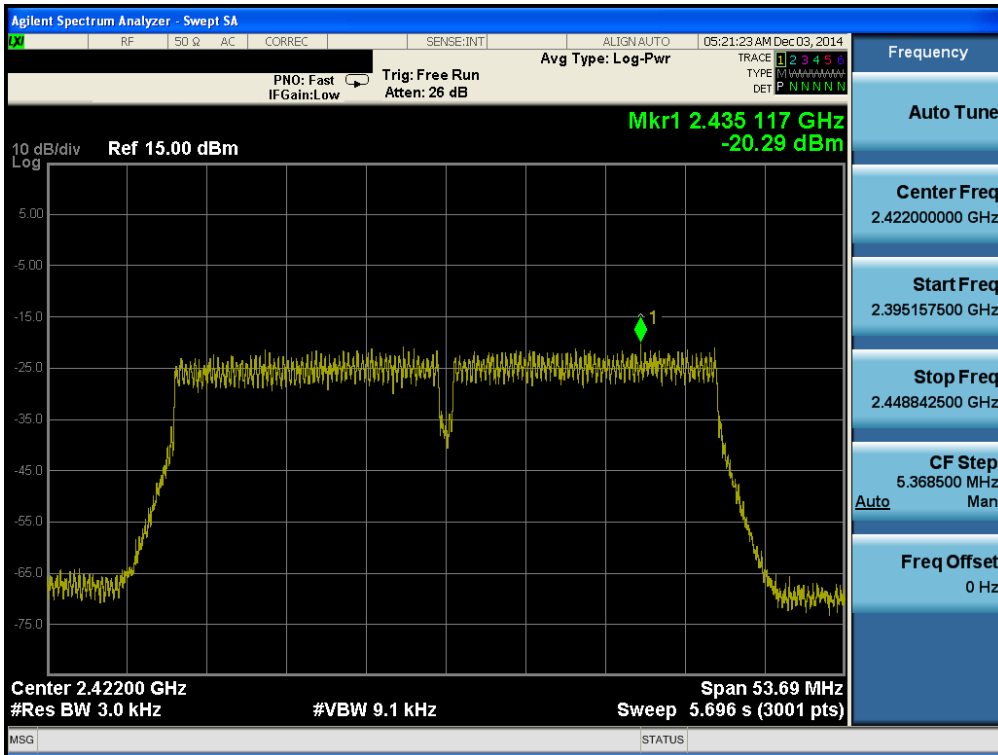
Maximum PPSD

TM 3 & ANT 2 & Highest



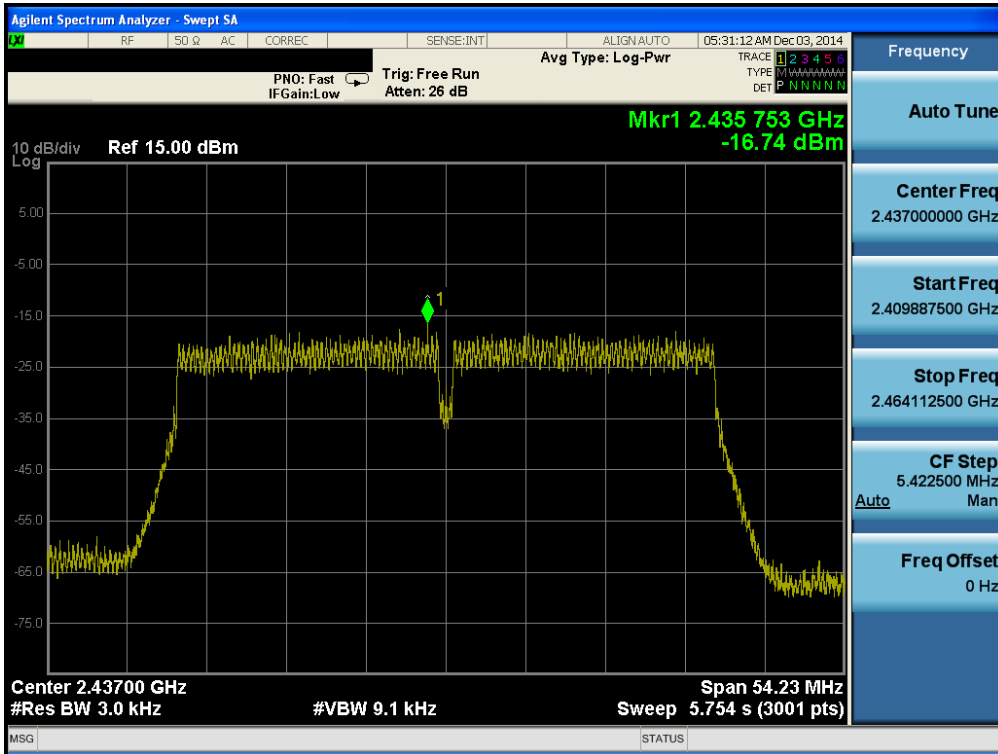
Maximum PPSD

TM 4 & ANT 1 & Lowest



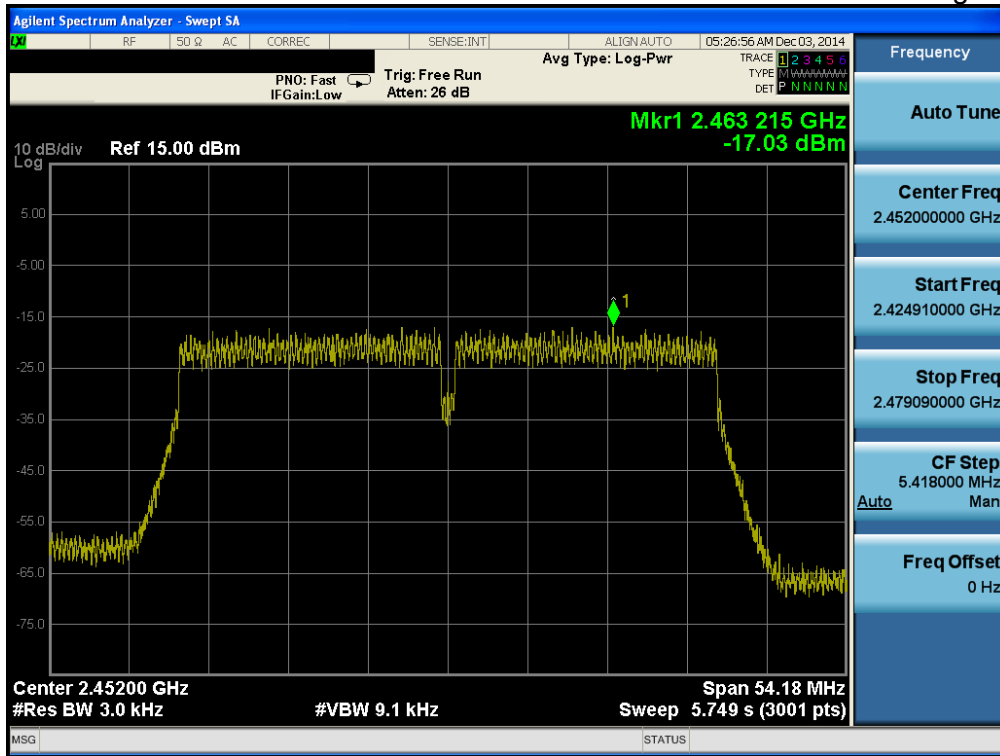
Maximum PPSD

TM 4 & ANT 1 & Middle



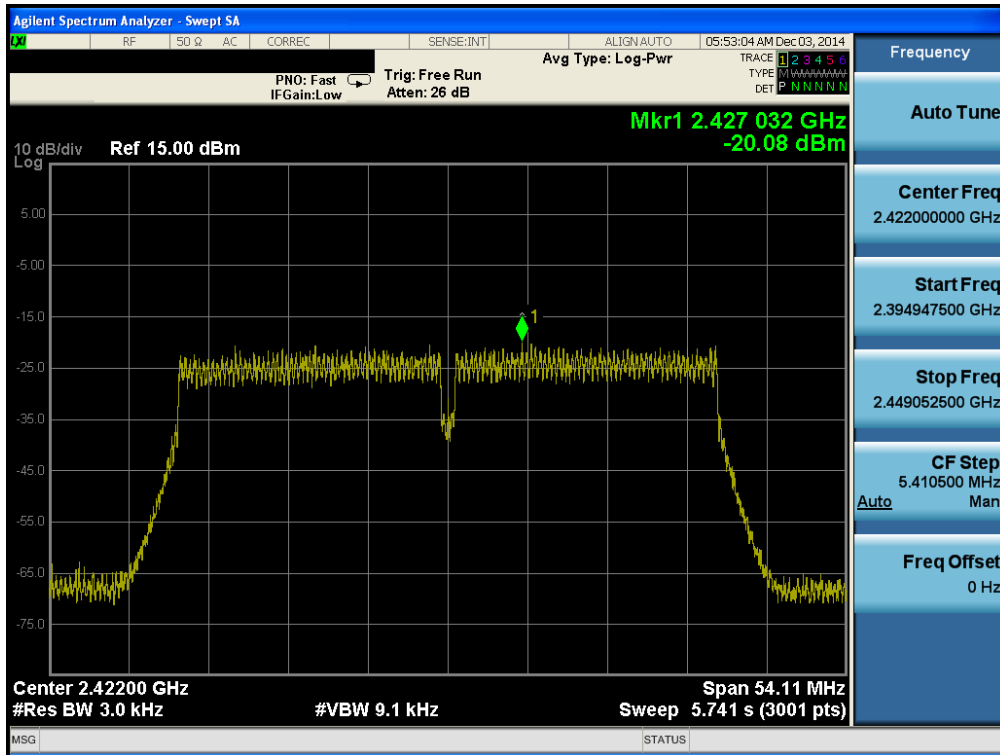
Maximum PPSD

TM 4 & ANT 1 & Highest



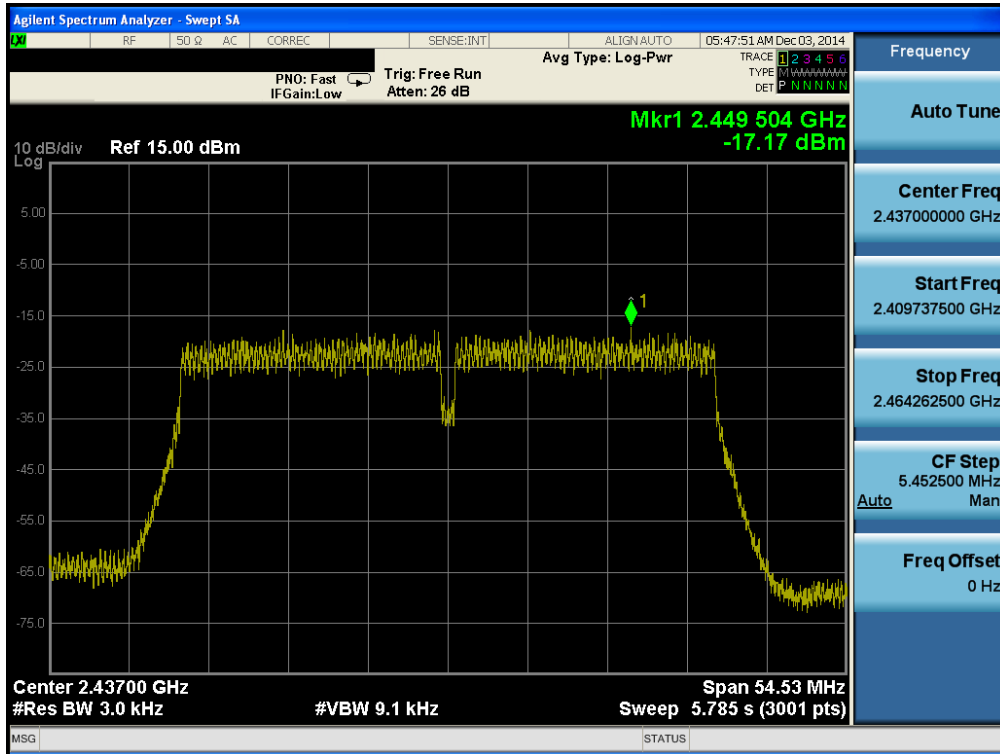
Maximum PPSD

TM 4 & ANT 2 & Lowest



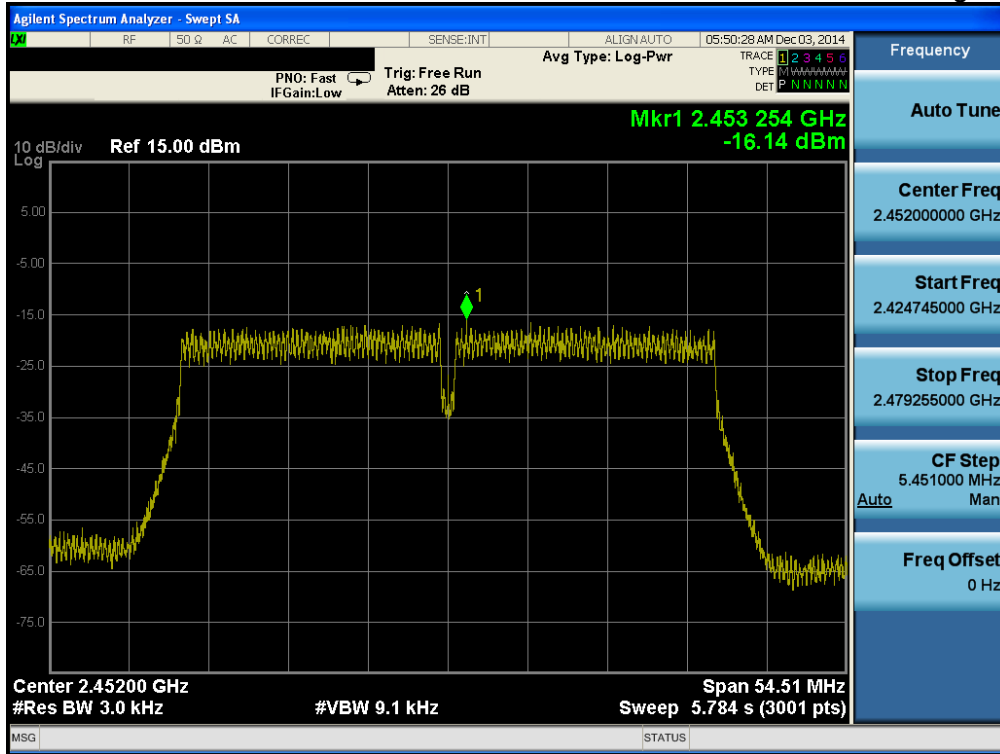
Maximum PPSD

TM 4 & ANT 2 & Middle



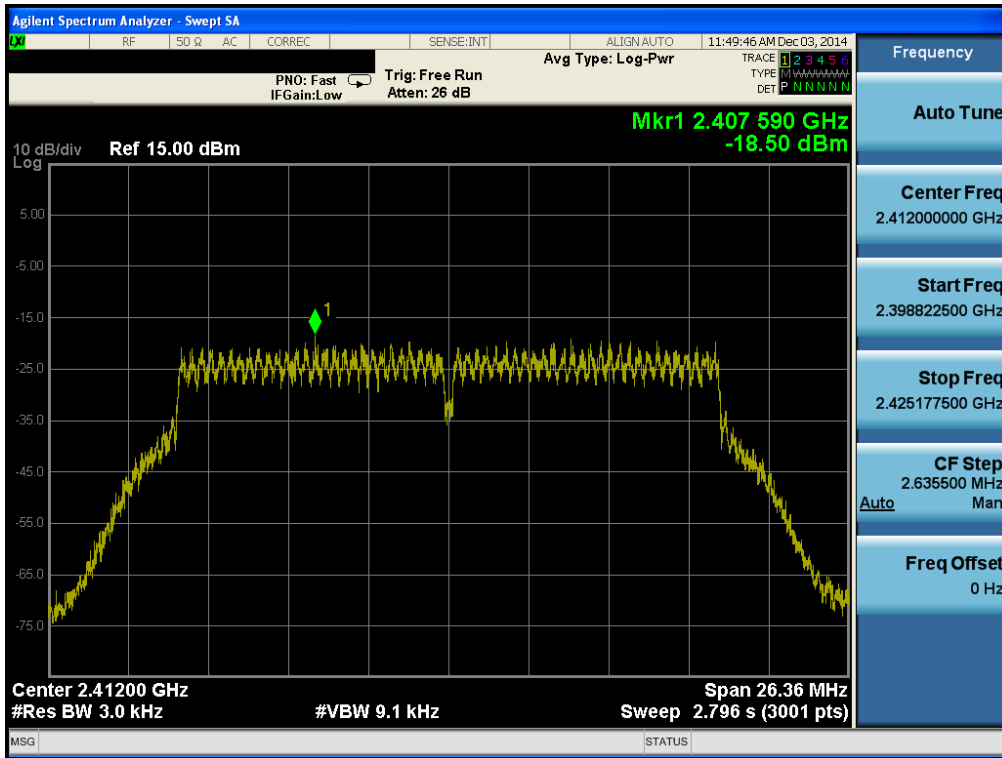
Maximum PPSD

TM 4 & ANT 2 & Highest



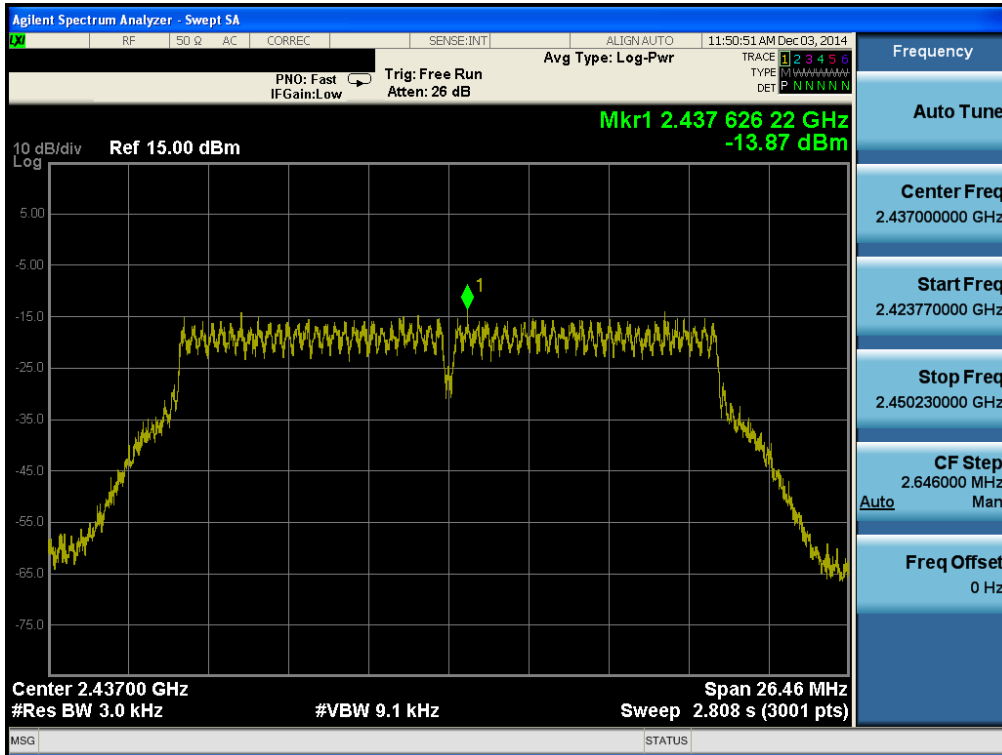
Maximum PPSD

TM 5 & ANT 1 & Lowest



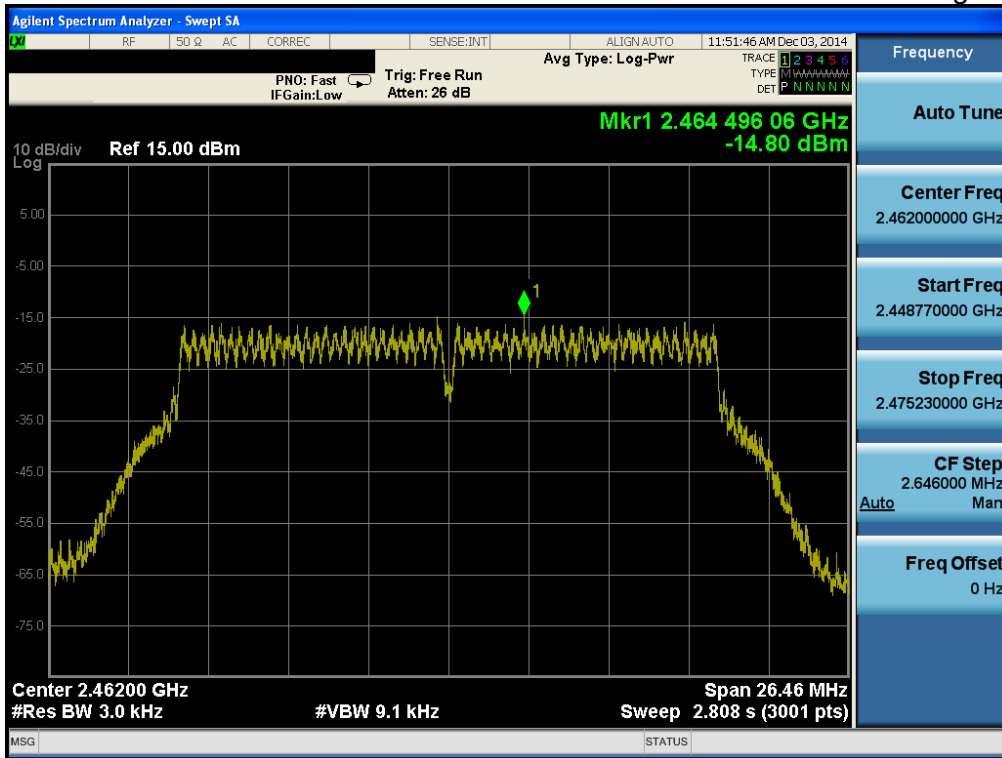
Maximum PPSD

TM 5 & ANT 1 & Middle



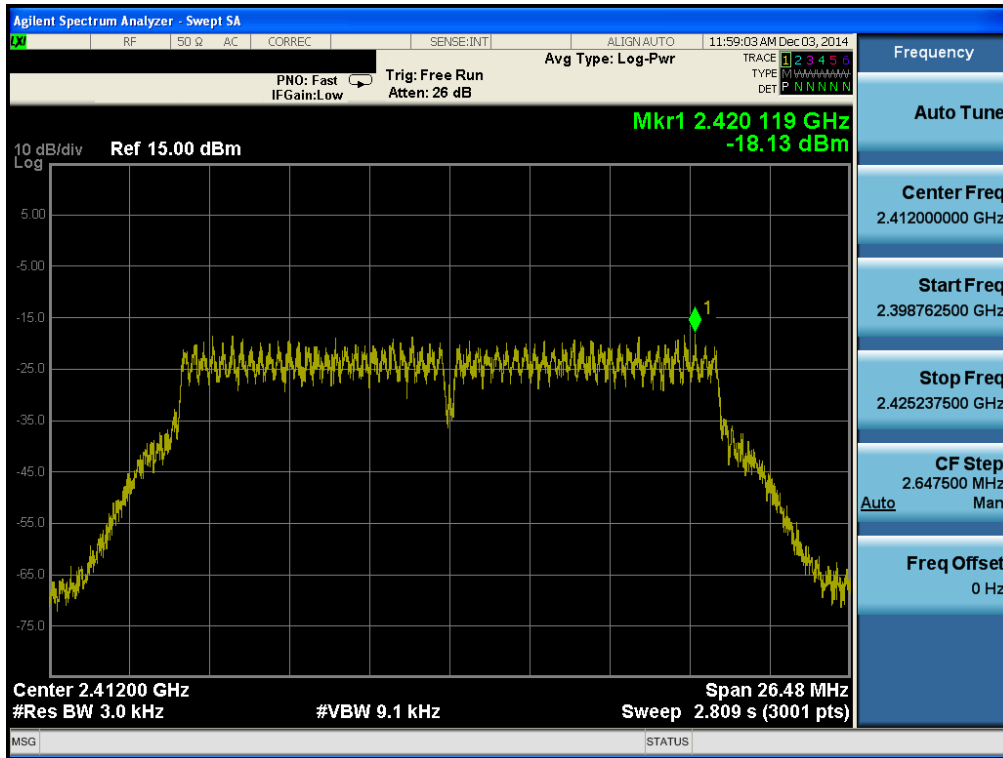
Maximum PPSD

TM 5 & ANT 1 & Highest



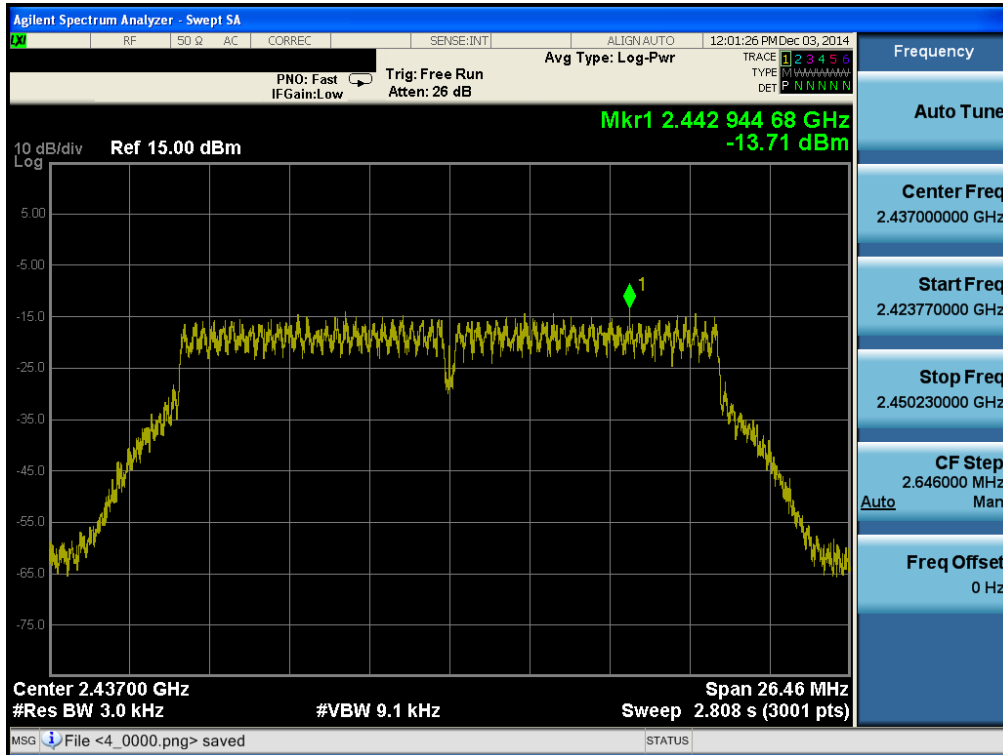
Maximum PPSD

TM 5 & ANT 2 & Lowest



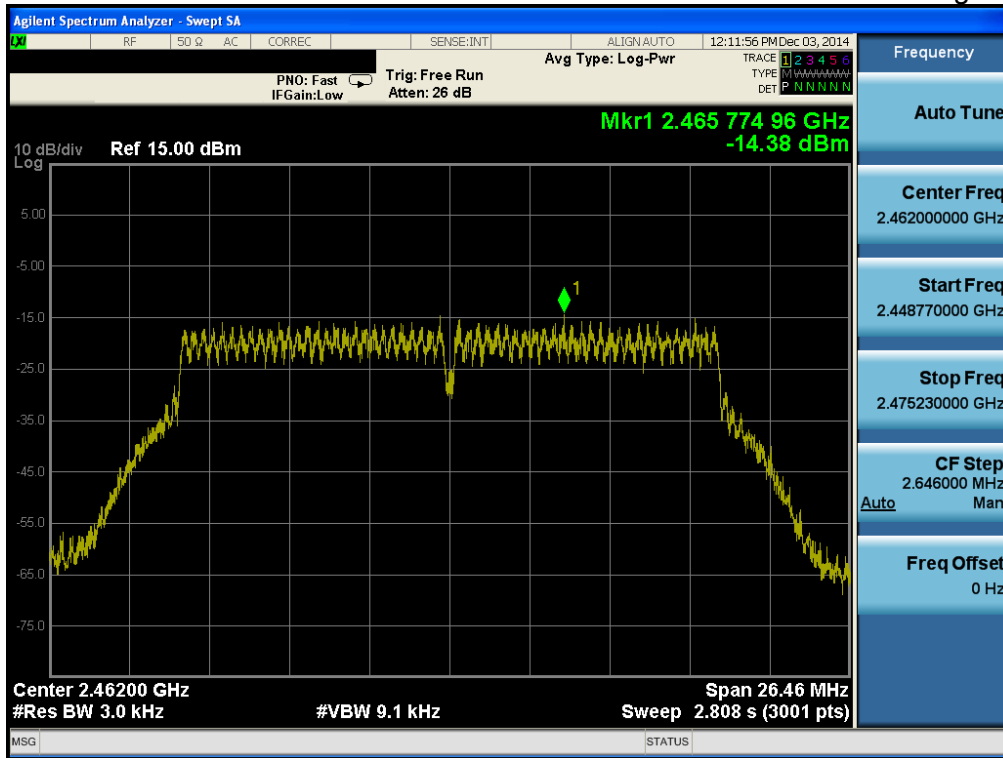
Maximum PPSD

TM 5 & ANT 2 & Middle



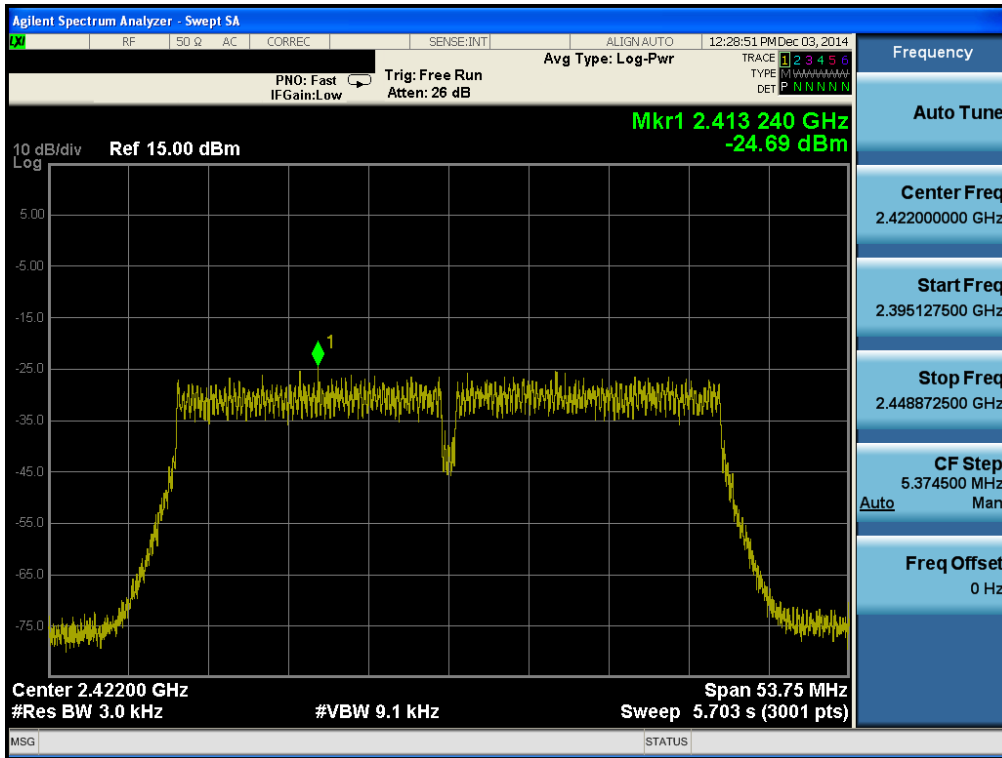
Maximum PPSD

TM 5 & ANT 2 & Highest



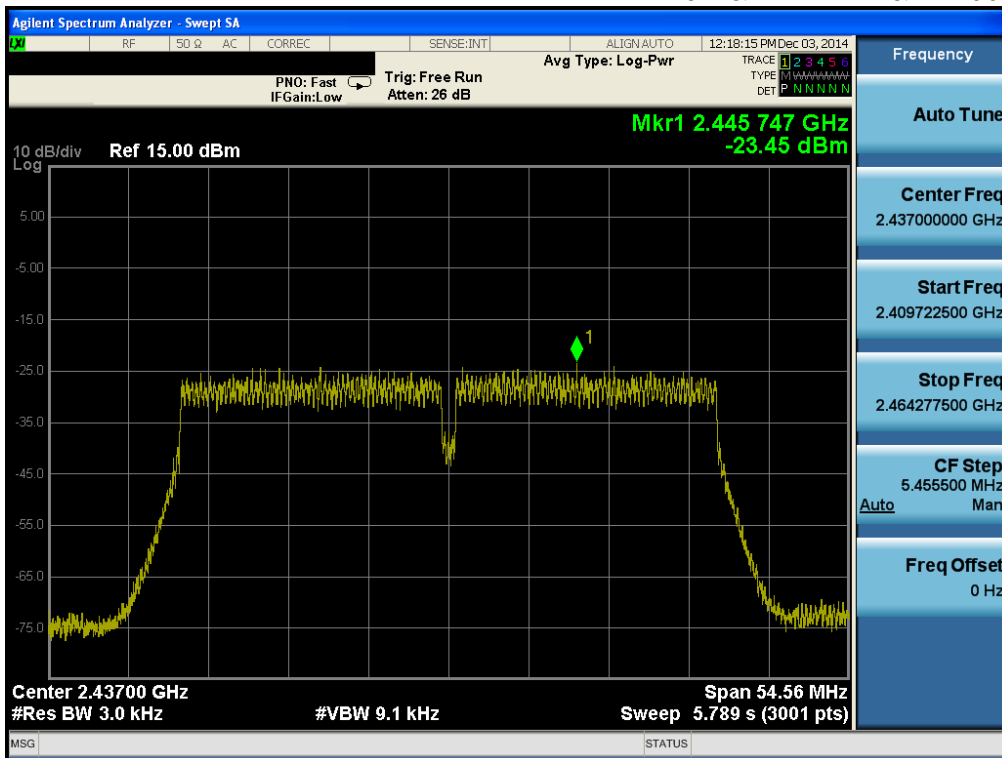
Maximum PPSD

TM 6 & ANT 1 & Lowest



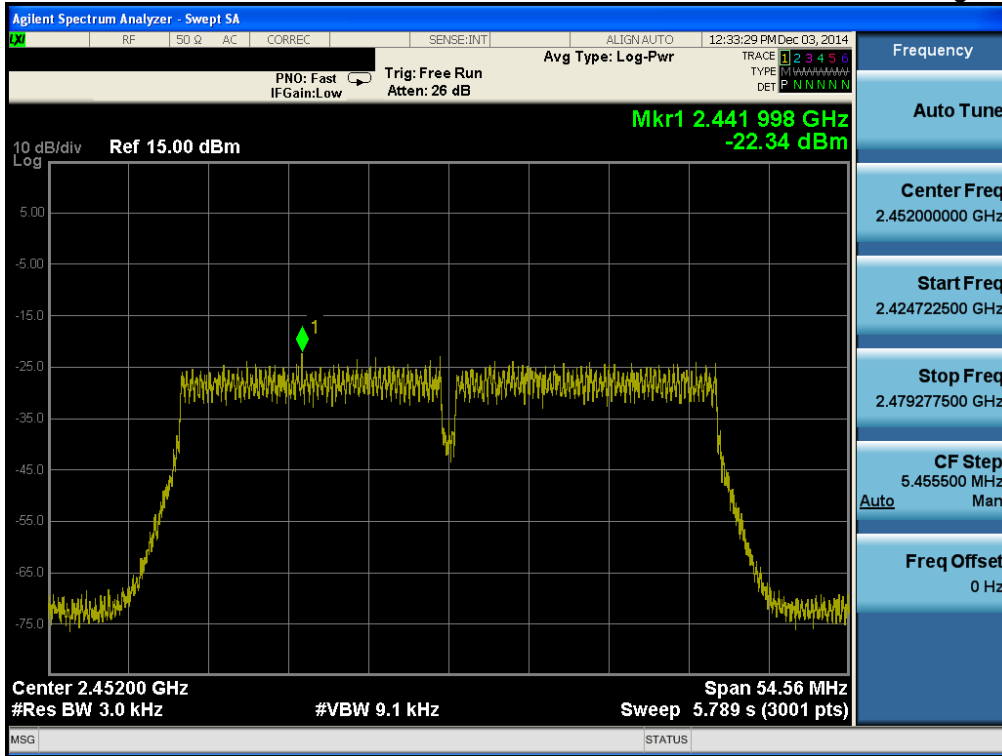
Maximum PPSD

TM 6 & ANT 1 & Middle



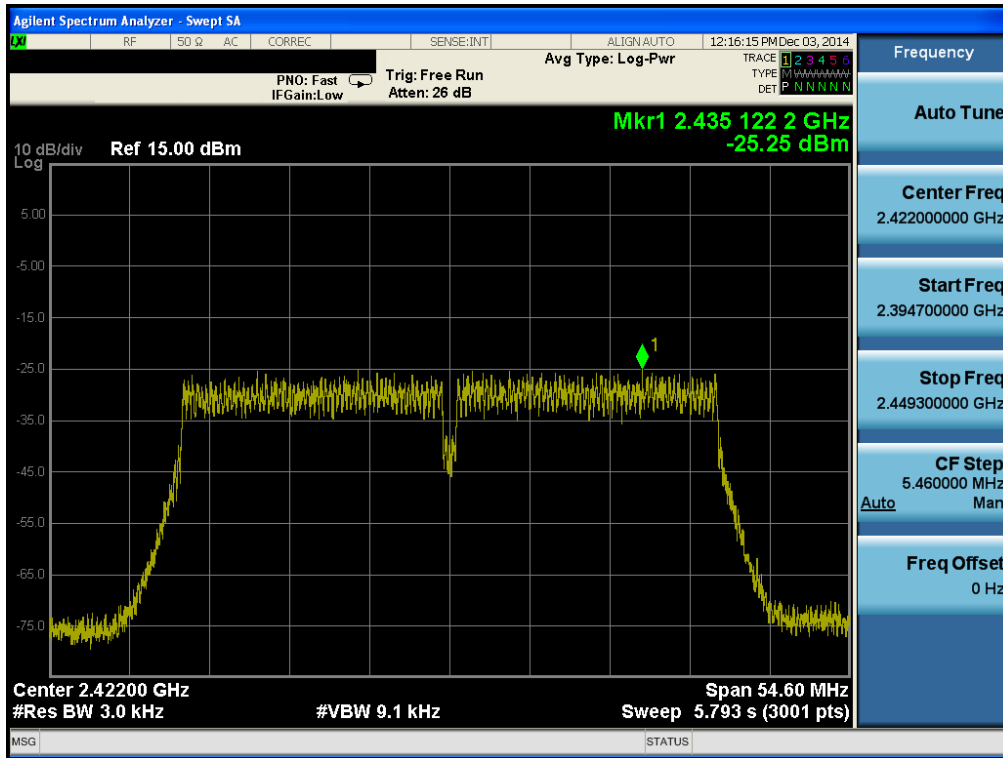
Maximum PPSD

TM 6 & ANT 1 & Highest



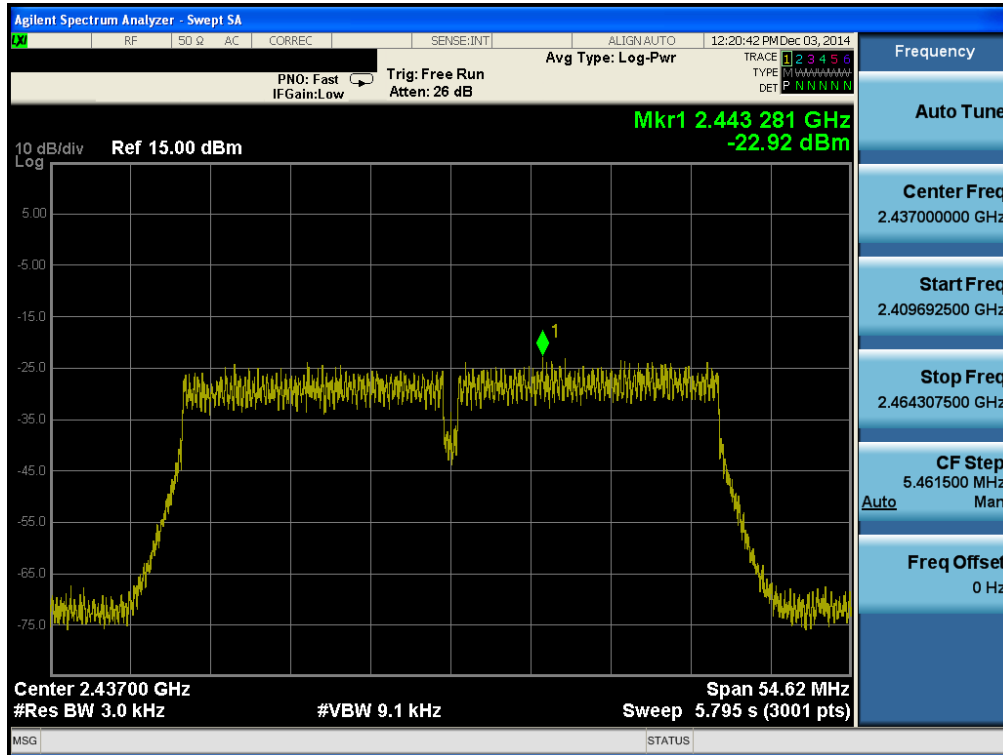
Maximum PPSD

TM 6 & ANT 2 & Lowest



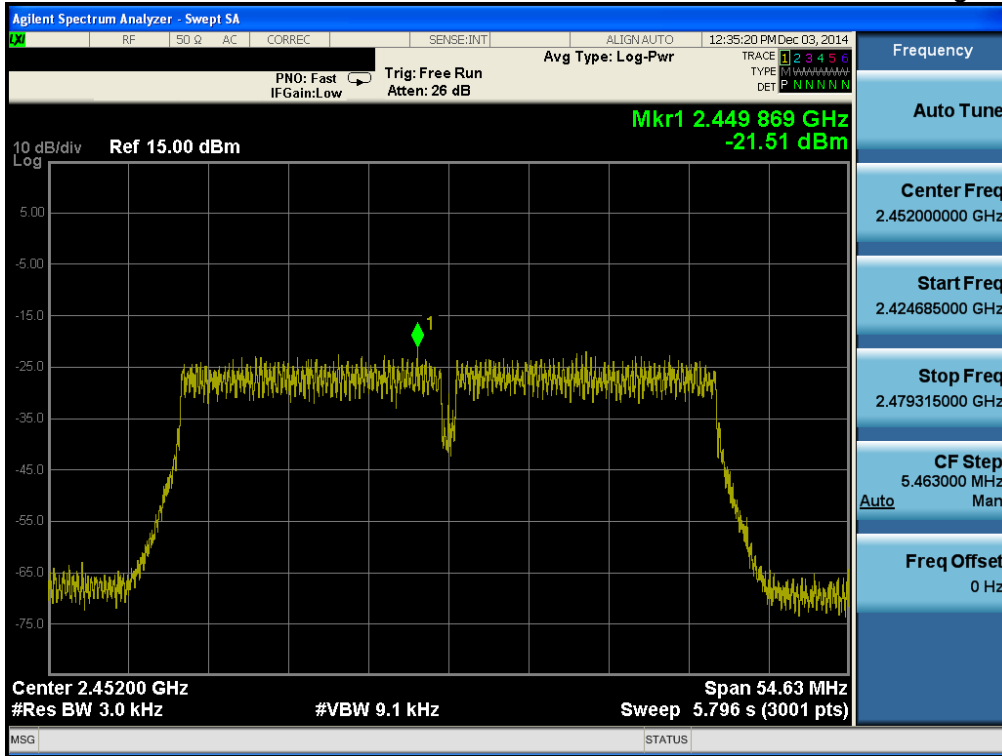
Maximum PPSD

TM 6 & ANT 2 & Middle



Maximum PPSD

TM 6 & ANT 2 & Highest



8.4 Out of band emissions at the band edge / conducted spurious emissions

■ Test requirements and limit, §15.247(d) & RSS-210 [A8.5]

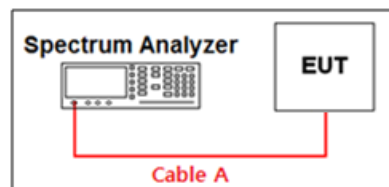
§15.247(d) specifies that in any 100 kHz bandwidth outside of the authorized frequency band, the power shall be attenuated according to the following conditions:

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



■ Test Procedure: KDB 558074 D01 DTS Meas. Guidance v03r2

- Measurement Procedure 1 – Reference Level

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 $\geq 3 \times$ 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

- Measurement Procedure 2 - Unwanted Emissions

1. Set the center frequency and span to encompass frequency range to be measured.
2. Set the RBW = **100 kHz for below 1 GHz, 1 MHz for above 1 GHz(Actual 1 MHz , See below note)**
3. Set the VBW $\geq 3 \times$ RBW (**Actual 3 MHz, See below note**)
4. Detector = **peak**.
5. Ensure that the number of measurement points \geq 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

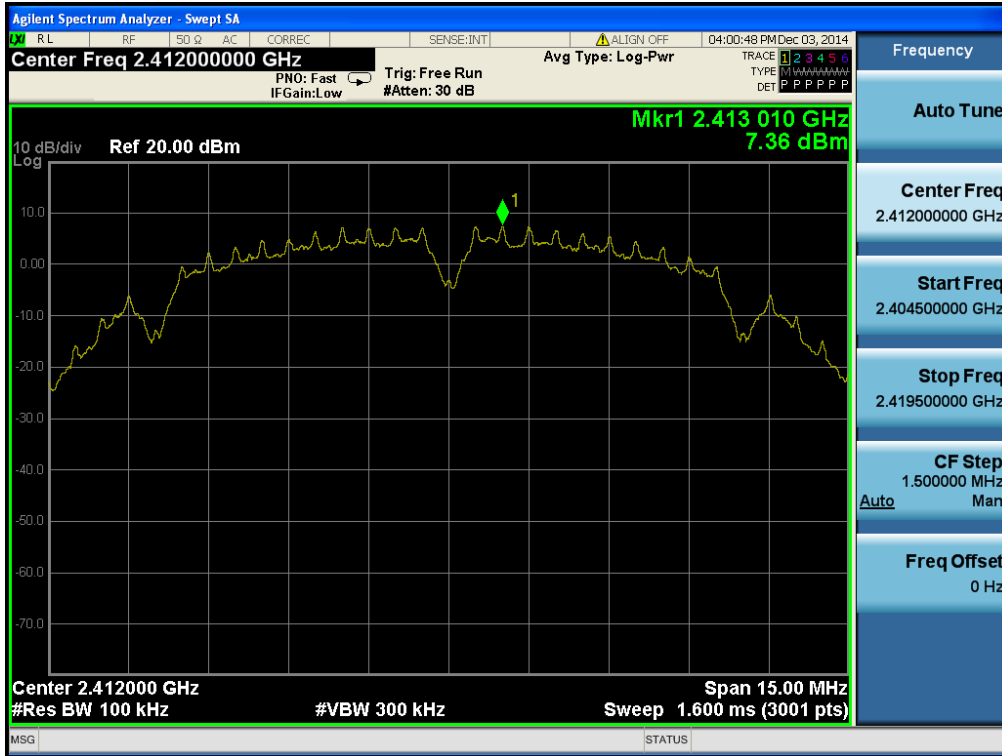
RBW= 1MHz, VBW= 3 MHz, SWEEP TIME = AUTO, DETECTOR = PEAK, TRACE = MAX HOLD, SWEEP POINT: 40001

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

Result Plots

TM 1 & ANT 1 & Lowest

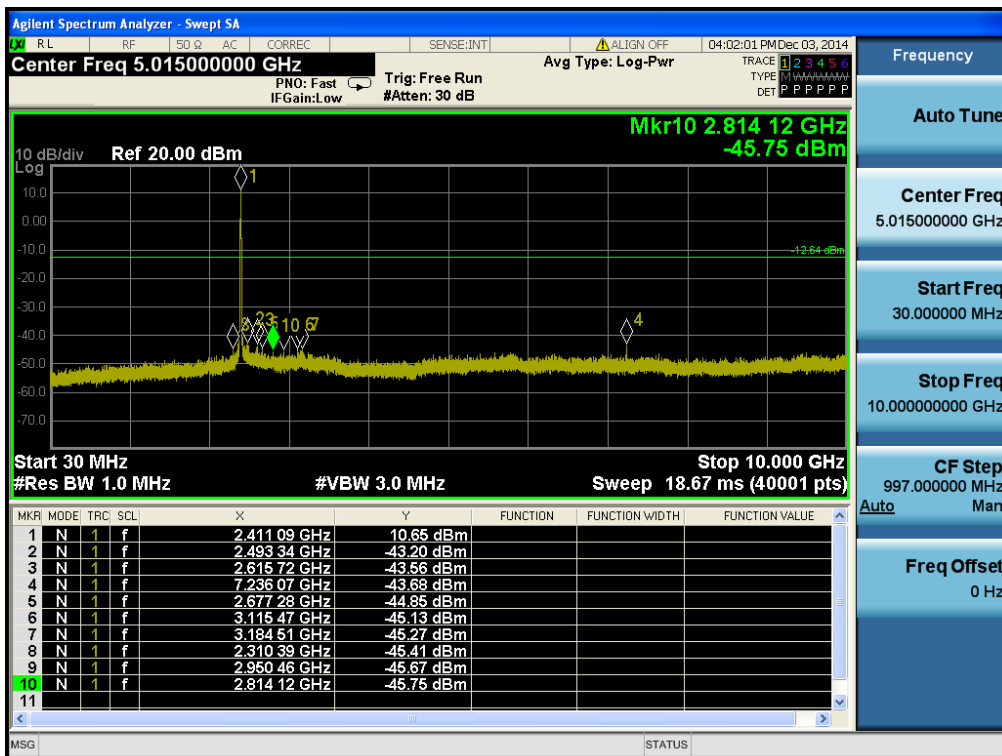
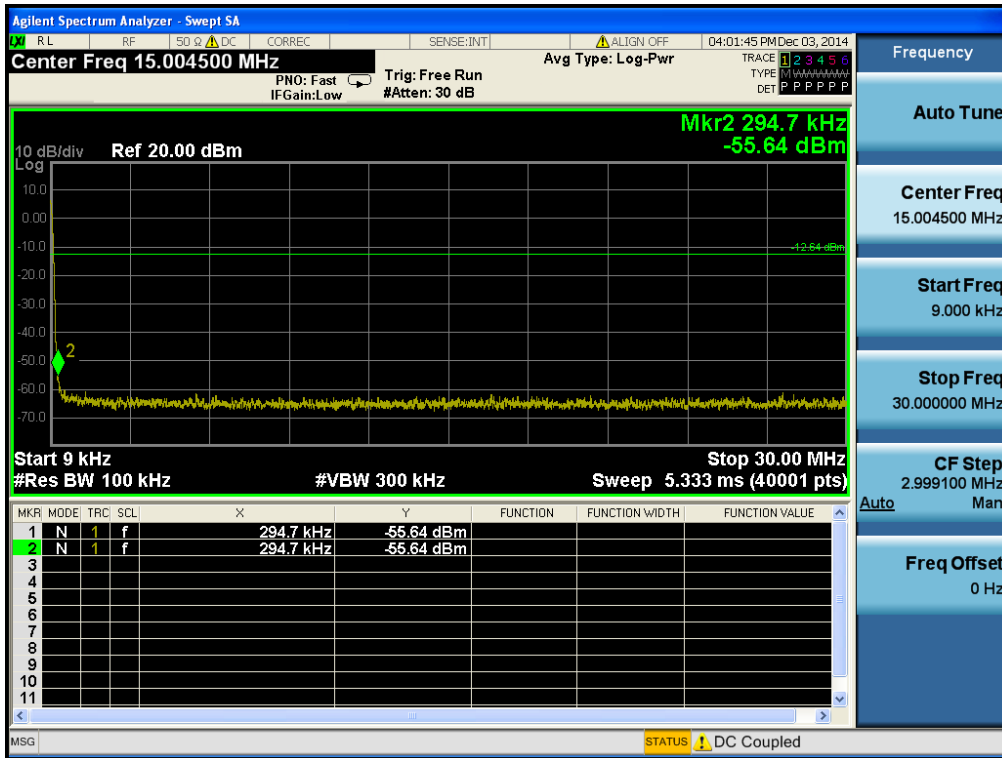
Reference



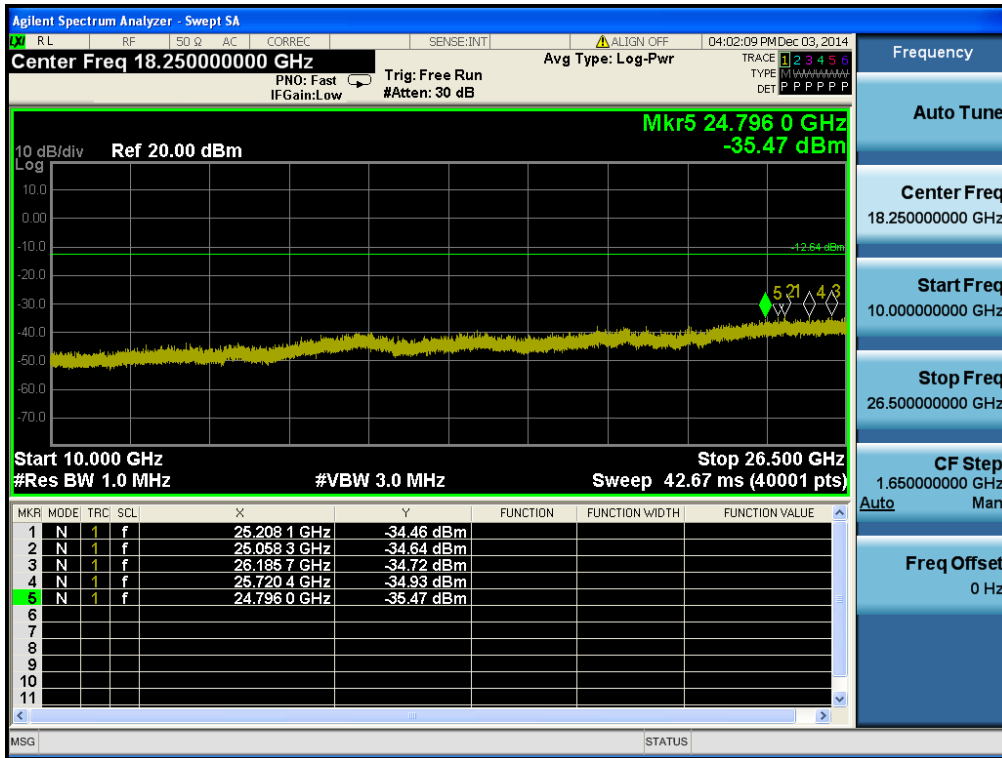
Low Band-edge



Conducted Spurious Emissions

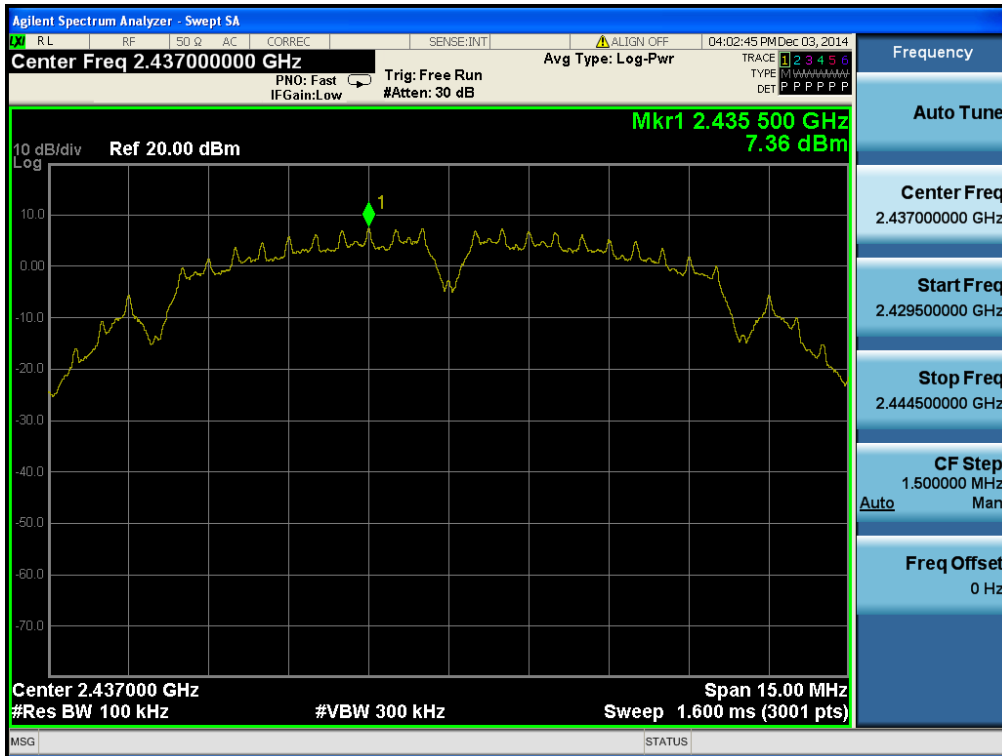


Conducted Spurious Emissions

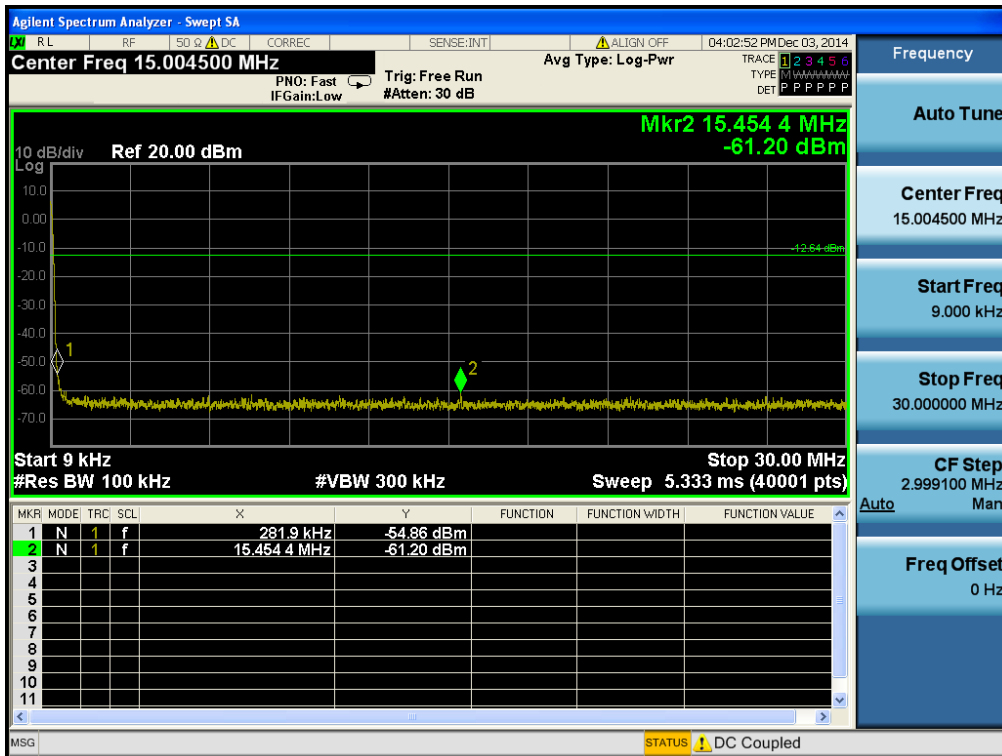


TM 1 & ANT 1 & Middle

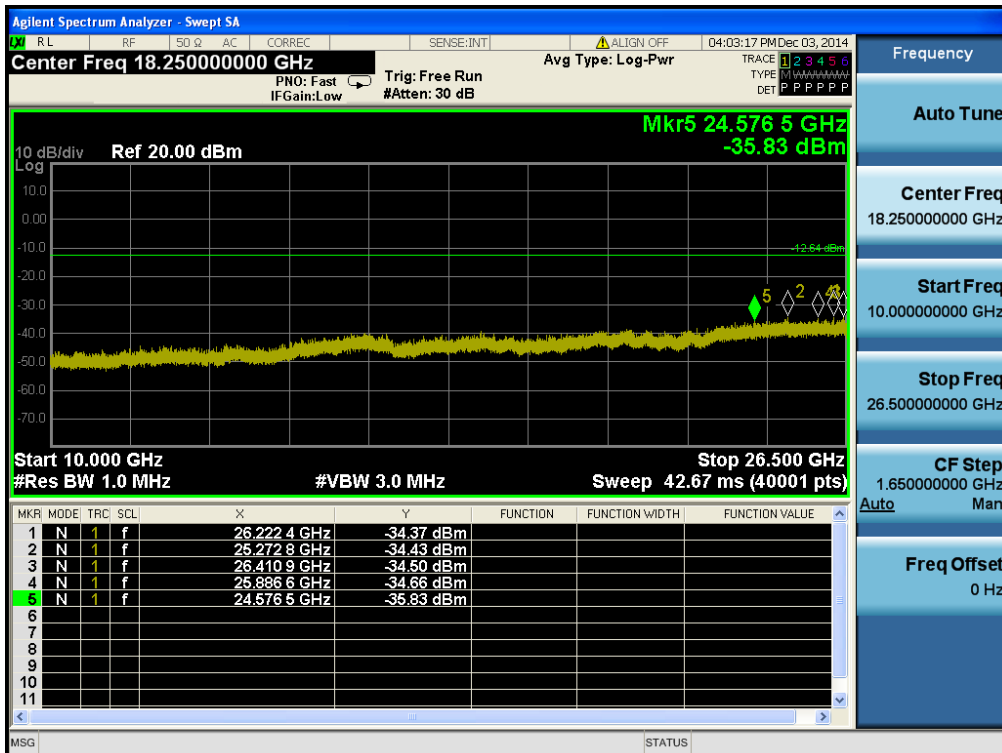
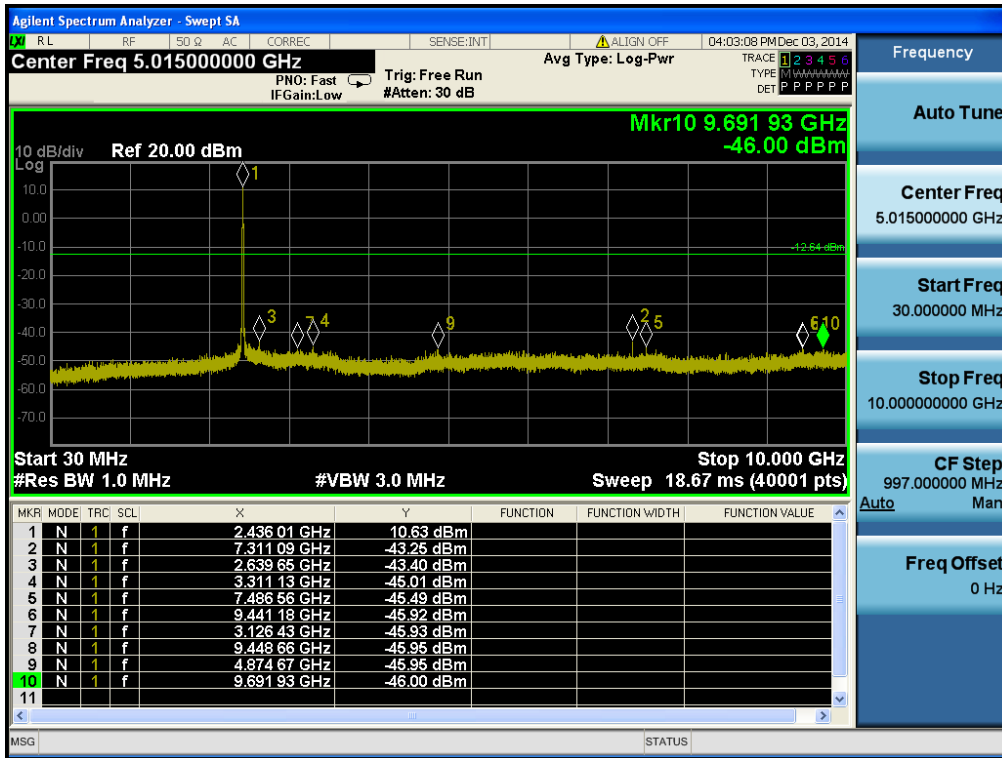
Reference



Conducted Spurious Emissions

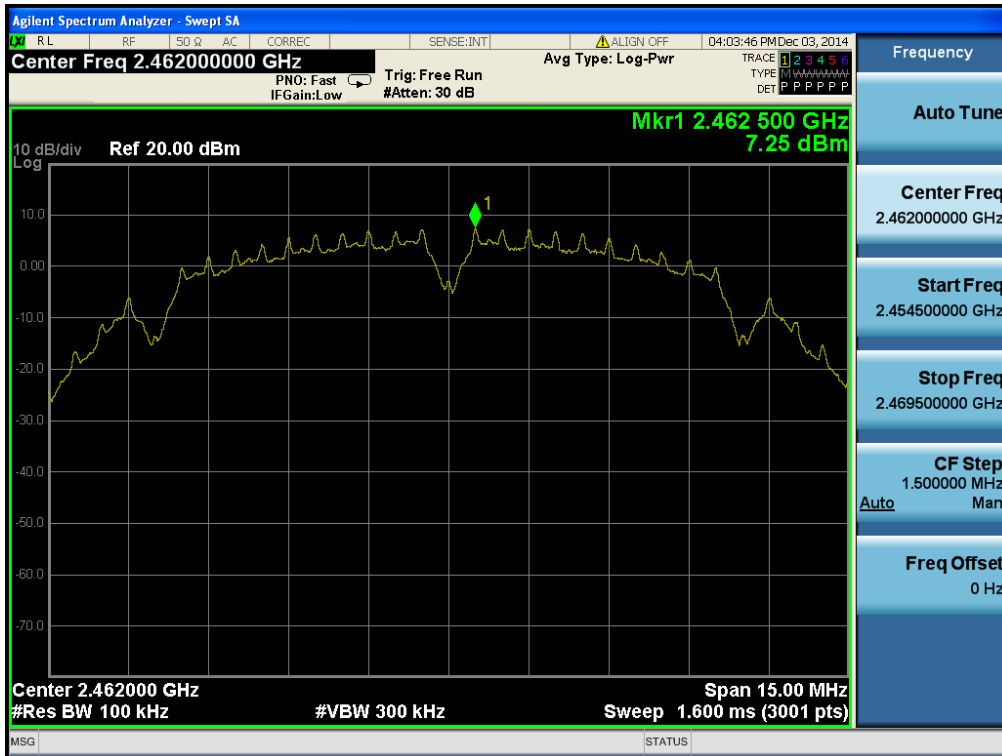


Conducted Spurious Emissions

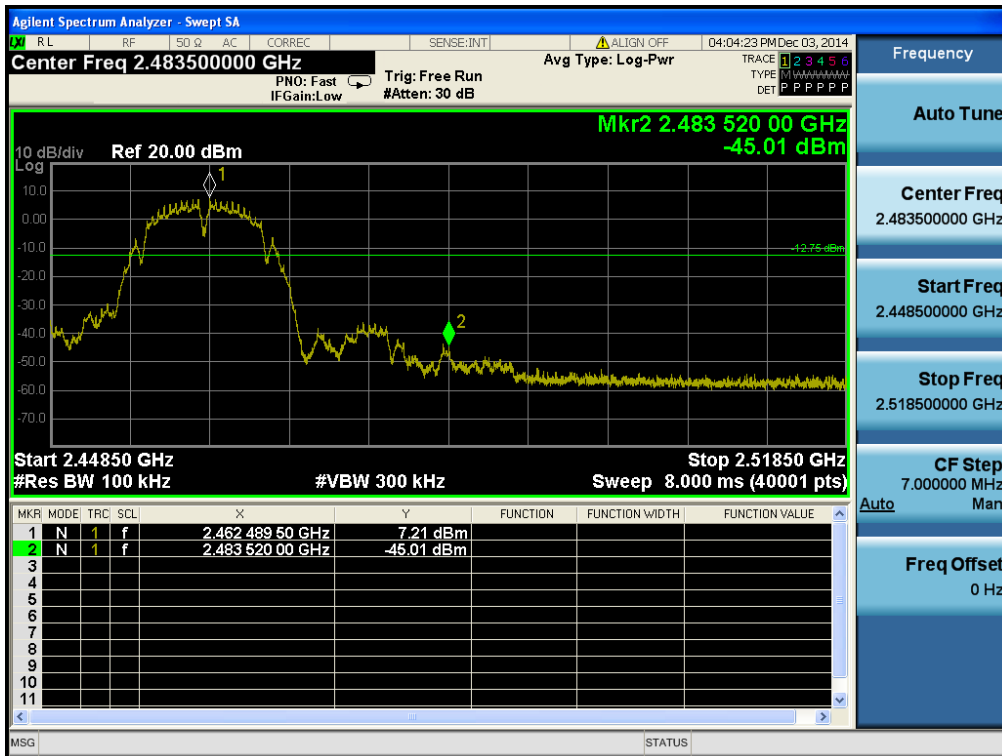


TM 1 & ANT 1 & Highest

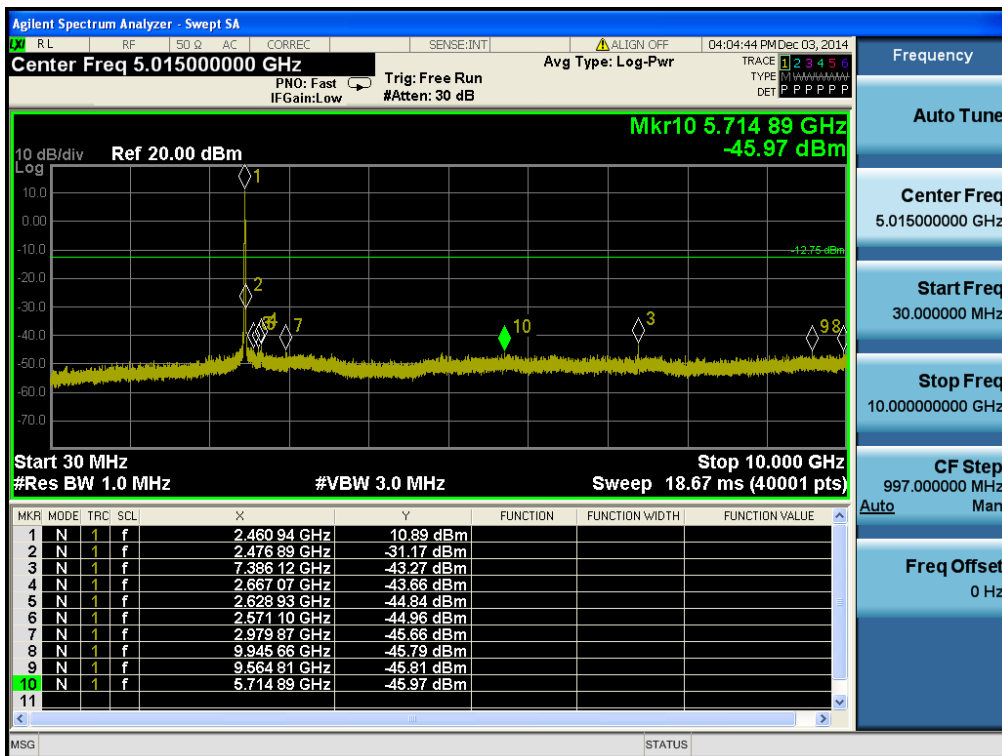
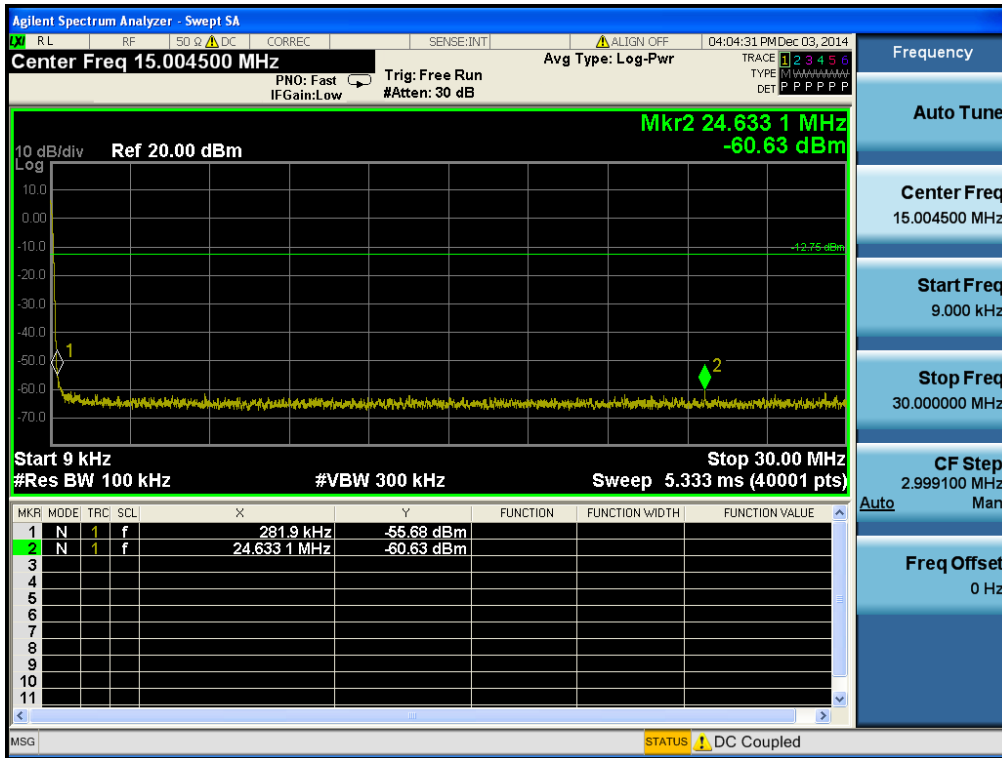
Reference



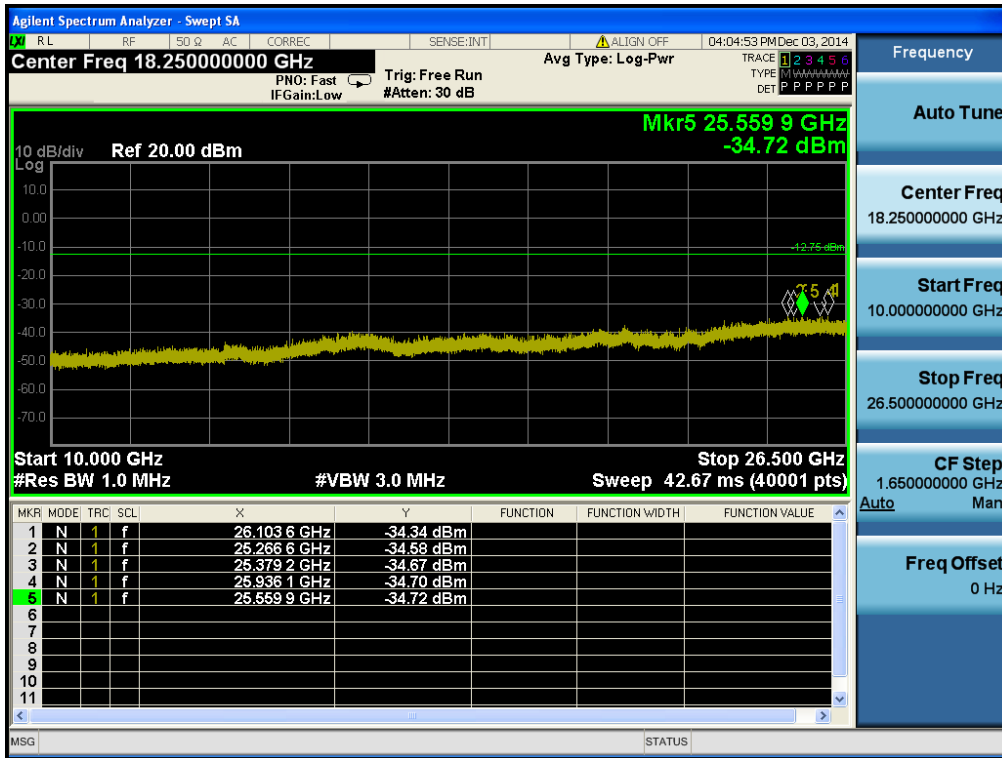
High Band-edge



Conducted Spurious Emissions

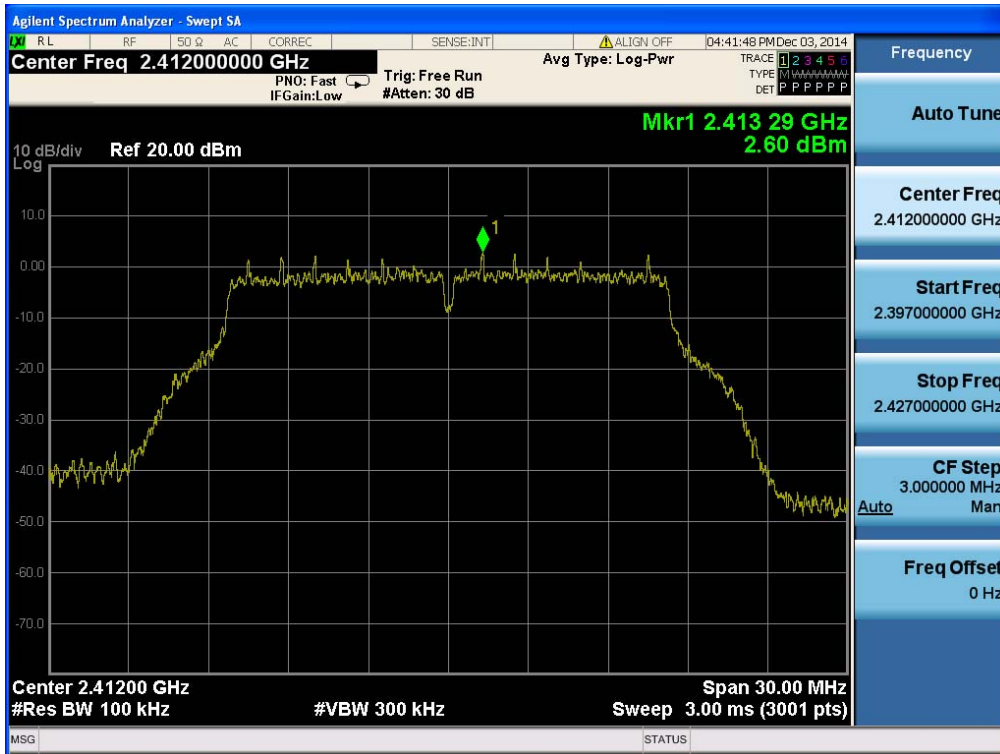


Conducted Spurious Emissions



TM 2 & ANT 1 & Lowest

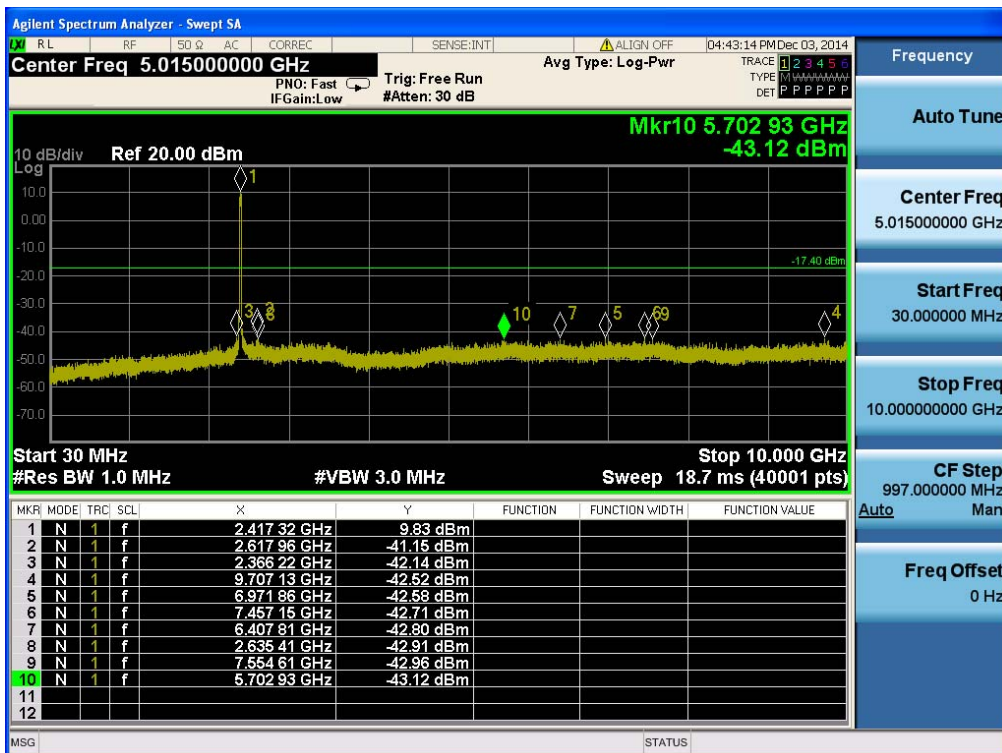
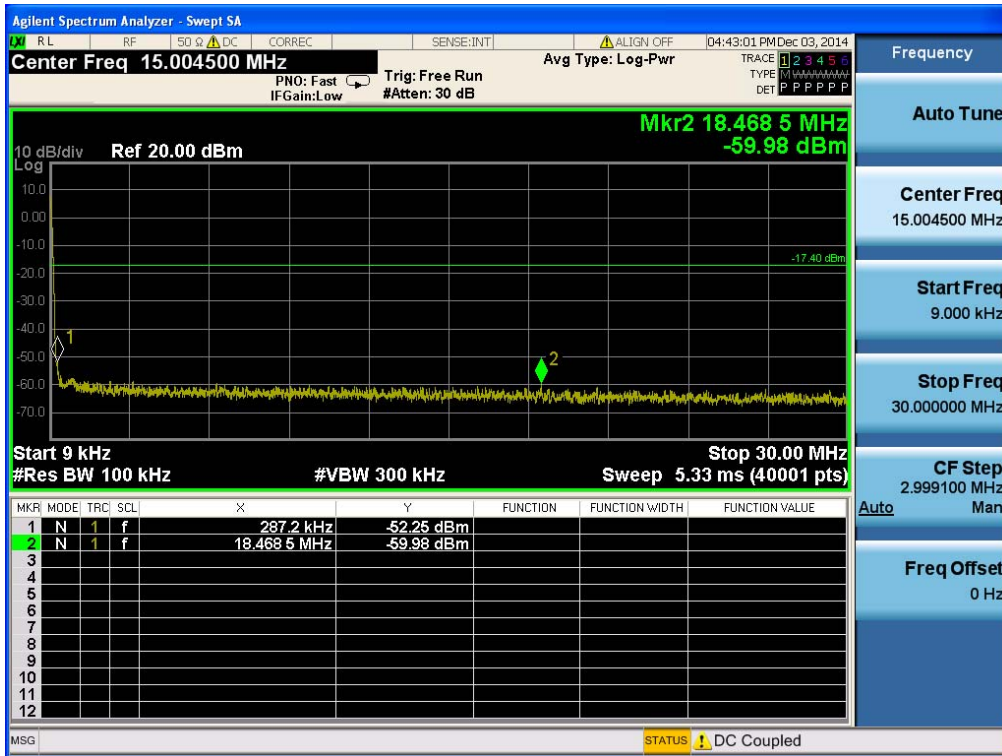
Reference



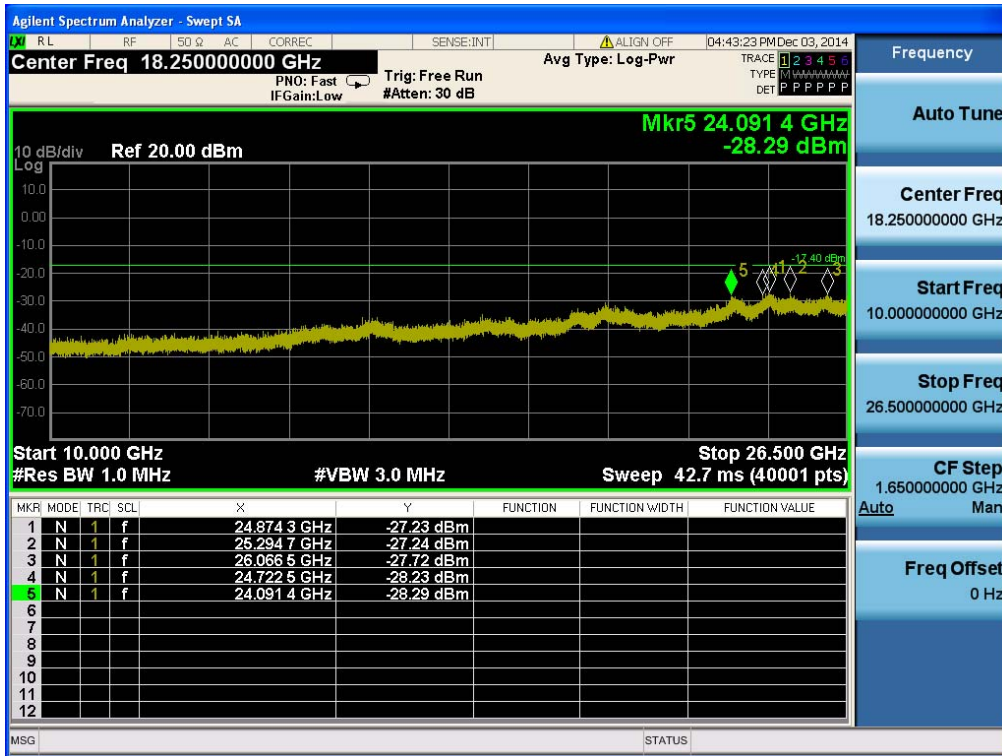
Low Band-edge



Conducted Spurious Emissions

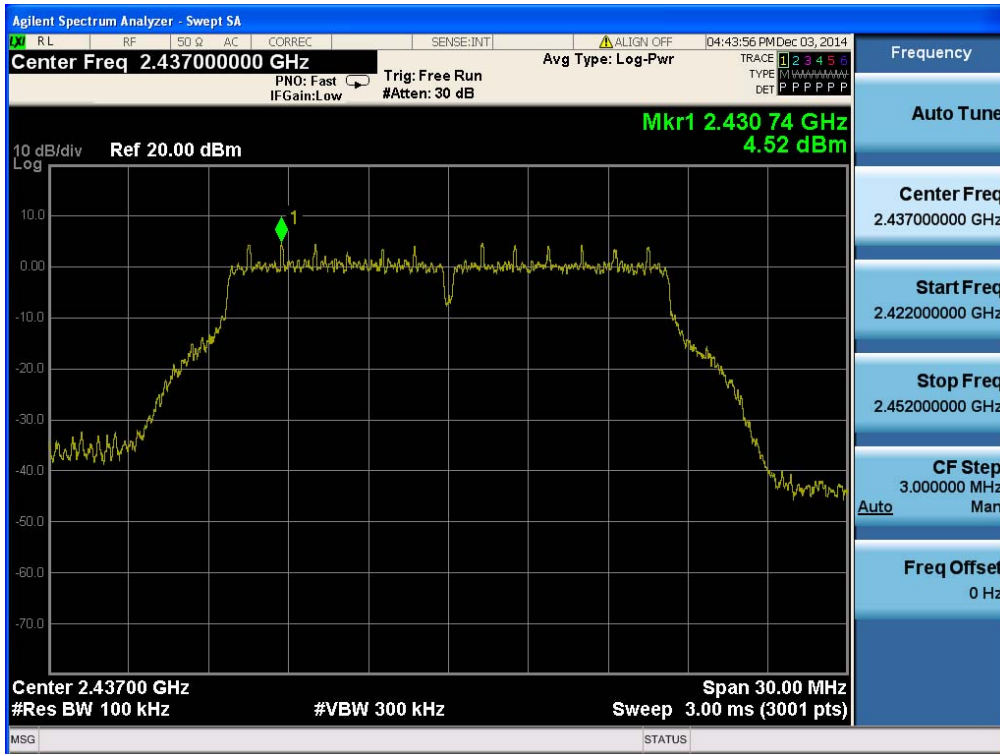


Conducted Spurious Emissions

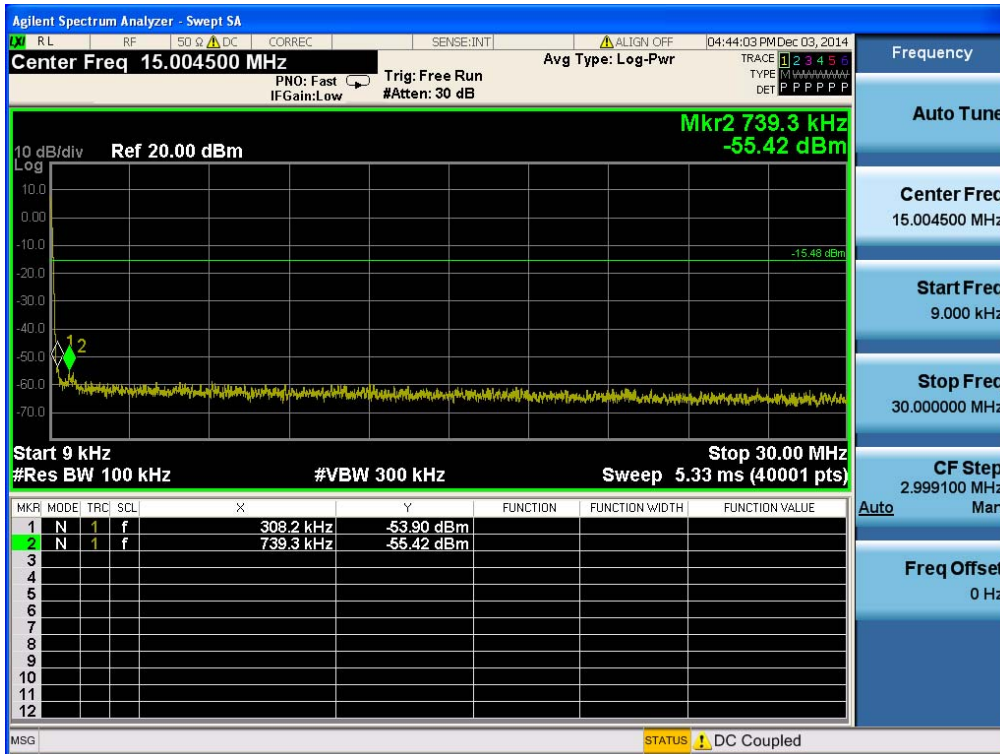


TM 2 & ANT 1 & Middle

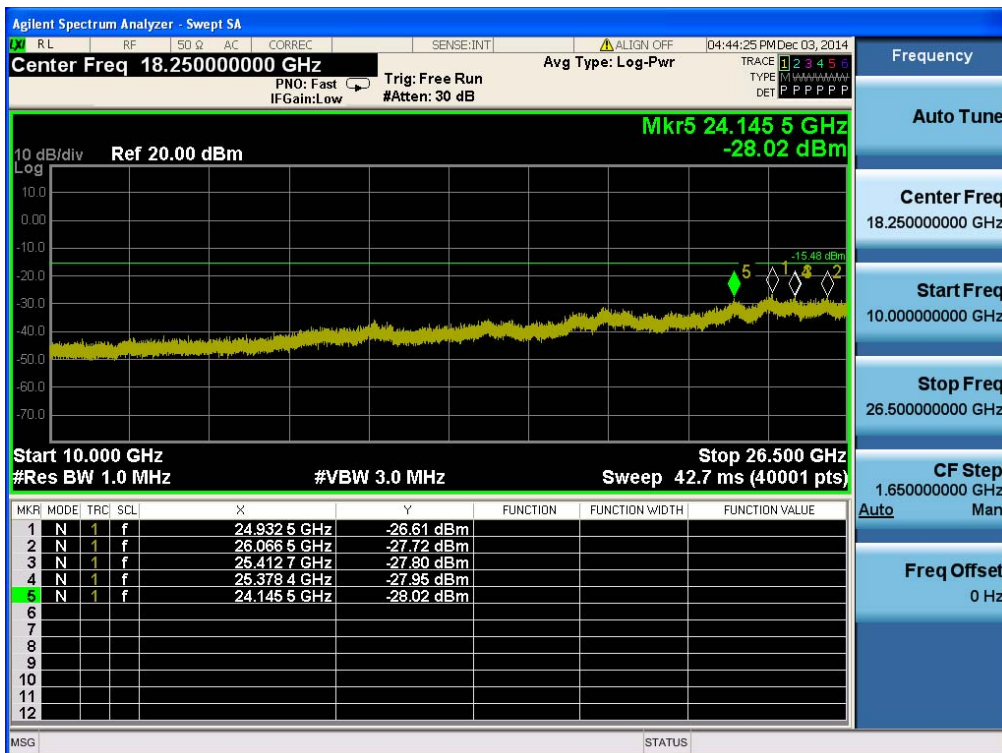
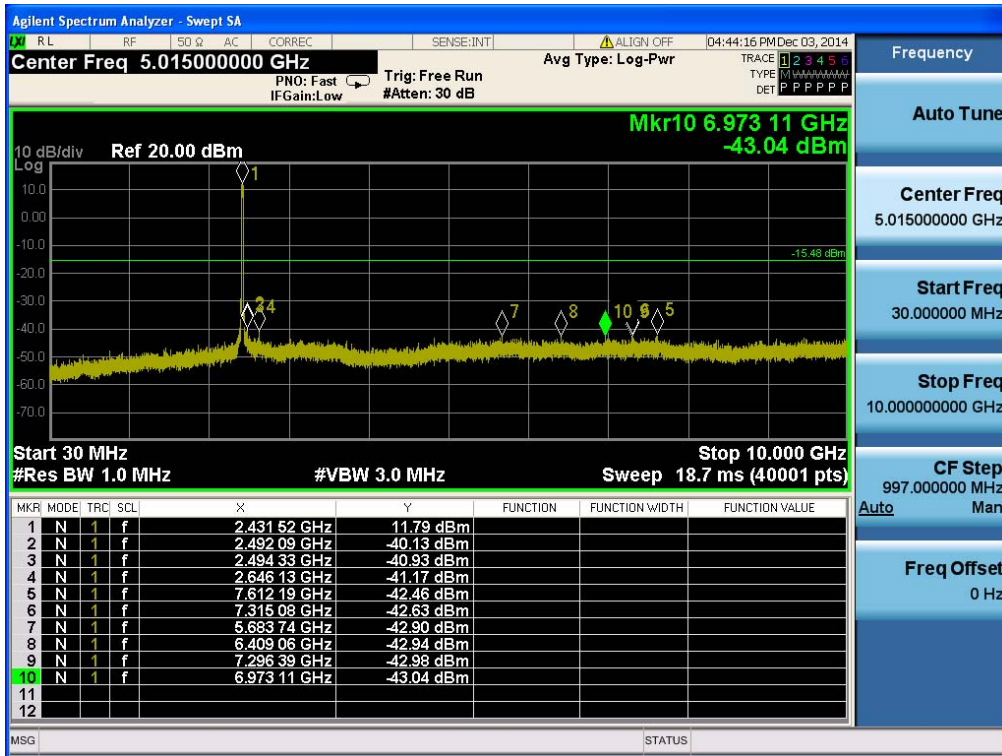
Reference



Conducted Spurious Emissions

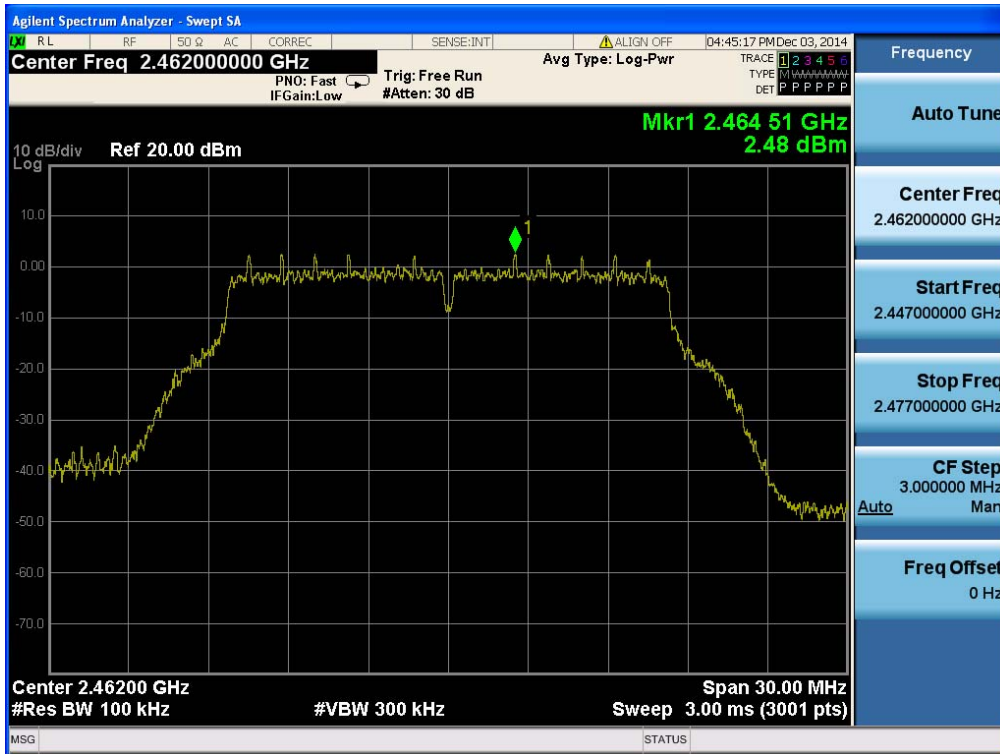


Conducted Spurious Emissions

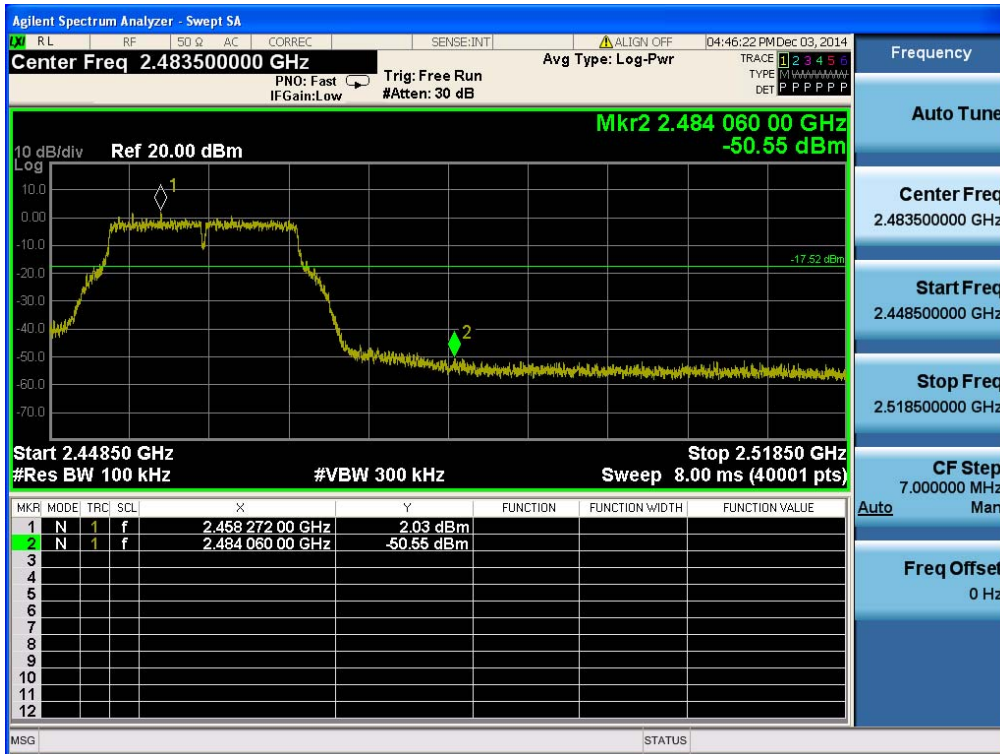


TM 2 & ANT 1 & Highest

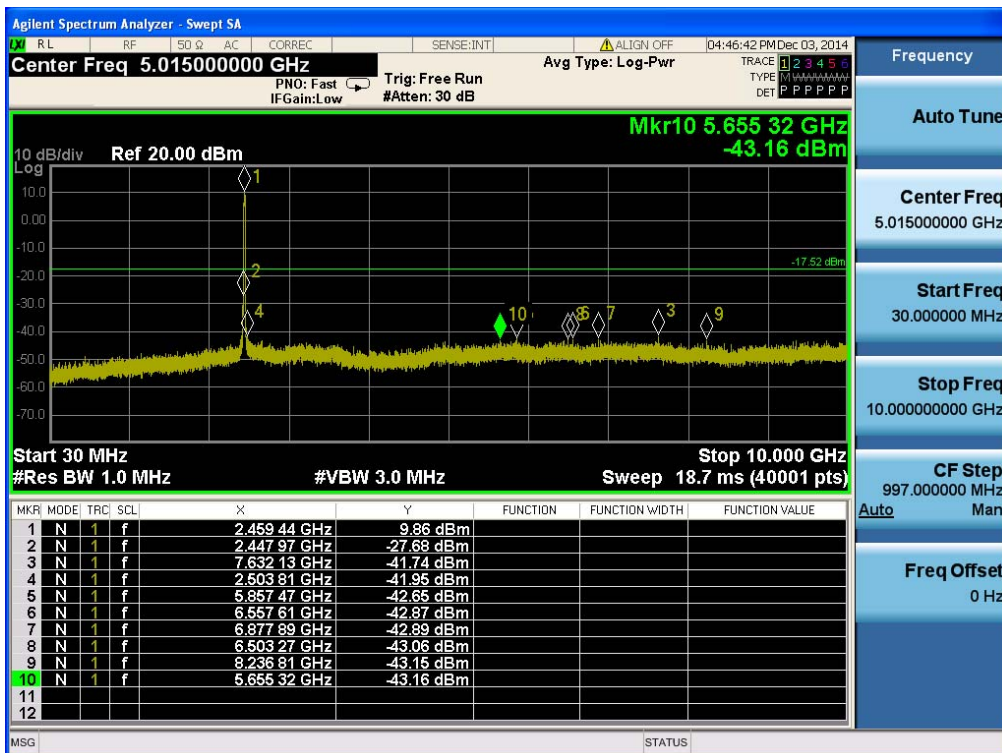
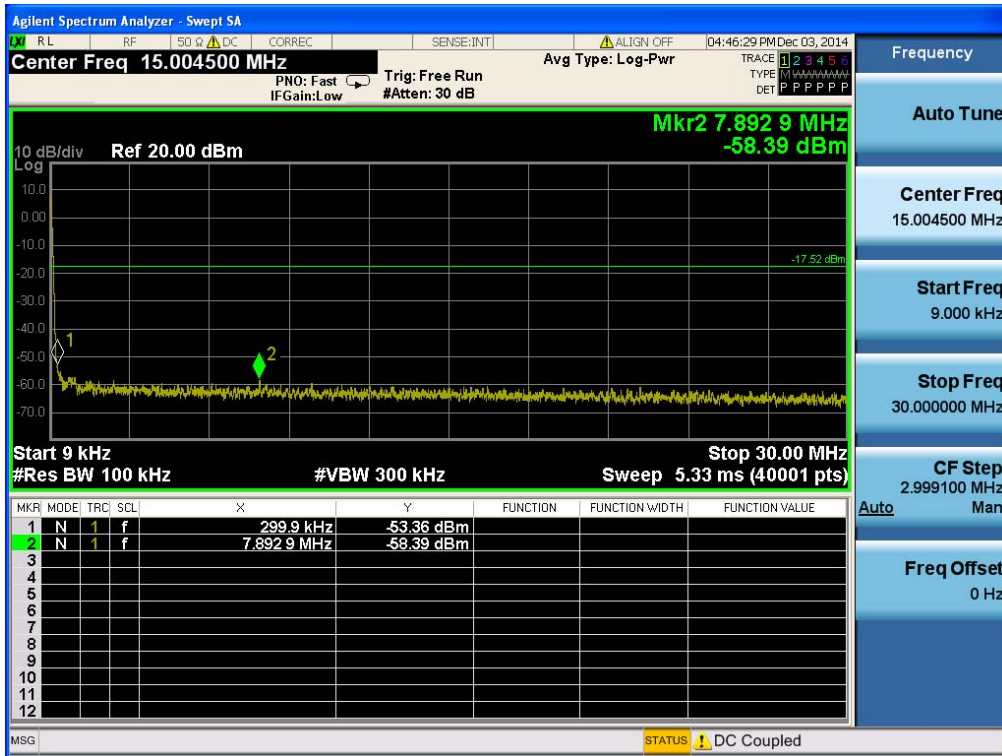
Reference



High Band-edge



Conducted Spurious Emissions



Conducted Spurious Emissions

