

TEST REPORT



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1. Report No : DRTFCC1708-0142(1)
2. Customer
 - Name : LG Electronics MobileComm USA, Inc.
 - Address : 1000 Sylvan Ave., Englewood Cliffs, New Jersey, United States, 07632
3. Use of Report : FCC & IC Original Grant
4. Product Name / Model Name : Mobile Phone / LGM-V300V
FCC ID / IC : ZNFV300V / 2703C-V300V
5. Test Method Used : KDB558074 D01v04
Test Specification : FCC Part 15.247
RSS-247 Issue 2 (2017-02), RSS-GEN Issue 4 (2014-11)
6. Date of Test : 2017.06.26 ~ 2017.08.04
7. Testing Environment : See appended test report.
8. Test Result : Refer to the attached test result.

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

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2017 . 08 . 18 .

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
DRTFCC1708-0142	Aug. 04, 2017	Initial issue
DRTFCC1708-0142(1)	Aug. 18, 2017	Added the note in section 8.5 and 9, Correction of typo

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1. EUT DESCRIPTION

FCC Equipment Class	Digital Transmission System(DTS)
Product	Mobile Phone
Model Name	LGM-V300V
Add Model Name	LGMV300V, V300V
Power Supply	DC 3.85 V
Frequency Range	▪ 802.11b/g/n/ac(20 MHz) : 2412 MHz ~ 2462 MHz
Max. RF Output Power	2.4GHz Band ▪ 802.11b : 18.82 dBm ▪ 802.11g : 20.94 dBm ▪ 802.11n (HT20) : 20.12 dBm
Modulation Type	▪ 802.11b: CCK, DSSS ▪ 802.11g/n: OFDM
Antenna Specification	Antenna type: Internal Antenna Antenna gain: Refer to the clause 7 in test report.

Transmitting configuration of EUT

Mode	Data rate
802.11b	1~11 Mbps
802.11a	6~54Mbps
802.11n(HT20)	MCS 0 ~ 7

. INFORMATION ABOUT TESTING

2.1 Test mode

Test mode	Worst case data rate	Tested Frequency(MHz)		
		Lowest	Middle	Highest
TM 1	802.11b 1 Mbps	2412	2437	2462
TM 2	802.11g 24 Mbps	2412	2437	2462
TM 3	802.11n(HT20) MCS 3	2412	2437	2462

Note 1: The worst case data rate is determined as above test mode according to the power measurements.

Also radiated spurious emission was performed at lowest data rate.

Note 2: The power measurement results for all modes and data rate were reported.

2.2 Auxiliary equipment

Equipment	Model No.	Serial No.	Manufacturer	Note
-	-	-	-	-
-	-	-	-	-

2.3 Tested environment

Temperature	: 22 ~ 27 °C
Relative humidity content	: 42 ~ 47 % R.H..
Details of power supply	: DC 3.85 V

2.4 EMI suppression Device(s) / Modifications

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

2.5 Measurement Uncertainty

The measurement uncertainties shown below were calculated in accordance with requirements of ANSI C 63.4-2014 and ANSI C 63.10-2013. All measurement uncertainty values are shown with a coverage factor of $k = 2$ to indicate a 95 % level of confidence.

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 %, $k = 2$)

3. SUMMARY OF TESTS

FCC Part Section(s)	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 [6.6]	RSS-Gen [6.6]	Occupied Bandwidth (99 %)		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 2, 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: This test item was performed in each axis and the worst case data was reported.

Note 3: For radiated emission tests below 30 MHz were performed on semi-anechoic chamber which is correlated with OATS.

4. TEST METHODOLOGY

Generally the tests were performed according to the KDB558074 D01v04, KDB662911 D01v02r01. 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

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 KDB558074 D01v04.

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 D01v04. 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 KDB558074 D01V04.

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.

4.4 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.

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 equipment, which is traceable to recognized national standards.

6. FACILITIES AND ACCREDITATIONS

6.1 Facilities

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 site is constructed in conformance with the requirements.		
- FCC MRA Accredited Test Firm No. : KR0034		
- IC Test site No. : 5740A-3		
www.dtnet.net		
Telephone	:	+ 82-31-321-2664
FAX	:	+ 82-31-321-1664

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, loop, 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

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 antenna is attached on the device by means of unique coupling method (Spring Tension). Therefore this E.U.T Complies with the requirement of §15.203

7.2 Directional antenna gain:

Bands	ANT gain [dBi]
2.4 GHz	-3.86

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

$$10 \log \left[\left(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20} \right)^2 / N_{ANT} \right] \text{ dBi}$$

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

$$10 \log \left[\left(10^{G1/10} + 10^{G2/10} + \dots + 10^{GN/10} \right) / N_{ANT} \right] \text{ dBi}$$

8. TEST RESULT

8.1 6dB 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:

The transmitter output is connected to the Spectrum Analyzer and used following test procedure of **KDB558074 D01V04**

1. Set resolution bandwidth (RBW) = 100 kHz.
2. Set the video bandwidth (VBW) $\geq 3 \times$ 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.

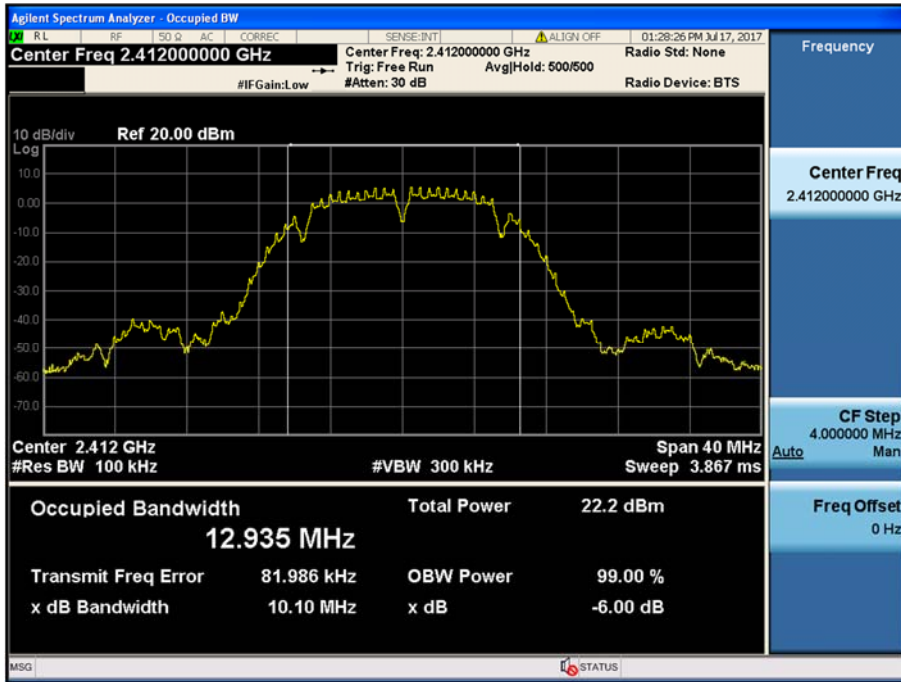
■ Test Results: **Comply**

Test Mode	Frequency	Test Results[MHz]
TM 1	Lowest	10.100
	Middle	10.110
	Highest	10.100
TM 2	Lowest	15.700
	Middle	15.440
	Highest	15.320
TM 3	Lowest	15.120
	Middle	15.150
	Highest	15.140

RESULT PLOTS

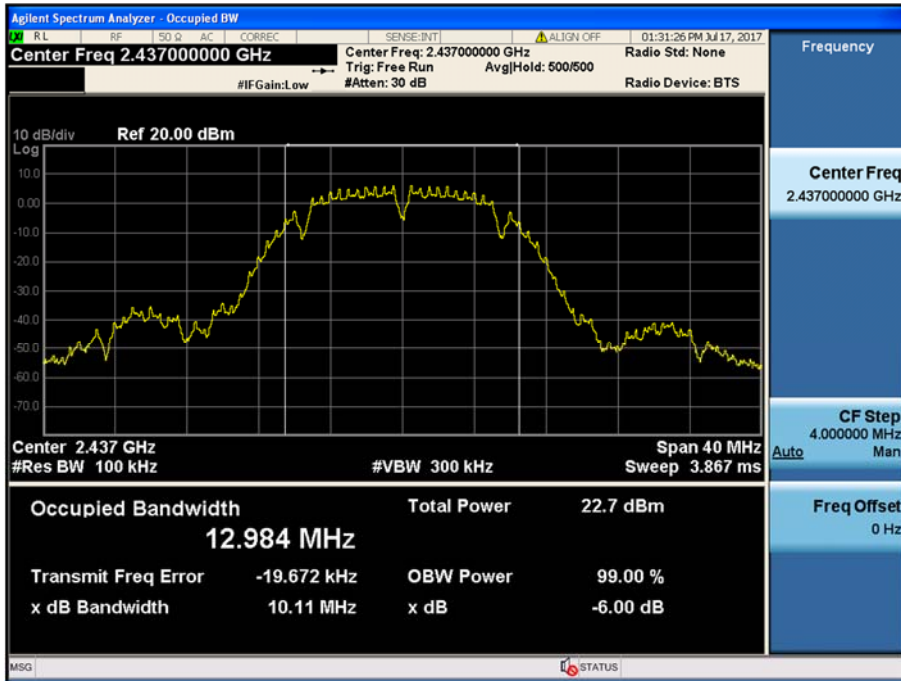
6 dB Bandwidth

TM 1 & Lowest



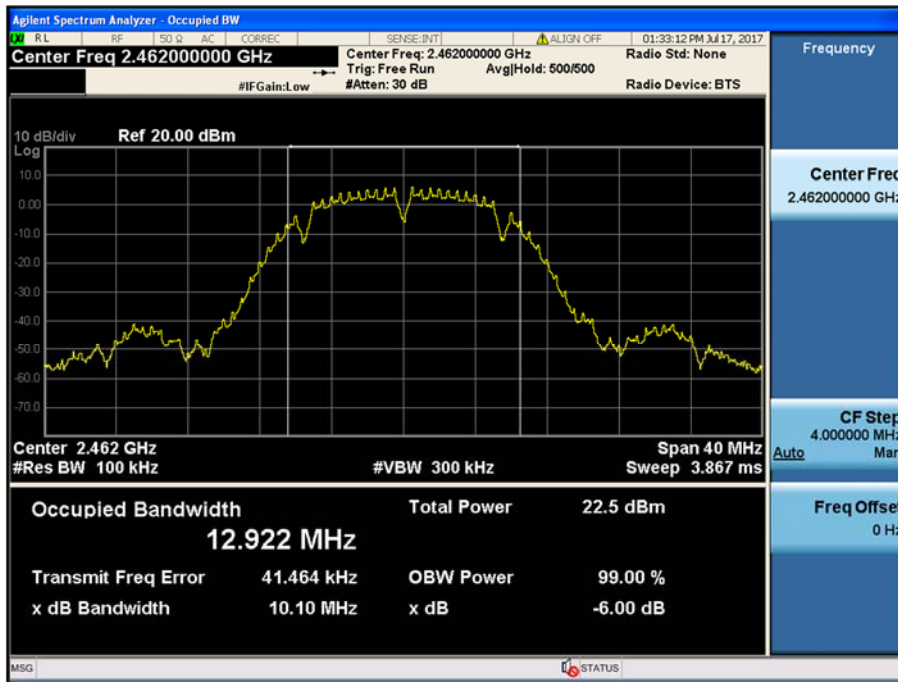
6 dB Bandwidth

TM 1 & Middle



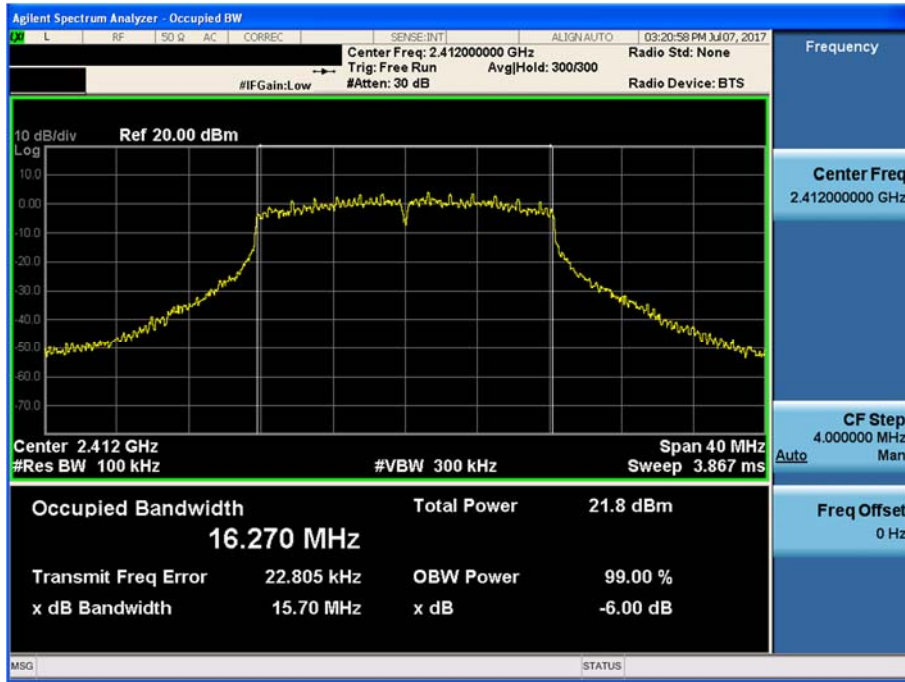
6 dB Bandwidth

TM 1 & Highest



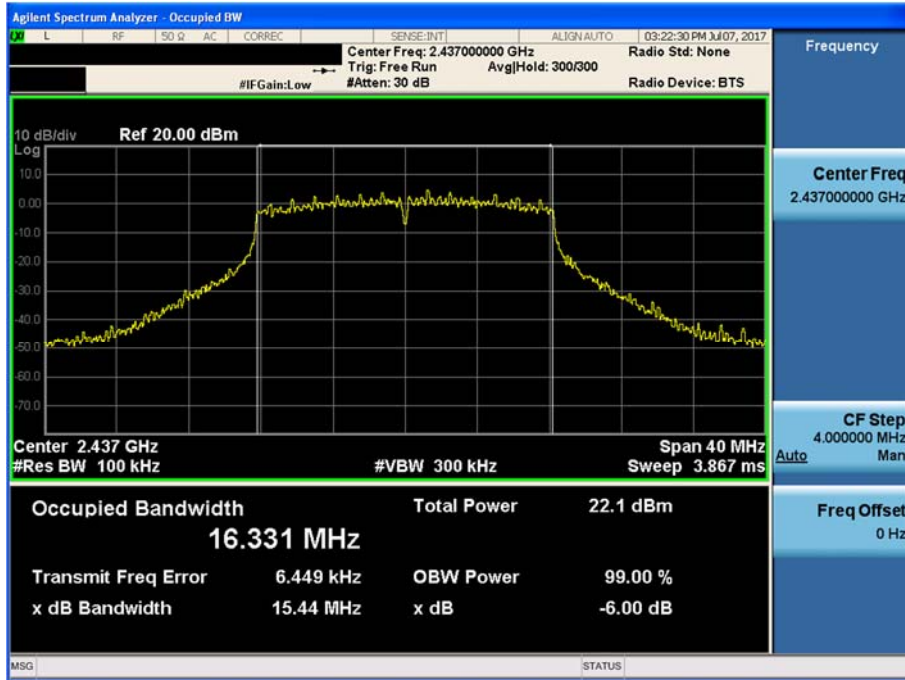
6 dB Bandwidth

TM 2 & Lowest



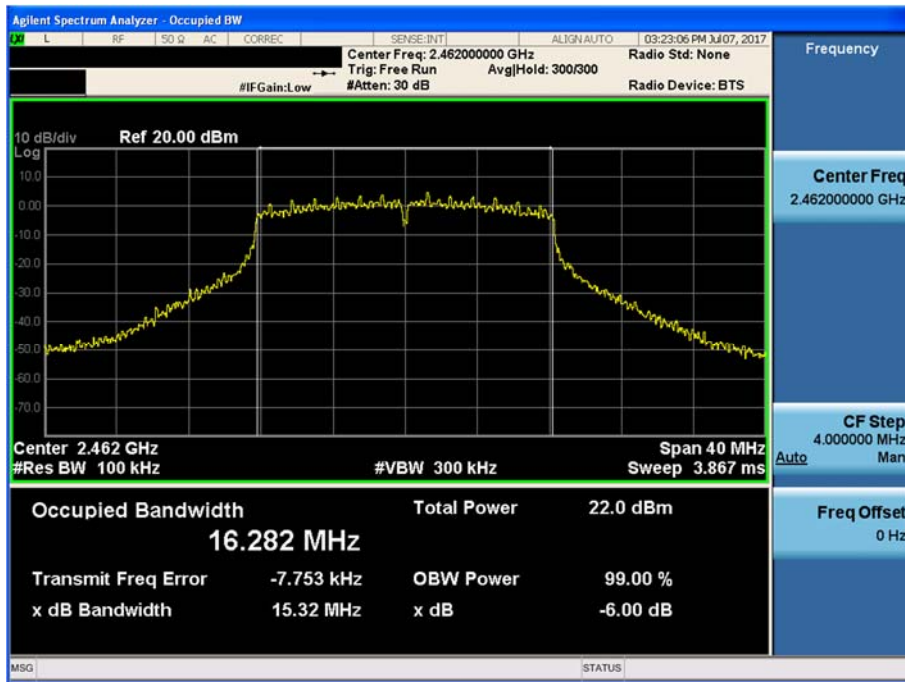
6 dB Bandwidth

TM 2 & Middle



6 dB Bandwidth

TM 2 & Highest



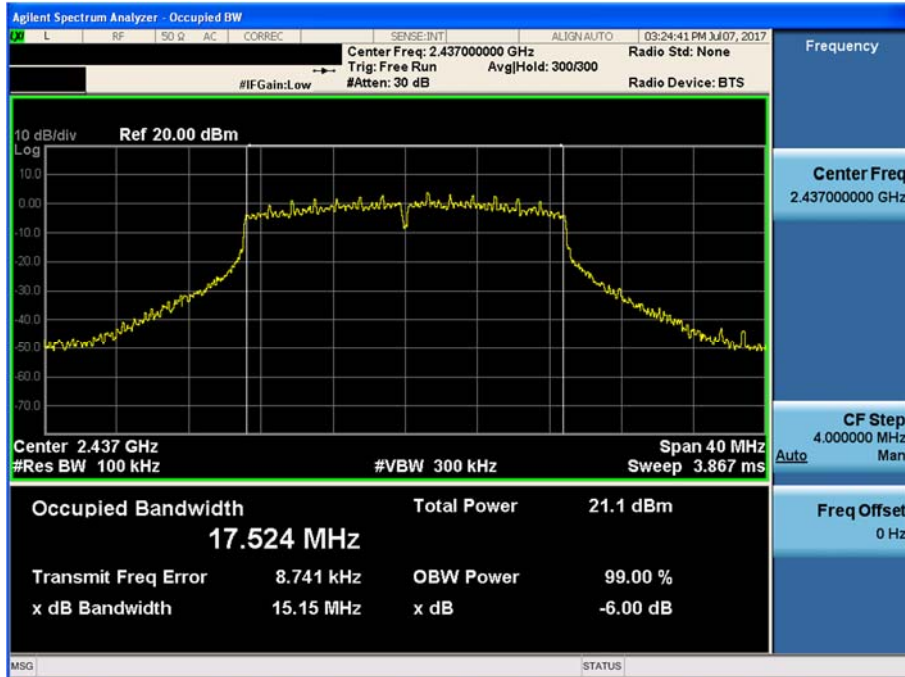
6 dB Bandwidth

TM 3 & Lowest



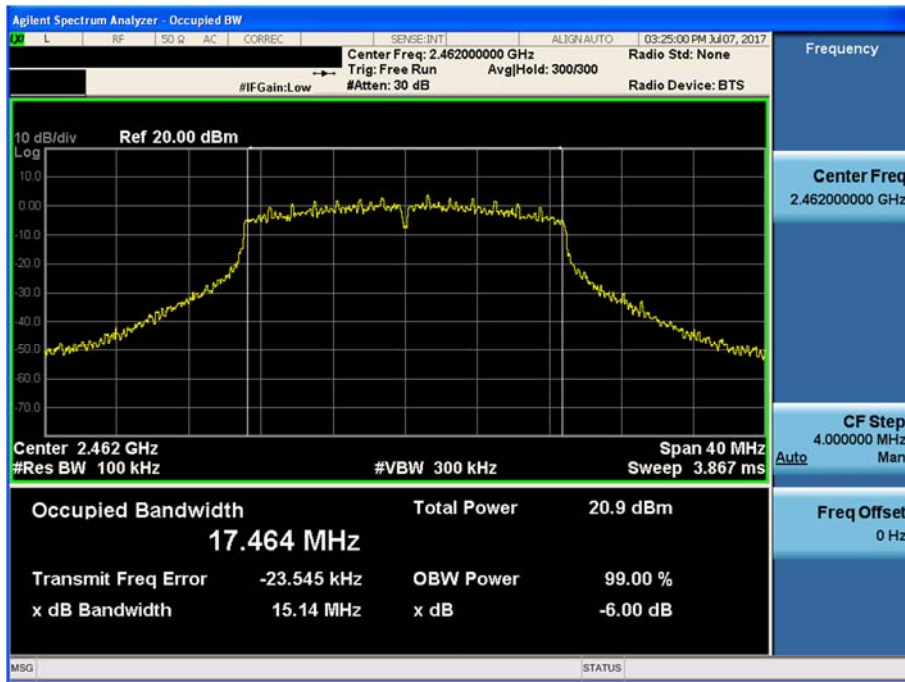
6 dB Bandwidth

TM 3 & Middle



6 dB Bandwidth

TM 3 & Highest

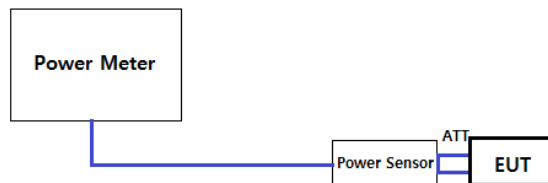


8.2 Maximum peak conducted output power

■ 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 D01V04

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 D01V04

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.

Note: The measure-and-sum technique is used for test mode with multiple transmitting.

■ Test Results: **Comply**

Freq. (MHz)	Det.	Maximum Peak Conducted Output Power (dBm) for 802.11b							
		Data Rate [Mbps]							
		1	2	5.5	11	-	-	-	-
2412	PK	18.620	18.260	18.390	18.600	-	-	-	-
	AV	15.430	15.070	14.990	15.410	-	-	-	-
2437	PK	18.820	18.520	18.610	18.800	-	-	-	-
	AV	15.770	15.430	15.240	15.710	-	-	-	-
2462	PK	18.720	18.330	18.470	18.630	-	-	-	-
	AV	15.570	15.180	15.150	15.560	-	-	-	-

Freq. (MHz)	Det.	Maximum Peak Conducted Output Power (dBm) for 802.11g							
		Data Rate [Mbps]							
		6	9	12	18	24	36	48	54
2412	PK	19.020	19.040	18.940	20.850	20.940	20.340	20.430	20.510
	AV	14.220	14.120	14.070	14.210	14.220	11.130	11.120	11.190
2437	PK	19.470	19.460	19.350	20.670	20.750	20.320	20.220	20.590
	AV	14.660	14.640	14.590	14.320	14.080	11.050	10.950	10.980
2462	PK	18.940	18.030	18.940	20.710	20.820	20.650	20.540	20.650
	AV	14.210	14.040	14.170	14.200	14.190	11.170	11.270	11.190

Freq. (MHz)	Det.	Maximum Peak Conducted Output Power (dBm) for 802.11n(HT20)							
		Data Rate [MCS]							
		0	1	2	3	4	5	6	7
2412	PK	18.310	18.240	19.870	20.120	19.860	19.880	19.720	19.360
	AV	13.370	13.220	13.050	13.060	11.150	11.130	10.240	10.230
2437	PK	18.490	18.520	19.880	20.070	19.920	20.030	20.040	19.410
	AV	13.650	13.560	13.450	13.530	11.460	11.270	10.720	10.730
2462	PK	17.920	18.140	19.860	19.980	19.690	19.420	19.880	19.170
	AV	13.480	13.140	13.140	13.100	11.220	11.240	10.210	10.130

8.3 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

Method PKPSD of KDB558074 D01V04 is used.

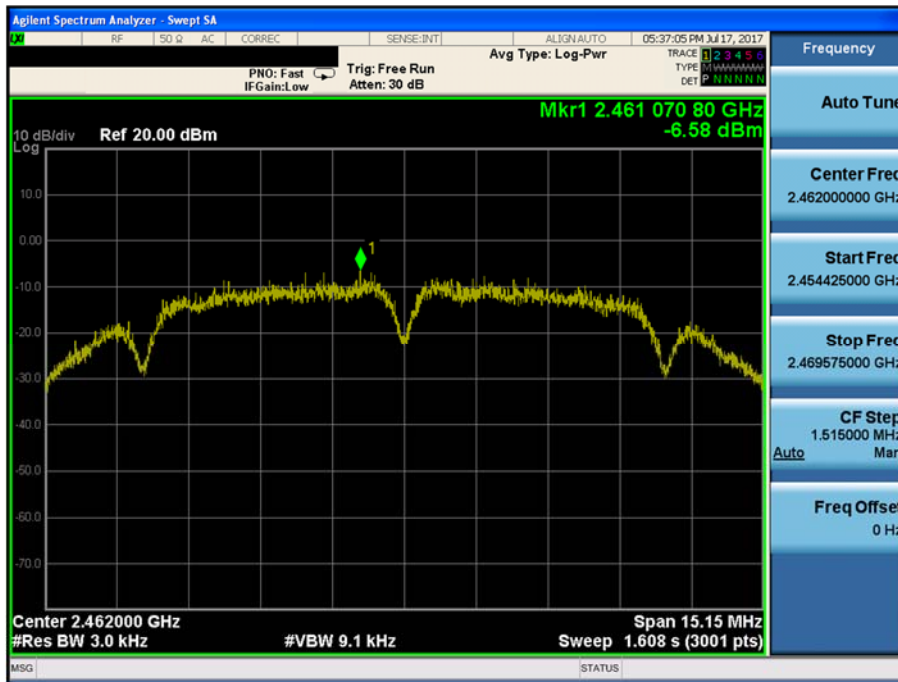
1. Set analyzer center frequency to DTS channel center frequency.
2. Set the span to **1.5 times** the DTS bandwidth.
3. Set the RBW to : **3 kHz ≤ RBW ≤ 100 kHz**
4. Set the VBW ≥ **3 x RBW**
5. Detector = **Peak**
6. Sweep time = **Auto couple**
7. Trace mode = **Max hold.**
8. Allow trace to fully 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]
TM 1	Lowest	3 kHz	-7.410
	Middle	3 kHz	-7.560
	Highest	3 kHz	-6.580
TM 2	Lowest	3 kHz	-10.410
	Middle	3 kHz	-10.420
	Highest	3 kHz	-10.380
TM 3	Lowest	3 kHz	-11.620
	Middle	3 kHz	-11.620
	Highest	3 kHz	-11.830

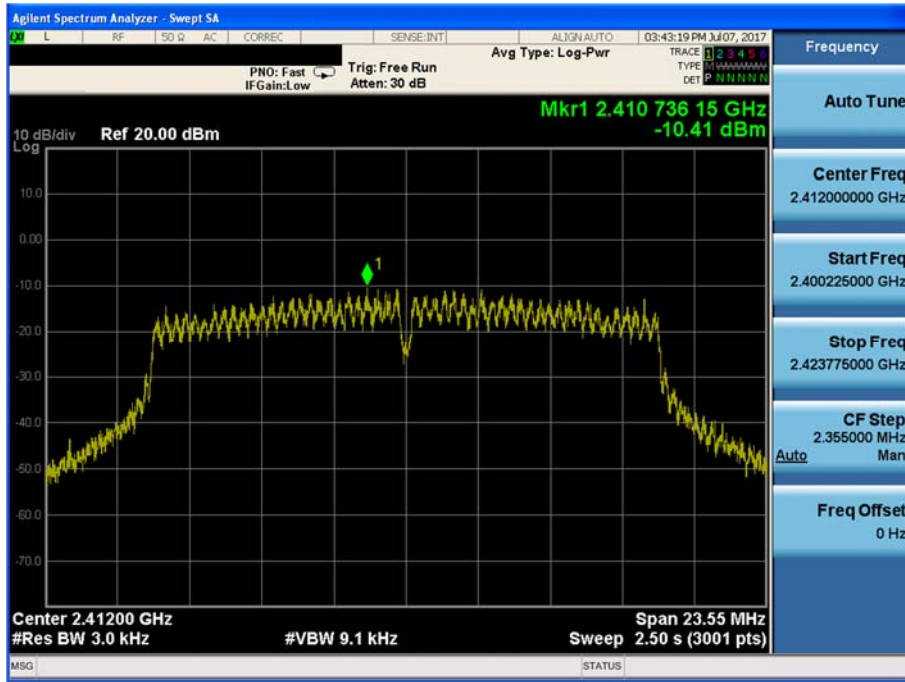
Maximum PPSD

TM 1 & Highest



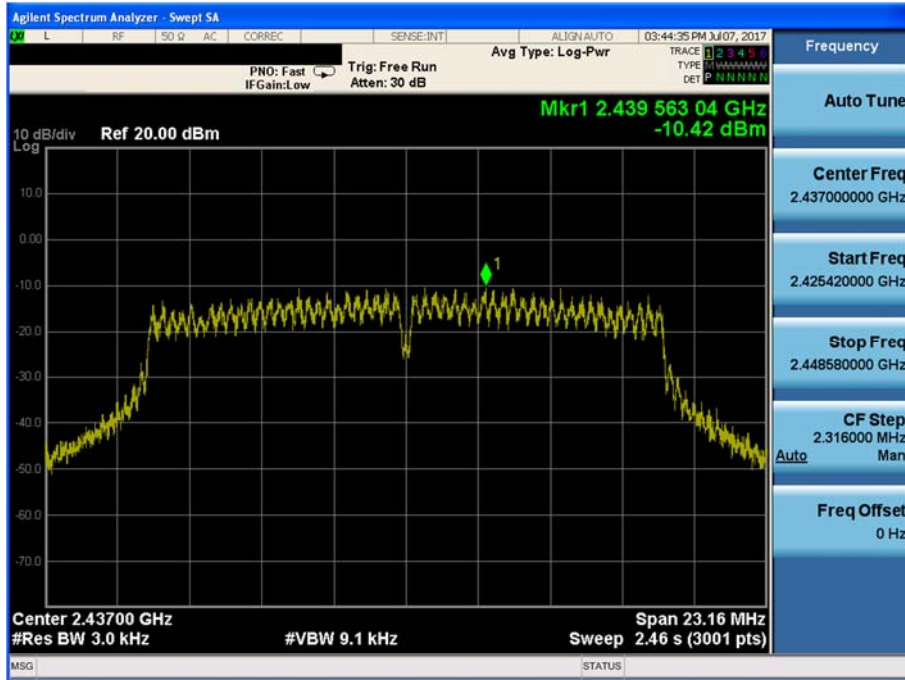
Maximum PPSD

TM 2 & Lowest



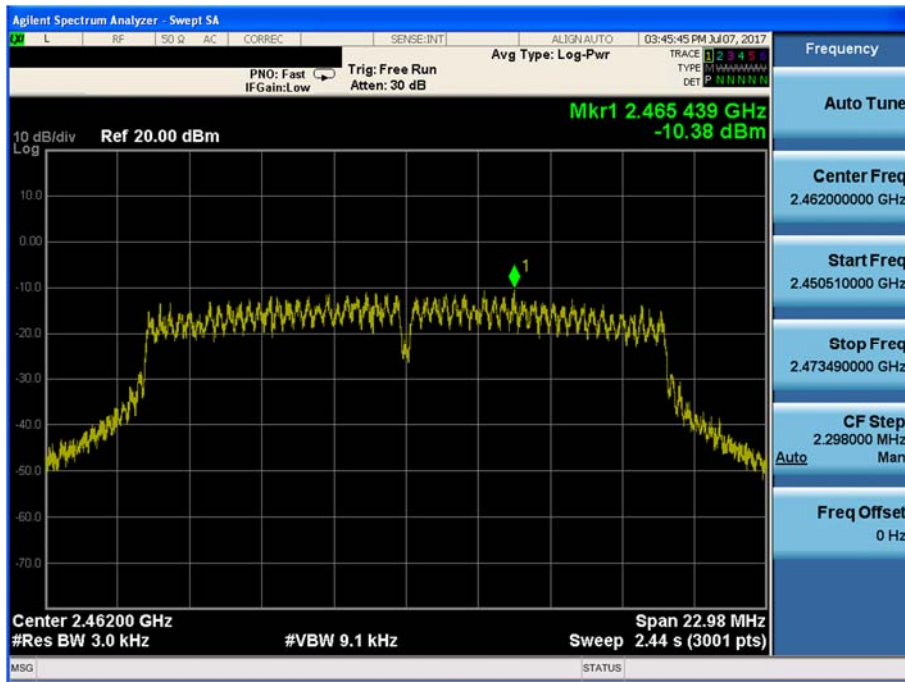
Maximum PPSD

TM 2 & Middle



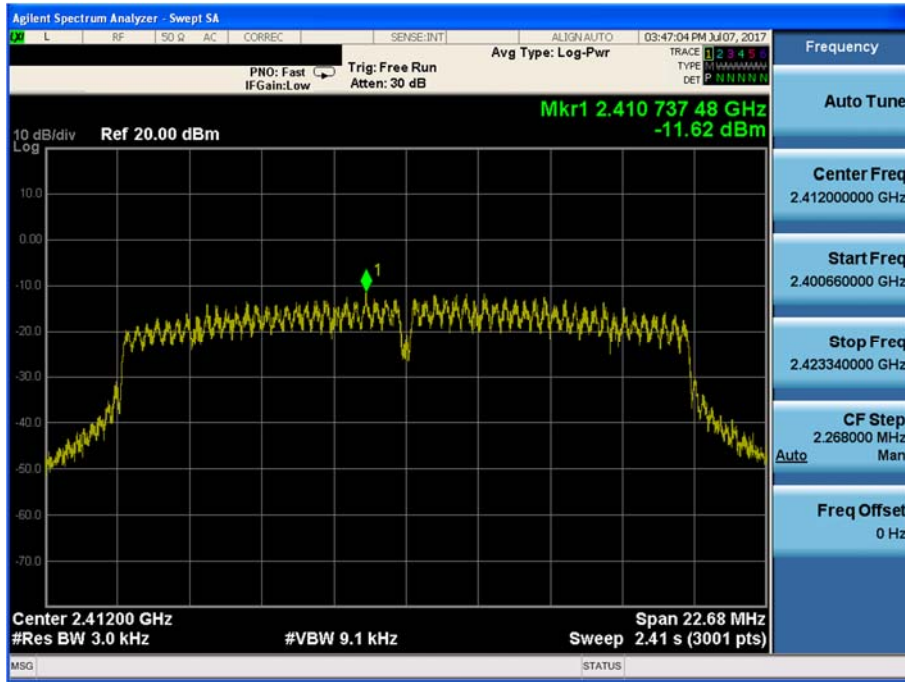
Maximum PPSD

TM 2 & Highest



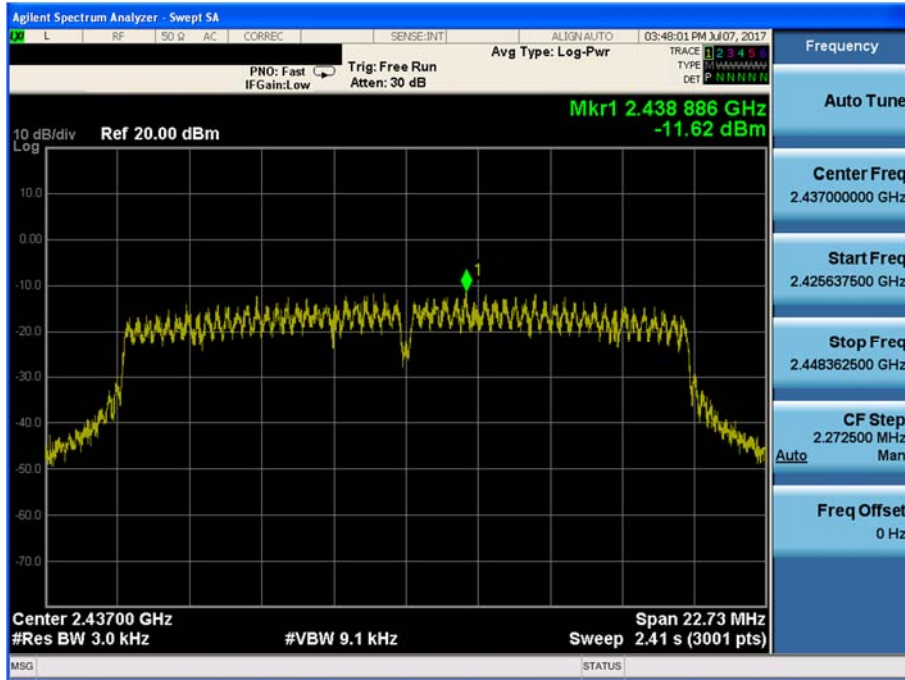
Maximum PPSD

TM 3 & Lowest



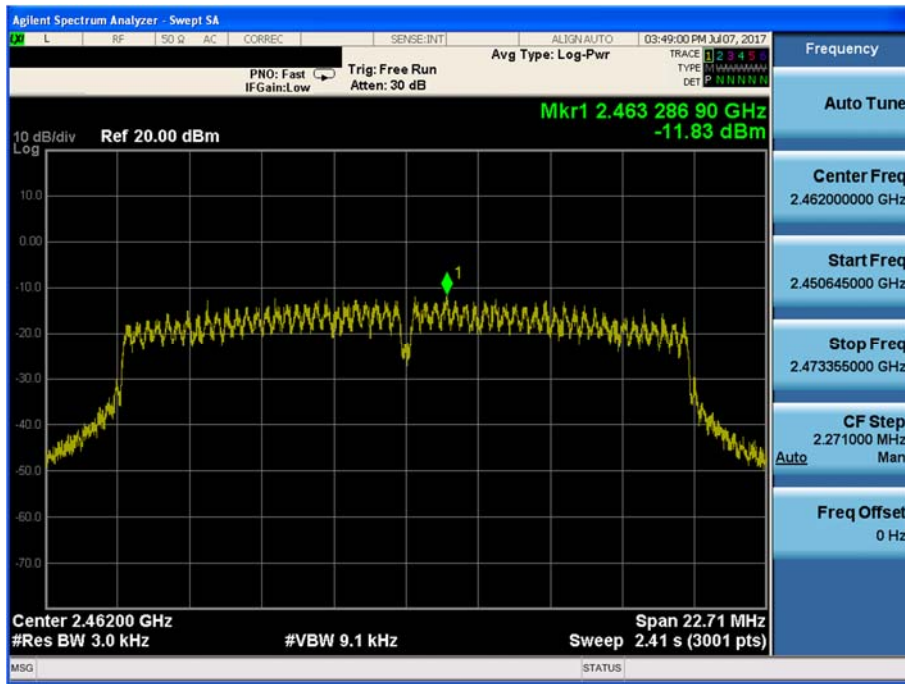
Maximum PPSD

TM 3 & Middle



Maximum PPSD

TM 3 & Highest



8.4 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

The transmitter output is connected to a spectrum analyzer.

- Measurement Procedure 1 – Reference Level of KDB558074 D01v04

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 of KDB558074 D01v04

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 $\geq 3 \times$ 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 = 1 MHz, VBW = 3 MHz, SWEEP TIME = AUTO, DETECTOR = PEAK, TRACE = MAX HOLD, SWEEP POINT : 40001

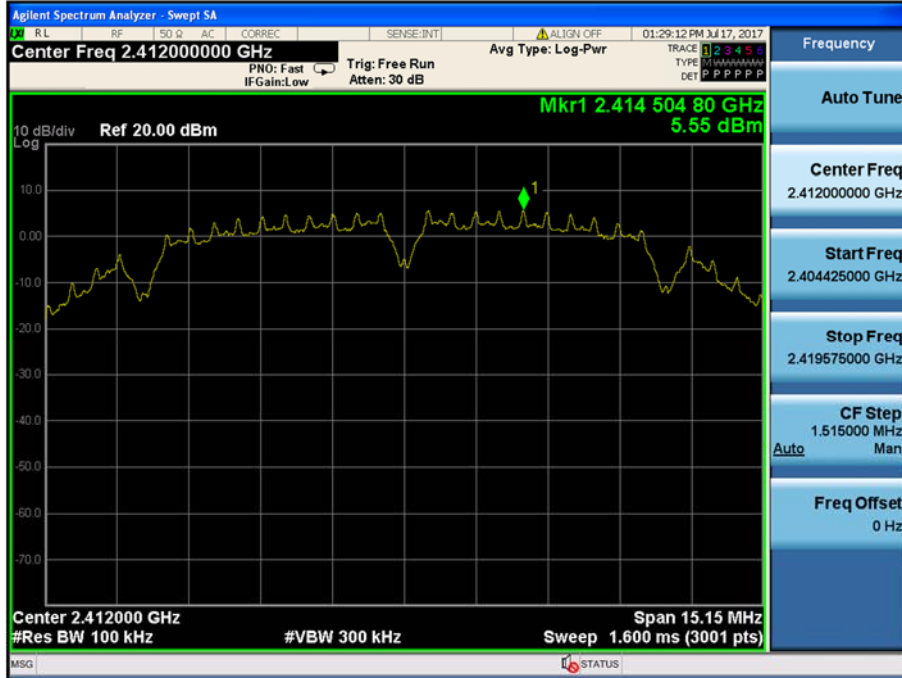
LIMIT LINE = 20 dB below of the reference level of above measurement procedure Step 2. (RBW = 100 kHz, VBW = 300 kHz)

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.

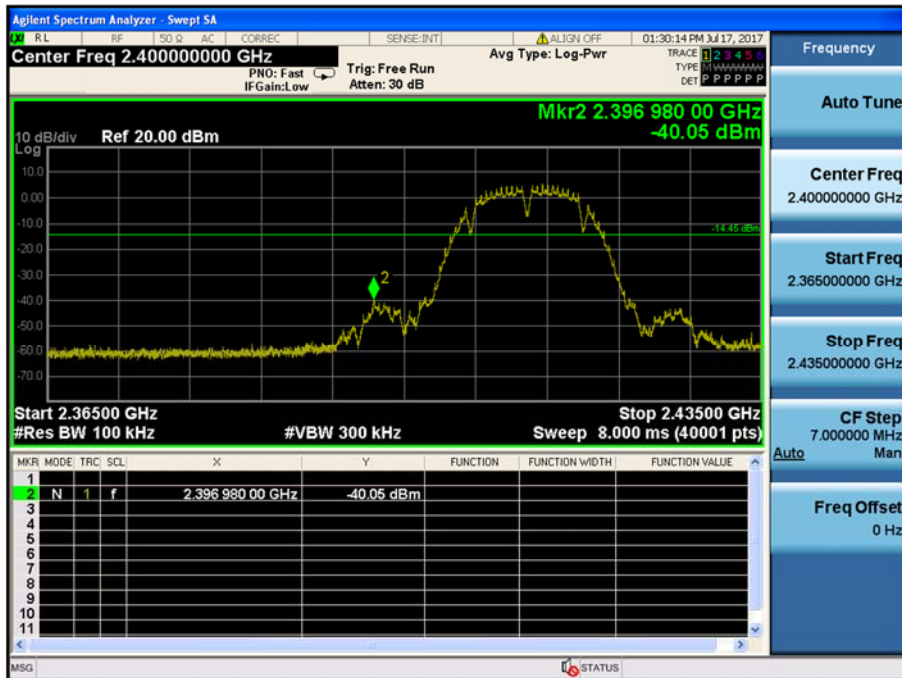
RESULT PLOTS

TM 1 & Lowest

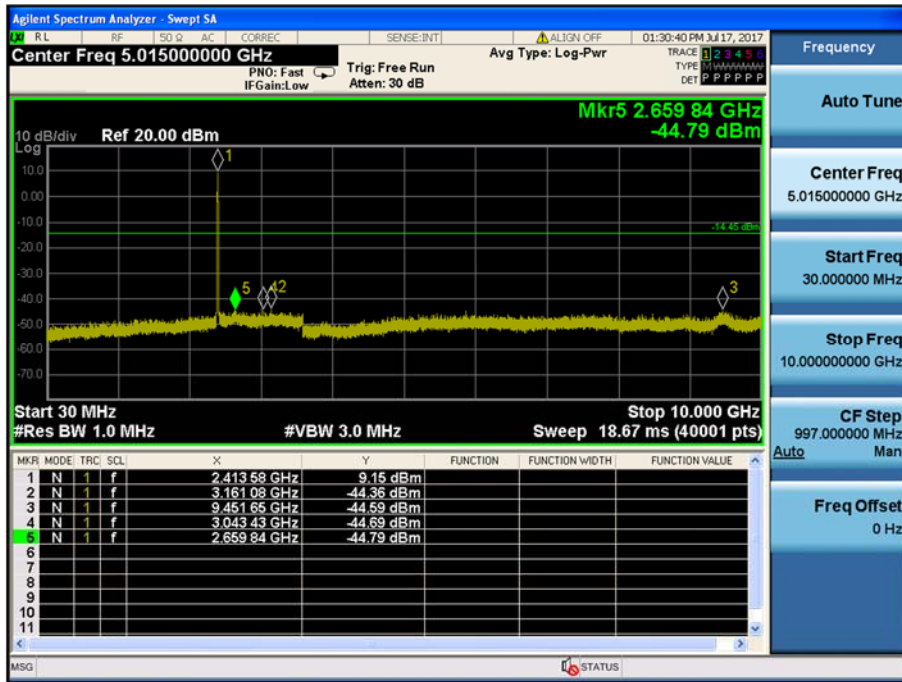
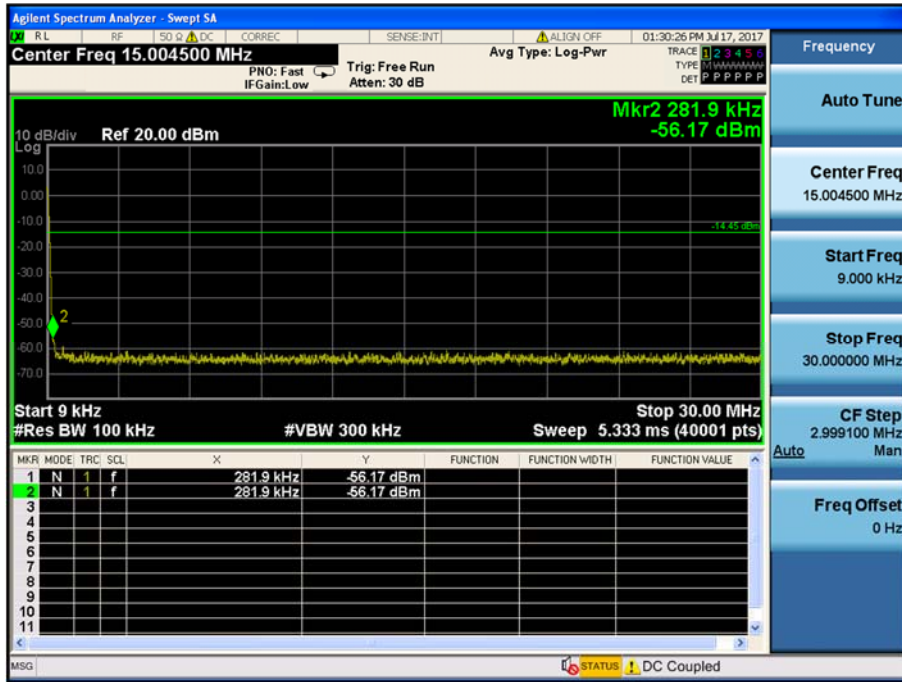
Reference



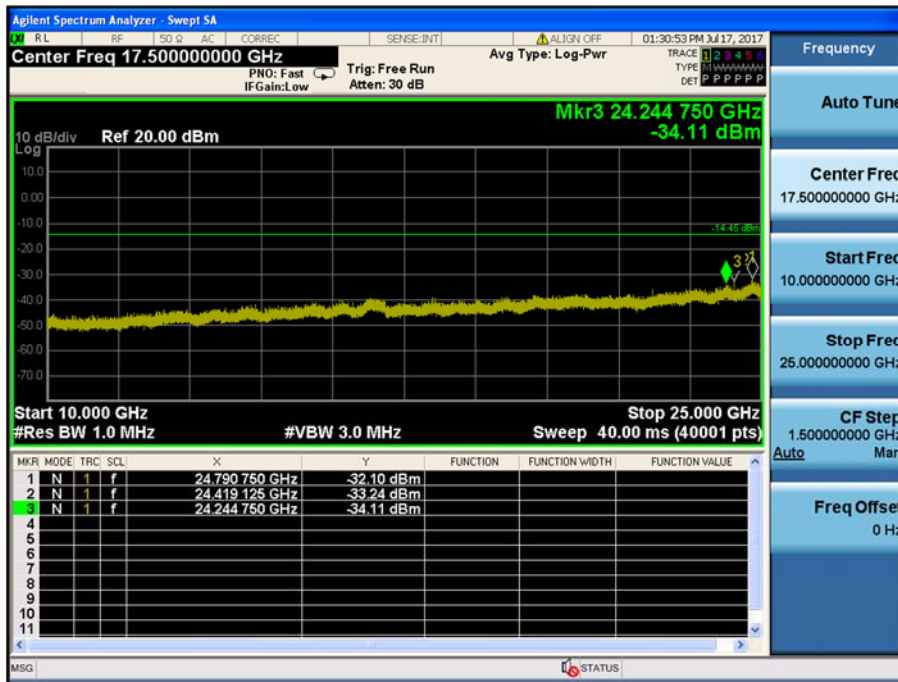
Low Band-edge



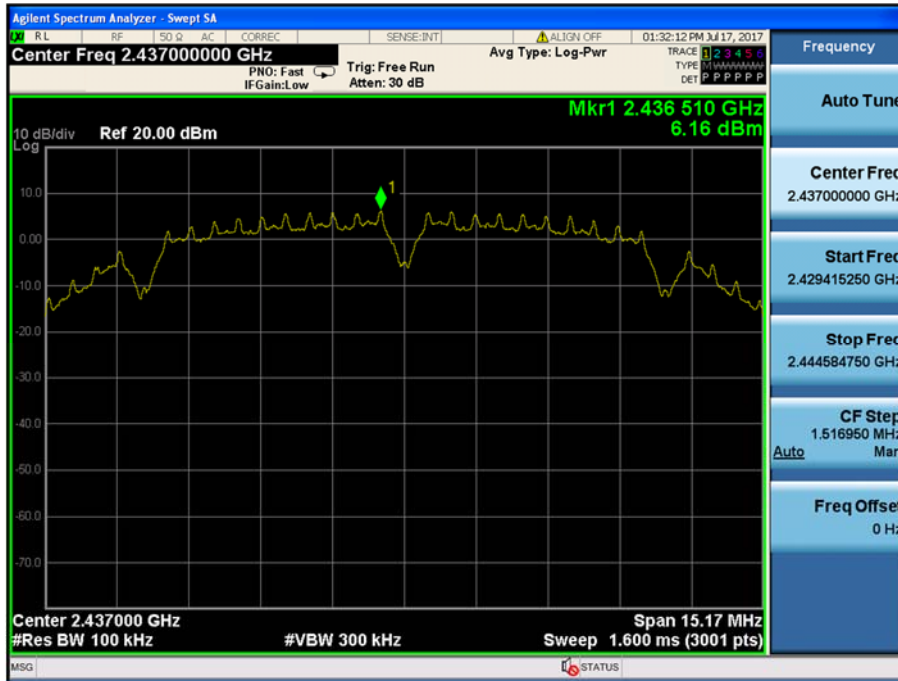
Conducted Spurious Emissions



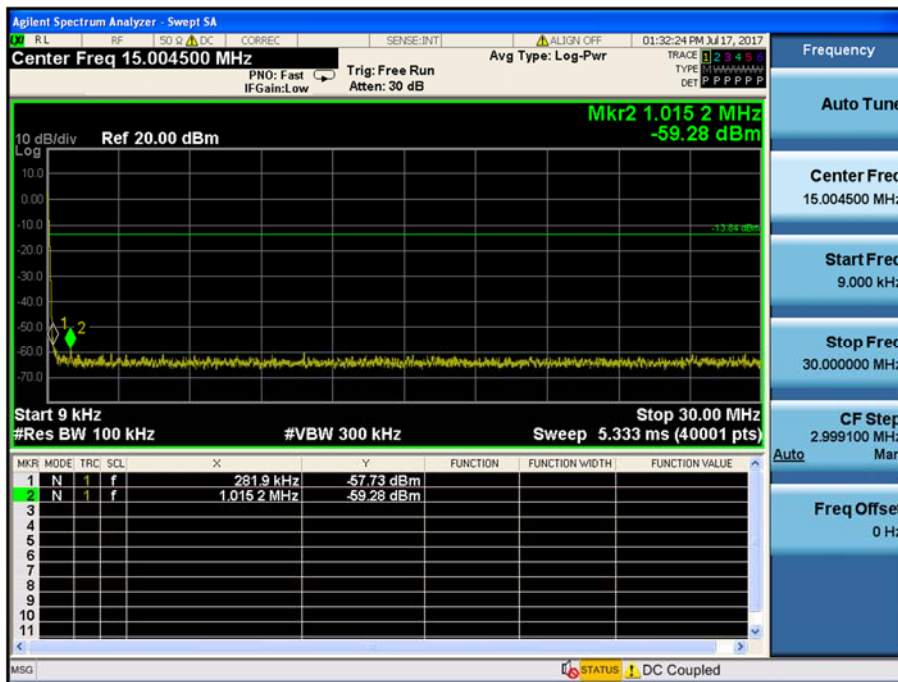
Conducted Spurious Emissions



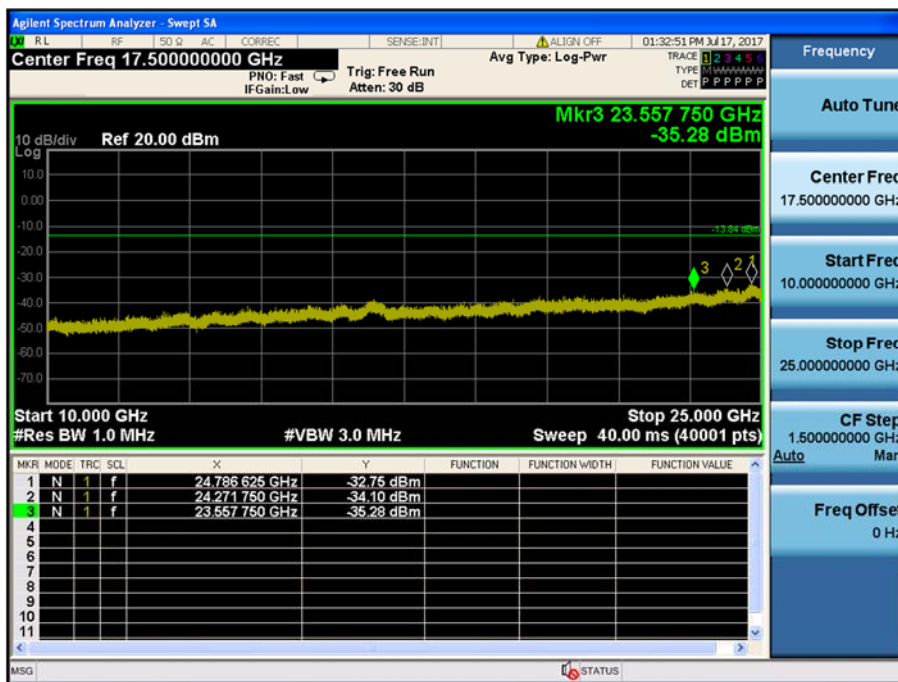
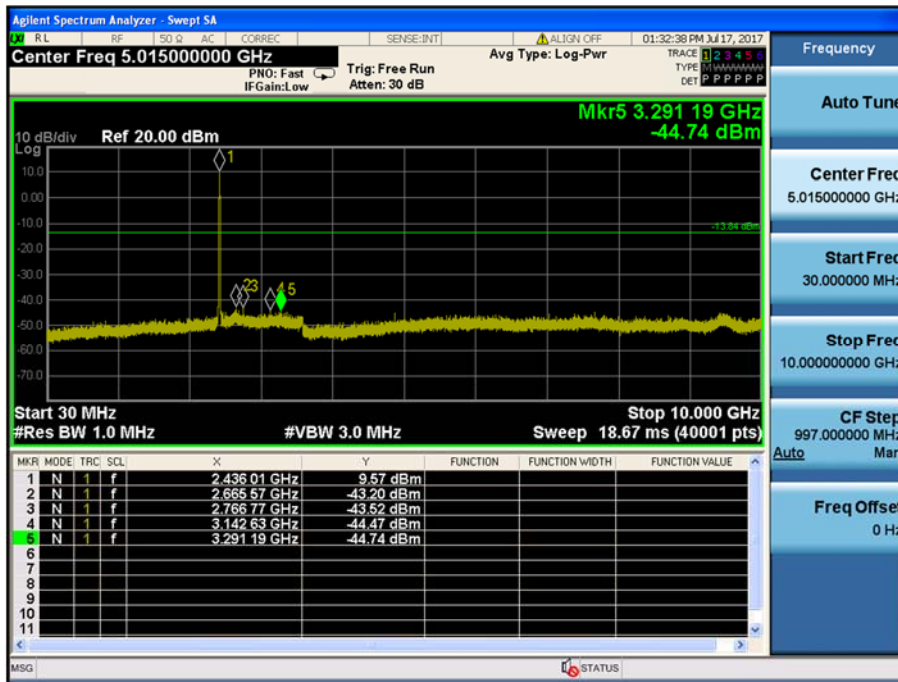
TM 1 & Middle
Reference



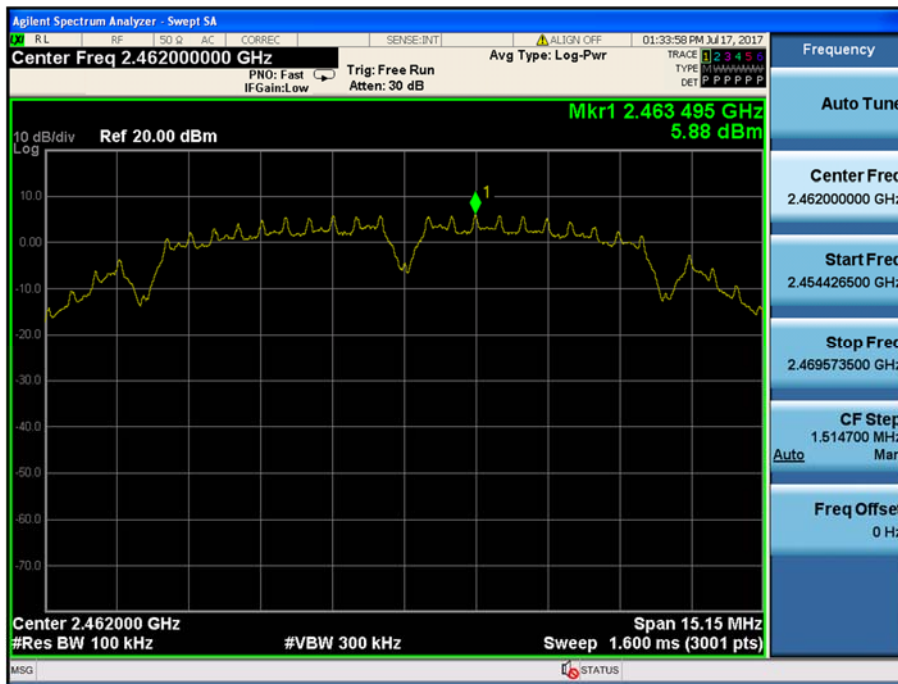
Conducted Spurious Emissions



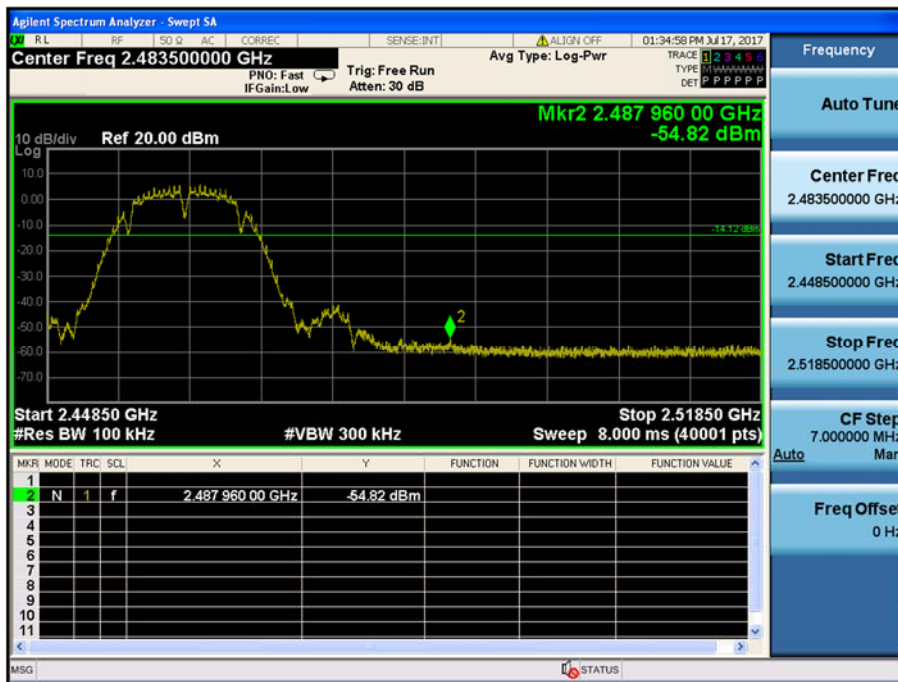
Conducted Spurious Emissions



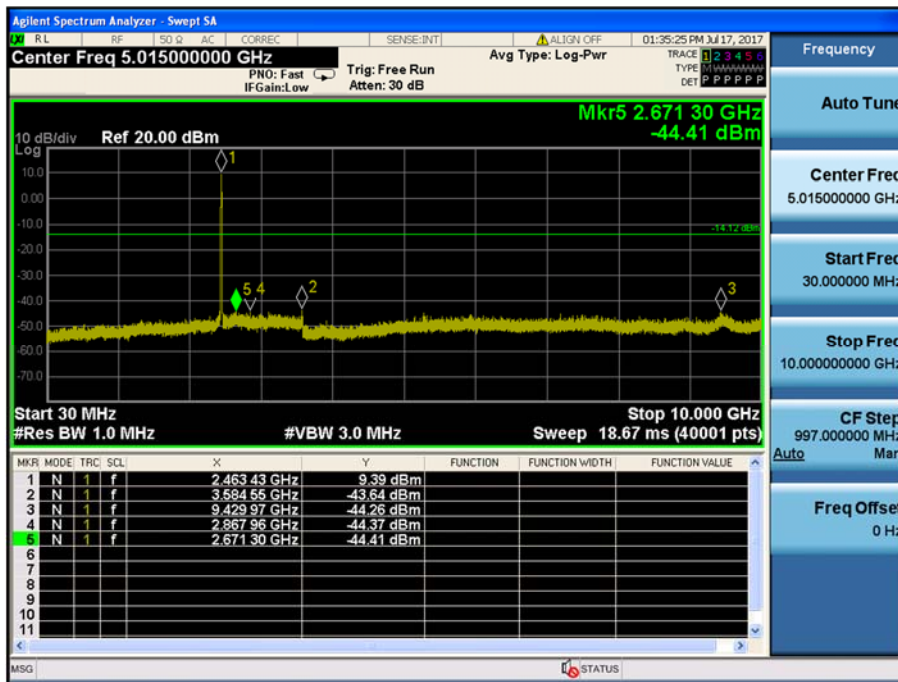
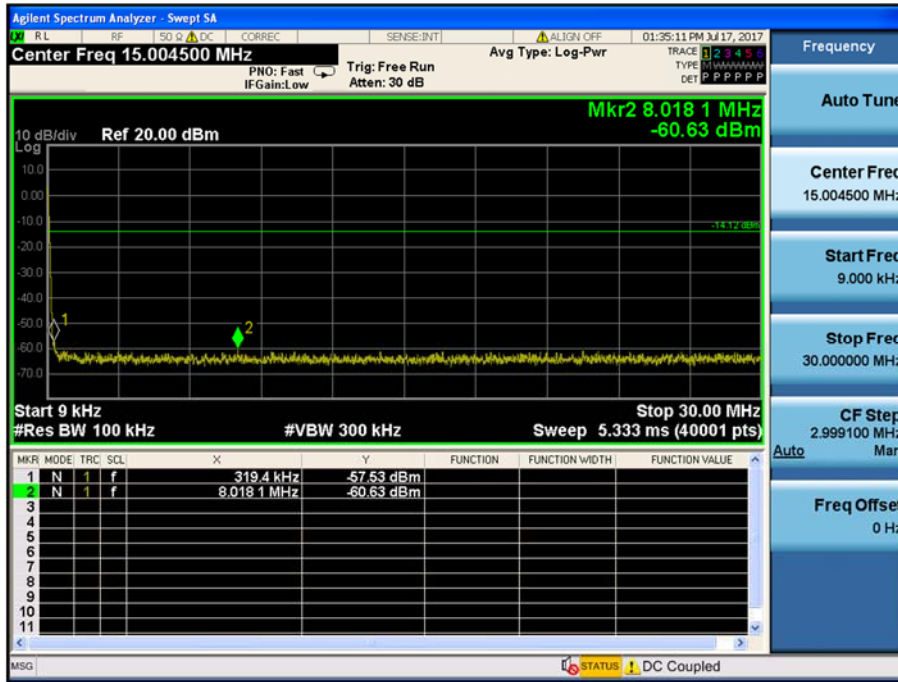
TM 1 & Highest Reference



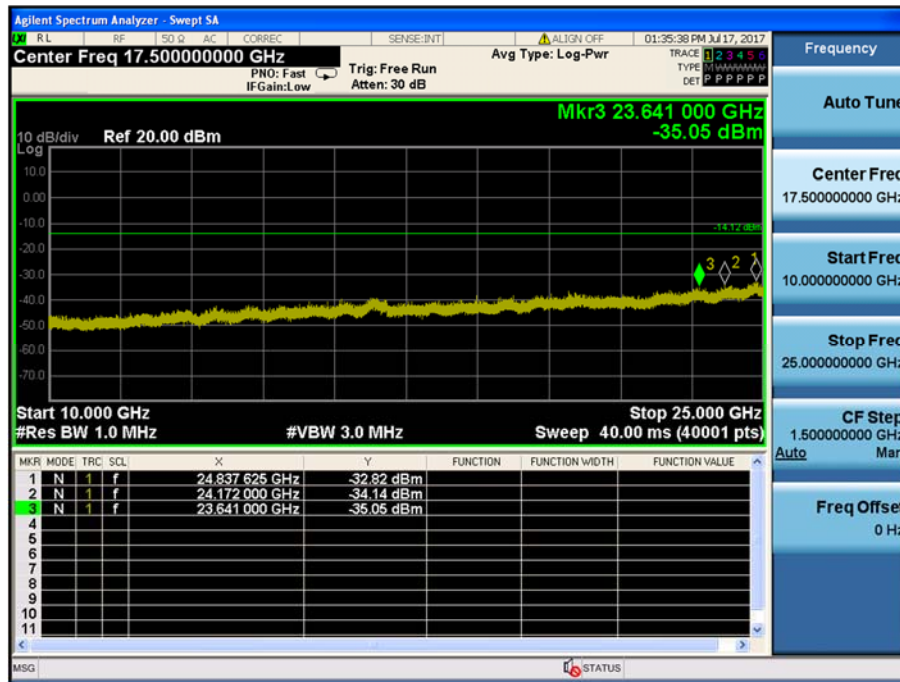
High Band-edge



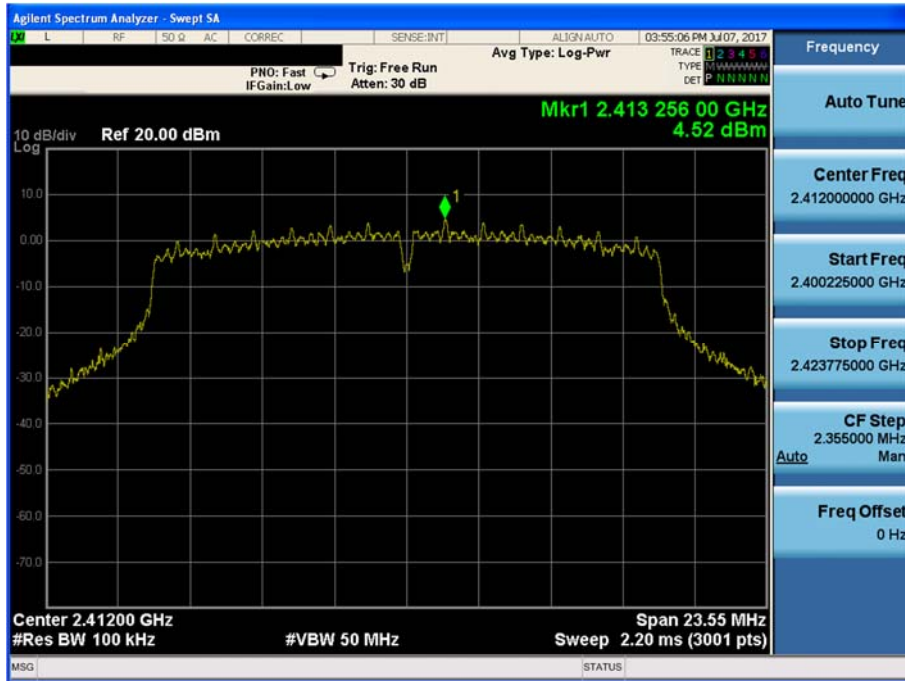
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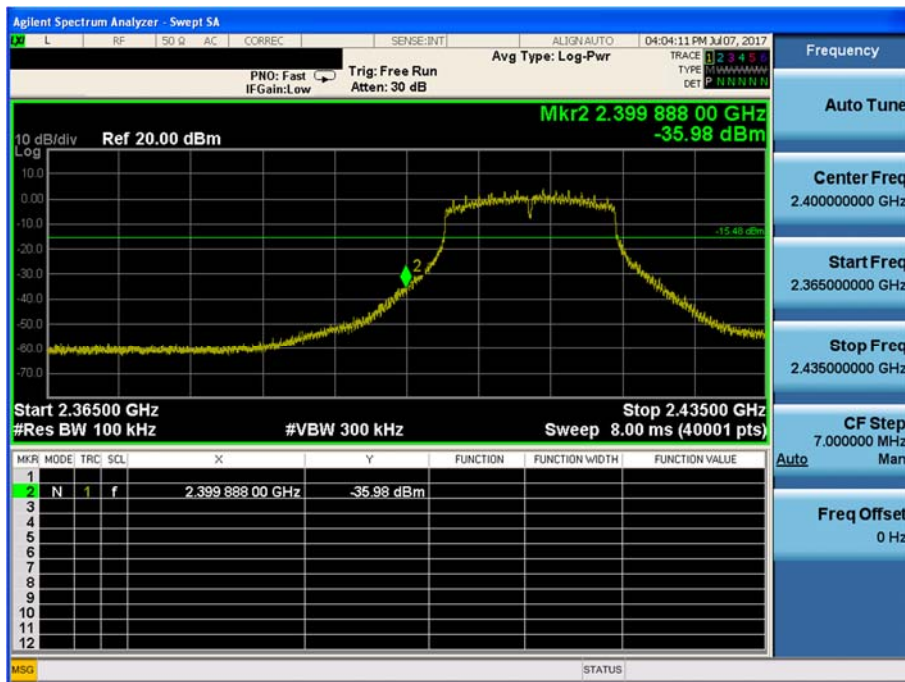
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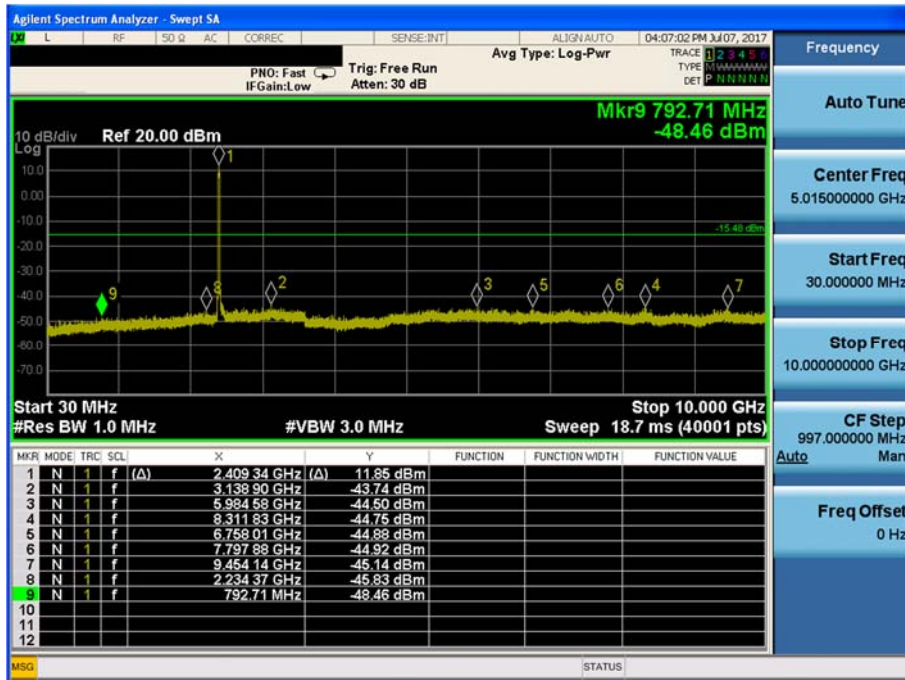
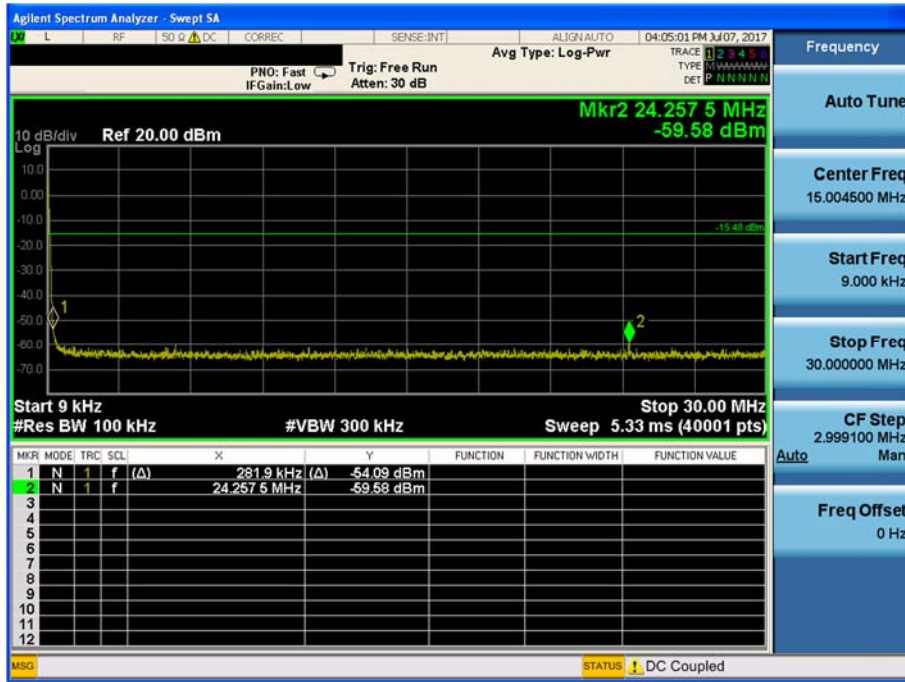
TM 2 & Lowest Reference



Low Band-edge



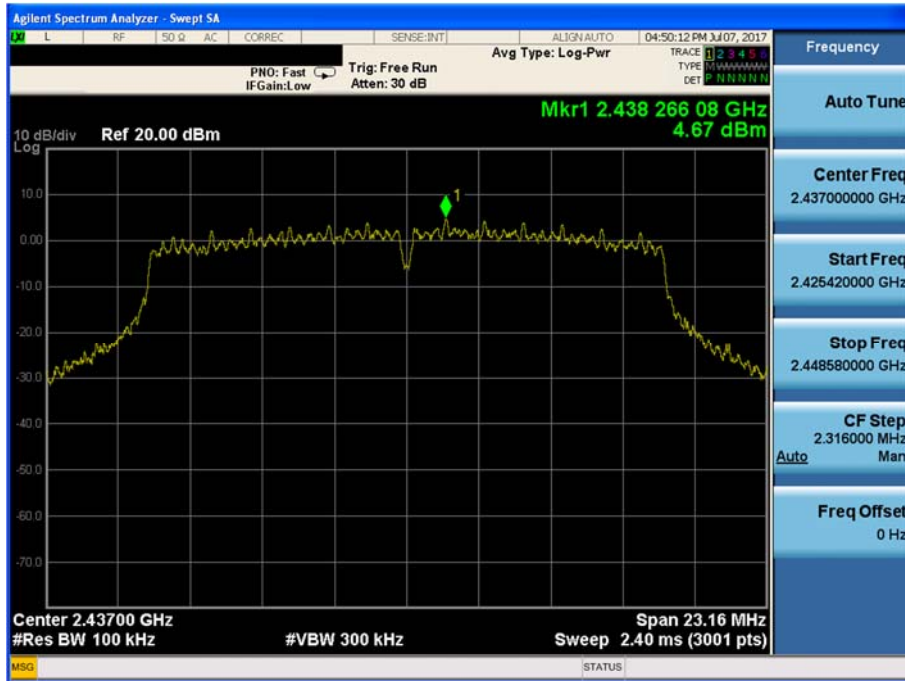
Conducted Spurious Emissions



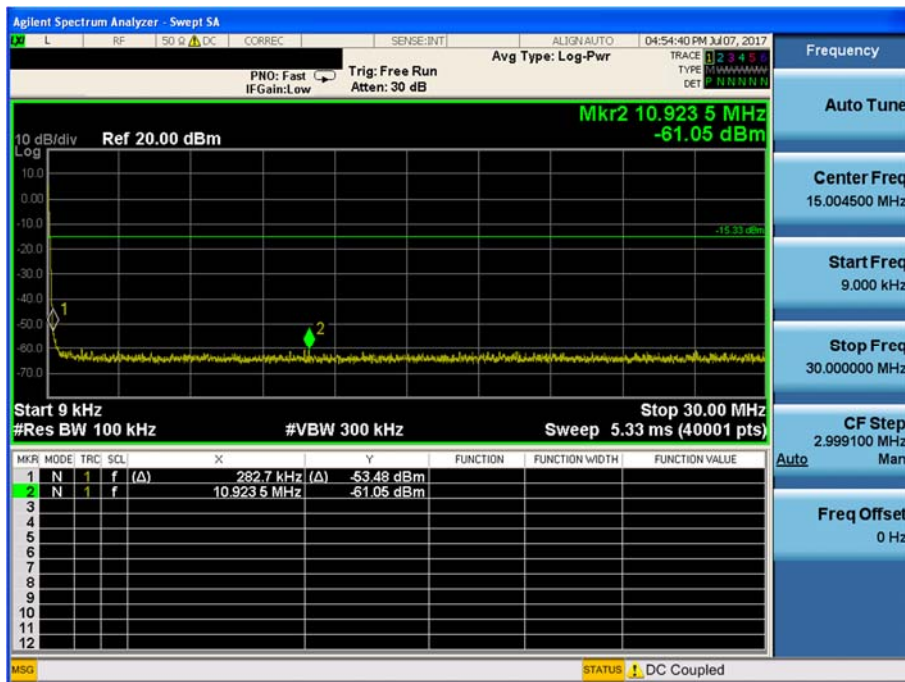
Conducted Spurious Emissions



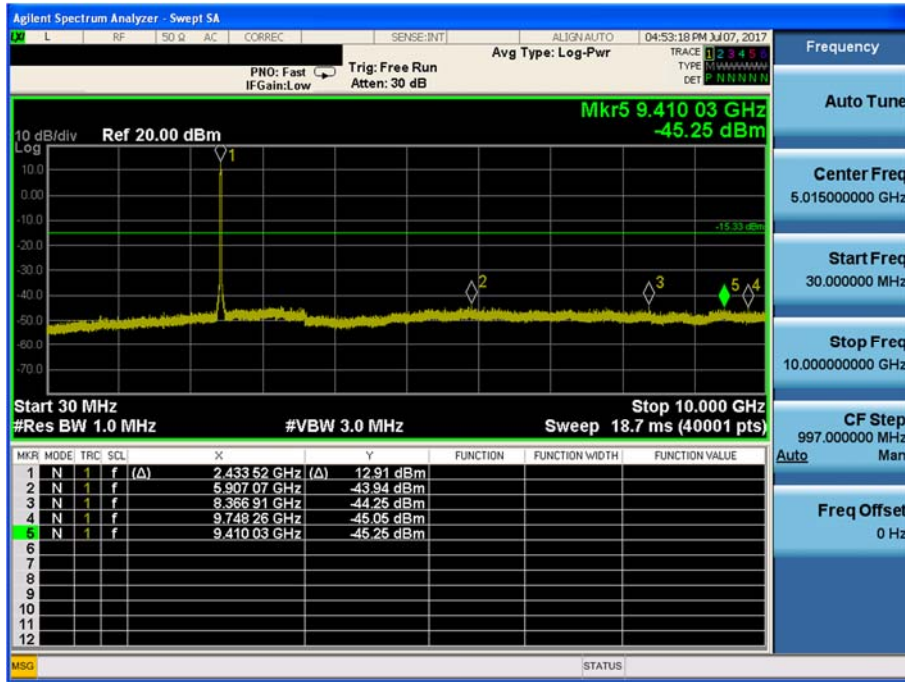
TM 2 & Middle
Reference



Conducted Spurious Emissions



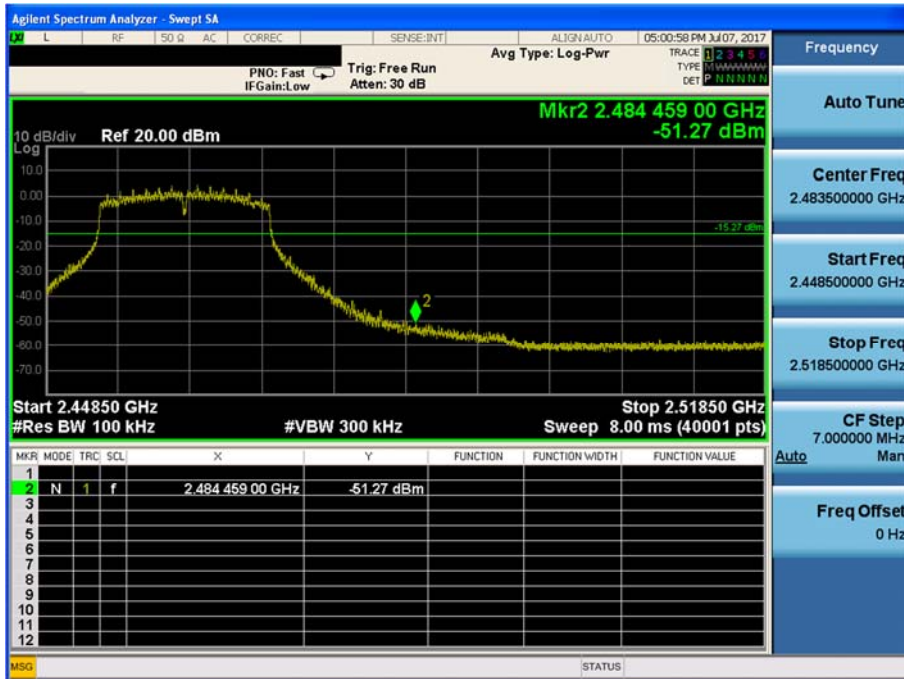
Conducted Spurious Emissions



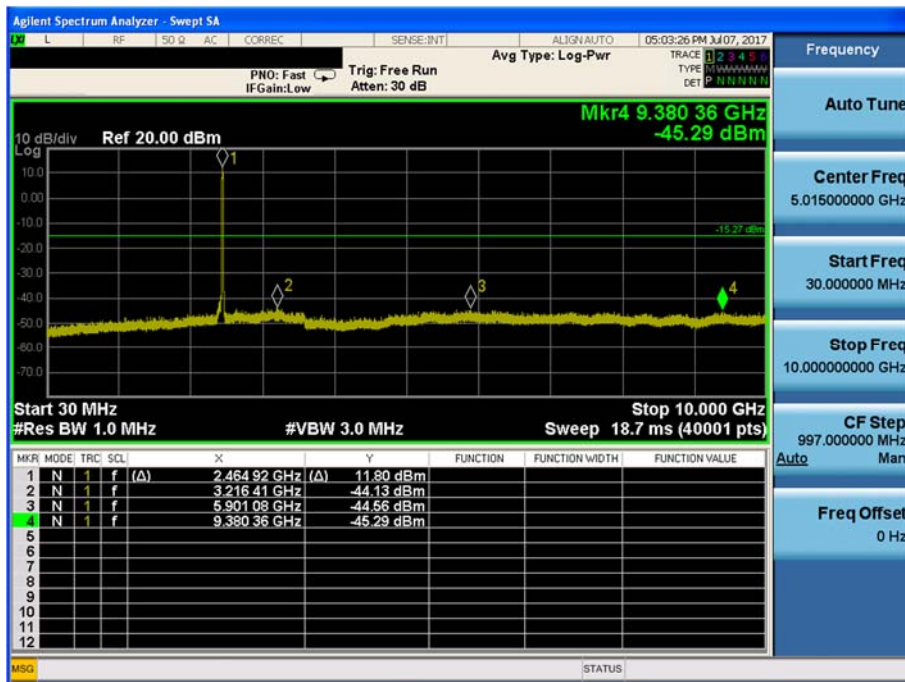
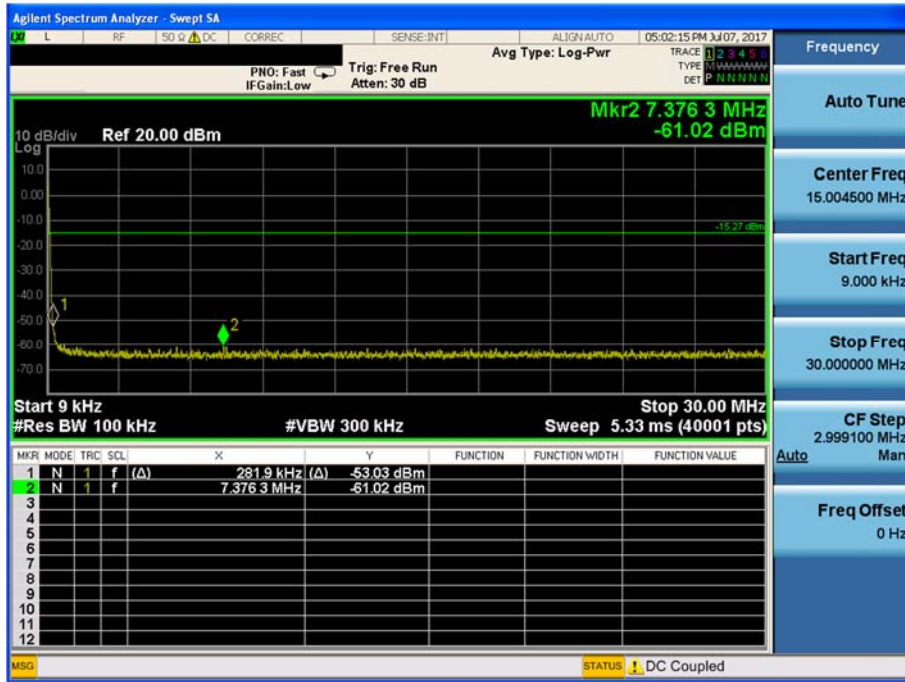
TM 2 & Highest Reference



High Band-edge



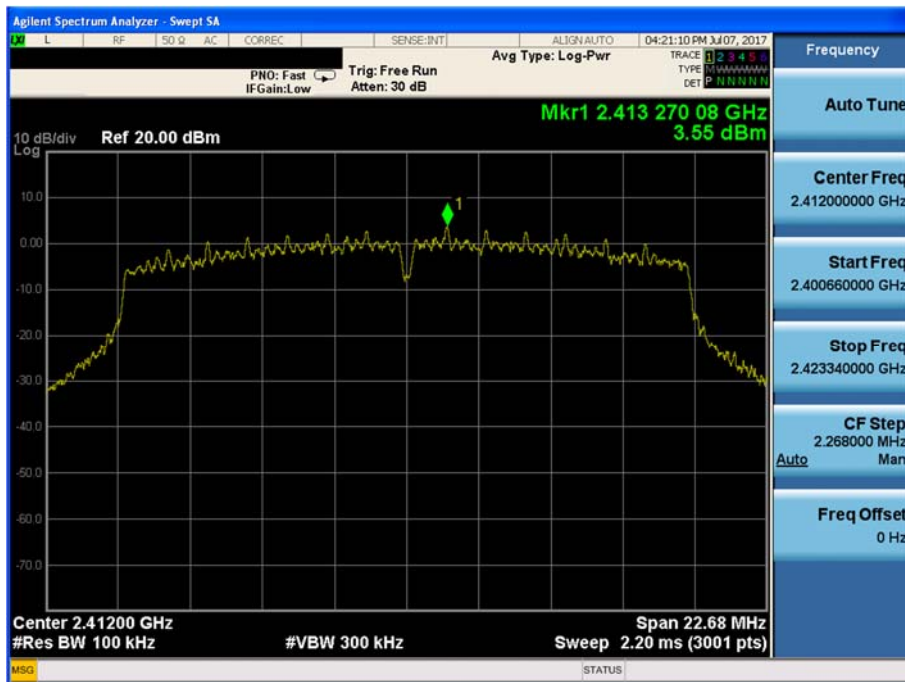
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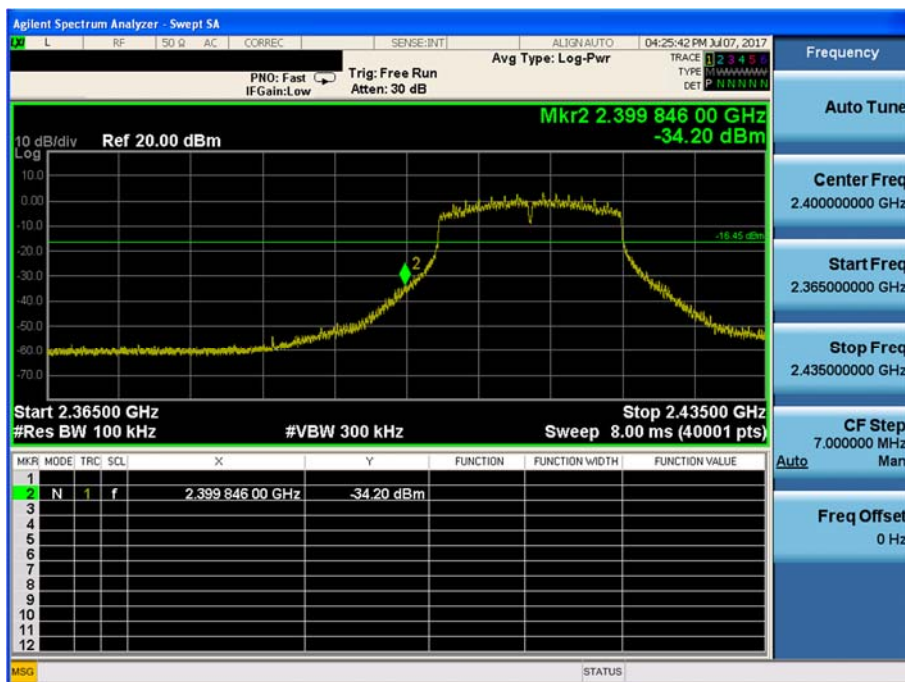
Conducted Spurious Emissions



TM 3 & Lowest Reference



Low Band-edge



Conducted Spurious Emissions

