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## CERTIFICATION TEST REPORT

**Report Number:** 2009 07131172 FCC 15.247

**Project Number:** 29120-2

**Nex Number:** 131172

**Applicant:** HME  
14110 STOWE DR.  
Poway, CA 92064

**Equipment Under Test (EUT):** RF MODULE


**Model:** XCVR6K1

**FCC ID:** BYMXCVR6K1

**IC:** 1860A-XCVR6K1

**In Accordance With:** FCC Part 15 Subpart C, 15.247  
IC RSS-210 Issue 7 June 2007  
IC RSS-Gen Issue 2 June 2007

**Tested By:** Nemko USA Inc.  
11696 Sorrento Valley Road, Suite F  
San Diego, CA 92121

**Authorized By:**   
Alan Laudani, EMC/RF Test Engineer

**Date:** July 28, 2009

**Total Number of Pages:** 62



## **Section1: Summary of Test Results**

### **General**

#### **All measurements are traceable to national standards**

These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with FCC Part 15; Subpart C and IC RSS-210. Radiated tests were conducted in accordance with ANSI C63.4-2003. Radiated emissions are made on an open area test site. A description of the test facility is on file with the FCC and IC.

The assessment summary is as follows:

<b>Apparatus Assessed:</b>	RF Module
<b>Model:</b>	XCVR6K1
<b>Specification:</b>	FCC Part 15 Subpart C, 15.247 IC RSS-210 Issue 7 June 2007
<b>Date Received in Laboratory:</b>	July 7, 2009
<b>Compliance Status:</b>	Complies
<b>Exclusions:</b>	None
<b>Non-compliances:</b>	None





### 1.1 Report Release History

REVISION	DATE	COMMENTS
-	July 28, 2009	Prepared By: Ferdinand Custodio
-	July 28, 2009	Initial Release: Alan Laudani

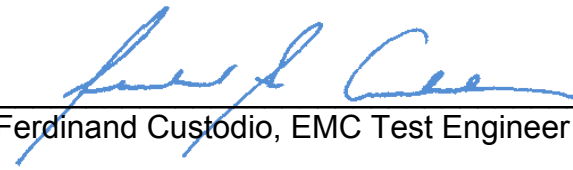
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Note that the results contained in this report relate only to the items tested and were obtained in the period between the date of initial receipt of samples and the date of issue of the report.

This test report has been completed in accordance with the requirements of ISO/IEC 17025.

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TESTED BY:   
Ferdinand Custodio, EMC Test Engineer

Date: July 28, 2009



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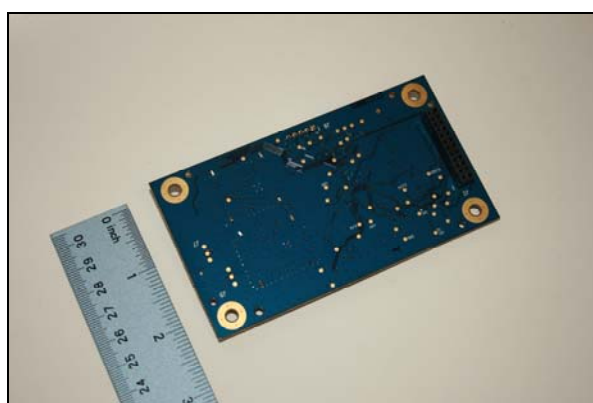
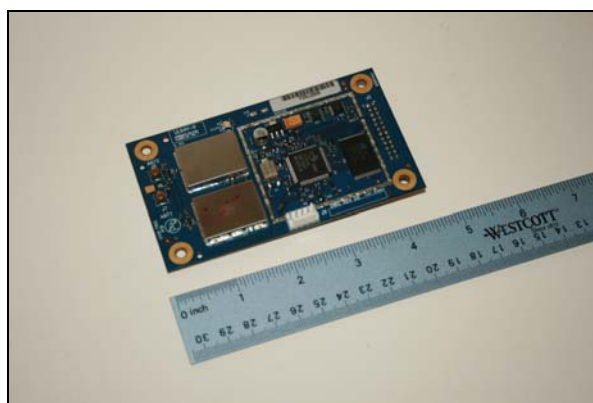


## Section 2: Equipment Under Test

### 2.1 Product Identification

The Equipment Under Test was indentified as follows:

*HME XCVR6K1 RF Module*



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### 2.2 Samples Submitted for Assessment

The following sample of the apparatus and antenna have been submitted for type assessment:

Sample No.	Description	Serial No.
131172-1	RF MODULE	F25L0010





### 2.3 Antenna Submitted for Assessment

The following sample of antenna have been submitted for type assessment:



**Antenna "A" - Base Station Antenna (2X):** Nearson 2.4GHz Right Angle Antenna Model 181 (2dBi gain)



**Antenna "B" - Remote Antenna Kit (with 9.14 meter cable):** HME EC20 Directional Extended Coverage Antenna Kit (0dBi gain)





## 2.4 Theory of Operation

The XCVR6K1 is a RF Module. Its function is to provide long-range data / voice communication between one or more mobile devices and a base station containing the module. The Module is not normally used by itself; it is contained in a base station with other functions. The transceiver Module was exercised by running several engineering applications on a PC to control the unit. These applications control power and frequency in any way necessary to conduct the regulatory testing. For testing, the Module was set to maximum power, continuous operation and test frequencies as necessary.

## 2.5 Technical Specifications of the EUT

<b>Manufacturer:</b>	HME
<b>Operating Frequency:</b>	2401.920 MHz to 2481.408 MHz in the 2400-2483.5 MHz Band
<b>Number of Operating Frequencies:</b>	47
<b>Rated Power:</b>	78.52 mW
<b>Modulation:</b>	FHSS
<b>Reference Designator:</b>	1M48Q7W
<b>Antenna Connector:</b>	Reverse-polarity TNC
<b>Power Source:</b>	5VDC from external AC Adapter (HP 6216C used for testing purposes only).





## **Section 3: Test Conditions**

### **3.1 Specifications**

The apparatus was assessed against the following specifications:

***FCC Part 15 Subpart C, 15.247***

Operation within the bands 902-928 MHz, 2400-2483.5 MHz, 5725-5850 MHz and 24.0-24.25 GHz bands.

***IC RSS-210 Issue 7 June 2007***

Low-power Licence-exempt Radio-communication Devices (All Frequency Bands): Category I Equipment. Annex 8 - Frequency Hopping and Digital Modulation Systems Operating in the Bands 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz

***IC RSS-Gen Issue 2 June 2007***

General Requirements and Information for the Certification of Radio-communication Equipment

### **3.2 Deviations From Laboratory Test Procedures**

No deviations from Laboratory Test Procedure

### **3.3 Test Environment**

All tests were performed under the following environmental conditions:

Temperature range	19.7-27.8 °C
Humidity range	33-67 %
Pressure range	87 - 105 kPa
Power supply range	4.25 to 5.75VDC





### 3.4 Test Equipment

Nemko ID	Device	Manufacturer	Model	Serial Number	Cal Date	Cal Due Date
956	Attenuator Set	Narda	118A/4	33693	21-Jan-09	21-Jan-10
936	DC Power Supply 0-50V 0-10A 200W	Hewlett Packard	6002A	N/A	Verified by Asset #815	
815	Multimeter	Fluke	111	78130066	16-Jul-08	16-Jul-09
114	Antenna, Bicon	EMCO	3104	2997	10-Feb-09	10-Feb-10
111	Antenna, LPA	EMCO	3146	1382	20-Oct-08	20-Oct-10
877	Antenna, DRG Horn, .7-18GHz	AH Systems	SAS-571	688	28-Jul-08	28-Jul-10
911	Spectrum Analyzer	Agilent	E4440A	US41421266	06-Nov-08	06-Nov-09
919	Preamplifier	Spacek Labs MM-Wave Technology	100MHz to 40GHz	3M12 (SLK-35-3) and 3M13 (SLKa-35-4)	10-Nov-08	11-Nov-09
901	pre amp	Sonoma	310 N	130607	13-Mar-08	13-Mar-09
946	Peak Power Sensor	Hewlett Packard	84815A 0.05-18GHz (-40 to 20dBm)	3318A01726	28-Aug-08	28-Aug-09
947	Peak Power Analyzer	Hewlett Packard	8991A	3621A00906	28-Aug-08	28-Aug-09
421	Quasi-Peak Adapter	HP	85650A	3145A01672	06-Apr-09	06-Apr-10
404	Spectrum Analyzer Display	HP	85662A	2648A15448	06-Apr-09	06-Apr-10
711	Spectrum Analyzer	HP	8566B	2747A04729	06-Apr-09	06-Apr-10
395	LISN	Solar	9348-50-R-24-BNC	941718	26-Mar-09	26-Mar-10
685	Transient Limiter	HP	11974A	3107A02637	05-Sep-08	05-Sep-09
564	High Pass Filter	Solar	7801-5.0	853130	17-Jul-08	17-Jul-09
317	Preamplifier	HP	8449A	2749A00167	16-Apr-09	16-Apr-10

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Registration of the OATS are on file with the Federal Communications Commission, under Registration Number 90579, the VCCI under registration number R-3027, and are also registered with Industry Canada under Site Numbers 2040B-1 and 2040B-2.



## **Section 4: Observations**

### **4.1 Modifications Performed During Assessment**

No modifications were performed during assessment.

### **4.2 Record Of Technical Judgements**

No technical judgements were made during the assessment.

### **4.3 EUT Parameters Affecting Compliance**

The user of the apparatus could not alter parameters that would affect compliance.

### **4.4 Test Deleted**

No Tests were deleted from this assessment.

### **4.5 Additional Observations**

There were no additional observations made during this assessment.





## Section 5: Results Summary

This section contains the following:

FCC Part 15 Subpart C:  
 IC RSS-210 Issue 7 June 2007 Annex 8  
 IC RSS-Gen Issue 2 June 2007

The column headed “Required” indicates whether the associated clauses were invoked for the apparatus under test. The following abbreviations are used:

- N No: not applicable / not relevant
- Y Yes: Mandatory i.e. the apparatus shall conform to these tests.
- N/T Not Tested, mandatory but not assessed. (See section 4.4 Test deleted)

The results contained in this section are representative of the operation of the apparatus as originally submitted.

### 5.1 Test Results

Part 15C	RSS	Test Description	Required	Result
15.207 (a)	RSS-Gen 7.2.2	Conducted Emission Limit	Y	Pass
15.247(a)(1)		Carrier Frequency Separation	Y	Pass
15.247(a)(1)(iii)		Number of Hopping Frequencies	Y	Pass
15.247(a)(1)(iii)		Time of Occupancy (Dwell Time)	Y	Pass
15.215(c)	RSS-Gen 4.6.1	20 dB Bandwidth	Y	Pass
15.247(b)(1)	RSS-Gen 4.8 & 4.9	Peak Output Power	Y	Pass
15.247(d)		Band-edge Compliance of RF Conducted Emissions	Y	Pass
15.247 (d)		Spurious RF Conducted Emissions	Y	Pass
15.247 (d)		Spurious Radiated Emissions	Y	Pass





## Appendix A: Test Results

### Section 15.207(a) – Power Line Conducted Emissions

15.207(a) Except as shown in paragraphs (b) and (c) of this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50  $\mu$ H/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

Frequency of emission (MHz)	Conducted limit (dB $\mu$ V)	
	Quasi-peak	Average
0.15–0.5	66 to 56*	56 to 46*
0.5–5	56	46
5–30	60	50

\*Decreases with the logarithm of the frequency.

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#### Test Conditions:

Sample Number:	XCVR6K1	Temperature:	22
Date:	July15, 2009	Humidity:	35
Modification State:	Test Mode (Hopping)	Tester:	FSCustodio
		Laboratory:	Shield Room #2

#### Test Results:

See attached plots for Line 1 (Hot) and Line 2 (Neutral).

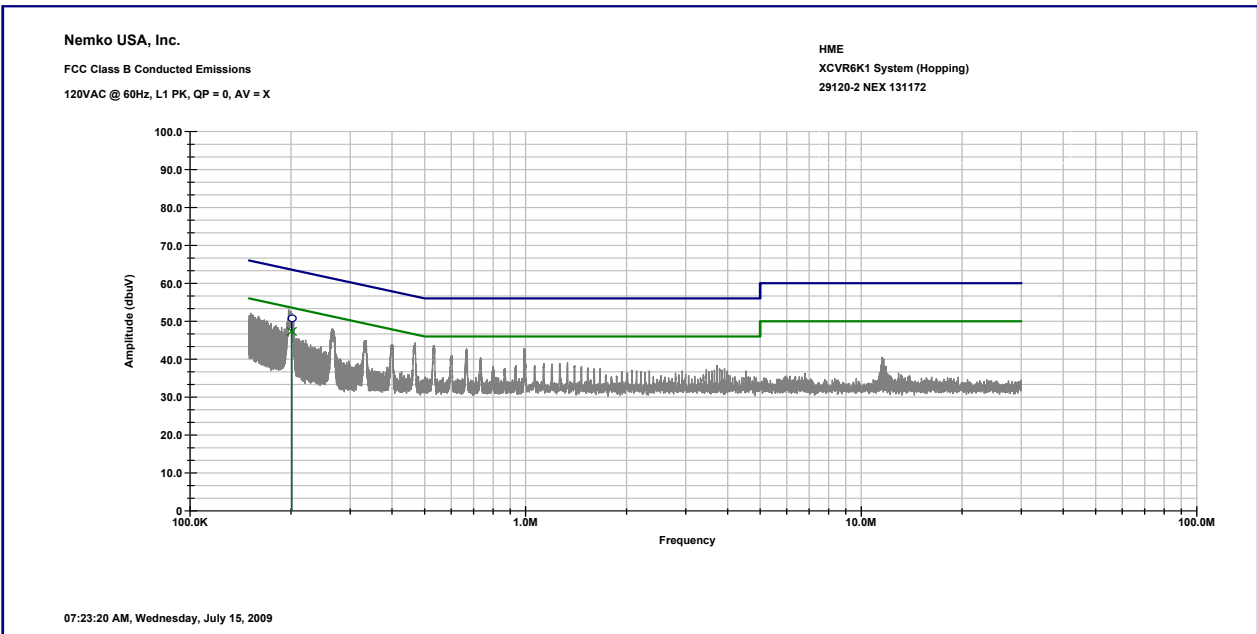
#### Additional Observations:

- Test parameters: Peak RBW/VBW is 100kHz/100kHz, Quasi-Peak and Average is 9kHz/30kHz.
- Blue line is Quasi Peak limit while green line is Average limit.
- **O** represents quasi peak measurement while **X** represent average measurement.
- Test was performed with the EUT installed inside the System 6100 Wireless Base Station.
- Test was performed using worst case configuration (hopping).

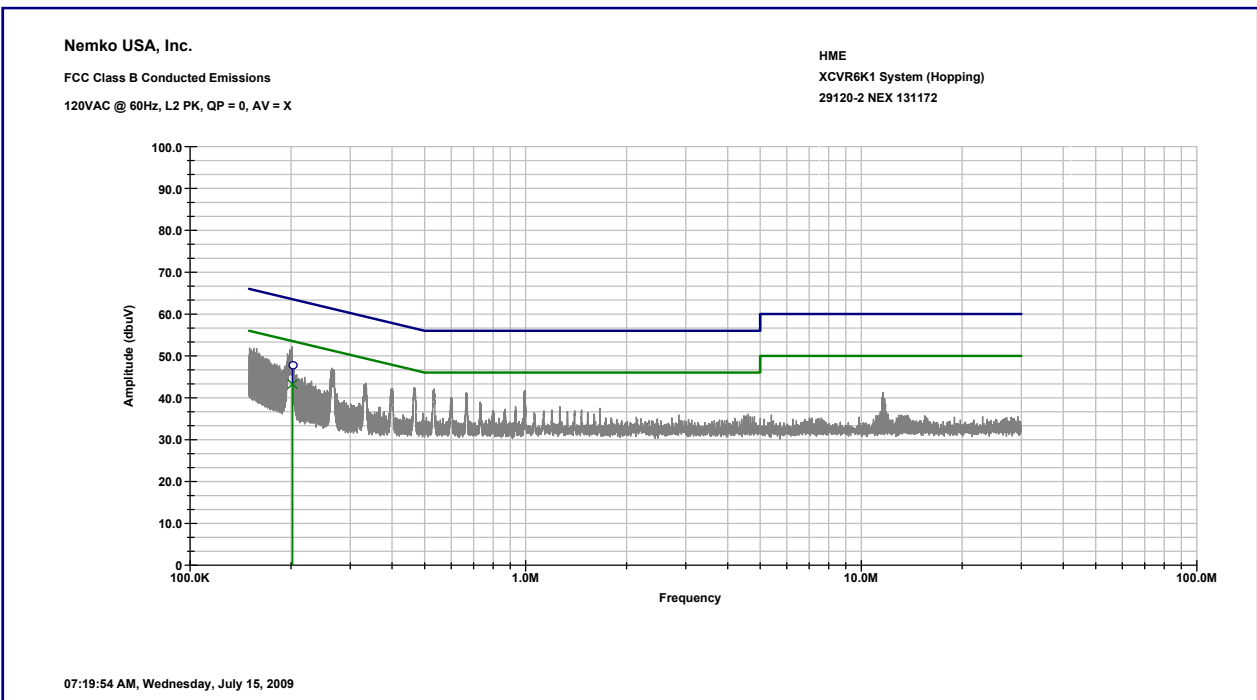




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Line 1



Line 2





The EUT installed inside the System 6100 Wireless Base Station. The base station uses a eUrasia Power AC adapter, Model CP-8026 with serial# 08470295.



**Section 15.247(a)(1) – Carrier Frequency Separation**

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400–2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW. The system shall hop to channel frequencies that are selected at the system hopping rate from a pseudo randomly ordered list of hopping frequencies. Each frequency must be used equally on the average by each transmitter. The system receivers shall have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals.

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**Test Conditions:**

<b>Sample Number:</b>	XCVR6K1	<b>Temperature:</b>	21
<b>Date:</b>	July 6, 2009	<b>Humidity:</b>	37
<b>Modification State:</b>	Between Channel 45 and 46	<b>Tester:</b>	FSCustodio
		<b>Laboratory:</b>	Shield Room #1

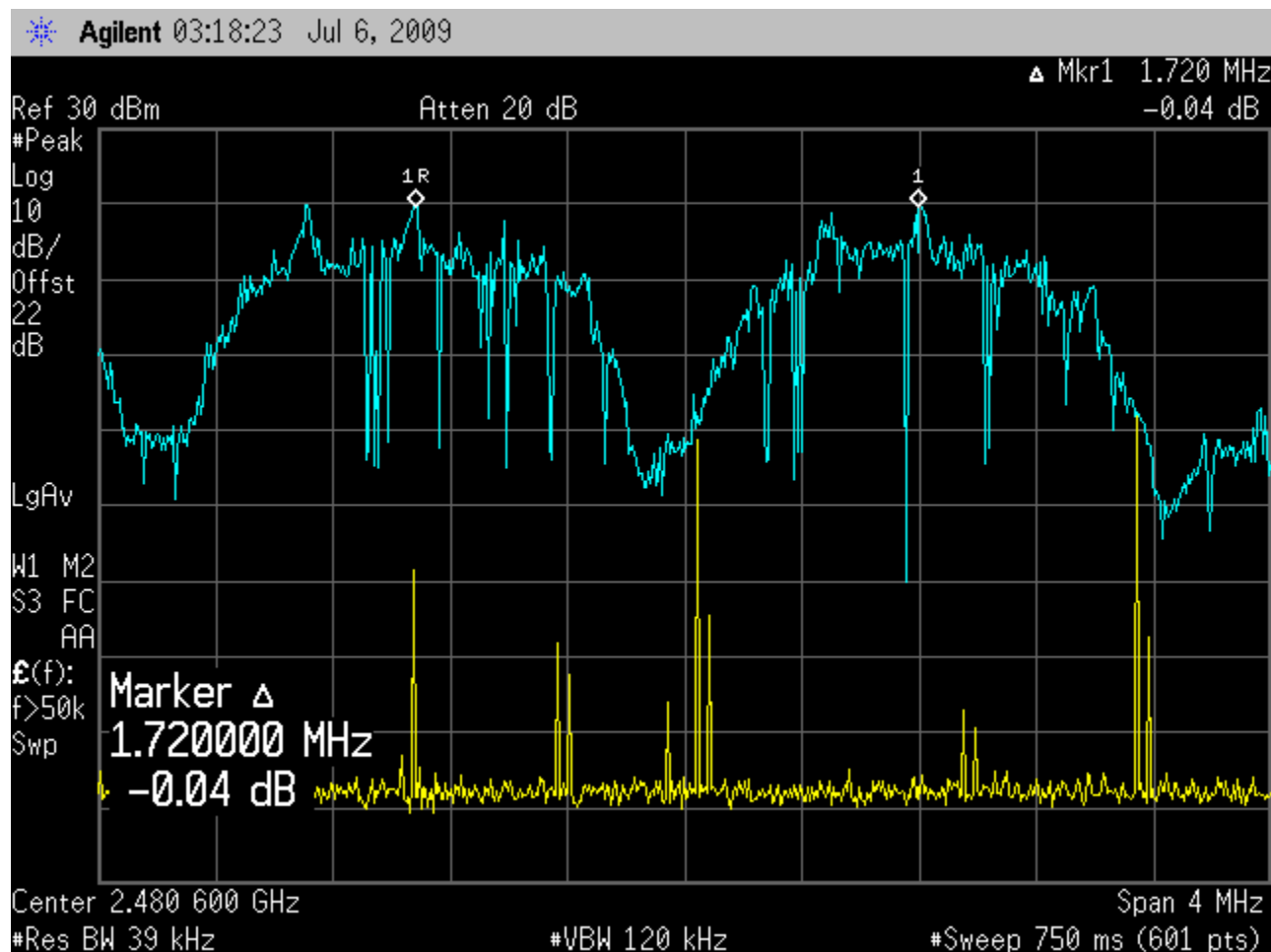
**Test Results:**

See attached plots.

**Additional Observations:**

- Hopping function enabled.
- Span is 4 MHz
- RBW is 1% of 4 MHz
- VBW is 3X RBW
- Sweep is auto
- Detector is Peak
- Trace is Max Hold
- Marker-delta function is used between the peaks of the adjacent channels.
- Observed Carrier Frequency Separation is 1.72 MHz.
- 20dB Bandwidth as per Part 15.215 (c) is 1.417 MHz.
- Observed Carrier Frequency Separation > 20dB Bandwidth = Complies





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**Section 15.247(a)(1)(iii) – Number of Hopping Frequencies**

(iii) Frequency hopping systems in the 2400–2483.5 MHz band shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.

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**Test Conditions:**

<b>Sample Number:</b>	XCVR6K1	<b>Temperature:</b>	21
<b>Date:</b>	July 6, 2009	<b>Humidity:</b>	37
<b>Modification State:</b>	Channel 0 to 46	<b>Tester:</b>	FSCustodio
		<b>Laboratory:</b>	Shield Room #1

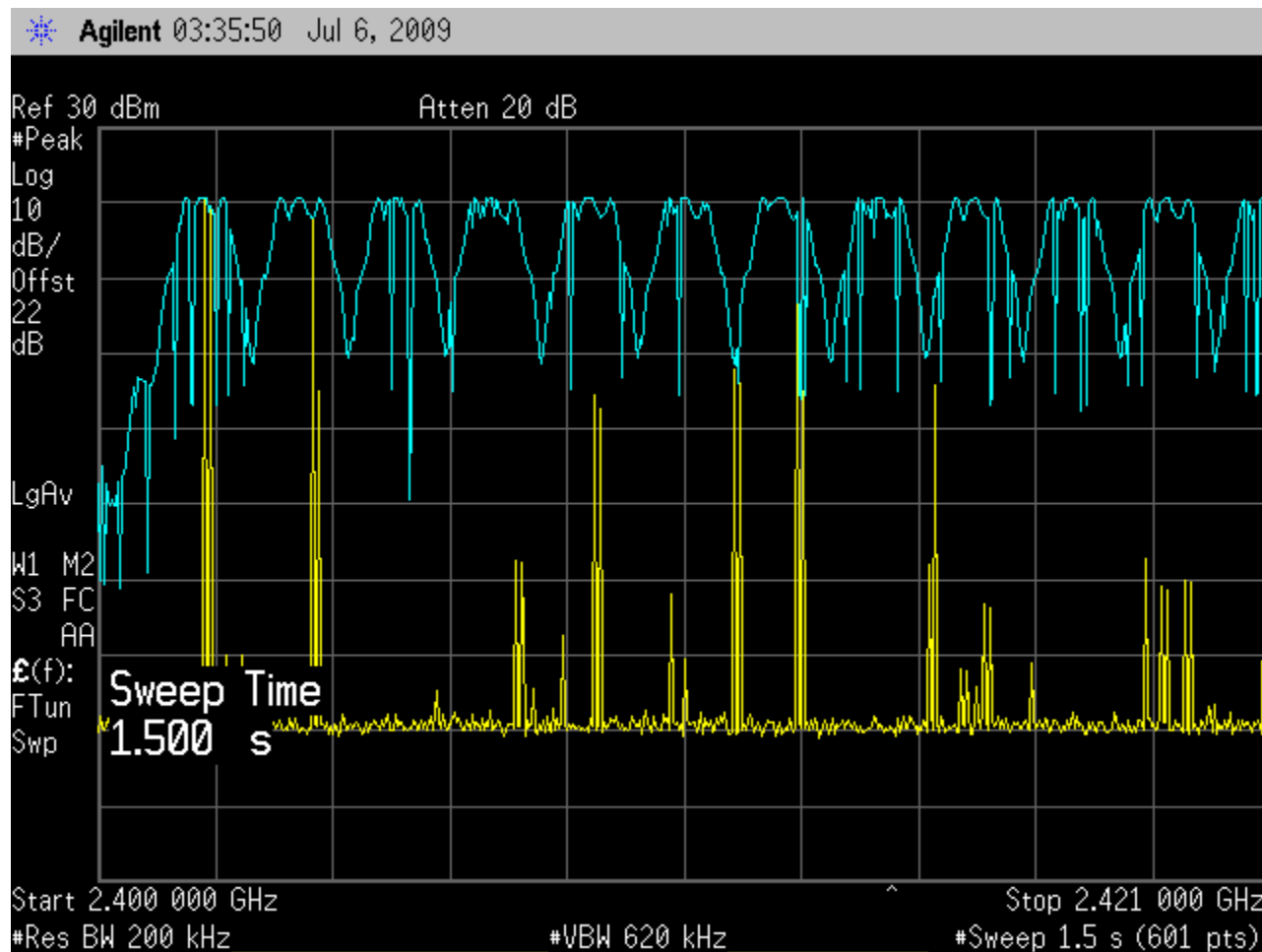
**Test Results:**

See attached plots.

**Additional Observations:**

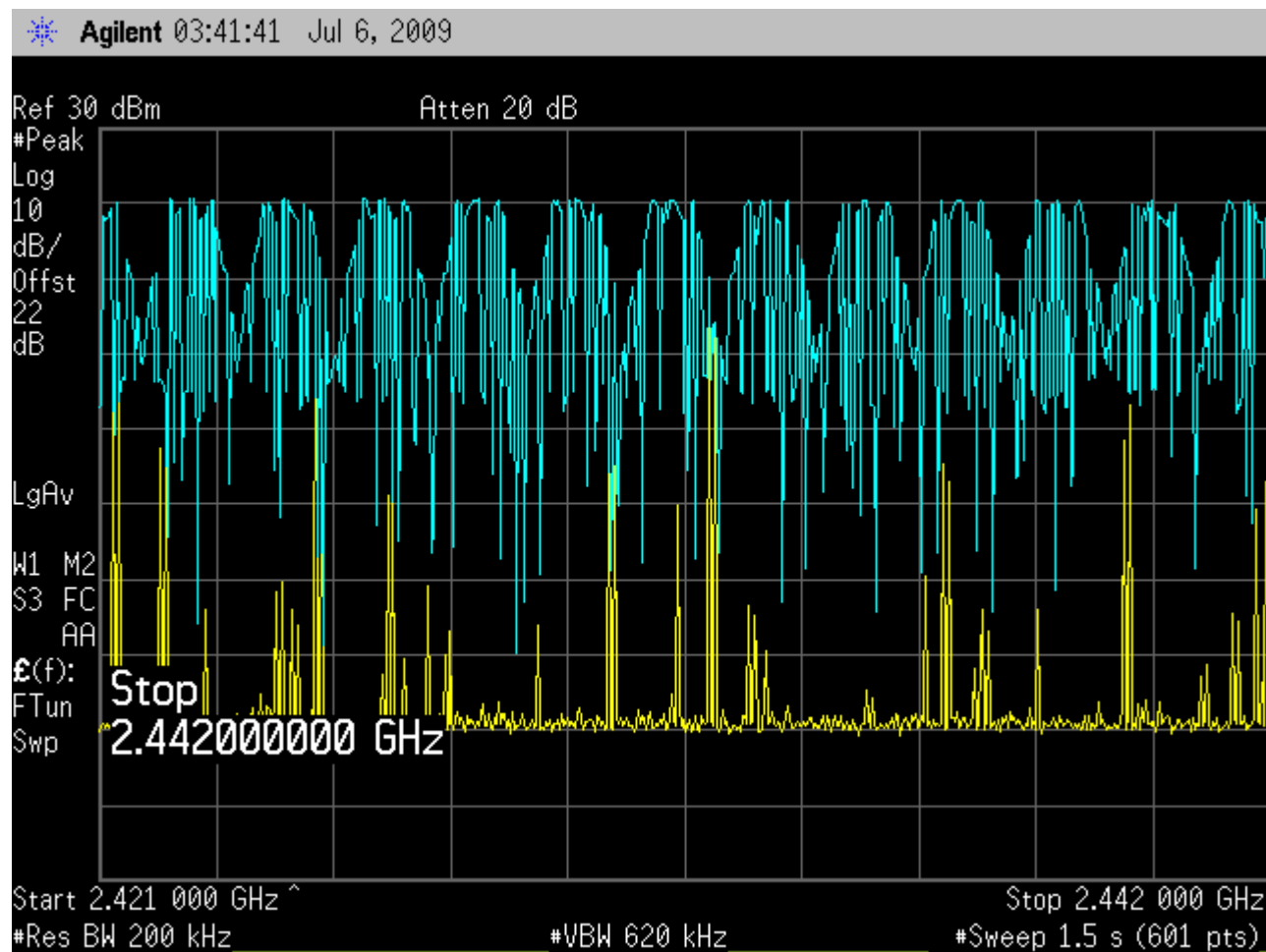
- Hopping function enabled.
- Span is frequency band of operation, divided into four plots for better resolution.
- RBW is 1% of the span
- VBW is 3X RBW
- Sweep is auto
- Detector is Peak
- Trace is Max Hold
- Observed Number of Hopping Frequencies is **47**.
  - = Plot#1 + Plot#2 + Plot#3 + Plot#4
  - = 12 + 12 + 12 + 11
  - = 47 channels





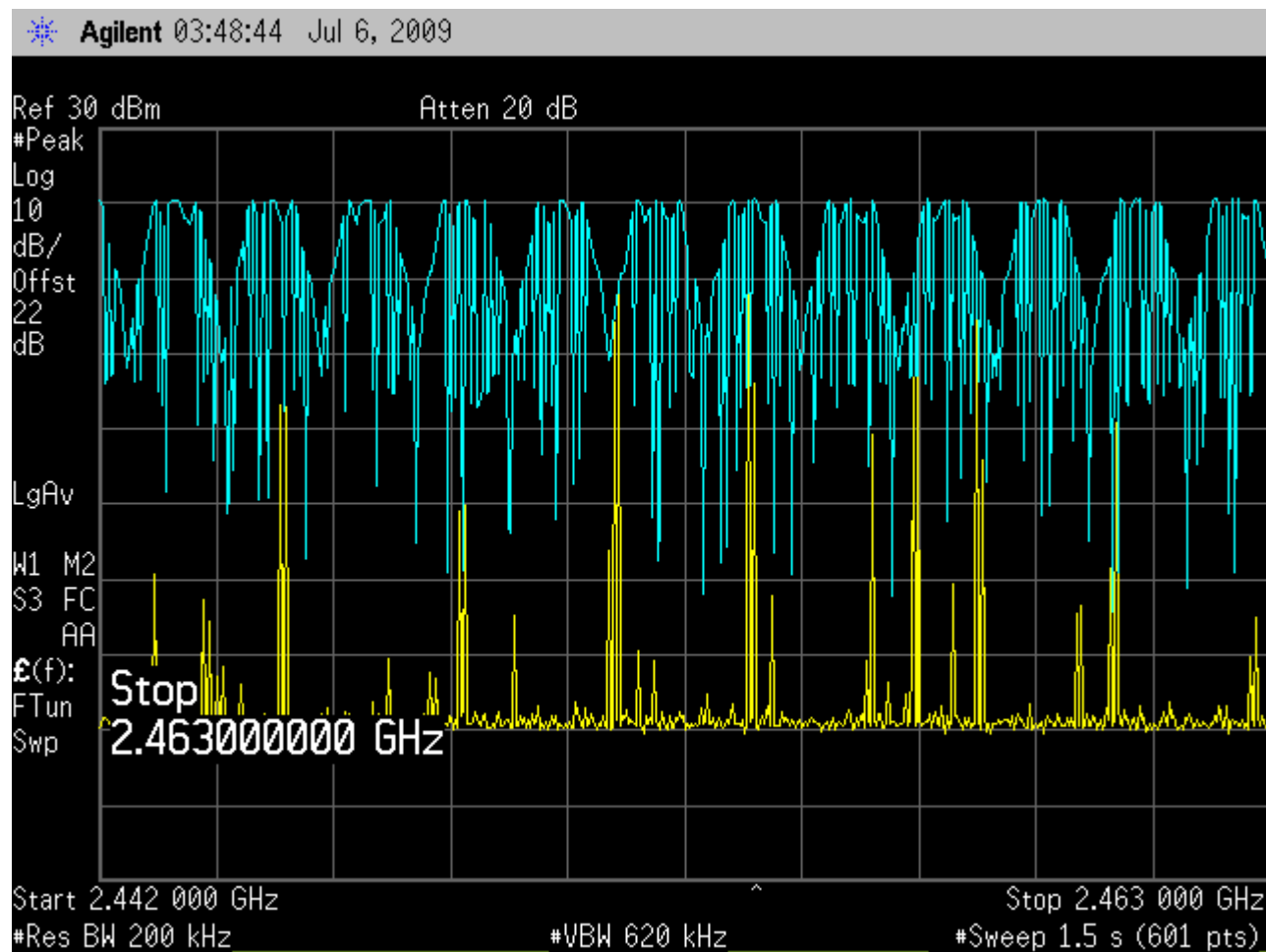
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Plot #1: Number of Hopping Frequencies is 12



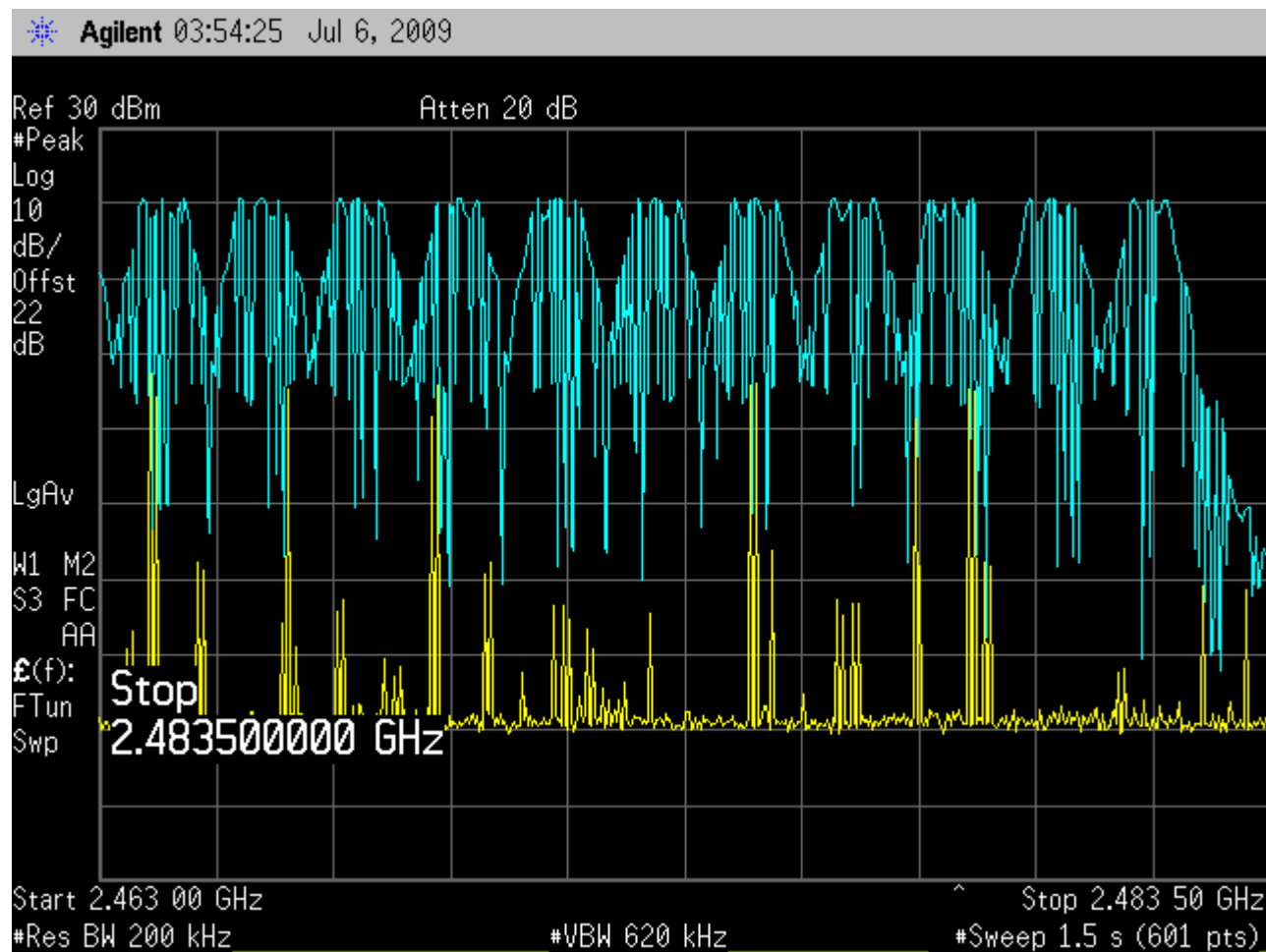
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Plot #2: Number of Hopping Frequencies is 12



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Plot #3: Number of Hopping Frequencies is 12



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Plot #3: Number of Hopping Frequencies is 11





**Section 15.247(a)(1)(iii) – Time of Occupancy (Dwell Time)**

(iii) Frequency hopping systems in the 2400–2483.5 MHz band shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.

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**Test Conditions:**

Sample Number:	XCVR6K1	Temperature:	21
Date:	July 6, 2009	Humidity:	37
Modification State:	Channel 0 to 46	Tester:	FSCustodio
		Laboratory:	Shield Room #1

**Test Results:**

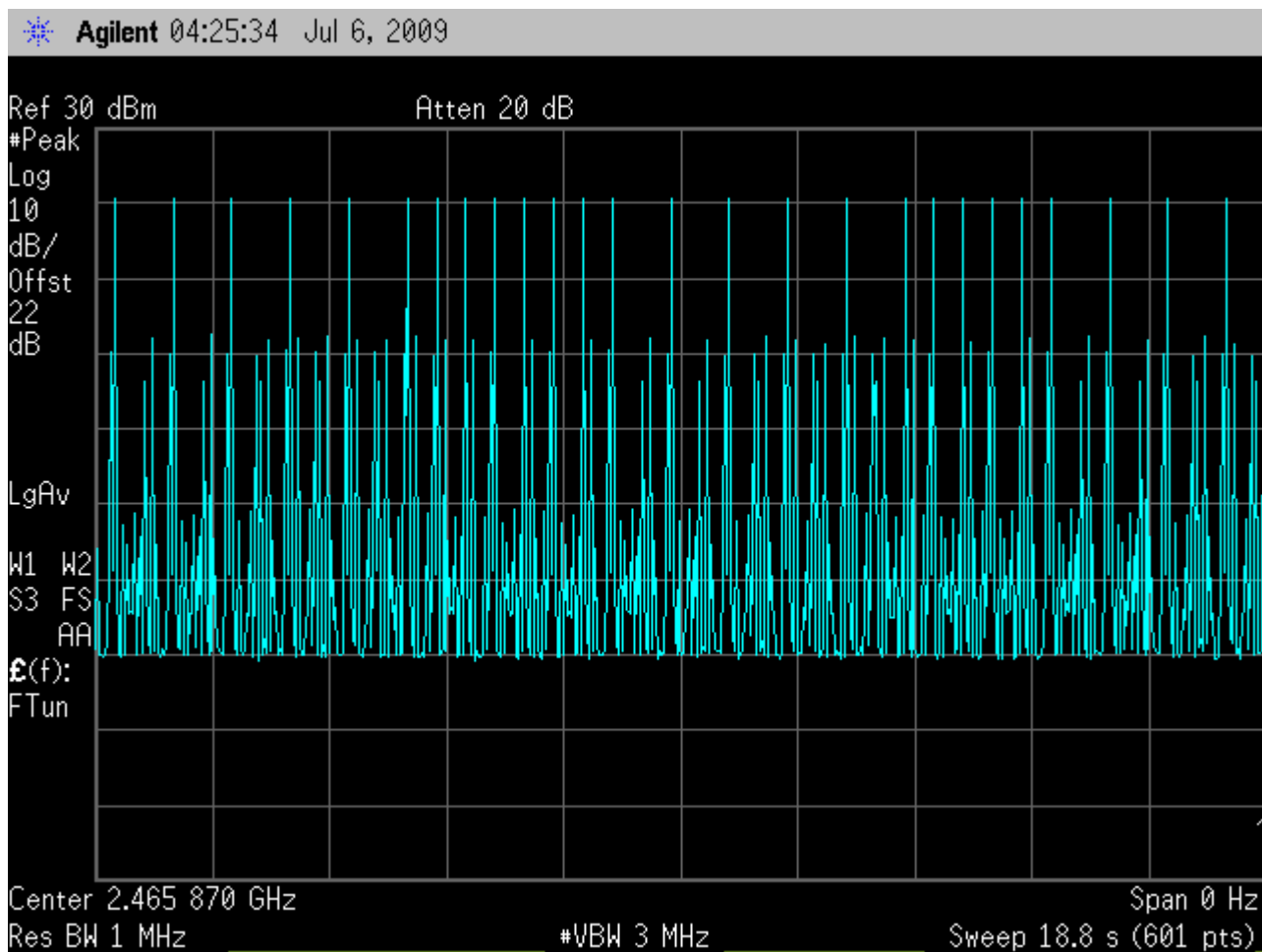
See attached plots.

**Additional Observations:**

- Hopping function enabled.
- Span is Zero span
- RBW is 1 MHz
- VBW is 3X RBW
- Sweep is 0.4 seconds multiplied by the number of hopping channels employed (0.4 x 47 = 18.8 seconds).
- Detector is Peak
- Trace is Max Hold
- Limit is 400 ms, time of occupancy is:
  - = No. of transmission per required sweep < 400 ms
  - = 0.41667 ms x 26
  - = **10.83 ms**

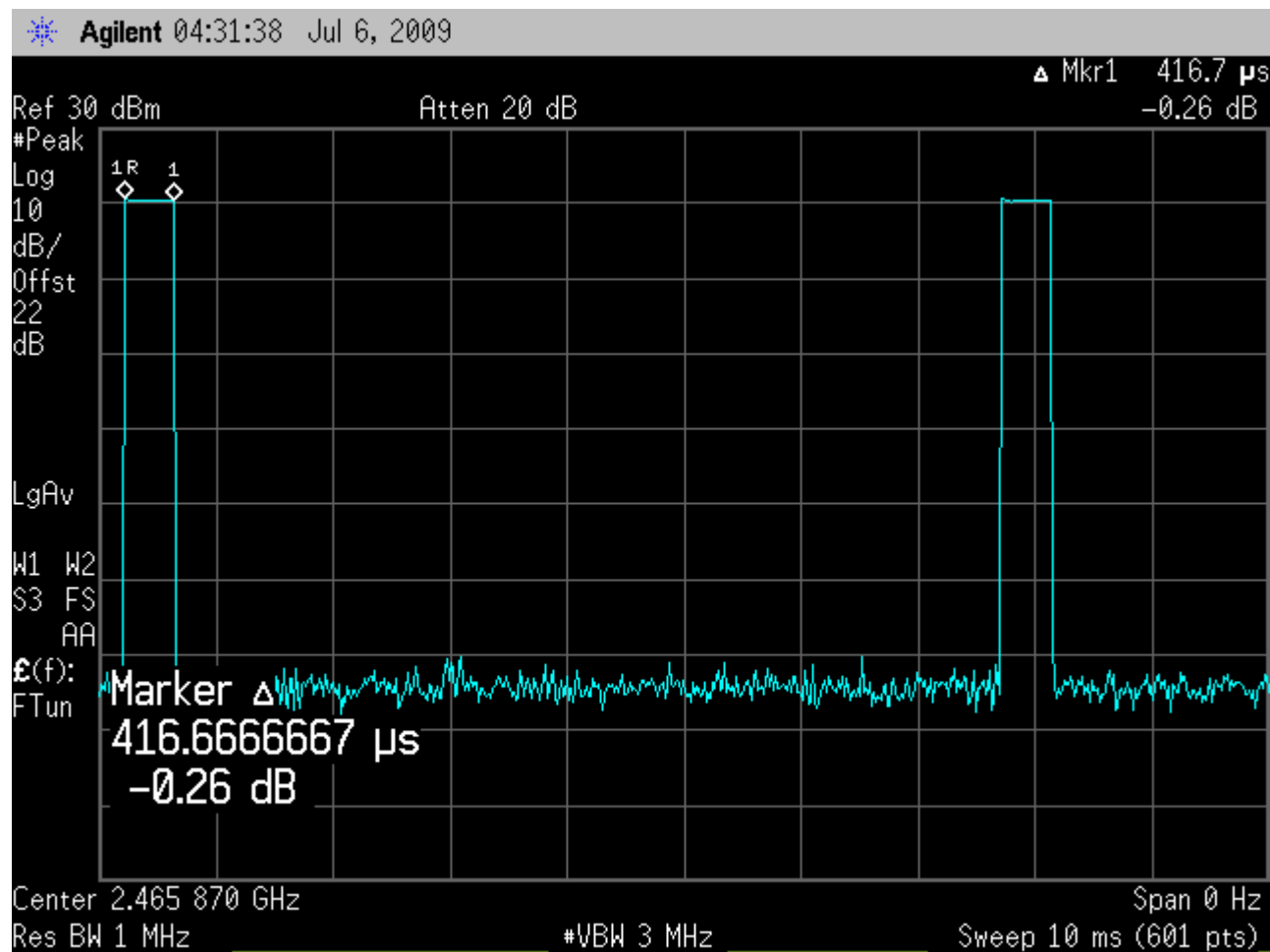
10.83 ms < 400 ms, EUT Complies





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Number of transmission per required sweep = 26



Single transmission time = 416.67 μs





**Section 15.215(c) – 20 dB Bandwidth**

(c) Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§15.217 through 15.257 and in Subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated. The requirement to contain the designated bandwidth of the emission within the specified frequency band includes the effects from frequency sweeping, frequency hopping and other modulation techniques that may be employed as well as the frequency stability of the transmitter over expected variations in temperature and supply voltage. If a frequency stability is not specified in the regulations, it is recommended that the fundamental emission be kept within at least the central 80% of the permitted band in order to minimize the possibility of out-of-band operation.

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**Test Conditions:**

<b>Sample Number:</b>	XCVR6K1	<b>Temperature:</b>	21
<b>Date:</b>	July 6, 2009	<b>Humidity:</b>	37
<b>Modification State:</b>	Low ,Mid and High Channel	<b>Tester:</b>	FSCustodio
		<b>Laboratory:</b>	Shield Room #1

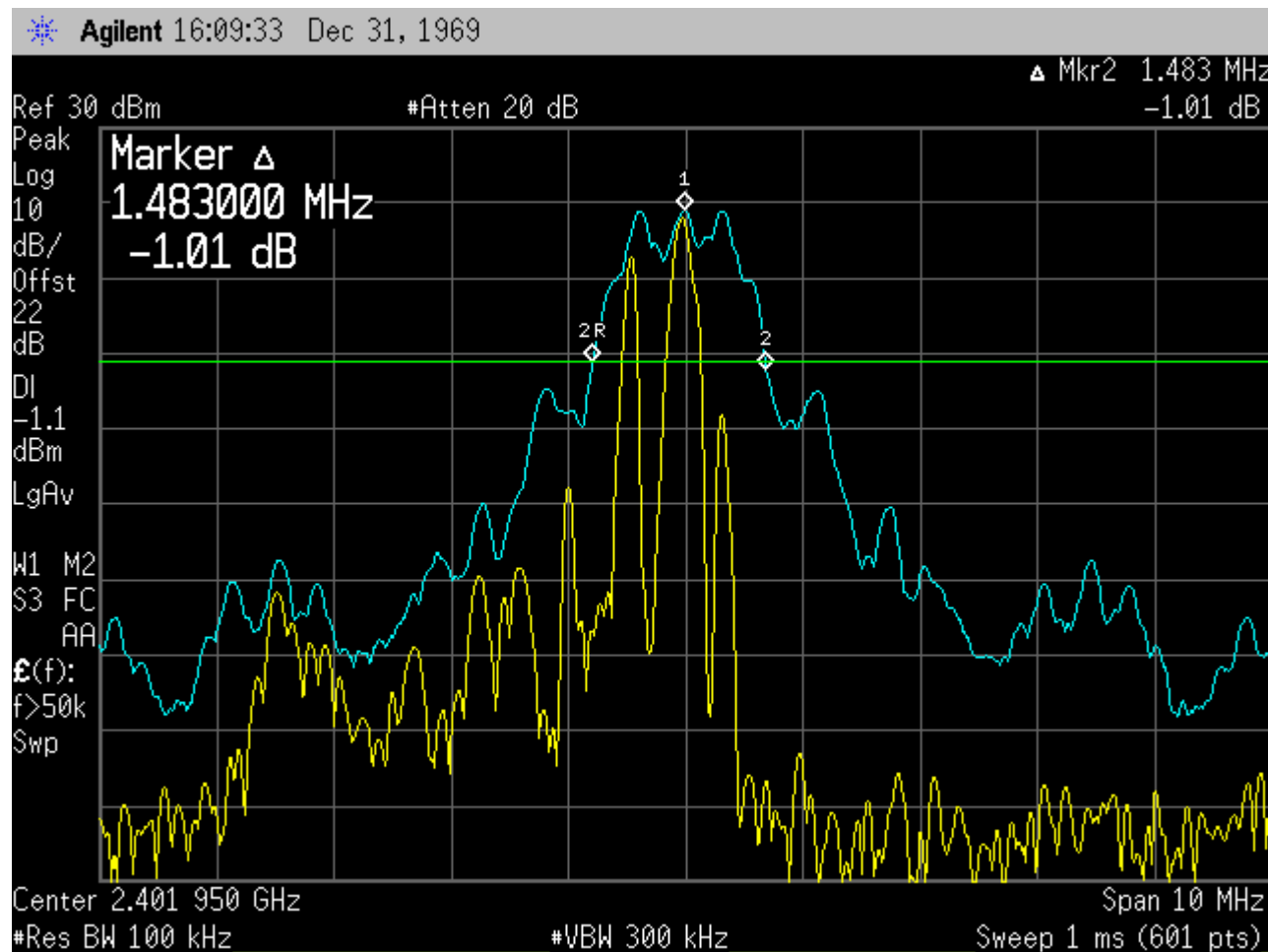
**Test Results:**

See attached plots.

**Additional Observations:**

- Hopping disabled. Centered at Channel 46
- Span is wide enough to capture the channel transmission
- RBW is 1% of the span
- VBW is 3X RBW
- Sweep is auto
- Detector is Peak
- Trace is Max Hold
- A peak output max hold reading was taken, a display line was drawn 20 dB lower than peak level. The 20 dB bandwidth was determined from where the channel output spectrum intersected the display line.
- Observed 20 dB BW is 1.483 MHz.
- 2401.920 MHz – 0.7415 MHz = 2401.1785 MHz (within the frequency band)
- 2481.408 MHz + 0.7415 = 2482.1495 MHz (within the frequency band)





(Low Channel) Observed 20 dB Bandwidth is **1.483 MHz**



(Mid Channel) Observed 20 dB Bandwidth is 1.45 MHz



(High Channel) Observed 20 dB Bandwidth is 1.417 MHz



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**Section 15.247(b)(1) – Peak Output Power**

(1) For frequency hopping systems operating in the 2400–2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725–5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400–2483.5 MHz band: 0.125 watts.

**Test Conditions:**

<b>Sample Number:</b>	XCVR6K1	<b>Temperature:</b>	21°C
<b>Date:</b>	July 6, 2009	<b>Humidity:</b>	37 %
<b>Modification State:</b>	Low, Mid and High Channels	<b>Tester:</b>	FSCustodio
		<b>Laboratory:</b>	Shield Room #1

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**Test Results:**

Peak Power Analyzer used on this test

**Additional Observations:**

- This is a conducted test. A 20dB attenuator was placed between the sensor and the antenna port. Additional 2.0 dB was added for cable and connectors. Total offset used is 22.0 dB.
- The EUT will only transmit with only one antenna and not both in any given time.
- Measurements were made at 4.25VDC, 5VDC and 5.75VDC, however the EUT stops transmitting @ 4.25VDC.

Channel Range MHz	Peak Power Output dBm @ 4.25VDC	Peak Power Output dBm @ 5VDC	Peak Power Output dBm @ 5.75VDC
2401.920	Ceases transmitting	18.95	18.95
2441.664	Ceases transmitting	18.95	18.90
2481.408	Ceases transmitting	18.90	18.90

Peak Output Power = 18.95 dBm or **78.52 mW**





**Section 15.247(d) – Band-edge Compliance of RF Conducted Emissions**

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

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**Test Conditions:**

<b>Sample Number:</b>	XCVR6K1	<b>Temperature:</b>	21°C
<b>Date:</b>	July 6, 2009	<b>Humidity:</b>	37 %
<b>Modification State:</b>	Low and High Channel	<b>Tester:</b>	FSCustodio
		<b>Laboratory:</b>	Shield Room #1

**Test Results:**

See attached plots.

**Additional Observations:**

- This is a conducted test. The 22.0dB offset is from the external attenuator and cable used.
- Span is wide enough to capture the peak level of the emission operating on the channel closest to the band edges (Lower and Upper).
- RBW is 1% of the span
- VBW is 3X RBW
- Sweep is auto.
- Detector is Peak
- Trace is Max Hold
- For each investigation, the peak level reading was taken and a display line was drawn 20 dBc below this level which will be the limit for this test.
- Test repeated between Hopping and Non-Hopping mode (transmission centered on a carrier frequency)





Lower Band edge (Hopping)



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Lower Band edge (Non-Hopping)





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Upper Band edge (Hopping)



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Upper Band edge (Non-Hopping)



**Section 15.247(d) – Spurious RF Conducted Emissions**

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

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**Test Conditions:**

<b>Sample Number:</b>	XCVR6K1	<b>Temperature:</b>	21°C
<b>Date:</b>	July 6, 2009 and July 28, 2009	<b>Humidity:</b>	37%
<b>Modification State:</b>	Hopping + Low, Mid and High	<b>Tester:</b>	FSCustodio
		<b>Laboratory:</b>	Shield Room #1

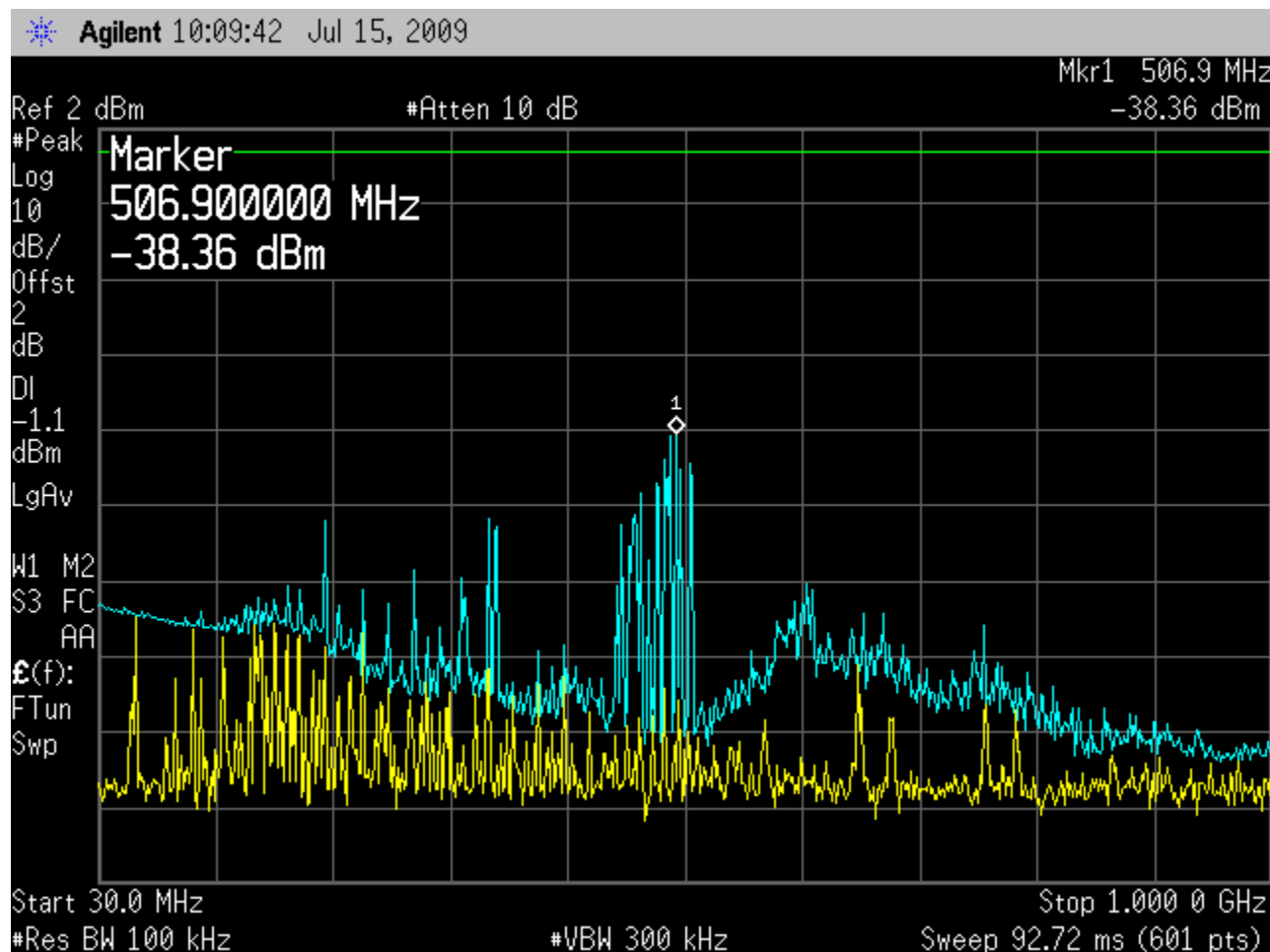
**Test Results:**

See attached plots.

**Additional Observations:**

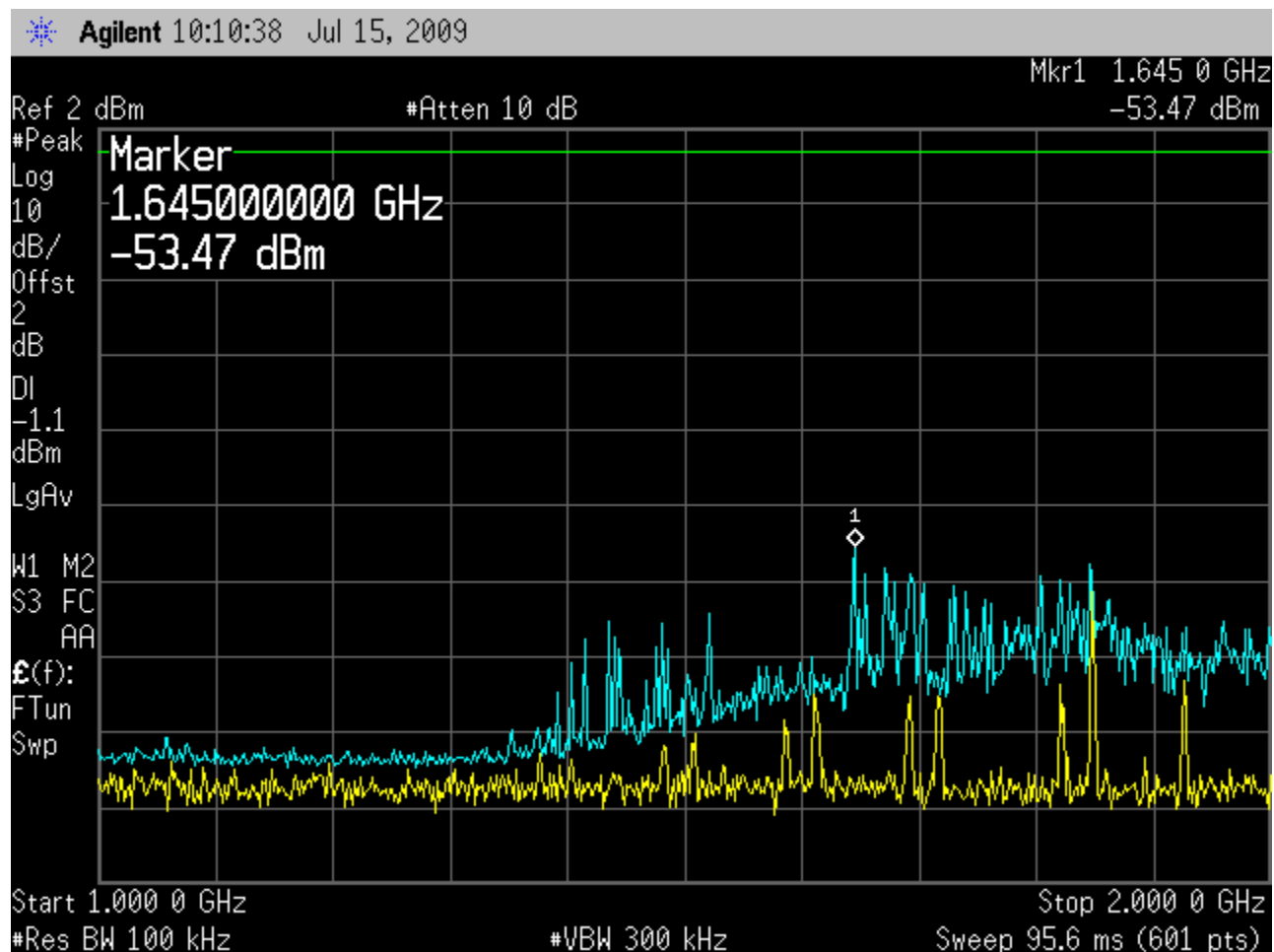
- This is a conducted test. The 22.0dB offset is from the external attenuator and cable used.
- The EUT was hopping during this investigation. Test results when hopping is disabled (transmitting at specific frequency) can be found under Appendix B. This test was done with a different cable thus using a 23.1dB offset.
- The 20dB attenuator was removed when measuring outside the authorized band.
- The peak level reading was taken at the carrier frequency then a display line was drawn 20 dBc below this level which will be the limit for this test.
- VBW is 3X RBW
- Sweep is auto.
- Detector is Peak
- Trace is Max Hold
- EUT complies.





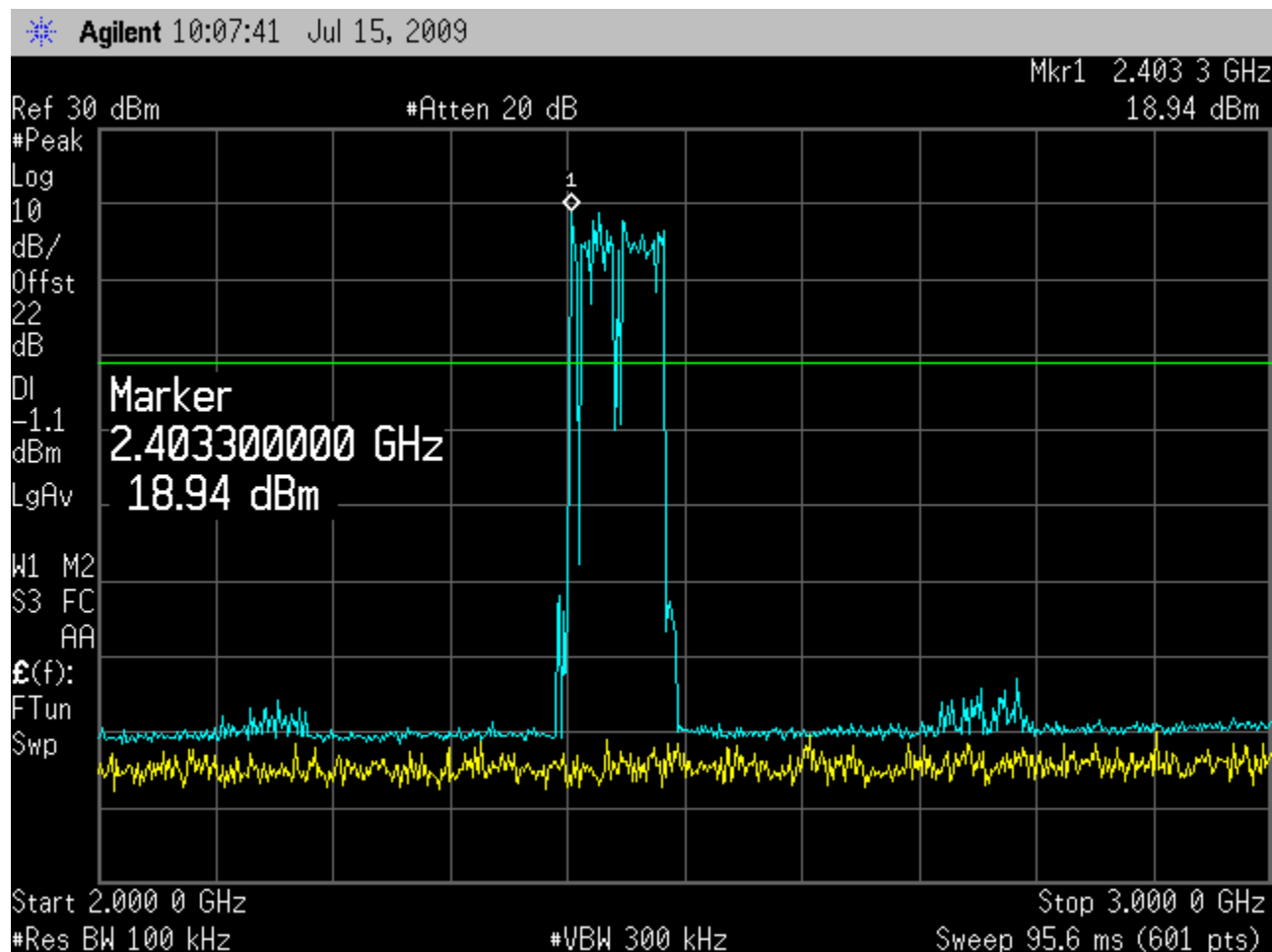
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Plots from 30 MHz to 1GHz , Display Line is -1.06 dBm which is 20dB below the highest in band emission.



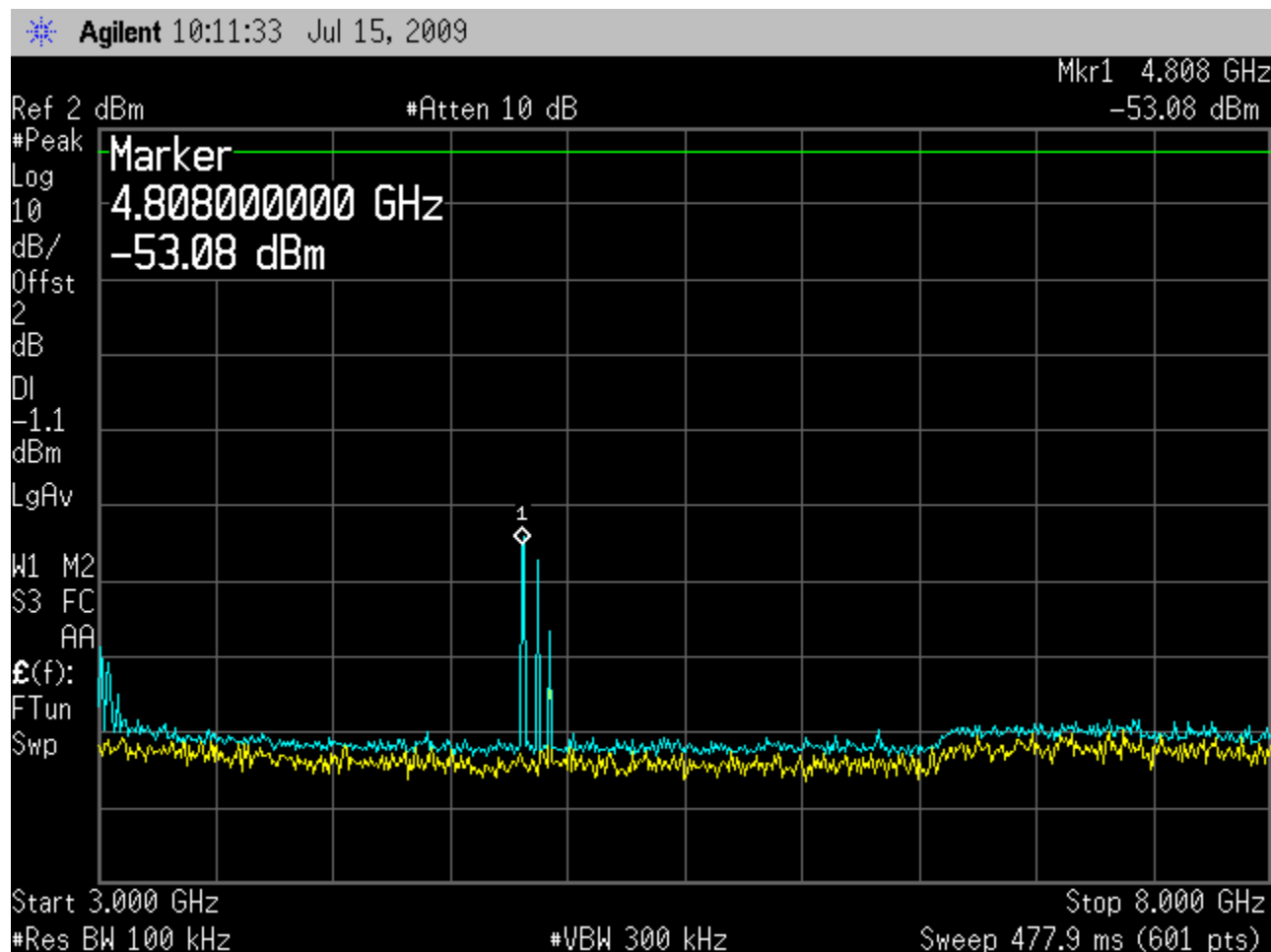
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Plots from 1GHz to 2GHz , Display Line is -1.06 dBm which is 20dB below the highest in band emission.

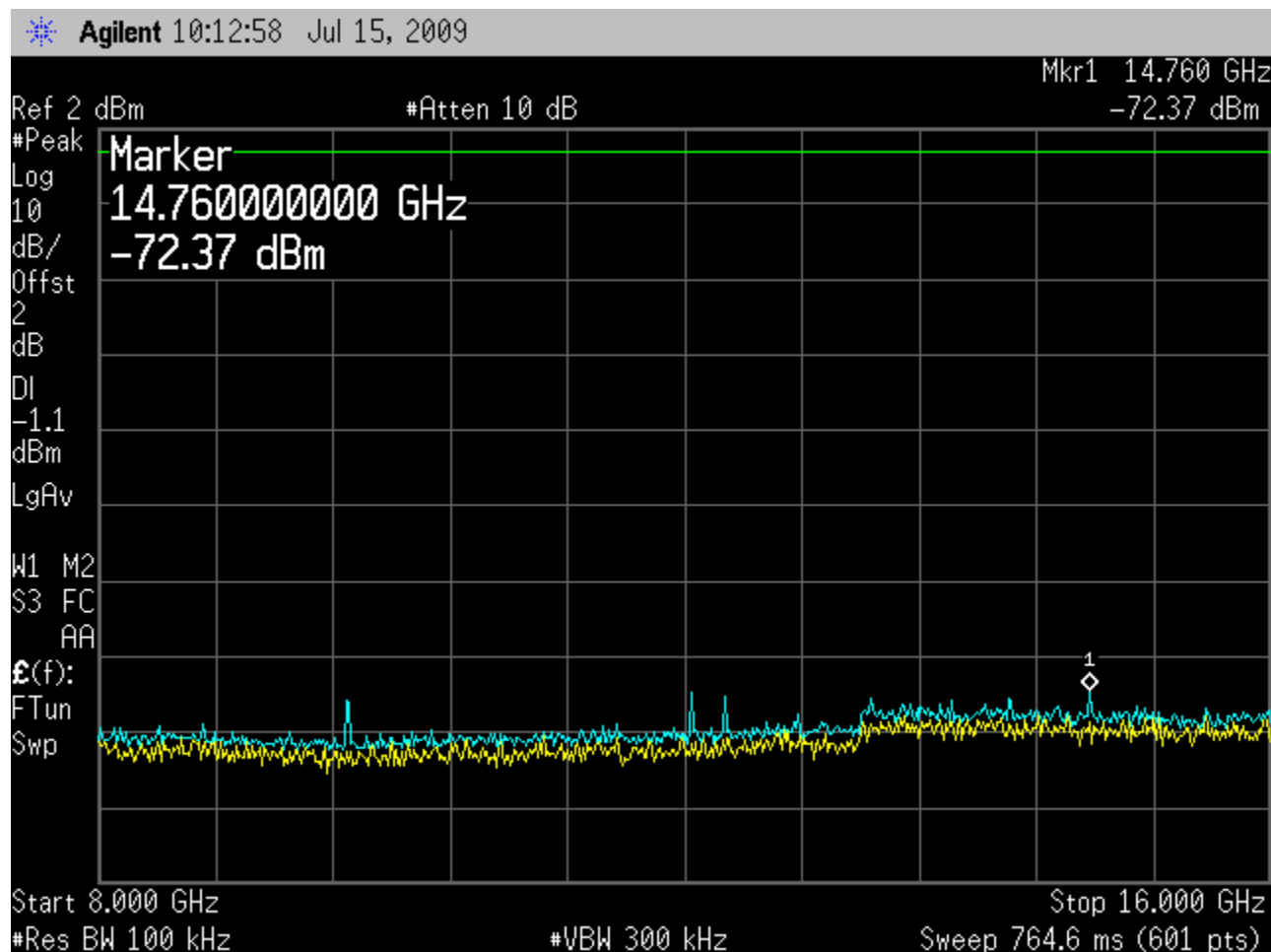


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Plots from 2GHz to 3GHz , Display Line is -1.06 dBm which is 20dB below the highest in band emission.



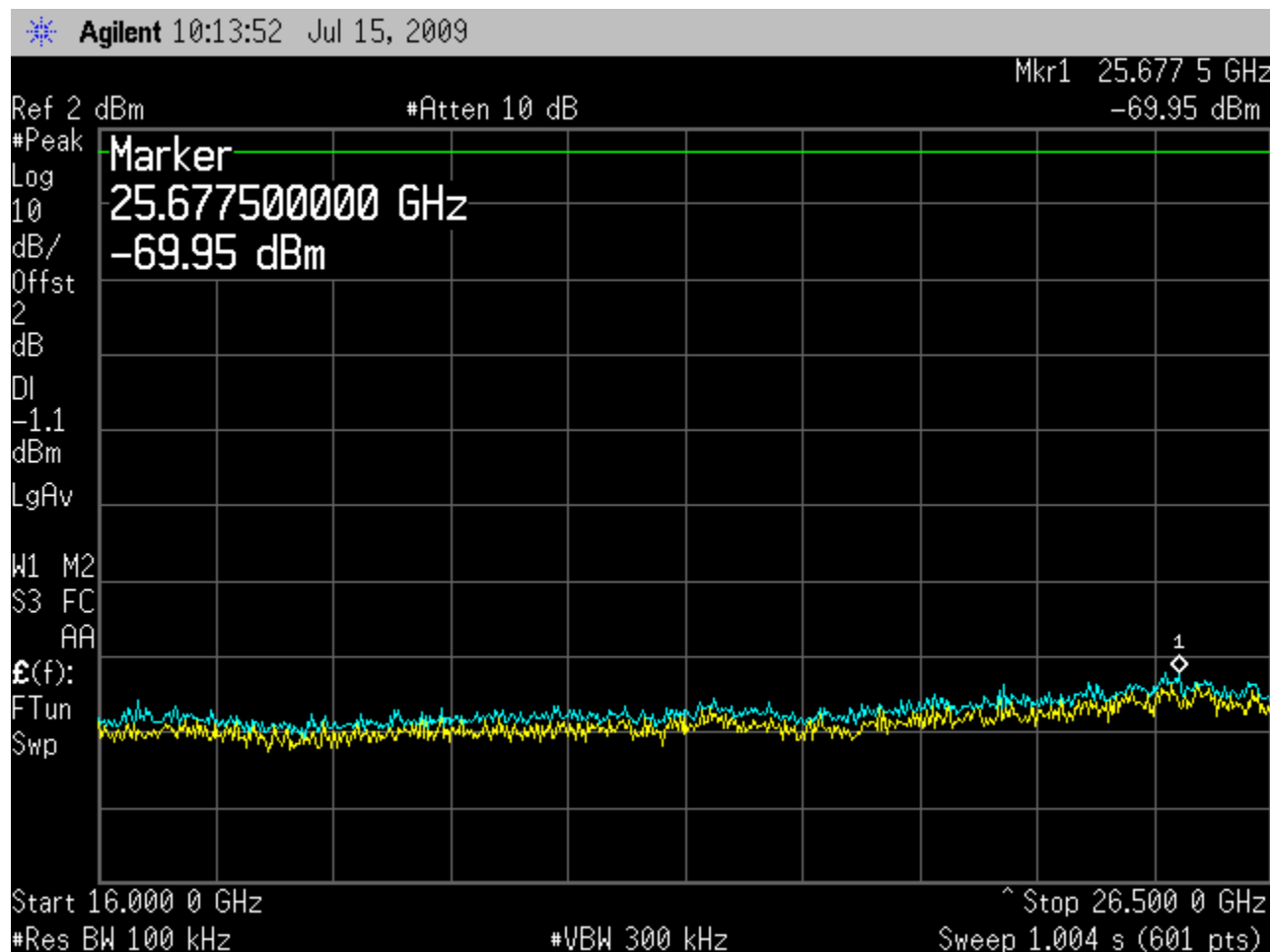
Plots from 3GHz to 8GHz , Display Line is -1.06 dBm which is 20dB below the highest in band emission.



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Plots from 8GHz to 16GHz , Display Line is -1.06 dBm which is 20dB below the highest in band emission.





Plots from 16GHz to 26.5GHz , Display Line is -1.06 dBm which is 20dB below the highest in band emission.



**Section 15.247(d) – Spurious Radiated Emissions**

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

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**Test Conditions:**

<b>Sample Number:</b>	XCVR6K1	<b>Temperature:</b>	27.8
<b>Date:</b>	July 10, 2009	<b>Humidity:</b>	33
<b>Modification State:</b>	As required (Hopping or Single)	<b>Tester:</b>	FSCustodio
		<b>Laboratory:</b>	SOATS

**Test Results:**

See attached plots.

**Additional Observations:**

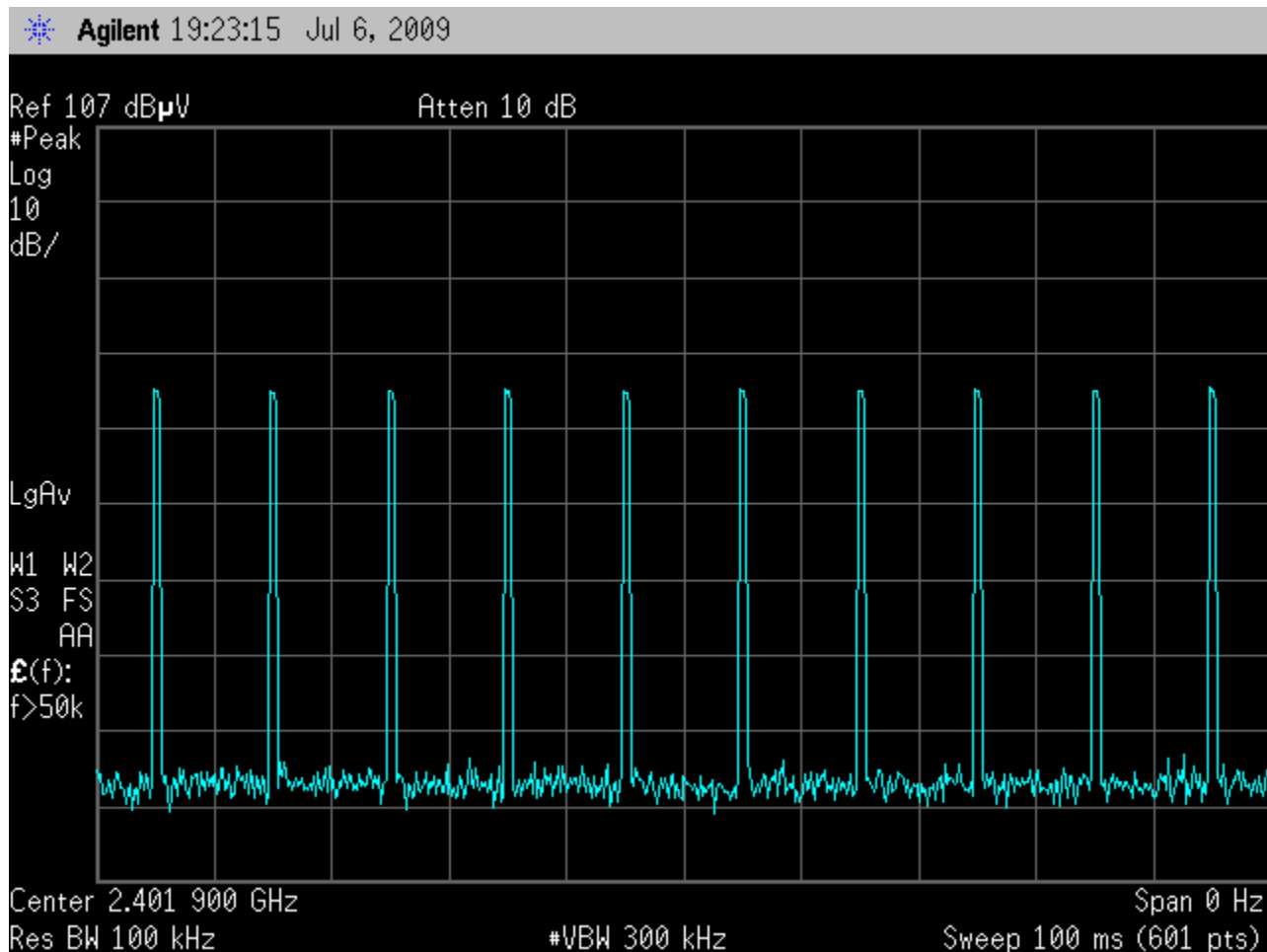
- The Spectrum was searched from 30MHz to the 10<sup>th</sup> Harmonic, 25000 MHz. There are no emissions found that do not comply to the restricted bands defined in **FCC Part 15 Subpart C, 15.205** or **Part 15.247(d)**.
- The EUT was measured on three orthogonal axes.
- The two antenna provided was investigated and compared and only the worst antenna presented.
- Duty Cycle Correction Factor used is -20 based from actual Duty Cycle of 4.83%.

**Sample Computation (base from page 42 data):**

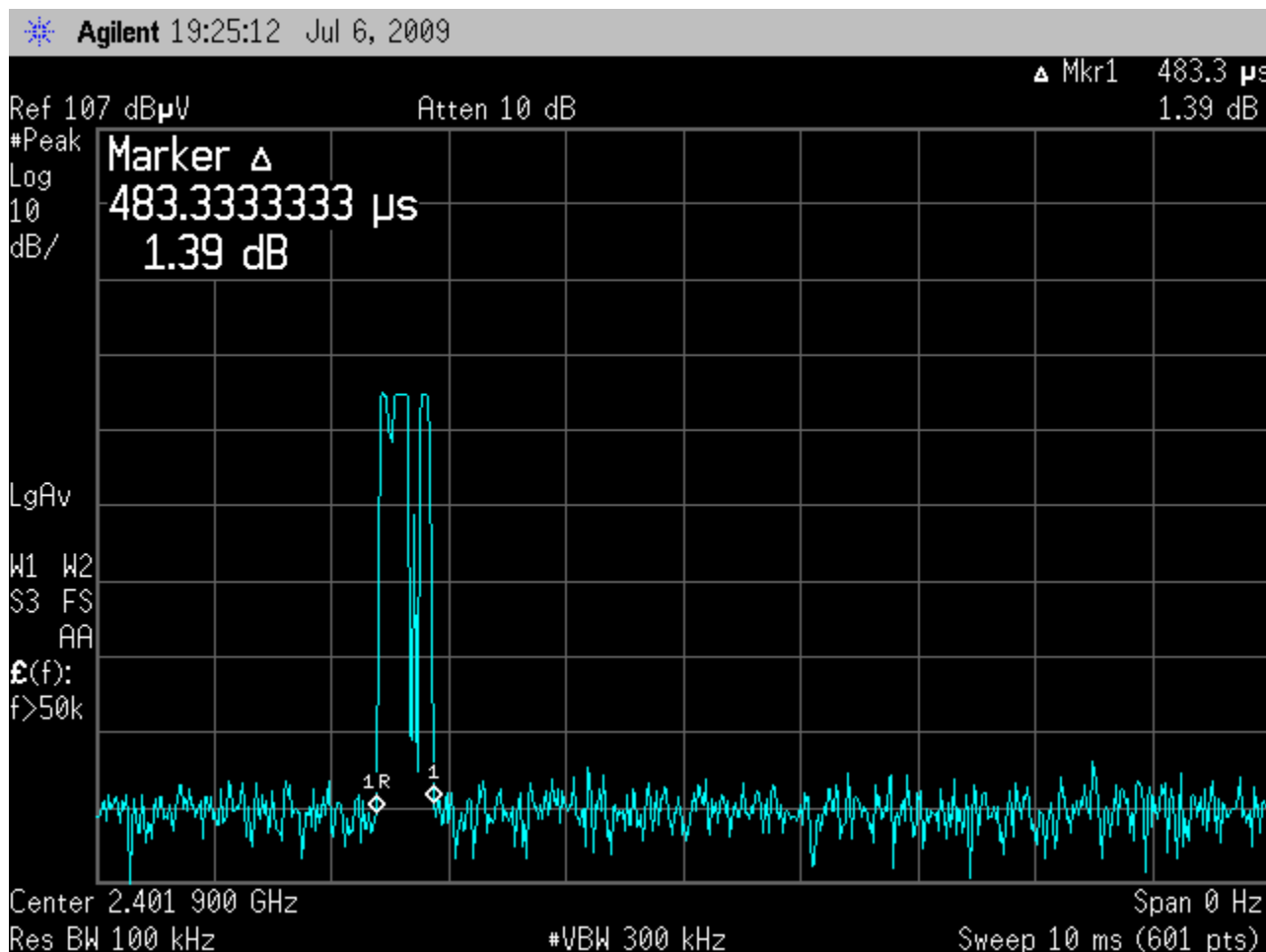
$$\begin{aligned}
 \text{Correction factor @ 199MHz} &= -13 \\
 &= \text{Antenna factor} + \text{Cable loss} - \text{Preamp gain} \\
 &= 16.4 + 2.3 - 31.7 \\
 \text{Corrected reading} &= \text{Max. reading} + \text{Correction factor} \\
 &= 47.13 + (-13) \\
 &= 34.13 \text{ dB}\mu\text{V/m}
 \end{aligned}$$



Duty Cycle Factor Computation:



10 transmissions per 100 ms



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483.33 μs per transmission

**Duty Cycle** = (0.48333 ms) x 10  
= 4.83 ms/100 ms  
= **4.83%**

**DCCF** = 20 log (0.04833)  
= **-26.32; limited to -20**

FCC ID: BYMXCVR6K1  
IC: 1860A-XCVR6K1

Report Number: 2009 07131172 FCC 15.247  
Specification: FCC Part 15 Subpart C, 15.247

**Test Notes:**

No emissions found that falls under the restricted bands defined in FCC Part 15 Subpart C, 15.205. Limit is from fundamental measurement @ 100kHz RBW (following page).



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**Radiated Emissions Data**

Job # : 29120-2 Date : 7/10/2009 Page 1 of 1  
 NEX #: 131172 Time : 12:30PM  
 Staff : FSC

Client Name : HME EUT Voltage : 5VDC  
 EUT Name : RF Module EUT Frequency :  
 EUT Model # : XCVR6K1 Phase:  
 EUT Serial # : F25L0010 NOATS  
 EUT Config : Hopping @ max power SOATS X  
 Distance < 1000 MHz: 3 m  
 Distance > 1000 MHz: 3 m

Specification : CFR47 Part 15, Subpart C, Part 15.247

Loop Ant. #: NA  
 Bicon Ant. #: 114\_10m Temp. (°C) : 27.8  
 Log Ant. #: 111\_10m Humidity (%) : 33  
 DRG Ant. #: 877 Spec An. #: 911  
 Cable LF#: SOATS Spec An. Display #: NA  
 Cable HF#: SOATS QP #: 911  
 Preamp LF#: 901 PreSelect#: NA  
 Preamp HF#: 919


Peak	RBW: 100 kHz
	Video Bandwidth 300 kHz

Meas. Freq. (MHz)	Meter Reading Vertical	Meter Reading Horizontal	Det.	EUT Side F/L/R/B	Ant. Height m	Max. Reading (dBµV)	Corrected Reading (dBµV/m)	Spec. limit (dBµV/m)	CR/SL Diff. (dB)	Pass Fail	Comment
199.3	47.1	39.9	P		1.5	47.13	34.2	95.8	-61.6	Pass	
394.0	50.2	61.9	P	F	1.4	61.9	48.2	95.8	-47.6	Pass	
456.2	46.9	51.0	P	F	1.5	51	38.7	95.8	-57.1	Pass	
508.0	49.6	57.1	P	F	1.6	57.14	47.1	95.8	-48.7	Pass	
518.4	48.9	55.0	P	F	1.7	55.02	45.4	95.8	-50.4	Pass	
559.9	45.0	49.5	P	F	1.5	49.47	40.3	95.8	-55.5	Pass	
798.3	48.3	52.9	P	F	1.7	52.93	46.8	95.8	-49.0	Pass	

FCC ID: BYMXCVR6K1  
IC: 1860A-XCVR6K1

Report Number: 2009 07131172 FCC 15.247  
Specification: FCC Part 15 Subpart C, 15.247

**Test Notes:** No other spurious emissions detected above 1GHz when in receive/standby mode (the EUT does not have a separate Receive mode, please see Technical Description of the EUT for more details).


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<b>Radiated Emissions Data</b>			
Job # :	29120-2	Date :	7/13/2009
NEX# :	131172	Time :	12:30PM
		Staff :	FSC
Client Name :	HME	EUT Voltage :	5VDC
EUT Name :	RF Module	EUT Frequency :	
EUT Model # :	XCVR6K1	Phase:	
EUT Serial # :	F25L0010	NOATS	
EUT Config. :	Hopping @ max power	SOATS	X
		Distance < 1000 MHz:	3 m
		Distance > 1000 MHz:	3 m
Specification :	CFR47 Part 15, Subpart B, Class B		
Loop Ant. #:	NA	Quasi Peak      RBW: 120 kHz Video Bandwidth 120 kHz	
Bicon Ant.#:	114_10m	Temp. (°C) :	26.3
Log Ant.#:	111_10m	Humidity (%) :	35.5
DRG Ant. #	877	Spec An.#:	911
Cable LF#:	SOATS	Spec An. Display #:	NA
Cable HF#:	SOATS	QP #:	911
Preamp LF#:	901	PreSelect#:	NA
Preamp HF#:	919		

Meas. Freq. (MHz)	Meter Reading Vertical	Meter Reading Horizontal	Det.	EUT Side F/L/R/B	Ant. Height m	Max. Reading (dBµV)	Corrected Reading (dBµV/m)	Spec. limit (dBµV/m)	CR/SL Diff. (dB)	Pass Fail	Comment
199.3	45.2	38.4	Q		1.5	45.23	31.8	43.5	-11.8	Pass	
394.0	49.0	56.5	Q	F	1.4	56.45	42.1	46.0	-3.9	Pass	
456.2	47.3	51.2	Q	F	1.5	51.23	38.2	46.0	-7.8	Pass	
508.0	46.3	53.2	Q	F	1.6	53.23	42.5	46.0	-3.5	Pass	
518.4	46.8	53.2	Q	F	1.7	53.23	42.9	46.0	-3.1	Pass	
559.9	44.3	48.3	Q	F	1.5	48.34	38.4	46.0	-7.6	Pass	
798.3	46.8	51.2	Q	F	1.7	51.23	44.3	46.0	-1.8	Pass	

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**Individual Channel Spurious Radiated Emissions Test Results:**

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<b>Radiated Emissions Data</b>			
Job # :	29120-2	Date :	7/29/2009
NEX# :	131172	Time :	7:00 AM
		Staff :	FSC
Client Name :	HME		EUT Voltage :
EUT Name :	RF Module		EUT Frequency :
EUT Model # :	XCVR6K1		Phase :
EUT Serial # :	F25L0010		NOATS
EUT Config. :	Low Channel using Antenna "A"		SOATS
			Distance < 1000 MHz:
			Distance > 1000 MHz:
Specification :	CFR47 Part 15, Subpart B, Class B		
Loop Ant. #:	NA		
Bicon Ant.#:	114_10m	Temp. (°C) :	19.7
Log Ant.#:	111_10m	Humidity (%) :	67
DRG Ant. #	877	Spec An.#:	911
Cable LF#:	SOATS	Spec An. Display #:	NA
Cable HF#:	SOATS	QP #:	911
Preamp LF#:	901	PreSelect#:	NA
Preamp HF#:	317	DCCF#:	20
		Peak (Restr.) RBW: 1 MHz Video Bandwidth 3 MHz Peak RBW: 100 KHz Video Bandwidth 300 KHz Average =Peak-DCCF	

Meas. Freq. (MHz)	Meter Reading Vertical	Meter Reading Horizontal	Det.	EUT Side F/L/R/B	Ant. Height m	Max. Reading (dBµV)	Corrected Reading (dBµV/m)	Spec. limit (dBµV/m)	CR/SL Diff. (dB)	Pass Fail	Comment
2401.9	75.2	67.1	P	R	1.0	75.23	113.2	116.2	-3.1	Pass	X
2401.9	76.5	69.2	P	BL	1.0	76.54	114.5	116.2	-1.8	Pass	Y
2401.9	76.5	69.0	P	R	1.0	76.5	114.4	116.2	-1.8	Pass	Z
2400.0	54.7	50.1	P	BL	1.0	54.71	59.4	94.5	-35.0	Pass	100kHz RBW
2400.0	34.7	30.1	A	BL	1.0	34.71	39.4	74.5	-35.0	Pass	100kHz RBW
2483.5	34.2	33.5	P	BL	1.0	34.17	38.9	74.0	-35.1	Pass	
2483.5	14.2	13.5	A	BL	1.0	14.17	18.9	54.0	-35.1	Pass	
4803.8	47.1	47.1	P		1.0	47.09	62.6	74.0	-11.3	Pass	NF
4803.8	27.1	27.1	A		1.0	27.09	42.6	54.0	-11.3	Pass	
7205.7	33.0	33.0	P		1.0	32.99	59.4	74.0	-14.6	Pass	NF-100kHz RBW

**Low Channel using Antenna "A"**

**Test Notes:** No other spurious emissions detected which is within 20dB of the limit as well as within the restricted bands defined in FCC Part 15 Subpart C, 15.205.







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**Radiated Emissions Data**

Job # : 29120-2 Date : 7/29/2009 Page 1 of 1  
 NEX# : 131172 Time : 7:00 AM  
 Staff : FSC

Client Name : HME EUT Voltage : 5VDC  
 EUT Name : RF Module EUT Frequency :  
 EUT Model # : XCVR6K1 Phase :  
 EUT Serial # : F25L0010 NOATS :  
 EUT Config. : Mid Channel using Antenna "A" SOATS : X  
 Distance < 1000 MHz : 3 m  
 Distance > 1000 MHz : 3 m

Specification : CFR47 Part 15, Subpart B, Class B  
 Loop Ant. # : NA  
 Bicon Ant.#: 114\_10m Temp. (°C) : 19.7  
 Log Ant.#: 111\_10m Humidity (%) : 67  
 DRG Ant. # 877 Spec An.#: 911  
 Cable LF#: SOATS Spec An. Display #: NA  
 Cable HF#: SOATS QP #: 911  
 Preamp LF#: 901 PreSelect#: NA  
 Preamp HF# 317 DCCF: 20

Peak (Restr.)	RBW: 1 MHz
	Video Bandwidth 3 MHz
Peak	RBW: 100 KHz
	Video Bandwidth 300 KHz
Average	=Peak-DCCF

Meas. Freq. (MHz)	Meter Reading Vertical	Meter Reading Horizontal	Det.	EUT Side F/L/R/B	Ant. Height m	Max. Reading (dBµV)	Corrected Reading (dBµV/m)	Spec. limit (dBµV/m)	CR/SL Diff. (dB)	Pass Fail	Comment
2441.7	75.5	66.0	P	R	1.0	75.53	113.5	116.2	-2.8	Pass	X
2441.7	75.6	67.9	P	BL	1.0	75.59	113.5	116.2	-2.7	Pass	Y
2441.7	76.6	68.6	P	R	1.0	76.63	114.6	116.2	-1.7	Pass	Z
2400.0	26.4	26.3	P	BL	1.0	26.42	31.1	93.5	-62.4	Pass	100kHz RBW
2400.0	6.4	6.3	A	BL	1.0	6.42	11.1	73.5	-62.4	Pass	100kHz RBW
2483.5	34.8	35.6	P	BL	1.0	35.61	40.3	74.0	-33.7	Pass	
2483.5	14.8	15.6	A	BL	1.0	15.61	20.3	54.0	-33.7	Pass	
4883.4	49.3	49.3	P		1.0	49.29	64.8	74.0	-9.1	Pass	NF
4883.4	29.3	29.3	A		1.0	29.29	44.8	54.0	-9.1	Pass	
7325.1	42.7	42.7	P		1.0	42.7	69.7	74.0	-4.3	Pass	
7325.1	22.7	22.7	A		1.0	22.7	49.7	54.0	-4.3	Pass	

**Mid Channel using Antenna "A"**

**Test Notes:** No other spurious emissions detected which is within 20dB of the limit as well as within the restricted bands defined in FCC Part 15 Subpart C, 15.205.

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**Radiated Emissions Data**

Job # : 29120-2 Date : 7/29/2009 Page 1 of 1  
 NEX# : 131172 Time : 11:00 AM  
 Staff : FSC

Client Name : HME EUT Voltage : 5VDC  
 EUT Name : RF Module EUT Frequency :  
 EUT Model # : XCVR6K1 Phase :  
 EUT Serial # : F25L0010 NOATS :  
 EUT Config. : Mid Channel using Antenna "B" SOATS : X  
 Distance < 1000 MHz : 3 m  
 Distance > 1000 MHz : 3 m

Specification : CFR47 Part 15, Subpart B, Class B  
 Loop Ant. # : NA  
 Bicon Ant.#: 114\_10m Temp. (°C) : 19.7  
 Log Ant.#: 111\_10m Humidity (%) : 67  
 DRG Ant. # : 877 Spec An.#: 911  
 Cable LF# : SOATS Spec An. Display # : NA  
 Cable HF# : SOATS QP # : 911  
 Preamp LF# : 901 PreSelect# : NA  
 Preamp HF# : 317 DCCF : 20

Peak (Restr.)	RBW: 1 MHz
	Video Bandwidth 3 MHz
Peak	RBW: 100 KHz
	Video Bandwidth 300 KHz
Average	=Peak-DCCF

Meas. Freq. (MHz)	Meter Reading Vertical	Meter Reading Horizontal	Det.	EUT Side F/L/R/B	Ant. Height m	Max. Reading (dBµV)	Corrected Reading (dBµV/m)	Spec. limit (dBµV/m)	CR/SL Diff. (dB)	Pass Fail	Comment
2441.7	71.1	65.3	P	R	1.0	71.08	109.0	116.2	-7.2	Pass	X
2441.7	69.4	64.3	P	BL	1.0	69.35	107.3	116.2	-9.0	Pass	Y
2441.7	71.1	64.5	P	R	1.0	71.14	109.1	116.2	-7.2	Pass	Z
2400.0	26.4	25.7	P	BL	1.0	26.37	31.1	87.3	-56.2	Pass	100kHz RBW
2400.0	6.4	5.7	A	BL	1.0	6.37	11.1	67.3	-56.2	Pass	100kHz RBW
2483.5	34.6	34.8	P	BL	1.0	34.82	39.5	74.0	-34.5	Pass	
2483.5	14.6	14.8	A	BL	1.0	14.82	19.5	54.0	-34.5	Pass	
4883.4	49.3	49.3	P		1.0	49.29	64.8	74.0	-9.1	Pass	NF
4883.4	29.3	29.3	A		1.0	29.29	44.8	54.0	-9.1	Pass	
7325.1	42.7	42.7	P		1.0	42.7	69.7	74.0	-4.3	Pass	
7325.1	22.7	22.7	A		1.0	22.7	49.7	54.0	-4.3	Pass	

**Mid Channel using Antenna "B"**

**Test Notes:** No other spurious emissions detected which is within 20dB of the limit as well as within the restricted bands defined in FCC Part 15 Subpart C, 15.205.

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**Radiated Emissions Data**

Job # : 29120-2 Date : 7/29/2009 Page 1 of 1  
NEX # : 131172 Time : 7:00 AM  
Staff : FSC

Client Name : HME  
EUT Name : RF Module  
EUT Model # : XCVR6K1  
EUT Serial # : F25L0010  
EUT Config. : High Channel using Antenna "A"

EUT Voltage : 5VDC  
EUT Frequency :  
Phase :  
NOATS  
SOATS X  
Distance < 1000 MHz: 3 m  
Distance > 1000 MHz: 3 m

Specification : CFR47 Part 15, Subpart B, Class B  
Loop Ant. # : NA  
Bicon Ant.# : 114\_10m Temp. (°C) : 19.7  
Log Ant.# : 111\_10m Humidity (%) : 67  
DRG Ant. # : 877 Spec An.#: 911  
Cable LF# : SOATS Spec An. Display # : NA  
Cable HF# : SOATS QP # : 911  
Preamp LF# : 901 PreSelect#: NA  
Preamp HF# : 317 DCCF: 20

Peak (Restr.)	RBW: 1 MHz
	Video Bandwidth 3 MHz
Peak	RBW: 100 KHz
	Video Bandwidth 300 KHz
Average	=Peak-DCCF

Meas. Freq. (MHz)	Meter Reading Vertical	Meter Reading Horizontal	Det.	EUT Side F/L/R/B	Ant. Height m	Max. Reading (dBµV)	Corrected Reading (dBµV/m)	Spec. limit (dBµV/m)	CR/SL Diff. (dB)	Pass Fail	Comment
2481.4	75.9	66.9	P	R	1.0	75.9	113.8	116.2	-2.4	Pass	X
2481.4	73.6	66.9	P	BL	1.0	73.62	111.5	116.2	-4.7	Pass	Y
2481.4	76.6	67.1	P	R	1.0	76.63	114.6	116.2	-1.7	Pass	Z
2400.0	24.9	25.2	P	BL	1.0	25.16	29.9	91.5	-61.7	Pass	100kHz RBW
2400.0	4.9	5.2	A	BL	1.0	5.16	9.9	71.5	-61.7	Pass	100kHz RBW
2483.5	43.3	36.8	P	BL	1.0	43.29	48.0	74.0	-26.0	Pass	
2483.5	23.3	16.8	A	BL	1.0	23.29	28.0	54.0	-26.0	Pass	
4962.8	48.9	48.9	P		1.0	48.87	64.4	74.0	-9.6	Pass	NF
4962.8	28.9	28.9	A		1.0	28.87	44.4	54.0	-9.6	Pass	
7444.2	43.3	43.3	P		1.0	43.3	70.5	74.0	-3.4	Pass	NF
7444.2	23.3	23.3	A		1.0	23.3	50.5	54.0	-3.4	Pass	

**High Channel using Antenna "A"**

**Test Notes:** No other spurious emissions detected which is within 20dB of the limit as well as within the restricted bands defined in FCC Part 15 Subpart C, 15.205.

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**Radiated Emissions Data**

Job # : 29120-2 Date : 7/29/2009 Page 1 of 1  
NEX #: 131172 Time : 11:00 AM  
Staff : FSC

Client Name : HME  
EUT Name : RF Module  
EUT Model # : XCVR6K1  
EUT Serial # : F25L0010  
EUT Config : High Channel using Antenna "B"

EUT Voltage : 5VDC  
EUT Frequency :  
Phase :  
NOATS  
SOATS X  
Distance < 1000 MHz: 3 m  
Distance > 1000 MHz: 3 m

Specification : CFR47 Part 15, Subpart B, Class B  
Loop Ant. #: NA  
Bicon Ant.#: 114\_10m Temp. (°C) : 19.7  
Log Ant.#: 111\_10m Humidity (%) : 67  
DRG Ant. # 877 Spec An.#: 911  
Cable LF#: SOATS Spec An. Display #: NA  
Cable HF#: SOATS QP #: 911  
Preamp LF#: 901 PreSelect#: NA  
Preamp HF# 317 DCCF: 20

Peak (Restr.)	RBW: 1 MHz
Video Bandwidth 3 MHz	
Peak	RBW: 100 KHz
Video Bandwidth 300 KHz	
Average	=Peak-DCCF

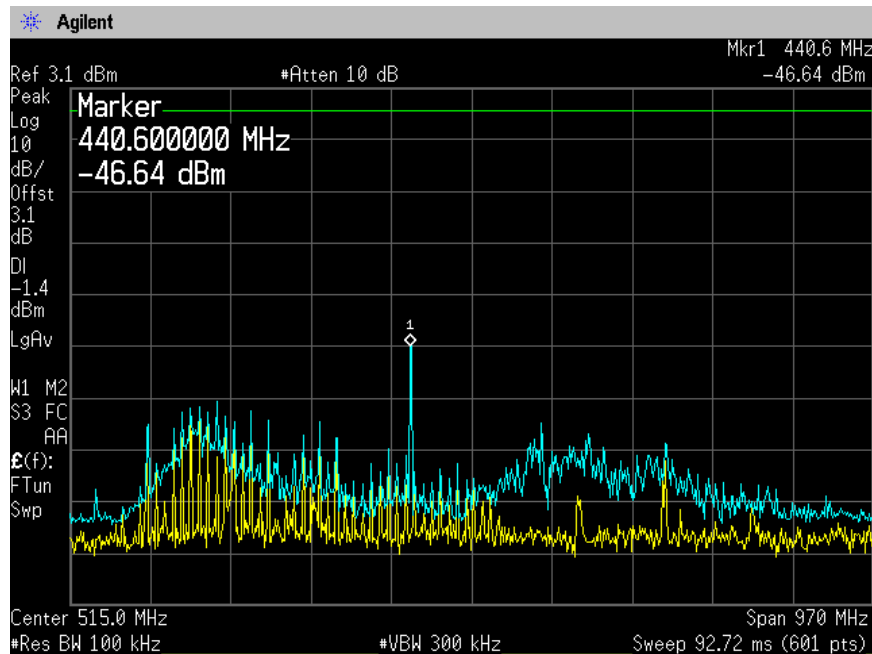
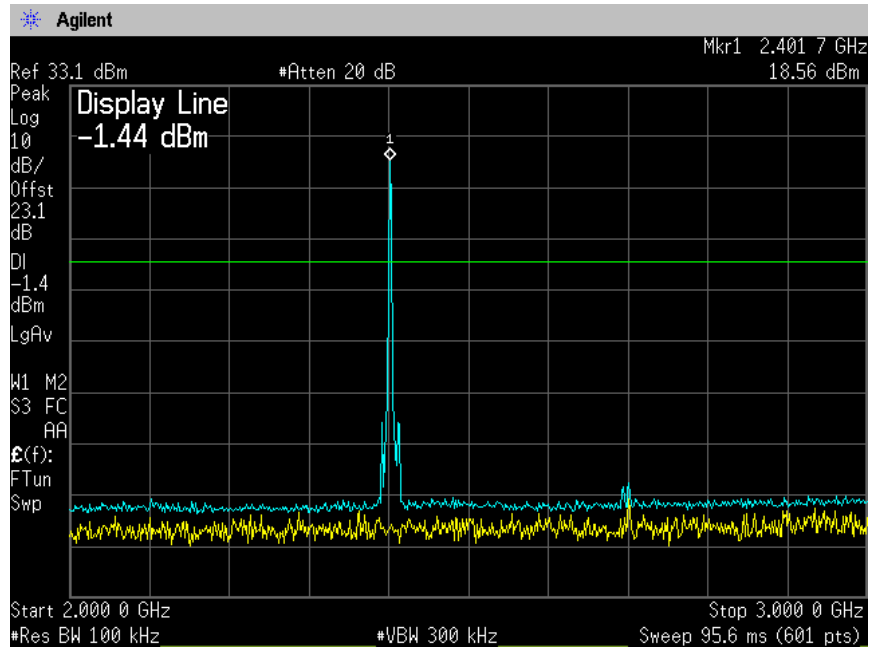
Meas. Freq. (MHz)	Meter Reading Vertical	Meter Reading Horizontal	Det.	EUT Side F/L/R/B	Ant. Height m	Max. Reading (dBµV)	Corrected Reading (dBµV/m)	Spec. limit (dBµV/m)	CR/SL Diff. (dB)	Pass Fail	Comment
2481.4	69.4	65.4	P	R	1.0	69.42	107.3	116.2	-8.9	Pass	X
2481.4	69.7	63.8	P	BL	1.0	69.71	107.6	116.2	-8.6	Pass	Y
2481.4	69.9	66.5	P	R	1.0	69.9	107.8	116.2	-8.4	Pass	Z
2400.0	26.5	26.7	P	BL	1.0	26.66	31.4	87.8	-56.5	Pass	100kHz RBW
2400.0	6.5	6.7	A	BL	1.0	6.66	11.4	67.8	-56.5	Pass	100kHz RBW
2483.5	51.3	50.1	P	BL	1.0	51.32	56.0	74.0	-18.0	Pass	
2483.5	31.3	30.1	A	BL	1.0	31.32	36.0	54.0	-18.0	Pass	
4962.8	48.9	48.9	P		1.0	48.87	64.4	74.0	-9.6	Pass	NF
4962.8	28.9	28.9	A		1.0	28.87	44.4	54.0	-9.6	Pass	
7444.2	43.3	43.3	P		1.0	43.3	70.5	74.0	-3.4	Pass	NF
7444.2	23.3	23.3	A		1.0	23.3	50.5	54.0	-3.4	Pass	

**High Channel using Antenna "B"**

**Test Notes:** No other spurious emissions detected which is within 20dB of the limit as well as within the restricted bands defined in FCC Part 15 Subpart C, 15.205.

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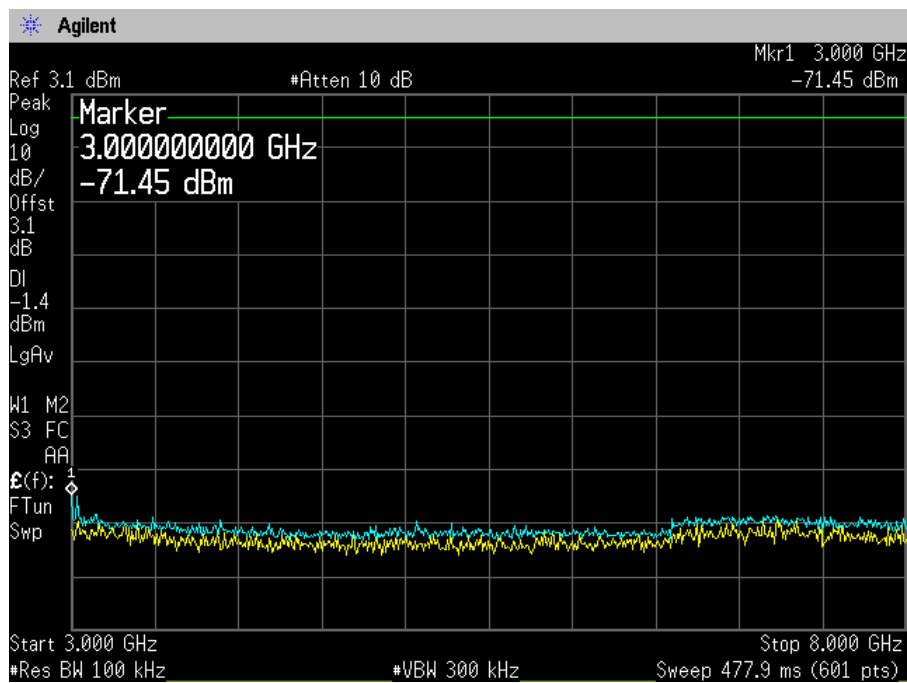
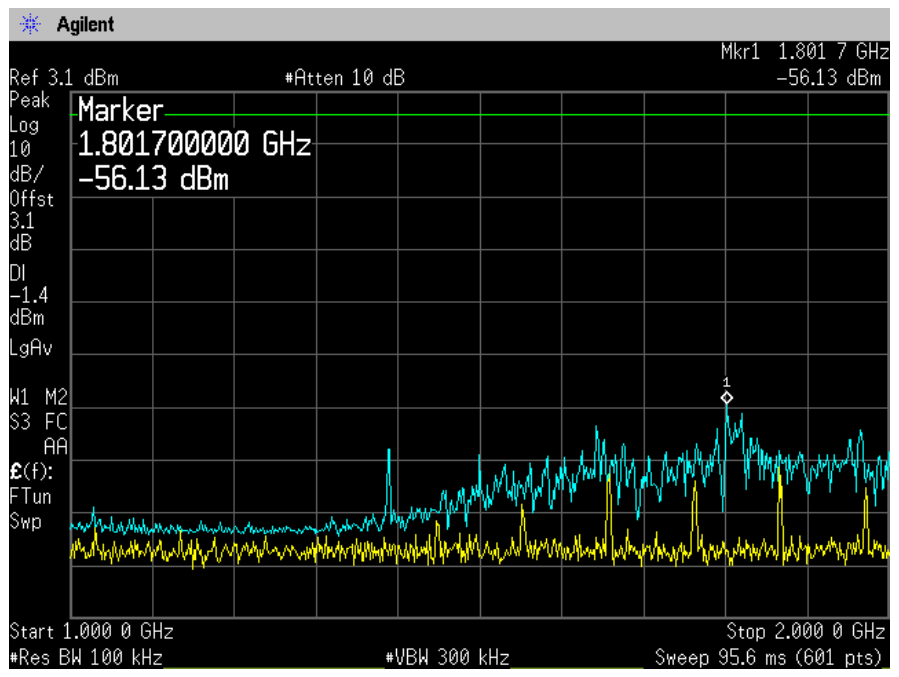
### Appendix B: Section 15.247(d) – Spurious RF Conducted Emissions Test Results (Low, Mid and High Channels)



LOW Channel



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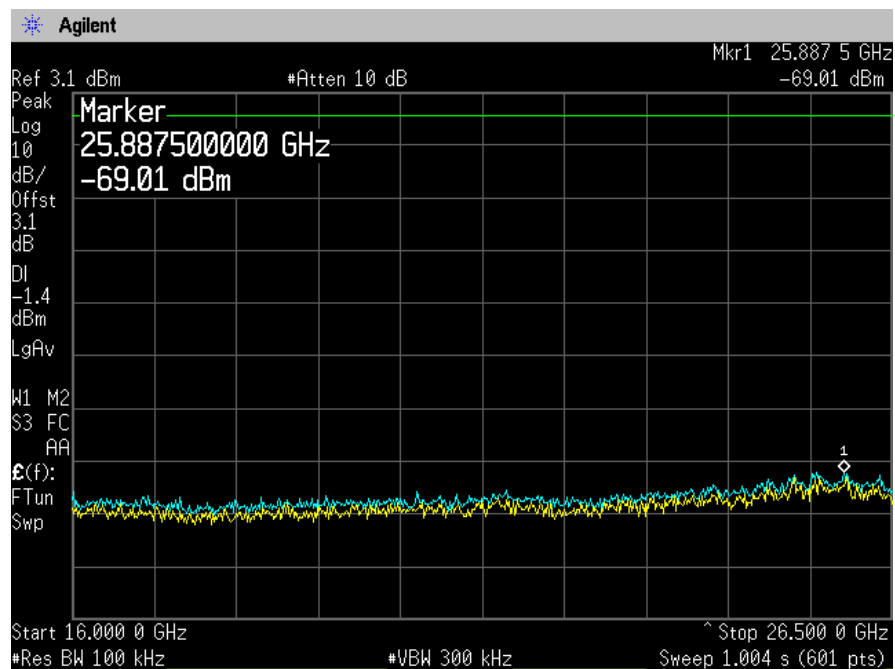
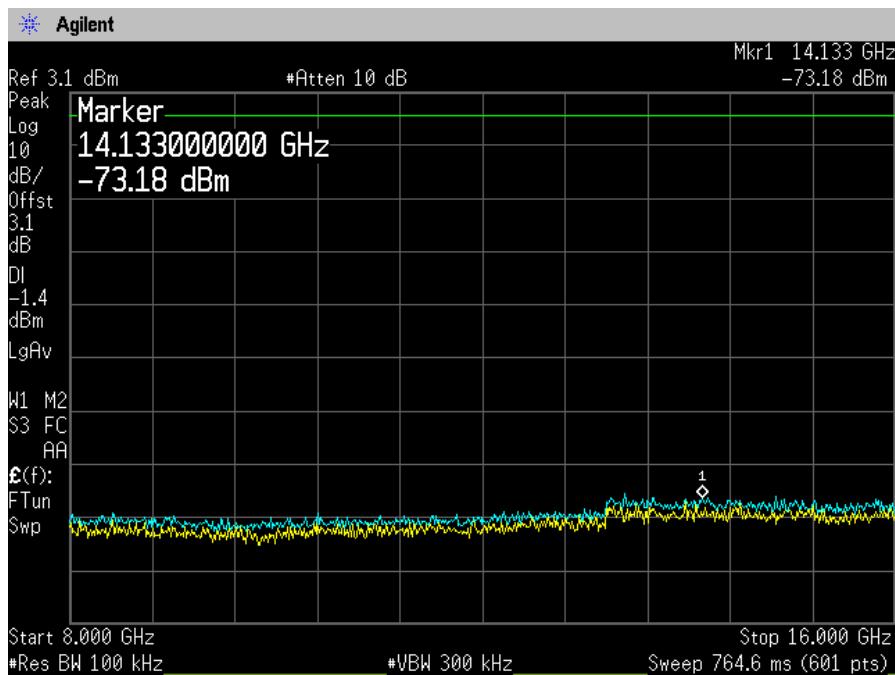


LOW Channel





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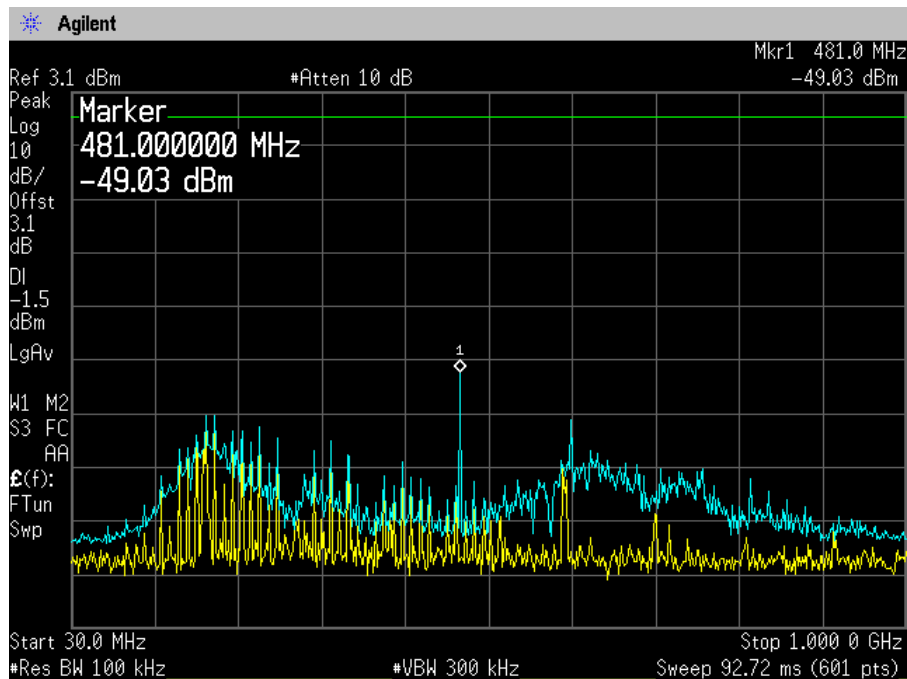
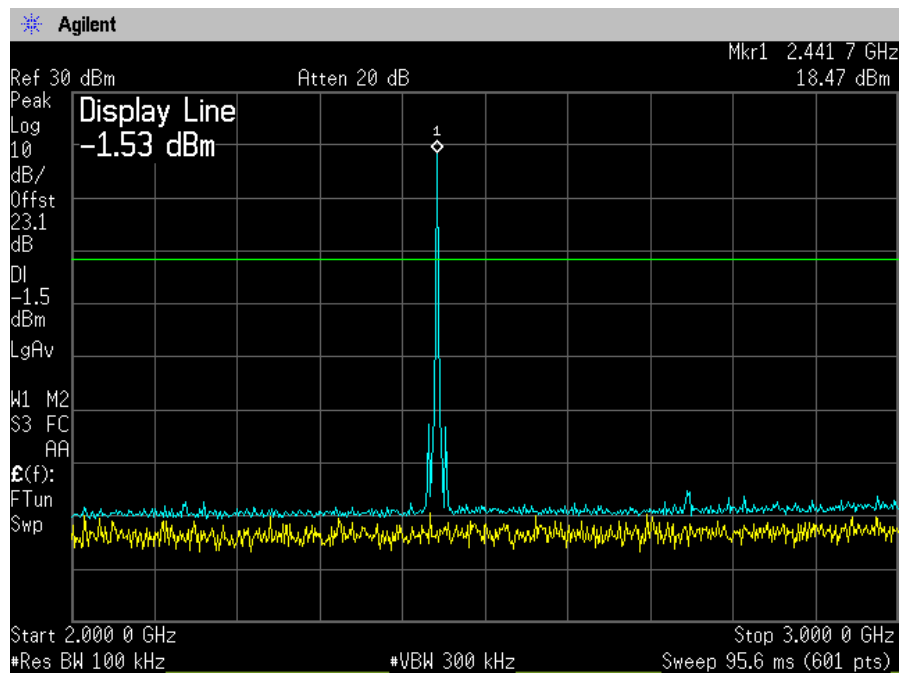


LOW Channel





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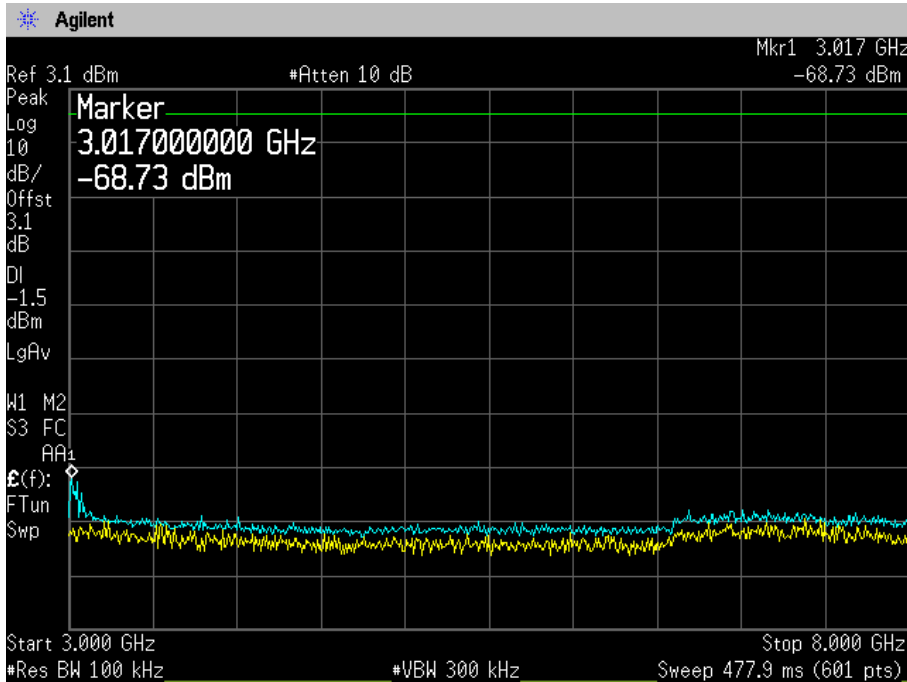
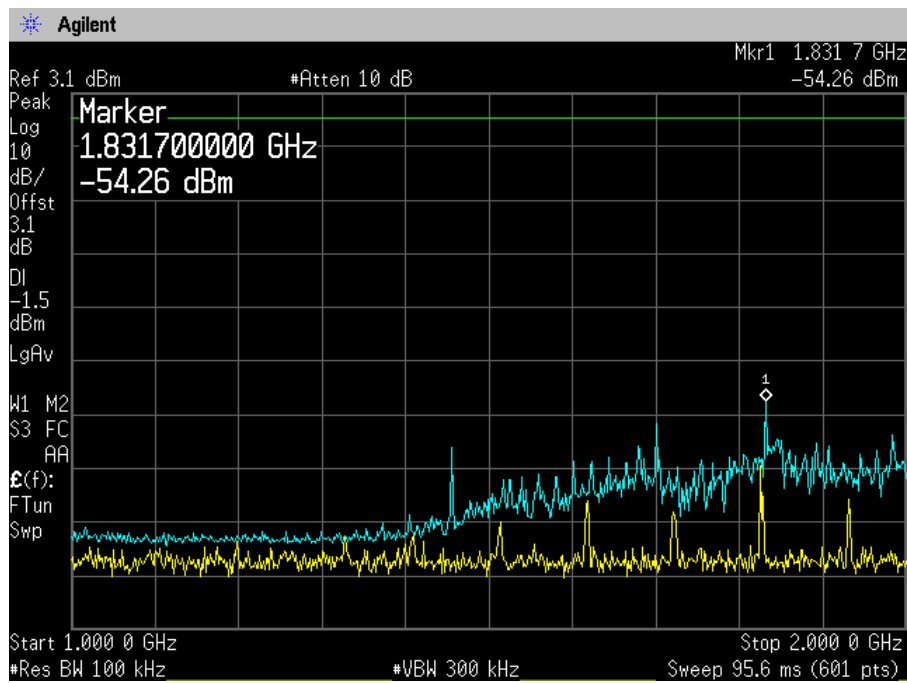
MID Channel







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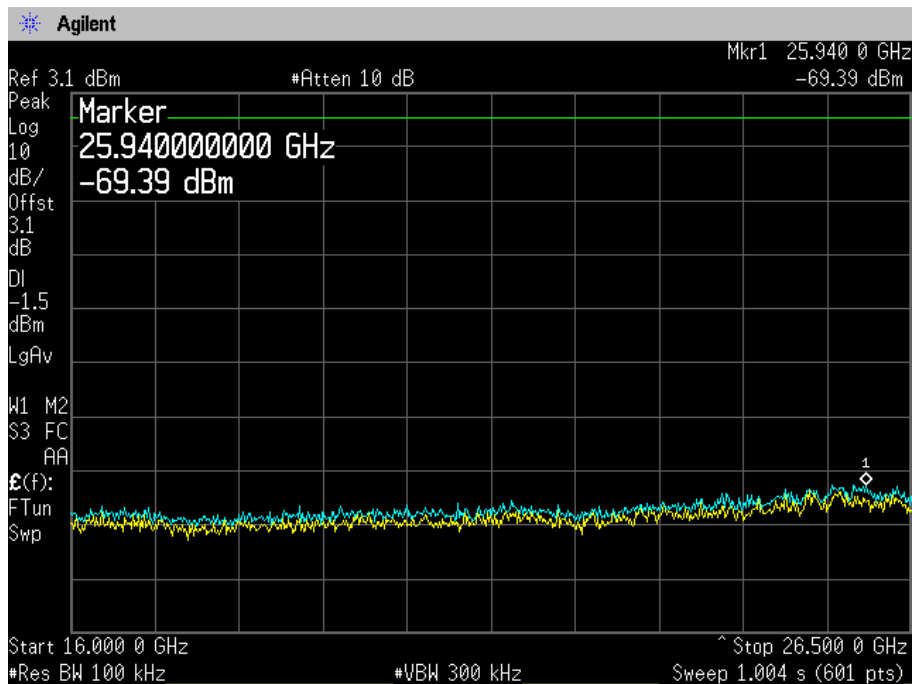
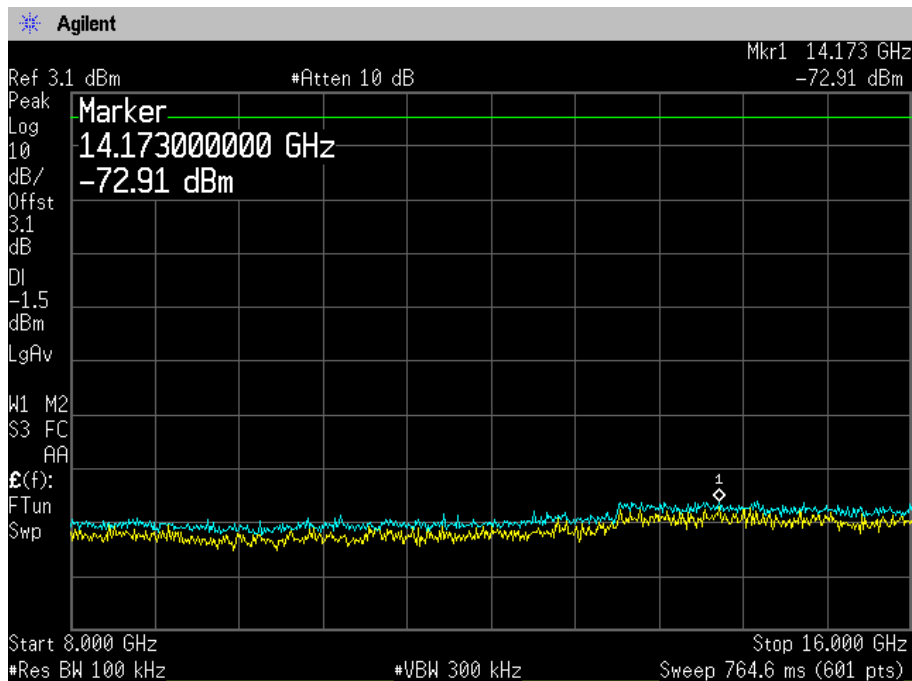


MID Channel



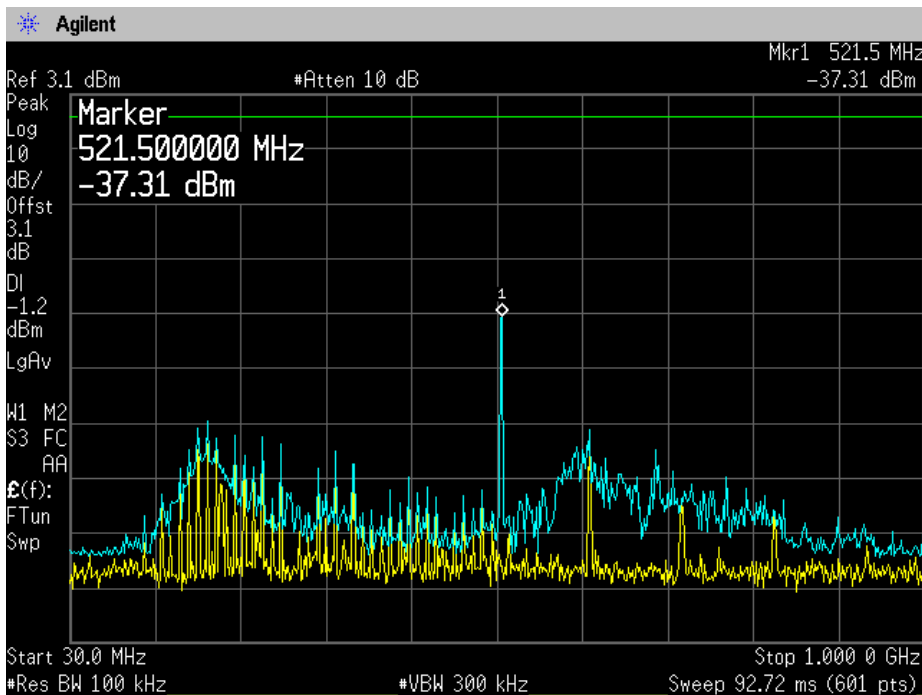
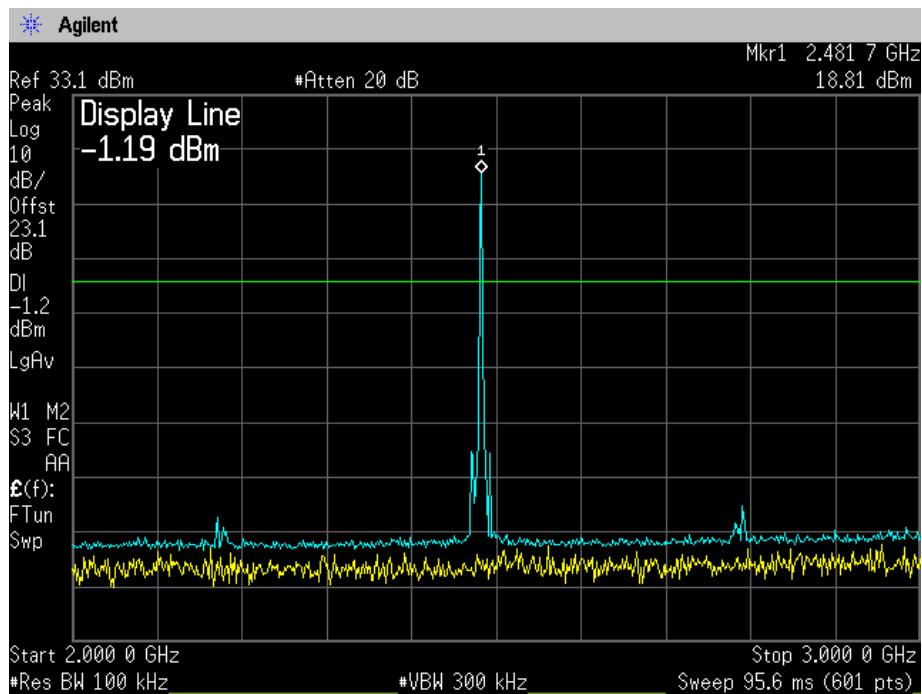


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MID Channel



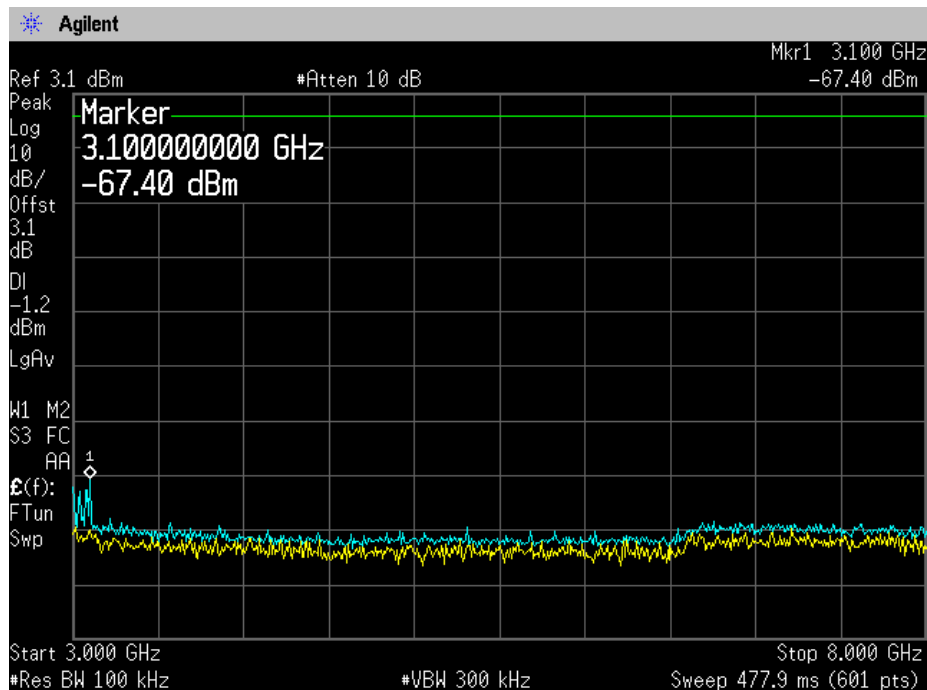
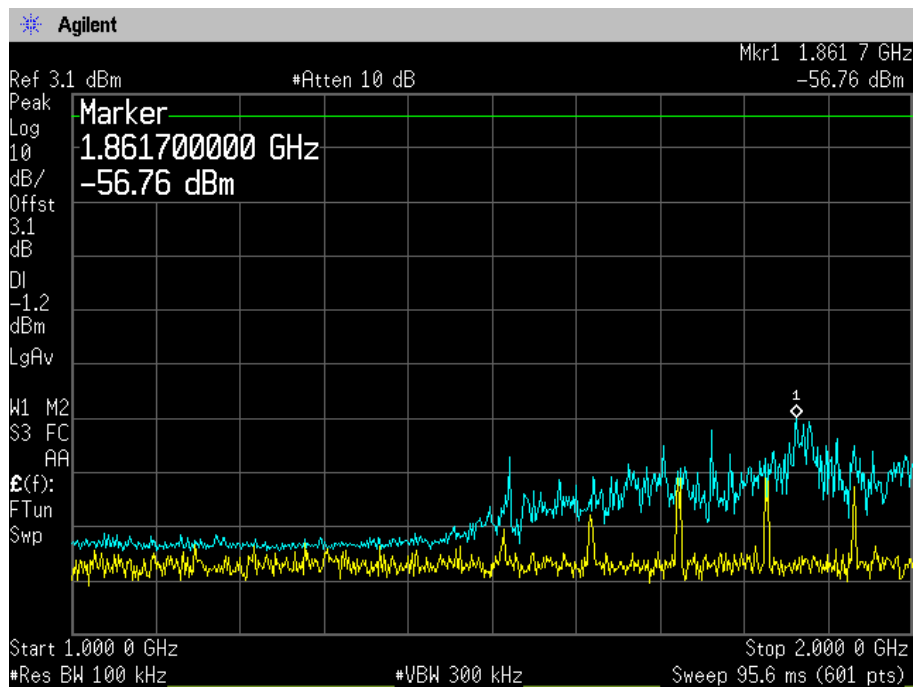


HIGH Channel



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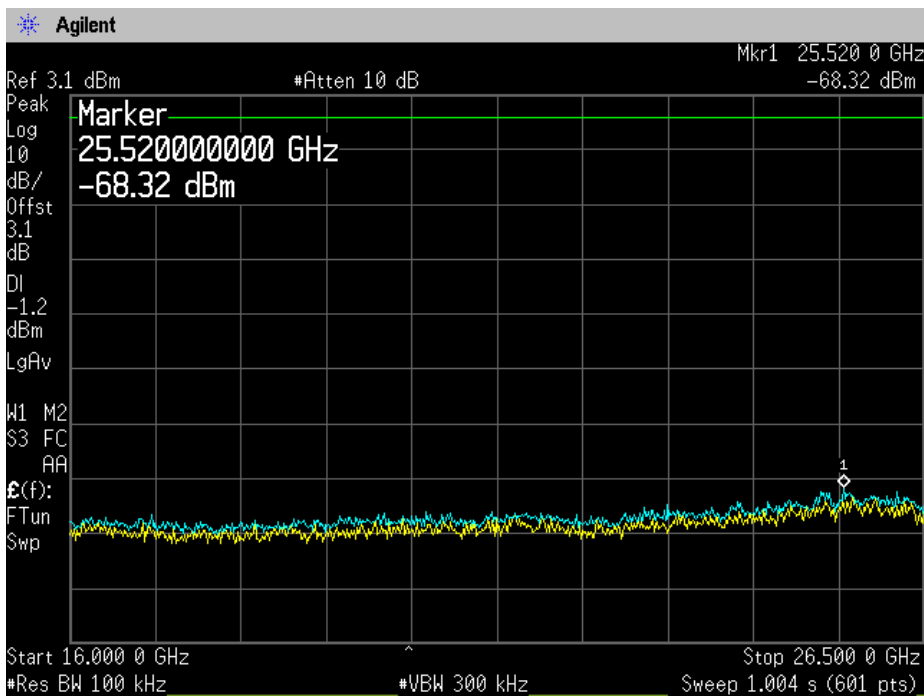
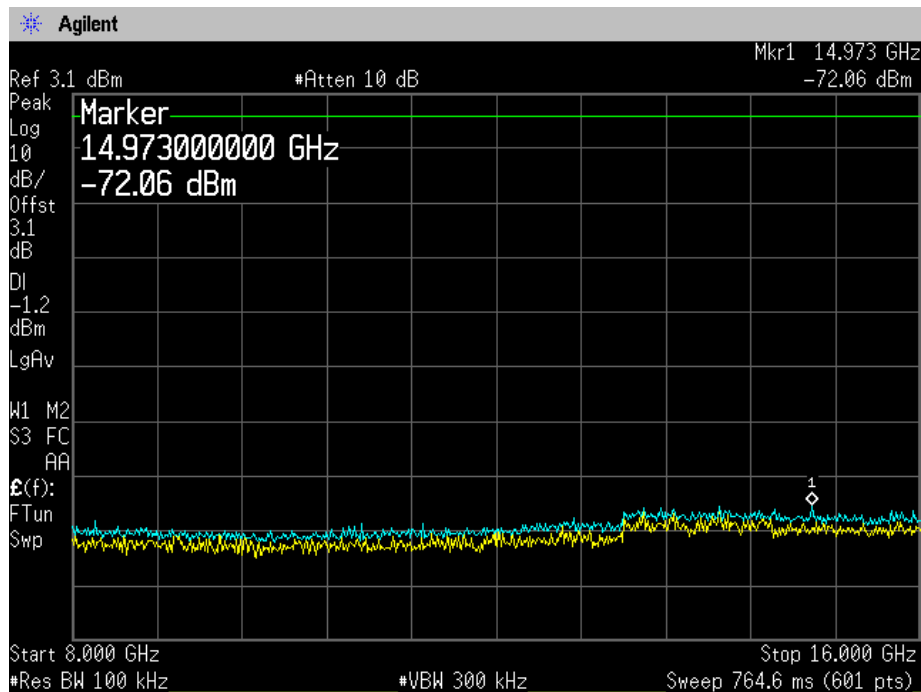




HIGH Channel



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HIGH Channel



## Appendix C: Block Diagram of Test Setups

### Test Site For Radiated Emissions

