



**FCC CFR47 PART 15 SUBPART F**

**CERTIFICATION TEST REPORT**

**FOR**

**UWB RADIO DEVICE WITH USB 2.0 INTERFACE**

**MODEL NUMBER: CY-WDCB7UT**

**FCC ID: A3LCYWDCB7UT**

**REPORT NUMBER: 12U14355-1, Revision A**

**ISSUE DATE: JUNE 01, 2012**

*Prepared for*  
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**416, MAETAN 3-DONG, YEONGTONG-GU, SUWON-CITY, GYEONGGI-DO**  
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**NVLAP LAB CODE 200065-0**

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Revision History

| Rev. | Issue Date | Revisions                            | Revised By   |
|------|------------|--------------------------------------|--------------|
| --   | 4/19/2012  | Initial Issue                        | M. Heckrotte |
| A    | 6/1/2012   | Added UWB BW for 53.3 MB/s data rate | M. Heckrotte |

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## 1. ATTESTATION OF TEST RESULTS

**COMPANY NAME:** SAMSUNG ELECTRONICS CO., LTD.  
416, MAETAN 3-DONG, YEONGTONG-GU, SUWON-CITY,  
GYEONGGI-DO  
KOREA

**EUT DESCRIPTION:** UWB RADIO DEVICE WITH USB 2.0 INTERFACE

**MODEL:** CY-WDCB7UT

**SERIAL NUMBER:** Prototype

**DATE TESTED:** APRIL 3 TO JUNE 01, 2012

| APPLICABLE STANDARDS     |              |
|--------------------------|--------------|
| STANDARD                 | TEST RESULTS |
| CFR 47 Part 15 Subpart F | Pass         |

Compliance Certification Services (UL CCS) tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by UL CCS based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

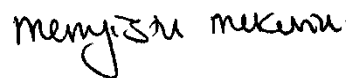
**Note:** The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by UL CCS and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL CCS will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, any agency of the Federal Government, or any agency of any government.

Approved & Released For UL CCS By:

Tested By:



MIKE HECKROTTE  
DIRECTOR OF ENGINEERING  
UL CCS



MENGISTU MEKURIA  
EMC ENGINEER  
UL CCS

## 2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.4-2003, FCC CFR 47 Part 15 Subpart F, and FCC 05-58.

## 3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 47173 Benicia Street, Fremont, California, USA.

UL CCS is accredited by NVLAP, Laboratory Code 200065-0. The full scope of accreditation can be viewed at <http://www.ccsemc.com>.

## 4. CALIBRATION AND UNCERTAINTY

### 4.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

### 4.2. SAMPLE CALCULATION

Where relevant, the following sample calculation is provided:

$$\begin{aligned} \text{Field Strength (dBuV/m)} &= \text{Measured Voltage (dBuV)} + \text{Antenna Factor (dB/m)} + \\ &\text{Cable Loss (dB)} - \text{Preamp Gain (dB)} \\ 36.5 \text{ dBuV} + 18.7 \text{ dB/m} + 0.6 \text{ dB} - 26.9 \text{ dB} &= 28.9 \text{ dBuV/m} \end{aligned}$$

### 4.3. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

| PARAMETER                             | UNCERTAINTY |
|---------------------------------------|-------------|
| Conducted Disturbance, 0.15 to 30 MHz | 3.52 dB     |
| Radiated Disturbance, 30 to 1000 MHz  | 4.94 dB     |

Uncertainty figures are valid to a confidence level of 95%.

## 5. EQUIPMENT UNDER TEST

### 5.1. DESCRIPTION OF EUT

The EUT is an Ultra Wide Band transceiver module with a single antenna. The EUT is intended for handheld use as a communications device. The UWB radio uses hopping and non-hopping coding and modulation rates.

### 5.2. OPERATING FREQUENCY RANGE

The UWB radio operates over a nominal frequency range of 3168 to 8976 MHz. The measured UWB bandwidths of all channels lie within this range.

### 5.3. MAXIMUM OUTPUT POWER

The UWB transmitter has a maximum radiated output power as follows:

| RMS Output Power<br>(dBm/MHz EIRP) | RMS Output Power<br>(uW/MHz EIRP) |
|------------------------------------|-----------------------------------|
| -49.20                             | 0.012                             |

### 5.4. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes an integral antenna, with a maximum gain of 1.7 dBi.

### 5.5. SOFTWARE AND FIRMWARE

The firmware installed in the EUT during testing was revision 18704.  
The test utility software used during testing was RegulatoryTxTool, revision 8.13.0.

### 5.6. WORST-CASE CONFIGURATION

Preliminary investigations were performed at all coding and modulation rates. The worst-case mode was determined to be TFC4 at 480 Mb/s.

### 5.7. OPERATING MODE

The EUT was tested in its normal operating (hopping) mode in accordance with the waiver documented in ET Docket 04-352 (FCC 05-58). Test results demonstrate that the EUT does not operate within the 5030 to 5650 MHz band.

## 5.8. DESCRIPTION OF TEST SETUP

### SUPPORT EQUIPMENT

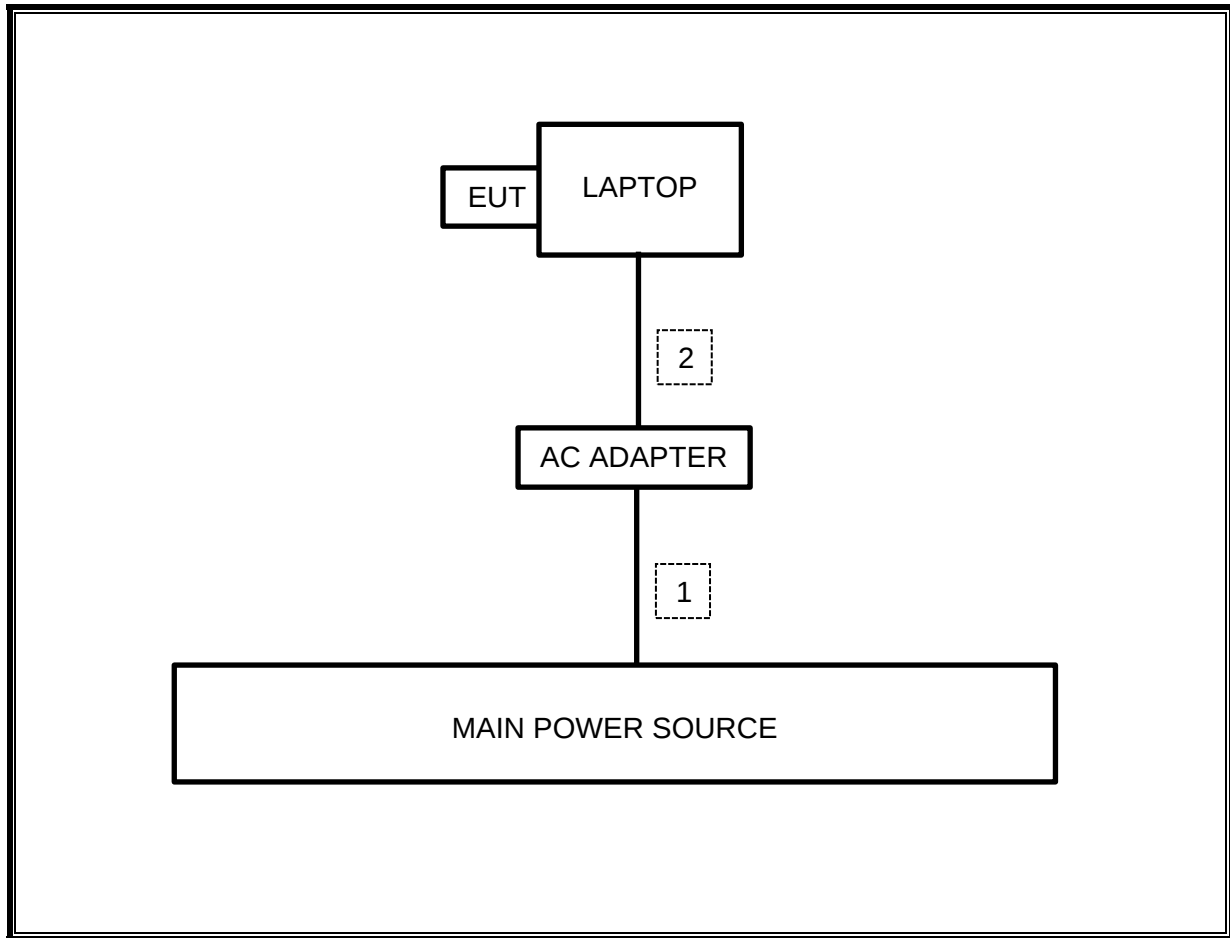
| PERIPHERAL SUPPORT EQUIPMENT LIST |              |         |                        |        |
|-----------------------------------|--------------|---------|------------------------|--------|
| Description                       | Manufacturer | Model   | Serial Number          | FCC ID |
| Laptop                            | Lenovo       | T410    | R8-3LV40 10/07         | DoC    |
| AC Adapter                        | Lenovo       | 42T4418 | 11S42T4418Z1ZGWG08R90G | DoC    |

### I/O CABLES

| I/O CABLE LIST |      |                      |                |             |              |         |
|----------------|------|----------------------|----------------|-------------|--------------|---------|
| Cable No.      | Port | # of Identical Ports | Connector Type | Cable Type  | Cable Length | Remarks |
| 1              | AC   | 1                    | AC             | Un-Shielded | 1.5 m        | N/A     |
| 2              | DC   | 1                    | DC             | Un-Shielded | 1.5 m        | N/A     |

### TEST SETUP

The EUT is connected to a host laptop computer via USB cable during the tests. Test software exercised the radio card.

**SETUP DIAGRAM FOR TESTS**

## 6. TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment was utilized for the tests documented in this report:

| TEST EQUIPMENT LIST       |                |                  |        |            |            |
|---------------------------|----------------|------------------|--------|------------|------------|
| Description               | Manufacturer   | Model            | Asset  | Cal Date   | Cal Due    |
| Preamplifier, 40 GHz      | Miteq          | NSP4000-SP2      | C00990 | 8/2/2011   | 8/2/2012   |
| Preamplifier, 26.5 GHz    | Agilent / HP   | 8449B            | C01063 | 7/12/2011  | 7/12/2012  |
| Preamplifier, 26.5 GHz    | Agilent / HP   | 8449B            | C01052 | 7/12/2011  | 7/12/2012  |
| Preamplifier, 4 GHz       | Miteq          | NSP2600-44       | C01128 | 8/20/2011  | 8/20/2012  |
| Preamplifier, 1300 MHz    | Agilent / HP   | 8447D            | C00885 | 11/11/2011 | 11/11/2012 |
| Preamplifier, 1300 MHz    | Agilent / HP   | 8447D            | C00558 | 11/11/2011 | 11/11/2012 |
| Spectrum Analyzer, 44 GHz | Agilent / HP   | E4446A           | C01159 | 5/11/2011  | 5/11/2012  |
| Spectrum Analyzer, 44 GHz | Agilent / HP   | E4446A           | C00986 | 3/22/2012  | 3/22/2013  |
| EMI Test Receiver, 30 MHz | R & S          | ESHS 20          | N02396 | 8/19/2011  | 8/19/2013  |
| Antenna, Bilog, 1 GHz     | Sunol Sciences | JB1              | C01016 | 7/16/2011  | 7/16/2012  |
| Antenna, Bilog, 1 GHz     | Sunol Sciences | JB1              | T243   | 2/7/2012   | 2/7/2013   |
| Antenna, Horn, 5 GHz      | A-R            | AT4002A          | 322899 | 3/15/2012  | 3/15/2013  |
| Antenna, Horn, 18 GHz     | EMCO           | 3115             | C00945 | 10/6/2011  | 10/6/2012  |
| Antenna, Horn, 18 GHz     | EMCO           | 3115             | C00783 | 6/29/2011  | 6/29/2012  |
| Antenna, Horn, 26.5 GHz   | ARA            | MVH-1826/B       | C00980 | 7/28/2011  | 7/28/2012  |
| Antenna, Horn, 40 GHz     | ARA            | MVH-2640/B       | C00981 | 6/14/2011  | 6/14/2012  |
| LISN, 30 MHz              | FCC            | 50/250-25-2      | C00626 | 12/13/2011 | 12/13/2012 |
| LISN, 10 kHz ~ 30 MHz     | Solar          | 8012-50-R-24-BNC | N02486 | 3/7/2012   | 3/7/2013   |

## 7. UWB TEST PROCEDURES

### TEST PROCEDURES

All RF characteristics of the EUT are made using radiated measurements.

The EUT is placed on a non-conducting table 80 cm above the ground plane. The EUT is configured in accordance with ANSI C63.4. The EUT is set to transmit in a continuous mode.

For measurements below 1 GHz the antenna is located 3 meters from the EUT. The resolution bandwidth is set to 100 kHz for peak detection measurements or 120 kHz for quasi-peak detection measurements. Peak detection is used unless otherwise noted as quasi-peak.

Trace data values are downloaded, then correction factors for the antenna, preamplifier, and cables as a function of frequency are applied to yield field strength.

For 1 MHz RBW final measurements above 960 MHz the antenna is located no more than 3 meters from the EUT. The RBW and VBW are both set to 1 MHz. An Agilent PSA series spectrum analyzer with a true RMS detector is utilized. The number of points on the horizontal axis is set equal to (Frequency Span in MHz) + 1 and the sweep time is set to no more than (Frequency Span in MHz) milliseconds so as not to exceed the maximum 1 ms averaging time.

For 1 kHz RBW final measurements above 960 MHz the antenna is located no more than 3 meters from the EUT. The RBW and VBW are both set to 10 kHz. Additional measurements of excessively high emissions are repeated using a narrow span with the RBW and VBW set to 1 kHz. An Agilent PSA series spectrum analyzer with a true RMS detector is utilized. The number of points on the horizontal axis is set equal to (Frequency Span in MHz) + 1 and the sweep time is set to no more than (Frequency Span in MHz) milliseconds so as not to exceed the maximum 1 ms averaging time.

Trace data values are downloaded, then correction factors for the antenna, preamplifier, and cables as a function of frequency, plus the constant distance correction factor as required, are applied to yield field strength. The resulting 3 meter field strength is converted to EIRP using the equation  $P \text{ (dBm EIRP)} = E \text{ (dBuV/m)} - 95.2$ .

Measurements used for calculating bandwidth, peak power, and the peak level of digital device emissions are made using peak detection.

## 8. LIMITS AND RESULTS

### 8.1. UWB BANDWIDTH, CENTER FREQUENCY, AND FRACTIONAL BW

#### DEFINITIONS AND LIMITS

§15.503 Definitions.

(a) UWB Bandwidth. For the purpose of this subpart, the UWB bandwidth is the frequency band bounded by the points that are 10 dB below the highest radiated emission, as based on the complete transmission system including the antenna. The upper boundary is designated  $f_H$  and the lower boundary is designated  $f_L$ . The frequency at which the highest radiated emission occurs is designated  $f_M$ .

(b) Center frequency. The center frequency,  $f_C$ , equals  $(f_H + f_L)/2$ .

(c) Fractional bandwidth. The fractional bandwidth equals  $2(f_H - f_L)/(f_H + f_L)$ .

(d) Ultra-wideband (UWB) transmitter. An intentional radiator that, at any point in time, has a fractional bandwidth equal to or greater than 0.20 or has a UWB bandwidth equal to or greater than 500 MHz, regardless of the fractional bandwidth.

§15.519 (b) The UWB bandwidth of a device operating under the provisions of this section must be contained between 3100 MHz and 10,600 MHz.

#### TEST PROCEDURE

Radiated measurements are made using the procedures described above. The detection mode is set to peak detection, the sweep time is AUTO, and the Max Hold trace function is utilized. The frequency range from 3.1 to 10.6 GHz is measured, and corrected from raw values to Peak EIRP.

The frequency at which the maximum EIRP is measured is designated as  $f_M$ . A major graticule line of the plot is adjusted to exactly equal the peak EIRP at  $f_M$ . The spectral envelope at the major graticule line that is 10 dB below the reference graticule is examined to determine the frequency band bounded by the points that are 10 dB below the highest radiated emission. The upper boundary is designated  $f_H$  and the lower boundary is designated  $f_L$ .

The center frequency,  $f_C$ , is calculated as  $(f_H + f_L)/2$ .

The antenna polarization that yields the highest EIRP at  $f_M$  is used to calculate the above parameters.

Calculations are made independently for each of the three channels.

### 8.1.1. UWB BANDWIDTH FOR BG1 (53.3 MB/s)

#### BG1 LOW CHANNEL RESULTS

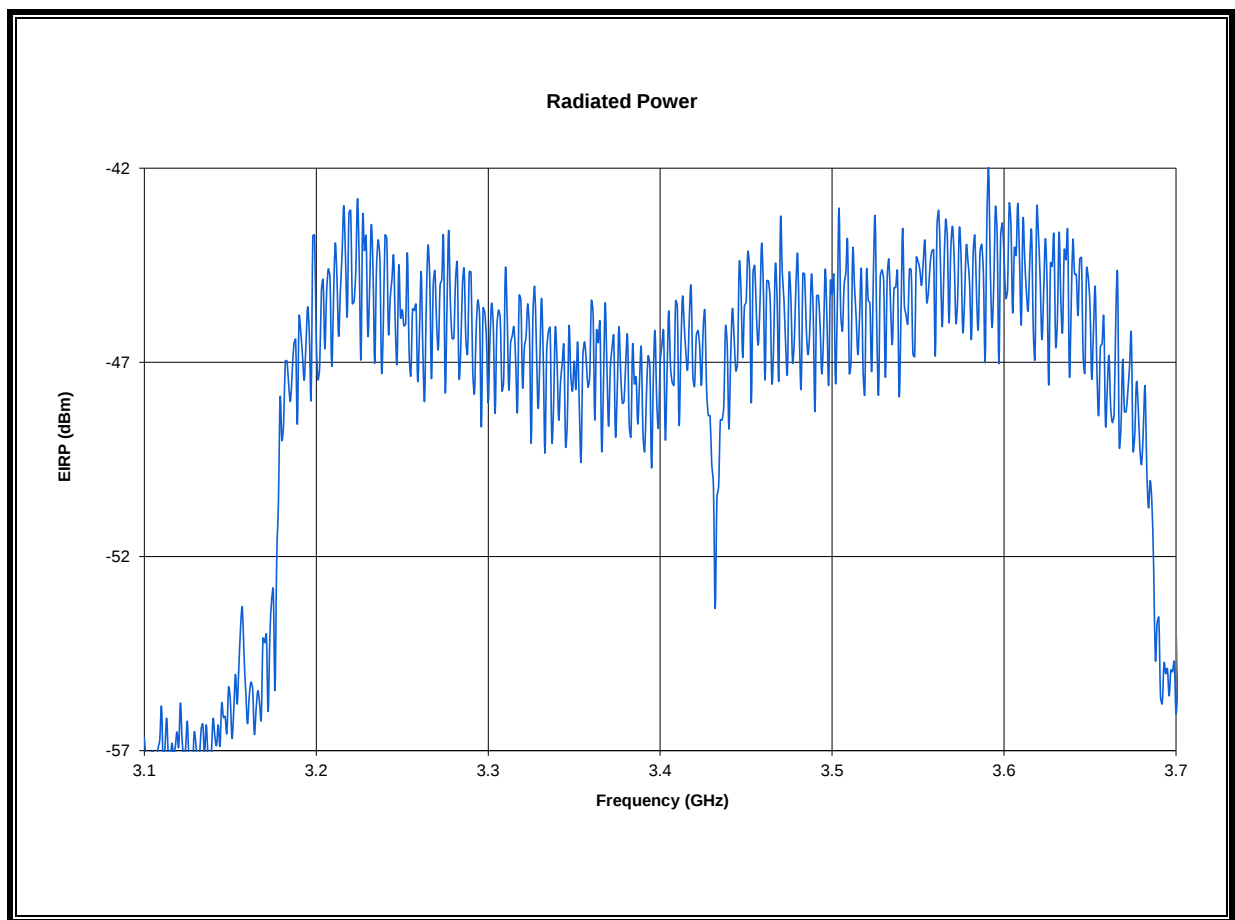
| <b>f Max<br/>(GHz)</b> | <b>Reference EIRP at f<br/>Max<br/>(dBm)</b> | <b>10 dB down from<br/>Reference EIRP<br/>(dBm)</b> |
|------------------------|----------------------------------------------|-----------------------------------------------------|
| 3.591                  | -42.1                                        | -52.1                                               |

| <b>f Low<br/>(GHz)</b> | <b>Minimum f Low<br/>(GHz)</b> |
|------------------------|--------------------------------|
| 3.177                  | 3.1                            |

| <b>f High<br/>(GHz)</b> | <b>Maximum f High<br/>(GHz)</b> |
|-------------------------|---------------------------------|
| 3.687                   | 10.6                            |

| <b>f Center<br/>(GHz)</b> |
|---------------------------|
| 3.432                     |

| <b>UWB BW<br/>(MHz)</b> | <b>Minimum UWB BW<br/>(MHz)</b> |
|-------------------------|---------------------------------|
| 510                     | 500                             |



**BG1 MID CHANNEL RESULTS**

| <b>f Max<br/>(GHz)</b> | <b>Reference EIRP at f<br/>Max<br/>(dBm)</b> | <b>10 dB down from<br/>Reference EIRP<br/>(dBm)</b> |
|------------------------|----------------------------------------------|-----------------------------------------------------|
| 4.102                  | -41.3                                        | -51.3                                               |

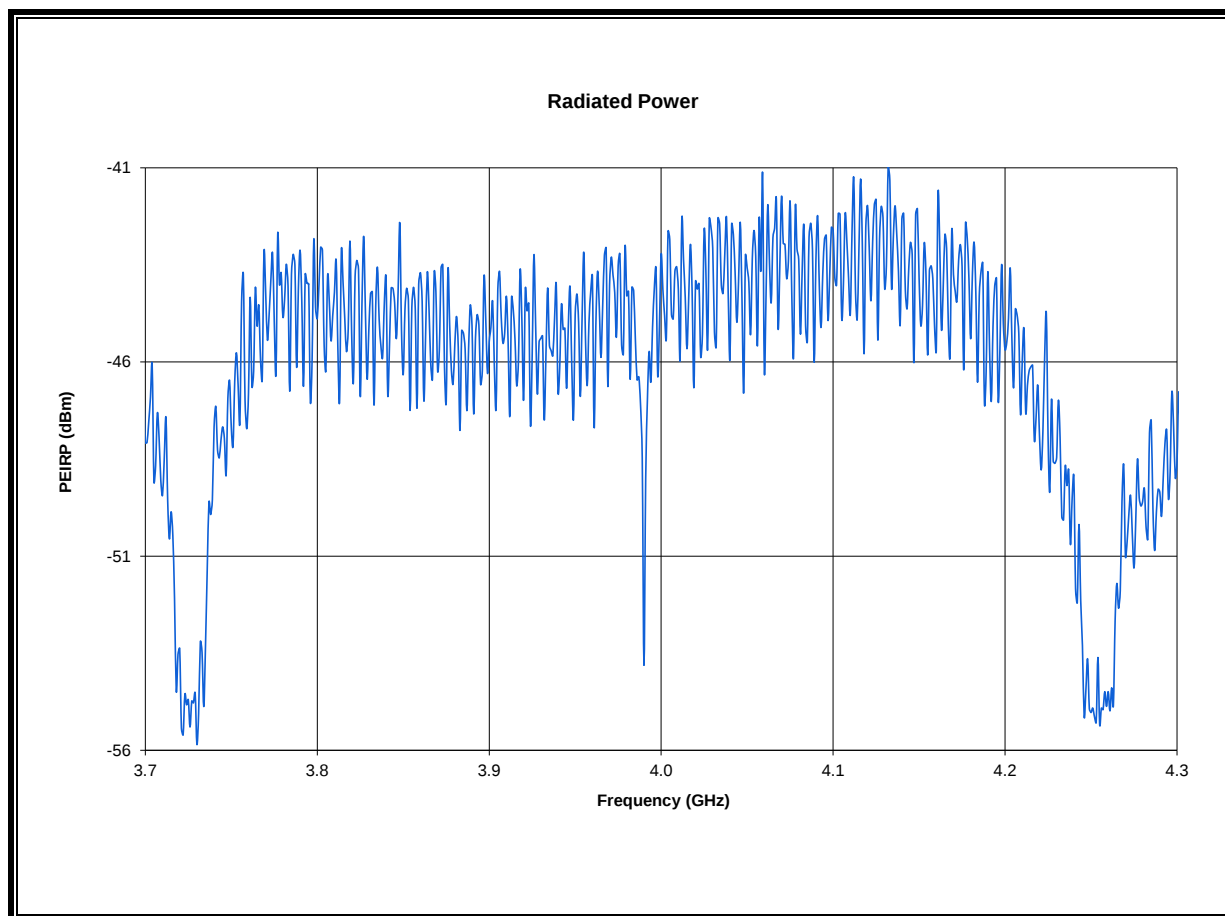
| <b>f Low<br/>(GHz)</b> | <b>Minimum f Low<br/>(GHz)</b> |
|------------------------|--------------------------------|
| 3.707                  | 3.1                            |

| <b>f High<br/>(GHz)</b> | <b>Maximum f High<br/>(GHz)</b> |
|-------------------------|---------------------------------|
| 4.213                   | 10.6                            |

| <b>f Center<br/>(GHz)</b> |
|---------------------------|
| 3.960                     |

| <b>UWB BW<br/>(MHz)</b> | <b>Minimum UWB BW<br/>(MHz)</b> |
|-------------------------|---------------------------------|
| 506                     | 500                             |

**PLOT WITH REFERENCE GRATICULE ADJUSTED FOR BG1 MID CHANNEL F MAX**



**BG1 HIGH CHANNEL RESULTS**

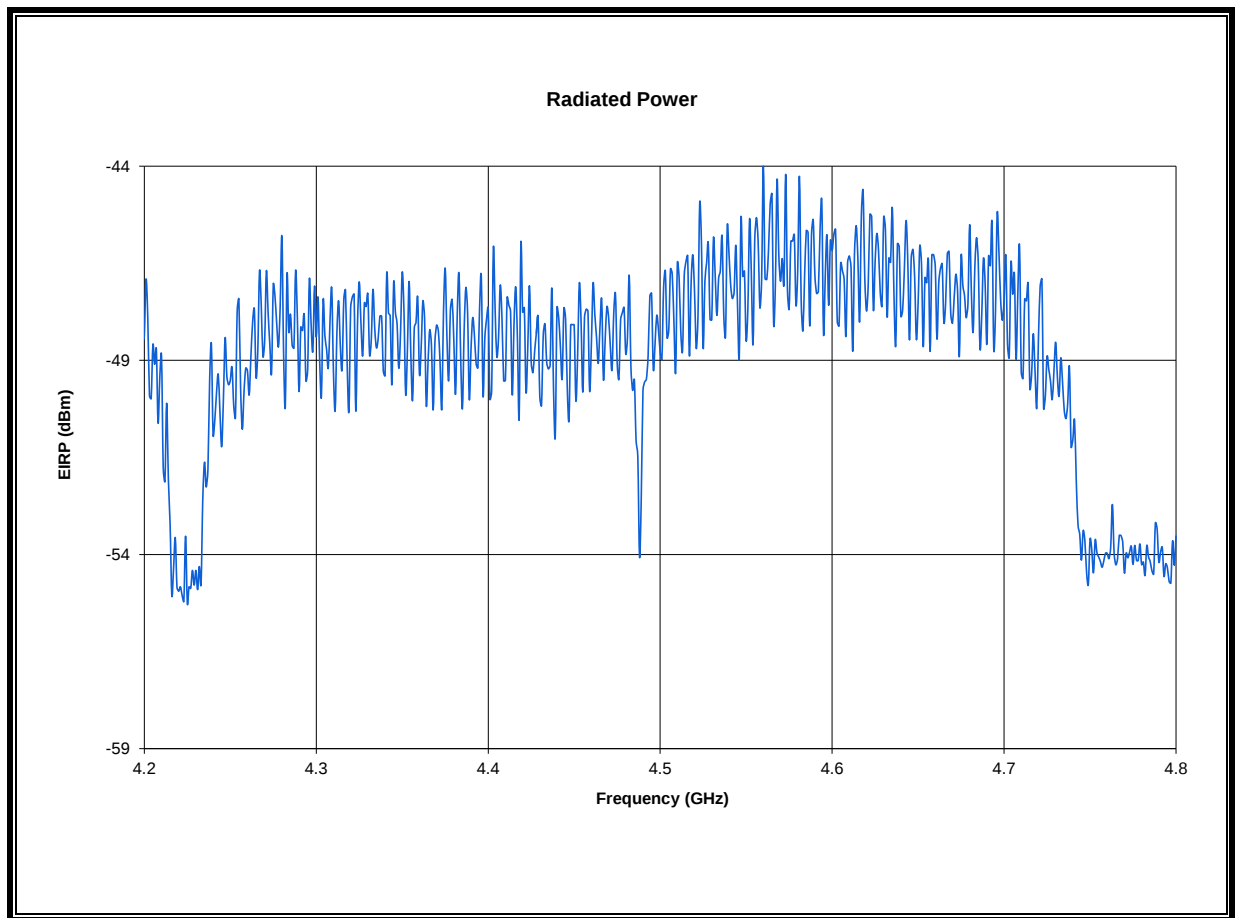
| <b>f Max<br/>(GHz)</b> | <b>Reference EIRP at f<br/>Max<br/>(dBm)</b> | <b>10 dB down from<br/>Reference EIRP<br/>(dBm)</b> |
|------------------------|----------------------------------------------|-----------------------------------------------------|
| 4.560                  | -44.4                                        | -54.4                                               |

| <b>f Low<br/>(GHz)</b> | <b>Minimum f Low<br/>(GHz)</b> |
|------------------------|--------------------------------|
| 4.234                  | 3.1                            |

| <b>f High<br/>(GHz)</b> | <b>Maximum f High<br/>(GHz)</b> |
|-------------------------|---------------------------------|
| 4.745                   | 10.6                            |

| <b>f Center<br/>(GHz)</b> |
|---------------------------|
| 4.490                     |

| <b>UWB BW<br/>(MHz)</b> | <b>Minimum UWB BW<br/>(MHz)</b> |
|-------------------------|---------------------------------|
| 511                     | 500                             |

**PLOT WITH REFERENCE GRATICULE ADJUSTED FOR BG1 HIGH CHANNEL F MAX**

## 8.1.2. UWB BANDWIDTH FOR BG3 (53.3 MB/s)

### BG3 LOW CHANNEL RESULTS

| <b>f Max<br/>(GHz)</b> | <b>Reference EIRP at f<br/>Max<br/>(dBm)</b> | <b>10 dB down from<br/>Reference EIRP<br/>(dBm)</b> |
|------------------------|----------------------------------------------|-----------------------------------------------------|
| 6.787                  | -41.1                                        | -51.1                                               |

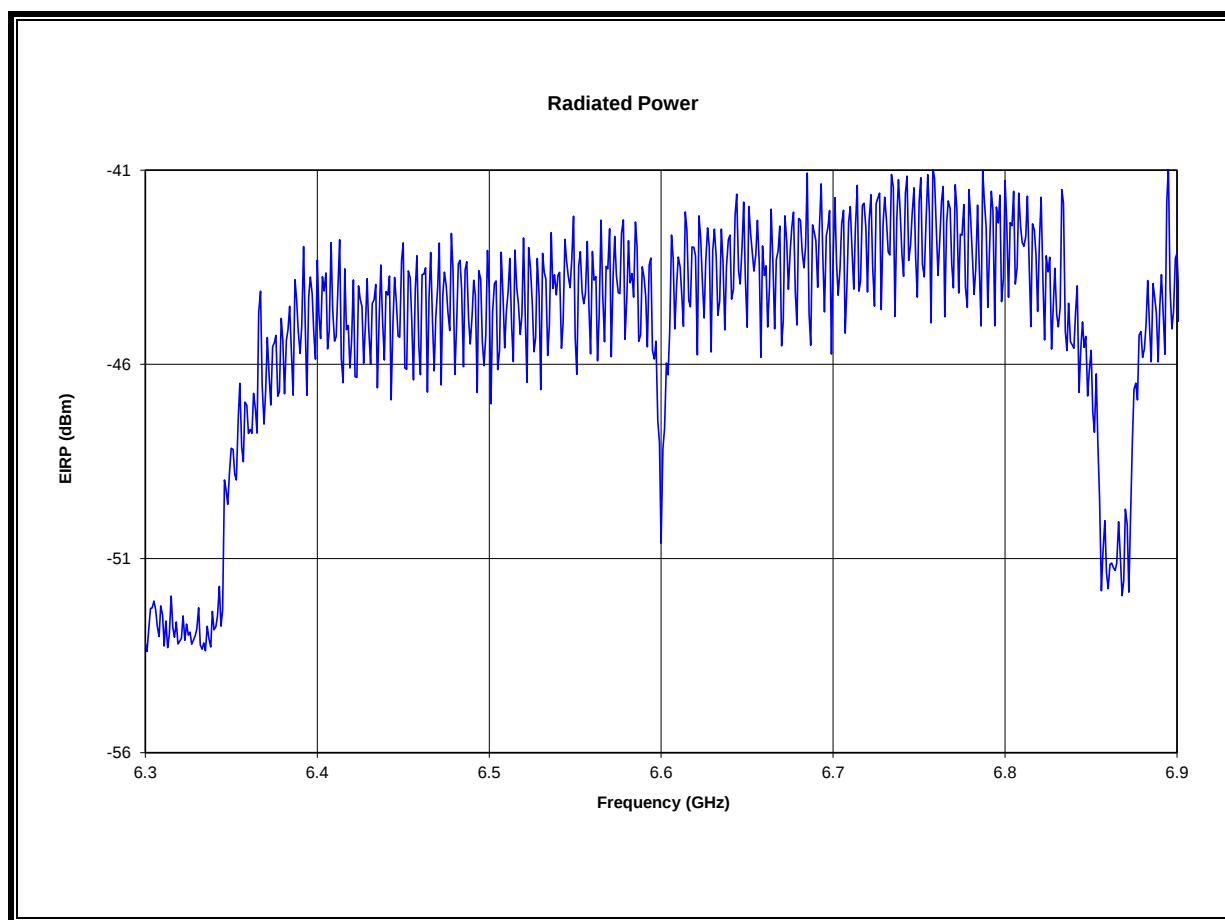
| <b>f Low<br/>(GHz)</b> | <b>Minimum f Low<br/>(GHz)</b> |
|------------------------|--------------------------------|
| 6.346                  | 3.1                            |

| <b>f High<br/>(GHz)</b> | <b>Maximum f High<br/>(GHz)</b> |
|-------------------------|---------------------------------|
| 6.857                   | 10.6                            |

| <b>f Center<br/>(GHz)</b> |
|---------------------------|
| 6.602                     |

| <b>UWB BW<br/>(MHz)</b> | <b>Minimum UWB BW<br/>(MHz)</b> |
|-------------------------|---------------------------------|
| 511                     | 500                             |

**PLOT WITH REFERENCE GRATICULE ADJUSTED FOR BG3 LOW CHANNEL F MAX**



**BG3 MID CHANNEL RESULTS**

| <b>f Max<br/>(GHz)</b> | <b>Reference EIRP at f<br/>Max<br/>(dBm)</b> | <b>10 dB down from<br/>Reference EIRP<br/>(dBm)</b> |
|------------------------|----------------------------------------------|-----------------------------------------------------|
| 7.263                  | -40.1                                        | -50.1                                               |

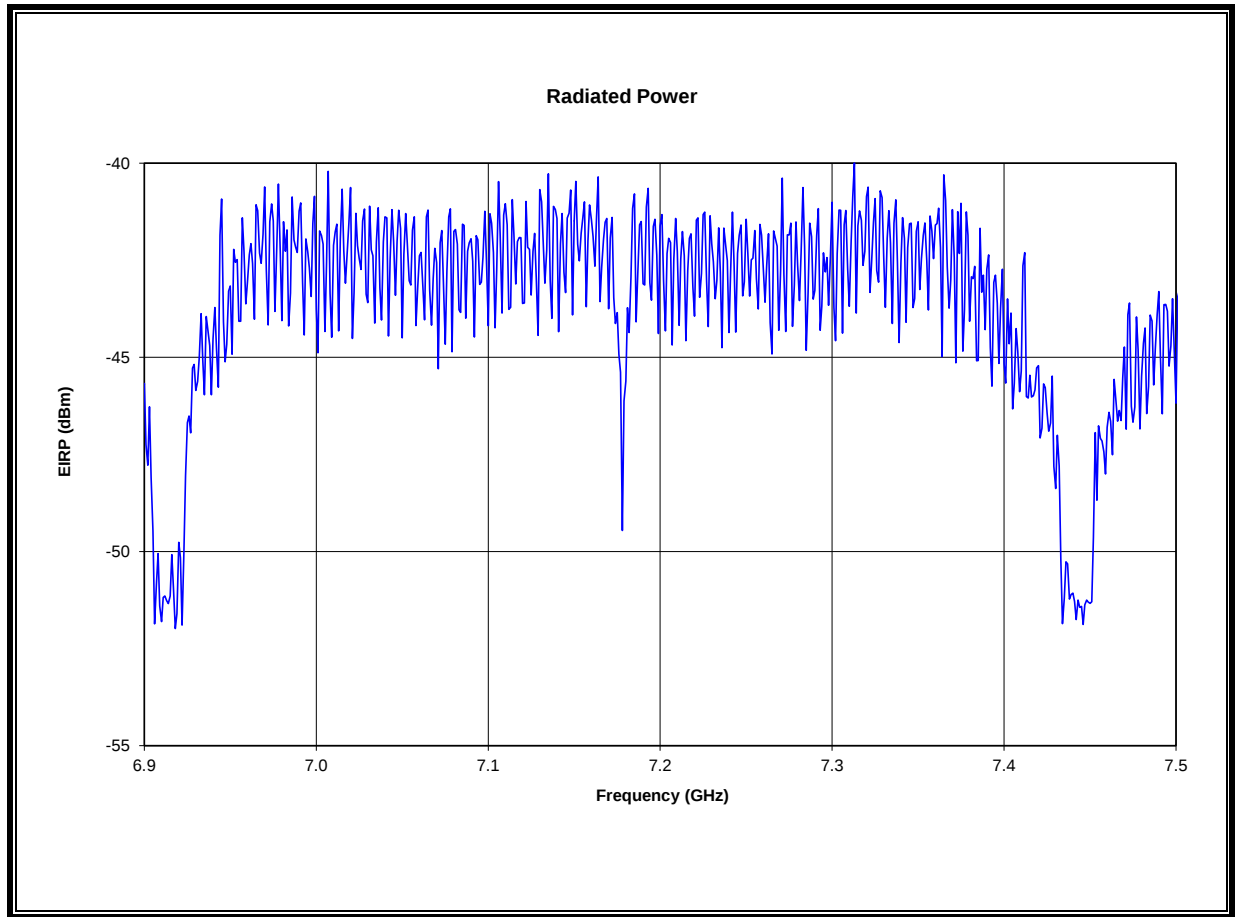
| <b>f Low<br/>(GHz)</b> | <b>Minimum f Low<br/>(GHz)</b> |
|------------------------|--------------------------------|
| 6.871                  | 3.1                            |

| <b>f High<br/>(GHz)</b> | <b>Maximum f High<br/>(GHz)</b> |
|-------------------------|---------------------------------|
| 7.383                   | 10.6                            |

| <b>f Center<br/>(GHz)</b> |
|---------------------------|
| 7.127                     |

| <b>UWB BW<br/>(MHz)</b> | <b>Minimum UWB BW<br/>(MHz)</b> |
|-------------------------|---------------------------------|
| 512                     | 500                             |

**PLOT WITH REFERENCE GRATICULE ADJUSTED FOR BG3 MID CHANNEL F MAX**



**BG3 HIGH CHANNEL RESULTS**

| <b>f Max<br/>(GHz)</b> | <b>Reference EIRP at f<br/>Max<br/>(dBm)</b> | <b>10 dB down from<br/>Reference EIRP<br/>(dBm)</b> |
|------------------------|----------------------------------------------|-----------------------------------------------------|
| 7.806                  | -39.5                                        | -49.5                                               |

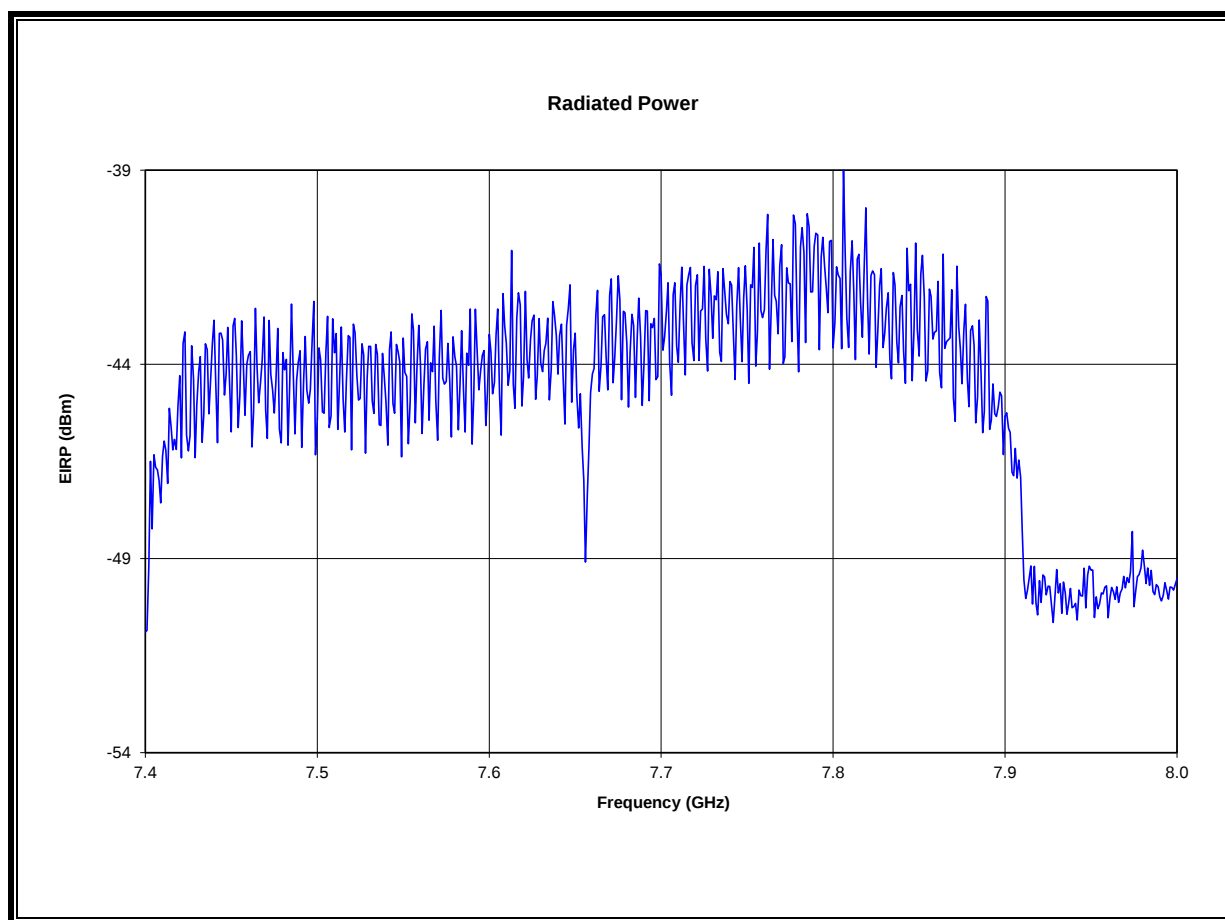
| <b>f Low<br/>(GHz)</b> | <b>Minimum f Low<br/>(GHz)</b> |
|------------------------|--------------------------------|
| 7.402                  | 3.1                            |

| <b>f High<br/>(GHz)</b> | <b>Maximum f High<br/>(GHz)</b> |
|-------------------------|---------------------------------|
| 7.915                   | 10.6                            |

| <b>f Center<br/>(GHz)</b> |
|---------------------------|
| 7.659                     |

| <b>UWB BW<br/>(MHz)</b> | <b>Minimum UWB BW<br/>(MHz)</b> |
|-------------------------|---------------------------------|
| 513                     | 500                             |

**PLOT WITH REFERENCE GRATICULE ADJUSTED FOR BG3 HIGH CHANNEL F MAX**



### 8.1.3. UWB BANDWIDTH FOR BG6 (53.3 MB/s)

#### BG6 LOW CHANNEL RESULTS

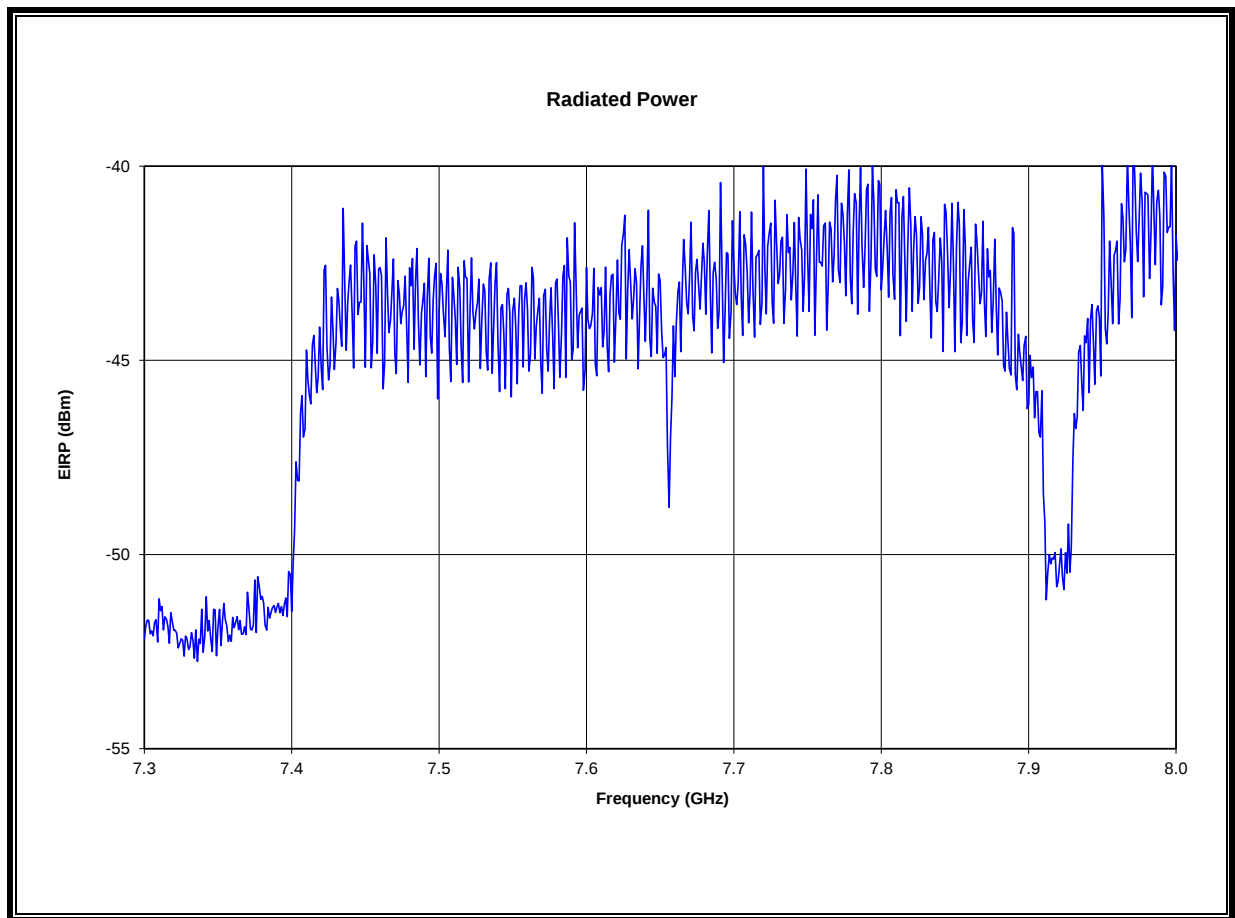
| <b>f Max<br/>(GHz)</b> | <b>Reference EIRP at f<br/>Max<br/>(dBm)</b> | <b>10 dB down from<br/>Reference EIRP<br/>(dBm)</b> |
|------------------------|----------------------------------------------|-----------------------------------------------------|
| 7.794                  | -40.1                                        | -50.1                                               |

| <b>f Low<br/>(GHz)</b> | <b>Minimum f Low<br/>(GHz)</b> |
|------------------------|--------------------------------|
| 7.401                  | 3.1                            |

| <b>f High<br/>(GHz)</b> | <b>Maximum f High<br/>(GHz)</b> |
|-------------------------|---------------------------------|
| 7.914                   | 10.6                            |

| <b>f Center<br/>(GHz)</b> |
|---------------------------|
| 7.658                     |

| <b>UWB BW<br/>(MHz)</b> | <b>Minimum UWB BW<br/>(MHz)</b> |
|-------------------------|---------------------------------|
| 513                     | 500                             |



**BG6 MID CHANNEL RESULTS**

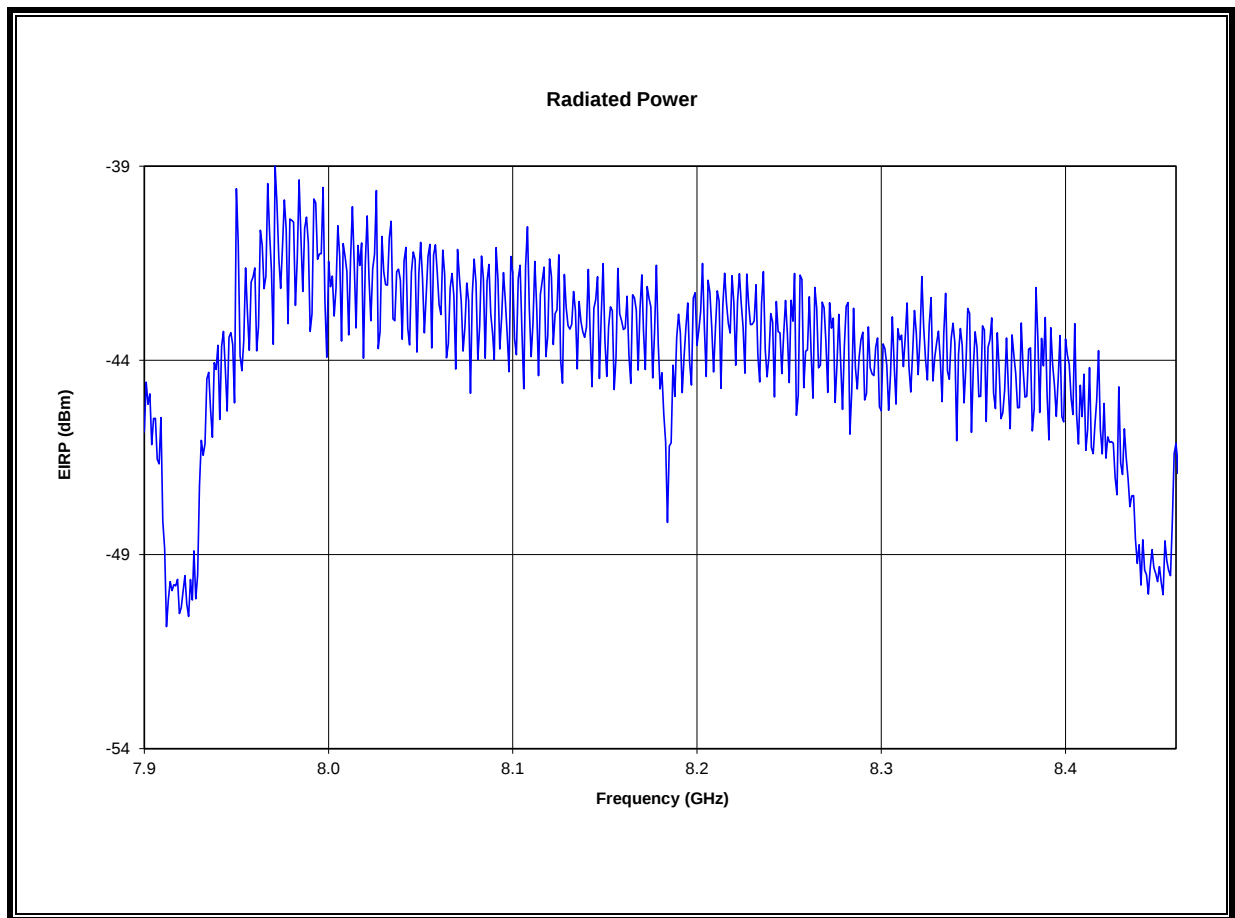
| <b>f Max<br/>(GHz)</b> | <b>Reference EIRP at f<br/>Max<br/>(dBm)</b> | <b>10 dB down from<br/>Reference EIRP<br/>(dBm)</b> |
|------------------------|----------------------------------------------|-----------------------------------------------------|
| 7.971                  | -39.4                                        | -49.4                                               |

| <b>f Low<br/>(GHz)</b> | <b>Minimum f Low<br/>(GHz)</b> |
|------------------------|--------------------------------|
| 7.927                  | 3.1                            |

| <b>f High<br/>(GHz)</b> | <b>Maximum f High<br/>(GHz)</b> |
|-------------------------|---------------------------------|
| 8.440                   | 10.6                            |

| <b>f Center<br/>(GHz)</b> |
|---------------------------|
| 8.184                     |

| <b>UWB BW<br/>(MHz)</b> | <b>Minimum UWB BW<br/>(MHz)</b> |
|-------------------------|---------------------------------|
| 513                     | 500                             |

**PLOT WITH REFERENCE GRATICULE ADJUSTED FOR BG6 MID CHANNEL F MAX**

**BG61 HIGH CHANNEL RESULTS**

| <b>f Max<br/>(GHz)</b> | <b>Reference EIRP at f<br/>Max<br/>(dBm)</b> | <b>10 dB down from<br/>Reference EIRP<br/>(dBm)</b> |
|------------------------|----------------------------------------------|-----------------------------------------------------|
| 8.554                  | -41.2                                        | -51.2                                               |

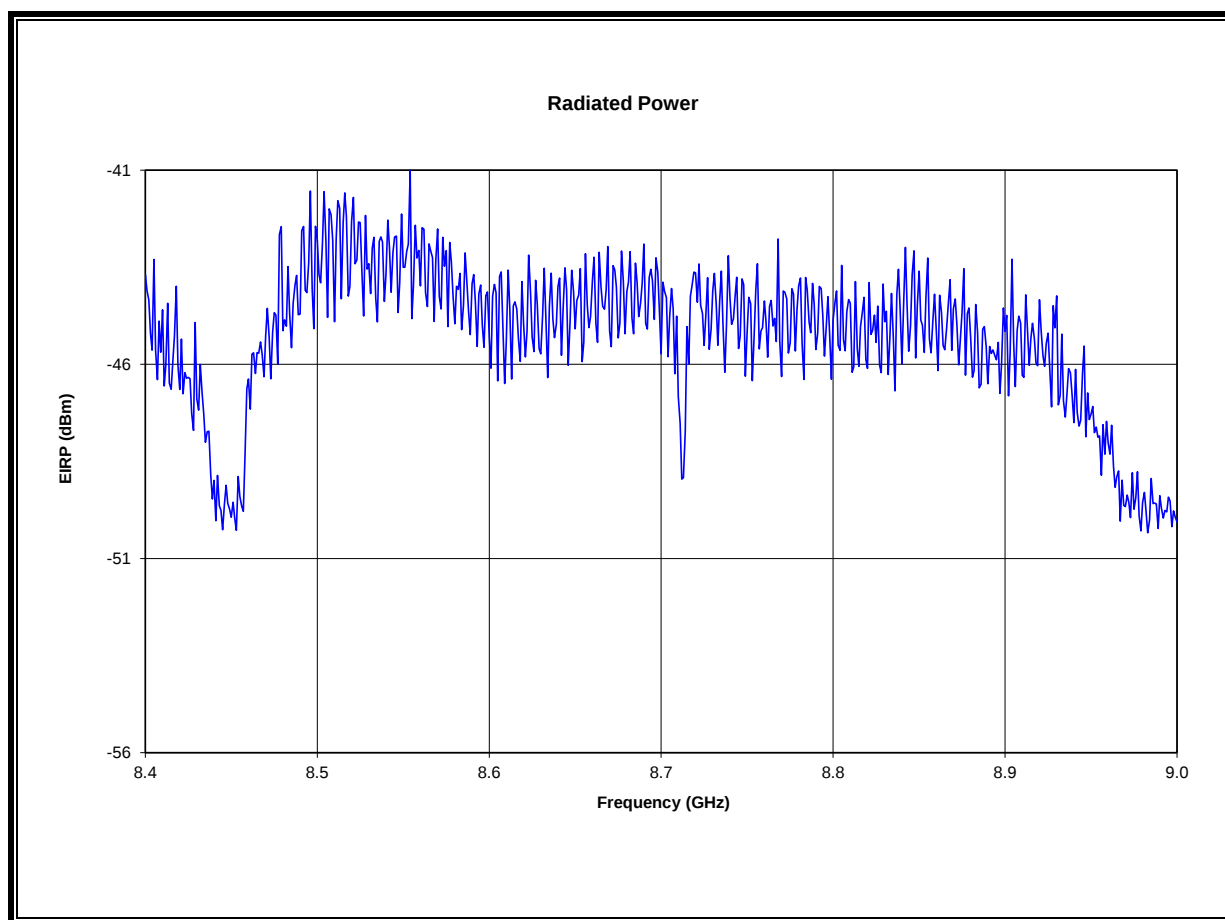
| <b>f Low<br/>(GHz)</b> | <b>Minimum f Low<br/>(GHz)</b> |
|------------------------|--------------------------------|
| 8.455                  | 3.1                            |

| <b>f High<br/>(GHz)</b> | <b>Maximum f High<br/>(GHz)</b> |
|-------------------------|---------------------------------|
| 8.963                   | 10.6                            |

| <b>f Center<br/>(GHz)</b> |
|---------------------------|
| 8.709                     |

| <b>UWB BW<br/>(MHz)</b> | <b>Minimum UWB BW<br/>(MHz)</b> |
|-------------------------|---------------------------------|
| 508                     | 500                             |

**PLOT WITH REFERENCE GRATICULE ADJUSTED FOR BG6 HIGH CHANNEL F MAX**



### 8.1.4. UWB BANDWIDTH FOR BG1 (480 MB/s)

#### BG1 LOW CHANNEL RESULTS

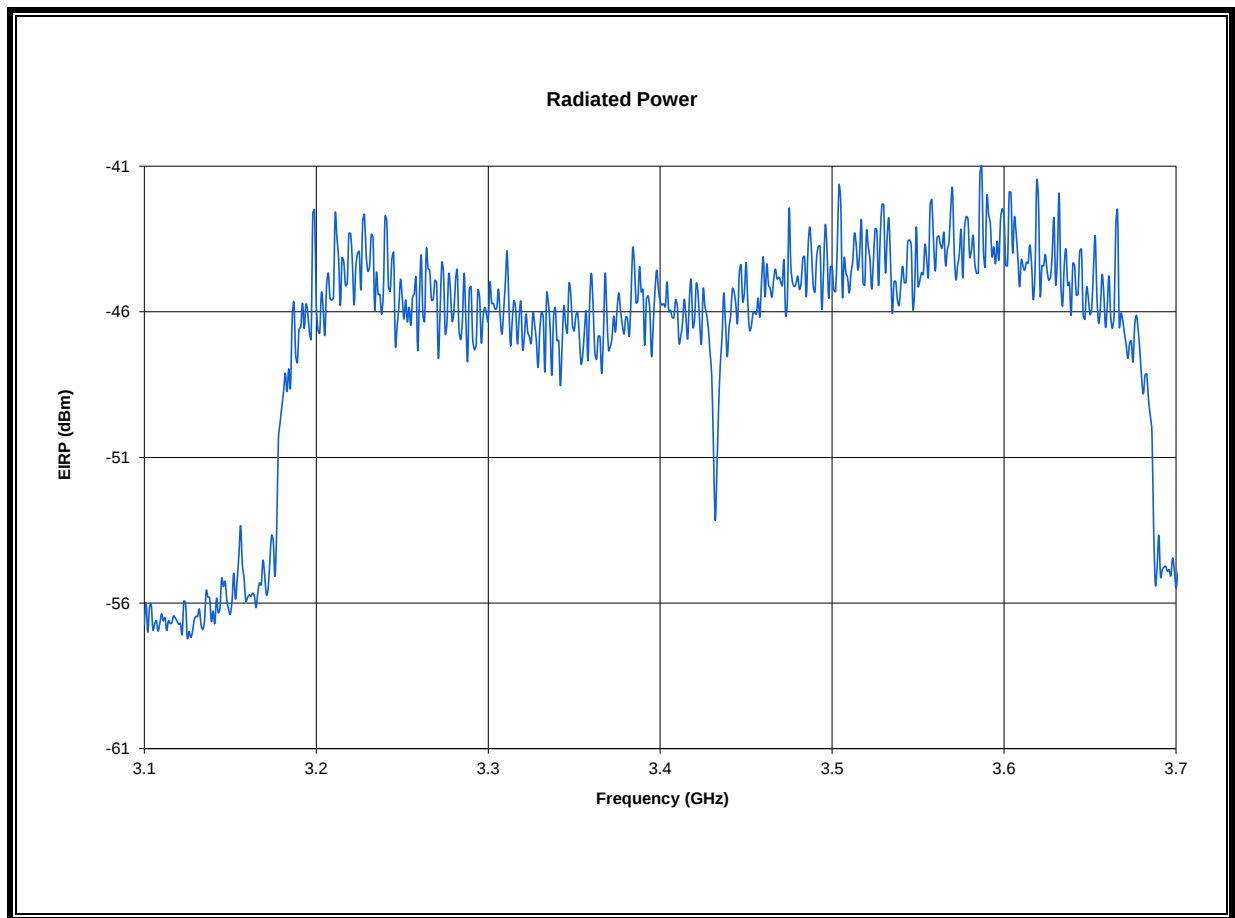
| <b>f Max<br/>(GHz)</b> | <b>Reference EIRP at f<br/>Max<br/>(dBm)</b> | <b>10 dB down from<br/>Reference EIRP<br/>(dBm)</b> |
|------------------------|----------------------------------------------|-----------------------------------------------------|
| 3.587                  | -41.2                                        | -51.2                                               |

| <b>f Low<br/>(GHz)</b> | <b>Minimum f Low<br/>(GHz)</b> |
|------------------------|--------------------------------|
| 3.177                  | 3.1                            |

| <b>f High<br/>(GHz)</b> | <b>Maximum f High<br/>(GHz)</b> |
|-------------------------|---------------------------------|
| 3.687                   | 10.6                            |

| <b>f Center<br/>(GHz)</b> |
|---------------------------|
| 3.432                     |

| <b>UWB BW<br/>(MHz)</b> | <b>Minimum UWB BW<br/>(MHz)</b> |
|-------------------------|---------------------------------|
| 510                     | 500                             |



**BG1 MID CHANNEL RESULTS**

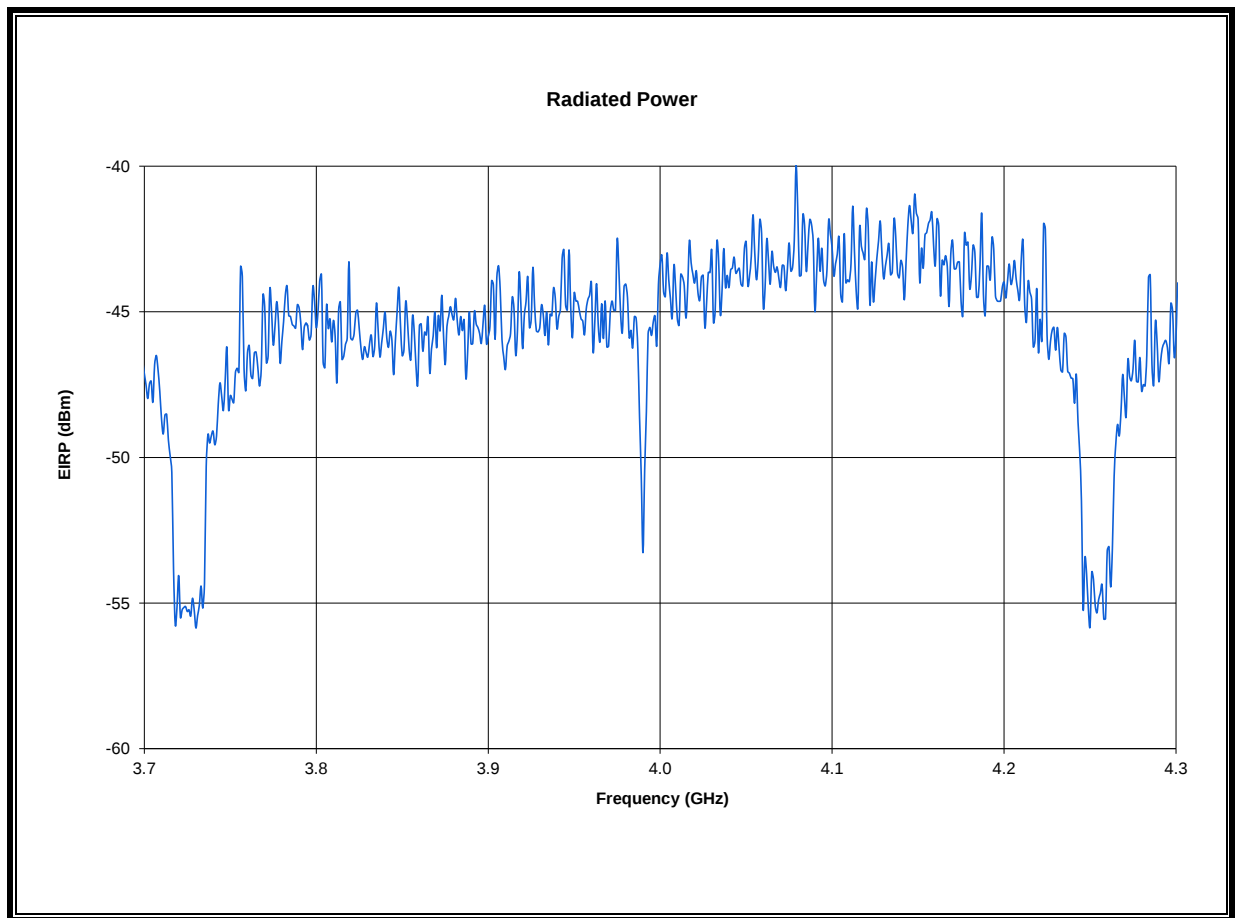
| <b>f Max<br/>(GHz)</b> | <b>Reference EIRP at f<br/>Max<br/>(dBm)</b> | <b>10 dB down from<br/>Reference EIRP<br/>(dBm)</b> |
|------------------------|----------------------------------------------|-----------------------------------------------------|
| 4.049                  | -39.8                                        | -49.8                                               |

| <b>f Low<br/>(GHz)</b> | <b>Minimum f Low<br/>(GHz)</b> |
|------------------------|--------------------------------|
| 3.706                  | 3.1                            |

| <b>f High<br/>(GHz)</b> | <b>Maximum f High<br/>(GHz)</b> |
|-------------------------|---------------------------------|
| 4.215                   | 10.6                            |

| <b>f Center<br/>(GHz)</b> |
|---------------------------|
| 3.961                     |

| <b>UWB BW<br/>(MHz)</b> | <b>Minimum UWB BW<br/>(MHz)</b> |
|-------------------------|---------------------------------|
| 509                     | 500                             |



**BG1 HIGH CHANNEL RESULTS**

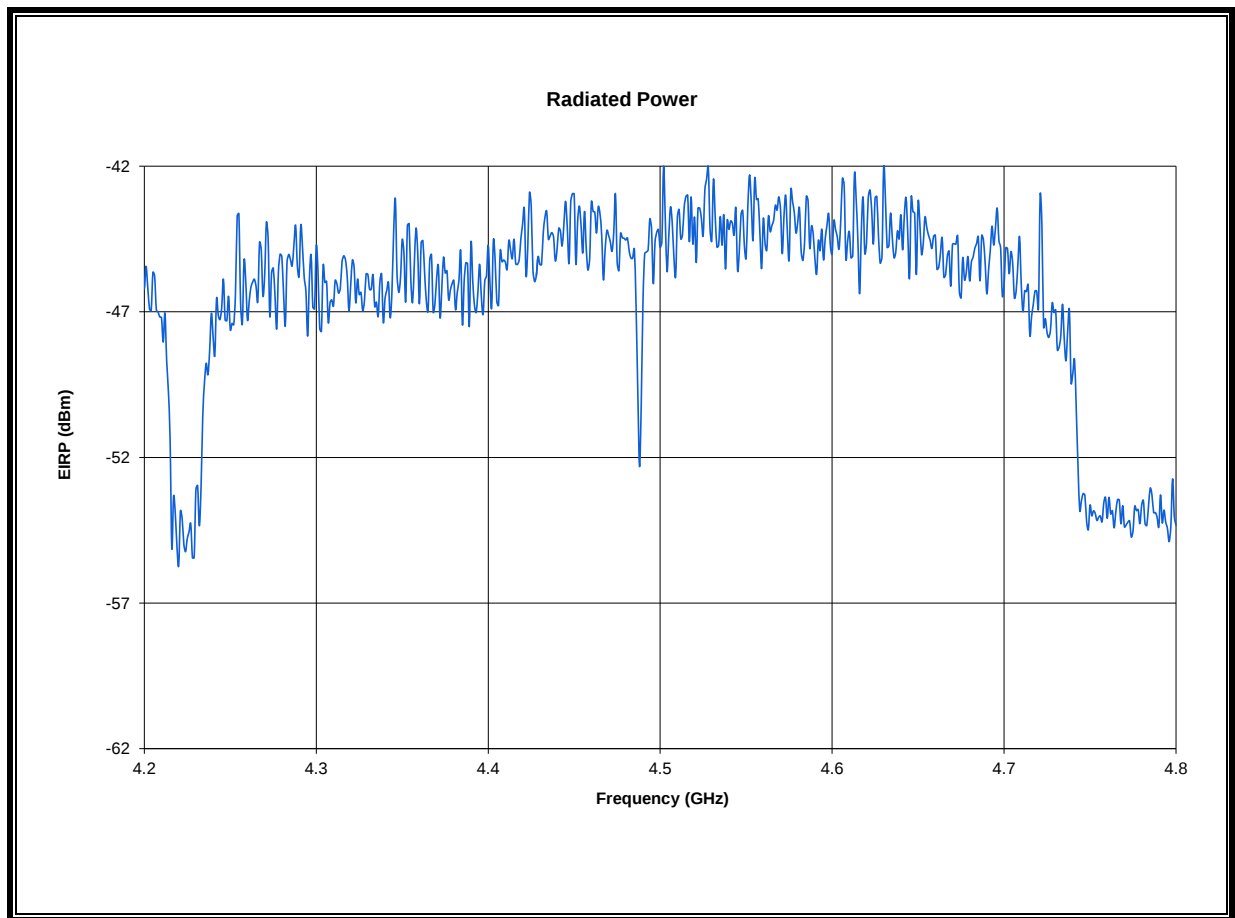
| <b>f Max<br/>(GHz)</b> | <b>Reference EIRP at f<br/>Max<br/>(dBm)</b> | <b>10 dB down from<br/>Reference EIRP<br/>(dBm)</b> |
|------------------------|----------------------------------------------|-----------------------------------------------------|
| 4.502                  | -41.9                                        | -51.9                                               |

| <b>f Low<br/>(GHz)</b> | <b>Minimum f Low<br/>(GHz)</b> |
|------------------------|--------------------------------|
| 4.233                  | 3.1                            |

| <b>f High<br/>(GHz)</b> | <b>Maximum f High<br/>(GHz)</b> |
|-------------------------|---------------------------------|
| 4.743                   | 10.6                            |

| <b>f Center<br/>(GHz)</b> |
|---------------------------|
| 4.488                     |

| <b>UWB BW<br/>(MHz)</b> | <b>Minimum UWB BW<br/>(MHz)</b> |
|-------------------------|---------------------------------|
| 510                     | 500                             |

**PLOT WITH REFERENCE GRATICULE ADJUSTED FOR BG1 HIGH CHANNEL F MAX**

### 8.1.5. UWB BANDWIDTH FOR BG3 (480 MB/s)

#### BG3 LOW CHANNEL RESULTS

| <b>f Max<br/>(GHz)</b> | <b>Reference EIRP at f<br/>Max<br/>(dBm)</b> | <b>10 dB down from<br/>Reference EIRP<br/>(dBm)</b> |
|------------------------|----------------------------------------------|-----------------------------------------------------|
| 6.672                  | -37.6                                        | -47.6                                               |

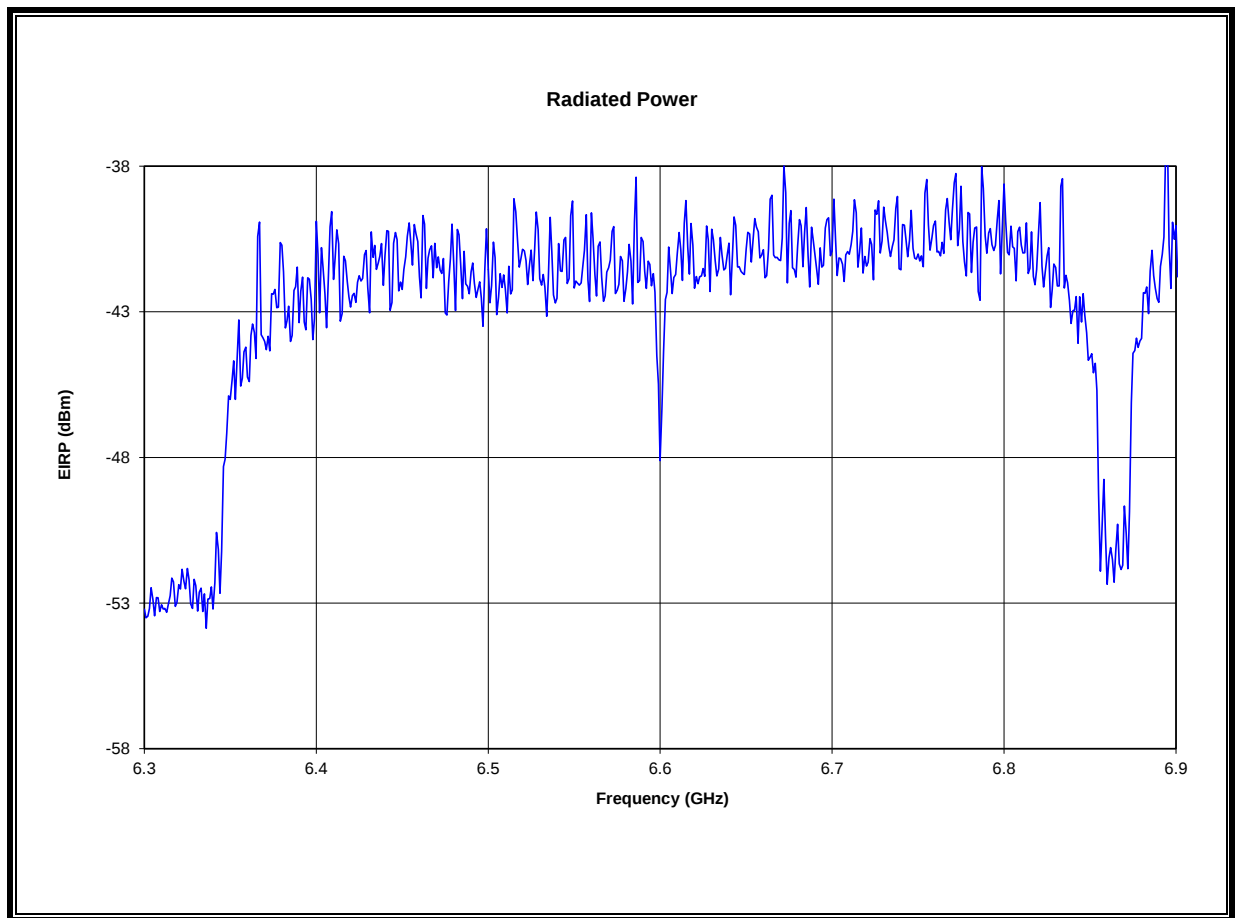
| <b>f Low<br/>(GHz)</b> | <b>Minimum f Low<br/>(GHz)</b> |
|------------------------|--------------------------------|
| 6.346                  | 3.1                            |

| <b>f High<br/>(GHz)</b> | <b>Maximum f High<br/>(GHz)</b> |
|-------------------------|---------------------------------|
| 6.856                   | 10.6                            |

| <b>f Center<br/>(GHz)</b> |
|---------------------------|
| 6.601                     |

| <b>UWB BW<br/>(MHz)</b> | <b>Minimum UWB BW<br/>(MHz)</b> |
|-------------------------|---------------------------------|
| 510                     | 500                             |

**PLOT WITH REFERENCE GRATICULE ADJUSTED FOR BG3 LOW CHANNEL F MAX**



**BG3 MID CHANNEL RESULTS**

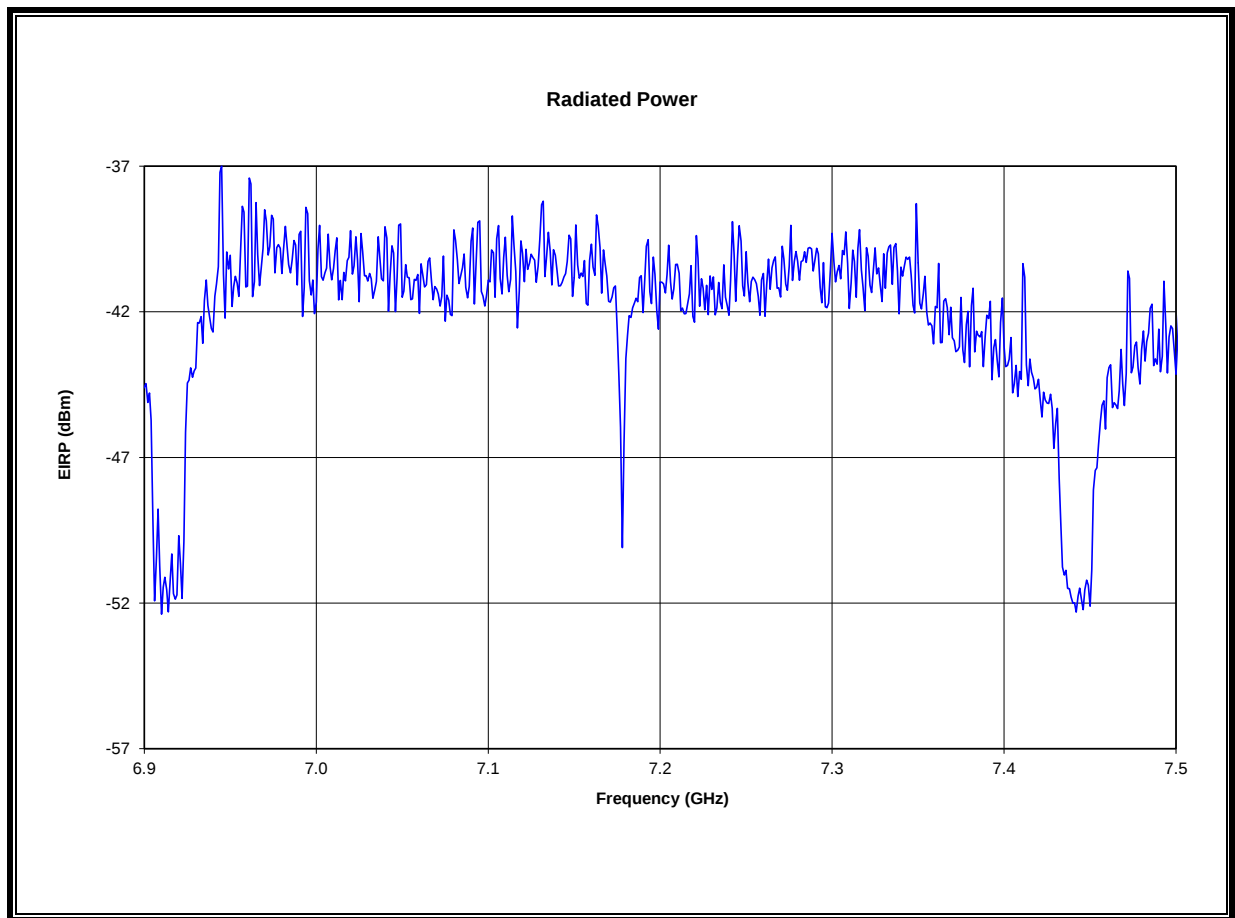
| <b>f Max<br/>(GHz)</b> | <b>Reference EIRP at f<br/>Max<br/>(dBm)</b> | <b>10 dB down from<br/>Reference EIRP<br/>(dBm)</b> |
|------------------------|----------------------------------------------|-----------------------------------------------------|
| 6.895                  | -36.6                                        | -46.6                                               |

| <b>f Low<br/>(GHz)</b> | <b>Minimum f Low<br/>(GHz)</b> |
|------------------------|--------------------------------|
| 6.872                  | 3.1                            |

| <b>f High<br/>(GHz)</b> | <b>Maximum f High<br/>(GHz)</b> |
|-------------------------|---------------------------------|
| 7.383                   | 10.6                            |

| <b>f Center<br/>(GHz)</b> |
|---------------------------|
| 7.128                     |

| <b>UWB BW<br/>(MHz)</b> | <b>Minimum UWB BW<br/>(MHz)</b> |
|-------------------------|---------------------------------|
| 511                     | 500                             |

**PLOT WITH REFERENCE GRATICULE ADJUSTED FOR BG3 MID CHANNEL F MAX**

**BG3 HIGH CHANNEL RESULTS**

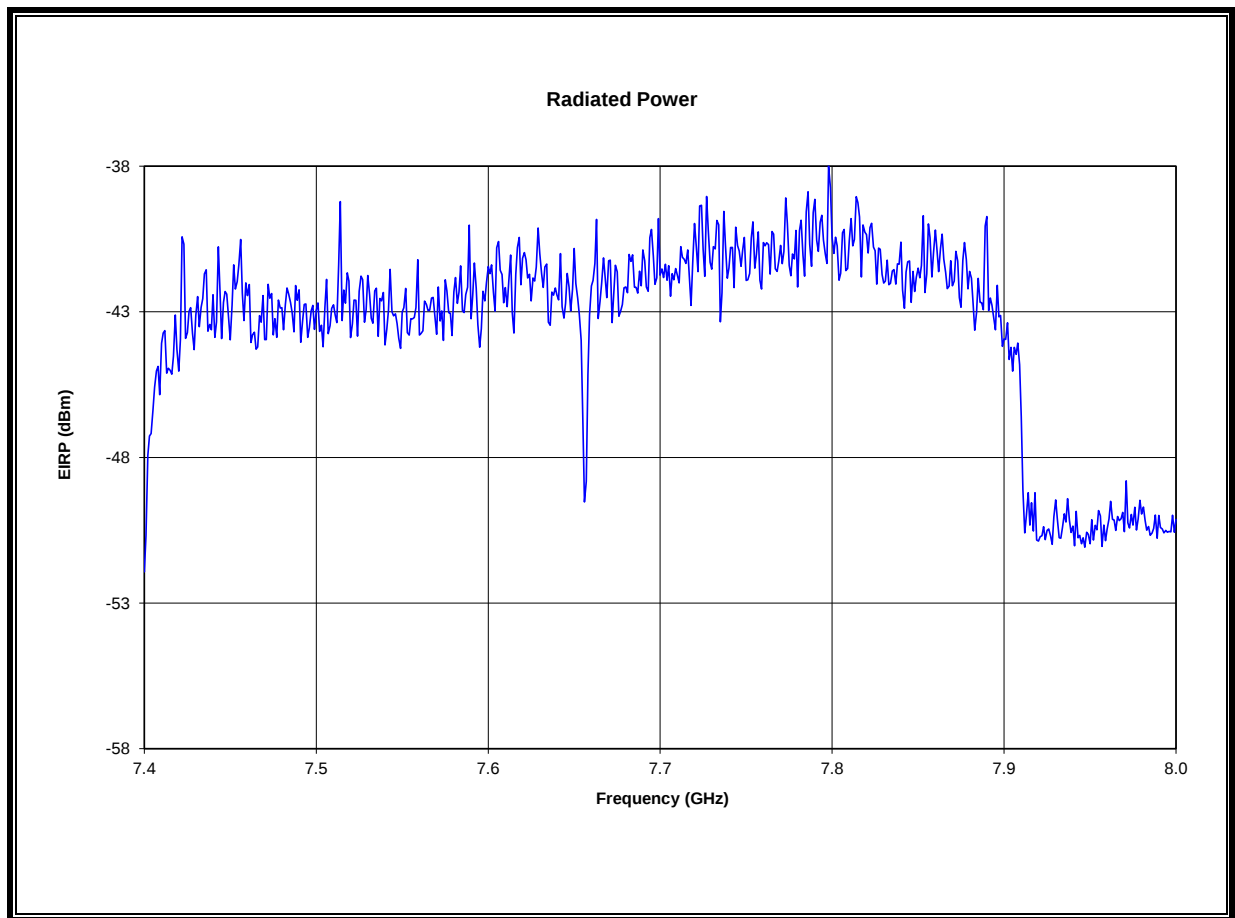
| <b>f Max<br/>(GHz)</b> | <b>Reference EIRP at f<br/>Max<br/>(dBm)</b> | <b>10 dB down from<br/>Reference EIRP<br/>(dBm)</b> |
|------------------------|----------------------------------------------|-----------------------------------------------------|
| 7.798                  | -37.8                                        | -47.8                                               |

| <b>f Low<br/>(GHz)</b> | <b>Minimum f Low<br/>(GHz)</b> |
|------------------------|--------------------------------|
| 7.401                  | 3.1                            |

| <b>f High<br/>(GHz)</b> | <b>Maximum f High<br/>(GHz)</b> |
|-------------------------|---------------------------------|
| 7.911                   | 10.6                            |

| <b>f Center<br/>(GHz)</b> |
|---------------------------|
| 7.656                     |

| <b>UWB BW<br/>(MHz)</b> | <b>Minimum UWB BW<br/>(MHz)</b> |
|-------------------------|---------------------------------|
| 510                     | 500                             |

**PLOT WITH REFERENCE GRATICULE ADJUSTED FOR BG3 HIGH CHANNEL F MAX**

### 8.1.6. UWB BANDWIDTH FOR BG6 (480 MB/s)

#### BG6 LOW CHANNEL RESULTS

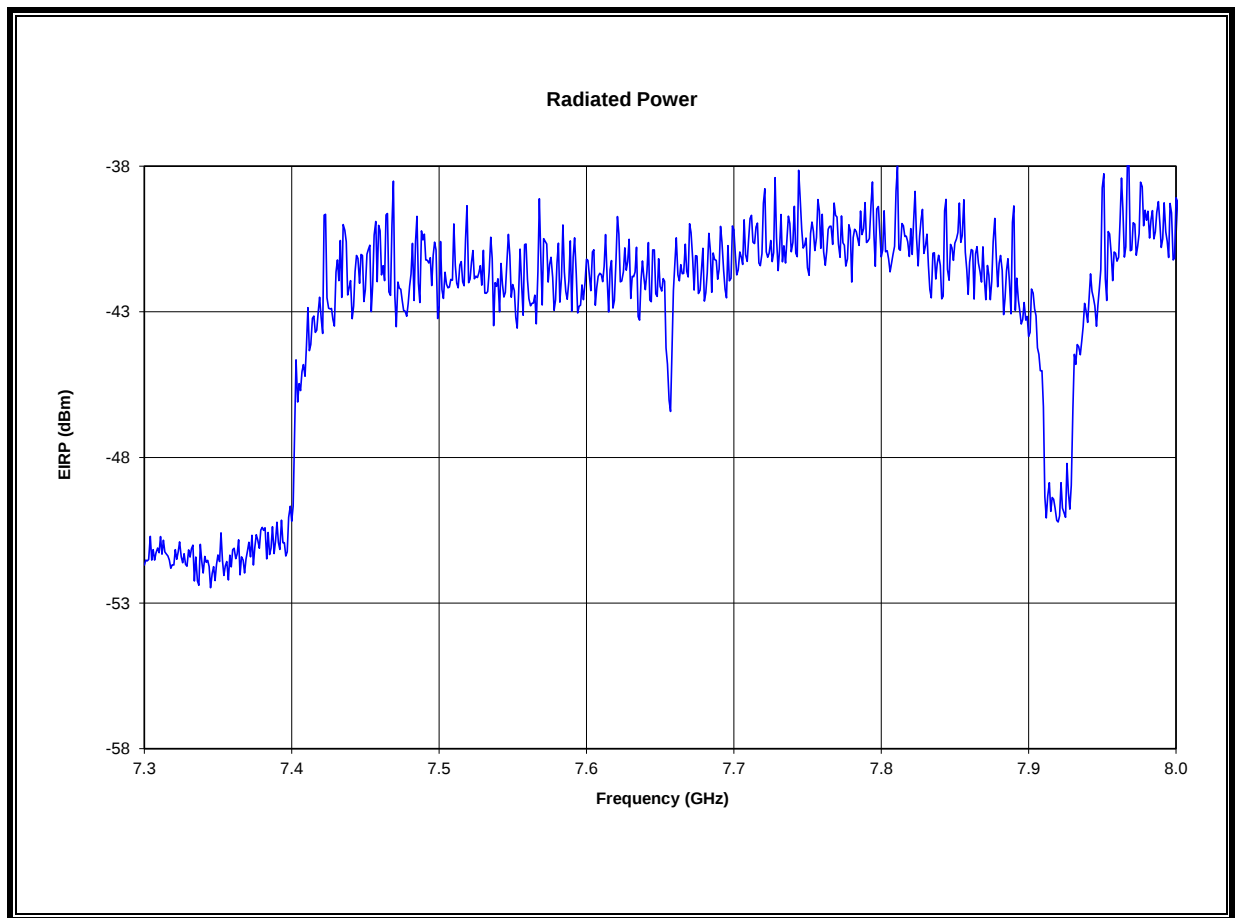
| <b>f Max<br/>(GHz)</b> | <b>Reference EIRP at f<br/>Max<br/>(dBm)</b> | <b>10 dB down from<br/>Reference EIRP<br/>(dBm)</b> |
|------------------------|----------------------------------------------|-----------------------------------------------------|
| 7.811                  | -38.3                                        | -48.3                                               |

| <b>f Low<br/>(GHz)</b> | <b>Minimum f Low<br/>(GHz)</b> |
|------------------------|--------------------------------|
| 7.401                  | 3.1                            |

| <b>f High<br/>(GHz)</b> | <b>Maximum f High<br/>(GHz)</b> |
|-------------------------|---------------------------------|
| 7.911                   | 10.6                            |

| <b>f Center<br/>(GHz)</b> |
|---------------------------|
| 7.656                     |

| <b>UWB BW<br/>(MHz)</b> | <b>Minimum UWB BW<br/>(MHz)</b> |
|-------------------------|---------------------------------|
| 510                     | 500                             |

**PLOT WITH REFERENCE GRATICULE ADJUSTED FOR BG6 LOW CHANNEL F MAX**

**BG6 MID CHANNEL RESULTS**

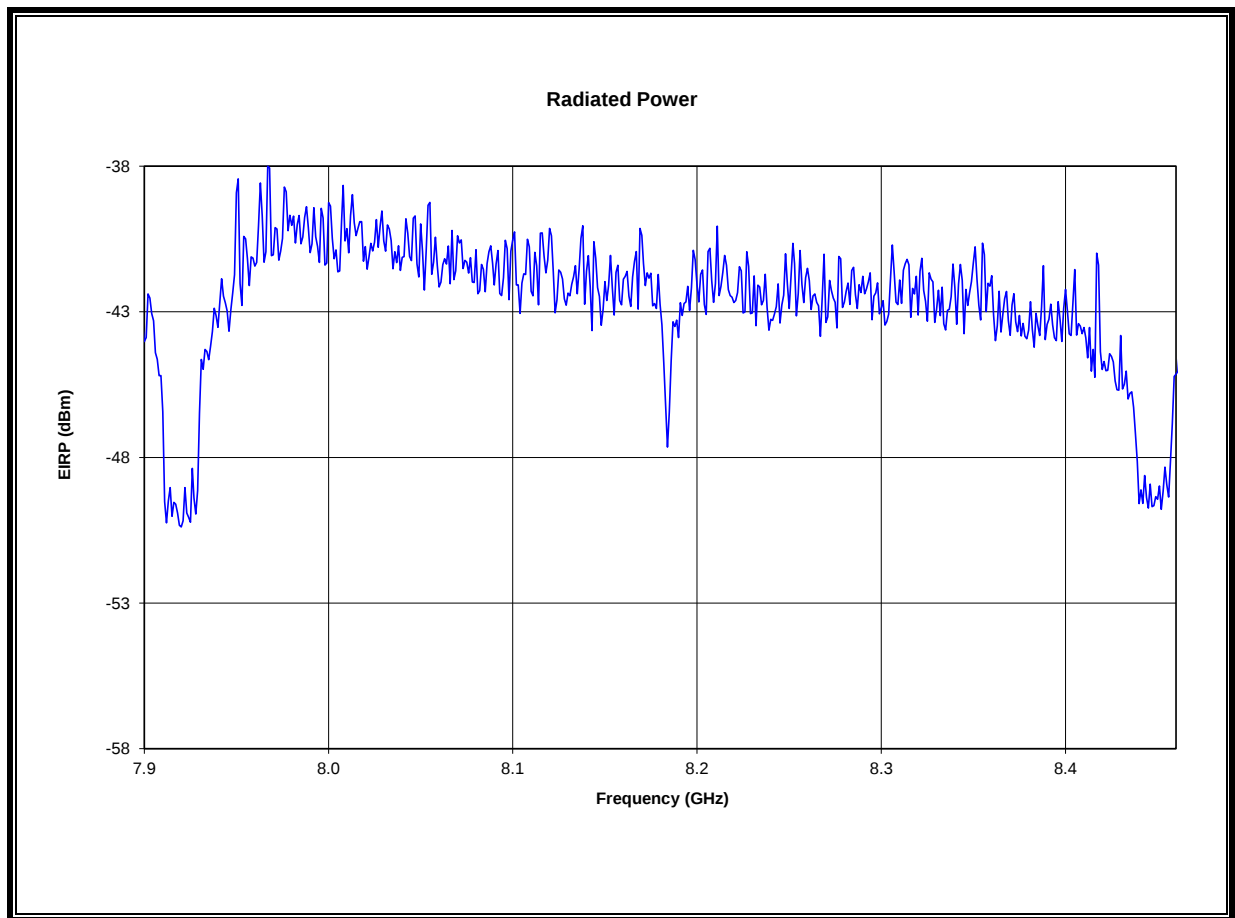
| <b>f Max<br/>(GHz)</b> | <b>Reference EIRP at f<br/>Max<br/>(dBm)</b> | <b>10 dB down from<br/>Reference EIRP<br/>(dBm)</b> |
|------------------------|----------------------------------------------|-----------------------------------------------------|
| 7.967                  | -38.1                                        | -48.1                                               |

| <b>f Low<br/>(GHz)</b> | <b>Minimum f Low<br/>(GHz)</b> |
|------------------------|--------------------------------|
| 7.929                  | 3.1                            |

| <b>f High<br/>(GHz)</b> | <b>Maximum f High<br/>(GHz)</b> |
|-------------------------|---------------------------------|
| 8.439                   | 10.6                            |

| <b>f Center<br/>(GHz)</b> |
|---------------------------|
| 8.184                     |

| <b>UWB BW<br/>(MHz)</b> | <b>Minimum UWB BW<br/>(MHz)</b> |
|-------------------------|---------------------------------|
| 510                     | 500                             |

**PLOT WITH REFERENCE GRATICULE ADJUSTED FOR BG6 MID CHANNEL F MAX**

**BG61 HIGH CHANNEL RESULTS**

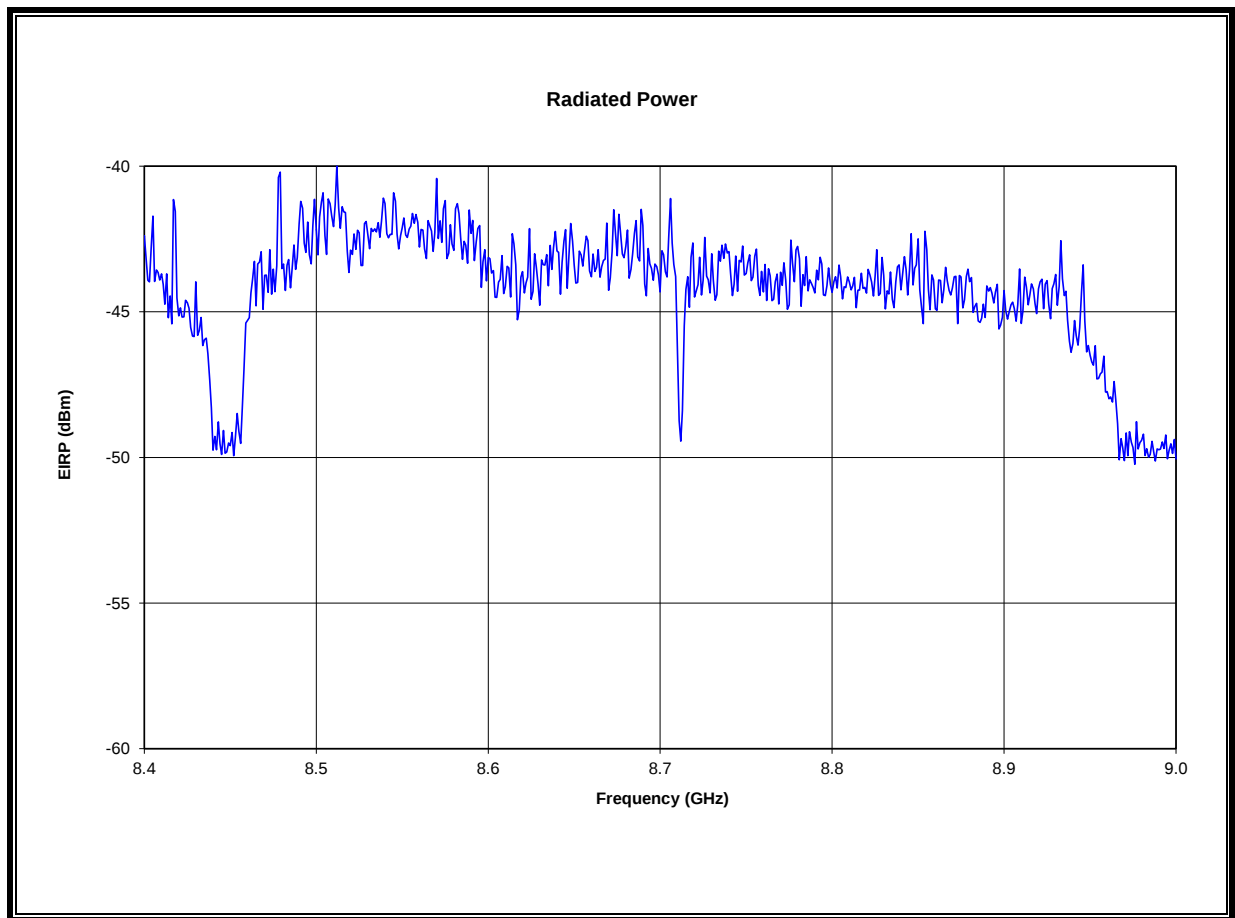
| <b>f Max<br/>(GHz)</b> | <b>Reference EIRP at f<br/>Max<br/>(dBm)</b> | <b>10 dB down from<br/>Reference EIRP<br/>(dBm)</b> |
|------------------------|----------------------------------------------|-----------------------------------------------------|
| 8.512                  | -40.0                                        | -50.0                                               |

| <b>f Low<br/>(GHz)</b> | <b>Minimum f Low<br/>(GHz)</b> |
|------------------------|--------------------------------|
| 8.457                  | 3.1                            |

| <b>f High<br/>(GHz)</b> | <b>Maximum f High<br/>(GHz)</b> |
|-------------------------|---------------------------------|
| 8.967                   | 10.6                            |

| <b>f Center<br/>(GHz)</b> |
|---------------------------|
| 8.712                     |

| <b>UWB BW<br/>(MHz)</b> | <b>Minimum UWB BW<br/>(MHz)</b> |
|-------------------------|---------------------------------|
| 510                     | 500                             |

**PLOT WITH REFERENCE GRATICULE ADJUSTED FOR BG6 HIGH CHANNEL F MAX**

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## **8.2. PEAK POWER**

### **LIMIT**

§15.517 (f) There is a limit on the peak level of the emissions contained within a 50 MHz bandwidth centered on the frequency at which the highest radiated emission occurs, fM. That limit is 0 dBm EIRP. It is acceptable to employ a different resolution bandwidth, and a correspondingly different peak emission limit, following the procedures described in Section 15.521 of this chapter.

§15.521 (g) When a peak measurement is required, it is acceptable to use a resolution bandwidth other than the 50 MHz specified in this subpart. This resolution bandwidth shall not be lower than 1 MHz or greater than 50 MHz, and the measurement shall be centered on the frequency at which the highest radiated emission occurs, fM. If a resolution bandwidth other than 50 MHz is employed, the peak EIRP limit shall be  $20 \log (RBW/50)$  dBm where RBW is the resolution bandwidth in megahertz that is employed. This may be converted to a peak field strength level at 3 meters using  $E(dBuV/m) = P(dBm \text{ EIRP}) + 95.2$ . If RBW is greater than 3 MHz, the application for certification filed with the Commission must contain a detailed description of the test procedure, calibration of the test setup, and the instrumentation employed in the testing.

### **TEST PROCEDURE**

Radiated measurements are made using the procedures described above.

The spectrum analyzer center frequency is set to fM. The frequency span is set to 50 MHz. The RBW and VBW are both set to 8 MHz. The detector function is set to peak.

Both the test procedure and the calibration of the test setup are identical to that for which a 1 or 3 MHz RBW is specified. The instrumentation is an Agilent spectrum analyzer model E4446A, which includes a standard RBW of 8 MHz.

## RESULTS

Preliminary testing was performed in Vertical and Horizontal polarizations. Vertical polarization was determined to be the worst-case therefore was used for final testing.

|       |   |         |        |            |     |
|-------|---|---------|--------|------------|-----|
| RBW = | 8 | Limit = | -15.92 | Distance = | 3.0 |
|-------|---|---------|--------|------------|-----|

| BG1            |                                           |                              |                                     |                           |                            |
|----------------|-------------------------------------------|------------------------------|-------------------------------------|---------------------------|----------------------------|
| f Max<br>(GHz) | Reading<br>(dBuV)                         | Antenna<br>Factor<br>(dB/m)  | Cable<br>(Incl with Preamp)<br>(dB) | Preamp<br>& Cable<br>(dB) | Distance<br>Factor<br>(dB) |
| 3.2293         | 64.78                                     | 32.34                        | 0.00                                | -30.77                    | 0.00                       |
|                | Field Strength<br>at 3 meters<br>(dBuV/m) | EIRP<br>Conversion<br>Factor | EIRP<br>(dBm)                       | EIRP<br>Limit<br>(dBm)    | Margin<br>(dB)             |
|                | 66.35                                     | -95.20                       | -28.85                              | -15.92                    | -12.93                     |

| BG3            |                                           |                              |                                     |                           |                            |
|----------------|-------------------------------------------|------------------------------|-------------------------------------|---------------------------|----------------------------|
| f Max<br>(GHz) | Reading<br>(dBuV)                         | Antenna<br>Factor<br>(dB/m)  | Cable<br>(Incl with Preamp)<br>(dB) | Preamp<br>& Cable<br>(dB) | Distance<br>Factor<br>(dB) |
| 6.9214         | 62.43                                     | 35.19                        | 0.00                                | -29.39                    | 0.00                       |
|                | Field Strength<br>at 3 meters<br>(dBuV/m) | EIRP<br>Conversion<br>Factor | EIRP<br>(dBm)                       | EIRP<br>Limit<br>(dBm)    | Margin<br>(dB)             |
|                | 68.22                                     | -95.20                       | -26.98                              | -15.92                    | -11.06                     |

| BG6            |                                           |                              |                                     |                           |                            |
|----------------|-------------------------------------------|------------------------------|-------------------------------------|---------------------------|----------------------------|
| f Max<br>(GHz) | Reading<br>(dBuV)                         | Antenna<br>Factor<br>(dB/m)  | Cable<br>(Incl with Preamp)<br>(dB) | Preamp<br>& Cable<br>(dB) | Distance<br>Factor<br>(dB) |
| 7.6154         | 62                                        | 37.15                        | 0.00                                | -28.77                    | 0.00                       |
|                | Field Strength<br>at 3 meters<br>(dBuV/m) | EIRP<br>Conversion<br>Factor | EIRP<br>(dBm)                       | EIRP<br>Limit<br>(dBm)    | Margin<br>(dB)             |
|                | 70.38                                     | -95.20                       | -24.82                              | -15.92                    | -8.90                      |

### 8.3. RADIATED EMISSIONS ABOVE 960 MHz

#### LIMITS

§15.519 (c) The radiated emissions above 960 MHz from a device operating under the provisions of this section shall not exceed the following average limits when measured using a resolution bandwidth of 1 MHz:

| Frequency in MHz | EIRP in dBm |
|------------------|-------------|
| 960–1610         | - 75.3      |
| 1610–1990        | - 63.3      |
| 1990–3100        | - 61.3      |
| 3100–10600       | - 41.3      |
| Above 10600      | - 61.3      |

§15.519 (e) In addition to the radiated emission limits specified in the above table, UWB transmitters operating under the provisions of this section shall not exceed the following average limits when measured using a resolution bandwidth of no less than 1 kHz:

| Frequency in MHz | EIRP in dBm |
|------------------|-------------|
| 1164–1240        | - 85.3      |
| 1559–1610        | - 85.3      |

§15.521 (d) Within the tables in §§15.509, 15.511, 15.513, 15.515, 15.517, and 15.519, the tighter emission limit applies at the band edges. Radiated emission levels above 960 MHz are based on RMS average measurements over a 1 MHz resolution bandwidth. The RMS average measurement is based on the use of a spectrum analyzer with a resolution bandwidth of 1 MHz, an RMS detector, and a 1 millisecond or less averaging time.

§15.521 (e) The frequency at which the highest radiated emission occurs, fM, must be contained within the UWB bandwidth.

#### TEST PROCEDURE

Radiated measurements are made using the procedures described above.

## RESULTS

Preliminary testing was performed in Vertical and Horizontal polarizations. Vertical polarization was determined to be the worst-case therefore was used for final testing.

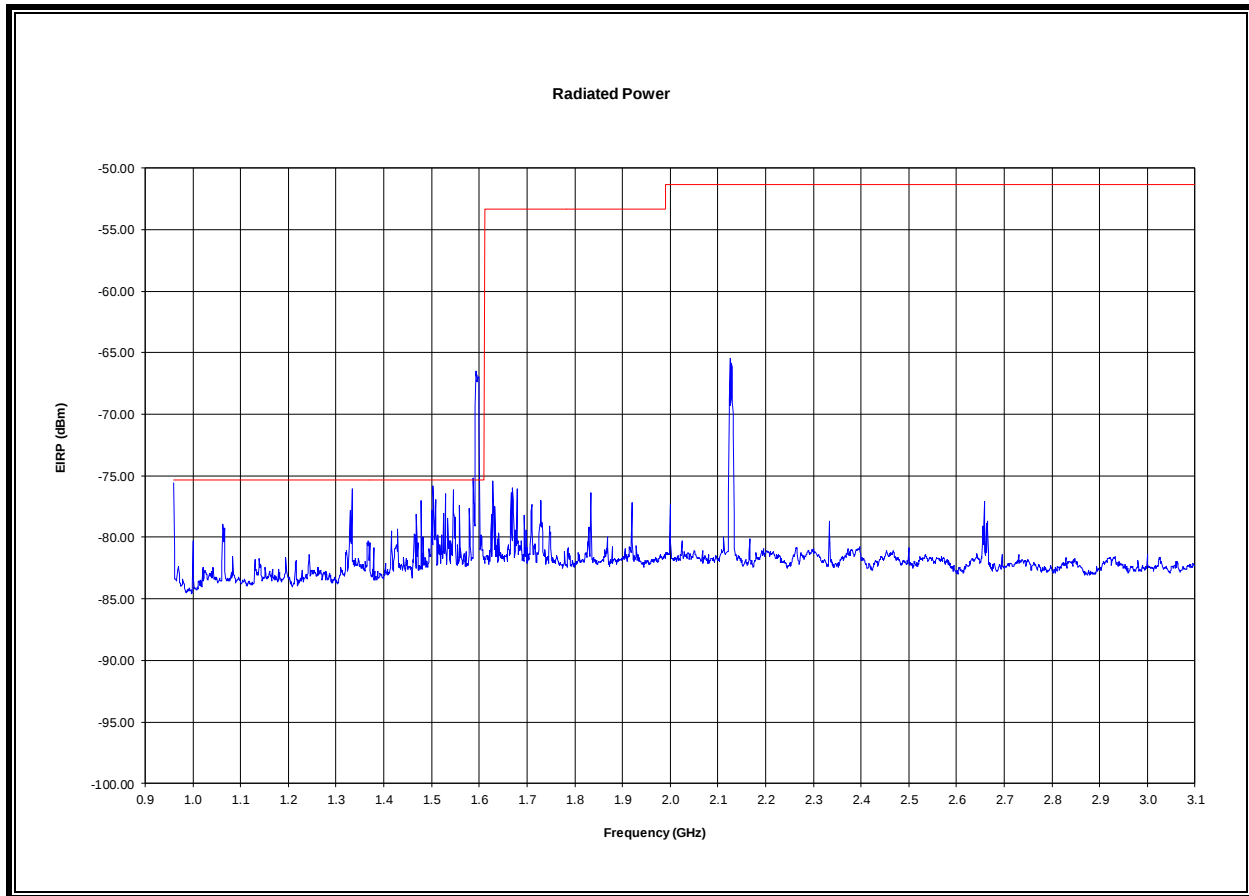
|                |          |            |     |
|----------------|----------|------------|-----|
| Polarization = | Vertical | Distance = | 3.0 |
|----------------|----------|------------|-----|

| f Max<br>(GHz) | Reading<br>(dBuV) | Antenna<br>Factor<br>(dB/m) | Cable<br>(Incl with Preamp)<br>(dB) | Preamp<br>& Cable<br>(dB) | Distance<br>Factor<br>(dB) |
|----------------|-------------------|-----------------------------|-------------------------------------|---------------------------|----------------------------|
| 6.805          | 40.4              | 35.1                        | 0.0                                 | -29.5                     | 0.00                       |

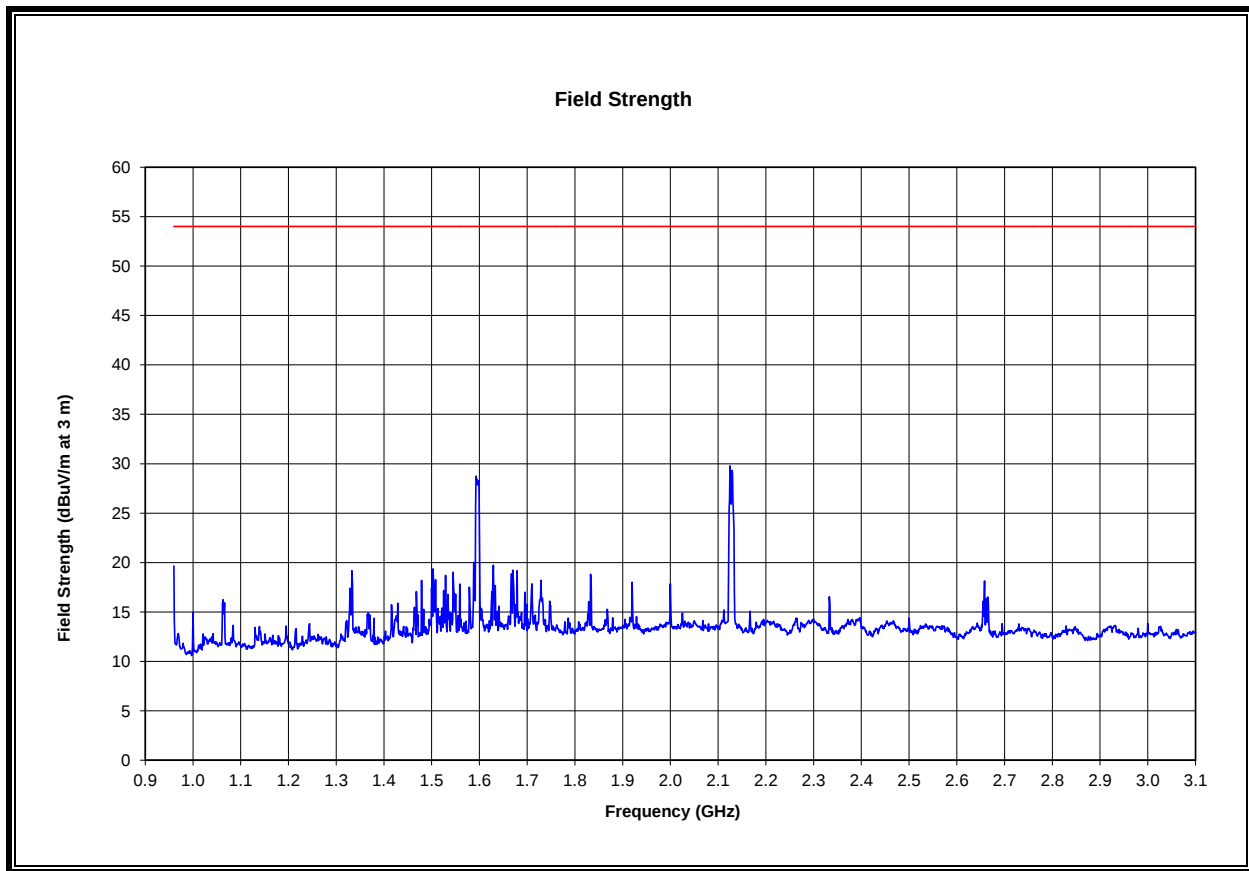
| Field Strength<br>at 3 meters<br>(dBuV/m) | EIRP<br>Conversion<br>Factor | EIRP<br>(dBm/MHz) | EIRP<br>Limit<br>(dBm/MHz) | Margin<br>(dB) |
|-------------------------------------------|------------------------------|-------------------|----------------------------|----------------|
| 45.96                                     | -95.2                        | -49.2             | -41.3                      | -7.9           |

### 8.3.1. RADIATED EMISSIONS ABOVE 960 MHz FOR BG1

#### EIRP 0.960 TO 3.1 GHz, 1 MHz BW

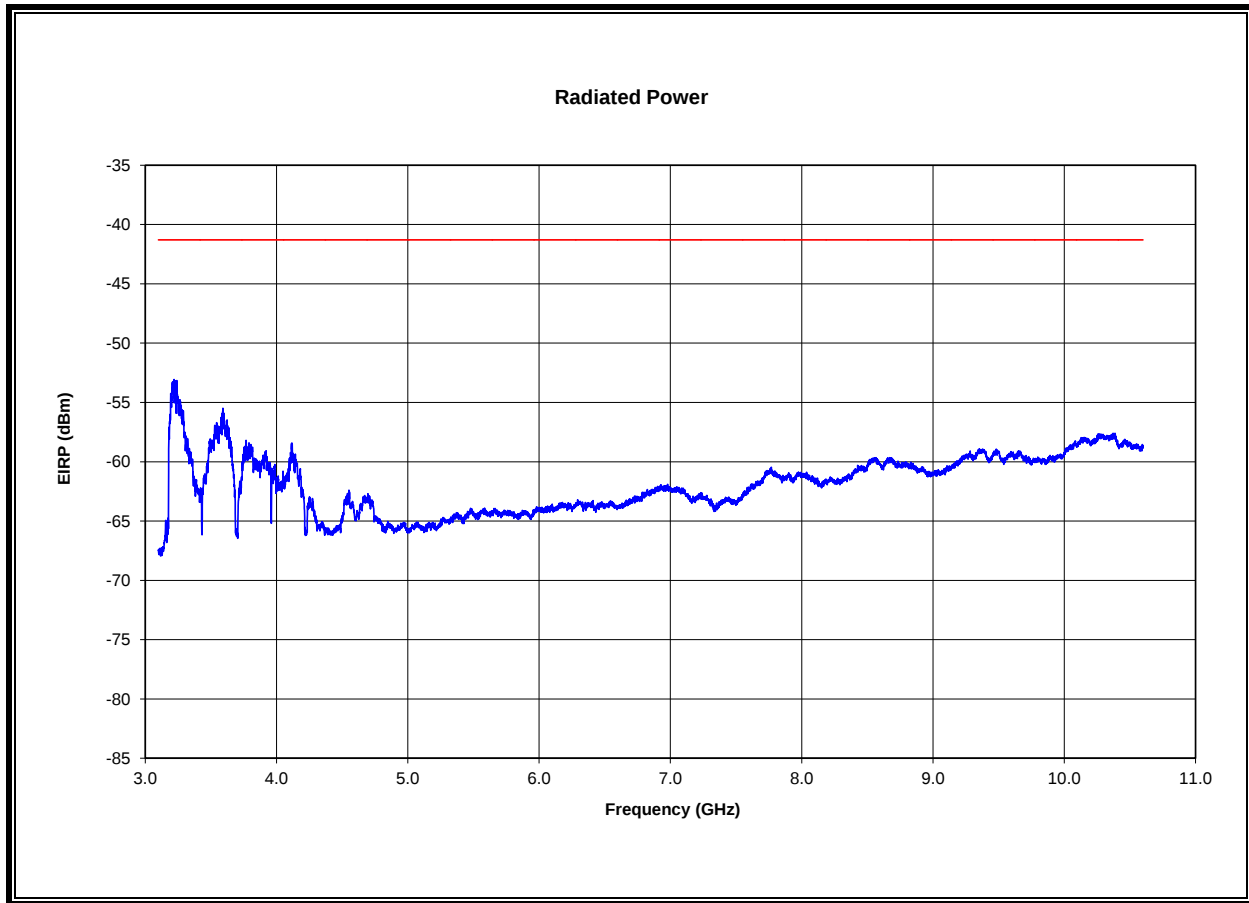


The emission at 1593 MHz is due to digital device circuitry. This was determined by turning off the UWB transmitter and observing that this emission remained.

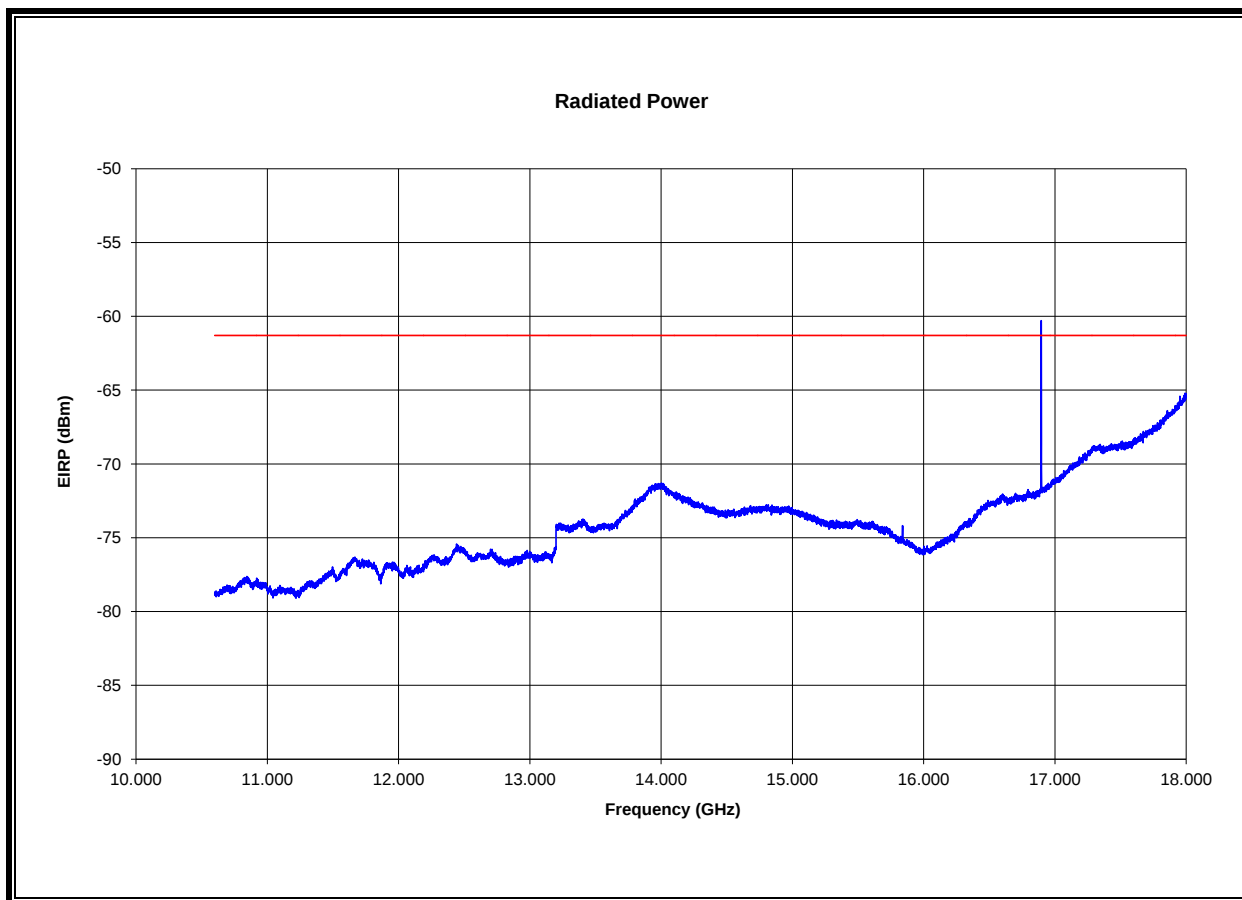


The peak measurement is compared to the average 15.209 field strength limit.

**EIRP 3.1 TO 10.6 GHz, 1 MHz BW**



**EIRP 10.6 TO 18 GHz, 1 MHz BW**

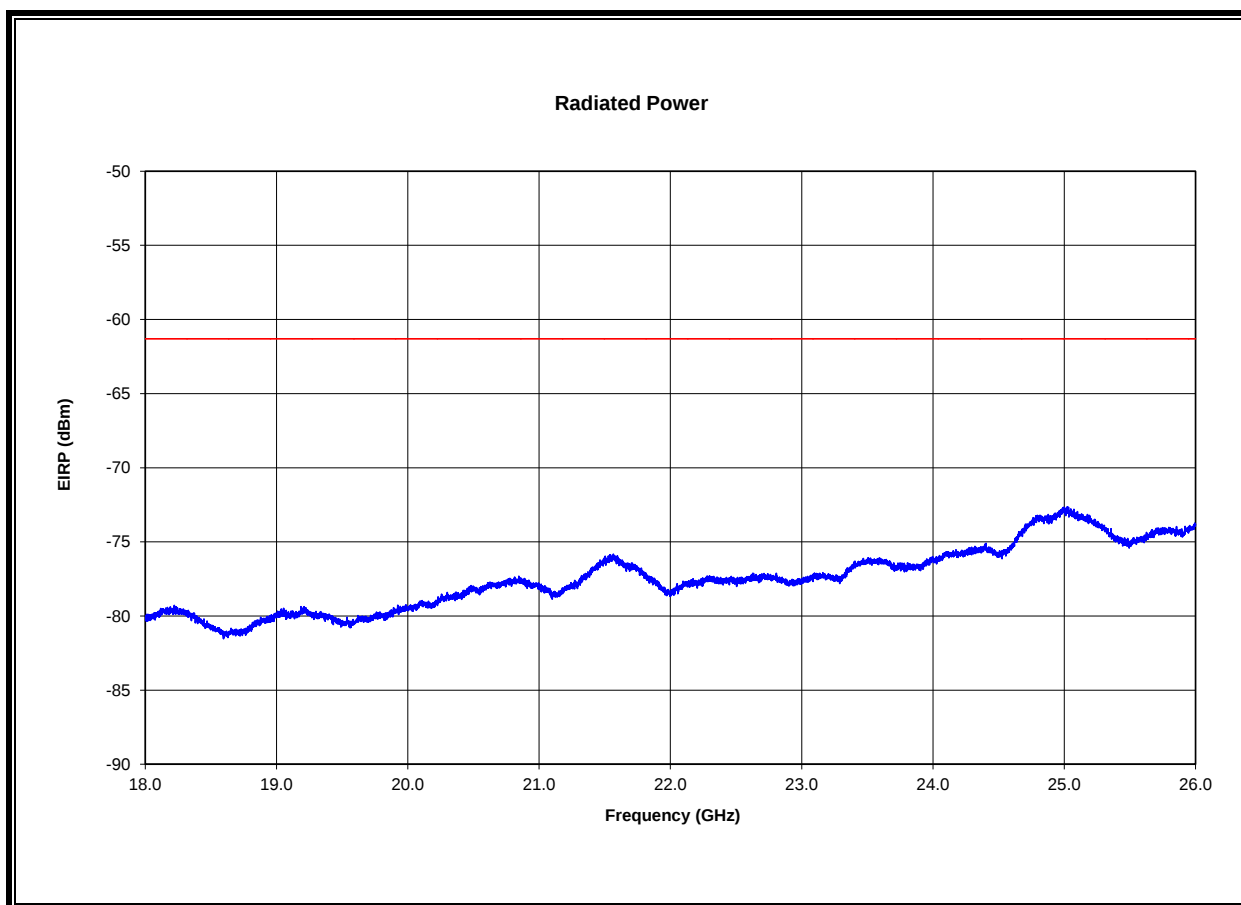


The emission at 18.896 GHz is due to digital device circuitry. This was determined by turning off the UWB transmitter and observing that this emission remained.

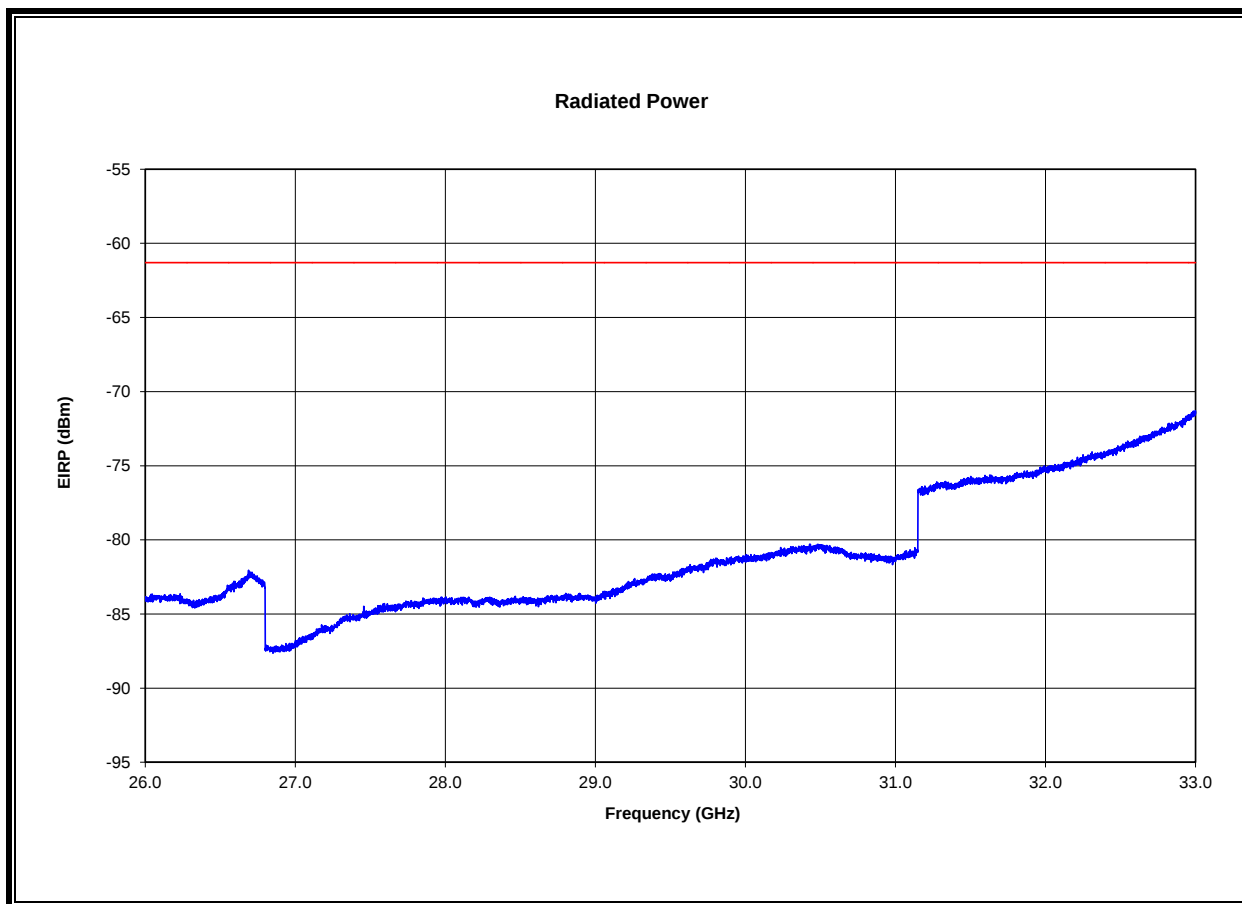
**FIELD STRENGTH 18.896 GHz, 1 MHz BW**

| Freq<br>GHz | Dist<br>(m) | Reading<br>dBuV | AF<br>dB/m | CL<br>dB | Amp<br>dB | D Corr<br>dB | Fltr<br>dB | Peak Corrected<br>dBuV/m | Average Limit<br>dBuV/m | Margin<br>dB |
|-------------|-------------|-----------------|------------|----------|-----------|--------------|------------|--------------------------|-------------------------|--------------|
| 16.896      | 1.0         | 37.1            | 41.8       | 13.2     | -31.9     | -9.5         | 0.0        | 50.6                     | 54                      | -3.4         |

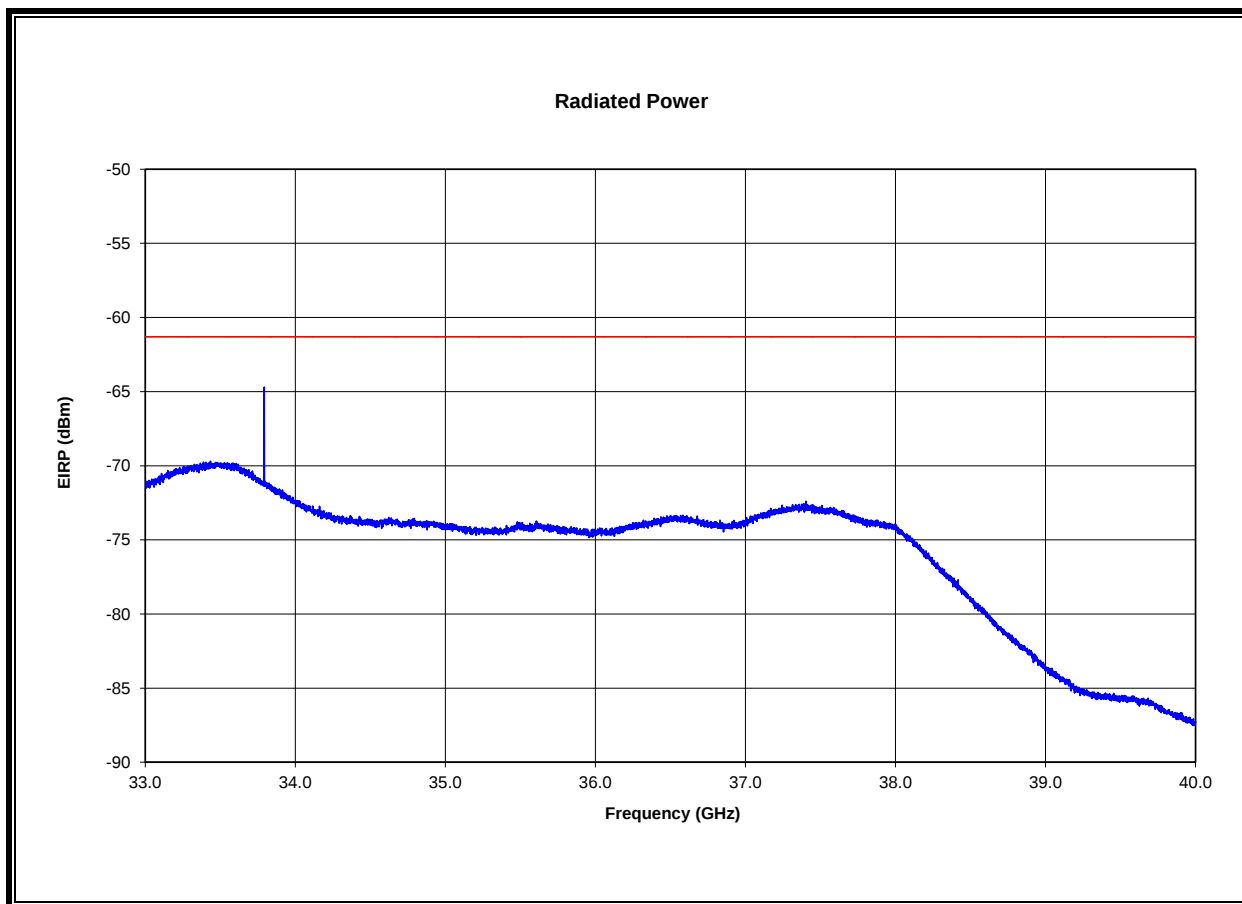
The peak measurement is compared to the average 15.209 field strength limit.



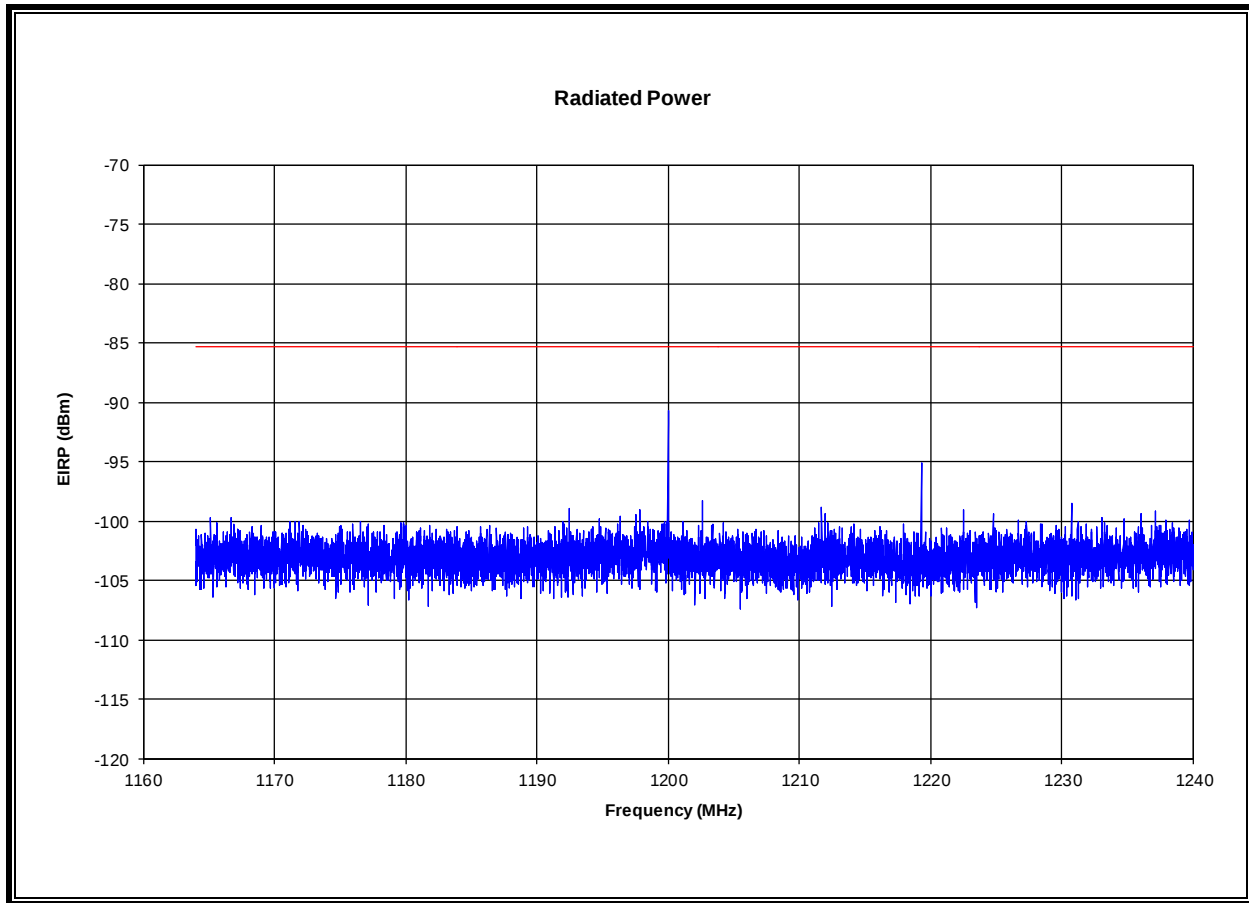
**EIRP 26 TO 33 GHz, 1 MHz BW**



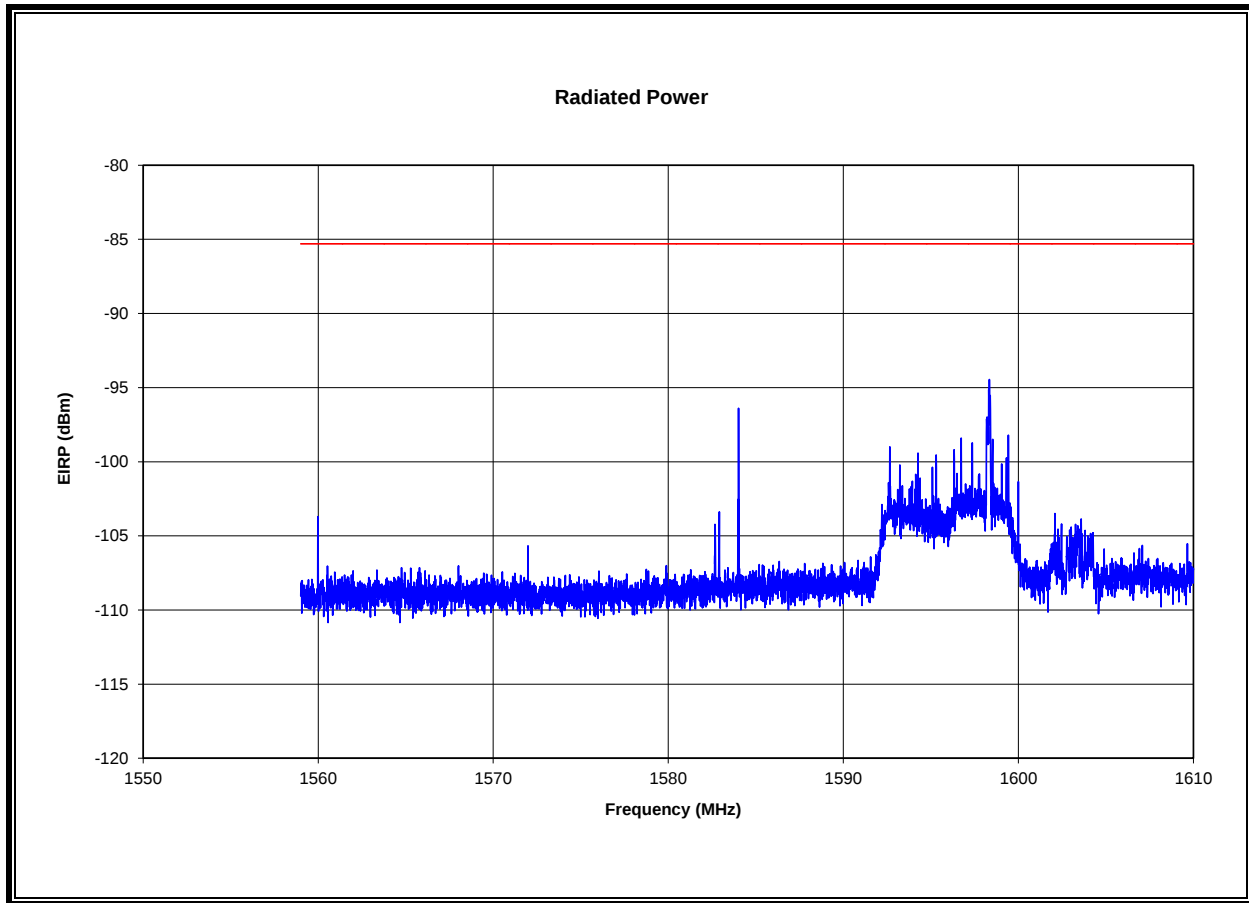
**EIRP 33 TO 40 GHz, 1 MHz BW**



**EIRP 1.164 TO 1.240 GHz, 1 kHz BW**

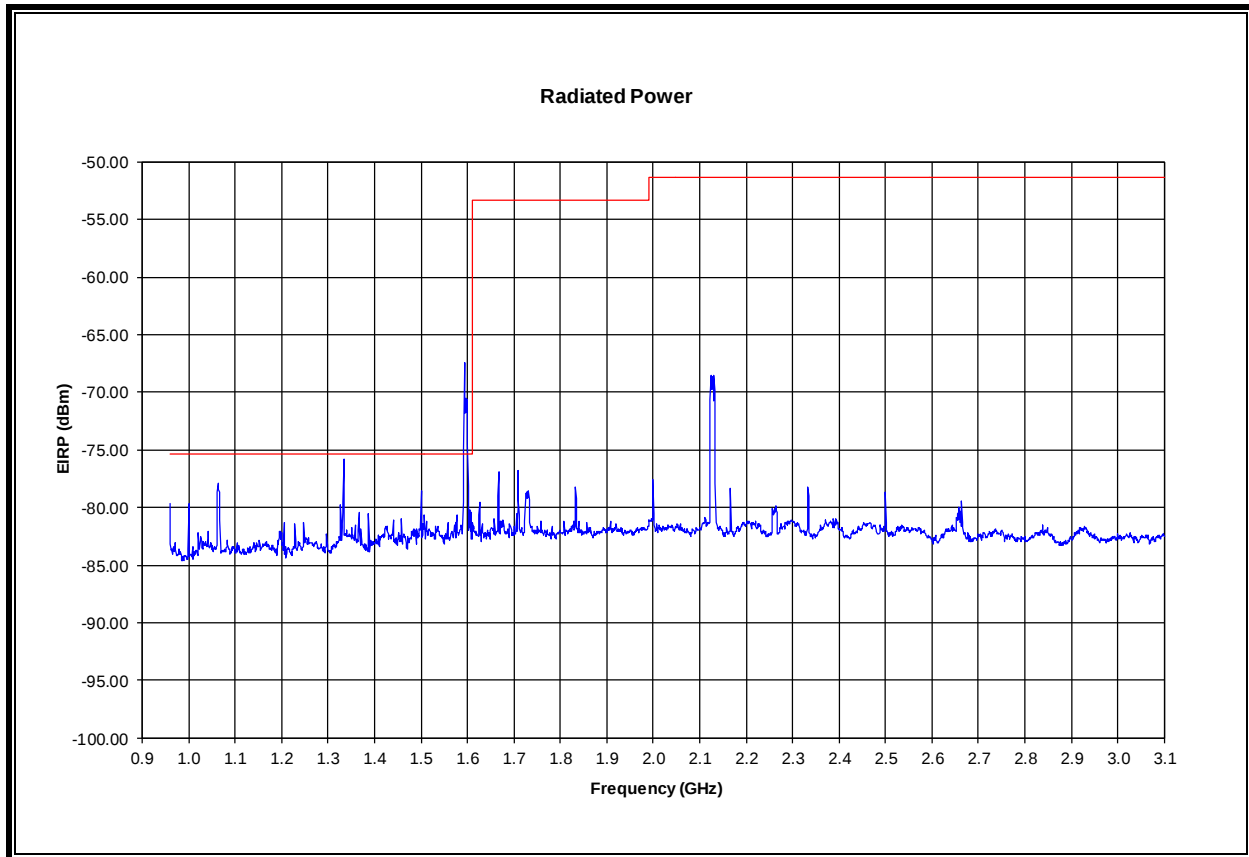


**EIRP 1.559 TO 1.610 GHz, 1 kHz BW**



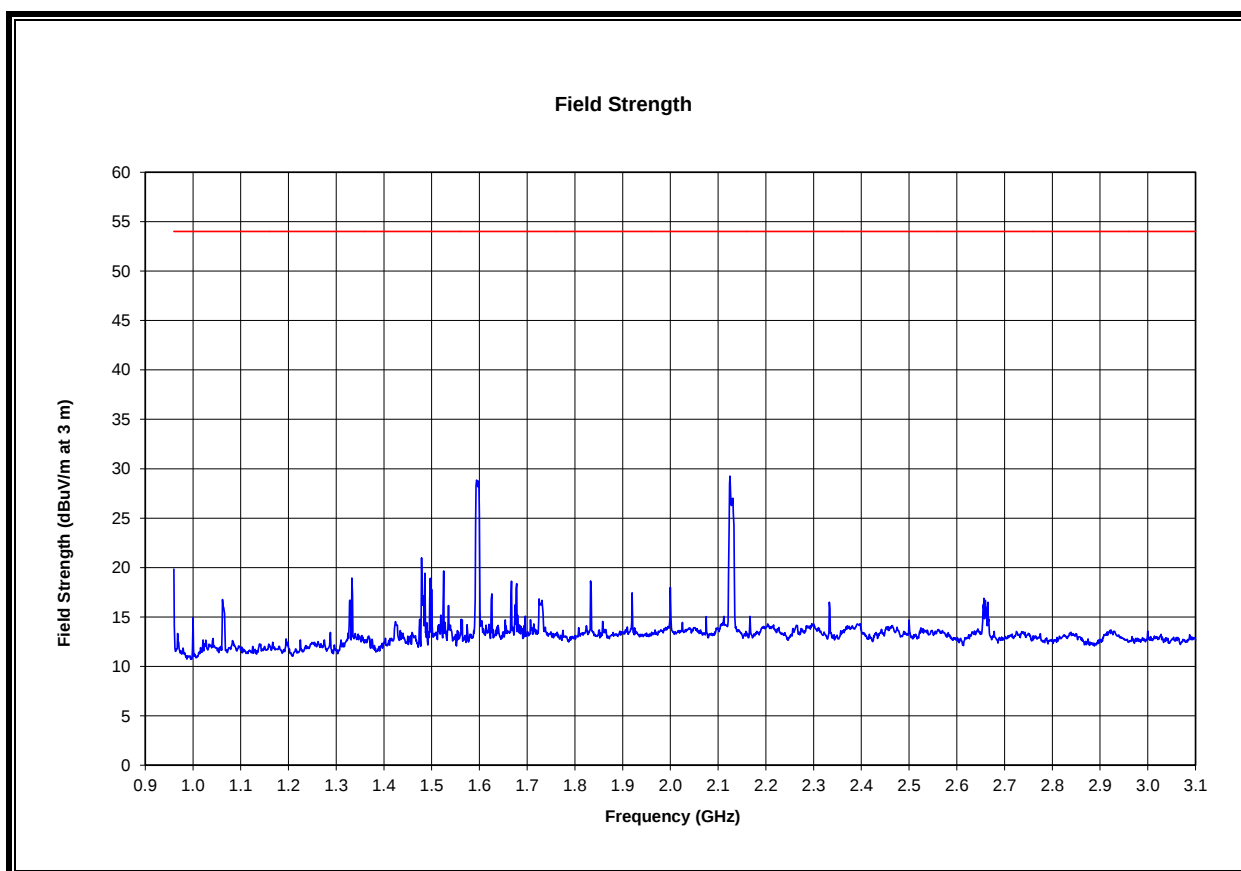
### 8.3.2. RADIATED EMISSIONS ABOVE 960 MHz FOR BG3

#### EIRP 0.960 TO 3.1 GHz, 1 MHz BW



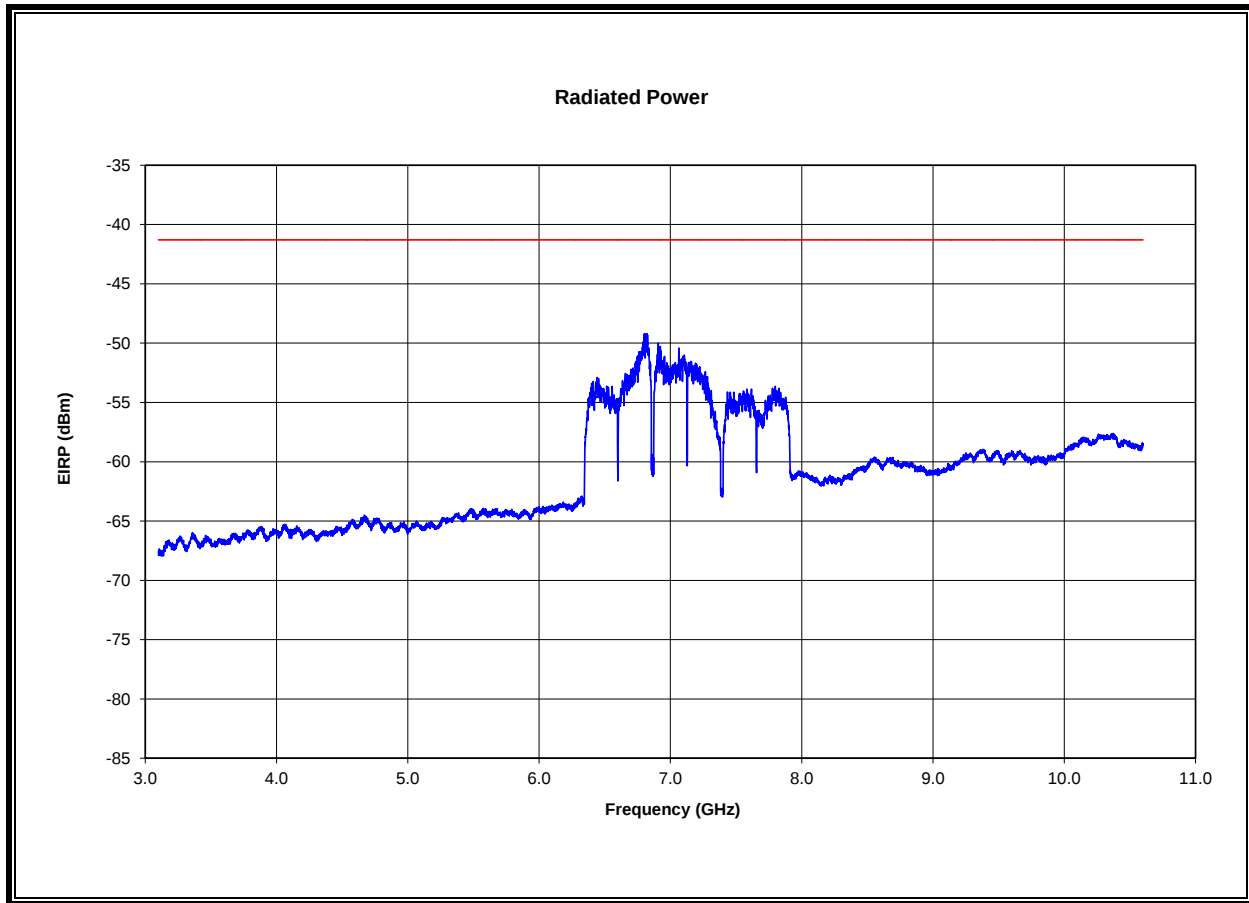
The emission at 1593 MHz is due to digital device circuitry. This was determined by turning off the UWB transmitter and observing that this emission remained.

**FIELD STRENGTH 0.960 TO 3.1 GHz, 1 MHz BW**

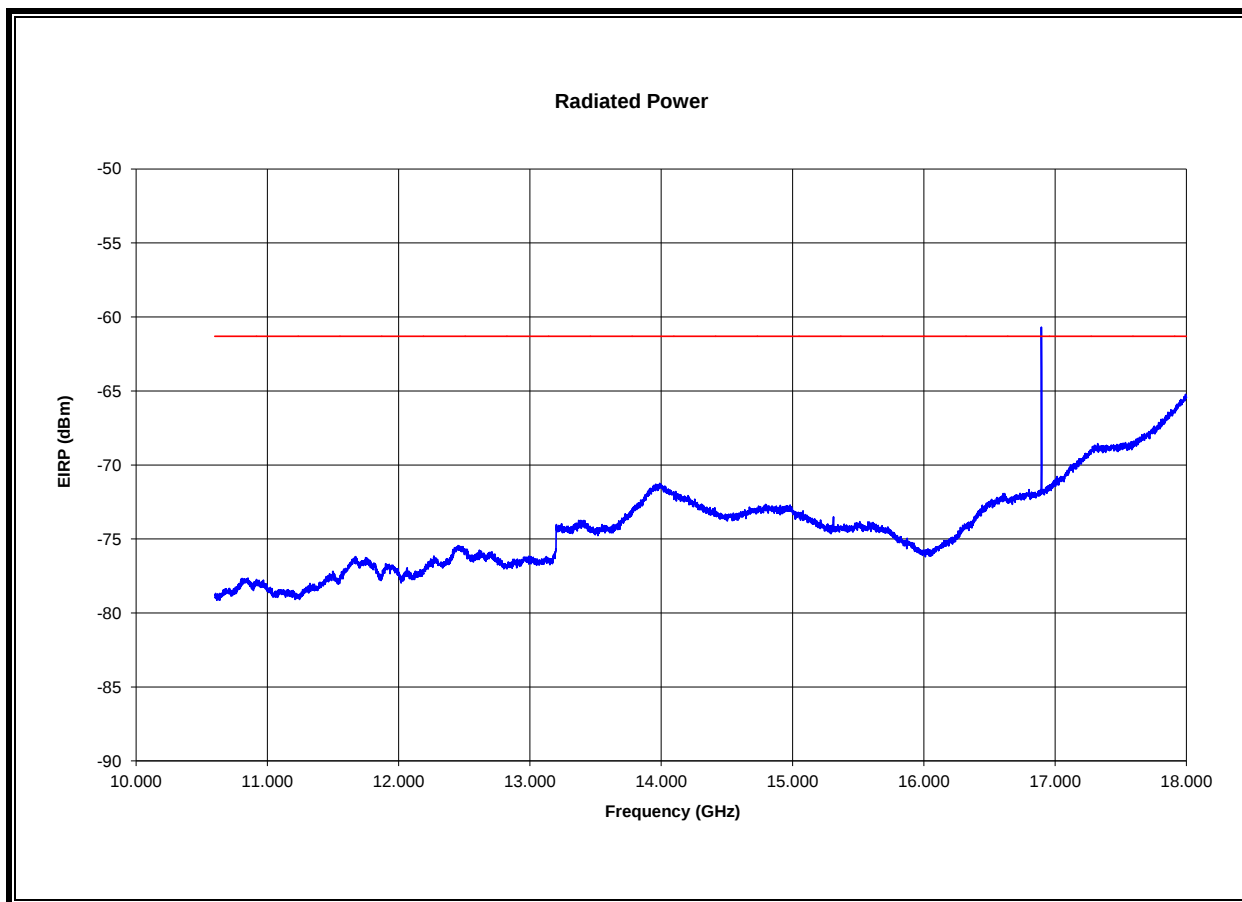


The peak measurement is compared to the average 15.209 field strength limit.

**EIRP 3.1 TO 10.6 GHz, 1 MHz BW**



**EIRP 10.6 TO 18 GHz, 1 MHz BW**

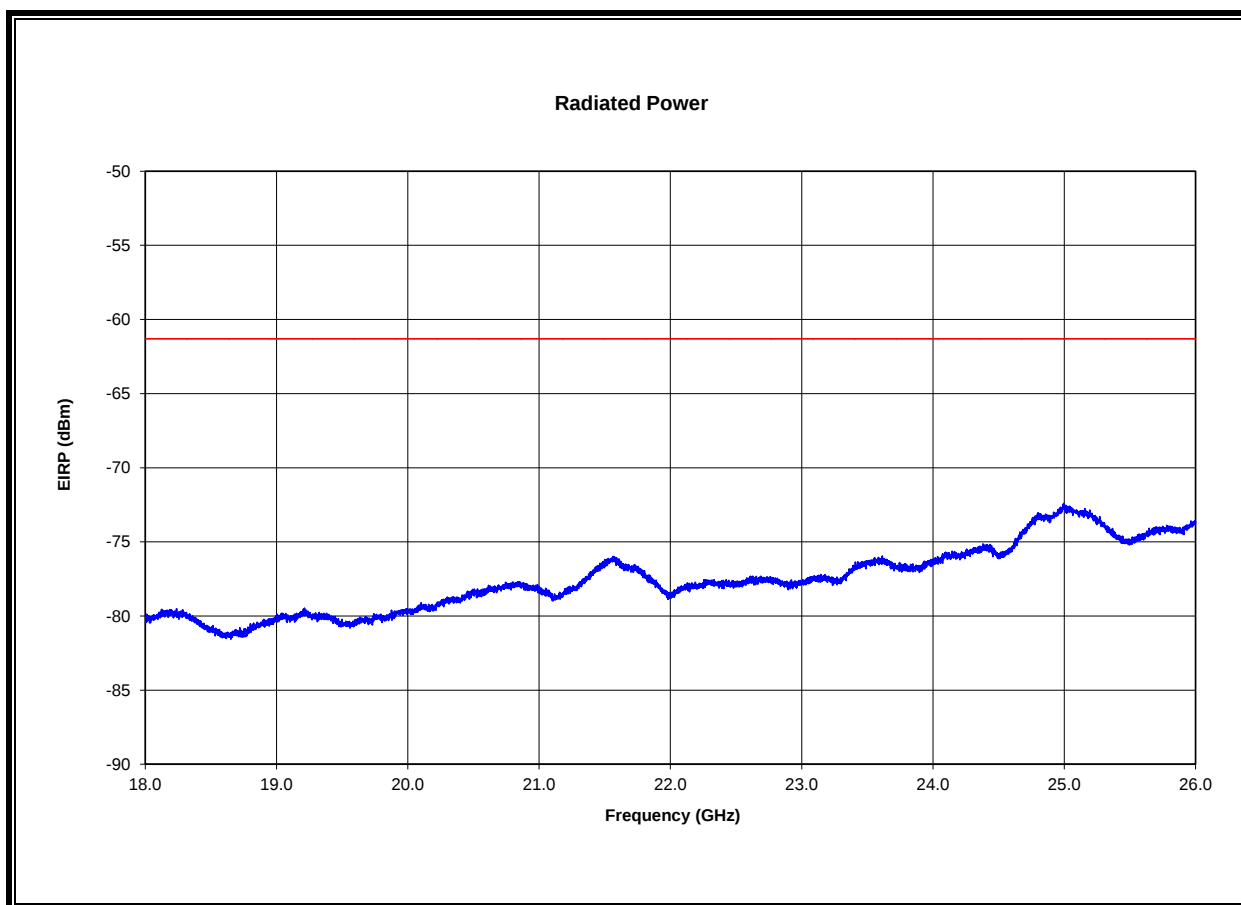


The emission at 18.896 GHz is due to digital device circuitry. This was determined by turning off the UWB transmitter and observing that this emission remained.

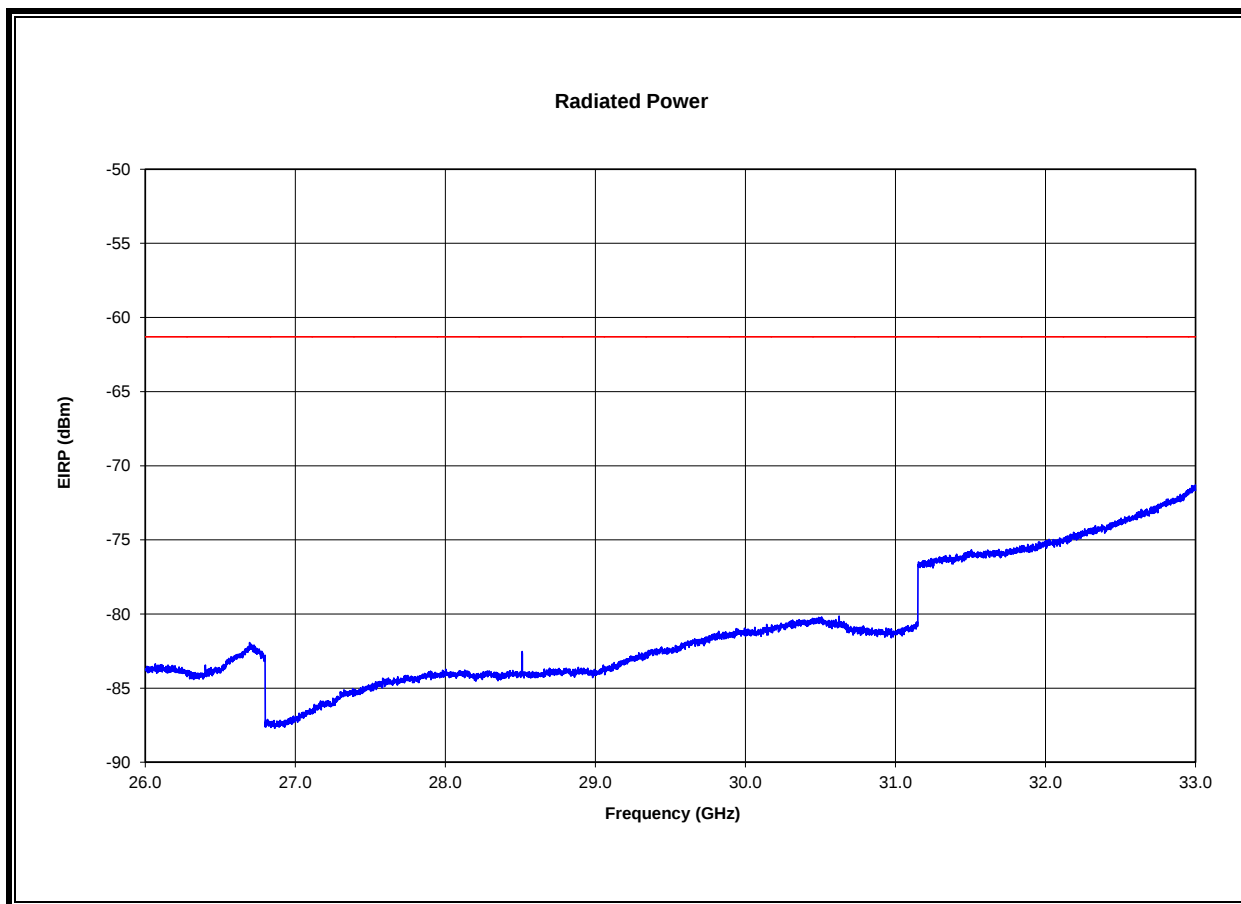
**FIELD STRENGTH 18.896 GHz, 1 MHz BW**

| Freq<br>GHz | Dist<br>(m) | Reading<br>dBuV | AF<br>dB/m | CL<br>dB | Amp<br>dB | D Corr<br>dB | Fltr<br>dB | Peak Corrected<br>dBuV/m | Average Limit<br>dBuV/m | Margin<br>dB |
|-------------|-------------|-----------------|------------|----------|-----------|--------------|------------|--------------------------|-------------------------|--------------|
| 16.896      | 1.0         | 37.1            | 41.8       | 13.2     | -31.9     | -9.5         | 0.0        | 50.6                     | 54                      | -3.4         |

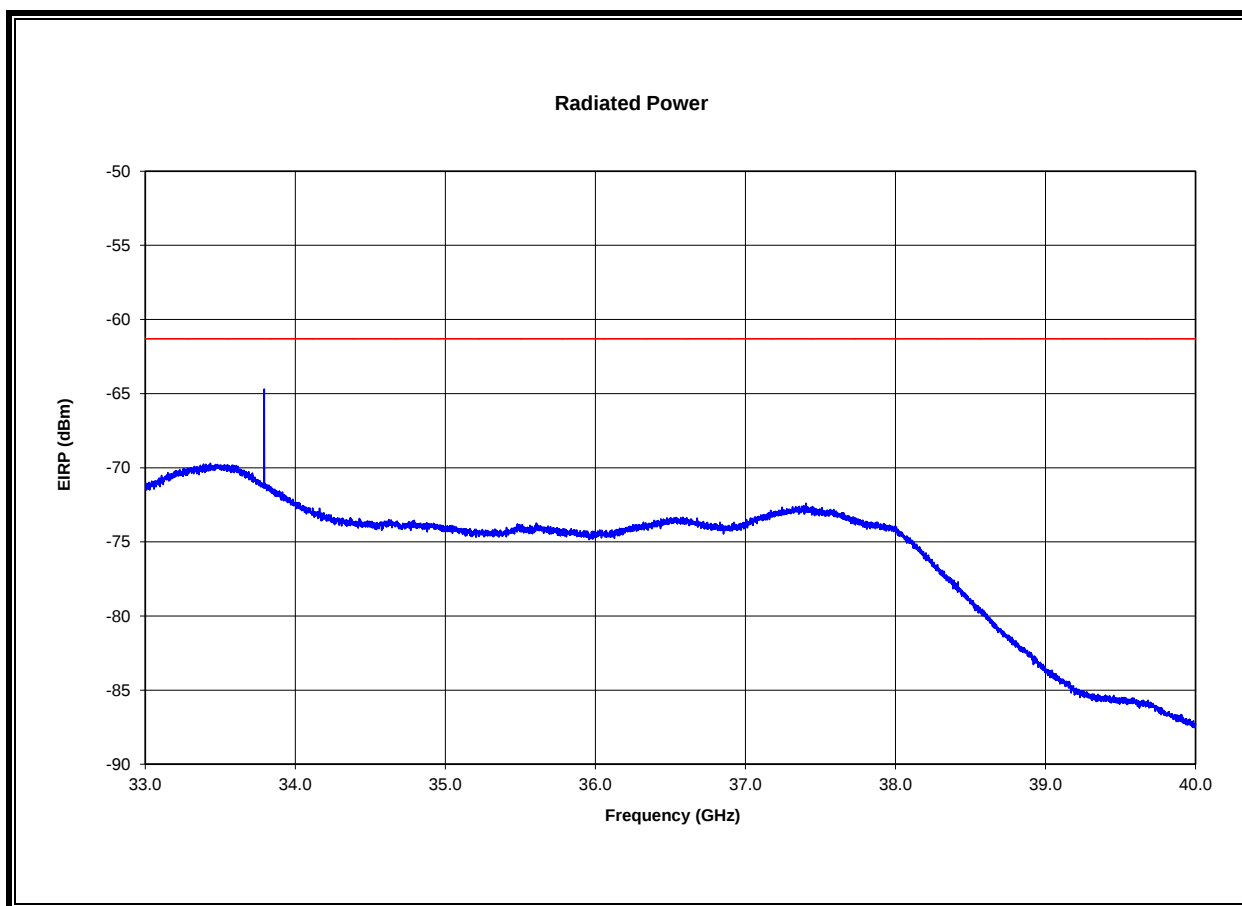
The peak measurement is compared to the average 15.209 field strength limit.



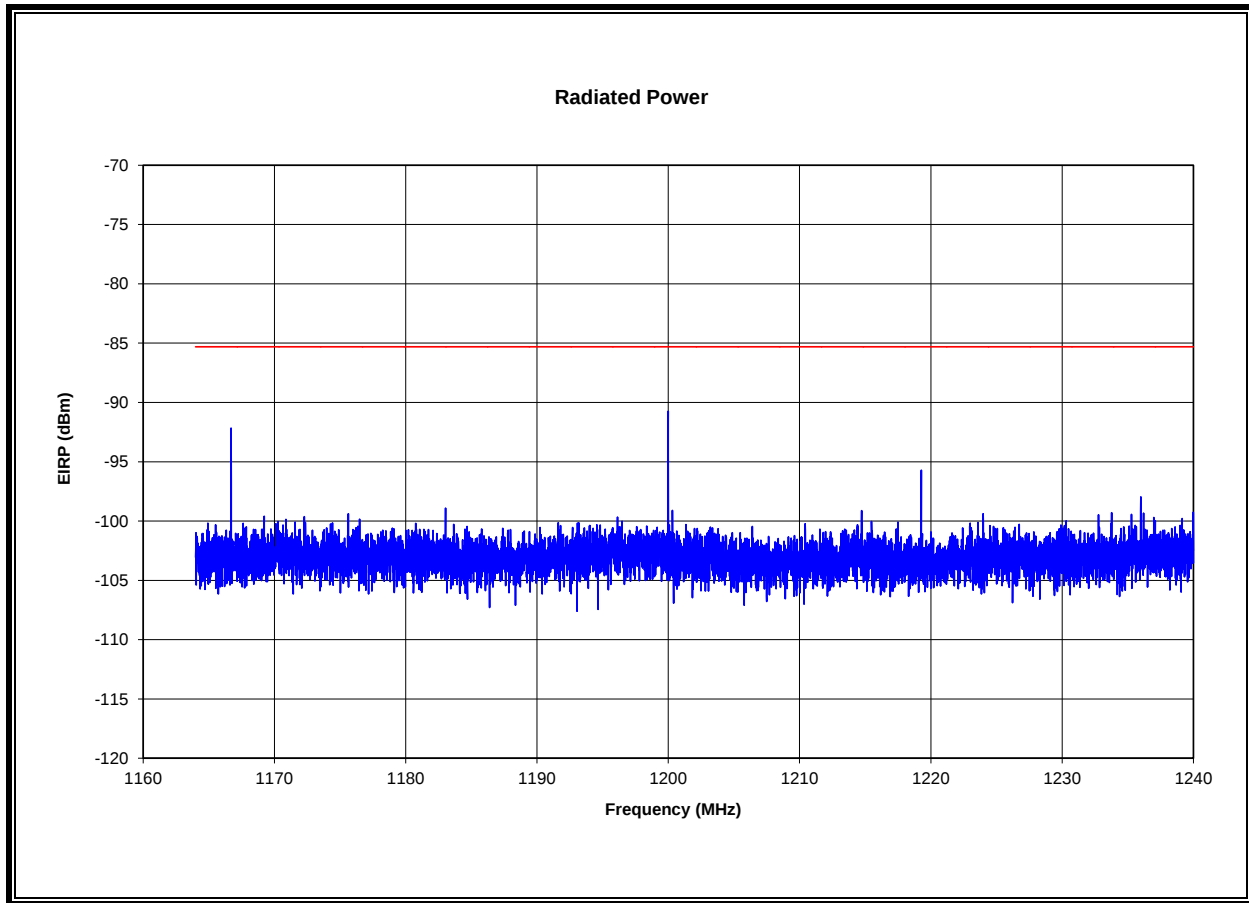
**EIRP 26 TO 33 GHz, 1 MHz BW**



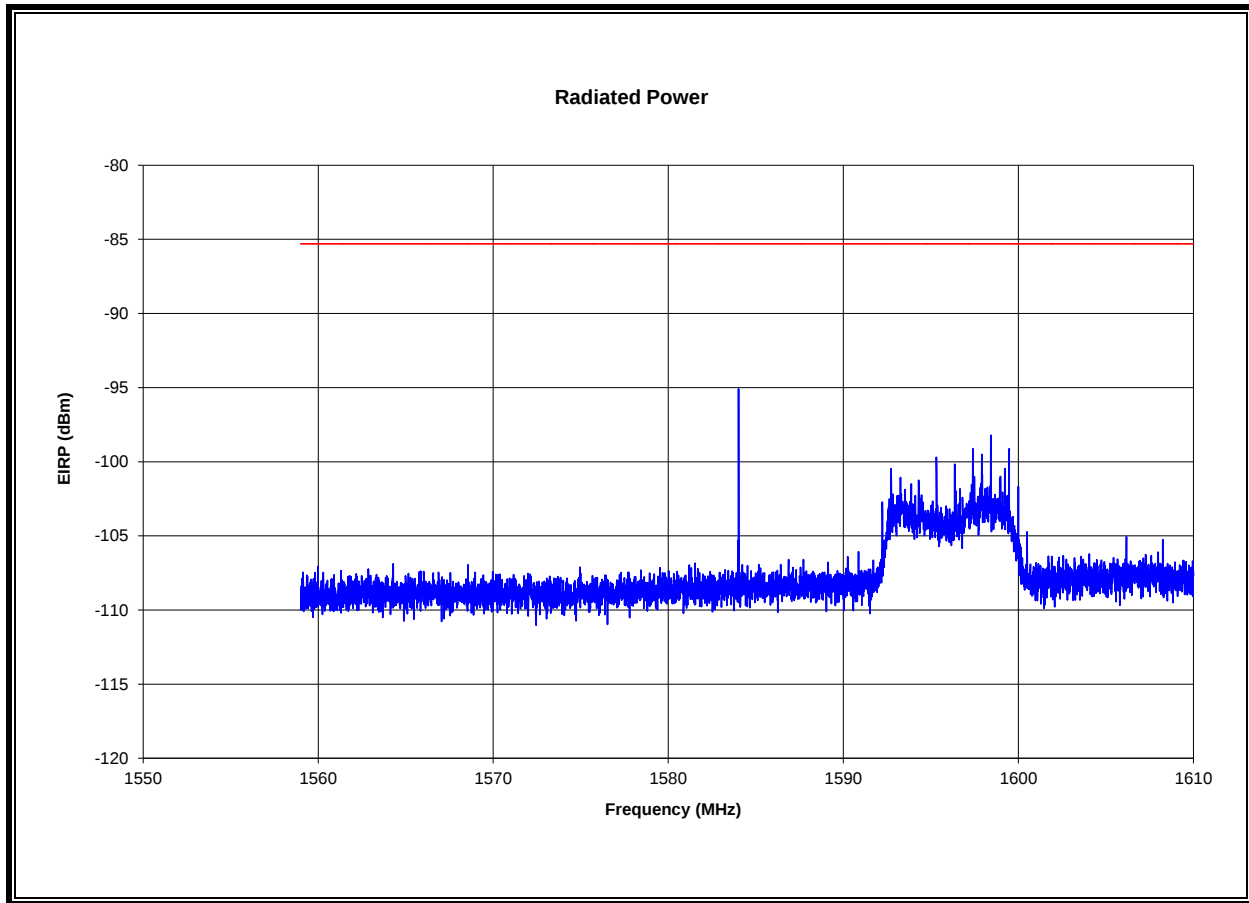
**EIRP 33 TO 40 GHz, 1 MHz BW**



**EIRP 1.164 TO 1.240 GHz, 1 kHz BW**

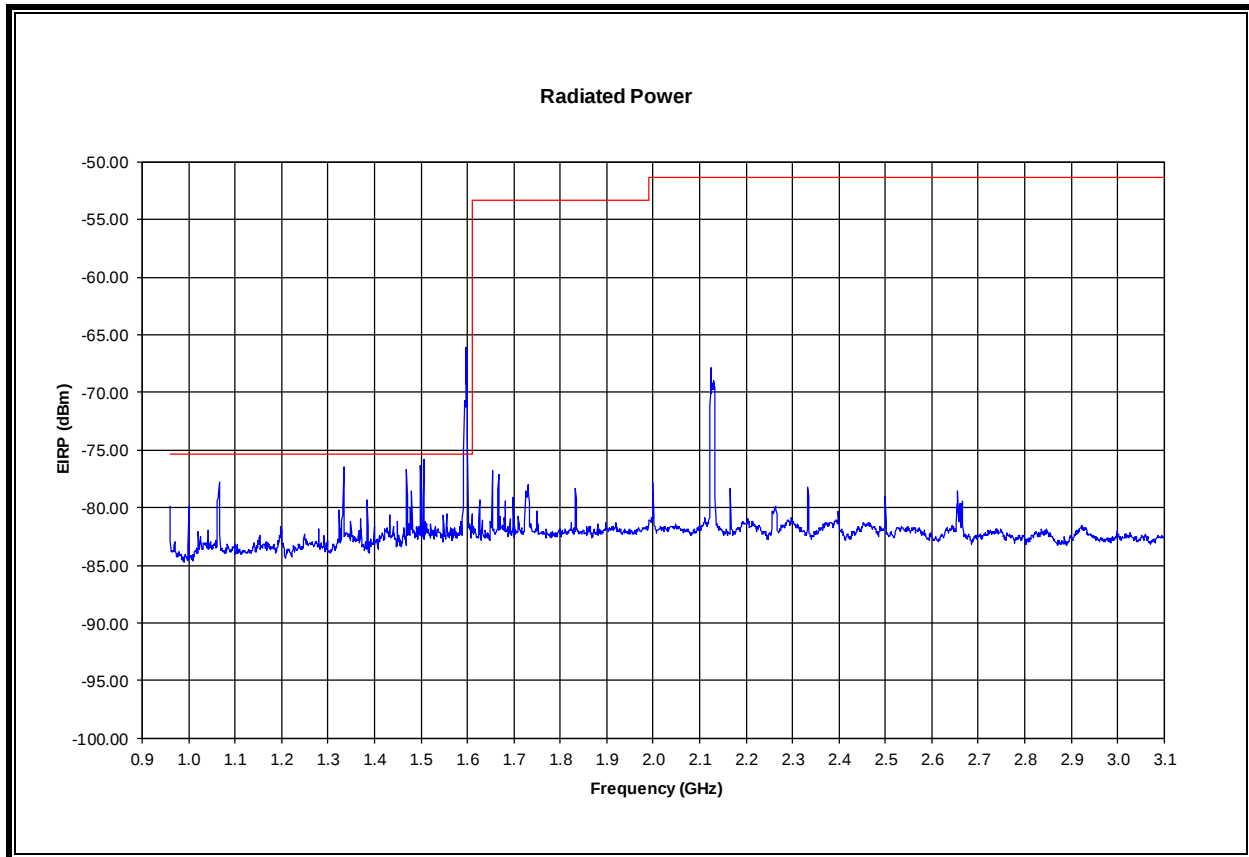


**EIRP 1.559 TO 1.610 GHz, 1 kHz BW**



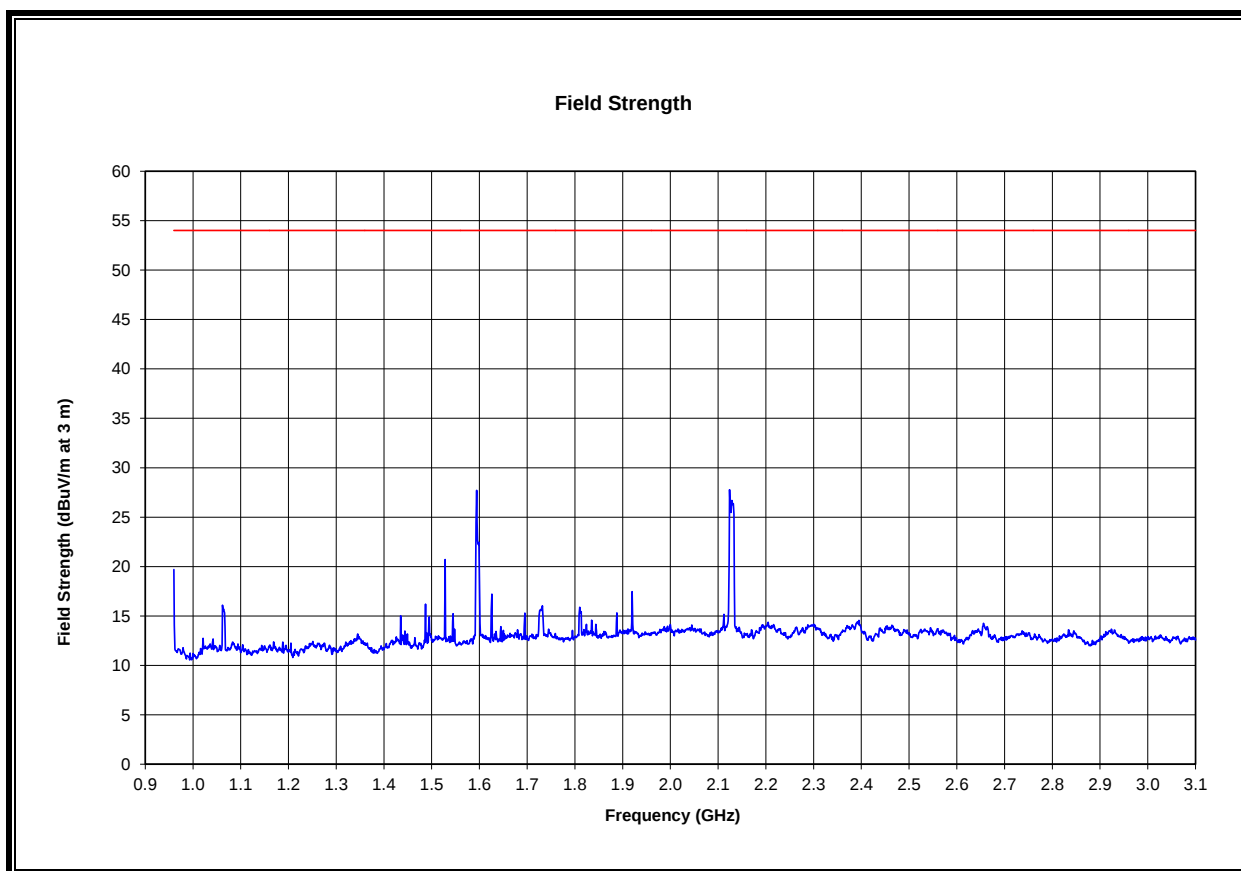
### 8.3.3. RADIATED EMISSIONS ABOVE 960 MHz FOR BG6

#### EIRP 0.960 TO 3.1 GHz, 1 MHz BW



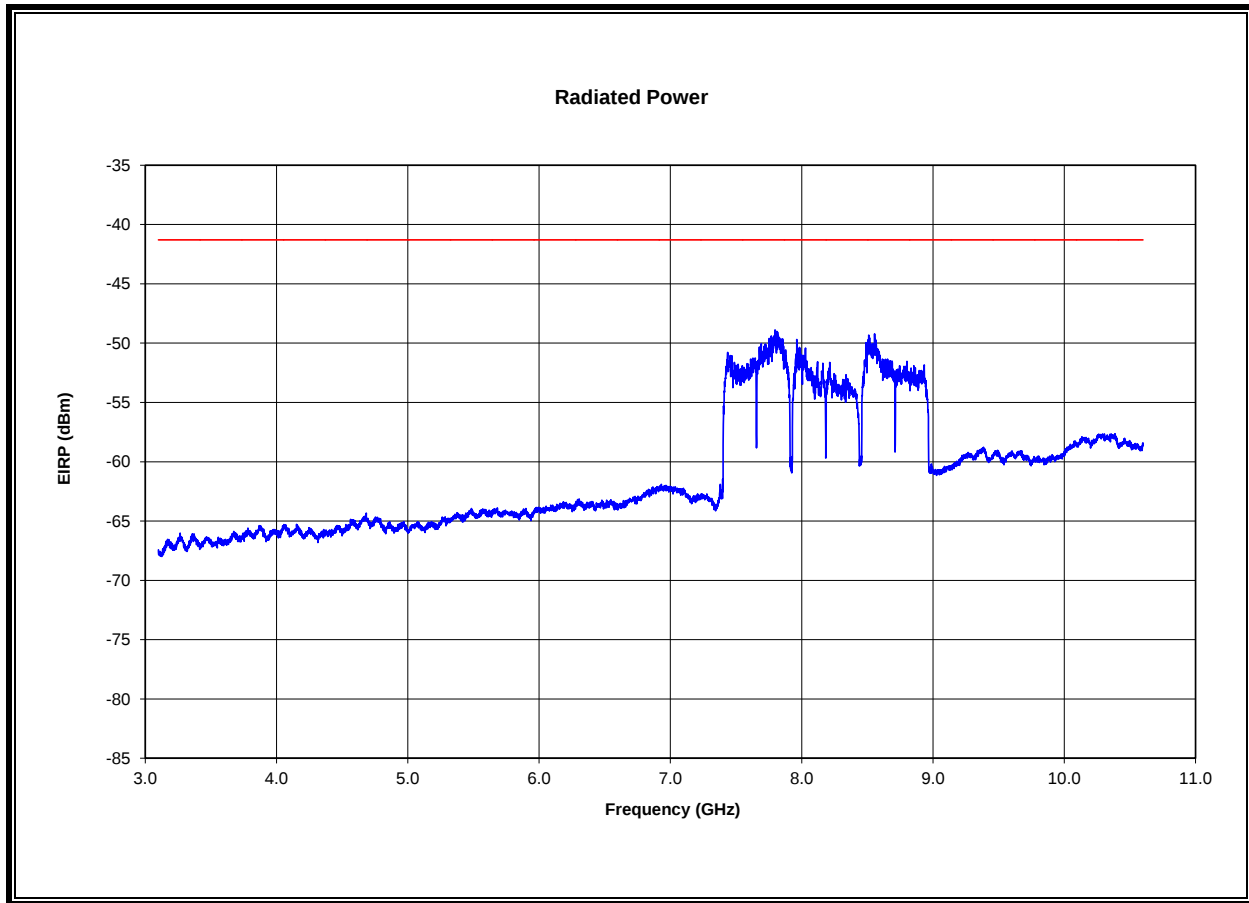
The emission at 1593 MHz is due to digital device circuitry. This was determined by turning off the UWB transmitter and observing that this emission remained.

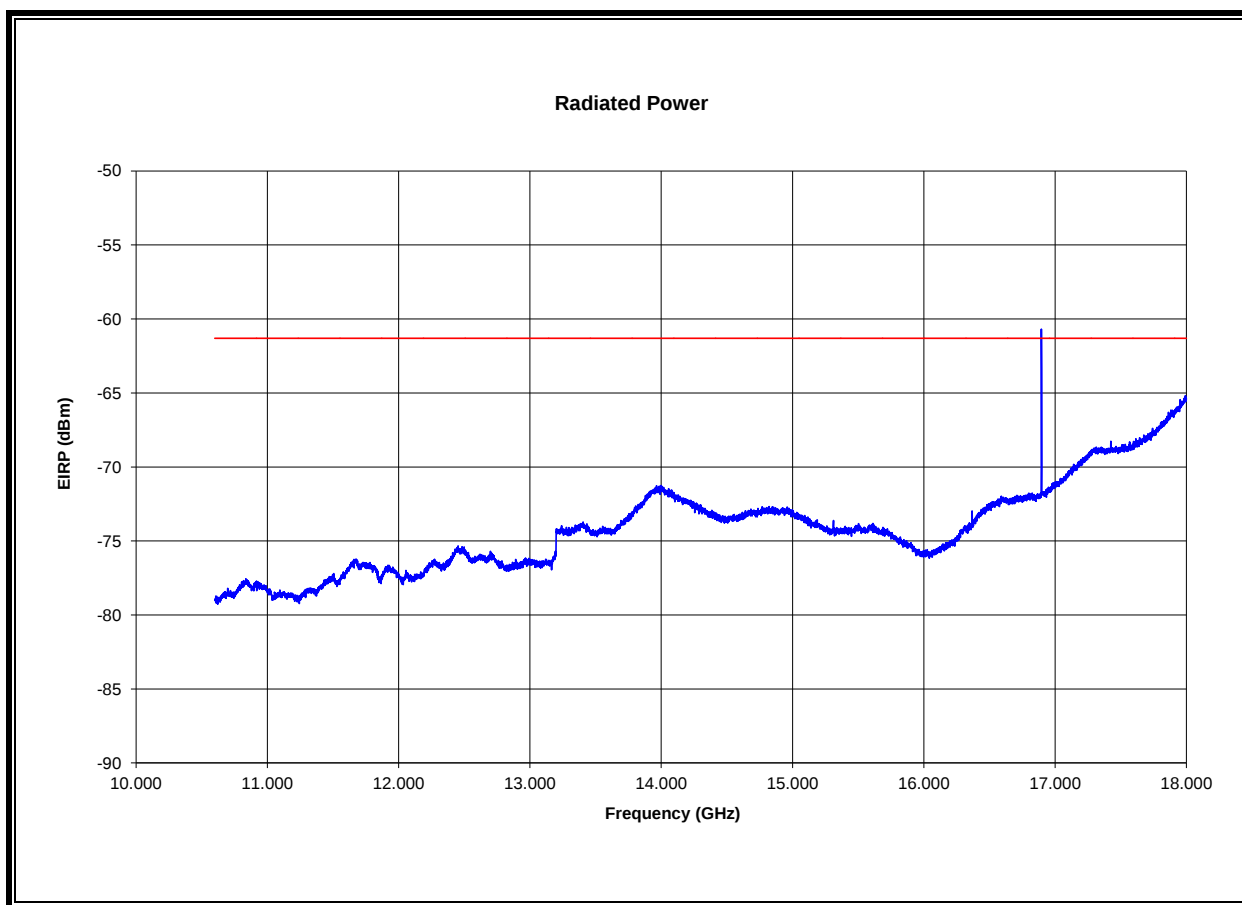
**FIELD STRENGTH 0.960 TO 3.1 GHz, 1 MHz BW**



The peak measurement is compared to the average 15.209 field strength limit.

**EIRP 3.1 TO 10.6 GHz, 1 MHz BW**



**EIRP 10.6 TO 18 GHz, 1 MHz BW**

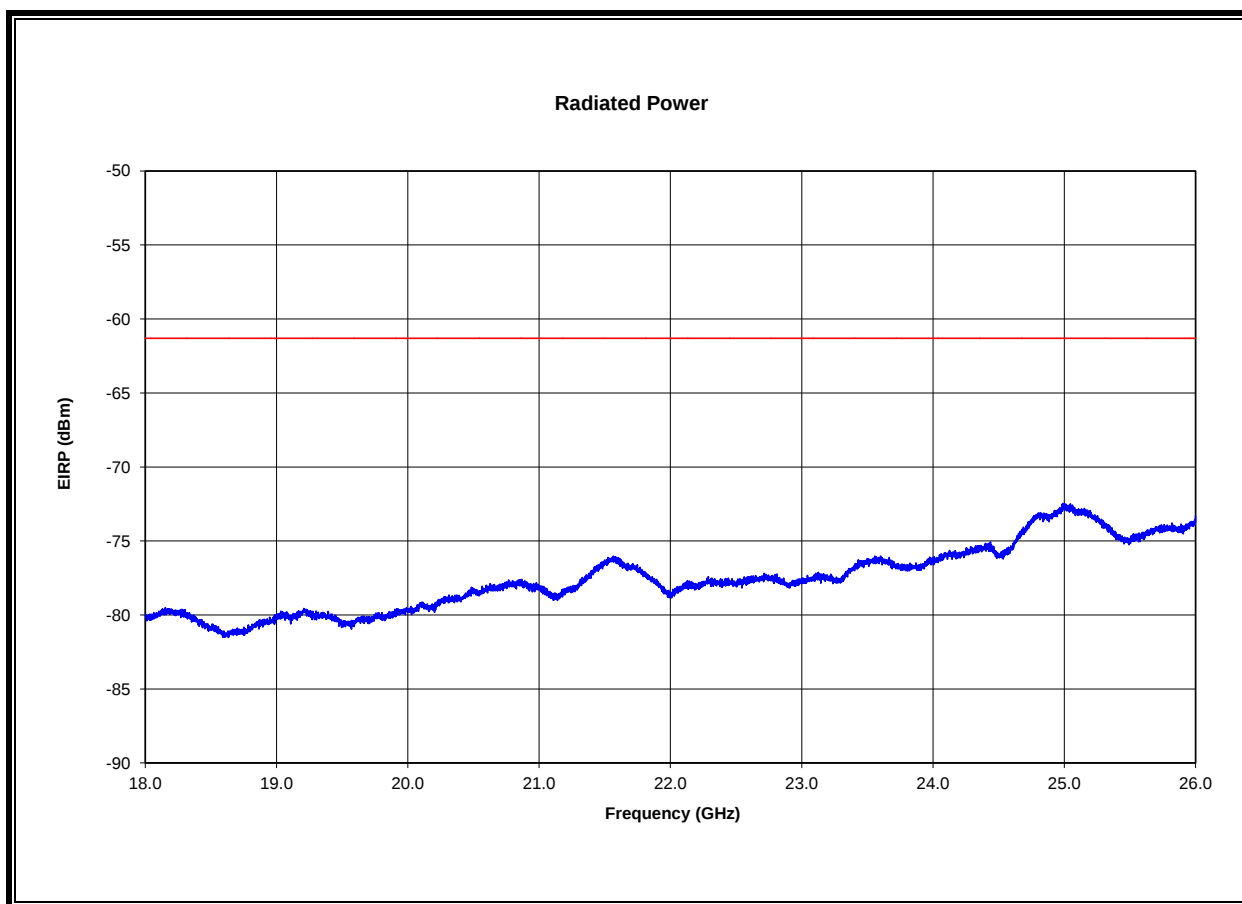
The emission at 18.896 GHz is due to digital device circuitry. This was determined by turning off the UWB transmitter and observing that this emission remained.

**FIELD STRENGTH 18.896 GHz, 1 MHz BW**

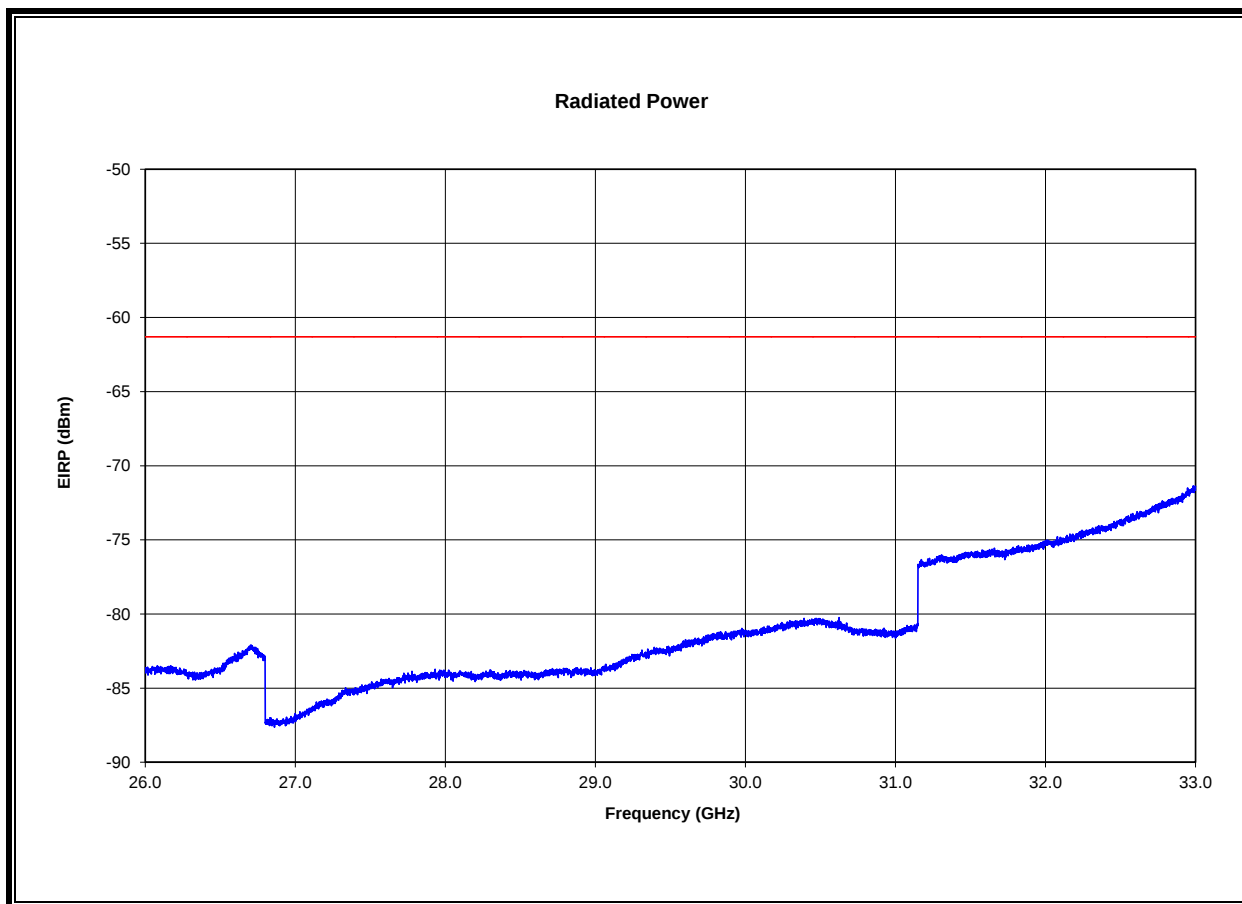
| Freq<br>GHz | Dist<br>(m) | Reading<br>dBuV | AF<br>dB/m | CL<br>dB | Amp<br>dB | D Corr<br>dB | Fltr<br>dB | Peak Corrected<br>dBuV/m | Average Limit<br>dBuV/m | Margin<br>dB |
|-------------|-------------|-----------------|------------|----------|-----------|--------------|------------|--------------------------|-------------------------|--------------|
| 16.896      | 1.0         | 37.1            | 41.8       | 13.2     | -31.9     | -9.5         | 0.0        | 50.6                     | 54                      | -3.4         |

The peak measurement is compared to the average 15.209 field strength limit.

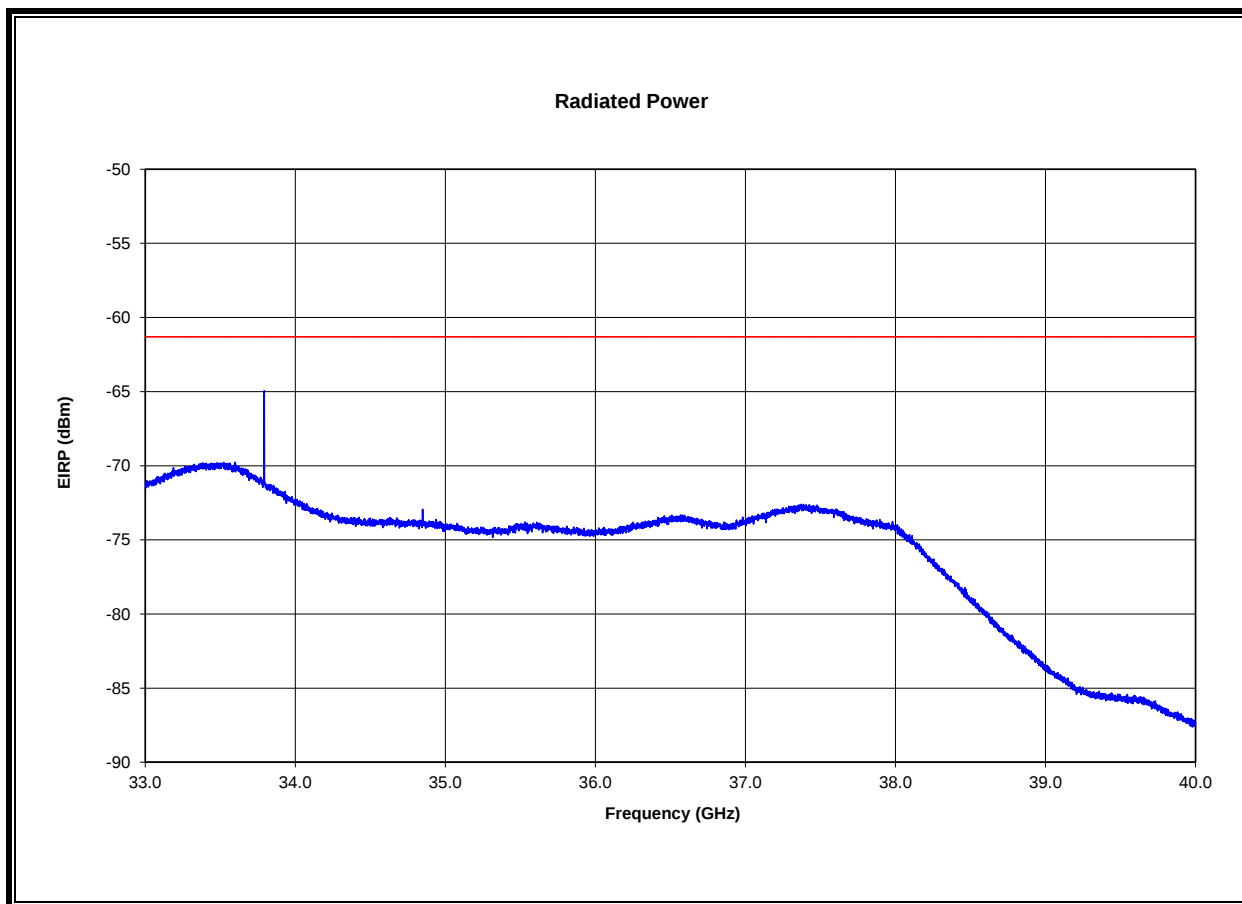
**EIRP 18 TO 26 GHz, 1 MHz BW**



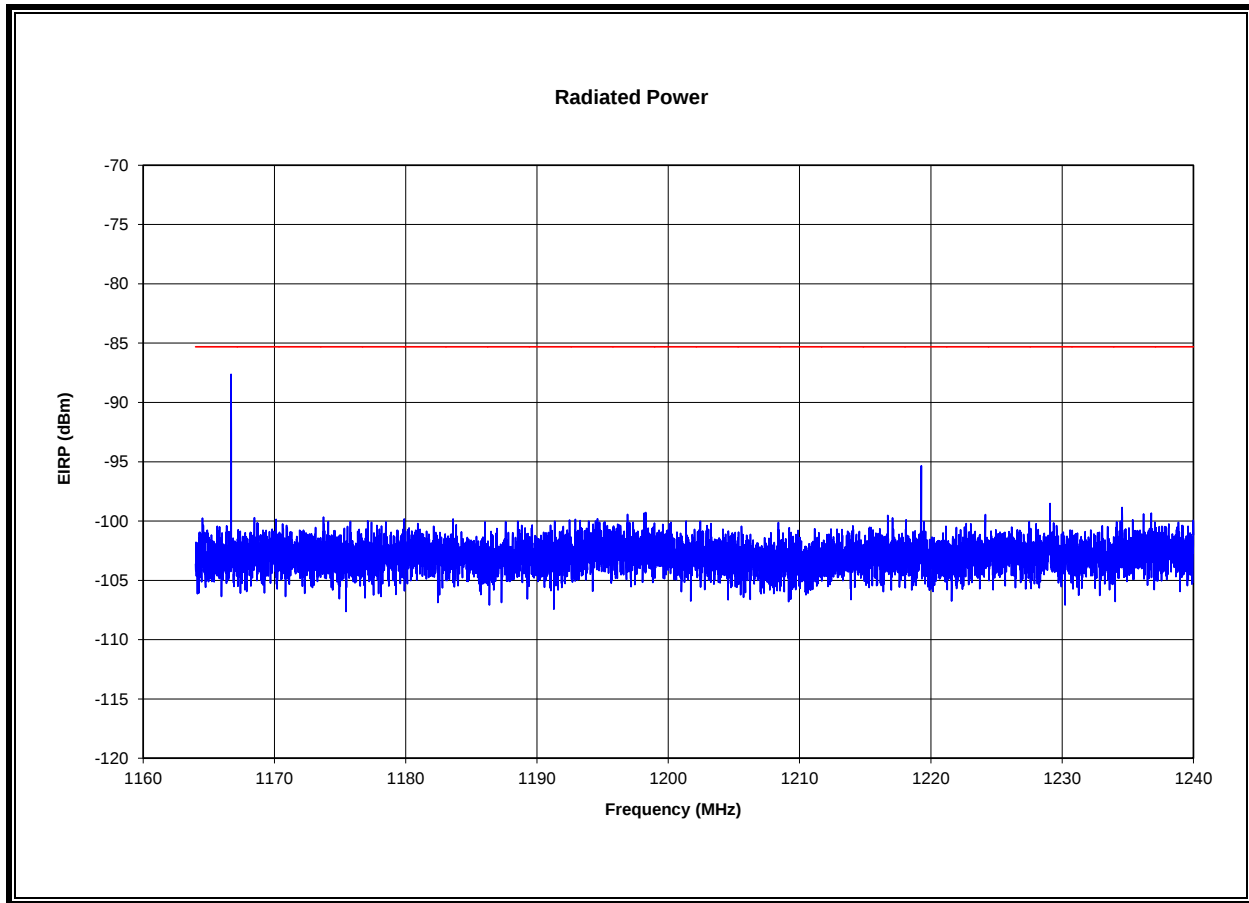
**EIRP 26 TO 33 GHz, 1 MHz BW**



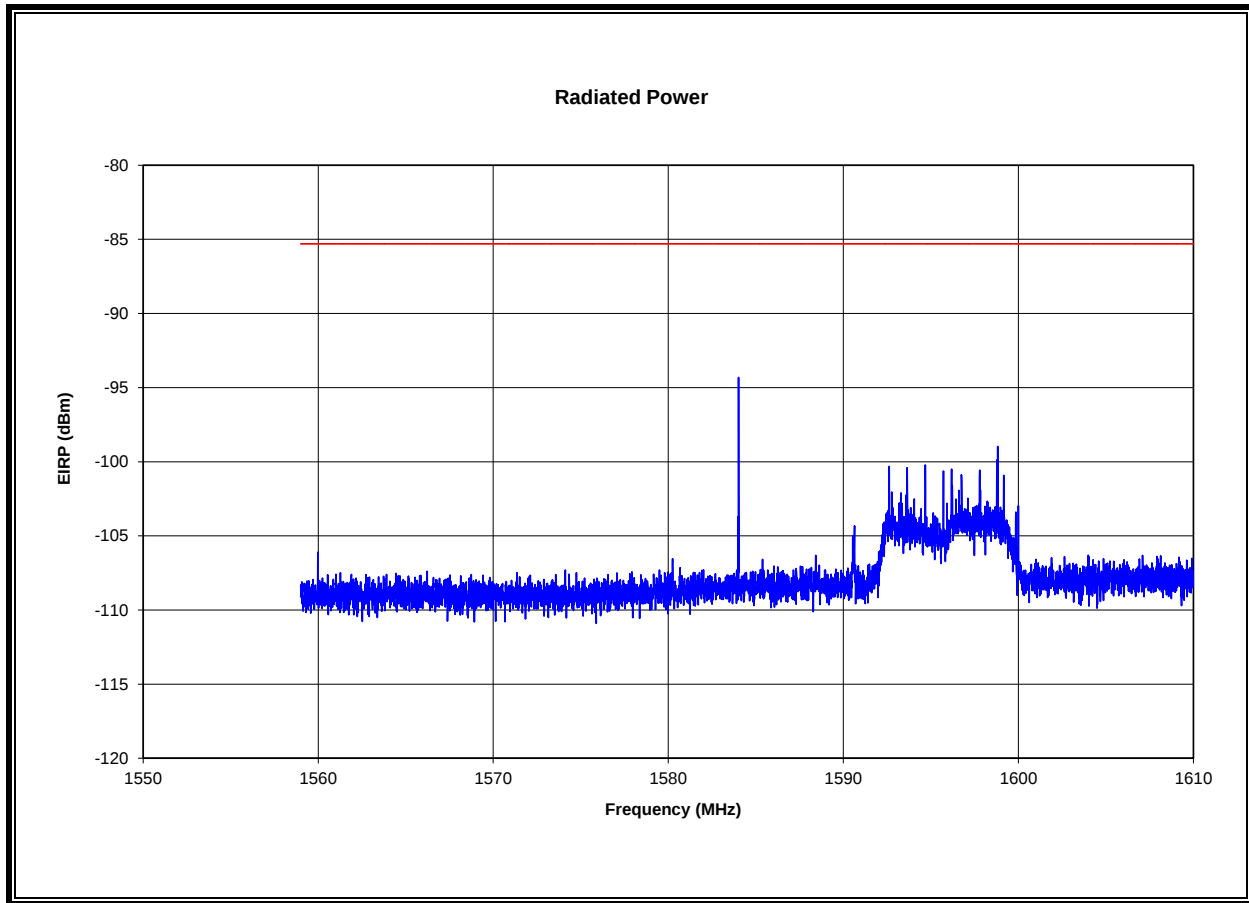
**EIRP 33 TO 40 GHz, 1 MHz BW**



**EIRP 1.164 TO 1.240 GHz, 1 kHz BW**



**EIRP 1.559 TO 1.610 GHz, 1 kHz BW**



## 8.4. RADIATED EMISSIONS AT OR BELOW 960 MHz

### LIMITS

§15.517 (c) The radiated emissions at or below 960 MHz from a device operating under the provisions of this section shall not exceed the emission levels in Section 15.209 of this chapter.

§15.209 (a) Except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

| Frequency<br>(MHz) | Field Strength<br>(microvolts/meter) | Measurement Distance<br>(meters) |
|--------------------|--------------------------------------|----------------------------------|
| 30 - 88            | 100 **                               | 3                                |
| 88 - 216           | 150 **                               | 3                                |
| 216 - 960          | 200 **                               | 3                                |
| Above 960          | 500                                  | 3                                |

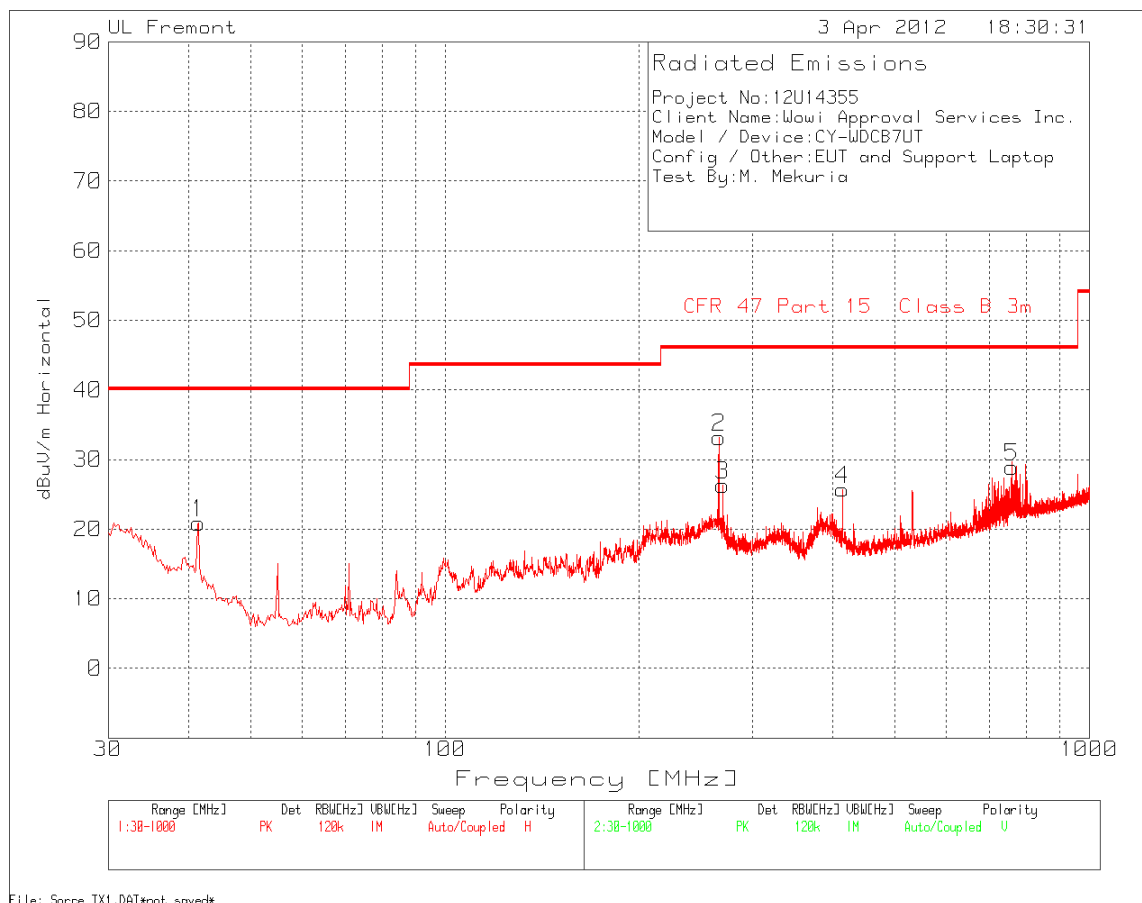
\*\* Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.

§15.209 (b) In the emission table above, the tighter limit applies at the band edges.

### RESULTS

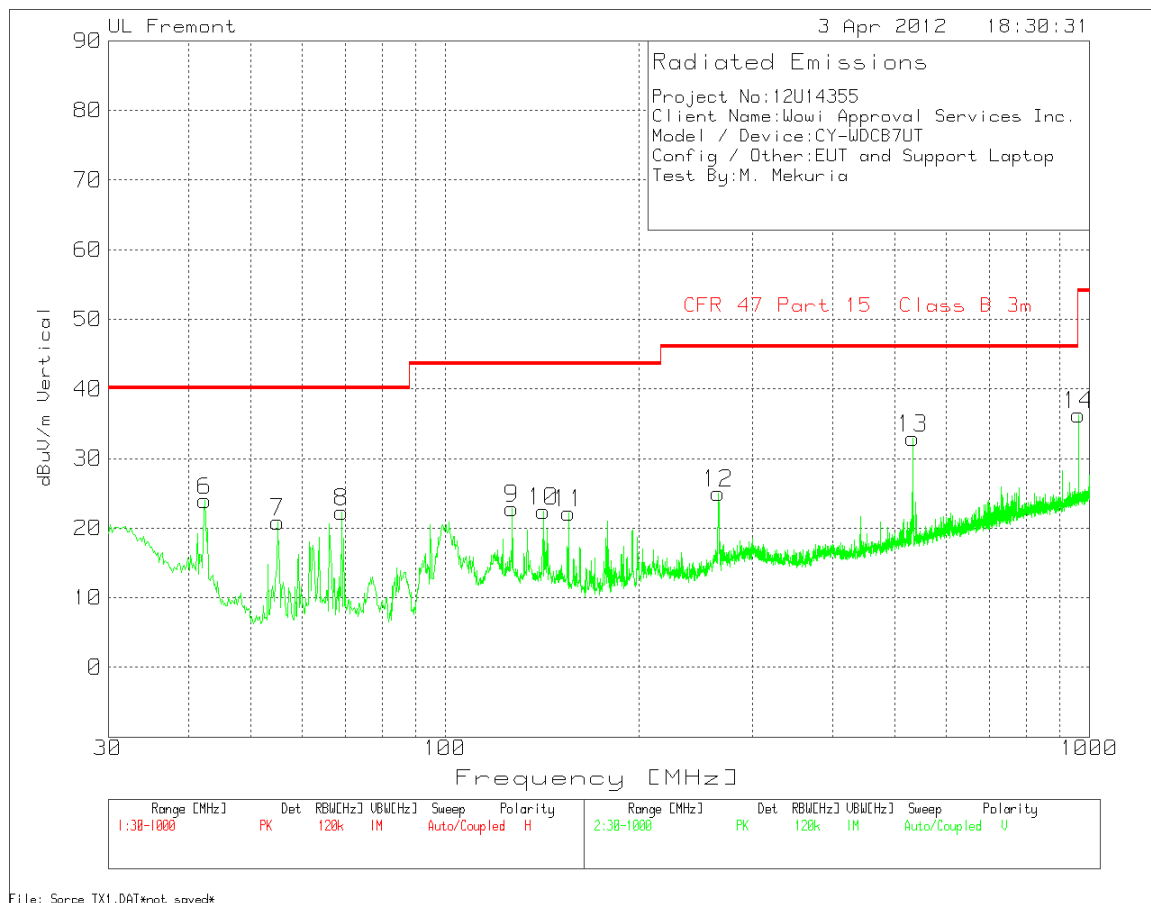
**SPURIOUS EMISSIONS 30 TO 960 MHz HORIZONTAL**

**HORIZONTAL PLOT**



**SPURIOUS EMISSIONS 30 TO 960 MHz VERTICAL**

**VERTICAL PLOT**



## HORIZONTAL AND VERTICAL DATA

| Project No:12U14355                     |               |          |                            |                             |        |                           |        |             |          |
|-----------------------------------------|---------------|----------|----------------------------|-----------------------------|--------|---------------------------|--------|-------------|----------|
| Client Name:Wowi Approval Services Inc. |               |          |                            |                             |        |                           |        |             |          |
| Model / Device:CY-WDCB7UT               |               |          |                            |                             |        |                           |        |             |          |
| Config / Other:EUT and Support Laptop   |               |          |                            |                             |        |                           |        |             |          |
| Test By:M. Mekuria                      |               |          |                            |                             |        |                           |        |             |          |
| Range 1 30 - 1000MHz                    |               |          |                            |                             |        |                           |        |             |          |
| Test Frequency                          | Meter Reading | Detector | 25MHz-1Ghz ChmbrB Amp [dB] | T130 Bilog Factors.TXT [dB] | dBuV/m | CFR 47 Part 15 Class B 3m | Margin | Height [cm] | Polarity |
| 41.4369                                 | 36.84         | PK       | -29.2                      | 13.2                        | 20.84  | 40                        | -19.16 | 100         | Horz     |
| 266.1031                                | 47.84         | PK       | -27                        | 12.3                        | 33.14  | 46                        | -12.86 | 200         | Horz     |
| 269.7862                                | 40.95         | PK       | -27                        | 12.4                        | 26.35  | 46                        | -19.65 | 100         | Horz     |
| 414.3945                                | 37.33         | PK       | -26.9                      | 15.3                        | 25.73  | 46                        | -20.27 | 100         | Horz     |
| 757.8877                                | 34.33         | PK       | -25.7                      | 20.3                        | 28.93  | 46                        | -17.07 | 100         | Horz     |
| Range 2 30 - 1000MHz                    |               |          |                            |                             |        |                           |        |             |          |
| Test Frequency                          | Meter Reading | Detector | 25MHz-1Ghz ChmbrB Amp [dB] | T130 Bilog Factors.TXT [dB] | dBuV/m | CFR 47 Part 15 Class B 3m | Margin | Height [cm] | Polarity |
| 42.4061                                 | 40.53         | PK       | -29.2                      | 12.6                        | 23.93  | 40                        | -16.07 | 200         | Vert     |
| 55.006                                  | 42            | PK       | -29                        | 7.9                         | 20.9   | 40                        | -19.1  | 100         | Vert     |
| 69.1567                                 | 43.02         | PK       | -28.9                      | 8.2                         | 22.32  | 40                        | -17.68 | 100         | Vert     |
| 127.1163                                | 37.37         | PK       | -28.3                      | 13.8                        | 22.87  | 43.5                      | -20.63 | 100         | Vert     |
| 142.4301                                | 37.49         | PK       | -28.1                      | 13.1                        | 22.49  | 43.5                      | -21.01 | 100         | Vert     |
| 155.4177                                | 38.61         | PK       | -28                        | 11.6                        | 22.21  | 43.5                      | -21.29 | 100         | Vert     |
| 265.5216                                | 39.67         | PK       | -27                        | 12.3                        | 24.97  | 46                        | -21.03 | 300         | Vert     |
| 532.6399                                | 42.44         | PK       | -26.8                      | 17.3                        | 32.94  | 46                        | -13.06 | 100         | Vert     |
| 963.9448                                | 38.38         | PK       | -24.3                      | 22.2                        | 36.28  | 54                        | -17.72 | 100         | Vert     |

## 9. AC POWER LINE CONDUCTED EMISSIONS

### LIMITS

FCC §15.207 (a)

| Frequency of Emission (MHz) | Conducted Limit (dBuV) |          |
|-----------------------------|------------------------|----------|
|                             | 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.

### TEST PROCEDURE

The EUT is placed on a non-conducting table 40 cm from the vertical ground plane and 80 cm above the horizontal ground plane. The EUT is configured in accordance with ANSI C63.4.

The receiver is set to a resolution bandwidth of 9 kHz. Peak detection is used unless otherwise noted as quasi-peak or average.

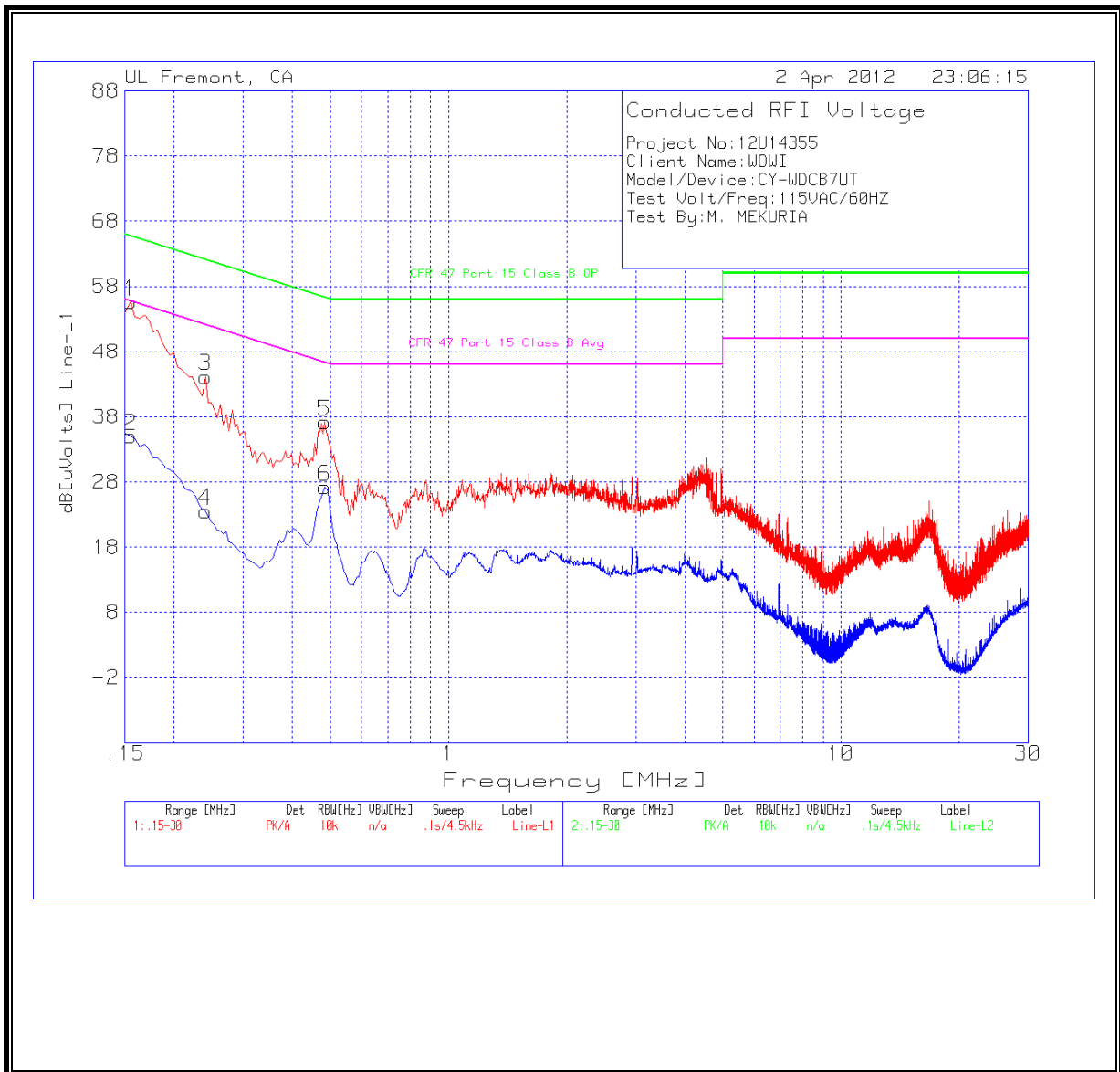
Line conducted data is recorded for both NEUTRAL and HOT lines.

### RESULTS

**6 WORST EMISSIONS**

| Project No:12U14355        |               |          |                    |                        |            |                           |        |                            |        |
|----------------------------|---------------|----------|--------------------|------------------------|------------|---------------------------|--------|----------------------------|--------|
| Client Name:WOWI           |               |          |                    |                        |            |                           |        |                            |        |
| Model/Device:CY-WDCB7UT    |               |          |                    |                        |            |                           |        |                            |        |
| Test Volt/Freq:115VAC/60HZ |               |          |                    |                        |            |                           |        |                            |        |
| Test By:M. MEKURIA         |               |          |                    |                        |            |                           |        |                            |        |
| Line-L1 .15 - 30MHz        |               |          |                    |                        |            |                           |        |                            |        |
| Test Frequency             | Meter Reading | Detector | T24 IL L1.TXT [dB] | LC Cables 1&3.TXT [dB] | dB[uVolts] | CFR 47 Part 15 Class B QP | Margin | CFR 47 Part 15 Class B Avg | Margin |
| 0.1545                     | 55.57         | PK       | 0.1                | 0                      | 55.67      | 65.8                      | -10.13 | -                          | -      |
| 0.1545                     | 34.91         | Av       | 0.1                | 0                      | 35.01      | -                         | -      | 55.8                       | -20.79 |
| 0.24                       | 44.09         | PK       | 0.1                | 0                      | 44.19      | 62.1                      | -17.91 | -                          | -      |
| 0.24                       | 23.48         | Av       | 0.1                | 0                      | 23.58      | -                         | -      | 52.1                       | -28.52 |
| 0.483                      | 37.12         | PK       | 0.1                | 0                      | 37.22      | 56.3                      | -19.08 | -                          | -      |
| 0.483                      | 27.08         | Av       | 0.1                | 0                      | 27.18      | -                         | -      | 46.3                       | -19.12 |
| Line-L2 .15 - 30MHz        |               |          |                    |                        |            |                           |        |                            |        |
| Test Frequency             | Meter Reading | Detector | T24 IL L2.TXT [dB] | LC Cables 2&3.TXT [dB] | dB[uVolts] | CFR 47 Part 15 Class B QP | Margin | CFR 47 Part 15 Class B Avg | Margin |
| 0.15                       | 59.96         | PK       | 0.1                | 0                      | 60.06      | 66                        | -5.94  | -                          | -      |
| 0.15                       | 40.82         | Av       | 0.1                | 0                      | 40.92      | -                         | -      | 56                         | -15.08 |
| 0.1725                     | 54.21         | PK       | 0.1                | 0                      | 54.31      | 64.8                      | -10.49 | -                          | -      |
| 0.1725                     | 33.22         | Av       | 0.1                | 0                      | 33.32      | -                         | -      | 54.8                       | -21.48 |
| 0.483                      | 35.71         | PK       | 0.1                | 0                      | 35.81      | 56.3                      | -20.49 | -                          | -      |
| 0.483                      | 26.93         | Av       | 0.1                | 0                      | 27.03      | -                         | -      | 46.3                       | -19.27 |

**LINE 1 RESULTS**



**LINE 2 RESULTS**

