FCC CFR47 PART 15 SUBPART F

CERTIFICATION TEST REPORT

FOR

UWB RADIO DEVICE WITH USB 2.0 INTERFACE

MODEL NUMBER: CY-WDCB7UR

FCC ID: A3LCYWDCB7UR

REPORT NUMBER: 12U14355-2, Revision B

ISSUE DATE: APRIL 28, 2012

Prepared for
SAMSUNG ELECTRONICS CO., LTD.
416, MAETAN 3-DONG, YEONGTONG-GU, SUWON-CITY, GYEONGGI-DO
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Revision History

Rev.	Issue Date	Revisions	Revised By
--	04/19/2012	Initial Issue	M. Heckrotte
B	06/28/2012	Added Frequency Stability Results	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-WDCB7UR
SERIAL NUMBER:	Prototype
DATE TESTED:	APRIL 3 TO JUNE 27, 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:

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Tested By:

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:

Field Strength (dBuV/m) = Measured Voltage (dBuV) + Antenna Factor (dB/m) + Cable Loss (dB) – Preamp Gain (dB)
36.5 dBuV + 18.7 dB/m + 0.6 dB – 26.9 dB = 28.9 dBuV/m

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 (dBm/MHz EIRP)	RMS Output Power (uW/MHz EIRP)
-43.20	0.048

5.4. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes an integral antenna, with a maximum gain of 3.1 dBi.

5.5. SOFTWARE AND FIRMWARE

The firmware installed in the EUT during testing was revision 1.0.18704-19933.
The test utility software used during testing was RegulatoryRxTool.exe, 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. 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**
Test Jig	HANSHIN IT	N/A	N/A	N/A
Laptop	Lenovo	T410	R8-3LV40 10/07	DoC
AC Adapter	Lenovo	42T4418	11S42T4418Z1ZGWG08R90G	DoC
AC Adapter	DVE	DSA-12PFA-05-FKA 050200	3510HB	N/A

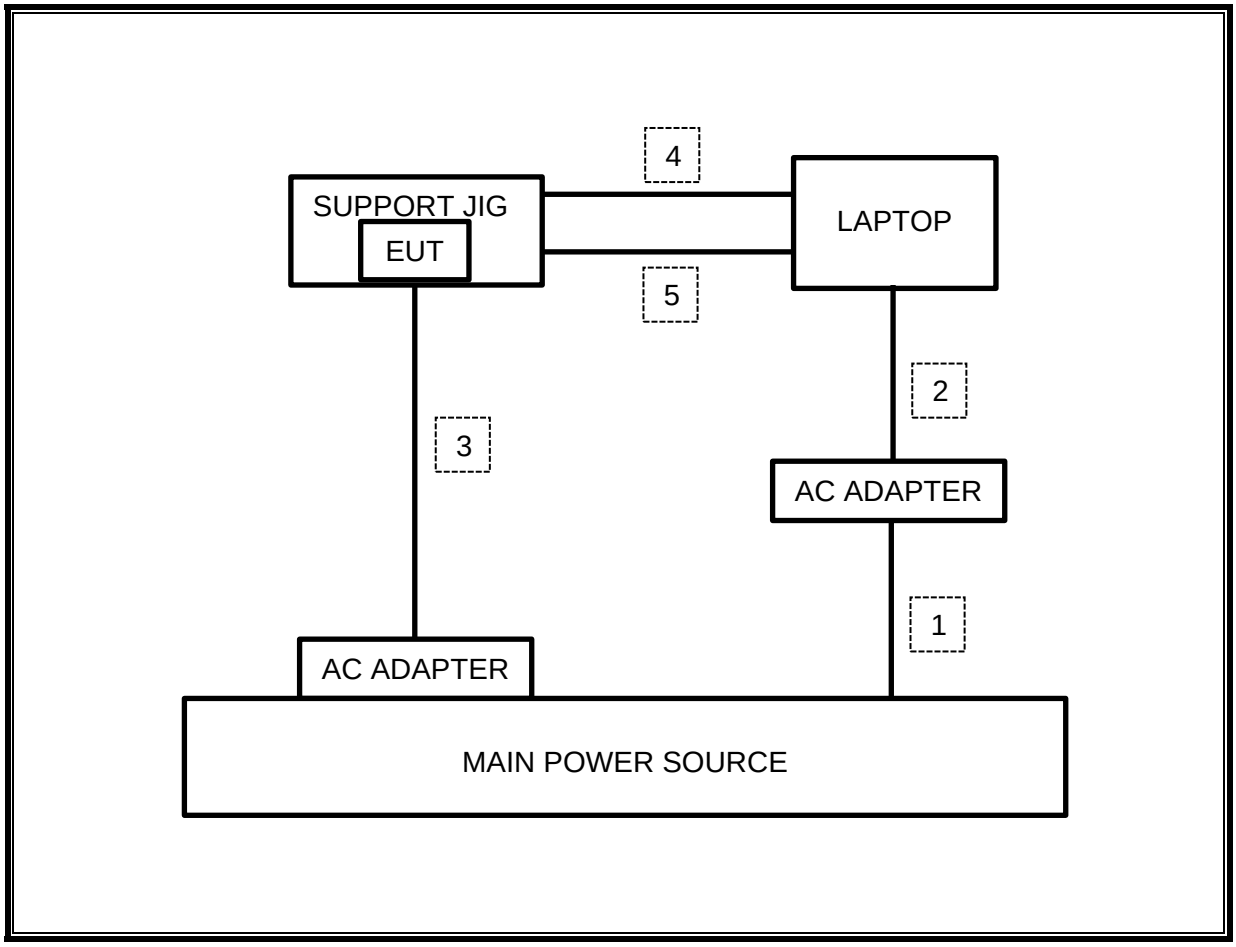
I/O CABLES

I/O CABLE LIST						
Cable No.	**Port**	**# of Identica 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
3	DC	1	Mini Jack	Un-Shielded	1.5 m	Ferrite at EUT side
4	USB	1	USB	Un-Shielded	1.0 m	N/A
5	USB	1	Mini USB	Un-Shielded	1.0 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	MWH-1826/B	C00980	7/28/2011	7/28/2012
Antenna, Horn, 40 GHz	ARA	MWH-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
Temperature Chamber	Thermotron	SE 600-10-10	C00930	4/20/2012	10/20/2012

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 (dBm EIRP) = E (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 fH and the lower boundary is designated fL. The frequency at which the highest radiated emission occurs is designated fM.
(b) Center frequency. The center frequency, fC, equals (fH + fL)/2.
(c) Fractional bandwidth. The fractional bandwidth equals 2(fH - fL)/ (fH + fL).
(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 fM. A major graticule line of the plot is adjusted to exactly equal the peak EIRP at fM. 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 fH and the lower boundary is designated fL.

The center frequency, fC, is calculated as (fH + fL)/2.

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

Calculations are made independently for each of the three channels.

8.1.1. UWB BANDWIDTH FOR BG1

BG1 LOW CHANNEL RESULTS

f Max (GHz)	Reference EIRP at f Max (dBm)	10 dB down from Reference EIRP (dBm)
3.632	-37.4	-47.4

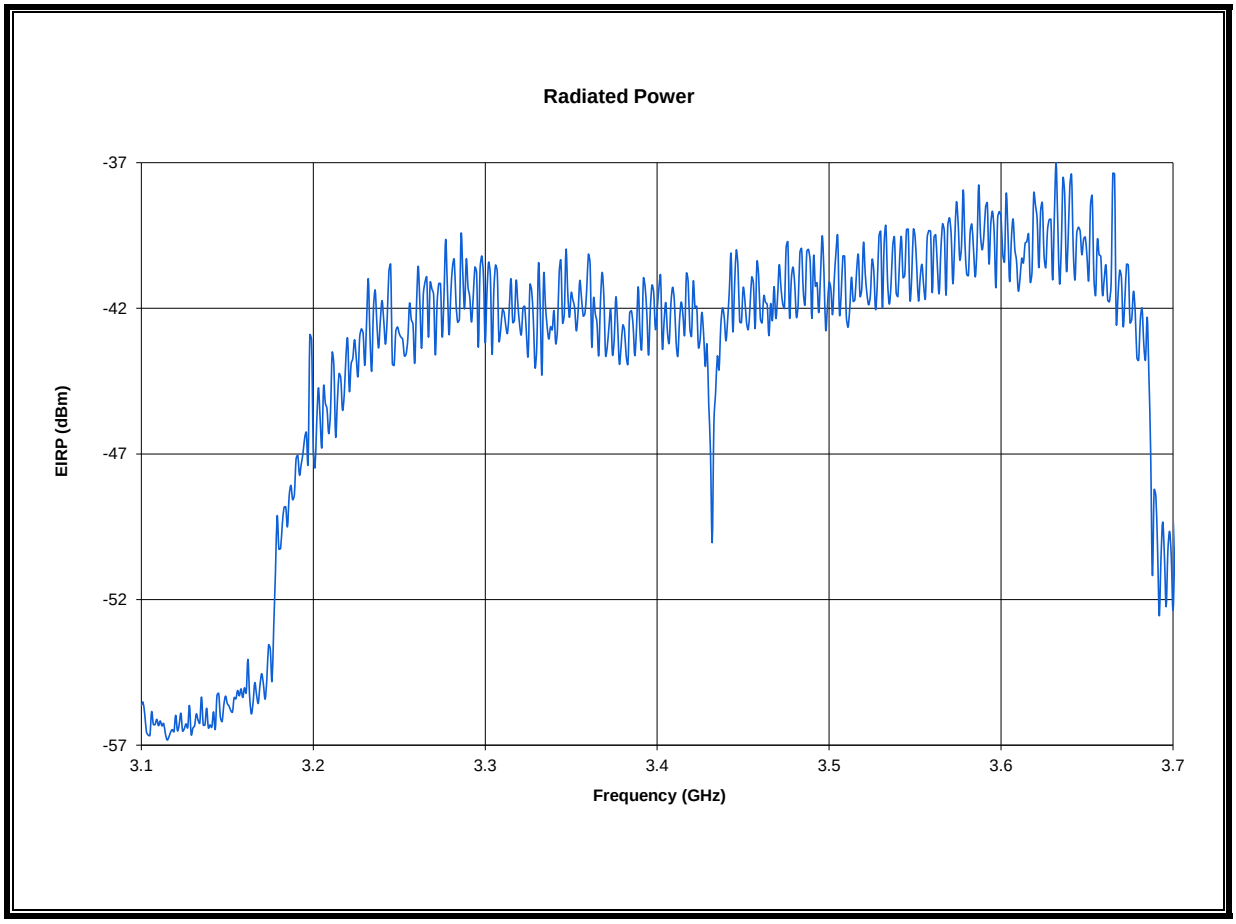
f Low (GHz)	Minimum f Low (GHz)
3.187	3.1

f High (GHz)	Maximum f High (GHz)
3.690	10.6

f Center (GHz)
3.439

UWB BW (MHz)	Minimum UWB BW (MHz)
503	500

PLOT WITH REFERENCE GRATICULE ADJUSTED FOR BG1 LOW CHANNEL F MAX



BG1 MID CHANNEL RESULTS

f Max (GHz)	Reference EIRP at f Max (dBm)	10 dB down from Reference EIRP (dBm)
4.024	-36.4	-46.4

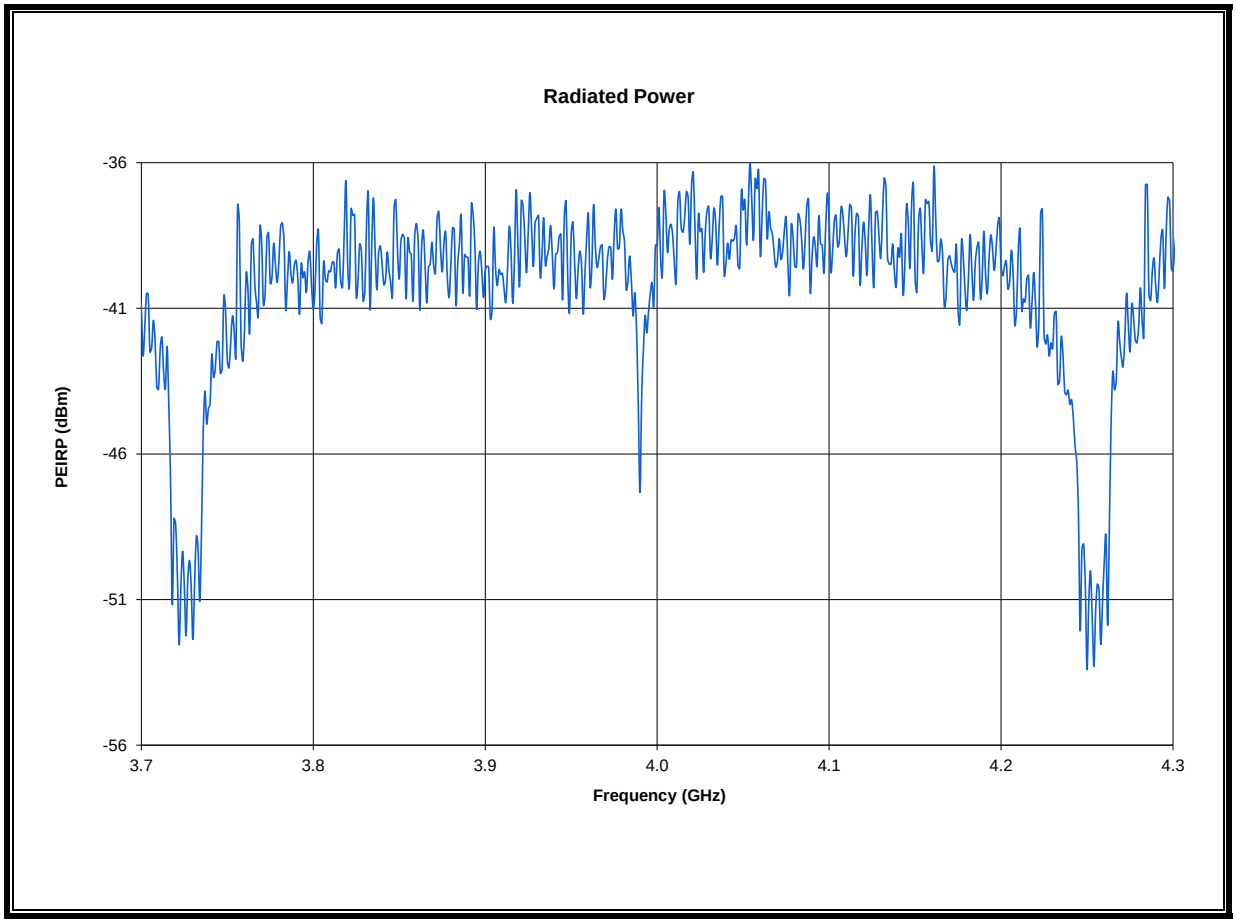
f Low (GHz)	Minimum f Low (GHz)
3.706	3.1

f High (GHz)	Maximum f High (GHz)
4.215	10.6

f Center (GHz)
3.961

UWB BW (MHz)	Minimum UWB BW (MHz)
509	500

PLOT WITH REFERENCE GRATICULE ADJUSTED FOR BG1 MID CHANNEL F MAX



BG1 HIGH CHANNEL RESULTS

f Max (GHz)	Reference EIRP at f Max (dBm)	10 dB down from Reference EIRP (dBm)
4.445	-35.3	-45.3

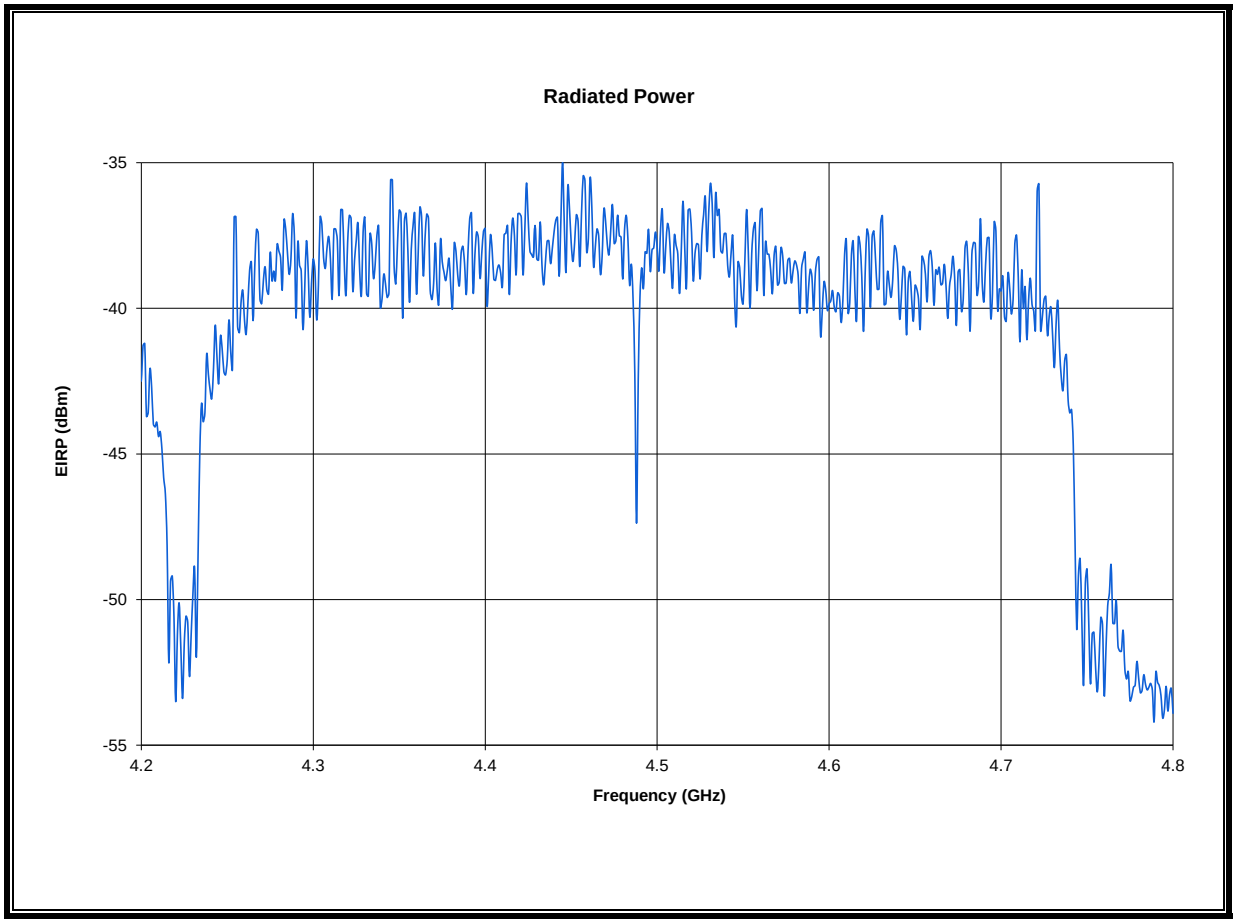
f Low (GHz)	Minimum f Low (GHz)
4.233	3.1

f High (GHz)	Maximum f High (GHz)
4.746	10.6

f Center (GHz)
4.490

UWB BW (MHz)	Minimum UWB BW (MHz)
513	500

PLOT WITH REFERENCE GRATICULE ADJUSTED FOR BG1 HIGH CHANNEL F MAX



8.1.2. UWB BANDWIDTH FOR BG3

BG3 LOW CHANNEL RESULTS

f Max (GHz)	Reference EIRP at f Max (dBm)	10 dB down from Reference EIRP (dBm)
6.833	-32.2	-42.2

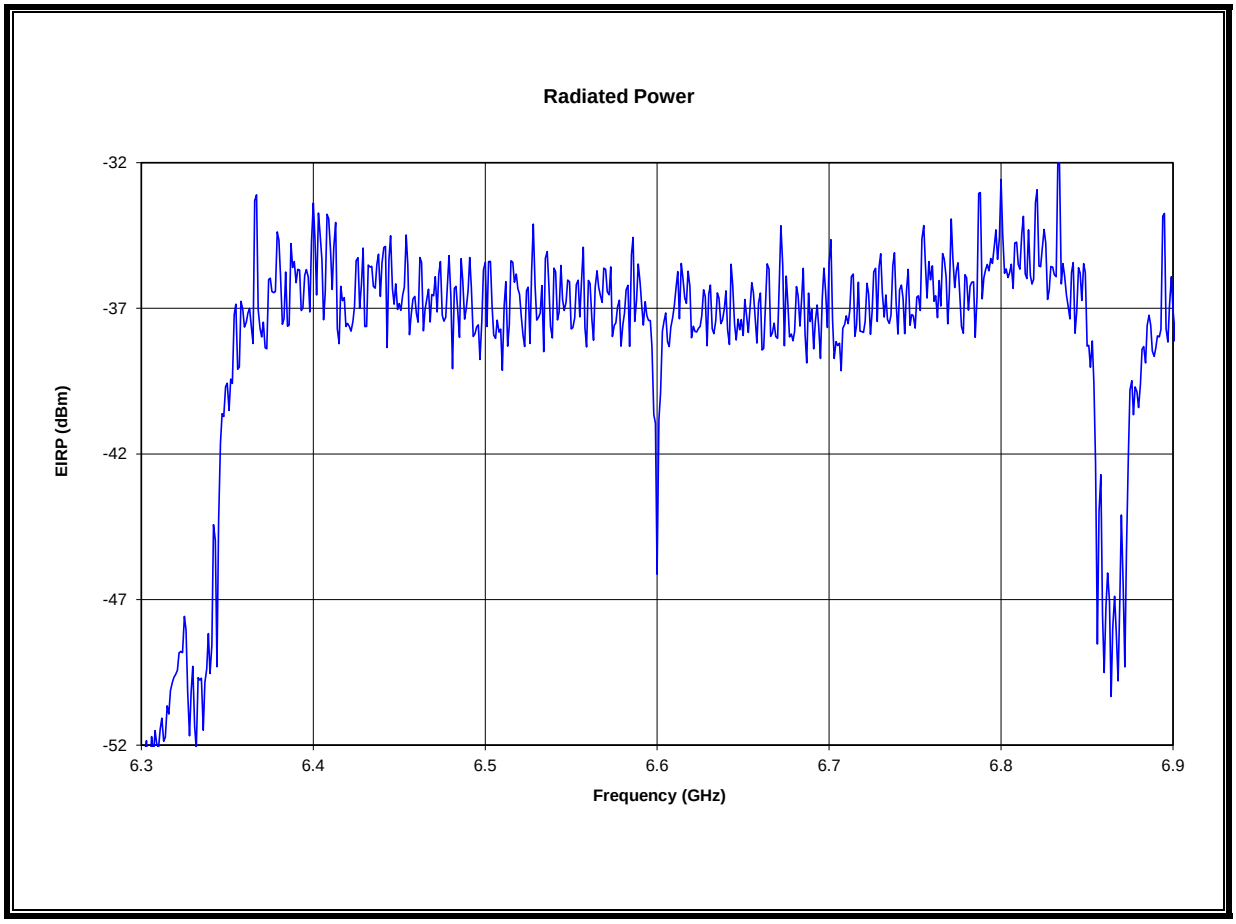
f Low (GHz)	Minimum f Low (GHz)
6.345	3.1

f High (GHz)	Maximum f High (GHz)
6.859	10.6

f Center (GHz)
6.602

UWB BW (MHz)	Minimum UWB BW (MHz)
514	500

PLOT WITH REFERENCE GRATICULE ADJUSTED FOR BG3 LOW CHANNEL F MAX



BG3 MID CHANNEL RESULTS

f Max (GHz)	Reference EIRP at f Max (dBm)	10 dB down from Reference EIRP (dBm)
6.911	-33.8	-43.8

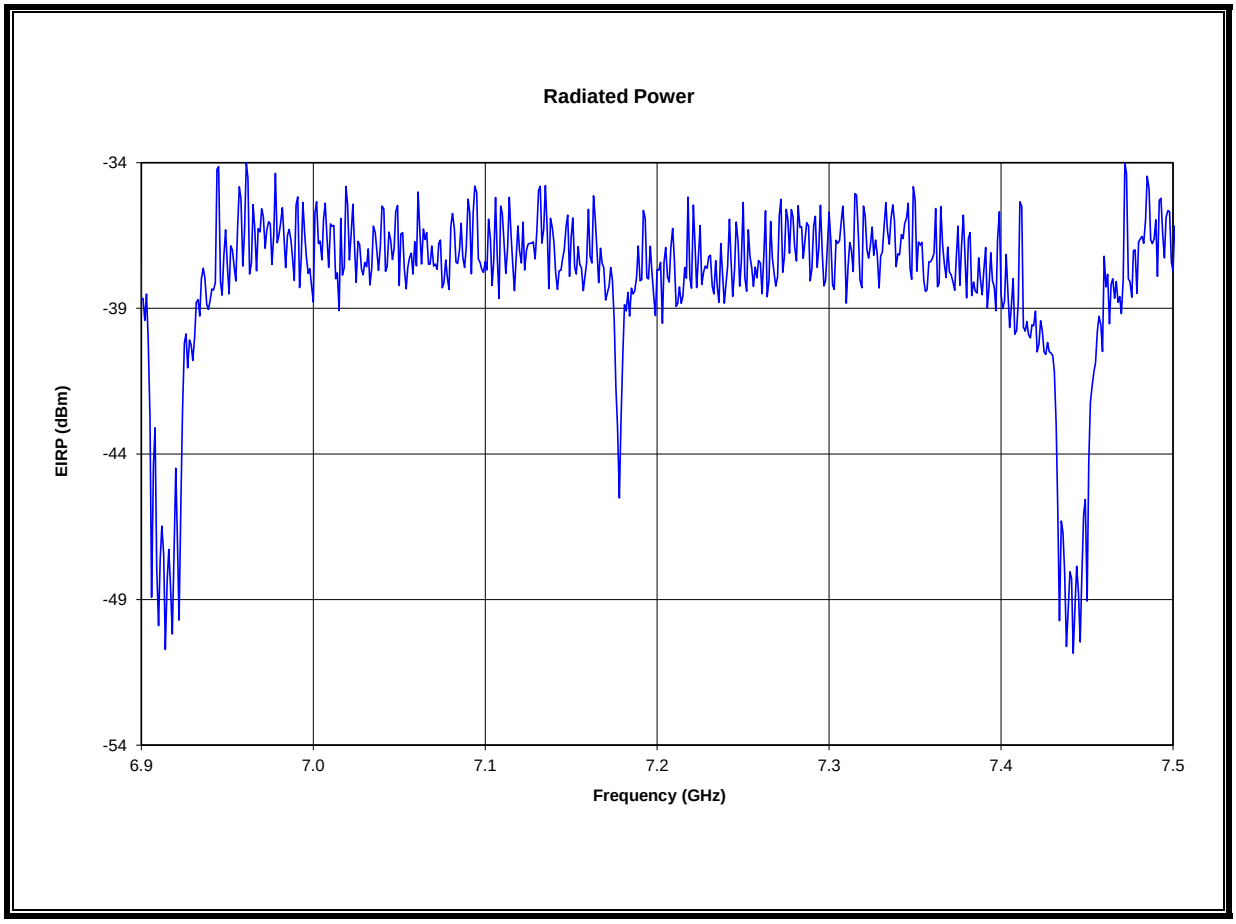
f Low (GHz)	Minimum f Low (GHz)
6.873	3.1

f High (GHz)	Maximum f High (GHz)
7.383	10.6

f Center (GHz)
7.128

UWB BW (MHz)	Minimum UWB BW (MHz)
510	500

PLOT WITH REFERENCE GRATICULE ADJUSTED FOR BG3 MID CHANNEL F MAX



BG3 HIGH CHANNEL RESULTS

f Max (GHz)	Reference EIRP at f Max (dBm)	10 dB down from Reference EIRP (dBm)
7.514	-33.7	-43.7

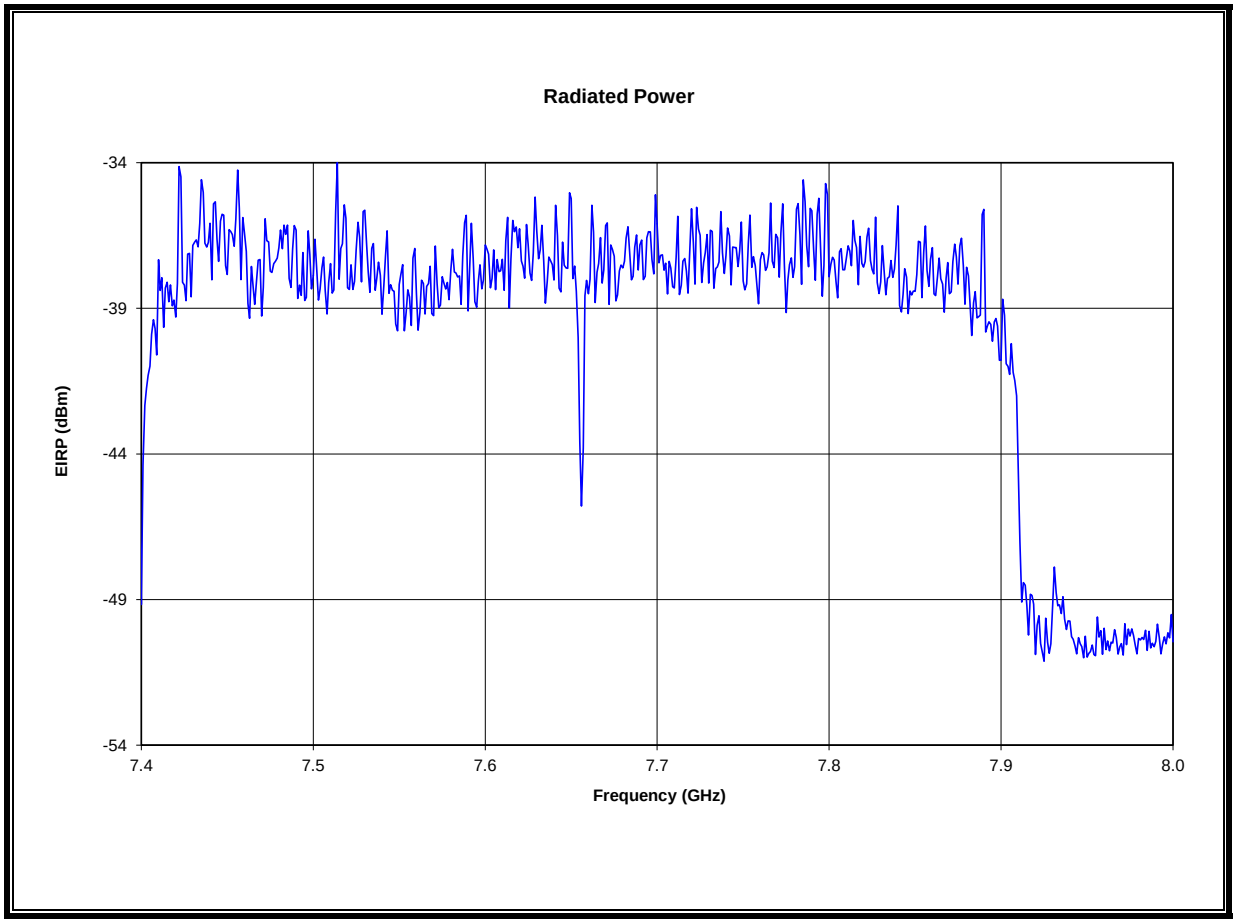
f Low (GHz)	Minimum f Low (GHz)
7.401	3.1

f High (GHz)	Maximum f High (GHz)
7.910	10.6

f Center (GHz)
7.656

UWB BW (MHz)	Minimum UWB BW (MHz)
509	500

PLOT WITH REFERENCE GRATICULE ADJUSTED FOR BG3 HIGH CHANNEL F MAX



8.1.3. UWB BANDWIDTH FOR BG6

BG6 LOW CHANNEL RESULTS

f Max (GHz)	Reference EIRP at f Max (dBm)	10 dB down from Reference EIRP (dBm)
7.423	-33.8	-43.8

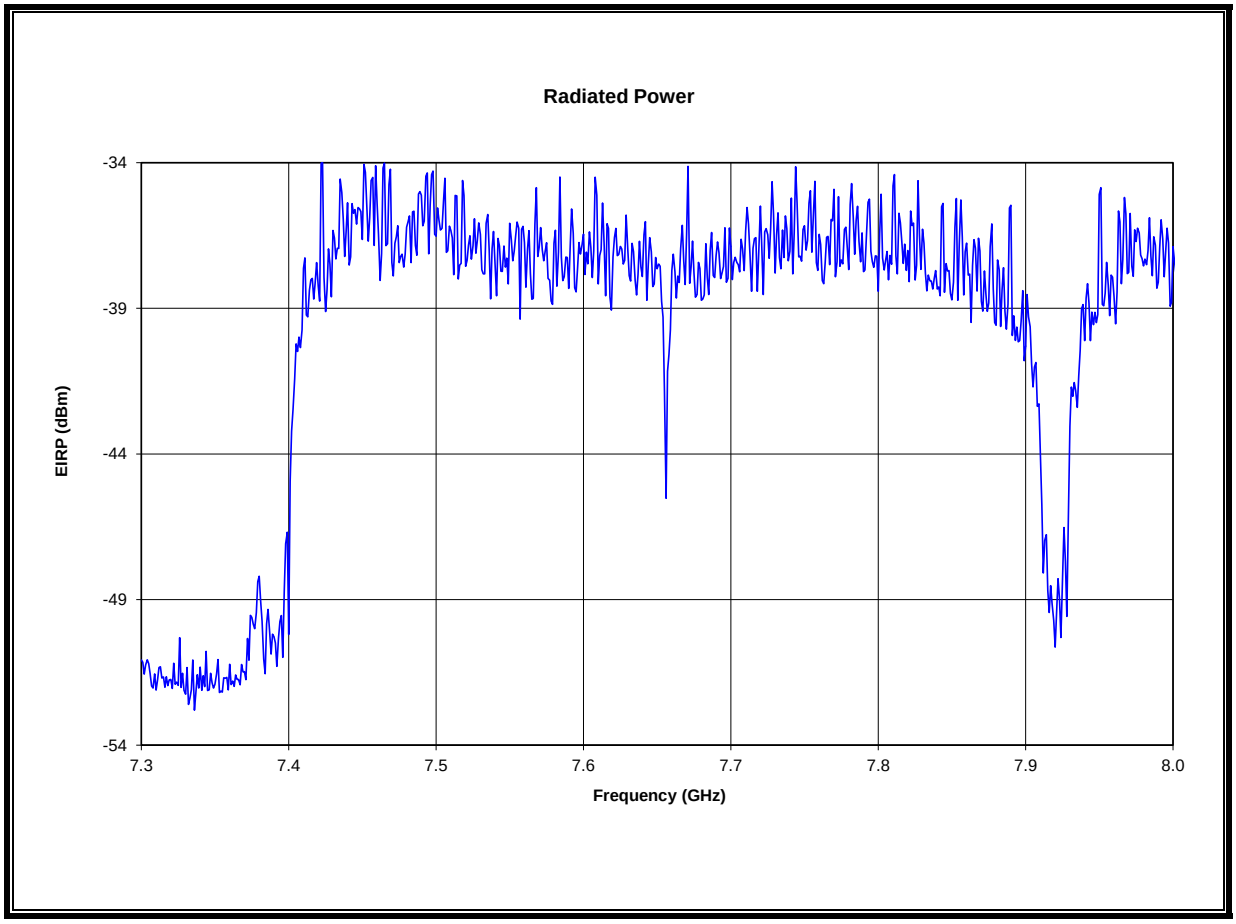
f Low (GHz)	Minimum f Low (GHz)
7.401	3.1

f High (GHz)	Maximum f High (GHz)
7.911	10.6

f Center (GHz)
7.656

UWB BW (MHz)	Minimum UWB BW (MHz)
510	500

PLOT WITH REFERENCE GRATICULE ADJUSTED FOR BG6 LOW CHANNEL F MAX



BG6 MID CHANNEL RESULTS

f Max (GHz)	Reference EIRP at f Max (dBm)	10 dB down from Reference EIRP (dBm)
8.418	-33.6	-43.6

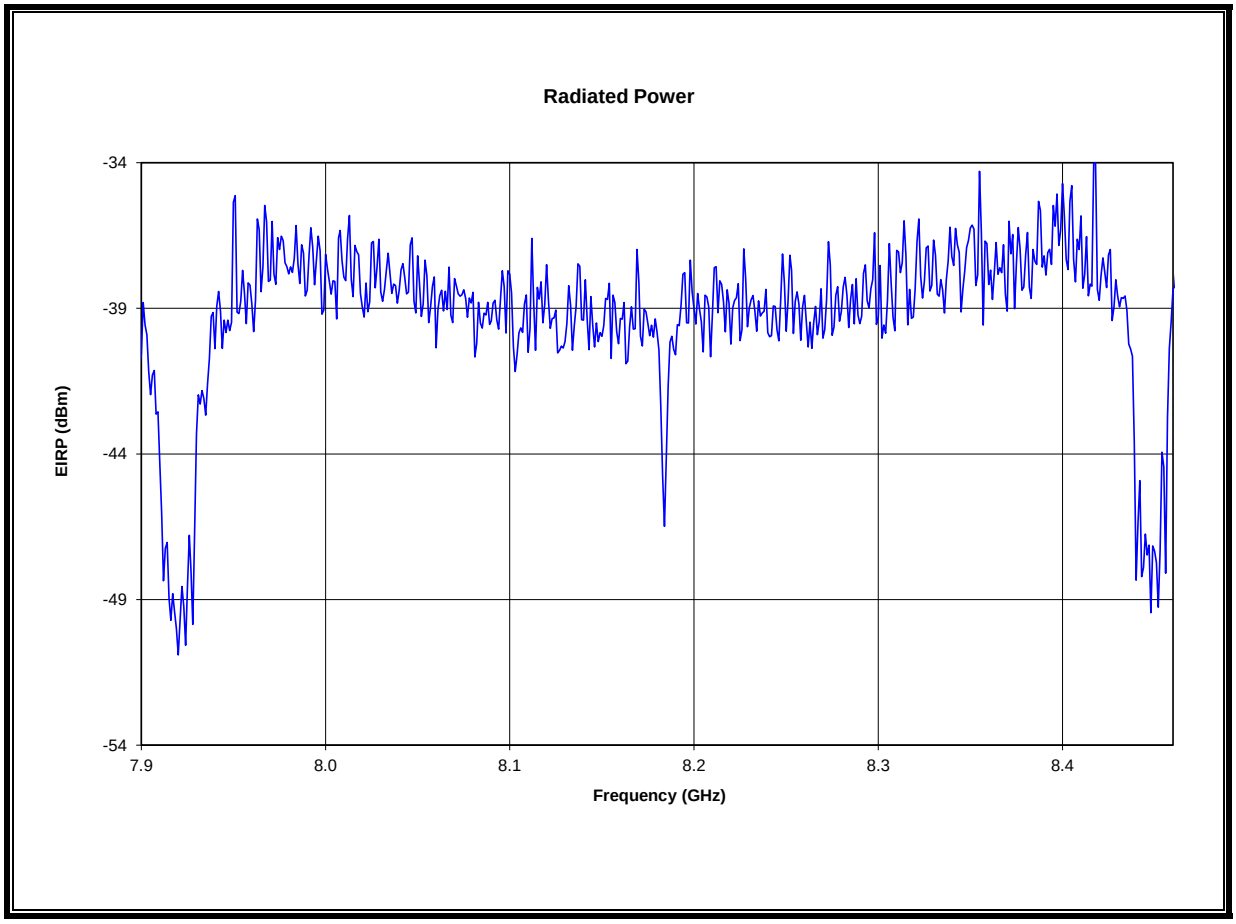
f Low (GHz)	Minimum f Low (GHz)
7.930	3.1

f High (GHz)	Maximum f High (GHz)
8.440	10.6

f Center (GHz)
8.185

UWB BW (MHz)	Minimum UWB BW (MHz)
510	500

PLOT WITH REFERENCE GRATICULE ADJUSTED FOR BG6 MID CHANNEL F MAX



BG61 HIGH CHANNEL RESULTS

f Max (GHz)	Reference EIRP at f Max (dBm)	10 dB down from Reference EIRP (dBm)
8.512	-30.4	-40.4

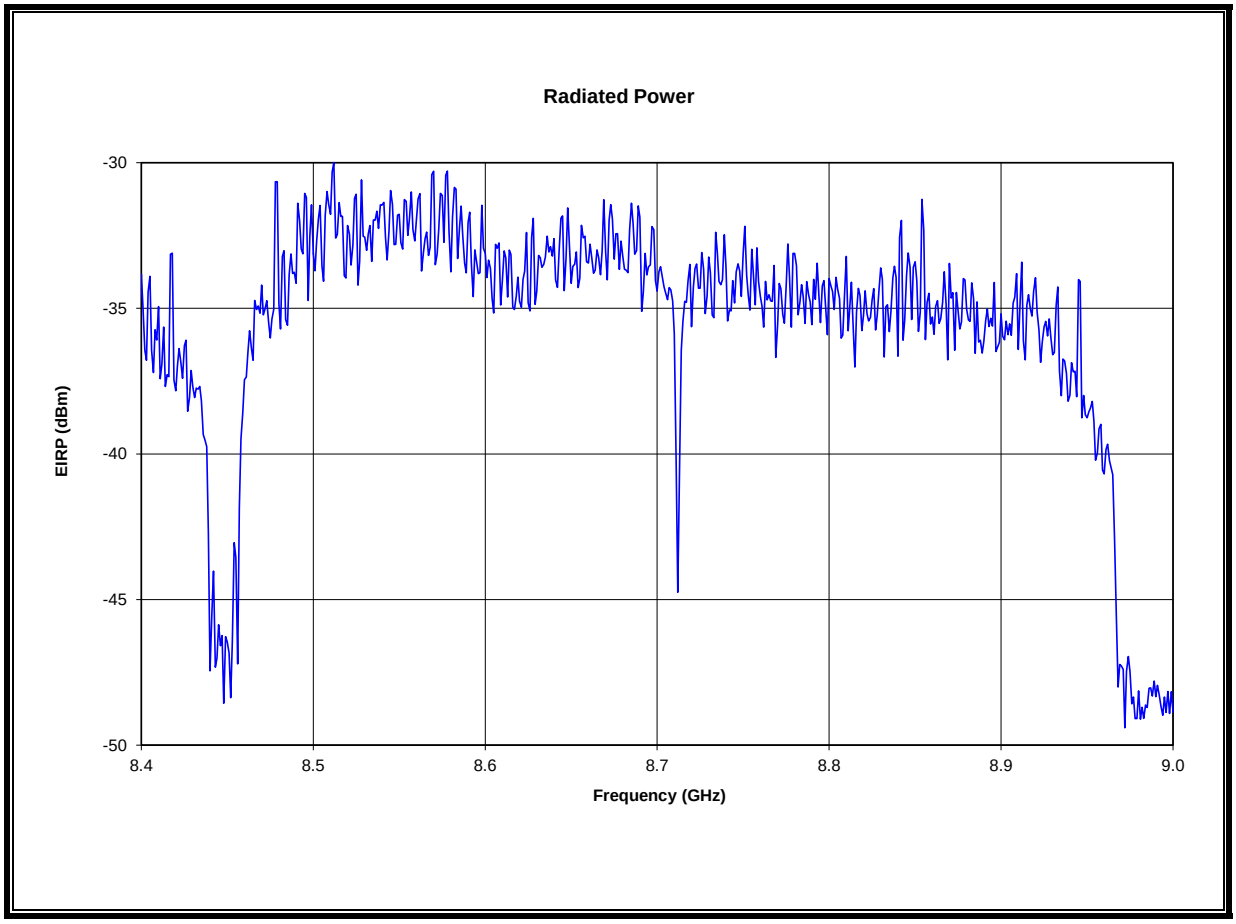
f Low (GHz)	Minimum f Low (GHz)
8.457	3.1

f High (GHz)	Maximum f High (GHz)
8.961	10.6

f Center (GHz)
8.709

UWB BW (MHz)	Minimum UWB BW (MHz)
504	500

PLOT WITH REFERENCE GRATICULE ADJUSTED FOR BG6 HIGHCHANNEL F MAX



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 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 (GHz)	**Reading (dBuV)**	**Antenna Factor (dB/m)**	**Cable (Incl with Preamp) (dB)**	**Preamp & Cable (dB)**	**Distance Factor (dB)**
4.5739	66.55	32.34	0.00	-30.77	0.00
	Field Strength at 3 meters (dBuV/m)	**EIRP Conversion Factor**	**EIRP (dBm)**	**EIRP Limit (dBm)**	**Margin (dB)**
	68.12	-95.20	-27.08	-15.92	-11.16

BG3					
f Max (GHz)	**Reading (dBuV)**	**Antenna Factor (dB/m)**	**Cable (Incl with Preamp) (dB)**	**Preamp & Cable (dB)**	**Distance Factor (dB)**
6.8031	67.2	35.19	0.00	-29.39	0.00
	Field Strength at 3 meters (dBuV/m)	**EIRP Conversion Factor**	**EIRP (dBm)**	**EIRP Limit (dBm)**	**Margin (dB)**
	72.99	-95.20	-22.21	-15.92	-6.29

BG6					
f Max (GHz)	**Reading (dBuV)**	**Antenna Factor (dB/m)**	**Cable (Incl with Preamp) (dB)**	**Preamp & Cable (dB)**	**Distance Factor (dB)**
8.5389	66.09	37.15	0.00	-28.77	0.00
	Field Strength at 3 meters (dBuV/m)	**EIRP Conversion Factor**	**EIRP (dBm)**	**EIRP Limit (dBm)**	**Margin (dB)**
	74.47	-95.20	-20.73	-15.92	-4.81

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

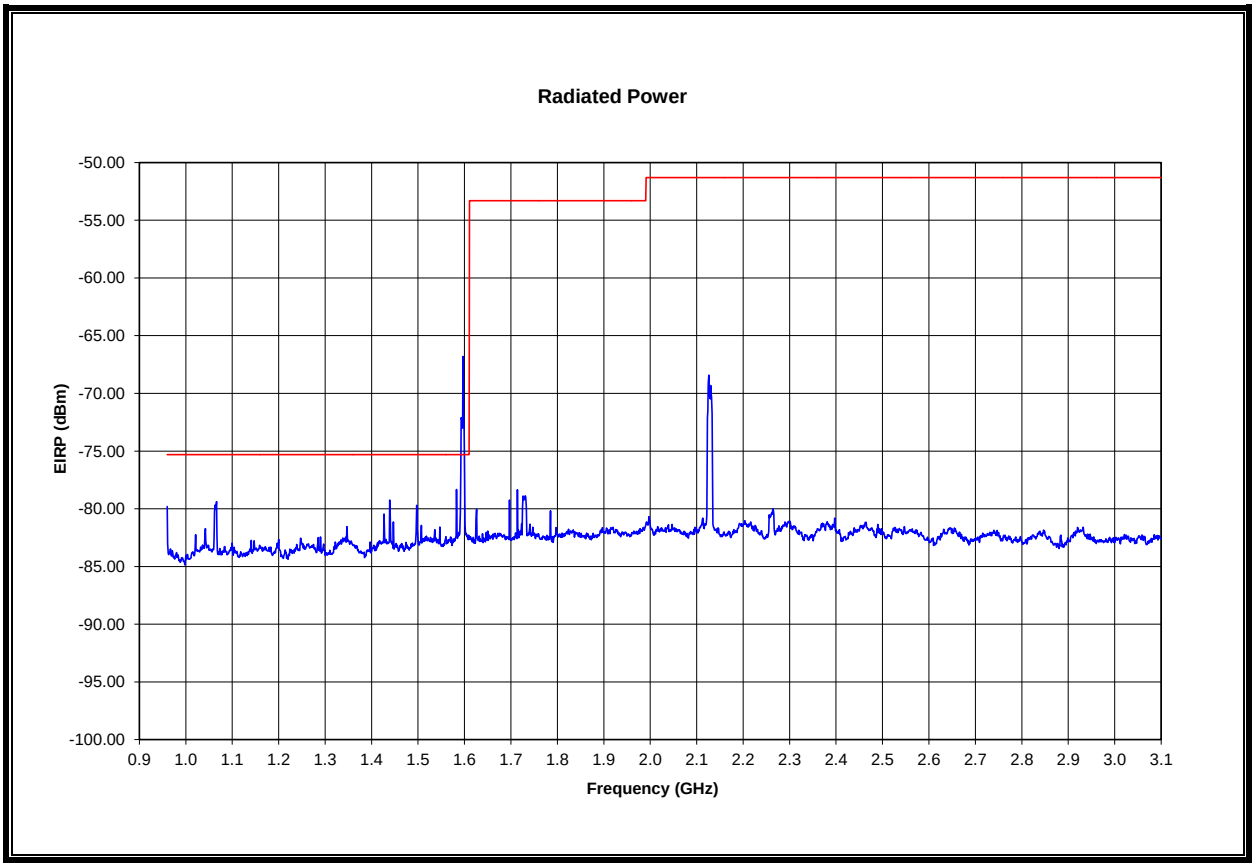
Distance =	3.0

f Max (GHz)	Reading (dBuV)	Antenna Factor (dB/m)	Cable (Incl with Preamp) (dB)	Preamp & Cable (dB)	Distance Factor (dB)
8.539	43.4	37.2	0.0	-28.6	0.00

Field Strength at 3 meters (dBuV/m)	EIRP Conversion Factor	EIRP (dBm/MHz)	EIRP Limit (dBm/MHz)	Margin (dB)
51.98	-95.2	-43.2	-41.3	-1.9

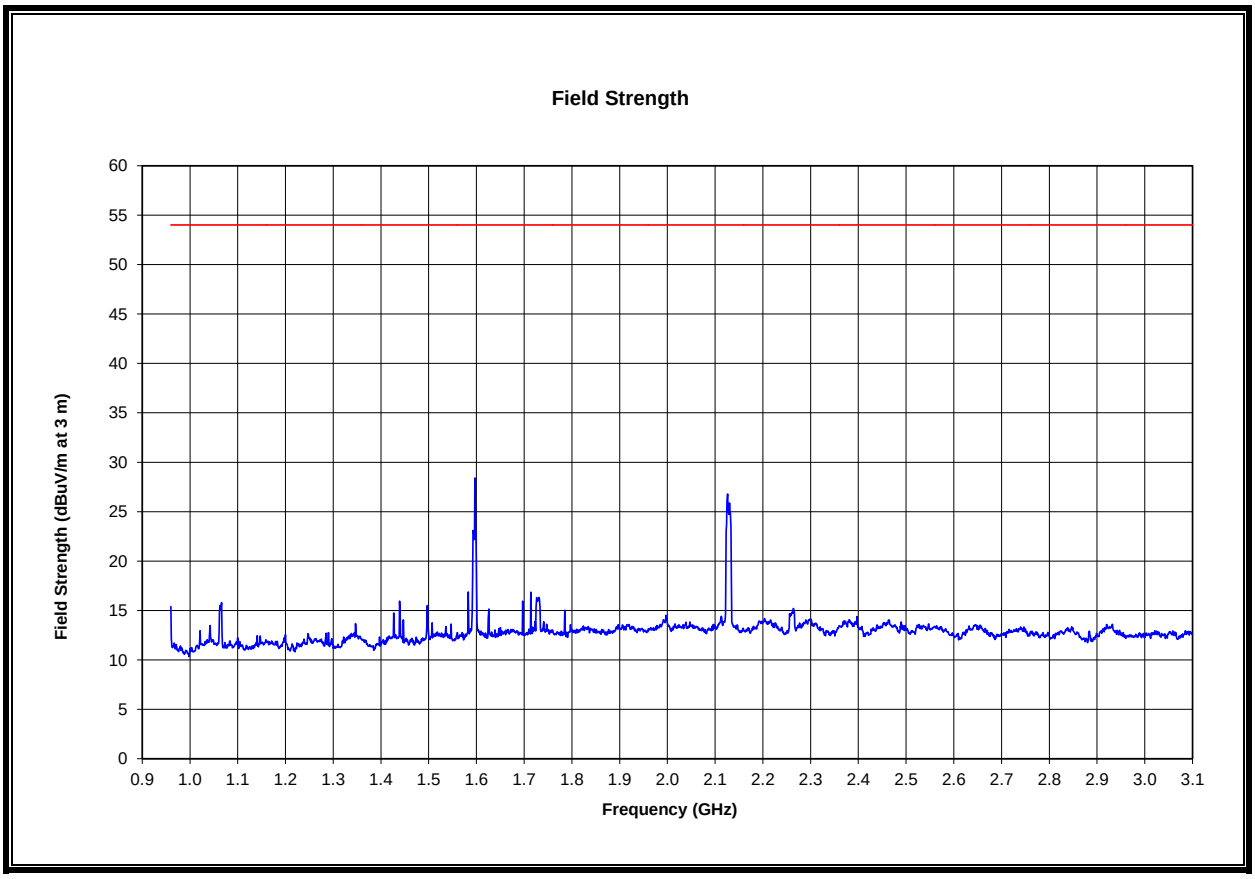
8.3.1. RADIATED EMISSIONS ABOVE 960 MHz FOR BG1

EIRP 0.960 TO 3.1 GHz, 1 MHz BW



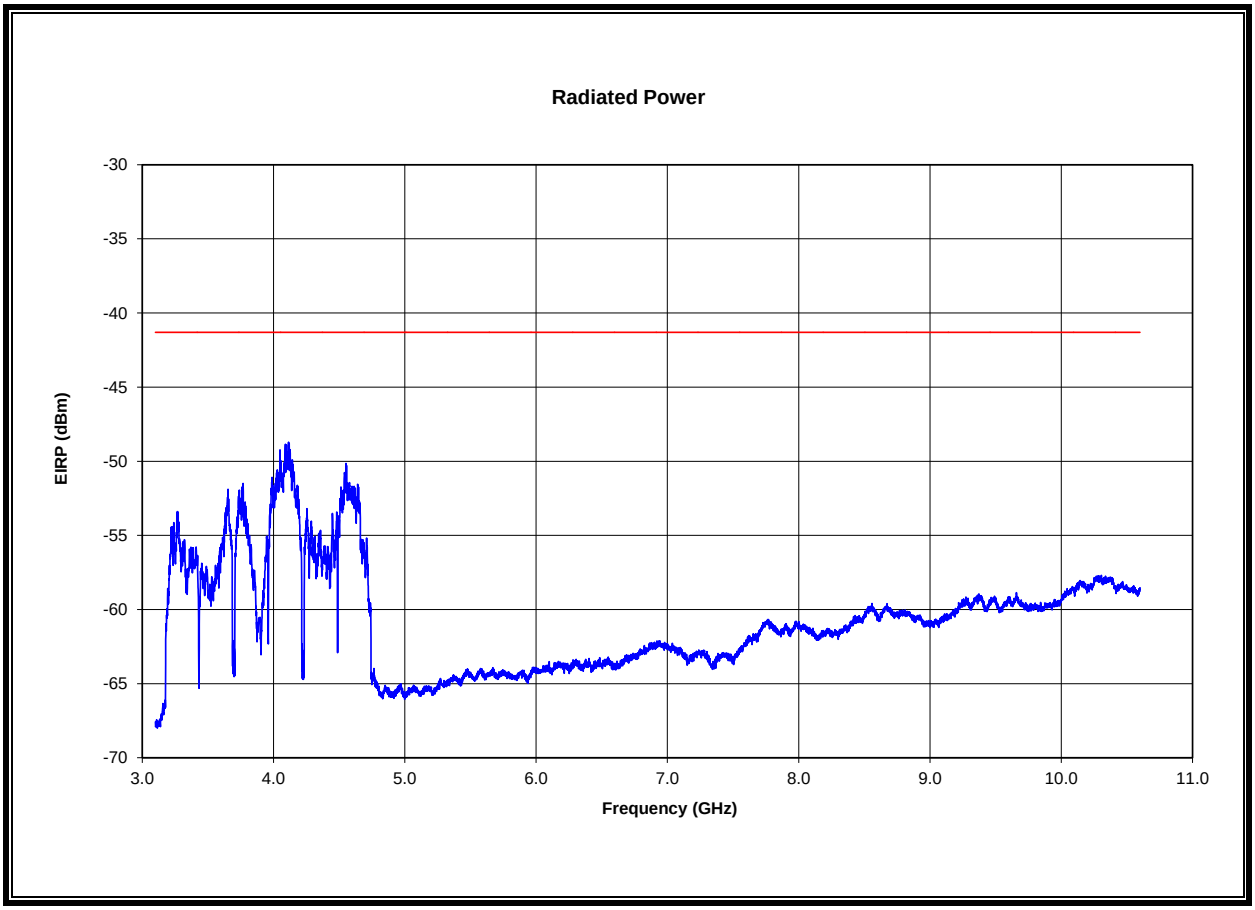
The emission at 1597 MHz is due to digital device circuitry. This was determined by turning off the UWB transmitter and observing that this emission remained.

FIELD STRENGTH 0.960 TO 3.1 GHz, 1 MHz BW

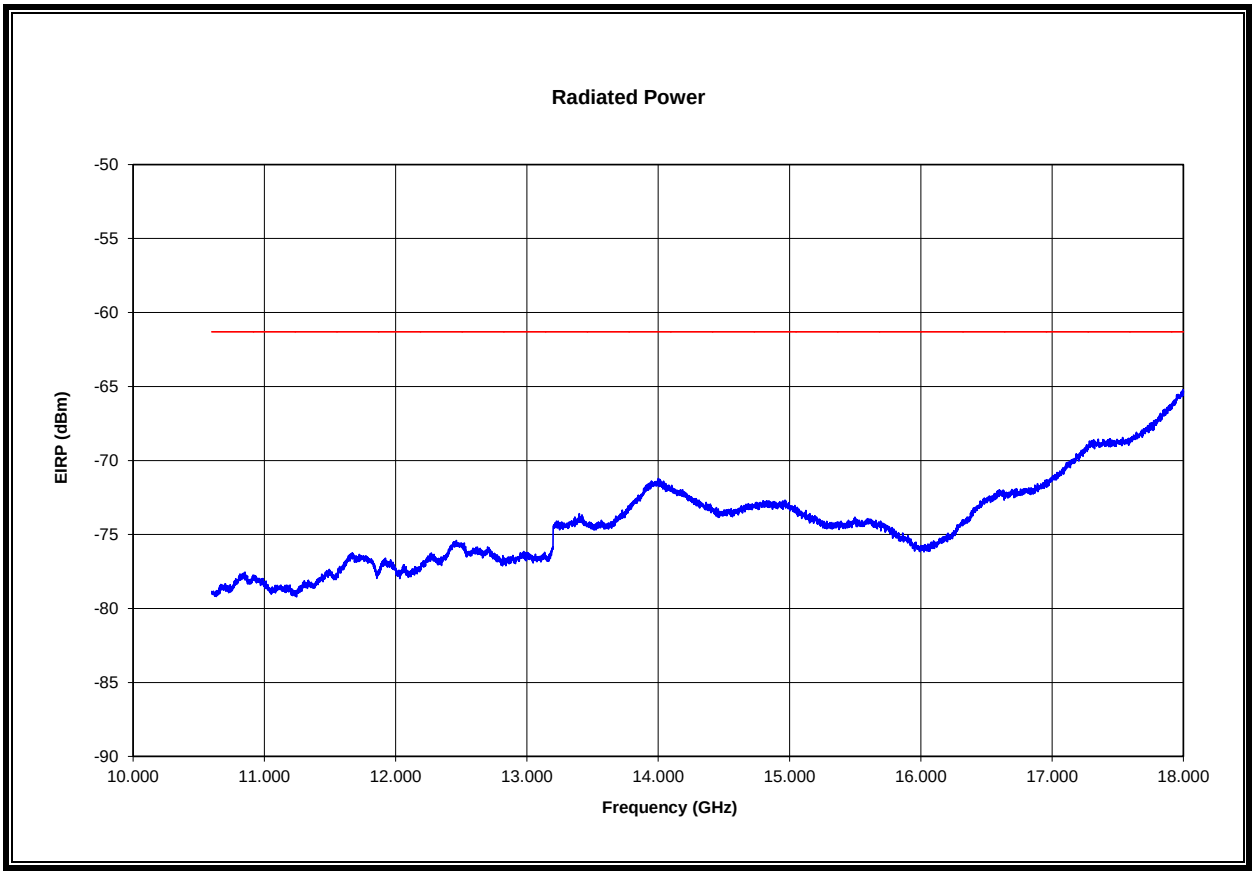


The peak measurement is compared to the average 15.209 field strength limit.

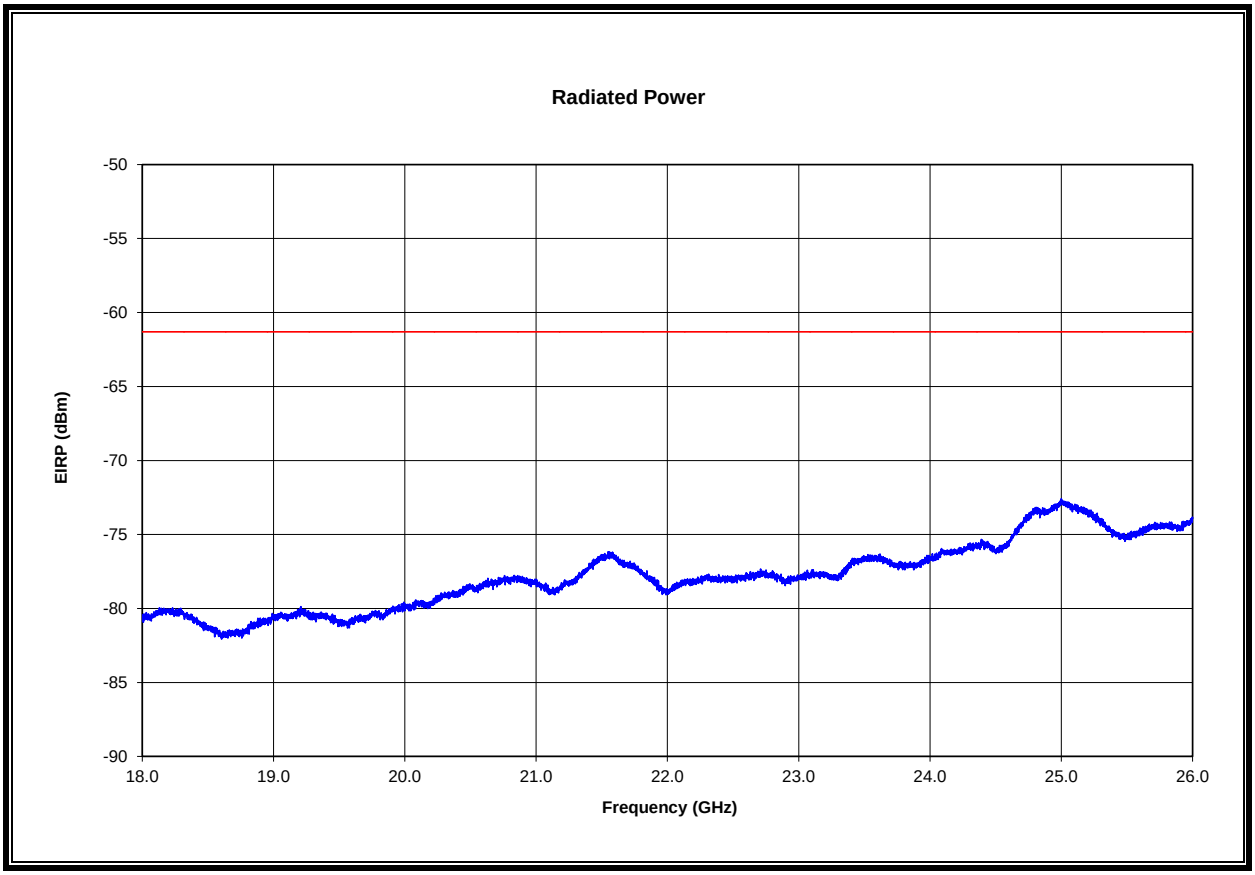
EIRP 3.1 TO 10.6 GHz, 1 MHz BW



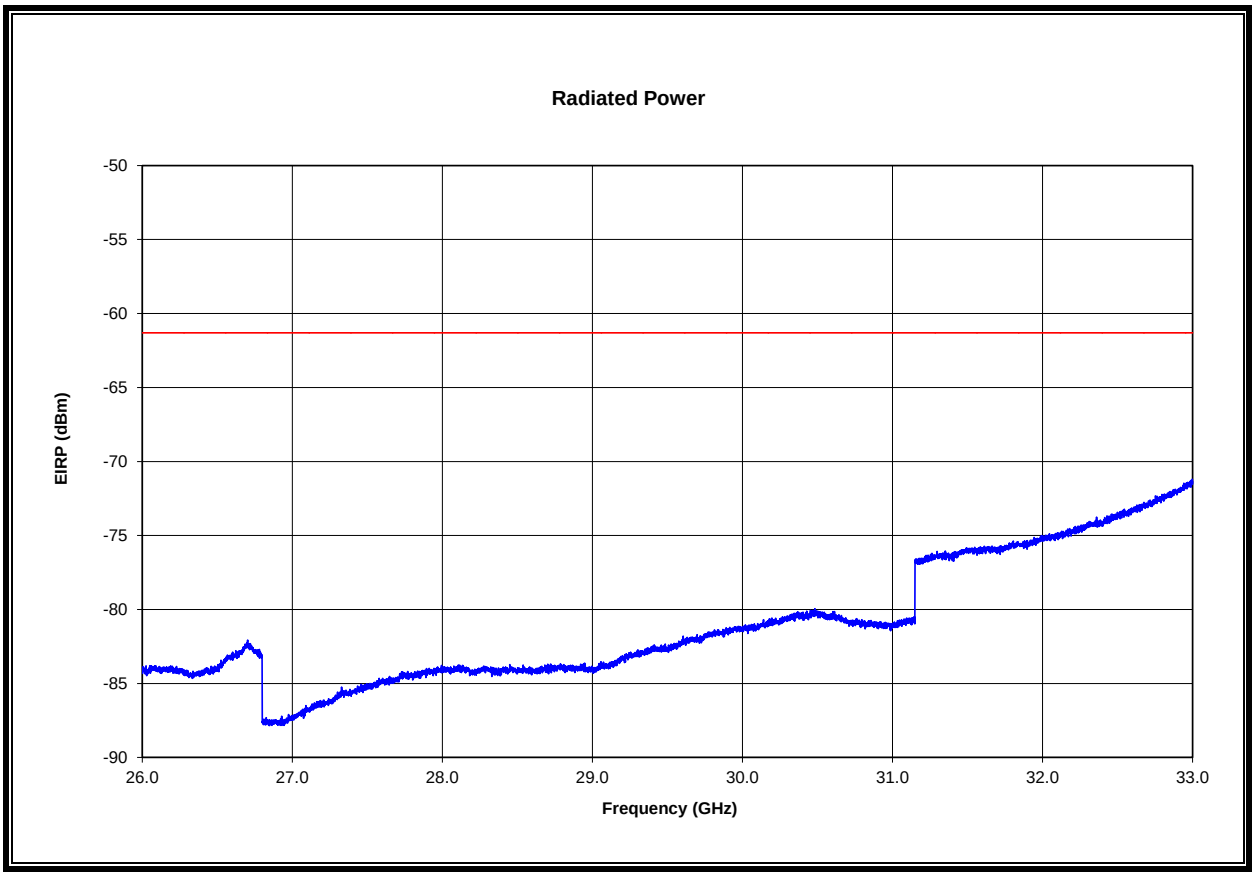
EIRP 10.6 TO 18 GHz, 1 MHz BW



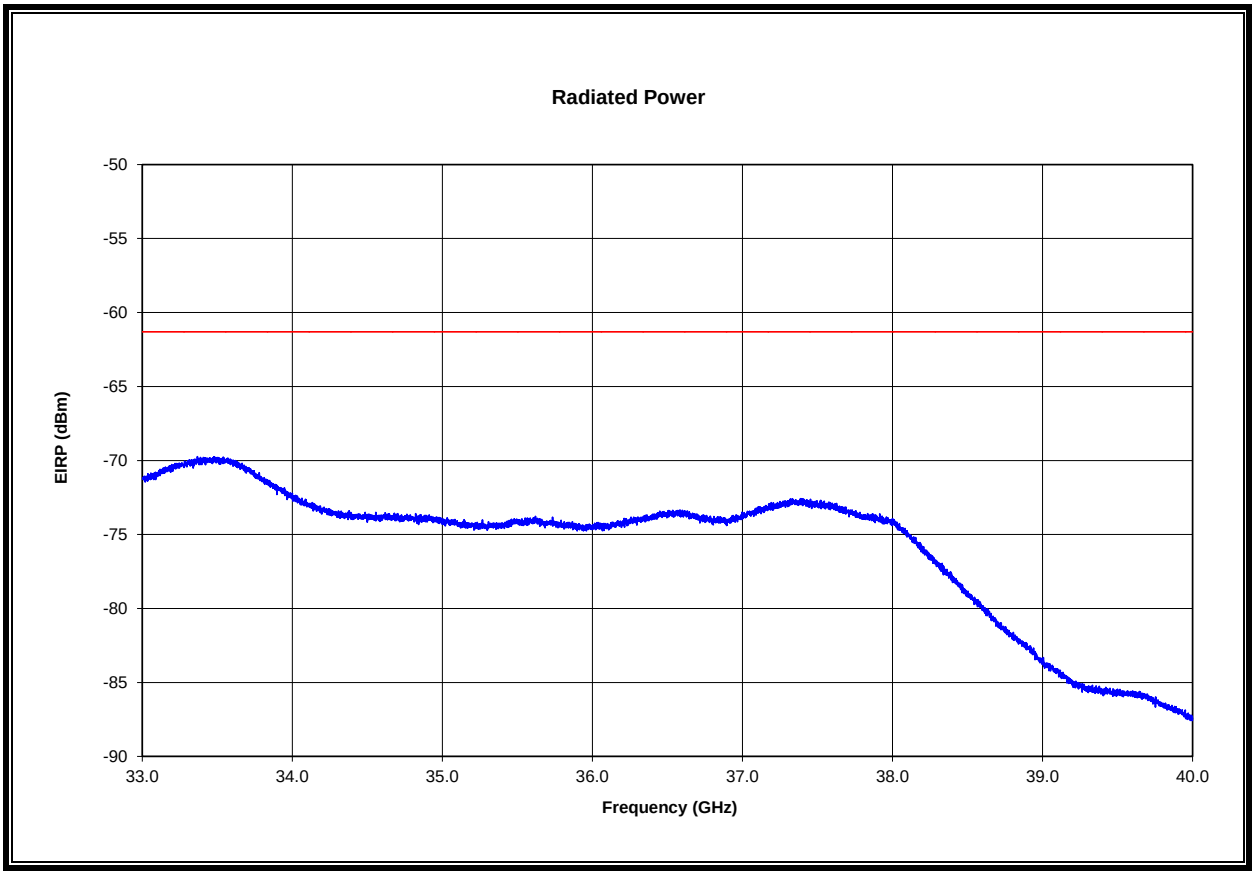
EIRP 18 TO 26 GHz, 1 MHz BW



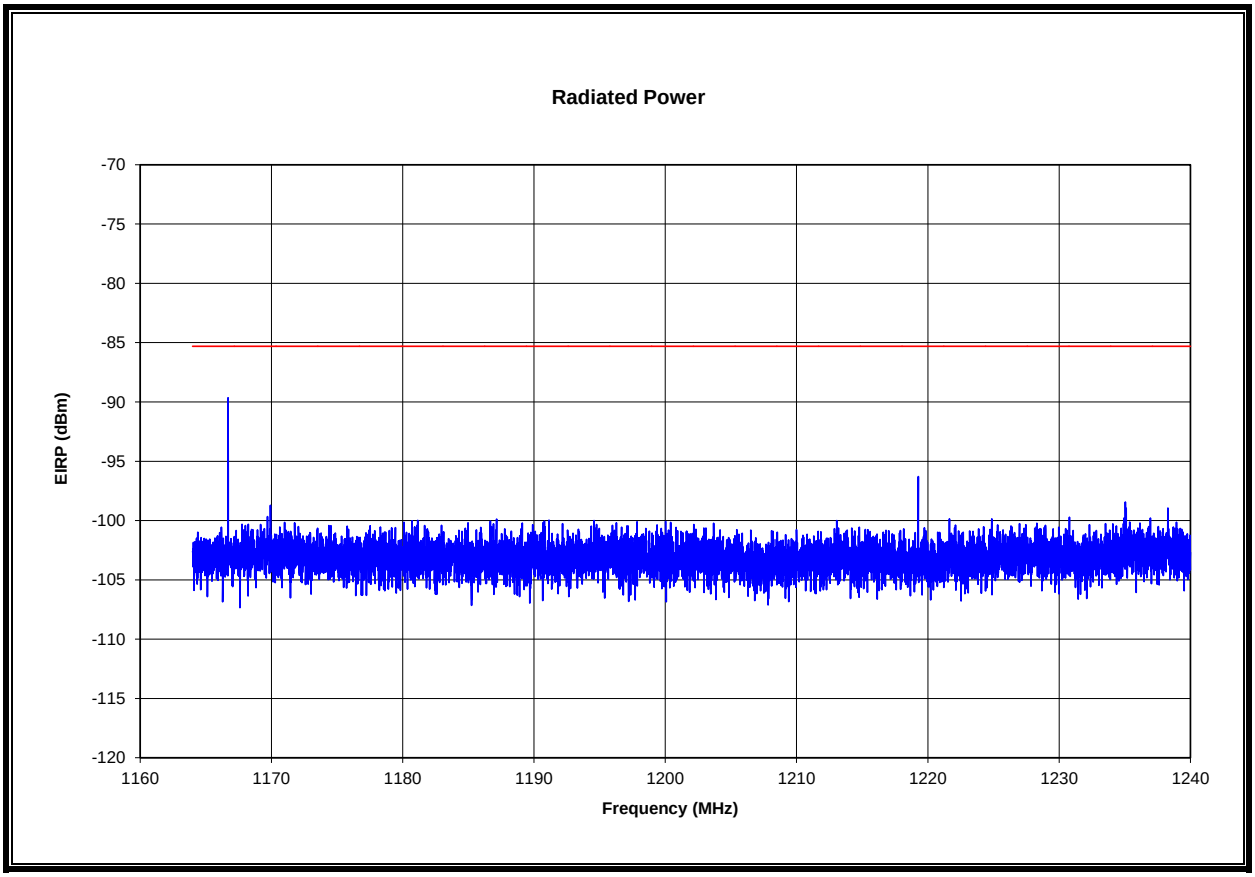
EIRP 26 TO 33 GHz, 1 MHz BW



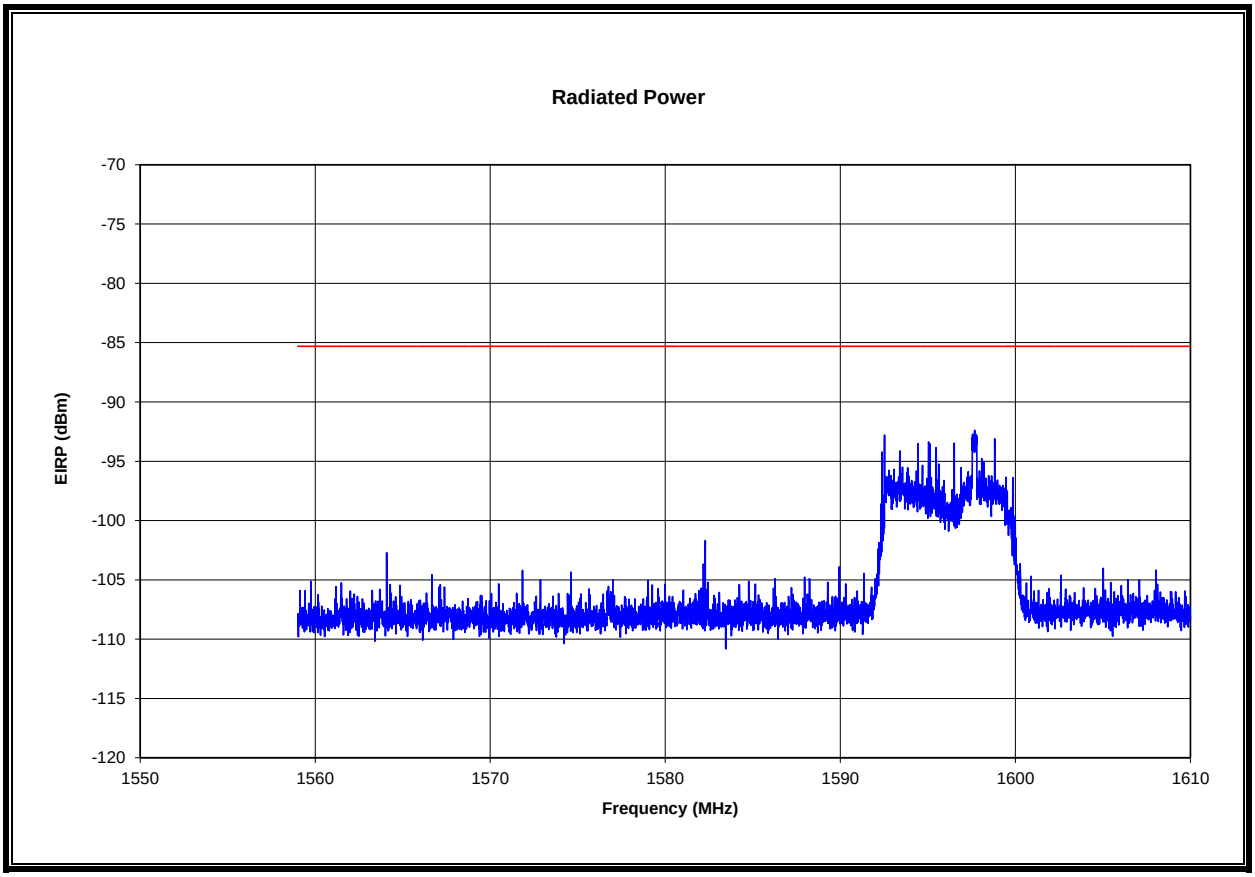
EIRP 33 TO 40 GHz, 1 MHz BW



EIRP 1.164 TO 1.240 GHz, 1 kHz BW

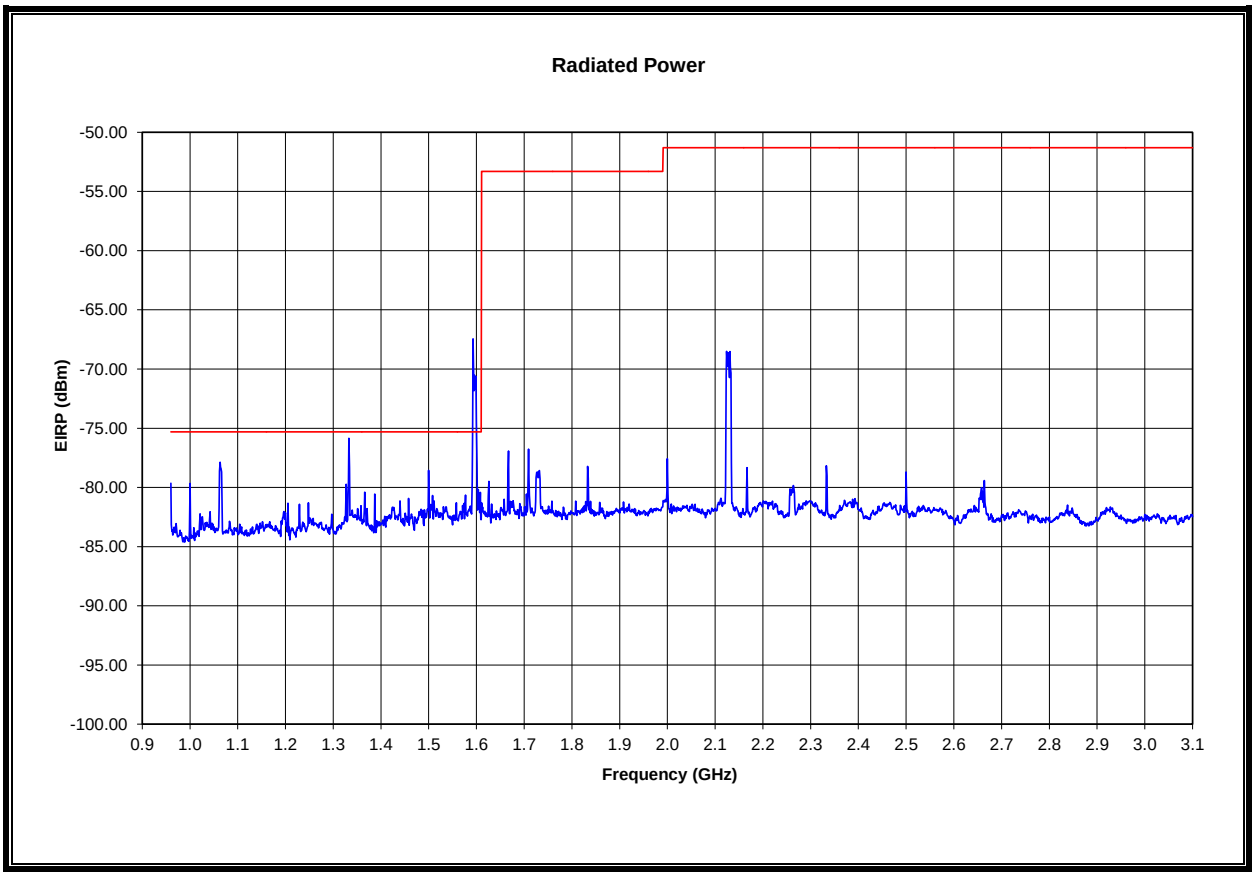


EIRP 1.559 TO 1.610 GHz, 1 kHz BW



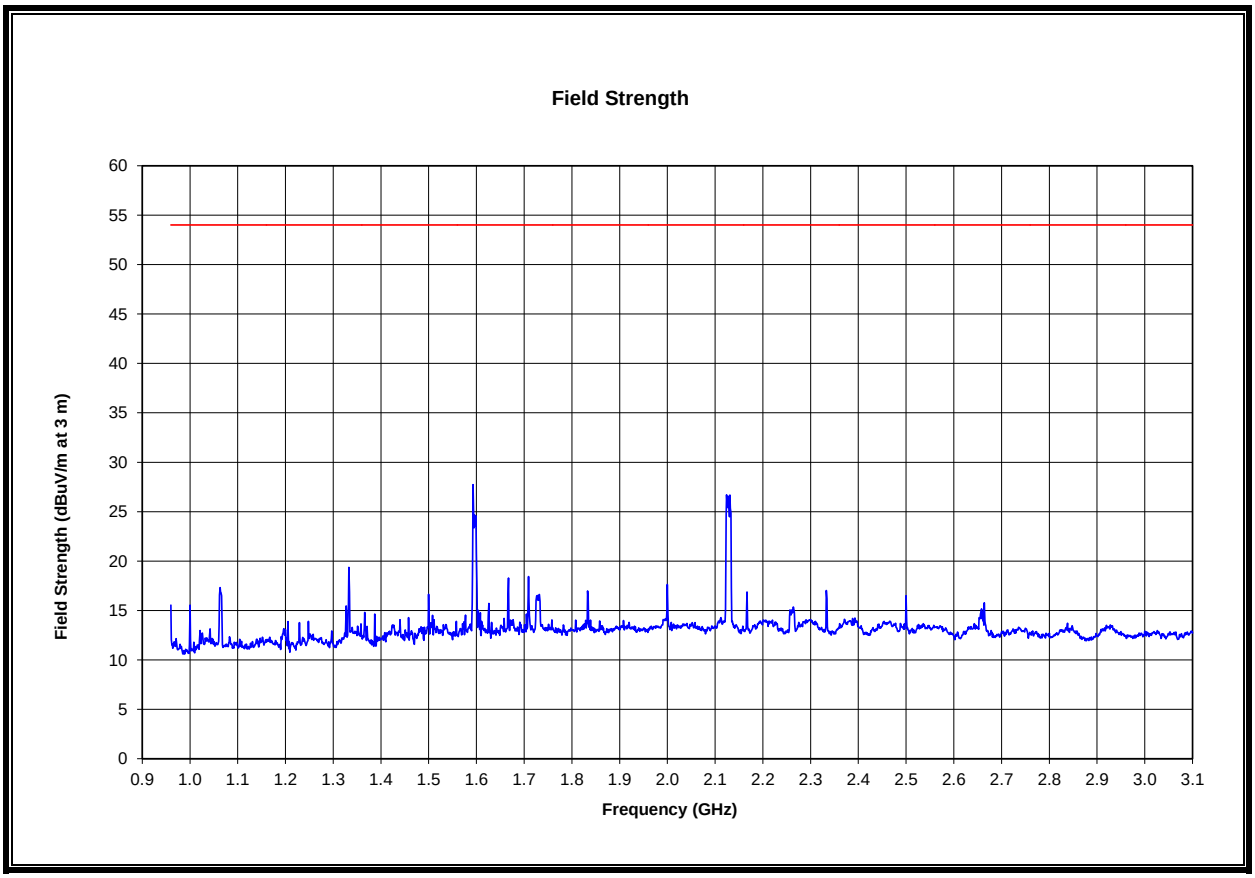
8.3.2. RADIATED EMISSIONS ABOVE 960 MHz FOR BG3

EIRP 0.960 TO 3.1 GHz, 1 MHz BW



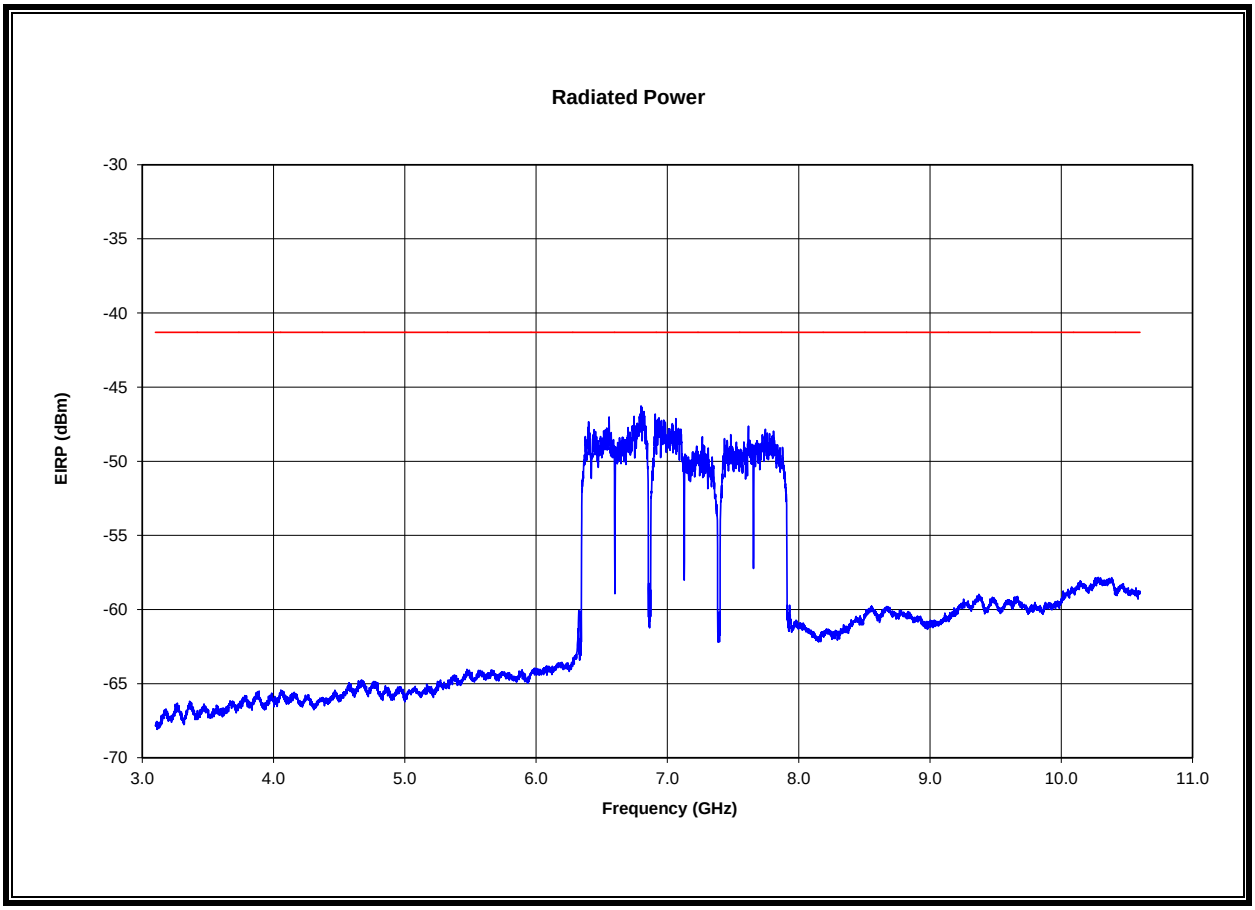
The emission at 1597 MHz is due to digital device circuitry. This was determined by turning off the UWB transmitter and observing that this emission remained.

FIELD STRENGTH 0.960 TO 3.1 GHz, 1 MHz BW

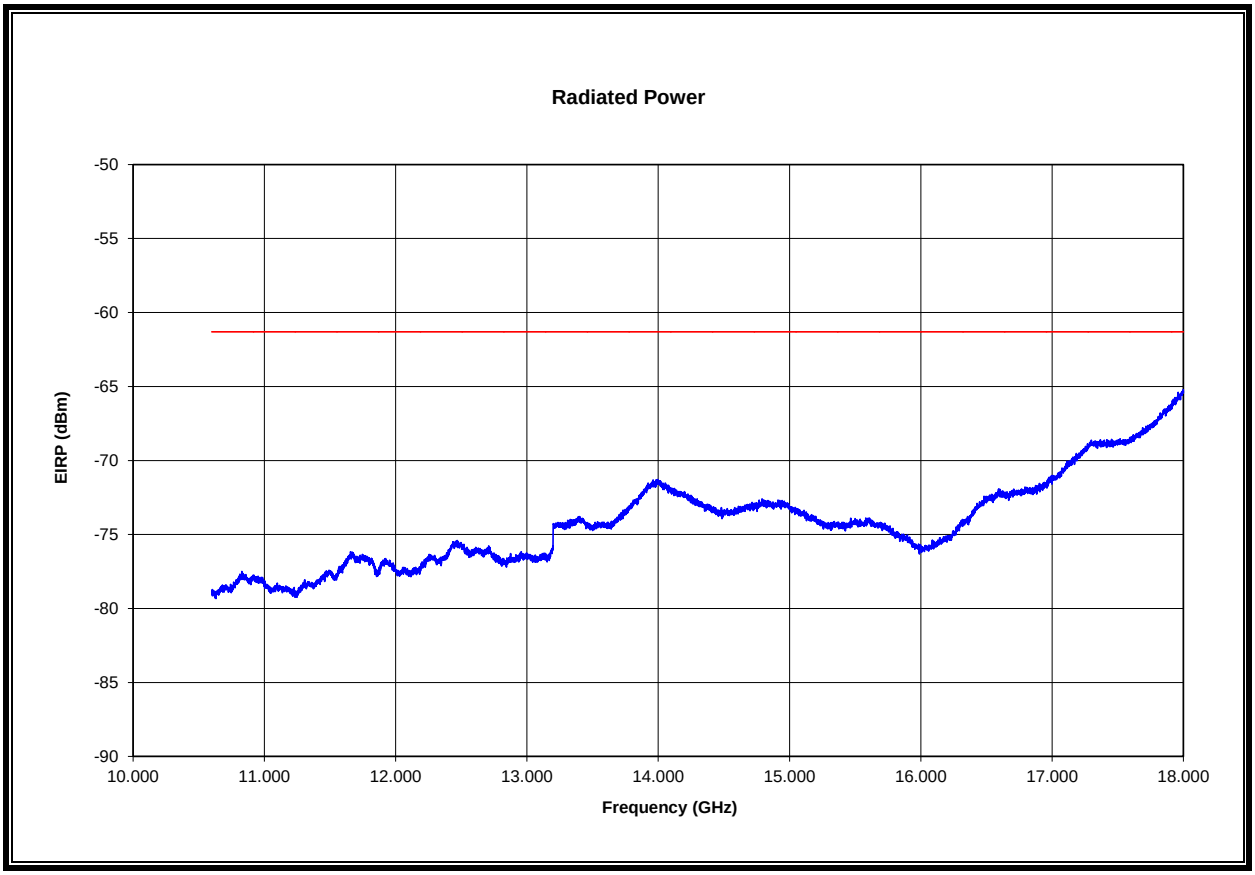


The peak measurement is compared to the average 15.209 field strength limit.

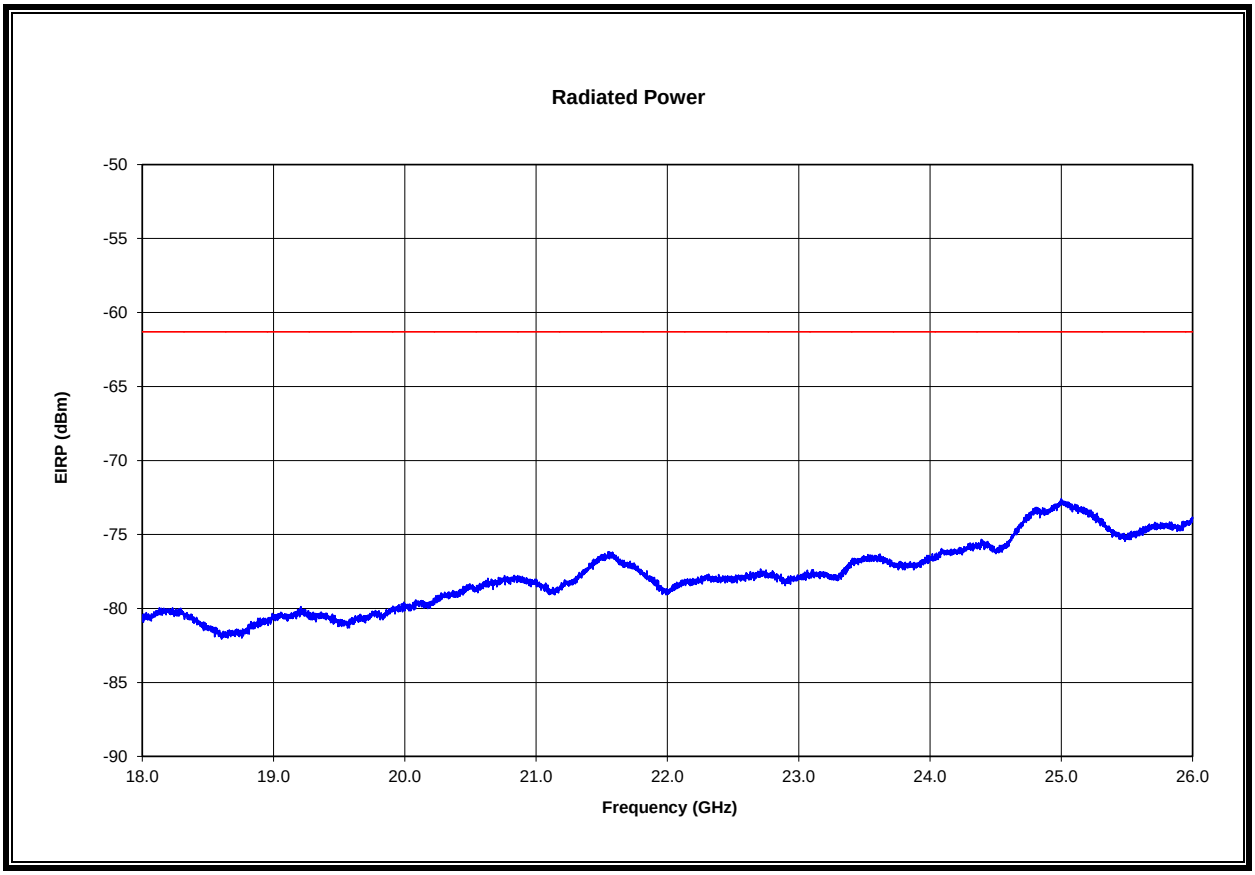
EIRP 3.1 TO 10.6 GHz, 1 MHz BW



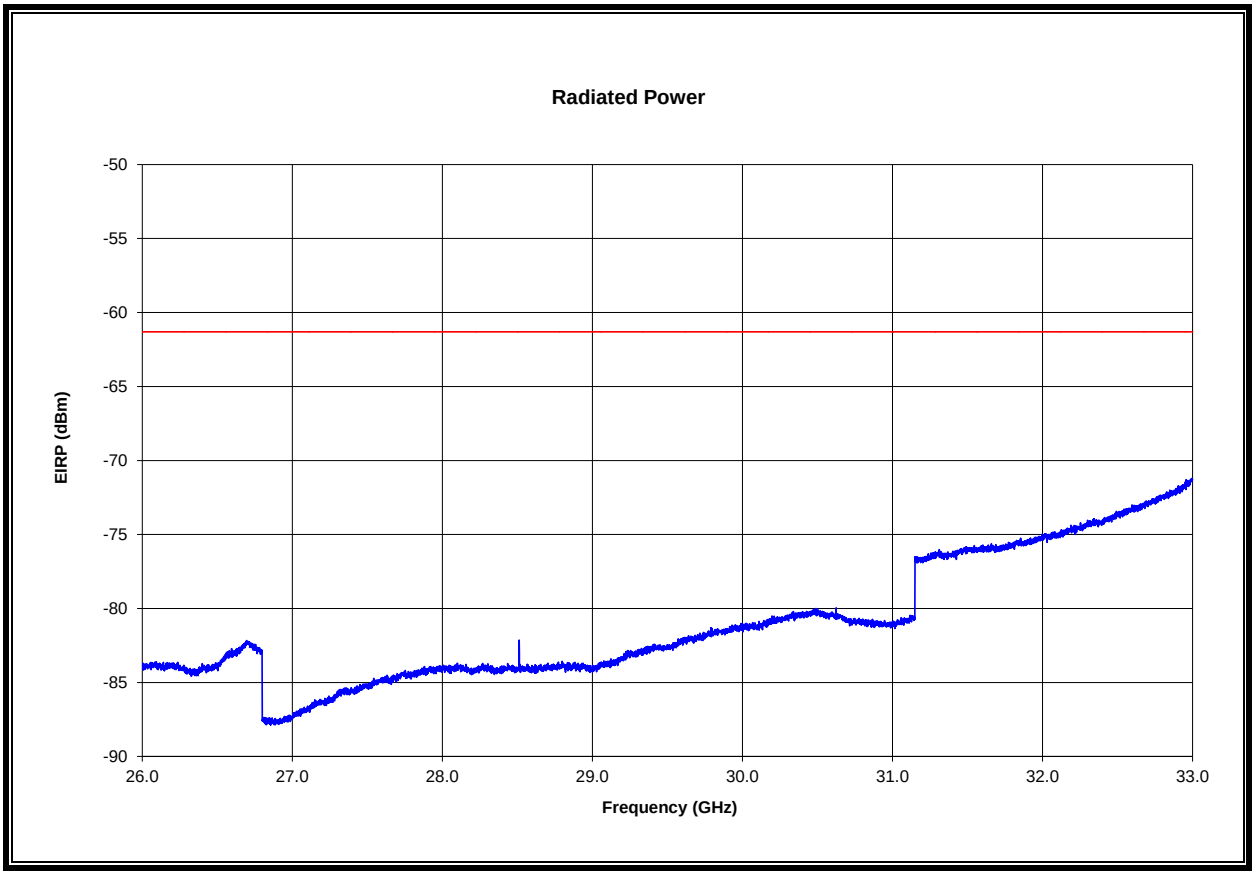
EIRP 10.6 TO 18 GHz, 1 MHz BW



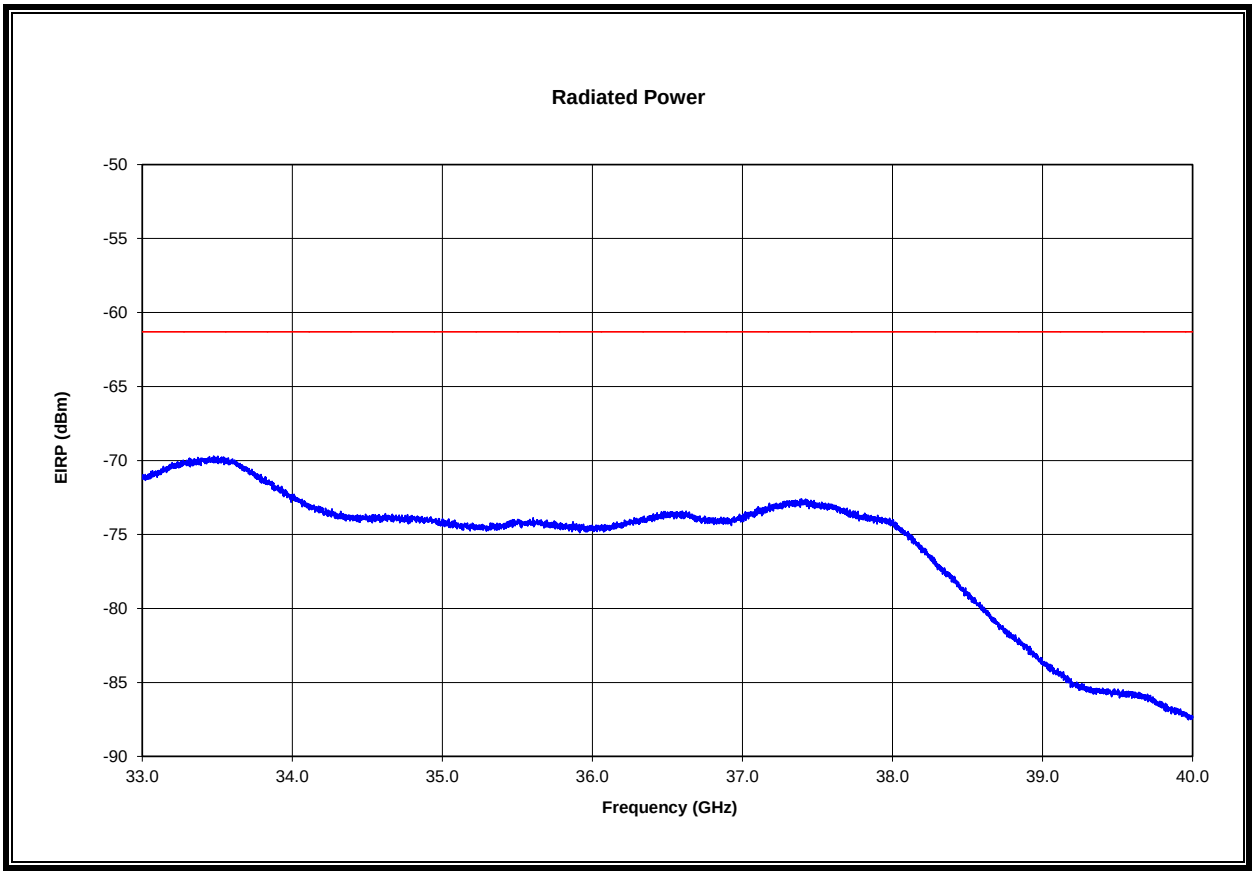
EIRP 18 TO 26 GHz, 1 MHz BW



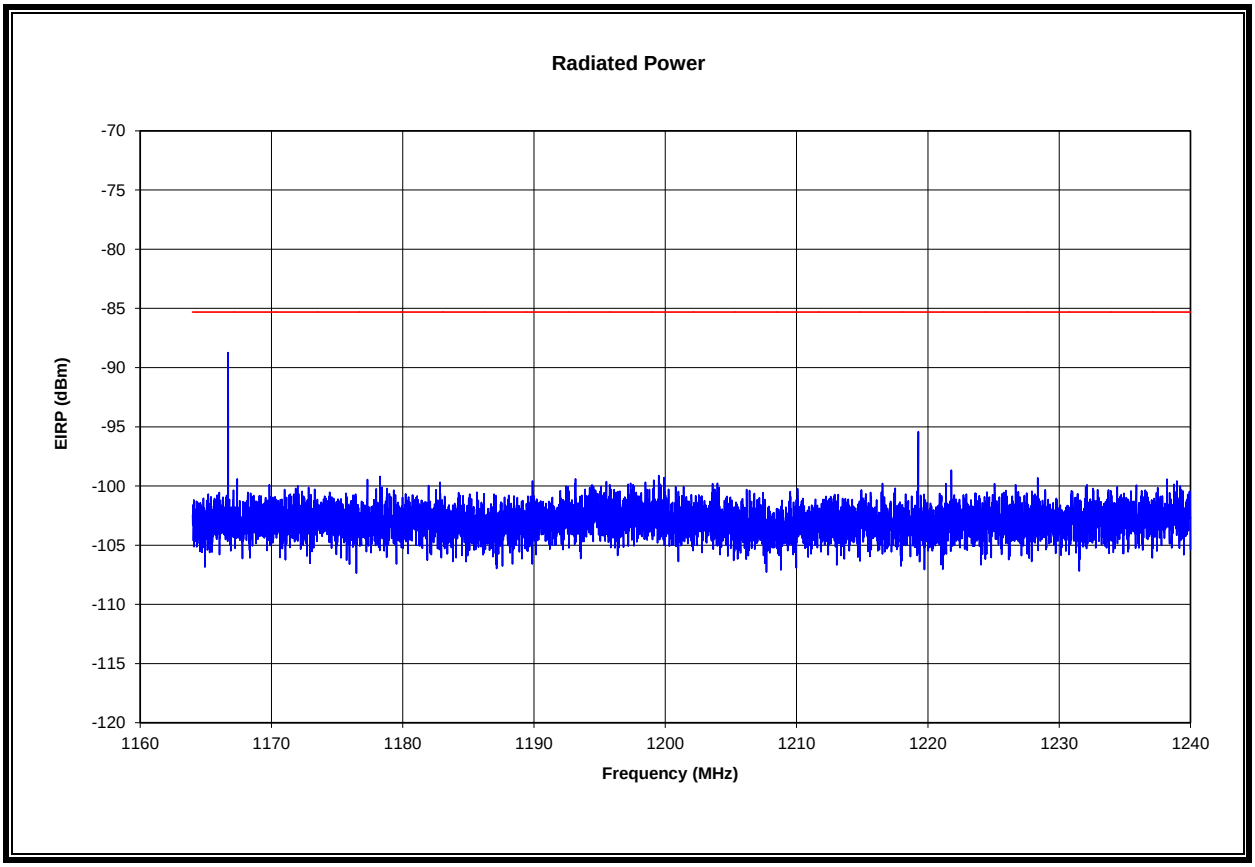
EIRP 26 TO 33 GHz, 1 MHz BW



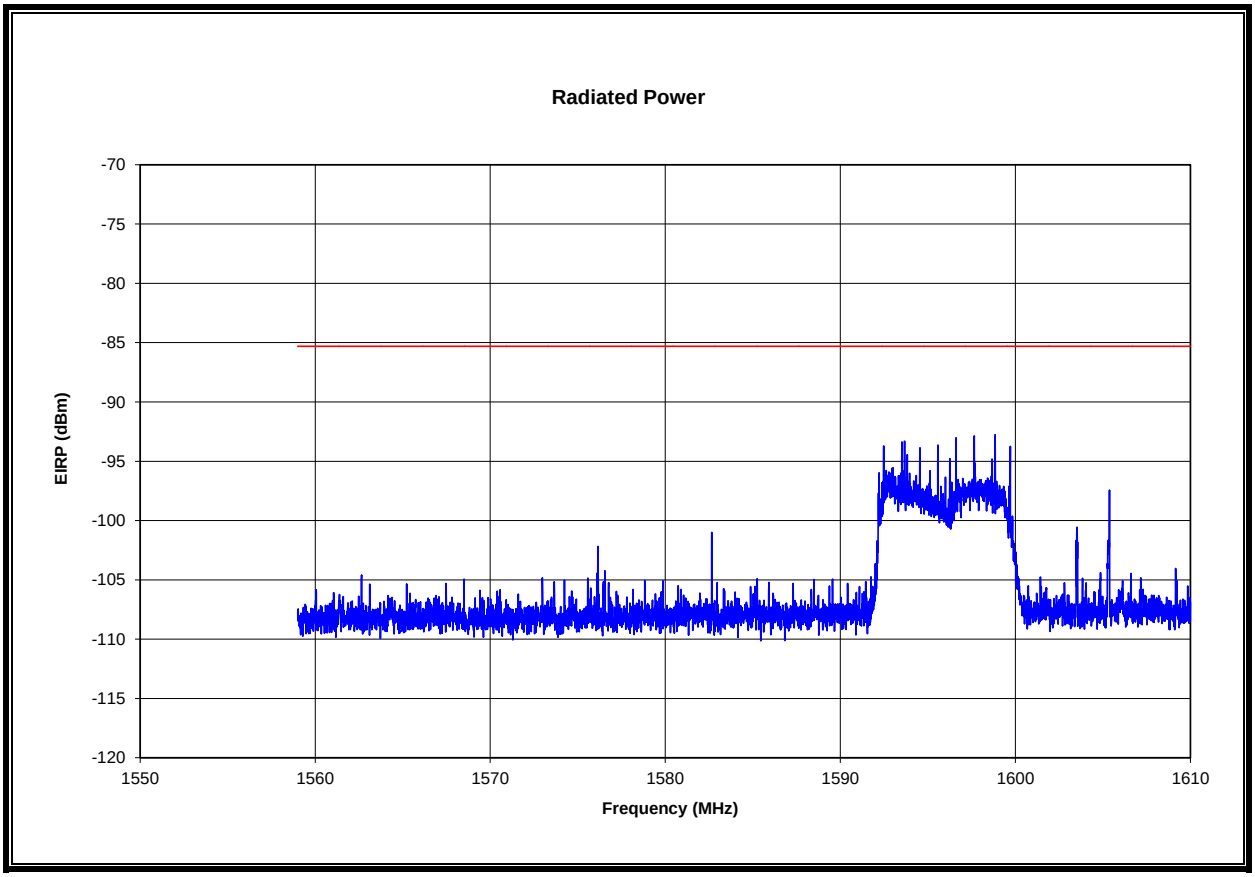
EIRP 33 TO 40 GHz, 1 MHz BW



EIRP 1.164 TO 1.240 GHz, 1 kHz BW

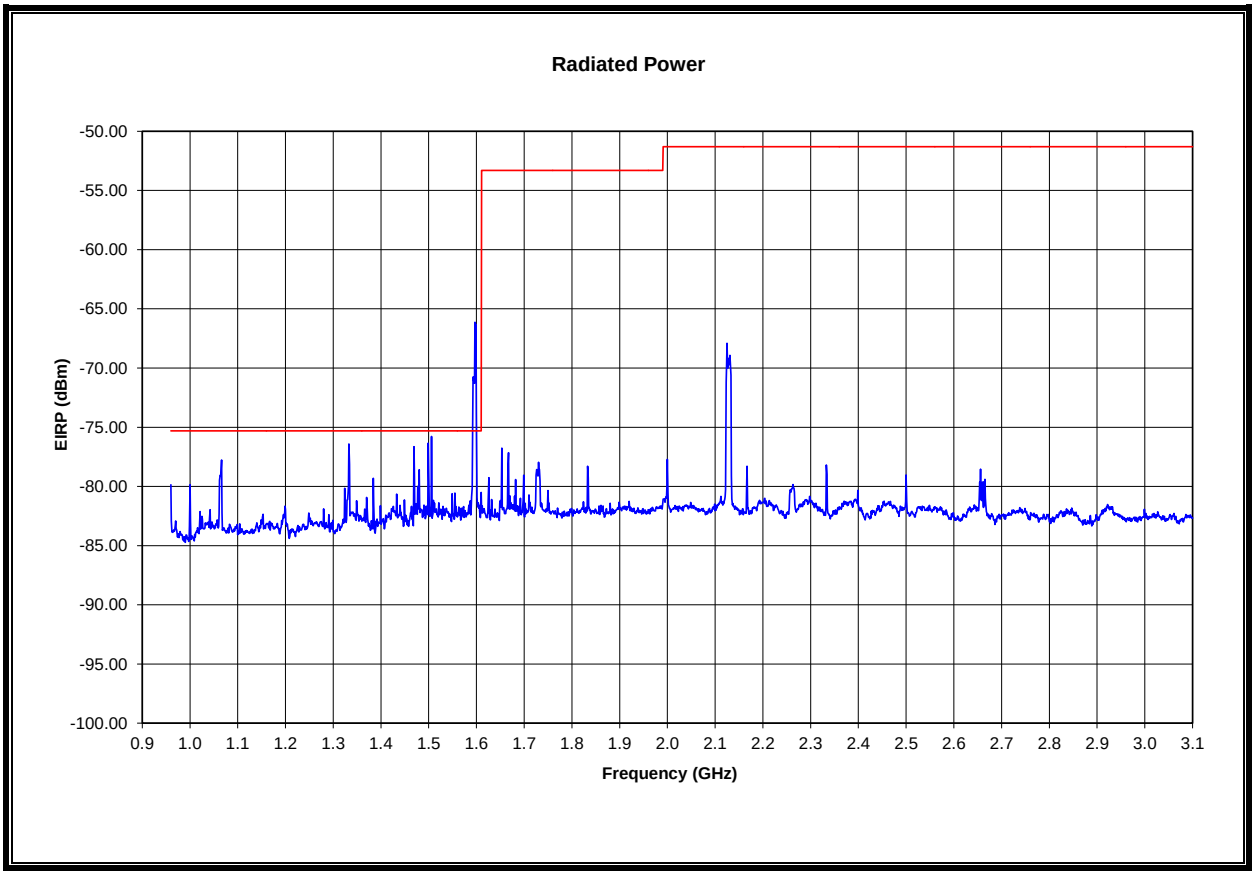


EIRP 1.559 TO 1.610 GHz, 1 kHz BW



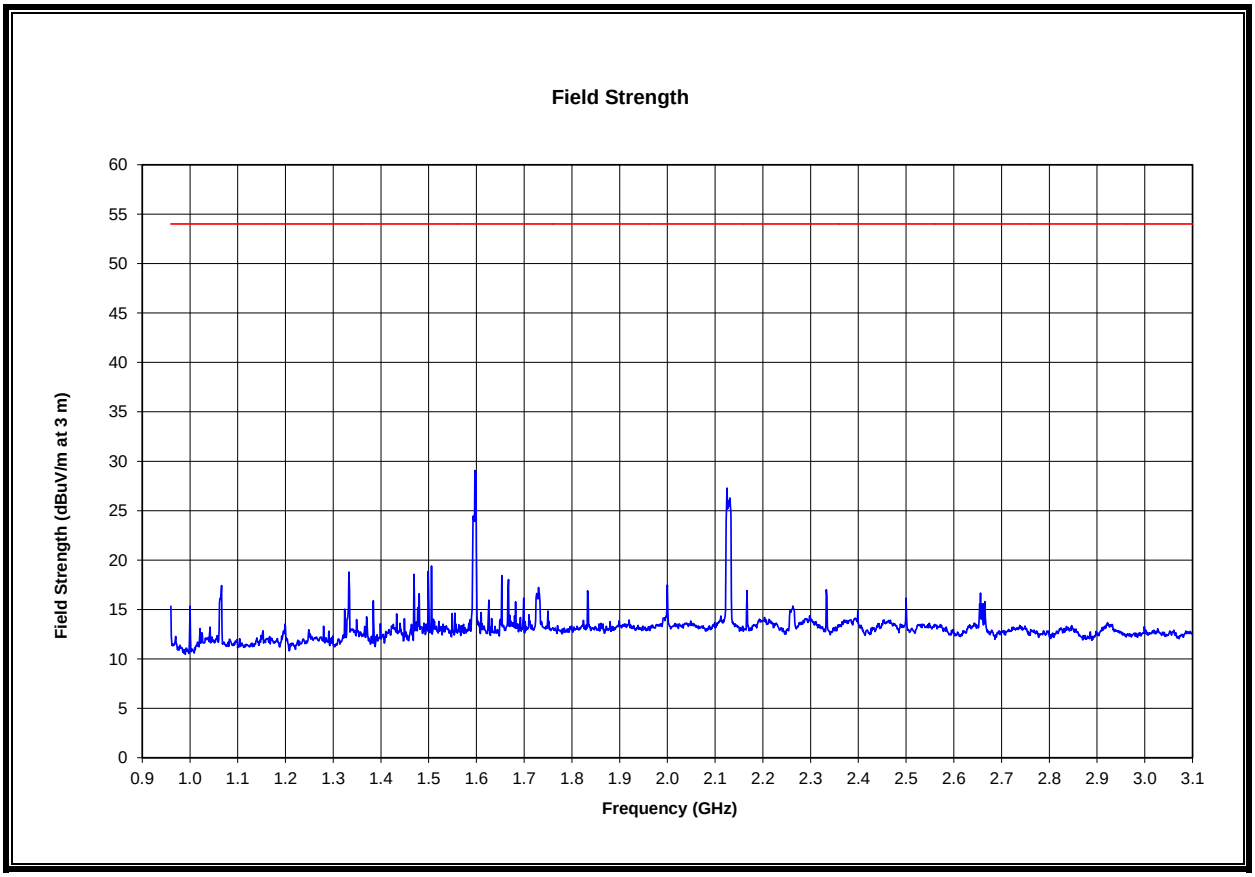
8.3.3. RADIATED EMISSIONS ABOVE 960 MHz FOR BG6

EIRP 0.960 TO 3.1 GHz, 1 MHz BW



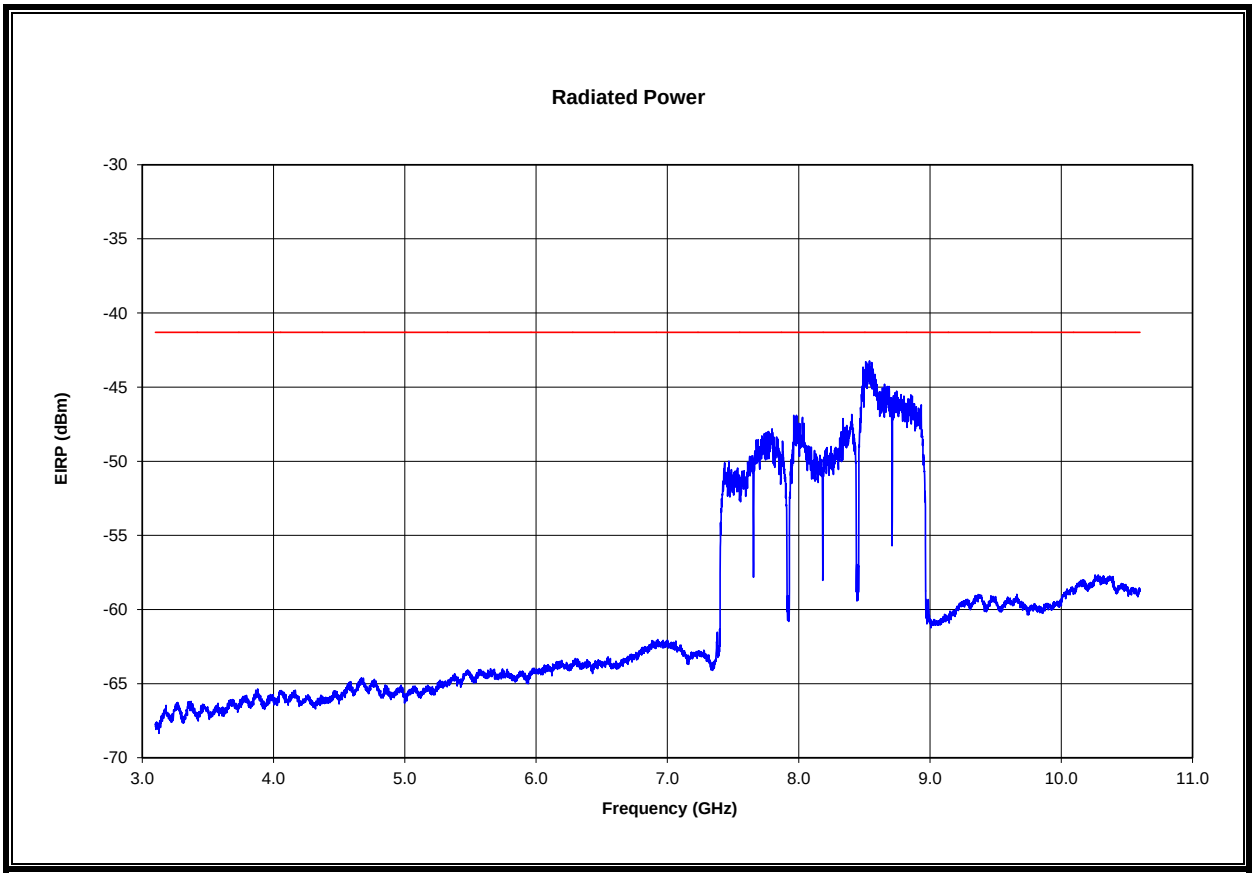
The emission at 1597 MHz is due to digital device circuitry. This was determined by turning off the UWB transmitter and observing that this emission remained.

FIELD STRENGTH 0.960 TO 3.1 GHz, 1 MHz BW

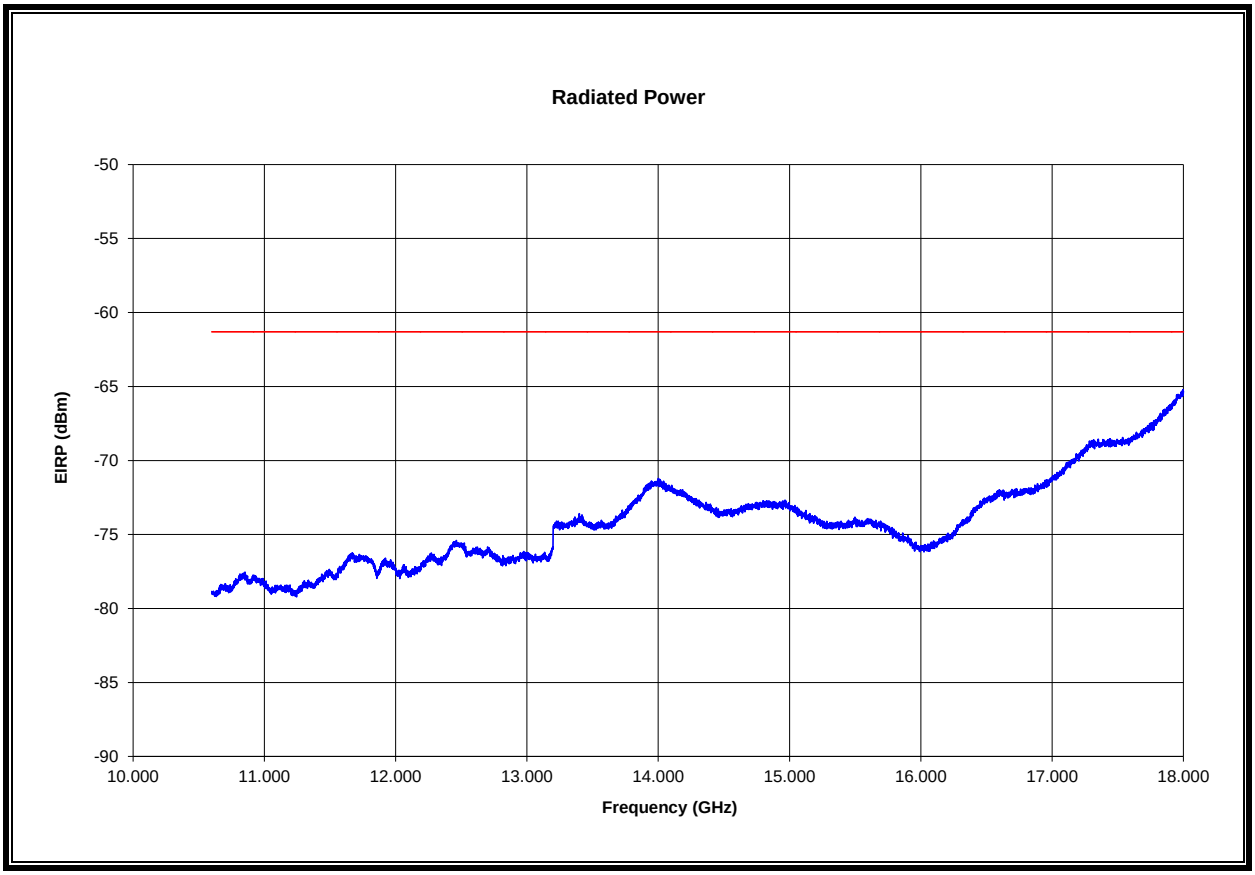


The peak measurement is compared to the average 15.209 field strength limit.

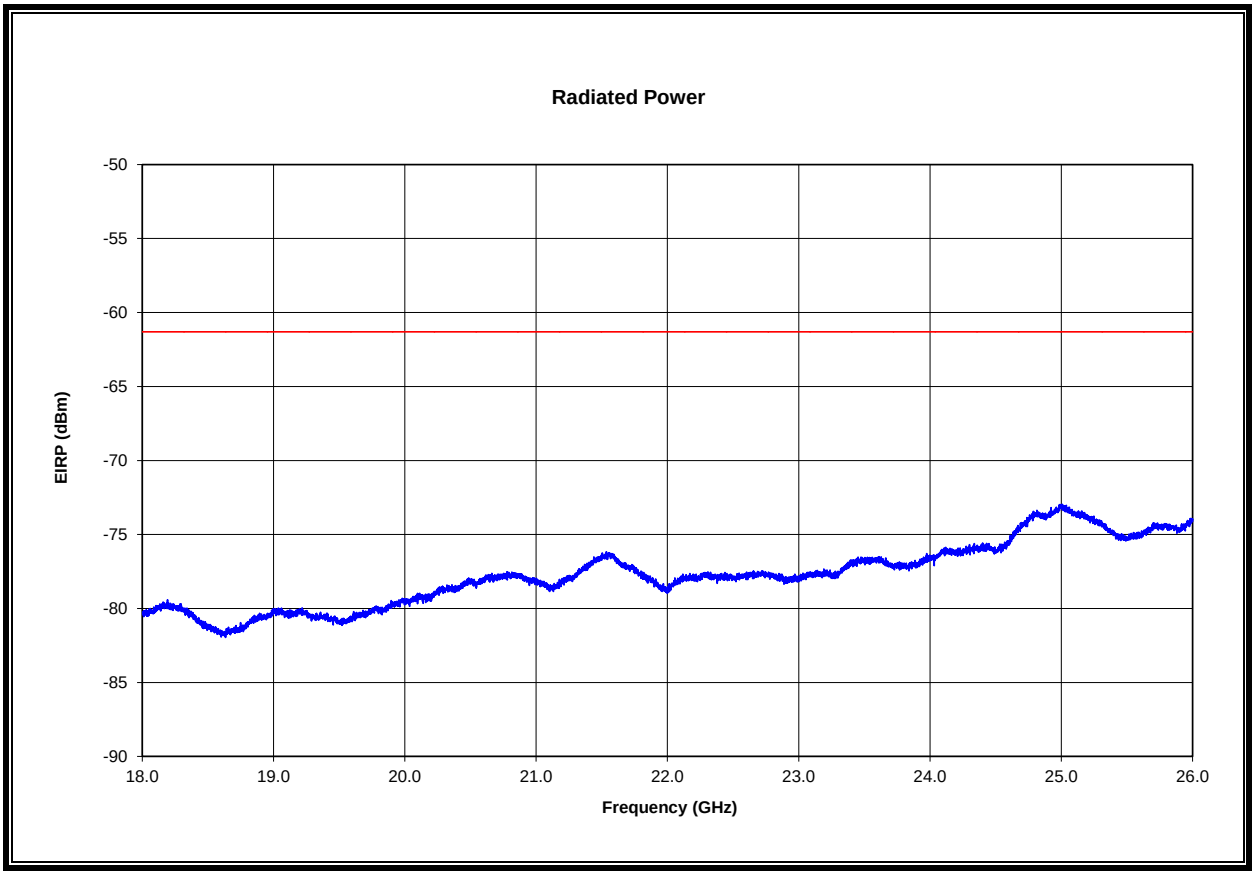
EIRP 3.1 TO 10.6 GHz, 1 MHz BW



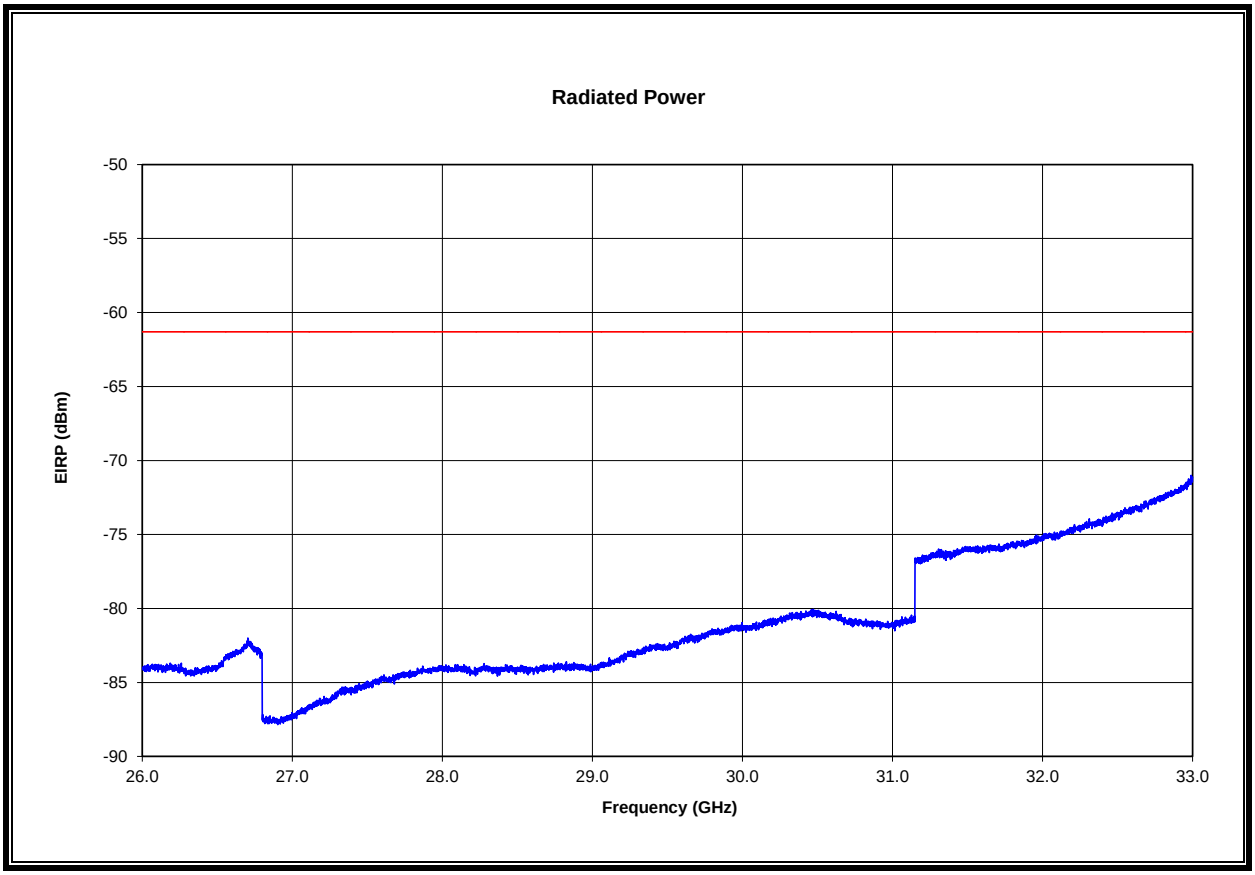
EIRP 10.6 TO 18 GHz, 1 MHz BW



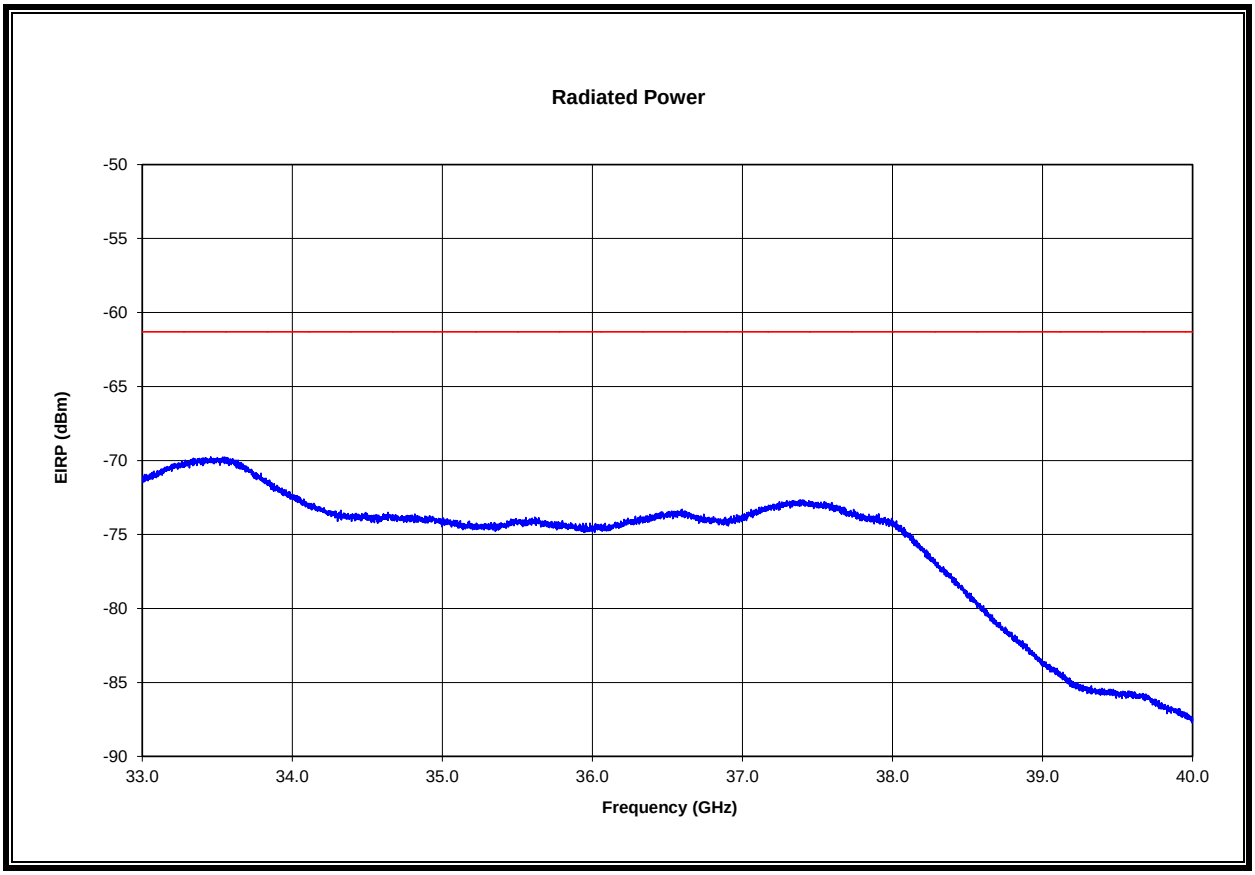
EIRP 18 TO 26 GHz, 1 MHz BW



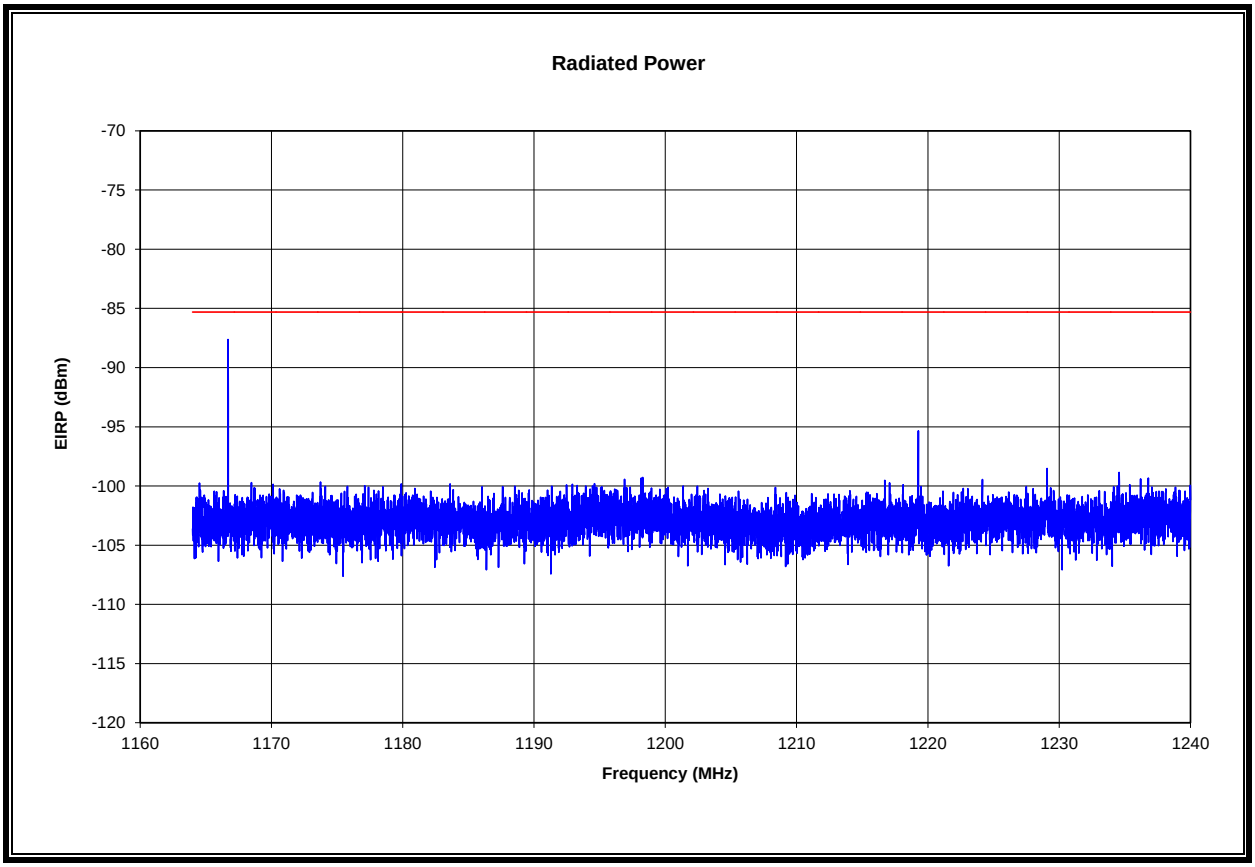
EIRP 26 TO 33 GHz, 1 MHz BW



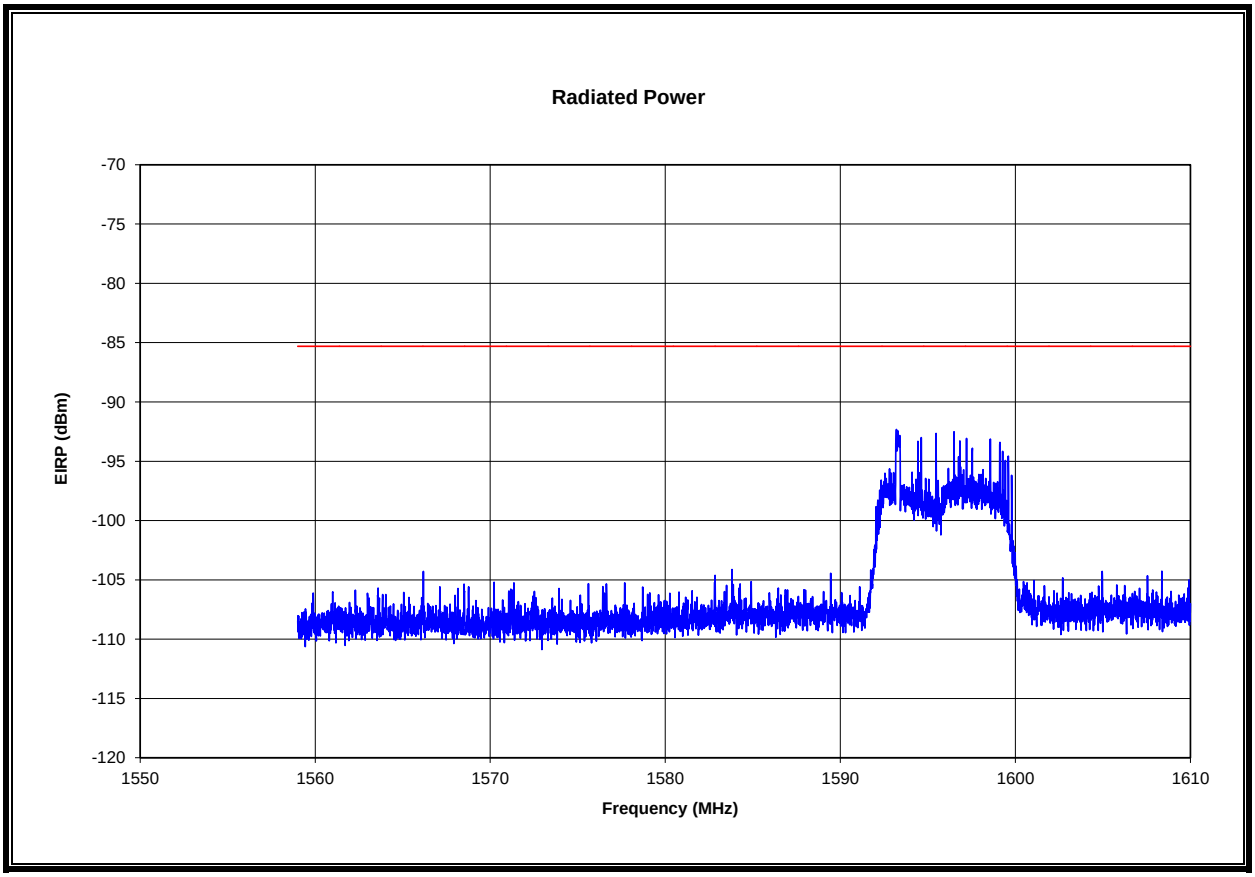
EIRP 33 TO 40 GHz, 1 MHz BW



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

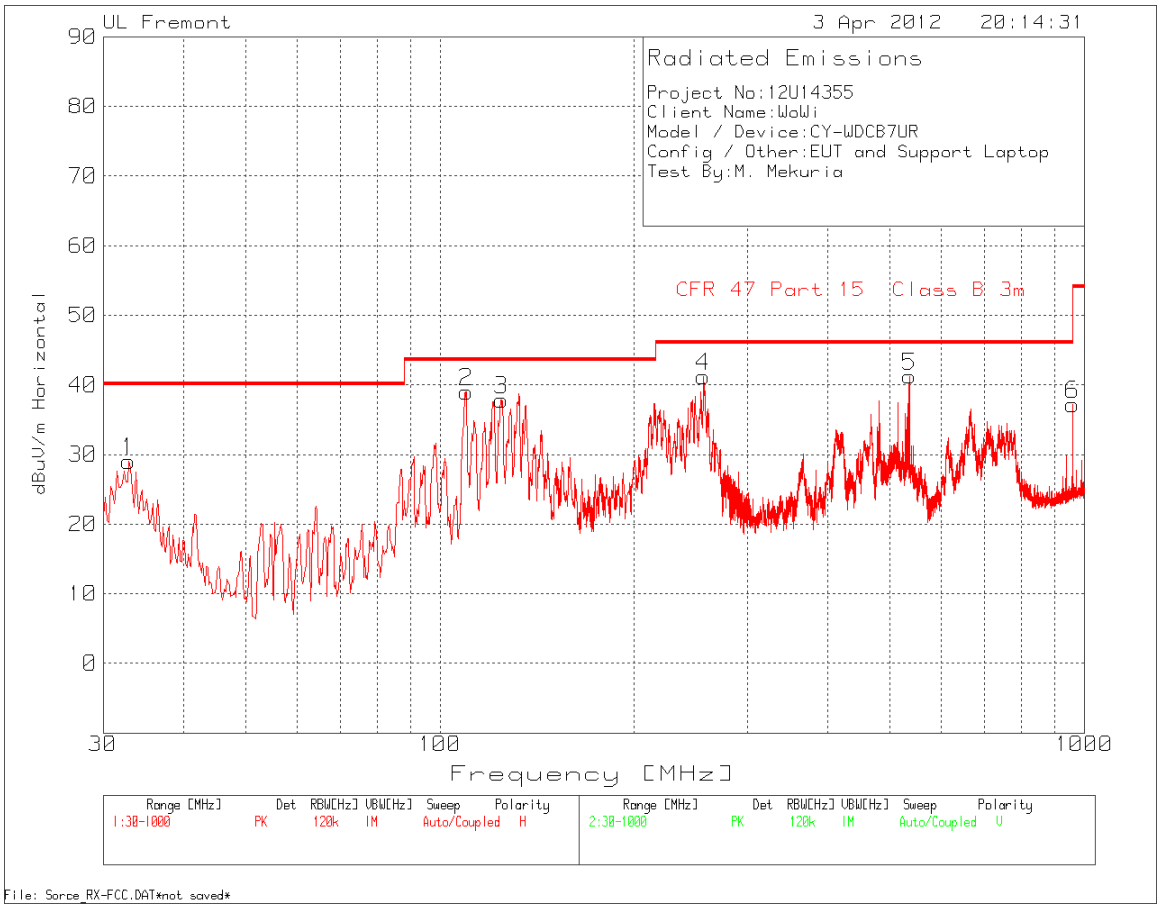
** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this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

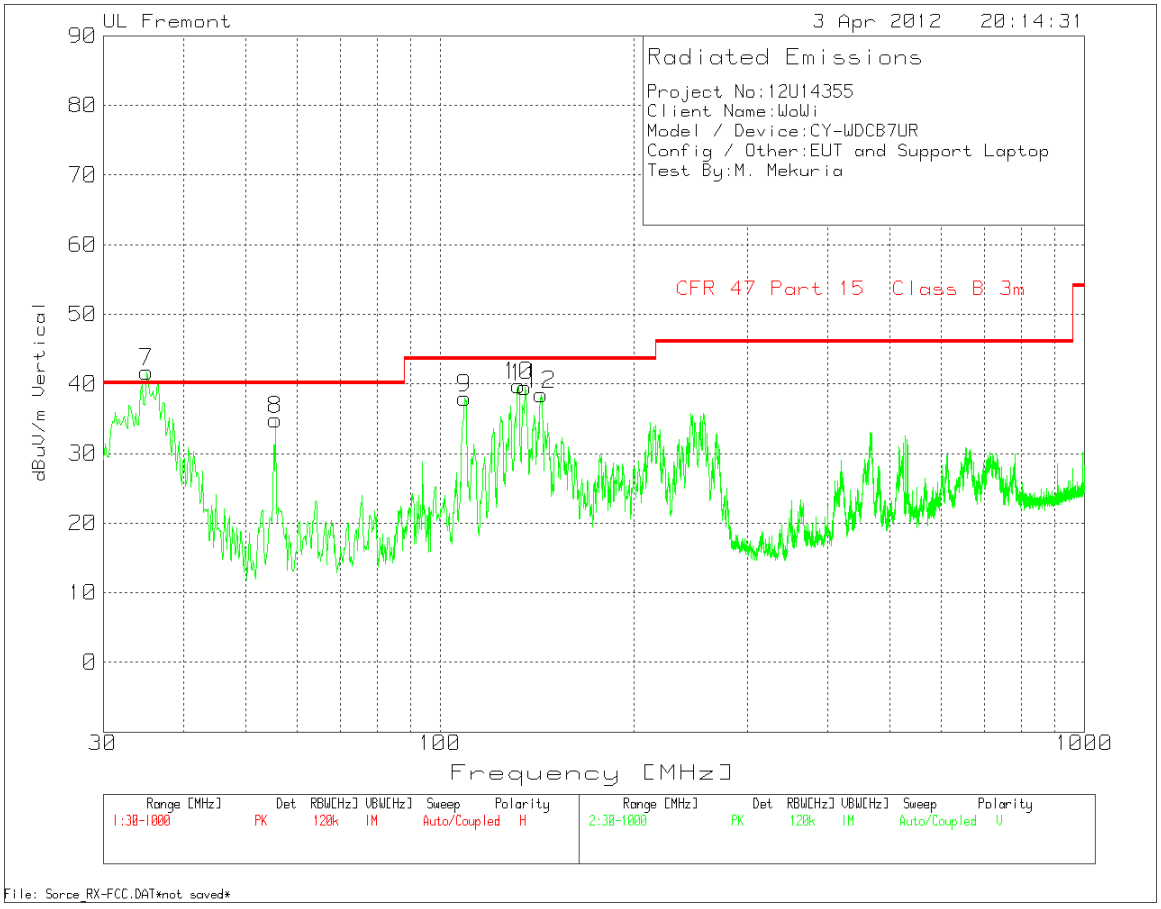
SPURIOUS EMISSIONS 30 TO 960 MHz HORIZONTAL

HORIZONTAL PLOT



SPURIOUS EMISSIONS 30 TO 960 MHz VERTICAL

VERTICAL PLOT



HORIZONTAL AND VERTICAL DATA

Project No:12U14355								
Client Name:WoWi								
Model / Device:CY-WDCB7UR								
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
32.9077	39.2	PK	-29.2	19	29	40	-11	200	Horz
109.8641	55.64	PK	-28.5	11.9	39.04	43.5	-4.46	300	Horz
124.5963	52.38	PK	-28.3	13.8	37.88	43.5	-5.62	200	Horz
256.4109	56.3	PK	-27.1	12	41.2	46	-4.8	100	Horz
535.1599	50.86	PK	-26.9	17.3	41.26	46	-4.74	200	Horz
960.0679	39.31	PK	-24.3	22.2	37.21	54	-16.79	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
35.04	52.87	PK	-29.2	18	41.67	40	1.67	100	Vert
35.04	44.83	QP	-29.2	18	33.63	40	-6.37	100	Vert
55.5875	55.99	PK	-29	7.9	34.89	40	-5.11	100	Vert
109.2826	54.7	PK	-28.5	11.8	38	43.5	-5.5	100	Vert
132.544	54.44	PK	-28.2	13.5	39.74	43.5	-3.76	100	Vert
135.6455	54.28	PK	-28.2	13.4	39.48	43.5	-4.02	100	Vert
143.787	53.63	PK	-28.1	13	38.53	43.5	-4.97	100	Vert

9. FREQUENCY STABILITY

LIMITS

The fundamental emissions shall remain within the authorized band.

For this device the maximum allowable negative deviation in frequency is 87 MHz and the maximum allowable positive deviation in frequency is 1639 MHz.

PROCEDURE

The EUT is place inside a temperature chamber and power is furnished by a variable supply.

The power is set to 115 VAC, the temperature is set to 25 ºC and the EUT is allowed to stabilize. After sufficient soak time, the transmitting frequency is measured as a reference.

The supply voltage is set to 85% of nominal, and 115% of nominal, at a temperature of 25 ºC. The transmitting frequency is measured and compared to the reference transmitting frequency.

The temperature is varied over the operating temperature range, in 10 degree increments, at the nominal supply voltage. After sufficient soak time at each temperature the transmitting frequency is measured and compared to the reference transmitting frequency.

Measurements are made at the highest operating frequency. For simplicity the maximum allowable negative frequency deviation at the lowest operating frequency is translated, yielding a conservative worse-than-actual analysis compared to scaling the maximum allowable negative frequency deviation.

RESULTS

Reference Frequency: BG6 High Channel at 100% of nominal voltage and 25°C Note: Near field reference frequency is offset 0.5 MHz from far field at normal conditions. Note: Device remains within limits even if near-field reference offset is added to measured delta				
Power Supply (% of nominal)	**Temperature (°C)**	**Frequency (MHz)**	**Deviation (MHz)**	**Deviation Limit (MHz)**
100%	***25***	***8711.50***	***Reference***	***Reference***
85%	25	8711.50	0.00	+1639 / -87
115%	25	8711.50	0.00	+1639 / -87
100%	0	8711.50	0.00	+1639 / -87
100%	10	8711.50	0.00	+1639 / -87
100%	20	8711.50	0.00	+1639 / -87
100%	30	8712.00	0.50	+1639 / -87
100%	40	8712.00	0.50	+1639 / -87
100%	50	8711.50	0.00	+1639 / -87

10. 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.

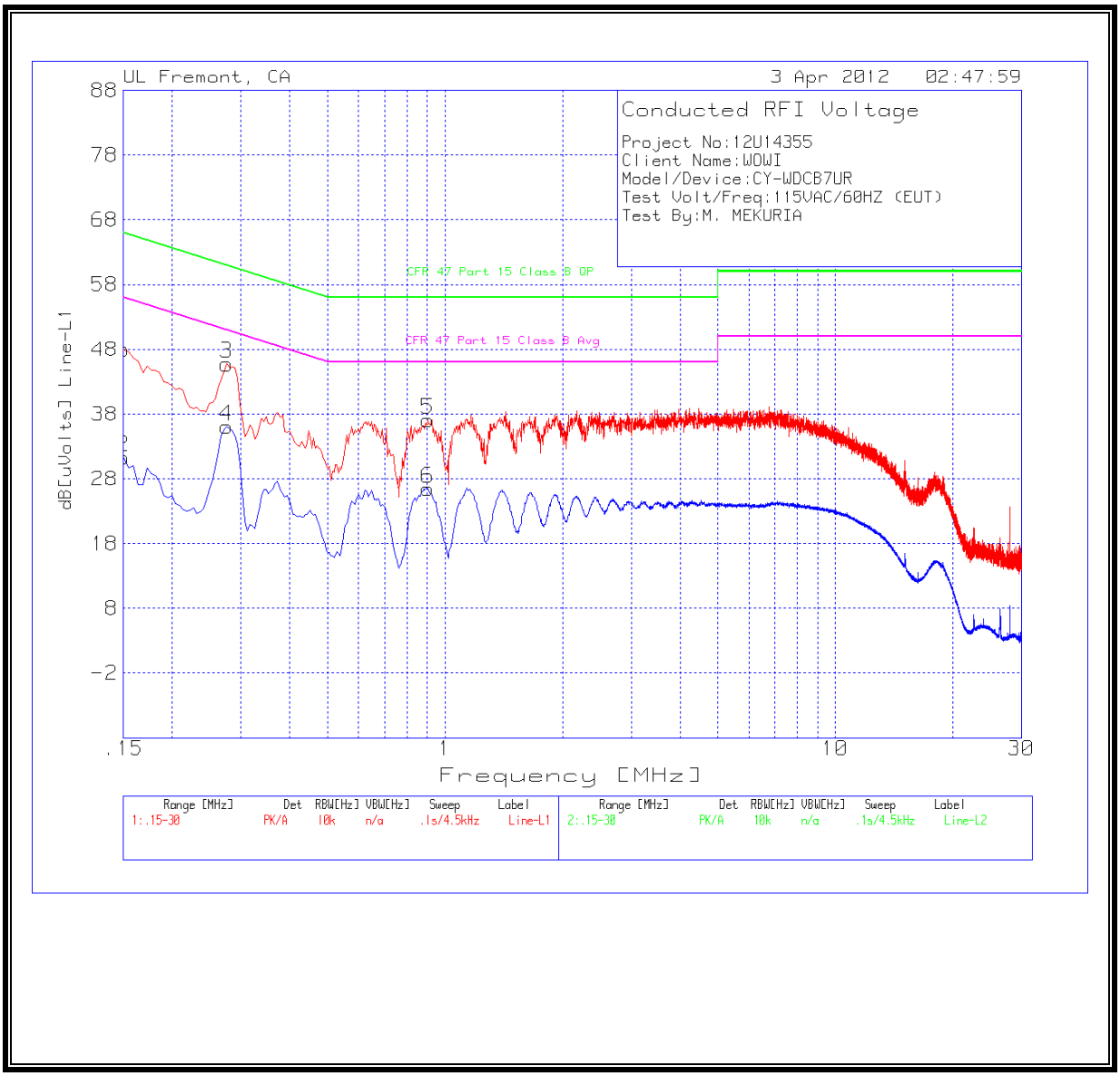
Line conducted data is recorded for both NEUTRAL and HOT lines.

RESULTS

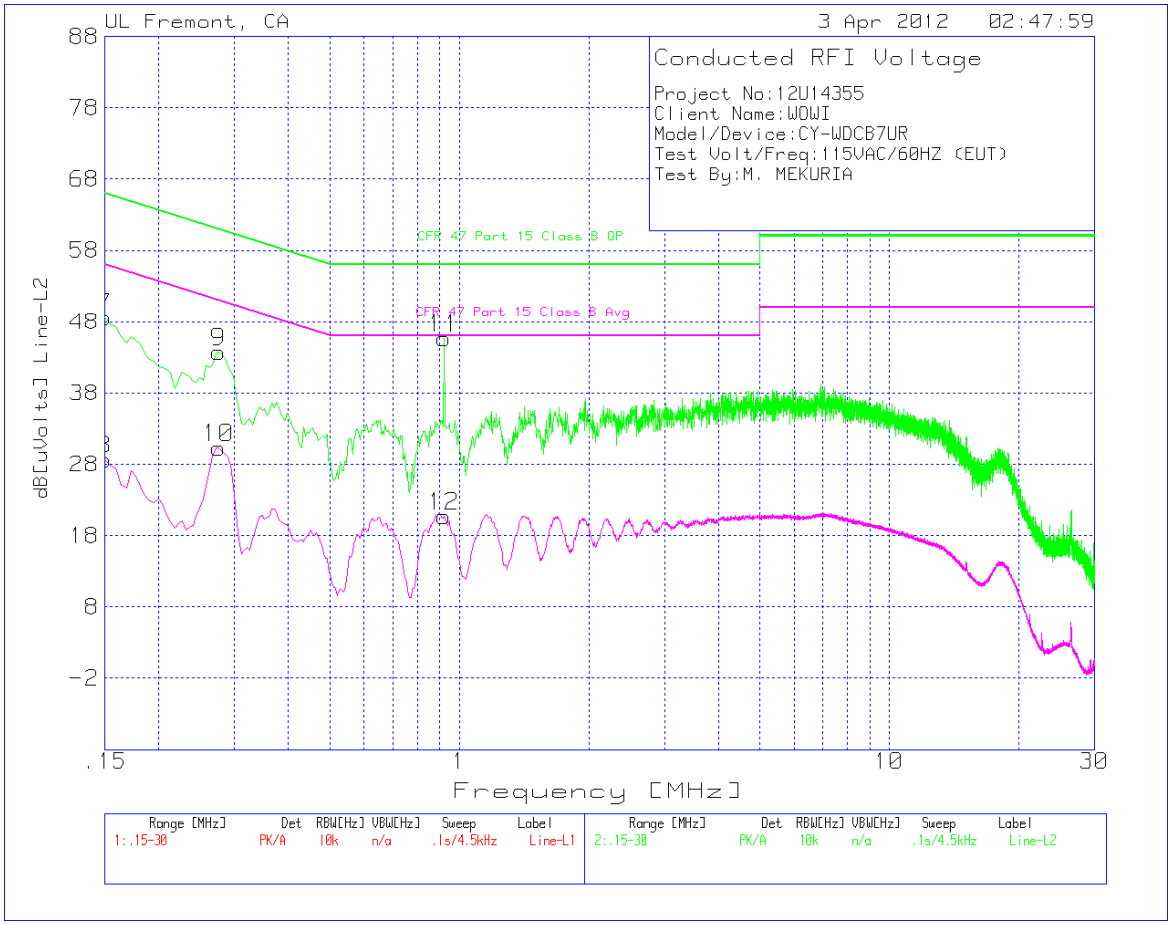
6 WORST EMISSIONS (EUT)

Project No:12U14355									
Client Name:WOWI									
Model/Device:CY-WDCB7UR									
Test Volt/Freq:115VAC/60HZ (EUT)									
Test By:M. MEKURIA									
ne-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
0.15	47.93	PK	0.1	0	48.03	66	-17.97	-	-
0.15	31.19	Av	0.1	0	31.29	-	-	56	-24.71
0.276	45.63	PK	0.1	0	45.73	60.9	-15.17	-	-
0.276	35.92	Av	0.1	0	36.02	-	-	50.9	-14.88
0.9015	37.02	PK	0.1	0	37.12	56	-18.88	-	-
0.9015	26.33	Av	0.1	0	26.43	-	-	46	-19.57
ne-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	48.53	PK	0.1	0	48.63	66	-17.37	-	-
0.15	28.49	Av	0.1	0	28.59	-	-	56	-27.41
0.276	43.62	PK	0.1	0	43.72	60.9	-17.18	-	-
0.276	30.17	Av	0.1	0	30.27	-	-	50.9	-20.63
0.9195	45.46	PK	0.1	0.1	45.66	56	-10.34	-	-
0.9195	20.47	Av	0.1	0.1	20.67	-	-	46	-25.33

LINE 1 RESULTS



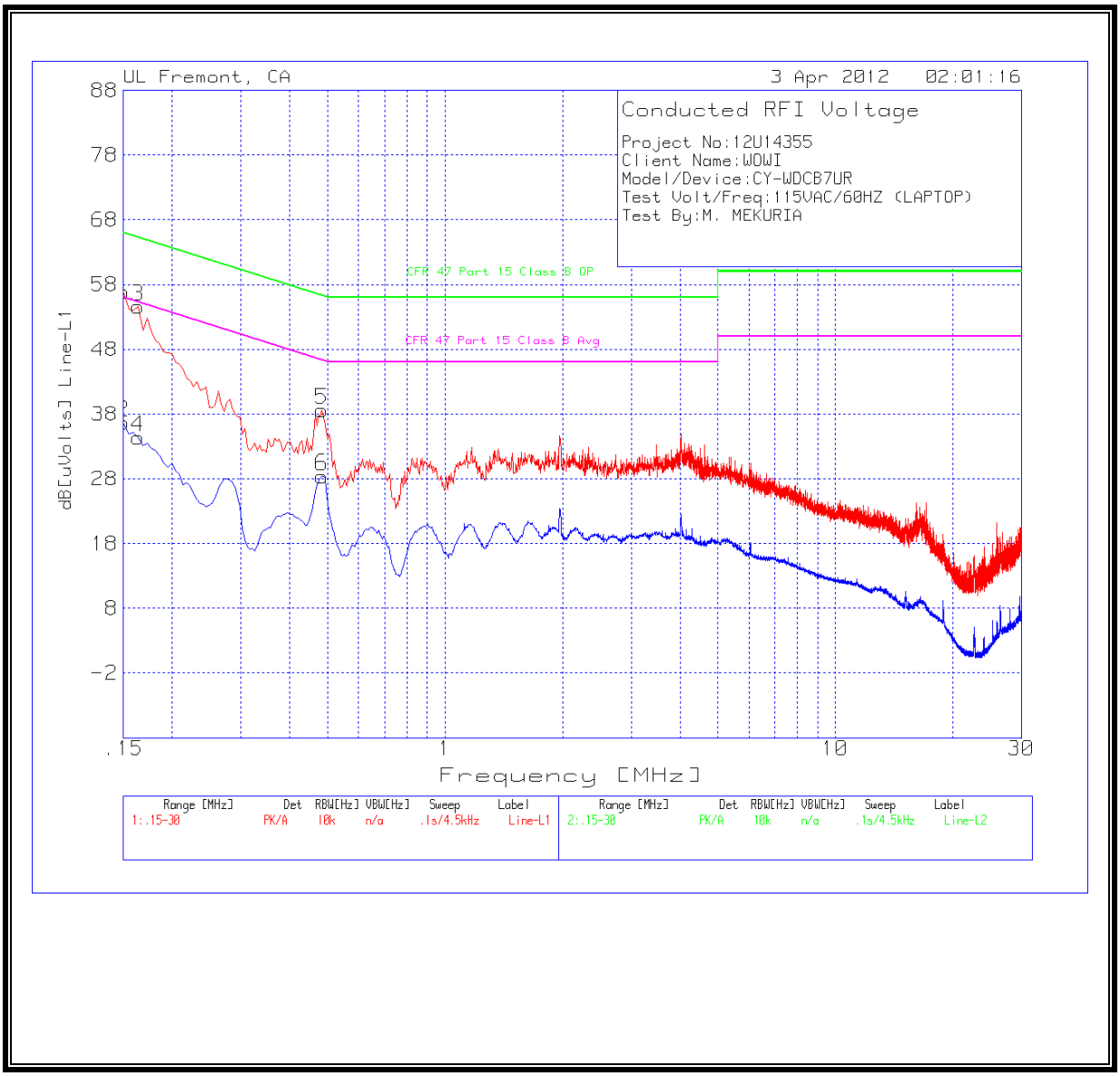
LINE 2 RESULTS



6 WORST EMISSIONS (LAPTOP)

Project No:12U14355									
Client Name:WOWI									
Model/Device:CY-WDCB7UR									
Test Volt/Freq:115VAC/60HZ (LAPTOP)									
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
0.15	56.81	PK	0.1	0	56.91	66	-9.09	-	-
0.15	36.63	Av	0.1	0	36.73	-	-	56	-19.27
0.1635	54.55	PK	0.1	0	54.65	65.3	-10.65	-	-
0.1635	34.3	Av	0.1	0	34.4	-	-	55.3	-20.9
0.483	38.49	PK	0.1	0	38.59	56.3	-17.71	-	-
0.483	28.34	Av	0.1	0	28.44	-	-	46.3	-17.86
ıe-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
0.1545	54.34	PK	0.1	0	54.44	65.8	-11.36	-	-
0.1545	35.72	Av	0.1	0	35.82	-	-	55.8	-19.98
0.474	37.37	PK	0.1	0	37.47	56.4	-18.93	-	-
0.474	28.02	Av	0.1	0	28.12	-	-	46.4	-18.28
2.8635	33.7	PK	0.1	0.1	33.9	56	-22.1	-	-
2.8635	20.7	Av	0.1	0.1	20.9	-	-	46	-25.1

LINE 1 RESULTS



LINE 2 RESULTS