Test Report for Certification of Xaver™ 400 Through Wall Imaging System

Customer:	Camero Tech
Date:	December 13, 2011
TDK Report:	TTS 5-4-116-124

Test performed by: TDK R&D Corporation
1101 Cypress Creek Rd
Cedar Park, TX 78613

	Test Engineer	Checked by
Radiated 9 kHz to 40 GHz	A. Medina	N. Mellen
Report	A. Medina	N. Mellen

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1 Executive Summary

An EMC evaluation to determine compliance of the Xaver™ 400 Through Wall Imaging System with the requirements of FCC 47 CFR Part 15, Subpart F Section 15.510 and the following data is presented in support of the Certification of the Xaver™ 400 Through Wall Imaging System. The client should retain a copy of this document on file for at least 5 years after the manufacturing of the product has been discontinued.

Test Description	FCC 47 CFR Section	Compliance
Operational Limitations	15.510(d)	The client has been notified of these limitations.
UWB Bandwidth	15.510(a)	Yes
Radiated Emissions	15.510(3), 15.209	Yes
Radiated Emissions in GPS Bands	15.510(4)	Yes
Peak Emissions within a 50 MHz Bandwidth	15.510(5)	Yes
Labeling Requirements	15.19/15.510(e)	Yes

Report prepared by:

Armando Medina
December 13, 2011

Approved by:

Neal Mellen
December 15, 2011

2 Task Description

2.1 Scope

Reference	FCC 47 CFR, Part 15, Subpart F, Ultra-Wideband Operation FCC ET Docket No. 98-153, FCC 02-48 First R&O, Revision of Part 15 of the Commission's Rules Regarding Ultra-Wideband Transmissions Systems; FCC ET Docket No. 04-352, Petition for Waiver of the Part 15 UWB Regulations Filed by MBOA-SIG (Adopted: March 10, 2005).
Purpose of Test	To gain FCC Certification for technical requirements for Through Wall Imaging Systems operating between 1990 MHz and 10600 MHz.
Test Procedures	The tests were conducted in accordance with the following documents: • ANSI C63.4: 2009: Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz • FCC Code of Federal Regulations 47, Part 15 Subpart A: General • FCC ET Docket No. 04-352, Petition for Waiver of the Part 15 UWB Regulations Filed by MBOA-SIG (Adopted: March 10, 2005)
General Procedures	FCC Code of Federal Regulations 47, Part 2 Frequency Allocations and Radio Treaty Matter: General Rules and Regulations
Classification of EUT	Through Wall Imaging System

2.2 Related Submittal(s)/Grant(s)

Not Applicable.

2.3 Test Plan References

Publication	Year	Title
FCC 47 CFR, Part 15, Subpart A	10/2010	Code of Federal Regulations, Part 15 Subpart A: General
FCC 47 CFR, Part 15, Subpart B	10/2010	Code of Federal Regulations, Part 15 Subpart B: Unintentional Radiators
FCC 47 CFR, Part 15, Subpart C	10/2010	Code of Federal Regulations, Part 15 Subpart C: Intentional Radiators
FCC 47 CFR, Part 15, Subpart F	10/2010	Code of Federal Regulations, Part 15 Subpart F: Ultra-Wideband Operation
FCC ET Docket 98-153, FCC 02-48 First R&O	04/2002	Revision of Part 15 of the Commission's Rules Regarding Ultra-Wideband Transmissions Systems: First Report & Order
ANSI C63.4: 2009	01/2009	Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz
FCC ET Docket No. 04-352	3/2005	Petition for Waiver of the Part 15 UWB Regulations Filed by MBOA-SIG

2.4 Client Information

APPLICANT

Name: Camero-Tech
Address: Grand Netter Ind. Zone, Intergama Building
P.O.Box 3521
Kfar Netter 40593, Israel
Contact Person: Oren Berkalis

MANUFACTURER

Name: Camero-Tech
Address: Grand Netter Ind. Zone, Intergama Building
P.O.Box 3521
Kfar Netter 40593, Israel
Contact Person: Oren Berkalis

2.5 Equipment Under Test (EUT)

The following information (with the exception of the date information) has been supplied by the applicant.

The test results in this report pertain only to the item tested.

2.5.1 General

Brand Name	Camero-Tech
Product Name	Xaver™ 400
Model Name/Number	AT0028 Rev 01.02
Serial Number	300602
Type of Equipment	Through Wall Imaging System
Input Power Supply Type	Battery or AC to DC power supply adapter.
Classification	Original Equipment

2.5.2 Antennas

Manufacturer	Camero-Tech
Model Name or Number	AN0002
Type and Description	UWB flat antenna
Antenna Connector Type	Not Applicable
Cable Length (cm)	Not Applicable

2.5.3 Technical

Power Supply Requirements	Battery and AC Operated
RF Output Rating	-42 dBm EIRP @ 3 meters
Operating Frequency Range	2000 MHz to 6600 MHz
RF Output Impedance	50Ω
Channel Spacing	Not Applicable
Pulse Width	.27nSec
Pulse Repetition Frequency	1 MHz
10 dB Bandwidth	>500 MHz
Modulation/Constellation	Pulse
Oscillators' Frequencies	24.6kHz / 242.7kHz / 825kHz / 1MHz / 1.16MHz / 3.125MHz / 6.25MHz / 7MHz / 12MHz / 24MHz / 25MHz / 30MHz / 96MHz / 100 MHz / 200MHz.
EUT Ports	BNC 75Ω video, 4-pin DC., Technician Ethernet and debug ports.

2.5.4 Logistics

EUT Received Date	November 28, 2011
EUT Received Condition	Good
Test Start Date	December 5, 2011
Test Completion Date	December 9, 2011

2.5.5 Support Equipment

Description	Manufacturer	Model No.	Serial No.	FCC ID
AC Power Adapter	CINCON ELECTRONICS CO., LTD	TRG70A150 01E12	70150-0006419	None

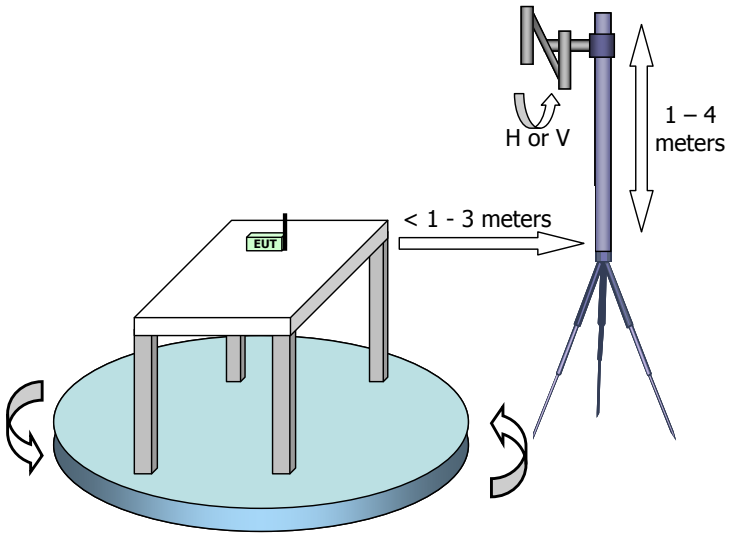
2.5.6 I/O Cables

Not Applicable

2.5.7 Measurement Set Up

The EUT was configured to run preliminary scans in a normal mode of operation both with and without a gypsum wall. The data presented in section 6 is the worst-case data.

To insure maximum emissions were detected, the system was rotated 360·, the antenna height was varied from 1 to 4 meters in 1 meter steps above the ground plane in both horizontal and vertical polarizations. These maximum emissions are represented in the collected data enclosed. Above 960 MHz, the measurements were made at equal or less than 1 meter due to the extremely low emission limits outside the UWB bandwidth margins. At 3 meters, the instrument noise floor is at or above the limits specified in 15.510(d). The intentional emissions were measured at 3 meter distance.



The highest frequency employed in 47 CFR Section 15.33 to determine the frequency range over which radiated emissions are made is based on the center frequency, f_C, unless a higher frequency was generated within the UWB device. For measuring emission levels, the spectrum was investigated from the lowest frequency generated in the UWB, without going below 9 kHz, up to the frequency range shown in Section 15.33(a) of 47 CFR or up to fc + 3/(pulse width in seconds), whichever was higher. There is no requirement to measure emissions beyond 40 GHz provided fc was less than 10 GHz; beyond 100 GHz if fc was at or above 10 GHz and below 30 GHz; or beyond 200 GHz if fc was at or above 30 GHz.

The center frequency (of the highest sub band) fc was found to be 3639.5 MHz. Therefore; the highest frequency measured was 40 GHz.

2.5.8 Mode(s) of Operation

The system has three maximum ranges: 8m, 4m and 20m and three operation modes: Tracker, Expert and High Penetration. There is no difference in measured radiation under all modes and ranges. Please reference the user's manual and Theory of Operation for detailed information.

2.5.9 Modifications Required for Compliance

No modifications were required to bring the unit into compliance with the appropriate sections of FCC 47 CFR Part 15.

3 Facilities and Accreditation

3.1 Facilities and Equipment

The entire EMC test facility (comprising the open area test site, semi-anechoic chamber, fully anechoic antenna/high frequency chamber, and support test instrumentation) is located at 1101 Cypress Creek Rd, Cedar Park, TX USA 78613.

All measurement facilities are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 and CISPR Publication 22.

The test receiver instrumentation (e.g. receiver, analyzer, QP adapter, pre-selector) and LISN's conform to the CISPR Publication 16-2 (Specifications for Radio Interference Measuring Apparatus and Measurement Methods) Publication 16-1 where required.

3.2 Laboratory Accreditations and Listings

The test facilities used to perform radiated and conducted emissions tests are accredited by National Voluntary Laboratory Accreditation Program for the specific scope of accreditation under Lab Code: 200430-0 to perform Electromagnetic Compatibility tests according to FCC 47 CFR, Part 15 requirements. No part of this report may be used to claim or imply product endorsement by NVLAP or any agency of the US Government.

3.3 Table of Accreditations and Listings

Country	Agency	Accreditation	Logo
USA	NVLAP	200430-0	NVLAP® NVLAP LAB Code: 200430-0
USA	FCC	94066	FC

4 Test Equipment and Procedure

4.1 Test and Measurement Equipment

Test Equipment Matrix

Description	Make	Model No.	Serial No.	Cal Date	Cal Due
EMI Test Receiver	Hewlett Packard	8546A	3520A00237	06/06/11	06/06/12
RF Filter Section	Hewlett Packard	85460A	3448A00238	06/06/11	06/06/12
PSA	Agilent	E4448A	MY46180748	12/15/10	12/15/11
Preamplifier	Quinstar	QLN-2230J0	7164001	12/02/11	12/02/12
Preamplifier	Quinstar	QLN-3330J0	7164002	12/02/11	12/02/12
Preamplifier	TDK	PA-02	0900002	12/02/11	12/02/12
Preamplifier	TDK	AFS42-20P	00101200	12/05/11	12/05/12
Hybrid Log Antenna	TDK	HLP-3003C	130358	05/25/11	05/25/12
Horn Antenna	TDK	HRN0118	130091	05/26/11	05/26/12
Horn Antenna	ARA	SWH-28	1008	06/03/11	06/03/12
Horn Antenna	ARA	SWH-29	1003	06/03/11	06/03/12
Active Loop	Com-Power	AL-130	121022	08/12/11	08/12/12
Low Pass Filter	Camero	None	None	12/05/11	12/05/12
High Pass Filter	Camero	None	None	12/05/11	12/05/12
Attenuators (3,6,10dB)	Fairview Microwave	SA18E-3,-6,-10	None	12/05/11	12/05/12
LISN	R&S	ESH3-Z5	8466-95/020	06/01/11	06/01/12
Transient Limiter	R&S	ESH3-Z2	357.8810.52	12/02/11	12/02/12
RF Cable	MicroCoax	UFB142A-0-1574-200200	RE157IN-18G26G	12/02/11	12/02/12
RF Cable	MicroCoax	UFB142A-0-0787-200200	RE097IN-26G40G	12/02/11	12/02/12
RF Cable	Semflex	S130BFBS10276	RE276IN-900M18G	12/02/11	12/02/12
RF Cable	Semflex	130BFBS10107	RE107IN-900M18G	12/02/11	12/02/12
RF Cable	Semflex	130BFSS10040	RE040IN-900M18G	12/02/11	12/02/12
RF Cable	Huber+Suhner	Sucoflex 106P	RE197IN-30M6G	12/02/11	12/02/12
RF Cable	Huber+Suhner	Sucoflex 106P	CE-ESH372-106P-150K30M	12/02/11	12/02/12

4.2 Measuring Instrument Calibration

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

4.3 Measurement Uncertainty

Compliance of the product is based on the reported measured values. However, the measurement uncertainty is included for informational purposes in the table below.

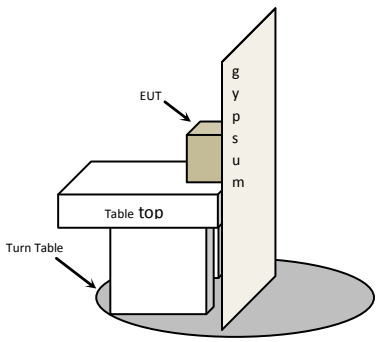
Radiated Emissions			
Frequency Range	Uncertainty		
	1 m	3 m	10 m
9 kHz to 30 MHz	± 3.8 dB	N/A	N/A
30 MHz to 200 MHz	N/A	± 3.8 dB	± 3.5 dB
200 MHz to 1 GHz	N/A	± 3.8 dB	± 3.5 dB
1 GHz to 18 GHz	± 4.5 dB	± 4.6 dB	N/A
18 GHz to 40 GHz	± 4.2 dB	N/A	N/A
Conducted Emissions			
150 kHz to 30 MHz	2.6 dB		

Note: The combined level of uncertainty in each case above was expanded to provide a confidence level of approximately 95% (k=2).

4.4 Test Setup for UWB Device Tests

4.4.1 EUT Setup

The EUT was positioned on top of a Styrofoam table top with the front face of the EUT flush to the gypsum board (dry wall) with the AC adapter connected to mains supply. The device has three modes of operation; 4m Tracker, 8m Tracker, and 20m Tracker. While the 8m mode was utilized, there is no effect of the operation mode on the transmitter output level. The gypsum board was used only during in-band measurements.



SETUP diagram

4.4.2 Radiated Emission Test Setup

The facilities and test equipment listed in sections 3.1 and 4.1, respectively, were utilized to test compliance of the EUT. For all measurements the EUT was located on a table whose top was 80 cm above the ground plane. The table was constructed of non-conductive materials and the dimensions were 0.8 meter by 1.2 meter. The table was located in the center of the turntable.

For the test, four types of receive antennas were used depending on frequency range. The antenna was held on an antenna mast which has the ability to switch the polarization of the receive antenna by 90 degrees by means of mechanical rotation. The distance between the EUT and the receive antenna was equal or less than 3 meters, depending on the test. Shorter measurement distances may be used to improve the measurement system's noise floor. As Subpart F description is based on the measurement in distance of 3 meters, the data obtained at 1 meter distance was compared to the calculated limit for 1m distance:

Limit at 1meter distance (dBm)

= limit at 3 meter distance (dBm) -20 LOG (1/3)(dB)

= limit at 3 m distance (dBm) - 9.54(dB).

The maximization of the radiated signal was achieved by rotating the EUT over 360 degrees in the azimuth. Additionally, the receive antenna was scanned in height from 1 meter to 4 meters (while maintaining boresight alignment) with both horizontal and vertical polarizations being recorded. The maximization was performed by use of automated software with CPU controlled maximum-hold function for both single and multiple sweeps.

The spectrum analyzer and EMI receiver were set up as described in each test procedure in section 6. The data used to determine compliance of EUT was calculated from the data following the method described in section 4.6. The equipment set up for the radiated emissions tests followed the guidelines in ANSI C63.4: 2009.

4.4.3 Conducted Emissions Test Setup

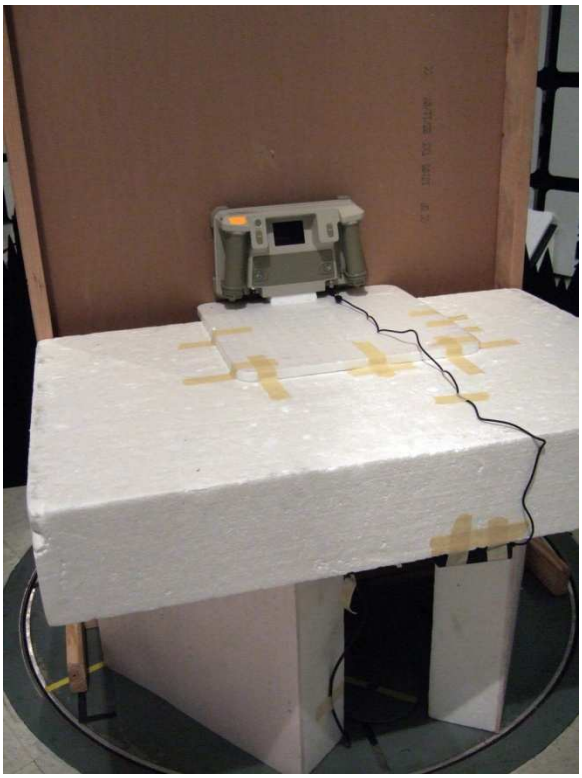
In the AC mains line-conducted disturbance test, measurements were carried out using quasi-peak and average detector receivers in accordance with ANSI C63.4: 2009. A LISN was required to provide defined impedance at high frequencies across the power feed at the point of measurement of terminal voltage and also to provide isolation of the circuit under test from the ambient noise on the power lines. A LISN as defined in ANSI C63.4: 2009.

The EUT was placed on a table whose top is 80 cm above the ground plane. A vertical, metal reference plane and the metal shield wall of the chamber was placed 40 cm from the EUT. The vertical metal reference plane was at least 2 meters by 2 meters. The EUT was kept at least 80 cm from any other metal surface or other ground plane not being part of the EUT. The table was constructed of non-conductive materials. Its dimensions were 0.8 m by 1.2 m. The EUT was located so that the distance between the boundary of the EUT and the closest surface of the LISN is 0.8 m.

A flexible AC power adapter was provided by the manufacturer and connected to the LISN.

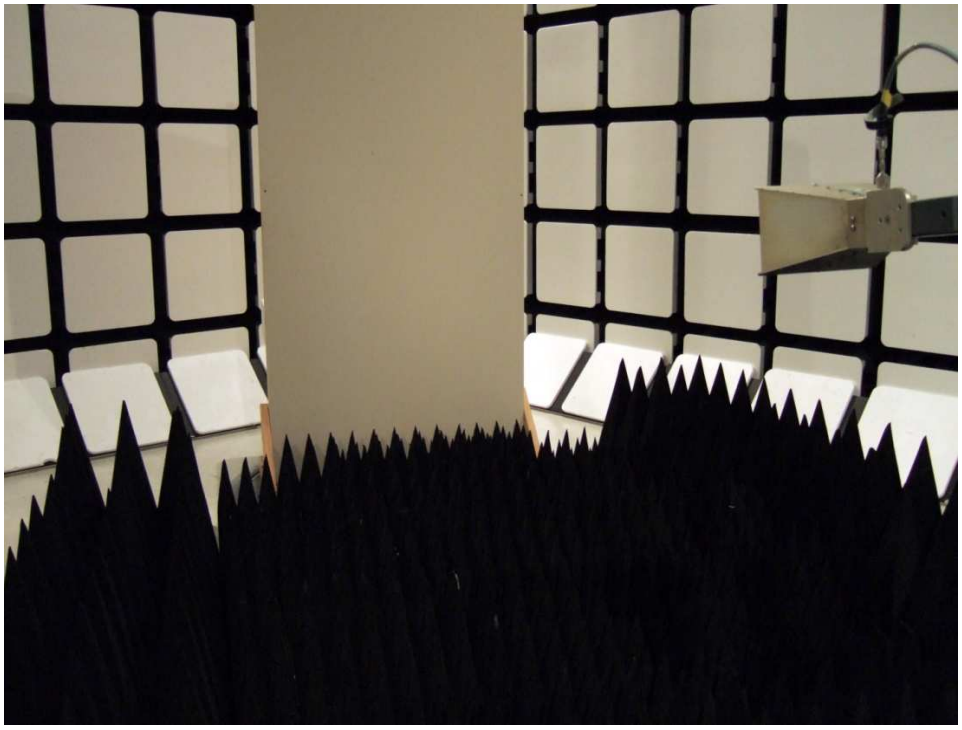
Conducted disturbance was measured between the phase lead and the reference ground, and between the neutral lead and the reference ground.

4.4.4 Test Configuration Photographs

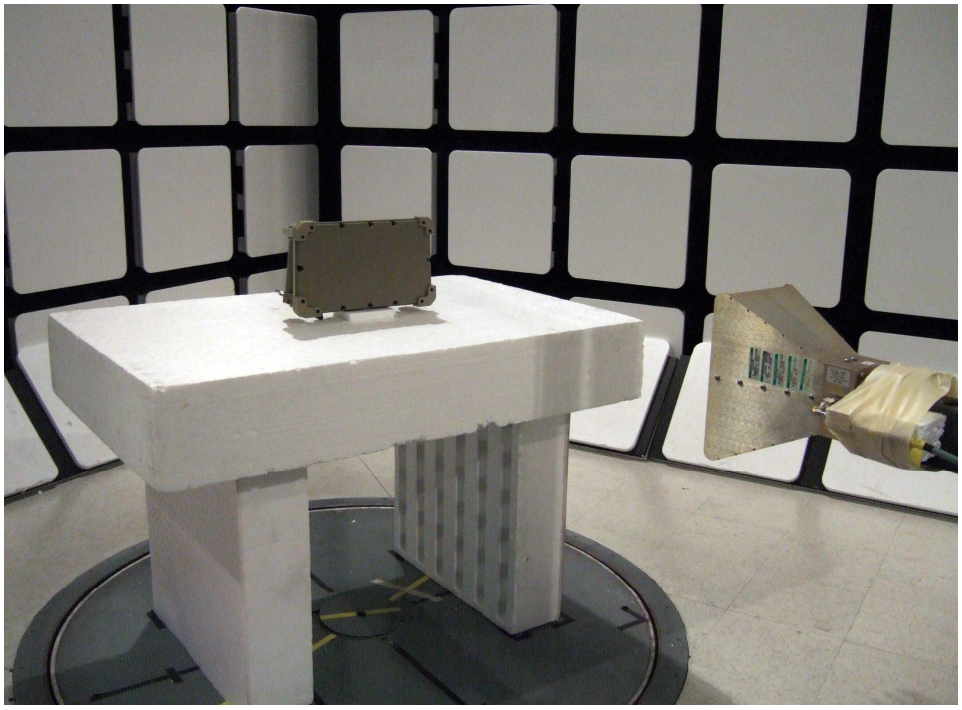


Test Configuration 1: EUT Setup

NOTE: The gypsum wall was used only for in-band measurements and was removed for out-of-band measurements.

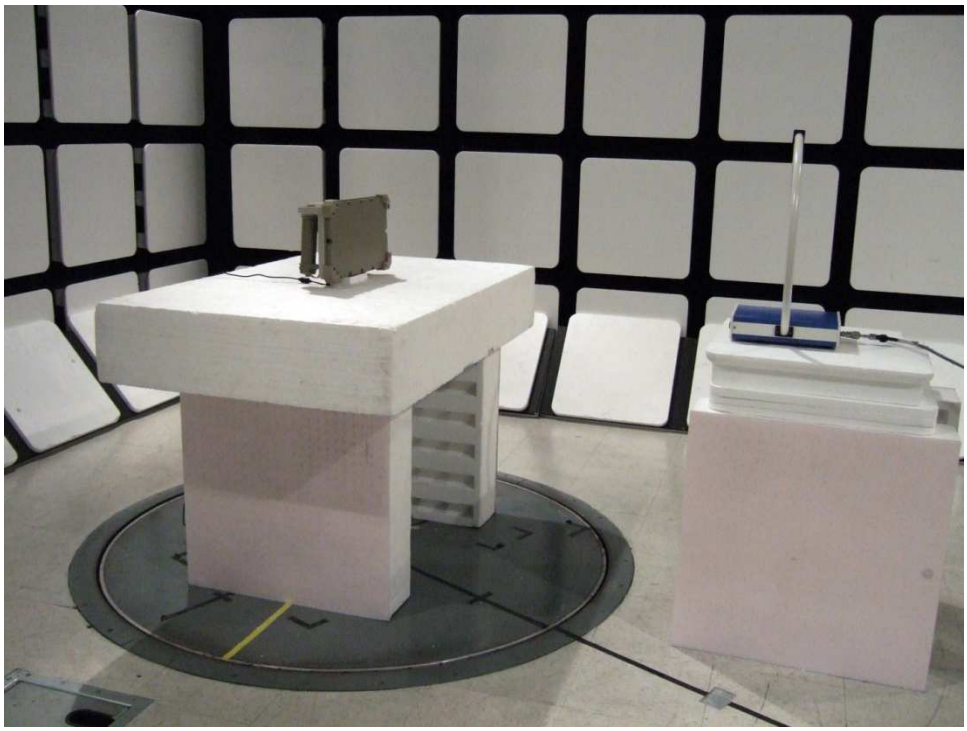


Test Configuration 2: UWB Inband

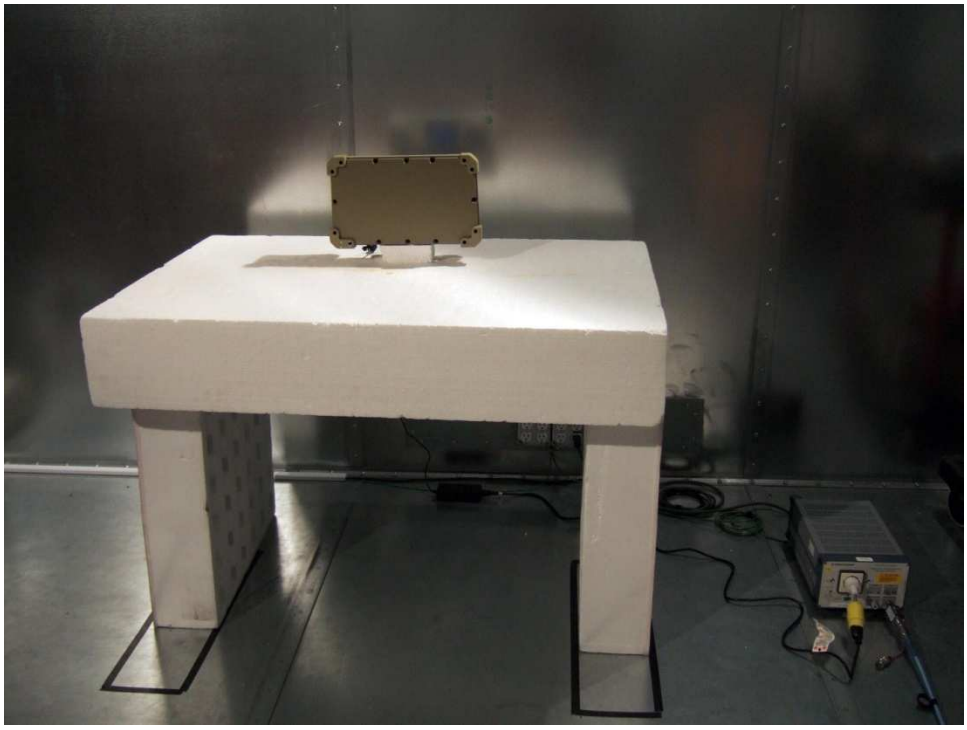


Test Configuration 3: 960 MHz to 40 GHz

Test Configuration 4: 30 MHz to 960 MHz



Test Configuration 4: 9 kHz to 30 MHz



Test Configuration 4: 150 kHz to 30 MHz

4.4.5 EUT Setup for Digital Circuitry Radiated Emission Tests

The facilities and test equipment listed in sections 3.1 and 4.1, respectively, were utilized to test compliance of the EUT. For all measurements, the EUT was located on a table whose top was 0.8 m above the ground plane. The table was constructed of non-conductive materials and the dimensions were 0.8 meter by 1.2 meter. The table and EUT were located in the center of the turntable.

4.5 Measurement Calculations

4.5.1 Field Strength Calculations

The field strength is calculated by taking the received spectrum analyzer (or receiver) signal and adjusting it by the system parameters. These system parameters are the antenna factor (AF); any cable, coupler, filter or switching losses (CL); and the preamplifier gain (PG).

The basic formula is:

$$E\ (dB\cdot V/m) = SA\ (dB\cdot V) + AF\ (dB/m) + CL\ (dB) - PG\ (dB)$$

Where:

E is the electric field represented in dB·V/m

SA is the spectrum analyser (or receiver) reading in dB·V

AF is the receive antenna's factor in dB/m

CL is the cable, etc. system losses in dB

PG is the external pre-amplifier gain in dB

Assume a spectrum analyzer reading of 50 dB·V at 80 MHz on a 3 meter site. With an antenna factor of 10 dB/m, system losses of about 1.5 dB, and a pre-amplifier gain of 25 dB, the resulting electric field strength would be calculated as follows.

$$E\ (dB\cdot V/m) = 50\ (dB\cdot V) + 10\ (dB/m) + 1.5\ (dB) - 25\ (dB) = 36.5\ dB\cdot V/m$$

4.5.2 EIRP Calculations

As defined in FCC 47 CFR Part 15, Subpart F (15.503 k), EIRP is the equivalent isotropic radiated power, i.e. the product of the power supplied to the antenna and the antenna gain in a given direction relative to an isotropic antenna. The EIRP, in terms of dBm, can be converted to field strength, in dB·V/m at 3 meters, by adding 95.2 dB. Conversely, the field strength in dB·V/m at 3 meters can be converted to the EIRP in dBm by subtracting 95.2 dB. As used in Subpart F, EIRP refers to the highest signal strength measured in any direction and at any frequency from the UWB device, as tested in accordance with the procedures specified in 15.31(a) and 15.523 of FCC 47 CFR.

As in the example above, assume a spectrum analyzer reading of 50 dB·V at 80 MHz on a 3 m site. With an antenna factor of 10 dB/m, system losses of about 1.5 dB, and a pre-amplifier gain of 25 dB, the resulting electric field strength would be calculated as follows.

$$\begin{aligned} E\ (dB\cdot V/m) &= 50\ (dB\cdot V) + 10\ (dB/m) + 1.5\ (dB) - 25\ (dB) \\ &= 36.5\ dB\cdot V/m \end{aligned}$$

Now to convert to an EIRP reading at 3 meters use EIRP (dBm) = E (dB·V/m) – 95.2 (dB)

$$\begin{aligned} EIRP\ (dBm) &= 36.5\ (dB\cdot V/m) - 95.2\ (dB) \\ &= -58.7\ dBm \end{aligned}$$

4.5.3 UWB Maximum Permissible Exposure

Transmitter Category: Portable device. A portable device is defined as a transmitting device designed to be used so that the radiating structure(s) of the device is/are within 20 centimeters of the body of the user. The FCC rules for evaluating portable devices for RF compliance are found in 47 CFR §2.1093.

Device Usage: General Population/Uncontrolled Exposure. The general population/uncontrolled exposure limits are applicable to situation in which the general public may be exposed or in which persons who are exposed as a consequence of their employment may not be made fully aware of the potential for exposure or cannot exercise control over their exposure.

Exposure Calculation: According to §1.1310 of the FCC rules, the power density limit for the General Population/Uncontrolled Exposure is 1 mW/cm2. According to the mobile product device category, this value is to be calculated at a distance of 20 cm. The following formula is used to calculate the power density:

$$S = \frac{PG}{4\pi r^2} = \frac{EIRP}{4\pi r^2}$$

Where:

S = Power Density
P = Power at the Antenna Terminal
G = Gain of the Transmit Antenna
EIRP = Effective Isotropic Radiated Power
r = Measurement Distance

From the measurement data of section 6.3.3 Test Results, we can see that the peak detected EIRP at 3 meters distance and 8 MHz RBW yields a result of -22.40 dBm. Translated to 20 cm this would yield a result of 1.12 dBm. Correlating this to a worst-case scenario with a 50 MHz RBW would yield 18.58 dBm EIRP. 18.58 dBm is equal to 72.1 mW EIRP. Plugging this into the above equation yields:

$$S = \frac{72.1}{4\pi(20)^2} = 0.0143 mW/cm^2$$

Based on these worst case calculations the device is well below the maximum permissible exposure limit of 1mW/cm2 by a large margin.

5 Operational Limitations

5.1 FCC 47 CFR Section 15.510 (d)(1)

"Parties operating this equipment must hold a license issued by the Federal Communications Commission to operate a transmitter in the Public Safety Radio Pool under part 90 of this chapter. The license may be held by the organization for which the UWB operator works on a paid or volunteer basis."

This statement is contained in the user manual.

5.2 FCC 47 CFR Section 15.510 (d)(2)

"This equipment may be operated only for law enforcement applications, the providing of emergency services, and necessary training operations."

The client has been informed of this requirement.

5.3 FCC 47 CFR Section 15.510 (e)

"Through-wall imaging systems operating under the provisions of this section shall bear the following or similar statement in a conspicuous location on the device: "Operation of this device is restricted to law enforcement, emergency rescue and firefighter personnel. Operation by any other party is a violation of 47 U.S.C 301 and could subject the operator to serious legal penalties."

The client has been informed of this requirement

6 Test Limits, Procedures, Results and Setups

6.1 UWB Bandwidth

6.1.1 Test Limits

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.

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.

Center frequency. The center frequency (f_C):

$$f_C = \frac{f_H + f_L}{2}$$

Bandwidth (BW):

$$BW = f_H - f_L$$

Fractional bandwidth (FBW):

$$FBW = 2\frac{f_H - f_L}{f_H + f_L}$$

Per section 15.510(a), the UWB bandwidth of an imaging system operating under the provisions of this section must be below 960 MHz or the center frequency, f_C, and the frequency at which the highest radiated emission occurs, f_M, must be contained between 1990 MHz and 10600 MHz.

6.1.2 Test Procedure

Facilities and equipment was set up as described in section 4; resolution bandwidth (RBW) of 8 MHz, video bandwidth (VBW) of 8 MHz, peak detector, and the sweep time was set to auto. The EUT was located at a 3 meter distance from the receive antenna.

Maximum emission amplitude was determined from the measured data for both horizontal and vertical polarization and the higher emission amplitude of these two polarizations was used to determine the frequency at which the highest radiated emission occurred, f_M. Next, the points that are 10dB above and below the highest radiated emission were identified as the

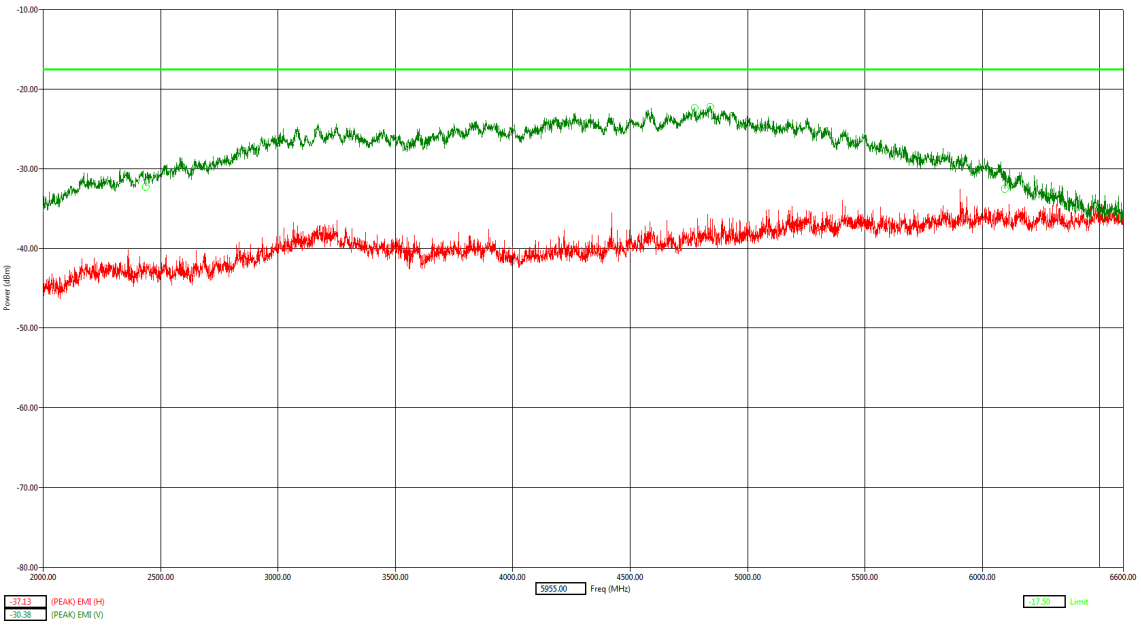
lower and higher frequency sides of the f_M EIRP graph, they are denoted as f_L and f_H, respectively. The UWB bandwidth (BW) is the difference between f_L and f_H.

The vertical polarization was utilized to determine the UWB bandwidth on the maximized signals (in azimuth and elevation).

6.1.3 Test Results

6.1.3.1 UWB Bandwidth Requirements:

47 CFR, Part 15, Subpart F, §15.510(d)(5)



Frequency: 2000 MHz to 6800 MHz

- Measurements made with 8 MHz RBW / 8MHz VBW, peak detector
- Measurement Time auto for sweep
- Measurement Distance: 3.0 meters

10dB down points:

f_L = 2436 MHz
f_H = 6097 MHz
f_M = 4843 MHz
f_C = 3639.50 MHz
UWB BW = 3661.00 MHz

6.2 Radiated Emissions, UWB Specific Requirements

6.2.1 Test Limits

The radiated emissions at or below 960 MHz shall not exceed the emission levels in Section 15.209 Table below.

Frequency (MHz)	E-Field (·V/m)	E- Field (dB·V/m)	Distance (m)
0.009 to 0.490	2400/F(kHz)	67.6 – 20Log[F(kHz)]	300
0.490 to 1.705	24000/F(kHz)	87.6 – 20Log[F(kHz)]	30
1.705 to 30.0	30	29.5	30
30 to 88	100	40.0	3
88 to 216	150	43.5	3
216 to 960	200	46.0	3

The radiated emissions above 960 MHz shall not exceed the RMS detected limits in Section 15.510d table below when measured using a resolution bandwidth of 1 MHz.

Frequency (MHz)	EIRP (dBm)	E- Field (dB·V/m)	Distance (m)
960 to 1610	-46.3	48.9	3
1610 to 10600	-41.3	53.9	3
Above 10600	-51.3	43.9	3

From 47 CFR Section 15.521(c): "As noted in Section 15.3(k), digital circuitry that is used only to enable the operation of a transmitter and that does not control additional functions or capabilities is not classified as a digital device. Instead, the emissions from that digital circuitry are subject to the same limits as those applicable to the transmitter. If it can be clearly demonstrated that an emission from a UWB transmitter is due solely to emissions from digital circuitry contained within the transmitter and that the emission is not intended to be radiated from the transmitter's antenna, the limits shown in Section 15.209 shall apply to that emission rather than the limits specified in this section."

6.2.2 Test Procedure

The measurements made over the frequency range from 9 kHz to 960 MHz were maximized using an EMI test receiver with peak detector capabilities. Measurements of the radiated electric field from 9 kHz to 30 MHz were made with the measurement antenna located a distance of 1 meter from the EUT and a 1 meter fixed height from ground floor to center of loop antenna. No emissions were detected in this frequency range. The relative CISPR resolutions bandwidth of 200 Hz and 9 kHz was used for these measurements. Measurements of the radiated field from

30 MHz to 960 MHz were made with the measurement antenna located a distance of 3 meters from the EUT and the final measurements made utilizing a quasi-peak detector at the frequencies with the largest amplitudes. The relative CISPR resolutions bandwidth of 120 kHz was used for these measurements. In the case where there was sufficient margin between the peak detected maximized spectrum and the quasi-peak limit lines, no additional measurements were undertaken.

Measurements above 960 MHz were maximized using a spectrum analyzer with RMS detector capabilities. A spectrum analyzer was used for the final measurements utilizing an RMS detector at the frequencies with the largest amplitudes. The prescribed RBW of 1 MHz and VBW of 3 MHz, and a 1 msec averaging time were used for these measurements. Measurements of the radiated field at frequencies above 960 MHz were made with the measurement antenna located at a distance of 1 meter or less from the EUT.

The equipment set up for the radiated emissions tests followed the guidelines in ANSI C63.4: 2009.

6.2.3 Test Results

The spectrum between 9 kHz and 960 MHz contained no intentional radiation and lies below the limits. The spectrum between 960 MHz and 12 GHz contained intentional UWB signals between 1990 MHz and 10600 MHz and are below the limits. No other intentional emissions above 10600 MHz were detected. The maximum frequency tested was 40 GHz.

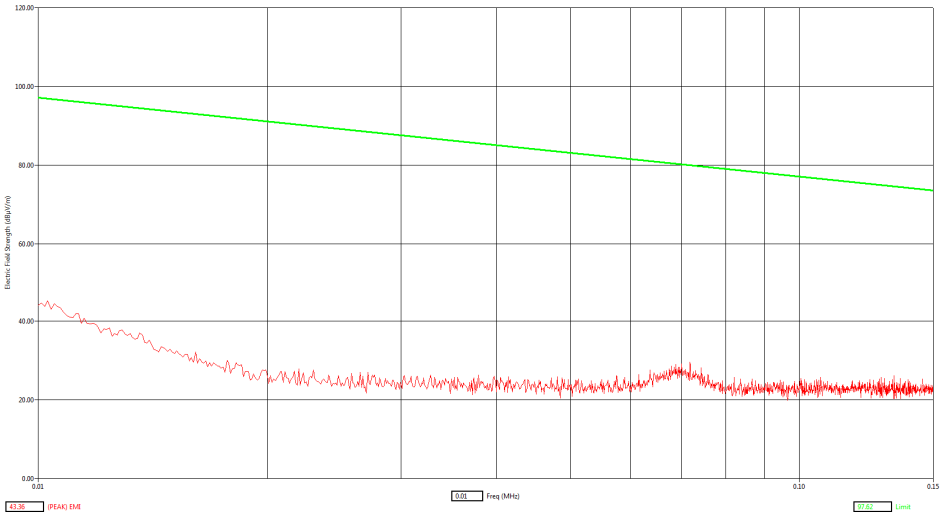
Per 47 CFR, Part 15, Subpart F, §15.521(c) (§15.209) all digital emissions from the transmitter whether radiating from the antenna port or not intended to be radiated from the antenna port meet the 15.209 subpart C limits.

Per 47 CFR, Part 15, Subpart F, §15.505(a) (§15.109) all emissions from the digital devices not directly associated with the operation of the transmitter meets the Class B limits of §15.109

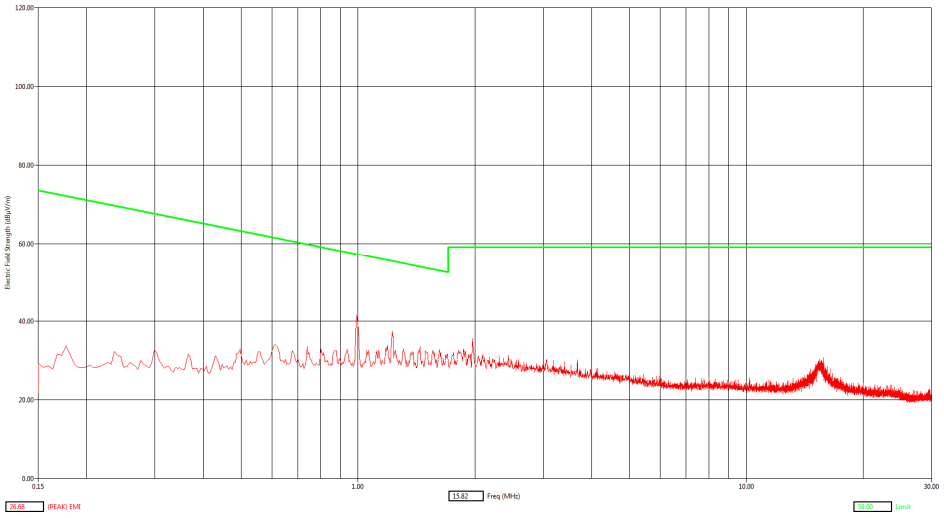
Refer to the "UWB Radiated Emissions 960 MHz to 40 GHz" section for the specific data presentation.

6.2.3.1 UWB Radiated Emissions 9 kHz to 30 MHz Requirements:

47 CFR, Part 15, Subpart F, §15.510(d)(3) (§15.209)



Frequency: 9 kHz to 150 kHz



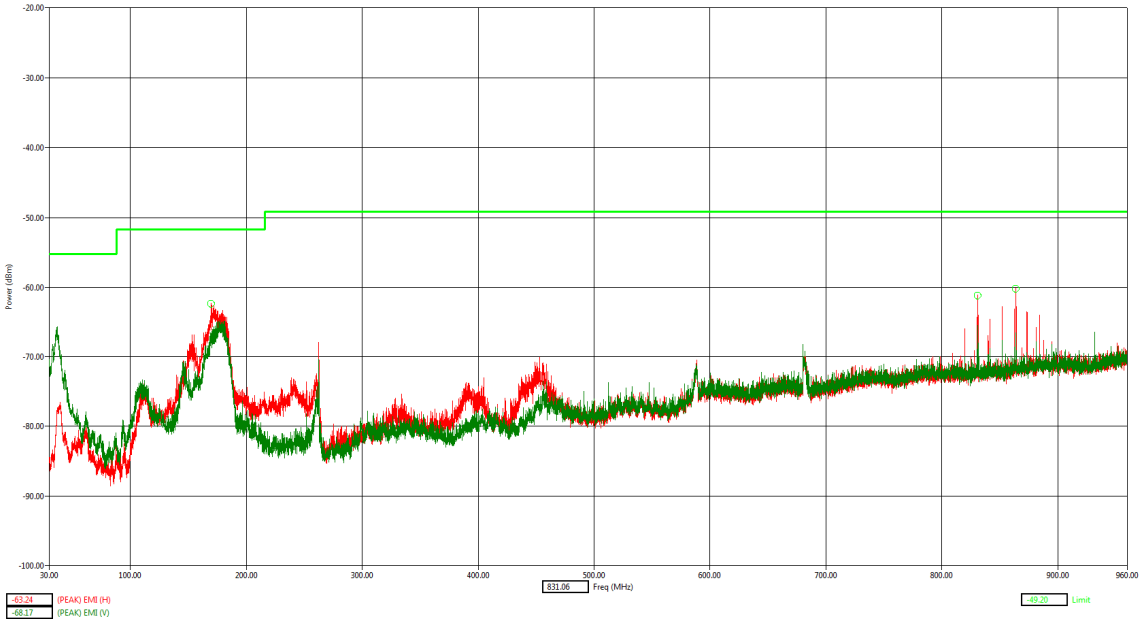
Frequency: 150 kHz to 30 MHz

- 9 kHz - 150 kHz measurements made with 200 Hz RBW, VBW auto, at 1m distance
- 150 kHz - 30MHz measurements made with 9kHz RBW, VBW 300kHz, at 1m distance
- Measurement Time Auto and 5sec respectively for sweep
- Limit line converted to dBm

All digital emissions from the transmitter whether radiating from the antenna port, or not intended to be radiated from the antenna port, meet the limits of 47 CFR, Part 15, Subpart F, §15.510(d)(3) (§15.209).

6.2.3.2 UWB Radiated Emissions 30 MHz to 960 MHz Requirements:

47 CFR, Part 15, Subpart F, §15.510(d)(3) (§15.209)



Frequency: 30 MHz to 960 MHz

- Measurements made with 120 kHz RBW, VBW auto, at 3 meter distance
- Measurement Time auto for sweep
- Limit line converted to dBm

In both polarizations the peak-detected measurements were below the quasi-peak limit

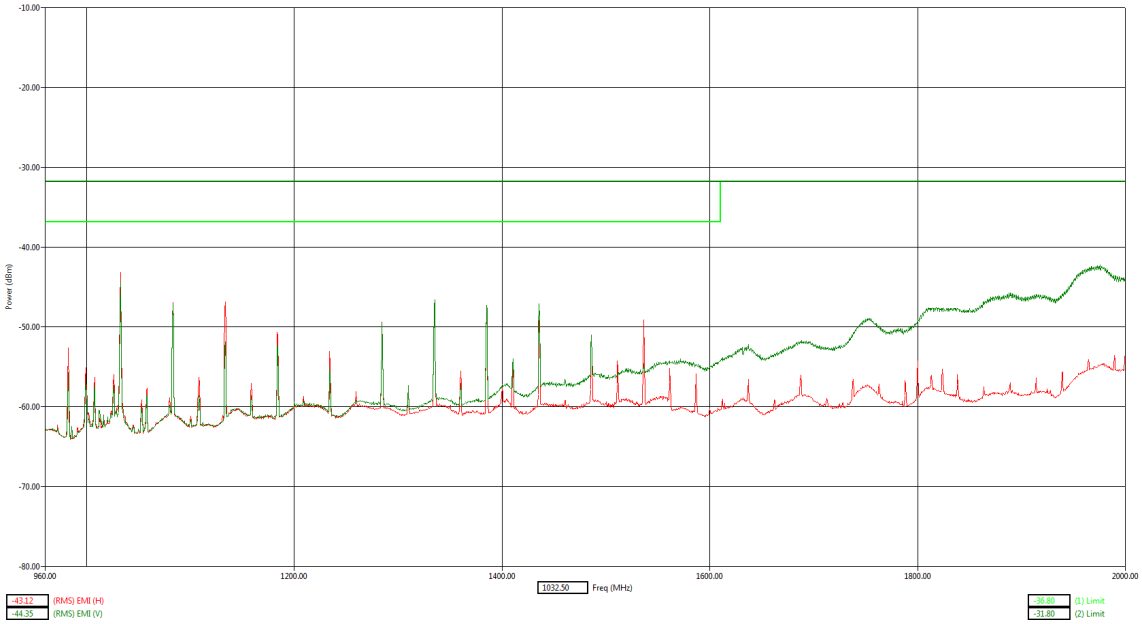
Final Measurement at peak; Total Range Maximized

Freq (Max) (MHz)	Pol	(QP) EMI(dBm)	(QP) Margin(dB)	Limit (dBm)	Ttbl Agl(deg)	Twr Ht (cm)
176.34	H	-62.90	11.20	-51.70	112.0	100
831.12	H	-60.54	11.34	-49.20	272.30	104.17
864.01	H	-59.50	10.30	-49.20	259.60	103.65

All digital emissions from the transmitter whether radiating from the antenna port or not intended to be radiated from the antenna port meet the limits of 47 CFR, Part 15, Subpart F, §15.510(d)(3) (§15.209).

6.2.3.3 UWB Radiated Emissions 960 MHz to 2 GHz Requirements:

47 CFR, Part 15, Subpart F, §15.510(d)(3) (§15.209)



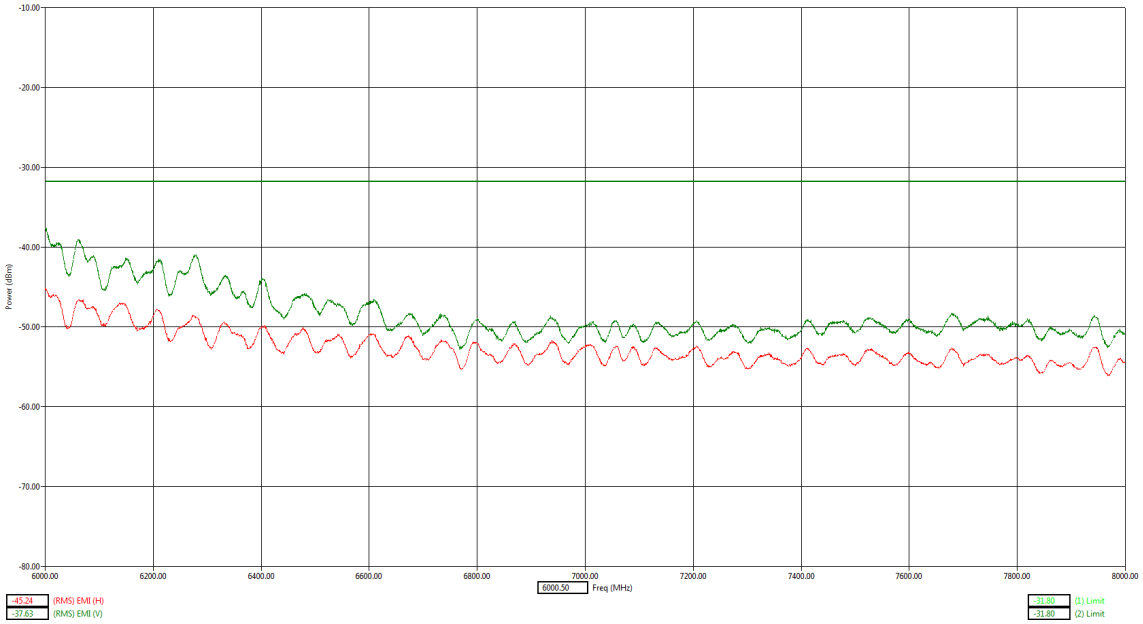
Frequency: 960 MHz to 2 GHz

- Measurements made with 1 MHz RBW / 3 MHz VBW at 1 meter distance
- Measurement time 1 msec per frequency
- Limit line converted to account for 1 meter measurement distance
- Total range maximized.

All digital emissions from the transmitter radiating from the antenna port meet the limits of 47 CFR, Part 15, Subpart F, §15.510(d)(3) (§15.209).

6.2.3.4 UWB Radiated Emissions 6 GHz to 8 GHz Requirements:

47 CFR, Part 15, Subpart F, §15.510(d)(3) (§15.209)



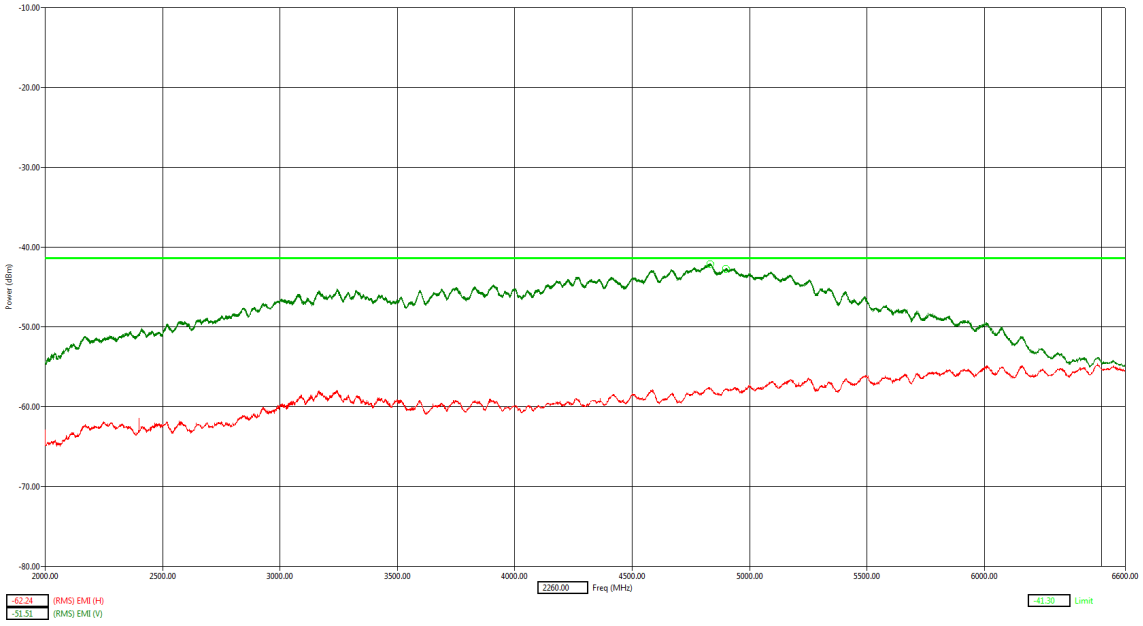
Frequency: 6 GHz to 8 GHz

- Measurements made with 1 MHz RBW / 3 MHz VBW at 1 meter distance
- Measurement time 1 msec per frequency
- Limit line converted to account for 1 meter measurement distance
- Total range maximized.

All digital emissions from the transmitter radiating from the antenna port meet the limits of 47 CFR, Part 15, Subpart F, §15.510(d)(3) (§15.209).

6.2.3.5 UWB Radiated Emissions UWB Inband

47 CFR, Part 15, Subpart F, §15.510(d)(3) (§15.209)



Frequency: 2 GHz to 6.6 GHz

- Measurements made with 1 MHz RBW / 3 MHz VBW at 3 meter distance
- Measurement time 1 msec per frequency
- Antenna height 1 meter to 4 meters, 1 meter steps, antenna bore sighted to EUT

Final Measurement at peak; Total Range Maximized
Without Dry Wall

Freq (Max) (MHz)	Pol	(RMS) EMI(dBm)	(RMS) Margin(dB)	Limit (dBm)	Ttbl Agl(deg)	Twr Ht(cm)
4831.10	V	-44.49	3.19	-41.30	3.50	128.00
4902.24	V	-44.77	3.47	-41.30	360.10	170.00

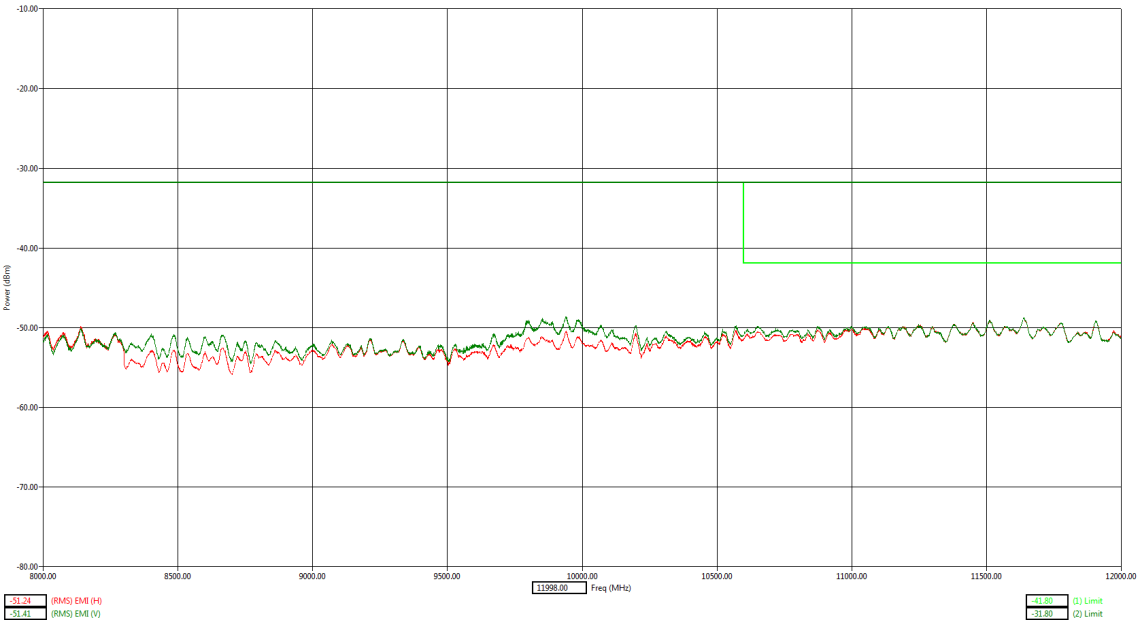
With Dry Wall

Freq (Max) (MHz)	Pol	(RMS) EMI(dBm)	(RMS) Margin dB)	Limit (dBm)	Ttbl Agl(deg)	Twr Ht(cm)
4831.19	V	-43.29	1.99	-41.30	3.30	135.00
4901.69	V	-42.62	1.32	-41.30	351.10	100.00

1.6.2.3.5

6.2.3.6 UWB Radiated Emissions 8 GHz to 12 GHz Requirements:

47 CFR, Part 15, Subpart F, §15.510(d)(3) (§15.209)



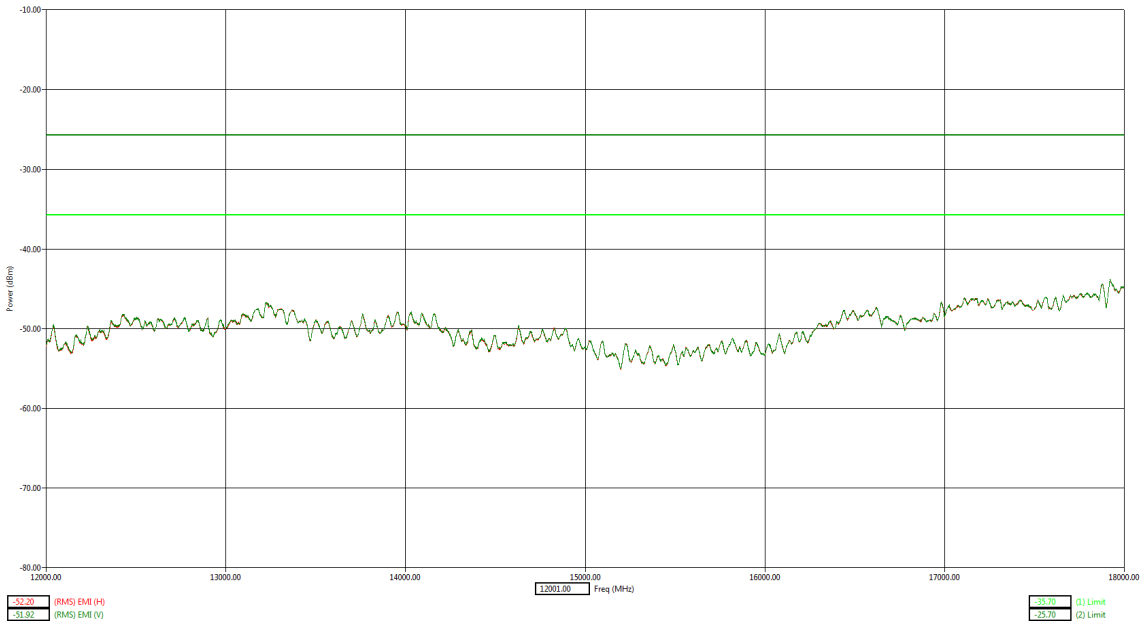
Frequency: 8 GHz to 12 GHz

- Measurements made with 1 MHz RBW / 3 MHz VBW at 1 meter distance
- Measurement time 1 msec per frequency
- Limit line converted to account for 1 meter measurement distance
- Total range maximized.

All digital emissions from the transmitter radiating from the antenna port meet the limits of 47 CFR, Part 15, Subpart F, §15.510(d)(3) (§15.209).

6.2.3.7 UWB Radiated Emissions 12 GHz to 18 GHz Requirements:

47 CFR, Part 15, Subpart F, §15.510(d)(3) (§15.209)



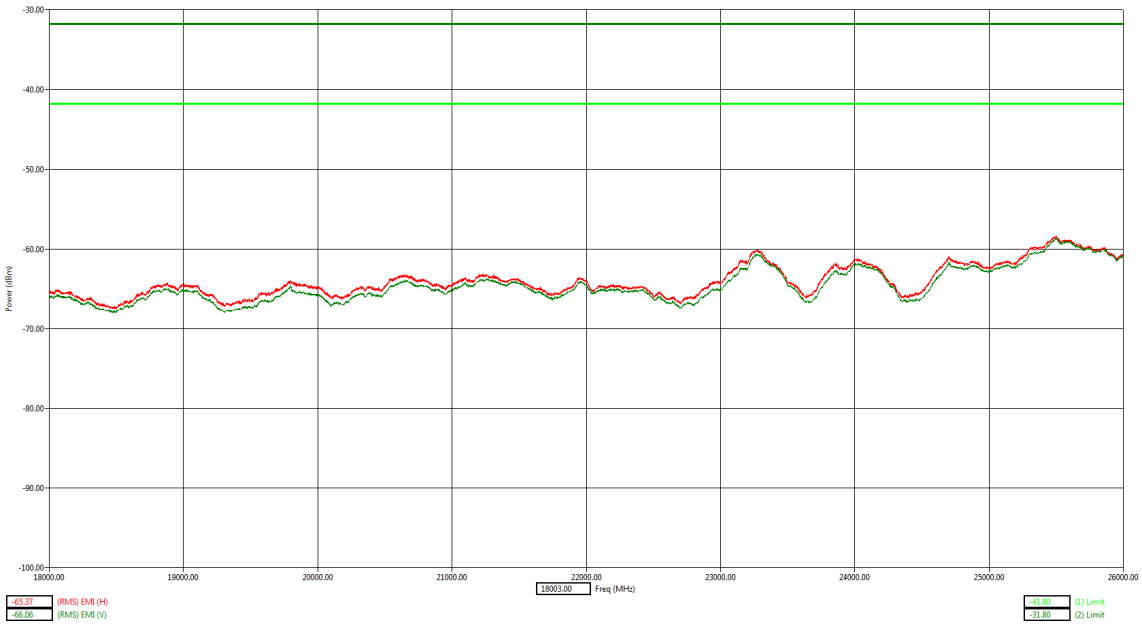
Frequency: 12 GHz to 18 GHz

- Measurements made with 1 MHz RBW / 3 MHz VBW at .5 meter distance
- Measurement time 1 msec per frequency
- Limit line converted to account for .5 meter measurement distance
- Total range maximized.

All digital emissions from the transmitter radiating from the antenna port meet the limits of 47 CFR, Part 15, Subpart F, §15.510(d)(3), (§15.209).

6.2.3.8 UWB Radiated Emissions 18 GHz to 26 GHz Requirements:

47 CFR, Part 15, Subpart F, §15.510(d)(3) (§15.209)



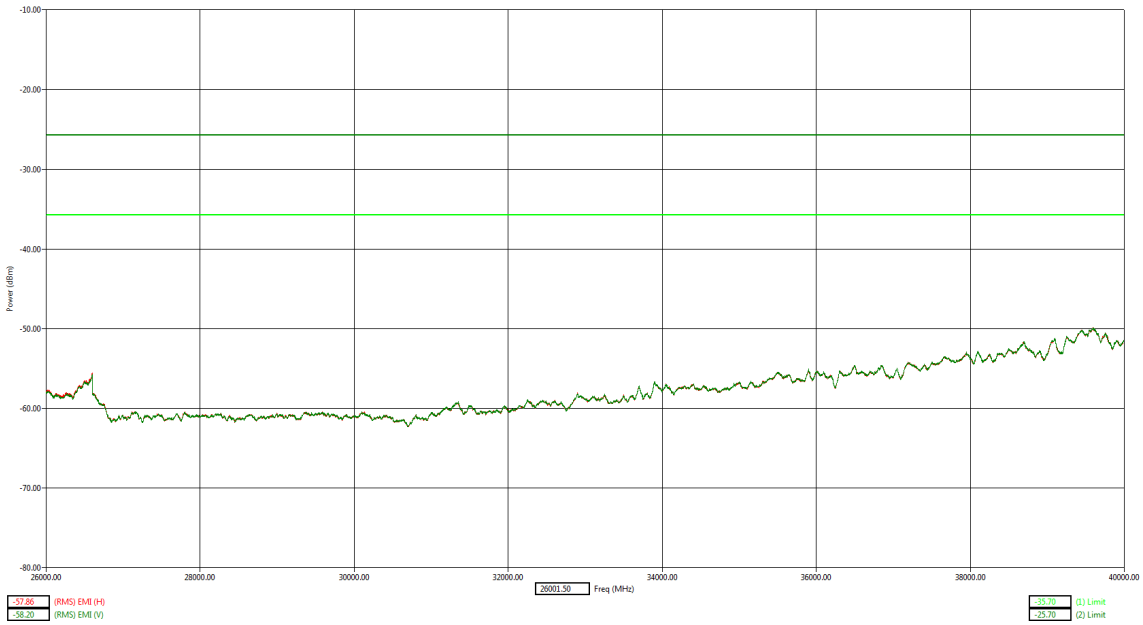
Frequency: 18 GHz to 26 GHz

- Measurements made with 1 MHz RBW / 3 MHz VBW at 1 meter distance
- Measurement time 1 msec per frequency
- Limit line converted to account for 1 meter measurement distance
- Total range maximized.

All digital emissions from the transmitter radiating from the antenna port meet the limits of 47 CFR, Part 15, Subpart F, §15.510(d)(3), (§15.209).

6.2.3.9 UWB Radiated Emissions 26 GHz to 40 GHz Requirements:

47 CFR, Part 15, Subpart F, §15.510(d)(3) (§15.209)



Frequency: 26 GHz to 40 GHz

- Measurements made with 1 MHz RBW / 3 MHz VBW at .5 meter distance
- Measurement time 1 msec per frequency
- Limit line converted to account for .5 meter measurement distance
- Total range maximized.

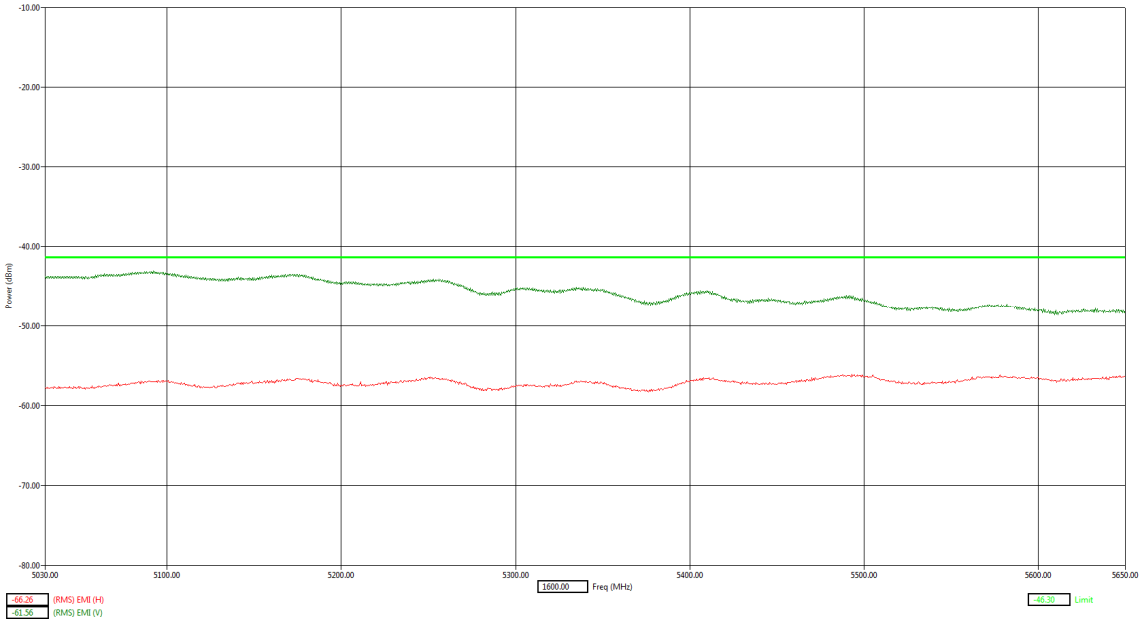
All digital emissions from the transmitter radiating from the antenna port meet the limits of 47 CFR, Part 15, Subpart F, §15.510(d)(3) (§15.209).

6.2.3.10 Radiated Emissions 5030 MHz to 5650 MHz

Because of federal operations in the following frequency bands:

- Microwave Landing Systems (MLS: 5030 MHz to 5091 MHz)
- Terminal Doppler Weather Radar (TDWR): 5600 MHz to 5650 MHz

UWB devices are not permitted to operate under this waiver in the contiguous 5030 MHZ to 5650 MHz band.



Frequency: 5030 MHz to 5650 MHz

- Measurements made with 1 MHz RBW / 3 MHz VBW at 3 meter distance
- Measurement Time 1 msec per frequency

In both polarizations the measurements were below the RMS limit line and did not contain the fundamental emissions of the UWB signal.

All digital emissions from the transmitter whether radiating from the antenna port or not intended to be radiated from the antenna port meet the limits of 47 CFR, Part 15, Subpart F, §15.510(d)(3) (§15.209)

6.3 Radiated Emissions in GPS Bands

6.3.1 Test Limits

In addition to the radiated emission limits specified in the table in paragraph 6.2.1 of this report, 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 (MHz)	EIRP (dBm)	E- Field (dB·V/m)	Distance (m)
1164 to 1240	-56.3	38.9	3
1559 to 1610	-56.3	38.9	3

6.3.2 Test Procedure

The measurements made over the frequency range from 1164 MHz to 1240 MHz and from 1559 MHz to 1610 MHz were maximized using a spectrum analyzer with RMS detector capabilities. A spectrum analyzer was used for the final measurements utilizing an RMS detector at the frequencies with the largest amplitudes. The prescribed RBW of 10 kHz and VBW of 10 kHz with a suitable averaging time were used for these measurements.

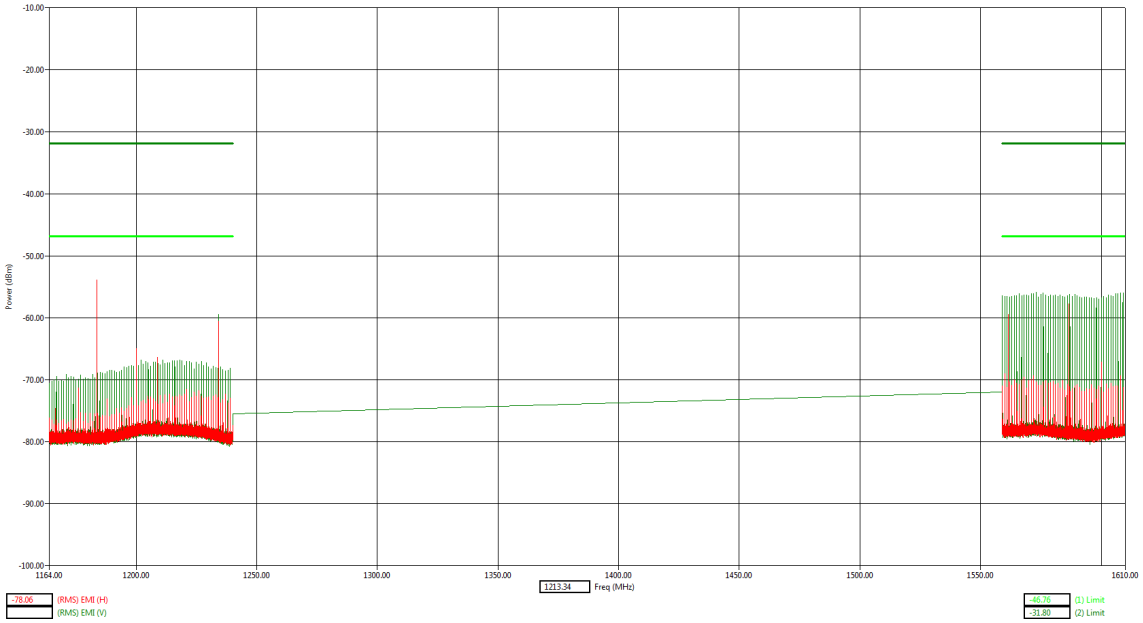
Measurements of the radiated field at these frequencies were made with the measurement antenna located a distance of 1 meter from the EUT to improve the measurement system's noise floor. In the case where there was sufficient margin between the RMS detected maximized spectrum and the RMS limit lines, no additional measurements were undertaken.

The equipment set up for the radiated emissions tests followed the guidelines in ANSI C63.4: 2009.

6.3.3 Test Results

6.3.3.1 UWB Radiated Emissions GPS Band Requirements:

47 CFR, Part 15, Subpart F, §15.510(4)



Frequency: 1164 MHz to 1240 MHz and 1559 MHz to 1610 MHz

- Measurements made with 10 kHz RBW / 10 kHz VBW at 1 meter distance
- Measurement Time 1 msec per frequency
- Limit lines converted to account for 1 meter measurement distance
- Lower limit line is 47 CFR, Part 15 subpart F
- Top limit line is 47 CFR, Part 15 subpart C

In both polarizations the measurements were below the RMS limit line

All digital emissions from the transmitter radiating from the antenna port meet the limits of 47 CFR, Part 15, Subpart F, §15.510(4) (§15.209). See the following graphs for expanded detail of the emissions caused by digital emissions.

6.4 Peak Radiated Emissions in a 50 MHz RBW

6.4.1.1 Test Limits

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 §15.510(5).

6.4.1.2 Test Procedure

The measurements made over the intentionally radiating frequency range of the EUT, from 2000 MHz to 6600 MHz, were maximized using a spectrum analyzer with peak detector capabilities. A spectrum analyzer was used for the final measurement utilizing a peak detector at the frequency with the largest amplitude.

The spectrum analyzer did not support the prescribed resolution bandwidth of 50 MHz. However, when a peak measurement is required, it is acceptable to use a resolution bandwidth other than the 50 MHz specified in 47 CFR Part 15, Subpart F. The resolution bandwidth for this measurement was set to 8 MHz. A setting of 8 MHz RBW has been determined to have an actual impulse response bandwidth of 6.7 MHz. Therefore the limit line is reduced by 20 Log (6.7/50). The measurement was centered on the frequency at which the highest radiated emission occurred, fM. The video bandwidth was 8 MHz.

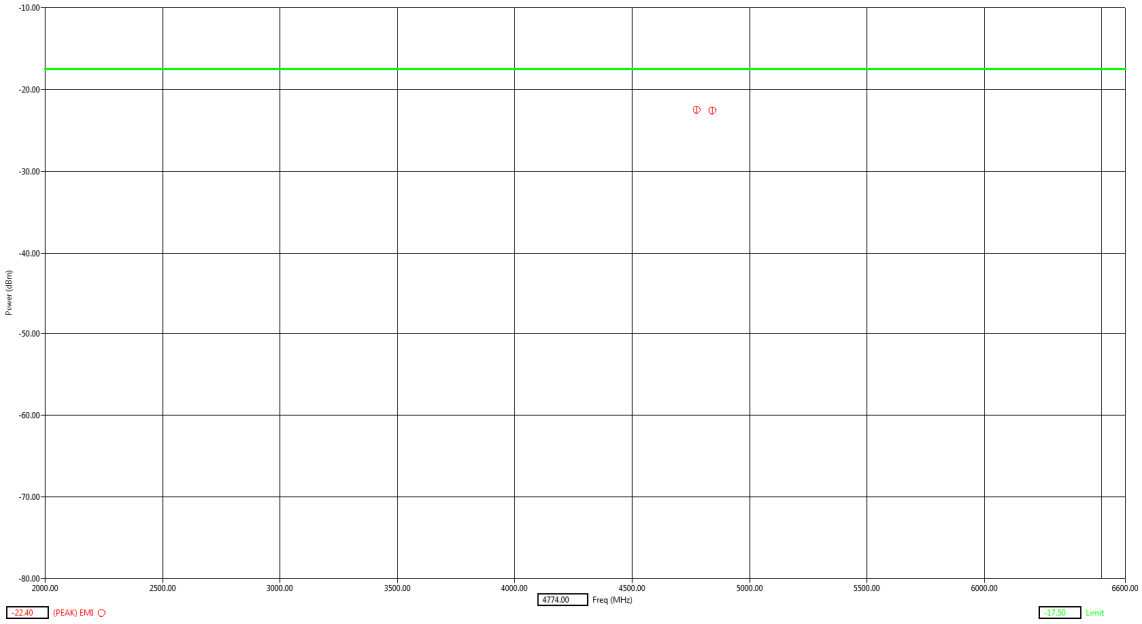
Since a resolution bandwidth other than 50 MHz was employed, the peak EIRP limit has to be adjusted by the resolution bandwidth ratio of 20 Log (RBW/50) dB, where RBW is the resolution bandwidth used for the measurement expressed in MHz.

The equipment set up for the radiated emissions tests followed the guidelines in ANSI C63.4: 2003.

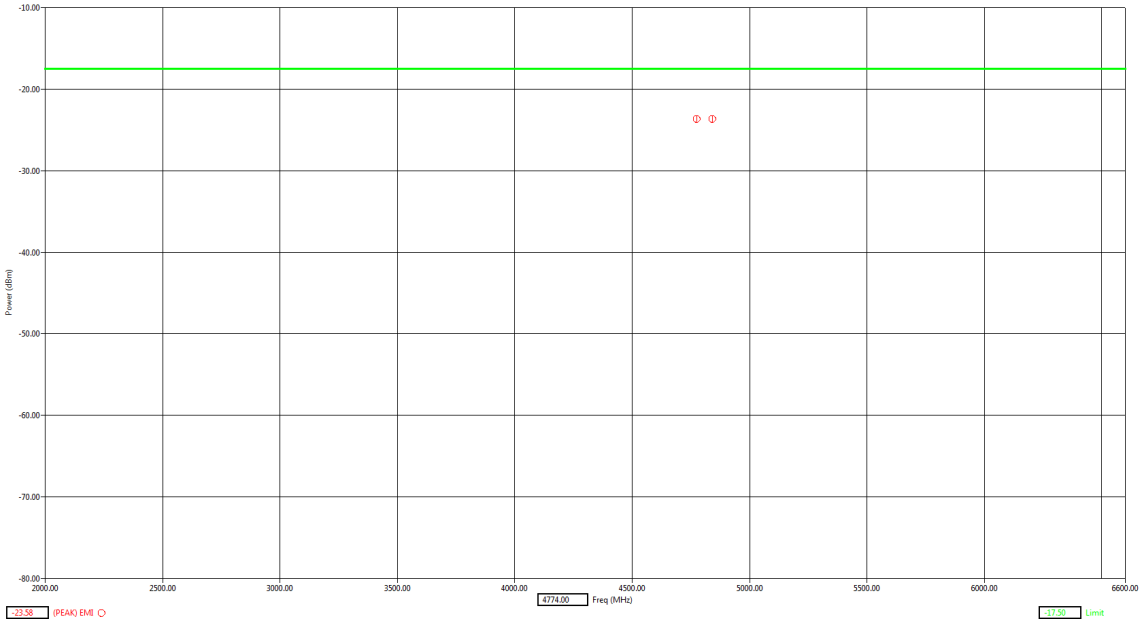
6.4.1.3 Test Results

UWB Peak Radiated Emissions in 50 MHz RBW Requirements:
47 CFR, Part 15, Subpart F, §15.510(5)

With Drywall



Without Drywall



Frequency Range: 2,000 – 6,600 MHz

- Measurements made with 8 MHz RBW / 8 MHz VBW at 3 meter distance.
- Measurement Time auto for sweep

- Limit line converted to account for 8 MHz RBW as per FCC requirements: 20 LOG (RBW/50)

Final Measurement at Peak; Total Range Maximized

No Dry Wall

Freq (Max) (MHz)	Pol	(PEAK) EMI(dBm)	(PEAK) Margin(dB)	Limit(dBm)	Ttbl Agl (deg)	Twr Ht(cm)
4774.36	V	-23.58	6.08	-17.5	4.6	113
4844.11	V	-23.57	6.07	-17.5	3.3	115

With Dry Wall

Freq (Max) (MHz)	Pol	(PEAK) EMI(dBm)	(PEAK) Margin(dB)	Limit (dBm)	Ttbl Agl (deg)	Twr Ht(cm)
4773.58	V	-22.40	4.90	-17.50	3.10	134.00
4842.38	V	-22.53	5.03	-17.50	6.40	106.00

6.5 AC Mains Line-Conducted Disturbance

6.5.1 Test Limits

For an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50 µH/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal.

Frequency Range (MHz)	Conducted Limit (dB·V)	
	Quasi-Peak	Average
0.15 to 0.5	66 to 56*	56 to 46*
0.5 to 5	56	46
5 to 30	60	50

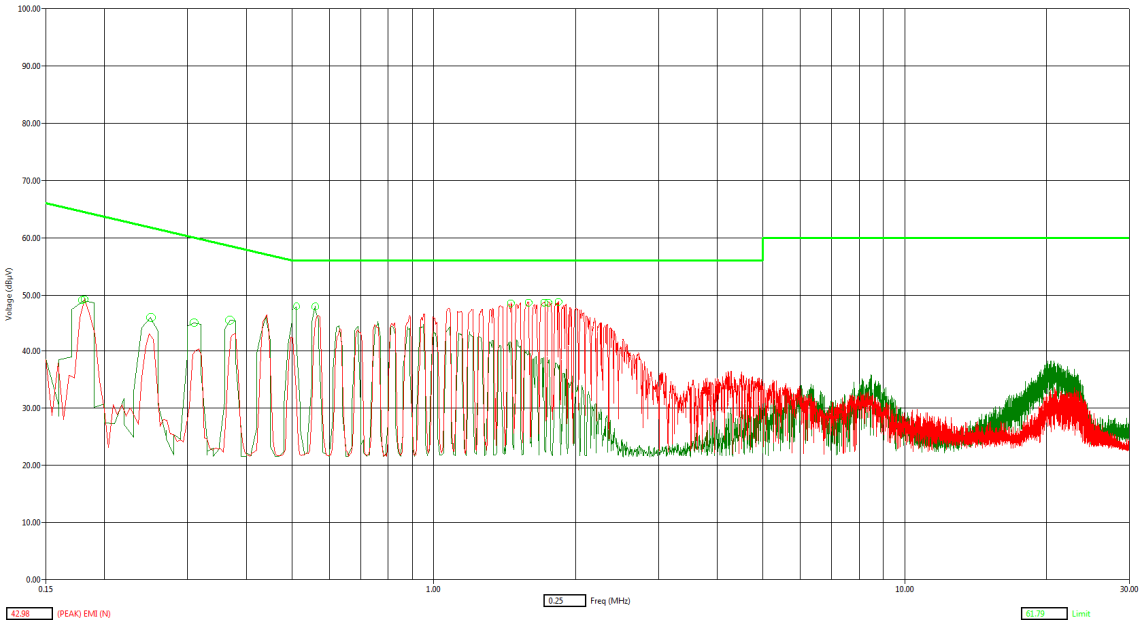
* Decreases with logarithm of the frequency

6.5.2 Test Procedure

Measurements were carried out using quasi-peak and average detector receivers in accordance with ANSI C63.4:2009. A LISN was required to provide defined impedance at high frequencies across the power feed at the point of measurement of terminal voltage and also to provide isolation of the circuit under test from the ambient noise on the power lines. A LISN as defined in ANSI C63.4:2009.

Conducted disturbance was measured between the phase lead and the reference ground, and between the neutral lead and the reference ground. Both measured values were reported.

6.5.3 Test Results



Frequency: 150 kHz to 30 MHz

- Measurements made with Peak detector, 9 KHz RBW, 30 kHz VBW, conducted LISN as per ANSI C63.4
- Measurement Time auto for sweep

Both the phase and neutral lines of the peak detected measurements were below the quasi-peak limit.

Final measurements at peaks with QP detector, 9kHz RBW, 30kHz VBW:

Freq (MHz)	(QP) EMI(dBuV)	(PEAK) Margin(dBuV)	Limit(dBm)	Line
0.1815	40.21	24.21	64.42	N
1.4595	43.36	12.64	56.00	N
1.5900	36.32	19.68	56.00	N
1.7160	37.50	18.50	56.00	N
1.7520	47.52	8.48	56.00	N
1.8420	39.85	16.15	56.00	N
0.1800	35.96	28.53	64.49	L1
0.2450	40.99	20.93	61.92	L1
0.3100	43.64	16.33	59.97	L1
0.3700	41.04	17.46	58.50	L1
0.5050	47.07	8.93	56.00	L1
0.5650	45.67	10.33	56.00	L1

7 Labeling and Instruction Manual Requirements

A UWB device subject to certification shall be labeled as followed in a conspicuous location on the device:

"This device complied with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation."

(1) Where a device is constructed in two or more sections connected by wires and marketed together, the statement specified directly above this section is required to be affixed only to the main control unit.

(2) When the device is so small or for such use that it is not practicable to place the statement specified under paragraph (a) of this section on it, the information required by this paragraph shall be placed in a prominent location in the instruction manual or pamphlet supplied to the user or, alternatively, shall be placed on the container in which the device is marketed. However, the FCC identifier or the unique identifier, as appropriate, must be displayed on the device.

The users' manual or instruction manual for an intentional or unintentional radiator shall caution the user that changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

If using a permanently affixed label, the modular transmitter must be labeled with its own FCC identification number, and, if the FCC identification number is not visible when the module is installed inside another device, then the outside of the device into which the module is installed must also display a label referring to the enclosed module. This exterior label can use wording such as the following: "Contains Transmitter Module FCC ID: XYZMODEL1" or "Contains FCC ID: XYZMODEL1." Any similar wording that expresses the same meaning may be used. The Grantee may either provide such a label, an example of which must be included in the application for equipment authorization, or, must provide adequate instructions along with the module which explain this requirement. In the latter case, a copy of these instructions must be included in the application for equipment authorization.

8 Certification Information

The following is extracted from Title 47 of the Code of Federal regulations, Part 2, Subpart I – Marketing of Radio Frequency Devices.

§ 2.801 Radio Frequency Device Defined

As used in this part, a radio frequency device is any device that in its operation is capable of emitting radio frequency by radiation, conduction or other means. Radio frequency devices include, but are not limited to:

(a) The various types of radio communication transmitting devices described throughout this chapter.

(b) The incidental, unintentional and intentional radiators defined in Part 15 of this chapter.

(c) The industrial, scientific and medical equipment described in part 18 of this chapter.

(d) Any part or component thereof that in use emits radio frequency energy by radiation, conduction or other means.

§ 2.803 Marketing of Radio Frequency Devices Prior to Equipment Authorization

(a) Except as provided elsewhere in this chapter no person shall sell or lease, or offer for sale or lease (including advertising for sale or lease), or import, ship or distribute for the purpose of selling or leasing or offering for sale or lease, any radio frequency device unless:

(1) In the case of a device subject to certification, such device has been authorized by the Commission in accordance with the rules in this chapter and is properly identified and labeled as required by §2.925 and other relevant sections in this chapter; or

(2) In the case of a device that is not required to have grant of equipment authorization issued by the Commission, but which must comply with the specified technical standards prior to use, such device also complies with all applicable administrative (including verification of the equipment or authorization under a Declaration of Conformity, where required), technical, labeling and identification requirements specified in this chapter.

(e) Notwithstanding the provisions of paragraph (a) of this section, the offer for sale solely to business, commercial, industrial, scientific or

medical users (but not an offer for sale to other parties or to end users located in a residential environment) of a radio frequency device that is in the conceptual, developmental, design or pre-production stage is permitted prior to equipment authorization or, for devices not subject to the equipment authorization requirements, prior to a determination of compliance with the applicable technical requirements provided that the prospective buyer is advised in writing at the time of the offer for sale that the equipment is subject to FCC rules and that the equipment will comply with the appropriate rules before delivery to the buyer or to centers of distribution.

(e)(1) Notwithstanding the provisions of paragraph (a) of this section, prior to equipment authorization or determination of compliance with the applicable technical requirements any radio frequency device may be operated, but not marketed, for the following purposes and under the following conditions:

(i) Compliance testing;

(ii) Demonstrations at a trade show provide the notice contained in paragraph (c) of this section is displayed in a conspicuous location on, or immediately adjacent to, the device;

(iii) Demonstrations at an exhibition conducted at a business, commercial, industrial, scientific or medical location, but excluding locations in a residential environment, provided the notice contained in paragraphs (c) or (d) of this section, as appropriate, is displayed in a conspicuous location on, or immediately adjacent to, the device;

(iv) Evaluation of the product performance and determination of customer acceptability, provided such operation takes place at the manufacturer's facilities during developmental, design or pre-production states; or

(v) Evaluation of product performance and determination of customer acceptability where customer acceptability of a radio frequency device cannot be determined at the manufacturer's facilities because of size, unique capability of the device, provided the device is operated at a business, commercial, industrial, scientific or medical user's site, but not at a residential site, during the development, design or pre-production stages.

(e)(2) For the purpose of paragraphs (e)(1)(iv) and (e)(1)(v) of this section, the term manufacturer's facilities includes the facilities of the party responsible for compliance with the regulations and the manufacturer's premises, as well as the facilities of other entities working

under the authorization of the responsible party in connection with the development and manufacture, but not the marketing, of the equipment.

(f) For radio frequency devices subject to verification and sold solely to business, commercial, industrial, scientific and medical users (excluding products sold to other parties or for operation in residential environment), parties responsible for verification of the devices shall have the option of ensuring compliance with the applicable technical specifications of this chapter at each end user's location after installation, provided that the purchase or lease agreement includes a proviso that such a determination of compliance be made and is the responsibility of the party responsible for verification of the equipment.

The following is extracted from Title 47 of the Code of Federal Regulations, Part 2, Subpart J – Equipment Authorization Procedures:

§ 2.901 Basis and Purpose

(a) In order to carry out its responsibilities under the Communications Act and the various treaties and international regulations and in order to promote efficient use if the radio spectrum, the Commission has developed technical standards for radio frequency equipment and parts or components thereof. The technical standards applicable to individual types are found in that part of the rules governing the service wherein the equipment is to be operated. In addition to the technical standards provided, the rules governing in the service may require that such equipment be verified by the manufacturer or importer be authorized under the Declaration of Conformity, or receive an equipment authorization from the Commission by one of the following procedures: certification or registration.

(b) The following sections describe the verification procedure, the procedure for a Declaration of Conformity, or the procedures to be followed in obtaining certification from the Commission and the conditions attendant to such a grant, which ever is applicable.

§ 2.907 Certification

(a) Certification is an equipment authorization issued by the Commission, based on representation and test data submitted by the applicant.

(b) Certification attaches to all units subsequently marketed by the grantee which are identical (see Section 2.908) to the sample tested except for permissive changes or other variations authorized by the Commission pursuant to Section 2.1043.

§ 2.948 Description of Measurement Facilities

(a) Each party making measurements of equipment that is subject to an equipment authorization under Part 15 or Part 18 of this chapter, regardless of whether the measurements are filed with the Commission or kept on file by the party responsible for compliance of equipment marketed within the US or its possessions, shall compile a description of the measurement facilities employed.

(1) If the measured equipment is subject to the verification procedure, the description of the measurement facilities shall be retained by the party responsible for verification of the equipment.

(i) If the equipment is verified through measurements performed by an independent laboratory, it is acceptable for the party responsible for verification of the equipment to rely upon the description of the measurement facilities retained by or placed on file with the Commission by that laboratory. In this situation, the party responsible for the verification of the equipment is not required to retain a duplicate copy of the description of the measurement facilities.

(ii) If the equipment is verified based on measurements performed at the installation site of the equipment, no specific site calibration data is required. It is acceptable to retain the description of the measurement facilities at the site that the measurements were performed.

(2) If the equipment is to be authorized by the Commission under the certification procedure, the description of the measurement facilities shall be filed with the Commission's Laboratory in Columbia, Maryland. The data describing the measurement facilities need only be filed once but must be updated as changes are made to the measurement facilities or as otherwise described in this section. At least every three years, the organization responsible for filing the data with the Commission shall certify that the data on file is current.

9 Coordination Requirements

The following is extracted from Title 47 of the Code of Federal regulations, Part 15, Subpart F – Coordination requirements.

§ 15.525 Coordination requirements

(a) UWB imaging systems require coordination through the FCC before the equipment may be used. The operator shall comply with any constraints on equipment usage resulting from this coordination.

(b) The users of UWB imaging devices shall supply operational areas to the FCC Office of Engineering and Technology, which shall coordinate this information with the Federal Government through the National Telecommunications and Information provided by the UWB operator shall include the name, address and other pertinent contact information of the user, the desired geographical area(s) of operation, and the FCC ID number and other nomenclature of the UWB device. If the imaging device is intended to be used for mobile applications, the geo graphical area(s) of operation may be the state(s) or county(ies) in which the equipment will be operated. The operator of an imaging system used for fixed operation shall supply a specific geographical location or the address at which the equipment will be operated. This material shall be submitted to the following address:

Frequency Coordination Branch, OET
Federal Communications Commission
445 12th Street, SW
Washington, D.C. 20554
Attn: UWB Coordination

(c) The manufacturers, or their authorized sales agents, must inform purchasers and users of their systems of the requirement to undertake detailed coordination of operational areas with the FCC prior to the equipment being operated.

(d) Users of authorized, coordinated UWB systems may transfer them to other qualified users and to different locations upon coordination of change of ownership or location to the FCC and coordination with existing authorized operations.

(e) The FCC/NTIA coordination report shall identify those geographical areas within which the operation of an imaging system requires additional coordination or within which the operation of animaging system is prohibited. If additional coordination is required for operation within specific geographical areas, a local coordination contact will be provided. Except for operation within these designated areas, once the information requested on the UWB imaging system is submitted to the FCC no additional coordination with the FCC is required provided the reported areas of operation do not change. If the area of operation changes, updated information shall be submitted to the FCC following the procedure in paragraph (b) of this section.

(f) The coordination of routine UWB operations shall not take longer than 15 business days from the receipt of the coordination request by NTIA. Special temporary operations may be handled with an expedited turn-around time when circumstances warrant. The operation of UWB systems in emergency situations involving the safety of life or property may occur without coordination provided a notification procedure, similar to that contained in Section 2.405(a) through (e) of this chapter, is followed by the UWB equipment user.

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