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## Electromagnetic Emission Compliance Test Report



<b>Equipment Under Test (EUT)</b>	Chaser XR	
<b>Model</b>	CHASERXR	
<b>Applicant</b>	IDS GeoRadar srl	
<b>In Accordance With</b>	FCC Part 15, Subpart F Industry Canada RSS-220 (Issue 1/2009)	
<b>Tested by</b>	Advanced Compliance Laboratory, Inc. 210 Cougar Court Hillsborough, New Jersey 08844	
<b>Authorized by</b>	Wei Li Lab Manager	Signature 
<b>Date</b>	July 31, 2023	
<b>AC Lab Report Number</b>	0048-230710-01-FCC-IC	



Lab Code:200101-0

**The test result in this report is supported and covered by the NVLAP accreditation.**

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## Section 1. Summary of Test Results

Manufacturer: IDS GeoRadar srl  
Product Name: Chaser XR  
Model/Parts No.: CHASERXR  
S/N: 020-23-000543

General: **All measurements are traceable to national standards**

These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with FCC Part 15, Sub Part F and Industry Canada RSS-220 (Issue 1/2009).

New Submission  Production Unit  
 Class I Permissive Change  Pre-Production Unit

THIS TEST REPORT RELATES ONLY TO THE ITEM(S) TESTED.

THE FOLLOWING DEVIATIONS FROM, ADDITIONS TO, OR EXCLUSIONS FROM THE TEST SPECIFICATIONS HAVE BEEN MADE.

“See Summary of Test Data”



**NVLAP LAB CODE: 200101-0**

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### Summary of Test Data

Compliance Requirement	FCC & IC Rule Part	Test No. in Section 4	Result
<b>Cross Reference</b>	15.505 &RSS-GEN	1	Complies
<b>Marketing of UWB Equipment</b>	15.507 &RSS-GEN	2	Complies
<b>Pulse Repetition Frequency(PRF)</b>	15.509 &RSS-220 6.2	3	Complies
<b>UWB Bandwidth</b>	15.509(a) &RSS-220 6.2.1(a)	4	Complies
<b>General Operational Requirements for LF Imaging System</b>	15.509(b) &RSS-220 6	5	Complies
<b>Spurious Radiated Emissions≤960MHz</b>	15.509(d) 15.209 &RSS-220 3.4, 6.2(c), 6.2(d)	6	Complies
<b>Spurious Radiated Emissions&gt;960MHz</b>	15.509(d) 15.209 &RSS-220 3.4, 6.2(c), 6.2(d)	7	Complies
<b>Radiated Emissions in GPS Bands</b>	15.509(e) 15.209 &RSS-220 6.2(e)	8	Complies
<b>Highest Radiated Emission at f<sub>M</sub></b>	15.509(f) 15.209 &RSS-220 6.2(g)	9	Complies
<b>Technical Requirements Applicable to All UWB Devices</b>	15.521	10	Complies
<b>Coordination Requirement</b>	15.525	11	N/A
<b>Antenna Requirement</b>	15.203& 15.204 &RSS-GEN 7.1.4	12	Complies
<b>Radio Frequency Exposure</b>	FCC OET Bulletin 65 &RSS-GEN	13	N/A
<b>Conducted Emissions</b>	15.507 &RSS-GEN	14	*
<b>Transmission Duration</b>	15.509(c) &15.519(a)(1)	15	Complies

\* NOT APPLICABLE to the EUT as it is a battery-powered device;

The estimated uncertainty of the test result is given as following. The method of uncertainty calculation is provided in Advanced Compliance Lab. Doc. No. 0048-01-01.

	Prob. Dist.	Uncertainty(dB) 30-1000MHz	Uncertainty(dB) 1-6.5GHz	Uncertainty(dB) Conducted
Combined Std. Uncertainty $u_c$	norm.	$\pm 2.36$	$\pm 2.99$	$\pm 1.83$



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Wei Li  
Lab Manager  
Advanced Compliance Lab

Date: July 31, 2023

## Section 2. General Equipment & Test Configuration

### 2.1. EUT Specification

<b>EUT</b>	Chaser XR, Model# CHASERXR, manufactured by IDS GeoRadar srl. is a dual frequency GPR intended to be used in non-destructive testing and geophysical surveying.
<b>Supply Voltage</b>	10.8V Smart Li-on Battery
<b>Operating Frequency</b>	Specific Frequency Range: 120 MHz to 1500 MHz
<b>-10dB UWB Bandwidth</b>	Normal Operation Mode: 2220.27MHz (from $f_L=146.73\text{MHz}$ to $f_H=2367.0\text{MHz}$ )
<b>Modulation Type</b>	200KHz Pulse Repetition Frequency (PRF)
<b>Peak Emissions in a 50 MHz Bandwidth</b>	Max. peak emissions above 1GHz: -19.1dBm @ 1232MHz, under 0dBm limit
<b>Antenna</b>	Two Dipole Antenna Pairs
<b>Hardware Version</b>	1.0
<b>Software Version</b>	FW 1.6 / uMap 01.02.002

### 2.2. Description of Operation

The system performs time domain reflectometry by radiating a radio frequency CW with a cycle frequency of up to 200Hz from a transmitting dipole (TX dipole). Transitions between materials exhibiting different wave impedance through which the electromagnetic wave travels cause the wave to be reflected. These reflections are received by the receiving dipole (RX dipole) and sampled by the instrument. Results may be displayed in real time on the system screen and recorded on an internal solid state disk drive for later analysis. In the field, the system is powered from a removable rechargeable battery.

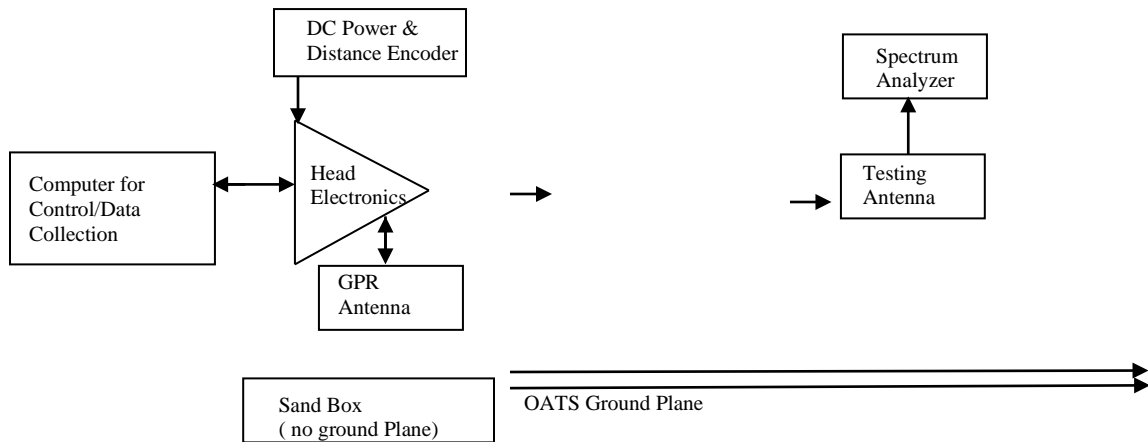
### 2.3. System Diagram

See Attachment provided by Applicant.

### 2.4. General EUT Setup

The EUT is operated in continuous transmission mode with the antennas permanently mounted in an all in one plastic housing with the controlling electronics and battery.

All measurements shall be made at room temperature and at nominal DC input voltage (provided by a battery). The EUT is placed directly on the dry sand with no ground plane under it.



### 2.5. Operational Frequency channel(s) for testing:

- Clocks: 10, 16, 25,50, 100, 125, 129, 1000, 4000 MHz
- RF antenna center frequencies for TX/RX modulations : CH1/120-800MHz & CH2/300-1500MHz

### Section 3. Test Methodology & Facilities

#### 3.1 Measurement Procedure

The tests documented in this report were performed in accordance with ANSI C63.4 /C63.10, FCC CFR 47 Part 2 & 15, Industry Canada RSS-220 (Issue 1/2009) & FCC Order, ET Docket No. 980153(FCC02-08). Test procedure described in FCC “KDB 393764, UWB Compliance Measurements” is used in this report. The test methods used to generate the data in this test report is in accordance with ANSI C63.10:2013, American National Standard for Testing Unlicensed Wireless Devices.

In accordance with ANSI C63.10:2013, Section 10.2.2, the device under test was placed on a bed of dry sand and rotated through 16 azimuth angles (Clause 5.4) to determine which produced the highest emission relative to the limit. The azimuth that produced the highest emission relative to the limit was used for all radiated emission measurements.

#### 3.2. Facilities and Accreditation

The test sites and measurement facilities used to collect data are located at Hillsborough, New Jersey, USA. The sites are constructed in conformance with the requirements of ANSI C63.4, ANSI C63.7 and CISPR Publication 32. All receiving equipment conforms to CISPR Publication 16-1, “Radio Interference Measuring Apparatus and Measurement Methods”.

This site is accepted by FCC to perform measurements under Part 15 or 18 (Registration # 90601, MRA designation No. US5347) and also designated by IC as “ site IC 3130A”. ACL is accredited by NVLAP, Laboratory Code 200101-0. 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. Test and Measurement Equipment

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

Manufacture	Model	Serial No.	Description	Cal Due dd/mm/yy
Hewlett-Packard	HP8546A	3448A00290	EMI Receiver	25/09/23
Agilent	E4440A	US40420700	3Hz-26.5GHz Spectrum Analyzer	17/06/24
EMCO	3104C	9307-4396	20-300MHz Biconical Antenna	15/01/24
EMCO	3146	9008-2860	200-1000MHz Log-Periodic Antenna	15/01/24
EMCO	3115	4945	Double Ridge Guide Horn Antenna	22/01/24

All Test Equipment Used is Calibrated, Traceable to NIST Standards. 2 Year Interval.



**Section 4. Measurement Data**

Test No.1

<b>Name of Test:</b>	<i>Cross Reference</i>	<b>Test Standard:</b>	<i>15.505 &amp;RSS-GEN</i>
<b>Tested By:</b>	WEI LI	<b>Test Date:</b>	07/10/2023-07/31/2023

**Minimum Standard:** 15.505(a)  
Equipment under test complies with all the relevant and applicable requirements of Subpart A, Subpart B and Section 15.201 through 15.204 and Section 15.207 of Subpart C. 15.505(b)  
The Digital circuitry portion of the EUT has been tested and verified to comply with 47 CFR Part 15, subpart B.

**Method of Measurement:** a) Except where specifically stated otherwise within this subpart, the provisions of Subparts A and B and of Sections 15.201 through 15.204 and Section 15.207 of Subpart C of this part apply to unlicensed UWB intentional radiators. The provisions of Sections 15.35(c) and 15.205 do not apply to devices operated under this subpart. The provisions of Footnote US 246 to the Table of Frequency Allocations contained in Section 2.106 of this chapter do not apply to devices operated under this subpart.

b) The requirements of Subpart F apply only to the radio transmitter, i.e., the intentional radiator, contained in the UWB device. Other aspects of the operation of a UWB device may be subject to requirements contained elsewhere in this chapter. In particular, a UWB device that contains digital circuitry not directly associated with the operation of the transmitter also is subject to the requirements for unintentional radiators in Subpart B of this chapter. Similarly, an associated receiver that operates (tunes) within the frequency range 30 MHz to 960 MHz is subject to the requirements in Subpart B of this chapter.

**Test Result:** **Complies**

**Test Data:** **Data and Plots**

<b>Project Number:</b>	0048-230710-01-FCC-IC
<b>EUT:</b>	Chaser XR
<b>S/N:</b>	020-23-000543
<b>Tested By:</b>	David Tu
<b>Temperature:</b>	75°F
<b>Humidity:</b>	30%

***Spurious Radiated Emissions from Digital Circuitry (RF off) complies with FCC Part 15.109 (Class A), measured per ANSI C63.4 with standard setup.***

Freq. (MHz)	H,V	SA Peak/QP* Reading (dBuV/m)	Height (m)	Angle (degree)	Refer to Part 15.209 10m Limit (dBuV/m)	Margin (dB)	Result
44.0	H	23.4	1.8	090	39.1	-15.7	Pass
61.0	H	23.7	1.8	090	39.1	-15.4	Pass
142.6	H	25.3	1.8	135	43.5	-18.2	Pass
147.3	H	25.4	1.6	090	43.5	-18.1	Pass
300	H	23.4	1.1	135	46.5	-23.1	Pass
434	H	24.6	1.0	135	46.5	-21.9	Pass
500	H	28.3	1.0	045	46.5	-18.2	Pass
700	H	27.8	1.0	045	46.5	-18.7	Pass
1150	H	29.0	1.0	090	49.5	-20.5	Pass
1575	H	30.1	1.0	090	49.5	-19.4	Pass
1830	H	31.4	1.0	090	49.5	-18.1	Pass
44.0	V	29.2	1.2	180	39.1	-9.9	Pass
141.8	V	36.7	1.2	180	43.5	-6.8	Pass
144.3*	V	33.7*	1.1	180	43.5	-9.8	Pass
149.4*	V	33.6*	1.1	180	43.5	-9.9	Pass
152.8	V	33.0	1.1	180	43.5	-10.5	Pass
500	V	32.8	1.1	225	46.5	-13.7	Pass
618	V	26.1	1.1	225	46.5	-20.4	Pass
700	V	27.8	1.1	225	46.5	-18.7	Pass
900	V	30.5	1.1	225	46.5	-16.0	Pass
1100	V	32.4	1.1	180	49.5	-17.1	Pass
1143	V	31.9	1.1	180	49.5	-17.6	Pass
1500	V	30.4	1.1	180	49.5	-19.1	Pass
1600	V	34.0	1.1	225	49.5	-15.5	Pass
2000	V	33.2	1.1	225	49.5	-16.3	Pass

Note: Quasi-peak readings will be marked with \*. The missions with peak values close to ( or over) the specification limit (if any) will be also measured in the quasi-peak or average mode to determine the compliance. Distance factor (Radiated field Strength at 10m distance = Radiated field Strength at 3m distance - 10.5 dBuV/m) can be used for low level signals with high level ambient, if test distance is changed from 10m to 3m.

Test No.2

<b>Name of Test:</b>	<i>Marketing of UWB Equipment</i>	<b>Test Standard:</b>	<i>15.507 &amp;RSS-GEN</i>
<b>Tested By:</b>	WEI LI	<b>Test Date:</b>	07/10/2023-07/31/2023

**Minimum** 15.507/ 2.909

**Standard:** The responsible party is properly informed about the responsible for ensuring that the equipment is marketed only to eligible parties, and provide correct information on the customers and users.  
(See Important note for the US customers of the Installation Guide and User Manual)

**Method of Measurement:** In some cases, the operation of UWB devices is limited to specific parties, e.g., law enforcement, fire and rescue organizations operating under the auspices of a state or local government. The marketing of UWB devices must be directed solely to parties eligible to operate the equipment. The responsible party, as defined in Section 2.909 of this chapter, is responsible for ensuring that the equipment is marketed only to eligible parties. Marketing of the equipment in any other manner may be considered grounds for revocation of the grant of certification issued for the equipment.

**Test Result:**

**Complies**

**Test Data:**

**NA**

Test No.3

<b>Name of Test:</b>	<i>Pulse Repetition Frequency (PRF)</i>	<b>Test Standard:</b>	<i>15.509(d) &amp; RSS-220 6.2</i>
<b>Tested By:</b>	WEI LI	<b>Test Date:</b>	07/10/2023-07/31/2023

**Minimum** Definition:

**Standard:** Pulse Repetition Frequency (PRF) is the trigger repetition frequency.

PRF declared by applicant: Total 200KHz

**Method of Measurement:** Tested at 3-meter OATS per ANSI C63.4  
Spectrum Analyzer Settings:  
RBW: 30KHz  
VBW:  $\geq$ RBW  
Detector: Peak  
Span: As required  
Sweep: Auto

**Test Result:**

**Complies**

**Test Data:**

**PRF=200KHz**

Test No.4

<b>Name of Test:</b>	<i>UWB Bandwidth</i>	<b>Test Standard:</b>	<i>15.509(a) 15.503(a) &amp; RSS-220 6.2.1(a)</i>
<b>Tested By:</b>	WEI LI	<b>Test Date:</b>	07/10/2023-07/31/2023

**Minimum Standard:**

Definition:

The bandwidth of a UWB emission is defined by the points on the emission spectrum where the amplitude is 10 dB below the maximum emission amplitude (i.e., the -10 dB points), 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  $f_M$ . The center frequency  $f_C$ , equals  $(f_H + f_L) / 2$ . The fractional bandwidth equals  $2 * (f_H - f_L) / (f_H + f_L)$ .

In cases where the measured emission spectrum contains multiple (more than two) -10 dB points, the outermost points define the bandwidth (i.e., the widest bandwidth is assumed).

Limits:

The UWB bandwidth of an imaging system operating under the provisions of this section must be below 10.6 GHz.

**Method of Measurement:**

Tested at 3-meter OATS per ANSI C63.4

Spectrum Analyzer Settings:

RBW: 1MHz

VBW: 3MHz

Detector: Peak

Span: As required ( to display a full spectrum of the RF emission)

Sweep: Auto

Test Procedure:

- 1) The receiving antenna which varied from 1 to 4 m to find the highest emission is positioned 3 m away from the EUT.
- 2) Measure the Highest radiated emission at  $f_M$  as described in the test No. 9.
- 3) Recorded the upper and lower frequency that are at the side of the band bounded by the points at 10 dB below the highest radiated UWB emission level. Measuring the bandwidth of a UWB device using a radiated test set-up, it is imperative that appropriate adjustments be made to the measured amplitude levels to account for the frequency-dependent components of the measurement system (e.g., antenna gain

or factor, pre-amplifier gain, cable loss, etc). Since UWB emissions can have bandwidths several GHz wide, these frequency-dependent characteristics can vary dramatically over the fundamental emission. According to the nature of the broadband emission characteristics, significant care must be taken to capture the true spectrum of emission, extremely narrow sweep widths is recommended.

4) The UWB bandwidth is the different of the upper and lower frequency recorded.

**Test Result:       Complies**

**Test Data:         Data and Plots**

Measurement Data (Values in MHz):

$f_M$	The highest emission peak	837.3
$f_L$	10 dB below the highest peak	146.73
$f_H$	10 dB above the highest peak	2367.0
$f_C$	Calculated: $(f_H + f_L)/2$	1256.87
Bandwidth	Calculated: $(f_H - f_L)$	2220.27
Fractional BW	Calculated: $2*(f_H - f_L)/(f_H + f_L)$	1.77

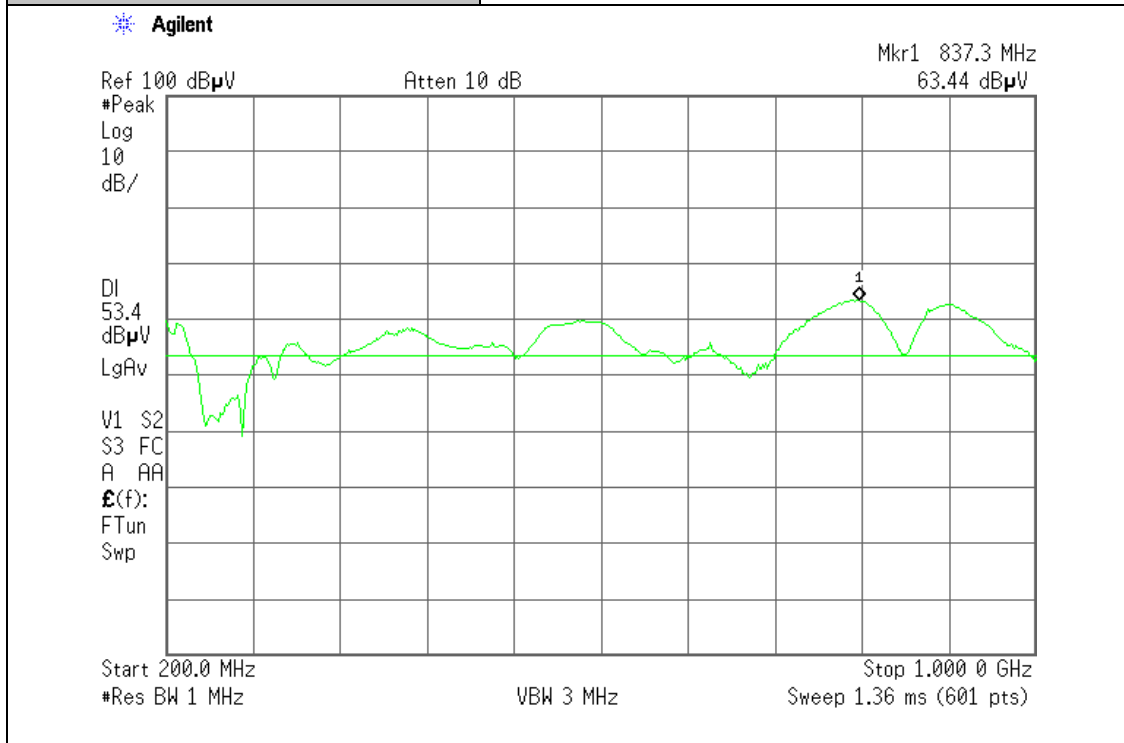
Note: The Fraction Bandwidth is greater than 0.2.



Measurement Plots:

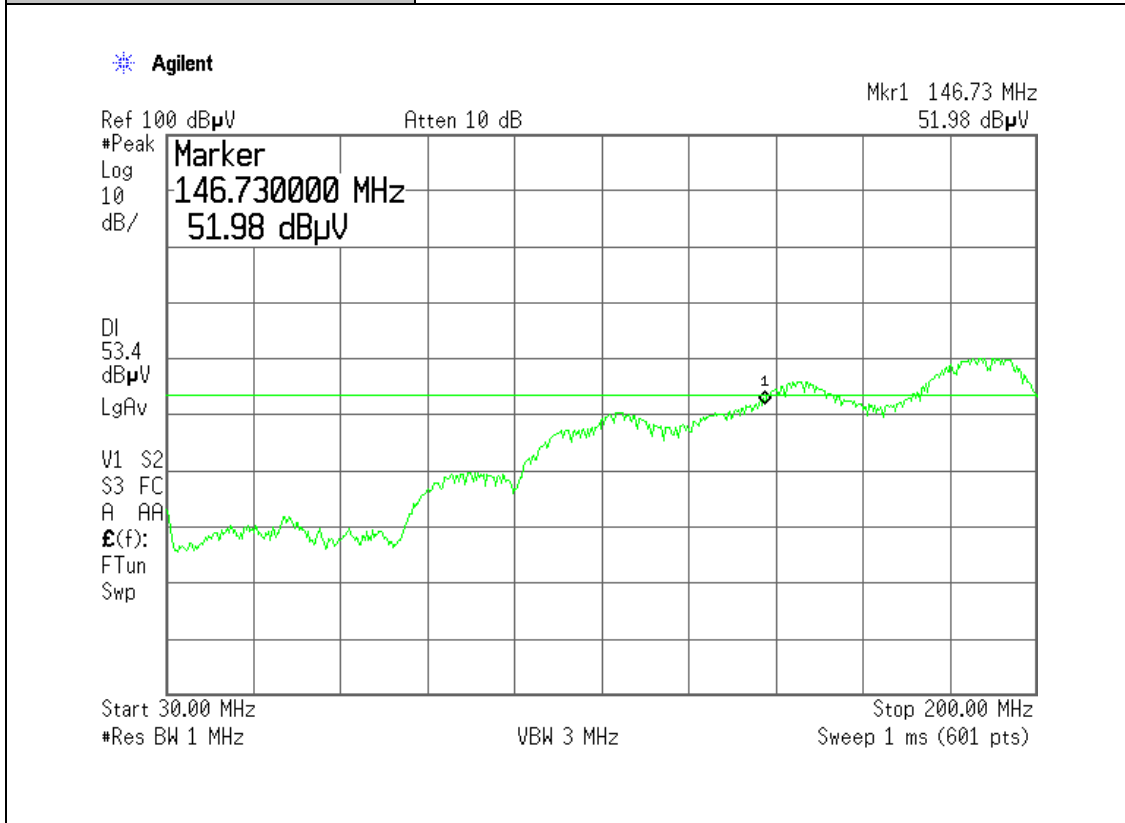
<b>Project Number:</b>	0048-230710-01-FCC-IC
<b>EUT:</b>	Chaser XR
<b>S/N:</b>	020-23-000543
<b>Tested By:</b>	Wei Li
<b>Temperature:</b>	75°F
<b>Humidity:</b>	30%

<b>Section:</b>	UWB Bandwidth/ LF Antenna
<b>Plot Name:</b>	-10dB UWB Bandwidth in Anechoic Chamber Max Peak
<b>Configuration:</b>	Stand alone, Continue operation



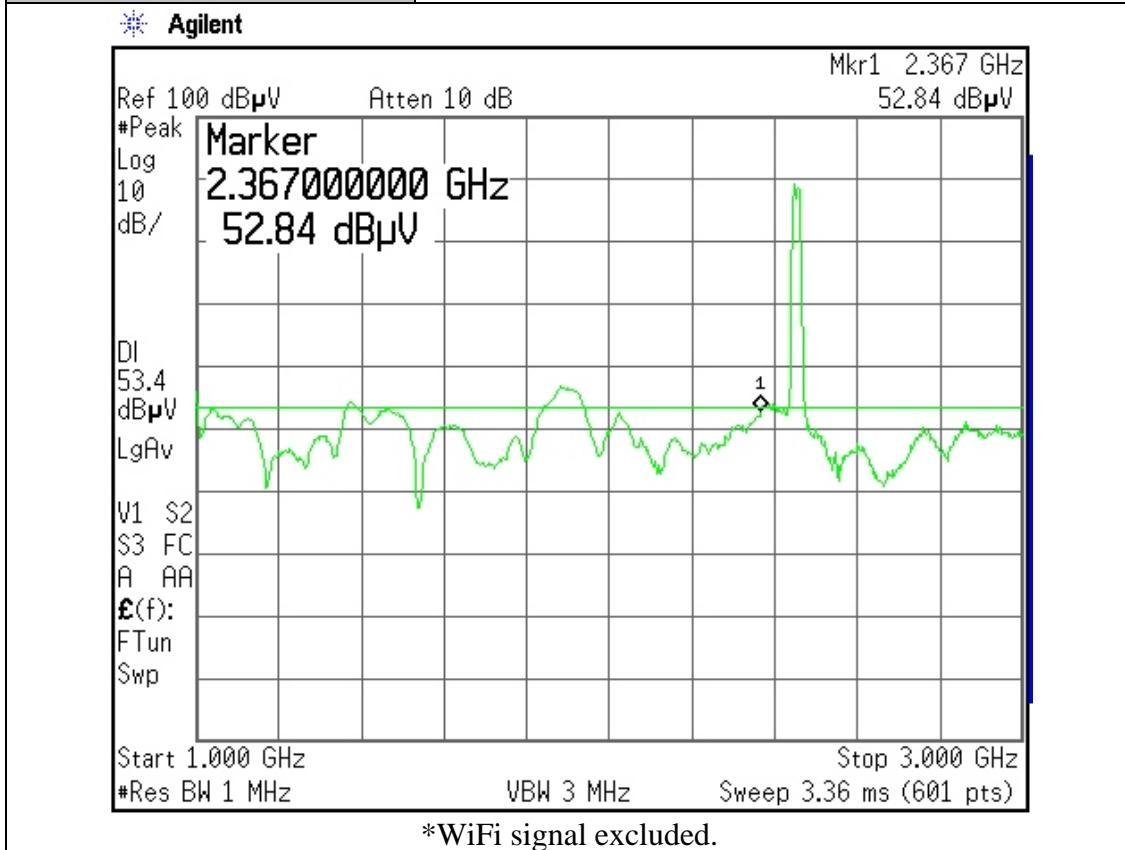
<b>Project Number:</b>	0048-230710-01-FCC-IC
<b>EUT:</b>	Chaser XR
<b>S/N:</b>	020-23-000543
<b>Tested By:</b>	Wei Li
<b>Temperature:</b>	75°F
<b>Humidity:</b>	30%

<b>Section:</b>	UWB Bandwidth
<b>Plot Name:</b>	-10dB UWB Bandwidth in Anechoic Chamber Lower edge
<b>Configuration:</b>	Stand alone, Continue operation



<b>Project Number:</b>	0048-230710-01-FCC-IC
<b>EUT:</b>	Chaser XR
<b>S/N:</b>	020-23-000543
<b>Tested By:</b>	Wei Li
<b>Temperature:</b>	75°F
<b>Humidity:</b>	30%

<b>Section:</b>	UWB Bandwidth
<b>Plot Name:</b>	-10dB UWB Bandwidth in Anechoic Chamber Upper Edge
<b>Configuration:</b>	Stand alone, Continue operation



Test No.5

<b>Name of Test:</b>	<i>General Operational Requirements for LFIS</i>	<b>Test Standard:</b>	<i>15.509(b) &amp;RSS-220 6</i>
<b>Tested By:</b>	WEI LI	<b>Test Date:</b>	07/10/2023-07/31/2023

**Minimum** 15.509(b) &RSS-220 6

**Standard:** Operation under the provisions of this section is limited to Chaser XRs and wall imaging systems operated for the purposes with law enforcement, fire fighting, emergency rescue, scientific research, commercial mining, or construction.

**Method of Measurement:** The manufacturer Shall state that the device under test complies with the requirements outlined in section FCC Part 15.509 (b).

**Test Result:**

**Complies**

**Test Data:**

**NA**

Test No.6

<b>Name of Test:</b>	<i>Spurious Radiated Emissions ≤960MHz</i>	<b>Test Standard:</b>	<i>15.509(d) 15.209 &amp;RSS-220 3.4, 6.2(c), 6.2(d)</i>
<b>Tested By:</b>	David Tu	<b>Test Date:</b>	07/10/2023-07/31/2023

**Minimum Standard:** Definition:  
 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.

Limits:

Frequency (MHz)	Field Strengths Limits (dBµV/m)	Measuring RBW kHz	Distance (meters)
0.009-0.490	67,6-20*Logf(kHz)	1	300
0.490-1.705	87,6-20*Logf(kHz)	9	30
1.705-30	29.5	9	30
30-88	40.0	120	3
88-216	43.5	120	3
216-960	46.0	120	3

**Method of Measurement:** Tested at 3-meter OATS per ANSI C63.4  
Spectrum Analyzer Settings:  
RBW: 120KHz  
VBW:  $\geq 3x$  RBW  
Detector: Quasi-Peak  
Span: As required  
Sweep: Auto

Test Procedure:

- 1) The EUT was placed on sandpit area filled with dry sand initially placed in front of the ground plane (0° degree position)
- 2) The receiving antenna which varied from 1 to 4 m to find the highest emission is positioned 3 m away from the EUT.
- 3) The receiving antenna was positioned in horizontal polarization.
- 4) The measurements were made with the detector set to peak with a bandwidth of 120 kHz during monitoring the frequency range below 960 MHz.
- 5) Upon detection of a suspect emission signal, its amplitude and frequency were noted.
- 6) It is recommended to demodulate the received signals for suitable discrimination of the ambient emission from the EUT emission.
- 7) At the worst case combination of the EUT operating mode and antenna height, the field strength measure was recorded. At each of the frequencies were a field strength was recorded the final measurement was performed with a Quasi-Peak detector.
- 8) The receiving antenna was positioned in vertical polarization and the steps 2 to 6 was repeated.
- 9) The EUT was rotating from 0° to 360° degrees with 45° step increment and the steps 4 to 7 was repeated.
- 10) All the worst case combination field strength emissions founded of each EUT position and antenna polarization was recorded in the following table and compared with the applicable limits.

**Test Result:**

**Complies**

**Test Data:**

**Data**

<b>Project Number:</b>	0048-230710-01-FCC-IC
<b>EUT:</b>	CHASER XR
<b>S/N:</b>	020-23-000543
<b>Tested By:</b>	David Tu
<b>Temperature:</b>	75°F
<b>Humidity:</b>	30%

Worst Case Scenario: the worst case combination field strength emissions founded of each EUT position and antenna polarization was recorded in the following table and compared with the applicable limits.

- EUT Position (angle) : 45 ° interval.
- Antenna Polarization : Horizontal & Vertical; Antenna Height : 1-4m

Freq.* (MHz)	H,V	SA QP Reading (dBuV/m)	Height (m)	Angle (degree)	Refer to Part 15.209 3m Limit (dBuV/m)	Margin (dB)	Result
98.9	H	32.8	1.0	315	43.5	-10.7	Pass
147.7	H	41.4	1.0	315	43.5	-2.1	Pass
161.8	H	41.9	1.0	315	43.5	-1.6	Pass
198.7	H	41.7	1.0	315	43.5	-1.8	Pass
400.0	H	41.0	1.0	315	46.0	-5.0	Pass
414.7	H	40.2	1.0	000	46.0	-5.8	Pass
558.0	H	40.3	1.0	000	46.0	-5.7	Pass
650.0	H	39.5	1.0	315	46.0	-6.5	Pass
689.3	H	40.7	1.0	315	46.0	-5.3	Pass
708.0	H	42.0	1.0	000	46.0	-4.0	Pass
789.3	H	40.4	1.0	000	46.0	-5.6	Pass
117.9	V	41.9	1.1	180	43.5	-1.6	Pass
133.5	V	41.0	1.1	135	43.5	-2.5	Pass
147.7	V	42.5	1.1	135	43.5	-1.0	Pass
170.6	V	40.5	1.1	180	43.5	-3.0	Pass
198.6	V	40.8	1.1	180	43.5	-2.7	Pass
212.0	V	42.5	1.1	135	43.5	-1.0	Pass
226.7	V	40.6	1.1	135	46.0	-5.4	Pass
245.3	V	41.2	1.1	135	46.0	-4.8	Pass

357.0	V	38.7	1.1	135	46.0	-7.3	Pass
565.0	V	40.0	1.1	180	46.0	-6.0	Pass
617.0	V	41.4	1.1	180	46.0	-4.6	Pass
662.0	V	41.2	1.1	180	46.0	-4.8	Pass
802.0	V	40.6	1.1	180	46.0	-5.4	Pass

\*Emissions from Digital circuitry (identified in Test No.1 for FCC Part 15 B) shall be excluded.



Test No.7

<b>Name of Test:</b>	<i>Spurious Radiated Emissions &gt;960MHz</i>	<b>Test Standard:</b>	<i>15.509(d) 15.209 &amp;RSS-220 3.4, 6.2(c), 6.2(d)</i>
<b>Tested By:</b>	David Tu	<b>Test Date:</b>	07/10/2023-07/31/2023

**Minimum Definition:**

**Standard:** 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.

Limits:

Frequency (MHz)	EIRP @ 3 meters (1 MHz BW) (dBm)	Field strength @ 3 meters (1 MHz BW) (dBµV/m)	Field strength @ 1 meters (1 MHz BW) (dBµV/m)
960-1610	-	29,9	39,4
1610-1990	-	41,9	51,4
1990-3100	-	43,9	53,4
3100-10600	-	53,9	63,4
Above 10600	-	43,9	53,9

Remark: The limits were converted from EIRP to field strength at 3 and 1 meter according to FCC 15.503(k).

**Method of Measurement:** Tested at 3-meter OATS per ANSI C63.4  
Spectrum Analyzer Settings:  
RBW: 1MHz  
VBW:  $\geq 3 \times$  RBW  
Detector: RMS Average Detector  
Span: As required  
Sweep: Auto

Test Procedure:

- 1) The EUT was placed on sandpit area filled with dry sand initially placed in front of the ground plane (0° degree position)
- 2) The receiving antenna is placed at 1 meter away from the EUT and it is pointed in the direction of the radiating head with an inclination of -10° to find the highest emission.
- 3) The receiving antenna was positioned in horizontal polarization.
- 4) The measurements were made with the detector set to RMS with a bandwidth of 1 MHz during monitoring the frequency range above 960 MHz.
- 5) Upon detection of a suspect emission signal, its amplitude and frequency were noted.
- 6) It is recommended to demodulate the received signals for suitable discrimination of the ambient emission from the EUT emission.
- 7) At the worst case combination of the EUT operating mode and antenna height, the field strength measure was recorded.
- 8) The receiving antenna was positioned in vertical polarization and the steps 2 to 6 were repeated.
- 9) The EUT was rotating from 0° to 360° degrees with 45° step increment and the steps 4 to 7 was repeated.
- 10) All the worst case combination field strength emissions founded of each EUT position and antenna polarization was recorded in the following table and compared with the applicable limits.

**Test Result:**

**Complies**

**Test Data:**

**Data**

<b>Project Number:</b>	0048-230710-01-FCC-IC
<b>EUT:</b>	CHASER XR
<b>S/N:</b>	020-23-000543
<b>Tested By:</b>	David Tu
<b>Temperature:</b>	75°F
<b>Humidity:</b>	30%

Worst Case Scenario: the worst case combination field strength emissions founded of each EUT position and antenna polarization was recorded in the following table and compared with the applicable limits.

- EUT Position (angle) : 45 ° interval.
- Antenna Polarization : Horizontal & Vertical; Antenna Height: 1m-4m.

Freq.* (MHz)	H,V	SA Average Reading @3m (dBuV/m)	Height (m)	Angle (degree)	Refer to 15.509(d) 15.209 & RSS-220 3.4, 6.2(c), 6.2(d) Limit (dBuV/m)	Margin (dB)	Result
1013.2	H	28.3	1.0	180	29.9	-1.6	Pass
1052.8	H	27.5	1.0	180	29.9	-2.4	Pass
1097.2	H	28.3	1.0	135	29.9	-1.6	Pass
1147.6	H	28.4	1.0	135	29.9	-1.5	Pass
1210.0	H	27.7	1.0	180	29.9	-2.2	Pass
1280.8	H	27.4	1.0	180	29.9	-2.5	Pass
1348.0	H	27.7	1.0	180	29.9	-2.2	Pass
1451.2	H	28.1	1.0	180	29.9	-1.8	Pass
1468.0	H	28.1	1.0	180	29.9	-1.8	Pass
1519.0	H	27.9	1.0	135	29.9	-2.0	Pass
1566.4	H	28.0	1.0	135	29.9	-1.9	Pass
1822.3	H	27.9	1.0	135	41.9	-14.0	Pass
1983.0	H	27.8	1.0	180	41.9	-14.1	Pass
2387.1	H	27.7	1.0	135	43.9	-16.2	Pass
2515.4	H	27.1	1.0	180	43.9	-16.8	Pass
2867.3	H	27.2	1.0	180	43.9	-16.7	Pass
1020.0	V	28.5	1.1	315	29.9	-1.4	Pass
1039.6	V	28.3	1.1	315	29.9	-1.6	Pass
1072.0	V	28.7	1.1	315	29.9	-1.2	Pass

1094.8	V	28.7	1.1	225	29.9	-1.2	Pass
1124.8	V	28.5	1.1	225	29.9	-1.4	Pass
1163.2	V	28.7	1.1	315	29.9	-1.2	Pass
1232.8	V	28.9	1.1	045	29.9	-1.0	Pass
1285.6	V	27.9	1.1	045	29.9	-2.0	Pass
1349.2	V	27.8	1.1	315	29.9	-2.1	Pass
1410.4	V	27.9	1.1	315	29.9	-2.0	Pass
1516.0	V	27.6	1.1	315	29.9	-2.3	Pass
1573.6	V	27.7	1.1	315	29.9	-2.2	Pass
1779	V	27.5	1.1	315	41.9	-14.4	Pass
1955	V	27.6	1.1	315	41.9	-14.3	Pass
2055	V	27.6	1.1	315	43.9	-16.3	Pass
2705	V	27.8	1.1	315	43.9	-16.1	Pass
2777	V	27.7	1.1	315	43.9	-16.2	Pass

\*Emissions from Digital circuitry (identified in Test No.1 for FCC Part 15 B) shall be excluded.

\*\* Emissions above 3100MHz has larger margin comparing to the higher limit.

Test No.8

<b>Name of Test:</b>	<i>Radiated Emissions in GPS Bands</i>	<b>Test Standard:</b>	<i>15.509(e) 15.209 &amp; RSS-220 6.2(e)</i>
<b>Tested By:</b>	David Tu	<b>Test Date:</b>	07/10/2023-07/31/2023

**Minimum Standard:**

Definition:

In addition to the radiated emission limits specified for frequency above 960 MHz, 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 in the GPS frequency bands.

Limits:

Frequency (MHz)	EIRP @ 3 meters (1 MHz BW) (dB m)	Field strength @ 3 meters (1 MHz BW) (dBµV/m)	Field strength @ 1 meters (1 MHz BW) (dBµV/m)
1164-1240	-	19.9	29.4
1559-1610	-	19.9	29.4

Remark: The limits were converted from EIRP to field strength at 3 and 1 meter according to FCC 15.503(k).

**Method of Measurement:** Tested at 3-meter OATS per ANSI C63.4  
Spectrum Analyzer Settings:  
RBW: 1KHz  
VBW: >3xRBW  
Detector: RMS Average Detector  
Span: As required  
Sweep: Auto

Test Procedure:

- 1) The EUT was placed on sandpit area filled with dry sand initially placed in front of the ground plane (0° degree position)
- 2) The receiving antenna is placed at 1 meter away from the EUT and it is pointed in the direction of the radiating head with an inclination of -10° to find the highest emission.
- 3) The receiving antenna was positioned in horizontal polarization.
- 4) The measurements were made with the detector set to RMS during monitoring the frequency range above 960 MHz.
- 5) Upon detection of a suspect emission signal, its amplitude and frequency were noted.
- 6) It is recommended to demodulate the received signals for suitable discrimination of the ambient emission from the EUT emission.
- 7) At the worst case combination of the EUT operating mode and antenna height, the field strength measure was recorded.
- 8) The receiving antenna was positioned in vertical polarization and the steps 2 to 6 were repeated.
- 9) The EUT was rotating from 0° to 360° degrees with 45° step increment and the steps 4 to 7 was repeated.
- 10) All the worst case combination field strength emissions founded of each EUT position and antenna polarization was recorded in the following table and compared with the applicable limits.

**Test Result:**

**Complies**

**Test Data:**

**Data and Plot**

<b>Project Number:</b>	0048-230710-01-FCC-IC
<b>EUT:</b>	CHASER XR
<b>S/N:</b>	020-23-000543
<b>Tested By:</b>	David Tu
<b>Temperature:</b>	75°F
<b>Humidity:</b>	30%

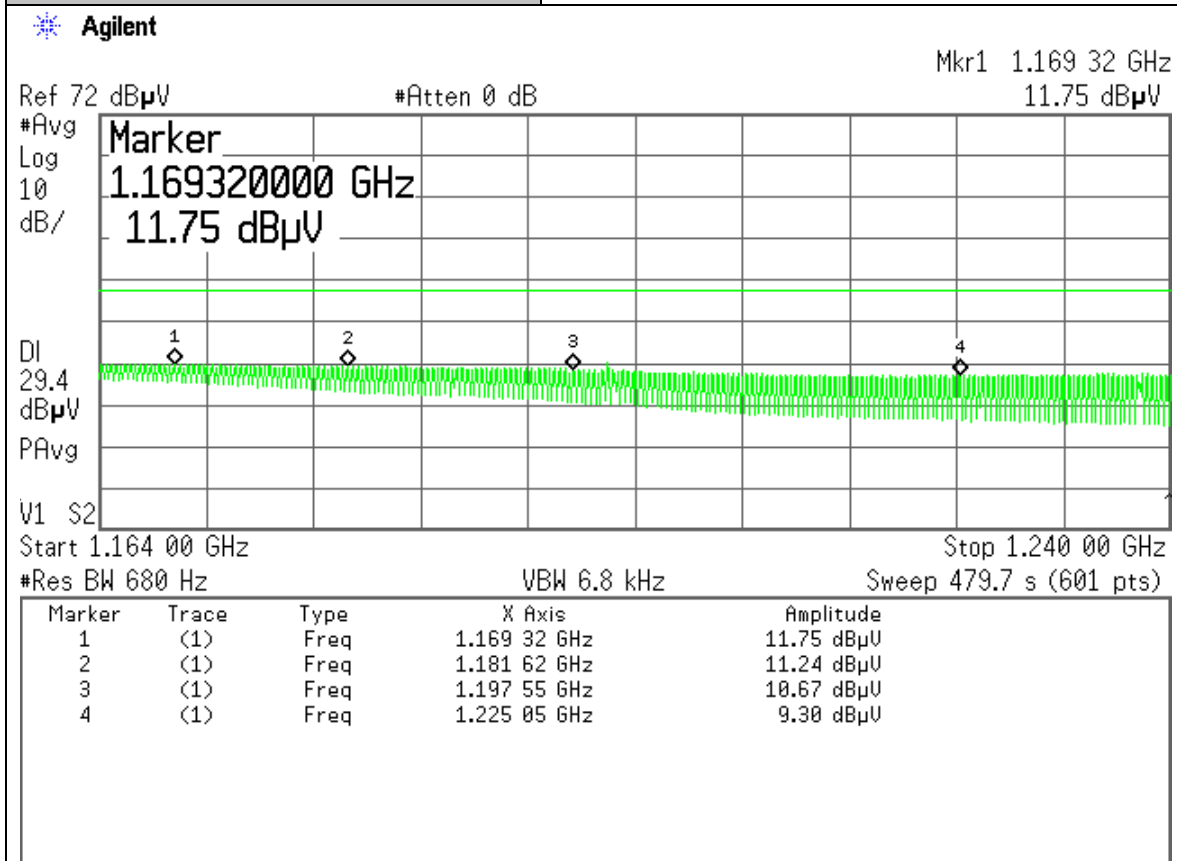
Worst Case Scenario: All maximum Field strength emissions were found at the following test set-up conditions:

Freq. (MHz)	H,V	SA Reading (dBuV/m)	Height (m)	Angle (degree)	1m Limit (dBuV/m)	Margin (dB)	Result
1169.32	H	11.75	1.1	315	29.4	-17.7	Pass
1181.62	H	11.24	1.1	000	29.4	-18.2	Pass
1197.55	H	10.67	1.1	315	29.4	-18.7	Pass
1225.05	H	9.30	1.1	315	29.4	-20.1	Pass
1562.32	H	10.73	1.1	315	29.4	-18.7	Pass
1566.91	H	10.67	1.1	000	29.4	-18.7	Pass
1582.37	H	10.90	1.1	000	29.4	-18.5	Pass
1593.26	H	10.40	1.1	315	29.4	-19.0	Pass
1166.15	V	12.23	1.1	180	29.4	-17.2	Pass
1173.13	V	11.98	1.1	180	29.4	-17.4	Pass
1184.25	V	11.01	1.1	180	29.4	-18.4	Pass
1225.05	V	7.84	1.1	135	29.4	-21.6	Pass
1562.06	V	12.33	1.1	135	29.4	-17.1	Pass
1569.29	V	11.73	1.1	135	29.4	-17.7	Pass
1580.58	V	13.13	1.1	180	29.4	-16.3	Pass
1592.07	V	12.99	1.1	180	29.4	-16.4	Pass

\* Digital Circuitry emissions do not fall under the requirements of this section.

<b>Project Number:</b>	0048-230710-01-FCC-IC
<b>EUT:</b>	CHASER XR
<b>S/N:</b>	020-23-000543
<b>Tested By:</b>	Wei Li
<b>Temperature:</b>	75°F
<b>Humidity:</b>	30%

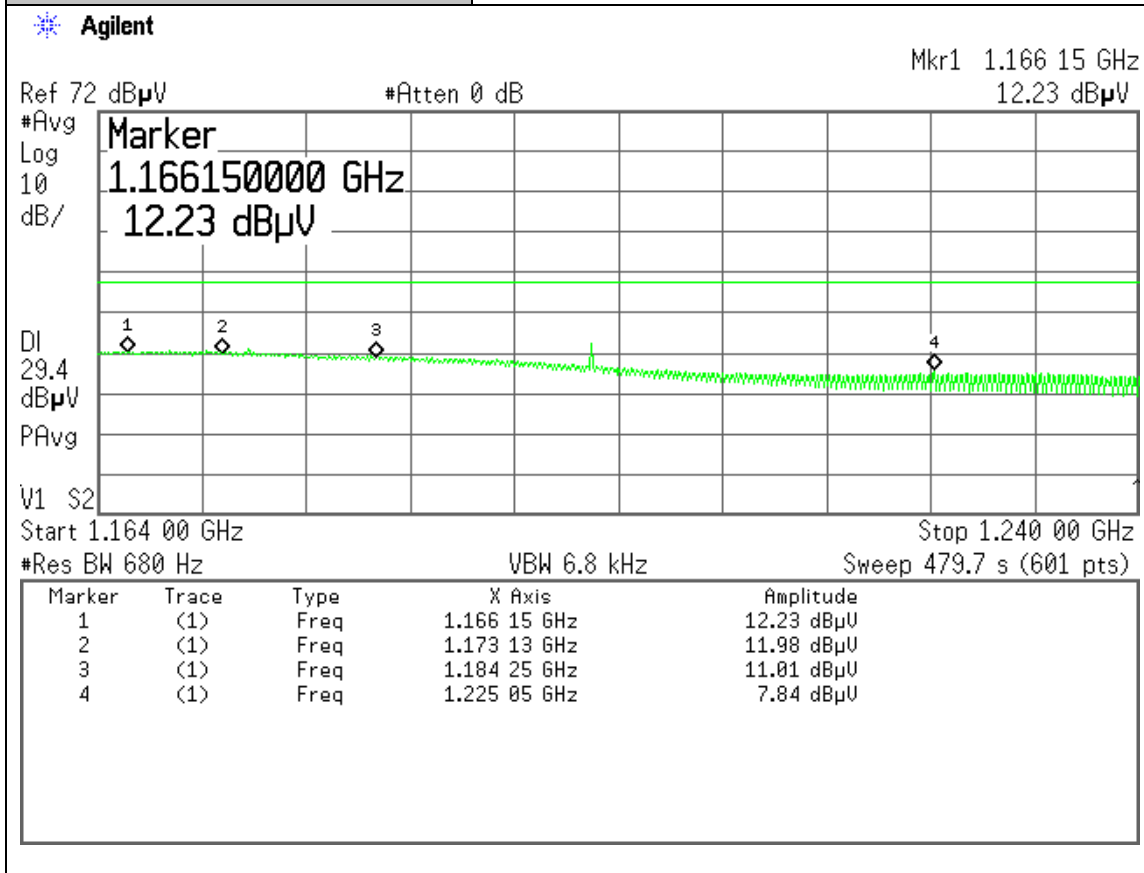
<b>Section:</b>	<i>Radiated Emissions in GPS Bands</i>
<b>Plot Name:</b>	Radiated Emissions in 1164-1240MHz Band H Polarity
<b>Configuration:</b>	Stand alone, Continue operation





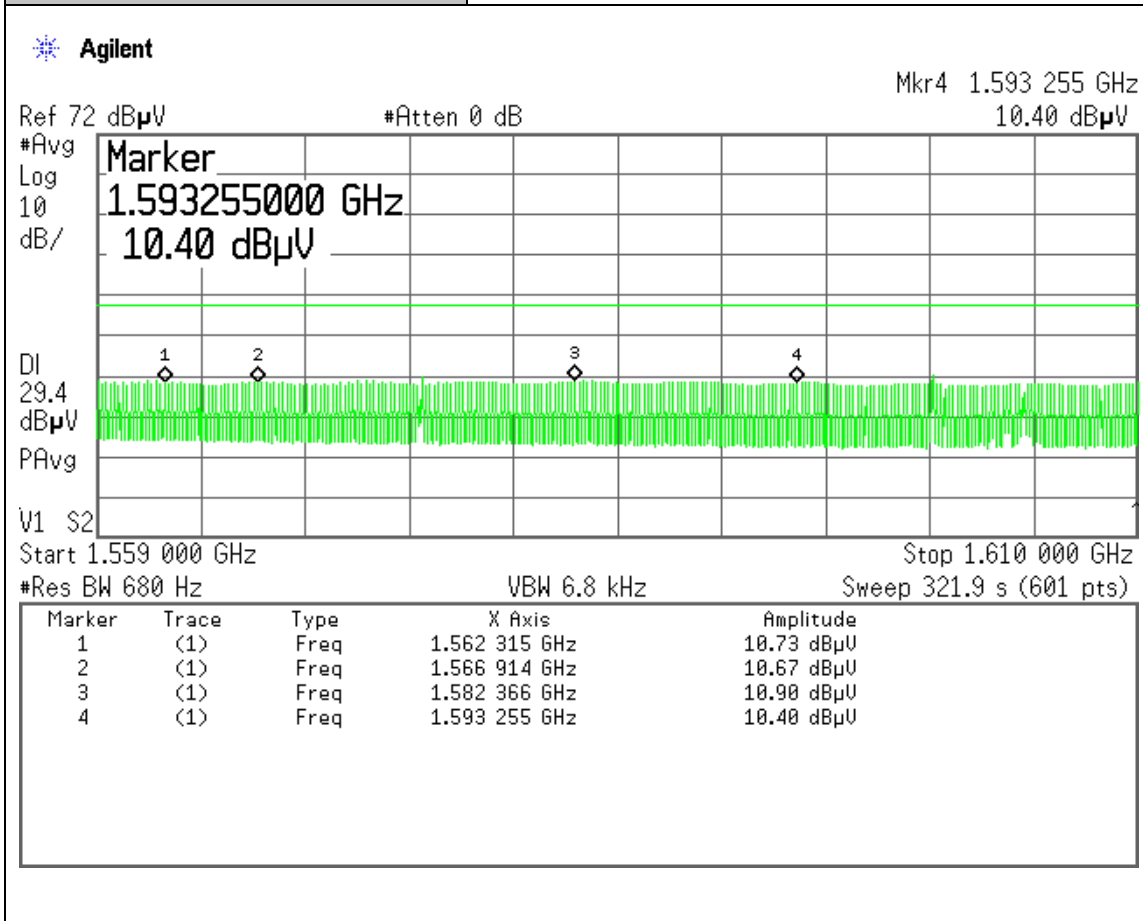
<b>Project Number:</b>	0048-230710-01-FCC-IC
<b>EUT:</b>	CHASER XR
<b>S/N:</b>	020-23-000543
<b>Tested By:</b>	Wei Li
<b>Temperature:</b>	75°F
<b>Humidity:</b>	30%

<b>Section:</b>	<i>Radiated Emissions in GPS Bands</i>
<b>Plot Name:</b>	Radiated Emissions in 1164-1240MHz Band V Polarity
<b>Configuration:</b>	Stand alone, Continue operation



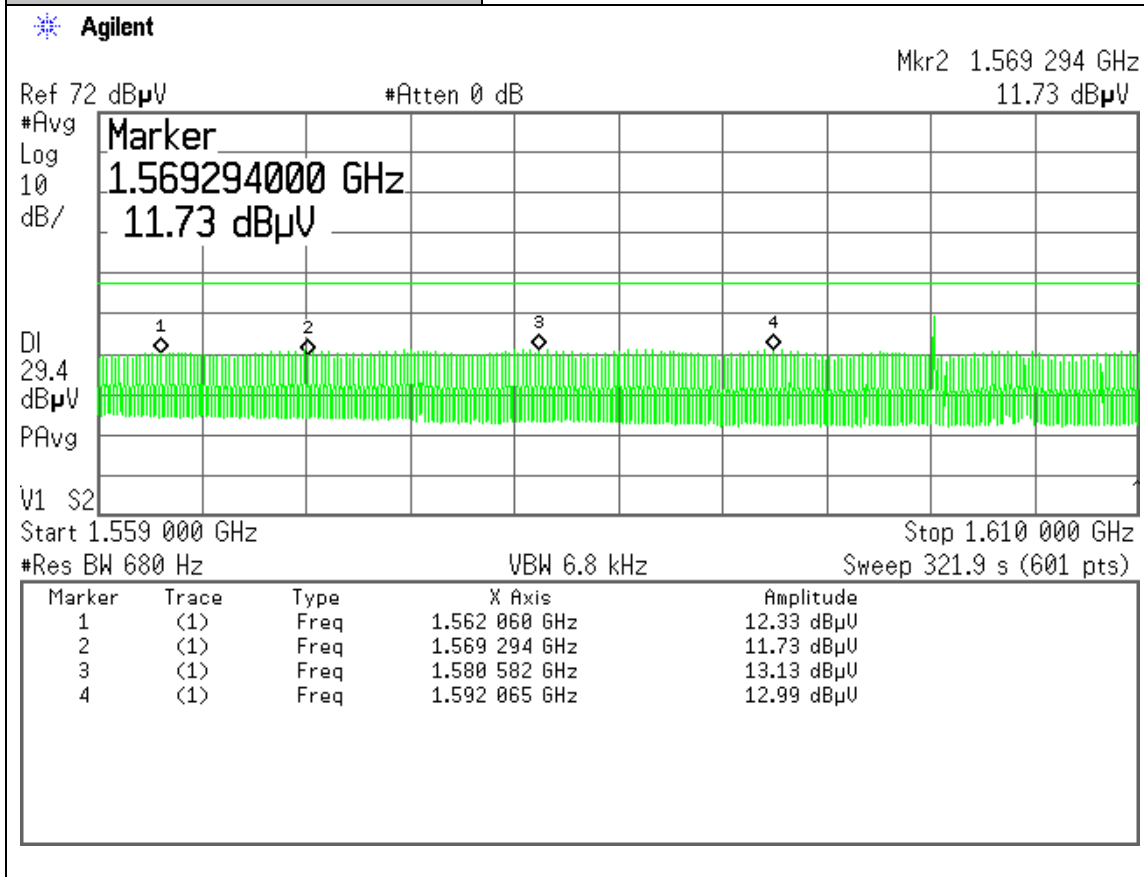
<b>Project Number:</b>	0048-230710-01-FCC-IC
<b>EUT:</b>	CHASER XR
<b>S/N:</b>	020-23-000543
<b>Tested By:</b>	Wei Li
<b>Temperature:</b>	75°F
<b>Humidity:</b>	30%

<b>Section:</b>	<i>Radiated Emissions in GPS Bands</i>
<b>Plot Name:</b>	Radiated Emissions in 1559-1610MHz Band H Polarity
<b>Configuration:</b>	Stand alone, Continue operation



<b>Project Number:</b>	0048-230710-01-FCC-IC
<b>EUT:</b>	CHASER XR
<b>S/N:</b>	020-23-000543
<b>Tested By:</b>	Wei Li
<b>Temperature:</b>	75°F
<b>Humidity:</b>	30%

<b>Section:</b>	<i>Radiated Emissions in GPS Bands</i>
<b>Plot Name:</b>	<b>Radiated Emissions in 1559-1610MHz Band V Polarity</b>
<b>Configuration:</b>	Stand alone, Continue operation



Test No.9

<b>Name of Test:</b>	<i>Highest Radiated Emission at f</i>	<b>Test Standard:</b>	<i>15.509(f) 15.209 &amp;RSS-220 6.2(g)</i>
<b>Tested By:</b>	David Tu	<b>Test Date:</b>	07/10/2023-07/31/2023

**Minimum Definition:**

**Standard:** For UWB devices where the frequency at which the highest radiated emission occurs,  $f_M$ , is above 960 MHz, there is a limit on the peak level of the emissions contained within a 50 MHz bandwidth centered on  $f_M$ .

**Limits:**

The peak emission level contained within a 50 MHz bandwidth centered on  $f_M$  must be limited to a maximum of 0 dBm EIRP.

EIRP limit  (dBm)	Field strength limit @ 3 meters for 50MHz RBW  (dBuV/m)  (dBμV/m)	Field strength limit @ 3 meters (measured with 3 MHz RBW)  (dBμV/m)
0	95.2	70.8

The limits were converted from EIRP to field strength at 3 meter according to FCC 15.503(k).

As the measurement was employed with a 3 MHz resolution bandwidth the applicable limit is adjusted with a  $20\log(1/50)$  dB factor.

$20\log(3/50) = -24.4$  dB. Therefore the 0dBm limit will be converted to -24.4 dBm with 3MHz RBW, i.e 70.8 dBuV/m field strength.

**Method of Measurement:** Tested at 3-meter OATS per ANSI C63.4  
Spectrum Analyzer Settings:  
RBW: 3MHz  
VBW:  $\geq 3 \times$  RBW  
Detector: Peak  
Span: As required  
Sweep: Auto

Test Procedure:

- 1) The EUT was placed on sandpit area filled with dry sand initially placed in front of the ground plane ( $0^\circ$  degree position).
- 2) The receiving antenna which varied from 1 to 4 m to find the highest emission is positioned 3 m away from the EUT.
- 3) The receiving antenna was positioned in horizontal polarization.
- 4) The measurements were made with the detector set to peak with a bandwidth of 3 MHz during monitoring the frequency range inside the UWB of the EUT.
- 5) At the worst case combination of the EUT operating mode and antenna height, the field strength measure was recorded.
- 6) The receiving antenna was positioned in vertical polarization and the steps 4 to 6 were repeated.
- 7) The EUT was rotating from  $0^\circ$  to  $360^\circ$  degrees with  $45^\circ$  step increment and the steps 4 to 7 was repeated.
- 8) Record the peak emission from the EUT.

**Test Result:**

**Complies**

**Test Data:**

<b>Project Number:</b>	0048-230710-01-FCC-IC
<b>EUT:</b>	CHASER XR
<b>S/N:</b>	020-23-000543
<b>Tested By:</b>	David Tu
<b>Temperature:</b>	75°F
<b>Humidity:</b>	30%

Worst Case Scenario: The maximum peak level of emission is found at the following test set-up conditions:

Applicable to Normal Mode:

Freq. (MHz)	H,V	SA Peak Reading At 3 meter (dBuV/m)	RBW	Reading correction		Limit (dBuV/m)	Margin (dB)	Result
1232.0*	V	51.7	3MHz	0		70.8	-19.1	Pass

Convert to 50MHz RBW, the max. peak power is 76.1dBuV/m @ 3m, i.e. -19.1dBm.

Test No.10

<b>Name of Test:</b>	<b><i>Technical Requirements Applicable to ALL UWB Devices</i></b>	<b>Test Standard:</b>	<b><i>15.521</i></b>
<b>Tested By:</b>	WEI LI	<b>Test Date:</b>	07/10/2023-07/31/2023

**Requirement**    **Description**

15.521(a)	The EUT is not employed for the operation of toys, operation onboard an aircraft, ship and satellite.
15.521(b)	Permanent attached antenna, no External radio frequency power amplifiers and antenna modifications are permitted.
15.521(c)	The Digital circuitry portion of the EUT has been tested and verified to comply with 47 CFR Part 15, subpart B.
15.521(d)	Considered
15.521(e)	The $f_M$ , frequency at which the highest radiated emission occurs is contained within the measured UWB bandwidth.
15.521(f)	The EUT is not intended to detection of tags or the transfer or data or voice information.
15.521(g)	Considered
15.521(h)	Considered
15.521(i)	Prohibition in Sections 2.201(f) and 15.5(d) of this chapter against Class B (damped wave) emissions is not applied.
15.521(j)	Battery operating device not connected to AC power lines.
15.521(a)	The EUT is not employed for the operation of toys, operation onboard an aircraft, ship and satellite.

**Test Result:**

**Complies**

**Test Data:**

**NA**

Test No.11

<b>Name of Test:</b>	<b><i>Coordination Requirement</i></b>	<b>Test Standard:</b>	<b><i>15.525</i></b>
<b>Tested By:</b>	Wei Li	<b>Test Date:</b>	07/10/2023-07/31/2023

**Minimum Standard:** The responsible party is properly informed about the required coordination requirement and provide correct information to the customers and users about their specific care and legislative obligations.

(See Important note for the US customers of the Installation Guide and User Manual)

**Method of Measurement:** (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 Administration.

(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 an imaging system is prohibited.

(f) The coordination of routine UWB operations shall not take longer than 15 business days from the receipt of the coordination request by NTIA.

**Test Result:**

**Test Data:** NA



Test No. 12

<b>Name of Test:</b>	<i>Antenna Requirement</i>	<b>Test Standard:</b>	<i>15.203&amp;15.204 &amp;RSS-GEN 7.1.4</i>
<b>Tested By:</b>	WEI LI	<b>Test Date:</b>	

**Minimum Standard:** An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply.

**Method of Measurement:** The antenna utilized by the device under test is an internal, non user replaceable unit.

**Test Result:** Complied with using an internal, non user replaceable Antenna

**Test Data:** NA

Test No.13

<b>Name of Test:</b>	<b>Radio Frequency Exposure</b>	<b>Test Standard:</b>	<b>FCC OET Bulletin 65 &amp; RSS-GEN</b>
<b>Tested By:</b>	WEI LI	<b>Test Date:</b>	07/10/2023-07/31/2023

**LIMITS for FCC RF Exposure Evaluation**

§1.1310 The criteria listed in Table 1 shall be used to evaluate the environmental impact of human exposure to radio-frequency (RF) radiation as specified in §1.1307(b), except in the case of portable devices which shall be evaluated according to the provisions of §2.1093 of this chapter.

TABLE 1—LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm <sup>2</sup> )	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposures				
0.3–3.0	614	1.63	* (100)	6
3.0–30	1842/f	4.89/f	* (900/f <sup>2</sup> )	6
30–300	61.4	0.163	f/300	6
300–1500			f/300	6
1500–100,000			5	6
(B) Limits for General Population/Uncontrolled Exposure				
0.3–1.34	614	1.63	* (100)	30
1.34–30	824/f	2.19/f	* (180/f <sup>2</sup> )	30

TABLE 1—LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)—Continued

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm <sup>2</sup> )	Averaging time (minutes)
30–300	27.5	0.073	0.2	30
300–1500			f/1500	30
1500–100,000			1.0	30

f = frequency in MHz  
 \* = Plane-wave equivalent power density  
 NOTE 1 TO TABLE 1: Occupational/controlled limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure. Limits for occupational/controlled exposure also apply in situations when an individual is transient through a location where occupational/controlled limits apply provided he or she is made aware of the potential for exposure.  
 NOTE 2 TO TABLE 1: General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or can not exercise control over their exposure.

**LIMITS per 2.5.2 Exemption Limits for Routine Evaluation – RF Exposure Evaluation**

RF exposure evaluation is required if the separation distance between the user and/or bystander and the device's radiating element is greater than 20 cm, except when the device operates as follows:

- below 20 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 1 W (adjusted for tune-up tolerance);
- at or above 20 MHz and below 48 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than  $4.49/f^{0.5}$  W (adjusted for tune-up tolerance), where f is in MHz;
- at or above 48 MHz and below 300 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 0.6 W (adjusted for tune-up tolerance);
- at or above 300 MHz and below 6 GHz and the source-based, time-averaged maximum

**e.i.r.p. of the device is equal to or less than  $1.31 \times 10^{-2} f^{0.6834}$  W (adjusted for tune-up tolerance), where  $f$  is in MHz;**  
• at or above 6 GHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 5 W (adjusted for tune-up tolerance).

In these cases, the information contained in the RF exposure technical brief may be limited to information that demonstrates how the e.i.r.p. was derived.

### CALCULATIONS for MPE distance and Power Density

Given

$$E = \sqrt{(30 * P * G) / d}$$

and

$$S = E^2 / 3770$$

where

E = Field Strength in Volts/meter

P = Power in Watts

G = Numeric

antenna gain

d = Distance in

meters

S = Power Density in milliwatts/square centimeter

Combining equations and rearranging the terms to express the distance as a function of the remaining variables yields:

$$d = \sqrt{((30 * P * G) / (3770 * S))}$$

Changing to units of Power to mW and Distance to

cm, using:  $P(\text{mW}) = P(\text{W}) / 1000$  and

$d(\text{cm}) = 100 * d(\text{m})$

yields

$$d = 100 * \sqrt{((30 * (P / 1000) * G) / (3770 * S))}$$

$$d = 0.282 * \sqrt{(P * G / S)}$$

where

d = distance in cm

P = Power in mW

G = Numeric antenna gain

S = Power Density in  $\text{mW}/\text{cm}^2$

Substituting the logarithmic form of power and

gain using:  $P(\text{mW}) = 10^{(P(\text{dBm}) / 10)}$  and

$G(\text{numeric}) = 10^{(G(\text{dBi}) / 10)}$

yields

$$d = 0.282 * 10^{((P + G) / 20) / \sqrt{S}}$$

Equation (1)

$$S = 0.0795 * 10^{((P + G) / 10) / d^2}$$

Equation (2)

where

d = MPE distance in cm

P = Power in dBm

G = Antenna Gain in dBi

S = Power Density Limit in  $\text{mW}/\text{cm}^2$

Equation (1) and the measured Output power is used to calculate the MPE distance.  
Equation (2) and the measured Output power is used to calculate the Power density.

**APPLICABLE LIMITS**

**RF Exposure** for separation  $\geq$  20cm

FCC: From §1.1310 Table 1 (B), for Public  $S = 1.0 \text{ mW/cm}^2$  ; for Professional,  $S = 5.0 \text{ mW/cm}^2$   
 IC: With formula of  $1.31 \times 10^{-2} f^{0.6834} \text{ W}$ , more restricted EIRP limit value are 1.37W at 902MHz, 2.67W at 2400MHz.

**RESULTS**

No non-compliance noted.

**For GPR UWB Transmitter only:**

1-mW Test Exemption:  
 Per § 1.1307(b)(3)(i)(A), a single RF source is exempt RF device (from the requirement to show data demonstrating compliance to RF exposure limits, as previously mentioned) if the available maximum time-averaged power is no more than 1 mW, regardless of separation distance. This exemption applies to all operating configurations and exposure conditions, for the frequency range 100 kHz to 100 GHz, regardless of fixed, mobile, or portable device exposure conditions.

For this EUT, max emission level is under the 0dBm limit set in Part 15F. No RF hazard need to be concerned.

The max. power density can be obtain by using the max.  $P+G=0\text{dBm}$  and  $d=20\text{cm}$ , and plug all three items into equation (2), yielding,

<b>Power Density Limit (mW/cm<sup>2</sup>)</b>	<b>Max. Output Power+ Antenna] Gain (dBm)</b>	<b>Calculated Power Density (mW/ cm<sup>2</sup>)</b>
1.0/5.0	0	0.0002

**For UWB and WiFi Transmitters transmitting simultaneously:**

The following evaluation is for combined MPE compliance: While  $d=20\text{cm}$ , if

$$[ Pd(1) / LPd(1) ] + [ Pd(2) / LPd(2) ] + \dots + [ Pd(n) / LPd(n) ] < 1$$

then, the device complies with FCC’s RF radiation exposure limit for general population as a mobile device. Where;

$Pd(n)$  = Power density of  $n^{\text{th}}$  transmitter at 20cm.

$LPd(n)$  = Power density limit for the  $n^{\text{th}}$  transmitter

From WiFi module's MPE report (FCC ID: Z9W-RMB):

Frequency (MHz)	Maximum Output power (dBm)	Maximum Output power (mW)	Antenna Gain (dBi)	Antenna Gain (numeric)	Distance (cm)	Result (mW/cm <sup>2</sup> )	Limits for General Population/ Uncontrolled Exposure (mW/cm <sup>2</sup> )
2.4G WIFI for Antenna 1							
802.11b mode							
2462	22.64	183.65	10	10	20	0.37	1

Note:

1. Just the worst case mode was shown in report.

We can use reported 0.37mW/ cm<sup>2</sup> as the max. power density for WiFi transmission.  
 Therefore

$$[ Pd(1) / LPd(1) ] + [ Pd(2) / LPd(2) ] = 0.0002/1 + 0.37/1 = 0.37 < 1$$

The EUT meets RF radiation exposure limit for general population as a mobile device.

For IC Application: The UWB and WiFi module meet the most restricted EIRP limit value are 0.6W at 120MHz (for UWB 120-1500MHz Band), 2.67W at 2400MHz (for WiFi) by the value of max. 1mW for UWB and 1.84W (22.64+10=32.64dBm).

Test No.14

<b>Name of Test:</b>	<i>Conducted Emissions</i>	<b>Test Standard:</b>	<i>15.507 &amp;RSS-GEN</i>
<b>Tested By:</b>	-	<b>Test Date:</b>	-

**Minimum Standard:** 15.507 &RSS-GEN  
 Limit

Frequency Range (MHz)	Limits (dBµV)	
	Quasi-Peak	Average
0.15 to 0.50	66 to 56*	56 to 46*
0.50 to 5.0	56	46
5.0 to 30.0	60	50

\* Decreases with the logarithm of the frequency.

**Method of Measurement:** Test measurements were made in accordance with ANSI C63.4-2003, Standard Methods of Measurement of Radio Noise Emissions from Low-Voltage Electrical and Electronics Equipment in the Range of 9 kHz to 40 GHz.

Spectrum Analyzer Setting:  
 Frequency Range: 150KHz to 30MHz  
 RBW: 9KHz  
 VBW: 30KHz  
 Detector: Peak/QP/Average

**Test Result:** NA  
 (The EUT is only powered via a lithium-ion battery which is remotely recharged)

**Test Data:** NA

Test No.15

<b>Name of Test:</b>	<i>Transmission Duration</i>	<b>Test Standard:</b>	<i>15.509(c)&amp; 15.519(a)(1)</i>
<b>Tested By:</b>	-	<b>Test Date:</b>	-

**Minimum** 15.509 (c)

**Standard:** A GPR that is designed to be operated while being hand held and a wall imaging system shall contain a manually operated switch that causes the transmitter to cease operation within 10 seconds of being released by the operator. In lieu of a switch located on the imaging system, it is permissible to operate an imaging system by remote control provided the imaging system ceases transmission within 10 seconds of the remote switch being released by the operator.

15.519(a)(1)---for hand held UWB Systems

A UWB device operating under the provisions of this section shall transmit only when it is sending information to an associated receiver. The UWB intentional radiator shall cease transmission within 10 seconds unless it receives an acknowledgement from the associated receiver that its transmission is being received. An acknowledgment of reception must continue to be received by the UWB intentional radiator at least every 10 seconds or the UWB device must cease transmitting.

**Method of Measurement:** Functional Check

**Test Result:** **Complies**

**Test Data:** De-activation takes place within 10 seconds of the control system being switched off/not active or released by the operator or an acknowledgment of reception was received by the UWB intentional radiator within 10 seconds. Procedure is documented in operational description manual.

<b>Project Number:</b>	0048-230201-01
<b>EUT:</b>	CHASER XR
<b>S/N:</b>	020-23-000543
<b>Tested By:</b>	Wei Li
<b>Temperature:</b>	75°F
<b>Humidity:</b>	30%

<b>Section:</b>	<i>Transmission Duration</i>
<b>Plot Name:</b>	Transmission Duration with Switch Control ( worst case)
<b>Configuration:</b>	Stand alone, Software Control or Power Switch ( worst case)

