Advanced Compliance Laboratory

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Electromagnetic Emission Compliance Test Report

Equipment Under Test (EUT)	GroundSense
Model	166-53-05NA-E
Applicant	GPR
In Accordance With	FCC Part 15, Subpart F Industry Canada RSS-220 (Issue 1/2009+A1/2018)
Tested by	Advanced Compliance Laboratory, Inc. 210 Cougar Court Hillsborough, New Jersey 08844
Authorized by	Wei Li Lab Manager Signature
Date	November 9, 2023
AC Lab Report Number	0048-231023-01-FCC-IC

Lab Code:200101-0

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

Table of Contents

Section 1. Summary of Test Results

Manufacturer: GPR
Product Name: GroundSense

Model/Parts No. : 166-53-05NA-E

S/N: PT001

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+A1/2018).

☐ 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

Summary of Test Data

Compliance Requirement	FCC & IC Rule Part	Test No. in Section 4	Result
Cross Reference	15.505 &RSS-GEN	1	Complies
Marketing of UWB Equipment	15.507 &RSS-GEN	2	Complies
Pulse Repetition Frequency(PRF)	15.509 &RSS-220 6.2	3	**
UWB Bandwidth	15.509(a) &RSS-220 6.2.1(a)	4	Complies
General Operational Requirements for LF Imaging System	15.509(b) &RSS-220 6	5	**
Spurious Radiated Emissions≤960MHz	15.509(d) 15.209 &RSS-220 3.4, 6.2(c), 6.2(d)	6	Complies
Spurious Radiated Emissions>960MHz	15.509(d) 15.209 &RSS-220 3.4, 6.2(c), 6.2(d)	7	Complies
Radiated Emissions in GPS Bands	15.509(e) 15.209 &RSS-220 6.2(e)	8	Complies
Highest Radiated Emission at f_M	15.509(f) 15.209 &RSS-220 6.2(g)	9	**
Technical Requirements Applicable to All UWB Devices	15.521	10	Complies
Coordination Requirement	15.525	11	N/A
Antenna Requirement	15.203& 15.204 &RSS-GEN 7.1.4	12	Complies
Radio Frequency Exposure	FCC OET Bulletin 65 &RSS-GEN	13	Complies
Conducted Emissions	15.507 &RSS-GEN	14	*
Transmission Duration	15.509(c) &15.519(a)(1)	15	**
Additional Tests per Wavier DA 23-1041 Conditions	DA 23-1041, Sec. 19.2 & 19.3	16	Complies

***** NOT APPLICABLE to the EUT as it is a battery-powered device;
** NOT APPLICABLE based on product design.

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.

Four specific test set ups in the 3m/10m open site of Advanced Compliance Lab are evaluated for the purpose of uncertainty calculations. Six important factors are considered: antenna, cable, EMI receiver, site imperfections, LISN, and system repeatability. The following table shows the uncertainty budget for radiated emission and conducted emission testing measurements.

Contribution*	Prob. Dist.	Uncertainty (d B)	Uncertainty (d B)	Uncertainty (d B)	Uncertainty (d B)
		Biconical	Log-Per.	Horn Ant.	Conducted
Antenna factor calibration	nom. k=2	±0.93	±1.2	±0.37	N/A
Cable loss calibration	norm.k=2	±0.25	±0.25	±0.5	±0.25
LISN calibration	rect.	N/A	N/A	N/A	±0.98
EMI receiver specification	rect.	±1.3	±1.3	±2.0	±1.3
Site imperfections	rect.	±1.64	±1.64	±2.0	N/A
System repeatability	norm.k=2	±0.5	±0.5	±0.5	±0.25
Combined Std. Uncertainty u_c	norm.	±2.36	±2.48	±2.94	±1.67
Expanded Uncertainty U_{lab}	norm.k=2	±4.72	±4.95	±5.88	±3.33

Decision Rule For Emission Tests: Pass or Fail
Pass: when emission level is ON or LESS THAN the related standard limit with zero dB margin OR customer specified margin to the limit;
Fail: when emission level is LESS THAN the related standard limit with zero dB margin OR customer specified margin to the limit.

Wei Li
Lab Manager
Advanced Compliance Lab

Date: November 9, 2023

Section 2. General Equipment & Test Configuration

2.1. EUT Specification

EUT	GroundSense, Model No.: **166-53-05NA-E** manufactured by GPR. This GPR is an FMCW Radar system intended to be used in subsurface imaging for navigation and localization of automated vehicles.
Supply Voltage	12.8VDC, provided by Lithium Ion Rechargeable Battery
Operating Frequency	Specific Frequency Range: 137 MHz to 400 MHz
-10dB UWB Bandwidth	263.5MHz (Fractional BW=0.98)
Modulation Type	LFM/FMCW
Peak Emissions in a 50 MHz Bandwidth	Max. peak emission frequency is Under 1GHz
Antenna	Multiple Dipole Antennas
Hardware Version	000818
Software Version	4.0.7.d

2.2. Description of Operation

The system performs time domain reflectometry by radiating an FMCW radar “chirp” with a cycle frequency of up to 130 Hz from a transmitting dipole (TX dipole) into the drive path immediately under a vehicle mounted with the technology. Transitions between materials exhibiting different wave impedance through which the electromagnetic wave travels, causes the wave to be reflected. These reflections are received by the receiving dipole (RX dipole), is digitized via an onboard ADC, and

sampled by the instrument. In the field, the system is powered from the vehicle's DC power delivery system.

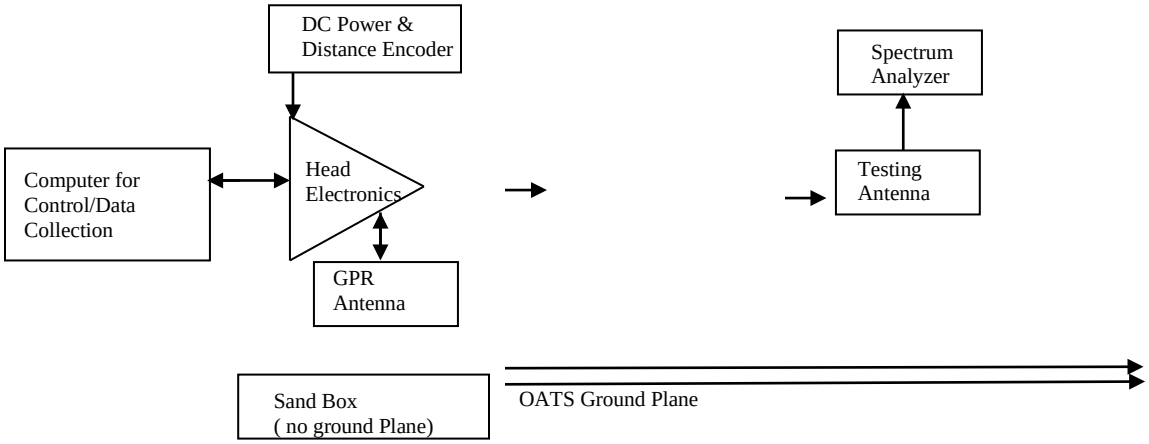
2.3. System Diagram

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:

- Operating Frequency Range in US: 137 MHz – 322MHz; 335.4 MHz - 400 MHz

Non-RF Operating Frequencies:

- 400/300/100/25 MHz digital clock
- 0.4 MHz analog signal
- 2.1/2.5 MHz switched power supply
- 33.3 MHz processor oscillator
- 25 MHz Ethernet oscillator
- 48 MHz USB oscillator

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 is 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	25/09/24
Agilent	E4440A	US40420700	3Hz-26.5GHz Spectrum Analyzer	17/06/4
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

Name of Test:	*Cross Reference*	Test Standard:	*15.505 &RSS-GEN*
Tested By:	WEI LI	Test Date:	10/23/2023-11/9/2023

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**

Project Number:	0048-231023-01-FCC-IC
EUT:	166-53-05NA-E
S/N:	PT001
Tested By:	David Tu
Temperature:	65°F
Humidity:	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 15.109 Class A 10m Limit (dBuV/m)	Margin (dB)	Result
44.0*	H	46.0	1.8	000	49.6	-3.6	Pass
48.7	H	42.1	1.8	090	49.6	-7.5	Pass
69.5	H	44.8	1.8	090	49.6	-4.8	Pass
102.7	H	42.8	1.6	315	54.0	-11.2	Pass
144.3	H	45.9	1.8	090	54.0	-8.1	Pass
150	H	34.3	1.8	090	54.0	-19.7	Pass
175	H	35.3	1.8	180	54.0	-18.7	Pass
200	H	41.6	1.8	090	54.0	-12.4	Pass
375	H	34.6	1.6	315	56.9	-22.3	Pass
400	H	37.1	1.1	090	56.9	-19.8	Pass
450	H	40.9	1.0	135	56.9	-16	Pass
500	H	46.9	1.0	045	56.9	-10	Pass
675	H	35.9	1.0	045	56.9	-21	Pass
900	H	45.5	1.0	180	56.9	-11.4	Pass
950	H	43.5	1.0	045	56.9	-13.4	Pass
39.8*	V	46.8	1.2	090	49.6	-2.8	Pass
50.1*	V	45.5	1.2	180	49.6	-4.1	Pass
81.9	V	42.6	1.2	090	49.6	-7	Pass
102.7*	V	46.3	1.2	315	54.0	-7.7	Pass
144.3*	V	42.2	1.2	090	54.0	-11.8	Pass
150	V	31.9	1.2	090	54.0	-22.1	Pass
175	V	35.2	1.2	045	54.0	-18.8	Pass
200	V	41.8	1.1	000	54.0	-12.2	Pass
375	V	38.4	1.1	090	56.9	-18.5	Pass

400	V	38.8	1.1	225	56.9	-18.1	Pass
450	V	35.9	1.1	225	56.9	-21	Pass
500	V	46.7	1.1	135	56.9	-10.2	Pass
675	V	39.5	1.1	045	56.9	-17.4	Pass
950	V	44.8	1.1	180	56.9	-12.1	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

Name of Test:	***Marketing of UWB Equipment***	**Test Standard:**	***15.507 &RSS-GEN***
Tested By:	WEI LI	**Test Date:**	10/23/2023-11/9/2023

Minimum Standard: 15.507/ 2.909
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

Name of Test:	***Pulse Repetition Frequency (PRF)***	**Test Standard:**	***15.509(d) &RSS-220 6.2***
Tested By:	WEI LI	**Test Date:**	10/23/2023-11/9/2023

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

PRF declared by applicant: N/A

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

Test Result: **Complies**

Test Data: **N/A**

Test No.4

Name of Test:	***UWB Bandwidth***	**Test Standard:**	***15.509(a) 15.503(a) &RSS-220 6.2.1(a)***
Tested By:	WEI LI	**Test Date:**	10/23/2023-11/9/2023

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):

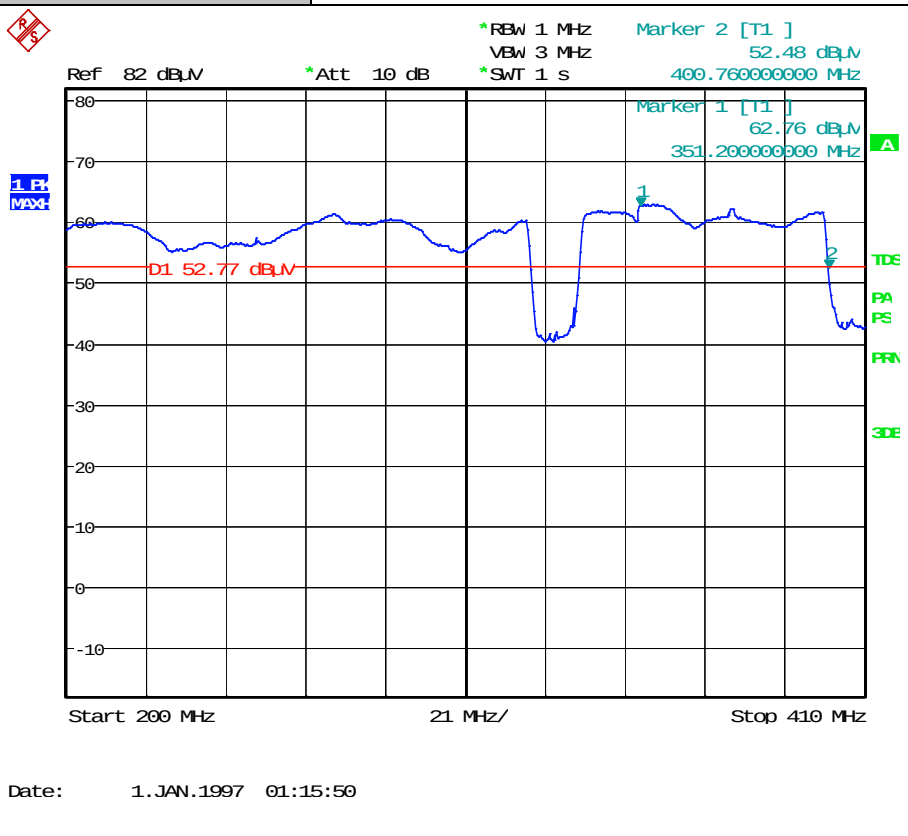
f_M	The highest emission peak	351.2
f_H	10 dB below the highest peak	400.7
f_L	10 dB above the highest peak	137.2
f_C	Calculated: $(f_H + f_L)/2$	268.95
Bandwidth	Calculated: $(f_H - f_L)$	263.5
Fractional BW	Calculated: $2*(f_H - f_L)/(f_H + f_L)$	0.98

Note: The Fraction Bandwidth is greater than 0.2.

Measurement Plots:

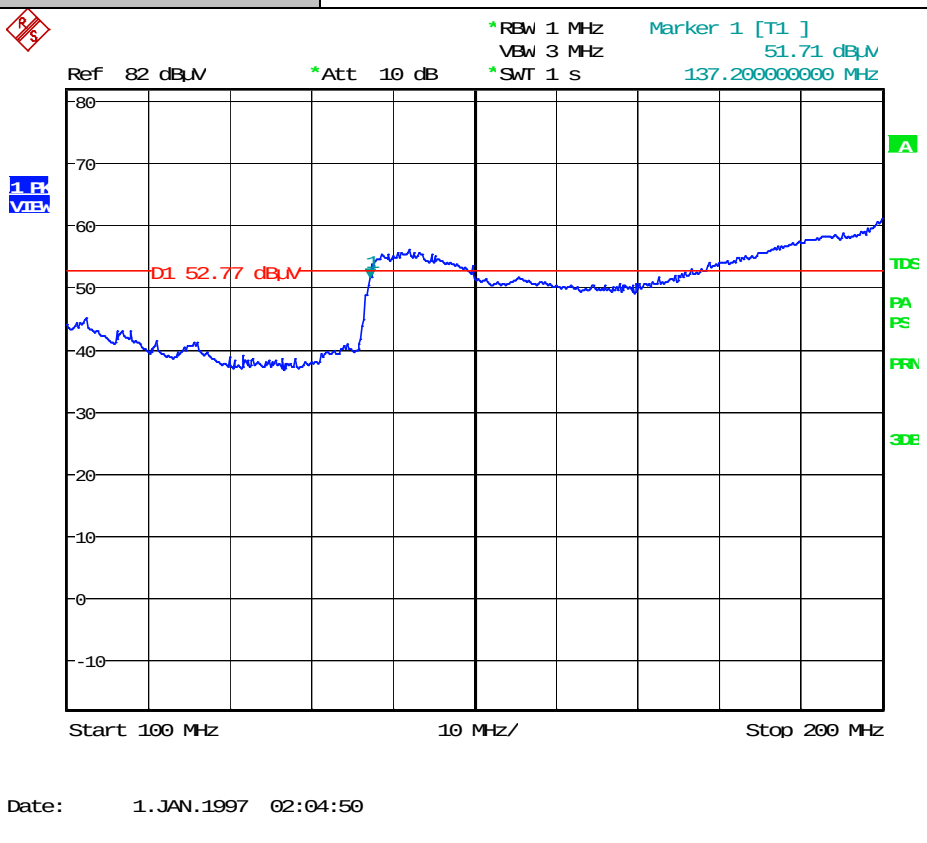
Project Number:	0048-231023-01-FCC-IC
EUT:	166-53-05NA-E
S/N:	PT001
Tested By:	Wei Li
Temperature:	65°F
Humidity:	30%

Section:	**UWB Bandwidth**
Plot Name:	**-10dB UWB Bandwidth Upper edge**
Configuration:	Stand alone, Continue operation



Project Number:	0048-231023-01-FCC-IC
EUT:	166-53-05NA-E
S/N:	PT001
Tested By:	Wei Li
Temperature:	65°F
Humidity:	30%

Section:	**UWB Bandwidth**
Plot Name:	**-10dB UWB Bandwidth Lower edge**
Configuration:	Stand alone, Continue operation



Test No.5

Name of Test:	***General Operational Requirements for LFIS***	**Test Standard:**	***15.509(b) &RSS-220 6***
Tested By:	WEI LI	**Test Date:**	10/23/2023-11/9/2023

Minimum Standard: 15.509(b) &RSS-220 6
Operation under the provisions of this section is limited to GPRs 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

Name of Test:	***Spurious Radiated Emissions ≤960MHz***	**Test Standard:**	***15.509(d) 15.209 &RSS-220 3.4, 6.2(c), 6.2(d)***
Tested By:	David Tu	**Test Date:**	10/23/2023-11/9/2023

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: ≥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**

Project Number:	0048-231023-01-FCC-IC
EUT:	166-53-05NA-E
S/N:	PT001
Tested By:	David Tu
Temperature:	65°F
Humidity:	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
138.2	H	40.1	1.8	090	43.5	-3.4	Pass
149.5	H	39.0	1.8	090	43.5	-4.5	Pass
170.6	H	39.5*	1.8	045	43.5	-4.0	Pass
173.4	H	35.1*	1.8	090	43.5	-8.4	Pass
189.22	H	40.5*	1.8	090	43.5	-3.0	Pass
192.16	H	41.0*	1.8	270	43.5	-2.5	Pass
193.0	H	41.3*	1.8	270	43.5	-2.2	Pass
197.3	H	41.4*	1.8	270	43.5	-2.1	Pass
210.9	H	42.3*	1.0	090	43.5	-1.2	Pass
218.5	H	42.3*	1.0	090	46.0	-3.7	Pass
237.8	H	42.9*	1.0	090	46.0	-3.1	Pass
261.7	H	43.7*	1.0	270	46.0	-2.3	Pass
288.2	H	44.9*	1.0	270	46.0	-1.1	Pass
294.9	H	43.7*	1.0	090	46.0	-2.3	Pass
311.7	H	43.5*	1.0	090	46.0	-2.5	Pass
339.9	H	42.2*	1.0	090	46.0	-3.8	Pass
357.1	H	44.0*	1.0	090	46.0	-2	Pass
362.5	H	44.2*	1.0	090	46.0	-1.8	Pass
372.2	H	43.9*	1.0	090	46.0	-2.1	Pass

138.10	V	38.4*	1.0	000	43.5	-5.1	Pass
149.52	V	38.6*	1.0	000	43.5	-4.9	Pass
176.62	V	41.8*	1.0	000	43.5	-1.7	Pass
189.64	V	39.8*	1.1	000	43.5	-3.7	Pass
191.6	V	38.0*	1.0	000	43.5	-5.5	Pass
195.4	V	43.0*	1.0	000	43.5	-0.5	Pass
197.63	V	43.3*	1.0	000	43.5	-0.2	Pass
205.9	V	42.2*	1.1	000	43.5	-1.3	Pass
262.6	V	41.3	1.1	000	46.0	-4.7	Pass
272.8	V	42.0*	1.1	000	46.0	-4.0	Pass
278.1	V	42.4*	1.1	000	46.0	-3.6	Pass
288.6	V	41.6*	1.1	000	46.0	-4.4	Pass
308.4	V	42.3*	1.1	180	46.0	-3.7	Pass
339.0	V	44.9*	1.1	180	46.0	-1.1	Pass
341.1	V	44.4*	1.1	190	46.0	-1.6	Pass
342.0	V	44.1*	1.1	180	46.0	-1.9	Pass
351.6	V	44.3*	1.1	000	46.0	-1.7	Pass
355.0	V	41.3*	1.1	180	46.0	-4.7	Pass
357.9	V	43.9*	1.1	180	46.0	-2.1	Pass
365.1	V	42.3*	1.1	180	46.0	-3.7	Pass
373.8	V	40.7*	1.1	180	46.0	-5.3	Pass

*QP reading for RF ON

**Emissions from Digital circuitry are excluded for meeting FCC Part 15 F limit.

Test No.7

Name of Test:	***Spurious Radiated Emissions >960MHz***	**Test Standard:**	***15.509(d) 15.209 &RSS-220 3.4, 6.2(c), 6.2(d)***
Tested By:	David Tu	**Test Date:**	10/23/2023-11/9/2023

Minimum Standard: Definition:
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: ≥3x 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**

Project Number:	0048-231023-01-FCC-IC
EUT:	166-53-05NA-E
S/N:	PT001
Tested By:	David Tu
Temperature:	65°F
Humidity:	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 @1m (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
1007.6	H	27.2	1.0	090	29.9	-2.7	Pass
1201.1	H	27.4	1.0	090	29.9	-2.5	Pass
1338.0	H	27.1	1.0	090	29.9	-2.8	Pass
1560.8	H	28.7	1.0	090	29.9	-1.2	Pass
1007.6	V	26.6	1.0	000	29.9	-3.3	Pass
1192.6	V	27.7	1.0	000	29.9	-2.2	Pass
1265.8	V	27.2	1.0	000	29.9	-2.7	Pass
1569.8	V	28.5	1.0	000	29.9	-1.4	Pass

**Emissions from Digital circuitry are excluded for meeting FCC Part 15F limit.

Test No.8

Name of Test:	***Radiated Emissions in GPS Bands***	**Test Standard:**	***15.509(e) 15.209 &RSS-220 6.2(e)***
Tested By:	David Tu	**Test Date:**	10/23/2023-11/9/2023

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) (dBm)	Field strength @ 3 meters (1 MHz BW) (dBµV/m)	Field strength @ 1 meters (1 MHz BW) (dBµV/m)
1164-1240	-75.3	19.9	29.4
1559-1610	-75.3	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**

Project Number:	0048-231023-01-FCC-IC
EUT:	166-53-05NA-E
S/N:	PT001
Tested By:	David Tu
Temperature:	65°F
Humidity:	30%

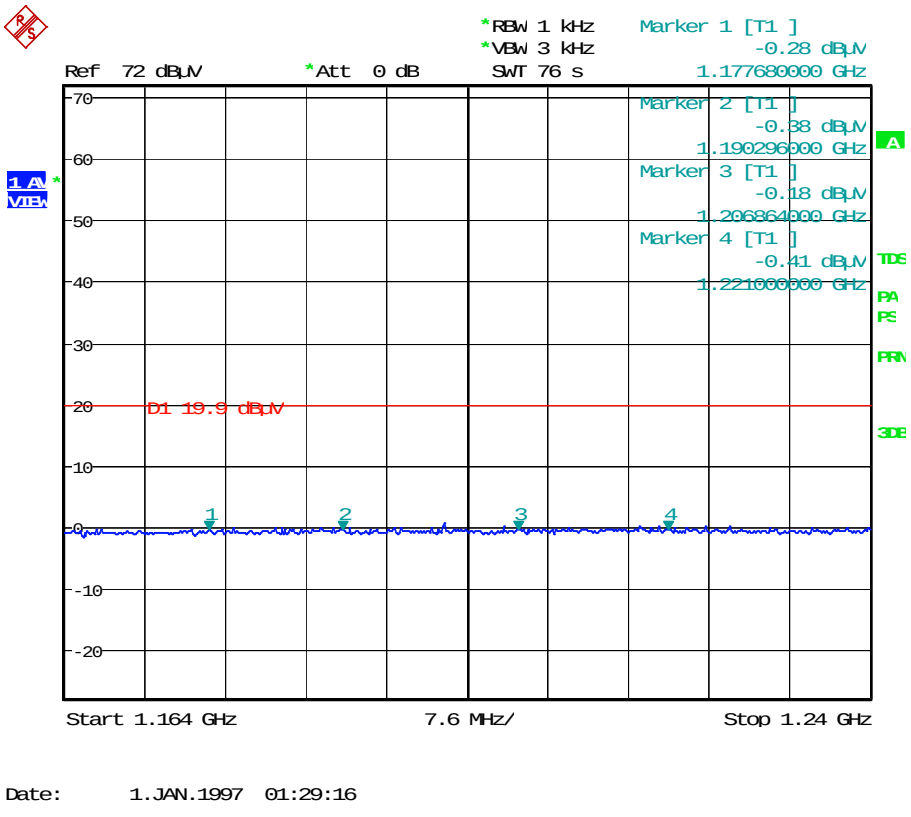
Worst Case Scenario: All maximum Field strength emissions were found at the following test set-up conditions:

Freq. (MHz)	H,V	SA Reading (dBuV/m)	Height (m)	Angle (degree)	1m Limit (dBuV/m)	Margin (dB)	Result
1117.7	H	-0.28	1.1	000	29.4	-29.68	Pass
1190.3	H	-0.38	1.1	000	29.4	-29.78	Pass
1206.9	H	-0.18	1.1	000	29.4	-29.58	Pass
1331.0	H	-0.41	1.1	000	29.4	-29.81	Pass
1573.1	H	0.47	1.1	000	29.4	-28.93	Pass
1583.0	H	0.73	1.1	000	29.4	-28.67	Pass
1600.3	H	0.53	1.1	000	29.4	-28.87	Pass
1624.1	H	1.34	1.1	000	29.4	-28.06	Pass
1168.9	V	-0.64	1.1	135	29.4	-30.04	Pass
1188.9	V	-0.81	1.1	135	29.4	-30.21	Pass
1218.0	V	-0.41	1.1	135	29.4	-29.81	Pass
1335.6	V	-0.40	1.1	135	29.4	-29.8	Pass
1564.7	V	0.80	1.1	135	29.4	-28.6	Pass
1583.6	V	0.98	1.1	135	29.4	-28.42	Pass
1603,1	V	1.04	1.1	135	29.4	-28.36	Pass
1637.3	V	0.92	1.1	135	29.4	-28.48	Pass

* Digital signals with narrowband and related to the microprocessor / clocks do not fall under the requirements of this section.

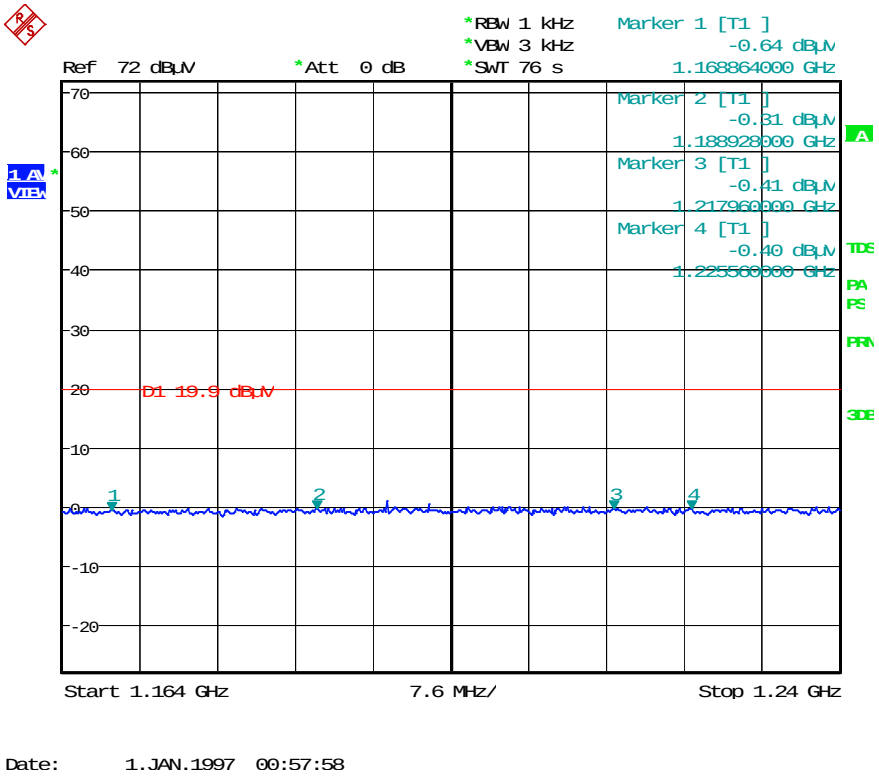
Project Number:	0048-231023-01-FCC-IC
EUT:	166-53-05NA-E
S/N:	PT001
Tested By:	Wei Li
Temperature:	65°F
Humidity:	30%

Section:	***Radiated Emissions in GPS Bands***
Plot Name:	**Radiated Emissions in 1164-1240MHz Band H Polarity**
Configuration:	Stand alone, Continue operation



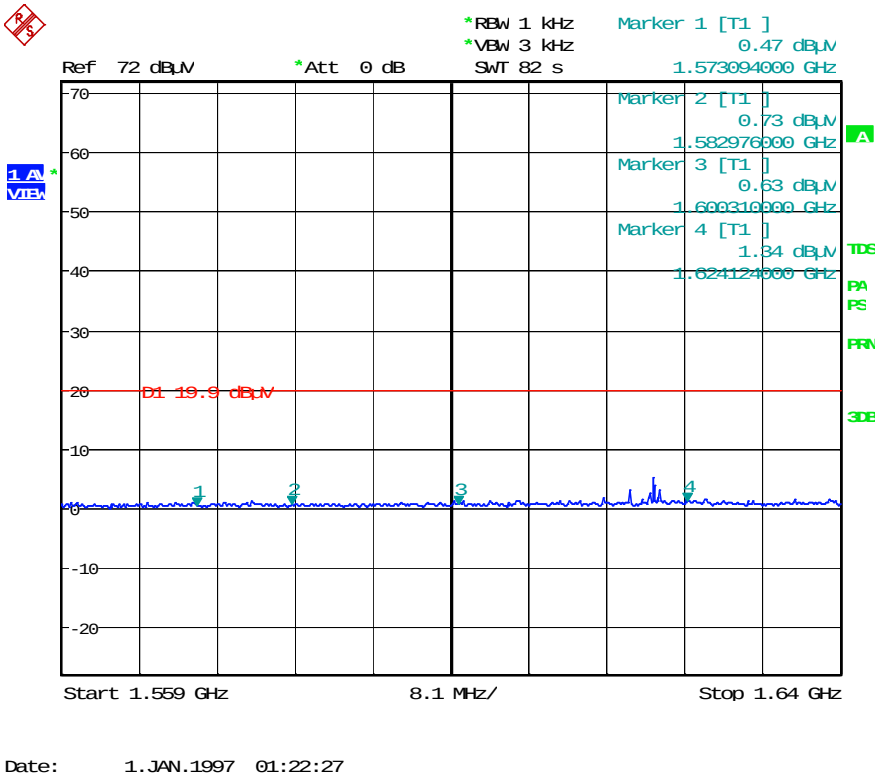
Project Number:	0048-231023-01-FCC-IC
EUT:	166-53-05NA-E
S/N:	PT001
Tested By:	Wei Li
Temperature:	65°F
Humidity:	30%

Section:	***Radiated Emissions in GPS Bands***
Plot Name:	**Radiated Emissions in 1164-1240MHz Band V Polarity**
Configuration:	Stand alone, Continue operation



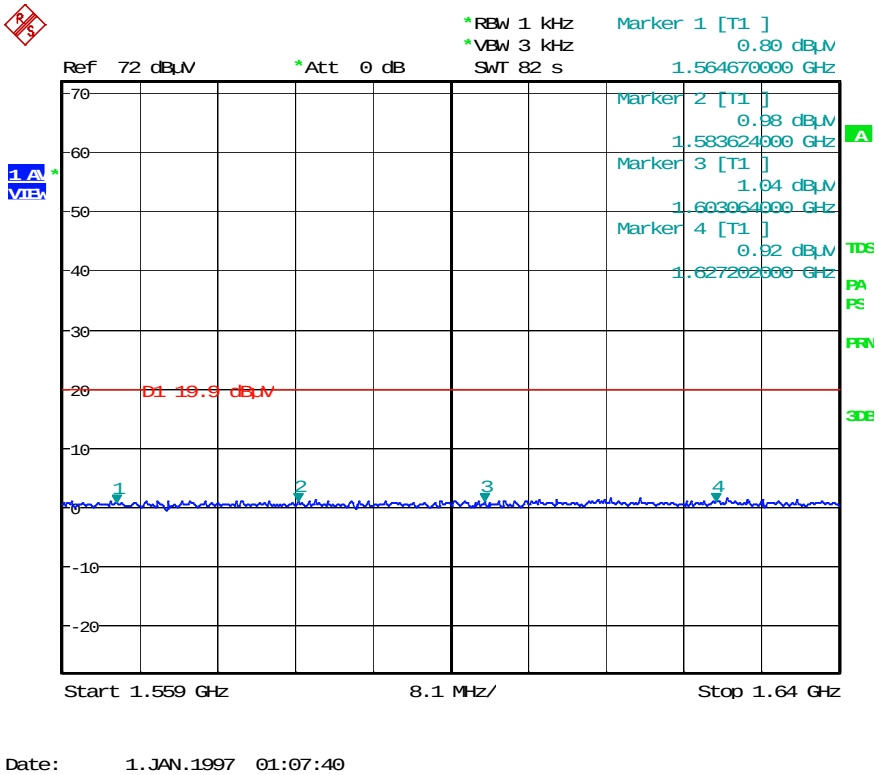
Project Number:	0048-231023-01-FCC-IC
EUT:	166-53-05NA-E
S/N:	PT001
Tested By:	Wei Li
Temperature:	65°F
Humidity:	30%

Section:	***Radiated Emissions in GPS Bands***
Plot Name:	**Radiated Emissions in 1559-1610MHz Band H Polarity**
Configuration:	Stand alone, Continue operation



Project Number:	0048-231023-01-FCC-IC
EUT:	166-53-05NA-E
S/N:	PT001
Tested By:	Wei Li
Temperature:	65°F
Humidity:	30%

Section:	***Radiated Emissions in GPS Bands***
Plot Name:	**Radiated Emissions in 1559-1610MHz Band V Polarity**
Configuration:	Stand alone, Continue operation



Test No.9

Name of Test:	***Highest Radiated Emission at f***	**Test Standard:**	***15.509(f) 15.209 &RSS-220 6.2(g)***
Tested By:	David Tu	**Test Date:**	10/23/2023-11/9/2023

Minimum Standard:

Definition:

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 cantered on f_M mast be limited to a maximum of 0 dBm EIRP.

EIRP limit (dBm)	Field strength limit @ 3 meters for 50MHz RBW (dBuV/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 20log(1/50) dB factor:

20 log (3/50)dB = -24.4 dB. -24.4 dBm EIRP is converted to 70.8 dBuV/m field strength at 3m.

Method of Measurement:

Tested at 3-meter OATS per ANSI C63.4
Spectrum Analyzer Settings:
RBW: 3MHz
VBW: ≥3x 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° 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° to 360° degrees with 45° step increment and the steps 4 to 7 was repeated.
8) Record the peak emission from the EUT.

Test Result: **Complies**

Test Data:

Project Number:	0048-231023-01-FCC-IC
EUT:	166-53-05NA-E
S/N:	PT001
Tested By:	David Tu
Temperature:	65°F
Humidity:	30%

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

Freq. (MHz)	H,V	SA Peak Reading At 1 meter (dBuV/m)	RBW	Reading corrected for 3 meter		Limit (dBuV/m)	Margin (dB)	Result
N/A								

* Highest peak level is located at the frequency range of <1GHz.

Test No.10

Name of Test:	***Technical Requirements Applicable to ALL UWB Devices***	**Test Standard:**	***15.521***
Tested By:	WEI LI	**Test Date:**	10/23/2023-11/9/2023

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

Name of Test:	***Coordination Requirement***	**Test Standard:**	***15.525***
Tested By:	Wei Li	**Test Date:**	10/23/2023-11/9/2023

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

Name of Test:	***Antenna Requirement***	**Test Standard:**	***15.203&15.204 &RSS-GEN 7.1.4***
Tested By:	WEI LI	**Test Date:**	

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. All the measurements were using radiated method. No Antenna spec. is needed.

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

Test Data: **NA**

Test No.13

Name of Test:	***Radio Frequency Exposure***	**Test Standard:**	***FCC OET Bulletin 65 &RSS-GEN***
Tested By:	WEI LI	**Test Date:**	10/23/2023-11/9/2023

Minimum Standard: Public Exposure to Radio Frequency Energy Levels (1.1307 (b)(1)) Limits:

From §1.1310 Table 1 (B),
for Public S = 1.0 mW/cm^2
for Professional, S = 5.0 mW/cm^2

Method of Measurement:

$d = 0.282 * 10 ^ ((P + G) / 20) / \sqrt{S}$ 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 mW/cm^2

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

Test Result:	
Test Data:	**NA**

Calculation

For GPR UWB Transmitter:

For FCC Approval:
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=0dBm and d=20cm, and plug all three items into equation (2), yielding,

Power Density Limit (mW/cm^2)	**Max. Output Power+ Antenna] Gain (dBm)**	**Calculated Power Density (mW/cm^2)**
1.0/5.0	0	0.0002

For IC Approval:
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.

The UWB meet the most restricted EIRP limit value are 0.6W at 137.2MHz (for UWB 137.2-400.7MHz Band), by the value of max. 1mW for UWB.

Test No.14

Name of Test:	***Conducted Emissions***	**Test Standard:**	***15.507 &RSS-GEN***
Tested By:	-	**Test Date:**	-

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

Name of Test:	***Transmission Duration***	**Test Standard:**	***15.509(c)& 15.519(a)(1)***
Tested By:	-	**Test Date:**	-

Minimum Standard: 15.509 (c)
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: **N/A**

Test Data: **N/A**

Test No.16

Name of Test:	***Additional Tests per Wavier DA 23-1041 Conditions***	**Standards:**	***DA 23-1041, Sec. 19.2 & 19.3***
Tested By:	WEI LI	**Test Date:**	10/23/2023-11/9/2023

Minimum Standard:

Wavier DA 23-1041, Section 19: This waiver is subject to the following conditions:

2) The GPR device shall operate only in the bands 137-322 MHz and 335.4-400 MHz. It shall not produce intentional emissions below 137 MHz, above 400 MHz or in the 322-335.4 MHz band. Emissions below 137 MHz and above 400 MHz must comply with the applicable limits, e.g., those in Section 15.209 at frequencies at or below 960 MHz and those in Section 15.509 at frequencies above 960 MHz.

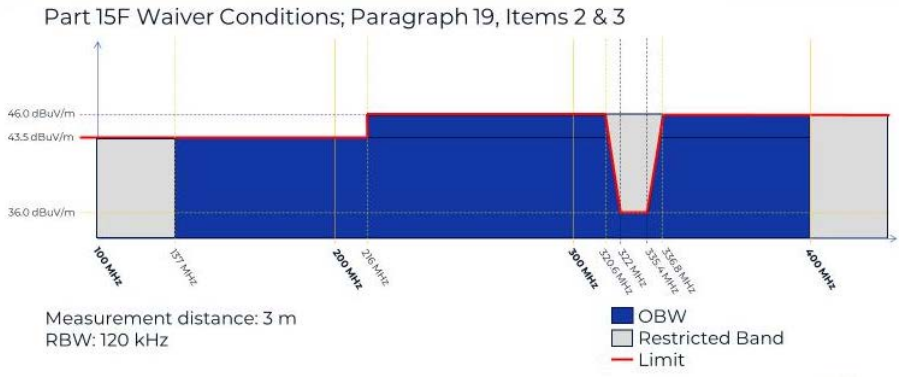
3) Emissions from the GPR device in the following bands shall not exceed the following limits, measured using a CISPR quasi-peak detector as specified in Section 15.209(d):

a) 320.6-322 MHz: linearly interpolated between the Section 15.209(a) limit at the lower end of the band and 10 dB below the Section 15.209(a) limit at the upper end of the band.

b) 322-335.4 MHz: 10 dB below the Section 15.209(a) limit.

c) 335.4-336.8 MHz: linearly interpolated between 10 dB below the Section 15.209(a) limit at the lower end of the band and the Section 15.209(a) limit at the upper end of the band.

Following is the "emission mask" per this Waiver's requirement.



Method of Measurement:

Same method as defined in Test No.6.

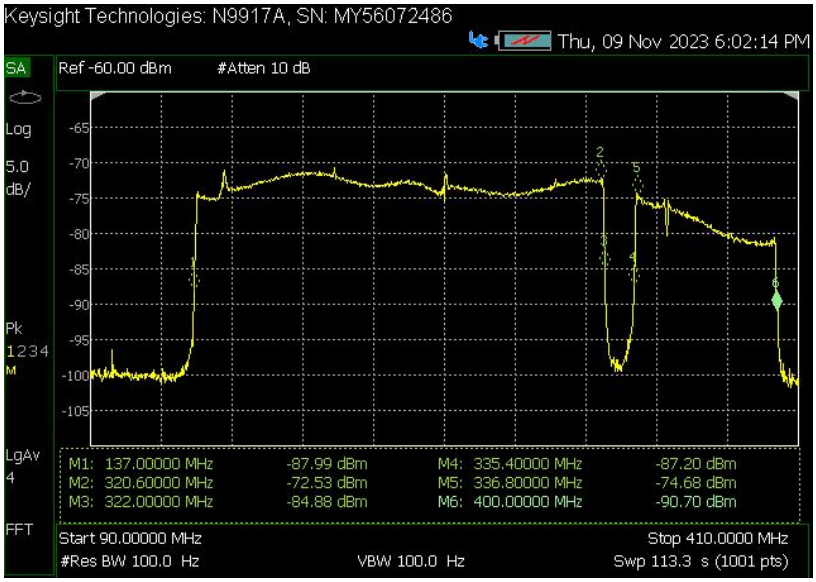
Test Result: **Complies**

Test Data: Data and Plots

Requirement No. 1:

The GPR device shall operate only in the bands 137-322 MHz and 335.4-400 MHz. It shall not produce intentional emissions below 137 MHz, above 400 MHz or in the 322-335.4 MHz band.

Reference for Band Design Spectrum:



Requirement No.2:

Emissions below 137 MHz and above 400 MHz must comply with the applicable limits, e.g., those in Section 15.209 at frequencies at or below 960 MHz and those in Section 15.509 at frequencies above 960 MHz.

Measurement data refers to Test No. 6 in this report.

Requirement No.3:

Emissions from the GPR device in the following bands
a) 320.6-322 MHz
b) 322-335.4 MHz
c) 335.4-336.8 MHz

are measured by using the same method as defined in Test No.6 and QP readings of such emissions are given as following and compared to the limit in Waiver.

Project Number:	0048-231023-01-FCC-IC
EUT:	166-53-05NA-E
S/N:	PT001
Tested By:	David Tu
Temperature:	65°F
Humidity:	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

Segment Frequency points for restricted band of 322-335.4MHz (Values in MHz):

Wavier Section 19 (3)	**Frequency Points (MHz)**	**Emission Mask Limit (dBuV/m) @ 3m**
Notch F_L-1.4MHz	*320.6*	*46*
Lower Edge F MHz	*320.6-322*	*46-7.143*(F-320.6)*
Notch F_L	*322*	*36*
Restricted Band	*322-335.4*	*36*
Notch F_H	*335.4*	*36*
Upper Edge F MHz	*335.4-336.8*	*36+7.143(F-335.4)*
Notch F_H +1.4MHz	*336.8*	*46*

Freq.* (MHz)	**H,V**	**SA QP Reading (dBuV/ m)****	**Height (m)**	**Angle (degree)**	**Refer to Waiver Sec.19.3 3m Limit (dBuV/m)**	**Margin (dB)**	**Result**
320.6	H	42.1	1.0	90	46	-3.9	Pass
321.0	H	39.5	1.0	90	43.1	-3.6	Pass
321.6	H	34.3	1.0	90	38.9	-4.4	Pass
322.0	H	31.4	1.0	90	36	-4.6	Pass
335.4	H	31.3	1.0	90	36	-4.7	Pass
336.0	H	34.1	1.0	90	40.3	-6.2	Pass
336.5	H	40.4	1.0	90	43.9	-3.5	Pass

336.8	H	42.6	1.0	90	46	-3.4	Pass
320.6	V	42.8	1.0	180	46	-3.2	Pass
321.1	V	39.7	1.0	180	42.4	-2.7	Pass
321.5	V	35.3	1.0	180	39.6	-4.3	Pass
322.0	V	30.4	1.0	180	36	-5.6	Pass
335.4	V	32.2	1.0	180	36	-3.8	Pass
335.7	V	33.6	1.0	180	38.1	-4.5	Pass
336.2	V	39.5	1.0	180	41.7	-2.2	Pass
336.8	V	44.5	1.0	180	46	-1.5	Pass

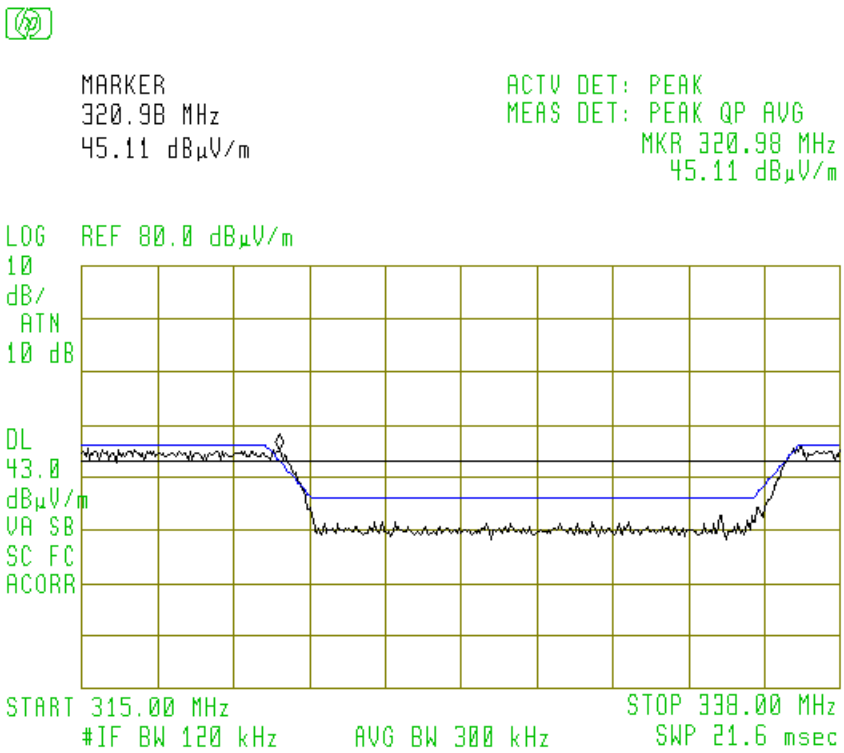
*QP reading for RF ON

**Emissions from Digital circuitry are excluded for meeting wavier limit.

Measurement Plots:

Project Number:	0048-231023-01-FCC-IC
EUT:	166-53-05NA-E
S/N:	PT001
Tested By:	Wei Li
Temperature:	65°F
Humidity:	30%

Section:	**Wavier DA 23-1041 Sec.19 (3)**
Plot Name:	**Emission Mask for Band 322-335.4MHz and Edges**
Configuration:	Stand alone, Continue operation



*This is peak value plot for illustration. QK readings are recorded in the table above.