



HEXWAVE™

Walkthrough Explosives
and Weapons Detection
System



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1. That the device mode operation is permissible under the specific Part 15 subpart F.

The HEXWAVE is a UWB device that is designed to operate in the 6-10.6 GHz band by sweeping through its frequency range in 200-megahertz blocks. UWB devices are low-power radio frequency devices that operate under Part 15 Subpart F of the Commission's rules without individual licenses from the Commission. UWB transmitters use narrow or short duration pulses that result in transmissions over very large bandwidths. Surveillance systems, under 15.511, such as the HEXWAVE are a particular type of UWB imaging device that are designed to operate as "security fences" by establishing a stationary RF perimeter field and detecting the intrusion by persons or objects in that field.

Liberty Defense received FCC Waiver DA-22-133A1-c3 for Hexwave System that easy some of the requirements.

From Standard:

Under § 15.511 Technical requirements for surveillance systems were Hexwave operating:

- (a) The UWB bandwidth of an imaging system operating under the provisions of this section must be contained between 1990 MHz and 10,600 MHz.

As stated before, Hexwave operates between 6-10.6 GHz. The intentional emission test results can be found on the following pages of that document. (Please refer to Intertek test report number 105270120BOX-007)

From Standard:

(b) Operation under the provisions of this section is limited to fixed surveillance systems operated by law enforcement, fire or emergency rescue organizations or by manufacturers licensees, petroleum licensees or power licensees as defined in [§ 90.7 of this chapter](#).

(1) Parties operating under the provisions of this section must be eligible for licensing under the provisions of [part 90 of this chapter](#).

(2) The operation of imaging systems under this section requires coordination, as detailed in [§ 15.525](#).

Per Liberty Defense waiver conditions, (FCC Waiver DA-22-133A1-c3) the introductory text of 15.511(b), 15.511(b)(2), are waived.

From Standard

(c) The radiated emissions at or below 960 MHz from a device operating under the provisions of this section shall not exceed the emission levels in [§ 15.209](#). The radiated emissions above 960 MHz from a device operating under the provisions of this section shall not exceed the following average limits when measured using a resolution bandwidth of 1 MHz:

Frequency in MHz EIRP in dBm

960–1610 -53.3

1610–1990 -51.3

Frequency in MHz	EIRP in dBm
------------------	-------------

1990–10600	-41.3
Above 10600	-51.3

Hexwave has been tested under 15.209 limits below 960Mhz and under 15.511 requirements above 960 GHz (Please refer to Intertek test report number 105270120BOX-007)

From Standard

(d) In addition to the radiated emission limits specified in the table in [paragraph \(c\)](#) of this section, UWB transmitters operating under the provisions of this section shall not exceed the following average limits when measured using a resolution bandwidth of no less than 1 kHz:

Frequency in MHz	EIRP in dBm
1164–1240	-63.3
1559–1610	-63.3

Please refer to Intertek test report number 105270120BOX-007 page 18.

“Both Peak and Average measurements are performed for frequencies above 1 GHz. The peak level of radiated emissions was measured with a resolution bandwidth (RBW) of 1 MHz, a video bandwidth (VBW) of 3 MHz, and a peak detector. The average level of radiated emissions was measured with a resolution bandwidth (RBW) of 1 MHz, a video bandwidth (VBW) of 3 MHz, and an RMS detector with trace averaging.”

From Standard

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

Per Liberty Defense waiver conditions, (FCC Waver DA-22-133A1-c3) the 15.521(d) requirements are waived. Test results can be found on the following page.

From Standard

(f) Imaging systems operating under the provisions of this section shall bear the following or similar statement in a conspicuous location on the device: “Operation of this device is restricted to law enforcement, fire and rescue officials, public utilities, and industrial entities. Operation by any other party is a violation of [47 U.S.C. 301](#) and could subject the operator to serious legal penalties.”

Per Liberty Defense waiver conditions, (FCC Waver DA-22-133A1-c3) the 15.511(f) requirements are waived. Please see below.

FCC (Document DA 22-133) is waiver conditioned on Liberty meeting the specified waiver conditions. Liberty is not requesting a relaxation of the restrictive emission limits that are an integral part of the UWB rules, and which FCC has acknowledged to be conservative and extremely protective of incumbent services. Because the HEXWAVE must comply with these rules, and because it can operate under a waiver of the four rules FCC have identified in a manner consistent with the use characteristics associated with other UWB surveillance applications without increasing the potential for harmful interference to authorized users, FCC find good cause to grant the waiver request.

There only one operational mode in Hexwave system.

According to FCC Waver DA-22-133A1-c3 the following requirements are waived: Sections 15.31(c), 15.503(d), the introductory text of 15.511(b), 15.511(b)(2), 15.511(f), and 15.521(d) of the rules to permit the certification and marketing of the HEXWAVE System. This waiver is subject to the following conditions:

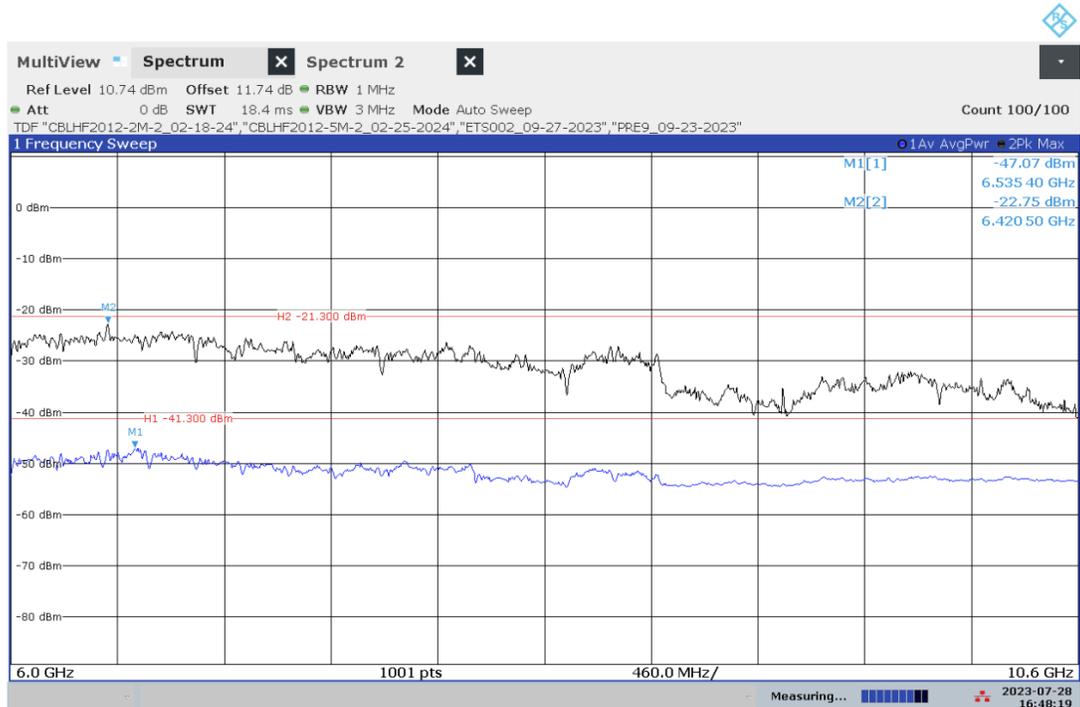
- 1) The maximum EIRP of the HEXWAVE system shall not exceed -41.3 dBm/MHz.
- 2) The intentional emissions generated by the HEXWAVE device must be completely contained within the 6-10.6 GHz frequency range.
- 3) The total transmit time of the HEXWAVE system during a cycle will be less than 54 milliseconds and each cycle will be repeated with a period of no less than 100 milliseconds.
- 4) Each HEXWAVE system will be operated such that no two antennas within a single HEXWAVE system will transmit concurrently.

Device operations:

- 1) The maximum EIRP:
Maximum EIRP Method Tests are performed in accordance with ANSI C63.10 and FCC Waver DA-22-133A1-c3 (please refer to Intertek test report number 105270120BOX-007 page 7)
The sample tested was found to Comply. Fundamental emissions Limits (FCC Part 15, Subpart F, §15.511, FCC Waver DA-22-133A1-c3): Fundamental emissions Limits (FCC Waver DA-22-133A1-c3).

6.5 Plots/Data:

Worst-case antenna polarization, -47.07 dBm



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- 2) The intentional emissions generated by HEXWAVE.
 The sample tested was found to Comply. (Please refer to Intertek test report number 105270120BOX-007 page 12)
 Occupied Bandwidth Limits (FCC Part 15, Subpart F, §15.511, FCC Waver DA-22-133A1-c3): The intentional emissions generated by the HEXWAVE device must be completely contained within the 6-10.6 GHz frequency range.

7.5 Plots/Data:

Lower edge – M1 = 6.0156 GHz
 Upper edge – M2 = 10.587 GHz

The intentional emissions generated by the HEXWAVE device was completely contained within the 6-10.6 GHz frequency range.



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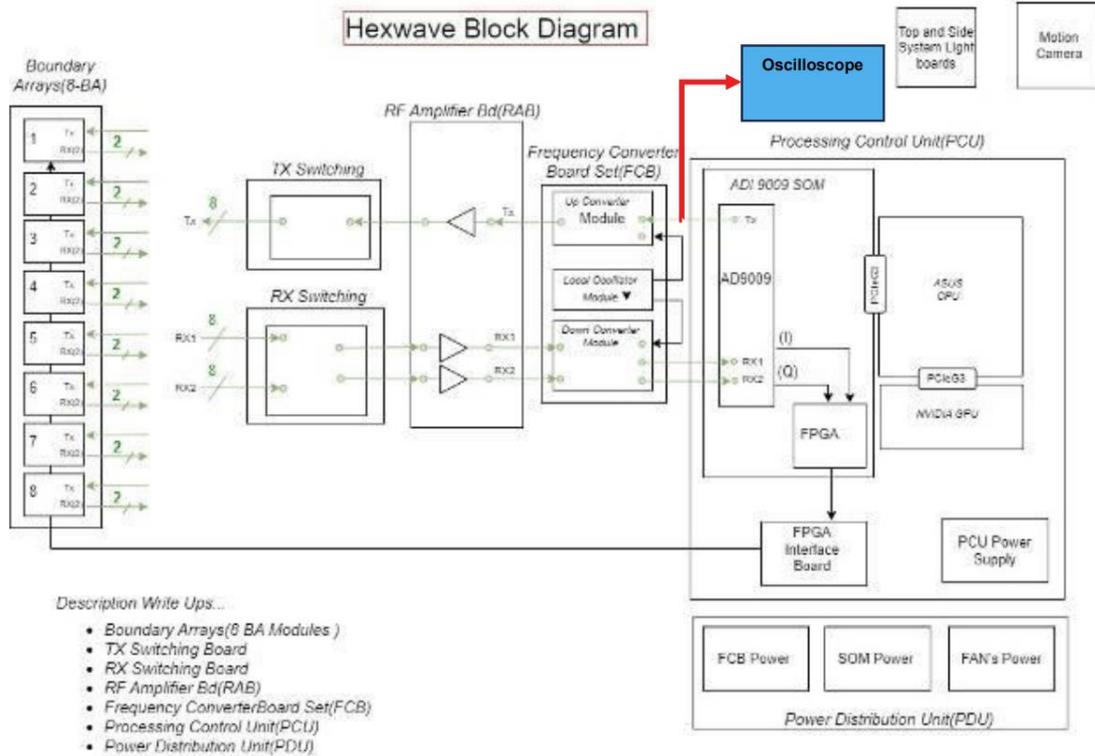
- 3) The total transmit time of the HEXWAVE.
 The sample tested was found to Comply. (Please refer to Intertek test report number 105270120BOX-007 page 15)
 Total Transmit Time Limits (FCC Part 15, Subpart F, §15.511, FCC Waver DA-22- 133A1-c3):

Hexwave System Transmit Time

Hexwave waiver state that:

"5) The total transmit time of the HEXWAVE system during a cycle will be less than 54 milliseconds and each cycle will be repeated with a period of no less than 100 milliseconds."

Test Setup



The measurement of the transmit cycle has been performed using high-speed oscilloscope where we directly connect output of AD9009 transmitter to Keysight Infinium Oscilloscope.

Duty-cycle measurements of Hexwave transmit cycle.

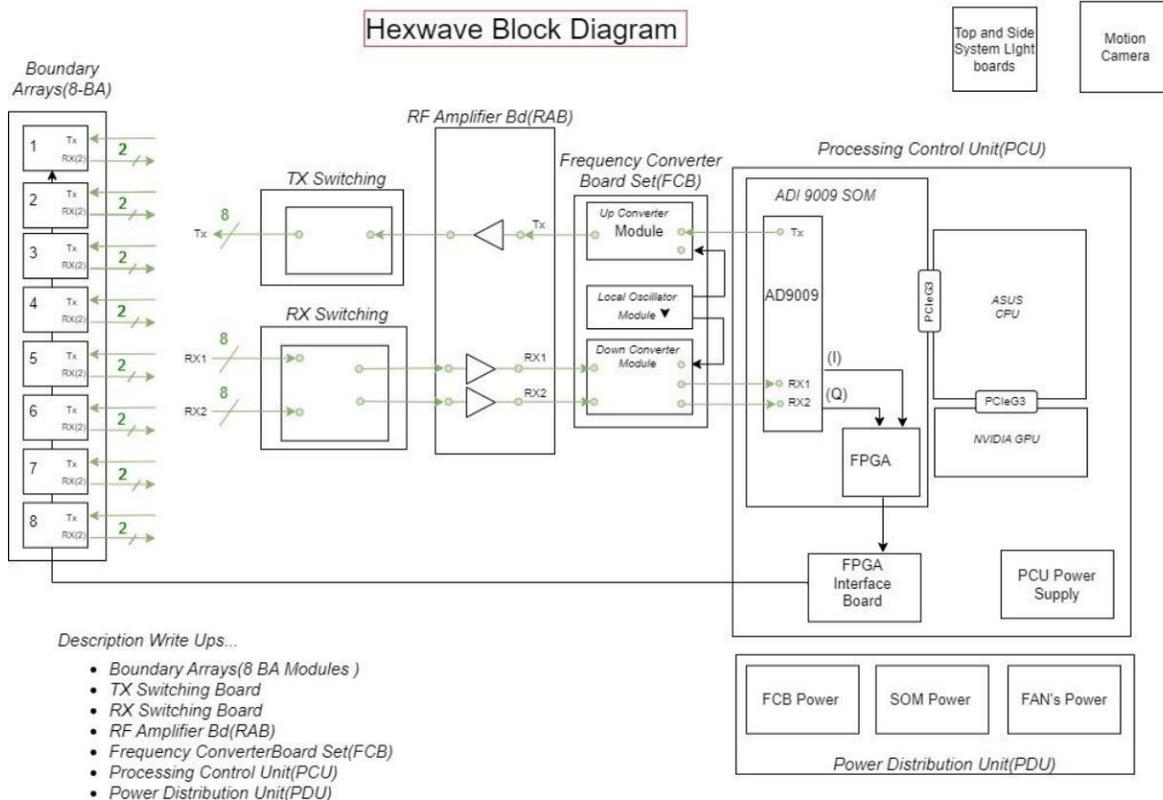


Blue marks showing a 100ms duty-cycle, during that we are executing two transmits.
Each transmission is 26ms (Red markers).
So, total transmit time during 100 milliseconds is 52 milliseconds.

Actual transmit time even smaller than 26mS per transmit. There are delays imposed between frequency synthesizers switching and between received and transmit antennas.

- 4) Each HEXWAVE system will be operated such that no two antennas within a single HEXWAVE system will transmit concurrently.

Please refer to Hexwave block diagram. Only one Transmitter designed in system (Output of SOM9009 RF transceiver module). Also Maximum EIRP measurements supporting that only one antenna active in the system



2. Specify if § 15.250 (15C) is used as alternative to §15.517 or §15.519 (15F)

Hexwave System has been tested according to requirements specified in 15.250 and specific waiver conditions (FCC Waver DA-22-133A1-c3 page 7)

“The measurement requirements in 47 CFR §15.31(c) and 47 CFR § 15.521(d) are waived to permit the HEXWAVE device to be tested with the frequency sweep active, rather than stopped, to demonstrate compliance with the maximum permitted average power in Section 15.511;”

For rest of the test methods under 15.250 (Please refer to Intertek test report number 105270120BOX-007, page 18) test methods and test equipment please see below:

- The procedure described in Subclauses 6.3-6.6 and 9.9 of ANSI C63.10-2013 and Subclause 5.5.4 (field strength method) of ANSI C63.26-2015 were utilized to determine unwanted emissions.
- Radiated emission measurements are performed from 9 kHz to 231 GHz. Measurements for frequencies less than or equal to 1 GHz are made with an EMI receiver employing a CISPR quasi-peak detector. Measurements for frequencies above 1 GHz are made with an EMI receiver or a spectrum analyzer employing an average detector and a peak detector.
- Quasi-peak measurements are performed for frequencies less than or equal to 1 GHz. The quasi-peak level of radiated emissions was measured with a resolution bandwidth (RBW) of 9 kHz for frequencies below 30 MHz and 120 kHz for frequencies between 30 MHz to 1 GHz.
- Both Peak and Average measurements are performed for frequencies above 1 GHz. The peak level of radiated emissions was measured with a resolution bandwidth (RBW) of 1 MHz, a video bandwidth (VBW) of 3 MHz, and a peak detector. The average level of radiated emissions was measured with a resolution bandwidth (RBW) of 1 MHz, a video bandwidth (VBW) of 3 MHz, and an RMS detector with trace averaging.
- Radiated emissions measurement is performed at 10 meters distance for frequencies below 1 GHz, 3 meters for frequency between 1 GHz and 18 GHz, and 1 meter for frequencies above 18 GHz. If the emission level is too low for measurement at that distance, a pre-amplifier is used and/or the test is performed at a closer distance.
- The EUT is configured to transmit continuously at its maximum data rate. The EUT is placed 80 cm in height for frequencies below 1 GHz and 1.5 meters in height for frequency above 1 GHz. For portable or handheld devices, the EUT is manipulated through three orthogonal orientations.

- For radiated emissions measurements Below 30 MHz, the measuring antenna is positioned with its plane perpendicular to the ground at the specified distance from the EUT. The lowest height of the measurement antenna is 1 m above the ground. During the test, the EUT is rotated 0° through 360° and the measuring antenna orientations are varied (parallel, perpendicular, and ground-parallel) during the search for maximum emission level. EMI receiver's resolution bandwidth is set at 9 kHz.
- For radiated emissions measurements between 30 MHz to 18 GHz, measurements are performed with the EUT rotated from 0° to 360°, the measuring antenna height scanned between 1 to 4 meters, and the measuring antenna varied for both horizontal and vertical polarization, to determine the maximum emission level.
- For radiated emissions measurements between 18 GHz to 100 GHz, handheld measurement is performed at a far field distance. As the surfaces of the EUT are scanned, the test antenna is kept pointed toward the EUT and the measuring antenna polarization is varied slowly to cover all possible polarizations and orientations of the emission(s).
- Data included is representative of the worst-case configuration (the configuration which resulted in the highest emission levels). Plots below are corrected for distance, cables, preamp, filters, antenna factors, and conversion factors then compared to the limits.

Test Equipment Used:

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
IW002'	2 meter Armored cable	Insulated Wire	2800-NPS	002	10/11/2022	10/11/2023
145-420'	Receiver to floor cable	Utiflex	UFB311 A-2-0591-70070	145-420	02/18/2023	02/18/2024
HS001'	DC-18GHz cable 1.5m long	Huber & Suhner	SucoFlex 106A	HS001	01/25/2023	01/25/2024
HS003	10m under floor cable	Huber-Schuner	10m-1	HS003	02/18/2023	02/18/2024
145145'	Broadband Hybrid Antenna 30 MHz - 3 GHz	Sunol Sciences Corp.	JB3	A122313	06/23/2023	06/23/2024
PRE10'	30-1000MHz pre-amp	ITS	PRE10	PRE10	02/17/2023	02/17/2024
ETS002'	1-18GHz DRG Horn Antenna	ETS Lindgren	3117	00143260	09/27/2022	09/27/2023

PRE9'	100MHz-40GHz Preamp	MITEQ	NSP40 00-NFG	1260417	09/23/2022	09/23/2023
145-408'	10m Chamber - 3m Track B In-floor Cable	Huber + Suhner	sucofle x 106-11000m m	001	07/19/2023	07/19/2024
EMC04'	ANTENNA, RIDGED GUIDE, 18-40 GHZ	EMCO	3116	2090	01/26/2023	01/26/2024
OML3'	Mixer / Antenna	Oleson Microwave Lab	M12HWD	E21011-1	11/30/2022	11/30/2023
ROS005-1'	Signal and Spectrum Analyzer	Rohde and Schwartz	FSW43	100646	11/18/2022	11/18/2023
CBLHF2 012-5M-2'	5m 9kHz-40GHz Coaxial Cable - SET2	Huber & Suhner	SF102	252676002	02/25/2023	02/25/2024
CBLHF2 012-2M-2'	2m 9kHz-40GHz Coaxial Cable - SET2	Huber & Suhner	SF102	252675002	02/18/2023	02/18/2024
OML4'	Mixer / Antenna	Oleson Microwave Lab	M19HWA	U21011-1	11/30/2022	11/30/2023
OML2'	Mixer / Antenna	Oleson Microwave Lab	M08HWA	F21011-1	11/30/2022	11/30/2023
PRE12'	Pre-amplifier	Com Power	PAM-118A	18040117	12/17/2022	12/17/2023
DAV006'	Weather Station	Davis	6250	MS191218071	02/21/2023	02/21/2024
145-420'	Receiver to floor cable	Utiflex	UFB311A-2-0591-70070	145-420	02/18/2023	02/18/2024
145-424'	9kHz to 40GHz Cable	Huber and Suhner	Sucofle x	145-424	02/18/2023	02/18/2024
145-422'	10Amp Pre-amp to under floor	Utiflex	UFB311A-0-2756-70070	145-422	02/18/2023	02/18/2024
145108'	EMI Test Receiver (20Hz - 40GHz)	Rohde & Schwarz	ESIB40	100209	06/28/2023	06/28/2024

3. Show that KDB 393764 Q6 is being followed.

Question 1: What technical characteristics must be measured to demonstrate ultra-wideband (UWB) device compliance to the applicable requirements specified in Part 15 Subpart F?

Hexwave UWB technical characteristics that was measured includes the emission bandwidth, the average and peak power spectral density associated with the fundamental emission, and the average power spectral density associated with unwanted emissions (out-of-band and spurious domain) using applicable methods and waiver.

(Please refer to Intertek test report number 105270120BOX-007 page 2)

- CFR 47 FCC Part 15,
- Subpart F, Subpart C, §15.511 (08/2023)
- FCC Waiver DA-22-133A1-c3

Question 2: Are standardized measurement procedures available for performing the requisite compliance measurements?

Question 3: What portion of the emission spectrum from a UWB device is required to be contained within the authorized frequency bands? Is it adequate for just the center frequency to be within the authorized band?

Standardized procedures for measuring the technical parameters necessary to demonstrate compliance to the UWB rule requirements have been done according to 10.1 of ANSI C63.10-2013.

Please refer to Intertek test report number 105270120BOX-007 pages 6,7,12,15 and 18. Maximum EIRP, Occupied Bandwidth, Total Transmit Time, and Unwanted Emissions.

Question 4: How is the requirement for a UWB device to cease transmission after 10 seconds of inactivity (i.e., Section 15.519(a)(1)) interpreted?

Not applicable, since the device is only operating during activation when target is detected and follow the duty cycle specified in waiver (FCC Waiver DA-22-133A1-c3)

Question 5: What types of devices are considered to be “hand held” under Section 15.519?

Not applicable, Hexwave is not a handheld device.

Question 6: What compliance information should be included with an application for certification?

The UWB application category (e.g., imaging device, indoor system, hand held device), and the applicable rule section (among Sections 15.509 through 15.519).

According to FCC Waiver DA-22-133A1-c3 (page 1) Liberty Defense Technologies, waiver of our rules governing unlicensed ultra-wideband (UWB) devices to permit the certification and marketing of its threat detection imaging system. According to 15.503 definitions, part j, *Surveillance system* A field disturbance sensor is used to establish a stationary RF perimeter field that is used for security purposes to detect the intrusion of persons or objects, tested under 15.209 and 15.511 standards.

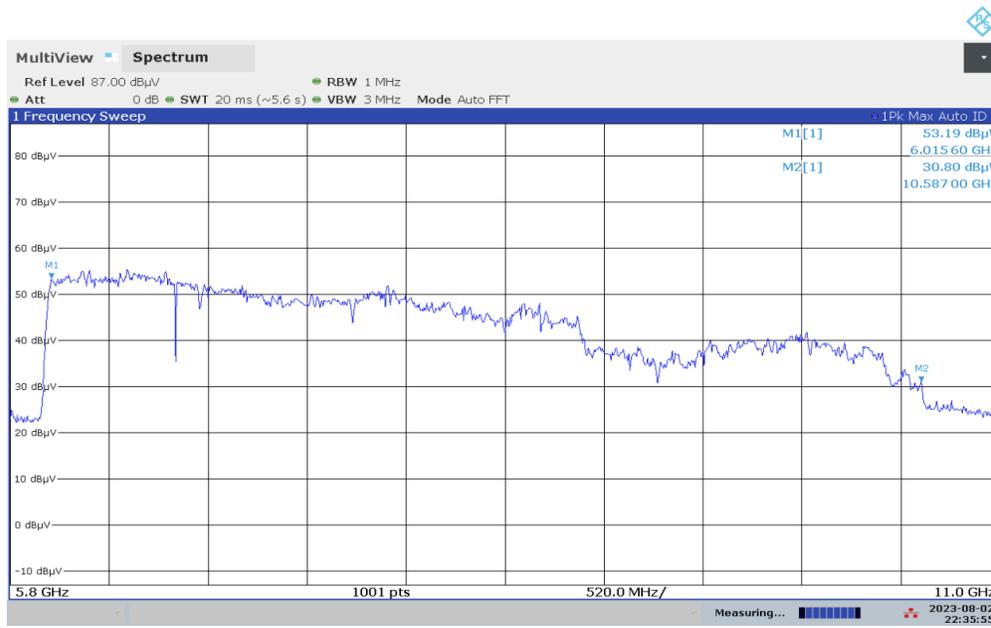
The lower and upper -10 dB frequencies (fL and fH, respectively) and the frequency of the maximum observed emission level (fM). Also provide a frequency vs. amplitude plot that graphically depicts these values.

The intentional emissions generated by HEXWAVE are kept between 6GHz and 10.6GHz according to waiver conditions. (FCC Waiver DA-22-133A1-c3). The sample tested was found to Comply. Please refer to Intertek test report number 105270120BOX-007 page 12) Occupied Bandwidth Limits (FCC Part 15, Subpart F, §15.511, FCC Waiver DA-22-133A1-c3): The intentional emissions generated by the HEXWAVE device must be completely contained within the 6-10.6 GHz frequency range.

7.5 Plots/Data:

Lower edge – M1 = 6.0156 GHz
Upper edge – M2 = 10.587 GHz

The intentional emissions generated by the HEXWAVE device was completely contained within the 6-10.6 GHz frequency range.



The maximum radiated emissions (including narrowband emissions) and the associated frequencies observed in each frequency band identified in the applicable emission limits tables.

15.511 part c, calling for the following limits:

Frequency in MHz EIRP in dBm

960–1610	-53.3
1610–1990	-51.3
1990–10600	-41.3
Above 10600	-51.3

The following results are from 1Ghz to 18Ghz. (Please refer to Intertek test report number 105270120BOX-007 page 33)

Average (12)

Frequency (MHz)	Field Strength Level (dBuV/m)	EIRP Level (dBm)	EIRP Limit (dBm)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW	Correction (dB)
3188.947368	47.38	-47.82	-41.3	-6.52	240.00	1.78	Horizontal	1M	5.70
6101.315789	37.85	-57.35	-41.3	-16.05	45.00	1.38	Horizontal	1M	2.24
6308.157895	38.93	-56.27	-41.3	-14.97	324.00	1.14	Horizontal	1M	2.89
6499.473684	40.09	-55.11	-41.3	-13.81	10.00	1.74	Horizontal	1M	3.10
6689.736842	39.41	-55.79	-41.3	-14.49	340.00	1.38	Horizontal	1M	3.11
7038.684211	39.31	-55.89	-41.3	-14.59	22.00	1.21	Horizontal	1M	3.37
7540.263158	38.91	-56.29	-41.3	-14.99	8.00	3.02	Horizontal	1M	3.92
8037.894737	38.15	-57.05	-41.3	-15.75	8.00	2.25	Vertical	1M	4.90
8415.789474	38.13	-57.07	-41.3	-15.77	351.00	1.27	Horizontal	1M	5.91
9812.105263	34.92	-60.28	-41.3	-18.98	86.00	1.41	Horizontal	1M	5.83
12799.21053	43.45	-51.75	-51.3	-0.45	240.00	3.22	Horizontal	1M	13.81
13000.78947	40.56	-54.64	-51.3	-3.34	135.00	1.07	Horizontal	1M	13.27

Notes:

EIRP Level (dBm) = Field Strength Level (dBuV/m) + 20*log(d) - 104.7

EIRP Level (dBm) = Field Strength Level (dBuV/m) – 95.2, at 3 meters

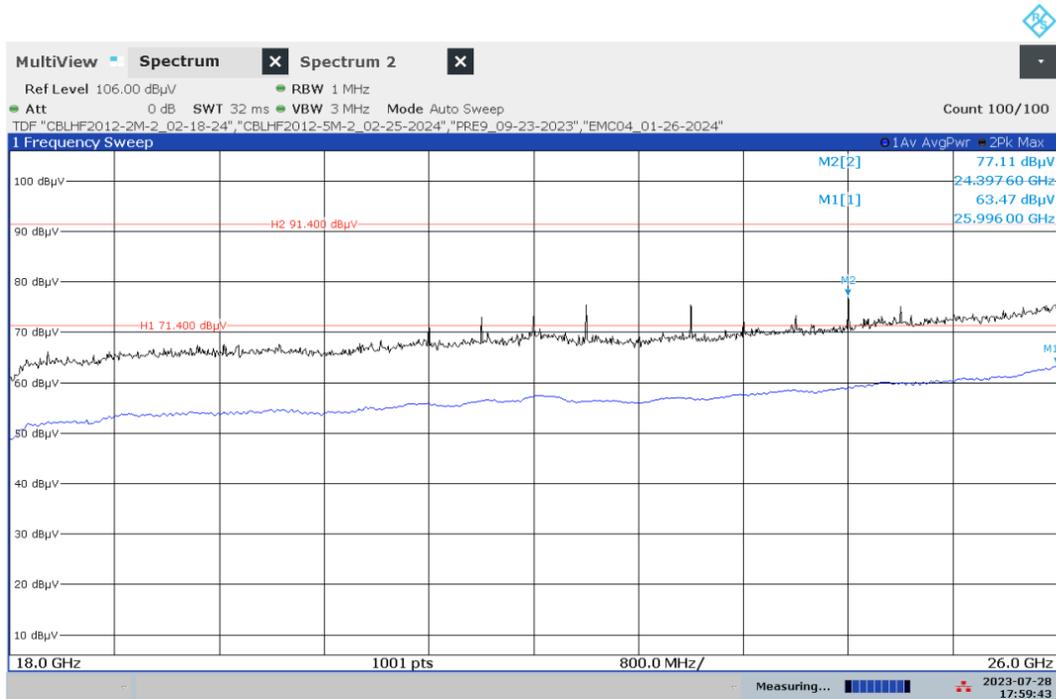
EIRP Limit per FCC Part 15 Subpart F Section 15.511(c)

For Bands above 18Ghz please see plots on following pages.

In the event that no emissions are observed in the aforementioned frequency bands, report the minimum sensitivity (noise floor) of the measurement system in these bands (i.e., show that the measurement system is capable of detecting emissions down to the level indicated by the applicable emissions limit).

Please refer to the test methods and equipment list specified on pages 8 and 9 of that document. Below are attached plots for emissions measured between 18Ghz and 100GHz. (Please refer to Intertek test report number 105270120BOX-007 pages 34-38)

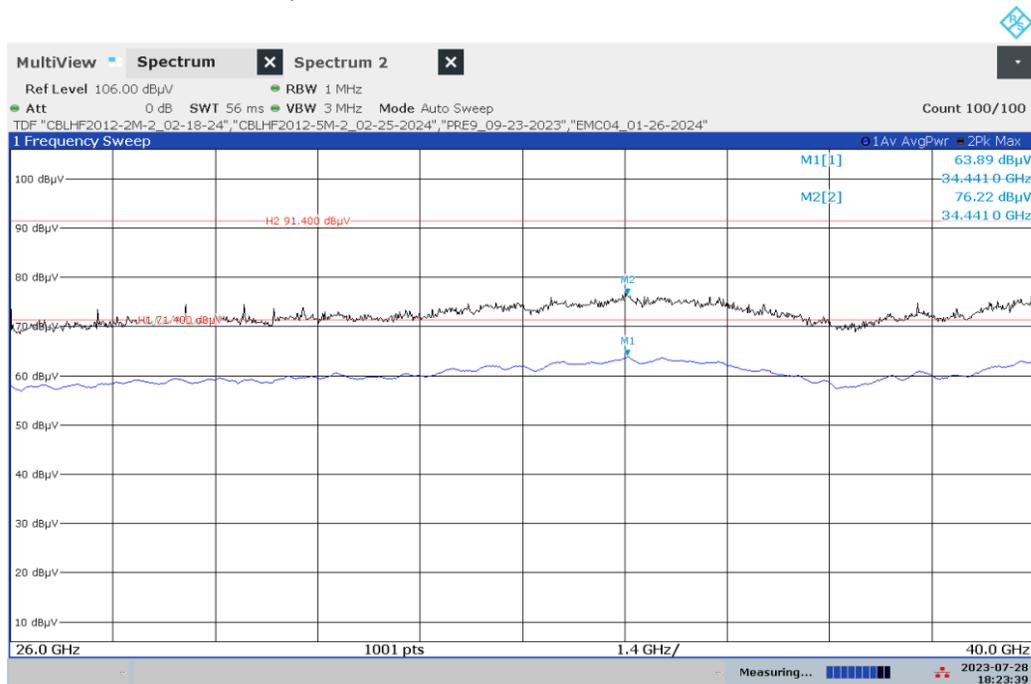
Powered from 120VAC 60Hz, 18-26 GHz



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Note: The antenna factor, cable loss, and pre-amp gain were internally compensated as TDF. Testing was performed with antenna located at 10 cm from the EUT.

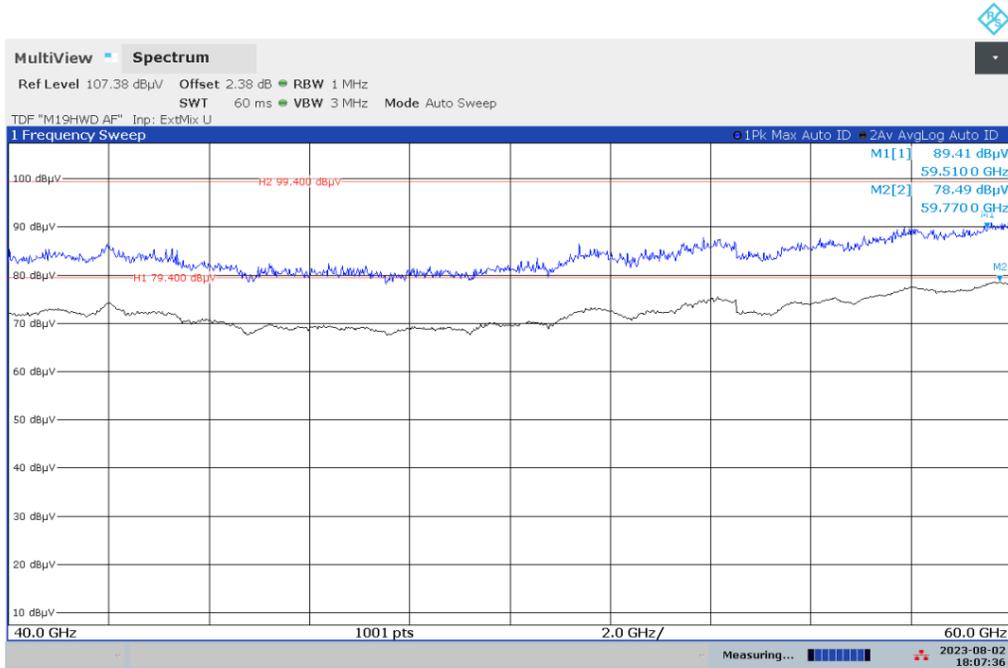
Powered from 120VAC 60Hz, 26-40 GHz



06:23:39 PM 07/28/2023

Note: The antenna factor, cable loss, and pre-amp gain were internally compensated as TDF. Testing was performed with antenna located at 10 cm from the EUT.

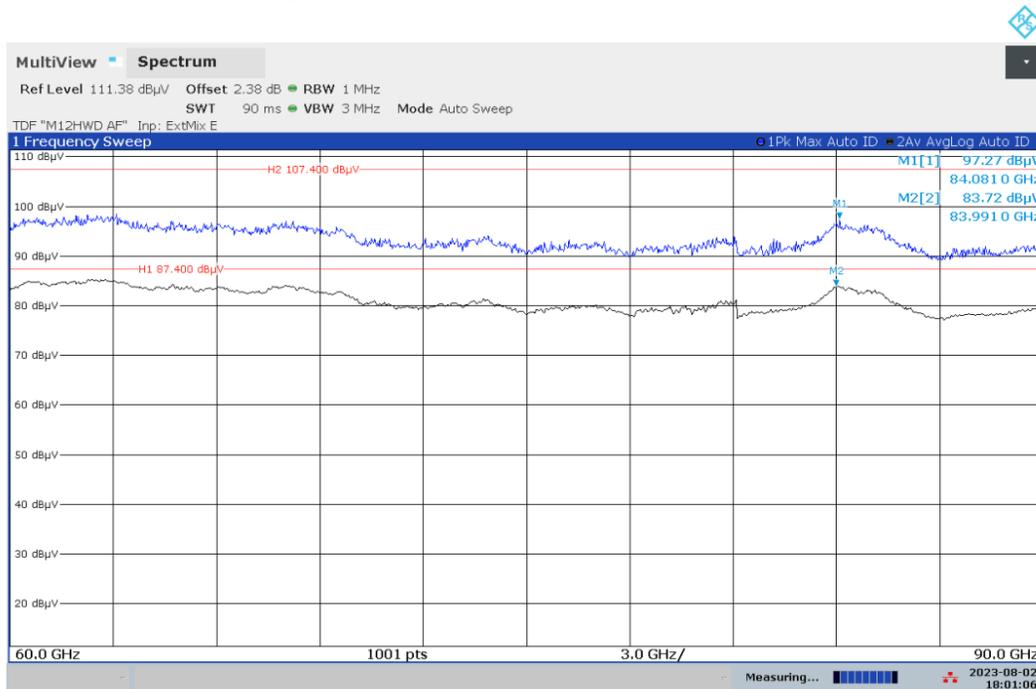
Powered from 120VAC 60Hz, 40-60 GHz



06:07:36 PM 08/02/2023

Note: Antenna factor and cable loss were internally compensated as TDF and dB-ffset. Testing was performed with antenna located at 5 cm from EUT. No emissions were detected above the measuring equipment noise floor.

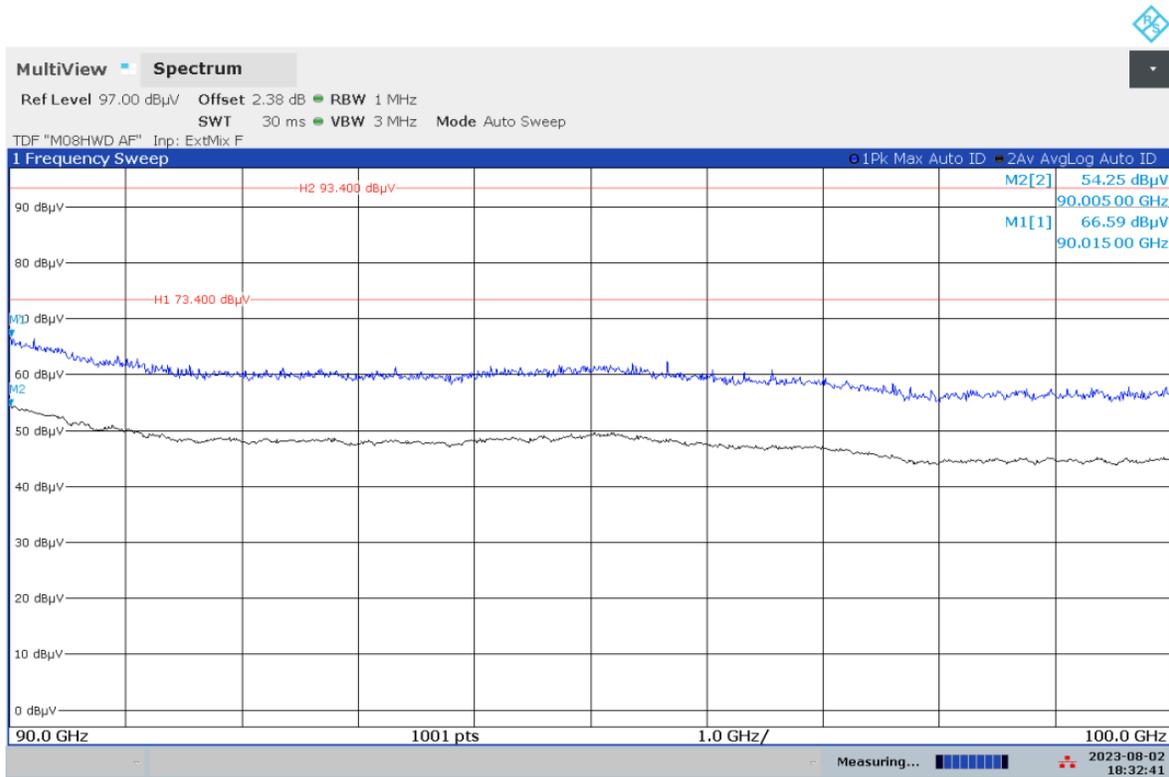
Powered from 120VAC 60Hz, 60-90 GHz



06:01:06 PM 08/02/2023

Note: Antenna factor and cable loss were internally compensated as TDF and dB-ffset. Testing was performed with antenna located at 2 cm from EUT. No emissions were detected above the measuring equipment noise floor.

Powered from 120VAC 60Hz, 90-100 GHz



06:32:42 PM 08/02/2023

Note: Antenna factor and cable loss were internally compensated as TDF and dB-ffset. Testing was performed with antenna located at 10 cm from EUT. No emissions were detected above the measuring equipment noise floor.

If applicable, report all digital circuitry emissions exceeding the applicable UWB limits, and provide a complete description of the process used to justify invoking the exception stated in Section 15.521(c).

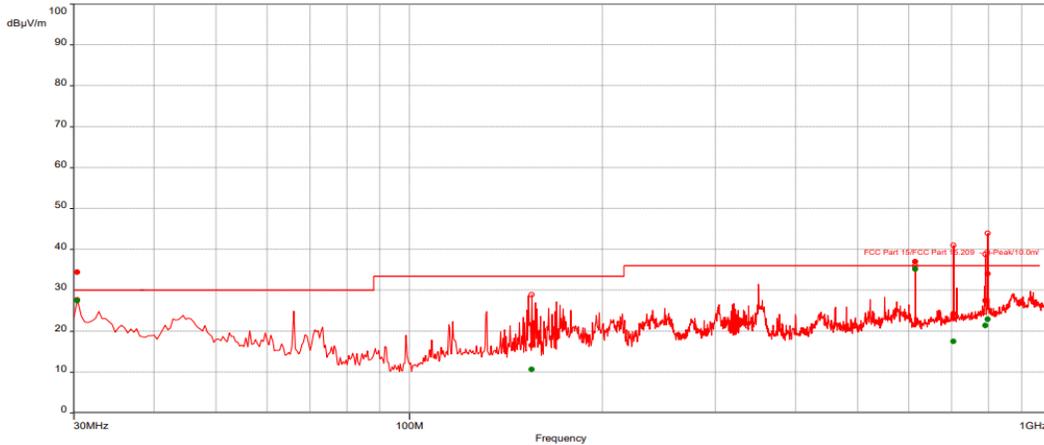
Hexwave system has been tested according 15.209 standard and complied with limits specified in the standard. No exceeded emissions. (Please refer to Intertek test report number 105270120BOX-007 page 32)

Powered from 120VAC 60Hz, 30 – 1000 MHz

Test Information:

Date and Time	6/26/2023 11:31:15 AM
Client and Project Number	Liberty Defense G105270120
Engineer	Randi Torres
Temperature	23C
Humidity	52%
Atmospheric Pressure	1001mbars
Comments	Scan4 RE 30-1000MHz SA mode

Graph:



Results:

QuasiPeak (PASS) (6)

Frequency (MHz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW	Correction (dB)
30.34736842	27.47	30.00	-2.53	257.00	1.57	Vertical	120k	-12.75
155.2	10.65	33.50	-22.85	316.00	2.00	Vertical	120k	-19.98
614.4	35.21	36.00	-0.79	227.00	1.00	Horizontal	120k	-11.49
704.7368421	17.48	36.00	-18.52	247.00	1.76	Vertical	120k	-9.50
790.3052632	21.37	36.00	-14.63	133.00	3.13	Horizontal	120k	-7.97
796.9894737	22.91	36.00	-13.09	341.00	2.76	Vertical	120k	-7.71

Frequency vs. amplitude plots depicting the measured fundamental emission, the out-of-band emission domain, and the emissions into the GPS frequency bands.

All GPS satellites broadcast on at least two carrier frequencies: L1, at 1575.42 MHz, and L2, at 1227.6 MHz (newer satellites also broadcast on L5 at 1176 MHz).

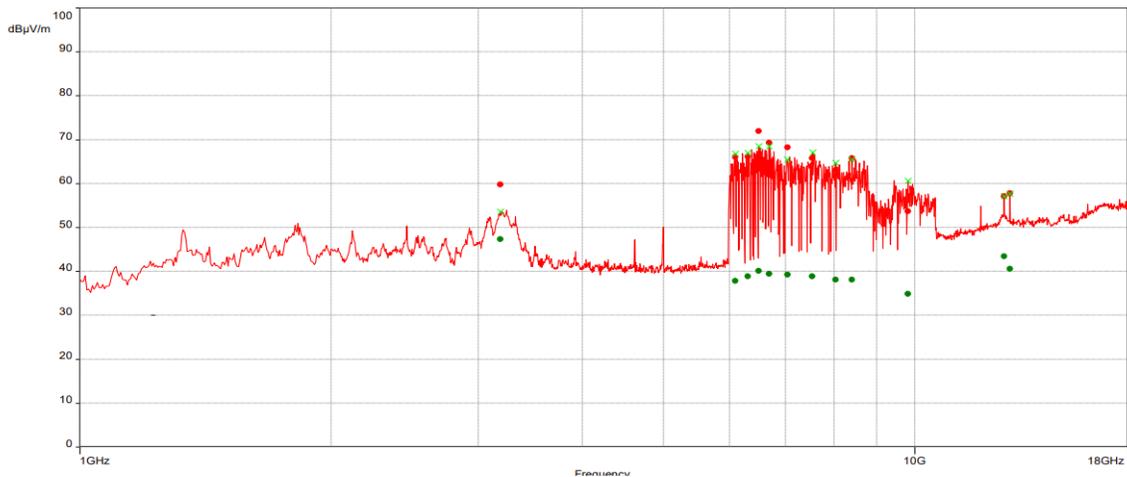
(Please refer to Intertek test report number 105270120BOX-007 page 33)

Powered from 120VAC 60Hz, 1-18 GHz

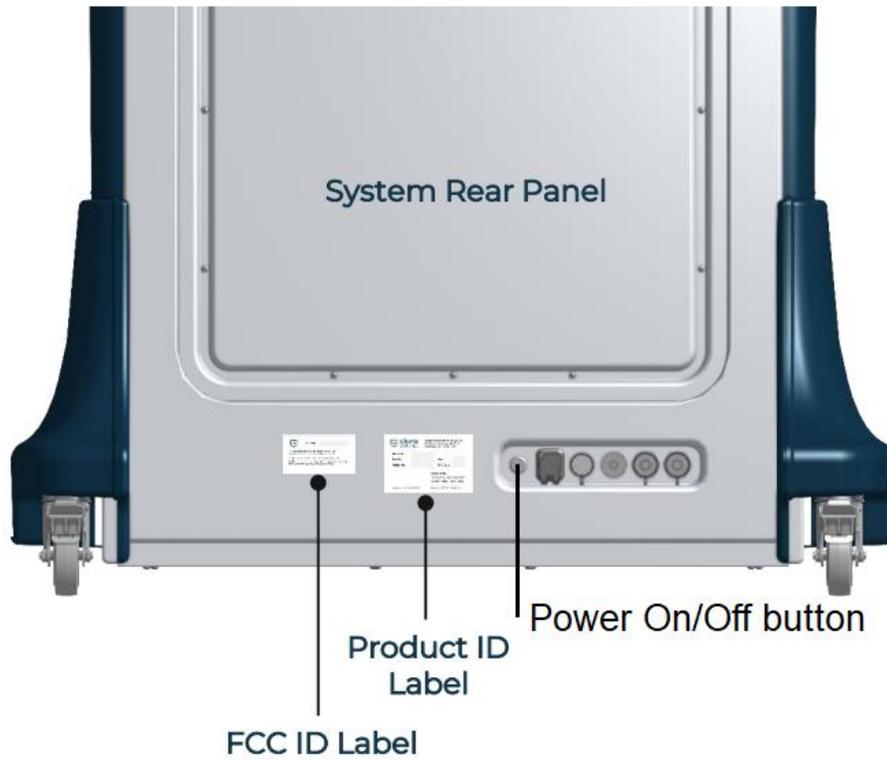
Test Information:

Date and Time	7/13/2023 3:05:05 PM
Client and Project Number	Liberty Defense
Engineer	Kouma Sin
Temperature	26 C
Humidity	39 %
Atmospheric Pressure	1002 mbar
Comments	Scan 3: 2nd Modification, RE 1 to 18 GHz SA mode

Graph:



- Where applicable, indicate the location of required operating labels and/or a manual disable switch.



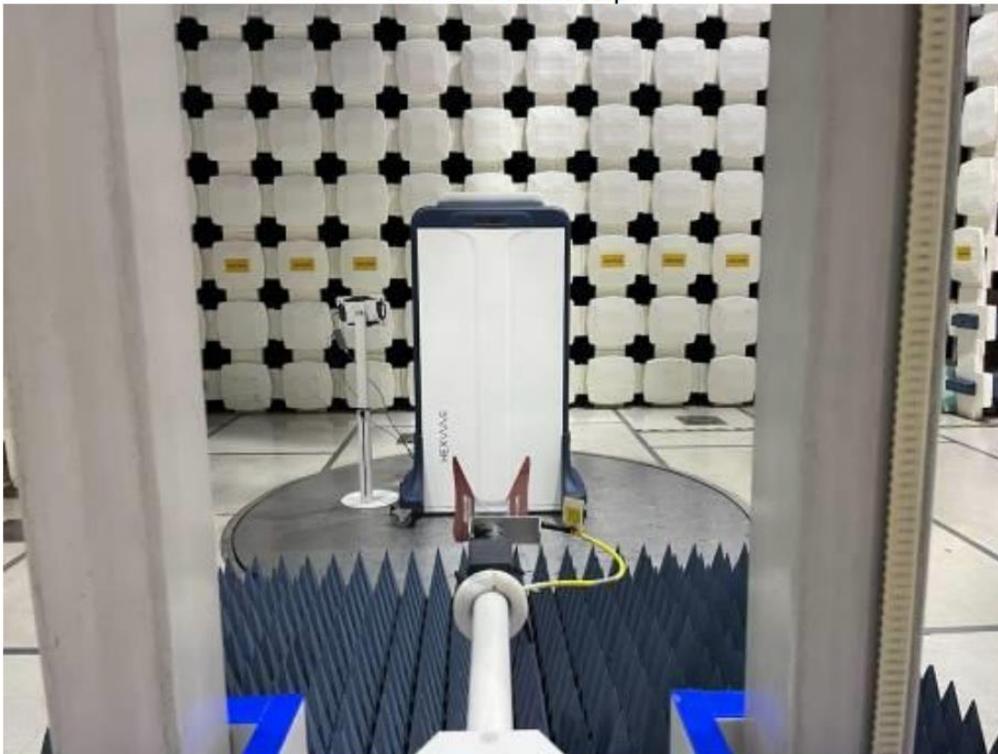
Please Refer to User Manual.

- Supporting photographs depicting the measurement system set-up and the device under test. (Please refer to Intertek test report number 105270120BOX-007)

30-1000 MHz Test Setup



1-18 GHz Test Setup



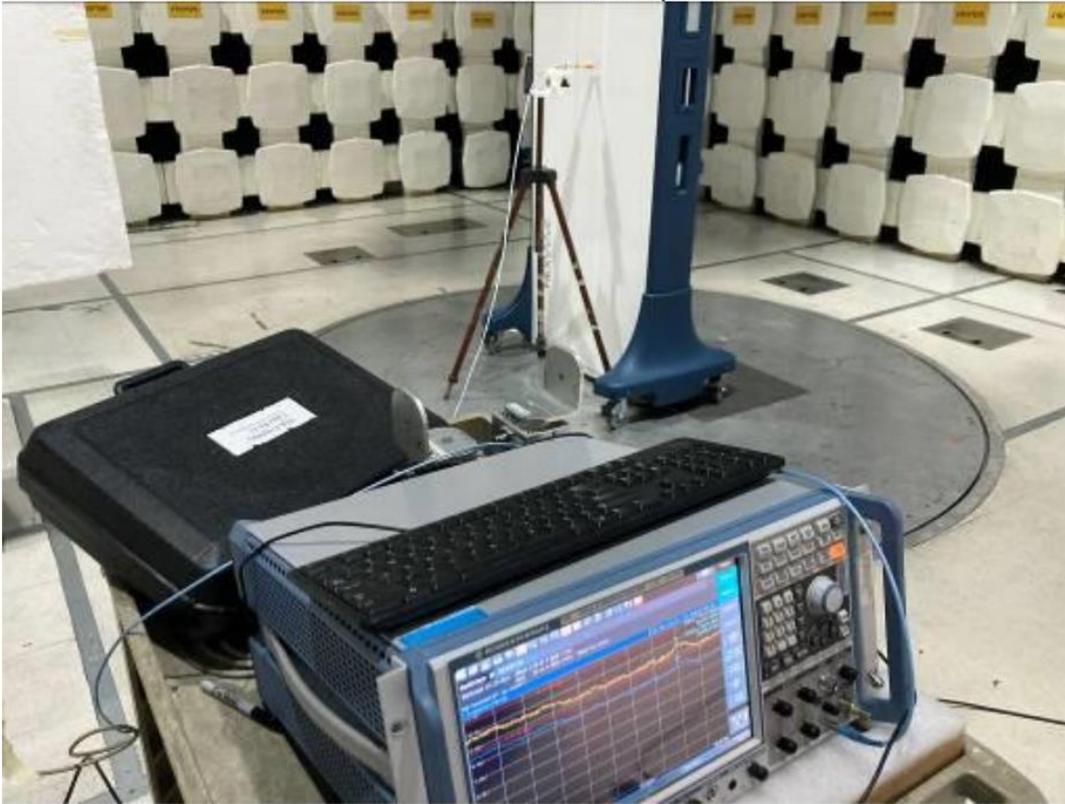
18-40 GHz Test Setup



40-60 GHz Test Setup



60-90 GHz Test Setup



90-100 GHz Test Setup



Question 7: Are there any special considerations for UWB devices applying for modular approval?

Not applying for modular approval.

Question 8: Are there any other options for certifying UWB devices under FCC rules?

Please refer to FCC Waiver DA-22-133A1-c3 page 8

“The intentional emissions generated by the HEXWAVE device must be completely contained within the 6-10.6 GHz frequency range.”

Question 9: Is there a provision for operating wireless tank level gauges (e.g., level-probing radar) under the UWB rules?

Not applicable.

4. Account for all technical requirements specific to each UWB mode of operation

Hexwave System (HW2000) has been tested according to Standards:
CFR 47 FCC Part 15, Subpart F, Subpart C, §15.511 (08/2023) ,
FCC Waiver DA-22-133A1-c3
Intertek report Number: 105270120BOX-007.

5. Verify that §15.519 devices do not utilize fixed infrastructure

According to FCC Waiver DA-22-133A1-c3 and Operational manual, Hexwave is not utilizing fixed infrastructure.

6. Verify that grant restrictions and notices are in accordance with specific rule part.

According to FCC Waiver DA-22-133A1-c3 page 8, paragraph e:

“in lieu of the labeling requirement of 47 CFR §15.511(f), each HEXWAVE system shall bear the following or substantially similar statement in a conspicuous location on the device: “Operation of this device is restricted to law enforcement, fire and rescue officials, private security personnel, public utilities, and industrial entities. Operation by any other party is a violation of 47 U.S.C. 301 and could subject the operator to serious legal penalties.”

Product Labels and Descriptions



Figure 1. Product ID Label

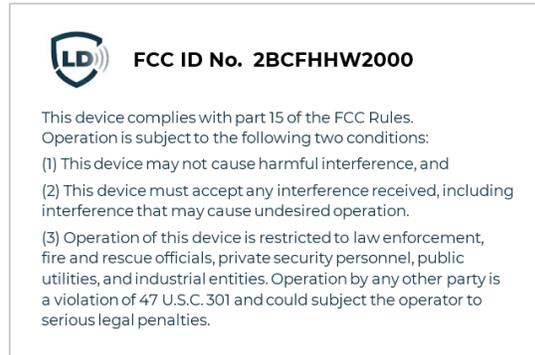


Figure 2. FCC ID Label

7. Verify requirements and restrictions for UWB modular approvals.

Not applicable not seeking modular approval.

8. TCB to include §15.521(a) statement on Grant Restrictions and verify the required device/user manual for all UWB modes of operation.

TCB to fill.