ELECTROMAGNETIC COMPATIBILITY & RADIO COLLOCATION TEST REPORT

Report Reference Number:	E11099-2003_Guardhat_IS-HC1.1(NA Version)_**Rev 1.1**
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Laboratory Accreditations (per ISO/IEC 17025:2017)

ACCREDITED
CERT #3657.02

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Manufacturer:	**Guardhat Inc.**
Address:	1520 Woodward Ave., 3rd Floor Detroit MI, 48226 USA
Equipment Tested:	**IS-HC1.1**
Model Number(s):	IS-HC1.1
FCC IC: IC ID :	2AR6OHC1000 24751-HC1000

GUARDHAT

REVISION HISTORY

Date	Report Number	Details	Author's Initials
June 18, 2021	E11099-2003_Guardhat_IS-HC1.1(NA Version)_**Rev 1.1**	FCC/IC ID	RH
June 1, 2021	E11099-2003_Guardhat_IS-HC1.1(NA Version)_**Rev 1.0**	Final	RS
All previous versions of this report have been superseded by the latest dated revision as listed in the above table. Please dispose of all previous electronic and paper printed revisions accordingly.			

REPORT AUTHORIZATION

The data documented in this report is for the test equipment provided by the manufacturer. The tests were conducted on the sample equipment as requested by the manufacturer for the purpose of demonstrating compliance with the standards outlined in Section II of this report as agreed upon by the Manufacturer under the quote 20SH09172.

The Manufacturer is responsible for the tested product configurations, continued product compliance, and for the appropriate auditing of subsequent products as required.

This report may comprise a partial list of tests that are required for FCC, ISED and CE. Declaration of Conformity can only be produced by the manufacturer.
This is to certify that the following report is true and correct to the best of our knowledge.

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QAI EMC ACCREDITATION

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EMC Laboratory Location	FCC Designation (3m SAC)	IC Registration (3m SAC)	A2LA Certificate
Burnaby, BC, Canada	CA9543	9543A	3657.02

EMC Facility Burnaby BC, Canada

TABLE OF CONTENTS

Section I: GENERAL INFORMATION

1.1 Product Description

The information provided in this section is for the Equipment Under Test (EUT) and the corresponding Auxiliary Equipment needed to perform the tests as a complete system.

Equipment Under Test (EUT) Information

EUT	Description	Manufacturer	Model No.	Serial No.
IS-HC1.1	Guardhat Intrinsically Safe Smart Hardhat	Guardhat Inc.	IS-HC1.1	---
Note: Lowest Frequency Generated or Tuned upon within the EUT : 380kHz Highest frequency generated or tuned upon within the EUT is 6.5 GHz.				

Radio Modules

Wireless Function	Manufacturer	Manufacturer/Module Part Number	FCC ID	Certified
NFC	NXP	PN7150B0HN/C1102Y	N7NHL7588	Yes
Wifi-BT-BLE on SOM	Qualcomm on Intrinsyc Integrated Som	WCN3680B Qualcomm on Intrinsyc 626 SOM (Integration)	2AFDI-ITCOQ626S	Yes
UWB	DECAWAVE	Decawave DW1000 on 2AR6OGHP2470	2AR6OGHP2470	Yes

Wireless Function	Manufacturer	Manufacturer/Module Part Number	IC ID	Certified
NFC	NXP	PN7150B0HN/C1102Y	2417C-HL7588	Yes
Wifi-BT-BLE on SOM	Qualcomm on Intrinsyc Integrated Som	WCN3680B Qualcomm on Intrinsyc 626 SOM (Integration)	9049A-ITCOQ6265	Yes
UWB	DECAWAVE	Decawave DW1000 on 2AR6OGHP2470	24751-GHP2470	Yes

Summary of Model Difference between HC1 and IS-HC1.1:

The HC1 device has been modified to be used in hazardous locations with a new HVIN designation: IS-HC1.1. Changes have been made to the digital support circuitry to comply with “Intrinsically Safe“ requirements.

The IS-HC1.1 added more dc power domains between functions (audio, video, etc), dc current limiting to prevent over current situation in the event of component failures, potting over various circuits to add thermal and spark protection, and an intrinsically safe battery pack. All of these additions ensure that the electronics in IS-HC1.1 are intrinsically safe while maintaining wireless and system performance consistent with HC1. The IS-HC1.1 utilizes utilize the same pre-certified modules with minimal movement of components around those modules.

HC1 Battery Power distribution

From the distribution board, there is a 0 Ohm jumper that connects the position board to the battery. In addition, the distribution board has two ferrite beads (Murata p/n BLM31PG330SN1L) that connect the sensor and carrier boards to the battery. These ferrite beads are used on both versions of the distribution board.

IS-HC1.1 Battery Power distribution

IS-HC1.1 power distribution goes from the battery to the distribution board. From the distribution board, there is an electronic current limiter that connects the position board to the battery. In addition, the distribution board has two ferrite beads (Murata p/n BLM31PG330SN1L) that connect the sensor and carrier boards to the battery. These ferrite beads are used on both versions of the distribution board.

HC1 Battery

The non-IS battery for HC1 is composed of two cells from JHY, part number JHY784860. Each cell has a 2400mAh capacity (4800mAh total pack capacity) and 3.7V nominal voltage. Each cell is connected to its own protective circuit.

IS-HC1.1 Battery

The IS battery for IS-HC1.1 is composed of two cells from Molicel, part number ICP103450DA. Each cell has a 2200mAh capacity (4400mAh total pack capacity) and 3.7V nominal voltage. Each cell is connected to its own protective circuit.

Ancillary Equipment

Equipment	Item/Description	Count	Manufacturer	Model No.	Serial No.
Laptop	Setting test modes. Win10 Home OS build 1836.388	1	HP	14ds-0003dx	5CD932C5Q5
USB cable	Micro USB for communication b/w laptop and EUT.	3	Various	N/A	N/A

Ancillary Boards

Item	Item/Description	Count	Version	Manufacturer	Specifications
Carrier Debugger Board	Setting LTE test modes	1	v2	Guardhat	PCB 20-980020-200
USB to UART Bridge	Setting Zigbee and UWB test modes	1	N/A	N/A	FT232R

Ancillary Software

Software	Description	Application in Test	Publisher	Version
Vysor	Android mirror and access control from PC	Virtual interface to SOM626	Vysor	Pro Ver. 2.1.7
QRCT_CONN3	Radio Control Toolkit	Setting test modes for WLAN, BT and BLE.	QUALCOMM Atheros	3.0.248.0
Windows command prompts	N/A	Configuring SOM626 and setting NFC.	Windows	N/A
Tera Term	Terminal emulator	Setting test modes for LTE	Tera Term project	4.104 (SVN# 8043)
Radio Test Mode Tool	N/A	Setting modes for UWB and Zigbee.	N/A	N/A

Product Specifications

Wireless Connectivity	UWB, Zigbee, Wifi, LTE, NFC, BLE, Bluetooth
Multimedia Options	LEDs, Audio Speakers, Microphones, 13MP Camera (video and still image), PTT, VOIP, Video Uplink
3-D Location Accuracy	< 1 meter
Sensors	Temperature, Humidity, Pressure, Noise Level, Hat Not Worn, Fall Detection, Proximity Danger
Battery Capacity	4.4 Ah (typically 8 -12 hours)
Maximum Weight (with suspension)	970 g / 2 lb, 2.2 oz
Operating Temperature IS-HC1.1	-20° C to 60° C / -4° F to 140° F
Operating Temperature IS-HC1.1 w/ BPIS-HF1.1A Battery	-20° C to 57° C / -4° F to 134° F
Storage Temperature	-20° C to 60° C / -4° F to 140° F
Recommended Battery Storage Temperature	20° C ± 5° C / 68° F ± 9° F
PPE Certification	ANSI/ISEA Z89.1-2014, Type 1, Class G EN397:2012+A1:2012, Electrical Insulation 440 V A.C.
ATEX/IECEx	II 2G Ex ib IIC T4 Gb II 2D Ex ib IIIC T135° C Db IP65
Hazloc	Class I Div. 1 Gropuls ABCD T4 Class II Div. 1 Groups EFG Class III Div. 1
Ingress Protection	IP65

EUT Test Mode/Configuration/Operation During Testing

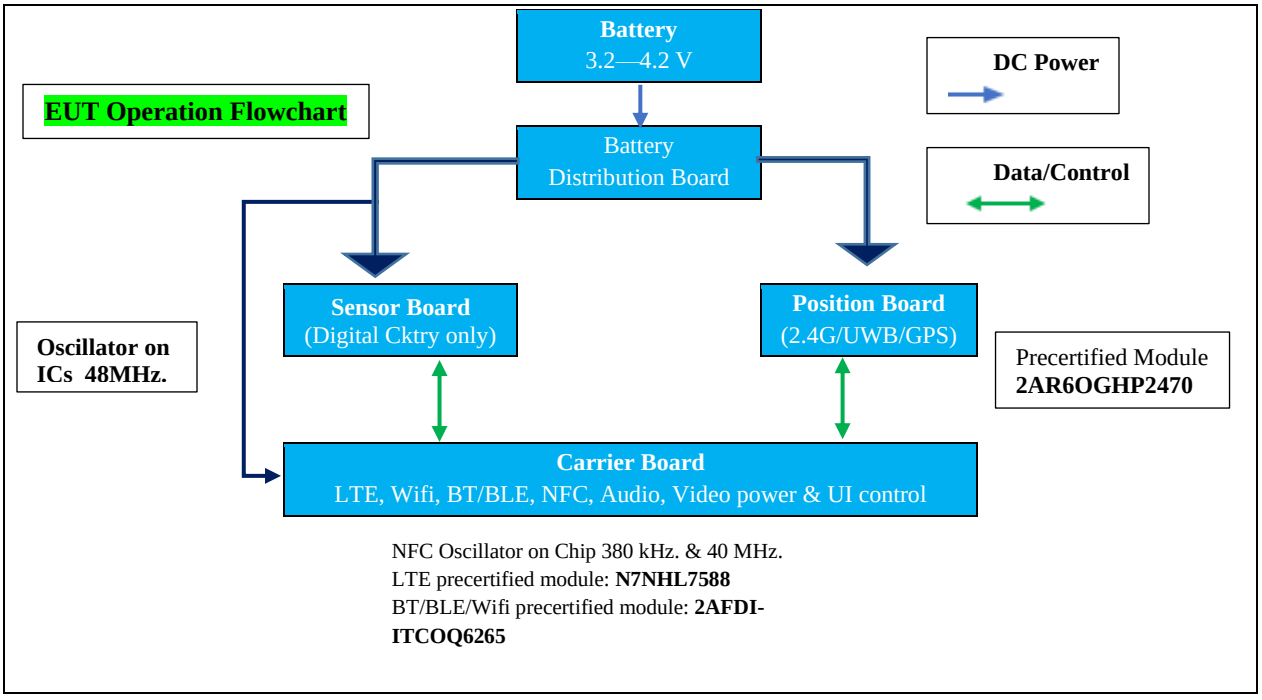
Mode	EUT Test Configuration/Operation	Worst Case
1	Operating continuously on Battery 4.2V (2x2400 mAHr.)	Mode 1

Emissions Test Settings

Transmitter	Test channels /frequencies	Test waveforms /modes	Test rates	General specifications	Output power (dBm)
LTE	1785 MHz 2535 MHz	10MHz bandwidth LTE PUSCH 50 RBs <0,0>	N/A	QPSK Net signal val 1	23
Bluetooth	CH 19 CH 78	BT2_DH5 BT3_DH5	N/A	Payload 339 Pseudorandom	9
Ultra-Wide Band	CH 2 CH 5	PRF 16 MHZ Continuous Wave	850 k	PreambCode 3 Length 256 Att. 0 dB	-21dBm/500MHz.
NFC	13.56 MHz	PRBS Tech. A	106	N/A	N/A

Test Modes - Transmitter Mapping

10 kHz – 30 MHz	30 MHz-1GHz	1GHz – 18 GHz
ON	ON	ON
Ultra-Wide Band CH 5	Ultra-Wide Band CH 5	Ultra-Wide Band CH 2
LTE 1875	LTE 1875	LTE 2535
Bluetooth CH78	Bluetooth CH78	Bluetooth CH19
NFC	NFC	NFC



Monitoring the EUT As per client's instructions and procedures.

1.2 Environmental Conditions

The equipment under test was operated and tested under the following environmental conditions:

Parameter	Conditions
Location	Indoors
Temperature	21ºC
Relative Humidity	48.5 %
Atmospheric Pressure	101.1 kPa

1.3 Measurement Uncertainty

Parameter	Uncertainty
Radiated Emissions, 30MHz-1GHz	± 2.40 dB
Radiated Emissions, 1GHz-40GHz	± 2.48 dB
Conducted Emissions, 0.15MHz-30MHz	± 2.82 dB
Radio Frequency	±1.5 x 10-5 MHz
Total RF Power Conducted	±1.36 dB
Spurious Emissions, Conducted	±1.36 dB
RF Power Density, Conducted	±1.36 dB
Temperature	±1ºC
Humidity	±5 %
DC and low frequency voltages	±3 %

1.4 Worst Test Case

Worst-case orientation was determined during the preliminary testing.
The final radiated emissions were performed in the worst-case orientation.

1.5 Sample Calculations of Emissions Data

Radiated and conducted emissions were performed using EMC32 software developed by Rohdes & Schwarz. Transducer factors like Antenna factors, Cable Losses and Amplifier gains were stored in the test templates which are used to perform the emissions measurements. After test is finished, data is generated from the EMC32 consisting of product details, emission plots and final data tables as shown below.

Frequency (MHz)	Q-Peak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Ant. Ht. (cm)	Pol	Turntable Position (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
42.663900	33.0	1000.000	120.000	100.0	H	70.0	13.2	7.5	40.5

Quasi-Peak reading shown in the table above is already corrected by the software using correction factor shown in column "Corr." The correction factor listed under "Corr." table calculated as:

Corr.(dB) = Antenna factor + Cable loss

Or

Corr.(dB) = Antenna factor + Cable Loss - Amp gain (if pre-amplifier was used)

The final Quasi peak reading shown in the data is calculated by the software using following equation:

Corrected Quasi-Peak (dBµV/m) = Raw Quasi-Peak Reading + Antenna factor + Cable loss

To obtain the final Quasi-Peak or Average reading during power line conducted emissions, transducer factors are included in the final measurement as shown below.

Frequency (MHz)	Q-Peak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.150	44.3	1000.000	9.000	GND	0.6	21.7	66.0

Frequency (MHz)	Average (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.150	27.2	1000.000	9.000	GND	0.6	28.8	56.0

Quasi Peak or Average reading shown in above table is already corrected by the software using the correction factor shown in column "Corr." The correction factor listed under "Corr." table calculated as:

Corr.(dB) = Antenna factor + Cable loss

The final Quasi-peak or Average reading shown in the data is calculated by the software using following equation:

Corr. Quasi-Peak/Average Reading (dBµV) = Raw Quasi-Peak/Average Reading + Antenna factor + Cable loss

The allowable margin from the limits, as per the standards, were calculated for both radiated and conducted emissions:

Margin(dB) = Limit – Quasi-Peak or Average reading

1.6 Test Equipment List

The tables below contain all the equipment used by QAI Laboratories in conducting all tests on the Equipment Under Test (EUT) as per Section I.

Emissions Test Equipment

Sl. NO.	Manufacturer	Model	Description	Serial No.	S/W Version	Calibration Due Date
1	AH Systems	PAM118	Amplifier (10KHz-18GHz)	189	N/A	Conditional Use
2	California Instruments	PACS-1	Harmonics and flicker analyzer	52117	CTS3.0 v3.2.0.35	2021-May-23
3	California Instruments	OMNI 1-18 I	Programmable Impedance Flicker test	--	N/A	2021-May-23
4	California Instruments	3001ix	Power supply	HK52117	N/A	2021-May-23
5	EMCO	3825/2	LISN (150kHz-30MHz)	9002-1601	N/A	2021-Aug-25
6	ETS Lindgren	3117	Horn Antenna, 1.0-18 GHz	75944	N/A	2021 Aug 29
7	ETS Lindgren	2165	Turntable	00043677	N/A	N/A
8	ETS Lindgren	2125	Mast	00077487	N/A	N/A
9	ETS Lindgren	S201	5-meter Semi-Anechoic Chamber	1030	N/A	N/A
10	Hewlett Packard	8449B	Preamplifier (1-26 GHz)	2933A00198	N/A	2022-Jan-22
11	Rohde & Schwarz	ESU40	EMI Receiver	100011	EMC32 v10.35.10/ FV 4.73 SP4	2021-Sept-20
12	Sunol Sciences	SM46C	Turntable	051204-2	N/A	N/A
13	Sunol Sciences	TWR95	Mast	TREML0001	N/A	N/A
14	Sunol Sciences	JB3	Biconilog Antenna 30MHz – 2GHz	A120106	N/A	2022 May 10
15	Sunol Sciences	JB3	Biconilog Antenna 30MHz – 2GHz	02052019A	N/A	2022 May 10
16	Sunol Sciences	JB1	Biconilog Antenna 30MHz – 2GHz	A070209	N/A	2021 Aug 17
17	Sunol Sciences	DRH-118	Horn Antenna 1GHz-18GHz	A050905	N/A	2021 Aug 17

Measurement Software List

Sl. No.	Manufacturer	Model	Version	Description
1	Rhode & Schwarz	EMC 32	10.35.10	Emissions Test Software
2	TESEQ	WIN 3000	1.2.0	Surge, EFT & Voltage Dips Immunity Test Program
3	Thurlby Thandar Instruments	HA-PC Link Version	2.02	Harmonics and Flicker Test Program
4	VI Automation	Via EMC Immunity Executive	1.0.308	Radiated and Conducted Immunity Test Program

Note: Equipment listed above have 3 years calibration interval.

Section II: EXECUTIVE SUMMARY OF STANDARDS AND LIMITS

2.1 Purpose

The purpose of this report is to demonstrate and document the compliance of "IS-HC1.1 Hardhat" as per Sections 2.2 & 2.3 of this report.

2.2 Scope

The information documented in this report is based on the test methods and levels as per Quote 20SH09172.

CFR Title 47 FCC Part 15	– Radio Frequency Devices, Subpart B – Unintentional Radiators
ICES-003 Issue 6	– Information Technology Equipment (Including Digital Apparatus)
	– Limits and Methods of Measurement
FCC Title 47 Part 15	– Radio Frequency Devices, Subpart C – Intentional Radiators.
	–15.225: Operation within the band 13.110-14.010 MHz
RSS-210 Issue 8	**–**License-exempt Radio Apparatus (All Frequency Bands): Category I Equipment
	–Band 13.110-14.010 MHz

2.3 Summary of Results

The following tests demonstrate the testimony to "FCC and ISED" Mark Electromagnetic compatibility testing for "IS-HC1.1 Hardhat".

Test or Measurement	Applicable FCC and IC Standard	Performance Criteria
Radiated Spurious Emissions	CFR Title 47 FCC Part 15 - Subpart B ICES-003 Issue 6	Comply
Maximum Output Power - EIRP Exposure Evaluation	CFR Title 47 FCC Part 15.225 (13.110-14.010 MHz) RSS-210 Issue 8 (Band 13.110-14.010 MHz)	Comply
Out of Band Emissions (Band Edge)	CFR Title 47 FCC Part 15.225 (13.110-14.010 MHz) RSS-210 Issue 8 (Band 13.110-14.010 MHz)	Comply

Note: The gain of the antenna is provided by the client to measure or calculate test results and is not measured by QAI.

Section III: DATA & TEST RESULTS

Part 1 - Emissions & Radio Collocation Testing

3.1 Radiated Spurious Emissions

- **Date Performed:** February 16, 18, 2021
- **Test Standard:** CFR Title 47 FCC Part 15 - Subpart B
  ICES-003 Issue 6
- **Test Method:** ANSI C63.4-2014
- **Modifications:** No modification was required to comply for this test.
- **Result:** The EUT **comply** with the applicable standard.

Test Limits:

1) Radiated emission limits; general requirements – intentional radiators:

The emissions from an intentional radiator shall not exceed the field strength levels specified in the following table as per §15.209:

Frequency, *f* (MHz)	**Maximum Field strength Quasi-peak (dBµV/m at 3 m)**
0.009 – 0.490	2400/F(kHz)
0.490 – 1.705	24000/F(kHz)
1.705 – 30.0	49.5
30 – 88	40.0
88 – 216	43.5
216 – 960	46.0
above 960	54.0

Note 1: The above field strength limits are specified at a distance of 3 meters. The tighter limits apply at the band edges.

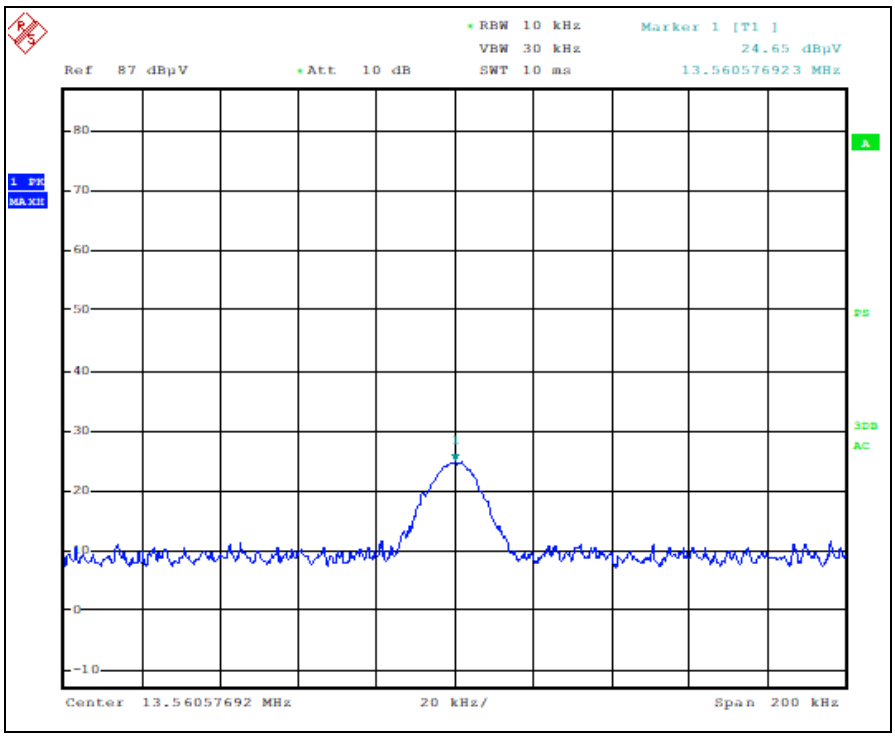
Note 2: The emissions limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz., 110-490 kHz. and above 1000 MHz.

Radiated emission limits in these three bands are based on measurements employing an average detector

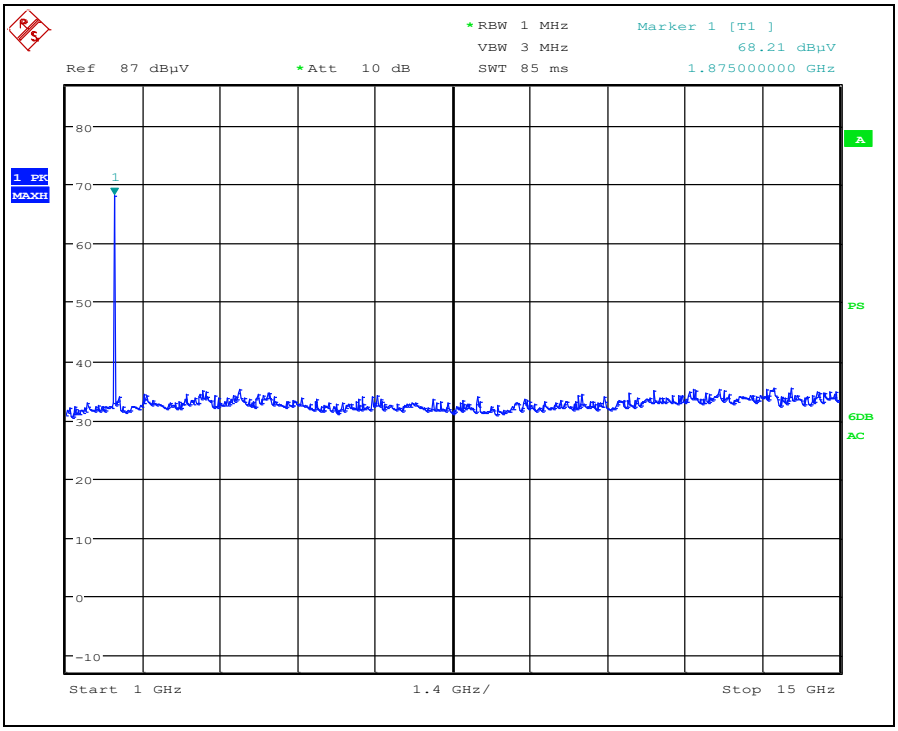
Maximum Field Strength (dB mV/m at 3 m)		
Frequency (GHz)	**Peak**	**Average**
1-40	60	80

Note 1: The lower limit shall apply at the transition frequency
Note 2: Additional provisions may be required for cases where interference occurs

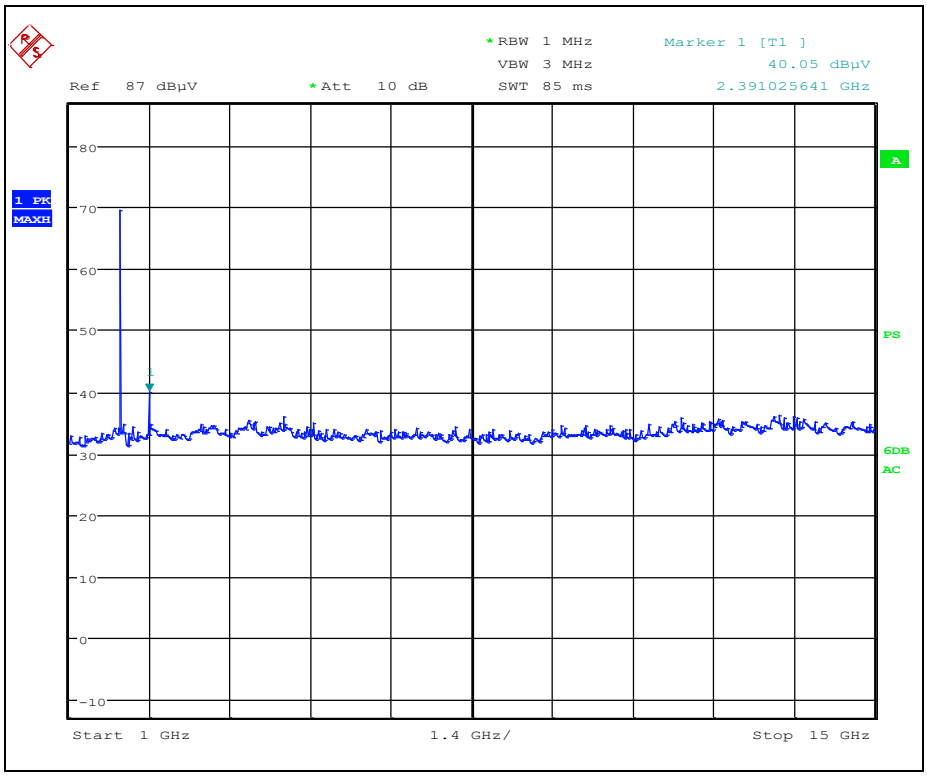
Measurement Data and Plots:



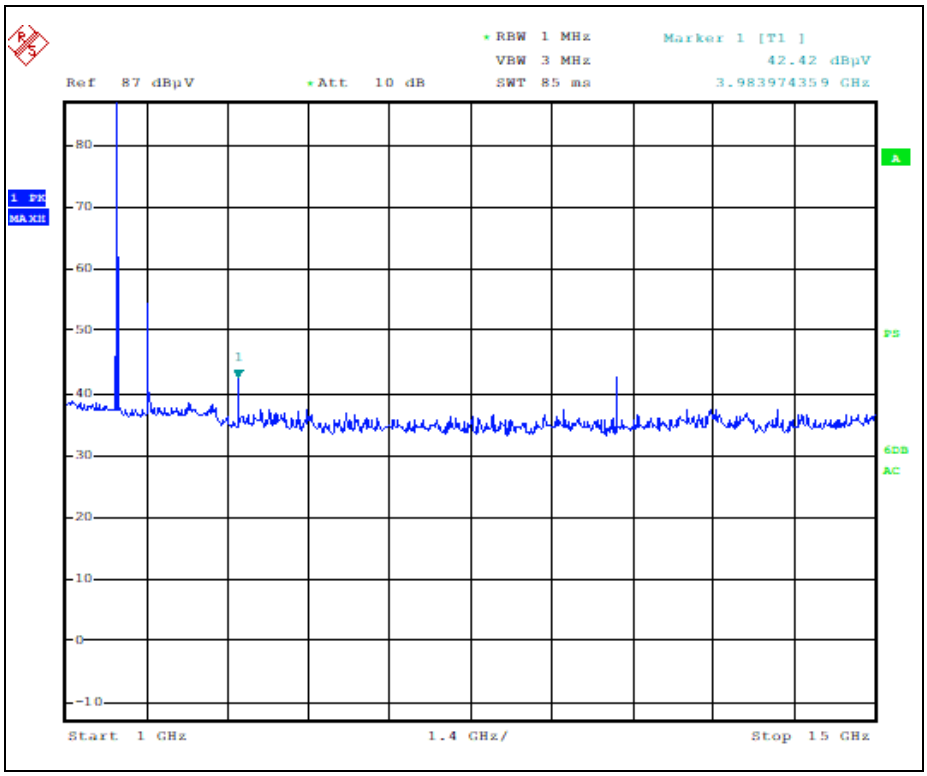
Plot 1: RFID was turned on



Plot 2: LTE turned on (see marker 1)

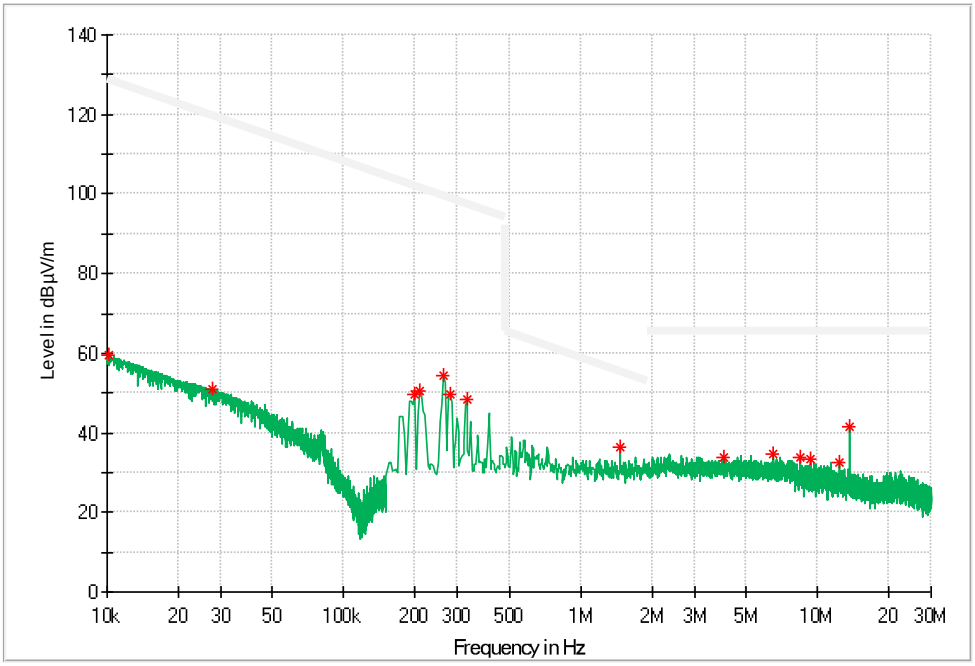


Plot 3: BT was on (see marker 1)



Plot 4: UWB was turned on (see marker 1)

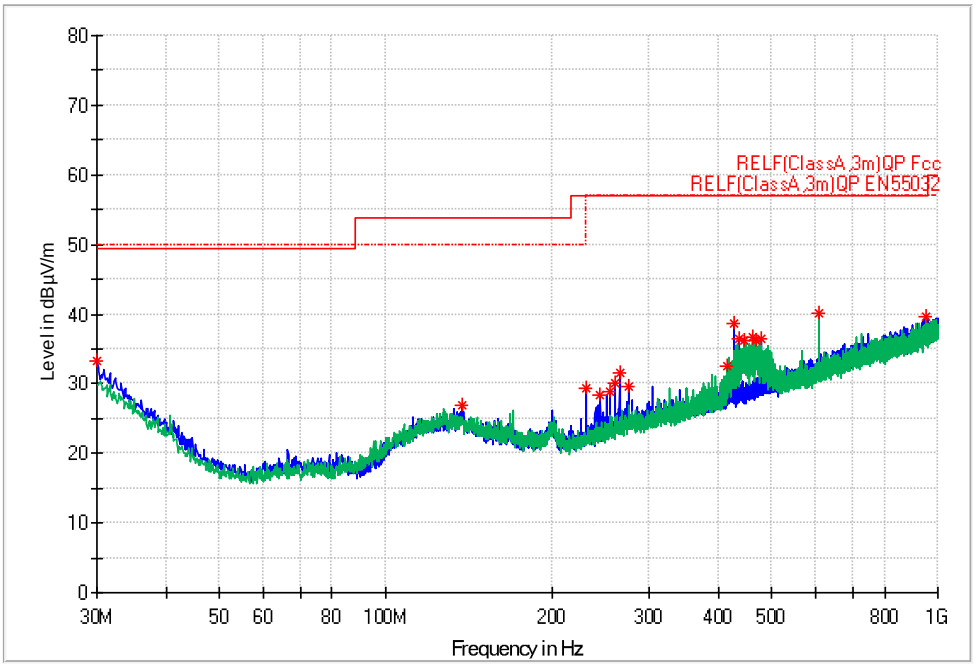
- Test Voltage Used: Battery 4.2VDC
- Frequency Range: 10kHz to 30MHz



Plot 5: Radiated Emissions scanned at 3m SAC−for reference only

Note: No emission of significance were observed.

- Test Voltage Used: Battery 4.2VDC
- Frequency Range: 30MHz to 1GHz



Plot 6: Radiated Emissions scanned at 3m SAC−for reference only

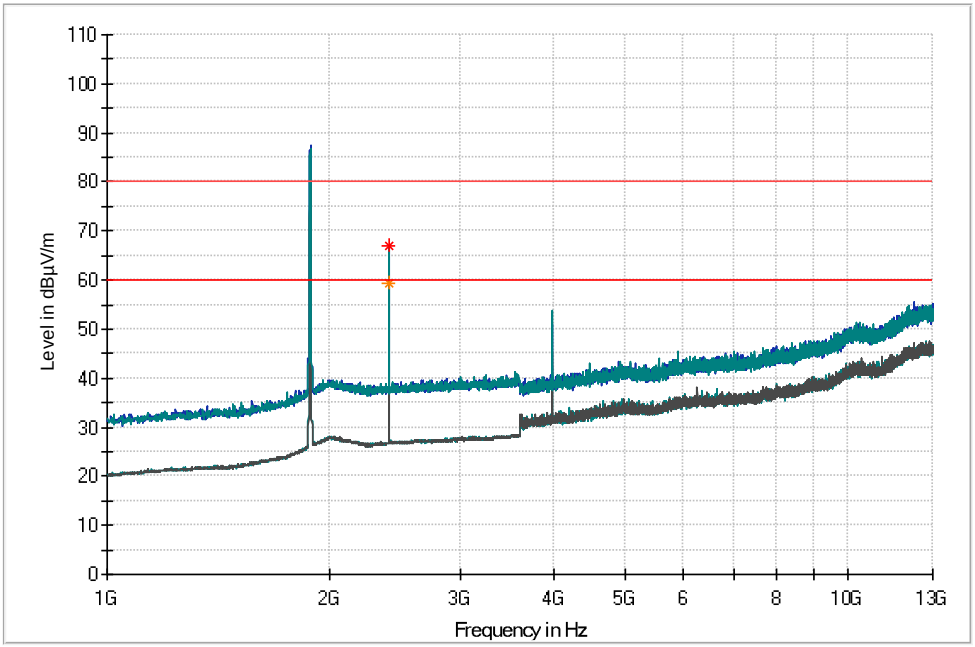
Table 1: Max. and Avg. Peak Data of Radiated Emissions at 3m SAC

Frequency (MHz)	Max. Peak (dBµV/m)	FCC/ISED Limit (dBµV/m)	FCC/ISED Margin (dBµV/m)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
255.0400	28.8	46	17.20	100.0	H	326	19.7
244.9763	28.4	46	17.60	100.0	H	358	19.6
230.5475	29.3	46	16.70	150.0	H	0	19.1
260.0113	30.0	46	16.00	150.0	H	174	20.2
264.9825	31.5	46	14.50	150.0	H	207	20.8
427.0938	38.6	46	7.40	200.0	H	47	25.1
30.0000	33.2	46	12.80	200.0	H	77	27.5
479.2313	36.5	46	9.50	200.0	H	88	26.4
435.7025	36.6	46	9.40	250.0	H	250	25.2
275.0463	29.6	46	16.40	350.0	H	90	21.3
137.3063	26.9	46	19.10	400.0	H	0	20.5
414.3625	32.4	46	13.60	100.0	V	0	24.4
447.2213	36.2	46	9.80	100.0	V	0	25.1
460.4375	36.6	46	9.40	100.0	V	0	25.3
467.8338	36.3	46	9.70	100.0	V	0	25.6
610.1813	40.2	46	5.80	100.0	V	15	28.1
954.5313	39.7	46	6.30	300.0	V	4	33.1

The following worst-case transmitters and channels were determined and examined from previous test reports.

Transmitters in worst case:	LTE:	1875 MHz
	BT:	CH 78, BT3_DH5
	UWB:	CH 5 - 6495 MHz
	NFC	

- Test Voltage Used: Battery 4.2VDC
- Frequency Range: 1GHz to 13GHz



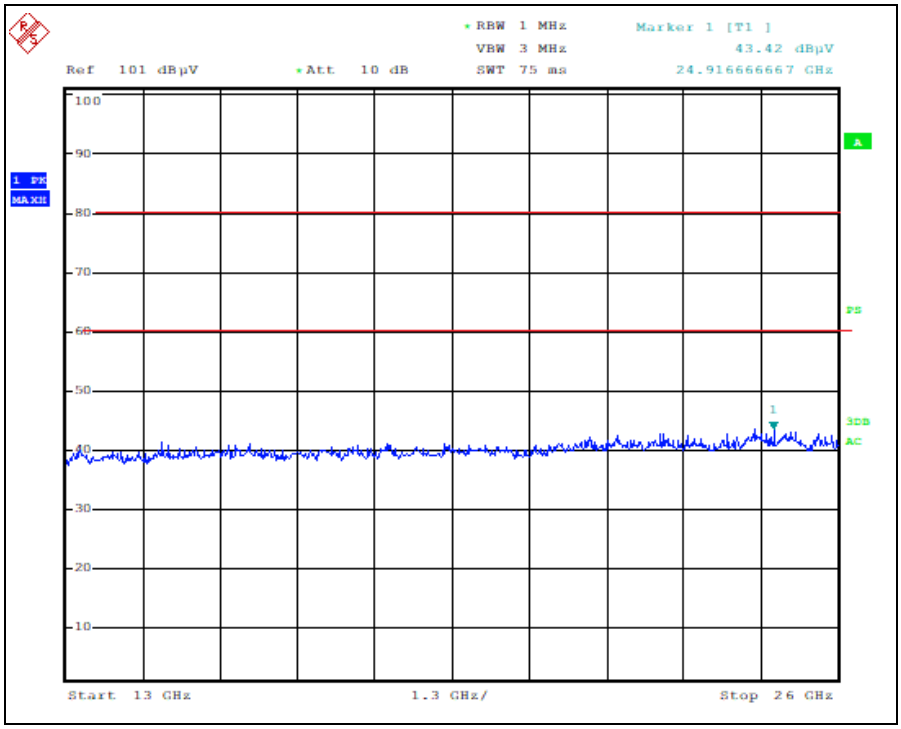
Plot 7: Radiated Emissions scanned at 3m SAC−for reference only

Table 2: Max. & Avg. Peak Data of Radiated Emissions at 3m SAC

Frequency (MHz)	Max Peak (dBµV/m)	Average (dBµV/m)	FCC/ISED Limit (dBµV/m)	FCC/ISED Margin (dBµV/m)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
12286.3000	---	47.02	60.0	12.98	150.0	V	248	15.8
17858.9000	---	56.89	60.0	3.11	250.0	H	292	26.1
3993.7000	---	45.36	60.0	14.64	150.0	V	195	2.4
17886.1000	64.09	---	80.0	15.91	100.0	H	0	26.1
2402.5000	67.10	---	80.0	12.90	250.0	V	17	-0.7

Transmitters in worst case: LTE: 2535 MHz
BT: CH 19, BT2_DH5
UWB: CH 2 - 3993 MHz
NFC

- Test Voltage Used: Battery 4.2VDC
- Frequency Range: 13GHz to 26GHz



Plot 8: Radiated Emissions scanned at 3m SAC−for reference only

Transmitters in worst case: LTE: 2535 MHz
BT: CH 19, BT2_DH5
Zigbee
NFC

Part 2 - Class II Permissive Change Data and Test Results

3.2 Maximum Output Power- EIRP Exposure Evaluation

- **Date Performed:** February 18, March 5, 2021
- **Test Standard:** CFR Title 47 FCC Part 15.225 (13.110-14.010 MHz)
  RSS-210 Issue 8 (Band 13.110-14.010 MHz)
- **Test Method:** ANSI C63.4-2014
- **Modifications:** No modification was required to comply for this test.
- **Result:** The EUT **comply** with the applicable standard.

Test Requirement:

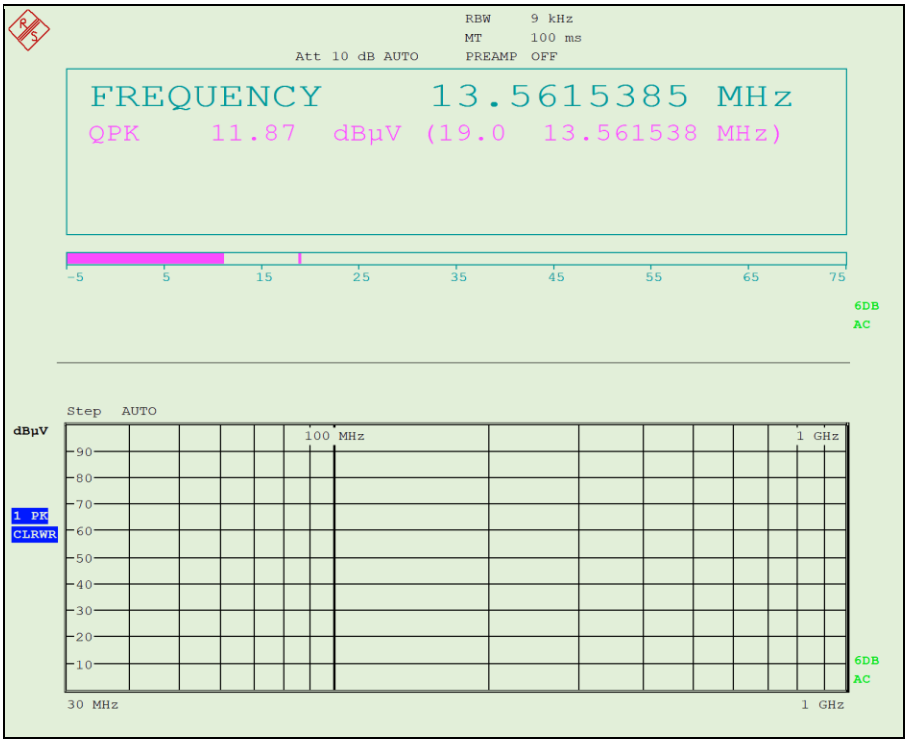
15.255 (a) The field strength of any emissions within the band 13.553-13.567 MHz shall not exceed 15,848 microvolts/meter at 30 meters.

Measurement Data and Plots:

- Test Voltage Used: Battery 4.2VDC
- Frequency: 13.56MHz

E.I.R.P. = E0 + 20 log10 D – 104.8
E.I.R.P. = e.i.r.p. corresponding with the electric field strength E0 (in dBm)
E0 = electric field strength (in dB(uV/m))
D = reference measurement distance (in meters).

Note: free-space propagation is assumed



Plot 9: Radiated Emissions scanned at 3m SAC–for reference only

Table 1: Max. & Avg. Peak Data of Radiated Emissions at 3m SAC–Class A Limit

Wireless Function	Frequency (MHz) RFID ON	Max. Quasi-Output Voltage (dBuV)	Corr. Factor (dB/m)	Quasi Peak (dBuV/m)	EIRP (dBm)	EIRP (mW)	Limit at 30 m (dBuV/m)	Limit at 3 m (dBuV/m)	Results
Current RFID	13.5615	19.0	21.3	40.30	-44.20	0.030	84	104	Comply
Previous report highest reading	---	---	---	**42.8**	---	---	---	---	---

Note 1) At 13.5615 MHz Maximum Quasi peak is 19.0 and correction factor is 21.3 therefore the Quasi peak is 40.3 which is 2.5 dB below the original test report.
Note 2) 20log d1/d2 for 3 to 30 m distance
Note 3) Meet Class I Permissive change
Note 4) Maximum reading peak was at position of "skewed"

3.3 Out of Band Emissions (Band Edge)

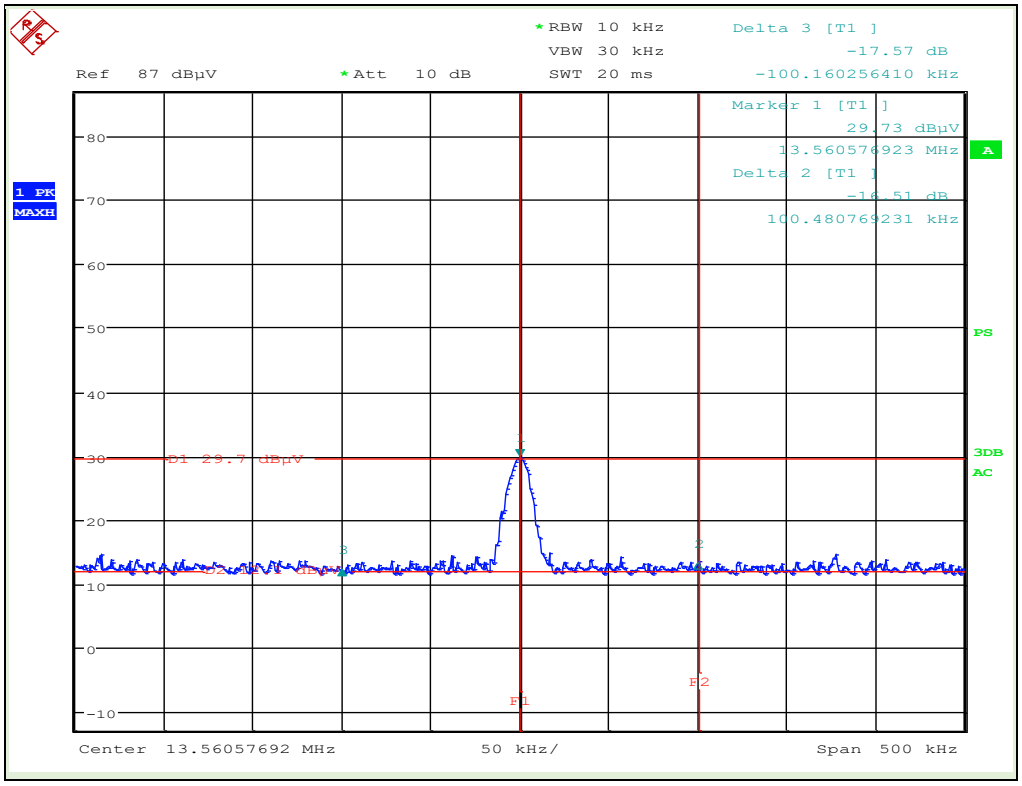
- **Date Performed:** February 18, 2021
- **Test Standard:** CFR Title 47 FCC Part 15.225 (13.110-14.010 MHz)
  RSS-210 Issue 8 (Band 13.110-14.010 MHz)
- **Test Method:** ANSI C63.4-2014
- **Modifications:** No modification was required to comply for this test.
- **Result:** The EUT **comply** with the applicable standard.

Test Requirement:

In any 100kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the RF power that is produced shall be at least 20 dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided that the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of root-mean-square averaging over a time interval, as permitted under Section A8.4 (4), the attenuation required shall be 30 dB instead of 20dB.

Measurement Data and Plots:

- Test Voltage Used: Battery 4.2VDC
- Frequency: 13.56MHz



Plot 10: Band Edge scanned at 3m SAC–for reference only

Appendix A: ABBREVIATIONS

Abbreviation	Definition
AC	Alternating Current
AM	Amplitude Modulation
ASW	Anti-Submarine Warfare
BIT	Built-in-Test
CE	European Conformity
CISPR	Comité International Spécial des Perturbations Radioélectriques (International Special Committee on Radio Interference)
DC	Direct Current
EFT	Electrical Fast Transient
EMC	Electro Magnetic Compatibility
EMI	Electro Magnetic Interference
ERP	Effective Radiated Power
ESD	Electrostatic Discharge
EUT	Equipment Under Test
FCC	Federal Communications Commission
FVIN	Firmware Version Identification Number FVIN
GFE	Government Furnished Equipment
IC	Industry Canada
ICES	Interference Causing Equipment Standard
IEC	International Electrotechnical Commission
LISN	Line Impedance Stabilizing Network
OATS	Open Area Test Site
RF	Radio Frequency
RMS	Root-Mean-Square
SAC	Semi-Anechoic Chamber
TEM	Transverse Electromagnetic
TPD	Terminal Protection Device

END OF REPORT