Report on the FCC and IC Testing of the IEE Sensing Inc Unattended Child Detection Sensor Model: LiDAS In accordance with FCC 47 CFR Part 15 C and ISED RSS-210 and ISED RSS-Gen

Prepared for: IEE Sensing Inc
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COMMERCIAL-IN-CONFIDENCE

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RESPONSIBLE FOR	NAME	DATE	SIGNATURE
Project Management	Martin Steindl	2020-10-06	Steindl Martin SIGN-ID 406509
Authorised Signatory	Matthias Stumpe	2020-10-06	Stumpe SIGN-ID 406526

Signatures in this approval box have checked this document in line with the requirements of TÜV SÜD Product Service document control rules.

Engineering Statement:

This measurement shown in this report were made in accordance with the procedures described on test pages.
All reporded testing was carried out on a sample equipment to demonstrate limited compilance with with FCC 47 CFR Part 15 C and ISED RSS-210 and RSS-GEN.
The sample tested was found to comply with the requirements defined in the applied rules.

RESPONSIBLE FOR	NAME	DATE	SIGNATURE
Testing	Martin Steindl	2020-10-06	Steindl Martin SIGN-ID 406510

Laboratory Accreditation	Laboratory recognition	Industry Canada test site registration
DAkkS Reg. No. D-PL-11321-11-02 DAkkS Reg. No. D-PL-11321-11-03	Registration No. BNetzA-CAB-16/21-15	3050A-2

Executive Statement:

A sample of this product was tested and found to be compilant with FCC 47 CFR Part 15 C:2019 and ISED RSS-210:2019 and ISED RSS-Gen:2019

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Product Service

Content

Product Service

1 Report Summary

1.1 Modification Report

Alternations and additions of this report will be issued to the holders of each copy in the form of a complete document.

Issue	*Description of changes*	*Date of Issue*
1	First Issue	2020-09-16
2	Altered RF exposure for ISED Altered emission designator to NONE	2020-10-06

Table 1: Report of Modifications

1.2 Introduction

Applicant	IEE Sensing Inc
Manufacturer	IEE Sensing Inc
Model Number(s)	LiDAS
Serial Number(s)	NAD02
Hardware Version(s)	N/A
Software Version(s)	N/A
FCC ID:	2AW4QLIDAS001
IC:	26303-LIDAS001
Number of Samples Tested	1
Test Specification(s) /	FCC 47 CFR Part 15 C : 2019 and
Issue / Date	ISED RSS-210, Issue 10, Amd. 1 : 2019
	ISED RSS-Gen, Issue 5, Amd. 1 : 2019
Test Plan/Issue/Date	N/A
Order Number	2006046403/4
Date	
Date of Receipt of EUT	2020-08-03
Start of Test	2020-08-06
Finish of Test	2020-08-11
Name of Engineer(s)	M. Steindl
Related Document(s)	ANSI C63.10:2013

Product Service

1.3 Brief Summary of Results

A brief summary of the tests carried out in accordance with FCC 47 CFR Part 15 C and ISED RSS-210 and RSS-Gen is shown below.

Section	*Specification Clause*	*Test Description*	*Result*
NAD02, Modification State 0			
---	15.203	Antenna requirement	Pass [1]
2.1	15.215(c)	Bandwidth of Signal	Pass
---	15.207	Conducted Disturbance at Mains Terminal	Not Applicable
2.2	15.209	Radiated Disturbance	Pass

Table 2: Results according to FCC 47 CFR Part 15 C

Section	*Specification Clause*	*Test Description*	*Result*
NAD02, Modification State 0			
2.2	7.3	Radiated Emissions	Pass
---	7.3	AC Power Line Conducted Emissions	Not Applicable

Table 3: Results according to ISED RSS-210

Section	*Specification Clause*	*Test Description*	*Result*
NAD02, Modification State 0			
2.1	6.7	Bandwidth of Signal	Pass
2.3	8.11	Temperature Stability	Pass
---	8.8	AC Power Line Conducted Emissions	Not Applicable
2.2	8.9, 8.10	Radiated Emissions	Pass

Table 4: Results according to ISED RSS-Gen

[1] Internal antenna array – See internal photos for details.

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1.4 Product Information

1.4.1 Technical Description

The EUT is a Doppler radar module that uses 24 GHz ISM band with Continuous Wave signals for motion detection.

Frequency Band	24.00 GHz – 24.25 GHz
Number of frequency channels:	1
Modulation type:	Continuous wave
Emission designator:	5M17N0N
Supply Voltage:	12 V
Supply Frequency:	DC: 0 Hz – Lead acid battery
Highest clock frequency (radio part):	24.25 GHz

1.4.2 List of Antennas

PCB antenna array

1.4.3 EUT Ports / Cables identification

Port	Max Cable Length specified	Usage	Type	Screened
NAD02, Modification State 0				
Control unit to UCD sensor	2 m	Signal / Control port with DC supply		No

Table 5

1.5 Test Configuration

The applicant provided a test sample with a control unit. The EUT was configured as external device of the control unit.

1.6 Modes of Operation

Transmitting continuously

Product Service

1.7 Deviations from Standard

Not applicable

1.8 EUT Modifications Record

The table below details modifications made to the EUT during the test program.
The modifications incorporated during each test are recorded on the appropriate test pages.

Modification State	Description of Modification still fitted to EUT	Modification Fitted By	Date Modification Fitted
0	As supplied by the customer	Not Applicable	Not Applicable

Table 6

Product Service

1.9 Test Location

TÜV SÜD Product Service conducted the following tests at our Straubing test laboratory:

Test Name	Name of Engineer(s)
NAD02, Modification State 0	
Antenna requirement	M. Steindl
Bandwidth of Signal	M. Steindl
Radiated Disturbance	M. Steindl
Temperature Stability	M. Steindl
RF Exposure	M. Steindl

Office Address:
Äußere Frühlingstraße 45
94315 Straubing
Germany

Product Service

2 Test Details

2.1 Bandwidth of Signal

2.1.1 Specification Reference

FCC 47 CFR Part 15 C, Clauses 15.215(c) and 15.249(a)
ISED RSS-Gen, Clause 6.7
ISED RSS-210, Clause B.10 a.

2.1.2 Equipment under Test and Modification State

LiDAS; S/N NAD02, Modification State 0

2.1.3 Date of Test

2020-08-06

2.1.4 Environmental Conditions

Ambient Temperature	24 °C
Relative Humidity	982 %

2.1.5 Specification Limits

The intentional radiator shall be operated in the frequency bands 902 MHz – 928 MHz; 2400 MHz – 2483.5 MHz; 5725 MHz – 5875 MHz or 24.0 GHz – 24.25 GHz.

2.1.6 Test Method

The test was performed according to ANSI C63.10, clauses 6.9
See section 2.2 of this test report for details.

Product Service

2.1.7 Test Results

See Annex A.1 for details on test results

Center frequency	*Lowest Frequency*	*Highest Frequency*	*20 dB Bandwidth (MHz)*
24.139 GHz	24.136702 MHz	24.142317 GHz	5.615 MHz

Table 7: 20 dBc bandwidth

Centre Frequency	*Lowest Frequency*	*Highest Frequency*	*99% Bandwidth (MHz)*
24.139 GHz	24.136904 GHz	24.1420692 GHz	5.165 MHz

Table 8: 99% bandwidth

2.1.8 Test Location and Test Equipment

The test was carried out in Semi Anechoic Room No. 11

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Due
Signal and Spectrum Analysator	Rohde & Schwarz	FSV40	20219	12	2021-01

Table 9

Product Service

2.2 Radiated Emissions

2.2.1 Specification Reference

FCC 47 CFR Part 15 C, Clauses 15.205, 15.209 and 15.249(a) and (b)
ISED RSS-210, Clauses 7.7, B.10 a. and b.
ISED RSS-Gen, Clauses 8.9 and 8.10

2.2.2 Equipment under Test and Modification State

LiDAS; S/N NAD02, Modification State 0

2.2.3 Date of Test

2020-08-07 – 2020-08-10

2.2.4 Environmental Conditions

Ambient Temperature	24 °C
Relative Humidity	982 %

Product Service

2.2.5 Specification Limits

The field strength of fundamental and harmonic emissions measured at 3 m shall not exceed the limits below:

Frequency band (MHz)	*Field strength (mV/m)*	
	Fundamental emissions	*Harmonic emissions*
24000 – 24250	250	2.5

Emissions radiated outside of the specified frequency bands, except for harmonic emissions, shall be attenuated at least 50 dB below the level of the fundamental emissions or to the general field strength limits, whichever is less stringent.
The field strength limits above 1000 MHz are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits by more than 20 dB under any condition of modulation.

General radiated emission limits:					
Frequency Range (MHz)	*Test distance (m)*	*Field strength (µA/m)*	*(dBµA/m)*	*Field strength (µV/m)*	*(dBµV/m)*
0.009 – 0.49	300	6.37 / *f*	20*lg(6.37 / *f*)	2400 / *f*	20*lg(2400 / *f*)
0.49 – 1.705	30	63.7 / *f*	20*lg(63.7 / *f*)	24000 / *f*	20*lg(24000 / *f*)
1.705 - 30	30	0.08	20*lg(0.08 / *f*)	30	20*lg(30 / *f*)
30 – 88	3	---	---	100	40
88 – 216	3	--	---	150	43.5
126 – 960	3	--	---	200	46
above 960	3	--	---	500	54
Note 1: *f* in kHz					

Table 10 General radiated emission limits

Product Service

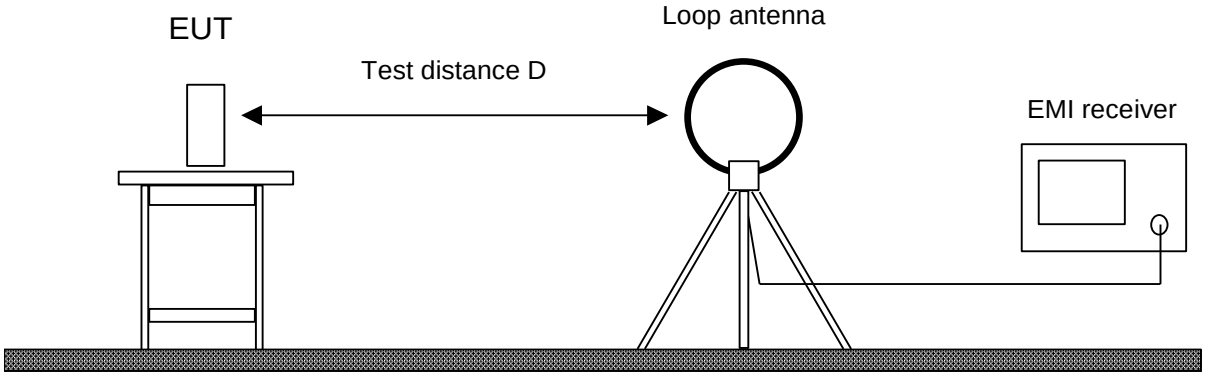
2.2.6 Test Method

The test was performed according to ANSI C63.10, sections 11.11 and 11.12

Prescans are performed in six positions of the EUT to get the full spectrum of emission caused by the EUT with the measuring antenna raised and lowered from 1 m to 4 m with vertical and horizontal polarisation to find the combination of table position, antenna height and antenna polarisation for the maximum emission levels.
Data reduction is applied to these results to select those levels having less margin than 10 dB or exceeding the limit using subranges and limited number of maximums.
Further maximisation for adjusting the maximum position is following.
Equipment and cables are placed and moved within the range of position likely to find their maximum emissions.

Freqeuency range	*Test distance*
9 kHz – 13 GHz	3 m
13 GHz – 18 GHz	1 m
18 GHz – 40 GHz	3 m
40 GHz – 60 GHz	0.5 m
60 GHz – 100 GHz	0.25 m

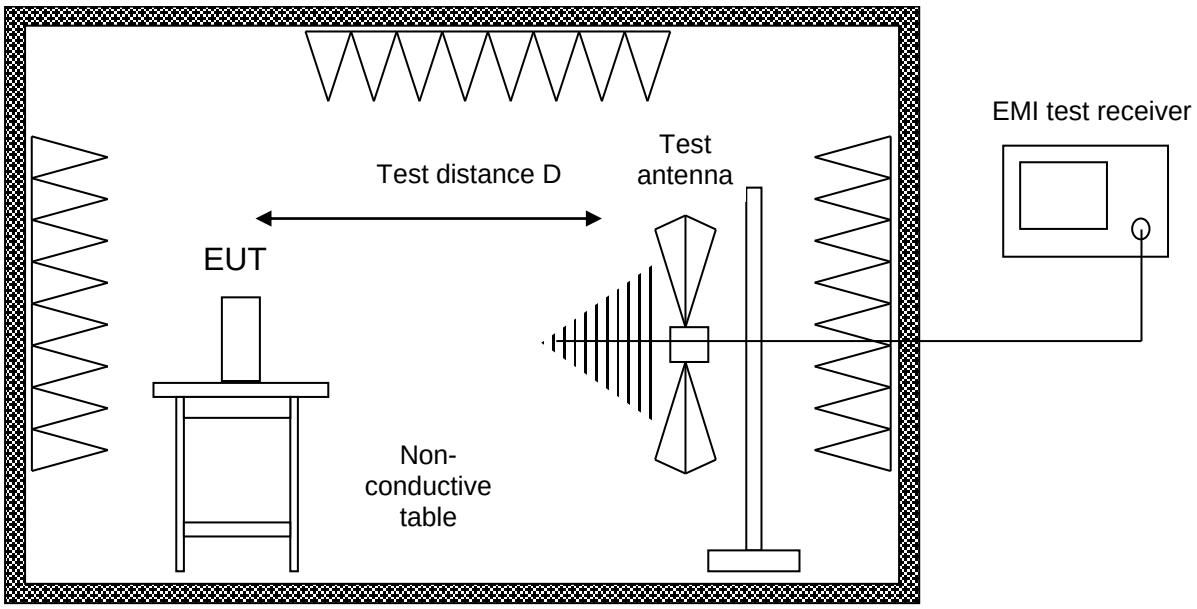
2.2.6.1 Frequency range 9 kHz – 30 MHz



The EUT was placed on a non-conductive table, 0.8 m above the ground.
Radiated emissions in the frequency 9 kHz – 30 MHz is measured within a semi-anechoic room with an active loop antenna with the measurement detector set to peak. In addition in the frequency range 9 kHz to 490 kHz also an average detector was used. The measurement bandwidth of the receiver was set to 300 Hz in the frequency range 9 kHz to 150 kHz and 10 kHz in the frequency range 150 kHz to 30 MHz. Prescans were performed in six positions of the EUT.
For final measurements the detector was set to CISPR quasi-peak and in addition to CISPR average in the frequency range 9 kHz to 490 kHz with a resolution bandwidth 200 Hz in the frequency range 9 kHz to 150 kHz and 9 kHz in the frequency range 150 kHz to 30 MHz. Final tests were performed immediately after a final frequency and zoom (for drifting disturbances) and maximum adjustment.

Product Service

2.2.6.2 Frequency range 30 MHz – 1 GHz

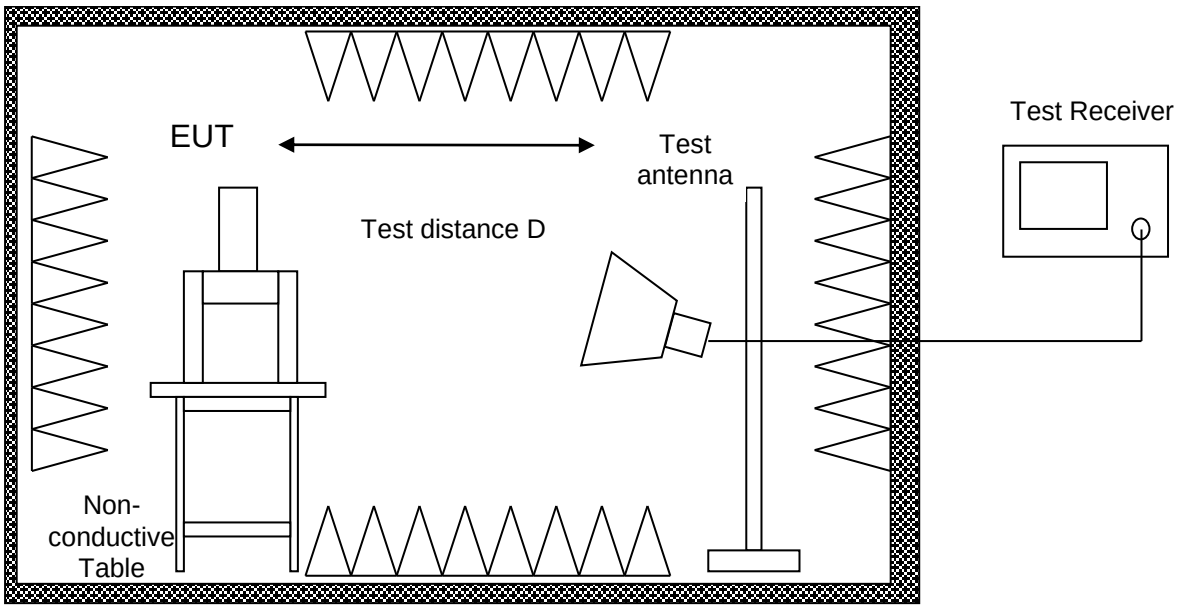


Alternate test site (semi anechoic room)

The EUT was placed on a non-conductive table, 0.8 m above the ground plane
Radiated emissions in the frequency range 30 MHz – 1 GHz is measured within a semi-anechoic room with groundplane complying with the NSA requirements of ANSI C63.4. for alternative test sites. A linear polarised logarithmic periodic antenna combined with a 4:1 broadband dipole (“Trilog broadband antenna”) is used.
For prescan tests the test receiver is set to peak-detector with a bandwidth of 120 kHz.
With the measurement bandwidth of the test receiver set to 120 kHz CISPR quasi-peak detector is selected for final measurements following immediately after a final frequency zoom (for drifting disturbances) and maximum adjustment.

Product Service

2.2.6.3 Frequency range above 1 GHz



Fully anechoic room

The EUT was placed on a non-conductive table, 1.5 m above the ground plane
Radiated emission tests above 1 GHz are performed in a fully anechoic room with the S_{VSWR} requirements of ANSI C63.4. Measurements are performed both in the horizontal and vertical planes of polarisation using a test receiver with the detector function set to peak and average and the resolution bandwidth set to 1 MHz. Testing above 1 GHz is performed with horn antennas with the EUT in boresight of the antenna.
For prescan tests the test receiver is set to peak- and average-detector with a bandwidth of 1 MHz. With the measurement bandwidth of the test receiver set to 1 MHz and peak- and CISPR average-detector is selected for final measurements following immediately after a final frequency zoom (for drifting disturbances) and maximum adjustment.

Product Service

2.2.7 Test Results

Sample calculation:
Final Value (dBµV/m) = Reading Value (dBµV) + (Cable attenuation (dB) + Antenna Transducer (dB(1/m)))

See Annex A.2 for plots taken during tests

Frequency range 9 kHz – 30 MHz:

Frequency MHz	QuasiPeak dBµV/m	CAverage dBµV/m	Limit dBµV/m	Margin dB	Meas. Time ms	Bandwidth kHz	Height cm	Pol	Azimuth deg	Corr. dB/m
8.639250	21.38	---	69.54	48.16	1000.0	9.000	100.0	H	126.0	19.0

Frequency range 30 MHz – 1 GHz:

Frequency MHz	QuasiPeak dBµV/m	Limit dBµV/m	Margin dB	Meas. Time ms	Bandwidth kHz	Height cm	Pol	Azimuth deg	Corr. dB/m
30.360000	21.36	40.00	18.64	1000.0	120.000	131.0	V	114.0	25.6
124.980000	25.08	43.50	18.42	1000.0	120.000	114.0	V	15.0	17.9
927.270000	32.36	46.02	13.66	1000.0	120.000	292.0	H	82.0	29.1

Frequency range 1 GHz – 13 GHz:

Frequency MHz	MaxPeak dBµV/m	CAverage dBµV/m	Limit dBµV/m	Margin dB	Meas. Time ms	Bandwidth kHz	Height cm	Pol	Azimuth deg	Corr. dB/m
7958.750000	64.93		73.98	9.05	1000.0	1000.000	375.0	H	131.0	43.4
7958.750000		51.20	53.98	2.78	1000.0	1000.000	375.0	H	131.0	43.4
12827.750000	61.63		73.98	12.35	1000.0	1000.000	252.0	H	14.0	47.6
12827.750000		48.81	53.98	5.16	1000.0	1000.000	252.0	H	14.0	47.6

Frequency range 13 GHz – 18 GHz:

Frequency MHz	MaxPeak dBµV/m	CAverage dBµV/m	Limit dBµV/m	Margin dB	Meas. Time ms	Bandwidth kHz	Height cm	Pol	Azimuth deg	Corr. dB/m
17396.000000		55.30	63.50	8.20	1000.0	1000.000	119.0	V	-149.0	54.1
17396.000000	68.12		83.50	15.38	1000.0	1000.000	119.0	V	-149.0	54.1

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Frequency range 18 GHz – 40 GHz:

Frequency MHz	Max-Peak dBµV/m	CAver-age dBµV/m	Limit dBµV/m	Margin dB	Meas. Time ms	Band-width kHz	Height cm	Pol	Azi-muth deg	Corr. dB/m
24141.750000		81.85	107.96	26.11	1000.0	1000.000	100.0	V	-25.0	21.0
24141.750000	97.66		127.96	30.30	1000.0	1000.000	100.0	V	-25.0	21.0

Frequency range 40 GHz – 60 GHz:

Frequency MHz	Max-Peak dBµV/m	Limit dBµV/m	Mar-gin dB	Meas. Time ms	Band-width kHz	Height cm	Pol	Azi-muth deg	Corr. dB
48274.375000	89.54	103.52	13.98	5.0	1000.000	150.0	V	53.0	44.3

Frequency MHz	Aver-age dBµV/m	Limit dBµV/m	Mar-gin dB	Meas. Time ms	Band-width kHz	Height cm	Pol	Azi-muth deg	Corr. dB/m
48274.375000	82.38	83.52	1.14	100.0	1000.000	150.0	V	66.0	44

Frequency range 60 GHz – 90 GHz:

Frequency MHz	Max-Peak dBµV/m	Limit dBµV/m	Mar-gin dB	Meas. Time ms	Band-width kHz	Height cm	Pol	Azi-muth deg	Corr. dB
60071.250000	80.33	95.60	15.27	100.0	1000.000	150.0	H	335.0	47.8
70962.187500	74.71	95.60	20.89	100.0	1000.000	150.0	V	199.0	47.9
72411.562500	79.37	109.54	30.17	100.0	1000.000	150.0	V	4.0	47.9
73879.687500	74.01	95.60	21.59	100.0	1000.000	150.0	V	194.0	47.9

Frequency MHz	Aver-age dBµV/m	Limit dBµV/m	Mar-gin dB	Meas. Time ms	Band-width kHz	Height cm	Pol	Azi-muth deg	Corr. dB/m
72411.562500	73.19	89.54	16.35	100.0	1000.000	150.0	V	35.0	48

Frequency range 75 GHz – 100 GHz:

Frequency MHz	Max-Peak dBµV/m	Limit dBµV/m	Mar-gin dB	Meas. Time ms	Band-width kHz	Height cm	Pol	Azi-muth deg	Corr. dB	Com-ment
99851.562500	81.44	95.60	14.16	100.0	1000.000	150.0	H	233.0	49.7	

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2.2.8 Test Location and Test Equipment

The test was carried out in Semi anechoic room no. 11

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Due
Signal and Spectrum Analysator	Rohde & Schwarz	FSV40	20219	12	2021-01
EMI test receiver	Rohde & Schwarz	ESW44	39897	12	2021-03
Waveguide mixer	Rohde & Schwarz	FS-Z60	25849	36	2023-02
Waveguide mixer	Rohde & Schwarz	FS-Z90	25850	36	2023-02
Waveguide mixer	Rohde & Schwarz	FS-Z110	25851	36	2023-02
EMC test software	Rohde & Schwarz	EMC32 V10.50.10	42986	---	
Semi anechoic room No. 11	Frankonia	Cabin No. 11	42961	---	
Loop antenna	Schwarzbeck	FMZB 1519 B	44334	36	2023-01
ULTRALOG Antenna	Rohde & Schwarz	HL562E	39969	36	2022-11
6 d Attenuator	Aeroflex / Weinschel	CK2164	39632	36	2022-11
Double ridged horn antenna	Rohde & Schwarz	HF907	40089	24	2022-02
Horn antenna with preamplifier	Rohde & Schwarz	LB-180500H-KF + TS-LNA1840	43661	12	2020-10
Horn antenna	Flann	24240-20	19946	---	
Horn antenna	Flann	26250-20	27898	---	
Horn antenna	Flann	27250-20	27899	---	

Table 11

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2.3 Temperature Stability

2.3.1 Specification Reference

ISED RSS-Gen, Clause 6.11, 8.11

2.3.2 Equipment under Test and Modification State

LiDAS; S/N NAD02, Modification State 0

2.3.3 Date of Test

2020-08-07

2.3.4 Environmental Conditions

Ambient Temperature	24 °C
Relative Humidity	982 %

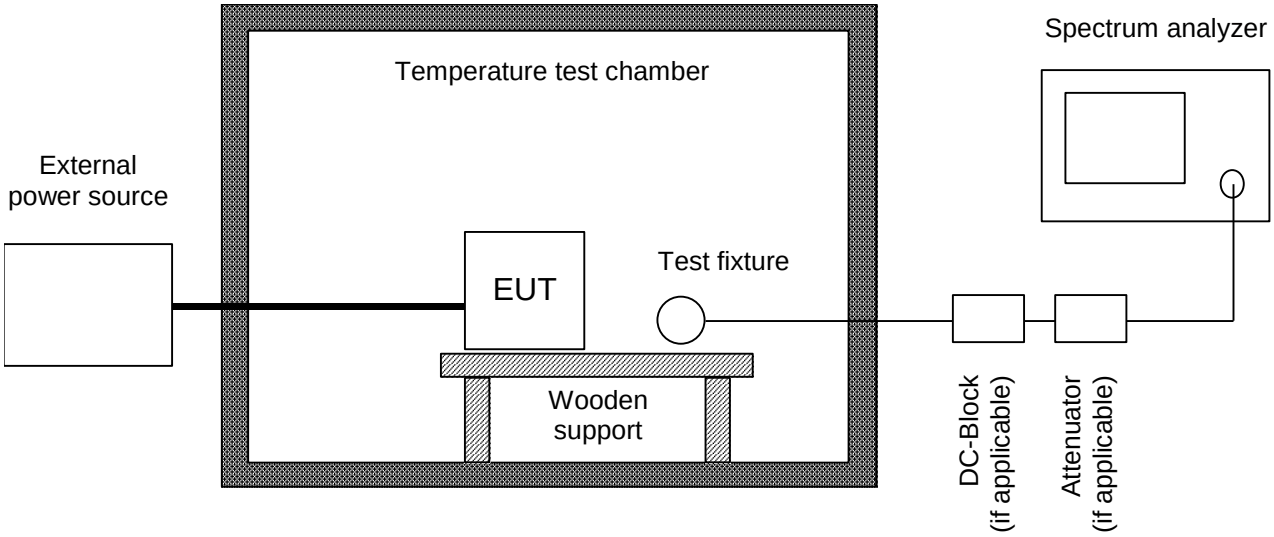
2.3.5 Specification Limits

If the stability of the license-exempt radio apparatus is not specified in the applicable RSS, the fundamental emissions of the radio apparatus should be kept within at least the central 80 % of its permitted operating frequency band in order to minimize the possiblilty of out-of-band operation. In additions, its occupied bandwidth shall be entirely outside the resitricted bands and the prohibited TV bands of 85 MHz – 72 MHz, 76 MHz – 88 MHz, 174 MHz – 216 MHz, and 470 MHz – 602 MHz, unless otherwise indicated.

Product Service

2.3.6 Test Method

The test was performed according to ANSI C63.10, section 6.8.



The frequency tolerance of the carrier signal is measured over a temperature variation of -20 °C to +50 °C at normal supply voltage, and for a variation in the primary supply voltage from 85 % to 115 % of the rates supply voltage at a temperature of 20 °C. Temperature and voltage range may vary if the manufacturer states another temperature or voltage range.
If the EUT provides an antenna connector the spectrum analyzer is connected to this port. If required, a resistive matching network equal to the impedance specified or employed for the antenna is used as well as a DC block and appropriate (50 Ω) attenuators. In case where the EUT does not provide an antenna connector or a test fixture is used.
For battery operated equipment, the test is performed using a new battery. Alternatively, an external supply voltage can be used and is at least set to:

- The maximum battery voltage as delivered by a new battery or 115 % of the battery nominal voltage;
- The battery nominal voltage
- 85 % of the battery nominal voltage
- The battery operating end point voltage which shall be specified by the equipment manufacturer.

The EUT is operating providing an unmodulated carrier for frequency error tests. The peak detector of the spectrum analyzer is selected and resolution as well as video bandwidth are set to values appropriate to shape of the spectrum of the EUT. The frequency counter mode of the spectrum analyzer is used to maximize the accuracy of the measured frequency tolerance.
If an unmodulated carrier is not available a significant and stable point of the spectrum is selected and the span is reduced to a value that delivers an accuracy which shall be better than 1 % of the maximum frequency tolerance allowed for the carrier signal. This method may be performed as long as the margin to the frequency tolerance is larger than the uncertainty of the measured frequency tolerance.

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2.3.7 Test Results

Temperature (°C)	*Voltage (V)*	*Lowest frequency band measured (GHz)*	*Highest frequency band measured (GHz)*	*99 OBW (MHz)*	*Variation OBW (%)*
-20	12	24.1468162	24.1424023	5.8610	+12.50
20	10	24.1370188	24.1422576	5.2388	+0.56
20	12	24.1370188	24.1422287	5.2098	0.00
20	14	24.1370188	24.1422287	5.2098	0.00
50	12	24.13690609	24.1419103	4.9493	-5.00

Table 12

2.3.8 Test Location and Test Equipment

The test was carried out in radio laboratory

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Due
Signal and Spectrum Analysator	Rohde & Schwarz	FSV40	20219	12	2021-01
Climatic test chamber	Feutron	KPK200-2	19686	12	2021-08

Table 13

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2.4 RF Exposure

2.4.1 Specification Reference

FCC 47 CFR Part 1, Clause 1.1310
KDB 447498 D01 V06, section 4.3.1
ISED RSS-Gen, Clause 3.4
ISED RSS-102, Clause

2.4.2 Equipment under Test and Modification State

LiDAS; S/N NAD02, Modification State 0

2.4.3 Date of Test

2020-08-07

2.4.4 Environmental Conditions

Ambient Temperature	24 °C
Relative Humidity	982 %

2.4.5 Test Method

Estimation is based on output power test.
For details please refer to section 2.2 of this test report.

2.4.6 Specification Limits

FCC 47 CFR Part 1, Clause 1.1310 (d)(3) and (e)
At operating frequencies above 6 GHz, the MPE limits listed in Table 1 in paragraph (e)(1) shall be used in all cases to evaluate the environmental impact of human exposure to RF radiation as specified in § 1.1307(b).
The Maximum Permissible Exposure for General Population / Uncontrolled Exposure for frequencies between 1500 MHz and 100 GHz is 1 mW/cm².

ISED RSS-102, Clause 2.5.1
SAR evaluation is required if the separation distance between the user and/or bystander and the antenna and/or radiating element of the device is less than or equal to 20 cm, except when the device operates at or below the applicable output power level (adjusted for tune-up tolerance) for the specified separation distance defined in the table.
For controlled use devices where the 8 W/kg for 1 gram of tissue applies, the exemption limits for routine evaluation in the table are multiplied by a factor of 5. For limb-worn devices where the 10 gram value applies, the exemption limits for routine evaluation in the table are multiplied by a factor of 2.5. If the operating frequency of the device is between two frequencies located in the table, linear

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interpolation shall be applied for the applicable separation distance. For test separation distance less than 5 mm, the exemption limits for a separation distance of 5 mm can be applied to determine if a routine evaluation is required.
For medical implants devices, the exemption limit for routine evaluation is set at 1 mW. The output power of a medical implants device is defined as the higher of the conducted or e.i.r.p to determine whether the device is exempt from the SAR evaluation.:

Frequency (MHz)	Exemption limits (mW)[2] at separation distance of									
	≤5 mm	10 mm	15 mm	20 mm	25 mm	30 mm	35 mm	40 mm	45 mm	≥50 mm
≤300 [3]	71	101	132	162	193	223	254	284	315	345
450	52	70	88	106	123	141	159	177	195	213
835	17	30	42	55	67	80	92	105	117	130
1900	7	10	18	34	60	99	153	225	316	431
2450	4	7	15	30	52	83	123	173	235	309
3500	2	6	16	32	55	86	124	170	225	290
5800	1	6	15	27	41	56	71	85	97	106

At the present time ISED Canada SAR Exemption calculations are valid for frequencies up to and including 6 GHz, and RSS-102 Clause 2.5.1 refers. Furthermore, ISED Canada RF Exposure calculations are valid for distances of 20 cm or more. Therefore, the applicant cannot perform RF Exposure calculations at distances less than 20 cm for demonstration of compliance without ISED Canada permission.

[2] The excemption limit in the table are based on measurements and simulations on half-wave dipole antennas at separaton distances of 5 mm to 25 mm from a flat phantom, providing a SAR value of approximately 0.4 W/kg for 1 g of tissue. For low frequencies (300 MHz to 835 MHz), the exemption limits are derived from alinear fit. For high frequencies (1900 MHz and above), the exemption limits are derived from athird order polynomial fit.
[3] Transmitters operating between 3 kHz and 10 MHz, meeting the exemption from routine SAR evaluation, shall demonstrate compliance to the instantaneous limits in IC RSS-102, issue 5, section 4.

Product Service

2.4.7 Test Results

Electric Fieldstrength (*E*) at distance (*d*) 3 m: 81.85 dBµV/m = 12.37 mV/m

Equivalent Isotropic Radiated Power: $EIRP = \frac{E^2}{Z_0} 4\,\pi\, d^2 \approx \frac{E^2\, d^2}{30\Omega}$

EIRP = 45.93 µW

FCC 47 CFR Part 1 and ISED RSS-Gen, Clause 3.4

Maximum output power:	45.93 µW
Frequency:	24.142 GHz
Exemption Limit:	1 mW
Test Result:	Pass

Product Service

3 Measurement Uncertainty

For a 95% confidence level, the measurement uncertainties for defined systems are:

The measurement uncertainty in the laboratory is less than or equal to the maximum measurement uncertainty according to CISPR16-4-2: 2011 + A1 + A2 + Cor1 (U_{CISPR}). This normative regulation means that the measured value is also the value to be assessed in relation to the limit value.

Radio Interference Emission Testing		
Test Name	*kp*	*Expanded Uncertainty*
Conducted Voltage Emission		
9 kHz to 150 kHz (50Ω/50µH AMN)	2	± 3.8 dB
150 kHz to 30 MHz (50Ω/50µH AMN)	2	± 3.4 dB
100 kHz to 200 MHz (50Ω/5µH AMN)	2	± 3.6 dB
Discontinuous Conducted Emission		
9 kHz to 150 kHz (50Ω/50µH AMN)	2	± 3.8 dB
150 kHz to 30 MHz (50Ω/50µH AMN)	2	± 3.4 dB
Conducted Current Emission		
9 kHz to 200 MHz	2	± 3.5 dB
Magnetic Fieldstrength		
9 kHz to 30 MHz (with loop antenna)	2	± 3.9 dB
9 kHz to 30 MHz (large-loop antenna 2 m)	2	± 3.5 dB
Radiated Emission		
30 MHz to 300 MHz	2	± 4.9 dB
300 MHz to 1 GHz	2	± 5.0 dB
1 GHz to 6 GHz	2	± 4.6 dB
Test distance 10 m		
30 MHz to 300 MHz	2	± 4.9 dB
300 MHz to 1 GHz	2	± 4.9 dB
The expanded uncertainty reported according to to CISPR16-4-2: 2011 + A1 + A2 + Cor1 is based on a standard uncertainty multiplied by a coverage factor of kp = 2, providing a level of confidence of p = 95.45%		

Table 14 Measurement uncertainty based on CISPR 16-4-2

Radio Interference Emission Testing		
Test Name	*kp*	*Expanded Uncertainty*
Occupied Bandwdith	2	± 5 %
Conducted Power		
9 kHz ≤ f < 30 MHz	2	± 1.0 dB
30 MHz ≤ f < 1 GHz	2	± 1.5 dB
1 GHz ≤ f ≤ 40 GHz	2	± 2.5 dB
1 MS/s power sensor (TS8997)	2	± 1.5 dB
Occupied Bandwidth	2	± 5 %
Power Spectral Density	2	± 3.0 dB
Radiated Power		
9 kHz ≤ f < 26.5 GHz	2	± 6.5 dB
26.5 GHz ≤ f < 60 GHz	2	± 8.0 dB
60 GHz ≤ f < 325 GHz	2	± 10 dB
Conducted Spurious Emissions	2	± 3.0 dB
Radiated Spurious Emissions	2	± 6.0 dB
Voltage		
DC	2	± 1.0 %
AC	2	± 2.0 %
Time (automatic)	2	± 5 %
Frequency	2	± 10^{-7}
The expanded uncertainty reported according to to ETSI TR 100 028:2001 is based on a standard uncertainty multiplied by a coverage factor of kp = 2, providing a level of confidence of p = 95.45%		

Table 15 Measurement uncertainty based on ETSI TR 100 028