

TEST REPORT

Test Report No. : UL-RPT-RP14723421-916A

Manufacturer : Acquisition System Ltd

Model No. : VS8601

PMN : iVAS Roam

HVIN : VS8601

FCC ID : 2BFIVVS8601

ISED Certification No. : IC: 32355-VS8601

Test Standard(s) : FCC Parts 15.207, 15.209(a) & 15.225
ISED Canada RSS-Gen Issue 5 April 2018 &
RSS-210 Issue 11 June 2024

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2. The results in this report apply only to the sample(s) tested.
3. The sample tested is in compliance with the above standard(s).
4. The test results in this report are traceable to the national or international standards.
5. Version 2.0 supersedes all previous versions.

Date of Issue: 16 April 2025

Checked by:



Ben Mercer
Lead Project Engineer, Radio Laboratory

Issued by :



Sarah Williams
RF Operations Leader, Radio Laboratory



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1. Customer Information

Company Name:	Acquisition Systems Ltd
Address:	39 Ivanhoe Road Hogwood Industrial Estate Finchampstead Wokingham Berkshire RG40 4QQ United Kingdom

2. Summary of Testing

2.1. General Information

Specification Reference:	47CFR15.225
Specification Title:	Code of Federal Regulations Volume 47 (Telecommunications): Part 15 Subpart C (Radio Frequency Devices) - Section 15.225
Specification Reference:	47CFR15.207 and 47CFR15.209
Specification Title:	Code of Federal Regulations Volume 47 (Telecommunications): Part 15 Subpart C (Intentional Radiators) - Sections 15.207 and 15.209
Specification Reference:	RSS-Gen Issue 5 April 2018
Specification Title:	General Requirements for Compliance of Radio Apparatus
Specification Reference:	RSS-210 Issue 11 June 2024
Specification Title:	Licence-Exempt Radio Apparatus: Category I Equipment
Site Registration:	FCC: 685609, ISEDC: 20903
FCC Lab. Designation No.:	UK2011
ISEDC CABID:	UK0001
Location of Testing:	Unit 3 Horizon, Wade Road, Kingsland Business Park, Basingstoke, Hampshire, RG24 8AH, United Kingdom
Test Dates:	09 January 2024 to 06 March 2025

2.2. Summary of Test Results

FCC Reference (47CFR)	IC Reference	Measurement	Result
Part 15.207	RSS-Gen 8.8	Transmitter AC Conducted Emissions	
Part 15.225(a)(b)(c)(d)	RSS-Gen 6.12 RSS-210 B.6(a)	Transmitter Fundamental Field Strength	
Part 15.209(a)/ 15.225(d)	RSS-Gen 6.13 RSS-210 B.6(a)	Transmitter Radiated Emissions	
Part 15.209(a)/ 15.225(c)(d)	RSS-Gen 6.13 RSS-210 B.6(a)	Transmitter Band Edge Radiated Emissions	
Part 15.215(c)	N/A	Transmitter 20 dB Bandwidth	
N/A	RSS-Gen 6.7	Transmitter 99% Occupied Bandwidth	
Part 15.225(e)	RSS-Gen 6.11 RSS-210 B.6(b)	Transmitter Frequency Stability (Temperature & Voltage Variation)	
Key to Results  = Complied  = Did not comply			

2.3. Methods and Procedures

Reference:	ANSI C63.4-2014
Title:	American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz.
Reference:	ANSI C63.10-2013
Title:	American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices
Reference:	FCC KDB 414788 D01 Radiated Test Site v01r01 July 12, 2018
Title:	Test Sites for Radiated Emission Measurements
Reference:	FCC KDB 174176 D01 Line Conducted FAQ v01r01 June 3, 2015
Title:	AC Power-Line Conducted Emissions Frequently Asked Questions
Reference:	Notice 2020 - DRS0023
Title:	Guidance on magnetic field strength radiated emission measurements (9 kHz - 30 MHz)

2.4. Deviations from the Test Specification

For the measurements contained within this test report, there were no deviations from, additions to, or exclusions from the test specification identified above.

3. Equipment Under Test (EUT)

3.1. Identification of Equipment Under Test (EUT)

Brand Name:	Pharmagraph
Model Number:	VS8601
PMN:	iVAS Roam
HVIN:	VS8601
Test Sample Serial Number:	SN103 (<i>Radiated Sample</i>)
Hardware Version:	A
Firmware Version:	1.0
FCC ID:	2BFIVVS8601
ISED Certification Number:	IC: 32355-VS8601

Brand Name:	Pharmagraph
Model Number:	VS8601
PMN:	iVAS Roam
HVIN:	VS8601
Test Sample Serial Number:	SN104 (<i>Radiated Sample</i>)
Hardware Version:	A
Firmware Version:	1.0
FCC ID:	2BFIVVS8601
ISED Certification Number:	IC: 32355-VS8601

3.2. Description of EUT

The equipment under test was a Portable Viable Air Sampler containing an NFC transceiver.

3.3. Modifications Incorporated in the EUT

The sample with serial number SN103 was modified on 16 January 2024 to allow the supply voltage to be varied using an external DC power supply. No other modifications were applied to the EUT during testing.

3.4. Additional Information Related to Testing

Tested Technology:	NFC	
Category of Equipment:	Transceiver	
Channel Spacing:	Single channel device	
Transmit Frequency Range:	13.56 MHz	
Power Supply Requirement:	Nominal	14.4V
	Minimum	11.2V
	Maximum	16.8V
Tested Temperature Range:	Minimum	0°C
	Maximum	40°C

3.5. Support Equipment

The following support equipment was used to exercise the EUT during testing:

Description:	Laptop PC
Brand Name:	Dell
Model Name or Number:	TTYFJA00
Serial Number:	DF55262

Description:	USB 2.0 Extender
Brand Name:	Not marked or stated
Model Name or Number:	Not marked or stated
Serial Number:	Not marked or stated

Description:	USB-C Cable
Brand Name:	Not marked or stated
Model Name or Number:	E23846
Serial Number:	Not marked or stated

Description:	Ethernet Cable
Brand Name:	U/UTP Network
Model Name or Number:	Not marked or stated
Serial Number:	Not marked or stated

Description:	AC/DC USB Charger
Brand Name:	Powertron Electronics Corp
Model Name or Number:	PS1010-005HB200
Serial Number:	B20220700025700

Description:	1-Port USB-C Wall Charger
Brand Name:	StarTech Com
Model Name or Number:	WCH1CUK
Serial Number:	2323031041

4. Operation and Monitoring of the EUT during Testing

4.1. Operating Modes

The EUT was tested in the following operating mode(s):

- Constantly transmitting at full power with a modulated carrier in NFC test mode with an NFC tag present.

4.2. Configuration and Peripherals

The EUT was tested in the following configuration(s):

- The NFC transmitter test mode was enabled by means of bespoke software provided by the customer. The software did not provide the means to vary the NFC mode or data rate. Testing was performed on the mode and data rate enabled by the test software.
- Initial measurements were performed with and without the NFC tag. The worst case was found to be with the tag present. All formal measurements were performed with the tag present.
- The EUT was connected to the laptop via USB / Ethernet extenders and Ethernet cable. The EUT was powered by a USB charger via the USB / Ethernet extender. The USB charger was connected to a 120 VAC single phase mains supply.
- Testing at voltage extremes was performed with the EUT powered by an external DC power supply. The EUT's battery was removed, and the DC power supply was connected to the EUT's battery terminals.
- Transmitter AC Conducted Emissions tests were performed with the EUT connected directly to the USB charger.

5. Measurements, Examinations and Derived Results

5.1. General Comments

Measurement uncertainties are evaluated in accordance with current best practice. Our reported expanded uncertainties are based on standard uncertainties, which are multiplied by an appropriate coverage factor to provide a statistical confidence level of approximately 95%. Please refer to *Section 6: Measurement Uncertainties* for details.

In accordance with UKAS requirements all the measurement equipment is on a calibration schedule. All equipment was within the calibration period on the date of testing.

5.2. Test Results

5.2.1. Transmitter AC Conducted Spurious Emissions

Test Summary:

Test Engineer:	Nick Tye	Test Date:	29 January 2024
Test Sample Serial Number:	SN104		

FCC Reference:	Part 15.207
ISED Canada Reference:	RSS-Gen 8.8
Test Method Used:	ANSI C63.10 Section 6.2 / FCC KDB 174176 and notes below

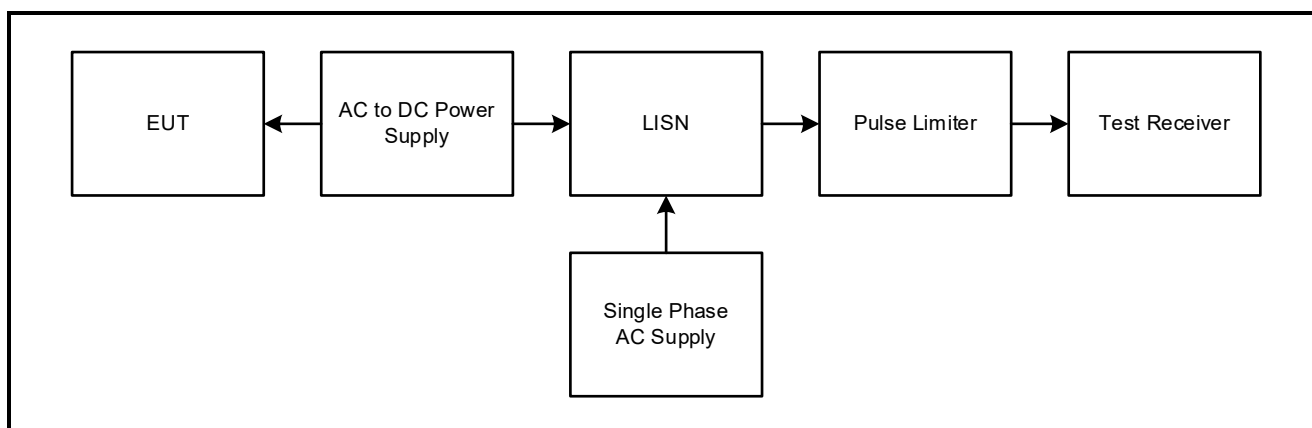
Environmental Conditions:

Temperature (°C):	21
Relative Humidity (%):	47

Note(s):

1. The EUT was connected to an AC/DC charger via a USB cable. The AC/DC charger was connected to a 120 VAC 60 Hz single phase supply via a LISN.
2. Pre-scans were performed, and markers placed on the highest live and neutral measured levels. Final measurements were performed on the marker frequencies and the results entered in the tables below.
3. In accordance with FCC KDB 174176 Q4, tests were performed with a 240 VAC 60 Hz single phase supply as this was within the voltage range marked on the AC/DC charger.
4. A pulse limiter was fitted between the LISN and the test receiver.

Test Setup:



Transmitter AC Conducted Spurious Emissions (continued)**Results: Live / Quasi Peak / 120 VAC**

Frequency (MHz)	Line	Level (dB μ V)	Limit (dB μ V)	Margin (dB)	Result
0.154500	Live	44.2	65.8	21.6	Pass
0.186000	Live	47.2	64.2	17.0	Pass
0.514500	Live	33.2	56.0	22.8	Pass
2.215500	Live	33.4	56.0	22.6	Pass
3.138000	Live	34.6	56.0	21.4	Pass
13.560000	Live	48.9	60.0	11.1	Pass

Results: Live / Average / 120 VAC

Frequency (MHz)	Line	Level (dB μ V)	Limit (dB μ V)	Margin (dB)	Result
0.186000	Live	32.8	54.2	21.4	Pass
0.487500	Live	22.7	46.2	23.5	Pass
0.946500	Live	21.3	46.0	24.7	Pass
6.400500	Live	28.1	50.0	21.9	Pass
13.560000	Live	46.1	50.0	3.9	Pass
23.433000	Live	10.8	50.0	39.2	Pass

Results: Neutral / Quasi Peak / 120 VAC

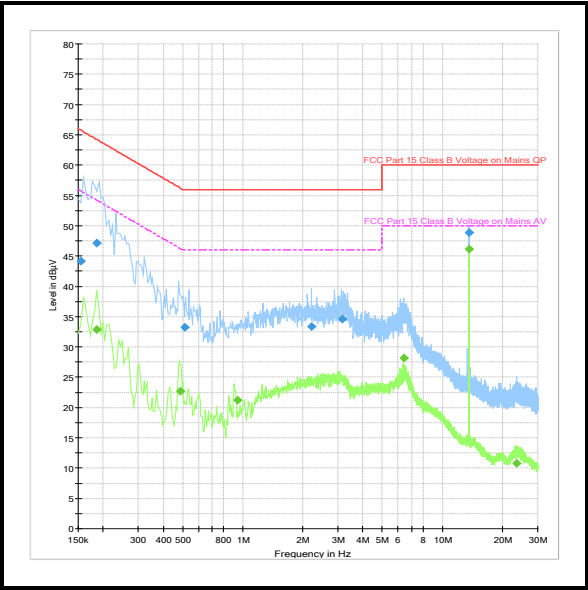
Frequency (MHz)	Line	Level (dB μ V)	Limit (dB μ V)	Margin (dB)	Result
0.159000	Neutral	40.4	65.5	25.1	Pass
0.231000	Neutral	34.3	62.4	28.1	Pass
0.487500	Neutral	37.3	56.2	18.9	Pass
3.165000	Neutral	31.1	56.0	24.9	Pass
6.391500	Neutral	34.5	60.0	25.5	Pass
13.560000	Neutral	47.1	60.0	12.9	Pass

Results: Neutral / Average / 120 VAC

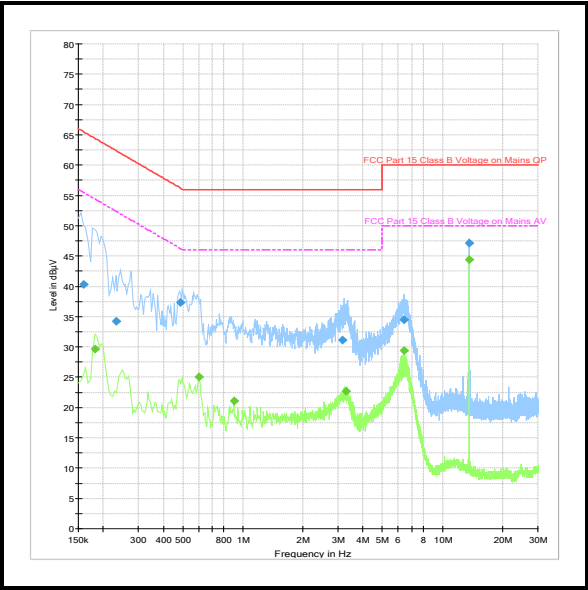
Frequency (MHz)	Line	Level (dB μ V)	Limit (dB μ V)	Margin (dB)	Result
0.181500	Neutral	29.7	54.4	24.7	Pass
0.604500	Neutral	25.0	46.0	21.0	Pass
0.901500	Neutral	21.1	46.0	24.9	Pass
3.273000	Neutral	22.7	46.0	23.3	Pass
6.400500	Neutral	29.4	50.0	20.6	Pass
13.560000	Neutral	44.3	50.0	5.7	Pass

Transmitter AC Conducted Spurious Emissions (continued)

Results: 120 VAC



Live



Neutral

Note: These plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables.

Transmitter AC Conducted Spurious Emissions (continued)**Results: Live / Quasi Peak / 240 VAC**

Frequency (MHz)	Line	Level (dB μ V)	Limit (dB μ V)	Margin (dB)	Result
0.186000	Live	47.7	64.2	16.5	Pass
0.604500	Live	39.4	56.0	16.6	Pass
2.058000	Live	39.9	56.0	16.1	Pass
3.372000	Live	39.7	56.0	16.3	Pass
13.560000	Live	48.9	60.0	11.1	Pass
24.225000	Live	24.2	60.0	35.8	Pass

Results: Live / Average / 240 VAC

Frequency (MHz)	Line	Level (dB μ V)	Limit (dB μ V)	Margin (dB)	Result
0.190500	Live	37.4	54.0	16.6	Pass
1.081500	Live	30.0	46.0	16.0	Pass
2.782500	Live	31.0	46.0	15.0	Pass
6.517500	Live	33.5	50.0	16.5	Pass
13.560000	Live	46.3	50.0	3.7	Pass
24.099000	Live	18.4	50.0	31.6	Pass

Results: Neutral / Quasi Peak / 240 VAC

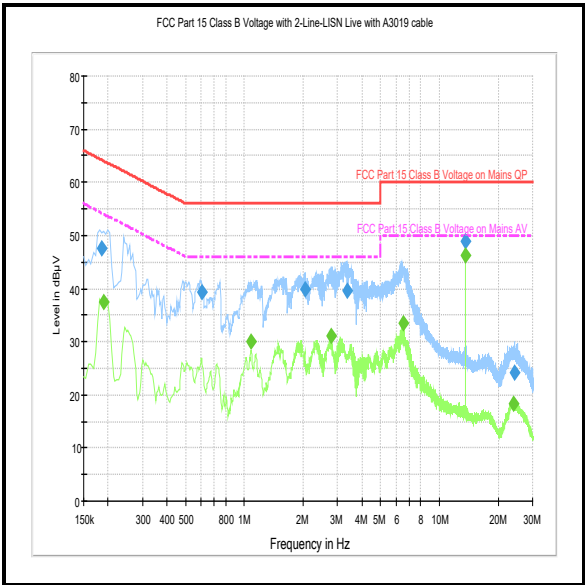
Frequency (MHz)	Line	Level (dB μ V)	Limit (dB μ V)	Margin (dB)	Result
0.181500	Neutral	48.4	64.4	16.0	Pass
0.487500	Neutral	40.3	56.2	15.9	Pass
3.511500	Neutral	37.9	56.0	18.1	Pass
6.436500	Neutral	40.5	60.0	19.5	Pass
13.560000	Neutral	47.1	60.0	12.9	Pass
23.221500	Neutral	21.8	60.0	38.2	Pass

Results: Neutral / Average / 240 VAC

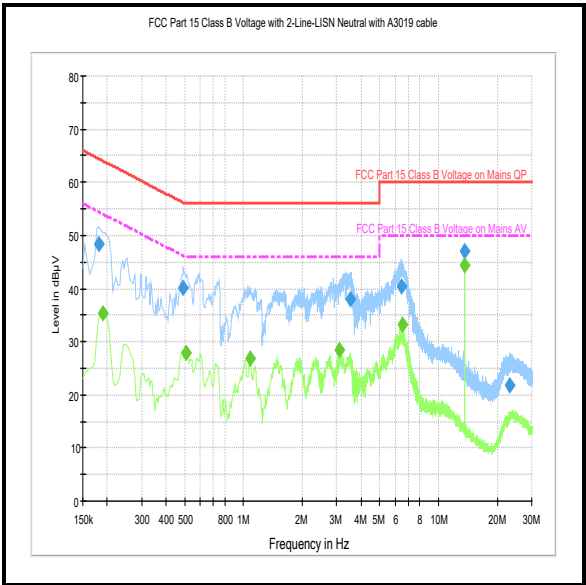
Frequency (MHz)	Line	Level (dB μ V)	Limit (dB μ V)	Margin (dB)	Result
0.190500	Neutral	35.4	54.0	18.6	Pass
0.510000	Neutral	27.9	46.0	18.1	Pass
1.081500	Neutral	26.9	46.0	19.1	Pass
3.084000	Neutral	28.4	46.0	17.6	Pass
6.517500	Neutral	33.2	50.0	16.8	Pass
13.560000	Neutral	44.3	50.0	5.7	Pass

Transmitter AC Conducted Spurious Emissions (continued)

Results: 240 VAC



Live



Neutral

Note: These plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables.

Test Equipment Used:

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
M2037	Thermohygrometer	Testo	608-H1	45124925	27 Dec 2024	12
A649	LISN	Rohde & Schwarz	ESH3-Z5	825562/008	23 Aug 2024	12
A1830	Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100668	01 Jun 2024	12
M1124	Test Receiver	Rohde & Schwarz	ESIB26	100046	02 Oct 2024	12
A2953	Mains Transformer	Tacima	SC 5467	Not marked or stated	Calibration not required	N/A

Test Measurement Software/Firmware Used:

Name	Version	Release Date
Rohde & Schwarz EMC32	6.30.0	2018

5.2.2. Transmitter Fundamental Field Strength

Test Summary:

Test Engineer:	Andrew Harding	Test Date:	10 January 2024
Test Sample Serial Number:	SN103		

FCC Reference:	Part 15.225(a)(b)(c)(d)
ISED Canada Reference:	RSS-Gen 6.12 / RSS-210 B.6(a)
Test Method Used:	ANSI C63.10 Section 6.4

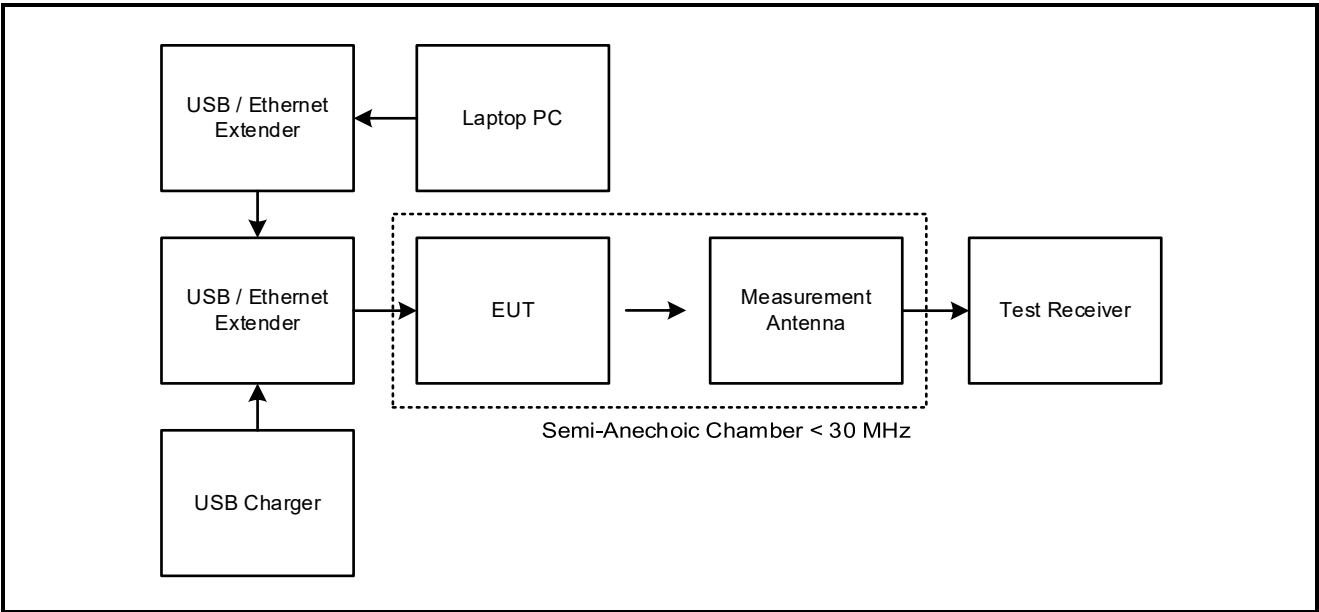
Environmental Conditions:

Temperature (°C):	21
Relative Humidity (%):	35

Note(s):

- Measurements below 30 MHz were performed in a semi-anechoic chamber (Asset Number K0001) at 3 metres. The EUT was placed at a height of 80 cm above the reference ground plane in the centre of the chamber turntable. The limit was extrapolated to 3 metres in accordance ANSI C63.10 clause 6.4.3 & 6.4.4.2. As allowed by ANSI C63.10 clause 5.2; an alternative test site that can demonstrate equivalence to an open area test site may be used for measurements below 30 MHz. Therefore, measurements were performed in a semi-anechoic chamber. The correlation data between semi-anechoic chamber and an open field test site is available upon request.
- Pre-scan measurements were performed using a spectrum analyser with a peak detector and measurement bandwidth of 10 kHz. The fundamental field strength was maximized by rotating the measurement antenna and EUT.
- The spectrum analyser was then switched to test receiver mode and the final measurement on the maximised level was performed. In accordance with ANSI C63.10 Clause 4.2.3.2.1 and CISPR 16-1-1, a quasi-peak detector was used in conjunction with a measurement bandwidth of 9 kHz and 15 second sweep time. Quasi-peak levels were recorded at a 3 metre measurement distance. These levels were then compared to the limit at 30 metres as a worst case.

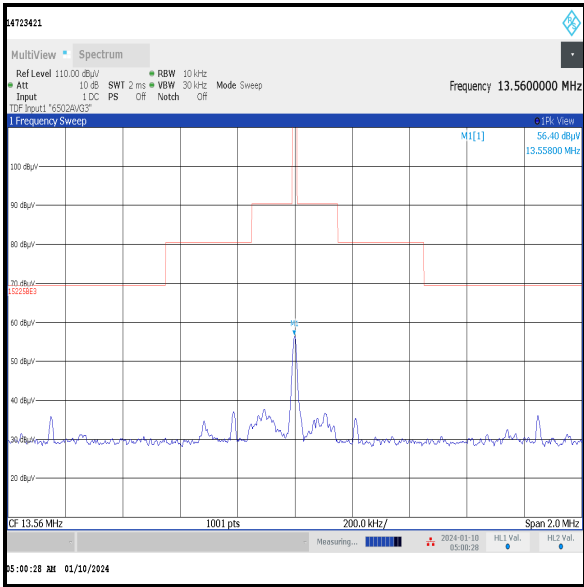
Test Setup:



Transmitter Fundamental Field Strength (continued)

Results: Quasi Peak

Frequency (MHz)	Antenna Polarity	Level at 3m (dBµV/m)	Limit at 30 m (dBµV/m)	Margin (dB)	Result
13.56	90° to EUT	54.2	84.0	29.8	Complied



Test Equipment Used:

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
M2040	Thermohygrometer	Testo	608-H1	45124934	27 Dec 2024	12
K0001	3m RSE Chamber	Rainford EMC	N/A	N/A	06 Sep 2024	12
A3165	Magnetic Loop Antenna	ETS-Lindgren	6502	00224383	13 Apr 2024	12
M236226	Test Receiver	Rohde & Schwarz	ESW26	103134	21 Apr 2024	12

5.2.3. Transmitter Radiated Spurious Emissions**Test Summary:**

Test Engineer:	Andrew Harding	Test Dates:	09 January 2024 to 12 January 2024
Test Sample Serial Number:	SN103		

FCC Reference:	Parts 15.225(d) & 15.209(a)
ISED Canada Reference:	RSS-Gen 6.13 / RSS-210 B.6(a)(iii & iv)
Test Method Used:	ANSI C63.10 Sections 6.3, 6.4 and 6.5 and notes below
Frequency Range:	9 kHz to 1000 MHz

Environmental Conditions:

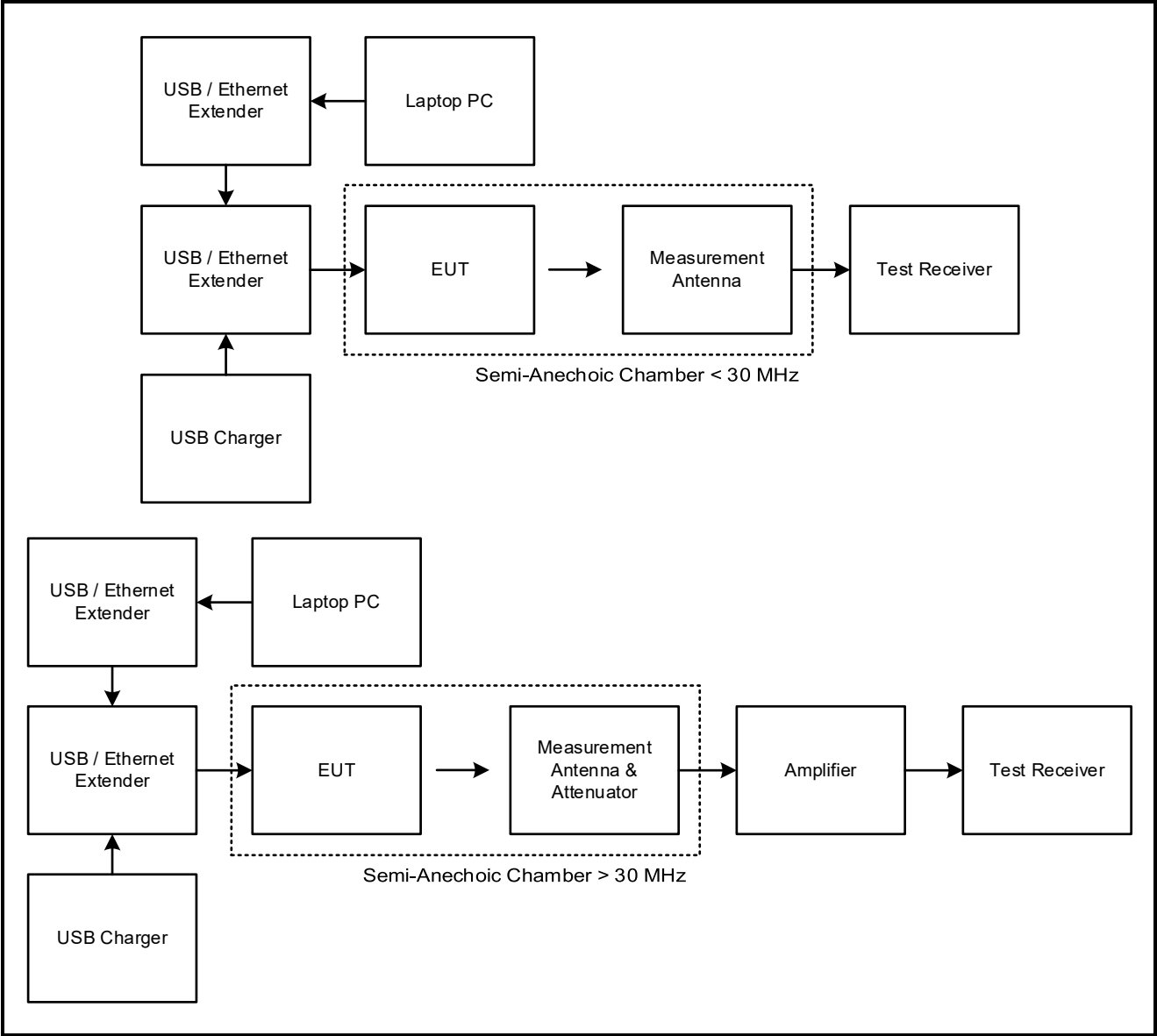
Temperature (°C):	21
Relative Humidity (%):	31 to 34

Transmitter Radiated Spurious Emissions (continued)**Note(s):**

1. The final measured value, for the given emission, in the table below incorporates the calibrated antenna factor and cable loss.
2. All other emissions were greater than 20 dB below the applicable limit, below the noise floor of the measurement system or ambient.
3. Measurements below 30 MHz were performed in a semi-anechoic chamber (Asset Number K226203) at a distance of 3 metres. The EUT was placed at a height of 80 cm above the reference ground plane in the centre of the chamber turntable. As allowed by ANSI C63.10 clause 5.2; an alternative test site that can demonstrate equivalence to an open area test site may be used for measurements below 30 MHz. Therefore, measurements were performed in a semi-anechoic chamber. The correlation data between semi-anechoic chamber and an open field test site is available upon request.
4. The measured values at 3 metres were extrapolated to the required measurement distances of 300 metres and 30 metres and compared to the specified limits at those distances:
 - 9 kHz to 490 kHz: measured value extrapolated from 3 metres to 300 metres by subtracting 80 dB at 40 dB / decade
 - 490 kHz to 30 MHz: measured value extrapolated from 3 metres to 30 metres by subtracting 40 dB at 40 dB / decade
5. Measurements from 30 MHz to 1 GHz were performed in a semi-anechoic chamber (Asset Number K0001) at a distance of 3 metres. The EUT was placed at a height of 80 cm above the reference ground plane in the centre of the chamber turntable. Maximum emission levels were determined by height searching the measurement antenna over the range 1 metre to 4 metres.
6. Pre-scans were performed, and markers placed on the highest measured levels. The test receiver was configured as follows: During 9 kHz to 150 kHz measurements, the resolution bandwidth was set to 300 Hz and video bandwidth 1 kHz. A peak detector was used and trace mode was Max Hold. For 150 kHz to 30 MHz, the resolution bandwidth was set to 10 kHz and video bandwidth 30 kHz, trace mode was Max Hold. During 30 MHz to 1 GHz measurements, the resolution bandwidth was set to 120 kHz and video bandwidth 500 kHz. A peak detector was used, sweep time was set to auto and trace mode was Max Hold. Final measurements were performed using a CISPR Quasi-Peak detector and measurement time set to 15 seconds.
7. The limits in CFR 47, Part 15, Subpart C, paragraph 15.209 (a), are identical to those in RSS-Gen Section 8.9, Table 6, since the measurements are performed in terms of magnetic field strength and converted to electric field strength levels (as reported in the table) using the free space impedance of 377Ω . For example, the measurement frequency X kHz resulted in a level of Y dB μ V/m, which is equivalent to $Y - 51.5 = Z$ dB μ A/m, which has the same margin, W dB, to the corresponding RSS-Gen Table 6 limit as it has to the 15.209(a) limit.
8. In accordance with 47 CFR 15.209(c), the level of any unwanted emissions from an intentional radiator shall not exceed the level of the fundamental emission. All emissions observed at a level exceeding the fundamental were investigated and found to originate from the unintentional radiator part of the EUT.

Transmitter Radiated Spurious Emissions (continued)

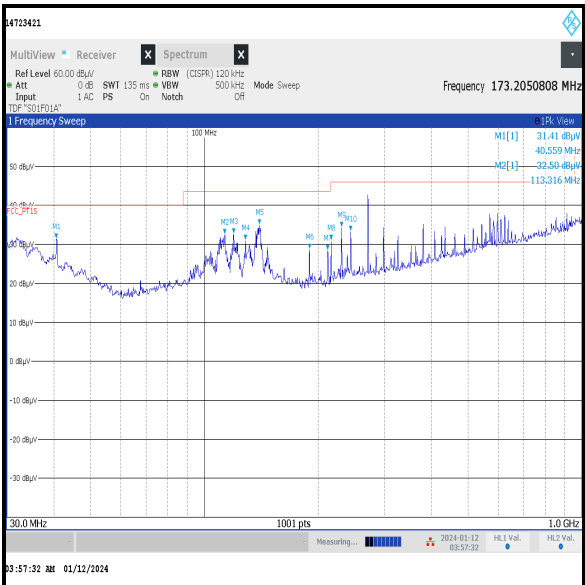
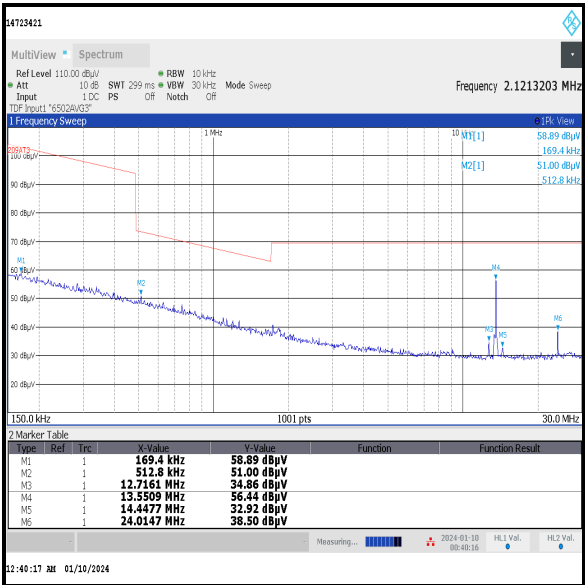
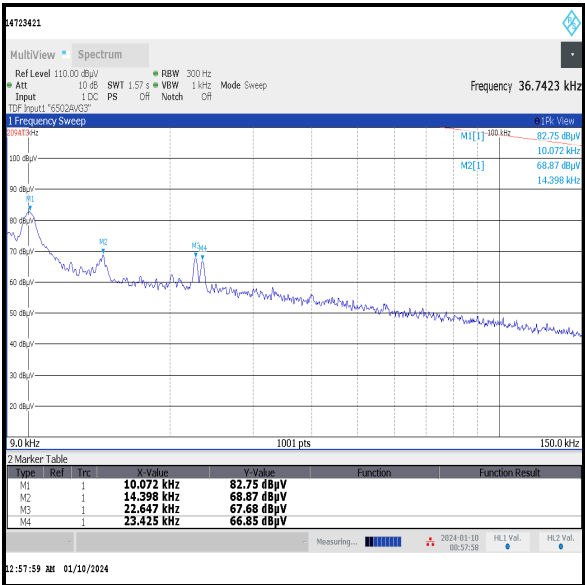
Test Setup:



Transmitter Radiated Spurious Emissions (continued)

Results: Quasi Peak

Frequency (MHz)	Antenna Polarity	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Result
113.338	V	30.0	43.5	13.5	Complied
119.502	V	30.2	43.5	13.3	Complied
128.705	V	29.4	43.5	14.1	Complied
244.094	H	33.3	46.0	12.7	Complied
271.203	H	43.7	46.0	2.3	Complied
325.434	H	33.7	46.0	12.3	Complied
609.922	V	34.7	46.0	11.3	Complied



Note: These plots are pre-scans and for indication purposes only. For final measurements, see accompanying table.

Transmitter Radiated Spurious Emissions (continued)**Test Equipment Used:**

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
M2040	Thermohygrometer	Testo	608-H1	45124934	27 Dec 2024	12
K0001	3m RSE Chamber	Rainford EMC	N/A	N/A	06 Sep 2024	12
M236226	Test Receiver	Rohde & Schwarz	ESW26	103134	21 Apr 2024	12
A3165	Magnetic Loop Antenna	ETS-Lindgren	6502	00224383	13 Apr 2024	12
A3154	Pre Amplifier	Com Power	PAM-103	18020012	21 Aug 2024	12
A231925	Antenna	Chase	CBL6111D	63584	27 Apr 2024	12

5.2.4. Transmitter Band Edge Radiated Emissions**Test Summary:**

Test Engineer:	Andrew Harding	Test Date:	10 January 2024
Test Sample Serial Number:	SN103		

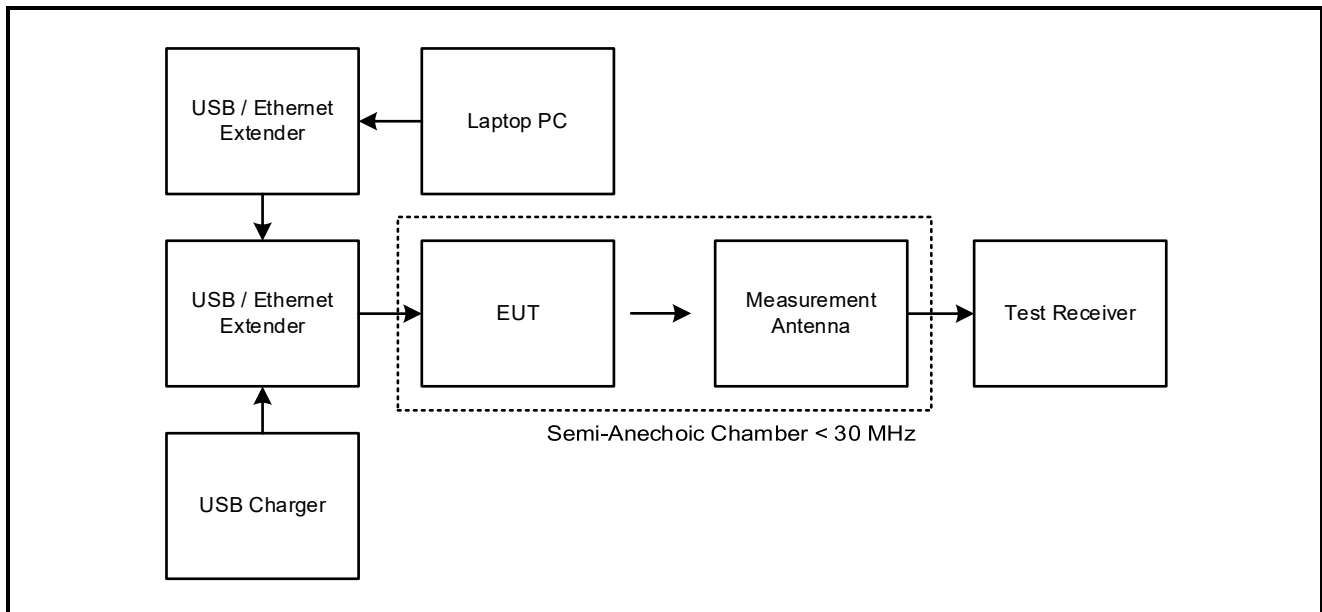
FCC Reference:	Parts 15.225(c)(d) & 15.209(a)
ISED Canada Reference:	RSS-Gen 6.13 / RSS-210 B.6(a)(iii & iv)
Test Method Used:	ANSI C63.10 Section 6.10.5.2 and Notes below

Environmental Conditions:

Temperature (°C):	21
Relative Humidity (%):	35

Note(s):

1. Measurements below 30 MHz were performed in a semi-anechoic chamber (Asset Number K0001) at 3 metres. The EUT was placed at a height of 80 cm above the reference ground plane in the centre of the chamber turntable. The limit was extrapolated to 3 metres in accordance ANSI C63.10 clause 6.4.3 & 6.4.4.2. As allowed by ANSI C63.10 clause 5.2; an alternative test site that can demonstrate equivalence to an open area test site may be used for measurements below 30 MHz. Therefore, measurements were performed in a semi-anechoic chamber. The correlation data between semi-anechoic chamber and an open field test site is available upon request.
2. *Field strength measurements performed at 3 metres in a semi-anechoic chamber were extrapolated to a distance of 30 metres by subtracting 40 dB (using a linear distance extrapolation factor of 40 dB/decade).
3. The test receiver resolution bandwidth was set to 10 kHz and video bandwidth 30 kHz. A peak detector was used, sweep time was set to auto trace mode was Max Hold. The span was set to 2 MHz, with frequency lines were placed on the lower and upper band edges. A marker was placed on the band edge spot frequencies and a second marker placed on the highest emission level in the adjacent restricted band of operation (where a higher level emission was present). Marker frequencies and levels were recorded.

Transmitter Band Edge Radiated Emissions (continued)**Test Setup:**

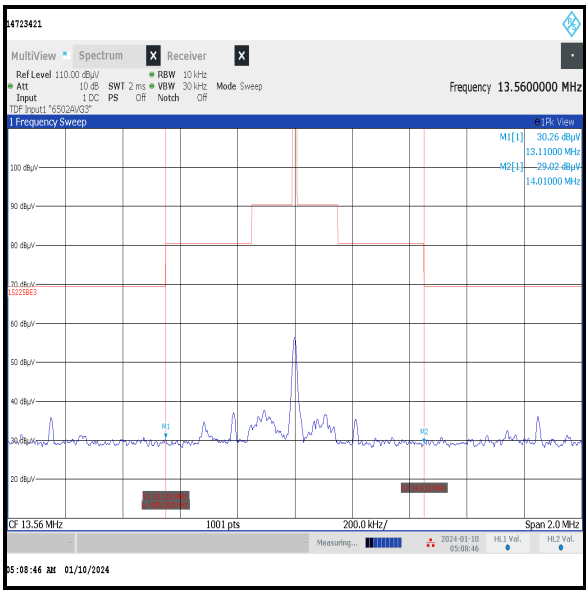
Transmitter Band Edge Radiated Emissions (continued)

Results: Quasi Peak / Lower Band Edge

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
13.11	-10.7*	29.5	40.2	Complied

Results: Quasi Peak / Upper Band Edge

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
14.01	-11.0*	29.5	40.5	Complied



Test Equipment Used:

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
M2040	Thermohygrometer	Testo	608-H1	45124934	27 Dec 2024	12
K0001	3m RSE Chamber	Rainford EMC	N/A	N/A	06 Sep 2024	12
A3165	Magnetic Loop Antenna	ETS-Lindgren	6502	00224383	13 Apr 2024	12
M236226	Test Receiver	Rohde & Schwarz	ESW26	103134	21 Apr 2024	12

5.2.5. Transmitter 20 dB Bandwidth

Test Summary:

Test Engineer:	Andrew Harding	Test Date:	11 January 2024
Test Sample Serial Number:	SN103		

FCC Reference:	Part 2.1049
ISED Canada Reference:	N/A
Test Method Used:	ANSI C63.10 Section 6.9.2

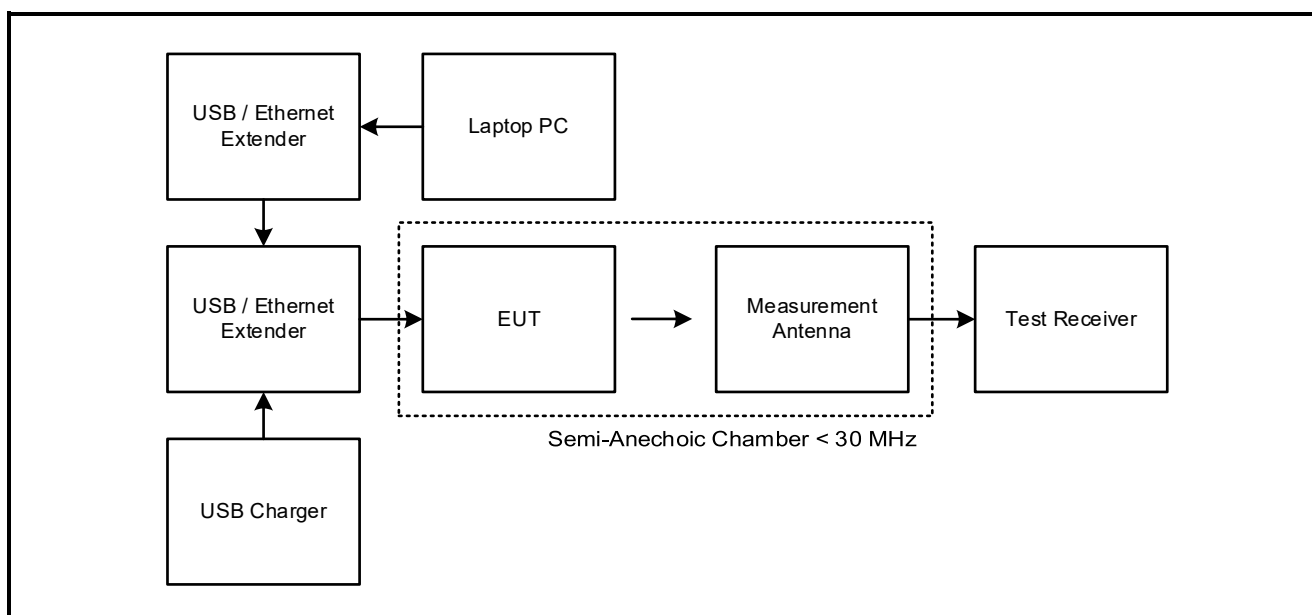
Environmental Conditions:

Temperature (°C):	21
Relative Humidity (%):	35

Note(s):

1. The signal analyser resolution bandwidth was set to 10 kHz and video bandwidth 30 kHz. A peak detector was used, sweep time was set to auto and the trace mode was Max Hold. The span was set to 2 MHz. Normal and delta markers were placed 20 dB down from the peak of the carrier. The delta value was recorded in the tables below.

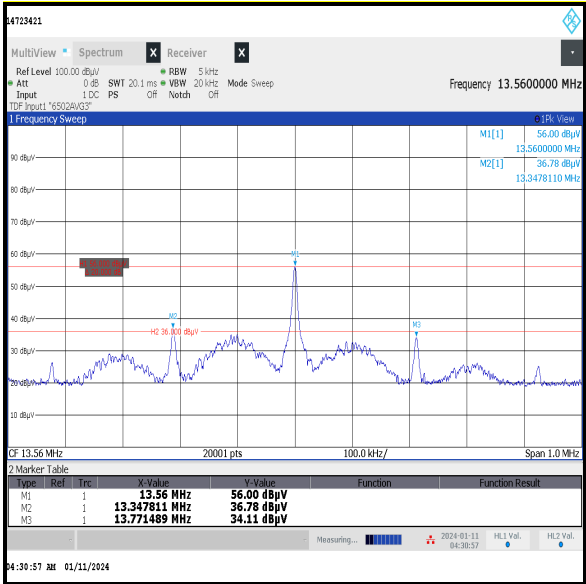
Test Setup:



Transmitter 20 dB Bandwidth (continued)

Results:

20 dB Bandwidth (kHz)
423.678



Test Equipment Used:

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
M2040	Thermohygrometer	Testo	608-H1	45124934	27 Dec 2024	12
K0001	3m RSE Chamber	Rainford EMC	N/A	N/A	06 Sep 2024	12
A3165	Magnetic Loop Antenna	ETS-Lindgren	6502	00224383	13 Apr 2024	12
M236226	Test Receiver	Rohde & Schwarz	ESW26	103134	21 Apr 2024	12

5.2.6. Transmitter 99% Occupied Bandwidth

Test Summary:

Test Engineer:	Nick Steele	Test Date:	06 March 2025
Test Sample Serial Number:	SN103		

FCC Reference	N/A
ISED Canada Reference:	RSS-Gen 6.7
Test Method Used:	RSS-Gen 6.7

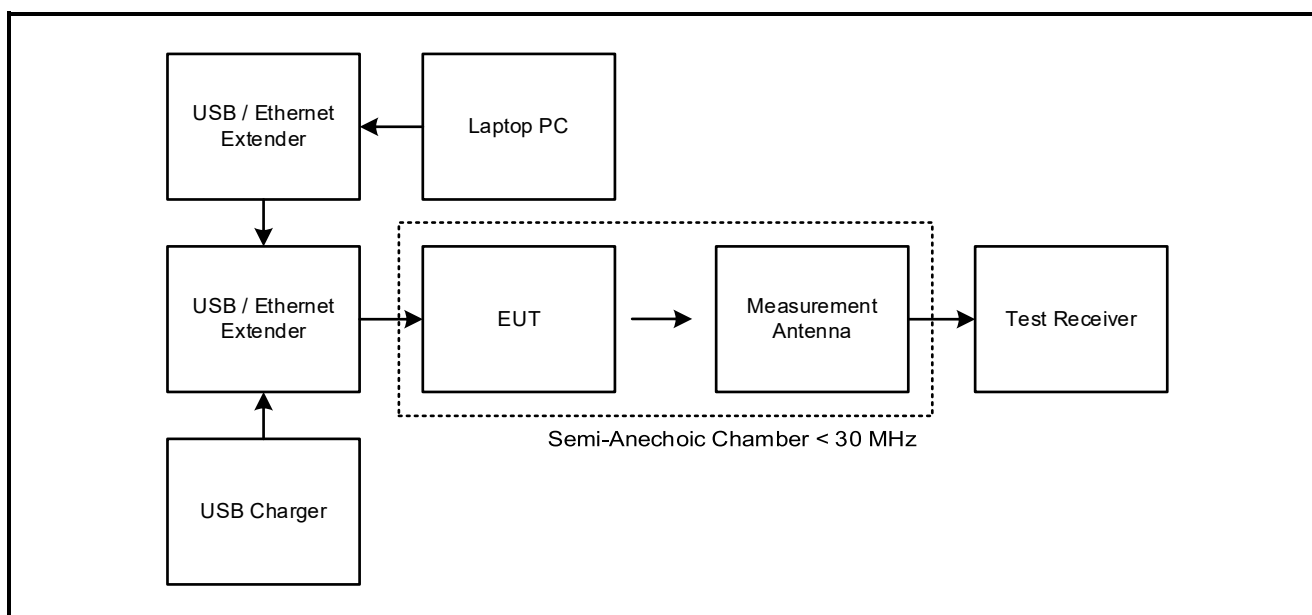
Environmental Conditions:

Temperature (°C):	21
Relative Humidity (%):	36

Note(s):

1. The signal analyser resolution bandwidth was set to 20 kHz and video bandwidth 100 kHz. A peak detector was used, sweep time was set to auto and the trace mode was Max Hold. The span was set to 2 MHz. The signal analyser's 99% Occupied Bandwidth function was enabled the value was recorded in the table below.

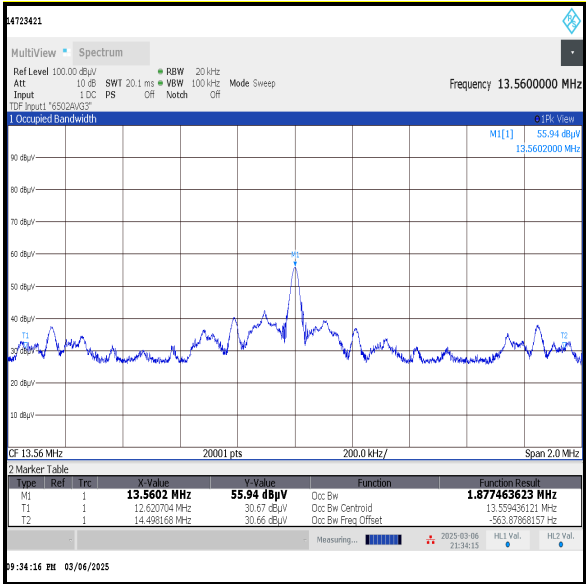
Test Setup:



Transmitter 99% Occupied Bandwidth (continued)

Results:

99% Occupied Bandwidth (kHz)
1877.464



Test Equipment Used:

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
M2040	Thermohygrometer	Testo	608-H1	45124934	23 Dec 2025	12
K0001	3m RSE Chamber	Rainford EMC	N/A	N/A	11 Sep 2025	12
A3198	Magnetic Loop Antenna	ETS-Lindgren	6502	00221887	05 Nov 2025	12
M236226	Test Receiver	Rohde & Schwarz	ESW26	103134	06 May 2025	12

5.2.7. Transmitter Frequency Stability (Temperature & Voltage Variation)

Test Summary:

Test Engineer:	Nick Tye	Test Date:	30 January 2024
Test Sample Serial Number:	SN103		

FCC Reference:	Part 15.225(e)
ISED Canada Reference:	RSS-Gen 6.11 / RSS-210 B.6 (b)
Test Method Used:	ANSI C63.10 Section 6.8.1 and 6.8.2

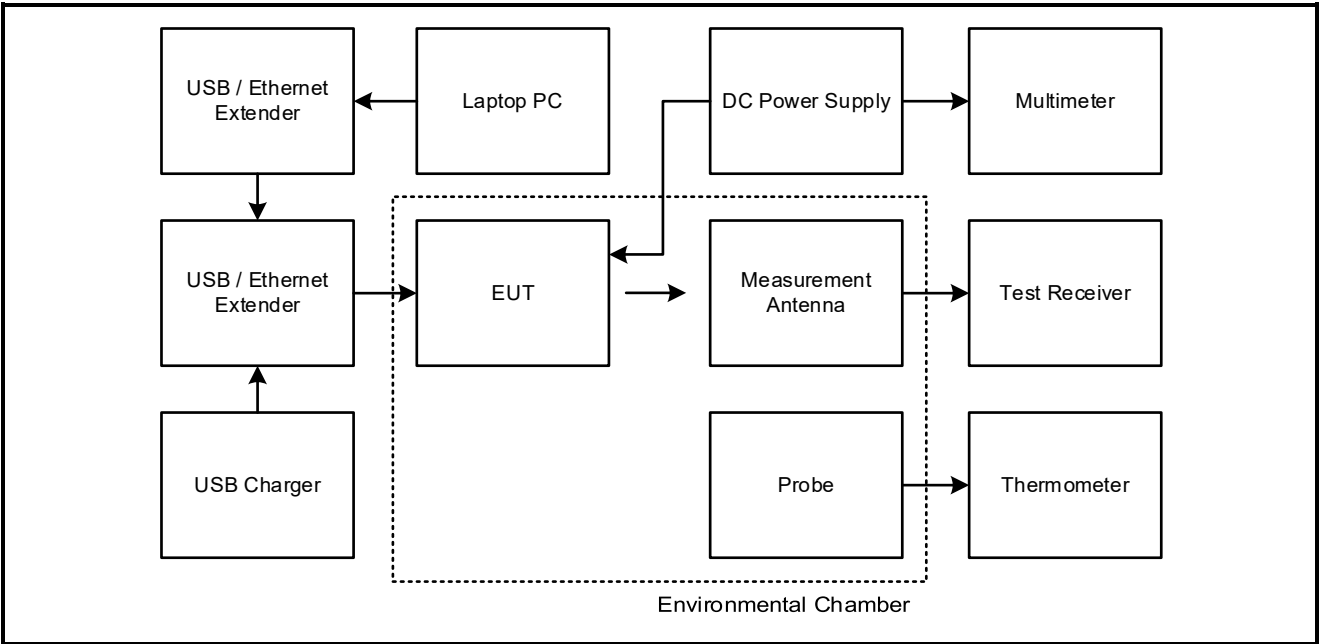
Environmental Conditions:

Ambient Temperature (°C):	25
Ambient Relative Humidity (%):	32

Note(s):

- Testing at voltage extremes was performed with the EUT powered by an external DC power supply. The EUT's battery was removed and the power supply was connected to the EUT's battery terminals. The manufacturer declared the minimum and maximum primary supply voltages as 11.2V and 16.8V.
- Tests were performed using the manufacturers declared minimum and maximum temperatures of 0°C and 40°C. Device operation is not guaranteed outside of this range.
- Frequency error was measured using a calibrated Rohde & Schwarz signal analyser.
- Temperature was monitored throughout the test with a calibrated digital thermometer.
- Voltage was monitored throughout the test with a calibrated digital voltmeter.

Test setup:



Transmitter Frequency Stability (Temperature & Voltage Variation) (continued)

Results: Temperature Variation

Temperature (°C)	Time after Start-up			
	0 minutes	2 minutes	5 minutes	10 minutes
0	13.560102 MHz	13.560102 MHz	13.560103 MHz	13.560102 MHz
20	13.560074 MHz	13.560075 MHz	13.560075 MHz	13.560078 MHz
40	13.560046 MHz	13.560044 MHz	13.560044 MHz	13.560044 MHz

Frequency with Worst Case Deviation (MHz)	Frequency Error (Hz)	Frequency Error (%)	Limit (%)	Margin (%)	Result
13.560103	103	0.00076	0.01	0.00924	Complied

Results: Voltage Variation

Temperature (°C)	Supply Voltage (V)	Nominal Frequency (MHz)	Measured Frequency (MHz)	Frequency Error (Hz)	Frequency Error (%)	Limit (%)	Margin (%)	Result
20	11.2	13.56	13.560074	74	0.000546	0.01	0.009454	Complied
20	14.4	13.56	13.560073	73	0.000538	0.01	0.009462	Complied
20	16.8	13.56	13.560075	75	0.000553	0.01	0.009447	Complied

Test Equipment Used:

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
M2038	Thermohygrometer	Testo	608-H1	45124919	27 Dec 2024	12
E0518	Environmental Chamber	TAS	LTCL 1200	24000107	Calibrated before use	-
M1249	Thermometer	Fluke	52II	88800049	20 Nov 2024	12
M1251	Multimeter	Fluke	175	89170179	08 Jun 2024	12
M1996	Signal Analyser	Rohde & Schwarz	FSV13	100975	16 Mar 2024	12
S0579	DC Power Supply	TTI Limited	EX1810R	444110	Calibrated before use	-

6. Measurement Uncertainty

No measurement or test can ever be perfect and the imperfections give rise to error of measurement in the results. Consequently the result of a measurement is only an approximation to the value of the measurand (the specific quantity subject to measurement) and is only complete when accompanied by a statement of the uncertainty of the approximation.

The expression of uncertainty of a measurement result allows realistic comparison of results with reference values and limits given in specifications and standards.

The uncertainty of the result may need to be taken into account when interpreting the measurement results.

The reported expanded uncertainties below are based on a standard uncertainty multiplied by an appropriate coverage factor such that a confidence level of approximately 95% is maintained. For the purposes of this document “approximately” is interpreted as meaning “effectively” or “for most practical purposes”.

Measurement Type	Range	Confidence Level (%)	Calculated Uncertainty
AC Conducted Spurious Emissions	0.15 MHz to 30 MHz	95%	±4.69 dB
20 dB Bandwidth	13 MHz to 14 MHz	95%	±4.59 %
99% Occupied Bandwidth	13 MHz to 14 MHz	95%	±3.92 %
Frequency Stability	13 MHz to 14 MHz	95%	±1.62 ppm
Radiated Spurious Emissions	9 kHz to 30 MHz	95%	±2.85 dB
Radiated Spurious Emissions	30 MHz to 1000 MHz	95%	±3.16 dB
Transmitter Fundamental Field Strength	13 MHz to 14 MHz	95%	±2.85 dB

The methods used to calculate the above uncertainties are in line with those recommended within the various measurement specifications. Where measurement specifications do not include guidelines for the evaluation of measurement uncertainty the published guidance of the appropriate accreditation body is followed.

7. Report Revision History

Version Number	Revision Details		
	Page No(s)	Clause	Details
1.0	-	-	Initial Version
2.0	1, 7	3.1	HVIN updated

--- END OF REPORT ---