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RADIO TEST REPORT

Report ID:
REP024911

Project number:
PRJ0047527

Type of assessment:
Final product testing

Applicant:
StrongBo Agritech Canada Ltd.

Description of the product:
StrongBo WP Electrical Box

Model (HVIN):
SB-WCTSC4R00

Product marketing name (PMN):
StrongBo WP Electrical Box

FCC identifier:
FCC ID: 2BE3T-WP01

ISED certification number:
IC: 32066-WP01

Specifications:

- FCC 47 CFR Part 15 Subpart C
- RSS-210, Issue 10, December 2019, Annex B.6

Date of issue: March 14, 2024

Fahar Abdul Sukkoor, EMC/RF Specialist
Tested by


Signature

Kevin Rose EMC/RF Specialist
Reviewed by


Signature

Lab locations

Company name	Nemko Canada Inc.		
Facilities	Ottawa site: 303 River Road Ottawa, Ontario Canada K1V 1H2 Tel: +1 613 737 9680 Fax: +1 613 737 9691	Montréal site: 292 Labrosse Avenue Pointe-Claire, Québec Canada H9R 5L8 Tel: +1 514 694 2684 Fax: +1 514 694 3528	Cambridge site: 1-130 Saltsman Drive Cambridge, Ontario Canada N3E 0B2 Tel: +1 519 650 4811

Test site identifier	**Organization**	**Ottawa**	**Montreal**	**Cambridge**
	FCC:	CA2040	CA2041	CA0101
	ISED:	2040A-4	2040G-5	24676
Website	www.nemko.com			

Limits of responsibility

Note that the results contained in this report relate only to the items tested and were obtained in the period between the date of initial receipt of samples and the date of issue of the report.
This test report has been completed in accordance with the requirements of ISO/IEC 17025. All results contained in this report are within Nemko Canada's ISO/IEC 17025 accreditation.

Copyright notification

Table of Contents

Section 1 Report summary

1.1 Test specifications

FCC 47 CFR Part 15, Subpart C	Intentional Radiators
RSS-210, Issue 10, Dec 2019, Annex B.6	Licence-Exempt Radio Apparatus: Category I Equipment.

1.2 Test methods

ANSI C63.10 v2013	American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices
RSS-Gen, Issue 5, March 2019	General Requirements for Compliance of Radio Apparatus

1.3 Exclusions

None

1.4 Statement of compliance

In the configuration tested, the EUT was found compliant.

Testing was performed against all relevant requirements of the test standard except as noted in section 1.3 above. Results obtained indicate that the product under test complies In full with the requirements tested. The test results relate only to the items tested.

See "Summary of test results" for full details.

1.5 Test report revision history

Table 1.5-1: *Test report revision history*

Report ID	Date of issue	Details of changes made to test report
REP024911	March 14, 2024	Original report issued

Section 2 Engineering considerations

2.1 Modifications incorporated in the EUT for compliance

There were no modifications performed to the EUT during this assessment.

2.2 Technical judgment

The EUT tested with representative configuration which have LTE radio module B404X. EUT will also use different LTE radio modules based on region (B404X- North America B528 – Australia) it is used.
The LTE radio modules have identical configuration doesn't affect the results for EMC, Radio and safety performance as declared by manufacturer.

2.3 Model variant declaration

There were no model variants declared by the applicant.

2.4 Deviations from laboratory tests procedures

No deviations were made from laboratory procedures.

Section 3 Test conditions

3.1 Power supply range

The normal test voltage for equipment to be connected to the mains shall be the nominal mains voltage. For the purpose of the present document, the nominal voltage shall be the declared voltage, or any of the declared voltages ±5 %, for which the equipment was designed.

Section 4 Information provided by the applicant

4.1 Disclaimer

This section contains information provided by the applicant and has been utilized to support the test plan. Inaccurate information provided by the applicant can affect the validity of the results contained within this test report. Nemko accepts no responsibility for the information contained within this section and the impact it may have on the test plan and resulting measurements.

4.2 Applicant/Manufacturer

Applicant name	Strongbo Agritech Canada Ltd.
Applicant address	3842 Manser Road, Linwood, ON, N0B 2A0 Canada
Manufacturer name	Same as applicant
Manufacturer address	Same as applicant

4.3 EUT information

Product	StrongBo WP Electrical Box
Model	SB-WCTSC4R00
Serial number	P006AD136FS23N4
Power supply requirements	12 V_{DC} powered by 12 V automotive battery
Product description and theory of operation	Enclosed Electronics Box uses RFID to read livestock tags. Designed to be used with certified modules

4.4 Radio technical information

Frequency band	134.2 kHz (one channel)
RF power Max (W)	N/A
Field strength, dBµV/m @ 3 m	132.2 @ 3 m
Measured BW (kHz), 99% OBW	186 kHz
Type of modulation	AM
Emission classification	K1D
Transmitter spurious, dBµV/m @ 3 m	83.9 pk @ 0.267 MHz
Antenna information	Manufacturer: Gallagher Group Ltd. Antenna type: 2 inductive loop antenna 1300 x 600 mm large panel Antenna gain: 0 dBi

4.5 EUT setup details

4.5.1 Radio exercise details

Operating conditions	RFID module starts transmitting as soon as EUT is powered ON.
Transmitter state	Transmitter set in to continuous mode.

4.5.2 EUT setup configuration

Table 4.5-1: *EUT sub assemblies*

Description	Brand name	Model, Part number, Serial number, Revision level
EUT (Bovine Hub)	Strongbo	MN: SB-WCTSC4R00, SN: P006AD136FS23N4
RFID antenna panel	Gallagher	MN: G03121

Table 4.5-2: *EUT interface ports*

Description	Qty.
RFID Antenna port	1

Table 4.5-3: *Support equipment*

Description	Brand name	Model, Part number, Serial number, Revision level
12 V_{DC} battery	Kirkland	PN: 1114556, MN: Group 5 size

Table 4.5-4: *Inter-connection cables*

Cable description	From	To	Length (m)
Battery power	EUT	Battery	<3
RFID cable	EUT	RFID antenna	<3

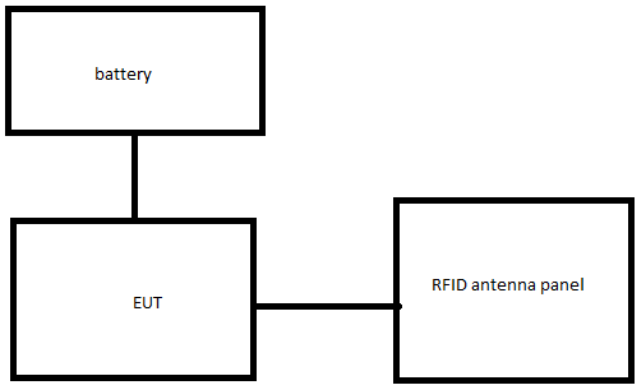

Figure 4.5-1: *Radiated testing block diagram*

Section 5 Summary of test results

5.1 Testing period

Test start date	January 19, 2024	Test end date	January 19, 2024

5.2 Sample information

Receipt date	January 16, 2024	Nemko sample ID number(s)	PRJ00475270001

5.3 FCC Part 15 Subpart A and C, general requirements test results

Table 5.3-1: *FCC general requirements results.*

Part	Test description	Verdict
§15.207(a)	Conducted limits	Not applicable
§15.31(e)	Variation of power source	Pass
§15.31(m)	Number of tested frequencies	Pass
§15.203	Antenna requirement	Pass
§15.215 (c)	Emission bandwidth	Pass
§15.209(a)	Radiated emission limits; general requirements.	Pass

Notes: EUT is a DC device powered by 12 V battery.

5.4 ISED RSS-Gen, Issue 5, test results

Table 5.4-1: *RSS-Gen requirements result.*

Clause	Test description	Verdict
7.3	Receiver radiated emission limits	Not applicable
7.4	Receiver conducted emission limits	Not applicable
6.9	Operating bands and selection of test frequencies	Pass
8.8	AC powerline conducted emissions limits	Not applicable
6.7	Occupied bandwidth	Pass

Notes: [1]According to sections 5.2 and 5.3 of RSS-Gen, Issue 5 the EUT does not have a stand-alone receiver neither scanner receiver, therefore exempt from receiver requirements.
EUT is a DC device powered by 12 V battery.

5.5 ISED RSS-210, Issue 10, test results

Table 5.5-1: *ISED RSS-210 requirements results*

Section	Test description	Verdict
7.1	Emissions falling within restricted frequency bands	Pass
7.2	General field strength limits	Pass

Notes: None

Section 6 Test equipment

6.1 Test equipment list

Table 6.1-1: *Equipment list*

Equipment	Manufacturer	Model no.	Asset no.	Cal cycle	Next cal.
3 m EMI test chamber	TDK	SAC-3	FA003012	1 year	January 31, 2024
Receiver/spectrum analyzer	Rohde & Schwarz	ESR26	FA002969	1 year	February 10, 2024
50 Ω coax cable	Huber + Suhner	None	FA003046	1 year	July 27, 2024
50 Ω coax cable	Huber + Suhner	None	FA003402	1 year	July 27,2024
Bilog antenna (30–2000 MHz)	SUNAR	JB1	FA003010	1 year	July 14, 2024
Active loop antenna (0.01–30 MHz)	Com-Power	AL-130R	FA003002	1 year	April 25, 2024

Notes: None

Table 6.1-2: *Automation software details*

Test description	Manufacturer of Software	Details
Radiated emissions	Rohde & Schwarz	EMC32, Software for EMC Measurements, Version 10.60.00

Table 6.1-3: *Measurement uncertainty calculations based on equipment list*

Measurement	Measurement uncertainty, ±dB
Radiated spurious emissions (9 kHz to 30 MHz)	3.42
Radiated spurious emissions (30 MHz to 1 GHz)	4.27

Notes: UKAS Lab 34, TIA-603 and ETSI TR 100 028-1&2 have been used as guidance for measurement uncertainty reasonable estimations with regards to previous experience and validation of data. Nemko Canada Inc. follows these test methods in order to satisfy ISO/IEC 17025 requirements for estimation of uncertainty of measurement for wireless products. Measurement uncertainty calculations assume a coverage factor of K = 2 with 95% certainty.

Section 7 Testing data

7.1 Variation of power source

7.1.1 References, definitions and limits

FCC §15.31 (e):

For intentional radiators, measurements of the variation of the input power or the radiated signal level of the fundamental frequency component of the emission, as appropriate, shall be performed with the supply voltage varied between 85% and 115% of the nominal rated supply voltage. For battery operated equipment, the equipment tests shall be performed using a new battery.

7.1.2 Test summary

Verdict	Pass		
Test date	January 19, 2024	Temperature	23 °C
Tested by	Fahar Abdul Sukkoor	Air pressure	1010 mbar
Test location	Cambridge	Relative humidity	33 %

7.1.3 Observations, settings and special notes

The testing was performed as per ANSI C63.10 Section 5.13.

a) Where the device is intended to be powered from an external power adapter, the voltage variations shall be applied to the input of the adapter provided with the device at the time of sale. If the device is not marketed or sold with a specific adapter, then a typical power adapter shall be used.
b) For devices, where operating at a supply voltage deviating ±15% from the nominal rated value may cause damages or loss of intended function, test to minimum and maximum allowable voltage per manufacturer's specification and document in the report.
c) For devices with wide range of rated supply voltage, test at 15% below the lowest and 15% above the highest declared nominal rated supply voltage.
d) For devices obtaining power from an input/output (I/O) port (USB, firewire, etc.), a test jig is necessary to apply voltage variation to the device from a support power supply, while maintaining the functionalities of the device.

For battery-operated equipment, the equipment tests shall be performed using a variable power supply.

7.1.4 Test data

EUT Power requirements:	☐ AC	☐ DC	☒ Battery
If EUT is an AC or a DC powered, was the noticeable output power variation observed?	☐ YES	☐ NO	☒ N/A
If EUT is battery operated, was the testing performed using fresh batteries?	☐ YES	☐ NO	☒ N/A
If EUT is rechargeable battery operated, was the testing performed using fully charged batteries?	☒ YES	☐ NO	☐ N/A

7.2 Number of frequencies

7.2.1 References, definitions and limits

FCC §15.31:

(m) Measurements on intentional radiators or receivers shall be performed and, if required, reported for each band in which the device can be operated with the device operating at the number of frequencies in each band specified in the following table.

RSS-Gen, Clause 6.9:

Except where otherwise specified, measurements shall be performed for each frequency band of operation for which the radio apparatus is to be certified, with the device operating at the frequencies in each band of operation shown in table below. The frequencies selected for measurements shall be reported in the test report.

Table 7.2-1: *Frequency Range of Operation*

Frequency range over which the device operates (in each band)	Number of test frequencies required	Location of measurement frequency inside the operating frequency range
1 MHz or less	1	Center (middle of the band)
1–10 MHz	2	1 near high end, 1 near low end
Greater than 10 MHz	3	1 near high end, 1 near center and 1 near low end

Notes: "near" means as close as possible to or at the centre / low end / high end of the frequency range over which the device operates.

7.2.2 Test summary

Verdict	Pass		
Test date	January 19, 2024	Temperature	23 °C
Tested by	Fahar Abdul Sukkoor	Air pressure	1010 mbar
Test location	Cambridge	Relative humidity	33 %

7.2.3 Observations, settings and special notes

ANSI C63.10, Clause 5.6.2.1:

The number of channels tested can be reduced by measuring the center channel bandwidth first and then applying the following relaxations as appropriate:

a) For each operating mode, if the measured channel bandwidth on the middle channel is at least 150% of the minimum permitted bandwidth, then it is not necessary to measure the bandwidth on the high and low channels.

b) For multiple-input multiple-output (MIMO) systems, if the measured channel bandwidth on testing the middle channel exceeds the minimum permitted bandwidth by more than 50% on one transmit chain, then it is not necessary to repeat testing on the other chains.

c) If the measured channel bandwidth on the middle channel is less than 50% of the maximum permitted bandwidth, then it is not necessary to measure the bandwidth on the high and low channels.

ANSI C63.10, Clause 5.6.2.2:

For devices with multiple operating modes, measurements on the middle channel can be used to determine the worst-case mode(s). The worst-case modes are as follows:

a) Band edge requirements—Measurements on the mode with the widest bandwidth can be used to cover the same channel (center frequency) on modes with narrower bandwidth that have the same or lower output power for each modulation family (e.g., OFDM and direct sequence spread spectrum).

b) Spurious emissions—Measure the mode with the highest output power and the mode with the highest output power spectral density for each modulation family (e.g., OFDM and direct sequence spread spectrum).

c) In-band PSD—Measurements on the mode with the narrowest bandwidth can be used to cover all modes within the same modulation family of an equal or lower output power provided the result is less than 50% of the limit.

7.2.4 Test data

Table 7.2-2: *Test channels selection*

Start of Frequency range, MHz	End of Frequency range, MHz	Frequency range bandwidth, Hz	Tx channel, kHz
0.1341	0.1343	200	134.2

7.3 Antenna requirement

7.3.1 References, definitions and limits

FCC §15.203:

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with §15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.

RSS-Gen, Clause 6.8:

The applicant for equipment certification shall provide a list of all antenna types that may be used with the transmitter, where applicable (i.e. for transmitters with detachable antenna), indicating the maximum permissible antenna gain (in dBi) and the required impedance for each antenna. The test report shall demonstrate the compliance of the transmitter with the limit for maximum equivalent isotropically radiated power (e.i.r.p.) specified in the applicable RSS, when the transmitter is equipped with any antenna type, selected from this list.

For expediting the testing, measurements may be performed using only the antenna with highest gain of each combination of transmitter and antenna type, with the transmitter output power set at the maximum level. However, the transmitter shall comply with the applicable requirements under all operational conditions and when in combination with any type of antenna from the list provided in the test report.

7.3.2 Test summary

Verdict	Pass		
Test date	January 19, 2024	Temperature	23 °C
Tested by	Fahar Abdul Sukkoor	Air pressure	1010 mbar
Test location	Cambridge	Relative humidity	23 %

7.3.3 Observations, settings and special notes

None

7.3.4 Test data

Must the EUT be professionally installed?	☒ YES	☐ NO	
Does the EUT have detachable antenna(s)?	☒ YES	☐ NO	
If detachable, is the antenna connector(s) non-standard?	☒ YES	☐ NO	☐ N/A

Table 7.3-1: *Antenna information*

Antenna type	Manufacturer	Model number	Connector type
Inductive loop antenna	Gallagher	G03121	N-type Amphenol

7.4 Emission bandwidth

7.4.1 References, definitions and limits

FCC Part §15.215:

Additional provisions to the general radiated emission limitations:

(c) Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§15.217 through 15.257 and in subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated.

ANSI C63.10-2013, Clause 6.9.3:

The occupied bandwidth is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers are each equal to 0.5% of the total mean power of the given emission.

RSS-Gen, Clause 6.7:

For the 99% emission bandwidth, the trace data points are recovered and directly summed in linear power level terms. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5% of the total is reached, and that frequency recorded. The process is repeated for the highest frequency data points (starting at the highest frequency, at the right side of the span, and going down in frequency). This frequency is then recorded. The difference between the two recorded frequencies is the occupied bandwidth (or the 99% emission bandwidth).

7.4.2 Test summary

Verdict	Pass		
Test date	January 19, 2024	Temperature	23 °C
Tested by	Fahar Abdul Sukkoor	Air pressure	1010 mbar
Test location	Cambridge	Relative humidity	33 %

7.4.3 Observations, settings and special notes

The emission bandwidth was tested per ANSI C63.10, Clause 6.9.3. Spectrum analyser settings:

Resolution bandwidth:	≥ 1 % of span
Video bandwidth:	≥3 × RBW
Detector mode:	Peak
Trace mode:	Max Hold

7.4.4 Test data

Table 7.4-1: *99% bandwidth results*

Frequency, kHz	99% bandwidth, Hz
134.2	186

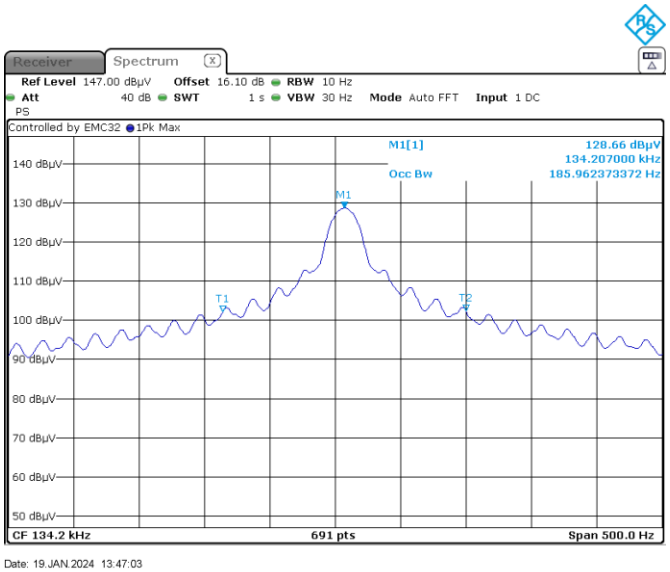

Figure 7.4-1: *99% bandwidth*

7.5 Radiated emission limits, general requirements

7.5.1 References, definitions and limits

FCC §15.209:

(a) Except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

ANSI C63.10, Clause 4.1.4.2:

Specific detector functions and bandwidths for unlicensed wireless device measurements

4.1.4.2.1 Frequencies less than or equal to 1000 MHz

At any frequency or frequencies less than or equal to 1000 MHz, measurements shall be made with the CISPR quasi-peak detector and related measurement bandwidths, unless otherwise specified. The specifications for the measuring instrument using the CISPR quasi-peak detector are given in CISPR 16-1-1:2010. Where average limits are specified, an average detector shall be used. Where peak limits are also specified, the peak emission shall also be measured with instrumentation properly adjusted for factors, such as pulse desensitization. As an alternative to CISPR quasi-peak measurements or average measurements, a test laboratory may demonstrate compliance with the emission limits using measuring equipment employing a peak detector function as long as the equivalent or greater bandwidths as indicated for CISPR quasi-peak measurements or average measurements, as applicable, are employed.

Pulse-modulated devices with a pulse repetition frequency of 20 Hz or less have additional requirements.

4.1.4.2.2 Frequencies above 1000 MHz

Unless otherwise stated, on any frequency or frequencies above 1000 MHz, measurements shall be made with measurement instrumentation employing an average detector function. Unless otherwise specified, measurements above 1000 MHz shall be performed using a minimum resolution bandwidth of 1 MHz. Peak measurements can apply to the total peak emission level radiated by the device (i.e., the total peak power level) depending on the applicable regulatory requirement. Note that the use of a pulse desensitization correction factor might be needed to determine the total peak emission level.

RSS-210:

7.3 Transmitters whose wanted and unwanted emissions fall within the general field strength limits specified in RSS-Gen may operate licence-exempt in any of the frequency bands, other than the restricted frequency bands listed in RSS-Gen and the TV bands 54–72 MHz, 76–88 MHz, 174–216 MHz and 470–602 MHz, and shall be certified under RSS-210. Under no circumstances shall the level of any unwanted emissions exceed the level of the fundamental emissions.

Table 7.5-1: *FCC §15.209 and RSS-Gen – Radiated emission limits*

	Field strength of emissions		
Frequency, MHz	**µV/m**	**dBµV/m**	**Measurement distance, m**
0.009–0.490	2400/F	$67.6 - 20 \times \log_{10}(F)$	300
0.490–1.705	24000/F	$87.6 - 20 \times \log_{10}(F)$	30
1.705–30.0	30	29.5	30
30–88	100	40.0	3
88–216	150	43.5	3
216–960	200	46.0	3
above 960	500	54.0	3

Notes: In the emission table above, the tighter limit applies at the band edges.
For frequencies above 1 GHz the limit on peak RF emissions is 20 dB above the maximum permitted average emission limit applicable to the equipment under test.

References, definitions and limits, continued

Table 7.5-2: *ISED restricted frequency bands*

MHz	MHz	MHz	GHz
0.090–0.110	12.57675–12.57725	399.9–410	7.25–7.75
0.495–0.505	13.36–13.41	608–614	8.025–8.5
2.1735–2.1905	16.42–16.423	960–1427	9.0–9.2
3.020–3.026	16.69475–16.69525	1435–1626.5	9.3–9.5
4.125–4.128	16.80425–16.80475	1645.5–1646.5	10.6–12.7
4.17725–4.17775	25.5–25.67	1660–1710	13.25–13.4
4.20725–4.20775	37.5–38.25	1718.8–1722.2	14.47–14.5
5.677–5.683	73–74.6	2200–2300	15.35–16.2
6.215–6.218	74.8–75.2	2310–2390	17.7–21.4
6.26775–6.26825	108–138	2483.5–2500	22.01–23.12
6.31175–6.31225	149.9–150.05	2655–2900	23.6–24.0
8.291–8.294	156.52475–156.52525	3260–3267	31.2–31.8
8.362–8.366	156.7–156.9	3332–3339	36.43–36.5
8.37625–8.38675	162.0125–167.17	3345.8–3358	Above 38.6
8.41425–8.41475	167.72–173.2	3500–4400	
12.29–12.293	240–285	4500–5150	
12.51975–12.52025	322–335.4	5350–5460	

Note: Certain frequency bands listed in this table**Error! Reference source not found.** and above 38.6 GHz are designated for licence-exempt applications. These f requency bands and the requirements that apply to related devices are set out in the 200 and 300 series of RSSs.

Table 7.5-3: *FCC restricted frequency bands*

MHz	MHz	MHz	GHz
0.090–0.110	16.42–16.423	399.9–410	4.5–5.15
0.495–0.505	16.69475–16.69525	608–614	5.35–5.46
2.1735–2.1905	16.80425–16.80475	960–1240	7.25–7.75
4.125–4.128	25.5–25.67	1300–1427	8.025–8.5
4.17725–4.17775	37.5–38.25	1435–1626.5	9.0–9.2
4.20725–4.20775	73–74.6	1645.5–1646.5	9.3–9.5
6.215–6.218	74.8–75.2	1660–1710	10.6–12.7
6.26775–6.26825	108–121.94	1718.8–1722.2	13.25–13.4
6.31175–6.31225	123–138	2200–2300	14.47–14.5
8.291–8.294	149.9–150.05	2310–2390	15.35–16.2
8.362–8.366	156.52475–156.52525	2483.5–2500	17.7–21.4
8.37625–8.38675	156.7–156.9	2690–2900	22.01–23.12
8.41425–8.41475	162.0125–167.17	3260–3267	23.6–24.0
12.29–12.293	167.72–173.2	3332–3339	31.2–31.8
12.51975–12.52025	240–285	3345.8–3358	36.43–36.5
12.57675–12.57725	322–335.4	3600–4400	Above 38.6
13.36–13.41			

7.5.2 Test summary

Verdict	Pass		
Test date	January 19, 2024	Temperature	23 °C
Tested by	Fahar Abdul Sukkoor	Air pressure	1010 mbar
Test location	Cambridge	Relative humidity	33 %

7.5.3 Observations, settings and special notes

- The spectrum was searched from 9 kHz to 1 GHz.
- EUT was set to transmit with 100 % duty cycle.
- Radiated measurements were performed at a distance of 3 m. Plots are shown in worst case orientation
- The spurious emission was tested per ANSI C63.10, Clause 6.4 and 6.5.

Spectrum analyser settings for measurements below 150 kHz:

Resolution bandwidth:	200 Hz
Video bandwidth:	1 kHz
Detector mode:	Peak
Trace mode:	Max Hold

Spectrum analyser settings for measurements below 30 MHz:

Resolution bandwidth:	9 kHz
Video bandwidth:	30 kHz
Detector mode:	Peak
Trace mode:	Max Hold

Spectrum analyser settings for measurements below 1 GHz:

Resolution bandwidth:	100 kHz
Video bandwidth:	300 kHz
Detector mode:	Peak (Preview) and Quasi-peak (Final)
Trace mode:	Max Hold

7.5.4 Test data

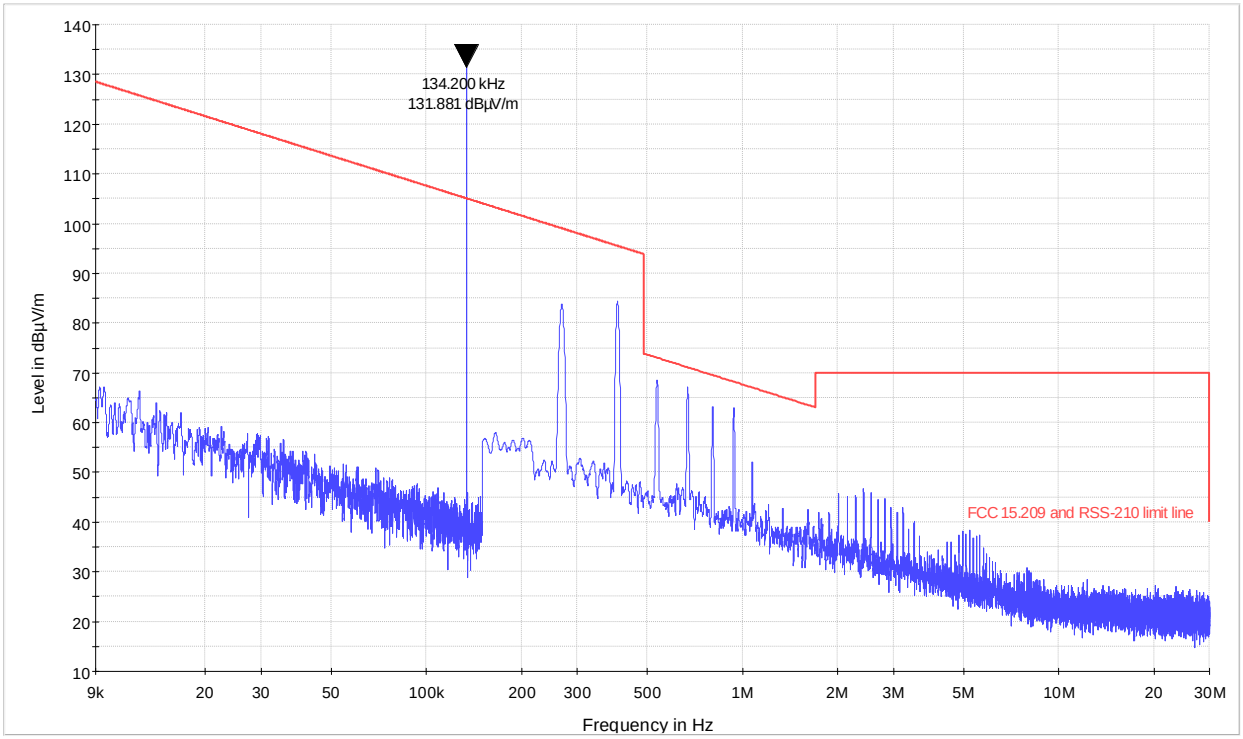

Figure 7.5-1: *Field strength of spurious emissions below 30 MHz*

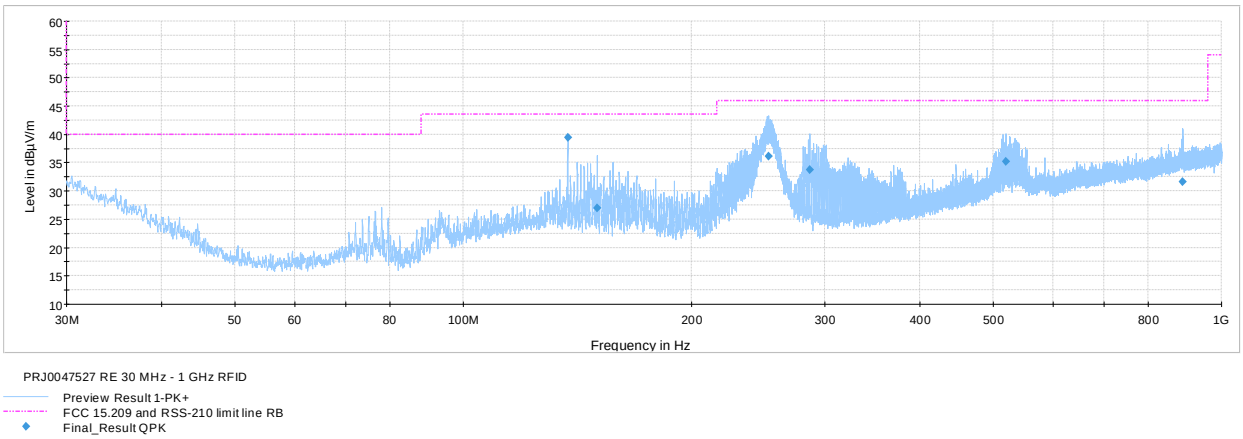

Figure 7.5-2: *Field strength of spurious emissions above 30 MHz*

Test data, continued

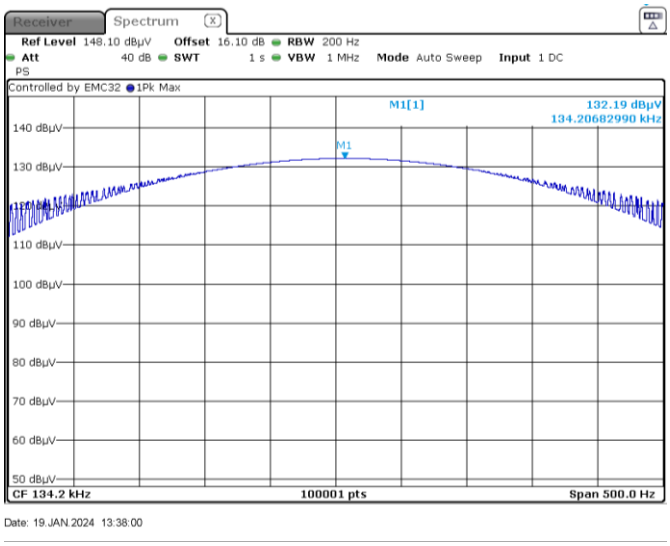

Figure 7.5-3: *Field strength @ 3 m*

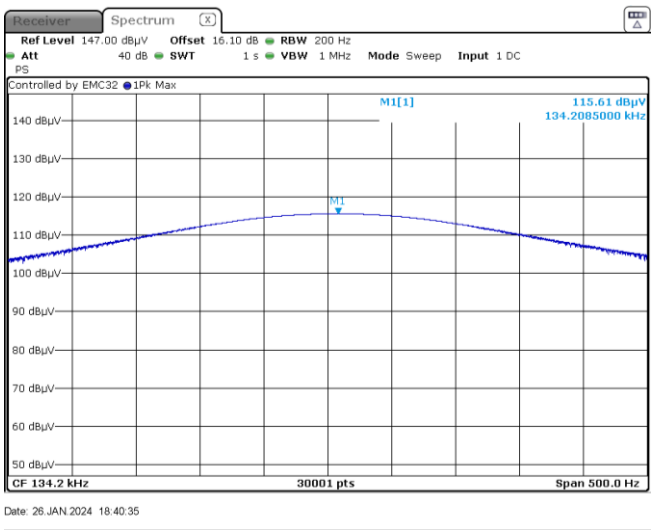

Figure 7.5-4: *Field strength @ 6 m*

Table 7.5-1: *Radiated field strength measurement calculations*

Frequency (kHz)	Peak field strength (dBµV/m) in Chamber at 3m	Peak field strength (dBµV/m) in chamber 6m	Peak field strength (dBµV/m) at 300m calculated
134.2	132.19	115.61	22.04

Table 7.5-1: *Radiated field strength measurement final results*

Frequency (kHz)	Peak field strength (dBµV/m) at 300m calculated	Field strength limit strength (dBµV/m) @ 300 m	Margin (dB)
134.2	22.04	25.04	3.0

As per ANSI C63.10 Clause 6.4.4.4 (calculation of extrapolation factor from two points) and FCC 15.209/ RSS Gen limits, final values method and Final limit line method are applied respectively:

Sample calculation of final values:

$$\text{Extrapolation Factor (dB/decade)} = \begin{cases} -40 \text{ (dB/decade)} & \text{if } d_1 = d_2 \\ \dfrac{\text{Reading Value } d_2 \text{ (dBµV)} - \text{Reading Value } d_1 \text{ (dBµV)}}{\text{Log}(d_2) - \text{Log}(d_1)} & \text{if } d_1 \neq d_2 \end{cases}$$

Please note that d1 = 3 m and d2 =6m
Extrapolation Factor (dB) = -55.08 dB/decade

Peak Field at 300m (dBµV/ m) = Peak Field at 6 m + Extrapolation Factor *Log (300 m/6 m)= 115.61 – 55.08 (1.6989) = 22.04 dBµV/m

limits at 300m (µV/m) = 2400/F(kHz) with F(kHz) = 134.2. Then limits at 300 m = 17.88 µV/m or 20 Log_{10} (17.88) dBµV/m = 25.04 dBµV/ m (at 300 m)

Test data, continued

Table 7.5-4: *Radiated spurious emissions results.*

Frequency (MHz)	Field strength[1 and 3] (dBµV/m)	Field strength limit (dBµV/m)	Margin (dB)
0.267	83.9	99.0	15.1
0.401	84.5	95.5	11
0.536	68.6	73.0	4.4
0.670	67.2	71.1	3.9
0.804	63.2	69.5	6.3
0.940	62.9	68.2	5.3
1.072	51.9	67.0	15.1
137.42	39.4	43.5	4.1

Notes: Field Strength limits are adjusted to 3 m distance in plots.
Peak measurements are taken for 9 kHz – 30 MHz.
Quasi peak measurements are provided for emissions above 30 MHz.

Section 8 Block diagram and test setups

8.1 Radiated emissions setup

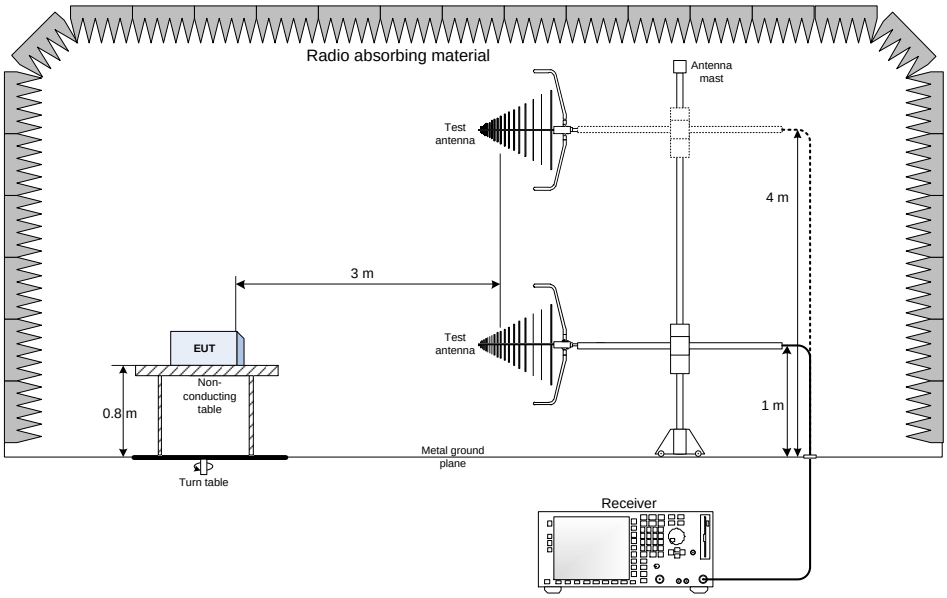

Figure 8.1-1: *Block diagram of radiated emissions setup*

End of the test report