

DETNET SOUTH AFRICA (PTY) LTD TEST REPORT

SCOPE OF WORK

Radiated Emission Testing on Tx (Transmitter)

REPORT NUMBER

106575429BOX-001

ISSUE DATE

06/08/2026

[REVISED DATE]

DOCUMENT CONTROL NUMBER

Non-Specific Radio Report Shell Rev. October 2022
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EMISSIONS TEST REPORT (FULL COMPLIANCE)

Report Number: 106575429BOX-001

Project Number: G106575429

Report Issue Date: 06/08/2026

Model(s) Tested: Tx (Transmitter)

Model(s) Partially Tested: None

Model(s) Not Tested but declared equivalent by the client: None

Standards: FCC Part 15C, 15.209:2024

FCC Part 15C, 15.205:2024

RSS-210 Issue 11 June 25, 2024

Tested by:
Intertek
70 Codman Hill Road
Boxborough, MA 01719
USA

Client:
DetNet South Africa (Pty) Ltd
Block 1B, Founder Hill Office Park
Modderfontein, 1645
Johannesburg
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Report prepared by



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Report reviewed by



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1 Introduction and Conclusion

The tests indicated in section 2.0 were performed on the product constructed as described in section 4.0. The remaining test sections are the verbatim text from the actual data sheets used during the investigation. These test sections include the test name, the specified test Method, a list of the actual Test Equipment Used, documentation Photos, Results and raw Data. No additions, deviations, or exclusions have been made from the standard(s) unless specifically noted.

Based on the results of our investigation, we have concluded the product tested **complies** with the requirements of the standard(s) indicated. The results obtained in this test report pertain only to the item(s) tested. Intertek does not make any claims of compliance for samples or variants which were not tested.

2 Test Summary

Section	Test full name	Result
3	Client Information	--
4	Description of Equipment Under Test and Variant Models	--
5	System Setup and Method	--
6	Radiated Emissions FCC Part 15C, 15.209:2024 FCC Part 15C, 15.205:2024 RSS-210 Issue 11 June 25, 2024	Pass
7	Revision History	---

3 Client Information

This EUT was tested at the request of:

Client: DetNet South Africa (Pty) Ltd
Block 1B, Founder Hill Office Park
Modderfontein, 1645
Johannesburg
South Africa

Contact: Steve Bedford
Telephone: 011 657 7609
Email: bedfords@detnet.com

4 Description of Equipment Under Test and Variant Models

Manufacturer:

DetNet South Africa (Pty) Ltd
Block 1B, Founder Hill Office Park
Modderfontein, 1645
Johannesburg
South Africa

Equipment Under Test	
Type	Blast Control Equipment
Manufacturer	DetNet South Africa (Pty) Ltd
Name	CyberDet I
Model Number	Tx (Transmitter)
Brand	CyberDet
Serial Number	BOX2401231433-001 (Intertek Assigned)
Frequency Range	3.9-4.1 kHz
Modulation Type	CSS
Max. RF Output Power	10.22 dBm
Antenna Gain & Type	0 dBi, Omnidirectional loop antenna
EIRP	10.22 dBm
Technologies	Magnetic Spread-Spectrum

Note: $EIRP = E_{Meas} + 20\log(d_{meas}) - 104.7$; where d_{meas} is a test distance and E_{Meas} is a field strength
 $EIRP = P_{Cond} + \text{Antenna Gain (dBi)}$

Receive Date:	7/24/2024 & 01/23/2025
Received Condition:	Good
Type:	Production

Description of Equipment Under Test (provided by client)

The CyberDet I Tx (Transmitter) system consists of a transmitter, capacitor bank and a loop antenna. The CyberDet I provides a wireless through-the-earth (TTE) means of communication from a CyberDet I Tx (Transmitter) via an antenna to one or more CyberDet I Rx (Receiver).

Equipment Under Test Power Configuration			
Rated Voltage	Rated Current	Rated Frequency	Number of Phases
Battery Powered	N/A	N/A	N/A

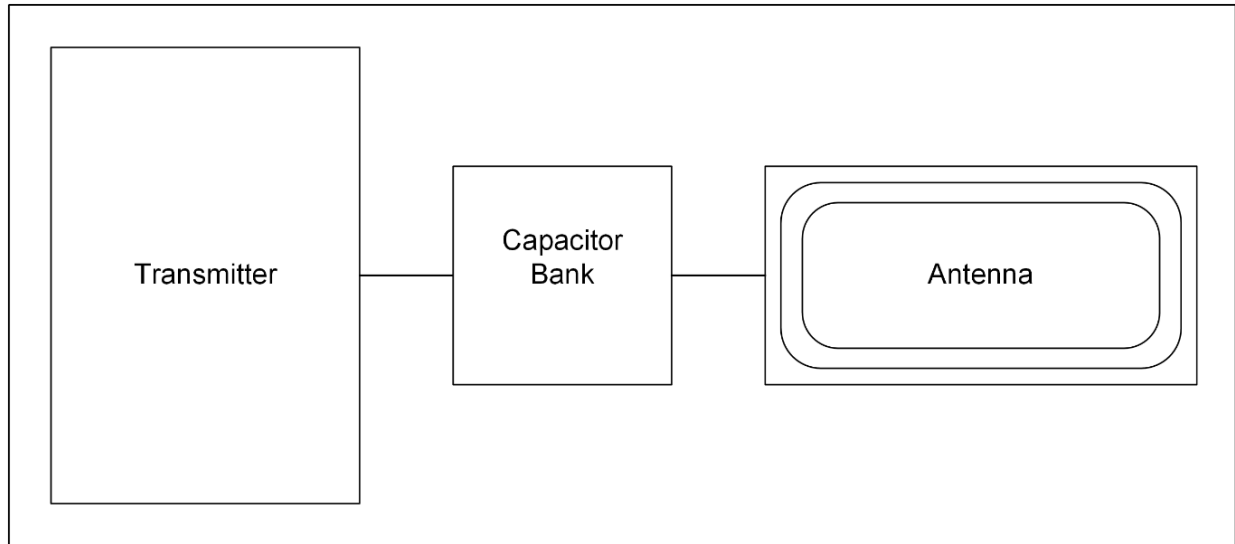
Operating modes of the EUT:

No.	Descriptions of EUT Exercising
1	Transmission test mode – 4 test messages per minute. Each message lasting 8 seconds.

2	Testing was performed with the EUT on battery power
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Software used by the EUT:

No.	Descriptions of EUT Exercising
1	Software V1.2.5

Tx (Transmitter) System Overview

The loop antenna is a passive device and does not generate RF emissions. Compliance of the Tx (Transmitter) antenna is verified as part of system testing with the Tx (Transmitter) system."

Variant Models:

The following variant models were not tested as part of this evaluation and are not eligible for certification; but have been identified by the manufacturer as being electrically identical models, depopulated models, or with reasonable similarity to the model(s) tested. Intertek does not make any claims of compliance for samples or variants which were not tested.

None

5 System Setup and Method

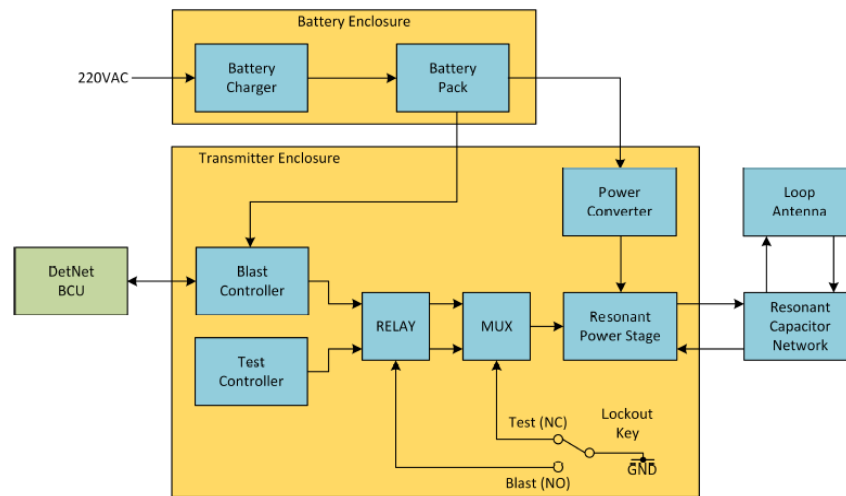
Cables					
ID	Description	Length (m)	Shielding	Ferrites	Termination
1	SOC IF Assy Loom 03300-02695	0.5m	Braided Screen Sleeve, Tinned Cu, 93% Coverage	N/A	N/A
2	Battery InterLink Loom Assy 03300-02657	0.5m	Braided Screen Sleeve, Tinned Cu, 93% Coverage	N/A	N/A
3	TX to Capacitor bank cable	1m	Tinned Copper BRAID Shield, 85% Coverage	N/A	N/A
4	Battery SOC, Link Cable Assy (Twisted pair)	0.155m	N/A	N/A	N/A
5	Battery Link NEG Loom Assy 03300-02688	0.06m	N/A	N/A	N/A
6	Battery Link Cable Assy, POS 03300-02655	0.06m	N/A	N/A	N/A

Support Equipment			
Description	Manufacturer	Model Number	Serial Number
Capacitor bank	Etion Create	30030-02465	Not labelled
19", 3U, 48VDC Battery Pack	Pylontech	US3000	Not labelled
2x8m loop antenna	Etion Create	30030-02464	Not labelled

5.1 Method:

Configuration as required by ANSI C63.10:2020.

5.2 EUT Block Diagram:



6 Radiated Emissions

6.1 Method

Tests are performed in accordance with ANSI C63.10.

TEST SITE: 10m ALSE

The 10m ALSE is 13m (Length) x 21m (Depth) x 10m (Height) with the effective size in terms of space from the tips of the absorber is 12m (Length) x 20m (Depth) x 8.5m (Height). This chamber achieves broadband performance using a unique arrangement of hybrid and ferrite tile absorber. This chamber has a built in 3m diameter turntable (Embedded type). The metal structure of the table makes electrical connection around the entire circumference of the turntable to the ground plane with a metal brush type connection. The turntable is located on one end of the chamber and the antennas are mounted 3 and 10 meters away at the other end of the chamber on the adjustable an Antenna Mast. The antenna mast is a non-conductive bore sighted type with remote control of antenna height and polarization. The Antenna Mast and the turntable can be remotely controlled through the controller located in the adjacent Control room. A Styrofoam table 80 cm high is used for table-top equipment.

Measurement Uncertainty

Measurement	Frequency Range	Expanded Uncertainty (k=2)	Ucisp
Radiated Emissions, 10m	30-1000 MHz	5.0 dB	6.3 dB
Radiated Emissions, 3m	30-1000 MHz	4.6 dB	6.3 dB
Radiated Emissions, 3m	1-6 GHz	4.9 dB	5.2 dB
Radiated Emissions, 3m	6-15 GHz	5.1 dB	5.5 dB
Radiated Emissions, 3m	15-18 GHz	4.7 dB	5.5 dB
Radiated Emissions, 3m	18-40 GHz	4.7 dB	5.5 dB

As shown in the table above our radiated emissions U_{lab} is less than the corresponding U_{CISPR} reference value in CISPR 16-4-2 Table 1, hence the compliance of the product is only based on the measured value, and no measurement uncertainty correction is required, based on CISPR 22 and CISPR 11 (for 2006 and later revisions) Clause 11.

Sample Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain (if any) from the measured reading. The basic equation with a sample calculation is as follows:

$$FS = RA + AF + CF - AG$$

Where

- FS = Field Strength in dB μ V/m
- RA = Receiver Amplitude (including preamplifier) in dB μ V
- CF = Cable Attenuation Factor in dB
- AF = Antenna Factor in dB
- AG = Amplifier Gain in dB

In the following table(s), the reading shown on the data table reflects the preamplifier gain. An example for the calculations in the following table is as follows.

Assume a receiver reading of 52.0 dB μ V is obtained. The antenna factor of 7.4 dB and cable factor of 1.6 dB is added. The amplifier gain of 29 dB is subtracted, giving a field strength of 32 dB μ V/m. This value in dB μ V/m was converted to its corresponding level in μ V/m.

RA = 52.0 dB μ V
 AF = 7.4 dB/m
 CF = 1.6 dB
 AG = 29.0 dB
 FS = 32 dB μ V/m

To convert from dB μ V to μ V or mV the following was used:

$UF = 10^{(NF / 20)}$ where UF = Net Reading in μ V
 NF = Net Reading in dB μ V

Example:

$FS = RA + AF + CF - AG = 52.0 + 7.4 + 1.6 - 29.0 = 32.0$
 $UF = 10^{(32 \text{ dB}\mu\text{V} / 20)} = 39.8 \mu\text{V/m}$

Alternately, when BAT-EMC Emission Software is used, the "Level" includes all losses and gains and is compared directly in the "Margin" column to the "Limit". The "Correction" includes Antenna Factor, Preamp, and Cable Loss. These are already accounted for in the "Level" column.

6.2 Test Equipment Used:

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
DAV007'	Weather Station Vantage Vue	Davis	6250	MS191212003	03/27/2024	03/27/2025
FLU12'	Digital Multimeter	Fluke	87-5	23500627	01/17/2024	01/17/2025
147-509'	Turntable controller	EMCO	2090	00094617	VBU	Verified
147-510'	Mast Controller	EMCO	2090	00094618	VBU	Verified
ROS014'	Receiver 1Hz-44GHz	Rhode & Schwarz	ESW 44	103232	06/10/2024	06/10/2025
145106'	Bilog Antenna (30MHz - 5GHz)	Sunol Sciences	JB5	A111003	09/14/2023	09/14/2024
PRE11'	50dB gain pre-amp	Pasternack	PRE11	PRE11	09/15/2023	09/15/2024
ETS003'	9kHz-30MHz Active Loop Antenna	ETS Lindgren	6502	00143396	01/25/2024	01/25/2025
145-422'	10Amp Pre-amp to under floor	Utiflex	UFB311A-0-2756-70070	145-422	03/26/2024	03/26/2025
IW003'	8.4 meter cable	Insulated Wire	2800-NPS	003	01/17/2024	01/17/2025

Software Utilized:

Name	Manufacturer	Version
BAT-EMC	NEXIO	2023.0.9.0

6.3 Results:

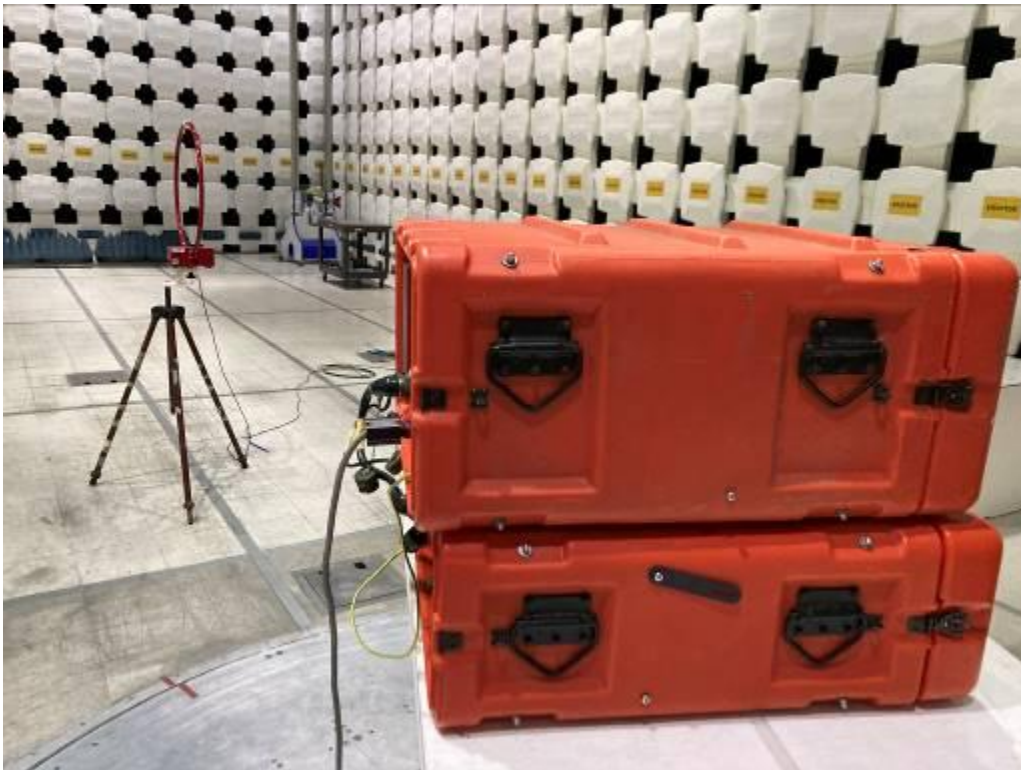
The sample tested was found to Comply.

6.4 Setup Photographs:

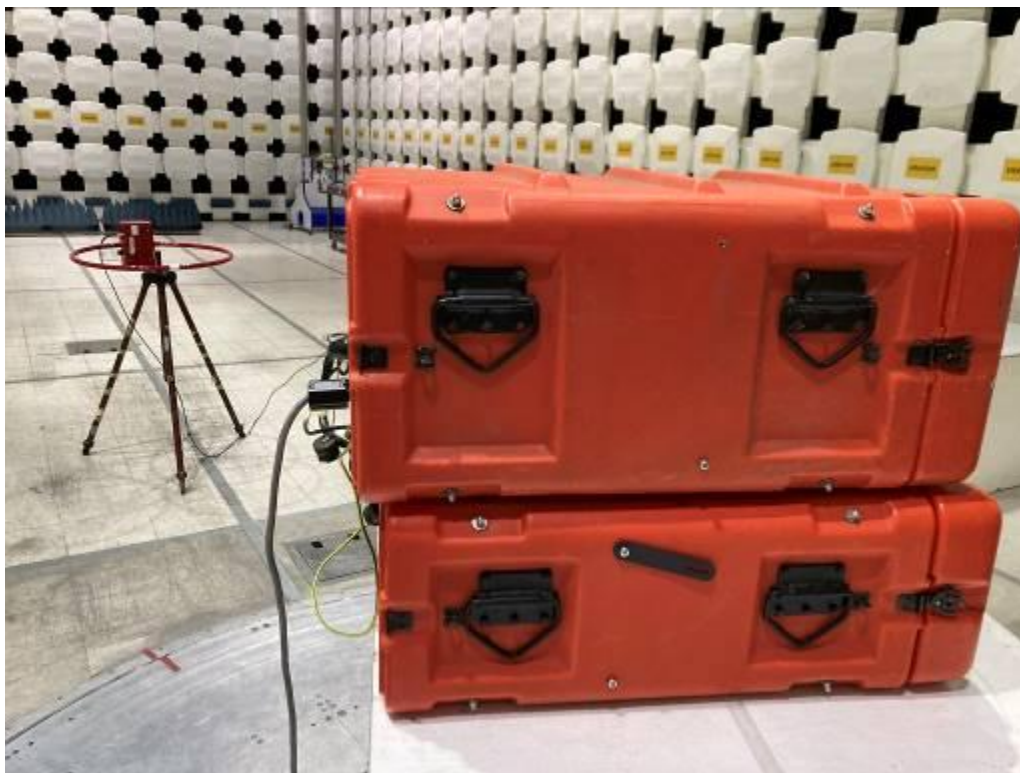
9 kHz-30 MHz, antenna unfolded [X Axis]



9 kHz-30 MHz, antenna unfolded [Y Axis]



9kHz-30 MHz, antenna unfolded [Z Axis]



9 kHz-30 MHz, antenna folded [X Axis]



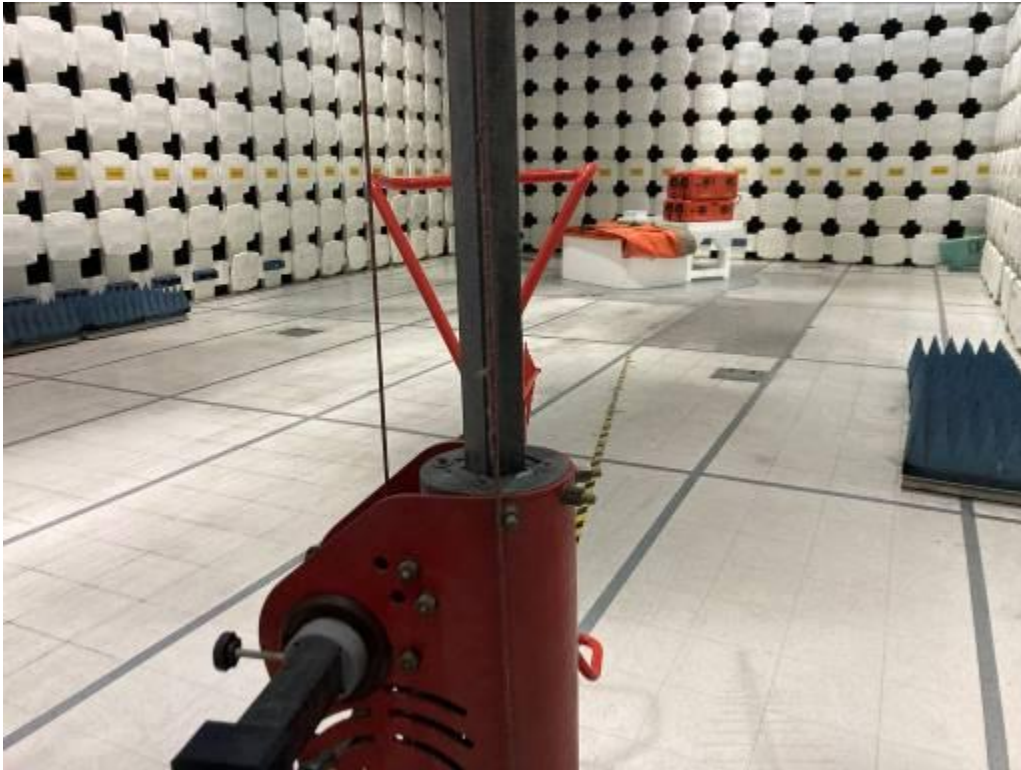
9 kHz-30 MHz, antenna folded [Y Axis]



9 kHz-30 MHz, antenna folded [Z Axis]



30-1000 MHz, antenna folded



30-1000 MHz, antenna unfolded



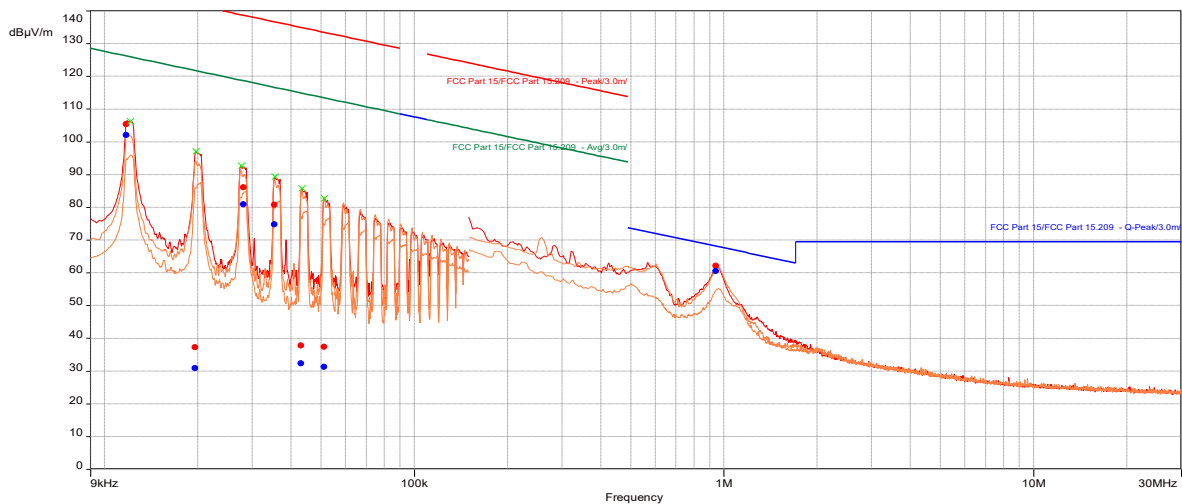
6.5 Plots/Data:

RE 9 kHz-30 MHz Loop antenna, Electric Field, 3M Location (FCC 15.209/RSS-210) Battery powered, Antenna unfolded, Ferrite on external cable

Test Information:

Date and Time	7/24/2024 7:15:34 PM
Client and Project Number	Detnet_G105855712
Engineer	Vathana Ven
Temperature	23 deg C
Humidity	46 %
Atmospheric Pressure	1011 mbars
Comments	Scan #8_RE 9kHz-30MHz Loop antenna, Electric Field, 3M Location (FCC 15.209) Battery power Antenna unfolded Ferrite on ext cbl

Graph:



Results:

Peak (PASS) (7)

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Azimuth (°)	Pol.	RBW	Meas.Time(s)	Correction (dB)
0.0117608	105.38	126.20	-20.82	87.20	Horizontal	200	0.10	18.24
0.0195903	37.32	121.76	-84.44	86.80	Horizontal	200	0.10	14.46
0.0280703	86.14	118.64	-32.50	143.70	Horizontal	200	0.10	13.77
0.0353002	80.81	116.65	-35.84	325.60	Horizontal	200	0.10	13.06
0.0430007	37.79	114.94	-77.15	87.00	Horizontal	200	0.10	12.24
0.0510753	37.39	113.44	-76.05	189.60	Horizontal	200	0.10	11.64
0.9416	62.15	68.12	-5.97	115.00	Horizontal	9k	0.10	11.19

QuasiPeak (PASS) (7)

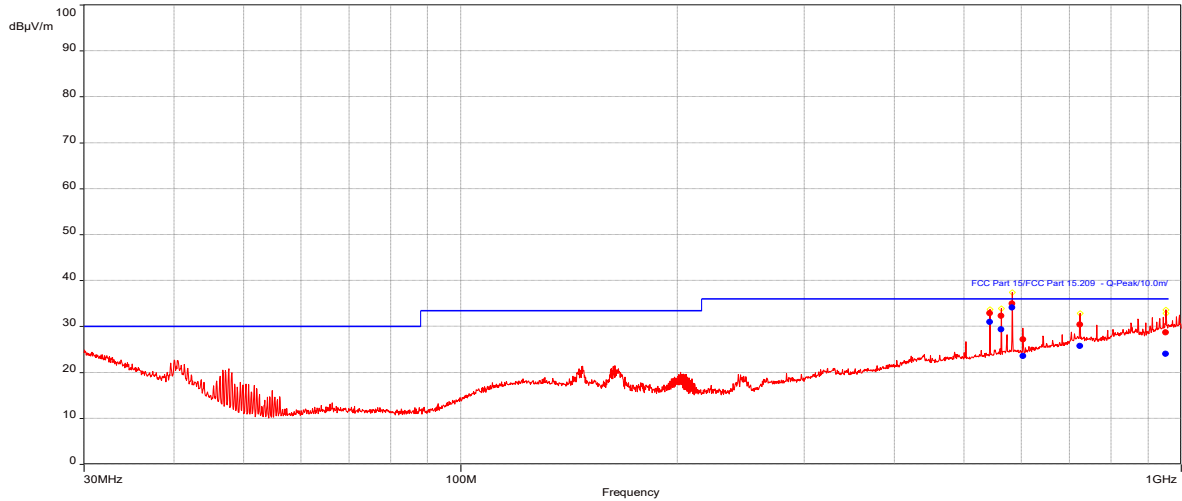
Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Azimuth (°)	Pol.	RBW	Meas.Time(s)	Correction (dB)
0.0117608	102.14	126.20	-24.06	87.20	Horizontal	200	0.10	18.24
0.0195903	30.84	121.76	-90.96	86.80	Horizontal	200	0.10	14.46
0.0280703	80.98	118.64	-37.66	143.70	Horizontal	200	0.10	13.77
0.0353002	74.79	116.65	-41.86	325.60	Horizontal	200	0.10	13.06
0.0430007	32.41	114.94	-82.53	87.00	Horizontal	200	0.10	12.24
0.0510753	31.24	113.44	-82.20	189.60	Horizontal	200	0.10	11.64
0.9416	60.55	68.12	-7.57	115.00	Horizontal	9k	0.10	11.19

RE 30-1000MHz, Battery powered, Antenna unfolded, Ferrite on external cable

Test Information:

Date and Time	7/24/2024 5:11:52 PM
Client and Project Number	Detnet_G105855712
Engineer	Vathana Ven
Temperature	23 deg C
Humidity	46 %
Atmospheric Pressure	1011 mbars
Comments	Scan#3_RE 30-1000MHz_Battery power_Antenna unfolded_Ferrite on external cbl

Graph:



Results:

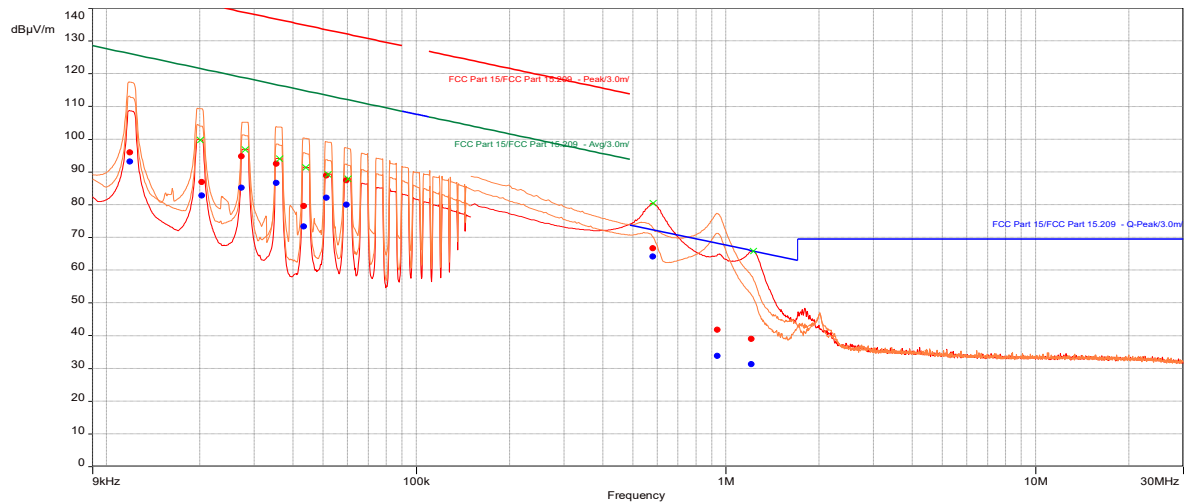
QuasiPeak (PASS) (6)

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW	Meas.Time(s)	Correction (dB)
542.6745	30.96	36.00	-5.04	277.10	1.00	Horizontal	120k	0.10	-12.88
562.7147	29.37	36.00	-6.63	282.20	1.00	Horizontal	120k	0.10	-12.53
582.9254	34.14	36.00	-1.86	277.40	1.00	Horizontal	120k	0.10	-12.20
603.217	23.59	36.00	-12.41	185.70	1.32	Horizontal	120k	0.10	-12.12
723.6717	25.76	36.00	-10.24	216.40	2.61	Horizontal	120k	0.10	-9.47
952.4126	24.10	36.00	-11.90	6.80	4.00	Horizontal	120k	0.10	-6.04

**RE 9 kHz-30 MHz Loop antenna, Electric Field, 3M Location (FCC 15.209),
Battery powered, Antenna folded, Ferrite on external cable**

Test Information:

Date and Time	7/24/2024 8:07:44 PM
Client and Project Number	Detnet_G105855712
Engineer	Vathana Ven
Temperature	23 deg C
Humidity	46 %
Atmospheric Pressure	1011 mbars
Comments	Scan #9 RE 9kHz-30MHz Loop antenna, Electric Field, 3M Location (FCC 15.209) Battery power Antenna folded Ferrite on ext cbl

Graph:**Results:****Peak (PASS) (10)**

Frequency (MHz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Azimuth (°)	Pol.	RBW	Meas.Time(s)	Correction (dB)
0.93785	41.75	68.16	-26.41	280.70	Vertical	9k	0.10	11.18
0.0119054	95.99	126.09	-30.10	110.00	Horizontal	200	0.10	18.18
0.0202795	86.92	141.56	-54.64	109.90	Horizontal	200	0.10	14.19
0.0272568	94.78	138.68	-43.90	269.20	Horizontal	200	0.10	13.81
0.0353494	92.50	136.45	-43.95	110.10	Horizontal	200	0.10	13.05
0.0432965	79.57	134.76	-55.19	269.40	Horizontal	200	0.10	12.22
0.0512414	88.86	133.32	-44.46	269.40	Horizontal	200	0.10	11.65
0.059599	87.48	112.10	-24.62	269.50	Horizontal	200	0.10	11.69
0.58178	66.66	72.31	-5.65	233.30	Horizontal	9k	0.10	11.06
1.20777	39.05	65.97	-26.92	223.20	Horizontal	9k	0.10	11.38

QuasiPeak (PASS) (10)

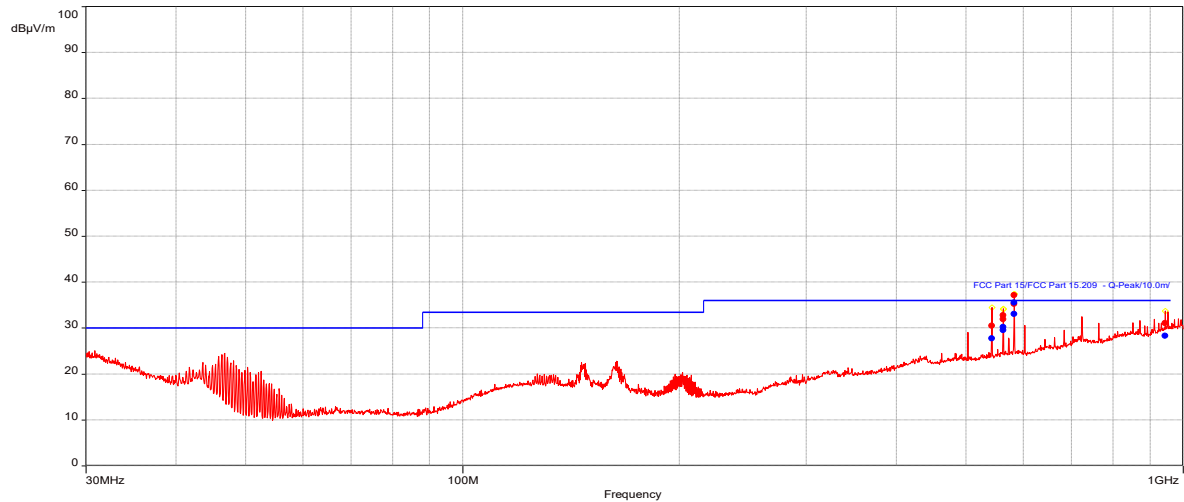
Frequency (MHz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Azimuth (°)	Pol.	RBW	Meas.Time(s)	Correction (dB)
0.93785	33.84	68.16	-34.32	280.70	Vertical	9k	0.10	11.18
0.0119054	93.11	126.09	-32.98	110.00	Horizontal	200	0.10	18.18
0.0202795	82.75	141.56	-58.81	109.90	Horizontal	200	0.10	14.19
0.0272568	85.14	138.68	-53.54	269.20	Horizontal	200	0.10	13.81
0.0353494	86.58	136.45	-49.87	110.10	Horizontal	200	0.10	13.05
0.0432965	73.32	134.76	-61.44	269.40	Horizontal	200	0.10	12.22
0.0512414	82.12	133.32	-51.20	269.40	Horizontal	200	0.10	11.65
0.059599	79.99	112.10	-32.11	269.50	Horizontal	200	0.10	11.69
0.58178	64.19	72.31	-8.11	233.30	Horizontal	9k	0.10	11.06
1.20777	31.34	65.97	-34.63	223.20	Horizontal	9k	0.10	11.38

RE 30-1000MHz, Battery powered, Folded antenna, Ferrite on external cable

Test Information:

Date and Time	7/24/2024 4:24:45 PM
Client and Project Number	Detnet_G105855712
Engineer	Vathana Ven
Temperature	23 deg C
Humidity	46 %
Atmospheric Pressure	1011 mbars
Comments	Scan#2_RE 30-1000MHz_Battery power_Folded antenna_Ferrite on external cbl

Graph:



Results:

QuasiPeak (PASS) (6)

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW	Meas.Time(s)	Correction (dB)
542.5845	27.73	36.00	-8.27	266.00	4.00	Horizontal	120k	0.10	-12.88
562.6305	30.23	36.00	-5.77	261.00	1.31	Horizontal	120k	0.10	-12.54
562.683	29.61	36.00	-6.39	271.50	1.00	Horizontal	120k	0.10	-12.53
582.7154	33.04	36.00	-2.96	266.40	1.00	Horizontal	120k	0.10	-12.18
582.8443	35.54	36.00	-0.46	265.50	1.00	Horizontal	120k	0.10	-12.19
944.6138	28.32	36.00	-7.68	314.70	1.30	Vertical	120k	0.10	-6.13

Product Standard: FCC Part 15C, 15.209, FCC Part 15C, 15.205					Limit applied: 15.209, 15.205		
					Pretest Verification w/BB source: Yes		
Test Date	Test Personnel/ Initials	Supervising Engineer/ Initials	Input Voltage	Mode	Atmospheric Data		
					Temp C°	Relative Humidity %	Atmospheric Pressure mbar
07/24/2024	Vathana Ven <i>VSV</i>	N/A	Battery Powered	See Report Section 4.0	23	46	1011

Deviations, Additions, or Exclusions: None

7 Revision History

Revision Level	Date	Report Number	Prepared By	Reviewed By	Notes
0	01/21/2025	105855712BOX-003b	VFV <i>VFV</i>	KPS <i>KPS</i>	Original Issue
1	09/16/2025	105855712BOX-003b.1	KPS <i>KPS</i>	VFV <i>VFV</i>	See Note 1 Below
2	01/12/2026	105855712BOX-003b.2	KPS <i>KPS</i>	VFV <i>VFV</i>	See Note 2 Below
3	05/26/2026	106575429BOX-001	VFV <i>VFV</i>	MFM <i>MFM</i>	See Note 3, Note 4, Note 5, and Note 6 Below

Note 1:

The client requested a report revision as below.

Product Name: CyberDet I

Model: Tx (Transmitter)

Brand: CyberDet

Frequencies: 3.9 – 4.1 kHz

Max RF Output Power: 10.22 dBm

Product Type: Blast Control Equipment

The EUT table in Section 4 was updated with above information. And the model number was updated throughout the report.

Note 2:

Added system overview block diagram in Section 5.

Note 3: Correct all references to the model name “Tx (Transmitter)” across the full report.

Note 4: Updated Equipment Under Test Table in Section 4.

Note 5: Inserted updated block diagram in Section 4 and added a statement.

Note 6: Made corrections to Note 1 above.