TEST REPORT

Product Name:	CloudBoxx
Trade Mark:	N/A
Model No. / HVIN:	CB1020
Add. Model No. / HVIN:	N/A
Report Number:	2209291892RFC-1
Test Standards:	FCC 47 CFR Part 15 Subpart C RSS-210 Issue 10 RSS-Gen Issue 5
FCC ID:	2ASRACB102001
IC:	24868-CB102001
Test Result:	PASS
Date of Issue:	September 14, 2023

Prepared for:

INVERS GmbH
Untere Industriestr. 20 D-57250 Netphen Germany

Prepared by:

Shenzhen UnionTrust Quality and Technology Co., Ltd.
Unit D/E of 9/F and 16/F, Block A, Building 6, Baoneng science and technology park, Longhua district, Shenzhen, China
TEL: +86-755-2823 0888
FAX: +86-755-2823 0886

Prepared by: Kieron Luo
Project Engineer

Reviewed by: Henry Lu
Team Leader

Approved by: Kevin Liang
Assistant Manager

Date: September 14, 2023

Version

Version No.	Date	Description
V1.0	September 14, 2023	Original

CONTENTS

1. GENERAL INFORMATION 4
   1.1 CLIENT INFORMATION 4
   1.2 EUT INFORMATION 4
      1.2.1 GENERAL DESCRIPTION OF EUT 4
      1.2.2 DESCRIPTION OF ACCESSORIES 4
   1.3 PRODUCT SPECIFICATION SUBJECTIVE TO THIS STANDARD 4
   1.4 OTHER INFORMATION 5
   1.5 DESCRIPTION OF SUPPORT UNITS 5
   1.6 TEST LOCATION 5
   1.7 TEST FACILITY 5
   1.8 DEVIATION FROM STANDARDS 6
   1.9 ABNORMALITIES FROM STANDARD CONDITIONS 6
   1.10 OTHER INFORMATION REQUESTED BY THE CUSTOMER 6
   1.11 MEASUREMENT UNCERTAINTY 6
2. TEST SUMMARY 7
3. EQUIPMENT LIST 8
4. TEST CONFIGURATION 9
   4.1 ENVIRONMENTAL CONDITIONS FOR TESTING 9
      4.1.1 NORMAL OR EXTREME TEST CONDITIONS 9
      4.1.2 RECORD OF NORMAL ENVIRONMENT AND TEST SAMPLE 9
   4.2 TEST CHANNELS 9
   4.3 EUT TEST STATUS 9
   4.4 TEST SETUP 10
      4.4.1 FOR RADIATED EMISSIONS TEST SETUP 10
      4.4.2 FOR CONDUCTED EMISSIONS TEST SETUP 11
      4.4.3 FOR CONDUCTED RF TEST SETUP 11
   4.5 SYSTEM TEST CONFIGURATION 12
5. RADIO TECHNICAL REQUIREMENTS SPECIFICATION 13
   5.1 REFERENCE DOCUMENTS FOR TESTING 13
   5.2 ANTENNA REQUIREMENT 13
   5.3 99% & 20DB BANDWIDTH 13
   5.4 FIELD STRENGTH OF RADIATED EMISSIONS 15
   5.5 AC POWER LINE CONDUCTED EMISSION 21
APPENDIX 1 PHOTOS OF TEST SETUP 22
APPENDIX 2 PHOTOS OF EUT CONSTRUCTIONAL DETAILS 22

1. GENERAL INFORMATION

1.1 CLIENT INFORMATION

Applicant:	INVERS GmbH
Address of Applicant:	Untere Industriestr. 20 D-57250 Netphen Germany
Manufacturer 1:	EPS Electronic Products & Systems GmbH
Address of Manufacturer 1:	Eiserfelder Straße 316 57080 Siegen
Manufacturer 2:	Reichhardt Elektronik GmbH
Address of Manufacturer 2:	Eichelhainer Straße 18, 36369 Lautertal-Engelrod
Manufacturer 3:	duotec GmbH
Address of Manufacturer 3:	Humboldtstraße 8a D-58553 Halve

1.2 EUT INFORMATION

1.2.1 General Description of EUT

Product Name:	CloudBoxx	
Model No. / HVIN:	CB1020	
Add. Model No. / HVIN:	N/A	
Trade Mark:	N/A	
DUT Stage:	Production Unit	
EUT Supports Function:	GSM Bands:	GSM850/1900
	E-UTRA Bands:	FDD Band 2/ Band 4/ Band 5/ Band 12/ Band 13/ Band 25/ Band 26/Band 66/ Band 85
	2.4 GHz ISM Band:	IEEE 802.11b/g/n (only Rx)
		Bluetooth 5.0
	RFID:	125 kHz
Software Version:	2.15.1-0 (Provided by the customer)	
Hardware Version:	CB1020 (Provided by the customer)	
Sample Received Date:	November 15, 2022	
Sample Tested Date:	December 27, 2022 to January 20, 2023	
Remark: The above EUT's information was provided by customer. Please refer to the specifications or user's manual for more detailed description.		

1.2.2 Description of Accessories

None.

1.3 PRODUCT SPECIFICATION SUBJECTIVE TO THIS STANDARD

Frequency Band:	125 kHz
Nominal Operating Frequency:	125 kHz
Type of Modulation:	ASK
Number of Channels:	1
Antenna Type: (Provided by the customer)	Integral Antenna
Maximum Field Strength:	90.38 dBµV/m at 3 meter
Normal Test Voltage:	12 Vdc
Extreme Test Voltage:	7 to 56 Vdc
Extreme Test Temperature:	-20 °C to +85 °C

1.4 OTHER INFORMATION

None

1.5 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested with associated equipment below.

1) Support Equipment

Description	Manufacturer	Model No.	Serial Number	Supplied by
RFID-Sticker	INVERS	5160254	N/A	Applicant
Storage Battery	Camel	58500 6-QWLZ-48	2602010594	UnionTrust

2) Support Cable

Cable No.	Description	Connector	Length	Supplied by
1	CAN Cable	CAN	3 Meter	Applicant

1.6 TEST LOCATION

Shenzhen UnionTrust Quality and Technology Co., Ltd.

Address: Unit D/E of 9/F and 16/F, Block A, Building 6, Baoneng science and technology park, Longhua district, Shenzhen, China, China 518109
Telephone: +86 (0) 755 2823 0888
Fax: +86 (0) 755 2823 0886

1.7 TEST FACILITY

The test facility is recognized, certified, or accredited by the following organizations:

CNAS-Lab Code: L9069
The measuring equipment utilized to perform the tests documented in this report has been calibrated once a year or in accordance with the manufacturer's recommendations, and is traceable under the ISO/IEC 17025 to international or national standards. Equipment has been calibrated by accredited calibration laboratories.

A2LA-Lab Certificate No.: 4312.01
Shenzhen UnionTrust Quality and Technology Co., Ltd. has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

ISED Wireless Device Testing Laboratories
CAB identifier: CN0032

FCC Accredited Lab.
Designation Number: CN1194
Test Firm Registration Number: 259480

1.8 DEVIATION FROM STANDARDS

None.

1.9 ABNORMALITIES FROM STANDARD CONDITIONS

None.

1.10 OTHER INFORMATION REQUESTED BY THE CUSTOMER

None.

1.11 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the Product as specified in CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

No.	Item	Measurement Uncertainty
1	Conducted emission 9kHz-150kHz	±3.2 dB
2	Conducted emission 150kHz-30MHz	±2.7 dB
3	Radiated emission 9kHz-30MHz	±4.7 dB
4	Radiated emission 30MHz-1GHz	±4.6 dB
5	Radiated emission 1GHz-18GHz	±4.4 dB
6	Radiated emission 18GHz-26GHz	±4.6 dB
7	Radiated emission 26GHz-40GHz	±4.6 dB
8	Occupied Channel Bandwidth	± 1.86 %
9	Radio frequency	± 6.5 x 10^{-8}

2. TEST SUMMARY

FCC 47 CFR Part 15 Subpart C Test Cases			
Test Item	**Test Requirement**	**Test Method**	**Result**
Antenna Requirement	FCC 47 CFR Part 15 Subpart C Section 15.203 RSS-Gen Issue 5, Section 6.8	N/A	PASS
AC Power Line Conducted Emission	FCC 47 CFR Part 15 Subpart C Section 15.207 RSS-Gen Issue 5, Section 8.8	ANSI C63.10-2013 Clause 6.2	N/A Note 2
Field strength of the Radiated Emissions	FCC 47 CFR Part 15 Subpart C Section 15.209 RSS-Gen Issue 5, section 8.9	ANSI C63.10-2013 Section 6.3/ 6.4/ 6.5	PASS
99% & 20DB Bandwidth	FCC 47 CFR Part 15 Subpart C Section 15.215(c) RSS-Gen Issue 5, section 6.7	ANSI C63.10-2013 Section 6.9	PASS

Note:

1) N/A: In this whole report not applicable.
2) This EUT is powered by a DC Power from Vehicle system.

3. EQUIPMENT LIST

Radiated Emission Test Equipment List						
Used	**Equipment**	**Manufacturer**	**Model No.**	**Serial Number**	**Cal. date**	**Cal. Due date**
☒	3M Chamber & Accessory Equipment	ETS-LINDGREN	3M	Euroshiedpn-CT001270-1317	22-Jan-2021	21-Jan-2024
☒	Receiver	R&S	ESIB26	100114	3-Nov-2022	2-Nov-2023
☒	EXA Spectrum Analyzer	KEYSIGHT	N9010A	MY51440197	15-Apr-2022	14-Apr-2023
☒	Loop Antenna	ETS-LINDGREN	6502	00202525	21-Nov-2022	20-Nov-2023
☒	Broadband Antenna	ETS-LINDGREN	3142E	00201566	13-Dem-2022	12-Dem-2023
☒	6dB Attenuator	Talent	RA6A5-N-18	18103001	13-Dem-2022	12-Dem-2023
☒	Preamplifier	HP	8447F	2805A02960	1-Nov-2022	31-Oct-2023
☒	Multi device Controller	ETS-LINDGREN	7006-001	00160105	N/A	N/A
☒	Test Software	Audix	e3	Software Version: 9.160323		

RF Conducted Test Equipment List						
Used	**Equipment**	**Manufacturer**	**Model No.**	**Serial Number**	**Cal. date**	**Cal. Due date**
☒	EXA Spectrum Analyzer	KEYSIGHT	N9010A	MY51440197	15-Apr-2022	14-Apr-2023

4. TEST CONFIGURATION

4.1 ENVIRONMENTAL CONDITIONS FOR TESTING

4.1.1 Normal or Extreme Test Conditions

Test Environment	Selected Values During Tests		
Test Condition	Ambient		
	Temperature (°C)	Voltage (V)	Relative Humidity (%)
TN/VN	+15 to +35	12	20 to 75
Remark: 1) VN: Normal Voltage; TN: Normal Temperature;			

4.1.2 Record of Normal Environment and Test Sample

Test Item	Temp. (°C)	Relative Humidity (%)	Pressure (kPa)	Sample No.	Tested by
AC Power Line Conducted Emission	N/A	N/A	N/A	N/A	N/A
Field strength of the Radiated Emissions	17.3	30.4	100.8	S20221116795-ZJA08/10	Andy Lin
99% & 20DB Bandwidth	20.3	35.8	100.3	S20221116795-ZJA08/10	Hank Wu

4.2 TEST CHANNELS

Frequency	Test RF Channel
125 kHz	Channel 1
	125 kHz

4.3 EUT TEST STATUS

Frequency	Tx Function	Description
125 kHz	1Tx	1. Keep the EUT in continuously transmitting during the test.

4.4 TEST SETUP

4.4.1 For Radiated Emissions test setup

Figure 1. Below 30MHz

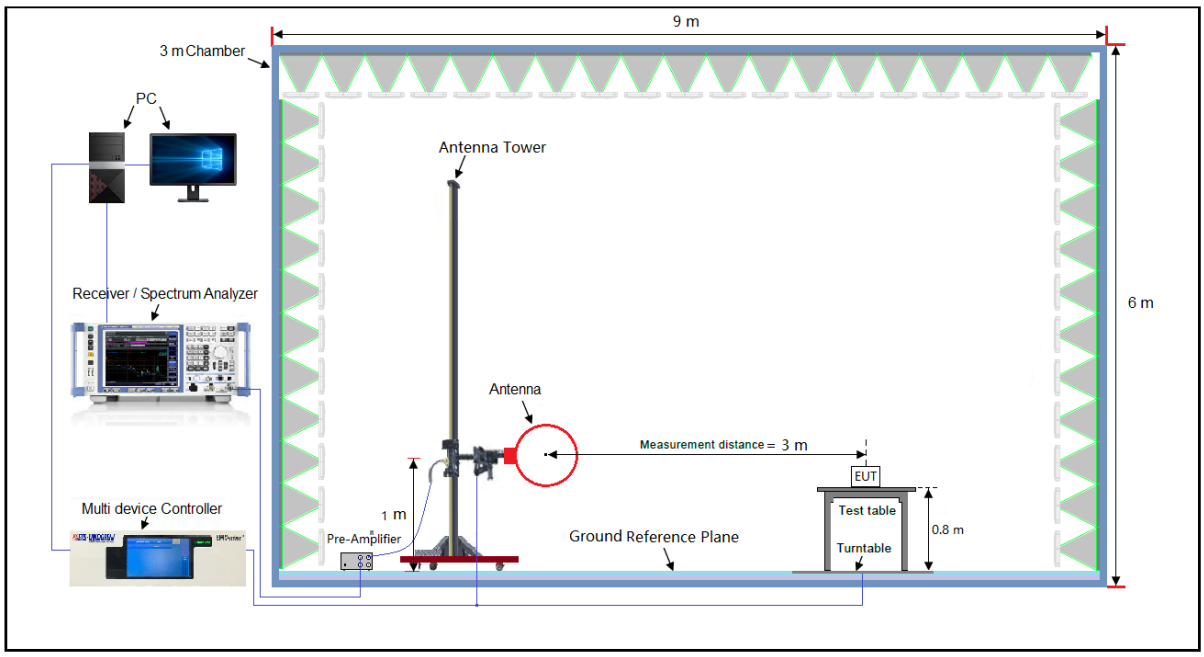
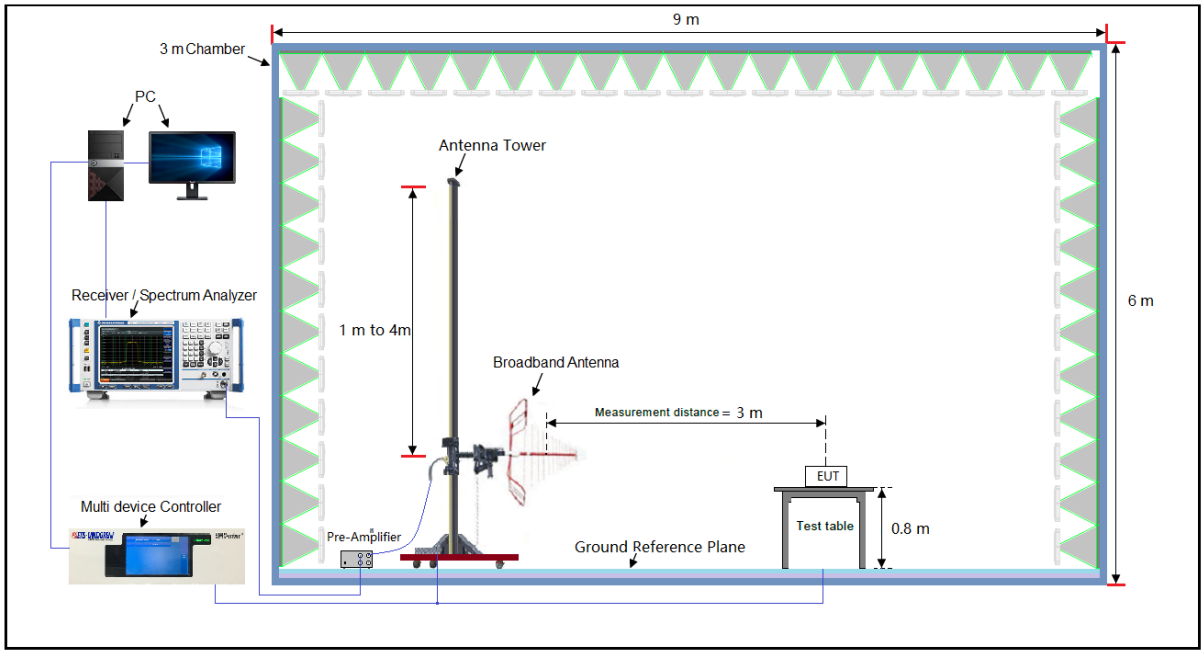
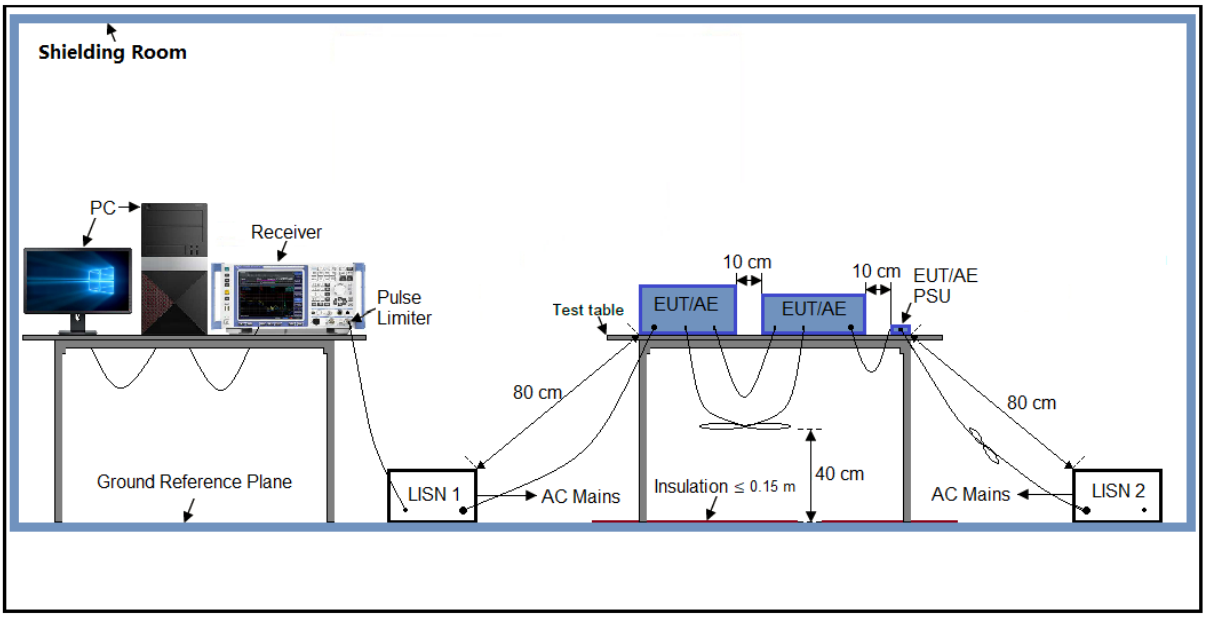


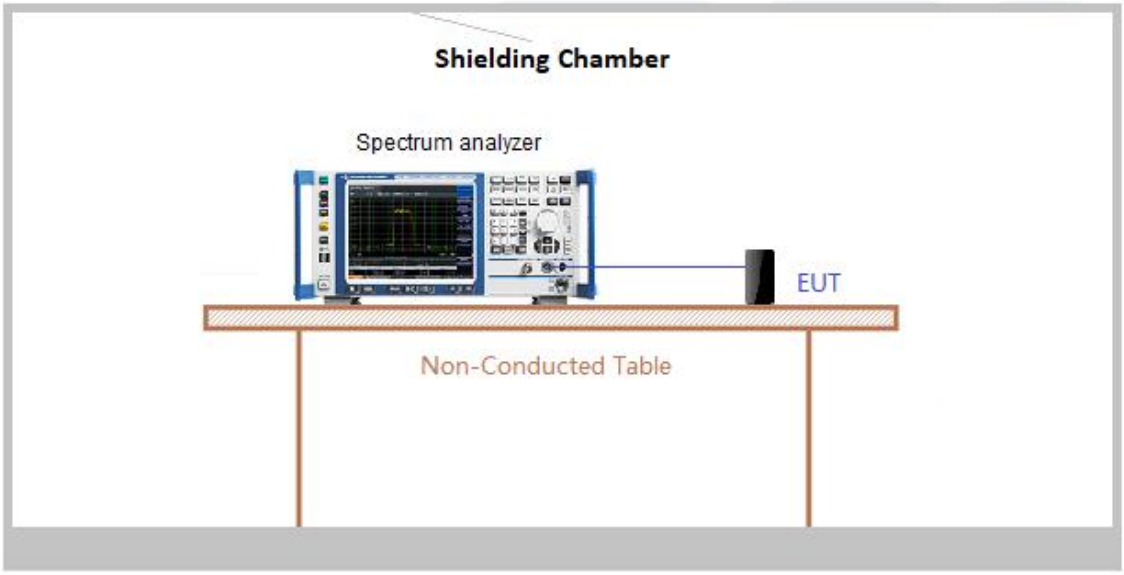
Figure 2. 30MHz to 1GHz



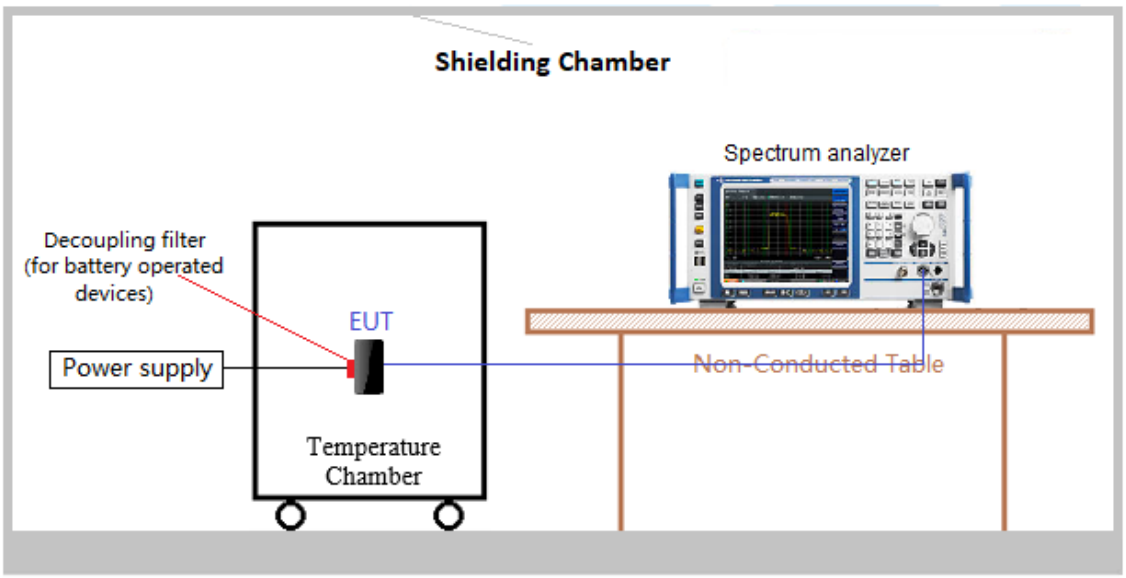
4.4.2 For Conducted Emissions test setup



4.4.3 For Conducted RF test setup



Normal Environment



Extreme Environment

4.5 SYSTEM TEST CONFIGURATION

For emissions testing, the equipment under test (EUT) setup to transmit continuously to simplify the measurement methodology. Care was taken to ensure proper power supply voltages during testing. During testing, radiated emission were performed with the EUT set to transmit at the channel with highest output power as worst-case scenario. It was powered by a 12Vdc DC Power from Vehicle system. Only the worst case data were recorded in this test report.

All readings are extrapolated back to the equivalent three meter reading using inverse scaling with distance. Analyzer resolution is 100 kHz or greater for frequencies below 1000 MHz. The resolution is 1 MHz or greater for frequencies above 1000 MHz. The spurious emissions more than 20 dB below the permissible value are not reported.

Radiated emission measurement were performed from the lowest radio frequency signal generated in the device which is greater than 9 kHz to the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower.

5. RADIO TECHNICAL REQUIREMENTS SPECIFICATION

5.1 REFERENCE DOCUMENTS FOR TESTING

No.	Identity	Document Title
1	FCC 47 CFR Part 15	Radio Frequency Devices
2	ANSI C63.10-2013	American National Standard for Testing Unlicesed Wireless Devices
3	RSS-Gen Issue 5	General Requirements for Compliance of Radio Apparatus
4	RSS-210 Issue 10	Licence-Exempt Radio Apparatus: Category I Equipment

5.2 ANTENNA REQUIREMENT

Standard Requirement
FCC 15.203 requirement: 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, 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. **RSS-Gen Issue 5, Section 6.8 requirement:** According to RSS-Gen Issue 5, Section 6.8, a transmitter can only be sold or operated with antennas with which it was certified. A transmitter may be certified with multiple antenna types. An antenna type comprises antennas having similar in-band and out-of-band radiation patterns.
EUT Antenna:
This product has a permanent antenna, fulfill the requirement of this section.

5.3 99% & 20DB BANDWIDTH

Test Requirement: FCC 47 CFR Part 15 Subpart C Section 15.215(c)
RSS-Gen Issue 5, section 6.7

Test Method: ANSI C63.10-2013 Section 6.9

Limit: Operation within the band 125 kHz

Requirement: 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 20dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equip compliance with the 20dB attenuation specification may base on measurement at the intentional radiator's antenna output terminal unless the intentional radiator uses a permanently attached antenna, in which case compliance shall be. Demonstrated by measuring the radiated emissions.

Test Procedure: Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
Use the following spectrum analyzer settings:

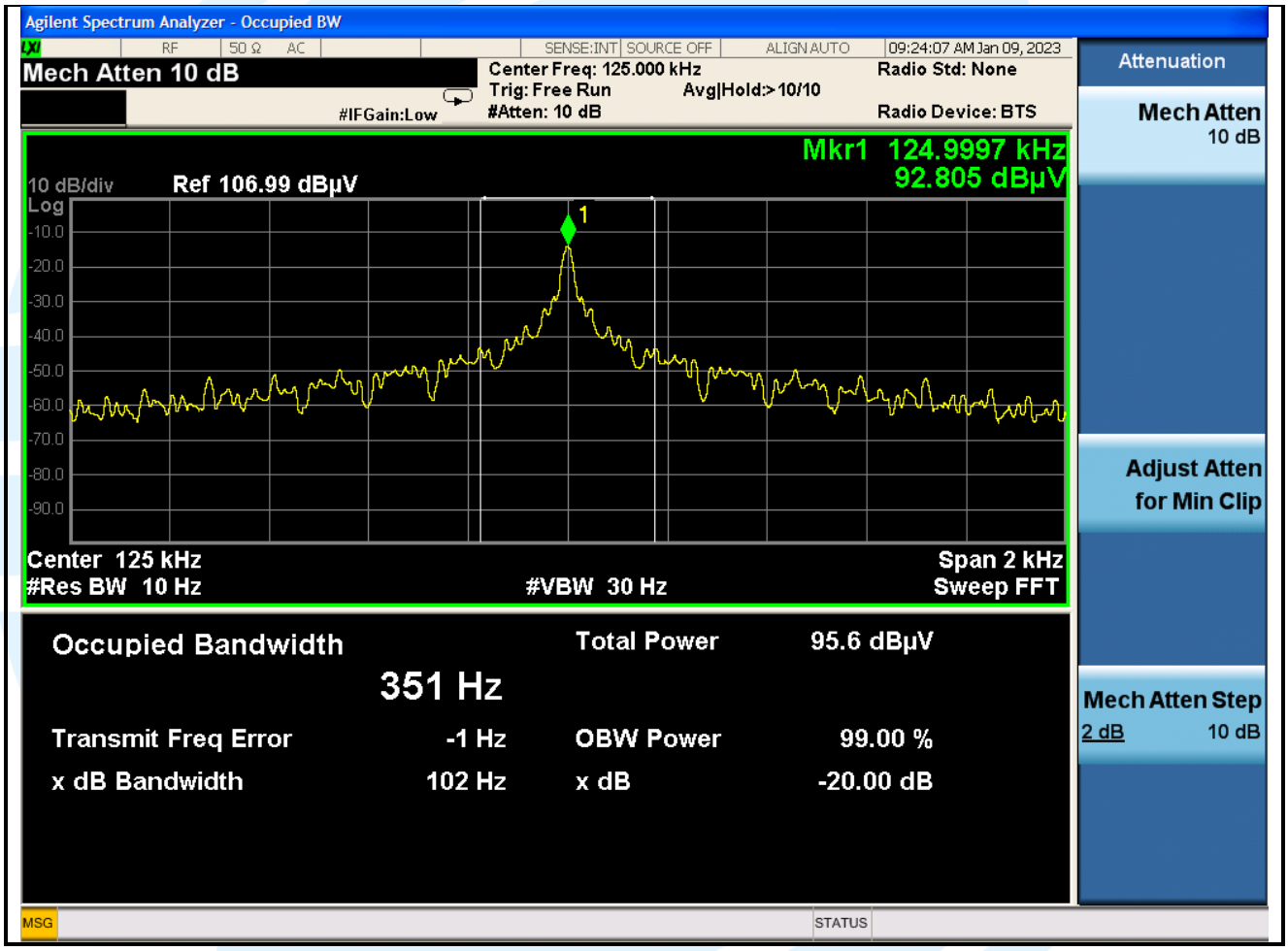
a) The spectrum analyzer center frequency is set to the nominal EUT channel center frequency
b) Span = approximately 2 to 5 times the OBW
c) RBW = 1% to 5%of the OBW
d) VBW ≥ 3*RBW
e) Sweep = auto;
f) Detector function = peak
g) Trace = max hold
h) All the trace to stabilize, use the marker-to-peak function to set the marker to the peak of the emission, use the marker-delta function to measure and record the 20dB down bandwidth of the emission.

Note: The cable loss and attenuator loss were offset into measure device as an amplitude offset.

Test Setup: Refer to section 4.5.3 for details.
Instruments Used: Refer to section 3 for details
Test Mode: Transmitter mode
Test Results: Pass
Test Data:

Frequency (kHz)	20 dB Bandwidth (Hz)	99% Bandwidth (Hz)	Limit
125 kHz	102	351	N/A

The test plot as follows:



5.4 FIELD STRENGTH OF RADIATED EMISSIONS

Test Requirement: FCC 47 CFR Part 15 Subpart C Section 15.209
RSS-210 Issue 10, section 7.3
RSS-Gen Issue 5, section 8.9

Test Method: ANSI C63.10-2013 Section 6.3/ 6.4/ 6.5

Receiver Setup:

Frequency	RBW
0.009 MHz-0.150 MHz	200/300 kHz
0.150 MHz -30 MHz	9/10 kHz
30 MHz-1 GHz	100/120 kHz
Above 1 GHz	1 MHz

Limits:

FCC 47 CFR Part 15.209:

The field strength of any emissions shall not exceed the general radiated emission limits in §15.209.

Spurious Emissions

Frequency	Field strength (microvolt/meter)	Limit (dBμV/m)	Remark	Measurement distance (m)
0.009 MHz-0.490 MHz	2400/F(kHz)	--	--	300
0.490 MHz-1.705 MHz	24000/F(kHz)	--	--	30
1.705 MHz-30 MHz	30	--	--	30
30 MHz-88 MHz	100	40.0	Quasi-peak	3
88 MHz-216 MHz	150	43.5	Quasi-peak	3
216 MHz-960 MHz	200	46.0	Quasi-peak	3
960MHz-1GHz	500	54.0	Quasi-peak	3
Above 1 GHz	500	54.0	Average	3

RSS-210 Issue 10:

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.

RSS-Gen Issue 5:

Except where otherwise indicated in the applicable RSS, radiated emissions shall comply with the field strength limits shown in following tables. Additionally, the level of any transmitter unwanted emission shall not exceed the level of the transmitter's fundamental emission.

General field strength limits at frequencies below 30 MHz:

Frequency	Magnetic field strength (H-Field) (μA/m)	Measurement distance (m)
9 - 490 kHz Note 1	6.37/F (F in kHz)	300
490 - 1705 kHz	63.7/F (F in kHz)	30
1.705 - 30 MHz	0.08	30
Note 1: The emission limits for the ranges 9-90 kHz and 110-490 kHz are based on measurements employing a linear average detector.		

General field strength limits at frequencies above 30 MHz:

Frequency (MHz)	Field strength (μV/m at 3 m)
30 – 88	100
88 – 216	150
216 – 960	200
Above 960	500

Remark:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBμV/m) = 20 log Emission level (μV/m).
3. For frequencies above 1000 MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20 dB under any condition of modulation.
4. For Below 30MHz, according to ANSI C63.10-2013 Section 6.4, If both the single point and the limit distance are equal to or closer to the EUT than λ/2π, then extrapolation to the limit distance shall be calculated using following Equation:

$$FS_{limit} = FS_{max} - 40log\left(\frac{d_{limit}}{d_{measure}}\right)$$

where

FS_{limit} is the calculation of field strength at the limit distance, expressed in dBμV/m
FS_{max} is the measured field strength, expressed in dBμV/m
$d_{measure}$ is the distance of the measurement point from the EUT
d_{limit} is the reference distance or the distance of the λ/2π point

Example:

Field strength limit for 125 kHz = 19.20 μV/m at 300m
= 25.67 dBμV/m at 300m
= 25.67 dBμV/m + 40log (300/3) dB at 3m
= 105.67 dBμV/m at 3m

Test Setup: Refer to section 4.5.1 for details.

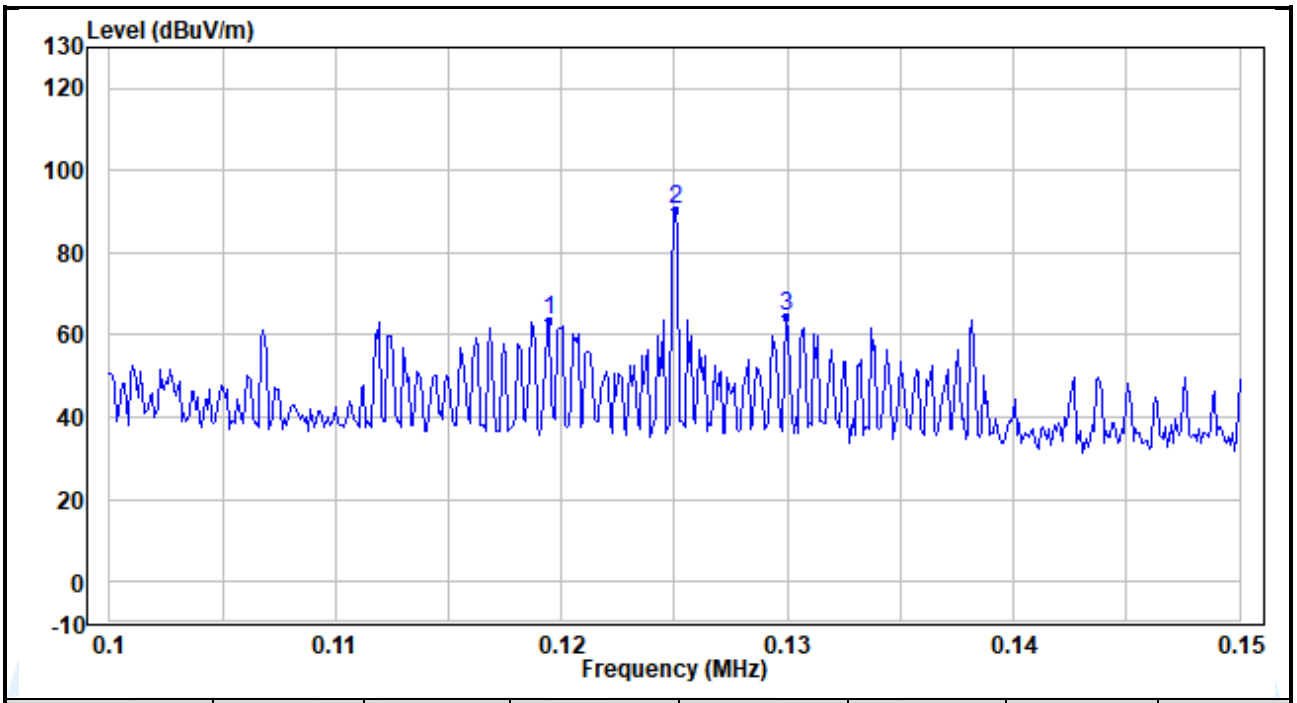
Test Procedures:

1) The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation.
2) The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
3) The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
4) For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rota table table was turned from 0 degrees to 360 degrees to find the maximum reading.
5) The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
6) If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.
7) The radiation measurements are performed in X, Y, Z axis positioning. And found the X axis positioning which it is worse case, only the test worst case mode is recorded in the report.(for portable and mobile devices)

Equipment Used: Refer to section 3 for details.

Test Result: Pass

Fundamental Strength

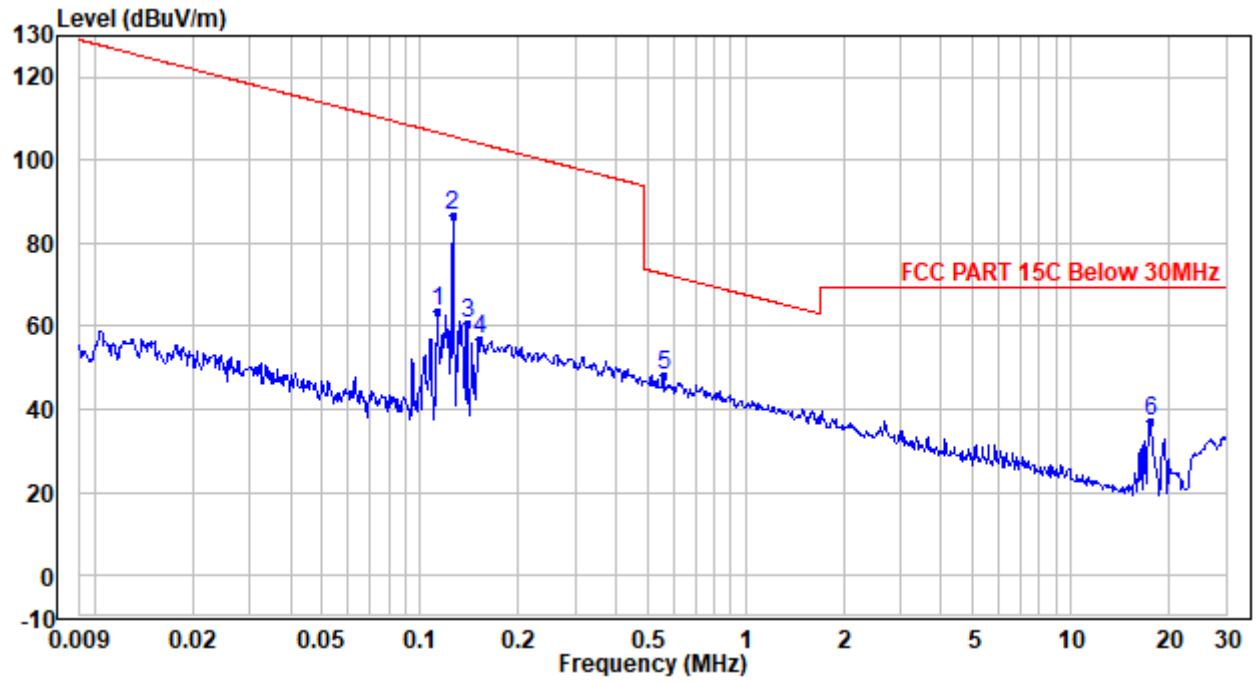


Fundamental frequency	Detector	Read Level (dBμV)	Correction factor (dB/m)	Result at 3m (dBμV/m)	Limit at 3m (dBμV/m)	Limit at 300m (dBμV/m)	Margin (dB)
125 kHz	Peak	108.04	-17.66	90.38	105.67	25.67	15.29

Fundamental frequency	Detector	Read Level (dBμV)	Factor (dB)	Result at 3m (dBμA/m)	Limit at 3m (dBμA/m)	Limit at 300m (dBμA/m)	Margin (dB)
125 kHz	Peak	108.04	-69.16	38.88	54.33	-25.86	15.26

Note 1:
E (dBμV/m) = AF (dBs/m) + Read Level (dBμV) + Cable Loss (dB) - PA (dB);
Correction factor = AF (dBs/m) + Cable Loss (dB) - PA (dB)
M (dBμA/m) = E (dBμV/m) - 51.5 dB
Factor (dB) = Read Level (dBμV) + Correction factor - 51.5 dB
E (dBμA/m) is the magnetic field strength (Final Test results);
AF (dBs/m) is the magnetic antenna factor of the antenna (H-field);
V (dBμV) is the reading level on the spectrum analyzer;
PA (dB) is the gain value of the preamplifier;
Note that when using the AF (dBs/m) the 51.5 dB is already account for into the antenna factor.

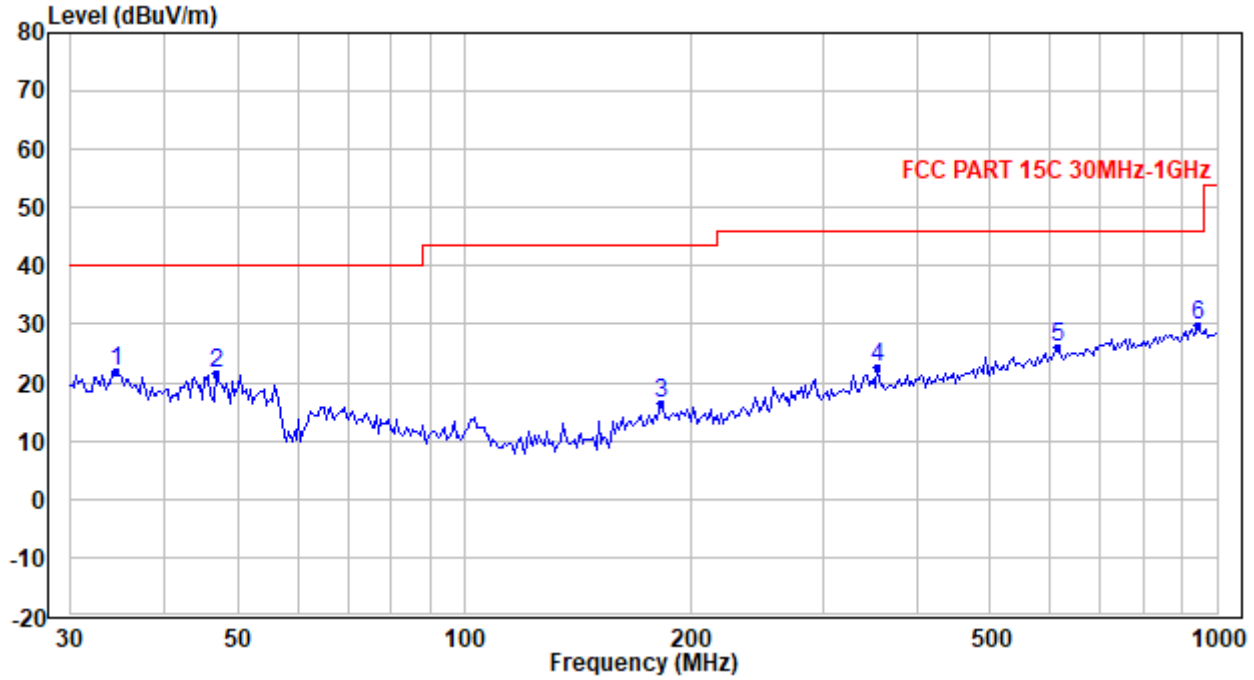
Radiated Emission Test Data (9 kHz ~ 30MHz):



No.	Frequency (MHz)	Reading (dBµV)	Correction factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
1	0.113	81.38	-17.83	63.55	106.71	-43.16	QP
2	0.125	104.38	-17.65	86.73	105.76	-19.03	Peak
3	0.139	78.53	-17.60	60.93	104.87	-43.94	QP
4	0.152	74.56	-17.60	56.96	104.13	-47.17	QP
5	0.560	65.73	-17.75	47.98	72.65	-24.67	QP
6	17.642	55.42	-18.49	36.93	69.50	-32.57	QP

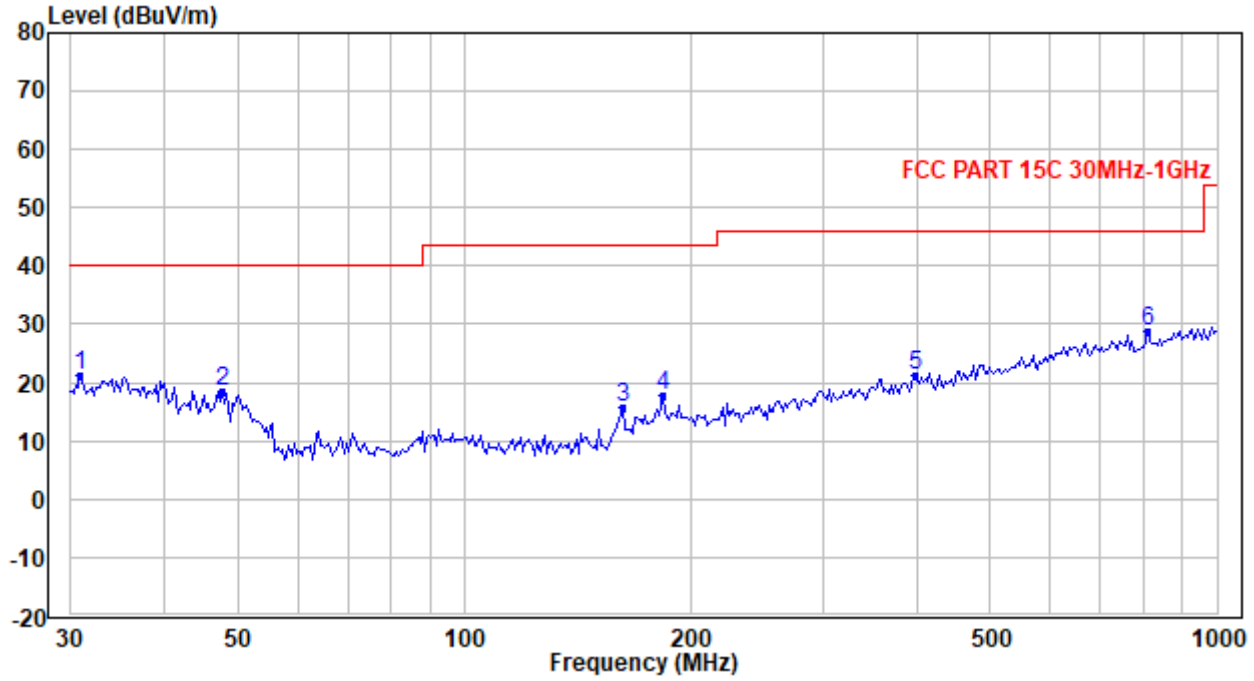
Radiated Emission Test Data (30 MHz ~ 1 GHz):

Horizontal



No.	Frequency (MHz)	Reading (dBµV)	Correction factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
1	34.527	26.61	-4.60	22.01	40.00	-17.99	QP
2	46.708	33.63	-12.15	21.48	40.00	-18.52	QP
3	182.578	26.58	-10.20	16.38	43.50	-27.12	QP
4	353.447	27.45	-4.94	22.51	46.00	-23.49	QP
5	615.774	26.45	-0.45	26.00	46.00	-20.00	QP
6	945.334	25.29	4.61	29.90	46.00	-16.10	QP

Vertical



No.	Frequency (MHz)	Reading (dBµV)	Correction factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
1	30.855	25.74	-4.54	21.20	40.00	-18.80	QP
2	47.703	31.56	-13.04	18.52	40.00	-21.48	QP
3	162.020	28.83	-13.09	15.74	43.50	-27.76	QP
4	183.866	28.15	-10.31	17.84	43.50	-25.66	QP
5	398.296	25.84	-4.50	21.34	46.00	-24.66	QP
6	809.924	26.29	2.64	28.93	46.00	-17.07	QP

Remark:

1. Correct Factor = Antenna Factor + Cable Loss - Amplifier Gain, the value was added to Original Receiver Reading by the software automatically.
2. Result = Reading + Correct Factor.
3. Margin = Result – Limit

5.5 AC POWER LINE CONDUCTED EMISSION

Test Requirement: FCC 47 CFR Part 15 Subpart C Section 15.207
RSS-Gen Issue 5, Section 8.8

Test Method: ANSI C63.10-2013 Clause 6.2

Limits:

Frequency range (MHz)	Limits (dB(μV)	
	Quasi-peak	Average
0,15 to 0,50	66 to 56	56 to 46
0,50 to 5	56	46
5 to 30	60	50

Remark:

1. The lower limit shall apply at the transition frequencies.
2. The limit decreases linearly with the logarithm of the frequency in the range 0.15 to 0.50 MHz.

Test Setup: Refer to section 4.5.2 for details.

Test Procedures:

Test frequency range :150KHz-30MHz

1) The mains terminal disturbance voltage test was conducted in a shielded room.
2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a 50Ω/50μH + 5Ω linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as the LISN 1 for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded.
3) The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane,
4) The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0.4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN 1 was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane for LISNs mounted on top of the ground reference plane. This distance was between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0.8 m from the LISN 2.
5) In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10 on conducted measurement.

Equipment Used: Refer to section 3 for details.

Test Result: N/A.

Remark:

Since the EUT is powered by a DC power from Vehicle system, not applicable for the test item.

APPENDIX 1 PHOTOS OF TEST SETUP

See test photos attached in Appendix 1 for the actual connections between Product and support equipment.

APPENDIX 2 PHOTOS OF EUT CONSTRUCTIONAL DETAILS

Refer to Appendix 2 for EUT external and internal photos.

*** End of Report ***

The test report is effective only with both signature and specialized stamp. The result(s) shown in this report refer only to the sample(s) tested. Without written approval of UnionTrust, this report can't be reproduced except in full.