CFR 47 FCC PART 15 SUBPART C

CERTIFICATION TEST REPORT

For

Rain collector

MODEL NUMBER: SR3001

FCC ID: 2AE3N-SR3001

REPORT NUMBER: 4789711969.1-1

ISSUE DATE: December 23, 2020

Prepared for

Guangzhou Bresser Optical Instruments Co., Ltd.
Kangda Rd. 12, Yunpu Ind. Area, Huangpu District, Guangzhou, PRC

Prepared by

UL Verification Services (Guangzhou) Co., Ltd, Song Shan Lake Branch

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Revision History

Rev.	Issue Date	Revisions	Revised By
V0	12/23/2020	Initial Issue	

Summary of Test Results			
Clau se	Test Items	FCC Rules	Test Results
1	Transmitter Timeout	CFR 47 FCC §15.231 (a) (1)	Pass
2	20 dB Bandwidth and 99 % Occupied Bandwidth	CFR 47 FCC §15.231 (c)	Pass
3	Radiated Emission	CFR 47 FCC §15.231 (b)(e) CFR 47 FCC §15.205 and §15.209	Pass
4	Antenna Requirement	CFR 47 FCC §15.203	Pass
Note 1: This test report is only published to and used by the applicant, and it is not for evidence purpose in China. Note 2: The measurement result for the sample received is <Pass> according to < CFR 47 FCC PART 15 SUBPART C > when <Accuracy Method> decision rule is applied.			

TABLE OF CONTENTS

1. ATTESTATION OF TEST RESULTS

Applicant Information

Company Name:	Guangzhou Bresser Optical Instruments Co., Ltd.
Address:	Kangda Rd. 12, Yunpu Ind. Area, Huangpu, Guangzhou, PRC

Manufacturer Information

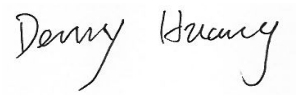
Company Name:	Guangzhou Bresser Optical Instruments Co., Ltd.
Address:	Kangda Rd. 12, Yunpu Ind. Area, Huangpu, Guangzhou, PRC

EUT Information

EUT Name:	Rain collector
Model:	SR3001
Serial Model:	/
Brand:	EXPLORE SCIENTIFIC
Sample Received Date:	November 23, 2020
Sample Status:	Normal
Sample ID:	3480579
Date of Tested:	November 23, 2020 ~ December 22, 2020

APPLICABLE STANDARDS	
STANDARD	**TEST RESULTS**
CFR 47 FCC PART 15 SUBPART C	PASS

Prepared By:



Denny Huang
Project Engineer

Checked By:

Shawn Wen
Laboratory Leader

Approved By:

Stephen Guo

Laboratory Manager

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with KDB 414788 D01 Radiated Test Site v01r01, FCC CFR 47 Part 2, FCC CFR 47 Part 15, ANSI C63.10-2013.

3. FACILITIES AND ACCREDITATION

Accreditation Certificate	**A2LA (Certificate No.: 4102.01)** UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch. has been assessed and proved to be in compliance with A2LA. **FCC (FCC Designation No.: CN1187)** UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch. Has been recognized to perform compliance testing on equipment subject to the Commission's Declaration of Conformity (DoC) and Certification rules **ISED (Company No.: 21320)** UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch. has been registered and fully described in a report filed with Industry Canada. The Company Number is 21320. **VCCI (Registration No.: G-20019, R-20004, C-20012 and T-20011)** UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch. has been assessed and proved to be in compliance with VCCI, the Membership No. is 3793. Facility Name: Chamber D, the VCCI registration No. is G-20019 and R-20004 Shielding Room B, the VCCI registration No. is C-20012 and T-20011

Note 1: All tests measurement facilities use to collect the measurement data are located at Building 10, Innovation Technology Park, Song Shan Lake Hi tech Development Zone, Dongguan, 523808, China

Note 2: The test anechoic chamber in UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch had been calibrated and compared to the open field sites and the test anechoic chamber is shown to be equivalent to or worst case from the open field site.

Note 3: For below 30 MHz, lab had performed measurements at test anechoic chamber and comparing to measurements obtained on an open field site. And these measurements below 30MHz had been correlated to measurements performed on an OFS.

4. CALIBRATION AND UNCERTAINTY

4.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations and is traceable to recognize national standards.

4.2. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

Test Item	Uncertainty
Conduction emission	3.62 dB
Radiation Emission test (include Fundamental emission) (9 kHz-30 MHz)	2.2 dB
Radiation Emission test (include Fundamental emission) (30 MHz-1 GHz)	4.00 dB
Radiation Emission test (1 GHz to 26GHz) (include Fundamental emission)	5.78 dB (1 GHz-18 GHz)
	5.23 dB (18 GHz-26 GHz)
Note: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.	

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

EUT Name	Rain collector	
Model	SR3001	
Product Description	Operation Frequency	433.92 MHz
	Modulation Type	FSK
Power Supply	DC 1.5 V (AA)*2	

5.2. MAXIMUM FIELD STRENGTH

Frequency (MHz)	Maximum Peak Field Strength (dBµV/m)
433.92	55.98

5.3. TEST CHANNEL CONFIGURATION

Test Mode	Frequency
FSK	433.92 MHz

5.4. DESCRIPTION OF AVAILABLE ANTENNAS

Frequency (MHz)	Antenna Type	Antenna Gain (dBi)
433.92	wire antenna	0

Note: The value of the antenna gain was declared by customer.

5.5. TEST ENVIRONMENT

Environment Parameter	Selected Values During Tests	
Relative Humidity	55 ~ 65 %	
Atmospheric Pressure:	1025 Pa	
Temperature	TN	23 ~ 28 °C
Voltage:	VL	/
	VN	DC 3.0 V
	VH	/

Note: VL= Lower Extreme Test Voltage
VN= Nominal Voltage
VH= Upper Extreme Test Voltage
TN= Normal Temperature

5.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Item	Equipment	Brand Name	Model Name	P/N
1	/	/	/	/

I/O CABLES

Cable No	Port	Connector Type	Cable Type	Cable Length(m)	Remarks
1	/	/	/	/	/

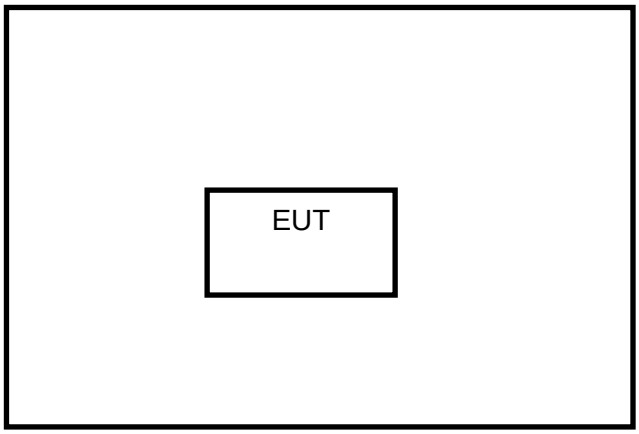
ACCESSORY

Item	Accessory	Brand Name	Model Name	Description
1	/	/	/	/

TEST SETUP

1. A fully charged battery was used for all tests.
2. The test sample can transmit automatically.

SETUP DIAGRAM FOR TEST



5.7. MEASURING INSTRUMENT AND SOFTWARE USED

Radiated Emissions						
Instrument						
Used	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
☑	MXE EMI Receiver	KESIGHT	N9038A	MY56400036	Nov.12,2020	Nov.12,2021
☑	Hybrid Log Periodic Antenna	TDK	HLP-3003C	130960	Sep.17, 2018	Sep.17, 2021
☑	Preamplifier	HP	8447D	2944A09099	Nov.12,2020	Nov.12,2021
☑	EMI Measurement Receiver	R&S	ESR26	101377	Nov.12,2020	Nov.12,2021
☑	Horn Antenna	TDK	HRN-0118	130939	Sep.17, 2018	Sep.17, 2021
☑	Preamplifier	TDK	PA-02-0118	TRS-305-00066	Nov.12,2020	Nov.12,2021
☑	Preamplifier	TDK	PA-02-2	TRS-307-00003	Nov.12,2020	Nov.12,2021
☑	Loop antenna	Schwarzbeck	1519B	00008	Jan.07, 2019	Jan.07, 2022
☑	Preamplifier	TDK	PA-02-001-3000	TRS-302-00050	Nov.12,2020	Nov.12,2021
Software						
Used	Description		Manufacturer	Name		Version
☑	Test Software for Radiated disturbance		Farad	EZ-EMC		Ver. UL-3A1

Other instruments						
Used	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
☑	Spectrum Analyzer	Keysight	N9030A	MY55410512	Nov.20,2020	Nov.20,2021

6. ANTENNA PORT TEST RESULTS

6.1. ON TIME AND DUTY CYCLE

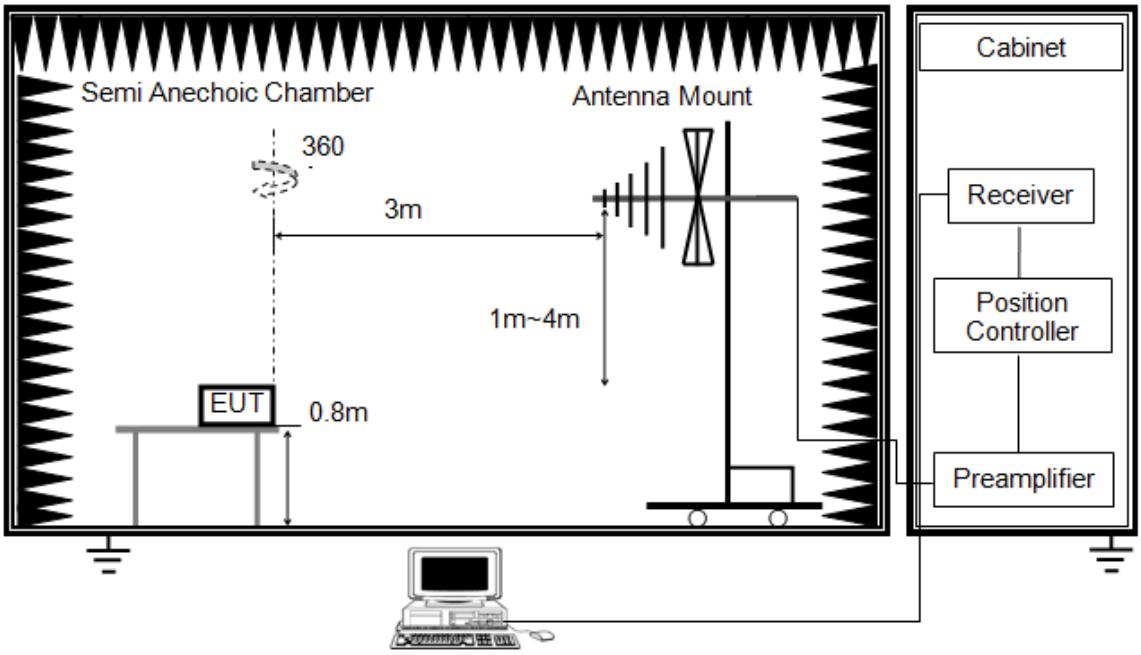
LIMITS

None; for reporting purposes only

PROCEDURE

FCC Reference:	CFR 47 §15.35(c)
Test Method Used:	ANSI C63.10 Section 7.5

TEST SETUP



a. Set RBW of spectrum analyzer to 8 MHz and VBW to 8 MHz.
b. Use a video trigger with the trigger level set to enable triggering only on full pulses.
c. Sweep Time is at least a 100 ms.
d. Set the center frequency on any frequency would be measure and set the frequency span to zero span.
e. Measure the maximum time duration of one single pulse.

TEST ENVIRONMENT

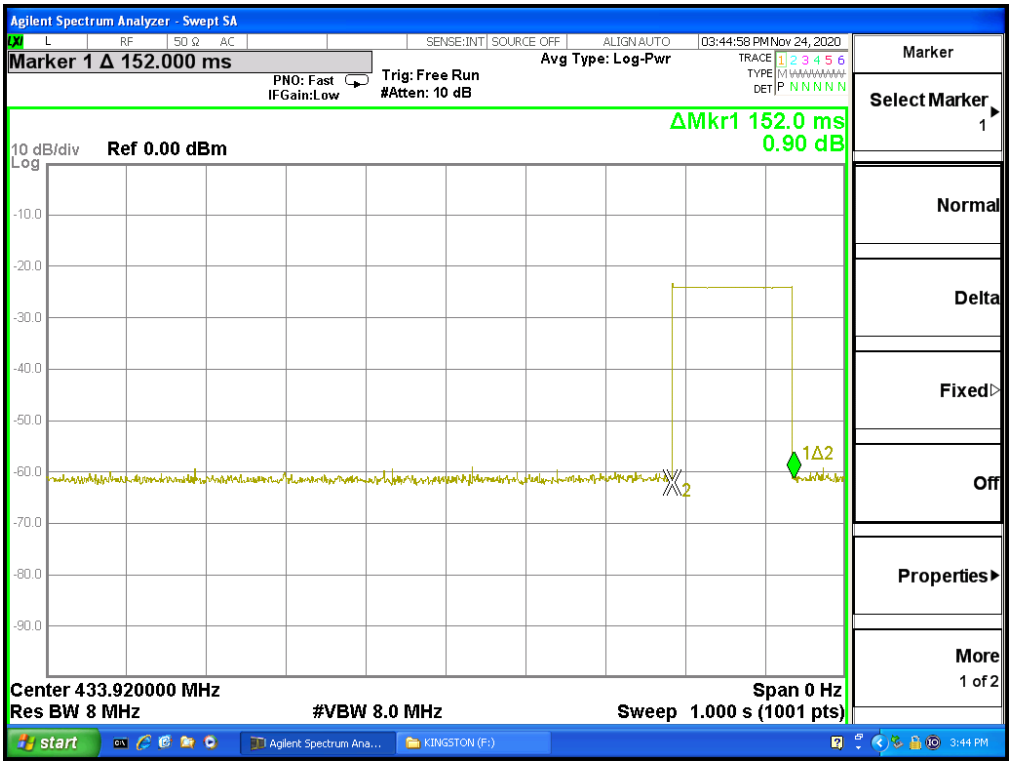
Temperature	21.7 °C	Relative Humidity	61.3 %
Atmosphere Pressure	101 kPa	Test Voltage	DC 3.0 V

RESULTS

Total Ton times (ms)	Period (ms)	Duty Cycle (Linear)	Duty Cycle Correction Factor
100	100	100	0

Note: Duty Cycle Correction Factor=20log(x).
Where: x is Duty Cycle

Ton



Note: Because the transmit period of the EUT already exceed 100 ms, so 100 ms was used for calculated.

Note: All the modes had been tested, only the worst data was recorded in the report.

6.2. TRANSMITTER TIMEOUT

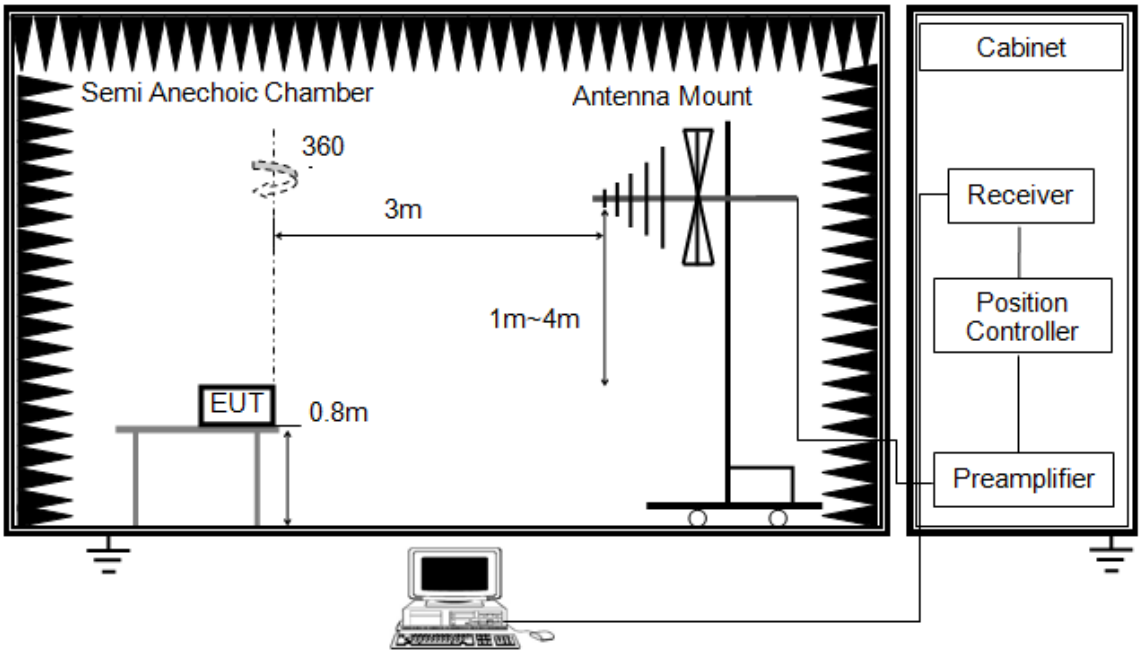
LIMITS

CFR 47 §15.231(e):
Devices operated under the provisions of this paragraph shall be provided with a means for automatically limiting operation so that the duration of each transmission shall not be greater than one second and the silent period between transmissions shall be at least 30 times the duration of the transmission but in no case less than 10 seconds.

TEST PROCEDURE

FCC Reference:	CFR 47 FCC §15.231(e)
Test Method Used:	The duration of each transmission shall not be greater than one second and the silent period between transmissions shall be at least 30 times the duration of the transmission but in no case less than 10 seconds.

TEST SETUP



For CFR 47 Part 15.231(e):

a. Set RBW of spectrum analyzer to 8 MHz and VBW to 8 MHz.
b. Use a video trigger with the trigger level set to enable triggering only on full pulses.
c. Set the center frequency on any frequency would be measure and set the frequency span to zero span.
d. Measure the maximum time duration of one single pulse.

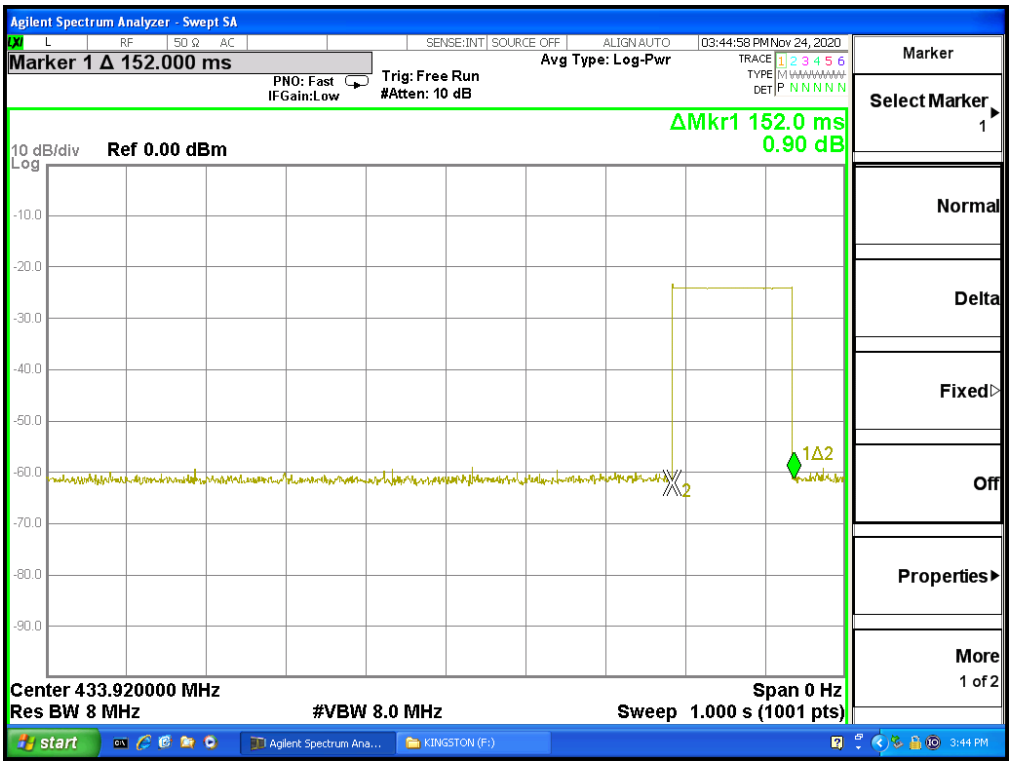
TEST ENVIRONMENT

Temperature	21.7 °C	Relative Humidity	61.3 %
Atmosphere Pressure	101 kPa	Test Voltage	DC 3.0 V

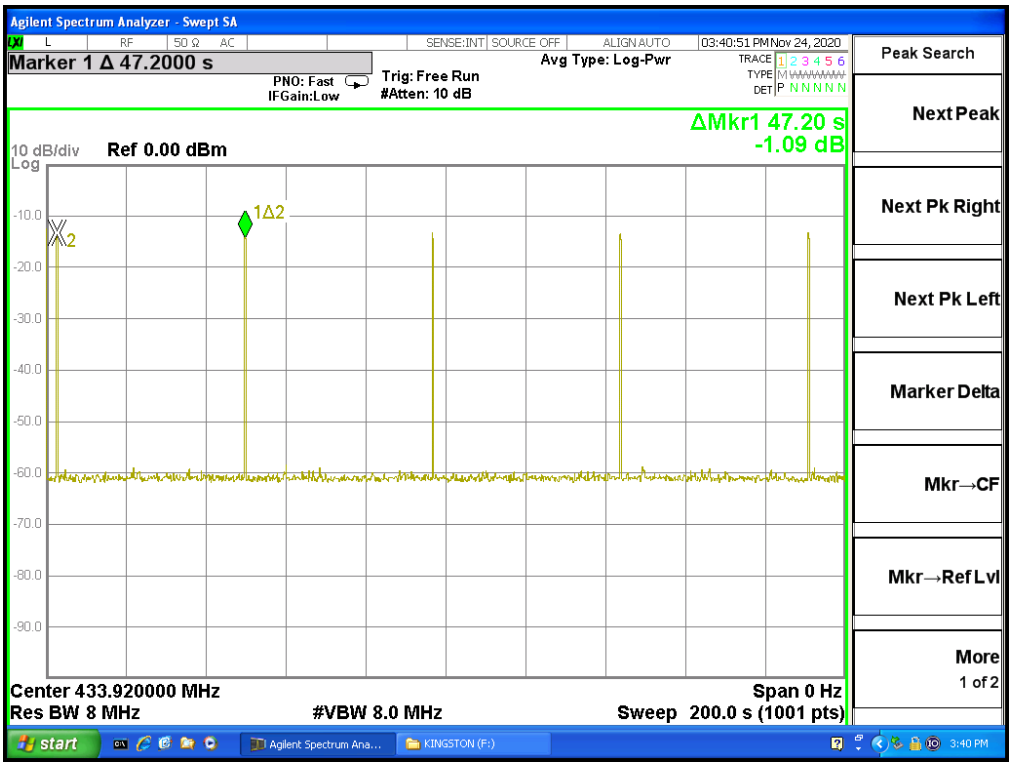
RESULTS

Automatically periodic transmitting mode						
Frequency (MHz)	On Time (ms)	Limit (s)	On Time*30 (s)	Period (s)	OFF Time (s)	Limit (s)
433.92	152	1	4.56	47.352	47.2	10

Test Plot - 1



Test Plot – 2



Note: All the modes had been tested, only the worst data was recorded in the report.

6.3. 20 dB BANDWIDTH AND 99 % OCCUPIED BANDWIDTH

LIMITS

CFR 47 FCC §15.231 (c)

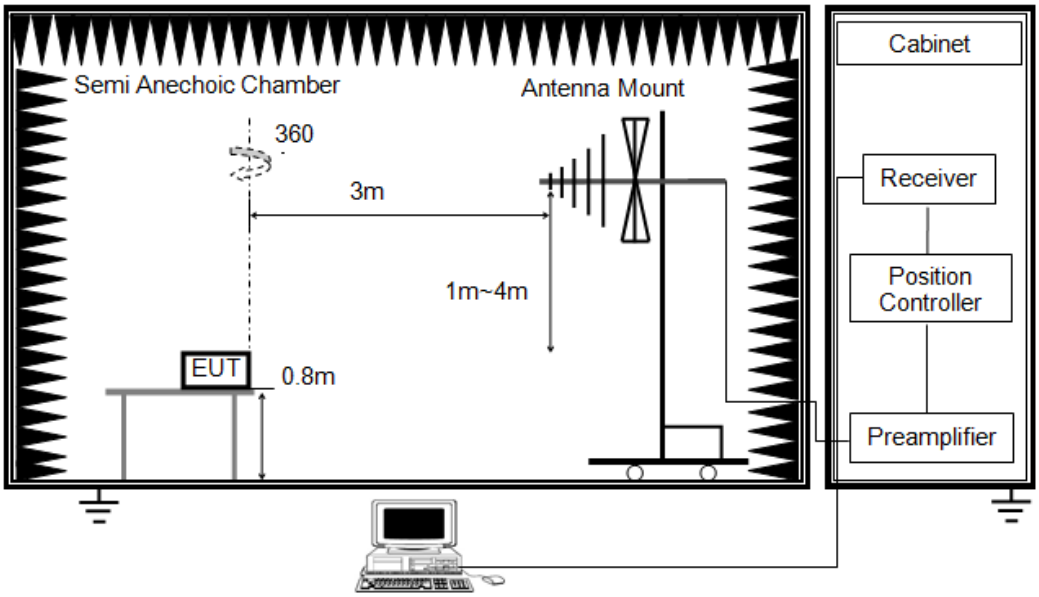
The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900 MHz. For devices operating above 900 MHz, the emission shall be no wider than 0.5 % of the center frequency. Bandwidth is determined at the points 20 dB down from the modulated carrier.

So, the limit calculated as: 0.0025 * 433.92 MHz = 1.0848 MHz

TEST PROCEDURE

FCC Reference:	CFR 47 Part 15.231(c)
Test Method Used:	ANSI C63.10 Section 6.9.2

TEST SETUP



1. The EUT was arranged to its worst case and then turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level.

2. The EUT was placed on a turntable with 0.8 meter above ground.

3. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower

4. Set the spectrum analyzer in the following setting as:

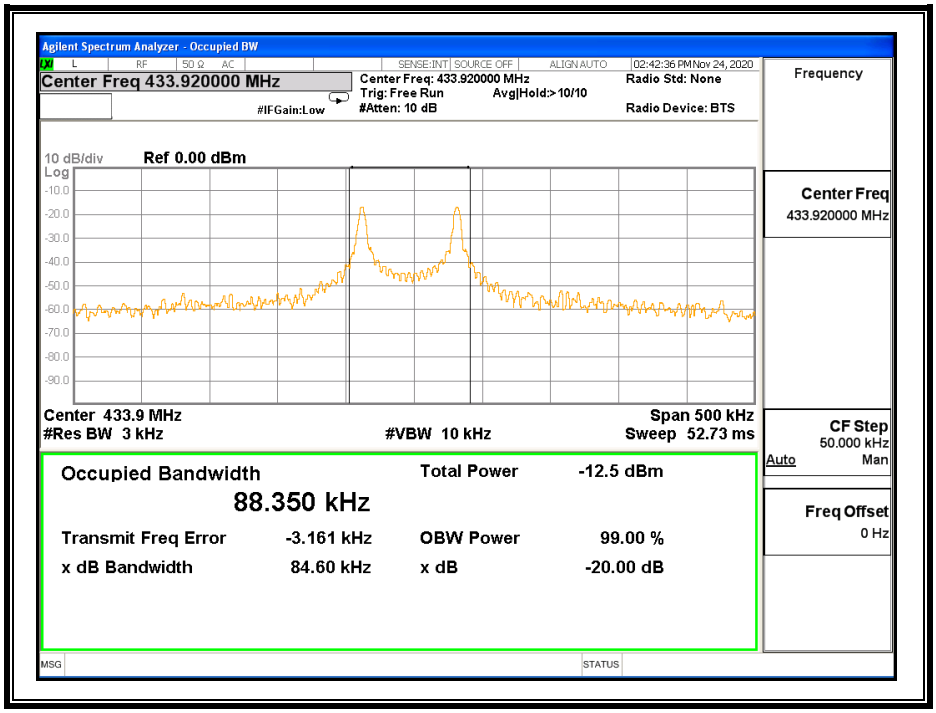
RBW is set to 1% to 5% of the OBW and VBW is set 3 * RBW.

TEST ENVIRONMENT

Temperature	21.7 °C	Relative Humidity	61.3 %
Atmosphere Pressure	101 kPa	Test Voltage	DC 3.0 V

RESULTS

20 dB Bandwidth (MHz)	99 % Occupied Bandwidth (MHz)	Limit (MHz)	Result
0.08460	0.08835	1.0848	Pass



Note: All the modes had been tested, only the worst data was recorded in the report.

6.4. RADIATED TEST RESULTS

LIMITS

CFR 47 FCC §15.231 (b)(e)

CFR 47 FCC §15.205 and §15.209

1. In addition to the provisions of §15.205, the field strength of emissions from intentional radiators operated under this section shall not exceed the following:

Fundamental frequency (MHz)	Field strength of fundamental (microvolts/meter)	Field strength of spurious emissions (microvolts/meter)
40.66-40.70	2,250	225
70-130	1,250	125
130-174	[1]1,250 to 3,750	[1]125 to 375
174-260	3,750	375
260-470	[1]3,750 to 12,500	[1]375 to 1,250
Above 470	12,500	1,250

Note:
1. To obtain the average limit at the test frequency the values given in the table of FCC part 15.231(b) have to be linear interpolated and then converted to dBµV/m. The limit at 260 MHz is 3750 µV/m and at 470 MHz it is 12500 µV/m. Limit at 433.92 MHz is calculated as shown in ANSI C63.10 Section 7.6.2:

Limit [µV/m] = Limlower + ΔF [(Limupper – Limlower) / ($f$upper – $f$lower)]
where ΔF = fc – $f$lower = 433.92 – 260 = 173.92

Limit = 3750 + 173.92 * [(12500 – 3750) / (470 -260)]
= 3750 + 173.92 * [8750 / 210]
= 10996.7 µV/m

dBµV/m = 20 * log (µV/m)
= 20 * log (10996.7)

Average Limit at 433.92 MHz = 80.8 dBµV/m

2. If the average limit is specified for the EUT, the peak limit is 20 dB above the average limit as specified in FCC 15.35 (b)

2. Please refer to CFR 47 FCC part 15.231(e)

Fundamental frequency (MHz)	Field strength of fundamental (microvolts/meter)	Field strength of spurious emission (microvolts/meter)
40.66-40.70	1,000	100
70-130	500	50
130-174	500 to 1,500[1]	50 to 150[1]
174-260	1,500	150
260-470	1,500 to 5,000[1]	150 to 500[1]
Above 470	5,000	500

Note:
1. To obtain the average limit at the test frequency the values given in the table of FCC part 15.231(b) have to be linear interpolated and then converted to dBµV/m. The limit at 260 MHz is 3750 µV/m and at 470 MHz it is 12500 µV/m. Limit at 433.92 MHz is calculated as shown in ANSI C63.10 Section 7.6.2:

Limit [µV/m] = Limlower + ΔF [(Limupper – Limlower) / ($f$upper – $f$lower)]
where ΔF = fc – $f$lower = 433.92 – 260 = 173.92

Limit = 1500 + 173.92 * [(5000 – 1500) / (470 -260)]
= 1500 + 173.92 * [3500 / 210]
= 4398.7 µV/m

dBµV/m = 20 * log (µV/m)
= 20 * log (4398.7)

Average Limit at 433.92 MHz = 72.87 dBµV/m

If the average limit is specified for the EUT, the peak limit is 20 dB above the average limit as specified in FCC 15.35 (b)

3. 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:

Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100**	3
88-216	150**	3
216-960	200**	3
Above 960	500	3

**Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this part, e.g., §§15.231 and 15.241.

4. Radiation Disturbance Test Limit for FCC (Class B) (9 kHz-1 GHz)

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(kHz)	300
0.490~1.705	24000/F(kHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
960~1000	500	3

Note: (1) At frequencies at or above 30 MHz, measurements may be performed at a distance other than what is specified provided: measurements are not made in the near field except where it can be shown that near field measurements are appropriate due to the characteristics of the device; and it can be demonstrated that the signal levels needed to be measured at the distance employed can be detected by the measurement equipment. Measurements shall not be performed at a distance greater than 30 meters unless it can be further demonstrated that measurements at a distance of 30 meters or less are impractical. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade (inverse linear-distance for field strength measurements; inverse-linear-distance-squared for power density measurements).
Note: (2) At frequencies below 30 MHz, measurements may be performed at a distance closer than that specified in the regulations; however, an attempt should be made to avoid making measurements in the near field. Pending the development of an appropriate measurement procedure for measurements performed below 30 MHz, when performing measurements at a closer distance than specified, the results shall be extrapolated to the specified distance by either making measurements at a minimum of two distances on at least one radial to determine the proper extrapolation factor or by using the square of an inverse linear distance extrapolation factor (40 dB/decade). This paragraph (f) shall not apply to Access BPL devices operating below 30 MHz.

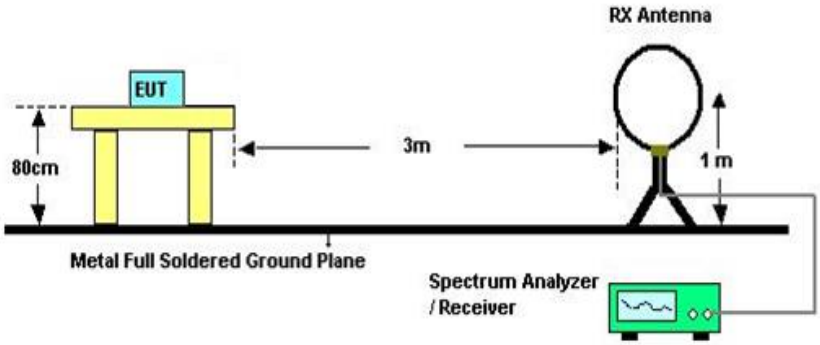
Restricted bands of operation

MHz	MHz	MHz	GHz
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
[1]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	([2])
13.36-13.41			

Note: [1]Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.
[2]Above 38.6c

TEST SETUP AND PROCEDURE

Below 30 MHz



The setting of the spectrum analyser

RBW	200 Hz (From 9 kHz to 0.15 MHz)/ 9 kHz (From 0.15 MHz to 30 MHz)
VBW	200 Hz (From 9 kHz to 0.15 MHz)/ 9 kHz (From 0.15 MHz to 30 MHz)
Sweep	Auto
Detector	Peak/QP/ Average
Trace	Max hold

1. The testing follows the guidelines in ANSI C63.10-2013.

2. The EUT was arranged to its worst case and then turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level. Both Horizontal, Face-on and Face-off polarizations of the antenna are set to make the measurement.

3. The EUT was placed on a turntable with 80 cm meter above ground.

4. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a 1m height antenna tower.

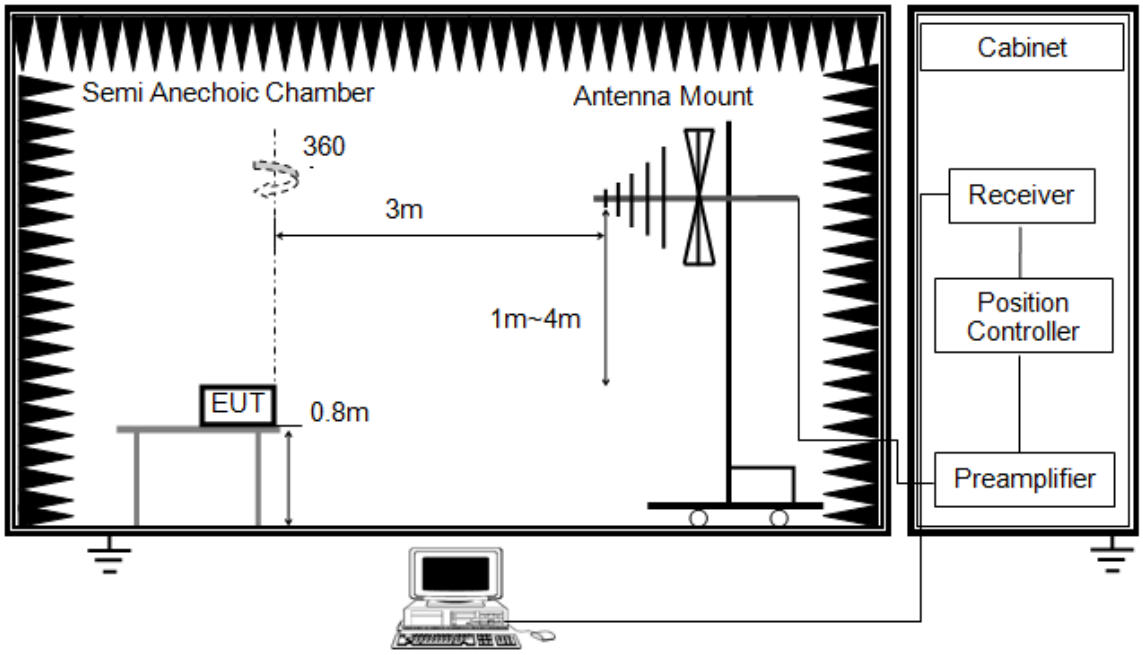
5. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.

6. I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.

7. The radiated emission limits are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.

8. Although these tests were performed other than open area test site, adequate comparison measurements were confirmed against 30m open field site. Therefore, the sufficient tests were made to demonstrate that the alternative site produces results that correlate with the ones of tests made in an open field based on KDB 414788.

Below 1 GHz



The setting of the spectrum analyser

RBW	120 kHz
VBW	300 kHz
Sweep	Auto
Detector	Peak/QP
Trace	Max hold

1. The testing follows the guidelines in ANSI C63.10-2013.

2. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

3. The EUT was placed on a turntable with 80 cm above ground.

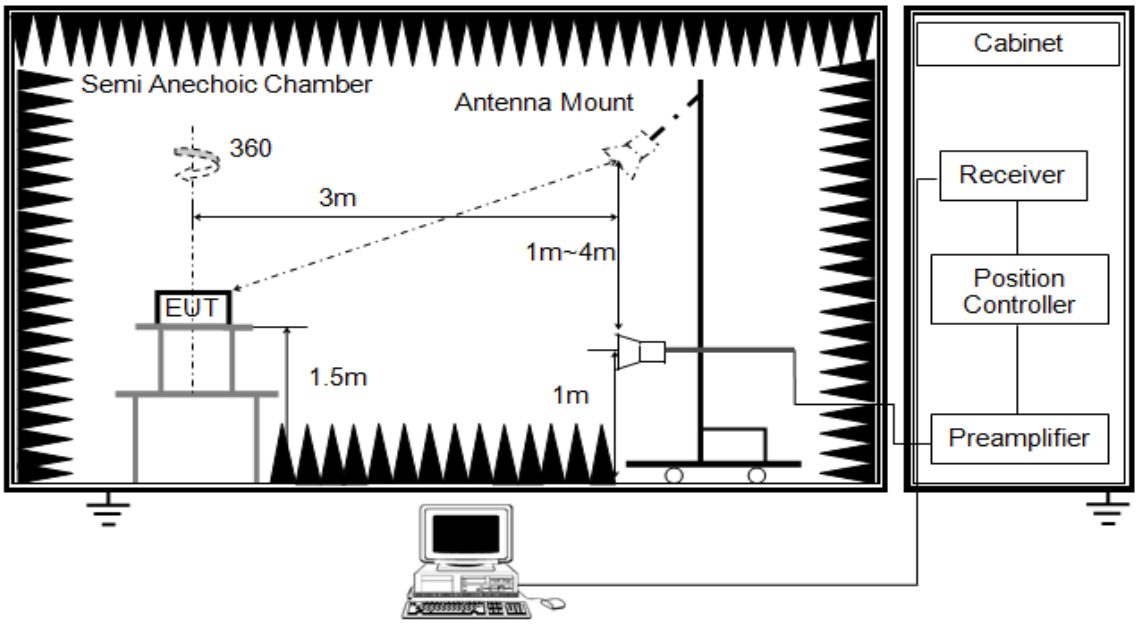
4. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.

5. I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.

6. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.

7. The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.

Above 1 GHz



The setting of the spectrum analyser

RBW	1 MHz
VBW	PEAK: 3 MHz AVG: see note 6
Sweep	Auto
Detector	Peak
Trace	Max hold

1. The testing follows the guidelines in ANSI C63.10-2013.

2. The EUT was arranged to its worst case and then tune the antenna tower (1.5 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter or band reject filter are used for the test in order to get better signal level. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

3. The EUT was placed on a turntable with 80 cm above ground.

4. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.

5. I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.

4. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.

6. For measurements above 1 GHz the resolution bandwidth is set to 1 MHz, then the video bandwidth is set to 3 MHz for peak measurements. Where necessary, average emission are determined by applying the Duty Cycle Correction Factor to the peak measurements. For the Duty Cycle and Correction Factor please refer to clause 6.1. ON TIME AND DUTY CYCLE.

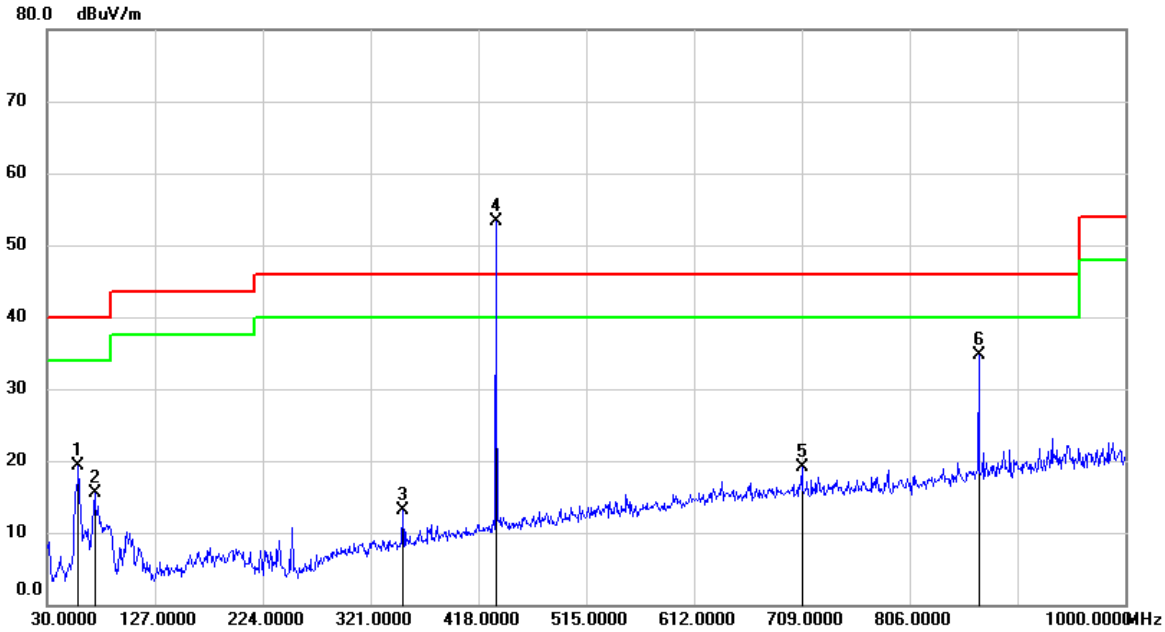
TEST ENVIRONMENT

Radiated Emissions - Below 1 GHz		Radiated Emissions - Above 1 GHz	
Temperature:	20.8 °C	Temperature:	20.9 °C
Humidity:	40.6 %	Humidity:	52.9 %
Atmosphere Pressure	101 kPa	Atmosphere Pressure	101 kPa

RESULTS

6.4.1. FIELD STRENGTH AND SPURIOUS EMISSIONS BELOW 1 GHz AND ABOVE 30 MHz

FIELD STRENGTH AND SPURIOUS EMISSIONS (HORIZONTAL)



No.	Frequency	Reading	Correct	Peak Result	Limit	Margin	Remark
	(MHz)	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	58.1300	39.76	-20.55	19.21	40.00	-20.79	QP
2	72.6800	36.18	-20.76	15.42	40.00	-24.58	QP
3	350.1000	27.37	-14.32	13.05	46.00	-32.95	QP
4 (Fundamental Frequency)	433.9200	65.92	-12.67	53.25	92.87	-39.62	peak
5	709.0000	27.41	-8.27	19.14	46.00	-26.86	QP
6 (2th Harmonic)	868.0800	40.46	-5.80	34.66	72.87	-38.21	peak

Note: 1. Result Level = Read Level + Correct Factor.
2. Peak: Peak detector.
3. Average Result = Peak Result + Duty Correction Factor.
4. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
5. Mark 4 is the fundamental frequency, Mark 6 is 2th harmonic.

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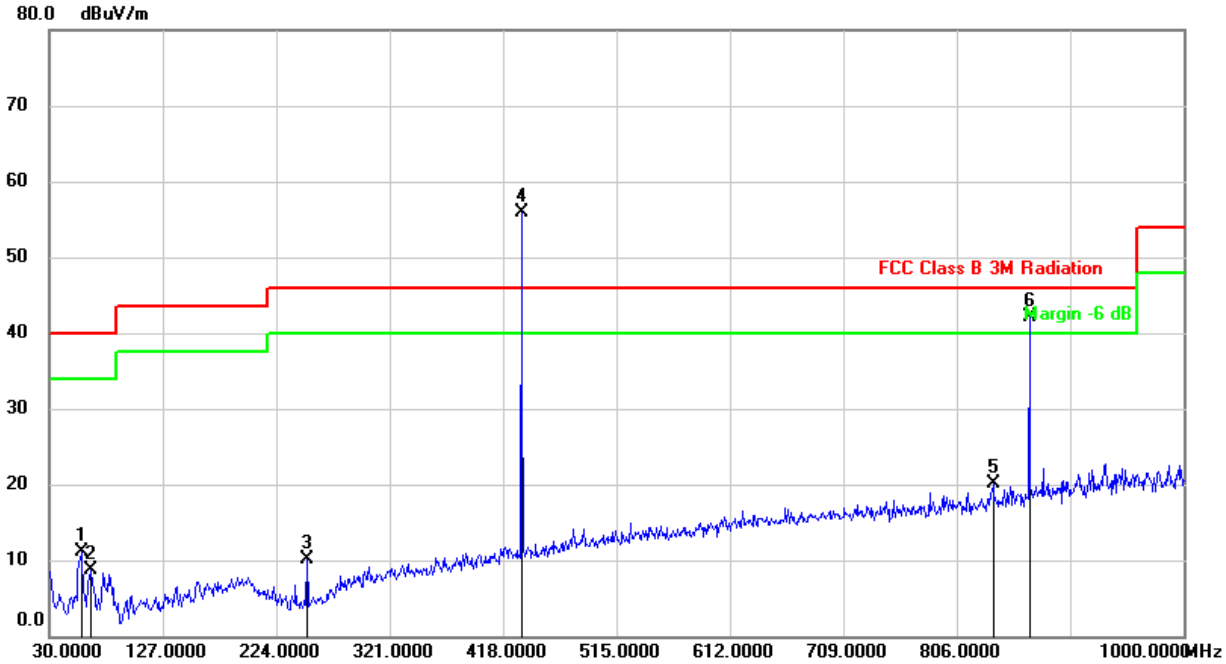
FIELD STRENGTH HARMONICS AND SPURIOUS EMISSIONS (HORIZONTAL)



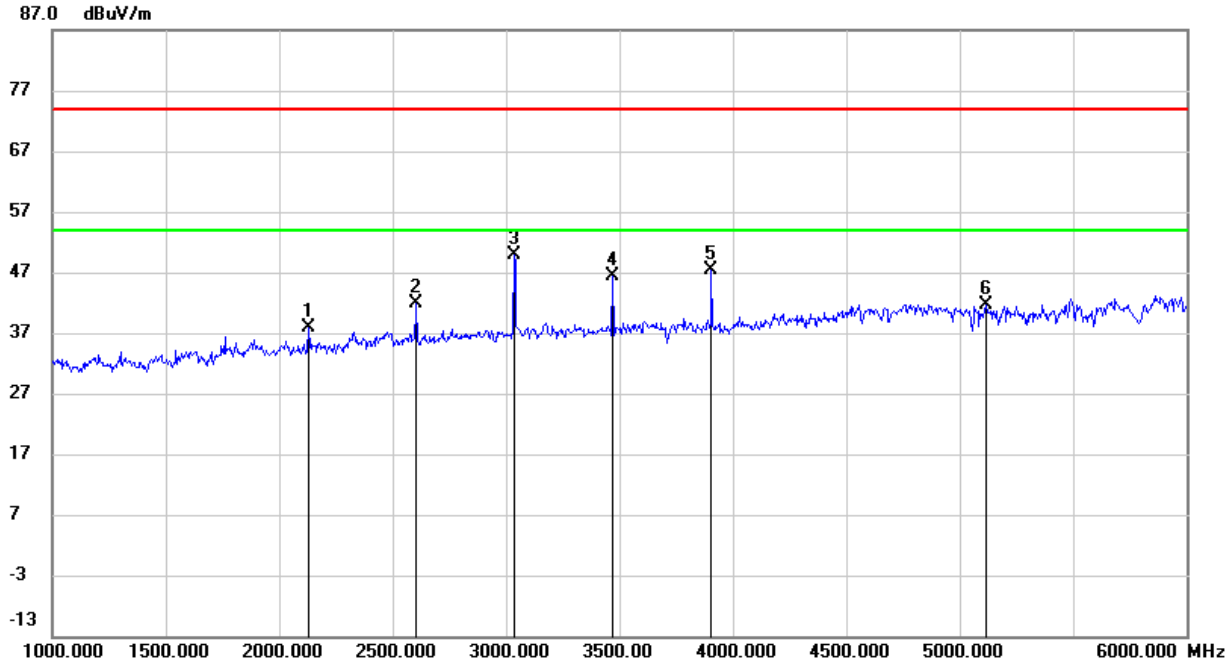
No.	Frequency	Reading	Correct	Peak Result	Limit	Margin	Remark
	(MHz)	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	57.1600	31.74	-20.58	11.16	40.00	-28.84	QP
2	65.8900	29.28	-20.55	8.73	40.00	-31.27	QP
3	250.1900	29.05	-18.91	10.14	46.00	-35.86	
4 (Fundamental Frequency)	433.9200	68.65	-12.67	55.98	92.87	-36.89	peak
5	837.0400	26.60	-6.53	20.07	46.00	-25.93	QP
6 (2^{th} Harmonic)	868.0800	47.82	-5.80	42.02	72.87	-30.85	peak

Note: 1. Result Level = Read Level + Correct Factor.
2. Peak: Peak detector.
3. Average Result = Peak Result + Duty Correction Factor.
4. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
5. Mark 4 is the fundamental frequency, Mark 6 is 2^{th} harmonic.

Note: All the modes had been tested, only the worst data was recorded in the report.

6.4.2. SPURIOUS EMISSIONS ABOVE 1 GHz

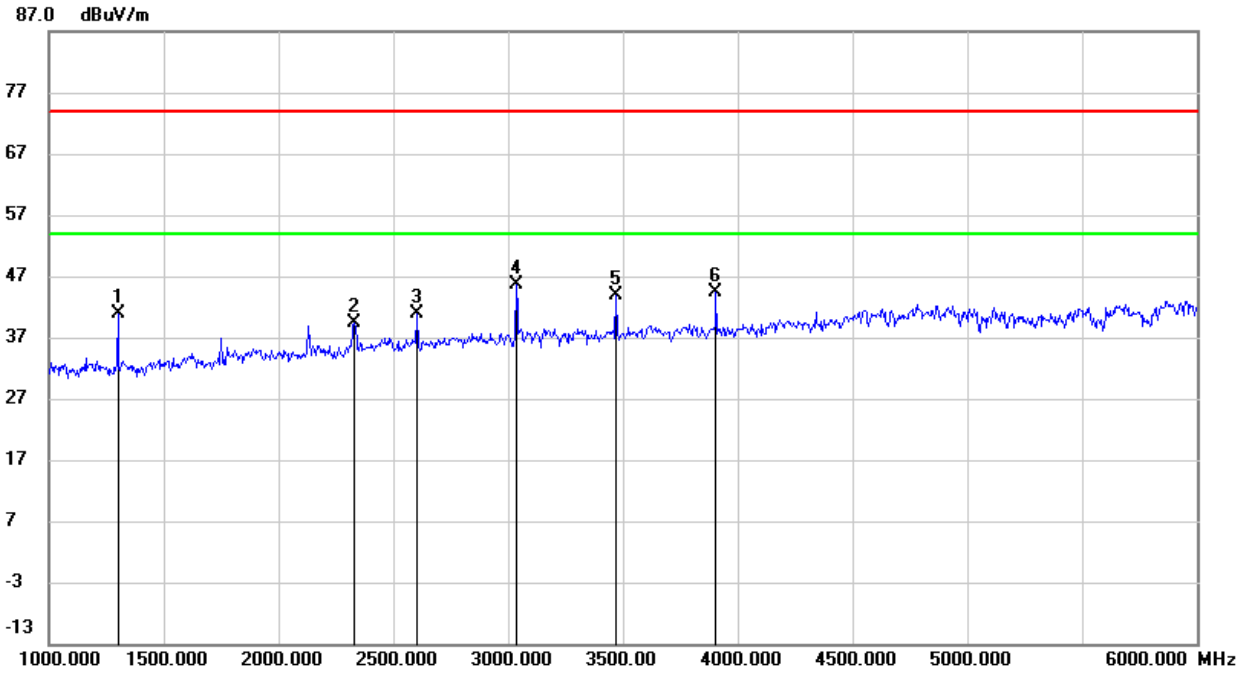
HARMONICS AND SPURIOUS EMISSIONS (HORIZONTAL)



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	2130.000	47.89	-9.96	37.93	74.00	-36.07	peak
2 (6^{th} Harmonic)	2603.520	49.96	-8.16	41.80	72.87	-32.20	peak
3 (7^{th} Harmonic)	3037.440	55.48	-5.65	49.83	72.87	-24.17	peak
4 (8^{th} Harmonic)	3471.360	51.61	-5.32	46.29	72.87	-27.71	peak
5 (9^{th} Harmonic)	3905.280	51.47	-4.19	47.28	72.87	-26.72	peak
6	5115.000	40.75	0.94	41.69	74.00	-32.31	peak

Note: 1. Result Level = Read Level + Correct Factor.
2. Peak: Peak detector.
3. The average limit for harmonic is 52.87 dBuV/m, the average limit for other bands is 54 dBuV/m.
4. If peak result complies with average limit, the average result is deemed to comply with average limit.

HARMONICS AND SPURIOUS EMISSIONS (VERTICAL)



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	1301.760	54.04	-13.09	40.95	74.00	-33.05	peak
2	2330.000	48.39	-9.02	39.37	74.00	-34.63	peak
3 (6^{th} Harmonic)	2603.520	48.93	-8.16	40.77	72.87	-33.23	peak
4 (6^{th} Harmonic)	3037.440	51.19	-5.65	45.54	72.87	-28.46	peak
5 (6^{th} Harmonic)	3471.360	49.11	-5.32	43.79	72.87	-30.21	peak
6 (6^{th} Harmonic)	3905.280	48.53	-4.19	44.34	72.87	-29.66	peak

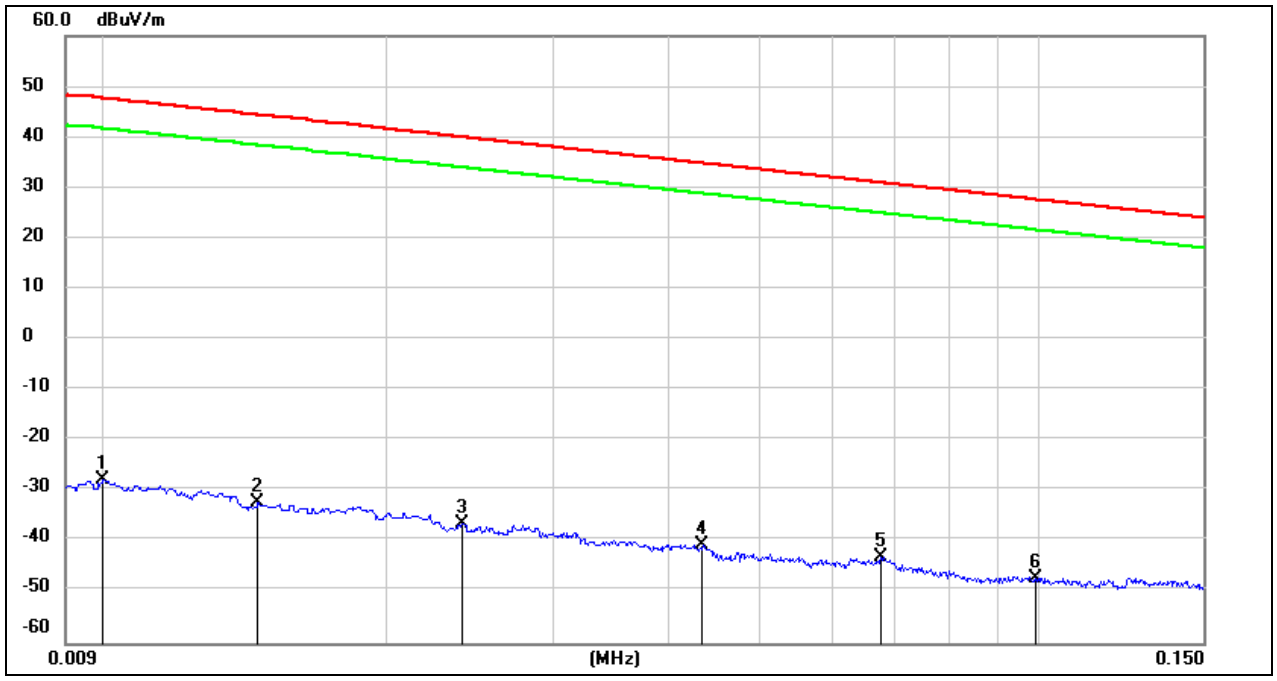
Note: 1. Result Level = Read Level + Correct Factor.
2. Peak: Peak detector.
3. The average limit for harmonic is 52.87 dBuV/m, the average limit for other bands is 54 dBuV/m.
4. If peak result complies with average limit, the average result is deemed to comply with average limit.

Note: All the modes had been tested, only the worst data was recorded in the report.

6.4.3. SPURIOUS EMISSIONS BELOW 30 MHz

SPURIOUS EMISSIONS (LOOP ANTENNA FACE ON TO THE EUT)

0.09 kHz~ 150 kHz



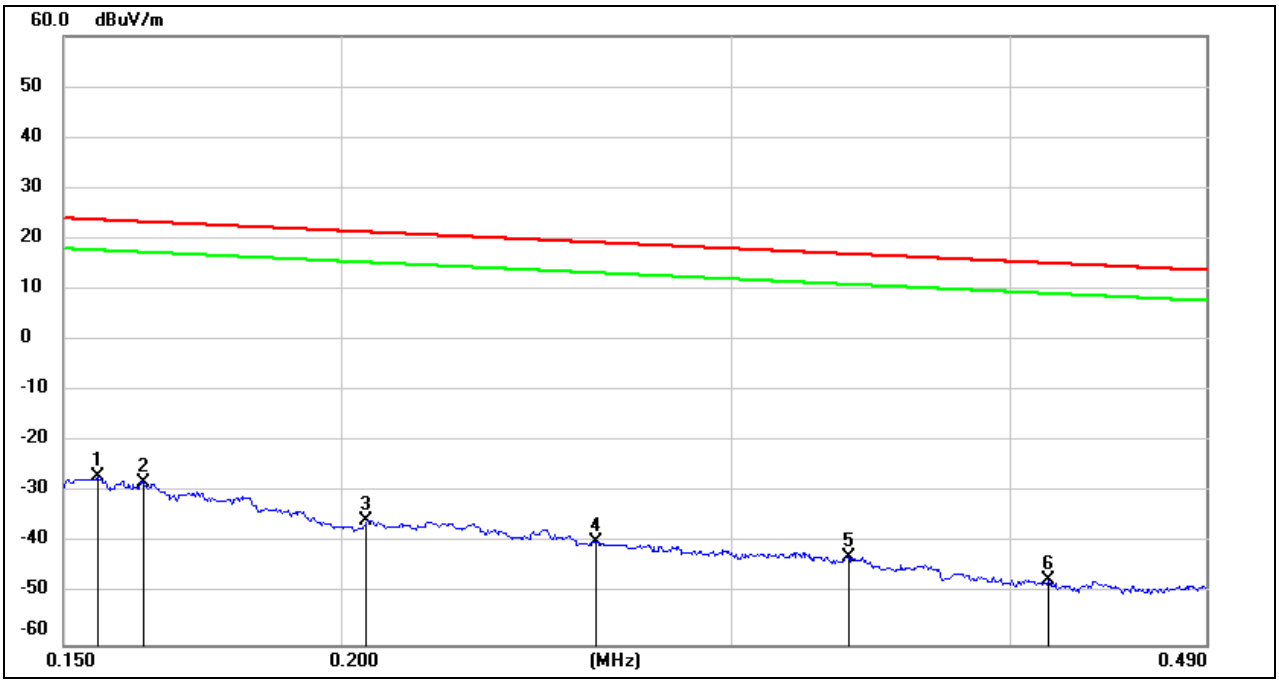
No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	0.0100	73.72	-101.40	-27.68	47.60	-75.28	peak
2	0.0145	69.05	-101.38	-32.33	44.37	-76.70	peak
3	0.0240	64.82	-101.36	-36.54	40.00	-76.54	peak
4	0.0434	60.82	-101.45	-40.63	34.85	-75.48	peak
5	0.0675	58.64	-101.56	-42.92	31.02	-73.94	peak
6	0.0994	54.70	-101.80	-47.10	27.65	-74.75	peak

Note: 1. Measurement = Reading Level + Correct Factor.

2. If Peak Result complies with AV and QP limit, AV and QP Result are deemed to comply with AV limit.

3. All 3 polarizations (Horizontal, Face-on and Face-off) of the loop antenna had been tested, but only the worst data recorded in the report.

150 kHz ~ 490 kHz



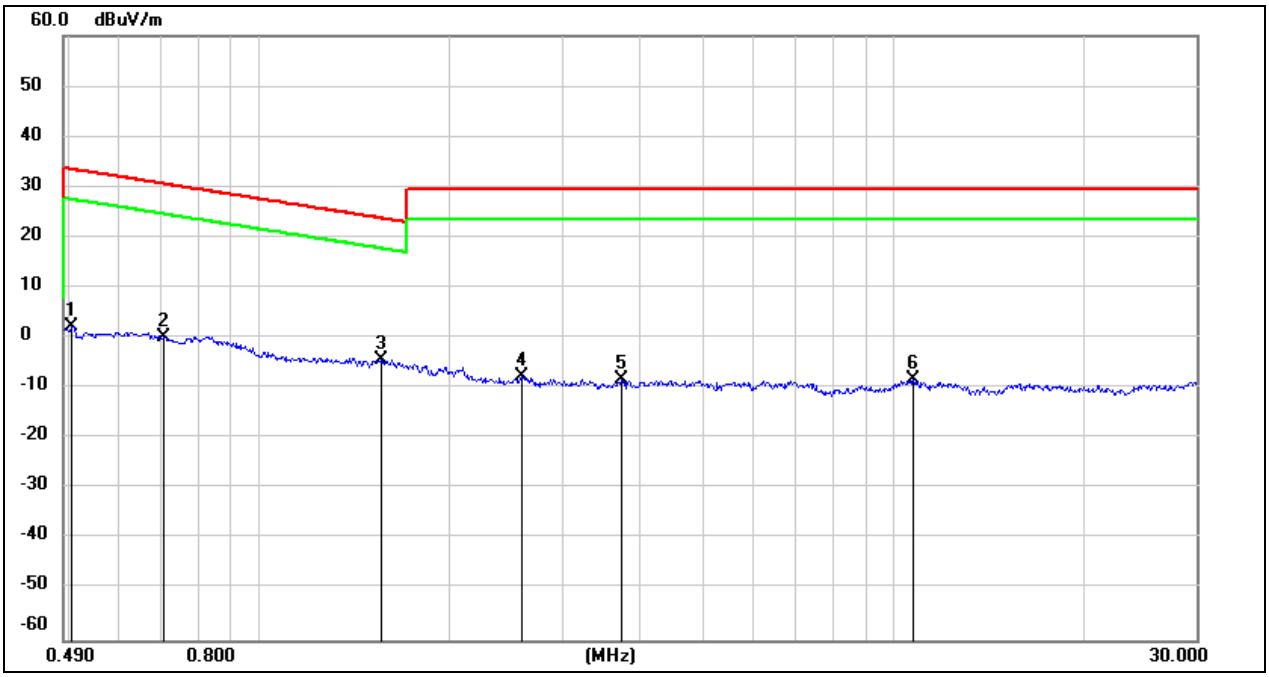
No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	0.1554	74.77	-101.65	-26.88	23.77	-50.65	peak
2	0.1630	73.49	-101.65	-28.16	23.36	-51.52	peak
3	0.2053	66.29	-101.73	-35.44	21.35	-56.79	peak
4	0.2605	62.14	-101.81	-39.67	19.28	-58.95	peak
5	0.3382	59.23	-101.90	-42.67	17.02	-59.69	peak
6	0.4162	54.68	-101.98	-47.30	15.22	-62.52	peak

Note: 1. Measurement = Reading Level + Correct Factor.

2. If Peak Result complies with AV and QP limit, AV and QP Result are deemed to comply with AV limit.

3. All 3 polarizations (Horizontal, Face-on and Face-off) of the loop antenna had been tested, but only the worst data recorded in the report.

490 kHz ~ 30 MHz



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	0.5039	64.44	-62.07	2.37	33.56	-31.19	peak
2	0.7066	62.40	-62.11	0.29	30.62	-30.33	peak
3	1.5564	57.68	-62.02	-4.34	23.76	-28.10	peak
4	2.5935	54.11	-61.68	-7.57	29.54	-37.11	peak
5	3.7100	53.20	-61.41	-8.21	29.54	-37.75	peak
6	10.7299	52.48	-60.83	-8.35	29.54	-37.89	peak

Note: 1. Measurement = Reading Level + Correct Factor.
2. If Peak Result complies with AV and QP limit, AV and QP Result are deemed to comply with AV limit.
3. All 3 polarizations (Horizontal, Face-on and Face-off) of the loop antenna had been tested, but only the worst data recorded in the report.

Note: All the modes had been tested, only the worst data was recorded in the report.

7. ANTENNA REQUIREMENTS

APPLICABLE REQUIREMENTS

Please refer to 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.

Please refer to FCC §15.247(b)(4)
The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

RESULTS

Complies

END OF REPORT