



**FCC 47 CFR PART 15 SUBPART C
ISED RSS-210 ISSUE 10**

CERTIFICATION TEST REPORT

For

Siren Hub

MODEL NUMBER: SCGA25BWBP4

**FCC ID:2AB2Q-SCGA25BWBP4
IC:10256A-SCGA25BWBP4**

REPORT NUMBER: 4790976263.1-1

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Prepared for

LEEDARSON LIGHTING CO., LTD.

Xingda Road, Xingtai Industrial Zone, Changtai County, Zhangzhou, Fujian, China

Prepared by

**UL Verification Services (Guangzhou) Co., Ltd, Song Shan Lake Branch
Room 101, Building 10, Innovation Technology Park,
Song Shan Lake Hi tech Development Zone, Dongguan, 523808, China**

Tel: +86 769 33817100

Fax: +86 769 33244054

Website: www.ul.com



Revision History

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1. ATTESTATION OF TEST RESULTS

Applicant Information

Company Name: LEEDARSON LIGHTING CO., LTD.
Address: Xingda Road, Xingtai Industrial Zone, Changtai County, Zhangzhou, Fujian, China

Manufacturer Information

Company Name: LEEDARSON LIGHTING CO., LTD.
Address: Xingda Road, Xingtai Industrial Zone, Changtai County, Zhangzhou, Fujian, China

EUT Information

EUT Name: Siren Hub
Model: SCGA25BWBP4
Sample Received Date: August 22, 2023
Sample Status: Normal
Sample ID: 6378382
Date of Tested: August 22, 2023~ October 16, 2023

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
CFR 47 Part 15 Subpart C	PASS
ISED RSS-210 Issue 10	PASS
ISED RSS-GEN Issue 5	PASS

Prepared By:

Fanny Huang
Engineer Project Associate

Checked By:

Denny Huang
Senior Project Engineer

Approved By:

Stephen Guo
Operations Manager



2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with FCC CFR 47 Part 2, FCC CFR 47 Part 15, ANSI C63.10-2013, ISED RSS-210 Issue 10 and RSS-GEN Issue 5

3. FACILITIES AND ACCREDITATION

Accreditation Certificate	<p>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.</p> <p>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</p> <p>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 ISED. Body Identifier (CABID) is CN0046.</p> <p>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</p>
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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 30MHz, 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 recognized 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
Radiated Emission (Included Fundamental Emission) (9 kHz ~ 30 MHz)	2.2 dB
Radiated Emission (Included Fundamental Emission) (30 MHz ~ 1 GHz)	4.00 dB
Radiated Emission (Included Fundamental Emission) (1 GHz to 26 GHz)	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	Siren Hub
Model	SCGA25BWBP4
Power supply	Battery: DC 4.5 V / 5 Vdc via adapter
Transmit Frequency Range	902 MHz ~ 928 MHz
Modulation	FSK
Bit Rate	4.8 kbps

We have pre-test the two ways of power supply, only the worst data recorded in the report.

5.2. CHANNEL LIST

Channel	Frequency (MHz)
1	915

5.3. MAXIMUM EMISSIONS FIELD STRENGTH

Operation Frequency (MHz)	Number of Transmit Chains (NTX)	Channel Number	Max. Emissions Field Strength (dB μ V/m)
902-928	1	1	92.44

**5.4. THE WORSE CASE POWER SETTING PARAMETER**

The Worse Case Power Setting Parameter under 902~928MHz		
Test Software		/
Modulation Type	Test Channel	Test Channel
		915MHz
FSK	1	0

5.5. TEST ENVIRONMENT

Environment Parameter	Selected Values During Tests	
Relative Humidity	55 ~ 65%	
Atmospheric Pressure:	1025Pa	
Temperature	TN	23 ~ 28°C
Voltage :	VL	N/A
	VN	DC 4.5 V
	VH	N/A

Note: VL= Lower Extreme Test Voltage

VN= Nominal Voltage

VH= Upper Extreme Test Voltage

TN= Normal Temperature

5.6. TEST CHANNEL CONFIGURATION

Test Mode	Test Channel Number	Test Channel
FSK	CH 1/Low	915MHz

**5.7. DESCRIPTION OF AVAILABLE ANTENNAS**

Ant.	Frequency (MHz)	Antenna Type	Antenna Gain (dBi)
1	902 - 928	Internal inverted F PCB antenna	1.55

Test Mode	Transmit and Receive Mode	Description
FSK	<input checked="" type="checkbox"/> 1TX, 1RX	Antenna 1 can be used as transmitting/receiving antenna.

Note: 1. The value of the antenna gain was declared by customer.

5.8. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Item	Equipment	Brand Name	Model Name	Remark
1	PC	Lenovo	E42-80	/
2	SWITCHING POWER SUPPLY	KLEC	SW-0018	Input: AC 100-240V, 0.2A, 50-60Hz Output: DC 5V, 1A
3	UART	/	/	/

I/O CABLES

Cable No	Port	Connector Type	Cable Type	Cable Length(m)	Remarks
1	USB	/	/	1.0	/

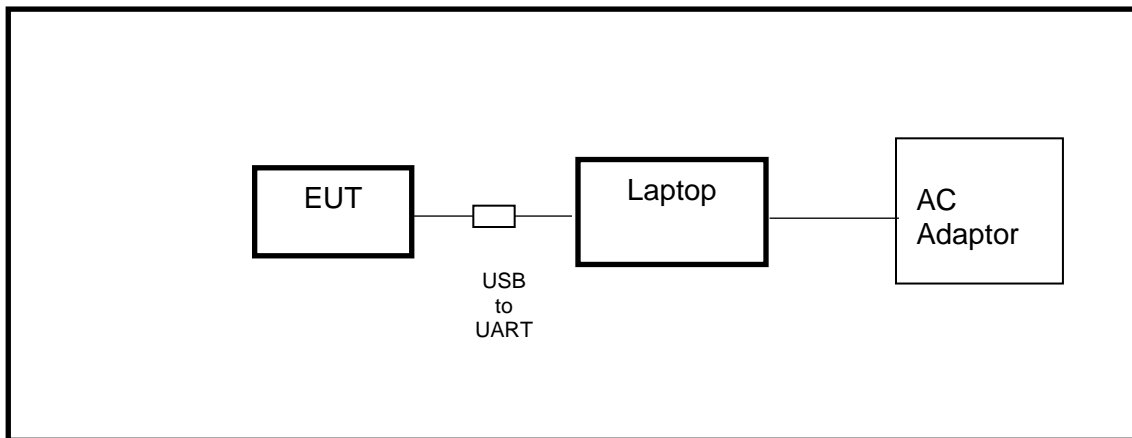
ACCESSORIES

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

TEST SETUP

The EUT can work in engineering mode with a software through a Laptop.

SETUP DIAGRAM FOR TESTS



**5.9. MEASURING INSTRUMENT AND SOFTWARE USED**

Conducted Emissions					
Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Due Date
EMI Test Receiver	R&S	ESR3	101961	Oct.17, 2022	Oct.16, 2023
Two-Line V-Network	R&S	ENV216	101983	Oct.17, 2022	Oct.16, 2023
Artificial Mains Networks	Schwarzbeck	NSLK 8126	8126465	Oct.17, 2022	Oct.16, 2023
Software					
Description			Manufacturer	Name	Version
Test Software for Conducted Emissions			Farad	EZ-EMC	Ver. UL-3A1

Radiated Emissions					
Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Due Date
MXE EMI Receiver	KESIGHT	N9038A	MY56400036	Oct.17, 2022	Oct.16, 2023
Hybrid Log Periodic Antenna	TDK	HLP-3003C	130959	Aug.02, 2021	Aug.01, 2024
Preamplifier	HP	8447D	2944A09099	Oct.17, 2022	Oct.16, 2023
EMI Measurement Receiver	R&S	ESR26	101377	Oct.17, 2022	Oct.16, 2023
Horn Antenna	TDK	HRN-0118	130940	July 20, 2021	July 19, 2024
Preamplifier	TDK	PA-02-0118	TRS-305-00067	Oct.17, 2022	Oct.16, 2023
Horn Antenna	Schwarzbeck	BBHA9170	697	July 20, 2021	July 19, 2024
Preamplifier	TDK	PA-02-2	TRS-307-00003	Oct.17, 2022	Oct.16, 2023
Preamplifier	TDK	PA-02-3	TRS-308-00002	Oct.17, 2022	Oct.16, 2023
Loop antenna	Schwarzbeck	1519B	00008	Dec.14, 2021	Dec.13, 2024
Preamplifier	TDK	PA-02-001-3000	TRS-302-00050	Oct.17, 2022	Oct.16, 2023
Preamplifier	Mini-Circuits	ZX60-83LN-S+	SUP01202035	Oct.17, 2022	Oct.16, 2023
High Pass Filter	Wi	WHKX10-2700-3000-18000-40SS	23	Dec.01,2022	Nov.30,2023
Highpass Filter	Wainwright	WHKX10-5850-6500-1800-40SS	4	Dec.01,2022	Nov.30,2023
Band Reject Filter	Wainwright	WRCJV12-5695-5725-	4	Dec.01,2022	Nov.30,2023



		5850-5880-40SS			
Band Reject Filter	Wainwright	WRCJV20-5120-5150-5350-5380-60SS	2	Dec.01,2022	Nov.30,2023
Band Reject Filter	Wainwright	WRCJV20-5440-5470-5725-5755-60SS	1	Dec.01,2022	Nov.30,2023
Band Reject Filter	Wainwright	WRCJV8-2350-2400-2483.5-2533.5-40SS	4	Dec.01,2022	Nov.30,2023
Band Reject Filter	Wainwright	WRCD5-1879-1879.85-1880.15-1881-40SS	1	Dec.01,2022	Nov.30,2023
Notch Filter	Wainwright	WHJ10-882-980-7000-40SS	1	Dec.01,2022	Nov.30,2023
Software					
Description		Manufacturer	Name	Version	
Test Software for Radiated Emissions		Farad	EZ-EMC	Ver. UL-3A1	

Other instruments					
Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
Spectrum Analyzer	Keysight	N9030A	MY55410512	Oct.17, 2022	Oct.16, 2023
Signal Analyzer	R&S	FSV40	101118	Oct.17, 2022	Oct.16, 2023
Temperature humidity probe	OMEGA	ITHX-SD-5	18470007	Oct.22, 2022	Oct.21, 2023



6. SUMMARY OF TEST RESULTS

Summary of Test Results			
Clause	Test Items	FCC/IC Rules	Test Results
1	20dB Bandwidth	FCC Part 15.215(c)	Pass
2	99% Emission Bandwidth	RSS-Gen Clause 6.7	Pass
3	TX Spurious Emission	FCC 15.249 (a)(d)(e) FCC 15.209 FCC 15.205 RSS-GEN Clause 8.9 RSS-GEN Clause 8.10	Pass
4	AC Power Line Conducted Emission	FCC Part 15.207 RSS-GEN Clause 8.8	Pass
5	Antenna Requirement	FCC Part 15.203 RSS-GEN Clause 6.8	Pass



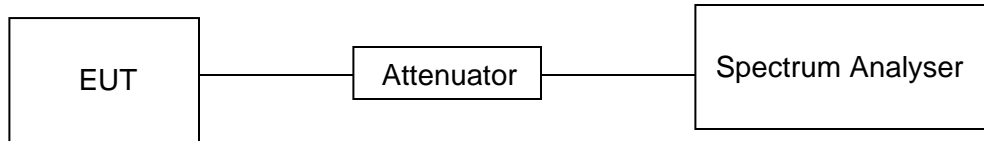
7. ANTENNA PORT TEST RESULTS

7.1. ON TIME AND DUTY CYCLE

LIMITS

None; for reporting purposes only

TEST SETUP



TEST ENVIRONMENT

Temperature	24.6 °C	Relative Humidity	58 %
Atmosphere Pressure	101 kPa	Test Voltage	DC 5 V

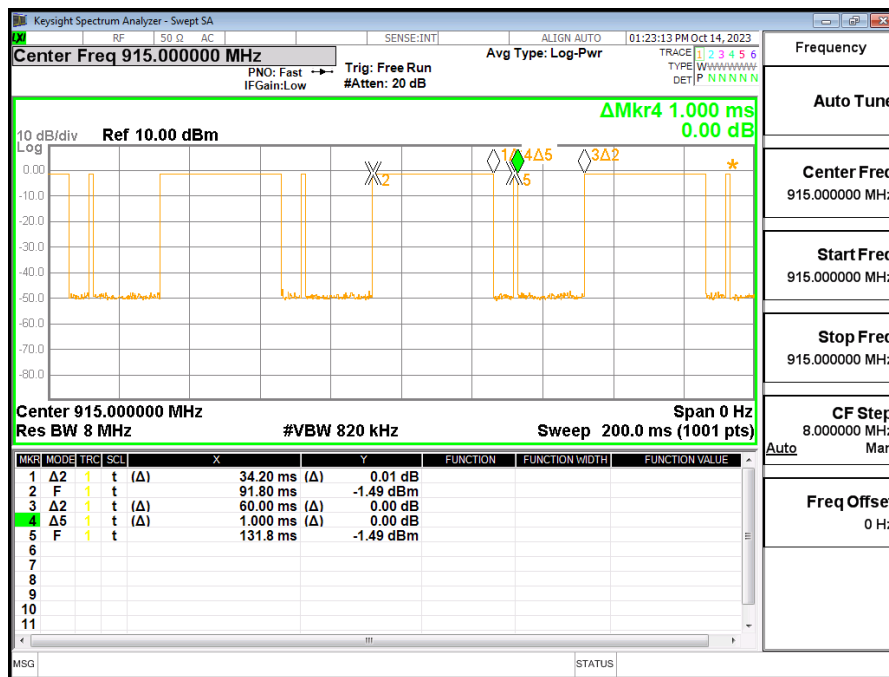


RESULTS

Test Channel	On Time (msec)	Period (msec)	Duty Cycle x (Linear)	Duty Cycle (%)	Duty Cycle Correction Factor (db)	minimum VBW 1/T (KHz)
MID	35.20	60	0.5867	58.67%	2.32	3

Note: Duty Cycle Correction Factor=10log(1/x).
Where: x is Duty Cycle (Linear)
Where: T is On Time (transmit duration)
On Time= Ton 1+ Ton 2=34.20+1.00=35.20ms

ON TIME AND DUTY CYCLE MID



**7.2. 20 dB AND 99% EMISSION BANDWIDTH****LIMITS**

FCC Part15 (15.249) , Subpart C			
Section	Test Item	Limit	Frequency Range (MHz)
FCC 15.215(c)	20dB Bandwidth	for reporting purposes only	902-928 MHz
RSS-Gen Clause 6.7	99% Emission Bandwidth	N/A	902-928 MHz

TEST PROCEDURE

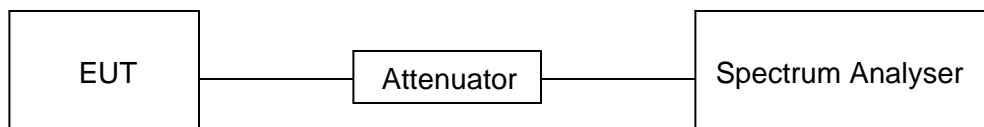
Connect the UUT to the spectrum analyser and use the following settings:

Center Frequency	The center frequency of the channel under test
Detector	Peak
RBW	1% to 5% of the occupied bandwidth
VBW	$\geq 3 \times \text{RBW}$
Span	Approximately 2 to 3 times the 20dB bandwidth
Trace	Max hold
Sweep	Auto couple

Allow the trace to stabilize and measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 20 dB relative to the maximum level measured in the fundamental emission.

TEST ENVIRONMENT

Temperature	24.6 °C	Relative Humidity	58 %
Atmosphere Pressure	101 kPa	Test Voltage	DC 5 V

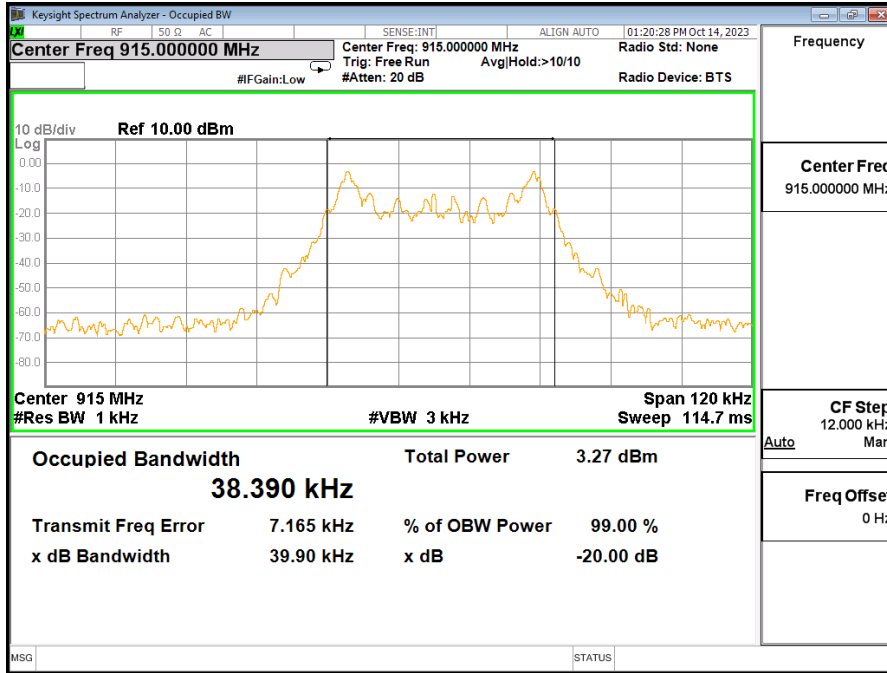
TEST SETUP



RESULTS

Channel	20dB bandwidth (KHz)	99% bandwidth (KHz)	Result
Low	39.90	38.390	Pass

BANDWIDTH LOW CH





8. RADIATED TEST RESULTS

8.1. LIMITS AND PROCEDURE

LIMITS

Please refer to FCC §15.205 and §15.209

Please refer to FCC §15.249 (a)(d)(e)

RSS-210 Issue 10 Clause Annex B B.10

Please refer to ISED RSS-GEN Clause 8.9 and Clause 8.10

The field strength of emissions from intentional radiators operated within these frequency bands			
Frequency (MHz)	Field strength of Fundamental	Field strength of Harmonics	Distance (m)
902 - 928	50 mV/m (94 dBuV/m)	500 uV/m (54d BuV/m)	3
2400 – 2483.5	50 mV/m (94 dBuV/m)	500 uV/m (54d BuV/m)	3
5725 – 5875	50 mV/m (94 dBuV/m)	500 uV/m (54 dBuV/m)	3

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).



(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.

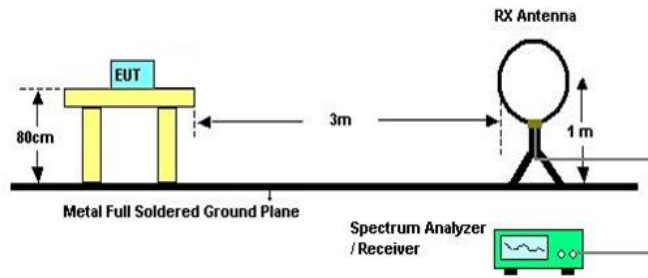
Radiation Disturbance Test Limit for FCC (Above 1GHz)

Frequency (MHz)	dB (uV/m) (at 3 meters)	
	Peak	Average
Above 1000	74	54

About Restricted bands of operation please refer to RSS-Gen section 8.10 and FCC §15.205 (a)

TEST SETUP AND PROCEDURE

Below 30 MHz

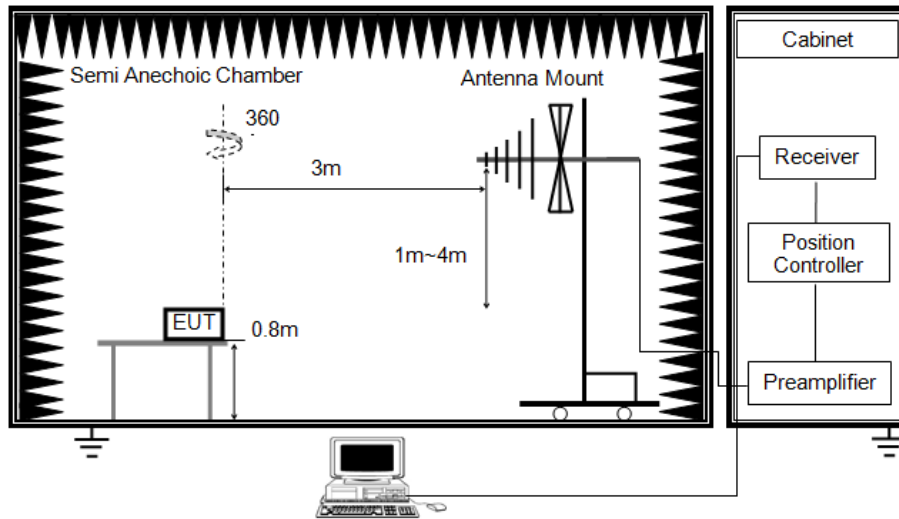


The setting of the spectrum analyser

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
Trace	Max hold

1. The testing follows the guidelines in ANSI C63.10-2013 clause 6.4.
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 above ground.
4. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a 1 m height antenna tower.
5. 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 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.
6. For measurement below 1 GHz, 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 and average detector mode re-measured. If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak and average detector and reported.
7. Although these tests were performed other than open field site, adequate comparison measurements were confirmed against 30m open field site. Therefore sufficient tests were made to demonstrate that the alternative site produces results that correlate with the ones of tests made in an open field site based on KDB 414788.
8. The limits in CFR 47, Part 15, Subpart C, paragraph 15.209 (a), are identical to those in RSS-GEN Section 8.9, Table 6, since the measurements are performed in terms of magnetic field strength and converted to electric field strength levels (as reported in the table) using the free space impedance of 377Ω. For example, the measurement frequency X KHz resulted in a level of Y dBuV/m, which is equivalent to $Y-51.5 = Z$ dBuA/m, which has the same margin, W dB, to the corresponding RSS-GEN Table 6 limit as it has to be 15.209(a) limit.

BELOW 1G



The setting of the spectrum analyser. (For Bandedge and Field strength)

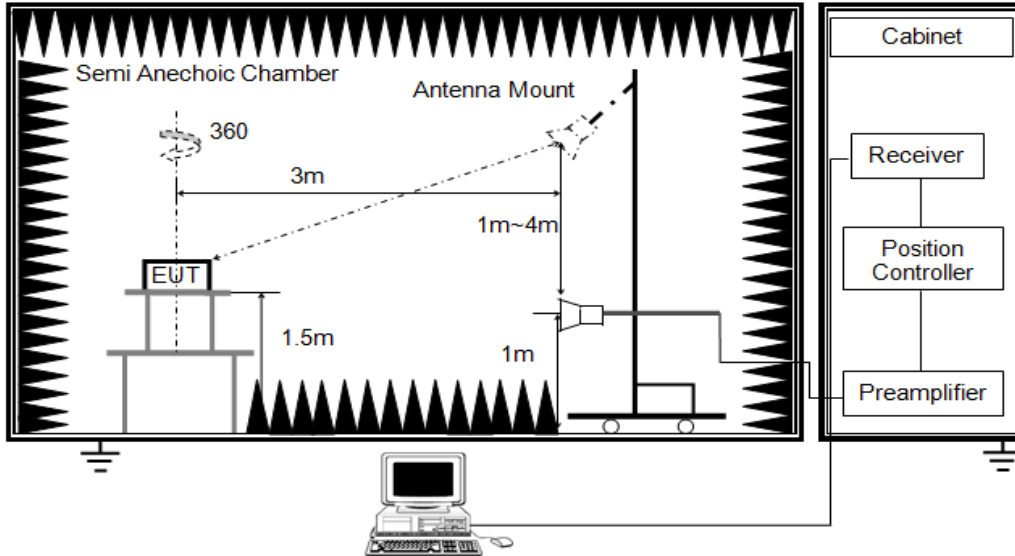
RBW	≥ OBW (125 kHz)
VBW	300 kHz
Sweep	Auto
Detector	Peak/QP
Trace	Max hold

The setting of the spectrum analyser. (For Spurious emissions)

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 clause 6.5.
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 0.8 meter above ground.
4. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
5. Measurement = Reading Level + Correct Factor
6. For measurement below 1GHz, 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. If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.
7. For the actual test configuration, please refer to the related item in this test report (Photographs of the Test Configuration)

ABOVE 1G

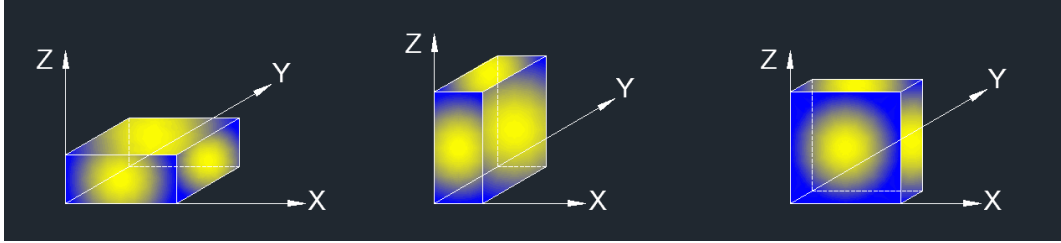


The setting of the spectrum analyser

RBW	1M MHz
VBW	PEAK: 3MHz AVG: See Note 6
Sweep	Auto
Detector	Peak
Trace	Max hold

1. The testing follows the guidelines in ANSI C63.10-2013 clause 6.6.
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 1.5m above ground.
4. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
5. For measurement above 1GHz, the emission measurement will be measured by the peak detector. This peak level, once corrected, must comply with the limit specified in Section 15.209.
6. For average power measurement, set the detector to AVG, while maintaining all of the other instrument settings, if the duty cycle of the EUT is less than 98%, the Duty Cycle Correction Factor shall be added to the measured emission levels. For the Duty Cycle and Correction Factor please refer to clause 7.1.ON TIME AND DUTY CYCLE.
7. For the actual test configuration, please refer to the related item in this test report (Photographs of the Test Configuration)

X axis, Y axis, Z axis positions:



Note 1: For all radiated test, EUT in each of three orthogonal axis emissions had been tested, but only the worst case (X axis) data recorded in the report.

TEST ENVIRONMENT

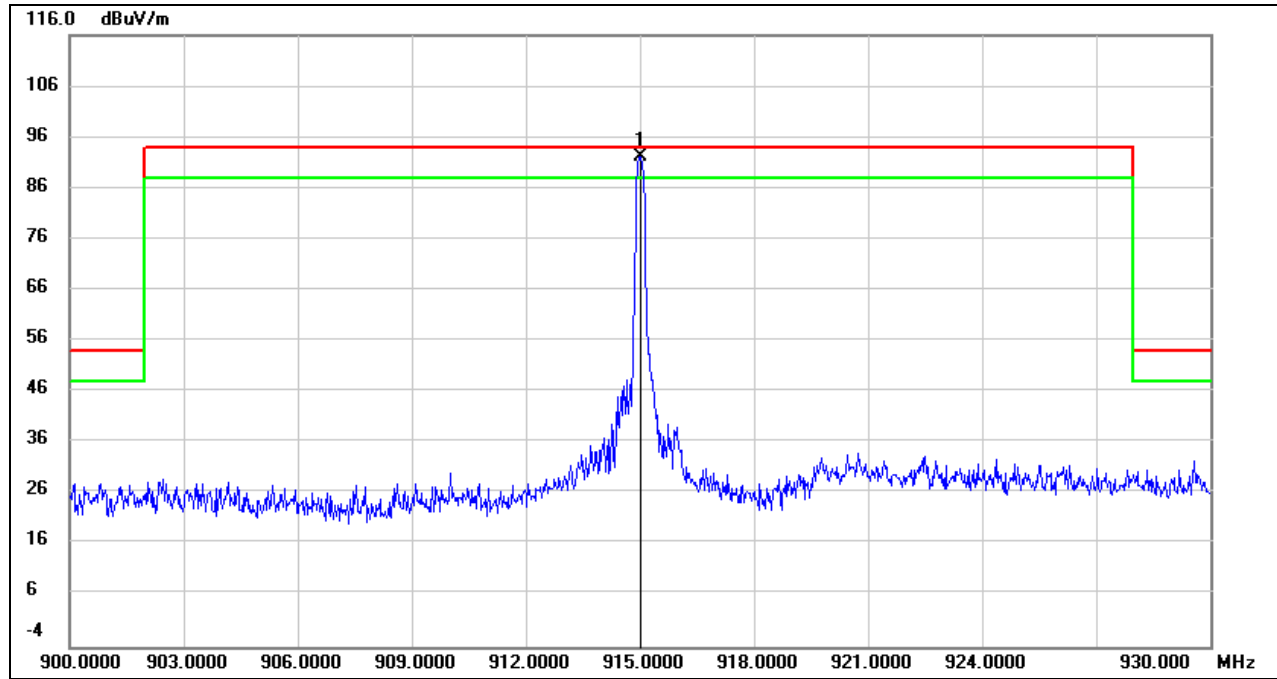
Temperature	23.8 °C	Relative Humidity	65 %
Atmosphere Pressure	101 kPa	Test Voltage	DC 5 V

RESULTS



8.2. FIELD STRENGTH OF INTENTIONAL EMISSIONS

FIELD STRENGTH OF INTENTIONAL EMISSIONS (LOW CHANNEL, HORIZONTAL)

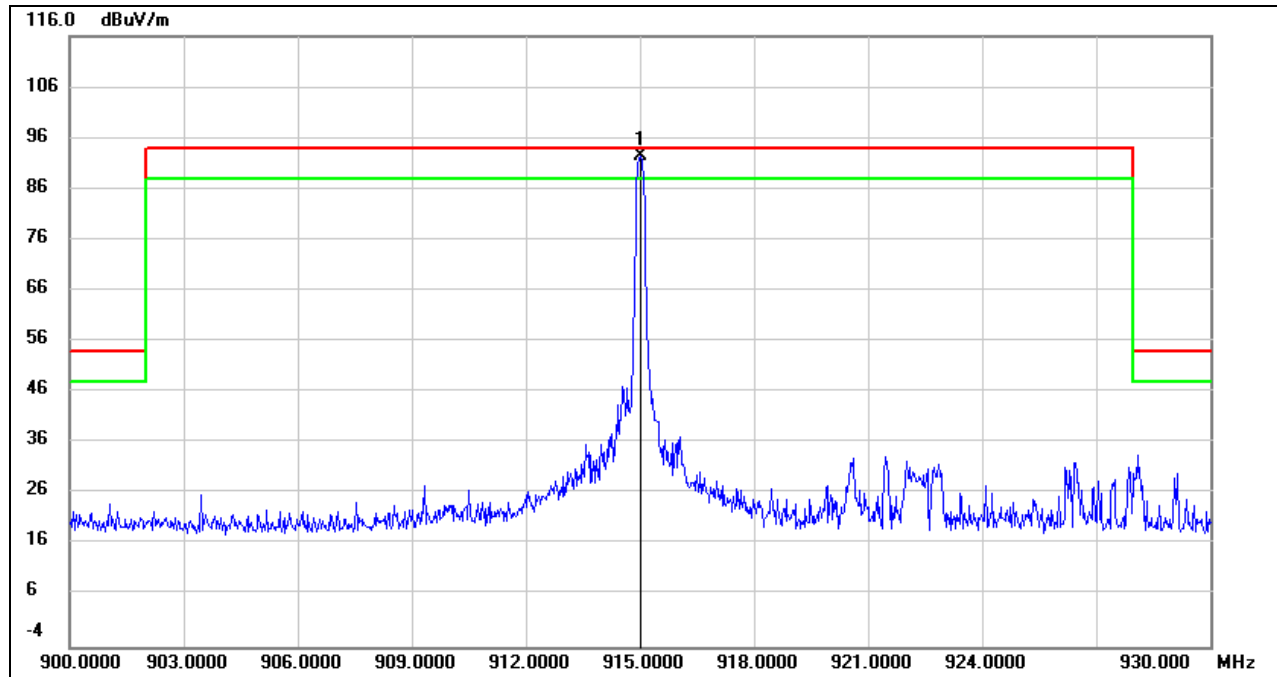


No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	915.0000	96.92	-4.65	92.27	94.00	-1.73	peak

Note: 1. Measurement = Reading Level + Correct Factor.
 2. Peak detector.



FIELD STRENGTH OF INTENTIONAL EMISSIONS (LOW CHANNEL, VERTICAL)



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	915.0000	97.09	-4.65	92.44	94.00	-1.56	peak

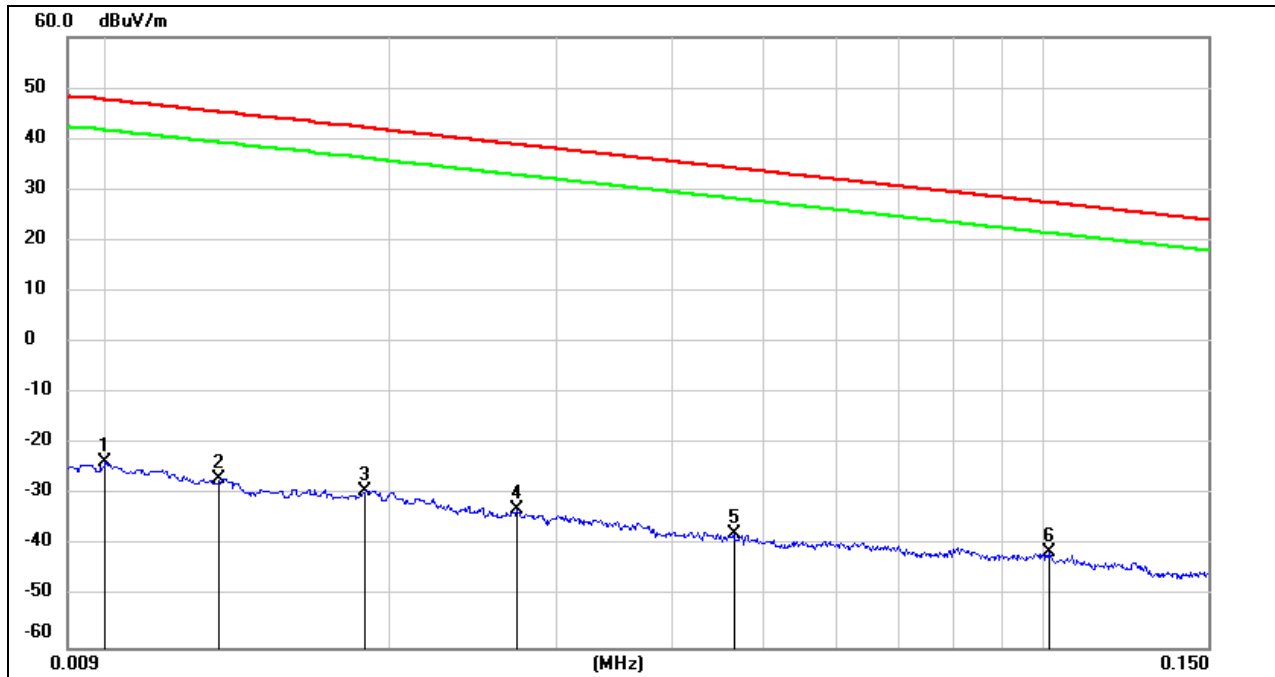
Note: 1. Measurement = Reading Level + Correct Factor.
 2. Peak detector.

8.3. SPURIOUS EMISSIONS BELOW 30M

SPURIOUS EMISSIONS

(LOW CHANNEL, LOOP ANTENNA FACE ON TO THE EUT, WORST-CASE CONFIGURATION)

9kHz~ 150kHz



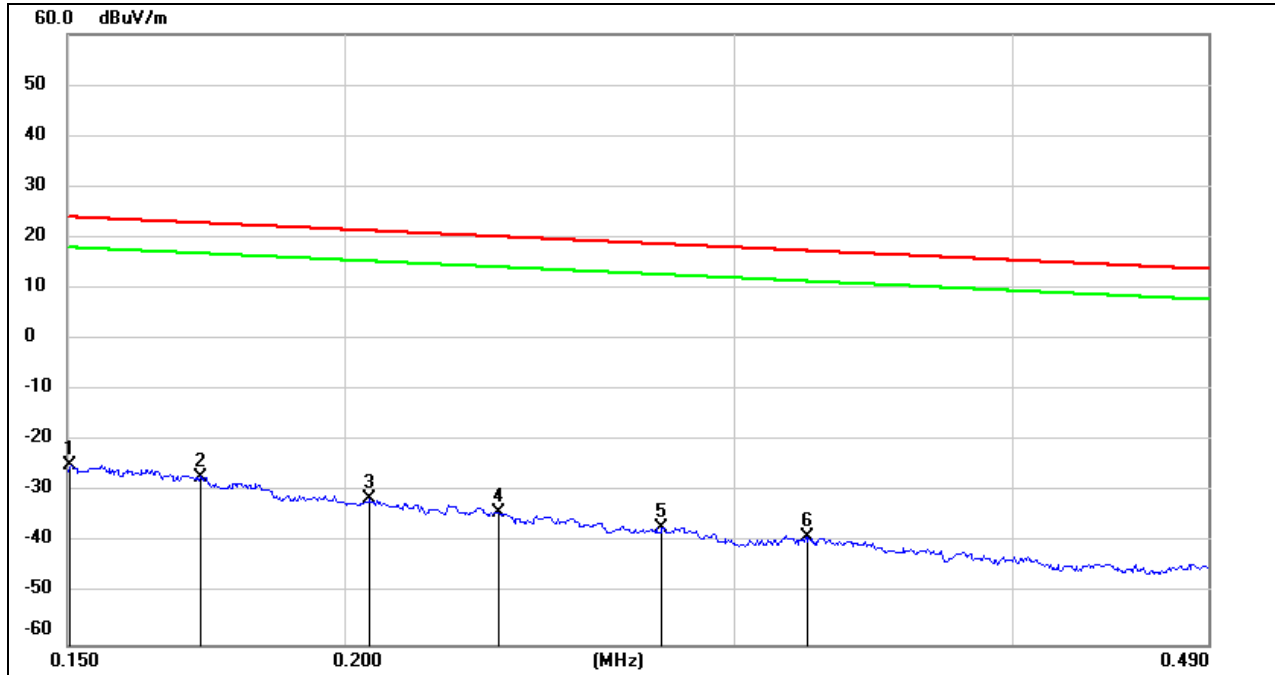
No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	FCC Result (dBuV/m)	FCC Limit (dBuV/m)	ISED Result (dBuA/m)	ISED Limit (dBuA/m)	Margin (dB)	Remark
1	0.0100	77.72	-101.40	-23.68	47.60	-75.18	-3.90	-71.28	peak
2	0.0131	74.47	-101.38	-26.91	45.25	-78.41	-6.25	-72.16	peak
3	0.0188	72.14	-101.35	-29.21	42.12	-80.71	-9.38	-71.33	peak
4	0.0273	68.49	-101.38	-32.89	38.88	-84.39	-12.62	-71.77	peak
5	0.0466	63.67	-101.46	-37.79	34.23	-89.29	-17.27	-72.02	peak
6	0.1014	60.56	-101.79	-41.23	27.48	-92.73	-24.02	-68.71	peak

Note: 1. Measurement = Reading Level + Correct Factor (dBuA/m= dBuV/m- 20Log10[120π] = dBuV/m- 51.5).

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.

150kHz ~ 490kHz



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	FCC Result (dBuV/m)	FCC Limit (dBuV/m)	ISED Result (dBuA/m)	ISED Limit (dBuA/m)	Margin (dB)	Remark
1	0.1504	76.75	-101.63	-24.88	24.06	-76.38	-27.44	-48.94	peak
2	0.1723	74.50	-101.67	-27.17	22.88	-78.67	-28.62	-50.05	peak
3	0.2053	70.30	-101.73	-31.43	21.35	-82.93	-30.15	-52.78	peak
4	0.2346	67.85	-101.77	-33.92	20.19	-85.42	-31.31	-54.11	peak
5	0.2782	64.79	-101.83	-37.04	18.71	-88.54	-32.79	-55.75	peak
6	0.3234	62.98	-101.88	-38.90	17.41	-90.40	-34.09	-56.31	peak

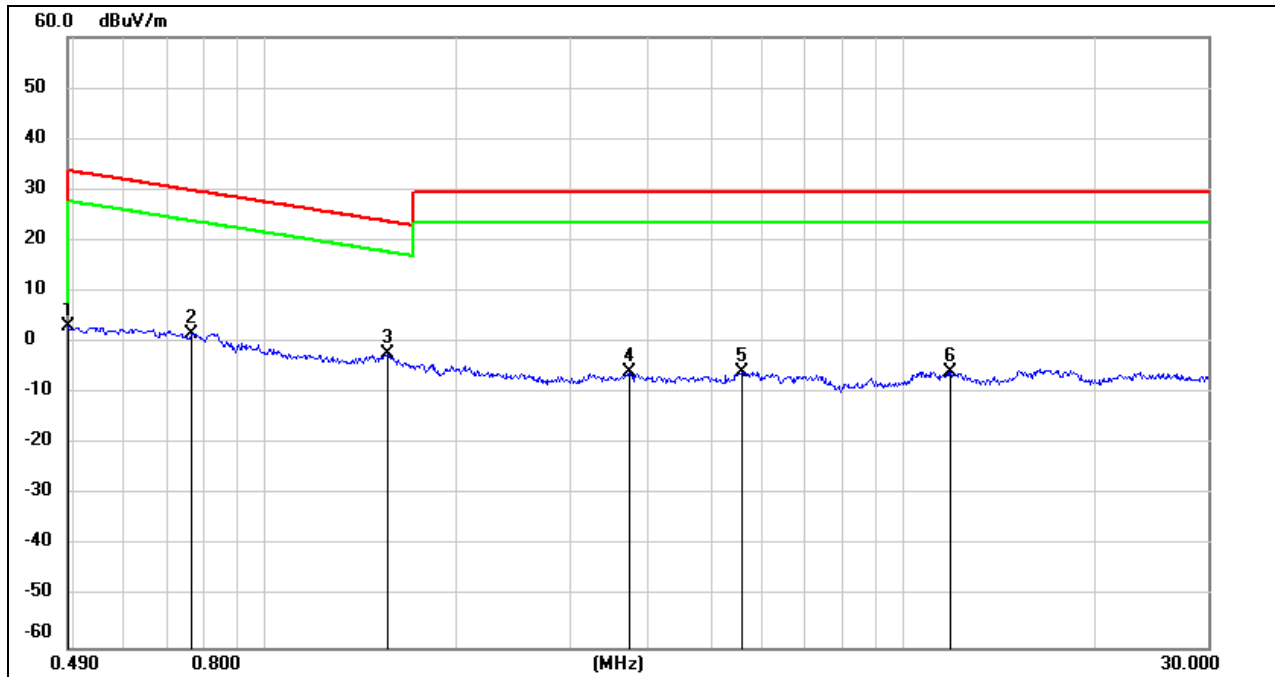
Note: 1. Measurement = Reading Level + Correct Factor (dBuA/m= dBuV/m- 20Log10[120π] = dBuV/m- 51.5).

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.



490kHz ~ 30MHz

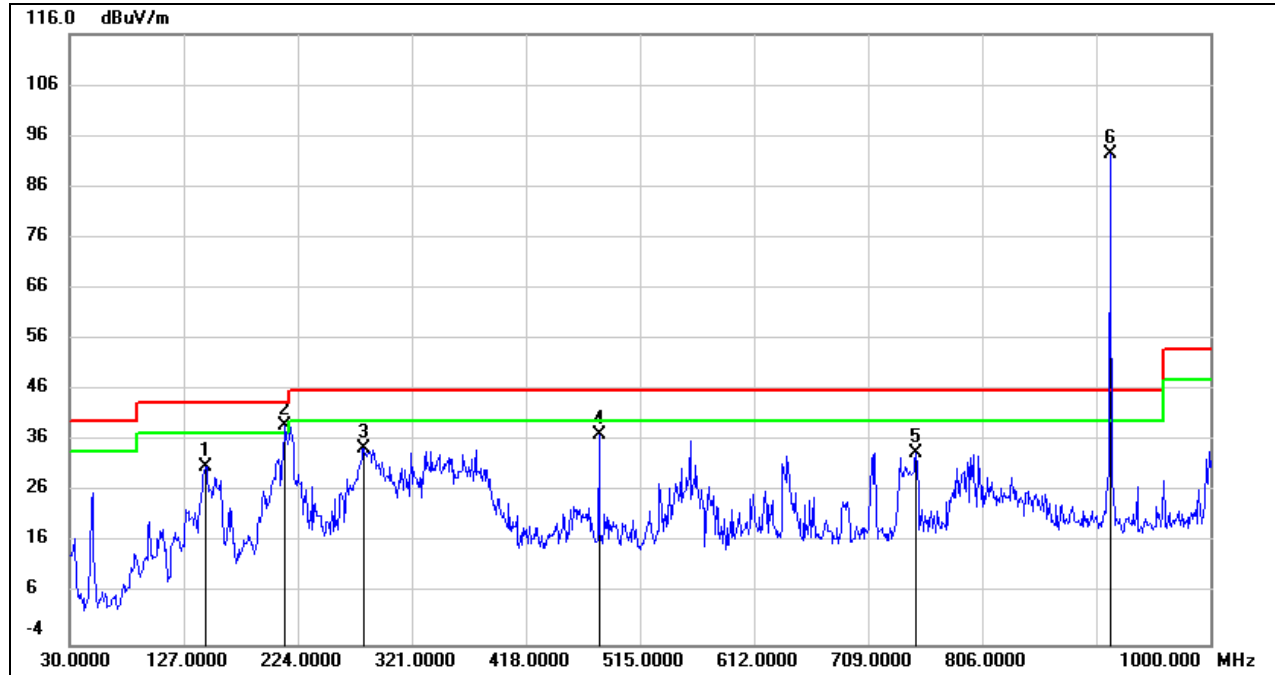


No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	FCC Result (dBuV/m)	FCC Limit (dBuV/m)	ISED Result (dBuA/m)	ISED Limit (dBuA/m)	Margin (dB)	Remark
1	0.4900	65.22	-62.06	3.16	13.80	-48.34	-37.70	-10.64	peak
2	0.7641	63.92	-62.12	1.80	29.94	-49.70	-21.56	-28.14	peak
3	1.5564	59.68	-62.02	-2.34	23.76	-53.84	-27.74	-26.10	peak
4	3.7100	55.70	-61.41	-5.71	29.54	-57.21	-21.96	-35.25	peak
5	5.5952	55.55	-61.41	-5.86	29.54	-57.36	-21.96	-35.40	peak
6	11.8513	55.06	-60.88	-5.82	29.54	-57.32	-21.96	-35.36	peak

Note: 1. Measurement = Reading Level + Correct Factor (dBuA/m= dBuV/m- 20Log10[120π] = dBuV/m- 51.5).

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.

**8.4. SPURIOUS EMISSIONS BELOW 1 GHz****SPURIOUS EMISSIONS BELOW 1GHZ (WORST-CASE LOW CHANNEL, HORIZONTAL)**

No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	145.4299	49.67	-18.60	31.07	43.50	-12.43	QP
2	213.3300	56.36	-17.20	39.16	43.50	-4.34	QP
3	280.2600	51.22	-16.58	34.64	46.00	-11.36	QP
4	480.0800	48.16	-11.05	37.11	46.00	-8.89	QP
5	749.7400	40.94	-7.14	33.80	46.00	-12.20	QP
6	914.6400	96.91	-4.67	92.24	/	/	fundamental

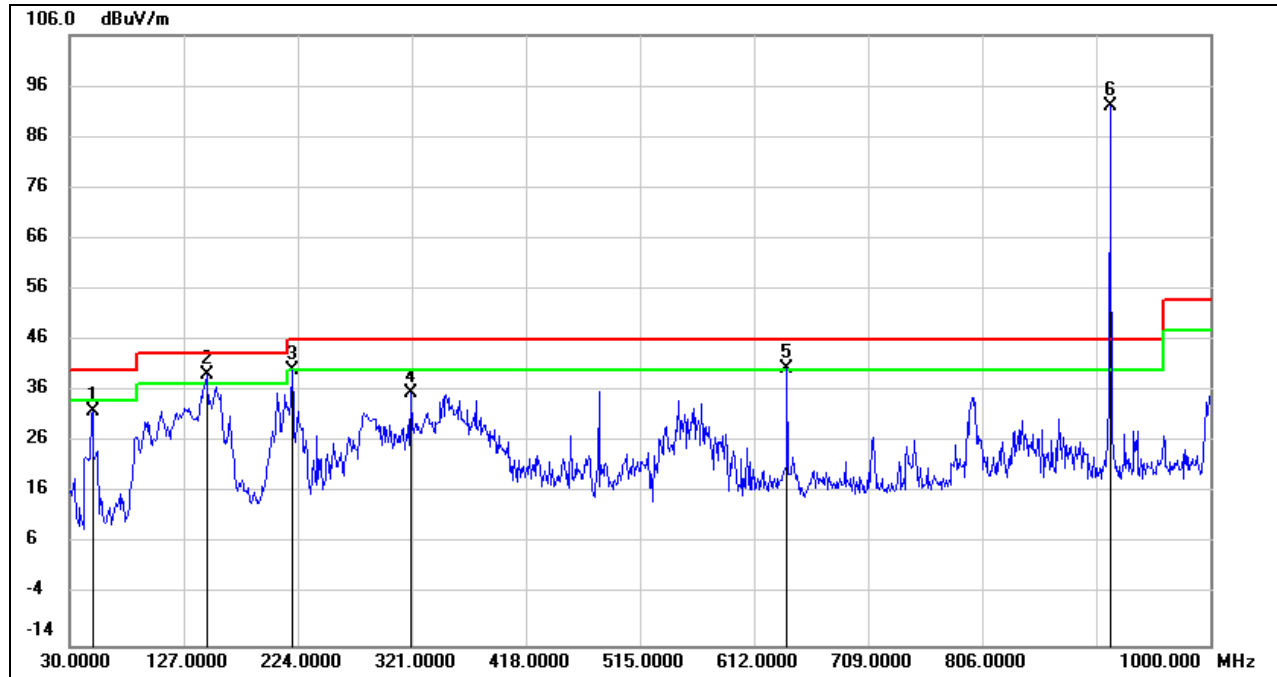
Note: 1. Result Level = Read Level + Antenna Factor + Cable loss.

2. If Peak Result complies with QP limit, QP Result is deemed to comply with QP limit.

3. Test setup: RBW: 120 kHz, VBW: 300 kHz, Sweep time: auto.

4. About the Fundamental emission test result please refer to section 8.2.

SPURIOUS EMISSIONS BELOW 1GHz (WORST-CASE LOW CHANNEL, VERTICAL)



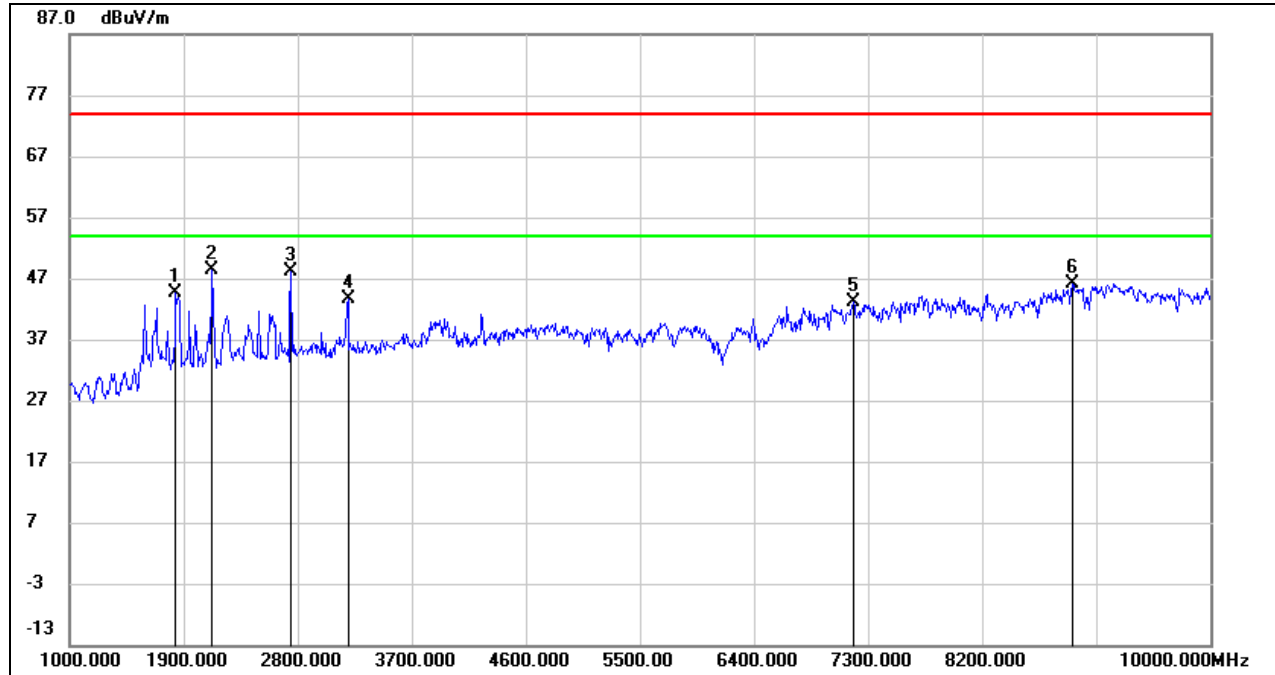
No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	49.4000	52.64	-20.52	32.12	40.00	-7.88	QP
2	146.4000	57.82	-18.55	39.27	43.50	-4.23	QP
3	219.1500	57.64	-17.45	40.19	46.00	-5.81	QP
4	320.0300	49.88	-14.24	35.64	46.00	-10.36	QP
5	640.1300	49.76	-9.41	40.35	46.00	-5.65	QP
6	914.6400	96.84	-4.67	92.17	/	/	fundamental

- Note: 1. Result Level = Read Level + Antenna Factor + Cable loss.
 2. If Peak Result complies with QP limit, QP Result is deemed to comply with QP limit.
 3. Test setup: RBW: 120 kHz, VBW: 300 kHz, Sweep time: auto
 4. About the Fundamental emission test result please refer to section 8.2.



8.5. SPURIOUS EMISSIONS 1 ~ 10GHz

HARMONICS AND SPURIOUS EMISSIONS (LOW CHANNEL, HORIZONTAL)



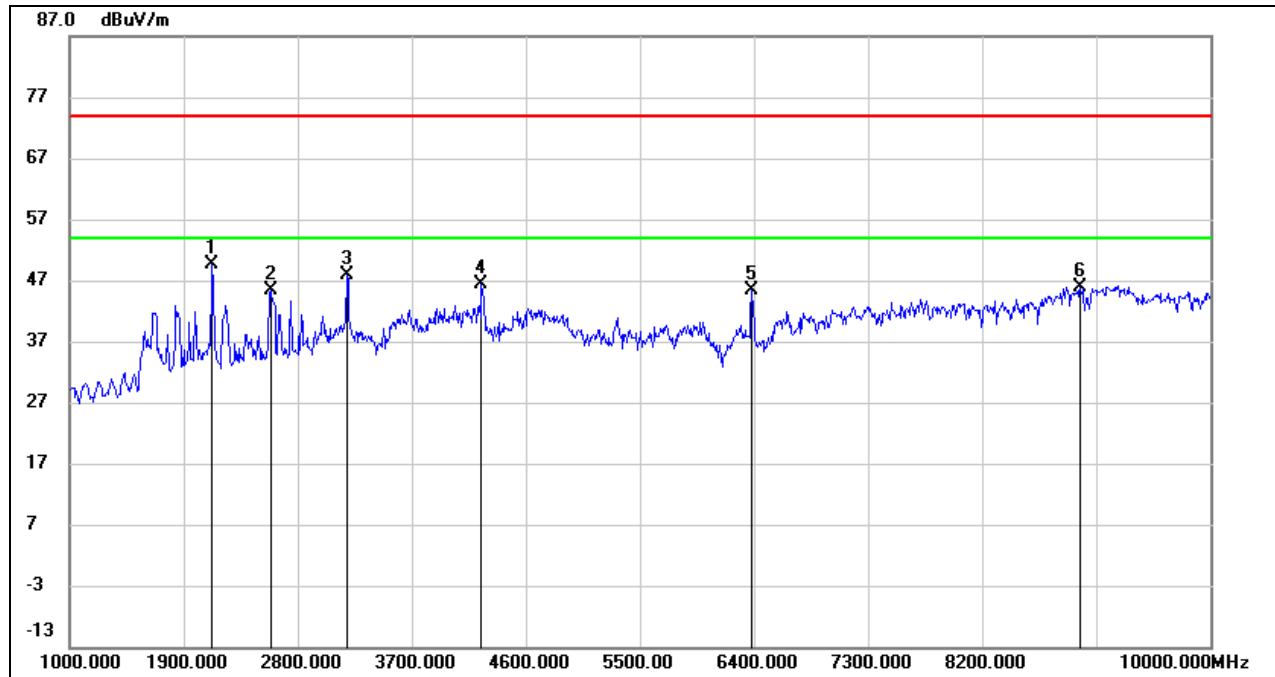
No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1837.000	56.21	-11.60	44.61	74.00	-29.39	peak
2	2125.000	58.73	-10.42	48.31	74.00	-25.69	peak
3	2746.000	55.96	-7.75	48.21	74.00	-25.79	peak
4	3196.000	50.12	-6.54	43.58	74.00	-30.42	peak
5	7183.000	37.05	6.01	43.06	74.00	-30.94	peak
6	8911.000	36.93	9.11	46.04	74.00	-27.96	peak

Note: 1. Result = Reading + Correct Factor.

2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.

3. Test setup: RBW: 1 MHz, VBW: 3 MHz, Sweep time: auto.

RSS-Gen section 8.10

**HARMONICS AND SPURIOUS EMISSIONS (LOW CHANNEL, VERTICAL)**

No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2125.000	59.95	-10.42	49.53	74.00	-24.47	peak
2	2584.000	53.55	-8.24	45.31	74.00	-28.69	peak
3	3187.000	54.35	-6.56	47.79	74.00	-26.21	peak
4	4249.000	49.71	-3.32	46.39	74.00	-27.61	peak
5	6382.000	42.06	3.28	45.34	74.00	-28.66	peak
6	8974.000	36.30	9.56	45.86	74.00	-28.14	peak

Note: 1. Result = Reading + Correct Factor.

2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.

3. Test setup: RBW: 1 MHz, VBW: 3 MHz, Sweep time: auto.

9. AC POWER LINE CONDUCTED EMISSION

LIMITS

Please refer to CFR 47 FCC §15.207 (a) and ISED RSS-Gen Clause 8.8

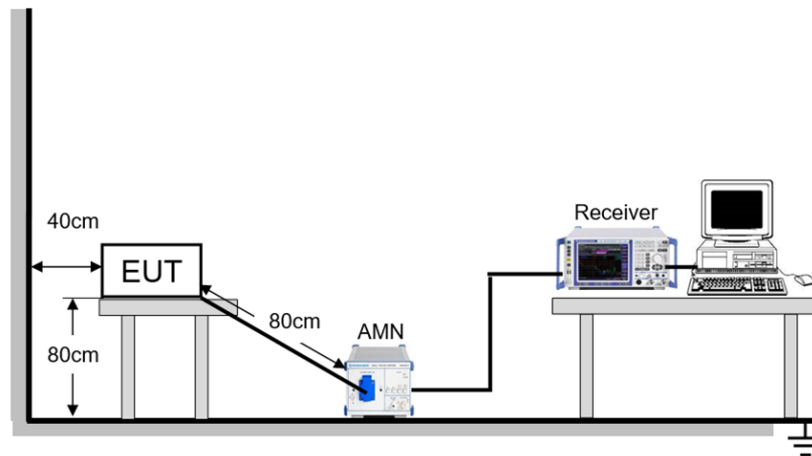
FREQUENCY (MHz)	Quasi-peak	Average
0.15 -0.5	66 - 56 *	56 - 46 *
0.50 -5.0	56.00	46.00
5.0 -30.0	60.00	50.00

TEST PROCEDURE

The EUT is put on a table of non-conducting material that is 80 cm high. The vertical conducting wall of shielding is located 40 cm to the rear of the EUT. The power line of the EUT is connected to the AC mains through a Artificial Mains Network (A.M.N.). A EMI Measurement Receiver (R&S Test Receiver ESR3) is used to test the emissions from both sides of AC line. According to the requirements in Section 6.2 of ANSI C63.10-2013. Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30 MHz using CISPR Quasi-Peak and average detector mode. The bandwidth of EMI test receiver is set at 9 kHz.

The arrangement of the equipment is installed to meet the standards and operating in a manner, which tends to maximize its emission characteristics in a normal application.

TEST SETUP





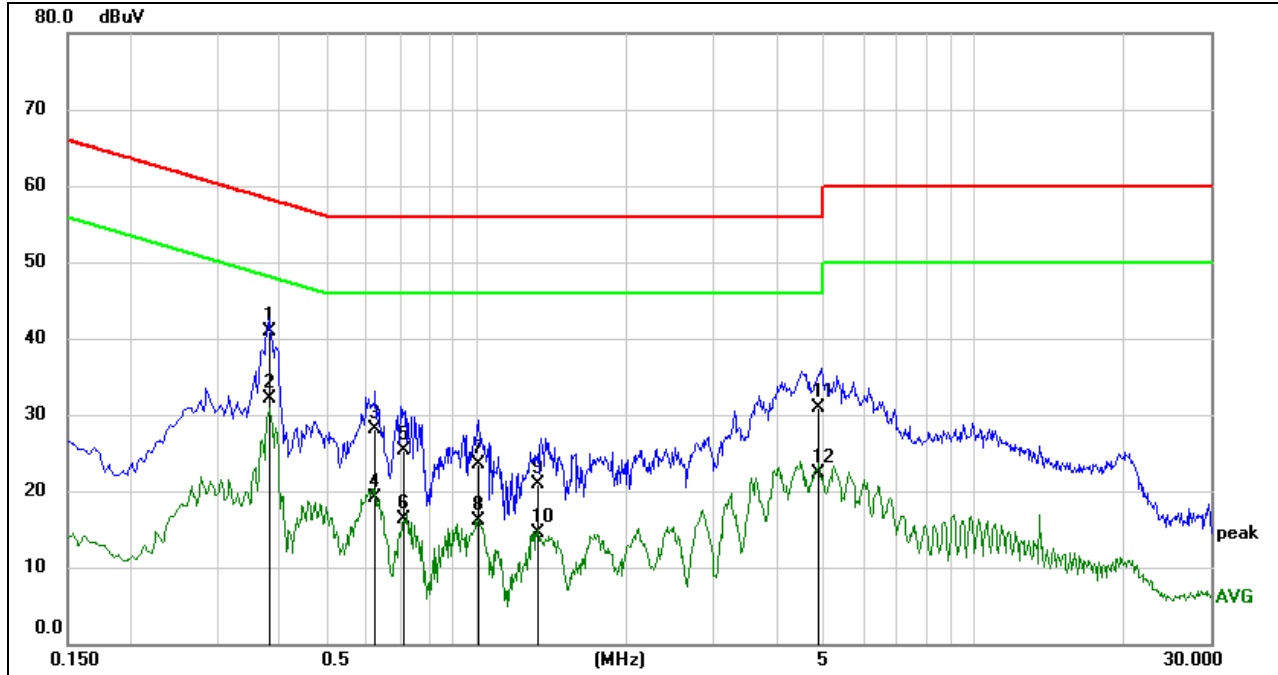
TEST ENVIRONMENT

Temperature	24.9°C	Relative Humidity	59%
Atmosphere Pressure	101kPa	Test Voltage	AC 120 V, 60 Hz



TEST RESULTS

Test Mode:	FSK	Channel:	915 MHz
Line:	Line	Test Voltage:	AC 120 V, 60 Hz



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.3814	31.33	9.59	40.92	58.25	-17.33	QP
2	0.3814	22.60	9.59	32.19	48.25	-16.06	AVG
3	0.6248	18.58	9.60	28.18	56.00	-27.82	QP
4	0.6248	9.48	9.60	19.08	46.00	-26.92	AVG
5	0.7123	15.61	9.60	25.21	56.00	-30.79	QP
6	0.7123	6.70	9.60	16.30	46.00	-29.70	AVG
7	1.0071	13.93	9.61	23.54	56.00	-32.46	QP
8	1.0071	6.47	9.61	16.08	46.00	-29.92	AVG
9	1.3243	11.20	9.61	20.81	56.00	-35.19	QP
10	1.3243	4.81	9.61	14.42	46.00	-31.58	AVG
11	4.8888	21.16	9.71	30.87	56.00	-25.13	QP
12	4.8888	12.61	9.71	22.32	46.00	-23.68	AVG

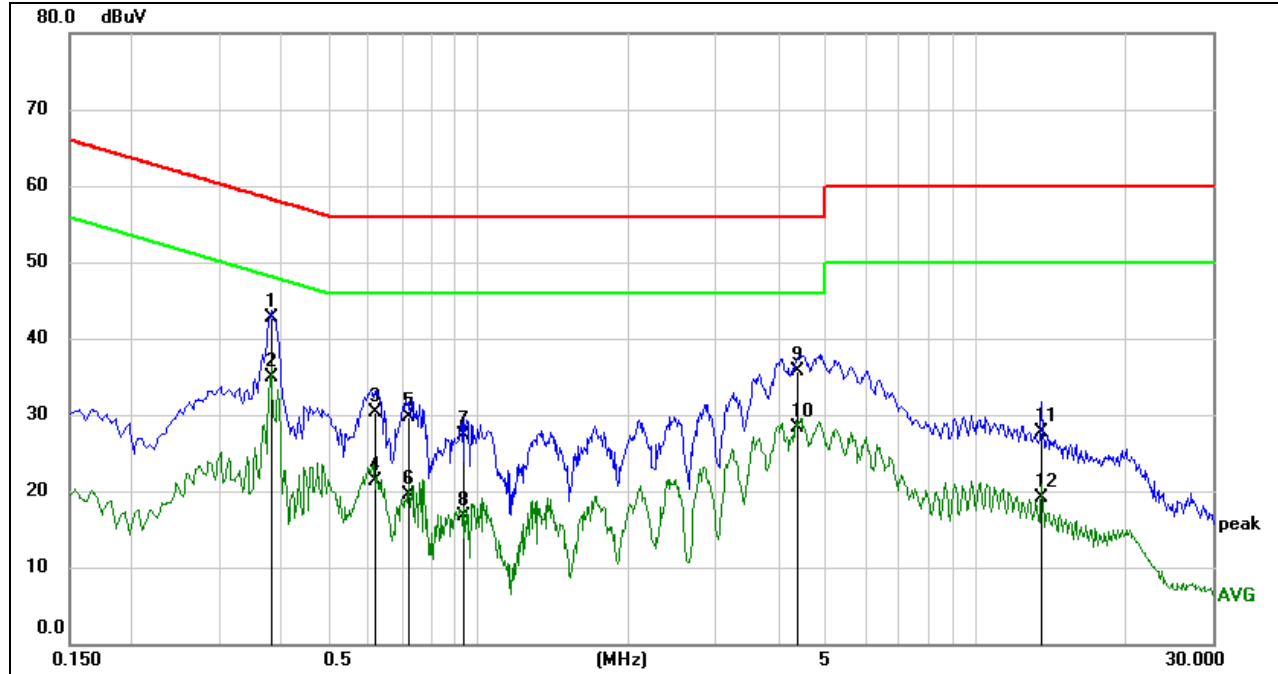
Note:

1. Result = Reading + Correct Factor.
2. If QP Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Test setup: RBW: 200 Hz (9 kHz ~ 150 kHz), 9 kHz (150 kHz ~ 30 MHz).
4. Step size: 80 Hz (0.009 MHz ~ 0.15 MHz), 4 kHz (0.15 MHz ~ 30 MHz), Scan time: auto.

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



Test Mode:	FSK	Channel:	915 MHz
Line:	Neutral	Test Voltage:	AC 120 V, 60 Hz



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.3810	33.12	9.53	42.65	58.26	-15.61	QP
2	0.3810	25.42	9.53	34.95	48.26	-13.31	AVG
3	0.6200	20.85	9.50	30.35	56.00	-25.65	QP
4	0.6200	11.88	9.50	21.38	46.00	-24.62	AVG
5	0.7241	20.12	9.50	29.62	56.00	-26.38	QP
6	0.7241	9.93	9.50	19.43	46.00	-26.57	AVG
7	0.9412	17.76	9.51	27.27	56.00	-28.73	QP
8	0.9412	7.19	9.51	16.70	46.00	-29.30	AVG
9	4.4056	26.00	9.61	35.61	56.00	-20.39	QP
10	4.4056	18.65	9.61	28.26	46.00	-17.74	AVG
11	13.5600	18.03	9.66	27.69	60.00	-32.31	QP
12	13.5600	9.35	9.66	19.01	50.00	-30.99	AVG

Note:

1. Result = Reading + Correct Factor.
2. If QP Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Test setup: RBW: 200 Hz (9 kHz ~ 150 kHz), 9 kHz (150 kHz ~ 30 MHz).
4. Step size: 80 Hz (0.009 MHz ~ 0.15 MHz), 4 kHz (0.15 MHz ~ 30 MHz), Scan time: auto.

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



10. 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.

RESULTS

Complies

END OF REPORT