



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

**CERTIFICATION TEST REPORT**

*For*

**NFC Function Board**

**MODEL NUMBER: SRP.NFC.01**

**FCC ID: 2AR82-SRPNFC0101**

**IC: 24728-SRPNFC0101**

**REPORT NUMBER: 4789095658**

**ISSUE DATE: August 12, 2019**

*Prepared for*

**Guangzhou Shikun Electronics Co., Ltd**

**NO.192 KEZHU ROAD,SCIENCE PARK GUANGZHOU,GUANGDONG,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 22038881**

**Fax: +86 769 33871725**

**Website: [www.ul.com](http://www.ul.com)**



Revision History

<u>Rev.</u>	<u>Issue Date</u>	<u>Revisions</u>	<u>Revised By</u>
--	08/12/2019	Initial Issue	



Summary of Test Results			
Clause	Test Items	FCC/ISED Rules	Test Results
1	Transmitter AC Conducted Emissions	Part 15.207 RSS-Gen 8.8	PASS
2	Transmitter Fundamental Field Strength	Part 15.225(a)(b)(c)(d) RSS-Gen 6.12/RSS-210 B.6	PASS
3	Transmitter Radiated Emissions	Part 15.209(a)/ 15.225(d) RSS-Gen 6.13/RSS-210 B.6	PASS
5	Transmitter Band Edge Radiated Emissions	Part 15.209(a)/ 15.225(c)(d) RSS-Gen 6.13/ RSS-210 B.6	PASS
6	Transmitter 99% Emission Bandwidth / 20dB Bandwidth	RSS-Gen 6.7/ Part 15.215 (c)	PASS
7	Transmitter Frequency Stability (Temperature & Voltage Variation)	Part 15.225(e) RSS-Gen 6.11/ RSS-210 B.6	PASS
8	Antenna Requirement	FCC Part 15.203 RSS-GEN Clause 6.8	PASS



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# 1. ATTESTATION OF TEST RESULTS

## Applicant Information

Company Name: Guangzhou Shikun Electronics Co., Ltd

Address: NO.192 KEZHU ROAD,SCIENCE PARK  
GUANGZHOU,GUANGDONG,CHINA

## Manufacturer Information

Company Name: Guangzhou Shikun Electronics Co., Ltd

Address: NO.192 KEZHU ROAD,SCIENCE PARK  
GUANGZHOU,GUANGDONG,CHINA

EUT Name: NFC Function Board  
Model: SRP.NFC.01  
Sample Status: Normal  
Sample ID: 12955306  
Sample Received Date: July 23, 2019  
Date of Tested: July 23~August 12, 2019

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
CFR 47 Part 15 Subpart C	PASS
ISED RSS-210 Issue 9	PASS
ISED RSS-GEN Issue 5	PASS

Prepared By:

Kebo Zhang  
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 ANSI C63.10-2013, FCC CFR 47 Part 2, FCC CFR 47 Part 15, KDB414788 D01 Radiated Test Site v01, ISED RSS-210 Issue 9 and ISED RSS-GEN Issue 5.

## 3. FACILITIES AND ACCREDITATION

Accreditation Certificate	<p><b>A2LA (Certificate No.: 4102.01)</b> UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch. has been assessed and proved to be in compliance with A2LA.</p> <p><b>IAS (Lab Code: TL-702)</b> UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch. has demonstrated compliance with ISO/IEC Standard 17025:2005, General requirements for the competence of testing and calibration laboratories</p> <p><b>FCC (FCC Designation No.: CN1187)</b> 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><b>ISED (Company No.: 21320)</b> UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch. has been registered and fully described in a report filed with ISED. The Company Number is 21320.</p> <p><b>VCCI (Registration No.: G-20019, R-20004, C-20012 and T-20011)</b> 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 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
Uncertainty for Conduction emission test	2.90dB
Uncertainty for Radiation Emission test(include Fundamental emission) (9KHz-30MHz)	2.2dB
Uncertainty for Radiation Emission test(include Fundamental emission) (30MHz-1GHz)	4.52dB
Uncertainty for Radiation Emission test (1GHz to 26GHz)( include Fundamental emission)	5.04dB(1-6GHz)
	5.30dB (6GHz-18Gz)
	5.23dB (18GHz-26Gz)
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

Equipment	NFC Function Board
Model Name	SRP.NFC.01
Operation frequency	13.56 MHz
Modulation Technique	ASK
Rated Input Power	DC 5V

### 5.2. MAXIMUM FIELD STRENGTH

Frequency (MHz)	Number of Transmit Chains (NTX)	Frequency (MHz)	Channel Number	Max field strength (dB $\mu$ V/m)
13.56	1	13.56	1	40.24

### 5.3. CHANNEL LIST

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	13.56	/	/	/	/	/	/

### 5.4. THE WORSE CASE CONFIGURATION

Test ware completed under engineering sample and the engineering sample can work in a continue transmission mode.

With and without tag have considered and continue transmission mode deemed to a worst case mode.





### 5.5. DESCRIPTION OF TEST SETUP

#### SUPPORT EQUIPMENT

Item	Equipment	Brand Name	Model Name	P/N
1	Laptop	ThinkPad	T460S	SL10K24796 JS
2	Test Card	N/A	N/A	N/A
3	Power Supply	N/A	N/A	N/A

#### I/O PORT

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

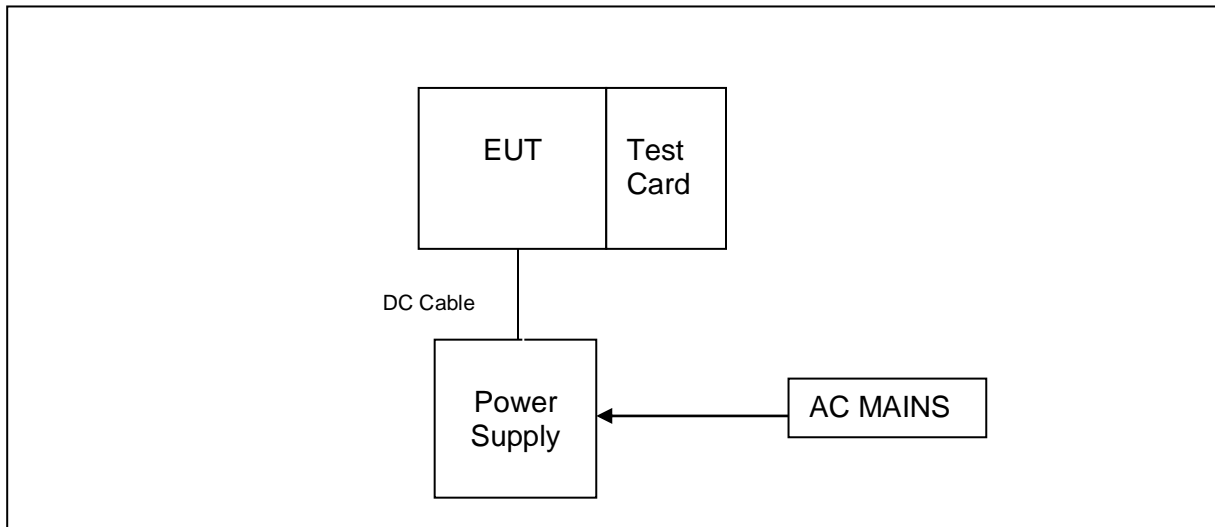
#### ACCESSORY

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

#### TEST SETUP

The EUT can continue work normally after power on, the test card only use for ensure the sample working states.

#### SETUP DIAGRAM FOR TESTS





### MEASURING INSTRUMENT AND SOFTWARE USED

Conducted Emissions						
Used	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
<input checked="" type="checkbox"/>	EMI Test Receiver	R&S	ESR3	101961	Dec.10,2018	Dec.10,2019
<input checked="" type="checkbox"/>	Two-Line V-Network	R&S	ENV216	101983	Dec.10,2018	Dec.10,2019
<input checked="" type="checkbox"/>	Artificial Mains Networks	Schwarzbeck	NSLK 8126	8126465	Dec.10,2018	Dec.10,2019
Radiated Emissions						
Used	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
<input checked="" type="checkbox"/>	MXE EMI Receiver	KESIGHT	N9038A	MY56400 036	Dec.10,2018	Dec.10,2019
<input checked="" type="checkbox"/>	Hybrid Log Periodic Antenna	TDK	HLP-3003C	130960	Sep.17, 2018	Sep.17, 2021
<input checked="" type="checkbox"/>	Preamplifier	HP	8447D	2944A090 99	Dec.10,2018	Dec.10,2019
<input checked="" type="checkbox"/>	EMI Measurement Receiver	R&S	ESR26	101377	Dec.10,2018	Dec.10,2019
<input checked="" type="checkbox"/>	Preamplifier	TDK	PA-02-0118	TRS-305- 00066	Dec.10,2018	Dec.10,2019
<input checked="" type="checkbox"/>	Preamplifier	TDK	PA-02-2	TRS-307- 00003	Dec.10,2018	Dec.10,2019
<input checked="" type="checkbox"/>	Loop antenna	Schwarzbeck	1519B	00008	Jan.01,2019	Jan.01, 2022
Software						
Used	Description		Manufacturer	Name	Version	
<input checked="" type="checkbox"/>	Test Software for Radiated disturbance		Farad	EZ-EMC	Ver. UL-3A1	

## 6. ANTENNA PORT TEST RESULTS

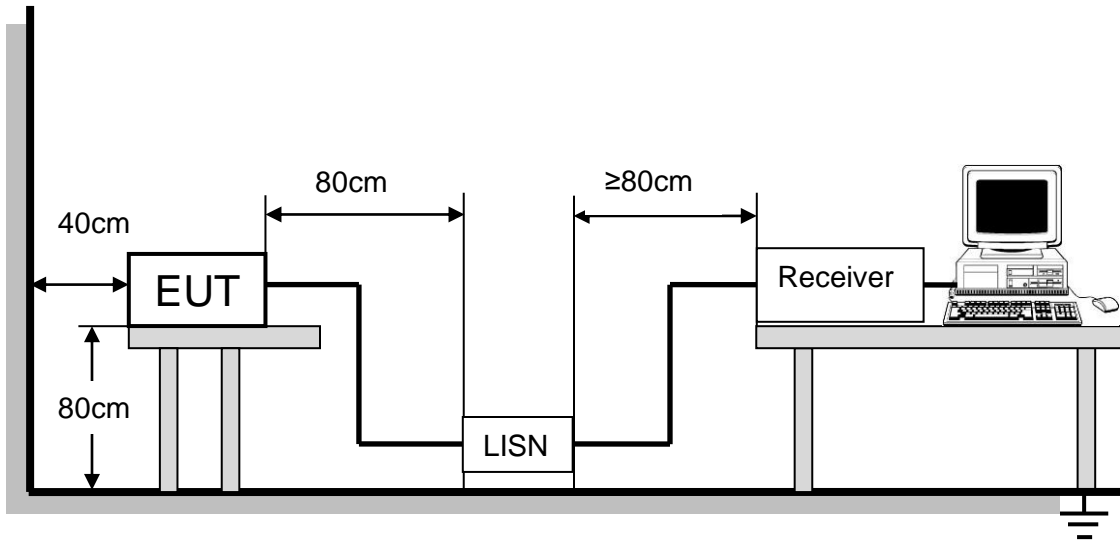
### 6.1. AC CONDUCTED SPURIOUS EMISSIONS

#### LIMITS

FCC Reference:	Part 15.207
ISED Canada Reference:	RSS-Gen 8.8
Test Method Used:	ANSI C63.10 Section 6.2

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 SETUP AND PROCEDURE



The EUT is put on a table of non-conducting material that is 80cm high. The vertical conducting wall of shielding is located 40cm 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 30MHz using CISPR Quasi-Peak and average detector mode. The bandwidth of EMI test receiver is set at 9kHz.

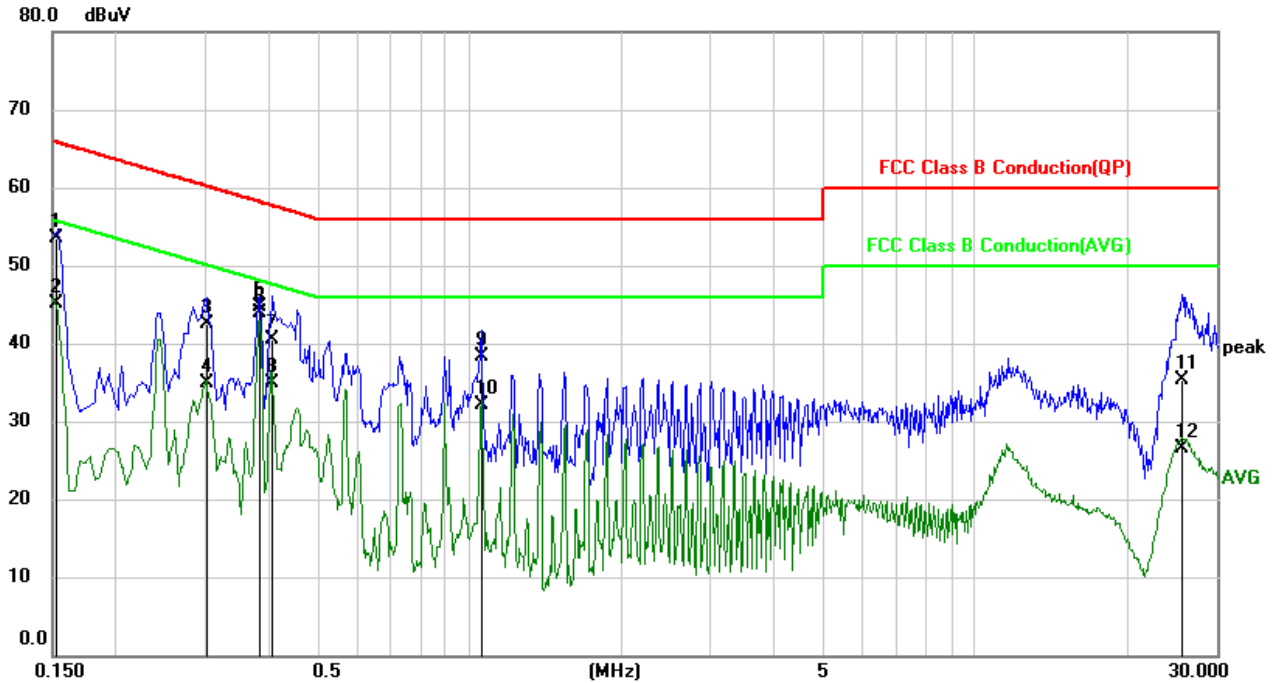
The arrangement of the equipment is installed to meet the standards and operating in a manner, which tends to maximize its emission characteristics in a normal application.



**TEST ENVIRONMENT**

Temperature	24.2°C	Relative Humidity	62%
Atmosphere Pressure	101kPa	Test Voltage	AC 120V60Hz

**LINE N RESULTS (WORST-CASE CONFIGURATION)**

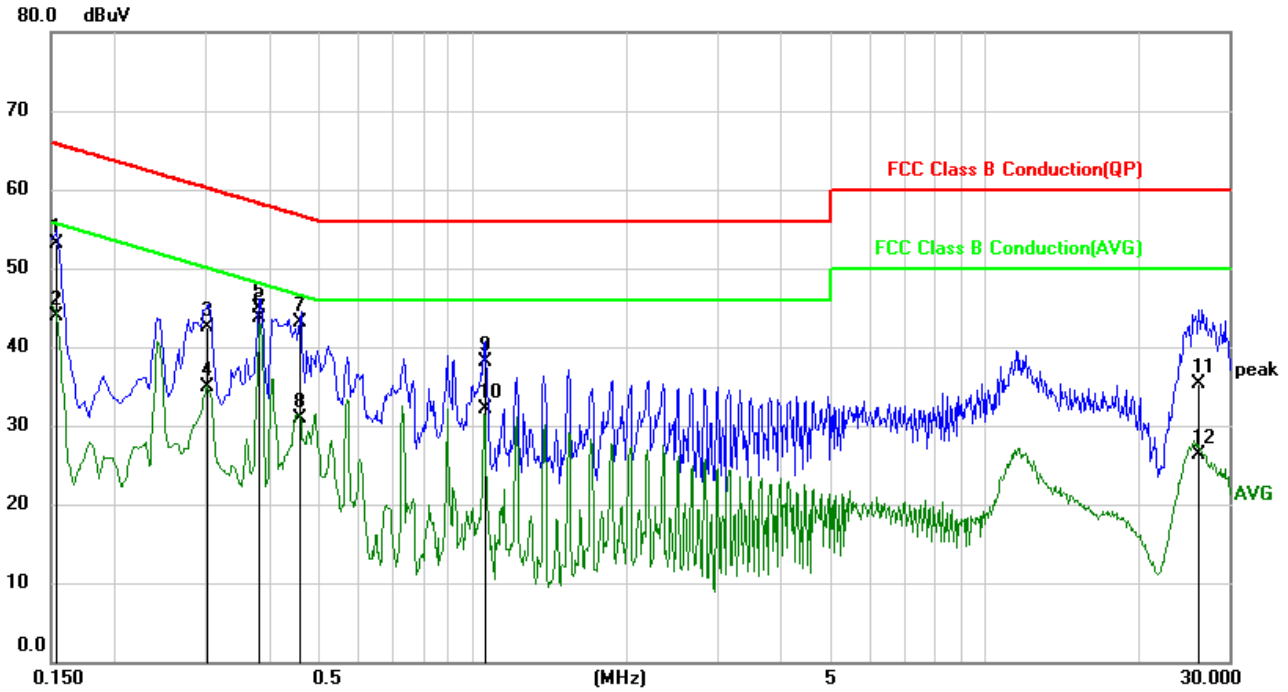


No.	Frequency (MHz)	Reading (dBuV)	Correct (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.1522	43.91	9.60	53.51	65.88	-12.37	QP
2	0.1522	35.43	9.60	45.03	55.88	-10.85	AVG
3	0.3026	32.97	9.60	42.57	60.17	-17.60	QP
4	0.3026	25.22	9.60	34.82	50.17	-15.35	AVG
5	0.3844	35.17	9.60	44.77	58.18	-13.41	QP
6	0.3844	34.40	9.60	44.00	48.18	-4.18	AVG
7	0.4094	30.97	9.60	40.57	57.66	-17.09	QP
8	0.4094	25.29	9.60	34.89	47.66	-12.77	AVG
9	1.0580	28.74	9.61	38.35	56.00	-17.65	QP
10	1.0580	22.43	9.61	32.04	46.00	-13.96	AVG
11	25.6837	25.25	10.04	35.29	60.00	-24.71	QP
12	25.6837	16.48	10.04	26.52	50.00	-23.48	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: 80Hz (0.009MHz-0.15MHz), 4 kHz (0.15MHz-30MHz), Scan time: auto.



**LINE L RESULTS (WORST-CASE CONFIGURATION)**



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.1538	43.58	9.61	53.19	65.79	-12.60	QP
2	0.1538	34.34	9.61	43.95	55.79	-11.84	AVG
3	0.3033	32.86	9.60	42.46	60.15	-17.69	QP
4	0.3033	25.23	9.60	34.83	50.15	-15.32	AVG
5	0.3830	35.21	9.60	44.81	58.21	-13.40	QP
6	0.3830	34.05	9.60	43.65	48.21	-4.56	AVG
7	0.4585	33.51	9.60	43.11	56.72	-13.61	QP
8	0.4585	21.32	9.60	30.92	46.72	-15.80	AVG
9	1.0564	28.55	9.61	38.16	56.00	-17.84	QP
10	1.0564	22.47	9.61	32.08	46.00	-13.92	AVG
11	26.1530	25.41	9.92	35.33	60.00	-24.67	QP
12	26.1530	16.38	9.92	26.30	50.00	-23.70	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: 80Hz (0.009MHz-0.15MHz), 4 kHz (0.15MHz-30MHz), Scan time: auto.



## 6.2. RADIATED EMISSION

### TEST PROCEDURE

Fundamental field strength

FCC Reference:	Part 15.225(a)(b)(c)(d) & 15.209(a)
ISED Canada Reference:	RSS-Gen 6.13 & RSS-210 B.6
Test Method Used:	ANSI C63.10 Sections 6.3, 6.4 and 6.5

Frequency (MHz)	Field Strength (uV/m)	Field Strength (dBuV/m) at 30M	Field Strength (dBuV/m) at 3M
13.553-13.567	15848	84	123.90
13.410-13.553/13.567-13.710	334	50.47	90.47
13.110-13.410/13.710-14.010	106	40.51	80.51

Note(s):

1. The field strength of any emissions appearing outside of the 13.110-14.010 MHz band shall not exceed the general radiated emission limits in §15.209.
2. The limit is specified at a test distance of 30 meters. However, as specified by FCC Section 15.31 (f)(2) / RSS-Gen Section 6.4, measurements may be performed at a closer distance and the measured level corrected to the specified measurement distance by using the square of an inverse linear distance extrapolation factor (40dB/decade).



Radiation Disturbance Test Limit for FCC (Class B)(9KHz-1GHz)

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.

Restricted bands of operation

MHz	MHz	MHz	GHz
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
<sup>1</sup> 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	( <sup>2</sup> )
13.36-13.41			

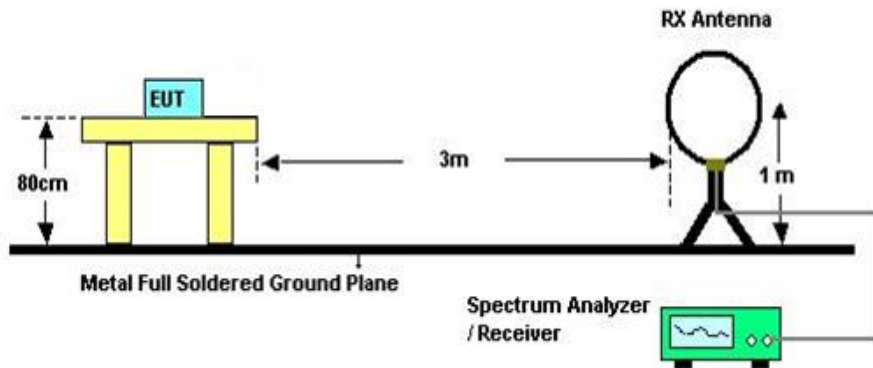
Note: <sup>1</sup>Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.

<sup>2</sup>Above 38.6c

<b>FCC Reference:</b>	Parts 15.231(b) / 15.209
<b>Test Method Used:</b>	ANSI C63.10 Sections 6.3 and 6.5

**TEST SETUP**

Below 30MHz



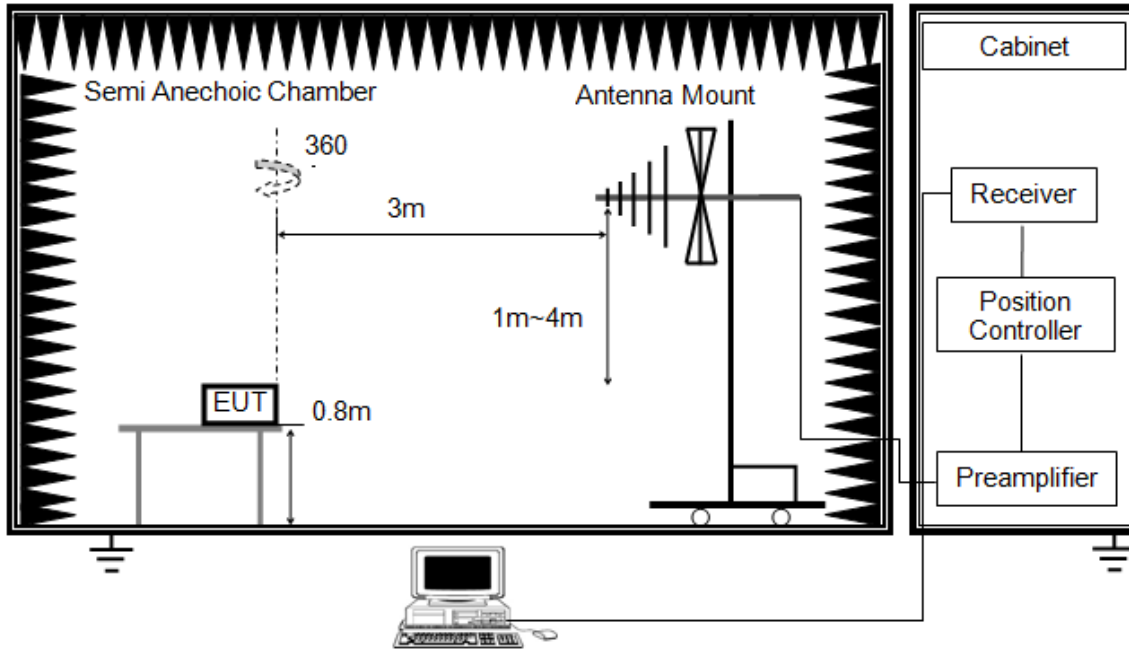
The setting of the spectrum analyser

RBW	200Hz (From 9kHz to 0.15MHz)/ 9KHz (From 0.15MHz to 30MHz)
VBW	200Hz (From 9kHz to 0.15MHz)/ 9KHz (From 0.15MHz to 30MHz)
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 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. 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 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 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.



Below 1G

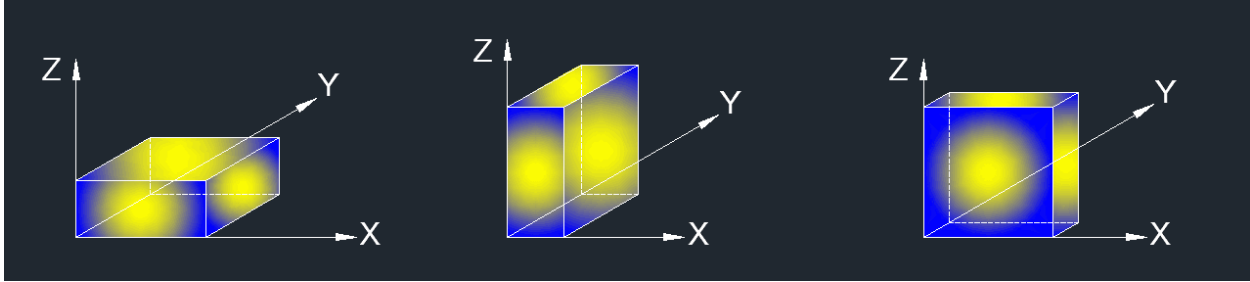


The setting of the spectrum analyser

RBW	120K
VBW	300K
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 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.

X axis, Y axis, Z axis positions:



Note: 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.



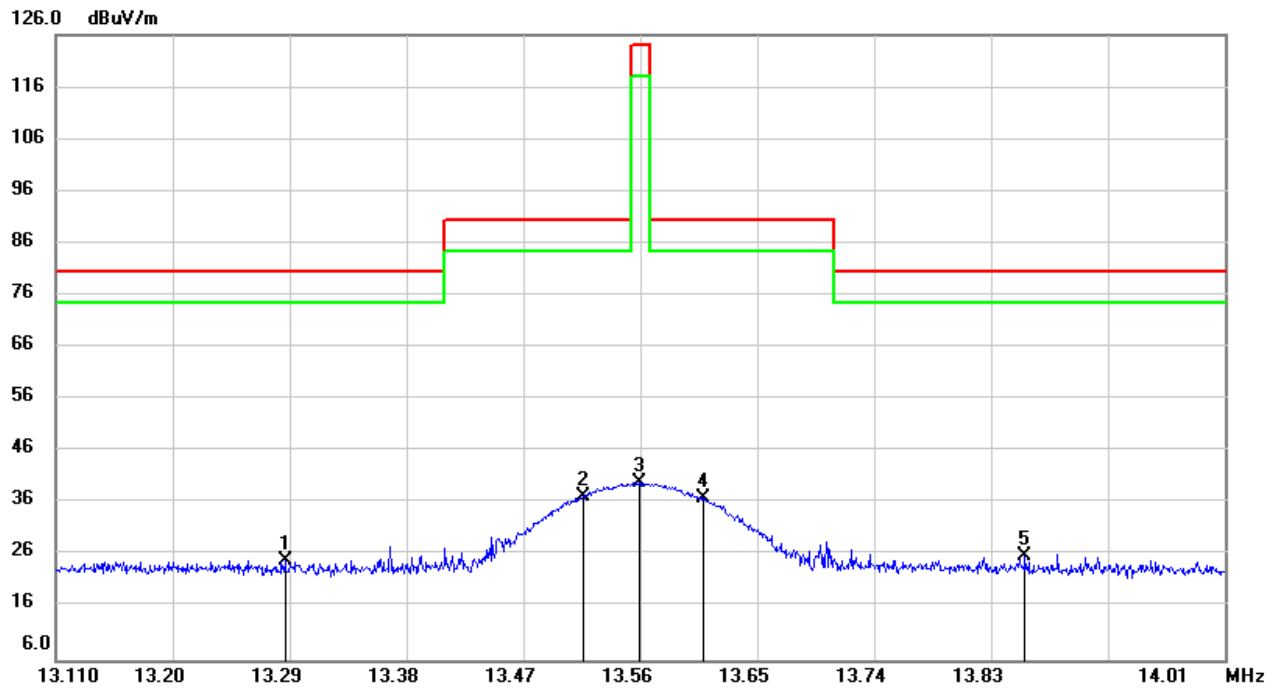
**RESULTS**

**TEST ENVIRONMENT**

Temperature	24.5°C	Relative Humidity	62%
Atmosphere Pressure	101kPa	Test Voltage	AC 120V60Hz

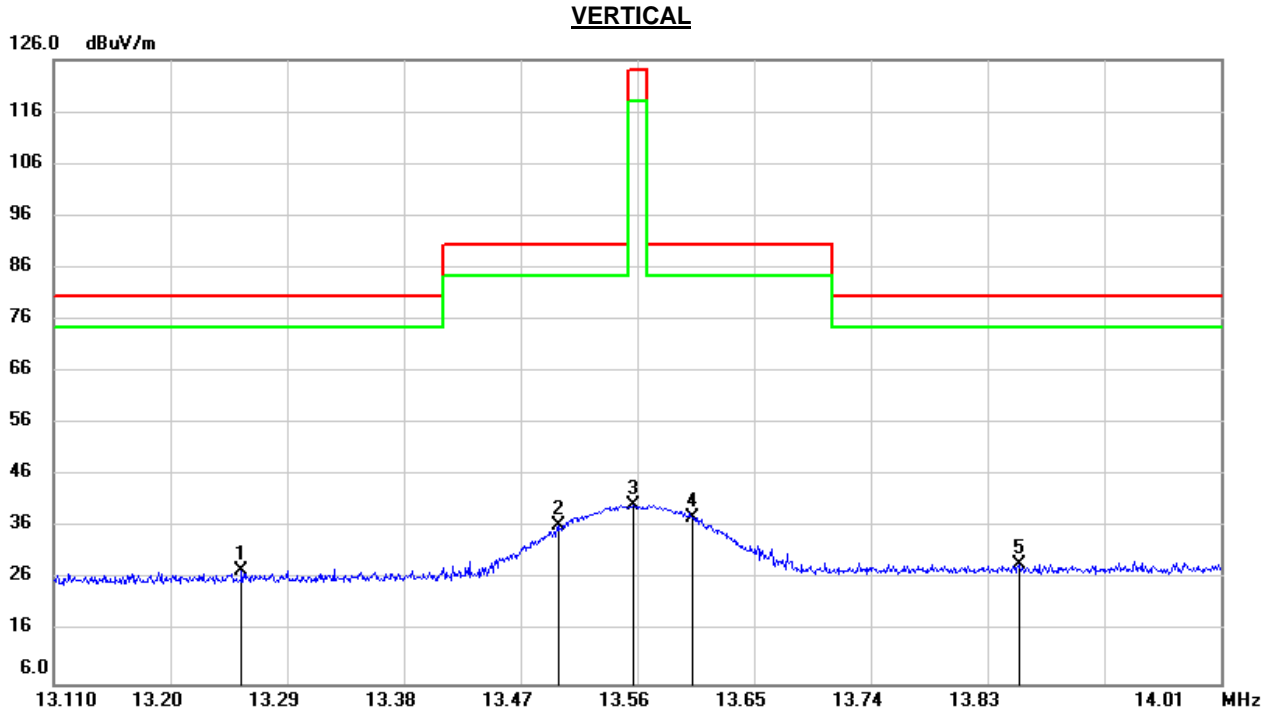
**6.2.1. FUNDAMENTAL FIELD STRENGTH**

**HORIZONTAL**



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (3m) (dBuV/m)	Limit (3m) (dBuV/m)	Margin (dB)	Remark
1	13.2864	55.83	-30.84	24.99	80.51	-55.52	peak
2	13.5159	68.24	-30.84	37.40	90.47	-53.07	peak
3	13.5591	71.01	-30.84	40.17	123.90	-83.73	peak
4	13.6085	68.03	-30.84	37.19	90.47	-53.28	peak
5	13.8560	56.73	-30.84	25.89	80.51	-54.62	peak

Note: 1. Result 3m= Reading+ Correct Factor  
2. Result 30m= Result 3m-40 dBuV/m



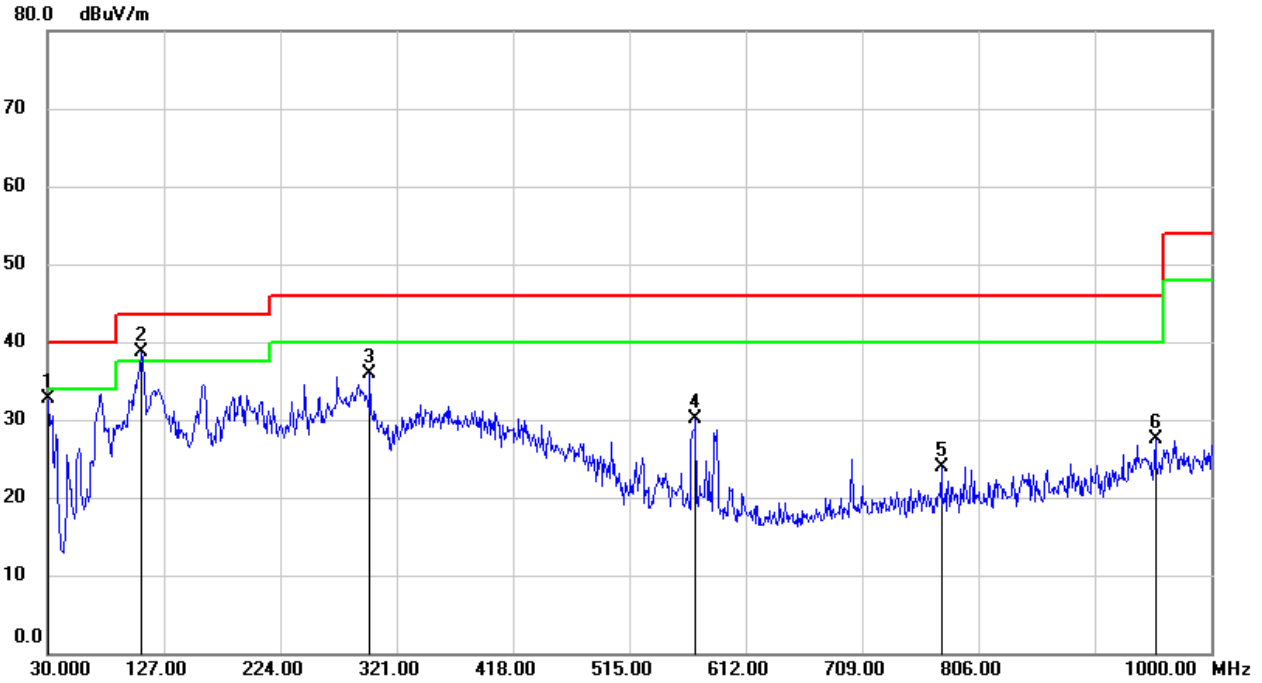
No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (3m) (dBuV/m)	Limit (3m) (dBuV/m)	Margin (dB)	Remark
1	13.2549	58.45	-30.84	27.61	80.51	-52.90	peak
2	13.4997	67.16	-30.84	36.32	90.47	-54.15	peak
3	13.5573	71.08	-30.84	40.24	123.90	-83.66	peak
4	13.6023	68.83	-30.84	37.99	90.47	-52.48	peak
5	13.8543	59.86	-30.84	29.02	80.51	-51.49	peak

Note: 1. Result 3m= Reading+ Correct Factor  
2. Result 30m= Result 3m-40 dBuV/m



### 6.2.2. SPURIOUS EMISSIONS BELOW 1G

#### HORIZONTAL

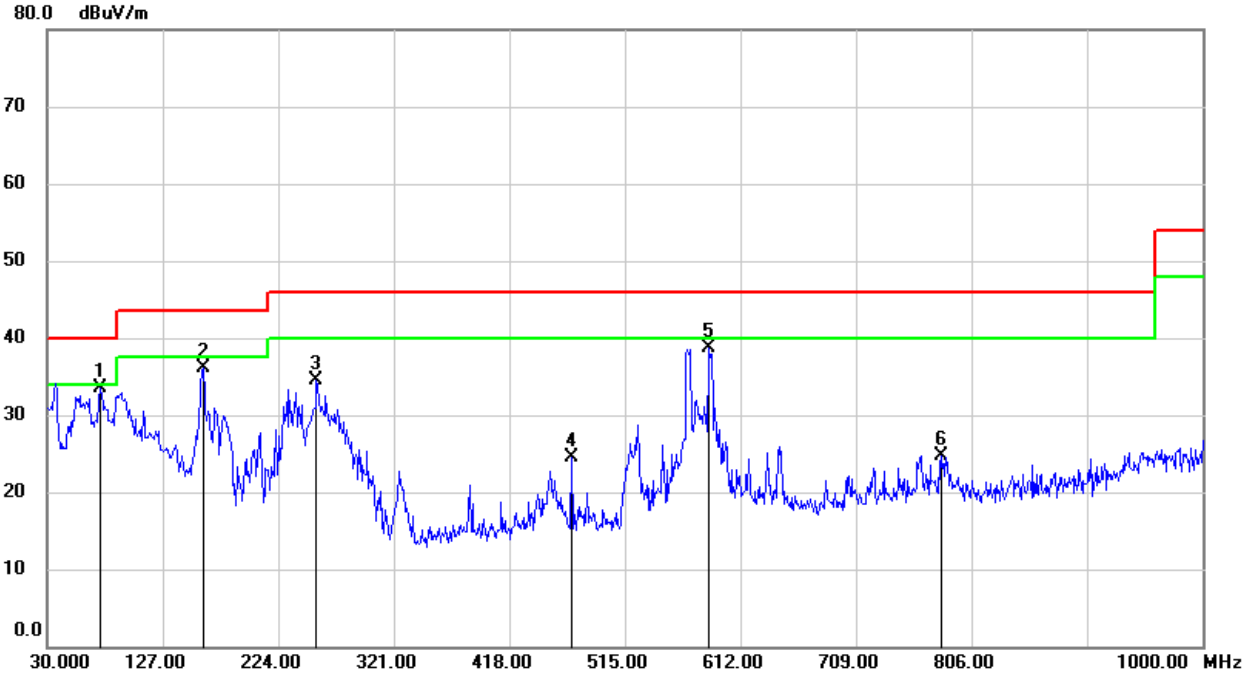


No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	30.0000	49.65	-17.00	32.65	40.00	-7.35	QP
2	107.6000	60.28	-21.56	38.72	43.50	-4.78	QP
3	298.6900	49.89	-13.93	35.96	46.00	-10.04	QP
4	570.2900	39.17	-8.99	30.18	46.00	-15.82	QP
5	774.9600	29.61	-5.72	23.89	46.00	-22.11	QP
6	953.4400	30.86	-3.37	27.49	46.00	-18.51	QP

Note: 1. Result Level = Read Level + Correct Factor.  
2. Test setup: RBW: 120 kHz, VBW: 300 kHz, Sweep time: auto.



**VERTICAL**



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	74.6200	53.84	-20.40	33.44	40.00	-6.56	QP
2	160.9500	53.73	-17.72	36.01	43.50	-7.49	QP
3	256.0100	50.53	-15.95	34.58	46.00	-11.42	QP
4	470.3800	35.46	-10.98	24.48	46.00	-21.52	QP
5	585.8100	47.47	-8.68	38.79	46.00	-7.21	QP
6	780.7800	30.30	-5.60	24.70	46.00	-21.30	QP

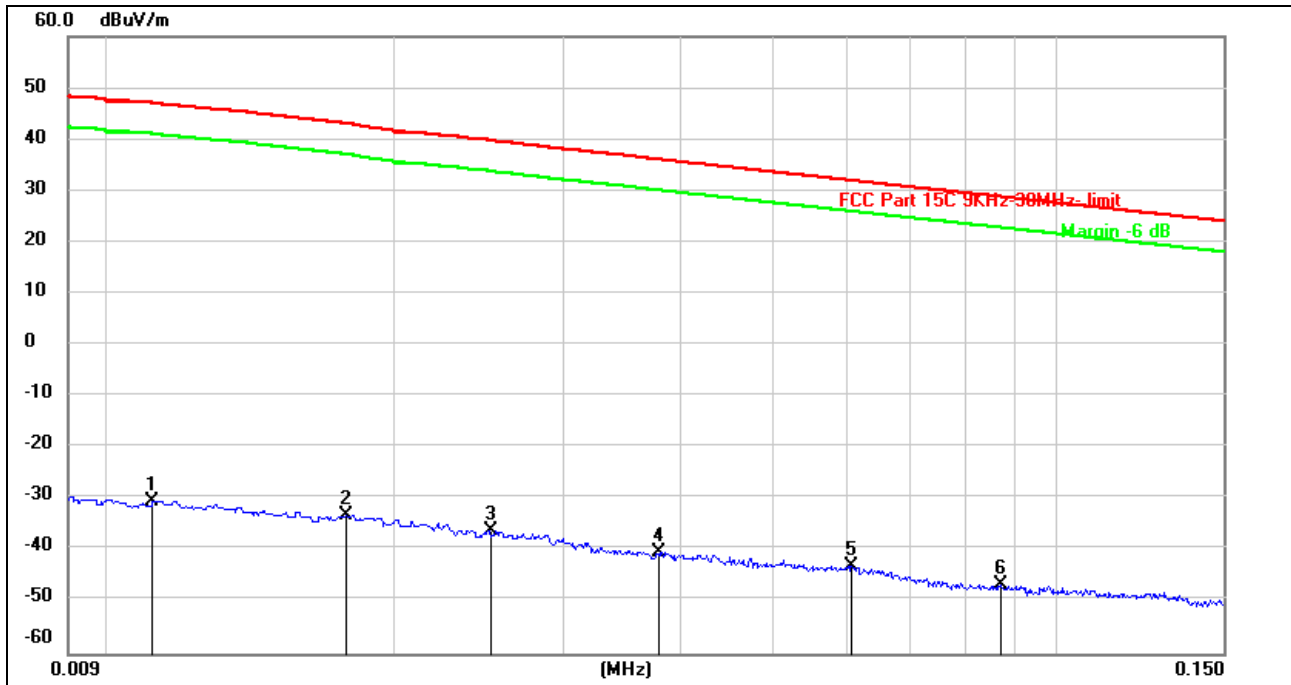
Note: 1. Result Level = Read Level + Correct Factor.  
2. Test setup: RBW: 120 kHz, VBW: 300 kHz, Sweep time: auto.



### 6.2.3. SPURIOUS EMISSIONS BELOW 30M

#### SPURIOUS EMISSIONS (MID CHANNEL, LOOP ANTENNA FACE ON TO THE EUT, WORST-CASE CONFIGURATION)

0.09kHz~ 150kHz



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.0111	70.95	-101.39	-30.44	46.94	-77.38	peak
2	0.0177	68.12	-101.35	-33.23	42.96	-76.19	peak
3	0.0252	65.32	-101.37	-36.05	39.75	-75.80	peak
4	0.0379	61.07	-101.42	-40.35	36.09	-76.44	peak
5	0.0606	58.45	-101.52	-43.07	31.96	-75.03	peak
6	0.0873	54.96	-101.69	-46.73	28.80	-75.53	peak

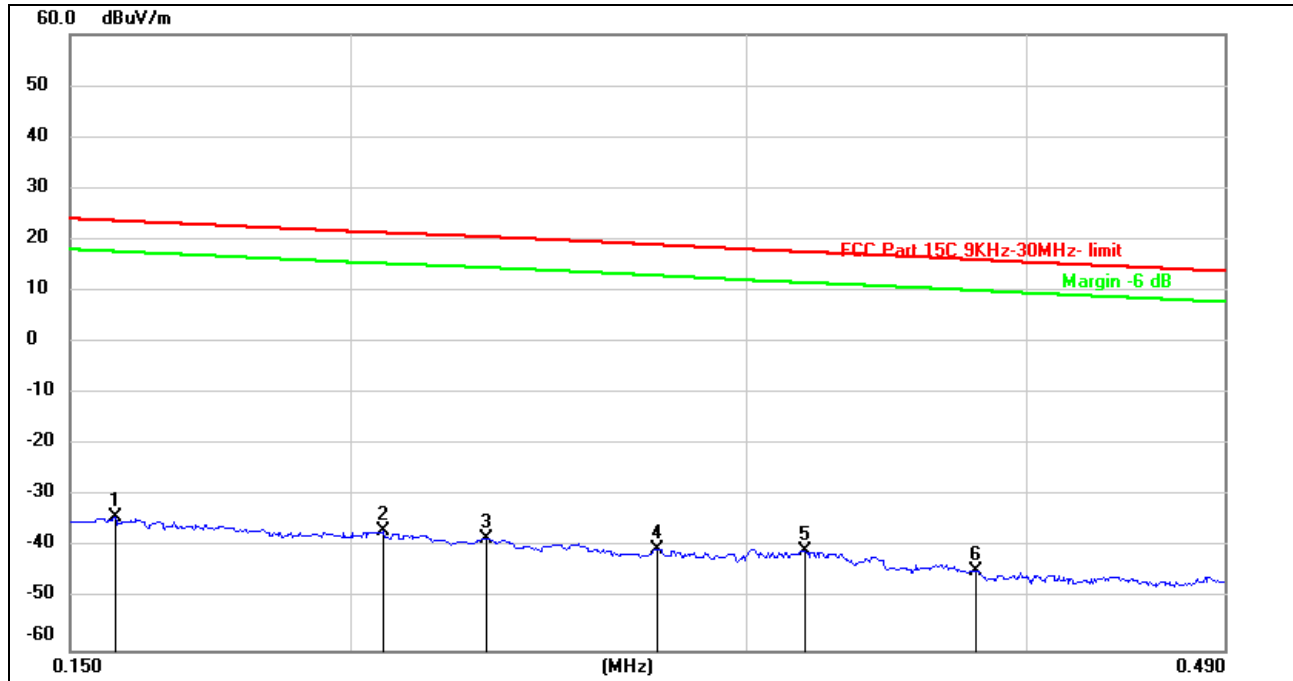
Note: 1. Measurement = Reading Level + Correct Factor.

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.



**150kHz ~ 490kHz**



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.1570	67.53	-101.65	-34.12	23.69	-57.81	peak
2	0.2068	64.95	-101.73	-36.78	21.34	-58.12	peak
3	0.2298	63.55	-101.77	-38.22	20.53	-58.75	peak
4	0.2736	61.58	-101.83	-40.25	18.99	-59.24	peak
5	0.3190	61.29	-101.88	-40.59	17.58	-58.17	peak
6	0.3800	57.52	-101.94	-44.42	16.06	-60.48	peak

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

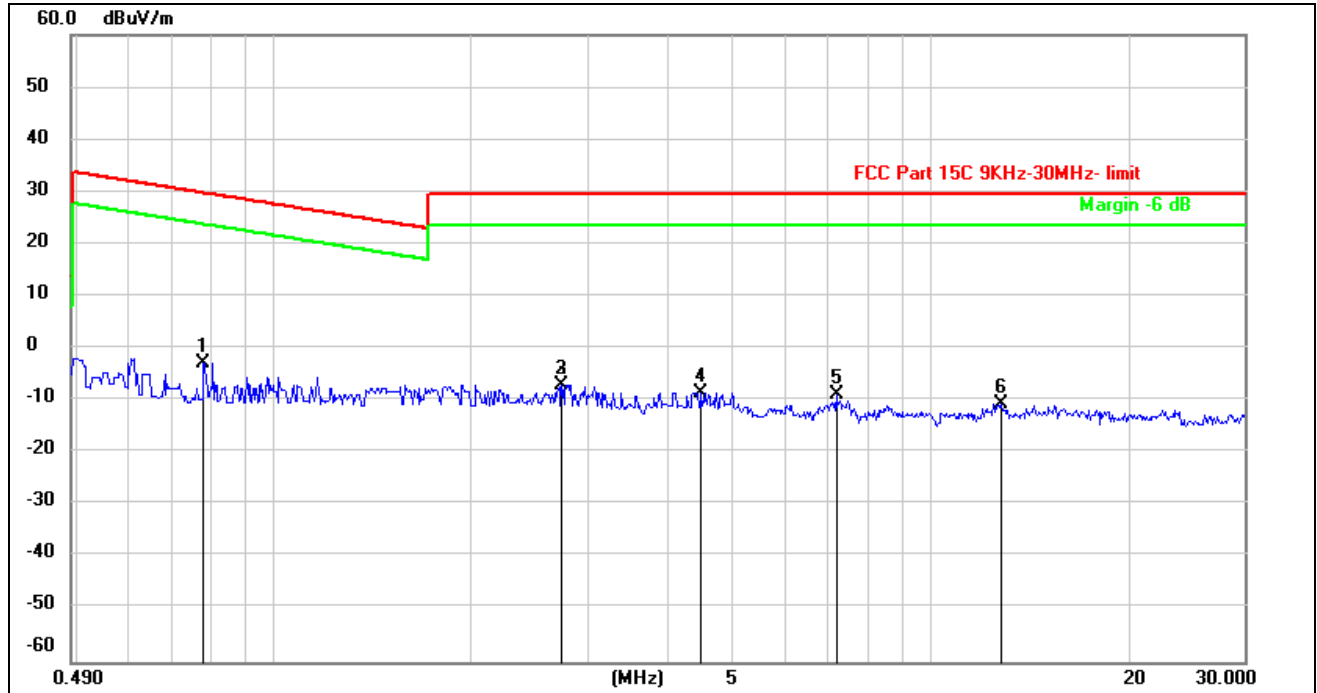
2. If Peak Result complies with AV and QP limit, AV and QP Result are deemed to comply with AV limit.

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.





**490kHz ~ 30MHz**



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.7799	59.40	-62.13	-2.73	29.77	-32.50	peak
2	2.7360	54.64	-61.64	-7.00	29.54	-36.54	peak
3	2.7360	54.64	-61.64	-7.00	29.54	-36.54	peak
4	4.4739	52.88	-61.40	-8.52	29.54	-38.06	peak
5	7.1886	52.26	-61.19	-8.93	29.54	-38.47	peak
6	12.7660	50.40	-60.92	-10.52	29.54	-40.06	peak

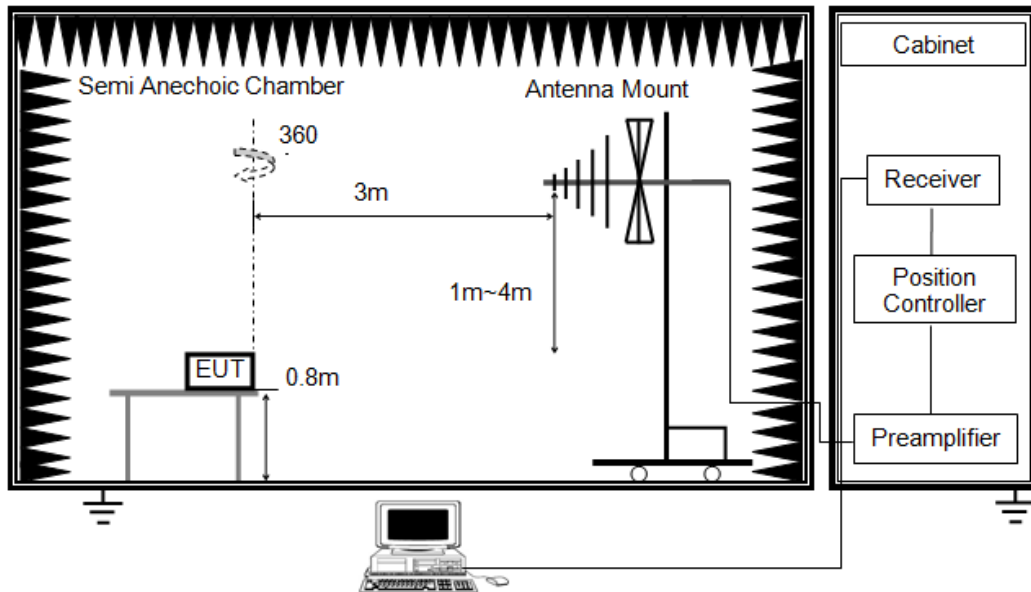
- Note: 1. Measurement = Reading Level + Correct Factor.  
 2. If Peak Result complies with AV and QP limit, AV and QP Result are deemed to comply with AV limit.  
 3. All 3 polarizations(Horizontal, Face-on and Face-off) of the loop antenna had been tested, but only the worst data recorded in the report.

### 6.3. 99%/20dB BANDWIDTH

#### LIMITS

FCC Part15 (15.247) Subpart C RSS-247 ISSUE 2		
Section	Test Item	Limit
ANSI C63.10 Section 6.9.2	20dB% Bandwidth	For reporting purposes only.
RSS-Gen Clause 6.7	99% Bandwidth	For reporting purposes only.

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

Center Frequency	The centre frequency of the channel under test
Detector	Peak
RBW	1% to 5% of the occupied bandwidth
VBW	approximately 3xRBW
Span	approximately 2 to 3 times the 20 dB bandwidth
Trace	Max hold
Sweep	Auto couple

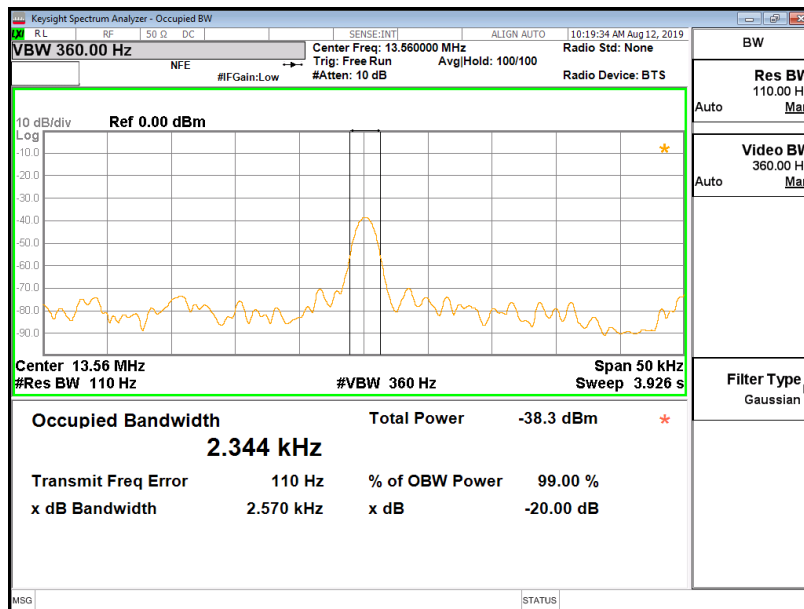
Allow the trace to stabilize and measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 20 dB and 99% relative to the maximum level measured in the fundamental emission.

**TEST ENVIRONMENT**

Temperature	24.5°C	Relative Humidity	58%
Atmosphere Pressure	101kPa	Test Voltage	AC 120V60Hz

**RESULTS**

Frequency (MHz)	99% bandwidth (KHz)	20dB bandwidth (KHz)
13.56	3.089	2.945





## 6.4. TRANSMITTER FREQUENCY STABILITY

### LIMITS

The frequency tolerance of the carrier signal shall be maintained within  $\pm 0.01\%$  of the operating frequency over a temperature variation of  $-20$  degrees to  $+ 50$  degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C.

### TEST SETUP AND PROCEDURE

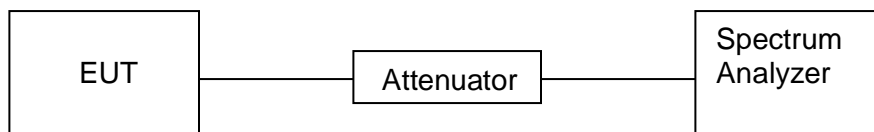
Connect the UUT to the spectrum analyser and use the following settings:

Center Frequency	The center frequency of the channel under test
Detector	PEAK
RBW	10KHz
VBW	$\geq 3 \times$ RBW
Span	Encompass the entire emissions bandwidth (EBW) of the signal
Trace	Max hold
Sweep time	Auto

Allow the trace to stabilize, find the peak value of the power envelope and record the frequency, then calculated the frequency drift.

The test extreme voltage is to change the primary supply voltage from 85 to 115 percent of the nominal value.

### TEST SETUP





**TEST ENVIRONMENT**

Temperature	24.5°C	Relative Humidity	58%
Atmosphere Pressure	101kPa	Test Voltage	/

**TEST RESULTS**

Maximum frequency error of the EUT with variations in ambient temperature

Temperature (°C)	Time after			
	0 minutes	2 minutes	5 minutes	10 minutes
-20	13.5604 MHz	13.5604 MHz	13.5605 MHz	13.5605 MHz
-10	13.5603 MHz	13.5605 MHz	13.5604 MHz	13.5606 MHz
0	13.5605 MHz	13.5604 MHz	13.5605 MHz	13.5604 MHz
10	13.5603 MHz	13.5605 MHz	13.5606 MHz	13.5606 MHz
20	13.5604 MHz	13.5606 MHz	13.5604 MHz	13.5605 MHz
30	13.5605 MHz	13.5605 MHz	13.5603 MHz	13.5604 MHz
40	13.5604 MHz	13.5603 MHz	13.5605 MHz	13.5605 MHz
50	13.5606 MHz	13.5604 MHz	13.5606 MHz	13.5604 MHz

Maximum frequency error of the EUT with variations in nominal operating voltage at an ambient

Normal temperature

Supply Voltage (V)	Nominal Frequency (MHz)	Measured Frequency (MHz)	Tolerance (kHz)	Tolerance (ppm)	Limit (%)	Result
102	13.56	13.5608	0.5000	36.87	100	Pass
120	13.56	13.5606	0.4000	29.50	100	Pass
138	13.56	13.5607	0.5000	36.87	100	Pass



## 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**