

FCC TEST REPORT FCC

ID: 2AUE5-SRP211A

Report Number..... : ZKT-211220L7050-02

Date of Test..... Dec. 12, 2021 -- Dec. 23, 2021

Date of issue..... : Dec. 23, 2021

Total number of pages : 26

Test Result : PASS

Testing Laboratory..... : Shenzhen ZKT Technology Co., Ltd.

Address : 1/F, No. 101, Building B, No. 6, Tangwei Community Industrial Avenue, Fuhai Street, Bao'an District, Shenzhen, China

Applicant's name : Zhejiang Xunshi Technology Co.,Ltd

Address : 4 / F, building 2, Qihang building, science and Technology Park, 586 Xihuan Road, Kebei Economic Development Zone, Keqiao District, Shaoxing City, China

Manufacturer's name : Zhejiang Xunshi Technology Co.,Ltd

Address : 4 / F, building 2, Qihang building, science and Technology Park, 586 Xihuan Road, Kebei Economic Development Zone, Keqiao District, Shaoxing City, China

Test specification:

Standard..... : FCC CFR Title 47 Part 15 Subpart C Section 15.225
ANSI C63.10:2013

Test procedure : /

Non-standard test method : N/A

Test Report Form No. : TRF-EL-111_V0

Test Report Form(s) Originator : ZKT Testing

Master TRF : Dated: 2020-01-06

This device described above has been tested by ZKT, and the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.

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Product name..... : Pro S

Trademark : /

Model/Type reference : SRP2110A, SRP2110B

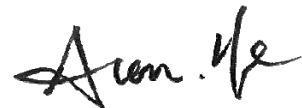
Ratings..... : AC 120V 50/60Hz 200W

Testing procedure and testing location:

Testing Laboratory.....: Shenzhen ZKT Technology Co., Ltd.

Address: 1/F, No. 101, Building B, No. 6, Tangwei Community
Industrial Avenue, Fuhai Street, Bao'an District,
Shenzhen, China

Tested by (name + signature).....: Alen He



Reviewer (name + signature).....: Joe Liu



Approved (name + signature): Lake Xie



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1.VERSION

Report No.	Version	Description	Approved
ZKT-211220L7050-02	Rev.01	Initial issue of report	Dec. 23, 2021

2.1 SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:

FCC Part15 (15.249) , Subpart C			
Standard Section	Test Item	Judgment	Remark
§15.207	Conduction Emission, 0.15MHz to 30MHz	PASS	
§15.225, §15.205, § 15.209, §15.35	Radiation Emission	PASS	
§15.215	Occupied Bandwidth	PASS	
§15.203	Antenna requirement	PASS	
§15.225	Frequency stability	PASS	

NOTE:

(1)" N/A" denotes test is not applicable in this Test Report

2.1 TEST FACILITY

Shenzhen ZKT Technology Co., Ltd.

Add. : 1/F, No. 101, Building B, No. 6, Tangwei Community Industrial Avenue, Fuhai Street, Bao'an District, Shenzhen, China

FCC Test Firm Registration Number: 692225

Designation Number: CN1299

IC Registered No.: 27033

2.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement $y \pm U$, where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately 95 % .

No.	Item	Uncertainty
1	Conducted Emission Test	$\pm 1.38\text{dB}$
2	RF power conducted	$\pm 0.16\text{dB}$
3	Spurious emissions conducted	$\pm 0.21\text{dB}$
4	All emissions radiated(<1G)	$\pm 4.68\text{dB}$
5	All emissions radiated(>1G)	$\pm 4.89\text{dB}$
6	Temperature	$\pm 0.5^\circ\text{C}$
7	Humidity	$\pm 2\%$

3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

Product Name:	Pro S
Trade Name:	/
Model/Type reference:	SRP2110A
Listed Models	SRP2110B
Hardware Version:	V1.0
Software Version:	V1.1
Sample(s) Status:	Engineer sample
Channel numbers:	1
Operation frequency:	13.56MHz
Channel number:	1
Channel separation:	/
Antenna type:	Loop Antenna

Note: 1. For more details, refer to the user's manual of the EUT.

Channel	Frequency
1	13.56MHz

3.2 DESCRIPTION OF TEST MODES

Transmitting mode	Keep the EUT in continuously transmitting mode
Remark: During the test, the test voltage was tuned from 85% to 115% of the nominal rated supply voltage, and found that the worst case was under the nominal rated supply condition. So the report just shows that condition's data.	

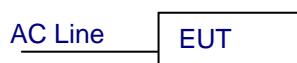
Test Software	Key combination
Power level setup	<0dBm

3.3 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED

Conducted Emission



Radiated Emission



Test Environment and Mode

Operating Environment:	
Temperature:	24.0 °C
Humidity:	54 % RH
Atmospheric Pressure:	1010 mbar
Test Mode:	
Operation mode:	Keep the EUT in continuous transmitting with modulation
<p>The sample was placed (0.8m below 1GHz, 1.5m above 1GHz) above the ground plane of 3m chamber. Measurements in both horizontal and vertical polarities were performed. During the test, each emission was maximized by: having the EUT continuously working, investigated all operating modes, rotated about all 3 axis (X, Y & Z) and considered typical configuration to obtain worst position, manipulating interconnecting cables, rotating the turntable, varying antenna height from 1m to 4m in both horizontal and vertical polarizations. The emissions worst-case are shown in Test Results of the following pages.</p>	

Per-test mode.			
We have verified the construction and function in typical operation, The EUT was placed on three different polar directions; i.e. X axis, Y axis, Z axis. which was shown in this test report and defined as follows:			
Axis	X	Y	Z
Field Strength(dBuV/m)	62.47	65.62	62.59
Final Test Mode:			
According to ANSI C63.10 standards, the test results are both the "worst case" and "worst setup": Y axis (see the test setup photo)			

3.4 DESCRIPTION OF SUPPORT UNITS (CONDUCTED MODE)

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Item	Equipment	Mfr/Brand	Model/Type No.	Series No.	Note

Item	Shielded Type	Ferrite Core	Length	Note

Note:

- (1) The support equipment was authorized by Declaration of Confirmation.
- (2) For detachable type I/O cable should be specified the length in cm in 『Length』 column.

3.5 EQUIPMENTS LIST FOR ALL TEST ITEMS

Radiation Test equipment

Item	Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
1	Spectrum Analyzer (9kHz-26.5GHz)	KEYSIGHT	9020A	MY45109572	Sep. 21, 2021	Sep. 20, 2022
2	Spectrum Analyzer (1GHz-40GHz)	Agilent	E4446A	100363	Sep. 21, 2021	Sep. 20, 2022
3	Test Receiver (9kHz-7GHz)	R&S	ESCI7	101169	Sep. 21, 2021	Sep. 20, 2022
4	Bilog Antenna (30MHz-1400MHz)	Schwarzbeck	VULB9168	00877	Sep. 21, 2021	Sep. 20, 2022
5	Horn Antenna (1GHz-18GHz)	SCHWARZBEC K	BBHA9120D	1541	Sep. 21, 2021	Sep. 20, 2022
6	Horn Antenna (18GHz-40GHz)	A.H. System	SAS-574	588	Sep. 21, 2021	Sep. 20, 2022
7	Amplifier (30-1000MHz)	EM Electronics	EM330 Amplifier	N/A	Sep. 21, 2021	Sep. 20, 2022
8	Amplifier (1GHz-40GHz)	QUANJUDA	DLE-161	097	Sep. 21, 2021	Sep. 20, 2022
9	Loop Antenna (9KHz-30MHz)	SCHWARZBEC K	FMZB1519B	014	Sep. 21, 2021	Sep. 20, 2022
10	RF cables1 (9kHz-30MHz)	N/A	9kHz-30MHz	N/A	Sep. 21, 2021	Sep. 20, 2022
11	RF cables2 (30MHz-1GHz)	N/A	30MHz-1GHz	N/A	Sep. 21, 2021	Sep. 20, 2022
12	RF cables3 (1GHz-40GHz)	N/A	1GHz-40GHz	N/A	Sep. 21, 2021	Sep. 20, 2022
13	CMW500 Test	R&S	CMW500	106504	Sep. 21, 2021	Sep. 20, 2022
14	ESG Signal Generator	Agilent	E4421B	GB40051203	Sep. 21, 2021	Sep. 20, 2022
15	Signal Generator	Agilent	N5182A	MY47420215	Sep. 21, 2021	Sep. 20, 2022
16	D.C. Power Supply	LongWei	TPR-6405D	\	\	\
17	Software	Frad	EZ-EMC	FA-03A2 RE	\	\

Conduction Test equipment

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
1	LISN	R&S	ENV216	101471	Sep. 21, 2021	Sep. 20, 2022
2	LISN	CYBERTEK	EM5040A	E1850400149	Sep. 21, 2021	Sep. 20, 2022
3	Test Cable	N/A	C01	N/A	Sep. 21, 2021	Sep. 20, 2022
4	Test Cable	N/A	C02	N/A	Sep. 21, 2021	Sep. 20, 2022
5	EMI Test Receiver	R&S	ESRP3	101946	Sep. 21, 2021	Sep. 20, 2022
6	Absorbing Clamp	DZ	ZN23201	N/A	Sep. 21, 2021	Sep. 20, 2022

4. EMC EMISSION TEST

4.1 CONDUCTED EMISSION MEASUREMENT

Test Requirement:	FCC Part15 C Section 15.207
Test Method:	ANSI C63.10:2013
Test Frequency Range:	150KHz to 30MHz
Receiver setup:	RBW=9KHz, VBW=30KHz, Sweep time=auto

4.1.1 POWER LINE CONDUCTED EMISSION Limits

FREQUENCY (MHz)	Limit (dBuV)		Standard
	Quas -peak	Average	
0.15 -0.5	66 - 56 *	56 - 46 *	FCC
0.50 -5.0	56.00	46.00	FCC
5.0 -30.0	60.00	50.00	FCC

Note:

(1) *Decreases with the logarithm of the frequency.

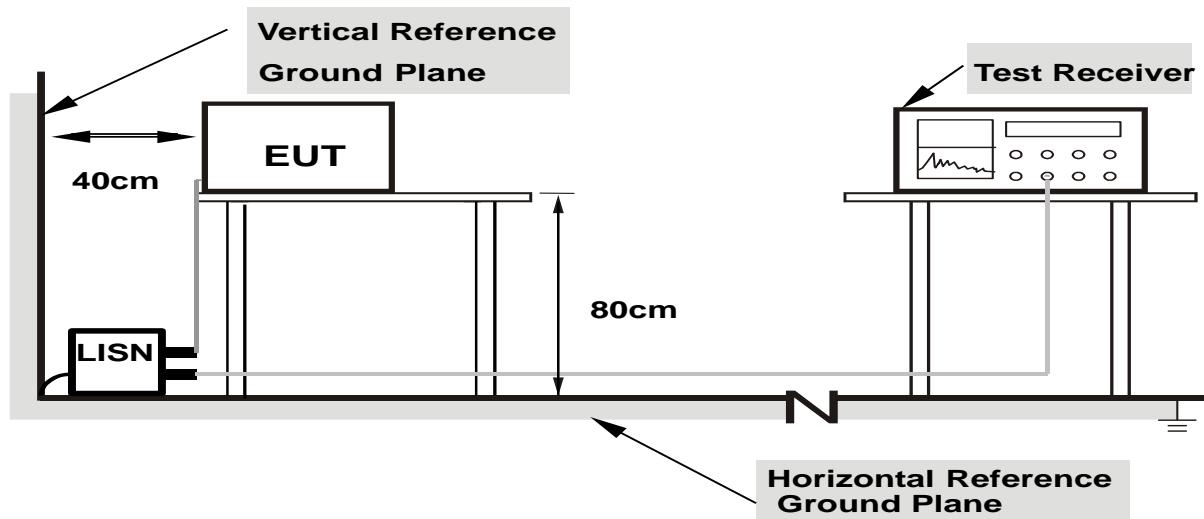
4.1.2 TEST PROCEDURE

- a. The EUT was placed 0.8 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- b. 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.
- c. 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.
- d. LISN at least 80 cm from nearest part of EUT chassis.
- e. For the actual test configuration, please refer to the related Item –EUT Test Photos.

4.1.3 DEVIATION FROM TEST STANDARD

No deviation

4.1.4 TEST SETUP



Note:

1. Support units were connected to second LISN.
2. Both of LISNs (AMN) are 80 cm from EUT and at least 80 cm from other units and other metal planes

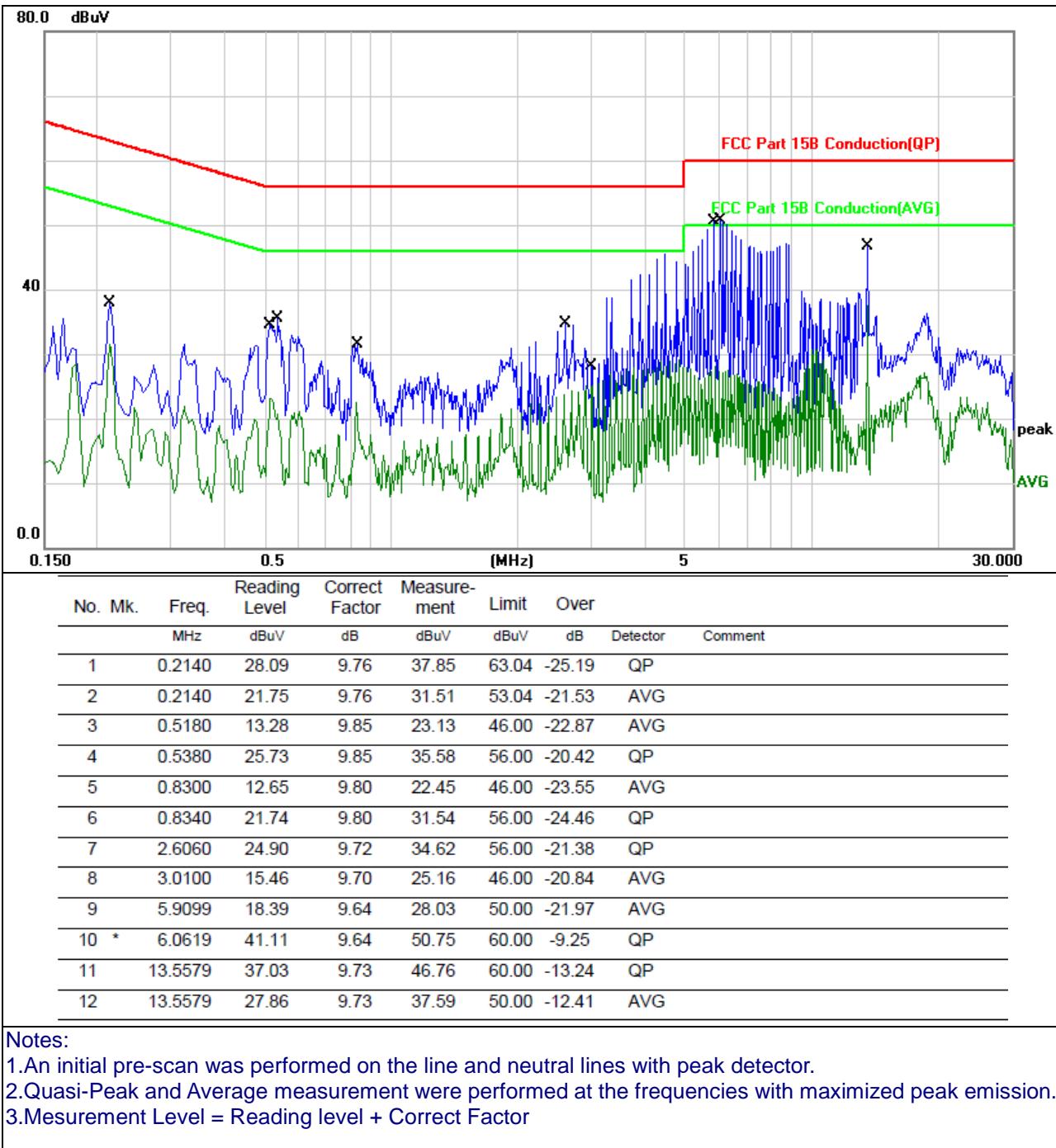
4.1.5 EUT OPERATING CONDITIONS

The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.

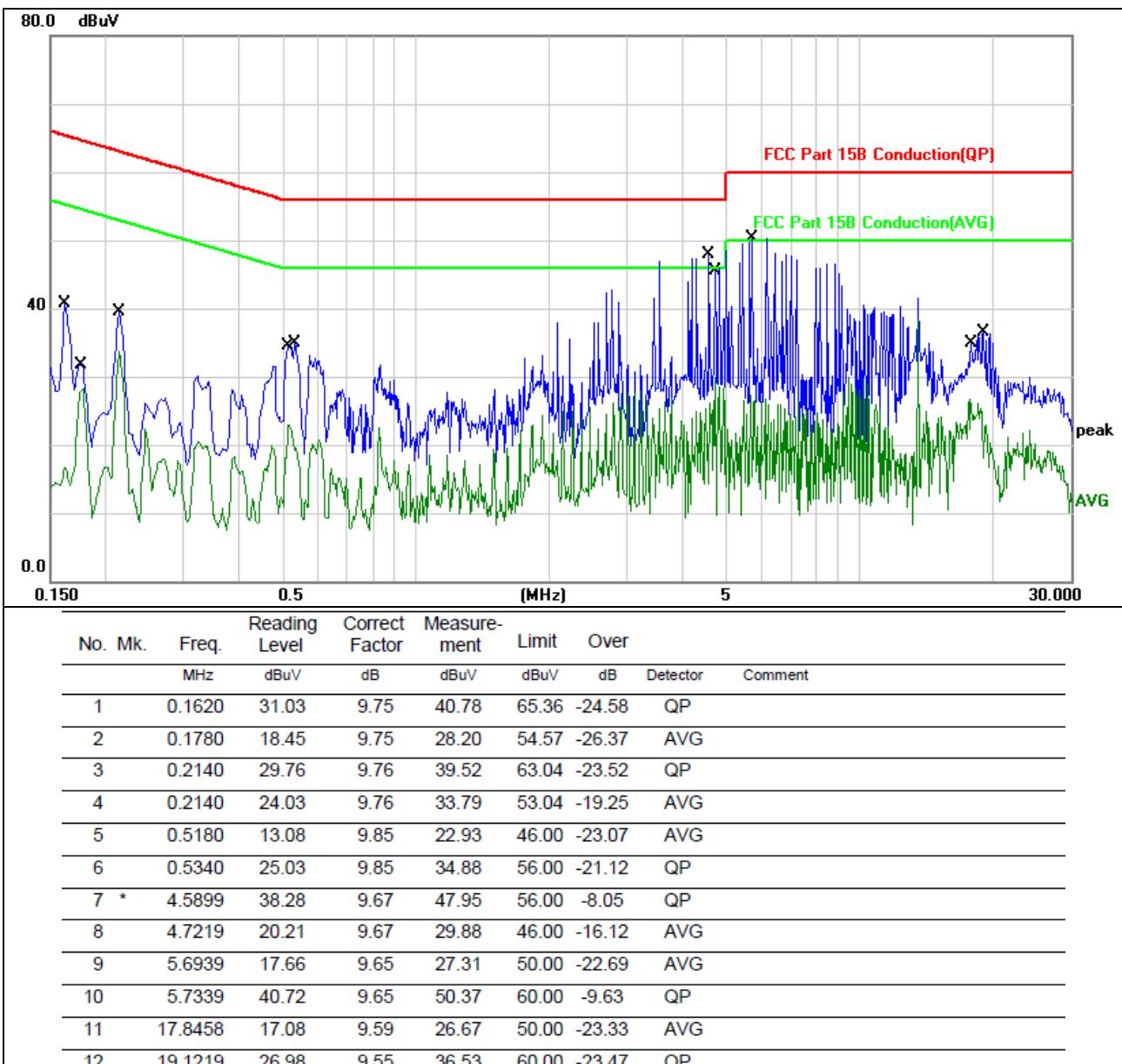
We pretest AC 120V, the worst voltage was AC 120V and the data recording in the report.

4.1.6 TEST RESULTS

Temperature :	26°C	Relative Humidity:	54%
Pressure :	101kPa	Phase :	L
Test Voltage :	AC 120V/60Hz		



Temperature :	26°C	Relative Humidity:	54%
Pressure :	101kPa	Phase :	N
Test Voltage :	AC 120V/60Hz		



Notes:

Notes:

1. An initial pre-scan was performed on the line and neutral lines with peak detector.
2. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.
3. Mesurement Level = Reading level + Correct Factor

4.2 RADIATED EMISSION MEASUREMENT

Test Requirement:	FCC Part15 C Section 15.209				
Test Method:	ANSI C63.10:2013				
Test Frequency Range:	9kHz to 25GHz				
Test site:	Measurement Distance: 3m				
Receiver setup:	Frequency	Detector	RBW	BW	Value
	9KHz-150KHz	Quasi-peak	200Hz	600Hz	Quasi-peak
	150KHz-30MHz	Quasi-peak	9KHz	30KHz	Quasi-peak
	30MHz-1GHz	Quasi-peak	100KHz	300KHz	Quasi-peak
	Above 1GHz	Peak	1MHz	3MHz	Peak
		Peak	1MHz	10Hz	Average

4.2.1 RADIATED EMISSION LIMITS

Frequencies (MHz)	Field Strength (microvolt/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

The field strength of any emissions within the band 13.553-13.567 MHz shall not exceed 15,848 microvolts/meter at 30 meters.

- (b) Within the bands 13.410-13.553 MHz and 13.567-13.710 MHz, the field strength of any emissions shall not exceed 334 microvolts/meter at 30 meters.
- (c) Within the bands 13.110-13.410 MHz and 13.710-14.010 MHz the field strength of any emissions shall not exceed 106 microvolts/meter at 30 meters.
- (d) 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.

4.2.2 TEST PROCEDURE

- a. The measuring distance of at 3 m shall be used for measurements at frequency up to 25GHz. For frequencies above 1GHz, any suitable measuring distance may be used.
- b. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-chamber test. The table was rotated 360 degrees to determine the position of the highest radiation.

- c. The height of the equipment or of the substitution antenna shall be 0.8m; above 1GHz, the height was 1.5m, the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. 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.
- e. If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed.
- f. For the actual test configuration, please refer to the related Item –EUT Test Photos.
- g. For the radiated emission test above 1GHz:
Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response.
The measurement antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final measurement antenna elevation shall be that which maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane.

Note:

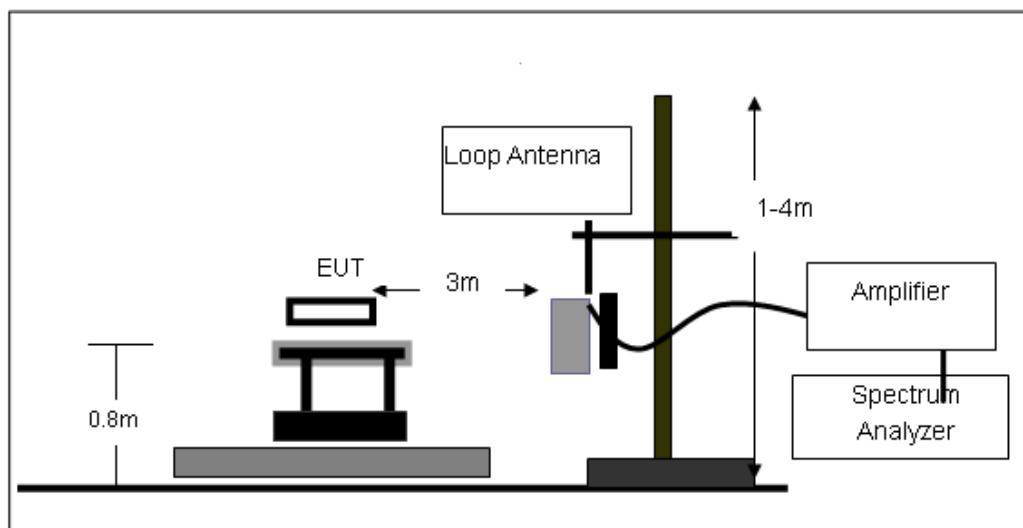
Both horizontal and vertical antenna polarities were tested and performed pretest to three orthogonal axis. The worst case emissions were reported

4.2.3 DEVIATION FROM TEST STANDARD

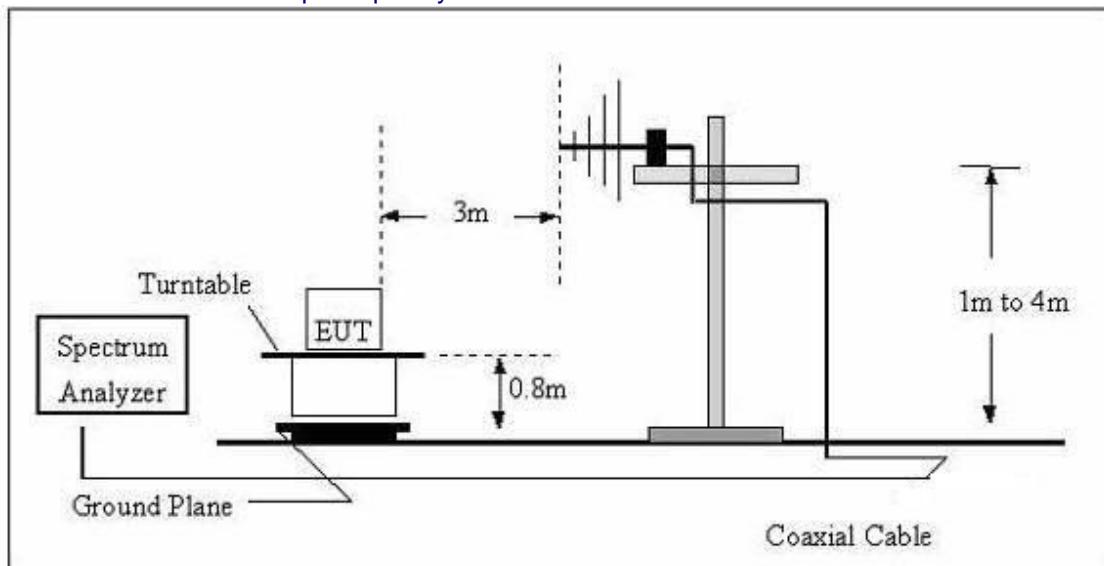
No deviation

4.2.4 TEST SETUP

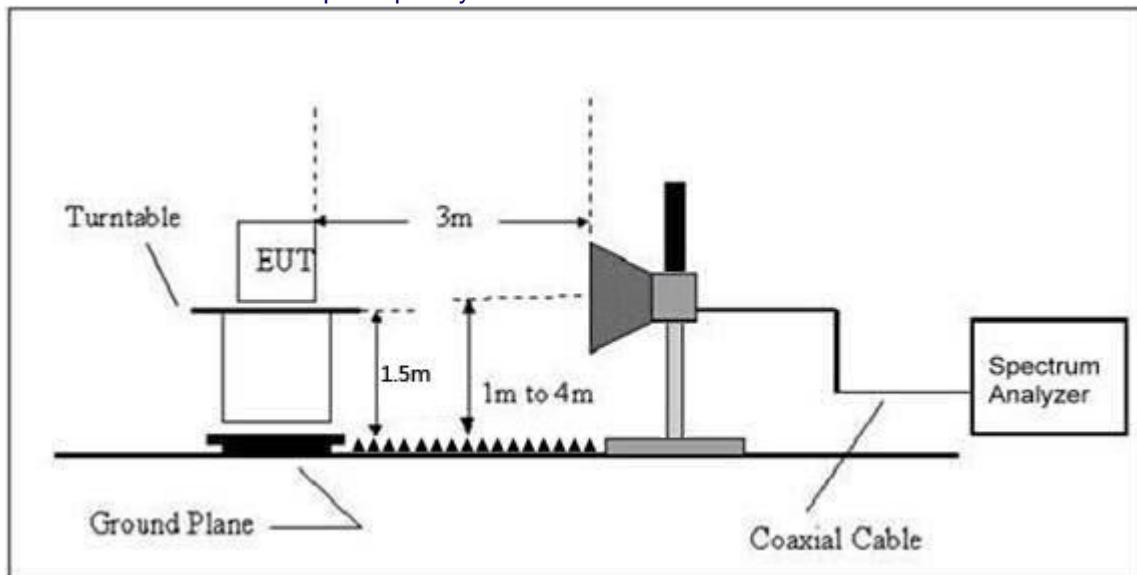
(A) Radiated Emission Test-Up Frequency Below 30MHz



(B) Radiated Emission Test-Up Frequency 30MHz~1GHz



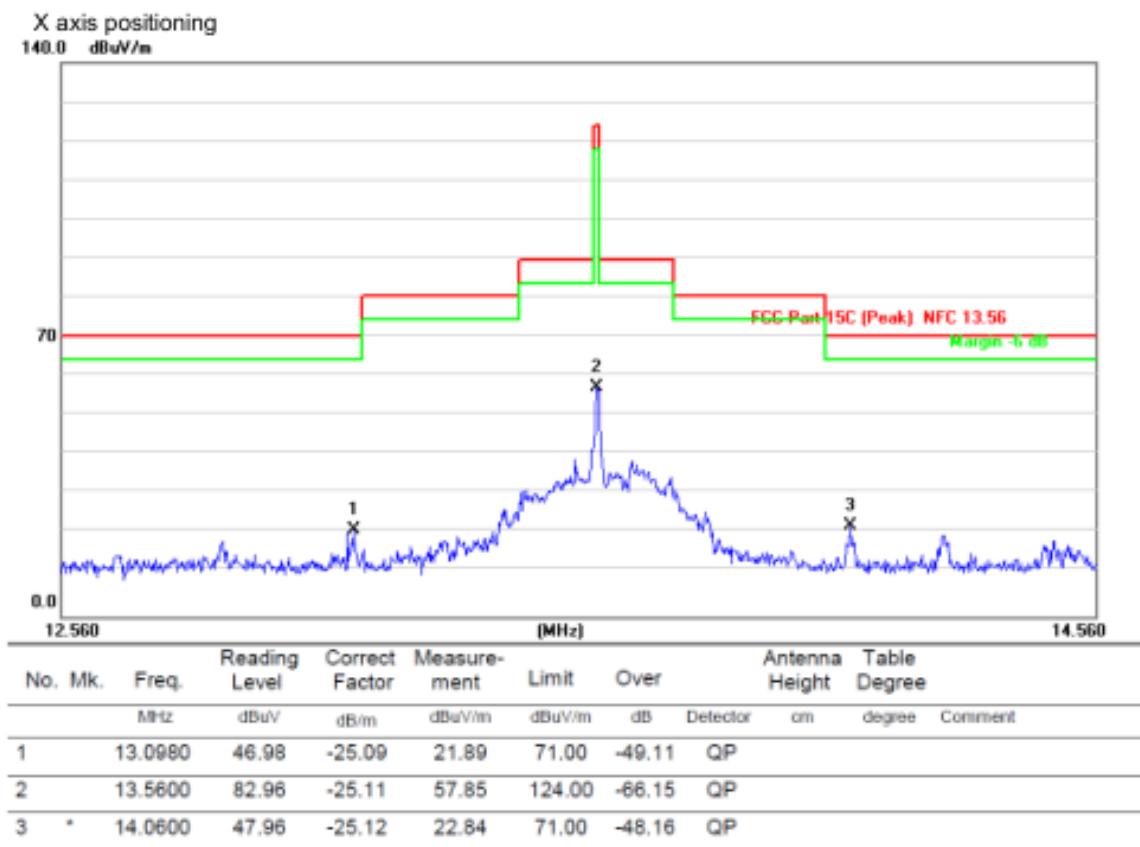
(C) Radiated Emission Test-Up Frequency Above 1GHz



4.2.5 EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

4.2.6 TEST RESULTS



Remark:

The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

Factor= Antenna Factor + Cable Factor – Preamplifier Factor,

Level = Read Level + Factor,

Over Limit=Level-Limit Line.

Field Strength of Fundamental

Frequency (MHz)	Reading (dBuV/m)	Correction Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
13.29	51.38	-21.35	30.03	80.51	-50.48	QP
13.41	68.44	-21.35	47.09	90.47	-43.38	QP
13.56	99.62	-21.35	78.27	124.00	-45.73	QP
13.90	51.38	-21.35	30.03	80.51	-50.48	QP

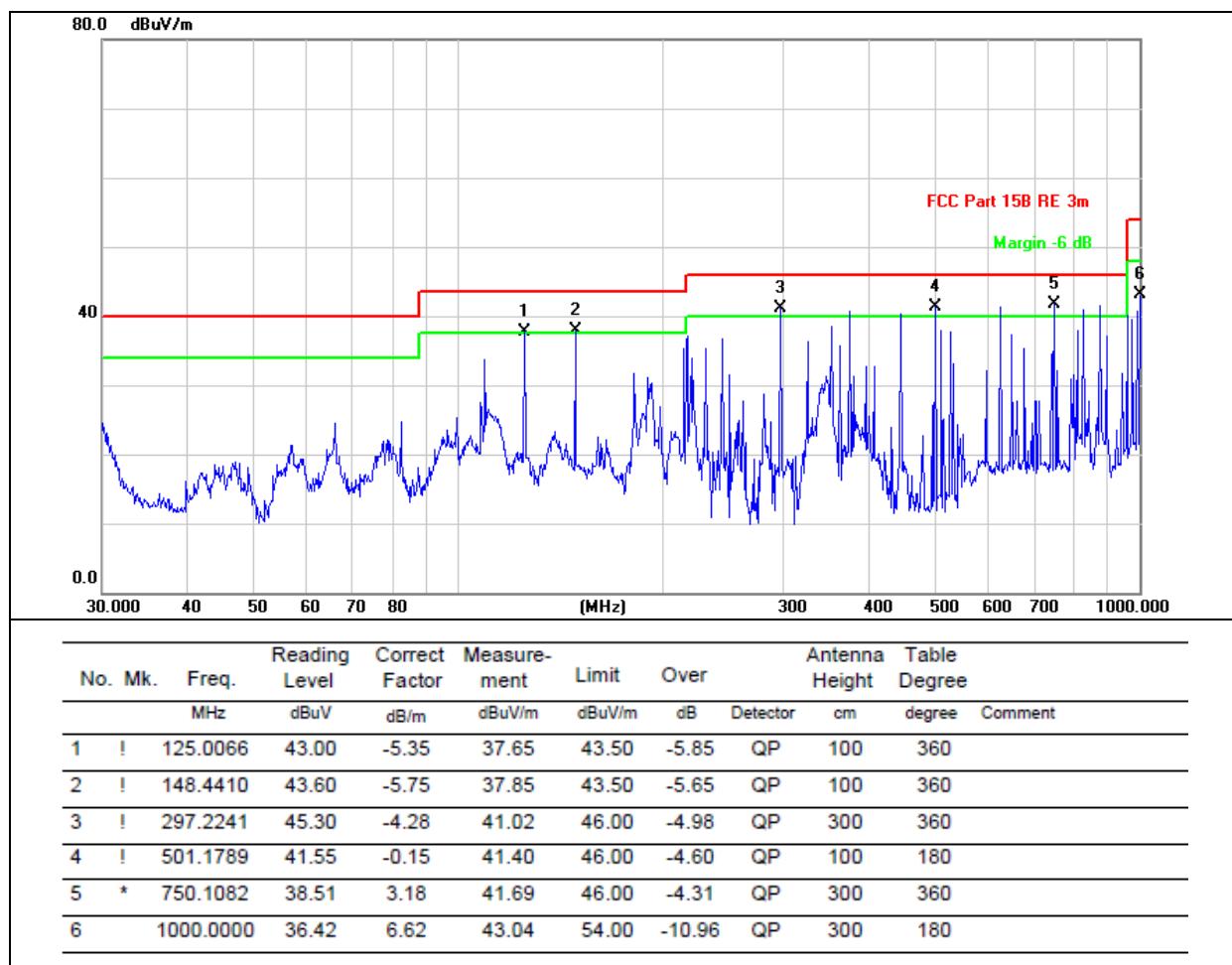
Spurious Emissions:

For 9 kHz-30MHz Test Results:

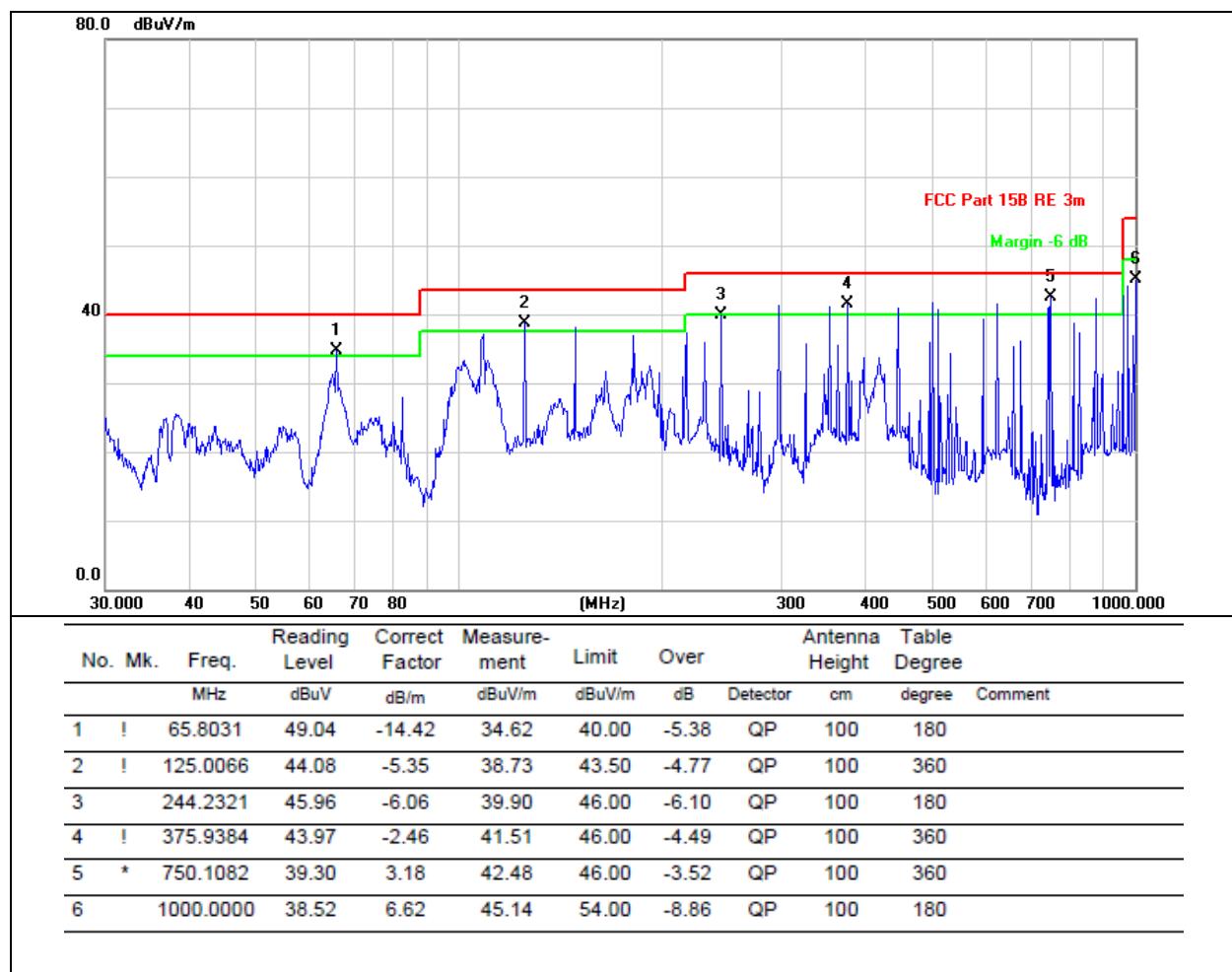
The emission from 9 kHz to 30MHz was pre-tested and found the result was 20dB lower than the limit, and according to 15.31(o) & RSS-Gen 6.13, the test result no need to reported.

Between 30MHz – 1GHz

Temperature:	26°C	Relative Humidity:	54%
Pressure:	101 kPa	Polarization:	Horizontal
Test Voltage:	AC120V		



Temperature:	26°C	Relative Humidity:	54%
Pressure:	101kPa	Polarization:	Vertical
Test Voltage:	AC120V		



Remarks:

- 1.Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor
- 2.The emission levels of other frequencies are very lower than the limit and not show in test report.

5. CHANNEL BANDWIDTH

Test Requirement:	FCC Part15 C Section 15.215 (c)
Test Method:	ANSI C63.10: 2013

5.1 APPLIED PROCEDURES / LIMIT

Section	Test Item	Frequency Range (MHz)	Result
15.215 (c)	Bandwidth	2400-2483.5	PASS

5.2 TEST PROCEDURE

1. Set resolution bandwidth (RBW) = 30 kHz.
2. Set the video bandwidth (VBW) $\geq 3 \times$ RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. Sweep = auto couple.
6. Allow the trace to stabilize.
7. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

5.3 DEVIATION FROM STANDARD

No deviation.

5.4 TEST SETUP



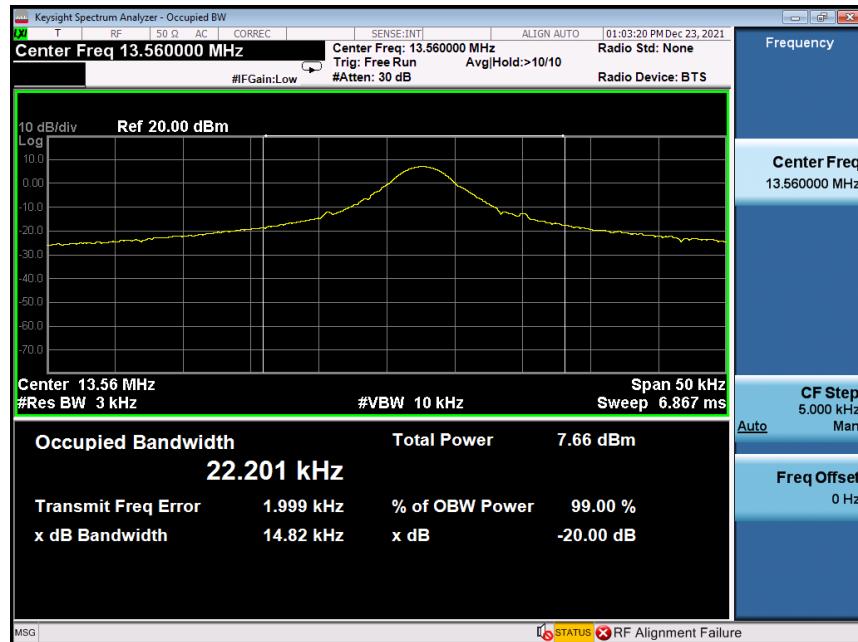
5.5 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

5.6 TEST RESULTS

Temperature :	26°C	Relative Humidity :	54%
Test Mode :	ASK	Test Voltage :	AC120V

Test Channel (MHz)	20dB Occupy Bandwidth (kHz)	Limit (kHz)	Conclusion
13.56	14.82	N/A	PASS



6. FREQUENCY STABILITY

Test Requirement:	FCC Part15 C Section 15.225
Test Method:	ANSI C63.10: 2013

6.1 APPLIED PROCEDURES / LIMIT

Section	Test Item	Limit	Result
15.225 (e)	frequency tolerance of the carrier signal	±0.01%	PASS

6.2 TEST PROCEDURE

1. Set resolution bandwidth (RBW) = 10 kHz.
2. Set the video bandwidth (VBW) \geq RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. Sweep = auto couple.
6. Allow the trace to stabilize.

6.3 DEVIATION FROM STANDARD

No deviation.

6.4 TEST SETUP



6.5 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

6.6 TEST RESULTS

Voltage (V)	Temperature (°C)	Frequency (MHz)	Deviation (%)	Limit (%)
AC 120	-20	13.560053	0.00039003	+/-0.01%
AC 120	-10	13.560517	0.00381620	
AC 120	0	13.560132	0.00097155	
AC 120	10	13.560564	0.00415899	
AC 120	20	13.560178	0.00131313	
AC 120	30	13.560569	0.00419876	
AC 120	40	13.560024	0.00017817	
AC 120	50	13.560074	0.00054922	
AC138	-20	13.560412	0.00303838	

AC138	-10	13.560133	0.00098275
AC138	0	13.560384	0.00283041
AC138	10	13.560580	0.00427990
AC138	20	13.560207	0.00152675
AC138	30	13.560552	0.00407080
AC138	40	13.560452	0.00333651
AC138	50	13.560426	0.00314506
AC138	-20	13.560019	0.00014109
AC138	-10	13.560600	0.00442539
AC102	0	13.560728	0.00537101
AC102	10	13.560290	0.00214106
AC102	20	13.560404	0.00297825
AC102	30	13.560150	0.00110543
AC102	40	13.560067	0.00049297
AC102	50	13.560637	0.00469941

7. ANTENNA REQUIREMENT

Standard requirement:	FCC Part15 C Section 15.203
<p>15.203 requirement: An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.</p>	
<p>EUT Antenna: The antenna is loop antenna, the best case gain of the antennas is 1.8dBi, reference to the appendix II for details loop antenna</p>	

8. TEST SETUP PHOTO

Reference to the test setup file for details.

9. EUT CONSTRUCTIONAL DETAILS

Please refer to external photos file and internal photos file

***** END OF REPORT *****