FCC TEST REPORT

FOR

Beijing Yunji Technology Co.,Ltd.

Iot Module of Robot Elevator

Test Model: IOT-LIFT03

Prepared for	:	Beijing Yunji Technology Co.,Ltd.
Address	:	Floor 5,Hailong Mansion,No.1 Zhongguancun Avenue, Haidian District, Beijing, China
Prepared by	:	Shenzhen LCS Compliance Testing Laboratory Ltd.
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Date of receipt of test sample	:	December 01, 2022
Number of tested samples	:	2
Sample No.	:	A120122009-1, A120122009-2
Serial number	:	Prototype
Date of Test	:	December 01, 2022 ~ January 04, 2022
Date of Report	:	January 04, 2023

FCC TEST REPORT

FCC CFR 47 PART 15 F

Report Reference No.	**:**	**LCSA120122009EB**
Date of Issue.....	:	January 04, 2023
Testing Laboratory Name	**:**	**Shenzhen LCS Compliance Testing Laboratory Ltd.**
Address.....	:	101, 201 Bldg A & 301 Bldg C, Juji Industrial Park Yabianxueziwei, Shajing Street, Baoan District, Shenzhen, 518000, China
Testing Location/ Procedure.....	:	Full application of Harmonised standards ■ Partial application of Harmonised standards □ Other standard testing method □
Applicant's Name.....	**:**	**Beijing Yunji Technology Co.,Ltd.**
Address.....	:	Floor 5,Hailong Mansion,No.1 Zhongguancun Avenue, Haidian District, Beijing, China
Test Specification		
Standard.....	:	FCC CFR 47 PART 15F
Test Report Form No.	:	LCSEMC-1.0
TRF Originator	:	Shenzhen LCS Compliance Testing Laboratory Ltd.
Master TRF	:	Dated 2022-08

Test Item Description.	**:**	**Iot Module of Robot Elevator**
Trade Mark.....	:	Yunji
Test Model	:	IOT-LIFT03
Ratings.....	:	For AC Adapter Model: GM12-120100-1A Input: 100-240V~, 50/60Hz, 0.5A Output: 12V⎓1.0A
Result	**:**	**Positive**

Compiled by:	**Supervised by:**	**Approved by:**
Kay Hu/ Administrator	Cary Luo/ Technique principal	Gavin Liang / Manager

FCC -- TEST REPORT

Test Report No. : LCSA120122009EB	January 04, 2023 Date of issue

Test Model.....	: IOT-LIFT03
EUT.....	: Iot Module of Robot Elevator
Applicant.....	**: Beijing Yunji Technology Co.,Ltd.**
Address.....	: Floor 5,Hailong Mansion,No.1 Zhongguancun Avenue, Haidian District, Beijing, China
Telephone.....	: /
Fax.....	: /
Manufacturer.....	**: Beijing Yunji Technology Co.,Ltd.**
Address.....	: Floor 5,Hailong Mansion,No.1 Zhongguancun Avenue, Haidian District, Beijing, China
Telephone.....	: /
Fax.....	: /
Factory.....	**: *I***
Address.....	: /
Telephone.....	: /
Fax.....	: /

Test Result	**Positive**

The test report merely corresponds to the test sample.
It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

Revision History

Report Version	Issue Date	Revision Content	Revised By
000	January 04, 2023	Initial Issue	--

TABLE OF CONTENTS

1. GENERAL INFORMATION

1.1 Description of Device (EUT)

EUT	:	Iot Module of Robot Elevator
Test Model	:	IOT-LIFT03
Power Supply	:	For AC Adapter Model: GM12-120100-1A Input: 100-240V~, 50/60Hz, 0.5A Output: 12V⎓1.0A
Hardware Version	:	/
Software Version	:	/
2.4G		
Frequency Range	:	2405MHz
Channel Number	:	1 Channel
Modulation Type	:	GFSK
Antenna Description	:	External Antenna, 5dBi (Max.)
UWB		
Frequency Range	:	3744MHz-4243MHz
Channel Number	:	1
Sample Type	:	Indoor Use
Modulation Type	:	PM
Antenna Description	:	External Antenna, 0dBi(Max)

1.2 Support equipment List

Manufacturer	Description	Model	Serial Number	Certificate
--	Adapter	GM12-120100-1A	A2111348464	FCC
--	Adapter	GM12-120100-1A	A2111348520	FCC

1.3 External I/O Cable

I/O Port Description	Quantity	Cable
Power Port	1	N/A
LAN Port	1	N/A

1.4 Description of Test Facility

NVLAP Accreditation Code is 600167-0.

FCC Designation Number is CN5024.

CAB identifier is CN0071.

CNAS Registration Number is L4595.

Test Firm Registration Number: 254912.

The 3m-Semi anechoic test site fulfills CISPR 16-1-4 according to ANSI C63.10:2013 and CISPR 16-1-4:2010 SVSWR requirement for radiated emission above 1GHz.

1.5 Statement of the Measurement Uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. To CISPR 16 – 4 “Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements” and is documented in the LCS quality system acc. To DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

1.6 Measurement Uncertainty

Test Item		Frequency Range	Uncertainty	Note
Radiation Uncertainty	:	9KHz~30MHz	3.10dB	(1)
		30MHz~200MHz	2.96dB	(1)
		200MHz~1000MHz	3.10dB	(1)
		1GHz~26.5GHz	3.80dB	(1)
		26.5GHz~40GHz	3.90dB	(1)
Conduction Uncertainty	:	150kHz~30MHz	1.63dB	(1)
Power disturbance	:	30MHz~300MHz	1.60dB	(1)

(1). This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

1.7 Description of Test Modes

The EUT works in the X-axis, Y-axis, Z-axis. The following operating modes were applied for the related test items. All test modes were tested, only the result of the worst case was recorded in the report.

Mode of Operations	Frequency Range (MHz)
UWB	3744MHz-4243MHz

Worst-case mode and channel used for 150 KHz-30 MHz power line conducted emissions was determined to be TX.

Worst-case mode and channel used for 9 KHz-1000 MHz radiated emissions was determined to be TX.

Pre-test AC conducted emission at charge from Low Channel mode, recorded worst case.

Pre-test AC conducted emission at both voltage AC 120V/60Hz and AC 240V/60Hz, recorded worst case.

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.10-2013, FCC CFR PART 15F 15.517, 15.521 and 15.203.

2.1 EUT Configuration

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner that intends to maximize its emission characteristics in a continuous normal application.

2.2 EUT Exercise

The EUT was operated in the normal operating mode for Hopping Numbers and Dwell Time test and a continuous transmits mode for other tests.

According to its specifications, the EUT must comply with the requirements of the Section 15.517, 15.521 and 15.203 under the FCC Rules Part 15 Subpart F.

2.3 General Test Procedures

2.3.1 Conducted Emissions

The EUT is placed on the turntable, which is 0.8 m above ground plane. According to the requirements in Section 6.1.1 of ANSI C63.10-2013 Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using Quasi-peak and average detector modes.

2.3.2 Radiated Emissions

The EUT is placed on a turn table, which is 0.8 m above ground plane below 1GHz and 1.5 m above ground plane above 1GHz. The turntable shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna, which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the maximum emissions, exploratory radiated emission measurements were made according to the requirements in Section 6.4 of ANSI C63.10-2013

2.4. Test Sample

The application provides 2 samples to meet requirement;

Sample Number	Description
Sample 1(A120122009-1)	Engineer sample – continuous transmit
Sample 2(A120122009-2)	Normal sample – Intermittent transmit

3. SYSTEM TEST CONFIGURATION

3.1 Justification

The system was configured for testing in a continuous transmits condition.

3.2 EUT Exercise Software

The system was configured for testing in a continuous transmits condition

3.3 Special Accessories

Manufacturer	Description	Model	Serial Number	Certificate
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3.4 Block Diagram/Schematics

Please refer to the related document.

3.5 Equipment Modifications

Shenzhen LCS Compliance Testing Laboratory Ltd. has not done any modification on the EUT.

3.6 Test Setup

Please refer to the test setup photo.

4. SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Test Sample	Result
§15.517(c)(e)	EIRP	Sample 1	Compliant
§15.517(c) §15.209(a)	Radiated Spurious Emissions	Sample 1 Sample 2	Compliant
§15.503(a)(d)	UWB Bandwidth	Sample 1	Compliant
§15.207	AC Mains Conducted Emissions	Sample 1	Compliant
§15.517(b)	Band Edges	Sample 1	Compliant
§15.519(a)(1)	Dwell Time	Sample 1	Compliant
§15.517(a3) §15.521(b) §15.203	Antenna Requirement	Sample 1	Compliant

5. SUMMARY OF TEST EQUIPMENT

Item	Equipment	Manufacturer	Model No.	Serial No.	Cal Date	Due Date
1	Power Meter	R&S	NRVS	100444	2022-06-16	2023-06-15
2	Power Sensor	R&S	NRV-Z81	100458	2022-06-16	2023-06-15
3	Power Sensor	R&S	NRV-Z32	10057	2022-06-16	2023-06-15
4	Test Software	Tonscend	JS1120-2	/	N/A	N/A
5	RF Control Unit	Tonscend	JS0806-2	N/A	2022-10-29	2023-10-28
6	MXA Signal Analyzer	Agilent	N9020A	MY50510140	2022-10-29	2023-10-28
7	DC Power Supply	Agilent	E3642A	N/A	2022-10-29	2023-10-28
8	EMI Test Software	AUDIX	E3	/	N/A	N/A
9	3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03CH03-HY	2022-06-16	2023-06-15
10	Positioning Controller	Max-Full	MF7802BS	MF780208586	N/A	N/A
11	Active Loop Antenna	SCHWARZBECK	FMZB 1519B	00005	2021-08-29	2024-08-28
12	By-log Antenna	SCHWARZBECK	VULB9163	9163-470	2021-09-12	2024-09-11
13	Horn Antenna	SCHWARZBECK	BBHA 9120D	9120D-1925	2021-09-05	2024-09-04
14	Broadband Horn Antenna	SCHWARZBECK	BBHA 9170	791	2021-08-29	2024-08-28
15	Broadband Preamplifier	SCHWARZBECK	BBV9719	9719-025	2022-06-16	2023-06-15
16	EMI Test Receiver	R&S	ESR 7	101181	2022-06-16	2023-06-15
17	RS SPECTRUM ANALYZER	R&S	FSP40	100503	2022-10-29	2023-10-28
18	Broadband Preamplifier	/	BP-01M18G	P190501	2022-06-16	2023-06-15
19	6dB Attenuator	/	100W/6dB	1172040	2022-06-16	2023-06-15
20	3dB Attenuator	/	2N-3dB	/	2022-10-29	2023-10-28
21	EMI Test Receiver	R&S	ESPI	101940	2022-08-18	2023-08-17
22	Artificial Mains	R&S	ENV216	101288	2022-06-16	2023-06-15
23	10dB Attenuator	SCHWARZBECK	MTS-IMP-136	261115-001-0032	2022-06-16	2023-06-15
24	EMI Test Software	Farad	EZ	/	N/A	N/A

6. MEASUREMENT RESULTS

6.1. EIRP

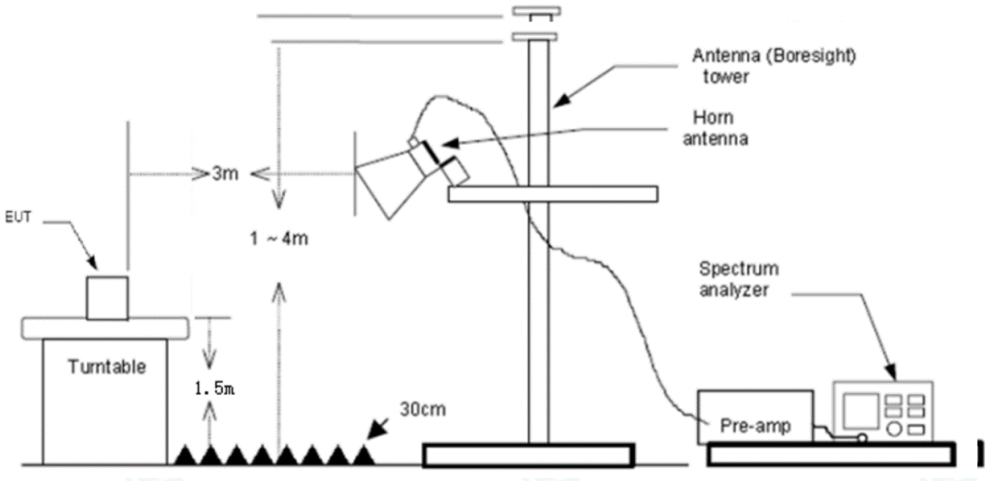
6.1.1 Limit

Frequency in MHz	Limit EIRP in dBm	Detector
960-1610	-75.3(RBW=1MHz) at 3m	Average
1610-1990	-53.3(RBW=1MHz) at 3m	Average
1990-3100	-51.3(RBW=1MHz) at 3m	Average
3100-10600	-41.3(RBW=1MHz) at 3m	Average
Above 10600	-51.3(RBW=1MHz) at 3m	Average
Fundamental	0(RBW=50MHz) at 3m	Peak

According to ANSI 63.10 Clause 10.3.9, the EIRP to field strength at a specified measurement distance of 3 m is below:
E = EIRP – 20log D + 104.77=EIRP+95.23
Where:
E = electric field strength in dBμV/m,
EIRP = equivalent isotropic radiated power in dBm
D = specified measurement distance in meters.
Thus, the field strength limit for the test above 1GHz is below:

Frequency in MHz	Limit EIRP in dBm	Limit EIRP in Field Strength(dBuV/m)	Detector
960-1610	-75.3(RBW=1MHz) at 3m	19.93 at 3m	Average
1610-1990	-53.3(RBW=1MHz) at 3m	41.93 at 3m	Average
1990-3100	-51.3(RBW=1MHz) at 3m	43.93 at 3m	Average
3100-10600	-41.3(RBW=1MHz) at 3m	53.93 at 3m	Average
Above 10600	-51.3(RBW=1MHz) at 3m	43.93 at 3m	Average
Fundamental	0(RBW=50MHz) at 3m	95.23 at 3m	Peak

6.1.2 Test Setup Layout



6.1.3 Test Procedure

1) Sequence of testing 960MHz to 18 GHz

Setup:

--- The equipment was set up to simulate a typical usage like described in the user manual or described by manufacturer.

--- If the EUT is a tabletop system, a rotatable table with 1.5 m height is used.

--- If the EUT is a floor standing device, it is placed on the ground plane with insulation between both.

--- Auxiliary equipment and cables were positioned to simulate normal operation conditions

--- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.

--- The measurement distance is 3 meter.

--- The EUT was set into operation.

Premeasurement:

--- The turntable rotates from 0° to 315° using 45° steps.

--- The antenna is polarized vertical and horizontal.

--- The antenna height scan range is 1 meter to 2.5 meter.

--- At each turntable position and antenna polarization the analyzer sweeps with peak detection to find the maximum of all emissions.

Final measurement:

--- The final measurement will be performed with minimum the six highest peaks.

--- According to the maximum antenna and turntable positions of premeasurement the software maximize the peaks by changing turntable position (± 45°) and antenna movement between 1 and 4 meter. This procedure is repeated for both antenna polarizations.

--- The final measurement will be done in the position (turntable, EUT-table and antenna polarization) causing the highest emissions with Peak and Average detector.

--- The final levels, frequency, measuring time, bandwidth, turntable position, EUT-table position, antenna polarization, correction factor, margin to the limit and limit will be recorded. Also a plot with the graph of the premeasurement with marked maximum final measurements and the limit will be stored.

2) Sequence of testing above 18 GHz

Setup:

--- The equipment was set up to simulate a typical usage like described in the user manual or described by manufacturer.

--- If the EUT is a tabletop system, a rotatable table with 1.5 m height is used.

--- If the EUT is a floor standing device, it is placed on the ground plane with insulation between both.

--- Auxiliary equipment and cables were positioned to simulate normal operation conditions

--- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.

--- The measurement distance is 1 meter.

--- The EUT was set into operation.

Premeasurement:

--- The antenna is moved spherical over the EUT in different polarizations of the antenna.

Final measurement:

--- The final measurement will be performed at the position and antenna orientation for all detected emissions that were found during the premeasurements with Peak and Average detector.

--- The final levels, frequency, measuring time, bandwidth, correction factor, margin to the limit and limit will be recorded. Also a plot with the graph of the premeasurement and the limit will be stored.

6.1.4. Test result:

The EUT was programmed to be in continuously transmitting mode.

6.1.5. Test result

Temperature	23.5℃	Humidity	52.2%
Test Engineer	Nick Peng	Atmospheric Pressure	1010 mbar

Peak Field Strength for fundamental @ RBW=8MHz				
Frequency (MHz)	Reading Level (dBuV)	Correction Factor (dB/m)	Result Level (dBuV/m)	Polarization
3994	54.9	-13.12	41.78	Horizontal
3994	56.41	-13.12	43.29	Vertical

Calculated Peak Field Strength for fundamental @ RBW=50MHz						
Frequency (MHz)	Measured Field Strength of fundamental (FS_M) (dBuV/m)	Limit for RBW=50MHz (dBuV/m) (L_{50M})	Caculated factor for RBW=50MHz to RBW=8MHz	Limit for RBW=8MHz (dBuV/m) (L_{8M})	Over Limit(dB)	Polarization
3994	70.82	95.23	-15.92	79.31	-24.41	Horizontal
3994	72.33	95.23	-15.92	79.31	-22.9	Vertical

Average Field Strength for fundamental @ RBW=1MHz				
Frequency (MHz)	Reading Level (dBuV)	Correction Factor (dB/m)	Result Level (dBuV/m)	Polarization
3994	36.84	-11.85	24.99	Horizontal
3994	38.35	-11.85	26.50	Vertical

Result Level = Reading + Factor, Margin = Level – Limit,

Factor = Antenna Factor + Cable Loss - Preamp Factor

Note: $L_{10M} = L_{50M} + 20\log(8MHz/50MHz) = L_{50M} - 15.92$

6.2. UWB Bandwidth (10dB Bandwidth)

6.2.1. Standard Applicable

47 CFR Part 15F Section 15.503;

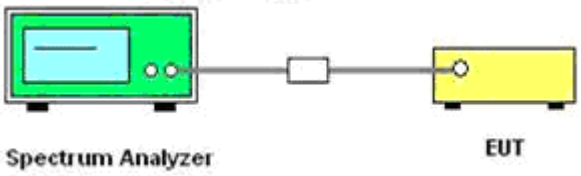
6.2.2. Limit

≥500MHz

6.2.3. Test Procedures

Refer to FCC Part 15.503(a)(b)(c)

6.2.4. Test Setup Layout



6.2.5. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

6.2.6. Test Result

Temperature	23.5℃	Humidity	52.2%
Test Engineer	Nick Peng	Atmospheric Pressure	1010 mbar

Frequency (MHz)	FL (MHz)	FH (MHz)	10dB bandwidth (MHz)	Limit (MHz)	Results
3994	3625.8	4313.462	516.4	≥500MHz	PASS

6.3. Band Edges

6.3.1. Standard Applicable

47 CFR Part 15F Section 15.517(b);

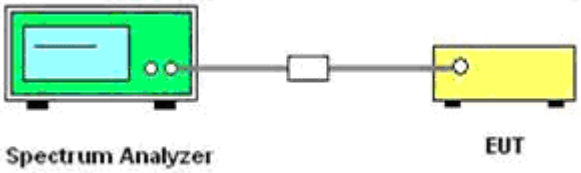
6.3.2. Limit

The UWB bandwidth of a UWB system operating under the provisions of this section must be contained between 3100 MHz and 10,600 MHz

6.3.3. Test Procedures

Refer to FCC Part 15.503(a)(b)(c)

6.3.4. Test Setup Layout



6.3.5. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

6.3.6. Test Result

Temperature	23.5℃	Humidity	52.2%
Test Engineer	Nick Peng	Atmospheric Pressure	1010 mbar

Frequency (MHz)	FL (MHz)	FH (MHz)	Limit (MHz)	Results
3994	3624.9	4320.120	3100 MHz -10600 MHz	PASS

6.4. Radiated Spurious Emissions

6.4.1. Standard Applicable

15.205 (a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

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			

\1\ Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.

\2\ Above 38.6

A47 CFR Part 15, Subpart F Section 15.519 (c)(d) & 15.209 & 15.521 (c)(d)(e)(g)(h).

Frequencies (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
960-1610	-75.3 dBm (RBW=1MHz) Average	3
1610-1990	-53.3 dBm (RBW=1MHz) Average	3
1990-3100	-51.3 dBm (RBW=1MHz) Average	3
3100-10600	-41.3 dBm (RBW=1MHz) Average	3
Above 10600	-51.3 dBm (RBW=1MHz) Average	3
1164-1240	-85.3 dBm (RBW=1KHz) Average	3
1559-1610	-85.3 dBm (RBW=1KHz) Average	3

6.4.2. Measuring Instruments and Setting

Please refer to of equipment list in this report. The following table is the setting of spectrum analyzer and receiver.

Spectrum Parameter	Setting
Attenuation	Auto

Start Frequency	1000 MHz
Stop Frequency	10th carrier harmonic
RB / VB (Emission in restricted band)	1MHz / 1MHz for Peak, 1 MHz / 1/T kHz for Average
RB / VB (Emission in non-restricted band)	1MHz / 1MHz for Peak, 1 MHz / 1/T kHz for Average

Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RB/VB 200Hz/1KHz for QP/AVG
Start ~ Stop Frequency	150kHz~30MHz / RB/VB 9kHz/30KHz for QP/AVG
Start ~ Stop Frequency	30MHz~1000MHz / RB/VB 120kHz/1MHz for QP

6.4.3. Test Procedures

1) Sequence of testing 9 kHz to 30 MHz

Setup:

--- The equipment was set up to simulate a typical usage like described in the user manual or described by manufacturer.

--- If the EUT is a tabletop system, a rotatable table with 0.8 m height is used.

--- If the EUT is a floor standing device, it is placed on the ground.

--- Auxiliary equipment and cables were positioned to simulate normal operation conditions.

--- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.

--- The measurement distance is 3 meter.

--- The EUT was set into operation.

Premeasurement:

--- The turntable rotates from 0° to 315° using 45° steps.

--- The antenna height is 1.0 meter.

--- At each turntable position the analyzer sweeps with peak detection to find the maximum of all emissions

Final measurement:

--- Identified emissions during the premeasurement the software maximizes by rotating the turntable position (0° to 360°) and by rotating the elevation axes (0° to 360°).

--- The final measurement will be done in the position (turntable and elevation) causing the highest emissions with QPK detector.

--- The final levels, frequency, measuring time, bandwidth, turntable position, correction factor, margin to the limit and limit will be recorded. Also a plot with the graph of the premeasurement and the limit will be stored.

2) Sequence of testing 30 MHz to 1 GHz

Setup:

--- The equipment was set up to simulate a typical usage like described in the user manual or described by manufacturer.

--- If the EUT is a tabletop system, a table with 0.8 m height is used, which is placed on the ground plane.

--- If the EUT is a floor standing device, it is placed on the ground plane with insulation between both.

--- Auxiliary equipment and cables were positioned to simulate normal operation conditions

--- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.

--- The measurement distance is 3 meter.

--- The EUT was set into operation.

Premeasurement:

--- The turntable rotates from 0° to 315° using 45° steps.

--- The antenna is polarized vertical and horizontal.

--- The antenna height changes from 1 to 4 meter.

--- At each turntable position, antenna polarization and height the analyzer sweeps three times in peak to find the maximum of all emissions.

Final measurement:

--- The final measurement will be performed with minimum the six highest peaks.

--- According to the maximum antenna and turntable positions of premeasurement the software maximize the peaks by changing turntable position (± 45°) and antenna movement between 1 and 4 meter.

--- The final measurement will be done with QP detector with an EMI receiver.

--- The final levels, frequency, measuring time, bandwidth, antenna height, antenna polarization, turntable angle, correction factor, margin to the limit and limit will be recorded. Also a plot with the graph of the premeasurement with marked maximum final measurements and the limit will be stored.

3) Sequence of testing 1 GHz to 18 GHz

Setup:

--- The equipment was set up to simulate a typical usage like described in the user manual or described by manufacturer.

--- If the EUT is a tabletop system, a rotatable table with 1.5 m height is used.

--- If the EUT is a floor standing device, it is placed on the ground plane with insulation between both.

--- Auxiliary equipment and cables were positioned to simulate normal operation conditions

--- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.

--- The measurement distance is 3 meter.

--- The EUT was set into operation.

Premeasurement:

--- The turntable rotates from 0° to 315° using 45° steps.

--- The antenna is polarized vertical and horizontal.

--- The antenna height scan range is 1 meter to 4 meter.

--- At each turntable position and antenna polarization the analyzer sweeps with peak detection to find the maximum of all emissions.

Final measurement:

--- The final measurement will be performed with minimum the six highest peaks.

--- According to the maximum antenna and turntable positions of premeasurement the software maximize the peaks by changing turntable position (± 45°) and antenna movement between 1 and 4 meter. This procedure is repeated for both antenna polarizations.

--- The final measurement will be done in the position (turntable, EUT-table and antenna polarization) causing the highest emissions with Peak and Average detector.

--- The final levels, frequency, measuring time, bandwidth, turntable position, EUT-table position, antenna polarization, correction factor, margin to the limit and limit will be recorded. Also a plot with the graph of the premeasurement with marked maximum final measurements and the limit will be stored.

4) Sequence of testing above 18 GHz

Setup:

--- The equipment was set up to simulate a typical usage like described in the user manual or described by manufacturer.

--- If the EUT is a tabletop system, a rotatable table with 1.5 m height is used.

--- If the EUT is a floor standing device, it is placed on the ground plane with insulation between both.

--- Auxiliary equipment and cables were positioned to simulate normal operation conditions

--- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.

--- The measurement distance is 1 meter.

--- The EUT was set into operation.

Premeasurement:

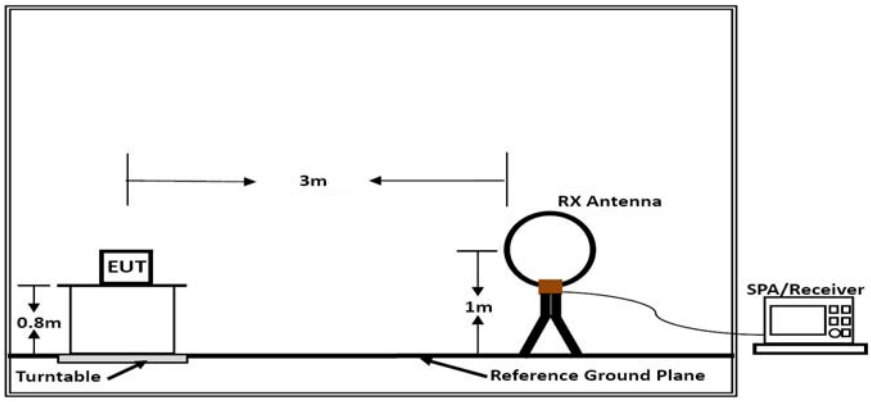
--- The antenna is moved spherical over the EUT in different polarizations of the antenna.

Final measurement:

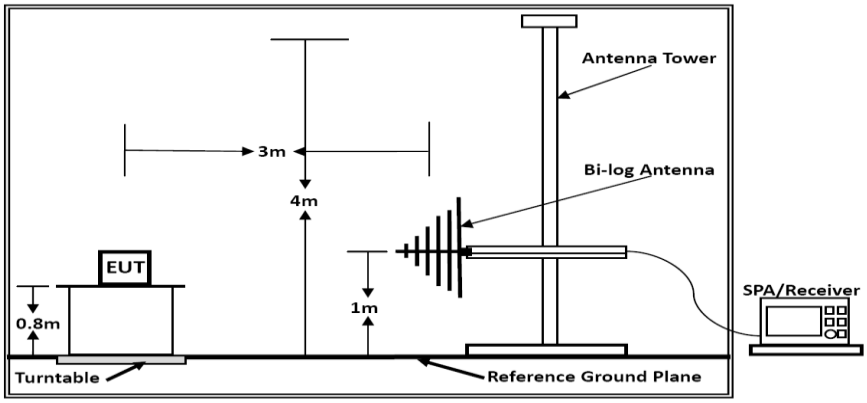
--- The final measurement will be performed at the position and antenna orientation for all detected emissions that were found during the premeasurements with Peak and Average detector.

--- The final levels, frequency, measuring time, bandwidth, correction factor, margin to the limit and limit will be recorded. Also a plot with the graph of the premeasurement and the limit will be stored.

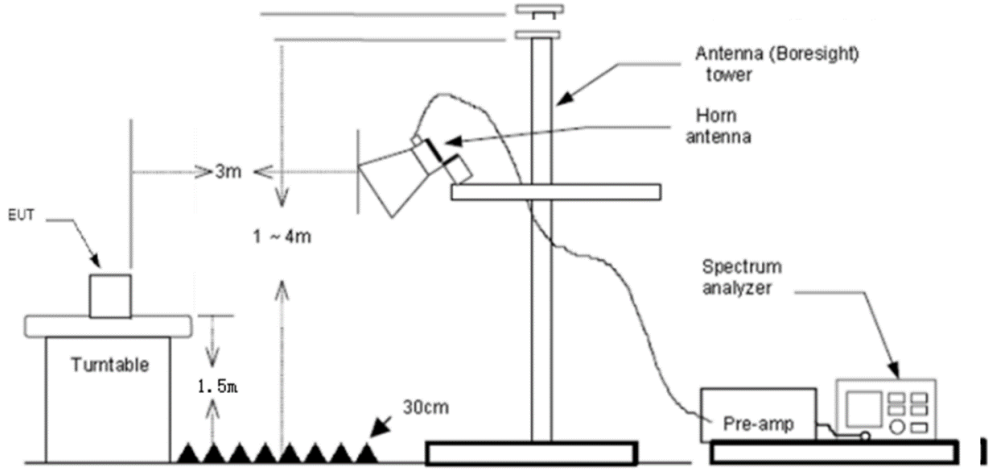
6.4.4. Test Setup Layout



Below 30MHz



Below 1GHz



Above 10 GHz shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade form 3m to 1.5m.

6.4.5. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

6.4.6. Results of Radiated Emissions (9 KHz~30MHz)

Temperature	23.8℃	Humidity	52.1%
Test Engineer	Nick Peng	Atmospheric Pressure	1010 mbar

Freq. (MHz)	Level (dBuV)	Over Limit (dB)	Over Limit (dBuV)	Remark
-	-	-	-	See Note

Note:

The amplitude of spurious emissions which are attenuated by more than 20 dB below the permissible value has no need to be reported.

Distance extrapolation factor = 40 log (specific distance / test distance) (dB);
Limit line = specific limits (dBuV) + distance extrapolation factor.

6.4.7. Results of Radiated Emissions (30 MHz~1000 MHz)

Temperature	23.8℃	Humidity	52.1%
Test Engineer	Nick Peng	Atmospheric Pressure	1010 mbar

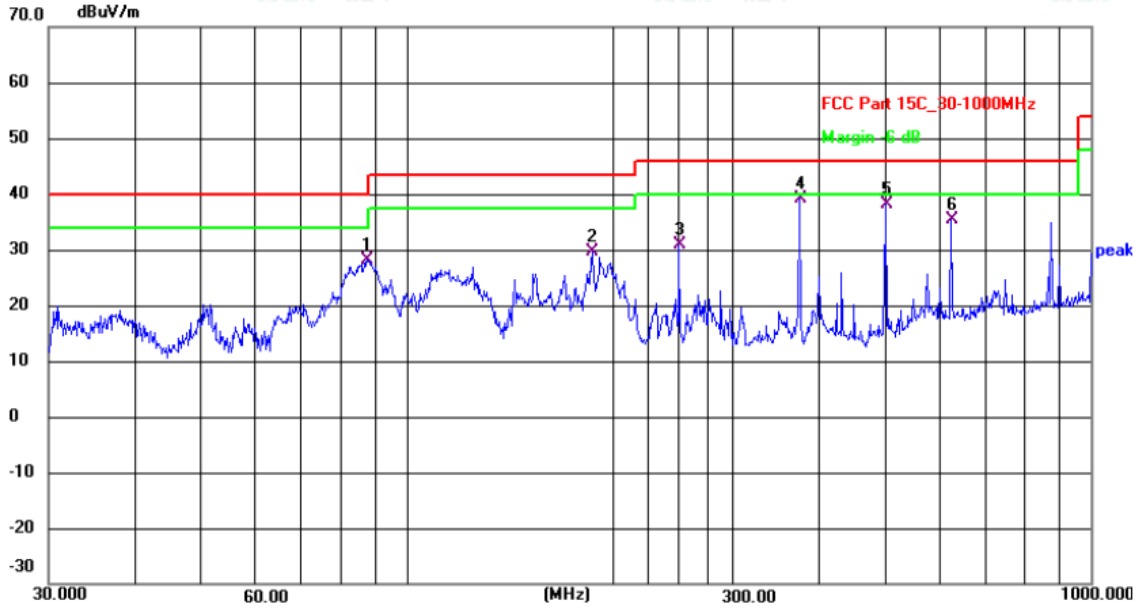
PASS.

Only record the worst test result in this report.

The test data please refer to following page.

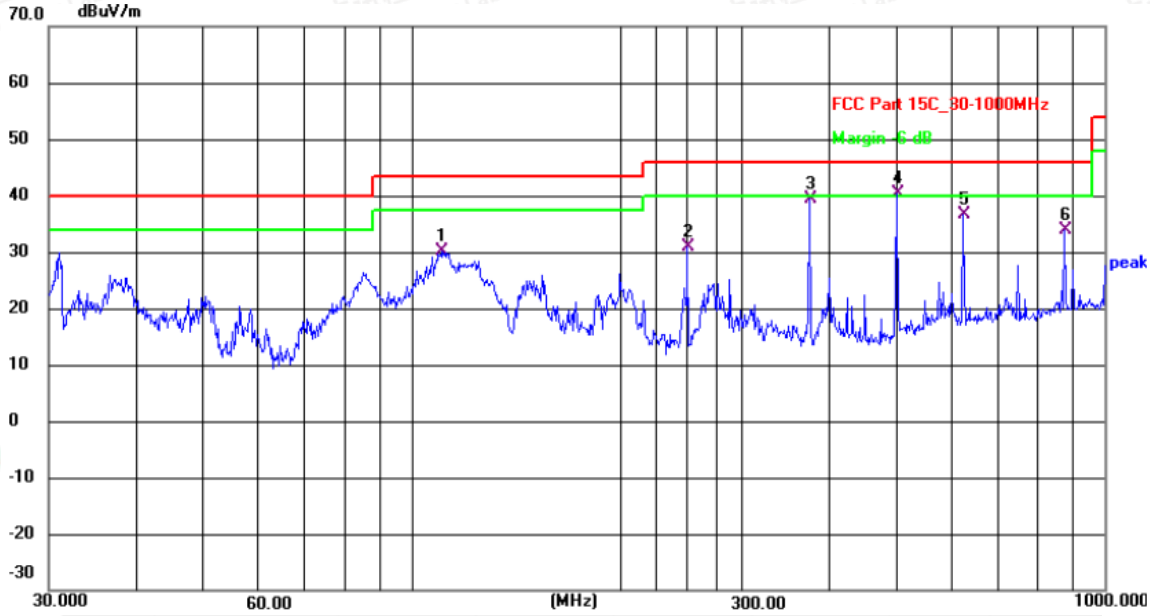
Below 1GHz

Horizontal



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	87.7246	47.18	-19.11	28.07	40.00	-11.93	QP
2	187.0956	47.25	-17.73	29.52	43.50	-13.98	QP
3	250.3011	46.49	-15.61	30.88	46.00	-15.12	QP
4	375.9385	53.85	-14.72	39.13	46.00	-6.87	QP
5	501.1790	51.34	-13.14	38.20	46.00	-7.80	QP
6	625.0780	46.47	-11.08	35.39	46.00	-10.61	QP

Vertical



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	110.5686	49.27	-19.11	30.16	43.50	-13.34	QP
2	250.3011	46.61	-15.61	31.00	46.00	-15.00	QP
3	375.9385	54.17	-14.72	39.45	46.00	-6.55	QP
4	501.1790	53.43	-13.14	40.29	46.00	-5.71	QP
5	625.0780	47.66	-11.08	36.58	46.00	-9.42	QP
6	875.2469	42.62	-8.69	33.93	46.00	-12.07	QP

Note:

1). Pre-scan all modes and recorded the worst case results in this report (BT 3Mbps-Low Channel).

2). Emission level (dBuV/m) = 20 log Emission level (uV/m).

3). Level = Reading + Factor, Margin = Level–Limit, Factor = Antenna Factor + Cable Loss - Preamp Factor.

6.4.8. Results of Radiated Emissions (1 GHz~26 GHz)

Note: All the modes have been tested and recorded worst mode in the report.

Freq. MHz	Reading dBuv	Ant. Fac dB/m	Pre. Fac. dB	Cab. Loss dB	Measured dBuv/m	Limit dBuv/m	Margin dB	Remark	Pol.
4810.00	59.96	33.06	35.04	3.94	61.92	74.00	-12.08	Peak	Horizontal
4810.00	45.54	33.06	35.04	3.94	47.50	54.00	-6.50	Average	Horizontal
4810.00	59.02	33.06	35.04	3.94	60.98	74.00	-13.02	Peak	Vertical
4810.00	45.31	33.06	35.04	3.94	47.27	54.00	-6.73	Average	Vertical

Notes:

1). Measuring frequencies from 9 KHz~10th harmonic (ex. 26GHz), at least have 20dB margin found between lowest internal used/generated frequency to 30 MHz.

2). Radiated emissions measured in frequency range from 9 KHz~10th harmonic (ex. 26GHz) were made with an instrument using Peak detector mode.

3). 18~25GHz at least have 20dB margin. No recording in the test report.

4). Measured Level = Reading Level + Factor, Margin = Measured Level – Limit, Factor = Antenna Factor + Cable Loss - Preamp Factor

6.5. AC Power Line Conducted Emissions

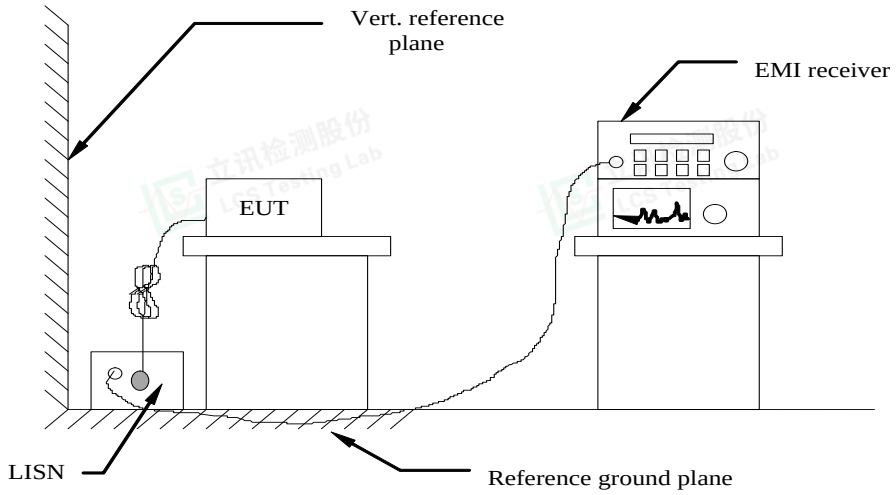
6.5.1 Standard Applicable

According to §15.207 (a): For an intentional radiator which is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed 250 microvolts (The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz). The limits at specific frequency range is listed as follows:

Frequency Range (MHz)	Limits (dBμV)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56	56 to 46
0.50 to 5	56	46
5 to 30	60	50

* Decreasing linearly with the logarithm of the frequency

6.5.2 Block Diagram of Test Setup



6.5.3 Test Results

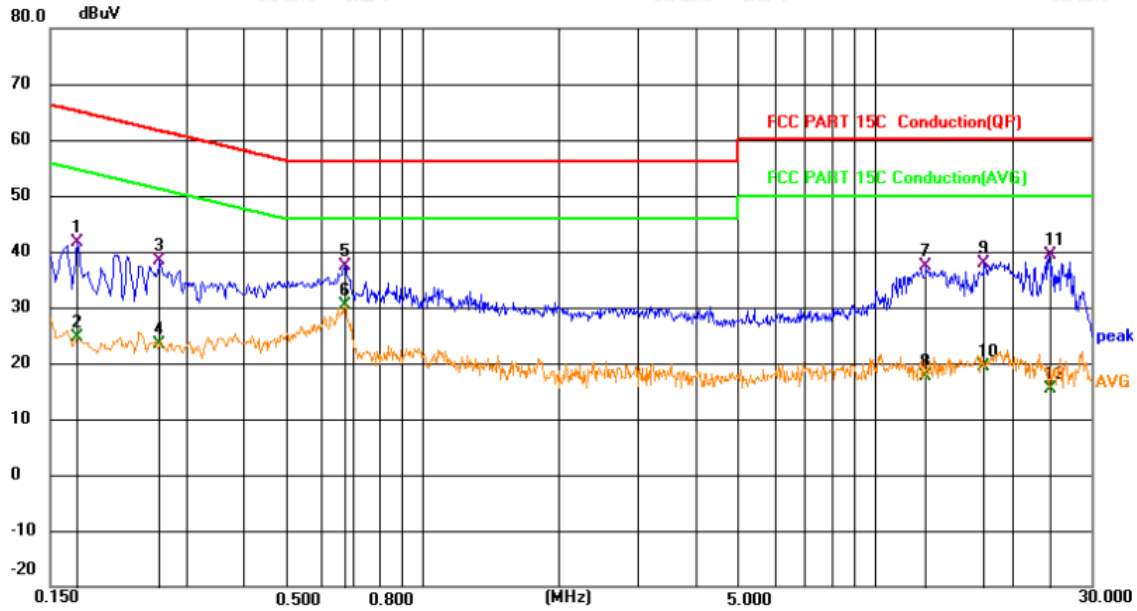
PASS.

The test data please refer to following page.

Temperature	24.5℃	Humidity	53.5%
Test Engineer	Nick Peng	Atmospheric Pressure	1010 mbar

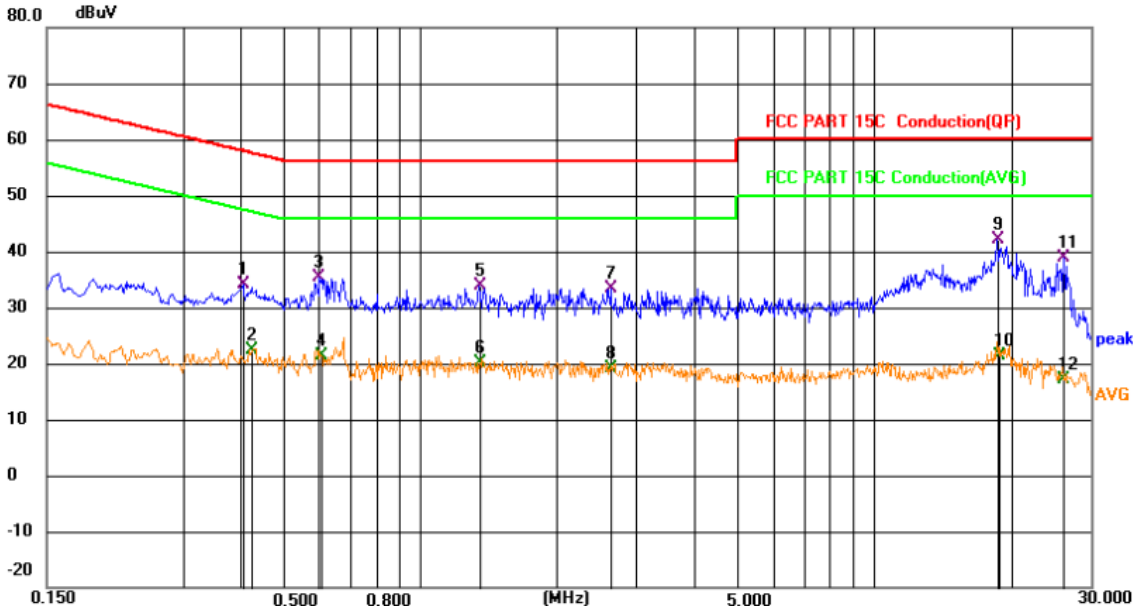
AC Conducted Emission @ AC 120V/60Hz (worst case)

Line



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1726	21.95	19.63	41.58	64.83	-23.25	QP	
2		0.1726	4.92	19.63	24.55	54.83	-30.28	AVG	
3		0.2626	18.80	19.63	38.43	61.35	-22.92	QP	
4		0.2626	3.75	19.63	23.38	51.35	-27.97	AVG	
5		0.6720	17.69	19.65	37.34	56.00	-18.66	QP	
6	*	0.6720	10.65	19.65	30.30	46.00	-15.70	AVG	
7		12.9571	17.45	19.85	37.30	60.00	-22.70	QP	
8		12.9571	-2.17	19.85	17.68	50.00	-32.32	AVG	
9		17.4571	17.84	20.09	37.93	60.00	-22.07	QP	
10		17.4571	-0.74	20.09	19.35	50.00	-30.65	AVG	
11		24.1529	19.42	20.04	39.46	60.00	-20.54	QP	
12		24.1529	-4.64	20.04	15.40	50.00	-34.60	AVG	

Neutral



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.4066	14.45	19.63	34.08	57.72	-23.64	QP	
2		0.4245	2.67	19.63	22.30	47.36	-25.06	AVG	
3		0.6000	15.61	19.66	35.27	56.00	-20.73	QP	
4		0.6010	1.64	19.66	21.30	46.00	-24.70	AVG	
5		1.3469	14.12	19.66	33.78	56.00	-22.22	QP	
6		1.3560	0.44	19.66	20.10	46.00	-25.90	AVG	
7		2.6295	13.64	19.71	33.35	56.00	-22.65	QP	
8		2.6385	-0.50	19.71	19.21	46.00	-26.79	AVG	
9	*	18.6360	21.90	20.17	42.07	60.00	-17.93	QP	
10		18.8340	1.19	20.18	21.37	50.00	-28.63	AVG	
11		26.2636	18.80	20.03	38.83	60.00	-21.17	QP	
12		26.2636	-2.97	20.03	17.06	50.00	-32.94	AVG	

****Note: Pre-scan all modes and recorded the worst case results in this report (BT 3Mbps-Low Channel). Measurement = Reading + Correct, Margin = Measurement – Limit.*

6.6. Antenna Requirement

6.6.1 Standard Applicable

47 CFR Part 15, Subpart C 15.203 & 15.519(a)(2); RSS-Gen Clause 6.8

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 re-placed by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of Sections 15.211, 15.213, 15.217, 15.219, or 15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with Section 15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this Part are not exceeded.

6.6.2 Antenna Connected Construction

6.6.4.1. Standard Applicable

According to § 15.203 & RSS-Gen, 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.

15.517(a)(3)

The use of outdoor mounted antennas, e.g., antennas mounted on the outside of a building or on a telephone pole, or any other outdoors infrastructure is prohibited.

15.521(b)

Manufacturers and users are reminded of the provisions of §§ 15.203 and 15.204.

6.6.4.2. Antenna Connector Construction

The directional gains of antenna used for transmitting is 0dBi(Max), and the antenna is an External Antenna connect to PCB board and no consideration of replacement. Please see EUT photo for details.

6.6.4.3. Results: Compliance.

7. TEST SETUP PHOTOGRAPHS OF EUT

Please refer to separated files for Test Setup Photos of the EUT.

8. EXTERIOR PHOTOGRAPHS OF THE EUT

Please refer to separated files for External Photos of the EUT.

9. INTERIOR PHOTOGRAPHS OF THE EUT

Please refer to separated files for Internal Photos of the EUT.

----------THE END OF TEST REPORT----------