



ZHONGHAN

Project No.: ZHT-240628014E-5

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## FCC TEST REPORT

### FCC ID:2AH4J-HUB422

Report Number.....: ZHT-240628014E-5

Date of Test.....: June 28, 2024 to Aug. 26, 2024

Date of issue.....: Aug. 26, 2024

Test Result.....: PASS

Testing Laboratory.....: Guangdong Zhonghan Testing Technology Co., Ltd.

Address .....: Room 104, Building 1, Yibaolai Industrial Park, Qiaotou Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China

Applicant's name .....: Consumer 2.0

Address .....: 6300 Wilshire Blvd Suite 620, Los Angeles, CA 90048,United States

Manufacturer's name .....: Consumer 2.0

Address .....: 6300 Wilshire Blvd Suite 620, Los Angeles, CA 90048,United States

#### Test specification:

Standard.....: FCC CFR Title 47 Part 15 Subpart C Section 15.249  
ANSI C63.10:2013

Test procedure.....: ANSI C63.10:2013

Non-standard test method .....: N/A

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

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Product name.....: Rently Hub 4

Trademark .....: /

Model/Type reference.....: HUB422, HUB422-1

Model Difference .....: All the model are of the same circuit and RF module, and the only difference is the Storage chip different.

Ratings.....: Input: DC 5V, 2.5A for adapter



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Testing procedure and testing location:

Testing Laboratory.....: Guangdong Zhonghan Testing Technology Co., Ltd.

Address.....: Room 104, Building 1, Yibaolai Industrial Park, Qiaotou Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China

Leon Li

Tested by (name + signature).....: Leon Li

Baret Wu

Reviewer (name + signature).....: Baret Wu

Levi Lee

Approved (name + signature).....: Levi Lee

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## 1.VERSION

Report No.	Version	Description	Approved
ZHT-240628014E-5	Rev.01	Initial issue of report	Aug. 26, 2024



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## 2. SUMMARY OF TEST RESULTS

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Test procedures according to the technical standards:

FCC Part15 (15.249) , Subpart C			
Standard Section	Test Item	Judgment	Remark
FCC part 15.203	Antennarequirement	PASS	
FCC part 15.207	AC Power Line Conducted Emission	PASS	
FCC part 15.249	Fundamental &Radiated Spurious Emission Measurement	PASS	
FCC part 15.215 (c)	20dB Channel Bandwidth	PASS	

### NOTE:

- (1) " N/A" denotes test is not applicable in this Test Report
- (2) EUT has two different types of storage chips, with the same circuit design, PCB layout, RF module/circuit, antenna type (s), and antenna location. The RF output power of the Storage chip 1 and Storage chip 2 are not significantly different, while the RF output power of the Storage chip 1 is slightly larger than that of the Storage chip 2. So chose the Storage chip 1 for all the tests.
- (3) All projects of Storage chip 1 and Storage chip 2 have been tested, and the report only reflects the worst test data of Storage chip 1.

## 2.1 TEST FACILITY

Guangdong Zhonghan Testing Technology Co., Ltd.

Add. : Room 104, Building 1, Yibaolai Industrial Park, Qiaotou Community, Fuhai Street, Bao'an District Shenzhen, Guangdong, China

FCC Registration Number:255941

Designation Number: CN0325

IC Registered No.: 29832

CAB identifier: CN0143

## 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 conducted power	$\pm 0.16\text{dB}$
3	Conducted spurious emissions	$\pm 0.21\text{dB}$
4	All radiated emissions (9k-30MHz)	$\pm 4.68\text{dB}$
5	All radiated emissions (<1G)	$\pm 4.68\text{dB}$
6	All radiated emissions (>1G)	$\pm 4.89\text{dB}$
7	Temperature	$\pm 0.5^\circ\text{C}$
8	Humidity	$\pm 2\%$
9	Occupied Bandwidth	$\pm 4.96\%$



## 3.1 GENERAL DESCRIPTION OF EUT

Product Name:	Rently Hub 4
Model No.:	HUB422, HUB422-1
Model Different.:	N/A
Hardware Version:	V1.0
Software Version:	V1.0
Sample(s) Status:	Engineer sample
Operation Frequency:	908.4MHz, 908.42MHz, 916MHz
Channel Numbers:	3
Modulation Type:	FSK(908.4MHz, 908.42MHz), QFSK(916MHz)
Antenna Type:	PCB Antenna
Antenna gain:	1dBi
Power supply:	Input: DC 5V, 2.5A for adapter
SWITCHING POWER ADAPTER:	Input: AC 100-240V, 50/60Hz Output: DC 5V, 2.5A
Sample Number:	240628014E-1#, 240628014E-2#

## Operation Frequency each of channel

Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
1	908.4MHz	2	908.42MHz	3	916MHz		

## Note:

In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

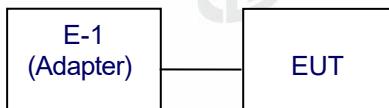
Channel	Frequency
The lowest channel	908.40MHz
The middle channel	908.42MHz
The Highest channel	916MHz

## 3.2 DESCRIPTION OF TEST MODES

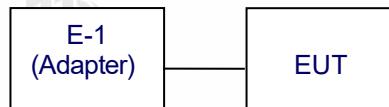
Transmitting mode	Keep the EUT in continuously transmitting mode
Remark: The EUT use new battery during the test. The test voltage was tuned from 85% to 115% of the nominal rated supply voltage, and found that the worst case was under the nominal rated supply condition. So the report just shows that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

### 3.3 BLOCK DIAGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED

#### Conducted Emission



#### Radiated Emission



### 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
E-1	Adapter	/	KN-CA018005	/	EUT

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.

## Radiation Test equipment

Item	Equipment	Manufacturer	Model	Serial No.	Last Cal.	Next Cal.
1	Receiver	R&S	ESCI	100874	May 10, 2024	May 09, 2025
2	Loop antenna	EMCI	LAP600	272	May 10, 2024	May 09, 2025
3	Amplifier	Schwarzbeck	BBV 9743 B	00378	May 10, 2024	May 09, 2025
4	Amplifier	Schwarzbeck	BBV 9718 B	00040	May 10, 2024	May 09, 2025
5	Bilog Antenna	Schwarzbeck	VULB9168	00498	Aug. 04, 2023	Aug. 03, 2024
6	Horn Antenna	Schwarzbeck	BBHA9120D	02623	May 16, 2024	May 15, 2025
7	Horn Antenna	A.H.SYSTEMS	SAS574	588	May 10, 2024	May 09, 2025
8	Amplifier	AEROFLEX	100KHz-40GHz	097	May 10, 2024	May 09, 2025
9	Spectrum Analyzer	R&S	FSV40	101413	May 16, 2024	May 15, 2025
10	966 Anechoic Chamber	EMToni	9m6m6m	/	Nov. 25, 2021	Nov. 24, 2024
11	Spectrum Analyzer	KEYSIGHT	N9020A	MY53420208	May 10, 2024	May 09, 2025
12	WIDBAND RADIO COMMUNICATION TESTER	R&S	CMW500	109863	May 10, 2024	May 09, 2025
13	Single Generator	Agilent	N5182A	MY48180575	May 10, 2024	May 09, 2025
14	Power Sensor	MWRFtest	MW100-RFCB	/	May 10, 2024	May 09, 2025
15	Power Amplifier Shielding Room	EMToni	2m3m3m	/	Nov. 25, 2021	Nov. 24, 2024

## Conduction Test equipment

Equipment	Manufacturer	Model	Serial No.	Last Cal.	Next Cal.
Receiver	R&S	ESCI	100874	May 10, 2024	May 09, 2025
LISN	R&S	ENV216	102794	May 10, 2024	May 09, 2025
ISN CAT 6	Schwarzbeck	NTFM 8158	00318	May 10, 2024	May 09, 2025
ISN CAT 5	Schwarzbeck	CAT5 8158	00343	May 10, 2024	May 09, 2025
Capacitive Voltage Probe	Schwarzbeck	CVP 9222 C	00101	May 10, 2024	May 09, 2025
Current Transformer Clamp	Schwarzbeck	SW 9605	SW9605 #209	May 10, 2024	May 09, 2025
CE Shielding Room	EMToni	9m4m3m	/	Nov. 25, 2021	Nov. 24, 2024

## Conducted Test equipment

Item	Equipment	Manufacturer	Model	Serial No.	Last Cal.	Next Cal.
1	Spectrum Analyzer	R&S	FSV40	101413	May 10, 2024	May 09, 2025
2	Spectrum Analyzer	KEYSIGHT	N9020A	MY53420208	May 10, 2024	May 09, 2025
3	Power Sensor	MWRFtest	MW100-RFCB	/	May 10, 2024	May 09, 2025

## 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:

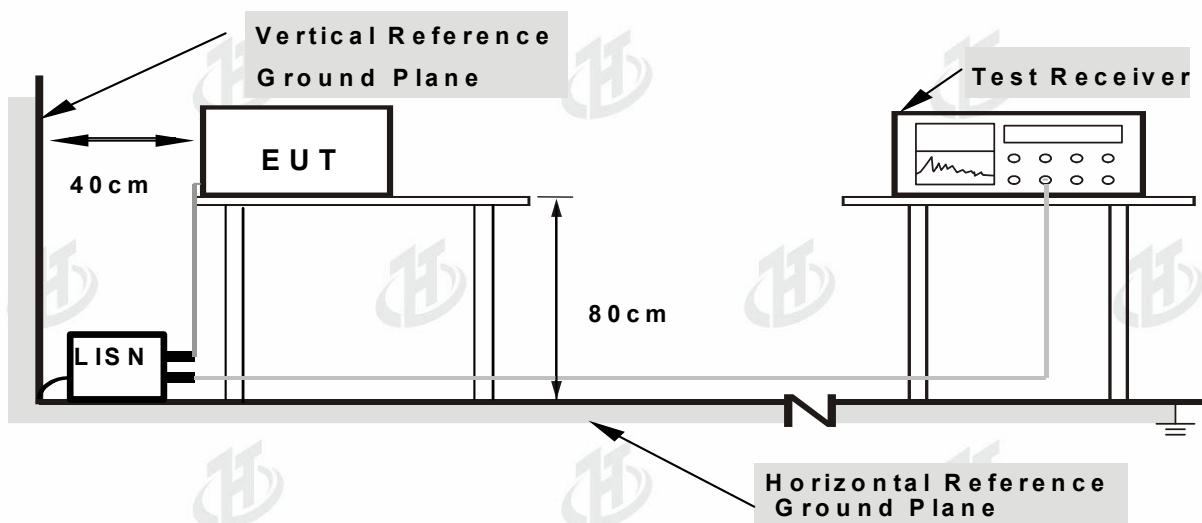
(1) \*Decreases with the logarithm of the frequency.

#### 4.1.2 TEST PROCEDURE

- 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.
- 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.
- 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.
- LISN at least 80 cm from nearest part of EUT chassis.
- For the actual test configuration, please refer to the related Item –EUT Test Photos.

#### 4.1.3 DEVIATION FROM TEST STANDARD

No deviation



**Note:**

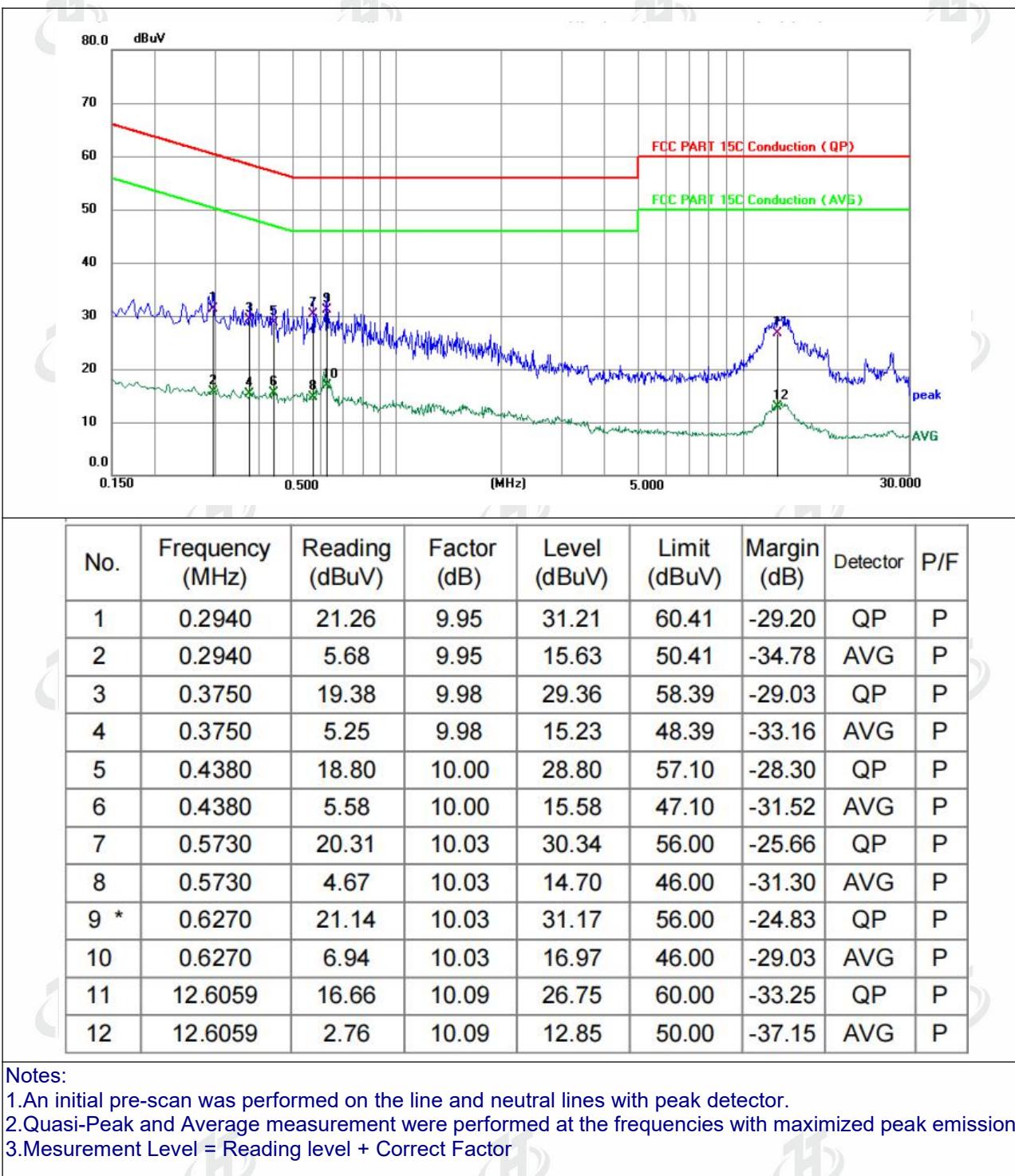
1. Support units were connected to second LISN.
2. Both of LISNs (AMN) are 80 cm from EUT and at least 80 cm from other units and other metal planes

#### 4.1.5 EUT OPERATING CONDITIONS

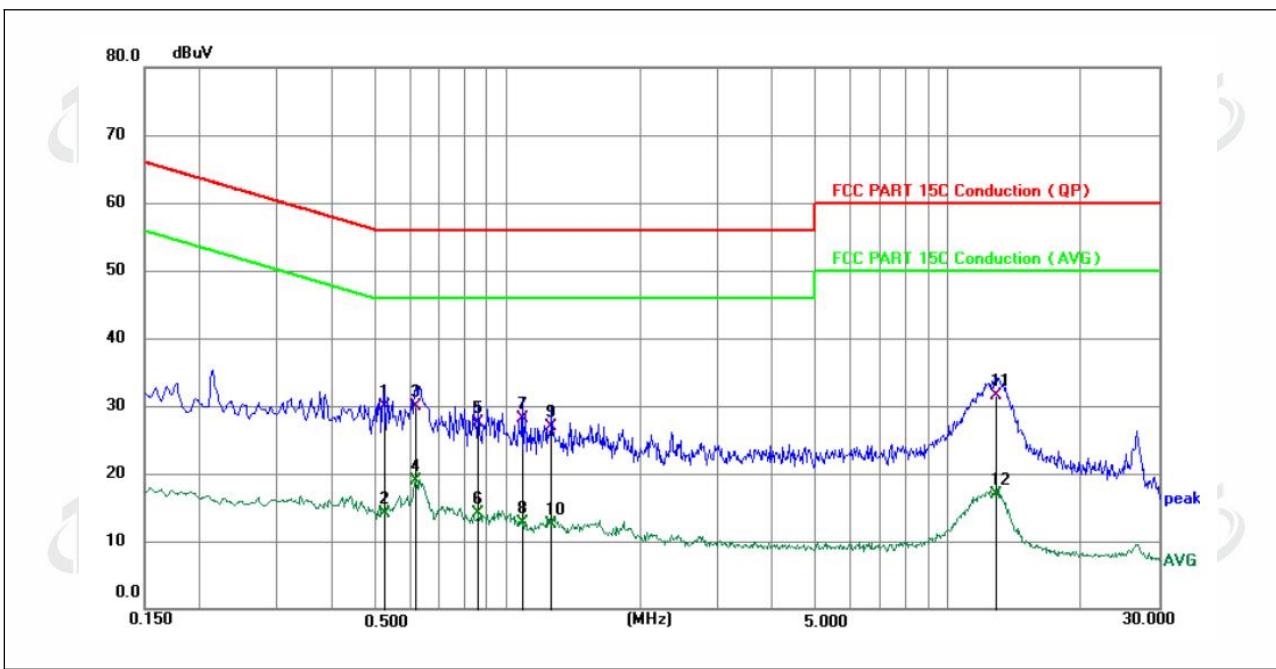
The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.

## 4.1.6 TEST RESULTS

Temperature:	25.1°C	Relative Humidity :	50%
Pressure:	101kPa	Phase :	L
Test Voltage :	AC 120V/60Hz		



Temperature:	25.1 °C	Relative Humidity :	50%
Pressure:	101kPa	Phase :	N
Test Voltage :	AC 120V/60Hz		



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F
1 *	0.5233	19.96	10.02	29.98	56.00	-26.02	QP	P
2	0.5233	4.16	10.02	14.18	46.00	-31.82	AVG	P
3	0.6180	19.82	10.03	29.85	56.00	-26.15	QP	P
4	0.6180	8.85	10.03	18.88	46.00	-27.12	AVG	P
5	0.8610	17.52	10.05	27.57	56.00	-28.43	QP	P
6	0.8610	3.96	10.05	14.01	46.00	-31.99	AVG	P
7	1.0813	17.95	10.06	28.01	56.00	-27.99	QP	P
8	1.0813	2.61	10.06	12.67	46.00	-33.33	AVG	P
9	1.2570	16.85	10.06	26.91	56.00	-29.09	QP	P
10	1.2570	2.52	10.06	12.58	46.00	-33.42	AVG	P
11	12.8490	21.39	10.09	31.48	60.00	-28.52	QP	P
12	12.8490	6.75	10.09	16.84	50.00	-33.16	AVG	P

**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. Measurement Level = Reading level + Correct Factor

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	VBW	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 (micorvolts/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 emissions from intentional radiators operated within these frequency bands shall comply with the following:

Fundamental frequency	Field strength of fundamental (millivolts/meter)	Field strength of harmonics (microvolts/meter)
902-928 MHz	50	500
2400-2483.5 MHz	50	500
5725-5875 MHz	50	500
24.0-24.25 GHz	250	2500

## LIMITS OF RADIATED EMISSION MEASUREMENT

FREQUENCY (MHz)	Limit (dBuV/m) (at 3M)	
	PEAK	AVERAGE
Above 1000	74	54

Notes:

- (1) The limit for radiated test was performed according to FCC PART 15C.
- (2) The tighter limit applies at the band edges.
- (3) Emission level (dBuV/m)=20log Emission level (uV/m).

## 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:

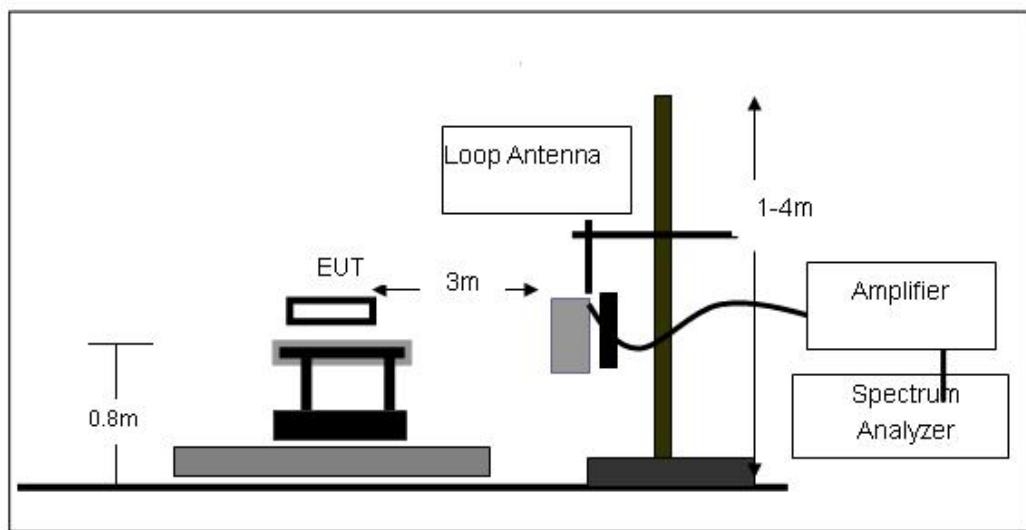
Both horizontal and vertical antenna polarities were tested and performed pretest to three orthogonal axis. The worst case emissions were reported

## 4.2.3 DEVIATION FROM TEST STANDARD

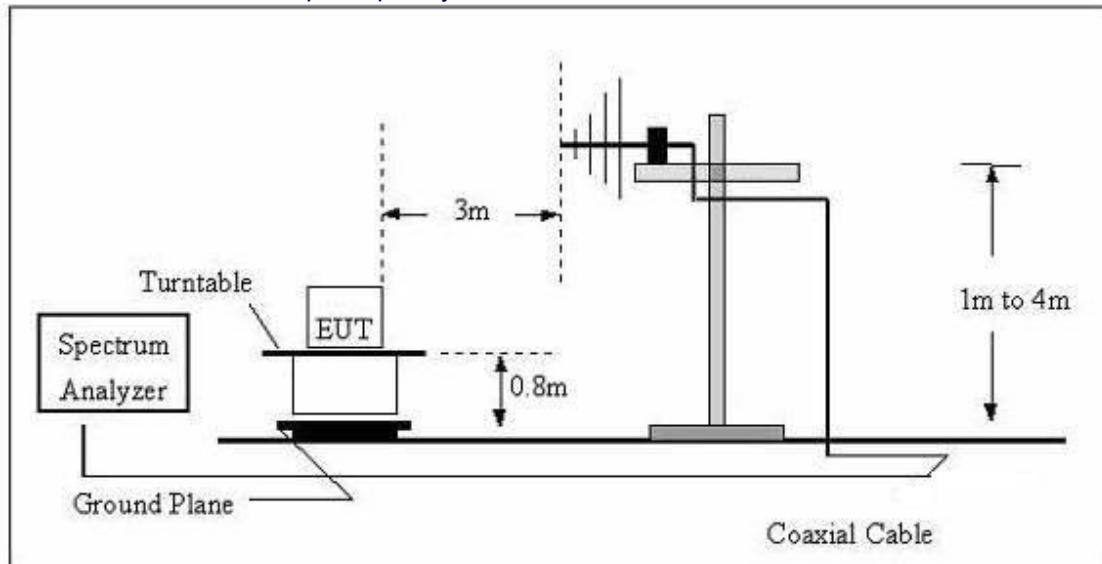
No deviation

## 4.2.4 TEST SETUP

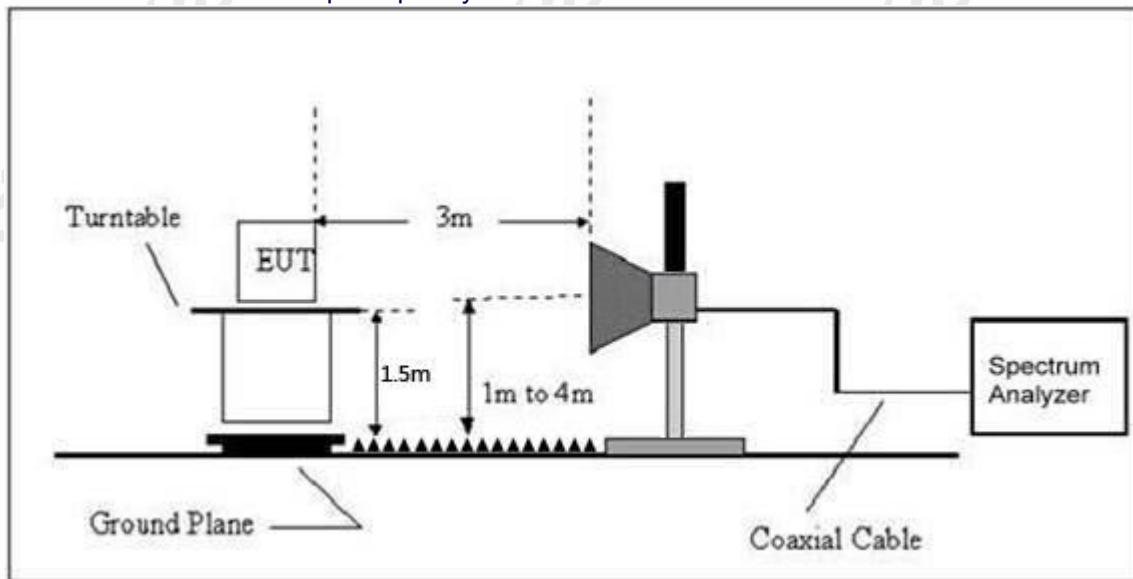
## (A) Radiated Emission Test-Up Frequency Below 30MHz



## (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.

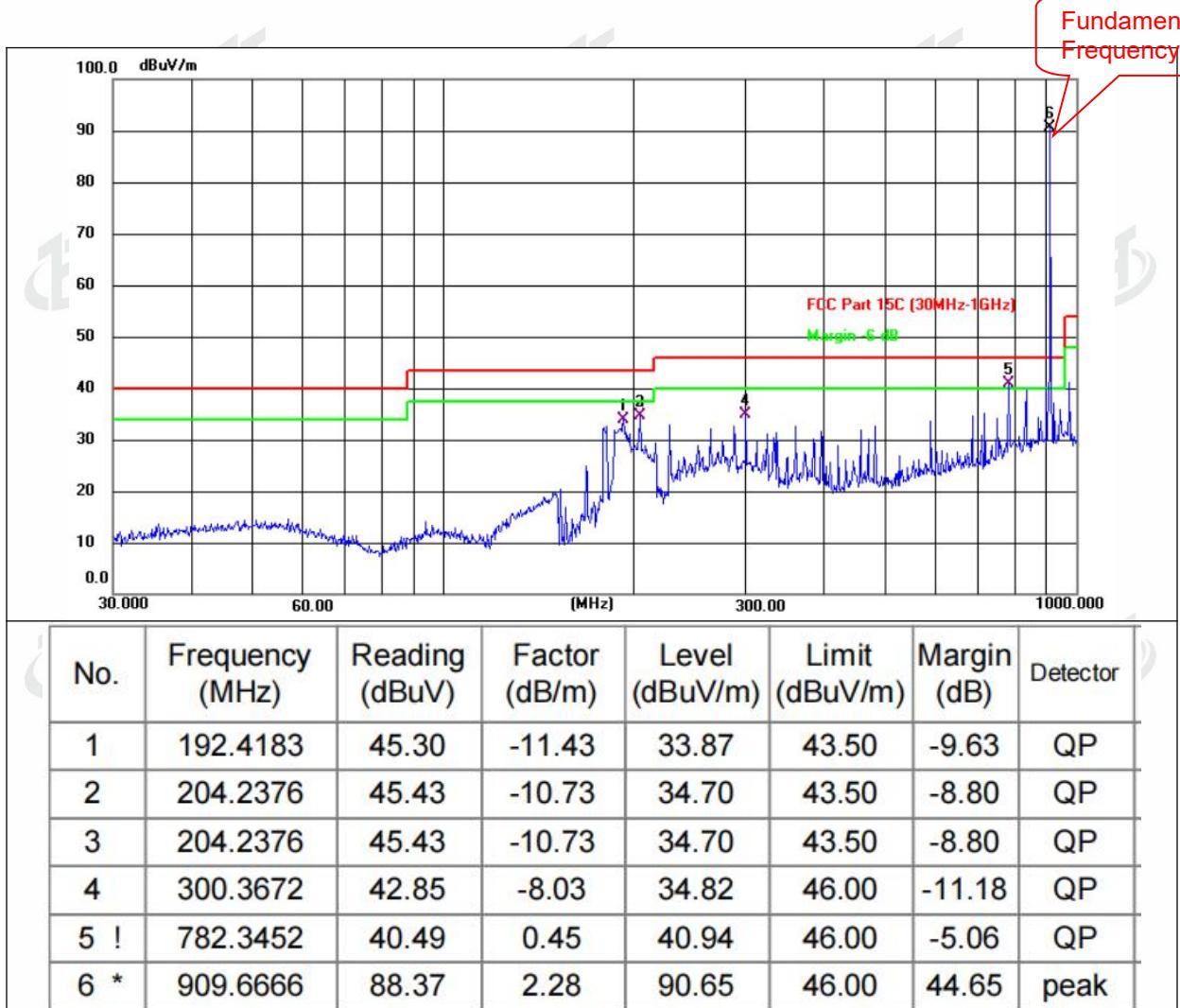
## 4.2.6 TEST RESULTS (Between 9KHz – 30 MHz)

Field strength of Harmonics and Spurious Emissions  
Only the worst-case (916MHz TX) were record in the report.

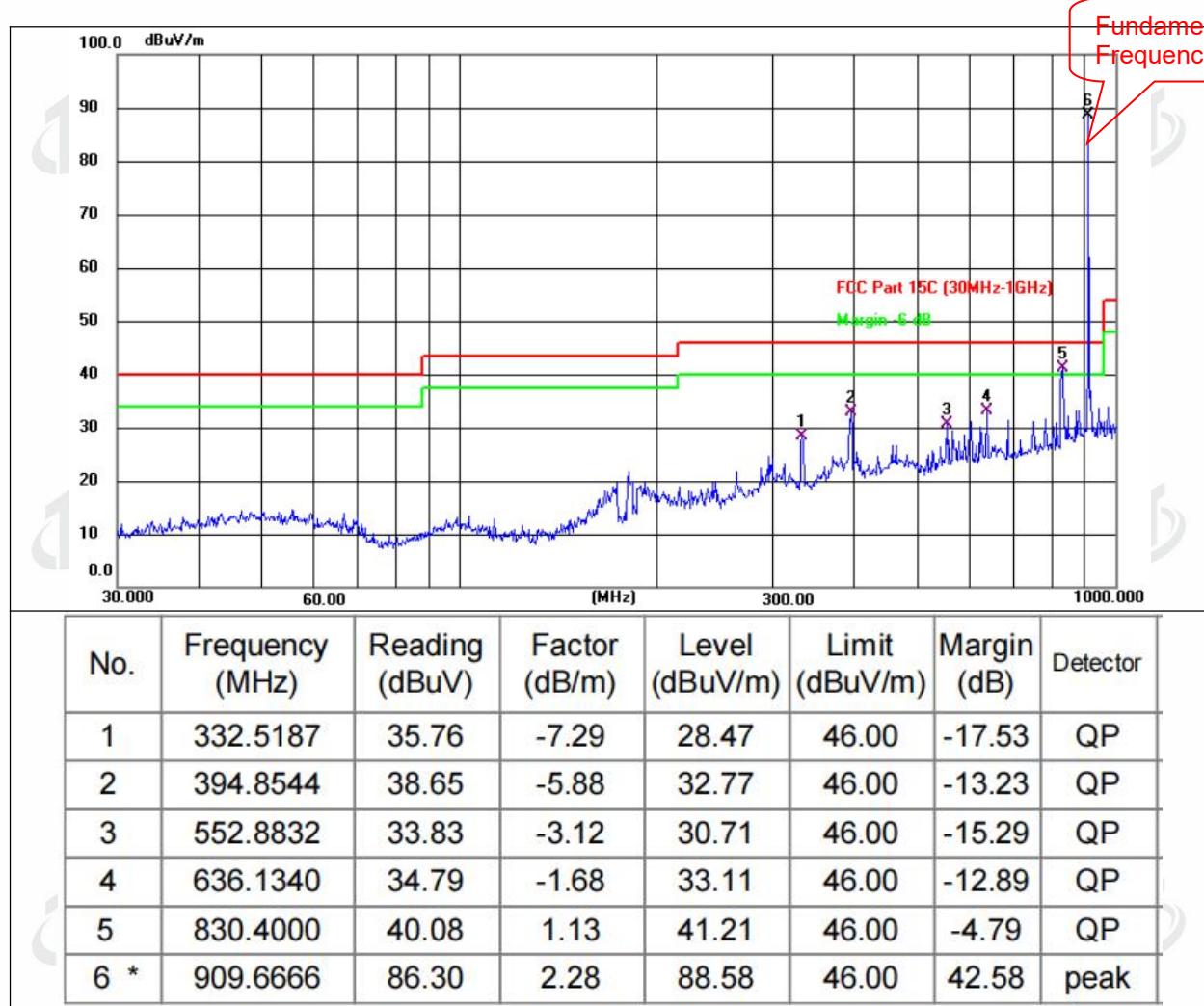
The emission from 9 kHz to 30MHz was pre-tested and found the result was 20dB lower than the limit, and according to 15.31(o), the test result no need to reported.

Between 30MHz – 1GHz

Temperature:	24.9°C	Relative Humidity:	54%
Pressure:	101 kPa	Polarization:	Horizontal
Test Voltage:	AC 120V/60Hz		



Temperature:	24.9°C	Relative Humidity:	54%
Pressure:	101kPa	Polarization:	Vertical
Test Voltage:	AC 120V/60Hz		



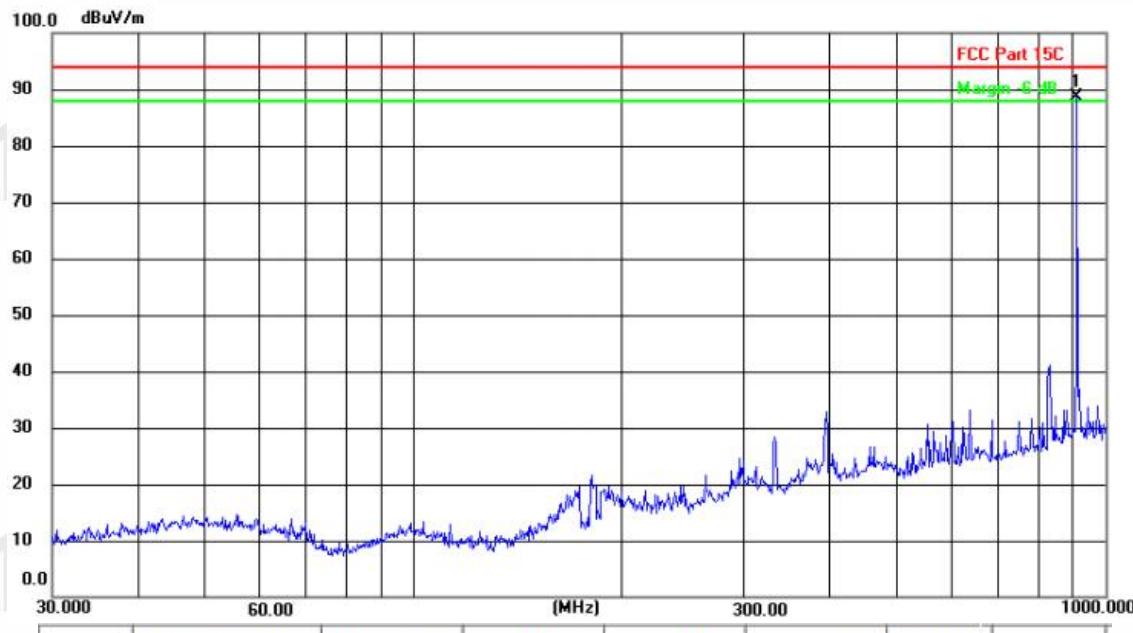
## Remarks:

- 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.

## Field Strength of The Fundamental Signal

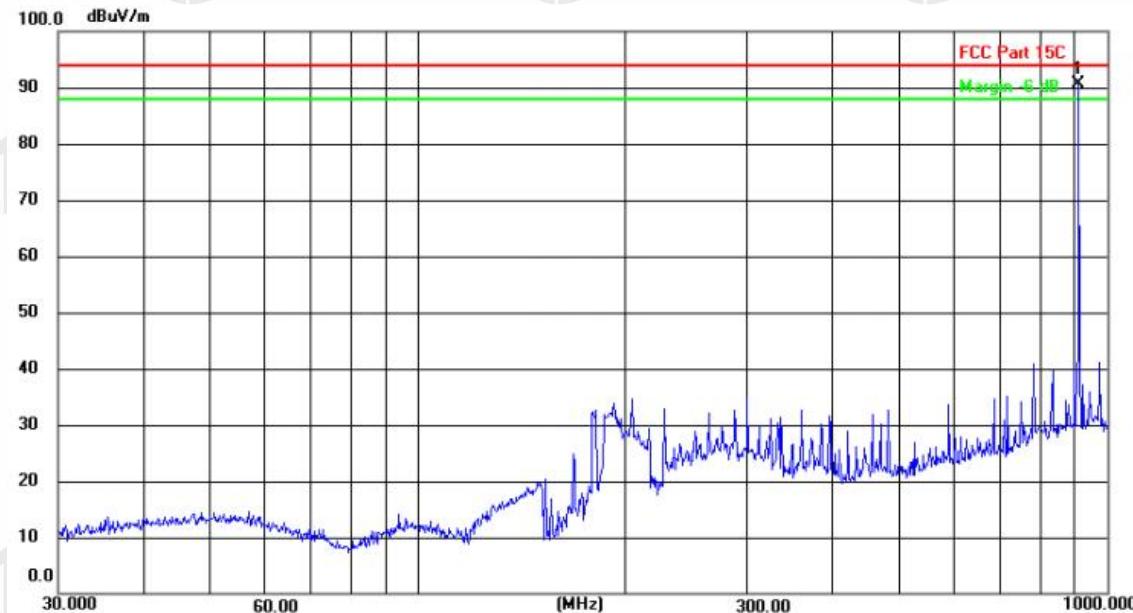
 Note: maximum permissible field strength is 50mV/m(93.98dB  $\mu$  V/m).

908.40MHz (Vertical)

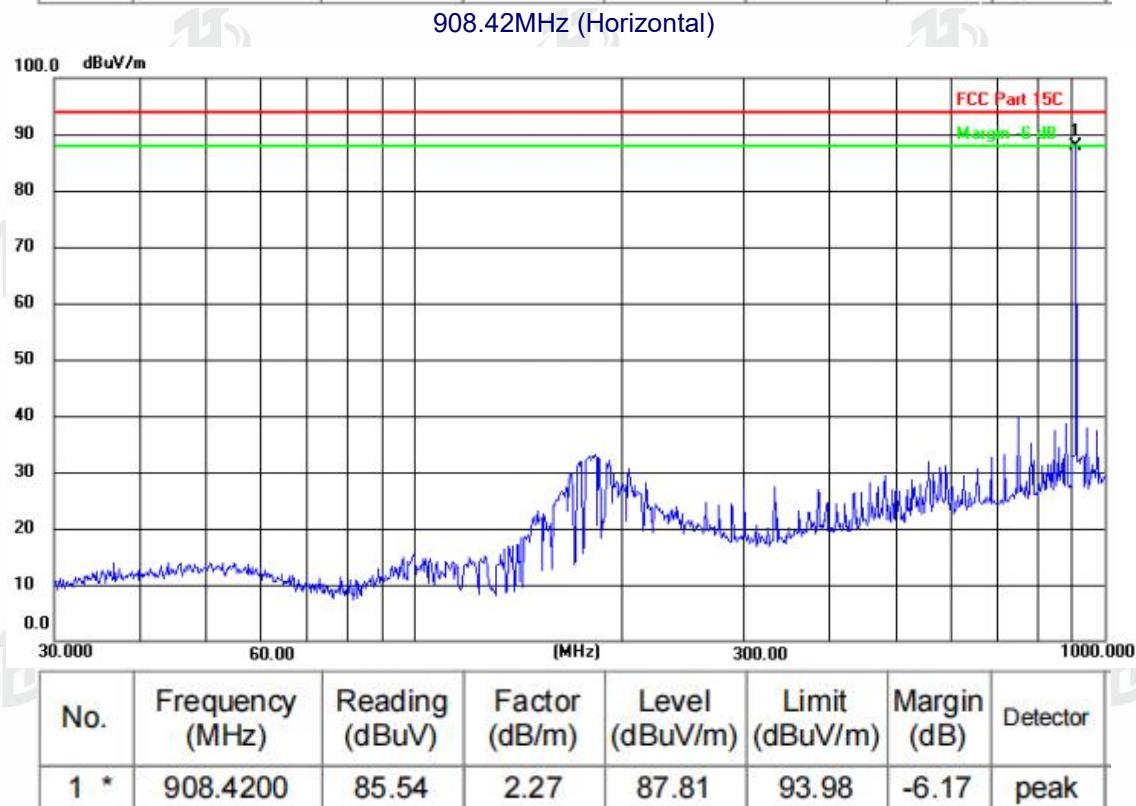
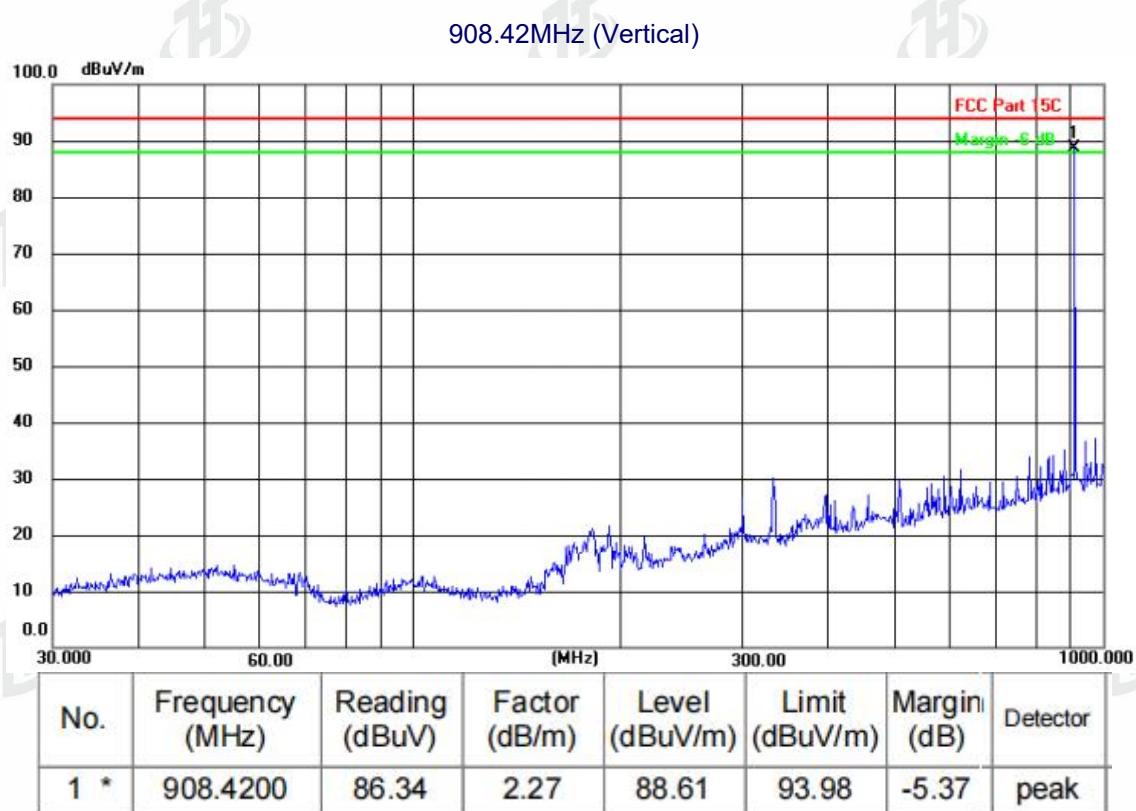


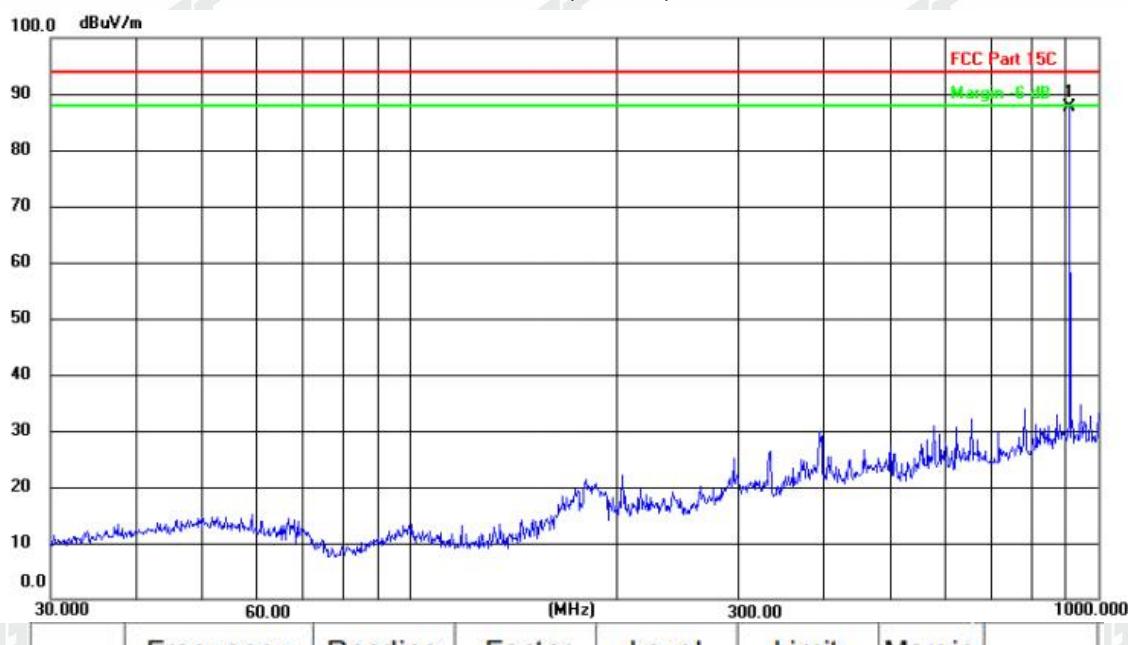
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1 *	908.4000	86.31	2.27	88.58	93.98	-5.40	peak

908.40MHz (Horizontal)

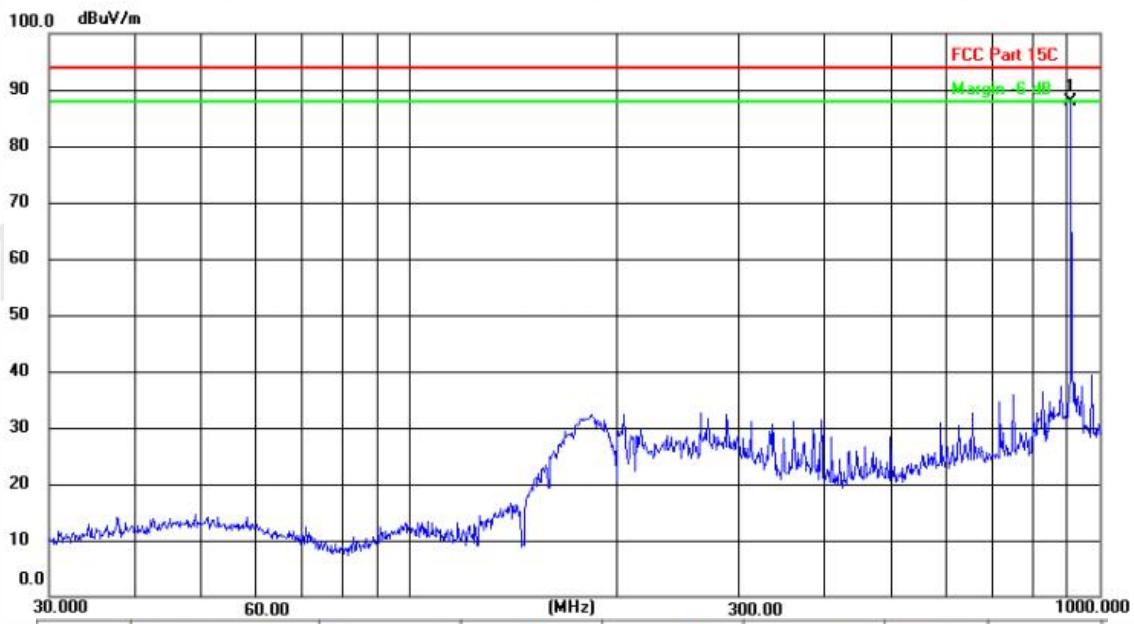


No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1 *	908.4000	88.38	2.27	90.65	93.98	-3.33	peak



**916MHz (Vertical)**


No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1 *	916.0000	85.38	2.33	87.71	93.98	-6.27	peak

**916MHz (Horizontal)**


No.	Frequency (MHz)	Reading (dBuA)	Factor (dB/m)	Level (dBuA/m)	Limit (dBuA/m)	Margin (dB)	Detector
1 *	9.1600	85.49	2.33	87.82	93.98	-6.16	peak

Polar (H/V)	Frequency	Meter Reading	Pre-ampli fier	Cable Loss	Antenna Factor	Emission Level	Limits	Margin	Detector Type
	(MHz)	(dBuV)	(dB)	(dB)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
Channel: 916MHz									
V	1832	52.58	30.55	5.77	24.66	52.46	74	-21.54	Pk
V	1832	42.38	30.55	5.77	24.66	42.26	54	-11.74	AV
V	2748	50.74	30.33	6.32	24.55	51.28	74	-22.72	Pk
V	2748	43.04	30.33	6.32	24.55	43.58	54	-10.42	AV
H	1832	52.91	30.55	5.77	24.66	52.79	74	-21.21	Pk
H	1832	42.81	30.55	5.77	24.66	42.69	54	-11.31	AV
H	2748	51.73	30.33	6.32	24.55	52.27	74	-21.73	Pk
H	2748	42.84	30.33	6.32	24.55	43.38	54	-10.62	AV

**Remark:**

1. Emission Level = Meter Reading + Antenna Factor + Cable Loss – Pre-amplifier,  
Margin= Emission Level - Limit
2. If peak below the average limit, the average emission was no test.
3. The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value  
has no need to be reported.

## 5. CHANNEL BANDWIDTH

Test Requirement:	FCC Part15 C Section 15.249/15.215
Test Method:	ANSI C63.10: 2013

### 5.1 APPLIED PROCEDURES / LIMIT

FCC Part15 (15.249) , Subpart C			
Section	Test Item	Frequency Range (MHz)	Result
15.249(c)	Bandwidth	2400-2483.5	PASS

### 5.2 TEST PROCEDURE

1. Set resolution bandwidth (RBW) = 1-5% or DTS BW, not to exceed 100 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

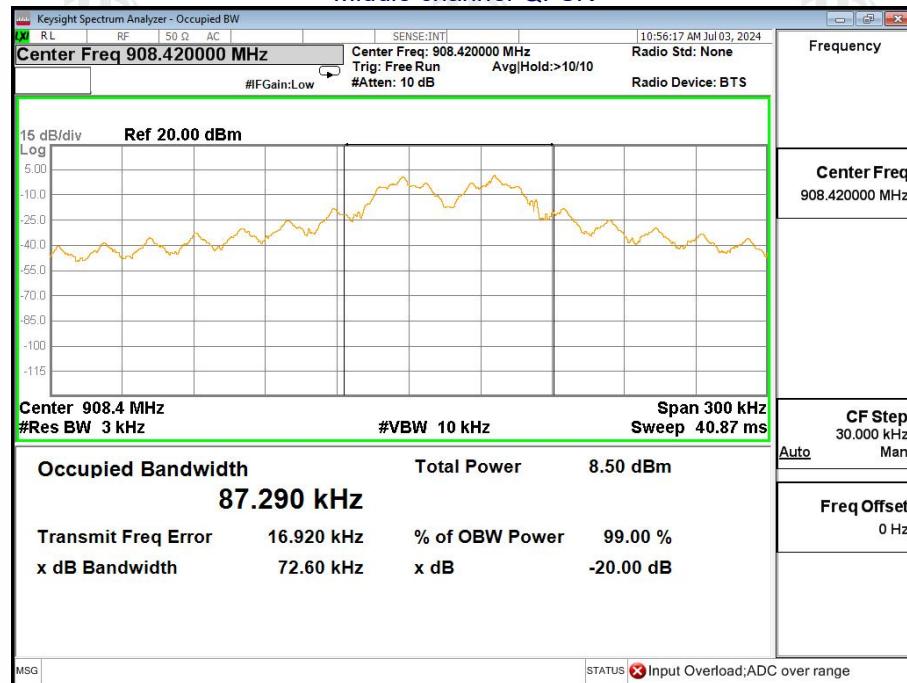
Temperature:	25.1°C	Relative Humidity:	53%
Test Mode :	FSK, QFSK	Test Voltage:	AC 120V/60Hz

Mode	Test channel	20dB Emission Bandwidth (kHz)	Result
FSK	Lowest	88.017	Pass
FSK	Middle	87.290	
QFSK	Highest	107.50	

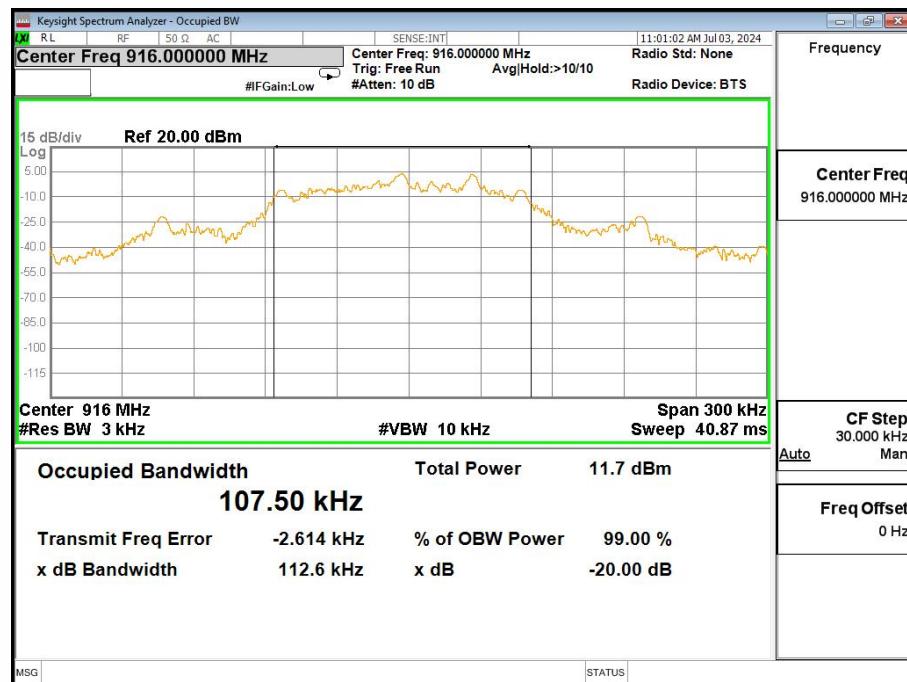
Test plots  
Lowest channel-FSK



### Middle channel-QFSK



### Highest channel-QFSK





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## 6.ANTENNA REQUIREMENT

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Standard requirement:	FCC Part15 C Section 15.203
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.	
EUT Antenna: The antennas are PCB Antenna, the best case gain of the antennas are 1dBi, reference to the appendix II for details.	

## 7. TEST SETUP PHOTO

Reference to the appendix I for details.

## 8. EUT CONSTRUCTIONAL DETAILS

Reference to the appendix II for details.

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