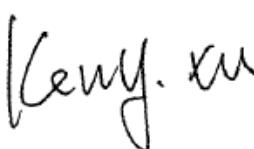


Report No.: SZEM181200108703  
Page: 1 of 34**TEST REPORT**

**Application No.:** SZEM1812001087CR  
**Applicant:** SHENZHEN GIEC DIGITAL CO., LTD  
**Address of Applicant:** 1st&3rd Building, No.26 Puzai Road, Pingdi, Longgang District, Shenzhen, China  
**Manufacturer:** SHENZHEN GIEC DIGITAL CO., LTD  
**Address of Manufacturer:** 1st&3rd Building, No.26 Puzai Road, Pingdi, Longgang District, Shenzhen, China  
**Factory:** SHENZHEN GIEC DIGITAL CO., LTD  
**Address of Factory:** 1st&3rd Building, No.26 Puzai Road, Pingdi, Longgang District, Shenzhen, China  
**Equipment Under Test (EUT):**  
**EUT Name:** Hubitat Elevation Hub  
**Model No.:** C-5  
**Trade mark:** Hubitat  
**FCC ID:** 2AHYK-1218C5  
**Standard(s) :** 47 CFR Part 15, Subpart C 15.249  
**Date of Receipt:** 2018-12-27  
**Date of Test:** 2019-01-04 to 2019-01-08  
**Date of Issue:** 2019-01-10

<b>Test Result:</b>	<b>Pass*</b>
---------------------	--------------

\* In the configuration tested, the EUT complied with the standards specified above.



Keny Xu  
EMC Laboratory Manager

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<b>Revision Record</b>				
<b>Version</b>	<b>Chapter</b>	<b>Date</b>	<b>Modifier</b>	<b>Remark</b>
01		2019-01-10		Original

<b>Authorized for issue by:</b>			
			
	<b>Leo Li /Project Engineer</b>		
			
	<b>Eric Fu /Reviewer</b>		

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## 2 Test Summary

<b>Radio Spectrum Technical Requirement</b>				
<b>Item</b>	<b>Standard</b>	<b>Method</b>	<b>Requirement</b>	<b>Result</b>
Antenna Requirement	47 CFR Part 15, Subpart C 15.249	N/A	47 CFR Part 15, Subpart C 15.203	Pass

<b>Radio Spectrum Matter Part</b>				
<b>Item</b>	<b>Standard</b>	<b>Method</b>	<b>Requirement</b>	<b>Result</b>
Conducted Emissions at AC Power Line (150kHz-30MHz)	47 CFR Part 15, Subpart C 15.249	ANSI C63.10 (2013) Section 6.2	47 CFR Part 15, Subpart C 15.207	Pass
20dB Bandwidth	47 CFR Part 15, Subpart C 15.249	ANSI C63.10 (2013) Section 6.9	47 CFR Part 15, Subpart C 15.215	Pass
Field Strength of the Fundamental Signal (15.249(a))	47 CFR Part 15, Subpart C 15.249	ANSI C63.10 (2013) Section 6.5&6.6	47 CFR Part 15, Subpart C 15.249(a)	Pass
Restricted Band Around Fundamental Frequency	47 CFR Part 15, Subpart C 15.249	ANSI C63.10 (2013) Section 6.4&6.5&6.6	47 CFR Part 15, Subpart C 15.205 & 15.249(d) & 15.209	Pass
Radiated Emissions	47 CFR Part 15, Subpart C 15.249	ANSI C63.10 (2013) Section 6.4&6.5&6.6	47 CFR Part 15, Subpart C 15.209 & 15.249 (a),(d)	Pass

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## 4 General Information

### 4.1 Details of E.U.T.

Power supply:	DC 5V from adapter input AC 120V/60Hz Adapter Model: TEKA006-0501000UK Input:AC100-240V 50/60Hz 0.3A Output: DC 5V 1A
Cable:	USB cable: 80cm shielded
Operation Frequency:	908.4MHz, 916MHz
Modulation Type:	GFSK
Number of Channels:	2
Antenna Type:	FPC Antenna
Antenna Gain:	1.64dBi

### 4.2 Description of Support Units

The EUT has been tested as an independent unit.

### 4.3 Measurement Uncertainty

No.	Item	Measurement Uncertainty
1	Radio Frequency	$\pm 7.25 \times 10^{-8}$
2	Duty cycle	$\pm 0.37\%$
3	Occupied Bandwidth	$\pm 3\%$
4	RF conducted power	$\pm 0.75\text{dB}$
5	RF power density	$\pm 2.84\text{dB}$
6	Conducted Spurious emissions	$\pm 0.75\text{dB}$
7	RF Radiated power	$\pm 4.5\text{dB}$ (below 1GHz) $\pm 4.8\text{dB}$ (above 1GHz)
8	Radiated Spurious emission test	$\pm 4.5\text{dB}$ (Below 1GHz) $\pm 4.8\text{dB}$ (Above 1GHz)
9	Temperature test	$\pm 1\text{ }^{\circ}\text{C}$
10	Humidity test	$\pm 3\%$
11	Supply voltages	$\pm 1.5\%$
12	Time	$\pm 3\%$

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#### **4.4 Test Location**

All tests were performed at:

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518057.

Tel: +86 755 2601 2053      Fax: +86 755 2671 0594

No tests were sub-contracted.

#### **4.5 Test Facility**

The test facility is recognized, certified, or accredited by the following organizations:

- CNAS (No. CNAS L2929)**

CNAS has accredited SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch EMC

Lab to ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration Laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing.

- A2LA (Certificate No. 3816.01)**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 3816.01.

- VCCI**

The 3m Fully-anechoic chamber for above 1GHz, 10m Semi-anechoic chamber for below 1GHz, Shielded Room for Mains Port Conducted Interference Measurement and Telecommunication Port Conducted Interference Measurement of SGS-CSTC Standards Technical Services Co., Ltd. have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: G-20026, R-14188, C-12383 and T-11153 respectively.

- FCC –Designation Number: CN1178**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been recognized as an accredited testing laboratory.

Designation Number: CN1178. Test Firm Registration Number: 406779.

- Innovation, Science and Economic Development Canada**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been recognized by ISED as an accredited testing laboratory.

CAB identifier: CN0006.

IC#: 4620C.

#### **4.6 Deviation from Standards**

None

#### **4.7 Abnormalities from Standard Conditions**

None

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## 5 Equipment List

Conducted Emissions at AC Power Line (150kHz-30MHz)					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
Shielding Room	ZhongYu Electron	GB-88	SEM001-06	2017-05-10	2020-05-09
Measurement Software	AUDIX	e3 V5.4.1221d	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM024-01	2018-07-12	2019-07-11
LISN	Rohde & Schwarz	ENV216	SEM007-01	2018-09-25	2019-09-24
LISN	ETS-LINDGREN	3816/2	SEM007-02	2018-04-02	2019-04-01
EMI Test Receiver	Rohde & Schwarz	ESCI	SEM004-02	2018-04-02	2019-04-01

20dB Bandwidth					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
DC Power Supply	ZhaoXin	RXN-305D	SEM011-02	2018-09-25	2019-09-24
Spectrum Analyzer	Rohde & Schwarz	FSP	SEM004-06	2018-09-27	2019-09-26
Measurement Software	JS Tonscend	JS1120-2 BT/WIFI V2.	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM031-02	2018-07-12	2019-07-11
Attenuator	Weinschel Associates	WA41	SEM021-09	N/A	N/A
Signal Generator	KEYSIGHT	N5173B	SEM006-05	2018-09-27	2019-09-26
Power Meter	Rohde & Schwarz	NRVS	SEM014-02	2018-09-25	2019-09-24

Field Strength of the Fundamental Signal (15.249(a))					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
3m Semi-Anechoic Chamber	ETS-LINDGREN	N/A	SEM001-01	2017-08-05	2020-08-04
MXE EMI Receiver (20Hz-8.4GHz)	Agilent Technologies	N9038A	SEM004-05	2018-09-25	2019-09-24
BiConiLog Antenna (26-3000MHz)	ETS-LINDGREN	3142C	SEM003-01	2017-06-27	2020-06-26
Pre-amplifier (0.1-1300MHz)	Agilent Technologies	8447D	SEM005-01	2018-04-02	2019-04-01
Measurement Software	AUDIX	e3 V8.2014-6-27	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM025-01	2018-07-12	2019-07-11



<b>Restricted Band Around Fundamental Frequency</b>					
<b>Equipment</b>	<b>Manufacturer</b>	<b>Model No</b>	<b>Inventory No</b>	<b>Cal Date</b>	<b>Cal Due Date</b>
3m Semi-Anechoic Chamber	ETS-LINDGREN	N/A	SEM001-01	2017-08-05	2020-08-04
MXE EMI Receiver (20Hz-8.4GHz)	Agilent Technologies	N9038A	SEM004-05	2018-09-25	2019-09-24
BiConiLog Antenna (26-3000MHz)	ETS-LINDGREN	3142C	SEM003-01	2017-06-27	2020-06-26
Pre-amplifier (0.1-1300MHz)	Agilent Technologies	8447D	SEM005-01	2018-04-02	2019-04-01
Measurement Software	AUDIX	e3 V8.2014-6-27	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM025-01	2018-07-12	2019-07-11

<b>Radiated Emissions</b>					
<b>Equipment</b>	<b>Manufacturer</b>	<b>Model No</b>	<b>Inventory No</b>	<b>Cal Date</b>	<b>Cal Due Date</b>
3m Semi-Anechoic Chamber	AUDIX	N/A	SEM001-02	2018-03-13	2021-03-12
Measurement Software	AUDIX	e3 V8.2014-6-27	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM026-01	2018-07-12	2019-07-11
Spectrum Analyzer	Rohde & Schwarz	FSU43	SEM004-08	2018-04-02	2019-04-01
BiConiLog Antenna (26-3000MHz)	ETS-Lindgren	3142C	SEM003-01	2017-06-27	2020-06-26
Horn Antenna (1-18GHz)	Rohde & Schwarz	HF907	SEM003-07	2018-04-13	2021-04-12
Horn Antenna (15GHz-40GHz)	Schwarzbeck	BBHA 9170	SEM003-15	2017-10-17	2020-10-16
Pre-amplifier (0.1-1300MHz)	HP	8447D	SEM005-02	2018-09-25	2019-09-24
Pre-Amplifier (0.1-26.5GHz)	Compliance Directions Systems Inc.	PAP-0126	SEM004-11	2018-09-27	2019-09-26
Pre-amplifier (18-26GHz)	Rohde & Schwarz	CH14-H052	SEM005-17	2018-04-02	2019-04-01
Pre-amplifier (26GHz-40GHz)	Compliance Directions Systems Inc.	PAP-2640-50	SEM005-08	2018-04-02	2019-04-01
DC Power Supply	Zhao Xin	RXN-305D	SEM011-02	2018-09-25	2019-09-24
Active Loop Antenna	ETS-Lindgren	6502	SEM003-08	2017-08-22	2020-08-21
Band filter	N/A	N/A	SEM023-01	N/A	N/A

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**RE in Chamber**

Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. Date (yyyy-mm-dd)	Cal. Due date (yyyy-mm-dd)
3m Semi-Anechoic Chamber	ETS-LINDGREN	N/A	SEM001-01	2017-08-05	2020-08-04
MXE EMI Receiver (20Hz-8.4GHz)	Agilent Technologies	N9038A	SEM004-05	2018-09-25	2019-09-24
BiConiLog Antenna (26-3000MHz)	ETS-LINDGREN	3142C	SEM003-01	2017-06-27	2020-06-26
Pre-amplifier (0.1-1300MHz)	Agilent Technologies	8447D	SEM005-01	2018-04-02	2019-04-01
Measurement Software	AUDIX	e3 V8.2014-6-27	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM025-01	2018-07-12	2019-07-11

**General used equipment**

Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
Humidity/ Temperature Indicator	Shanghai Meteorological Industry Factory	ZJ1-2B	SEM002-03	2018-09-27	2019-09-26
Humidity/ Temperature Indicator	Shanghai Meteorological Industry Factory	ZJ1-2B	SEM002-04	2018-09-27	2019-09-26
Humidity/ Temperature Indicator	Mingle	N/A	SEM002-08	2018-09-27	2019-09-26
Barometer	Changchun Meteorological Industry Factory	DYM3	SEM002-01	2018-04-08	2019-04-07

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## 6 Radio Spectrum Technical Requirement

### 6.1 Antenna Requirement

#### 6.1.1 Test Requirement:

47 CFR Part 15, Subpart C 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.

#### 6.1.2 Conclusion

EUT Antenna:

The antenna is integrated on the main PCB and no consideration of replacement. The best case gain of the antenna is 1.64dBi.

Antenna location: Refer to Appendix(Internal photos)



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## 7 Radio Spectrum Matter Test Results

### 7.1 Conducted Emissions at AC Power Line (150kHz-30MHz)

Test Requirement 47 CFR Part 15, Subpart C 15.207

Test Method: ANSI C63.10 (2013) Section 6.2

Limit:

Frequency range (MHz)	Limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

\* Decreases with the logarithm of the frequency.

#### 7.1.1 E.U.T. Operation

Operating Environment:

Temperature: 22 °C Humidity: 62.3 % RH Atmospheric Pressure: 1030 mbar

Test mode b:TX mode\_Keep the EUT in transmitting with modulation mode.

#### 7.1.2 Measurement Procedure and Data

- 1) The mains terminal disturbance voltage test was conducted in a shielded room.
- 2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a 50ohm/50µH + 5ohm linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as the LISN 1 for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded.
- 3) The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane,
- 4) The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0.4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN 1 was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane for LISNs mounted on top of the ground reference plane. This distance was between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0.8 m from the LISN 2.
- 5) In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10 on conducted measurement.

Remark: LISN=Read Level+ Cable Loss+ LISN Factor

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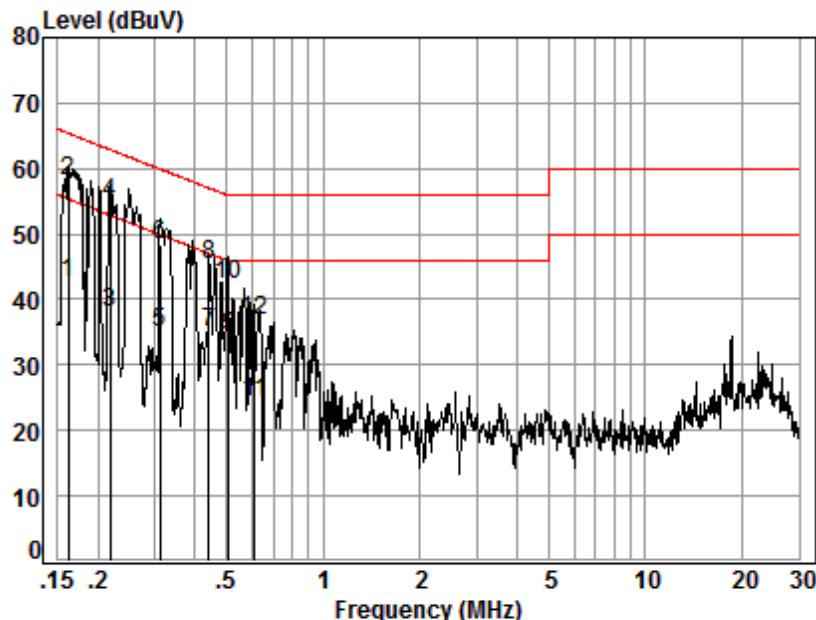
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Mode:b; Line:Live Line



Site : Shielding Room

Condition: Line

Job No. : 01087CR

Test mode: b

Freq	Cable	LISN	Read	Limit		Over	Remark
	Loss	Factor	Level	Level	Line	Limit	
	MHz	dB	dB	dBuV	dBuV	dBuV	dB
1	0.16	0.01	9.66	32.82	42.49	55.38	-12.89 Average
2	0.16	0.01	9.66	48.33	58.00	65.38	-7.38 QP
3	0.22	0.03	9.66	28.37	38.06	52.88	-14.82 Average
4	0.22	0.03	9.66	44.94	54.63	62.88	-8.25 QP
5	0.31	0.04	9.67	25.13	34.84	49.93	-15.09 Average
6	0.31	0.04	9.67	38.79	48.50	59.93	-11.43 QP
7	0.44	0.06	9.67	25.37	35.10	47.02	-11.92 Average
8	0.44	0.06	9.67	35.55	45.28	57.02	-11.74 QP
9	0.51	0.06	9.67	24.61	34.34	46.00	-11.66 Average
10	0.51	0.06	9.67	32.56	42.29	56.00	-13.71 QP
11	0.61	0.07	9.67	14.63	24.37	46.00	-21.63 Average
12	0.61	0.07	9.67	27.08	36.82	56.00	-19.18 QP

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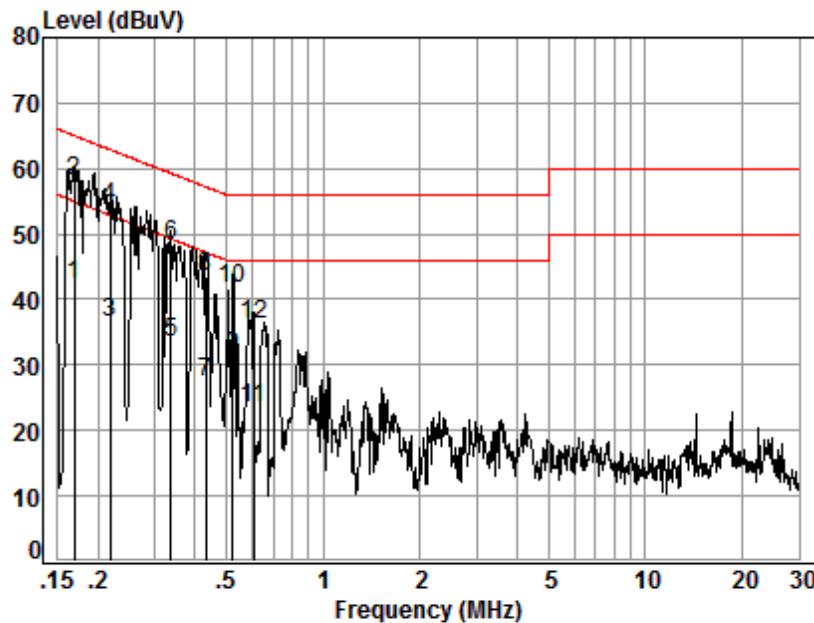
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Mode:b; Line:Neutral Line



Site : Shielding Room

Condition: Neutral

Job No. : 01087CR

Test mode: b

Freq	Cable	LISN	Read	Limit		Over	Remark
	Loss	Factor	Level	Level	Line	Limit	
	MHz	dB	dB	dBuV	dBuV	dBuV	dB
1	0.17	0.01	9.64	32.69	42.34	55.03	-12.69 Average
2	0.17	0.01	9.64	48.30	57.95	65.03	-7.08 QP
3	0.22	0.03	9.64	26.91	36.58	52.88	-16.30 Average
4	0.22	0.03	9.64	44.58	54.25	62.88	-8.63 QP
5	0.34	0.04	9.64	23.65	33.33	49.31	-15.98 Average
6	0.34	0.04	9.64	38.65	48.33	59.31	-10.98 QP
7	0.43	0.05	9.65	17.63	27.33	47.20	-19.87 Average
8	0.43	0.05	9.65	33.73	43.43	57.20	-13.77 QP
9	0.52	0.06	9.64	21.56	31.26	46.00	-14.74 Average
10	0.52	0.06	9.64	31.87	41.57	56.00	-14.43 QP
11	0.61	0.07	9.64	13.61	23.32	46.00	-22.68 Average
12	0.61	0.07	9.64	26.62	36.33	56.00	-19.67 QP

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## 7.2 20dB Bandwidth

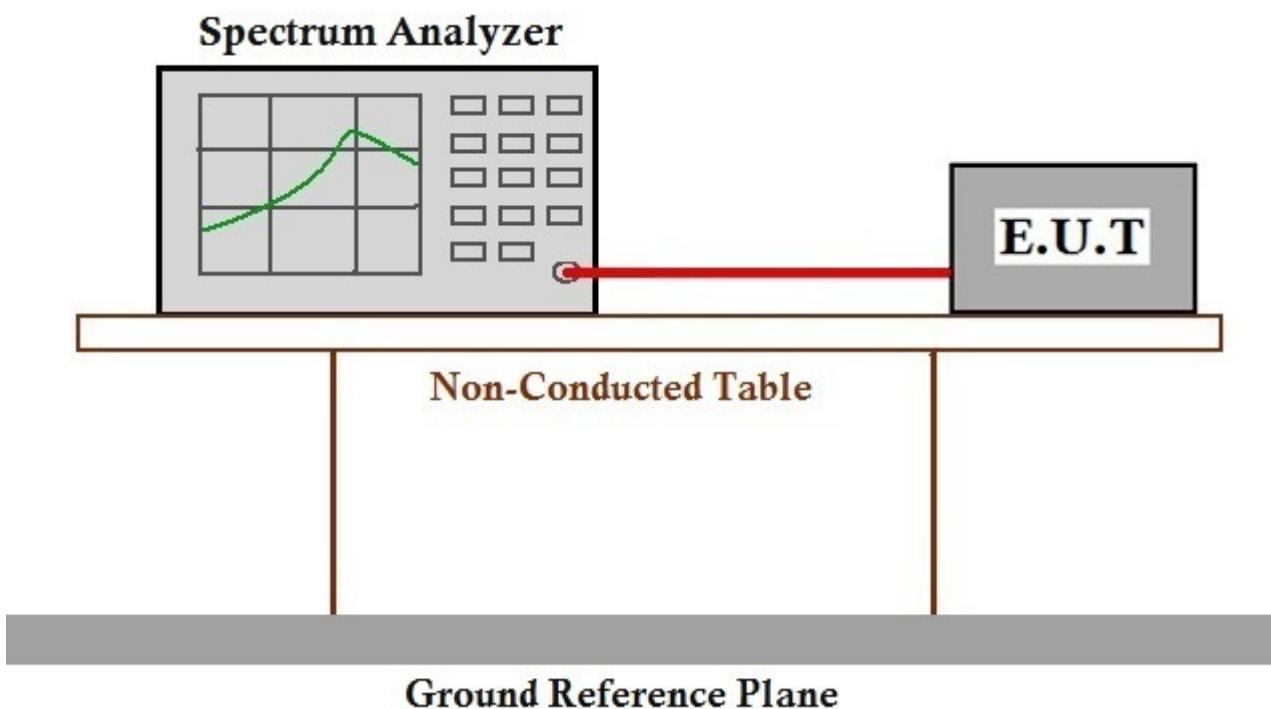
Test Requirement 47 CFR Part 15, Subpart C 15.215  
Test Method: ANSI C63.10 (2013) Section 6.9  
Limit: N/A

### 7.2.1 E.U.T. Operation

Operating Environment:

Temperature: 20.1 °C      Humidity: 49.8 % RH      Atmospheric Pressure: 1030 mbar  
Test mode      b:TX mode\_Keep the EUT in transmitting with modulation mode.

### 7.2.2 Test Setup Diagram



### 7.2.3 Measurement Procedure and Data

Test Frequency(MHz)	20dB bandwidth (KHz)	Limit (MHz)	Results
908.4	112.31	N/A	Pass
916	114.23	N/A	Pass



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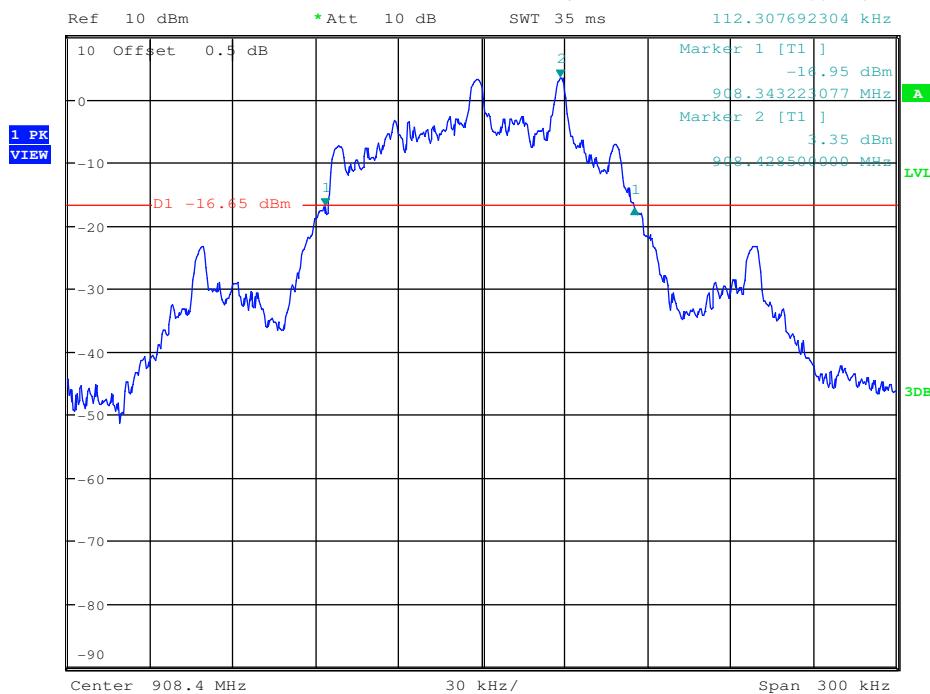
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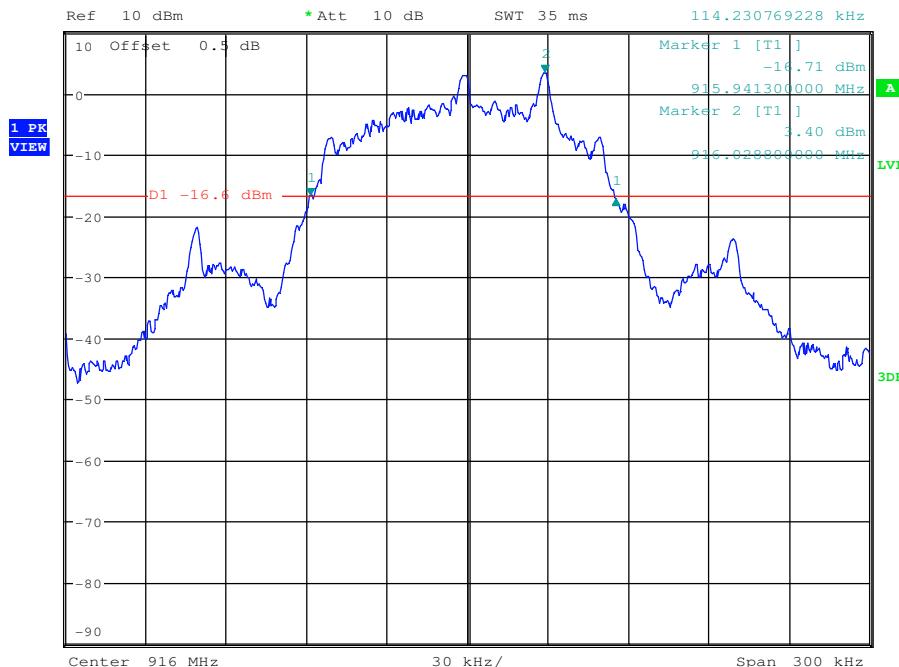
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**Test Plots:**

908.4MHz



916MHz



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### 7.3 Field Strength of the Fundamental Signal (15.249(a))

Test Requirement 47 CFR Part 15, Subpart C 15.249(a)

Test Method: ANSI C63.10 (2013) Section 6.5&amp;6.6

Measurement Distance: 3m

Limit:

Frequency	Limit (dBuV/m @3m)	Remark
902MHz-928MHz	94.0	Quasi-peak Value

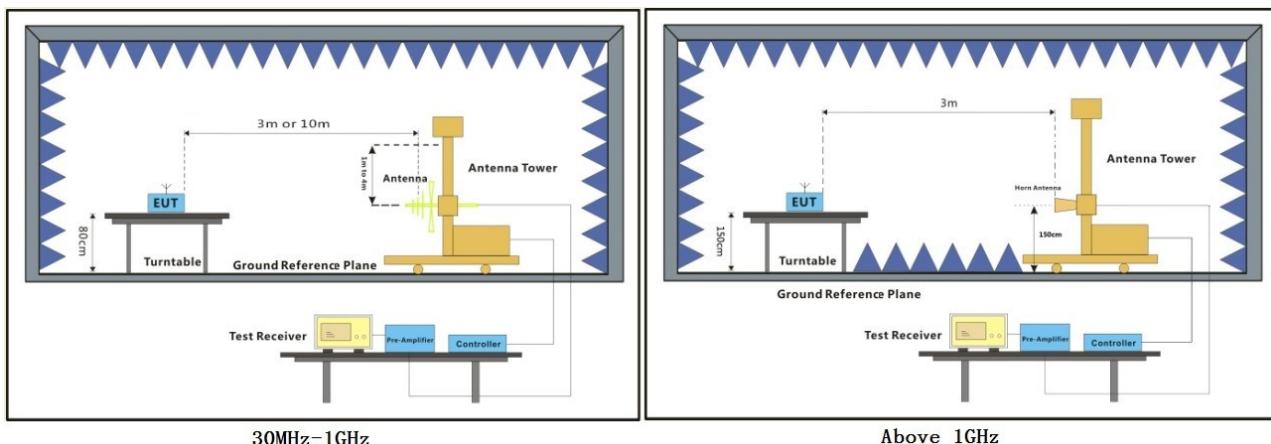
#### 7.3.1 E.U.T. Operation

Operating Environment:

Temperature: 21.4 °C Humidity: 67.2 % RH Atmospheric Pressure: 1030 mbar

Test mode b:TX mode\_Keep the EUT in transmitting with modulation mode.

#### 7.3.2 Test Setup Diagram



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**7.3.3 Measurement Procedure and Data**

- a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- c. The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- d. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- e. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- f. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- g. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.
- h. Test the EUT in the lowest channel, the middle channel, the Highest channel.
- i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.
- j. Repeat above procedures until all frequencies measured was complete.

Remark: Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor

**Test data:**

Mode: b; Polarization: Horizontal

Freq (MHz)	Cable_Loss (dB)	Antenna_Factor (dB/m)	Preamp_Gain (dB)	Read_Level (dBuV)	Level (dBuV/m)	Limit_Line (dBuV/m)	Over_Limit (dB)	Polarization
908.4	3.61	29.84	27.01	83.57	90.01	94	-3.99	Horizontal
908.4	3.61	29.84	27.01	76.91	83.35	94	-10.65	Vertical
916	3.62	29.88	26.97	83.77	90.3	94	-3.7	Horizontal
916	3.62	29.88	26.97	76.89	83.42	94	-10.58	Vertical



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## 7.4 Restricted Band Around Fundamental Frequency

Test Requirement 47 CFR Part 15, Subpart C 15.205 &amp; 15.249(d) &amp; 15.209

Test Method: ANSI C63.10 (2013) Section 6.4&amp;6.5&amp;6.6

Measurement Distance: 3m

Limit:

Frequency	Limit (dBuV/m @3m)	Remark
30MHz-88MHz	40.0	Quasi-peak Value
88MHz-216MHz	43.5	Quasi-peak Value
216MHz-960MHz	46.0	Quasi-peak Value
960MHz-1GHz	54.0	Quasi-peak Value
Above 1GHz	54.0	Average Value
Above 1GHz	74.0	Peak Value

Emission radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in Section 15.209, whichever is the lesser attenuation.

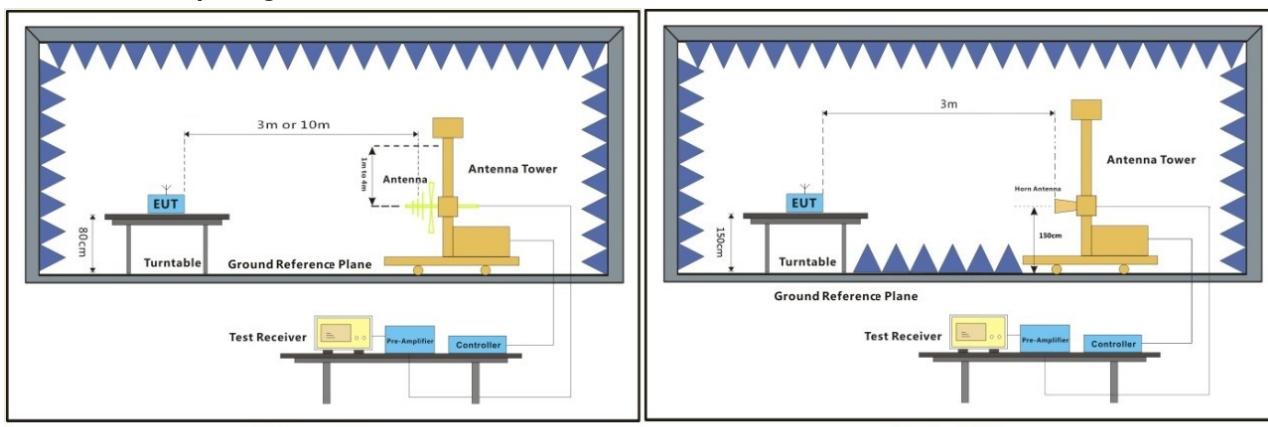
### 7.4.1 E.U.T. Operation

Operating Environment:

Temperature: 21.4 °C Humidity: 67.1 % RH Atmospheric Pressure: 1030 mbar

Test mode b:TX mode\_Keep the EUT in transmitting with modulation mode.

### 7.4.2 Test Setup Diagram

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#### 7.4.3 Measurement Procedure and Data

- a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- c. The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- d. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- e. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- f. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- g. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.
- h. Test the EUT in the lowest channel, the middle channel, the Highest channel.
- i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.
- j. Repeat above procedures until all frequencies measured was complete.

Remark: Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor



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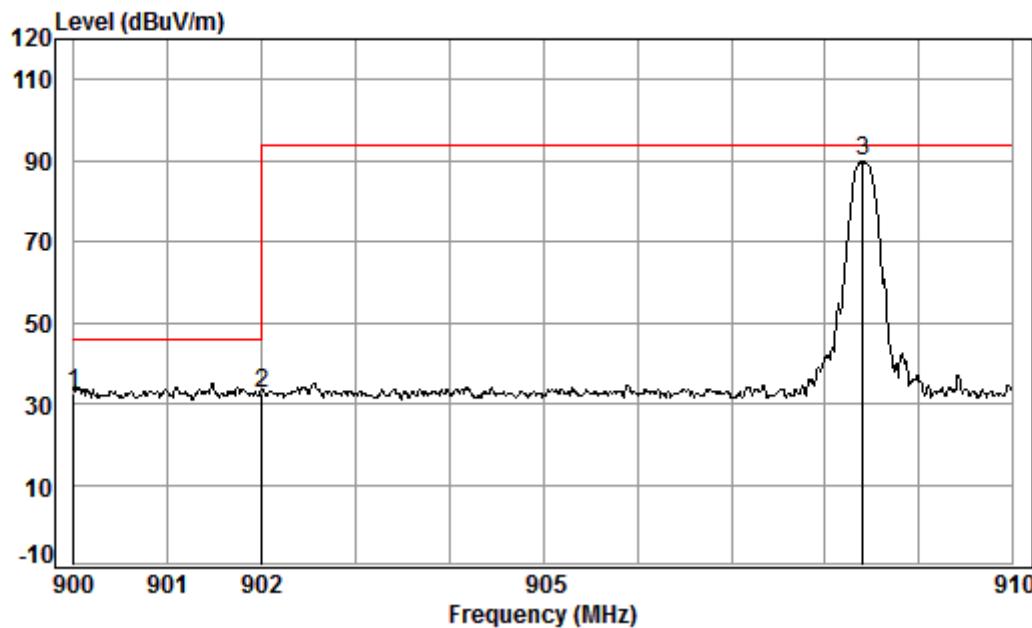
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**908.4MHz**

Mode:b; Polarization:Horizontal;



Condition: 3m HORIZONTAL

Job No. : 01087CR

Test mode: TX

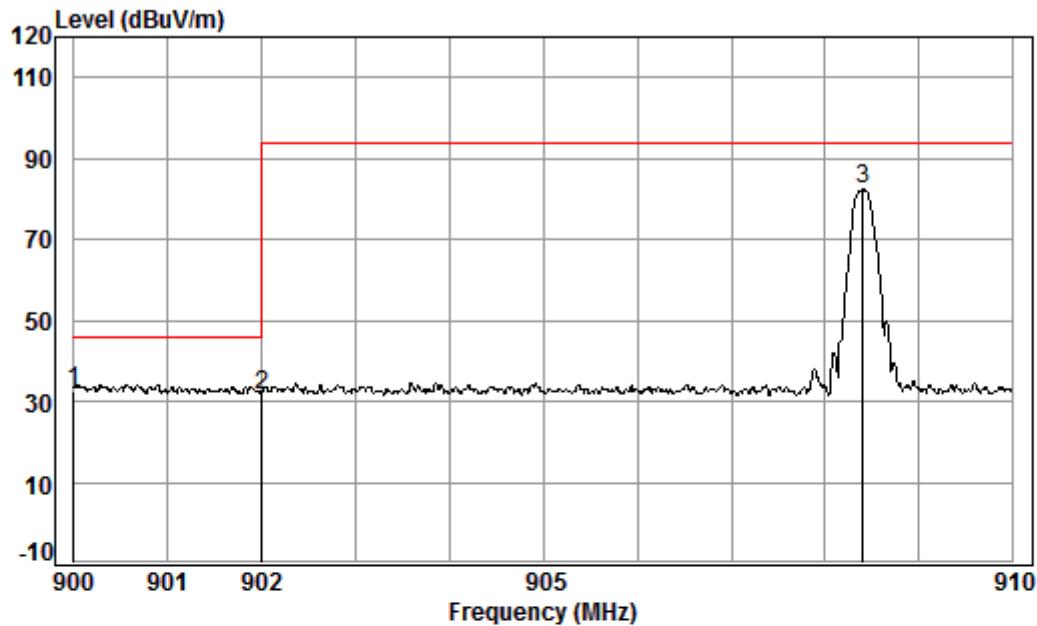
: 908.4

		Cable Freq	Ant Loss	Preamp Factor	Read Level	Limit Level	Limit Line	Over Limit	Remark
		MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1		900.00	3.60	29.80	27.05	26.16	32.51	46.00	-13.49 QP
2		902.00	3.60	29.81	27.04	26.36	32.73	46.00	-13.27 QP
3 pp		908.40	3.61	29.84	27.01	83.20	89.64	94.00	-4.36 QP

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Mode:b; Polarization:Vertical;



Condition: 3m VERTICAL

Job No. : 01087CR

Test mode: TX

: 908.4

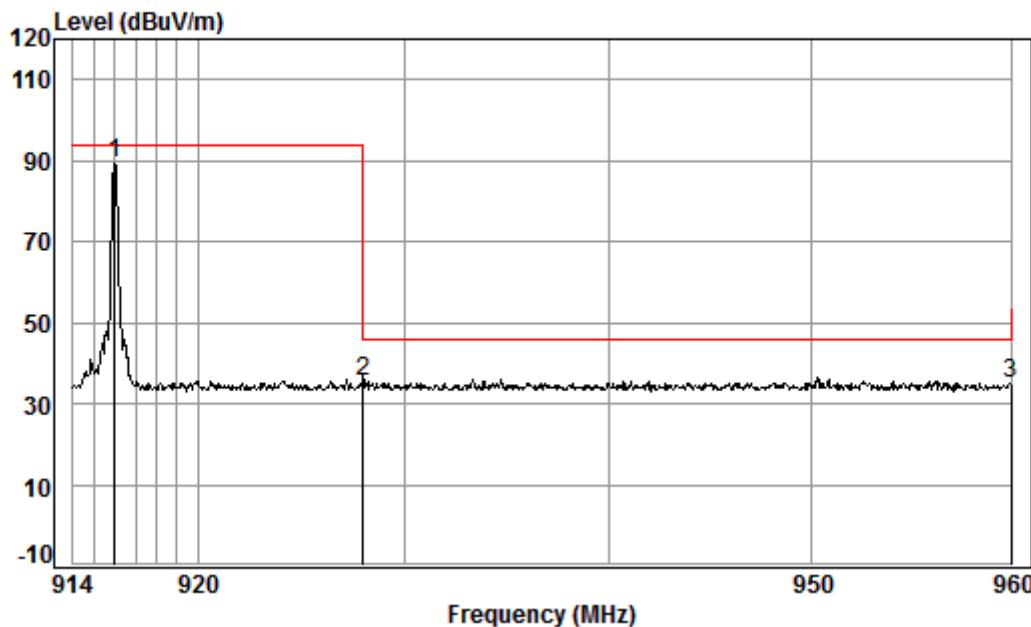
Freq	Cable	Ant	Preamp	Read	Limit		Over	Remark
	Freq	Loss	Factor	Factor	Level	Level	Line	
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	900.00	3.60	29.80	27.05	26.36	32.71	46.00	-13.29 QP
2	902.00	3.60	29.81	27.04	25.23	31.60	46.00	-14.40 QP
3 pp	908.40	3.61	29.84	27.01	75.79	82.23	94.00	-11.77 QP

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**916MHz**

Mode:b; Polarization:Horizontal;



Condition: 3m HORIZONTAL

Job No. : 01087CR

Test mode: TX

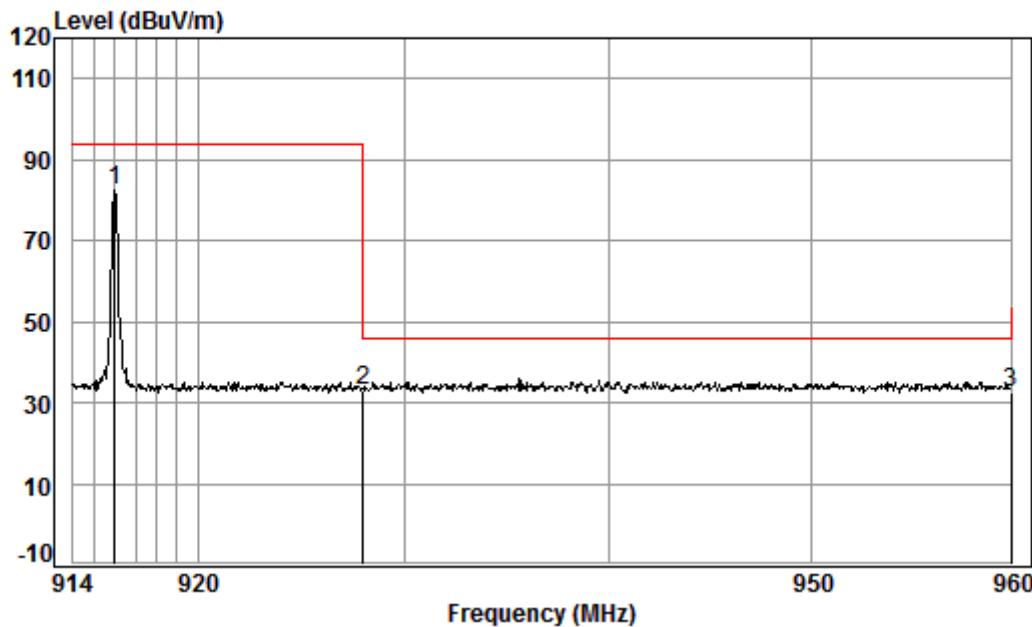
: 916

		Cable Freq	Ant Loss	Preamp Factor	Read Level	Limit Level	Limit Line	Over Limit	Remark
		MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	pp	916.00	3.62	29.88	26.97	82.92	89.45	94.00	-4.55 QP
2		928.00	3.63	29.95	26.90	29.00	35.68	46.00	-10.32 QP
3		960.00	3.66	30.11	26.73	28.14	35.18	46.00	-10.82 QP

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Mode:b; Polarization:Vertical;



Condition: 3m VERTICAL

Job No. : 01087CR

Test mode: TX

: 916

		Cable Freq	Ant Loss	Preamp Factor	Read Level	Limit Level	Over Line	Over Limit	Remark
		MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	pp	916.00	3.62	29.88	26.97	75.66	82.19	94.00	-11.81 QP
2		928.00	3.63	29.95	26.90	26.31	32.99	46.00	-13.01 QP
3		960.00	3.66	30.11	26.73	25.37	32.41	46.00	-13.59 QP

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## 7.5 Radiated Emissions

Test Requirement 47 CFR Part 15, Subpart C 15.209 &amp; 15.249 (a),(d)

Test Method: ANSI C63.10 (2013) Section 6.4&amp;6.5&amp;6.6

Measurement Distance: 3m

Limit:

Frequency(MHz)	Field strength (microvolts/meter)	Limit (dBuV/m)	Detector	Measurement Distance (meters)
0.009-0.490	2400/F(kHz)	-	-	300
0.490-1.705	24000/F(kHz)	-	-	30
1.705-30	30	-	-	30
30-88	100	40.0	QP	3
88-216	150	43.5	QP	3
216-960	200	46.0	QP	3
960-1000	500	54.0	QP	3
Above 1000	500	54.0	AV	3

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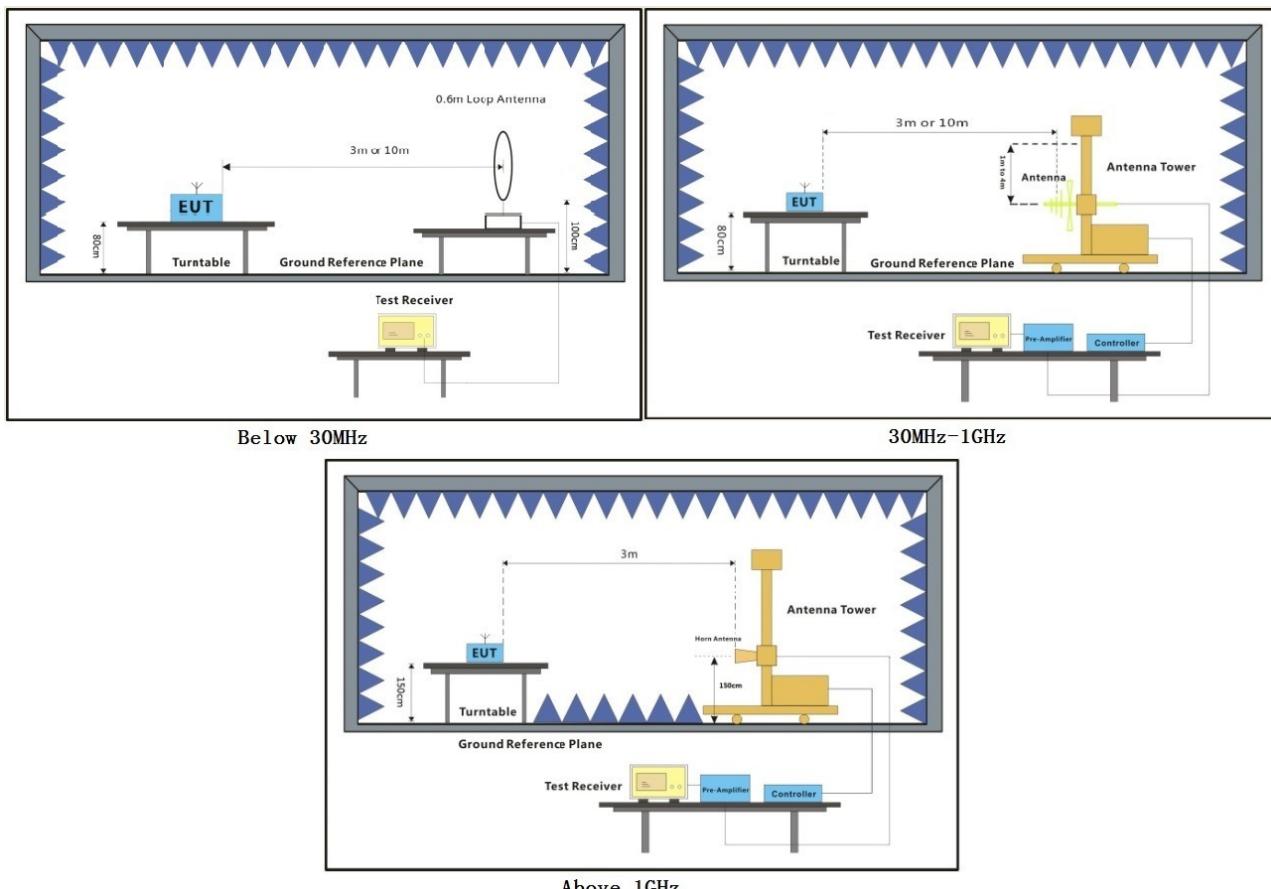
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### 7.5.1 E.U.T. Operation

Operating Environment:

Temperature: 20.6 °C      Humidity: 68.7 % RH      Atmospheric Pressure: 1030 mbar  
Test mode      b:TX mode\_Keep the EUT in transmitting with modulation mode.

### 7.5.2 Test Setup Diagram



### 7.5.3 Measurement Procedure and Data

For testing performed with the loop antenna, the center of the loop was positioned 1 m above the ground and positioned with its plane vertical at the specified distance from the EUT. During testing the loop was rotated about its vertical axis for maximum response at each azimuth and also investigated with the loop positioned in the horizontal plane. Only the worst position of vertical was shown in the report.

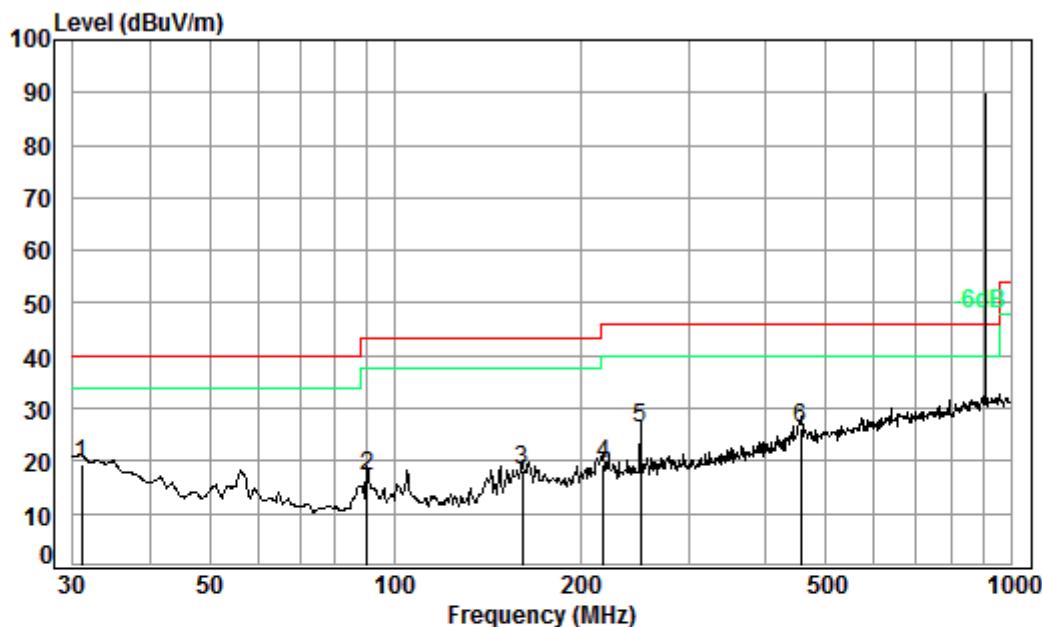
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**30MHz~1GHz**

QP value: 908.4MHz

Mode: b; Polarization: Horizontal



Condition: 3m HORIZONTAL

Job No. : 01087CR

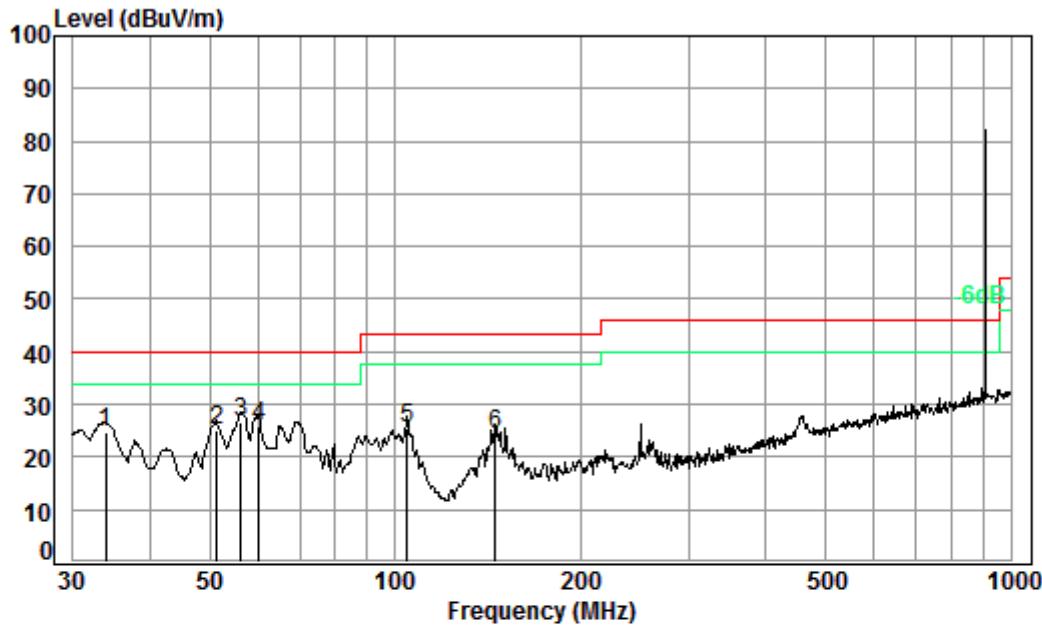
Test mode: b

Freq	Cable	Ant	Preamp	Read	Limit	Over	
	MHz	Loss	Factor	Level			
	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	30.96	0.60	21.95	27.45	24.18	19.28	40.00 -20.72
2	90.22	1.10	13.12	27.36	30.32	17.18	43.50 -26.32
3	160.91	1.34	15.52	27.04	28.30	18.12	43.50 -25.38
4	218.31	1.51	17.14	26.85	27.65	19.45	46.00 -26.55
5	250.30	1.68	18.96	26.76	32.49	26.37	46.00 -19.63
6 pp	455.91	2.43	23.69	27.43	27.70	26.39	46.00 -19.61

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Mode: b; Polarization: Vertical



Condition: 3m VERTICAL

Job No. : 01087CR

Test mode: b

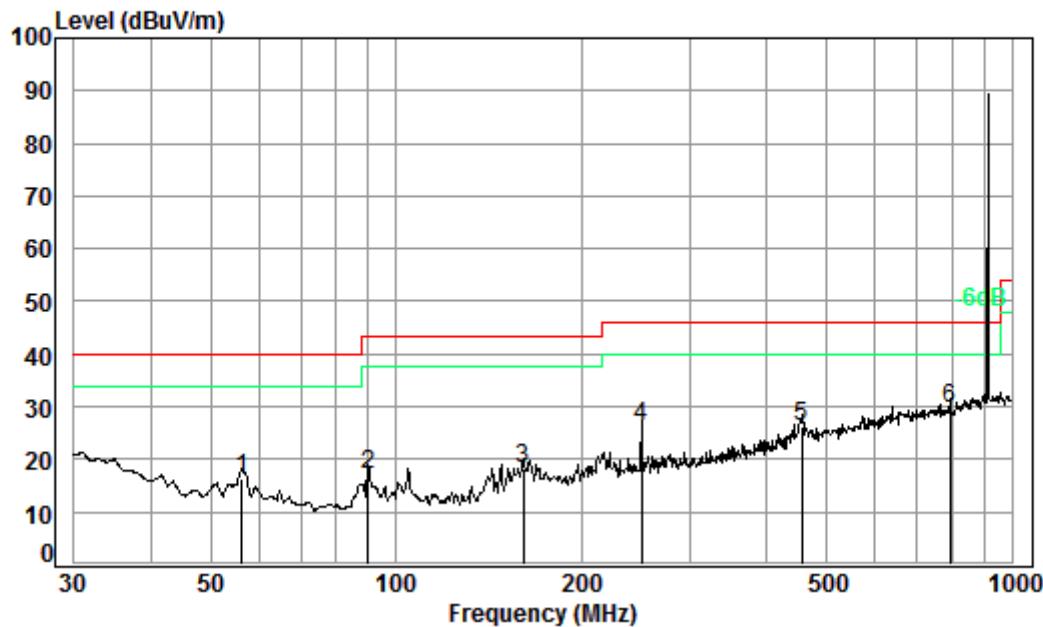
Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Limit		Over Limit
					Level	Line	
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	33.92	0.60	20.37	27.44	31.22	24.75	40.00 -15.25
2	51.30	0.80	14.06	27.41	37.51	24.96	40.00 -15.04
3 pp	56.20	0.80	13.56	27.40	39.64	26.60	40.00 -13.40
4	60.07	0.80	13.20	27.39	39.21	25.82	40.00 -14.18
5	104.54	1.21	13.78	27.32	37.90	25.57	43.50 -17.93
6	145.35	1.31	14.21	27.11	35.75	24.16	43.50 -19.34

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QP value: 916MHz

Mode: b; Polarization: Horizontal



Condition: 3m HORIZONTAL

Job No. : 01087CR

Test mode: b

Freq	Cable	Ant	Preamp	Read	Limit	Over		
	MHz	Loss	Factor	Factor	Level	Level	Line	Limit
1	56.20	0.80	13.56	27.40	29.37	16.33	40.00	-23.67
2	90.22	1.10	13.12	27.36	30.32	17.18	43.50	-26.32
3	160.91	1.34	15.52	27.04	28.30	18.12	43.50	-25.38
4	250.30	1.68	18.96	26.76	32.49	26.37	46.00	-19.63
5	455.91	2.43	23.69	27.43	27.70	26.39	46.00	-19.61
6 pp	793.40	3.18	28.46	27.65	25.73	29.72	46.00	-16.28

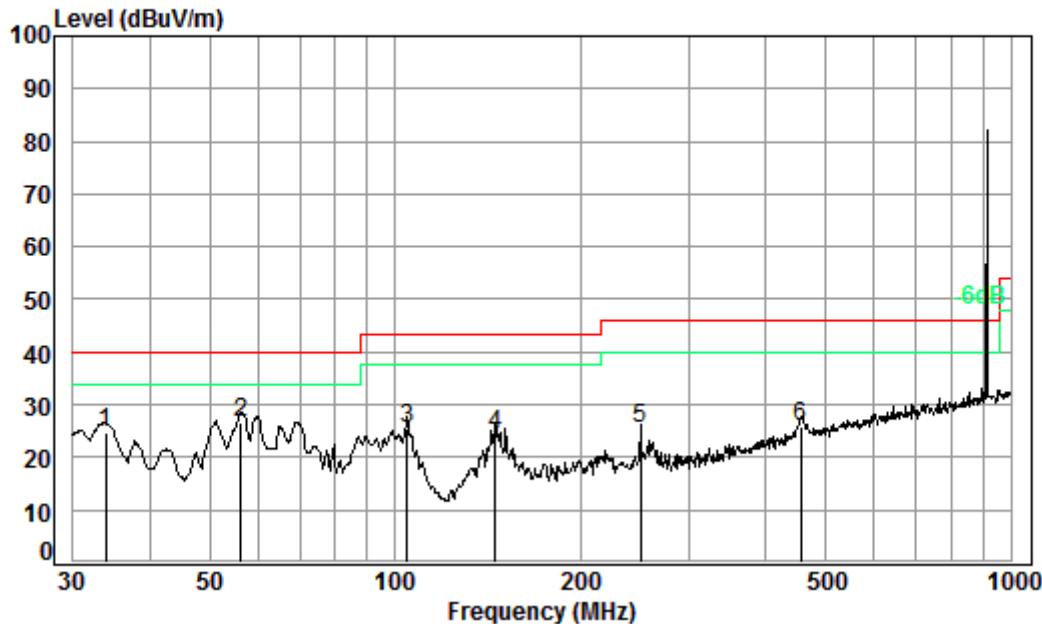
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Mode: b; Polarization: Vertical



Condition: 3m VERTICAL

Job No. : 01087CR

Test mode: b

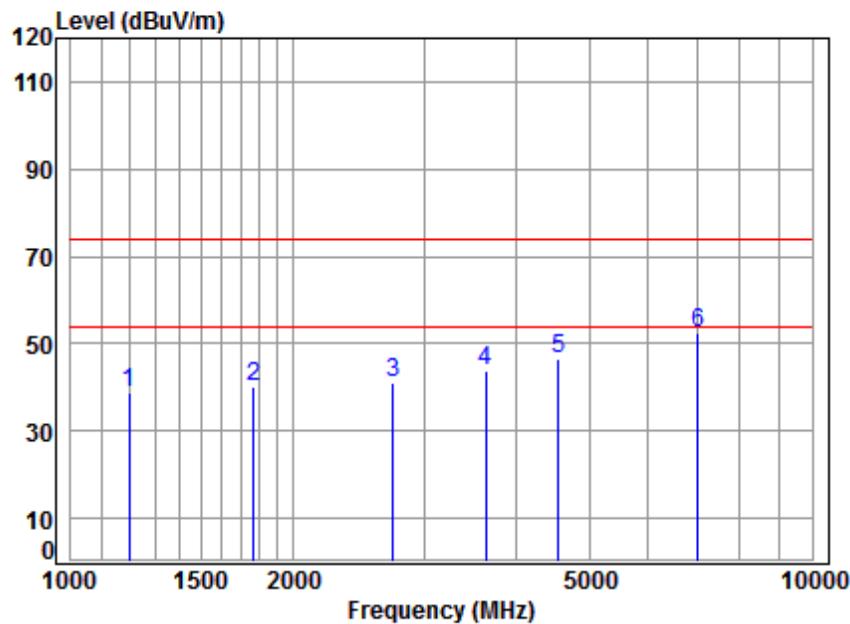
Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Limit		Over Limit
					Level	Line	
1	33.92	0.60	20.37	27.44	31.22	24.75	40.00 -15.25
2 pp	56.20	0.80	13.56	27.40	39.64	26.60	40.00 -13.40
3	104.54	1.21	13.78	27.32	37.90	25.57	43.50 -17.93
4	145.35	1.31	14.21	27.11	35.75	24.16	43.50 -19.34
5	250.30	1.68	18.96	26.76	31.43	25.31	46.00 -20.69
6	455.91	2.43	23.69	27.43	27.10	25.79	46.00 -20.21

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**Above 1GHz**

Mode:b; Polarization:Horizontal; Modulation:GFSK; ; Channel:Low



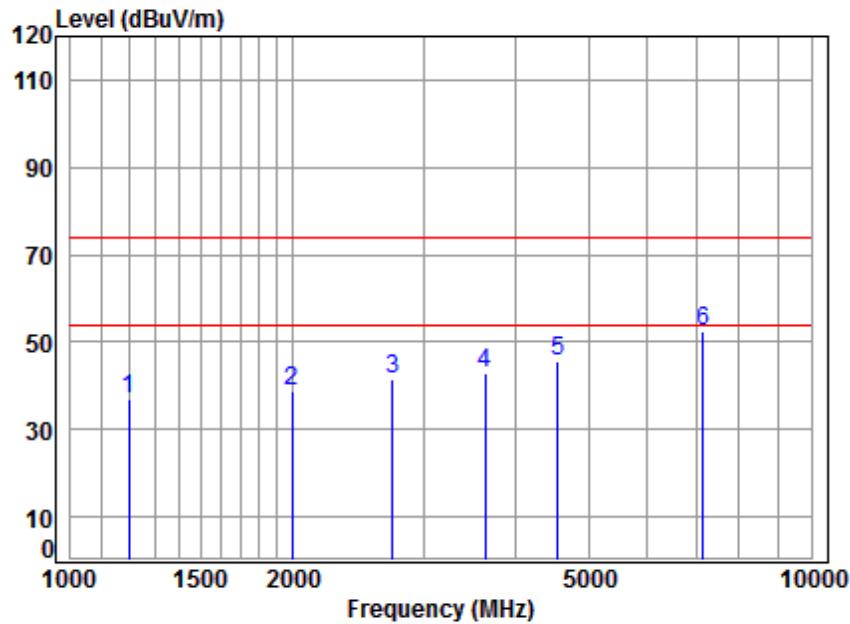
Site : chamber  
Condition: 3m HORIZONTAL  
Job No : 01087CR  
Mode : 908.4 TX SE  
Note :

Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Limit Level	Limit Line	Over Limit	Remark	
								MHz	dB
1	1199.499	4.42	24.59	40.48	50.07	38.60	74.00	-35.40	Peak
2	1766.038	5.15	26.94	40.87	48.86	40.08	74.00	-33.92	Peak
3	2725.200	5.79	29.73	41.30	46.94	41.16	74.00	-32.84	Peak
4	3633.600	6.60	31.97	42.30	47.43	43.70	74.00	-30.30	Peak
5	4542.000	7.60	33.65	43.35	48.71	46.61	74.00	-27.39	Peak
6	7014.553	10.13	35.91	42.00	48.46	52.50	74.00	-21.50	Peak

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Mode:b; Polarization:Vertical; Modulation:GFSK; ; Channel:Low



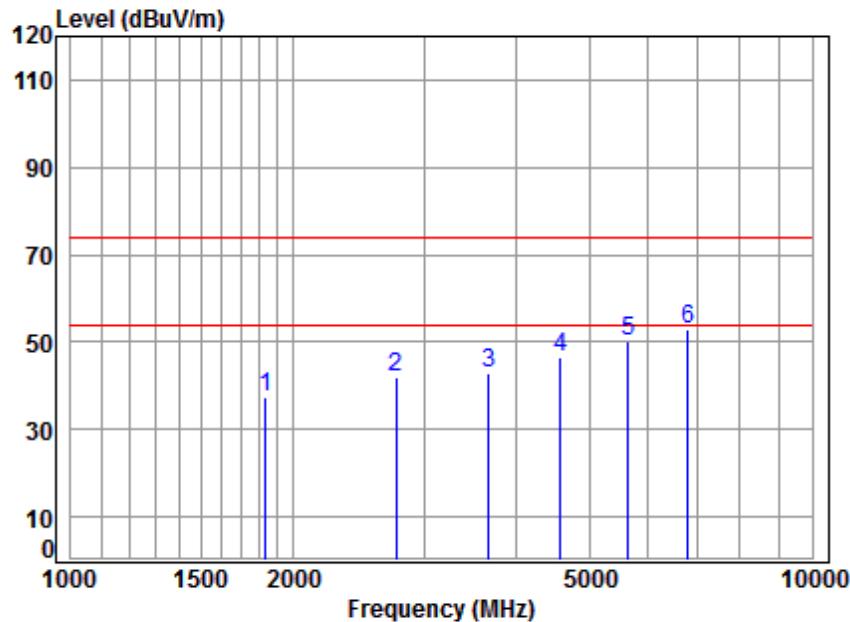
Site : chamber  
Condition: 3m VERTICAL  
Job No : 01087CR  
Mode : 908.4 TX SE  
Note :

Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Limit Level	Limit Line	Over Limit	Remark	
								MHz	dB
1 1199.499	4.42	24.59	40.48	48.61	37.14	74.00	-36.86	Peak	
2 1990.673	4.91	27.77	40.99	47.29	38.98	74.00	-35.02	Peak	
3 2725.200	5.79	29.73	41.30	47.30	41.52	74.00	-32.48	Peak	
4 3633.600	6.60	31.97	42.30	46.50	42.77	74.00	-31.23	Peak	
5 4542.000	7.60	33.65	43.35	47.73	45.63	74.00	-28.37	Peak	
6 7144.963	10.09	36.02	41.90	48.31	52.52	74.00	-21.48	Peak	

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Mode:b; Polarization:Horizontal; Modulation:GFSK; ; Channel:High



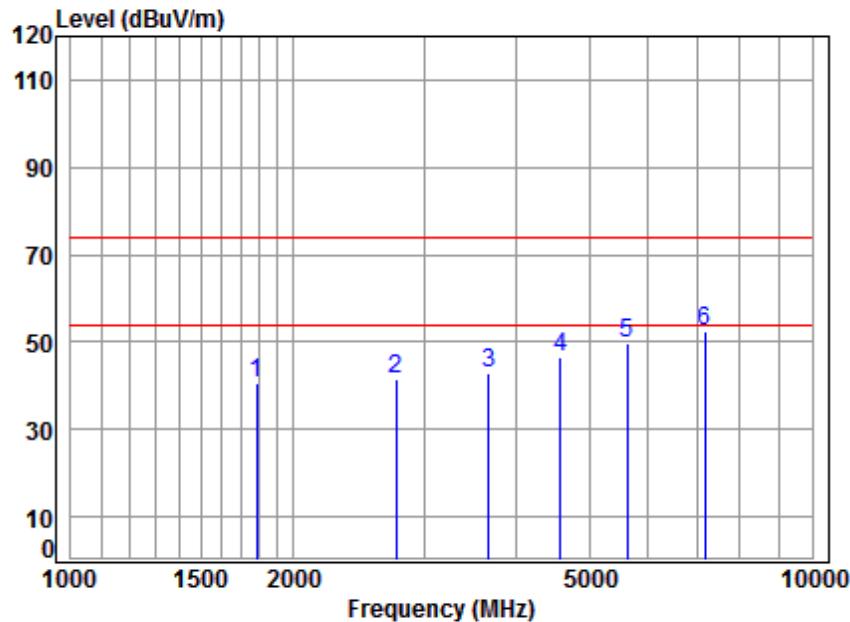
Site : chamber  
Condition: 3m HORIZONTAL  
Job No : 01087CR  
Mode : 916 TX SE  
Note :

Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Limit Level	Limit Line	Over Limit	Remark	
								MHz	dB
1 1832.314	5.08	27.19	40.91	45.97	37.33	74.00	-36.67	Peak	
2 2748.000	5.81	29.84	41.31	47.62	41.96	74.00	-32.04	Peak	
3 3664.000	6.64	32.04	42.34	46.44	42.78	74.00	-31.22	Peak	
4 4580.000	7.65	33.70	43.39	48.54	46.50	74.00	-27.50	Peak	
5 5649.370	9.38	34.75	43.15	49.07	50.05	74.00	-23.95	Peak	
6 6807.693	10.66	35.79	42.16	48.66	52.95	74.00	-21.05	Peak	

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Mode:b; Polarization:Vertical; Modulation:GFSK; ; Channel:High



Site : chamber  
Condition: 3m VERTICAL  
Job No : 01087CR  
Mode : 916 TX SE  
Note :

Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Limit Level	Limit Line	Over Limit	Remark	
								MHz	dB
1	1782.379	5.13	27.00	40.88	49.55	40.80	74.00	-33.20	Peak
2	2748.000	5.81	29.84	41.31	47.34	41.68	74.00	-32.32	Peak
3	3664.000	6.64	32.04	42.34	46.41	42.75	74.00	-31.25	Peak
4	4580.000	7.65	33.70	43.39	48.61	46.57	74.00	-27.43	Peak
5	5636.376	9.33	34.74	43.16	48.79	49.70	74.00	-24.30	Peak
6	7161.434	10.09	36.03	41.89	48.37	52.60	74.00	-21.40	Peak

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## **8 Photographs**

### **8.1 Test Setup**

Refer to Setup Photos

### **8.2 EUT Constructional Details (EUT Photos)**

Refer to EUT external and internal photos

- End of the Report -



SGS-CSTC Standards Technical Services Co., Ltd.  
Shenzhen Branch Inspection & Testing Services EEC Laboratory

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