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Report No.: SZEM181000914602
Page: 1 of 27

TEST REPORT

Application No.: SZEM1810009146CR
Applicant: Chongqing Jinshan Science & Technology (Group) Co., Ltd.
Address of Applicant: No.18, Nishang Road, LiangLu Industrial City, Yubei, Yubei District, Chongqing China
Manufacturer: Chongqing Jinshan Science & Technology (Group) Co., Ltd.
Address of Manufacturer: No.18, Nishang Road, LiangLu Industrial City, Yubei, Yubei District, Chongqing China
Factory: Chongqing Jinshan Science & Technology (Group) Co., Ltd.
Address of Factory: No.18, Nishang Road, LiangLu Industrial City, Yubei, Yubei District, Chongqing China

Equipment Under Test (EUT):

EUT Name: pH Capsule Monitoring Systems
Model No.: JSPC-1
Trade mark: OMOM
FCC ID: XE8JSPH-3
Standard(s) : 47 CFR Part 15, Subpart C 15.231
Date of Receipt: 2018-10-22
Date of Test: 2018-11-12 to 2018-11-14
Date of Issue: 2018-11-20

Test Result:	Pass*
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* In the configuration tested, the EUT complied with the standards specified above.



Keny Xu

EMC Laboratory Manager

The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards. Any mention of SGS International Electrical Approvals or testing done by SGS International Electrical Approvals in connection with, distribution or use of the product described in this report must be approved by SGS International Electrical Approvals in writing.

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Revision Record				
Version	Chapter	Date	Modifier	Remark
01		2018-11-20		Original

Authorized for issue by:			
		 Edison Li /Project Engineer	
		 Eric Fu /Reviewer	

2 Test Summary

Radio Spectrum Technical Requirement				
Item	Standard	Method	Requirement	Result
Antenna Requirement	47 CFR Part 15, Subpart C 15.231	N/A	47 CFR Part 15, Subpart C 15.203	Pass

N/A: Not applicable

Radio Spectrum Matter Part				
Item	Standard	Method	Requirement	Result
20dB Bandwidth	47 CFR Part 15, Subpart C 15.231	ANSI C63.10 (2013) Section 6.9	47 CFR Part 15, Subpart C 15.231(c)	Pass
Dwell Time (15.231(e))	47 CFR Part 15, Subpart C 15.231	ANSI C63.10 (2013) Section 7.8.4	47 CFR Part 15, Subpart C 15.231(e)	Pass
Duty Cycle	47 CFR Part 15, Subpart C 15.231	ANSI C63.10 (2013)	47 CFR Part 15, Subpart C 15.35(c)	Pass
Field Strength of the Fundamental Signal (15.231(e))	47 CFR Part 15, Subpart C 15.231	ANSI C63.10 (2013) Section 6.5	47 CFR Part 15, Subpart C 15.231(e)	Pass
Radiated Emissions	47 CFR Part 15, Subpart C 15.231	ANSI C63.10 (2013) Section 6.4&6.5&6.6	47 CFR Part 15, Subpart C 15.231(e)	Pass

N/A: Not applicable

3 Contents

	Page
1 COVER PAGE	1
2 TEST SUMMARY	3
3 CONTENTS	4
4 GENERAL INFORMATION	5
4.1 DETAILS OF E.U.T	5
4.2 DESCRIPTION OF SUPPORT UNITS	5
4.3 MEASUREMENT UNCERTAINTY	5
4.4 TEST LOCATION	6
4.5 TEST FACILITY	6
4.6 DEVIATION FROM STANDARDS	6
4.7 ABNORMALITIES FROM STANDARD CONDITIONS	6
5 EQUIPMENT LIST	7
6 RADIO SPECTRUM TECHNICAL REQUIREMENT	9
6.1 ANTENNA REQUIREMENT	9
6.1.1 <i>Test Requirement:</i>	9
6.1.2 <i>Conclusion</i>	9
7 RADIO SPECTRUM MATTER TEST RESULTS	10
7.1 20dB BANDWIDTH	10
7.1.1 <i>E.U.T. Operation</i>	10
7.1.2 <i>Test Setup Diagram</i>	10
7.1.3 <i>Measurement Procedure and Data</i>	10
7.2 DWELL TIME (15.231(E))	12
7.2.1 <i>E.U.T. Operation</i>	12
7.2.2 <i>Test Setup Diagram</i>	12
7.2.3 <i>Measurement Procedure and Data</i>	12
7.3 DUTY CYCLE	14
7.3.1 <i>E.U.T. Operation</i>	14
7.3.2 <i>Test Setup Diagram</i>	14
7.3.3 <i>Measurement Procedure and Data</i>	14
7.4 FIELD STRENGTH OF THE FUNDAMENTAL SIGNAL (15.231(E))	16
7.4.1 <i>E.U.T. Operation</i>	16
7.4.2 <i>Test Setup Diagram</i>	16
7.4.3 <i>Measurement Procedure and Data</i>	17
7.5 RADIATED EMISSIONS	20
7.5.1 <i>E.U.T. Operation</i>	21
7.5.2 <i>Test Setup Diagram</i>	21
7.5.3 <i>Measurement Procedure and Data</i>	21
8 PHOTOGRAPHS	27
8.1 TEST SETUP	27
8.2 EUT CONSTRUCTIONAL DETAILS (EUT PHOTOS)	27

4 General Information

4.1 Details of E.U.T.

Power supply:	3.0V DC
Operation Frequency:	433.92MHz
Modulation Type:	ASK
Number of Channels:	1
Antenna Type:	Integral
Antenna Gain:	0dBi

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	$\pm 3\%$

4.4 Test Location

All tests were performed at:

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen Branch

No. 1 Workshop, M-10, Middle Section, Science & Technology Park, Shenzhen, Guangdong, China.
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

5 Equipment List

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

Dwell Time					
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					
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
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
EMI Test Receiver	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



SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch

Report No.: SZEM181000914602
Page: 8 of 27

Radiated Emissions (Below 1GHz)					
Test 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	2017-09-27	2018-09-26
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

Radiated Emissions (Above 1GHz)					
Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. Date	Cal. Due date
3m Semi-Anechoic Chamber	AUDIX	N/A	SEM001-02	2018-03-13	2021-03-12
EXA Signal Analyzer (10Hz-26.5GHz)	Agilent Technologies Inc	N9010A	SEM004-09	2018-04-13	2019-04-12
BiConiLog Antenna (26-3000MHz)	ETS-Lindgren	3142C	SEM003-01	2017-06-27	2020-06-26
Horn Antenna (800MHz-18GHz)	Rohde & Schwarz	HF907	SEM003-07	2018-04-13	2021-04-12
Amplifier (0.1-1300MHz)	HP	8447D	SEM005-02	2017-09-27	2018-09-26
Low Noise Amplifier (100MHz-18GHz)	Black Diamond Series	BDLNA-0118-352810	SEM005-05	2017-09-27	2018-09-26
Band filter	N/A	N/A	N/A	N/A	N/A
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

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:

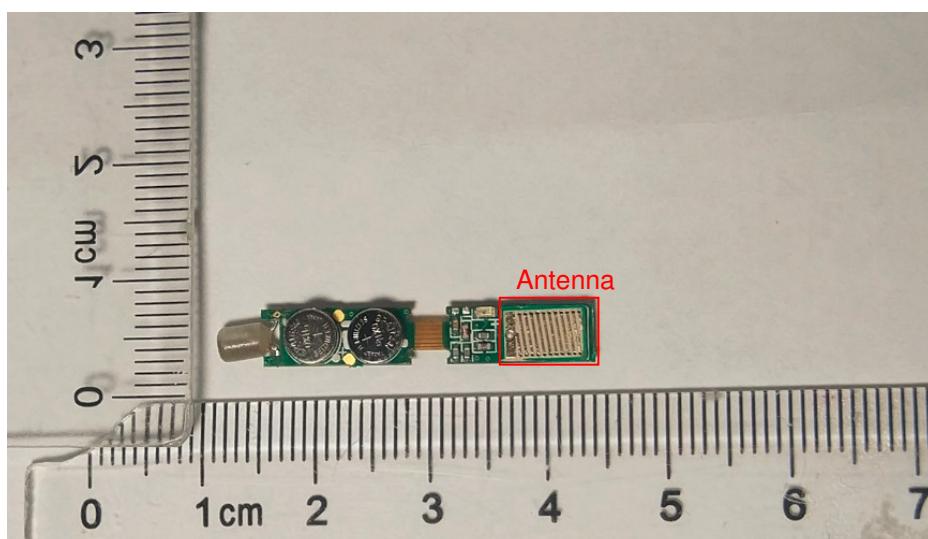
47 CFR Part 15, Subpart C 15.203

6.1.2 Conclusion

Standard 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 antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit permanently attached antenna or of an 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 antenna is integrated on the main PCB and no consideration of replacement. The best case gain of the antenna is 0dBi.

7 Radio Spectrum Matter Test Results

7.1 20dB Bandwidth

Test Requirement 47 CFR Part 15, Subpart C 15.231(e)
Test Method: ANSI C63.10 (2013) Section 6.9
Limit:

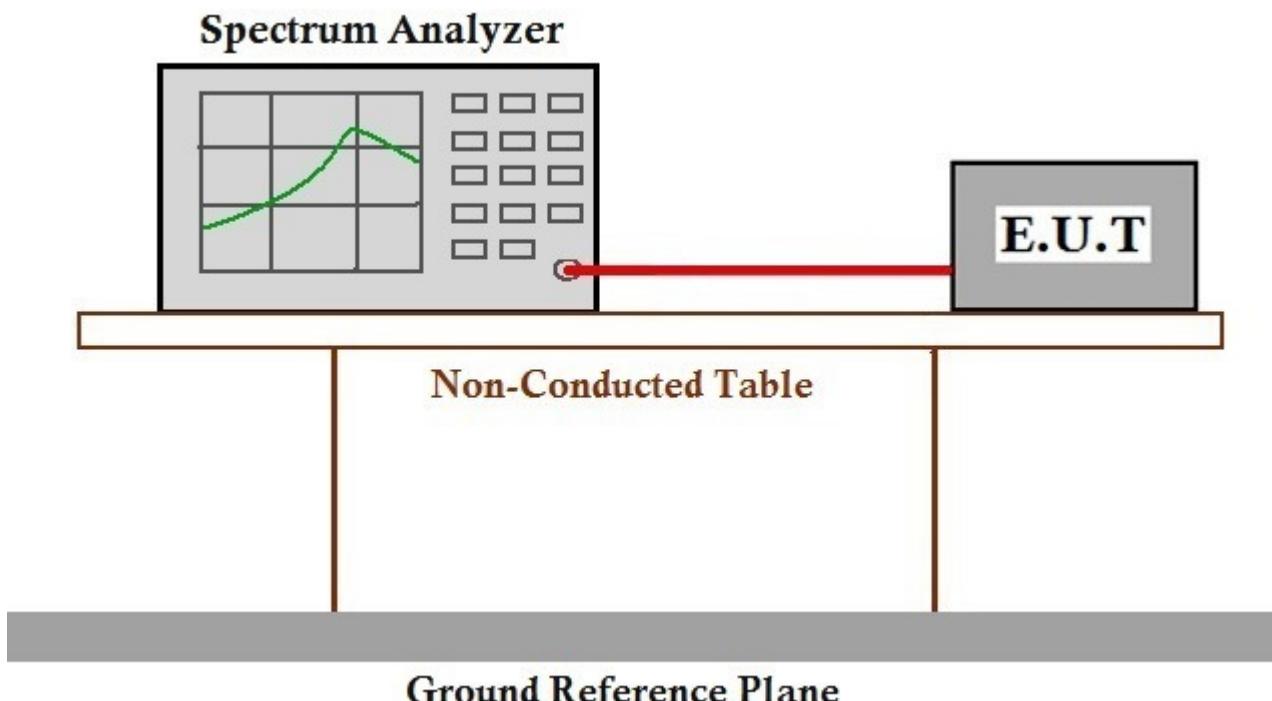
Frequency range(MHz)	Limit
70-900	No wider than 0.25% of the center frequency
Above 900	No wider than 0.5% of the center frequency

7.1.1 E.U.T. Operation

Operating Environment:

Temperature: 24.6 °C Humidity: 56.3 % RH Atmospheric Pressure: 1015 mbar
Test mode: b:TX mode_Keep the EUT in transmitting with modulation mode.

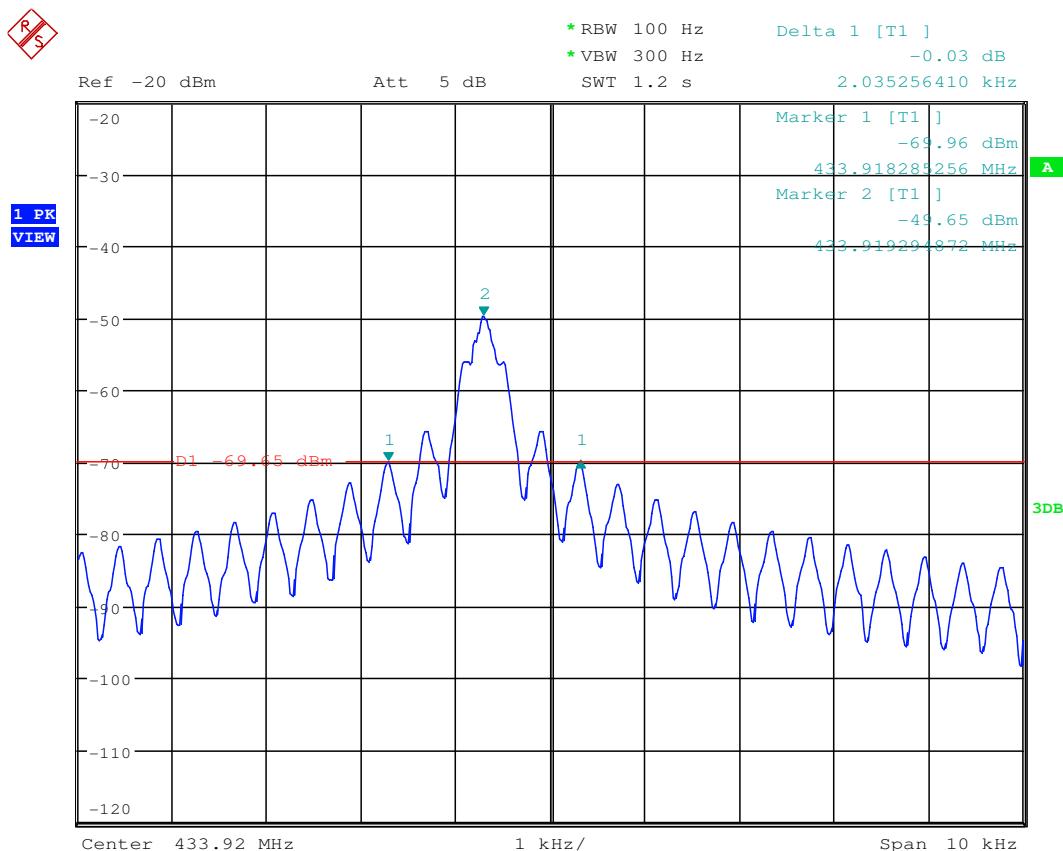
7.1.2 Test Setup Diagram



7.1.3 Measurement Procedure and Data

Test Result:

20dB bandwidth (MHz)	Limit (MHz)	Results
0.002	1.8048	Pass



7.2 Dwell Time (15.231(e))

Test Requirement 47 CFR Part 15, Subpart C 15.231(e)

Test Method: ANSI C63.10 (2013) Section 7.8.4

Limit:

Device type	Limit
Manually operated transmitter	The switch automatically deactivate the transmitter within not more than 5 seconds of being released
Automatically activated transmitter	Cease transmission within 5 seconds after activation
Periodic transmissions to determine system integrity of transmitters used in security or safety applications	The total transmission time does not exceed 2 seconds per hour

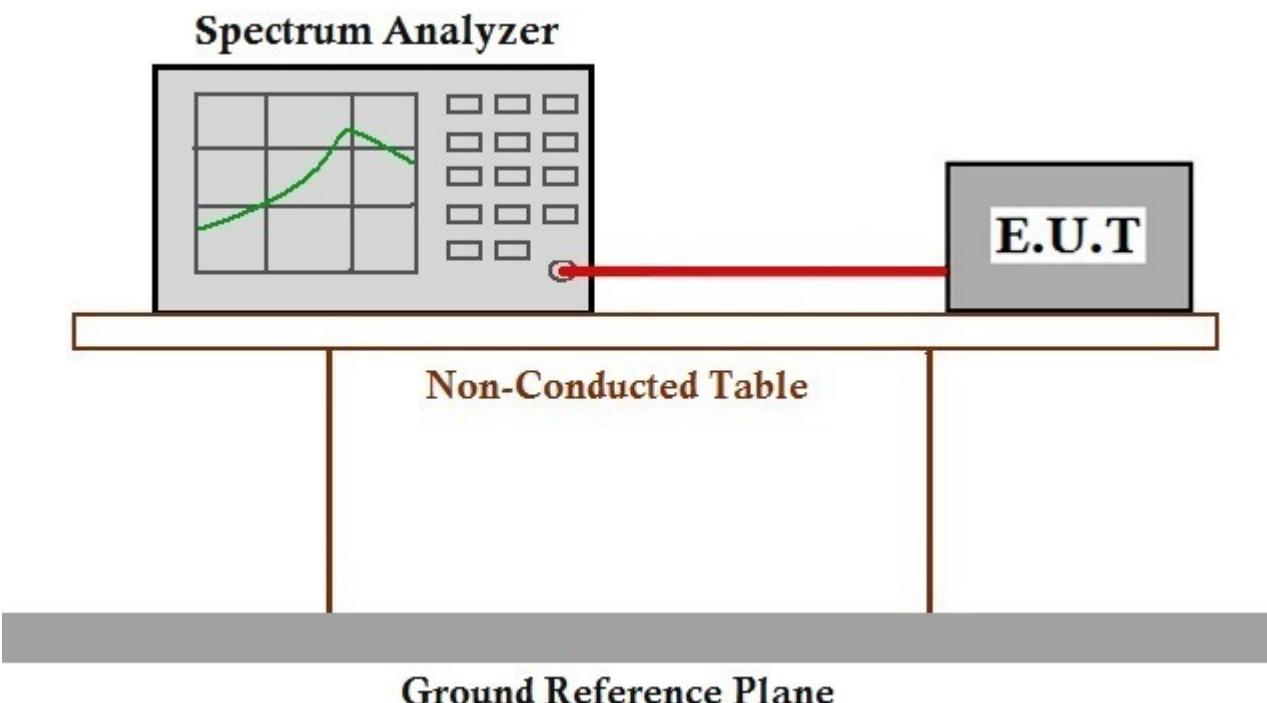
7.2.1 E.U.T. Operation

Operating Environment:

Temperature: 24.6 °C Humidity: 56.3 % RH Atmospheric Pressure: 1015 mbar

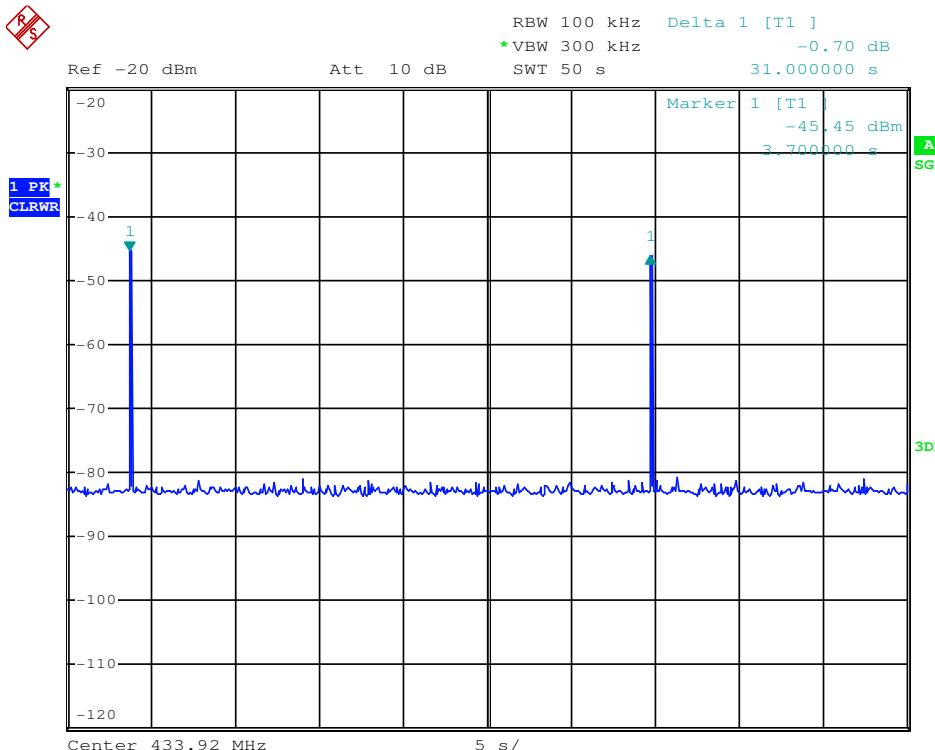
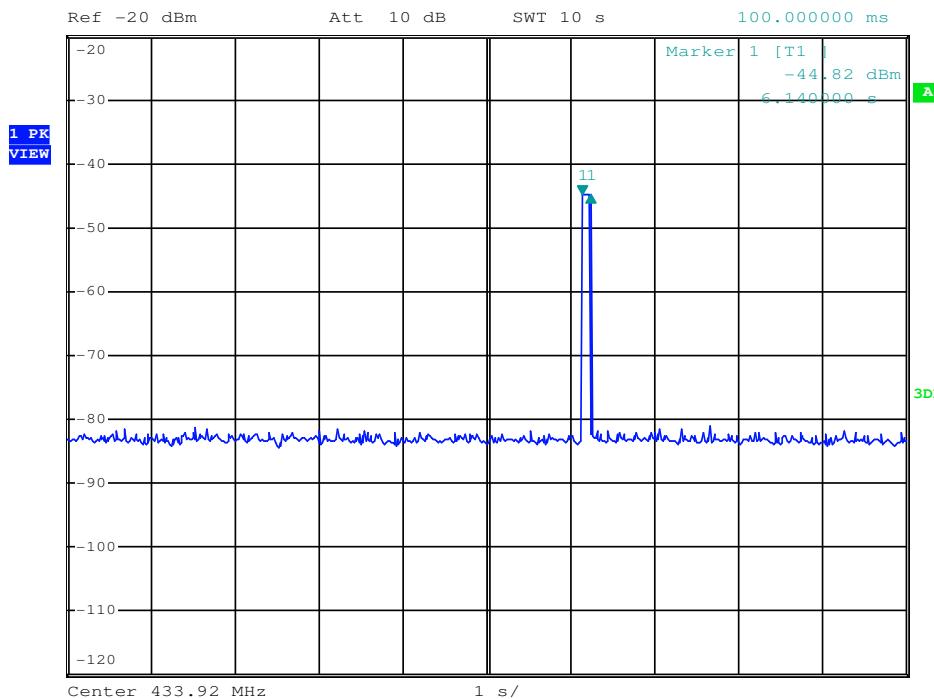
Test mode: b:TX mode_Keep the EUT in transmitting with modulation mode.

7.2.2 Test Setup Diagram



7.2.3 Measurement Procedure and Data

Test item	Limit	Results
Transmitting time: 0.1s	≤1S	Pass
Silent time: 31s	30 times Transmission time, no less than 10s	Pass

Test plot as follows:


7.3 Duty Cycle

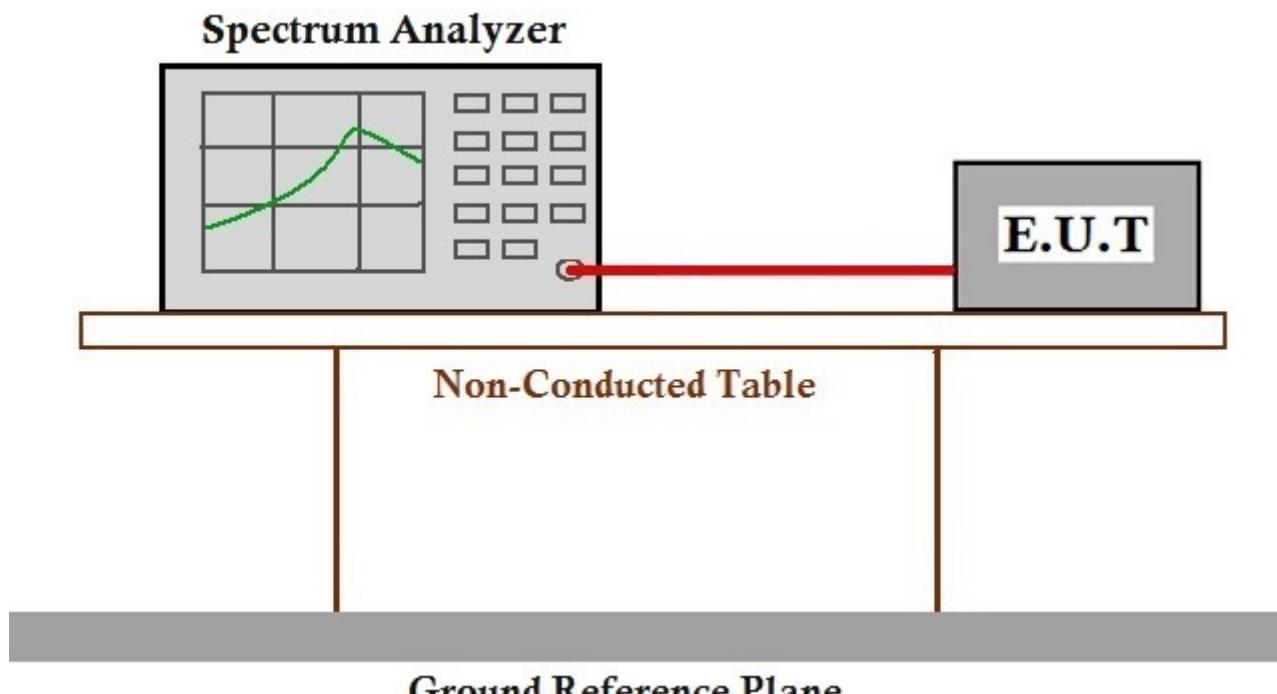
Test Requirement 47 CFR Part 15C Section 15.35 (c)
Test Method: ANSI C63.10:2013
Limit: N/A

7.3.1 E.U.T. Operation

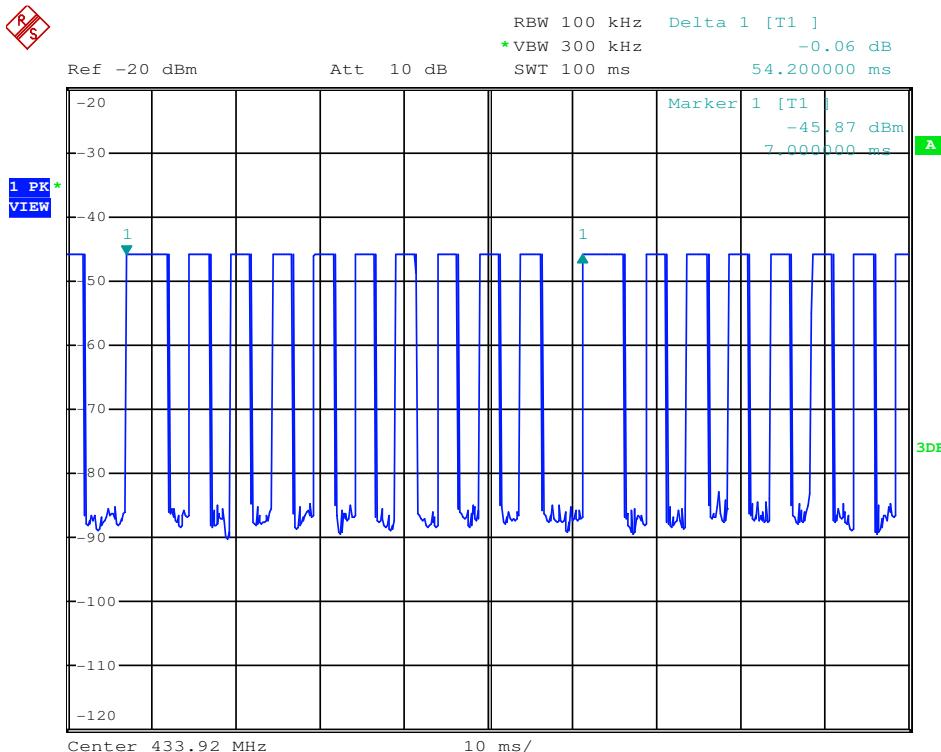
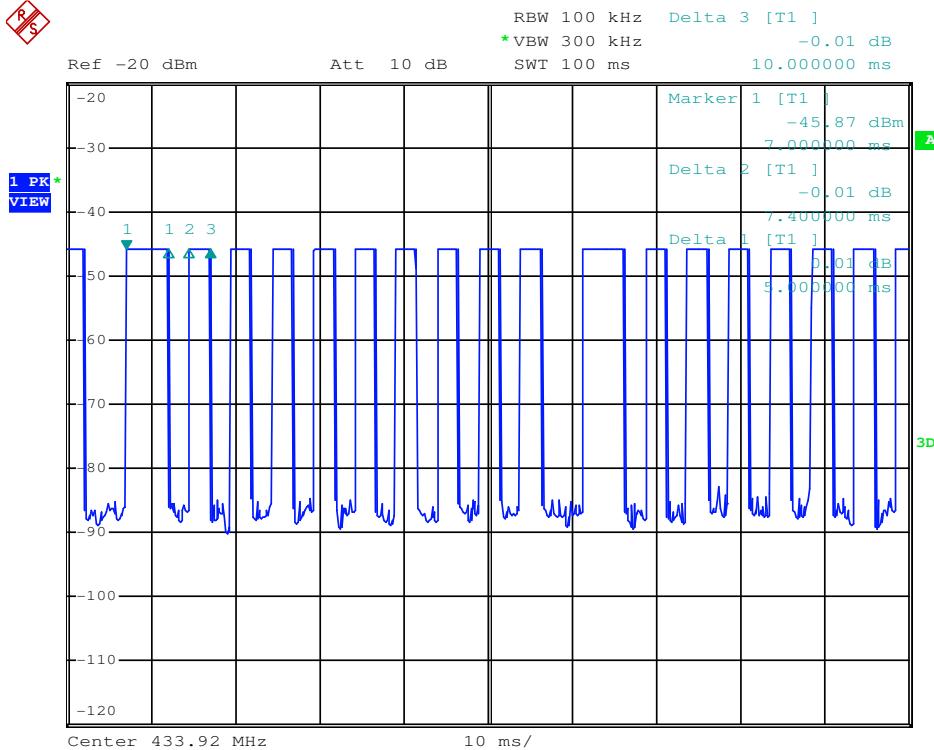
Operating Environment:

Temperature: 24.6 °C Humidity: 56.3 % RH Atmospheric Pressure: 1015 mbar
Test mode: b:TX mode_Keep the EUT in transmitting with modulation mode.

7.3.2 Test Setup Diagram



7.3.3 Measurement Procedure and Data

Test plot as follows:


7.4 Field Strength of the Fundamental Signal (15.231(e))

Test Requirement N/A

Test Method: ANSI C63.10 (2013) Section 6.5

Measurement Distance: 3m

Limit:

Fundamental frequency(MHz)	Field strength of fundamental(microvolts/meter)	Field strength of spurious emissions(microvolts/meter)
40.66-40.70	1000	100
70-130	500	50
130-174	500 to 1500	50 to 150
174-260	1500	150
260-470	1500 to 5000	150 to 500
Above 470	5000	500

Remark: the emission limit is based on measurement instrumentation employing an average detector at a distance of 3 meters. The frequencies above 1000MHz are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.

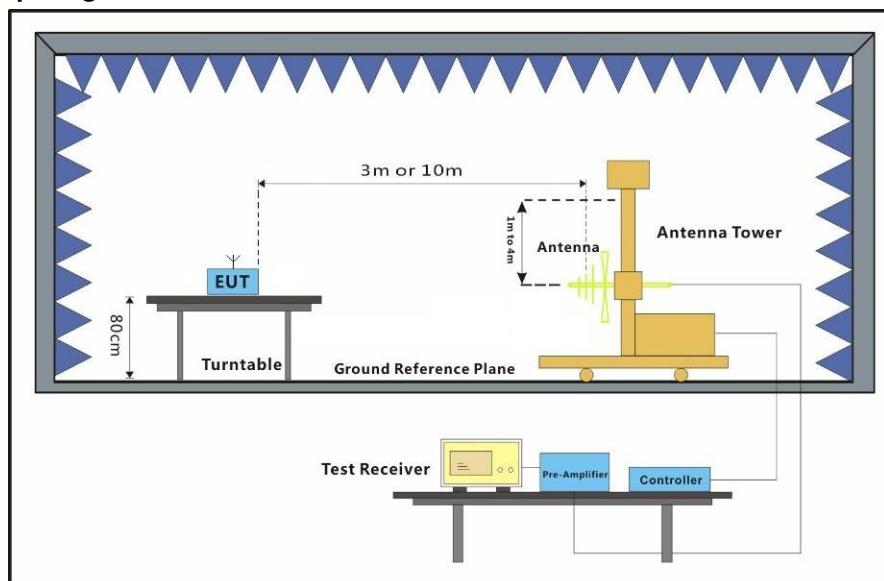
7.4.1 E.U.T. Operation

Operating Environment:

Temperature: 23.6 °C Humidity: 58.3 % RH Atmospheric Pressure: 1015 mbar

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

7.4.2 Test Setup Diagram



7.4.3 Measurement Procedure and Data

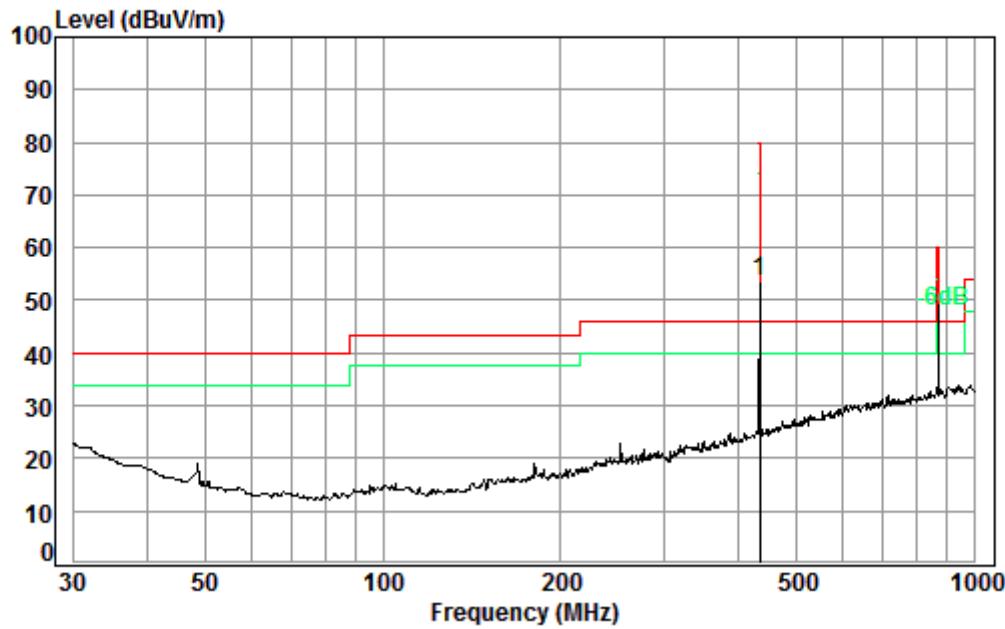
- a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 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. The radiation measurements are performed in X, Y, Z axis positioning. And found the X axis positioning which it is worse case, only the test worst case mode is recorded in the report.

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

Average value:	
Calculate Formula:	Average value=Peak value + PDCF
	PDCF=20 log(Duty cycle)= 20 log[(5+2.6*9)/54.2]=-5.61
	Duty cycle= T on time / T period
Test data:	T on time =28.4ms
	T period =54.2ms

Peak value:								
Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamp Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
433.92	2.35	23.2	27.79	55.66	53.42	92.87	-39.45	Horizontal
433.92	2.35	23.2	27.79	57.90	55.66	92.87	-37.21	Vertical
Average Value:								
Frequency (MHz)	PCDF		Average Level (dBuV/m)	Limit Line (dBuV/m)		Over Limit (dB)	Polarization	
433.92	-5.61		47.81	72.87		-25.06	Horizontal	
433.92			50.05	72.87		-22.82	Vertical	

Mode:b; Polarization:Horizontal



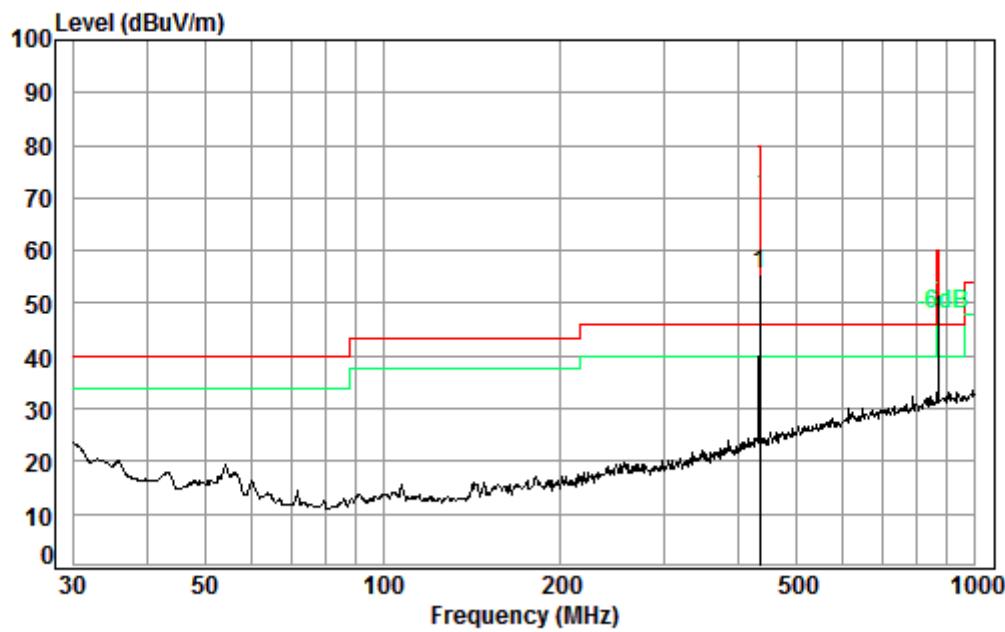
Condition: 3m HORIZONTAL

Job No. : 09146CR

Test mode: b

	Cable Freq	Ant Loss	Preamp Factor	Read Level	Limit Level	Limit Line	Over Limit
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dB
1 pp	433.92	2.35	23.20	27.79	55.66	53.42	80.00 -26.58

Mode:b; Polarization:Vertical



Condition: 3m VERTICAL

Job No. : 09146CR

Test mode: b

	Cable Freq	Ant Loss	Preamp Factor	Read Level	Limit Level	Limit Line	Over Limit
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dB
1 pp	433.92	2.35	23.20	27.79	57.90	55.66	80.00 -24.34

7.5 Radiated Emissions

Test Requirement N/A

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

Measurement Distance: 3m

Limit:

Frequency(MHz)	Field strength(microvolts/meter)	Measurement distance(meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

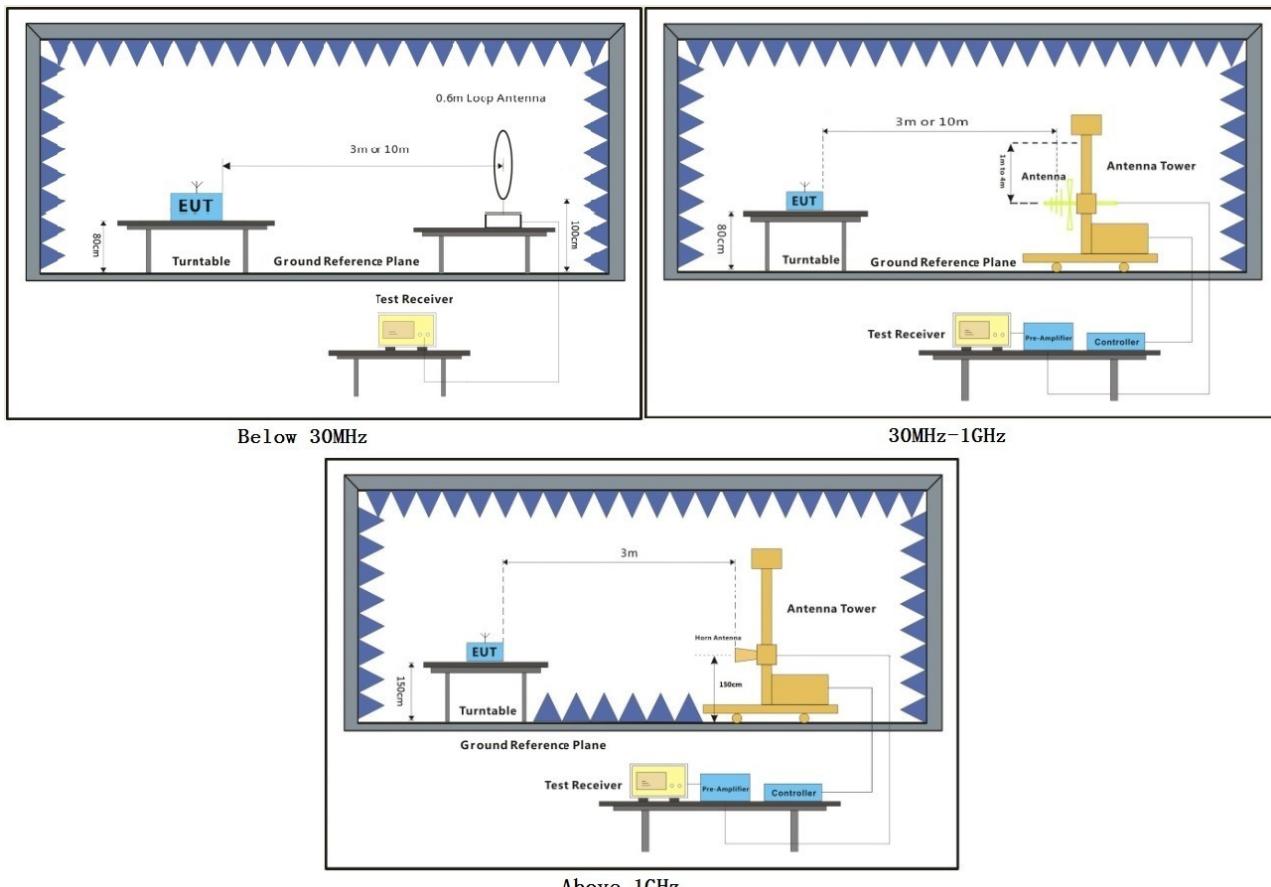
Remark: The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90kHz, 110-490kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.

7.5.1 E.U.T. Operation

Operating Environment:

Temperature: 22.7 °C Humidity: 52.9 % RH Atmospheric Pressure: 1015 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.

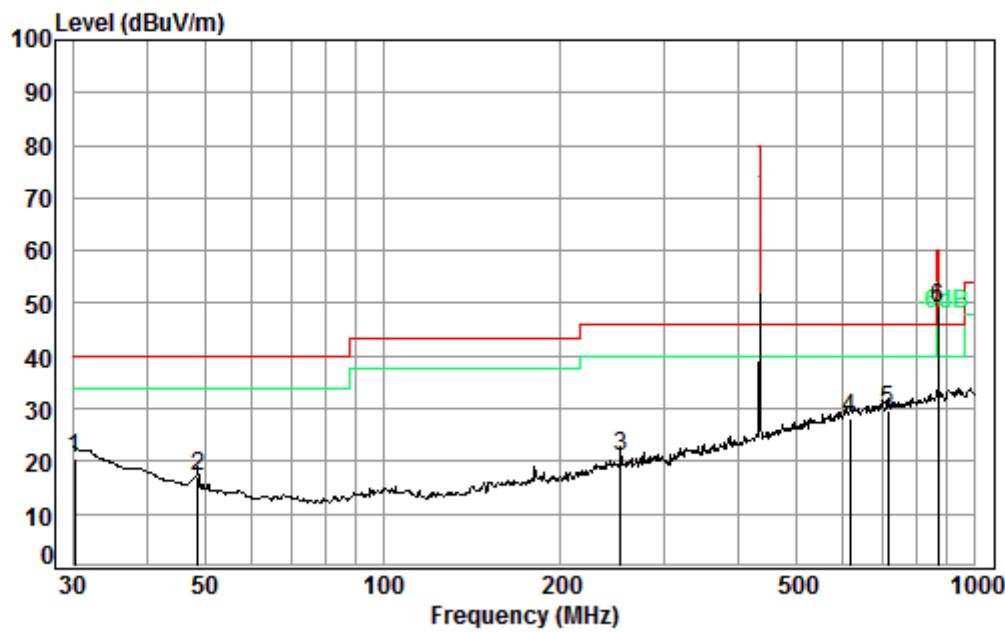


Peak value:								
Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamp Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
867.840	3.48	29.4	27.18	43.22	48.92	72.87	-23.95	Horizontal
867.840	3.48	29.4	27.18	45.55	51.25	72.87	-21.62	Vertical
Average Value:								
Frequency (MHz)	PCDF		Average Level (dBuV/m)		Limit Line (dBuV/m)		Over Limit (dB)	Polarization
867.840	-5.61		43.31		52.87		-9.56	Horizontal
867.840			45.64		52.87		-7.23	Vertical

Remark 1: Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor

Below 1GHz:

Mode:b; Polarization:Horizontal



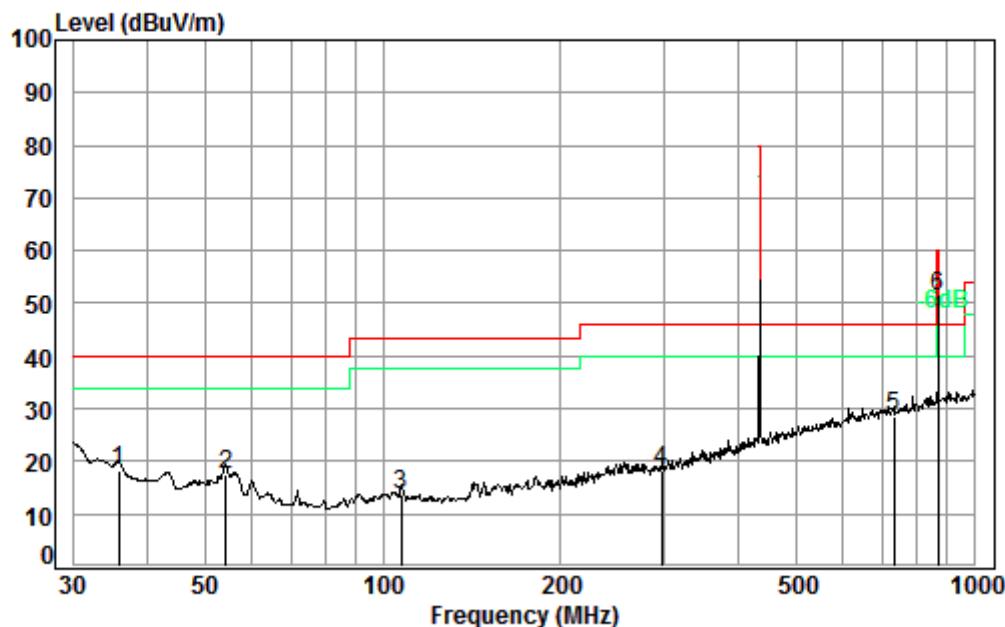
Condition: 3m HORIZONTAL

Job No. : 09146CR

Test mode: b

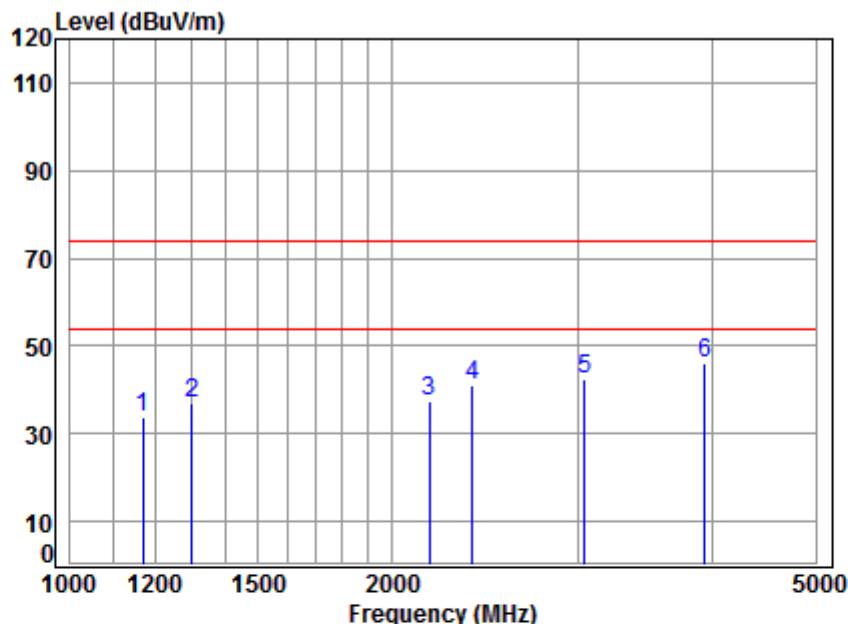
Freq	Cable	Ant	Preamp	Read	Limit	Over		
	Loss	Factor	Factor	Level				
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	30.21	0.60	22.38	27.67	25.32	20.63	40.00	-19.37
2	48.67	0.77	14.60	27.60	29.20	16.97	40.00	-23.03
3	252.06	1.68	18.98	27.54	27.64	20.76	46.00	-25.24
4	616.37	2.74	26.83	27.68	26.31	28.20	46.00	-17.80
5	714.17	2.95	27.99	27.53	26.36	29.77	46.00	-16.23
6 pp	867.85	3.48	29.40	27.18	43.22	48.92	46.00	2.92

Mode:b; Polarization:Vertical



Above 1GHz:

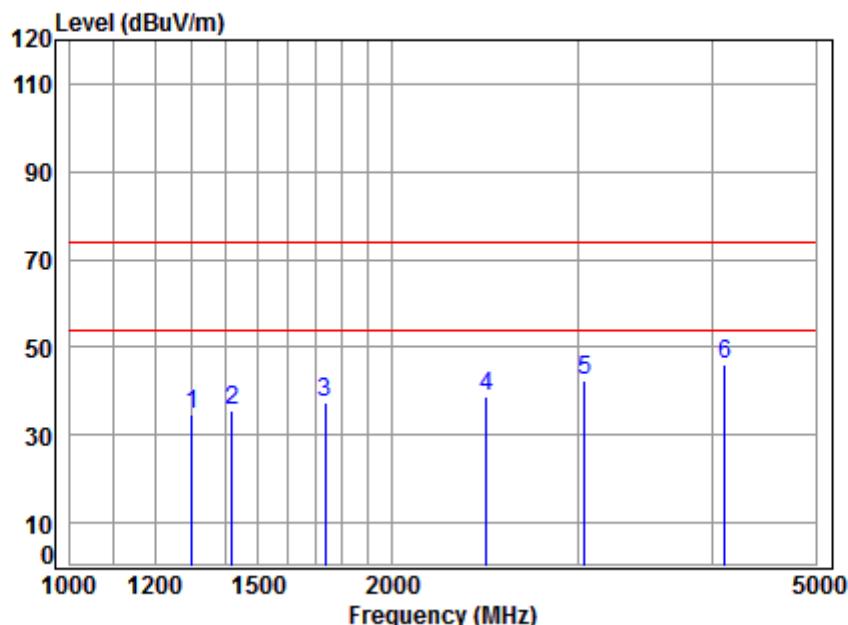
Mode:b; Polarization:Horizontal



Site : chamber
Condition: 3m HORIZONTAL
Job No : 09146CR
Mode : 433.92 TX SE
Note :

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Limit Level	Limit Line	Over Limit
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	1170.844	4.30	24.46	41.16	46.23	33.83	74.00	-40.17
2	1301.760	5.40	25.70	41.39	47.47	37.18	74.00	-36.82
3	2169.600	4.92	27.83	41.70	46.50	37.55	74.00	-36.45
4	2380.920	5.46	28.50	41.87	48.93	41.02	74.00	-32.98
5	3037.440	5.95	30.69	42.08	47.76	42.32	74.00	-31.68
6	3940.238	6.92	32.59	42.31	48.75	45.95	74.00	-28.05

Mode:b; Polarization:Vertical



Site : chamber
Condition: 3m VERTICAL
Job No : 09146CR
Mode : 433.92 TX SE
Note :

Freq	Cable	Ant	Preamp	Read	Limit	Over		
	Loss	Factor	Factor	Level	Level	Line	Limit	
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	1301.760	4.46	24.64	41.19	46.66	34.57	74.00	-39.43
2	1418.001	5.21	25.49	41.35	46.30	35.65	74.00	-38.35
3	1735.680	5.03	27.36	41.63	46.57	37.33	74.00	-36.67
4	2458.806	5.57	28.63	41.90	46.60	38.90	74.00	-35.10
5	3037.440	6.11	31.11	42.13	47.48	42.57	74.00	-31.43
6	4108.617	7.11	32.90	42.35	48.44	46.10	74.00	-27.90

8 Photographs

8.1 Test Setup

Please refer to setup photos.

8.2 EUT Constructional Details (EUT Photos)

Please refer to external and internal photos for details.

- End of the Report -