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

No. 1 Workshop, M-10, Middle section, Science & Technology Park,
Shenzhen, Guangdong, China 518057

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TEST REPORT

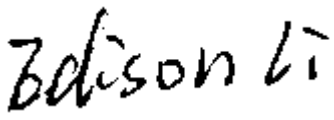
Application No.:	SZEM1703001849CR
Applicant:	Standard Euler, Inc.
Address of Applicant:	805 Kains Ave, Albany, CA 94706
Manufacturer:	Jetta Company Limited
Address of Manufacturer:	19 On Kui St., On Lok Tsuen, Fanling, NT, HK, Hong Kong
Equipment Under Test (EUT):	
EUT Name:	Puck
Model No.:	Puck
Trade mark:	Flair
FCC ID:	2AK78PUCKU
Standards:	47 CFR Part 15, Subpart C 15.249
Date of Receipt:	2017-03-15
Date of Test:	2017-03-15 to 2017-05-09
Date of Issue:	2017-05-12
Test Result :	**Pass***

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

Jack Zhang
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.

Revision Record				
Version	**Chapter**	**Date**	**Modifier**	**Remark**
01		2017-05-12		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 15.249	N/A	47 CFR Part 15, Subpart C 15.203	Pass

Radio Spectrum Matter Part				
Item	**Standard**	**Method**	**Requirement**	**Result**
Conducted Disturbance 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

Remark:

Model No.: Puck

There are two colors of the above model, only the sample and adapter with black was tested, since the electrical circuit design, layout, components used, internal wiring and functions were identical for all the above models, only different on color of appearance.

3 Contents

4 General Information

4.1 Details of E.U.T.

Power supply:	3.0V DC (2 x alkaline AAA cell Batteries) AC Adapter Model: TY0500100A1mn Iuput: AC 100-240V, 50/60Hz, 0.6A Output: DC 5V, 1.0A
Cable:	USB cable: 140cm unshielded
Frequency range:	905MHz-925MHz
Modulation Type:	GFSK
Number of channels:	5
Antenna type:	Ceramic Antenna
Antenna gain:	-1dBi
Sample type:	Fixed production

Operation Frequency each of channel

Channel	Frequency
0	905 MHz
1	910 MHz
2	915 MHz
3	920 MHz
4	925 MHz

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(CH0)	905 MHz
The Middle channel(CH2)	915 MHz
The Highest channel(CH4)	925 MHz

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	7.25 x 10-8
2	Duty cycle	0.37%
3	Occupied Bandwidth	3%
4	RF conducted power	0.75dB
5	RF power density	2.84dB
6	Conducted Spurious emissions	0.75dB
7	RF Radiated power	4.5dB (below 1GHz)
		4.8dB (above 1GHz)
8	Radiated Spurious emission test	4.5dB (30MHz-1GHz)
		4.8dB (1GHz-18GHz)
9	Temperature test	1℃
10	Humidity test	3%
11	Supply voltages	1.5%

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 10m Semi-anechoic chamber and Shielded Room of SGS-CSTC Standards Technical Services Co., Ltd. have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: G-823, R-4188, T-1153 and C-2383 respectively.

• **FCC – Registration No.: 556682**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration No.: 556682.

• **Industry Canada (IC)**

Two 3m Semi-anechoic chambers and the 10m Semi-anechoic chamber of SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch EMC Lab have been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 4620C-1, 4620C-2, 4620C-3.

4.6 Deviation from Standards

None

4.7 Abnormalities from Standard Conditions

None

5 Equipment List

Conducted Disturbance 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	2016-05-10	2017-05-10
LISN	Rohde & Schwarz	ENV216	SEM007-01	2016-10-09	2017-10-09
LISN	ETS-LINDGREN	3816/2	SEM007-02	2017-04-14	2018-04-14
8 Line ISN	Fischer Custom Communications Inc.	FCC-TLISN-T8-02	EMC0120	2016-09-28	2017-09-28
4 Line ISN	Fischer Custom Communications Inc.	FCC-TLISN-T4-02	EMC0121	2016-09-28	2017-09-28
2 Line ISN	Fischer Custom	FCC-TLISN-T2-02	EMC0122	2016-09-28	2017-09-28

RF Conducted Test					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
DC Power Supply	ZhaoXin	RXN-305D	SEM011-02	2016-10-09	2017-10-09
Spectrum Analyzer	Rohde & Schwarz	FSP	SEM004-06	2016-10-09	2017-10-09
Power Meter	Rohde & Schwarz	NRVS	SEM014-02	2016-10-09	2017-10-09

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	2016-05-13	2017-05-13
EMI Test Receiver	Agilent Technologies	N9038A	SEM004-05	2016-10-09	2017-10-09
BiConiLog Antenna (26-3000MHz)	ETS-LINDGREN	3142C	SEM003-01	2014-11-01	2017-11-01
Double-ridged horn (1-18GHz)	ETS-LINDGREN	3117	SEM003-11	2015-10-17	2018-10-17
Horn Antenna (18-26GHz)	ETS-LINDGREN	3160	SEM003-12	2014-11-24	2017-11-24
Pre-amplifier (0.1-1300MHz)	Agilent Technologies	8447D	SEM005-01	2016-10-09	2017-10-09
Band filter	Amindeon	Asi 3314	SEM023-01	N/A	N/A
DC Power Supply	Zhao Xin	RXN-305D	SEM011-02	2016-10-09	2017-10-09
Loop Antenna	Beijing Daze	ZN30401	SEM003-09	2015-05-13	2018-05-13

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	AUDIX	N/A	SEM001-02	2016-05-13	2017-05-13
EXA Spectrum Analyzer	Agilent Technologies Inc	N9010A	SEM004-09	2016-07-19	2017-07-19
BiConiLog Antenna (26-3000MHz)	ETS-Lindgren	3142C	SEM003-02	2014-11-15	2017-11-15
Amplifier (0.1-1300MHz)	HP	8447D	SEM005-02	2016-10-09	2017-10-09
Horn Antenna (1-18GHz)	Rohde & Schwarz	HF907	SEM003-07	2015-06-14	2018-06-14
Horn Antenna (18-26GHz)	ETS-Lindgren	3160	SEM003-12	2014-11-24	2017-11-24
Horn Antenna(26GHz-40GHz)	A.H.Systems, inc.	SAS-573	SEM003-13	2015-02-12	2018-02-12
Low Noise Amplifier	Black Diamond Series	BDLNA-0118-352810	SEM005-05	2016-10-09	2017-10-09
Band filter	Amindeon	Asi 3314	SEM023-01	N/A	N/A

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	2016-10-12	2017-10-12
Humidity/ Temperature Indicator	Shanghai Meteorological Industry Factory	ZJ1-2B	SEM002-04	2016-10-12	2017-10-12
Humidity/ Temperature Indicator	Mingle	N/A	SEM002-08	2016-10-12	2017-10-12
Barometer	Changchun Meteorological Industry Factory	DYM3	SEM002-01	2016-05-18	2017-05-18

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

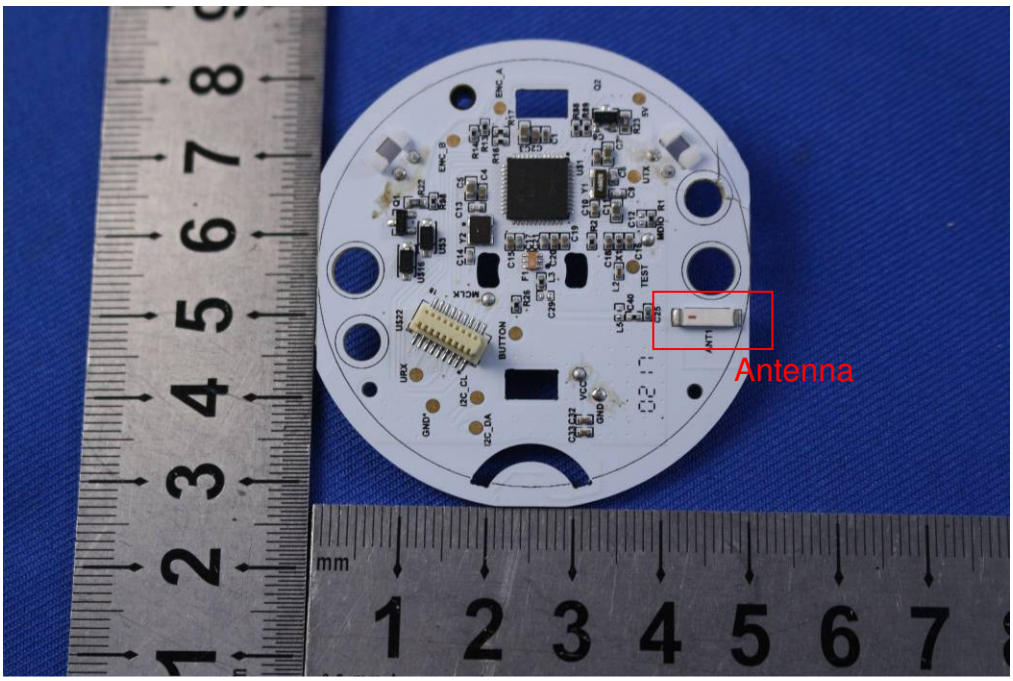
Standard Requirement:

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 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 antenna is integrated on the main PCB and no consideration of replacement. The best case gain of the antenna is -1dBi.



7 Radio Spectrum Matter Test Results

7.1 Conducted Disturbance 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

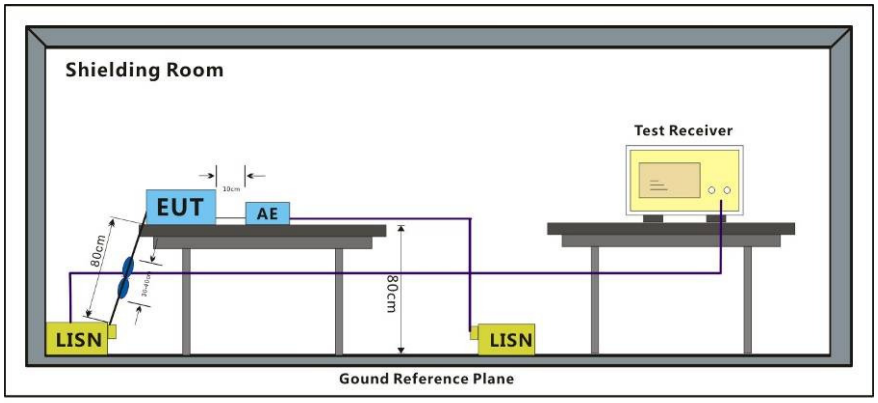
Operating Environment:

Temperature: 25.0 °C Humidity: 55 % RH Atmospheric Pressure: 1020 mbar

Test mode: Transmitting with GFSK modulation.

c: TX mode, Keep the EUT in transmitting mode with adapter.

7.1.2 Test Setup Diagram



7.1.3 Measurement Data

1) The mains terminal disturbance voltage test was conducted in a shielded room.

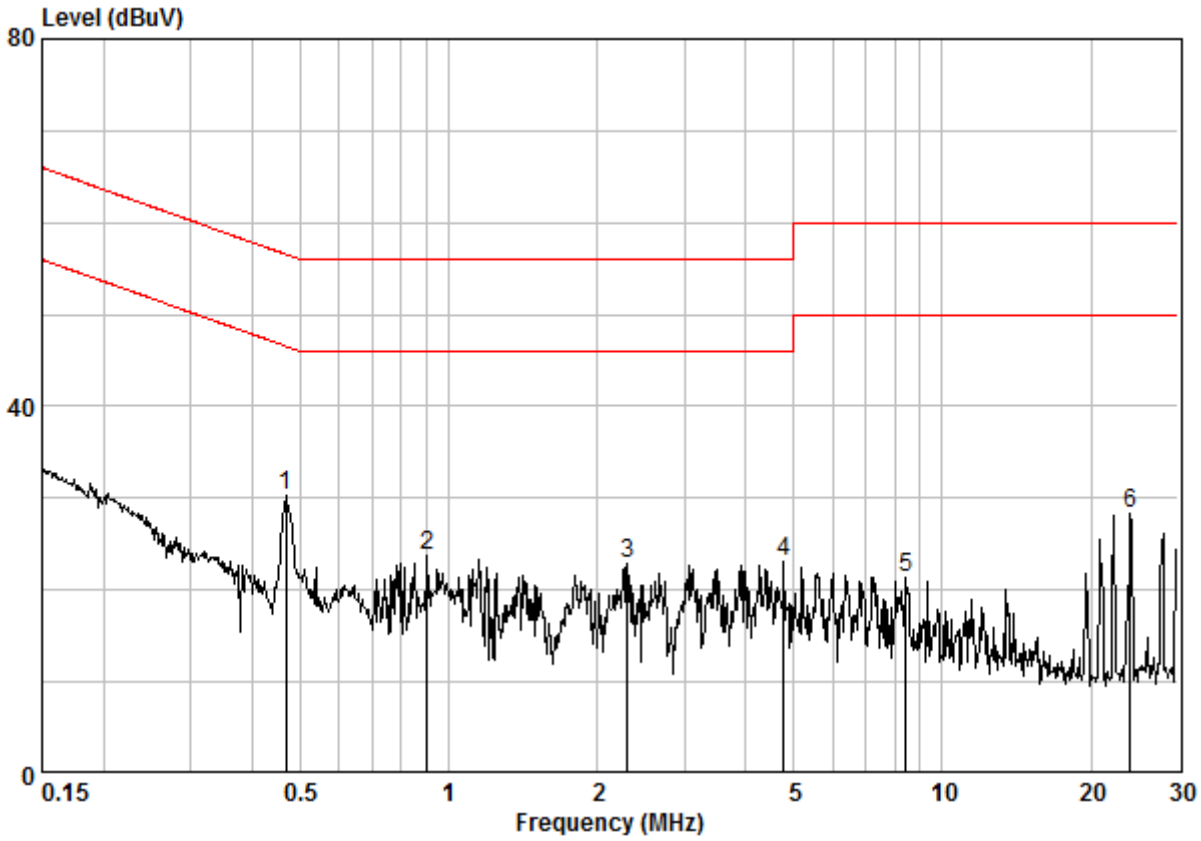
2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a 50ohm/50μH + 5ohm linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as 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.

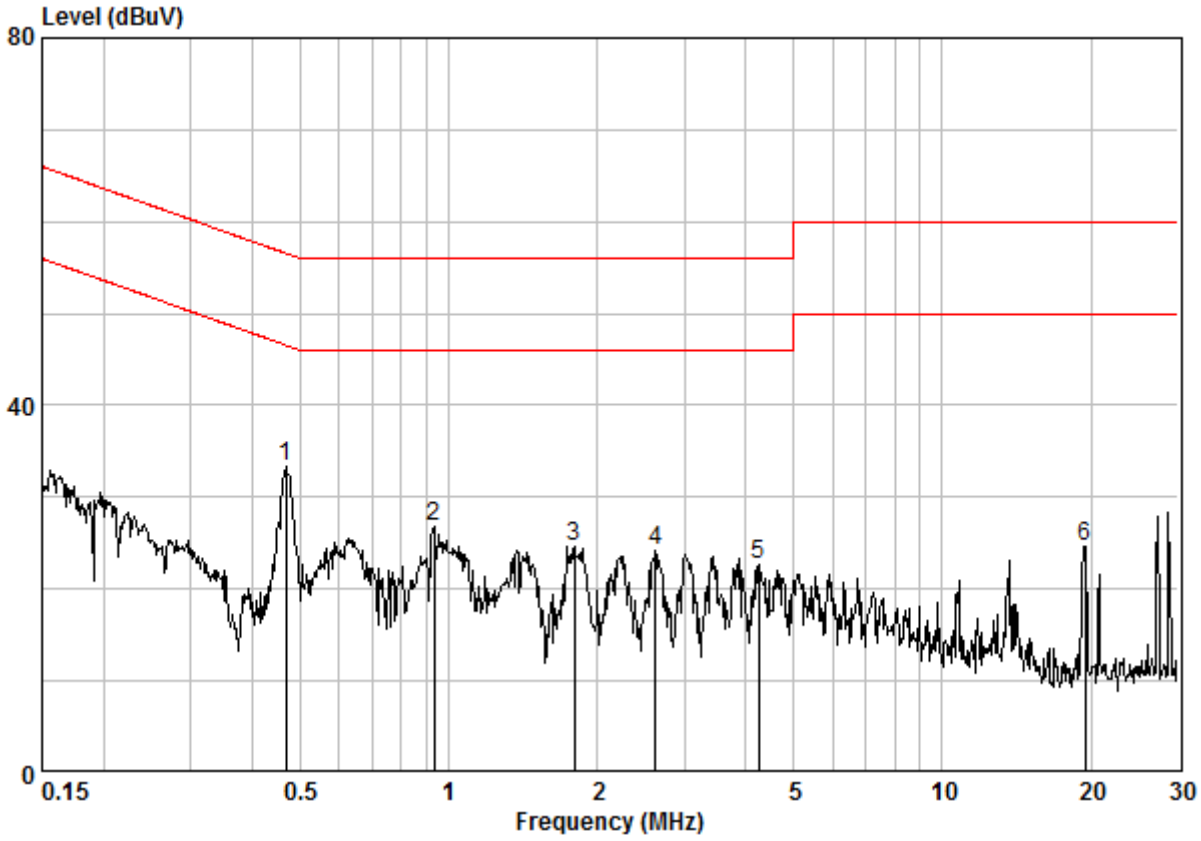
Mode:c; Line:Live Line



Site : Shielding Room
Condition : CE LINE
Job No. : 01849CR
Test Mode : c

	Freq	Cable Loss	LISN Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB	dBuV	dBuV	dBuV	dB	
1 @	0.46861	0.02	9.64	20.59	30.25	46.54	-16.29	Peak
2	0.90394	0.03	9.65	14.16	23.84	46.00	-22.16	Peak
3	2.297	0.03	9.68	13.24	22.94	46.00	-23.06	Peak
4	4.772	0.02	9.73	13.42	23.18	46.00	-22.82	Peak
5	8.456	0.11	9.82	11.47	21.40	50.00	-28.60	Peak
6	24.015	0.16	10.31	17.77	28.24	50.00	-21.76	Peak

Mode:c; Line:Neutral Line



Site : Shielding Room
Condition : CE NEUTRAL
Job No. : 01849CR
Test Mode : c

	Freq	Cable Loss	LISN Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB	dBuV	dBuV	dBuV	dB	
1 @	0.46861	0.02	9.63	23.61	33.26	46.54	-13.28	Peak
2	0.93314	0.03	9.64	17.07	26.74	46.00	-19.26	Peak
3	1.800	0.03	9.66	14.97	24.66	46.00	-21.34	Peak
4	2.622	0.03	9.66	14.59	24.28	46.00	-21.72	Peak
5	4.247	0.02	9.70	13.00	22.72	46.00	-23.28	Peak
6	19.428	0.17	10.17	14.39	24.73	50.00	-25.27	Peak

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

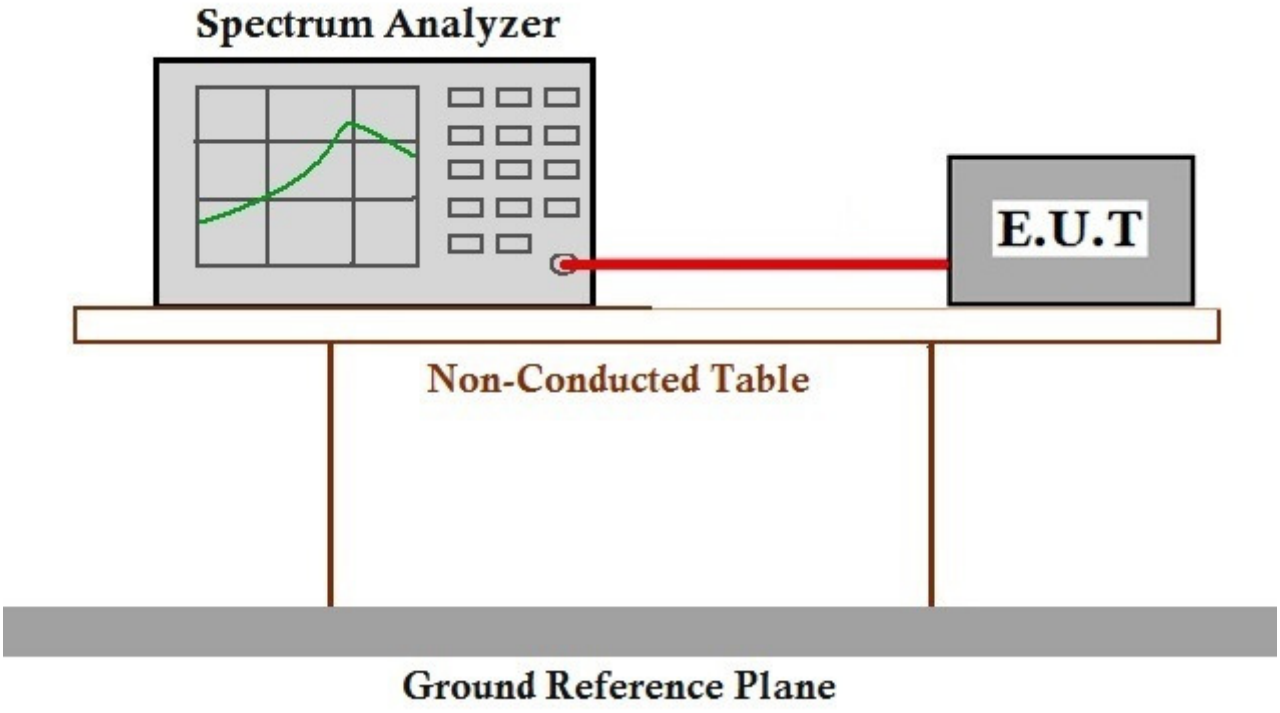
7.2.1 E.U.T. Operation

Operating Environment:

Temperature: 23.0 °C Humidity: 56 % RH Atmospheric Pressure: 1015 mbar

Pretest these mode to find the worst case:	Transmitting with GFSK modulation. c:TX mode, Keep the EUT in transmitting mode with adapter. d:TX mode, Keep the EUT in transmitting mode with battery.
The worst case for final test:	Transmitting with GFSK modulation. c:TX mode, Keep the EUT in transmitting mode with adapter.

7.2.2 Test Setup Diagram

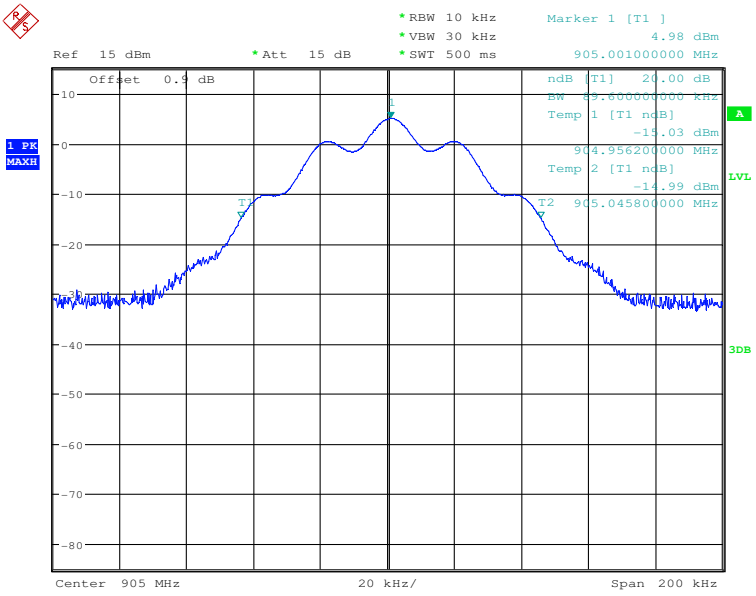


7.2.3 Measurement Data

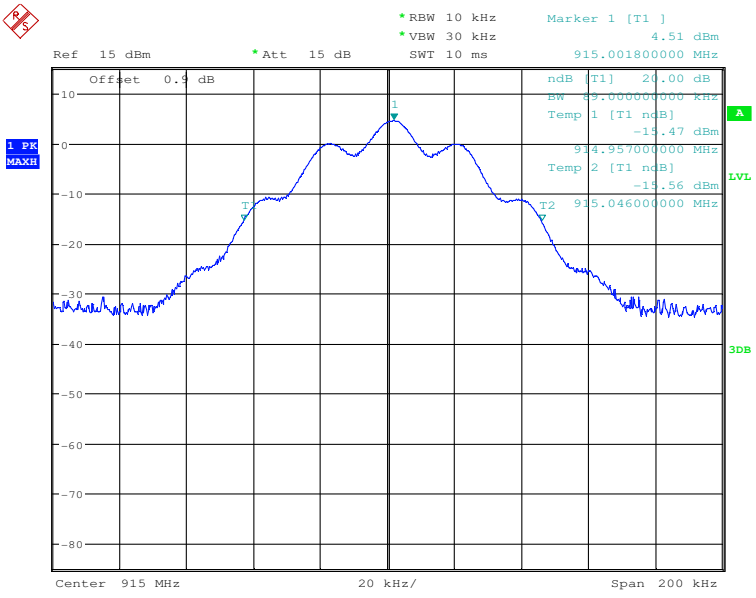
Test Channel	20dB bandwidth (MHz)	Results
Lowest	0.0896	Pass
Middle	0.0890	Pass
Highest	0.0892	Pass

Test plot as follows:

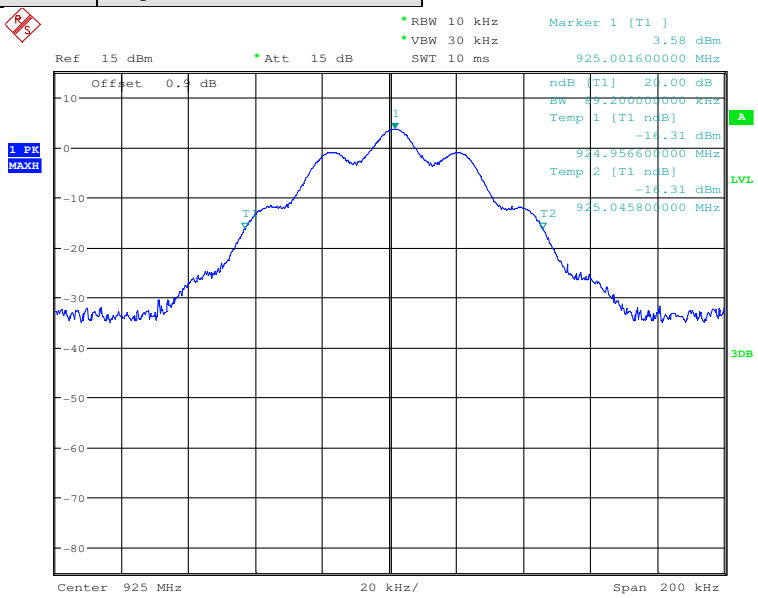
Test channel:	Lowest



Test channel:	Middle



Test channel:	Highest



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&6.6
Measurement Distance: 3m
Limit:

Frequency	Field strength of fundamental (millivolts/meter)	Field strength of harmonics (microvolts/meter)
902MHz-928MHz	50	500

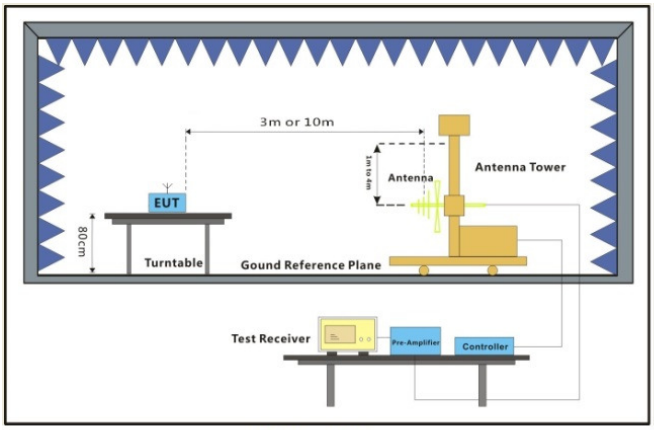
7.3.1 E.U.T. Operation

Operating Environment:
Temperature: 25.0 °C Humidity: 50 % RH Atmospheric Pressure: 1015 mbar

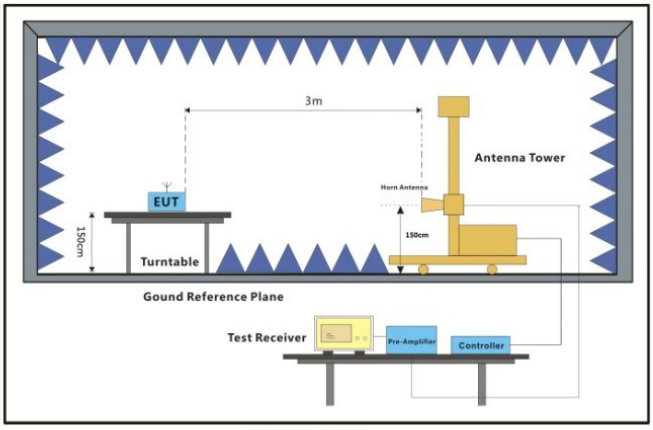
Pretest these mode to find the worst case: Transmitting with GFSK modulation.
c:TX mode, Keep the EUT in transmitting mode with adapter.
d:TX mode, Keep the EUT in transmitting mode with battery.

The worst case for final test: Transmitting with GFSK modulation.
c:TX mode, Keep the EUT in transmitting mode with adapter.

7.3.2 Test Setup Diagram



30MHz-1GHz



Above 1GHz

7.3.3 Measurement 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.

QP 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
905	3.61	23.22	26.75	90.59	90.67	94	-3.33	Horizontal
905	3.61	23.22	26.75	86.15	86.23	94	-7.77	Vertical
915	3.62	23.31	26.64	90.58	90.87	94	-3.13	Horizontal
915	3.62	23.31	26.64	87.33	87.62	94	-6.38	Vertical
925	3.63	23.3	26.64	90.56	90.85	94	-3.15	Horizontal
925	3.63	23.3	26.64	88.97	89.26	94	-4.74	Vertical

7.4 Restricted Band Around Fundamental Frequency

Test Requirement 47 CFR Part 15, Subpart C 15.205 & 15.249(d) & 15.209
Test Method: ANSI C63.10 (2013) Section 6.4&6.5&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

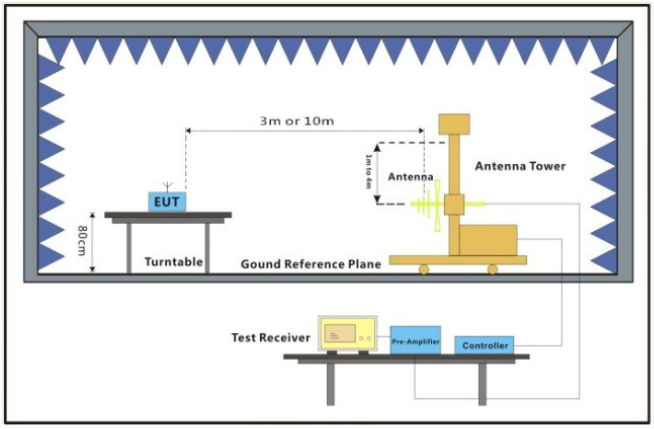
Operating Environment:

Temperature: 23.0 °C Humidity: 54 % RH Atmospheric Pressure: 1015 mbar

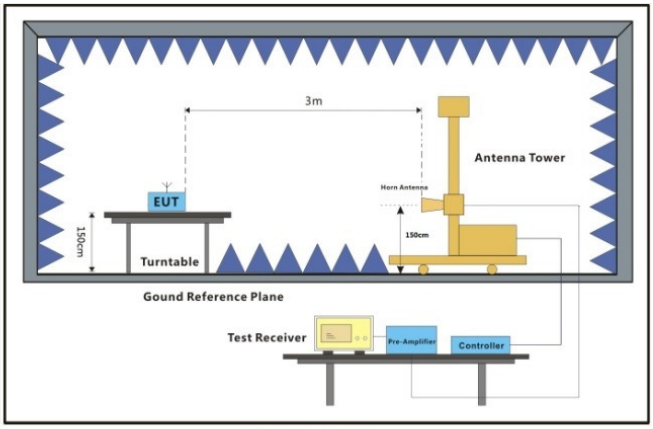
Pretest these mode to find the worst case: Transmitting with GFSK modulation.
c:TX mode, Keep the EUT in transmitting mode with adapter.
d:TX mode, Keep the EUT in transmitting mode with battery.

The worst case for final test: Transmitting with GFSK modulation.
c:TX mode, Keep the EUT in transmitting mode with adapter.

7.4.2 Test Setup Diagram



30MHz-1GHz



Above 1GHz

7.4.3 Measurement 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.

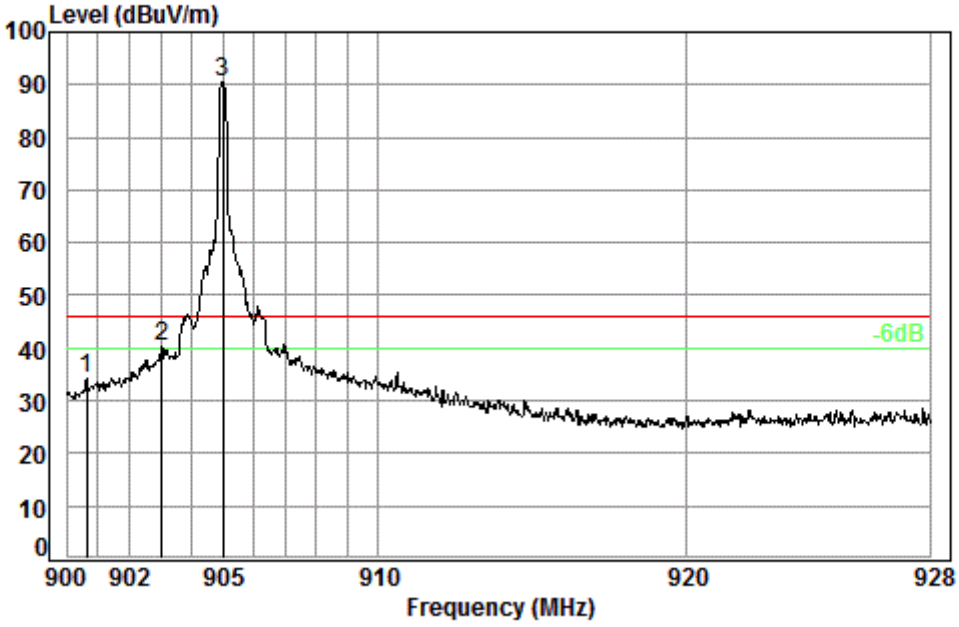
g. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified 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.

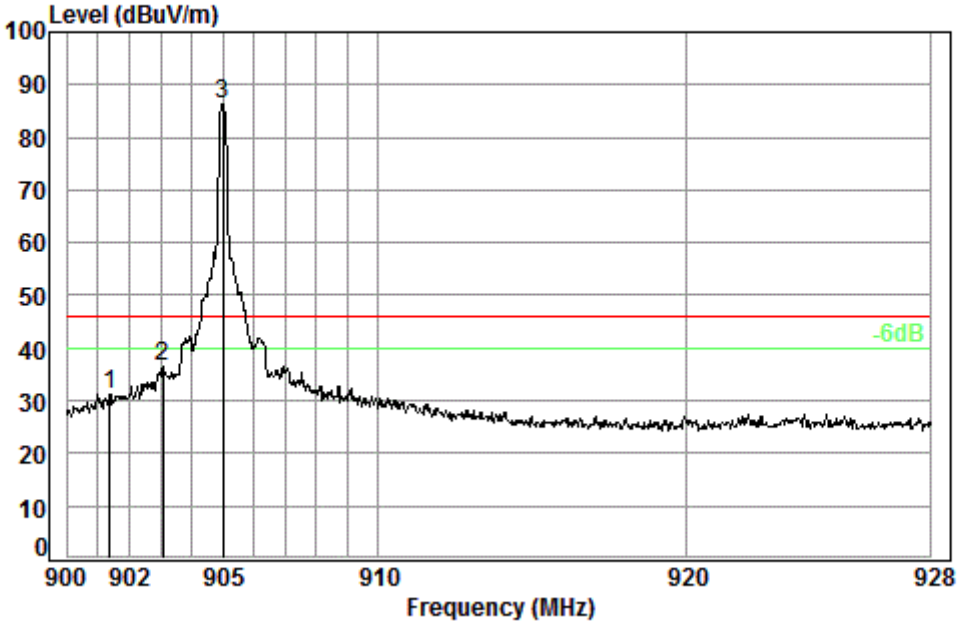
Mode:c; Polarization:Horizontal; Modulation Type:GFSK; Channel:Low



Condition: 3m HORIZONTAL
Job No. : 01849CR
Test mode: c
: 905M

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	900.63	3.60	23.20	26.78	34.24	34.26	46.00	-11.74
2	903.04	3.60	23.21	26.75	40.12	40.18	46.00	-5.82
3 pp	905.00	3.61	23.22	26.75	90.59	90.67	46.00	44.67

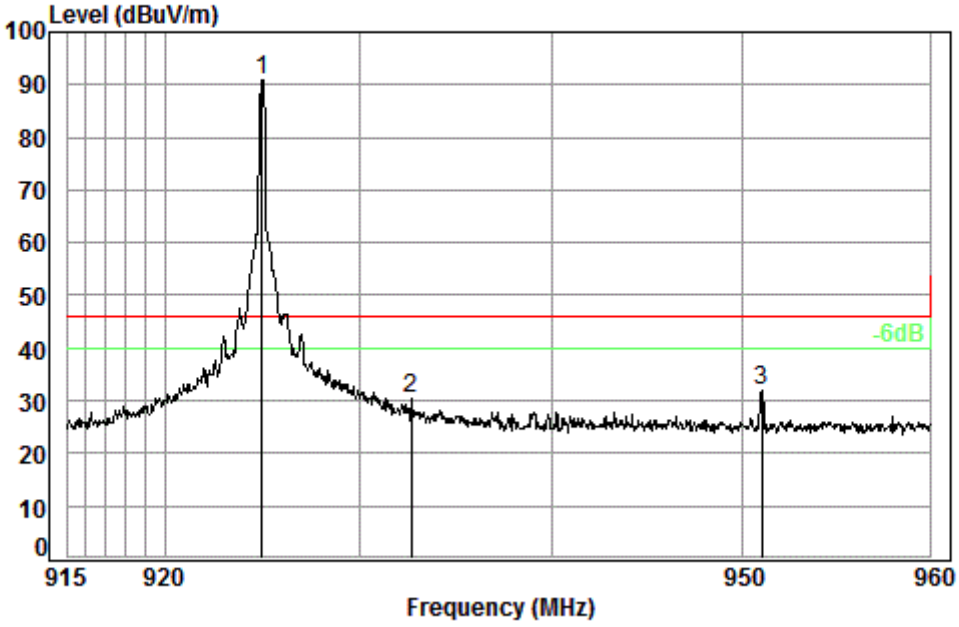
Mode:c; Polarization:Vertical; Modulation Type:GFSK; Channel:Low



Condition: 3m VERTICAL
Job No. : 01849CR
Test mode: c
: 905M

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	901.38	3.60	23.21	26.78	31.30	31.33	46.00	-14.67
2	903.09	3.60	23.21	26.75	36.58	36.64	46.00	-9.36
3 pp	905.00	3.61	23.22	26.75	86.15	86.23	46.00	40.23

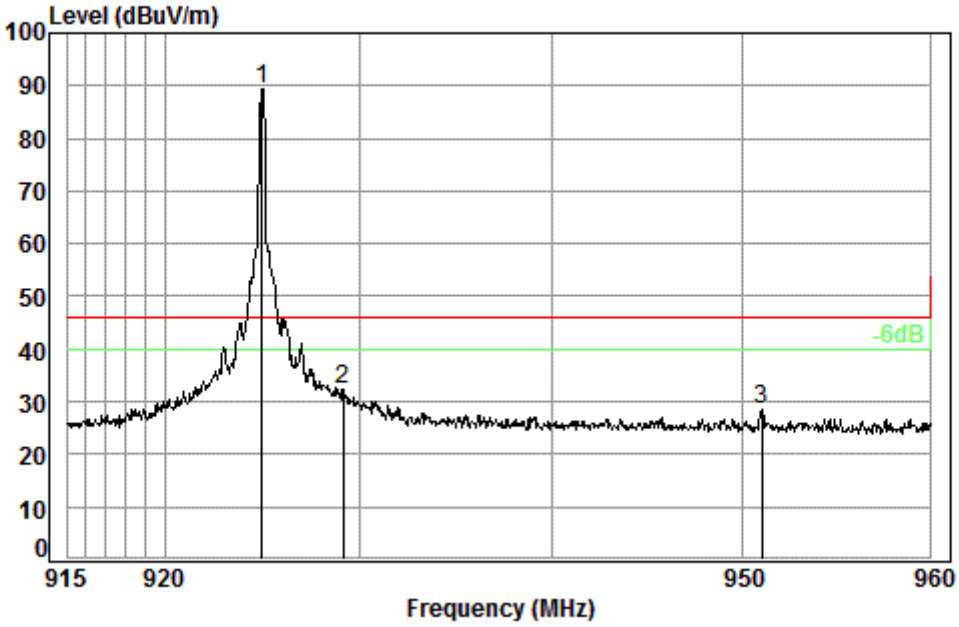
Mode:c; Polarization:Horizontal; Modulation Type:GFSK; Channel:High



Condition: 3m HORIZONTAL
Job No. : 01849CR
Test mode: c
: 925M

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1 pp	924.98	3.63	23.30	26.64	90.56	90.85	46.00	44.85
2	932.70	3.63	23.30	26.61	29.93	30.25	46.00	-15.75
3	951.01	3.65	23.30	26.54	31.36	31.77	46.00	-14.23

Mode:c; Polarization:Vertical; Modulation Type:GFSK; Channel:High



Condition: 3m VERTICAL
Job No. : 01849CR
Test mode: c
: 925M

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1 pp	924.98	3.63	23.30	26.64	88.97	89.26	46.00	43.26
2	929.17	3.63	23.30	26.64	32.16	32.45	46.00	-13.55
3	951.01	3.65	23.30	26.54	28.12	28.53	46.00	-17.47

7.5 Radiated Emissions

Test Requirement 47 CFR Part 15, Subpart C 15.209 & 15.249 (a),(d)
Test Method: ANSI C63.10 (2013) Section 6.4&6.5&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

7.5.1 E.U.T. Operation

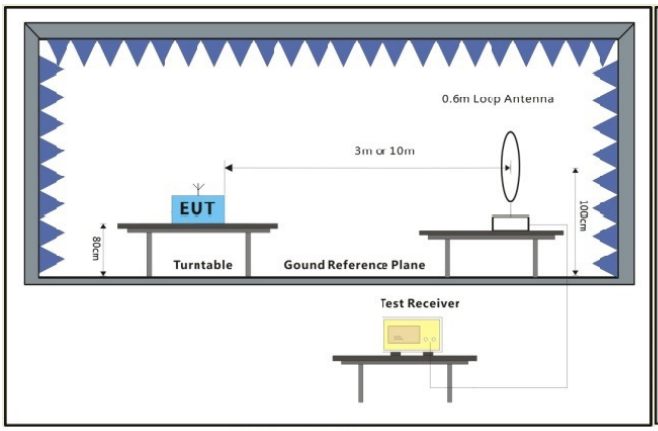
Operating Environment:

Temperature: 25.0 °C Humidity: 55 % RH Atmospheric Pressure: 1020 mbar

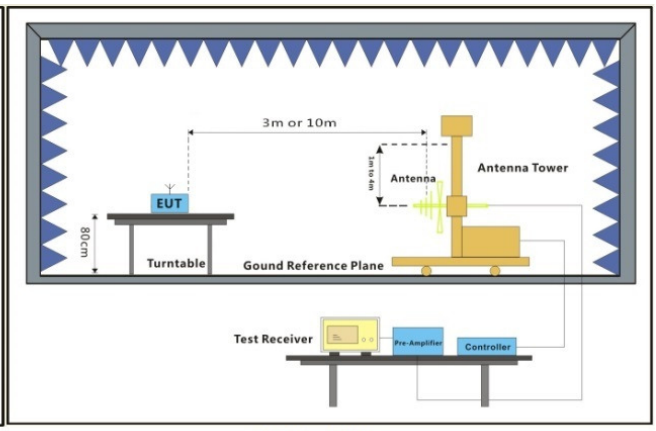
Pretest these mode to find the worst case: Transmitting with GFSK modulation.
c:TX mode, Keep the EUT in transmitting mode with adapter.
d:TX mode, Keep the EUT in transmitting mode with battery.

The worst case for final test: Transmitting with GFSK modulation.
c:TX mode, Keep the EUT in transmitting mode with adapter.

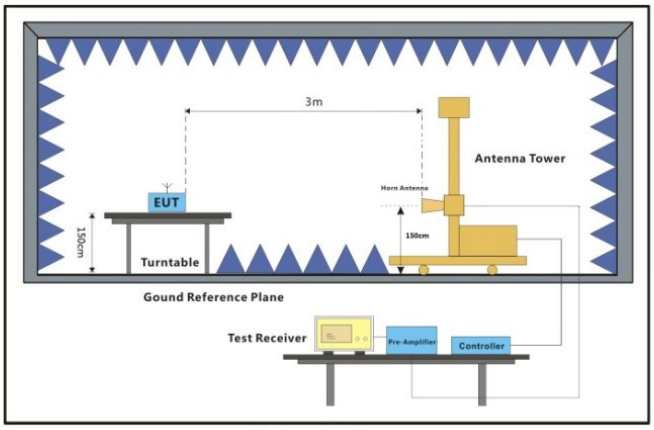
7.5.2 E.U.T. Operation



Below 30MHz



30MHz-1GHz



Above 1GHz

7.5.3 Measurement 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.

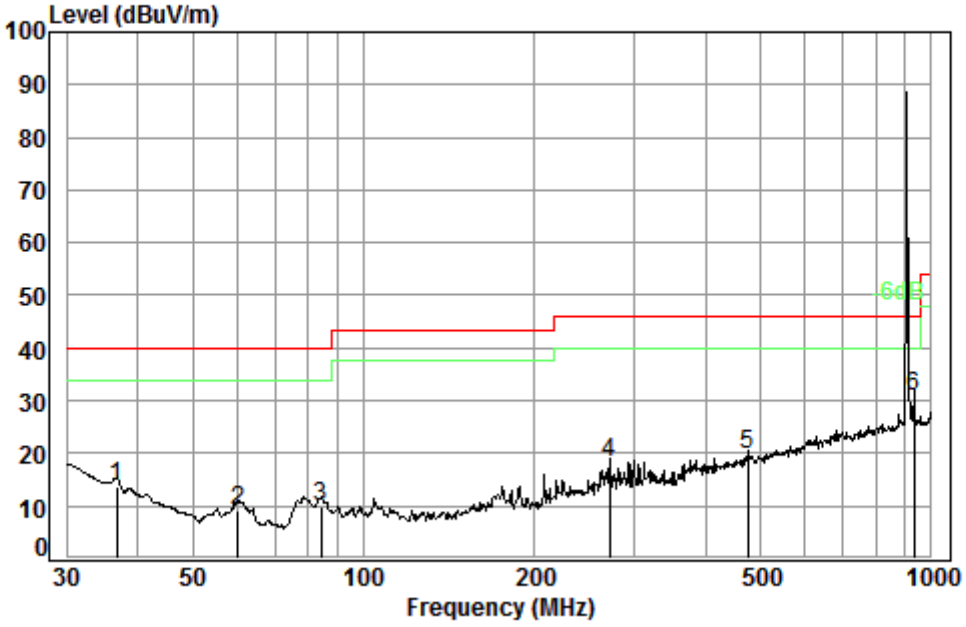
h. Test the EUT in the lowest channel (905MHz),the middle channel (915MHz),the Highest channel (925MHz)

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.

Below 1GHz:

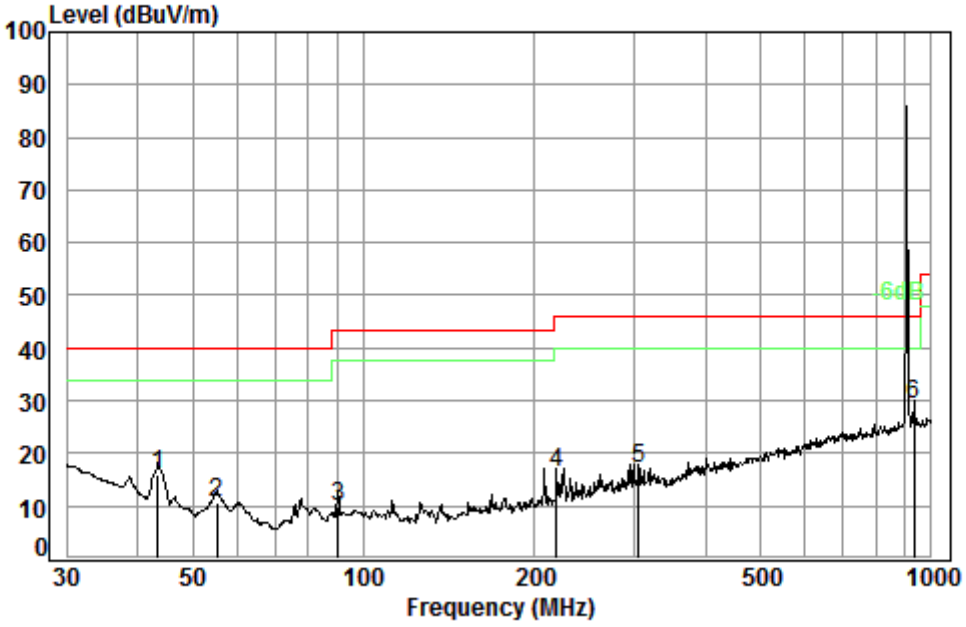
Mode:c; Polarization:Horizontal; Modulation Type:GFSK; Channel:Low



Condition: 3m HORIZONTAL
Job No. : 01849CR
Test mode: c
: 905M

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	36.77	0.60	14.91	27.33	25.36	13.54	40.00	-26.46
2	60.07	0.80	7.20	27.27	28.39	9.12	40.00	-30.88
3	84.41	1.10	8.14	27.22	27.81	9.83	40.00	-30.17
4	271.32	1.77	12.73	26.47	30.08	18.11	46.00	-27.89
5	475.50	2.51	17.80	27.58	26.85	19.58	46.00	-26.42
6 pp	932.27	3.63	23.30	26.61	30.50	30.82	46.00	-15.18

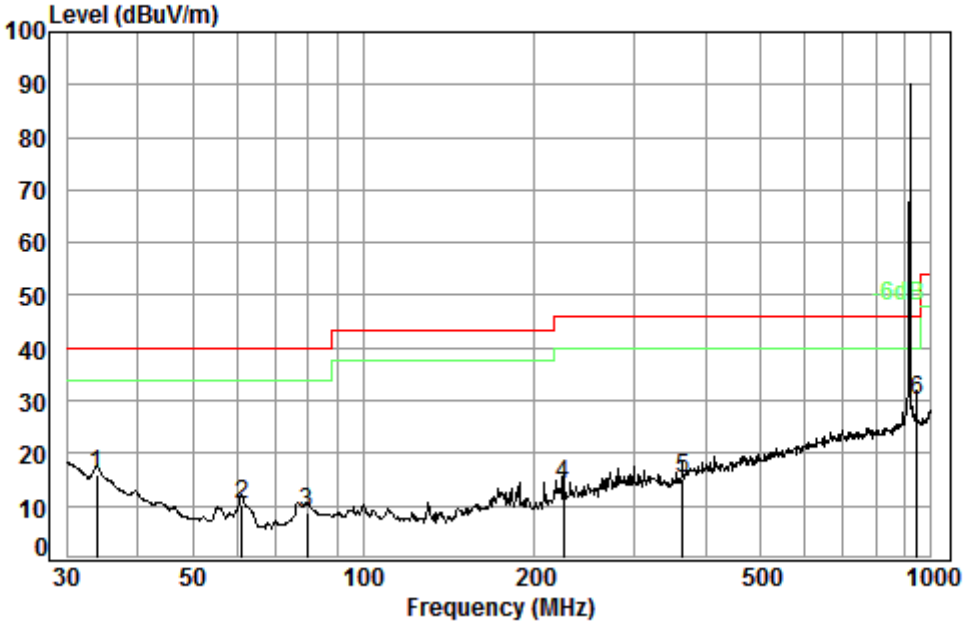
Mode:c; Polarization:Vertical; Modulation Type:GFSK; Channel:Low



Condition: 3m VERTICAL
Job No. : 01849CR
Test mode: c
: 905M

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	43.51	0.68	11.56	27.31	31.13	16.06	40.00	-23.94
2	55.22	0.80	7.92	27.28	29.37	10.81	40.00	-29.19
3	90.22	1.10	8.71	27.21	27.13	9.73	43.50	-33.77
4	219.08	1.51	11.19	26.63	30.15	16.22	46.00	-29.78
5	305.68	1.92	14.10	26.44	27.35	16.93	46.00	-29.07
6 pp	932.27	3.63	23.30	26.61	28.77	29.09	46.00	-16.91

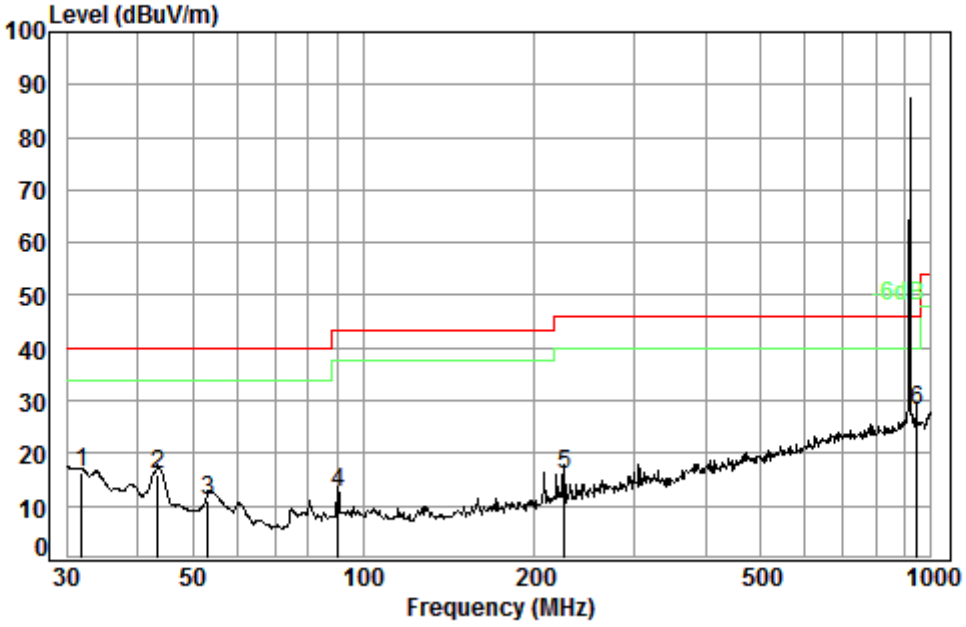
Mode:c; Polarization:Horizontal; Modulation Type:GFSK; Channel:middle



Condition: 3m HORIZONTAL
Job No. : 01849CR
Test mode: c
: 915M

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	33.92	0.60	16.51	27.34	26.02	15.79	40.00	-24.21
2	61.13	0.80	7.17	27.26	29.38	10.09	40.00	-29.91
3	79.52	1.08	7.66	27.23	27.19	8.70	40.00	-31.30
4	225.31	1.55	11.51	26.61	27.43	13.88	46.00	-32.12
5	364.26	2.10	15.10	26.89	25.02	15.33	46.00	-30.67
6 pp	942.13	3.64	23.30	26.58	29.56	29.92	46.00	-16.08

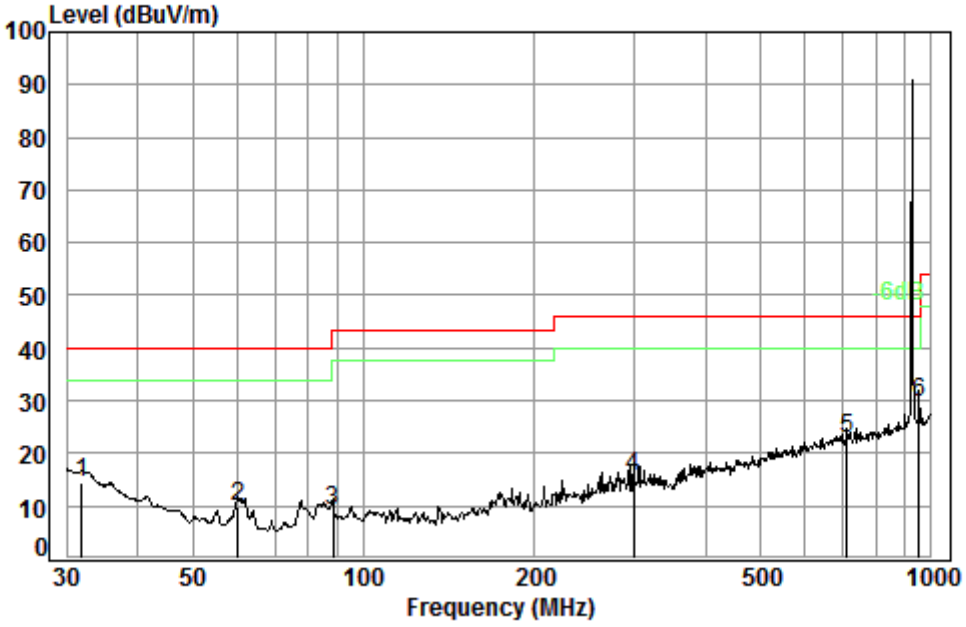
Mode:c; Polarization:Vertical; Modulation Type:GFSK; Channel:middle



Condition: 3m VERTICAL
Job No. : 01849CR
Test mode: c
: 915M

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	31.95	0.60	17.61	27.35	25.38	16.24	40.00	-23.76
2	43.51	0.68	11.56	27.31	30.91	15.84	40.00	-24.16
3	53.32	0.80	8.20	27.28	29.14	10.86	40.00	-29.14
4	90.22	1.10	8.71	27.21	30.04	12.64	43.50	-30.86
5	226.10	1.55	11.54	26.61	29.50	15.98	46.00	-30.02
6 pp	942.13	3.64	23.30	26.58	27.88	28.24	46.00	-17.76

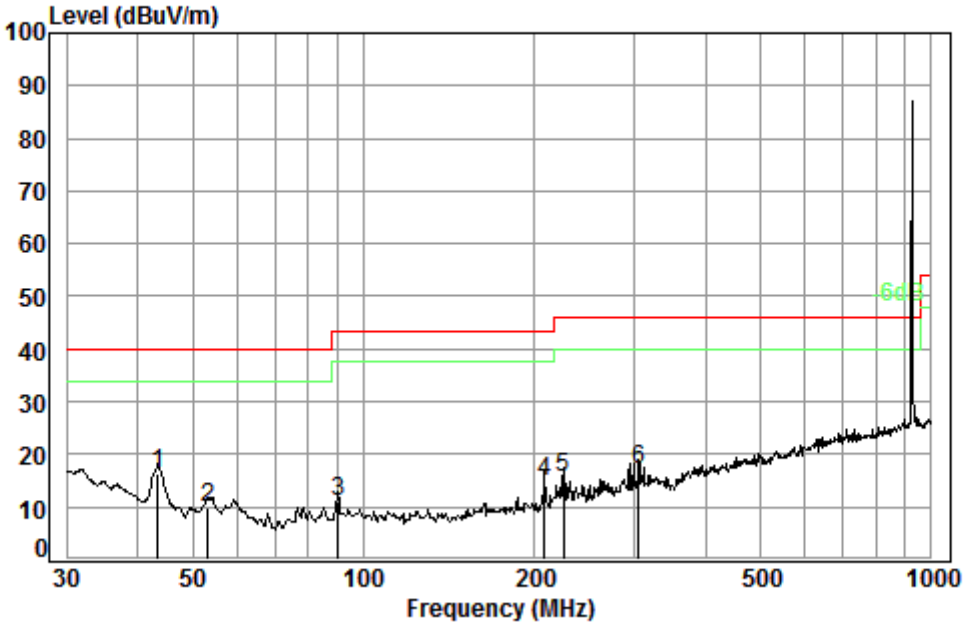
Mode:c; Polarization:Horizontal; Modulation Type:GFSK; Channel:High



Condition: 3m HORIZONTAL
Job No. : 01849CR
Test mode: c
: 925M

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	31.95	0.60	17.61	27.35	23.75	14.61	40.00	-25.39
2	60.07	0.80	7.20	27.27	29.10	9.83	40.00	-30.17
3	88.34	1.10	8.53	27.22	26.81	9.22	43.50	-34.28
4	299.32	1.90	13.87	26.41	26.05	15.41	46.00	-30.59
5	709.18	2.93	21.60	27.40	25.58	22.71	46.00	-23.29
6 pp	952.09	3.65	23.30	26.54	29.36	29.77	46.00	-16.23

Mode:c; Polarization:Vertical; Modulation Type:GFSK; Channel:High



Condition: 3m VERTICAL
Job No. : 01849CR
Test mode: c
: 925M

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1 pp	43.51	0.68	11.56	27.31	31.28	16.21	40.00	-23.79
2	53.32	0.80	8.20	27.28	28.23	9.95	40.00	-30.05
3	90.22	1.10	8.71	27.21	28.40	11.00	43.50	-32.50
4	208.58	1.45	10.65	26.67	29.57	15.00	43.50	-28.50
5	225.31	1.55	11.51	26.61	29.17	15.62	46.00	-30.38
6	305.68	1.92	14.10	26.44	27.46	17.04	46.00	-28.96

Above 1GHz:

Mode:c; Polarization:Horizontal; Modulation Type:GFSK; Channel:Low

Frequency (MHz)	Antenna factors (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Reading Level (dBmV)	Level (dBmV/m)	Limit (dBmV/m)	Over limit (dB)
1810.000	27.11	4.82	38.02	51.40	45.31	74.00	-28.69
2715.000	30.27	5.65	37.93	51.79	49.78	74.00	-24.22
3620.000	32.56	6.40	37.96	50.93	51.93	74.00	-22.07
5430.000	34.41	8.22	38.41	48.75	52.97	74.00	-21.03
6335.000	34.97	8.96	37.96	45.11	51.08	74.00	-22.92
8145.000	36.42	10.12	36.25	42.82	53.11	74.00	-20.89

Mode:c; Polarization:Vertical; Modulation Type:GFSK; Channel:Low

Frequency (MHz)	Antenna factors (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Reading Level (dBmV)	Level (dBmV/m)	Limit (dBmV/m)	Over limit (dB)
1810.000	27.11	4.82	38.02	54.88	48.79	74.00	-25.21
2715.000	30.27	5.65	37.93	52.85	50.84	74.00	-23.16
3620.000	32.56	6.40	37.96	49.85	50.85	74.00	-23.15
5432.503	34.41	8.22	38.41	47.10	51.32	74.00	-22.68
6338.697	34.97	8.96	37.96	46.90	52.87	74.00	-21.13
8145.000	36.42	10.12	36.25	43.19	53.48	74.00	-20.52

Mode:c; Polarization:Horizontal; Modulation Type:GFSK; Channel:middle

Frequency (MHz)	Antenna factors (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Reading Level (dBmV)	Level (dBmV/m)	Limit (dBmV/m)	Over limit (dB)
1830.000	27.19	4.85	38.02	55.65	49.67	74.00	-24.33
2745.000	29.17	5.36	37.96	51.82	48.39	74.00	-25.61
3660.000	32.68	6.44	37.97	49.30	50.45	74.00	-23.55
5490.000	34.40	8.25	38.40	48.21	52.46	74.00	-21.54
6412.096	35.03	9.01	37.89	45.56	51.71	74.00	-22.29
8241.381	36.31	10.17	36.16	42.93	53.25	74.00	-20.75

Mode:c; Polarization:Vertical; Modulation Type:GFSK; Channel:middle

Frequency (MHz)	Antenna factors (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Reading Level (dBmV)	Level (dBmV/m)	Limit (dBmV/m)	Over limit (dB)
1830.000	27.19	4.85	38.02	53.97	47.99	74.00	-26.01
2745.000	30.39	5.68	37.93	52.22	50.36	74.00	-23.64
3660.000	32.68	6.44	37.97	48.37	49.52	74.00	-24.48
5490.000	34.40	8.25	38.40	48.07	52.32	74.00	-21.68
6412.096	35.03	9.01	37.89	45.94	52.09	74.00	-21.91
7328.245	36.37	9.74	37.00	44.21	53.32	74.00	-20.68

Mode:c; Polarization:Horizontal; Modulation Type:GFSK; Channel:High

Frequency (MHz)	Antenna factors (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Reading Level (dBmV)	Level (dBmV/m)	Limit (dBmV/m)	Over limit (dB)
1850.000	27.26	4.86	38.02	54.34	48.44	74.00	-25.56
2775.000	30.48	5.71	37.92	51.88	50.15	74.00	-23.85
3700.000	32.78	6.47	37.97	49.05	50.33	74.00	-23.67
4623.810	33.83	7.47	38.31	48.77	51.76	74.00	-22.24
6471.426	35.08	9.04	37.83	46.17	52.46	74.00	-21.54
8317.638	36.21	10.21	36.08	42.72	53.06	74.00	-20.94

Mode:c; Polarization:Vertical; Modulation Type:GFSK; Channel:High

Frequency (MHz)	Antenna factors (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Reading Level (dBmV)	Level (dBmV/m)	Limit (dBmV/m)	Over limit (dB)
1850.000	27.26	4.86	38.02	54.87	48.97	74.00	-25.03
2775.000	30.48	5.71	37.92	51.11	49.38	74.00	-24.62
3700.000	32.78	6.47	37.97	48.76	50.04	74.00	-23.96
5546.257	34.43	8.30	38.39	47.16	51.50	74.00	-22.50
7396.053	36.34	9.78	36.94	42.49	51.67	74.00	-22.33
8317.638	36.21	10.21	36.08	42.91	53.25	74.00	-20.75

Remark:
1) The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:
Final Test Level =Receiver Reading + Antenna Factor + Cable Factor – Preamplifier Factor

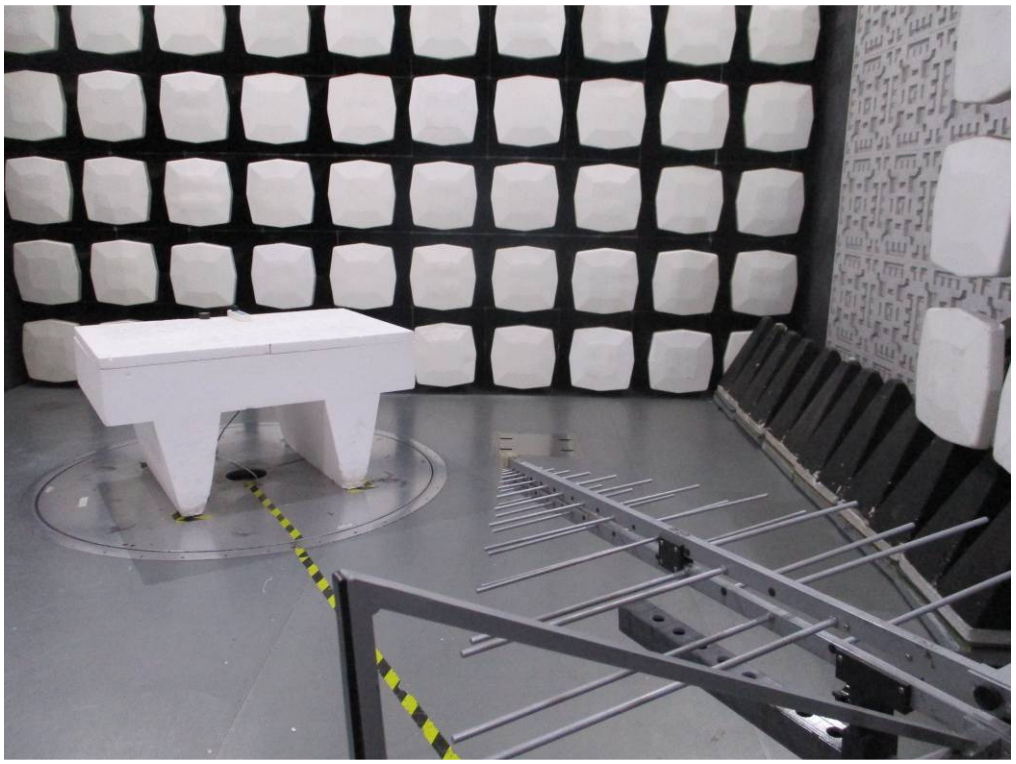
2) Scan from 9kHz to 25GHz, the disturbance above 13GHz and below 30MHz was very low, and the above harmonics were the highest point could be found when testing, so only the above harmonics had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported.

3) As shown in this section, for frequencies above 1GHz, the field strength limits 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. So, only the peak measurements were shown in the report.

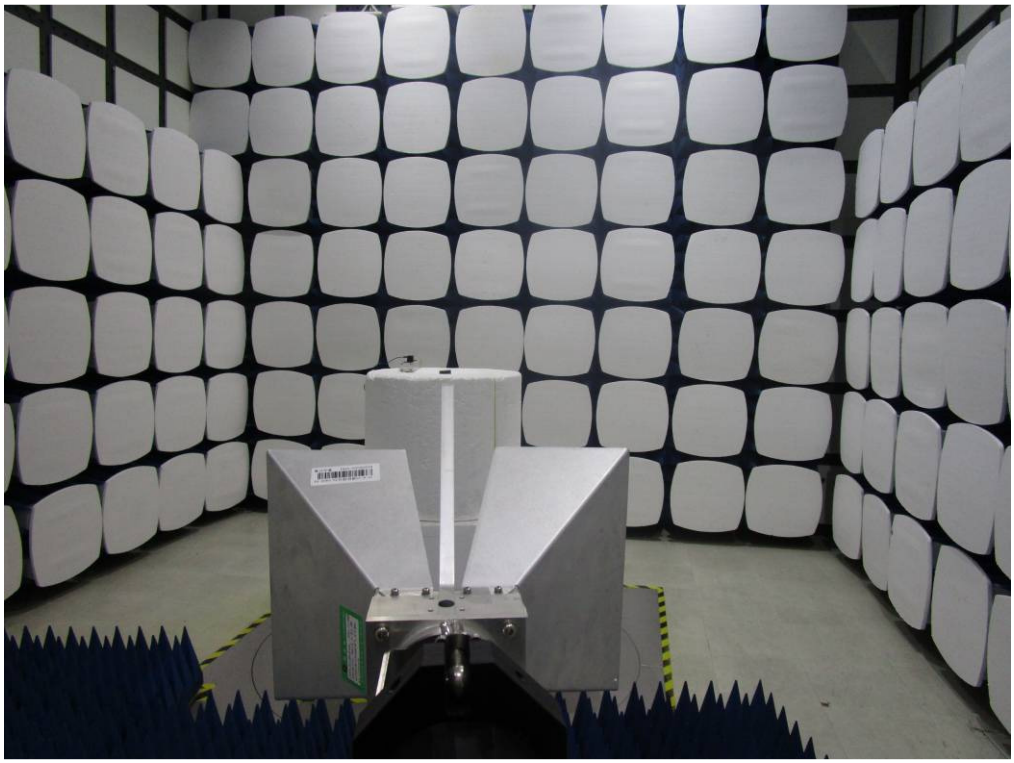
8 Photographs

8.1 Conducted Disturbance at AC Power Line(150kHz-30MHz) Test Setup

8.2 Field Strength of the Fundamental Signal(15.249(a)) Test Setup



8.3 Radiated Emissions Test Setup



8.4 EUT Constructional Details

Refer to Appendix A - Photographs of EUT Constructional Details for SZEM1703001849CR.