TEST REPORT

Application No.:	FYCR2210000392HS
Applicant:	Shenzhen DBS Technology Co., Ltd.
Address of Applicant:	A201, Yuantong Industrial Park, Building 8th, NO. 6352, Pingshan Avenue, Shatian Community, Kengzi Street, Pingshan District, Shenzhen
Manufacturer:	Shenzhen DBS Technology Co., Ltd.
Address of Manufacturer:	A201, Yuantong Industrial Park, Building 8th, NO. 6352, Pingshan Avenue, Shatian Community, Kengzi Street, Pingshan District, Shenzhen
Factory:	Shenzhen DBS Technology Co., Ltd.
Address of Factory:	A201, Yuantong Industrial Park, Building 8th, NO. 6352, Pingshan Avenue, Shatian Community, Kengzi Street, Pingshan District, Shenzhen
Equipment Under Test (EUT):	
EUT Name:	Remote control
Model Name:	AL-RM-700
FCC ID:	2AWOIDBS-01A
Standard(s) :	47 CFR Part 15, Subpart C 15.249
Date of Receipt:	2022-10-09
Date of Test:	2022-10-11 to 2022-03-03
Date of Issue:	2023-03-09
Test Result:	**Pass***

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

Winkey Wang
EMC Technical Manager

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Revision Record				
Version	***Chapter***	***Date***	***Modifier***	***Remark***
01		*2023-03-09*		*Original*

Authorized for issue by:				
		Tree Zhan		
		Tree Zhan/Project Engineer		
		Winkey Wang		
		Winkey Wang/Reviewer		

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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 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		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))		ANSI C63.10 (2013) Section 6.5&6.6	47 CFR Part 15, Subpart C 15.249(a)	Pass
Restricted Band Around Fundamental Frequency		ANSI C63.10 (2013) Section 6.10.5	47 CFR Part 15, Subpart C 15.205 & 15.249(d) & 15.209	Pass
Radiated Emissions Below 1GHz		ANSI C63.10 (2013) Section 6.4&6.5	47 CFR Part 15, Subpart C 15.209 & 15.249 (a),(d)	Pass
Radiated Emissions Above 1GHz		ANSI C63.10 (2013) Section 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:	Input 5Vdc, Rechargeable Battery inside: 3.7Vdc, 300mAh
Operation Frequency:	2402-2480MHz
Modulation Type:	GFSK
Number of Channels:	79
Channel Spacing:	1MHz
Antenna Type:	Internal Antenna

Remark: The information in this section is provided by the applicant or manufacturer, CCS is not liable to the accuracy, suitability, reliability or/and integrity of the information.

4.2 Description of Support Units

Description	Manufacturer	Model No.	Serial No.
Adapter	Apple	A1443	----

4.3 Measurement Uncertainty

Test Item	Measurement Uncertainty
Conducted Emissions at AC Power Line (150kHz-30MHz)	± 2.1 dB (9kHz to 30MHz)
20dB Bandwidth	± 0.3%
Field Strength of the Fundamental Signal (15.249(a))	± 3.1dB (Below 1GHz),± 4.4dB (Above 1GHz)
Restricted Band Around Fundamental Frequency	± 3.1dB (Below 1GHz),± 4.4dB (Above 1GHz)
Radiated Emissions Below 1GHz	± 3.1dB (Below 1GHz)
Radiated Emissions Above 1GHz	± 4.4dB (Above 1GHz)

Remark:
The U_{lab} (lab Uncertainty) is less than $U_{cispr/ETSI}$ (CISPR/ETSI Uncertainty), so the test results
– compliance is deemed to occur if no measured disturbance level exceeds the disturbance limit;
– non-compliance is deemed to occur if any measured disturbance level exceeds the disturbance limit.

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4.4 Test Location

All tests were performed at:

Compliance Certification Services（Kunshan）Inc. Shenzhen branch.

Fuyong lab. Xinlong TechnoPark,Fengtang Road, Fuyong Subdistrict, Bao'an, Shenzhen, China

Tel: +86 755 8866 3988 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:

• A2LA (Certificate No. 6606.01)

Compliance Certification Services（Kunshan）Inc. Shenzhen branch is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 6606.01.

• FCC –Designation Number: CN1322

Compliance Certification Services（Kunshan）Inc. Shenzhen branch has been recognized as an accredited testing laboratory.

Designation Number: CN1322. Test Firm Registration Number: 718073

• Innovation, Science and Economic Development Canada

Compliance Certification Services（Kunshan）Inc. Shenzhen branch has been recognized by ISED as an accredited testing laboratory.

CAB identifier: CN0129.

IC#: 28189.

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	CRT	N/A	SEM001-14	2021/7/13	2024/7/12
EMI Test Receiver	Rohde & Schwarz	ESCI	SEM004-01	2022/7/12	2023/7/11
Two-Line V-Network	Rohde & Schwarz	ENV216	SEM007-16	2022/7/12	2023/7/11
Two-Line V-Network	Rohde & Schwarz	ESH3-Z5	SEM007-22	2023/1/9	2024/1/8
Measurement Software	AUDIX	e3 V8.2014-6-27	N/A	N/A	N/A

20dB Bandwidth					
Equipment	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal Date**	**Cal Due Date**
MXA Signal Analyzer	KEYSIGHT	N9020A	SEM004-25	2022/5/30	2023/5/29
Attenuator	Huber+Suhner	6620_SMA-50-1	SEM021-09	2022/7/12	2023/7/11
Measurement Software	TST PASS	TST PASS V2.0	N/A	N/A	N/A

Field Strength of the Fundamental Signal (15.249(a))					
Equipment	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal Date**	**Cal Due Date**
3m Anechoic Chamber	CRT	N/A	SEM001-13	2021/7/13	2024/7/12
Trilog-Broadband Antenna	Schwarzbeck	VULB9168	SEM003-33	2021/9/25	2024/9/24
MXE EMI receiver	Agilent	N9038A	SEM004-05	2022/7/12	2023/7/11
Pre-amplifier	HP	8447D	SEM005-02	2022/7/12	2023/7/11
Broad-Band Horn Antenna	Schwarzbeck	BBHA 9120D	SEM003-32	2021/9/26	2024/9/25
MXA Signal Analyzer	KEYSIGHT	N9020A	SEM004-23	2022/4/24	2023/4/23
Coaxial Cable	CCS	N/A	SEM035-01	2022/5/16	2023/5/15
Coaxial Cable	CCS	N/A	SEM035-02	2022/5/16	2023/5/15
Pre-amplifier	TST PASS	LNA04080G30	SEM005-27	2022/4/15	2023/4/14
Pre-amplifier	TST PASS	LNA10180G45	SEM005-28	2022/4/15	2023/4/14
Measurement Software	AUDIX	e3 V8.2014-6-27	N/A	N/A	N/A
Measurement Software	AUDIX	e3 V8.2014-6-27	N/A	N/A	N/A

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Restricted Band Around Fundamental Frequency					
Equipment	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal Date**	**Cal Due Date**
3m Anechoic Chamber	CRT	N/A	SEM001-13	2021/7/13	2024/7/12
Trilog-Broadband Antenna	Schwarzbeck	VULB9168	SEM003-33	2021/9/25	2024/9/24
MXE EMI receiver	Agilent	N9038A	SEM004-05	2022/7/12	2023/7/11
Pre-amplifier	HP	8447D	SEM005-02	2022/7/12	2023/7/11
Broad-Band Horn Antenna	Schwarzbeck	BBHA 9120D	SEM003-32	2021/9/26	2024/9/25
MXA Signal Analyzer	KEYSIGHT	N9020A	SEM004-23	2022/4/24	2023/4/23
Coaxial Cable	CCS	N/A	SEM035-01	2022/5/16	2023/5/15
Coaxial Cable	CCS	N/A	SEM035-02	2022/5/16	2023/5/15
Pre-amplifier	TST PASS	LNA04080G30	SEM005-27	2022/4/15	2023/4/14
Pre-amplifier	TST PASS	LNA10180G45	SEM005-28	2022/4/15	2023/4/14
Measurement Software	AUDIX	e3 V8.2014-6-27	N/A	N/A	N/A
Measurement Software	AUDIX	e3 V8.2014-6-27	N/A	N/A	N/A

Radiated Emissions Below 1GHz					
Equipment	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal Date**	**Cal Due Date**
3m Anechoic Chamber	CRT	N/A	SEM001-13	2021/7/13	2024/7/12
Loop Antenna(9kHz-30MHz)	ETS-LINDGREN	6502	SEM003-36	2021/9/26	2024/9/25
Trilog-Broadband Antenna	Schwarzbeck	VULB9168	SEM003-33	2021/9/25	2024/9/24
MXE EMI receiver	Agilent	N9038A	SEM004-05	2022/7/12	2023/7/11
Pre-amplifier	HP	8447D	SEM005-02	2022/7/12	2023/7/11
Coaxial Cable	CCS	N/A	SEM035-01	2022/5/16	2023/5/15
Measurement Software	AUDIX	e3 V8.2014-6-27	N/A	N/A	N/A

Radiated Emissions Above 1GHz					
Equipment	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal Date**	**Cal Due Date**
3m Anechoic Chamber	CRT	N/A	SEM001-13	2021/7/13	2024/7/12
Broad-Band Horn Antenna	Schwarzbeck	BBHA 9120D	SEM003-32	2021/9/26	2024/9/25
MXA Signal Analyzer	KEYSIGHT	N9020A	SEM004-23	2022/4/24	2023/4/23
Coaxial Cable	CCS	N/A	SEM035-03	2022/5/16	2023/5/15
Pre-amplifier	TST PASS	LNA04080G30	SEM005-27	2022/4/15	2023/4/14
Pre-amplifier	TST PASS	LNA10180G45	SEM005-28	2022/4/15	2023/4/14

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Measurement Software	AUDIX	e3 V8.2014-6-27	N/A	N/A	N/A

General used equipment					
Equipment	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal Date**	**Cal Due Date**
Humidity/ Temperature Indicator	Mingle	TH607	SEM002-22	2022/7/12	2023/7/11
Humidity/ Temperature Indicator	Mingle	TH607	SEM002-23	2022/7/12	2023/7/11
Barometer	DUMAI	DYM3	SEM002-24	2022/7/12	2023/7/11

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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

15.203 requirement:

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

EUT Antenna:

The antenna is integrated on the main PCB and no consideration of replacement.

Antenna location: Refer to 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 of emission(MHz)	Conducted limit(dBμV)	
	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.		
Detector: Peak for pre-scan (9kHz resolution bandwidth) 0.15M to 30MHz		

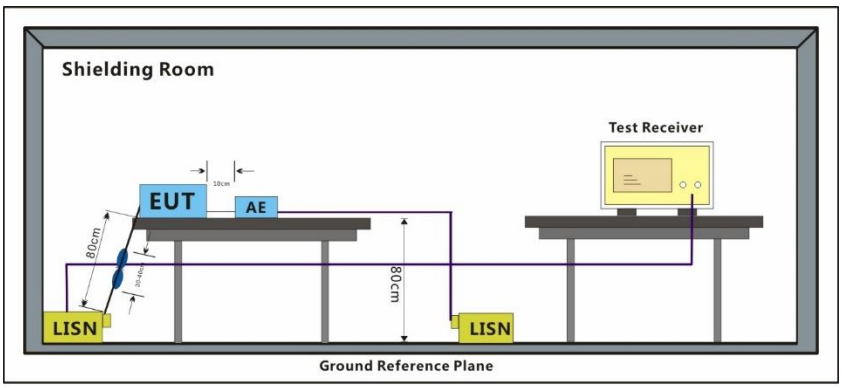
7.1.1 E.U.T. Operation

Operating Environment:
Temperature: 23.1 °C Humidity: 52.6 % RH Atmospheric Pressure: 1020 mbar

7.1.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	01	Charge + TX mode_Keep the EUT in charging and transmitting with modulation mode.

7.1.3 Test Setup Diagram



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

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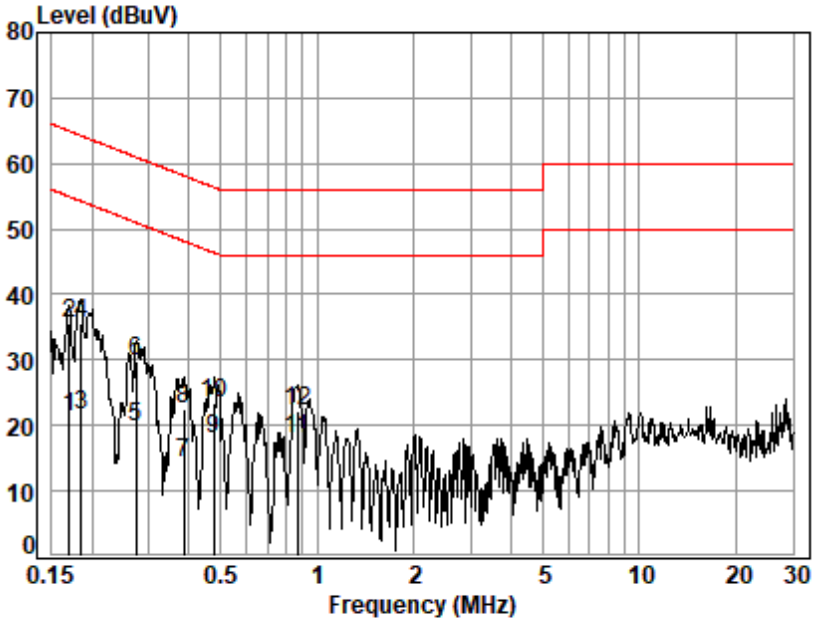
Test Mode: 01; Line: Live line



Site : Shielding Room
Condition: Line
Job No. : 00392HS
Test mode: 01

	Freq	Cable Loss	LISN Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB	dBuV	dBuV	dBuV	dB	
1	0.1694	0.02	0.25	20.89	21.16	54.99	-33.83	Average
2	0.1694	0.02	0.25	35.36	35.63	64.99	-29.36	QP
3	0.1854	0.02	0.26	21.45	21.73	54.24	-32.51	Average
4	0.1854	0.02	0.26	35.33	35.61	64.24	-28.63	QP
5	0.2744	0.03	0.26	19.54	19.83	50.98	-31.15	Average
6	0.2744	0.03	0.26	29.63	29.92	60.98	-31.06	QP
7	0.3852	0.03	0.27	13.97	14.27	48.17	-33.90	Average
8	0.3852	0.03	0.27	22.32	22.62	58.17	-35.55	QP
9	0.4786	0.01	0.27	17.66	17.94	46.36	-28.42	Average
10	0.4786	0.01	0.27	23.13	23.41	56.36	-32.95	QP
11	0.8664	0.03	0.20	17.83	18.06	46.00	-27.94	Average
12	0.8664	0.03	0.20	21.95	22.18	56.00	-33.82	QP

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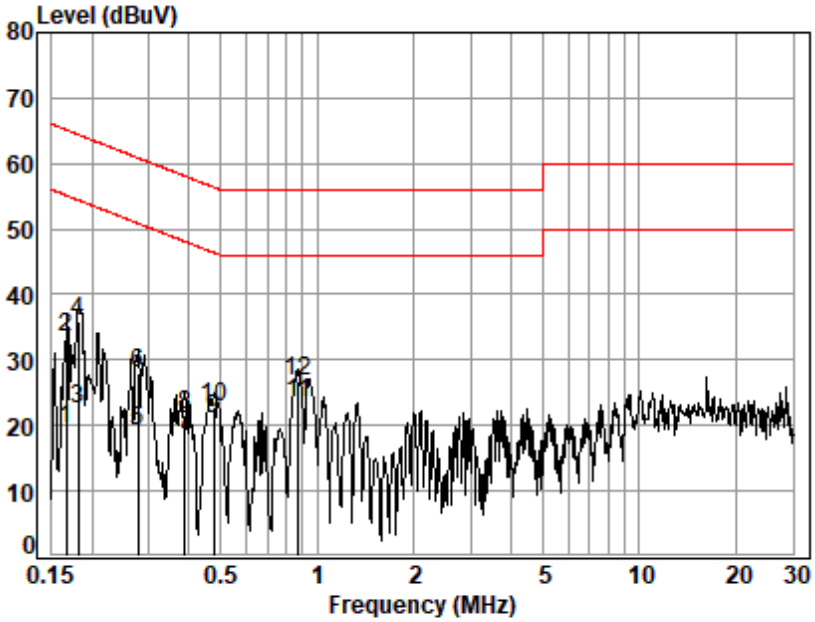
Test Mode: 01; Line: Neutral Line



Site : Shielding Room
Condition: Neutral
Job No. : 00392HS
Test mode: 01

	Freq	Cable Loss	LISN Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB	dBuV	dBuV	dBuV	dB	
1	0.1668	0.02	0.30	19.24	19.56	55.12	-35.56	Average
2	0.1668	0.02	0.30	33.15	33.47	65.12	-31.65	QP
3	0.1815	0.02	0.30	22.30	22.62	54.42	-31.80	Average
4	0.1815	0.02	0.30	35.44	35.76	64.42	-28.66	QP
5	0.2773	0.03	0.28	18.94	19.25	50.90	-31.65	Average
6	0.2773	0.03	0.28	27.68	27.99	60.90	-32.91	QP
7	0.3872	0.03	0.28	18.32	18.63	48.12	-29.49	Average
8	0.3872	0.03	0.28	21.35	21.66	58.12	-36.46	QP
9	0.4786	0.01	0.27	20.84	21.12	46.36	-25.24	Average
10	0.4786	0.01	0.27	22.55	22.83	56.36	-33.53	QP
11	0.8757	0.02	0.10	23.41	23.53	46.00	-22.47	Average
12	0.8757	0.02	0.10	26.56	26.68	56.00	-29.32	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

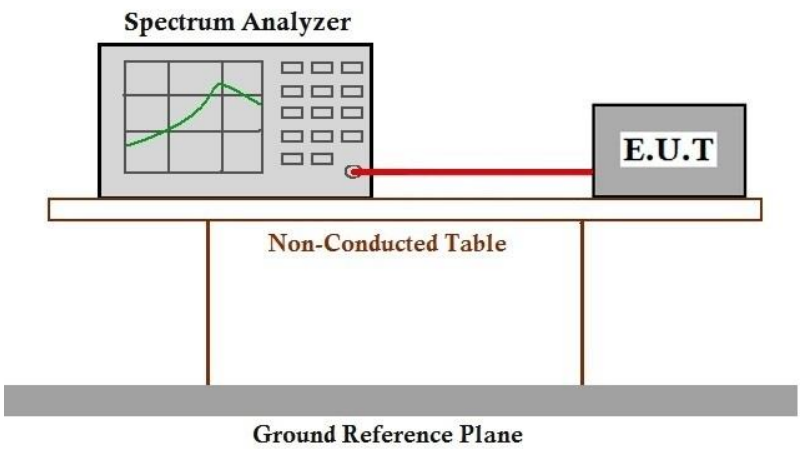
7.2.1 E.U.T. Operation

Operating Environment:
Temperature: 21.5 °C Humidity: 54.1 % RH Atmospheric Pressure: 1020 mbar

7.2.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Pre-scan	00	TX mode_Keep the EUT in transmitting with modulation mode.
Final test	01	Charge + TX mode_Keep the EUT in charging and transmitting with modulation mode.

7.2.3 Test Setup Diagram



7.2.4 Measurement Procedure and Data

Test channel	20dB bandwidth (MHz)	Results
Lowest	0.541	Pass
Middle	2.012	Pass
Highest	2.437	Pass

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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&6.6
Measurement Distance: 3m

Limit:

Fundamental frequency(MHz)	Field strength of fundamental(millivolts/meter)	Field strength of harmonics(microvolts/meter)
902-928	50	500
2400-2483.5	50	500
5725-5875	50	500
24000-24250	250	2500
Remark: 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. For fundamental frequency in “902-928MHz”, the field strength of fundamental is based on Quasi-Peak.		

7.3.1 E.U.T. Operation

Operating Environment:

Temperature: 23.5 °C Humidity: 52.9 % RH Atmospheric Pressure: 1020 mbar

7.3.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	TX mode_Keep the EUT in transmitting with modulation mode.
Pre-scan	01	Charge + TX mode_Keep the EUT in charging and transmitting with modulation mode.

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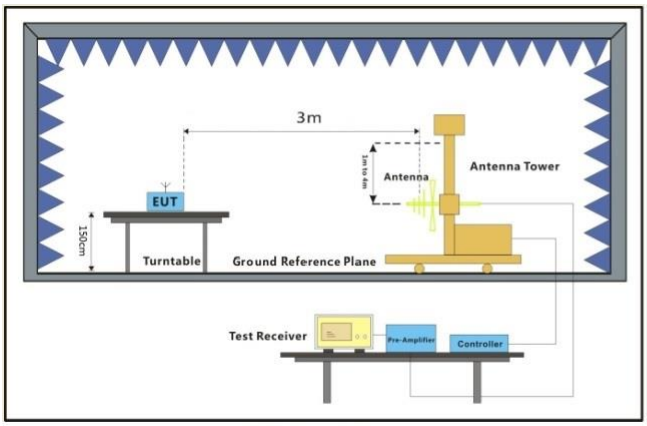
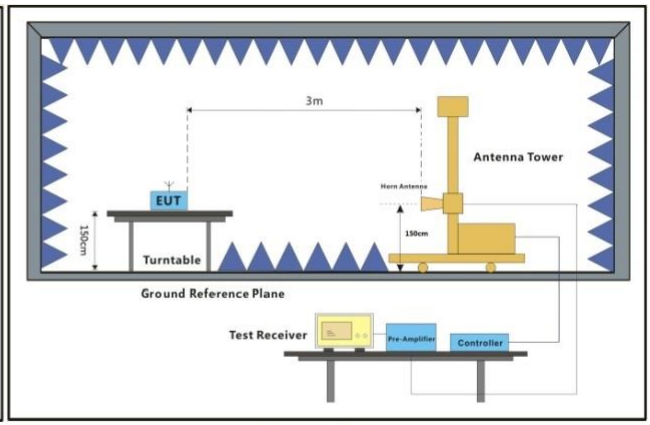
7.3.3 Test Setup Diagram



30MHz-1GHz



Above 1GHz

7.3.4 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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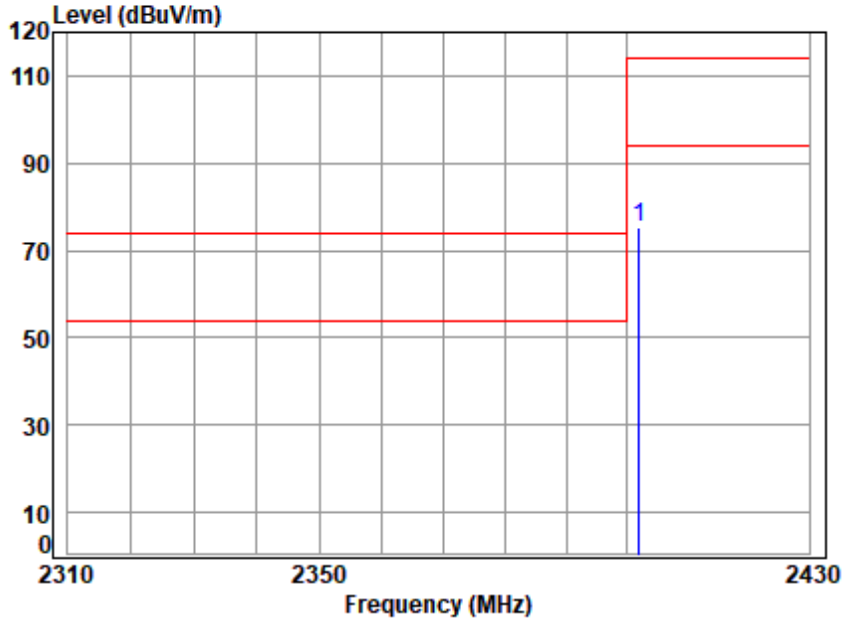
Test Mode: 01; Polarity: Horizontal; Modulation:GFSK; Channel:Low



Site : chamber
Condition: 3m HORIZONTAL
Job No : 00392HS
Mode : 2402 Field Strengh

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	2402.000	5.06	27.18	32.50	75.67	75.41	114.00	-38.59	Peak

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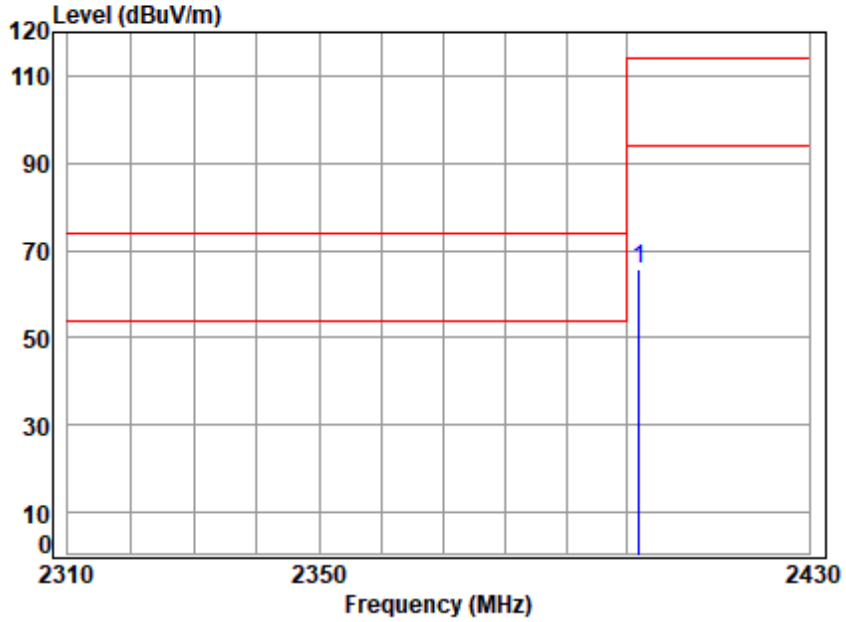
Test Mode: 01; Polarity: Vertical; Modulation:GFSK; Channel:Low



Site : chamber
Condition: 3m VERTICAL
Job No : 00392HS
Mode : 2402 Field Strengh

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	2402.000	5.06	27.18	32.50	66.09	65.83	114.00	-48.17	Peak

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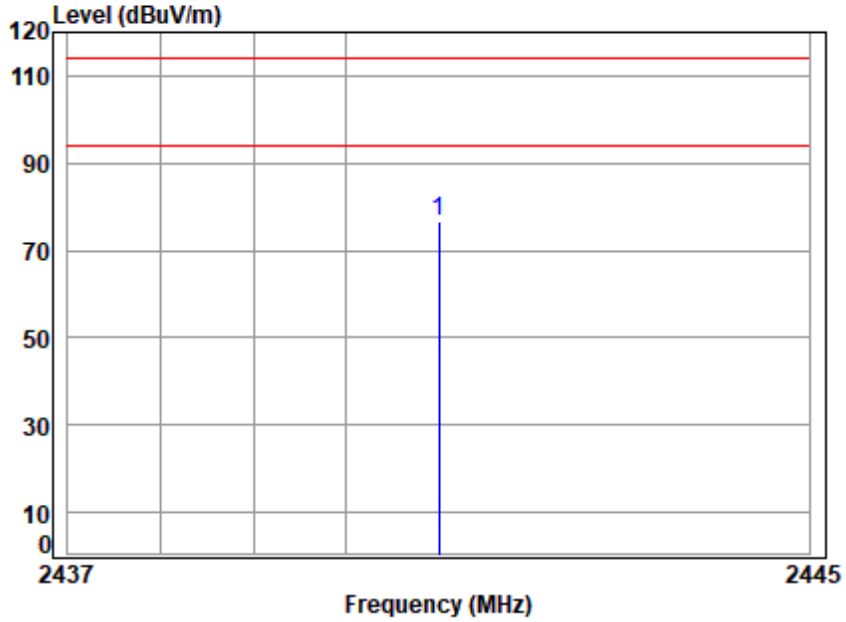
Test Mode: 01; Polarity: Horizontal; Modulation:GFSK; Channel:middle



Site : chamber
Condition: 3m HORIZONTAL
Job No : 00392HS
Mode : 2441 Field Strengh

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	2441.000	5.09	27.27	32.50	76.66	76.52	114.00	-37.48	Peak

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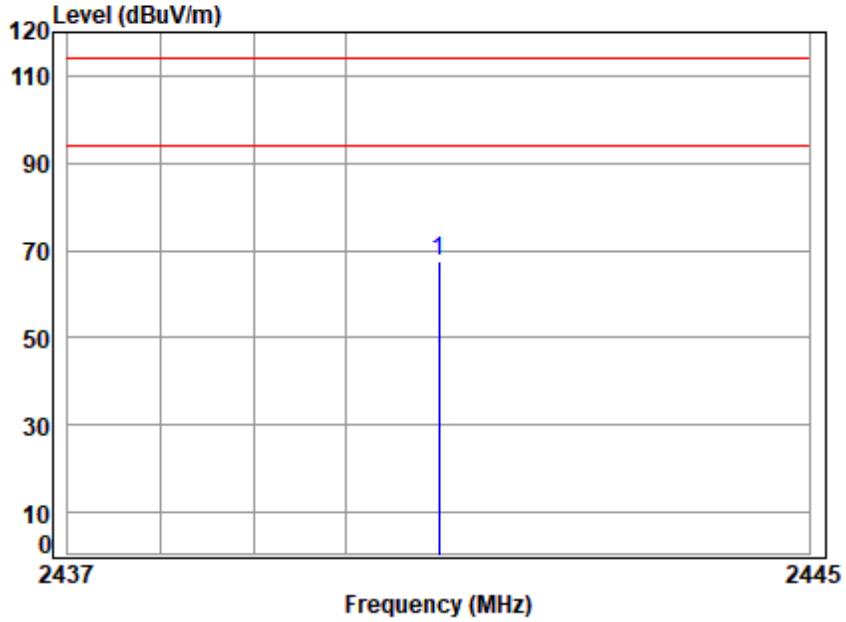
Test Mode: 01; Polarity: Vertical; Modulation:GFSK; Channel:middle



Site : chamber
Condition: 3m VERTICAL
Job No : 00392HS
Mode : 2441 Field Strengh

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	2441.000	5.09	27.27	32.50	67.72	67.58	114.00	-46.42	Peak

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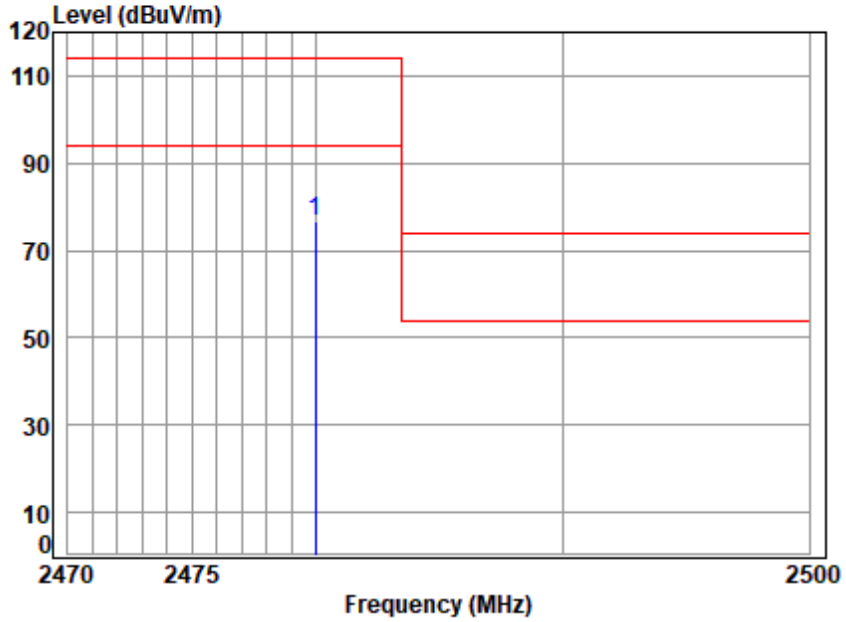
Test Mode: 01; Polarity: Horizontal; Modulation:GFSK; Channel:High



Site : chamber
Condition: 3m HORIZONTAL
Job No : 00392HS
Mode : 2480 Field Strengh

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	2480.000	5.12	27.36	32.50	76.74	76.72	114.00	-37.28	Peak

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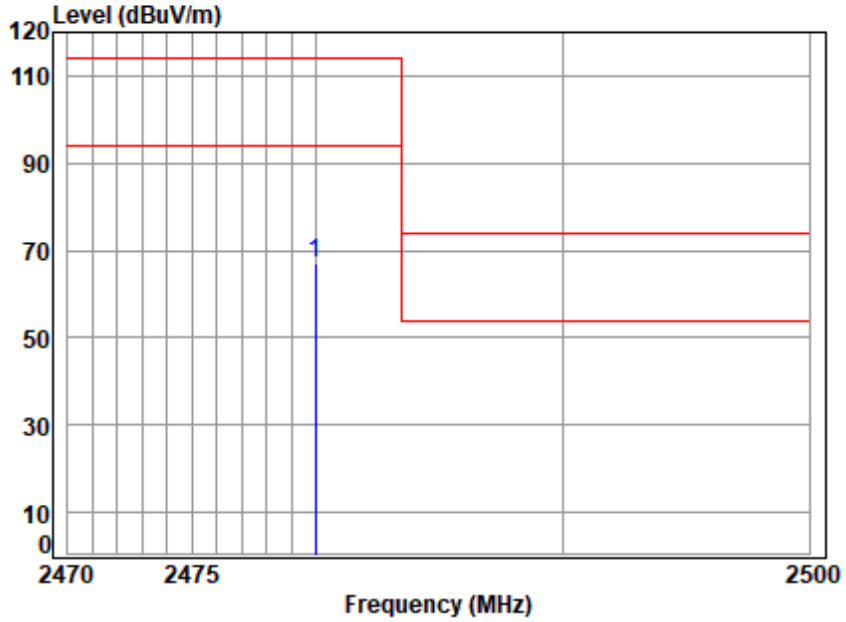
Test Mode: 01; Polarity: Vertical; Modulation:GFSK; Channel:High



Site : chamber
Condition: 3m VERTICAL
Job No : 00392HS
Mode : 2480 Field Strengh

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	2480.000	5.12	27.36	32.50	67.23	67.21	114.00	-46.79	Peak

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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 6.10.5
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: 22.2 °C Humidity: 52.3 % RH Atmospheric Pressure: 1020 mbar

7.4.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	TX mode_Keep the EUT in transmitting with modulation mode.
Pre-scan	01	Charge + TX mode_Keep the EUT in charging and transmitting with modulation mode.

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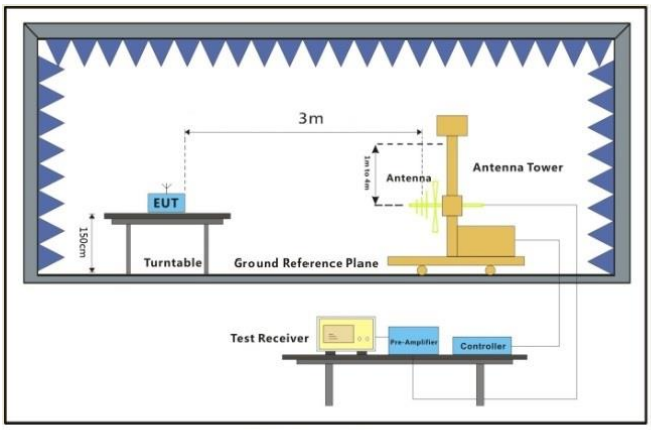
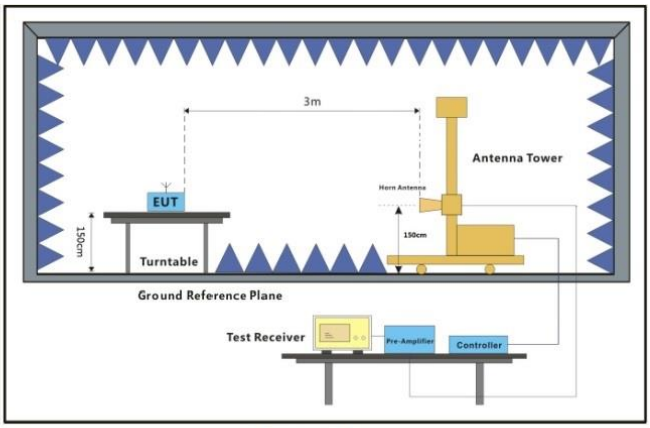
7.4.3 Test Setup Diagram



30MHz-1GHz



Above 1GHz

7.4.4 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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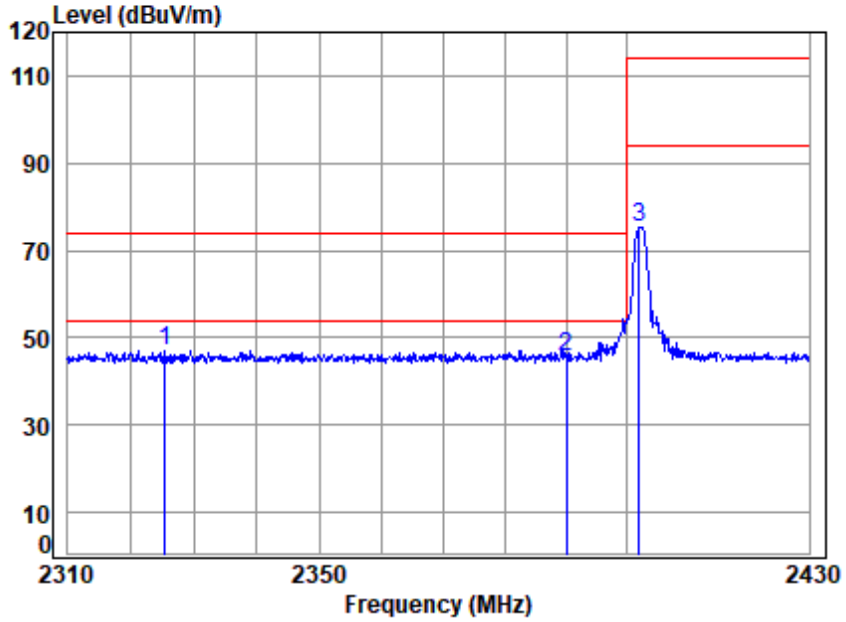
Test Mode: 01; Polarity: Horizontal; Modulation:GFSK; Channel:Low



Site : chamber
Condition: 3m HORIZONTAL
Job No : 00392HS
Mode : 2402 Band edge

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	2325.376	5.01	27.01	32.50	47.69	47.21	74.00	-26.79	Peak
2	2390.000	5.05	27.16	32.50	46.00	45.71	74.00	-28.29	Peak
3	2402.000	5.06	27.18	32.50	75.67	75.41	114.00	-38.59	Peak

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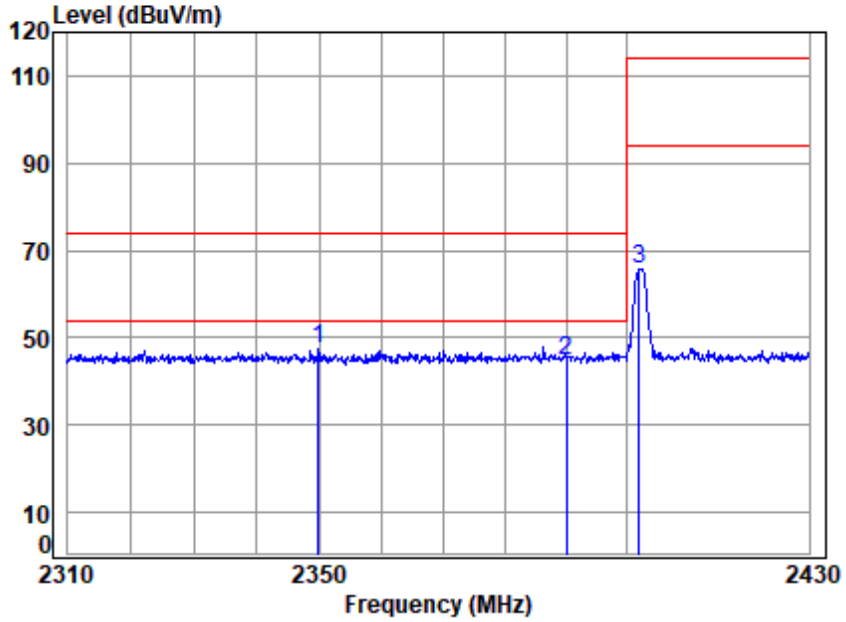
Test Mode: 01; Polarity: Vertical; Modulation:GFSK; Channel:Low



Site : chamber
Condition: 3m VERTICAL
Job No : 00392HS
Mode : 2402 Band edge

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	2349.882	5.02	27.07	32.50	47.85	47.44	74.00	-26.56	Peak
2	2390.000	5.05	27.16	32.50	45.15	44.86	74.00	-29.14	Peak
3	2402.000	5.06	27.18	32.50	66.09	65.83	114.00	-48.17	Peak

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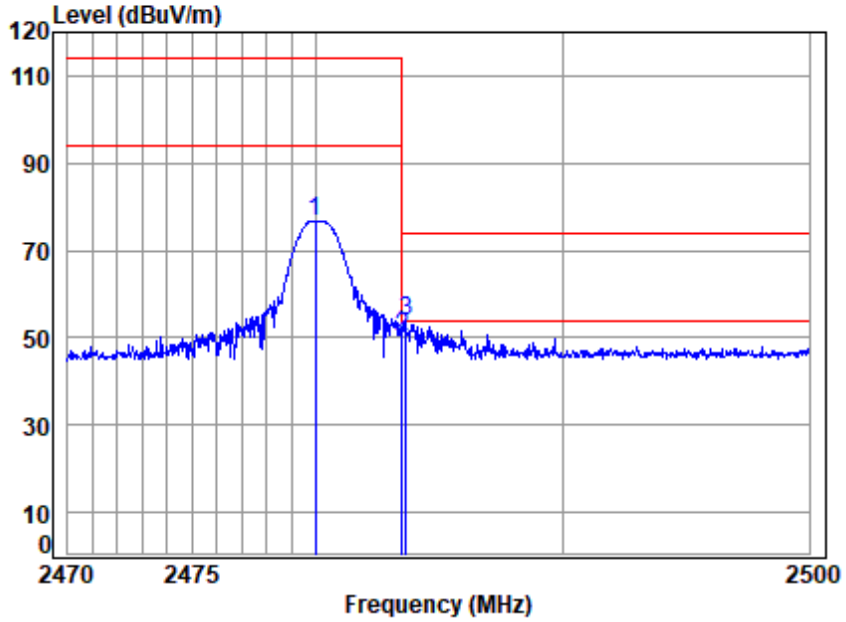
Test Mode: 01; Polarity: Horizontal; Modulation:GFSK; Channel:High



Site : chamber
Condition: 3m HORIZONTAL
Job No : 00392HS
Mode : 2480 Band edge

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	2480.000	5.12	27.36	32.50	76.74	76.72	114.00	-37.28	Peak
2	2483.500	5.12	27.36	32.50	50.18	50.16	74.00	-23.84	Peak
3	2483.635	5.12	27.36	32.50	53.83	53.81	74.00	-20.19	Peak

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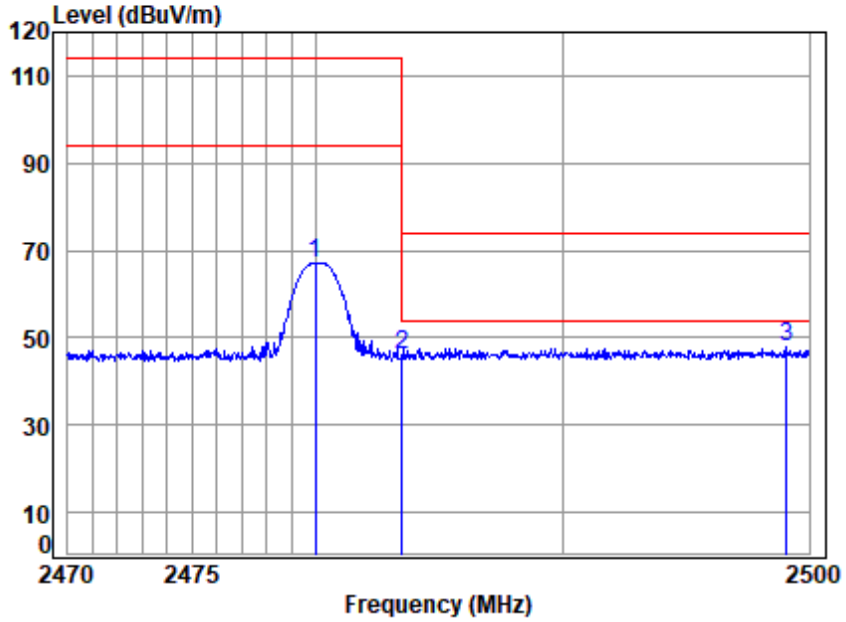
Test Mode: 01; Polarity: Vertical; Modulation:GFSK; Channel:High



Site : chamber
Condition: 3m VERTICAL
Job No : 00392HS
Mode : 2480 Band edge

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	2480.000	5.12	27.36	32.50	67.23	67.21	114.00	-46.79	Peak
2	2483.500	5.12	27.36	32.50	46.26	46.24	74.00	-27.76	Peak
3	2499.064	5.13	27.40	32.50	47.81	47.84	74.00	-26.16	Peak

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7.5 Radiated Emissions Below 1GHz

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
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
960-1000	500	3

7.5.1 E.U.T. Operation

Operating Environment:
Temperature: 23.2 °C Humidity: 52.6 % RH Atmospheric Pressure: 1020 mbar

7.5.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Pre-scan	00	TX mode_Keep the EUT in transmitting with modulation mode.
Final test	01	Charge + TX mode_Keep the EUT in charging and transmitting with modulation mode.

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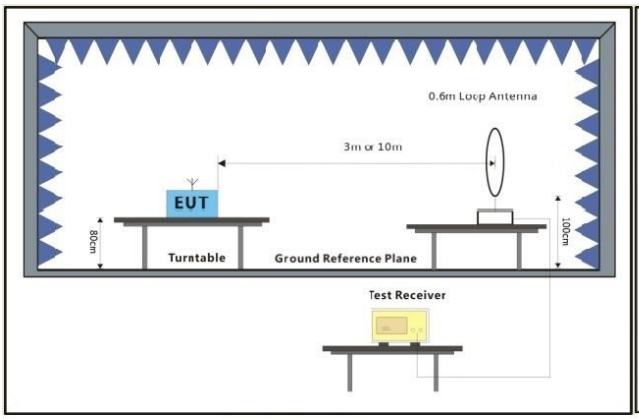
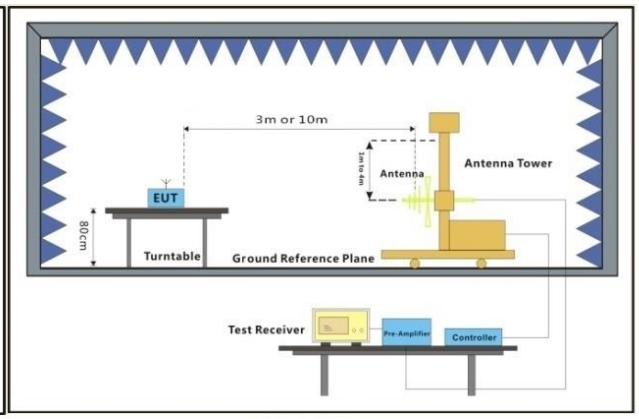
7.5.3 Test Setup Diagram



Below 30MHz



30MHz-1GHz

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7.5.4 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 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.

b. 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.

c. 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.

d. 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.

e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

f. 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 quasi-peak method as specified and then reported in a data sheet.

g. Test the EUT in the lowest channel, the middle channel, the Highest channel.

h. 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.

i. Repeat above procedures until all frequencies measured was complete.

Remark:

1. Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor

2. Scan from 9kHz to 30MHz, the disturbance below 30MHz was very low. The points marked on above plots are the highest emissions could be found when testing, so only above points 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. The disturbance below 1GHz was very low and the harmonics were the highest point could be found when testing, so only the above harmonics had been displayed.

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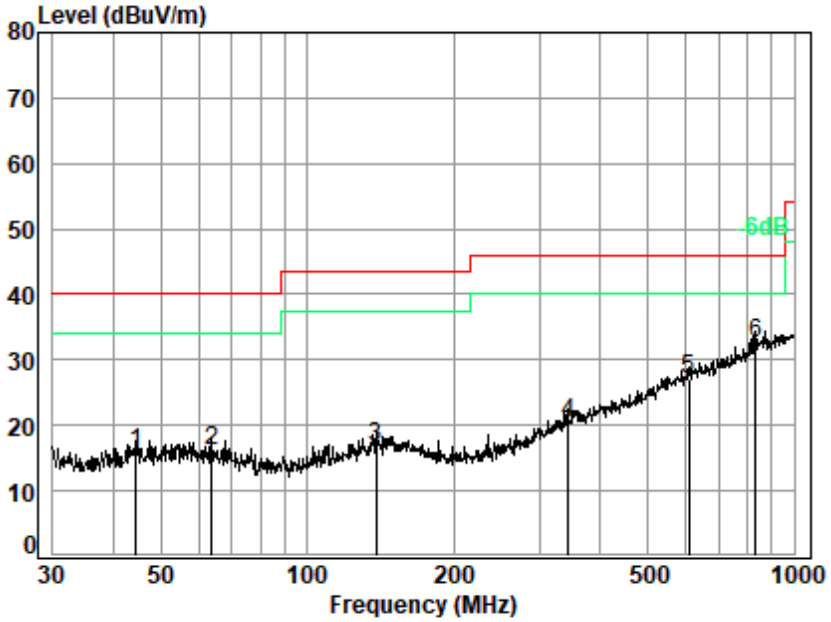
Test Mode: 01; Polarity: Horizontal



Site : chamber
Condition: 3m HORIZONTAL
Job No : 00392HS
Mode : 01

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	44.4308	0.23	17.29	26.01	24.16	15.67	40.00	-24.33	QP
2	63.7588	0.26	16.63	25.90	25.10	16.09	40.00	-23.91	QP
3	138.3873	0.97	17.31	25.54	24.00	16.74	43.50	-26.76	QP
4	343.1800	1.45	19.80	25.43	24.69	20.51	46.00	-25.49	QP
5	607.7867	2.24	24.48	24.96	25.19	26.95	46.00	-19.05	QP
6	833.3171	2.68	27.76	24.16	26.16	32.44	46.00	-13.56	QP

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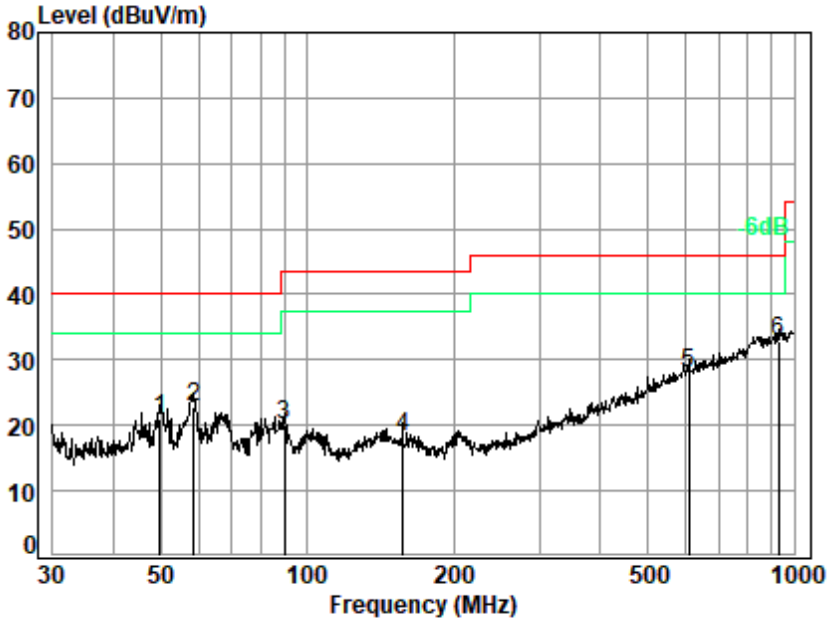
Test Mode: 01; Polarity: Vertical



Site : chamber
Condition: 3m VERTICAL
Job No : 00392HS
Mode : 01

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	49.7068	0.21	17.36	26.00	29.49	21.06	40.00	-18.94	QP
2	58.4075	0.26	16.94	25.93	31.57	22.84	40.00	-17.16	QP
3	89.9047	0.67	13.61	25.70	31.37	19.95	43.50	-23.55	QP
4	157.0074	0.87	17.27	25.52	25.72	18.34	43.50	-25.16	QP
5	607.7867	2.24	24.48	24.96	26.28	28.04	46.00	-17.96	QP
6	929.0082	2.25	29.06	24.07	25.59	32.83	46.00	-13.17	QP

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7.6 Radiated Emissions Above 1GHz

Test Requirement 47 CFR Part 15, Subpart C 15.209 & 15.249 (a),(d)
Test Method: ANSI C63.10 (2013) Section 6.6
Measurement Distance: 3m

Limit:

Frequency(MHz)	Field strength(microvolts/meter)	Measurement distance(meters)
Above 1000	500	3

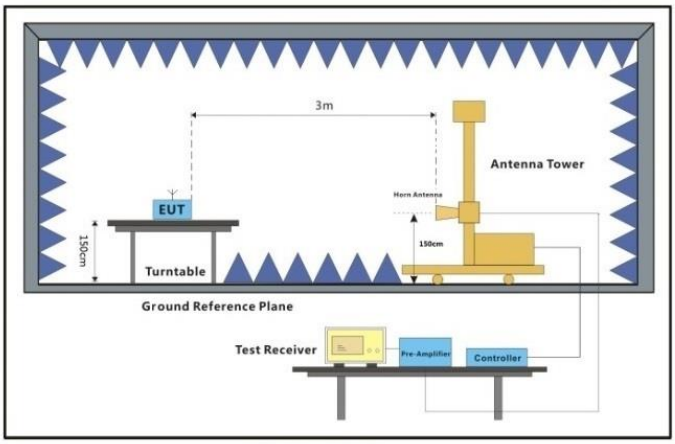
7.6.1 E.U.T. Operation

Operating Environment:
Temperature: 23.6 °C Humidity: 52.6 % RH Atmospheric Pressure: 1020 mbar

7.6.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	TX mode_Keep the EUT in transmitting with modulation mode.
Pre-scan	01	Charge + TX mode_Keep the EUT in charging and transmitting with modulation mode.

7.6.3 Test Setup Diagram



Above 1GHz

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7.6.4 Measurement Procedure and Data

a. 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.

b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

c. 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.

d. 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.

e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

f. 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 or average method as specified and then reported in a data sheet.

g. Test the EUT in the lowest channel, the middle channel, the Highest channel.

h. 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.

i. Repeat above procedures until all frequencies measured was complete.

Remark:

1. Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor

2. Scan from 18GHz to 40GHz, the disturbance above 18GHz was very low. The points marked on above plots are the highest emissions could be found when testing, so only above points 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. For the emissions whose peak level is lower than the average limit, only the peak measurement is shown in the report.

4. The disturbance above 18GHz were very low and the harmonics were the highest point could be found when testing, so only the above harmonics had been displayed.

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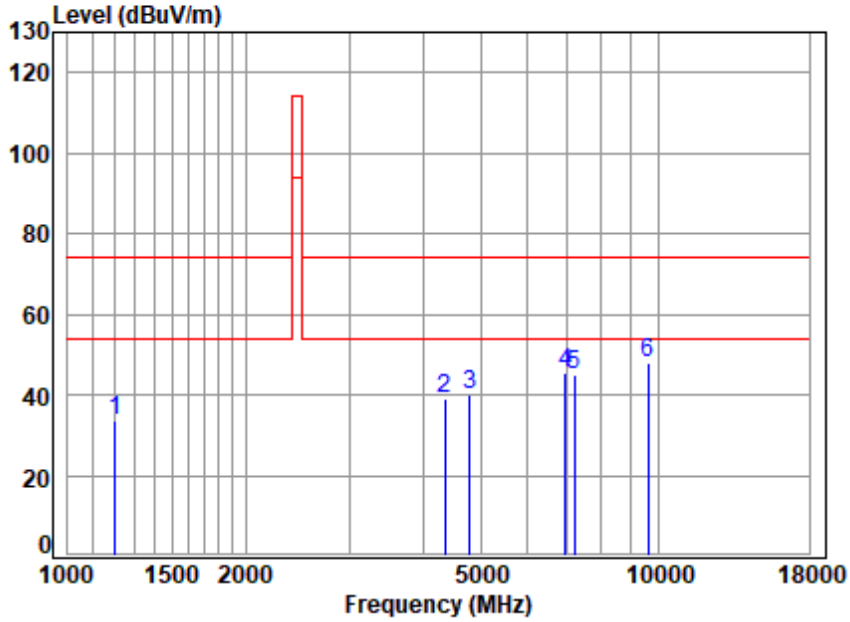
Test Mode: 01; Polarity: Horizontal; Modulation:GFSK; Channel:Low



Site : chamber
Condition: 3m HORIZONTAL
Job No : 00392HS
Mode : 2402 TX RSE

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1203.199	3.29	24.30	52.66	58.90	33.83	74.00	-40.17	peak
2	4354.454	7.63	30.00	52.91	54.29	39.01	74.00	-34.99	peak
3	4804.000	8.32	30.94	53.05	53.97	40.18	74.00	-33.82	peak
4	6954.852	8.25	35.70	53.47	55.14	45.62	74.00	-28.38	peak
5	7206.000	8.33	36.05	53.52	53.88	44.74	74.00	-29.26	peak
6	9608.000	11.71	37.53	53.58	52.41	48.07	74.00	-25.93	peak

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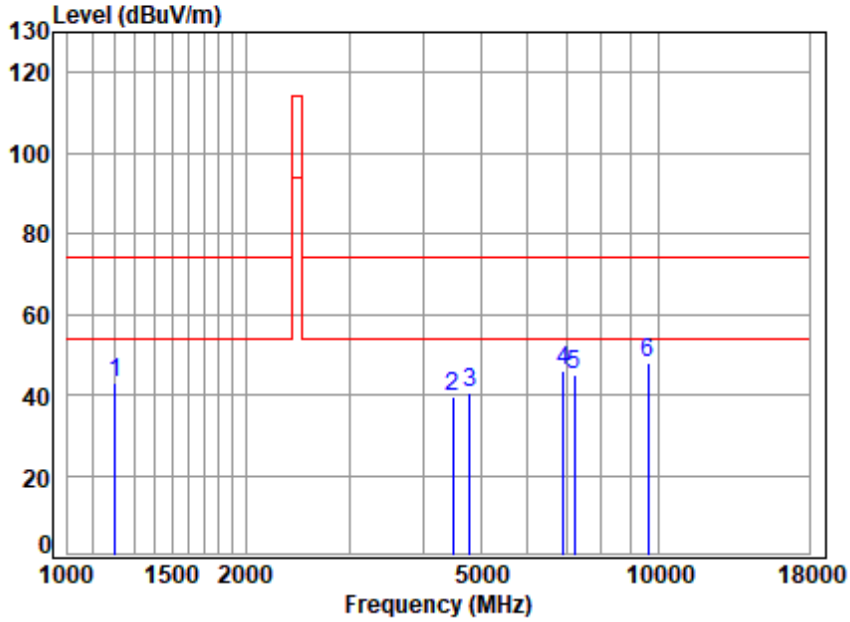
Test Mode: 01; Polarity: Vertical; Modulation:GFSK; Channel:Low



Site : chamber
Condition: 3m VERTICAL
Job No : 00392HS
Mode : 2402 TX RSE

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1203.199	3.29	24.30	52.66	68.12	43.05	74.00	-30.95	peak
2	4495.125	7.54	30.19	52.96	54.88	39.65	74.00	-34.35	peak
3	4804.000	8.32	30.94	53.05	54.11	40.32	74.00	-33.68	peak
4	6914.763	8.21	35.60	53.44	55.85	46.22	74.00	-27.78	peak
5	7206.000	8.33	36.05	53.52	54.08	44.94	74.00	-29.06	peak
6	9608.000	11.71	37.53	53.58	52.44	48.10	74.00	-25.90	peak

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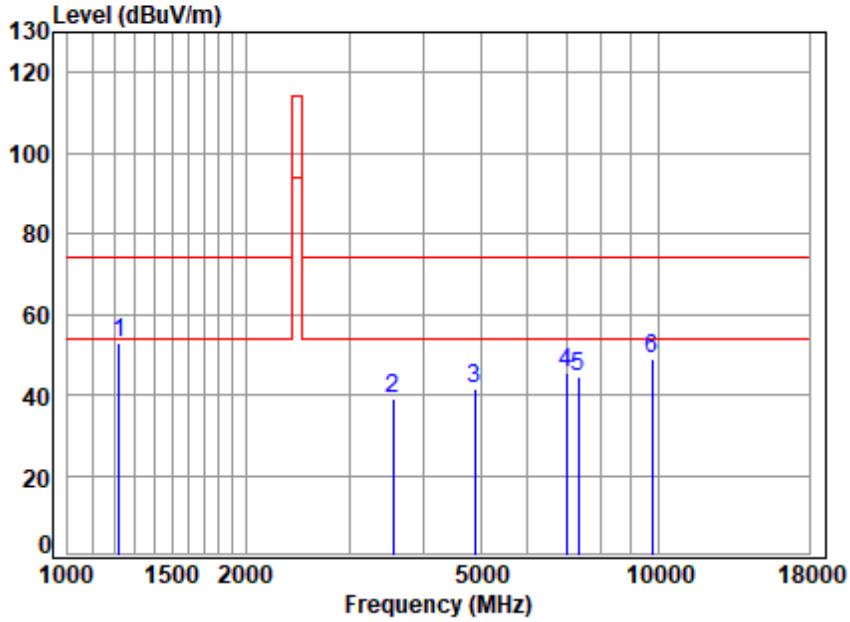

Site : chamber
Condition: 3m HORIZONTAL
Job No : 00392HS
Mode : 2441 TX RSE

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1220.714	3.32	24.29	52.67	77.72	52.66	74.00	-21.34	peak
2	3556.843	7.23	28.80	52.92	56.04	39.15	74.00	-34.85	peak
3	4882.000	8.51	31.13	53.07	54.85	41.42	74.00	-32.58	peak
4	6974.982	8.27	35.74	53.48	54.90	45.43	74.00	-28.57	peak
5	7323.000	8.35	36.19	53.53	53.24	44.25	74.00	-29.75	peak
6	9764.000	11.74	37.88	53.43	52.73	48.92	74.00	-25.08	peak

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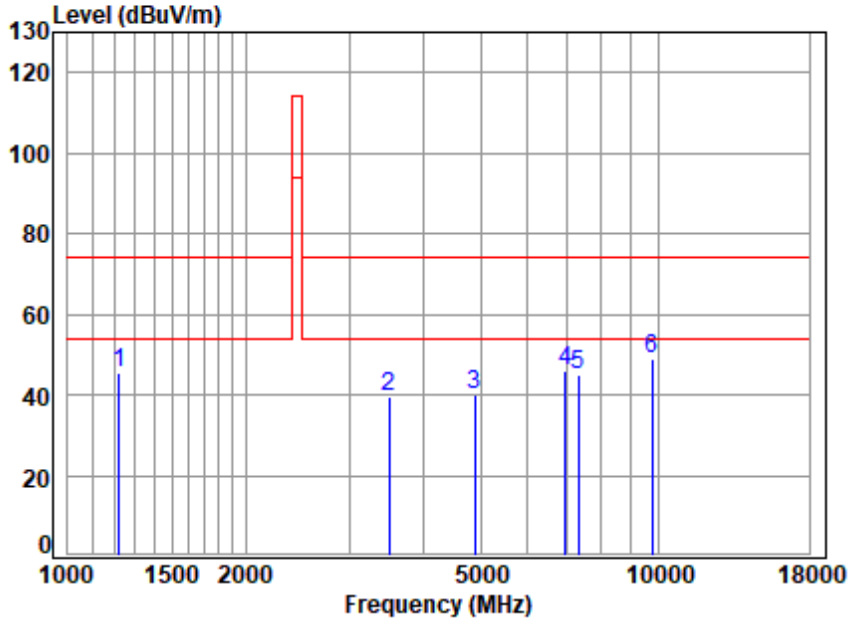

Site : chamber
Condition: 3m VERTICAL
Job No : 00392HS
Mode : 2441 TX RSE

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1220.714	3.32	24.29	52.67	70.67	45.61	74.00	-28.39	peak
2	3505.809	7.16	28.71	52.94	56.42	39.35	74.00	-34.65	peak
3	4882.000	8.51	31.13	53.07	53.71	40.28	74.00	-33.72	peak
4	6954.852	8.25	35.70	53.47	55.48	45.96	74.00	-28.04	peak
5	7323.000	8.35	36.19	53.53	54.06	45.07	74.00	-28.93	peak
6	9764.000	11.74	37.88	53.43	52.73	48.92	74.00	-25.08	peak

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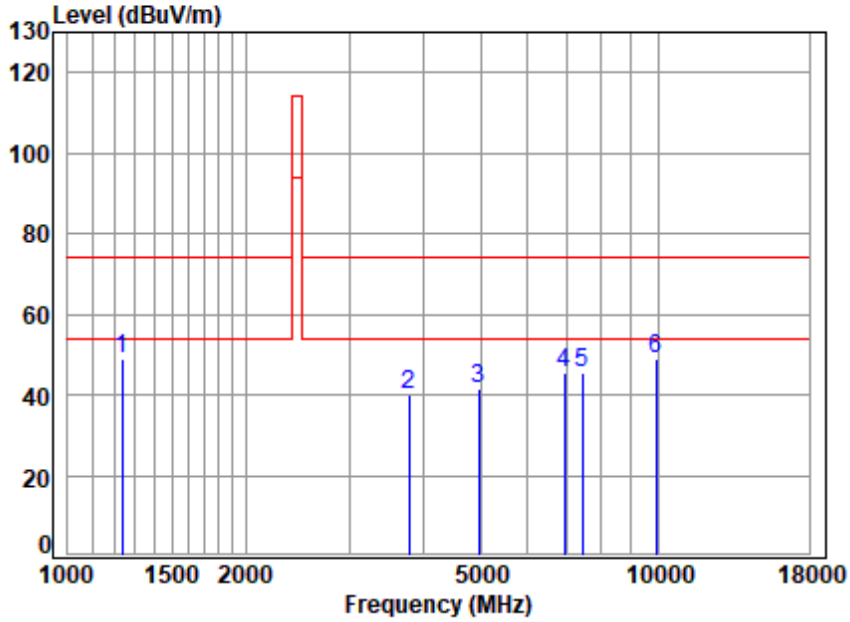

Site : chamber
Condition: 3m HORIZONTAL
Job No : 00392HS
Mode : 2480 TX RSE

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1238.483	3.35	24.28	52.69	74.12	49.06	74.00	-24.94	peak
2	3779.422	7.55	29.16	52.86	56.00	39.85	74.00	-34.15	peak
3	4960.000	8.69	31.31	53.09	54.56	41.47	74.00	-32.53	peak
4	6934.778	8.23	35.65	53.46	54.82	45.24	74.00	-28.76	peak
5	7440.000	8.37	36.33	53.55	54.45	45.60	74.00	-28.40	peak
6	9920.000	11.77	38.22	53.28	52.18	48.89	74.00	-25.11	peak

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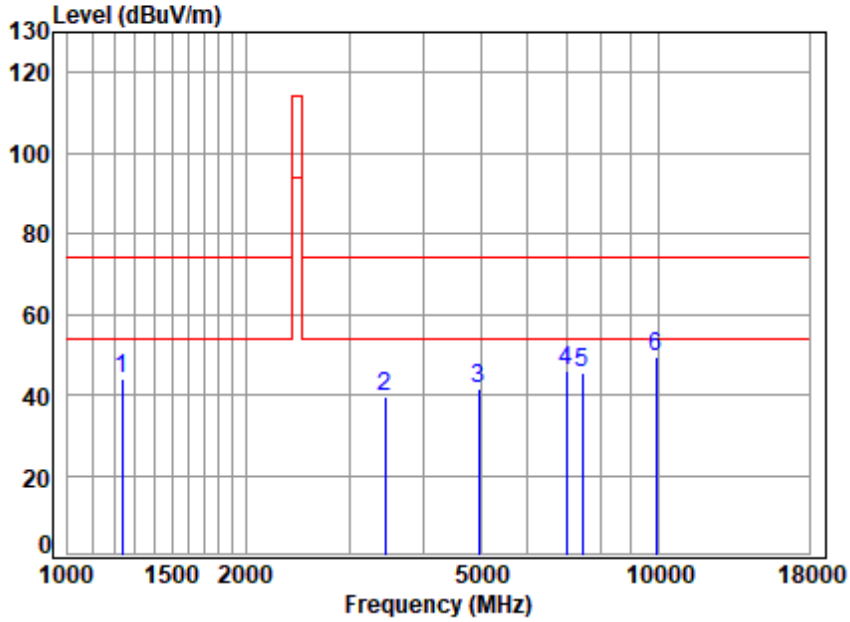
Test Mode: 01; Polarity: Vertical; Modulation:GFSK; Channel:High



Site : chamber
Condition: 3m VERTICAL
Job No : 00392HS
Mode : 2480 TX RSE

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1238.483	3.35	24.28	52.69	69.05	43.99	74.00	-30.01	peak
2	3445.535	7.01	28.69	52.96	56.57	39.31	74.00	-34.69	peak
3	4960.000	8.69	31.31	53.09	54.65	41.56	74.00	-32.44	peak
4	6995.172	8.29	35.79	53.50	55.19	45.77	74.00	-28.23	peak
5	7440.000	8.37	36.33	53.55	54.49	45.64	74.00	-28.36	peak
6	9920.000	11.77	38.22	53.28	52.92	49.63	74.00	-24.37	peak

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8 Test Setup Photo

Refer to Appendix - Test Setup Photo for FYCR2210000392HS

9 EUT Constructional Details (EUT Photos)

Refer to External and Internal Photos for FYCR2210000392HS

- End of the Report -

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