TEST REPORT

Application No.:	GZCR2408001015AT
Applicant:	LIAONING AROMA INTERNATIONAL TRADE CO., LTD
Address of Applicant:	No.11jia, Fuxinsanjie, Heping Dist., Shenyang, China
Manufacturer:	LIAONING AROMA INTERNATIONAL TRADE CO., LTD
Address of Manufacturer:	No.11jia, Fuxinsanjie, Heping Dist., Shenyang, China
Factory:	LIAONING AROMA INTERNATIONAL TRADE CO., LTD
Address of Factory:	No.11jia, Fuxinsanjie, Heping Dist., Shenyang, China
Product Name:	Microwave radar module
Model No.:	LD01, LD02, LD03, LD04, LD05, LD06, LD07, LD08, LD09, LD10, LD11, LD12, LD13, LD14, LD15 ♣
♣	Please refer to section 2 of this report which indicates which item was actually tested and which were electrically identical.
Standard(s) :	47 CFR Part 15, Subpart C 15.249
Date of Receipt:	2024-08-28
Date of Test:	2024-09-09 to 2024-10-15
Date of Issue:	2024-11-29
Test Result:	**Pass***

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

Ricky Liu
Manager

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Revision Record			
Version	**Report No.**	**Date**	**Remark**
01	GZCR240800101502	2024-11-29	Original

Authorized for issue by:				
		Luke Lin **Luke Lin/Project Engineer**		
		Vico Cui **Vico Cui/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**
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		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
20dB Bandwidth		ANSI C63.10 (2013) Section 6.9	47 CFR Part 15, Subpart C 15.215	Pass

Note:

E.U.T./EUT means Equipment Under Test.

Pass means the test result passed the test standard requirement, please find the detailed decision rule in the report relative section.

♣ Declaration of EUT Family Grouping:

Model No.: LD01, LD02, LD03, LD04, LD05, LD06, LD07, LD08, LD09, LD10, LD11, LD12, LD13, LD14, LD15

According to the declaration from the applicant, the electrical circuit design, layout, components used and internal wiring were identical for all models, with only difference on model designation, appearance and colour.

Therefore only one model LD01 was tested in this report.

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4 General Information

4.1 Details of E.U.T.

Power supply:	DC 4.5V = battery 'AA'*3pcs
Test voltage:	DC 4.5V
Cable(s):	N/A
Operation Frequency:	5730MHz, 5803MHz, 5870MHz
Modulation Type:	FMCW
Number of Channels:	3
Antenna Type:	PCB Antenna
Antenna Gain:	2.09 dBi according to antenna specification

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

4.2 Description of Support Units

The EUT has been tested as an independent unit.

4.3 Measurement Uncertainty

Test Item	Measurement Uncertainty
Field Strength of the Fundamental Signal (15.249(a))	± 5.14dB (30MHz-1GHz);± 4.88dB (1GHz-6GHz)
Restricted Band Around Fundamental Frequency	±5.14dB (3m); ±4.90dB (10m);±4.88dB (1GHz-6GHz);±5.06dB (6GHz-18GHz); ±5.30dB (18GHz-40GHz)
Radiated Emissions Below 1GHz	±3.08dB (9kHz to 150kHz); ±3.19dB(150kHz to 30MHz); ±5.14dB (30MHz-1GHz) (3m); ±4.90dB (30MHz-1GHz) (10m)
Radiated Emissions Above 1GHz	±4.88dB (1GHz-6GHz);±5.06dB (6GHz-18GHz); ±5.30dB (18GHz-40GHz)
20dB Bandwidth	± 0.274%

Remark:

The U_{lab} (lab Uncertainty) is less than U_{cispr} (CISPR Uncertainty) or U_{ETSI}(ETSI Uncertainty).

Emission decision rule:

– Compliance is deemed to occur if no measured disturbance level exceeds the disturbance limit, marked as Pass in the report.

– Non-compliance is deemed to occur if any measured disturbance level exceeds the disturbance limit, marked as Fail in the report.

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4.4 Test Location

All tests were performed at:

SGS-CSTC Standards Technical Services Co., Ltd., Guangzhou Branch EMC Laboratory,

No.198, Kezhu Road, Science City, Economic & Technological Development Area, Guangzhou, Guangdong, China 510663

Tel: +86 20 82155555

No tests were sub-contracted.

4.5 Test Facility

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

- **ACMA**

SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory can also perform testing for the Australian/New Zealand Regulatory Compliance Mark (RCM).

- **SGS UK(Certificate No.: 32), SGS-TUV SAARLAND and SGS-FIMKO**

Have approved SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory as a supplier of EMC TESTING SERVICES and SAFETY TESTING SERVICES.

- **FCC Recognized Accredited Test Firm(Registration No.: 486818)**

SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory has been accredited and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Designation Number: CN5016, Test Firm Registration Number: 486818.

- **ISED (Registration No.: 4620B, CAB identifier: CN0052)**

SGS-CSTC Standards Technical Services Co., Ltd., has been registered by Innovation Science and Economic Development Canada for Wireless Device Testing laboratories to test to Canadian radio equipment requirements. Registration No. 4620B, CAB identifier: CN0052.

- **VCCI (Registration No.: R-12460, C-12584, G-20107 and T-11179)**

The 10m Semi-anechoic chamber, 966 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.: R-12460, C-12584, G-20107 and T-11179 respectively.

- **CBTL (Lab Code: TL129)**

SGS-CSTC Standards Technical Services Co., Ltd., E&E Laboratory has been assessed and fully comply with the requirements of ISO/IEC 17025:2017, the Basic Rules, IECEE 01 and Rules of procedure IECEE 02, and the relevant IECEE CB-Scheme Operational documents.

4.6 Deviation from Standards

None

4.7 Abnormalities from Standard Conditions

None

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5 Equipment List

Field Strength of the Fundamental Signal (15.249(a))					
Equipment	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal Date**	**Cal Due Date**
1GHz-26.5 GHz Pre-Amplifier	Agilent	8449B	EMC0521	2024-10-14	2025-10-13
EMI Test Receiver (10Hz-26.5GHz)	Rohde & Schwarz	ESIB26	EMC0522	2024-09-02	2025-09-01
Chamber cable (Above 1GHz)	Scoflex	KMKM-8.0m	EMC0545	2024-08-19	2026-08-18
Horn Antenna (1GHz-18GHz)	SCHWARZBECK MESS-ELEKTRONIK	BBHA 9120D	EMC2026	2022-09-23	2025-09-22
EXA Signal Analyzer (10Hz-44GHz)	Keysight	N9010A	EMC2138	2024-08-19	2025-08-18
966 Anechoic Chamber	C.R.T	9m x 6m x 6m	EMC2142	2023-12-20	2026-12-19
Test Software E3	Audix	Ver.6.120110a	GZE100-61	N/A	N/A

Restricted Band Around Fundamental Frequency					
Equipment	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal Date**	**Cal Due Date**
1GHz-26.5 GHz Pre-Amplifier	Agilent	8449B	EMC0521	2024-10-14	2025-10-13
EMI Test Receiver (10Hz-26.5GHz)	Rohde & Schwarz	ESIB26	EMC0522	2024-09-02	2025-09-01
Chamber cable (Above 1GHz)	Scoflex	KMKM-8.0m	EMC0545	2024-08-19	2026-08-18
Horn Antenna (1GHz-18GHz)	SCHWARZBECK MESS-ELEKTRONIK	BBHA 9120D	EMC2026	2022-09-23	2025-09-22
966 Anechoic Chamber	C.R.T	9m x 6m x 6m	EMC2142	2023-12-20	2026-12-19
Test Software E3	Audix	Ver.6.120110a	GZE100-61	N/A	N/A

Radiated Emissions Below 1GHz					
Equipment	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal Date**	**Cal Due Date**
966 Anechoic Chamber	Shenzhen C.R.T	CRTSGSSAC966	EMC2230	2022-04-12	2025-04-11
EMI Test Receiver(1Hz-8GHz)	Rohde & Schwarz	ESW8	EMC2229	2024-02-19	2025-02-18
Amplifier(9k-1000MHz)	SONOMA	310	EMC2237	2024-03-22	2025-03-21
TRILOG Broadband Antenna（25M-2GHz)	SCHWRZBECK	VULB 9168	EMC2238	2022-04-20	2025-04-19
Coaxial Cable	Mirco-COAX UTIFLEX ve	LA2-C125-8000	EMC2239	2023-06-14	2025-06-13
Test Software E3	Audix	Ver.6.191211	GZE100-81	N/A	N/A
Active Loop Antenna-RED	ETS-Lindgren	6502	EMC2190	2024-04-08	2026-04-07

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Radiated Emissions Above 1GHz					
Equipment	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal Date**	**Cal Due Date**
1GHz-26.5 GHz Pre-Amplifier	Agilent	8449B	EMC0521	2024-10-14	2025-10-13
EMI Test Receiver (10Hz-26.5GHz)	Rohde & Schwarz	ESIB26	EMC0522	2024-09-02	2025-09-01
Chamber cable (Above 1GHz)	Scoflex	KMKM-8.0m	EMC0545	2024-08-19	2026-08-18
Horn Antenna (1GHz-18GHz)	SCHWARZBECK MESS-ELEKTRONIK	BBHA 9120D	EMC2026	2022-09-23	2025-09-22
Horn Antenna (14-40GHz)	SCHWARZBECK	BBHA 9170	EMC2041	2023-06-18	2026-06-17
EXA Signal Analyzer (10Hz-44GHz)	Keysight	N9010A	EMC2138	2024-08-19	2025-08-18
966 Anechoic Chamber	C.R.T	9m x 6m x 6m	EMC2142	2023-12-20	2026-12-19
Notch Filter (5150-5880)	Mico-Tronics	BRM50716	EMC2168	2024-07-17	2025-07-16
Microwave Broadband Preamplifier (18-40GHz)	SCHWARZBECK	BBV 9721	EMC2172	2024-08-19	2025-08-18
Test Software E3	Audix	Ver.6.120110a	GZE100-61	N/A	N/A

RF Conducted Test					
Equipment	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal Date**	**Cal Due Date**
MXA Signal Analyzer (10Hz-8.4GHz)	Agilent Technologies	N9020A	SEM004-10	2024-02-20	2025-02-19
MI CABLE	SGS-EMC	0.8M	EMC2136	2023-11-02	2025-11-01

General used equipment					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
DMM	Fluke	73	EMC0006	2024-06-13	2025-06-12

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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.

The best case gain of the antenna is 2.09 dBi.

Antenna location: Refer to Internal photos

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7 Radio Spectrum Matter Test Results

7.1 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

Limit:

Test Distance: 3m

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.		

7.1.1 E.U.T. Operation

Operating Environment:

Temperature: 25.7 °C Humidity: 59.2 % RH Atmospheric Pressure: 1005 mbar

7.1.2 Test Mode Description

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

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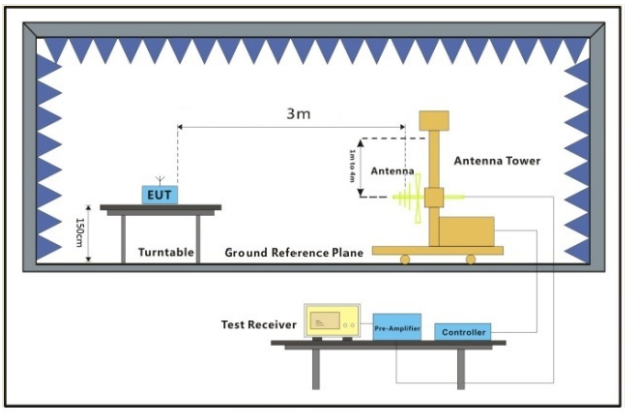
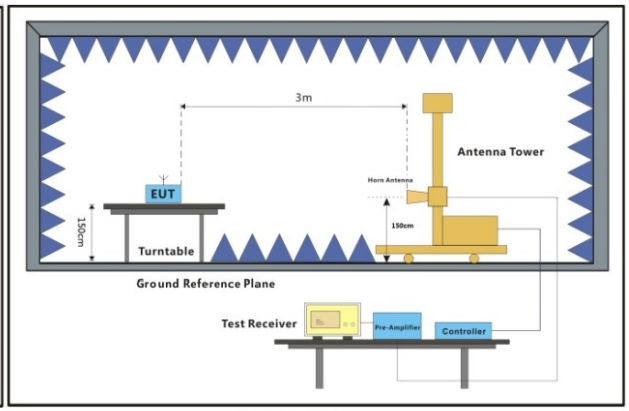
7.1.3 Test Setup Diagram



30MHz-1GHz



Above 1GHz

7.1.4 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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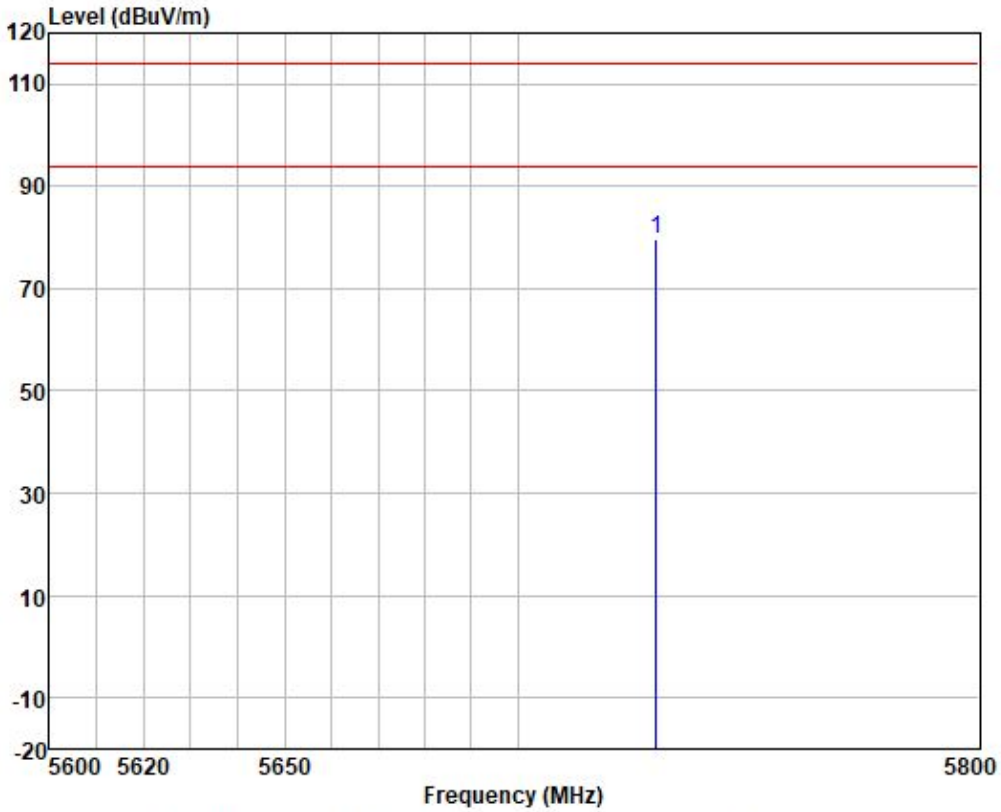
Test Mode: 00; Polarity: Vertical; Channel:Low



	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	5730.000	78.51	32.65	5.29	36.78	79.67	114.00	-34.33	VERTICAL	peak

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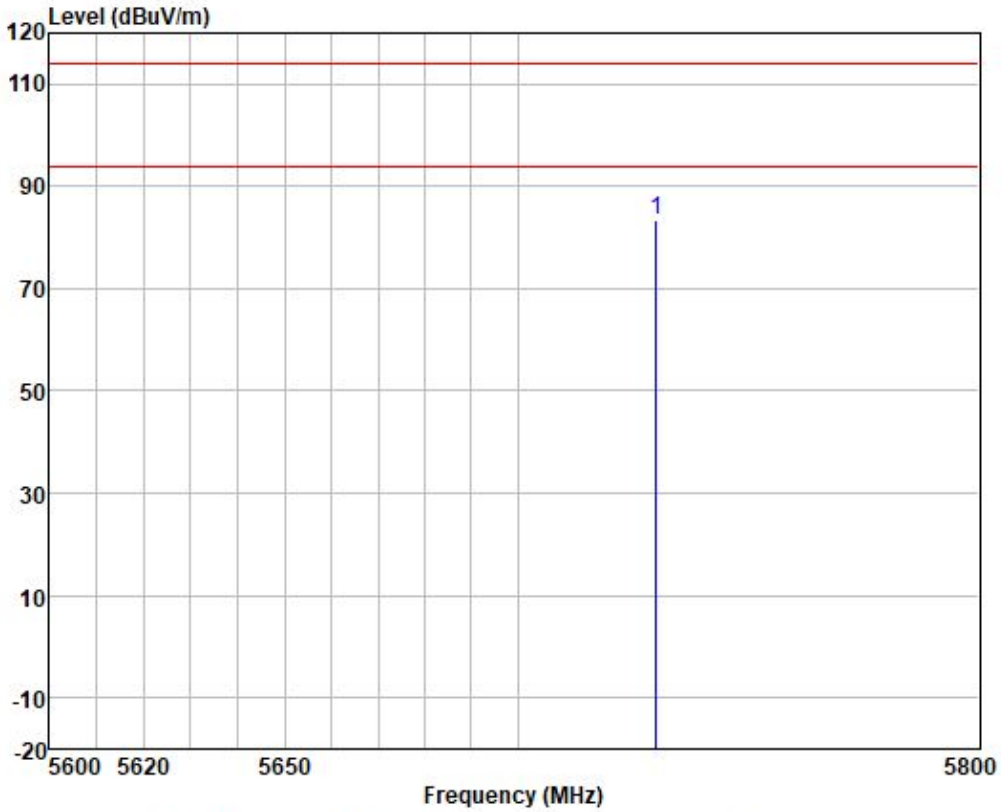
Test Mode: 00; Polarity: Horizontal; Channel:Low



	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	5730.000	82.38	32.65	5.29	36.78	83.54	114.00	-30.46	HORIZONTAL	peak

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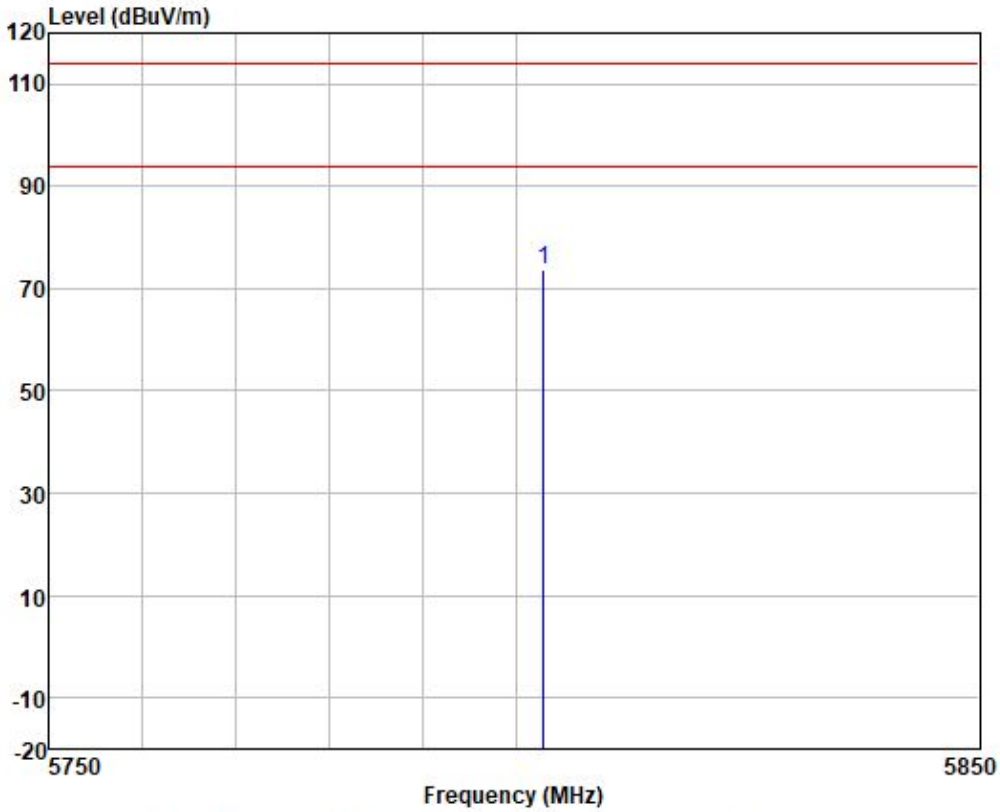
Test Mode: 00; Polarity: Vertical; Channel:middle



	Freq	ReadLevel	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	5803.000	72.45	32.67	5.34	36.79	73.67	114.00	-40.33	VERTICAL	Peak

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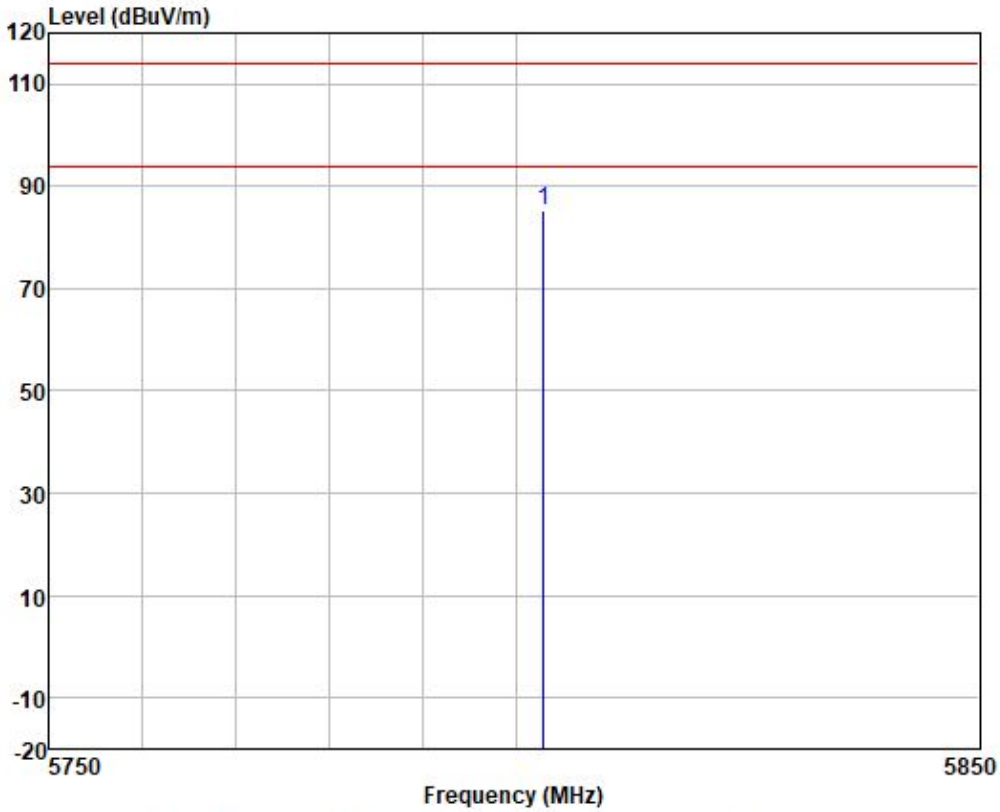
Test Mode: 00; Polarity: Horizontal; Channel:middle



	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	5803.000	84.05	32.67	5.34	36.79	85.27	114.00	-28.73	HORIZONTAL	Peak

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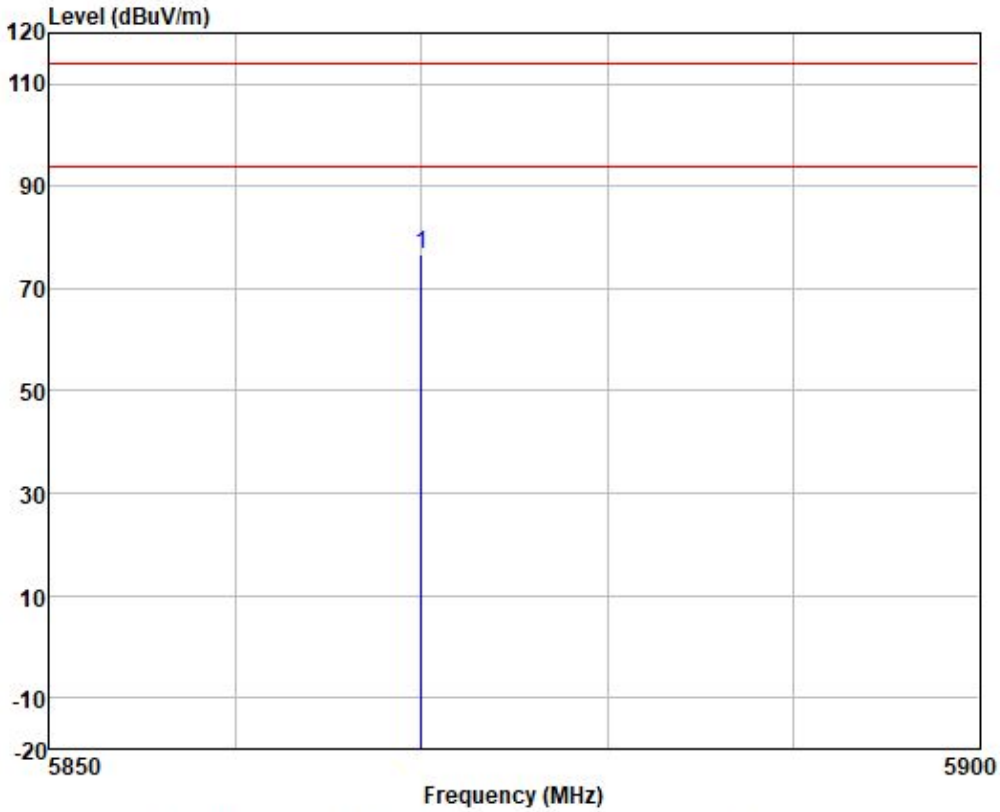
Test Mode: 00; Polarity: Vertical; Channel:High



	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	5870.000	75.47	32.68	5.38	36.79	76.74	114.00	-37.26	VERTICAL	Peak

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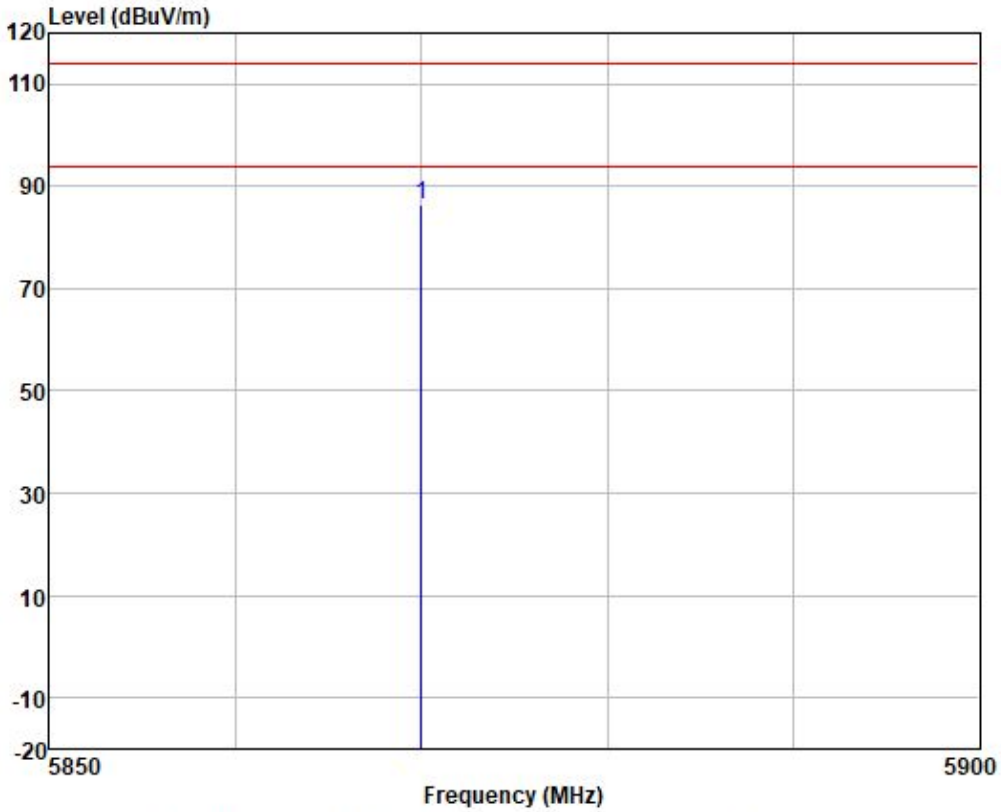
Test Mode: 00; Polarity: Horizontal; Channel:High



	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	5870.000	85.09	32.68	5.38	36.79	86.36	114.00	-27.64	HORIZONTAL	Peak

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7.2 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

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.		

7.2.1 E.U.T. Operation

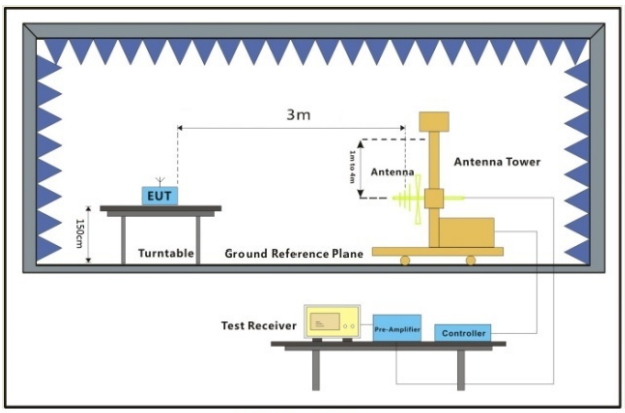
Operating Environment:

Temperature: 25.7 °C Humidity: 59.2 % RH Atmospheric Pressure: 1005 mbar

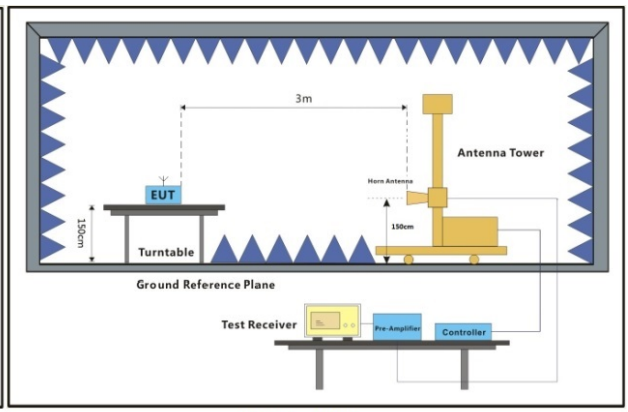
7.2.2 Test Mode Description

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

7.2.3 Test Setup Diagram



30MHz-1GHz



Above 1GHz

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7.2.4 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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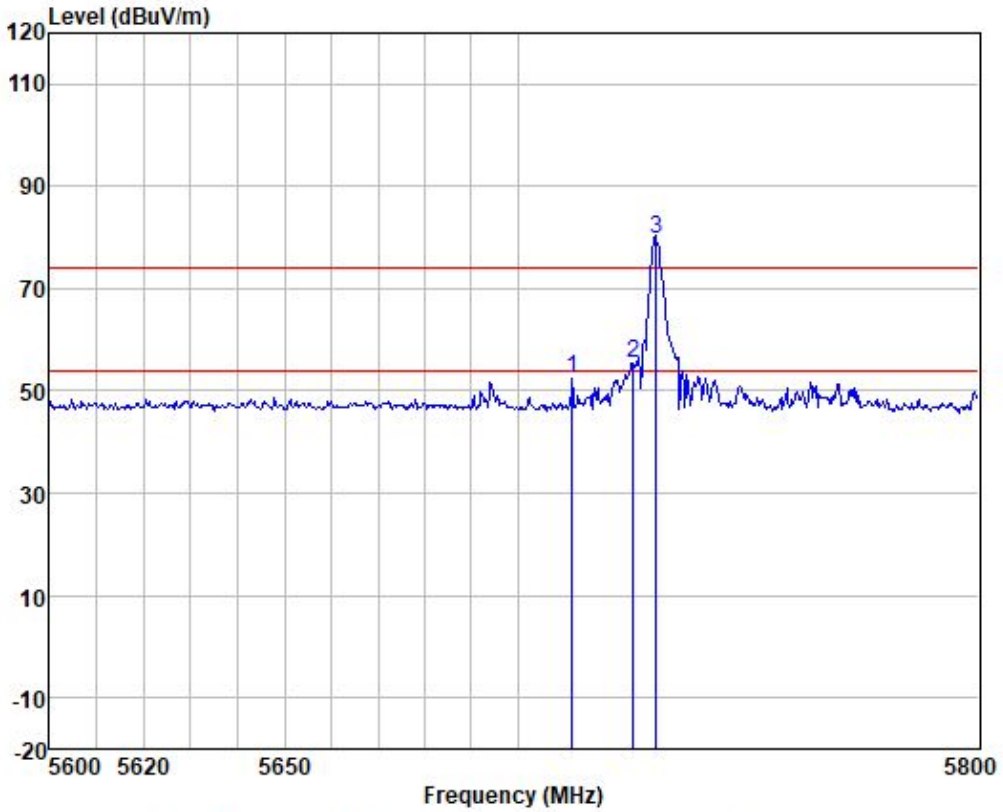
Test Mode: 00; Polarity: Vertical; Modulation:GFSK; Channel:Low



	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	5711.736	51.17	32.65	5.27	36.78	52.31	74.00	-21.69	VERTICAL	peak
2	5725.000	54.15	32.65	5.29	36.78	55.31	74.00	-18.69	VERTICAL	peak
3 *	5730.000	78.51	32.65	5.29	36.78	79.67	74.00	5.67	VERTICAL	peak

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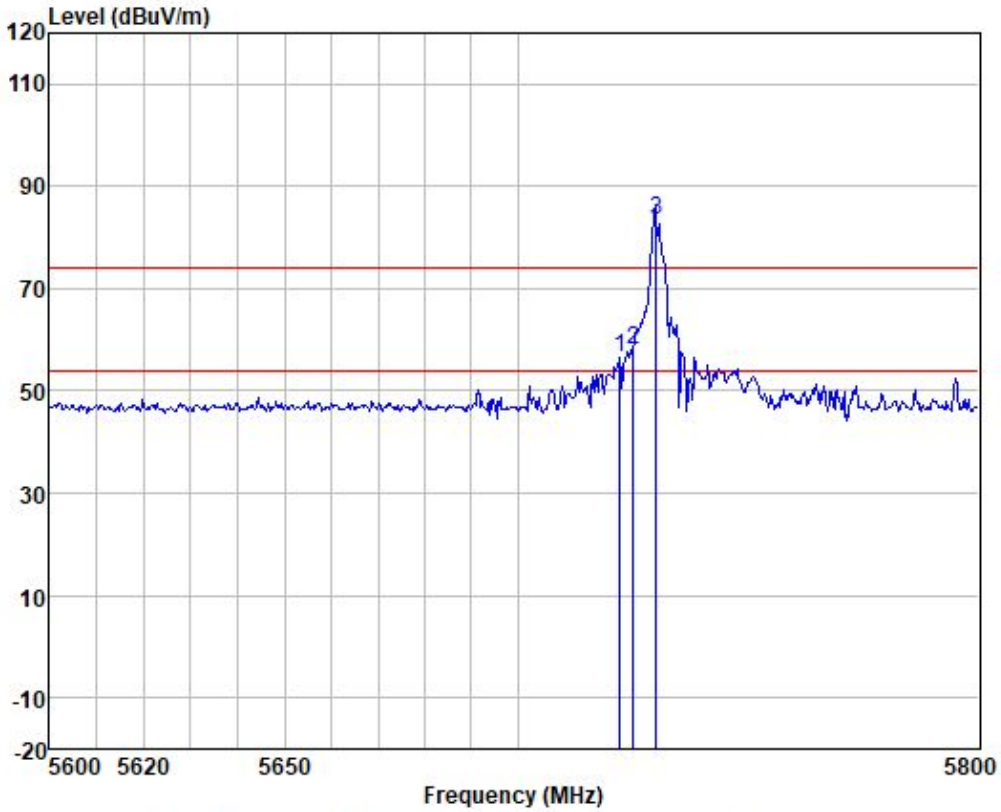
Test Mode: 00; Polarity: Horizontal; Modulation:GFSK; Channel:Low



		Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
		MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1		5722.168	55.45	32.65	5.29	36.78	56.61	74.00	-17.39	HORIZONTAL	peak
2		5725.000	56.76	32.65	5.29	36.78	57.92	74.00	-16.08	HORIZONTAL	peak
3	*	5730.000	82.38	32.65	5.29	36.78	83.54	74.00	9.54	HORIZONTAL	peak

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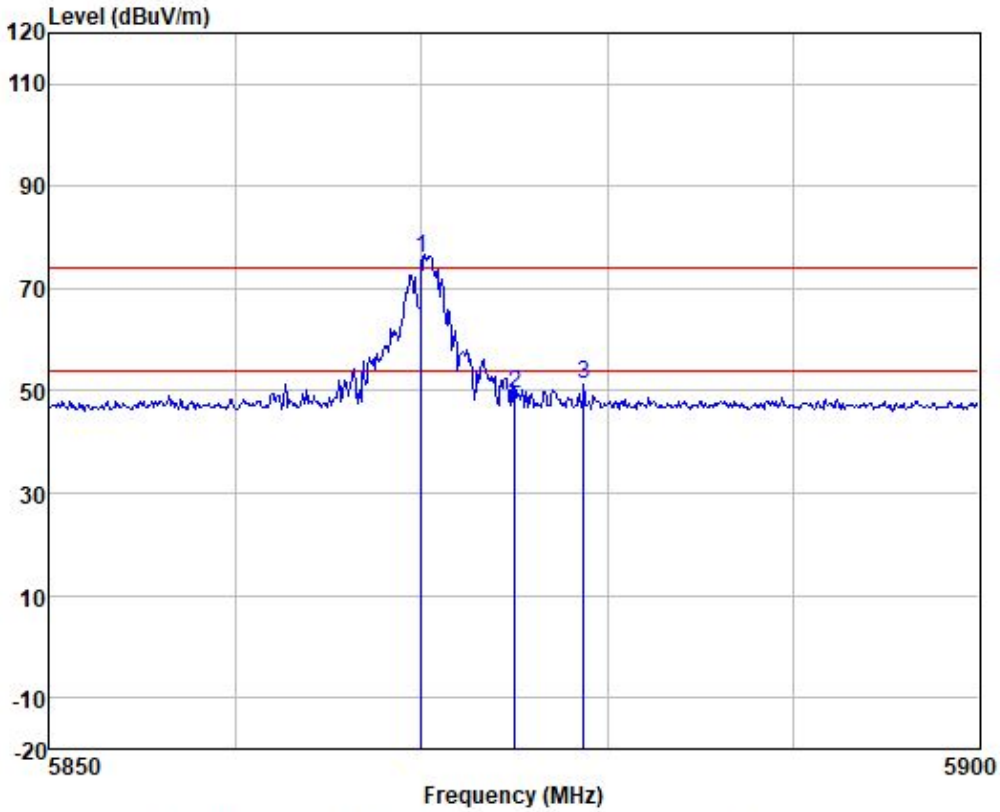
Test Mode: 00; Polarity: Vertical; Modulation:GFSK; Channel:High



	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1 *	5870.000	74.85	32.68	5.38	36.79	76.12	74.00	2.12	VERTICAL	peak
2	5875.000	48.21	32.68	5.39	36.79	49.49	74.00	-24.51	VERTICAL	peak
3	5878.748	49.85	32.68	5.39	36.79	51.13	74.00	-22.87	VERTICAL	peak

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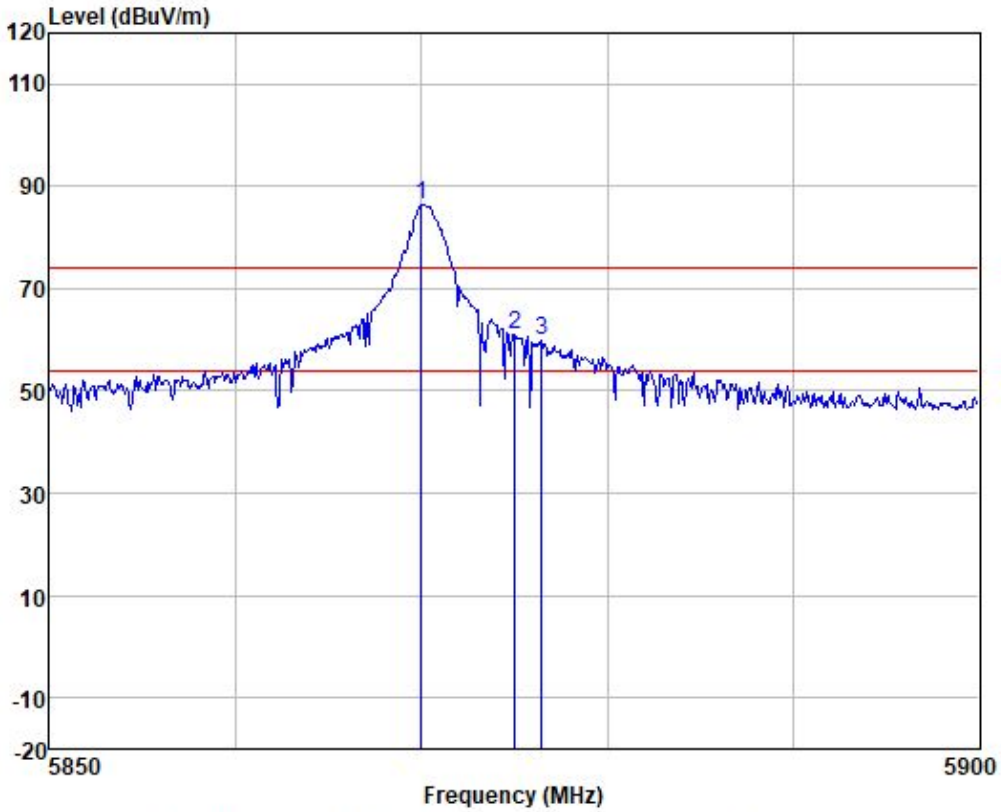
Test Mode: 00; Polarity: Horizontal; Modulation:GFSK; Channel:High



	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1 *	5870.000	85.05	32.68	5.38	36.79	86.32	74.00	12.32	HORIZONTAL	peak
2	5875.000	59.78	32.68	5.39	36.79	61.06	74.00	-12.94	HORIZONTAL	peak
3	5876.447	58.55	32.68	5.39	36.79	59.83	74.00	-14.17	HORIZONTAL	peak

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7.3 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

Limit:

Test Distance: 3 m

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

7.3.1 E.U.T. Operation

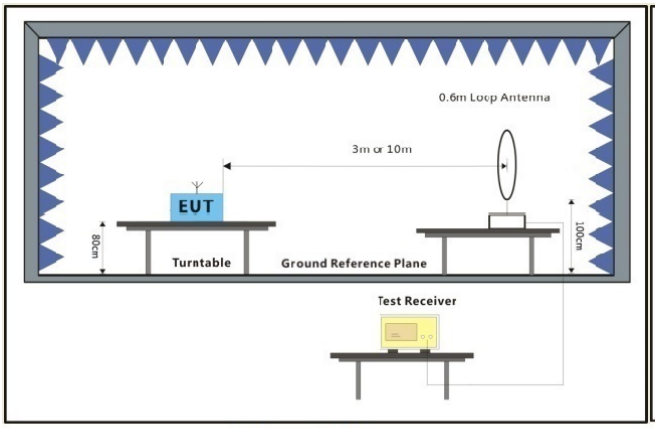
Operating Environment:

Temperature: 23.3 °C Humidity: 53.1 % RH Atmospheric Pressure: 1005 mbar

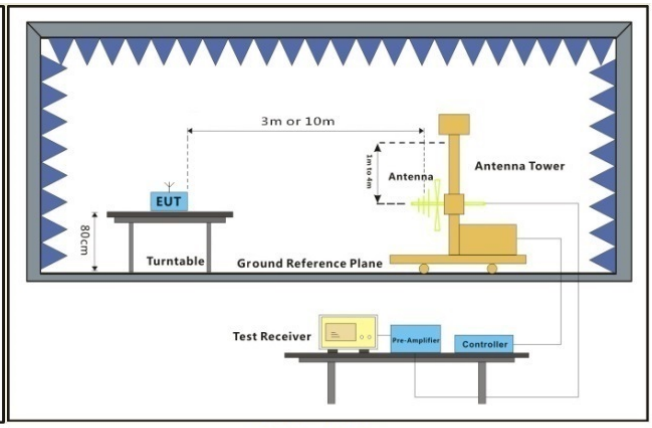
7.3.2 Test Mode Description

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

7.3.3 Test Setup Diagram



Below 30MHz



30MHz-1GHz

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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 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.

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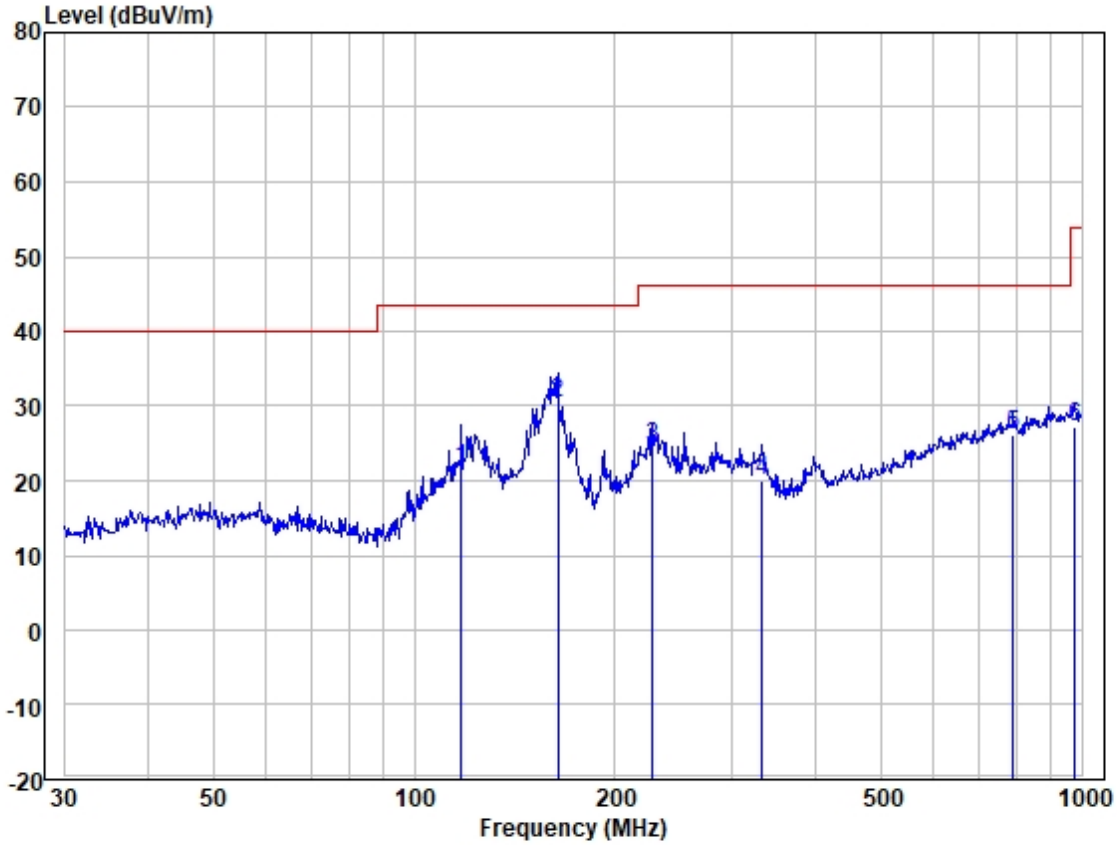
Test Mode: 00; Polarity: Horizontal



Site : 966 Chamber
Job :
Model :
Power :
Test Mode :

	Freq	Read Level	Anterna Factor	Cable Loss	Preamp Factor	Measured Level	Limit Line	Over Limit	Pol/ Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	117.773	36.77	16.94	0.60	32.80	21.51	43.52	-22.01	HORIZONTAL	QP
2	164.330	43.52	19.08	0.71	32.83	30.48	43.52	-13.04	HORIZONTAL	QP
3	227.691	40.51	16.13	0.82	32.85	24.61	46.02	-21.41	HORIZONTAL	QP
4	332.519	31.57	20.20	1.02	32.89	19.90	46.02	-26.12	HORIZONTAL	QP
5	787.851	28.60	28.39	1.65	32.44	26.20	46.02	-19.82	HORIZONTAL	QP
6	975.753	27.17	29.89	1.83	31.68	27.21	53.98	-26.77	HORIZONTAL	QP

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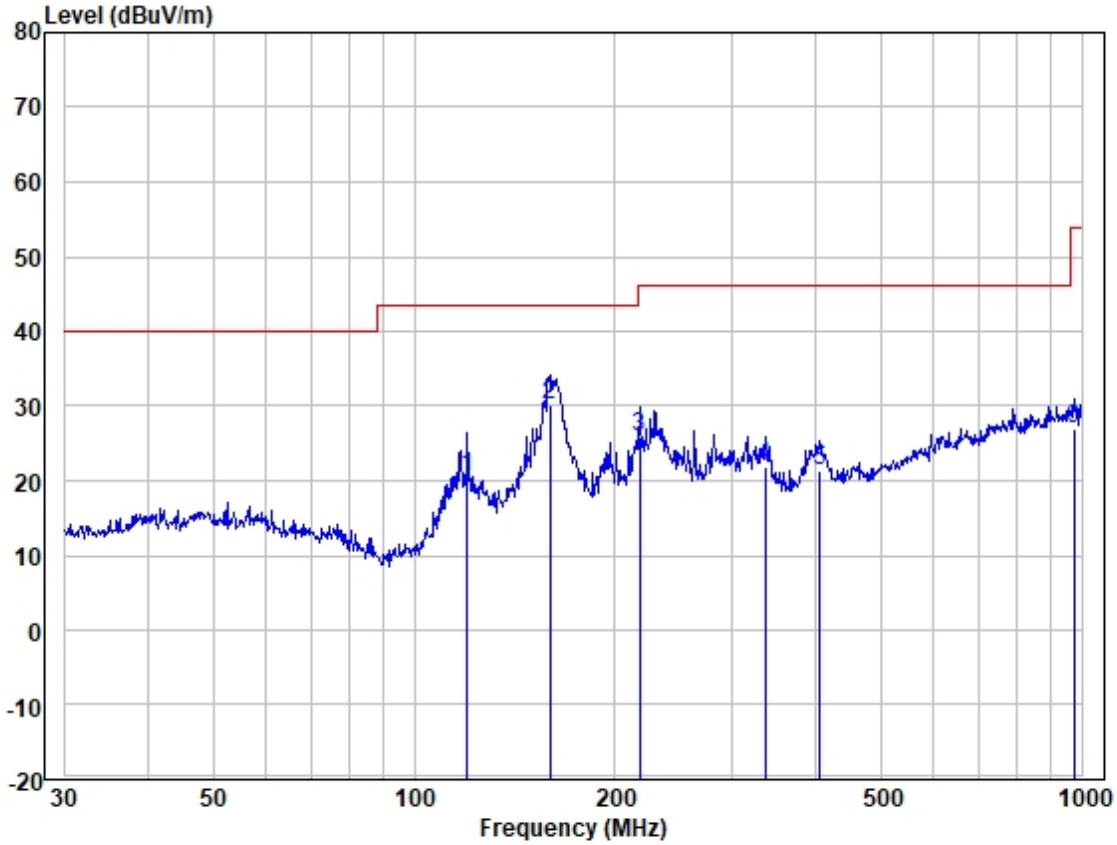
Test Mode: 00; Polarity: Vertical



Site : 966 Chamber
Job :
Model :
Power :
Test Mode :

	Freq	Read Level	Anterna Factor	Cable Loss	Preamp Factor	Measured Level	Limit Line	Over Limit	Pol/ Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	120.277	35.47	17.26	0.60	32.80	20.53	43.52	-22.99	VERTICAL	QP
2	159.784	42.93	19.21	0.70	32.83	30.01	43.52	-13.51	VERTICAL	QP
3	217.544	42.27	15.66	0.81	32.84	25.90	46.02	-20.12	VERTICAL	QP
4	336.035	33.51	20.22	1.03	32.89	21.87	46.02	-24.15	VERTICAL	QP
5	404.667	31.37	21.64	1.16	32.94	21.23	46.02	-24.79	VERTICAL	QP
6	972.337	26.96	29.82	1.83	31.69	26.92	53.98	-27.06	VERTICAL	QP

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7.4 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

Limit:

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

7.4.1 E.U.T. Operation

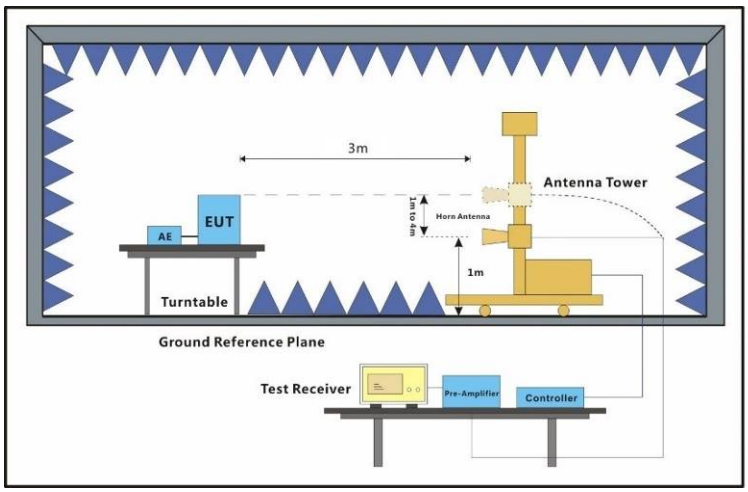
Operating Environment:

Temperature: 25.7 °C Humidity: 59.2 % RH Atmospheric Pressure: 1005 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.

7.4.3 Test Setup Diagram



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7.4.4 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.

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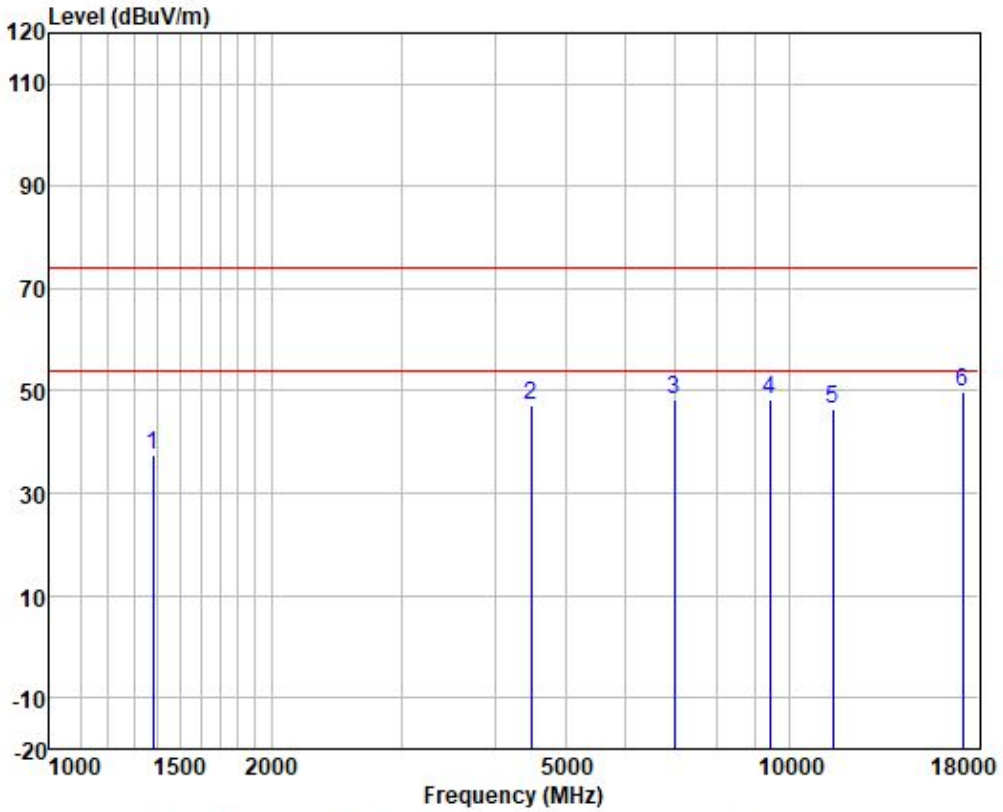
Test Mode: 00; Polarity: Vertical; Channel:Low



	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	1382.262	48.22	24.22	2.65	37.57	37.52	74.00	-36.48	VERTICAL	peak
2	4482.150	45.11	34.12	4.62	36.63	47.22	74.00	-26.78	VERTICAL	peak
3	6995.172	44.37	35.11	5.87	36.89	48.46	74.00	-25.54	VERTICAL	peak
4	9420.880	39.86	38.47	6.94	36.84	48.43	74.00	-25.57	VERTICAL	Peak
5	11460.000	35.06	40.26	7.62	36.64	46.30	74.00	-27.70	VERTICAL	peak
6	17190.000	34.14	42.28	9.48	36.10	49.80	74.00	-24.20	VERTICAL	peak

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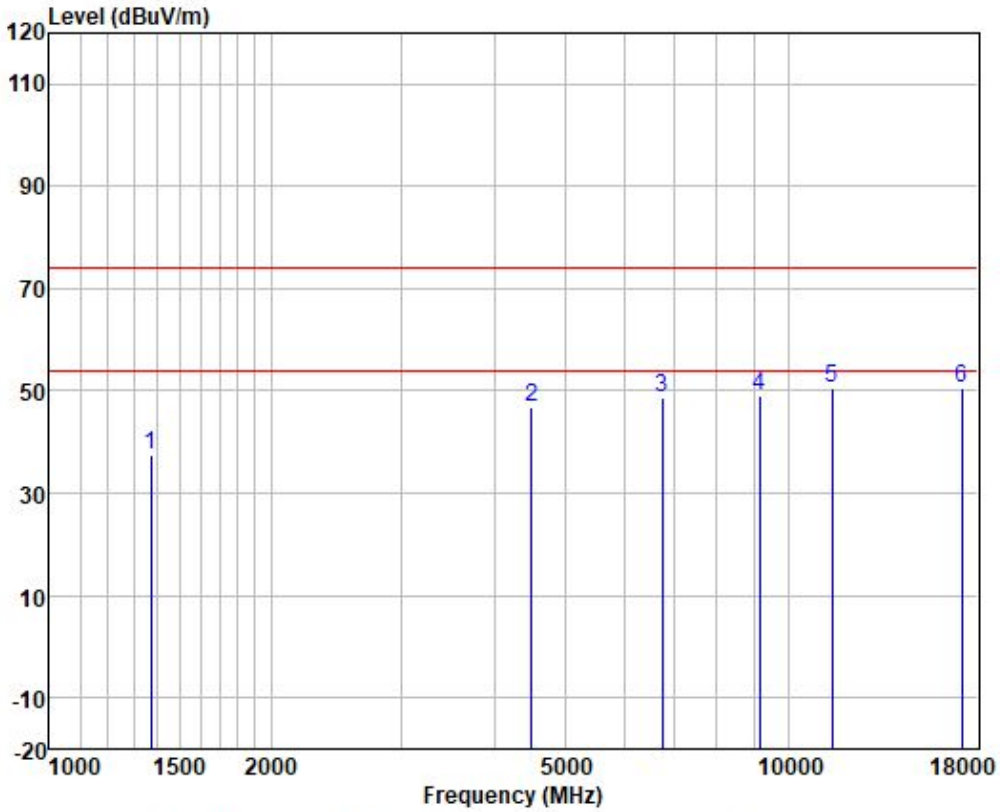
Test Mode: 00; Polarity: Horizontal; Channel:Low



	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	1374.295	48.39	24.20	2.64	37.57	37.66	74.00	-36.34	HORIZONTAL	peak
2	4495.125	44.60	34.17	4.62	36.63	46.76	74.00	-27.24	HORIZONTAL	peak
3	6756.708	45.29	34.56	5.77	36.86	48.76	74.00	-25.24	HORIZONTAL	peak
4	9152.479	41.36	37.85	6.68	36.87	49.02	74.00	-24.98	HORIZONTAL	Peak
5	11460.000	39.15	40.26	7.62	36.64	50.39	74.00	-23.61	HORIZONTAL	peak
6	17190.000	34.76	42.28	9.48	36.10	50.42	74.00	-23.58	HORIZONTAL	peak

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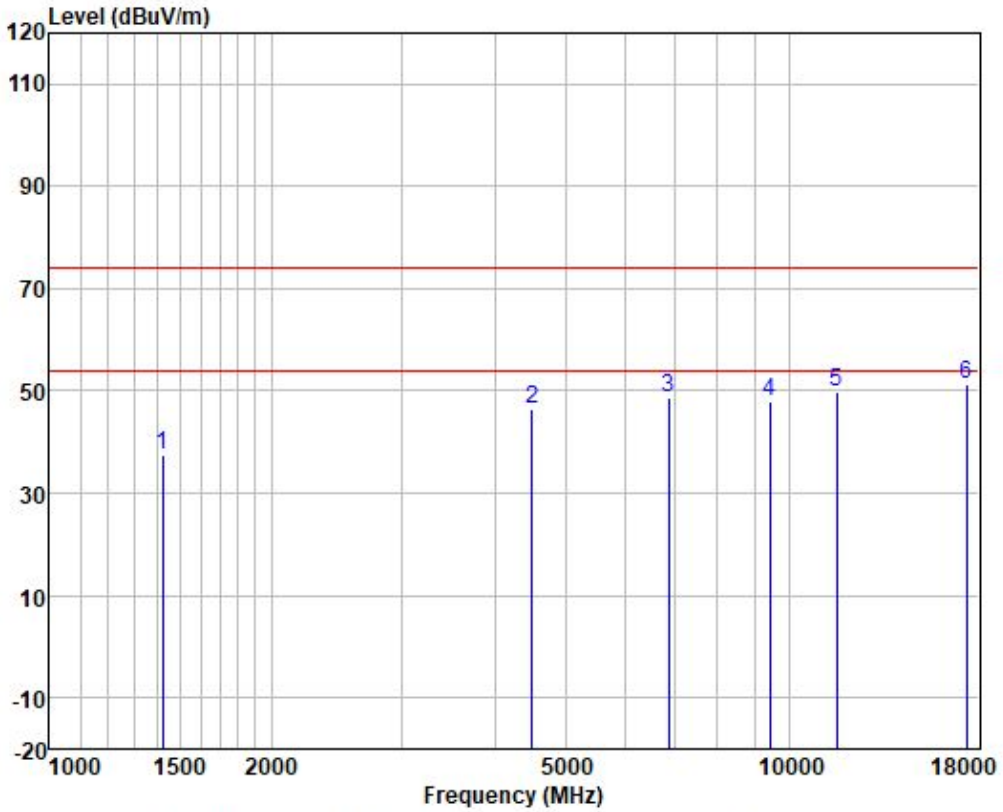
Test Mode: 00; Polarity: Vertical; Channel:middle



	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	1422.798	48.07	24.31	2.67	37.55	37.50	74.00	-36.50	VERTICAL	peak
2	4495.125	44.44	34.17	4.62	36.63	46.60	74.00	-27.40	VERTICAL	peak
3	6874.906	44.74	34.88	5.83	36.87	48.58	74.00	-25.42	VERTICAL	peak
4	9420.880	39.22	38.47	6.94	36.84	47.79	74.00	-26.21	VERTICAL	Peak
5	11606.000	38.72	40.01	7.65	36.62	49.76	74.00	-24.24	VERTICAL	peak
6	17409.000	34.60	43.10	9.55	35.99	51.26	74.00	-22.74	VERTICAL	peak

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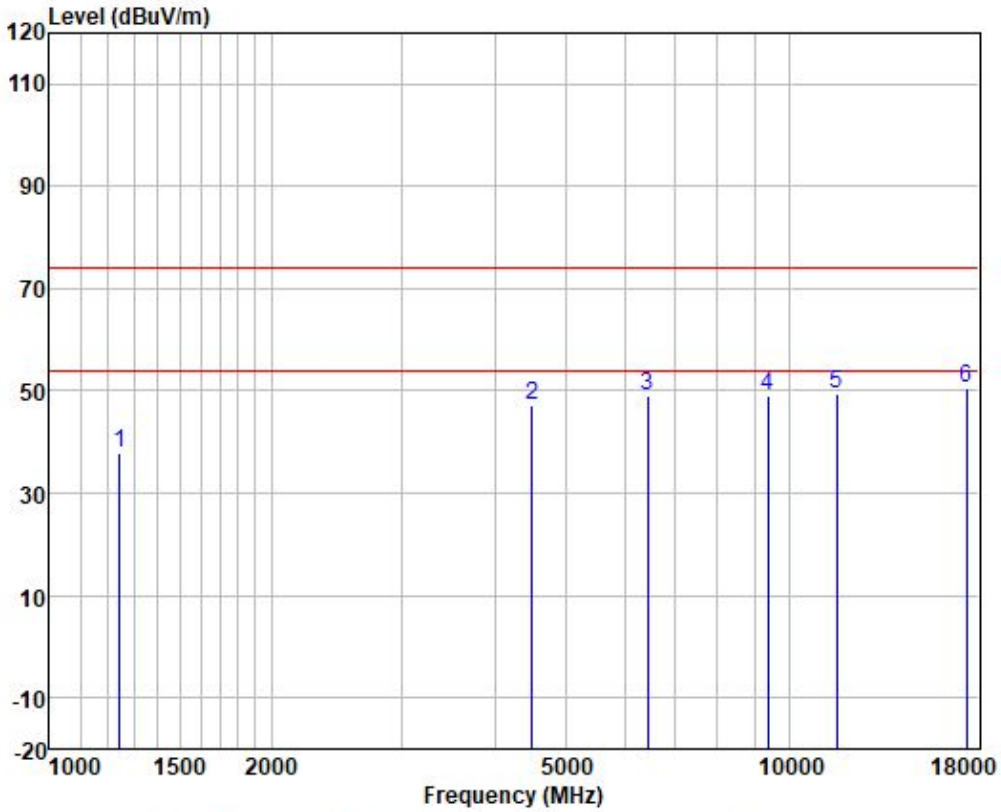
Test Mode: 00; Polarity: Horizontal; Channel:middle



	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	1245.663	49.22	23.65	2.51	37.63	37.75	74.00	-36.25	HORIZONTAL	peak
2	4495.125	44.87	34.17	4.62	36.63	47.03	74.00	-26.97	HORIZONTAL	peak
3	6451.353	46.32	33.78	5.63	36.83	48.90	74.00	-25.10	HORIZONTAL	peak
4	9366.577	40.79	38.37	6.90	36.84	49.22	74.00	-24.78	HORIZONTAL	Peak
5	11606.000	38.38	40.01	7.65	36.62	49.42	74.00	-24.58	HORIZONTAL	peak
6	17409.000	33.79	43.10	9.55	35.99	50.45	74.00	-23.55	HORIZONTAL	peak

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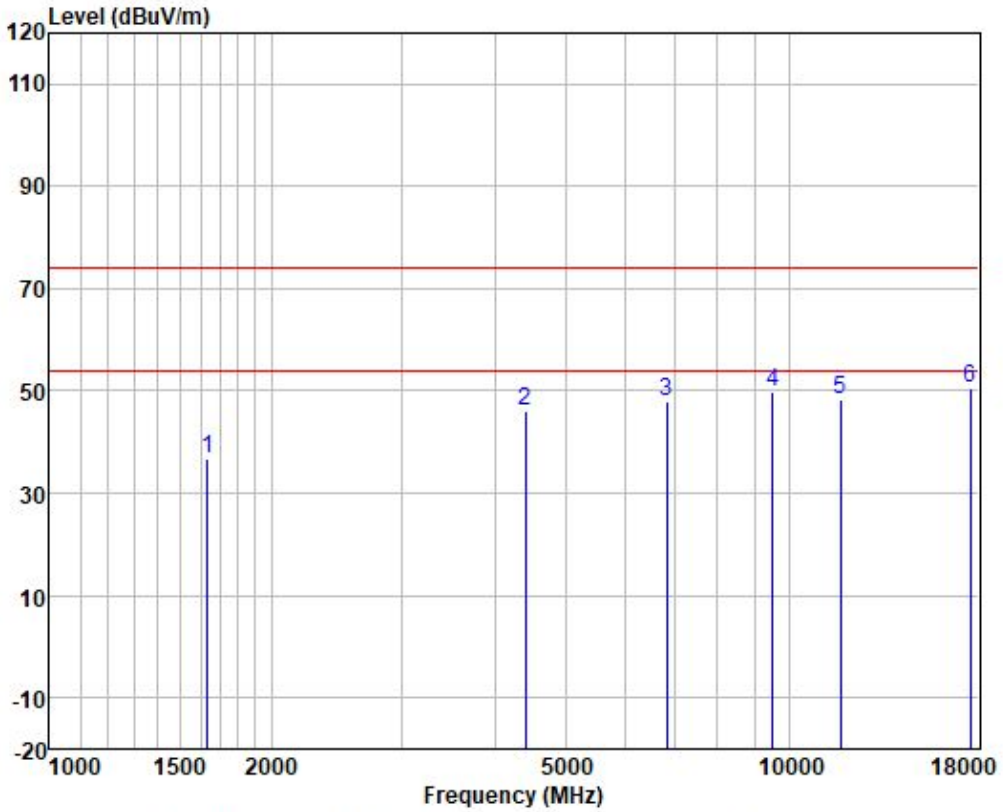
Test Mode: 00; Polarity: Vertical; Channel:High



	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	1634.543	46.46	24.81	2.78	37.42	36.63	74.00	-37.37	VERTICAL	peak
2	4405.090	44.36	33.74	4.61	36.62	46.09	74.00	-27.91	VERTICAL	peak
3	6835.278	44.15	34.79	5.81	36.87	47.88	74.00	-26.12	VERTICAL	peak
4	9502.925	41.02	38.61	7.00	36.83	49.80	74.00	-24.20	VERTICAL	Peak
5	11740.000	37.69	39.58	7.68	36.61	48.34	74.00	-25.66	VERTICAL	peak
6	17610.000	32.30	44.45	9.62	35.91	50.46	74.00	-23.54	VERTICAL	peak

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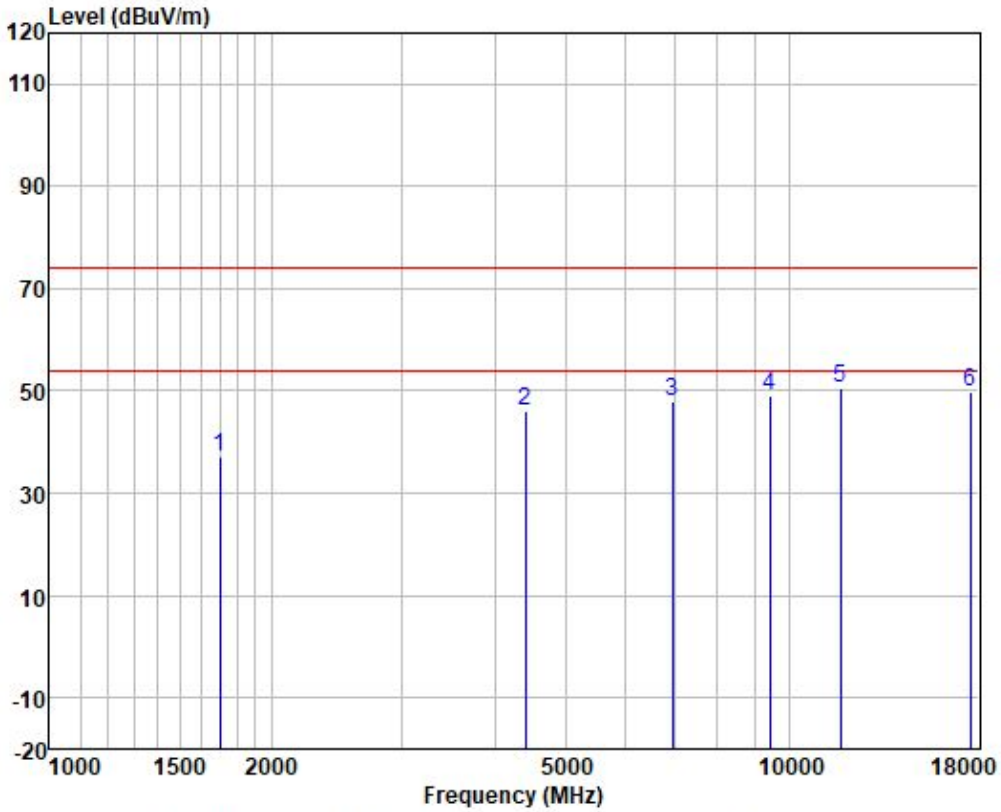
Test Mode: 00; Polarity: Horizontal; Channel:High



	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	1702.042	46.60	25.15	2.85	37.39	37.21	74.00	-36.79	HORIZONTAL	peak
2	4405.090	44.39	33.74	4.61	36.62	46.12	74.00	-27.88	HORIZONTAL	peak
3	6954.852	44.03	35.04	5.86	36.89	48.04	74.00	-25.96	HORIZONTAL	peak
4	9420.880	40.49	38.47	6.94	36.84	49.06	74.00	-24.94	HORIZONTAL	Peak
5	11740.000	39.87	39.58	7.68	36.61	50.52	74.00	-23.48	HORIZONTAL	peak
6	17610.000	31.58	44.45	9.62	35.91	49.74	74.00	-24.26	HORIZONTAL	peak

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7.5 20dB Bandwidth

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

7.5.1 E.U.T. Operation

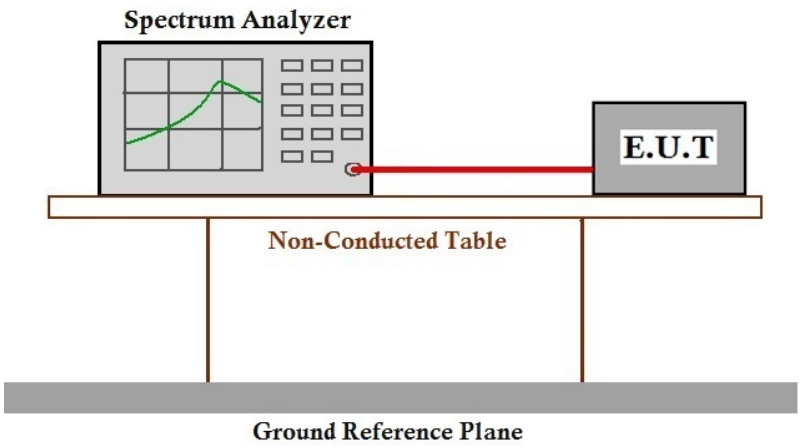
Operating Environment:

Temperature: 22.9 °C Humidity: 60.9 % RH Atmospheric Pressure: 1013 mbar

7.5.2 Test Mode Description

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

7.5.3 Test Setup Diagram



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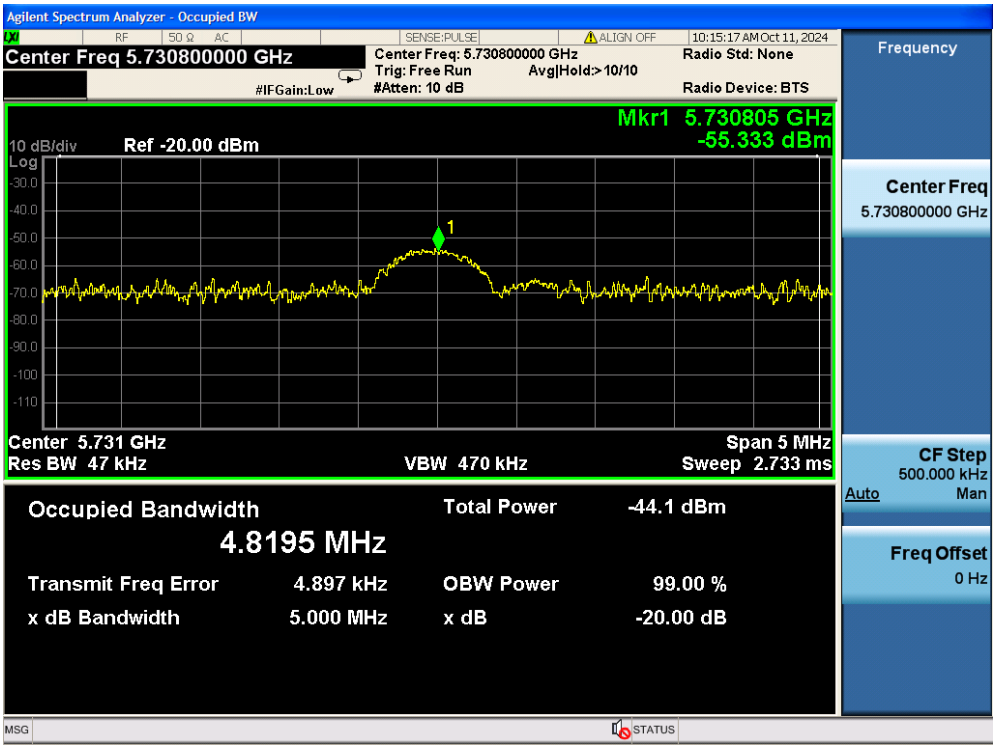
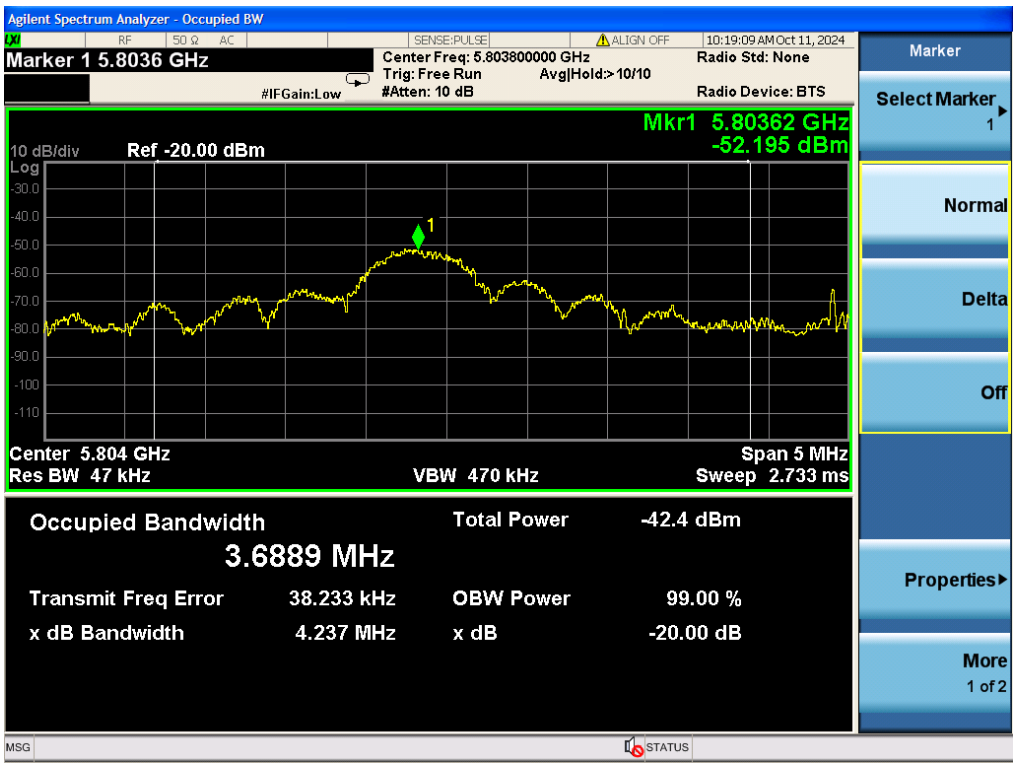
7.5.4 Measurement Procedure and Data

5730MHz



5800MHz



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5870MHz

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8 Test Setup Photo

Refer to Appendix - Test Setup Photo for GZCR240800101502

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9 EUT Constructional Details (EUT Photos)

Refer to External and Internal Photos for GZCR2408001015AT

- End of the Report -

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