

TEST REPORT

Application No.: SZCR2503001189AT
Applicant: Ommo Technologies, Inc.
Address of Applicant: 3330 Keller Springs Rd., Ste 205, Carrollton, TX 75006
Manufacturer: Ommo Technologies, Inc.
Address of Manufacturer: 3330 Keller Springs Rd., Ste 205, Carrollton, TX 75006
Factory: HUIZHOU SANHUA INDUSTRIAL CO., LTD
Address of Factory: One 14, Huizhou Zhongkai Hi-tech Development Zone, Huizhou, 516006, Guangdong, China

Equipment Under Test (EUT):

EUT Name: AXON Sensors and SIUs
Model No.: 13541, AXON 3 PORT SIU - 3.0; 13540, AXON 3 PORT SIU - 1.0 ♣
 ♣ Please refer to section 2 of this report which indicates which model was actually tested and which were electrically identical.
Trade Mark: Ommo
FCC ID: 2BGMI13541
Standard(s) : 47 CFR Part 15, Subpart C 15.249
Date of Receipt: 2025-03-27
Date of Test: 2025-04-01 to 2025-04-07
Date of Issue: 2025-04-13

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

Keny Xu

Keny Xu
EMC Laboratory Manager



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

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Revision Record				
Version	Chapter	Date	Modifier	Remark
01		2025-04-13		Original

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

Declaration of EUT Family Grouping:

Model No.: 13541, AXON 3 PORT SIU - 3.0; 13540, AXON 3 PORT SIU - 1.0

Only the model 13541, AXON 3 PORT SIU - 3.0 was tested, since according to the declaration from the applicant, the electrical circuit design, PCB layout, components used and internal wiring and functions were identical for the above models, with only difference on model No., and cable length.

Here are its detailed differences:

SIU's Model	SIU's Name	Cable Length	Port number(device connection)
13541	AXON 3 PORT SIU - 3.0	3m	3 port
13540	AXON 3 PORT SIU - 1.0	1m	3 port

In addition, the AXON SIUs will be paired with different sensors with the following differences:

Sensor's Model	Name	Cable Length	High performance Magnetometers
13536	AX1-1.5 SINGLE MAG SENSOR DEVICE	1.5m	1pc
13537	AX2-1.5 DUAL MAG SENSOR DEVICE	1.5m	2pc
13538	AX2-3.0 DUAL MAG SENSOR DEVICE	3m	2pc



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4 General Information

4.1 Details of E.U.T.

Power supply:	DC 5V powered by USB port
Operation Frequency:	2402MHz - 2480MHz
Modulation Type:	GFSK
Number of Channels:	40
Channel Spacing:	2MHz
Antenna Type:	Chip Antenna
Antenna Gain:	2.72dBi

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.

Operation Frequency each of channel							
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	2402	11	2422	21	2442	31	2462
2	2404	12	2424	22	2444	32	2464
3	2406	13	2426	23	2446	33	2466
4	2408	14	2428	24	2448	34	2468
5	2410	15	2430	25	2450	35	2470
6	2412	16	2432	26	2452	36	2472
7	2414	17	2434	27	2454	37	2474
8	2416	18	2436	28	2456	38	2476
9	2418	19	2438	29	2458	39	2478
10	2420	20	2440	30	2460	40	2480

Using test software was control EUT work in continuous transmitter and receiver mode. and select test channel as below:

Channel	Frequency
The Lowest channel(CH1)	2402MHz
The Middle channel(CH20)	2440MHz
The Highest channel(CH40)	2480MHz



4.2 Description of Support Units

Description	Manufacturer	Model No.	Serial No.
Laptop	Lenovo	R14	PF-3V0M64
Base station	Provided by client	/	/
AX2-3.0 DUAL MAG SENSOR DEVICE	Provided by client	13558	/
RF Cable	SGS	N/A(cable loss:0.6dB)	N/A

4.3 Measurement Uncertainty

Test Item	Measurement Uncertainty
Conducted Emissions at AC Power Line (150kHz-30MHz)	$\pm 3.1\text{dB}$
Field Strength of the Fundamental Signal (15.249(a))	$\pm 4.5\text{dB}$ (Below 1GHz); $\pm 4.8\text{dB}$ (Above 1GHz)
Restricted Band Around Fundamental Frequency	$\pm 6.0\text{dB}$ (Below 1GHz); $\pm 4.6\text{dB}$ (Above 1GHz)
Radiated Emissions Below 1GHz	$\pm 6.0\text{dB}$ for 3m; $\pm 5.0\text{dB}$ for 10m
Radiated Emissions Above 1GHz	$\pm 4.6\text{dB}$ (1GHz-18GHz); $\pm 4.8\text{dB}$ (18MHz-40GHz)
20dB Bandwidth	$\pm 3\%$

Remark:

The U_{lab} (lab Uncertainty) is less than $U_{\text{CISPR/ETSI}}$ (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:

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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:

• 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 (Member No. 1937)

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

• FCC –Designation Number: CN1336

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

Designation Number: CN1336. Test Firm Registration Number: 787754.

• Innovation, Science and Economic Development Canada

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

CAB identifier: CN0006.

IC#: 4620C.

4.6 Deviation from Standards

None

4.7 Abnormalities from Standard Conditions

None



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5 Equipment List

Conducted Emissions at AC Power Line (150kHz-30MHz)					
Equipment	Manufacturer	Model No.	Inventory No.	Cal Date	Cal Due Date
Shielding Room	ZhongYu Electron	GB-88	SEM001-06	2022-05-14	2025-05-13
EMI Test Receiver	Rohde&Schwarz	ESR	SZ-WRG-M-047	2025-01-08	2026-01-07
Measurement Software	AUDIX	e3 V8.2014-6-27a	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM024-01	2024-07-06	2025-07-05
LISN	Rohde&Schwarz	ENV216	SEM007-01	2024-08-15	2025-08-14
LISN	ETS-LINDGREN	3816/2	SEM007-02	2025-03-03	2026-03-02

Field Strength of the Fundamental Signal (15.249(a))					
Equipment	Manufacturer	Model No.	Inventory No.	Cal Date	Cal Due Date
3m Fully-Anechoic Chamber	AUDIX	N/A	SEM001-02	2024-05-11	2027-05-10
Signal Analyzer	Rohde & Schwarz	FSV40	SEM008-04	2025-03-04	2026-03-03
Horn Antenna	Rohde&Schwarz	HF907	SEM003-07	2023-07-23	2025-07-22
Microwave system amplifier	Agilent	83017A	SEM005-25	2024-09-14	2025-09-13
Measurement Software	AUDIX	e3 V8.2014-6-27	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM026-01	2024-07-06	2025-07-05

Restricted Band Around Fundamental Frequency					
Equipment	Manufacturer	Model No.	Inventory No.	Cal Date	Cal Due Date
3m Fully-Anechoic Chamber	AUDIX	N/A	SEM001-02	2024-05-11	2027-05-10
Signal Analyzer	Rohde & Schwarz	FSV40	SEM008-04	2025-03-04	2026-03-03
Horn Antenna	Rohde&Schwarz	HF907	SEM003-07	2023-07-23	2025-07-22
Microwave system amplifier	Agilent	83017A	SEM005-25	2024-09-14	2025-09-13
Measurement Software	AUDIX	e3 V8.2014-6-27	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM026-01	2024-07-06	2025-07-05
Broad-Band Horn Antenna	Schwarzbeck	BBHA 9170	SEM003-15	2024-08-10	2025-08-09
Pre-Amplifier	Compliance Directions Systems Inc.	PAP-2640-50	SEM005-08	2025-03-21	2026-03-20



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Radiated Emissions Below 1GHz					
Equipment	Manufacturer	Model No.	Inventory No.	Cal Date	Cal Due Date
Loop Antenna	ETS-Lindgren	6502	SEM003-08	2023-11-20	2025-11-19
3m Semi-Anechoic Chamber	ETS-LINDGREN	N/A	SEM001-01	2023-06-19	2026-06-18
MXE EMI Receiver	Agilent Technologies	N9038A	SEM004-15	2024-08-14	2025-08-13
BiConiLog Antenna	ETS-LINDGREN	3142C	SEM003-01	2023-09-16	2025-09-15
Pre-Amplifier	Agilent Technologies	8447D	SEM005-01	2025-03-04	2026-03-03
Measurement Software	AUDIX	e3 V8.2014-6-27	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM025-01	2024-07-06	2025-07-05

Radiated Emissions Above 1GHz					
Equipment	Manufacturer	Model No.	Inventory No.	Cal Date	Cal Due Date
3m Fully-Anechoic Chamber	AUDIX	N/A	SEM001-02	2024-05-11	2027-05-10
Signal Analyzer	Rohde & Schwarz	FSV40	SEM008-04	2025-03-04	2026-03-03
Horn Antenna	Rohde&Schwarz	HF907	SEM003-07	2023-07-23	2025-07-22
Microwave system amplifier	Agilent	83017A	SEM005-25	2024-09-14	2025-09-13
Measurement Software	AUDIX	e3 V8.2014-6-27	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM026-01	2024-07-06	2025-07-05

RF Conducted Test					
Equipment	Manufacturer	Model No.	Inventory No.	Cal Date	Cal Due Date
DC Power Supply	Chroma	62012P-80-60	SEM011-11	2024-08-14	2025-08-13
MXA Signal Analyzer	KEYSIGHT	N9020A	SEM004-19	2025-03-04	2026-03-03
Measurement Software	TST PASS	TST PASS V2.0	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM031-01	2024-07-06	2025-07-05
Attenuator	Huber+Suhner	6620_SMA-50-1	SEM021-09	2025-03-03	2026-03-02
Programmable Temperature & Humidity Chamber	Votsch Industrietechnik GmbH	VT 4002	SEM002-15	2025-02-26	2026-02-25



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General used equipment					
Equipment	Manufacturer	Model No.	Inventory No.	Cal Date	Cal Due Date
Humidity/ Temperature Indicator	deli	8838	SEM002-32	2024-07-24	2025-07-23
Humidity/ Temperature Indicator	deli	8838	SEM002-33	2024-07-24	2025-07-23
Barometer	Changchun Meteorological Industry Factory	DYM3	SEM002-01	2025-03-03	2026-03-02



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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 2.72dBi.

Antenna location: Refer to Internal photos



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: 22.0 °C

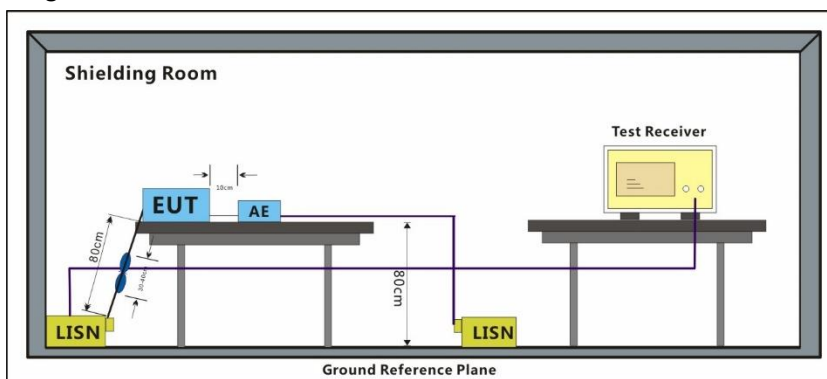
Humidity: 49.7 % RH

Atmospheric Pressure: 1020 mbar

7.1.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	02	TX mode_Keep the EUT in transmitting with modulation mode.

7.1.3 Test Setup Diagram



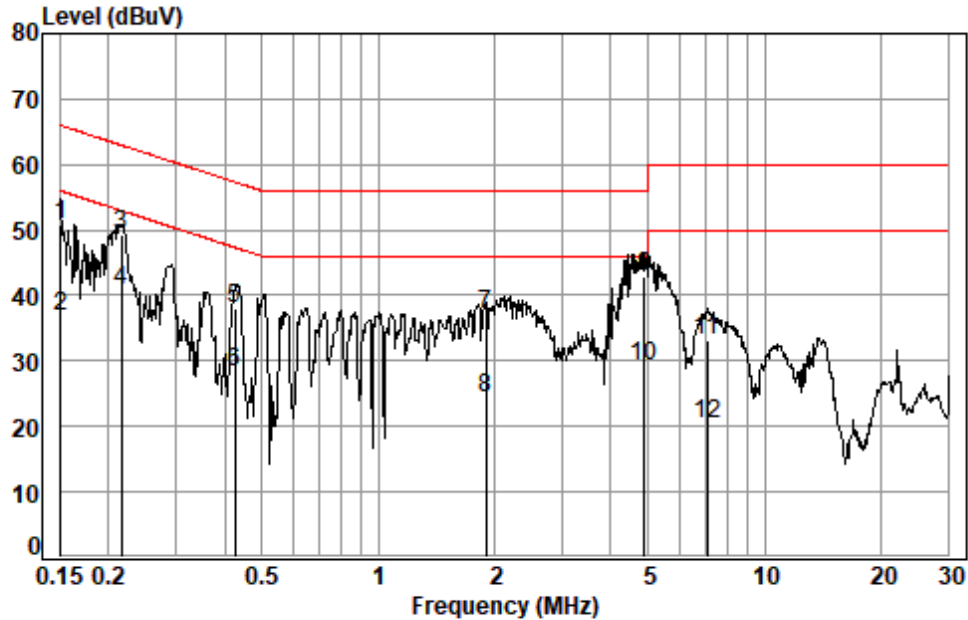
7.1.4 Measurement Procedure and Data

- 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



Test Mode: 02; Line: Live line



Site : Shielding Room
Condition: Line
Job No. : 01189AT
Test mode: 02

	Freq	Cable Loss	LISN Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB	dBuV	dBuV	dBuV	dB	
1	0.1508	0.06	10.19	40.52	50.77	65.96	-15.19	QP
2	0.1508	0.06	10.19	26.62	36.87	55.96	-19.09	Average
3	0.2162	0.06	10.07	39.20	49.33	62.96	-13.63	QP
4 *	0.2162	0.06	10.07	30.61	40.74	52.96	-12.22	Average
5	0.4260	0.08	9.64	28.38	38.10	57.33	-19.23	QP
6	0.4260	0.08	9.64	18.47	28.19	47.33	-19.14	Average
7	1.8979	0.10	9.58	27.42	37.10	56.00	-18.90	QP
8	1.8979	0.10	9.58	14.81	24.49	46.00	-21.51	Average
9 *	4.8997	0.12	9.66	33.15	42.93	56.00	-13.07	QP
10	4.8997	0.12	9.66	19.40	29.18	46.00	-16.82	Average
11	7.0997	0.16	9.68	23.17	33.01	60.00	-26.99	QP
12	7.0997	0.16	9.68	10.55	20.39	50.00	-29.61	Average



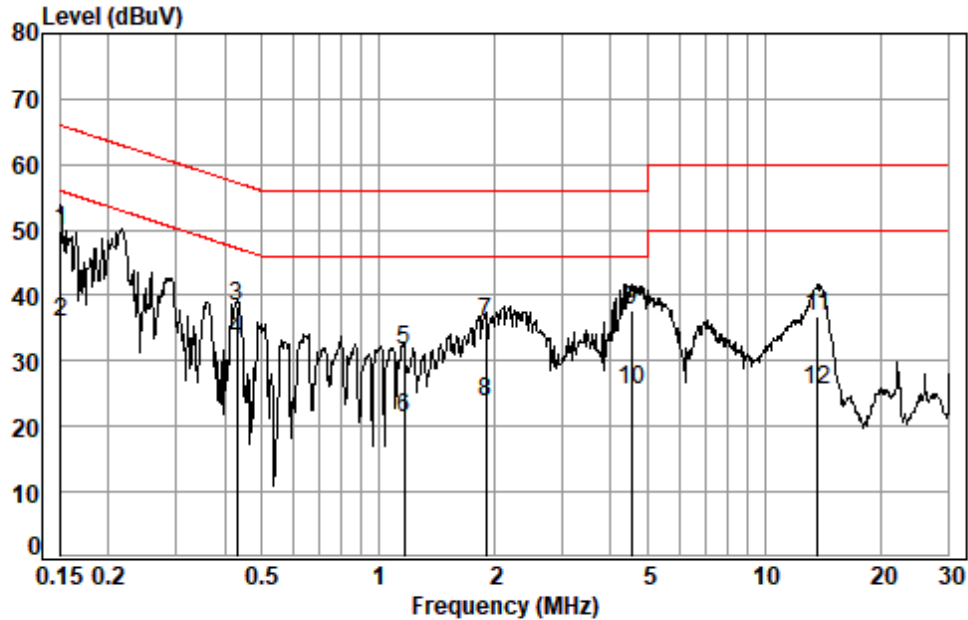
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SZEMC-TRF-01 Rev. A/1

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Test Mode: 02; Line: Neutral Line



Site : Shielding Room
Condition: Neutral
Job No. : 01189AT
Test mode: 02

	Freq	Cable Loss	LISN Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB	dBuV	dBuV	dBuV	dB	
1 *	0.1508	0.06	10.15	39.70	49.91	65.96	-16.05	QP
2	0.1508	0.06	10.15	25.53	35.74	55.96	-20.22	Average
3	0.4305	0.08	9.73	28.41	38.22	57.24	-19.02	QP
4 *	0.4305	0.08	9.73	23.46	33.27	47.24	-13.97	Average
5	1.1657	0.09	9.54	21.88	31.51	56.00	-24.49	QP
6	1.1657	0.09	9.54	11.79	21.42	46.00	-24.58	Average
7	1.8979	0.10	9.55	26.17	35.82	56.00	-20.18	QP
8	1.8979	0.10	9.55	14.09	23.74	46.00	-22.26	Average
9	4.5254	0.12	9.56	27.99	37.67	56.00	-18.33	QP
10	4.5254	0.12	9.56	15.80	25.48	46.00	-20.52	Average
11	13.7680	0.25	9.79	26.66	36.70	60.00	-23.30	QP
12	13.7680	0.25	9.79	15.56	25.60	50.00	-24.40	Average



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中国·广东·深圳市南山区科技园中区M-10栋1号厂房 邮编: 518057 t (86-755) 26012053 f (86-755) 26710594 sgs.china@sgs.com

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

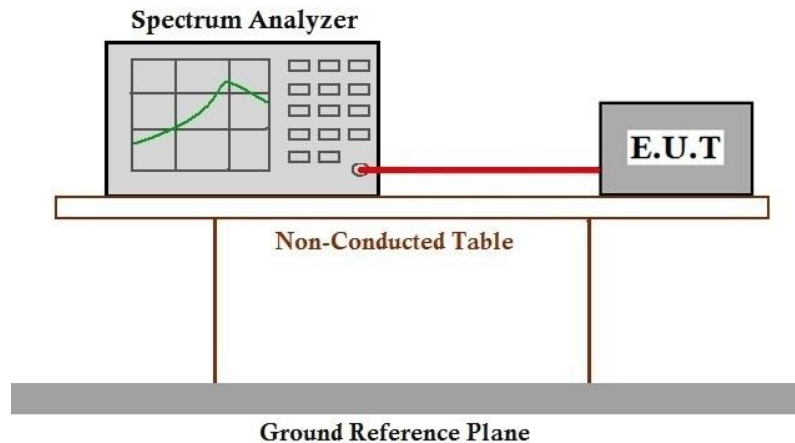
Operating Environment:

Temperature: 21.9 °C Humidity: 47.7 % RH Atmospheric Pressure: 1020 mbar

7.2.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	02	TX mode_Keep the EUT in transmitting with modulation mode.

7.2.3 Test Setup Diagram



7.2.4 Measurement Procedure and Data

Test channel	20dB bandwidth (MHz)	Results
Lowest	1.122	Pass
Middle	1.125	Pass
Highest	1.125	Pass

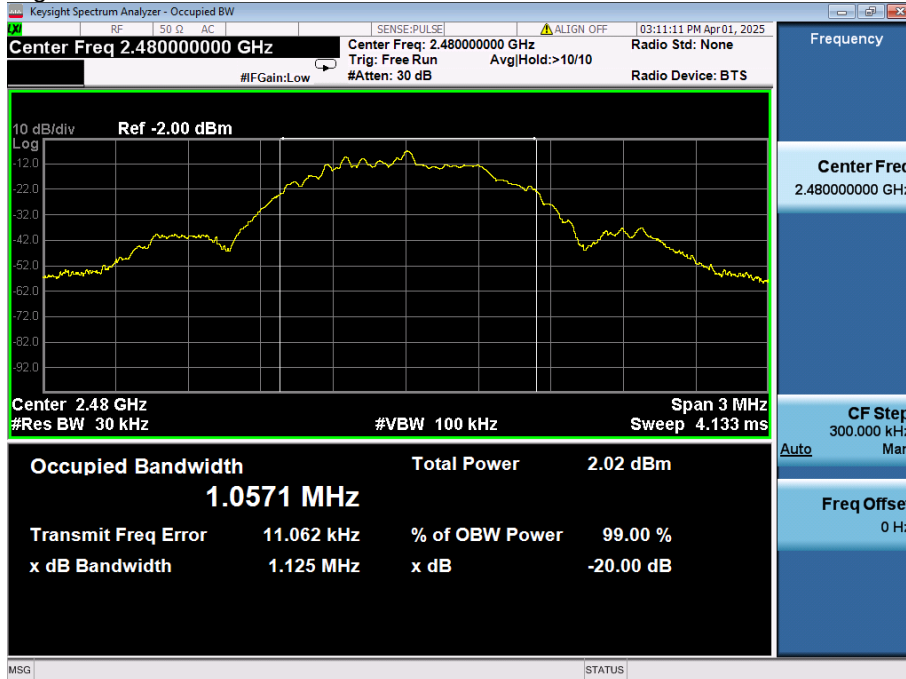
Low Channel



High Channel



High Channel



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

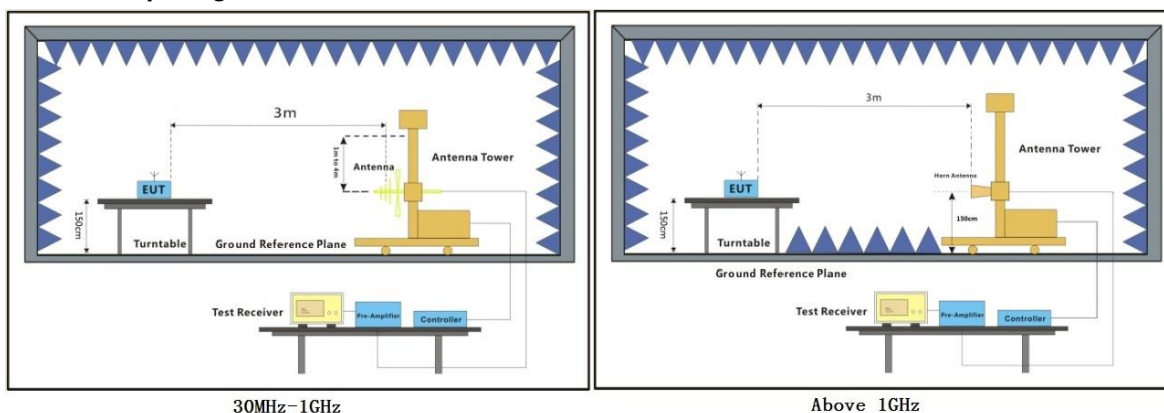
Humidity: 56.3 % RH

Atmospheric Pressure: 1020 mbar

7.3.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	02	TX mode_Keep the EUT in transmitting with modulation mode.

7.3.3 Test Setup Diagram

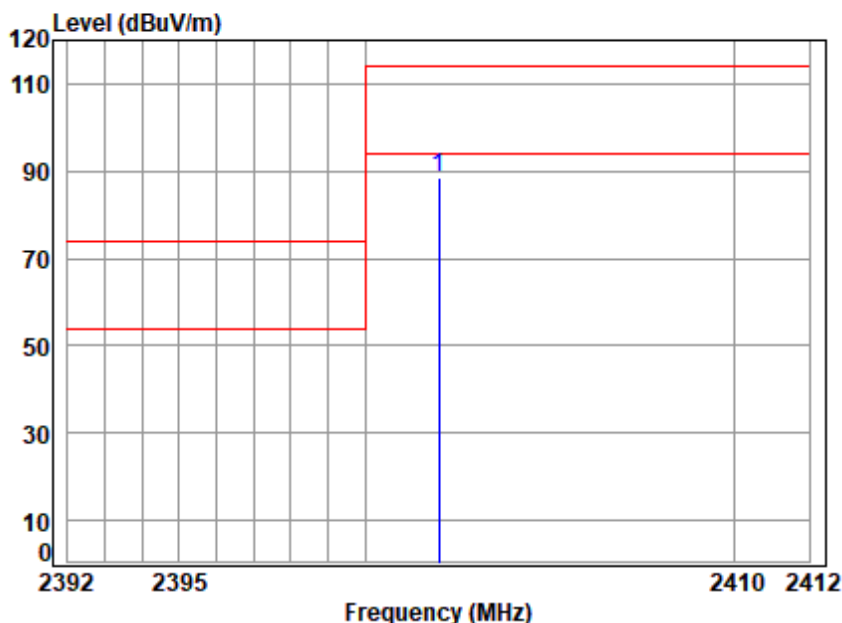


7.3.4 Measurement Procedure and Data

- 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



Test Mode: 02; Polarity: Horizontal; Modulation:GFSK; Channel:Low



Site : chamber

Condition: 3m HORIZONTAL

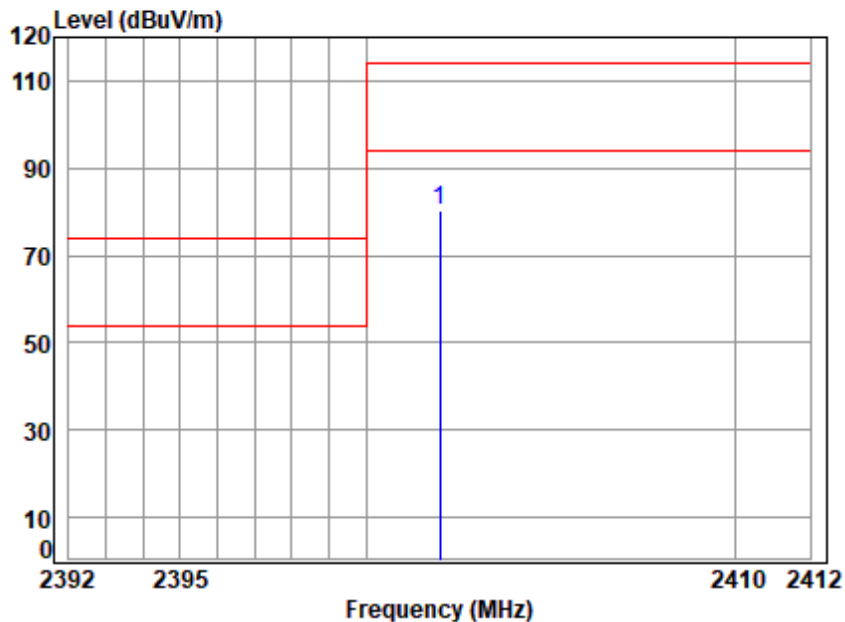
Job No : 01189AT

Mode : 2402 Field strength

	Cable	Ant	Preamp	Read		Limit	Over	
Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1 p 2402.000	15.82	29.09	32.77	76.16	88.30	114.00	-25.70	peak



Test Mode: 02; Polarity: Vertical; Modulation:GFSK; Channel:Low



Site : chamber

Condition: 3m VERTICAL

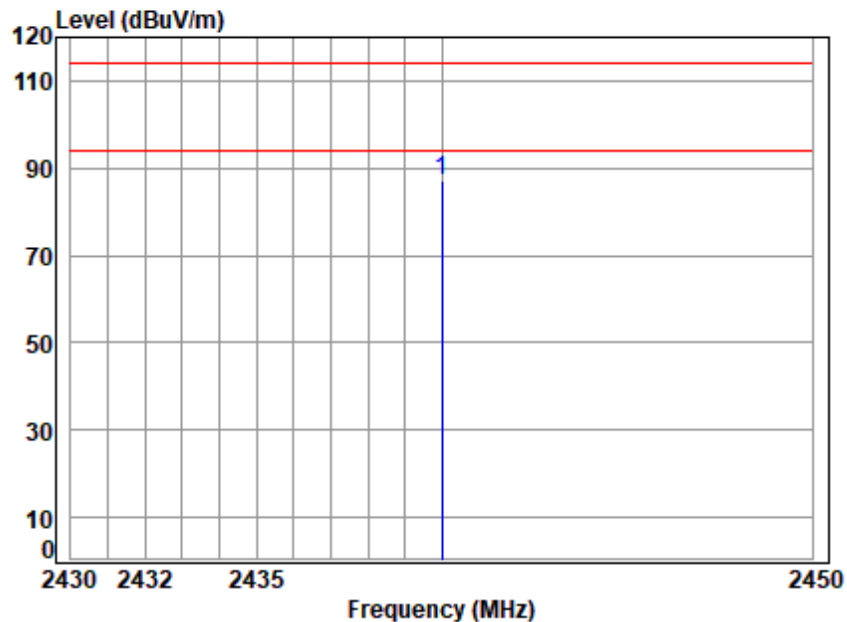
Job No : 01189AT

Mode : 2402 Field strength

	Cable	Ant	Preamp	Read		Limit	Over	
Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1 p 2402.000	15.82	29.09	32.77	68.02	80.16	114.00	-33.84	peak



Test Mode: 02; Polarity: Horizontal; Modulation:GFSK; Channel:middle



Site : chamber

Condition: 3m HORIZONTAL

Job No : 01189AT

Mode : 2440 Field strength

	Cable	Ant	Preamp	Read	Limit	Over	
Freq	Loss	Factor	Factor	Level	Level	Line	Limit Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1 p 2440.000	15.84	28.94	32.75	75.29	87.32	114.00	-26.68 peak



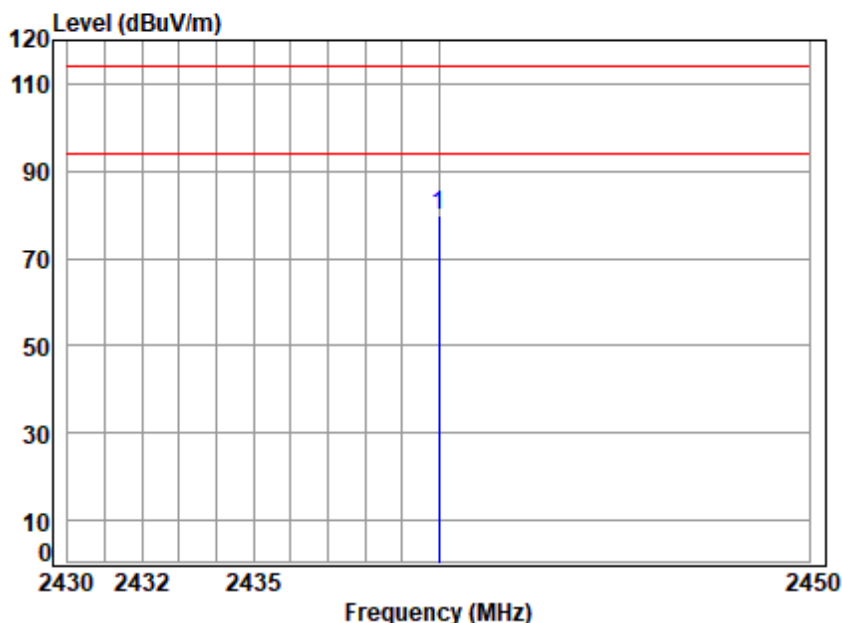
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Test Mode: 02; Polarity: Vertical; Modulation:GFSK; Channel:middle



Site : chamber

Condition: 3m VERTICAL

Job No : 01189AT

Mode : 2440 Field strength

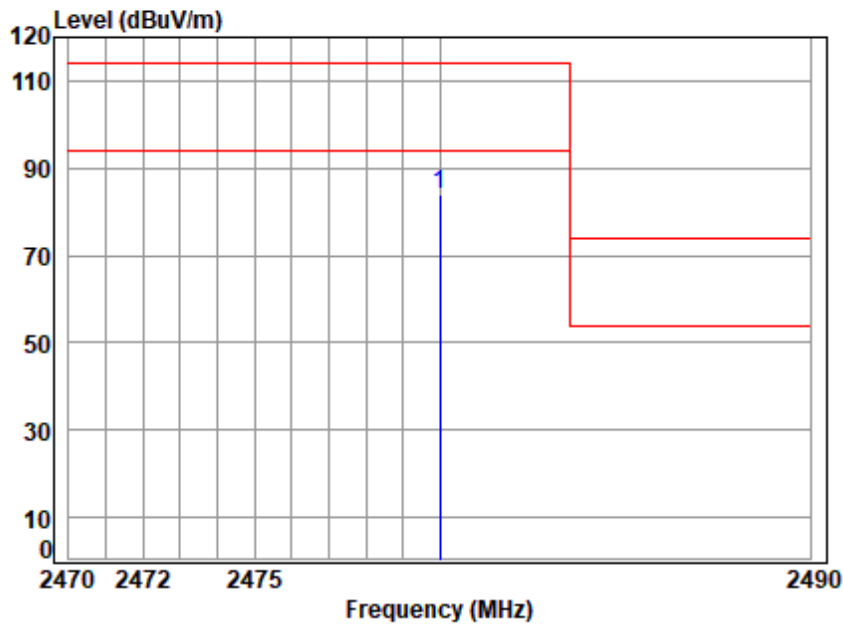
	Cable	Ant	Preamp	Read	Limit	Over	
Freq	Loss	Factor	Factor	Level	Level	Line	Limit Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1 p 2440.000	15.84	28.94	32.75	67.90	79.93	114.00	-34.07 peak



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Test Mode: 02; Polarity: Horizontal; Modulation:GFSK; Channel:High



Site : chamber

Condition: 3m HORIZONTAL

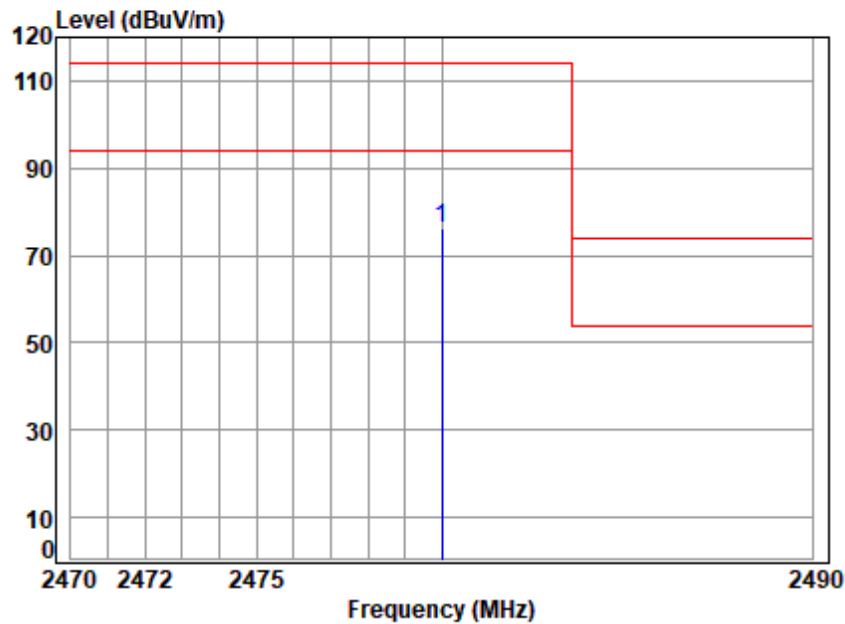
Job No : 01189AT

Mode : 2480 Field strength

	Cable	Ant	Preamp	Read	Limit	Over	
Freq	Loss	Factor	Factor	Level	Level	Line	Limit Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1 p 2480.000	15.86	28.90	32.73	71.77	83.80	114.00	-30.20 peak



Test Mode: 02; Polarity: Vertical; Modulation:GFSK; Channel:High



Site : chamber

Condition: 3m VERTICAL

Job No : 01189AT

Mode : 2480 Field strength

	Cable	Ant	Preamp	Read	Limit	Over	
Freq	Loss	Factor	Factor	Level	Level	Line	Limit Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1 p 2480.000	15.86	28.90	32.73	64.22	76.25	114.00	-37.75 peak



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: 23.5 °C

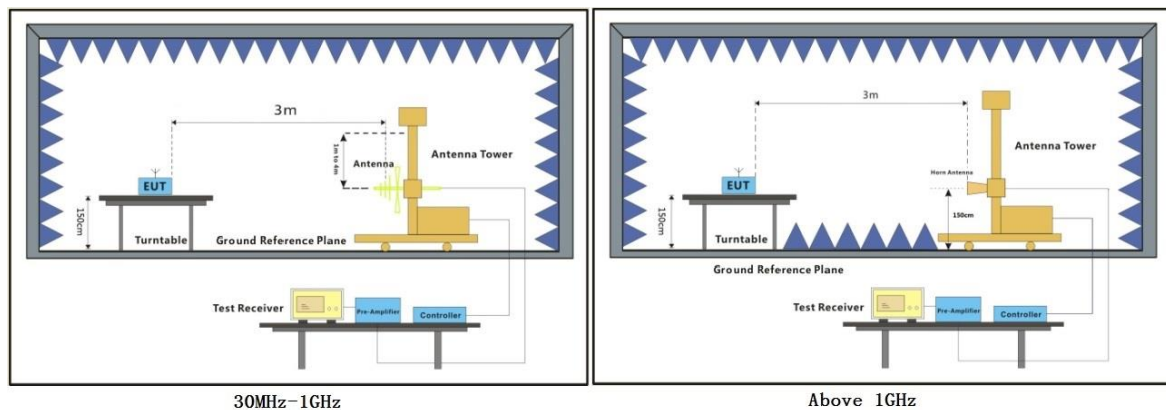
Humidity: 56.3 % RH

Atmospheric Pressure: 1020 mbar

7.4.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	02	TX mode_Keep the EUT in transmitting with modulation mode.

7.4.3 Test Setup Diagram



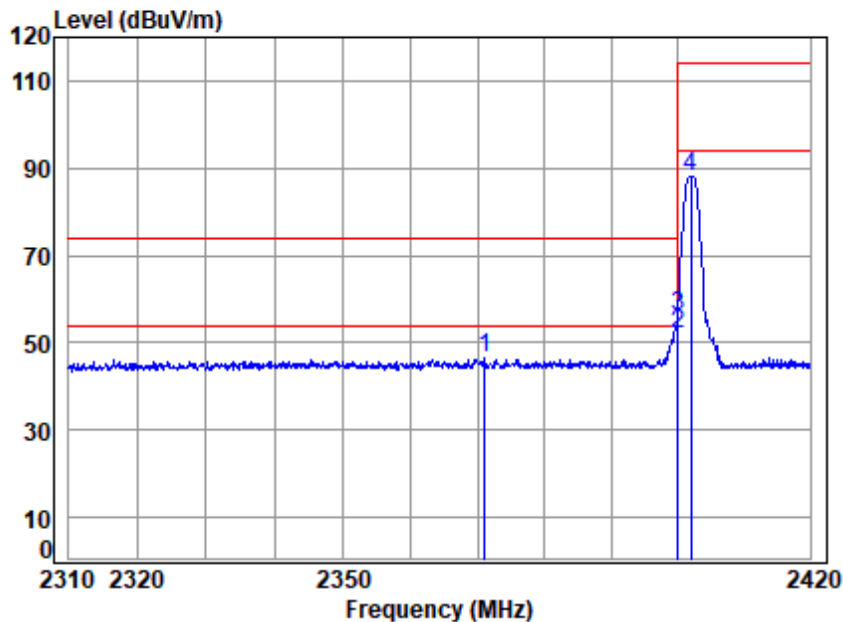
7.4.4 Measurement Procedure and Data

- 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



Test Mode: 02; Polarity: Horizontal; Modulation:GFSK; Channel:Low



Site : chamber

Condition: 3m HORIZONTAL

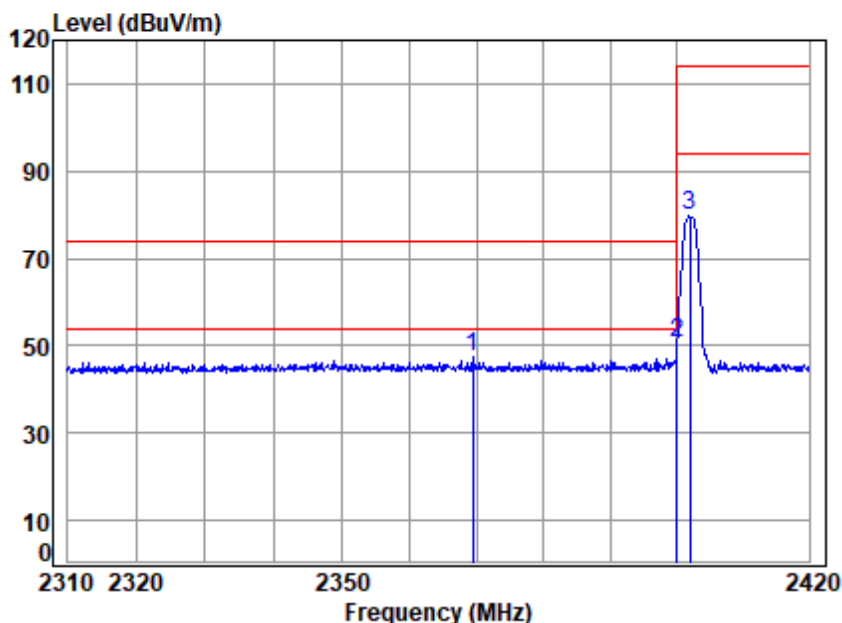
Job No : 01189AT

Mode : 2402 Band edge

		Cable	Ant	Preamp	Read	Limit	Over	
Freq		Loss	Factor	Factor	Level	Line	Limit	Remark
MHz		dB	dB/m	dB	dBuV	dBuV/m	dB	
1	2371.079	15.80	29.10	32.79	34.25	46.36	74.00	-27.64 Peak
2 q	2400.000	15.82	29.10	32.78	39.91	52.05	54.00	-1.95 Average
3 p	2400.000	15.82	29.10	32.78	43.95	56.09	74.00	-17.91 peak
4	2402.000	15.82	29.09	32.77	75.87	88.01	114.00	-25.99 peak



Test Mode: 02; Polarity: Vertical; Modulation:GFSK; Channel:Low



Site : chamber

Condition: 3m VERTICAL

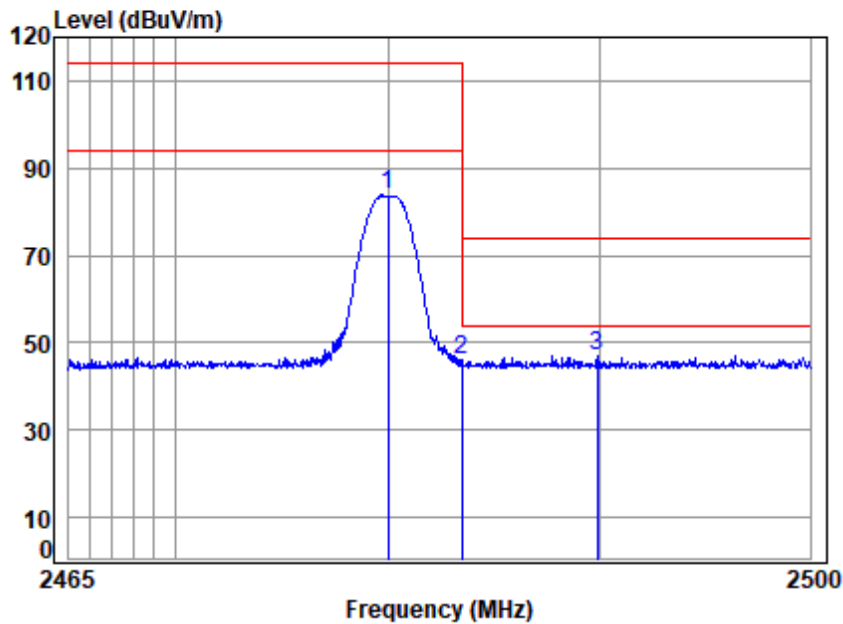
Job No : 01189AT

Mode : 2402 Band edge

		Cable	Ant	Preamp	Read	Limit	Over	
Freq		Loss	Factor	Factor	Level	Line	Limit	Remark
MHz		dB	dB/m	dB	dBuV	dBuV/m	dB	
1	2369.425	15.80	29.10	32.79	35.19	47.30	74.00	-26.70 Peak
2 p	2400.000	15.82	29.10	32.78	38.47	50.61	74.00	-23.39 peak
3	2402.000	15.82	29.09	32.77	67.52	79.66	114.00	-34.34 peak



Test Mode: 02; Polarity: Horizontal; Modulation:GFSK; Channel:High



Site : chamber

Condition: 3m HORIZONTAL

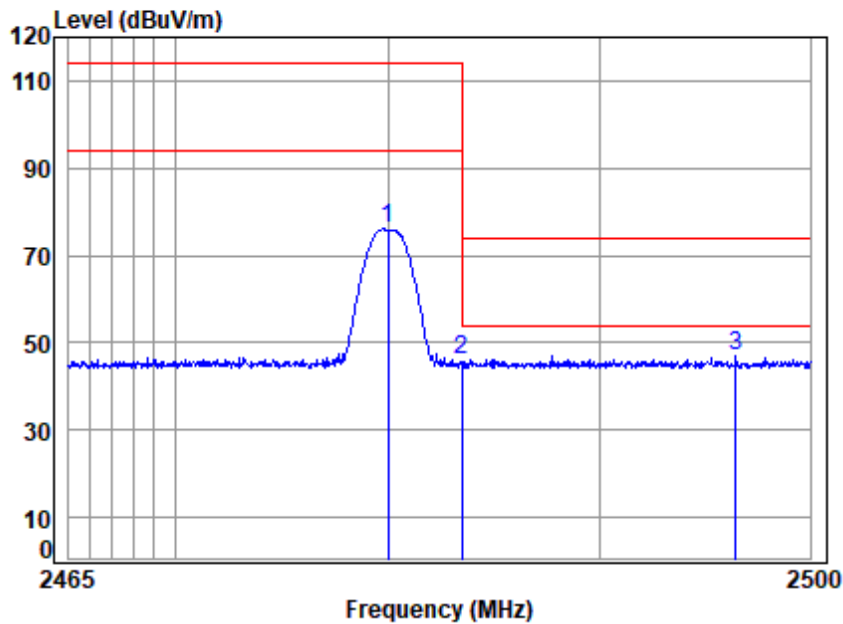
Job No : 01189AT

Mode : 2480 Band edge

		Cable	Ant	Preamp	Read	Limit	Over	
Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
MHz	dB		dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1 2480.000	15.86	28.90	32.73	71.72	83.75	114.00	-30.25	peak
2 2483.500	15.86	28.90	32.73	33.87	45.90	74.00	-28.10	peak
3 p 2489.905	15.86	28.90	32.73	35.05	47.08	74.00	-26.92	Peak



Test Mode: 02; Polarity: Vertical; Modulation:GFSK; Channel:High



Site : chamber

Condition: 3m VERTICAL

Job No : 01189AT

Mode : 2480 Band edge

		Cable	Ant	Preamp	Read	Limit	Over	
Freq	Loss	Factor	Factor	Factor	Level	Level	Line	Limit Remark
MHz	dB		dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1 2480.000	15.86	28.90	32.73	63.95	75.98	114.00	-38.02	peak
2 2483.500	15.86	28.90	32.73	34.15	46.18	74.00	-27.82	peak
3 p 2496.478	15.87	28.90	32.73	34.87	46.91	74.00	-27.09	Peak



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: 21.2 °C

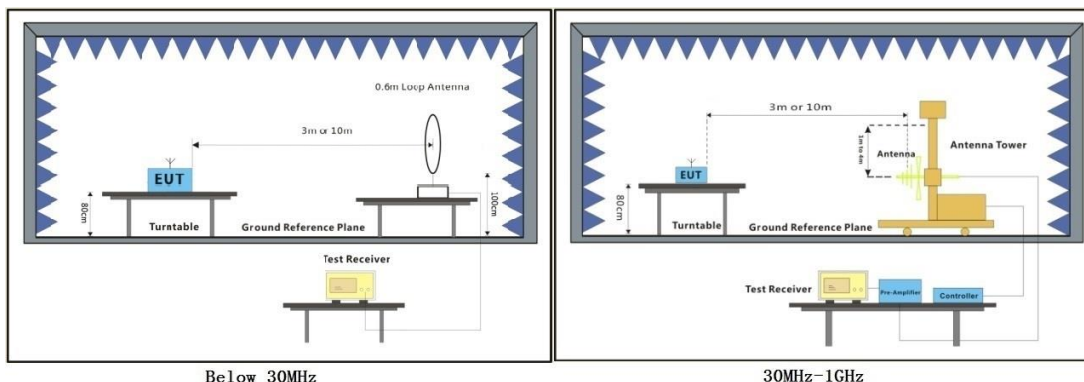
Humidity: 50.1 % RH

Atmospheric Pressure: 1020 mbar

7.5.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	02	TX mode_Keep the EUT in transmitting with modulation mode.

7.5.3 Test Setup Diagram



7.5.4 Measurement Procedure and Data

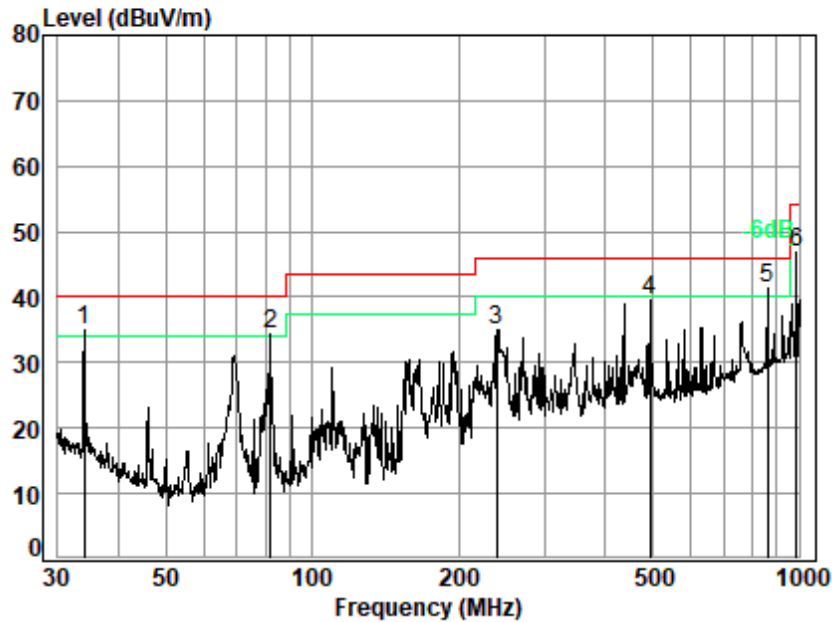
- a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 or 10 meters away from the interference-receiving antenna, 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.



Test Mode: 02; Polarity: Horizontal



Site : chamber

Condition: 3m HORIZONTAL

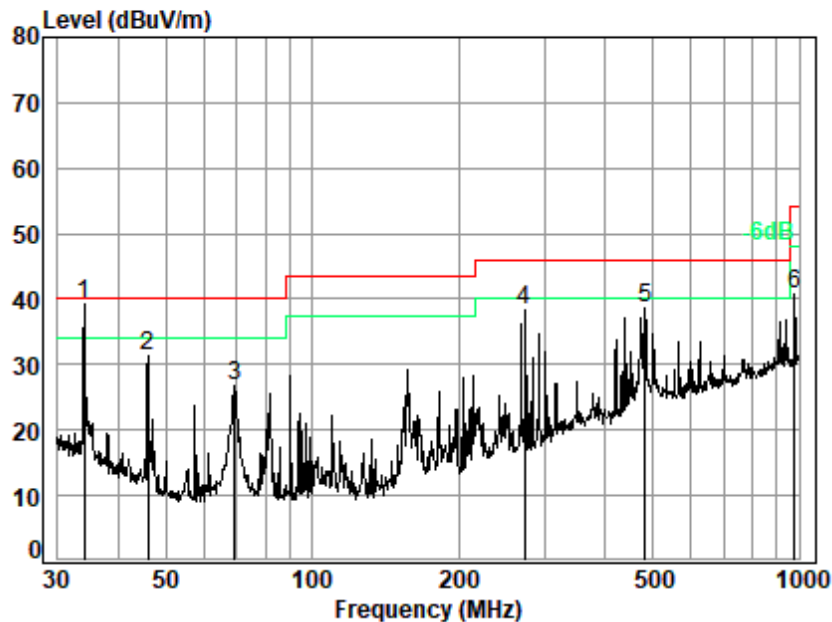
Job No. : 01189AT

Test Mode: 02 TX mode_Keep the EUT in transmitting

	Ant	Cable	Preamp	Read	Limit	Over	
Freq	Factor	Loss	Factor	Level	Level	Line	Limit Remark
MHz	dB/m	dB	dB	dBuV	dBuV/m	dBuV/m	dB
1	34.037	19.41	0.72	27.78	42.66	35.01	40.00 -4.99 QP
2	82.071	10.63	1.11	27.64	50.13	34.23	40.00 -5.77 QP
3	239.147	17.07	1.95	27.01	43.01	35.02	46.00 -10.98 QP
4	494.199	22.82	2.90	27.54	41.27	39.45	46.00 -6.55 QP
5 q	860.035	27.29	4.02	27.05	37.07	41.33	46.00 -4.67 QP
6	989.536	28.08	4.35	26.12	40.54	46.85	54.00 -7.15 QP



Test Mode: 02; Polarity: Vertical



Site : chamber

Condition: 3m VERTICAL

Job No. : 01189AT

Test Mode: 02 TX mode_Keep the EUT in transmitting

		Ant	Cable	Preamp	Read	Limit	Over	
	Freq	Factor	Loss	Factor	Level	Level	Line	Limit Remark
	MHz	dB/m	dB	dB	dBuV	dBuV/m	dBuV/m	dB
1 q	34.037	19.41	0.72	27.78	46.80	39.15	40.00	-0.85 QP
2	46.016	13.94	0.83	27.75	44.36	31.38	40.00	-8.62 QP
3	69.357	10.64	1.02	27.68	42.67	26.65	40.00	-13.35 QP
4	273.234	17.08	2.10	26.86	46.09	38.41	46.00	-7.59 QP
5	482.216	22.80	2.86	27.49	40.58	38.75	46.00	-7.25 QP
6	979.180	28.02	4.33	26.20	34.74	40.89	54.00	-13.11 QP



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: 23.5 °C

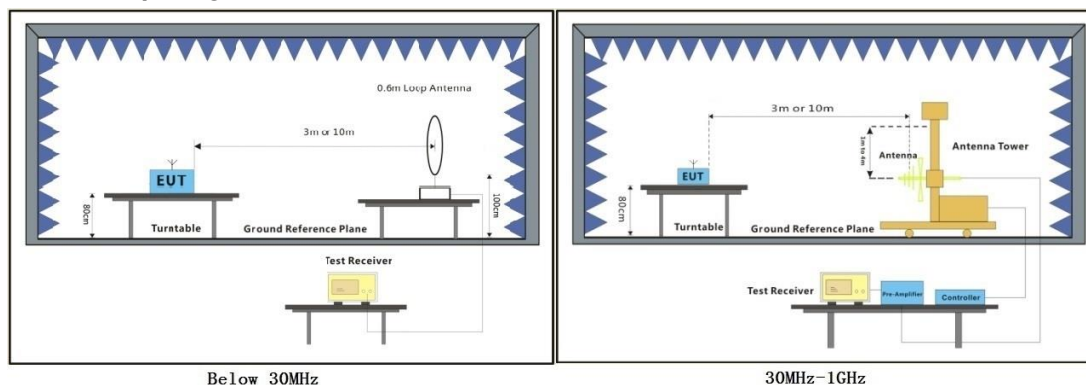
Humidity: 56.3 % RH

Atmospheric Pressure: 1020 mbar

7.6.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	02	TX mode_Keep the EUT in transmitting with modulation mode.

7.6.3 Test Setup Diagram



7.6.4 Measurement Procedure and Data

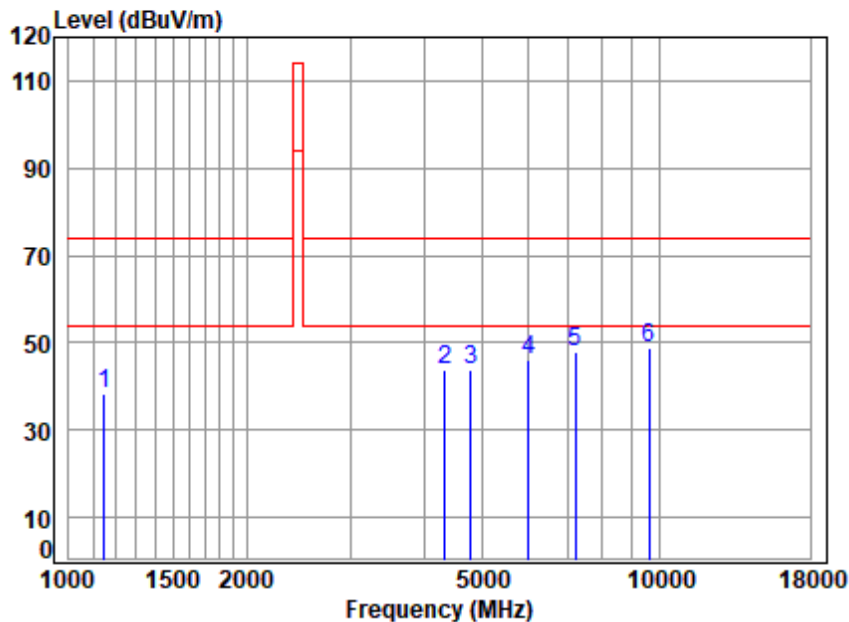
- a. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which 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.



Test Mode: 02; Polarity: Horizontal; Modulation:GFSK; Channel:Low

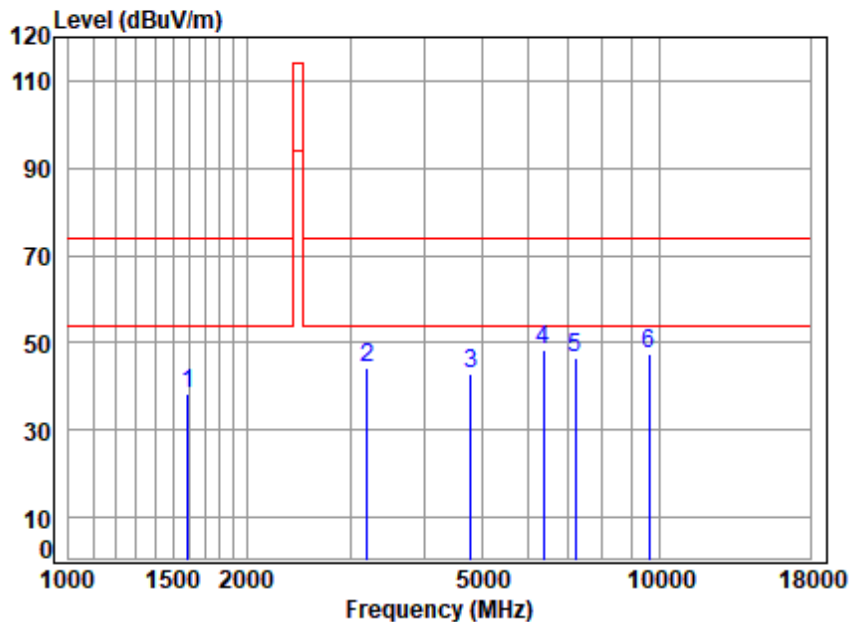


Site : chamber
Condition: 3m HORIZONTAL
Job No : 01189AT
Mode : 2402 TX RSE

		Cable	Ant	Preamp	Read		Limit	Over	
	Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1148.823	4.56	23.90	54.66	64.71	38.51	74.00	-35.49	peak
2	4341.886	8.07	34.34	54.26	55.66	43.81	74.00	-30.19	peak
3	4804.000	8.00	34.32	54.22	55.64	43.74	74.00	-30.26	peak
4	6001.626	9.52	34.90	53.10	54.85	46.17	74.00	-27.83	peak
5	7206.000	9.32	35.70	53.18	56.13	47.97	74.00	-26.03	peak
6 p	9608.000	11.41	37.42	53.35	53.35	48.83	74.00	-25.17	peak



Test Mode: 02; Polarity: Vertical; Modulation:GFSK; Channel:Low

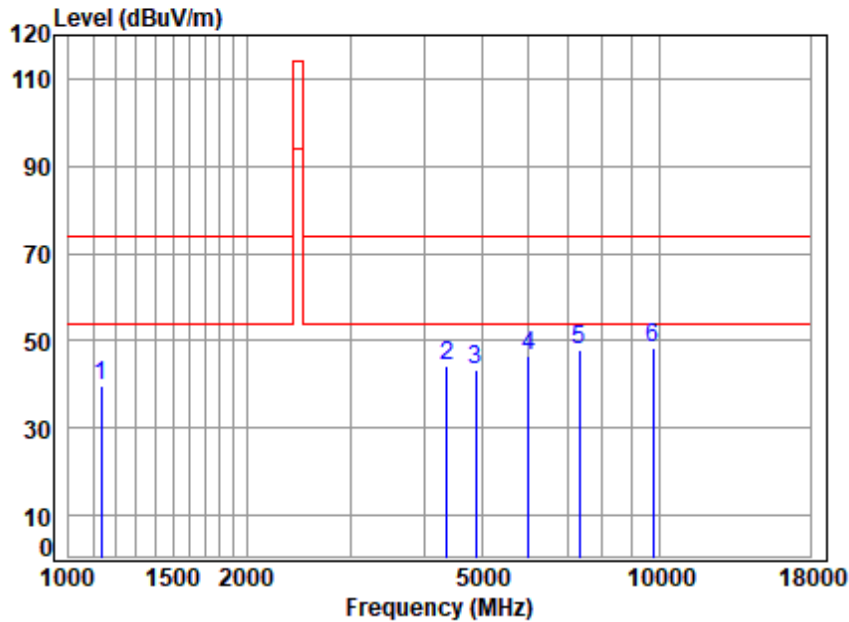


Site : chamber
Condition: 3m VERTICAL
Job No : 01189AT
Mode : 2402 TX RSE

		Cable	Ant	Preamp	Read		Limit	Over	
	Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1592.571	4.77	26.83	54.80	61.54	38.34	74.00	-35.66	peak
2	3196.094	6.78	32.87	54.85	59.24	44.04	74.00	-29.96	peak
3	4804.000	8.00	34.32	54.22	54.86	42.96	74.00	-31.04	peak
4 p	6377.195	9.23	35.06	53.14	57.38	48.53	74.00	-25.47	peak
5	7206.000	9.32	35.70	53.18	54.89	46.73	74.00	-27.27	peak
6	9608.000	11.41	37.42	53.35	51.98	47.46	74.00	-26.54	peak



Test Mode: 02; Polarity: Horizontal; Modulation:GFSK; Channel:middle

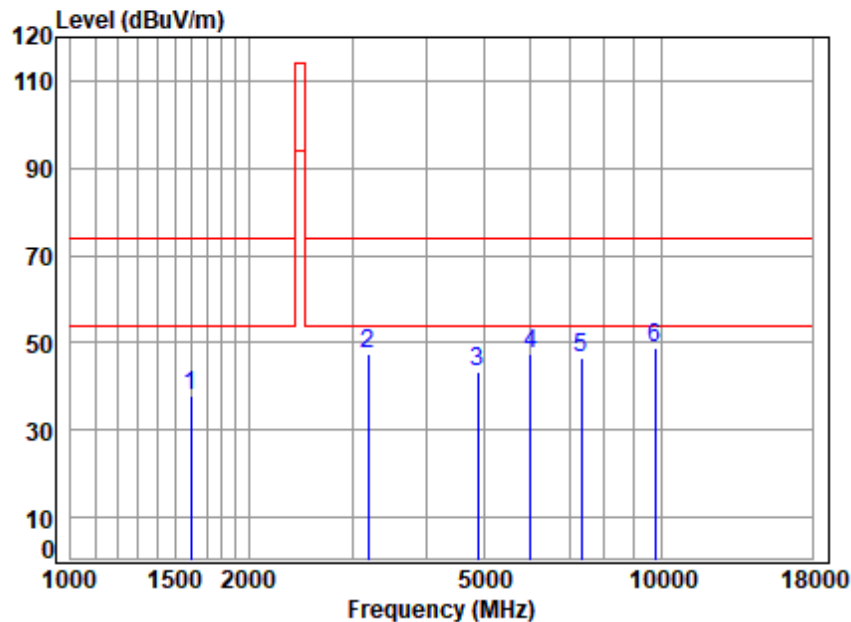


Site : chamber
Condition: 3m HORIZONTAL
Job No : 01189AT
Mode : 2440 TX RSE

		Cable	Ant	Preamp	Read		Limit	Over	
	Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1135.617	4.56	23.84	54.66	66.01	39.75	74.00	-34.25	peak
2	4367.058	8.04	34.54	54.26	55.94	44.26	74.00	-29.74	peak
3	4880.000	8.03	34.62	54.21	54.73	43.17	74.00	-30.83	peak
4	6001.626	9.52	34.90	53.10	55.07	46.39	74.00	-27.61	peak
5	7320.000	9.21	35.70	53.17	56.15	47.89	74.00	-26.11	peak
6 p	9760.000	11.32	37.38	53.29	52.83	48.24	74.00	-25.76	peak



Test Mode: 02; Polarity: Vertical; Modulation:GFSK; Channel:middle

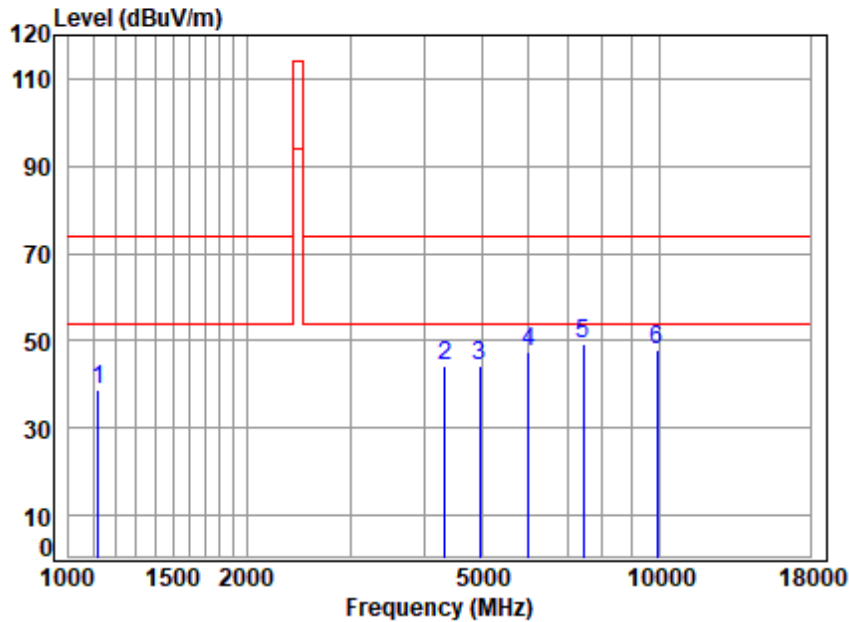


Site : chamber
Condition: 3m VERTICAL
Job No : 01189AT
Mode : 2440 TX RSE

		Cable	Ant	Preamp	Read		Limit	Over	
	Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1597.181	4.78	26.81	54.80	61.26	38.05	74.00	-35.95	peak
2	3186.869	6.77	32.79	54.85	62.73	47.44	74.00	-26.56	peak
3	4880.000	8.03	34.62	54.21	54.76	43.20	74.00	-30.80	peak
4	6001.626	9.52	34.90	53.10	56.09	47.41	74.00	-26.59	peak
5	7320.000	9.21	35.70	53.17	54.89	46.63	74.00	-27.37	peak
6 p	9760.000	11.32	37.38	53.29	53.56	48.97	74.00	-25.03	peak



Test Mode: 02; Polarity: Horizontal; Modulation:GFSK; Channel:High

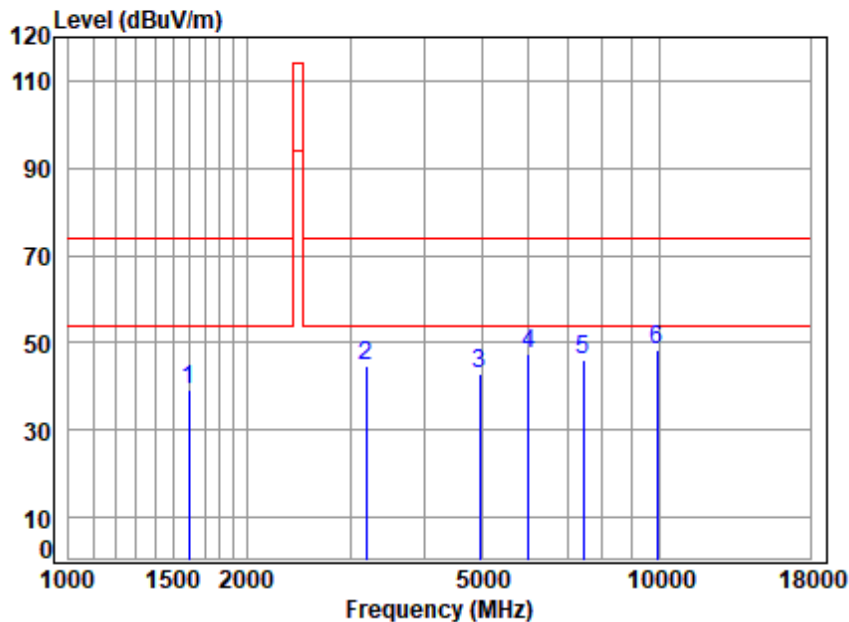


Site : chamber
Condition: 3m HORIZONTAL
Job No : 01189AT
Mode : 2480 TX RSE

		Cable	Ant	Preamp	Read		Limit	Over	
	Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1122.563	4.56	23.79	54.65	65.09	38.79	74.00	-35.21	peak
2	4341.886	8.07	34.34	54.26	56.24	44.39	74.00	-29.61	peak
3	4960.000	8.06	34.56	54.20	55.83	44.25	74.00	-29.75	peak
4	6001.626	9.52	34.90	53.10	56.10	47.42	74.00	-26.58	peak
5	7440.000	9.09	35.96	53.15	57.51	49.41	74.00	-24.59	peak
6	9920.000	11.23	37.30	53.23	52.76	48.06	74.00	-25.94	peak



Test Mode: 02; Polarity: Vertical; Modulation:GFSK; Channel:High



Site : chamber
Condition: 3m VERTICAL
Job No : 01189AT
Mode : 2480 TX RSE

		Cable	Ant	Preamp	Read	Limit	Over	
	Freq	Loss	Factor	Factor	Level	Level	Line	Limit Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	1597.181	4.78	26.81	54.80	62.36	39.15	74.00	-34.85 peak
2	3186.869	6.77	32.79	54.85	59.96	44.67	74.00	-29.33 peak
3	4960.000	8.06	34.56	54.20	54.33	42.75	74.00	-31.25 peak
4	6001.626	9.52	34.90	53.10	56.16	47.48	74.00	-26.52 peak
5	7440.000	9.09	35.96	53.15	53.96	45.86	74.00	-28.14 peak
6 p	9920.000	11.23	37.30	53.23	53.02	48.32	74.00	-25.68 peak



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8 Test Setup Photo

Refer to External and Internal Photos for SZCR2503001189AT

9 EUT Constructional Details (EUT Photos)

Refer to External and Internal Photos for SZCR2503001189AT

- End of the Report -

