

TEST REPORT

Application No.: GZCR2506000857AT
Applicant: GUANGZHOU HEYGEARS IMC. INC
Address of Applicant: BLOCK B2, 501, 601, ENTERPRISE ACCELERATOR, KAIFA DISTRICT, GUANGZHOU, GUANGDONG, CHINA
Manufacturer: GUANGZHOU HEYGEARS IMC. INC
Address of Manufacturer: BLOCK B2, 501, 601, ENTERPRISE ACCELERATOR, KAIFA DISTRICT, GUANGZHOU, GUANGDONG, CHINA
Factory: GUANGZHOU HEYGEARS IMC. INC
Address of Factory: BLOCK B2, 501, 601, ENTERPRISE ACCELERATOR, KAIFA DISTRICT, GUANGZHOU, GUANGDONG, CHINA
Product Name: UltraCraft Rapid Production System
Model No.: UltraCraft Reflex 2
Trade Mark: HEYGEARS
Standard(s) : 47 CFR Part 15, Subpart C 15.225
Date of Receipt: 2025-06-17
Date of Test: 2025-06-27 to 2025-08-20
Date of Issue: 2025-09-16

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



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Guangzhou Branch, EMC Laboratory

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Revision Record			
Version	Report No.	Date	Remark
01	GZCR250600085703	2025-09-16	Original

Authorized for issue by:			
		<i>Damon Guan</i>	
		Damon Guan/Project Engineer	
Approved By		<i>Vico Cui</i>	
		Vico Cui/Reviewer	



2 Test Summary

Radio Spectrum Technical Requirement				
Item	Standard	Method	Requirement	Result
Antenna Requirement	47 CFR Part 15, Subpart C 15.225	N/A	47 CFR Part 15, Subpart C 15.203	Pass

Radio Spectrum Matter Part				
Item	Standard	Method	Requirement	Result
Conducted Emissions at Mains Terminals (150kHz-30MHz)	47 CFR Part 15, Subpart C 15.225	ANSI C63.10 (2020) Section 6.2	47 CFR Part 15, Subpart C 15.207	Pass
20dB Bandwidth		ANSI C63.10 (2020) Section 6.9	47 CFR Part 15, Subpart C 15.215	Pass
Emission Mask		ANSI C63.10 (2020) Section 6.4	47 CFR Part 15, Subpart C 15.225(a)&(b)&(C)	Pass
Frequency tolerance		ANSI C63.10 (2020) Section 6.8	47 CFR Part 15, Subpart C 15.225(e)	Pass
Radiated Emissions (9kHz-30MHz)		ANSI C63.10 (2020) Section 6.4	47 CFR Part 15, Subpart C 15.225(d) & 15.209	Pass
Radiated Emissions (30MHz-1GHz)		ANSI C63.10 (2020) Section 6.5	47 CFR Part 15, Subpart C 15.225(d) & 15.209	Pass**

** : The EUT passed Radiated Emissions (30MHz-1GHz) test after modification.

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.



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3 Contents

	Page
1 Cover Page	1
2 Test Summary	3
3 Contents	4
4 General Information	6
4.1 Details of E.U.T.	6
4.2 Description of Support Units	6
4.3 Measurement Uncertainty	6
4.4 Test Location	7
4.5 Test Facility	7
4.6 Deviation from Standards	7
4.7 Abnormalities from Standard Conditions	7
5 Equipment List	8
6 Radio Spectrum Technical Requirement	10
6.1 Antenna Requirement	10
6.1.1 Test Requirement:	10
6.1.2 Conclusion	10
7 Radio Spectrum Matter Test Results	11
7.1 Conducted Emissions at Mains Terminals (150kHz-30MHz)	11
7.1.1 E.U.T. Operation	11
7.1.2 Test Mode Description	11
7.1.3 Test Setup Diagram	11
7.1.4 Measurement Procedure and Data	12
7.2 20dB Bandwidth	15
7.2.1 E.U.T. Operation	15
7.2.2 Test Mode Description	15
7.2.3 Test Setup Diagram	15
7.2.4 Measurement Procedure and Data	15
7.3 Emission Mask	18
7.3.1 E.U.T. Operation	18
7.3.2 Test Mode Description	18
7.3.3 Test Setup Diagram	19
7.3.4 Measurement Procedure and Data	19
7.4 Frequency tolerance	24
7.4.1 E.U.T. Operation	24
7.4.2 Test Mode Description	24
7.4.3 Test Setup Diagram	24
7.4.4 Measurement Procedure and Data	24
7.5 Radiated Emissions (9kHz-30MHz)	27
7.5.1 E.U.T. Operation	28
7.5.2 Test Mode Description	28
7.5.3 Test Setup Diagram	28



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7.5.4	Measurement Procedure and Data	28
7.6	Radiated Emissions (30MHz-1GHz)	37
7.6.1	E.U.T. Operation	37
7.6.2	Test Mode Description	37
7.6.3	Test Setup Diagram	37
7.6.4	Measurement Procedure and Data	38
8	Test Setup Photo	41
9	EUT Constructional Details (EUT Photos)	42



4 General Information

4.1 Details of E.U.T.

Power supply:	AC 100-240VAC, 50/60Hz
Cable(s):	About 1.6m x 3 wires unscreened AC input cable. USB Port x1 Micro SD Port x1 RJ45 Port x1 4 Pin DC output Port x1(Reserved only, function not developed)
Test Voltage:	AC 120 V, 60 Hz
Operation Frequency:	13.56MHz
Modulation Type:	ASK
Antenna Type:	Coil Antenna
Antenna Number:	2

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
Conducted Emissions at Mains Terminals (150kHz-30MHz)	$\pm 3.22\text{dB}$
20dB Bandwidth	$\pm 0.274\%$
Emission Mask	$\pm 3.19\text{dB}$
Frequency tolerance	$\pm 7.25 \text{ E-}8$
Radiated Emissions (9kHz-30MHz)	$\pm 3.19\text{dB}$
Radiated Emissions (30MHz-1GHz)	$\pm 5.14\text{dB}$ (30MHz-1GHz):3m; $\pm 4.90\text{dB}$ (30MHz-1GHz):10m

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.



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

The EUT passed Radiated Emissions (30MHz-1GHz) test after modification.



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5 Equipment List

Conducted Emissions at Mains Terminals (150kHz-30MHz)					
Equipment	Manufacturer	Model No.	Inventory No.	Cal Date	Cal Due Date
Coaxial Cable	HangTianXing	2m	EMC0107	2025-08-12	2026-08-11
Shielding Room	ChangZhou ZhongYu	8m x 3m x 3.8m	EMC0306	2025-08-14	2028-08-13
Two-Line V-Network-GZ	Rohde & Schwarz	ENV216	EMC2135	2025-08-13	2026-08-12
EMI Test Receiver (9kHz-3.6GHz)	Rohde & Schwarz	ESR3	EMC2221	2024-12-04	2025-12-03
Test Software E3r	Audix	Ver.6.191211	GZE100-77	N/A	N/A

20dB Bandwidth					
Equipment	Manufacturer	Model No.	Inventory No.	Cal Date	Cal Due Date
MXA Signal Analyzer (10Hz-8.4GHz)	Agilent Technologies	N9020A	SEM004-10	2024-12-03	2025-12-02
MI CABLE	SGS-EMC	0.8M	EMC2136	2023-11-02	2025-11-01

Emission Mask					
Equipment	Manufacturer	Model No.	Inventory No.	Cal Date	Cal Due Date
Active Loop Antenna-RED	ETS-Lindgren	6502	EMC2190	2024-04-16	2026-04-15
EMI Test Receiver (1Hz-8GHz)	Rohde & Schwarz	ESW8	EMC2229	2024-12-03	2025-12-02
Test Software E3	Audix	Ver.6.120110a	GZE100-61	N/A	N/A
966 Anechoic Chamber	Shenzhen C.R.T	CRTSGSSAC966	EMC2230	2025-03-22	2028-03-21
Coaxial Cable	Mirco-COAX UTIFLEX ve	LA2-C125-8000	EMC2239	2024-12-04	2026-12-03

Frequency tolerance					
Equipment	Manufacturer	Model No.	Inventory No.	Cal Date	Cal Due Date
Temperature Chamber	GZ GongWen Co.Ltd.	GDJW-100	EMC0039	2024-12-03	2025-12-02
MXA Signal Analyzer (10Hz-8.4GHz)	Agilent Technologies	N9020A	SEM004-10	2024-12-03	2025-12-02
MI CABLE	SGS-EMC	0.8M	EMC2136	2023-11-02	2025-11-01



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Radiated Emissions (9kHz-30MHz)					
Equipment	Manufacturer	Model No.	Inventory No.	Cal Date	Cal Due Date
Active Loop Antenna-RED	ETS-Lindgren	6502	EMC2190	2024-04-16	2026-04-15
EMI Test Receiver (1Hz-8GHz)	Rohde & Schwarz	ESW8	EMC2229	2024-12-03	2025-12-02
Test Software E3	Audix	Ver.6.120110a	GZE100-61	N/A	N/A
966 Anechoic Chamber	Shenzhen C.R.T	CRTSGSSAC966	EMC2230	2025-03-22	2028-03-21
Coaxial Cable	Mirco-COAX UTIFLEX ve	LA2-C125-8000	EMC2239	2024-12-04	2026-12-03

Radiated Emissions (30MHz-1GHz)					
Equipment	Manufacturer	Model No.	Inventory No.	Cal Date	Cal Due Date
966 Anechoic Chamber	Shenzhen C.R.T	CRTSGSSAC966	EMC2230	2025-03-22	2028-03-21
EMI Test Receiver(1Hz-8GHz)	Rohde & Schwarz	ESW8	EMC2229	2024-12-03	2025-12-02
Amplifier(9k-1000MHz)	SONOMA	310	EMC2237	2024-12-03	2025-12-02
Trilog Broadband Antenna (25MHz-2GHz)	Schwarzbeck Mess-Elektronik	VULB 9168	EMC2238	2025-03-24	2027-03-23
Coaxial Cable	Mirco-COAX UTIFLEX ve	LA2-C125-8000	EMC2239	2024-12-04	2026-12-03
Test Software E3	Audix	Ver.6.191211	GZE100-81	N/A	N/A

General used equipment					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
DMM	Fluke	73	EMC0006	2025-06-03	2026-06-02



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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.

Antenna location: Refer to Internal photos

7 Radio Spectrum Matter Test Results

7.1 Conducted Emissions at Mains Terminals (150kHz-30MHz)

Test Requirement 47 CFR Part 15, Subpart C 15.207

Test Method: ANSI C63.10 (2020) Section 6.2

Limit:

Frequency range (MHz)	Limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

* Decreases with the logarithm of the frequency.

7.1.1 E.U.T. Operation

Operating Environment:

Temperature: 22.0 °C

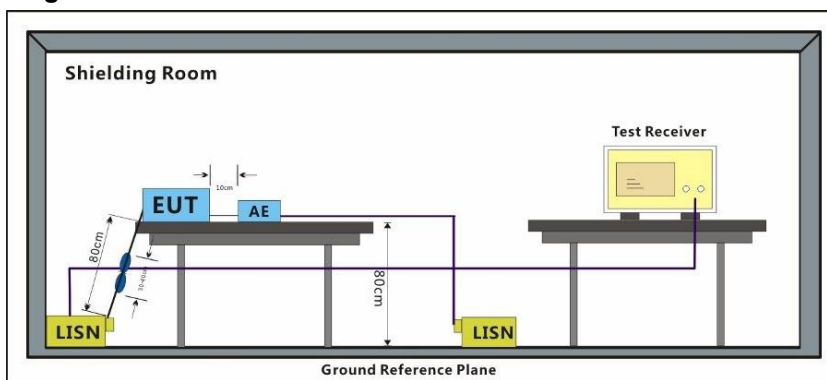
Humidity: 53.3 % RH

Atmospheric Pressure: 1008 mbar

7.1.2 Test Mode Description

Pre-scan / Mode	Description
Final test Code	
Final test 01	TX mode with modulation according to antenna 1
Pre-scan 03	TX mode with modulation according to antenna 2

7.1.3 Test Setup Diagram



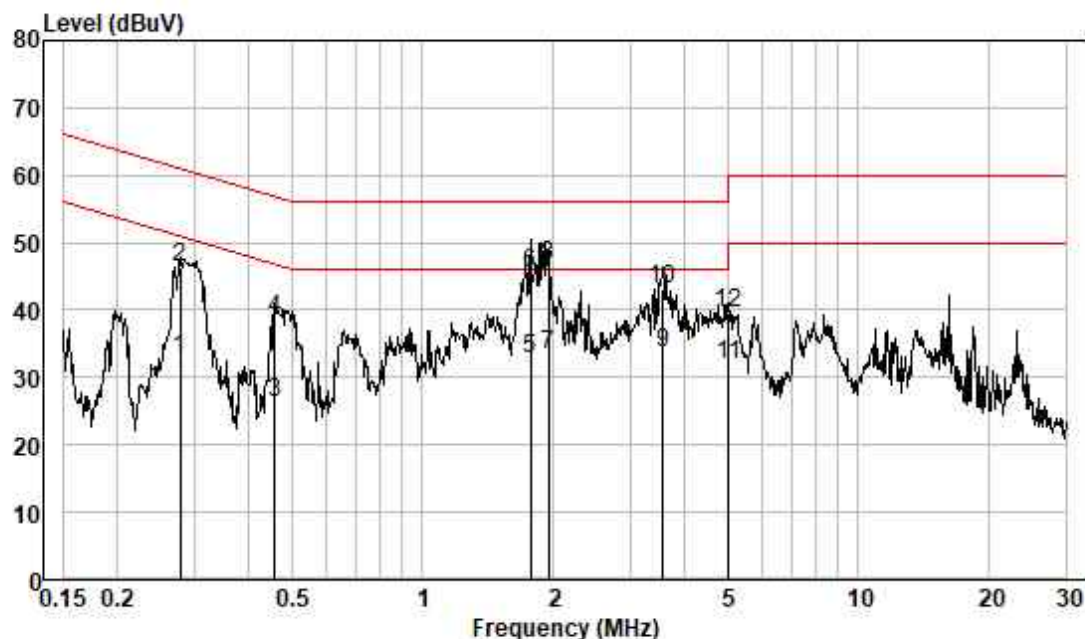
7.1.4 Measurement Procedure and Data

- 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: 01; Line: Live line

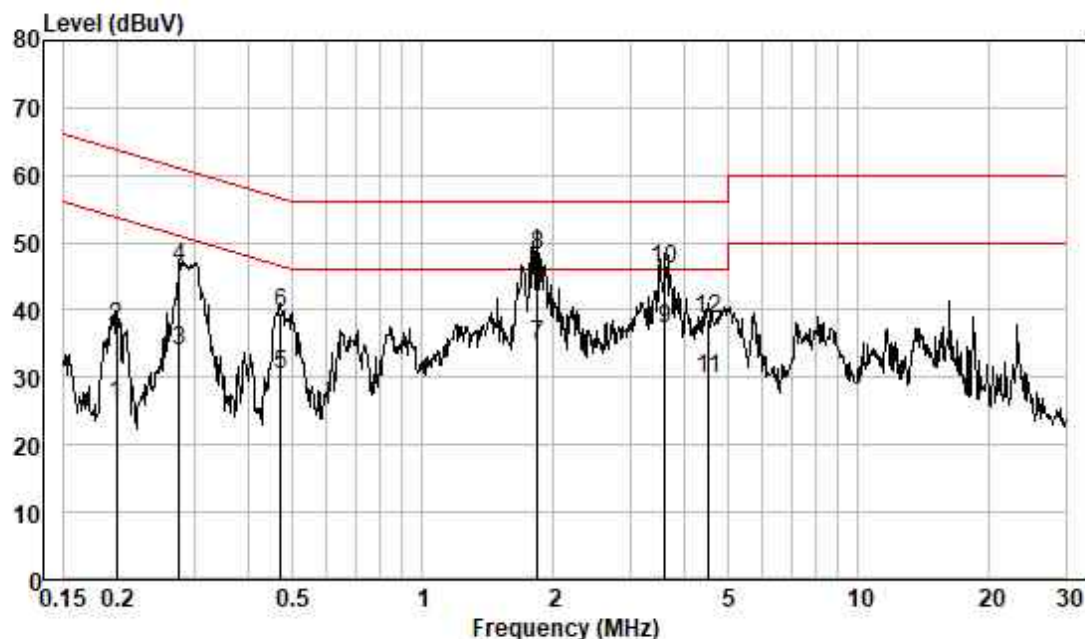


Pol :LINE
Mode :NFC
Model :
Power :

	Frequency MHz	Read Level dBuV	Cable Loss dB	LISN Factor dB	Measured Level dBuV	Limit Line dBuV	Over Limit dB	Remark
1	0.277	23.12	0.04	9.56	32.72	50.90	-18.18	Average
2	0.277	36.61	0.04	9.56	46.21	60.90	-14.69	QP
3	0.459	16.79	0.05	9.57	26.41	46.71	-20.30	Average
4	0.459	29.16	0.05	9.57	38.78	56.71	-17.93	QP
5	1.772	23.12	0.12	9.61	32.85	46.00	-13.15	Average
6	1.772	35.78	0.12	9.61	45.51	56.00	-10.49	QP
7	1.949	23.51	0.12	9.61	33.24	46.00	-12.76	Average
8	1.949	36.81	0.12	9.61	46.54	56.00	-9.46	QP
9	3.565	23.96	0.17	9.60	33.73	46.00	-12.27	Average
10	3.565	33.39	0.17	9.60	43.16	56.00	-12.84	QP
11	5.031	22.12	0.20	9.60	31.92	50.00	-18.08	Average
12	5.031	29.87	0.20	9.60	39.67	60.00	-20.33	QP



Test Mode: 01; Line: Neutral Line



Pol : NEUTRAL
Mode : NFC
Model :
Power :

	Frequency MHz	Read Level dBuV	Cable Loss dB	LISN Factor dB	Measured Level dBuV	Limit Line dBuV	Over Limit dB	Remark
1	0.199	16.30	0.04	9.55	25.89	53.67	-27.78	Average
2	0.199	27.93	0.04	9.55	37.52	63.67	-26.15	QP
3	0.276	24.51	0.04	9.54	34.09	50.94	-16.85	Average
4	0.276	36.81	0.04	9.54	46.39	60.94	-14.55	QP
5	0.474	20.79	0.05	9.57	30.41	46.45	-16.04	Average
6	0.474	29.96	0.05	9.57	39.58	56.45	-16.87	QP
7	1.839	25.13	0.12	9.52	34.77	46.00	-11.23	Average
8	1.839	38.62	0.12	9.52	48.26	56.00	-7.74	QP
9	3.603	27.33	0.17	9.58	37.08	46.00	-8.92	Average
10	3.603	36.24	0.17	9.58	45.99	56.00	-10.01	QP
11	4.525	19.89	0.19	9.63	29.71	46.00	-16.29	Average
12	4.525	28.99	0.19	9.63	38.81	56.00	-17.19	QP



7.2 20dB Bandwidth

Test Requirement 47 CFR Part 15, Subpart C 15.215

Test Method: ANSI C63.10 (2020) Section 6.9

7.2.1 E.U.T. Operation

Operating Environment:

Temperature: 22.1 °C

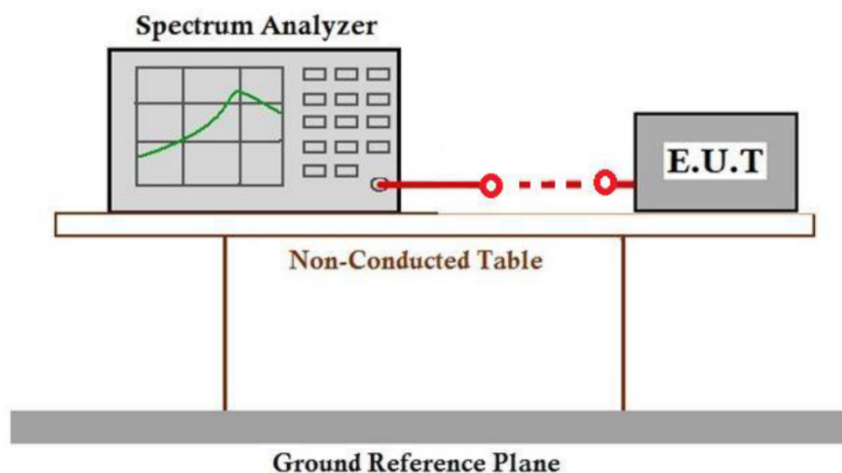
Humidity: 69.2 % RH

Atmospheric Pressure: 1006 mbar

7.2.2 Test Mode Description

Pre-scan /	Mode	Description
Final test	Code	
Final test	01	TX mode with modulation according to antenna 1
Final test	03	TX mode with modulation according to antenna 2

7.2.3 Test Setup Diagram



7.2.4 Measurement Procedure and Data

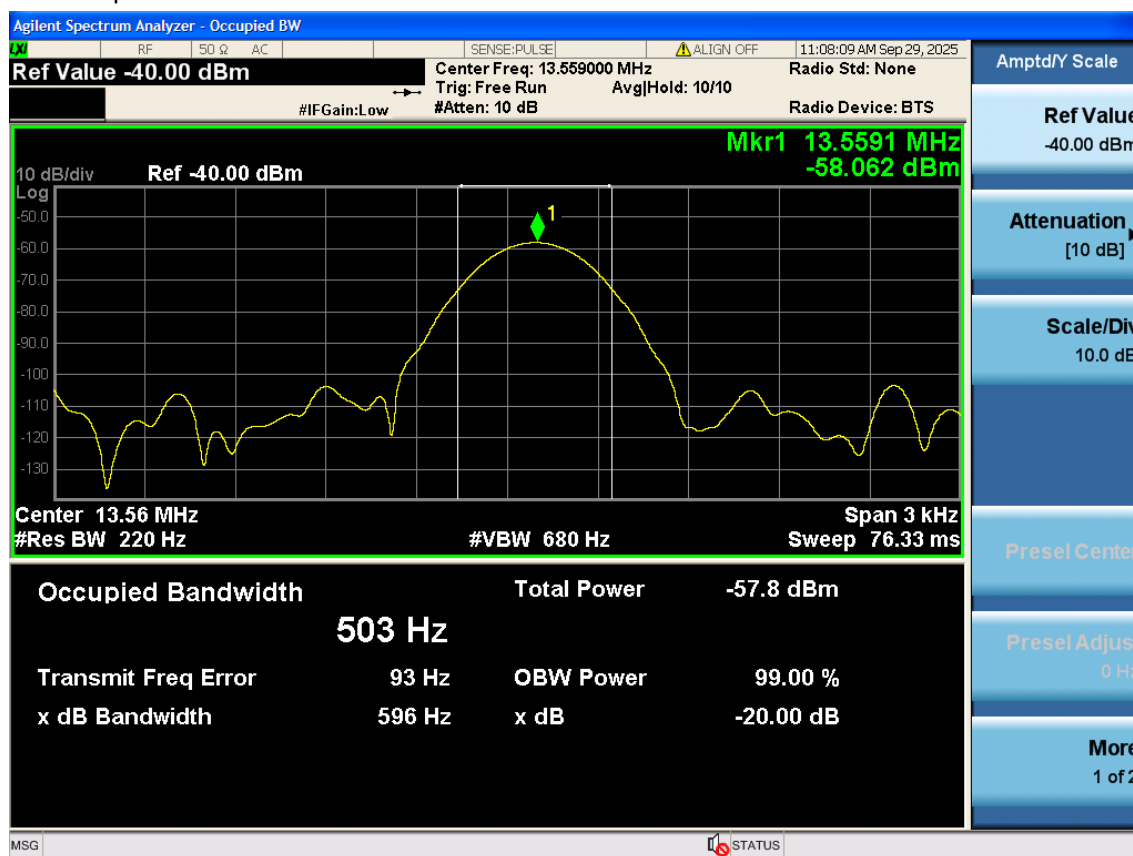
The useful radiated emission from the EUT was detected by the spectrum analyser with peak detector.

Test Mode: 01

Test Result

Operating Frequency (MHz)	20dB Bandwidth (Hz)	Operating frequency Limit	Result
13.56	596	--	Pass

Test Graphs

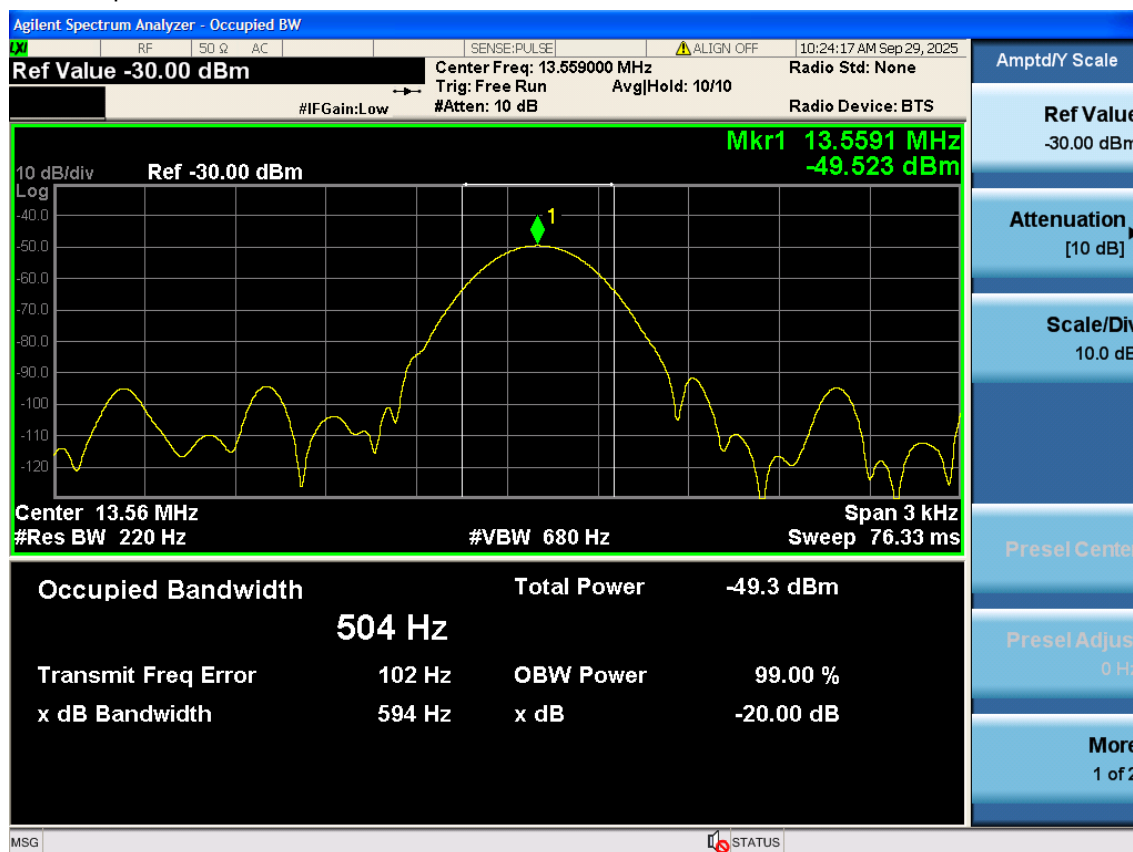


Test Mode: 03

Test Result

Operating Frequency (MHz)	20dB Bandwidth (Hz)	Operating frequency Limit	Result
13.56	594	--	Pass

Test Graphs



7.3 Emission Mask

Test Requirement 47 CFR Part 15, Subpart C 15.225(a)&(b)&(C)

Test Method: ANSI C63.10 (2020) Section 6.4

Test Distance: 3m

Limit:

(a) The field strength of any emissions within the band 13.553-13.567 MHz shall not exceed 15,848 microvolts/meter at 30 meters.

(b) Within the bands 13.410-13.553 MHz and 13.567-13.710 MHz, the field strength of any emissions shall not exceed 334 microvolts/meter at 30 meters.

(c) Within the bands 13.110-13.410 MHz and 13.710-14.010 MHz the field strength of any emissions shall not exceed 106 microvolts/meter at 30 meters.

(d) The field strength of any emissions appearing outside of the 13.110-14.010 MHz band shall not exceed the general radiated emission limits in § 15.209.

Below 30MHz

The test was performed at a 3m test site.

The factor calculated by the following equation:

$$FS_{\text{limit}} = FS_{\text{max}} - 40 \log \left(\frac{d_{\text{limit}}}{d_{\text{measure}}} \right)$$

where

FS_{limit} is the calculation of field strength at the limit distance, expressed in dBμV/m
 FS_{max} is the measured field strength, expressed in dBμV/m
 d_{measure} is the distance of the measurement point from the EUT
 d_{limit} is the reference distance or the distance of the $\lambda/2\pi$ point

The field strength of any emissions within the band 13.553-13.567 MHz shall not exceed 84dBuV/m at 30 meters.

7.3.1 E.U.T. Operation

Operating Environment:

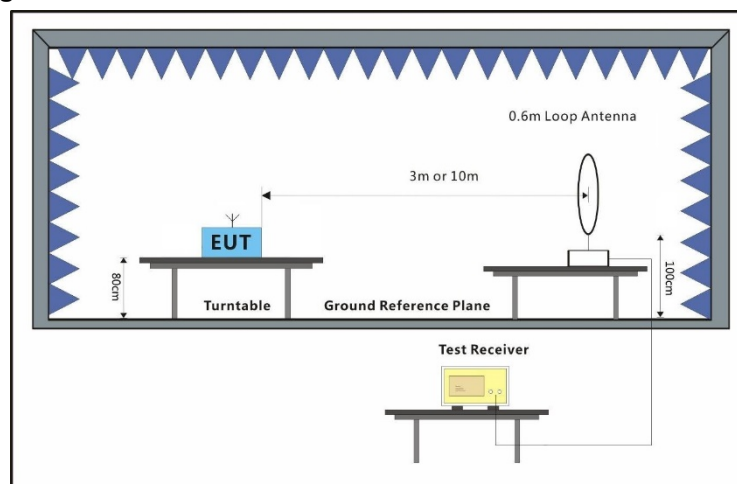
Temperature: 22.4 °C Humidity: 50.4 % RH Atmospheric Pressure: 1004 mbar

7.3.2 Test Mode Description

Pre-scan / Mode	Description
Final test Code	
Final test 01	TX mode with modulation according to antenna 1
Final test 03	TX mode with modulation according to antenna 2



7.3.3 Test Setup Diagram



7.3.4 Measurement Procedure and Data

For testing performed with the loop antenna, the center of the loop was positioned 1 m above the ground and positioned with its plane vertical at the specified distance from the EUT. During testing the loop was rotated about its vertical axis for maximum response at each azimuth and also investigated with the loop positioned in the horizontal plane. Only the worst position of vertical was shown in the report.



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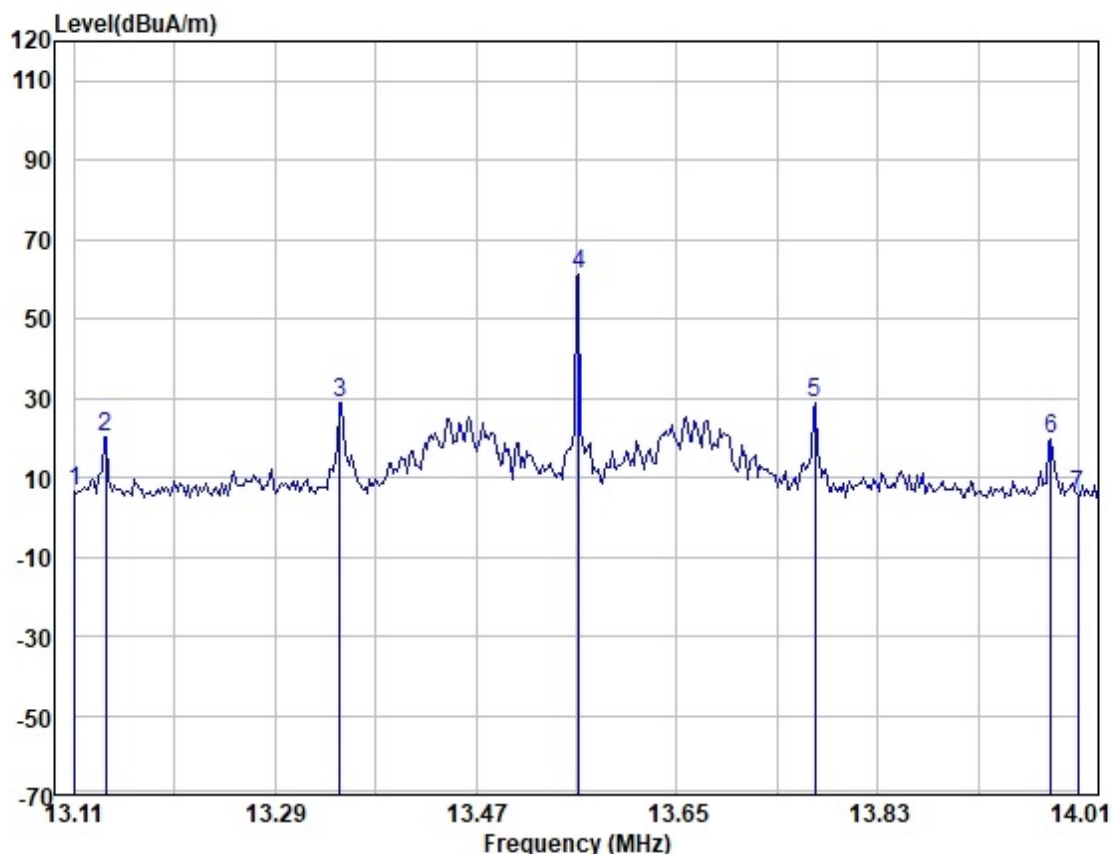
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Test Mode: 01



loop :
Test Mode:
Model :

Frequency MHz	Read level dBuV/m	Cable Loss dB	Antenna Factor dB/m	Preamplifier Factor dB	Measured level dBuV/m	Limit Line dBuV/m	Over limit dB
13.110	80.00	0.19	-40.92	32.71	6.56		
13.138	93.72	0.19	-40.92	32.71	20.28		
13.348	102.48	0.19	-40.97	32.71	28.99		
13.562	134.97	0.20	-41.02	32.72	61.43		
13.774	102.15	0.20	-41.06	32.72	28.57		
13.986	93.39	0.20	-41.10	32.72	19.77		
14.010	79.08	0.20	-41.10	32.72	5.46		



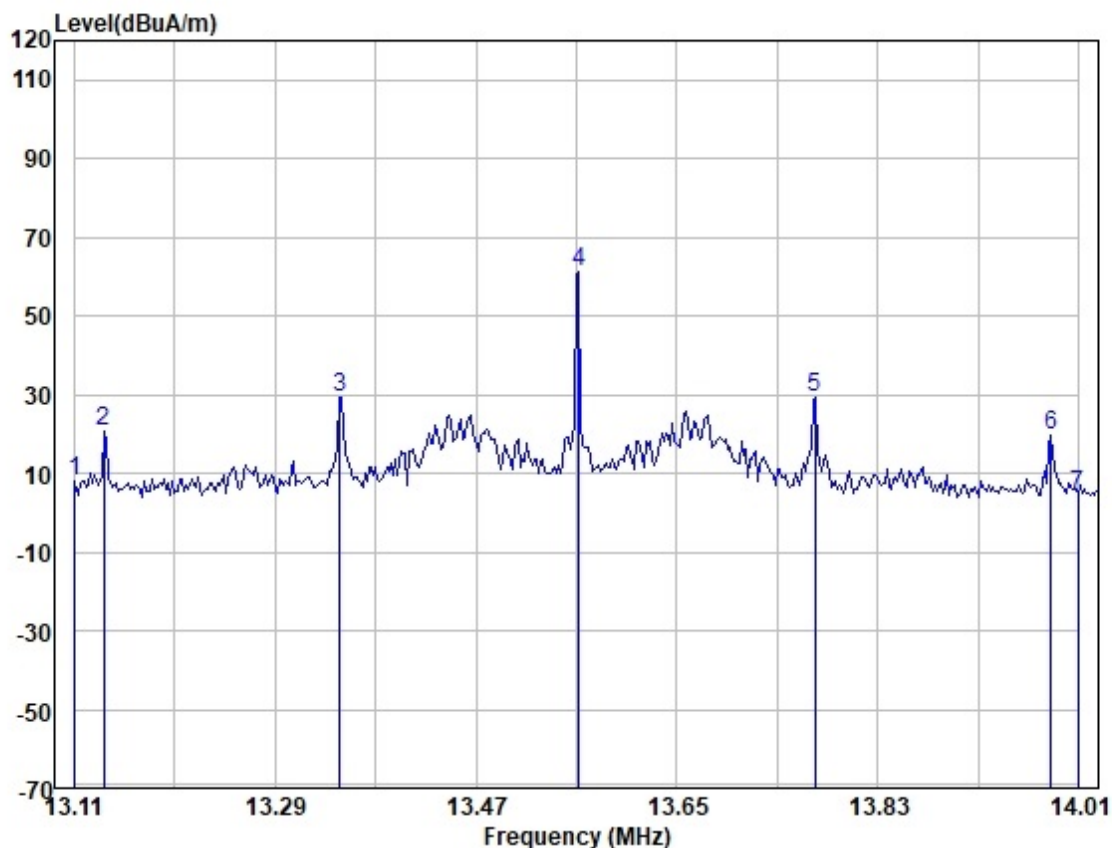
Frequency (MHz)	Measured Level (dBuV/m) @3m	Extrapolation Correction (dB)	Level (dBuV/m) @ 30m	Limit (dBuV/m) @30m	Over limit (dB)
13.110	6.56	40	-33.44	29.54	-62.98
13.138	20.28	40	-19.72	40.51	-60.23
13.348	28.99	40	-11.01	50.47	-61.48
13.562	61.43	40	21.43	84.00	-62.57
13.774	28.57	40	-11.43	50.47	-61.90
13.986	19.77	40	-20.23	40.51	-60.74
14.010	5.46	40	-34.54	29.54	-64.08

Remark: Extrapolation Correction (dB)@3m to 30 m = $40 \cdot \log(3/30) = -40$ according to FCC part 15.31 (f) (1)

Level (dBuV/m) @ 30m = Measured Level (dBuV/m) @3m + Extrapolation Correction (dB)@3m to 30 m



Test Mode: 03



loop :
Test Mode:
Model :

Frequency MHz	Read level dBuV/m	Cable Loss dB	Antenna Factor dB/m	Preamp Factor dB	Measured level dBuV/m	Limit Line dBuV/m	Over limit dB
13.110	81.31	0.19	-40.92	32.71	7.87		
13.136	94.02	0.19	-40.92	32.71	20.58		
13.348	102.81	0.19	-40.97	32.71	29.32		
13.562	134.96	0.20	-41.02	32.72	61.42		
13.774	102.69	0.20	-41.06	32.72	29.11		
13.986	93.24	0.20	-41.10	32.72	19.62		
14.010	78.23	0.20	-41.10	32.72	4.61		



Frequency (MHz)	Measured Level (dBuV/m) @3m	Extrapolation Correction (dB)	Level (dBuV/m) @ 30m	Limit (dBuV/m) @30m	Over limit (dB)
13.110	7.87	40	-32.13	29.54	-61.67
13.136	20.58	40	-19.42	40.51	-59.93
13.348	29.32	40	-10.68	50.47	-61.15
13.562	61.42	40	21.42	84.00	-62.58
13.774	29.11	40	-10.89	50.47	-61.36
13.986	19.62	40	-20.38	40.51	-60.89
14.010	4.61	40	-35.39	29.54	-64.93

Remark: Extrapolation Correction (dB)@3m to 30 m = $40 \cdot \log(3/30) = -40$ according to FCC part 15.31 (f) (1)

Level (dBuV/m) @ 30m = Measured Level (dBuV/m) @3m + Extrapolation Correction (dB)@3 m to 30 m



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7.4 Frequency tolerance

Test Requirement	47 CFR Part 15, Subpart C 15.225(e)
Test Method:	ANSI C63.10 (2020) Section 6.8
Limit:	Within $\pm 0.01\%$ of the operating frequency

7.4.1 E.U.T. Operation

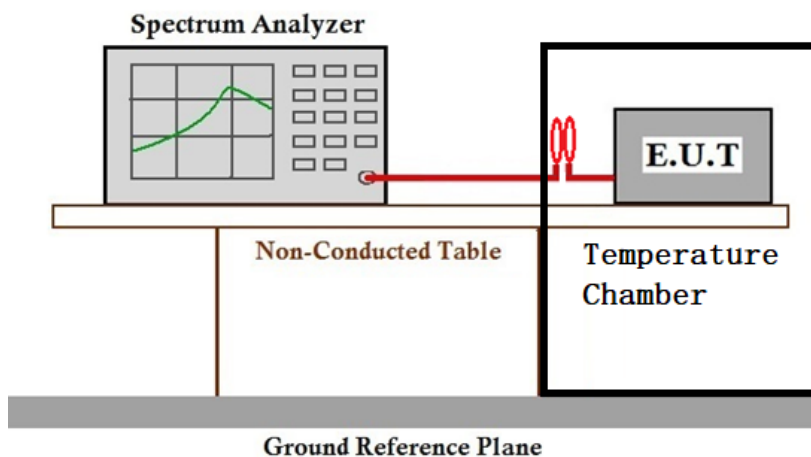
Operating Environment:

Temperature: 22.1 °C Humidity: 69.2 % RH Atmospheric Pressure: 1006 mbar

7.4.2 Test Mode Description

Pre-scan / Mode	Description
Final test Code	
Final test 01	TX mode with modulation according to antenna 1
Final test 03	TX mode with modulation according to antenna 2

7.4.3 Test Setup Diagram



7.4.4 Measurement Procedure and Data

The EUT was placed in an environmental test chamber and powered such that control element received normal voltage and the transmitter provided maximum RF output.

Test model: 01

Limit: $\pm 0.01\%$

Start up

Voltage (V AC)	Temperature (°C)	Frequency Measured (MHz)	Test data (%)	Verdict
$V_{\text{norm}} : 120$	-20	13.56121	0.0089%	Pass
	-10	13.56124	0.0092%	Pass
	0	13.56124	0.0091%	Pass
	10	13.56121	0.0089%	Pass
	$T_{\text{normal}} : +20$	13.56045	0.0033%	Pass
	30	13.56133	0.0098%	Pass
	40	13.56122	0.0090%	Pass
	50	13.56136	0.0100%	Pass
$V_{\text{max}} : 132$	$T_{\text{normal}} : +20$	13.56122	0.0090%	Pass
$V_{\text{min}} : 108$		13.56129	0.0095%	Pass

2min

Voltage (V AC)	Temperature (°C)	Frequency Measured (MHz)	Test data (%)	Verdict
$V_{\text{norm}} : 120$	-20	13.56109	0.0080%	Pass
	-10	13.5613	0.0096%	Pass
	0	13.56103	0.0076%	Pass
	10	13.56101	0.0075%	Pass
	$T_{\text{normal}} : +20$	13.56045	0.0033%	Pass
	30	13.56106	0.0078%	Pass
	40	13.56118	0.0087%	Pass
	50	13.56105	0.0078%	Pass
$V_{\text{max}} : 132$	$T_{\text{normal}} : +20$	13.56104	0.0077%	Pass
$V_{\text{min}} : 108$		13.56134	0.0099%	Pass

5min

Voltage (V AC)	Temperature (°C)	Frequency Measured (MHz)	Test data (%)	Verdict
$V_{\text{norm}} : 120$	-20	13.56121	0.0090%	Pass
	-10	13.56109	0.0080%	Pass
	0	13.56101	0.0075%	Pass
	10	13.5612	0.0088%	Pass
	$T_{\text{normal}} : +20$	13.56045	0.0033%	Pass
	30	13.56127	0.0093%	Pass
	40	13.56115	0.0085%	Pass
	50	13.56131	0.0097%	Pass
$V_{\text{max}} : 132$	$T_{\text{normal}} : +20$	13.56121	0.0089%	Pass
$V_{\text{min}} : 108$		13.5611	0.0081%	Pass

10min

Voltage (V AC)	Temperature (°C)	Frequency Measured (MHz)	Test data (%)	Verdict
$V_{\text{norm}} : 120$	-20	13.56121	0.0089%	Pass
	-10	13.56105	0.0077%	Pass
	0	13.56107	0.0079%	Pass
	10	13.56103	0.0076%	Pass
	$T_{\text{normal}} : +20$	13.56045	0.0033%	Pass
	30	13.56102	0.0075%	Pass
	40	13.56106	0.0078%	Pass
	50	13.56113	0.0083%	Pass
$V_{\text{max}} : 132$	$T_{\text{normal}} : +20$	13.56119	0.0088%	Pass
$V_{\text{min}} : 108$		13.5612	0.0089%	Pass



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Test model: 03

Limit: $\pm 0.01\%$

Start up

Voltage (V AC)	Temperature (°C)	Frequency Measured (MHz)	Test data (%)	Verdict
$V_{\text{norm}} : 120$	-20	13.56109	0.0080 %	Pass
	-10	13.56107	0.0079 %	Pass
	0	13.56101	0.0074 %	Pass
	10	13.56103	0.0076 %	Pass
	$T_{\text{normal}} : +20$	13.56045	0.0033 %	Pass
	30	13.56112	0.0082 %	Pass
	40	13.56135	0.0099 %	Pass
	50	13.56121	0.0089 %	Pass
$V_{\text{max}} : 132$	$T_{\text{normal}} : +20$	13.56102	0.0075 %	Pass
$V_{\text{min}} : 108$		13.56117	0.0086 %	Pass

2min

Voltage (V AC)	Temperature (°C)	Frequency Measured (MHz)	Test data (%)	Verdict
$V_{\text{norm}} : 120$	-20	13.56122	0.0090 %	Pass
	-10	13.56124	0.0091 %	Pass
	0	13.56133	0.0098 %	Pass
	10	13.56103	0.0076 %	Pass
	$T_{\text{normal}} : +20$	13.56045	0.0033 %	Pass
	30	13.56114	0.0084 %	Pass
	40	13.5611	0.0081 %	Pass
	50	13.56113	0.0084 %	Pass
$V_{\text{max}} : 132$	$T_{\text{normal}} : +20$	13.56116	0.0086 %	Pass
$V_{\text{min}} : 108$		13.56127	0.0094 %	Pass

5min

Voltage (V AC)	Temperature (°C)	Frequency Measured (MHz)	Test data (%)	Verdict
$V_{\text{norm}} : 120$	-20	13.56122	0.0090 %	Pass
	-10	13.56134	0.0099 %	Pass
	0	13.56111	0.0082 %	Pass
	10	13.56127	0.0094 %	Pass
	$T_{\text{normal}} : +20$	13.56045	0.0033 %	Pass
	30	13.56104	0.0077 %	Pass
	40	13.56111	0.0082 %	Pass
	50	13.56116	0.0085 %	Pass
$V_{\text{max}} : 132$	$T_{\text{normal}} : +20$	13.56116	0.0085 %	Pass

10min

Voltage (V AC)	Temperature (°C)	Frequency Measured (MHz)	Test data (%)	Verdict
$V_{\text{norm}} : 120$	-20	13.561	0.0074 %	Pass
	-10	13.56119	0.0088 %	Pass
	0	13.56101	0.0075 %	Pass
	10	13.56127	0.0094 %	Pass
	$T_{\text{normal}} : +20$	13.56045	0.0033 %	Pass
	30	13.56129	0.0095 %	Pass
	40	13.56127	0.0094 %	Pass
	50	13.56101	0.0074 %	Pass
$V_{\text{max}} : 132$	$T_{\text{normal}} : +20$	13.56114	0.0084 %	Pass





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EMC-TRF-01 Rev 2.0

Report No.: GZCR250600085703

Page: 27 of 43

V _{min} : 108		13.56101	0.0075 %	Pass	V _{min} : 108		13.56104	0.0077%	Pass
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7.5 Radiated Emissions (9kHz-30MHz)

Test Requirement 47 CFR Part 15, Subpart C 15.225(d) & 15.209

Test Method: ANSI C63.10 (2020) Section 6.4

Test Distance: 3 m

Limit:

Frequency(MHz)	Field strength (microvolts/meter)	Limit (dBuV/m)	Detector	Measurement Distance (meters)
0.009-0.490	2400/F(kHz)	-	-	300
0.490-1.705	24000/F(kHz)	-	-	30
1.705-30	30	-	-	30

Below 30MHz

If field strength is measured at only a single point, then that point shall be at the radial from the EUT that produces the maximum emission at the frequency being measured, as described in 5.4. If that point is closer to the EUT than $\lambda/2\pi$ and the limit distance is greater than $\lambda/2\pi$, the measurement shall be extrapolated to the limit distance by conservatively presuming that the field strength decreases at a 40 dB/decade of distance rate to the $\lambda/2\pi$ distance, and at a 20 dB/decade of distance rate beyond $\lambda/2\pi$. This shall be accomplished using Equation (2):

$$FS_{(10m)} = FS_{(30/300m)} + 40\log\{d_{(near\ field)}/d_{(10m)}\} + 20\log\{d_{(30/300m)}/d_{(near\ field)}\} \quad (2)$$

If the single point measured is at a distance greater than $\lambda/2\pi$, then extrapolation to the limit distance shall be calculated using Equation (3):

$$FS_{(10m)} = FS_{(30/300m)} + 20\log\{d_{(30/300m)}/d_{(10m)}\} \quad (3)$$

If both the single point and the limit distance are equal to or closer to the EUT than $\lambda/2\pi$, then extrapolation to the limit distance shall be calculated using Equation (4):

$$FS_{(10m)} = FS_{(30/300m)} + 40\log\{d_{(30/300m)}/d_{(10m)}\} \quad (4)$$

Remark:

$$d_{near\ field} = 47.77 / f_{MHz}$$

where f_{MHz} is the frequency of the emission being measured in MHz.

Remark:

1) The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

Final Test Level = Receiver Reading + Antenna Factor + Cable Factor – Preamplifier Factor

$$FS_{\text{limit}} = FS_{\text{max}} - 40 \log \left(\frac{d_{\text{limit}}}{d_{\text{measure}}} \right)$$

where

FS_{limit} is the calculation of field strength at the limit distance, expressed in dB μ V/m
 FS_{max} is the measured field strength, expressed in dB μ V/m
 d_{measure} is the distance of the measurement point from the EUT
 d_{limit} is the reference distance or the distance of the $\lambda/2\pi$ point

7.5.1 E.U.T. Operation

Operating Environment:

Temperature: 22.4 °C

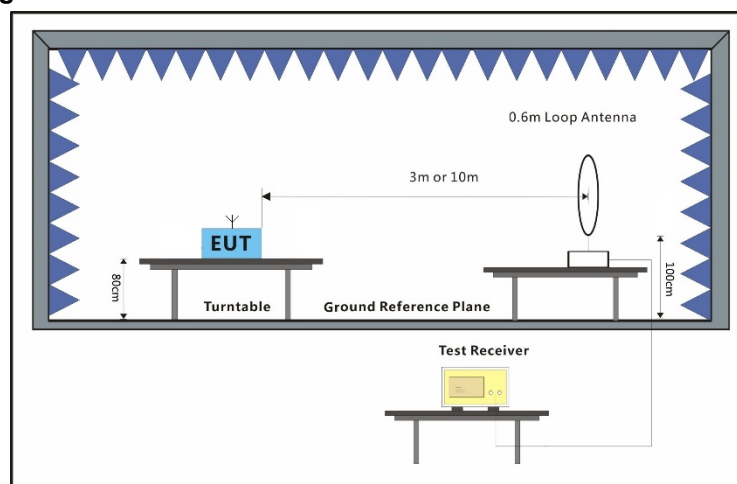
Humidity: 50.4 % RH

Atmospheric Pressure: 1004 mbar

7.5.2 Test Mode Description

Pre-scan / Mode	Description
Final test Code	
Final test 01	TX mode with modulation according to antenna 1
Final test 03	TX mode with modulation according to antenna 2

7.5.3 Test Setup Diagram

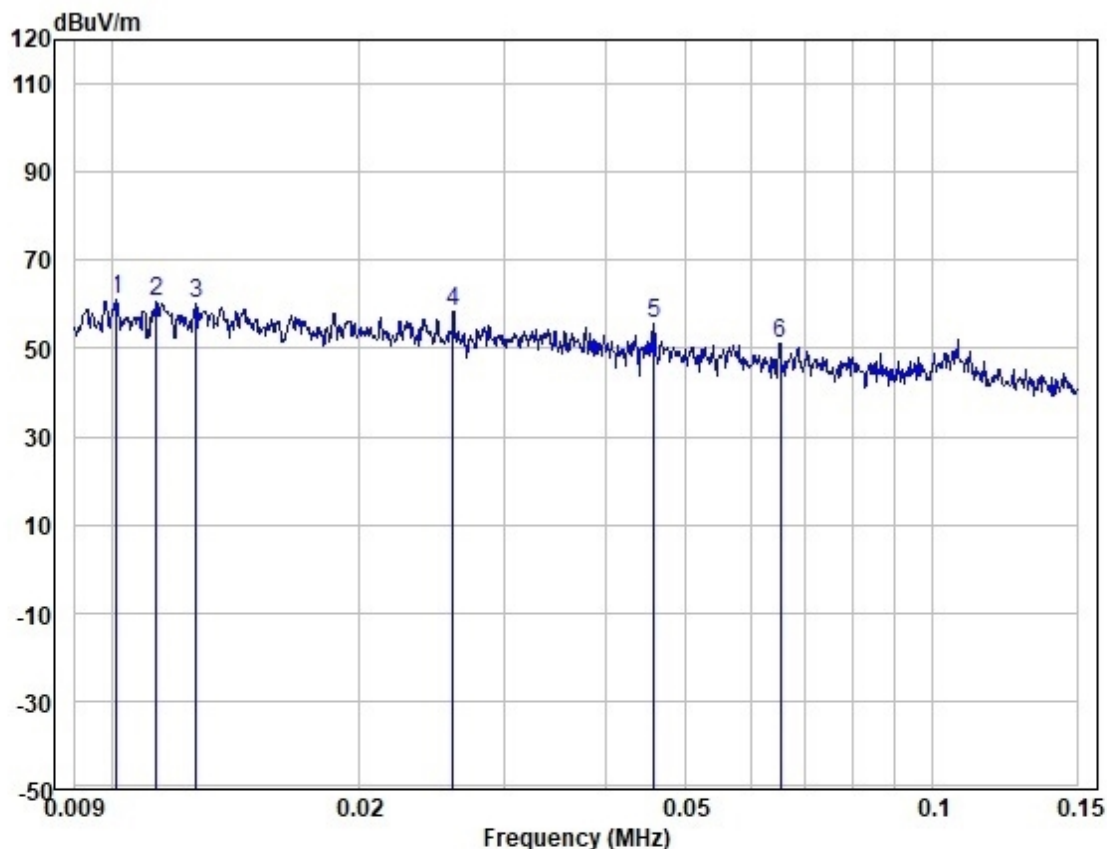


7.5.4 Measurement Procedure and Data

For testing performed with the loop antenna, the center of the loop was positioned 1 m above the ground and positioned with its plane vertical at the specified distance from the EUT. During testing the loop was rotated about its vertical axis for maximum response at each azimuth and also investigated with the loop positioned in the horizontal plane. Only the worst position of vertical was shown in the report.



Test Mode: 01



loop :
Test Mode:
Model :

Frequency MHz	Read level dBuV/m	Cable Loss dB	Antenna Factor dB/m	Preamp Factor dB	Measured level dBuV/m	Limit Line dBuV/m	Over limit dB
0.010	72.56	0.01	21.46	32.72	61.31		
0.011	72.29	0.01	20.98	32.72	60.56		
0.013	72.54	0.01	20.16	32.72	59.99		
0.026	75.06	0.01	16.07	32.72	58.42		
0.046	73.28	0.01	15.03	32.72	55.60		
0.065	68.84	0.01	14.82	32.72	50.95		



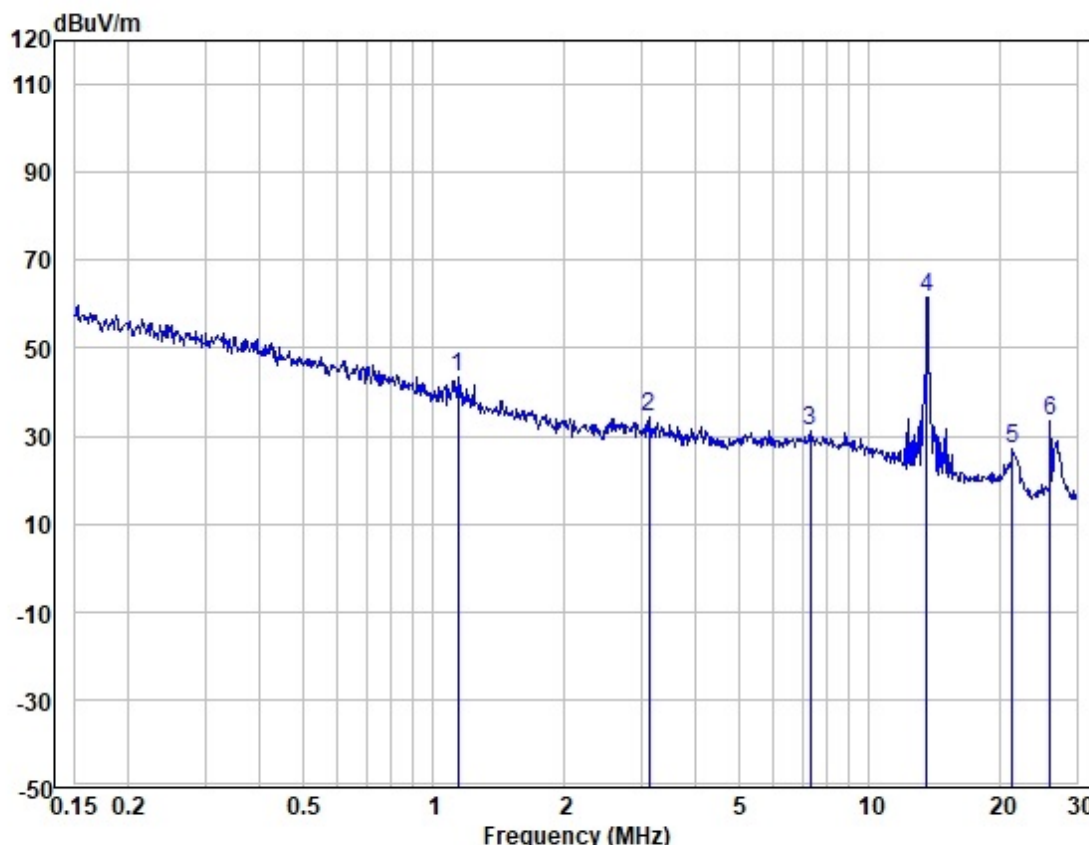
Frequency (MHz)	Level @3m (dBuV/m)	Limit @300m (dBuV/m)	Convert Factor (dB)	Level @ 300m (dBuV/m)	Over limit (dB)	Remark
0.010	61.31	47.60	80	-18.69	-66.29	AV
0.011	60.56	46.78	80	-19.44	-66.22	AV
0.013	59.99	45.33	80	-20.01	-65.34	AV
0.026	58.42	39.30	80	-21.58	-60.88	AV
0.046	55.60	34.35	80	-24.40	-58.75	AV
0.065	50.95	31.35	80	-29.05	-60.40	AV

Remark: Extrapolation Correction (dB)@3m to 30 m = $40 \cdot \log(3/30) = -40$ according to FCC part 15.31 (f) (1)

Level (dBuV/m) @ 30m = Measured Level (dBuV/m) @3m + Extrapolation Correction (dB)@3 m to 30 m



Test Mode: 01



loop :
Test Mode:
Model :

Frequency MHz	Read level dBuV/m	Cable Loss dB	Antenna Factor dB/m	Preamp Factor dB	Measured level dBuV/m	Limit Line dBuV/m	Over limit dB
1.135	62.85	0.05	13.38	32.70	43.58		
3.123	53.49	0.07	13.45	32.70	34.31		
7.329	51.55	0.13	12.38	32.71	31.35		
13.551	83.41	0.20	10.51	32.72	61.40		
21.260	50.48	0.25	8.88	32.73	26.88		
26.001	58.98	0.28	6.82	32.74	33.34		

Remark: Point 4 in the plot is the NFC operating frequency, and please refer to section 7.3.4 for details.



Frequency (MHz)	Level @3m (dBuV/m)	Extrapolation Correction (dB)	Level @ 30m (dBuV/m)	Limit @30m (dBuV/m)	Over limit (dB)	Remark
1.135	43.58	40	3.58	26.50	-22.92	QP
3.123	34.31	40	-5.69	29.54	-35.23	QP
7.329	31.35	40	-8.65	29.54	-38.19	QP
13.551	61.40	40	21.40	29.54	-8.14	QP
21.260	26.88	40	-13.12	29.54	-42.66	QP
26.001	33.34	40	-6.66	29.54	-36.20	QP

Remark: Extrapolation Correction (dB)@3m to 30 m = $40 \cdot \log(3/30) = -40$ according to FCC part 15.31 (f) (1)
 Level (dBuV/m) @ 30m = Measured Level (dBuV/m) @3m + Extrapolation Correction (dB)@3 m to 30 m



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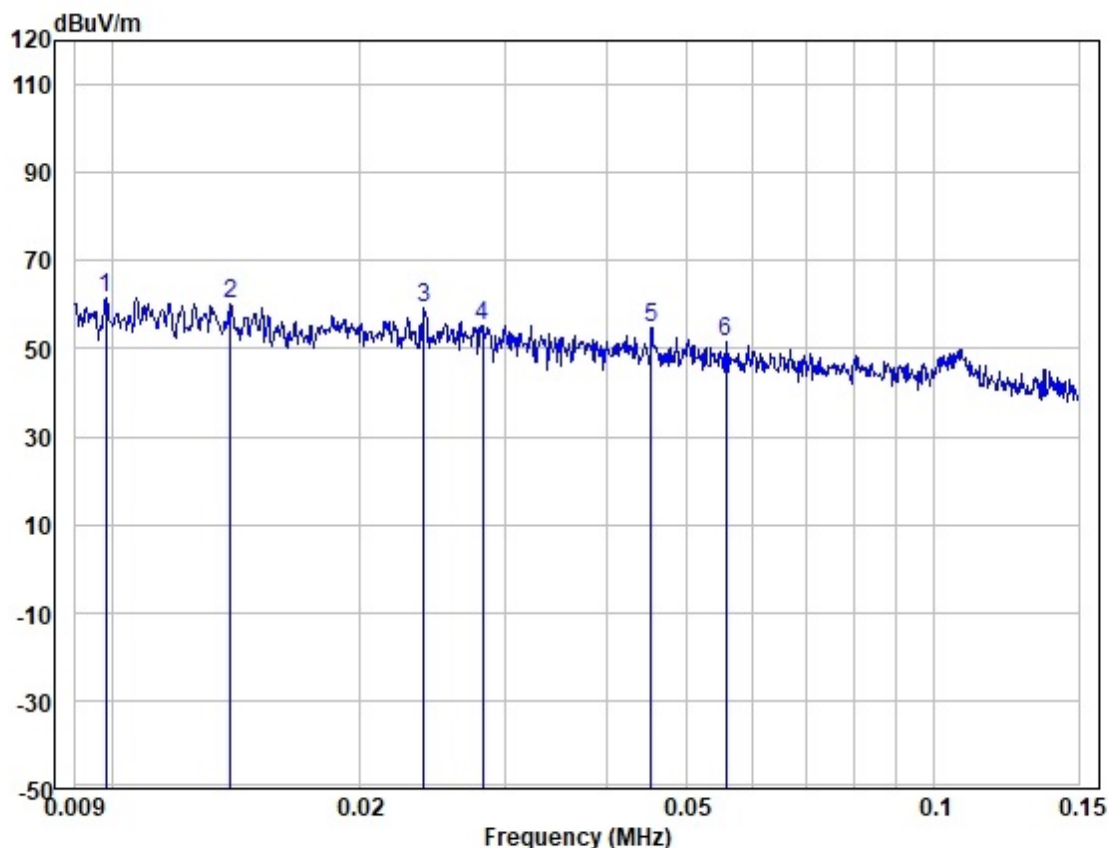
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Test Mode: 03



loop :
Test Mode:
Model :

Frequency MHz	Read level dBuV/m	Cable Loss dB	Antenna Factor dB/m	Preamp Factor db	Measured level dBuV/m	Limit Line dBuV/m	Over limit dB
0.010	72.18	0.01	21.58	32.72	61.05		
0.014	73.78	0.01	18.88	32.72	59.95		
0.024	75.29	0.01	16.46	32.72	59.04		
0.028	72.12	0.01	15.84	32.72	55.25		
0.045	72.34	0.01	15.04	32.72	54.67		
0.056	69.37	0.01	14.86	32.72	51.52		



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Frequency (MHz)	Level @3m (dBuV/m)	Limit @300m (dBuV/m)	Convert Factor (dB)	Level @ 300m (dBuV/m)	Over limit (dB)	Remark
0.010	61.05	47.60	80	-18.95	-66.55	AV
0.014	59.95	44.68	80	-20.05	-64.73	AV
0.024	59.04	40.00	80	-20.96	-60.96	AV
0.028	55.25	38.66	80	-24.75	-63.41	AV
0.045	54.67	34.54	80	-25.33	-59.87	AV
0.056	51.52	32.64	80	-28.48	-61.12	AV

Remark: Extrapolation Correction (dB)@3m to 30 m = $40 \cdot \log(3/30) = -40$ according to FCC part 15.31 (f) (1)

Level (dBuV/m) @ 30m = Measured Level (dBuV/m) @3m + Extrapolation Correction (dB)@3 m to 30 m



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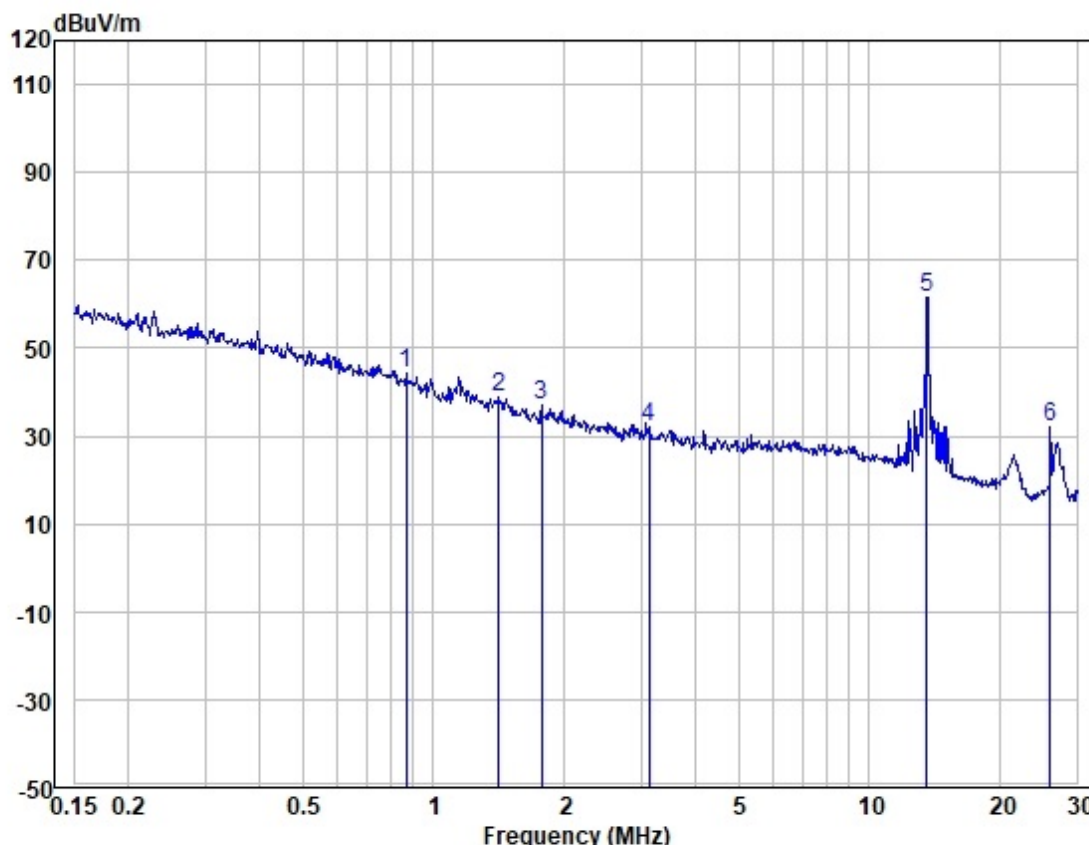
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Test Mode: 03



loop :
Test Mode:
Model :

Frequency MHz	Read level dBuV/m	Cable Loss dB	Antenna Factor dB/m	Preamp Factor dB	Measured level dBuV/m	Limit Line dBuV/m	Over limit dB
0.866	63.53	0.05	13.54	32.70	44.42		
1.411	57.93	0.05	13.64	32.70	38.92		
1.772	55.56	0.06	13.93	32.70	36.85		
3.123	51.20	0.07	13.45	32.70	32.02		
13.551	83.32	0.20	10.51	32.72	61.31		
26.001	57.71	0.28	6.82	32.74	32.07		

Remark: Point 5 in the plot is the NFC operating frequency, and please refer to section 7.3.4 for details.



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Frequency (MHz)	Level @3m (dBuV/m)	Extrapolation Correction (dB)	Level @ 30m (dBuV/m)	Limit @30m (dBuV/m)	Over limit (dB)	Remark
0.866	44.42	40	4.42	28.85	-24.43	QP
1.411	38.92	40	-1.08	24.61	-25.69	QP
1.772	36.85	40	-3.15	29.54	-32.69	QP
3.123	32.02	40	-7.98	29.54	-37.52	QP
13.551	61.31	40	21.31	29.54	-8.23	QP
26.001	32.07	40	-7.93	29.54	-37.47	QP

Remark: Extrapolation Correction (dB)@3m to 30 m = $40 \cdot \log(3/30) = -40$ according to FCC part 15.31 (f) (1)

Level (dBuV/m) @ 30m = Measured Level (dBuV/m) @3m + Extrapolation Correction (dB)@3 m to 30 m



7.6 Radiated Emissions (30MHz-1GHz)

Test Requirement 47 CFR Part 15, Subpart C 15.225(d) & 15.209

Test Method: ANSI C63.10 (2020) Section 6.5

Limit:

Frequency(MHz)	Field strength(microvolts/meter)	Measurement distance(meters)
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

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

7.6.1 E.U.T. Operation

Operating Environment:

Temperature: 25.1 °C

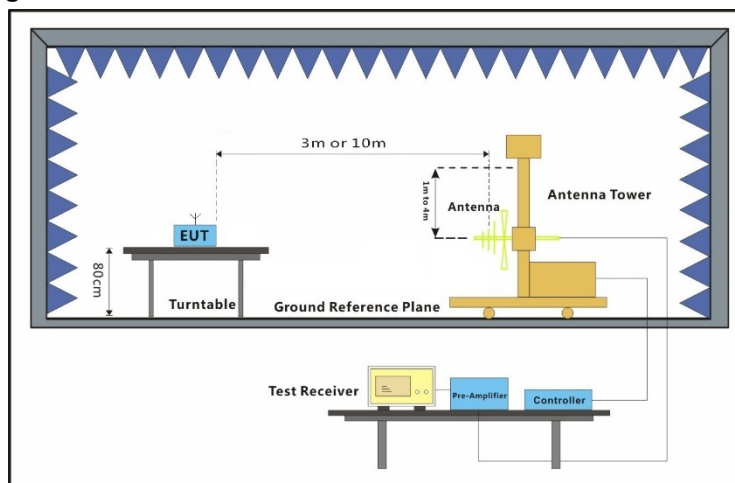
Humidity: 51.2 % RH

Atmospheric Pressure: 1008 mbar

7.6.2 Test Mode Description

Pre-scan / Mode	Description
Final test Code	
Final test 01	TX mode with modulation according to antenna 1
Pre-scan 03	TX mode with modulation according to antenna 2

7.6.3 Test Setup Diagram

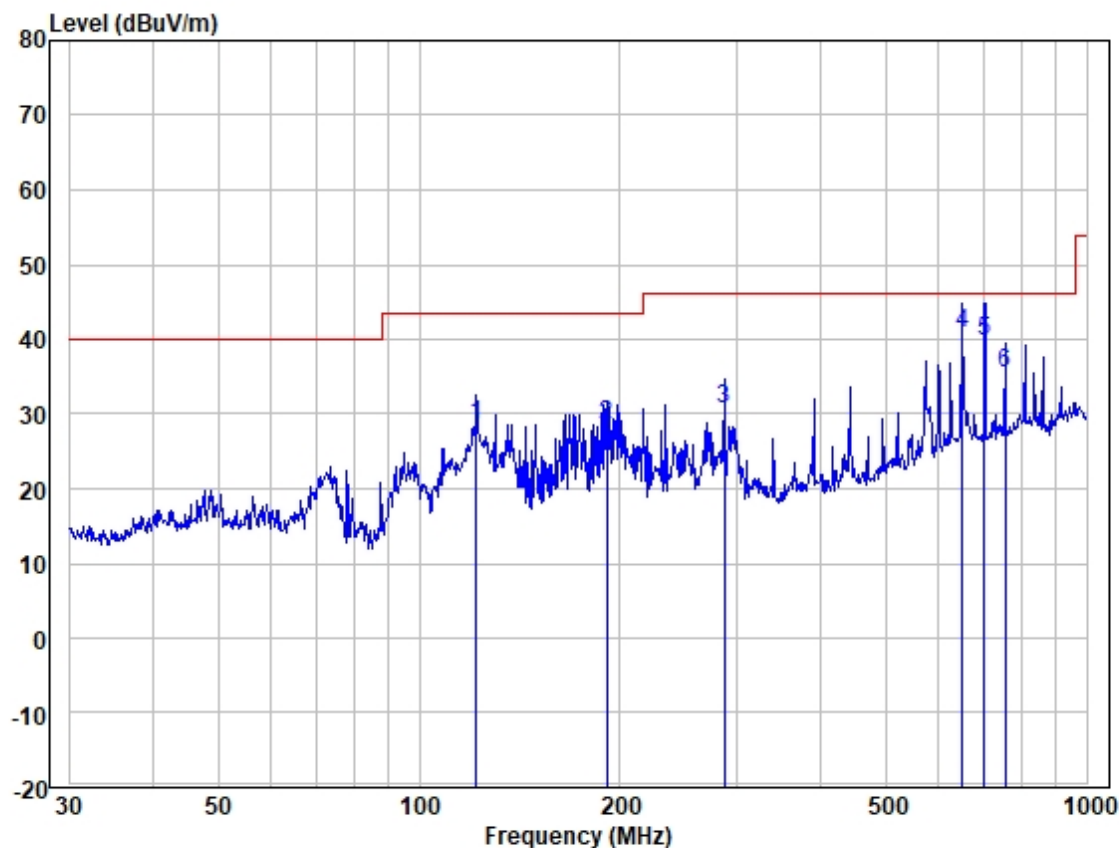


7.6.4 Measurement Procedure and Data

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground for below 1GHz 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 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, quasi-peak or average method as specified and then reported in a data sheet. g. The radiation measurements are performed in X, Y, Z axis positioning. And found the X axis positioning which it is worse case, only the test worst case mode is recorded in the report. Remark: Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor



Test Mode: 01; Polarity: Horizontal

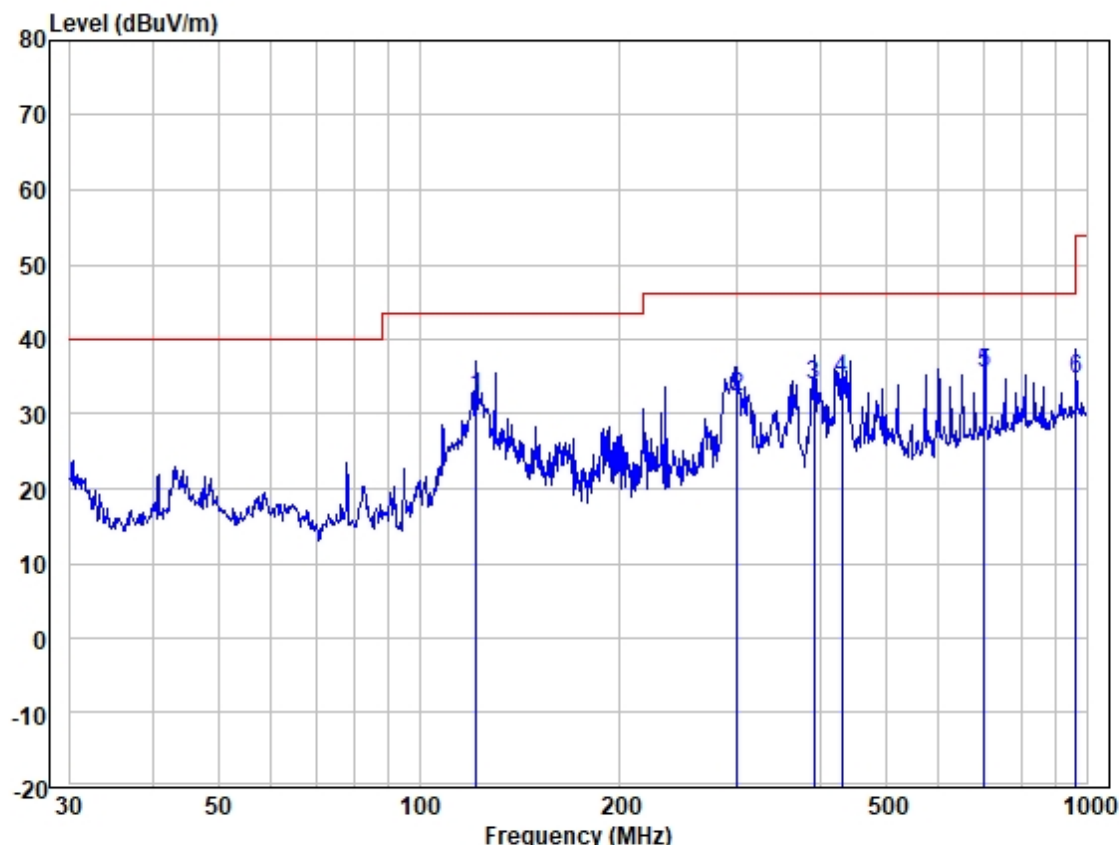


Site : 966 Chamber
Job :
Model :
Power :
Test Mode :

	Freq	Read Level	Antenna Factor	Cable Loss	Preamplifier Factor	Measured Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	121.976	43.48	17.08	0.60	32.71	28.45	43.52	-15.07	HORIZONTAL	
2	191.074	44.24	16.23	0.77	32.81	28.43	43.52	-15.09	HORIZONTAL	
3	285.978	43.60	18.91	0.97	32.87	30.61	46.02	-15.41	HORIZONTAL	
4	651.942	45.25	26.26	1.49	32.23	40.77	46.02	-5.25	HORIZONTAL	
5	701.761	42.88	27.21	1.54	31.84	39.79	46.02	-6.23	HORIZONTAL	
6	755.387	37.79	27.88	1.61	31.69	35.59	46.02	-10.43	HORIZONTAL	



Test Mode: 01; Polarity: Vertical



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

	Freq	Read Level	Antenna Factor	Cable Loss	Preamplifier Factor	Measured Level	Limit Line	Over Limit	Pol/Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	121.976	47.23	17.08	0.60	32.71	32.20	43.52	-11.32	VERTICAL	QP
2	299.316	44.90	19.27	0.98	32.87	32.28	46.02	-13.74	VERTICAL	QP
3	390.723	44.11	21.38	1.15	32.90	33.74	46.02	-12.28	VERTICAL	QP
4	429.523	44.07	22.23	1.19	32.93	34.56	46.02	-11.46	VERTICAL	QP
5	701.761	38.56	27.21	1.54	31.84	35.47	46.02	-10.55	VERTICAL	QP
6	962.162	33.42	30.12	1.82	30.73	34.63	53.98	-19.35	VERTICAL	QP



8 Test Setup Photo

Refer to Setup Photos for GZCR250600085703



9 EUT Constructional Details (EUT Photos)

Refer to External and Internal Photos for GZCR2506000857AT

- End of the Report -

