

Report No.: GZCR210802079801

Page: 1 of 26 **FCC ID:** 2AUIUWSTH1

# TEST REPORT

**Application No.:** GZCR2108020798AT **Applicant:** Wyze Labs, Inc.

Address of Applicant: 5808 Lake Washington Blvd NE Ste 300 Kirkland WA 98033

Manufacturer: Wyze Labs, Inc.

Address of Manufacturer: 5808 Lake Washington Blvd NE Ste 300 Kirkland WA 98033

**Equipment Under Test (EUT):** 

**EUT Name:** Wyze Climate Sensor

Model No.: WSTH1
Trade Mark: WYZE

Standard(s): 47 CFR Part 15, Subpart C 15.249

**Date of Receipt:** 2021-07-01

**Date of Test:** 2021-08-19 to 2021-08-27

**Date of Issue:** 2021-08-27

Test Result: Pass\*

Kobe Jian EMC Laboratory Manager

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<sup>\*</sup> In the configuration tested, the EUT complied with the standards specified above.



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	Revision Record					
Version	Chapter	Date	Modifier	Remark		
01		2021-08-27		Original		

Authorized for issue by			
	Cof Vhu		
	Curry Wu/Project Engineer	-	
	Riday Liu		
	Ricky Liu/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		
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	47 CFR Part 15, Subpart C 15.249	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		

#### 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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## 4 General Information

## 4.1 Details of E.U.T.

Power Supply:	DC 3.0V CR2032 button cell
Operation Frequency:	906.8MHz
Modulation Type:	GFSK
Number of Channels:	1
Antenna Type:	Integral
Antenna Gain:	-1.33dBi

4.2 Description of Support Units

Description	Manufacturer	Model No.	Serial No.			
The EUT has been tested as an independent unit.						

4.3 Measurement Uncertainty

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Test Item	Measurement Uncertainty
20dB Bandwidth	± 3%
Field Strength of the Fundamental Signal (15.249(a))	±5.06dB (3m); ±4.46dB (10m)
Restricted Band Around Fundamental Frequency	±5.06dB (3m); ±4.46dB (10m)
Radiated Emissions Below 1GHz	±5.06dB (3m); ±4.46dB (10m)
Radiated Emissions Above 1GHz	±5.08dB (1GHz-6GHz); ±5.14Db (above 6GHz)



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### 4.4 Test Location

All tests were performed at:

SGS-CSTC Standards Technical Services Co., Ltd., Guangzhou Branch EMC Laboratory, 198 Kezhu Road, Scientech Park, Guangzhou Economic & Technology Development District, Guangzhou, China 510663

Tel: +86 20 82155555 Fax: +86 20 82075059

No tests were sub-contracted.

### 4.5 Test Facility

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

NVLAP (Lab Code: 200611-0)

SGS-CSTC Standards Technical Services Co., Ltd., Guangzhou EMC Laboratory is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP/NIST). NVLAP Code: 200611-0.

The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.

#### 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.

#### CNAS (Lab Code: L0167)

SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory has been assessed and in compliance with CNAS-CL01:2018 accreditation criteria for testing laboratories (identical to ISO/IEC 17025:2017 General Requirements) for the Competence of Testing Laboratories.

### • 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.



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4.6 Deviation from Standards

None

4.7 Abnormalities from Standard Conditions

None



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# 5 Equipment List

20dB Bandwidth						
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date	
EXA Signal Analzer	Agilent	NOOAOA	EMC2138	2020 00 47	2024 00 46	
(10Hz-44GHz)	Technologies	N9010A	EIVICZ 138	2020-09-17	2021-09-16	
6dB Attenuator	HP	8491A	EMC2062	2020-04-15	2022-04-14	
Test Software JS1120-3	HangTianXing	V2.6	GZE100-69	N/A	N/A	
MI CABLE	SGS-EMC	0.8M	EMC2136	2019-11-02	2021-11-01	

Field Strength of the Fundamental Signal (15.249(a))						
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date	
Chamber cable	HangTianXing	N/A	EMC0542	2020-09-09	2022-09-08	
Trilog Broadband Antenna(25MHz-1GHz)- Lab	SCHWARZBECK MESS-ELEKTRONIK	VULB 9168	SEM003-18	2019-02-22	2022-02-22	
Amplifier(9kHz-1.3GHz)	HP	8447F	EMC2065	2021-05-19	2022-05-18	
Active Loop Antenna- RED	ETS-Lindgren	6502	EMC2190	2019-12-27	2021-12-26	
10m Semi-Anechoic Chamber	ETS	N/A	EMC0530	2019-10-20	2022-10-19	
Test Software E3	Audix	Ver.6.120110a	GZE100-61	N/A	N/A	
EMI Test Receiver(1Hz- 8GHz)	Rohde & Schwarz	ESW8	EMC2220	2021-05-26	2022-05-25	

Radiated Emissions (below 1GHz)						
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date	
Chamber cable	HangTianXing	N/A	EMC0542	2020-09-09	2022-09-08	
Trilog Broadband Antenna(25MHz-1GHz)- Lab	SCHWARZBECK MESS-ELEKTRONIK	VULB 9168	SEM003-18	2019-02-22	2022-02-22	
Amplifier(9kHz-1.3GHz)	HP	8447F	EMC2065	2021-05-19	2022-05-18	
Active Loop Antenna- RED	ETS-Lindgren	6502	EMC2190	2019-12-27	2021-12-26	
10m Semi-Anechoic Chamber	ETS	N/A	EMC0530	2019-10-20	2022-10-19	
Test Software E3	Audix	Ver.6.120110a	GZE100-61	N/A	N/A	
EMI Test Receiver(1Hz- 8GHz)	Rohde & Schwarz	ESW8	EMC2220	2021-05-26	2022-05-25	



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Radiated Emissions (above 1GHz)					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
Chamber cable(Above 1GHz)	Scoflex	KMKM-8.0m	EMC0545	2020-09-09	2022-09-08
Horn Antenna(1GHz- 18GHz)	SCHWARZBECK MESS-ELEKTRONIK	BBHA 9120D	EMC2026	2019-09-25	2022-09-24
1GHz-26.5 GHz Pre-Amplifier	Agilent	8449B	EMC0521	2021-01-08	2022-01-07
2.4GHz Filter	Micro-Tronics	BRM 50702	EMC2069	2021-01-08	2022-01-07
966 Anechoic Chamber	C.R.T	9m x 6m x 6m	EMC2142	2020-12-20	2023-12-19
MXE EMI Receiver(10Hz-8.4GHz)	Keysight	N9038A	EMC2139	2020-11-13	2021-11-12
EXA Signal Analyzer(10Hz-44GHz)	Keysight	N9010A	EMC2138	2020-09-17	2021-09-16
Test Software E3	Audix	Ver.6.120110a	GZE100-61	N/A	N/A

General used equipmer					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
DMM	Fluke	73	EMC0006	2021-07-05	2022-07-05
DMM	Fluke	73	EMC0007	2021-07-05	2022-07-05



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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

Limit:

### Standard Requirement:

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

#### **EUT Antenna:**

The antenna is integrated on the main PCB and no consideration of replacement. The best case gain of the antenna is -1.33dBi.

Antenna location: Refer to Internal photos.





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## 7 Radio Spectrum Matter Test Results

### 7.1 20dB Bandwidth

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

### 7.1.1 E.U.T. Operation

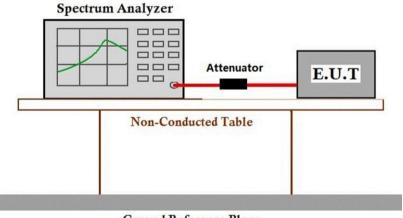
Operating Environment:

Temperature: 25.1 °C Humidity: 50.6 % RH Atmospheric Pressure: 1010 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.

### 7.1.3 Test Setup Diagram



**Ground Reference Plane** 

#### 7.1.4 Measurement Procedure and Data



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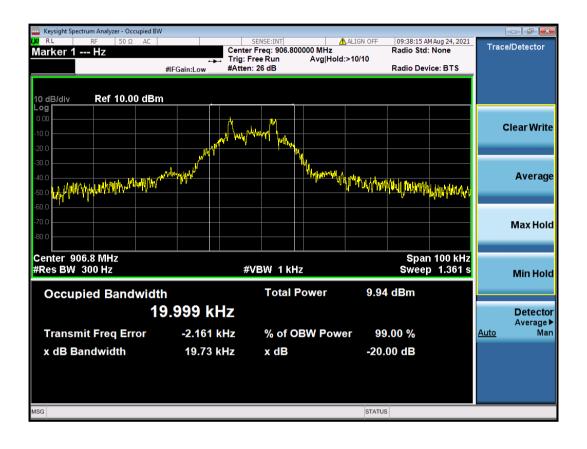


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Test Frequency	20dB bandwidth (MHz)	Results		
906.8MHz	0.01973	Pass		





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### 7.2 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.

### 7.2.1 E.U.T. Operation

Operating Environment:

Temperature: 25.2 °C Humidity: 52.3 % RH Atmospheric Pressure: 1010 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.



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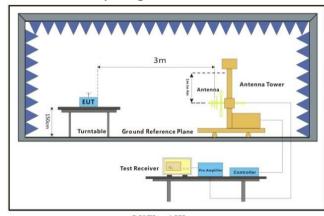
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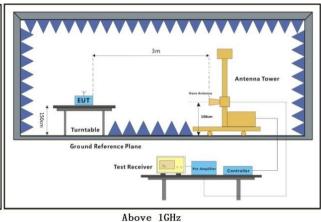


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#### 7.2.3 Test Setup Diagram





30MHz-1GHz

#### 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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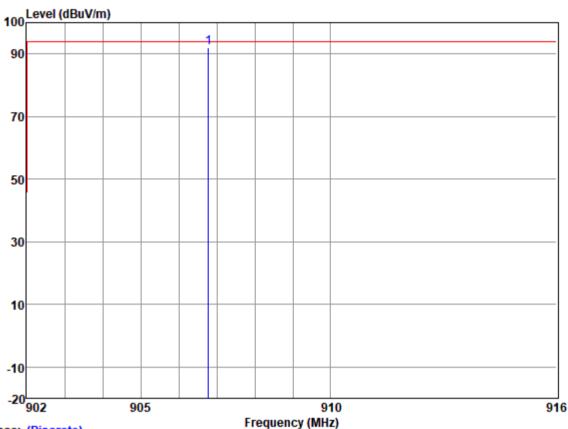


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Test Mode: 00; Polarity: Horizontal



Trace: (Discrete)

Site : SGS
Job :
Model :
Power :
Test Mode :

						Measured Level				Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dBuV		
1	906.78	89.58	23.37	6.96	27.84	92.07	94.00	-1.93	HORIZONTAL	QP



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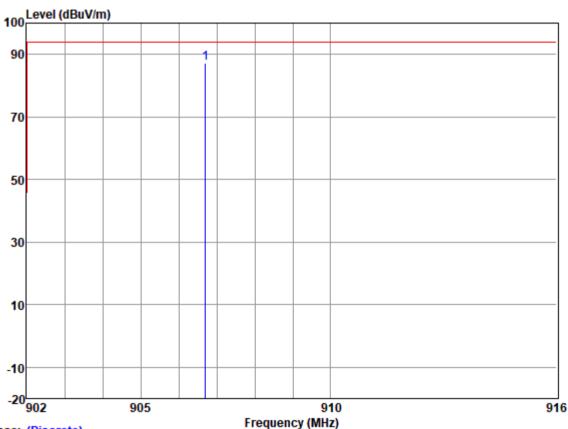


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Test Mode: 00; Polarity: Vertical



Trace: (Discrete)

Site : SGS Job : Model : Power : Test Mode :

	Freq					Measured Level				Remark
						dBuV/m				
1	906.70	84.75	23.37	6.96	27.84	87.24	94.00	-6.76	VERTICAL	QP



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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

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		

### 7.3.1 E.U.T. Operation

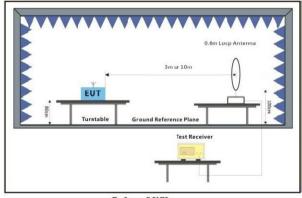
Operating Environment:

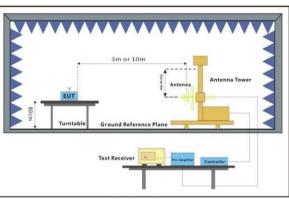
Temperature: 26.7 °C Humidity: 55.1 % RH Atmospheric Pressure: 1010 mbar

#### 7.3.2 Test Mode Description

1.0.2 Test mode bescription								
Pre-scan /	Mode	Description						
Final test	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.
- 3. The disturbance below 1GHz was very low and the harmonics were the highest point could be found when testing, so only the above harmonics had been displayed.



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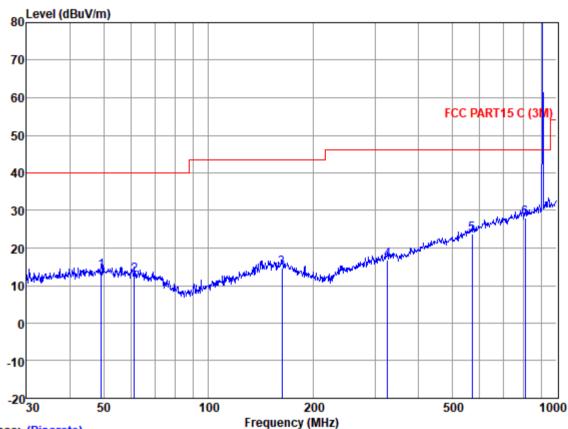


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Test Mode: 00; Polarity: Horizontal; Modulation:GFSK



Trace: (Discrete)

Site : SGS

Condition : FCC PART15 C (3M)

Job :
Model :
Power :
Test Mode :

	Freq					Measured Level			Pol/ Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dBuV		
1	49.19	25.87	13.94	1.14	27.17	13.78	40.00	-26.22	HORIZONTAL	QP
2	61.13	25.51	13.21	1.27	27.16	12.83	40.00	-27.17	HORIZONTAL	QP
3	162.61	25.52	13.57	2.35	26.79	14.65	43.50	-28.85	HORIZONTAL	QP
4	326.74	25.79	14.43	3.38	26.71	16.89	46.00	-29.11	HORIZONTAL	QP
5	570.61	28.08	18.90	4.98	28.17	23.79	46.00	-22.21	HORIZONTAL	QP
6	810.27	27.19	22.70	6.23	28.02	28.10	46.00	-17.90	HORIZONTAL	QP



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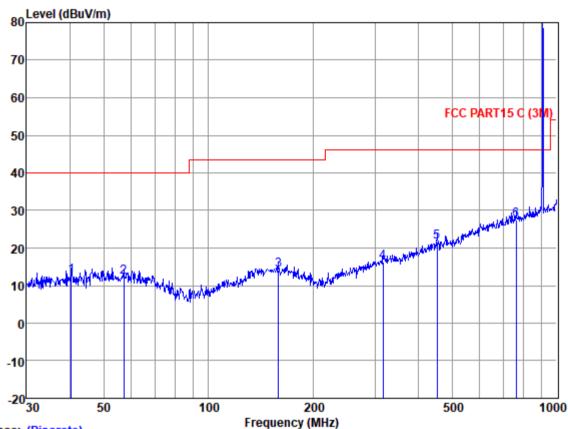


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Test Mode: 00; Polarity: Vertical; Modulation:GFSK



Trace: (Discrete)

Site : SGS

Condition : FCC PART15 C (3M)

Job :
Model :
Power :
Test Mode :

	Freq					Measured Level			Pol/ Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dBuV		
1	40.28	25.12	13.52	1.10	27.18	12.56	40.00	-27.44	VERTICAL	QP
2	56.99	24.63	13.65	1.21	27.16	12.33	40.00	-27.67	VERTICAL	QP
3	158.67	24.86	13.67	2.33	26.80	14.06	43.50	-29.44	VERTICAL	QP
4	316.59	25.41	14.15	3.29	26.64	16.21	46.00	-29.79	VERTICAL	QP
5	452.72	27.77	17.37	4.22	27.72	21.64	46.00	-24.36	VERTICAL	QP
6	763.38	27.35	22.20	6.05	28.07	27.53	46.00	-18.47	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)

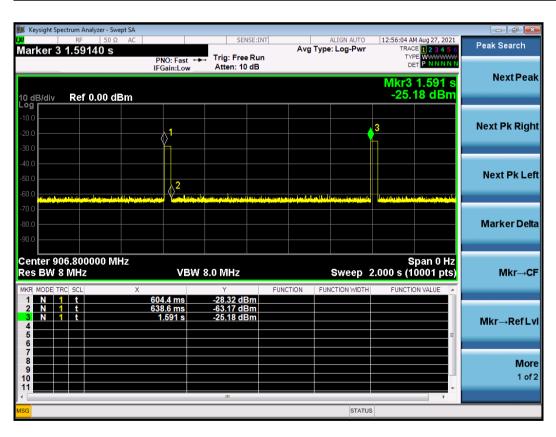
Test Method: ANSI C63.10 (2013) Section 6.6

### Limit:

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

### Average value:

_ / trotago raido.		
Calculate Formula:	Average value=Peak value + PDCF	
	PDCF=20 log(Duty cycle)	
	Duty cycle= T on time / T period	
Test data:	Ton time =34.2ms	
	T period =100ms	
	PCDF value= -9.32dB	





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### 7.4.1 E.U.T. Operation

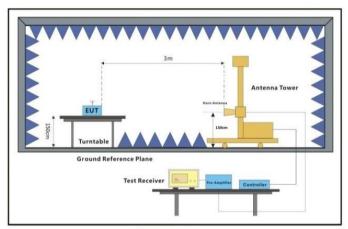
**Operating Environment:** 

Temperature: 23.7 °C Humidity: 54.6 % RH Atmospheric Pressure: 1010 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



Above 1GHz



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



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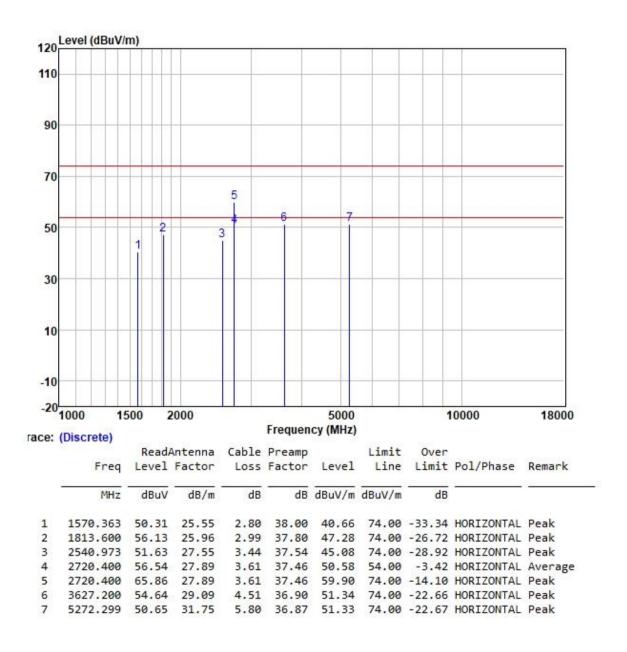


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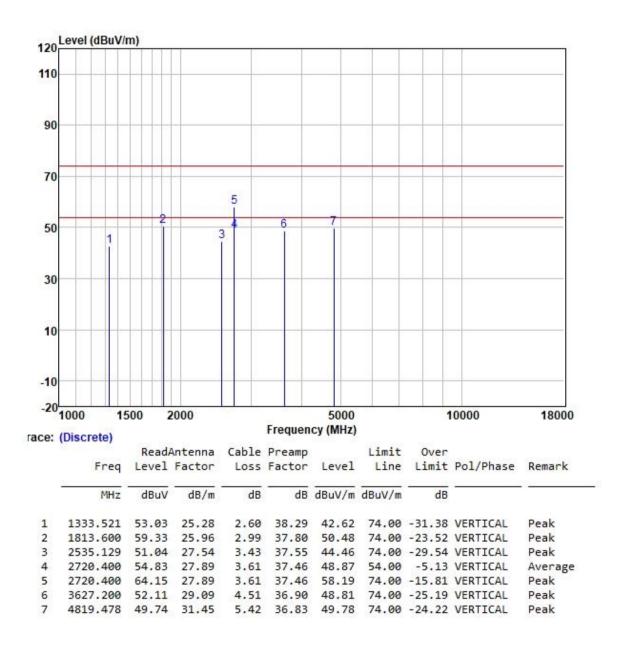


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# 8 Test Setup Photo

Refer to Appendix – Test Setup Photos for GZCR2108020798AT.

# 9 EUT Constructional Details (EUT Photos)

Refer to Appendix – External and Internal Photos for GZCR2108020798AT.

- End of the Report -



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