TEST REPORT

Application No.:	GZCR2109021155AT
Applicant:	Furrion Ltd
Address of Applicant:	4/F, Flat C & D, The Grid, 133 Wai Yip Street, Kwun Tong, Kowloon, Hong Kong
Manufacturer:	Furrion Ltd
Address of Manufacturer:	4/F, Flat C & D, The Grid, 133 Wai Yip Street, Kwun Tong, Kowloon, Hong Kong
Equipment Under Test (EUT):	
EUT Name:	Soundbar Speaker
Model No.:	FSB2N25MC-BL
Trade Mark:	FURRION
Standard(s) :	47 CFR Part 15, Subpart C 15.247
Date of Receipt:	2021-09-02
Date of Test:	2021-09-04 to 2021-10-08
Date of Issue:	2021-10-09
Test Result:	**Pass***

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

Kobe Jian
EMC Laboratory Manager

Revision Record				
Version	**Chapter**	**Date**	**Modifier**	**Remark**
01		*2021-10-09*		*Original*

Authorized for issue by:				
		Curry Wu/Project Engineer		
		Ricky Liu/Reviewer		

2 Test Summary

Radio Spectrum Matter Part				
Item	**Standard**	**Method**	**Requirement**	**Result**
Radiated Spurious Emissions (Below 1GHz)	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 6.4,6.5	47 CFR Part 15, Subpart C 15.205 & 15.209	Pass
Conducted Peak Output Power		ANSI C63.10 (2013) Section 7.8.5	47 CFR Part 15, Subpart C 15.247(b)(1)	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.

Remark:

Model No.: FSB2N25MC-BL

This test report (Ref. No.: GZCR210902115501) is only valid with the original test report (Ref. No.: SZCR210402040602).

Based on original report, it was valid for model FSBN25M-BL (Furrion 12V 4 zone 2.1 soundbar) and for model FSB2N25MC-BL (Furrion 12V 2 zone 2.1 soundbar). In this update, only for the FSB2N25MC-BL an alternative audio amplifier IC OB6220 or CS3818 is to be added, which are pin to pin replacement. The electrical circuit design, layout, internal wiring and functions were identical for FSBN25M-BL and FSB2N25MC-BL models, with only difference on the FSB2N25MC-BL model is the reduction of zone outputs is reduced from 4 to 2, the optical input, the subwoofer external output and the 24C02 data memory were removed and no RF module was changed.

Considering to the difference, pre-scan were performed on the sample in this report to find the items which can be influential to the result in the original test report were fully retested.

Therefore in this report Radiated Spurious Emissions (Below 1GHz) and Conducted Peak Output Power was fully retested and shown the data in this report, other tests please refer to original report SZCR210402040602.

3 Contents

4 General Information

4.1 Details of E.U.T.

Power supply:	DC 12V
	DC 3.0V (1*3.0V button battery) for remote controller
Operation Frequency:	2402MHz to 2480MHz
Bluetooth Version:	V5.0 Dual mode
Modulation Type:	GFSK, pi/4DQPSK, 8DPSK
Number of Channels:	79
Channel Spacing:	1MHz
Spectrum Spread Technology:	Frequency Hopping Spread Spectrum(FHSS)
Antenna Type:	PCB Antenna
Antenna Gain:	-0.5dBi

4.2 Description of Support Units

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

4.3 Measurement Uncertainty

Test Item	Measurement Uncertainty
Radiated Spurious Emissions (Below 1GHz)	±5.06dB (3m); ±4.46dB (10m)
Conducted Peak Output Power	± 0.75dB

Remark:

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

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.

4.6 Deviation from Standards

None

4.7 Abnormalities from Standard Conditions

None

5 Equipment List

Radiated Spurious 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

Conducted Peak Output Power					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
Power Meter (U2021XA_Ch2)	Agilent Technologies	U2021XA_Ch2	SEM009-02	2021-05-19	2022-05-18
MI CABLE	SGS-EMC	0.8M	EMC2136	2019-11-02	2021-11-01

General used equipment					
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

6 Radio Spectrum Matter Test Results

6.1 Radiated Spurious Emissions (Below 1GHz)

Test Requirement 47 CFR Part 15, Subpart C 15.205 & 15.209

Test Method: ANSI C63.10 (2013) Section 6.4,6.5

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
Remark: The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90kHz, 110-490kHz and 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.		

6.1.1 E.U.T. Operation

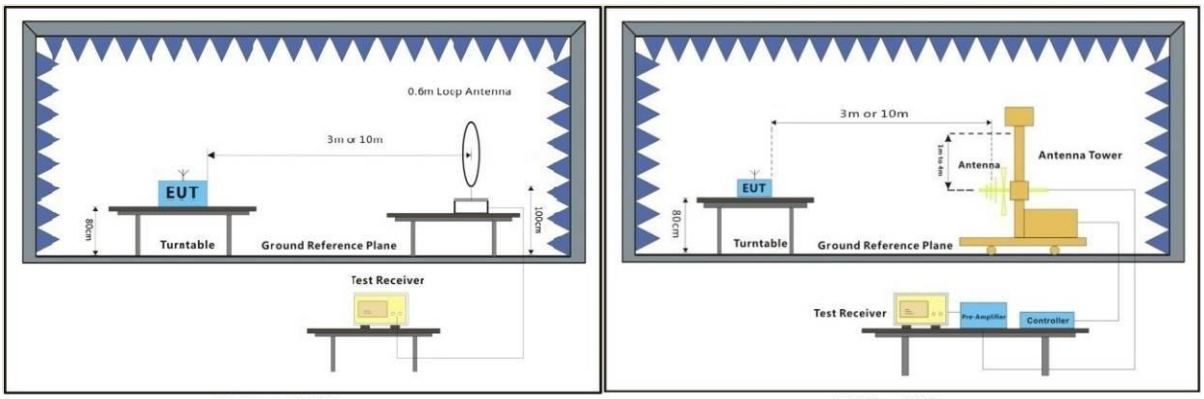
Operating Environment:

Temperature: 23.1 °C Humidity: 52.4 % RH Atmospheric Pressure: 1008 mbar

6.1.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	01	TX_non-Hop mode(OB6220 Sample)_Keep the EUT in continuously transmitting mode with GFSK modulation, pi/4DQPSK modulation, 8DPSK modulation. All modes have been tested and only the data of worst case is recorded in the report.
Final test	03	TX_non-Hop mode(CS3818 Sample)_Keep the EUT in continuously transmitting mode with GFSK modulation, pi/4DQPSK modulation, 8DPSK modulation. All modes have been tested and only the data of worst case is recorded in the report.

6.1.3 Test Setup Diagram



Below 30MHz 30MHz-1GHz

6.1.4 Measurement Procedure and Data

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

b. 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 peak, quasi-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:

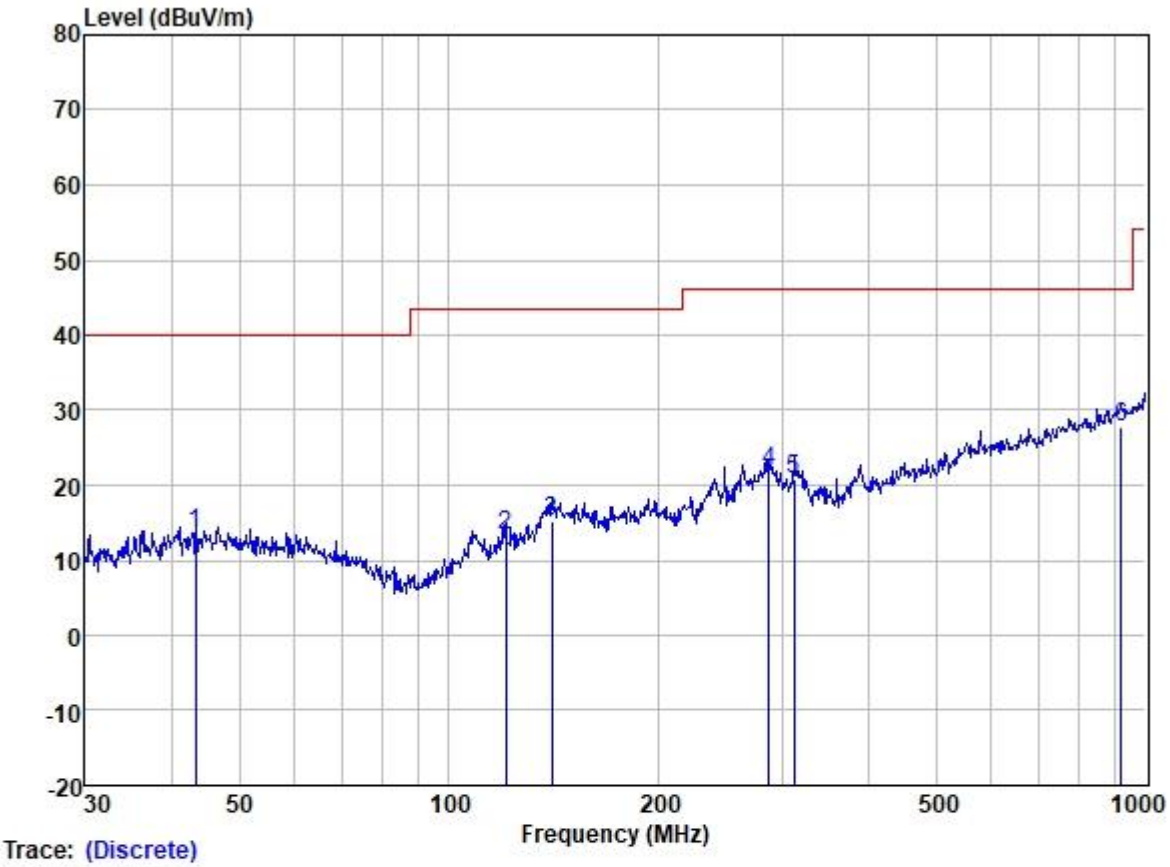
1) Through pre-scan found the worst case is the lowest channel. Only the worst case is recorded in the report.

2) 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

3) Scan from 9kHz to 1 GHz, 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.

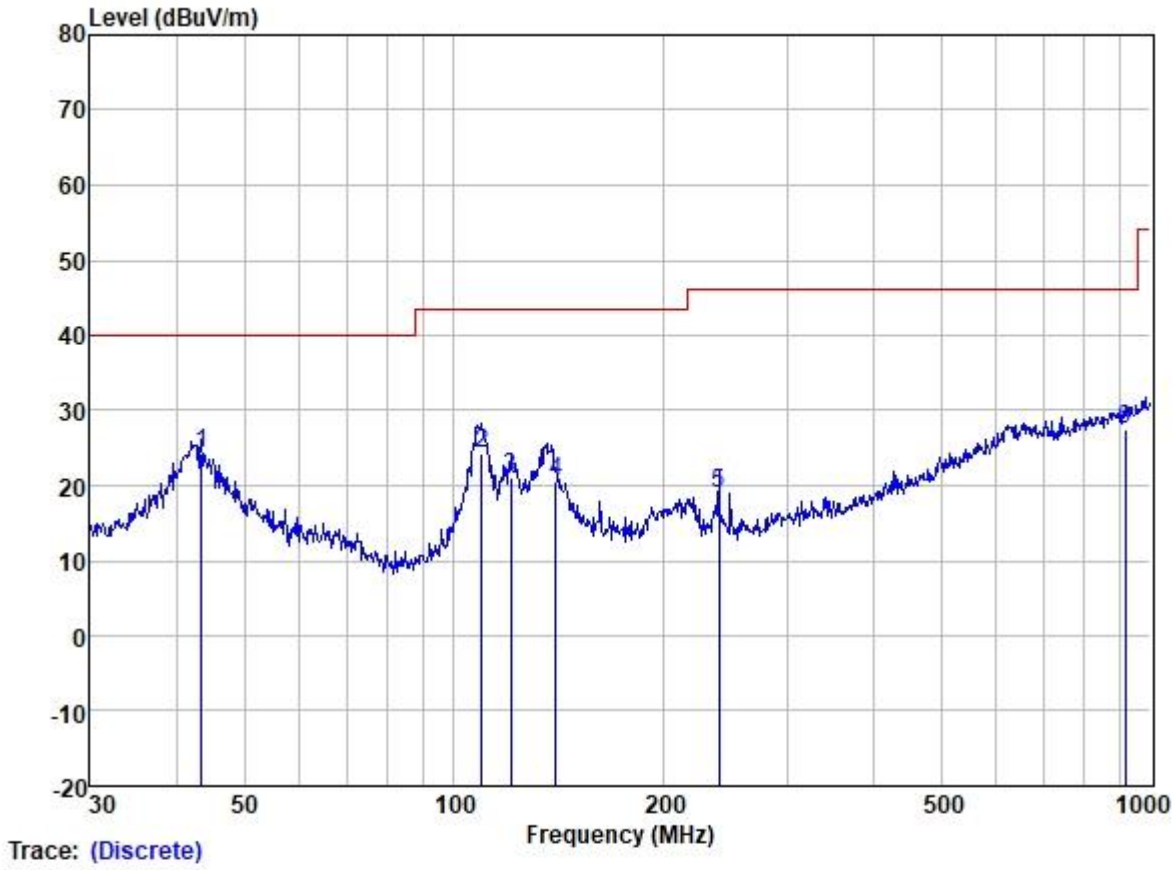
Test Mode: 01; Polarity: Horizontal; Modulation: GFSK; Channel: Low



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

	Freq	Read Level	Anterna Factor	Cable Loss	Preamp Factor	Measured Level	Limit Line	Over Limit	Pol/ Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dBuV		
1	43.20	25.93	13.77	1.12	27.17	13.65	40.00	-26.35	HORIZONTAL	QP
2	120.70	27.41	10.96	1.88	27.03	13.22	43.50	-30.28	HORIZONTAL	QP
3	140.34	26.63	13.35	2.10	26.92	15.16	43.50	-28.34	HORIZONTAL	QP
4	287.99	31.84	13.37	3.12	26.56	21.77	46.00	-24.23	HORIZONTAL	QP
5	312.18	30.08	14.00	3.26	26.61	20.73	46.00	-25.27	HORIZONTAL	QP
6	922.52	24.76	23.67	7.01	27.82	27.62	46.00	-18.38	HORIZONTAL	QP

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

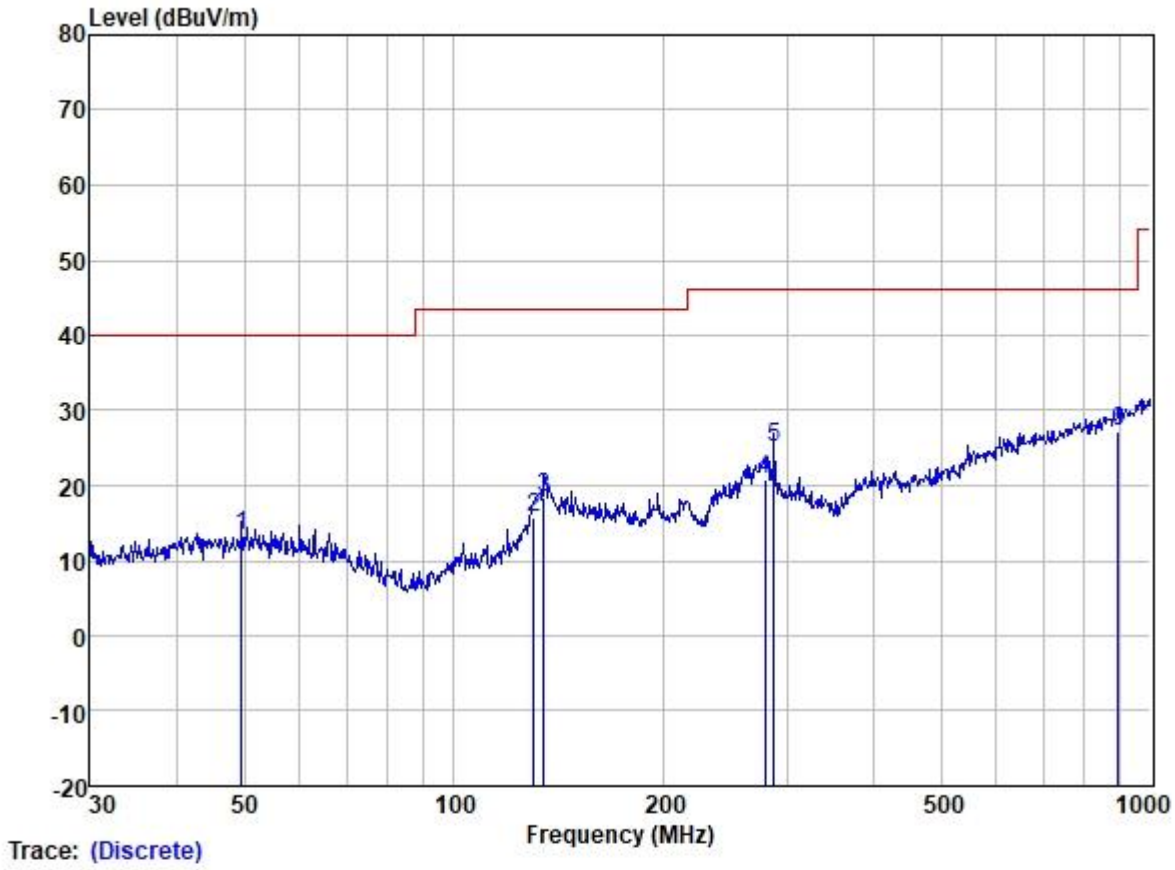


Trace: (Discrete)

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

	Freq	Read Level	Anterna Factor	Cable Loss	Preamp Factor	Measured Level	Limit Line	Over Limit	Pol/ Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dBuV		
1	43.35	36.59	13.77	1.12	27.17	24.31	40.00	-15.69	VERTICAL	QP
2	109.41	39.28	10.37	1.79	27.06	24.38	43.50	-19.12	VERTICAL	QP
3	120.70	35.16	10.96	1.88	27.03	20.97	43.50	-22.53	VERTICAL	QP
4	139.85	32.06	13.30	2.10	26.93	20.53	43.50	-22.97	VERTICAL	QP
5	239.99	30.79	11.90	2.81	26.66	18.84	46.00	-27.16	VERTICAL	QP
6	919.29	24.65	23.60	7.01	27.82	27.44	46.00	-18.56	VERTICAL	QP

Test Mode: 03; Polarity: Horizontal; Modulation: GFSK; Channel: Low

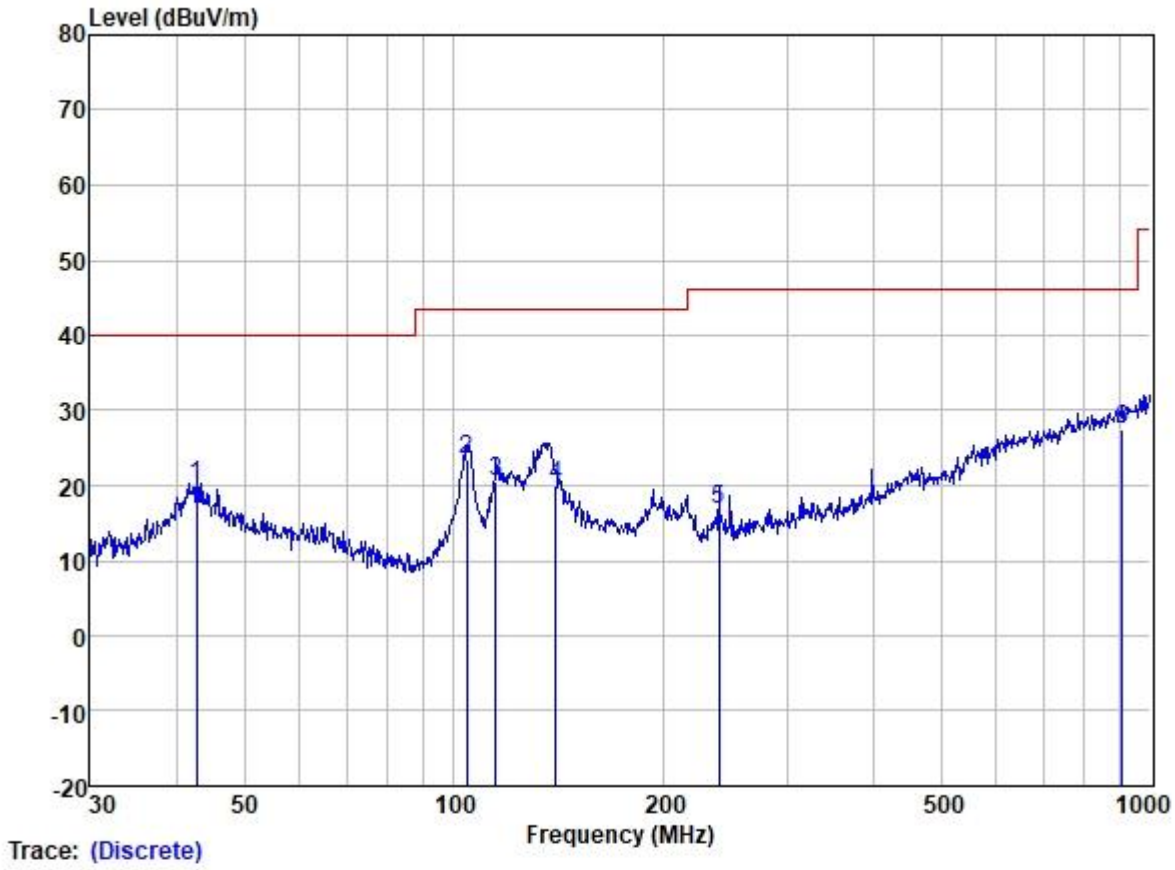


Trace: (Discrete)

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

	Freq	Read Level	Anterna Factor	Cable Loss	Preamp Factor	Measured Level	Limit Line	Over Limit	Pol/ Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dBuV		
1	49.53	25.42	13.92	1.14	27.17	13.31	40.00	-26.69	HORIZONTAL	QP
2	129.92	28.66	12.10	1.96	26.99	15.73	43.50	-27.77	HORIZONTAL	QP
3	134.56	30.73	12.57	2.01	26.97	18.34	43.50	-25.16	HORIZONTAL	QP
4	279.04	31.05	13.17	3.09	26.57	20.74	46.00	-25.26	HORIZONTAL	QP
5	287.99	35.18	13.37	3.12	26.56	25.11	46.00	-20.89	HORIZONTAL	QP
6	897.00	24.90	23.23	6.92	27.85	27.20	46.00	-18.80	HORIZONTAL	QP

Test Mode: 03; Polarity: Vertical; Modulation: GFSK; Channel: Low



Trace: (Discrete)

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

	Freq	Read Level	Anterna Factor	Cable Loss	Preamp Factor	Measured Level	Limit Line	Over Limit	Pol/ Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dBuV		
1	42.60	32.23	13.73	1.11	27.17	19.90	40.00	-20.10	VERTICAL	QP
2	104.17	38.93	9.80	1.75	27.07	23.41	43.50	-20.09	VERTICAL	QP
3	114.92	35.06	10.63	1.83	27.05	20.47	43.50	-23.03	VERTICAL	QP
4	139.85	31.57	13.30	2.10	26.93	20.04	43.50	-23.46	VERTICAL	QP
5	239.99	28.65	11.90	2.81	26.66	16.70	46.00	-29.30	VERTICAL	QP
6	909.67	24.98	23.40	6.96	27.83	27.51	46.00	-18.49	VERTICAL	QP

6.2 Conducted Peak Output Power

Test Requirement 47 CFR Part 15, Subpart C 15.247(b)(1)

Test Method: ANSI C63.10 (2013) Section 7.8.5

Limit:

Frequency range(MHz)	Output power of the intentional radiator(watt)
902-928	1 for ≥50 hopping channels
	0.25 for 25≤ hopping channels <50
	1 for digital modulation
2400-2483.5	1 for ≥75 non-overlapping hopping channels
	0.125 for all other frequency hopping systems
	1 for digital modulation
5725-5850	1 for frequency hopping systems and digital modulation

6.2.1 E.U.T. Operation

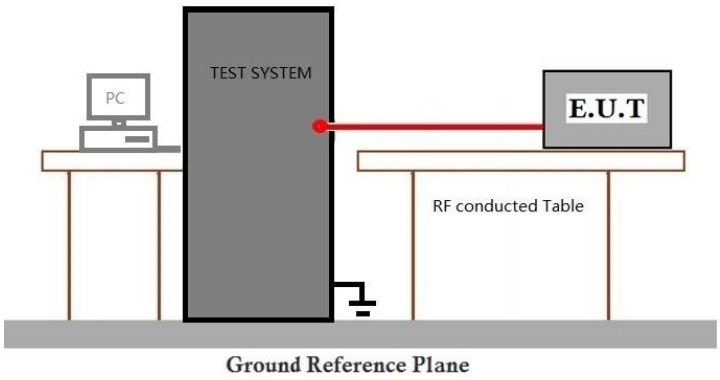
Operating Environment:

Temperature: 24.1 °C Humidity: 55.4 % RH Atmospheric Pressure: 1008 mbar

6.2.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	01	TX_non-Hop mode(OB6220 Sample)_Keep the EUT in continuously transmitting mode with GFSK modulation, pi/4DQPSK modulation, 8DPSK modulation. All modes have been tested and only the data of worst case is recorded in the report.
Final test	03	TX_non-Hop mode(CS3818 Sample)_Keep the EUT in continuously transmitting mode with GFSK modulation, pi/4DQPSK modulation, 8DPSK modulation. All modes have been tested and only the data of worst case is recorded in the report.

6.2.3 Test Setup Diagram



6.2.4 Measurement Procedure and Data

cable loss=0.9dB

Please Refer to Appendix for Details

7 Test Setup Photo

Refer to Appendix – Setup Photo for GZCR2109021155AT

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8 EUT Constructional Details (EUT Photos)

Refer to Appendix – External and Internal photos for GZCR2109021155AT.

SGS-CSTC Standards Technical Services Co., Ltd. Guangzhou Branch Testing Center, EEC Laboratory.
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9 Appendix

9.1Maximum Conducted Output Power

Sample with audio amplifier: CS3818

Mode	TX Type	Frequency (MHz)	Packet Type	Maximum Peak Conducted Output Power (dBm)		Verdict
				Ant1	Limit	
GFSK	SISO	2402	DH5	-4.05	<=30	Pass
		2441	DH5	-5.39	<=30	Pass
		2480	DH5	-6.53	<=30	Pass
Pi/4DQPSK	SISO	2402	2DH5	-1.17	<=20.97	Pass
		2441	2DH5	-2.76	<=20.97	Pass
		2480	2DH5	-4.08	<=20.97	Pass
8DPSK	SISO	2402	3DH5	-0.50	<=20.97	Pass
		2441	3DH5	-2.12	<=20.97	Pass
		2480	3DH5	-3.48	<=20.97	Pass
Note1: Antenna Gain: Ant1: -0.5dBi						

Sample with audio amplifier: OB6220

Mode	TX Type	Frequency (MHz)	Packet Type	Maximum Peak Conducted Output Power (dBm)		Verdict
				Ant1	Limit	
GFSK	SISO	2402	DH5	-4.05	<=30	Pass
		2441	DH5	-5.40	<=30	Pass
		2480	DH5	-6.54	<=30	Pass
Pi/4DQPSK	SISO	2402	2DH5	-1.21	<=20.97	Pass
		2441	2DH5	-2.79	<=20.97	Pass
		2480	2DH5	-4.12	<=20.97	Pass
8DPSK	SISO	2402	3DH5	-0.54	<=20.97	Pass
		2441	3DH5	-2.17	<=20.97	Pass
		2480	3DH5	-3.52	<=20.97	Pass
Note1: Antenna Gain: Ant1: -0.5dBi						

- End of the Report -