

Report No.: GZCR221000136701

Page: 1 of 38 FCC ID: APIJBLQ910WL

## TEST REPORT

Application No.: GZCR2210001367AT

**Applicant:** Harman International Industries, Inc

Address of Applicant: 8500 Balboa Boulevard, Northridge, California, 91329, United States

Manufacturer: Harman International Industries, Inc

Address of Manufacturer: 8500 Balboa Boulevard, Northridge, California, 91329, United States

Factory: Charter Media (Dongguan) Co., Ltd.

Address of Factory: Dabandi Industrial Zone, Daning District, Humen Town, 523930 Dongguan

City, Guangdong, China

**Equipment Under Test (EUT):** 

**EUT Name:** Gaming Wireless Headset

Model No.: QUANTUM910WIRELESS, QUANTUM910P CONSOLE WIRELESS,

QUANTUM910X WIRELESS FOR XBOX .

Please refer to section 2 of this report which indicates which model was

actually tested and which were electrically identical.

Trade Mark: JBL

Standard(s): 47 CFR Part 15, Subpart C 15.247

**Date of Receipt:** 2022-11-02

**Date of Test:** 2022-11-03 to 2022-11-03

**Date of Issue:** 2022-11-04

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.



Report No.: GZCR221000136701

Page: 2 of 38

	Revision Record						
Version	Chapter	Date	Modifier	Remark			
01		2022-11-04		Original			

Authorized for issue by		
	Cof Vlu	
	Curry Wu/Project Engineer	
	Riday Lin	
	Ricky Liu/Reviewer	



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Report No.: GZCR221000136701

Page: 3 of 38

### 2 Test Summary

Radio Spectrum Mat	ter Part			
Item	Standard	Method	Requirement	Result
Conducted Peak Output Power		ANSI C63.10 (2013) Section 11.9.1.3	47 CFR Part 15, Subpart C 15.247(b)(3)	Pass
Radiated Spurious Emissions (Below 1GHz)	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 6.4,6.5,6.6	47 CFR Part 15, Subpart C 15.205 & 15.209	Pass
Radiated Spurious Emissions (Above 1GHz)		ANSI C63.10 (2013) Section 6.4,6.5,6.6	47 CFR Part 15, Subpart C 15.205 & 15.209	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.: QUANTUM910WIRELESS, QUANTUM910P CONSOLE WIRELESS, QUANTUM910X WIRELESS FOR XBOX

This test report (Ref. No.: GZCR221000136701) is only valid with the original test report (Ref. No.: GZCR220600071101).

Compared with the original report, this report just added the model No and changed the MCU of U2 (Audio switch MCU) and U20(Tracking sensor IC).

According to the declaration from the applicant, the models in this report and models in original report were identical, only difference on model No., color, MCU of U2 (Audio switch MCU) and U20(Tracking sensor IC).

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 for fully retest.

Therefore in this report Conducted Peak Output Power, Radiated Spurious Emissions (Below 1GHz) and Radiated Spurious Emissions (Above 1GHz) were fully retested on model QUANTUM910X WIRELESS FOR XBOX and shown the data in this report, other tests data please refer to original report GZCR220600071101.



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Report No.: GZCR221000136701

Page: 4 of 38

### 3 Contents

		Page
1	1 Cover Page	
^	2 Test Summary	,
2	2 Test Summary	······································
3	3 Contents	
4	4 General Information	5
	4.1 Details of E.U.T.	
	4.2 Description of Support Units	
	4.3 Measurement Uncertainty	6
	4.4 Test Location	
	4.5 Test Facility	
	4.6 Deviation from Standards	
	4.7 Abnormalities from Standard Conditions	
5	5 Equipment List	s
•	C Equipment List	
6	6 Radio Spectrum Matter Test Results	10
	6.1 Conducted Peak Output Power	10
	6.1.1 E.U.T. Operation	
	6.1.2 Test Mode Description	
	6.1.3 Test Setup Diagram	
	6.1.4 Measurement Procedure and Data	
	6.2 Radiated Spurious Emissions (Below 1GHz)	12
	6.2.1 E.U.T. Operation	12
	6.2.2 Test Mode Description	12
	6.2.3 Test Setup Diagram	13
	6.2.4 Measurement Procedure and Data	
	6.3 Radiated Spurious Emissions (Above 1GHz)	
	6.3.1 E.U.T. Operation	
	6.3.2 Test Mode Description	
	6.3.3 Test Setup Diagram	
	6.3.4 Measurement Procedure and Data	
7	7 Test Setup Photo	3!
8	8 EUT Constructional Details (EUT Photos)	21
o	o EOT CONSTRUCTIONAL DETAILS (EOT FILOTOS)	
9	9 Annendix	37



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Report No.: GZCR221000136701

Page: 5 of 38

### **General Information**

#### Details of E.U.T.

Power supply: Rechargeable battery: 3.7V 1300mAh (Charged by adapter

Cable(s): Aux in cable: 1.25m unshielded

USB cable: 2.2m shielded

Calibration Microphone cable: 0.49m unshielded

BT

Operation Frequency: 2402MHz to 2480MHz

Bluetooth Version: V5.2 Classic

GFSK, pi/4DQPSK Modulation Type:

Number of Channels: 79 Channel Spacing: 1MHz

Spectrum Spread

Frequency Hopping Spread Spectrum(FHSS) Technology:

Antenna Type: Integral Antenna

1.4dBi Antenna Gain:

2.4G property

Operation Frequency: 2402MHz to 2480MHz GFSK, pi/4DQPSK Modulation Type:

Number of Channels: 79 Channel Spacing: 1MHz

Spectrum Spread

Frequency Hopping Spread Spectrum(FHSS) Technology:

Antenna Type: Integral Antenna

Antenna Gain: 2.0dBi

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

Description	Manufacturer	Model No.	Serial No.
Adapter	SAMSUNG	EP-TA200	PFTA200



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Report No.: GZCR221000136701

Page: 6 of 38

### 4.3 Measurement Uncertainty

Measurement Uncertainty
± 0.75dB
±5.00dB (30MHz-1GHz; 3m); ±4.38dB (30MHz-1GHz; 10m);
± 5.12dB (1GHz-6GHz); ± 5.38dB (6GHz-18GHz); ± 5.61dB (18GHz- 40GHz)

#### Remark:

The U<sub>lab</sub> (lab Uncertainty) is less than U<sub>cispr</sub> (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.



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Report No.: GZCR221000136701

Page: 7 of 38

#### 4.4 Test Location

All tests were performed at:

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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.

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

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

#### • ISED (Registration No.: 4620B, CAB identifier: CN0052)

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

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

The 10m Semi-anechoic chamber, 966 Anechoic Chamber and Shielded Room of SGS-CSTC Standards Technical Services Co., Ltd. have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-12460, C-12584, G-20107 and T-11179 respectively.

#### • CBTL (Lab Code: TL129)

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

### 4.6 Deviation from Standards

None

### 4.7 Abnormalities from Standard Conditions

None



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Report No.: GZCR221000136701

Page: 8 of 38

## 5 Equipment List

Conducted Peak Output Power					
Equipment	Manufacturer	Model No	<b>Inventory No</b>	Cal Date	Cal Due Date
Power Meter (U2021XA_Ch2)	Agilent Technologies	U2021XA_Ch2	SEM009-02	2022-05-16	2023-05-15
EXA Signal Analzer (10Hz-44GHz)	Agilent Technologies	N9010A	EMC2138	2022-09-08	2023-09-07
6dB Attenuator	HP	8491A	EMC2062	2022-03-29	2023-03-28
MI CABLE	SGS-EMC	M8.0	EMC2136	2021-11-01	2023-11-01
Test Software	TST	V2.0	GZE100-78	N/A	N/A

Radiated Spurious Emissions (Below 1GHz)					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
EMI Test Receiver(10Hz- 26.5GHz)	Rohde & Schwarz	ESIB26	EMC0522	2021-12-17	2022-12-16
Chamber cable	HangTianXing	N/A	EMC0542	2022-08-24	2023-08-23
Trilog Broadband Antenna(25MHz-1GHz)- Lab	SCHWARZBECK MESS-ELEKTRONIK	VULB 9168	SEM003-18	2022-02-21	2025-02-21
Amplifier(9kHz-1.3GHz)	HP	8447F	EMC2065	2022-06-21	2023-06-20
Active Loop Antenna- RED	ETS-Lindgren	6502	EMC2190	2022-04-06	2024-04-05
High Pass Filter (915MHz)	FSY MICROWAVE	HM1465-9SS	EMC2079	2021-12-17	2022-12-16
10m Semi-Anechoic Chamber	ETS	N/A	EMC0530	2022-10-16	2025-10-15
Test Software E3	Audix	Ver.6.120110a	GZE100-61	N/A	N/A
EMI Test Receiver(1Hz- 8GHz)	Rohde & Schwarz	ESW8	EMC2220	2022-05-20	2023-05-19

Radiated Spurious Emissions (Above 1GHz)					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
EMI Test Receiver (20Hz-26.5GHz)	Rohde & Schwarz	ESIB26	EMC0522	2021-12-17	2022-12-16
Chamber cable(Above 1GHz)	Scoflex	KMKM-8.0m	EMC0545	2022-08-24	2024-08-23
Horn Antenna(1GHz- 18GHz)	SCHWARZBECK MESS-ELEKTRONIK	BBHA 9120D	EMC2026	2022-09-21	2025-09-20
1GHz-26.5 GHz Pre-Amplifier	Agilent	8449B	EMC0521	2021-12-17	2022-12-16
2.4GHz Filter	Micro-Tronics	BRM 50702	EMC2069	2021-12-17	2022-12-16
966 Anechoic Chamber	C.R.T	9m x 6m x 6m	EMC2142	2020-12-20	2023-12-19



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Rev 1.0

EMC-TRF-01

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Report No.: GZCR221000136701

Page: 9 of 38

MXE EMI Receiver (10Hz-8.4GHz)	Keysight	N9038A	EMC2139	2022-10-21	2023-10-20
EXA Signal Analyzer (10Hz-44GHz)	Keysight	N9010A	EMC2138	2022-09-08	2023-09-07
Test Software E3	Audix	Ver.6.120110a	GZE100-61	N/A	N/A
Notch Filter (5150-5880)	Mico-Tronics	BRM50716	EMC2168	2022-07-29	2023-07-28
Horn Antenna(14- 40GHz)	SCHWARZBECK	BBHA 9170	EMC2041	2020-06-28	2023-06-27
Microwave Broadband Preamplifier (18-40GHz)	SCHWARZBECK	BBV 9721	EMC2172	2022-08-24	2023-08-23

General used equipmer	nt				
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
DMM	Fluke	73	EMC0006	2022-06-24	2023-06-23
DMM	Fluke	73	EMC0007	2022-06-24	2023-06-23



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Report No.: GZCR221000136701

Page: 10 of 38

## 6 Radio Spectrum Matter Test Results

### 6.1 Conducted Peak Output Power

Test Requirement 47 CFR Part 15, Subpart C 15.247(b)(3)
Test Method: ANSI C63.10 (2013) Section 11.9.1.3

Limit:

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

#### 6.1.1 E.U.T. Operation

Operating Environment:

Temperature: 25.4 °C Humidity: 46.5 % RH Atmospheric Pressure: 1015 mbar

#### 6.1.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	TX_non-Hop mode(BT Module)_Keep the EUT in continuously transmitting mode with GFSK modulation, Pi/4DQPSK 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(2.4G Module)_Keep the EUT in continuously transmitting mode with GFSK modulation, Pi/4DQPSK modulation. All modes have been tested and only the data of worst case is recorded in the report.



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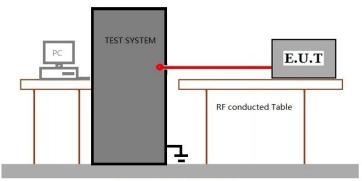
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Report No.: GZCR221000136701

Page: 11 of 38

#### 6.1.3 Test Setup Diagram



Ground Reference Plane

#### 6.1.4 Measurement Procedure and Data

cable loss=0.9dB

Please Refer to Appendix for Details



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Report No.: GZCR221000136701

Page: 12 of 38

### 6.2 Radiated Spurious Emissions (Below 1GHz)

Test Requirement 47 CFR Part 15, Subpart C 15.205 & 15.209
Test Method: ANSI C63.10 (2013) Section 6.4,6.5,6.6

Measurement Distance: 10m

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
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 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.

#### 6.2.1 E.U.T. Operation

Operating Environment:

Temperature: 25.4 °C Humidity: 46.5 % RH Atmospheric Pressure: 1015 mbar

#### 6.2.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Pre-scan	00	TX_non-Hop mode(BT Module)_Keep the EUT in continuously transmitting mode with GFSK modulation, Pi/4DQPSK modulation. All modes have been tested and only the data of worst case is recorded in the report.
Final test	01	Charge + TX_non-Hop mode(BT Module)_Keep the EUT in charging and continuously transmitting mode with GFSK modulation, Pi/4DQPSK modulation. All modes have been tested and only the data of worst case is recorded in the report.
Pre-scan	03	TX_non-Hop mode(2.4G Module)_Keep the EUT in continuously transmitting mode with GFSK modulation, Pi/4DQPSK modulation. All modes have been tested and only the data of worst case is recorded in the report.
Final test	04	Charge + TX_non-Hop mode(2.4G Module)_Keep the EUT in charging and continuously transmitting mode with GFSK modulation, Pi/4DQPSK modulation. All modes have been tested and only the data of worst case is recorded in the report.



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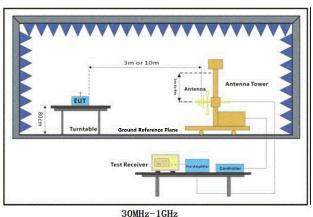
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Report No.: GZCR221000136701

Page: 13 of 38

#### 6.2.3 Test Setup Diagram



#### 6.2.4 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. 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.



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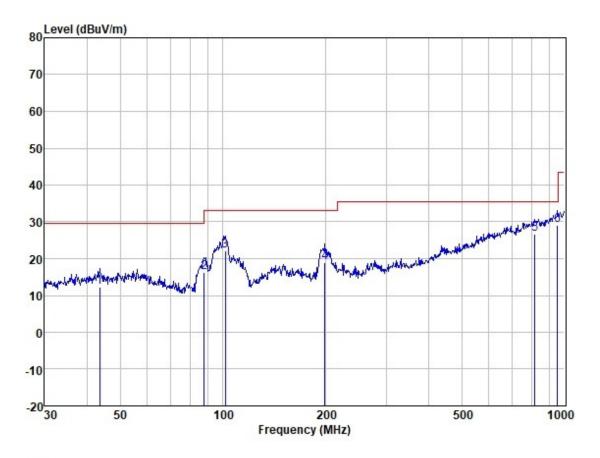
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Report No.: GZCR221000136701

Page: 14 of 38

Test Mode: 01; Polarity: Horizontal



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

	Freq					Measured Level			Pol/ Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	43.506	24.90	13.82	1.10	27.61	12.21	29.54	-17.33	HORIZONTAL	QP
2	88.033	34.44	7.91	1.57	27.60	16.32	33.06	-16.74	HORIZONTAL	QP
3	101.644	38.87	9.27	1.70	27.60	22.24	33.06	-10.82	HORIZONTAL	QP
4	198.588	33.55	10.13	2.52	27.30	18.90	33.06	-14.16	HORIZONTAL	QP
5	818.834	25.64	23.39	6.11	28.54	26.60	35.56	-8.96	HORIZONTAL	QP
6	952.094	26.19	24.26	6.80	28.09	29.16	35.56	-6.40	HORIZONTAL	QP



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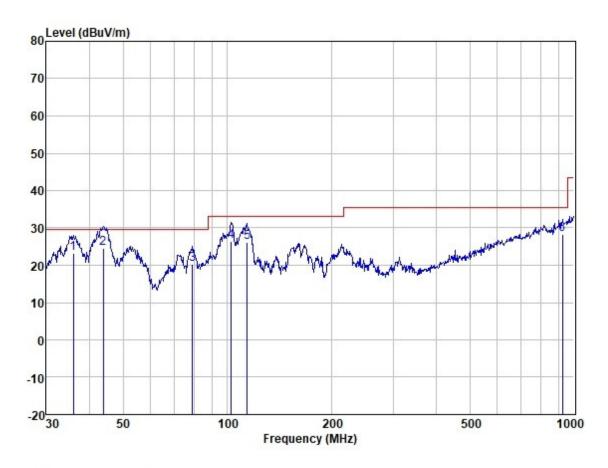
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Report No.: GZCR221000136701

Page: 15 of 38

Test Mode: 01; Polarity: Vertical



Site : SGS Job Model Power Test Mode

	Freq					Measured Level				Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	35.875	36.55	13.08	1.06	27.62	23.07	29.54	-6.47	VERTICAL	QP
2	43.812	37.18	13.82	1.11	27.61	24.50	29.54	-5.04	VERTICAL	QP
3	79.243	36.95	9.36	1.47	27.60	20.18	29.54	-9.36	VERTICAL	QP
4	102.360	42.95	9.42	1.71	27.60	26.48	33.06	-6.58	VERTICAL	QP
5	114.114	41.23	10.71	1.79	27.57	26.16	33.06	-6.90	VERTICAL	QP
6	925.756	26.30	23.50	6.55	28.16	28.19	35.56	-7.37	VERTICAL	QP



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Report No.: GZCR221000136701

Page: 16 of 38

distance,

 $L_3 / L_{10} = D_{10} / D_3$ 

Note:

 $L_3$ : Level @ 3m distance. Unit: uV/m;  $L_{10}$ : Level @ 10m distance. Unit: uV/m;

D<sub>3</sub>: 3m distance. Unit: m D<sub>10</sub>: 10m distance. Unit: m

The level at 3m test distance is below:

Frequency (MHz)	Level @ 10m (dBuV/m)	Level @ 10m (uV/m)	Level @ 3m (uV/m)	Level @ 3m (dBuV/m)	Limit @ 3m (dBuV/m)	Margin (dB)	Ant. Polarization
43.506	12.21	4.08	13.59	22.67	40.00	-17.33	Н
88.033	16.32	6.55	21.82	26.78	43.50	-16.72	Н
101.644	22.24	12.94	43.14	32.70	43.50	-10.80	Н
198.588	18.90	8.81	29.37	29.36	43.50	-14.14	Н
818.834	26.60	21.38	71.27	37.06	46.00	-8.94	Н
952.094	29.16	28.71	95.69	39.62	46.00	-6.38	Н
35.875	23.07	14.24	47.47	33.53	40.00	-6.47	V
43.812	24.50	16.79	55.96	34.96	40.00	-5.04	V
79.243	20.18	10.21	34.03	30.64	40.00	-9.36	V
102.360	26.48	21.09	70.29	36.94	43.50	-6.56	V
114.114	26.16	20.32	67.75	36.62	43.50	-6.88	V
925.756	28.19	25.67	85.58	38.65	46.00	-7.35	V



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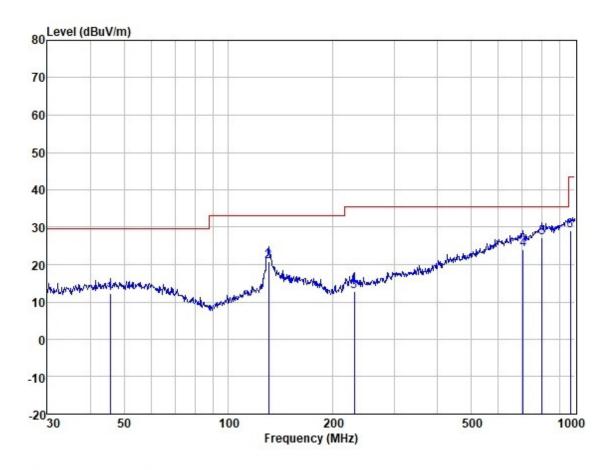
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Report No.: GZCR221000136701

Page: 17 of 38

Test Mode: 04; Polarity: Horizontal



Site : SGS Job Model Power Test Mode

	Freq					Measured Level			Pol/ Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	45.535	24.70	13.93	1.11	27.60	12.14	29.54	-17.40	HORIZONTAL	QP
2	130.379	34.32	12.13	1.95	27.52	20.88	33.06	-12.18	HORIZONTAL	QP
3	230.907	26.39	10.89	2.75	27.28	12.75	35.56	-22.81	HORIZONTAL	QP
4	706.700	25.95	21.25	5.53	28.70	24.03	35.56	-11.53	HORIZONTAL	QP
5	801.786	26.74	22.88	6.04	28.59	27.07	35.56	-8.49	HORIZONTAL	QP
6	968.934	26.00	24.32	6.90	28.05	29.17	43.52	-14.35	HORIZONTAL	QP



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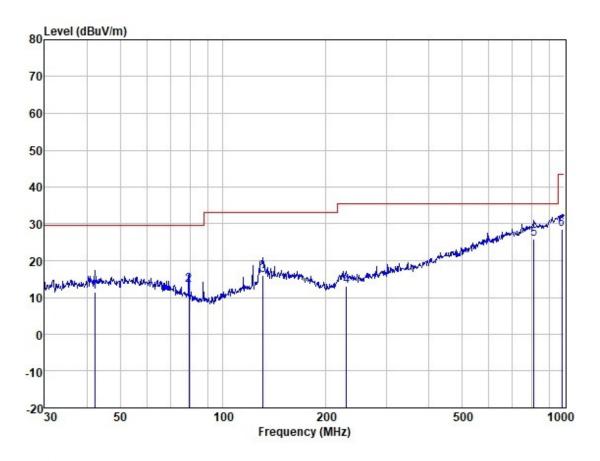
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Report No.: GZCR221000136701

Page: 18 of 38

Test Mode: 04; Polarity: Vertical



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

	Freq					Measured Level				Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		2
1	42.154	24.17	13.75	1.10	27.61	11.41	29.54	-18.13	VERTICAL	QP
2	79.521	30.04	9.36	1.47	27.60	13.27	29.54	-16.27	VERTICAL	QP
3	130.837	29.25	12.22	1.95	27.52	15.90	33.06	-17.16	VERTICAL	QP
4	230.099	26.84	10.79	2.75	27.28	13.10	35.56	-22.46	VERTICAL	QP
5	813.112	25.10	23.27	6.07	28.56	25.88	35.56	-9.68	VERTICAL	QP
6	982.620	25.28	24.22	7.00	28.02	28.48	43.52	-15.04	VERTICAL	QP



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Report No.: GZCR221000136701

Page: 19 of 38

distance,

 $L_3 / L_{10} = D_{10} / D_3$ 

Note:

 $L_3$ : Level @ 3m distance. Unit: uV/m;  $L_{10}$ : Level @ 10m distance. Unit: uV/m;

D<sub>3</sub>: 3m distance. Unit: m D<sub>10</sub>: 10m distance. Unit: m

The level at 3m test distance is below:

Frequency (MHz)	Level @ 10m (dBuV/m)	Level @ 10m (uV/m)	Level @ 3m (uV/m)	Level @ 3m (dBuV/m)	Limit @ 3m (dBuV/m)	Margin (dB)	Ant. Polarization
45.535	12.14	4.05	13.49	22.60	40.00	-17.40	Н
130.379	20.88	11.07	36.89	31.34	43.50	-12.16	Н
230.907	12.75	4.34	14.47	23.21	46.00	-22.79	Н
706.700	24.03	15.90	53.01	34.49	46.00	-11.51	Н
801.786	27.07	22.57	75.23	37.53	46.00	-8.47	Н
968.934	29.17	28.74	95.80	39.63	54.00	-14.37	Н
42.154	11.41	3.72	12.40	21.87	40.00	-18.13	V
79.521	13.27	4.61	15.36	23.73	40.00	-16.27	V
130.837	15.90	6.24	20.79	26.36	43.50	-17.14	V
230.099	13.10	4.52	15.06	23.56	46.00	-22.44	V
813.112	25.88	19.68	65.60	36.34	46.00	-9.66	V
982.620	28.48	26.55	88.49	38.94	54.00	-15.06	V



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Report No.: GZCR221000136701

Page: 20 of 38

### 6.3 Radiated Spurious Emissions (Above 1GHz)

Test Requirement 47 CFR Part 15, Subpart C 15.205 & 15.209
Test Method: ANSI C63.10 (2013) Section 6.4,6.5,6.6

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
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 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.

#### 6.3.1 E.U.T. Operation

Operating Environment:

Temperature: 25.4 °C Humidity: 46.5 % RH Atmospheric Pressure: 1015 mbar

#### 6.3.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	TX_non-Hop mode(BT Module)_Keep the EUT in continuously transmitting mode with GFSK modulation, Pi/4DQPSK modulation. All modes have been tested and only the data of worst case is recorded in the report.
Pre-scan	01	Charge + TX_non-Hop mode(BT Module)_Keep the EUT in charging and continuously transmitting mode with GFSK modulation, Pi/4DQPSK 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(2.4G Module)_Keep the EUT in continuously transmitting mode with GFSK modulation, Pi/4DQPSK modulation. All modes have been tested and only the data of worst case is recorded in the report.
Pre-scan	04	Charge + TX_non-Hop mode(2.4G Module)_Keep the EUT in charging and continuously transmitting mode with GFSK modulation, Pi/4DQPSK modulation. All modes have been tested and only the data of worst case is recorded in the report.



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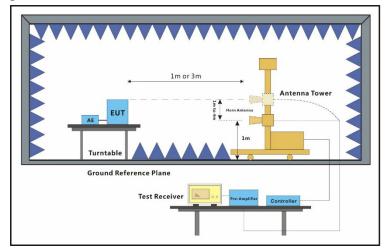
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Report No.: GZCR221000136701

Page: 21 of 38

### 6.3.3 Test Setup Diagram





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Report No.: GZCR221000136701

Page: 22 of 38

#### 6.3.4 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 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) 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

- 2) Scan from 1GHz to 25GHz, 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) The field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. For the emissions whose peak level is lower than the average limit, only the peak measurement is shown in the report.



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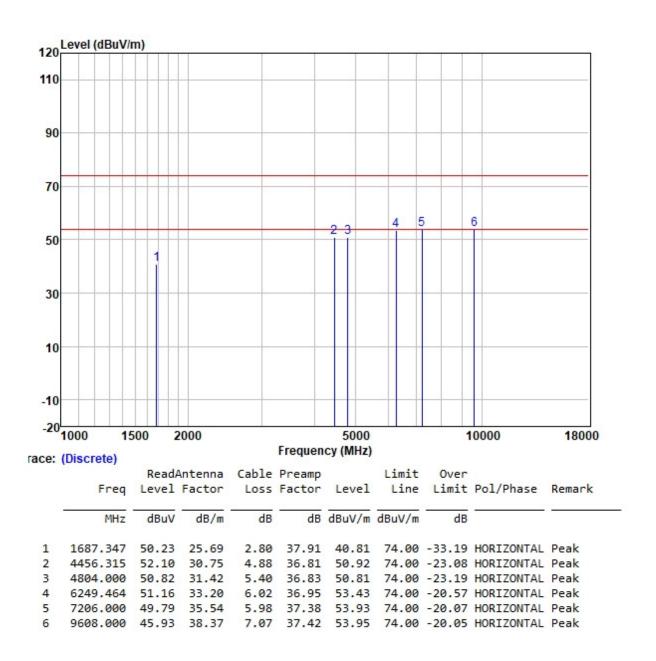
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Report No.: GZCR221000136701

Page: 23 of 38

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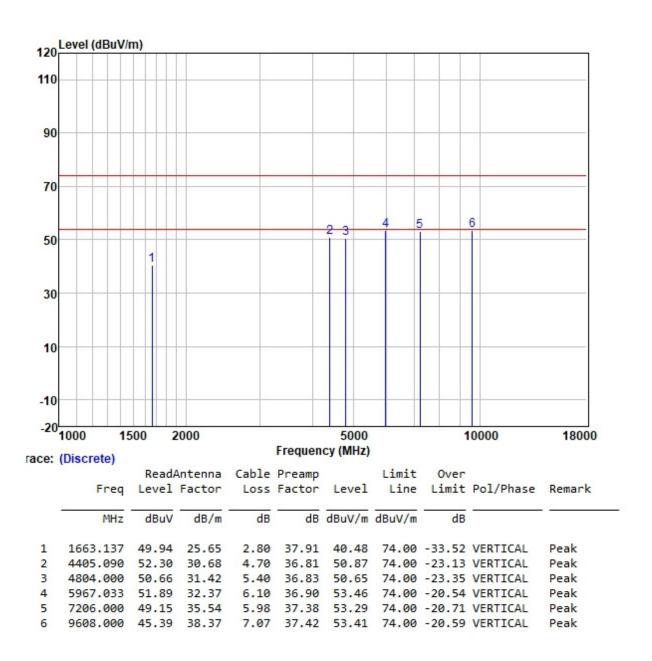
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Report No.: GZCR221000136701

Page: 24 of 38

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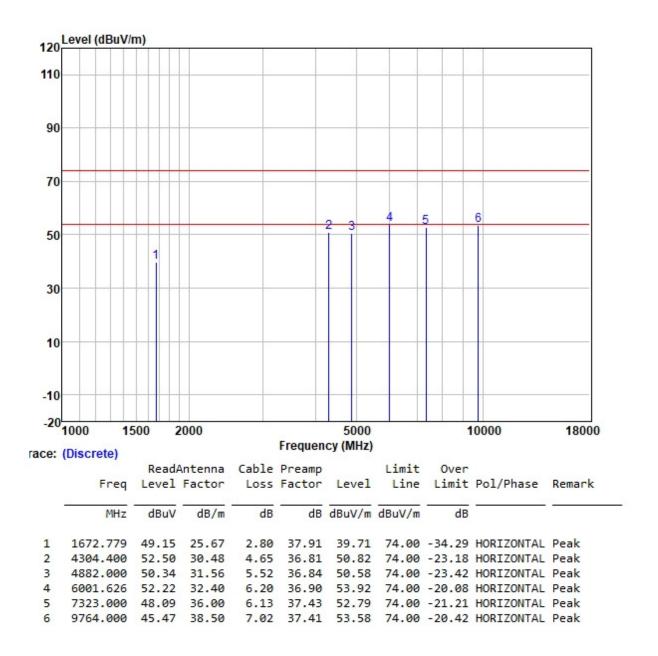
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Page: 25 of 38

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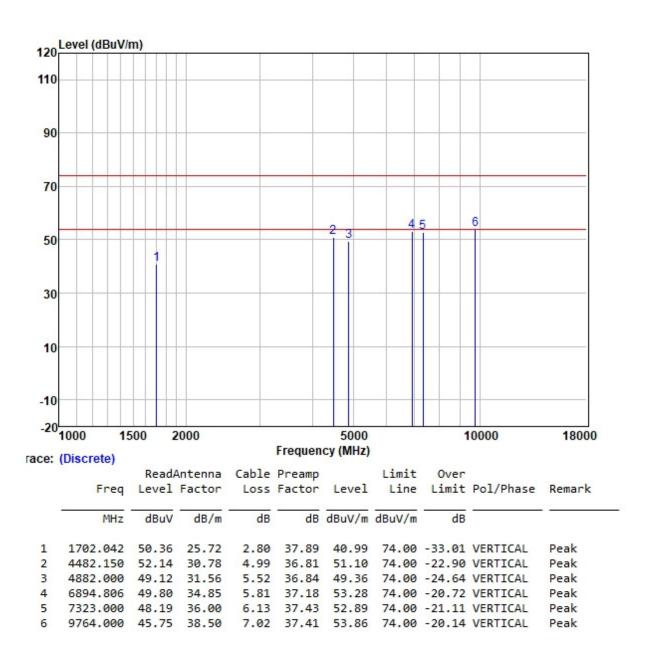
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Report No.: GZCR221000136701

Page: 26 of 38

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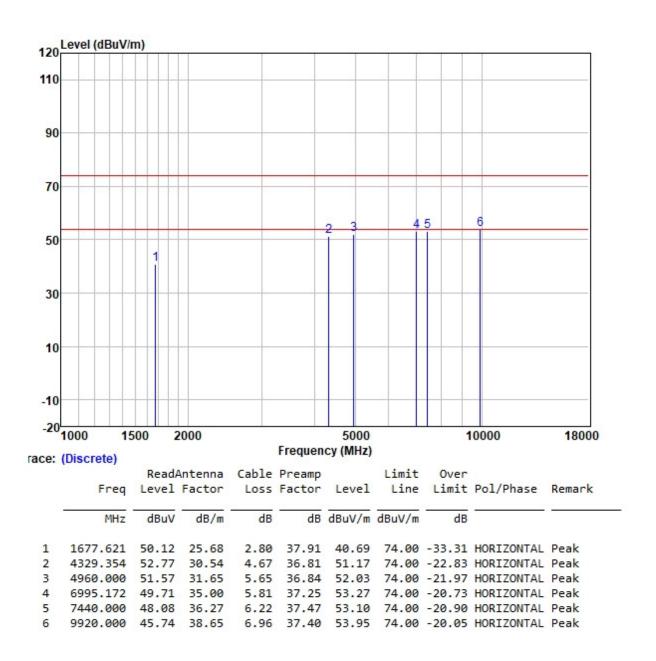
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Page: 27 of 38

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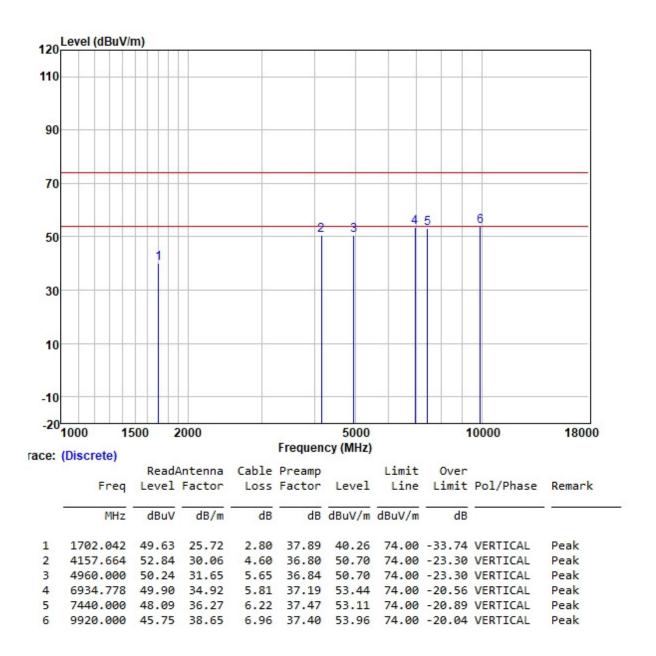
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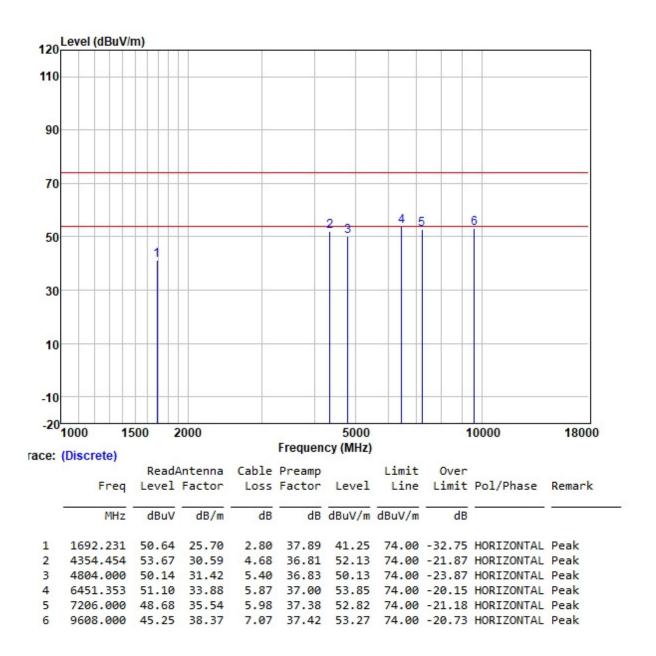
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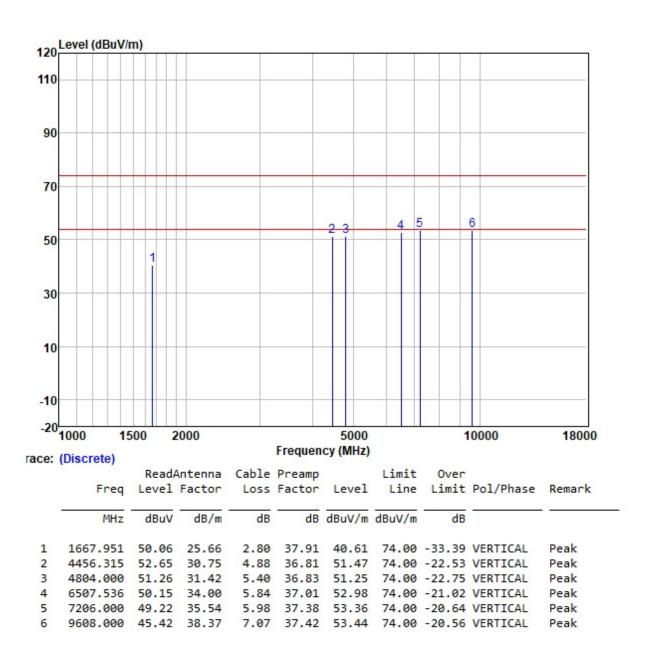
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Report No.: GZCR221000136701

Page: 30 of 38

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





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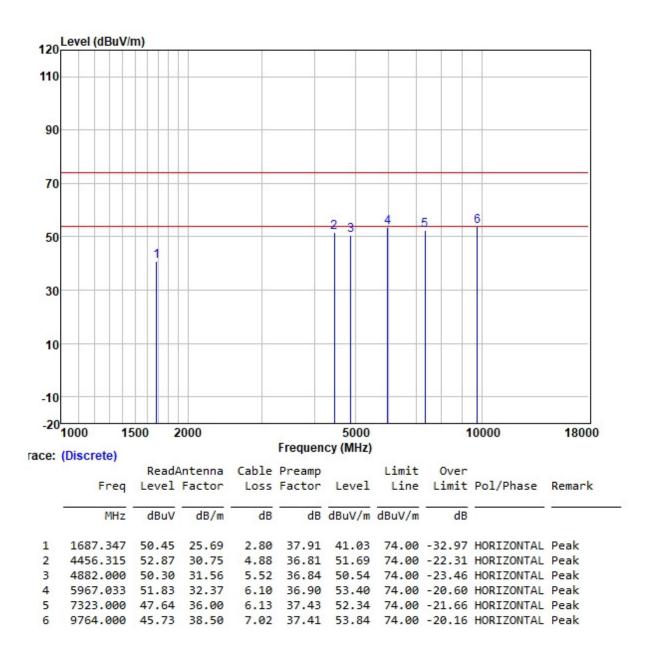
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Report No.: GZCR221000136701

Page: 31 of 38

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





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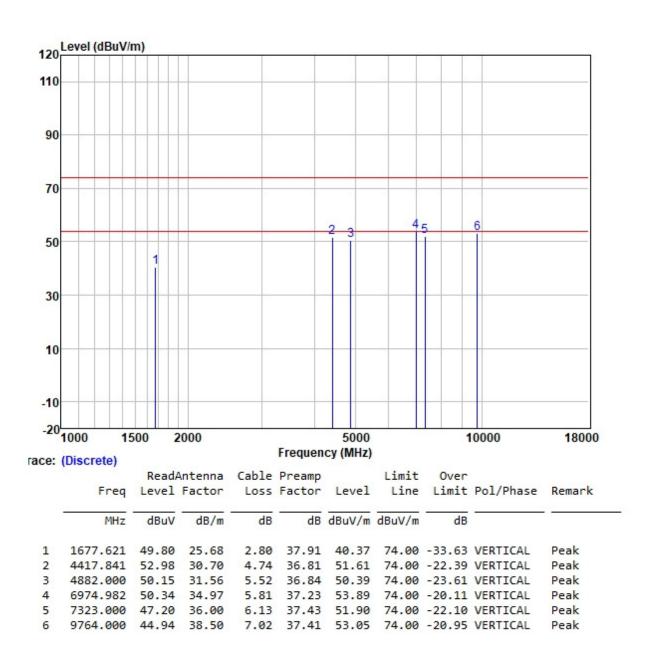
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Report No.: GZCR221000136701

Page: 32 of 38

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





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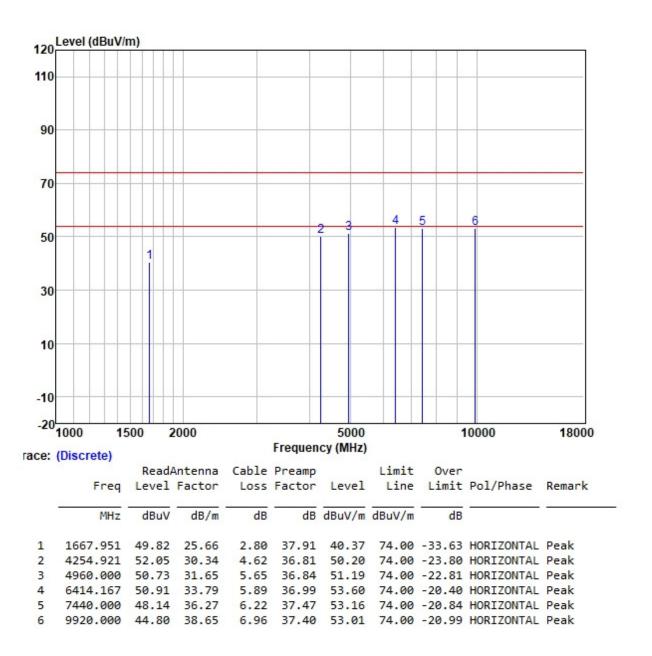
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Report No.: GZCR221000136701

Page: 33 of 38

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





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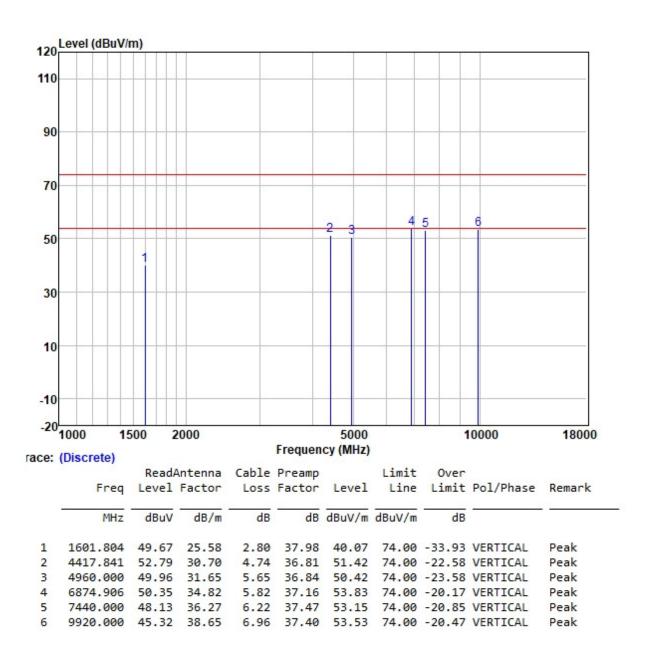
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Report No.: GZCR221000136701

Page: 34 of 38

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





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Page: 35 of 38

#### 7 **Test Setup Photo**

Refer to Appendix - SetupPhoto for GZCR2210001367AT



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Page: 36 of 38

#### 8 **EUT Constructional Details (EUT Photos)**

Refer to Appendix – External and Internal Photos for GZCR2210001367AT.



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Report No.: GZCR221000136701

Page: 37 of 38

## 9 Appendix

For BT Module

1. Maximum Conducted Output Power

1.1 Power

### 1.1.1 Test Result

Mode	TX	Frequency	Packet	Maximum Peak Conduc	Verdict	
	Type	(MHz)	Type	ANT1	Limit	verdict
GFSK SISO	2402	DH5	9.90	<=30	Pass	
	SISO	2441	DH5	9.25	<=30	Pass
		2480	DH5	8.69	<=30	Pass
		2402	2DH5	9.94	<=20.97	Pass
Pi/4DQPSK	SISO	2441	2DH5	9.29	<=20.97	Pass
		2480	2DH5	8.72	<=20.97	Pass



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Report No.: GZCR221000136701

Page: 38 of 38

### For 2.4 Module

### 1. Maximum Conducted Output Power

#### 1.1 Power

#### 1.1.1 Test Result

Mode	TX Type	Frequency (MHz)	Packet Type	Maximum Peak Conducted Output Power (dBm)		Vardiet
				ANT1	Limit	Verdict
GFSK	SISO	2402	DH5	8.31	<=30	Pass
		2441	DH5	7.90	<=30	Pass
		2480	DH5	7.73	<=30	Pass
Pi/4DQPSK	SISO	2402	2DH5	8.32	<=20.97	Pass
		2441	2DH5	7.91	<=20.97	Pass
		2480	2DH5	7.74	<=20.97	Pass

- End of the Report -



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