

TEST REPORT

Application No.: GZCR2209001150AT
Applicant: BLUE FROG ROBOTICS
Address of Applicant: 10 rue Mercoeur, 75011 Paris, FRANCE
Manufacturer: OMWAVE
Address of Manufacturer: 5 rue Barbès, 92120 Montrouge, FRANCE
Factory: OMWAVE
Address of Factory: 36 Avenue Salvador Allende, Batiment D - Village Mykonos, 60000 Beauvais, FRANCE

Equipment Under Test (EUT):

EUT Name: Buddy the Robot
Model No.: B01-US
Trade Mark: BLUE FROG ROBOTICS
Standard(s) : 47 CFR Part 15, Subpart B
Date of Receipt: 2022-09-15
Date of Test: 2022-10-26 to 2022-11-01
Date of Issue: 2023-04-27

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



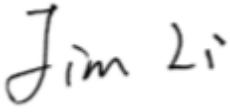
Ricky Liu
Manager



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Revision Record			
Version	Report No.	Date	Remark
01	GZCR220900115001	2023-04-27	Original

Authorized for issue by:			
	 Jim Li Jim Li/Project Engineer		
	 Ricky Liu Ricky Liu/Reviewer		

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2 Test Summary

Emission Part				
Item	Standard	Method	Requirement	Result
Conducted Emissions at Mains Terminals (150kHz-30MHz)	47 CFR Part 15, Subpart B	ANSI C63.4:2014	15.107(a);Class B	Pass
Radiated Emissions (30MHz-1GHz)		ANSI C63.4:2014	15.109(a);Class B	Pass
Radiated Emissions (Above 1GHz)		ANSI C63.4:2014	15.109(g);Class B	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: AC/DC SWITCHING ADAPTER
MODEL NO.: GST90A19
INPUT:100-240VAC, 50/60Hz, 1.3A
OUTPUT:19V, 4.74A, 90W Max

Test voltage: AC 120V, 60Hz

Cable(s): AC input cable, 3 wires, 1.8m, unshielded.
DC output cable, 2 wires, 1.2m, with ferrite bead.
USB Port for debugging.
SIM Slot Port x 1.

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)	2.76dB (150kHz to 30MHz)
Radiated Emissions (30MHz-1GHz)	5.00dB (30MHz-1GHz):3m; 4.38dB (30MHz-1GHz):10m
Radiated Emissions (Above 1GHz)	5.12dB (1GHz-6GHz); 5.38dB (6GHz-18GHz); 5.61dB (18GHz-40GHz)

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.

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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, IEC60068-2-27 and Rules of procedure IEC60068-2-27, and the relevant IEC60068-2-27 Operational documents.

4.6 Deviation from Standards

None

4.7 Abnormalities from Standard Conditions

None

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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	2022-08-24	2023-08-23
Shielding Room	ChangZhou ZhongYu	8m x 3m x 3.8m	EMC0306	2022-10-16	2025-10-15
Two-Line V-Network-GZ	Rohde & Schwarz	ENV216	EMC2135	2022-09-09	2023-09-08
EMI Test Receiver (9kHz-3.6GHz)	Rohde & Schwarz	ESR3	EMC2221	2022-05-20	2023-05-19
Test Software E3r	Audix	Ver.6.11812	GZE100-77	N/A	N/A

Radiated Emissions (30MHz-1GHz)					
Equipment	Manufacturer	Model No.	Inventory No.	Cal Date	Cal Due Date
10m Semi-Anechoic Chamber	ETS	N/A	EMC0530	2022-10-16	2025-10-15
Chamber cable	HangTianXing	N/A	EMC0542	2022-08-24	2023-08-23
Amplifier (9kHz-1.3GHz)	HP	8447F	EMC2065	2022-06-21	2023-06-20
EMI Test Receiver (1Hz-8GHz)	Rohde & Schwarz	ESW8	EMC2220	2022-05-20	2023-05-19
Test Software E3	Audix	Ver.6.120110a	GZE100-61	N/A	N/A
Trilog Broadband Antenna (25MHz-1GHz)	SCHWARZBECK MESS-ELEKTRONIK	VULB 9168	EMC2174	2022-06-19	2025-06-18

Radiated Emissions (Above 1GHz)					
Equipment	Manufacturer	Model No.	Inventory No.	Cal Date	Cal Due Date
1GHz-26.5 GHz Pre-Amplifier	Agilent	8449B	EMC0521	2021-12-17	2022-12-16
EMI Test Receiver (10Hz-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
966 Anechoic Chamber	C.R.T	9m x 6m x 6m	EMC2142	2020-12-20	2023-12-19
Test Software E3	Audix	Ver.6.120110a	GZE100-61	N/A	N/A

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

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6 Emission Test Results

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

Test Requirement:	47 CFR Part 15, Subpart B
Test Method:	ANSI C63.4:2014
Limit:	
0.15MHz-0.5MHz:	66dB(μV)-56dB(μV) quasi-peak, 56dB(μV)-46dB(μV) average
0.5MHz-5MHz:	56dB(μV) quasi-peak, 46dB(μV) average
5MHz-30MHz:	60dB(μV) quasi-peak, 50dB(μV) average
Detector:	Peak for pre-scan (9kHz resolution bandwidth) 0.15M to 30MHz

6.1.1 E.U.T. Operation

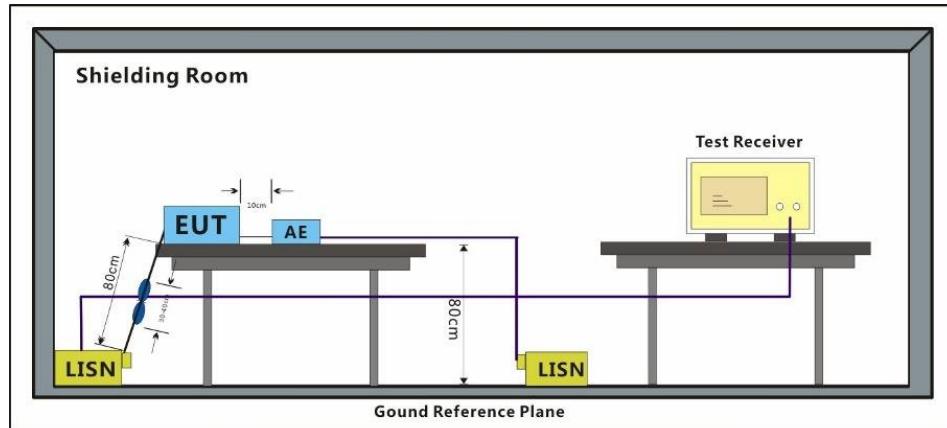
Operating Environment:

Temperature: 24.9 °C Humidity: 52.5 % RH Atmospheric Pressure: 1015 mbar

6.1.2 Test Mode Description

Pre-scan / Mode	Final test	Code	Description
	Final test	09	Normal working_keep the EUT in charging mode.

6.1.3 Test Setup Diagram



6.1.4 Measurement Procedure and Data

An initial pre-scan was performed with peak detector. Quasi-Peak or Average measurement were performed at the frequencies with maximized peak emission were detected.

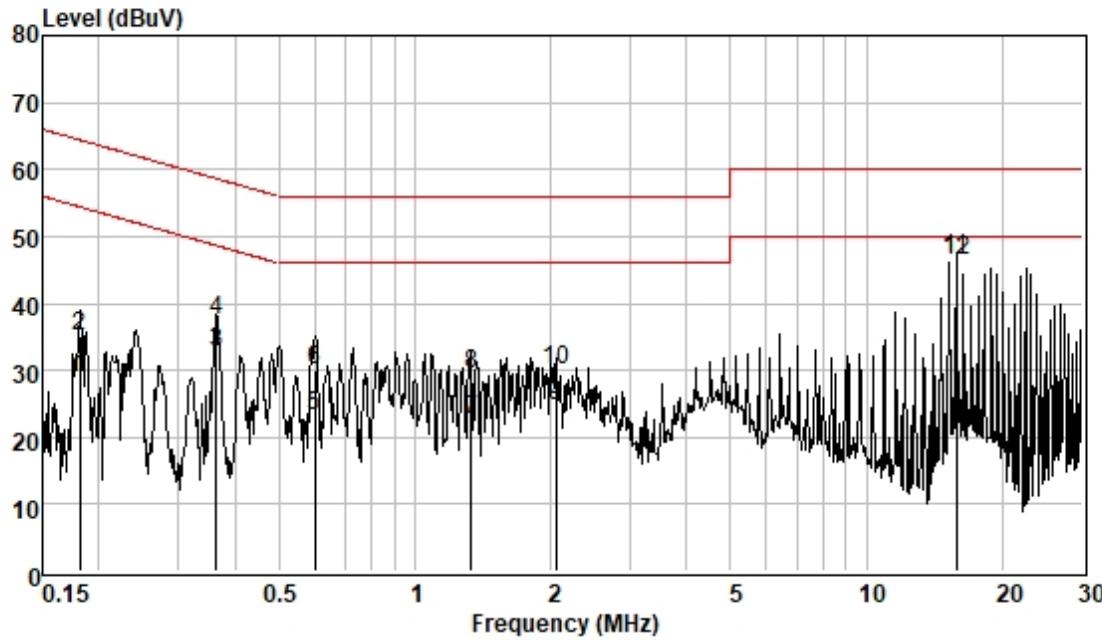
Remark: Level= Read Level+ Cable Loss+ LISN Factor

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Test Mode: 09; Line: Live line



Pol : LINE

Mode :

Model :

	Frequenc	Read Level	Cable Loss	LISN Factor	Measured Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.182	19.31	0.06	9.61	28.98	54.42	-25.44	Average
2	0.182	25.57	0.06	9.61	35.24	64.42	-29.18	QP
3	0.363	22.94	0.06	9.60	32.60	48.65	-16.05	Average
4	0.363	27.87	0.06	9.60	37.53	58.65	-21.12	QP
5	0.601	13.48	0.07	9.61	23.16	46.00	-22.84	Average
6	0.601	20.29	0.07	9.61	29.97	56.00	-26.03	QP
7	1.331	12.80	0.09	9.60	22.49	46.00	-23.51	Average
8	1.331	19.78	0.09	9.60	29.47	56.00	-26.53	QP
9	2.055	15.02	0.12	9.62	24.76	46.00	-21.24	Average
10	2.055	20.19	0.12	9.62	29.93	56.00	-26.07	QP
11	15.801	36.57	0.30	9.70	46.57	50.00	-3.43	Average
12	15.801	36.35	0.30	9.70	46.35	60.00	-13.65	QP

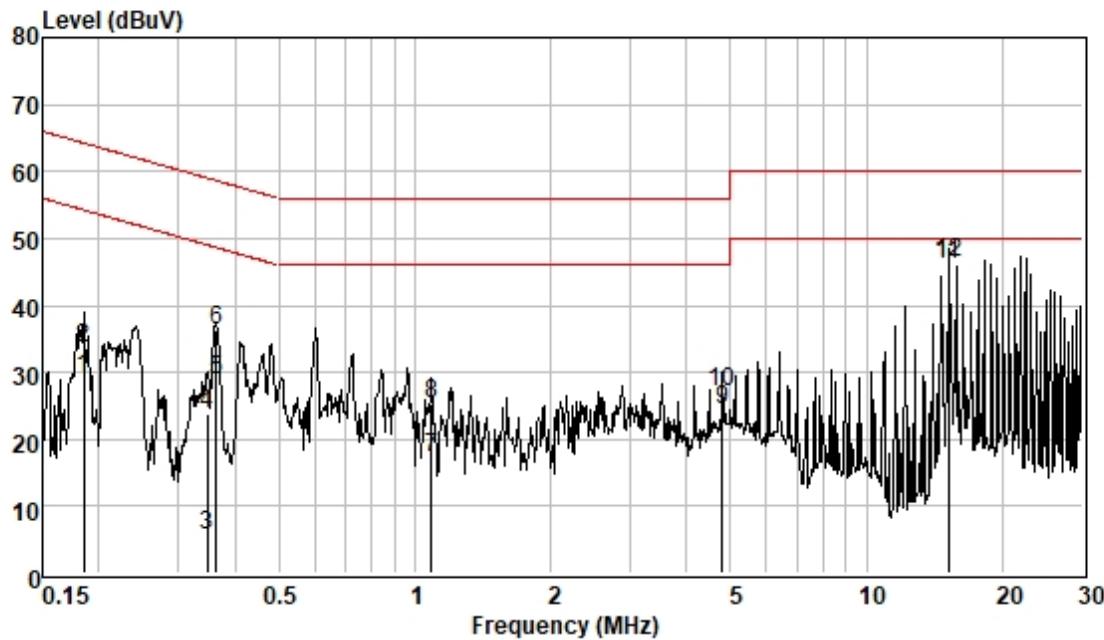
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Test Mode: 09; Line: Neutral Line



Pol : NEUTRAL

Mode :

Model :

	Frequenc	Read Level	Cable Loss	LISN Factor	Measured Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.185	19.43	0.06	9.60	29.09	54.24	-25.15	Average
2	0.185	23.94	0.06	9.60	33.60	64.24	-30.64	QP
3	0.348	-3.90	0.06	9.62	5.78	49.00	-43.22	Average
4	0.348	14.13	0.06	9.62	23.81	59.00	-35.19	QP
5	0.363	19.24	0.06	9.62	28.92	48.65	-19.73	Average
6	0.363	26.57	0.06	9.62	36.25	58.65	-22.40	QP
7	1.088	7.64	0.08	9.61	17.33	46.00	-28.67	Average
8	1.088	15.66	0.08	9.61	25.35	56.00	-30.65	QP
9	4.797	14.59	0.17	9.65	24.41	46.00	-21.59	Average
10	4.797	17.32	0.17	9.65	27.14	56.00	-28.86	QP
11	15.196	36.11	0.30	9.80	46.21	50.00	-3.79	Average
12	15.196	36.28	0.30	9.80	46.38	60.00	-13.62	QP

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6.2 Radiated Emissions (30MHz-1GHz)

Test Requirement:	47 CFR Part 15, Subpart B
Test Method:	ANSI C63.4:2014
Limit:	Class B
Test Distance:	10m
30MHz -88MHz	29.54 (dB μ V/m) quasi-peak
88MHz-216MHz	33.06 (dB μ V/m) quasi-peak
216MHz-960MHz	35.56 (dB μ V/m) quasi-peak
960MHz-1000MHz	43.52 (dB μ V/m) quasi-peak
Detector:	Peak for pre-scan (120kHz resolution bandwidth) 30MHz to1000MHz

6.2.1 E.U.T. Operation

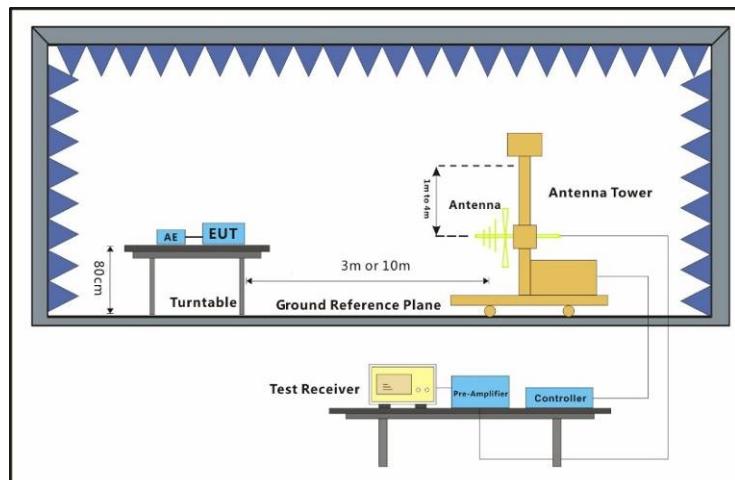
Operating Environment:

Temperature: 23.6 °C Humidity: 58.4 % RH Atmospheric Pressure: 1015 mbar

6.2.2 Test Mode Description

Pre-scan / Mode	Final test	Code	Description
	Final test	08	Normal working_keep the EUT in motor running mode(B/O mode).
	Pre-scan	09	Normal working_keep the EUT in charging mode.

6.2.3 Test Setup Diagram



6.2.4 Measurement Procedure and Data

An initial pre-scan was performed in the chamber using the spectrum analyser in peak detection mode. Quasi-peak measurements were conducted based on the peak sweep graph. The EUT was measured by BiConiLog antenna with 2 orthogonal polarities.

Remark: Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor

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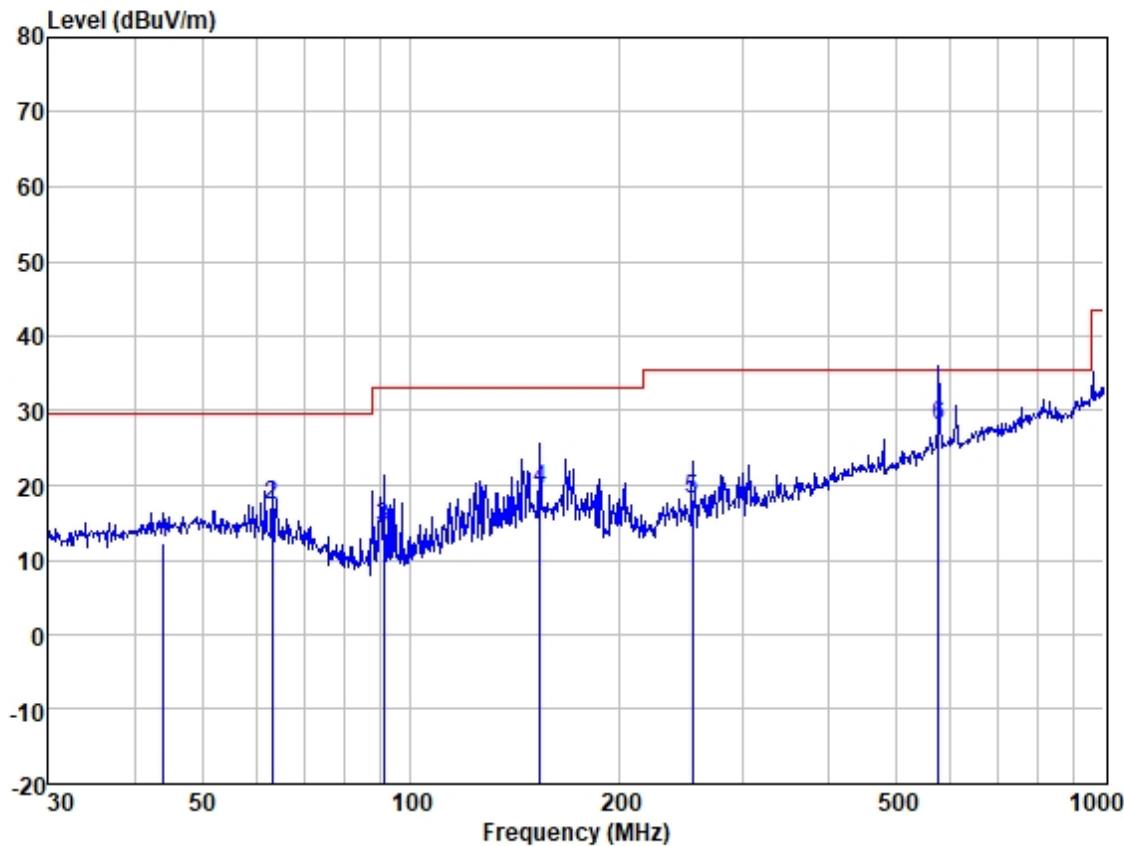
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Test Mode: 08; Polarity: Horizontal



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

Freq	Read	Antena	Cable	Preamp	Measured	Limit	Over	Pol/	Remark
	Level	Factor	Loss	Factor	Level	Line	Limit	Phase	
1	43.966	24.88	13.82	1.11	27.61	12.20	29.54	-17.34	HORIZONTAL QP
2	63.092	30.62	12.91	1.31	27.60	17.24	29.54	-12.30	HORIZONTAL QP
3	91.175	32.40	7.93	1.61	27.60	14.34	33.06	-18.72	HORIZONTAL QP
4	153.739	31.07	13.59	2.27	27.38	19.55	33.06	-13.51	HORIZONTAL QP
5	254.728	30.50	11.97	2.98	27.23	18.22	35.56	-17.34	HORIZONTAL QP
6	576.644	32.76	19.20	4.89	28.77	28.08	35.56	-7.48	HORIZONTAL QP

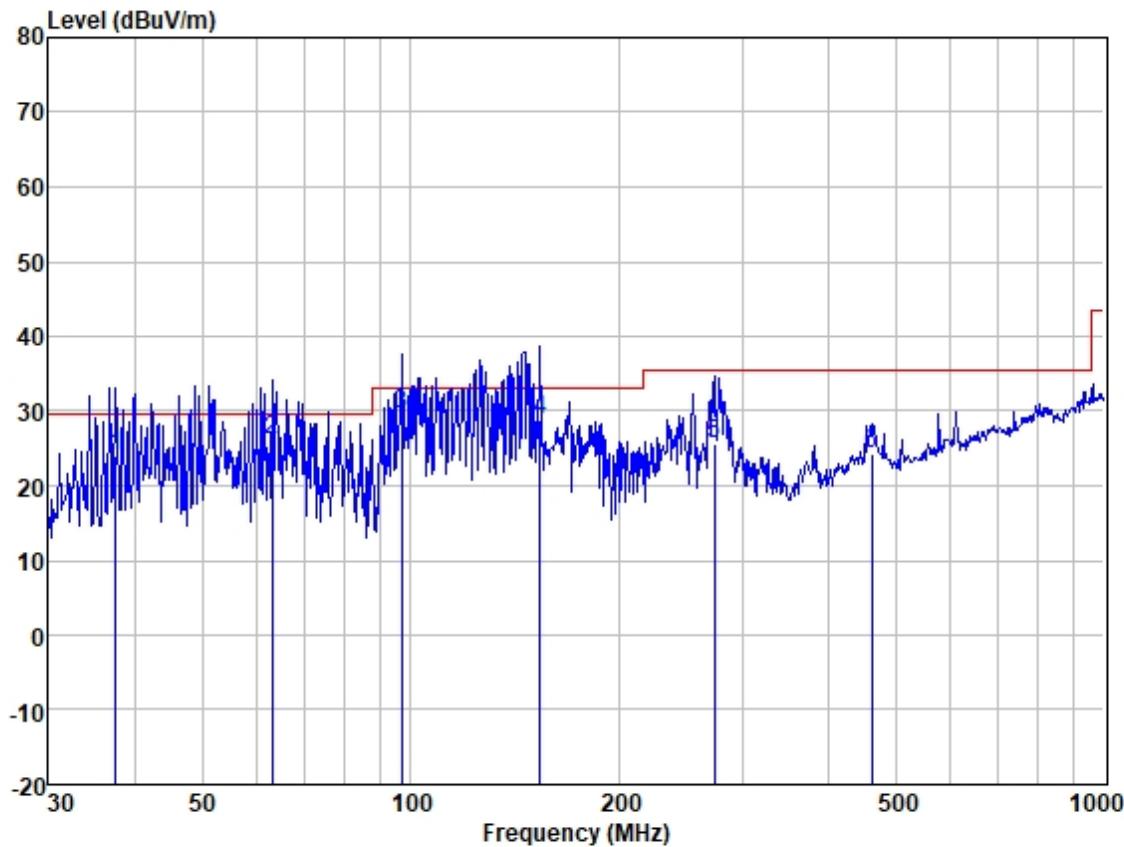
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Test Mode: 08; Polarity: Vertical



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

Freq	Read	Antenna	Cable	Preamp	Measured	Limit	Over	Pol/	Remark
	Level	Factor	Loss	Factor	Level	Line	Limit	Phase	
1	37.548	37.27	13.31	1.07	27.62	24.03	29.54	-5.51	VERTICAL QP
2	63.092	39.47	12.91	1.31	27.60	26.09	29.54	-3.45	VERTICAL QP
3	96.775	46.93	8.53	1.67	27.60	29.53	33.06	-3.53	VERTICAL QP
4	153.739	40.22	13.59	2.27	27.38	28.70	33.06	-4.36	VERTICAL QP
5	274.194	36.91	12.77	3.12	27.21	25.59	35.56	-9.97	VERTICAL QP
6	462.346	31.22	17.15	4.27	28.44	24.20	35.56	-11.36	VERTICAL QP

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6.3 Radiated Emissions (Above 1GHz)

Test Requirement:	47 CFR Part 15, Subpart B
Test Method:	ANSI C63.4:2014
Limit:	Class B
Above 1GHz	74(dB μ V/m) peak, 54(dB μ V/m) average
Detector:	Peak for pre-scan (1000kHz resolution bandwidth) 1000M to18000MHz

6.3.1 E.U.T. Operation

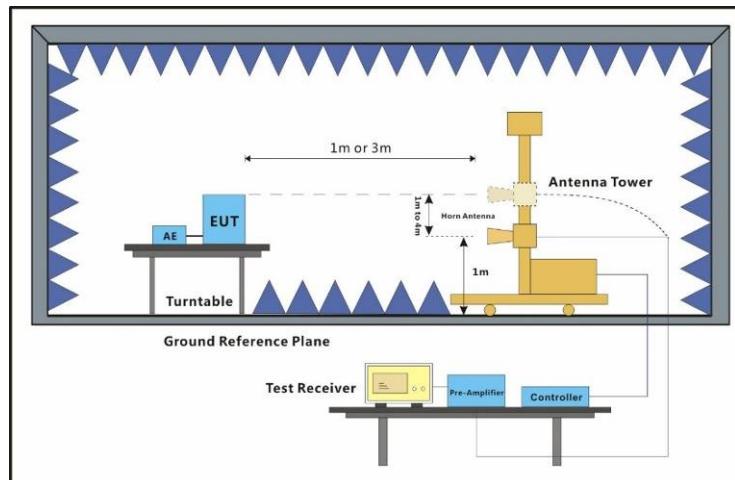
Operating Environment:

Temperature: 23.9 °C Humidity: 51.9 % RH Atmospheric Pressure: 1015 mbar

6.3.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Pre-scan	08	Normal working_keep the EUT in motor running mode(B/O mode).
Final test	09	Normal working_keep the EUT in charging mode.

6.3.3 Test Setup Diagram



6.3.4 Measurement Procedure and Data

An initial pre-scan was performed in the chamber using the spectrum analyser in peak detection mode. Average measurements were conducted based on the peak sweep graph. The EUT was measured by Horn antenna with 2 orthogonal polarities.

The red line show in graphic is the limit in standard used in this section.

Remark: Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor

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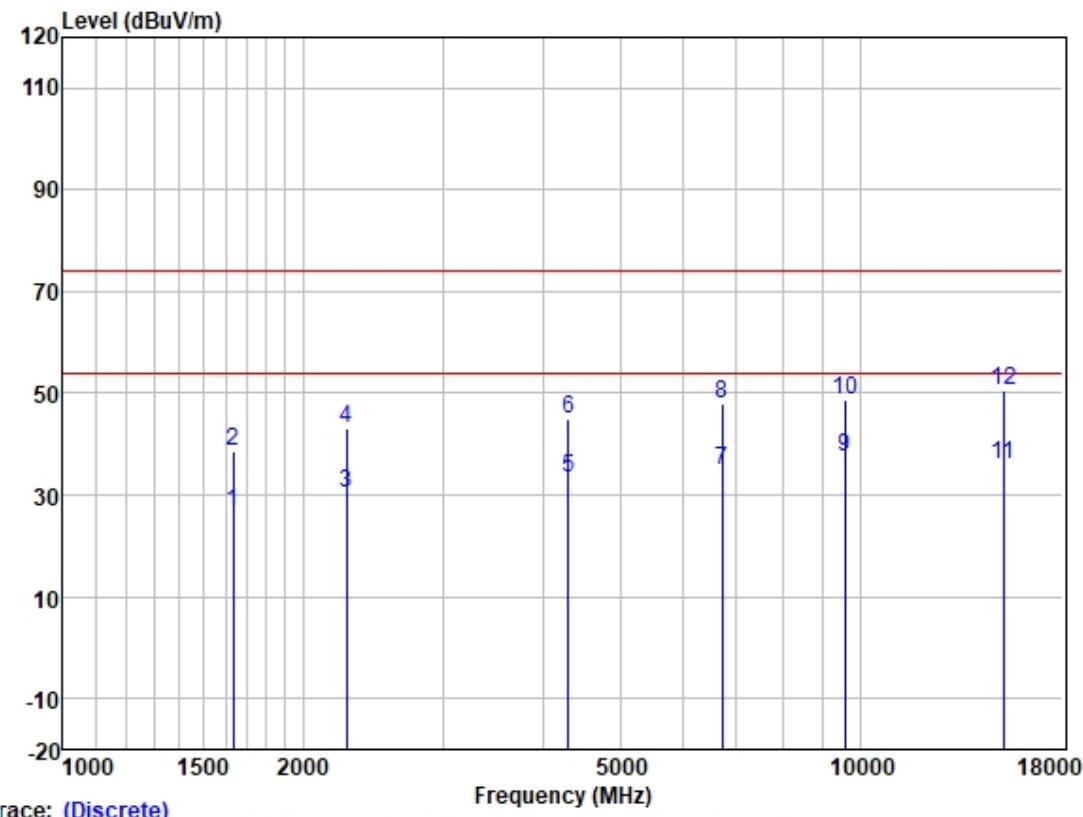
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Test Mode: 09; Polarity: Horizontal



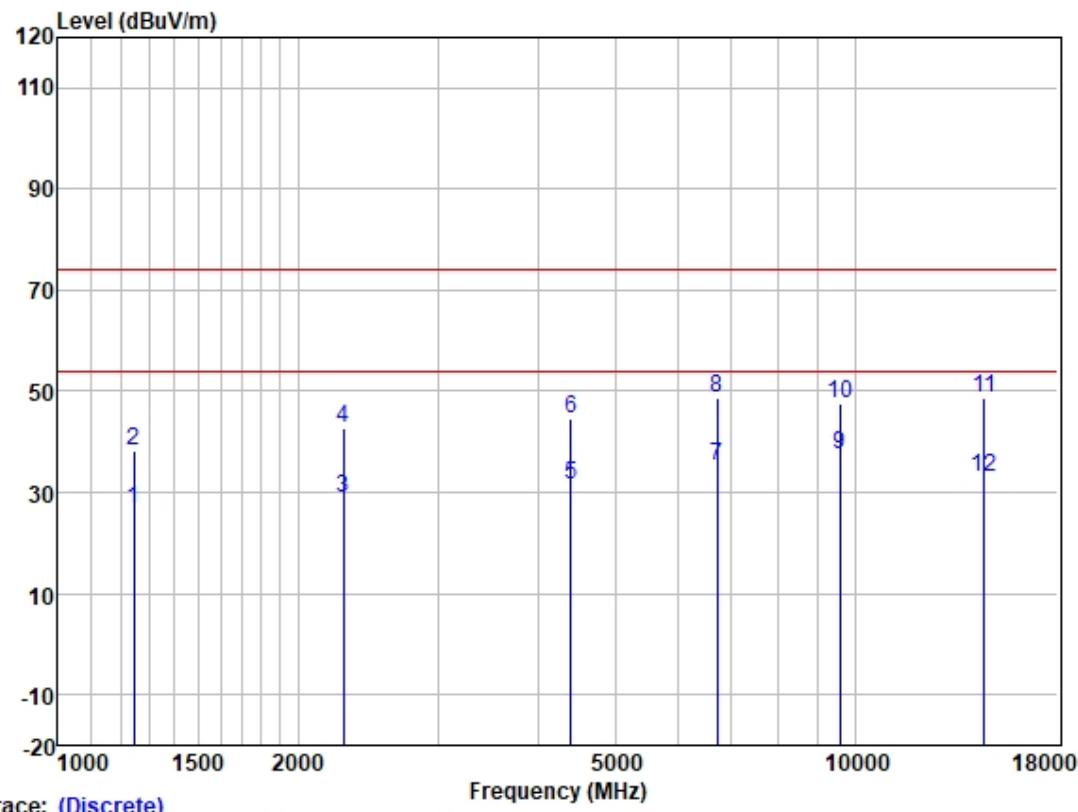
Freq	ReadAntenna		Cable		Preamp		Limit	Over	Limit Pol/Phase	Remark
	Level	Factor	Loss	Factor	Level	dBuV/m	dBuV/m	dB		
	MHz	dBuV	dB/m	dB						
1	1634.543	35.43	25.62	3.09	37.35	26.79	54.00	-27.21	HORIZONTAL	Average
2	1634.543	47.42	25.62	3.09	37.35	38.78	74.00	-35.22	HORIZONTAL	Peak
3	2265.907	34.90	26.98	5.79	37.15	30.52	54.00	-23.48	HORIZONTAL	Average
4	2265.907	47.41	26.98	5.79	37.15	43.03	74.00	-30.97	HORIZONTAL	Peak
5	4304.400	34.33	30.48	5.29	36.61	33.49	54.00	-20.51	HORIZONTAL	Average
6	4304.400	45.62	30.48	5.29	36.61	44.78	74.00	-29.22	HORIZONTAL	Peak
7	6717.762	30.98	34.44	6.29	36.73	34.98	54.00	-19.02	HORIZONTAL	Average
8	6717.762	43.93	34.44	6.29	36.73	47.93	74.00	-26.07	HORIZONTAL	Peak
9	9585.684	28.31	38.35	8.08	37.15	37.59	54.00	-16.41	HORIZONTAL	Average
10	9585.684	39.34	38.35	8.08	37.15	48.62	74.00	-25.38	HORIZONTAL	Peak
11	15134.080	24.35	40.26	7.33	35.88	36.06	54.00	-17.94	HORIZONTAL	Average
12	15134.080	38.89	40.26	7.33	35.88	50.60	74.00	-23.40	HORIZONTAL	Peak

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Test Mode: 09; Polarity: Vertical



Race:	Freq	ReadAntenna Level	Cable Loss	Preamp Factor	Limit Level	Limit Line	Over Limit	Pol/Phase	Remark	
									MHz	dBuV
									dB	dB/m
1	1245.663	36.56	25.00	2.61	37.61	26.56	54.00	-27.44	VERTICAL	Average
2	1245.663	48.41	25.00	2.61	37.61	38.41	74.00	-35.59	VERTICAL	Peak
3	2279.044	33.40	27.03	5.61	37.15	28.89	54.00	-25.11	VERTICAL	Average
4	2279.044	47.31	27.03	5.61	37.15	42.80	74.00	-31.20	VERTICAL	Peak
5	4405.090	31.97	30.68	5.37	36.61	31.41	54.00	-22.59	VERTICAL	Average
6	4405.090	45.28	30.68	5.37	36.61	44.72	74.00	-29.28	VERTICAL	Peak
7	6717.762	31.23	34.44	6.29	36.73	35.23	54.00	-18.77	VERTICAL	Average
8	6717.762	44.68	34.44	6.29	36.73	48.68	74.00	-25.32	VERTICAL	Peak
9	9585.684	28.21	38.35	8.08	37.15	37.49	54.00	-16.51	VERTICAL	Average
10	9585.684	38.40	38.35	8.08	37.15	47.68	74.00	-26.32	VERTICAL	Peak
11	14533.910	35.41	41.26	7.39	35.25	48.81	74.00	-25.19	VERTICAL	Peak
12	14533.910	19.69	41.26	7.39	35.25	33.09	54.00	-20.91	VERTICAL	Average

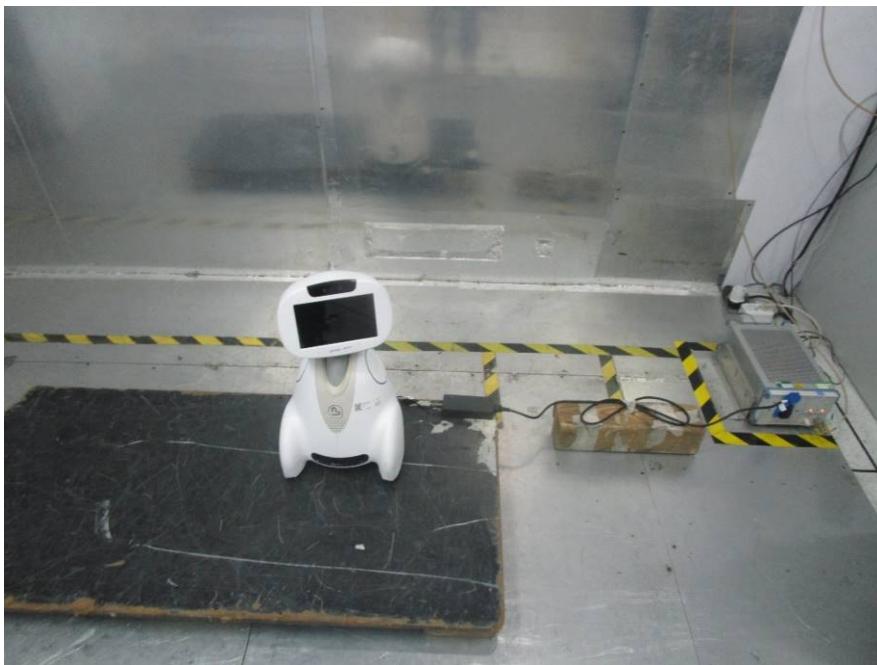
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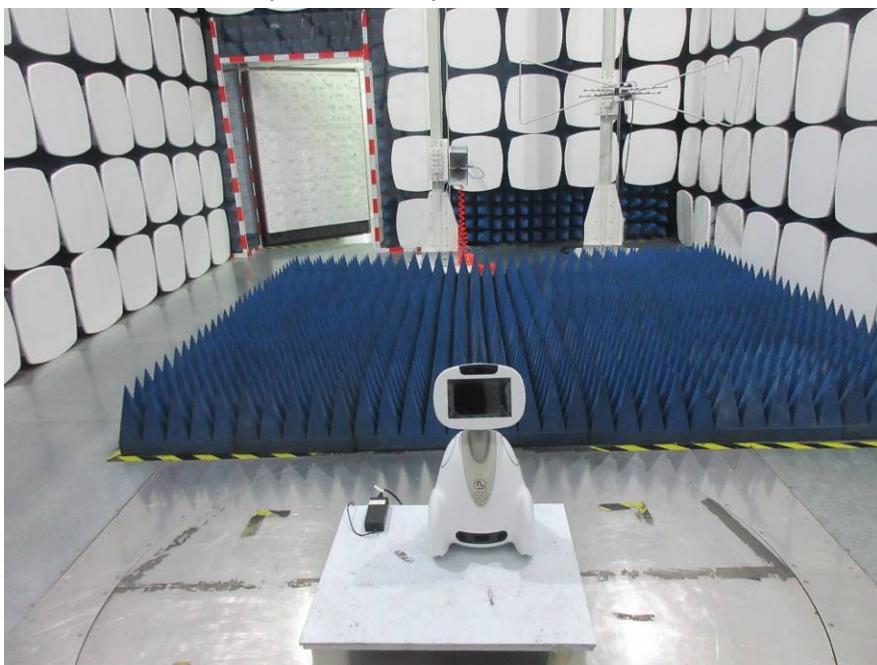


7 Test Setup Photo

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



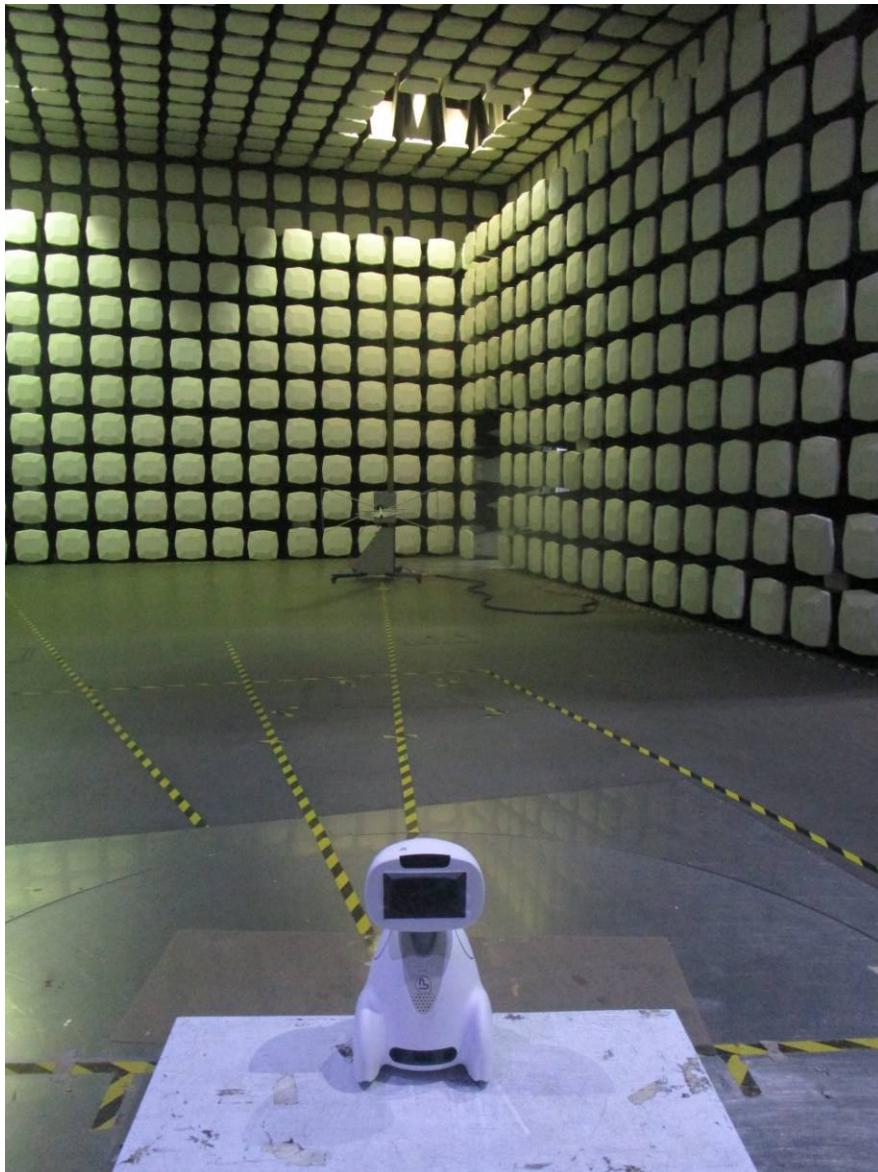
Radiated Emissions (Above 1GHz)



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Radiated Emissions (30MHz-1GHz)

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8 EUT Constructional Details (EUT Photos)

Refer to External and Internal Photos for GZCR2209001150AT

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