



TEST REPORT

Application No.:	GZEM2205002324LM
Applicant:	ROYCHE Co., Ltd
Address of Applicant:	F11 ParkLand B/D 601 Eunjuro Gangnam Gu, Seoul, Korea, 06109
Manufacturer:	ShenZhen Wang-tech Co., Ltd
Address of Manufacturer:	Room 806, Building 3A, Phase 1, Tiananyungu Industrial Park, Bantian Street, Longgang, ShenZhen, China
Factory:	ShenZhen Wang-tech Co., Ltd
Address of Factory:	Room 806, Building 3A, Phase 1, Tiananyungu Industrial Park, Bantian Street, Longgang, ShenZhen, China
Equipment Under Test (EUT):	
EUT Name:	BT21 minini dual blades Handy Fan
Model No.:	BT21-RHF-4E-TT, BT21-RHF-4E-CK, BT21-RHF-4E-CM, BT21-RHF-4E-SK, BT21-RHF-4E-RJ, BT21-RHF-4E-MG, BT21-RHF-4E-KY *
*	Please refer to section 2 of this report which indicates which item was actually tested and which were electrically identical.
Standard(s) :	47 CFR Part 15, Subpart B
Date of Receipt:	2022-05-09
Date of Test:	2022-05-10
Date of Issue:	2022-05-17
Test Result:	Pass*

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

Kobe Jian
EMC Laboratory Manager



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Revision Record			
Version	Report No.	Date	Remark
01	GZEM220500232401	2022-05-17	Original

Authorized for issue by:			
	 Michael Huang/Project Engineer		
	 Terry Lai/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

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.

Model No.: BT21-RHF-4E-TT, BT21-RHF-4E-CK, BT21-RHF-4E-CM, BT21-RHF-4E-SK, BT21-RHF-4E-RJ, BT21-RHF-4E-MG, BT21-RHF-4E-KY

According to the declaration from the applicant, the electrical circuit design, layout, components used and internal wiring were identical for all models, with only difference being the color.

Only the model BT21-RHF-4E-KY was tested.



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4 General Information

4.1 Details of E.U.T.

Power supply: Input: DC 5V 1A
Battery operation: DC 3.7V 7.4Wh 18650 battery
Highest operating frequency: Below 108MHz
Test Voltage: AC 120 V, 60 Hz powered by AC\DC adapter refer to section 4.2

4.2 Description of Support Units

Description	Manufacturer	Model No.	Serial No.
The EUT has been tested with the AC\DC adapter, supply by test lab.	/	Model: CX-4405(US), INPUT: AC 120V 60Hz, OUTPUT: DC 5V 1A	/

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

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

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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:

- **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, IEC60061 and Rules of procedure IEC60062, and the relevant IEC60065 CB-Scheme 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	2020-09-09	2022-09-08
Shielding Room	ChangZhou ZhongYu	8m x 3m x 3.8m	EMC0306	2019-10-20	2022-10-19
Two-Line V-Network-GZ	Rohde & Schwarz	ENV216	EMC2135	2021-09-24	2022-09-23
EMI Test Receiver (9kHz-3.6GHz)	Rohde & Schwarz	ESR3	EMC2221	2021-06-01	2022-05-31
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	2019-10-20	2022-10-19
Chamber cable	HangTianXing	N/A	EMC0542	2020-09-09	2022-09-08
Amplifier (9kHz-1.3GHz)	HP	8447F	EMC2065	2021-05-19	2022-05-18
EMI Test Receiver (1Hz-8GHz)	Rohde & Schwarz	ESW8	EMC2220	2021-05-26	2022-05-25
Test Software E3	Audix	Ver.6.120110a	GZE100-61	N/A	N/A
Trilog Broadband Antenna (25MHz-1GHz)	SCHWARZBECK MESS-ELEKTRONIK	VULB 9168	SEM003-18	2022-03-03	2025-03-02

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

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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

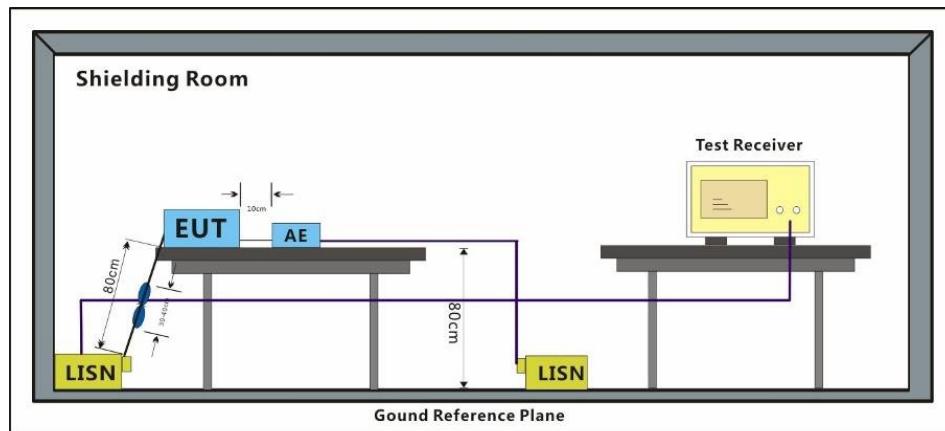
Operating Environment:

Temperature: 22.6 °C Humidity: 53.6 % RH Atmospheric Pressure: 1005 mbar

6.1.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Pre-scan	00	Test the EUT in charging mode, supply power by the AC\DC adapter.
Final test	01	Test the EUT in charging mode with motor running, adjusting speed at max output power, supply power by the AC\DC adapter.
Pre-scan	02	Test the EUT in charging mode with motor running, adjusting speed at middle output power, supply power by the AC\DC adapter.
Pre-scan	03	Test the EUT in charging mode with motor running, adjusting speed at lowest output power, supply power by the AC\DC adapter.

6.1.3 Test Setup Diagram



6.1.4 Measurement Procedure and Data

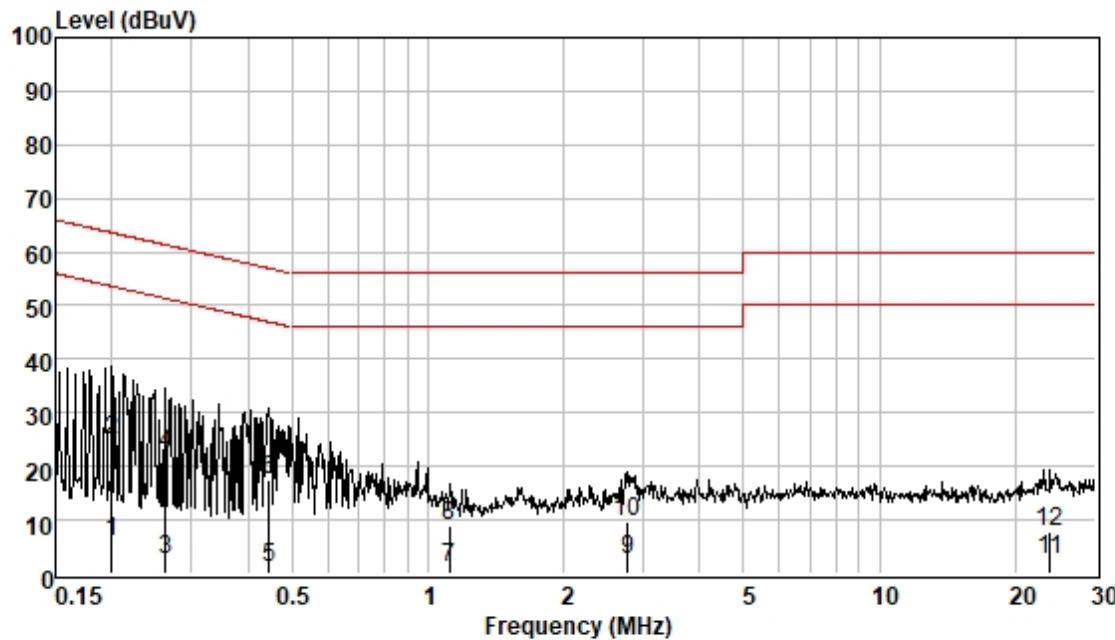
An initial pre-scan was performed with peak detector. Quasi-Peak or Average measurement were performed at the frequencies with maximized peak emission were detected.

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

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Test Mode: 01; Line: Live line



Pol :LINE

Mode :

Model :

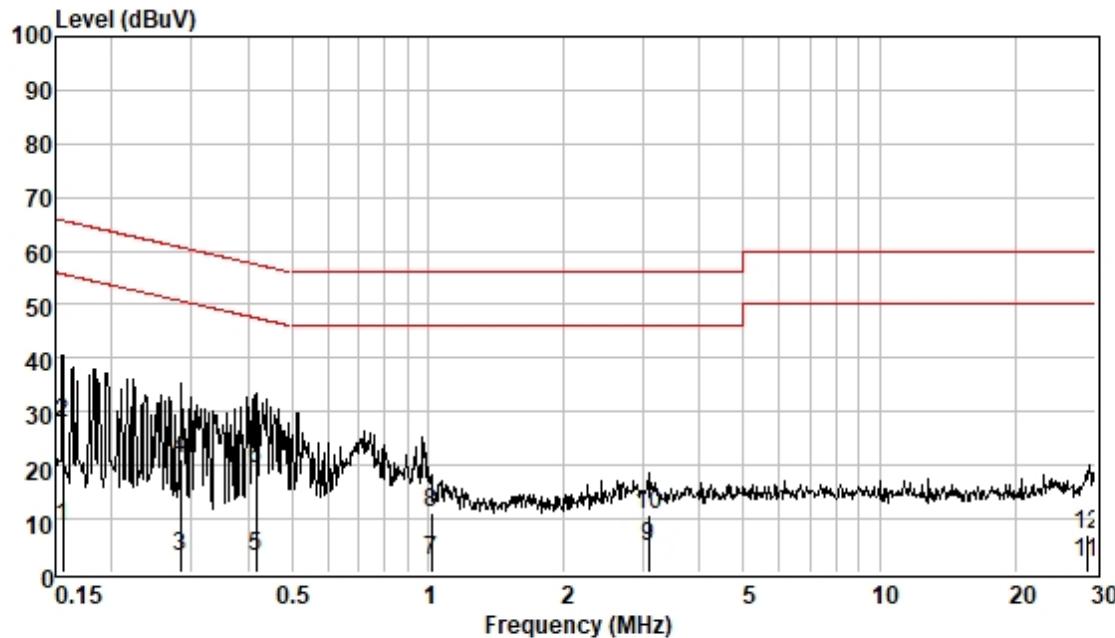
Frequenc MHz	Read Level dBuV	Cable Loss dB	LISN Factor dB	Measured Level dBuV	Limit Line dBuV	Over Limit dB	Remark
1 0.200	-3.62	0.06	9.56	6.00	53.62	-47.62	Average
2 0.200	15.25	0.06	9.56	24.87	63.62	-38.75	QP
3 0.263	-7.05	0.06	9.57	2.58	51.34	-48.76	Average
4 0.263	12.82	0.06	9.57	22.45	61.34	-38.89	QP
5 0.444	-8.51	0.06	9.58	1.13	46.98	-45.85	Average
6 0.444	7.65	0.06	9.58	17.29	56.98	-39.69	QP
7 1.117	-8.43	0.08	9.60	1.25	46.00	-44.75	Average
8 1.117	-0.82	0.08	9.60	8.86	56.00	-47.14	QP
9 2.765	-7.14	0.14	9.61	2.61	46.00	-43.39	Average
10 2.765	-0.21	0.14	9.61	9.54	56.00	-46.46	QP
11 23.762	-7.77	0.40	9.80	2.43	50.00	-47.57	Average
12 23.762	-2.40	0.40	9.80	7.80	60.00	-52.20	QP

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Test Mode: 01; 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	0.156	-1.00	0.06	9.53	8.59	55.69	-47.10	Average
2	0.156	18.44	0.06	9.53	28.03	65.69	-37.66	QP
3	0.283	-6.77	0.06	9.57	2.86	50.72	-47.86	Average
4	0.283	11.55	0.06	9.57	21.18	60.72	-39.54	QP
5	0.417	-6.56	0.06	9.58	3.08	47.51	-44.43	Average
6	0.417	9.55	0.06	9.58	19.19	57.51	-38.32	QP
7	1.021	-7.56	0.07	9.59	2.10	46.00	-43.90	Average
8	1.021	1.52	0.07	9.59	11.18	56.00	-44.82	QP
9	3.074	-5.00	0.15	9.61	4.76	46.00	-41.24	Average
10	3.074	1.06	0.15	9.61	10.82	56.00	-45.18	QP
11	28.755	-8.47	0.43	9.91	1.87	50.00	-48.13	Average
12	28.755	-3.30	0.43	9.91	7.04	60.00	-52.96	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 29.5(dB μ V/m) quasi-peak

88MHz-216MHz 33.1(dB μ V/m) quasi-peak

216MHz-960MHz 35.6(dB μ V/m) quasi-peak

960MHz-1000MHz 43.5(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: 22.0 °C Humidity: 59.9 % RH Atmospheric Pressure: 1005 mbar

6.2.2 Test Mode Description

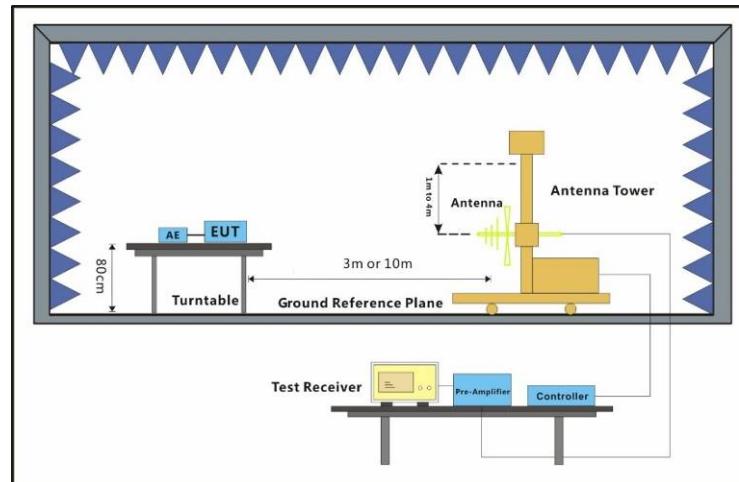
Pre-scan / Final test	Mode Code	Description
Pre-scan	00	Test the EUT in charging mode, supply power by the AC\DC adapter.
Final test	01	Test the EUT in charging mode with motor running, adjusting speed at max output power, supply power by the AC\DC adapter.
Pre-scan	02	Test the EUT in charging mode with motor running, adjusting speed at middle output power, supply power by the AC\DC adapter.
Pre-scan	03	Test the EUT in charging mode with motor running, adjusting speed at lowest output power, supply power by the AC\DC adapter.
Pre-scan	04	Test the EUT in motor running mode with max output power, supply power by the DC battery.
Pre-scan	05	Test the EUT in motor running mode with middle output power, supply power by the DC battery.
Pre-scan	06	Test the EUT in motor running mode with lowest output power, supply power by the DC battery.

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6.2.3 Test Setup Diagram**6.2.4 Measurement Procedure and Data**

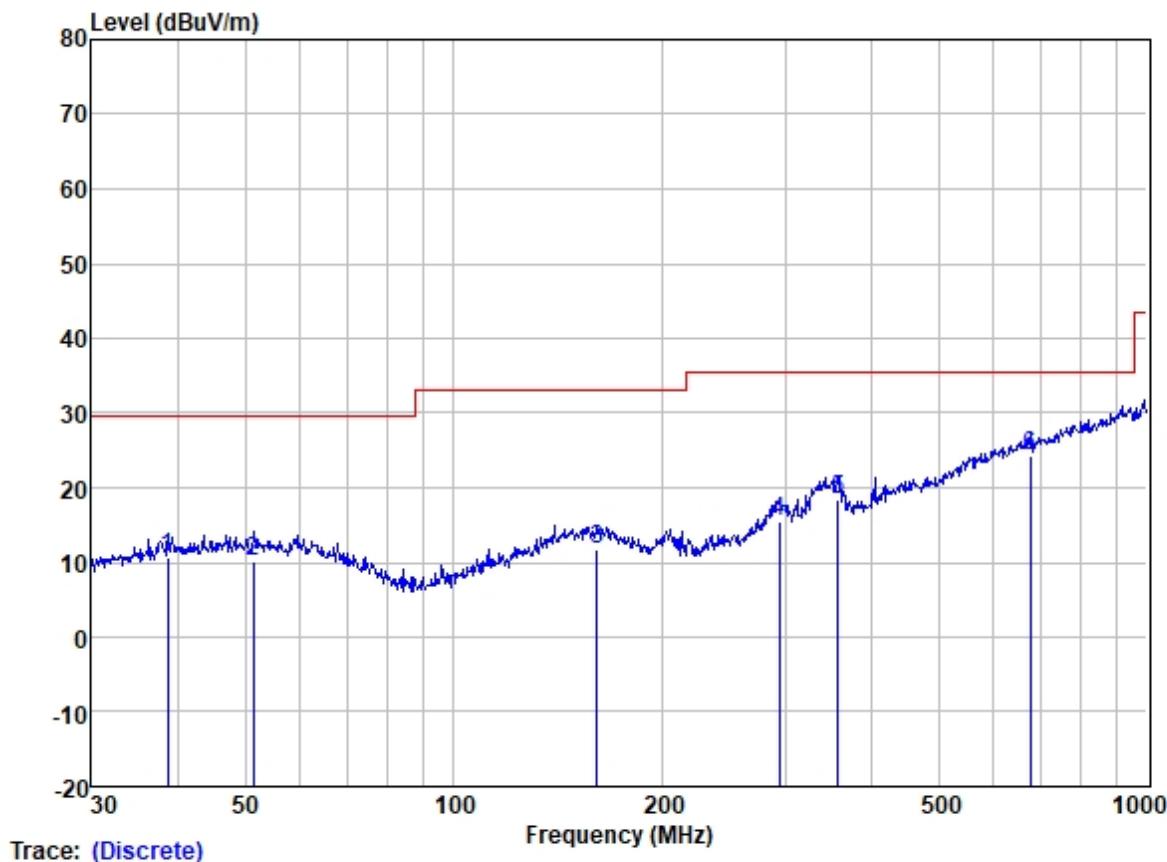
An initial pre-scan was performed in the chamber using the spectrum analyser in peak detection mode. Quasi-peak measurements were conducted based on the peak sweep graph. The EUT was measured by BiConiLog antenna with 2 orthogonal polarities.

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

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Test Mode: 01; Polarity: Horizontal



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

Freq	Read	Antenna	Cable	Preamp	Measured	Limit	Over	Pol/	Remark
	Level	Factor	Loss	Factor	Level	Line	Limit	Phase	
MHz									
1 38.616	23.94	12.91	1.09	27.18	10.76	29.50	-18.74	HORIZONTAL	QP
2 51.301	22.68	13.59	1.15	27.17	10.25	29.50	-19.25	HORIZONTAL	QP
3 160.909	22.96	13.29	2.34	26.79	11.80	33.10	-21.30	HORIZONTAL	QP
4 294.114	25.91	13.07	3.15	26.55	15.58	35.60	-20.02	HORIZONTAL	QP
5 357.929	27.32	14.35	3.70	27.09	18.28	35.60	-17.32	HORIZONTAL	QP
6 677.580	26.37	20.44	5.65	28.17	24.29	35.60	-11.31	HORIZONTAL	QP

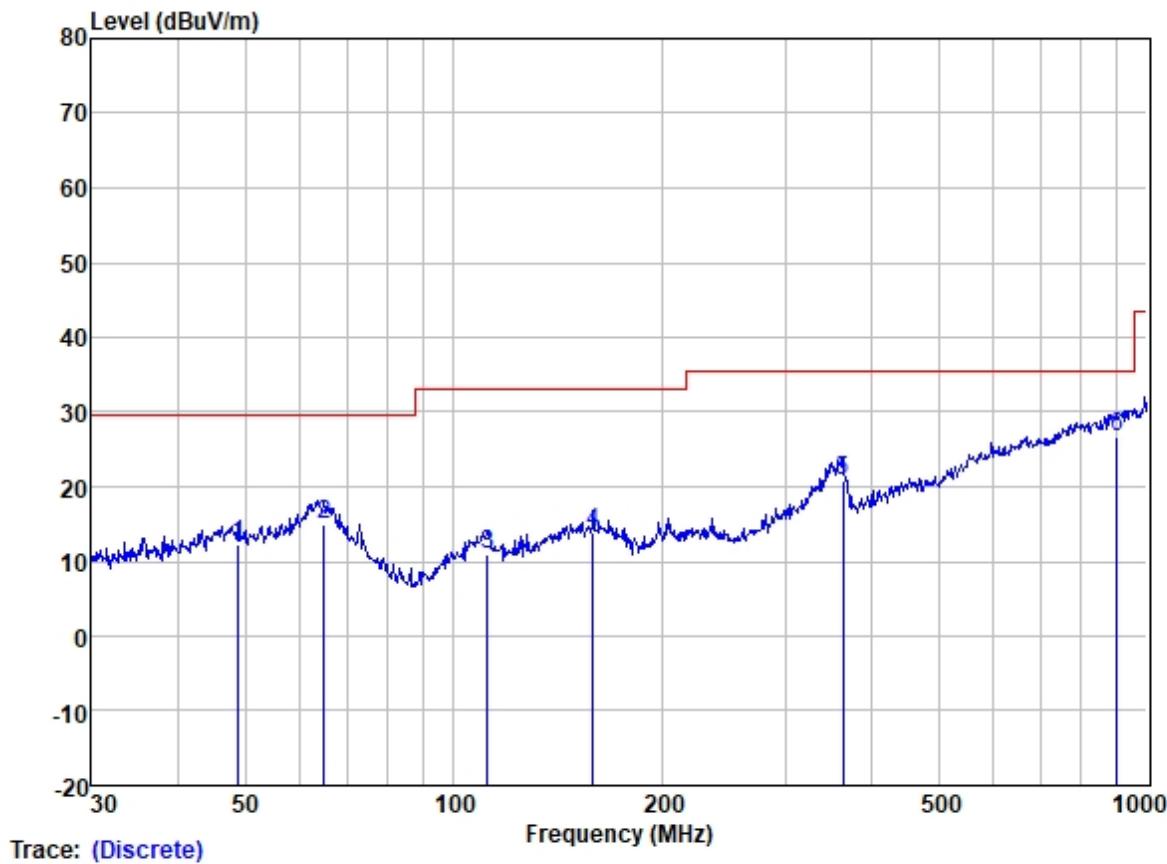
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Test Mode: 01; Polarity: Vertical



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

Freq	Read	Antenna	Cable	Preamp	Measured	Limit	Over	Pol/	Remark
	Level	Factor	Loss	Factor	Level	Line	Limit	Phase	
<hr/>									
1	48.843	24.71	13.59	1.14	27.17	12.27	29.50	-17.23	VERTICAL QP
2	64.887	28.70	12.14	1.35	27.15	15.04	29.50	-14.46	VERTICAL QP
3	111.738	25.87	10.22	1.80	27.05	10.84	33.10	-22.26	VERTICAL QP
4	158.668	24.89	13.36	2.33	26.80	13.78	33.10	-19.32	VERTICAL QP
5	364.260	29.63	14.54	3.73	27.15	20.75	35.60	-14.85	VERTICAL QP
6	903.309	24.44	23.23	6.92	27.84	26.75	35.60	-8.85	VERTICAL QP

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7 Test Setup Photo

Refer to Setup Photo for GZEM2205002324LM.



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8 EUT Constructional Details (EUT Photos)

Refer to External Photo & Internal Photo for GZEM2205002324LM.

- End of the Report -



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