

Report No.: GZCR211002122003

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## TEST REPORT

Application No.: GZCR2110021220MD

Applicant: CEFALY Technology SPRL

Address of Applicant: Rue Louis Plescia 34, 4102 Seraing, Belgium

Manufacturer: CEFALY Technology SPRL

Address of Manufacturer: Rue Louis Plescia 34, 4102 Seraing, Belgium

Factory: JDI Electronics Factory

Address of Factory: Sima Village, Chang Ping Town, Dongguan, Guangdong

**Equipment Under Test (EUT):** 

**EUT Name:** Medical device for the treatment of migraine

Model No.: CEFALY DUAL Connected

Standard(s): 47 CFR Part 15, Subpart C 15.225

**Date of Receipt:** 2021-10-14

**Date of Test:** 2021-10-22 to 2021-12-06

**Date of Issue:** 2021-12-07

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		2021-12-07		Original

Authorized for issue by:		
	by knong	
	Lily Kuang/Project Engineer	
	Riday Lin	
	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 15.225	N/A	47 CFR Part 15, Subpart C 15.203	Pass	

Radio Spectrum Matt	er Part			
Item	Standard	Method	Requirement	Result
20dB Bandwidth		ANSI C63.10 (2013) Section 6.9	47 CFR Part 15, Subpart C 15.215	Pass
Emission Mask		ANSI C63.10 (2013) Section 6.4	47 CFR Part 15, Subpart C 15.225(a)&(b)&(C)	Pass
Frequency tolerance	47.0ED Dor# 45	ANSI C63.10 (2013) Section 6.8	47 CFR Part 15, Subpart C 15.225(e)	Pass
Radiated Emissions (30MHz-1GHz)	47 CFR Part 15, Subpart C 15.225	ANSI C63.10 (2013) Section 6.4&6.5	47 CFR Part 15, Subpart C 15.225(d) & 15.209	Pass
Radiated Emissions (9kHz-30MHz)		ANSI C63.10 (2013) Section 6.4&6.5	47 CFR Part 15, Subpart C 15.225(d) & 15.209	Pass
Conducted Emissions at Mains Terminals (150kHz-30MHz)		ANSI C63.10 (2013) Section 6.2	47 CFR Part 15, Subpart C 15.207	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 5 V powered by AC/DC adapter as below for charging:

model: ILM-0500100M

Input: 100~240V ~50/60Hz 0.2A

Output: 5V===1A

DC 3.7 V powered by built-in battery as below for normal working:

Model: LP521540

Rated: DC 3.7 V, 280mAh

The details of charging dock as below:

Model: CEFALY Charging dock

Lot No.: 2124 Input: 5V===1A Output: 5V===1A

Cable(s): DC mains (unshielded, 0.8m)

Operation Frequency: 13.56MHz Modulation Type: ASK

Antenna Type: Loop Antenna

### 4.2 Description of Support Units

The EUT has been tested as an independent unit.

### 4.3 Measurement Uncertainty

Test Item	Measurement Uncertainty
20dB Bandwidth	± 3%
Emission Mask	± 3.12dB
Frequency tolerance	± 7.25 E-8
Radiated Emissions (30MHz-1GHz)	± 5.00dB (30MHz-1GHz):3m;±4.38dB (30MHz-1GHz):10m
Radiated Emissions (9kHz-30MHz)	± 3.12dB
Conducted Emissions at Mains Terminals (150kHz-30MHz)	± 2.76dB

### 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, 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 Analyzer(10Hz-44GHz)	Agilent Technologies	N9010A	EMC2138	2021-09-16	2022-09-15
6dB Attenuator	HP	8491A	EMC2062	2020-04-15	2022-04-14
Test Software JS1120-3	JS Tonscend	V2.6	GZE100-69	N/A	N/A
MI CABLE	SGS-EMC	M8.0	EMC2136	2021-11-02	2023-11-01

Emission Mask					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
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
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

Frequency tolerance					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
EXA Signal Analyzer(10Hz-44GHz)	Agilent Technologies	N9010A	EMC2138	2021-09-16	2022-09-15
6dB Attenuator	HP	8491A	EMC2062	2020-04-15	2022-04-14
Test Software JS1120-3	JS Tonscend	V2.6	GZE100-69	N/A	N/A
MI CABLE	SGS-EMC	0.8M	EMC2136	2021-11-02	2023-11-01
Temperature Chamber	GZ GongWen Co.Ltd.	GDJW-100	EMC0039	2021-07-04	2022-07-03

Radiated Emissions (30MHz-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	
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 (9kHz-30MHz)						
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date	
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	
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 Emissions at Mains Terminals (150kHz-30MHz)								
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date			
Shielding Room	ChangZhou ZhongYu	8m x 3m x 3.8m	EMC0306	N/A	N/A			
Two-Line V-Network-GZ	Rohde & Schwarz	ENV216	EMC2135	2021-09-24	2022-09-23			
Coaxial Cable	HangTianXing	2m	EMC0107	2020-09-09	2022-09-08			
Test Software E3c	Audix	Ver. 5.4.1221b	GZE100-62	N/A	N/A			
EMI Test Receiver(9kHz-3.6GHz)	Rohde & Schwarz	ESR3	EMC2221	2021-06-01	2022-05-31			

General used equipmen	t				
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 Radio Spectrum Technical Requirement

### 6.1 Antenna Requirement

### 6.1.1 Test Requirement:

47 CFR Part 15, Subpart C 15.203

#### 6.1.2 Conclusion

### 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. Antenna location: Refer to internal photo.



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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:

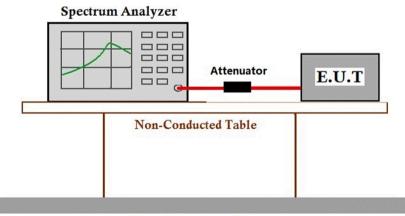
Temperature: 21.9 °C Humidity: 44.1 % RH Atmospheric Pressure: 1022 mbar

### 7.1.2 Test Mode Description

Pre-scan / Mode Final test Code Description

Final test 01 TX mode with modulation with NFC mode

#### 7.1.3 Test Setup Diagram







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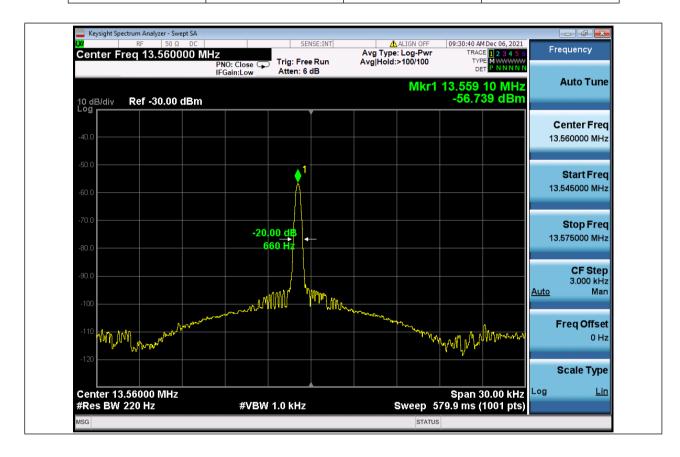
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### 7.1.4 Measurement Procedure and Data

Remark: The setting of RBW was the minimum for the spectrum.

Cable Loss= 0.9dB

operating frequency	20dB Bandwidth	Limit	Result
13.560 MHz	0.660 kHz		Pass





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### 7.2 Emission Mask

Test Requirement 47 CFR Part 15, Subpart C 15.225(a)&(b)&(C)

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

Limit:

- (a) The field strength of any emissions within the band 13.553-13.567 MHz shall not exceed 15,848 microvolts/meter at 30 meters.
- (b) Within the bands 13.410-13.553 MHz and 13.567-13.710 MHz, the field strength of any emissions shall not exceed 334 microvolts/meter at 30 meters.
- (c) Within the bands 13.110-13.410 MHz and 13.710-14.010 MHz the field strength of any emissions shall not exceed 106 microvolts/meter at 30 meters.
- (d) The field strength of any emissions appearing outside of the 13.110-14.010 MHz band shall not exceed the general radiated emission limits in § 15.209.

#### **Below 30MHz**

The test was performed at a 3m test site.

The factor calculated by the following equation:

$$FS_{\text{limit}} = FS_{\text{max}} - 40 \log \left( \frac{d_{\text{limit}}}{d_{\text{measure}}} \right)$$

where

FS<sub>limit</sub> is the calculation of field strength at the limit distance, expressed in dBμV/m

FS<sub>max</sub> is the measured field strength, expressed in dB $\mu$ V/m  $d_{measure}$  is the distance of the measurement point from the EUT

is the reference distance or the distance of the  $\lambda/2\pi$  point

The limit at 3m test distance is below:

The factor of field strength of any emissions within the band 13.553-13.567 MHz shall be 40dB at 3 meters.

#### 7.2.1 E.U.T. Operation

Operating Environment:

Temperature: 23.4 °C Humidity: 53.0 % RH Atmospheric Pressure: 1003 mbar

### 7.2.2 Test Mode Description

Pre-scan / Mode Final test Code Description

Final test 01 TX mode with modulation with NFC mode



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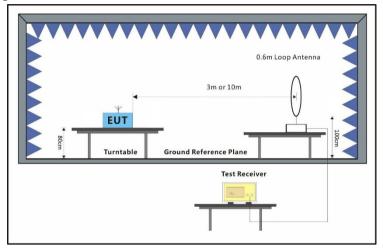
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#### 7.2.3 Test Setup Diagram



#### 7.2.4 Measurement Procedure and Data

For testing performed with the loop antenna, the center of the loop was positioned 1 m above the ground and positioned with its plane vertical at the specified distance from the EUT. During testing the loop was rotated about its vertical axis for maximum response at each azimuth and also investigated with the loop positioned in the horizontal plane.

The radiation measurements are performed in X, Y, Z axis positioning. And found the X axis positioning which it is worse case, only the test worst case mode is recorded in the report.

Measured Level=Read Level + Antenna Factor + Cable Loss - Preamp Factor + Extrapolation Correction



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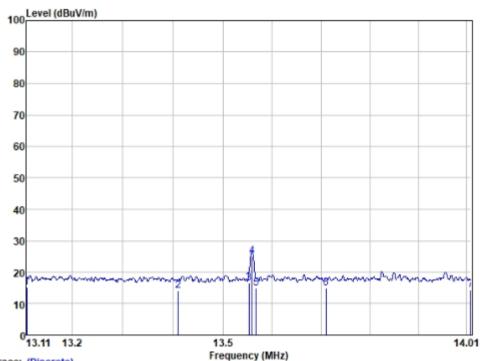
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### Test Mode: 01;



Trace: (Discrete)

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

	Freq					Measured Level		
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB
1	13.11	34.92	9.07	0.57	29.25	15.31		
2	13.41	33.78	8.99	0.58	29.25	14.10		
3	13.55	36.23	8.96	0.58	29.25	16.52		
4	13.56	44.71	8.96	0.58	29.25	25.00		
5	13.57	34.77	8.96	0.58	29.25	15.06		
6	13.71	34.75	8.93	0.58	29.25	15.01		
7	14.01	34.23	8.87	0.59	29.25	14.44		

Frequency (MHz)	Level (dBuV/m) @3m	Limit (dBuV/m) @30m	Convert Factor (dB)	Level (dBuV/m) @ 30m	Over limit (dB)
13.11	15.31	29.54	40	-23.59	-53.13
13.41	14.10	40.51	40	-24.53	-65.04
13.55	16.52	50.47	40	-20.85	-71.32
**13.56	25.00	84	40	-13.21	-97.21
13.57	15.06	50.47	40	-23.86	-74.33
13.71	15.01	40.51	40	-23.78	-64.29
14.01	14.44	29.54	40	-22.85	-52.39

<sup>\*\*</sup>Remark: This is the main operating frequency of the EUT.



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### 7.3 Frequency tolerance

Test Requirement 47 CFR Part 15, Subpart C 15.225(e)
Test Method: ANSI C63.10 (2013) Section 6.8

Limit:  $\pm 0.01\%(\pm 1.356 \text{kHz})$ 

#### 7.3.1 E.U.T. Operation

Operating Environment:

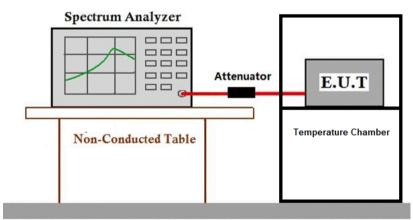
Temperature: 21.9 °C Humidity: 44.1 % RH Atmospheric Pressure: 1022 mbar

### 7.3.2 Test Mode Description

Pre-scan / Mode Final test Code Description

Final test 01 TX mode with modulation with NFC mode

### 7.3.3 Test Setup Diagram



Ground Reference Plane



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### 7.3.4 Measurement Procedure and Data

#### At startup:

Measurement Conditions		Limit: ±10		
Voltage (V AC)	Temperature (°C)	Frequency Measured (MHz)  13.55906  -69.32  13.55925  -55.31  13.55907  -68.58  13.55904  -70.80  13.55910  -66.37  13.55922  -57.52  13.55917  -61.21  13.55908  -67.85	Verdict	
	-20	13.55906	-69.32	PASS
	-10	13.55925	-55.31	PASS
	0	13.55907	-68.58	PASS
V .400	+10	13.55904	-70.80	PASS
V <sub>norm</sub> : 120	T <sub>normal</sub> : +20	13.55910	-66.37	PASS
	+30	13.55922	-57.52	PASS
	+40	13.55917	-61.21	PASS
	+50	13.55908	-67.85	PASS
V <sub>max</sub> : 138	T	13.55907	-68.58	PASS
V <sub>min</sub> : 102	$T_{normal}$ : +20	13.55904	-70.80	PASS

#### At 2 minutes later:

Measurement Conditions		Limit: ±10	Limit: ±100ppm			
Voltage (V AC)	Temperature (°C)	Frequency Measured (MHz)	Test data (ppm)	Verdict		
	-20	13.55923	-56.79	PASS		
	-10	13.55934	-48.67	PASS		
	0	13.55924	-56.05	PASS		
	+10	13.55907	-68.58	PASS		
V <sub>norm</sub> : 120	T <sub>normal</sub> : +20	13.55910	-66.37	PASS		
	+30	13.55921	-58.26	PASS		
	+40	13.55935	-47.94	PASS		
	+50	13.55907	-68.58	PASS		
V <sub>max</sub> : 138	T	13.55905	-70.06	PASS		
V <sub>min</sub> : 102	$T_{normal}$ : +20	13.55913	-64.16	PASS		



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#### At 5 minutes later:

Measurement Conditions		Limit: ±10		
Voltage (V AC)	Temperature (°C)	Frequency Measured (MHz)  13.55937 -46.46 13.55912 -64.90 13.55929 -52.36 13.55935 -47.94		Verdict
	-20	13.55937	-46.46	PASS
	-10	13.55912	-64.90	PASS
	0	13.55929	-52.36	PASS
V 400	+10	13.55935	-47.94	PASS
V <sub>norm</sub> : 120	T <sub>normal</sub> : +20	13.55910	-66.37	PASS
	+30	13.55905	-70.06	PASS
	+40	13.55909	-67.11	PASS
	+50	13.55927	-53.84	PASS
V <sub>max</sub> : 138	T . ±20	13.55917	-61.21	PASS
V <sub>min</sub> : 102	T <sub>normal</sub> : +20	13.55913	-64.16	PASS

#### At 10 minutes later:

Measurement Conditions		Limit: ±10	Limit: ±100ppm			
Voltage (V DC)	Temperature (°C)	Frequency Measured	Test data (ppm)	Verdict		
	-20	13.55909	-67.11	PASS		
	-10	13.55908	-67.85	PASS		
	0	13.55931	-50.89	PASS		
	+10	13.55927	-53.84	PASS		
V <sub>norm</sub> : 120	T <sub>normal</sub> : +20	13.55912	-64.90	PASS		
	+30	13.55914	-63.42	PASS		
	+40	13.55931	-50.89	PASS		
	+50	13.55903	-71.53	PASS		
V <sub>max</sub> : 138	T . +20	13.55902	-72.27	PASS		
V <sub>min</sub> : 102	$T_{normal}$ : +20	13.55930	-51.62	PASS		



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### 7.4 Radiated Emissions (30MHz-1GHz)

Test Requirement 47 CFR Part 15, Subpart C 15.225(d) & 15.209

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

Limit:

Frequency	Field strength (microvolt/meter)	Limit (dBuV/m)	Remark	Measurement distance (m)
30MHz-88MHz	100	40.0	Quasi-peak	3
88MHz-216MHz	150	43.5	Quasi-peak	3
216MHz-960MHz	200	46.0	Quasi-peak	3
960MHz-1GHz	500	54.0	Quasi-peak	3

### 7.4.1 E.U.T. Operation

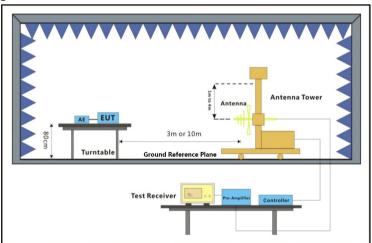
Operating Environment:

Temperature: 23.4 °C Humidity: 53.3 % RH Atmospheric Pressure: 1003 mbar

#### 7.4.2 Test Mode Description

Pre-scan /	wode	Description
Final test	Code	•
Final test	02	Normal working in Battery
Pre-scan	03	Normal working with AC_charging mode

### 7.4.3 Test Setup Diagram





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#### 7.4.4 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. 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. The radiation measurements are performed in X, Y, Z axis positioning. And found the X axis positioning which it is worse case, only the test worst case mode is recorded in the report.

Remark 1: Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor

Remark 2: 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.



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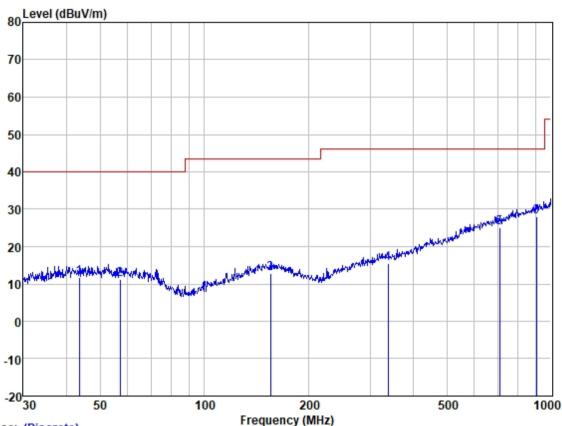
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Test Mode: 02; Polarity: Horizontal



Trace: (Discrete)

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

	Freq					Measured Level			Pol/ Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dBuV		
1	43.51	24.01	13.78	1.12	27.17	11.74	40.00	-28.26	HORIZONTAL	QP
2	56.99	23.63	13.65	1.21	27.16	11.33	40.00	-28.67	HORIZONTAL	QP
3	154.82	23.68	13.75	2.28	26.81	12.90	43.50	-30.60	HORIZONTAL	QP
4	338.40	24.24	14.50	3.50	26.82	15.42	46.00	-30.58	HORIZONTAL	QP
5	709.18	26.21	21.20	5.80	28.15	25.06	46.00	-20.94	HORIZONTAL	QP
6	906.48	25.64	23.37	6.96	27.84	28.13	46.00	-17.87	HORIZONTAL	QP



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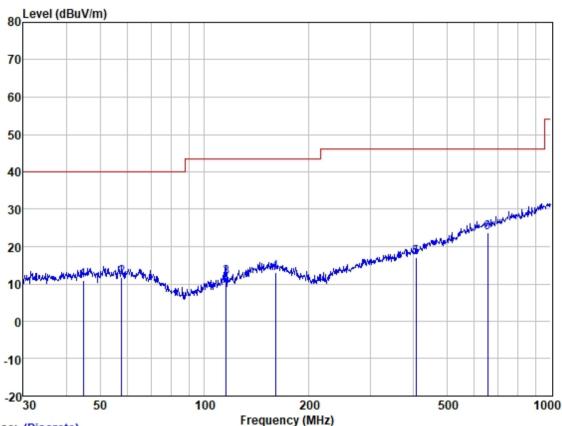
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Test Mode: 02; Polarity: Vertical



Trace: (Discrete)

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

	Freq					Measured Level			Pol/ Phase	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dBuV		
1	44.74	23.21	13.83	1.12	27.17	10.99	40.00	-29.01	VERTICAL	QP
2	57.59	24.18	13.62	1.22	27.16	11.86	40.00	-28.14	VERTICAL	QP
3	115.32	26.19	10.65	1.83	27.04	11.63	43.50	-31.87	VERTICAL	QP
4	160.35	23.82	13.60	2.33	26.80	12.95	43.50	-30.55	VERTICAL	QP
5	407.51	24.65	15.85	3.97	27.36	17.11	46.00	-28.89	VERTICAL	QP
6	656.53	25.86	20.55	5.56	28.18	23.79	46.00	-22.21	VERTICAL	QP



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### 7.5 Radiated Emissions (9kHz-30MHz)

Test Requirement 47 CFR Part 15, Subpart C 15.225(d) & 15.209

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

Limit:

Frequency(MHz)	Field strength (microvolts/meter )	Limit (dBuV/m)	Detector	Measurement Distance (meters)
0.009-0.490	2400/F(kHz)	-	-	300
0.490-1.705	24000/F(kHz)	-	-	30
1.705-30	30	-	-	30
30-88	100	40.0	QP	3
88-216	150	43.5	QP	3
216-960	200	46.0	QP	3
960-1000	500	54.0	QP	3
Above 1000	500	54.0	AV	3

According to ANSI C63.10 Section 6.4, the test data shall convert by below formula:

If both the single point and the limit distance are equal to or closer to the EUT than  $\lambda/2\pi$ , then extrapolation to the limit distance shall be calculated using Equation (4):

$$FS_{\text{limit}} = FS_{\text{max}} - 40\log\left(\frac{d_{\text{limit}}}{d_{\text{measure}}}\right) \tag{4}$$

where

 $FS_{limit}$  is the calculation of field strength at the limit distance, expressed in dB $\mu$ V/m

 $FS_{\text{max}}$  is the measured field strength, expressed in dB $\mu$ V/m

 $d_{\text{near field}}$  is the  $\lambda/2\pi$  distance

 $d_{\text{measure}}$  is the distance of the measurement point from the EUT  $d_{\text{limit}}$  is the reference distance or the distance of the  $\lambda/2\pi$  point

Table 5—Relationship of frequency and wavelength (informative)

Frequency (MHz)	λ (m)	0.625λ (m)	$\lambda/2\pi$
0.009	33333.3	20833.3	5305.2
0.1	3000.0	1875.0	477.5
0.3	1000.0	625.0	159.2
1	300.0	187.5	47.7
4.76	63.0	39.4	10.0
16	18.8	11.7	3.0
30	10.0	6.3	1.6

The limit at 3m test distance is below:

The factor of field strength of any emissions within the band 0.009-0.490 MHz shall be 80 dB and 0.490-30 MHz shall be 40dB at 3 meters.



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### 7.5.1 E.U.T. Operation

Operating Environment:

Temperature: 23.4 °C Humidity: 53.2 % RH Atmospheric Pressure: 1003 mbar

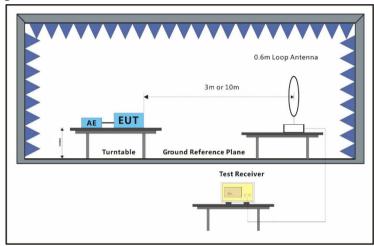
#### 7.5.2 Test Mode Description

Pre-scan / Mode Final test Code

Description

Final test 03 Normal working with AC\_charging mode

### 7.5.3 Test Setup Diagram



#### 7.5.4 Measurement Procedure and Data

Measurement distance: 3 m

For testing performed with the loop antenna, the center of the loop was positioned 1 m above the ground and positioned with its plane vertical at the specified distance from the EUT. During testing the loop was rotated about its vertical axis for maximum response at each azimuth and also investigated with the loop positioned in the horizontal plane.

The radiation measurements are performed in X, Y, Z axis positioning. And found the X axis positioning which it is worse case, only the test worst case mode is recorded in the report.

Measured Level=Read Level + Antenna Factor + Cable Loss - Preamp Factor + Extrapolation Correction

All the test data below the background of emissions in the frequency band, and the peak field strength of any emission is not exceeding the maximum permitted average limits specified above. So, no measurement data was shown.



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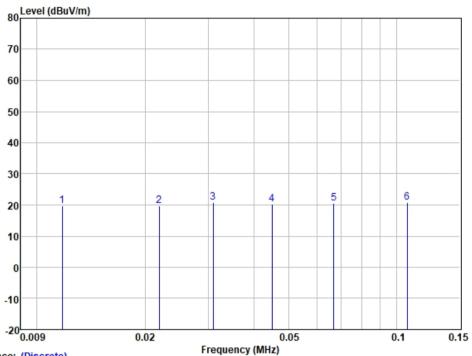
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Test Mode: 03; Polarity: Horizontal



Trace: (Discrete)

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	0.012	32.48	15.40	0.05	28.21	19.72			HORIZONTAL	QP
2	0.022	35.06	12.94	0.05	28.43	19.62			HORIZONTAL	QP
3	0.031	37.05	12.50	0.05	28.89	20.71			HORIZONTAL	QP
4	0.045	37.36	11.96	0.05	29.24	20.13			HORIZONTAL	QP
5	0.067	38.50	11.39	0.05	29.38	20.56			HORIZONTAL	QP
6	0.107	39.91	10.42	0.05	29.47	20.91			HORIZONTAL	QP

Frequency (MHz)	Level (dBuV/m) @3m	Limit (dBuV/m) @300m	Convert Factor (dB)	Level (dBuV/m) @ 300m	Over limit (dB)
0.012	19.72	46.02	80	-60.28	-106.3
0.022	19.62	40.76	80	-60.38	-101.14
0.031	20.71	37.78	80	-59.29	-97.07
0.045	20.13	34.54	80	-59.87	-94.41
0.067	20.56	31.08	80	-59.44	-90.52
0.107	20.91	27.02	80	-59.09	-86.11



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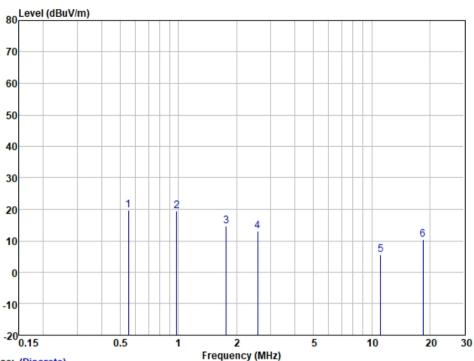
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Test Mode: 03; Polarity: Horizontal



Trace: (Discrete)

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	0.552	38.41	10.67	0.09	29.42	19.75			VERTICAL	QP
2	0.979	38.47	10.41	0.13	29.41	19.60			VERTICAL	QP
3	1.772	33.06	10.94	0.18	29.38	14.80			VERTICAL	QP
4	2.567	31.29	10.92	0.28	29.37	13.12			VERTICAL	QP
5	11.139	24.60	9.84	0.54	29.28	5.70			VERTICAL	QP
6	18.426	30.36	8.46	0.68	29.21	10.29			VERTICAL	OP

Frequency (MHz)	Level (dBuV/m) @3m	Limit (dBuV/m) @30m	Convert Factor (dB)	Level (dBuV/m) @ 30m	Over limit (dB)
0.552	19.75	32.77	40	-20.25	-53.02
0.979	19.60	27.79	40	-20.4	-48.19
1.772	14.80	29.54	40	-25.2	-54.74
2.567	13.12	29.54	40	-26.88	-56.42
11.139	5.70	29.54	40	-34.3	-63.84
18.426	10.29	29.54	40	-29.71	-59.25



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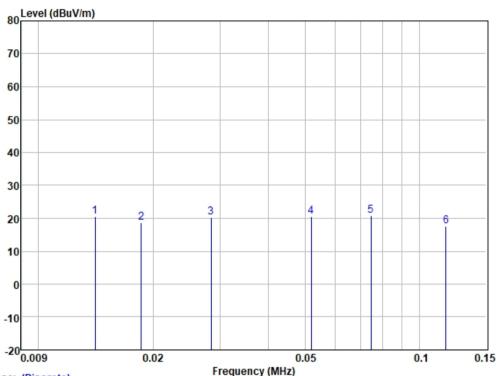
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Test Mode: 03; Polarity: Vertical



Trace: (Discrete)

: SGS Site Job Model Power Test Mode

	Freq					Measured Level				Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB		
1	0.014	34.19	14.48	0.05	28.25	20.47			VERTICAL	QP
2	0.019	33.76	13.16	0.05	28.35	18.62			VERTICAL	QP
3	0.028	36.18	12.68	0.05	28.70	20.21			VERTICAL	QP
4	0.052	37.94	11.86	0.05	29.30	20.55			VERTICAL	QP
5	0.074	39.16	10.94	0.05	29.41	20.74			VERTICAL	QP
6	0.117	36.43	10.46	0.05	29.47	17.47			VERTICAL	QP

Frequency (MHz)	Level (dBuV/m) @3m	Limit (dBuV/m) @300m	Convert Factor (dB)	Level (dBuV/m) @ 300m	Over limit (dB)
0.014	20.47	44.68	80	-59.53	-104.21
0.019	18.62	42.03	80	-61.38	-103.41
0.028	20.21	38.66	80	-59.79	-98.45
0.052	20.55	33.28	80	-59.45	-92.73
0.074	20.74	30.22	80	-59.26	-89.48
0.117	17.47	26.24	80	-62.53	-88.77

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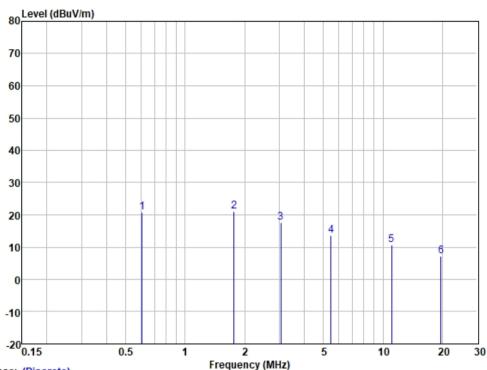
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Test Mode: 03; Polarity: Vertical



Trace: (Discrete)

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	0.608	39.53	10.65	0.10	29.42	20.86			HORIZONTAL	QP
2	1.772	39.23	10.94	0.18	29.38	20.97			HORIZONTAL	QP
3	3.041	35.97	10.79	0.31	29.36	17.71			HORIZONTAL	QP
4	5.476	32.09	10.47	0.36	29.33	13.59			HORIZONTAL	QP
5	11.080	29.43	9.87	0.54	29.28	10.56			HORIZONTAL	QP
6	19.635	27.20	8.41	0.72	29.20	7.13			HORIZONTAL	QP

Frequency (MHz)	Level (dBuV/m) @3m	Limit (dBuV/m) @30m	Convert Factor (dB)	Level (dBuV/m) @ 30m	Over limit
0.608	20.86	31.92	40	-19.14	-51.06
1.772	20.97	29.54	40	-19.03	-48.57
3.041	17.71	29.54	40	-22.29	-51.83
5.476	13.59	29.54	40	-26.41	-55.95
11.080	10.56	29.54	40	-29.44	-58.98
19.635	7.13	29.54	40	-32.87	-62.41



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

Test Requirement 47 CFR Part 15, Subpart C 15.207 Test Method: ANSI C63.10 (2013) Section 6.2

Limit:

Fraguency range (MHz)	Limit (c	IBuV)
Frequency range (MHz)	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

<sup>\*</sup> Decreases with the logarithm of the frequency.

### 7.6.1 E.U.T. Operation

Operating Environment:

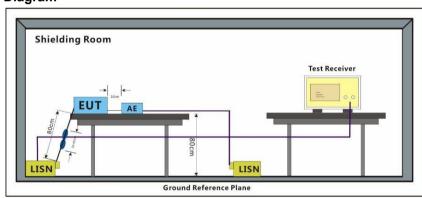
Temperature: 24.8 °C Humidity: 52 % RH Atmospheric Pressure: 1003 mbar

### 7.6.2 Test Mode Description

Pre-scan / Mode Final test Code Description

Final test 00 TX mode with modulation with NFC

#### 7.6.3 Test Setup Diagram





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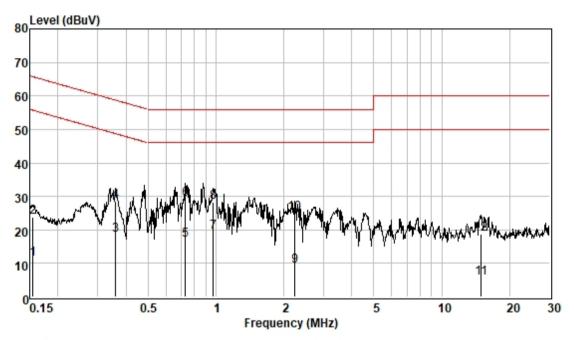
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#### 7.6.4 Measurement Procedure and Data

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.

Measured Level = Read level + Cable Loss + LISN Factor

Test Mode: 00; 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
0.15	1.56	0.06	9.62	11.24	55.74	-44.50	Average
0.15	14.12	0.06	9.62	23.80	65.74	-41.94	QP _
0.36	8.60	0.06	9.63	18.29	48.74	-30.45	Average
0.36	18.75	0.06	9.63	28.44	58.74	-30.30	QP _
0.73	7.33	0.07	9.63	17.03	46.00	-28.97	Average
0.73	19.57	0.07	9.63	29.27	56.00	-26.73	QP
0.97	9.57	0.07	9.62	19.26	46.00	-26.74	Average
0.97	18.47	0.07	9.62	28.16	56.00	-27.84	QP
2.24	-0.66	0.13	9.62	9.09	46.00	-36.91	Average
2.24	15.23	0.13	9.62	24.98	56.00	-31.02	QP _
14.91	-4.26	0.31	9.74	5.79	50.00	-44.21	Average
14.91	8.67	0.31	9.74	18.72	60.00	-41.28	QP



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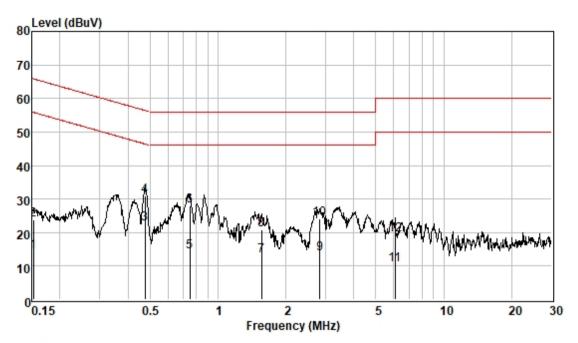
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Test Mode: 00; Line: Neutral Line



Pol :NEUTRAL

Mode : Model :

Frequenc MHz	Read Level dBuV	Cable Loss dB	LISN Factor dB	Measured Level dBuV	Limit Line dBuV	Over Limit dB	Remark
0.15	4.72	0.06	9.55	14.33	55.87	-41.54	Average
0.15	14.30	0.06	9.55	23.91	65.87	-41.96	QP
0.48	13.05	0.07	9.55	22.67	46.41	-23.74	Average
0.48	21.33	0.07	9.55	30.95	56.41	-25.46	QP
0.75	4.79	0.07	9.55	14.41	46.00	-31.59	Average
0.75	18.40	0.07	9.55	28.02	56.00	-27.98	QP
1.56	3.43	0.10	9.55	13.08	46.00	-32.92	Average
1.56	11.04	0.10	9.55	20.69	56.00	-35.31	QP
2.82	3.85	0.14	9.55	13.54	46.00	-32.46	Average
2.82	14.25	0.14	9.55	23.94	56.00	-32.06	QP
6.09	0.64	0.20	9.57	10.41	50.00	-39.59	Average
6.09	9.47	0.20	9.57	19.24	60.00	-40.76	QP



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#### **Test Setup Photo** 8

Refer to Appendix - Test Setup Photo for GZCR211002122003



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## 9 EUT Constructional Details (EUT Photos)

Refer to External and Internal Photos for GZCR2110021220MD

- End of the Report -



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