

# **FCC Test Report**

Report No.: AGC08696201004FE02

FCC ID	0	2AUR5-ESS2
APPLICATION PURPOSE	:	Original Equipment
PRODUCT DESIGNATION	:	Electric scooter
BRAND NAME		ORBO
MODEL NAME	.:	ESS2
APPLICANT	:	HL CORP (SHEN ZHEN)
DATE OF ISSUE	© •	Nov. 20,2020
STANDARD(S)	:	FCC Part 15.247
REPORT VERSION	:	V1.0



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#### Report No.: AGC08696201004FE02 Page 2 of 53

## **REPORT REVISE RECORD**

	Report Version	Revise Time	Issued Date	Valid Version	Notes	
)	V1.0		Nov. 20,2020	Valid	Initial Release	0

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## **1. VERIFICATION OF COMPLIANCE**

Applicant	HL CORP (SHEN ZHEN)
Address	The third Industrial Park, Bitou Village, Songgang Town, Baoan district, Shenzhen, China
Manufacturer	HL CORP (SHEN ZHEN)
Address	The third Industrial Park, Bitou Village, Songgang Town, Baoan district, Shenzhen, China
Factory	HL CORP (SHEN ZHEN)
Address	The third Industrial Park, Bitou Village, Songgang Town, Baoan district, Shenzhen, China
Product Designation	Electric scooter
Brand Name	ORBO
Test Model	ESS2
Date of test	Oct. 23,2020 to Nov. 20,2020
Deviation	No any deviation from the test method
Condition of Test Sample	Normal
Test Result	Pass
Report Template	AGCRT-US-BLE/RF

We hereby certify that:

The above equipment was tested by Attestation of Global Compliance (Shenzhen) Co., Ltd. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.10 (2013) and the energy emitted by the sample EUT tested as described in this report is in compliance with radiated emission limits of FCC part 15.247.

Prepared By

John Zerry

John Zeng (Project Engineer)

Nov. 20,2020

Max Zhang

**Reviewed By** 

Max Zhang (Reviewer)

Nov. 20,2020

Approved By

Forrest Lei (Authorized Officer)

oWe

Nov. 20,2020

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# 2. GENERAL INFORMATION

## 2.1. PRODUCT DESCRIPTION

The EUT is designed as a "Electric scooter". It is designed by way of utilizing the GFSK technology to achieve the system operation.

A major technical description of EUT is described as following

2.402 GHz to 2.480GHz
0.603dBm (Max)
V 4.0
BR □GFSK, EDR □π /4-DQPSK, □8DPSK BLE ⊠GFSK 1Mbps □GFSK 2Mbps
40 Channel
Integral Antenna (Comply with requirements of the FCC part 15.203)
OdBi
1.0
2.31
DC 46.8V by battery or DC 54.6V by adapter

2.2. TABLE OF CARRIER FREQUENCYS

Frequency Band	Channel Number	Frequency
	0	2402 MHz
		2404 MHz
2400~2483.5MHz		
	38	2478 MHz
	39	2480 MHz

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#### 2.3. RELATED SUBMITTAL(S)/GRANT(S)

This submittal(s) (test report) is intended for FCC ID: 2AUR5-ESS2 filing to comply with the FCC Part 15.247 requirements.

#### 2.4. TEST METHODOLOGY

Both conducted and radiated testing was performed according to the procedures in ANSI C63.10 (2013). Radiated testing was performed at an antenna to EUT distance 3 meters.

#### 2.5. SPECIAL ACCESSORIES

Refer to section 5.2.

#### 2.6. EQUIPMENT MODIFICATIONS

Not available for this EUT intended for grant.

#### 2.7. ANTENNA REQUIREMENT

This intentional radiator is designed with a permanently attached antenna of an antenna to ensure that no antenna other than that furnished by the responsible party shall be used with the device. For more information of the antenna, please refer to the APPENDIX B: PHOTOGRAPHS OF EUT.

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## 3. MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement y  $\pm U$ , where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95%.

- Uncertainty of Conducted Emission, Uc = ±3.2 dB
- Uncertainty of Radiated Emission below 1GHz,  $Uc = \pm 3.9 dB$
- Uncertainty of Radiated Emission above 1GHz, Uc = ±4.8 dB
- Uncertainty of total RF power, conducted,  $Uc = \pm 0.8 dB$
- Uncertainty of RF power density, conducted, Uc = ±2.6 dB
- Uncertainty of spurious emissions, conducted,  $Uc = \pm 2.7 dB$
- Uncertainty of Occupied Channel Bandwidth:  $Uc = \pm 2 \%$

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## 4. DESCRIPTION OF TEST MODES

NO.	TEST MODE DESCRIPTION
1	Low channel TX
2	Middle channel TX
3	High channel TX

Note:

1. Only the result of the worst case was recorded in the report, if no other cases.

2. For Radiated Emission, 3axis were chosen for testing for each applicable mode.

3. For Conducted Test method, a temporary antenna connector is provided by the manufacture.

4. The test software is the EMI\_Test\_V1.3 which can set the EUT into the individual test modes.

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# **5. SYSTEM TEST CONFIGURATION**

## 5.1. CONFIGURATION OF TESTED SYSTEM

Radiated Emission Configure:

EUT

Conducted Emission Configure:

CUT	$\square$		
EUT		AE	

## 5.2. EQUIPMENT USED IN TESTED SYSTEM

Item	Equipment	Model No.	ID or Specification	Remark
1	Electric scooter	ESS2	2AUR5-ESS2	EUT
2	Adapter	FY1505462000	N/A	Accessory
3	Control Box	N/A	N/A	Accessory

## **5.3. SUMMARY OF TEST RESULTS**

FCC RULES	DESCRIPTION OF TEST	RESULT
15.247 (b)(3)	Peak Output Power	Compliant
15.247 (a)(2)	6 dB Bandwidth	Compliant
15.247 (d)	Conducted Spurious Emission	Compliant
15.247 (e)	Maximum Conducted Output Power Density	Compliant
15.209	Radiated Emission	Compliant
15.207	Conducted Emission	Compliant

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# 6. TEST FACILITY

Test Site	Attestation of Global Compliance (Shenzhen) Co., Ltd	
Location	1-2/F, Building 19, Junfeng Industrial Park, Chongqing Road, Heping Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China	
Designation Number	CN1259	
FCC Test Firm Registration Number	975832	
A2LA Cert. No.	5054.02	
Description	Attestation of Global Compliance (Shenzhen) Co., Ltd is accredited by A2LA	

## **TEST EQUIPMENT OF CONDUCTED EMISSION TEST**

Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Due
TEST RECEIVER	R&S	ESPI	101206	May 15, 2020	May 14, 2021
LISN	R&S	ESH2-Z5	100086	Jul. 03,2020	Jul. 02,2021
Test software	R&S	ES-K1(Ver.V1.71)	N/A	N/A	N/A

## TEST EQUIPMENT OF RADIATED EMISSION TEST

Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Due
TEST RECEIVER	R&S	ESCI	10096	May 15, 2020	May 14, 2021
EXA Signal Analyzer	Aglient	N9010A	MY53470504	Dec. 12, 2019	Dec. 11, 2020
2.4GHz Filter	EM Electronics	2400-2500MHz	N/A	Mar. 23, 2020	Mar. 22, 2022
Attenuator	ZHINAN	E-002	N/A	N/A	N/A
Horn antenna	SCHWARZBECK	BBHA 9170	#768	Sep. 09, 2019	Sep. 08, 2021
Active loop antenna (9K-30MHz)	ZHINAN	ZN30900C	18051	May 22, 2020	May 21, 2022
Double-Ridged Waveguide Horn	ETS LINDGREN	3117	00034609	May 17, 2019	May 16, 2021
Broadband Preamplifier	ETS LINDGREN	3117PA	00225134	Sep. 03,2020	Sep. 02,2022
ANTENNA	SCHWARZBECK	VULB9168	494	Jan. 09, 2019	Jan. 08, 2021
Test software	Tonscend	JS32-RE (Ver.2.5)	C N/A	N/A	N/A

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# 7. PEAK OUTPUT POWER

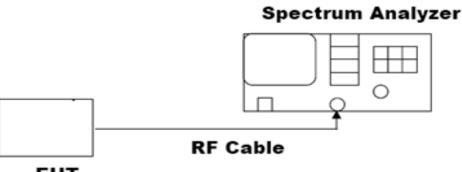
## 7.1. MEASUREMENT PROCEDURE

For peak power test:

- 1. Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator
- 2. RBW > DTS bandwidth
- 3. VBW≥3\*RBW.
- 4. SPAN≥VBW.
- 5. Sweep: Auto.
- 6. Detector function: Peak.
- 7. Trace: Max hold.

Allow trace to stabilize. Use the marker-to-peak function to set the marker to the peak of the emission. The indicated level is the peak output power, after any corrections for external attenuators and cables.

#### 7.2. TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION) PEAK POWER TEST SETUP



EUT

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#### 7.3. LIMITS AND MEASUREMENT RESULT

PEAK OUTPUT POWER MEASUREMENT RESULT						
	FOR GFSK MOUDULATION					
Frequency (GHz)	Applicable Limits (dBm)	Pass or Fail				
2.402	-0.514	30	Pass			
2.440	0.180	30	Pass			
2.480	0.603	30	Pass			

CH0

Agilent Spectrum Analyzer - Swept SA					
R RF 50 Ω A Center Freq 2.4020000		SENSE:INT	ALIGN AUTO/NORF	01:42:42 PM Nov 18, 2020 TRACE 1 2 3 4 5 6	Frequency
00110111092.402000	PNO: Fast +++ IFGain:Low	Trig: Free Run Atten: 30 dB	Avg Hold: 100/100	TYPE MWWWWWWW DET P N N N N N	
	II GUIILEON		Mkr1 :	2.402 145 GHz	Auto Tune
10 dB/div Ref 20.00 dBr	m			-0.514 dBm	
					Center Fred
10.0					2.402000000 GH
0.00		<b>∮</b> 1			
0.00					Start Fred
-10.0					2.399500000 GH
~					
-20.0					Stop Fred 2.404500000 GHz
-30.0					2.404500000 GH2
					CF Step
-40.0					500.000 kHz Auto Mar
-50.0					<u>Auto</u> Mar
					Freq Offset
-60.0					он:
-70.0					
Center 2.402000 GHz				Span 5.000 MHz	
#Res BW 1.5 MHz	#VBW	5.0 MHz	Sweep 1.0	000 ms (1001 pts)	
MSG			STATUS		

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CH39

Agilent Spectrum Analyzer - Swept SA	500055		A 4100 4170 21005		
Image: R         RF         50 Ω         AC           Center Freq 2.480000000         Image: R         Image: R <thimage: r<="" th=""> <thimage: r<="" th=""> <thimage< td=""><td>GH<sub>7</sub></td><td>Avg</td><td>Type: Log-Pwr</td><td>01:48:51 PMNov 18, 2020 TRACE 1 2 3 4 5 6 TYPE MWWWWW</td><td>Frequency</td></thimage<></thimage:></thimage:>	GH <sub>7</sub>	Avg	Type: Log-Pwr	01:48:51 PMNov 18, 2020 TRACE 1 2 3 4 5 6 TYPE MWWWWW	Frequency
	PNO: Fast +++ Trig: Fre IFGain:Low Atten: 30	eRun Avg i 0 dB	Hold: 100/100	DET PNNNN	
10 dB/div Ref 20.00 dBm			Mkr1 2	2.479 715 GHz 0.603 dBm	Auto Tune
10.0	1				<b>Center Freq</b> 2.480000000 GHz
-10.0					<b>Start Freq</b> 2.477500000 GHz
-20.0					<b>Stop Freq</b> 2.482500000 GHz
-40.0					CF Step 500.000 kHz <u>Auto</u> Man
-60.0					<b>Freq Offset</b> 0 Hz
-70.0 Center 2.480000 GHz				Span 5.000 MHz	
#Res BW 1.5 MHz	#VBW 5.0 MHz	2		100 ms (1001 pts)	
MSG			STATUS		

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## 8.6 DB BANDWIDTH

#### 8.1. MEASUREMENT PROCEDURE

- 1. Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator
- 2. Set the EUT Work on the top, the middle and the bottom operation frequency individually.
- 3. Set SPA Centre Frequency = Operation Frequency, RBW= 100 kHz, VBW≥3×RBW.
- 4. Set SPA Trace 1 Max hold, then View.

Note: The EUT was tested according to ANSI C63.10 for compliance to FCC PART 15.247 requirements.

#### 8.2. TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)

The same as described in section 7.2.

#### **8.3. LIMITS AND MEASUREMENT RESULTS**

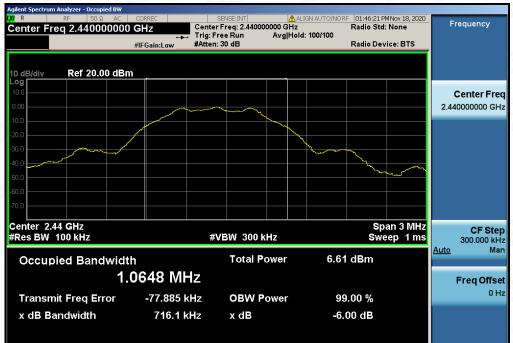
LIMITS AND MEASUREMENT RESULT					
Applicable Limite	Applicable Limits				
Applicable Limits	Test Data	(kHz)	Criteria		
>500KHZ	Low Channel	719.9	PASS		
	Middle Channel	716.1	PASS		
	High Channel	703.3	PASS		



## TEST PLOT OF BANDWIDTH FOR LOW CHANNEL

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#### TEST PLOT OF BANDWIDTH FOR MIDDLE CHANNEL

#### TEST PLOT OF BANDWIDTH FOR HIGH CHANNEL



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## 9. CONDUCTED SPURIOUS EMISSION

#### 9.1. MEASUREMENT PROCEDURE

- 1. Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator
- 2, Set the EUT Work on the top, the middle and the bottom operation frequency individually.
- 3. Set SPA Trace 1 Max hold, then View.

Note: The EUT was tested according to ANSI C63.10 for compliance to FCC PART 15.247 requirements.

#### 9.2. TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)

The same as described in section 7.2.

#### 9.3. MEASUREMENT EQUIPMENT USED

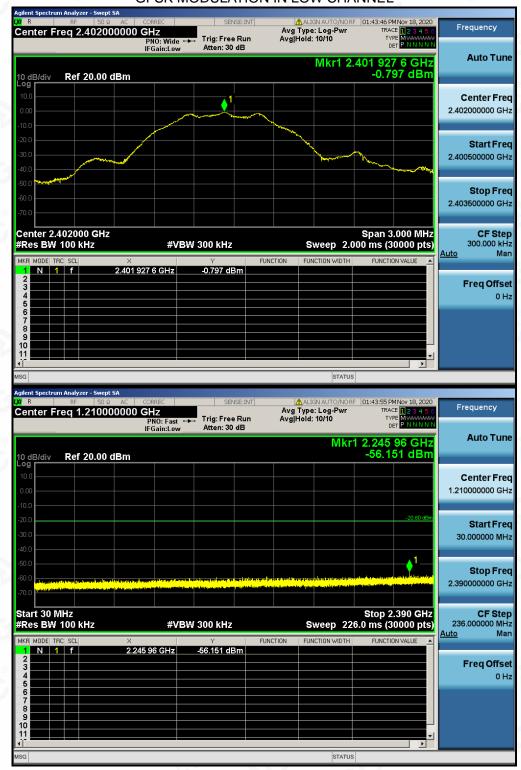
The same as described in section 6.

#### 9.4. LIMITS AND MEASUREMENT RESULT

LIMITS AND MEASUREMENT RESULT					
	Measurement Result				
Applicable Limits	Test Data	Criteria			
In any 100 kHz Bandwidth Outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produce by the intentional radiator shall be at least 20 dB below that in 100KHz bandwidth within the band that contains the highest level of the desired power.	At least -20dBc than the reference level	PASS			

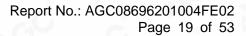
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## TEST RESULT FOR ENTIRE FREQUENCY RANGE GFSK MODULATION IN LOW CHANNEL

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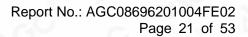
 Tel: +86-755 2523 4088
 E-mail: agc@agc-cert.com



Agilent Spectrum Analyzer - Swej					
Center Freq 2.4400		SENSE:INT	ALIGN AUTO/NOR Avg Type: Log-Pwr	F 01:47:13 PM Nov 18, 2020 TRACE 1 2 3 4 5 6	Frequency
Center Freq 2.4400	PNO: Wide +	🛌 Trig: Free Run	Avg Hold: 10/10	TYPE MWWWWWW DET P N N N N N	
	IFGain:Low _	Atten: 30 dB			Auto Tune
			IVIKET 2	439 923 2 GHz -0.095 dBm	
10 dB/div Ref 20.00	Jabm			-0.030 abiii	
10.0		1 <sup>'</sup>			Center Freq
0.00					2.440000000 GHz
-10.0					
-20.0					Start Freq
-30.0				~	2.438500000 GHz
-40.0				The second	
-50.0					
-60.0					Stop Freq
-70.0					2.441500000 GHz
Center 2.440000 GH #Res BW 100 kHz		W 300 kHz	Swoon J	Span 3.000 MHz (30000 pts) 000 ms	CF Step 300.000 kHz
			-		Auto Man
MKR MODE TRC SCL	× 2.439 923 2 GHz	-0.095 dBm	FUNCTION FUNCTION WIDTH	FUNCTION VALUE	
2	2.403 320 2 0112	-0.000 dBiii			Freq Offset
3					0 Hz
5					
7					
8					
10					
MSG					
			STATUS	5	
Agilent Spectrum Analyzer - Swej					
L <mark>XI</mark> R RF 50	Ω AC CORREC	SENSE:INT		F 01:47:22 PM Nov 18, 2020	Frequency
	Ω AC CORREC   000000 GHz PN0: Fast ←	► Trig: Free Run	ALIGN AUTO/NOR	F 01:47:22 PM Nov 18, 2020	Frequency
L <mark>XI</mark> R RF 50	Ω AC CORREC 000000 GHz	Talas Face Base	ALIGN AUTO/NOR Avg Type: Log-Pwr Avg Hold: 10/10	F 01:47:22 PMNov 18, 2020 TRACE 1 2 3 4 5 6 TYPE MYWWWW DET P N N N N	Frequency Auto Tune
Image: Window Conternation of the second s	Ω AC CORREC 000000 GHz PN0: Fast ← IFGain:Low	► Trig: Free Run	ALIGN AUTO/NOR Avg Type: Log-Pwr Avg Hold: 10/10	F 01:47:22 PMNov 18, 2020 TRACE 2 3 4 5 6 TYPE WWWWW DET P N N N N 1 2.283 95 GHz	
L <mark>XI</mark> R RF 50	Ω AC CORREC 000000 GHz PN0: Fast ← IFGain:Low	► Trig: Free Run	ALIGN AUTO/NOR Avg Type: Log-Pwr Avg Hold: 10/10	F 01:47:22 PMNov 18, 2020 TRACE 1 2 3 4 5 6 TYPE MYWWWW DET P N N N N	
XX         R         150           Center Freq 1.2150         100         <	Ω AC CORREC 000000 GHz PN0: Fast ← IFGain:Low	► Trig: Free Run	ALIGN AUTO/NOR Avg Type: Log-Pwr Avg Hold: 10/10	F 01:47:22 PMNov 18, 2020 TRACE 2 3 4 5 6 TYPE WWWWW DET P N N N N 1 2.283 95 GHz	
XX         R         RF         S0           Center Freq 1.2150         1.2150           10 dB/div         Ref 20.00           00         1.2150	Ω AC CORREC 000000 GHz PN0: Fast ← IFGain:Low	► Trig: Free Run	ALIGN AUTO/NOR Avg Type: Log-Pwr Avg Hold: 10/10	F 01:47:22 PMNov 18, 2020 TRACE 2 3 4 5 6 TYPE WWWWW DET P N N N N 1 2.283 95 GHz	Auto Tune
IXI         R         RF         SD           Center Freq 1.2150         Interference         Interference <t< td=""><td>Ω AC CORREC 000000 GHz PN0: Fast ← IFGain:Low</td><td>► Trig: Free Run</td><td>ALIGN AUTO/NOR Avg Type: Log-Pwr Avg Hold: 10/10</td><td>F 01:47:22 PMNov 18,2020 TRACE 12.23 4 5 6 TV DET MANNEN DET P.N.N.N.N. 1 2.2283 95 GHz -55.973 dBm</td><td>Auto Tune Center Freq</td></t<>	Ω AC CORREC 000000 GHz PN0: Fast ← IFGain:Low	► Trig: Free Run	ALIGN AUTO/NOR Avg Type: Log-Pwr Avg Hold: 10/10	F 01:47:22 PMNov 18,2020 TRACE 12.23 4 5 6 TV DET MANNEN DET P.N.N.N.N. 1 2.2283 95 GHz -55.973 dBm	Auto Tune Center Freq
IM         RF         SD           Center Freq 1.2150         1.2150           10 dB/div         Ref 20.00           10 dB/div         Ref 20.00           10 0         0.00	Ω AC CORREC 000000 GHz PN0: Fast ← IFGain:Low	► Trig: Free Run	ALIGN AUTO/NOR Avg Type: Log-Pwr Avg Hold: 10/10	F 01:47:22 PMNov 18, 2020 TRACE 2 3 4 5 6 TYPE WWWWW DET P N N N N 1 2.283 95 GHz	Auto Tune Center Freq 1.215000000 GHz
IXI         R         RF         SD           Center Freq 1.2150         Ref 20.00         Ref 20.00 <t< td=""><td>Ω AC CORREC 000000 GHz PN0: Fast ← IFGain:Low</td><td>► Trig: Free Run</td><td>ALIGN AUTO/NOR Avg Type: Log-Pwr Avg Hold: 10/10</td><td>F 01:47:22 PMNov 18,2020 TRACE 12.23 4 5 6 TV DET MANNEN DET P.N.N.N.N. 1 2.2283 95 GHz -55.973 dBm</td><td>Auto Tune Center Freq</td></t<>	Ω AC CORREC 000000 GHz PN0: Fast ← IFGain:Low	► Trig: Free Run	ALIGN AUTO/NOR Avg Type: Log-Pwr Avg Hold: 10/10	F 01:47:22 PMNov 18,2020 TRACE 12.23 4 5 6 TV DET MANNEN DET P.N.N.N.N. 1 2.2283 95 GHz -55.973 dBm	Auto Tune Center Freq
IX         R         RF         SO           Center Freq 1.2150         1.2150           10 dB/div         Ref 20.00           10.0	Ω AC CORREC 000000 GHz PN0: Fast ← IFGain:Low	► Trig: Free Run	ALIGN AUTO/NOR Avg Type: Log-Pwr Avg Hold: 10/10	F 01:47:22 PMNov 18,2020 TRACE 12.23 4 5 6 TV DET MANNEN DET P.N.N.N.N. 1 2.2283 95 GHz -55.973 dBm	Auto Tune Center Freq 1.215000000 GHz Start Freq
Image: Non-State         Ref         SO           Center Freq 1.2150	Ω AC CORREC 000000 GHz PN0: Fast ← IFGain:Low	► Trig: Free Run	ALIGN AUTO/NOR Avg Type: Log-Pwr Avg Hold: 10/10	F 01:47:22 PMNov 18,2020 TRACE 12.23 4 5 6 TV DET MANNEN DET P.N.N.N.N. 1 2.2283 95 GHz -55.973 dBm	Auto Tune Center Freq 1.21500000 GHz Start Freq 30.000000 MHz
Image: Non-Structure         RF         ED           10 dE/div         Ref 20.00           10 dE/div         Ref 20.00           10 dE/div         Ref 20.00           10 dE/div         Ref 20.00	Ω AC CORREC 000000 GHz PN0: Fast ← IFGain:Low	► Trig: Free Run	ALIGN AUTO/NOR Avg Type: Log-Pwr Avg Hold: 10/10	F 01:47:22 PMNov 18,2020 TRACE 12.23 4 5 6 TV DET MANNEN DET P.N.N.N.N. 1 2.2283 95 GHz -55.973 dBm	Auto Tune Center Freq 1.215000000 GHz Start Freq 30.000000 MHz Stop Freq
Image: Non-State State         Ref         SO           Center Freq 1.2150         Image: State         <	Ω AC CORREC 000000 GHz PN0: Fast ← IFGain:Low	► Trig: Free Run	ALIGN AUTO/NOR Avg Type: Log-Pwr Avg Hold: 10/10	F 01:47:22 PMNov 18,2020 TRACE 12.23 4 5 6 TV DET MANNEN DET P.N.N.N.N. 1 2.2283 95 GHz -55.973 dBm	Auto Tune Center Freq 1.21500000 GHz Start Freq 30.000000 MHz
IXI         R         RF         SD           Center Freq 1.2150         Ref 20.00         Ref 20.00 <thref 20.00<="" th="">         Ref 20.00         <th< td=""><td>Ω AC CORREC 000000 GHz PN0: Fast ← IFGain:Low</td><td>► Trig: Free Run</td><td>ALIGN AUTO/NOR Avg Type: Log-Pwr Avg Hold: 10/10</td><td>F 01:47:22 PMNov 18, 2020 TRACE 12 28 4 5 6 TVPE 12 28 3 95 GHz -55.973 dBm -20.10 dBm -20.10 dBm -20.10 dBm</td><td>Auto Tune           Center Freq           1.215000000 GHz           Start Freq           30.000000 MHz           Stop Freq           2.400000000 GHz</td></th<></thref>	Ω AC CORREC 000000 GHz PN0: Fast ← IFGain:Low	► Trig: Free Run	ALIGN AUTO/NOR Avg Type: Log-Pwr Avg Hold: 10/10	F 01:47:22 PMNov 18, 2020 TRACE 12 28 4 5 6 TVPE 12 28 3 95 GHz -55.973 dBm -20.10 dBm -20.10 dBm -20.10 dBm	Auto Tune           Center Freq           1.215000000 GHz           Start Freq           30.000000 MHz           Stop Freq           2.400000000 GHz
DV         R         PF         SO           Center Freq 1.2150         Ref 20.00         Ref 20.00 <thref 20.00<="" th="">         Ref 20.00         <thr< td=""><td>Q. AC     CORREC       D00000 GHz       PR0: Fast       IFGain:Low</td><td>Trig: Free Run Atten: 30 dB</td><td>Aug Type: Log-Pwr Avg Type: Log-Pwr Avg Hold: 10/10 Mikr</td><td>F 01:47:22 PMNov 18,2020 TRACE 12 23 4 5 6 TYPE MAXMMUN 18 TYPE MAXMMUN 18 1 2.283 95 GHz -55.973 dBm -2010 dBm -2010 dBm -2010 dBm -2010 dBm -2010 dBm</td><td>Auto Tune Center Freq 1.215000000 GHz Start Freq 30.000000 MHz Stop Freq</td></thr<></thref>	Q. AC     CORREC       D00000 GHz       PR0: Fast       IFGain:Low	Trig: Free Run Atten: 30 dB	Aug Type: Log-Pwr Avg Type: Log-Pwr Avg Hold: 10/10 Mikr	F 01:47:22 PMNov 18,2020 TRACE 12 23 4 5 6 TYPE MAXMMUN 18 TYPE MAXMMUN 18 1 2.283 95 GHz -55.973 dBm -2010 dBm -2010 dBm -2010 dBm -2010 dBm -2010 dBm	Auto Tune Center Freq 1.215000000 GHz Start Freq 30.000000 MHz Stop Freq
Image: Non-State in the second seco	R     AC     CORREC       D00000 GHz     PN0: Fast       PN0: Fast     IFGain:Low	<ul> <li>Trig: Free Run Atten: 30 dB</li> <li>Atten: 40 dB<td>Arg Type: Log-Pwr Avg Type: Log-Pwr Avg Hold: 10/10 Mkr</td><td>F 01:47:22 PMNov 18, 2020 TRACE 12 28 4 5 6 TVPE 12 28 3 95 GHz -55.973 dBm -20.10 dBm</td><td>Auto Tune Center Freq 1.215000000 GHz Start Freq 30.000000 MHz Stop Freq 2.400000000 GHz</td></li></ul>	Arg Type: Log-Pwr Avg Type: Log-Pwr Avg Hold: 10/10 Mkr	F 01:47:22 PMNov 18, 2020 TRACE 12 28 4 5 6 TVPE 12 28 3 95 GHz -55.973 dBm -20.10 dBm	Auto Tune Center Freq 1.215000000 GHz Start Freq 30.000000 MHz Stop Freq 2.400000000 GHz
Image: Non-State in the second seco	Q. AC     CORREC       D00000 GHz       PR0: Fast       IFGain:Low	<ul> <li>Trig: Free Run Atten: 30 dB</li> <li>Atten: 40 dB<td>Aug Type: Log-Pwr Avg Type: Log-Pwr Avg Hold: 10/10 Mikr</td><td>F 01:47:22 PMNov 18,2020 TRACE 12 23 4 5 6 TYPE MAXMMUN 18 TYPE MAXMMUN 18 1 2.283 95 GHz -55.973 dBm -2010 dBm -2010 dBm -2010 dBm -2010 dBm -2010 dBm</td><td>Auto Tune Center Freq 1.215000000 GHz Start Freq 30.000000 MHz Stop Freq 2.400000000 GHz CF Step 237.000000 MHz</td></li></ul>	Aug Type: Log-Pwr Avg Type: Log-Pwr Avg Hold: 10/10 Mikr	F 01:47:22 PMNov 18,2020 TRACE 12 23 4 5 6 TYPE MAXMMUN 18 TYPE MAXMMUN 18 1 2.283 95 GHz -55.973 dBm -2010 dBm -2010 dBm -2010 dBm -2010 dBm -2010 dBm	Auto Tune Center Freq 1.215000000 GHz Start Freq 30.000000 MHz Stop Freq 2.400000000 GHz CF Step 237.000000 MHz
XX         R         PF         SO           Center Freq 1.2150         Ref 20.00         Ref 20.00 <thref 20.00<="" th="">         Ref 20.00         <thr< td=""><td>AC CORREC  OQUOUO GHZ  PRO: Fast IFGain:Low  O dBm  O dBm  If Gain:Low  WHE  WHE  X</td><td>Trig: Free Run Atten: 30 dB</td><td>Arg Type: Log-Pwr Avg Type: Log-Pwr Avg Hold: 10/10 Mkr</td><td>F 01:47:22 PMNov 18, 2020 TRACE 12 28 4 5 6 TVPE 12 28 3 95 GHz -55.973 dBm -20.10 dBm</td><td>Auto Tune Center Freq 1.215000000 GHz Start Freq 30.000000 MHz Stop Freq 2.400000000 GHz CF Step 237.000000 MHz</td></thr<></thref>	AC CORREC  OQUOUO GHZ  PRO: Fast IFGain:Low  O dBm  O dBm  If Gain:Low  WHE  WHE  X	Trig: Free Run Atten: 30 dB	Arg Type: Log-Pwr Avg Type: Log-Pwr Avg Hold: 10/10 Mkr	F 01:47:22 PMNov 18, 2020 TRACE 12 28 4 5 6 TVPE 12 28 3 95 GHz -55.973 dBm -20.10 dBm	Auto Tune Center Freq 1.215000000 GHz Start Freq 30.000000 MHz Stop Freq 2.400000000 GHz CF Step 237.000000 MHz
DX         R         PF         SD           Center Freq 1.2150         Ref 20.00         SD         SD           10 dE/div         Ref 20.00         SD	AC CORREC  OQUOUO GHZ  PRO: Fast IFGain:Low  O dBm  O dBm  If Gain:Low  WHE  WHE  X	Trig: Free Run Atten: 30 dB	Arg Type: Log-Pwr Avg Type: Log-Pwr Avg Hold: 10/10 Mkr	F 01:47:22 PMNov 18, 2020 TRACE 12 28 4 5 6 TVPE 12 28 3 95 GHz -55.973 dBm -20.10 dBm	Start Freq           30.00000 GHz           Start Freq           30.000000 MHz           Stop Freq           2.400000000 GHz           CF Step           237.000000 MHz           Auto           Man
DX         R         PF         SO           Center Freq 1.2150         Conter Freq 1.2150         Conter Freq 1.2150           10 dB/div         Ref 20.00         Conter Freq 1.2150           -20 d	AC CORREC  OQUOUO GHZ  PRO: Fast IFGain:Low  O dBm  O dBm  If Gain:Low  WHE  WHE  X	Trig: Free Run Atten: 30 dB	Arg Type: Log-Pwr Avg Type: Log-Pwr Avg Hold: 10/10 Mkr	F 01:47:22 PMNov 18, 2020 TRACE 12 28 4 5 6 TVPE 12 28 3 95 GHz -55.973 dBm -20.10 dBm	Auto Tune Center Freq 1.215000000 GHz Start Freq 30.000000 MHz Stop Freq 2.400000000 GHz CF Step 237.000000 MHz Auto Man
DX         R         PF         SD           Center Freq 1.2150         Ref 20.00         Ref 20.00           Og         Image: Constraint of the second	AC CORREC  OQUOUO GHZ  PRO: Fast IFGain:Low  O dBm  O dBm  If Gain:Low  WHE  WHE  X	Trig: Free Run Atten: 30 dB	Arg Type: Log-Pwr Avg Type: Log-Pwr Avg Hold: 10/10 Mkr	F 01:47:22 PMNov 18, 2020 TRACE 12 28 4 5 6 TVPE 12 28 3 95 GHz -55.973 dBm -20.10 dBm	Auto Tune Center Freq 1.215000000 GHz Start Freq 30.000000 MHz Stop Freq 2.400000000 GHz CF Step 237.000000 MHz Auto Man
DX         R         PF         SD           Center Freq 1.2150         Ref 20.00         SD         SD           10         dE/div         Ref 20.00         SD         SD           10.0	AC CORREC  OQUOUO GHZ  PRO: Fast IFGain:Low  O dBm  O dBm  If Gain:Low  WHE  WHE  X	Trig: Free Run Atten: 30 dB	Arg Type: Log-Pwr Avg Type: Log-Pwr Avg Hold: 10/10 Mkr	F 01:47:22 PMNov 18, 2020 TRACE 12 28 4 5 6 TVPE 12 28 3 95 GHz -55.973 dBm -20.10 dBm	Auto Tune Center Freq 1.215000000 GHz Start Freq 30.000000 MHz Stop Freq 2.400000000 GHz CF Step 237.000000 MHz Auto Man
DV         R         PF         SD           Center Freq 1.2150         Ref 20.00         SO         SO           10 dB/div         Ref 20.00	AC CORREC  OQUOUO GHZ  PRO: Fast IFGain:Low  O dBm  O dBm  If Gain:Low  WHE  WHE  X	Trig: Free Run Atten: 30 dB	Arg Type: Log-Pwr Avg Type: Log-Pwr Avg Hold: 10/10 Mkr	F 01:47:22 PMNov 18, 2020 TRACE 12 28 4 5 6 TVPE 12 28 3 95 GHz -55.973 dBm -20.10 dBm	Auto Tune Center Freq 1.215000000 GHz Start Freq 30.000000 MHz Stop Freq 2.400000000 GHz CF Step 237.000000 MHz Auto Man
DV         R         PF         SD           Center Freq 1.2150         Ref 20.00         Ref 20.00           00	AC CORREC  OQUOUO GHZ  PRO: Fast IFGain:Low  O dBm  O dBm  If Gain:Low  WHE  WHE  X	Trig: Free Run Atten: 30 dB	Aug Type: Log-Pwr Avg Type: Log-Pwr Avg Hold: 10/10 Mkr	F 01:47:22 PMNov 18, 2020 TRACE [] 2 3 4 5 6 TYPE [] 2 3 4 5 6 TYPE [] 2 4 5 6 TYPE []	Auto Tune Center Freq 1.215000000 GHz Start Freq 30.000000 MHz Stop Freq 2.400000000 GHz CF Step 237.000000 MHz Auto Man

#### GFSK MODULATION IN MIDDLE CHANNEL

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Agilent Spectrum Analyzer - Swept SA					
<b>(X) R</b> RF 50 Ω AC	CORREC	SENSE:INT		01:47:47 PM Nov 18, 2020	Frequency
Center Freq 13.74175000			Avg Type: Log-Pwr AvglHold: 10/10	TRACE 123456	Trequency
		en: 30 dB	avginora. Ionio	TYPE MWWWWW DET P N N N N N	
			Miket	02 565 7 CHz	Auto Tune
			IVINI	1 23.565 7 GHz -48.707 dBm	
10 dB/div Ref 20.00 dBm				-40.707 ubm	
					Contor From
					Center Freq
0.00					13.741750000 GHz
-10.0					
-20.0				-20.10 dBm	
					Start Freq
-30.0					2.483500000 GHz
-40.0				1_	
-50.0					
-60.0	and the standard second		in the property of the second second		Stop Freq
And the state of t					25.00000000 GHz
-70.0					
				84++ 05 00 OU	OF Otom
Start 2.48 GHz #Res BW 100 kHz	#\/B\M 200		Swoon 3	Stop 25.00 GHz	CF Step 2.251650000 GHz
#Res BW TOU KHZ	#VBW 300 I	XHZ	Sweep 2	2.152 s (30000 pts)	Auto Man
MKR MODE TRC SCL X	Y		ON FUNCTION WIDTH	FUNCTION VALUE	Adto
	565 7 GHz -48.70	07 dBm			
2					Freq Offset
4					0 Hz
5					
6					
8					
9					
10					
MSG			STATUS		

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 Attestation of Global Compliance(Shenzhen)Co., Ltd

 Attestation of Global Compliance(Shenzhen)Std & Tech Co., Ltd

 Tel: +86-755 2523 4088
 E-mail: agc@agc-cert.com



R RF 50 \$	ot sa Ω AC CORREC	SENSE:INT		01:49:54 PM Nov 18, 2020	
enter Freq 2.4800	1000000 GHz PNO: Wide ↔ IFGain:Low	Trig: Free Run Atten: 30 dB	Avg Type: Log-Pwr Avg Hold: 10/10	TRACE 123456 TYPE MWWWW DET PNNNNN	Frequency
dB/div Ref 20.00		Hiteli oo ub	Mkr1 2.4	179 922 7 GHz 0.344 dBm	Auto Tun
J D D D					<b>Center Fre</b> 2.480000000 GH
					<b>Start Fre</b> 2.478500000 GH
					Stop Free 2.48150000 GH
nter 2.480000 GHz s BW 100 kHz		W 300 kHz	Sweep 2.00	Span 3.000 MHz 00 ms (30000 pts)	CF Ster 300.000 kH
MODE TRC SCL	×		UNCTION FUNCTION WIDTH	FUNCTION VALUE	<u>Auto</u> Mar
N 1 f	2.479 922 7 GHz	0.344 dBm			<b>Freq Offse</b> 0 Hz
				<b></b> *	
			STATUS		
nt Spectrum Analyzer - Swep	ot <b>SA</b> Ω AC CORREC	SENSE:INT		01:50:03 PMNov 18, 2020	
nter Freq 1.2150		Tala Face Day	Avg Type: Log-Pwr Avg Hold: 10/10	TRACE 123456 TYPE MWWWW DET PNNNN	Frequency
IB/div Ref 20.00	dBm		Mkr1	2.323 76 GHz -55.284 dBm	Auto Tune
)					
					Center Fred 1.215000000 GHz
)				-19.66 dBm	
o o o				-19.66 dBm	1.215000000 GH: Start Free 30.000000 MH;
				-19.66 dBm	1.215000000 GH Start Free 30.000000 MH Stop Free
0		N 300 kHz	Sweep 228	-19.66 dBm 1 -19.66 dBm 1 -19.06 dBm 1 -19.06 dBm 5 top 2.400 GHz .0 ms (30000 pts)	1.215000000 GH; Start Free 30.000000 MH; Stop Free 2.400000000 GH; CF Step 237.000000 MH;
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	#VB\ 2.323 76 GHz		Sweep 228	↓1	1.215000000 GH; Start Free 30.000000 MH; Stop Free 2.400000000 GH; 2.400000000 GH; 237.000000 MH; Auto Mar
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	×	Y FI		1 .top 2.400 GHz .0 ms (30000 pts)	1.215000000 GH; Start Free 30.000000 MH; Stop Free 2.400000000 GH; CF Step 237.000000 MH;
art 30 MHz Res BW 100 kHz	×	Y FI		1 .top 2.400 GHz .0 ms (30000 pts)	1.215000000 GH; Start Free 30.000000 MH; Stop Free 2.400000000 GH; 2.400000000 GH; 237.000000 MH; Auto Mar Freq Offset

## GFSK MODULATION IN HIGH CHANNEL

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Report No.: AGC08696201004FE02 Page 23 of 53

Agilent Spectrum Analyzer - Swept SA					
LX/R RF 50Ω AC			ALIGN AUTO/NORF		
Center Freq 13.75000000	0 GHz PNO: Fast +++ Trig: F		Type: Log-Pwr  Hold: 10/10	TRACE 12345 TYPE MWWWW	Å
		30 dB		DET PNNN	Ν
			Mkr1	21.559 6 GH	Auto Tune
10 dB/div Ref 20.00 dBm				-49.501 dBn	
Log					
10.0					Center Freq
0.00					13.750000000 GHz
-10.0					
				-19.66 dB	
-20.0					Start Freq
-30.0					2.500000000 GHz
-40.0				1	
-50.0					
-60.0	and a star strain strain for	line of the line states of the state	الماصيحة والمفاط والجريش		Stop Freq
Name and Address of the Address of t					25.00000000 GHz
-70.0					
Start 2.50 GHz				Stop 25.00 GH	CF Step
#Res BW 100 kHz	#VBW 300 kl	Ηz	Sweep 2	.152 s (30000 pts	2.250000000 GHz
		FUNCTION	FUNCTION WIDTH	FUNCTION VALUE	Auto Man
	Y 559 6 GHz -49.501		FUNCTION WIDTH	FUNCTION VALUE	
2	43.001	abiii			Freq Offset
3					0 Hz
5					UHZ
6					
8					
9					
10					
1 1					
MSG			STATUS		

Note: The peak emissions without marker on the above plots are fundamental wave and need not to compare with the limit.

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## TEST RESULT FOR BAND EDGE GFSK MODULATION IN LOW CHANNEL

### GFSK MODULATION IN HIGH CHANNEL



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## **10. MAXIMUM CONDUCTED OUTPUT POWER SPECTRAL DENSITY**

#### **10.1. MEASUREMENT PROCEDURE**

- (1). Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator
- (2). Set the EUT Work on the top, the middle and the bottom operation frequency individually.
- (3). Set the SPA Trace 1 Max hold, then View.

Note: The method of PKPSD in the KDB 558074 item 10.2 was used in this testing.

#### **10.2. TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)**

Refer to Section 7.2.

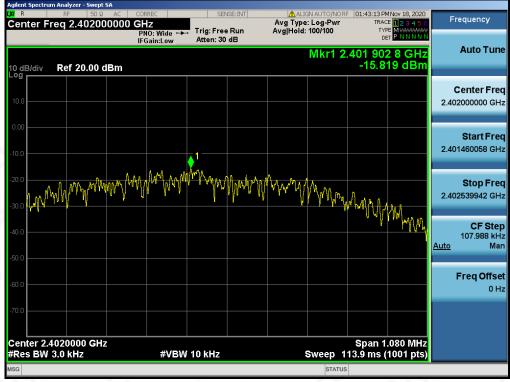
#### **10.3. MEASUREMENT EQUIPMENT USED**

Refer to Section 6.

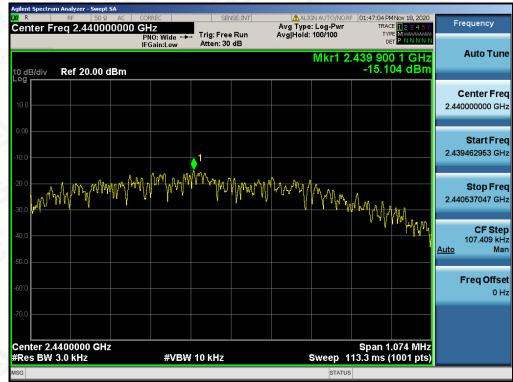
#### **10.4. LIMITS AND MEASUREMENT RESULT**

Channel No.	PSD (dBm/3kHz)	Limit (dBm/3kHz)	Result
Low Channel	-15.819	8	Pass
Middle Channel	-15.104	8	Pass
High Channel	-14.838	8	Pass

## TEST PLOT OF SPECTRAL DENSITY FOR LOW CHANNEL



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## TEST PLOT OF SPECTRAL DENSITY FOR MIDDLE CHANNEL

## TEST PLOT OF SPECTRAL DENSITY FOR HIGH CHANNEL



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## **11. RADIATED EMISSION**

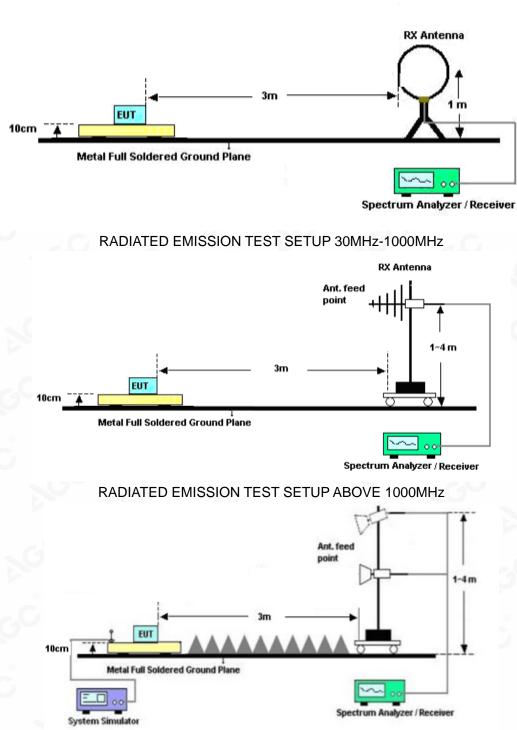
#### **11.1. MEASUREMENT PROCEDURE**

- 1. The EUT was placed on the top of the turntable 0.8 or 1.5 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
- 2. Power on the EUT and all the supporting units. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
- 3. The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emissions field strength of both horizontal and vertical polarization.
- 4. For each suspected emission, the antenna tower was scan (from 1 M to 4 M) and then the turntable was rotated (from 0 degree to 360 degrees) to find the maximum reading.
- 5. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function with specified bandwidth under Maximum Hold Mode.
- 6. For emissions above 1GHz, use 1MHz RBW and 3MHz VBW for peak reading. Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The measurement antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final measurement antenna elevation shall be that which maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane.
- 7. When the radiated emissions limits are expressed in terms of the average value of the emissions, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum values.
- 8. If the emissions level of the EUT in peak mode was 3 dB lower than the average limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method for below 1GHz.
- 9. For testing above 1GHz, the emissions level of the EUT in peak mode was lower than average limit (that means the emissions level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.
- 10. In case the emission is lower than 30MHz, loop antenna has to be used for measurement and the recorded data should be QP measured by receiver. High Low scan is not required in this case.

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**11.2. TEST SETUP** 



Radiated Emission Test-Setup Frequency Below 30MHz

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## **11.3. LIMITS AND MEASUREMENT RESULT**

15.209 Limit in the below table has to be followed

Frequencies (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		

Note: All modes were tested for restricted band radiated emission, the test records reported below are the worst result compared to other modes.

## 11.4. TEST RESULT

## **RADIATED EMISSION BELOW 30MHz**

The amplitude of spurious emissions from 9kHz to 30MHz which are attenuated more than 20 dB below the permissible value need not be reported.

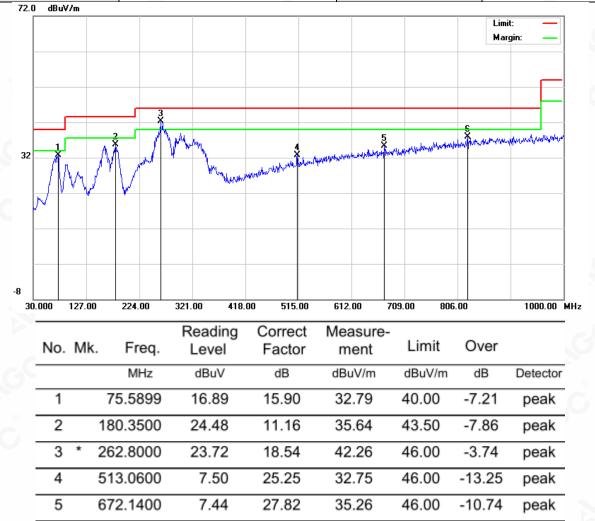
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#### Report No.: AGC08696201004FE02 Page 30 of 53

RADIATED EMISSION BELOW	1GHZ
-------------------------	------

EUT	Electric scooter	Model Name	ESS2
Temperature	25° C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 3	Antenna	Horizontal



**RESULT: PASS** 

6

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30.73

38.00

46.00

-8.00

peak

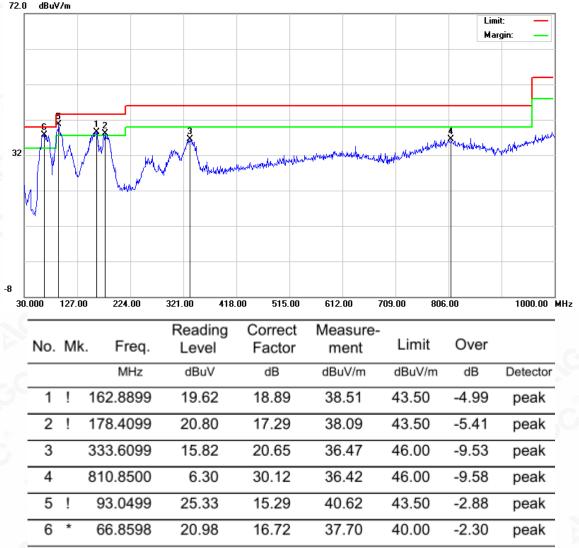
824.4300

7.27



#### Report No.: AGC08696201004FE02 Page 31 of 53

EUT	Electric scooter	Model Name	ESS2
Temperature	25° C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 3	Antenna	Vertical
72.0 JD.371			



#### RESULT: PASS Note:

- 1. Factor=Antenna Factor + Cable loss, Over= Measurement -Limit.
- 2. All test modes had been tested. The mode 3 is the worst case and recorded in the report.

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## Report No.: AGC08696201004FE02 Page 32 of 53

## **RADIATED EMISSION ABOVE 1GHZ**

EUT	Electric scooter	Model Name	ESS2
Temperature	25° C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 1	Antenna	Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Value Type
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	value Type
4804.000	46.58	0.08	46.66	74	-27.34	peak
4804.000	36.69	0.08	36.77	54	-17.23	AVG
7206.000	39.47	2.21	41.68	74	-32.32	peak
7206.000	32.32	2.21	34.53	54 🕓	-19.47	AVG
- 6	3			- 6	®	
	- C	©			- G	8
emark:						
actor = Anter	na Factor + Cab	le Loss – Pre-	amplifier.			

EUT	Electric scooter	Model Name	ESS2
Temperature	25° C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 1	Antenna	Vertical

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Value Type
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	value Type
4804.000	45.89	0.08	45.97	74	-28.03	peak
4804.000	35.64	0.08	35.72	54 💿	-18.28	AVG
7206.000	39.71	2.21	41.92	74	-32.08	peak
7206.000	31.52	2.21	33.73	54	-20.27	AVG
		- Cu				20
				(R)		

Factor = Antenna Factor + Cable Loss – Pre-amplifier.

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## Report No.: AGC08696201004FE02 Page 33 of 53

EUT	Electric scooter	Model Name	ESS2
Temperature	25° C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 2	Antenna	Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Value Type
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	value Type
4880.000	47.75	0.14	47.89	74	<sup>©</sup> -26.11	peak
4880.000	36.62	0.14	36.76	54	-17.24	AVG
7320.000	40.41	2.36	42.77	74	-31.23	peak
7320.000	33.32	2.36	35.68	54	-18.32	AVG
®				. C		
	8					
emark:	- 61	3		~0~	- 61	8
ictor = Anter	na Factor + Cable	Loss - Pre-	amplifier.			a.G

EUT	Electric scooter	Model Name	ESS2
Temperature	25° C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 2	Antenna	Vertical

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Value Type
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	value Type
4880.000	47.63	0.14	47.77	74	-26.23	peak
4880.000	39.47	0.14	39.61	54	-14.39	AVG
7320.000	41.52	2.36	43.88	74	-30.12	peak
7320.000	33.34	2.36	35.7	54	-18.3	AVG
		S.	0	8		0
emark:						

Factor = Antenna Factor + Cable Loss – Pre-amplifier.

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#### Report No.: AGC08696201004FE02 Page 34 of 53

EUT	Electric scooter	Model Name	ESS2
Temperature	25° C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 3	Antenna	Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Value Type
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	value Type
4960.000	45.36	0.22	45.58	74	-28.42	peak
4960.000	36.58	0.22	36.8	54	-17.2	AVG
7440.000	39.44	2.64	42.08	74	-31.92	peak
7440.000	30.47	2.64	33.11	54	-20.89	AVG
0				0		
C.	8			C.	®	
emark:	- 6	8			- 6	8
actor = Anter	nna Factor + Cable	Loss – Pre-	amplifier.			e.C

EUT	Electric scooter	Model Name	ESS2			
Temperature	25° C	Relative Humidity	55.4%			
Pressure	960hPa	Test Voltage	Normal Voltage			
Test Mode	Mode 3	Antenna	Vertical			

		Emission Level	Limits	Margin 🔬	
(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Value Type
45.76	0.22	45.98	74	-28.02	peak
35.59	0.22	35.81	54	-18.19	AVG
39.38	2.64	42.02	74	-31.98	peak
30.19	2.64	32.83	54	-21.17	AVG
SOU	20			0	20
	45.76 35.59 39.38	45.76         0.22           35.59         0.22           39.38         2.64	45.76         0.22         45.98           35.59         0.22         35.81           39.38         2.64         42.02	45.76         0.22         45.98         74           35.59         0.22         35.81         54           39.38         2.64         42.02         74	45.76         0.22         45.98         74         -28.02           35.59         0.22         35.81         54         -18.19           39.38         2.64         42.02         74         -31.98

Factor = Antenna Factor + Cable Loss – Pre-amplifier.

# **RESULT: PASS**

#### Note:

The amplitude of other spurious emissions from 1G to 25 GHz which are attenuated more than 20 dB below the permissible value need not be reported.

Factor = Antenna Factor + Cable loss - Amplifier gain, Margin= Level -Limit.

The "Factor" value can be calculated automatically by software of measurement system.

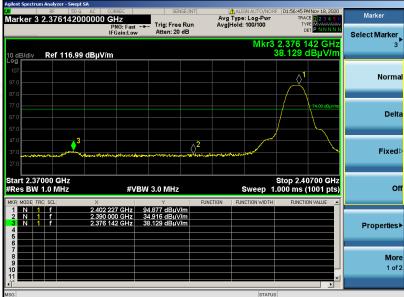
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TEST RESULT FOR RESTRICTED BANDS REQUIREMENTS					
EUT	Electric scooter	Model Name	ESS2		
Temperature	25° C	Relative Humidity	55.4%		
Pressure	960hPa	Test Voltage	Normal Voltage		
Test Mode	Mode 1	Antenna	Horizontal		

## TEST RESULT FOR RESTRICTED BANDS REQUIREMENTS

PK



AV



**RESULT: PASS** 

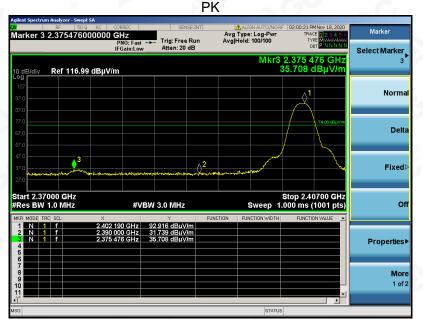
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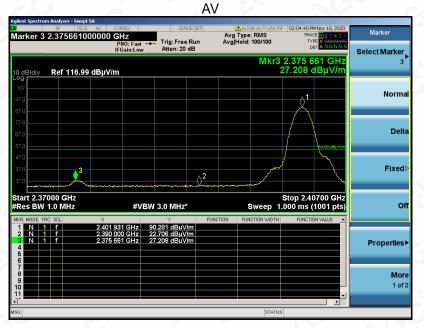
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#### Report No.: AGC08696201004FE02 Page 36 of 53

EUT	Electric scooter	Model Name	ESS2		
Temperature	25° C	Relative Humidity	55.4%		
Pressure	960hPa	Test Voltage	Normal Voltage		
Test Mode	Mode 1	Antenna	Vertical		
DI/					





**RESULT: PASS** 

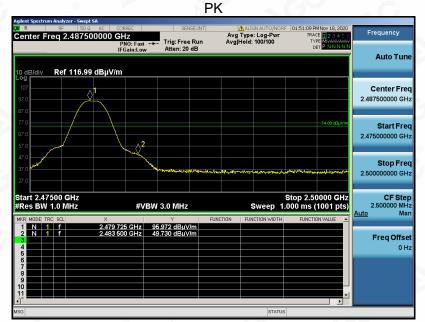
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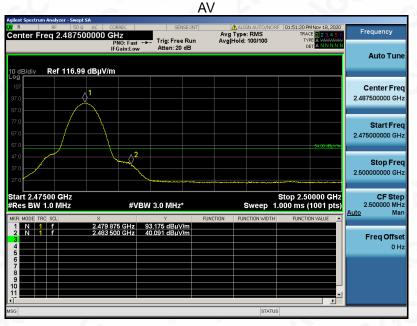
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### Report No.: AGC08696201004FE02 Page 37 of 53

EUT	Electric scooter	Model Name	ESS2
Temperature	25° C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 3	Antenna	Horizontal





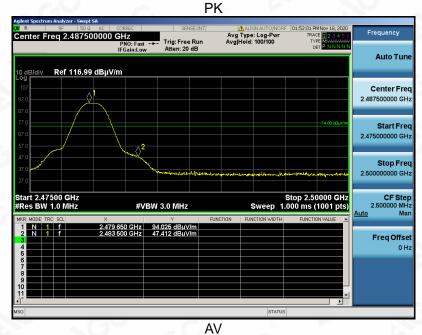
**RESULT: PASS** 

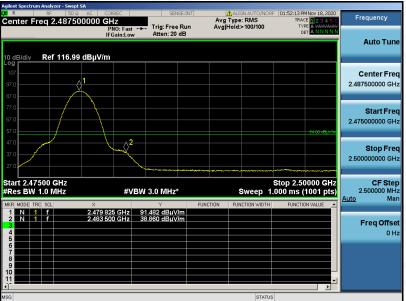
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### Report No.: AGC08696201004FE02 Page 38 of 53

EUT	Electric scooter	Model Name	ESS2
Temperature	25° C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 3	Antenna	Vertical





## **RESULT: PASS Note**: The factor had been edited in the "Input Correction" of the Spectrum Analyzer.

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# **12. FCC LINE CONDUCTED EMISSION TEST**

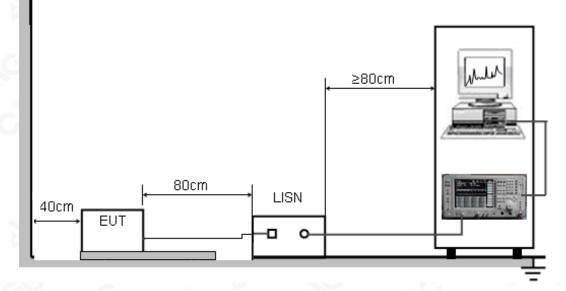
### **12.1. LIMITS OF LINE CONDUCTED EMISSION TEST**

Francisco	Maximum RF Line Voltage					
Frequency	Q.P.( dBuV)	Average( dBuV)				
150kHz~500kHz	66-56	56-46				
500kHz~5MHz	56	46				
5MHz~30MHz	60	50				

Note:

- 1. The lower limit shall apply at the transition frequency.
- 2. The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.

## 12.2. BLOCK DIAGRAM OF LINE CONDUCTED EMISSION TEST



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## 12.3. PRELIMINARY PROCEDURE OF LINE CONDUCTED EMISSION TEST

- The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. When the EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.10 (see Test Facility for the dimensions of the ground plane used). When the EUT is a floor-standing equipment, it is placed on the ground plane which has a 3-12 mm non-conductive covering to insulate the EUT from the ground plane.
- 2. Support equipment, if needed, was placed as per ANSI C63.10.
- 3. All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10.
- 4. All support equipment received AC120V/60Hz power from a LISN, if any.
- 5. The EUT received DC 3.3V power from control board which received AC120V/60Hz power from a LISN.
- 6. The test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
- 7. Analyzer / Receiver scanned from 150 kHz to 30MHz for emissions in each of the test modes.
- 8. During the above scans, the emissions were maximized by cable manipulation.
- 9. The test mode(s) were scanned during the preliminary test.

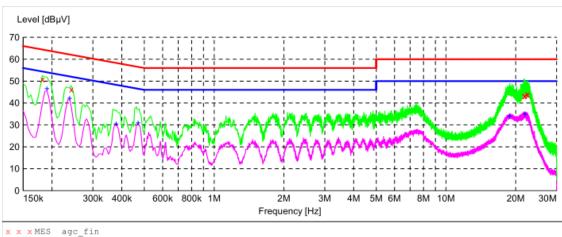
Then, the EUT configuration and cable configuration of the above highest emission level were recorded for reference of final testing.

### 12.4. FINAL PROCEDURE OF LINE CONDUCTED EMISSION TEST

- 1. EUT and support equipment was set up on the test bench as per step 2 of the preliminary test.
- 2. A scan was taken on both power lines, Line 1 and Line 2, recording at least the six highest emissions. Emission frequency and amplitude were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit. If EUT emission level was less – 2dB to the A.V. limit in Peak mode, then the emission signal was re-checked using Q.P and Average detector.
- 3. The test data of the worst case condition(s) was reported on the Summary Data page.

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### 12.5. TEST RESULT OF LINE CONDUCTED EMISSION TEST

Line Conducted Emission Test Line 1-L

### MEASUREMENT RESULT: "agc\_fin"

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.182000 0.242000 21.726000 21.858000 22.302000 22.574000	50.80 46.20 43.20 43.30 44.00 43.70	10.3 10.3 12.4 12.4 12.4 12.4	64 60 60 60 60	13.6 15.8 16.8 16.7 16.0 16.3	QP QP QP QP QP QP QP	L1 L1 L1 L1 L1 L1	GND GND GND GND GND GND

#### MEASUREMENT RESULT: "agc fin2"

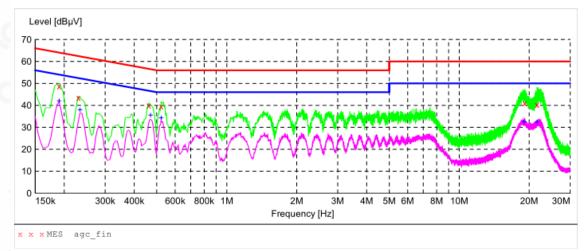
Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.190000 0.238000 0.378000 0.470000 18.854000 21.898000	46.50 42.10 30.40 30.90 33.90 34.80	10.3 10.3 10.3 10.3 12.2 12.4	54 52 48 47 50 50	7.5 10.1 17.9 15.6 16.1 15.2	AV AV AV AV AV	L1 L1 L1 L1 L1 L1	GND GND GND GND GND GND

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### MEASUREMENT RESULT: "agc\_fin"

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.190000 0.230000 0.462000 0.522000 19.098000 21.610000	48.70 43.50 40.00 39.60 41.00 40.30	10.3 10.3 10.3 10.3 12.2 12.4	64 62 57 56 60	15.3 18.9 16.7 16.4 19.0 19.7	QP QP QP QP QP QP	N N N N N	GND GND GND GND GND GND

#### MEASUREMENT RESULT: "agc fin2"

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.190000 0.234000 0.470000 0.522000 19.038000 21.610000	42.00 37.90 35.50 34.20 32.40 32.30	10.3 10.3 10.3 10.3 12.2 12.4	54 52 47 46 50 50	12.0 14.4 11.0 11.8 17.6 17.7	AV AV AV AV AV	N N N N N	GND GND GND GND GND GND

#### **RESULT: PASS**

Note: All the test modes had been tested, the mode 3 was the worst case. Only the data of the worst case would be record in this test report.

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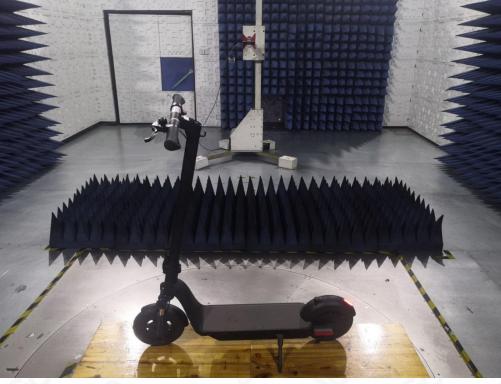
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# APPENDIX A: PHOTOGRAPHS OF TEST SETUP

RADIATED EMISSION TEST SETUP BELOW 1GHZ



RADIATED EMISSION TEST SETUP ABOVE 1GHZ



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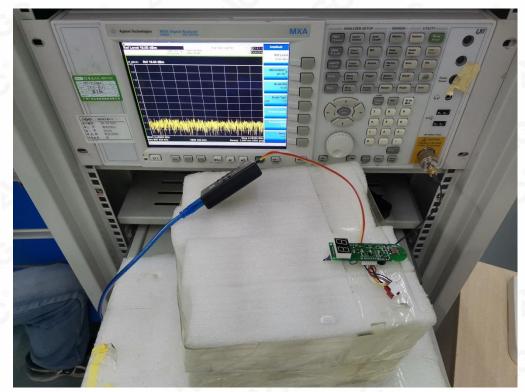


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CONDUCTED EMISSION TEST SETUP

CONDUCTED TEST SETUP



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APPENDIX B: PHOTOGRAPHS OF EUT WHOLE VIEW OF EUT

TOP VIEW OF EUT



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### BOTTOM VIEW OF EUT





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### BACK VIEW OF EUT



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**RIGHT VIEW OF EUT** 

**OPEN VIEW OF EUT-1** 



Compliance Dedicated Fest Any report having not been signed by authorized approver, or having been altered without authorization, or having not been stamped by the "bedicated "rest Stamp" is deemed to be invalid. Copying or excerpting portion of, or altering the content of the report is not permitted without the written enhorization of AGE presented in the report apply only to the tested sample. Any objections to report issued by AGC should be submitted to AGC within 15days after the issues of Further enquiry of validity or verification of the test report should be addressed to AGC by agc@agc~cert.com. g/Inspection he test results Bf the test report.



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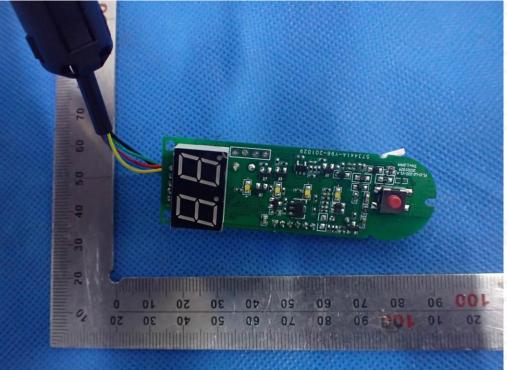


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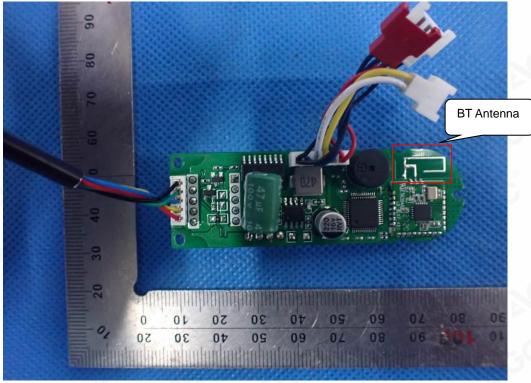


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#### **INTERNAL VIEW OF EUT-1**



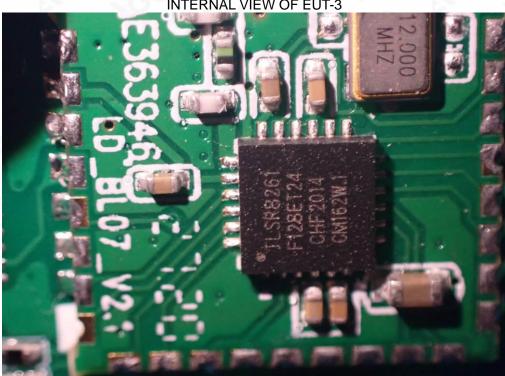
**INTERNAL VIEW OF EUT-2** 



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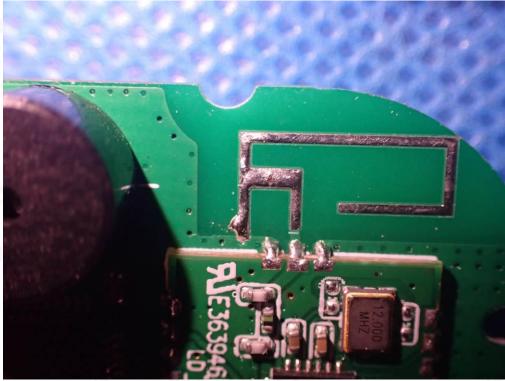


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**INTERNAL VIEW OF EUT-3** 

**INTERNAL VIEW OF EUT-4** 

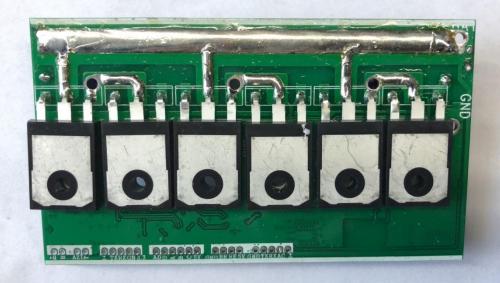


Compliancest Any report having not been signed by authorized approver, or having been altered without authorization, or having not been stamped by the "bedicated restriction of Stamp" is deemed to be invalid. Copying or excerpting portion of, or altering the content of the report is not permitted without the writter approver, and the test results presented in the report apply only to the tested sample. Any objections to report issued by AGC should be submitted to AGC within 15days after the issues of the test report. Further enquiry of validity or verification of the test report should be addressed to AGC by agc@agc-cert.com. The test results



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**INTERNAL VIEW OF EUT-5** 



**INTERNAL VIEW OF EUT-6** 

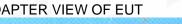


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### END OF REPORT----

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#### Conditions of Issuance of Test Reports

1. All samples and goods are accepted by the Attestation of Global Compliance (Shenzhen) Co., Ltd (the "Company") solely for testing and reporting in accordance with the following terms and conditions. The company provides its services on the basis that such terms and conditions constitute express agreement between the company and any person, firm or company requesting its services (the "Clients").

2. Any report issued by Company as a result of this application for testing services (the "Report") shall be issued in confidence to the Clients and the Report will be strictly treated as such by the Company. It may not be reproduced either in its entirety or in part and it may not be used for advertising or other unauthorized purposes without the written consent of the Company. The Clients to whom the Report is issued may, however, show or send it, or a certified copy thereof prepared by the Company to its customer, supplier or other persons directly concerned. The Company will not, without the consent of the Clients, enter into any discussion or correspondence with any third party concerning the contents of the Report, unless required by the relevant governmental authorities, laws or court orders.

3. The Company shall not be called or be liable to be called to give evidence or testimony on the Report in a court of law without its prior written consent, unless required by the relevant governmental authorities, laws or court orders.

4. The non-CMA report issued by AGC is only permitted to be used by the client as internal reference use and shall not be used for public demonstration purpose.

5. In the event of the improper use of the report as determined by the Company, the Company reserves the right to withdraw it, and to adopt any other additional remedies which may be appropriate.

6. Samples submitted for testing are accepted on the understanding that the Report issued cannot form the basis of, or be the instrument for, any legal action against the Company.

7. The Company will not be liable for or accept responsibility for any loss or damage however arising from the use of information contained in any of its Reports or in any communication whatsoever about its said tests or investigations.

8. Clients wishing to use the Report in court proceedings or arbitration shall inform the Company to that effect prior to submitting the sample for testing.

9. The Company is not responsible for recalling the electronic version of the original report when any revision is made to them. The Client assumes the responsibility to providing the revised version to any interested party who uses them.

10. Subject to the variable length of retention time for test data and report stored hereinto as otherwise specifically required by individual accreditation authorities, the Company will only keep the supporting test data and information of the test report for a period of six years. The data and information will be disposed of after the aforementioned retention period has elapsed. Under no circumstances shall we provide any data and information which has been disposed of after retention period. Under no circumstances shall we be liable for damage of any kind, including (but not limited to) compensatory damages, lost profits, lost data, or any form of special, incidental, indirect, consequential or punitive damages of any kind, whether based on breach of contract of warranty, tort (including negligence), product liability or otherwise, even if we are informed in advance of the possibility of such damages.

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