FCC TEST REPORT

For

LX PTY LTD

Andromeda

Test Model: ETCS2A-M2

Prepared for LX PTY LTD

Address Suite 101, NIC Building 4 Cornwallis Street, Eveleigh 2015 Australia

Prepared by Shenzhen LCS Compliance Testing Laboratory Ltd.

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Date of receipt of test sample January 14, 2022

2 Number of tested samples

Address

Sample No. 220114044A-1, 220114044A-2

Serial number Prototype

Date of Test January 14, 2022 ~ March 05, 2022

Date of Report March 07, 2022



Scan code to check authenticity

FCC TEST REPORT FCC Part 25 : LCS220114044AED Report Reference No. Date of Issue : March 07, 2022 Testing Laboratory Name..... : Shenzhen LCS Compliance Testing Laboratory Ltd. : 101, 201 Bldg A & 301 Bldg C, Juji Industrial Park Yabianxueziwei, Address Shajing Street, Baoan District, Shenzhen, 518000, China Testing Location/ Procedure..... : Full application of Harmonised standards Partial application of Harmonised standards Other standard testing method Applicant's Name : LX PTY LTD : Suite 101, NIC Building 4 Cornwallis Street, Eveleigh 2015 Australia **Test Specification** Standard..... : FCC CFR Title 47 Part 2, Part 25 : LCSEMC-1.0 Test Report Form No. TRF Originator : Shenzhen LCS Compliance Testing Laboratory Ltd.

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Master TRF..... : Dated 2011-03

Test Item Description.....: : Andromeda

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Result	: Positive
Ratings	: Input 3.6Vdc, 0.5A Max(Supply by 3.6V/12Ah Li/SOCl2 battery)
Test Model	: ETCS2A-M2
Trade Mark	: /

Compiled by:	Supervised by:	Approved by:
Roy Young	Jin Wang	Jains Riang
Ray Yang/ Administrator	Jin.Wang/ Technique principal	Gavin Liang/ Manager

RADIO -- TEST REPORT

 Test Report No.:
 LCS220114044AED
 March 07, 2022

 Date of issue

Test Model..... : ETCS2A-M2 EUT..... : Andromeda Applicant..... : LX PTY LTD Address..... : Suite 101, NIC Building 4 Cornwallis Street, Eveleigh 2015 Australia Telephone..... : / Fax..... Manufacturer..... : Sichuan Changhong Network Technologies Co.,Ltd. · Room 529, No.2 building, Innovation center, Science and Address..... education entrepreneurship Park, Mianyang, Sichuan, China Telephone..... : / Fax..... : / Factory..... : Sichuan Changhong Network Technologies Co.,Ltd. G05 Factory Premises, Changhong Intelligent Display Terminal Address..... : Industrial Park, 38, Xinping Avenue, High-tech District, Mianyang 621000, P. R. China Telephone..... : / Fax.....

Test Result	Positive
1 est Kesuit	rositive

The test report merely corresponds to the test sample.

It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

Revision History

Revision	Issue Date	Revision Content	Revised By
000	March 07, 2022	Initial Issue	

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1. GENERAL INFORMATION

1.1. Description of Device (EUT)

EUT : Andromeda
Test Model : ETCS2A-M2

Power Supply : Input 3.6Vdc, 0.5A Max(Supply by 3.6V/12Ah Li/SOC12 battery)

Hardware Version : V2.0

Software Version : V1.10.12.0

Bluetooth

Frequency Range : 2402MHz-2480MHz

Bluetooth Channel Number : 40 channels for Bluetooth V5.0 (DTS)

Bluetooth Channel Spacing : 2MHz for Bluetooth V5.0 (DTS)

Bluetooth Modulation Type : GFSK for Bluetooth V5.0 (DTS)

Bluetooth Version : V5.0

Antenna Description : PCB Antenna, 0.8dBi(Max.)

2.4G WLAN

Frequency Range : 2412 – 2462 MHz

Channel Number : 11 Channels for 20MHz bandwidth (2412~2462MHz)

Channel Spacing : 5MHz

Modulation Type : IEEE 802.11b: DSSS (CCK, DQPSK, DBPSK)

IEEE 802.11g: OFDM (64QAM, 16QAM, QPSK, BPSK) IEEE 802.11n: OFDM (64QAM, 16QAM, QPSK, BPSK)

Antenna Description : PCB Antenna, 0.6dBi(Max.)

LTE :

Support Band : \(\overline{\text{E-UTRA Band } 12(U.S.-Band)}\)

⊠E-UTRA Band 25(U.S.-Band)

LTE Release Version : R8

Type Of Modulation : QPSK/16QAM

Antenna Description : Internal Antenna

0dBi (max.) For E-UTRA Band 12 0dBi (max.) For E-UTRA Band 25

Power Class : Class 3

M2-24

Operating Frequency : Uplink: 399.9 ~ 400.05MHz

Downlink: 400.15 to 401MHz

Modulation Type : MSK

Emission Designator : 4K27G1D

Antenna Type : Internal Antenna

Shenzhen LCS Compliance Testing Laboratory Ltd.

Antenna Gain : -1.58dBi (max.)

GPS function : Support and only RX

1.2. Host System Configuration List and Details

Manufacturer	Description	Model	Serial Number	Certificate

1.3. External I/O Cable

I/O Port Description	Quantity	Cable

1.4. Description of Test Facility

NVLAP Accreditation Code is 600167-0.

FCC Designation Number is CN5024.

CAB identifier is CN0071.

CNAS Registration Number is L4595.

Test Firm Registration Number: 254912.

The sites are constructed in conformance with the requirements of ANSI C63.4 (2014) and CISPR Publication 22.

1.5. Statement of the Measurement Uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to ETSI TR 100 028 "Electromagnetic compatibility and Radio spectrum Matters (ERM); Uncertainties in the measurement of mobile radio equipment characteristics" and is documented in the Shenzhen LCS Compliance Testing Laboratory Ltd. quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

1.6. Measurement Uncertainty

Test Item	Uncertainty	Note
Frequency error	30 Hz	(1)
Transmitter power conducted	0.62 dB	(1)
Transmitter power Radiated	2.67 dB	(1)
Conducted spurious emission 9KHz-12.75 GHz	1.22 dB	(1)
Conducted Emission 9KHz-30MHz	1.63 dB	(1)
Radiated spurious emission 30~1000MHz	3.10 dB	(1)
Radiated spurious emission 1~18GHz	3.80 dB	(1)
Radiated spurious emission 18-40GHz	3.90 dB	(1)
Occupied Bandwidth	N/A	N/A
Emission Mask	N/A	N/A
Modulation Characteristic	N/A	N/A
Transmitter Frequency Behavior	N/A	N/A

(1) . This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

1.7. Description of Test Modes

The EUT has been tested under typical operating condition. As, test modes selected as below by the technical parameters of the EUT:

2. SYSTEM TEST CONFIGURATION

2.1. TEST STANDARDS

The tests were performed according to following standards:

FCC Rules Part 25: Satellite Communications.

ANSI/TIA-603-E-2016: Land Mobile FM or PM Communications Equipment Measurement and Performance Standards.

47 CFR FCC Part 15 Subpart B: Unintentional Radiators

FCC Part 2: FREQUENCY ALLOCA-TIONS AND RADIO TREATY MAT-TERS; GENERAL RULES AND REG-ULATIONS

ANSI C63.26:2015: American National Standard for Compliance Testing of Transmitters Used in Licensed Radio Services.

ANSI C63.4:2014: Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz

2.2. EUT Configuration

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner that intends to maximize its emission characteristics in a continuous normal application.

2.3. EUT Exercise

The EUT has been tested under typical operating condition and The Transmitter was operated in the normal operating mode. The TX frequency was fixed which was for the purpose of the measurements.

2.4. Test Sample

The application provides 1 samples to meet requirement;

Sample Number	Description
Sample 1	continuous transmit

3. SYSTEM TEST CONFIGURATION

3.1. Justification

The system was configured for testing in a continuous transmits condition.

3.2. EUT Exercise Software

N/A

3.3. Special Accessories

N/A

3.4. Block Diagram/Schematics

Please refer to the related document

3.5. Equipment Modifications

Shenzhen LCS Compliance Testing Laboratory Ltd. has not done any modification on the EUT.

3.6. Test Setup

Please refer to the test setup photo.

4. SUMMARY OF TEST RESULT

Transmitter Requirements				
FCC General Rules Part (47CFR)	Description of Test	Test Sample	Result	Remark
2.1046; 25.204	RF Output Power	Sample 1	Compliant	Note 1
2.1049	Occupied Bandwidth	Sample 1	Compliant	Note 2
2.1051; 25.202(f)	Unwanted Emissions at Antenna Terminals	Sample 1	Compliant	Note 1
2.1053; 25.202(f)	Radiated Spurious Emissions	Sample 1	Compliant	Note 1
25.216(c)(f)(g)(i)	Protection of Aeronautical Radio Navigation Satellite Service	Sample 1	N/A*	Note 1
2.1055(a)(1); 25.202(d)	Frequency Stability over Temperature Variations	Sample 1	Compliant	Note 1
2.1055(d); 25.202(d)	Frequency Stability over Voltage Variations	Sample 1	Compliant	Note 1

Remark:

- 1. Note 1 Test results inside test report;
- 2. Note $2 N/A^*$ Not Applicable for this device.

5. TEST CONDITIONS AND RESULTS

5.1. RF Power Output

5.1.1 Test Applicable

Per FCC Part 2.1046 and Part 25.204 Power limits for earth stations.

5.1.2 Test Procedure

As required by 47 CFR 2.1046, RF Power output measurements were made at the RF output terminals of the EUT. Customer provided a test mode internal to the EUT to control the RF modulation, and frequency channel. The EUT was connected through an attenuator to a Spectrum Analyzer capable of making power measurements. Measurements were made at the low and high channels of the entire frequency band. 5.1.3 Test Configuration

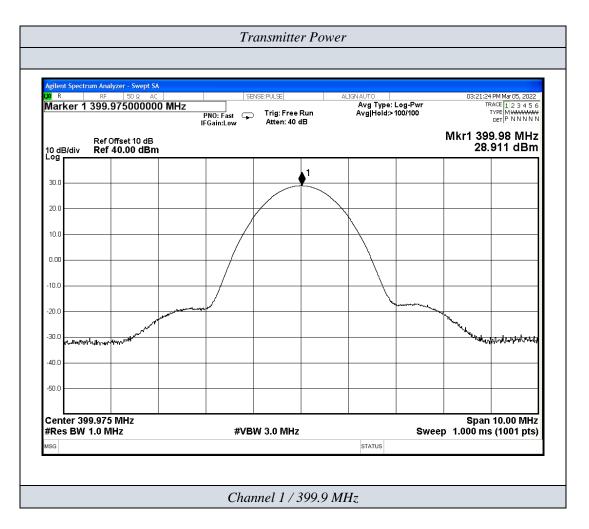


5.1.3 Test Results

Temperature	22.6℃	Humidity	53.7%
Test Engineer	Ling Zhu	Test Voltage	Normal Voltage

Frequency (MHz)	Channel	Conducted Power (dBm)	Transmit Antenna Gain (dBi)	Carrier Power Peak EIRP (dBm)	EIRP (dBW)	Specification Limit (dBW)
399.975	N/A	28.911	-1.58	27.331	-2.669	40
	Result: Pass					

 $EIRP(dBm) = E_{Meas} + G_T + L_C$

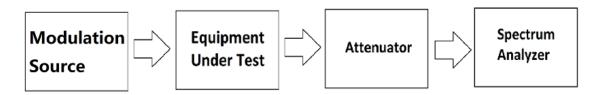


5.2. Occupied Bandwidth

5.2.1 Test Applicable

Occupied Bandwidth: The EUT was connected to the audio signal generator and the spectrum analyser via the main RF connector, and through an appropriate attenuator. The EUT was controlled to transmit its maximum power. Then the bandwidth of 99% power can be measured by the spectrum analyser.

5.2.2 Test Configuration



5.2.3 Test Procedure

As required by 47 CFR 2.1049, occupied bandwidth measurements were made at the output terminals of the EUT.

Customer provided a test mode internal to the EUT to control the RF modulation, and frequency channel. The EUT was connected through an attenuator to a Spectrum Analyzer. The measured highest peak power was set relative to zero dB reference. The RBW of the Spectrum Analyzer was set to at least 1% of the channel bandwidth and video bandwidth was set to 3 times the resolution bandwidth. Measurements were carried out at the low and high channels of the TX band.

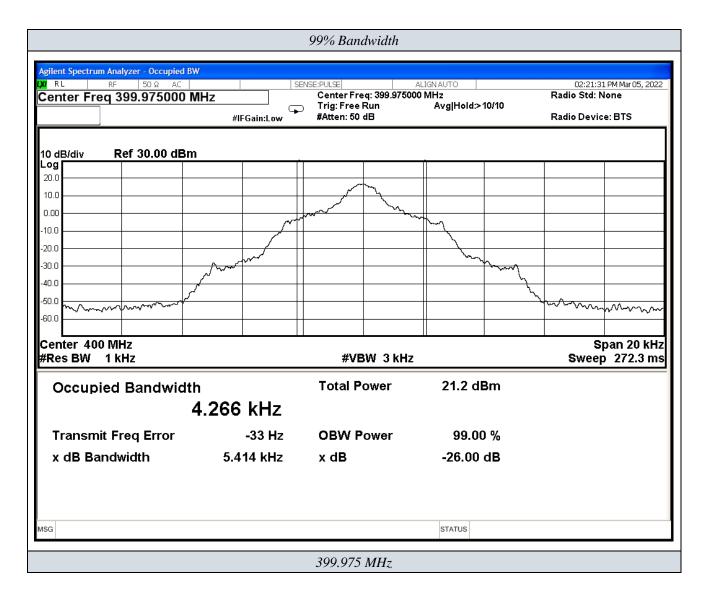
The following pages show measurements of Occupied Bandwidth plots:

5.2.4 Test Results

Temperature 22.6°C		Humidity	53.7%	
Test Engineer	Ling Zhu	Test Voltage	Normal Voltage	

Occupied Bandwidth

Test Frequency (MHz)	Occupied Bandwidth (KHz)
(IVIIIZ)	99%
399.975	4.266
Test Results	PASS



5.3. Unwanted Emissions at Antenna Terminals

5.3.1 Test Applicable

A As required by 47 CFR 25.202(f), unwanted emissions at antenna terminal measurements were made at the RF output antenna terminal of the EUT.

Customer provided a test mode internal to the EUT to control the RF modulation, and frequency channel. The EUT was connected through an attenuator to a Spectrum Analyzer to verify the DUT met the requirements as specified in \$25.202(f). Measurements were made at the lowest and highest frequency of the transmit band.

Emission limitations. Except for SDARS terrestrial repeaters and as provided for in paragraph (i), the mean power of emissions shall be attenuated below the mean output power of the transmitter in accordance with the schedule set forth in paragraphs (f)(1) through (f)(4) of this section. The out-of-band emissions of SDARS terrestrial repeaters shall be attenuated in accordance with the schedule set forth in paragraph (h) of this section.

- (1) In any 4 kHz band, the center frequency of which is removed from the assigned frequency by more than 50 percent up to and including 100 percent of the authorized bandwidth: 25 dB;
- (2) In any 4 kHz band, the center frequency of which is removed from the assigned frequency by more than 100 percent up to and including 250 percent of the authorized bandwidth: 35 dB;
- (3) In any 4 kHz band, the center frequency of which is removed from the assigned frequency by more than 250 percent of the authorized bandwidth: An amount equal to 43 dB plus 10 times the logarithm (to the base 10) of the transmitter power in watts;

5.3.2 Test Configuration



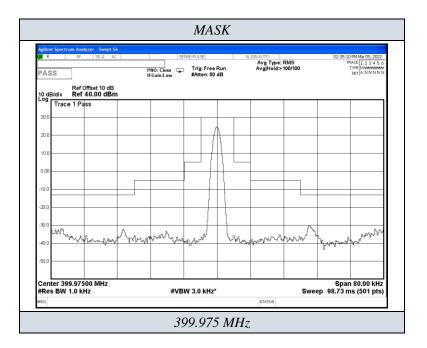
5.3.3 Test Results

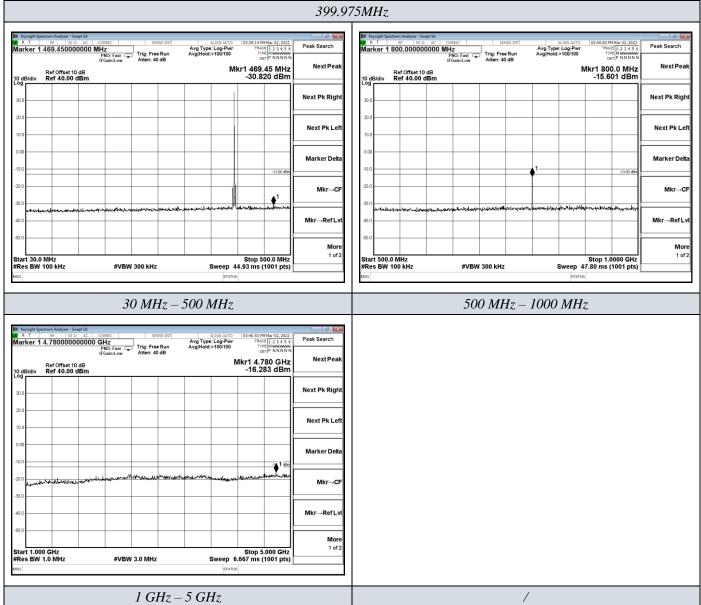
Temperature	Temperature 22.6°C		53.7%	
Test Engineer	Ling Zhu	Test Voltage	Normal Voltage	

Remark:

Please refer to following page.







5.4. Radiated Spurious Emissions

5.4.1. Standard Applicable

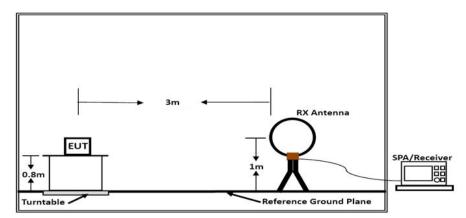
As required by 47 CFR 2.1053, field strength of radiated spurious measurements were made in accordance with the procedures of the ANSI C63.26-2015.

The EUT was placed on a non-reflective table inside a 3 meter open area test site. The EUT was set on continuous transmit.

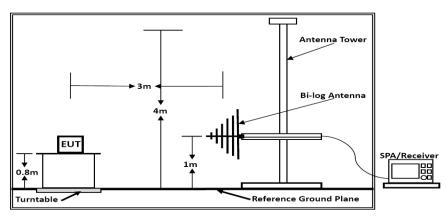
The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and polarization as well as EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. The test was performed by placing the EUT on 3 orthogonal axes. The frequency range up to the 10th harmonic was investigated.

To get a maximum emission level from the EUT, the EUT was rotated throughout the X-axis, Y-axis and Z-axis. Worst case is X-axis

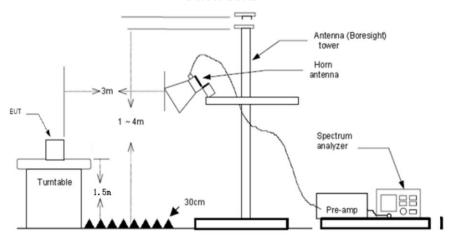
5.4.2. Test Setup Layout



Below 30MHz



Below 1GHz



5.4.3 Test Results

Temperature 23.5℃		Humidity	52.2%
Test Engineer	Ling Zhu	Configurations	M2-24

PASS.

Only record the worst test result in this report.

The test data please refer to following page.

Freq. MHz	Reading dBm	Ant. Fac dB	Pre. Fac. dB	Cab. Loss dB	Measured dBm	Limit dBm	Margin dB	Remark	Pol.
799.950	-24.63	5.28	9.37	2.15	-18.39	-13.00	-5.39	PASS	Horizontal
1199.925	-33.66	5.62	10.9	2.15	-26.23	-13.00	-13.23	PASS	Horizontal
1599.900	-38.64	6.73	10.83	2.15	-32.39	-13.00	-19.39	PASS	Horizontal
799.950	-24.52	5.28	9.31	2.15	-18.34	-13.00	-5.34	PASS	Vertical
1199.925	-36.03	5.84	11.01	2.15	-28.71	-13.00	-15.71	PASS	Vertical
1599.900	-36.68	6.75	11.06	2.15	-30.22	-13.00	-17.22	PASS	Vertical

Measured Level = Reading Level + Factor, Margin = Measured Level - Limit, Factor = Antenna Factor + Cable Loss - Preamp Factor



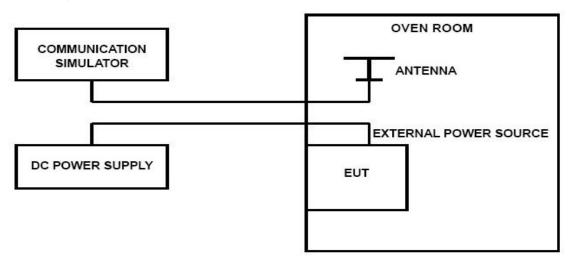
5.5. Frequency Stability over Temperature Variations

5.5.1 Test Applicable

As required by 47 CFR 2.0155, Frequency Stability measurements were made at the RF antenna output terminals of the EUT.

The EUT was placed in an Environmental Chamber with all the support equipment outside the chamber. The EUT was set to transmit a modulated carrier. The reference frequency at 20°C was observed and noted down. The frequency drift was investigated for every 10°C increment until the unit was stabilized then recorded the reading in tabular format with the temperature range of -30°C to 50°C.

5.5.2 Test Configuration



5.5.3 Test Limits

Frequency tolerance, Earth stations. The carrier frequency of each earth station transmitter authorized in these services shall be maintained within 0.001 percent of the reference frequency

5.5.4 Test Results

Test Engineer Ling Zhu

399.975MHz						
Temperature (°C)	Frequency error(Hz)	Frequency error(ppm)	Limit (ppm)	Verdict		
-30	14	0.035	±10	PASS		
-20	21	0.053	±10	PASS		
-10	22	0.055	±10	PASS		
0	-7	-0.018	±10	PASS		
10	-12	-0.030	±10	PASS		
20	0	0	±10	PASS		
30	-21	-0.053	±10	PASS		
40	13	0.033	±10	PASS		
50	14	0.035	±10	PASS		

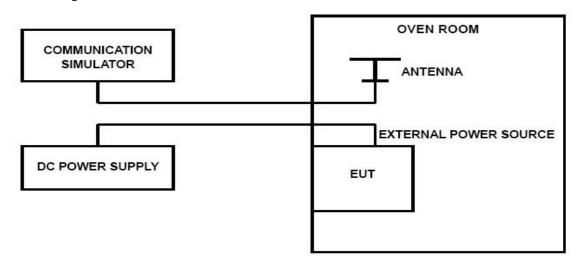
5.6. Frequency Stability over Voltage Variations

5.6.1 Test Applicable

As required by 47 CFR 2.0155, Frequency Stability measurements were made at the RF antenna output terminals of the EUT. The EUT was connected to a variable DC source. The frequency was measured at both the nominal 3.6 Vdc of the EUT and at the extreme $\pm 15\%$ of nominal which is 85% level or 3.06Vdc and at the 115% level or 4.14Vdc

With the voltage set to a measurement point, the transmitted signal was captured by the spectrum analyzer and the frequency value determined. The frequencies are compared to the tuned frequency.

5.6.2 Test Configuration



5.6.3 Test Limits

Frequency tolerance, Earth stations. The carrier frequency of each earth station transmitter authorized in these services shall be maintained within 0.001 percent of the reference frequency.

5.6.4 Test Results

m . r .	T ' 771
Test Engineer	Ling Zhu
	6

	399.975MHz						
DC Power Frequency error(Hz) Frequency error(ppm)		Limit (ppm)	Verdict				
3.06	19	0.048	±10	PASS			
3.6	58	0.145	±10	PASS			
4.15	32	0.080	±10	PASS			

6. LIST OF MEASURING EQUIPMENT

Item	Equipment	Manufacturer	Model No.	Serial No.	Cal Date	Due Date
1	Power Meter	R&S	NRVS	100444	2021-06-21	2022-06-20
2	Power Sensor	R&S	NRV-Z81	100458	2021-06-21	2022-06-20
3	Power Sensor	R&S	NRV-Z32	10057	2021-06-21	2022-06-20
4	ESG Vector Signal Generator	Agilent	E4438C	MY49072627	2021-06-21	2022-06-20
5	MXA Signal Analyzer	Agilent	N9020A	MY49061051	2021-06-21	2022-06-20
6	DC Power Supply	Agilent	E3642A	N/A	2021-11-25	2022-11-24
7	EMI Test Software	AUDIX	E3	/	N/A	N/A
8	3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03СН03-НҮ	2021-06-21	2022-06-20
9	Positioning Controller	MF	MF7082	MF78020803	2021-06-21	2022-06-20
10	Active Loop Antenna	SCHWARZBECK	FMZB 1519B	00005	2021-07-25	2024-07-24
11	By-log Antenna	SCHWARZBECK	VULB9163	9163-470	2021-07-25	2024-07-24
12	Horn Antenna	SCHWARZBECK	BBHA 9120D	9120D-1925	2021-07-01	2024-06-30
13	Broadband Horn Antenna	SCHWARZBECK	BBHA 9170	791	2020-09-20	2023-09-19
14	Broadband Preamplifier	SCHWARZBECK	BBV9745	9719-025	2021-06-21	2022-06-20
15	EMI Test Receiver	R&S	ESR 7	101181	2021-06-21	2022-06-20
16	RS SPECTRUM ANALYZER	R&S	FSP40	100503	2021-11-16	2022-11-15
17	6dB Attenuator	/	100W/6dB	1172040	2021-06-21	2022-06-20
18	3dB Attenuator	/	2N-3dB	/	2021-11-16	2022-11-15
19	10dB Attenuator	SCHWARZBECK	MTS-IMP-136	261115-001-0032	2021-06-21	2022-06-20
20	Combiner	N/A	N/A	SHWLCB2-52500S	2021-11-16	2022-11-15
21	Audio Analyzer	R&S	UPV	1146.2003K02-101 721-UW	2021-11-25	2022-11-24
22	MXG Vector Signal Generator	Agilent	N5182A	MY47071151	2021-06-21	2022-06-20
23	RF Filter	Micro-Tronics	BRC50721	S/N-013	2021-11-16	2022-11-15
24	RF Filter	Micro-Tronics	BRM50702	S/N-195	2021-06-21	2022-06-20
25	EMI Test Software	Farad	EZ	/	N/A	N/A

7. TEST SETUP PHOTOGRAPHS OF EUT

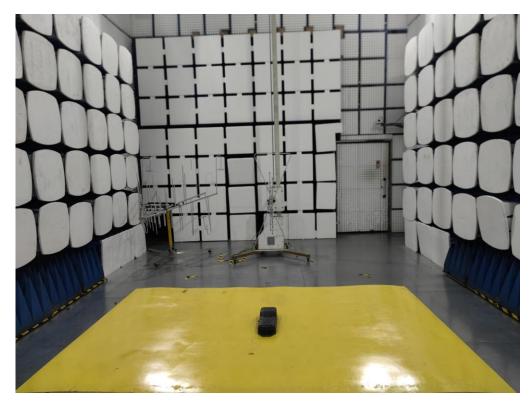


Fig.1 (below 1GHz)



Fig.2 (Above 1GHz)

EXTERIOR PHOTOGRAPHS OF THE EUT

Please refer to separated files for External Photos of the EUT.

9. INTERIOR PHOTOGRAPHS OF THE EUT

Please refer to separated files for Internal Photos of the EUT.

-----THE END OF REPORT-----