Shenzhen CTA Testing Technology Co., Ltd.

Room 106, Building 1, Yibaolai Industrial Park, Qiaotou Community, Fuhai Street, Bao'an District, Shenzhen, China

TEST REPORT

FCC Part 90R

Report Reference No.....:	**CTA24042900107**
FCC ID.....:	**2AVFN-FT205L**
Compiled by (position+printed name+signature) .:	File administrators Jinghua Xiao
Supervised by (position+printed name+signature) .:	Project Engineer Lushan Kong
Approved by (position+printed name+signature) .:	RF Manager Eric Wang
Date of issue.....:	May. 07, 2024

Testing Laboratory Name .....:	**Shenzhen CTA Testing Technology Co., Ltd.**
Address .....:	Room 106, Building 1, Yibaolai Industrial Park, Qiaotou Community, Fuhai Street, Bao'an District, Shenzhen, China

Applicant's name .....:	**Leax Arkivator Telecom USA Inc**
Address .....:	833 E Arapaho Rd.Suite 203 Richardson, TX 75081

Test specification .....:	
Standard .....:	**FCC CFR Title 47 Part 2, Part 90R** **ANSI/TIA-603-E-2016** **KDB 971168 D01**

Test item description.....:	**Industrial 4G Router**
Trade Mark .....:	N/A
Manufacturer .....:	Leax Arkivator Telecom USA Inc
Model/Type reference.....:	FT205L
Listed Models .....:	N/A
Ratings .....:	DC 12.0V From battery
Modulation .....:	QPSK, 16QAM
Hardware version .....:	V1.0
Software version .....:	V1.0
Frequency.....	E-UTRA Band 14
Result.....:	**PASS**

TEST REPORT

Equipment under Test	:	Industrial 4G Router
Model /Type	:	FT205L
Listed Models	:	N/A
Applicant	:	**Leax Arkivator Telecom USA Inc**
Address	:	833 E Arapaho Rd.Suite 203 Richardson, TX 75081
Manufacturer	:	**Leax Arkivator Telecom USA Inc**
Address	:	833 E Arapaho Rd.Suite 203 Richardson, TX 75081

Test result	**Pass ***

* In the configuration tested, the EUT complied with the standards specified page 4.

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.

Contents

1 SUMMARY

1.1 TEST STANDARDS

The tests were performed according to following standards:
FCC Part 2: FREQUENCY ALLOCA-TIONS AND RADIO TREATY MAT-TERS; GENERAL RULES AND REG-ULATIONS
FCC Part 90 : PRIVATE LAND MOBILE RADIO SERVICES
ANSI/TIA-603-E-2016: Land Mobile FM or PM Communications Equipment Measurement and Performance Standards.
ANSI C63.26-2015: IEEE/ANSI Standard for Compliance Testing of Transmitters Used in Licensed Radio Services
FCCKDB971168D01 Power Meas License Digital Systems

1.2 Test Description

Test Item	Section in CFR 47	Result
RF Output Power(Conducted Measurement)	Part 2.1046 Part 90R.542(a)(6)	Referring to the FCC ID No: XMR202008EC25AFXD issued by the Testing Lab (TA technology(shanghai) co., Ltd.)
RF Output Power(Radiated Measurement)	Part 2.1046 Part 90R.542(a)(6)	Pass
Peak-to-Average Ratio	Part 24.232 (d)	Referring to the FCC ID No: XMR202008EC25AFXD issued by the Testing Lab (TA technology(shanghai) co., Ltd.)
99% & -26 dB Occupied Bandwidth	Part 2.1049	Referring to the FCC ID No: XMR202008EC25AFXD issued by the Testing Lab (TA technology(shanghai) co., Ltd.)
Spurious Emissions at Antenna Terminal	Part 2.1051 Part 90R.543(e)	Referring to the FCC ID No: XMR202008EC25AFXD issued by the Testing Lab (TA technology(shanghai) co., Ltd.)
Field Strength of Spurious Radiation	Part 2.1053 Part 90R.543(e)	Pass
Emission Mask	Part 2.1051 Part 90R.543(e)	Referring to the FCC ID No: XMR202008EC25AFXD issued by the Testing Lab (TA technology(shanghai) co., Ltd.)
Frequency stability	Part 2.1055 Part 90.213	Referring to the FCC ID No: XMR202008EC25AFXD issued by the Testing Lab (TA technology(shanghai) co., Ltd.)

Note1: the LTE module in this product has already finished the certification (FCC ID: XMR202008EC25AFXD), Reference the results in the original test report.

1.3 Address of the test laboratory

Shenzhen CTA Testing Technology Co., Ltd.
Room 106, Building 1, Yibaolai Industrial Park, Qiaotou Community,Fuhai Street, Bao'an District, Shenzhen, China
The 3m-Semi anechoic test site fulfils CISPR 16-1-4 according to ANSI C63.4:2014 and CISPR 16-1-4:2010 SVSWR requirement for radiated emission above 1GHz.

1.4 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

FCC-Registration No.: 517856 Designation Number: CN1318
Shenzhen CTA Testing Technology Co., Ltd. has been listed on the US Federal Communications Commission list of test facilities recognized to perform electromagnetic emissions measurements.

Industry Canada Registration Number. Is: 27890 CAB identifier: CN0127
The Laboratory has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing.

A2LA-Lab Cert. No.: 6534.01
Shenzhen CTA Testing Technology Co., Ltd. has been listed by American Association for Laboratory Accreditation to perform electromagnetic emission measurement.

The 3m-Semi anechoic test site fulfils CISPR 16-1-4 according to ANSI C63.10 and CISPR 16-1-4:2010.

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 TR-100028-01" Electromagnetic compatibility and Radio spectrum Matters (ERM);Uncertainties in the measurement of mobile radio equipment characteristics; Part 1" and TR-100028-02 "Electromagnetic compatibility and Radio spectrum Matters (ERM);Uncertainties in the measurement of mobile radio equipment characteristics; Part 2 " and is documented in the Shenzhen CTA Testing Technology Co., 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.
Hereafter the best measurement capability for Shenzhen CTA Testing Technology Co., Ltd. :

Test	Range	Measurement Uncertainty	Notes
Radiated Emission	9KHz~30MHz	3.02 dB	(1)
Radiated Emission	30~1000MHz	4.06 dB	(1)
Radiated Emission	1~18GHz	5.14 dB	(1)
Radiated Emission	18-40GHz	5.38 dB	(1)
Conducted Disturbance	0.15~30MHz	2.14 dB	(1)
Output Peak power	30MHz~18GHz	0.55 dB	(1)
Power spectral density	/	0.57 dB	(1)
Spectrum bandwidth	/	1.1%	(1)
Radiated spurious emission (30MHz-1GHz)	30~1000MHz	4.10 dB	(1)
Radiated spurious emission (1GHz-18GHz)	1~18GHz	4.32 dB	(1)
Radiated spurious emission (18GHz-40GHz)	18-40GHz	5.54 dB	(1)

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

2 GENERAL INFORMATION

2.1 Environmental conditions

Date of receipt of test sample	:	Apr. 11, 2024
Testing commenced on	:	Apr. 11, 2024
Testing concluded on	:	May. 07, 2024

During the measurement the environmental conditions were within the listed ranges:

Normal Temperature:	25°C
Relative Humidity:	55 %
Air Pressure:	101 kPa

2.2 General Description of EUT

Product Description:	Industrial 4G Router
Model/Type reference:	FT205L
Power supply:	DC 12.0V From external circuit
Adapter information:	Model: GQ12-120100-CU Input: AC 100-240V 50/60Hz 0.4A Output: 12.0V 1.0A
Testing sample ID：	CTA240429001-1# (Engineer sample), CTA240429001-2# (Normal sample)
LTE	
Operation Band:	E-UTRA Band 14
Support Bandwidth:	Band 14: 5MHz, 10MHz
TX/RXFrequency Range:	E-UTRA Band 14(788MHz-798 MHz)
Modulation Type:	QPSK, 16QAM
Release Version:	Release 9
Category:	Cat 4
Antenna Type:	External antenna
Antenna Gain:	Band 14: 9.255dBi

Note: For more details, refer to the user's manual of the EUT.

2.3 Description of Test Modes and Test Frequency

The EUT has been tested under typical operating condition. The CMW500 used to control the EUT staying in continuous transmitting and receiving mode for testing. Regards to the frequency band operation: the lowest, middle and highest frequency of channel were selected to perform the test, then shown on this report.

2.4 Equipments Used during the Test

Test Equipment	Manufacturer	Model No.	Equipment No.	Calibration Date	Calibration Due Date
LISN	R&S	ENV216	CTA-308	2023/08/02	2024/08/01
LISN	R&S	ENV216	CTA-314	2023/08/02	2024/08/01

EMI Test Receiver	R&S	ESPI	CTA-307	2023/08/02	2024/08/01
EMI Test Receiver	R&S	ESCI	CTA-306	2023/08/02	2024/08/01
Spectrum Analyzer	Agilent	N9020A	CTA-301	2023/08/02	2024/08/01
Spectrum Analyzer	R&S	FSP	CTA-337	2023/08/02	2024/08/01
Vector Signal generator	Agilent	N5182A	CTA-305	2023/08/02	2024/08/01
Analog Signal Generator	R&S	SML03	CTA-304	2023/08/02	2024/08/01
Universal Radio Communication	CMW500	R&S	CTA-302	2023/08/02	2024/08/01
Temperature and humidity meter	Chigo	ZG-7020	CTA-326	2023/08/02	2024/08/01
Ultra-Broadband Antenna	Schwarzbeck	VULB9163	CTA-310	2023/10/17	2024/10/16
Horn Antenna	Schwarzbeck	BBHA 9120D	CTA-309	2023/10/13	2024/10/12
Loop Antenna	Zhinan	ZN30900C	CTA-311	2023/10/17	2024/10/16
Horn Antenna	Beijing Hangwei Dayang	OBH100400	CTA-336	2021/08/07	2024/08/06
Amplifier	Schwarzbeck	BBV 9745	CTA-312	2023/08/02	2024/08/01
Amplifier	Taiwan chengyi	EMC051845B	CTA-313	2023/08/02	2024/08/01
Directional coupler	NARDA	4226-10	CTA-303	2023/08/02	2024/08/01
High-Pass Filter	XingBo	XBLBQ-GTA18	CTA-402	2023/08/02	2024/08/01
High-Pass Filter	XingBo	XBLBQ-GTA27	CTA-403	2023/08/02	2024/08/01
Automated filter bank	Tonscend	JS0806-F	CTA-404	2023/08/02	2024/08/01
Power Sensor	Agilent	U2021XA	CTA-405	2023/08/02	2024/08/01
Amplifier	Schwarzbeck	BBV9719	CTA-406	2023/08/02	2024/08/01

Test Equipment	Manufacturer	Model No.	Version number	Calibration Date	Calibration Due Date
EMI Test Software	Tonscend	TS®JS32-RE	5.0.0.2	N/A	N/A
EMI Test Software	Tonscend	TS®JS32-CE	5.0.0.1	N/A	N/A
RF Test Software	Tonscend	TS®JS1120-3	3.1.65	N/A	N/A
RF Test Software	Tonscend	TS®JS1120	3.1.46	N/A	N/A

2.5 Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for filing to comply with of the FCC Part 27 Rules.

2.6 Modifications

No modifications were implemented to meet testing criteria.

3 TEST CONDITIONS AND RESULTS

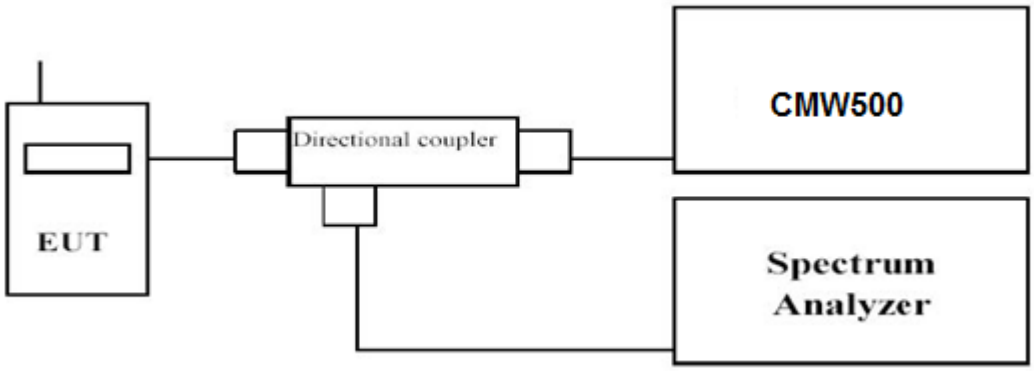
3.1 Output Power

LIMIT

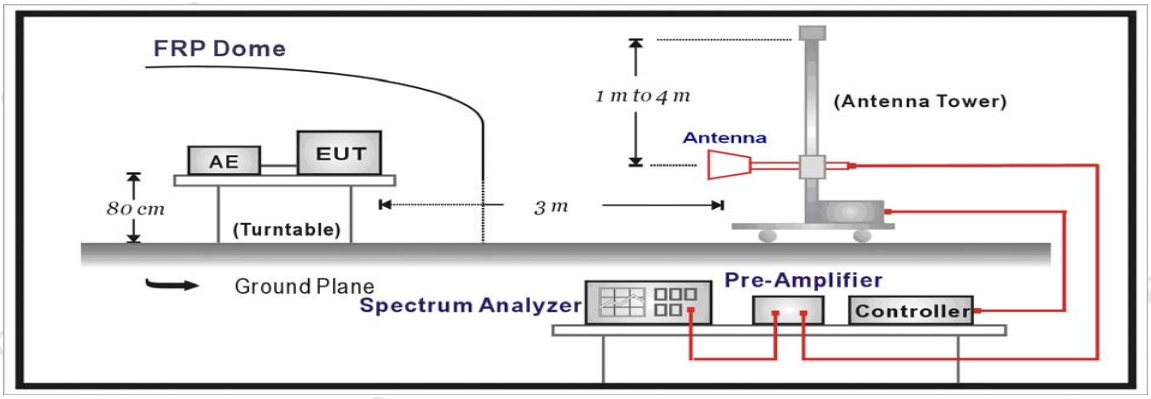
According to §90.542(6) specifies “Control stations and mobile stations transmitting in the 758-768 MHz band and the 788-798 MHz band are limited to 30 watts ERP.”

TEST CONFIGURATION

Conducted Power Measurement



Radiated Power Measurement:



TEST PROCEDURE

Radiated Power Measurement:

a) The EUT shall be placed at the specified height on a support, and in the position closest to normal use as declared by provider.
b) The test antenna shall be oriented initially for vertical polarization and shall be chosen to correspond to the frequency of the transmitter
c) The output of the test antenna shall be connected to the measuring receiver.
d) The transmitter shall be switched on and the measuring receiver shall be tuned to the frequency of the transmitter under test.
e) The test antenna shall be raised and lowered through the specified range of height until a maximum signal level is detected by the measuring receiver.
f) The transmitter shall then be rotated through 360°in the horizontal plane, until the maximum signal level is detected by the measuring receiver.
g) The test antenna shall be raised and lowered again through the specified range of height until a maximum signal level is detected by the measuring receiver.
h) The maximum signal level detected by the measuring receiver shall be noted.
i) The transmitter shall be replaced by a substitution antenna.
j) The substitution antenna shall be orientated for vertical polarization and the length of the substitution antenna shall be adjusted to correspond to the frequency of the transmitter.

k) The substitution antenna shall be connected to a calibrated signal generator.
l) If necessary, the input attenuator setting of the measuring receiver shall be adjusted in order to increase the sensitivity of the measuring receiver.
m) The test antenna shall be raised and lowered through the specified range of height to ensure that the maximum signal is received.
n) The input signal to the substitution antenna shall be adjusted to the level that produces a level detected by the measuring receiver, that is equal to the level noted while the transmitter radiated power was measured, corrected for the change of input attenuator setting of the measuring receiver.
o) The measurement shall be repeated with the test antenna and the substitution antenna orientated for horizontal polarization.
p) The measure of the effective radiated power is the larger of the two levels recorded at the input to the substitution antenna, corrected for gain of the substitution antenna if necessary.
q) Test site anechoic chamber refer to ANSI C63.4.

TEST RESULTS

Radiated Measurement:

Remark:

1. *We were tested all RB Configuration refer 3GPP TS136 521 for each Channel Bandwidth of LTE FDD Band 14; recorded worst case for each Channel Bandwidth of LTE FDD Band 14.*
2. *EIRP=P_{Mea}(dBm)-P_{cl}(dB)+P_{Ag}(dB)+G_a(dBi)*
3. *ERP = EIRP – 2.15dBi as EIRP by subtracting the gain of the dipole.*

LTE FDD Band 14_Channel Bandwidth 5MHz_QPSK

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	G_a Antenna Gain(dB)	Correction (dB)	P_{Ag} (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
790.5	-17.93	2.41	8.25	2.15	36.73	22.49	44.77	-22.28	V
793.0	-19.65	2.45	8.31	2.15	36.73	20.79	44.77	-23.98	V
795.5	-17.07	2.46	8.34	2.15	36.73	23.39	44.77	-21.38	V

LTE FDD Band 14_Channel Bandwidth 10MHz_QPSK

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	G_a Antenna Gain(dB)	Correction (dB)	P_{Ag} (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
793.0	-18.52	2.41	8.25	2.15	36.73	21.90	44.77	-22.87	V

LTE FDD Band 14_Channel Bandwidth 5MHz_16QAM

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	G_a Antenna Gain(dB)	Correction (dB)	P_{Ag} (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
790.5	-19.49	2.41	8.25	2.15	36.73	20.93	44.77	-23.84	V
793.0	-19.79	2.45	8.31	2.15	36.73	20.65	44.77	-24.12	V
795.5	-18.05	2.46	8.34	2.15	36.73	22.41	44.77	-22.36	V

LTE FDD Band 14_Channel Bandwidth 10MHz_16QAM

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	G_a Antenna Gain(dB)	Correction (dB)	P_{Ag} (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
793.0	-19.31	2.41	8.25	2.15	36.73	21.11	44.77	-23.66	V

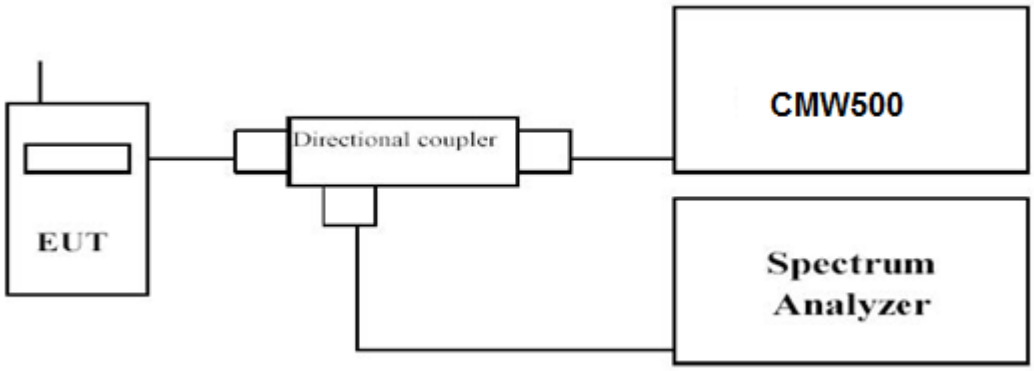
3.2 Spurious Emission

LIMIT

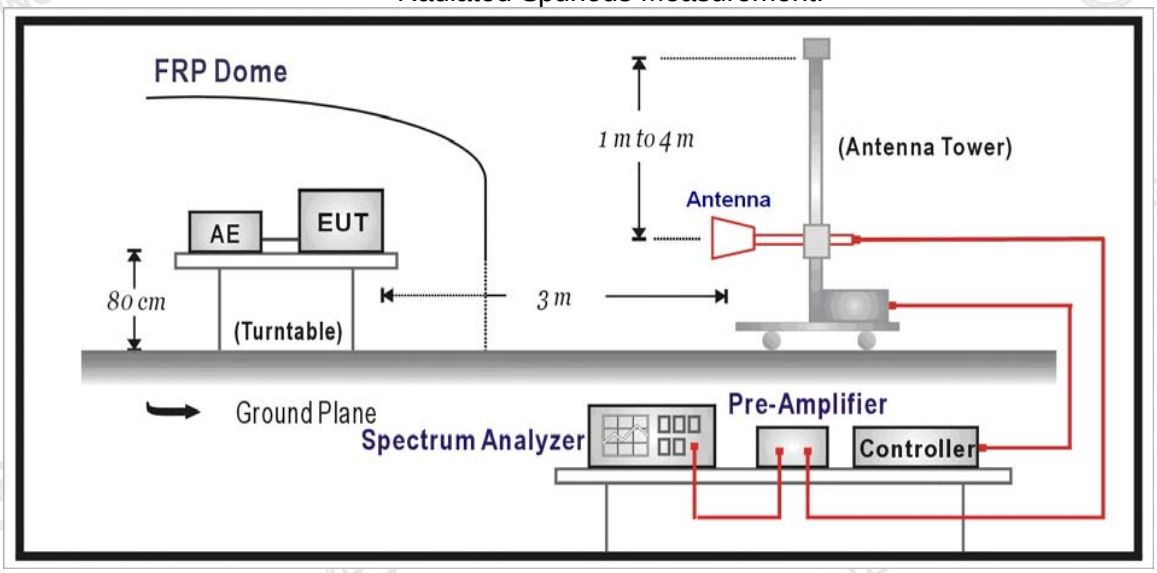
For operations in the 758-768 MHz and the 788-798 MHz bands, the power of any emission outside the licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, in accordance with the following:
(1) On all frequencies between 769-775 MHz and 799-805 MHz, by a factor not less than 76 + 10 log (P) dB in a 6.25 kHz band segment, for base and fixed stations.
(2) On all frequencies between 769-775 MHz and 799-805 MHz, by a factor not less than 65 + 10 log (P) dB in a 6.25 kHz band segment, for mobile and portable stations.
(3) On any frequency between 775-788 MHz, above 805 MHz, and below 758 MHz, by at least 43 + 10 log (P) dB.
(4) Compliance with the provisions of paragraphs (e)(1) and (2) of this section is based on the use of measurement instrumentation such that the reading taken with any resolution bandwidth setting should be adjusted to indicate spectral energy in a 6.25 kHz segment.

TEST CONFIGURATION

Conducted Spurious Measurement:



Radiated Spurious Measurement:



TEST PROCEDURE

Radiated Spurious Measurement:

a. The EUT shall be placed at the specified height on a support, and in the position closest to normal use as declared by provider.
b. The test antenna shall be oriented initially for vertical polarization and shall be chosen to correspond to the frequency of the transmitter
c. The output of the test antenna shall be connected to the measuring receiver.
d. The transmitter shall be switched on and the measuring receiver shall be tuned to the frequency of the transmitter under test.
e. The test antenna shall be raised and lowered through the specified range of height until a maximum signal level is detected by the measuring receiver.
f. The transmitter shall then be rotated through 360° in the horizontal plane, until the maximum signal level is detected by the measuring receiver.
g. The test antenna shall be raised and lowered again through the specified range of height until a maximum signal level is detected by the measuring receiver.
h. The maximum signal level detected by the measuring receiver shall be noted.
i. The transmitter shall be replaced by a substitution antenna.
j. The substitution antenna shall be orientated for vertical polarization and the length of the substitution antenna shall be adjusted to correspond to the frequency of the transmitter.
k. The substitution antenna shall be connected to a calibrated signal generator.
l. If necessary, the input attenuator setting of the measuring receiver shall be adjusted in order to increase the sensitivity of the measuring receiver.
m. The test antenna shall be raised and lowered through the specified range of height to ensure that the maximum signal is received.
n. The input signal to the substitution antenna shall be adjusted to the level that produces a level detected by the measuring receiver, that is equal to the level noted while the transmitter radiated power was measured, corrected for the change of input attenuator setting of the measuring receiver.
o. The measurement shall be repeated with the test antenna and the substitution antenna orientated for horizontal polarization.
p. The measure of the effective radiated power is the larger of the two levels recorded at the input to the substitution antenna, corrected for gain of the substitution antenna if necessary.
q. The resolution bandwidth of the spectrum analyzer was set at 100 kHz for Part 22 and 1MHz for Part 24. The frequency range was checked up to 10th harmonic.
r. Test site anechoic chamber refer to ANSI C63.

TEST RESULTS

Radiated Measurement:

Remark:
1. *We were tested all RB Configuration refer 3GPP TS136 521 for each Channel Bandwidth of LTE FDD Band 14; recorded worst case for each Channel Bandwidth of LTE FDD Band 71 @ QPSK*
2. EIRP=P_{Mea}(dBm)-P_{cl}(dB) +G_a(dBi)
3. We were not recorded other points as values lower than limits.
4. Margin = Limit - EIRP

LTE FDD Band 14_Channel Bandwidth 5MHz_QPSK_ Low Channel

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	Diatance	G_a Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1581.00	-39.54	2.89	3.00	8.64	-33.79	-13.00	-20.79	H
2371.50	-53.97	2.97	3.00	9.87	-47.07	-13.00	-34.07	H
1581.00	-44.36	2.89	3.00	8.64	-38.61	-13.00	-25.61	V
2371.50	-53.52	2.97	3.00	9.87	-46.62	-13.00	-33.62	V

LTE FDD Band 14_Channel Bandwidth 5MHz_QPSK_ Middle Channel

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	Diatance	G_a Antenna Gain(dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1586.00	-42.25	2.89	3.00	8.64	-36.50	-13.00	-23.50	H
2379.00	-52.51	2.97	3.00	9.87	-45.61	-13.00	-32.61	H
1586.00	-45.83	2.89	3.00	8.64	-40.08	-13.00	-27.08	V
2379.00	-53.07	2.97	3.00	9.87	-46.17	-13.00	-33.17	V

LTE FDD Band 14_Channel Bandwidth 5MHz_QPSK_ High Channel

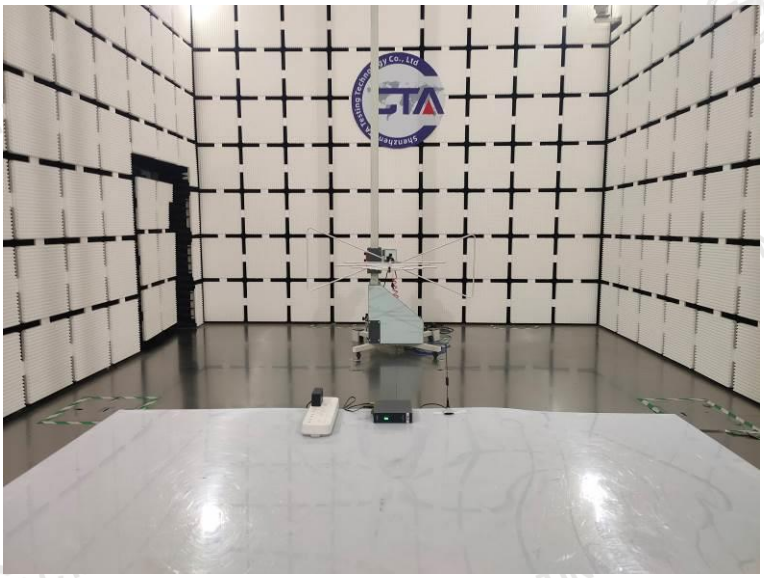
Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	Diatance	G_a Antenna Gain(dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1591.00	-44.13	2.89	3.00	8.64	-38.38	-13.00	-25.38	H
2386.50	-53.56	2.97	3.00	9.87	-46.66	-13.00	-33.66	H
1591.00	-43.08	2.89	3.00	8.64	-37.33	-13.00	-24.33	V
2386.50	-51.61	2.97	3.00	9.87	-44.71	-13.00	-31.71	V

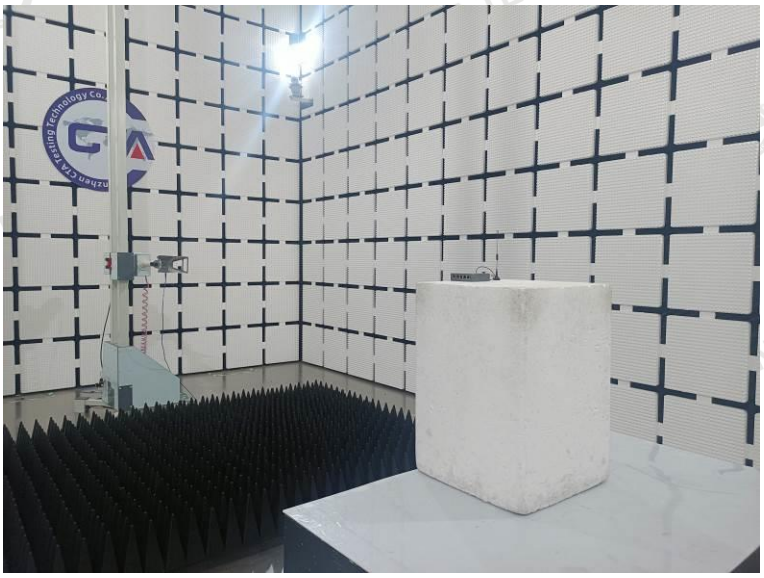
LTE FDD Band 14_Channel Bandwidth 10MHz_QPSK_ Middle Channel

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	Diatance	G_a Antenna Gain(dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1586.00	-39.72	2.89	3.00	8.64	-33.97	-13.00	-20.97	H
2379.00	-50.37	2.97	3.00	9.87	-43.47	-13.00	-30.47	H
1586.00	-42.15	2.89	3.00	8.64	-36.40	-13.00	-23.40	V
2379.00	-52.47	2.97	3.00	9.87	-45.57	-13.00	-32.57	V

Notes:
1.All channel bandwidth were tested,the report recorded the worst data.
2. EIRP=PMea(dBm)-Pcl(dB)+PAg(dB)+Ga(dBi)
3. ERP = EIRP – 2.15dBi as EIRP by subtracting the gain of the dipole.
4. Margin = EIRP – Limit
5. We measured all modes and only recorded the worst case.

4 Test Setup Photos of the EUT





5 Photos of the EUT

Reference to the test report No. **CTA24042900101**

********** End of Report **********