

FCC Test Report
FCC CFR Title 47 Part 2, Part 90R

Report Reference No.....: HK2601080047-6E
FCC ID.....: 2BBBN-RTB75T41
Compiled by
(position+printed name+signature)...: Testing Engineer Len Liao
Supervised by
(position+printed name+signature)...: Technical Manager Sliver Wan
Approved by
(position+printed name+signature)...: Authorized Signatory Jason Zhou

Len Liao
Sliver Wan
Jason Zhou



Date of issue.....: Mar. 02, 2026

Testing Laboratory Name **Shenzhen HUAKE Testing Technology Co., Ltd.**

Address: 1-2/F., Building B2, Junfeng Zhongcheng Zhizao Innovation Park,
Heping, Fuhai Street, Bao'an District, Shenzhen, Guangdong,
China

Applicant's Name **Hangzhou Tanlink Technology Co.,Ltd.**

Address: Room 701, South Building, Building 3, No.16, Longtan Road,
Cangqian Street, Yuhang District, Hangzhou, Zhejiang, China

Test Specification

Standard **FCC CFR Title 47 Part 2, Part 90R**

TRF Originator.....: Shenzhen HUAKE Testing Technology Co., Ltd.

Shenzhen HUAKE Testing Technology Co., Ltd. All rights reserved.

This publication may be reproduced in whole or in part for non-commercial purposes as long as the Shenzhen HUAKE Testing Technology Co., Ltd. is acknowledged as copyright owner and source of the material. Shenzhen HUAKE Testing Technology Co., Ltd. takes no responsibility for and will not assume liability for damages resulting from the reader's interpretation of the reproduced material due to its placement and context.

Product Name **4G LTE Battery Pack**

Trade Mark: Redtiger

Manufacturer..... **Hangzhou Tanlink Technology Co.,Ltd.**

Model Name: RTB75T41

Series Model(s): RTB75N21, RTB32N11, RTB75T42, RTB75T43, RTB75T45

Modulation Type.....: QPSK, 16QAM

Rating: DC12V From DC Power or DC9.6V From Battery

Hardware version: V1.0

Software version: V1.0

Result.....: **PASS**

TEST REPORT

Test Report No.:	HK2601080047-6E	Mar. 02, 2026
		Date of issue

Product Name : 4G LTE Battery Pack

Model Name : RTB75T41

Series Model(s) : RTB75N21, RTB32N11, RTB75T42, RTB75T43, RTB75T45

Applicant : **Hangzhou Tanlink Technology Co.,Ltd.**

Address : Room 701, South Building, Building 3, No.16, Longtan Road, Cangqian Street, Yuhang District, Hangzhou, Zhejiang, China

Manufacturer : **Hangzhou Tanlink Technology Co.,Ltd.**

Address : Room 701, South Building, Building 3, No.16, Longtan Road, Cangqian Street, Yuhang District, Hangzhou, Zhejiang, China

Test Result	Pass
--------------------	-------------

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	<u>Summary</u>	5
1.1	Test Standards	5
1.2	Test Description	5
1.3	Information of the Test Laboratory	6
1.4	Statement of the measurement uncertainty	6
2	<u>General Information</u>	7
2.1	General Remarks	7
2.2	Product Description	7
2.3	Equipment under Test	7
2.4	Test Frequency List	8
2.5	Environmental Conditions	8
2.6	Description of Test Modes	8
2.7	Equipments Used during the Test	9
2.8	Modifications	9
3	<u>Test Conditions and Results</u>	11
3.1	Output Power	11
3.2	Peak-to-Average Ratio (PAR)	15
3.3	Occupied Bandwidth and Emission Bandwidth	18
3.4	Band Edge compliance	21
3.5	Spurious Emission	23
3.6	Frequency Stability under Temperature & Voltage Variations	31
4	<u>Test Setup Photos of the EUT</u>	33
5	<u>Photos of the EUT</u>	35

**** Issued History ****

Revision	Description	Issued Date	Remark
Revision 1.0	Initial Test Report Release	Mar. 02, 2026	Jason Zhou



1 Summary

1.1 Test Standards

The tests were performed according to following standards:

[FCC Part 90](#): Private Land Mobile Radio Services (Subpart R—Regulations Governing the Licensing and Use of Frequencies in the 763-775 and 793-805 MHz Bands)

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

[FCC Part 2](#): Frequency Allocation and Radio Treaty Matters; General Rules and Regulations

[KDB971168 D01:v03r01](#): Measurement Guidance For Certification Of Licensed Digital Transmitters.

1.2 Test Description

Test Item	Section in CFR 47	Result
RF Output Power	Part 2.1046 90.542	Pass
Peak-to-Average Ratio	KDB 971168 D01(5.7)	Pass
99% & -26 dB Occupied Bandwidth	Part 2.1049	Pass
Spurious Emissions at Antenna Terminal	Part 90.543(e)	Pass
Out of Band Emission, Band Edge	Part 2.1051 Part 90.543	Pass
Frequency Stability	Part 2.1055	Pass
Note: 1. Pass: Test item meets the requirement. 2. Fail: Test item does not meet the requirement. 3. N/A: Test case does not apply to the test object. 4. The test result judgment is decided by the limit of test standard. 5. The measurement uncertainty is not included in the test result.		

1.3 Information of the Test Laboratory

Shenzhen HUAKE Testing Technology Co., Ltd.
Add.: 1-2/F., Building B2, Junfeng Zhongcheng Zhizao Innovation Park, Heping, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China

1.4 Statement of the measurement uncertainty

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

No.	Item	MU
1	All Emissions, Radiated(<1G)	$\pm 3.60\text{dB}$
2	All Emissions, Radiated(1-18G)	$\pm 3.86\text{dB}$
3	All Emissions, Radiated(18-40G)	$\pm 4.76\text{dB}$
4	Transmitter Power Conducted	$\pm 0.37\text{dB}$
5	Conducted Spurious Emission	$\pm 2.20\text{dB}$
6	Occupied Bandwidth	$\pm 3.68\%$
7	Temperature	$\pm 0.1^{\circ}\text{C}$
8	Humidity	$\pm 1.0\%$



2 General Information

2.1 General Remarks

Date of receipt of test sample	:	Jan. 08, 2026
Testing commenced on	:	Jan. 08, 2026
Testing concluded on	:	Mar. 02, 2026

2.2 Product Description

Product Name	4G LTE Battery Pack
Model Name:	RTB75T41
Series Model(s):	RTB75N21, RTB32N11, RTB75T42, RTB75T43, RTB75T45
Model Difference:	All model's the function, software and electric circuit are the same, only with a product color and model named different. Test sample model: RTB75T41.
Power Supply:	DC12V From DC Power or DC9.6V From Battery
Adapter Information	N/A
Modulation Type	QPSK, 16QAM
Antenna Type	FPC Antenna
Antenna Gain	-1.4dBi
Operation Frequency Band	LTE Band 14
Operation Frequency	LTE Band 14: 788~798 MHz
LTE Release	R8
Extreme Temp. Tolerance	-30°C to +50°C
Extreme Vol. Limits	10.2VDC to 13.8VDC (nominal: 12VDC)
Note: 1. For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual. 2. Antenna gain Refer to the antenna specifications. 3. The cable loss data is obtained from the supplier. 4. The test results in the report only apply to the tested sample.	

2.3 Equipment under Test

Power supply system utilised

Power supply voltage	:	☐ 120V/ 60 Hz	☐ 115V/60Hz
		☐ 12 V DC	☐ 24 V DC
		☒ Other (specified in blank below)	

DC12V From DC Power or DC9.6V From Battery

2.4 Test Frequency List

TX Channel Bandwidth	Frequency (MHz)	Channel
5 MHz	790.5	23305
	793	23330
	795.5	23355
10 MHz	/	/
	793	23330
	/	/

2.5 Environmental Conditions

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

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

2.6 Description of Test Modes

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.

Note:

1. For the ERP/EIRP and radiated emission test, every axis (X, Y, Z) was verified, and show the worst result on this report.
2. Test method and refer to 3GPP TS136521.



HUAKE TESTING

2.7 Equipments Used during the Test

Item	Test Equipment	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Due Date
1	L.I.S.N.	R&S	ENV216	HKE-002	2025/02/19	2026/02/18
2	L.I.S.N.	R&S	ENV216	HKE-059	2025/02/19	2026/02/18
3	EMI Test Receiver	R&S	ESR	HKE-005	2025/02/19	2026/02/18
4	Spectrum analyzer	Agilent	N9020A	HKE-117	2025/02/19	2026/02/18
5	Spectrum analyzer	R&S	FSV3044	HKE-126	2025/02/19	2026/02/18
6	Preamplifier	EMCI	EMC051845S	HKE-006	2025/02/19	2026/02/18
7	Preamplifier	Schwarzbeck	BBV 9743	HKE-016	2025/02/19	2026/02/18
8	Preamplifier	A.H. Systems	SAS-574	HKE-182	2025/02/19	2026/02/18
9	6dB Attenuator	Pasternack	6db	HKE-184	2025/02/19	2026/02/18
10	EMI Test Receiver	Rohde & Schwarz	ESR-7	HKE-010	2025/02/19	2026/02/18
11	Broadband Antenna	Schwarzbeck	VULB9168	HKE-167	2024/02/21	2026/02/20
12	Loop Antenna	COM-POWER	AL-130R	HKE-014	2024/02/21	2026/02/20
13	Horn Antenna	Schwarzbeck	9120D	HKE-013	2024/02/21	2026/02/20
14	EMI Test Software	Tonscend	JS32-CE 2.5.0.6	HKE-081	/	/
15	EMI Test Software	Tonscend	JS32-RE 5.0.0	HKE-082	/	/
16	RF Automatic control unit	Tonscend	JS0806-1	HKE-096	2025/02/19	2026/02/18
17	High pass filter unit	Tonscend	JS0806-F	HKE-055	2025/02/19	2026/02/18
18	Wireless Communication Test Set	R&S	CMU200	HKE-026	2025/02/19	2026/02/18
19	Wireless Communication Test Set	R&S	CMW500	HKE-027	2025/02/19	2026/02/18
20	High-low temperature chamber	Guangke	HT-80L	HKE-118	2025/06/09	2026/06/08
21	Temperature and humidity meter	Boyang	HTC-1	HKE-075	2025/06/09	2026/06/08
22	RF Test Software	Tonscend	JS1120 Version 3.5.39	HKE-183	/	/
23	RSE Test Software	Tonscend	JS36-RSE 5.0.0	HKE-184	/	/

The results shown in this test report refer only to the sample(s) tested unless otherwise stated and the sample(s) are retained for 15 days only. The document is issued by Shenzhen HUAKE Testing Technology Co., Ltd., this document cannot be reproduced except in full with our prior written permission.

Shenzhen HUAKE Testing Technology Co., Ltd. Tel.: +86-0755-2302 9901 E-mail: info@huak.com Web.: www.huak.com

Add.: 1-2/F., Building B2, Junfeng Zhongcheng Zhizao Innovation Park, Heping, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China



Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1	L.I.S.N.	R&S	ENV216	HKE-002	2026/02/11	1 Year
2	L.I.S.N.	R&S	ENV216	HKE-059	2026/02/04	1 Year
3	EMI Test Receiver	R&S	ESR-7	HKE-005	2026/02/06	1 Year
4	Spectrum analyzer	Agilent	N9020A	HKE-025	2026/02/06	1 Year
5	Spectrum analyzer	R&S	FSV3044	HKE-126	2026/02/06	1 Year
6	Preamplifier	EMCI	EMC051845SE	HKE-006	2026/02/04	1 Year
7	Preamplifier	Agilent	83051A	HKE-016	2026/02/04	1 Year
8	Preamplifier	A.H. Systems	SAS-574	HKE-182	2026/02/04	1 Year
9	6dB Attenuator	Pasternack	6db	HKE-007	2026/02/06	1 Year
10	EMI Test Receiver	R&S	ESR-7	HKE-010	2026/02/06	1 Year
11	Broadband Antenna	Schwarzbeck	VULB9168	HKE-167	2026/02/06	2 Year
12	Loop Antenna	COM-POWER	AL-130R	HKE-014	2026/02/06	2 Year
13	Horn Antenna	Schwarzbeck	9120D	HKE-013	2026/02/06	2 Year
14	EMI Test Software	Tonscend	JS32-CE 2.5.0.6	HKE-081	/	/
15	EMI Test Software	Tonscend	JS32-RE 5.0.0	HKE-082	/	/
16	RF Automatic control unit	Tonscend	JS0806-1	HKE-060	2026/02/06	1 Year
17	High pass filter unit	Tonscend	JS0806-F	HKE-055	2026/02/06	1 Year
18	Wireless Communication Test Set	R&S	CMW500	HKE-027	2026/02/06	1 Year
19	High-low temperature chamber	Guangke	HT-80L	HKE-118	2025/06/09	1 Year
20	Temperature and humidity meter	Boyang	HTC-1	HKE-075	2025/06/09	1 Year
21	RF Test Software	Tonscend	JS1120-3 Version 3.5.39	HKE-083	/	/

2.8 Modifications

No modifications were implemented to meet testing criteria.



3 Test Conditions and Results

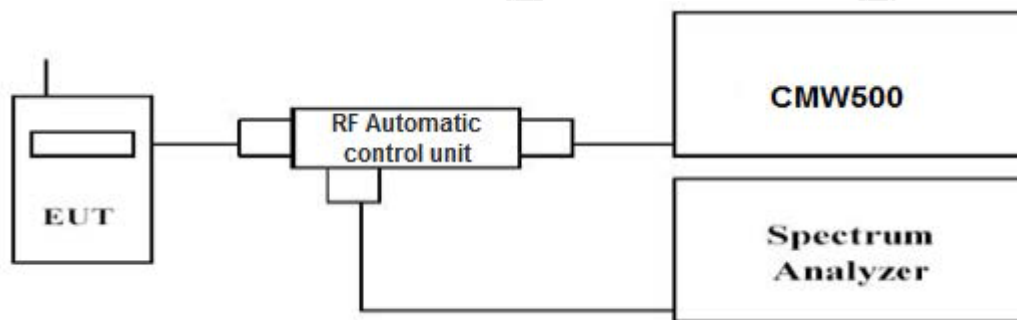
3.1 Output Power

LIMIT

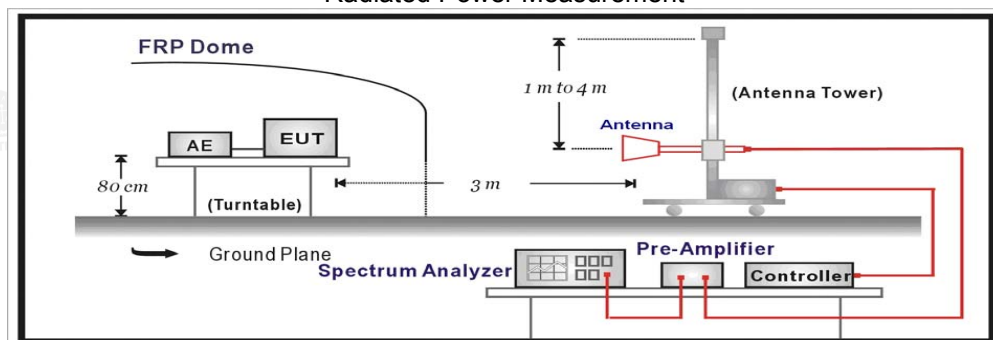
According to Part 90.635 (b) the maximum output power of the transmitter for mobile stations is 100 watts. 90.542(7) Portable stations (hand-held devices) transmitting in the 758-768 MHz band and the 788-798 MHz band are limited to 3 watts ERP.

TEST CONFIGURATION

Conducted Power Measurement



Radiated Power Measurement



TEST PROCEDURE

The EUT was setup according to ANSI/TIA-603-E.

Conducted Power Measurement:

- Place the EUT on a bench and set it in transmitting mode.
- Connect a low loss RF cable from the antenna port to a spectrum analyzer and CMW500 by a Directional Couple.
- EUT Communicate with CMW500, then select a channel for testing.
- Add a correction factor to the display of spectrum, and then test.

Radiated Power Measurement:

- The EUT shall be placed at the specified height on a support, and in the position closest to normal use as declared by provider.
- The test antenna shall be oriented initially for vertical polarization and shall be chosen to correspond to the frequency of the transmitter
- The output of the test antenna shall be connected to the measuring receiver.
- The transmitter shall be switched on and the measuring receiver shall be tuned to the frequency of the transmitter under test.
- 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

Conducted Measurement:

Band	Bandwidth	Modulation	Channel	RB Configuration	Result(dBm)	Verdict
Band14	5MHz	QPSK	23305	1RB#0	23.91	PASS
Band14	5MHz	QPSK	23305	1RB#12	24.33	PASS
Band14	5MHz	QPSK	23305	1RB#24	24.19	PASS
Band14	5MHz	QPSK	23305	12RB#13	23.00	PASS
Band14	5MHz	QPSK	23305	12RB#0	23.28	PASS
Band14	5MHz	QPSK	23305	12RB#6	23.23	PASS
Band14	5MHz	QPSK	23305	25RB#0	23.00	PASS
Band14	5MHz	QPSK	23330	1RB#0	24.11	PASS
Band14	5MHz	QPSK	23330	1RB#12	24.09	PASS
Band14	5MHz	QPSK	23330	1RB#24	24.13	PASS
Band14	5MHz	QPSK	23330	12RB#6	23.24	PASS
Band14	5MHz	QPSK	23330	12RB#0	23.15	PASS
Band14	5MHz	QPSK	23330	12RB#13	23.14	PASS
Band14	5MHz	QPSK	23330	25RB#0	23.15	PASS
Band14	5MHz	QPSK	23355	1RB#24	24.14	PASS
Band14	5MHz	QPSK	23355	1RB#12	24.04	PASS
Band14	5MHz	QPSK	23355	1RB#0	24.12	PASS
Band14	5MHz	QPSK	23355	12RB#6	23.17	PASS
Band14	5MHz	QPSK	23355	12RB#0	23.33	PASS
Band14	5MHz	QPSK	23355	12RB#13	23.22	PASS
Band14	5MHz	QPSK	23355	25RB#0	23.22	PASS

The results shown in this test report refer only to the sample(s) tested unless otherwise stated and the sample(s) are retained for 15 days only. The document is issued by Shenzhen HUAKE Testing Technology Co., Ltd., this document cannot be reproduced except in full with our prior written permission.



Band14	5MHz	16QAM	23305	1RB#0	23.91	PASS
Band14	5MHz	16QAM	23305	1RB#12	23.42	PASS
Band14	5MHz	16QAM	23305	1RB#24	23.06	PASS
Band14	5MHz	16QAM	23305	12RB#0	23.89	PASS
Band14	5MHz	16QAM	23305	12RB#13	23.13	PASS
Band14	5MHz	16QAM	23305	12RB#6	23.94	PASS
Band14	5MHz	16QAM	23305	25RB#0	23.02	PASS
Band14	5MHz	16QAM	23330	1RB#0	23.99	PASS
Band14	5MHz	16QAM	23330	1RB#12	23.38	PASS
Band14	5MHz	16QAM	23330	1RB#24	23.16	PASS
Band14	5MHz	16QAM	23330	12RB#0	23.12	PASS
Band14	5MHz	16QAM	23330	12RB#13	23.24	PASS
Band14	5MHz	16QAM	23330	12RB#6	23.10	PASS
Band14	5MHz	16QAM	23330	25RB#0	23.13	PASS
Band14	5MHz	16QAM	23355	1RB#12	23.15	PASS
Band14	5MHz	16QAM	23355	1RB#0	23.41	PASS
Band14	5MHz	16QAM	23355	1RB#24	23.10	PASS
Band14	5MHz	16QAM	23355	12RB#13	23.23	PASS
Band14	5MHz	16QAM	23355	12RB#6	23.28	PASS
Band14	5MHz	16QAM	23355	12RB#0	23.18	PASS
Band14	5MHz	16QAM	23355	25RB#0	23.18	PASS
Band14	10MHz	QPSK	23330	1RB#0	23.75	PASS
Band14	10MHz	QPSK	23330	1RB#49	24.50	PASS
Band14	10MHz	QPSK	23330	1RB#24	23.98	PASS
Band14	10MHz	QPSK	23330	25RB#0	23.31	PASS
Band14	10MHz	QPSK	23330	25RB#25	23.23	PASS
Band14	10MHz	QPSK	23330	25RB#12	23.20	PASS
Band14	10MHz	QPSK	23330	50RB#0	23.21	PASS
Band14	10MHz	16QAM	23330	1RB#49	23.02	PASS
Band14	10MHz	16QAM	23330	1RB#24	23.47	PASS
Band14	10MHz	16QAM	23330	1RB#0	23.21	PASS
Band14	10MHz	16QAM	23330	25RB#12	23.27	PASS
Band14	10MHz	16QAM	23330	25RB#0	23.04	PASS
Band14	10MHz	16QAM	23330	25RB#25	23.35	PASS
Band14	10MHz	16QAM	23330	50RB#0	23.08	PASS

The results shown in this test report refer only to the sample(s) tested unless otherwise stated and the sample(s) are retained for 15 days only. The document is issued by Shenzhen HUAK Testing Technology Co., Ltd., this document cannot be reproduced except in full with our prior written permission.

**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. $EIRP = P_{Mea}(dBm) - G_a(dBi) + P_{cl}(dB) - P_{Ag}(dB)$, $ERP = EIRP - 2.15$, $Margin = Limit - ERP$
3. We measured both Horizontal and Vertical direction, recorded worst case direction.

LTE FDD Band 14_Channel Bandwidth 5MHz_QPSK

Frequency (MHz)	P _{Mea} (dBm)	P _{cl} (dB)	G _a Antenna Gain(dB)	P _{Ag} (dB)	EIRP (dBm)	ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
790.5	68.45	3.06	9.68	34.80	27.03	24.88	34.77	9.89	V
793.0	68.21	3.17	9.68	34.80	26.90	24.75	34.77	10.02	V
795.5	68.05	3.22	9.75	34.80	26.72	24.57	34.77	10.20	V
790.5	68.56	3.06	9.68	34.80	27.14	24.99	34.77	9.78	H
793.0	68.26	3.17	9.68	34.80	26.95	24.80	34.77	9.97	H
795.5	69.10	3.22	9.75	34.80	27.77	25.62	34.77	9.15	H

LTE FDD Band 14_Channel Bandwidth 10MHz_QPSK

Frequency (MHz)	P _{Mea} (dBm)	P _{cl} (dB)	G _a Antenna Gain(dB)	P _{Ag} (dB)	EIRP (dBm)	ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
793.0	69.72	3.22	9.75	34.80	28.39	26.24	34.77	8.53	V
793.0	68.39	3.06	9.68	34.80	26.97	24.82	34.77	9.95	H

LTE FDD Band 14_Channel Bandwidth 5MHz_16QAM

Frequency (MHz)	P _{Mea} (dBm)	P _{cl} (dB)	G _a Antenna Gain(dB)	P _{Ag} (dB)	EIRP (dBm)	ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
790.5	69.07	3.06	9.68	34.80	27.65	25.50	34.77	9.27	V
793.0	67.59	3.17	9.68	34.80	26.28	24.13	34.77	10.64	V
795.5	69.33	3.22	9.75	34.80	28.00	25.85	34.77	8.92	V
790.5	68.61	3.06	9.68	34.80	27.19	25.04	34.77	9.73	H
793.0	68.16	3.17	9.68	34.80	26.85	24.70	34.77	10.07	H
795.5	69.39	3.22	9.75	34.80	28.06	25.91	34.77	8.86	H

LTE FDD Band 14_Channel Bandwidth 10MHz_16QAM

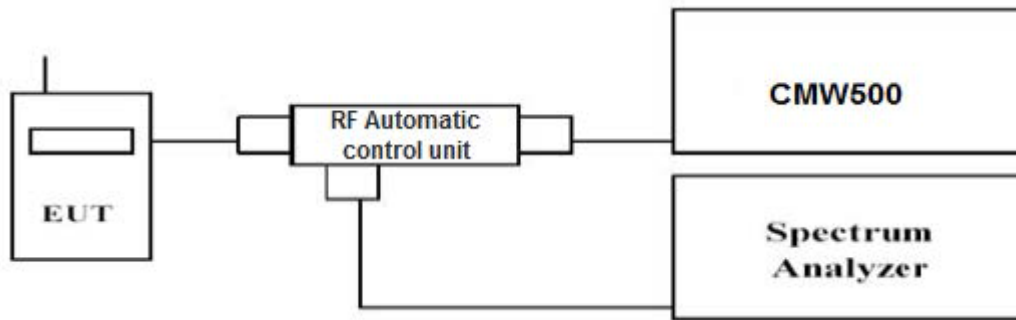
Frequency (MHz)	P _{Mea} (dBm)	P _{cl} (dB)	G _a Antenna Gain(dB)	P _{Ag} (dB)	EIRP (dBm)	ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
793.0	69.59	3.22	9.75	34.80	28.26	26.11	34.77	8.66	V
793.0	68.80	3.06	9.68	34.80	27.38	25.23	34.77	9.54	H

3.2 Peak-to-Average Ratio (PAR)

LIMIT

The Peak-to-Average Ratio (PAR) of the transmission may not exceed 13 dB.

TEST CONFIGURATION



TEST PROCEDURE

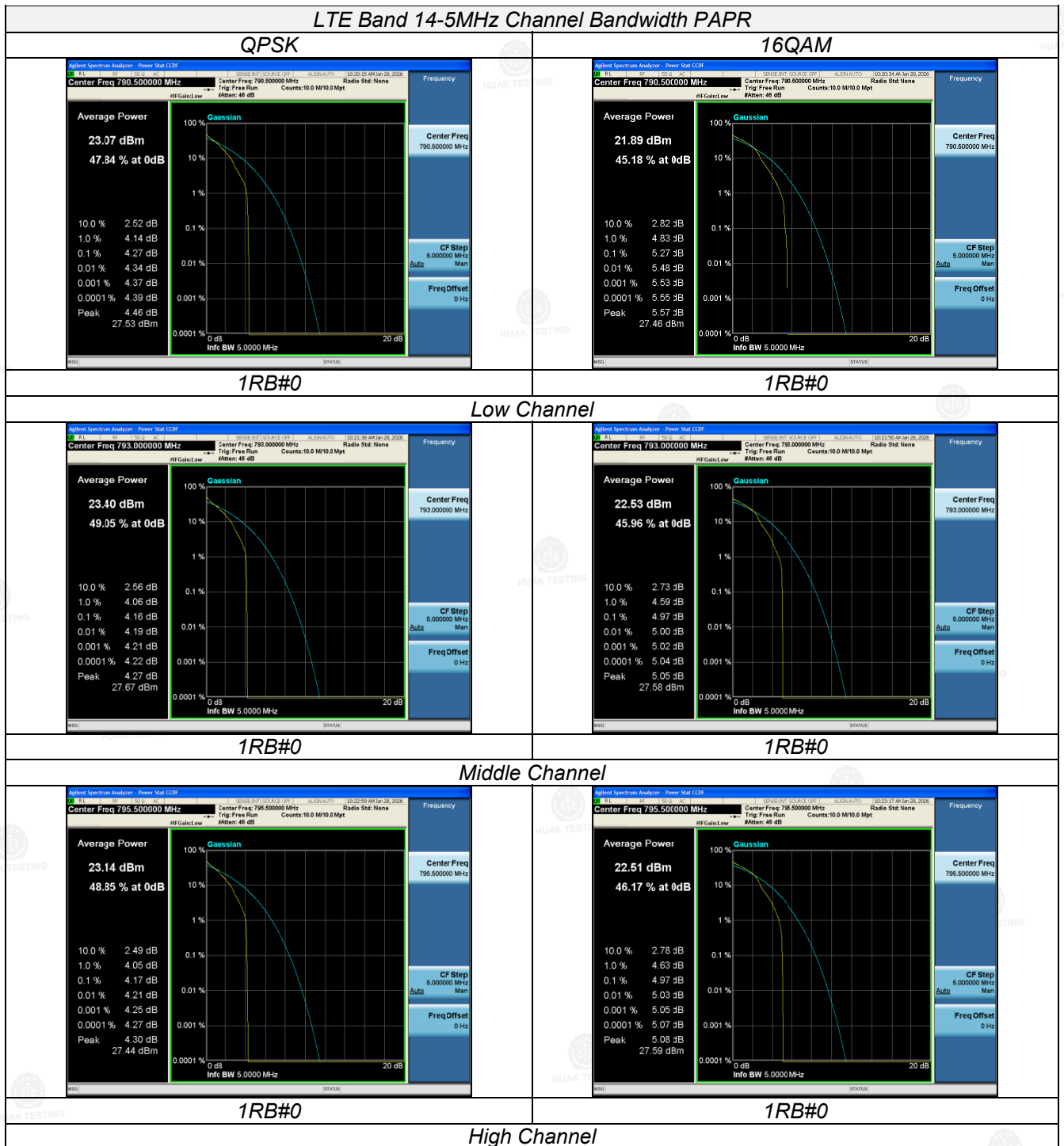
1. Refer to instrument's analyzer instruction manual for details on how to use the power statistics/CCDF function;
2. Set resolution/measurement bandwidth $\geq$ signal's occupied bandwidth;
3. Set the number of counts to a value that stabilizes the measured CCDF curve;
4. Set the measurement interval as follows:
 - 1). for continuous transmissions, set to 1 ms,
 - 2). for burst transmissions, employ an external trigger that is synchronized with the EUT burst timing sequence, or use the internal burst trigger with a trigger level that allows the burst to stabilize and set the measurement interval to a time that is less than or equal to the burst duration.
5. Record the maximum PAPR level associated with a probability of 0.1%.

TEST RESULTS

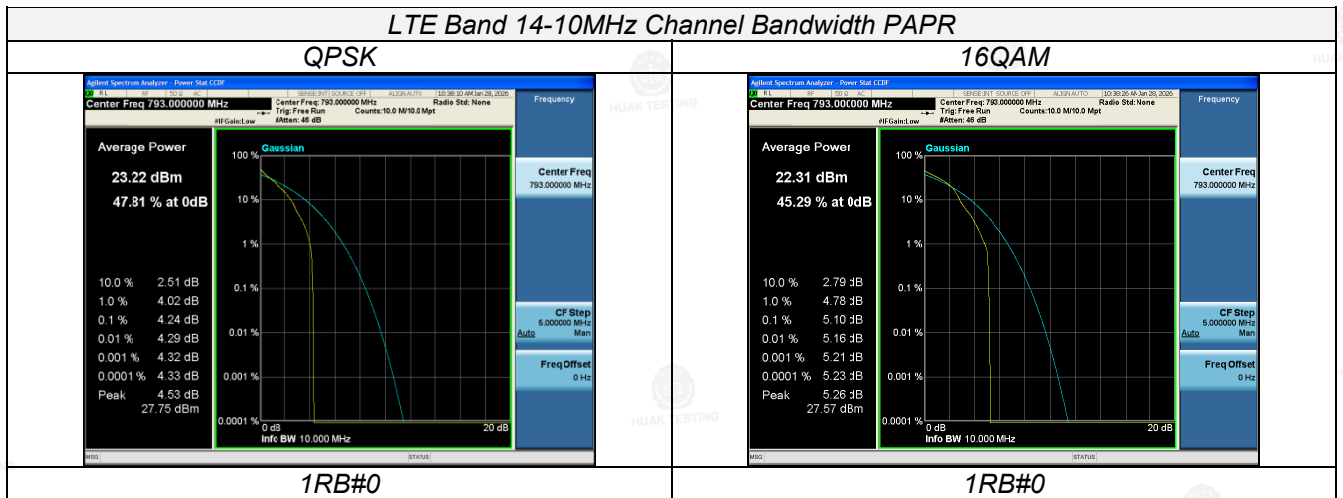
Remark:

1. We were tested all RB Configuration refer 3GPP TS136 521 for each Channel Bandwidth of LTE Band 14; recorded worst case for each Channel Bandwidth of LTE Band 14.

LTE Band 14				
TX Channel Bandwidth	Frequency (MHz)	RB Size/Offset	PAPR (dB)	
			QPSK	16QAM
5 MHz	790.5	1RB#0	4.27	5.27
	793		4.16	4.97
	795.5		4.17	4.97
10 MHz	793	1RB#0	4.24	5.10



The results shown in this test report refer only to the sample(s) tested unless otherwise stated and the sample(s) are retained for 15 days only. The document is issued by Shenzhen HUAKE Testing Technology Co., Ltd., this document cannot be reproduced except in full with our prior written permission.



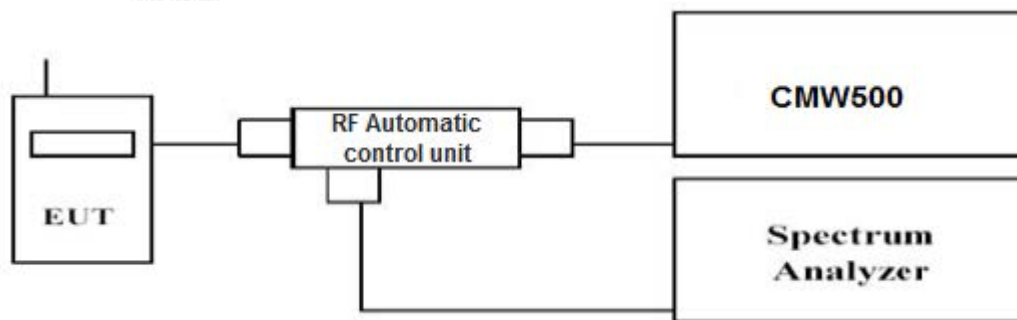
3.3 Occupied Bandwidth and Emission Bandwidth

LIMIT

No specific occupied bandwidth requirements in part 2.1049.

Part 90.209 (a) Each authorization issued to a station licensed under this part will show an emission designator representing the class of emission authorized. The designator will be prefixed by a specified necessary bandwidth. This number does not necessarily indicate the bandwidth occupied by the emission at any instant. In those cases where part 2.202 of this chapter does not provide a formula for the computation of necessary bandwidth, the occupied bandwidth, as defined in part 2 of this chapter, may be used in lieu of the necessary bandwidth.

TEST CONFIGURATION



TEST PROCEDURE

The transmitter output was connected to a calibrated coaxial cable and coupler, the other end of which was connected to a spectrum analyzer. The occupied bandwidth was measured with the spectrum analyzer at low, middle and high channel in each band. The -26dBc Emission bandwidth was also measured and recorded. Set RBW was set to about 1% of emission BW, VBW≥3 times RBW.

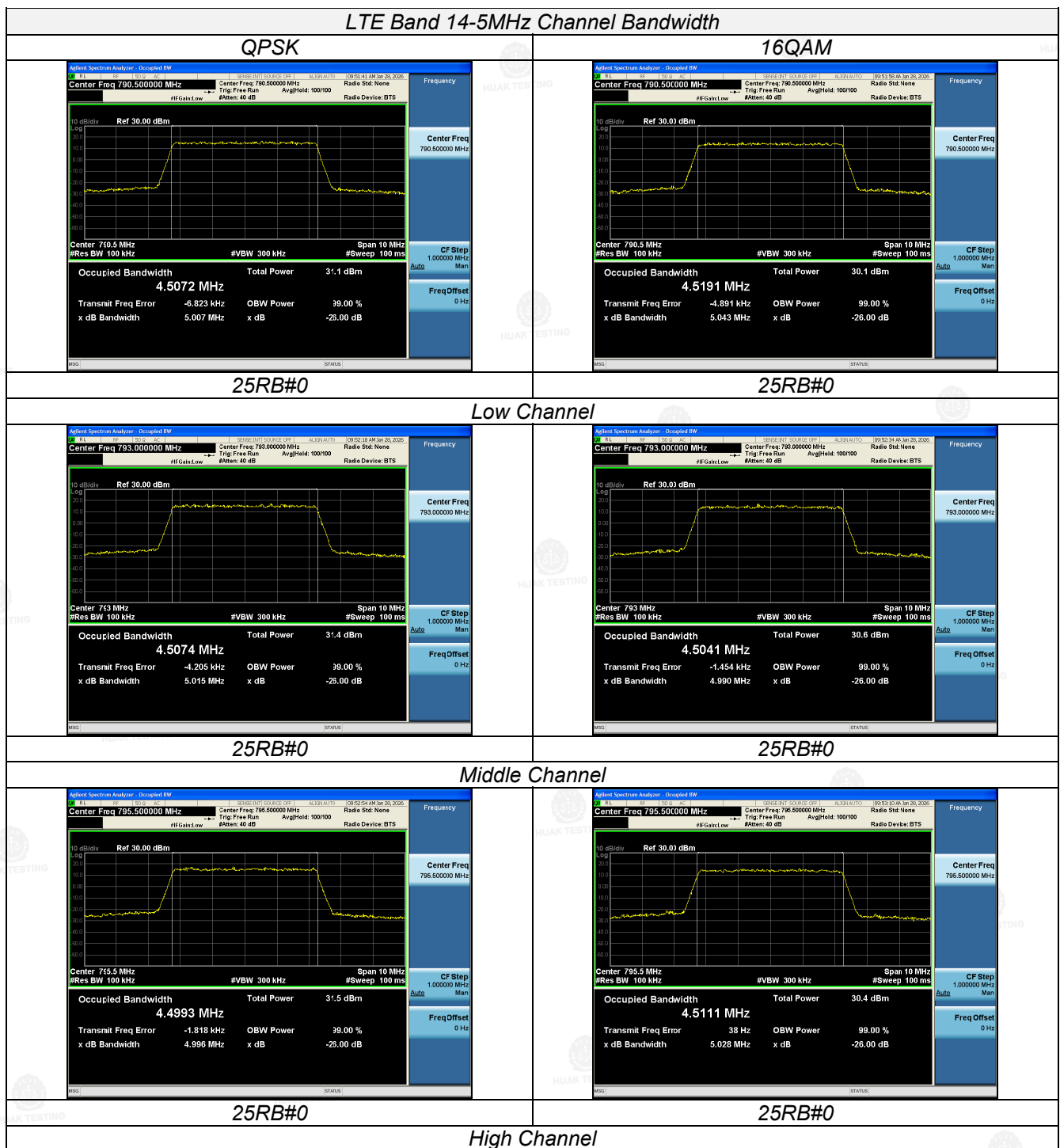
-26dBc display line was placed on the screen (or 99% bandwidth), the occupied bandwidth is the delta frequency between the two points where the display line intersects the signal trace.

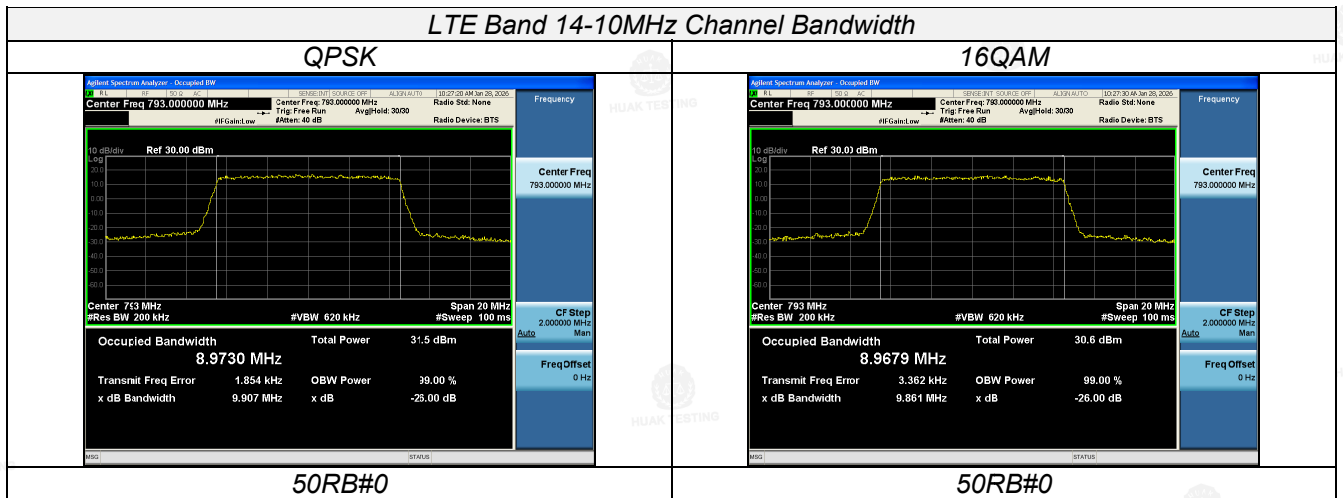
TEST RESULTS

Remark:

1. We were tested all RB Configuration refer 3GPP TS136 521 for each Channel Bandwidth of LTE Band 14; recorded worst case for each Channel Bandwidth of LTE Band 14.

LTE Band 14						
TX Channel Bandwidth	RB Size/Offset	Frequency (MHz)	-26dBc Emission bandwidth (MHz)		99% Occupied bandwidth (MHz)	
			QPSK	16QAM	QPSK	16QAM
5 MHz	25RB#0	790.5	5.007	5.043	4.5072	4.5191
		793	5.015	4.990	4.5074	4.5041
		795.5	4.996	5.028	4.4993	4.5111
10 MHz	50RB#0	793	9.907	9.861	8.9730	8.9679





The results shown in this test report refer only to the sample(s) tested unless otherwise stated and the sample(s) are retained for 15 days only. The document is issued by Shenzhen HUAKE Testing Technology Co., Ltd., this document cannot be reproduced except in full with our prior written permission.

Shenzhen HUAKE Testing Technology Co., Ltd. Tel.: +86-0755-2302 9901 E-mail: info@huak.com Web.: www.huak.com
 Add.: 1-2/F., Building B2, Junfeng Zhongcheng Zhizao Innovation Park, Heping, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China

3.4 Band Edge compliance

LIMIT

90.543 Emission limitations (e) 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.

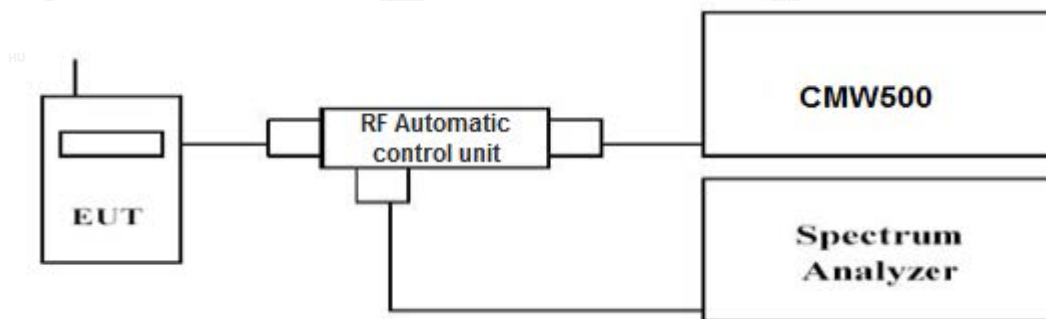
(3) On any frequency between 775-788 MHz, above 805 MHz, and below 758 MHz, by at least $43 + 10 \log (P)$ dB.

(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.

(5) Compliance with the provisions of paragraph (e)(3) of this section is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater. However, in the 100 kHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of 30 kHz may be employed.

(f) For operations in the 758-775 MHz and 788-805 MHz bands, all emissions including harmonics in the band 1559-1610 MHz shall be limited to -70 dBW/MHz equivalent isotropically radiated power (EIRP) for wideband signals, and -80 dBW EIRP for discrete emissions of less than 700 Hz bandwidth. For the purpose of equipment authorization, a transmitter shall be tested with an antenna that is representative of the type that will be used with the equipment in normal operation.

TEST CONFIGURATION



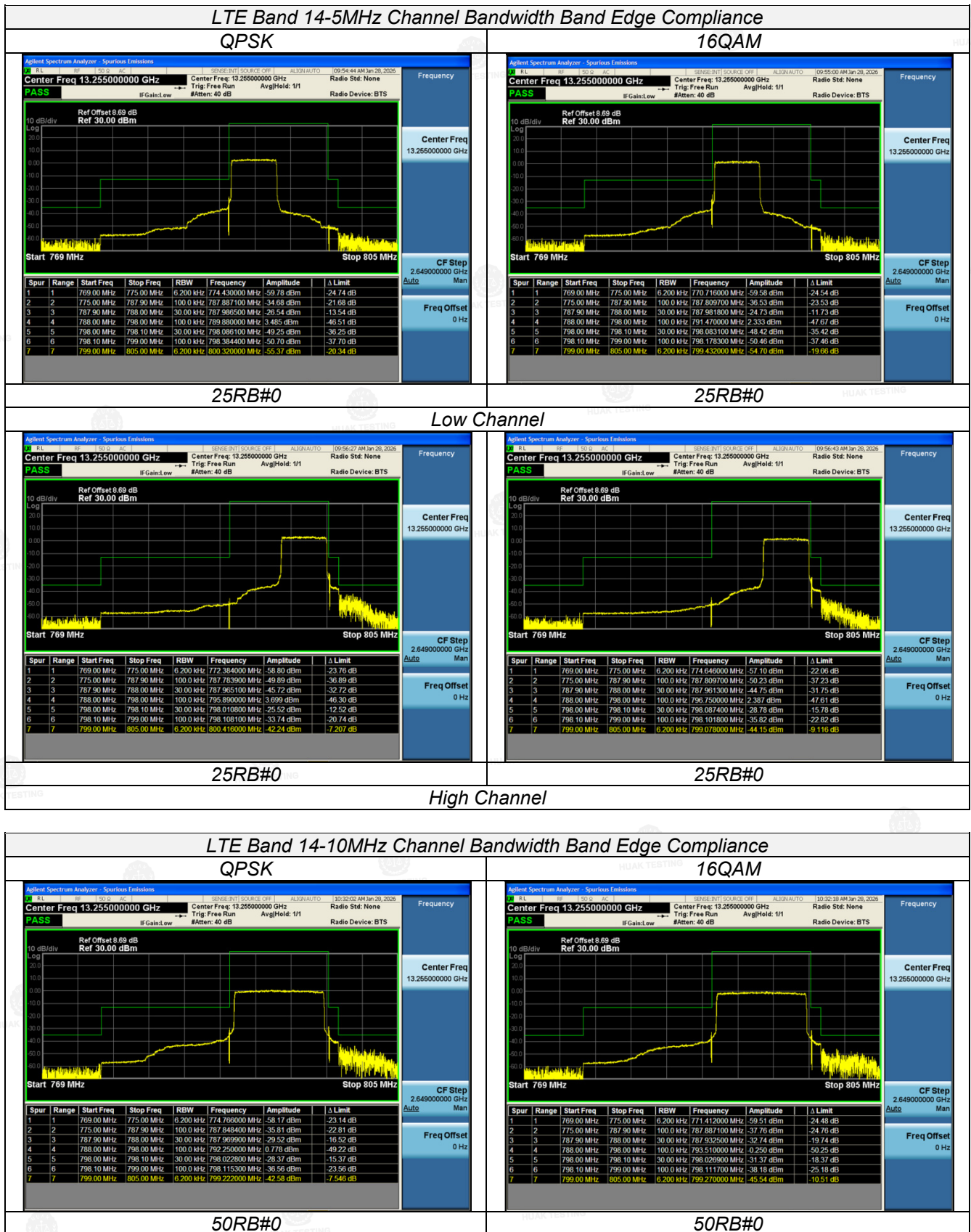
TEST PROCEDURE

1. The transmitter output port was connected to base station.
2. The RF output of EUT was connected to the power meter by RF cable and attenuator, the path loss was compensated to the results for each measurement.
3. Set EUT at maximum power through base station.
4. Select lowest and highest channels for each band and different modulation.
5. Measure Band edge using RMS (Average) detector by spectrum

TEST RESULTS

Remark:

1. We were tested all RB Configuration refer 3GPP TS136 521 for each Channel Bandwidth of LTE Band 14; recorded worst case for each Channel Bandwidth of LTE Band 14.



The results shown in this test report refer only to the sample(s) tested unless otherwise stated and the sample(s) are retained for 15 days only. The document is issued by Shenzhen HUAK Testing Technology Co., Ltd., this document cannot be reproduced except in full with our prior written permission.

3.5 Spurious Emission

LIMIT

90.543 Emission limitations (e) 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.

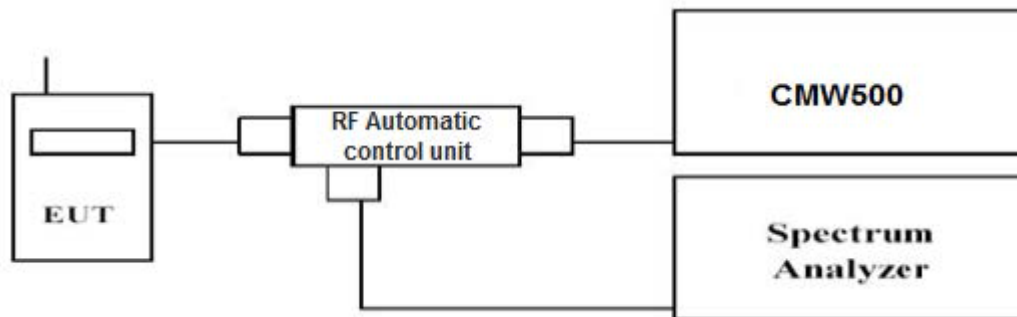
(4) Compliance with the provisions of paragraphs (e)(1) and (2) of this section is based on the use of measurement instrumentation such that the reading taken with any resolution bandwidth setting should be adjusted to indicate spectral energy in a 6.25 kHz segment.

(5) Compliance with the provisions of paragraph (e)(3) of this section is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater. However, in the 100 kHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of 30 kHz may be employed.

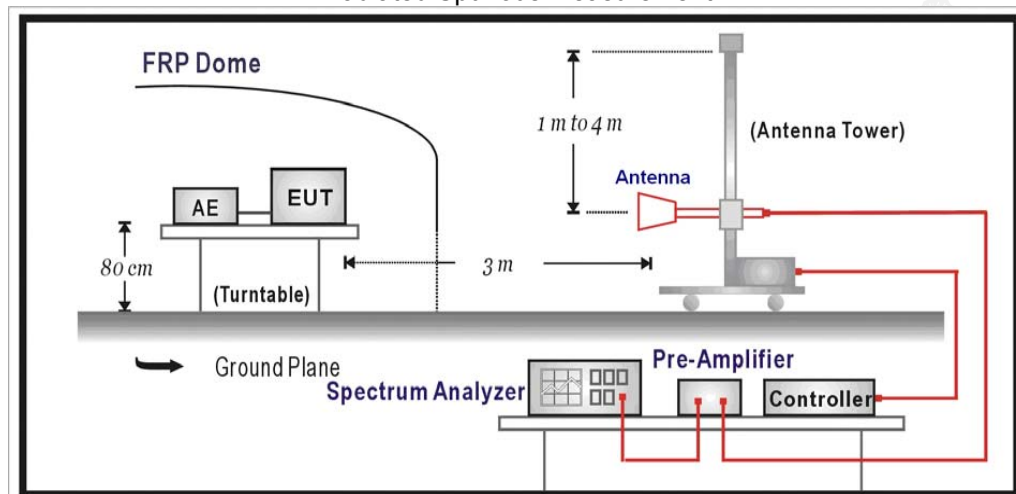
(f) For operations in the 758-775 MHz and 788-805 MHz bands, all emissions including harmonics in the band 1559-1610 MHz shall be limited to -70 dBW/MHz equivalent isotropically radiated power (EIRP) for wideband signals, and -80 dBW EIRP for discrete emissions of less than 700 Hz bandwidth. For the purpose of equipment authorization, a transmitter shall be tested with an antenna that is representative of the type that will be used with the equipment in normal operation.

TEST CONFIGURATION

Conducted Spurious Measurement:



Radiated Spurious Measurement



The results shown in this test report refer only to the sample(s) tested unless otherwise stated and the sample(s) are retained for 15 days only. The document is issued by Shenzhen HUAKE Testing Technology Co., Ltd., this document cannot be reproduced except in full with our prior written permission.

**TEST PROCEDURE**

The EUT was setup according to ANSI/TIA-603-E.

Conducted Spurious Measurement:

- Place the EUT on a bench and set it in transmitting mode.
- Connect a low loss RF cable from the antenna port to a spectrum analyzer and CMW500 by a Directional Couple.
- EUT Communicate with CMW500, then select a channel for testing.
- Add a correction factor to the display of spectrum, and then test.
- The resolution bandwidth of the spectrum analyzer was set sufficient scans were taken to show the out of band Emission if any up to 10th harmonic.
- Please refer to following tables for test antenna conducted emissions.

Working Frequency	Sub range (GHz)	RBW	VBW	Sweep time (s)
LTE FDD Band 14	0.000009~0.000015	1KHz	3KHz	Auto
	0.000015~0.03	10KHz	30KHz	Auto
	0.03~26.5	1 MHz	3 MHz	Auto

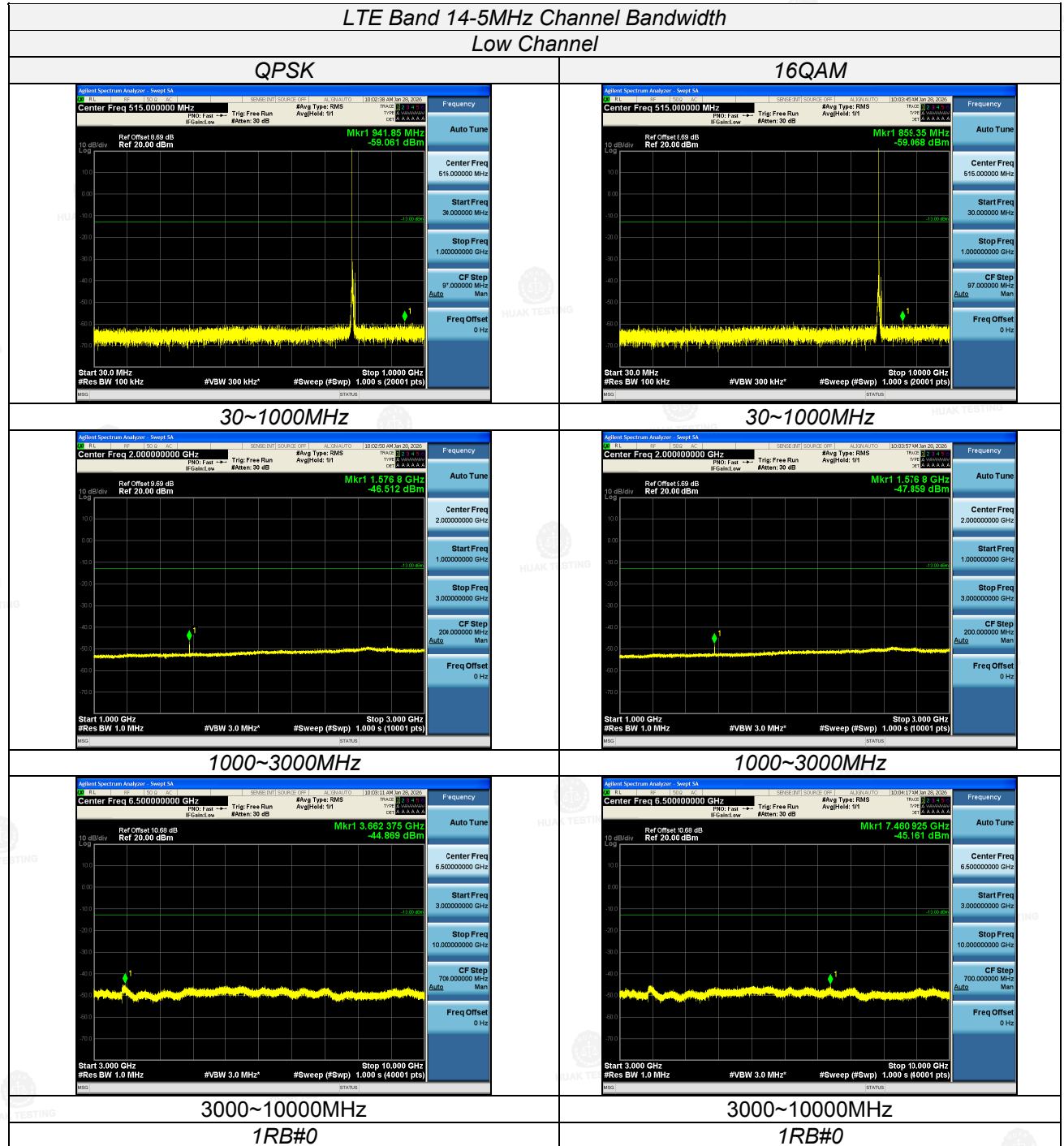
Radiated Spurious Measurement:

- The EUT shall be placed at the specified height on a support, and in the position closest to normal use as declared by provider.
- The test antenna shall be oriented initially for vertical polarization and shall be chosen to correspond to the frequency of the transmitter
- The output of the test antenna shall be connected to the measuring receiver.
- The transmitter shall be switched on and the measuring receiver shall be tuned to the frequency of the transmitter under test.
- 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.
- The transmitter shall then be rotated through 360° in the horizontal plane, until the maximum signal level is detected by the measuring receiver.
- 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.
- The maximum signal level detected by the measuring receiver shall be noted.
- The transmitter shall be replaced by a substitution antenna.
- 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.
- The substitution antenna shall be connected to a calibrated signal generator.
- If necessary, the input attenuator setting of the measuring receiver shall be adjusted in order to increase the sensitivity of the measuring receiver.
- The test antenna shall be raised and lowered through the specified range of height to ensure that the maximum signal is received.
- 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.
- The measurement shall be repeated with the test antenna and the substitution antenna orientated for horizontal polarization.
- 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.
- 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.
- Test site anechoic chamber refer to ANSI C63.

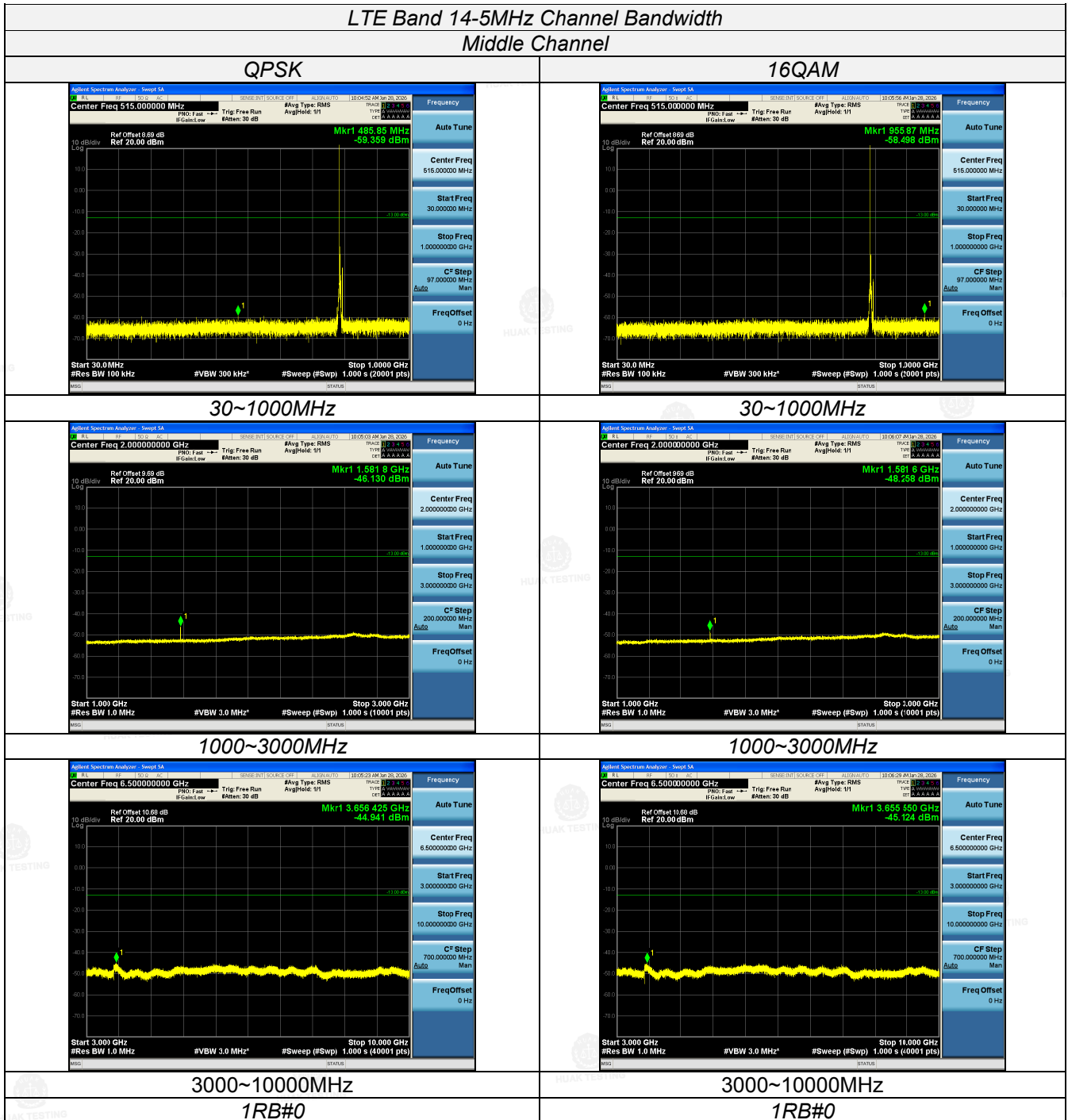
TEST RESULTS**Remark:**

- We were tested all RB Configuration refer 3GPP TS136 521 for each Channel Bandwidth of LTE Band 14; recorded worst case for each Channel Bandwidth of LTE Band 14.

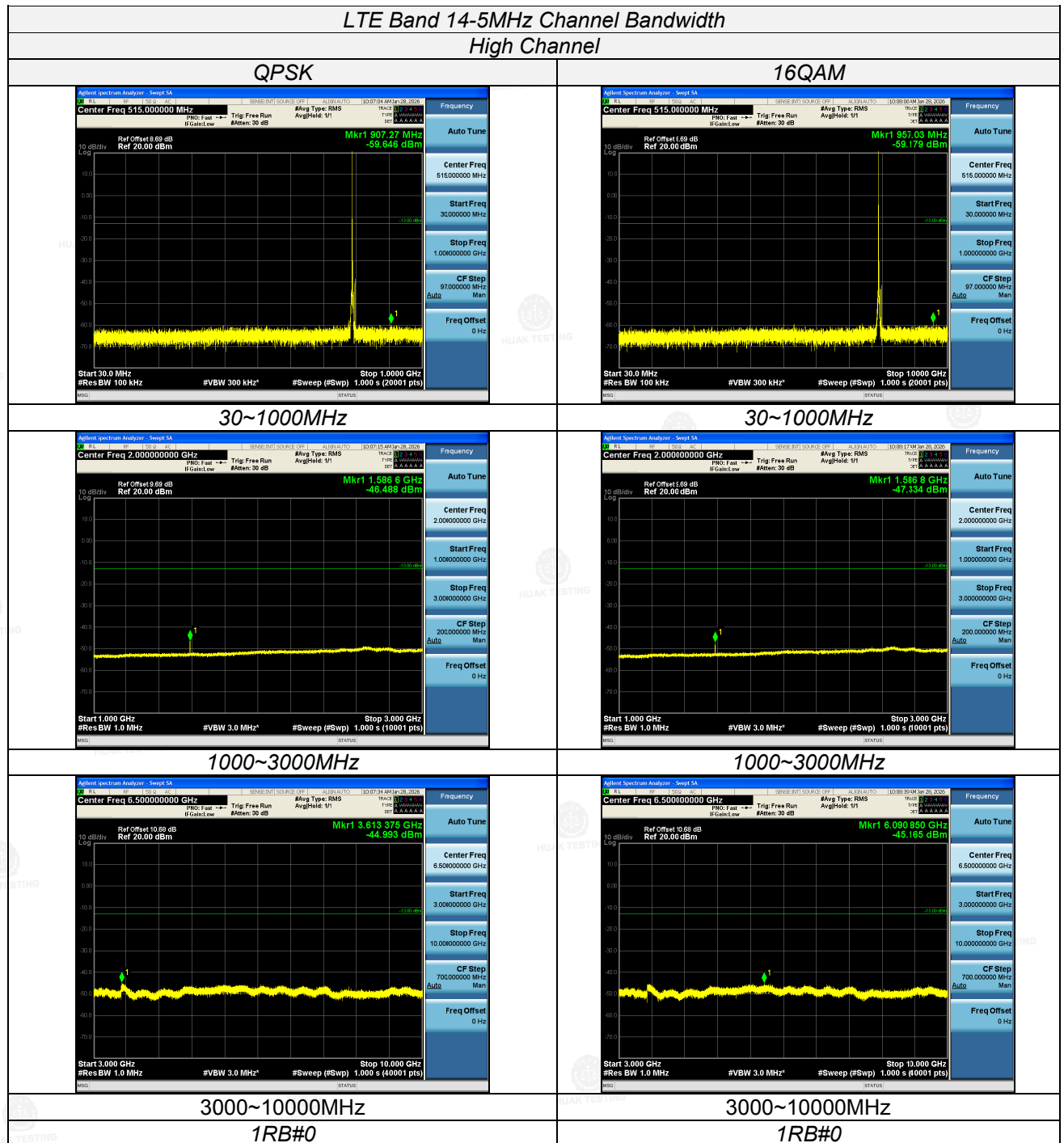
Conducted Measurement:



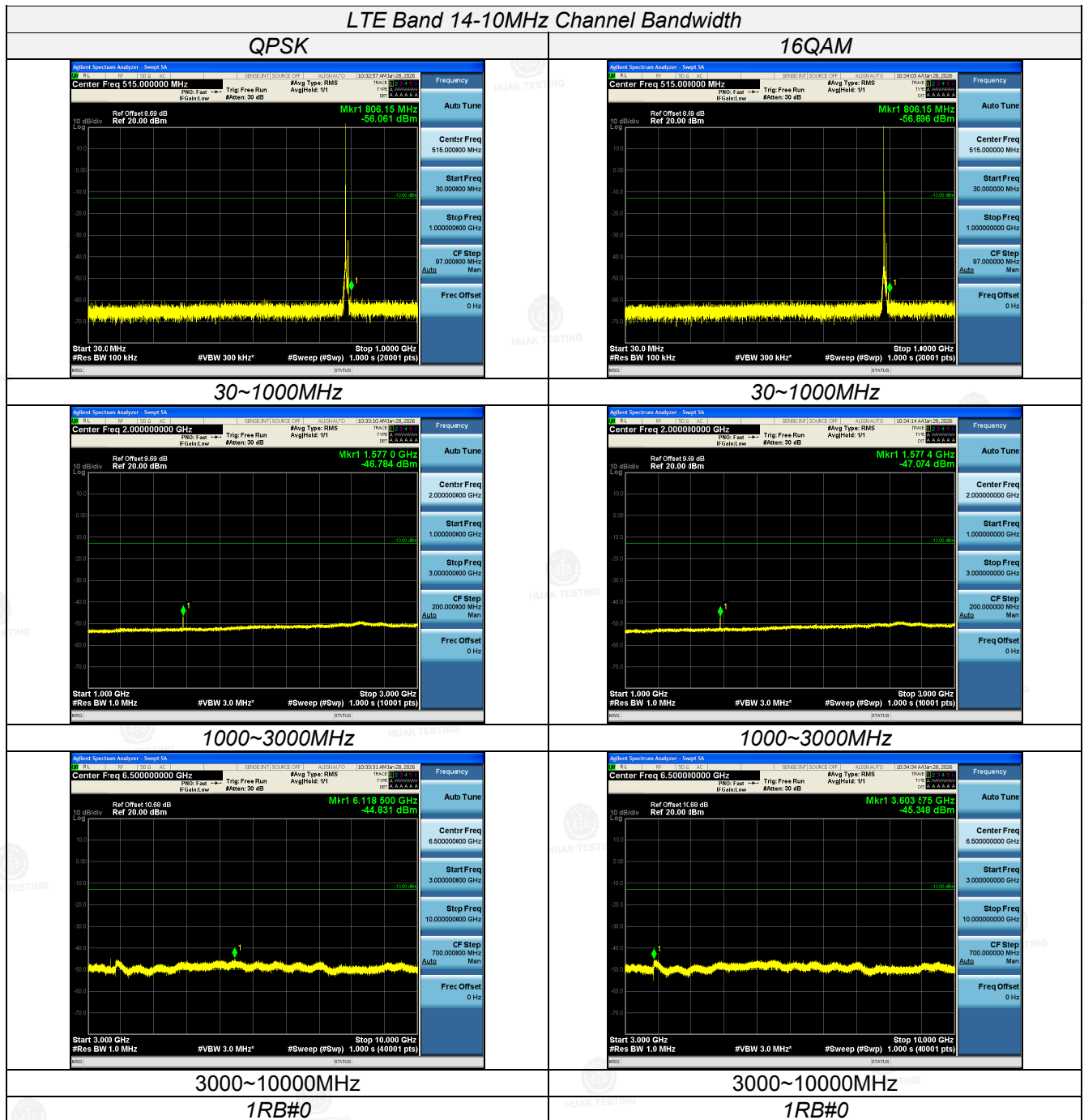
The results shown in this test report refer only to the sample(s) tested unless otherwise stated and the sample(s) are retained for 15 days only. The document is issued by Shenzhen HUAKE Testing Technology Co., Ltd., this document cannot be reproduced except in full with our prior written permission.



The results shown in this test report refer only to the sample(s) tested unless otherwise stated and the sample(s) are retained for 15 days only. The document is issued by Shenzhen HUAKE Testing Technology Co., Ltd., this document cannot be reproduced except in full with our prior written permission.



The results shown in this test report refer only to the sample(s) tested unless otherwise stated and the sample(s) are retained for 15 days only. The document is issued by Shenzhen HUAKE Testing Technology Co., Ltd., this document cannot be reproduced except in full with our prior written permission.



The results shown in this test report refer only to the sample(s) tested unless otherwise stated and the sample(s) are retained for 15 days only. The document is issued by Shenzhen HUAKE Testing Technology Co., Ltd., this document cannot be reproduced except in full with our prior written permission.

**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. $EIRP = P_{Mea}(dBm) - P_{cl}(dB) + G_a(dBi)$
3. We were not recorded other points as values lower than limits.
4. $Margin = Limit - EIRP$, $ERP = EIRP - 2.15dBi$

LTE FDD Band 14_Channel Bandwidth 5MHz_QPSK_Low Channel

Frequency (MHz)	PMea (dBm)	Pcl (dB)	Diatance	Ga Antenna Gain(dB)	ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1581	-54.56	4.02	3.00	12.21	-48.52	-40.00	10.67	H
2371.5	-47.93	5.11	3.00	13.26	-41.93	-13.00	31.08	H
1581	-58.57	4.02	3.00	12.21	-52.53	-40.00	14.68	V
2371.5	-53.05	5.11	3.00	13.26	-47.05	-13.00	36.20	V

LTE FDD Band 14_Channel Bandwidth 5MHz_QPSK_Middle Channel

Frequency (MHz)	PMea (dBm)	Pcl (dB)	Diatance	Ga Antenna Gain(dB)	ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1586	-53.36	4.02	3.00	12.21	-47.32	-40.00	9.47	H
2379	-46.55	5.11	3.00	13.26	-40.55	-13.00	29.70	H
1586	-59.15	4.02	3.00	12.21	-53.11	-40.00	15.26	V
2379	-54.29	5.11	3.00	13.26	-48.29	-13.00	37.44	V

LTE FDD Band 14_Channel Bandwidth 5MHz_QPSK_High Channel

Frequency (MHz)	PMea (dBm)	Pcl (dB)	Diatance	Ga Antenna Gain(dB)	ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1591	-54.46	4.02	3.00	12.21	-48.42	-40.00	10.57	H
2386.5	-47.37	5.11	3.00	13.26	-41.37	-13.00	30.52	H
1591	-59.22	4.02	3.00	12.21	-53.18	-40.00	15.33	V
2386.5	-53.06	5.11	3.00	13.26	-47.06	-13.00	36.21	V

LTE FDD Band 14_Channel Bandwidth 10MHz_QPSK

Frequency (MHz)	PMea (dBm)	Pcl (dB)	Diatance	Ga Antenna Gain(dB)	ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1586	-54.61	4.02	3.00	12.21	-48.57	-40.00	10.72	H
2379	-47.76	5.11	3.00	13.26	-41.76	-13.00	30.91	H
1586	-58.84	4.02	3.00	12.21	-52.80	-40.00	14.95	V
2379	-53.28	5.11	3.00	13.26	-47.28	-13.00	36.43	V



LTE FDD Band 14_Channel Bandwidth 5MHz_16QAM_Low Channel

Frequency (MHz)	PMea (dBm)	Pcl (dB)	Diatance	Ga Antenna Gain(dB)	ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1581	-53.68	4.02	3.00	12.21	-47.64	-40.00	9.79	H
2371.5	-47.81	5.11	3.00	13.26	-41.81	-13.00	30.96	H
1581	-58.39	4.02	3.00	12.21	-52.35	-40.00	14.50	V
2371.5	-53.05	5.11	3.00	13.26	-47.05	-13.00	36.20	V

LTE FDD Band 14_Channel Bandwidth 5MHz_16QAM_Middle Channel

Frequency (MHz)	PMea (dBm)	Pcl (dB)	Diatance	Ga Antenna Gain(dB)	ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1586	-53.28	4.02	3.00	12.21	-47.24	-40.00	9.39	H
2379	-47.48	5.11	3.00	13.26	-41.48	-13.00	30.63	H
1586	-58.85	4.02	3.00	12.21	-52.81	-40.00	14.96	V
2379	-53.45	5.11	3.00	13.26	-47.45	-13.00	36.60	V

LTE FDD Band 14_Channel Bandwidth 5MHz_16QAM_High Channel

Frequency (MHz)	PMea (dBm)	Pcl (dB)	Diatance	Ga Antenna Gain(dB)	ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1591	-54.45	4.02	3.00	12.21	-48.41	-40.00	10.56	H
2386.5	-46.91	5.11	3.00	13.26	-40.91	-13.00	30.06	H
1591	-58.39	4.02	3.00	12.21	-52.35	-40.00	14.50	V
2386.5	-53.78	5.11	3.00	13.26	-47.78	-13.00	36.93	V

LTE FDD Band 14_Channel Bandwidth 10MHz_16QAM

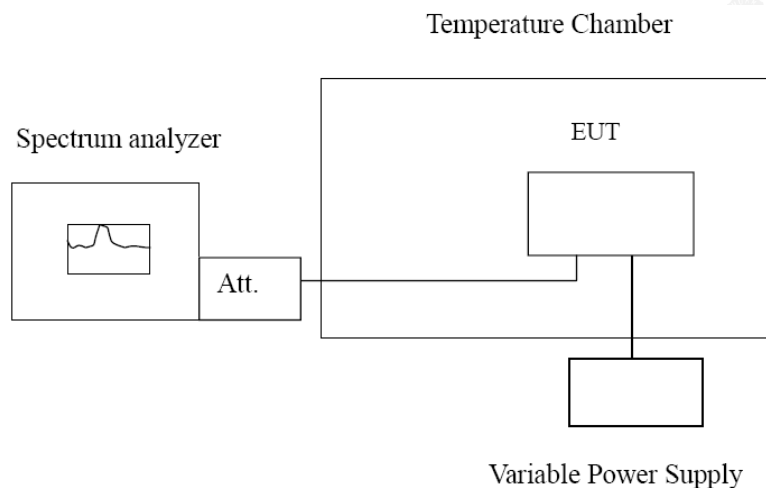
Frequency (MHz)	PMea (dBm)	Pcl (dB)	Diatance	Ga Antenna Gain(dB)	ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1586	-53.93	4.02	3.00	12.21	-47.89	-40.00	10.04	H
2379	-47.87	5.11	3.00	13.26	-41.87	-13.00	31.02	H
1586	-59.16	4.02	3.00	12.21	-53.12	-40.00	15.27	V
2379	-53.14	5.11	3.00	13.26	-47.14	-13.00	36.29	V

3.6 Frequency Stability under Temperature & Voltage Variations

LIMIT

90.539 (c) The frequency stability of mobile, portable, and control transmitters operating in the narrowband segment must be 400 parts per billion or better when AFC is locked to the base station. When AFC is not locked to the base station, the frequency stability must be at least 1.0 ppm for 6.25 kHz, 1.5 ppm for 12.5 kHz (2 channel aggregate), and 2.5 ppm for 25 kHz (4 channel aggregate).

TEST CONFIGURATION



TEST PROCEDURE

The EUT was setup according to ANSI/TIA-603-E.

Frequency Stability Under Temperature Variations:

In order to measure the carrier frequency under the condition of AFC lock, it is necessary to make measurements with the EUT in a "call mode". This is accomplished with the use of R&S CMW500 DIGITAL RADIO COMMUNICATION TESTER.

1. Measure the carrier frequency at room temperature.
2. Subject the EUT to overnight soak at -30°C.
3. With the EUT, powered via nominal voltage, connected to the CMW500 and in a simulated call on middle channel for LTE Band 14, measure the carrier frequency. These measurements should be made within 2 minutes of Powering up the EUT, to prevent significant self-warming.
4. Repeat the above measurements at 10°C increments from -30°C to +50°C. Allow at least 1.5 hours at each temperature, unpowered, before making measurements.
5. Re-measure carrier frequency at room temperature with nominal voltage. Vary supply voltage from minimum voltage to maximum voltage, in 0.1 Volt increments re-measuring carrier frequency at each voltage. Pause at nominal voltage for 1.5 hours unpowered, to allow any self-heating to stabilize, before continuing.
6. Subject the EUT to overnight soak at +50°C.
7. With the EUT, powered via nominal voltage, connected to the CMW500 and in a simulated call on the centre channel, measure the carrier frequency. These measurements should be made within 2 minutes of Powering up the EUT, to prevent significant self-warming.
8. Repeat the above measurements at 10 °C increments from +50°C to -30°C. Allow at least 1.5 hours at each temperature, unpowered, before making measurements
9. At all temperature levels hold the temperature to +/- 0.5°C during the measurement procedure.

Frequency Stability Under Voltage Variations:

Set chamber temperature to 20°C. Use a variable AC power supply / DC power source to power the EUT and set the voltage to rated voltage. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and recorded the frequency.



Reduce the input voltage to specify extreme voltage variation ($\pm 15\%$) and endpoint, record the maximum frequency change.

TEST RESULTS

Remark:

1. We tested all RB Configuration refer 3GPP TS136 521 for each Channel Bandwidth of LTE Band 14; recorded worst case.

LTE Band 14, 10MHz bandwidth (worst case of all bandwidths)

Frequency Error vs Voltage

Voltage (V)	Frequency error (Hz)		Frequency error (ppm)	
	QPSK	16QAM	QPSK	16QAM
10.2	-2.12	3.75	-0.002682	0.004729
12.0	-3.83	-1.70	-0.004845	-0.002144
13.8	-1.90	-2.27	-0.002404	-0.002863

Frequency Error vs Temperature

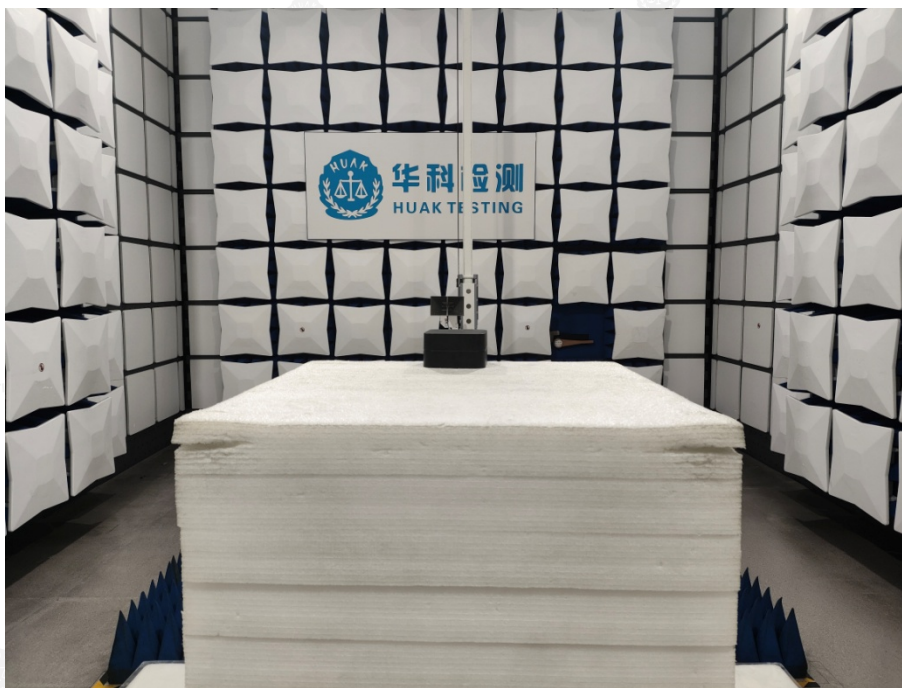
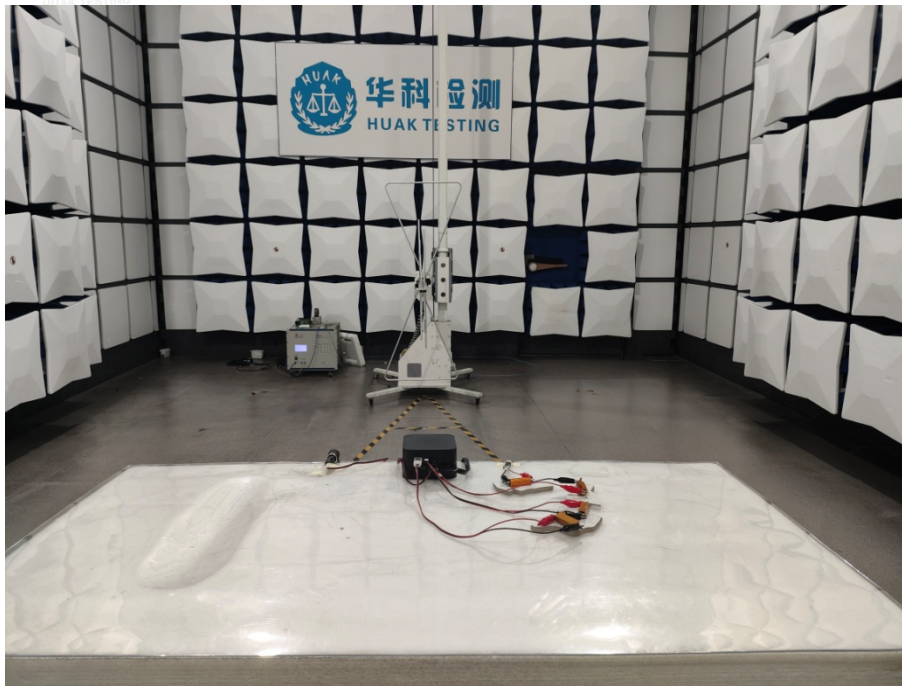
Temperature (°C)	Frequency error (Hz)		Frequency error (ppm)	
	QPSK	16QAM	QPSK	16QAM
-30°	-3.18	-1.26	-0.004023	-0.001589
-20°	-3.03	-3.38	-0.003833	-0.004262
-10°	-2.88	-2.92	-0.003643	-0.003682
0°	-3.68	-1.69	-0.004655	-0.002131
10°	-2.60	-2.80	-0.003289	-0.003531
20°	-3.30	-3.69	-0.004175	-0.004653
30°	-3.46	-2.37	-0.004377	-0.002989
40°	-5.65	-2.06	-0.007147	-0.002598
50°	-3.98	-2.88	-0.005035	-0.003632



HUAKE TESTING

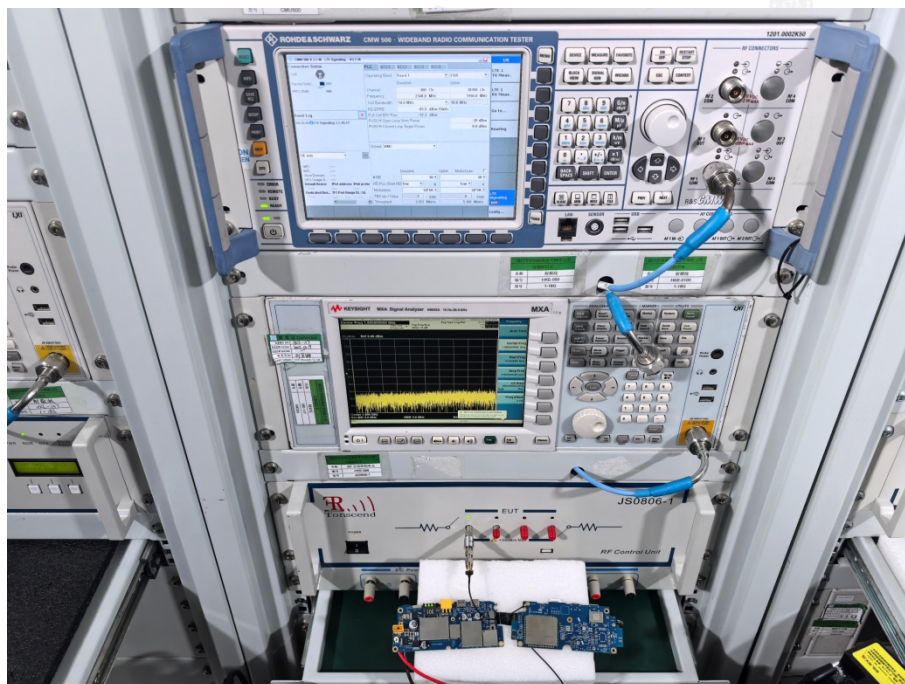
4 Test Setup Photos of the EUT

Radiated Emissions



The results shown in this test report refer only to the sample(s) tested unless otherwise stated and the sample(s) are retained for 15 days only. The document is issued by Shenzhen HUAKE Testing Technology Co., Ltd., this document cannot be reproduced except in full with our prior written permission.

RF Conducted Emission





HUAKE TESTING

5 Photos of the EUT

Reference to the report: ANNEX A of external photos and ANNEX B of internal photos

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

