

FCC Test Report
FCC CFR Title 47 Part 2, Part 27

Report Reference No.....: HK2601080047-5E

FCC ID.....: 2BBBN-RTB75T41

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

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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 27**

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

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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.:	HK2601080047-5E	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.**

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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
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The test report merely corresponds to the test sample.
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**** 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 27](#): Miscellaneous Wireless Communications Services

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

[FCC Part 2](#): Frequency Allocations 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 27.50 (b)(10)	Pass
Peak-to-Average Ratio	27.50 (d)(5)	Pass
99% & -26 dB Occupied Bandwidth	Part 2.1049 Part 27.53(h)	Pass
Spurious Emissions at Antenna Terminal	Part 2.1051 Part 27.53(h)	Pass
Field Strength of Spurious Radiation	Clause 7 of KDB971168 D01 v02r02	Pass
Out of Band Emission, Band Edge	2.1051 27.53 (c)(2) and (5), (h)(1) and (3)(i)	Pass
Frequency Stability	2.1055 27.54	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
Modulation Type	QPSK, 16QAM
Antenna Type	FPC Antenna
Antenna Gain	-1.4dBi
Operation Frequency Band	LTE Band 13
Operation Frequency	LTE Band 13: 777~787 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 Environmental Conditions

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

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



2.5 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.



2.6 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	/	/

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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	/	/

2.7 Modifications

No modifications were implemented to meet testing criteria.



3 Test Conditions and Results

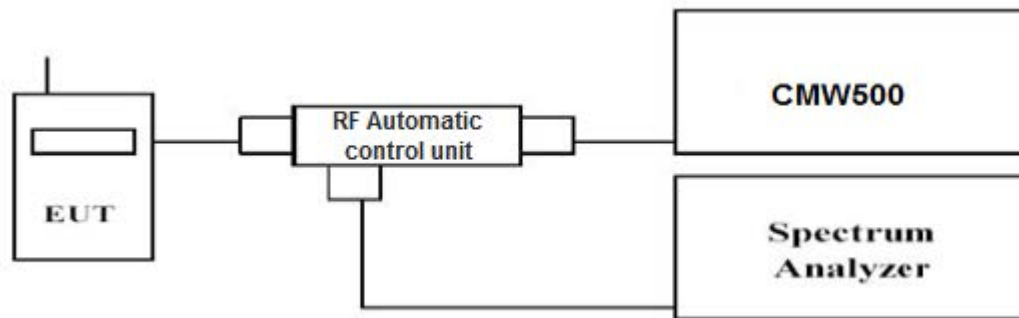
3.1 Output Power

LIMIT

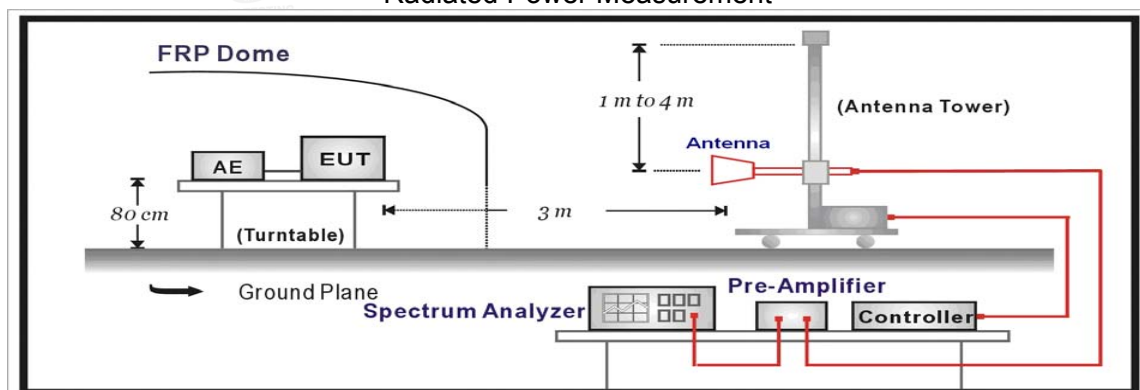
According to §27.50 (b) (10): Portable stations (hand-held devices) transmitting in the 746-757 MHz, 776-788 MHz, and 805-806 MHz bands are limited to 3 watts ERP.

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.



- 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

Conducted Measurement:

LTE FDD Band 13				
TX Channel Bandwidth	RB Size/Offset	Frequency (MHz)	Average Power [dBm]	
			QPSK	16QAM
5 MHz	1 RB low	779.5	23.74	22.79
		782	24.05	23.48
		784.5	23.90	22.69
	1 RB high	779.5	23.74	22.95
		782	23.61	23.71
		784.5	23.76	22.89
	50% RB mid	779.5	23.80	22.78
		782	23.76	23.74
		784.5	23.60	22.74
	100% RB	779.5	23.87	22.98
		782	23.80	23.91
		784.5	23.86	22.91
10 MHz	1 RB low	782	23.24	23.44
	1 RB high	782	24.08	23.73
	50% RB mid	782	23.66	23.99
	100% RB	782	23.30	23.83



3.2 Radiated Measurement

Remark:

1. We were tested all RB Configuration refer 3GPP TS136 521 for each Channel Bandwidth of LTE FDD Band 13; recorded worst case for each Channel Bandwidth of LTE FDD Band 13.
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 13_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
779.5	70.01	3.06	9.68	34.80	28.59	26.44	34.77	8.33	V
782.0	69.04	3.17	9.68	34.80	27.73	25.58	34.77	9.19	V
784.5	69.67	3.22	9.75	34.80	28.34	26.19	34.77	8.58	V
779.5	69.99	3.06	9.68	34.80	28.57	26.42	34.77	8.35	H
782.0	69.36	3.17	9.68	34.80	28.05	25.90	34.77	8.87	H
784.5	69.40	3.22	9.75	34.80	28.07	25.92	34.77	8.85	H

LTE FDD Band 13_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
782.0	70.11	3.22	9.75	34.80	28.78	26.63	34.77	8.14	V
782.0	69.51	3.06	9.68	34.80	28.09	25.94	34.77	8.83	H

LTE FDD Band 13_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
779.5	70.08	3.06	9.68	34.80	28.66	26.51	34.77	8.26	V
782.0	68.32	3.17	9.68	34.80	27.01	24.86	34.77	9.91	V
784.5	69.42	3.22	9.75	34.80	28.09	25.94	34.77	8.83	V
779.5	68.71	3.06	9.68	34.80	27.29	25.14	34.77	9.63	H
782.0	69.43	3.17	9.68	34.80	28.12	25.97	34.77	8.80	H
784.5	70.00	3.22	9.75	34.80	28.67	26.52	34.77	8.25	H

LTE FDD Band 13_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
782.0	70.14	3.22	9.75	34.80	28.81	26.66	34.77	8.11	V
782.0	68.54	3.06	9.68	34.80	27.12	24.97	34.77	9.80	H

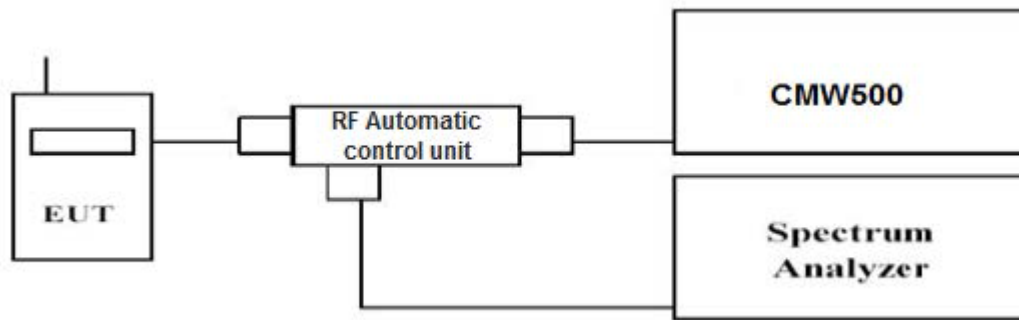


3.3 Peak-to-Average Ratio (PAR)

LIMIT

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

TEST CONFIGURATION



TEST PROCEDURE

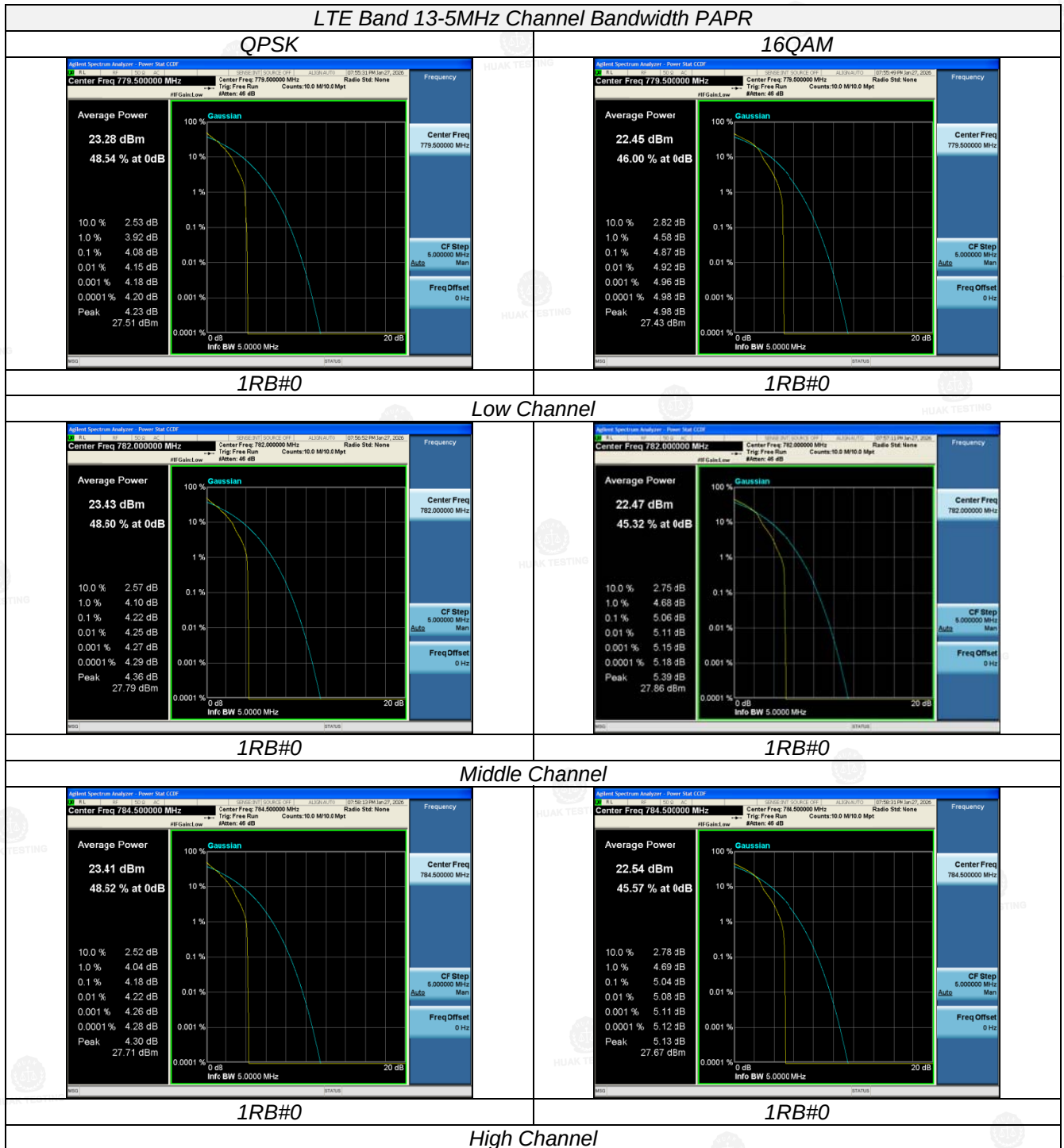
1. Refer to instrument's analyzer instruction manual for details on how to use the power statistics/CCDF function;
2. Set resolution/measurement bandwidth $\geq$ signal's occupied bandwidth;
3. Set the number of counts to a value that stabilizes the measured CCDF curve;
4. Set the measurement interval 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

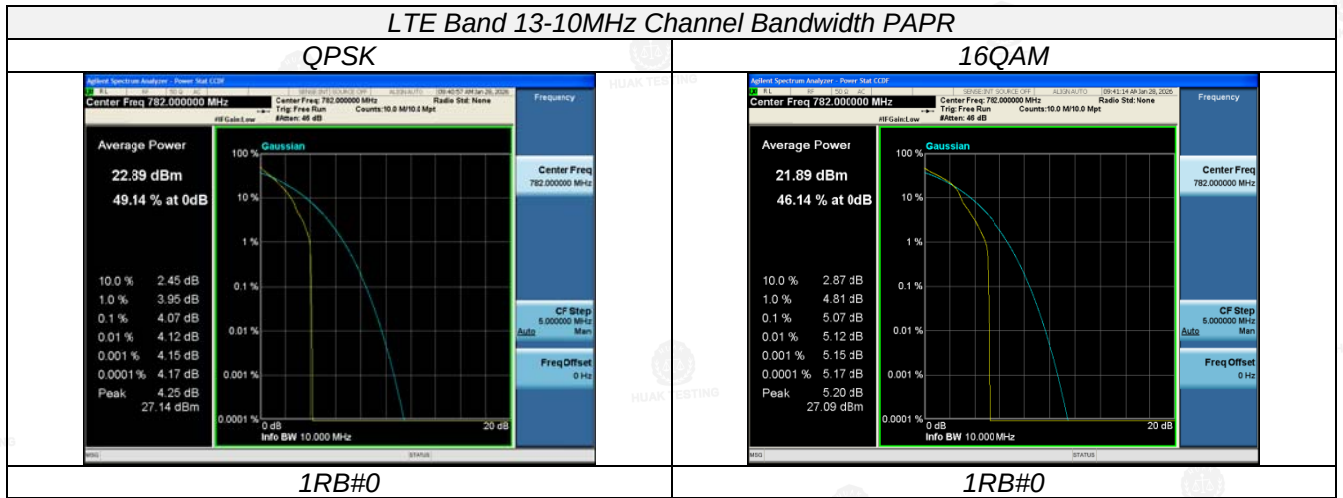
Remark:

1. We were tested all RB Configuration refer 3GPP TS136 521 for each Channel Bandwidth of LTE Band 13; recorded worst case for each Channel Bandwidth of LTE Band 13.

LTE Band 13				
TX Channel Bandwidth	Frequency (MHz)	RB Size/Offset	PAPR (dB)	
			QPSK	16QAM
5 MHz	779.5	1RB#0	4.08	4.87
	782		4.22	5.06
	784.5		4.18	5.04
10 MHz	782	1RB#0	4.07	5.07



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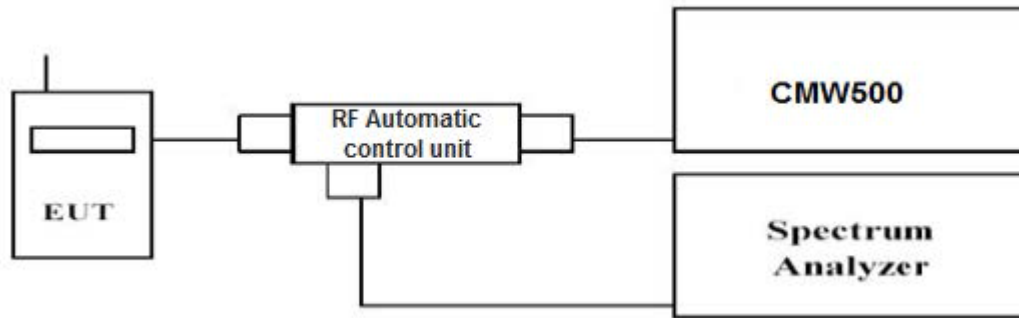


3.4 Occupied Bandwidth and Emission Bandwidth

LIMIT

N/A

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 $\geq$ 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 13; recorded worst case for each Channel Bandwidth of LTE Band 13.

LTE Band 13						
TX Channel Bandwidth	RB Size/Offset	Frequency (MHz)	-26dBc Emission bandwidth (MHz)		99% Occupied bandwidth (MHz)	
			QPSK	16QAM	QPSK	16QAM
5 MHz	25RB#0	779.5	5.008	5.017	4.4945	4.5104
		782	4.997	5.041	4.5022	4.5156
		784.5	5.029	4.993	4.5054	4.5008
10 MHz	50RB#0	782	9.880	9.898	8.9661	8.9639



LTE Band 13-10MHz Channel Bandwidth	
QPSK	16QAM
 Center Freq 782.000000 MHz #BW 620 kHz Span 20 MHz CF Step 2.000000 MHz #Sweep 100 ms Occupied Bandwidth 8.9661 MHz Total Power 31.2 dBm Transmit Freq Error 13.431 kHz OBW Power 99.00 % x dB Bandwidth 9.880 MHz x dB -25.00 dB	 Center Freq 782.000000 MHz #BW 620 kHz Span 20 MHz CF Step 2.000000 MHz #Sweep 100 ms Occupied Bandwidth 8.9639 MHz Total Power 30.2 dBm Transmit Freq Error 5.054 kHz OBW Power 99.00 % x dB Bandwidth 9.898 MHz x dB -25.00 dB
50RB#0	50RB#0

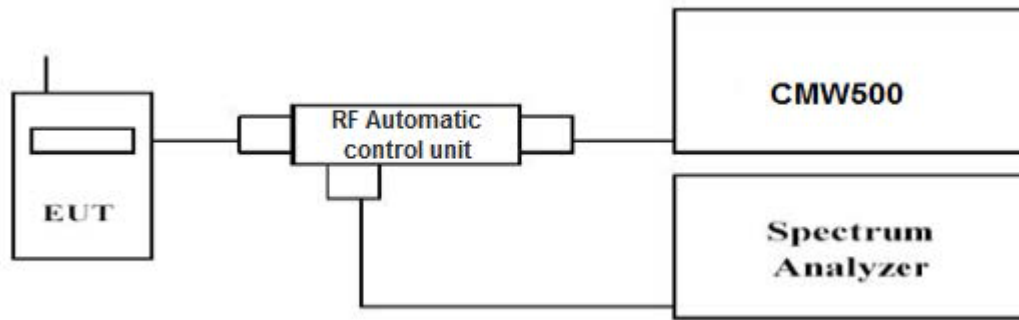
3.5 Band Edge Compliance

LIMIT

According to §27.53 (c): For operations in the 746-758 MHz band and the 776-788 MHz band, 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 any frequency outside the 746-758 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least $43 + 10 \log (P)$ dB;
- (2) On any frequency outside the 776-788 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least $43 + 10 \log (P)$ dB;
- (3) On all frequencies between 763-775 MHz and 793-805 MHz, by a factor not less than $76 + 10 \log (P)$ dB in a 6.25 kHz band segment, for base and fixed stations;
- (4) On all frequencies between 763-775 MHz and 793-805 MHz, by a factor not less than $65 + 10 \log (P)$ dB in a 6.25 kHz band segment, for mobile and portable stations;

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.

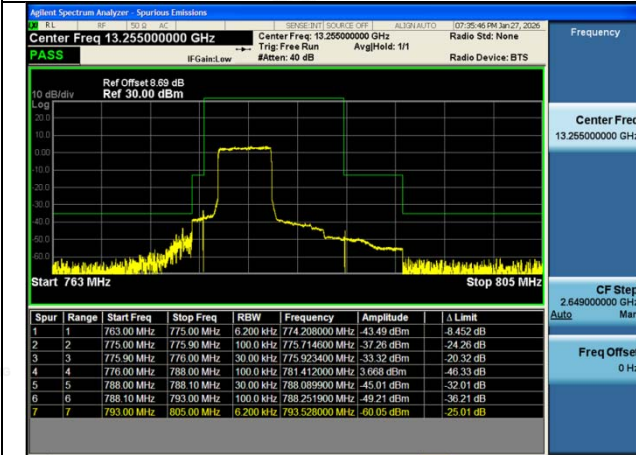
TEST RESULTS

Remark:

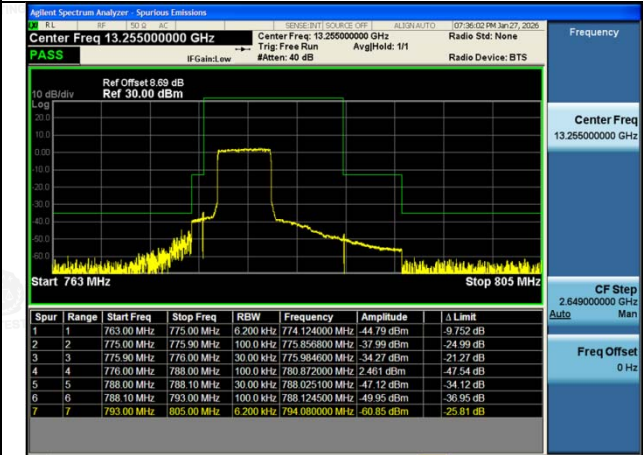
1. We were tested all RB Configuration refer 3GPP TS136 521 for each Channel Bandwidth of LTE Band 13; recorded worst case for each Channel Bandwidth of LTE Band 13.

LTE Band 13-5MHz Channel Bandwidth Band Edge Compliance

QPSK



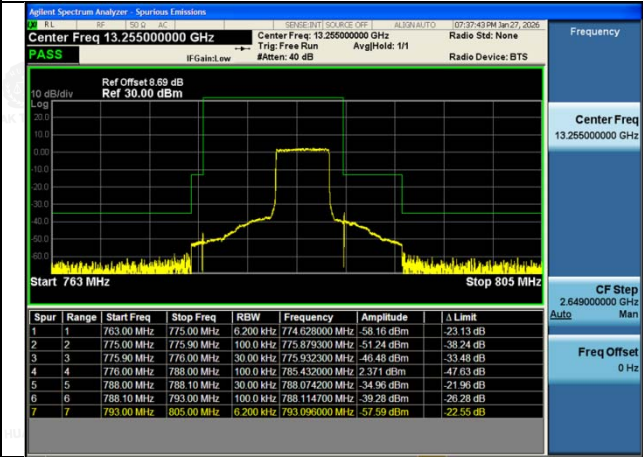
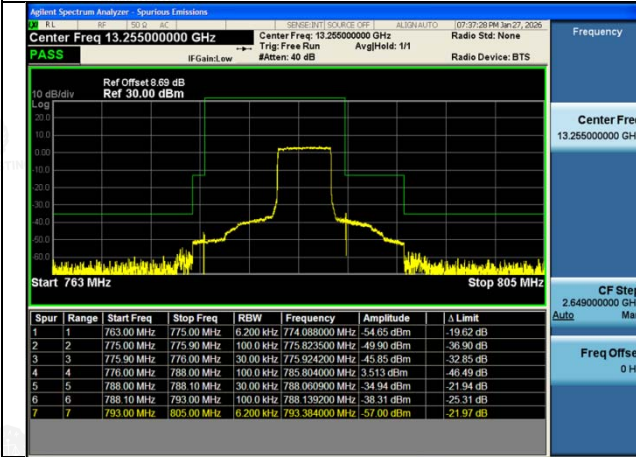
16QAM



25RB#0

25RB#0

Low Channel



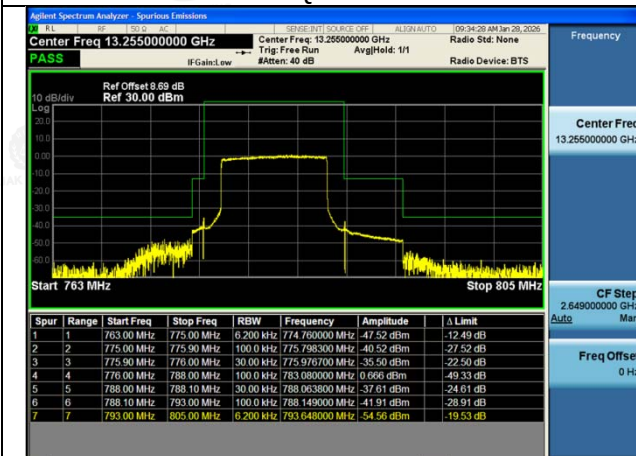
25RB#0

25RB#0

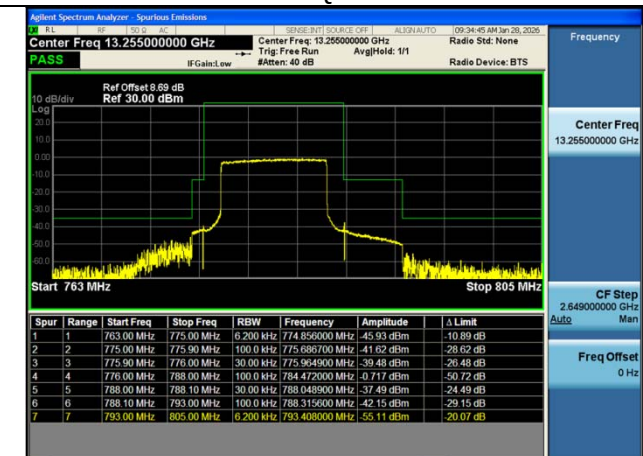
High Channel

LTE Band 13-10MHz Channel Bandwidth Band Edge Compliance

QPSK



16QAM



50RB#0

50RB#0

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3.6 Spurious Emission

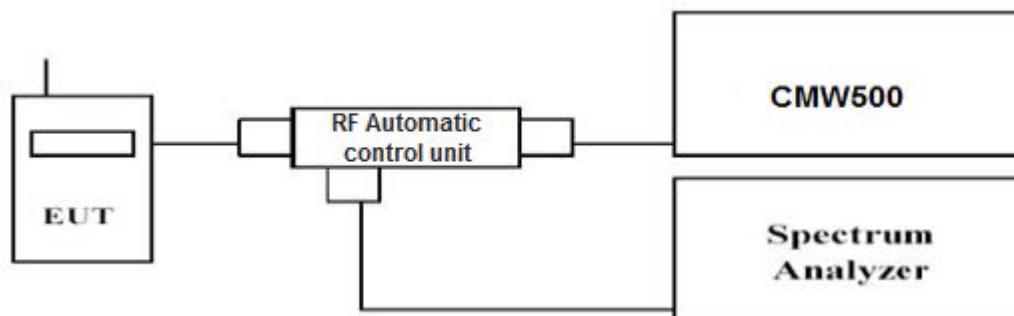
LIMIT

According to §27.53 (c): For operations in the 746-758 MHz band and the 776-788 MHz band, 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:

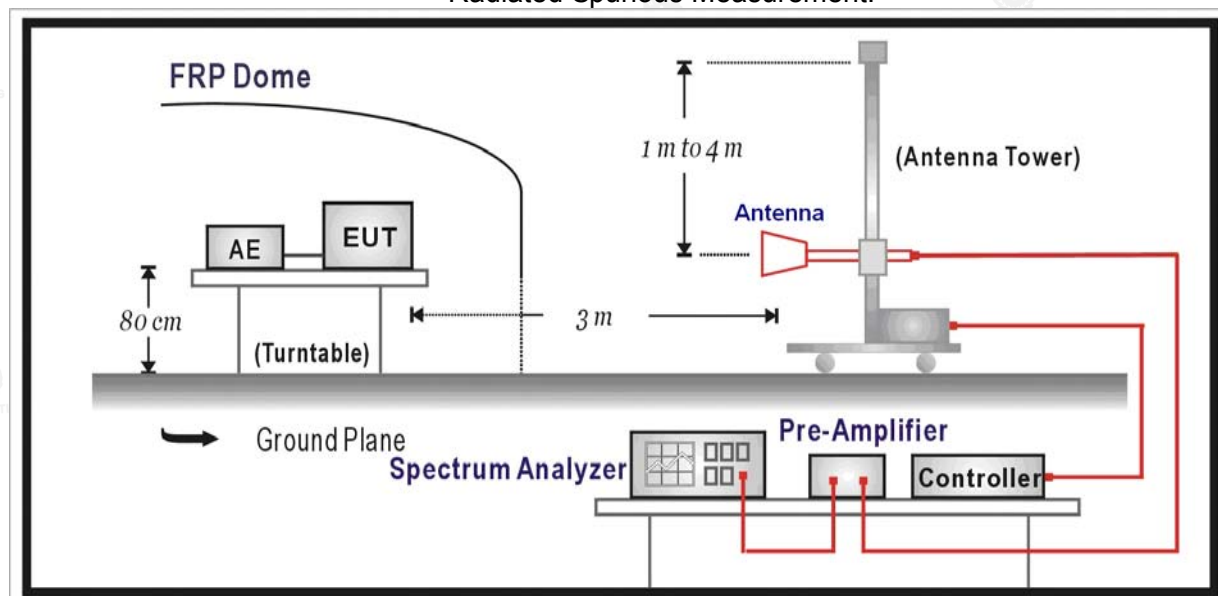
- (1) On any frequency outside the 746-758 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least $43 + 10 \log (P)$ dB;
- (2) On any frequency outside the 776-788 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least $43 + 10 \log (P)$ dB;
- (3) On all frequencies between 763-775 MHz and 793-805 MHz, by a factor not less than $76 + 10 \log (P)$ dB in a 6.25 kHz band segment, for base and fixed stations;
- (4) On all frequencies between 763-775 MHz and 793-805 MHz, by a factor not less than $65 + 10 \log (P)$ dB in a 6.25 kHz band segment, for mobile and portable stations;

TEST CONFIGURATION

Conducted Spurious Measurement:



Radiated Spurious Measurement:



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 13	0.000009~0.000015	1KHz	3KHz	Auto
	0.000015~0.03	10KHz	30KHz	Auto
	0.03~1	100KHz	300KHz	Auto
	1~26.5	1 MHz	3 MHz	Auto

Radiated Spurious Measurement:

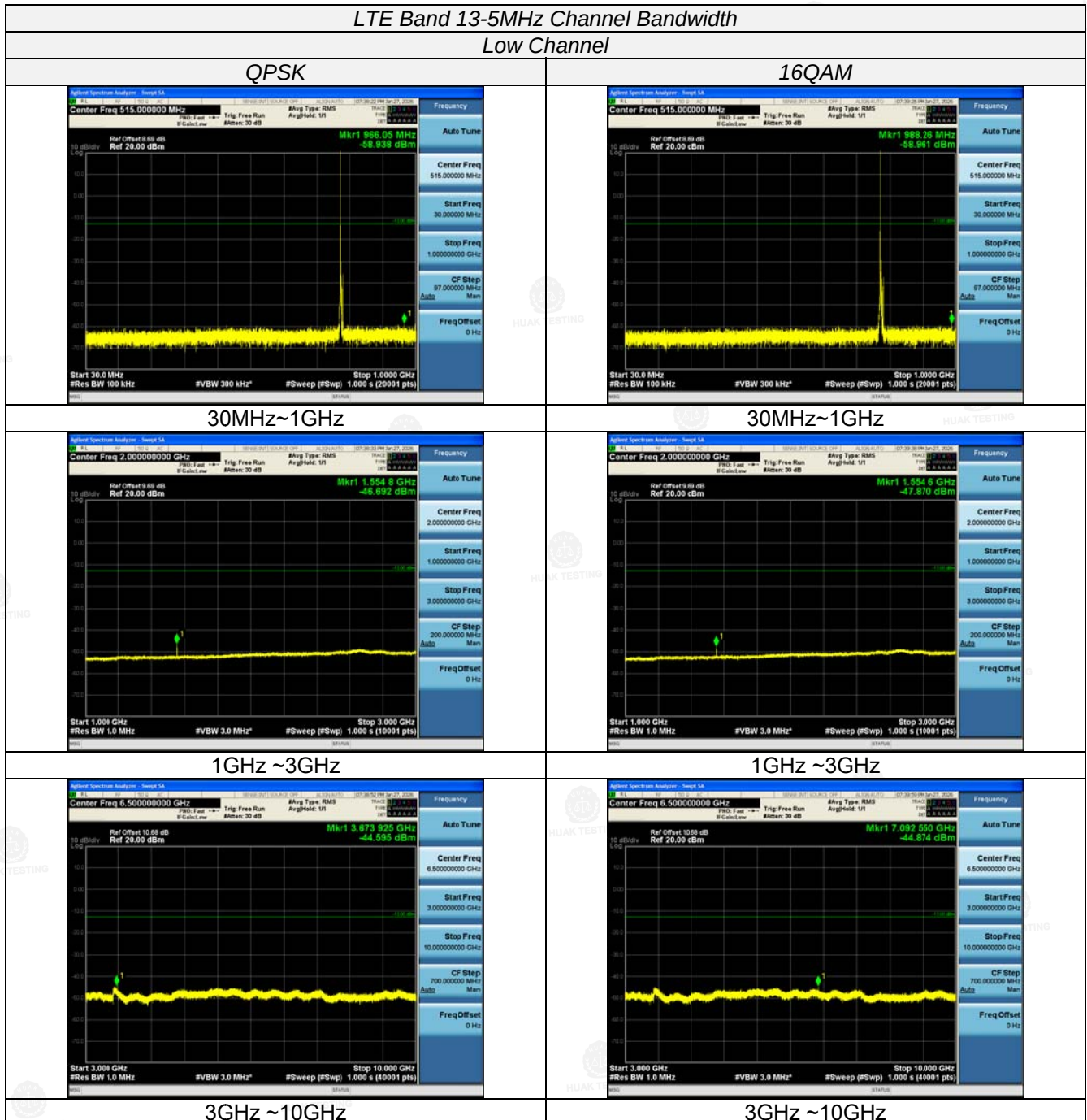
- The EUT shall be placed at the specified height on a support, and in the position closest to normal use as declared by provider.
- The test antenna shall be oriented initially for vertical polarization and shall be chosen to correspond to the frequency of the transmitter.
- The output of the test antenna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

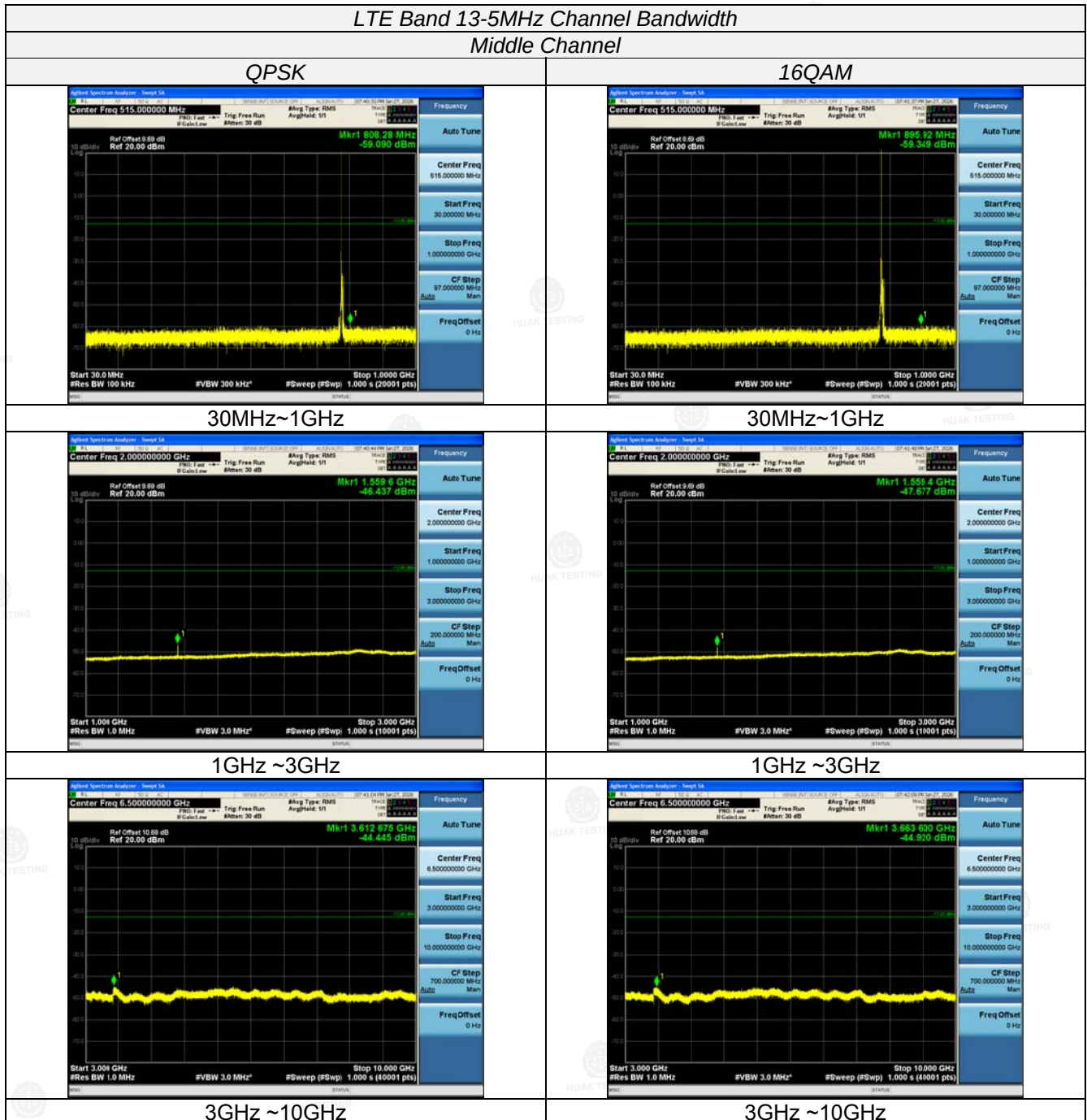
- We were tested all RB Configuration refer 3GPP TS136 521 for each Channel Bandwidth of LTE Band 13; recorded worst case for each Channel Bandwidth of LTE Band 13.

Conducted Measurement:

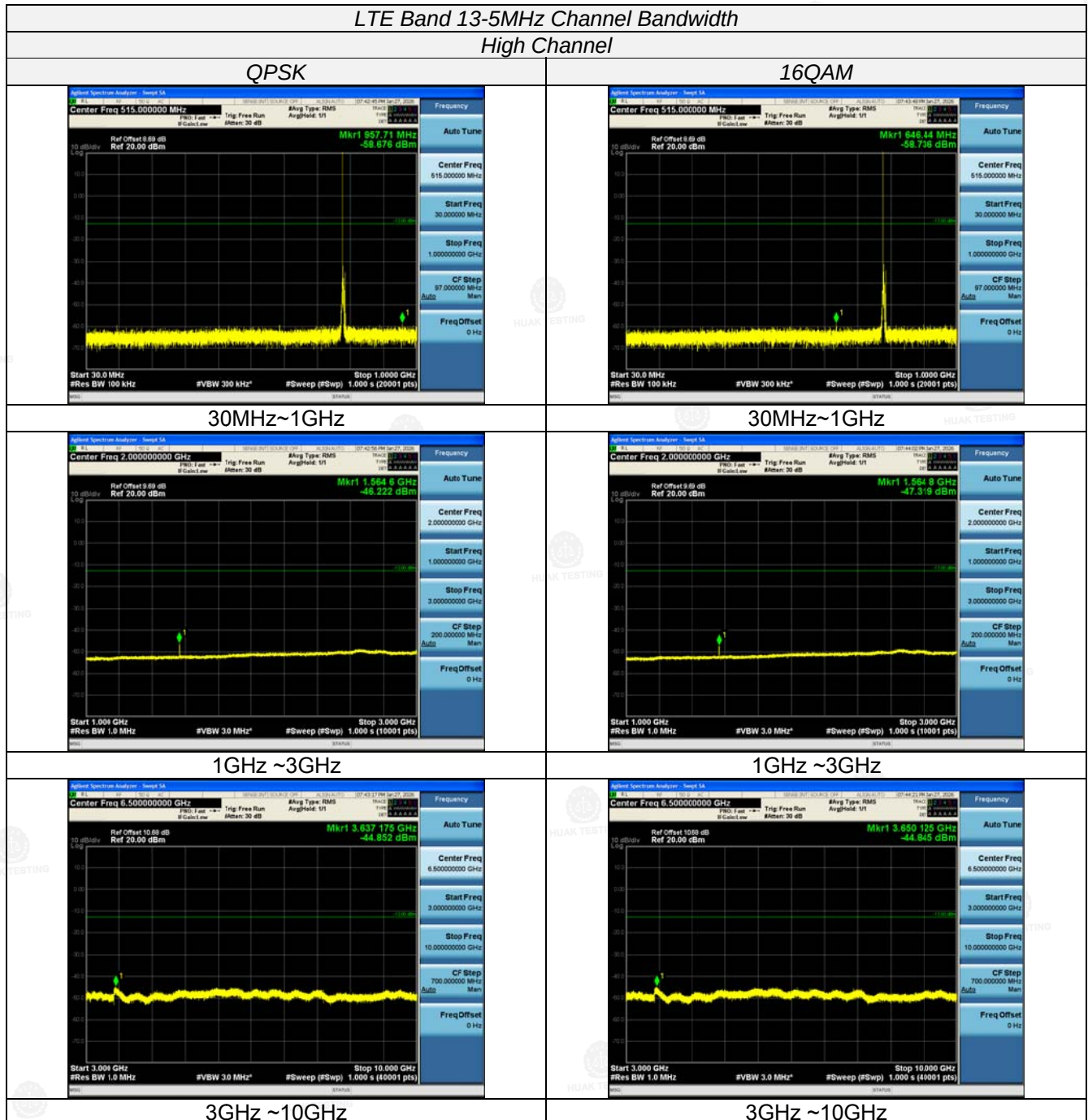
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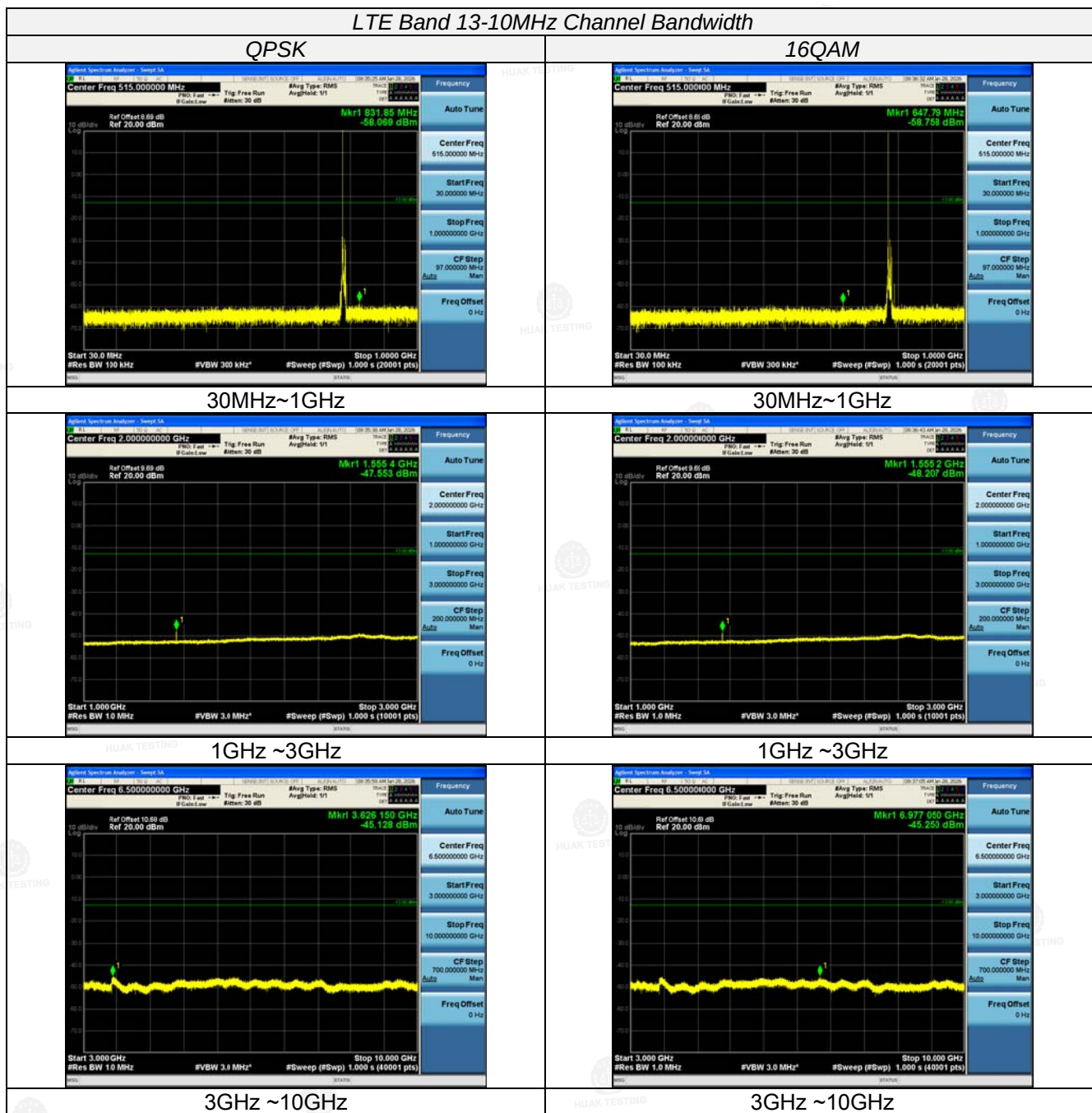
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Radiated Measurement:

Remark:

1. We were tested all RB Configuration refer 3GPP TS136 521 for each Channel Bandwidth of LTE FDD Band 13; recorded worst case for each Channel Bandwidth of LTE FDD Band 13.
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 13_Channel Bandwidth 5MHz_QPSK_Low Channel

Frequency (MHz)	PMea (dBm)	Pcl (dB)	Diatance	Ga Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1559.0	-53.70	4.02	3.00	12.21	-45.51	-40.00	5.51	H
2338.5	-48.89	5.11	3.00	13.26	-40.74	-13.00	27.74	H
1559.0	-59.38	4.02	3.00	12.21	-51.19	-40.00	11.19	V
2338.5	-53.39	5.11	3.00	13.26	-45.24	-13.00	32.24	V

LTE FDD Band 13_Channel Bandwidth 5MHz_QPSK_Middle Channel

Frequency (MHz)	PMea (dBm)	Pcl (dB)	Diatance	Ga Antenna Gain(dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1564.0	-53.27	4.02	3.00	12.21	-45.08	-40.00	5.08	H
2346.0	-48.37	5.11	3.00	13.26	-40.22	-13.00	27.22	H
1564.0	-59.12	4.02	3.00	12.21	-50.93	-40.00	10.93	V
2346.0	-53.02	5.11	3.00	13.26	-44.87	-13.00	31.87	V

LTE FDD Band 13_Channel Bandwidth 5MHz_QPSK_High Channel

Frequency (MHz)	PMea (dBm)	Pcl (dB)	Diatance	Ga Antenna Gain(dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1569.0	-53.19	4.02	3.00	12.21	-45.00	-40.00	5.00	H
2353.5	-47.56	5.11	3.00	13.26	-39.41	-13.00	26.41	H
1569.0	-58.79	4.02	3.00	12.21	-50.60	-40.00	10.60	V
2353.5	-52.54	5.11	3.00	13.26	-44.39	-13.00	31.39	V

LTE FDD Band 13_Channel Bandwidth 10MHz_QPSK

Frequency (MHz)	PMea (dBm)	Pcl (dB)	Diatance	Ga Antenna Gain(dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1564.0	-53.81	4.02	3.00	12.21	-45.62	-40.00	5.62	H
2346.0	-48.61	5.11	3.00	13.26	-40.46	-13.00	27.46	H
1564.0	-59.45	4.02	3.00	12.21	-51.26	-40.00	11.26	V
2346.0	-53.94	5.11	3.00	13.26	-45.79	-13.00	32.79	V



LTE FDD Band 13_Channel Bandwidth 5MHz_16QAM_Low Channel

Frequency (MHz)	PMea (dBm)	Pcl (dB)	Diatance	Ga Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1559.0	-53.52	4.02	3.00	12.21	-45.33	-40.00	5.33	H
2338.5	-48.55	5.11	3.00	13.26	-40.40	-13.00	27.40	H
1559.0	-59.14	4.02	3.00	12.21	-50.95	-40.00	10.95	V
2338.5	-53.09	5.11	3.00	13.26	-44.94	-13.00	31.94	V

LTE FDD Band 13_Channel Bandwidth 5MHz_16QAM_Middle Channel

Frequency (MHz)	PMea (dBm)	Pcl (dB)	Diatance	Ga Antenna Gain(dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1564.0	-53.27	4.02	3.00	12.21	-45.08	-40.00	5.08	H
2346.0	-48.16	5.11	3.00	13.26	-40.01	-13.00	27.01	H
1564.0	-59.40	4.02	3.00	12.21	-51.21	-40.00	11.21	V
2346.0	-52.99	5.11	3.00	13.26	-44.84	-13.00	31.84	V

LTE FDD Band 13_Channel Bandwidth 5MHz_16QAM_High Channel

Frequency (MHz)	PMea (dBm)	Pcl (dB)	Diatance	Ga Antenna Gain(dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1569.0	-53.63	4.02	3.00	12.21	-45.44	-40.00	5.44	H
2353.5	-47.71	5.11	3.00	13.26	-39.56	-13.00	26.56	H
1569.0	-58.69	4.02	3.00	12.21	-50.50	-40.00	10.50	V
2353.5	-53.01	5.11	3.00	13.26	-44.86	-13.00	31.86	V

LTE FDD Band 13_Channel Bandwidth 10MHz_16QAM

Frequency (MHz)	PMea (dBm)	Pcl (dB)	Diatance	Ga Antenna Gain(dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1564.0	-53.91	4.02	3.00	12.21	-45.72	-40.00	5.72	H
2346.0	-48.20	5.11	3.00	13.26	-40.05	-13.00	27.05	H
1564.0	-59.32	4.02	3.00	12.21	-51.13	-40.00	11.13	V
2346.0	-53.33	5.11	3.00	13.26	-45.18	-13.00	32.18	V

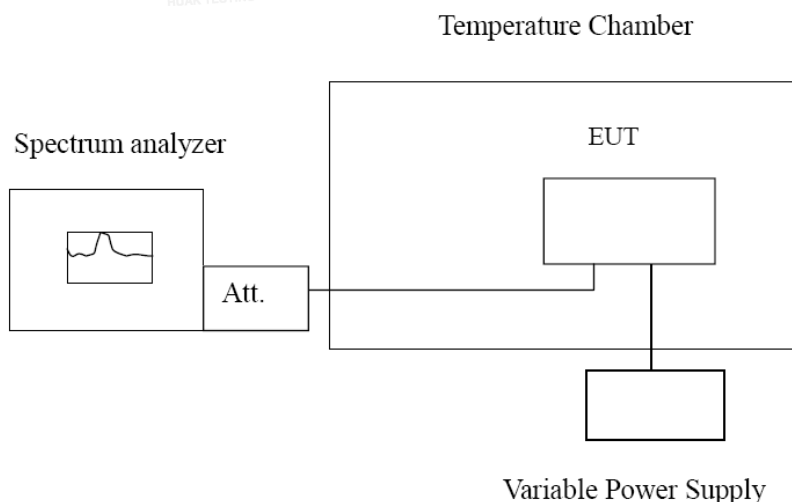


3.7 Frequency Stability Under Temperature & Voltage Variations

LIMIT

According to §27.54, §2.1055 requirement, the frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation and should not exceed 2.5ppm.

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 13, 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 0.1Volt 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 13; recorded worst case.

LTE Band 13, 10MHz bandwidth (worst case of all bandwidths)

Frequency Error vs Voltage

Voltage (V)	Frequency error (Hz)		Frequency error (ppm)	
	QPSK	16QAM	QPSK	16QAM
10.20	-3.23	-2.16	-0.004144	-0.002762
12.00	-3.99	-2.66	-0.005119	-0.003402
13.80	-4.03	2.02	-0.005170	0.002583

Frequency Error vs Temperature

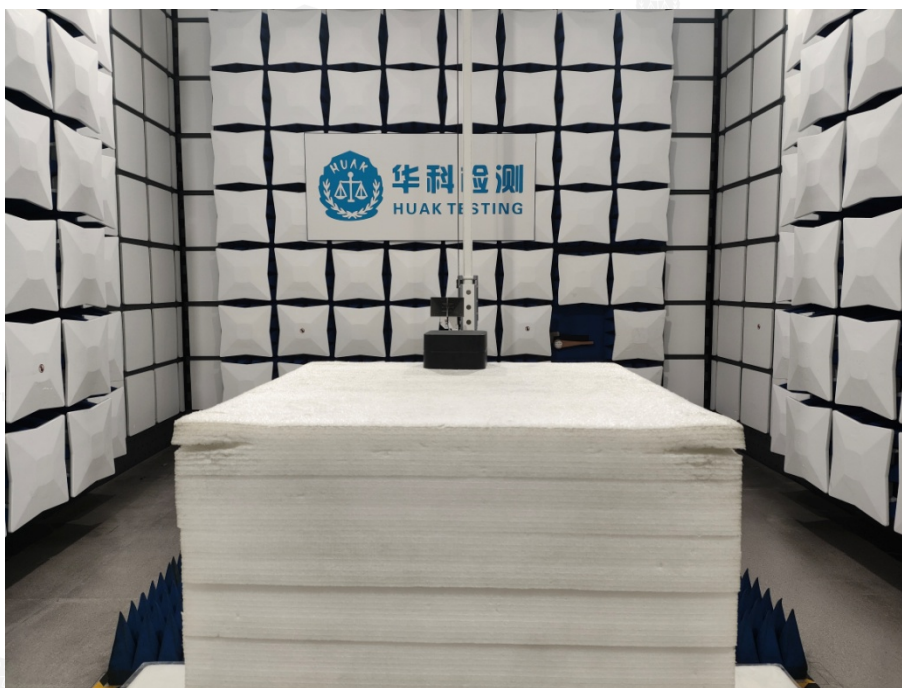
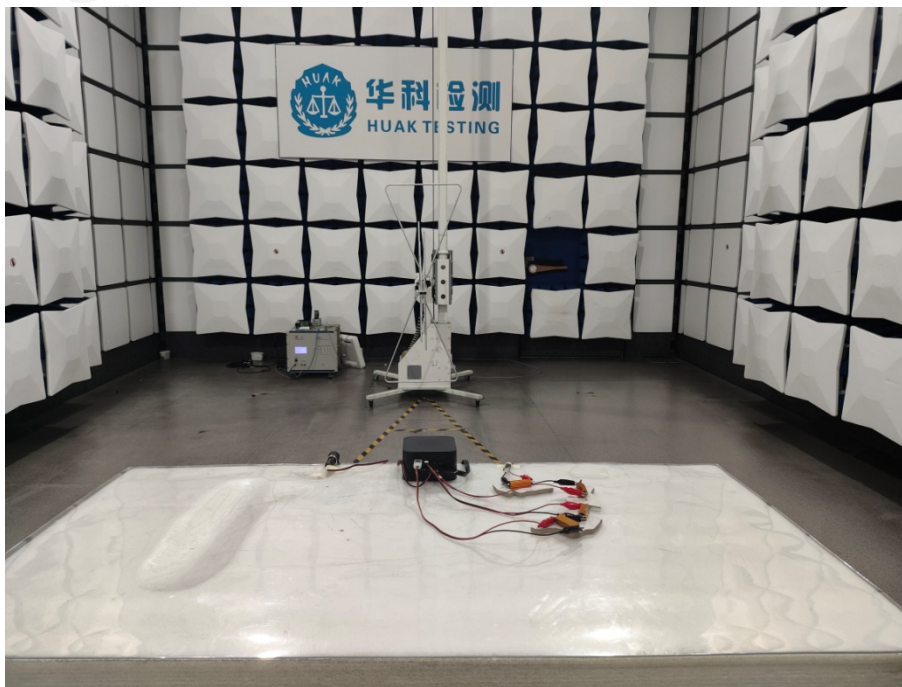
Temperature (°C)	Frequency error (Hz)		Frequency error (ppm)	
	QPSK	16QAM	QPSK	16QAM
-30°	-3.08	3.05	-0.003951	0.003900
-20°	-2.45	-2.50	-0.003143	-0.003197
-10°	-3.68	-3.22	-0.004721	-0.004118
0°	-3.71	3.13	-0.004759	0.004003
10°	-3.68	-2.17	-0.004721	-0.002775
20°	-4.38	-3.95	-0.005619	-0.005051
30°	-3.81	-3.35	-0.004888	-0.004284
40°	-5.38	1.34	-0.006902	0.001714
50°	-3.60	-3.42	-0.004618	-0.004373



HUAKE TESTING

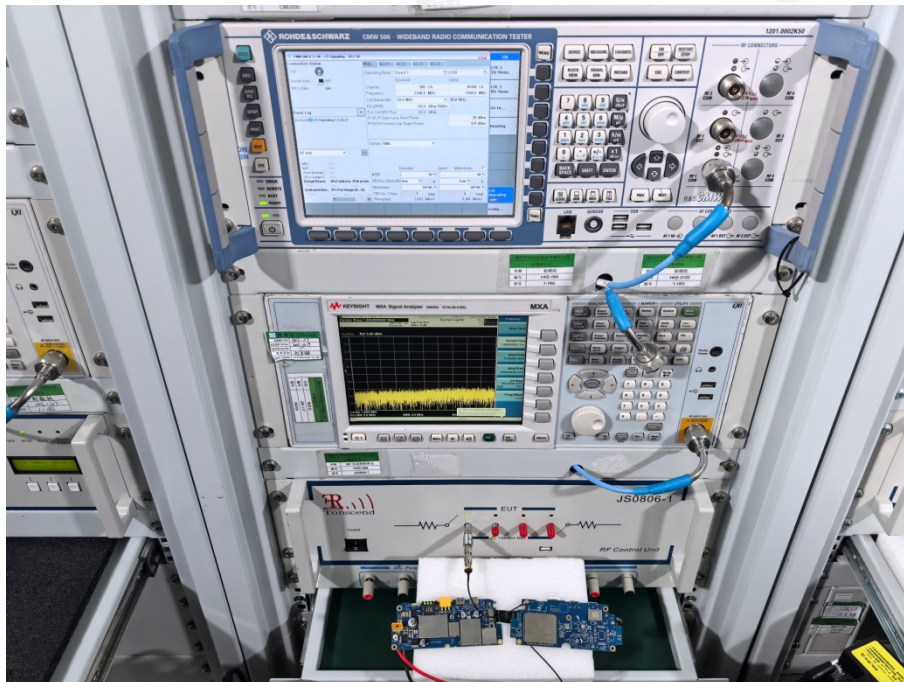
4 Test Setup Photos of the EUT

Radiated Emissions



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RF Conducted Emission





HUAKE TESTING

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5 Photos of the EUT

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

.....End of Report.....



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