TEST REPORT
FCC Part 27

Report Reference No.	HK2007011614-3E
FCC ID.	**2ACHB-R550**
Compiled by (position+printedname+signature) ..	File administrators Gary Qian
Supervised by (position+printedname+signature) ...	Technique principal Eden Hu
Approved by (position+printedname+signature) ...	ManagerJason Zhou
Date of issue	Jul. 20, 2020

Testing Laboratory Name	**Shenzhen HUAK Testing Technology Co., Ltd.**
Address	1F, B2 Building, Junfeng Zhongcheng Zhizao Innovation Park, Heping Community, Fuhai Street, Bao'an District, Shenzhen,China
Applicant's name	**ComNav Technology Ltd.**
Address	Building 2, No.618, Chengliu Middle Rd. Jiading district. Shanghai China
Test specification	
Standard	**FCC CFR Title 47 Part 2, Part 27**
TRF Originator	Shenzhen HUAK Testing Technology Co., Ltd.

Test item description .....:	R550 Data Collector
Trade Mark	SinoGNSS® By ComNav Technology Ltd.
Model/Type reference	R550
Listed Models	N/A
Modulation Type	QPSK, 16QAM
Rating	DC 3.8V From Battery
Hardware version	SD55-D3_Main board_P3 8400347FA30
Software version	V1.3
Result	**PASS**

TEST REPORT

Test Report No. :	HK2007011614-3E	Jul. 20, 2020 Date of issue

Equipment under Test	:	R550 Data Collector
Model /Type	:	R550
Listed Models	:	N/A
Applicant	:	**ComNav Technology Ltd.**
Address	:	Building 2, No.618, Chengliu Middle Rd. Jiading district. Shanghai China
Manufacturer	:	**ComNav Technology Ltd.**
Address	:	Building 2, No.618, Chengliu Middle Rd. Jiading district. Shanghai 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.

Revison History

Revision	Issue Date	Revisions	Revised By
V1.0	2020-07-20	Initial Issue	James Zhou

Contents

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 27 :MISCELLANEOUS WIRELESS COMMUNICATIONS 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

2 SUMMARY

2.1 General Remarks

Date of receipt of test sample	:	Jun. 15, 2020
Testing commenced on	:	Jun. 15, 2020
Testing concluded on	:	Jul. 20, 2020

2.2 Product Description

Name of EUT	R550 Data Collector
Model/Type reference:	R550
List Model:	N/A
Power supply:	DC 3.8V From Battery or DC 9V from Adapter
Adapter Information:	MODEL: KA1801A-0902000DE INPUT: 100-240V~50/60Hz 0.55A Max OUTPUT: 9V ⎓2000mA
Modilation Type	QPSK,16QAM
Antenna Type	FPC Antenna
Operation Frequency Band	LTE Band 41
Operation frequency	LTE Band 41:2555~2655 MHz
LTE Release	R8
Extreme temp. Tolerance	-30°C to +50°C
Extreme vol. Limits	3.42VDC to 4.18VDC (nominal: 3.8VDC)

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)		

DC 3.8V From Battery

2.4 Normal Accessory setting

Fully charged battery was used during the test.

2.5 EUT configuration

The following peripheral devices and interface cables were connected during the measurement:

● - supplied by the manufacturer

○ - supplied by the lab

○	Power Cable	Length (m) :	/
		Shield :	/
		Detachable :	/
○	Multimeter	Manufacturer :	/
		Model No. :	/

2.6 Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for**FCC ID: 2ACHB-R550** filing to comply with FCC Part 27, Rules.

2.7 Modifications

No modifications were implemented to meet testing criteria.

2.8 GeneralTest Conditions/Configurations

2.9.1 TestEnvironment

EnvironmentParameter	SelectedValuesDuringTests	
Relative Humidity	Ambient	
Temperature	TN	Ambient
Voltage	VL	3.42V
	VN	3.80V
	VH	4.18V

NOTE:VL=lowerextreme testvoltageVN=nominalvoltage
VH=upperextreme testvoltageTN=normaltemperature

3 TEST ENVIRONMENT

3.1 Address of the test laboratory

Test Firm	:	Shenzhen HUAK Testing Technology Co., Ltd.
Address	:	1F, B2 Building, Junfeng Zhongcheng Zhizao Innovation Park, Fuhai Street, Bao'an District, Shenzhen City, China
FCC designation number	:	CN1229
test firm registration number	:	616276

3.2 Test Description

Test Item	FCCRuleNo.	Verdict
Effective(Isotropic)RadiatedOutputPower	Part 2.1046 27.50(h)(2)	Pass
Peak-AverageRatio	Part 2.1046	Pass
ModulationCharacteristics	§2.1047	N/A
Bandwidth	Part 2.1049	Pass
BandEdgesCompliance	Part 2.1051 27.53(m)	Pass
SpuriousEmissionatAntennaTerminals	Part 2.1051 27.53(m)	Pass
Field Strengthof Spurious Radiation	Part 2.1053 27.53(m)	Pass
Frequency Stability	Part 2.1055 27.54	Pass
NOTE 1:For theverdict,the“N/A”denotes“not applicable”,the“N/T”denotes “nottested”.		

Remark:
1. The measurement uncertainty is not included in the test result.

3.3 Equipments Used during the Test

Test Equipment	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Due Date
LISN	R&S	ENV216	HKE-059	2019/12/26	2020/12/25
LISN	R&S	ENV216	HKE-002	2019/12/26	2020/12/25
Receiver	R&S	ESCI 7	HKE-010	2019/12/26	2020/12/25
Spectrum analyzer	R&S	FSP40	HKE-025	2019/12/26	2020/12/25
Spectrum analyzer	Agilent	N9020A	HKE-048	2019/12/26	2020/12/25
RF automatic control unit	Tonscend	JS0806-1	HKE-060	2019/12/26	2020/12/25
Loop antenna	Schwarzbeck	FMZB 1519 B	HKE-014	2019/12/26	2020/12/25
Bilog Broadband Antenna	Schwarzbeck	VULB9163	HKE-012	2019/12/26	2020/12/25
Horn antenna	Schwarzbeck	9120D	HKE-013	2019/12/26	2020/12/25
High gain antenna	Schwarzbeck	LB-180400KF	HKE-054	2019/12/26	2020/12/25
Preamplifier	EMCI	EMC051845SE	HKE-015	2019/12/26	2020/12/25
Preamplifier	Agilent	83051A	HKE-016	2019/12/26	2020/12/25
Preamplifier	Schwarzbeck	BBV 9743	HKE-006	2019/12/26	2020/12/25
Temperature and humidity meter	Boyang	HTC-1	HKE-075	2019/12/26	2020/12/25
High-low temperature chamber	Guangke	HT-80L	HKE-118	2019/12/26	2020/12/25
High pass filter unit	Tonscend	JS0806-F	HKE-055	2019/12/26	2020/12/25
RF Cable(below1GHz)	Times	9kHz-1GHz	HKE-117	2019/12/26	2020/12/25
RF Cable(above 1GHz)	Times	1-40G	HKE-034	2019/12/26	2020/12/25
Power meter	Agilent	E4419B	HKE-085	2019/12/26	2020/12/25
Power Sensor	Agilent	E9300A	HKE-086	2019/12/26	2020/12/25
Conducted test software	Tonscend	TS+ Rev 2.5.0.0	HKE-081	N/A	N/A
Radiated test software	Tonscend	TS+ Rev 2.5.0.0	HKE-082	N/A	N/A
RF test software	Tonscend	JS1120-B Version 2.6	HKE-083	N/A	N/A
RF test software	Tonscend	JS1120-4	HKE-113	N/A	N/A
RF test software	Tonscend	JS1120-3	HKE-114	N/A	N/A
RF test software	Tonscend	JS1120-1	HKE-115	N/A	N/A
Wireless Communication Test Set	R&S	CMW500	HKE-026	2019/12/26	2020/12/25
Wireless Communication Test Set	R&S	CMU200	HKE-029	2019/12/26	2020/12/25

4 TEST CONDITIONS AND RESULTS

4.1 Output Power

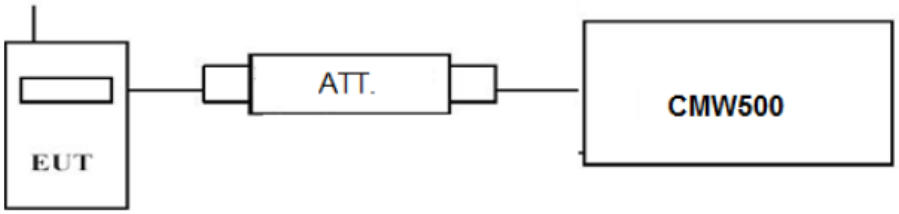
4.1.1 Coducted Output Power

TEST APPLICABLE

Part 27.50(h)(2) , during the process of testing, the EUT was controlled via R&S Digital Radio Communication tester (CMW500) to ensure max power transmission and proper modulation. This result contains output power measurements for the EUT. In all cases, output power is within the specified limits.

TEST CONFIGURATION

ConductedPowerMeasurement:



TEST PROCEDURE

Conducted Power Measurement:

a) Place the EUT on a bench and set it in transmitting mode.
b) Connect a low loss RF cable from the antenna port to a CMW500 by an Att.
c) EUT Communicate with CMW500 then selects a channel for testing.
d) Add a correction factor to the display CMW500, and then test.

TEST RESULTS

Remark:

1. We measured all RB Configuration refer 3GPP TS136 521 for each Channel Bandwidth of LTE Band 41;

LTE Band 41				
TX Channel Bandwidth	Frequency (MHz)	RB Size/Offset	Burst Average Power [dBm]	
			QPSK	16QAM
5 MHz	2593	1 RB low	20.53	22.45
		1 RB mid	20.66	22.53
		1 RB high	20.62	22.55
		50% RB low	21.43	22.56
		50% RB mid	21.52	22.44
		50% RB high	21.55	22.52
		100% RB	21.56	21.73
10 MHz	2593	1 RB low	21.62	20.83
		1 RB mid	21.93	20.50
		1 RB high	21.76	20.65
		50% RB low	20.75	20.75
		50% RB mid	20.64	20.63
		50% RB high	20.62	20.63
		100% RB	20.70	19.68
15 MHz	2593	1 RB low	21.65	20.55
		1 RB mid	22.03	20.66
		1 RB high	21.79	20.91
		50% RB low	20.55	20.91
		50% RB mid	20.66	20.55
		50% RB high	20.90	20.66
		100% RB	20.79	19.79

Note: band 41 do not support BW=20MHz，and only support the middle channel

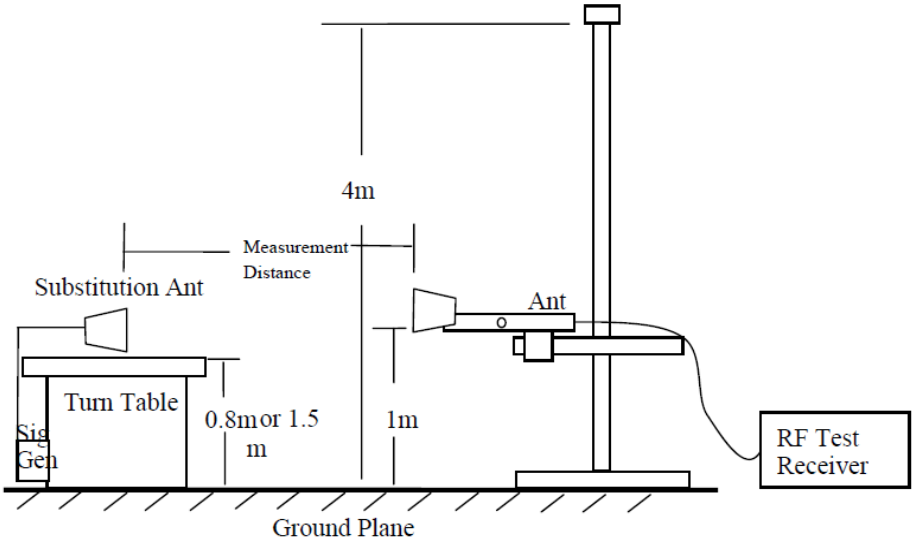
4.1.2. Radiated Output Power

LIMIT

This is the test for the maximum radiated power from the EUT.

TEST CONFIGURATION

RadiatedPowerMeasurement:
remark : 0.8m for below 1GHz, 1.5m for above 1GHz



TEST PROCEDURE
The EUT was setup according to EIA/TIA 603D

a. The EUT shall be placed at the specified height on a support, and in the position closestto normal use as declared by provider.
b. The test antenna shall be oriented initially for vertical polarization and shall be chosen to correspond to thefrequency 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 themaximum 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 antennaorientated 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 ifnecessary.
q. Test site anechoic chamber refer to ANSI C63.4.

TEST RESULTS

Radiated Measurement:

Remark:

1. *We measured all RB Configuration refer 3GPP TS136 521 for each Channel Bandwidth of LTE Band 41; recorded worst case for each Channel Bandwidth of LTE Band 41.*
2. *EIRP=P_s(dBm)-P_{cl}(dB)+G_a(dBi)*
3. *We measured both Horizontal and Vertical direction.*

LTE Band 41_Channel Bandwidth 5MHz_QPSK_1RB#0

Frequency (MHz)	P_s (dBm)	P_{cl} (dB)	G_a Antenna Gain(dB)	Burst Average EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
2593	7.40	3.49	15.12	19.03	33.01	13.98	V
2593	7.86	3.55	15.12	19.43	33.01	13.58	H

LTE Band 41_Channel Bandwidth 10MHz_QPSK_1RB#0

Frequency (MHz)	P_s (dBm)	P_{cl} (dB)	G_a Antenna Gain(dB)	Burst Average EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
2593	7.90	3.41	15.12	19.61	33.01	13.40	V
2593	8.19	3.49	15.12	19.82	33.01	13.19	H

LTE Band 41_Channel Bandwidth 15MHz_QPSK_1RB#0

Frequency (MHz)	P_s (dBm)	P_{cl} (dB)	G_a Antenna Gain(dB)	Burst Average EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
2593	7.81	3.41	15.12	19.52	33.01	13.49	V
2593	7.35	3.49	15.12	18.98	33.01	14.03	H

LTE Band 41_Channel Bandwidth 5MHz_16QAM_1RB#0

Frequency (MHz)	P_s (dBm)	P_{cl} (dB)	G_a Antenna Gain(dB)	Burst Average EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
2593	7.45	3.41	15.12	19.16	33.01	13.85	V
2593	7.42	3.49	15.12	19.05	33.01	13.96	H

LTE Band 41_Channel Bandwidth 10MHz_16QAM_1RB#0

Frequency (MHz)	P_s (dBm)	P_{cl} (dB)	G_a Antenna Gain(dB)	Burst Average EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
2593	7.38	3.41	15.12	19.09	33.01	13.92	V
2593	7.88	3.49	15.12	19.51	33.01	13.50	H

LTE Band 41_Channel Bandwidth 15MHz_16QAM_1RB#0

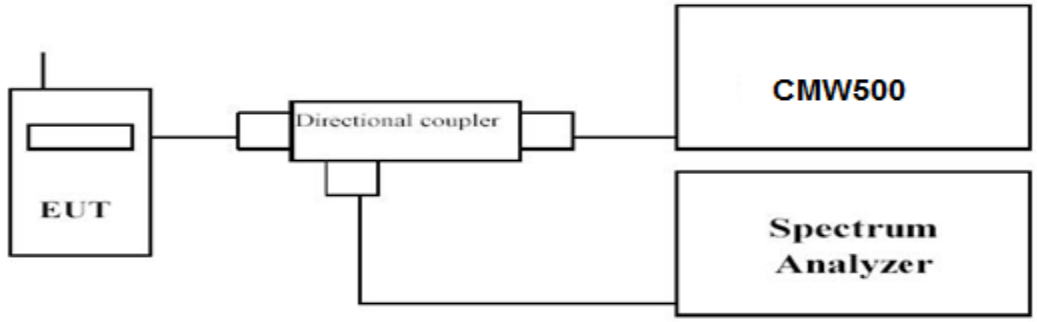
Frequency (MHz)	P_s (dBm)	P_{cl} (dB)	G_a Antenna Gain(dB)	Burst Average EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
2593	7.67	3.41	15.12	19.38	33.01	13.63	V
2593	7.60	3.49	15.12	19.23	33.01	13.78	H

4.2 Peak-to-Average Ratio (PAR)

LIMIT

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

TEST CONFIGURATION



TEST PROCEDURE

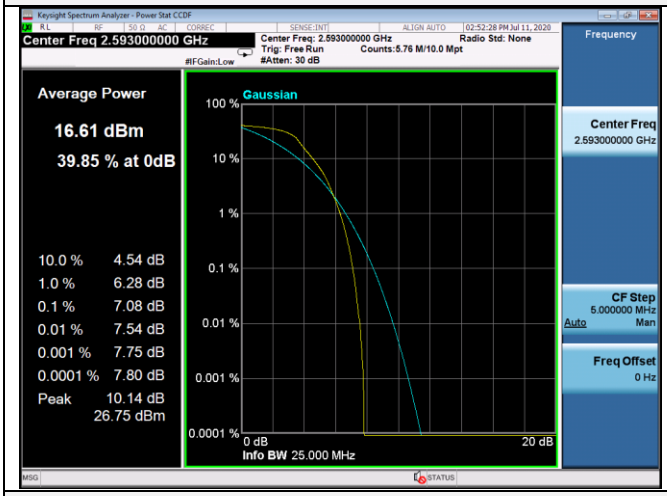
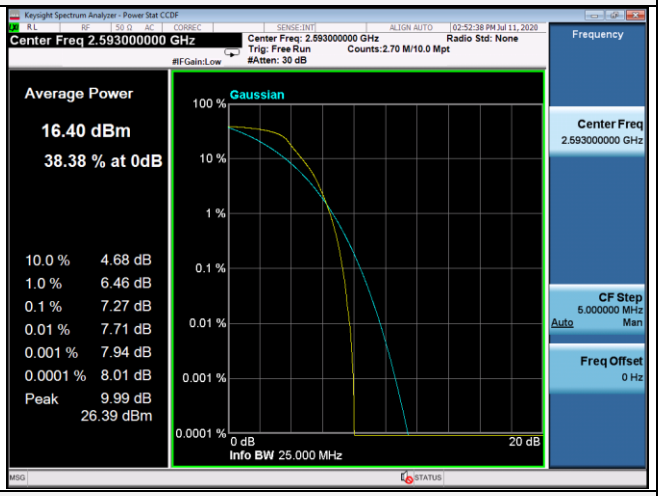
1. Refer to instrument's analyzer instruction manual for details on how to use the power statistics/CCDF function;
2. Set resolution/measurement bandwidth ≥ signal's occupied bandwidth;
3. Set the number of counts to a value that stabilizes the measured CCDF curve;
4. Set the measurement interval as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

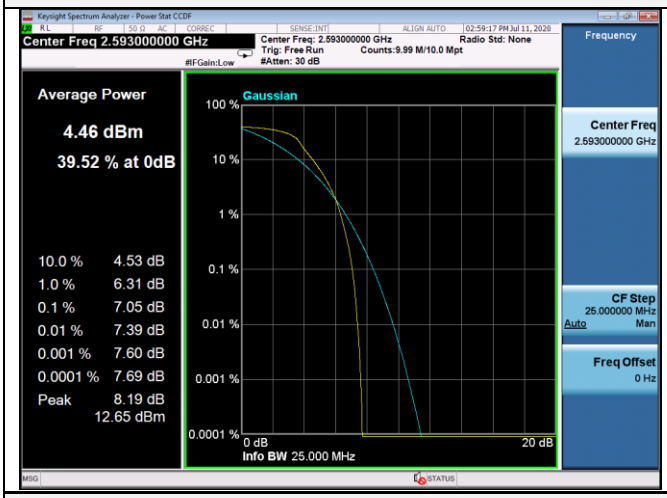
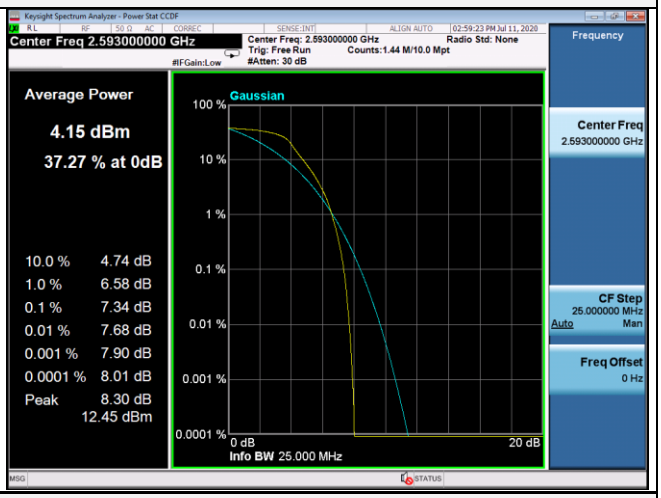
TEST RESULTS

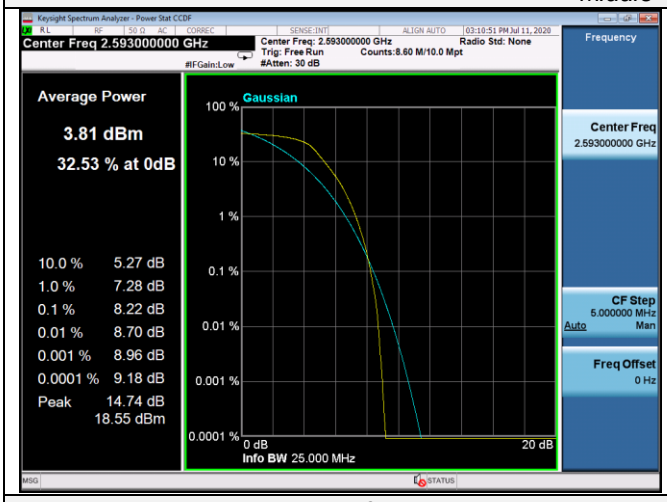
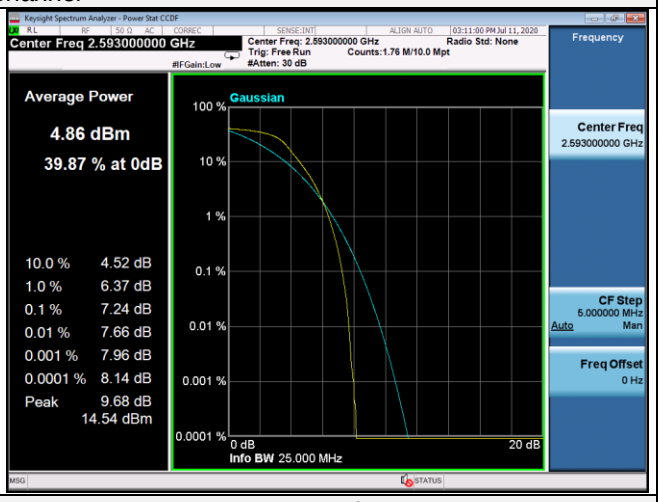
Remark:

1. *We measured all RB Configuration refer 3GPP TS136 521 for each Channel Bandwidth of LTE Band 41; recorded worst case for each Channel Bandwidth of LTE Band 41.*

LTE Band 41				
TX Channel Bandwidth	Frequency (MHz)	RB Size/Offset	PAPR(dB)	
			QPSK	16QAM
5 MHz	2593	*1RB#0*	7.08	7.27
10 MHz	2593	*1RB#0*	7.05	7.34
15 MHz	2593	*1RB#0*	8.22	7.24

LTE Band 41–5MHz Channel BandwidthPAPR	
QPSK	16QAM
Middle Channel	
	
1RB#0	1RB#0

LTE Band 41–10MHz Channel BandwidthPAPR	
Middle Channel	
	
1RB#0	1RB#0

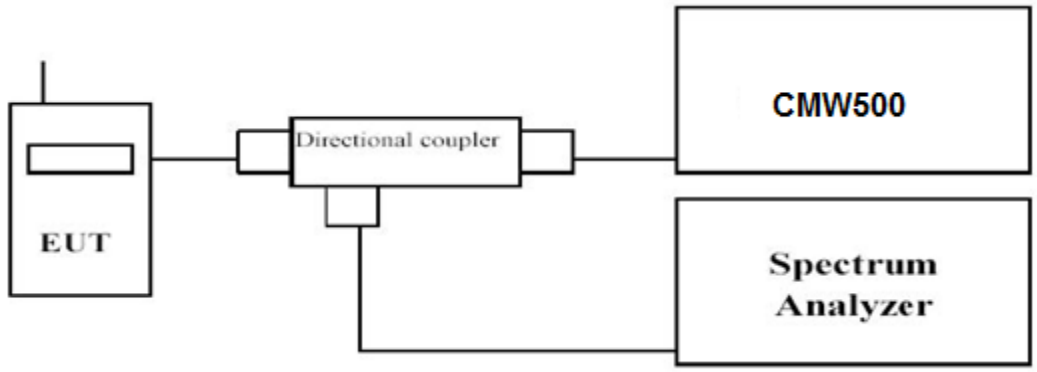
LTE Band 41– 15 MHz Channel BandwidthPAPR	
Middle Channel	
	
1RB#0	*1RB#0*

4.3 Occupied Bandwidth and Emission Bandwidth

LIMIT

N/A

TEST CONFIGURATION



TEST PROCEDURE

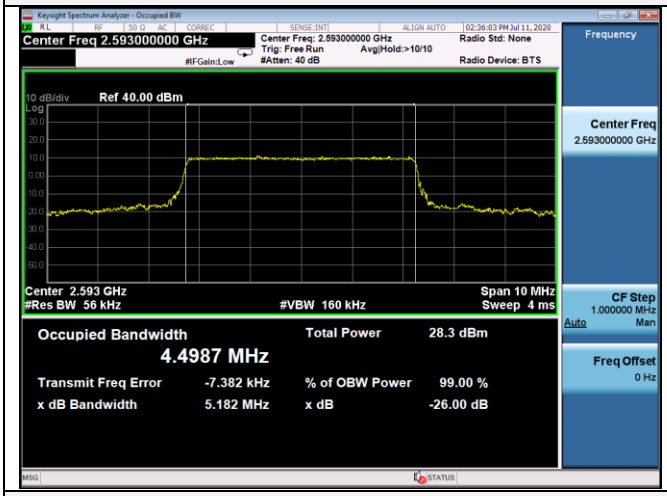
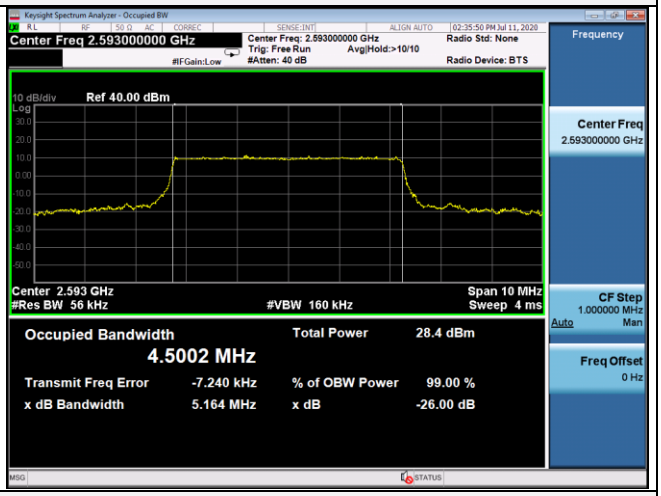
The transmitter output was connected to a calibrated coaxial cable and coupler, the other end of which was connected to a spectrum analyzer. The occupied bandwidth was measured with the spectrum analyzer at low, middle and high channel in each band. The -26dBc Emission bandwidth was also measured and recorded. Set RBWwas 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 isthe delta frequency between the two points where the display line intersects the signal trace.

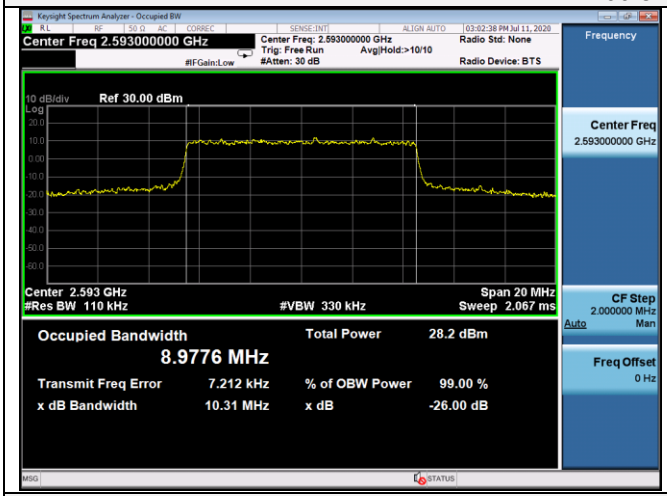
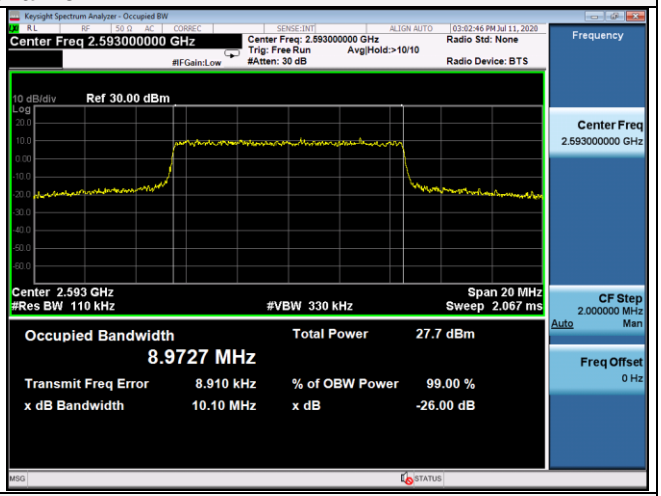
TEST RESULTS

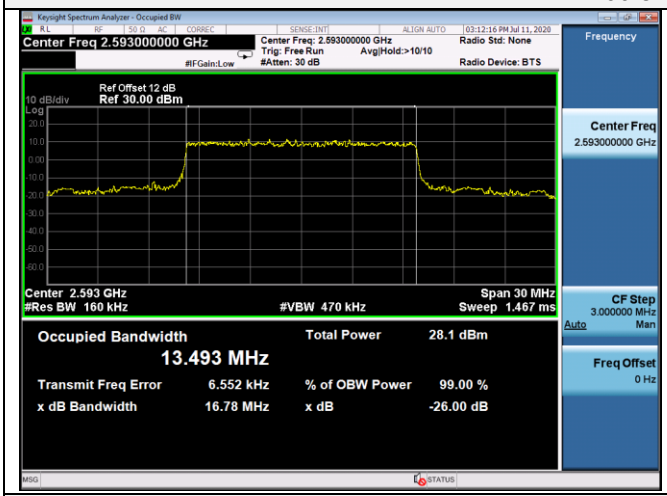
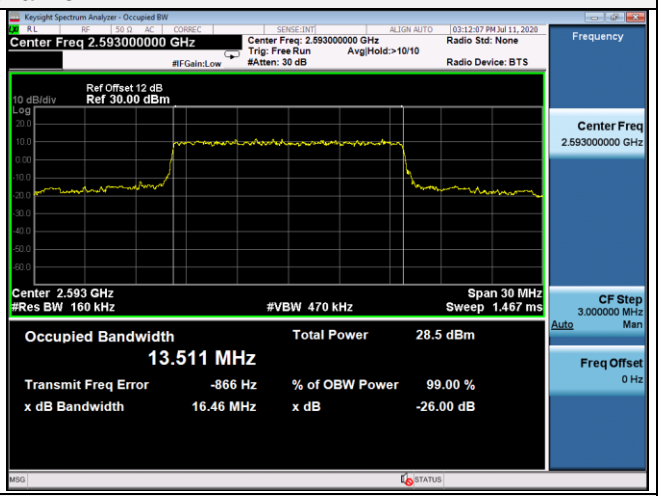
Remark:

1. *We were tested all RB Configuration refer 3GPP TS136 521 for each Channel Bandwidth of LTE Band 41; recorded worst case for each Channel Bandwidth of LTE Band 41.*

LTE Band 41						
TX Channel Bandwidth	RB Size/Offset	Frequency (MHz)	99% Occupied bandwidth (MHz)		-26dBc Emission bandwidth (MHz)	
			QPSK	16QAM	QPSK	16QAM
5 MHz	*25RB#0*	2593	4.4987	4.5002	5.182	5.164
10 MHz	*50RB#0*	2593	8.9776	8.9727	10.31	10.10
15 MHz	*75RB#0*	2593	13.493	13.511	16.78	16.46

LTE Band 41–5MHz Channel Bandwidth Occupied Bandwidth and Emission Bandwidth	
QPSK	16QAM
Middle Channel	
	
25RB#0	25RB#0

LTE Band 41–10MHz Channel Bandwidth Occupied Bandwidth and Emission Bandwidth	
QPSK	16QAM
Middle Channel	
	
50RB#0	50RB#0

LTE Band 41–15MHz Channel Bandwidth Occupied Bandwidth and Emission Bandwidth	
QPSK	16QAM
Middle Channel	
	
75RB#0	75RB#0

4.4 Band Edge compliance

LIMIT

the power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 40 + 10 log P dB (−10 dBm, 100 nW) on all frequencies between the channel edge and 5 MHz from the channel edge, 43 + 10 log P dB (−13 dBm, 50 nW) on all frequencies between 5 MHz and X MHz from the channel edge, and 55 + 10 log P dB (−25 dBm, 3 nW) on all frequencies more than 20 MHz from the channel edge, where XMHz is the greater of 6 MHz or the actual emission bandwidth (26 dB).

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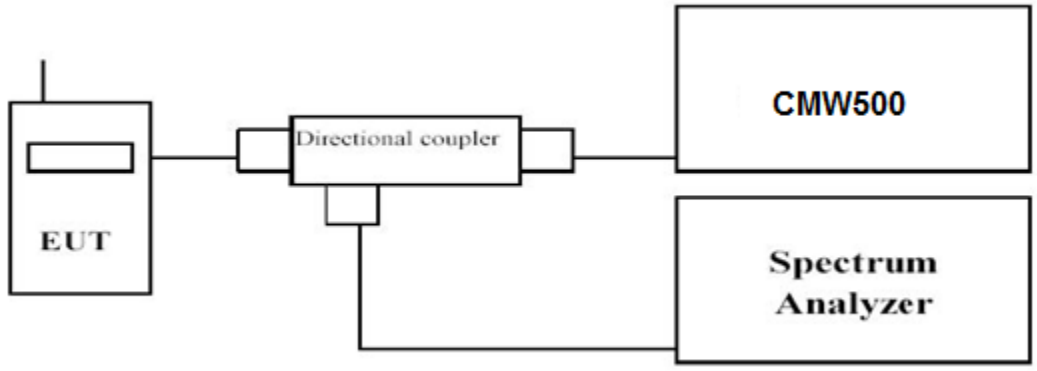
TEST CONFIGURATION



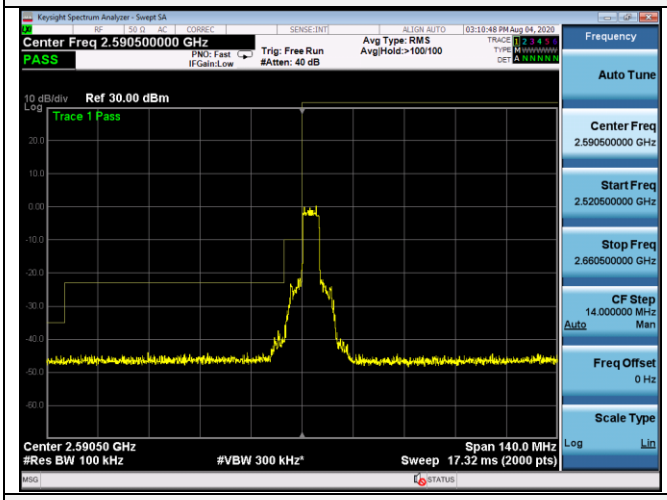
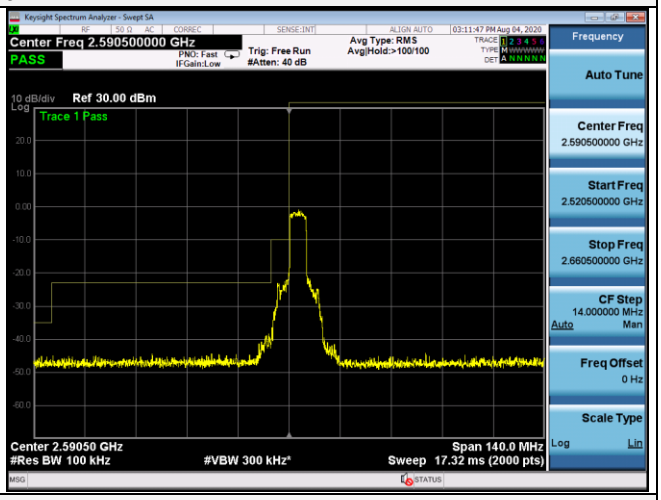
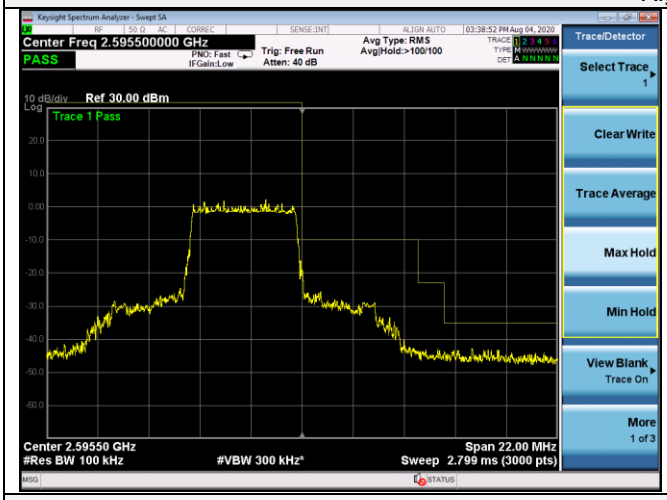
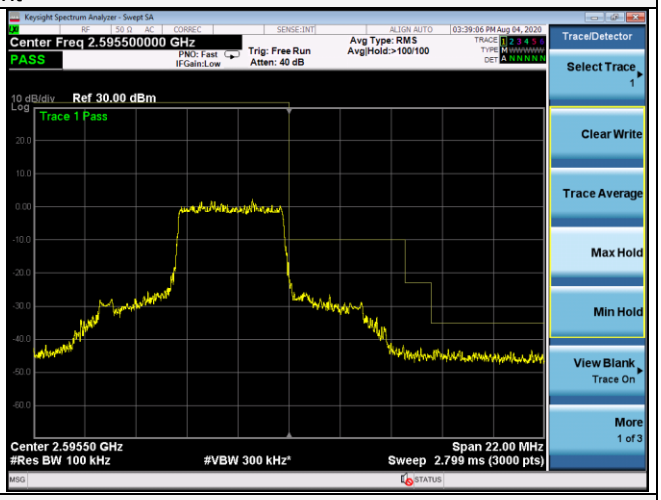
TEST PROCEDURE

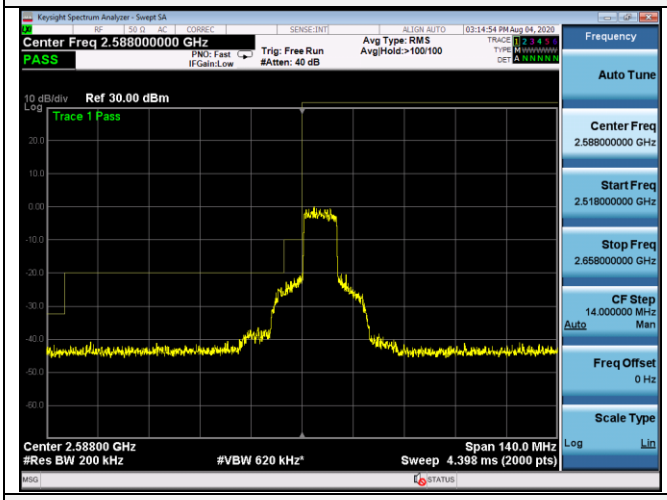
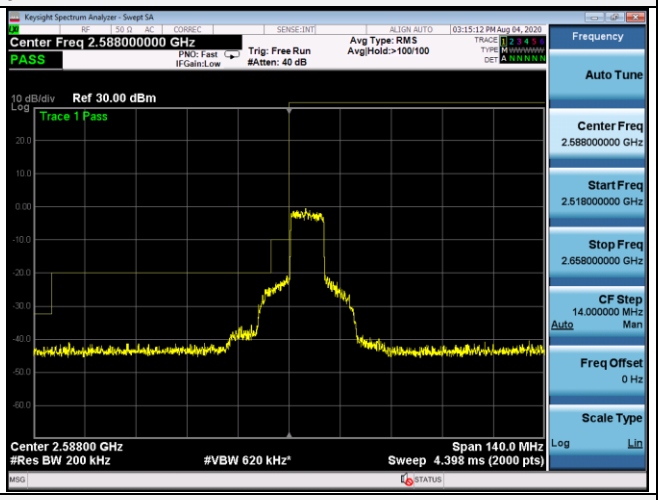
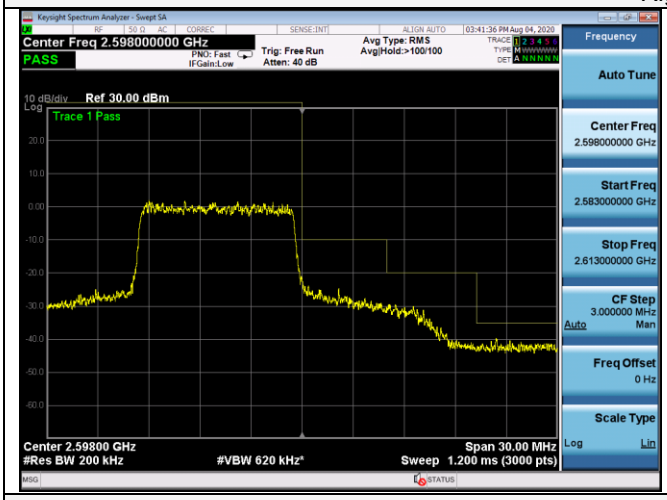
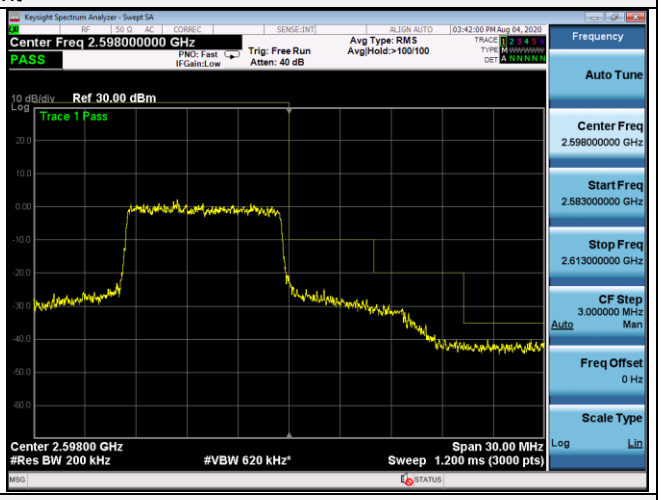
1. The transmitter output port was connected to base station.
2. The RF output of EUT was connected to the power meter by RF cable and attenuator, the path loss was compensated to the results for each measurement.
3. Set EUT at maximum power through base station.
4. Select lowestand highest channels for each band and different modulation.
5. Measure Band edge using RMS (Average) detector by spectrum
6. Set RBW = 100 kHz, VBW=300 kHz, Span=50MHz Peak Detector.

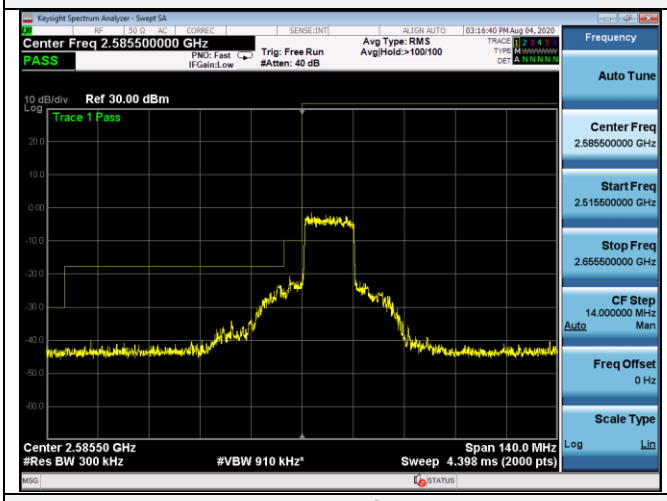
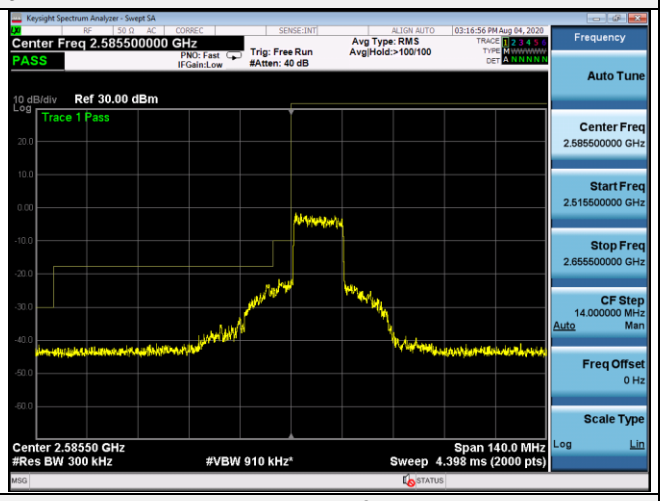
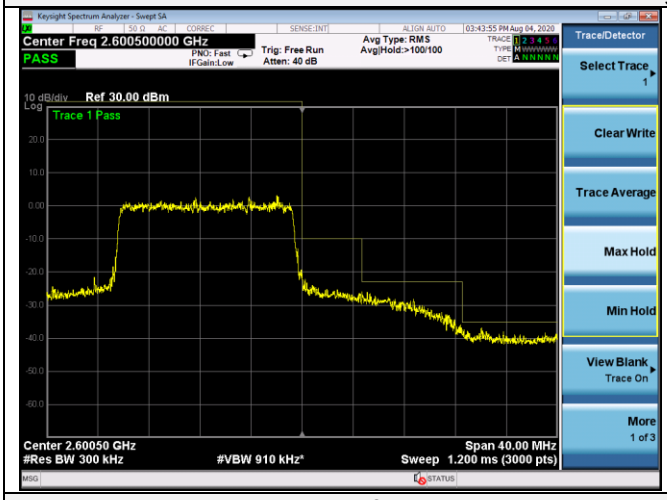
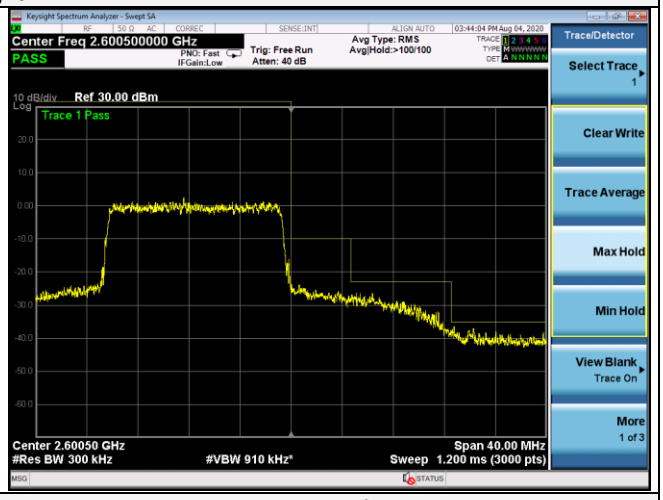
TEST RESULTS

Remark:

1. *We were tested all RB Configuration refer 3GPP TS136 521 for each Channel Bandwidth of LTE Band 41; recorded worst case for each Channel Bandwidth of LTE Band 41.*

LTE Band 41–5MHz Channel BandwidthBand Edge Compliance	
QPSK	16QAM
Left	
	
25RB#0	25RB#0
Right	
	
25RB#0	25RB#0

LTE Band 41– 10 MHz Channel BandwidthBand Edge Compliance	
QPSK	16QAM
Left	
	
50RB#0	50RB#0
Right	
	
50RB#0	50RB#0

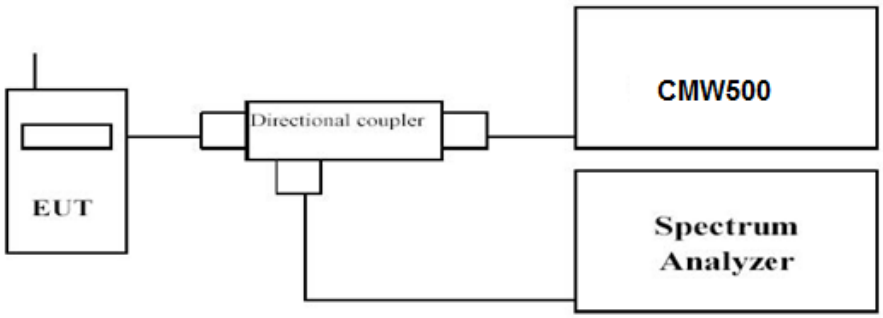
LTE Band 41–15MHz Channel BandwidthBand Edge Compliance	
QPSK	16QAM
Left	
	
75RB#0	75RB#0
Right	
	
75RB#0	75RB#0

4.5 Spurious Emssionon Antenna Port

LIMIT

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 40 + 10 log P dB (−10 dBm, 100 nW) on all frequencies between the channel edge and 5 MHz from the channel edge, 43 + 10 log P dB (−13 dBm, 50 nW) on all frequencies between 5 MHz and X MHz from the channel edge, and 55 + 10 log P dB (−25 dBm, 3 nW) on all frequencies more than 20 MHz from the channel edge, where X MHz is the greater of 6 MHz or the actual emission bandwidth (26 dB).

TEST CONFIGURATION



TEST PROCEDURE

The EUT was setup according to EIA/TIA 603D

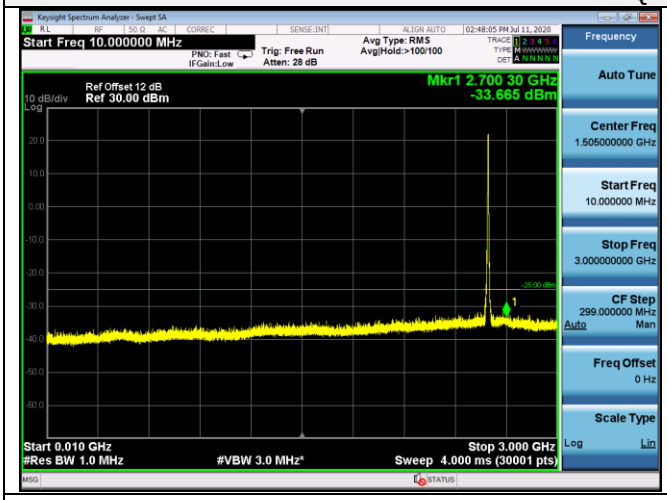
a. Place the EUT on a bench and set it in transmitting mode.
b. Connect a low loss RF cable from the antenna port to a spectrum analyzer andCMW500 by a Directional Couple.
c. EUT Communicate with CMW500, then select a channel for testing.
d. Add a correction factor to the display of spectrum, and then test.
e. The resolution bandwidth of the spectrum analyzer was setsufficient scans were taken to show the out of band Emission if any up to10th harmonic.
f. Please refer to following tables for test antenna conducted emissions.

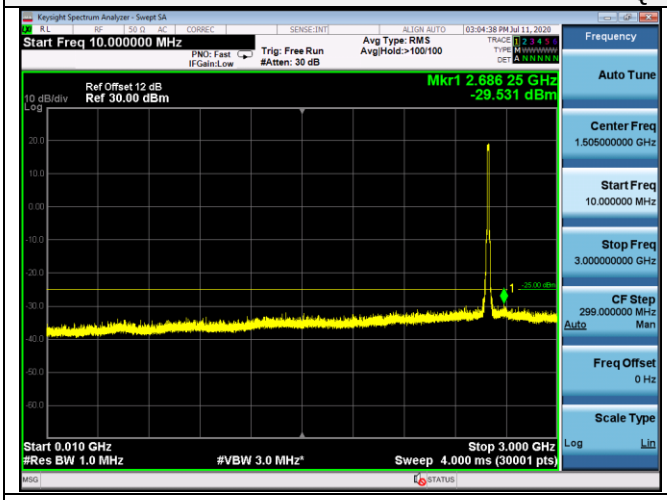
Working Frequency	Sub range (GHz)	RBW	VBW	Sweep time (s)
LTE Band 41	0.03~26.5	1 MHz	3 MHz	Auto

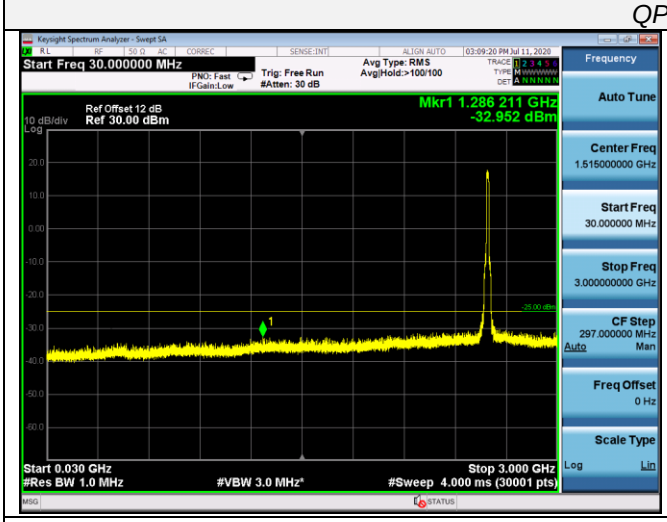
TEST RESULTS

Remark:

1. *We were tested all RB Configuration refer 3GPP TS136 521 for each Channel Bandwidth of LTE Band 41; recorded worst case at the QPSK Mode for each Channel Bandwidth of LTE Band 41*

LTE Band 41-5 MHz Channel Bandwidth	
Middle Channel	
QPSK	
	
10MHz~3GHz	*3GHz ~9GHz*
	
9 GHz ~15 GHz	*15 GHz ~26.5GHz*

LTE Band 41-10 MHz Channel Bandwidth	
Middle Channel	
QPSK	
	
10MHz~3GHz	3GHz ~9GHz
	
9 GHz ~15 GHz	15 GHz ~26.5GHz

LTE Band 41-15 MHz Channel Bandwidth	
Middle Channel	
QPSK	
	
10MHz~3GHz	3GHz ~9GHz

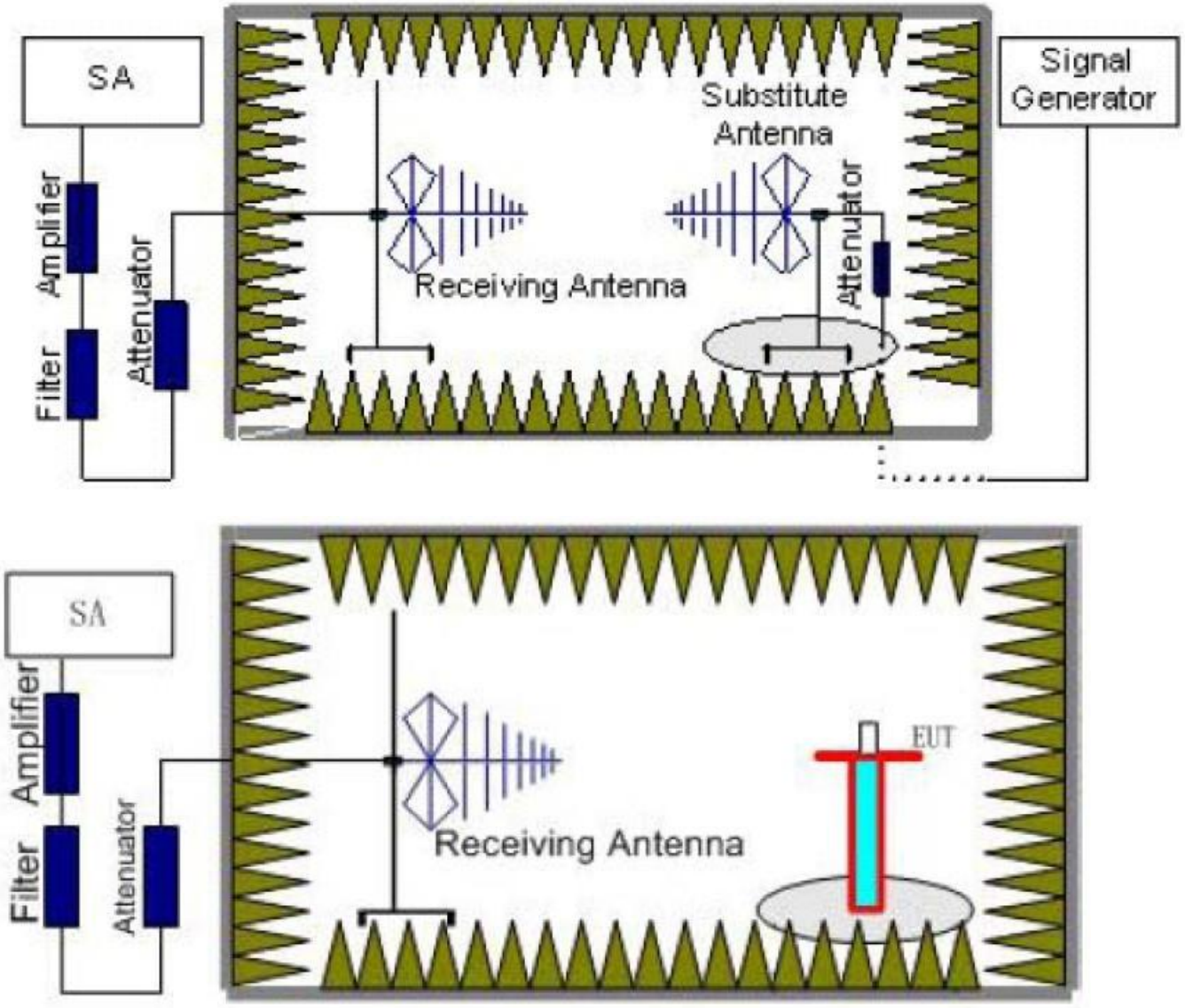
	
9 GHz ~15 GHz	15 GHz ~26.5GHz

4.6 Radiated Spurious Emssion

TEST APPLICABLE

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 40 + 10 log P dB (−10 dBm, 100 nW) on all frequencies between the channel edge and 5 MHz from the channel edge, 43 + 10 log P dB (−13 dBm, 50 nW) on all frequencies between 5 MHz and X MHz from the channel edge, and 55 + 10 log P dB (−25 dBm, 3 nW) on all frequencies more than 20 MHz from the channel edge, where XMHz is the greater of 6 MHz or the actual emission bandwidth (26 dB).

TEST CONFIGURATION



TEST PROCEDURE

The EUT was setup according to EIA/TIA 603D

a. The EUT shall be placed at the specified height on a support, and in the position closestto 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 themaximum 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 ifnecessary.
q. Test site anechoic chamber refer to ANSI C63.4:2014.

Frequency	Channel	Frequency Range	Verdict
LTE Band 41	Middle	30MHz -26.5GHz	PASS

Radiated Measurement:

Remark:
1. *We measured all RB Configuration refer 3GPP TS136 521 for each Channel Bandwidth of LTE Band 41; recorded worst case for each Channel Bandwidth of LTE Band 41.*
2. EIRP=P_S(dBm)-P_{cl}(dB) +G_a(dBi)
3. Not recorded other points means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
4. Margin = Limit – EIRP

LTE Band 41_Channel Bandwidth 5MHz_QPSK_1RB#0

Frequency (MHz)	P_S (dBm)	P_{cl} (dB)	Diatance	G_a Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
5200.0	-42.16	4.41	3.00	12.34	-34.23	-25.00	9.23	H
7800.0	-49.77	5.38	3.00	13.58	-41.57	-25.00	16.57	H
5200.0	-44.68	4.41	3.00	12.34	-36.75	-25.00	11.75	V
7800.0	-51.75	5.38	3.00	13.58	-43.55	-25.00	18.55	V

LTE Band 41_Channel Bandwidth 10MHz_QPSK_1RB#0

Frequency (MHz)	Ps (dBm)	P_{cl} (dB)	Diatance	G_a Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
5200.0	-41.53	4.41	3.00	12.34	-33.6	-25.00	8.6	H
7800.0	-49.35	5.38	3.00	13.58	-41.15	-25.00	16.15	H
5200.0	-43.87	4.41	3.00	12.34	-35.94	-25.00	10.94	V
7800.0	-51.42	5.38	3.00	13.58	-43.22	-25.00	18.22	V

LTE Band 41_Channel Bandwidth 15MHz_QPSK_1RB#0

Frequency (MHz)	Ps (dBm)	P_{cl} (dB)	Diatance	G_a Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
5200.0	-42.27	4.41	3.00	12.34	-34.34	-25.00	9.34	H
7800.0	-50.04	5.38	3.00	13.58	-41.84	-25.00	16.84	H
5200.0	-44.32	4.41	3.00	12.34	-36.39	-25.00	11.39	V
7800.0	-50.93	5.38	3.00	13.58	-42.73	-25.00	17.73	V

LTE Band 41_Channel Bandwidth 5MHz_16QAM_1RB#0

Frequency (MHz)	Ps (dBm)	P_{cl} (dB)	Diatance	G_a Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
5200.0	-41.82	4.41	3.00	12.34	-33.89	-25.00	8.89	H
7800.0	-49.58	5.38	3.00	13.58	-41.38	-25.00	16.38	H
5200.0	-44.51	4.41	3.00	12.34	-36.58	-25.00	11.58	V
7800.0	-51.55	5.38	3.00	13.58	-43.35	-25.00	18.35	V

LTE Band 41_Channel Bandwidth 10MHz_16QAM_1RB#0

Frequency (MHz)	Ps (dBm)	P_{cl} (dB)	Diatance	G_a Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
5200.0	-42.09	4.41	3.00	12.34	-34.16	-25.00	9.16	H
7800.0	-49.42	5.38	3.00	13.58	-41.22	-25.00	16.22	H
5200.0	-44.28	4.41	3.00	12.34	-36.35	-25.00	11.35	V
7800.0	-50.98	5.38	3.00	13.58	-42.78	-25.00	17.78	V

LTE Band 41_Channel Bandwidth 15MHz_16QAM_1RB#0

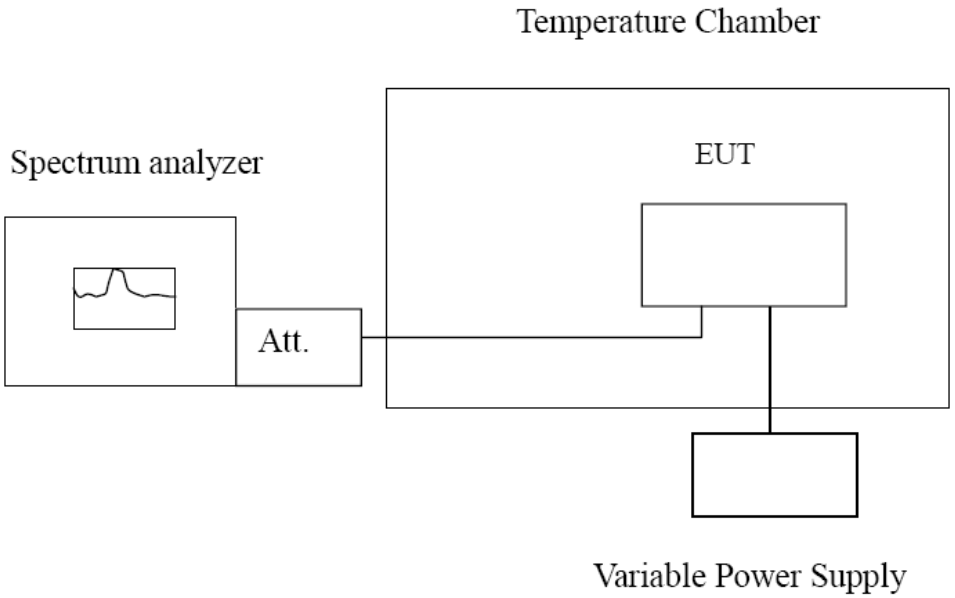
Frequency (MHz)	Ps (dBm)	P_{cl} (dB)	Diatance	G_a Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
5200.0	-42.27	4.41	3.00	12.34	-34.34	-25.00	9.34	H
7800.0	-50.14	5.38	3.00	13.58	-41.94	-25.00	16.94	H
5200.0	-44.47	4.41	3.00	12.34	-36.54	-25.00	11.54	V
7800.0	-50.99	5.38	3.00	13.58	-42.79	-25.00	17.79	V

4.7 Frequency Stability

LIMIT

According to §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 EIA/TIA 603D

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℃.
3. With the EUT, powered via nominal voltage, connected to the CMW500 and in a simulated call on middle channel for LTE band 41, 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℃ increments from -30℃ to +50℃. 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℃.
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 ℃ increments from +50℃ to -30℃. Allow at least 1.5 hours at each temperature, unpowered, before making measurements
9. At all temperature levels hold the temperature to +/- 0.5℃ during the measurement procedure.

Frequency Stability Under Voltage Variations:
Set chamber temperature to 20℃. 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 (±15%) and endpoint, recordthe maximum frequency change.

TEST RESULTS

Remark:
1. We testedall RB Configuration refer 3GPP TS136 521 for each Channel Bandwidth of LTE Band 41; recorded worst case.

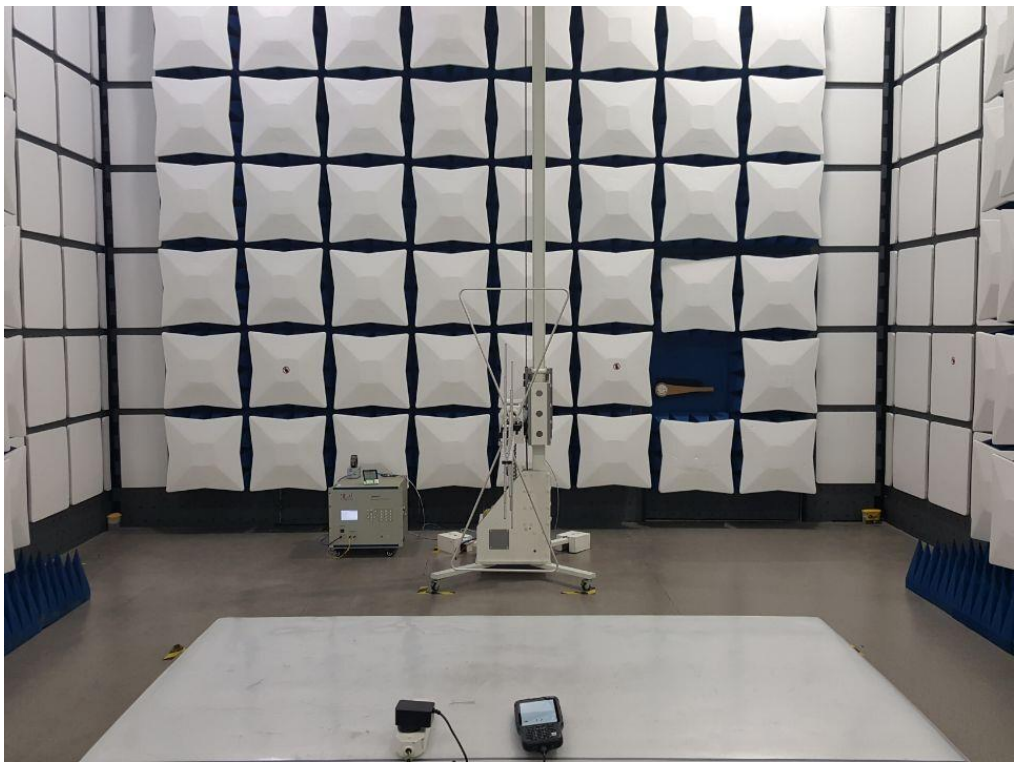
LTE Band 41_5MHz bandwidth_QPSK_1RB#0 (worst case of all bandwidths)

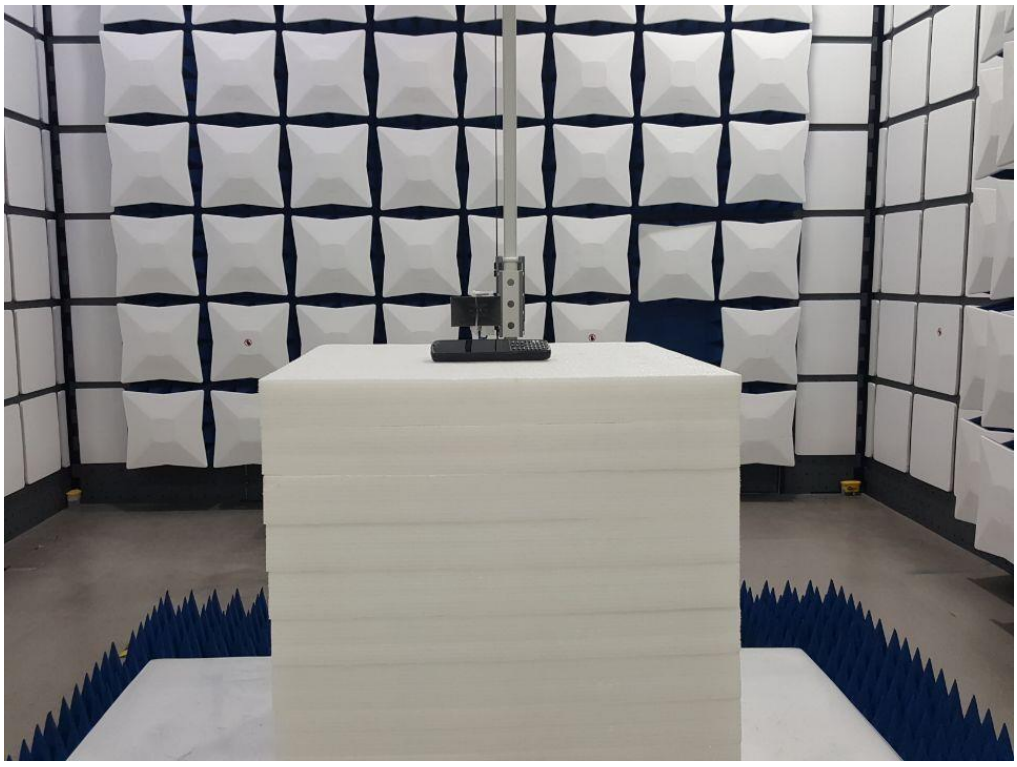
LTE Band 41					
DC Power	**Temperature (℃)**	**Frequency error(Hz)**	**Frequency error(ppm)**	**Limit (ppm)**	**Verdict**
3.40	20	28	-0.006134	2.50	PASS
3.70	20	32	-0.006412	2.50	PASS
4.20	20	18	-0.006816	2.50	PASS
3.70	-30	27	-0.005726	2.50	PASS
3.70	-20	19	0.013318	2.50	PASS
3.70	-10	15	-0.013524	2.50	PASS
3.70	0	32	-0.005652	2.50	PASS
3.70	10	19	0.011701	2.50	PASS
3.70	20	25	-0.014541	2.50	PASS
3.70	30	29	-0.013084	2.50	PASS
3.70	40	15	-0.006623	2.50	PASS
3.70	50	21	-0.006367	2.50	PASS

LTE Band 41_5MHz bandwidth_16QAM_1RB#0 (worst case of all bandwidths)

LTE Band 41					
DC Power	**Temperature (℃)**	**Frequency error(Hz)**	**Frequency error(ppm)**	**Limit (ppm)**	**Verdict**
3.40	20	34	-0.006748	2.50	PASS
3.70	20	42	0.009158	2.50	PASS
4.20	20	57	0.005364	2.50	PASS
3.70	-30	62	0.005924	2.50	PASS
3.70	-20	32	0.010887	2.50	PASS
3.70	-10	41	0.007008	2.50	PASS
3.70	0	32	-0.005887	2.50	PASS
3.70	10	27	0.011289	2.50	PASS
3.70	20	23	-0.006738	2.50	PASS
3.70	30	32	-0.005935	2.50	PASS
3.70	40	23	0.007421	2.50	PASS
3.70	50	17	0.006037	2.50	PASS

5 Test Setup Photos of the EUT





6 Photos of the EUT

Please refer to the report No.: HK2007011614-8E

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