



RF TEST REPORT

Applicant Honor Device Co., Ltd.

FCC ID 2AYGCTFY-LX2

Product Smart Phone

Model TFY-LX2

Report No. R2201A0038-R4V1

Issue Date February 28, 2022

TA Technology (Shanghai) Co., Ltd. tested the above equipment in accordance with the requirements in **FCC CFR47 Part 2 (2020)/ FCC CFR47 Part 27 (2020)**. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

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Version	Revision description	Issue Date
Rev.0	Initial issue of report.	February 14, 2022
Rev.1	Update description in Page 1.	February 28, 2022

Note: This revised report (Report No. R2201A0038-R4V1) supersedes and replaces the previously issued report (Report No. R2201A0038-R4). Please discard or destroy the previously issued report and dispose of it accordingly.



Summary of Measurement Results

Number	Test Case	Clause in FCC rules	Verdict
1	RF Power Output and Effective Isotropic Radiated Power	2.1046 /27.50(h)(2)	PASS
2	Occupied Bandwidth	2.1049	PASS
3	Band Edge Compliance	/27.53(m)	PASS
4	Peak-to-Average Power Ratio	27.50(d)/KDB971168 D01(5.7)	PASS
5	Frequency Stability	2.1055 / 27.54	PASS
6	Spurious Emissions at Antenna Terminals	2.1051 /27.53(m)	PASS
7	Radiates Spurious Emission	2.1053 /27.53(m)	PASS

Date of Testing: January 14, 2022 ~ February 14, 2022

Date of Sample Received: January 10, 2022

Note: PASS: The EUT complies with the essential requirements in the standard.

FAIL: The EUT does not comply with the essential requirements in the standard.

All indications of Pass/Fail in this report are opinions expressed by TA Technology (Shanghai) Co., Ltd. based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only.



1 Test Laboratory

1.1 Notes of the Test Report

This report shall not be reproduced in full or partial, without the written approval of **TA technology (shanghai) co., Ltd.** The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein .Measurement Uncertainties were not taken into account and are published for informational purposes only. This report is written to support regulatory compliance of the applicable standards stated above.

1.2. Test facility

FCC (Designation number: CN1179, Test Firm Registration Number: 446626)

TA Technology (Shanghai) Co., Ltd. has been listed on the US Federal Communications Commission list of test facilities recognized to perform measurements.

A2LA (Certificate Number: 3857.01)

TA Technology (Shanghai) Co., Ltd. has been listed by American Association for Laboratory Accreditation to perform measurement.

1.3 Testing Location

Company: TA Technology (Shanghai) Co., Ltd.
Address: No.145, Jintang Rd, Tangzhen Industry Park, Pudong Shanghai, China
City: Shanghai
Post code: 201201
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2 General Description of Equipment under Test

2.1 Applicant and Manufacturer Information

Applicant	Honor Device Co., Ltd.
Applicant address	Shum Yip Sky Park, No. 8089, Hongli West Road, Shenzhen, China
Manufacturer	Honor Device Co., Ltd.
Manufacturer address	Shum Yip Sky Park, No. 8089, Hongli West Road, Shenzhen, China

2.2 General information

EUT Description			
Model	TFY-LX2		
SN	AS6N011C28000037		
Hardware Version	HL6TFYM		
Software Version	4.2.0.35(C900E14R1P1)		
Power Supply	Battery / AC adapter		
Antenna Type	Internal Antenna		
Antenna Gain	Band	Main Antenna	Second Antenna
	LTE Band 41	0.18 dBi	0.52 dBi
Test Mode(s)	LTE Band 41;		
Test Modulation	(LTE)QPSK, 16QAM;		
LTE Category	4		
Maximum E.I.R.P./ E.R.P.	LTE Band 41:	24.65dBm	
Rated Power Supply Voltage	3.87V		
Operating Voltage	Minimum: 3.60V Maximum: 4.45V		
Operating Temperature	Lowest: 0°C Highest: 35°C		
Testing Temperature	Lowest: 0°C Highest: 35°C		
Operating Frequency Range(s)	Mode	Tx (MHz)	Rx (MHz)
	LTE Band 41	2496 ~ 2690	2496 ~ 2690

EUT Accessory			
Accessory	Model	Manufacture	No.
Adapter	HW-100225E00	Honor Device Co., Ltd. (Manufacturer:Huntkey)	1
	HW-100225U00	Honor Device Co., Ltd. (Manufacturer:Huntkey)	2
	HW-100225B00	Honor Device Co., Ltd. (Manufacturer:Huntkey)	3
	HN-100225E00	Honor Device Co., Ltd. (Manufacturer: Salcomp)	4



	HN-100225U00	Honor Device Co., Ltd. (Manufacturer: Salcomp)	5
Battery	HB416492EFW	Honor Device Co., Ltd. (Manufacturer: Sunwoda Electronic Co.,LTD)	1
	HB416492EFW	Honor Device Co., Ltd. (Manufacturer:NVT)	2
Earphone	MEND1532B528A11	Jiangxi Lianchuang Hongsheng Electronic Co., LTD.	1
	1293-3283-3.5mm-339	BOLUO COUNTY QUANCHENG ELECTRONIC CO.,LTD.	2
	EPAB542-2WH05-DH	FOXCONN INTERCONNECT TECHNOLOGY LIMITED	3
USB Cable	RY0002	NingBo Broad Telecommunication Co., Ltd.	1
	AU2-CRO013HF	Freeport Resources Enterprises Corp.	2
	2120-00001-0	MING JI ELECTRONICS CO., LTD.	3
	L125UC007-CS-H	LUXSHARE PRECISION INDUSTRY CO., LTD.	4
	CUDU01B-HC451-EH	FOXCONN INTERCONNECT TECHNOLOGY LIMITED	5

Note: 1. The EUT is sent from the applicant to TA and the information of the EUT is declared by the applicant.

2. There are more than one Adapter, Battery, Earphone and USB Cable, each one should be applied throughout the compliance test respectively, however, only the worst case (Adapter 1, Battery 2, Earphone 1 and USB Cable 3) will be recorded in this report.



3 Applied Standards

According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

Test standards:

FCC CFR47 Part 27 (2020)

FCC CFR47 Part 2 (2020)

Reference standard:

ANSI C63.26 (2015)

KDB 971168 D01 Power Meas License Digital Systems v03r01

4 Test Configuration

Radiated measurements are performed by rotating the EUT in three different orthogonal test planes. EUT stand-up position (Z axis), lie-down position (X, Y axis). Receiver antenna polarization (horizontal and vertical), the worst emission was found in position; Z axis, horizontal polarization for LTE Band (Main Antenna); Z axis, vertical polarization for LTE Band (Second Antenna) and the worst case was recorded.

All mode and data rates and positions and RB size and modulations were investigated.

Subsequently, only the worst case emissions are reported.

The following testing in LTE is set based on the maximum RF Output Power.

The following testing in different Bandwidth is set to detail in the following table:

Test modes are chosen to be reported as the worst case configuration below:

Test modes are chosen to be reported as the worst case configuration below for 41:

Test items	Modes	Bandwidth (MHz)						Modulation		RB			Test Channel		
		1.4	3	5	10	15	20	QPSK	16QAM	1	50%	100%	L	M	H
RF Power Output and Effective Isotropic Radiated Power	LTE 41	-	-	O	O	O	O	O	O	O	O	O	O	O	O
Occupied Bandwidth	LTE 41	-	-	O	O	O	O	O	O	-	-	O	O	O	O
Band Edge Compliance	LTE 41	-	-	O	O	O	O	O	O	O	-	O	O	-	O
Peak-to-Average Power Ratio	LTE 41	-	-	O	O	O	O	O	O	-	-	O	O	O	O
Frequency Stability	LTE 41	-	-	O	O	O	O	O	O	O	-	-	-	O	-
Spurious Emissions at Antenna Terminals	LTE 41	-	-	O	O	O	O	O	-	O	-	-	O	O	O
Radiates Spurious Emission	LTE 41	-	-	O	-	-	O	O	-	O	-	-	-	O	-
Note	1. The mark "O" means that this configuration is chosen for testing. 2. The mark "-" means that this configuration is not testing.														

5 Test Case Results

5.1 RF Power Output and Effective Isotropic Radiated Power

Ambient condition

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

Methods of Measurement

During the process of the testing, The EUT was connected to the Base Station Simulator with a known loss. The EUT is controlled by the Base Station Simulator test set to ensure max power transmission with proper modulation.

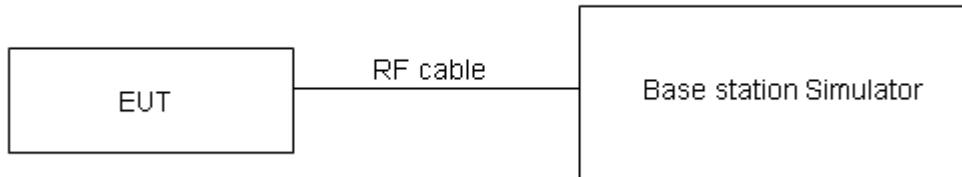
ERP can then be calculated as follows:

$$\text{EIRP (dBm)} = \text{Output Power (dBm)} - \text{Losses (dB)} + \text{Antenna Gain (dBi)}$$

where: dBd refers to gain relative to an ideal dipole.

$$\text{EIRP (dBm)} = \text{ERP (dBm)} + 2.15 \text{ (dB.)}$$

Test Setup



Limits

No specific RF power output requirements in part 2.1046.

Rule Part 27.50(h) (2) specifies that "Mobile and other user stations. Mobile stations are limited to 2.0 watts EIRP. All user stations are limited to 2.0 watts transmitter output power."

Part 27.50(h)(2) Limit	$\leq 2 \text{ W (33 dBm)}$
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Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor $k = 2$, $U=0.4$ dB for RF power output, $k = 2$, $U= 1.19$ dB for ERP/EIRP.



Test Results

LTE Band 41				Maximum Output Power(dBm)				EIRP (dBm) Mian Antenna			EIRP (dBm) Second Antenna					
BW	Modulation	RB size	RB offset	Channel/Frequency(MHz)												
				39675/ 2498.5	40620/ 2593	41565/ 2687.5	39675/ 2498.5	40620/ 2593	41565/ 2687.5	39675/ 2498.5	40620/ 2593	41565/ 2687.5				
5MHz	QPSK	1	0	24.05	23.74	24.13	24.23	23.92	24.31	24.57	24.26	24.65				
		1	13	24.05	23.82	23.98	24.23	24.00	24.16	24.57	24.34	24.50				
		1	24	24.06	23.14	23.74	24.24	23.32	23.92	24.58	23.66	24.26				
		12	0	23.56	23.25	23.36	23.74	23.43	23.54	24.08	23.77	23.88				
		12	6	23.35	23.19	23.22	23.53	23.37	23.40	23.87	23.71	23.74				
		12	13	23.32	23.27	22.95	23.50	23.45	23.13	23.84	23.79	23.47				
		25	0	23.35	23.31	23.27	23.53	23.49	23.45	23.87	23.83	23.79				
	16QAM	1	0	23.45	23.06	23.19	23.63	23.24	23.37	23.97	23.58	23.71				
		1	13	23.43	23.29	23.34	23.61	23.47	23.52	23.95	23.81	23.86				
		1	24	23.57	23.37	23.51	23.75	23.55	23.69	24.09	23.89	24.03				
		12	0	22.41	22.23	22.32	22.59	22.41	22.50	22.93	22.75	22.84				
		12	6	22.52	22.31	22.44	22.70	22.49	22.62	23.04	22.83	22.96				
		12	13	22.52	22.32	22.48	22.70	22.50	22.66	23.04	22.84	23.00				
		25	0	22.32	22.15	22.30	22.50	22.33	22.48	22.84	22.67	22.82				
10MHz	QPSK	RB size	RB offset	Channel/Frequency(MHz)												
				39700/ 2501	40620/ 2593	41540/ 2685	39700/ 2501	40620/ 2593	41540/ 2685	41565/ 2687.5	39675/ 2498.5	40620/ 2593				
				1	0	24.01	24.04	23.73	24.19	24.22	23.91	24.53	24.56	24.25		
				1	25	23.96	24.06	23.83	24.14	24.24	24.01	24.48	24.58	24.35		
				1	49	23.94	24.05	23.13	24.12	24.23	23.31	24.46	24.57	23.65		
				25	0	23.63	23.56	23.25	23.81	23.74	23.43	24.15	24.08	23.77		
				25	13	23.59	23.36	23.18	23.77	23.54	23.36	24.11	23.88	23.70		
	16QAM			25	25	23.27	23.32	23.28	23.45	23.50	23.46	23.79	23.84	23.80		
				50	0	23.42	23.39	23.33	23.60	23.57	23.51	23.94	23.91	23.85		
				1	0	23.34	23.44	23.05	23.52	23.62	23.23	23.86	23.96	23.57		
				1	25	23.33	23.43	23.29	23.51	23.61	23.47	23.85	23.95	23.81		
				1	49	23.45	23.57	23.36	23.63	23.75	23.54	23.97	24.09	23.88		
				25	0	22.32	22.42	22.24	22.50	22.60	22.42	22.84	22.94	22.76		
				25	13	22.39	22.51	22.30	22.57	22.69	22.48	22.91	23.03	22.82		
				25	25	22.42	22.52	22.32	22.60	22.70	22.50	22.94	23.04	22.84		



		50	0	22.23	22.33	22.14	22.41	22.51	22.32	22.75	22.85	22.66	
BW	Modulation	RB size	RB offset	Channel/Frequency(MHz)									
				39725/ 2503.5	40620/ 2593	41515/ 2682.5	39725/ 2503.5	40620/ 2593	41515/ 2682.5	41565/ 2687.5	39675/ 2498.5	40620/ 2593	
15MHz	QPSK	1	0	24.03	23.71	24.10	24.21	23.89	24.28	24.55	24.23	24.62	
		1	38	24.04	23.80	24.02	24.22	23.98	24.20	24.56	24.32	24.54	
		1	74	24.02	23.09	23.73	24.20	23.27	23.91	24.54	23.61	24.25	
		36	0	23.54	23.22	23.37	23.72	23.40	23.55	24.06	23.74	23.89	
		36	18	23.33	23.14	23.22	23.51	23.32	23.40	23.85	23.66	23.74	
		36	39	23.29	23.24	22.96	23.47	23.42	23.14	23.81	23.76	23.48	
		75	0	23.37	23.28	23.25	23.55	23.46	23.43	23.89	23.80	23.77	
	16QAM	1	0	23.39	23.03	23.20	23.57	23.21	23.38	23.91	23.55	23.72	
		1	38	23.41	23.27	23.35	23.59	23.45	23.53	23.93	23.79	23.87	
		1	74	23.54	23.33	23.49	23.72	23.51	23.67	24.06	23.85	24.01	
		36	0	22.39	22.21	22.35	22.57	22.39	22.53	22.91	22.73	22.87	
		36	18	22.48	22.26	22.43	22.66	22.44	22.61	23.00	22.78	22.95	
		36	39	22.50	22.29	22.49	22.68	22.47	22.67	23.02	22.81	23.01	
		75	0	22.30	22.10	22.30	22.48	22.28	22.48	22.82	22.62	22.82	
20MHz	QPSK	1	0	24.00	23.68	24.06	24.18	23.86	24.24	24.52	24.20	24.58	
		1	50	24.03	23.78	23.98	24.21	23.96	24.16	24.55	24.30	24.50	
		1	99	24.00	23.06	23.72	24.18	23.24	23.90	24.52	23.58	24.24	
		50	0	23.51	23.18	23.32	23.69	23.36	23.50	24.03	23.70	23.84	
		50	25	23.31	23.11	23.18	23.49	23.29	23.36	23.83	23.63	23.70	
		50	50	23.26	23.20	22.91	23.44	23.38	23.09	23.78	23.72	23.43	
		100	0	23.34	23.24	23.20	23.52	23.42	23.38	23.86	23.76	23.72	
	16QAM	1	0	23.18	22.98	23.16	23.36	23.16	23.34	23.70	23.50	23.68	
		1	50	23.37	23.23	23.33	23.55	23.41	23.51	23.89	23.75	23.85	
		1	99	23.52	23.31	23.46	23.70	23.49	23.64	24.04	23.83	23.98	
		50	0	22.36	22.18	22.31	22.54	22.36	22.49	22.88	22.70	22.83	
		50	25	22.45	22.23	22.41	22.63	22.41	22.59	22.97	22.75	22.93	
		50	50	22.47	22.25	22.44	22.65	22.43	22.62	22.99	22.77	22.96	
		100	0	22.28	22.07	22.26	22.46	22.25	22.44	22.80	22.59	22.78	

5.2 Occupied Bandwidth

Ambient condition

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

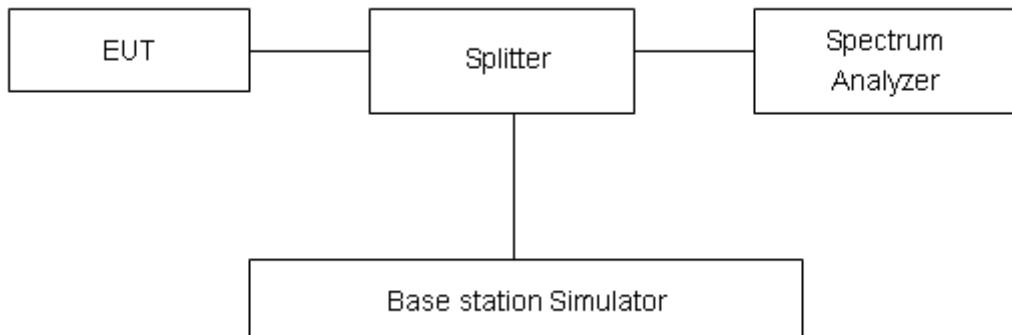
Method of Measurement

The EUT was connected to Spectrum Analyzer and Base Station Simulator via power Splitter. The occupied bandwidth is measured using spectrum analyzer.

RBW is set to $\geq 1\%$ EBW, VBW is set to 3x RBW.

99% power and -26dBc occupied bandwidths are recorded. Spectrum analyzer plots are included on the following pages.

Test Setup



Limits

No specific occupied bandwidth requirements in part 2.1049.

Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor $k = 2$, $U=624\text{Hz}$.



Test Result

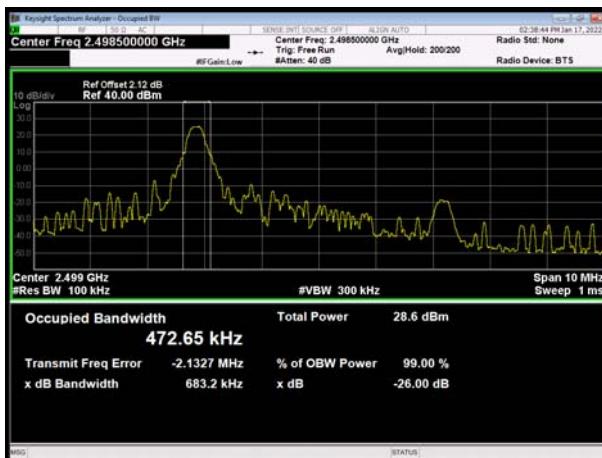
LTE Band 41						
RB	Modulation	Bandwidth (MHz)	Channel	Frequency (MHz)	99% Power Bandwidth(MHz)	-26dBc Bandwidth(MHz)
1	QPSK	5	39675	2498.5	0.473	0.683
			40620	2593	0.455	0.680
			41565	2687.5	0.485	0.648
		10	39700	2501	0.752	1.055
			40620	2593	0.707	0.908
			41540	2685	0.724	1.109
		15	39725	2503.5	1.104	1.599
			40620	2593	1.031	1.487
			41515	2682.5	1.025	1.510
		20	39750	2506	1.450	2.228
			40620	2593	1.337	1.927
			41490	2680	1.446	2.038
100%	16QAM	5	39675	2498.5	0.458	0.670
			40620	2593	0.472	0.707
			41565	2687.5	0.436	0.607
		10	39700	2501	0.693	0.966
			40620	2593	0.649	0.995
			41540	2685	0.730	1.192
		15	39725	2503.5	0.958	1.529
			40620	2593	0.957	1.415
			41515	2682.5	1.071	1.507
		20	39750	2506	1.421	2.946
			40620	2593	1.430	1.722
			41490	2680	1.335	1.875
100%	QPSK	5	39675	2498.5	4.492	5.148
			40620	2593	4.503	4.909
			41565	2687.5	4.520	4.906
		10	39700	2501	9.008	9.715
			40620	2593	8.986	9.843
			41540	2685	8.977	9.701
		15	39725	2503.5	13.481	14.528
			40620	2593	13.444	14.667
			41515	2682.5	13.424	14.598
		20	39750	2506	17.962	20.239
			40620	2593	17.891	19.239
			41490	2680	17.947	20.054



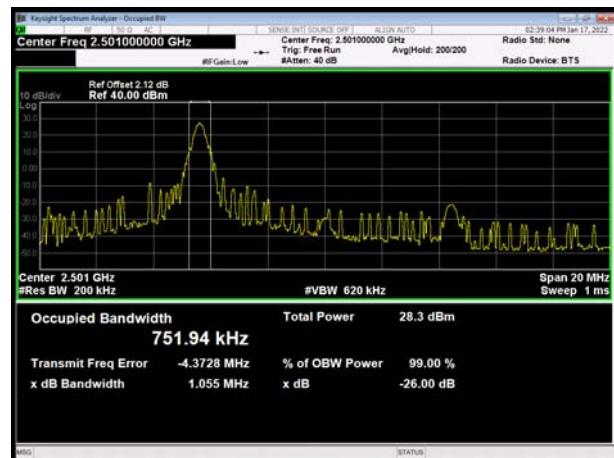
16QAM	5	39675	2498.5	4.509	4.886
		40620	2593	4.503	4.973
		41565	2687.5	4.505	4.964
	10	39700	2501	8.967	9.770
		40620	2593	8.978	9.654
		41540	2685	8.963	9.716
	15	39725	2503.5	13.472	14.634
		40620	2593	13.461	14.620
		41515	2682.5	13.433	14.625
	20	39750	2506	17.856	19.741
		40620	2593	17.974	19.303
		41490	2680	17.963	19.359



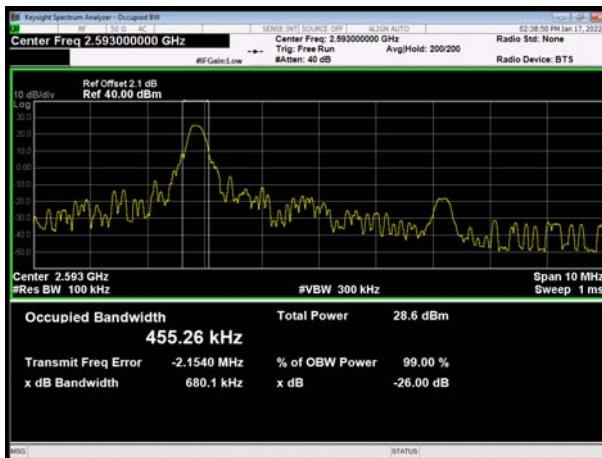
LTE Band 41 QPSK 5MHz CH-Low



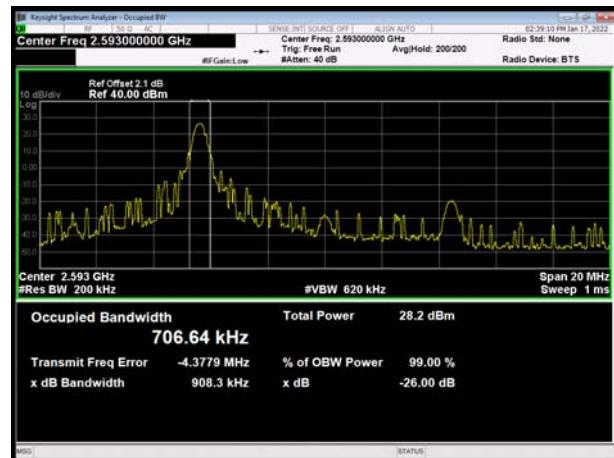
LTE Band 41 QPSK 10MHz CH-Low



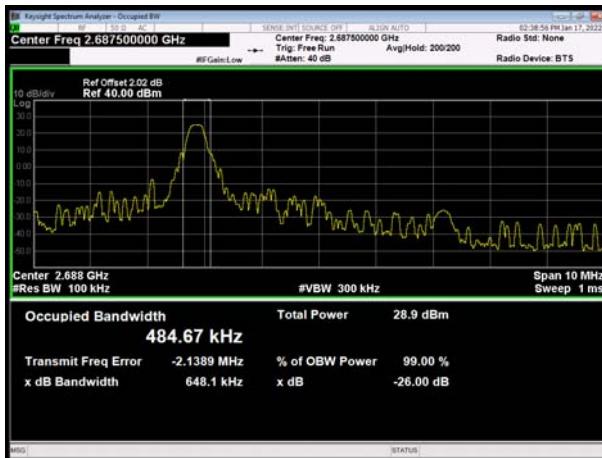
LTE Band 41 QPSK 5MHz CH-Middle



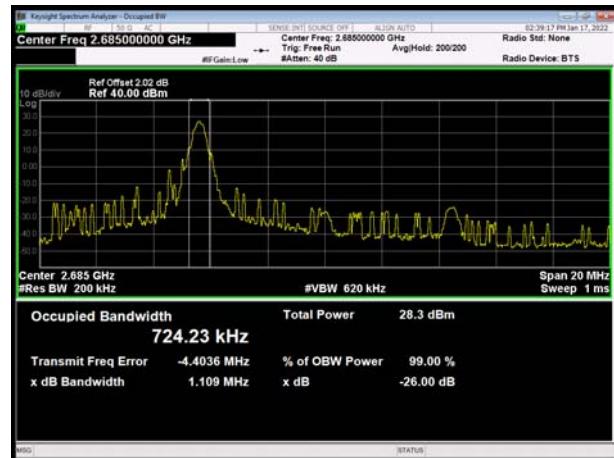
LTE Band 41 QPSK 10MHz CH-Middle



LTE Band 41 QPSK 5MHz CH-High

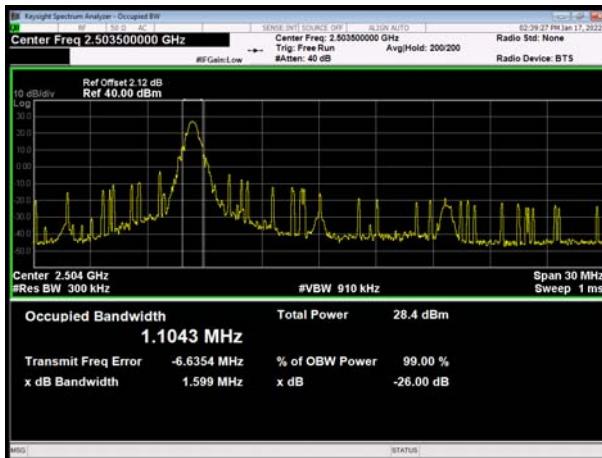


LTE Band 41 QPSK 10MHz CH-High

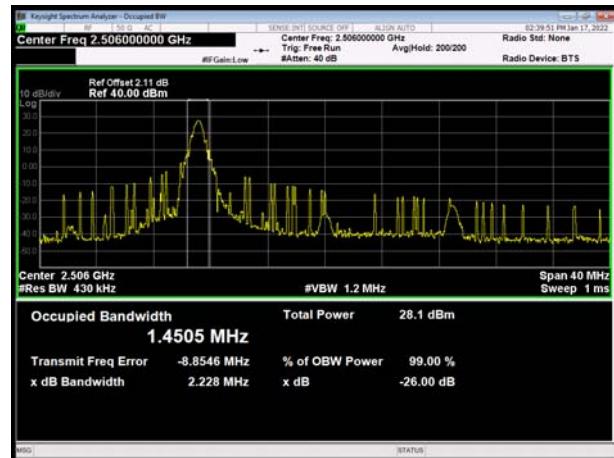




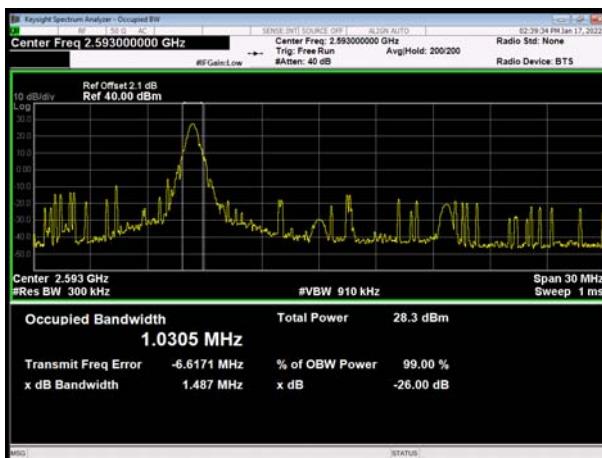
LTE Band 41 QPSK 15MHz CH-Low



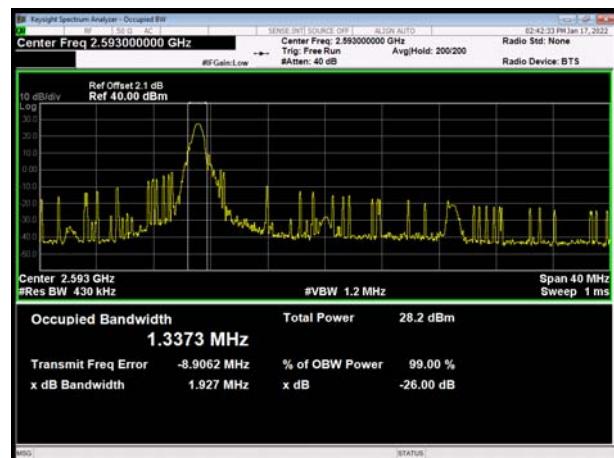
LTE Band 41 QPSK 20MHz CH-Low



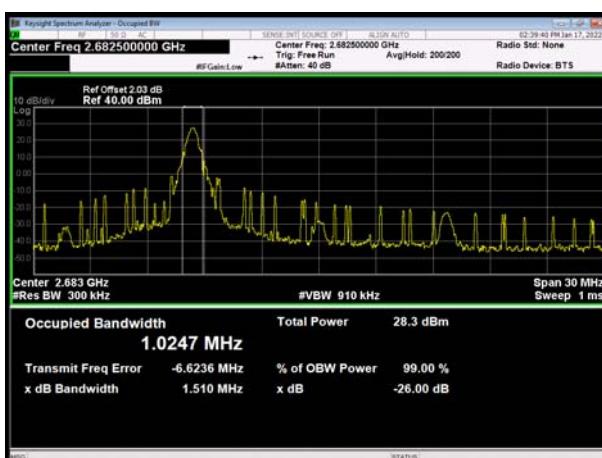
LTE Band 41 QPSK 15MHz CH-Middle



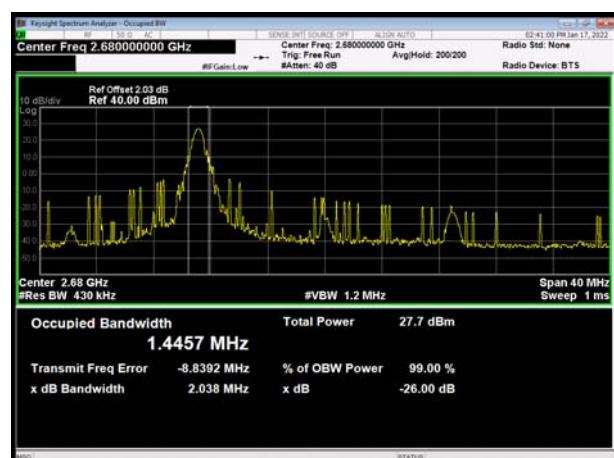
LTE Band 41 QPSK 20MHz CH-Middle



LTE Band 41 QPSK 15MHz CH-High

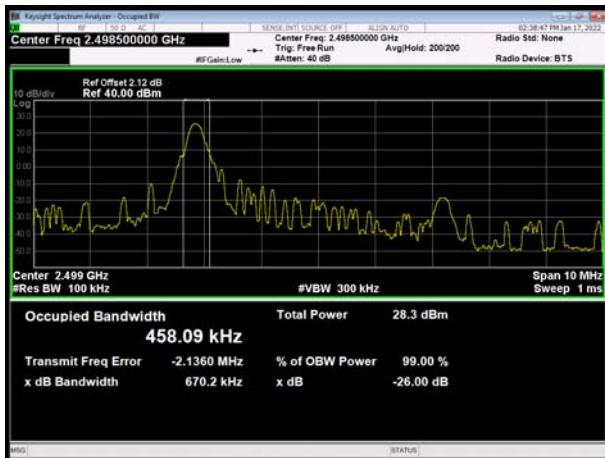


LTE Band 41 QPSK 20MHz CH-High

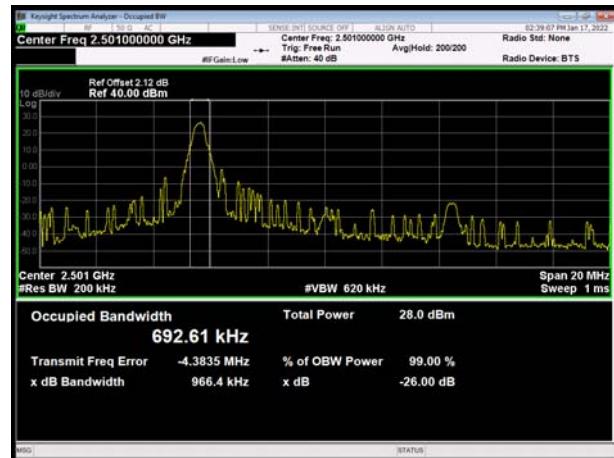




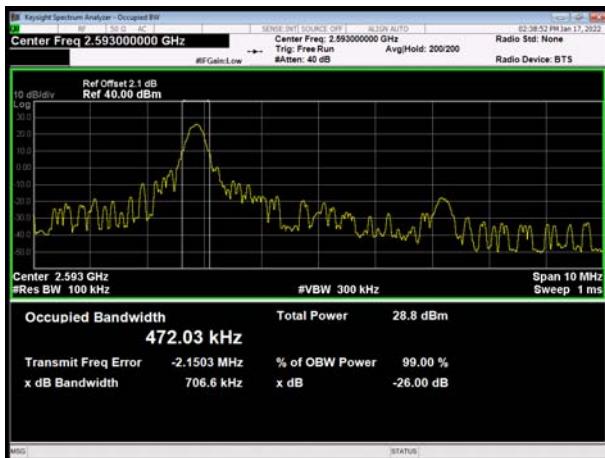
LTE Band 41 16QAM 5MHz CH-Low



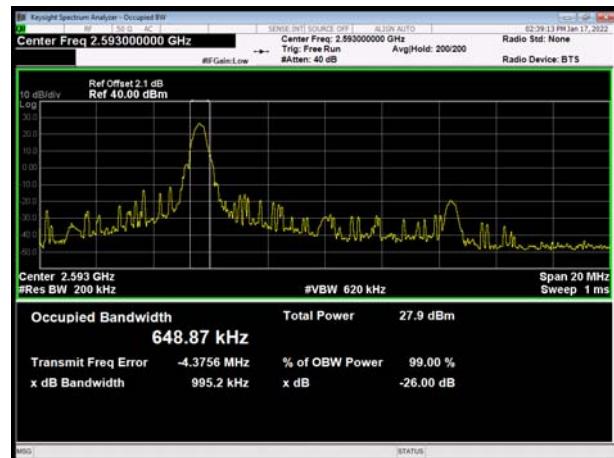
LTE Band 41 16QAM 10MHz CH-Low



LTE Band 41 16QAM 5MHz CH-Middle



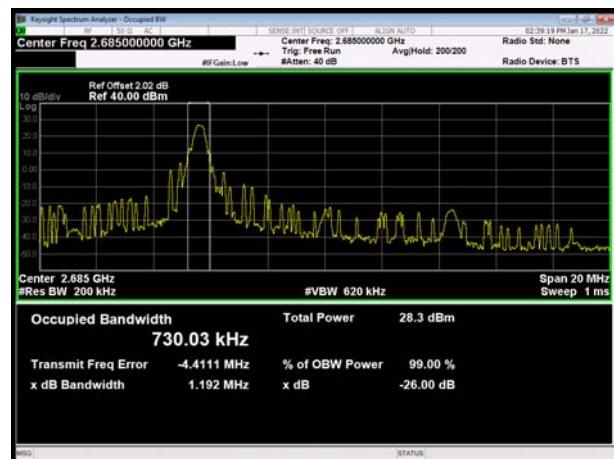
LTE Band 41 16QAM 10MHz CH-Middle



LTE Band 41 16QAM 5MHz CH-High

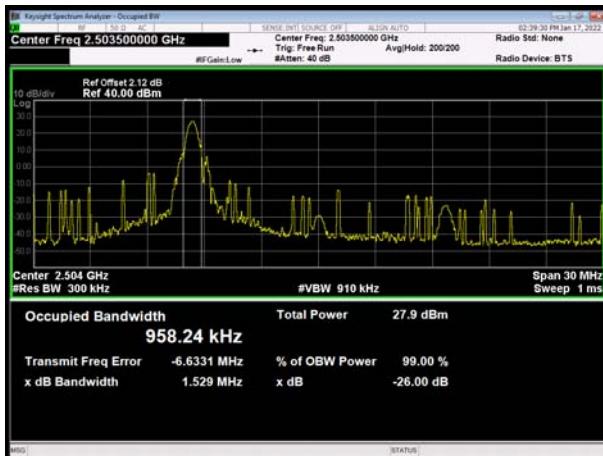


LTE Band 41 16QAM 10MHz CH-High

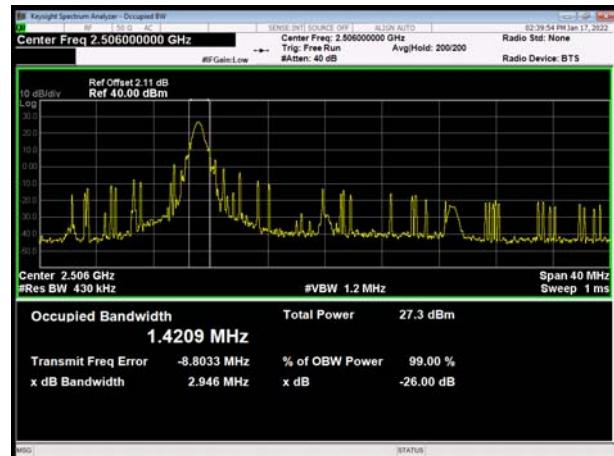




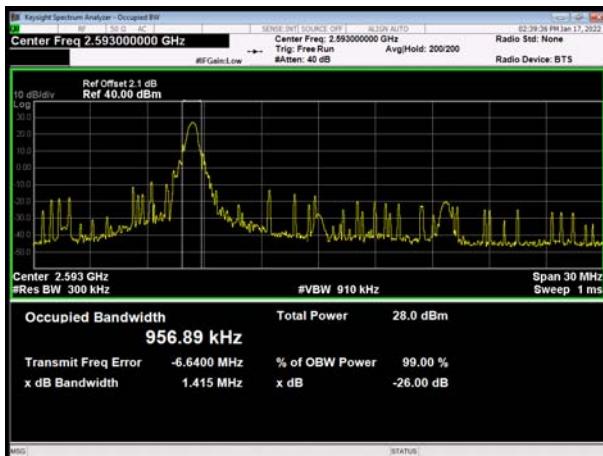
LTE Band 41 16QAM 15MHz CH-Low



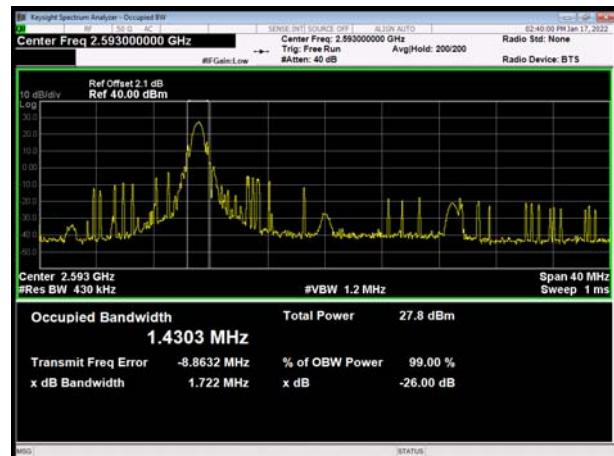
LTE Band 41 16QAM 20MHz CH-Low



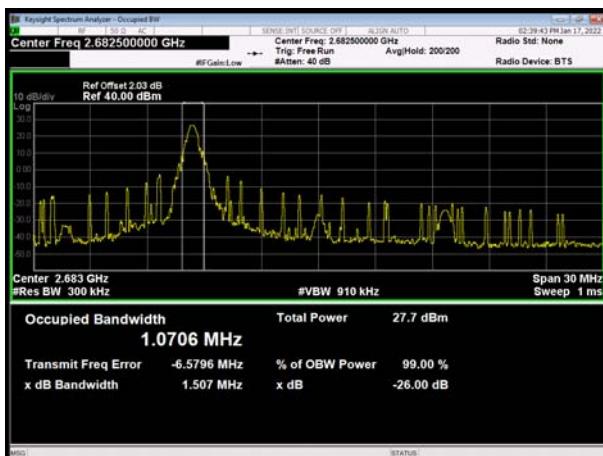
LTE Band 41 16QAM 15MHz CH-Middle



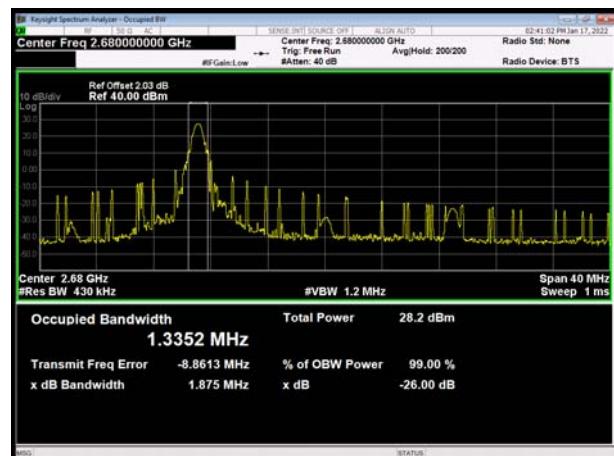
LTE Band 41 16QAM 20MHz CH-Middle



LTE Band 41 16QAM 15MHz CH-High

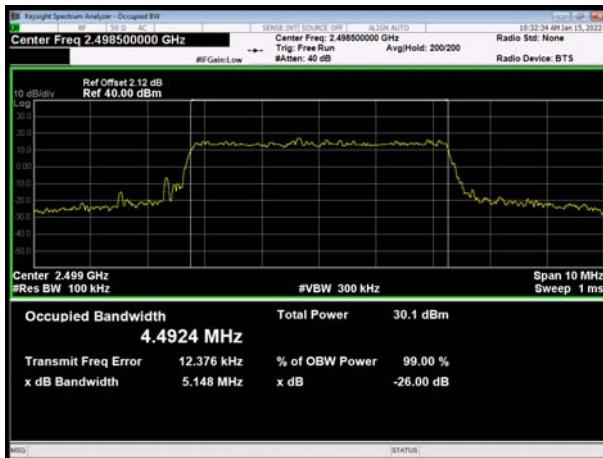


LTE Band 41 16QAM 20MHz CH-High

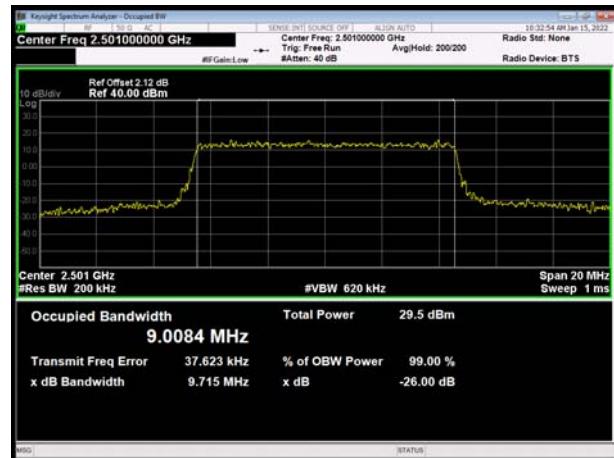


100%RB

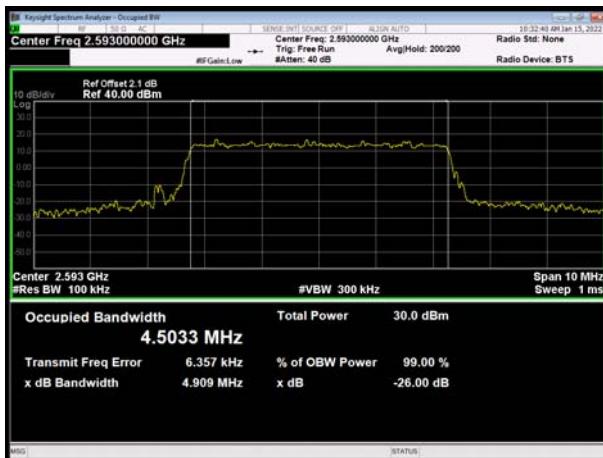
LTE Band 41 QPSK 5MHz CH-Low



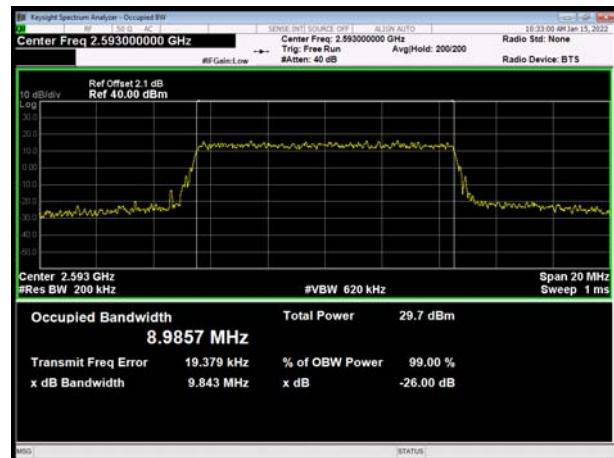
LTE Band 41 QPSK 10MHz CH-Low



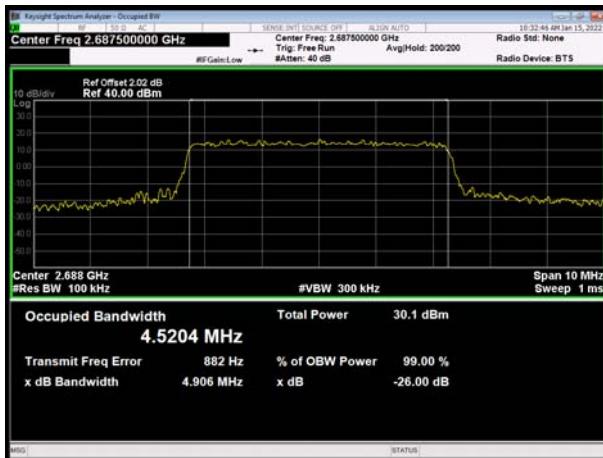
LTE Band 41 QPSK 5MHz CH-Middle



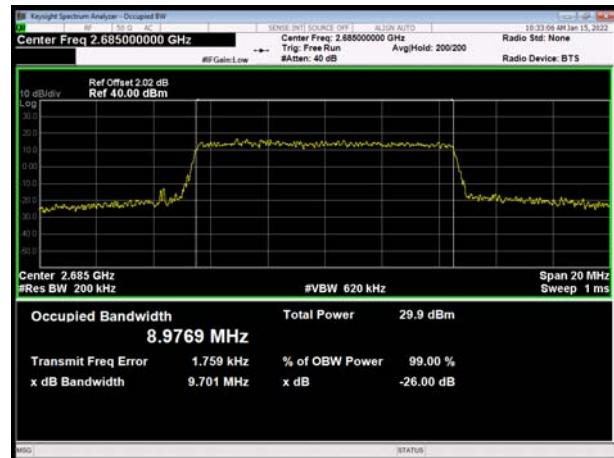
LTE Band 41 QPSK 10MHz CH-Middle



LTE Band 41 QPSK 5MHz CH-High

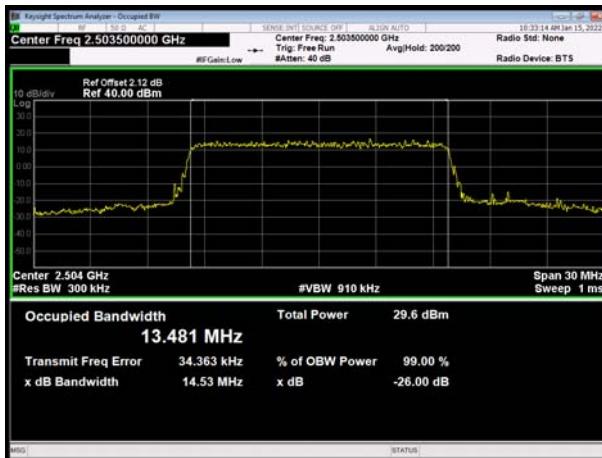


LTE Band 41 QPSK 10MHz CH-High

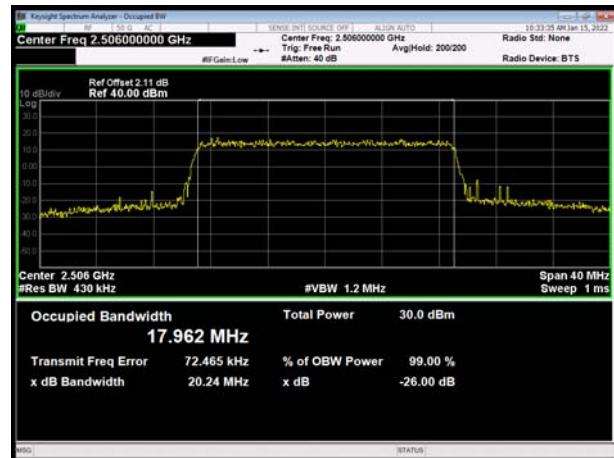




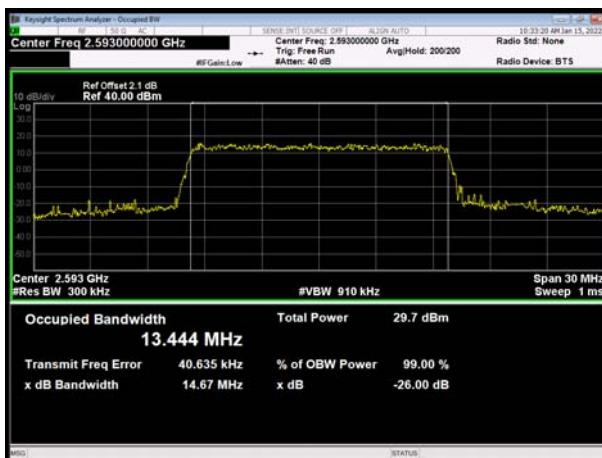
LTE Band 41 QPSK 15MHz CH-Low



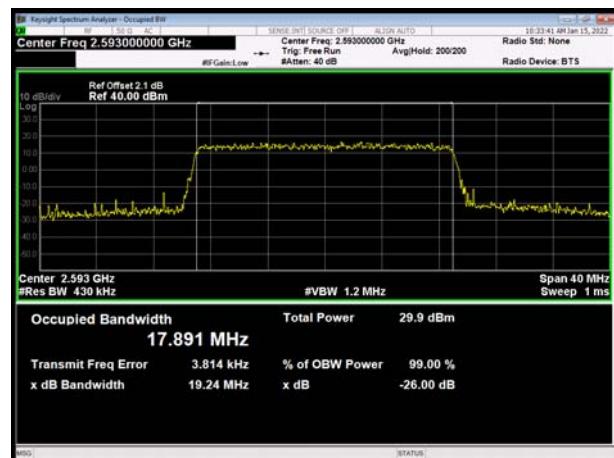
LTE Band 41 QPSK 20MHz CH-Low



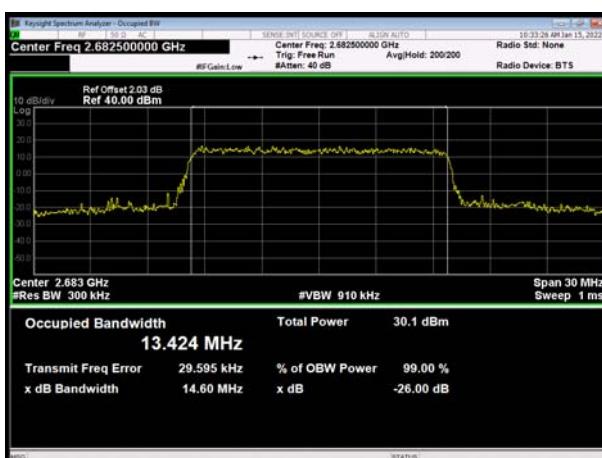
LTE Band 41 QPSK 15MHz CH-Middle



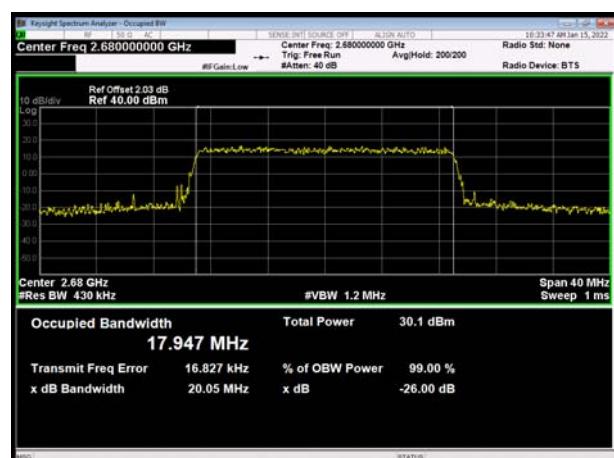
LTE Band 41 QPSK 20MHz CH-Middle



LTE Band 41 QPSK 15MHz CH-High

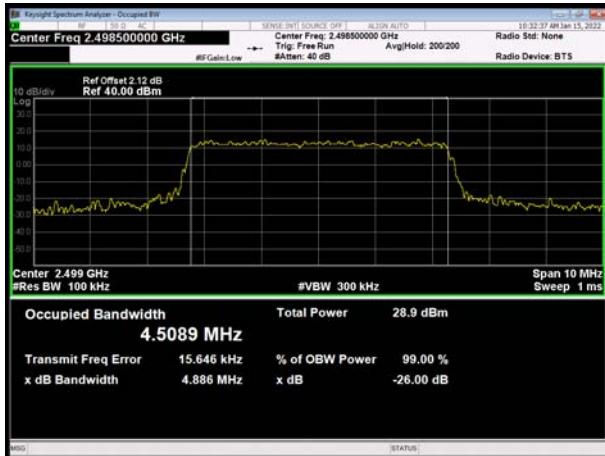


LTE Band 41 QPSK 20MHz CH-High





LTE Band 41 16QAM 5MHz CH-Low

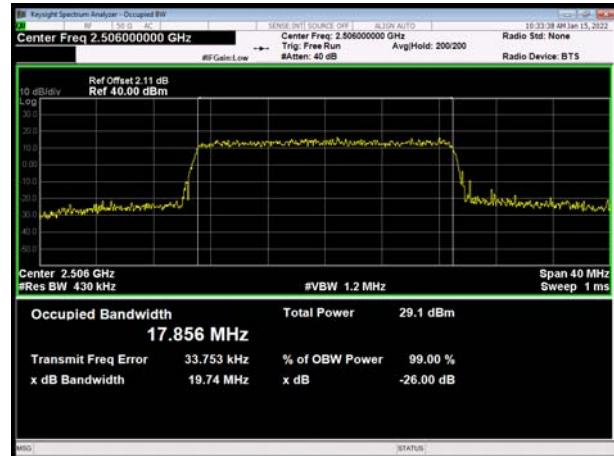




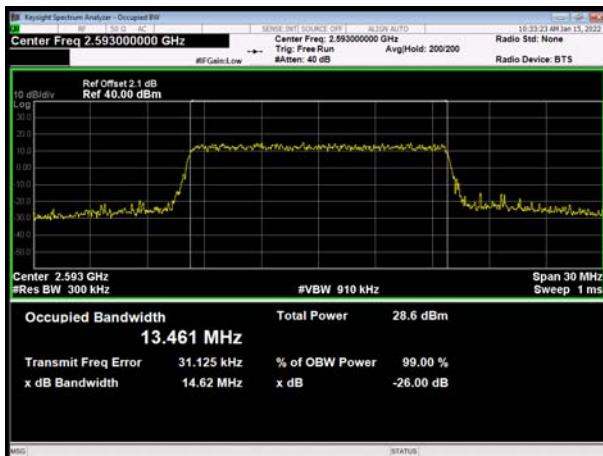
LTE Band 41 16QAM 15MHz CH-Low



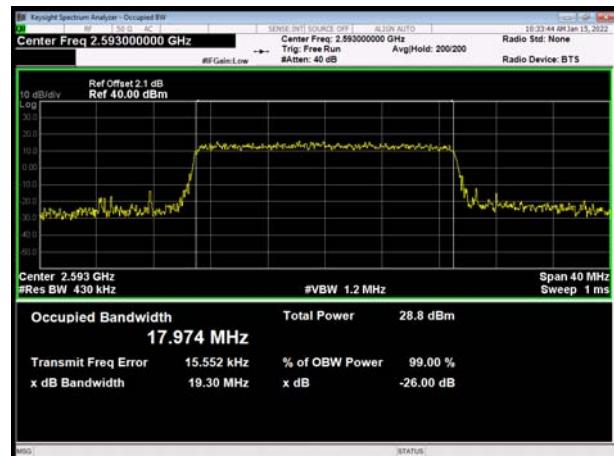
LTE Band 41 16QAM 20MHz CH-Low



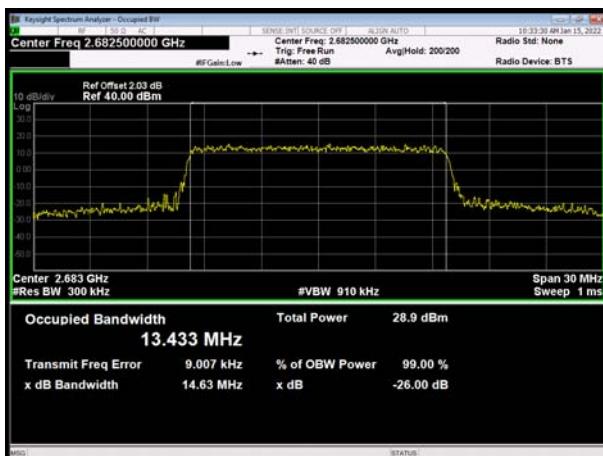
LTE Band 41 16QAM 15MHz CH-Middle



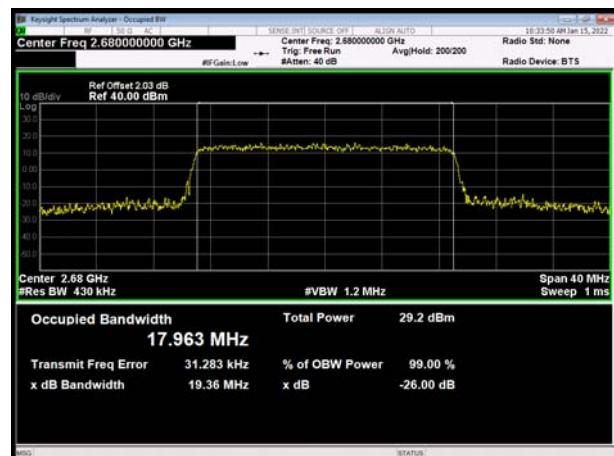
LTE Band 41 16QAM 20MHz CH-Middle



LTE Band 41 16QAM 15MHz CH-High



LTE Band 41 16QAM 20MHz CH-High



5.3 Band Edge Compliance

Ambient condition

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

Method of Measurement

The EUT was connected to Spectrum Analyzer and Base Station Simulator via power Splitter. The band edge of the lowest and highest channels were measured.

The testing follows KDB 971168 D01 v03r01 Section 6.0

The EUT was connected to spectrum analyzer and system simulator via a power divider.

The band edges of low and high channels for the highest RF powers were measured.

For LTE Band 41 the middle channel, high channel set RBW $\geq 1\%$ EBW in the 1MHz band immediately outside and adjacent to the band edge. Beyond the 1 MHz band from the band edge, RBW=1MHz was used; Low channel set RBW $\geq 2\%$ EBW in the 1MHz band immediately outside and adjacent to the band edge. Beyond the 1 MHz band from the band edge, RBW=1MHz was used.

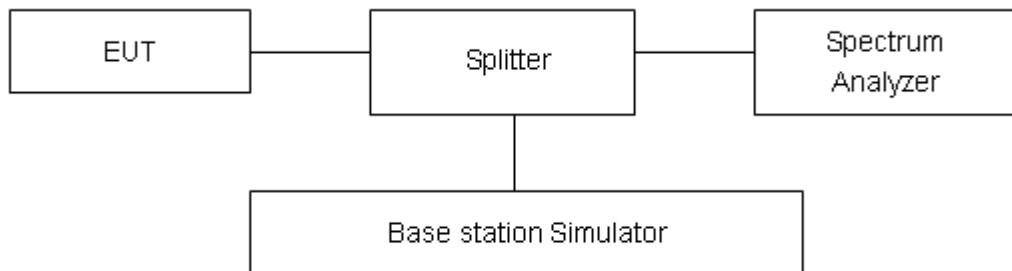
on spectrum analyzer.

Set spectrum analyzer with RMS detector.

The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

Checked that all the results comply with the emission limit line.

Test Setup



Limits

Rule Part 27.53(m) (4) specifies that "for BRS and EBS stations. For mobile digital stations, the attenuation factor shall be not less than $40 + 10 \log (P)$ dB on all frequencies between the channel edge and 5 megahertz from the channel edge, $43 + 10 \log (P)$ dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and $55 + 10 \log (P)$ dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(4) of this section. In addition, the attenuation factor shall not be less than $43 + 10 \log (P)$ dB on all frequencies between 2490.5 MHz and 2496 MHz and $55 + 10 \log (P)$ dB at or below 2490.5 MHz. Mobile Satellite Service licensees operating on frequencies below 2495 MHz may also submit a documented interference complaint against BRS



licensees operating on channel BRS Channel 1 on the same terms and conditions as adjacent channel BRS or EBS licensees.

Example:

The limit line is derived from $43 + 10\log(P)$ dB below the transmitter power P (Watts)

$$= P(W) - [43 + 10\log(P)] \text{ (dB)}$$

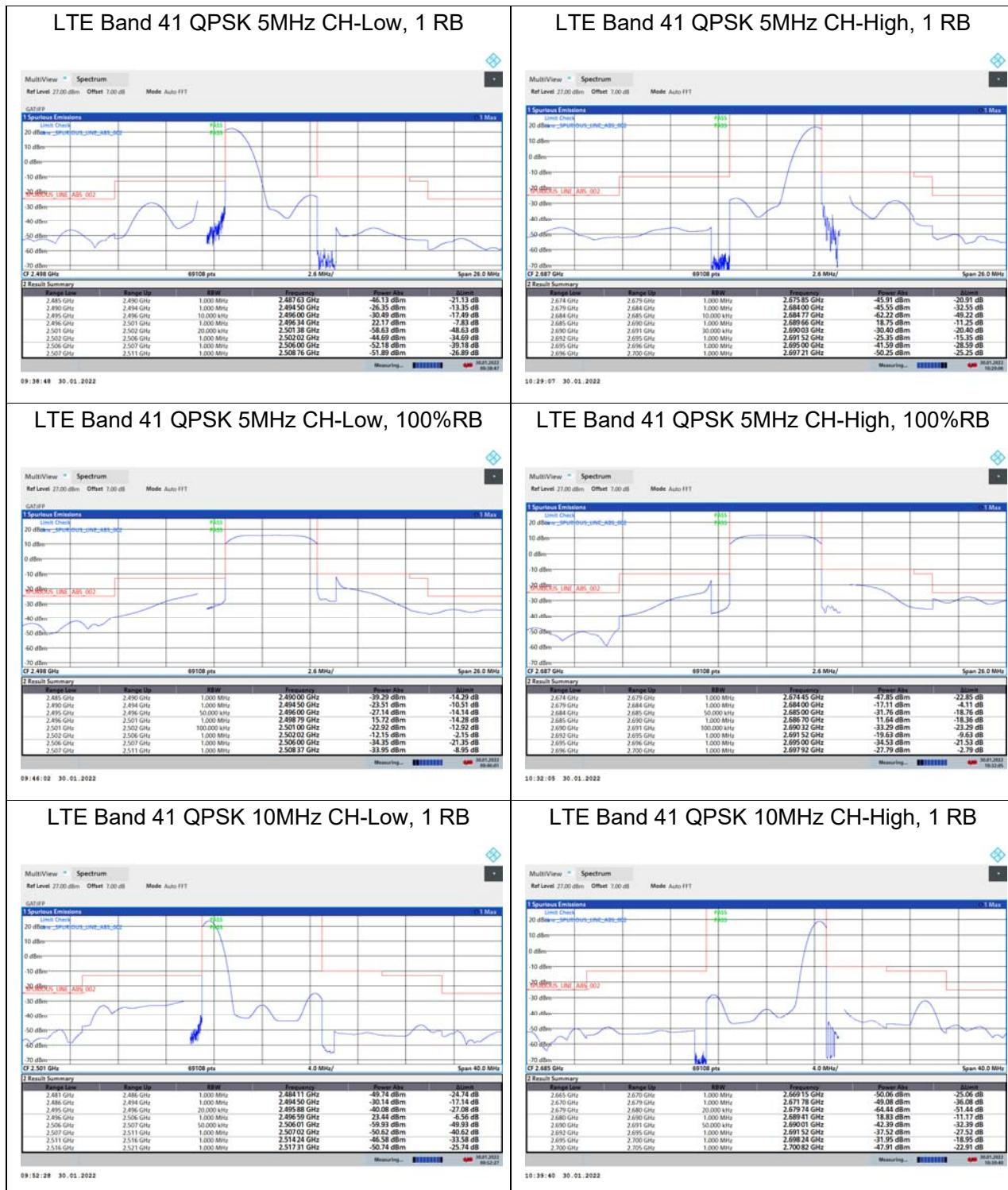
$$= [30 + 10\log(P)] \text{ (dBm)} - [43 + 10\log(P)] \text{ (dB)} = -13 \text{ dBm.}$$

Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor $k = 1.96$, $U=0.684$ dB.

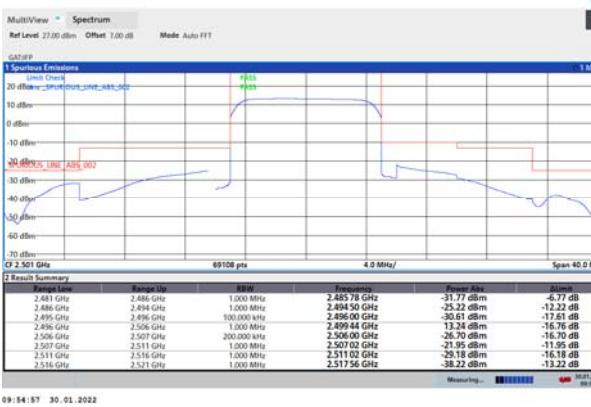
Test Result

All the test traces in the plots shows the test results clearly.

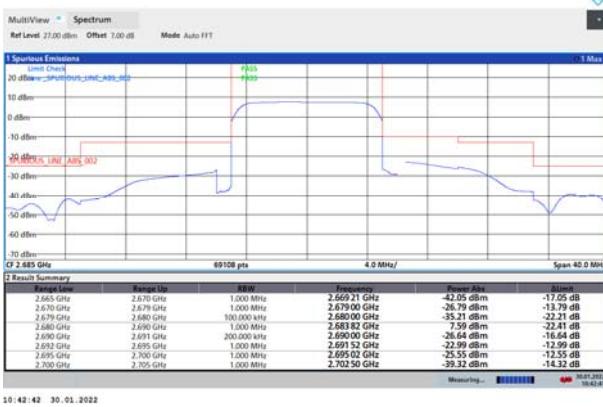




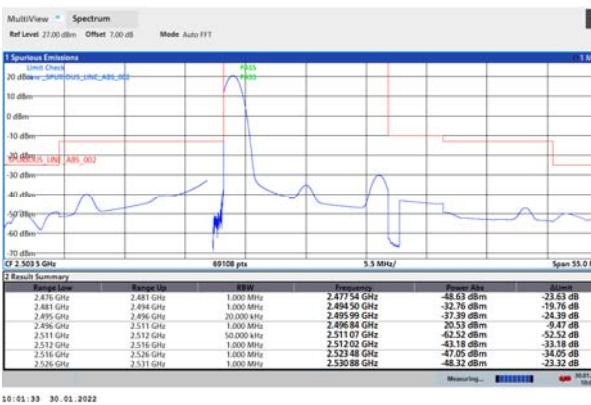
LTE Band 41 QPSK 10MHz CH-Low, 100%RB



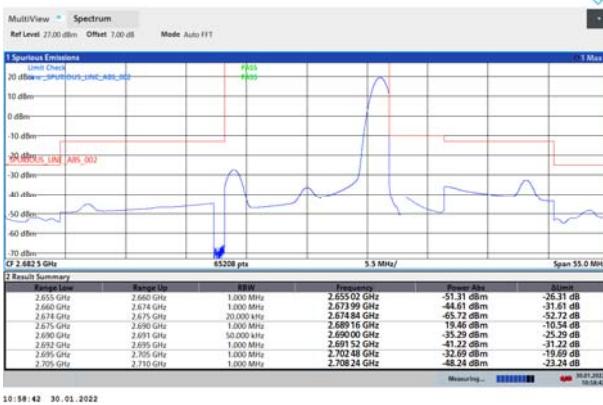
LTE Band 41 QPSK 10MHz CH-High, 100%RB



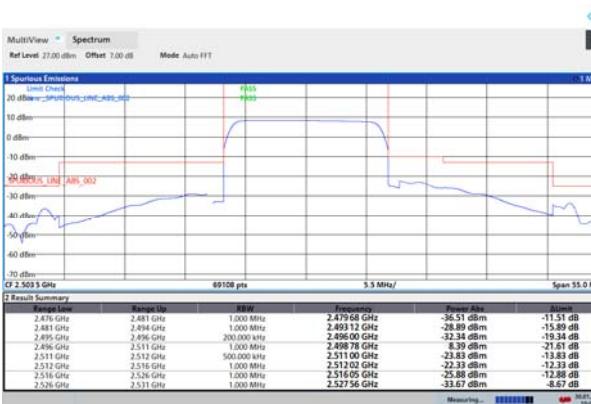
LTE Band 41 QPSK 15MHz CH-Low, 1 RB



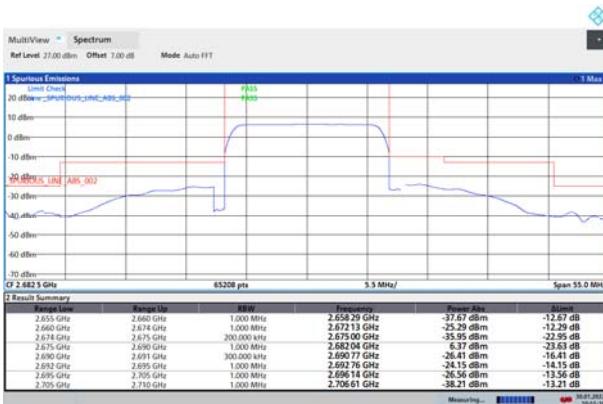
LTE Band 41 QPSK 15MHz CH-High, 1 RB



LTE Band 41 QPSK 15MHz CH-Low, 100%RB

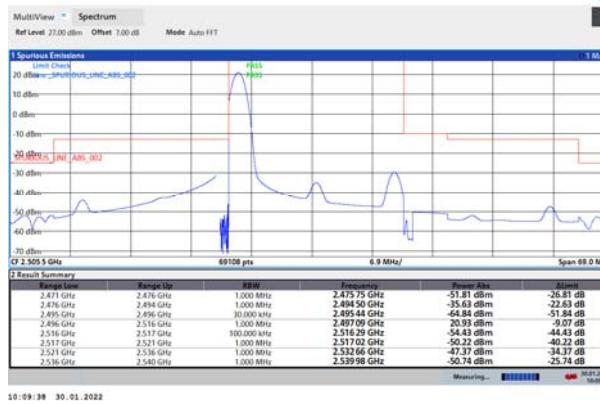


LTE Band 41 QPSK 15MHz CH-High, 100%RB

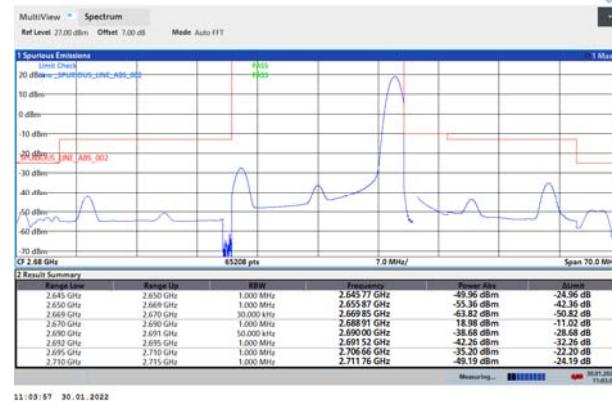




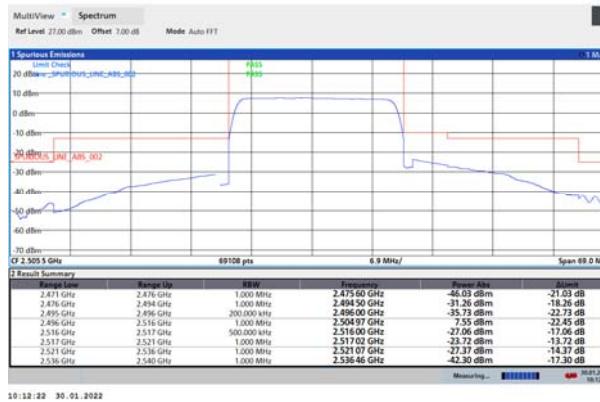
LTE Band 41 QPSK 20MHz CH-Low, 1 RB



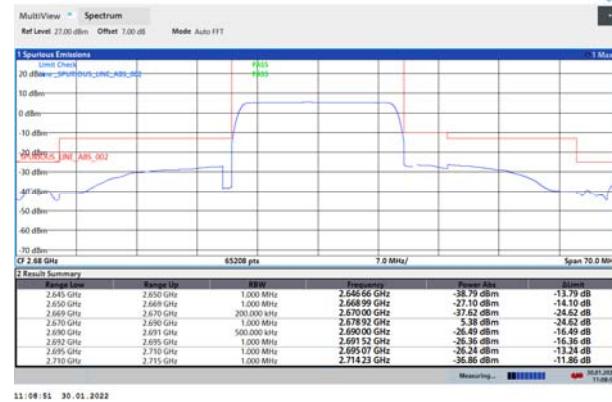
LTE Band 41 QPSK 20MHz CH-High, 1 RB



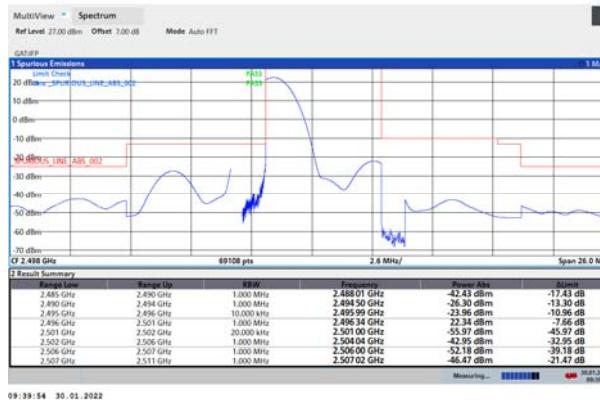
LTE Band 41 QPSK 20MHz CH-Low, 100%RB



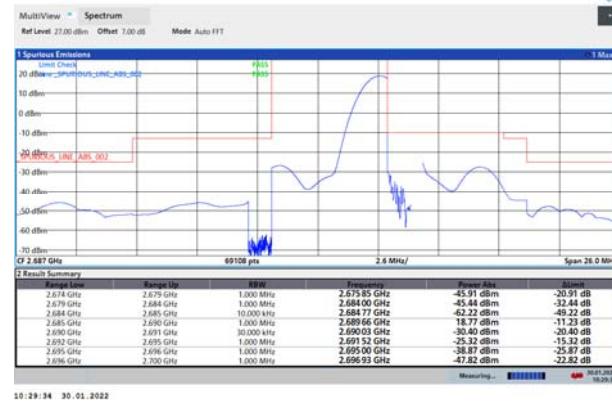
LTE Band 41 QPSK 20MHz CH-High, 100%RB



LTE Band 41 16QAM 5MHz CH-Low, 1 RB

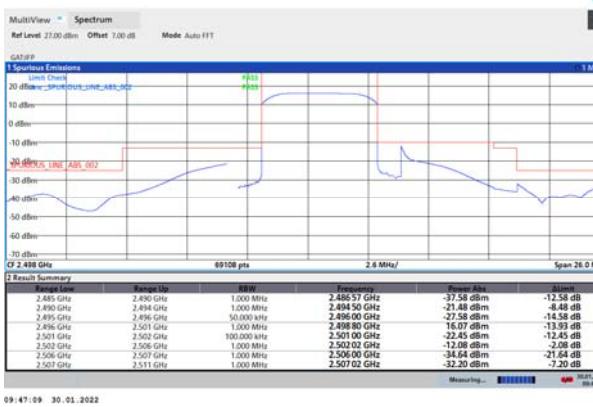


LTE Band 41 16QAM 5MHz CH-High, 1 RB

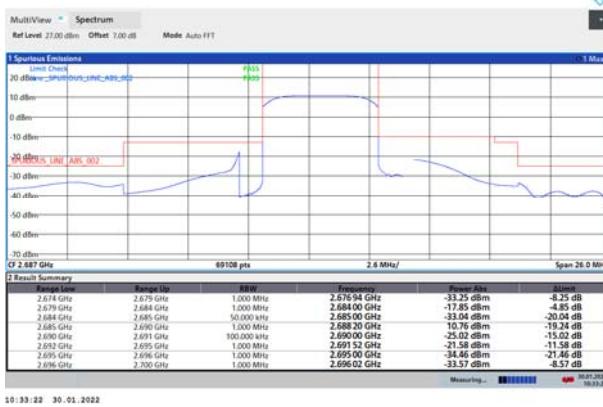




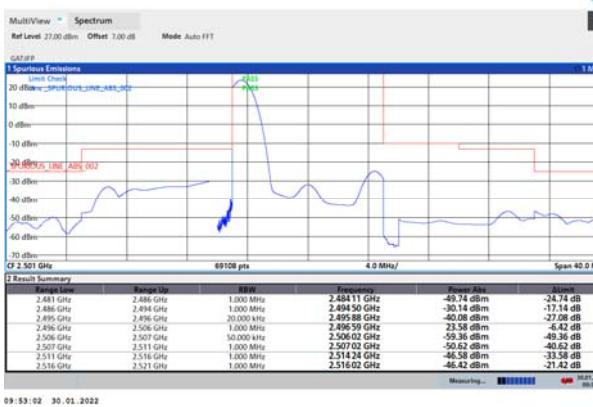
LTE Band 41 16QAM 5MHz CH-Low, 100%RB



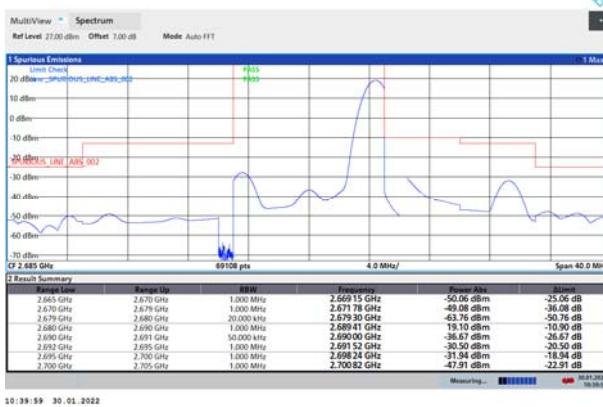
LTE Band 41 16QAM 5MHz CH-High, 100%RB



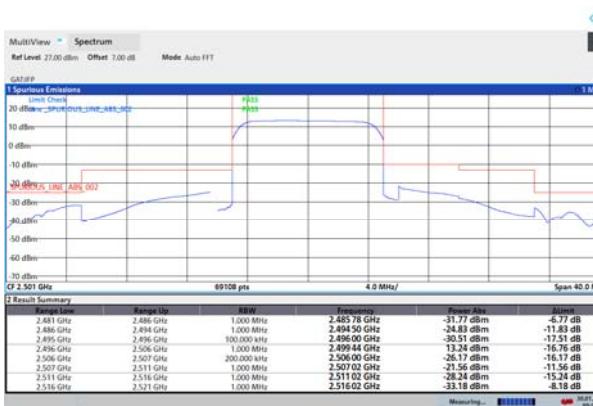
LTE Band 41 16QAM 10MHz CH-Low, 1 RB



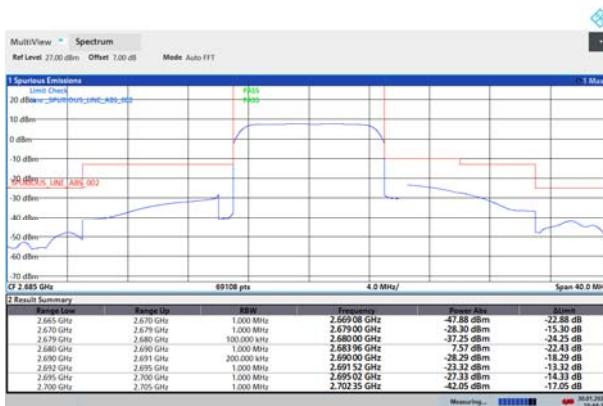
LTE Band 41 16QAM 10MHz CH-High, 1 RB



LTE Band 41 16QAM 10MHz CH-Low, 100%RB

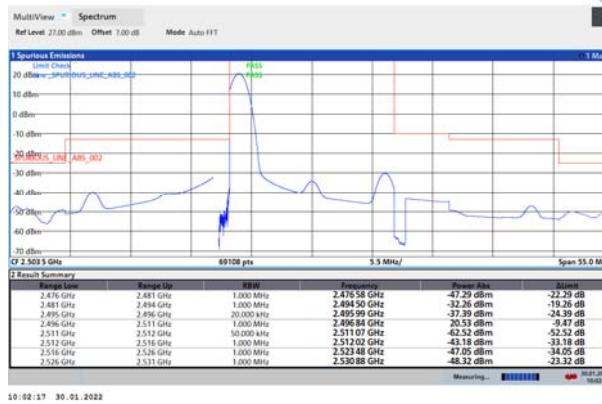


LTE Band 41 16QAM 10MHz CH-High, 100%RB

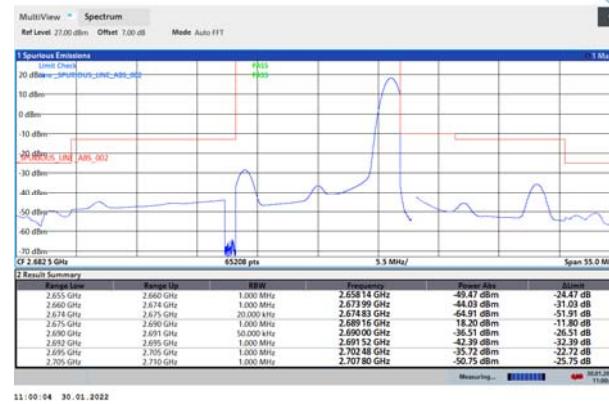




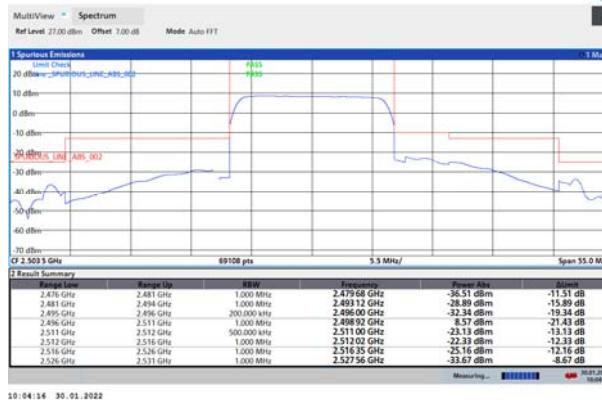
LTE Band 41 16QAM 15MHz CH-Low, 1 RB



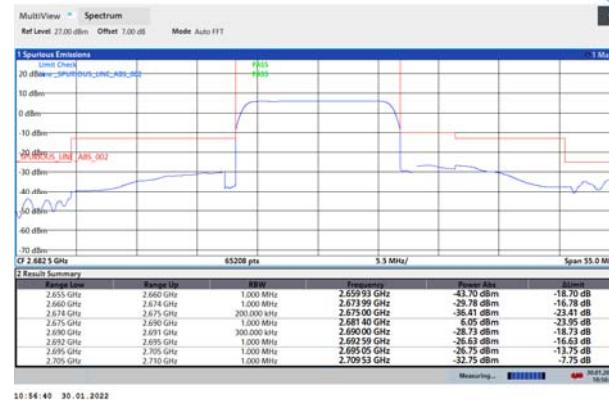
LTE Band 41 16QAM 15MHz CH-High, 1 RB



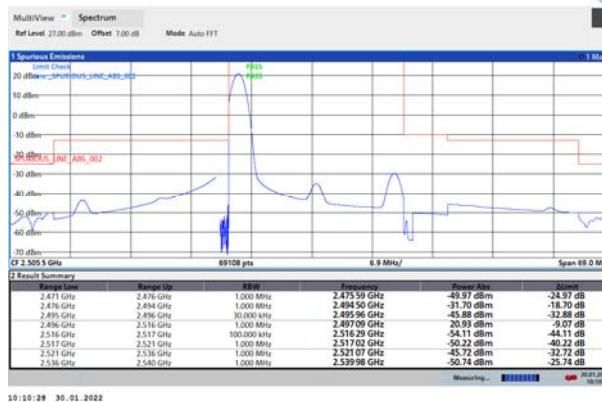
LTE Band 41 16QAM 15MHz CH-Low, 100%RB



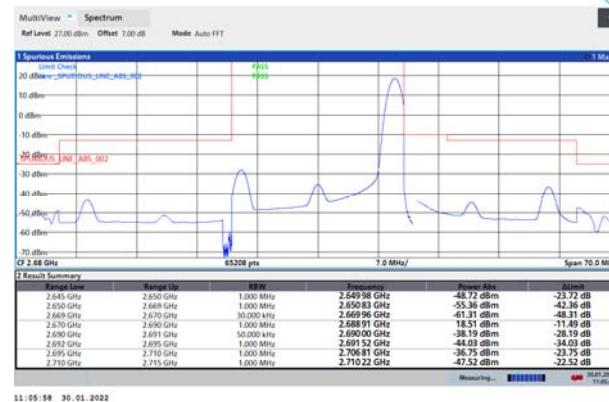
LTE Band 41 16QAM 15MHz CH-High, 100%RB

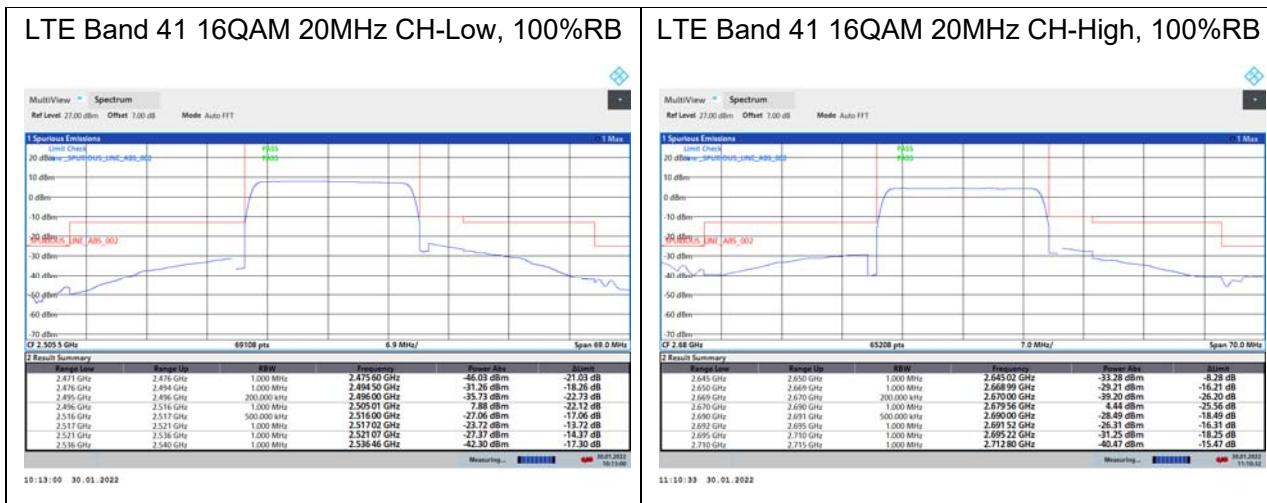


LTE Band 41 16QAM 20MHz CH-Low, RB 1



LTE Band 41 16QAM 20MHz CH-High, RB 1





5.4 Peak-to-Average Power Ratio (PAPR)

Ambient condition

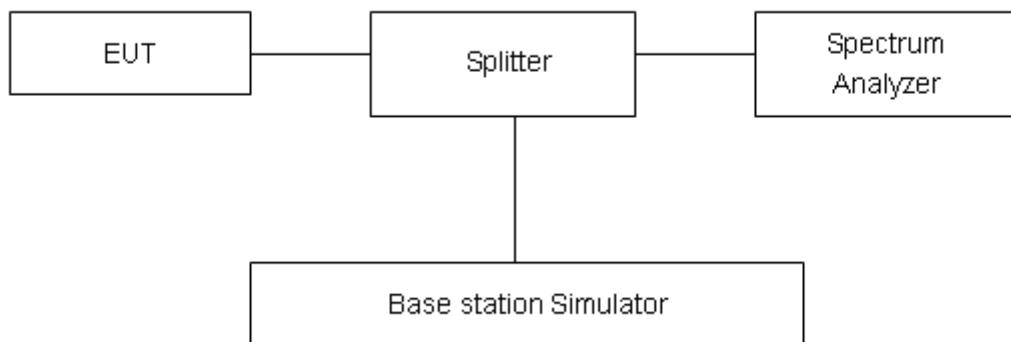
Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

Methods of Measurement

Measure the total peak power and record as PPk. And measure the total average power and record as PAvg. Both the peak and average power levels must be expressed in the same logarithmic units (e.g., dBm). Determine the PAPR from:

$$\text{PAPR (dB)} = \text{PPk (dBm)} - \text{PAvg (dBm)}.$$

Test Setup



Limits

Rule Part 27.50(d)(5) Equipment employed must be authorized in accordance with the provisions of 24.51. Power measurements for transmissions by stations authorized under this section may be made either in accordance with a Commission-approved average power technique or in compliance with paragraph (d)(6) of this section. In measuring transmissions in this band using an average power technique, the peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.

Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor $k = 2$, $U = 0.4$ dB.



Test Results

LTE Band 41								
Modulation	Bandwidth (MHz)	Channel	Frequency (MHz)	Peak (dBm)	Avg (dBm)	PAPR (dB)	Limit (dB)	Conclusion
QPSK	5	39675	2498.5	27.20	18.84	8.36	≤13	PASS
		40620	2593	27.39	19.49	7.90	≤13	PASS
		41565	2687.5	27.20	19.41	7.79	≤13	PASS
	10	39700	2501	27.22	19.48	7.74	≤13	PASS
		40620	2593	27.35	19.43	7.92	≤13	PASS
		41540	2685	27.23	19.29	7.94	≤13	PASS
	15	39725	2503.5	27.56	18.30	9.26	≤13	PASS
		40620	2593	27.65	18.42	9.23	≤13	PASS
		41515	2682.5	27.72	19.93	7.79	≤13	PASS
	20	39750	2506	27.47	19.07	8.40	≤13	PASS
		40620	2593	27.45	18.29	9.16	≤13	PASS
		41490	2680	27.54	18.30	9.24	≤13	PASS
16QAM	5	39675	2498.5	26.91	17.66	9.25	≤13	PASS
		40620	2593	27.06	17.35	9.71	≤13	PASS
		41565	2687.5	27.05	18.58	8.47	≤13	PASS
	10	39700	2501	26.94	17.95	8.99	≤13	PASS
		40620	2593	27.04	17.34	9.70	≤13	PASS
		41540	2685	26.95	17.10	9.85	≤13	PASS
	15	39725	2503.5	27.21	17.80	9.41	≤13	PASS
		40620	2593	27.23	16.66	10.57	≤13	PASS
		41515	2682.5	27.32	17.74	9.58	≤13	PASS
	20	39750	2506	27.24	18.33	8.91	≤13	PASS
		40620	2593	27.14	16.99	10.15	≤13	PASS
		41490	2680	27.36	18.11	9.25	≤13	PASS

5.5 Frequency Stability

Ambient condition

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

Method of Measurement

Frequency Stability (Temperature Variation)

The temperature inside the climate chamber is varied from 0°C to 35°C in 10°C step size.

(1)With all power removed, the temperature was decreased to -10°C and permitted to stabilize for three hours.

(2)Measure the carrier frequency with the test equipment in a “call mode”. These measurements should be made within 1 minute of powering up the mobile station, to prevent significant self warming.

(3) Repeat the above measurements at 10°C increments from 0°C to +35°C. Allow at least 1.5 hours at each temperature, un-powered, before making measurements.

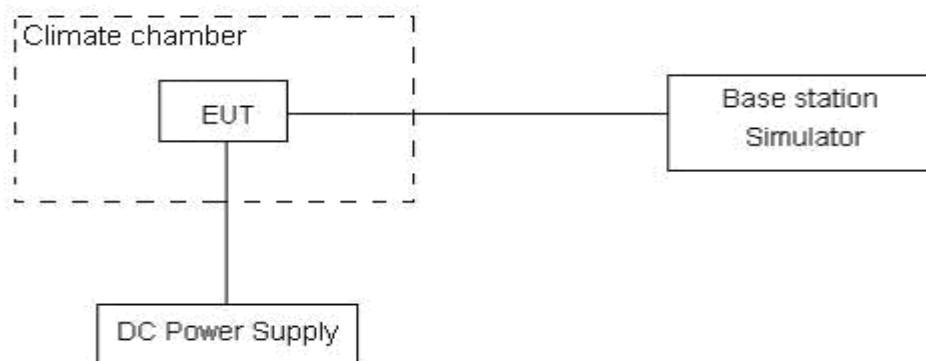
Frequency Stability (Voltage Variation)

The frequency stability shall be measured with variation of primary supply voltage as follows:

Primary Supply Voltage: The primary supply voltage is varied from 85% to 115% of the nominal value for non hand-carried battery and AC powered equipment. For hand-carried, battery-powered equipment, primary supply voltage is reduced to the battery operating end point which shall be specified by the manufacturer.

This transceiver is specified to operate with an input voltage of between 3.60 V and 4.45 V, with a nominal voltage of 3.87V.

Test setup



Limits

The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

Measurement Uncertainty

The assessed measurement uncertainty to ensure 99.75% confidence level for the normal distribution is with the coverage factor $k = 3, U=0.01\text{ppm}$.



Test Result

LTE Band 41						
Condition		Freq.Error (Hz)	Freq.Error (Hz)	Frequency Stability (ppm)	Frequency Stability (ppm)	Verdict
BANDWIDTH	5MHz					
Temperature	Voltage	16QAM	QPSK	16QAM	QPSK	Normal
Normal (25°C)	1.41	2.00	0.00054	0.00077		
Extreme (35°C)	14.58	9.00	0.00562	0.00347		
Extreme (30°C)	2.69	16.00	0.00104	0.00617		
Extreme (20°C)	9.07	6.00	0.00350	0.00231		
Extreme (10°C)	2.55	8.00	0.00098	0.00309		
Extreme (0°C)	3.24	15.00	0.00125	0.00578		
25°C	LV	8.23	14.00	0.00317	0.00540	PASS
	HV	2.37	7.00	0.00091	0.00270	PASS
Condition		Freq.Error (Hz)	Freq.Error (Hz)	Frequency Stability (ppm)	Frequency Stability (ppm)	Verdict
BANDWIDTH	10MHz					
Temperature	Voltage	16QAM	QPSK	16QAM	QPSK	Normal
Normal (25°C)	9.40	8.00	0.00363	0.00309		
Extreme (35°C)	7.41	16.00	0.00286	0.00617		
Extreme (30°C)	7.80	5.00	0.00301	0.00193		
Extreme (20°C)	5.97	17.00	0.00230	0.00656		
Extreme (10°C)	17.15	14.00	0.00661	0.00540		
Extreme (0°C)	13.54	3.00	0.00522	0.00116		
25°C	LV	15.03	12.00	0.00579	0.00463	PASS
	HV	14.55	2.00	0.00561	0.00077	PASS
Condition		Freq.Error (Hz)	Freq.Error (Hz)	Frequency Stability (ppm)	Frequency Stability (ppm)	Verdict
BANDWIDTH	15MHz					
Temperature	Voltage	16QAM	QPSK	16QAM	QPSK	Normal
Normal (25°C)	10.06	5.00	0.00388	0.00193		
Extreme (35°C)	9.67	11.00	0.00373	0.00424		
Extreme (30°C)	15.24	1.00	0.00588	0.00039		
Extreme (20°C)	11.95	9.00	0.00461	0.00347		
Extreme (10°C)	10.58	14.00	0.00408	0.00540		
Extreme (0°C)	3.22	16.00	0.00124	0.00617		
25°C	LV	15.71	10.00	0.00606	0.00386	PASS
	HV	3.39	3.00	0.00131	0.00116	PASS
Condition		Freq.Error (Hz)	Freq.Error (Hz)	Frequency Stability (ppm)	Frequency Stability (ppm)	Verdict
BANDWIDTH	20MHz					
Temperature	Voltage	16QAM	QPSK	16QAM	QPSK	Normal
Normal (25°C)	Normal	2.00	11.00	0.00077	0.00424	PASS



Extreme (35°C)		2.00	14.00	0.00077	0.00540	PASS
Extreme (30°C)		13.00	7.00	0.00501	0.00270	PASS
Extreme (20°C)		9.00	14.00	0.00347	0.00540	PASS
Extreme (10°C)		11.00	5.00	0.00424	0.00193	PASS
Extreme (0°C)		16.00	2.00	0.00617	0.00077	PASS
25°C	LV	2.00	10.00	0.00077	0.00386	PASS
	HV	9.00	15.00	0.00347	0.00578	PASS

5.6 Spurious Emissions at Antenna Terminals

Ambient condition

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

Method of Measurement

The EUT was connected to Spectrum Analyzer and Base Station Simulator via power Splitter. The measurement is carried out using a spectrum analyzer. The spectrum analyzer scans from 9kHz to the 10th harmonic of the carrier. The peak detector is used.

RBW is set to 100kHz, VBW is set to 300kHz for 30MHz~1GHz

RBW is set to 1MHz, VBW is set to 3MHz for above 1GHz, Sweep is set to ATUO.

RBW is set to 1 kHz (0.009MHz~ 0.15 MHz),

RBW is set to 10 kHz (0.15 MHz~ 30 MHz)

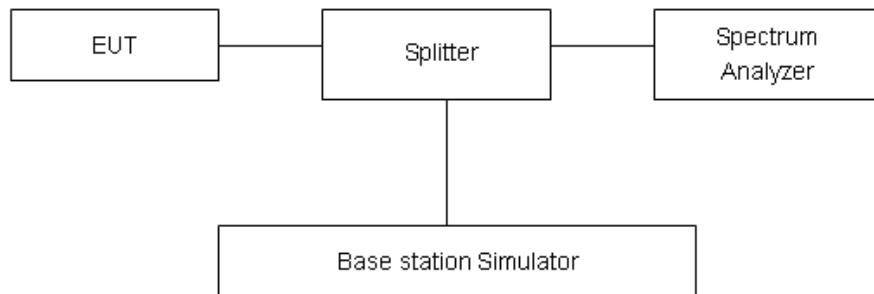
RBW is set to 100 kHz (30MHz~1000 MHz)

RBW is set to 1000 kHz (above 1000MHz)

Of those disturbances below (limit – 20 dB), the mark is not required for the EUT.

The modulation mode and RB allocation refer to section 5.1, using the maximum output power configuration.

Test setup



Limits

Rule Part 27.53(m) $55 + 10 \log (P)$ dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(4) of this section.

Part 27.53(m) Limit	-25 dBm
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Measurement Uncertainty

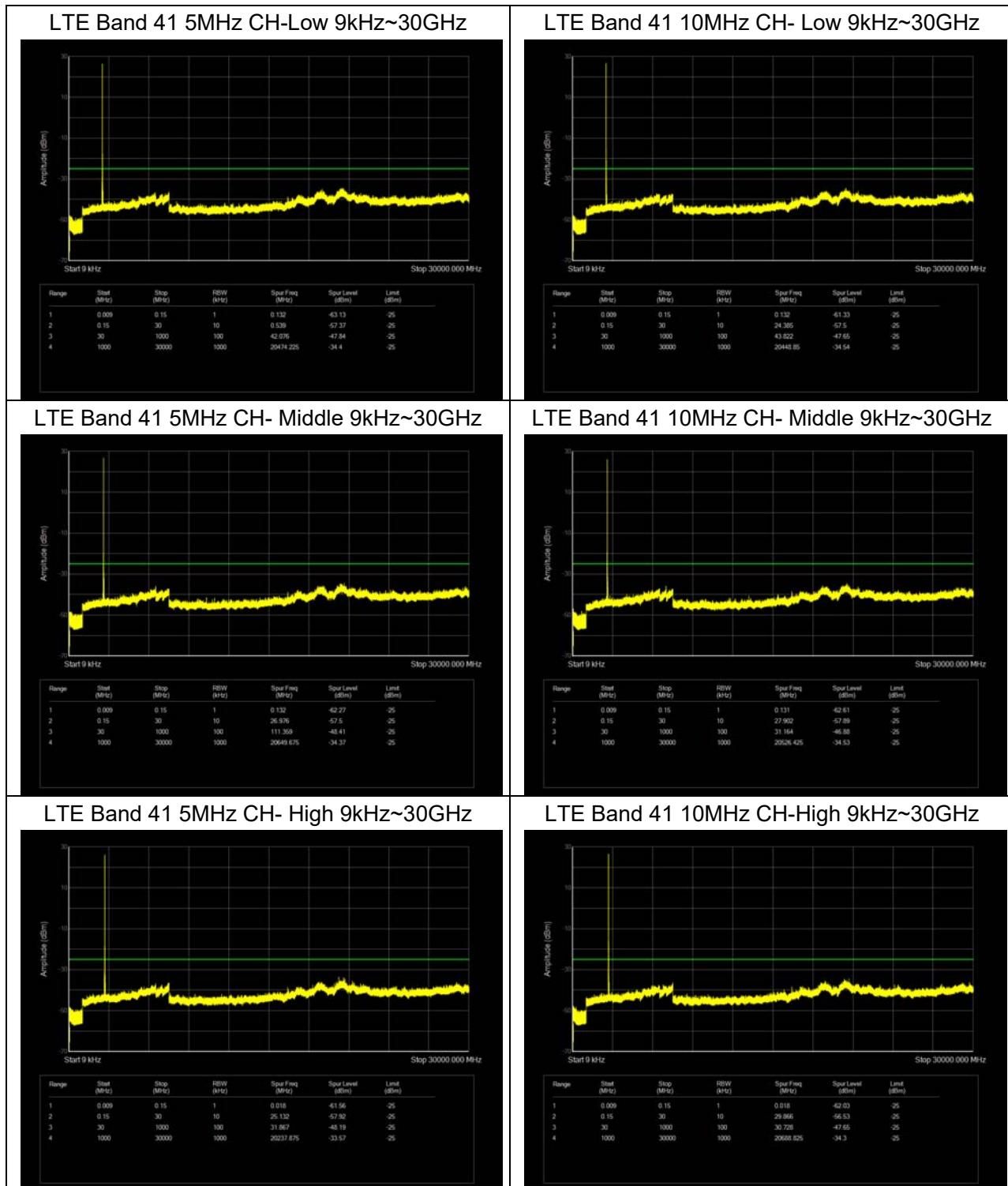
The assessed measurement uncertainty to ensure 99.75% confidence level for the normal distribution is with the coverage factor $k = 1.96$.

Frequency	Uncertainty
9kHz-1GHz	0.684 dB
1GHz-30GHz	1.407 dB

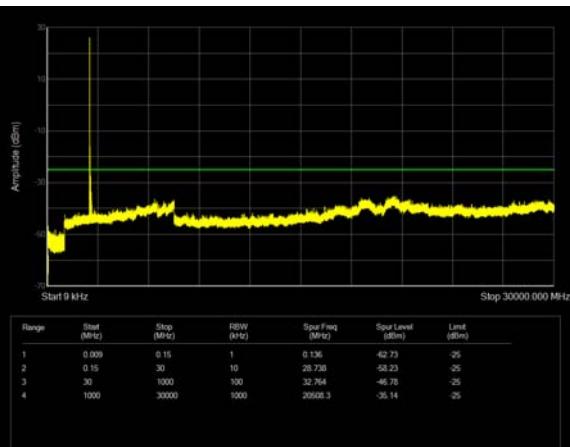
Test Result

Sweep the whole frequency band through the range from 9kHz to the 10th harmonic of the carrier, the emissions more than 20 dB below the limit are not reported.

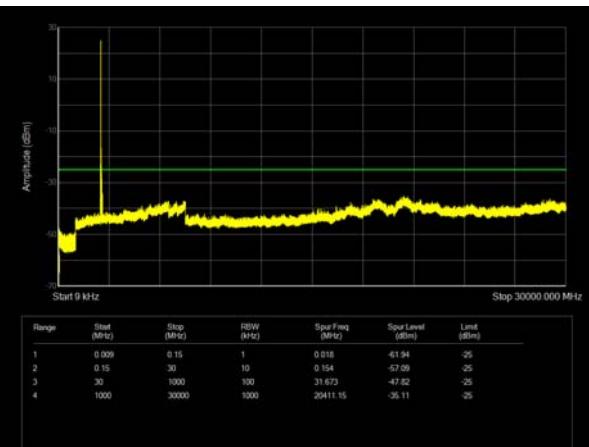
The signal beyond the limit is carrier.



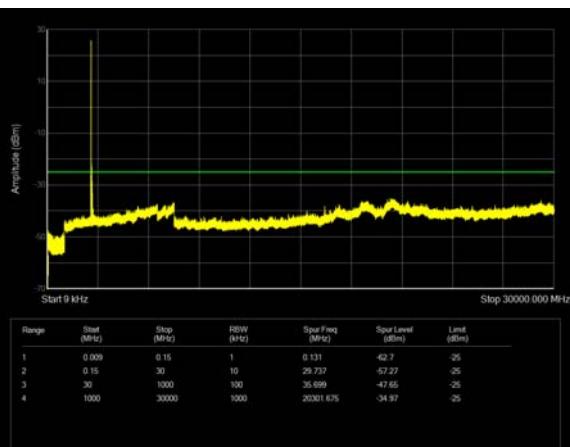
LTE Band 41 15MHz CH- Low 9kHz~30GHz



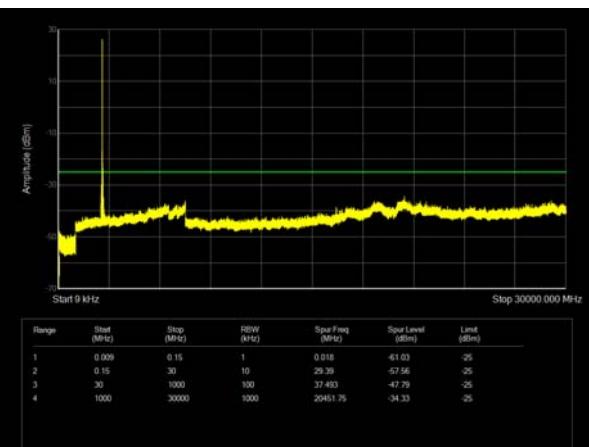
LTE Band 41 20MHz CH-Low 9kHz~30GHz



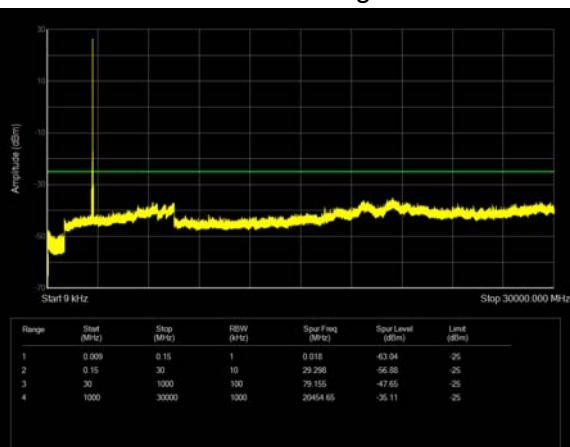
LTE Band 41 15MHz CH- Middle 9kHz~30GHz



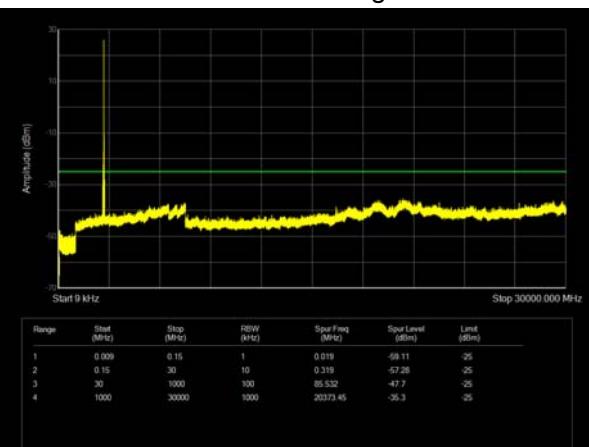
LTE Band 41 20MHz CH- Middle 9kHz~30GHz



LTE Band 41 15MHz CH-High 9kHz~30GHz



LTE Band 41 20MHz CH- High 9kHz~30GHz





5.7 Radiates Spurious Emission

Ambient condition

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

Method of Measurement

1. The testing follows FCC KDB 971168 D01 v03r01 Section 5.8 and ANSI C63.26 (2015).
2. Below 1GHz: The EUT is placed on a turntable 0.8 meters above the ground in the chamber, 3 meter away from the antenna. The maximal emission value is acquired by adjusting the antenna height, polarisation and turntable azimuth. Normally, the height range of antenna is 1 m to 4 m, the azimuth range of turntable is 0° to 360°, and the receive antenna has two polarizations Vertical (V) and Horizontal (H). Above 1GHz: (Note: the FCC's permission to use 1.5m as an alternative per TCBC Conf call of Dec. 2, 2014.) The EUT is placed on a turntable 1.5 meters above the ground in the chamber, 3 meter away from the antenna. The maximal emission value is acquired by adjusting the antenna height, polarisation and turntable azimuth. Normally, the height range of antenna is 1 m to 4 m, the azimuth range of turntable is 0° to 360°, and the receive antenna has two polarizations Vertical (V) and Horizontal (H).
3. A loop antenna, A log-periodic antenna or horn antenna shall be substituted in place of the EUT. The log-periodic antenna will be driven by a signal generator and the level will be adjusted till the same power value on the spectrum analyzer or receiver. The level of the spurious emissions can be calculated through the level of the signal generator, cable loss, the gain of the substitution antenna and the reading of the spectrum analyzer or receiver.
4. The EUT is then put into continuously transmitting mode at its maximum power level during the test. Set Test Receiver or Spectrum RBW=100kHz, VBW=300kHz for 30MHz to 1GHz and RBW=1MHz, VBW=3MHz for above 1GHz, and the maximum value of the receiver should be recorded as (Pr).
5. The EUT shall be replaced by a substitution antenna. In the chamber, an substitution antenna for the frequency band of interest is placed at the reference point of the chamber. An RF Signal source for the frequency band of interest is connected to the substitution antenna with a cable that has been constructed to not interfere with the radiation pattern of the antenna. A power (PMea) is applied to the input of the substitution antenna, and adjust the level of the signal generator output until the value of the receiver reach the previously recorded (Pr). The power of signal source (PMea) is recorded. The test should be performed by rotating the test item and adjusting the receiving antenna polarization.
6. A amplifier should be connected to the Signal Source output port. And the cable should be connect between the Amplifier and the Substitution Antenna. The cable loss (Pcl), the Substitution Antenna Gain (Ga) and the Amplifier Gain (PAg) should be recorded after test.
7. The measurement results are obtained as described below:

$$\text{Power(EIRP)} = \text{PMea} - \text{PAg} - \text{Pcl} + \text{Ga}$$

The measurement results are amend as described below:

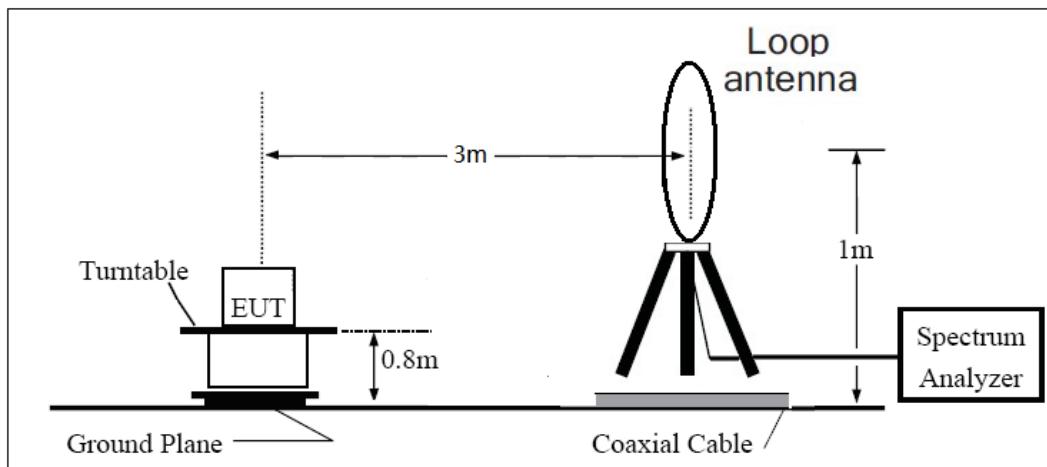
$$\text{Power(EIRP)} = \text{PMea} - \text{Pcl} + \text{Ga}$$

8. This value is EIRP since the measurement is calibrated using an antenna of known gain (2.15 dB) and known input power. ERP can be calculated from EIRP by subtracting the gain of the dipole, ERP = EIRP-2.15dB.

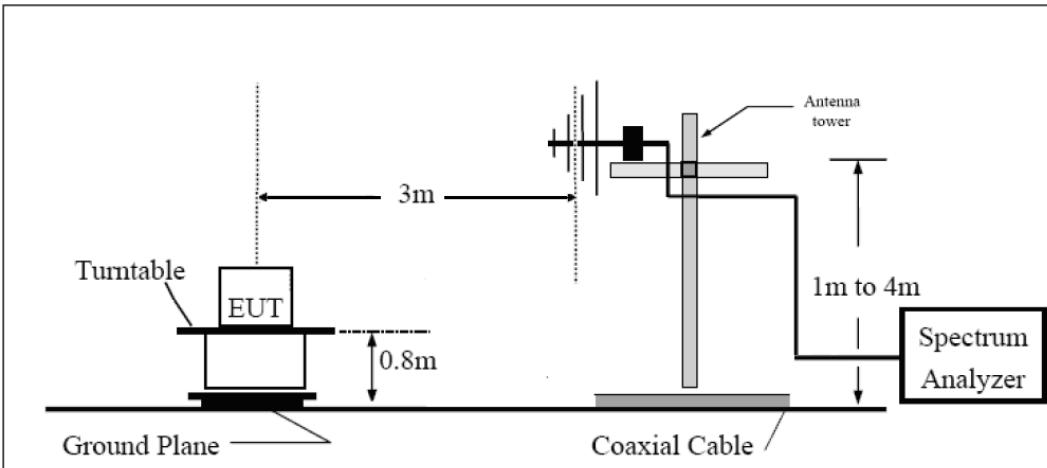
The modulation mode and RB allocation refer to section 5.1, using the maximum output power configuration.

Test setup

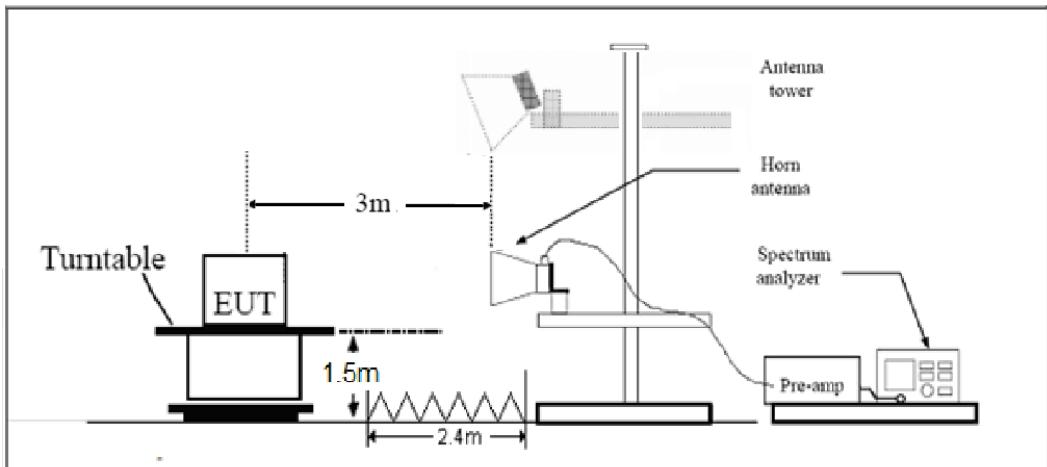
9KHz ~ 30MHz



30MHz ~ 1GHz



Above 1GHz



Note: Area side:2.4mX3.6m

Limits



Rule Part 27.53(m) $55 + 10 \log (P)$ dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(4) of this section.

Part 27.53(m) Limit	-25 dBm
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Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor $k = \pm 1.96$, $U = \pm 3.55$ dB.

**Test Result**

Sweep the whole frequency band through the range from 9kHz to the 10th harmonic of the carrier, the emissions below the noise floor will not be recorded in the report.

Main Antenna

LTE Band 41 QPSK 5MHz CH-Middle, RB 1

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	5181.70	-42.41	3.20	12.50	Horizontal	-33.11	-25.00	8.11	45
3	7772.80	-37.05	4.40	12.30	Horizontal	-29.15	-25.00	4.15	135
4	10363.60	-48.75	4.70	11.80	Horizontal	-41.65	-25.00	16.65	0
5	12954.20	-51.38	5.40	14.00	Horizontal	-42.78	-25.00	17.78	45
6	15489.90	-54.35	6.10	16.80	Horizontal	-43.65	-25.00	18.65	180
7	18071.55	--	--	--	--	--	--	--	--
8	20653.20	--	--	--	--	--	--	--	--
9	23234.85	--	--	--	--	--	--	--	--
10	25816.50	--	--	--	--	--	--	--	--

Note: 1. The other Spurious RF Radiated emissions level is no more than noise floor.

2. The worst emission was found in the antenna is Horizontal position.

LTE Band 41 QPSK 20MHz CH-Middle, RB 1

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	5168.10	-43.73	3.20	12.50	Horizontal	-34.43	-25.00	9.43	315
3	7752.60	-36.96	4.40	12.30	Horizontal	-29.06	-25.00	4.06	270
4	10336.40	-42.39	4.70	11.80	Horizontal	-35.29	-25.00	10.29	0
5	12920.00	-51.09	5.40	14.00	Horizontal	-42.49	-25.00	17.49	45
6	15448.80	-53.06	6.10	16.80	Horizontal	-42.36	-25.00	17.36	90
7	18023.60	--	--	--	--	--	--	--	--
8	20598.40	--	--	--	--	--	--	--	--
9	23173.20	--	--	--	--	--	--	--	--
10	25748.00	--	--	--	--	--	--	--	--

Note: 1. The other Spurious RF Radiated emissions level is no more than noise floor.

2. The worst emission was found in the antenna is Horizontal position.



Second Antenna

LTE Band 41 QPSK 5MHz CH-Middle, RB 1

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	5180.80	-59.98	3.20	12.50	Horizontal	-50.68	-25.00	25.68	225
3	7772.80	-57.65	4.40	12.30	Horizontal	-49.75	-25.00	24.75	225
4	10363.60	-51.60	4.70	11.80	Horizontal	-44.50	-25.00	19.50	180
5	12954.20	-51.36	5.40	14.00	Horizontal	-42.76	-25.00	17.76	315
6	15489.90	-52.96	6.10	16.80	Horizontal	-42.26	-25.00	17.26	135
7	18071.55	--	--	--	--	--	--	--	--
8	20653.20	--	--	--	--	--	--	--	--
9	23234.85	--	--	--	--	--	--	--	--
10	25816.50	--	--	--	--	--	--	--	--

Note: 1. The other Spurious RF Radiated emissions level is no more than noise floor.

2. The worst emission was found in the antenna is Horizontal position.

LTE Band 41 QPSK 20MHz CH-Middle, RB 1

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	5168.10	-60.42	3.20	12.50	Horizontal	-51.12	-25.00	26.12	135
3	7752.60	-58.05	4.40	12.30	Horizontal	-50.15	-25.00	25.15	135
4	10336.40	-50.82	4.70	11.80	Horizontal	-43.72	-25.00	18.72	225
5	12920.00	-52.07	5.40	14.00	Horizontal	-43.47	-25.00	18.47	270
6	15448.80	-52.90	6.10	16.80	Horizontal	-42.20	-25.00	17.20	270
7	18023.60	--	--	--	--	--	--	--	--
8	20598.40	--	--	--	--	--	--	--	--
9	23173.20	--	--	--	--	--	--	--	--
10	25748.00	--	--	--	--	--	--	--	--

Note: 1. The other Spurious RF Radiated emissions level is no more than noise floor.

2. The worst emission was found in the antenna is Horizontal position.



6 Main Test Instruments

Name	Manufacturer	Type	Serial Number	Calibration Date	Expiration Date
Signal Analyzer	R&S	FSV30	104028	2021-05-15	2022-05-14
Loop antenna	SCHWARZBECK	FMZB1519	1519-047	2020-04-02	2023-04-01
TRILOG Broadband Antenna	Schwarzbeck	VULB 9163	01111	2019-09-12	2022-09-11
Horn Antenna	Schwarzbeck	BBHA 9120D	1594	2020-12-17	2023-12-16
Horn Antenna	ETS-Lindgren	3160-09	00102643	2020-10-10	2023-10-09
Software	R&S	EMC32	10.35.10	/	/
Communication tester	Anritsu	MT8821C	6201538758	2021-05-15	2022-05-14
Climate Chamber	WEISS	VT 4002	582261194500 10	2021-05-15	2022-05-14
Climate Chamber	R&S	CMW500	150415	2021-05-15	2022-05-14
Spectrum Analyzer	Keysight	N9020A	MY52330084	2021-05-15	2022-05-14
Wireless Communication Tester	Agilent	E5515C	GB44400275	2021-05-15	2022-05-14
Spectrum Analyzer	R&S	FSV3030	101411	2021-12-12	2022-12-11

*****END OF REPORT*****



ANNEX A: The EUT Appearance

The EUT Appearance are submitted separately.



ANNEX B: Test Setup Photos

The Test Setup Photos are submitted separately.