FCC Test Report

(Part 27: CA mode (LTE Band 7C, 38C, 41C, 66C, 66B))

Report No.:	RFBFLF-WTW-P21010278-19
FCC ID:	MSQI007D
Test Model:	ASUS_I007D
Received Date:	Jan. 04, 2021
Test Date:	Mar. 11 ~ Apr. 13, 2021
Issued Date:	Apr. 14, 2021
Applicant:	ASUSTeK COMPUTER INC.
Address:	1F., No. 15, Lide Rd., Beitou Dist., Taipei City 112, Taiwan
Issued By:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch Lin Kou Laboratories
Lab Address:	No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan
Test Location:	No. 19, Hwa Ya 2nd Rd., Wen Hwa Vil., Kwei Shan Dist., Taoyuan City 33383, Taiwan
FCC Registration / Designation Number:	788550 / TW0003

Testing Laboratory
2021

Table of Contents

Release Control Record

Issue No.	Description	Date Issued
RFBFLF-WTW-P21010278-19	Original release	Apr. 14, 2021

1 Certificate of Conformity

Product:	EXP21 Smartphone
Brand:	ASUS
Test Model:	ASUS_I007D
Sample Status:	Engineering sample
Applicant:	ASUSTeK COMPUTER INC.
Test Date:	Mar. 11 ~ Apr. 13, 2021
Standards:	FCC Part 27, Subpart C, M, L

The above equipment has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's RF characteristics under the conditions specified in this report.

Prepared by : Pettie Chen , **Date:** Apr. 14, 2021

Pettie Chen / Senior Specialist

Approved by : Bruce Chen , **Date:** Apr. 14, 2021

Bruce Chen / Senior Project Engineer

2 Summary of Test Results

Applied Standard: FCC Part 27 & Part 2				
FCC Clause		Test Item	Result	Remarks
LTE B7 / LTE B38 / LTE B41	LTE B66			
2.1046 27.50 (h)(2)	2.1046 27.50 (d)(4)	Equivalent Isotropically Radiated Power	Pass	Meet the requirement of limit.
2.1047	2.1047	Modulation Characteristics	Pass	Refer to Note 2
---	27.50 (d)(5)	Peak To Average Ratio	Pass	Meet the requirement of limit.
2.1055 27.54	2.1055 27.54	Frequency Stability Stay with the authorized bands of operation	Pass	Meet the requirement of limit.
2.1049	2.1049	Emission Bandwidth	Pass	Meet the requirement of limit.
2.1051 27.53 (m)(4)(6)	2.1051 27.53(h)	Band Edge Measurements	Pass	Meet the requirement of limit.
2.1051 27.53 (m)(4)(6)	2.1051 27.53(h)	Conducted Spurious Emissions	Pass	Meet the requirement of limit.
2.1053 27.53 (m)(4)(6)	2.1053 27.53(h)	Radiated Spurious Emissions	Pass	Meet the requirement of limit. Minimum passing margin is -8.30dB at 30.00MHz.

Note:

1. Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.
2. LTE CA mode is similar to digital modulation in LTE single frequency band, so please refer to BV CPS report no.: RFBFLF-WTW-P21010278-11 for the modulation characteristics data of CA mode.

2.1 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

Measurement	Frequency	Expanded Uncertainty (k=2) (±)
Radiated Emissions up to 1 GHz	9kHz ~ 30MHz	3.04 dB
	30MHz ~ 200MHz	3.59 dB
	200MHz ~1000MHz	3.60 dB
Radiated Emissions above 1 GHz	1GHz ~ 18GHz	2.29 dB
	18GHz ~ 40GHz	2.29 dB

2.2 Test Site and Instruments

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Test Receiver KEYSIGHT	N9038A	MY55420137	Apr. 16, 2020	Apr. 15, 2021
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100039	Jun. 12, 2020	Jun. 11, 2021
Spectrum Analyzer ROHDE & SCHWARZ	FSW43	101866	Dec. 14, 2020	Dec. 13, 2021
MXG Vector signal generator Agilent	N5182B	MY53050430	Nov. 25, 2020	Nov. 24, 2021
5G Wireless Test Platforms Keysight	E7515B	MY58300759	Apr. 18, 2020	Apr. 17, 2021
BILOG Antenna SCHWARZBECK	VULB9168	9168-472	Nov. 06, 2020	Nov. 05, 2021
HORN Antenna SCHWARZBECK	BBHA 9120D	9120D-969	Nov. 22, 2020	Nov. 21, 2021
BILOG Antenna SCHWARZBECK	VULB9168	9168-160	Nov. 06, 2020	Nov. 05, 2021
HORN Antenna SCHWARZBECK	BBHA 9120 D	9120D-1169	Nov. 22, 2020	Nov. 21, 2021
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170241	Nov. 22, 2020	Nov. 21, 2021
Preamplifier Agilent (Below 1GHz)	8447D	2944A10638	Jun. 08, 2020	Jun. 07, 2021
Preamplifier Agilent (Above 1GHz)	8449B	3008A02367	Feb. 17, 2021	Feb. 16, 2022
RF signal cable HUBER+SUHNER&EMCI	SUCOFLEX 104 & EMC104-SM-SM8000	CABLE-CH9-02 (248780+171006)	Jan. 16, 2021	Jan. 15, 2022
RF signal cable HUBER+SUHNER	SUCOFLEX 104	CABLE-CH9-(250795/4)	Jan. 16, 2021	Jan. 15, 2022
RF signal cable Woken	8D-FB	Cable-CH9-01	Jun. 08, 2020	Jun. 07, 2021
Software BV ADT	ADT_Radiated_ V7.6.15.9.5	NA	NA	NA
Antenna Tower EMCO	2070/2080	512.835.4684	NA	NA
Turn Table EMCO	2087-2.03	NA	NA	NA
Antenna Tower &Turn BV ADT	AT100	AT93021705	NA	NA
Turn Table BV ADT	TT100	TT93021705	NA	NA
Turn Table Controller BV ADT	SC100	SC93021705	NA	NA
Boresight Antenna Fixture	FBA-01	FBA-SIP01	NA	NA
Standard Temperature And Humidity Chamber GIANT FORCE	GTH-120-40-CP-AR	MAA1306-019	Sep. 10, 2020	Sep. 09, 2021
JFW 20dB attenuation	50HF-020-SMA	NA	NA	NA
True RMS Clamp Meter Fluke	325	31130711WS	Jun. 06, 2020	Jun. 05, 2021
DC power supply Keysight	U8002A	MY56330015	NA	NA

Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in HwaYa Chamber 9.

3 General Information

3.1 General Description of EUT

Product	EXP21 Smartphone				
Brand	ASUS				
Test Model	ASUS_I007D				
Status of EUT	Engineering sample				
Power Supply Rating	7.74 Vdc (Battery) 5 Vdc / 9 Vdc / 12 Vdc / 15Vdc / 20Vdc (Adapter)				
Modulation Type	LTE: QPSK, 16QAM, 64QAM, 256QAM				
Operating Frequency	LTE Band 7C	2507.8MHz ~ 2560.0MHz			
	LTE Band 38C	2580.0MHz ~ 2610.0MHz			
	LTE Band 41C	2506.0MHz ~ 2680.0MHz			
	LTE Band 66C	1720.0MHz ~ 1770.0MHz			
	LTE Band 66B	1715.0MHz ~ 1775.0MHz			
Max. EIRP Power		QPSK	16QAM	64QAM	256QAM
	LTE Band 7C (20MHz+20MHz)	227.510mW (23.57dBm)	191.426mW (22.82dBm)	163.682mW (22.14dBm)	135.519mW (21.32dBm)
	LTE Band 38C (20MHz+20MHz)	214.783mW (23.32dBm)	187.499mW (22.73dBm)	155.239mW (21.91dBm)	131.220mW (21.18dBm)
	LTE Band 41C (20MHz+20MHz)	309.030mW (24.90dBm)	263.633mW (24.21dBm)	234.963mW (23.71dBm)	199.986mW (23.01dBm)
	LTE Band 66C (20MHz+20MHz)	142.889mW (21.55dBm)	124.451mW (20.95dBm)	106.660mW (20.28dBm)	93.756mW (19.72dBm)
	LTE Band 66B (10MHz+10MHz)	148.252mW (21.71dBm)	122.744mW (20.89dBm)	103.753mW (20.16dBm)	85.310mW (19.31dBm)
Emission Designator	LTE Band 7C (20MHz+20MHz)	37M6G7D	37M5D7W	37M5D7W	37M5D7W
	LTE Band 38C (20MHz+20MHz)	37M4G7D	37M4D7W	37M5D7W	37M4D7W
	LTE Band 41C (20MHz+20MHz)	37M7G7D	37M4D7W	37M4D7W	37M4D7W
	LTE Band 66C (20MHz+20MHz)	37M4G7D	37M4D7W	37M4D7W	37M4D7W
	LTE Band 66B (10MHz+10MHz)	18M6G7D	18M7D7W	18M7D7W	18M7D7W
Antenna Type	Refer to Note as below				
Antenna Connector	Refer to Note as below				
Accessory Device	Refer to Note as below				
Cable Supplied	Refer to Note as below				

Note:

1. The EUT contains following accessory devices.

Product	Brand	Model	Description
Battery	SCUD	C21P2002	Rating: 7.74 Vdc, 15.2 Wh
Adapter	AOHAI	A320Q-200325C-US	I/P: 100-240Vac, 50/60Hz,1.5A O/P: 5 Vdc, 3 A; 9 Vdc, 3 A; 12 Vdc, 3A; 15 Vdc, 3 A; 20 Vdc, 3.25 A
Type A to Type C USB Cable	Luxshare	LA9U2026-CS-R	0.5m
Type C to Type C Cable	Luxshare	LA9UC006-CS-R	1.2m
Bluetooth Earphone	Bang & Olufsen	EQ Earbud R	FCC ID: TTUBEOPLAYEQR IC: 3775B-BEOPLAYEQR
		EQ Earbud L	FCC ID: TTUBEOPLAYEQL IC: 3775B-BEOPLAYEQL
Bluetooth Earphone Charging Case	Bang & Olufsen	EQ Charging case	I/P: 5Vdc/500mA O/P: 5Vdc/ R170mA; L170mA

2. The following antennas were provided to the EUT.

Ant. No.	Brand	Model	Ant. Type	Connecter	Frequency Range
Ant 0	ASUS	ZS675KW	PIFA	LCP+Ipex	610-960MHz, 1710-2690MHz
Ant 1	ASUS	ZS675KW	PIFA	LCP+Ipex	1427-1510MHz, 1710-2690MHz
Ant 2	ASUS	ZS675KW	PIFA	LCP+Ipex	610-960MHz, 1427-1510MHz, 1710-2690MHz
Ant 3	INPAQ	ZS675KW	PIFA	Ipex	1575-1610MHz, 2400-2500MHz, 5150-5850MHz, 5925-7125MHz
Ant 4	INPAQ	ZS675KW	PIFA	Ipex	1176±10MHz, 2400-2500MHz, 5150-5850MHz, 5925-7125MHz
Ant 5	INPAQ	ZS675KW	PIFA	LCP+Ipex	3300-4000MHz, 4400-5000MHz
Ant 6	INPAQ	ZS675KW	PIFA	Ipex	1427-1510MHz, 2400-2500MHz, 5150-5850MHz, 5925-7125MHz
Ant 7	INPAQ	ZS675KW	PIFA	LCP+Ipex	3300-4000MHz, 4400-5000MHz
Ant 8	ASUS	ZS675KW	PIFA	LCP+Ipex	1427-1510MHz, 1710-2690MHz
Ant 9	ASUS	ZS675KW	PIFA	LCP+Ipex	1710-2690MHz
Ant 10	INPAQ	ZS675KW	PIFA	Ipex	3300-4000MHz, 4400-5000MHz
Ant 11	INPAQ	ZS675KW	PIFA	Ipex	3300-4000MHz, 4400-5000MHz

2G / 3G Band													
Band	Freq. Range (MHz)	Gain (dBi)											
		Ant. 0	Ant. 1	Ant. 2	Ant. 3	Ant. 4	Ant. 5	Ant. 6	Ant. 7	Ant. 8	Ant. 9	Ant. 10	Ant. 11
GSM-850	824 ~ 849	-1.891		-4.526									
GSM-1900	1850 ~ 1910		-1.887	-1.394						-2.89579			
WCDMA B2	1850 ~ 1910		-1.887	-1.394						-2.89579			
WCDMA B4	1710 ~ 1755		-2.884	-3.228						-3.13552			
WCDMA B5	824 ~ 849	-1.891		-4.526									
CDMA BC0	815 ~ 849	-1.891		-4.526									
CDMA BC1	1850 ~ 1910		-1.887	-1.394						-2.89579			
CDMA BC10	806 ~ 901	-1.891		-4.526									
LTE B2	1850 ~ 1910		-1.887	-1.394						-2.89579	-1.804		
LTE B4	1710 ~ 1755		-2.884	-3.228						-3.13552	-1.706		
LTE B5	824 ~ 849	-1.891		-4.526									
LTE B7	2500 ~ 2570		0.185	-0.657						-0.50837	-1.117		
LTE B12	698 ~ 716	-2.135		-4.343									
LTE B13	777 ~ 787	-4.37		-8.13									
LTE B14	788 ~ 798	-4.37		-7.931									
LTE B17	704 ~ 716	-2.135		-4.343									
LTE B25	1850 ~ 1915		-1.887	-1.394						-2.89579			
LTE B26	814 ~ 849	-1.891		-4.526									
LTE B30	2305 ~ 2315		-1.326	-2.669						-1.28433			
LTE B66	1710 ~ 1780		-2.884	-2.478						-3.0668	-1.685		
LTE B71	663 ~ 698	-5.741		-7.388									
T-LTE B38	2570 ~ 2620		0.724	-0.912						-0.59557			
T-LTE B40	2300 ~ 2400		-1.326	-2.669						-1.28433			
T-LTE B41	2496 ~ 2690		1.143	-0.657						-0.59557			
T-LTE B42	3400 ~ 3600						0.313		0.5277			-2.493	-0.35195
T-LTE B43	3600 ~ 3800						-0.434		0.5277			-0.477	-0.161
T-LTE B48	3550 ~ 3700						-0.434		0.5277			-0.477	-0.161

5G FR1 Band												
Band	Freq. Range (MHz)	Gain (dBi)										
		Ant. 0	Ant. 1	Ant. 2	Ant. 3	Ant. 4	Ant. 5	Ant. 6	Ant. 7	Ant. 8	Ant. 9	Ant. 10	Ant. 11
n2	1850 ~ 1910		-1.887	-1.394						-2.89579	-1.804		
n5	824 ~ 849	-1.891		-4.526									
n7	2500 ~ 2570		0.185	-0.657						-0.50837	-1.117		
n12	699 ~ 716	-2.135		-4.343									
n13	777 ~ 787	-4.37		-8.13									
n14	788 ~ 798	-4.37		-7.931									
n25	1850 ~ 1915		-1.887	-1.394						-2.89579	-1.627		
n26	814 ~ 849	-1.891		-4.526									
n30	2305 ~ 2315		-1.326	-2.669						-1.28433			
n38	2570 ~ 2620		0.724	-0.912						-0.59557	-1.3		
n41	2496 ~ 2690		1.143	-0.657						-0.59557	-0.076		
n66	1710 ~ 1780		-2.884	-2.478						-3.0668	-1.685		
n71	663 ~ 698	-5.741		-7.388									
n77	3300 ~ 4200						0.313		0.5277			2.017	0.19902
n78	3300 ~ 3800						0.313		0.5277			2.017	-0.161

* The above Antenna information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications, the laboratory shall not be held responsible.

3. For CA mode configuration, please consult the manufacturer to declare the test mode.

4. The EUT support the following CA Configuration.

Band Configuration
5B
7C
38C
41C
48C
66B
66C

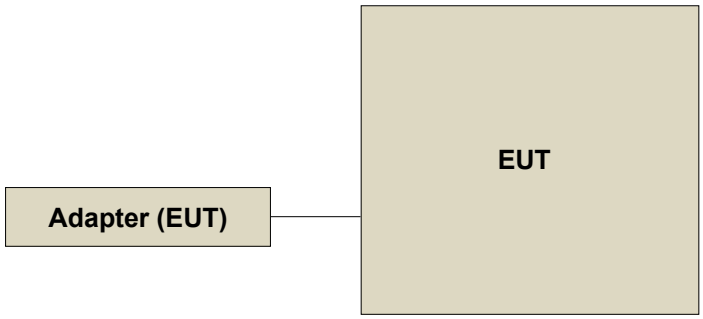
5. E-UTRA CA configuration / Bandwidth combination set.

E-UTRA CA configuration / Bandwidth combination set					
E-UTRA CA configuration	Uplink CA configurations	Component carriers in order of increasing carrier frequency		Maximum aggregated bandwidth [MHz]	Bandwidth combination set
		Channel bandwidths for carrier [MHz]	Channel bandwidths for carrier [MHz]		
CA_7C	CA_7C	15	15	40	0
		20	20		
		10	20	40	1
		15	15, 20		
		20	10, 15, 20		
		15	10, 15	40	2
		20	15, 20		
CA_38C	CA_38C	15	15	40	0
		20	20		
CA_41C	CA_41C	10	20	40	0
		15	15, 20		
		20	10, 15, 20		
		5, 10	20	40	1
		15	15, 20		
		20	5, 10, 15, 20		
		10	15, 20	40	2
		15	10, 15, 20		
		20	10, 15, 20		
		10	20	40	3
		20	20		
CA_66B	CA_66B	5	5, 10, 15	20	0
		10	5, 10		
		15	5		
CA_66C	CA_66C	5	20	40	0
		10	15, 20		
		15	10, 15, 20		
		20	5, 10, 15, 20		

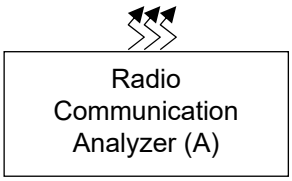
*7C/38C/41C/66C are continuous CA and maximum combination is 20M+20M.

*66B is continuous CA and maximum combination is 10M+10M.

3.2 Configuration of System under Test



Remote site



3.2.1 Description of Support Units

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Radio Communication Analyzer	Anritsu	MT8821C	6261806803	NA	-

Note:

1. All power cords of the above support units are non-shielded (1.8m).
2. Item A acted as a communication partner to transfer data.

3.3 Test Mode Applicability and Tested Channel Detail

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, XYZ axis and antenna ports. The worst case was found when positioned on Y-plane. Following channel(s) was (were) selected for the final test as listed below.

LTE Band 7 (CA 7C)

EUT Configure Mode	Test item	Available channel	Tested channel	Channel Bandwidth	Modulation	Mode
-	EIRP	20850 to 21152 21048 to 21350	20850(2510.0MHz)+ 21048(2529.8MHz), 21001(2525.1MHz)+ 21199(2544.9MHz), 21152(2540.2MHz)+ 21350(2560.0MHz)	20MHz + 20MHz	QPSK / 16QAM / 64QAM / 256QAM	1 RB / 0 RB Offset 1 RB / 74 RB Offset 1 RB / 99 RB Offset
-	Frequency Stability	20850 to 21152 21048 to 21350	20850(2510.0MHz)+ 21048(2529.8MHz)	20MHz + 20MHz	QPSK	75 RB / 0 RB Offset 100 RB / 0 RB Offse
-	Occupied Bandwidth	20850 to 21152 21048 to 21350	20850(2510.0MHz)+ 21048(2529.8MHz), 21001(2525.1MHz)+ 21199(2544.9MHz), 21152(2540.2MHz)+ 21350(2560.0MHz)	20MHz + 20MHz	QPSK / 16QAM / 64QAM / 256QAM	1 RB / 0 RB Offset 1 RB / 74 RB Offset 1 RB / 99 RB Offset
-	Emission Mask	20850 to 21152 21048 to 21350	20850(2510.0MHz)+ 21048(2529.8MHz), 21001(2525.1MHz)+ 21199(2544.9MHz), 21152(2540.2MHz)+ 21350(2560.0MHz)	20MHz + 20MHz	QPSK	1 RB / 0 RB Offset 1 RB / 74 RB Offset 75 RB / 0 RB Offset 1 RB / 99 RB Offset 100 RB / 0 RB Offset
-	Peak to Average Ratio	20850 to 21152 21048 to 21350	20850(2510.0MHz)+ 21048(2529.8MHz), 21001(2525.1MHz)+ 21199(2544.9MHz), 21152(2540.2MHz)+ 21350(2560.0MHz)	20MHz + 20MHz	QPSK / 16QAM / 64QAM / 256QAM	1 RB / 0 RB Offset 1 RB / 74 RB Offset
-	Conducted Emission	20850 to 21152 21048 to 21350	20850(2510.0MHz)+ 21048(2529.8MHz), 21001(2525.1MHz)+ 21199(2544.9MHz), 21152(2540.2MHz)+ 21350(2560.0MHz)	20MHz + 20MHz	QPSK	1 RB / 0 RB Offset 1 RB / 74 RB Offset
-	Radiated Emission Below 1GHz	20850 to 21152 21048 to 21350	21152(2540.2MHz)+ 21350(2560.0MHz)	20MHz + 20MHz	QPSK	1 RB / 0 RB Offset 1 RB / 74 RB Offset
-	Radiated Emission Above 1GHz	20850 to 21152 21048 to 21350	20850(2510.0MHz)+ 21048(2529.8MHz), 21001(2525.1MHz)+ 21199(2544.9MHz), 21152(2540.2MHz)+ 21350(2560.0MHz)	20MHz + 20MHz	QPSK	1 RB / 0 RB Offset 1 RB / 74 RB Offset

Note:

1. This device was tested under all bandwidths, RB configurations and modulations. The worst case was found in QPSK modulation.
2. LTE CA mode is similar to digital modulation in LTE single frequency band, so please refer to BV CPS report no.: RFBFLF-WTW-P21010278-11 for the modulation characteristics data of CA mode.

LTE Band 38 (CA 38C)

EUT Configure Mode	Test item	Available channel	Tested channel	Channel Bandwidth	Modulation	Mode
-	EIRP	37850 to 37952 38048 to 38150	37850(2580.0MHz)+ 38048(2599.8MHz), 37901(2585.1MHz)+ 38099(2604.9MHz), 37952(2590.2MHz)+ 38150(2610.0MHz)	20MHz + 20MHz	QPSK / 16QAM / 64QAM / 256QAM	1 RB / 0 RB Offset 1 RB / 99 RB Offset
-	Frequency Stability	37850 to 37952 38048 to 38150	37952(2590.2MHz)+ 38150(2610.0MHz)	20MHz + 20MHz	QPSK	100 RB / 0 RB Offset
-	Occupied Bandwidth	37850 to 37952 38048 to 38150	37850(2580.0MHz)+ 38048(2599.8MHz), 37901(2585.1MHz)+ 38099(2604.9MHz), 37952(2590.2MHz)+ 38150(2610.0MHz)	20MHz + 20MHz	QPSK / 16QAM / 64QAM / 256QAM	1 RB / 0 RB Offset 1 RB / 99 RB Offset 100 RB / 0 RB Offset
-	Emission Mask	37850 to 37952 38048 to 38150	37850(2580.0MHz)+ 38048(2599.8MHz), 37901(2585.1MHz)+ 38099(2604.9MHz), 37952(2590.2MHz)+ 38150(2610.0MHz)	20MHz + 20MHz	QPSK	1 RB / 0 RB Offset 1 RB / 99 RB Offset 100 RB / 0 RB Offset
-	Peak to Average Ratio	37850 to 37952 38048 to 38150	37850(2580.0MHz)+ 38048(2599.8MHz), 37901(2585.1MHz)+ 38099(2604.9MHz), 37952(2590.2MHz)+ 38150(2610.0MHz)	20MHz + 20MHz	QPSK / 16QAM / 64QAM / 256QAM	1 RB / 0 RB Offset 1 RB / 99 RB Offset
-	Conducted Emission	37850 to 37952 38048 to 38150	37850(2580.0MHz)+ 38048(2599.8MHz), 37901(2585.1MHz)+ 38099(2604.9MHz), 37952(2590.2MHz)+ 38150(2610.0MHz)	20MHz + 20MHz	QPSK	1 RB / 0 RB Offset 1 RB / 99 RB Offset
-	Radiated Emission Below 1GHz	37850 to 37952 38048 to 38150	37952(2590.2MHz)+ 38150(2610.0MHz)	20MHz + 20MHz	QPSK	1 RB / 0 RB Offset 1 RB / 99 RB Offset
-	Radiated Emission Above 1GHz	37850 to 37952 38048 to 38150	37850(2580.0MHz)+ 38048(2599.8MHz), 37901(2585.1MHz)+ 38099(2604.9MHz), 37952(2590.2MHz)+ 38150(2610.0MHz)	20MHz + 20MHz	QPSK	1 RB / 0 RB Offset 1 RB / 99 RB Offset

Note:

1. This device was tested under all bandwidths, RB configurations and modulations. The worst case was found in QPSK modulation.
2. LTE CA mode is similar to digital modulation in LTE single frequency band, so please refer to BV CPS report no.: RFBFLF-WTW-P21010278-11 for the modulation characteristics data of CA mode.

LTE Band 41 (CA 41C)

EUT Configure Mode	Test item	Available channel	Tested channel	Channel Bandwidth	Modulation	Mode
-	EIRP	39750 to 41292 39948 to 41490	39750(2506.0MHz)+ 39948(2525.8MHz), 40521(2583.1MHz)+ 40719(2602.9MHz), 41292(2660.2MHz)+ 41490(2680.0MHz)	20MHz + 20MHz	QPSK / 16QAM / 64QAM / 256QAM	1 RB / 0 RB Offset 1 RB / 99 RB Offset
-	Frequency Stability	39750 to 41292 39948 to 41490	41292(2660.2MHz)+ 41490(2680.0MHz)	20MHz + 20MHz	QPSK	100 RB / 0 RB Offset
-	Occupied Bandwidth	39750 to 41292 39948 to 41490	39750(2506.0MHz)+ 39948(2525.8MHz), 40521(2583.1MHz)+ 40719(2602.9MHz), 41292(2660.2MHz)+ 41490(2680.0MHz)	20MHz + 20MHz	QPSK / 16QAM / 64QAM / 256QAM	1 RB / 0 RB Offset 1 RB / 99 RB Offset
-	Emission Mask	39750 to 41292 39948 to 41490	39750(2506.0MHz)+ 39948(2525.8MHz), 40521(2583.1MHz)+ 40719(2602.9MHz), 41292(2660.2MHz)+ 41490(2680.0MHz)	20MHz + 20MHz	QPSK	1 RB / 0 RB Offset 1 RB / 99 RB Offset 100 RB / 0 RB Offset
-	Peak to Average Ratio	39750 to 41292 39948 to 41490	39750(2506.0MHz)+ 39948(2525.8MHz), 40521(2583.1MHz)+ 40719(2602.9MHz), 41292(2660.2MHz)+ 41490(2680.0MHz)	20MHz + 20MHz	QPSK / 16QAM / 64QAM / 256QAM	1 RB / 0 RB Offset 1 RB / 99 RB Offset
-	Conducted Emission	39750 to 41292 39948 to 41490	39750(2506.0MHz)+ 39948(2525.8MHz), 40521(2583.1MHz)+ 40719(2602.9MHz), 41292(2660.2MHz)+ 41490(2680.0MHz)	20MHz + 20MHz	QPSK	1 RB / 0 RB Offset 1 RB / 99 RB Offset
-	Radiated Emission Below 1GHz	39750 to 41292 39948 to 41490	41292(2660.2MHz)+ 41490(2680.0MHz)	20MHz + 20MHz	QPSK	1 RB / 0 RB Offset 1 RB / 99 RB Offset
-	Radiated Emission Above 1GHz	39750 to 41292 39948 to 41490	39750(2506.0MHz)+ 39948(2525.8MHz), 40521(2583.1MHz)+ 40719(2602.9MHz), 41292(2660.2MHz)+ 41490(2680.0MHz)	20MHz + 20MHz	QPSK	1 RB / 0 RB Offset 1 RB / 99 RB Offset

Note:

1. This device was tested under all bandwidths, RB configurations and modulations. The worst case was found in QPSK modulation.
2. LTE CA mode is similar to digital modulation in LTE single frequency band, so please refer to BV CPS report no.: RFBFLF-WTW-P21010278-11 for the modulation characteristics data of CA mode.

LTE Band 66 (CA 66C)

EUT Configure Mode	Test item	Available channel	Tested channel	Channel Bandwidth	Modulation	Mode
-	EIRP	132072 to 132374 132270 to 132572	132072(1720.0MHz)+ 132270(1739.8MHz), 132323(1745.1MHz)+ 132521(1764.9MHz), 132374(1750.2MHz)+ 132572(1770.0MHz)	20MHz + 20MHz	QPSK / 16QAM / 64QAM / 256QAM	1 RB / 0 RB Offset 1 RB / 99 RB Offset
-	Frequency Stability	132072 to 132374 132270 to 132572	132323(1745.1MHz)+ 132521(1764.9MHz)	20MHz + 20MHz	QPSK	100 RB / 0 RB Offset
-	Occupied Bandwidth	132072 to 132374 132270 to 132572	132072(1720.0MHz)+ 132270(1739.8MHz), 132323(1745.1MHz)+ 132521(1764.9MHz), 132374(1750.2MHz)+ 132572(1770.0MHz)	20MHz + 20MHz	QPSK / 16QAM / 64QAM / 256QAM	1 RB / 0 RB Offset 1 RB / 99 RB Offset
-	Band Edge	132072 to 132374 132270 to 132572	132072(1720.0MHz)+ 132270(1739.8MHz), 132374(1750.2MHz)+ 132572(1770.0MHz)	20MHz + 20MHz	QPSK	1 RB / 0 RB Offset 1 RB / 99 RB Offset 100 RB / 0 RB Offset
-	Peak to Average Ratio	132072 to 132374 132270 to 132572	132072(1720.0MHz)+ 132270(1739.8MHz), 132323(1745.1MHz)+ 132521(1764.9MHz), 132374(1750.2MHz)+ 132572(1770.0MHz)	20MHz + 20MHz	QPSK / 16QAM / 64QAM / 256QAM	1 RB / 0 RB Offset 1 RB / 99 RB Offset
-	Conducted Emission	132072 to 132374 132270 to 132572	132072(1720.0MHz)+ 132270(1739.8MHz), 132323(1745.1MHz)+ 132521(1764.9MHz), 132374(1750.2MHz)+ 132572(1770.0MHz)	20MHz + 20MHz	QPSK	1 RB / 0 RB Offset 1 RB / 99 RB Offset
-	Radiated Emission Below 1GHz	132072 to 132374 132270 to 132572	132323(1745.1MHz)+ 132521(1764.9MHz)	20MHz + 20MHz	QPSK	1 RB / 0 RB Offset 1 RB / 99 RB Offset
-	Radiated Emission Above 1GHz	132072 to 132374 132270 to 132572	132072(1720.0MHz)+ 132270(1739.8MHz), 132323(1745.1MHz)+ 132521(1764.9MHz), 132374(1750.2MHz)+ 132572(1770.0MHz)	20MHz + 20MHz	QPSK	1 RB / 0 RB Offset 1 RB / 99 RB Offset

Note:

1. This device was tested under all bandwidths, RB configurations and modulations. The worst case was found in QPSK modulation.
2. LTE CA mode is similar to digital modulation in LTE single frequency band, so please refer to BV CPS report no.: RFBFLF-WTW-P21010278-11 for the modulation characteristics data of CA mode.

LTE Band 66 (CA 66B)

EUT Configure Mode	Test item	Available channel	Tested channel	Channel Bandwidth	Modulation	Mode
-	EIRP	132022 to 132523 132121 to 132622	132022(1715.0MHz)+ 132121(1724.9MHz), 132373(1750.1MHz)+ 132472(1760.0MHz), 132523(1765.1MHz)+ 132622(1775.0MHz)	10MHz + 10MHz	QPSK / 16QAM / 64QAM / 256QAM	1 RB / 0 RB Offset 1 RB / 49 RB Offset
-	Frequency Stability	132022 to 132523 132121 to 132622	132022(1715.0MHz)+ 132121(1724.9MHz)	10MHz + 10MHz	QPSK	50 RB / 0 RB Offset
-	Occupied Bandwidth	132022 to 132523 132121 to 132622	132022(1715.0MHz)+ 132121(1724.9MHz), 132373(1750.1MHz)+ 132472(1760.0MHz), 132523(1765.1MHz)+ 132622(1775.0MHz)	10MHz + 10MHz	QPSK / 16QAM / 64QAM / 256QAM	1 RB / 0 RB Offset 1 RB / 49 RB Offset
-	Band Edge	132022 to 132523 132121 to 132622	132022(1715.0MHz)+ 132121(1724.9MHz), 132523(1765.1MHz)+ 132622(1775.0MHz)	10MHz + 10MHz	QPSK	1 RB / 0 RB Offset 1 RB / 49 RB Offset 50 RB / 0 RB Offset
-	Peak to Average Ratio	132022 to 132523 132121 to 132622	132022(1715.0MHz)+ 132121(1724.9MHz), 132373(1750.1MHz)+ 132472(1760.0MHz), 132523(1765.1MHz)+ 132622(1775.0MHz)	20MHz + 20MHz	QPSK / 16QAM / 64QAM / 256QAM	1 RB / 49 RB Offset 1 RB / 0 RB Offset
-	Conducted Emission	132022 to 132523 132121 to 132622	132022(1715.0MHz)+ 132121(1724.9MHz), 132373(1750.1MHz)+ 132472(1760.0MHz), 132523(1765.1MHz)+ 132622(1775.0MHz)	10MHz + 10MHz	QPSK	1 RB / 49 RB Offset 1 RB / 0 RB Offset
-	Radiated Emission Above 1GHz	132022 to 132523 132121 to 132622	132523(1765.1MHz)+ 132622(1775.0MHz)	10MHz + 10MHz	QPSK	1 RB / 49 RB Offset 1 RB / 0 RB Offset
-	Radiated Emission Above 1GHz	132022 to 132523 132121 to 132622	132022(1715.0MHz)+ 132121(1724.9MHz), 132373(1750.1MHz)+ 132472(1760.0MHz), 132523(1765.1MHz)+ 132622(1775.0MHz)	10MHz + 10MHz	QPSK	1 RB / 49 RB Offset 1 RB / 0 RB Offset

Note:

1. This device was tested under all bandwidths, RB configurations and modulations. The worst case was found in QPSK modulation.
2. LTE CA mode is similar to digital modulation in LTE single frequency band, so please refer to BV CPS report no.: RFBFLF-WTW-P21010278-11 for the modulation characteristics data of CA mode.

Test Condition:

Test Item	Environmental Conditions	Input Power	Tested By
EIRP	25deg. C, 60%RH	120Vac, 60Hz	Willy Cheng
Frequency Stability	25deg. C, 60%RH	7.74Vdc	Willy Cheng
Occupied Bandwidth	25deg. C, 60%RH	120Vac, 60Hz	Willy Cheng
Band Edge	25deg. C, 60%RH	120Vac, 60Hz	Willy Cheng
Peak To Average Ratio	25deg. C, 60%RH	120Vac, 60Hz	Willy Cheng
Conducted Emission	25deg. C, 60%RH	120Vac, 60Hz	Willy Cheng
Radiated Emission	22deg. C, 66%RH	120Vac, 60Hz	Rex Wang

3.4 EUT Operating Conditions

The EUT makes a call to the communication simulator. The communication simulator station system controlled a EUT to export maximum output power under transmission mode and specific channel frequency

3.5 General Description of Applied Standards and References

The EUT is a RF Product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards and References:

Test Standard:

FCC 47 CFR Part 2

FCC 47 CFR Part 27

ANSI/TIA/EIA-603-E 2016

ANSI 63.26-2015

All test items have been performed and recorded as per the above standards.

References Test Guidance:

KDB 971168 D01 Power Meas License Digital Systems v03r01

All test items have been performed as a reference to the above KDB test guidance.

4 Test Types and Results

4.1 Output Power Measurement

4.1.1 Limits of Output Power Measurement

LTE Band 66:
Mobile / Portable station are limited to 1 watts e.i.r.p.

LTE Band 7, LTE Band 38, LTE Band 41:
Mobile stations are limited to 2.0 watts EIRP. All user stations are limited to 2.0 watts transmitter output power.

4.1.2 Test Procedures

Conducted Power Measurement:

The EUT was set up for the maximum power with LTE link data modulation and link up with simulator. Set the EUT to transmit under low, middle and high channel and record the power level shown on simulator.

Maximum EIRP

The relevant equation for determining the maximum ERP or EIRP from the measured RF output power is given in Equation as follows:
ERP or EIRP = $P_{Meas} + G_T$
where
ERP or EIRP effective radiated power or equivalent isotropically radiated power, respectively
(expressed in the same units as P_{Meas}, e.g., dBm or dBW)
P_{Meas} measured transmitter output power or PSD, in dBm or dBW
G_T gain of the transmitting antenna, in dBd (ERP) or dBi (EIRP)

4.1.3 Test Setup

Conducted Power Measurement:

4.1.4 Test Results

Conducted Output Power (dBm)

LTE Band 7 (CA 7C)

Configure	Combination	PCC							SCC							Measurement Power
		Band	BW (MHz)	Modulation	RB Size	RB Offset	UL Chan.	UL Freq. (MHz)	Band	BW (MHz)	Modulation	RB Size	RB Offset	UL Chan.	UL Freq. (MHz)	Tx Power with UL-CA Active (dBm)
																Total
Intra Band Contiguous	CA_7C	7	20	QPSK	1	0	20850	2510	7	20	QPSK	1	99	21048	2529.8	15.76
					1	99						1	0			23.38
		7	20	QPSK	1	0	21001	2525.1	7	20	QPSK	1	99	21199	2544.9	15.96
					1	99						1	0			23.32
		7	20	QPSK	1	0	21152	2540.2	7	20	QPSK	1	99	21350	2560	15.67
					1	99						1	0			22.98

Configure	Combination	PCC							SCC							Measurement Power
		Band	BW (MHz)	Modulation	RB Size	RB Offset	UL Chan.	UL Freq. (MHz)	Band	BW (MHz)	Modulation	RB Size	RB Offset	UL Chan.	UL Freq. (MHz)	Tx Power with UL-CA Active (dBm)
																Total
Intra Band Contiguous	CA_7C	7	20	16QAM	1	0	20850	2510	7	20	16QAM	1	99	21048	2529.8	14.88
					1	99						1	0			22.63
		7	20	16QAM	1	0	21001	2525.1	7	20	16QAM	1	99	21199	2544.9	15.30
					1	99						1	0			22.61
		7	20	16QAM	1	0	21152	2540.2	7	20	16QAM	1	99	21350	2560	14.86
					1	99						1	0			22.12

Configure	Combination	PCC							SCC							Measurement Power
		Band	BW (MHz)	Modulation	RB Size	RB Offset	UL Chan.	UL Freq. (MHz)	Band	BW (MHz)	Modulation	RB Size	RB Offset	UL Chan.	UL Freq. (MHz)	Tx Power with UL-CA Active (dBm)
																Total
Intra Band Contiguous	CA_7C	7	20	64QAM	1	0	20850	2510	7	20	64QAM	1	99	21048	2529.8	14.23
					1	99						1	0			21.89
		7	20	64QAM	1	0	21001	2525.1	7	20	64QAM	1	99	21199	2544.9	14.46
					1	99						1	0			21.95
		7	20	64QAM	1	0	21152	2540.2	7	20	64QAM	1	99	21350	2560	14.20
					1	99						1	0			21.38

Configure	Combination	PCC							SCC							Measurement Power
		Band	BW (MHz)	Modulation	RB Size	RB Offset	UL Chan.	UL Freq. (MHz)	Band	BW (MHz)	Modulation	RB Size	RB Offset	UL Chan.	UL Freq. (MHz)	Tx Power with UL-CA Active (dBm)
																Total
Intra Band Contiguous	CA_7C	7	20	256QAM	1	0	20850	2510	7	20	256QAM	1	99	21048	2529.8	13.43
					1	99						1	0			21.13
		7	20	256QAM	1	0	21001	2525.1	7	20	256QAM	1	99	21199	2544.9	13.72
					1	99						1	0			21.11
		7	20	256QAM	1	0	21152	2540.2	7	20	256QAM	1	99	21350	2560	13.49
					1	99						1	0			20.46

LTE Band 38 (CA 38C)

Confugure	Combination	PCC							SCC							Measurement Power
		Band	BW (MHz)	Modulation	RB Size	RB Offset	UL Chan.	UL Freq. (MHz)	Band	BW (MHz)	Modulation	RB Size	RB Offset	UL Chan.	UL Freq. (MHz)	Tx Power with UL-CA Active (dBm)
																Total
Intra Band Contiguous	CA_38C	38	20	QPSK	1	0	37850	2580	38	20	QPSK	1	99	38048	2599.8	18.56
					1	99						1	0			22.60
		38	20	QPSK	1	0	37901	2585.1	38	20	QPSK	1	99	38099	2604.9	18.39
					1	99						1	0			22.55
		38	20	QPSK	1	0	37952	2590.2	38	20	QPSK	1	99	38150	2610	18.31
					1	99						1	0			22.57

Confugure	Combination	PCC							SCC							Measurement Power
		Band	BW (MHz)	Modulation	RB Size	RB Offset	UL Chan.	UL Freq. (MHz)	Band	BW (MHz)	Modulation	RB Size	RB Offset	UL Chan.	UL Freq. (MHz)	Tx Power with UL-CA Active (dBm)
																Total
Intra Band Contiguous	CA_38C	38	20	16QAM	1	0	37850	2580	38	20	16QAM	1	99	38048	2599.8	17.73
					1	99						1	0			22.01
		38	20	16QAM	1	0	37901	2585.1	38	20	16QAM	1	99	38099	2604.9	17.54
					1	99						1	0			21.70
		38	20	16QAM	1	0	37952	2590.2	38	20	16QAM	1	99	38150	2610	17.46
					1	99						1	0			21.84

Confugure	Combination	PCC							SCC							Measurement Power
		Band	BW (MHz)	Modulation	RB Size	RB Offset	UL Chan.	UL Freq. (MHz)	Band	BW (MHz)	Modulation	RB Size	RB Offset	UL Chan.	UL Freq. (MHz)	Tx Power with UL-CA Active (dBm)
																Total
Intra Band Contiguous	CA_38C	38	20	64QAM	1	0	37850	2580	38	20	64QAM	1	99	38048	2599.8	16.78
					1	99						1	0			21.19
		38	20	64QAM	1	0	37901	2585.1	38	20	64QAM	1	99	38099	2604.9	16.73
					1	99						1	0			20.86
		38	20	64QAM	1	0	37952	2590.2	38	20	64QAM	1	99	38150	2610	16.71
					1	99						1	0			21.03

Confugure	Combination	PCC							SCC							Measurement Power
		Band	BW (MHz)	Modulation	RB Size	RB Offset	UL Chan.	UL Freq. (MHz)	Band	BW (MHz)	Modulation	RB Size	RB Offset	UL Chan.	UL Freq. (MHz)	Tx Power with UL-CA Active (dBm)
																Total
Intra Band Contiguous	CA_38C	38	20	256QAM	1	0	37850	2580	38	20	256QAM	1	99	38048	2599.8	15.98
					1	99						1	0			20.46
		38	20	256QAM	1	0	37901	2585.1	38	20	256QAM	1	99	38099	2604.9	16.00
					1	99						1	0			20.02
		38	20	256QAM	1	0	37952	2590.2	38	20	256QAM	1	99	38150	2610	15.95
					1	99						1	0			20.29

LTE Band 41 (CA 41C)

Confugure	Combination	PCC							SCC							Measurement Power
		Band	BW (MHz)	Modulation	RB Size	RB Offset	UL Chan.	UL Freq. (MHz)	Band	BW (MHz)	Modulation	RB Size	RB Offset	UL Chan.	UL Freq. (MHz)	Tx Power with UL-CA Active (dBm)
																Total
Intra Band Contiguous	CA_41C	41	20	QPSK	1	0	39750	2506	41	20	QPSK	1	99	39948	2525.8	19.21
					1	99						1	0			23.76
		41	20	QPSK	1	0	40521	2583.1	41	20	QPSK	1	99	40719	2602.9	19.10
					1	99						1	0			23.67
		41	20	QPSK	1	0	41292	2660.2	41	20	QPSK	1	99	41490	2680	18.50
					1	99						1	0			23.25

Confugure	Combination	PCC							SCC							Measurement Power
		Band	BW (MHz)	Modulation	RB Size	RB Offset	UL Chan.	UL Freq. (MHz)	Band	BW (MHz)	Modulation	RB Size	RB Offset	UL Chan.	UL Freq. (MHz)	Tx Power with UL-CA Active (dBm)
																Total
Intra Band Contiguous	CA_41C	41	20	16QAM	1	0	39750	2506	41	20	16QAM	1	99	39948	2525.8	18.38
					1	99						1	0			23.07
		41	20	16QAM	1	0	40521	2583.1	41	20	16QAM	1	99	40719	2602.9	18.57
					1	99						1	0			22.93
		41	20	16QAM	1	0	41292	2660.2	41	20	16QAM	1	99	41490	2680	17.92
					1	99						1	0			22.53

Confugure	Combination	PCC							SCC							Measurement Power
		Band	BW (MHz)	Modulation	RB Size	RB Offset	UL Chan.	UL Freq. (MHz)	Band	BW (MHz)	Modulation	RB Size	RB Offset	UL Chan.	UL Freq. (MHz)	Tx Power with UL-CA Active (dBm)
																Total
Intra Band Contiguous	CA_41C	41	20	64QAM	1	0	39750	2506	41	20	64QAM	1	99	39948	2525.8	17.61
					1	99						1	0			22.57
		41	20	64QAM	1	0	40521	2583.1	41	20	64QAM	1	99	40719	2602.9	17.82
					1	99						1	0			22.15
		41	20	64QAM	1	0	41292	2660.2	41	20	64QAM	1	99	41490	2680	17.09
					1	99						1	0			21.81

Confugure	Combination	PCC							SCC							Measurement Power
		Band	BW (MHz)	Modulation	RB Size	RB Offset	UL Chan.	UL Freq. (MHz)	Band	BW (MHz)	Modulation	RB Size	RB Offset	UL Chan.	UL Freq. (MHz)	Tx Power with UL-CA Active (dBm)
																Total
Intra Band Contiguous	CA_41C	41	20	256QAM	1	0	39750	2506	41	20	256QAM	1	99	39948	2525.8	16.88
					1	99						1	0			21.86
		41	20	256QAM	1	0	40521	2583.1	41	20	256QAM	1	99	40719	2602.9	17.11
					1	99						1	0			21.56
		41	20	256QAM	1	0	41292	2660.2	41	20	256QAM	1	99	41490	2680	16.38
					1	99						1	0			21.09

LTE Band 66 (CA 66C)

Confugure	Combination	PCC							SCC							Measurement Power
		Band	BW (MHz)	Modulation	RB Size	RB Offset	UL Chan.	UL Freq. (MHz)	Band	BW (MHz)	Modulation	RB Size	RB Offset	UL Chan.	UL Freq. (MHz)	Tx Power with UL-CA Active (dBm)
																Total
Intra Band Contiguous	CA_66C	66	20	QPSK	1	0	132072	1720	66	20	QPSK	1	99	132270	1739.8	15.51
					1	99						1	0			22.98
		66	20	QPSK	1	0	132323	1745.1	66	20	QPSK	1	99	132521	1764.9	15.50
					1	99						1	0			23.17
		66	20	QPSK	1	0	132374	1750.2	66	20	QPSK	1	99	132572	1770	15.59
					1	99						1	0			23.23

Confugure	Combination	PCC							SCC							Measurement Power
		Band	BW (MHz)	Modulation	RB Size	RB Offset	UL Chan.	UL Freq. (MHz)	Band	BW (MHz)	Modulation	RB Size	RB Offset	UL Chan.	UL Freq. (MHz)	Tx Power with UL-CA Active (dBm)
																Total
Intra Band Contiguous	CA_66C	66	20	16QAM	1	0	132072	1720	66	20	16QAM	1	99	132270	1739.8	14.71
					1	99						1	0			22.07
		66	20	16QAM	1	0	132323	1745.1	66	20	16QAM	1	99	132521	1764.9	14.77
					1	99						1	0			22.36
		66	20	16QAM	1	0	132374	1750.2	66	20	16QAM	1	99	132572	1770	14.85
					1	99						1	0			22.64

Confugure	Combination	PCC							SCC							Measurement Power
		Band	BW (MHz)	Modulation	RB Size	RB Offset	UL Chan.	UL Freq. (MHz)	Band	BW (MHz)	Modulation	RB Size	RB Offset	UL Chan.	UL Freq. (MHz)	Tx Power with UL-CA Active (dBm)
																Total
Intra Band Contiguous	CA_66C	66	20	64QAM	1	0	132072	1720	66	20	64QAM	1	99	132270	1739.8	13.98
					1	99						1	0			21.41
		66	20	64QAM	1	0	132323	1745.1	66	20	64QAM	1	99	132521	1764.9	14.12
					1	99						1	0			21.78
		66	20	64QAM	1	0	132374	1750.2	66	20	64QAM	1	99	132572	1770	14.04
					1	99						1	0			21.96

Confugure	Combination	PCC							SCC							Measurement Power
		Band	BW (MHz)	Modulation	RB Size	RB Offset	UL Chan.	UL Freq. (MHz)	Band	BW (MHz)	Modulation	RB Size	RB Offset	UL Chan.	UL Freq. (MHz)	Tx Power with UL-CA Active (dBm)
																Total
Intra Band Contiguous	CA_66C	66	20	256QAM	1	0	132072	1720	66	20	256QAM	1	99	132270	1739.8	13.15
					1	99						1	0			20.78
		66	20	256QAM	1	0	132323	1745.1	66	20	256QAM	1	99	132521	1764.9	13.29
					1	99						1	0			20.94
		66	20	256QAM	1	0	132374	1750.2	66	20	256QAM	1	99	132572	1770	13.35
					1	99						1	0			21.40

LTE Band 66 (CA 66B)

Confugure	Combination	PCC							SCC							Measurement Power
		Band	BW (MHz)	Modulation	RB Size	RB Offset	UL Chan.	UL Freq. (MHz)	Band	BW (MHz)	Modulation	RB Size	RB Offset	UL Chan.	UL Freq. (MHz)	Tx Power with UL-CA Active (dBm)
																Total
Intra Band Contiguous	CA_66B	66	10	QPSK	1	0	132022	1715	66	10	QPSK	1	49	132121	1724.9	13.86
					1	49						1	0			22.93
		66	10	QPSK	1	0	132373	1750.1	66	10	QPSK	1	49	132472	1760	13.92
					1	49						1	0			23.32
		66	10	QPSK	1	0	132523	1765.1	66	10	QPSK	1	49	132622	1775	14.11
					1	49						1	0			23.39

Confugure	Combination	PCC							SCC							Measurement Power
		Band	BW (MHz)	Modulation	RB Size	RB Offset	UL Chan.	UL Freq. (MHz)	Band	BW (MHz)	Modulation	RB Size	RB Offset	UL Chan.	UL Freq. (MHz)	Tx Power with UL-CA Active (dBm)
																Total
Intra Band Contiguous	CA_66B	66	10	16QAM	1	0	132022	1715	66	10	16QAM	1	49	132121	1724.9	13.13
					1	49						1	0			22.13
		66	10	16QAM	1	0	132373	1750.1	66	10	16QAM	1	49	132472	1760	13.18
					1	49						1	0			22.57
		66	10	16QAM	1	0	132523	1765.1	66	10	16QAM	1	49	132622	1775	13.50
					1	49						1	0			22.55

Confugure	Combination	PCC							SCC							Measurement Power
		Band	BW (MHz)	Modulation	RB Size	RB Offset	UL Chan.	UL Freq. (MHz)	Band	BW (MHz)	Modulation	RB Size	RB Offset	UL Chan.	UL Freq. (MHz)	Tx Power with UL-CA Active (dBm)
																Total
Intra Band Contiguous	CA_66B	66	10	64QAM	1	0	132022	1715	66	10	64QAM	1	49	132121	1724.9	12.30
					1	49						1	0			21.51
		66	10	64QAM	1	0	132373	1750.1	66	10	64QAM	1	49	132472	1760	12.48
					1	49						1	0			21.85
		66	10	64QAM	1	0	132523	1765.1	66	10	64QAM	1	49	132622	1775	12.93
					1	49						1	0			21.83

Confugure	Combination	PCC							SCC							Measurement Power
		Band	BW (MHz)	Modulation	RB Size	RB Offset	UL Chan.	UL Freq. (MHz)	Band	BW (MHz)	Modulation	RB Size	RB Offset	UL Chan.	UL Freq. (MHz)	Tx Power with UL-CA Active (dBm)
																Total
Intra Band Contiguous	CA_66B	66	10	256QAM	1	0	132022	1715	66	10	256QAM	1	49	132121	1724.9	11.66
					1	49						1	0			20.74
		66	10	256QAM	1	0	132373	1750.1	66	10	256QAM	1	49	132472	1760	11.80
					1	49						1	0			21.00
		66	10	256QAM	1	0	132523	1765.1	66	10	256QAM	1	49	132622	1775	12.01
					1	49						1	0			20.98

EIRP Power (dBm)

LTE Band 7 (CA 7C)

Con fugure	Com-bination	PCC							SCC							Measurement Power
		Band	BW (MHz)	Modu lation	RB Size	RB Offset	UL Chan.	UL Freq. (MHz)	Band	BW (MHz)	Modu lation	RB Size	RB Offset	UL Chan.	UL Freq. (MHz)	EIRP (dBm)
																Total
Intra Band Conti-guous	CA_7C	7	20	QPSK	1	0	20850	2510	7	20	QPSK	1	99	21048	2529.8	15.95
					1	99						1	0			23.57
		7	20	QPSK	1	0	21001	2525.1	7	20	QPSK	1	99	21199	2544.9	16.14
					1	99						1	0			23.51
		7	20	QPSK	1	0	21152	2540.2	7	20	QPSK	1	99	21350	2560	15.86
					1	99						1	0			23.16

Con fugure	Com-bination	PCC							SCC							Measurement Power
		Band	BW (MHz)	Modu lation	RB Size	RB Offset	UL Chan.	UL Freq. (MHz)	Band	BW (MHz)	Modu lation	RB Size	RB Offset	UL Chan.	UL Freq. (MHz)	EIRP (dBm)
																Total
Intra Band Conti-guous	CA_7C	7	20	16QAM	1	0	20850	2510	7	20	16QAM	1	99	21048	2529.8	15.07
					1	99						1	0			22.82
		7	20	16QAM	1	0	21001	2525.1	7	20	16QAM	1	99	21199	2544.9	15.48
					1	99						1	0			22.79
		7	20	16QAM	1	0	21152	2540.2	7	20	16QAM	1	99	21350	2560	15.05
					1	99						1	0			22.31

Con fugure	Com-bination	PCC							SCC							Measurement Power
		Band	BW (MHz)	Modu lation	RB Size	RB Offset	UL Chan.	UL Freq. (MHz)	Band	BW (MHz)	Modu lation	RB Size	RB Offset	UL Chan.	UL Freq. (MHz)	EIRP (dBm)
																Total
Intra Band Conti-guous	CA_7C	7	20	64QAM	1	0	20850	2510	7	20	64QAM	1	99	21048	2529.8	14.42
					1	99						1	0			22.07
		7	20	64QAM	1	0	21001	2525.1	7	20	64QAM	1	99	21199	2544.9	14.64
					1	99						1	0			22.14
		7	20	64QAM	1	0	21152	2540.2	7	20	64QAM	1	99	21350	2560	14.39
					1	99						1	0			21.57

Con fugure	Com-bination	PCC							SCC							Measurement Power
		Band	BW (MHz)	Modu lation	RB Size	RB Offset	UL Chan.	UL Freq. (MHz)	Band	BW (MHz)	Modu lation	RB Size	RB Offset	UL Chan.	UL Freq. (MHz)	EIRP (dBm)
																Total
Intra Band Conti-guous	CA_7C	7	20	256QAM	1	0	20850	2510	7	20	256QAM	1	99	21048	2529.8	13.61
					1	99						1	0			21.32
		7	20	256QAM	1	0	21001	2525.1	7	20	256QAM	1	99	21199	2544.9	13.90
					1	99						1	0			21.29
		7	20	256QAM	1	0	21152	2540.2	7	20	256QAM	1	99	21350	2560	13.67
					1	99						1	0			20.65

*EIRP = Conducted + antenna gain (0.185dBi)

LTE Band 38 (CA 38C)

Con fugure	Com-bination	PCC							SCC							Measurement Power
		Band	BW (MHz)	Modu lation	RB Size	RB Offset	UL Chan.	UL Freq. (MHz)	Band	BW (MHz)	Modu lation	RB Size	RB Offset	UL Chan.	UL Freq. (MHz)	EIRP (dBm)
																Total
Intra Band Conti-guous	CA_38C	38	20	QPSK	1	0	37850	2580	38	20	QPSK	1	99	38048	2599.8	19.28
					1	99						1	0			23.32
		38	20	QPSK	1	0	37901	2585.1	38	20	QPSK	1	99	38099	2604.9	19.11
					1	99						1	0			23.27
		38	20	QPSK	1	0	37952	2590.2	38	20	QPSK	1	99	38150	2610	19.03
					1	99						1	0			23.29

Con fugure	Com-bination	PCC							SCC							Measurement Power
		Band	BW (MHz)	Modu lation	RB Size	RB Offset	UL Chan.	UL Freq. (MHz)	Band	BW (MHz)	Modu lation	RB Size	RB Offset	UL Chan.	UL Freq. (MHz)	EIRP (dBm)
																Total
Intra Band Conti-guous	CA_38C	38	20	16QAM	1	0	37850	2580	38	20	16QAM	1	99	38048	2599.8	18.45
					1	99						1	0			22.73
		38	20	16QAM	1	0	37901	2585.1	38	20	16QAM	1	99	38099	2604.9	18.26
					1	99						1	0			22.42
		38	20	16QAM	1	0	37952	2590.2	38	20	16QAM	1	99	38150	2610	18.18
					1	99						1	0			22.56

Con fugure	Com-bination	PCC							SCC							Measurement Power
		Band	BW (MHz)	Modu lation	RB Size	RB Offset	UL Chan.	UL Freq. (MHz)	Band	BW (MHz)	Modu lation	RB Size	RB Offset	UL Chan.	UL Freq. (MHz)	EIRP (dBm)
																Total
Intra Band Conti-guous	CA_38C	38	20	64QAM	1	0	37850	2580	38	20	64QAM	1	99	38048	2599.8	17.50
					1	99						1	0			21.91
		38	20	64QAM	1	0	37901	2585.1	38	20	64QAM	1	99	38099	2604.9	17.45
					1	99						1	0			21.58
		38	20	64QAM	1	0	37952	2590.2	38	20	64QAM	1	99	38150	2610	17.43
					1	99						1	0			21.75

Con fugure	Com-bination	PCC							SCC							Measurement Power
		Band	BW (MHz)	Modu lation	RB Size	RB Offset	UL Chan.	UL Freq. (MHz)	Band	BW (MHz)	Modu lation	RB Size	RB Offset	UL Chan.	UL Freq. (MHz)	EIRP (dBm)
																Total
Intra Band Conti-guous	CA_38C	38	20	256QAM	1	0	37850	2580	38	20	256QAM	1	99	38048	2599.8	16.70
					1	99						1	0			21.18
		38	20	256QAM	1	0	37901	2585.1	38	20	256QAM	1	99	38099	2604.9	16.72
					1	99						1	0			20.74
		38	20	256QAM	1	0	37952	2590.2	38	20	256QAM	1	99	38150	2610	16.67
					1	99						1	0			21.01

*EIRP = Conducted + antenna gain (0.724dBi)

LTE Band 41 (CA 41C)

Configure	Combination	PCC							SCC							Measurement Power
		Band	BW (MHz)	Modulation	RB Size	RB Offset	UL Chan.	UL Freq. (MHz)	Band	BW (MHz)	Modulation	RB Size	RB Offset	UL Chan.	UL Freq. (MHz)	EIRP (dBm)
																Total
Intra Band Contiguous	CA_41C	41	20	QPSK	1	0	39750	2506	41	20	QPSK	1	99	39948	2525.8	20.35
					1	99						1	0			24.90
		41	20	QPSK	1	0	40521	2583.1	41	20	QPSK	1	99	40719	2602.9	20.24
					1	99						1	0			24.81
		41	20	QPSK	1	0	41292	2660.2	41	20	QPSK	1	99	41490	2680	19.64
					1	99						1	0			24.39

Configure	Combination	PCC							SCC							Measurement Power
		Band	BW (MHz)	Modulation	RB Size	RB Offset	UL Chan.	UL Freq. (MHz)	Band	BW (MHz)	Modulation	RB Size	RB Offset	UL Chan.	UL Freq. (MHz)	EIRP (dBm)
																Total
Intra Band Contiguous	CA_41C	41	20	16QAM	1	0	39750	2506	41	20	16QAM	1	99	39948	2525.8	19.53
					1	99						1	0			24.21
		41	20	16QAM	1	0	40521	2583.1	41	20	16QAM	1	99	40719	2602.9	19.72
					1	99						1	0			24.07
		41	20	16QAM	1	0	41292	2660.2	41	20	16QAM	1	99	41490	2680	19.07
					1	99						1	0			23.67

Configure	Combination	PCC							SCC							Measurement Power
		Band	BW (MHz)	Modulation	RB Size	RB Offset	UL Chan.	UL Freq. (MHz)	Band	BW (MHz)	Modulation	RB Size	RB Offset	UL Chan.	UL Freq. (MHz)	EIRP (dBm)
																Total
Intra Band Contiguous	CA_41C	41	20	64QAM	1	0	39750	2506	41	20	64QAM	1	99	39948	2525.8	18.75
					1	99						1	0			23.71
		41	20	64QAM	1	0	40521	2583.1	41	20	64QAM	1	99	40719	2602.9	18.96
					1	99						1	0			23.30
		41	20	64QAM	1	0	41292	2660.2	41	20	64QAM	1	99	41490	2680	18.24
					1	99						1	0			22.95

Configure	Combination	PCC							SCC							Measurement Power
		Band	BW (MHz)	Modulation	RB Size	RB Offset	UL Chan.	UL Freq. (MHz)	Band	BW (MHz)	Modulation	RB Size	RB Offset	UL Chan.	UL Freq. (MHz)	EIRP (dBm)
																Total
Intra Band Contiguous	CA_41C	41	20	256QAM	1	0	39750	2506	41	20	256QAM	1	99	39948	2525.8	18.02
					1	99						1	0			23.01
		41	20	256QAM	1	0	40521	2583.1	41	20	256QAM	1	99	40719	2602.9	18.26
					1	99						1	0			22.70
		41	20	256QAM	1	0	41292	2660.2	41	20	256QAM	1	99	41490	2680	17.52
					1	99						1	0			22.23

*EIRP = Conducted + antenna gain (1.143dBi)

LTE Band 66 (CA 66C)

Confugure	Combination	PCC							SCC							Measurement Power
		Band	BW (MHz)	Modulation	RB Size	RB Offset	UL Chan.	UL Freq. (MHz)	Band	BW (MHz)	Modulation	RB Size	RB Offset	UL Chan.	UL Freq. (MHz)	EIRP (dBm)
																Total
Intra Band Contiguous	CA_66C	66	20	QPSK	1	0	132072	1720	66	20	QPSK	1	99	132270	1739.8	13.83
					1	99						1	0			21.30
		66	20	QPSK	1	0	132323	1745.1	66	20	QPSK	1	99	132521	1764.9	13.81
					1	99						1	0			21.48
		66	20	QPSK	1	0	132374	1750.2	66	20	QPSK	1	99	132572	1770	13.90
					1	99						1	0			21.55

Confugure	Combination	PCC							SCC							Measurement Power
		Band	BW (MHz)	Modulation	RB Size	RB Offset	UL Chan.	UL Freq. (MHz)	Band	BW (MHz)	Modulation	RB Size	RB Offset	UL Chan.	UL Freq. (MHz)	EIRP (dBm)
																Total
Intra Band Contiguous	CA_66C	66	20	16QAM	1	0	132072	1720	66	20	16QAM	1	99	132270	1739.8	13.03
					1	99						1	0			20.38
		66	20	16QAM	1	0	132323	1745.1	66	20	16QAM	1	99	132521	1764.9	13.08
					1	99						1	0			20.68
		66	20	16QAM	1	0	132374	1750.2	66	20	16QAM	1	99	132572	1770	13.16
					1	99						1	0			20.95

Confugure	Combination	PCC							SCC							Measurement Power
		Band	BW (MHz)	Modulation	RB Size	RB Offset	UL Chan.	UL Freq. (MHz)	Band	BW (MHz)	Modulation	RB Size	RB Offset	UL Chan.	UL Freq. (MHz)	EIRP (dBm)
																Total
Intra Band Contiguous	CA_66C	66	20	64QAM	1	0	132072	1720	66	20	64QAM	1	99	132270	1739.8	12.30
					1	99						1	0			19.73
		66	20	64QAM	1	0	132323	1745.1	66	20	64QAM	1	99	132521	1764.9	12.44
					1	99						1	0			20.09
		66	20	64QAM	1	0	132374	1750.2	66	20	64QAM	1	99	132572	1770	12.35
					1	99						1	0			20.28

Confugure	Combination	PCC							SCC							Measurement Power
		Band	BW (MHz)	Modulation	RB Size	RB Offset	UL Chan.	UL Freq. (MHz)	Band	BW (MHz)	Modulation	RB Size	RB Offset	UL Chan.	UL Freq. (MHz)	EIRP (dBm)
																Total
Intra Band Contiguous	CA_66C	66	20	256QAM	1	0	132072	1720	66	20	256QAM	1	99	132270	1739.8	11.47
					1	99						1	0			19.10
		66	20	256QAM	1	0	132323	1745.1	66	20	256QAM	1	99	132521	1764.9	11.61
					1	99						1	0			19.25
		66	20	256QAM	1	0	132374	1750.2	66	20	256QAM	1	99	132572	1770	11.67
					1	99						1	0			19.72

*EIRP = Conducted + antenna gain (-1.685dBi)

LTE Band 66 (CA 66B)

Confugure	Combination	PCC							SCC							Measurement Power
		Band	BW (MHz)	Modulation	RB Size	RB Offset	UL Chan.	UL Freq. (MHz)	Band	BW (MHz)	Modulation	RB Size	RB Offset	UL Chan.	UL Freq. (MHz)	EIRP (dBm)
																Total
Intra Band Contiguous	CA_66B	66	10	QPSK	1	0	132022	1715	66	10	QPSK	1	49	132121	1724.9	12.18
					1	49						1	0			21.25
		66	10	QPSK	1	0	132373	1750.1	66	10	QPSK	1	49	132472	1760	12.23
					1	49						1	0			21.63
		66	10	QPSK	1	0	132523	1765.1	66	10	QPSK	1	49	132622	1775	12.42
					1	49						1	0			21.71

Confugure	Combination	PCC							SCC							Measurement Power
		Band	BW (MHz)	Modulation	RB Size	RB Offset	UL Chan.	UL Freq. (MHz)	Band	BW (MHz)	Modulation	RB Size	RB Offset	UL Chan.	UL Freq. (MHz)	EIRP (dBm)
																Total
Intra Band Contiguous	CA_66B	66	10	16QAM	1	0	132022	1715	66	10	16QAM	1	49	132121	1724.9	11.45
					1	49						1	0			20.45
		66	10	16QAM	1	0	132373	1750.1	66	10	16QAM	1	49	132472	1760	11.49
					1	49						1	0			20.89
		66	10	16QAM	1	0	132523	1765.1	66	10	16QAM	1	49	132622	1775	11.82
					1	49						1	0			20.86

Confugure	Combination	PCC							SCC							Measurement Power
		Band	BW (MHz)	Modulation	RB Size	RB Offset	UL Chan.	UL Freq. (MHz)	Band	BW (MHz)	Modulation	RB Size	RB Offset	UL Chan.	UL Freq. (MHz)	EIRP (dBm)
																Total
Intra Band Contiguous	CA_66B	66	10	64QAM	1	0	132022	1715	66	10	64QAM	1	49	132121	1724.9	10.62
					1	49						1	0			19.83
		66	10	64QAM	1	0	132373	1750.1	66	10	64QAM	1	49	132472	1760	10.79
					1	49						1	0			20.16
		66	10	64QAM	1	0	132523	1765.1	66	10	64QAM	1	49	132622	1775	11.25
					1	49						1	0			20.15

Confugure	Combination	PCC							SCC							Measurement Power
		Band	BW (MHz)	Modulation	RB Size	RB Offset	UL Chan.	UL Freq. (MHz)	Band	BW (MHz)	Modulation	RB Size	RB Offset	UL Chan.	UL Freq. (MHz)	EIRP (dBm)
																Total
Intra Band Contiguous	CA_66B	66	10	256QAM	1	0	132022	1715	66	10	256QAM	1	49	132121	1724.9	9.98
					1	49						1	0			19.05
		66	10	256QAM	1	0	132373	1750.1	66	10	256QAM	1	49	132472	1760	10.11
					1	49						1	0			19.31
		66	10	256QAM	1	0	132523	1765.1	66	10	256QAM	1	49	132622	1775	10.33
					1	49						1	0			19.29

*EIRP = Conducted + antenna gain (-1.685dBi)

4.2 Occupied Bandwidth Measurement

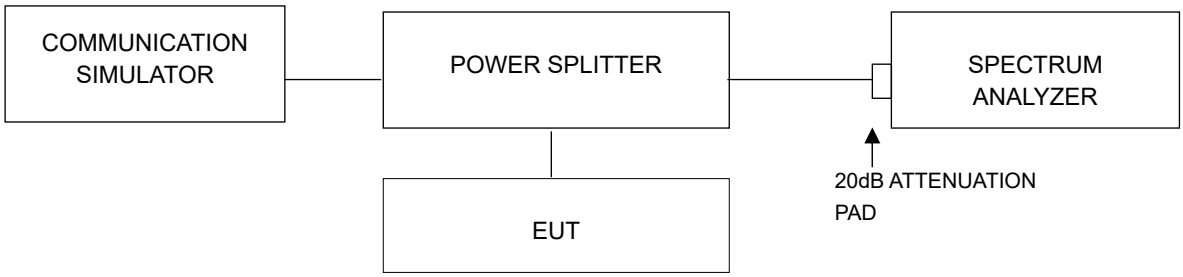
4.2.1 Limits of Occupied Bandwidth Measurement

The occupied bandwidth, that is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission

4.2.2 Test Procedure

The transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with RBW = 200kHz and VBW = 620kHz (Channel Bandwidth: 10MHz+10MHz) and RBW = 430kHz and VBW = 1.3MHz (Channel Bandwidth: 20MHz+20MHz). The 26dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 26dB.

4.2.3 Test Setup



4.2.4 Test Result

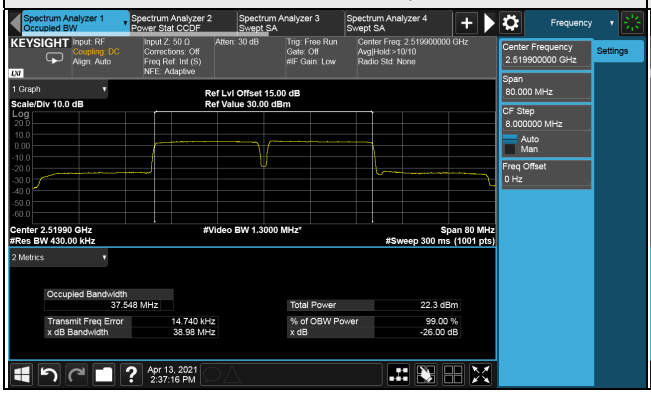
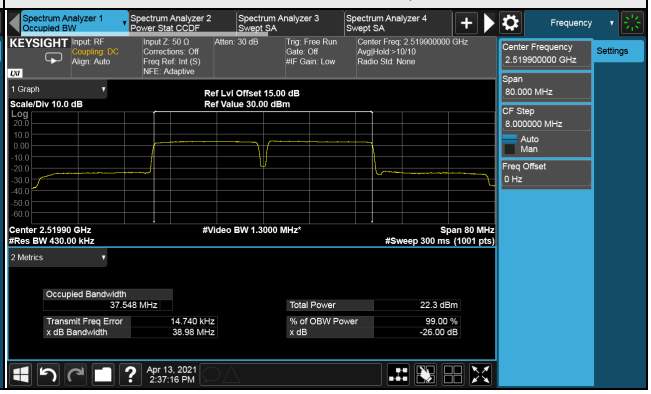
LTE Band 7 (CA 7C)

Occupied Bandwidth

LTE Band 7 (CA 7C), Channel Bandwidth 20MHz+20MHz					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)			
		QPSK	16QAM	64QAM	256QAM
20850+21048	2510.0+2529.8	37.55	37.46	37.46	37.44
21001+21199	2525.1+2544.9	37.49	37.45	37.45	37.46
21152+21350	2540.2+2560.0	37.49	37.45	37.47	37.45

26dB Bandwidth

LTE Band 7 (CA 7C), Channel Bandwidth 20MHz+20MHz					
Channel	Frequency (MHz)	26dB Bandwidth (MHz)			
		QPSK	16QAM	64QAM	256QAM
20850+21048	2510.0+2529.8	38.98	38.87	38.86	38.85
21001+21199	2525.1+2544.9	38.95	38.85	38.84	38.84
21152+21350	2540.2+2560.0	38.96	38.85	38.84	38.84

99% Occupied Bandwidth	26dB Bandwidth
Spectrum Plot of Worst Value	Spectrum Plot of Worst Value
20MHz+20MHz / QPSK	20MHz+20MHz / QPSK
	

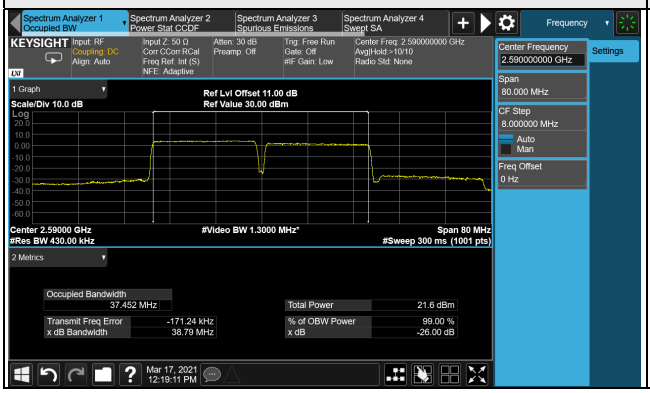
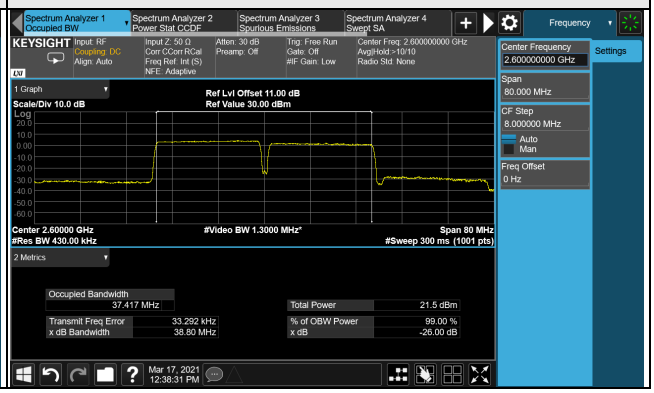
LTE Band 38 (CA 38C)

Occupied Bandwidth

LTE Band 38 (CA 38C), Channel Bandwidth 20MHz+20MHz					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)			
		QPSK	16QAM	64QAM	256QAM
37850+38048	2580.0+2599.8	37.44	37.42	37.45	37.43
37901+38099	2585.1+2604.9	37.42	37.42	37.43	37.43
37952+38150	2590.2+2610.0	37.40	37.40	37.43	37.42

26dB Bandwidth

LTE Band 38 (CA 38C), Channel Bandwidth 20MHz+20MHz					
Channel	Frequency (MHz)	26dB Bandwidth (MHz)			
		QPSK	16QAM	64QAM	256QAM
37850+38048	2580.0+2599.8	38.79	38.78	38.79	38.80
37901+38099	2585.1+2604.9	38.78	38.78	38.79	38.80
37952+38150	2590.2+2610.0	38.77	38.77	38.80	38.80

99% Occupied Bandwidth	26dB Bandwidth
Spectrum Plot of Worst Value	Spectrum Plot of Worst Value
20MHz+20MHz / 64QAM	20MHz+20MHz / 256QAM
	

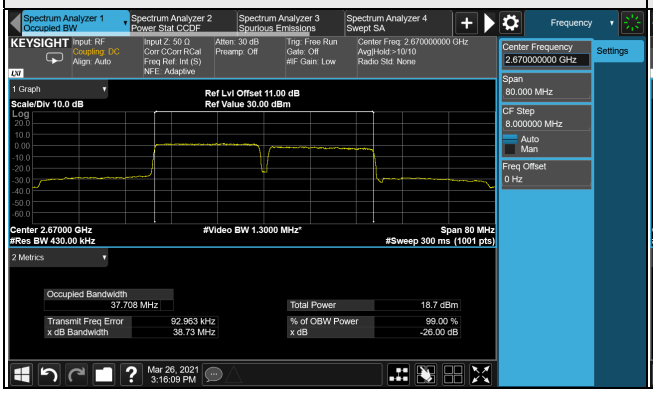
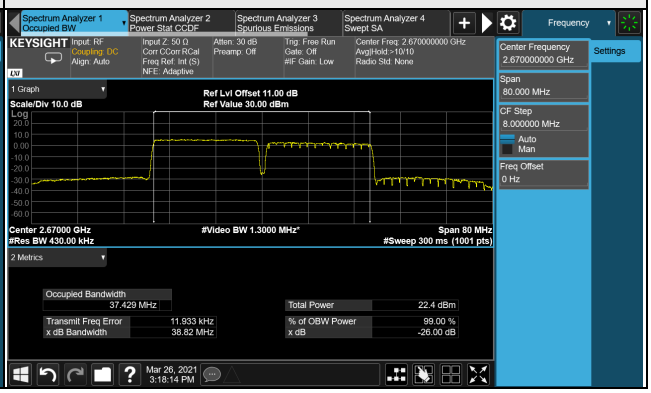
LTE Band 41 (CA 41C)

Occupied Bandwidth

LTE Band 41 (CA 41C), Channel Bandwidth 20MHz+20MHz					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)			
		QPSK	16QAM	64QAM	256QAM
39750+39948	2506.0+2525.8	37.32	37.31	37.33	37.32
40521+40719	2583.1+2602.9	37.41	37.39	37.41	37.42
41292+41490	2660.2+2680.0	37.71	37.40	37.43	37.43

26dB Bandwidth

LTE Band 41 (CA 41C), Channel Bandwidth 20MHz+20MHz					
Channel	Frequency (MHz)	26dB Bandwidth (MHz)			
		QPSK	16QAM	64QAM	256QAM
39750+39948	2506.0+2525.8	38.75	38.75	38.76	38.76
40521+40719	2583.1+2602.9	38.79	38.79	38.80	38.81
41292+41490	2660.2+2680.0	38.73	38.78	38.81	38.82

99% Occupied Bandwidth	26dB Bandwidth
Spectrum Plot of Worst Value	Spectrum Plot of Worst Value
20MHz+20MHz / QPSK	20MHz+20MHz / 256QAM
	

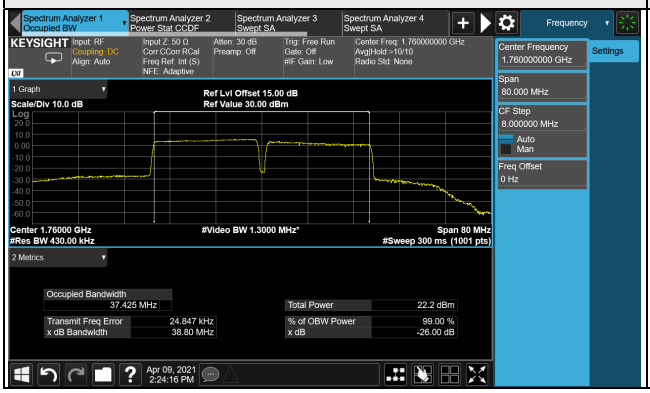
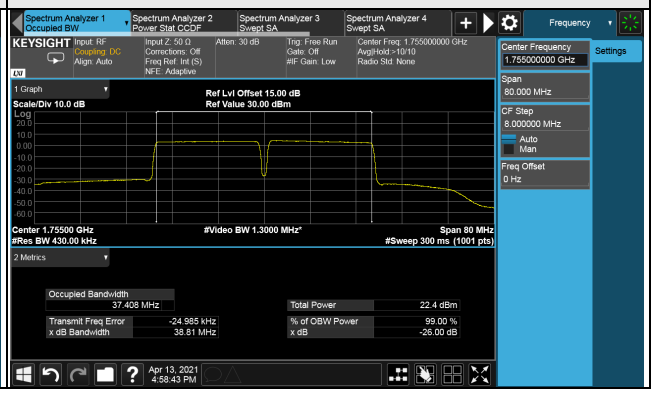
LTE Band 66 (CA 66C)

Occupied Bandwidth

LTE Band 66 (CA 66C), Channel Bandwidth 20MHz+20MHz					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)			
		QPSK	16QAM	64QAM	256QAM
132072+132270	1720.0+1739.8	37.37	37.37	37.37	37.36
132323+132521	1745.1+1764.9	37.41	37.40	37.41	37.40
132374+132572	1750.2+1770.0	37.40	37.43	37.39	37.37

26dB Bandwidth

LTE Band 66 (CA 66C), Channel Bandwidth 20MHz+20MHz					
Channel	Frequency (MHz)	26dB Bandwidth (MHz)			
		QPSK	16QAM	64QAM	256QAM
132072+132270	1720.0+1739.8	38.78	38.77	38.76	38.77
132323+132521	1745.1+1764.9	38.81	38.79	38.79	38.80
132374+132572	1750.2+1770.0	38.80	38.80	38.76	38.78

99% Occupied Bandwidth	26dB Bandwidth
Spectrum Plot of Worst Value	Spectrum Plot of Worst Value
20MHz+20MHz / 16QAM	20MHz+20MHz / QPSK
	

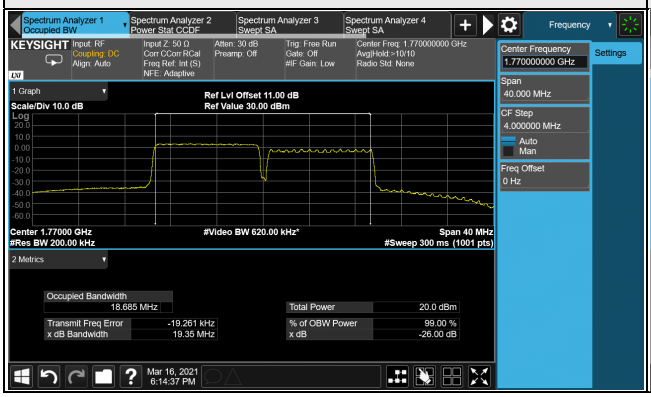
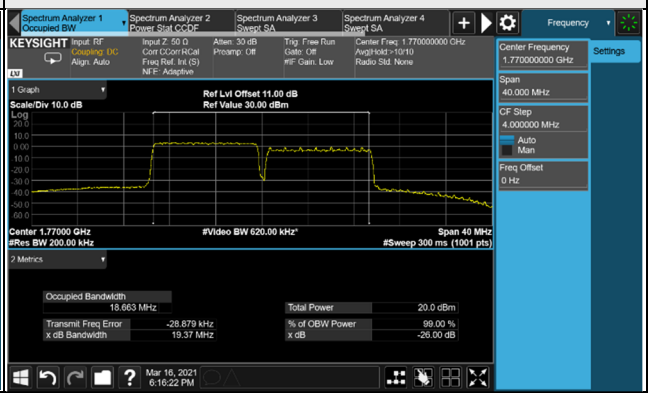
LTE Band 66 (CA 66B)

Occupied Bandwidth

LTE Band 66 (CA 66B), Channel Bandwidth 10MHz+10MHz					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)			
		QPSK	16QAM	64QAM	256QAM
132022+132121	1715.0+1724.9	18.63	18.66	18.62	18.63
132373+132472	1750.1+1760.0	18.59	18.59	18.59	18.62
132523+132622	1765.1+1775.0	18.62	18.69	18.66	18.66

26dB Bandwidth

LTE Band 66 (CA 66B), Channel Bandwidth 10MHz+10MHz					
Channel	Frequency (MHz)	26dB Bandwidth (MHz)			
		QPSK	16QAM	64QAM	256QAM
132022+132121	1715.0+1724.9	19.34	19.34	19.34	19.35
132373+132472	1750.1+1760.0	19.34	19.33	19.35	19.34
132523+132622	1765.1+1775.0	19.37	19.35	19.37	19.37

99% Occupied Bandwidth	26dB Bandwidth
Spectrum Plot of Worst Value	Spectrum Plot of Worst Value
20MHz+20MHz / 16QAM	20MHz+20MHz / 256QAM
	

4.3 Frequency Stability Measurement

4.3.1 Limits of Frequency Stability Measurement

According to the FCC part 2.1055 shall be tested the frequency stability. The rule is defined that" The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block." The test extreme voltage is according to the 2.1055(d)(1) Vary primary supply voltage from 85 to 115 percent of the nominal value for other than hand carried battery equipment and the extreme temperature rule is comply with specification of EUT -30℃ ~ 50℃.

4.3.2 Test Procedure

a. Device is placed at the oven room. The oven room could control the temperatures and humidity. Power warm up is at least 15 min and power applied should perform before recording frequency error.

b. EUT is connected the external power supply to control the DC input power. The test voltage range is from minimum to maximum working voltage. Each step shall be record the frequency error rate.

c. The temperature range step is 10 degrees in this test items. All temperature levels shall be hold the ±0.5 ℃ during the measurement testing. The each temperature step shall be at least 0.5 hours, consider the EUT could be test under the stability condition.

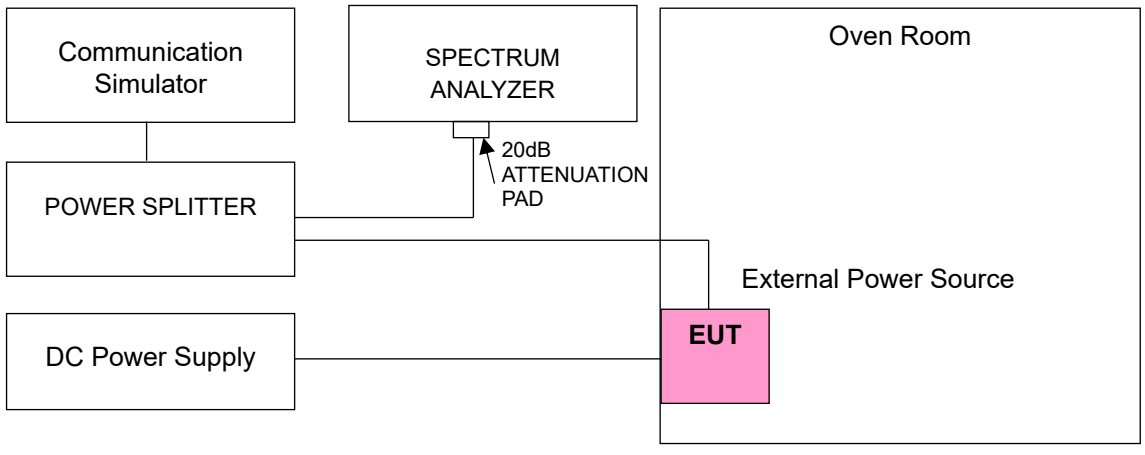
Note: The frequency error was recorded frequency error from the communication simulator.

4.3.3 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Radio Communication Analyzer Anritsu	MT8820C	6201010284	Dec. 28, 2020	Dec. 27, 2021
Temperature & Humidity Chamber TERCHY	HRM-120RF	931022	Dec. 24, 2020	Dec. 23, 2021
Digital Multimeter Fluke	87-III	70360742	Jun. 23, 2020	Jun. 22, 2021
DC Power Supply Topward	6306A	727263	NA	NA

Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

4.3.4 Test Setup



4.3.5 Test Results

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 7 (CA 7C), Channel Bandwidth 20MHz+20MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
8.90	2510.000002	0.001	2529.800003	0.001
7.74	2510.000004	0.002	2529.800003	0.001
6.58	2510.000002	0.001	2529.800002	0.001

Note: The applicant defined the normal working voltage is from 6.58Vdc to 8.90Vdc.

Frequency Error vs. Temperature

Temp. (℃)	LTE Band 7 (CA 7C), Channel Bandwidth 20MHz+20MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	2510.000001	0.001	2529.800002	0.001
-20	2510.000004	0.001	2529.800002	0.001
-10	2510.000001	0.000	2529.800004	0.002
0	2510.000002	0.001	2529.800002	0.001
10	2509.999999	0.000	2529.799997	-0.001
20	2509.999996	-0.002	2529.799997	-0.001
30	2509.999998	-0.001	2529.799998	-0.001
40	2509.999996	-0.001	2529.799999	-0.001
50	2509.999996	-0.001	2529.799996	-0.002

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 38 (CA 38C), Channel Bandwidth 20MHz+20MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
8.90	2580.000004	0.001	2599.800004	0.001
7.74	2580.000004	0.002	2599.800003	0.001
6.58	2580.000003	0.001	2599.800004	0.001

Note: The applicant defined the normal working voltage is from 6.58Vdc to 8.90Vdc.

Frequency Error vs. Temperature

Temp. (℃)	LTE Band 38 (CA 38C), Channel Bandwidth 20MHz+20MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	2580.000003	0.001	2599.800001	0.000
-20	2580.000002	0.001	2599.800003	0.001
-10	2580.000002	0.001	2599.800002	0.001
0	2580.000002	0.001	2599.800002	0.001
10	2579.999998	-0.001	2599.799998	-0.001
20	2579.999997	-0.001	2599.799998	-0.001
30	2579.999997	-0.001	2599.799998	-0.001
40	2579.999998	-0.001	2599.799996	-0.001
50	2579.999998	-0.001	2599.799998	-0.001

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 41 (CA 41C), Channel Bandwidth 20MHz+20MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
8.90	2660.200004	0.002	2680.000002	0.001
7.74	2660.200003	0.001	2680.000002	0.001
6.58	2660.200001	0.001	2680.000001	0.000

Note: The applicant defined the normal working voltage is from 6.58Vdc to 8.90Vdc.

Frequency Error vs. Temperature

Temp. (℃)	LTE Band 41 (CA 41C), Channel Bandwidth 20MHz+20MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	2660.200002	0.001	2680.000003	0.001
-20	2660.200002	0.001	2680.000003	0.001
-10	2660.200003	0.001	2680.000001	0.000
0	2660.200001	0.001	2680.000001	0.000
10	2660.199998	-0.001	2679.999997	-0.001
20	2660.199996	-0.002	2679.999997	-0.001
30	2660.199997	-0.001	2679.999996	-0.001
40	2660.199997	-0.001	2679.999997	-0.001
50	2660.199998	-0.001	2679.999999	0.000

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 66 (CA 66C), Channel Bandwidth 20MHz+20MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
8.90	1745.100002	0.001	1764.900002	0.001
7.74	1745.100002	0.001	1764.900003	0.001
6.58	1745.100001	0.001	1764.900002	0.001

Note: The applicant defined the normal working voltage is from 6.58Vdc to 8.90Vdc.

Frequency Error vs. Temperature

Temp. (℃)	LTE Band 66 (CA 66C), Channel Bandwidth 20MHz+20MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	1745.100004	0.002	1764.900002	0.001
-20	1745.100002	0.001	1764.900004	0.002
-10	1745.100003	0.002	1764.900003	0.002
0	1745.100003	0.002	1764.900002	0.001
10	1745.099999	-0.001	1764.899998	-0.001
20	1745.099997	-0.002	1764.899998	-0.001
30	1745.099998	-0.001	1764.899999	-0.001
40	1745.099996	-0.002	1764.899999	-0.001
50	1745.099999	-0.001	1764.899996	-0.002

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 66 (CA 66B), Channel Bandwidth 20MHz+20MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
8.90	1715.000002	0.001	1724.900001	0.001
7.74	1715.000002	0.001	1724.900002	0.001
6.58	1715.000003	0.002	1724.900004	0.002

Note: The applicant defined the normal working voltage is from 6.58Vdc to 8.90Vdc.

Frequency Error vs. Temperature

Temp. (℃)	LTE Band 66 (CA 66B), Channel Bandwidth 20MHz+20MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	1715.000003	0.002	1724.900003	0.001
-20	1715.000004	0.002	1724.900004	0.002
-10	1715.000003	0.002	1724.900002	0.001
0	1715.000001	0.001	1724.900003	0.002
10	1714.999996	-0.002	1724.899998	-0.001
20	1714.999999	-0.001	1724.899999	-0.001
30	1714.999997	-0.002	1724.899997	-0.002
40	1714.999997	-0.002	1724.899996	-0.002
50	1714.999999	-0.001	1724.899998	-0.001

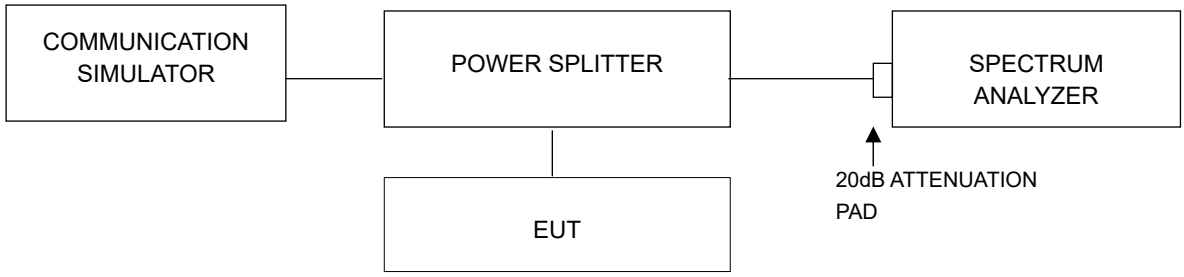
4.4 Channel Edge Measurement

4.4.1 Limits of Band Edge Measurement

For LTE Band 66
According to FCC 27.53(h) for operations in the 1695-1710 MHz, 1710-1755 MHz, 1755-1780 MHz, 1915-1920 MHz, 1995-2000 MHz, 2000-2020 MHz, 2110-2155 MHz, 2155-2180 MHz, and 2180-2200 bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least 43 + 10 log (P) dB.

For LTE Band 7, 38, 41
According to FCC 27.53(m)(4) specified that power of any emission outside of the channel edge must be attenuated below the transmitting power (P) by a 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. In addition, the attenuation factor shall not be less that 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. In the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least two percent may be employed, except when the 1 megahertz band is 2495-2496 MHz, in which case a resolution bandwidth of at least one percent may be employed.

4.4.2 Test Setup



4.4.3 Test Procedures

a. The EUT was set up for the rated peak power. The power was measured with Spectrum Analyzer. All measurements of Out-of-Band Emission were done at 2 channels: low and high operational frequency range. All measurements of Band Edge were done at 2 channels: low and high operational frequency range.(only for LTE Band 66 CA mode)

b. The center frequency of spectrum is the band edge frequency and span is 1MHz. RB of the spectrum is 200kHz and VB of the spectrum is 620kHz (LTE Channel Bandwidth 10MHz+10MHz). (only for LTE Band 66 CA mode)

c. The center frequency of spectrum is the band edge frequency and span is 1MHz. RB of the spectrum is 430kHz and VB of the spectrum is 1.3MHz (LTE Channel Bandwidth 20MHz+20MHz).(only for LTE Band 66 CA mode)

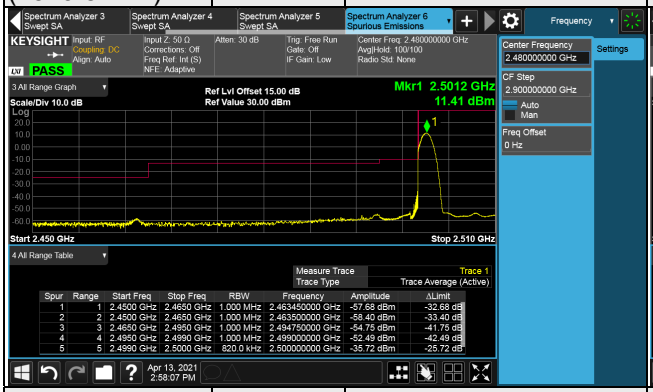
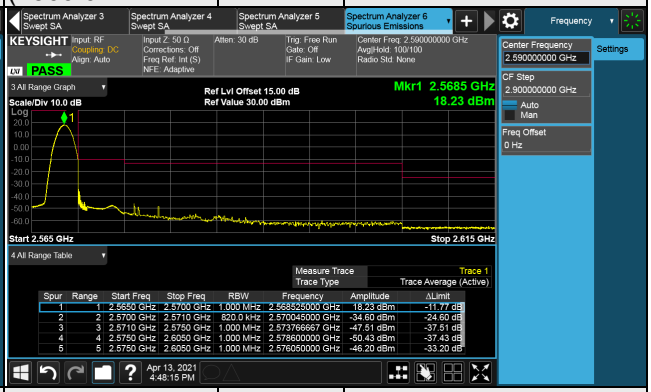
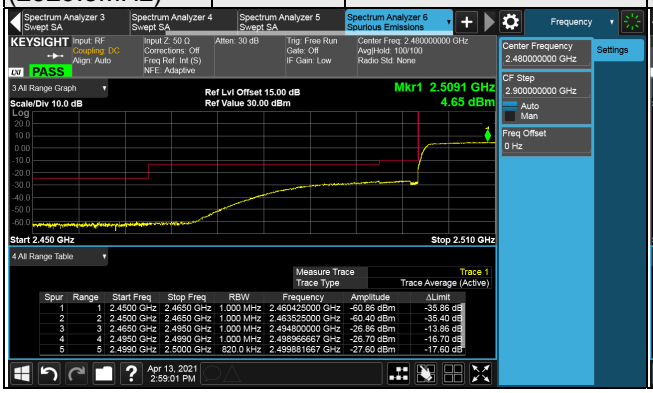
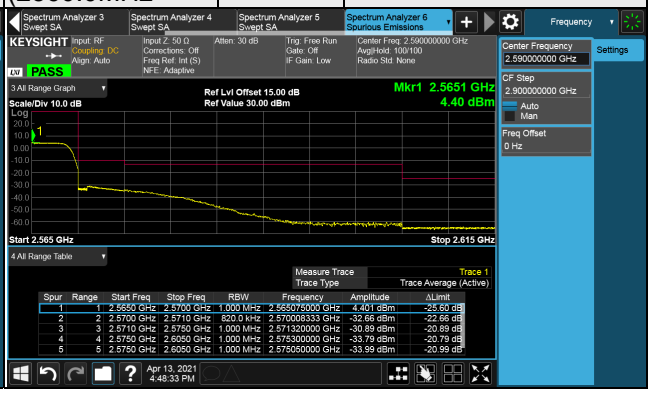
d. For the measurement method of LTE Band 7C, 38C, Band 41C, please refer to 27.53(m)(4)(6).

e. Record the max trace plot into the test report.

4.4.4 Test Results

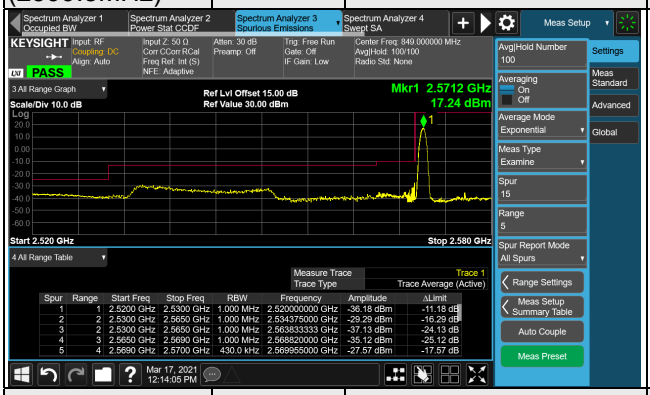
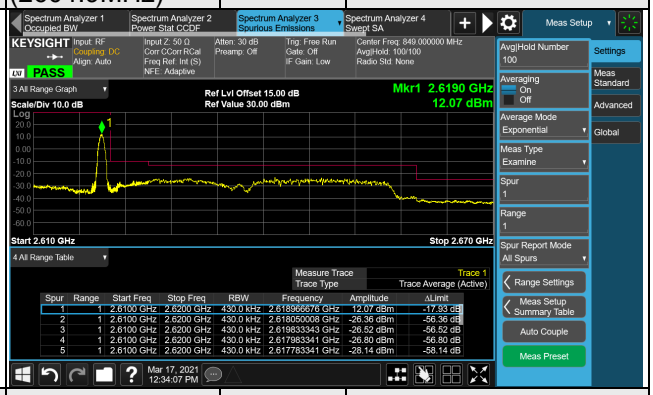
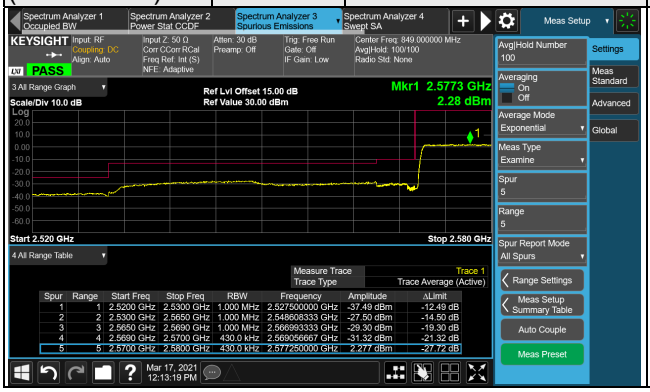
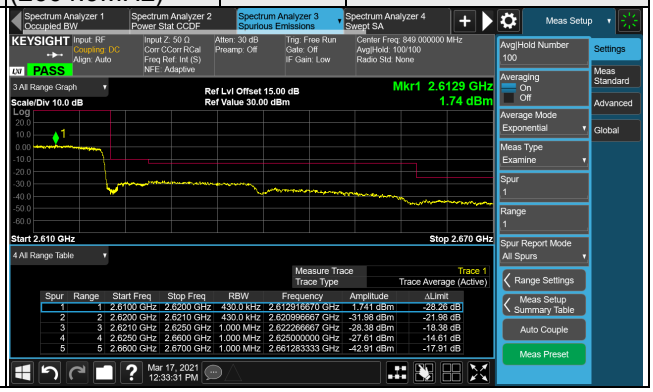
LTE Band 7 (CA 7C)

Out-of-Band Emission

Channel Bandwidth: 20MHz+20MHz					
Channel 20850 (2510.0MHz)+ Channel 21048 (2529.8MHz)	QPSK	1 RB / 0 RB Offset+ 1 RB / 99 RB Offset	Channel 21152 (2540.2MHz)+ Channel 21350 (2560.0MHz	QPSK	1 RB / 0 RB Offset+ 1 RB / 99 RB Offset
					
Channel 20850 (2510.0MHz)+ Channel 21048 (2529.8MHz)	QPSK	75 RB / 0 RB Offset 100 RB / 0 RB Offset	Channel 21152 (2540.2MHz)+ Channel 21350 (2560.0MHz	QPSK	75 RB / 0 RB Offset 100 RB / 0 RB Offset
					

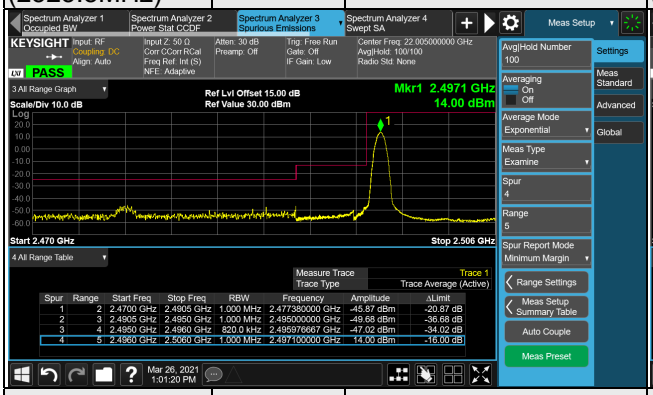
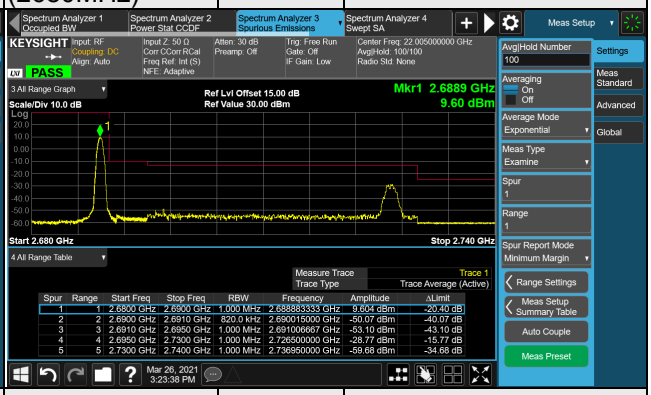
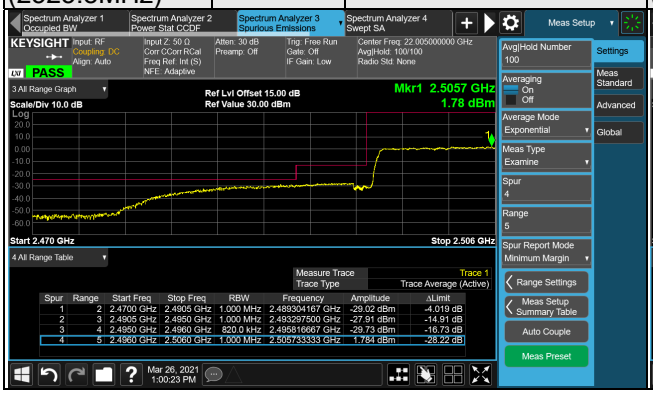
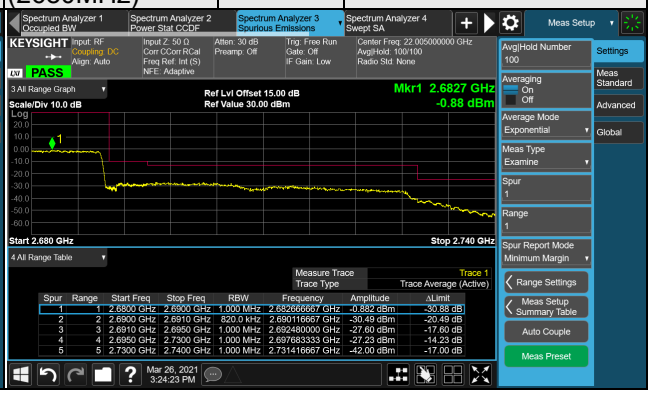
LTE Band 38 (CA 38C)

Out-of-Band Emission

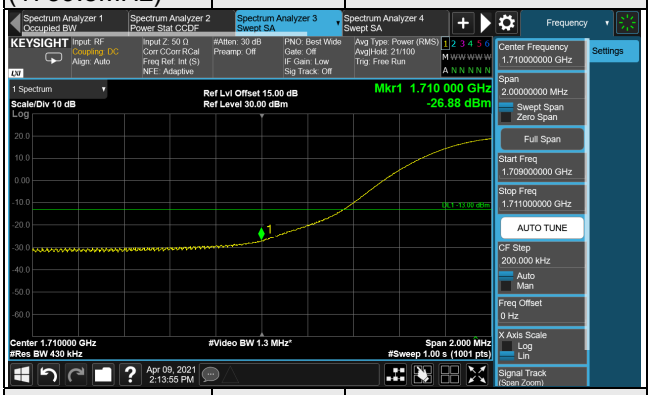
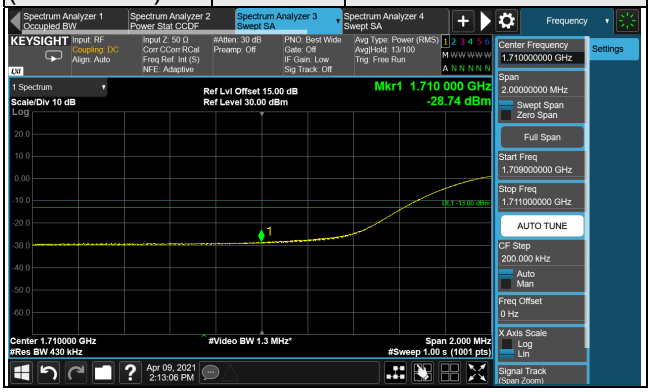
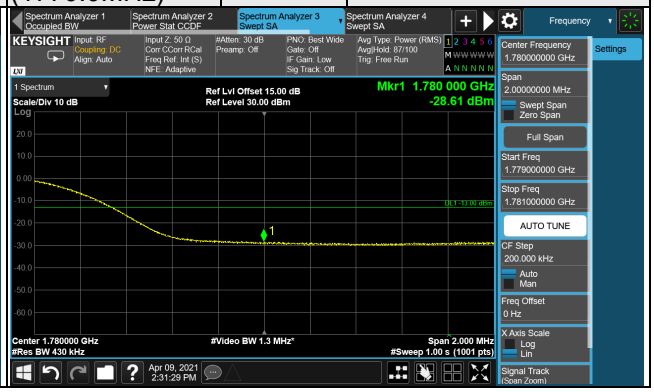
Channel Bandwidth: 20MHz+20MHz					
Channel 37850 (2580.0MHz)+ Channel 38048 (2599.8MHz)	QPSK	1 RB / 0 RB Offset+ 1 RB / 99 RB Offset	Channel 37901 (2585.1MHz)+ Channel 38099 (2604.9MHz)	QPSK	1 RB / 0 RB Offset+ 1 RB / 99 RB Offset
					
Channel 37850 (2580.0MHz)+ Channel 38048 (2599.8MHz)	QPSK	100 RB / 0 RB Offset	Channel 37901 (2585.1MHz)+ Channel 38099 (2604.9MHz)	QPSK	100 RB / 0 RB Offset
					

LTE Band 41 (CA 41C)

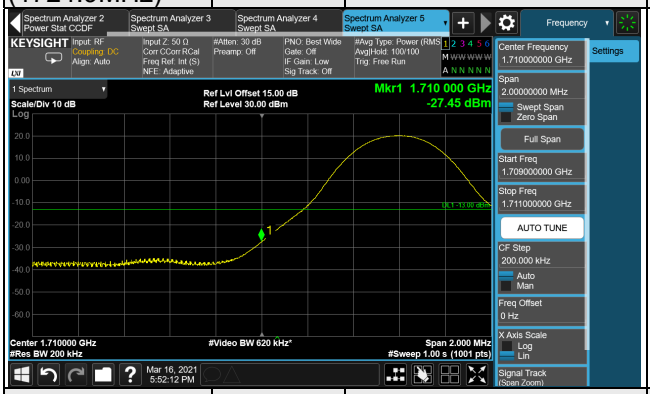
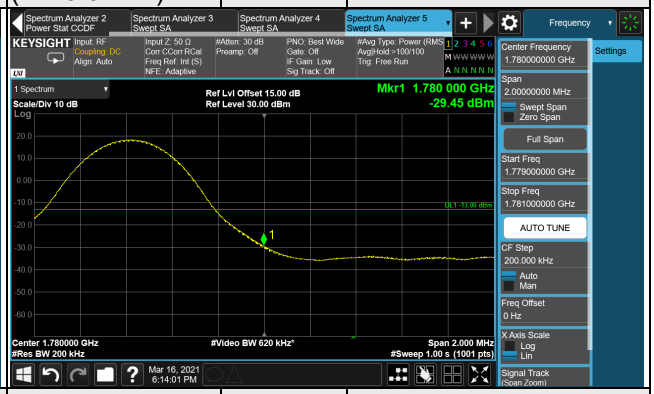
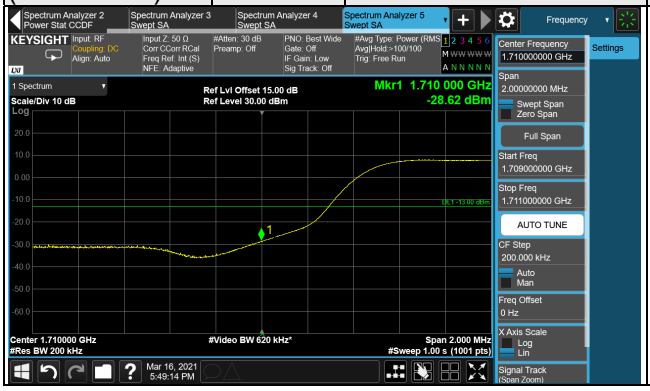
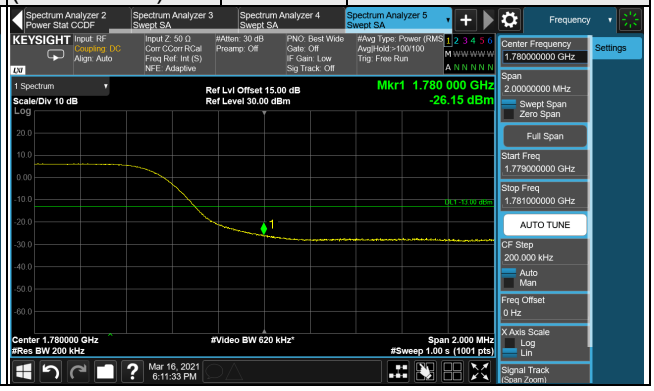
Out-of-Band Emission

Channel Bandwidth: 20MHz+20MHz					
Channel 39750 (2506.0MHz)+ Channel 39948 (2525.8MHz)	QPSK	1 RB / 0 RB Offset+ 1 RB / 99 RB Offset	Channel 41292 (2660.2MHz)+ Channel 41490 (2680MHz)	QPSK	1 RB / 0 RB Offset+ 1 RB / 99 RB Offset
					
Channel 39750 (2506.0MHz)+ Channel 39948 (2525.8MHz)	QPSK	100 RB / 0 RB Offset	Channel 41292 (2660.2MHz)+ Channel 41490 (2680MHz)	QPSK	100 RB / 0 RB Offset
					

LTE Band 66 (CA 66C)
Band Edge:

Channel Bandwidth: 20MHz+20MHz					
Channel 132072 (1720.0MHz)+ Channel 132270 (1739.8MHz)	QPSK	1 RB / 0 RB Offset+ 1 RB / 99 RB Offset	Channel 132374 (1750.2MHz)+ Channel 132572 (1770.0MHz)	QPSK	1 RB / 0 RB Offset+ 1 RB / 99 RB Offset
					
Channel 132072 (1720.0MHz)+ Channel 132270 (1739.8MHz)	QPSK	100 RB / 0 RB Offset	Channel 132374 (1750.2MHz)+ Channel 132572 (1770.0MHz)	QPSK	100 RB / 0 RB Offset
					

LTE Band 66 (CA 66B)
Band Edge:

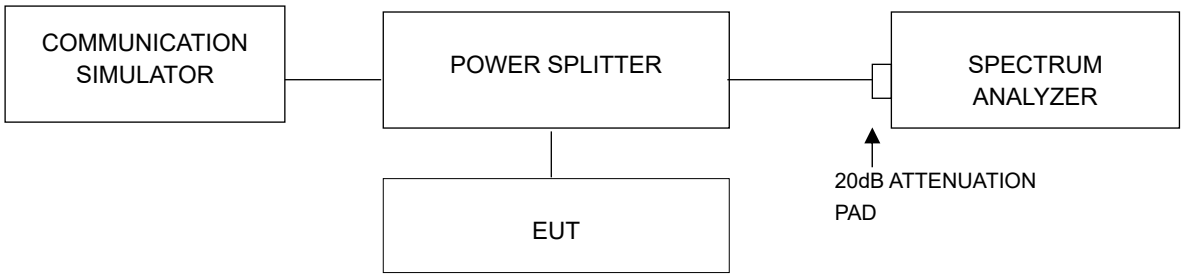
Channel Bandwidth: 10MHz+10MHz					
Channel 132022 (1715.0MHz)+ Channel 132121 (1724.9MHz)	QPSK	1 RB / 0 RB Offset+ 1 RB / 49 RB Offset	Channel 132523 (1765.1MHz)+ Channel 132622 (1775.0MHz)	QPSK	1 RB / 0 RB Offset+ 1 RB / 49 RB Offset
					
Channel 132022 (1715.0MHz)+ Channel 132121 (1724.9MHz)	QPSK	50 RB / 0 RB Offset	Channel 132523 (1765.1MHz)+ Channel 132622 (1775.0MHz)	QPSK	50 RB / 0 RB Offset
					

4.5 Peak to Average Ratio

4.5.1 Limits of Peak to Average Ratio Measurement

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

4.5.2 Test Setup



4.5.3 Test Procedures

a. Set resolution/measurement bandwidth ≥ signal's occupied bandwidth;

b. Set the number of counts to a value that stabilizes the measured CCDF curve;

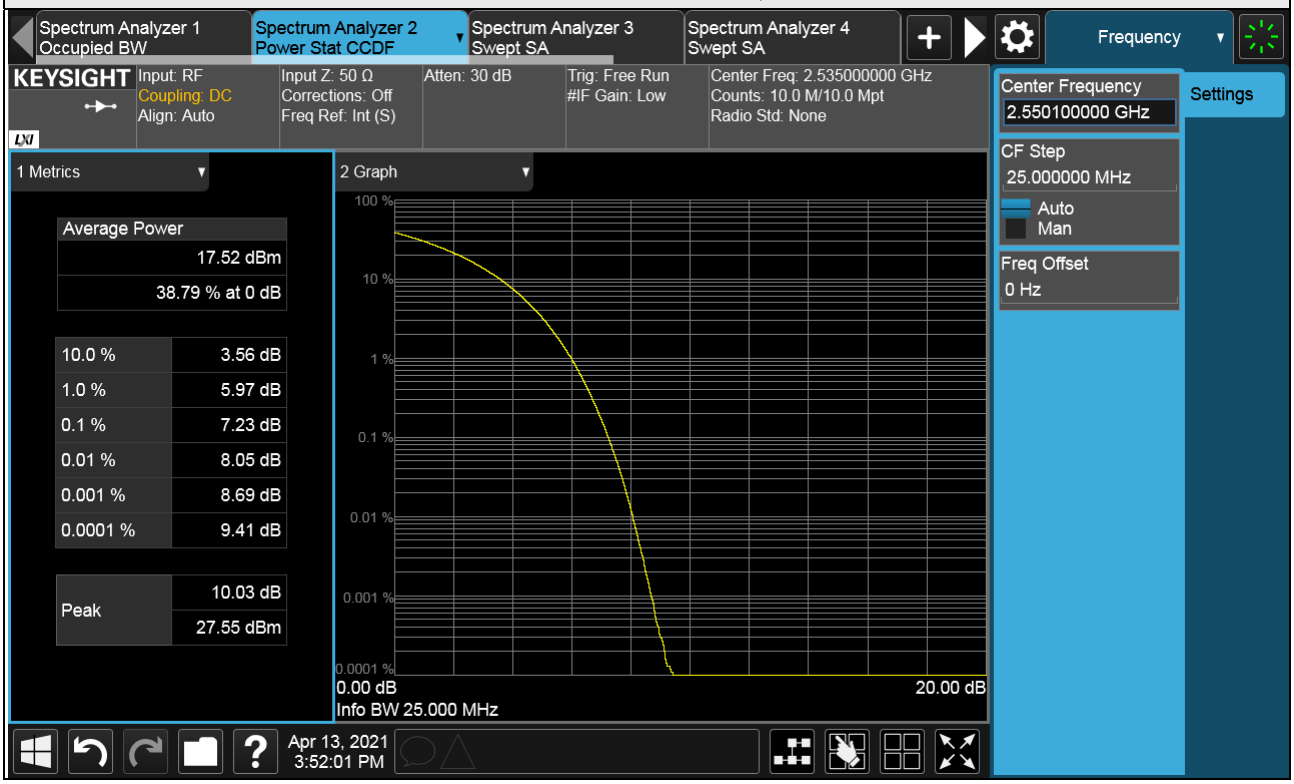
c. Record the maximum PAPR level associated with a probability of 0.1%.

4.5.4 Test Results

LTE Band 7 (CA 7C)

LTE Band 7 (CA 7C), Channel Bandwidth 20MHz+20MHz					
Channel	Frequency (MHz)	Peak To Average Ratio (dB)			
		QPSK	16QAM	64QAM	256QAM
20850+21048	2510.0+2529.8	5.85	6.61	6.67	6.75
21001+21199	2525.1+2544.9	5.97	7.00	7.15	7.20
21152+21350	2540.2+2560.0	6.60	6.99	7.15	7.23

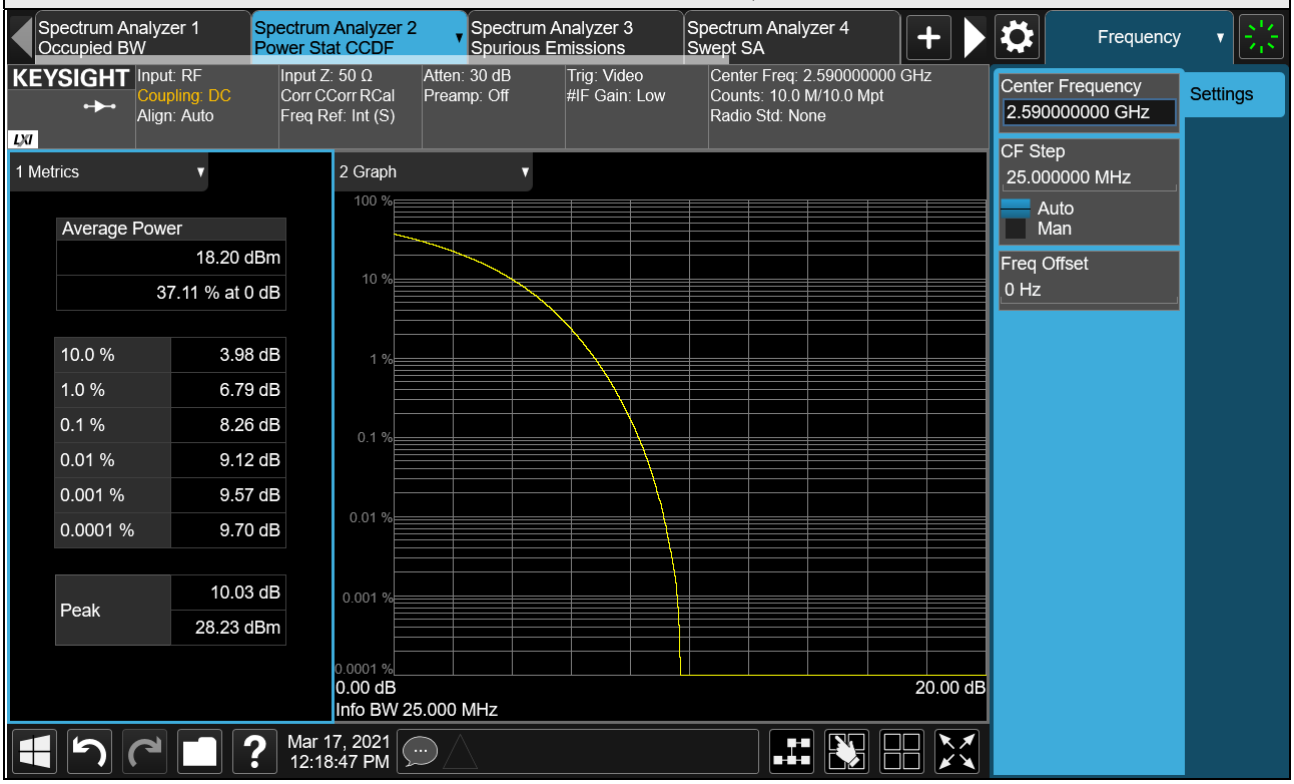
Peak To Average Ratio
Spectrum Plot of Worst Value
20MHz+20MHz / 256QAM



LTE Band 38 (CA 38C)

LTE Band 38 (CA 38C), Channel Bandwidth 20MHz+20MHz					
Channel	Frequency (MHz)	Peak To Average Ratio (dB)			
		QPSK	16QAM	64QAM	256QAM
37850+38048	2580.0+2599.8	6.64	7.88	8.26	8.19
37901+38099	2585.1+2604.9	6.75	7.79	7.97	8.11
37952+38150	2590.2+2610.0	6.46	7.76	8.13	7.96

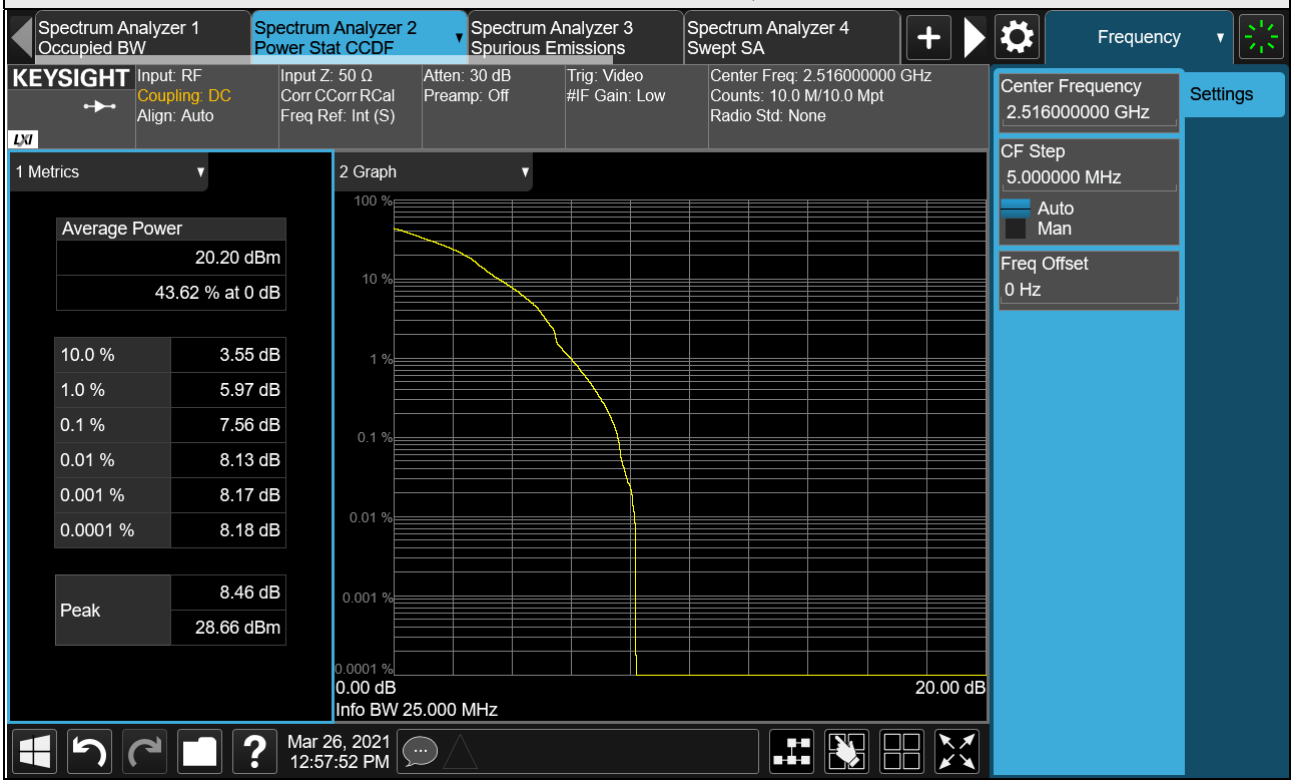
Peak To Average Ratio
Spectrum Plot of Worst Value
20MHz+20MHz / 64QAM



LTE Band 41 (CA 41C)

LTE Band 41 (CA 41C), Channel Bandwidth 20MHz+20MHz					
Channel	Frequency (MHz)	Peak To Average Ratio (dB)			
		QPSK	16QAM	64QAM	256QAM
39750+39948	2506.0+2525.8	5.09	7.56	7.18	7.40
40521+40719	2583.1+2602.9	5.09	7.44	7.44	7.40
41292+41490	2660.2+2680.0	6.09	5.20	7.26	7.35

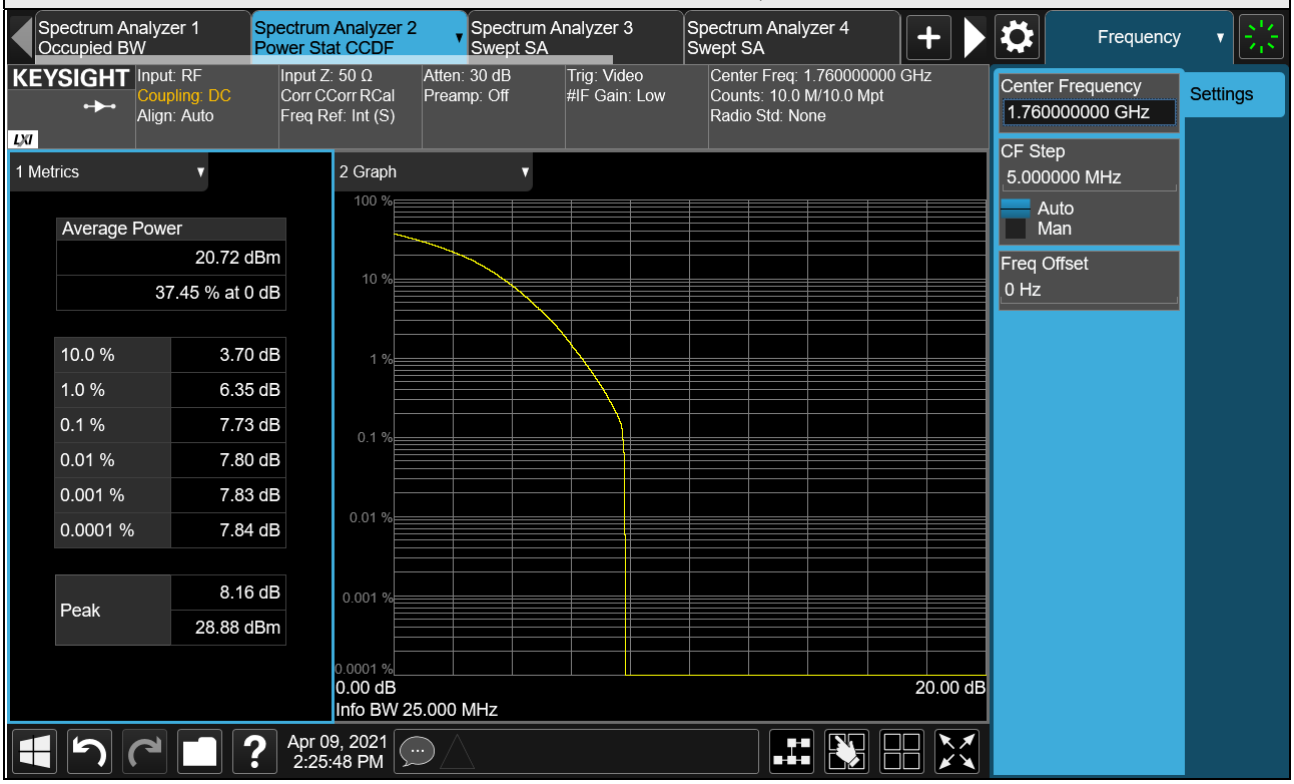
Peak To Average Ratio
Spectrum Plot of Worst Value
20MHz+20MHz / 16QAM



LTE Band 66 (CA 66C)

LTE Band 66 (CA 66C), Channel Bandwidth 20MHz+20MHz					
Channel	Frequency (MHz)	Peak To Average Ratio (dB)			
		QPSK	16QAM	64QAM	256QAM
132072+132270	1720.0+1739.8	5.74	6.36	7.54	7.53
132323+132521	1745.1+1764.9	6.43	6.87	6.93	7.01
132374+132572	1750.2+1770.0	5.88	7.71	7.71	7.73

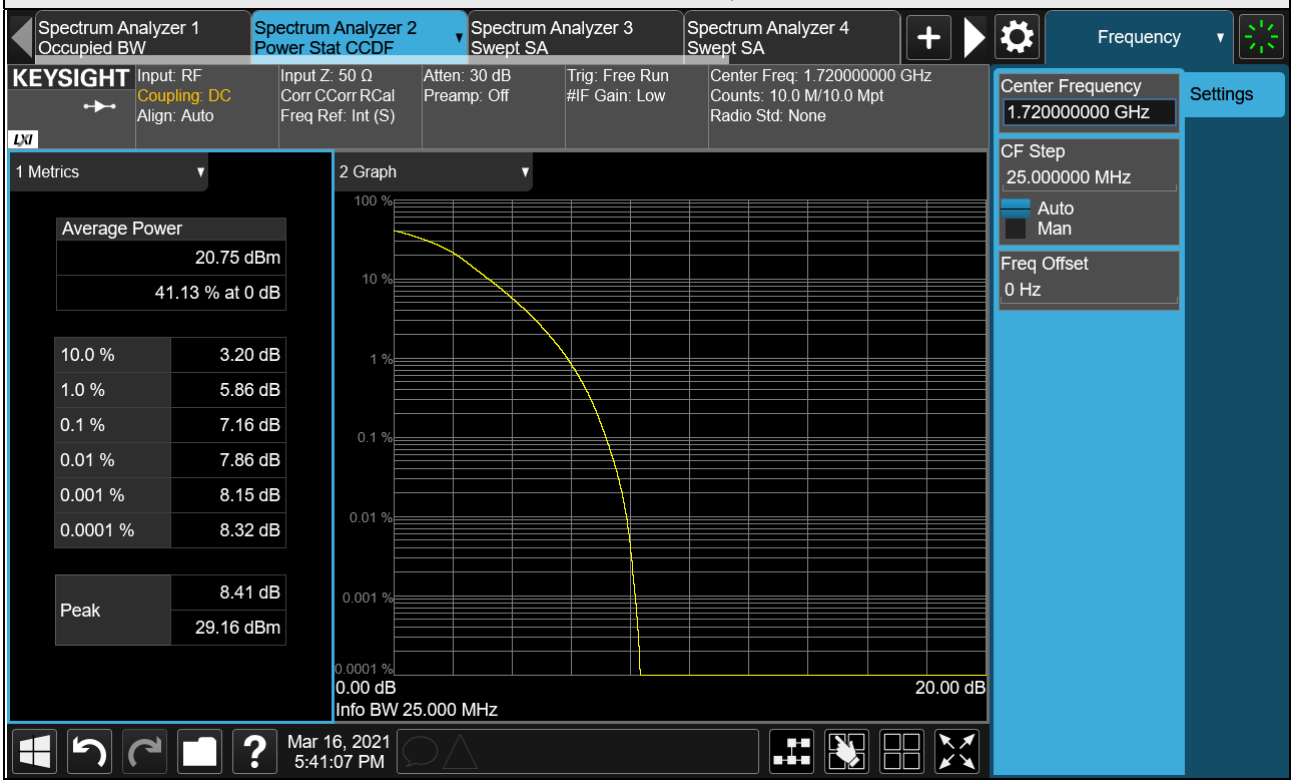
Peak To Average Ratio
Spectrum Plot of Worst Value
20MHz+20MHz / 256QAM



LTE Band 66 (CA 66B)

LTE Band 66 (CA 66B), Channel Bandwidth 10MHz+10MHz					
Channel	Frequency (MHz)	Peak To Average Ratio (dB)			
		QPSK	16QAM	64QAM	256QAM
132022+132121	1715.0+1724.9	7.16	6.47	6.87	6.86
132373+132472	1750.1+1760.0	6.18	6.76	7.07	7.05
132523+132622	1765.1+1775.0	6.33	6.84	7.07	7.04

Peak To Average Ratio
Spectrum Plot of Worst Value
10MHz+10MHz / QPSK



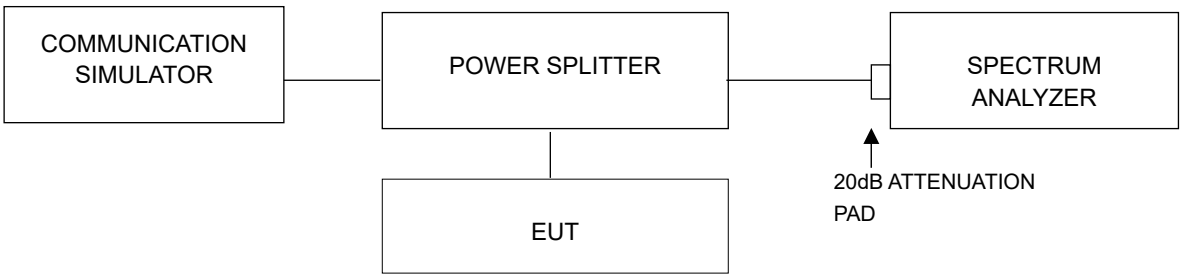
4.6 Conducted Spurious Emissions

4.6.1 Limits of Conducted Spurious Emissions Measurement

For LTE Band 66
In the FCC 27.53(h),On any frequency outside a licensee's frequency block, The power of any emission shall be attenuated below the transmitter power (P) by at least 43 + 10 log (P) dB. The emission limit equal to –13dBm.

For LTE Band 7, 38, 41
In the FCC 27.53(m)(4),On any frequency outside a licensee's frequency block, The power of any emission shall be attenuated below the transmitter power (P) by at least 55 + 10 log (P) dB. The emission limit equal to –25dBm.

4.6.2 Test Setup



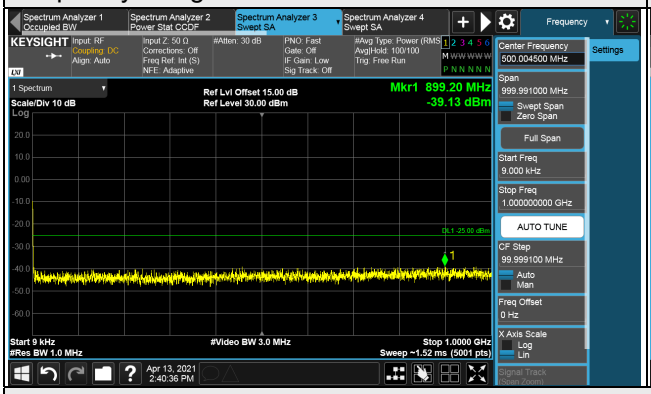
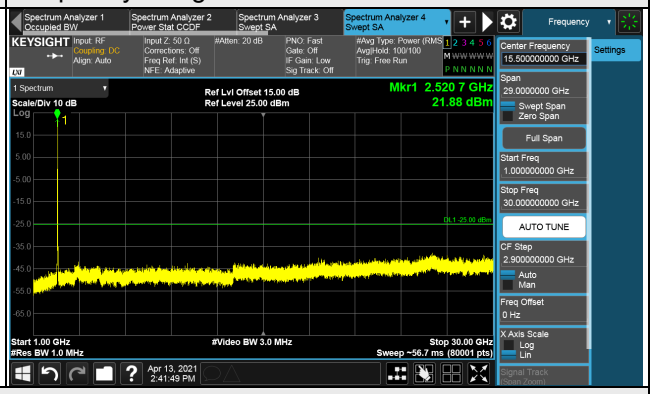
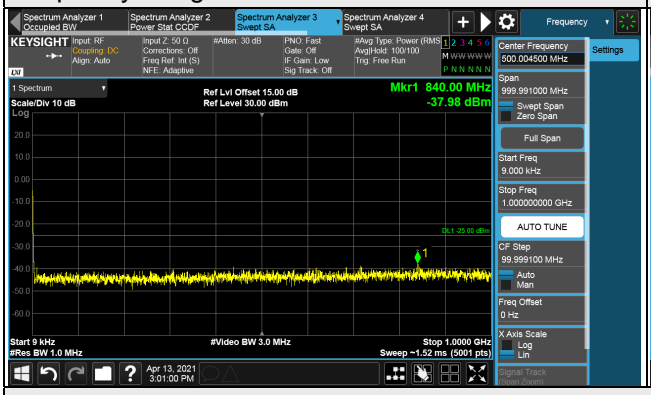
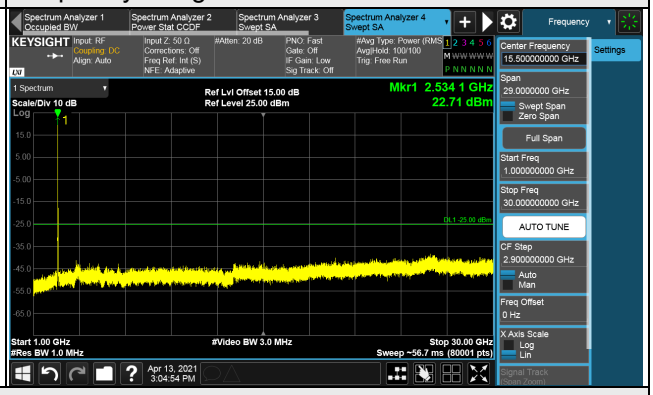
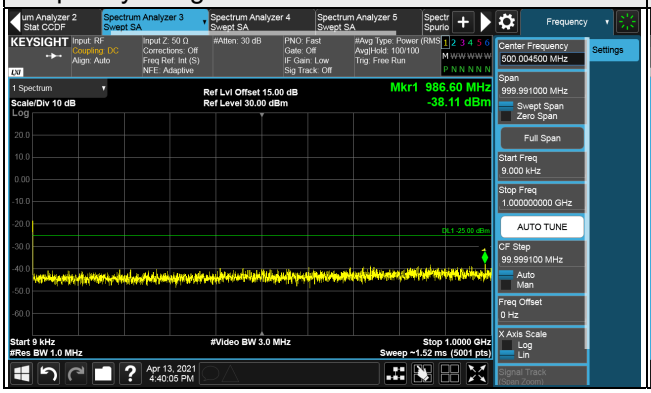
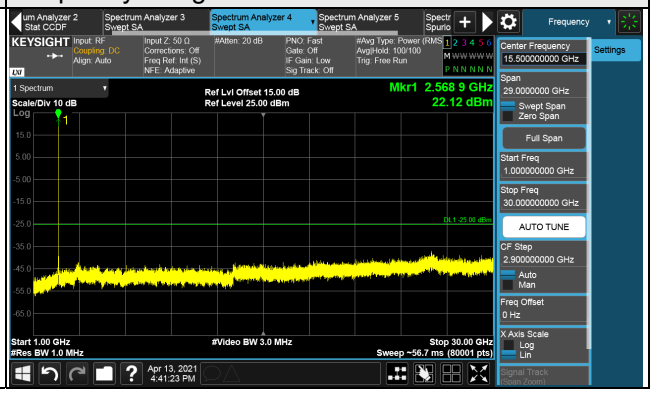
4.6.3 Test Procedure

a. All measurements were done at 3 channels: low, middle and high operational frequency range.

b. When the spectrum scanned from 9kHz to 20GHz or 30GHz or 40GHz, it shall be connected to the attenuator with the carried frequency.

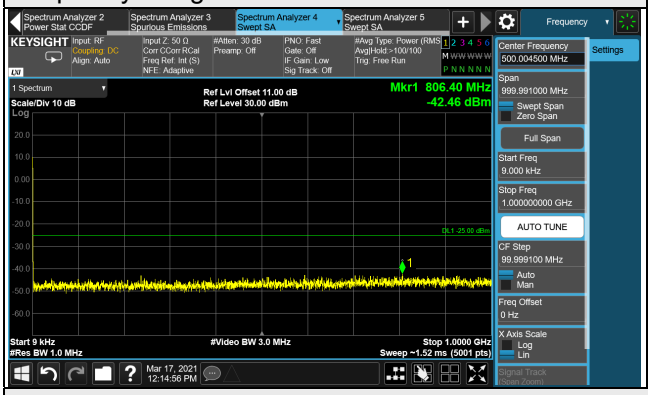
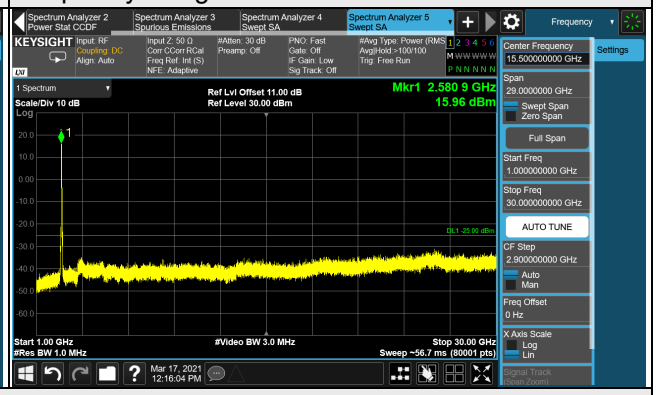
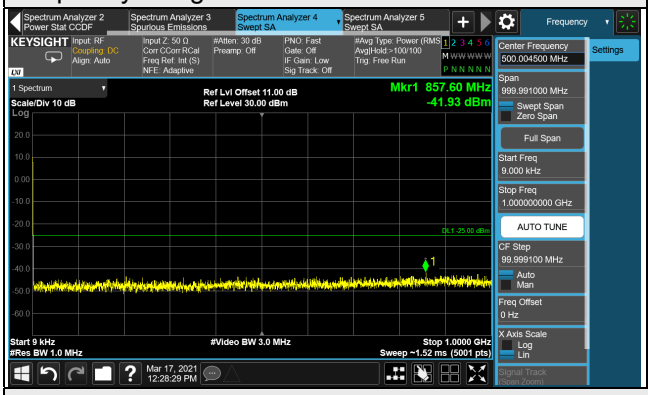
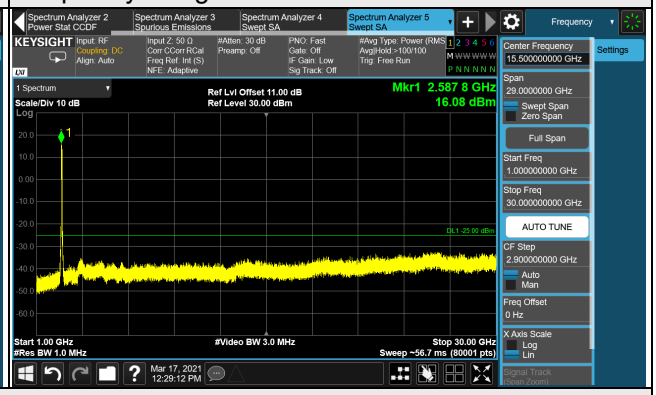
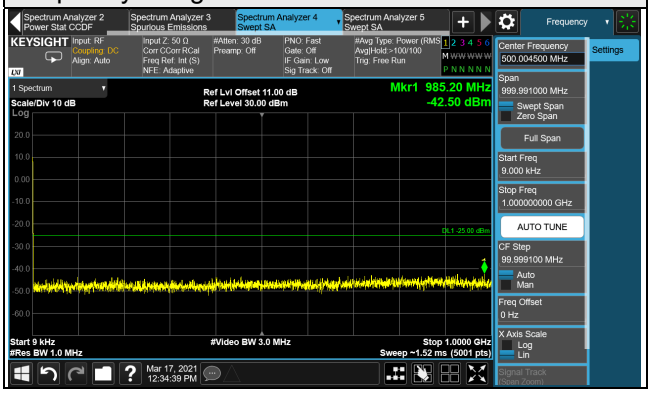
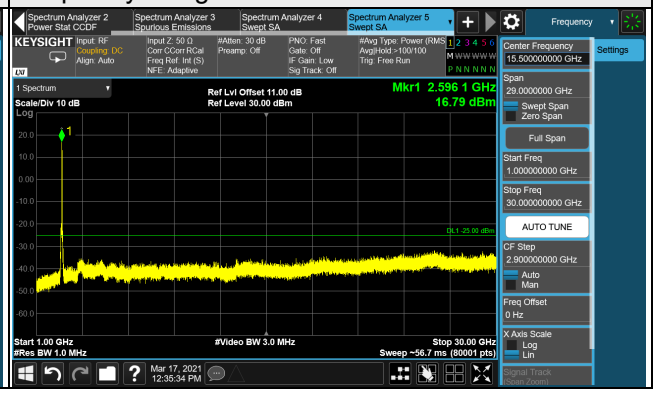
4.6.4 Test Results

LTE Band 7 (CA 7C)

Channel Band width: 20MHz+20MHz	
Channel 20828(2507.8MHz)+ 21048(2529.8MHz)	
Frequency Range : 9kHz~1GHz	Frequency Range : 1GHz~30GHz
	
Channel 21001(2525.1MHz)+ 21199(2544.9MHz)	
Frequency Range : 9kHz~1GHz	Frequency Range : 1GHz~30GHz
	
Channel 21152(2540.2MHz)+21350(2560.0MHz)	
Frequency Range : 9kHz~1GHz	Frequency Range : 1GHz~30GHz
	

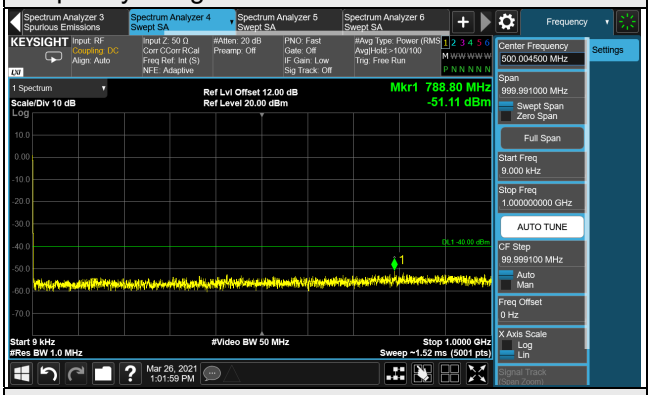
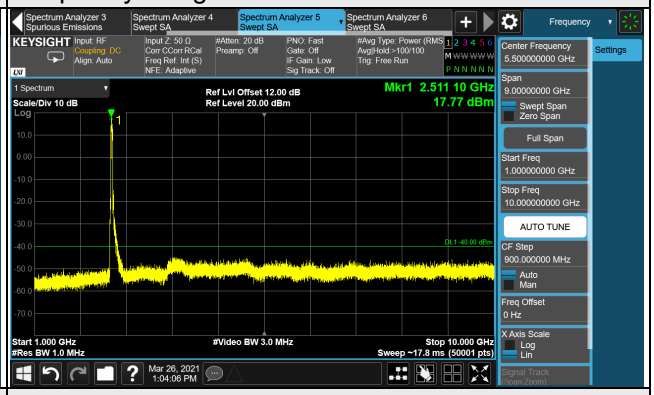
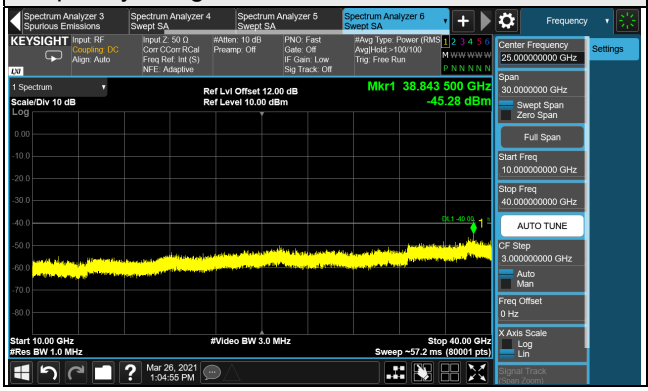
*The 9kHz signal over the limit is from Spectrum.

LTE Band 38 (CA 38C)

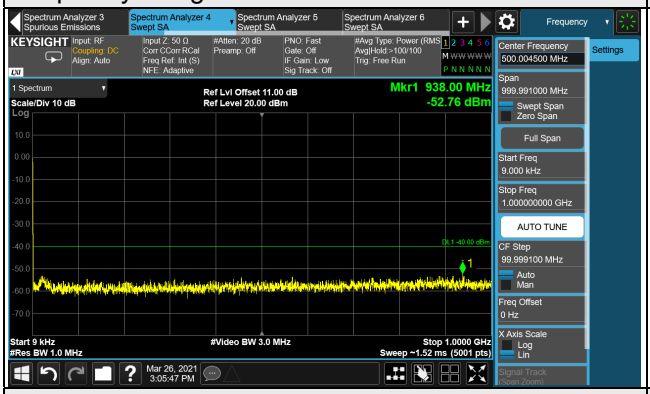
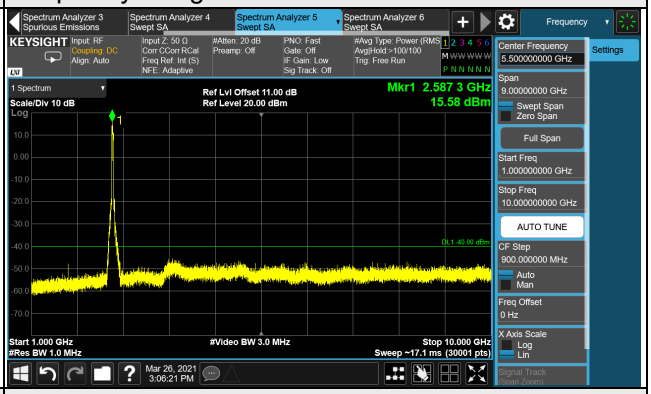
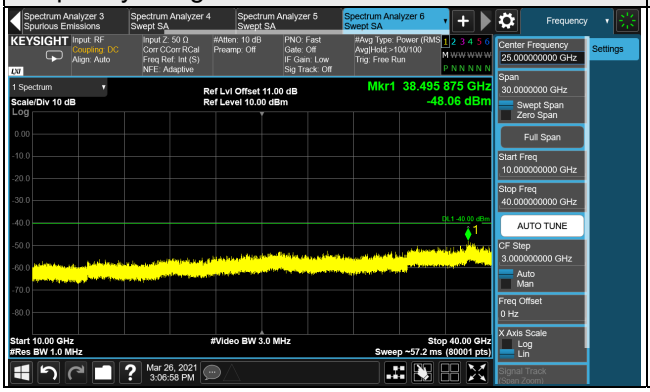
Channel Band width: 20MHz+20MHz	
Channel 37850(2580.0MHz)+38048(2599.8MHz)	
Frequency Range : 9kHz~1GHz	Frequency Range : 1GHz~30GHz
	
Channel 37901(2585.1MHz)+38099(2604.9MHz)	
Frequency Range : 9kHz~1GHz	Frequency Range : 1GHz~30GHz
	
Channel 37952(2590.2MHz)+38150(2610.0MHz)	
Frequency Range : 9kHz~1GHz	Frequency Range : 1GHz~30GHz
	

*The 9kHz signal over the limit is from Spectrum.

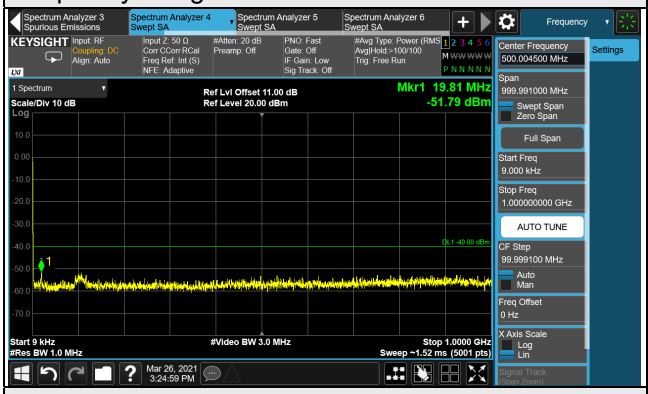
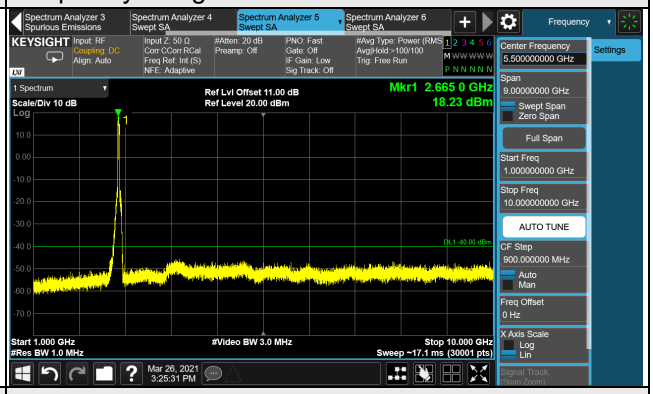
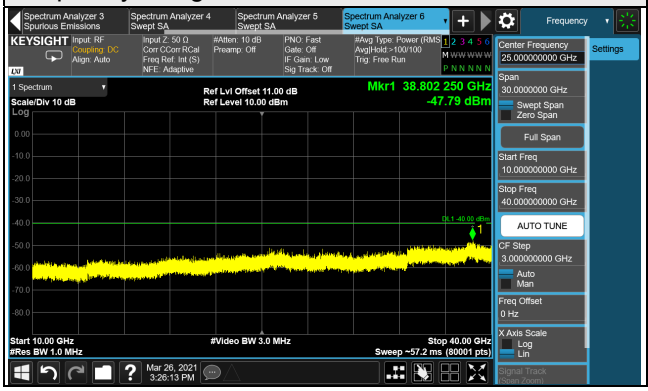
LTE Band 41 (CA 41C)

Channel Band width: 20MHz+20MHz	
Channel 39750(2506.0MHz)+39948(2525.8MHz)	
Frequency Range : 9kHz~1GHz	Frequency Range : 1GHz~10GHz
	
Frequency Range : 10GHz~40GHz	
	

*The 9kHz signal over the limit is from Spectrum.

Channel 40521(2583.1MHz)+40719(2602.9MHz)	
Frequency Range : 9kHz~1GHz	Frequency Range : 1GHz~10GHz
	
Frequency Range : 10GHz~40GHz	
	

*The 9kHz signal over the limit is from Spectrum.

Channel 41292(2660.2MHz)+41490(2680.0MHz)	
Frequency Range : 9kHz~1GHz	Frequency Range : 1GHz~10GHz
	
Frequency Range : 10GHz~40GHz	
	

*The 9kHz signal over the limit is from Spectrum.