FCC Test Report
(Part 27)

Report No.:	RF200610C03
FCC ID:	H8N-ASK-SFE116
Test Model:	ASK-SFE116
Received Date:	Jun. 10, 2020
Test Date:	Jul. 02 ~ Jul. 31, 2020
Issued Date:	Jul. 31, 2020
Applicant:	ASKEY COMPUTER CORP.
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Issued By:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch Lin Kou Laboratories
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Test Location:	No. 19, Hwa Ya 2nd Rd., Wen Hwa Vil., Kwei Shan Dist., Taoyuan City 33383, Taiwan
FCC Registration / Designation Number:	788550 / TW0003

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Table of Contents

Release Control Record **4**

1 Certificate of Conformity **5**

2 Summary of Test Results **6**

2.1 Measurement Uncertainty 6
2.2 Test Site and Instruments 7

3 General Information **8**

3.1 General Description of EUT 8
3.2 Configuration of System under Test 10
3.2.1 Description of Support Units 10
3.3 Test Mode Applicability and Tested Channel Detail 11
3.4 EUT Operating Conditions 15
3.5 General Description of Applied Standards and References 15

4 Test Types and Results **16**

4.1 Output Power Measurement 16
4.1.1 Limits of Output Power Measurement 16
4.1.2 Test Procedures 16
4.1.3 Test Setup 17
4.1.4 Test Results 18
4.2 Modulation Characteristics Measurement 33
4.2.1 Limits of Modulation Characteristics 33
4.2.2 Test Procedure 33
4.2.3 Test Setup 33
4.2.4 Test Results 34
4.3 Frequency Stability Measurement 37
4.3.1 Limits of Frequency Stability Measurement 37
4.3.2 Test Procedure 37
4.3.3 Test Setup 37
4.3.4 Test Results 38
4.4 Occupied Bandwidth Measurement 48
4.4.1 Limits of Occupied Bandwidth Measurement 48
4.4.2 Test Procedure 48
4.4.3 Test Setup 48
4.4.4 Test Result 49
4.5 Channel Edge Measurement 69
4.5.1 Limits of Band Edge Measurement 69
4.5.2 Test Setup 69
4.5.3 Test Procedures 69
4.5.4 Test Results 70
4.6 Peak to Average Ratio 80
4.6.1 Limits of Peak to Average Ratio Measurement 80
4.6.2 Test Setup 80
4.6.3 Test Procedures 80
4.6.4 Test Results 81
4.7 Conducted Spurious Emissions 91
4.7.1 Limits of Conducted Spurious Emissions Measurement 91
4.7.2 Test Setup 91
4.7.3 Test Procedure 91
4.7.4 Test Results 92
4.8 Radiated Emission Measurement 116
4.8.1 Limits of Radiated Emission Measurement 116
4.8.2 Test Procedure 116
4.8.3 Deviation from Test Standard 116
4.8.4 Test Setup 117

4.8.5 Test Results 118
5 Pictures of Test Arrangements 134
Appendix – Information of the Testing Laboratories 135

Release Control Record

Issue No.	Description	Date Issued
RF200610C03	Original release	Jul. 31, 2020

1 Certificate of Conformity

Product: LTE Network Extender

Brand: ASKEY

Test Model: ASK-SFE116

Sample Status: Engineering Sample

Applicant: ASKEY COMPUTER CORP.

Test Date: Jul. 02 ~ Jul. 31, 2020

Standards: FCC Part 27, Subpart C, F, 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 : _____ , **Date:** Jul. 31, 2020

Polly Chien / Specialist

Approved by : _____ , **Date:** Jul. 31, 2020

Bruce Chen / Senior Project Engineer

2 Summary of Test Results

Applied Standard: FCC Part 27 & Part 2					
FCC Clause			Test Item	Result	Remarks
LTE B4	LTE B13	LTE B66			
2.1046 27.50(d)(2)	2.1046 27.50(b)(4)	2.1046 27.50(d)(2)	Equivalent Isotropically Radiated Power / Equivalent Radiated Power	Pass	Meet the requirement of limit.
2.1047	2.1047	2.1047	Modulation Characteristics	Pass	Meet the requirement of limit.
27.50 (d)(5)	----	27.50 (d)(5)	Peak To Average Ratio	Pass	Meet the requirement of limit.
2.1055 27.54	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 27.53(h)	2.1049	2.1049	Occupied Bandwidth	Pass	Meet the requirement of limit.
27.53(h)	2.1051 27.53(c)	27.53(h)	Band Edge Measurements	Pass	Meet the requirement of limit.
2.1051 27.53(h)	2.1051 27.53(c)	2.1051 27.53(h)	Conducted Spurious Emissions	Pass	Meet the requirement of limit.
2.1053 27.53(h)	2.1053 27.53(c)	2.1053 27.53(h)	Radiated Spurious Emissions	Pass	Meet the requirement of limit. Minimum passing margin is -23.3dB at 4380.00MHz.

Note: Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

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	101582	Mar. 31, 2020	Mar. 30, 2021
BILOG Antenna SCHWARZBECK	VULB9168	9168-160	Nov. 07, 2019	Nov. 06, 2020
HORN Antenna SCHWARZBECK	BBHA 9120 D	9120D-1169	Nov. 24, 2019	Nov. 23, 2020
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170241	Nov. 24, 2019	Nov. 23, 2020
BILOG Antenna SCHWARZBECK	VULB9168	9168-158	Nov. 08, 2019	Nov. 07, 2020
Loop Antenna TESEQ	EM-6879	269	Sep. 16, 2019	Sep. 15, 2020
Preamplifier Agilent (Below 1GHz)	8447D	2944A10638	Jun. 08, 2020	Jun. 07, 2021
Preamplifier Agilent (Above 1GHz)	8449B	3008A02367	Feb. 18, 2020	Feb. 17, 2021
RF signal cable HUBER+SUHNER&EMCI	SUCOFLEX 104 & EMC104-SM-SM8000	CABLE-CH9-02 (248780+171006)	Jan. 18, 2020	Jan. 17, 2021
RF signal cable HUBER+SUHNER	SUCOFLEX 104	CABLE-CH9-(250795/4)	Jan. 18, 2020	Jan. 17, 2021
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	BAF-02	5	NA	NA
Standard Temperature And Humidity Chamber TERCHY	HRM-120RF	931022	Dec. 12, 2019	Dec. 11, 2020
JFW 20dB attenuation	50HF-020-SMA	NA	NA	NA
DC Power Supply Keysight	U8002A	MY56330015	NA	NA
Radio Communication Analyzer Anritsu	MT8821C	6201462755	Feb. 13, 2020	Feb. 12, 2021
Digital Multimeter Fluke	87-III	70360742	Jul. 12, 2019	Jul. 11, 2020
			Jul. 10, 2020	Jul. 09, 2021
MXG Vector signal generator Agilent	N5182B	MY53050430	Nov. 25, 2019	Nov. 24, 2020

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	LTE Network Extender				
Brand	ASKEY				
Test Model	ASK-SFE116				
Operating Software	V0.07_V1.0.008				
Status of EUT	Engineering Sample				
Power Supply Rating	12Vdc (Adapter)				
Modulation Type	LTE: QPSK, 16QAM, 64QAM				
Operating Frequency	LTE Band 4	Channel Bandwidth 5MHz	2112.5MHz ~ 2152.5MHz		
		Channel Bandwidth 10MHz	2115.0MHz ~ 2150.0MHz		
		Channel Bandwidth 15MHz	2117.5MHz ~ 2147.5MHz		
		Channel Bandwidth 20MHz	2120.0MHz ~ 2145.0MHz		
	LTE Band 13	Channel Bandwidth 5MHz	748.5MHz ~ 753.5MHz		
		Channel Bandwidth 10MHz	751MHz		
	LTE Band 66	Channel Bandwidth 5MHz	2112.5MHz ~ 2177.5MHz		
		Channel Bandwidth 10MHz	2115.0MHz ~ 2175.0MHz		
		Channel Bandwidth 15MHz	2117.5MHz ~ 2172.5MHz		
		Channel Bandwidth 20MHz	2120.0MHz ~ 2170.0MHz		
Max. EIRP Power			QPSK	16QAM	64QAM
	LTE Band 4	Channel Bandwidth 5MHz	213.796mW (23.3dBm)	173.780mW (22.4dBm)	154.882mW (21.9dBm)
		Channel Bandwidth 10MHz	223.872mW (23.5dBm)	186.209mW (22.7dBm)	173.780mW (22.4dBm)
		Channel Bandwidth 15MHz	223.872mW (23.5dBm)	186.209mW (22.7dBm)	158.489mW (22.0dBm)
		Channel Bandwidth 20MHz	229.087mW (23.6dBm)	165.959mW (22.2dBm)	151.356mW (21.8dBm)
	LTE Band 66	Channel Bandwidth 5MHz	213.796mW (23.3dBm)	177.828mW (22.5dBm)	158.489mW (22.0dBm)
		Channel Bandwidth 10MHz	218.776mW (23.4dBm)	177.828mW (22.5dBm)	162.181mW (22.1dBm)
		Channel Bandwidth 15MHz	223.872mW (23.5dBm)	181.970mW (22.6dBm)	169.824mW (22.3dBm)
		Channel Bandwidth 20MHz	229.087mW (23.6dBm)	173.780mW (22.4dBm)	158.489mW (22.0dBm)
Max. ERP Power			QPSK	16QAM	64QAM
	LTE Band 13	Channel Bandwidth 5MHz	190.546mW (22.8dBm)	154.882mW (21.9dBm)	141.254mW (21.5dBm)
		Channel Bandwidth 10MHz	181.970mW (22.6dBm)	154.882mW (21.9dBm)	141.254mW (21.5dBm)

			QPSK	16QAM	64QAM
Emission Designator	LTE Band 4	Channel Bandwidth 5MHz	4M47G7D	4M47D7W	4M47D7W
		Channel Bandwidth 10MHz	8M93G7D	8M93D7W	8M93D7W
		Channel Bandwidth 15MHz	13M4G7D	13M4D7W	13M4D7W
		Channel Bandwidth 20MHz	17M9G7D	17M9D7W	17M9D7W
	LTE Band 13	Channel Bandwidth 5MHz	4M47G7D	4M47D7W	4M47D7W
		Channel Bandwidth 10MHz	8M93G7D	8M93D7W	8M93D7W
	LTE Band 66	Channel Bandwidth 5MHz	4M47G7D	4M47D7W	4M47D7W
		Channel Bandwidth 10MHz	8M92G7D	8M93D7W	8M92D7W
		Channel Bandwidth 15MHz	13M4G7D	13M4D7W	13M4D7W
		Channel Bandwidth 20MHz	17M9G7D	17M9D7W	17M9D7W
Antenna Type	Refer to Note as below				
Antenna Connector	Refer to Note as below				
Accessory Device	Adapter, GPS antenna (7m, model: GPSGLONASS53D-S6-00)				
Data Cable Supplied	1.45m non-shielded RJ45 cable without core				

Note:

1. The EUT uses following antenna.

Antenna Type	Connector Type	Band	Freq. (MHz)	Antenna Gain (dBi)	
				Main	Aux
Dipole	I-pex	LTE Band 13	746	1.31	-0.26
			751	1.36	-0.47
			756	1.47	0.52
		LTE Band 4, LTE Band 66	2110	1.20	2.72
			2155	1.88	2.55
			2200	1.29	2.89

* 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.

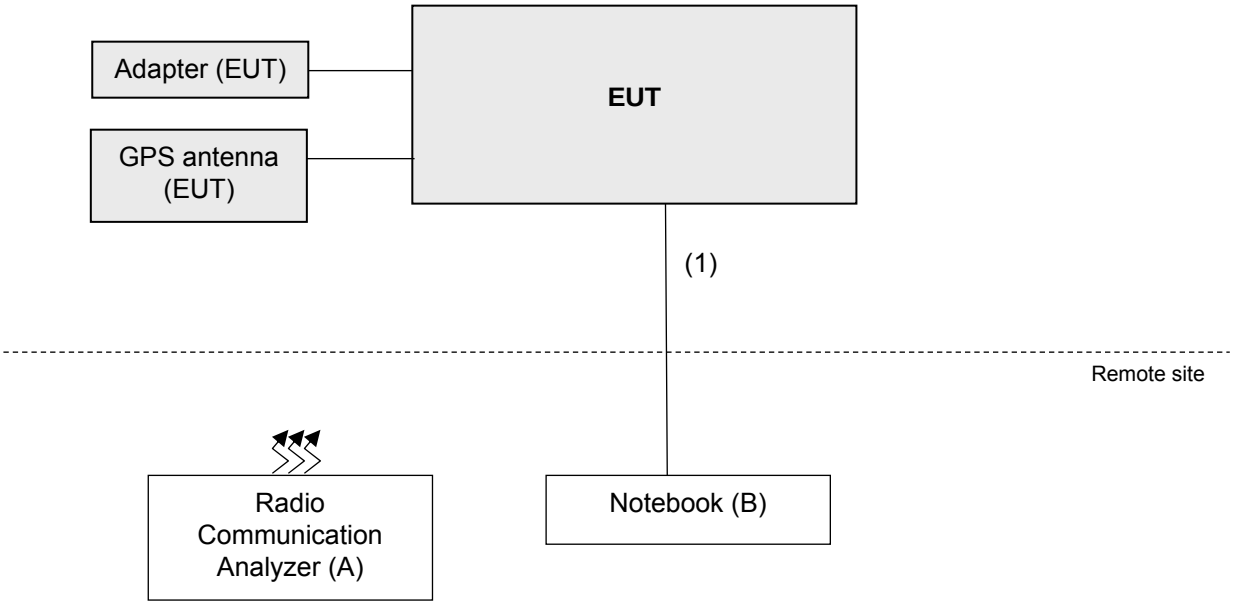
2. The EUT consumes following Adapters.

Adapter 1	
Brand	ChenZhou Frecom Elecronics Co., Ltd
Model	F18L16-120150SPAU
Input Power	100-240Vac, 50/60Hz, 0.6A
Output Power	+12Vdc, 1.5A
Power Line	1.5 m cable without core

Adapter 2	
Brand	I.T.E Power Supply
Model	MU18B1120150-A1
Input Power	100-240Vac, 50/60Hz, 0.6A
Output Power	+12Vdc, 1.5A
Power Line	1.45 m cable without core

* After the pretesting, the adapter 1 is found to be the worst case and chosen for final test.

3.2 Configuration of System under Test



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	-
B.	Notebook	DELL	E5410	1HC2XM1	FCC DoC Approved	-

Note:

1. All power cords of the above support units are non-shielded (1.8m).
2. Items A, B acted as communication partners to transfer data.

No.	Cable Description	Qty.	Length (m)	Shielded (Yes/ No)	Cores (Number)	Remark
1.	LAN cable	1	7	N	0	Provided by Lab RJ45, Cat5e

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 X-plane. Following channel(s) was (were) selected for the final test as listed below.

LTE Band 4

EUT Configure Mode	Test Item	Available Channel	Tested Channel	Channel Bandwidth	Modulation
-	EIRP	1975 to 2375	1975(2112.5MHz), 2175(2132.5MHz), 2375(2152.5MHz)	5MHz	QPSK / 16QAM / 64QAM
		2000 to 2350	2000(2115.0MHz), 2175(2132.5MHz), 2350(2150.0MHz)	10MHz	QPSK / 16QAM / 64QAM
		2025 to 2325	2025(2117.5MHz), 2175(2132.5MHz), 2325(2147.5MHz)	15MHz	QPSK / 16QAM / 64QAM
		2050 to 2300	2050(2120.0MHz), 2175(2132.5MHz), 2300(2145.0MHz)	20MHz	QPSK / 16QAM / 64QAM
-	Modulation Characteristics	2050 to 2300	2175(2132.5MHz)	20MHz	QPSK / 16QAM / 64QAM
-	Frequency Stability	1975 to 2375	1975(2112.5MHz), 2375(2152.5MHz)	5MHz	QPSK
		2000 to 2350	2000(2115.0MHz), 2350(2150.0MHz)	10MHz	QPSK
		2025 to 2325	2025(2117.5MHz), 2325(2147.5MHz)	15MHz	QPSK
		2050 to 2300	2050(2120.0MHz), 2300(2145.0MHz)	20MHz	QPSK
-	Emission Bandwidth	1975 to 2375	1975(2112.5MHz), 2375(2152.5MHz)	5MHz	QPSK / 16QAM / 64QAM
		2000 to 2350	2000(2115.0MHz), 2350(2150.0MHz)	10MHz	QPSK / 16QAM / 64QAM
		2025 to 2325	2025(2117.5MHz), 2175(2132.5MHz), 2325(2147.5MHz)	15MHz	QPSK / 16QAM / 64QAM
		2050 to 2300	2050(2120.0MHz), 2175(2132.5MHz), 2300(2145.0MHz)	20MHz	QPSK / 16QAM / 64QAM
-	Peak to Average Ratio	1975 to 2375	1975(2112.5MHz), 2175(2132.5MHz), 2375(2152.5MHz)	5MHz	QPSK / 16QAM / 64QAM
		2000 to 2350	2000(2115.0MHz), 2175(2132.5MHz), 2350(2150.0MHz)	10MHz	QPSK / 16QAM / 64QAM
		2025 to 2325	2025(2117.5MHz), 2175(2132.5MHz), 2325(2147.5MHz)	15MHz	QPSK / 16QAM / 64QAM
		2050 to 2300	2050(2120.0MHz), 2175(2132.5MHz), 2300(2145.0MHz)	20MHz	QPSK / 16QAM / 64QAM
-	Conducted Emission	1975 to 2375	1975(2112.5MHz), 2175(2132.5MHz), 2375(2152.5MHz)	5MHz	QPSK
		2000 to 2350	2000(2115.0MHz), 2175(2132.5MHz), 2350(2150.0MHz)	10MHz	QPSK
		2025 to 2325	2025(2117.5MHz), 2175(2132.5MHz), 2325(2147.5MHz)	15MHz	QPSK
		2050 to 2300	2050(2120.0MHz), 2175(2132.5MHz), 2300(2145.0MHz)	20MHz	QPSK

EUT Configure Mode	Test Item	Available Channel	Tested Channel	Channel Bandwidth	Modulation
-	Radiated Emission Below 1GHz	2050 to 2300	2300(2145.0MHz)	20MHz	QPSK
-	Radiated Emission Above 1GHz	1975 to 2375	1975(2112.5MHz), 2175(2132.5MHz), 2375(2152.5MHz)	5MHz	QPSK
		2050 to 2300	2050(2120.0MHz), 2175(2132.5MHz), 2300(2145.0MHz)	20MHz	QPSK

Note: The conducted output power for QPSK, 16QAM and 64QAM measured value of QPSK is higher than 16QAM and 64QAM mode. Therefore, only EIRP, Modulation characteristics, occupied bandwidth and Peak to average ratio items had been tested under QPSK, 16QAM and 64QAM modes, the other test items were performed under QPSK mode only.

LTE Band 13

EUT Configure Mode	Test item	Available channel	Tested channel	Channel Bandwidth	Modulation
-	ERP	5205 to 5255	5205(748.5MHz), 5230(751.0MHz), 5255(753.5MHz)	5MHz	QPSK / 16QAM / 64QAM
		5230	5230(751.0MHz)	10MHz	QPSK / 16QAM / 64QAM
-	Modulation Characteristics	5230	5230(751.0MHz),	10MHz	QPSK / 16QAM / 64QAM
-	Frequency Stability	5205 to 5255	5205(748.5MHz), 5255(753.5MHz)	5MHz	QPSK
		5230	5230(751.0MHz),	10MHz	QPSK
-	Emission Bandwidth	5205 to 5255	5205(748.5MHz), 5230(751.0MHz), 5255(753.5MHz)	5MHz	QPSK / 16QAM / 64QAM
		5230	5230(751.0MHz)	10MHz	QPSK / 16QAM / 64QAM
-	Band Edge	5205 to 5255	5205(748.5MHz), 5255(753.5MHz)	5MHz	QPSK
		5230	5230(751.0MHz)	10MHz	QPSK
-	Peak to Average Ratio	5205 to 5255	5205(748.5MHz), 5230(751.0MHz), 5255(753.5MHz)	5MHz	QPSK / 16QAM / 64QAM
		5230	5230(751.0MHz)	10MHz	QPSK / 16QAM / 64QAM
-	Conducted Emission	5205 to 5255	5205(748.5MHz), 5230(751.0MHz), 5255(753.5MHz)	5MHz	QPSK
		5230	5230(751.0MHz)	10MHz	QPSK
-	Radiated Emission Below 1GHz	5205 to 5255	5205(748.5MHz)	5MHz	QPSK
-	Radiated Emission Above 1GHz	5205 to 5255	5205(748.5MHz), 5230(751.0MHz), 5255(753.5MHz)	5MHz	QPSK
		5230	5230(751.0MHz)	10MHz	QPSK

Note: The conducted output power for QPSK, 16QAM and 64QAM measured value of QPSK is higher than 16QAM and 64QAM mode. Therefore, only ERP, Modulation characteristics, occupied bandwidth and Peak to average ratio items had been tested under QPSK, 16QAM and 64QAM modes, the other test items were performed under QPSK mode only.

LTE Band 66

EUT Configure Mode	Test Item	Available Channel	Tested Channel	Channel Bandwidth	Modulation
-	EIRP	66461 to 67111	66461 (2112.5MHz), 66786 (2145.0MHz), 67111 (2177.5MHz)	5MHz	QPSK / 16QAM / 64QAM
		66486 to 67086	66486 (2115.0MHz), 66786 (2145.0MHz), 67086 (2175.0MHz)	10MHz	QPSK / 16QAM / 64QAM
		66511 to 67061	66511 (2117.5MHz), 66786 (2145.0MHz), 67061 (2172.5MHz)	15MHz	QPSK / 16QAM / 64QAM
		66536 to 67036	66536 (2120.0MHz), 66786 (2145.0MHz), 67036 (2170.0MHz)	20MHz	QPSK / 16QAM / 64QAM
-	Modulation Characteristics	66536 to 67036	66786 (2145.0MHz)	20MHz	QPSK / 16QAM / 64QAM
-	Frequency Stability	66461 to 67111	66461 (2112.5MHz), 67111 (2177.5MHz)	5MHz	QPSK
		66486 to 67086	66486 (2115.0MHz), 67086 (2175.0MHz)	10MHz	QPSK
		66511 to 67061	66511 (2117.5MHz), 67061 (2172.5MHz)	15MHz	QPSK
		66536 to 67036	66536 (2120.0MHz), 67036 (2170.0MHz)	20MHz	QPSK
-	Emission Bandwidth	66461 to 67111	66461 (2112.5MHz), 66786 (2145.0MHz), 67111 (2177.5MHz)	5MHz	QPSK / 16QAM / 64QAM
		66486 to 67086	66486 (2115.0MHz), 66786 (2145.0MHz), 67086 (2175.0MHz)	10MHz	QPSK / 16QAM / 64QAM
		66511 to 67061	66511 (2117.5MHz), 66786 (2145.0MHz), 67061 (2172.5MHz)	15MHz	QPSK / 16QAM / 64QAM
		66536 to 67036	66536 (2120.0MHz), 66786 (2145.0MHz), 67036 (2170.0MHz)	20MHz	QPSK / 16QAM / 64QAM
-	Band Edge	66461 to 67111	66461 (2112.5MHz), 66786 (2145.0MHz), 67111 (2177.5MHz)	5MHz	QPSK
		66486 to 67086	66486 (2115.0MHz), 66786 (2145.0MHz), 67086 (2175.0MHz)	10MHz	QPSK
		66511 to 67061	66511 (2117.5MHz), 66786 (2145.0MHz), 67061 (2172.5MHz)	15MHz	QPSK
		66536 to 67036	66536 (2120.0MHz), 66786 (2145.0MHz), 67036 (2170.0MHz)	20MHz	QPSK

EUT Configure Mode	Test Item	Available Channel	Tested Channel	Channel Bandwidth	Modulation
-	Peak to Average Ratio	66461 to 67111	66461 (2112.5MHz), 66786 (2145.0MHz), 67111 (2177.5MHz)	5MHz	QPSK / 16QAM / 64QAM
		66486 to 67086	66486 (2115.0MHz), 66786 (2145.0MHz), 67086 (2175.0MHz)	10MHz	QPSK / 16QAM / 64QAM
		66511 to 67061	66511 (2117.5MHz), 66786 (2145.0MHz), 67061 (2172.5MHz)	15MHz	QPSK / 16QAM / 64QAM
		66536 to 67036	66536 (2120.0MHz), 66786 (2145.0MHz), 67036 (2170.0MHz)	20MHz	QPSK / 16QAM / 64QAM
-	Conducted Emission	66461 to 67111	66461 (2112.5MHz), 66786 (2145.0MHz), 67111 (2177.5MHz)	5MHz	QPSK
		66486 to 67086	66486 (2115.0MHz), 66786 (2145.0MHz), 67086 (2175.0MHz)	10MHz	QPSK
		66511 to 67061	66511 (2117.5MHz), 66786 (2145.0MHz), 67061 (2172.5MHz)	15MHz	QPSK
		66536 to 67036	66536 (2120.0MHz), 66786 (2145.0MHz), 67036 (2170.0MHz)	20MHz	QPSK
-	Radiated Emission Below 1GHz	66536 to 67036	67036 (2170.0MHz)	20MHz	QPSK
-	Radiated Emission Above 1GHz	66461 to 67111	66461 (2112.5MHz), 66786 (2145.0MHz), 67111 (2177.5MHz)	5MHz	QPSK
		66536 to 67036	66536 (2120.0MHz), 66786 (2145.0MHz), 67036 (2170.0MHz)	20MHz	QPSK

Note: The conducted output power for QPSK, 16QAM and 64QAM measured value of QPSK is higher than 16QAM and 64QAM mode. Therefore, only EIRP, Modulation characteristics, occupied bandwidth and Peak to average ratio items had been tested under QPSK, 16QAM and 64QAM modes, the other test items were performed under QPSK mode only.

Test Condition:

Test Item	Environmental Conditions	Input Power	Tested By
EIRP / ERP	22deg. C, 66%RH	120Vac, 60Hz	Han Wu
Modulation characteristics	24deg. C, 64%RH	120Vac, 60Hz	James Yang
Frequency Stability	24deg. C, 64%RH	120Vac, 60Hz	James Yang
Occupied Bandwidth	24deg. C, 64%RH	120Vac, 60Hz	James Yang
Band Edge	24deg. C, 64%RH	120Vac, 60Hz	James Yang
Peak To Average Ratio	24deg. C, 64%RH	120Vac, 60Hz	James Yang
Conducted Emission	24deg. C, 64%RH	120Vac, 60Hz	James Yang
Radiated Emission	22deg. C, 66%RH 22deg. C, 68%RH	120Vac, 60Hz	Greg Lin Han Wu

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 4/LTE Band 66:

The radiated peak output power shall be according to the specific rule Part 27.50(d)(2) that are limited to EIRP of 1640 watts/MHz when transmitting with an emission bandwidth greater than 1 MHz.

LTE Band 13:

Fixed and base stations transmitting a signal in the 746-757 MHz and 776-787 MHz bands with an emission bandwidth greater than 1 MHz must not exceed an ERP of 1000 watts/MHz and an antenna height of 305 m HAAT, except that antenna heights greater than 305 m HAAT are permitted if power levels are reduced below 1000 watts/MHz ERP in accordance with Table 3 of this section.

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.

EIRP / ERP Measurement:

a. All measurements were done at low, middle and high operational frequency range. RBW and VBW is 20MHz for LTE mode.
b. Substitution method is used for E.I.R.P measurement. In the semi-anechoic chamber, EUT placed on the 0.8m(below or equal 1GHz) and/or 1.5m(above 1GHz) height of Turn Table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1m to 4m to find the maximum polar radiated power. The "Read Value" is the spectrum reading the maximum power value.
c. The substitution horn antenna is substituted for EUT at the same position and signals generator export the CW signal to the substitution antenna via a TX cable. Rotated the Turn Table and moved receiving antenna to find the maximum radiation power. Adjust output power level of S.G to get a Value of spectrum reading equal to "Read Value" of step b. Record the power level of S.G
d. EIRP = Output power level of S.G – TX cable loss + Antenna gain of substitution horn.E.R.P power can be calculated form E.I.R.P power by subtracting the gain of dipole, E.R.P power = E.I.R.P power - 2.15dBi.

Where:

$ERP/EIRP = P_{Meas} + G_T - L_C$

P_{Meas} : Measure transmitter output power.
G_T : Gain of the transmitting antenna.
L_C : signal attenuation in the connecting cable between the transmitter and antenna.

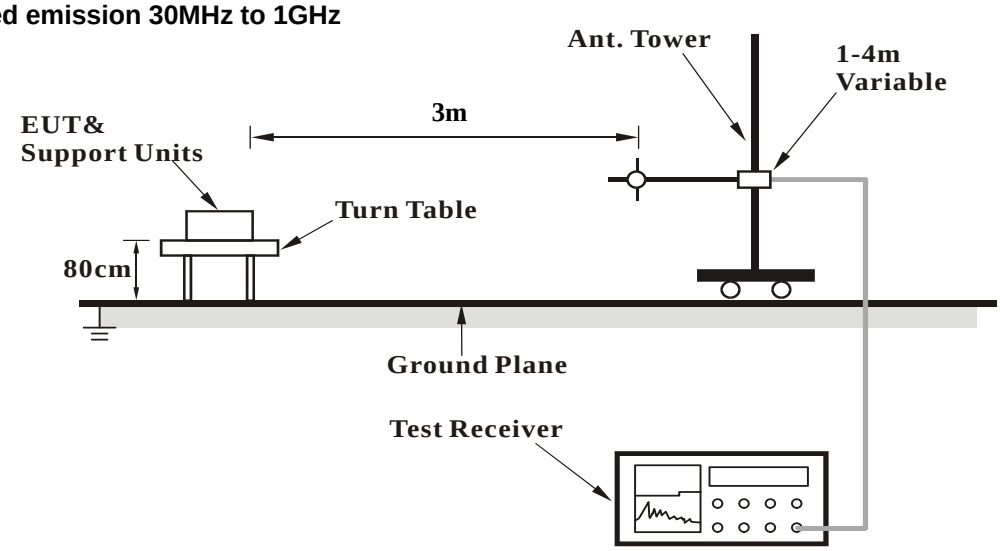
4.1.3 Test Setup

Conducted Power Measurement:

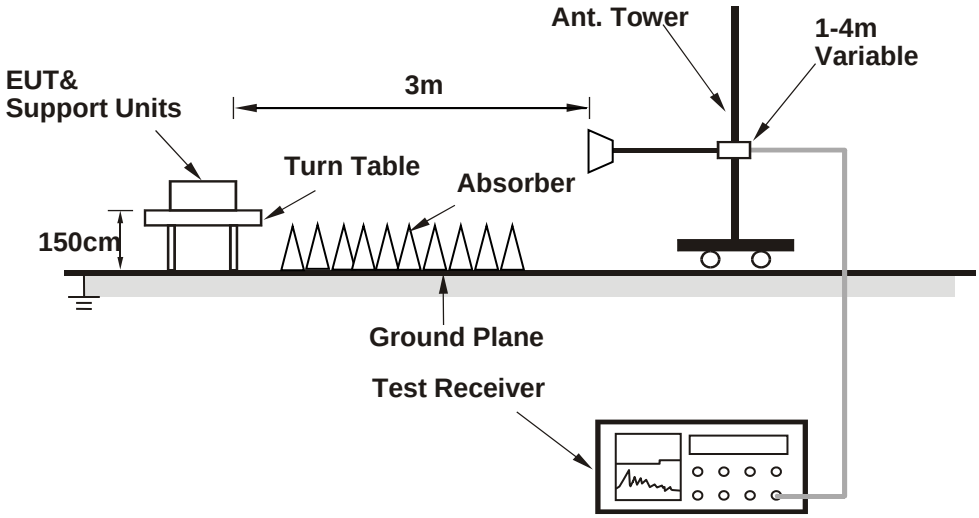
For the actual test configuration, please refer to the attached file (Test Setup Photo).

EIRP / ERP Measurement:

For radiated emission 30MHz to 1GHz



For radiated emission above 1GHz



For the actual test configuration, please refer to the attached file (Test Setup Photo).

4.1.4 Test Results

Conducted Output Power (dBm)

LTE Band 4

Band	BW	Chain	QPSK			16QAM			64QAM		
			Low CH 1975	Mid CH 2175	High CH 2375	Low CH 1975	Mid CH 2175	High CH 2375	Low CH 1975	Mid CH 2175	High CH 2375
			2112.5 MHz	2132.5 MHz	2152.5 MHz	2112.5 MHz	2132.5 MHz	2152.5 MHz	2112.5 MHz	2132.5 MHz	2152.5 MHz
LTE Band 4	5M	0	18.26	18.24	18.27	18.25	18.20	18.22	18.23	18.21	18.22
		1	18.18	18.15	18.16	18.13	18.16	18.12	18.15	18.14	18.14
		Total	21.23	21.21	21.23	21.20	21.19	21.18	21.20	21.19	21.19

Band	BW	Chain	QPSK			16QAM			64QAM		
			Low CH 2000	Mid CH 2175	High CH 2350	Low CH 2000	Mid CH 2175	High CH 2350	Low CH 2000	Mid CH 2175	High CH 2350
			2115 MHz	2132.5 MHz	2150 MHz	2115 MHz	2132.5 MHz	2150 MHz	2115 MHz	2132.5 MHz	2150 MHz
LTE Band 4	10M	0	18.28	18.26	18.26	18.27	18.24	18.23	18.22	18.24	18.20
		1	18.12	18.17	18.14	18.05	18.12	18.16	18.13	18.15	18.13
		Total	21.21	21.23	21.21	21.17	21.19	21.21	21.19	21.21	21.18

Band	BW	Chain	QPSK			16QAM			64QAM		
			Low CH 2025	Mid CH 2175	High CH 2325	Low CH 2025	Mid CH 2175	High CH 2325	Low CH 2025	Mid CH 2175	High CH 2325
			2117.5 MHz	2132.5 MHz	2147.5 MHz	2117.5 MHz	2132.5 MHz	2147.5 MHz	2117.5 MHz	2132.5 MHz	2147.5 MHz
LTE Band 4	15M	0	18.25	18.27	18.24	18.21	18.22	18.23	18.24	18.26	18.24
		1	18.18	18.10	18.10	18.12	18.17	18.19	18.12	18.09	18.12
		Total	21.23	21.20	21.18	21.18	21.21	21.22	21.19	21.19	21.19

Band	BW	Chain	QPSK			16QAM			64QAM		
			Low CH 2050	Mid CH 2175	High CH 2300	Low CH 2050	Mid CH 2175	High CH 2300	Low CH 2050	Mid CH 2175	High CH 2300
			2120 MHz	2132.5 MHz	2145 MHz	2120 MHz	2132.5 MHz	2145 MHz	2120 MHz	2132.5 MHz	2145 MHz
LTE Band 4	20M	0	18.31	18.28	18.23	18.22	18.25	18.19	18.24	18.22	18.20
		1	18.11	18.04	18.06	18.04	18.05	18.02	18.08	18.06	18.04
		Total	21.22	21.17	21.16	21.14	21.16	21.12	21.17	21.15	21.13

LTE Band 13

Band	BW	Chain	QPSK			16QAM			64QAM		
			Low CH 5205	Mid CH 5230	High CH 5255	Low CH 5205	Mid CH 5230	High CH 5255	Low CH 5205	Mid CH 5230	High CH 5255
			748.5 MHz	751 MHz	753.5 MHz	748.5 MHz	751 MHz	753.5 MHz	748.5 MHz	751 MHz	753.5 MHz
LTE Band 13	5M	0	18.52	18.56	18.55	18.50	18.52	18.51	18.51	18.53	18.54
		1	18.82	18.79	18.79	18.76	18.77	18.75	18.77	18.76	18.77
		Total	21.68	21.69	21.68	21.64	21.66	21.64	21.65	21.66	21.67

Band	BW	Chain	QPSK	16QAM	64QAM
			Mid CH 5230	Mid CH 5230	Mid CH 5230
			751 MHz	751 MHz	751 MHz
LTE Band 13	10M	0	18.56	18.52	18.55
		1	18.88	18.80	18.81
		Total	21.73	21.67	21.69

LTE Band 66

Band	BW	Chain	QPSK			16QAM			64QAM		
			Low CH 66461 2112.5 MHz	Mid CH 66786 2145 MHz	High CH 67111 2177.5 MHz	Low CH 66461 2112.5 MHz	Mid CH 66786 2145 MHz	High CH 67111 2177.5 MHz	Low CH 66461 2112.5 MHz	Mid CH 66786 2145 MHz	High CH 67111 2177.5 MHz
LTE Band 66	5M	0	18.25	18.27	18.24	18.25	18.23	18.22	18.24	18.22	18.23
		1	17.82	17.88	17.86	17.79	17.83	17.81	17.80	17.82	17.84
		Total	21.05	21.09	21.06	21.04	21.04	21.03	21.04	21.03	21.05

Band	BW	Chain	QPSK			16QAM			64QAM		
			Low CH 66486 2115 MHz	Mid CH 66786 2145 MHz	High CH 67086 2175 MHz	Low CH 66486 2115 MHz	Mid CH 66786 2145 MHz	High CH 67086 2175 MHz	Low CH 66486 2115 MHz	Mid CH 66786 2145 MHz	High CH 67086 2175 MHz
LTE Band 66	10M	0	18.24	18.27	18.23	18.22	18.23	18.21	18.23	18.25	18.22
		1	17.85	17.83	17.88	17.88	17.85	17.86	17.82	17.84	17.84
		Total	21.06	21.07	21.07	21.06	21.05	21.05	21.04	21.06	21.04

Band	BW	Chain	QPSK			16QAM			64QAM		
			Low CH 66511 2117.5 MHz	Mid CH 66786 2145 MHz	High CH 67061 2172.5 MHz	Low CH 66511 2117.5 MHz	Mid CH 66786 2145 MHz	High CH 67061 2172.5 MHz	Low CH 66511 2117.5 MHz	Mid CH 66786 2145 MHz	High CH 67061 2172.5 MHz
LTE Band 66	15M	0	18.22	18.24	18.26	18.24	18.21	18.22	18.23	18.25	18.23
		1	17.86	17.91	17.81	17.77	17.85	17.76	17.80	17.84	17.86
		Total	21.05	21.09	21.05	21.02	21.04	21.01	21.03	21.06	21.06

Band	BW	Chain	QPSK			16QAM			64QAM		
			Low CH 66536 2120 MHz	Mid CH 66786 2145 MHz	High CH 67036 2170 MHz	Low CH 66536 2120 MHz	Mid CH 66786 2145 MHz	High CH 67036 2170 MHz	Low CH 66536 2120 MHz	Mid CH 66786 2145 MHz	High CH 67036 2170 MHz
LTE Band 66	20M	0	18.18	18.21	18.24	18.11	18.17	18.16	18.14	18.12	18.11
		1	17.90	17.84	17.88	17.86	17.82	17.84	17.86	17.82	17.84
		Total	21.05	21.04	21.07	21.00	21.01	21.01	21.01	20.98	20.99

EIRP/ERP

Modulation Type: QPSK

LTE Band 4, Channel Bandwidth: 5MHz

Mode		TX channel 1975, 2175, 2375					
Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	2112.5	-18.3	23.4	-0.3	23.1	62.1	-39.0
2	2132.5	-18.5	23.4	-0.4	23.0	62.1	-39.1
3	2152.5	-18.4	23.6	-0.3	**23.3**	62.1	-38.8
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	2112.5	-22.3	20.2	-0.3	19.9	62.1	-42.2
2	2132.5	-21.6	21.0	-0.4	20.6	62.1	-41.5
3	2152.5	-22.0	20.4	-0.3	20.1	62.1	-42.0

Note: EIRP (dBm) = S.G Power Value (dBm) + Correction Factor (dB).

LTE Band 4, Channel Bandwidth: 10MHz

Mode		TX channel 2000, 2175, 2350					
Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	2115.0	-18.4	23.3	-0.3	23.0	62.1	-39.1
2	2132.5	-18.7	23.2	-0.4	22.8	62.1	-39.3
3	2150.0	-18.1	23.8	-0.3	**23.5**	62.1	-38.6
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	2115.0	-21.7	20.8	-0.3	20.5	62.1	-41.6
2	2132.5	-22.4	20.2	-0.4	19.8	62.1	-42.3
3	2150.0	-22.2	20.2	-0.3	19.9	62.1	-42.2

Note: EIRP (dBm) = S.G Power Value (dBm) + Correction Factor (dB).

LTE Band 4, Channel Bandwidth: 15MHz

Mode		TX channel 2025, 2175, 2325					
Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	2117.5	-18.2	23.5	-0.3	23.2	62.1	-38.9
2	2132.5	-18.6	23.3	-0.4	22.9	62.1	-39.2
3	2147.5	-18.1	23.8	-0.3	**23.5**	62.1	-38.6
Antenna Polarity & Test Distance: Vertical at 3 m							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	2117.5	-21.8	20.7	-0.3	20.4	62.1	-41.7
2	2132.5	-22.1	20.5	-0.4	20.1	62.1	-42.0
3	2147.5	-21.7	20.7	-0.3	20.4	62.1	-41.7

Note: EIRP (dBm) = S.G Power Value (dBm) + Correction Factor (dB).

LTE Band 4, Channel Bandwidth: 20MHz

Mode	TX channel 2050, 2175, 2300						
Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	2120.0	-18.6	23.2	-0.3	22.9	62.1	-39.2
2	2132.5	-18.5	23.4	-0.4	23.0	62.1	-39.1
3	2145.0	-18.0	23.9	-0.3	**23.6**	62.1	-38.5
Antenna Polarity & Test Distance: Vertical at 3 m							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	2120.0	-22.3	20.2	-0.3	19.9	62.1	-42.2
2	2132.5	-22.2	20.4	-0.4	20.0	62.1	-42.1
3	2145.0	-22.6	19.9	-0.3	19.6	62.1	-42.5

Note: EIRP (dBm) = S.G Power Value (dBm) + Correction Factor (dB).

LTE Band 13, Channel Bandwidth: 5MHz

MODE	TX channel 5205, 5230, 5255						
Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	748.5	-6.2	19.1	3.7	**22.8**	60.0	-37.2
2	751.0	-6.2	19.0	3.7	22.7	60.0	-37.3
3	753.5	-6.6	18.5	3.9	22.4	60.0	-37.6
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	748.5	-11.4	16.8	3.7	20.5	60.0	-39.5
2	751.0	-11.2	17.0	3.7	20.7	60.0	-39.3
3	753.5	-11.7	16.4	3.9	20.3	60.0	-39.7

Note: ERP (dBm) = S.G Power Value (dBm) + Correction Factor (dB).

LTE Band 13, Channel Bandwidth: 10MHz

MODE	TX channel 5230						
Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	751.0	-6.2	18.9	3.7	**22.6**	60.0	-37.4
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	751.0	-11.4	16.8	3.7	20.5	60.0	-39.5

Note: ERP (dBm) = S.G Power Value (dBm) + Correction Factor (dB).

LTE Band 66, Channel Bandwidth: 5MHz

MODE		TX channel 66461, 66786, 67111					
Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	2112.5	-18.9	22.8	-0.3	22.5	62.1	-39.6
2	2145.0	-19.1	22.8	-0.3	22.5	62.1	-39.6
3	2177.5	-18.5	23.5	-0.2	**23.3**	62.1	-38.8
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	2112.5	-22.4	20.1	-0.3	19.8	62.1	-42.3
2	2145.0	-22.7	19.8	-0.3	19.5	62.1	-42.6
3	2177.5	-22.2	20.1	-0.2	19.9	62.1	-42.2

Note: EIRP (dBm) = S.G Power Value (dBm) + Correction Factor (dB).

LTE Band 66, Channel Bandwidth: 10MHz

MODE		TX channel 66486, 66786, 67086					
Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	2115.0	-18.7	23.0	-0.3	22.7	62.1	-39.4
2	2145.0	-19.2	22.8	-0.3	22.5	62.1	-39.6
3	2175.0	-18.5	23.6	-0.2	**23.4**	62.1	-38.7
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	2115.0	-22.3	20.2	-0.3	19.9	62.1	-42.2
2	2145.0	-22.6	19.8	-0.3	19.5	62.1	-42.6
3	2175.0	-22.0	20.3	-0.2	20.1	62.1	-42.0

Note: EIRP (dBm) = S.G Power Value (dBm) + Correction Factor (dB).

LTE Band 66, Channel Bandwidth: 15MHz

MODE		TX channel 66511, 66786, 67061					
Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	2117.5	-18.6	23.1	-0.3	22.8	62.1	-39.3
2	2145.0	-19.0	23.0	-0.3	22.7	62.1	-39.4
3	2172.5	-18.4	23.7	-0.2	**23.5**	62.1	-38.6
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	2117.5	-22.3	20.2	-0.3	19.9	62.1	-42.2
2	2145.0	-22.8	19.6	-0.3	19.3	62.1	-42.8
3	2172.5	-22.2	20.1	-0.2	19.9	62.1	-42.2

Note: EIRP (dBm) = S.G Power Value (dBm) + Correction Factor (dB).

LTE Band 66, Channel Bandwidth: 20MHz

MODE	TX channel 66536, 66786, 67036						
Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	2120.0	-18.9	22.9	-0.3	22.6	62.1	-39.5
2	2145.0	-19.0	23.0	-0.3	22.7	62.1	-39.4
3	2170.0	-18.3	23.8	-0.2	**23.6**	62.1	-38.5
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	2120.0	-22.3	20.2	-0.3	19.9	62.1	-42.2
2	2145.0	-22.6	19.8	-0.3	19.5	62.1	-42.6
3	2170.0	-22.2	20.1	-0.2	19.9	62.1	-42.2

Note: EIRP (dBm) = S.G Power Value (dBm) + Correction Factor (dB).

Modulation Type: 16QAM

LTE Band 4, Channel Bandwidth: 5MHz

Mode		TX channel 1975, 2175, 2375					
Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	2112.5	-19.1	22.6	-0.3	22.3	62.1	-39.8
2	2132.5	-19.2	22.7	-0.4	22.3	62.1	-39.8
3	2152.5	-19.3	22.7	-0.3	**22.4**	62.1	-39.7
Antenna Polarity & Test Distance: Vertical at 3 m							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	2112.5	-23.0	19.5	-0.3	19.2	62.1	-42.9
2	2132.5	-22.4	20.2	-0.4	19.8	62.1	-42.3
3	2152.5	-22.6	19.8	-0.3	19.5	62.1	-42.6

Note: EIRP (dBm) = S.G Power Value (dBm) + Correction Factor (dB).

LTE Band 4, Channel Bandwidth: 10MHz

Mode		TX channel 2000, 2175, 2350					
Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	2115.0	-19.2	22.5	-0.3	22.2	62.1	-39.9
2	2132.5	-19.4	22.5	-0.4	22.1	62.1	-40.0
3	2150.0	-18.9	23.0	-0.3	**22.7**	62.1	-39.4
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	2115.0	-22.5	20.0	-0.3	19.7	62.1	-42.4
2	2132.5	-23.3	19.3	-0.4	18.9	62.1	-43.2
3	2150.0	-23.0	19.4	-0.3	19.1	62.1	-43.0

Note: EIRP (dBm) = S.G Power Value (dBm) + Correction Factor (dB).

LTE Band 4, Channel Bandwidth: 15MHz

Mode		TX channel 2025, 2175, 2325					
Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	2117.5	-18.9	22.8	-0.3	22.5	62.1	-39.6
2	2132.5	-19.4	22.5	-0.4	22.1	62.1	-40.0
3	2147.5	-18.9	23.0	-0.3	**22.7**	62.1	-39.4
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	2117.5	-22.6	19.9	-0.3	19.6	62.1	-42.5
2	2132.5	-22.8	19.8	-0.4	19.4	62.1	-42.7
3	2147.5	-22.6	19.8	-0.3	19.5	62.1	-42.6

Note: EIRP (dBm) = S.G Power Value (dBm) + Correction Factor (dB).

LTE Band 4, Channel Bandwidth: 20MHz

Mode		TX channel 2050, 2175, 2300					
Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	2120.0	-19.4	22.4	-0.3	22.1	62.1	-40.0
2	2132.5	-19.3	22.6	-0.4	**22.2**	62.1	-39.9
3	2145.0	-19.5	22.4	-0.3	22.1	62.1	-40.0
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	2120.0	-23.2	19.3	-0.3	19.0	62.1	-43.1
2	2132.5	-23.1	19.5	-0.4	19.1	62.1	-43.0
3	2145.0	-23.2	19.3	-0.3	19.0	62.1	-43.1

Note: EIRP (dBm) = S.G Power Value (dBm) + Correction Factor (dB).

LTE Band 13, Channel Bandwidth: 5MHz

MODE		TX channel 5205, 5230, 5255					
Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	748.5	-7.1	18.2	3.7	**21.9**	60.0	-38.1
2	751.0	-7.0	18.2	3.7	**21.9**	60.0	-38.1
3	753.5	-7.5	17.6	3.9	21.5	60.0	-38.5
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	748.5	-12.2	15.9	3.7	19.6	60.0	-40.4
2	751.0	-12.1	16.1	3.7	19.8	60.0	-40.2
3	753.5	-12.5	15.6	3.9	19.5	60.0	-40.5

Note: ERP (dBm) = S.G Power Value (dBm) + Correction Factor (dB).

LTE Band 13, Channel Bandwidth: 10MHz

MODE		TX channel 5230					
Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	751.0	-7.0	18.2	3.7	**21.9**	60.0	-38.1
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	751.0	-12.2	15.9	3.7	19.6	60.0	-40.4

Note: ERP (dBm) = S.G Power Value (dBm) + Correction Factor (dB).

LTE Band 66, Channel Bandwidth: 5MHz

MODE	TX channel 66461, 66786, 67111						
Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	2112.5	-19.7	22.0	-0.3	21.7	62.1	-40.4
2	2145.0	-20.0	21.9	-0.3	21.6	62.1	-40.5
3	2177.5	-19.3	22.7	-0.2	**22.5**	62.1	-39.6
Antenna Polarity & Test Distance: Vertical at 3 m							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	2112.5	-23.3	19.2	-0.3	18.9	62.1	-43.2
2	2145.0	-23.6	18.9	-0.3	18.6	62.1	-43.5
3	2177.5	-23.0	19.3	-0.2	19.1	62.1	-43.0

Note: EIRP (dBm) = S.G Power Value (dBm) + Correction Factor (dB).

LTE Band 66, Channel Bandwidth: 10MHz

MODE	TX channel 66486, 66786, 67086						
Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	2115.0	-19.5	22.2	-0.3	21.9	62.1	-40.2
2	2145.0	-20.0	22.0	-0.3	21.7	62.1	-40.4
3	2175.0	-19.4	22.7	-0.2	**22.5**	62.1	-39.6
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	2115.0	-23.1	19.4	-0.3	19.1	62.1	-43.0
2	2145.0	-23.4	19.0	-0.3	18.7	62.1	-43.4
3	2175.0	-22.9	19.4	-0.2	19.2	62.1	-42.9

Note: EIRP (dBm) = S.G Power Value (dBm) + Correction Factor (dB).

LTE Band 66, Channel Bandwidth: 15MHz

MODE	TX channel 66511, 66786, 67061						
Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	2117.5	-19.4	22.3	-0.3	22.0	62.1	-40.1
2	2145.0	-19.9	22.1	-0.3	21.8	62.1	-40.3
3	2172.5	-19.3	22.8	-0.2	**22.6**	62.1	-39.5
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	2117.5	-23.2	19.3	-0.3	19.0	62.1	-43.1
2	2145.0	-23.6	18.8	-0.3	18.5	62.1	-43.6
3	2172.5	-23.1	19.2	-0.2	19.0	62.1	-43.1

Note: EIRP (dBm) = S.G Power Value (dBm) + Correction Factor (dB).

LTE Band 66, Channel Bandwidth: 20MHz

MODE	TX channel 66536, 66786, 67036						
Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	2120.0	-19.7	22.1	-0.3	21.8	62.1	-40.3
2	2145.0	-19.8	22.2	-0.3	21.9	62.1	-40.2
3	2170.0	-19.5	22.6	-0.2	**22.4**	62.1	-39.7
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	2120.0	-23.2	19.3	-0.3	19.0	62.1	-43.1
2	2145.0	-23.4	19.0	-0.3	18.7	62.1	-43.4
3	2170.0	-23.0	19.3	-0.2	19.1	62.1	-43.0

Note: EIRP (dBm) = S.G Power Value (dBm) + Correction Factor (dB).

Modulation Type: 64QAM

LTE Band 4, Channel Bandwidth: 5MHz

Mode		TX channel 1975, 2175, 2375					
Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	2112.5	-19.5	22.2	-0.3	**21.9**	62.1	-40.2
2	2132.5	-19.7	22.2	-0.4	21.8	62.1	-40.3
3	2152.5	-19.8	22.2	-0.3	**21.9**	62.1	-40.2
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	2112.5	-23.5	19.0	-0.3	18.7	62.1	-43.4
2	2132.5	-23.0	19.6	-0.4	19.2	62.1	-42.9
3	2152.5	-23.2	19.2	-0.3	18.9	62.1	-43.2

Note: EIRP (dBm) = S.G Power Value (dBm) + Correction Factor (dB).

LTE Band 4, Channel Bandwidth: 10MHz

Mode		TX channel 2000, 2175, 2350					
Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	2115.0	-19.6	22.1	-0.3	21.8	62.1	-40.3
2	2132.5	-19.8	22.1	-0.4	21.7	62.1	-40.4
3	2150.0	-19.2	22.7	-0.3	**22.4**	62.1	-39.7
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	2115.0	-22.9	19.6	-0.3	19.3	62.1	-42.8
2	2132.5	-23.6	19.0	-0.4	18.6	62.1	-43.5
3	2150.0	-23.4	19.0	-0.3	18.7	62.1	-43.4

Note: EIRP (dBm) = S.G Power Value (dBm) + Correction Factor (dB).

LTE Band 4, Channel Bandwidth: 15MHz

Mode		TX channel 2025, 2175, 2325					
Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	2117.5	-19.8	21.9	-0.3	21.6	62.1	-40.5
2	2132.5	-20.2	21.7	-0.4	21.3	62.1	-40.8
3	2147.5	-19.6	22.3	-0.3	**22.0**	62.1	-40.1
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	2117.5	-23.9	18.6	-0.3	18.3	62.1	-43.8
2	2132.5	-23.3	19.3	-0.4	18.9	62.1	-43.2
3	2147.5	-23.1	19.3	-0.3	19.0	62.1	-43.1

Note: EIRP (dBm) = S.G Power Value (dBm) + Correction Factor (dB).

LTE Band 4, Channel Bandwidth: 20MHz

Mode		TX channel 2050, 2175, 2300					
Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	2120.0	-19.7	22.1	-0.3	**21.8**	62.1	-40.3
2	2132.5	-19.8	22.1	-0.4	21.7	62.1	-40.4
3	2145.0	-19.9	22.0	-0.3	21.7	62.1	-40.4
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	2120.0	-23.5	19.0	-0.3	18.7	62.1	-43.4
2	2132.5	-23.5	19.1	-0.4	18.7	62.1	-43.4
3	2145.0	-23.7	18.8	-0.3	18.5	62.1	-43.6

Note: EIRP (dBm) = S.G Power Value (dBm) + Correction Factor (dB).

LTE Band 13, Channel Bandwidth: 5MHz

MODE		TX channel 5205, 5230, 5255					
Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	748.5	-7.5	17.8	3.7	**21.5**	60.0	-38.5
2	751.0	-7.4	17.8	3.7	**21.5**	60.0	-38.5
3	753.5	-7.8	17.3	3.9	21.2	60.0	-38.8
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	748.5	-12.5	15.7	3.7	19.4	60.0	-40.6
2	751.0	-12.5	15.7	3.7	19.4	60.0	-40.6
3	753.5	-12.8	15.3	3.9	19.2	60.0	-40.8

Note: ERP (dBm) = S.G Power Value (dBm) + Correction Factor (dB).

LTE Band 13, Channel Bandwidth: 10MHz

MODE		TX channel 5230					
Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)
1	751.0	-7.4	17.8	3.7	**21.5**	60.0	-38.5
Antenna Polarity & Test Distance: Vertical at 3 M							
1	751.0	-12.7	15.5	3.7	19.2	60.0	-40.8

Note: ERP (dBm) = S.G Power Value (dBm) + Correction Factor (dB).

LTE Band 66, Channel Bandwidth: 5MHz

MODE		TX channel 66461, 66786, 67111					
Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	2112.5	-20.1	21.6	-0.3	21.3	62.1	-40.8
2	2145.0	-20.5	21.4	-0.3	21.1	62.1	-41.0
3	2177.5	-19.8	22.2	-0.2	**22.0**	62.1	-40.1
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	2112.5	-23.6	18.9	-0.3	18.6	62.1	-43.5
2	2145.0	-24.0	18.5	-0.3	18.2	62.1	-43.9
3	2177.5	-23.4	18.9	-0.2	18.7	62.1	-43.4

Note: EIRP (dBm) = S.G Power Value (dBm) + Correction Factor (dB).

LTE Band 66, Channel Bandwidth: 10MHz

MODE		TX channel 66486, 66786, 67086					
Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	2115.0	-19.9	21.8	-0.3	21.5	62.1	-40.6
2	2145.0	-20.3	21.7	-0.3	21.4	62.1	-40.7
3	2175.0	-19.8	22.3	-0.2	**22.1**	62.1	-40.0
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	2115.0	-23.5	19.0	-0.3	18.7	62.1	-43.4
2	2145.0	-23.7	18.7	-0.3	18.4	62.1	-43.7
3	2175.0	-23.4	18.9	-0.2	18.7	62.1	-43.4

Note: EIRP (dBm) = S.G Power Value (dBm) + Correction Factor (dB).

LTE Band 66, Channel Bandwidth: 15MHz

MODE		TX channel 66511, 66786, 67061					
Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	2117.5	-19.8	21.9	-0.3	21.6	62.1	-40.5
2	2145.0	-20.3	21.7	-0.3	21.4	62.1	-40.7
3	2172.5	-19.6	22.5	-0.2	**22.3**	62.1	-39.8
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	2117.5	-23.6	18.9	-0.3	18.6	62.1	-43.5
2	2145.0	-24.0	18.4	-0.3	18.1	62.1	-44.0
3	2172.5	-23.4	18.9	-0.2	18.7	62.1	-43.4

Note: EIRP (dBm) = S.G Power Value (dBm) + Correction Factor (dB).

LTE Band 66, Channel Bandwidth: 20MHz

MODE	TX channel 66536, 66786, 67036						
Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	2120.0	-20.0	21.8	-0.3	21.5	62.1	-40.6
2	2145.0	-20.2	21.8	-0.3	21.5	62.1	-40.6
3	2170.0	-19.9	22.2	-0.2	**22.0**	62.1	-40.1
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	2120.0	-23.6	18.9	-0.3	18.6	62.1	-43.5
2	2145.0	-23.8	18.6	-0.3	18.3	62.1	-43.8
3	2170.0	-23.3	19.0	-0.2	18.8	62.1	-43.3

Note: EIRP (dBm) = S.G Power Value (dBm) + Correction Factor (dB).

4.2 Modulation Characteristics Measurement

4.2.1 Limits of Modulation Characteristics

N/A

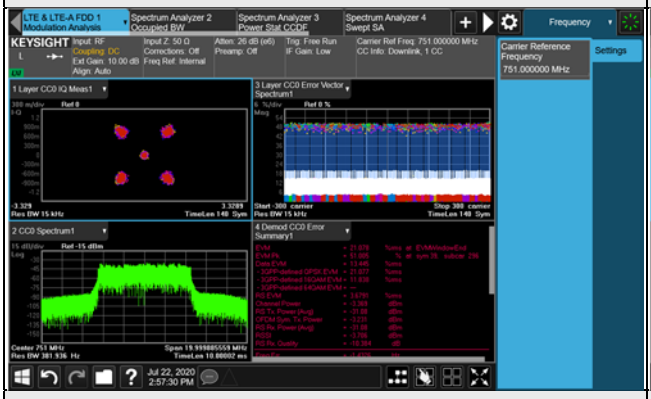
4.2.2 Test Procedure

Connect the EUT to Communication Simulator via the antenna connector, The frequency band is set as EUT supported Modulation and Channels, the EUT output is matched with 50 ohm load, the waveform quality and constellation of the EUT was tested.

4.2.3 Test Setup

4.2.4 Test Results

LTE Band 4	
Spectrum Plot of Measurement Value	
Channel: 2175 / Frequency (MHz): 2132.5MHz	
QPSK	16QAM
64QAM	

LTE Band 13	
Spectrum Plot of Measurement Value	
Channel: 5230 / Frequency (MHz): 751.0MHz	
QPSK	16QAM
	
64QAM	

LTE Band 66	
Spectrum Plot of Measurement Value	
Channel: 66786 / Frequency (MHz): 2145.0 MHz	
QPSK	16QAM
64QAM	

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

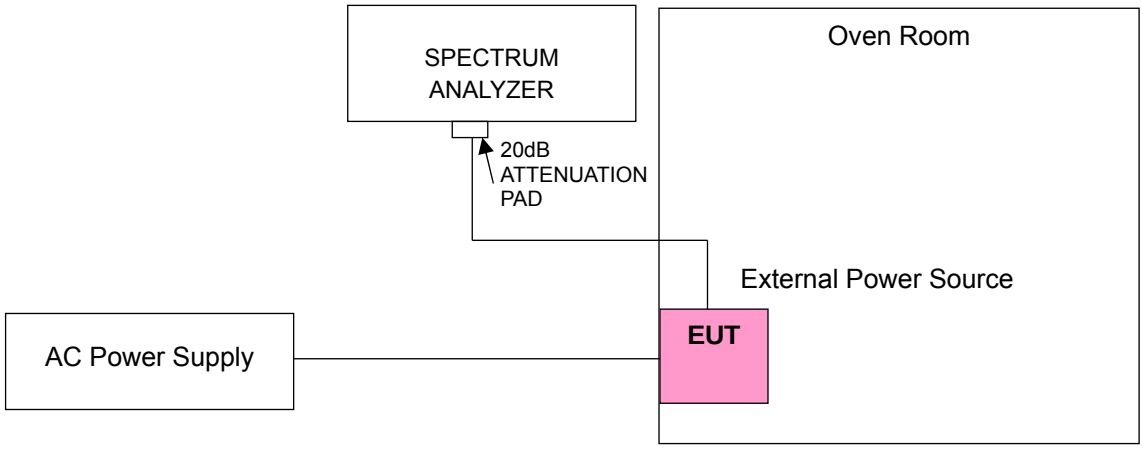
a. Device is placed at the oven room. The oven room could control the temperatures and humidity. Power warm up is at least 15 min and power applied should perform before recording frequency error.

b. EUT is connected the external power supply to control the AC 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 Setup



4.3.4 Test Results

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 4			
	Channel Bandwidth: 5 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
120	2112.500003	0.001	2152.500004	0.002
102	2112.500002	0.001	2152.500004	0.002
138	2112.500003	0.002	2152.500002	0.001

Note: The applicant defined the normal working voltage is from 102Vac to 138Vac.

Frequency Error vs. Temperature

Temp. (℃)	LTE Band 4			
	Channel Bandwidth: 5 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	2112.500001	0.001	2152.500004	0.002
-20	2112.500001	0.001	2152.500002	0.001
-10	2112.500003	0.002	2152.500002	0.001
0	2112.500004	0.002	2152.500002	0.001
10	2112.500002	0.001	2152.500001	0.001
20	2112.499999	-0.001	2152.499999	0.000
30	2112.499998	-0.001	2152.499997	-0.002
40	2112.499996	-0.002	2152.499999	-0.001
50	2112.499998	-0.001	2152.499999	-0.001

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 4			
	Channel Bandwidth: 10 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
120	2115.000004	0.002	2150.000003	0.001
102	2115.000002	0.001	2150.000004	0.002
138	2115.000004	0.002	2150.000003	0.001

Note: The applicant defined the normal working voltage is from 102Vac to 138Vac.

Frequency Error vs. Temperature

Temp. (℃)	LTE Band 4			
	Channel Bandwidth: 10 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	2115.000002	0.001	2150.000002	0.001
-20	2115.000001	0.001	2150.000003	0.002
-10	2115.000001	0.001	2150.000004	0.002
0	2115.000002	0.001	2150.000002	0.001
10	2115.000003	0.001	2150.000002	0.001
20	2114.999998	-0.001	2149.999998	-0.001
30	2114.999998	-0.001	2149.999997	-0.001
40	2114.999997	-0.001	2149.999998	-0.001
50	2114.999996	-0.002	2149.999998	-0.001

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 4			
	Channel Bandwidth: 15 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
120	2117.500004	0.002	2147.500001	0.001
102	2117.500001	0.000	2147.500004	0.002
138	2117.500001	0.001	2147.500001	0.001

Note: The applicant defined the normal working voltage is from 102Vac to 138Vac.

Frequency Error vs. Temperature

Temp. (℃)	LTE Band 4			
	Channel Bandwidth: 15 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	2117.500002	0.001	2147.500003	0.002
-20	2117.500004	0.002	2147.500002	0.001
-10	2117.500003	0.001	2147.500003	0.002
0	2117.500003	0.001	2147.500004	0.002
10	2117.500003	0.001	2147.500004	0.002
20	2117.499998	-0.001	2147.499997	-0.001
30	2117.499997	-0.001	2147.499998	-0.001
40	2117.499998	-0.001	2147.499997	-0.001
50	2117.499998	-0.001	2147.499997	-0.001

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 4			
	Channel Bandwidth: 20 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
120	2120.000004	0.002	2145.000001	0.001
102	2120.000003	0.001	2145.000004	0.002
138	2120.000003	0.001	2145.000003	0.001

Note: The applicant defined the normal working voltage is from 102Vac to 138Vac.

Frequency Error vs. Temperature

Temp. (℃)	LTE Band 4			
	Channel Bandwidth: 20 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	2120.000003	0.002	2145.000002	0.001
-20	2120.000003	0.001	2145.000003	0.002
-10	2120.000004	0.002	2145.000003	0.001
0	2120.000003	0.001	2145.000004	0.002
10	2120.000002	0.001	2145.000001	0.001
20	2119.999999	-0.001	2144.999996	-0.002
30	2119.999999	-0.001	2144.999998	-0.001
40	2119.999998	-0.001	2144.999996	-0.002
50	2119.999999	-0.001	2144.999998	-0.001

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 13			
	Channel Bandwidth: 5 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
120	748.500003	0.003	753.500002	0.002
102	748.500002	0.002	753.500002	0.002
138	748.500002	0.002	753.500003	0.004

Note: The applicant defined the normal working voltage is from 102Vac to 138Vac.

Frequency Error vs. Temperature

Temp. (℃)	LTE Band 13			
	Channel Bandwidth: 5 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	748.500001	0.001	753.500002	0.003
-20	748.500001	0.002	753.500002	0.003
-10	748.500002	0.003	753.500001	0.002
0	748.500004	0.005	753.500002	0.003
10	748.500003	0.003	753.500003	0.004
20	748.499997	-0.005	753.499997	-0.005
30	748.499998	-0.003	753.499999	-0.002
40	748.499996	-0.005	753.499999	-0.001
50	748.499999	-0.002	753.499998	-0.003

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 13	
	Channel Bandwidth: 10 MHz	
	Frequency (MHz)	Frequency Error (ppm)
120	751.000004	0.005
102	751.000004	0.005
138	751.000003	0.004

Note: The applicant defined the normal working voltage is from 102Vac to 138Vac.

Frequency Error vs. Temperature

Temp. (℃)	LTE Band 13	
	Channel Bandwidth: 10 MHz	
	Frequency (MHz)	Frequency Error (ppm)
-30	751.000003	0.004
-20	751.000002	0.003
-10	751.000004	0.005
0	751.000003	0.003
10	751.000001	0.002
20	750.999998	-0.003
30	750.999996	-0.005
40	750.999998	-0.003
50	750.999999	-0.002

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 66			
	Channel Bandwidth: 5 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
120	2112.500003	0.002	2177.500004	0.002
102	2112.500003	0.001	2177.500004	0.002
138	2112.500002	0.001	2177.500002	0.001

Note: The applicant defined the normal working voltage is from 102Vac to 138Vac.

Frequency Error vs. Temperature

Temp. (℃)	LTE Band 66			
	Channel Bandwidth: 5 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	2112.500002	0.001	2177.500002	0.001
-20	2112.500004	0.002	2177.500003	0.001
-10	2112.500004	0.002	2177.500001	0.001
0	2112.500002	0.001	2177.500001	0.001
10	2112.500002	0.001	2177.500002	0.001
20	2112.499998	-0.001	2177.499996	-0.002
30	2112.499997	-0.002	2177.499997	-0.001
40	2112.499997	-0.001	2177.499999	-0.001
50	2112.499997	-0.002	2177.499998	-0.001

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 66			
	Channel Bandwidth: 10 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
120	2115.000002	0.001	2175.000002	0.001
102	2115.000001	0.001	2175.000002	0.001
138	2115.000002	0.001	2175.000001	0.000

Note: The applicant defined the normal working voltage is from 102Vac to 138Vac.

Frequency Error vs. Temperature

Temp. (℃)	LTE Band 66			
	Channel Bandwidth: 10 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	2115.000002	0.001	2175.000004	0.002
-20	2115.000001	0.001	2175.000003	0.001
-10	2115.000003	0.001	2175.000002	0.001
0	2115.000002	0.001	2175.000002	0.001
10	2115.000001	0.001	2175.000002	0.001
20	2114.999997	-0.001	2174.999998	-0.001
30	2114.999996	-0.002	2174.999997	-0.001
40	2114.999998	-0.001	2174.999999	-0.001
50	2114.999999	-0.001	2174.999997	-0.001

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 66			
	Channel Bandwidth: 15 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
120	2117.500001	0.001	2172.500003	0.001
102	2117.500001	0.001	2172.500002	0.001
138	2117.500003	0.002	2172.500001	0.001

Note: The applicant defined the normal working voltage is from 102Vac to 138Vac.

Frequency Error vs. Temperature

Temp. (℃)	LTE Band 66			
	Channel Bandwidth: 15 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	2117.500003	0.001	2172.500002	0.001
-20	2117.500003	0.002	2172.500003	0.001
-10	2117.500002	0.001	2172.500002	0.001
0	2117.500001	0.001	2172.500002	0.001
10	2117.500002	0.001	2172.500002	0.001
20	2117.499999	-0.001	2172.499996	-0.002
30	2117.499999	0.000	2172.499998	-0.001
40	2117.499998	-0.001	2172.499998	-0.001
50	2117.499999	-0.001	2172.499997	-0.001

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 66			
	Channel Bandwidth: 20 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
120	2120.000004	0.002	2170.000004	0.002
102	2120.000002	0.001	2170.000004	0.002
138	2120.000004	0.002	2170.000003	0.001

Note: The applicant defined the normal working voltage is from 102Vac to 138Vac.

Frequency Error vs. Temperature

Temp. (℃)	LTE Band 66			
	Channel Bandwidth: 20 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	2120.000002	0.001	2170.000004	0.002
-20	2120.000001	0.000	2170.000003	0.001
-10	2120.000002	0.001	2170.000004	0.002
0	2120.000003	0.001	2170.000001	0.001
10	2120.000003	0.002	2170.000001	0.001
20	2119.999997	-0.001	2169.999997	-0.001
30	2119.999998	-0.001	2169.999997	-0.001
40	2119.999996	-0.002	2169.999997	-0.001
50	2119.999996	-0.002	2169.999998	-0.001

4.4 Occupied Bandwidth Measurement

4.4.1 Limits of Occupied Bandwidth Measurement

-26dBc Bandwidth
According to FCC 27.53(m)(6) specified that emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26dB below the transmitter power.

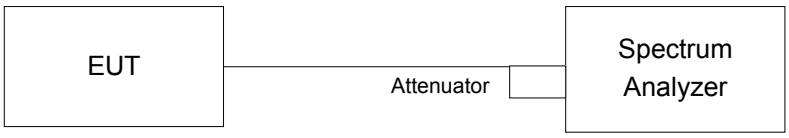
Occupied Bandwidth
The EUT makes a call to the communication simulator. All measurements were done at low, middle and high operational frequency range. The communication simulator station system controlled a EUT to export maximum output power under transmission mode and specific channel frequency. Use OBW measurement function of Spectrum analyzer to measure 99 % occupied bandwidth.

4.4.2 Test Procedure

-26dBc Bandwidth
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 = 51kHz and VBW = 150kHz (Channel Bandwidth: 5MHz), RBW = 100kHz and VBW = 300kHz (Channel Bandwidth: 10MHz), RBW = 150kHz and VBW = 470kHz (Channel Bandwidth: 15MHz) and RBW = 200kHz and VBW = 620kHz (Channel Bandwidth: 20MHz). The 26dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 26dB.

Occupied Channel Bandwidth
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 = 51kHz and VBW = 150kHz (Channel Bandwidth: 5MHz), RBW = 100kHz and VBW = 300kHz (Channel Bandwidth: 10MHz), RBW = 150kHz and VBW = 470kHz (Channel Bandwidth: 15MHz) and RBW = 200kHz and VBW = 620kHz (Channel Bandwidth: 20MHz).

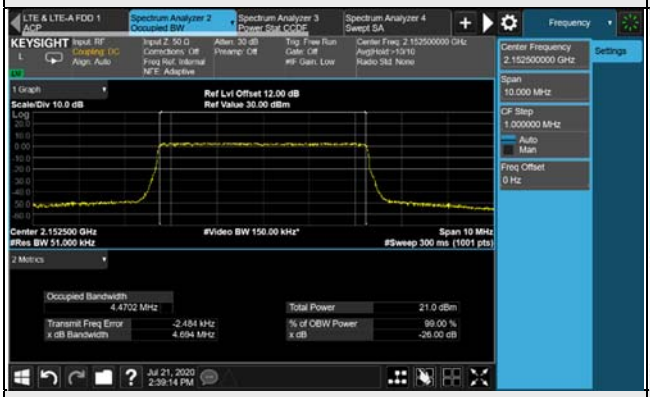
4.4.3 Test Setup



4.4.4 Test Result

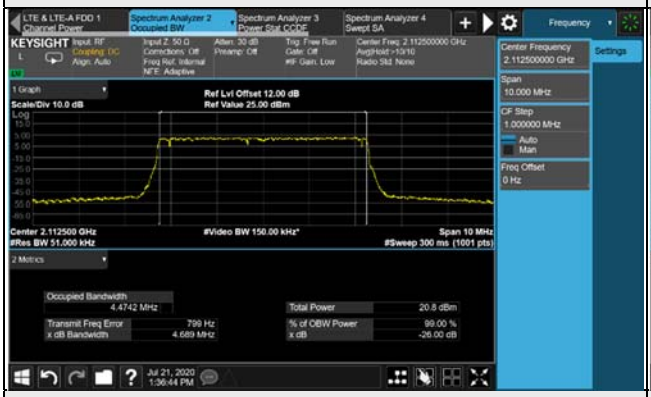
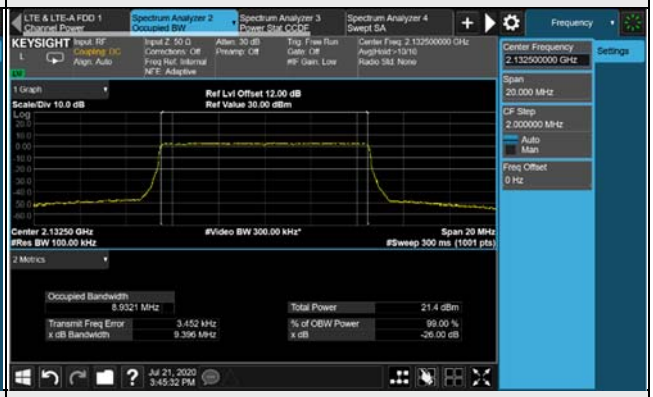
Occupied Bandwidth
LTE Band 4
Chain 0

LTE Band 4, Channel Bandwidth 5MHz				
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)		
		QPSK	16QAM	64QAM
1975	2112.5	4.47	4.47	4.47
2175	2132.5	4.47	4.46	4.47
2375	2152.5	4.47	4.47	4.47
LTE Band 4, Channel Bandwidth 10MHz				
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)		
		QPSK	16QAM	64QAM
2000	2115.0	8.93	8.93	8.92
2175	2132.5	8.92	8.93	8.92
2350	2150.0	8.92	8.92	8.93
LTE Band 4, Channel Bandwidth 15MHz				
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)		
		QPSK	16QAM	64QAM
2025	2117.5	13.41	13.41	13.40
2175	2132.5	13.40	13.40	13.40
2325	2147.5	13.39	13.39	13.40
LTE Band 4, Channel Bandwidth 20MHz				
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)		
		QPSK	16QAM	64QAM
2050	2120.0	17.87	17.84	17.87
2175	2132.5	17.86	17.85	17.86
2300	2145.0	17.84	17.85	17.84

Spectrum Plot of Worst Value	
5MHz / 64QAM	10MHz / 64QAM
	
15MHz / 16QAM	20MHz / 64QAM

Chain 1

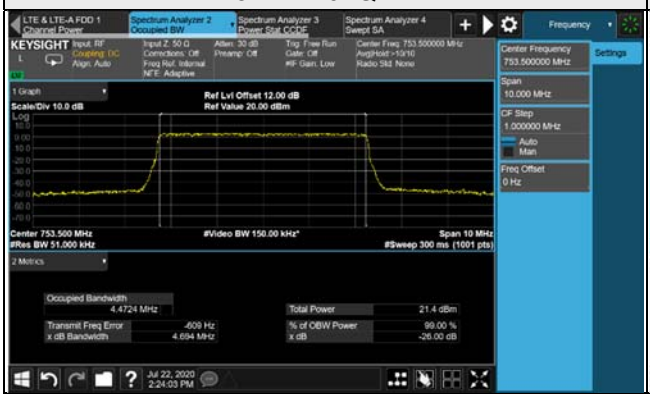
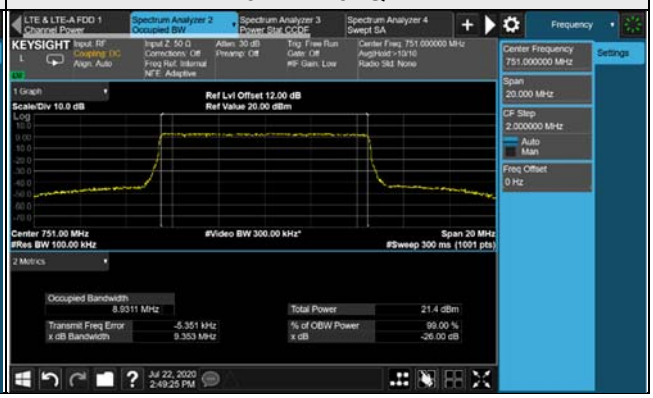
LTE Band 4, Channel Bandwidth 5MHz				
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)		
		QPSK	16QAM	64QAM
1975	2112.5	4.47	4.47	4.47
2175	2132.5	4.47	4.47	4.47
2375	2152.5	4.47	4.46	4.47
LTE Band 4, Channel Bandwidth 10MHz				
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)		
		QPSK	16QAM	64QAM
2000	2115.0	8.93	8.92	8.92
2175	2132.5	8.93	8.93	8.93
2350	2150.0	8.93	8.92	8.92
LTE Band 4, Channel Bandwidth 15MHz				
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)		
		QPSK	16QAM	64QAM
2025	2117.5	13.40	13.40	13.40
2175	2132.5	13.40	13.40	13.40
2325	2147.5	13.41	13.40	13.40
LTE Band 4, Channel Bandwidth 20MHz				
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)		
		QPSK	16QAM	64QAM
2050	2120.0	17.86	17.85	17.85
2175	2132.5	17.86	17.86	17.85
2300	2145.0	17.85	17.86	17.86

Spectrum Plot of Worst Value	
5MHz / 64QAM	10MHz / QPSK
	
15MHz / QPSK	20MHz / 16QAM

LTE Band 13

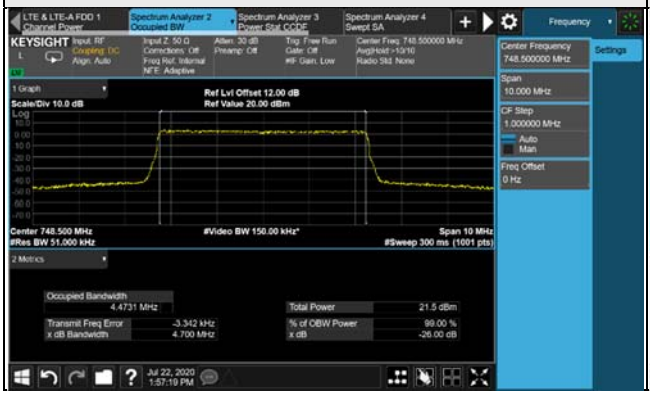
Chain 0

LTE Band 13, Channel Bandwidth 5MHz				
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)		
		QPSK	16QAM	64QAM
5205	748.5	4.47	4.47	4.47
5230	751.0	4.47	4.47	4.47
5255	753.5	4.47	4.47	4.47
LTE Band 13, Channel Bandwidth 10MHz				
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)		
		QPSK	16QAM	64QAM
5230	751.0	8.92	8.93	8.93

Spectrum Plot of Worst Value	
5MHz / 64QAM	10MHz / 64QAM
	

Chain 1

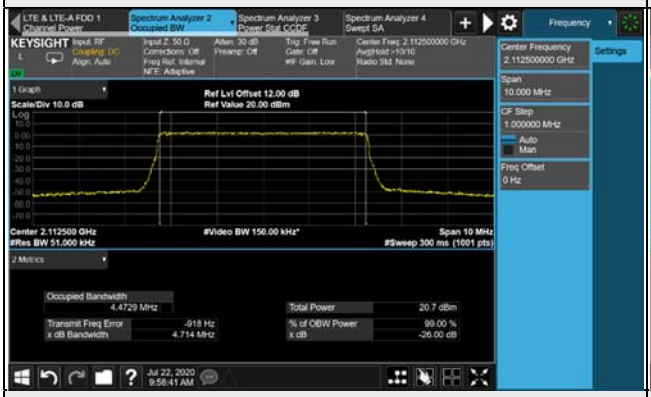
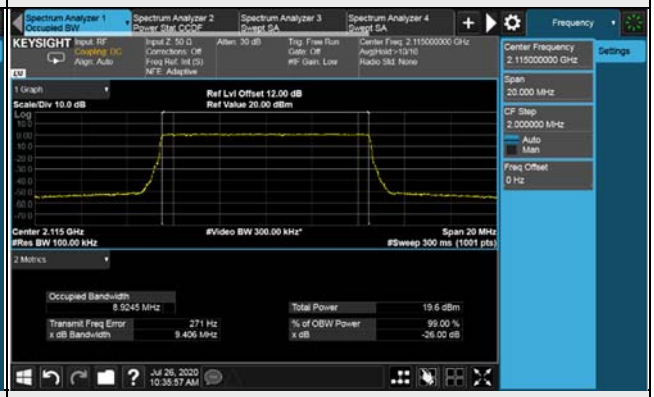
LTE Band 13, Channel Bandwidth 5MHz				
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)		
		QPSK	16QAM	64QAM
5205	748.5	4.47	4.47	4.47
5230	751.0	4.47	4.47	4.47
5255	753.5	4.46	4.46	4.46
LTE Band 13, Channel Bandwidth 10MHz				
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)		
		QPSK	16QAM	64QAM
5230	751.0	8.93	8.93	8.93

Spectrum Plot of Worst Value	
5MHz / 64QAM	10MHz / QPSK
	

LTE Band 66

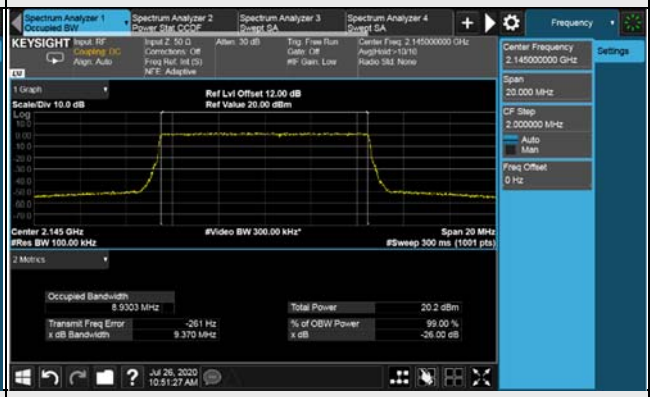
Chain 0

LTE Band 66, Channel Bandwidth 5MHz				
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)		
		QPSK	16QAM	64QAM
66461	2112.5	4.47	4.47	4.47
66786	2145.0	4.47	4.47	4.46
67111	2177.5	4.47	4.47	4.47
LTE Band 66, Channel Bandwidth 10MHz				
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)		
		QPSK	16QAM	64QAM
66486	2115.0	8.92	8.92	8.92
66786	2145.0	8.92	8.92	8.92
67086	2175.0	8.92	8.92	8.92
LTE Band 66, Channel Bandwidth 15MHz				
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)		
		QPSK	16QAM	64QAM
66511	2117.5	13.41	13.41	13.41
66786	2145.0	13.40	13.40	13.39
67061	2172.5	13.41	13.41	13.41
LTE Band 66, Channel Bandwidth 20MHz				
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)		
		QPSK	16QAM	64QAM
66536	2120.0	17.88	17.88	17.88
66786	2145.0	17.83	17.86	17.86
67036	2170.0	17.88	17.89	17.88

Spectrum Plot of Worst Value	
5MHz / 64QAM	10MHz / 64QAM
	
15MHz / 64QAM	20MHz / 16QAM

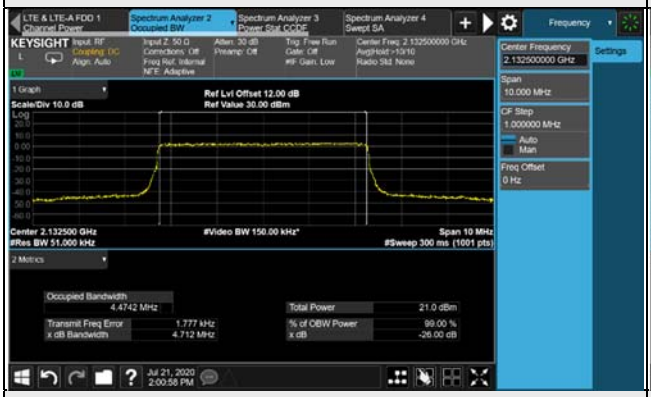
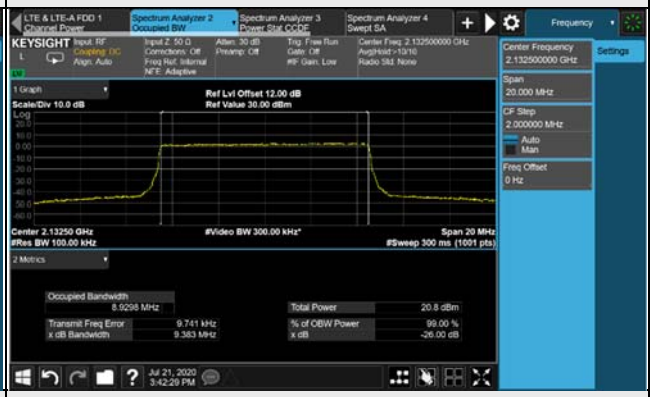
Chain 1

LTE Band 66, Channel Bandwidth 5MHz				
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)		
		QPSK	16QAM	64QAM
66461	2112.5	4.47	4.47	4.46
66786	2145.0	4.46	4.47	4.47
67111	2177.5	4.47	4.47	4.47
LTE Band 66, Channel Bandwidth 10MHz				
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)		
		QPSK	16QAM	64QAM
66486	2115.0	8.92	8.92	8.92
66786	2145.0	8.92	8.93	8.92
67086	2175.0	8.92	8.92	8.92
LTE Band 66, Channel Bandwidth 15MHz				
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)		
		QPSK	16QAM	64QAM
66511	2117.5	13.40	13.41	13.40
66786	2145.0	13.40	13.40	13.40
67061	2172.5	13.40	13.40	13.40
LTE Band 66, Channel Bandwidth 20MHz				
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)		
		QPSK	16QAM	64QAM
66536	2120.0	17.86	17.86	17.86
66786	2145.0	17.87	17.87	17.88
67036	2170.0	17.86	17.86	17.86

Spectrum Plot of Worst Value	
5MHz / 16QAM	10MHz / 16QAM
	
15MHz / 16QAM	20MHz / 64QAM

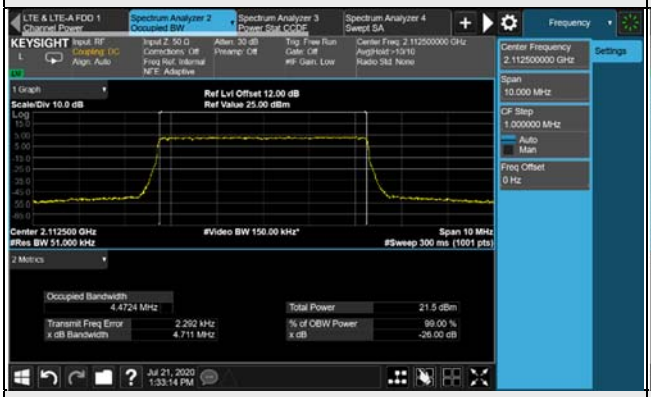
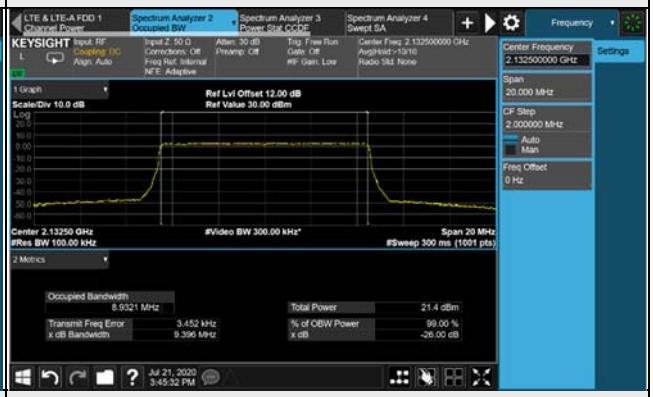
26dB Bandwidth
LTE Band 4
Chain 0

LTE Band 4, Channel Bandwidth 5MHz				
Channel	Frequency (MHz)	26 dB Bandwidth (MHz)		
		QPSK	16QAM	64QAM
1975	2112.5	4.69	4.70	4.71
2175	2132.5	4.71	4.71	4.70
2375	2152.5	4.71	4.71	4.69
LTE Band 4, Channel Bandwidth 10MHz				
Channel	Frequency (MHz)	26 dB Bandwidth (MHz)		
		QPSK	16QAM	64QAM
2000	2115.0	9.38	9.38	9.36
2175	2132.5	9.36	9.34	9.38
2350	2150.0	9.37	9.35	9.36
LTE Band 4, Channel Bandwidth 15MHz				
Channel	Frequency (MHz)	26 dB Bandwidth (MHz)		
		QPSK	16QAM	64QAM
2025	2117.5	14.04	14.02	14.07
2175	2132.5	14.01	14.08	14.00
2325	2147.5	14.04	14.04	14.03
LTE Band 4, Channel Bandwidth 20MHz				
Channel	Frequency (MHz)	26 dB Bandwidth (MHz)		
		QPSK	16QAM	64QAM
2050	2120.0	18.55	18.54	18.57
2175	2132.5	18.56	18.55	18.55
2300	2145.0	18.56	18.55	18.55

Spectrum Plot of Worst Value	
5MHz / QPSK	10MHz / 64QAM
	
15MHz / 16QAM	20MHz / 64QAM

Chain 1

LTE Band 4, Channel Bandwidth 5MHz				
Channel	Frequency (MHz)	26 dB Bandwidth (MHz)		
		QPSK	16QAM	64QAM
1975	2112.5	4.71	4.69	4.68
2175	2132.5	4.69	4.70	4.70
2375	2152.5	4.69	4.69	4.69
LTE Band 4, Channel Bandwidth 10MHz				
Channel	Frequency (MHz)	26 dB Bandwidth (MHz)		
		QPSK	16QAM	64QAM
2000	2115.0	9.35	9.34	9.33
2175	2132.5	9.39	9.39	9.37
2350	2150.0	9.36	9.35	9.34
LTE Band 4, Channel Bandwidth 15MHz				
Channel	Frequency (MHz)	26 dB Bandwidth (MHz)		
		QPSK	16QAM	64QAM
2025	2117.5	14.03	14.05	14.10
2175	2132.5	14.05	14.00	14.05
2325	2147.5	13.99	14.03	14.07
LTE Band 4, Channel Bandwidth 20MHz				
Channel	Frequency (MHz)	26 dB Bandwidth (MHz)		
		QPSK	16QAM	64QAM
2050	2120.0	18.59	18.55	18.57
2175	2132.5	18.55	18.55	18.59
2300	2145.0	18.59	18.61	18.59

Spectrum Plot of Worst Value	
5MHz / QPSK	10MHz / QPSK
	
15MHz / 64QAM	20MHz / 16QAM

LTE Band 13

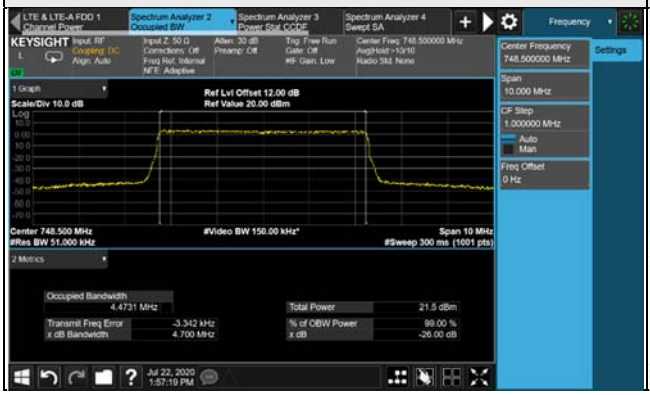
Chain 0

LTE Band 13, Channel Bandwidth 5MHz				
Channel	Frequency (MHz)	26 dB Bandwidth (MHz)		
		QPSK	16QAM	64QAM
5205	748.5	4.69	4.71	4.69
5230	751.0	4.70	4.69	4.70
5255	753.5	4.71	4.69	4.69
LTE Band 13, Channel Bandwidth 10MHz				
Channel	Frequency (MHz)	26 dB Bandwidth (MHz)		
		QPSK	16QAM	64QAM
5230	751.0	9.38	9.36	9.35

Spectrum Plot of Worst Value	
5MHz / 16QAM	10MHz / QPSK

Chain 1

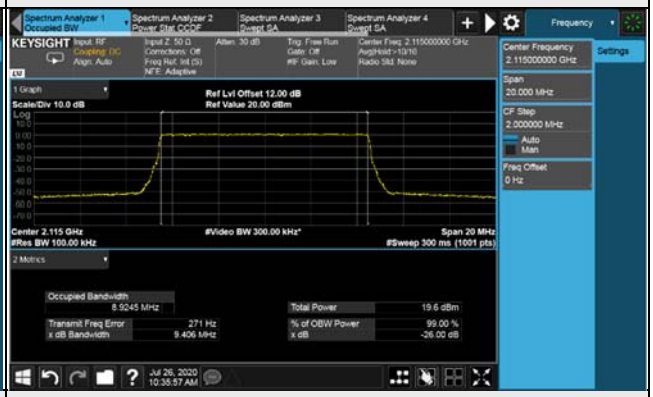
LTE Band 13, Channel Bandwidth 5MHz				
Channel	Frequency (MHz)	26 dB Bandwidth (MHz)		
		QPSK	16QAM	64QAM
5205	748.5	4.70	4.70	4.70
5230	751.0	4.70	4.70	4.70
5255	753.5	4.70	4.69	4.67
LTE Band 13, Channel Bandwidth 10MHz				
Channel	Frequency (MHz)	26 dB Bandwidth (MHz)		
		QPSK	16QAM	64QAM
5230	751.0	9.37	9.35	9.36

Spectrum Plot of Worst Value	
5MHz / 64QAM	10MHz / QPSK
	

LTE Band 66

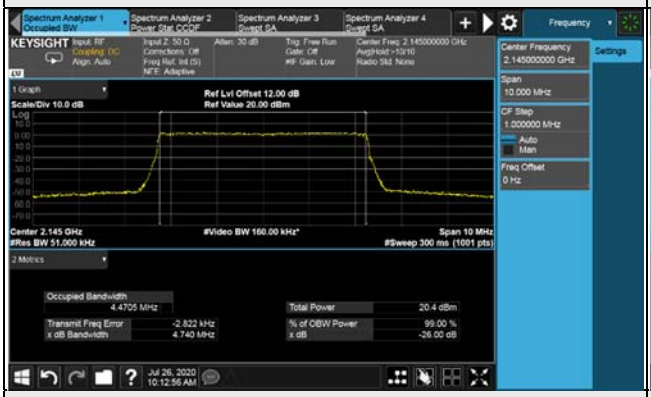
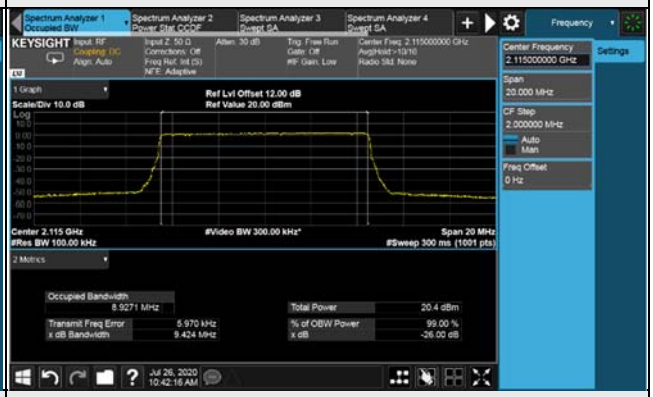
Chain 0

LTE Band 66, Channel Bandwidth 5MHz				
Channel	Frequency (MHz)	26 dB Bandwidth (MHz)		
		QPSK	16QAM	64QAM
66461	2112.5	4.69	4.71	4.71
66786	2145.0	4.73	4.74	4.74
67111	2177.5	4.74	4.74	4.73
LTE Band 66, Channel Bandwidth 10MHz				
Channel	Frequency (MHz)	26 dB Bandwidth (MHz)		
		QPSK	16QAM	64QAM
66486	2115.0	9.38	9.36	9.40
66786	2145.0	9.34	9.40	9.39
67086	2175.0	9.40	9.39	9.36
LTE Band 66, Channel Bandwidth 15MHz				
Channel	Frequency (MHz)	26 dB Bandwidth (MHz)		
		QPSK	16QAM	64QAM
66511	2117.5	14.00	13.97	14.05
66786	2145.0	14.02	14.01	14.03
67061	2172.5	13.99	14.04	13.97
LTE Band 66, Channel Bandwidth 20MHz				
Channel	Frequency (MHz)	26 dB Bandwidth (MHz)		
		QPSK	16QAM	64QAM
66536	2120.0	18.70	18.76	18.73
66786	2145.0	18.61	18.61	18.67
67036	2170.0	18.63	18.57	18.60

Spectrum Plot of Worst Value	
5MHz / 64QAM	10MHz / 64QAM
	
15MHz / 64QAM	20MHz / 16QAM

Chain 1

LTE Band 66, Channel Bandwidth 5MHz				
Channel	Frequency (MHz)	26 dB Bandwidth (MHz)		
		QPSK	16QAM	64QAM
66461	2112.5	4.71	4.70	4.68
66786	2145.0	4.72	4.74	4.72
67111	2177.5	4.73	4.73	4.73
LTE Band 66, Channel Bandwidth 10MHz				
Channel	Frequency (MHz)	26 dB Bandwidth (MHz)		
		QPSK	16QAM	64QAM
66486	2115.0	9.42	9.42	9.37
66786	2145.0	9.41	9.37	9.38
67086	2175.0	9.37	9.34	9.40
LTE Band 66, Channel Bandwidth 15MHz				
Channel	Frequency (MHz)	26 dB Bandwidth (MHz)		
		QPSK	16QAM	64QAM
66511	2117.5	14.03	13.99	14.02
66786	2145.0	14.02	14.00	14.01
67061	2172.5	14.05	14.01	14.04
LTE Band 66, Channel Bandwidth 20MHz				
Channel	Frequency (MHz)	26 dB Bandwidth (MHz)		
		QPSK	16QAM	64QAM
66536	2120.0	18.68	18.58	18.61
66786	2145.0	18.66	18.64	18.72
67036	2170.0	18.66	18.57	18.69

Spectrum Plot of Worst Value	
5MHz / 16QAM	10MHz / QPSK
	
15MHz / QPSK	20MHz / 64QAM

4.5 Channel Edge Measurement

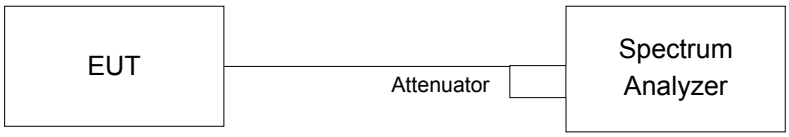
4.5.1 Limits of Band Edge Measurement

LTE Band 4, 66

According to FCC 27.53(h) specified 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 log10 (P) dB. In the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed.

For LTE Band 13
According to FCC 27.53(c), for operations in the 746-758 MHz band and the 776-788 MHz band, the power of any emission outside the licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured watts, in accordance with the following:
(1) On any frequency outside the 746-758 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least 43 + 10 log (P) dB.

4.5.2 Test Setup



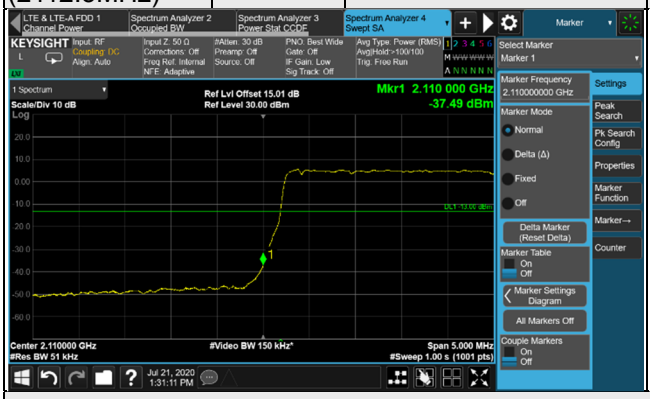
4.5.3 Test Procedures

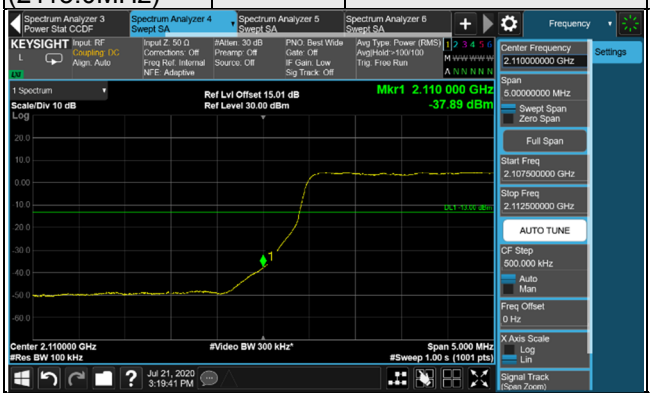
a. The EUT was set up for the rated peak power. The power was measured with Spectrum Analyzer. Band edge measurements were done at 3 channels: low, middle and high operational frequency range. Emission mask measurements were done at 2 channels: low and high operational frequency range.
b. Offset=12(Cable loss)+3.01(2TX directional)=15.01 dB.
c. The center frequency of spectrum is the band edge frequency and span is 5MHz. RB of the spectrum is 51kHz and VB of the spectrum is 150kHz (LTE Channel Bandwidth 5MHz).
d. The center frequency of spectrum is the band edge frequency and span is 5MHz. RB of the spectrum is 100kHz and VB of the spectrum is 300kHz (LTE Channel Bandwidth 10MHz).
e. The center frequency of spectrum is the band edge frequency and span is 5MHz. RB of the spectrum is 150kHz and VB of the spectrum is 470kHz (LTE Channel Bandwidth 15MHz).
f. The center frequency of spectrum is the band edge frequency and span is 5MHz. RB of the spectrum is 200kHz and VB of the spectrum is 1MHz (LTE Channel Bandwidth 20MHz).
g. Record the max trace plot into the test report.

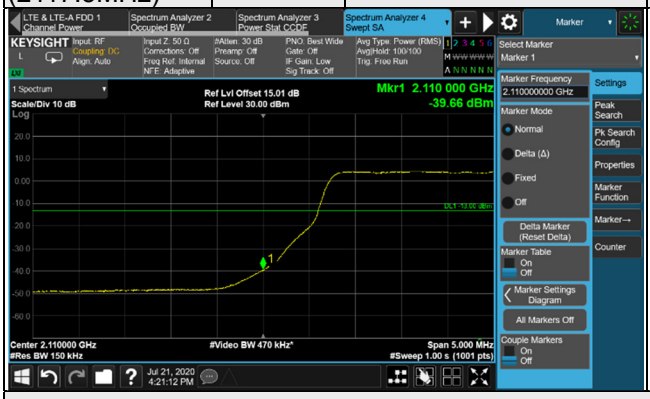
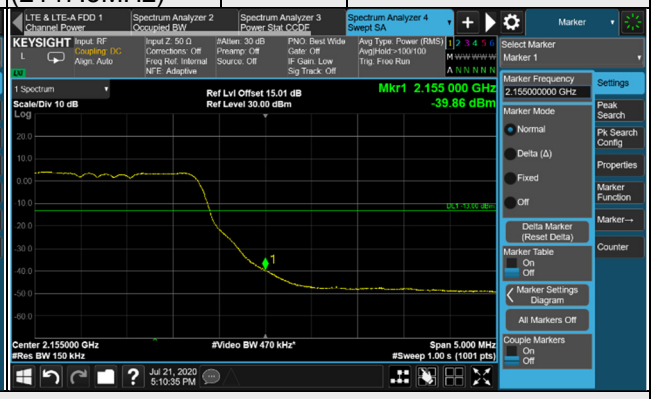
4.5.4 Test Results

LTE Band 4

Chain 0

Channel Bandwidth: 5MHz					
Channel 1975 (2112.5MHz)	QPSK		Channel 2375 (2152.5MHz)	QPSK	
					

Channel Bandwidth: 10MHz					
Channel 2000 (2115.0MHz)	QPSK		Channel 2350 (2150.0MHz)	QPSK	
					

Channel Bandwidth: 15MHz					
Channel 2025 (2117.5MHz)	QPSK		Channel 2325 (2147.5MHz)	QPSK	
					

Channel Bandwidth: 20MHz					
Channel 2050 (2120.0MHz)	QPSK		Channel 2300 (2145.0MHz)	QPSK	