FCC Test Report

(Part 27- LTE Band 4, 7, 12, 13, 17)

Report No.:	RF210105C01-7
FCC ID:	PZWBHTM70QWG
Test Model:	BHT-M70-QWG
Received Date:	Dec. 29, 2020
Test Date:	Dec. 29, 2020 ~ Sep. 02, 2021
Issued Date:	Sep. 29, 2021
Applicant:	DENSO WAVE INCORPORATED
Address:	1 Yoshiike Kusagi Agui-cho,Chita-gun Aichi 470-2297, Japan
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

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Release Control Record

Issue No.	Description	Date Issued
RF210105C01-7	Original release	Sep. 29, 2021

1 Certificate of Conformity

Product:	2D Code Handy Terminal
Brand:	DENSO
Test Model:	BHT-M70-QWG
Sample Status:	Engineering sample
Applicant:	DENSO WAVE INCORPORATED
Test Date:	Dec. 29, 2020 ~ Sep. 02, 2021
Standards:	FCC Part 27, Subpart C, L, M, H, F

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:** Sep. 29, 2021

Pettie Chen / Senior Specialist

Approved by : Bruce Chen , **Date:** Sep. 29, 2021

Bruce Chen / Senior Engineer

2 Summary of Test Results

For LTE B4

Applied Standard: FCC Part 27 & Part 2			
FCC Clause	Test Item	Result	Remarks
2.1046 27.50(d)	Equivalent Isotropically radiated power	Pass	Meet the requirement of limit.
2.1047	Modulation characteristics	Pass	Meet the requirement
2.1055 27.54	Frequency Stability	Pass	Meet the requirement of limit.
2.1049	Emission Bandwidth	Pass	Meet the requirement of limit.
2.1051 27.53(h)	Out of Band Emission Measurements	Pass	Meet the requirement of limit.
27.50(d)(5)	Peak To Average Ratio	Pass	Meet the requirement of limit.
2.1051 27.53(h)	Conducted Spurious Emissions	Pass	Meet the requirement of limit.
2.1053 27.53(h)	Radiated Spurious Emissions	Pass	Meet the requirement of limit. Minimum passing margin is -23.47dB at 43.58MHz.

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

For LTE B7

Applied Standard: FCC Part 27 & Part 2			
FCC Clause	Test Item	Result	Remarks
2.1046 27.50(h)(2)	Equivalent Isotropically radiated power	Pass	Meet the requirement of limit.
2.1047	Modulation characteristics	Pass	Meet the requirement
2.1055 27.54	Frequency Stability	Pass	Meet the requirement of limit.
2.1049	Emission Bandwidth	Pass	Meet the requirement of limit.
2.1051 27.53(m)(4)(6)	Channel Edge / Out of Band Emission Measurements	Pass	Meet the requirement of limit.
--	Peak To Average Ratio	Pass	Meet the requirement of limit.
2.1051 27.53(m)(4)(6)	Conducted Spurious Emissions	Pass	Meet the requirement of limit.
2.1053 27.53(m)(4)(6)	Radiated Spurious Emissions	Pass	Meet the requirement of limit. Minimum passing margin is -6.90dB at 5070.00MHz.

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

For LTE B12/B17

Applied Standard: FCC Part 27 & Part 2			
FCC Clause	Test Item	Result	Remarks
2.1046 27.50(c)	Equivalent radiated power	Pass	Meet the requirement of limit.
2.1047	Modulation characteristics	Pass	Meet the requirement
2.1055 27.54	Frequency Stability	Pass	Meet the requirement of limit.
2.1049	Emission Bandwidth	Pass	Meet the requirement of limit.
2.1051 27.53(g)	Out of Band Emission Measurements	Pass	Meet the requirement of limit.
--	Peak To Average Ratio	Pass	Meet the requirement of limit.
2.1051 27.53(g)	Conducted Spurious Emissions	Pass	Meet the requirement of limit.
2.1053 27.53(g)	Radiated Spurious Emissions	Pass	Meet the requirement of limit. Minimum passing margin is -29.75dB at 39.70MHz.

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

For LTE B13

Applied Standard: FCC Part 27 & Part 2			
FCC Clause	Test Item	Result	Remarks
2.1046 27.50(b)	Equivalent radiated power	Pass	Meet the requirement of limit.
2.1047	Modulation characteristics	Pass	Meet the requirement
2.1055 27.54	Frequency Stability	Pass	Meet the requirement of limit.
2.1049	Emission Bandwidth	Pass	Meet the requirement of limit.
2.1051 27.53(c)	Out of Band Emission Measurements	Pass	Meet the requirement of limit.
--	Peak To Average Ratio	Pass	Meet the requirement of limit.
2.1051 27.53(c)(f)	Conducted Spurious Emissions	Pass	Meet the requirement of limit.
2.1053 27.53(c)(f))	Radiated Spurious Emissions	Pass	Meet the requirement of limit. Minimum passing margin is -17.76dB at 1569.00MHz.

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:

HwaYa Chamber 10:

Measurement	Frequency	Expanded Uncertainty (k=2) (±)
Radiated Emissions up to 1 GHz	9kHz ~ 30MHz	2.44 dB
	30MHz ~ 200MHz	2.93 dB
	200MHz ~1000MHz	2.95 dB
Radiated Emissions above 1 GHz	1GHz ~ 18GHz	2.26 dB
	18GHz ~ 40GHz	1.94 dB

HwaYa Chamber 3:

Measurement	Frequency	Expanded Uncertainty (k=2) (±)
Radiated Emissions up to 1 GHz	9kHz ~ 30MHz	3.04 dB
	30MHz ~ 200MHz	3.86 dB
	200MHz ~1000MHz	3.87 dB
Radiated Emissions above 1 GHz	1GHz ~ 18GHz	2.29 dB
	18GHz ~ 40GHz	2.29 dB

2.2 Test Site and Instruments

Test Mode A (Test Date: Dec. 29, 2020 ~ Sep. 02, 2021)

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Test Receiver Agilent	N9038A	MY55420137	Apr. 16, 2020	Apr. 15, 2021
			Apr. 09, 2021	Apr. 08, 2022
Spectrum Analyzer Agilent	N9010A	MY52220314	Dec. 07, 2020	Dec. 06, 2021
Spectrum Analyzer ROHDE & SCHWARZ	FSU43	101261	Apr. 16, 2020	Apr. 15, 2021
			Apr. 12, 2021	Apr. 11, 2022
Broadband Horn Antenna SCHWARZBECK	BBHA 9170	148	Nov. 22, 2020	Nov. 21, 2021
HORN Antenna SCHWARZBECK	BBHA 9120D	9120D-969	Nov. 22, 2020	Nov. 21, 2021
BILOG Antenna SCHWARZBECK	VULB 9168	9168-472	Nov. 06, 2020	Nov. 05, 2021
Fixed Attenuator WOKEN	MDCS18N-10	MDCS18N-10-01	Apr. 14, 2020	Apr. 13, 2021
			Apr. 13, 2021	Apr. 12, 2022
MXG Vector signal generator Agilent	N5182B	MY53050430	Nov. 25, 2020	Nov. 24, 2021
Bluetooth Tester	CBT	100946	Aug. 06, 2020	Aug. 05, 2022
Preamplifier EMCI	EMC 012645	980115	Oct. 07, 2020	Oct. 06, 2021
Preamplifier EMCI	EMC 184045	980116	Oct. 07, 2020	Oct. 06, 2021
Preamplifier EMCI	EMC 330H	980112	Oct. 07, 2020	Oct. 06, 2021
Power Meter Anritsu	ML2495A	1232001	Dec. 29, 2020	Dec. 28, 2021
Power Sensor Anritsu	MA2411B	1207334	Dec. 29, 2020	Dec. 28, 2021
RF Coaxial Cable EMCI	EMC104-SM-SM-8000	171005	Oct. 07, 2020	Oct. 06, 2021
RF Coaxial Cable HUBER+SUHNNER	SUCOFLEX 104	EMC104-SM-SM-1000(140807)	Oct. 07, 2020	Oct. 06, 2021
RF Coaxial Cable WOKEN	8D-FB	Cable-Ch10-01	Oct. 07, 2020	Oct. 06, 2021
Boresight Antenna Fixture	FBA-01	FBA-SIP01	NA	NA
Software BV ADT	E3 6.120103	NA	NA	NA
Antenna Tower MF	MFA-440H	NA	NA	NA
Turn Table MF	MFT-201SS	NA	NA	NA
Antenna Tower &Turn Table Controller MF	MF-7802	NA	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 10.

Test Mode B (Test Date: Aug. 06, 2021)

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Test Receiver ROHDE & SCHWARZ	ESR3	102579	Jul. 05, 2021	Jul. 04, 2022
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100269	Jun. 07, 2021	Jun. 06, 2022
BILOG Antenna SCHWARZBECK	VULB9168	9168-171	Nov. 04, 2020	Nov. 03, 2021
HORN Antenna SCHWARZBECK	9120D	209	Nov. 22, 2020	Nov. 21, 2021
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170241	Nov. 22, 2020	Nov. 21, 2021
Preamplifier Agilent (Below 1GHz)	8447D	2944A10738	Aug. 16, 2020	Aug. 15, 2021
Preamplifier Agilent (Above 1GHz)	8449B	3008A02465	Mar. 22, 2021	Mar. 21, 2022
RF Coaxial Cable WOKEN With 5dB PAD	8D-FB	Cable-CH3-01	Aug. 16, 2020	Aug. 15, 2021
RF signal cable HUBER+SUHNER	SUCOFLEX 104	Cable-CH3-03 (223653/4)	Aug. 16, 2020	Aug. 15, 2021
RF signal cable HUBER+SUHNER& EMCI	SUCOFLEX 104&EMC104-SM- SM-8000	Cable-CH3-03 (309224+170907)	Aug. 16, 2020	Aug. 15, 2021
Software BV ADT	ADT_Radiated_ V7.6.15.9.5	NA	NA	NA
Antenna Tower inn-co GmbH	MA 4000	013303	NA	NA
Antenna Tower Controller BV ADT	AT100	AT93021702	NA	NA
Turn Table BV ADT	TT100	TT93021702	NA	NA
Turn Table Controller BV ADT	SC100	SC93021702	NA	NA
Boresight Antenna Fixture	FBA-01	FBA-SIP01	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 3.

3 General Information

3.1 General Description of EUT

Product	2D Code Handy Terminal	
Brand	DENSO	
Test Model	BHT-M70-QWG	
Status of EUT	Engineering sample	
Power Supply Rating	5.0 Vdc (host equipment) 5.0 / 9.0 / 12.0 Vdc (adapter) 3.6 Vdc (battery)	
Modulation Type	QPSK, 16QAM	
Operating Frequency	LTE Band 4 (Channel Bandwidth 1.4MHz)	1710.7MHz ~ 1754.3MHz
	LTE Band 4 (Channel Bandwidth 3MHz)	1711.5MHz ~ 1753.5MHz
	LTE Band 4 (Channel Bandwidth 5MHz)	1712.5MHz ~ 1752.5MHz
	LTE Band 4 (Channel Bandwidth 10MHz)	1715.0MHz ~ 1750.0MHz
	LTE Band 4 (Channel Bandwidth 15MHz)	1717.5MHz ~ 1747.5MHz
	LTE Band 4 (Channel Bandwidth 20MHz)	1720.0MHz ~ 1745.0MHz
	LTE Band 7 (Channel Bandwidth 5MHz)	2502.5MHz ~ 2567.5MHz
	LTE Band 7 (Channel Bandwidth 10MHz)	2505.0MHz ~ 2565.0MHz
	LTE Band 7 (Channel Bandwidth 15MHz)	2507.5MHz ~ 2562.5MHz
	LTE Band 7 (Channel Bandwidth 20MHz)	2510.0MHz ~ 2560.0MHz
	LTE Band 12 (Channel Bandwidth 1.4MHz)	699.7MHz ~ 715.3MHz
	LTE Band 12 (Channel Bandwidth 3MHz)	700.5MHz ~ 714.5MHz
	LTE Band 12 (Channel Bandwidth 5MHz)	701.5MHz ~ 713.5MHz
	LTE Band 12 (Channel Bandwidth 10MHz)	704.0MHz ~ 711.0MHz
	LTE Band 13 (Channel Bandwidth 5MHz)	779.5MHz ~ 784.5MHz
	LTE Band 13 (Channel Bandwidth 10MHz)	782.0MHz
	LTE Band 17 (Channel Bandwidth 5MHz)	706.5MHz ~ 713.5MHz
	LTE Band 17 (Channel Bandwidth 10MHz)	709.0MHz ~ 711.0MHz

Max. EIRP Power		QPSK	16QAM
	LTE Band 4 (Channel Bandwidth 1.4MHz)	224.388mW (23.51dBm)	187.499mW (22.73dBm)
	LTE Band 4 (Channel Bandwidth 3MHz)	230.144mW (23.62dBm)	158.855mW (22.01dBm)
	LTE Band 4 (Channel Bandwidth 5MHz)	224.905mW (23.52dBm)	156.675mW (21.95dBm)
	LTE Band 4 (Channel Bandwidth 10MHz)	224.905mW (23.52dBm)	156.315mW (21.94dBm)
	LTE Band 4 (Channel Bandwidth 15MHz)	230.675mW (23.63dBm)	160.325mW (22.05dBm)
	LTE Band 4 (Channel Bandwidth 20MHz)	231.739mW (23.65dBm)	161.808mW (22.09dBm)
	LTE Band 7 (Channel Bandwidth 5MHz)	271.644mW (24.34dBm)	214.289mW (23.31dBm)
	LTE Band 7 (Channel Bandwidth 10MHz)	272.270mW (24.35dBm)	214.783mW (23.32dBm)
	LTE Band 7 (Channel Bandwidth 15MHz)	267.917mW (24.28dBm)	217.270mW (23.37dBm)
	LTE Band 7 (Channel Bandwidth 20MHz)	274.789mW (24.39dBm)	217.270mW (23.37dBm)
Max. ERP Power		QPSK	16QAM
	LTE Band 12 (Channel Bandwidth 1.4MHz)	59.979mW (17.78dBm)	49.545mW (16.95dBm)
	LTE Band 12 (Channel Bandwidth 3MHz)	60.674mW (17.83dBm)	46.132mW (16.64dBm)
	LTE Band 12 (Channel Bandwidth 5MHz)	61.376mW (17.88dBm)	47.643mW (16.78dBm)
	LTE Band 12 (Channel Bandwidth 10MHz)	61.660mW (17.90dBm)	47.863mW (16.80dBm)
	LTE Band 13 (Channel Bandwidth 5MHz)	91.201mW (19.60dBm)	70.958mW (18.51dBm)
	LTE Band 13 (Channel Bandwidth 10MHz)	92.045mW (19.64dBm)	70.958mW (18.51dBm)
	LTE Band 17 (Channel Bandwidth 5MHz)	60.954mW (17.85dBm)	48.978mW (16.90dBm)
	LTE Band 17 (Channel Bandwidth 10MHz)	61.235mW (17.87dBm)	49.659mW (16.96dBm)
Emission Designator		QPSK	16QAM
	LTE Band 4 (Channel Bandwidth 1.4MHz)	1M09G7D	1M09D7W
	LTE Band 4 (Channel Bandwidth 3MHz)	2M70G7D	2M70D7W
	LTE Band 4 (Channel Bandwidth 5MHz)	4M49G7D	4M50D7W
	LTE Band 4 (Channel Bandwidth 10MHz)	8M97G7D	8M97D7W
	LTE Band 4 (Channel Bandwidth 15MHz)	13M5G7D	13M5D7W
	LTE Band 4 (Channel Bandwidth 20MHz)	17M9G7D	17M9D7W
	LTE Band 7 (Channel Bandwidth 5MHz)	4M49G7D	4M50D7W
	LTE Band 7 (Channel Bandwidth 10MHz)	8M97G7D	8M98D7W
	LTE Band 7 (Channel Bandwidth 15MHz)	13M5G7D	13M5D7W
	LTE Band 7 (Channel Bandwidth 20MHz)	17M9G7D	18M0D7W
	LTE Band 12 (Channel Bandwidth 1.4MHz)	1M09G7D	1M09D7W
	LTE Band 12 (Channel Bandwidth 3MHz)	2M70G7D	2M70D7W
	LTE Band 12 (Channel Bandwidth 5MHz)	4M49G7D	4M50D7W
	LTE Band 12 (Channel Bandwidth 10MHz)	8M98G7D	8M98D7W
	LTE Band 13 (Channel Bandwidth 5MHz)	4M50G7D	4M50D7W
	LTE Band 13 (Channel Bandwidth 10MHz)	8M95G7D	8M96D7W
	LTE Band 17 (Channel Bandwidth 5MHz)	4M49G7D	4M50D7W
	LTE Band 17 (Channel Bandwidth 10MHz)	8M98G7D	8M98D7W
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.

Battery (accessory)	
Brand	DENSO
Model	BT3
Rating	3.6Vdc, 3050mAh, 10.98Wh

Adapter (Optional)	
Brand	CHANNEL WELL
Model	2ACP0183C
Input Power	100-240Vac, 0.5A, 50/60Hz
Output Power	5.0Vdc / 3.0A, 15W 9.0Vdc / 2.0A, 18.0W, 12.0Vdc / 1.5A, 18.0W

USB Cable (Optional)	
Brand	NIEN-YI
Model	NYS3892-0
Signal Line	1.45m shielded cable

QC3.0 charge single Cradle (Optional)	
Brand	DENSO
Model	CU-M70UQ

LAN Cradle with Spare battery charge (Optional)	
Brand	DENSO
Model	CU-M70L

USB Cradle with spare battery charge (Optional)	
Brand	DENSO
Model	CU-M70U

AC Adapter (CU-M70U & CU-M70L cradle use) (Optional)	
Brand	Sunny
Model	SYS1548-5012-T3
Input Power	100-240V~1.5A MAX 50-60Hz
Output Power	+12.0V / 4.16A
Power Cable	DC: 1.16m non-shielded cable with 1 core AC: 1.71m non-shielded cable without core

*After pre-testing, Cradle model: CU-M70L was the worst for the final tests.

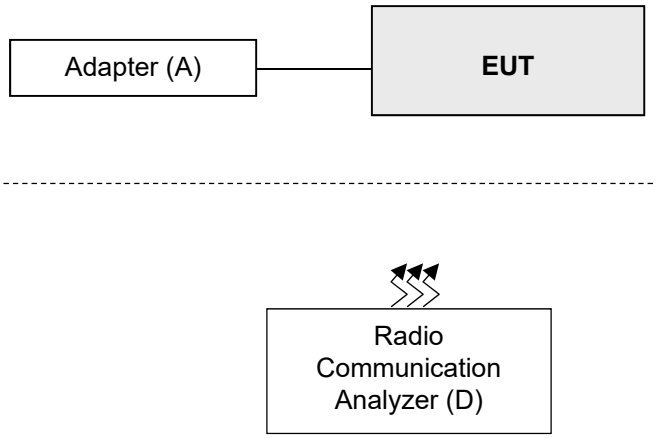
2. The following antennas were provided to the EUT.

Band	Freq. Range (MHz)	Gain (dBi)
LTE Band 4	1710.7 ~ 1754.3	1.29
LTE Band 7	2502.5 ~ 2567.5	1.48
LTE Band 12	699.7 ~ 715.3	-1.84
LTE Band 13	779.5 ~ 784.5	-0.21
LTE Band 17	706.5 ~ 713.5	-1.84

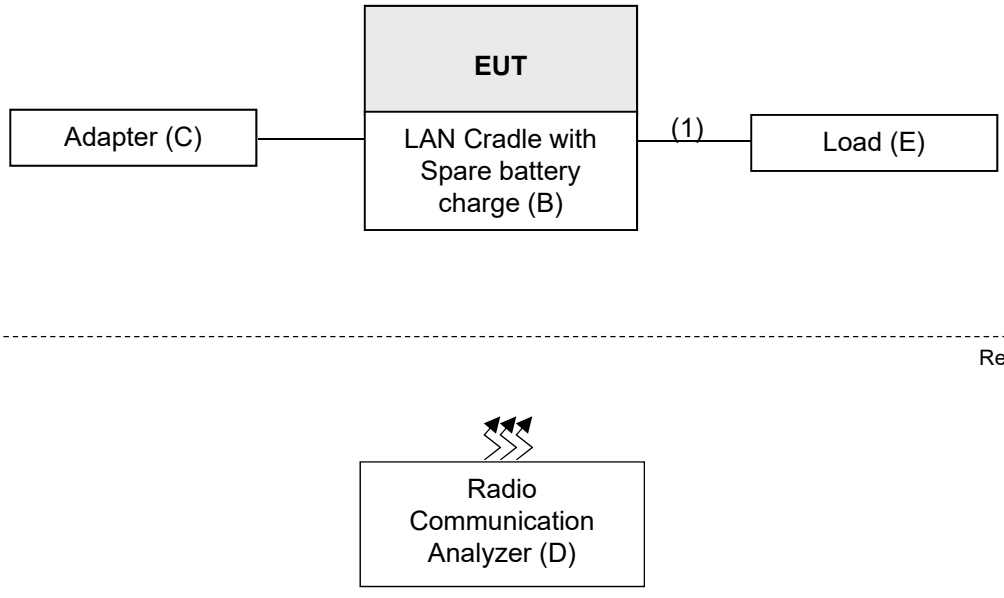
* The above Antenna information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications, the laboratory shall not be held responsible.

3.2 Configuration of System under Test

Test Mode A



Test Mode B



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	Adapter	CHANNEL WELL	2ACP0183C	NA	NA	-
B	LAN Cradle with Spare battery charge	DENSO	CU-M70L	NA	NA	-
C	Adapter	Sunny	SYS1548-5012-T3	NA	NA	-
D	Radio Communication Analyzer	Anritsu	MT8821C	6261806803	NA	-
E	Load	NA	NA	NA	NA	-

Note:

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

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	LAN cable	1	1.5	N	0	-

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 as the table below. Following channel(s) was (were) selected for the final test as listed below:

Band	Radiated Emission
LTE Band 4	Y-plane
LTE Band 7	Y-plane
LTE Band 12	X-plane
LTE Band 13	Z-plane
LTE Band 17	Y-plane

LTE Band 4

EUT Configure Mode	Test Item	Available Channel	Tested Channel	Channel Bandwidth	Modulation	Mode
A	EIRP	19957 to 20393	19957 (1710.7MHz), 20175 (1732.5MHz), 20393 (1754.3MHz)	1.4MHz	QPSK / 16QAM	1 RB / 0 RB Offset 1 RB / 2 RB Offset 1 RB / 5 RB Offset 3 RB / 0 RB Offset 3 RB / 1 RB Offset 3 RB / 3 RB Offset 6 RB / 0 RB Offset
		19965 to 20385	19965 (1711.5MHz), 20175 (1732.5MHz), 20385 (1753.5MHz)	3MHz	QPSK / 16QAM	1 RB / 0 RB Offset 1 RB / 7 RB Offset 1 RB / 14 RB Offset 8 RB / 0 RB Offset 8 RB / 3 RB Offset 8 RB / 7 RB Offset 15 RB / 0 RB Offset
		19975 to 20375	19975 (1712.5MHz), 20175 (1732.5MHz), 20375 (1752.5MHz)	5MHz	QPSK / 16QAM	1 RB / 0 RB Offset 1 RB / 12 RB Offset 1 RB / 24 RB Offset 12 RB / 0 RB Offset 12 RB / 6 RB Offset 12 RB / 13 RB Offset 25 RB / 0 RB Offset
		20000 to 20350	20000 (1715.0MHz), 20175 (1732.5MHz), 20350 (1750.0MHz)	10MHz	QPSK / 16QAM	1 RB / 0 RB Offset 1 RB / 24 RB Offset 1 RB / 49 RB Offset 25 RB / 0 RB Offset 25 RB / 12 RB Offset 25 RB / 25 RB Offset 50 RB / 0 RB Offset
		20025 to 20325	20025 (1717.5MHz), 20175 (1732.5MHz), 20325 (1747.5MHz)	15MHz	QPSK / 16QAM	1 RB / 0 RB Offset 1 RB / 37 RB Offset 1 RB / 74 RB Offset 36 RB / 0 RB Offset 36 RB / 19 RB Offset 36 RB / 39 RB Offset 75 RB / 0 RB Offset
		20050 to 20300	20050 (1720.0MHz), 20175 (1732.5MHz), 20300 (1745.0MHz)	20MHz	QPSK / 16QAM	1 RB / 0 RB Offset 1 RB / 50 RB Offset 1 RB / 99 RB Offset 50 RB / 0 RB Offset 50 RB / 25 RB Offset 50 RB / 50 RB Offset 100 RB / 0 RB Offset
A	Modulation Characteristics	20050 to 20300	20175 (1732.5MHz)	20MHz	QPSK / 16QAM	100 RB / 0 RB Offset

EUT Configure Mode	Test Item	Available Channel	Tested Channel	Channel Bandwidth	Modulation	Mode
A	Frequency Stability	19957 to 20393	19957 (1710.7MHz), 20393 (1754.3MHz)	1.4MHz	QPSK	6 RB / 0 RB Offset
		19965 to 20385	19965 (1711.5MHz), 20385 (1753.5MHz)	3MHz	QPSK	15 RB / 0 RB Offset
		19975 to 20375	19975 (1712.5MHz), 20375 (1752.5MHz)	5MHz	QPSK	25 RB / 0 RB Offset
		20000 to 20350	20000 (1715.0MHz), 20350 (1750.0MHz)	10MHz	QPSK	50 RB / 0 RB Offset
		20025 to 20325	20025 (1717.5MHz), 20325 (1747.5MHz)	15MHz	QPSK	75 RB / 0 RB Offset
		20050 to 20300	20050 (1720.0MHz), 20300 (1745.0MHz)	20MHz	QPSK	100 RB / 0 RB Offset
A	Emission Bandwidth	19957 to 20393	19957 (1710.7MHz), 20175 (1732.5MHz), 20393 (1754.3MHz)	1.4MHz	QPSK / 16QAM	6 RB / 0RB Offset
		19965 to 20385	19965 (1711.5MHz), 20175 (1732.5MHz), 20385 (1753.5MHz)	3MHz	QPSK / 16QAM	15 RB / 0RB Offset
		19975 to 20375	19975 (1712.5MHz), 20175 (1732.5MHz), 20375 (1752.5MHz)	5MHz	QPSK / 16QAM	25RB / 0RB Offset
		20000 to 20350	20000 (1715.0MHz), 20175 (1732.5MHz), 20350 (1750.0MHz)	10MHz	QPSK / 16QAM	50RB / 0RB Offset
		20025 to 20325	20025 (1717.5MHz), 20175 (1732.5MHz), 20325 (1747.5MHz)	15MHz	QPSK / 16QAM	75 RB / 0 RB Offset
		20050 to 20300	20050 (1720.0MHz), 20175 (1732.5MHz), 20300 (1745.0MHz)	20MHz	QPSK / 16QAM	100 RB / 0 RB Offset
A	Band Edge	19957 to 20393	19957 (1710.7MHz), 20393 (1754.3MHz)	1.4MHz	QPSK	1 RB / 0 RB Offset 1 RB / 5 RB Offset 6 RB / 0 RB Offset
		19965 to 20385	19965 (1711.5MHz), 20385 (1753.5MHz)	3MHz	QPSK	1 RB / 0 RB Offset 1 RB / 14 RB Offset 15 RB / 0 RB Offset
		19975 to 20375	19975 (1712.5MHz), 20375 (1752.5MHz)	5MHz	QPSK	1 RB / 0 RB Offset 1 RB / 24 RB Offset 25 RB / 0 RB Offset
		20000 to 20350	20000 (1715.0MHz), 20350 (1750.0MHz)	10MHz	QPSK	1 RB / 0 RB Offset 1 RB / 49 RB Offset 50 RB / 0 RB Offset
		20025 to 20325	20025 (1717.5MHz), 20325 (1747.5MHz)	15MHz	QPSK	1 RB / 0 RB Offset 1 RB / 74 RB Offset 75 RB / 0 RB Offset
		20050 to 20300	20050 (1720.0MHz), 20300 (1745.0MHz)	20MHz	QPSK	1 RB / 0 RB Offset 1 RB / 99 RB Offset 100 RB / 0 RB Offset

EUT Configure Mode	Test Item	Available Channel	Tested Channel	Channel Bandwidth	Modulation	Mode
A	Peak To Average Ratio	19957 to 20393	19957 (1710.7MHz), 20175 (1732.5MHz), 20393 (1754.3MHz)	1.4MHz	QPSK / 16QAM	1 RB / 0 RB Offset
		19965 to 20385	19965 (1711.5MHz), 20175 (1732.5MHz), 20385 (1753.5MHz)	3MHz	QPSK / 16QAM	1 RB / 0 RB Offset
		19975 to 20375	19975 (1712.5MHz), 20175 (1732.5MHz), 20375 (1752.5MHz)	5MHz	QPSK / 16QAM	1 RB / 0 RB Offset
		20000 to 20350	20000 (1715.0MHz), 20175 (1732.5MHz), 20350 (1750.0MHz)	10MHz	QPSK / 16QAM	1 RB / 0 RB Offset
		20025 to 20325	20025 (1717.5MHz), 20175 (1732.5MHz), 20325 (1747.5MHz)	15MHz	QPSK / 16QAM	1 RB / 0 RB Offset
		20050 to 20300	20050 (1720.0MHz), 20175 (1732.5MHz), 20300 (1745.0MHz)	20MHz	QPSK / 16QAM	1 RB / 0 RB Offset
A	Conducted Emission	19957 to 20393	19957 (1710.7MHz), 20175 (1732.5MHz), 20393 (1754.3MHz)	1.4MHz	QPSK	1 RB / 0 RB Offset
		19965 to 20385	19965 (1711.5MHz), 20175 (1732.5MHz), 20385 (1753.5MHz)	3MHz	QPSK	1 RB / 0 RB Offset
		19975 to 20375	19975 (1712.5MHz), 20175 (1732.5MHz), 20375 (1752.5MHz)	5MHz	QPSK	1 RB / 0 RB Offset
		20000 to 20350	20000 (1715.0MHz), 20175 (1732.5MHz), 20350 (1750.0MHz)	10MHz	QPSK	1 RB / 0 RB Offset
		20025 to 20325	20025 (1717.5MHz), 20175 (1732.5MHz), 20325 (1747.5MHz)	15MHz	QPSK	1 RB / 0 RB Offset
		20050 to 20300	20050 (1720.0MHz), 20175 (1732.5MHz), 20300 (1745.0MHz)	20MHz	QPSK	1 RB / 0 RB Offset

EUT Configure Mode	Test Item	Available Channel	Tested Channel	Channel Bandwidth	Modulation	Mode
A, B	Radiated Emission Below 1GHz	20050 to 20300	20175 (1732.5MHz)	20MHz	QPSK	1 RB / 0 RB Offset
A	Radiated Emission Above 1GHz	19957 to 20393	19957 (1710.7MHz), 20175 (1732.5MHz), 20393 (1754.3MHz)	1.4MHz	QPSK	1 RB / 0 RB Offset
		19975 to 20375	19975 (1712.5MHz), 20175 (1732.5MHz), 20375 (1752.5MHz)	5MHz	QPSK	1 RB / 0 RB Offset
		20050 to 20300	20050 (1720.0MHz), 20175 (1732.5MHz), 20300 (1745.0MHz)	20MHz	QPSK	1 RB / 0 RB Offset

Note:

1. For radiated emission below 1GHz, select the worst radiated emission channel (above 1GHz) for final testing.
2. For radiated emission above 1GHz, according to 3GPP 36.521 Section 6.6.3.1.4, choose the lowest, 5MHz & highest channel bandwidth for final test.
3. The measured output power for QPSK mode is higher than the measured output power for 16QAM mode. Therefore, only Modulation characteristics, occupied bandwidth and Peak to average ratio items had been tested under QPSK and 16QAM modes, the other test items were performed under QPSK mode only.

LTE Band 7

EUT Configure Mode	Test item	Available channel	Tested channel	Channel Bandwidth	Modulation	Mode
A	EIRP	20775 to 21425	20775 (2502.5MHz), 21100 (2535.0MHz), 21425 (2567.5MHz)	5MHz	QPSK / 16QAM	1 RB / 0 RB Offset 1 RB / 12 RB Offset 1 RB / 24 RB Offset 12 RB / 0 RB Offset 12 RB / 6 RB Offset 12 RB / 13 RB Offset 25 RB / 0 RB Offset
		20800 to 21400	20800 (2505.0MHz), 21100 (2535.0MHz), 21400 (2565.0MHz)	10MHz	QPSK / 16QAM	1 RB / 0 RB Offset 1 RB / 24 RB Offset 1 RB / 49 RB Offset 25 RB / 0 RB Offset 25 RB / 12 RB Offset 25 RB / 25 RB Offset 50 RB / 0 RB Offset
		20825 to 21375	20825 (2507.5MHz), 21100 (2535.0MHz), 21375 (2562.5MHz)	15MHz	QPSK / 16QAM	1 RB / 0 RB Offset 1 RB / 37 RB Offset 1 RB / 74 RB Offset 36 RB / 0 RB Offset 36 RB / 19 RB Offset 36 RB / 39 RB Offset 75 RB / 0 RB Offset
		20850 to 21350	20850 (2510.0MHz), 21100 (2535.0MHz), 21350 (2560.0MHz)	20MHz	QPSK / 16QAM	1 RB / 0 RB Offset 1 RB / 50 RB Offset 1 RB / 99 RB Offset 50 RB / 0 RB Offset 50 RB / 25 RB Offset 50 RB / 50 RB Offset 100 RB / 0 RB Offset
A	Modulation Characteristics	20850 to 21350	21100 (2535.0MHz)	20MHz	QPSK / 16QAM	100 RB / 0 RB Offset
A	Frequency Stability	20775 to 21425	20775 (2502.5MHz), 21425 (2567.5MHz)	5MHz	QPSK	25 RB / 0 RB Offset
		20800 to 21400	20800 (2505.0MHz), 21400 (2565.0MHz)	10MHz	QPSK	50 RB / 0 RB Offset
		20825 to 21375	20825 (2507.5MHz), 21375 (2562.5MHz)	15MHz	QPSK	75 RB / 0 RB Offset
		20850 to 21350	20850 (2510.0MHz), 21350 (2560.0MHz)	20MHz	QPSK	100 RB / 0 RB Offset
A	Emission Bandwidth	20775 to 21425	20775 (2502.5MHz), 21100 (2535.0MHz), 21425 (2567.5MHz)	5MHz	QPSK / 16QAM	25 RB / 0 RB Offset
		20800 to 21400	20800 (2505.0MHz), 21100 (2535.0MHz), 21400 (2565.0MHz)	10MHz	QPSK / 16QAM	50 RB / 0 RB Offset
		20825 to 21375	20825 (2507.5MHz), 21100 (2535.0MHz), 21375 (2562.5MHz)	15MHz	QPSK / 16QAM	75 RB / 0 RB Offset
		20850 to 21350	20850 (2510.0MHz), 21100 (2535.0MHz), 21350 (2560.0MHz)	20MHz	QPSK / 16QAM	100 RB / 0 RB Offset

EUT Configure Mode	Test item	Available channel	Tested channel	Channel Bandwidth	Modulation	Mode
A	Out-of-Band Emissions	20775 to 21425	20775 (2502.5MHz), 21425 (2567.5MHz)	5MHz	QPSK	1 RB / 0 RB Offset 1 RB / 24 RB Offset 25 RB / 0 RB Offset
		20800 to 21400	20800 (2505.0MHz), 21400 (2565.0MHz)	10MHz	QPSK	1 RB / 0 RB Offset 1 RB / 49 RB Offset 50 RB / 0 RB Offset
		20825 to 21375	20825 (2507.5MHz), 21375 (2562.5MHz)	15MHz	QPSK	1 RB / 0 RB Offset 1 RB / 74 RB Offset 75 RB / 0 RB Offset
		20850 to 21350	20850 (2510.0MHz), 21350 (2560.0MHz)	20MHz	QPSK	1 RB / 0 RB Offset 1 RB / 99 RB Offset 100 RB / 0 RB Offset
A	Peak to Average Ratio	20775 to 21425	20775 (2502.5MHz), 21100 (2535.0MHz), 21425 (2567.5MHz)	5MHz	QPSK / 16QAM	1 RB / 0 RB Offset
		20800 to 21400	20800 (2505.0MHz), 21100 (2535.0MHz), 21400 (2565.0MHz)	10MHz	QPSK / 16QAM	1 RB / 0 RB Offset
		20825 to 21375	20825 (2507.5MHz), 21100 (2535.0MHz), 21375 (2562.5MHz)	15MHz	QPSK / 16QAM	1 RB / 0 RB Offset
		20850 to 21350	20850 (2510.0MHz), 21100 (2535.0MHz), 21350 (2560.0MHz)	20MHz	QPSK / 16QAM	1 RB / 0 RB Offset
A	Conducted Emission	20775 to 21425	20775 (2502.5MHz), 21100 (2535.0MHz), 21425 (2567.5MHz)	5MHz	QPSK	1 RB / 0 RB Offset
		20800 to 21400	20800 (2505.0MHz), 21100 (2535.0MHz), 21400 (2565.0MHz)	10MHz	QPSK	1 RB / 0 RB Offset
		20825 to 21375	20825 (2507.5MHz), 21100 (2535.0MHz), 21375 (2562.5MHz)	15MHz	QPSK	1 RB / 0 RB Offset
		20850 to 21350	20850 (2510.0MHz), 21100 (2535.0MHz), 21350 (2560.0MHz)	20MHz	QPSK	1 RB / 0 RB Offset
A, B	Radiated Emission Below 1GHz	20775 to 21425	21100 (2535.0MHz)	5MHz	QPSK	1 RB / 0 RB Offset
A	Radiated Emission Above 1GHz	20775 to 21425	20775 (2502.5MHz), 21100 (2535.0MHz), 21425 (2567.5MHz)	5MHz	QPSK	1 RB / 0 RB Offset
		20850 to 21350	20850 (2510.0MHz), 21100 (2535.0MHz), 21350 (2560.0MHz)	20MHz	QPSK	1 RB / 0 RB Offset

Note:

1. For radiated emission below 1GHz, select the worst radiated emission channel (above 1GHz) for final testing.
2. For radiated emission above 1GHz, according to 3GPP 36.521 Section 6.6.3.1.4, choose the 5MHz & highest channel bandwidth for final test.
3. The measured output power for QPSK mode is higher than the measured output power for 16QAM mode. Therefore, only Modulation characteristics, occupied bandwidth and Peak to average ratio items had been tested under QPSK and 16QAM modes, the other test items were performed under QPSK mode only.

LTE Band 12

EUT Configure Mode	Test item	Available channel	Tested channel	Channel Bandwidth	Modulation	Mode
A	ERP	23017 to 23173	23017 (699.7MHz), 23095 (707.5MHz), 23173 (715.3MHz)	1.4MHz	QPSK / 16QAM	1 RB / 0 RB Offset 1 RB / 2 RB Offset 1 RB / 5 RB Offset 3 RB / 0 RB Offset 3 RB / 1 RB Offset 3 RB / 3 RB Offset 6 RB / 0 RB Offset
		23025 to 23165	23025 (700.5MHz), 23095 (707.5MHz), 23165 (714.5MHz)	3MHz	QPSK / 16QAM	1 RB / 0 RB Offset 1 RB / 7 RB Offset 1 RB / 14 RB Offset 8 RB / 0 RB Offset 8 RB / 3 RB Offset 8 RB / 7 RB Offset 15 RB / 0 RB Offset
		23035 to 23155	23035 (701.5MHz), 23095 (707.5MHz), 23155 (713.5MHz)	5MHz	QPSK / 16QAM	1 RB / 0 RB Offset 1 RB / 12 RB Offset 1 RB / 24 RB Offset 12 RB / 0 RB Offset 12 RB / 6 RB Offset 12 RB / 13 RB Offset 25 RB / 0 RB Offset
		23060 to 23130	23060 (704.0MHz), 23095 (707.5MHz), 23130 (711.0 MHz)	10MHz	QPSK / 16QAM	1 RB / 0 RB Offset 1 RB / 24 RB Offset 1 RB / 49 RB Offset 25 RB / 0 RB Offset 25 RB / 12 RB Offset 25 RB / 25 RB Offset 50 RB / 0 RB Offset
A	Modulation Characteristics	23060 to 23130	23095 (707.5MHz)	10MHz	QPSK / 16QAM	50 RB / 0 RB Offset
A	Frequency Stability	23017 to 23173	23017 (699.7MHz), 23173 (715.3MHz)	1.4MHz	QPSK	6 RB / 0 RB Offset
		23025 to 23165	23025 (700.5MHz), 23165 (714.5MHz)	3MHz	QPSK	15 RB / 0 RB Offset
		23035 to 23155	23035 (701.5MHz), 23155 (713.5MHz)	5MHz	QPSK	25 RB / 0 RB Offset
		23060 to 23130	23060 (704.0MHz), 23130 (711.0MHz)	10MHz	QPSK	50 RB / 0 RB Offset
A	Emission Bandwidth	23017 to 23173	23017 (699.7MHz), 23095 (707.5MHz), 23173 (715.3MHz)	1.4MHz	QPSK / 16QAM	6 RB / 0 RB Offset
		23025 to 23165	23025 (700.5MHz), 23095 (707.5MHz), 23165 (714.5MHz)	3MHz	QPSK / 16QAM	15 RB / 0 RB Offset
		23035 to 23155	23035 (701.5MHz), 23095 (707.5MHz), 23155 (713.5MHz)	5MHz	QPSK / 16QAM	25 RB / 0 RB Offset
		23060 to 23130	23060 (704.0MHz), 23095 (707.5MHz), 23130 (711.0MHz)	10MHz	QPSK / 16QAM	50 RB / 0 RB Offset

EUT Configure Mode	Test item	Available channel	Tested channel	Channel Bandwidth	Modulation	Mode
A	Band Edge	23017 to 23173	23017 (699.7MHz), 23173 (715.3MHz)	1.4MHz	QPSK	1 RB / 0 RB Offset 1 RB / 5 RB Offset 6 RB / 0 RB Offset
		23025 to 23165	23025 (700.5MHz), 23165 (714.5MHz)	3MHz	QPSK	1 RB / 0 RB Offset 1 RB / 14 RB Offset 15 RB / 0 RB Offset
		23035 to 23155	23035 (701.5MHz), 23155 (713.5MHz)	5MHz	QPSK	1 RB / 0 RB Offset 1 RB / 24 RB Offset 25 RB / 0 RB Offset
		23060 to 23130	23060 (704.0MHz), 23130 (711.0MHz)	10MHz	QPSK	1 RB / 0 RB Offset 1 RB / 49 RB Offset 50 RB / 0 RB Offset
A	Peak to Average Ratio	23017 to 23173	23017 (699.7MHz), 23095 (707.5MHz), 23173 (715.3MHz)	1.4MHz	QPSK / 16QAM	1 RB / 0 RB Offset
		23025 to 23165	23025 (700.5MHz), 23095 (707.5MHz), 23165 (714.5MHz)	3MHz	QPSK / 16QAM	1 RB / 0 RB Offset
		23035 to 23155	23035 (701.5MHz), 23095 (707.5MHz), 23155 (713.5MHz)	5MHz	QPSK / 16QAM	1 RB / 0 RB Offset
		23060 to 23130	23060 (704.0MHz), 23095 (707.5MHz), 23130 (711.0MHz)	10MHz	QPSK / 16QAM	1 RB / 0 RB Offset
A	Conducted Emission	23017 to 23173	23017 (699.7MHz), 23095 (707.5MHz), 23173 (715.3MHz)	1.4MHz	QPSK	1 RB / 0 RB Offset
		23025 to 23165	23025 (700.5MHz), 23095 (707.5MHz), 23165 (714.5MHz)	3MHz	QPSK	1 RB / 0 RB Offset
		23035 to 23155	23035 (701.5MHz), 23095 (707.5MHz), 23155 (713.5MHz)	5MHz	QPSK	1 RB / 0 RB Offset
		23060 to 23130	23060 (704.0MHz), 23095 (707.5MHz), 23130 (711.0MHz)	10MHz	QPSK	1 RB / 0 RB Offset

EUT Configure Mode	Test item	Available channel	Tested channel	Channel Bandwidth	Modulation	Mode
A, B	Radiated Emission Below 1GHz	23017 to 23173	23173 (715.3MHz)	1.4MHz	QPSK	1 RB / 0 RB Offset
A	Radiated Emission Above 1GHz	23017 to 23173	23017 (699.7MHz), 23095 (707.5MHz), 23173 (715.3MHz)	1.4MHz	QPSK	1 RB / 0 RB Offset
		23035 to 23155	23035 (701.5MHz), 23095 (707.5MHz), 23155 (713.5MHz)	5MHz	QPSK	1 RB / 0 RB Offset
		23060 to 23130	23060 (704.0MHz), 23095 (707.5MHz), 23130 (711.0MHz)	10MHz	QPSK	1 RB / 0 RB Offset

Note:

1. For radiated emission below 1GHz, select the worst radiated emission channel (above 1GHz) for final testing.
2. For radiated emission above 1GHz, according to 3GPP 36.521 Section 6.6.3.1.4, choose the lowest, 5MHz & highest channel bandwidth for final test.
3. The measured output power for QPSK mode is higher than the measured output power for 16QAM mode. Therefore, only Modulation characteristics, occupied bandwidth and Peak to average ratio items had been tested under QPSK and 16QAM 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	Mode
A	ERP	23205 to 23255	23205 (779.5MHz), 23230 (782.0MHz), 23255 (784.5MHz)	5MHz	QPSK / 16QAM	1 RB / 0 RB Offset 1 RB / 12 RB Offset 1 RB / 24 RB Offset 12 RB / 0 RB Offset 12 RB / 6 RB Offset 12 RB / 13 RB Offset 25 RB / 0 RB Offset
		23230	23230 (782.0MHz)	10MHz	QPSK / 16QAM	1 RB / 0 RB Offset 1 RB / 24 RB Offset 1 RB / 49 RB Offset 25 RB / 0 RB Offset 25 RB / 12 RB Offset 25 RB / 25 RB Offset 50 RB / 0 RB Offset
A	Modulation Characteristics	23230	23230 (782.0MHz),	10MHz	QPSK / 16QAM	50 RB / 0 RB Offset
A	Frequency Stability	23205 to 23255	23205 (779.5MHz), 23255 (784.5MHz)	5MHz	QPSK	25 RB / 0 RB Offset
		23230	23230 (782.0MHz),	10MHz	QPSK	50 RB / 0 RB Offset
A	Emission Bandwidth	23205 to 23255	23205 (779.5MHz), 23230 (782.0MHz), 23255 (784.5MHz)	5MHz	QPSK / 16QAM	25 RB / 0 RB Offset
		23230	23230 (782.0MHz)	10MHz	QPSK / 16QAM	50 RB / 0 RB Offset
A	Band Edge	23205 to 23255	23205 (779.5MHz), 23255 (784.5MHz)	5MHz	QPSK	1 RB / 0 RB Offset 1 RB / 24 RB Offset 25 RB / 0 RB Offset
		23230	23230 (782.0MHz)	10MHz	QPSK	1 RB / 0 RB Offset 1 RB / 49 RB Offset 50 RB / 0 RB Offset
A	Peak to Average Ratio	23205 to 23255	23205 (779.5MHz), 23230 (782.0MHz), 23255 (784.5MHz)	5MHz	QPSK / 16QAM	1 RB / 0 RB Offset
		23230	23230 (782.0MHz)	10MHz	QPSK / 16QAM	1 RB / 0 RB Offset
A	Conducted Emission	23205 to 23255	23205 (779.5MHz), 23230 (782.0MHz), 23255 (784.5MHz)	5MHz	QPSK	1 RB / 0 RB Offset
		23230	23230 (782.0MHz)	10MHz	QPSK	1 RB / 0 RB Offset

EUT Configure Mode	Test item	Available channel	Tested channel	Channel Bandwidth	Modulation	Mode
A, B	Radiated Emission Below 1GHz	23205 to 23255	23255 (784.5MHz)	5MHz	QPSK	1 RB / 0 RB Offset
A	Radiated Emission Above 1GHz	23205 to 23255	23205 (779.5MHz), 23230 (782.0MHz), 23255 (784.5MHz)	5MHz	QPSK	1 RB / 0 RB Offset
		23230	23230 (782.0MHz)	10MHz	QPSK	1 RB / 0 RB Offset

Note:

1. For radiated emission below 1GHz, select the worst radiated emission channel (above 1GHz) for final testing.
2. For radiated emission above 1GHz, according to 3GPP 36.521 Section 6.6.3.1.4, choose the 5MHz & highest channel bandwidth for final test.
3. The measured output power for QPSK mode is higher than the measured output power for 16QAM mode. Therefore, only Modulation characteristics, occupied bandwidth and Peak to average ratio items had been tested under QPSK and 16QAM modes, the other test items were performed under QPSK mode only.

LTE Band 17

EUT Configure Mode	Test item	Available channel	Tested channel	Channel Bandwidth	Modulation	Mode
A	ERP	23755 to 23825	23755 (706.5MHz), 23790 (710.0MHz), 23825 (713.5MHz)	5MHz	QPSK / 16QAM	1 RB / 0 RB Offset 1 RB / 12 RB Offset 1 RB / 24 RB Offset 12 RB / 0 RB Offset 12 RB / 6 RB Offset 12 RB / 13 RB Offset 25 RB / 0 RB Offset
		23780 to 23800	23780 (709.0MHz), 23790 (710.0MHz), 23800 (711.0MHz)	10MHz	QPSK / 16QAM	1 RB / 0 RB Offset 1 RB / 24 RB Offset 1 RB / 49 RB Offset 25 RB / 0 RB Offset 25 RB / 12 RB Offset 25 RB / 25 RB Offset 50 RB / 0 RB Offset
A	Modulation Characteristics	23780 to 23800	23790 (710.0MHz)	10MHz	QPSK / 16QAM	50 RB / 0 RB Offset
A	Frequency Stability	23755 to 23825	23755 (706.5MHz), 23825 (713.5MHz)	5MHz	QPSK	25 RB / 0 RB Offset
		23780 to 23800	23780 (709.0MHz), 23800 (711.0MHz)	10MHz	QPSK	50 RB / 0 RB Offset
A	Emission Bandwidth	23755 to 23825	23755 (706.5MHz), 23790 (710.0MHz), 23825 (713.5MHz)	5MHz	QPSK / 16QAM	25 RB / 0 RB Offset
		23780 to 23800	23780 (709.0MHz), 23790 (710.0MHz), 23800 (711.0MHz)	10MHz	QPSK / 16QAM	50 RB / 0 RB Offset
A	Band Edge	23755 to 23825	23755 (706.5MHz), 23825 (713.5MHz)	5MHz	QPSK	1 RB / 0 RB Offset 1 RB / 24 RB Offset 25 RB / 0 RB Offset
		23780 to 23800	23780 (709.0MHz), 23800 (711.0MHz)	10MHz	QPSK	1 RB / 0 RB Offset 1 RB / 49 RB Offset 50 RB / 0 RB Offset
A	Peak to Average Ratio	23755 to 23825	23755 (706.5MHz), 23790 (710.0MHz), 23825 (713.5MHz)	5MHz	QPSK	1 RB / 0 RB Offset
		23780 to 23800	23780 (709.0MHz), 23790 (710.0MHz), 23800 (711.0MHz)	10MHz	QPSK / 16QAM	1 RB / 0 RB Offset
A	Conducted Emission	23755 to 23825	23755 (706.5MHz), 23790 (710.0MHz), 23825 (713.5MHz)	5MHz	QPSK	1 RB / 0 RB Offset
		23780 to 23800	23780 (709.0MHz), 23790 (710.0MHz), 23800 (711.0MHz)	10MHz	QPSK	1 RB / 0 RB Offset

EUT Configure Mode	Test item	Available channel	Tested channel	Channel Bandwidth	Modulation	Mode
A, B	Radiated Emission Below 1GHz	23780 to 23800	23790 (710.0MHz)	10MHz	QPSK	1 RB / 0 RB Offset
A	Radiated Emission Above 1GHz	23755 to 23825	23755 (706.5MHz), 23790 (710.0MHz), 23825 (713.5MHz)	5MHz	QPSK	1 RB / 0 RB Offset
		23780 to 23800	23780 (709.0MHz), 23790 (710.0MHz), 23800 (711.0MHz)	10MHz	QPSK	1 RB / 0 RB Offset

Note:

1. For radiated emission below 1GHz, select the worst radiated emission channel (above 1GHz) for final testing.
2. For radiated emission above 1GHz, according to 3GPP 36.521 Section 6.6.3.1.4, choose the 5MHz & highest channel bandwidth for final test.
3. The measured output power for QPSK mode is higher than the measured output power for 16QAM mode. Therefore, only Modulation characteristics, occupied bandwidth and Peak to average ratio items had been tested under QPSK and 16QAM modes, the other test items were performed under QPSK mode only.

Test Condition:

Test Item	Environmental Conditions	Input Power	Tested By
ERP / EIRP	25deg. C, 60%RH	120Vac, 60Hz	James Yang
Modulation characteristics	25deg. C, 60%RH	120Vac, 60Hz	James Yang
Frequency Stability	25deg. C, 60%RH	3.6Vdc	James Yang
Emission Bandwidth	25deg. C, 60%RH	120Vac, 60Hz	James Yang
Channel Edge / Out-of-Band Emission	25deg. C, 60%RH	120Vac, 60Hz	James Yang
Conducted Emission	25deg. C, 60%RH	120Vac, 60Hz	James Yang
Radiated Emission	25deg. C, 66%RH 22deg. C, 68%RH	120Vac, 60Hz	Edison Lee Greg Lin

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

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

FCC 47 CFR Part 2

FCC 47 CFR Part 27

ANSI 63.26-2015

References Test Guidance:

KDB 971168 D01 Power Meas License Digital Systems v03r01

ANSI/TIA/EIA-603-E 2016

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

4 Test Types and Results

4.1 Output Power Measurement

4.1.1 Limits of Output Power Measurement

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

For LTE Band 13:
Control stations and mobile stations in the 746-757 MHz, 776-788 MHz, and 805-806 MHz bands and fixed stations transmitting in the 787-788 MHz and 805-806 MHz bands are limited to 30 watts ERP.
Portable stations (hand-held devices) transmitting in the 746-757 MHz, 776-788 MHz, and 805-806 MHz bands are limited to 3 watts ERP.

For LTE Band 12, 17:
Control and mobile stations in the 698-746 MHz band are limited to 30 watts ERP.
Portable stations (hand-held devices) in the 600 MHz uplink band and the 698-746 MHz band, and fixed and mobile stations in the 600 MHz uplink band are limited to 3 watts ERP.

For LTE Band 4:
Fixed, mobile, and portable (hand-held) stations operating in the 1710-1755 MHz band and mobile and portable stations operating in the 1695-1710 MHz and 1755-1780 MHz bands are limited to 1 watt EIRP.

4.1.2 Test Procedures

Conducted Power Measurement:

The EUT was set up for the maximum power with LTE and 5GNR 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 / ERP

The relevant equation for determining the maximum ERP or EIRP from the measured RF output power is given in Equation as follows:

$EIRP = P_{Meas} + G_T$

$ERP = P_{Meas} + G_T - 2.15$

where

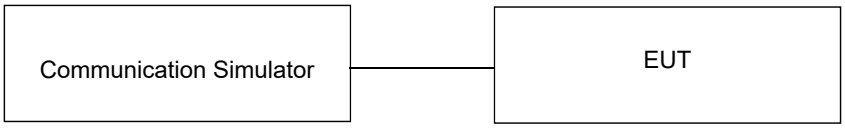
ERP or EIRP effective radiated power or equivalent isotropically radiated power, respectively (expressed in the same units as P_{Meas}, e.g., dBm or dBW)

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 4						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		20050	20175	20300
		Frequence (MHz)		1720	1732.5	1745
20M	QPSK	1	0	22.25	22.33	22.36
		1	50	22.24	22.30	22.35
		1	99	22.23	22.29	22.34
		50	0	21.22	21.28	21.33
		50	25	21.15	21.21	21.26
		50	50	21.14	21.20	21.25
		100	0	21.25	21.31	21.36
	16QAM	1	0	20.69	20.75	20.80
		1	50	20.65	20.71	20.76
		1	99	20.58	20.64	20.69
		50	0	20.47	20.50	20.50
		50	25	20.41	20.47	20.50
		50	50	20.39	20.45	20.50
		100	0	20.38	20.44	20.49

LTE Band 4						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		20025	20175	20325
		Frequence (MHz)		1717.5	1732.5	1747.5
15M	QPSK	1	0	22.18	22.26	22.34
		1	37	22.24	22.26	22.32
		1	74	22.13	22.27	22.27
		36	0	21.16	21.19	21.25
		36	19	21.15	21.16	21.25
		36	39	21.14	21.17	21.16
		75	0	21.23	21.23	21.29
	16QAM	1	0	20.61	20.68	20.76
		1	37	20.63	20.64	20.70
		1	74	20.48	20.60	20.59
		36	0	20.45	20.46	20.43
		36	19	20.34	20.43	20.41
		36	39	20.34	20.38	20.45
		75	0	20.31	20.36	20.49

LTE Band 4						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		20000	20175	20350
		Frequence (MHz)		1715	1732.5	1750
10M	QPSK	1	0	22.13	22.14	22.23
		1	24	22.17	22.20	22.14
		1	49	22.19	22.20	22.21
		25	0	21.07	21.13	21.20
		25	12	20.97	21.10	21.08
		25	25	20.99	21.12	21.10
		50	0	21.23	21.14	21.18
	16QAM	1	0	20.55	20.61	20.63
		1	24	20.60	20.60	20.65
		1	49	20.44	20.59	20.62
		25	0	20.42	20.26	20.30
		25	12	20.29	20.41	20.29
		25	25	20.20	20.23	20.36
		50	0	20.16	20.31	20.44

LTE Band 4						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		19975	20175	20375
		Frequence (MHz)		1712.5	1732.5	1752.5
5M	QPSK	1	0	22.15	22.15	22.15
		1	12	22.19	22.19	22.23
		1	24	22.14	22.23	22.14
		12	0	21.17	21.17	21.15
		12	6	21.10	20.97	21.01
		12	13	20.96	21.09	21.00
		25	0	21.08	21.23	21.04
	16QAM	1	0	20.54	20.66	20.58
		1	12	20.52	20.58	20.58
		1	24	20.49	20.48	20.49
		12	0	20.31	20.28	20.35
		12	6	20.27	20.43	20.31
		12	13	20.15	20.44	20.35
		25	0	20.24	20.35	20.33

LTE Band 4						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		19965	20175	20385
		Frequence (MHz)		1711.5	1732.5	1753.5
3M	QPSK	1	0	22.07	22.17	22.17
		1	7	22.21	22.27	22.26
		1	14	22.06	22.17	22.33
		8	0	21.17	21.19	21.33
		8	3	20.98	21.08	21.18
		8	7	20.97	21.05	21.04
		15	0	21.14	21.22	21.26
	16QAM	1	0	20.52	20.72	20.58
		1	7	20.42	20.56	20.71
		1	14	20.48	20.43	20.64
		8	0	20.33	20.40	20.49
		8	3	20.23	20.32	20.44
		8	7	20.29	20.30	20.38
		15	0	20.26	20.35	20.48

LTE Band 4						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		19957	20175	20393
		Frequence (MHz)		1710.7	1732.5	1754.3
1.4M	QPSK	1	0	22.18	22.18	22.19
		1	2	22.03	22.18	22.19
		1	5	22.22	22.13	22.13
		3	0	22.00	22.22	22.17
		3	1	22.02	22.05	22.04
		3	3	22.06	22.06	22.15
		6	0	21.07	21.19	21.16
	16QAM	1	0	20.56	20.68	20.61
		1	2	20.45	20.59	20.59
		1	5	20.46	20.64	20.56
		3	0	21.38	21.34	21.44
		3	1	21.27	21.31	21.35
		3	3	21.27	21.41	21.36
		6	0	20.19	20.22	20.43

LTE Band 7						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		20850	21100	21350
		Frequency (MHz)		2510	2535	2560
20M	QPSK	1	0	22.91	22.62	22.45
		1	50	22.76	22.51	22.29
		1	99	22.65	22.40	22.18
		50	0	21.83	21.78	21.44
		50	25	21.79	21.54	21.32
		50	50	21.77	21.52	21.30
		100	0	21.80	21.55	21.33
20M	16QAM	1	0	21.84	21.89	21.67
		1	50	21.80	21.85	21.63
		1	99	21.71	21.46	21.24
		50	0	20.92	20.67	20.45
		50	25	20.89	20.64	20.42
		50	50	20.85	20.60	20.38
		100	0	20.86	20.61	20.39

LTE Band 7						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		20825	21100	21375
		Frequency (MHz)		2507.5	2535	2562.5
15M	QPSK	1	0	22.80	22.56	22.38
		1	37	22.67	22.50	22.27
		1	74	22.61	22.34	22.15
		36	0	21.83	21.70	21.44
		36	19	21.77	21.48	21.25
		36	39	21.68	21.47	21.29
		75	0	21.78	21.46	21.30
15M	16QAM	1	0	21.78	21.89	21.64
		1	37	21.80	21.75	21.58
		1	74	21.66	21.36	21.15
		36	0	20.84	20.64	20.40
		36	19	20.83	20.62	20.34
		36	39	20.83	20.60	20.34
		75	0	20.85	20.54	20.30

LTE Band 7						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		20800	21100	21400
		Frequency (MHz)		2505	2535	2565
10M	QPSK	1	0	22.87	22.42	22.30
		1	24	22.58	22.40	22.15
		1	49	22.54	22.27	22.07
		25	0	21.66	21.67	21.38
		25	12	21.65	21.33	21.20
		25	25	21.73	21.36	21.14
		50	0	21.63	21.39	21.26
10M	16QAM	1	0	21.61	21.82	21.51
		1	24	21.69	21.84	21.44
		1	49	21.52	21.42	21.09
		25	0	20.83	20.56	20.34
		25	12	20.75	20.48	20.30
		25	25	20.61	20.46	20.31
		50	0	20.73	20.47	20.28

LTE Band 7						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		20775	21100	21425
		Frequency (MHz)		2502.5	2535	2567.5
5M	QPSK	1	0	22.86	22.50	22.34
		1	12	22.62	22.39	22.04
		1	24	22.47	22.33	22.09
		12	0	21.71	21.66	21.40
		12	6	21.54	21.47	21.09
		12	13	21.70	21.44	21.10
		25	0	21.70	21.37	21.13
5M	16QAM	1	0	21.70	21.83	21.57
		1	12	21.56	21.77	21.60
		1	24	21.57	21.34	21.11
		12	0	20.81	20.52	20.28
		12	6	20.77	20.57	20.31
		12	13	20.75	20.45	20.23
		25	0	20.66	20.51	20.29

LTE Band 12						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		23060	23095	23130
		Frequency (MHz)		704	707.5	711
10M	QPSK	1	0	21.53	21.75	21.89
		1	24	21.39	21.69	21.72
		1	49	21.35	21.65	21.68
		25	0	20.54	20.84	20.87
		25	12	20.47	20.77	20.80
		25	25	20.40	20.70	20.73
		50	0	20.50	20.80	20.83
10M	16QAM	1	0	20.79	20.09	20.12
		1	24	20.77	20.07	20.10
		1	49	20.73	20.03	20.06
		25	0	19.63	19.93	19.96
		25	12	19.57	19.87	19.90
		25	25	19.49	19.79	19.82
		50	0	19.57	19.87	19.90

LTE Band 12						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		23035	23095	23155
		Frequency (MHz)		701.5	707.5	713.5
5M	QPSK	1	0	21.52	21.65	21.87
		1	12	21.30	21.69	21.69
		1	24	21.32	21.63	21.63
		12	0	20.49	20.74	20.81
		12	6	20.37	20.77	20.72
		12	13	20.37	20.61	20.72
		25	0	20.49	20.78	20.81
5M	16QAM	1	0	20.74	20.08	20.12
		1	12	20.77	20.02	20.02
		1	24	20.72	19.96	20.01
		12	0	19.57	19.84	19.96
		12	6	19.51	19.82	19.82
		12	13	19.47	19.76	19.72
		25	0	19.56	19.77	19.89

LTE Band 12						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		23025	23095	23165
		Frequency (MHz)		700.5	707.5	714.5
3M	QPSK	1	0	21.44	21.55	21.82
		1	7	21.26	21.61	21.55
		1	14	21.35	21.50	21.56
		8	0	20.45	20.78	20.73
		8	3	20.38	20.58	20.70
		8	7	20.23	20.53	20.60
		15	0	20.43	20.67	20.73
3M	16QAM	1	0	20.62	19.97	20.03
		1	7	20.63	19.91	19.98
		1	14	20.55	19.97	19.95
		8	0	19.58	19.78	19.87
		8	3	19.41	19.75	19.84
		8	7	19.40	19.76	19.71
		15	0	19.46	19.70	19.81

LTE Band 12						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		23017	23095	23173
		Frequency (MHz)		699.7	707.5	715.3
1.4M	QPSK	1	0	21.45	21.59	21.77
		1	2	21.22	21.54	21.48
		1	5	21.24	21.51	21.53
		3	0	21.32	21.67	21.68
		3	1	21.35	21.70	21.58
		3	3	21.28	21.56	21.51
		6	0	20.37	20.65	20.73
1.4M	16QAM	1	0	20.64	19.92	19.93
		1	2	20.76	19.96	19.93
		1	5	20.53	19.92	19.99
		3	0	20.54	20.85	20.94
		3	1	20.51	20.81	20.75
		3	3	20.33	20.69	20.75
		6	0	19.43	19.74	19.71

LTE Band 13				
BW	MCS Index	RB Size	RB Offset	Low
		Channel		23230
		Frequency (MHz)		782
10M	QPSK	1	0	22.00
		1	24	21.95
		1	49	21.93
		25	0	20.63
		25	12	20.58
		25	25	20.54
		50	0	20.57
10M	16QAM	1	0	20.87
		1	24	20.78
		1	49	20.77
		25	0	19.69
		25	12	19.66
		25	25	19.64
		50	0	19.67

LTE Band 13						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		23205	23230	23255
		Frequency (MHz)		779.5	782	784.5
5M	QPSK	1	0	21.93	21.96	21.94
		1	12	21.87	21.90	21.89
		1	24	21.85	21.84	21.85
		12	0	20.59	20.61	20.56
		12	6	20.57	20.59	20.57
		12	13	20.48	20.51	20.49
		25	0	20.54	20.47	20.54
5M	16QAM	1	0	20.82	20.87	20.82
		1	12	20.77	20.79	20.77
		1	24	20.68	20.69	20.68
		12	0	19.69	19.67	19.71
		12	6	19.66	19.63	19.65
		12	13	19.63	19.60	19.63
		25	0	19.58	19.57	19.58

LTE Band 17						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		23780	23790	23800
		Frequency (MHz)		709	710	711
10M	QPSK	1	0	21.08	21.86	21.06
		1	24	21.24	21.74	21.22
		1	49	21.08	21.58	21.06
		25	0	20.26	20.76	20.24
		25	12	20.21	20.71	20.19
		25	25	20.19	20.69	20.17
		50	0	20.21	20.71	20.19
10M	16QAM	1	0	20.77	20.95	20.75
		1	24	20.40	20.90	20.38
		1	49	20.38	20.88	20.36
		25	0	19.37	19.87	19.35
		25	12	19.31	19.81	19.29
		25	25	19.30	19.80	19.28
		50	0	19.31	19.81	19.29

LTE Band 17						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		23755	23790	23825
		Frequency (MHz)		706.5	710	713.5
5M	QPSK	1	0	21.01	21.84	21.00
		1	12	21.19	21.68	21.15
		1	24	21.07	21.51	21.03
		12	0	20.25	20.68	20.17
		12	6	20.11	20.64	20.19
		12	13	20.10	20.64	20.15
		25	0	20.14	20.65	20.18
5M	16QAM	1	0	20.76	20.89	20.66
		1	12	20.30	20.84	20.37
		1	24	20.33	20.85	20.33
		12	0	19.36	19.81	19.31
		12	6	19.23	19.74	19.26
		12	13	19.25	19.74	19.21
		25	0	19.27	19.74	19.25

EIRP / ERP Power

LTE Band 4						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		20050	20175	20300
		Frequency (MHz)		1720	1732.5	1745
20M	QPSK	1	0	23.54	23.62	23.65
		1	50	23.53	23.59	23.64
		1	99	23.52	23.58	23.63
		50	0	22.51	22.57	22.62
		50	25	22.44	22.50	22.55
		50	50	22.43	22.49	22.54
		100	0	22.54	22.60	22.65
20M	16QAM	1	0	21.98	22.04	22.09
		1	50	21.94	22.00	22.05
		1	99	21.87	21.93	21.98
		50	0	21.76	21.79	21.79
		50	25	21.70	21.76	21.79
		50	50	21.68	21.74	21.79
		100	0	21.67	21.73	21.78

*EIRP = Conducted + antenna gain (1.29dBi)

LTE Band 4						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		20025	20175	20325
		Frequency (MHz)		1717.5	1732.5	1747.5
15M	QPSK	1	0	23.47	23.55	23.63
		1	37	23.53	23.55	23.61
		1	74	23.42	23.56	23.56
		36	0	22.45	22.48	22.54
		36	19	22.44	22.45	22.54
		36	39	22.43	22.46	22.45
		75	0	22.52	22.52	22.58
15M	16QAM	1	0	21.90	21.97	22.05
		1	37	21.92	21.93	21.99
		1	74	21.77	21.89	21.88
		36	0	21.74	21.75	21.72
		36	19	21.63	21.72	21.70
		36	39	21.63	21.67	21.74
		75	0	21.60	21.65	21.78

*EIRP = Conducted + antenna gain (1.29dBi)

LTE Band 4						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		20000	20175	20350
		Frequency (MHz)		1715	1732.5	1750
10M	QPSK	1	0	23.42	23.43	23.52
		1	24	23.46	23.49	23.43
		1	49	23.48	23.49	23.50
		25	0	22.36	22.42	22.49
		25	12	22.26	22.39	22.37
		25	25	22.28	22.41	22.39
		50	0	22.52	22.43	22.47
10M	16QAM	1	0	21.84	21.90	21.92
		1	24	21.89	21.89	21.94
		1	49	21.73	21.88	21.91
		25	0	21.71	21.55	21.59
		25	12	21.58	21.70	21.58
		25	25	21.49	21.52	21.65
		50	0	21.45	21.60	21.73

*EIRP = Conducted + antenna gain (1.29dBi)

LTE Band 4						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		19975	20175	20375
		Frequency (MHz)		1712.5	1732.5	1752.5
5M	QPSK	1	0	23.44	23.44	23.44
		1	12	23.48	23.48	23.52
		1	24	23.43	23.52	23.43
		12	0	22.46	22.46	22.44
		12	6	22.39	22.26	22.30
		12	13	22.25	22.38	22.29
		25	0	22.37	22.52	22.33
5M	16QAM	1	0	21.83	21.95	21.87
		1	12	21.81	21.87	21.87
		1	24	21.78	21.77	21.78
		12	0	21.60	21.57	21.64
		12	6	21.56	21.72	21.60
		12	13	21.44	21.73	21.64
		25	0	21.53	21.64	21.62

*EIRP = Conducted + antenna gain (1.29dBi)

LTE Band 4						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		19965	20175	20385
		Frequency (MHz)		1711.5	1732.5	1753.5
3M	QPSK	1	0	23.36	23.46	23.46
		1	7	23.50	23.56	23.55
		1	14	23.35	23.46	23.62
		8	0	22.46	22.48	22.62
		8	3	22.27	22.37	22.47
		8	7	22.26	22.34	22.33
		15	0	22.43	22.51	22.55
3M	16QAM	1	0	21.81	22.01	21.87
		1	7	21.71	21.85	22.00
		1	14	21.77	21.72	21.93
		8	0	21.62	21.69	21.78
		8	3	21.52	21.61	21.73
		8	7	21.58	21.59	21.67
		15	0	21.55	21.64	21.77

*EIRP = Conducted + antenna gain (1.29dBi)

LTE Band 4						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		19957	20175	20393
		Frequency (MHz)		1710.7	1732.5	1754.3
1.4M	QPSK	1	0	23.47	23.47	23.48
		1	2	23.32	23.47	23.48
		1	5	23.51	23.42	23.42
		3	0	23.29	23.51	23.46
		3	1	23.31	23.34	23.33
		3	3	23.35	23.35	23.44
		6	0	22.36	22.48	22.45
1.4M	16QAM	1	0	21.85	21.97	21.90
		1	2	21.74	21.88	21.88
		1	5	21.75	21.93	21.85
		3	0	22.67	22.63	22.73
		3	1	22.56	22.60	22.64
		3	3	22.56	22.70	22.65
		6	0	21.48	21.51	21.72

*EIRP = Conducted + antenna gain (1.29dBi)

LTE Band 7						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		20850	21100	21350
		Frequency (MHz)		2510	2535	2560
20M	QPSK	1	0	24.39	24.10	23.93
		1	50	24.24	23.99	23.77
		1	99	24.13	23.88	23.66
		50	0	23.31	23.26	22.92
		50	25	23.27	23.02	22.80
		50	50	23.25	23.00	22.78
		100	0	23.28	23.03	22.81
20M	16QAM	1	0	23.32	23.37	23.15
		1	50	23.28	23.33	23.11
		1	99	23.19	22.94	22.72
		50	0	22.40	22.15	21.93
		50	25	22.37	22.12	21.90
		50	50	22.33	22.08	21.86
		100	0	22.34	22.09	21.87

*EIRP = Conducted + antenna gain (1.48dBi)

LTE Band 7						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		20825	21100	21375
		Frequency (MHz)		2507.5	2535	2562.5
15M	QPSK	1	0	24.28	24.04	23.86
		1	37	24.15	23.98	23.75
		1	74	24.09	23.82	23.63
		36	0	23.31	23.18	22.92
		36	19	23.25	22.96	22.73
		36	39	23.16	22.95	22.77
		75	0	23.26	22.94	22.78
15M	16QAM	1	0	23.26	23.37	23.12
		1	37	23.28	23.23	23.06
		1	74	23.14	22.84	22.63
		36	0	22.32	22.12	21.88
		36	19	22.31	22.10	21.82
		36	39	22.31	22.08	21.82
		75	0	22.33	22.02	21.78

*EIRP = Conducted + antenna gain (1.48dBi)

LTE Band 7						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		20800	21100	21400
		Frequency (MHz)		2505	2535	2565
10M	QPSK	1	0	24.35	23.90	23.78
		1	24	24.06	23.88	23.63
		1	49	24.02	23.75	23.55
		25	0	23.14	23.15	22.86
		25	12	23.13	22.81	22.68
		25	25	23.21	22.84	22.62
		50	0	23.11	22.87	22.74
10M	16QAM	1	0	23.09	23.30	22.99
		1	24	23.17	23.32	22.92
		1	49	23.00	22.90	22.57
		25	0	22.31	22.04	21.82
		25	12	22.23	21.96	21.78
		25	25	22.09	21.94	21.79
		50	0	22.21	21.95	21.76

*EIRP = Conducted + antenna gain (1.48dBi)

LTE Band 7						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		20775	21100	21425
		Frequency (MHz)		2502.5	2535	2567.5
5M	QPSK	1	0	24.34	23.98	23.82
		1	12	24.10	23.87	23.52
		1	24	23.95	23.81	23.57
		12	0	23.19	23.14	22.88
		12	6	23.02	22.95	22.57
		12	13	23.18	22.92	22.58
		25	0	23.18	22.85	22.61
5M	16QAM	1	0	23.18	23.31	23.05
		1	12	23.04	23.25	23.08
		1	24	23.05	22.82	22.59
		12	0	22.29	22.00	21.76
		12	6	22.25	22.05	21.79
		12	13	22.23	21.93	21.71
		25	0	22.14	21.99	21.77

*EIRP = Conducted + antenna gain (1.48dBi)

LTE Band 12						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		23060	23095	23130
		Frequency (MHz)		704	707.5	711
10M	QPSK	1	0	17.54	17.76	17.90
		1	24	17.40	17.70	17.73
		1	49	17.36	17.66	17.69
		25	0	16.55	16.85	16.88
		25	12	16.48	16.78	16.81
		25	25	16.41	16.71	16.74
		50	0	16.51	16.81	16.84
10M	16QAM	1	0	16.80	16.10	16.13
		1	24	16.78	16.08	16.11
		1	49	16.74	16.04	16.07
		25	0	15.64	15.94	15.97
		25	12	15.58	15.88	15.91
		25	25	15.50	15.80	15.83
		50	0	15.58	15.88	15.91

*ERP = Conducted + antenna gain (-1.84dBi)-2.15

LTE Band 12						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		23035	23095	23155
		Frequency (MHz)		701.5	707.5	713.5
5M	QPSK	1	0	17.53	17.66	17.88
		1	12	17.31	17.70	17.70
		1	24	17.33	17.64	17.64
		12	0	16.50	16.75	16.82
		12	6	16.38	16.78	16.73
		12	13	16.38	16.62	16.73
		25	0	16.50	16.79	16.82
5M	16QAM	1	0	16.75	16.09	16.13
		1	12	16.78	16.03	16.03
		1	24	16.73	15.97	16.02
		12	0	15.58	15.85	15.97
		12	6	15.52	15.83	15.83
		12	13	15.48	15.77	15.73
		25	0	15.57	15.78	15.90

*ERP = Conducted + antenna gain (-1.84dBi)-2.15

LTE Band 12						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		23025	23095	23165
		Frequency (MHz)		700.5	707.5	714.5
3M	QPSK	1	0	17.45	17.56	17.83
		1	7	17.27	17.62	17.56
		1	14	17.36	17.51	17.57
		8	0	16.46	16.79	16.74
		8	3	16.39	16.59	16.71
		8	7	16.24	16.54	16.61
		15	0	16.44	16.68	16.74
3M	16QAM	1	0	16.63	15.98	16.04
		1	7	16.64	15.92	15.99
		1	14	16.56	15.98	15.96
		8	0	15.59	15.79	15.88
		8	3	15.42	15.76	15.85
		8	7	15.41	15.77	15.72
		15	0	15.47	15.71	15.82

*ERP = Conducted + antenna gain (-1.84dBi)-2.15

LTE Band 12						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		23017	23095	23173
		Frequency (MHz)		699.7	707.5	715.3
1.4M	QPSK	1	0	17.46	17.60	17.78
		1	2	17.23	17.55	17.49
		1	5	17.25	17.52	17.54
		3	0	17.33	17.68	17.69
		3	1	17.36	17.71	17.59
		3	3	17.29	17.57	17.52
		6	0	16.38	16.66	16.74
1.4M	16QAM	1	0	16.65	15.93	15.94
		1	2	16.77	15.97	15.94
		1	5	16.54	15.93	16.00
		3	0	16.55	16.86	16.95
		3	1	16.52	16.82	16.76
		3	3	16.34	16.70	16.76
		6	0	15.44	15.75	15.72

*ERP = Conducted + antenna gain (-1.84dBi)-2.15

LTE Band 13				
BW	MCS Index	RB Size	RB Offset	Low
		Channel		23230
		Frequency (MHz)		782
10M	QPSK	1	0	19.64
		1	24	19.59
		1	49	19.57
		25	0	18.27
		25	12	18.22
		25	25	18.18
		50	0	18.21
10M	16QAM	1	0	18.51
		1	24	18.42
		1	49	18.41
		25	0	17.33
		25	12	17.30
		25	25	17.28
		50	0	17.31

*ERP = Conducted + antenna gain (-0.21dBi)-2.15

LTE Band 13						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		23205	23230	23255
		Frequency (MHz)		779.5	782	784.5
5M	QPSK	1	0	19.57	19.60	19.58
		1	12	19.51	19.54	19.53
		1	24	19.49	19.48	19.49
		12	0	18.23	18.25	18.20
		12	6	18.21	18.23	18.21
		12	13	18.12	18.15	18.13
		25	0	18.18	18.11	18.18
5M	16QAM	1	0	18.46	18.51	18.46
		1	12	18.41	18.43	18.41
		1	24	18.32	18.33	18.32
		12	0	17.33	17.31	17.35
		12	6	17.30	17.27	17.29
		12	13	17.27	17.24	17.27
		25	0	17.22	17.21	17.22

*ERP = Conducted + antenna gain (-0.21dBi)-2.15

LTE Band 17						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		23780	23790	23800
		Frequency (MHz)		709	710	711
10M	QPSK	1	0	17.09	17.87	17.07
		1	24	17.25	17.75	17.23
		1	49	17.09	17.59	17.07
		25	0	16.27	16.77	16.25
		25	12	16.22	16.72	16.20
		25	25	16.20	16.70	16.18
		50	0	16.22	16.72	16.20
10M	16QAM	1	0	16.78	16.96	16.76
		1	24	16.41	16.91	16.39
		1	49	16.39	16.89	16.37
		25	0	15.38	15.88	15.36
		25	12	15.32	15.82	15.30
		25	25	15.31	15.81	15.29
		50	0	15.32	15.82	15.30

*ERP = Conducted + antenna gain (-1.84dBi)-2.15

LTE Band 17						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		23755	23790	23825
		Frequency (MHz)		706.5	710	713.5
5M	QPSK	1	0	17.02	17.85	17.01
		1	12	17.20	17.69	17.16
		1	24	17.08	17.52	17.04
		12	0	16.26	16.69	16.18
		12	6	16.12	16.65	16.20
		12	13	16.11	16.65	16.16
		25	0	16.15	16.66	16.19
5M	16QAM	1	0	16.77	16.90	16.67
		1	12	16.31	16.85	16.38
		1	24	16.34	16.86	16.34
		12	0	15.37	15.82	15.32
		12	6	15.24	15.75	15.27
		12	13	15.26	15.75	15.22
		25	0	15.28	15.75	15.26

*ERP = Conducted + antenna gain (-1.84dBi)-2.15

4.2 Modulation characteristics Measurement

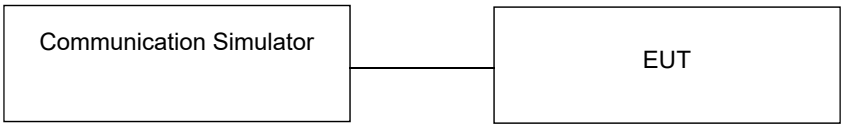
4.2.1 Limits of Modulation characteristics

N/A

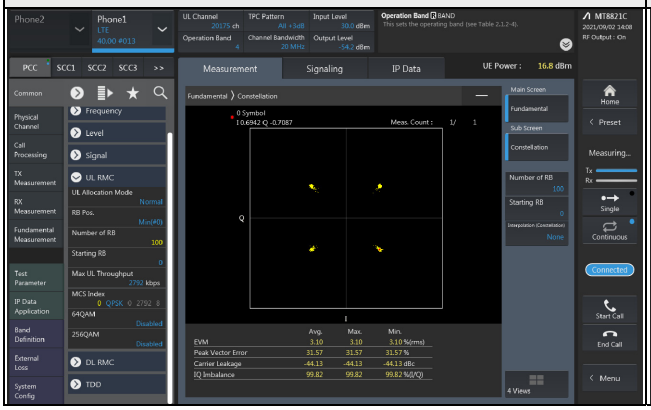
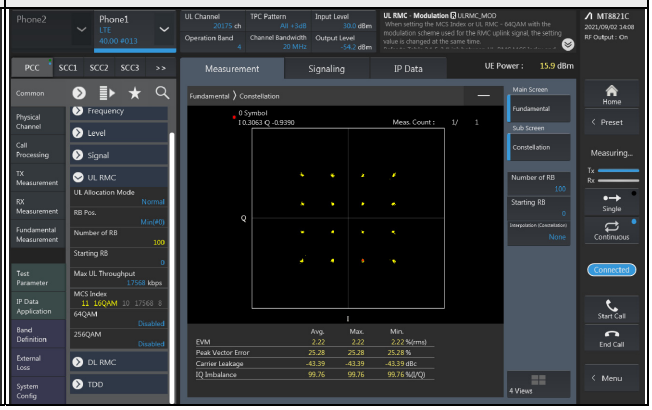
4.2.2 Test Procedure

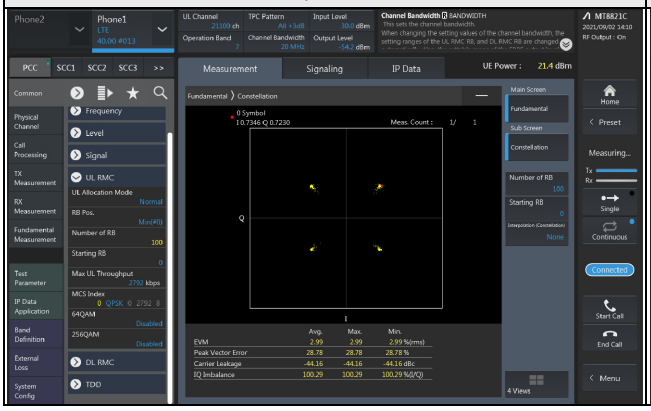
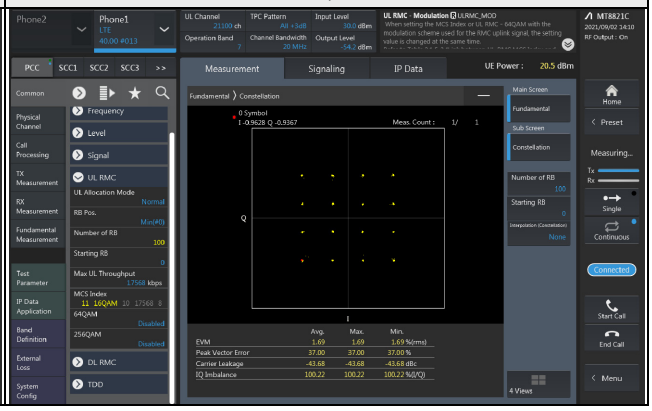
Connect the EUT to Communication Simulator via the antenna connector, The frequency band is set as EUT supported Modulation and Channels, the EUT output is matched with 50 ohm load, the waveform quality and constellation of the EUT was tested.

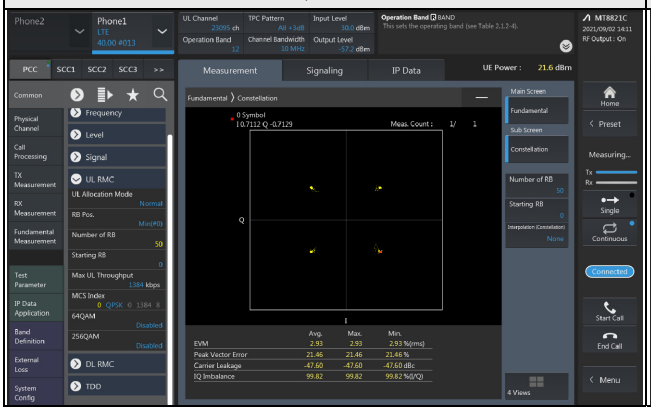
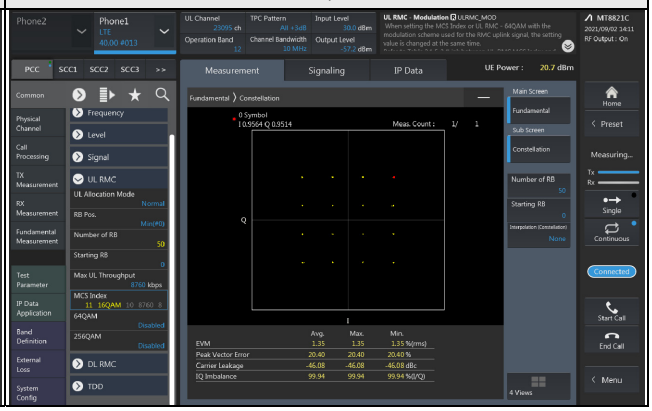
4.2.3 Test Setup

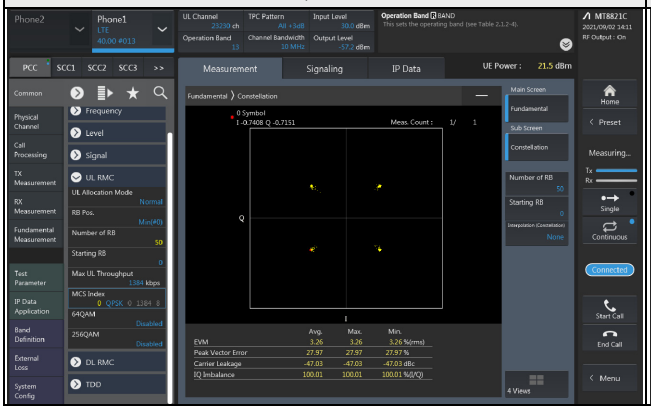
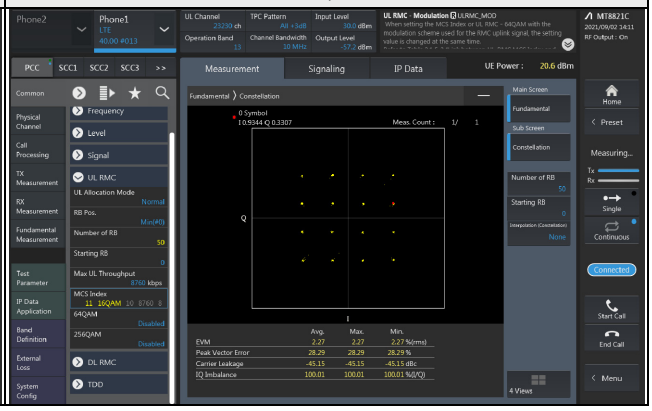


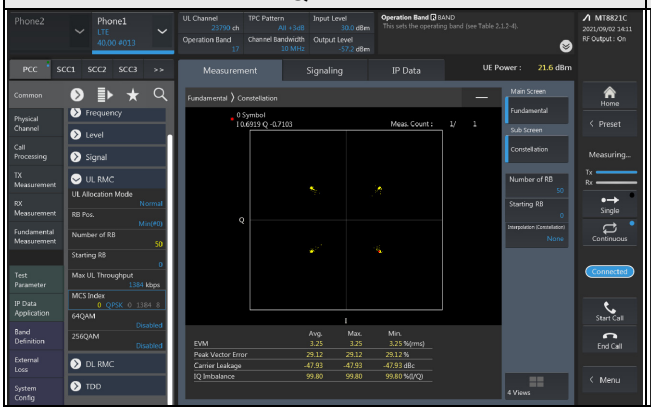
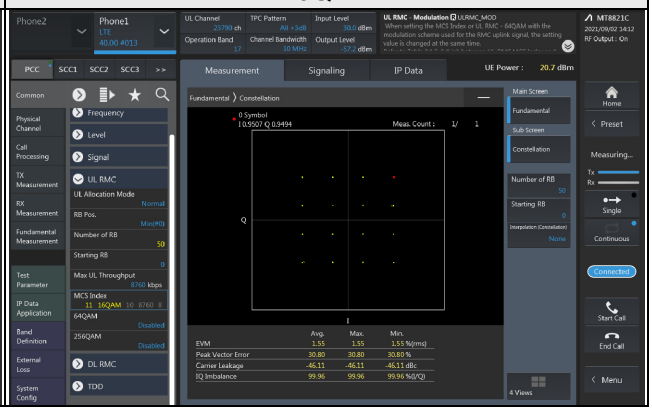
4.2.4 Test Results

LTE Band 4	
Spectrum Plot of Measurement Value	
Channel: 20175 / Frequency (MHz): 1732.5MHz	
QPSK	16QAM
	

LTE Band 7	
Spectrum Plot of Measurement Value	
Channel: 21100 / Frequency (MHz): 2535.0MHz	
QPSK	16QAM
	

LTE Band 12	
Spectrum Plot of Measurement Value	
Channel: 23095 / Frequency (MHz): 707.5MHz	
QPSK	16QAM
	

LTE Band 13	
Spectrum Plot of Measurement Value	
Channel: 23230 / Frequency (MHz): 782.0MHz	
QPSK	16QAM
	

LTE Band 17	
Spectrum Plot of Measurement Value	
Channel: 23790 / Frequency (MHz): 710.0MHz	
QPSK	16QAM
	

4.3 Frequency Stability Measurement

4.3.1 Limits of Frequency Stability Measurement

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

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.

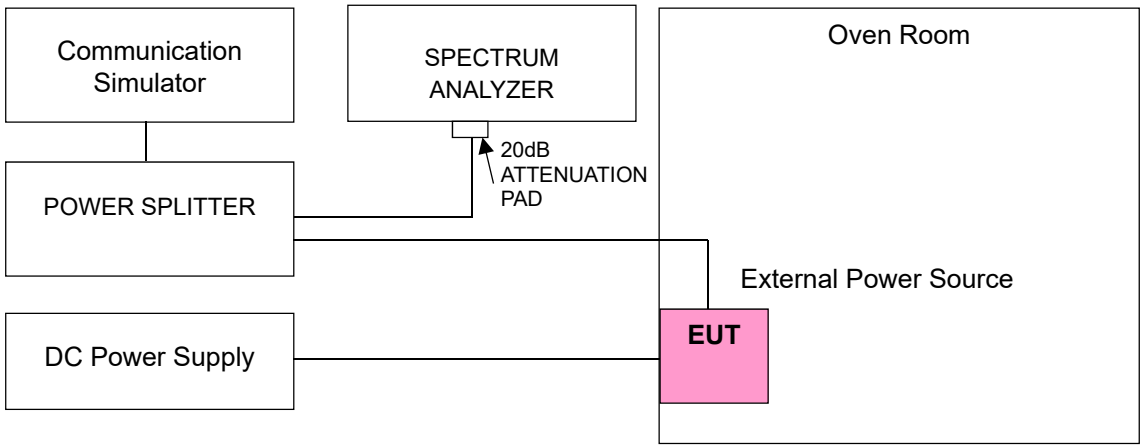
4.3.3 Test Instruments

Test Date: Sep. 02, 2021

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Radio Communication Analyzer Anritsu	MT8821C	6261806803	Jan. 22, 2021	Jan. 21, 2022
Temperature & Humidity Chamber TERCHY	HRM-120RF	931022	Dec. 24, 2020	Dec. 23, 2021
Digital Multimeter Fluke	87-III	70360742	Jun. 24, 2021	Jun. 23, 2022
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 (Vdc)	LTE Band 4			
	Channel Bandwidth 1.4 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
3.6	1710.700002	0.001	1754.300001	0.001
3.06	1710.700004	0.002	1754.300003	0.002
4.14	1710.700001	0.001	1754.300002	0.001

Note: The applicant defined the normal working voltage is from 3.06Vdc to 4.14Vdc.

Frequency Error vs. Temperature

Temp. (℃)	LTE Band 4			
	Channel Bandwidth 1.4 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	1710.700001	0.001	1754.300003	0.002
-20	1710.700003	0.002	1754.300001	0.001
-10	1710.700002	0.001	1754.300002	0.001
0	1710.700003	0.002	1754.300002	0.001
10	1710.700001	0.001	1754.300004	0.002
20	1710.699998	-0.001	1754.299997	-0.002
30	1710.699997	-0.002	1754.299999	-0.001
40	1710.699997	-0.002	1754.299999	-0.001
50	1710.699997	-0.002	1754.299997	-0.002

Frequency Error vs. Voltage

Voltage (Vdc)	LTE Band 4			
	Channel Bandwidth 3 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
3.6	1711.500002	0.001	1753.500002	0.001
3.06	1711.500001	0.001	1753.500004	0.002
4.14	1711.500001	0.001	1753.500002	0.001

Note: The applicant defined the normal working voltage is from 3.06Vdc to 4.14Vdc.

Frequency Error vs. Temperature

Temp. (℃)	LTE Band 4			
	Channel Bandwidth 3 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	1711.500005	0.003	1753.500002	0.001
-20	1711.500003	0.002	1753.500003	0.002
-10	1711.500002	0.001	1753.500001	0.001
0	1711.500001	0.001	1753.500001	0.001
10	1711.500003	0.002	1753.500002	0.001
20	1711.499999	-0.001	1753.499999	-0.001
30	1711.499996	-0.002	1753.499997	-0.002
40	1711.499998	-0.001	1753.499996	-0.002
50	1711.499998	-0.001	1753.499997	-0.002

Frequency Error vs. Voltage

Voltage (Vdc)	LTE Band 4			
	Channel Bandwidth 5MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
3.6	1712.500002	0.001	1752.500003	0.001
3.06	1712.500002	0.001	1752.500003	0.002
4.14	1712.500002	0.001	1752.500003	0.002

Note: The applicant defined the normal working voltage is from 3.06Vdc to 4.14Vdc.

Frequency Error vs. Temperature

Temp. (℃)	LTE Band 4			
	Channel Bandwidth 5MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	1712.500003	0.002	1752.500001	0.001
-20	1712.500001	0.001	1752.500002	0.001
-10	1712.500003	0.002	1752.500003	0.002
0	1712.500004	0.002	1752.500003	0.002
10	1712.500002	0.001	1752.500001	0.001
20	1712.499996	-0.002	1752.499997	-0.001
30	1712.499996	-0.002	1752.499998	-0.001
40	1712.499997	-0.002	1752.499998	-0.001
50	1712.499999	-0.001	1752.499996	-0.002

Frequency Error vs. Voltage

Voltage (Vdc)	LTE Band 4			
	Channel Bandwidth 10MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
3.6	1715.000004	0.002	1750.000003	0.002
3.06	1715.000001	0.001	1750.000004	0.002
4.14	1715.000003	0.001	1750.000002	0.001

Note: The applicant defined the normal working voltage is from 3.06Vdc to 4.14Vdc.

Frequency Error vs. Temperature

Temp. (℃)	LTE Band 4			
	Channel Bandwidth 10MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	1715.000001	0.001	1750.000002	0.001
-20	1715.000002	0.001	1750.000002	0.001
-10	1715.000003	0.002	1750.000002	0.001
0	1715.000001	0.001	1750.000003	0.002
10	1715.000004	0.002	1750.000004	0.002
20	1714.999997	-0.002	1749.999999	-0.001
30	1714.999999	-0.001	1749.999997	-0.002
40	1714.999998	-0.001	1749.999998	-0.001
50	1714.999997	-0.002	1749.999999	-0.001

Frequency Error vs. Voltage

Voltage (Vdc)	LTE Band 4			
	Channel Bandwidth 15MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
3.6	1717.500003	0.002	1747.500003	0.002
3.06	1717.500003	0.002	1747.500004	0.002
4.14	1717.500002	0.001	1747.500002	0.001

Note: The applicant defined the normal working voltage is from 3.06Vdc to 4.14Vdc.

Frequency Error vs. Temperature

Temp. (℃)	LTE Band 4			
	Channel Bandwidth 15MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	1717.500004	0.002	1747.500008	0.005
-20	1717.500003	0.002	1747.500002	0.001
-10	1717.500004	0.002	1747.500003	0.002
0	1717.500001	0.001	1747.500002	0.001
10	1717.500003	0.002	1747.500001	0.001
20	1717.499997	-0.002	1747.499999	-0.001
30	1717.499996	-0.002	1747.499998	-0.001
40	1717.499997	-0.002	1747.499996	-0.002
50	1717.499999	-0.001	1747.499999	-0.001

Frequency Error vs. Voltage

Voltage (Vdc)	LTE Band 4			
	Channel Bandwidth 20MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
3.6	1720.000002	0.001	1745.000003	0.002
3.06	1720.000004	0.002	1745.000002	0.001
4.14	1720.000003	0.002	1745.000003	0.002

Note: The applicant defined the normal working voltage is from 3.06Vdc to 4.14Vdc.

Frequency Error vs. Temperature

Temp. (℃)	LTE Band 4			
	Channel Bandwidth 20MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	1720.000003	0.002	1745.000004	0.002
-20	1720.000002	0.001	1745.000003	0.001
-10	1720.000004	0.002	1745.000003	0.001
0	1720.000004	0.002	1745.000002	0.001
10	1720.000002	0.001	1745.000001	0.001
20	1719.999997	-0.002	1744.999997	-0.002
30	1719.999999	-0.001	1744.999997	-0.002
40	1719.999997	-0.002	1744.999997	-0.001
50	1719.999998	-0.001	1744.999998	-0.001

Frequency Error vs. Voltage

Voltage (Vdc)	LTE Band 7			
	Channel Bandwidth 5MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
3.6	2502.500002	0.001	2567.500001	0.001
3.06	2502.500001	0.000	2567.500003	0.001
4.14	2502.500002	0.001	2567.500003	0.001

Note: The applicant defined the normal working voltage is from 3.06Vdc to 4.14Vdc.

Frequency Error vs. Temperature

Temp. (℃)	LTE Band 7			
	Channel Bandwidth 5MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	2502.500002	0.001	2567.500006	0.002
-20	2502.500003	0.001	2567.500001	0.001
-10	2502.500002	0.001	2567.500001	0.001
0	2502.500001	0.000	2567.500003	0.001
10	2502.500004	0.002	2567.500003	0.001
20	2502.499998	-0.001	2567.499998	-0.001
30	2502.499998	-0.001	2567.499999	-0.001
40	2502.499998	-0.001	2567.499999	0.000
50	2502.499997	-0.001	2567.499997	-0.001

Frequency Error vs. Voltage

Voltage (Vdc)	LTE Band 7			
	Channel Bandwidth 10MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
3.6	2505.000001	0.001	2565.000001	0.001
3.06	2505.000002	0.001	2565.000003	0.001
4.14	2505.000004	0.001	2565.000002	0.001

Note: The applicant defined the normal working voltage is from 3.06Vdc to 4.14Vdc.

Frequency Error vs. Temperature

Temp. (℃)	LTE Band 7			
	Channel Bandwidth 10MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	2505.000007	0.003	2565.000005	0.002
-20	2505.000002	0.001	2565.000003	0.001
-10	2505.000001	0.001	2565.000001	0.000
0	2505.000002	0.001	2565.000004	0.001
10	2505.000003	0.001	2565.000001	0.000
20	2504.999998	-0.001	2564.999997	-0.001
30	2504.999999	-0.001	2564.999996	-0.001
40	2504.999997	-0.001	2564.999998	-0.001
50	2504.999997	-0.001	2564.999997	-0.001

Frequency Error vs. Voltage

Voltage (Vdc)	LTE Band 7			
	Channel Bandwidth 15MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
3.6	2507.500002	0.001	2562.500002	0.001
3.06	2507.500004	0.001	2562.500003	0.001
4.14	2507.500001	0.000	2562.500001	0.001

Note: The applicant defined the normal working voltage is from 3.06Vdc to 4.14Vdc.

Frequency Error vs. Temperature

Temp. (℃)	LTE Band 7			
	Channel Bandwidth 15MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	2507.500002	0.001	2562.500003	0.001
-20	2507.500002	0.001	2562.500002	0.001
-10	2507.500002	0.001	2562.500002	0.001
0	2507.500001	0.000	2562.500004	0.001
10	2507.500002	0.001	2562.500003	0.001
20	2507.499999	-0.001	2562.499997	-0.001
30	2507.499997	-0.001	2562.499997	-0.001
40	2507.499999	0.000	2562.499998	-0.001
50	2507.499997	-0.001	2562.499997	-0.001

Frequency Error vs. Voltage

Voltage (Vdc)	LTE Band 7			
	Channel Bandwidth 20MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
3.6	2510.000001	0.000	2560.000001	0.001
3.06	2510.000004	0.002	2560.000002	0.001
4.14	2510.000002	0.001	2560.000001	0.000

Note: The applicant defined the normal working voltage is from 3.06Vdc to 4.14Vdc.

Frequency Error vs. Temperature

Temp. (℃)	LTE Band 7			
	Channel Bandwidth 20MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	2510.000001	0.000	2560.000001	0.000
-20	2510.000002	0.001	2560.000003	0.001
-10	2510.000004	0.001	2560.000002	0.001
0	2510.000001	0.001	2560.000002	0.001
10	2510.000003	0.001	2560.000001	0.000
20	2509.999998	-0.001	2559.999998	-0.001
30	2509.999996	-0.001	2559.999998	-0.001
40	2509.999999	-0.001	2559.999997	-0.001
50	2509.999997	-0.001	2559.999996	-0.002

Frequency Error vs. Voltage

Voltage (Vdc)	LTE Band 12			
	Channel Bandwidth 1.4 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
3.6	699.700001	0.001	715.300003	0.004
3.06	699.700003	0.004	715.300003	0.004
4.14	699.700002	0.003	715.300003	0.004

Note: The applicant defined the normal working voltage is from 3.06Vdc to 4.14Vdc.

Frequency Error vs. Temperature

Temp. (℃)	LTE Band 12			
	Channel Bandwidth 1.4 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	699.700001	0.001	715.300002	0.003
-20	699.700003	0.004	715.300004	0.005
-10	699.700002	0.003	715.300002	0.003
0	699.700002	0.002	715.300003	0.004
10	699.700001	0.001	715.300002	0.003
20	699.699998	-0.003	715.299999	-0.002
30	699.699998	-0.003	715.299999	-0.002
40	699.699997	-0.004	715.299997	-0.004
50	699.699998	-0.003	715.299998	-0.003

Frequency Error vs. Voltage

Voltage (Vdc)	LTE Band 12			
	Channel Bandwidth 3 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
3.6	700.500002	0.003	714.500004	0.006
3.06	700.500003	0.004	714.500003	0.004
4.14	700.500003	0.004	714.500003	0.004

Note: The applicant defined the normal working voltage is from 3.06Vdc to 4.14Vdc.

Frequency Error vs. Temperature

Temp. (℃)	LTE Band 12			
	Channel Bandwidth 3 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	700.500002	0.003	714.500003	0.004
-20	700.500004	0.005	714.500003	0.004
-10	700.500003	0.005	714.500002	0.003
0	700.500003	0.005	714.500003	0.004
10	700.500002	0.003	714.500002	0.002
20	700.499998	-0.003	714.499998	-0.003
30	700.499996	-0.006	714.499997	-0.004
40	700.499998	-0.003	714.499996	-0.006
50	700.499998	-0.003	714.499998	-0.002

Frequency Error vs. Voltage

Voltage (Vdc)	LTE Band 12			
	Channel Bandwidth 5MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
3.6	701.500002	0.002	713.500001	0.002
3.06	701.500002	0.003	713.500004	0.005
4.14	701.500002	0.003	713.500002	0.003

Note: The applicant defined the normal working voltage is from 3.06Vdc to 4.14Vdc.

Frequency Error vs. Temperature

Temp. (℃)	LTE Band 12			
	Channel Bandwidth 5MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	701.500004	0.006	713.500005	0.007
-20	701.500002	0.002	713.500004	0.005
-10	701.500003	0.005	713.500002	0.003
0	701.500003	0.004	713.500004	0.005
10	701.500002	0.003	713.500002	0.003
20	701.499999	-0.002	713.499996	-0.005
30	701.499998	-0.003	713.499998	-0.003
40	701.499996	-0.005	713.499999	-0.002
50	701.499997	-0.005	713.499997	-0.004

Frequency Error vs. Voltage

Voltage (Vdc)	LTE Band 12			
	Channel Bandwidth 10MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
3.6	704.000002	0.003	711.000004	0.005
3.06	704.000002	0.002	711.000001	0.002
4.14	704.000002	0.003	711.000003	0.004

Note: The applicant defined the normal working voltage is from 3.06Vdc to 4.14Vdc.

Frequency Error vs. Temperature

Temp. (℃)	LTE Band 12			
	Channel Bandwidth 10MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	704.000001	0.001	711.000005	0.007
-20	704.000002	0.003	711.000003	0.004
-10	704.000004	0.006	711.000003	0.004
0	704.000003	0.004	711.000002	0.003
10	704.000004	0.006	711.000002	0.003
20	703.999998	-0.002	710.999999	-0.002
30	703.999998	-0.002	710.999997	-0.004
40	703.999996	-0.005	710.999999	-0.002
50	703.999996	-0.005	710.999996	-0.005

Frequency Error vs. Voltage

Voltage (Vdc)	LTE Band 13			
	Channel Bandwidth 5MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
3.6	779.500001	0.002	784.500002	0.003
3.06	779.500002	0.003	784.500002	0.003
4.14	779.500002	0.003	784.500002	0.002

Note: The applicant defined the normal working voltage is from 3.06Vdc to 4.14Vdc.

Frequency Error vs. Temperature

Temp. (℃)	LTE Band 13			
	Channel Bandwidth 5MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	779.500003	0.004	784.500001	0.001
-20	779.500002	0.002	784.500002	0.002
-10	779.500002	0.002	784.500004	0.005
0	779.500003	0.004	784.500002	0.003
10	779.500003	0.004	784.500002	0.002
20	779.499998	-0.003	784.499998	-0.003
30	779.499998	-0.002	784.499996	-0.005
40	779.499998	-0.003	784.499998	-0.002
50	779.499998	-0.003	784.499998	-0.002

Frequency Error vs. Voltage

Voltage (Vdc)	LTE Band 13	
	Channel Bandwidth 10MHz	
	Frequency (MHz)	Frequency Error (ppm)
3.6	782.000002	0.003
3.06	782.000003	0.004
4.14	782.000001	0.002

Note: The applicant defined the normal working voltage is from 3.06Vdc to 4.14Vdc.

Frequency Error vs. Temperature

Temp. (℃)	LTE Band 13	
	Channel Bandwidth 10MHz	
	Frequency (MHz)	Frequency Error (ppm)
-30	782.000001	0.001
-20	782.000003	0.004
-10	782.000001	0.002
0	782.000002	0.002
10	782.000003	0.003
20	781.999998	-0.003
30	781.999996	-0.005
40	781.999998	-0.003
50	781.999998	-0.003

Frequency Error vs. Voltage

Voltage (Vdc)	LTE Band 17			
	Channel Bandwidth 5MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
3.6	706.500002	0.003	713.500001	0.002
3.06	706.500003	0.005	713.500001	0.002
4.14	706.500003	0.005	713.500002	0.002

Note: The applicant defined the normal working voltage is from 3.06Vdc to 4.14Vdc.

Frequency Error vs. Temperature

Temp. (℃)	LTE Band 17			
	Channel Bandwidth 5MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	706.500002	0.003	713.500007	0.010
-20	706.500003	0.004	713.500004	0.005
-10	706.500002	0.003	713.500003	0.004
0	706.500002	0.002	713.500003	0.004
10	706.500003	0.005	713.500001	0.002
20	706.499999	-0.002	713.499999	-0.002
30	706.499999	-0.002	713.499999	-0.002
40	706.499997	-0.004	713.499996	-0.006
50	706.499998	-0.002	713.499997	-0.004

Frequency Error vs. Voltage

Voltage (Vdc)	LTE Band 17			
	Channel Bandwidth 10MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
3.6	709.000003	0.005	711.000002	0.002
3.06	709.000003	0.004	711.000002	0.003
4.14	709.000002	0.003	711.000001	0.001

Note: The applicant defined the normal working voltage is from 3.06Vdc to 4.14Vdc.

Frequency Error vs. Temperature

Temp. (℃)	LTE Band 17			
	Channel Bandwidth 10MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	709.000002	0.003	711.000001	0.001
-20	709.000003	0.004	711.000002	0.003
-10	709.000001	0.002	711.000003	0.004
0	709.000003	0.004	711.000003	0.004
10	709.000001	0.002	711.000002	0.002
20	708.999999	-0.002	710.999997	-0.004
30	708.999997	-0.004	710.999999	-0.001
40	708.999997	-0.005	710.999996	-0.005
50	708.999998	-0.003	710.999997	-0.005

4.4 Emission Bandwidth Measurement

4.4.1 Limits of Emission Bandwidth Measurement

According to FCC 2.1049, 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 % of the total mean power radiated by a given emission.

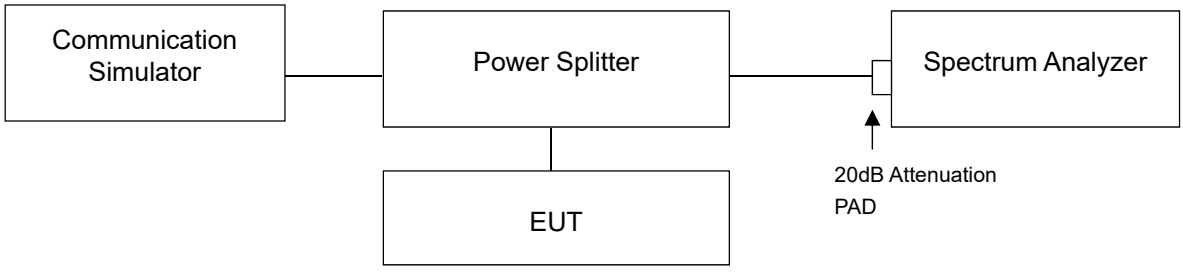
4.4.2 Test Procedure

For the 26dBc bandwidth measurement method, please refer to section 5.4.3 of ANSI C63.26.

a) The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The span range for the spectrum analyzer shall be wide enough to see sufficient roll off of the signal to make the measurement.
b) The nominal RBW shall be in the range of 1% to 5% of the anticipated OBW, and the VBW shall be set ≥ 3 × RBW.
c) Set the reference level of the instrument as required to prevent the signal amplitude from exceeding the maximum spectrum analyzer input mixer level for linear operation. See guidance provided in 4.2.3.
d) The dynamic range of the spectrum analyzer at the selected RBW shall be more than 10 dB below the target "−X dB" requirement, i.e., if the requirement calls for measuring the −26 dB OBW, the spectrum analyzer noise floor at the selected RBW shall be at least 36 dB below the reference level.
e) Set spectrum analyzer detection mode to peak, and the trace mode to max hold.
f) Determine the following reference values: Set the EUT to transmit a modulated signal. Allow the trace to stabilize. Set the spectrum analyzer marker to the highest level of the displayed trace (this is the reference value).
g) Determine the "−X dB amplitude" as equal to (Reference Value − X). Alternatively, this calculation can be performed on the spectrum analyzer using the delta-marker measurement function.
h) Place two markers, one at the lowest and the other at the highest frequency of the envelope of the spectral display such that each marker is at or slightly below the "−X dB amplitude" determined in step f). If a marker is below this "−X dB amplitude" value it should be as close as possible to this value. The OBW is the positive frequency difference between the two markers.
i) The OBW shall be reported by providing plot(s) of the measuring instrument display, to include markers depicting the relevant frequency and amplitude information (e.g., marker table). The frequency and amplitude axis and scale shall be clearly labeled. Tabular data may be reported in addition to the plot(s).

For the occupied bandwidth measurement method, please refer to section 5.4.4 of ANSI C63.26.

4.4.3 Test Setup



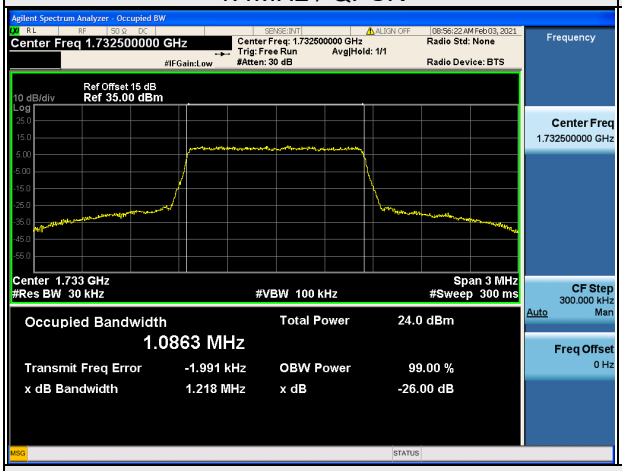
4.4.4 Test Result

LTE Band 4, Channel Bandwidth 1.4MHz					
Channel	Frequency (MHz)	26dB Bandwidth (MHz)		Occupied Bandwidth (MHz)	
		QPSK	16QAM	QPSK	16QAM
19957	1710.7	1.22	1.22	1.09	1.09
20175	1732.5	1.22	1.21	1.09	1.09
20393	1754.3	1.22	1.22	1.09	1.09

Spectrum Plot of Worst Value

26dB Bandwidth

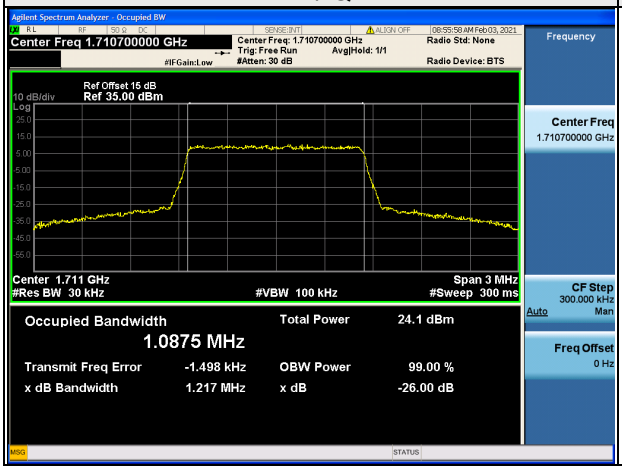
1.4MHz / QPSK



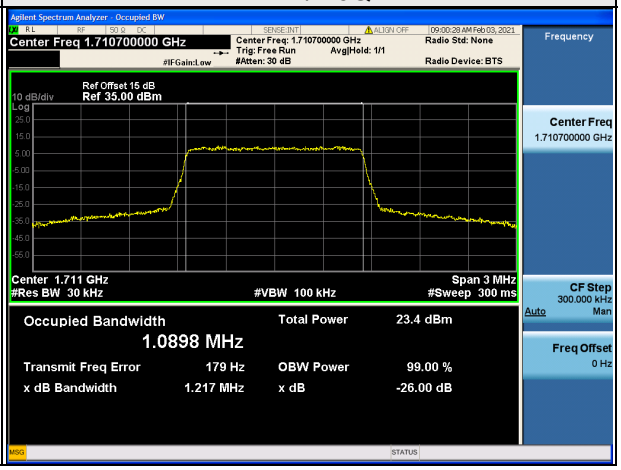
1.4MHz / 16QAM

Occupied Bandwidth

1.4MHz / QPSK



1.4MHz / 16QAM

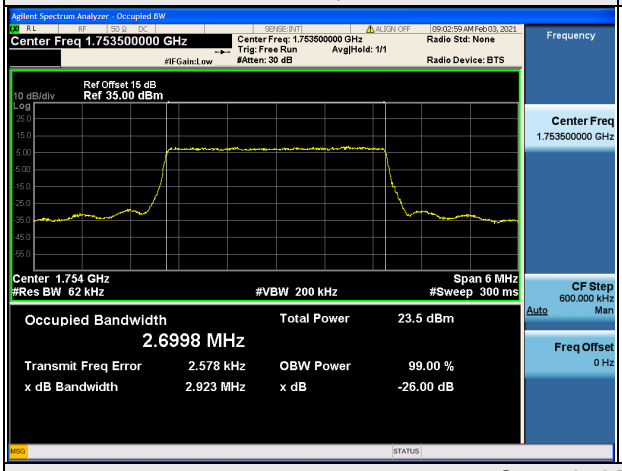


LTE Band 4, Channel Bandwidth 3MHz					
Channel	Frequency (MHz)	26dB Bandwidth (MHz)		Occupied Bandwidth (MHz)	
		QPSK	16QAM	QPSK	16QAM
19965	1711.5	2.92	2.93	2.70	2.70
20175	1732.5	2.92	2.93	2.70	2.70
20385	1753.5	2.92	2.93	2.70	2.70

Spectrum Plot of Worst Value

26dB Bandwidth

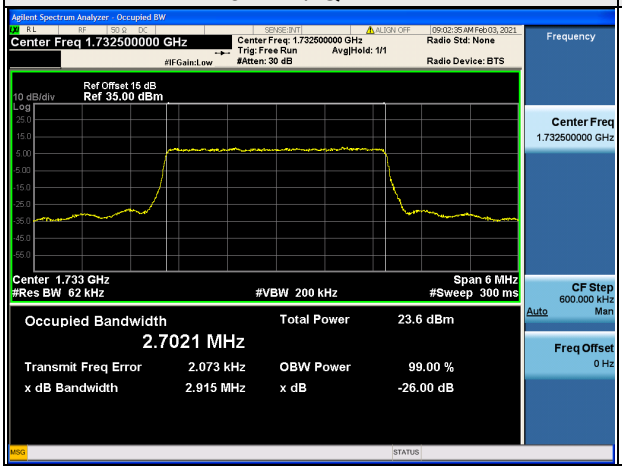
3MHz / QPSK



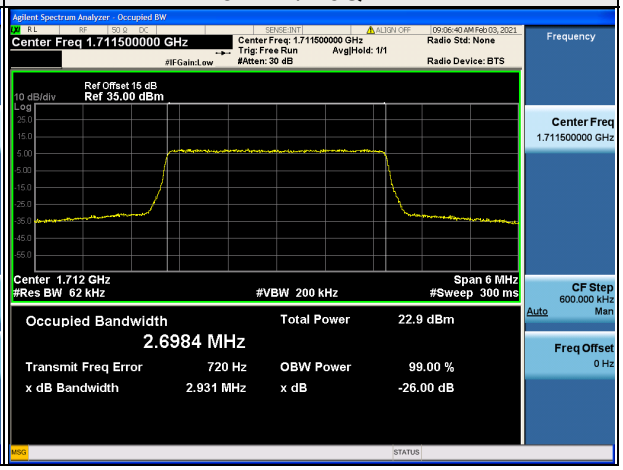
3MHz / 16QAM

Occupied Bandwidth

3MHz / QPSK



3MHz / 16QAM

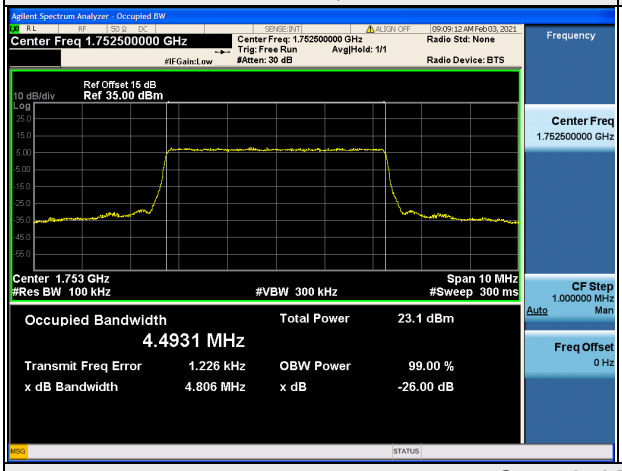


LTE Band 4, Channel Bandwidth 5MHz					
Channel	Frequency (MHz)	26dB Bandwidth (MHz)		Occupied Bandwidth (MHz)	
		QPSK	16QAM	QPSK	16QAM
19975	1712.5	4.80	4.81	4.49	4.49
20175	1732.5	4.80	4.82	4.49	4.50
20375	1752.5	4.81	4.81	4.49	4.50

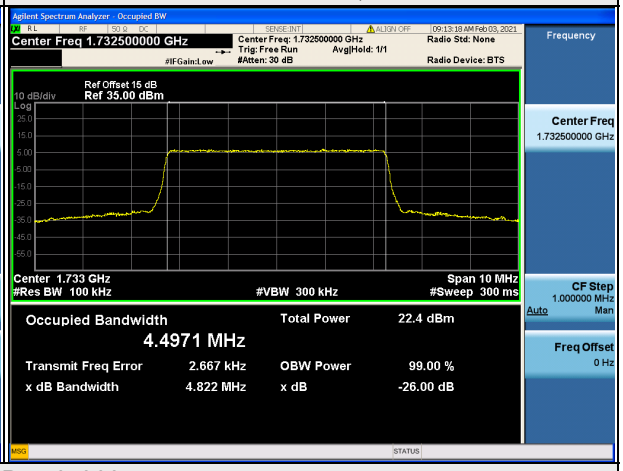
Spectrum Plot of Worst Value

26dB Bandwidth

5MHz / QPSK

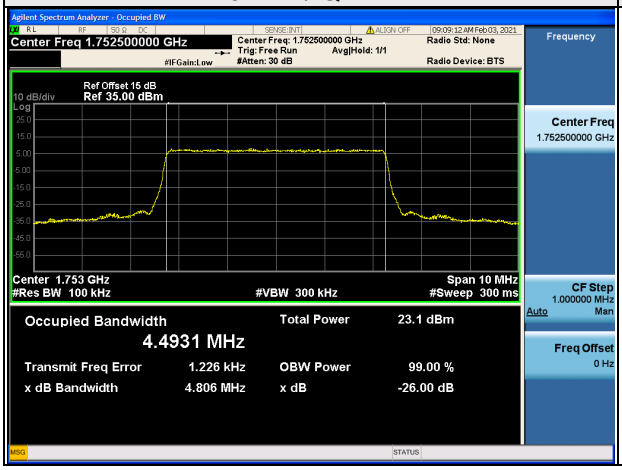


5MHz / 16QAM

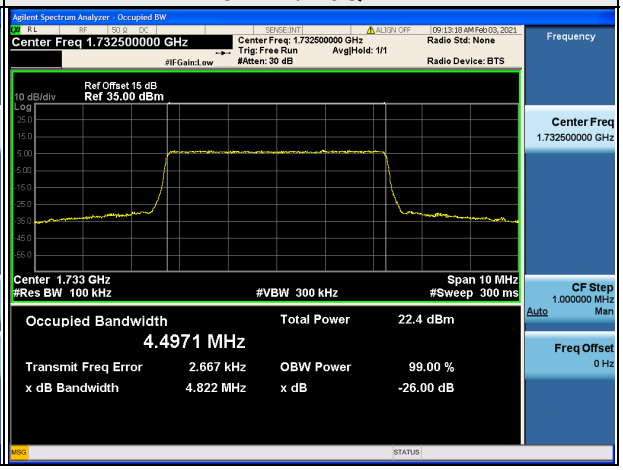


Occupied Bandwidth

5MHz / QPSK



5MHz / 16QAM

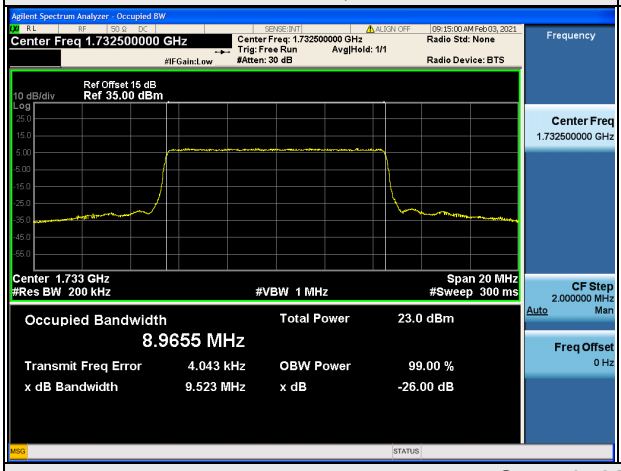


LTE Band 4, Channel Bandwidth 10MHz					
Channel	Frequency (MHz)	26dB Bandwidth (MHz)		Occupied Bandwidth (MHz)	
		QPSK	16QAM	QPSK	16QAM
20000	1715.0	9.51	9.52	8.97	8.97
20175	1732.5	9.52	9.51	8.97	8.97
20350	1750.0	9.52	9.52	8.97	8.97

Spectrum Plot of Worst Value

26dB Bandwidth

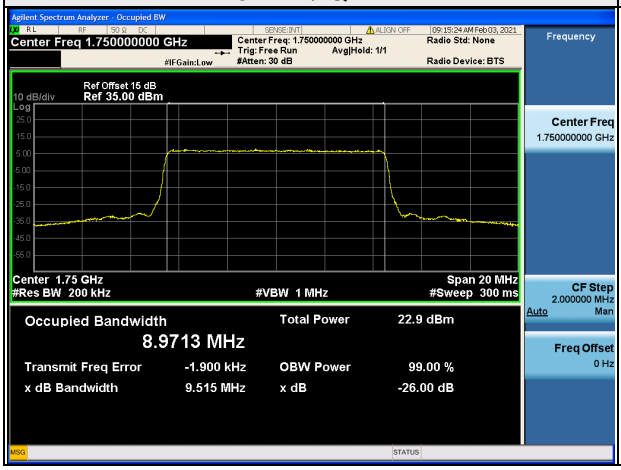
10MHz / QPSK



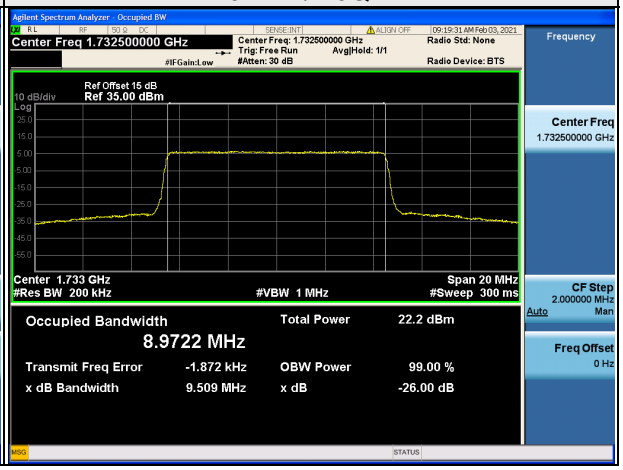
10MHz / 16QAM

Occupied Bandwidth

10MHz / QPSK



10MHz / 16QAM

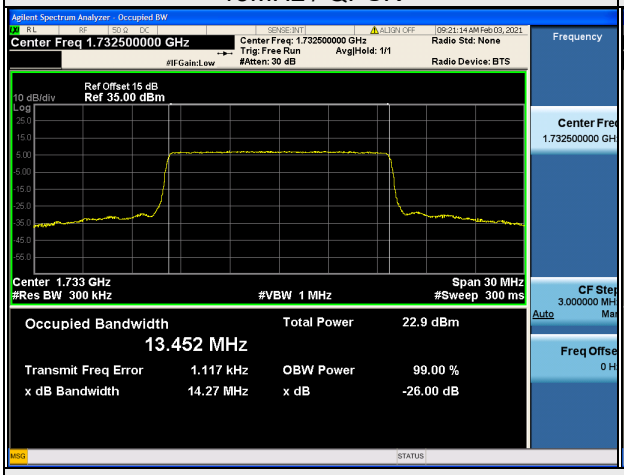


LTE Band 4, Channel Bandwidth 15MHz					
Channel	Frequency (MHz)	26dB Bandwidth (MHz)		Occupied Bandwidth (MHz)	
		QPSK	16QAM	QPSK	16QAM
20025	1717.5	14.25	14.24	13.45	13.44
20175	1732.5	14.27	14.23	13.45	13.44
20325	1747.5	14.25	14.24	13.46	13.45

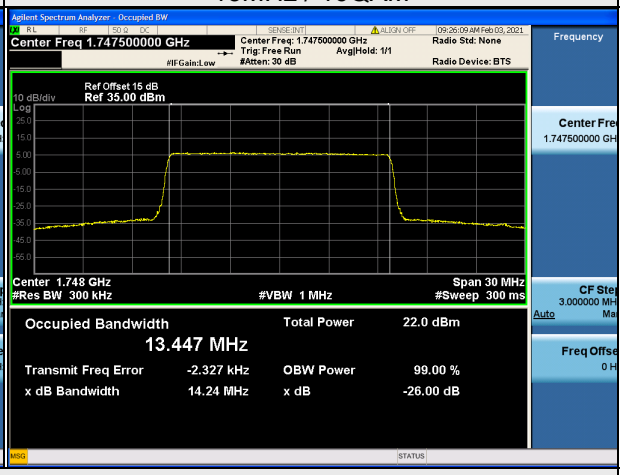
Spectrum Plot of Worst Value

26dB Bandwidth

15MHz / QPSK

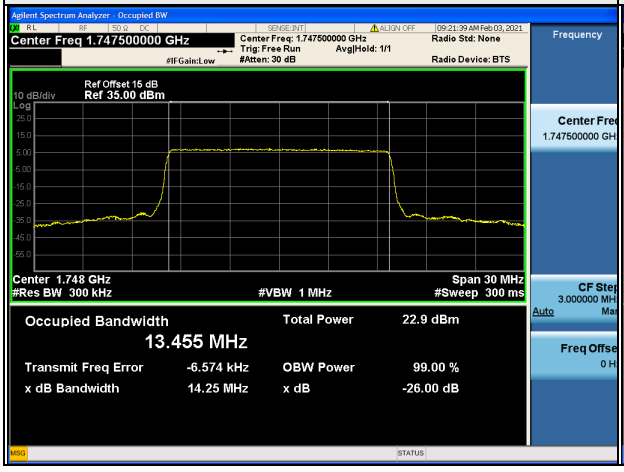


15MHz / 16QAM



Occupied Bandwidth

15MHz / QPSK



15MHz / 16QAM

LTE Band 4, Channel Bandwidth 20MHz					
Channel	Frequency (MHz)	26dB Bandwidth (MHz)		Occupied Bandwidth (MHz)	
		QPSK	16QAM	QPSK	16QAM
20050	1720.0	19.04	19.02	17.92	17.93
20175	1732.5	19.02	19.03	17.91	17.94
20300	1745.0	19.02	19.01	17.92	17.93

Spectrum Plot of Worst Value

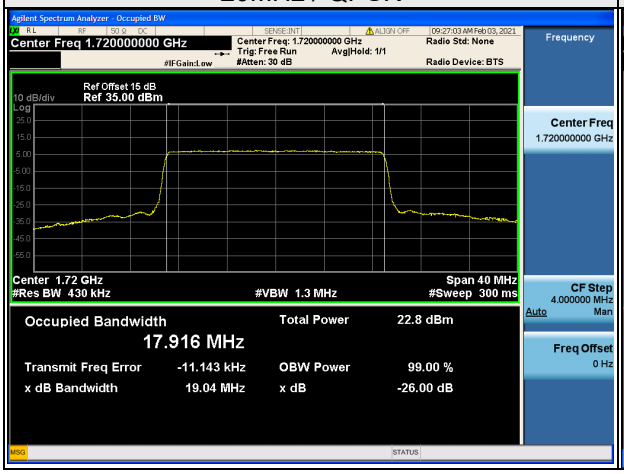
26dB Bandwidth

20MHz / QPSK

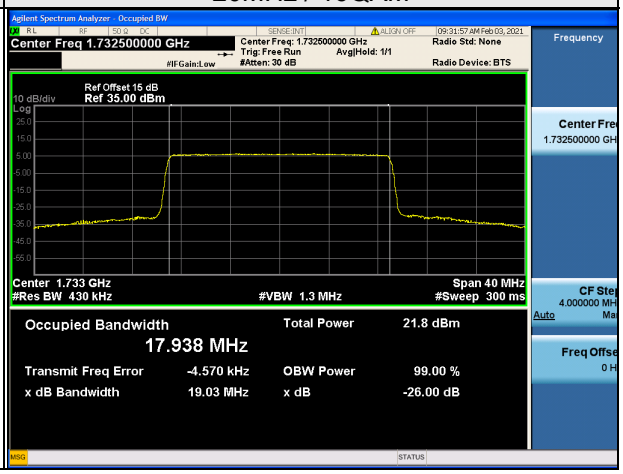
20MHz / 16QAM

Occupied Bandwidth

20MHz / QPSK



20MHz / 16QAM

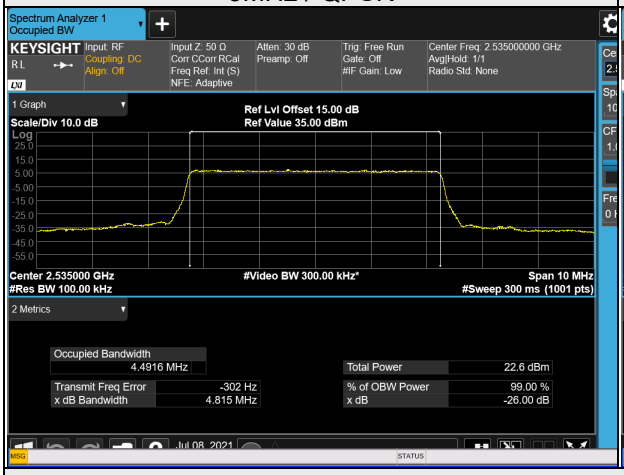


LTE Band 7, Channel Bandwidth 5MHz					
Channel	Frequency (MHz)	26dB Bandwidth (MHz)		Occupied Bandwidth (MHz)	
		QPSK	16QAM	QPSK	16QAM
20775	2502.5	4.80	4.82	4.49	4.49
21100	2535.0	4.82	4.81	4.49	4.50
21425	2567.5	4.81	4.80	4.49	4.50

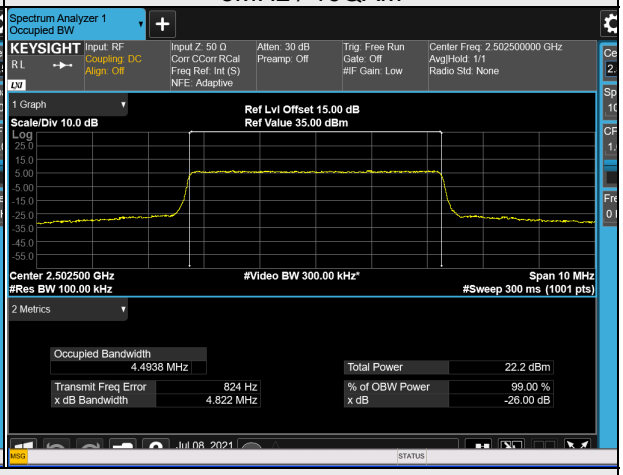
Spectrum Plot of Worst Value

26dB Bandwidth

5MHz / QPSK

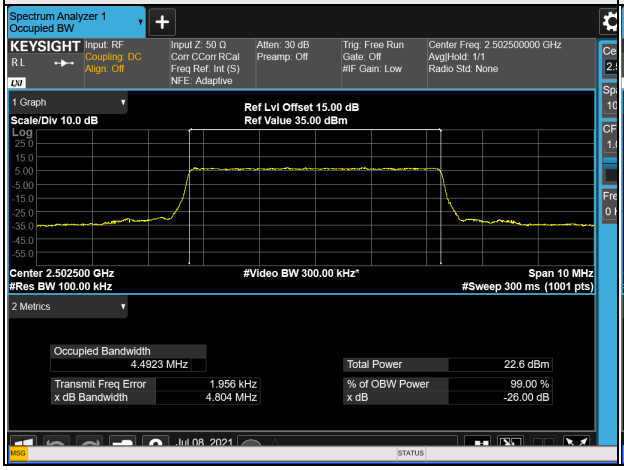


5MHz / 16QAM

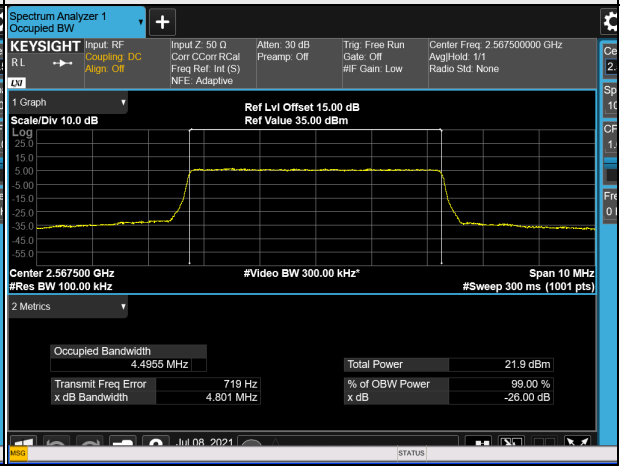


Occupied Bandwidth

5MHz / QPSK



5MHz / 16QAM

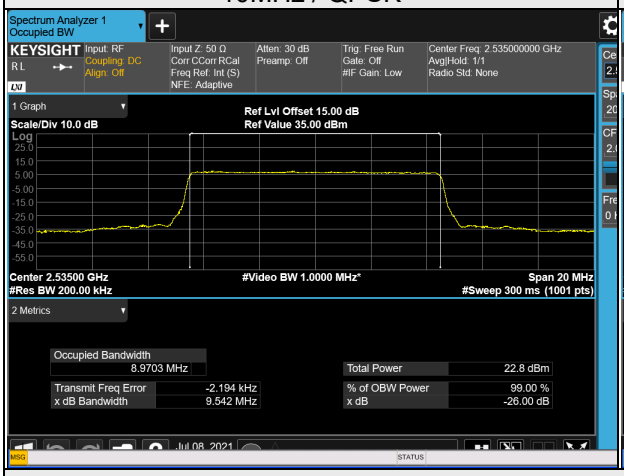


LTE Band 7, Channel Bandwidth 10MHz					
Channel	Frequency (MHz)	26dB Bandwidth (MHz)		Occupied Bandwidth (MHz)	
		QPSK	16QAM	QPSK	16QAM
20800	2505.0	9.54	9.56	8.97	8.98
21100	2535.0	9.54	9.51	8.97	8.98
21400	2565.0	9.53	9.52	8.97	8.97

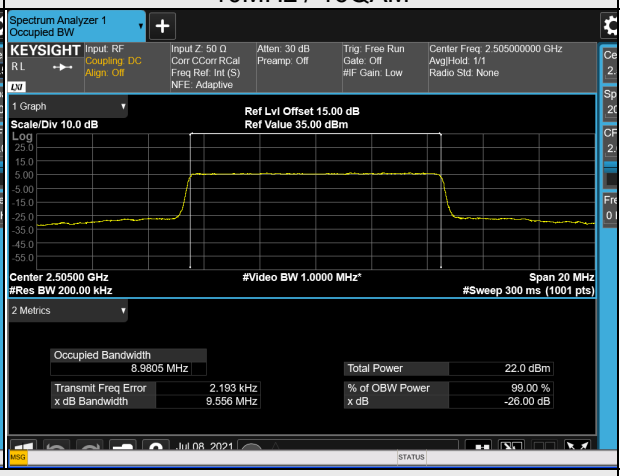
Spectrum Plot of Worst Value

26dB Bandwidth

10MHz / QPSK

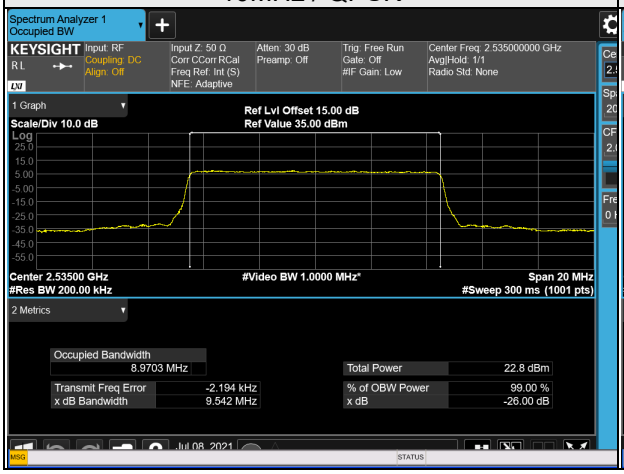


10MHz / 16QAM

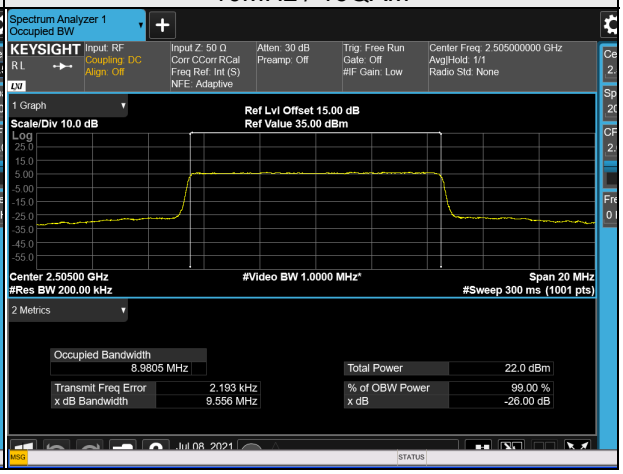


Occupied Bandwidth

10MHz / QPSK



10MHz / 16QAM

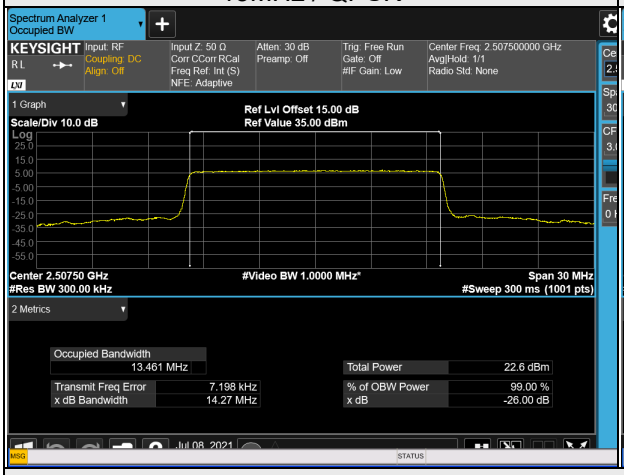


LTE Band 7, Channel Bandwidth 15MHz					
Channel	Frequency (MHz)	26dB Bandwidth (MHz)		Occupied Bandwidth (MHz)	
		QPSK	16QAM	QPSK	16QAM
20825	2507.5	14.27	14.25	13.46	13.45
21100	2535.0	14.26	14.23	13.45	13.45
21375	2562.5	14.26	14.23	13.44	13.43

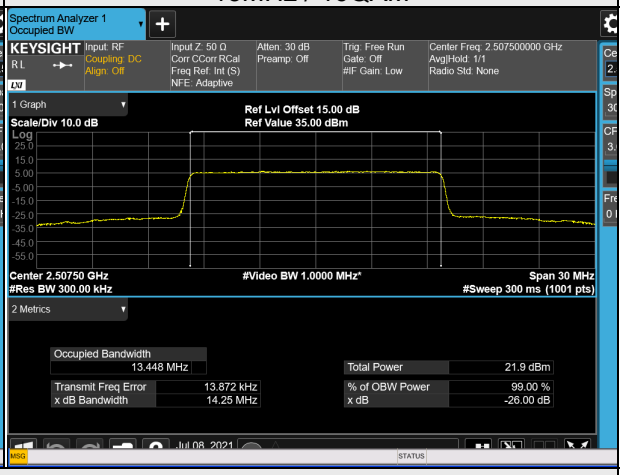
Spectrum Plot of Worst Value

26dB Bandwidth

15MHz / QPSK

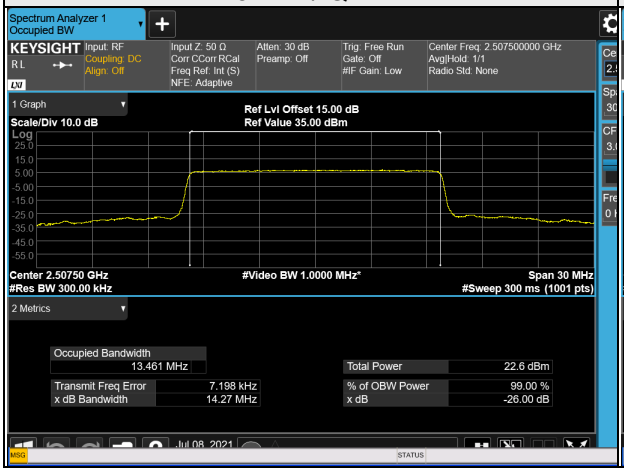


15MHz / 16QAM

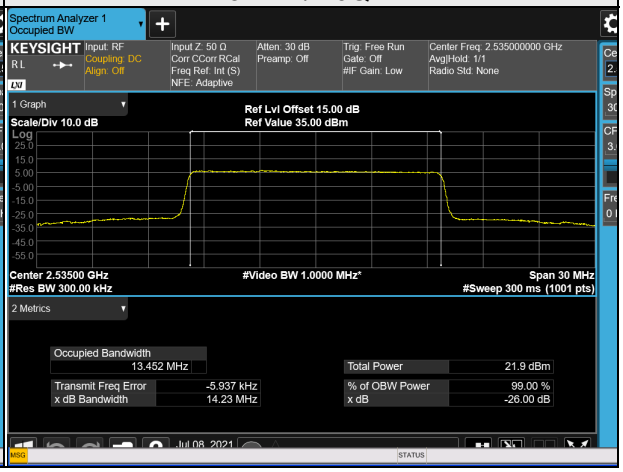


Occupied Bandwidth

15MHz / QPSK



15MHz / 16QAM

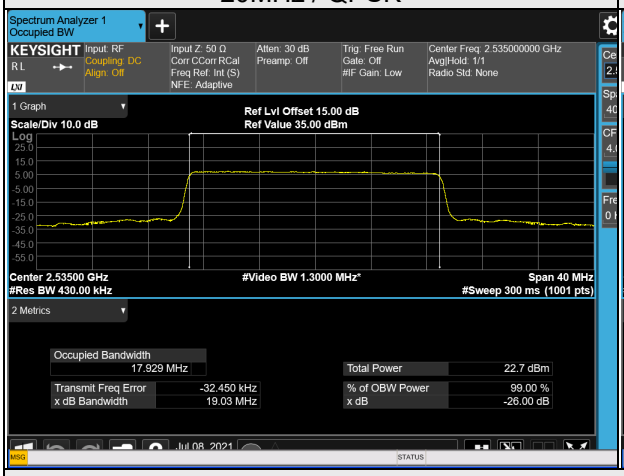


LTE Band 7, Channel Bandwidth 20MHz					
Channel	Frequency (MHz)	26dB Bandwidth (MHz)		Occupied Bandwidth (MHz)	
		QPSK	16QAM	QPSK	16QAM
20850	2510.0	19.03	19.04	17.90	17.94
21100	2535.0	19.03	19.03	17.93	17.96
21350	2560.0	19.03	19.02	17.90	17.92

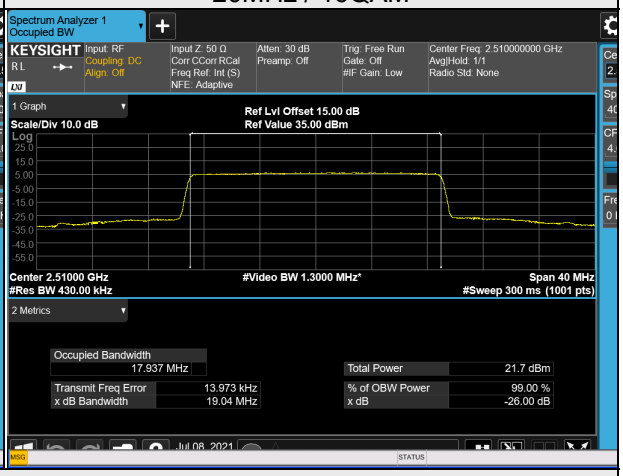
Spectrum Plot of Worst Value

26dB Bandwidth

20MHz / QPSK

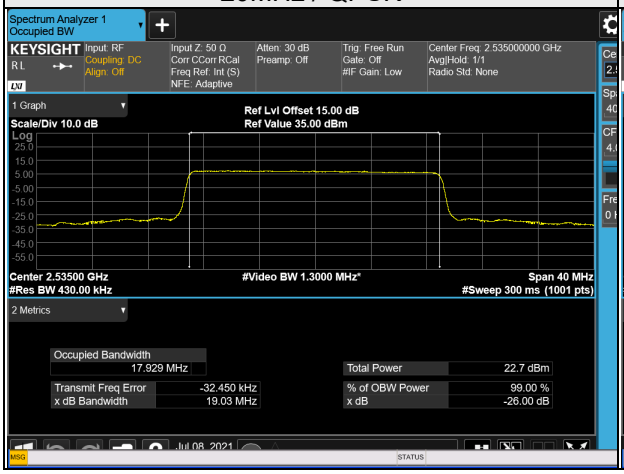


20MHz / 16QAM

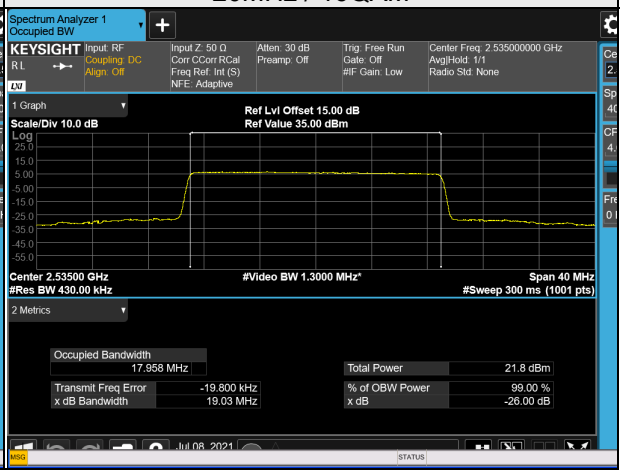


Occupied Bandwidth

20MHz / QPSK



20MHz / 16QAM

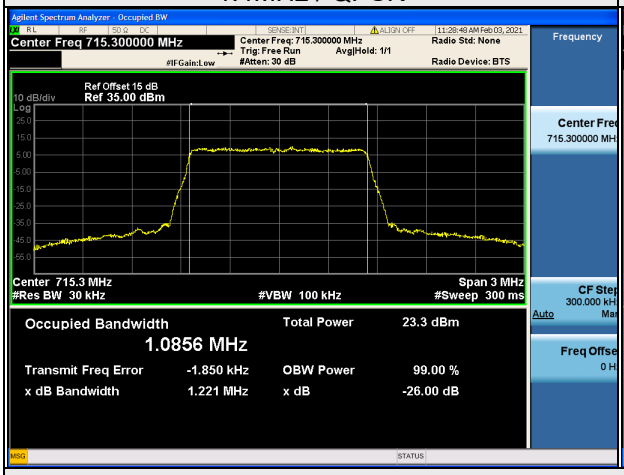


LTE Band 12, Channel Bandwidth 1.4MHz					
Channel	Frequency (MHz)	26dB Bandwidth (MHz)		Occupied Bandwidth (MHz)	
		QPSK	16QAM	QPSK	16QAM
23017	699.7	1.22	1.21	1.09	1.09
23095	707.5	1.22	1.21	1.09	1.09
23173	715.3	1.22	1.21	1.09	1.09

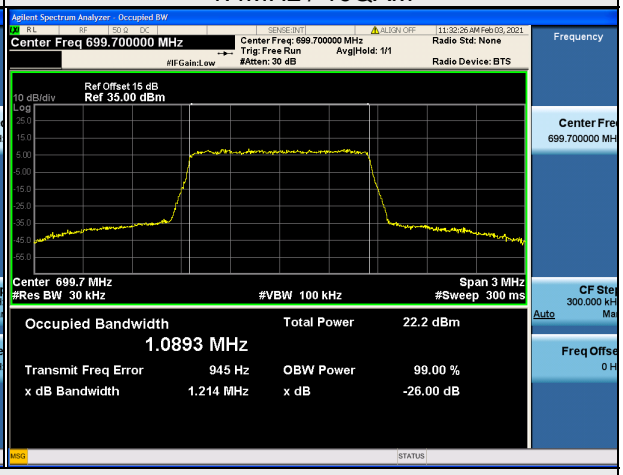
Spectrum Plot of Worst Value

26dB Bandwidth

1.4MHz / QPSK

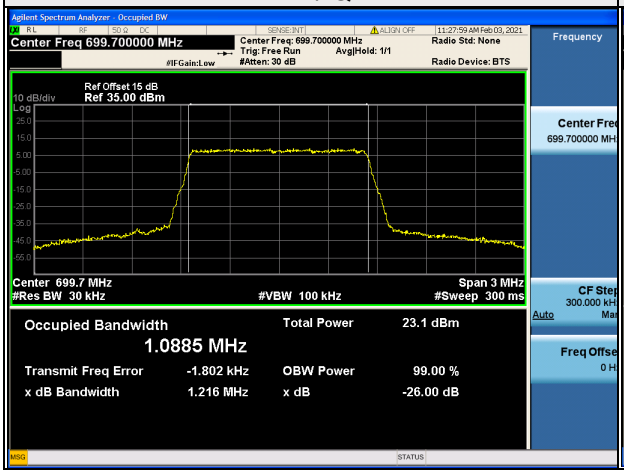


1.4MHz / 16QAM

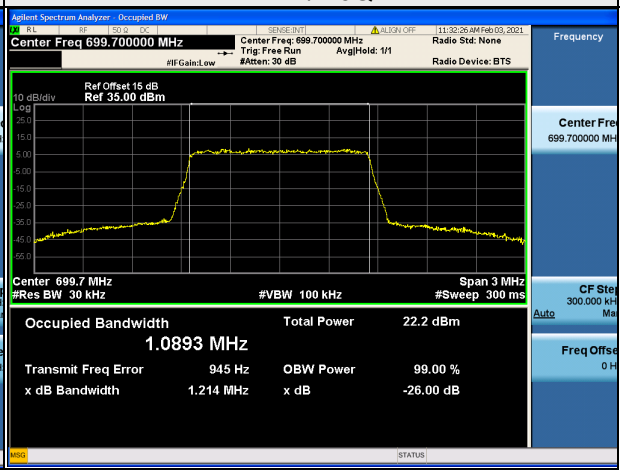


Occupied Bandwidth

1.4MHz / QPSK



1.4MHz / 16QAM

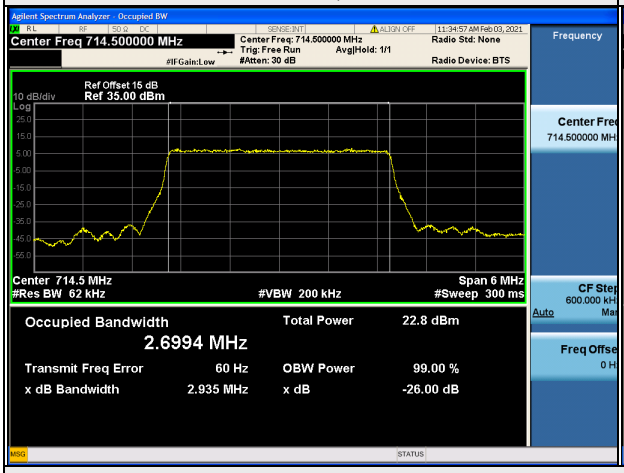


LTE Band 12, Channel Bandwidth 3MHz					
Channel	Frequency (MHz)	26dB Bandwidth (MHz)		Occupied Bandwidth (MHz)	
		QPSK	16QAM	QPSK	16QAM
23025	700.5	2.91	2.92	2.70	2.70
23095	707.5	2.93	2.91	2.70	2.70
23165	714.5	2.94	2.92	2.70	2.70

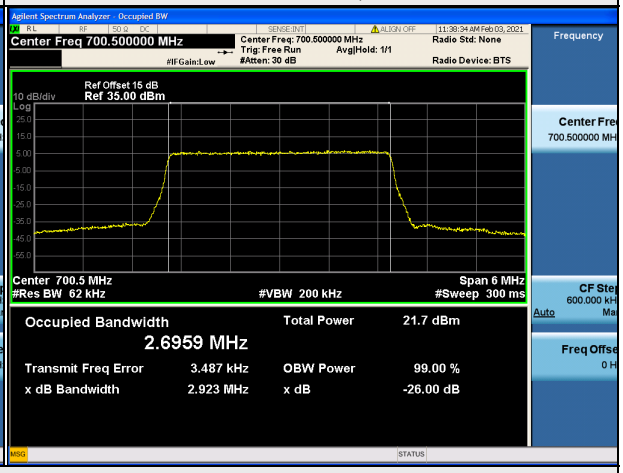
Spectrum Plot of Worst Value

26dB Bandwidth

3MHz / QPSK

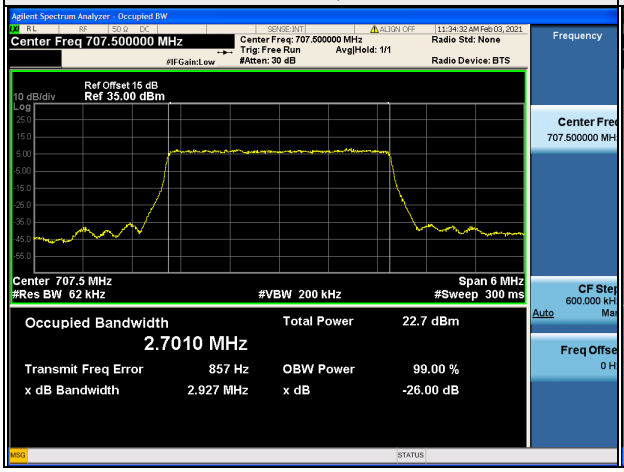


3MHz / 16QAM

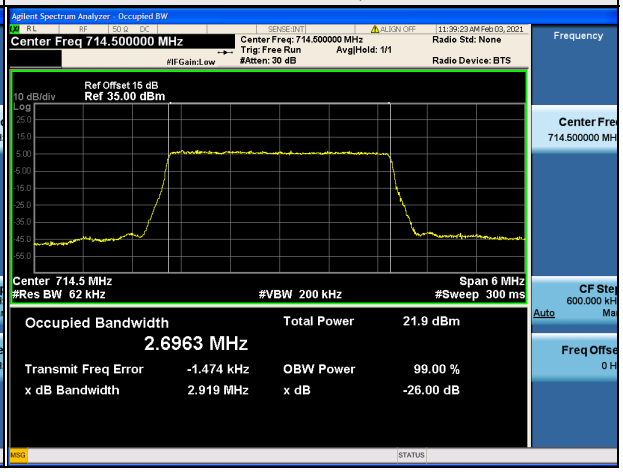


Occupied Bandwidth

3MHz / QPSK



3MHz / 16QAM

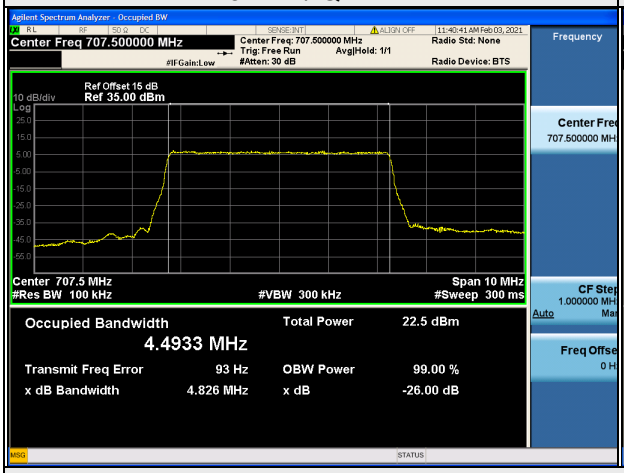


LTE Band 12, Channel Bandwidth 5MHz					
Channel	Frequency (MHz)	26dB Bandwidth (MHz)		Occupied Bandwidth (MHz)	
		QPSK	16QAM	QPSK	16QAM
23035	701.5	4.82	4.79	4.49	4.49
23095	707.5	4.83	4.82	4.49	4.50
23155	713.5	4.81	4.80	4.49	4.49

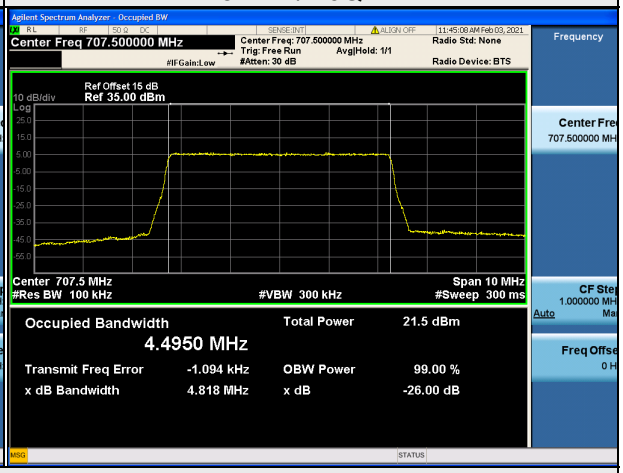
Spectrum Plot of Worst Value

26dB Bandwidth

5MHz / QPSK

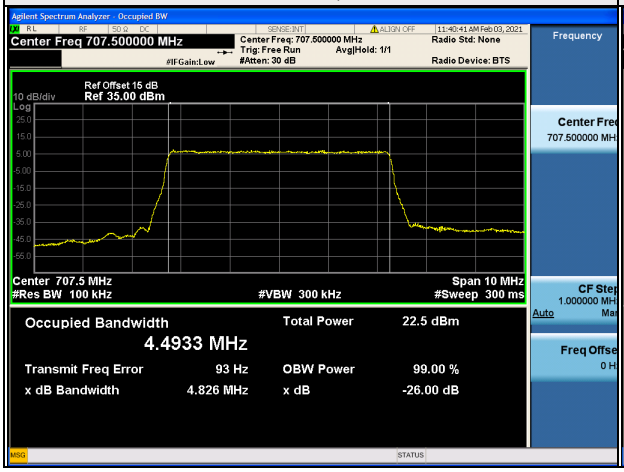


5MHz / 16QAM

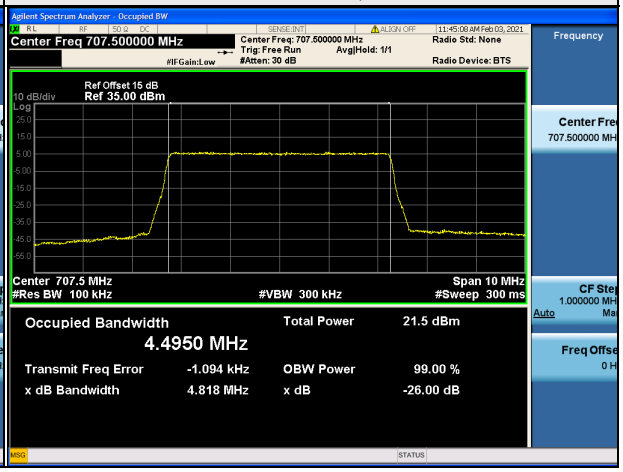


Occupied Bandwidth

5MHz / QPSK



5MHz / 16QAM

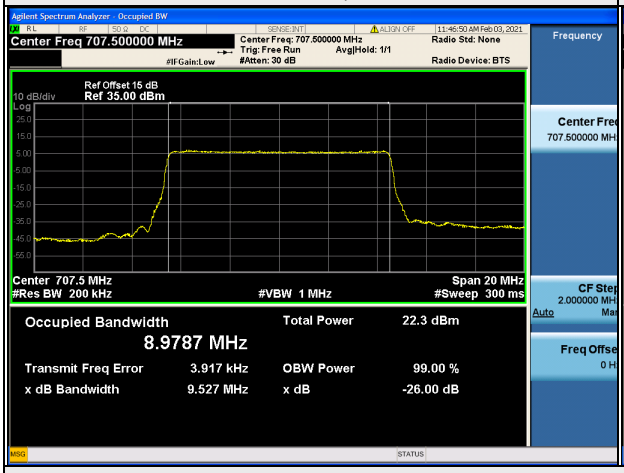


LTE Band 12, Channel Bandwidth 10MHz					
Channel	Frequency (MHz)	26dB Bandwidth (MHz)		Occupied Bandwidth (MHz)	
		QPSK	16QAM	QPSK	16QAM
23060	704.0	9.50	9.50	8.95	8.95
23095	707.5	9.53	9.51	8.98	8.98
23130	711.0	9.52	9.50	8.96	8.97

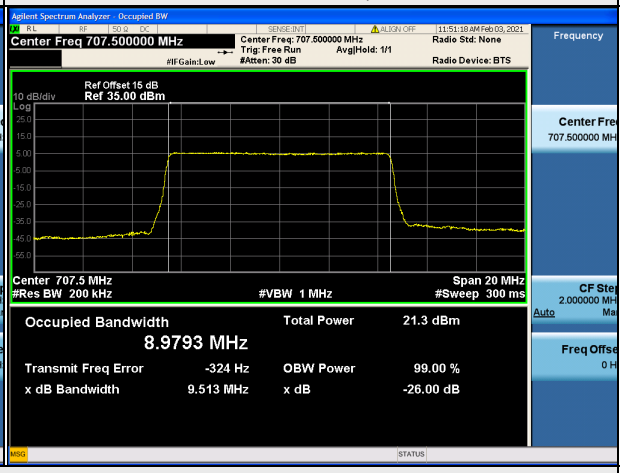
Spectrum Plot of Worst Value

26dB Bandwidth

10MHz / QPSK

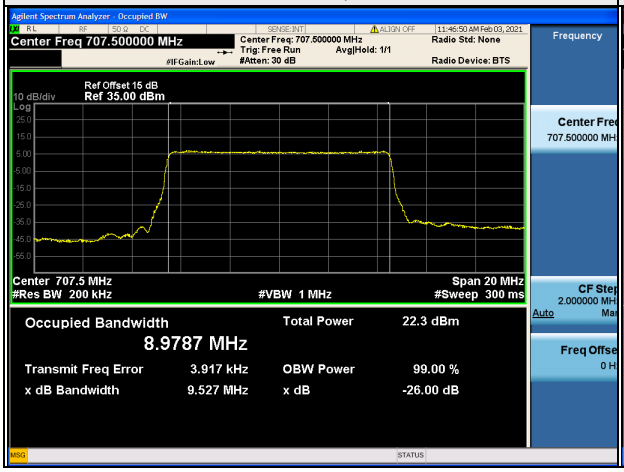


10MHz / 16QAM

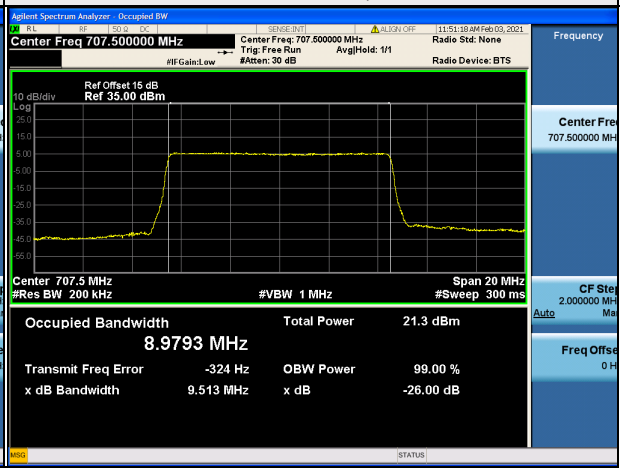


Occupied Bandwidth

10MHz / QPSK



10MHz / 16QAM



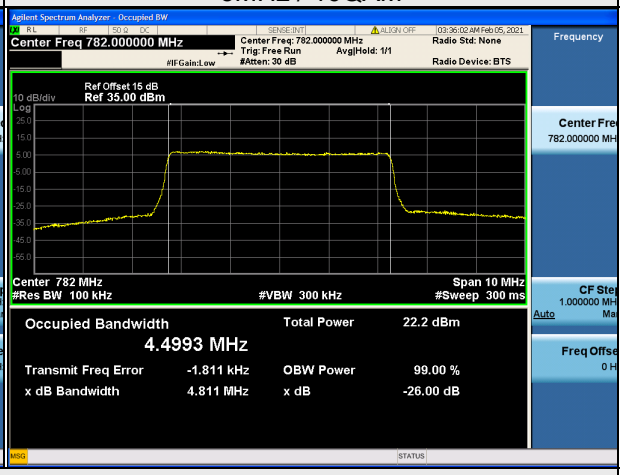
LTE Band 13, Channel Bandwidth 5MHz					
Channel	Frequency (MHz)	26dB Bandwidth (MHz)		Occupied Bandwidth (MHz)	
		QPSK	16QAM	QPSK	16QAM
23205	779.5	4.77	4.78	4.48	4.47
23230	782.0	4.83	4.81	4.50	4.50
23255	784.5	4.82	4.79	4.49	4.49

Spectrum Plot of Worst Value

26dB Bandwidth

5MHz / QPSK

5MHz / 16QAM



Occupied Bandwidth

5MHz / QPSK

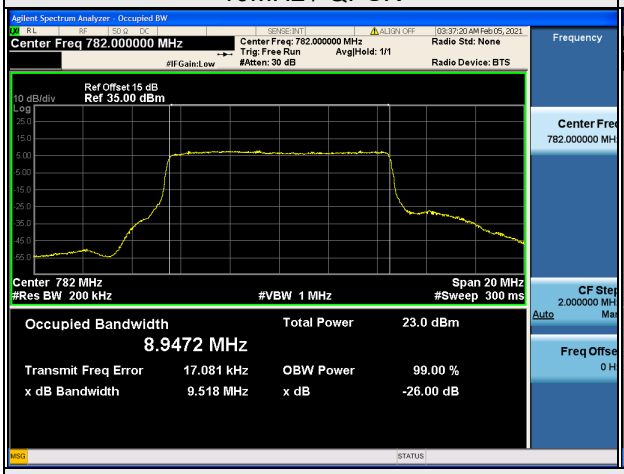
5MHz / 16QAM

LTE Band 13, Channel Bandwidth 10MHz					
Channel	Frequency (MHz)	26dB Bandwidth (MHz)		Occupied Bandwidth (MHz)	
		QPSK	16QAM	QPSK	16QAM
23230	782.0	9.52	9.49	8.95	8.96

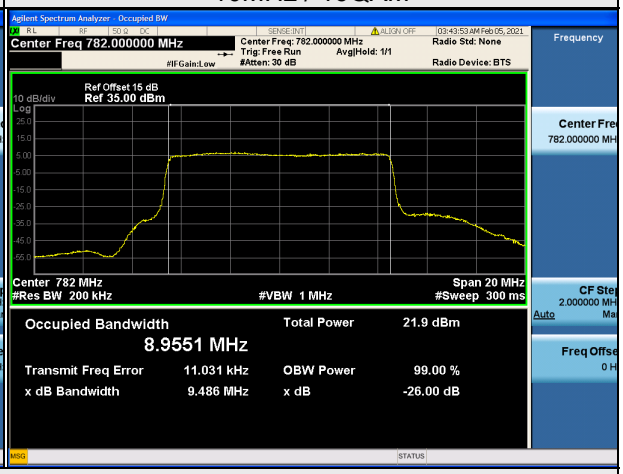
Spectrum Plot of Worst Value

26dB Bandwidth

10MHz / QPSK

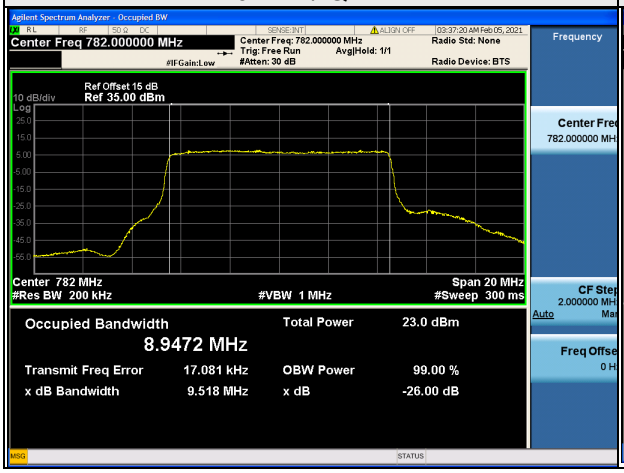


10MHz / 16QAM

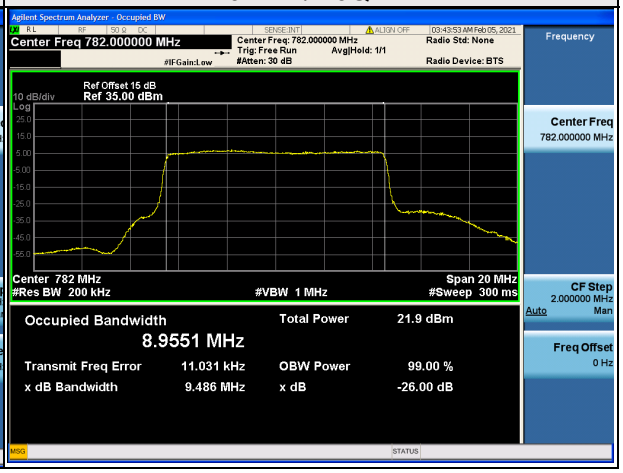


Occupied Bandwidth

10MHz / QPSK



10MHz / 16QAM

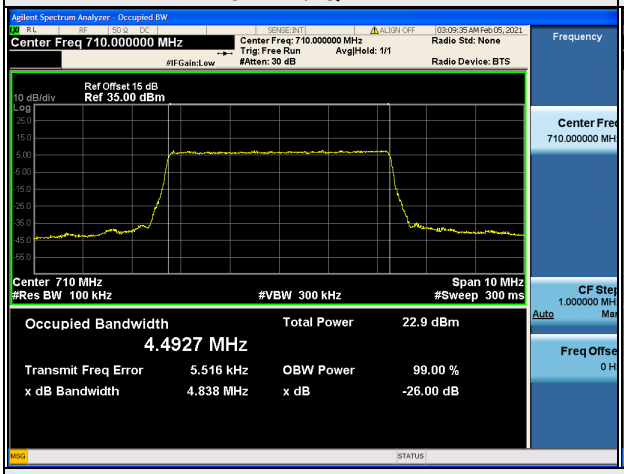


LTE Band 17, Channel Bandwidth 5MHz					
Channel	Frequency (MHz)	26dB Bandwidth (MHz)		Occupied Bandwidth (MHz)	
		QPSK	16QAM	QPSK	16QAM
23755	706.5	4.82	4.81	4.49	4.50
23790	710.0	4.84	4.81	4.49	4.50
23825	713.5	4.79	4.81	4.49	4.49

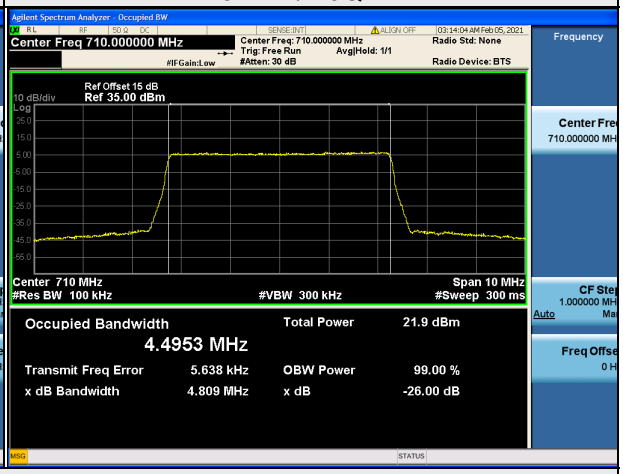
Spectrum Plot of Worst Value

26dB Bandwidth

5MHz / QPSK

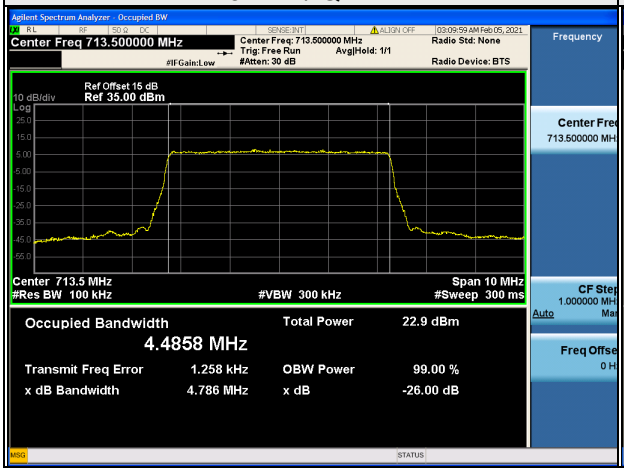


5MHz / 16QAM

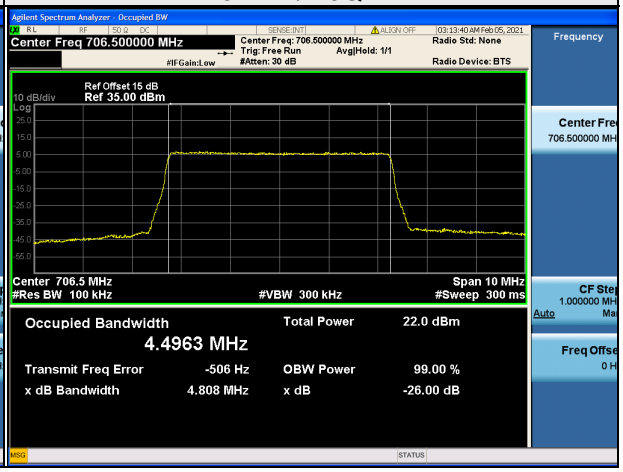


Occupied Bandwidth

5MHz / QPSK



5MHz / 16QAM



LTE Band 17, Channel Bandwidth 10MHz					
Channel	Frequency (MHz)	26dB Bandwidth (MHz)		Occupied Bandwidth (MHz)	
		QPSK	16QAM	QPSK	16QAM
23780	709.0	9.52	9.51	8.98	8.98
23790	710.0	9.51	9.51	8.97	8.98
23800	711.0	9.50	9.51	8.96	8.97

Spectrum Plot of Worst Value

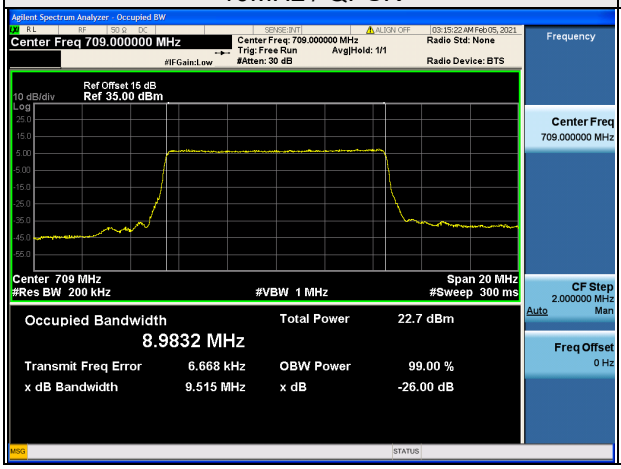
26dB Bandwidth

10MHz / QPSK

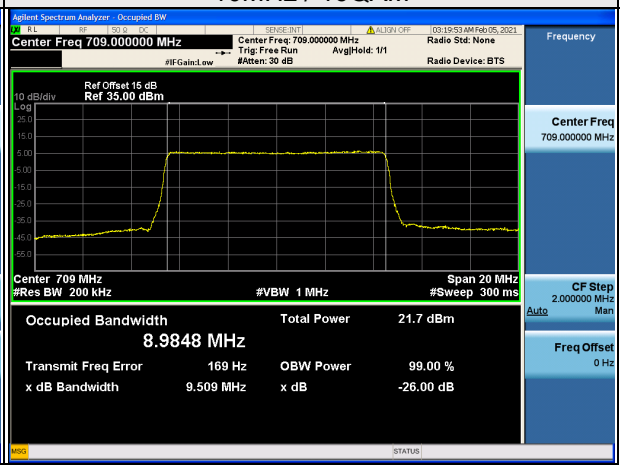
10MHz / 16QAM

Occupied Bandwidth

10MHz / QPSK



10MHz / 16QAM



4.5 Channel Edge / Out-of-Band Emission Measurement

4.5.1 Limits of Channel Edge / Out-of-Band Emission Measurement

For LTE Band 7:
According to FCC 27.53(m)(4) regulations, any transmit 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 2490.5MHz and 2496 MHz and 55 + 10 log (P) dB at or below 2490.5MHz. 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.

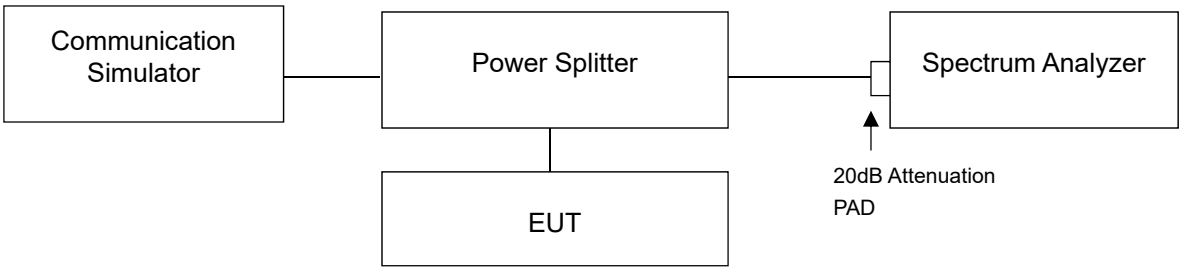
For LTE Band 12, 17:
According to FCC 27.53(g), for operations in the 600 MHz band and the 698-746 MHz band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least 43 + 10 log (P) dB. Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kilohertz or greater. However, in the 100 kilohertz bands immediately outside and adjacent to a licensee's frequency block, a resolution bandwidth of at least 30 kHz may be employed.

For LTE Band 13:
According to FCC 27.53(c)(2), for on any frequency outside the 776-788 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least 43 + 10 log (P) dB. Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kilohertz or greater. However, in the 100 kilohertz bands immediately outside and adjacent to a licensee's frequency block, a resolution bandwidth of at least 30 kHz may be employed.

According to 27.53(c)(4), on all frequencies between 763-775MHz and 793-805MHz, by a factor not less than 65 + 10 log (P) dB in a 6.25 kHz band segment, for mobile and portable stations

For LTE Band 4:
According to FCC 27.53(h), for operations in the 1695-1710MHz, 1710-1755MHz, 1755-1780 MHz, 1915-1920MHz, 1995-2000 MHz, 2000-2020MHz, 2110-2155MHz, 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. However, in the 1 megahertz bands immediately outside and adjacent to the licensee's frequency block, a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed.

4.5.2 Test Setup



4.5.3 Test Procedures

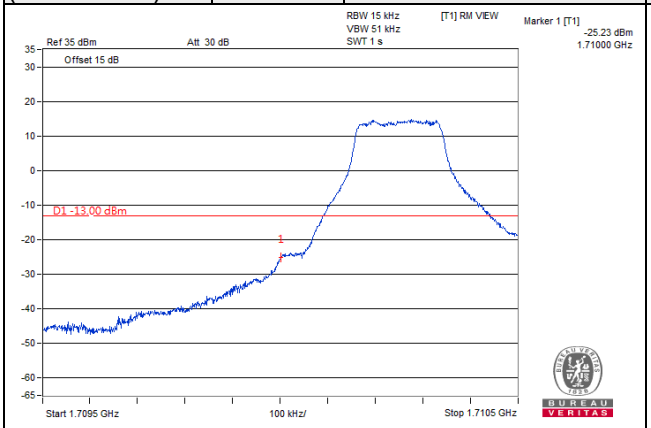
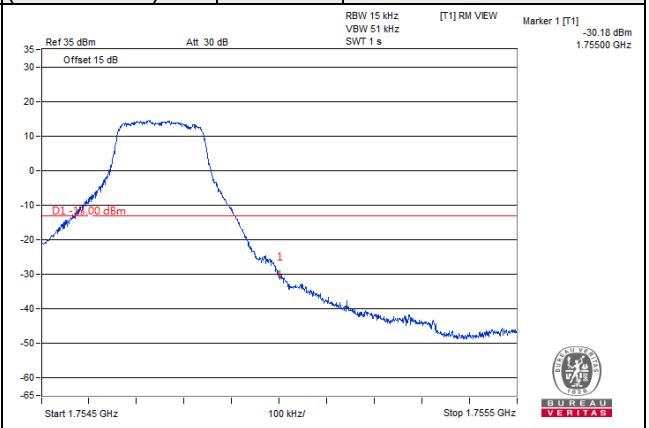
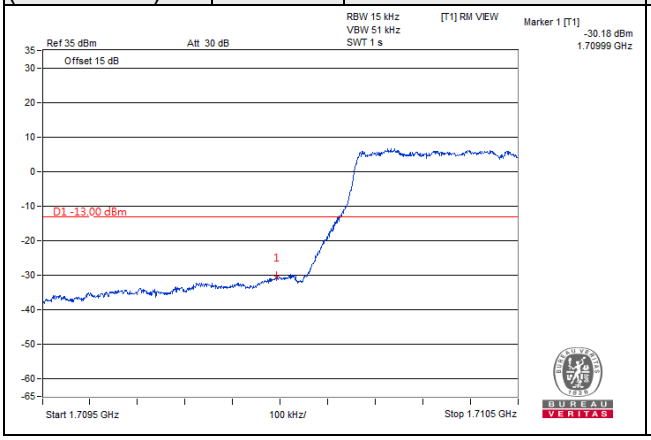
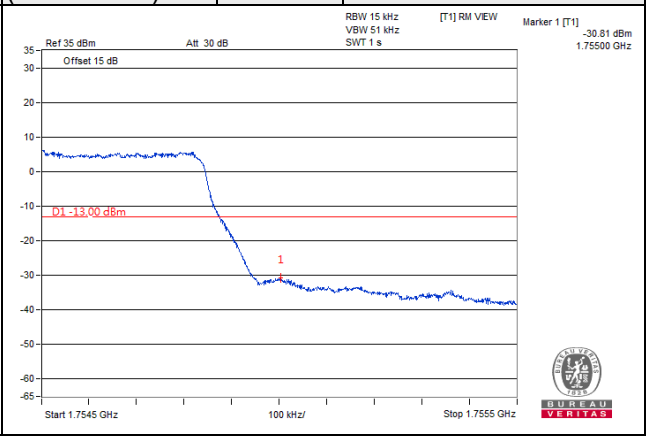
a. The EUT was set up for the rated peak power. The power was measured with Spectrum Analyzer. All measurements were done at 2 channels: low and high operational frequency range.

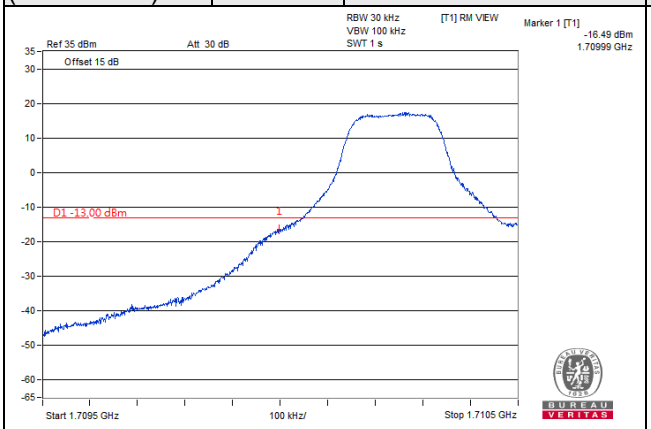
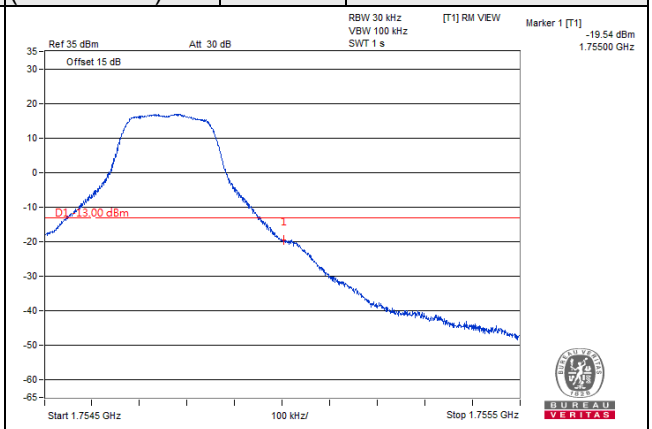
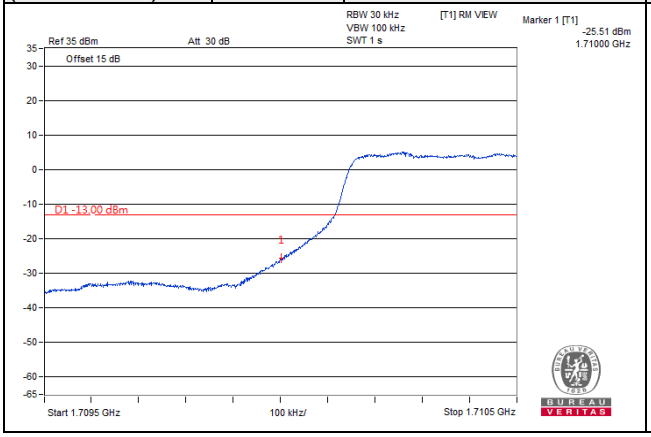
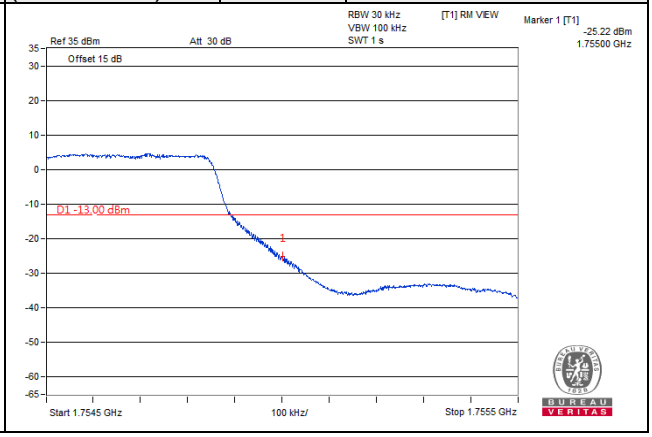
b. Measurement refer to ANSI C63.26 section 5.7.2 and FCC Part 27 section 27.53

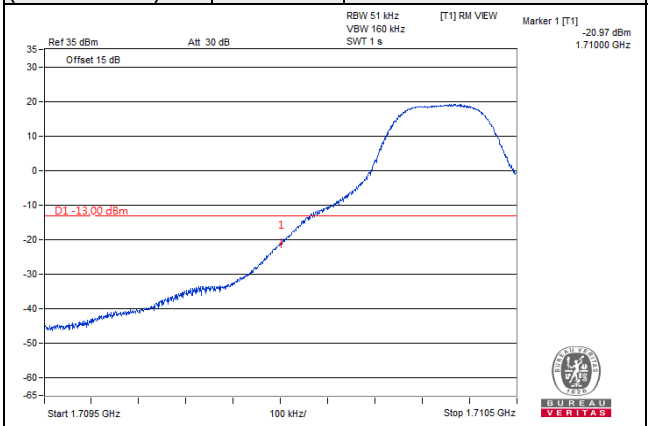
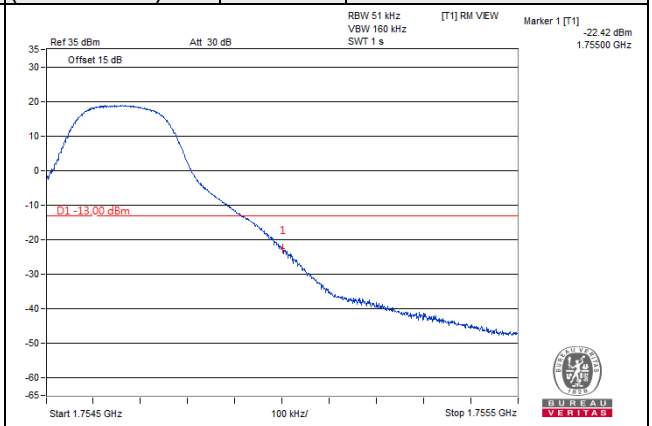
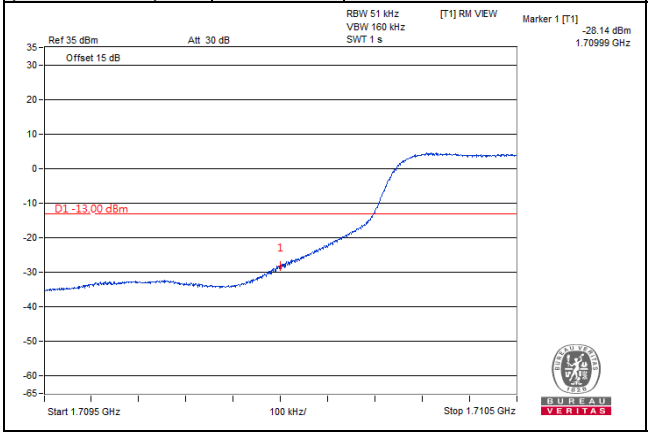
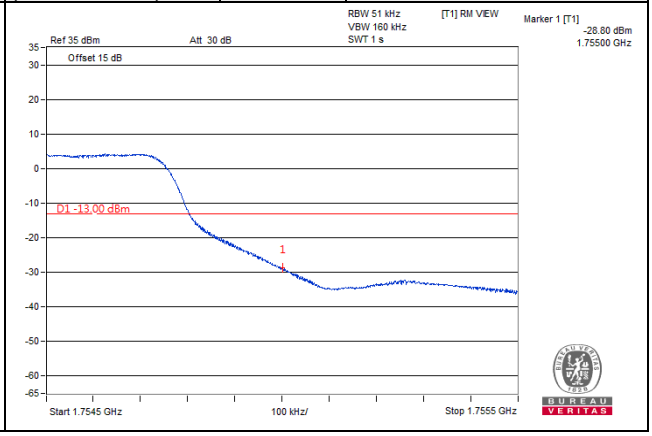
c. Record the max trace plot into the test report.

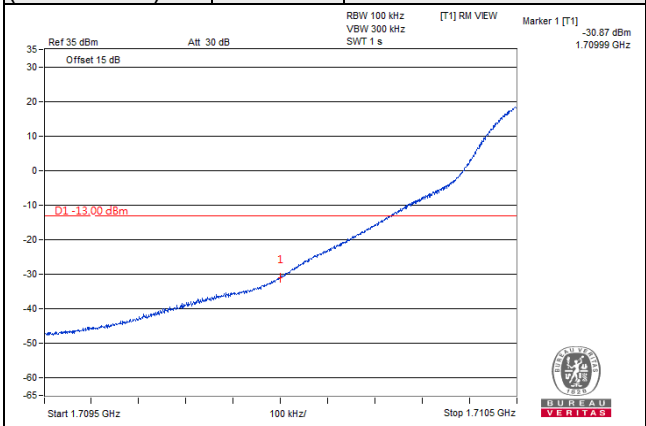
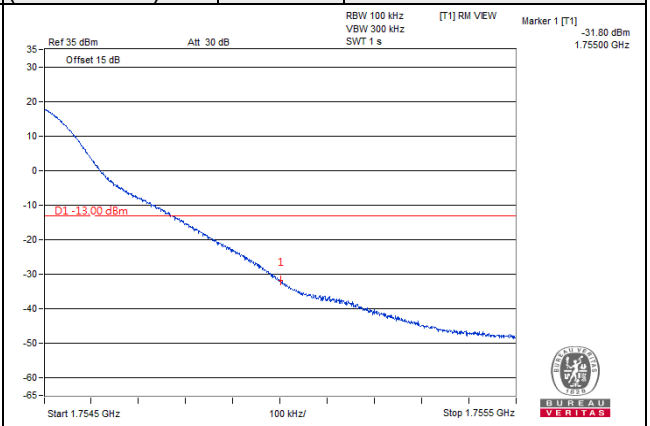
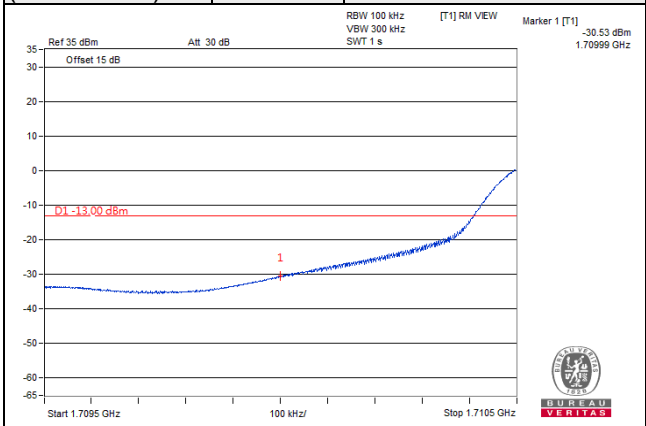
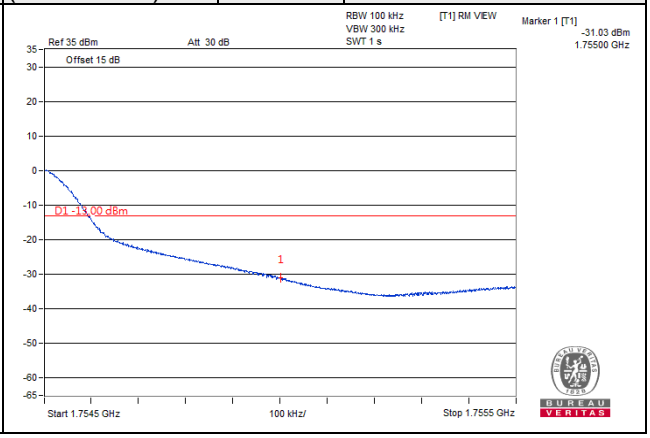
4.5.4 Test Results

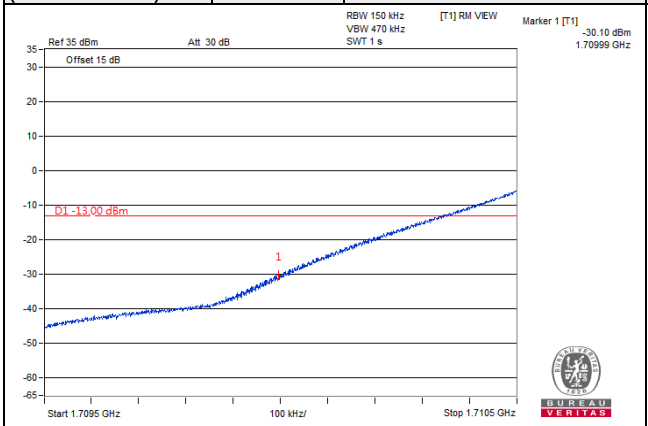
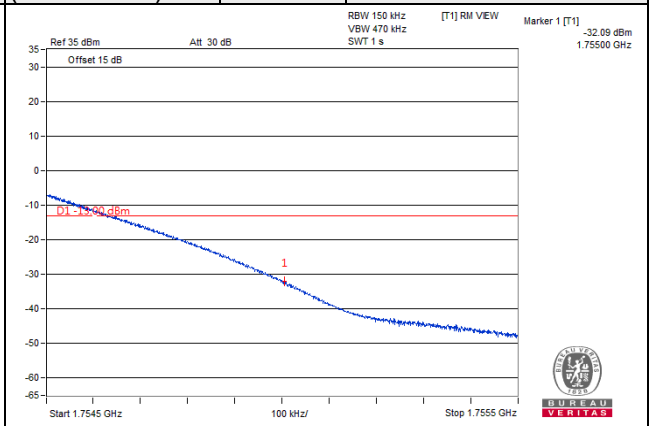
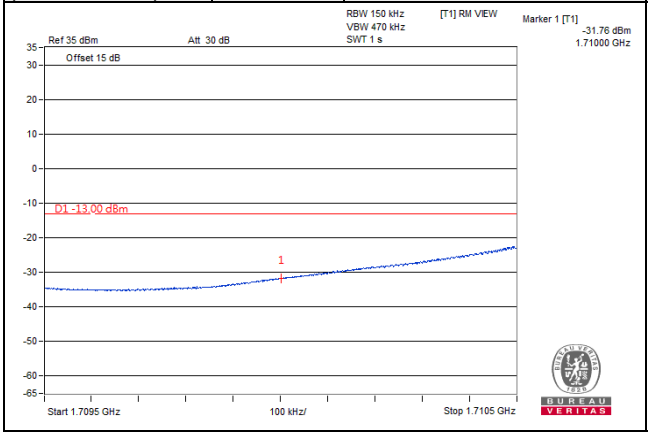
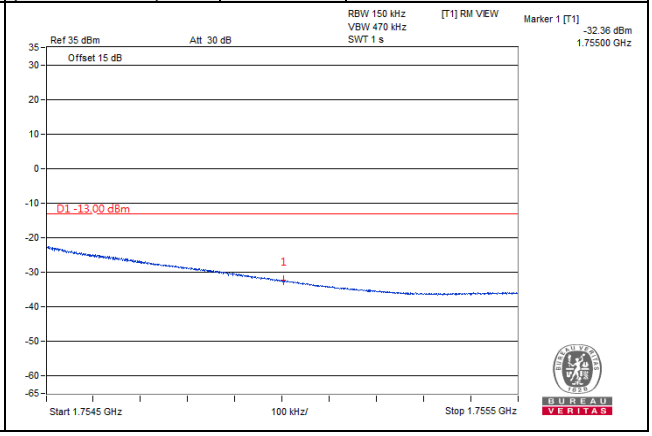
Band Edge

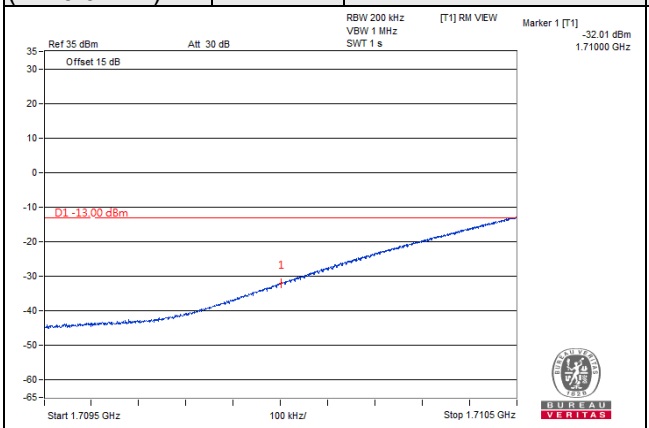
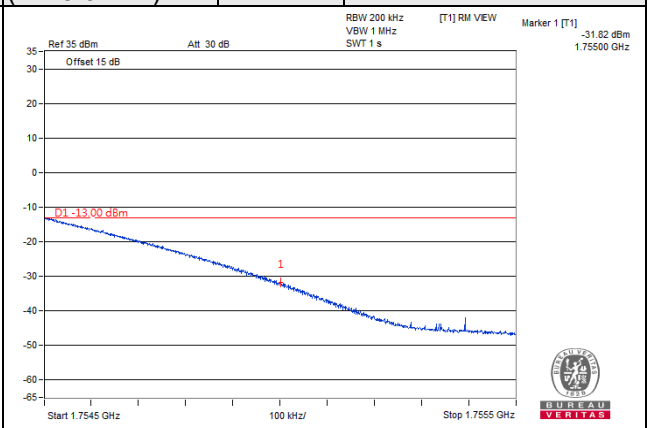
LTE Band 4, Channel Bandwidth 1.4MHz					
Channel 19957 (1710.7MHz)	QPSK	1 RB / 0 RB Offset	Channel 20393 (1754.3MHz)	QPSK	1 RB / 5 RB Offset
					
Channel 19957 (1710.7MHz)	QPSK	6 RB / 0 RB Offset	Channel 20393 (1754.3MHz)	QPSK	6 RB / 0 RB Offset
					

LTE Band 4, Channel Bandwidth 3MHz					
Channel 19965 (1711.5MHz)	QPSK	1 RB / 0 RB Offset	Channel 20385 (1753.5MHz)	QPSK	1 RB / 14 RB Offset
					
Channel 19965 (1711.5MHz)	QPSK	15 RB / 0 RB Offset	Channel 20385 (1753.5MHz)	QPSK	15 RB / 0 RB Offset
					

LTE Band 4, Channel Bandwidth 5MHz					
Channel 19975 (1712.5MHz)	QPSK	1 RB / 0 RB Offset	Channel 20375 (1752.5MHz)	QPSK	1 RB / 24 RB Offset
					
Channel 19975 (1712.5MHz)	QPSK	25 RB / 0 RB Offset	Channel 20375 (1752.5MHz)	QPSK	25 RB / 0 RB Offset
					

LTE Band 4, Channel Bandwidth 10MHz					
Channel 20000 (1715.0MHz)	QPSK	1 RB / 0 RB Offset	Channel 20350 (1750.0MHz)	QPSK	1 RB / 49 RB Offset
					
Channel 20000 (1715.0MHz)	QPSK	50 RB / 0 RB Offset	Channel 20350 (1750.0MHz)	QPSK	50 RB / 0 RB Offset
					

LTE Band 4, Channel Bandwidth 15MHz					
Channel 20025 (1717.5MHz)	QPSK	1 RB / 0 RB Offset	Channel 20325 (1747.5MHz)	QPSK	1 RB / 74 RB Offset
					
Channel 20025 (1717.5MHz)	QPSK	75 RB / 0 RB Offset	Channel 20325 (1747.5MHz)	QPSK	75 RB / 0 RB Offset
					

LTE Band 4, Channel Bandwidth 20MHz					
Channel 20050 (1720.0MHz)	QPSK	1 RB / 0 RB Offset	Channel 20300 (1745.0MHz)	QPSK	1 RB / 99 RB Offset
					
Channel 20050 (1720.0MHz)	QPSK	100 RB / 0 RB Offset	Channel 20300 (1745.0MHz)	QPSK	100 RB / 0 RB Offset