

FCC Test Report

(PART 27)

Report No.: RFBFMG-WTW-P22060328-8

FCC ID: B32V2104GPLUS

Test Model: V210 4G Plus

Received Date: Jun. 09, 2022

Test Date: Jul. 12, 2022 ~ Jul. 20, 2022

Issued Date: Sep. 08, 2022

Applicant: Verifone, Inc.

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Issued By: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
Lin Kou Laboratories

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Test Location (2): No. 70, Wenming Rd., Guishan Dist., Taoyuan City 333, Taiwan (R.O.C.)

FCC Registration / 788550 / TW0003

Designation Number: 281270 / TW0032



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Release Control Record

Issue No.	Description	Date Issued
RFBFMG-WTW-P22060328-8	Original Release	Sep. 08, 2022

1 Certificate of Conformity

Product: Point of Sale Terminal

Brand: Verifone

Test Model: V210 4G Plus

Sample Status: Engineering Sample

Applicant: Verifone, Inc.

Test Date: Jul. 12, 2022 ~ Jul. 20, 2022

Standards: FCC Part 27, Subpart C, L

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

Prepared by : Vera Huang, **Date:** Sep. 08, 2022
Vera Huang / Specialist

Approved by : Jeremy Lin, **Date:** Sep. 08, 2022
Jeremy Lin / Project Engineer

2 Summary of Test Results

Applied Standard: FCC Part 27 & Part 2 (WCDMA)			
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 -30.61 dB at 126.03 MHz.

Applied Standard: FCC Part 27 & Part 2 (LTE 4)			
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 -22.08 dB at 71.71 MHz.

Applied Standard: FCC Part 27 & Part 2 (LTE 66)			
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 -26.75 dB at 71.71 MHz.

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

2.1 Measurement Uncertainty

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

Measurement	Frequency	Expanded Uncertainty (k=2) (±)
Radiated Emissions up to 1 GHz	9kHz ~ 30MHz	3.00 dB
	30MHz ~ 200MHz	2.91 dB
	200MHz ~ 1000MHz	2.92 dB
Radiated Emissions above 1 GHz	1GHz ~ 18GHz	1.76 dB
	18GHz ~ 40GHz	1.77 dB

2.2 Test Site and Instruments

Description & Manufacturer	Model No.	Serial No.	Date Of Calibration	Due Date Of Calibration
Test Receiver Rohde & Schwarz	ESR3	102579	Jul. 01, 2022	Jun. 30, 2023
Spectrum Analyzer KEYSIGHT	N9020B	MY60110462	Dec. 21, 2021	Dec. 20, 2022
BILOG Antenna SCHWARZBECK	VULB9168	995	Oct. 28, 2021	Oct. 27, 2022
HORN Antenna SCHWARZBECK	BBHA 9120 D	9120D-404	Nov. 14, 2021	Nov. 13, 2022
HORN Antenna SCHWARZBECK	BBHA 9170	995	Nov. 14, 2021	Nov. 13, 2022
Loop Antenna EMCI	EM-6879	269	Sep. 16, 2021	Sep. 15, 2022
Preamplifier EMCI	EMC330N	980783	Jan. 17, 2022	Jan. 16, 2023
Preamplifier EMCI	EMC118A45SE	980810	Dec. 30, 2021	Dec. 29, 2022
Preamplifier EMCI	EMC184045SE	980787	Jan. 17, 2022	Jan. 16, 2023
RF signal cable EMCI	EMC104-SM-SM-(900 0+2000+1000)	201230+ 201242+ 210101	Jan. 17, 2022	Jan. 16, 2023
RF signal cable EMCI	EMCCFD400-NM-NM -(9000+300+500)	201252+ 201250+ 201245	Jan. 17, 2022	Jan. 16, 2023
RF signal cable EMCI	EMC101G-KM-KM-(5 000+3000+2000)	201261+201258+ 201249	Jan. 17, 2022	Jan. 16, 2023
Software BV CPS	ADT_Radiated_V7.6.1 5.9.5	NA	NA	NA
Turn Table Max-Full	MFT-151SS-0.5T	NA	NA	NA
Turn Table Controller Max-Full	MF-7802BS	MF780208675	NA	NA
Antenna Tower KaiTuo	NA	NA	NA	NA
Antenna Tower Controller KaiTuo	KT-2000	NA	NA	NA
USB Wideband Power Sensor KEYSIGHT	U2021XA	MY55050005/MY5 5190004/MY55190 007/MY55210005	Jul. 12, 2021	Jul. 11, 2022
			Jul. 13, 2022	Jul. 12, 2023
Radio Communication Analyzer Anritsu	MT8821C	6261806803	Feb. 16, 2022	Feb. 15, 2023

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 WM Chamber 7.

3 General Information

3.1 General Description of EUT

Product	Point of Sale Terminal	
Brand	Verifone	
Test Model	V210 4G Plus	
Status of EUT	Engineering Sample	
Power Supply Rating	5 Vdc (from adapter) 3.7 Vdc (from Li-ion battery)	
Modulation Type	WCDMA	QPSK
	LTE	QPSK, 16QAM
Frequency Range	WCDMA Band 4	1712.4 ~ 1752.6 MHz
	LTE Band 4 (Channel Bandwidth: 1.4 MHz)	1710.7 ~ 1754.3 MHz
	LTE Band 4 (Channel Bandwidth: 3 MHz)	1711.5 ~ 1753.5 MHz
	LTE Band 4 (Channel Bandwidth: 5 MHz)	1712.5 ~ 1752.5 MHz
	LTE Band 4 (Channel Bandwidth: 10 MHz)	1715.0 ~ 1750.0 MHz
	LTE Band 4 (Channel Bandwidth: 15 MHz)	1717.5 ~ 1747.5 MHz
	LTE Band 4 (Channel Bandwidth: 20 MHz)	1720.0 ~ 1745.0 MHz
	LTE Band 66 (Channel Bandwidth: 1.4 MHz)	1710.7 ~ 1779.3 MHz
	LTE Band 66 (Channel Bandwidth: 3 MHz)	1711.5 ~ 1778.5 MHz
	LTE Band 66 (Channel Bandwidth: 5 MHz)	1712.5 ~ 1777.5 MHz
	LTE Band 66 (Channel Bandwidth: 10 MHz)	1715.0 ~ 1775.0 MHz
	LTE Band 66 (Channel Bandwidth: 15 MHz)	1717.5 ~ 1772.5 MHz
	LTE Band 66 (Channel Bandwidth: 20 MHz)	1720.0 ~ 1770.0 MHz
Emission Designator	WCDMA Band 4	4M19F9W
	LTE Band 4 (Channel Bandwidth: 1.4 MHz)	1M09D7W
	LTE Band 4 (Channel Bandwidth: 3 MHz)	2M70G7D
	LTE Band 4 (Channel Bandwidth: 5 MHz)	4M49D7W
	LTE Band 4 (Channel Bandwidth: 10 MHz)	8M96G7D
	LTE Band 4 (Channel Bandwidth: 15 MHz)	13M5G7D
	LTE Band 4 (Channel Bandwidth: 20 MHz)	17M9D7W
	LTE Band 66 (Channel Bandwidth: 1.4 MHz)	1M09G7D
	LTE Band 66 (Channel Bandwidth: 3 MHz)	2M70D7W
	LTE Band 66 (Channel Bandwidth: 5 MHz)	4M49G7D
	LTE Band 66 (Channel Bandwidth: 10 MHz)	8M96D7W
	LTE Band 66 (Channel Bandwidth: 15 MHz)	13M5D7W
	LTE Band 66 (Channel Bandwidth: 20 MHz)	17M9G7D

Max. EIRP Power	WCDMA Band 4	322.107mW (25.08dBm)
	LTE Band 4 (Channel Bandwidth: 1.4 MHz)	336.512mW (25.27dBm)
	LTE Band 4 (Channel Bandwidth: 3 MHz)	339.625mW (25.31dBm)
	LTE Band 4 (Channel Bandwidth: 5 MHz)	345.144mW (25.38dBm)
	LTE Band 4 (Channel Bandwidth: 10 MHz)	339.625mW (25.31dBm)
	LTE Band 4 (Channel Bandwidth: 15 MHz)	346.737mW (25.40dBm)
	LTE Band 4 (Channel Bandwidth: 20 MHz)	352.371mW (25.47dBm)
	LTE Band 66 (Channel Bandwidth: 1.4 MHz)	380.189mW (25.80dBm)
	LTE Band 66 (Channel Bandwidth: 3 MHz)	389.942mW (25.91dBm)
	LTE Band 66 (Channel Bandwidth: 5 MHz)	396.278mW (25.98dBm)
	LTE Band 66 (Channel Bandwidth: 10 MHz)	393.550mW (25.95dBm)
	LTE Band 66 (Channel Bandwidth: 15 MHz)	395.367mW (25.97dBm)
	LTE Band 66 (Channel Bandwidth: 20 MHz)	399.945mW (26.02dBm)

Note:

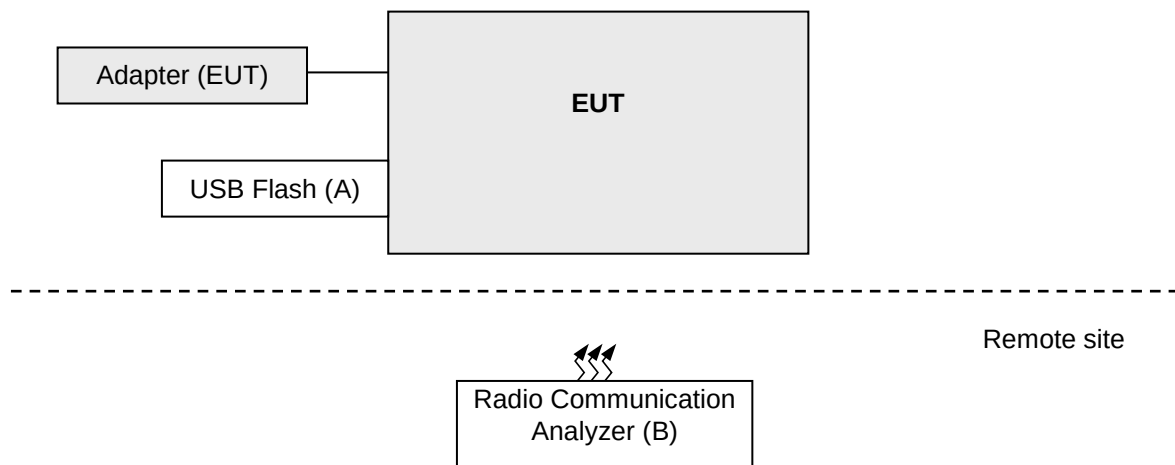
1. The antenna information is listed as below.

Ant. Type	Ant.	Antenna Peak Gain (dBi)				
		GSM850 / WCDMA 5 / LTE 5	GSM1900 / WCDMA 2 / LTE 2	WCDMA 4 / LTE 4	LTE 7	LTE 66
Dipole	1	0	3.6	3.2	2.0	3.2
	2	1.9	3.8	2.7	2.2	2.7

* The Max antenna gain was chosen for final test.

2. Detail antenna specification please refer to antenna datasheet and/or antenna measurement report.
3. The above EUT information is declared by manufacturer and for more detailed features description, please refers to the manufacturer's specifications or user's manual.

3.2 Configuration of System under Test



3.2.1 Description of Support Units

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

ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A	USB Flash	SanDisk	SDDDC3-032G	N/A	N/A	Supplied by lab
B	Radio Communication Analyzer	Anritsu	MT8821C	6261806803	N/A	Supplied by lab

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
WCDMA	X-plane
LTE Band 4	X-plane
LTE Band 66	X-plane

WCDMA

EUT Configure Mode	Test Item	Available Channel	Tested Channel	Mode
-	EIRP	1312 to 1513	1312, 1413, 1513	WCDMA, HSDPA, HSUPA
-	Modulation Characteristics	1312 to 1513	1413	WCDMA, HSDPA, HSUPA
-	Frequency Stability	1312 to 1513	1312, 1513	WCDMA
-	Occupied Bandwidth	1312 to 1513	1312, 1413, 1513	WCDMA, HSDPA, HSUPA
-	Band Edge	1312 to 1513	1312, 1513	WCDMA, HSDPA, HSUPA
-	Peak to Average Ratio	1312 to 1513	1312, 1413, 1513	WCDMA, HSDPA, HSUPA
-	Conducted Emission	1312 to 1513	1312, 1413, 1513	WCDMA, HSDPA, HSUPA
-	Radiated Emission Below 1GHz	1312 to 1513	1413	WCDMA
-	Radiated Emission Above 1GHz	1312 to 1513	1312, 1413, 1513	WCDMA

LTE Band 4

EUT Configure Mode	Test Item	Available Channel	Tested Channel	Channel Bandwidth	Modulation	RB #
-	EIRP	19957 to 20393	19957, 20175, 20393	1.4 MHz	QPSK / 16QAM	1 Half Full
		19965 to 20385	19965, 20175, 20385	3 MHz	QPSK / 16QAM	1 Half Full
		19975 to 20375	19975, 20175, 20375	5 MHz	QPSK / 16QAM	1 Half Full
		20000 to 20350	20000, 20175, 20350	10 MHz	QPSK / 16QAM	1 Half Full
		20025 to 20325	20025, 20175, 20325	15 MHz	QPSK / 16QAM	1 Half Full
		20050 to 20300	20050, 20175, 20300	20 MHz	QPSK / 16QAM	1 Half Full
-	Modulation Characteristics	20050 to 20300	20175	5 MHz	QPSK / 16QAM	Full
-	Frequency Stability	19957 to 20393	19957, 20393	1.4 MHz	QPSK	Full
		19965 to 20385	19965, 20385	3 MHz	QPSK	Full
		19975 to 20375	19975, 20375	5 MHz	QPSK	Full
		20000 to 20350	20000, 20350	10 MHz	QPSK	Full
		20025 to 20325	20025, 20325	15 MHz	QPSK	Full
		20050 to 20300	20050, 20300	20 MHz	QPSK	Full
-	Occupied Bandwidth	19957 to 20393	19957, 20175, 20393	1.4 MHz	QPSK / 16QAM	Full
		19965 to 20385	19965, 20175, 20385	3 MHz	QPSK / 16QAM	Full
		19975 to 20375	19975, 20175, 20375	5 MHz	QPSK / 16QAM	Full
		20000 to 20350	20000, 20175, 20350	10 MHz	QPSK / 16QAM	Full
		20025 to 20325	20025, 20175, 20325	15 MHz	QPSK / 16QAM	Full
		20050 to 20300	20050, 20175, 20300	20 MHz	QPSK / 16QAM	Full
-	Peak to Average Ratio	19957 to 20393	19957, 20175, 20393	1.4 MHz	QPSK / 16QAM	1
		19965 to 20385	19965, 20175, 20385	3 MHz	QPSK / 16QAM	1
		19975 to 20375	19975, 20175, 20375	5 MHz	QPSK / 16QAM	1
		20000 to 20350	20000, 20175, 20350	10 MHz	QPSK / 16QAM	1
		20025 to 20325	20025, 20175, 20325	15 MHz	QPSK / 16QAM	1
		20050 to 20300	20050, 20175, 20300	20 MHz	QPSK / 16QAM	1

EUT Configure Mode	Test Item	Available Channel	Tested Channel	Channel Bandwidth	Modulation	RB #
-	Band Edge	19957 to 20393	19957, 20393	1.4 MHz	QPSK	1 Half Full
		19965 to 20385	19965, 20385	3 MHz	QPSK	1 Half Full
		19975 to 20375	19975, 20375	5 MHz	QPSK	1 Half Full
		20000 to 20350	20000, 20350	10 MHz	QPSK	1 Half Full
		20025 to 20325	20025, 20325	15 MHz	QPSK	1 Half Full
		20050 to 20300	20050, 20300	20 MHz	QPSK	1 Half Full
-	Conducted Emission	19957 to 20393	19957, 20175, 20393	1.4 MHz	QPSK	1
		19965 to 20385	19965, 20175, 20385	3 MHz	QPSK	1
		19975 to 20375	19975, 20175, 20375	5 MHz	QPSK	1
		20000 to 20350	20000, 20175, 20350	10 MHz	QPSK	1
		20025 to 20325	20025, 20175, 20325	15 MHz	QPSK	1
		20050 to 20300	20050, 20175, 20300	20 MHz	QPSK	1
-	Radiated Emission Below 1GHz	20050 to 20300	20175	20 MHz	QPSK	1
-	Radiated Emission Above 1GHz	19957 to 20393	19957, 20175, 20393	1.4 MHz	QPSK	1
		19975 to 20375	19975, 20175, 20375	5 MHz	QPSK	1
		20050 to 20300	20050, 20175, 20300	20 MHz	QPSK	1

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 output power for QPSK and 16QAM, measured value of QPSK is higher than 16QAM mode. Therefore, only EIRP, 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 worse mode according to the maximum output power.

LTE Band 66

EUT Configure Mode	Test Item	Available Channel	Tested Channel	Channel Bandwidth	Modulation	RB #
-	EIRP	131979 to 132665	131979, 132322, 132665	1.4 MHz	QPSK / 16QAM	1 Half Full
		131987 to 132657	131987, 132322, 132657	3 MHz	QPSK / 16QAM	1 Half Full
		131997 to 132647	131997, 132322, 132647	5 MHz	QPSK / 16QAM	1 Half Full
		132022 to 132622	132022, 132322, 132622	10 MHz	QPSK / 16QAM	1 Half Full
		132047 to 132597	132047, 132322, 132597	15 MHz	QPSK / 16QAM	1 Half Full
		132072 to 132572	132072, 132322, 132572	20 MHz	QPSK / 16QAM	1 Half Full
-	Modulation Characteristics	132072 to 132572	132322	20 MHz	QPSK / 16QAM	Full
-	Frequency Stability	131979 to 132665	131979, 132665	1.4 MHz	QPSK	Full
		131987 to 132657	131987, 132657	3 MHz	QPSK	Full
		131997 to 132647	131997, 132647	5 MHz	QPSK	Full
		132022 to 132622	132022, 132622	10 MHz	QPSK	Full
		132047 to 132597	132047, 132597	15 MHz	QPSK	Full
		132072 to 132572	132072, 132572	20 MHz	QPSK	Full
-	Occupied Bandwidth	131979 to 132665	131979, 132322, 132665	1.4 MHz	QPSK / 16QAM	Full
		131987 to 132657	131987, 132322, 132657	3 MHz	QPSK / 16QAM	Full
		131997 to 132647	131997, 132322, 132647	5 MHz	QPSK / 16QAM	Full
		132022 to 132622	132022, 132322, 132622	10 MHz	QPSK / 16QAM	Full
		132047 to 132597	132047, 132322, 132597	15 MHz	QPSK / 16QAM	Full
		132072 to 132572	132072, 132322, 132572	20 MHz	QPSK / 16QAM	Full
-	Peak to Average Ratio	131979 to 132665	131979, 132322, 132665	1.4 MHz	QPSK / 16QAM	1
		131987 to 132657	131987, 132322, 132657	3 MHz	QPSK / 16QAM	1
		131997 to 132647	131997, 132322, 132647	5 MHz	QPSK / 16QAM	1
		132022 to 132622	132022, 132322, 132622	10 MHz	QPSK / 16QAM	1
		132047 to 132597	132047, 132322, 132597	15 MHz	QPSK / 16QAM	1
		132072 to 132572	132072, 132322, 132572	20 MHz	QPSK / 16QAM	1

EUT Configure Mode	Test Item	Available Channel	Tested Channel	Channel Bandwidth	Modulation	RB #
-	Band Edge	131979 to 132665	131979, 132665	1.4 MHz	QPSK	1 Half Full
		131987 to 132657	131987, 132657	3 MHz	QPSK	1 Half Full
		131997 to 132647	131997, 132647	5 MHz	QPSK	1 Half Full
		132022 to 132622	132022, 132622	10 MHz	QPSK	1 Half Full
		132047 to 132597	132047, 132597	15 MHz	QPSK	1 Half Full
		132072 to 132572	132072, 132572	20 MHz	QPSK	1 Half Full
-	Conducted Emission	131979 to 132665	131979, 132322, 132665	1.4 MHz	QPSK	1
		131987 to 132657	131987, 132322, 132657	3 MHz	QPSK	1
		131997 to 132647	131997, 132322, 132647	5 MHz	QPSK	1
		132022 to 132622	132022, 132322, 132622	10 MHz	QPSK	1
		132047 to 132597	132047, 132322, 132597	15 MHz	QPSK	1
		132072 to 132572	132072, 132322, 132572	20 MHz	QPSK	1
-	Radiated Emission Below 1GHz	132072 to 132572	132322	20 MHz	QPSK	1
-	Radiated Emission Above 1GHz	131979 to 132665	131979, 132322, 132665	1.4 MHz	QPSK	1
		131997 to 132647	131997, 132322, 132647	5 MHz	QPSK	1
		132072 to 132572	132072, 132322, 132572	20 MHz	QPSK	1

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 output power for QPSK and 16QAM, measured value of QPSK is higher than 16QAM mode. Therefore, only EIRP, 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 worse mode according to the maximum output power.

Test Condition:

Test Item	Environmental Conditions	Input Power	Tested By
EIRP	25 deg. C, 65 % RH	3.7 Vdc	James Yang
Modulation Characteristics	25 deg. C, 65 % RH	3.7 Vdc	James Yang
Frequency Stability	25 deg. C, 65 % RH	3.7 Vdc	James Yang
Occupied Bandwidth	25 deg. C, 65 % RH	3.7 Vdc	James Yang
Band Edge	25 deg. C, 65 % RH	3.7 Vdc	James Yang
Peak to Average Ratio	25 deg. C, 65 % RH	3.7 Vdc	James Yang
Conducted Emission	25 deg. C, 65 % RH	3.7 Vdc	James Yang
Radiated Emission Below 1GHz	23 deg. C, 68 % RH	120 Vac, 60 Hz	Edison Lee
Radiated Emission Above 1GHz	23 deg. C, 68 % RH	120 Vac, 60 Hz	Edison Lee

3.4 EUT Operating Conditions

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

3.5 General Description of Applied Standards and references

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

Test Standard:

FCC 47 CFR Part 2

FCC 47 CFR Part 27

ANSI/TIA/EIA-603-E 2016

ANSI 63.26-2015

References Test Guidance:

KDB 971168 D01 Power Meas License Digital Systems v03r01

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

4 Test Types and Results

4.1 Output Power Measurement

4.1.1 Limits of Output Power Measurement

For WCDMA Band 4, LTE Band 4, 66:

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 WCDMA and LTE link data modulation and link up with simulator.
- Set the EUT to transmit under low, middle and high channel and record the power level shown on simulator.

Maximum EIRP / ERP

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

$$\text{EIRP} = P_{\text{Meas}} + G_T$$

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

where

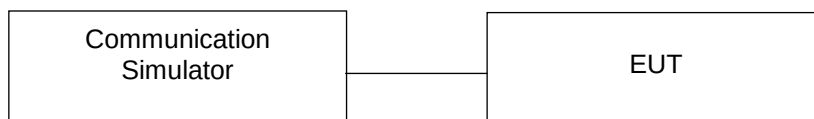
ERP or EIRP effective radiated power or equivalent isotropically radiated power, respectively
(expressed in the same units as P_{Meas} , e.g., dBm or dBW)

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)

Band	WCDMA IV		
Channel	1312	1413	1513
Frequency (MHz)	1712.4	1732.6	1752.6
RMC 12.2K	21.88	21.83	21.82
HSDPA Subtest-1	20.83	20.87	20.99
HSDPA Subtest-2	20.74	20.81	21.11
HSDPA Subtest-3	20.45	20.22	20.04
HSDPA Subtest-4	20.43	20.21	20.02
HSUPA Subtest-1	20.76	20.79	21.08
HSUPA Subtest-2	18.55	18.53	18.55
HSUPA Subtest-3	19.95	19.87	19.86
HSUPA Subtest-4	18.51	18.52	18.54

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	21.86	22.07	21.50
		1	2	21.74	21.77	21.67
		1	5	21.51	21.54	21.51
		3	0	21.50	21.59	21.55
		3	1	21.31	21.43	21.26
		3	3	21.32	21.39	21.24
		6	0	20.20	20.43	20.35
1.4M	16QAM	1	0	21.05	21.13	21.02
		1	2	20.88	20.96	20.93
		1	5	20.60	20.83	20.61
		3	0	20.56	20.52	20.37
		3	1	20.24	20.49	20.32
		3	3	20.17	20.30	20.17
		6	0	19.33	19.34	19.28

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	21.89	22.11	21.62
		1	7	21.72	21.71	21.69
		1	14	21.53	21.59	21.57
		8	0	20.61	20.49	20.51
		8	3	20.25	20.39	20.32
		8	7	20.43	20.31	20.17
		15	0	20.32	20.35	20.33
3M	16QAM	1	0	21.05	21.10	21.02
		1	7	20.93	20.93	20.93
		1	14	20.69	20.82	20.63
		8	0	19.44	19.56	19.47
		8	3	19.35	19.44	19.19
		8	7	19.31	19.23	19.17
		15	0	19.37	19.45	19.40

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	21.85	22.18	21.41
		1	12	21.74	21.85	21.64
		1	24	21.63	21.56	21.28
		12	0	20.63	20.57	20.44
		12	6	20.25	20.37	20.32
		12	13	20.44	20.32	20.09
		25	0	20.20	20.40	20.29
5M	16QAM	1	0	21.04	21.15	21.06
		1	12	20.87	20.92	21.06
		1	24	20.57	20.85	20.69
		12	0	19.52	19.56	19.39
		12	6	19.29	19.47	19.29
		12	13	19.17	19.21	19.20
		25	0	19.31	19.45	19.30

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	21.93	22.11	21.50
		1	24	21.69	21.85	21.65
		1	49	21.56	21.50	21.42
		25	0	20.60	20.61	20.53
		25	12	20.38	20.40	20.34
		25	25	20.33	20.30	20.21
		50	0	20.29	20.40	20.39
10M	16QAM	1	0	21.18	21.12	21.07
		1	24	20.86	20.96	21.06
		1	49	20.71	20.77	20.61
		25	0	19.48	19.44	19.41
		25	12	19.27	19.49	19.32
		25	25	19.24	19.27	19.15
		50	0	19.37	19.41	19.37

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	21.94	22.20	21.64
		1	37	21.83	21.85	21.76
		1	74	21.65	21.64	21.57
		36	0	20.64	20.62	20.57
		36	19	20.38	20.48	20.39
		36	39	20.44	20.41	20.31
		75	0	20.34	20.48	20.41
15M	16QAM	1	0	21.19	21.16	21.09
		1	37	21.01	21.03	21.07
		1	74	20.72	20.88	20.74
		36	0	19.58	19.59	19.51
		36	19	19.37	19.52	19.33
		36	39	19.31	19.35	19.30
		75	0	19.45	19.46	19.40

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	21.97	22.27	21.87
		1	50	21.90	21.93	21.86
		1	99	21.65	21.65	21.64
		50	0	20.66	20.69	20.59
		50	25	20.48	20.51	20.48
		50	50	20.44	20.45	20.35
		100	0	20.43	20.48	20.42
20M	16QAM	1	0	21.20	21.24	21.15
		1	50	21.07	21.08	21.07
		1	99	20.80	20.89	20.78
		50	0	19.66	19.66	19.60
		50	25	19.45	19.54	19.39
		50	50	19.40	19.44	19.36
		100	0	19.45	19.52	19.40

LTE Band 66						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		131979	132322	132665
		Frequency (MHz)		1710.7	1745	1779.3
1.4M	QPSK	1	0	22.60	22.08	21.94
		1	2	22.38	22.01	21.85
		1	5	21.75	21.70	21.85
		3	0	22.49	22.51	22.42
		3	1	22.47	22.32	22.30
		3	3	22.21	22.10	22.15
		6	0	21.43	21.31	21.45
1.4M	16QAM	1	0	21.31	21.29	21.24
		1	2	21.69	21.68	21.67
		1	5	20.97	21.06	20.92
		3	0	21.47	21.42	21.53
		3	1	21.81	21.67	21.73
		3	3	21.42	21.18	21.23
		6	0	20.50	20.49	20.42

LTE Band 66						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		131987	132322	132657
		Frequency (MHz)		1711.5	1745	1778.5
3M	QPSK	1	0	22.71	22.18	21.98
		1	7	22.39	22.05	21.91
		1	14	21.86	21.80	21.88
		8	0	21.64	21.62	21.51
		8	3	21.54	21.45	21.44
		8	7	21.25	21.23	21.16
		15	0	21.48	21.45	21.45
3M	16QAM	1	0	21.39	21.35	21.30
		1	7	21.84	21.82	21.70
		1	14	21.10	21.07	21.06
		8	0	20.60	20.55	20.57
		8	3	20.84	20.80	20.82
		8	7	20.44	20.29	20.26
		15	0	20.54	20.61	20.48

LTE Band 66						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		131997	132322	132647
		Frequency (MHz)		1712.5	1745	1777.5
5M	QPSK	1	0	22.78	22.12	22.05
		1	12	22.47	22.06	21.95
		1	24	21.83	21.79	21.86
		12	0	21.65	21.63	21.51
		12	6	21.54	21.46	21.38
		12	13	21.32	21.16	21.23
		25	0	21.51	21.46	21.49
5M	16QAM	1	0	21.35	21.34	21.31
		1	12	21.87	21.80	21.66
		1	24	21.13	21.10	20.98
		12	0	20.57	20.48	20.53
		12	6	20.79	20.77	20.82
		12	13	20.42	20.31	20.17
		25	0	20.62	20.52	20.49

LTE Band 66						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		132022	132322	132622
		Frequency (MHz)		1715	1745	1775
10M	QPSK	1	0	22.75	22.12	22.04
		1	24	22.46	22.05	22.00
		1	49	21.85	21.83	21.84
		25	0	21.72	21.60	21.52
		25	12	21.47	21.48	21.43
		25	25	21.27	21.17	21.24
		50	0	21.48	21.46	21.47
10M	16QAM	1	0	21.41	21.34	21.27
		1	24	21.87	21.84	21.69
		1	49	21.15	21.13	21.06
		25	0	20.50	20.48	20.51
		25	12	20.81	20.86	20.81
		25	25	20.38	20.26	20.24
		50	0	20.56	20.52	20.50

LTE Band 66						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		132047	132322	132597
		Frequency (MHz)		1717.5	1745	1772.5
15M	QPSK	1	0	22.77	22.13	22.01
		1	37	22.39	22.08	21.92
		1	74	21.84	21.87	21.81
		36	0	21.73	21.62	21.50
		36	19	21.54	21.46	21.43
		36	39	21.26	21.21	21.16
		75	0	21.47	21.49	21.53
15M	16QAM	1	0	21.41	21.30	21.23
		1	37	21.86	21.78	21.75
		1	74	21.17	21.13	21.03
		36	0	20.59	20.57	20.54
		36	19	20.79	20.83	20.78
		36	39	20.40	20.28	20.21
		75	0	20.58	20.52	20.51

LTE Band 66						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		132072	132322	132572
		Frequency (MHz)		1720	1745	1770
20M	QPSK	1	0	22.82	22.21	22.05
		1	50	22.47	22.14	22.01
		1	99	21.89	21.89	21.89
		50	0	21.74	21.67	21.57
		50	25	21.54	21.52	21.48
		50	50	21.34	21.26	21.26
		100	0	21.56	21.54	21.54
20M	16QAM	1	0	21.44	21.36	21.33
		1	50	21.94	21.84	21.76
		1	99	21.17	21.16	21.06
		50	0	20.60	20.58	20.57
		50	25	20.87	20.87	20.82
		50	50	20.45	20.35	20.27
		100	0	20.62	20.61	20.58

EIRP Power (dBm)

Band	WCDMA IV		
Channel	1312	1413	1513
Frequency (MHz)	1712.4	1732.6	1752.6
RMC 12.2K	25.08	25.03	25.02
HSDPA Subtest-1	24.03	24.07	24.19
HSDPA Subtest-2	23.94	24.01	24.31
HSDPA Subtest-3	23.65	23.42	23.24
HSDPA Subtest-4	23.63	23.41	23.22
HSUPA Subtest-1	23.96	23.99	24.28
HSUPA Subtest-2	21.75	21.73	21.75
HSUPA Subtest-3	23.15	23.07	23.06
HSUPA Subtest-4	21.71	21.72	21.74

*EIRP = Conducted + antenna gain (3.2dBi)

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	25.06	25.27	24.70
		1	2	24.94	24.97	24.87
		1	5	24.71	24.74	24.71
		3	0	24.70	24.79	24.75
		3	1	24.51	24.63	24.46
		3	3	24.52	24.59	24.44
		6	0	23.40	23.63	23.55
1.4M	16QAM	1	0	24.25	24.33	24.22
		1	2	24.08	24.16	24.13
		1	5	23.80	24.03	23.81
		3	0	23.76	23.72	23.57
		3	1	23.44	23.69	23.52
		3	3	23.37	23.50	23.37
		6	0	22.53	22.54	22.48

*EIRP = Conducted + antenna gain (3.2dBi)

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	25.09	25.31	24.82
		1	7	24.92	24.91	24.89
		1	14	24.73	24.79	24.77
		8	0	23.81	23.69	23.71
		8	3	23.45	23.59	23.52
		8	7	23.63	23.51	23.37
		15	0	23.52	23.55	23.53
3M	16QAM	1	0	24.25	24.30	24.22
		1	7	24.13	24.13	24.13
		1	14	23.89	24.02	23.83
		8	0	22.64	22.76	22.67
		8	3	22.55	22.64	22.39
		8	7	22.51	22.43	22.37
		15	0	22.57	22.65	22.60

*EIRP = Conducted + antenna gain (3.2dBi)

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	25.05	25.38	24.61
		1	12	24.94	25.05	24.84
		1	24	24.83	24.76	24.48
		12	0	23.83	23.77	23.64
		12	6	23.45	23.57	23.52
		12	13	23.64	23.52	23.29
		25	0	23.40	23.60	23.49
5M	16QAM	1	0	24.24	24.35	24.26
		1	12	24.07	24.12	24.26
		1	24	23.77	24.05	23.89
		12	0	22.72	22.76	22.59
		12	6	22.49	22.67	22.49
		12	13	22.37	22.41	22.40
		25	0	22.51	22.65	22.50

*EIRP = Conducted + antenna gain (3.2dBi)

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	25.13	25.31	24.70
		1	24	24.89	25.05	24.85
		1	49	24.76	24.70	24.62
		25	0	23.80	23.81	23.73
		25	12	23.58	23.60	23.54
		25	25	23.53	23.50	23.41
		50	0	23.49	23.60	23.59
10M	16QAM	1	0	24.38	24.32	24.27
		1	24	24.06	24.16	24.26
		1	49	23.91	23.97	23.81
		25	0	22.68	22.64	22.61
		25	12	22.47	22.69	22.52
		25	25	22.44	22.47	22.35
		50	0	22.57	22.61	22.57

*EIRP = Conducted + antenna gain (3.2dBi)

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	25.14	25.40	24.84
		1	37	25.03	25.05	24.96
		1	74	24.85	24.84	24.77
		36	0	23.84	23.82	23.77
		36	19	23.58	23.68	23.59
		36	39	23.64	23.61	23.51
		75	0	23.54	23.68	23.61
15M	16QAM	1	0	24.39	24.36	24.29
		1	37	24.21	24.23	24.27
		1	74	23.92	24.08	23.94
		36	0	22.78	22.79	22.71
		36	19	22.57	22.72	22.53
		36	39	22.51	22.55	22.50
		75	0	22.65	22.66	22.60

*EIRP = Conducted + antenna gain (3.2dBi)

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	25.17	25.47	25.07
		1	50	25.10	25.13	25.06
		1	99	24.85	24.85	24.84
		50	0	23.86	23.89	23.79
		50	25	23.68	23.71	23.68
		50	50	23.64	23.65	23.55
		100	0	23.63	23.68	23.62
20M	16QAM	1	0	24.40	24.44	24.35
		1	50	24.27	24.28	24.27
		1	99	24.00	24.09	23.98
		50	0	22.86	22.86	22.80
		50	25	22.65	22.74	22.59
		50	50	22.60	22.64	22.56
		100	0	22.65	22.72	22.60

*EIRP = Conducted + antenna gain (3.2dBi)

LTE Band 66						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		131979	132322	132665
		Frequency (MHz)		1710.7	1745	1779.3
1.4M	QPSK	1	0	25.80	25.28	25.14
		1	2	25.58	25.21	25.05
		1	5	24.95	24.90	25.05
		3	0	25.69	25.71	25.62
		3	1	25.67	25.52	25.50
		3	3	25.41	25.30	25.35
		6	0	24.63	24.51	24.65
1.4M	16QAM	1	0	24.51	24.49	24.44
		1	2	24.89	24.88	24.87
		1	5	24.17	24.26	24.12
		3	0	24.67	24.62	24.73
		3	1	25.01	24.87	24.93
		3	3	24.62	24.38	24.43
		6	0	23.70	23.69	23.62

*EIRP = Conducted + antenna gain (3.2dBi)

LTE Band 66						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		131987	132322	132657
		Frequency (MHz)		1711.5	1745	1778.5
3M	QPSK	1	0	25.91	25.38	25.18
		1	7	25.59	25.25	25.11
		1	14	25.06	25.00	25.08
		8	0	24.84	24.82	24.71
		8	3	24.74	24.65	24.64
		8	7	24.45	24.43	24.36
		15	0	24.68	24.65	24.65
3M	16QAM	1	0	24.59	24.55	24.50
		1	7	25.04	25.02	24.90
		1	14	24.30	24.27	24.26
		8	0	23.80	23.75	23.77
		8	3	24.04	24.00	24.02
		8	7	23.64	23.49	23.46
		15	0	23.74	23.81	23.68

*EIRP = Conducted + antenna gain (3.2dBi)

LTE Band 66						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		131997	132322	132647
		Frequency (MHz)		1712.5	1745	1777.5
5M	QPSK	1	0	25.98	25.32	25.25
		1	12	25.67	25.26	25.15
		1	24	25.03	24.99	25.06
		12	0	24.85	24.83	24.71
		12	6	24.74	24.66	24.58
		12	13	24.52	24.36	24.43
		25	0	24.71	24.66	24.69
5M	16QAM	1	0	24.55	24.54	24.51
		1	12	25.07	25.00	24.86
		1	24	24.33	24.30	24.18
		12	0	23.77	23.68	23.73
		12	6	23.99	23.97	24.02
		12	13	23.62	23.51	23.37
		25	0	23.82	23.72	23.69

*EIRP = Conducted + antenna gain (3.2dBi)

LTE Band 66						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		132022	132322	132622
		Frequency (MHz)		1715	1745	1775
10M	QPSK	1	0	25.95	25.32	25.24
		1	24	25.66	25.25	25.20
		1	49	25.05	25.03	25.04
		25	0	24.92	24.80	24.72
		25	12	24.67	24.68	24.63
		25	25	24.47	24.37	24.44
		50	0	24.68	24.66	24.67
10M	16QAM	1	0	24.61	24.54	24.47
		1	24	25.07	25.04	24.89
		1	49	24.35	24.33	24.26
		25	0	23.70	23.68	23.71
		25	12	24.01	24.06	24.01
		25	25	23.58	23.46	23.44
		50	0	23.76	23.72	23.70

*EIRP = Conducted + antenna gain (3.2dBi)

LTE Band 66						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		132047	132322	132597
		Frequency (MHz)		1717.5	1745	1772.5
15M	QPSK	1	0	25.97	25.33	25.21
		1	37	25.59	25.28	25.12
		1	74	25.04	25.07	25.01
		36	0	24.93	24.82	24.70
		36	19	24.74	24.66	24.63
		36	39	24.46	24.41	24.36
		75	0	24.67	24.69	24.73
15M	16QAM	1	0	24.61	24.50	24.43
		1	37	25.06	24.98	24.95
		1	74	24.37	24.33	24.23
		36	0	23.79	23.77	23.74
		36	19	23.99	24.03	23.98
		36	39	23.60	23.48	23.41
		75	0	23.78	23.72	23.71

*EIRP = Conducted + antenna gain (3.2dBi)

LTE Band 66						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		132072	132322	132572
		Frequency (MHz)		1720	1745	1770
20M	QPSK	1	0	26.02	25.41	25.25
		1	50	25.67	25.34	25.21
		1	99	25.09	25.09	25.09
		50	0	24.94	24.87	24.77
		50	25	24.74	24.72	24.68
		50	50	24.54	24.46	24.46
		100	0	24.76	24.74	24.74
20M	16QAM	1	0	24.64	24.56	24.53
		1	50	25.14	25.04	24.96
		1	99	24.37	24.36	24.26
		50	0	23.80	23.78	23.77
		50	25	24.07	24.07	24.02
		50	50	23.65	23.55	23.47
		100	0	23.82	23.81	23.78

*EIRP = Conducted + antenna gain (3.2dBi)

4.2 Modulation Characteristics Measurement

4.2.1 Limits of Modulation Characteristics

N/A

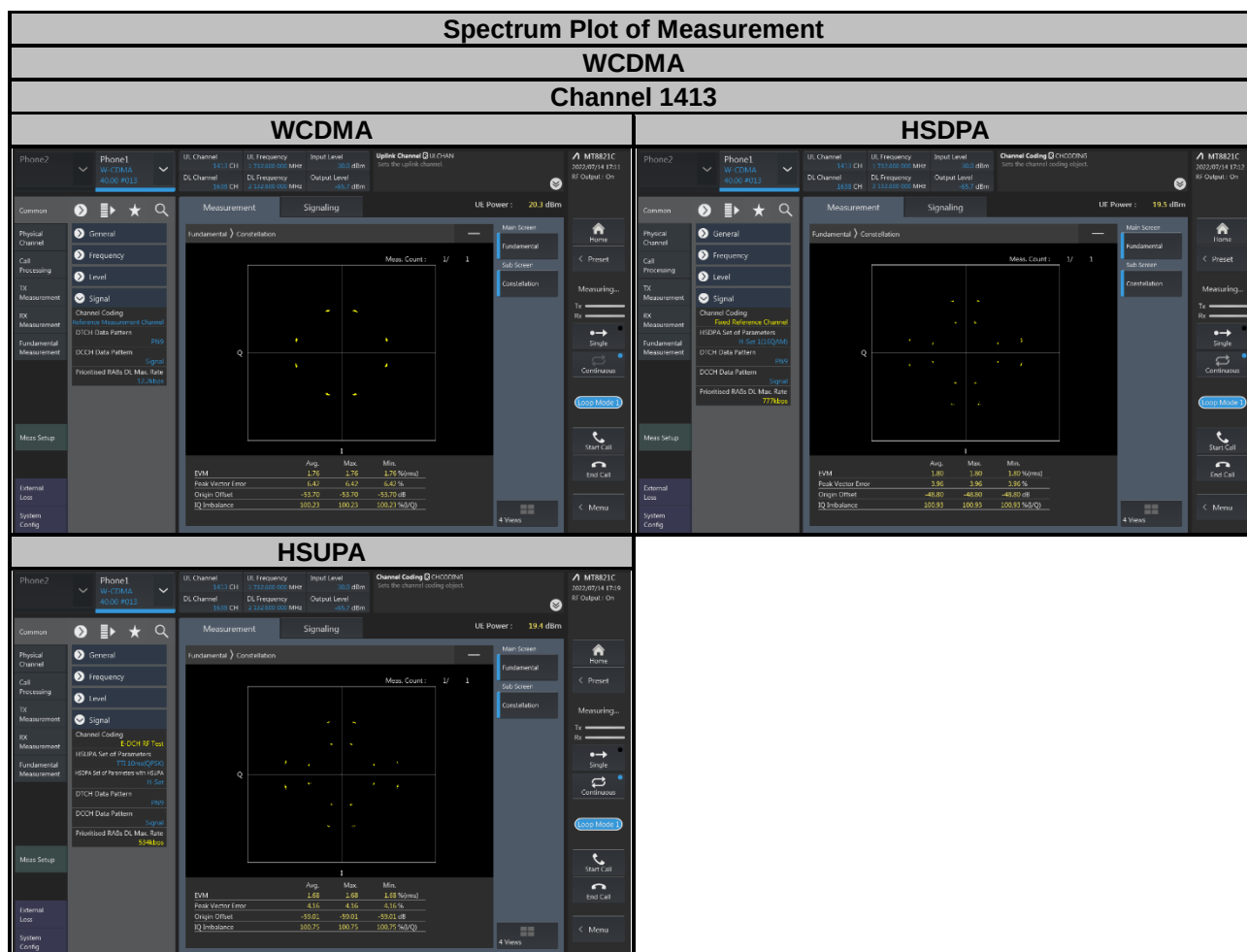
4.2.2 Test Setup

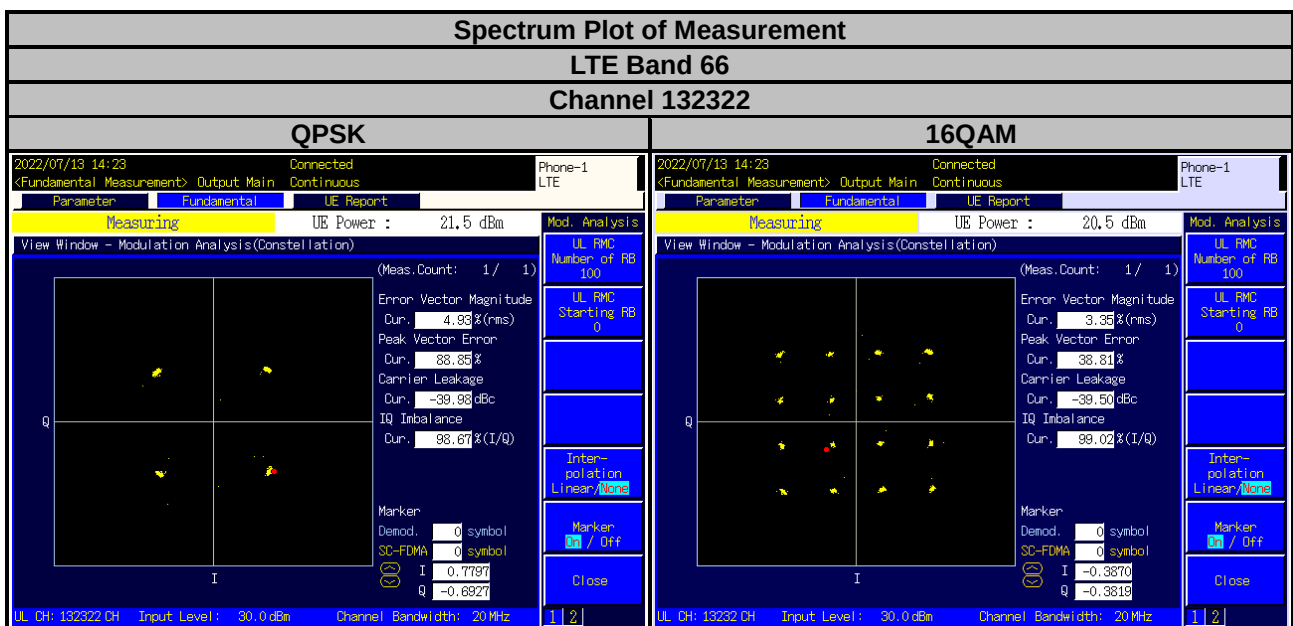
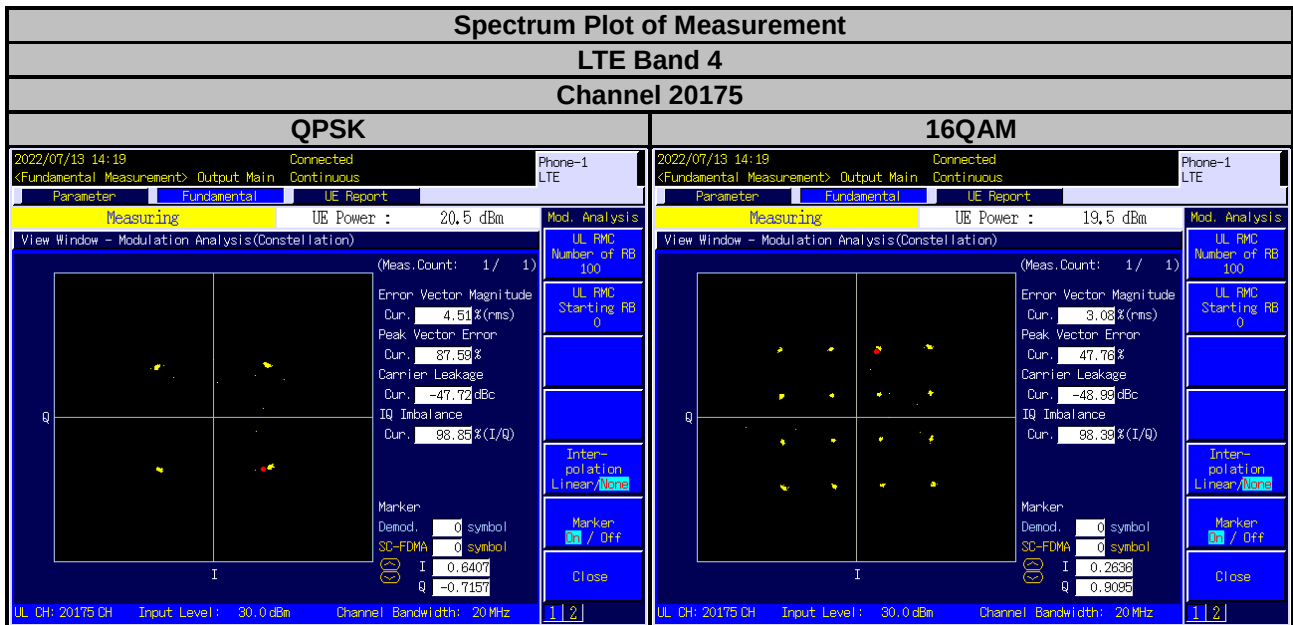


4.2.3 Test Procedure

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.

4.2.4 Test Results





4.3 Frequency Stability Measurement

4.3.1 Limits of Frequency Stability Measurement

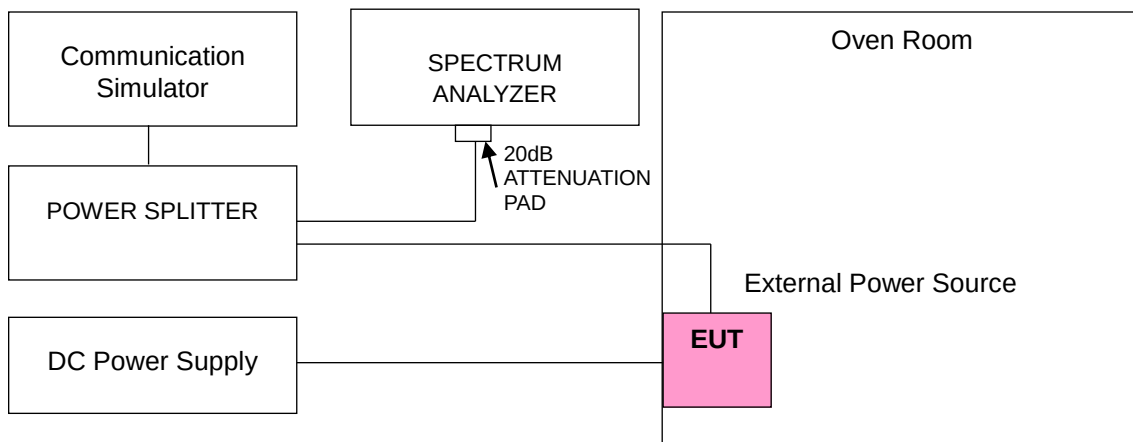
The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

4.3.2 Test Procedure

- 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.
- 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.
- The temperature range step is 10 degrees in this test items. All temperature levels shall be hold the $\pm 0.5^{\circ}\text{C}$ during the measurement testing. The each temperature step shall be at least 0.5 hours, consider the EUT could be test under the stability condition.

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

4.3.3 Test Setup



4.3.4 Test Results

Frequency Error vs. Voltage

Voltage (Volts)	WCDMA			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
3.7	1712.400002	0.001	1752.600002	0.001
3.15	1712.400003	0.002	1752.600003	0.002
4.26	1712.400004	0.002	1752.600003	0.002

Note: The applicant defined the normal working voltage is from 3.15 Vdc to 4.26 Vdc.

Frequency Error vs. Temperature

Temp. (°C)	WCDMA			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	1712.400003	0.002	1752.600001	0.001
-20	1712.400002	0.001	1752.600004	0.002
-10	1712.400002	0.001	1752.600002	0.001
0	1712.400002	0.001	1752.600001	0.001
10	1712.400003	0.002	1752.600002	0.001
20	1712.399996	-0.002	1752.599999	-0.001
30	1712.399999	-0.001	1752.599998	-0.001
40	1712.399996	-0.002	1752.599997	-0.002
50	1712.399998	-0.001	1752.599997	-0.002

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 4			
	Channel Bandwidth: 1.4 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
3.7	1710.700002	0.001	1754.300003	0.002
3.15	1710.700001	0.001	1754.300001	0.001
4.26	1710.700002	0.001	1754.300002	0.001

Note: The applicant defined the normal working voltage is from 3.15 Vdc to 4.26 Vdc.

Frequency Error vs. Temperature

Temp. (°C)	LTE Band 4			
	Channel Bandwidth: 1.4 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	1710.700002	0.001	1754.300001	0.001
-20	1710.700003	0.002	1754.300003	0.002
-10	1710.700004	0.002	1754.300002	0.001
0	1710.700001	0.001	1754.300001	0.001
10	1710.700003	0.002	1754.300003	0.002
20	1710.699999	-0.001	1754.299999	-0.001
30	1710.699998	-0.001	1754.299997	-0.002
40	1710.699998	-0.001	1754.299996	-0.002
50	1710.699997	-0.002	1754.299998	-0.001

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 4			
	Channel Bandwidth: 3 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
3.7	1711.500001	0.001	1753.500004	0.002
3.15	1711.500003	0.002	1753.500003	0.001
4.26	1711.500004	0.002	1753.500001	0.001

Note: The applicant defined the normal working voltage is from 3.15 Vdc to 4.26 Vdc.

Frequency Error vs. Temperature

Temp. (°C)	LTE Band 4			
	Channel Bandwidth: 3 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	1711.500002	0.001	1753.500002	0.001
-20	1711.500003	0.002	1753.500003	0.002
-10	1711.500004	0.002	1753.500001	0.001
0	1711.500002	0.001	1753.500002	0.001
10	1711.500004	0.002	1753.500002	0.001
20	1711.499997	-0.002	1753.499998	-0.001
30	1711.499998	-0.001	1753.499996	-0.002
40	1711.499997	-0.002	1753.499998	-0.001
50	1711.499997	-0.002	1753.499999	-0.001

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 4			
	Channel Bandwidth: 5 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
3.7	1712.500004	0.002	1752.500003	0.001
3.15	1712.500001	0.001	1752.500003	0.002
4.26	1712.500001	0.001	1752.500003	0.002

Note: The applicant defined the normal working voltage is from 3.15 Vdc to 4.26 Vdc.

Frequency Error vs. Temperature

Temp. (°C)	LTE Band 4			
	Channel Bandwidth: 5 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	1712.500001	0.001	1752.500004	0.002
-20	1712.500001	0.001	1752.500001	0.001
-10	1712.500003	0.002	1752.500004	0.002
0	1712.500002	0.001	1752.500003	0.001
10	1712.500003	0.002	1752.500003	0.001
20	1712.499998	-0.001	1752.499998	-0.001
30	1712.499998	-0.001	1752.499996	-0.002
40	1712.499998	-0.001	1752.499997	-0.001
50	1712.499998	-0.001	1752.499998	-0.001

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 4			
	Channel Bandwidth: 10 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
3.7	1715.000003	0.002	1750.000003	0.002
3.15	1715.000004	0.002	1750.000003	0.002
4.26	1715.000004	0.002	1750.000003	0.002

Note: The applicant defined the normal working voltage is from 3.15 Vdc to 4.26 Vdc.

Frequency Error vs. Temperature

Temp. (°C)	LTE Band 4			
	Channel Bandwidth: 10 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	1715.000002	0.001	1750.000002	0.001
-20	1715.000004	0.002	1750.000002	0.001
-10	1715.000002	0.001	1750.000002	0.001
0	1715.000003	0.002	1750.000003	0.002
10	1715.000002	0.001	1750.000003	0.002
20	1714.999997	-0.002	1749.999997	-0.002
30	1714.999999	-0.001	1749.999998	-0.001
40	1714.999997	-0.002	1749.999998	-0.001
50	1714.999996	-0.002	1749.999999	-0.001

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 4			
	Channel Bandwidth: 15 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
3.7	1717.500002	0.001	1747.500003	0.002
3.15	1717.500003	0.002	1747.500003	0.002
4.26	1717.500003	0.002	1747.500003	0.002

Note: The applicant defined the normal working voltage is from 3.15 Vdc to 4.26 Vdc.

Frequency Error vs. Temperature

Temp. (°C)	LTE Band 4			
	Channel Bandwidth: 15 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	1717.500003	0.001	1747.500004	0.002
-20	1717.500004	0.002	1747.500002	0.001
-10	1717.500002	0.001	1747.500003	0.002
0	1717.500001	0.001	1747.500003	0.002
10	1717.500001	0.001	1747.500002	0.001
20	1717.499996	-0.002	1747.499997	-0.002
30	1717.499998	-0.001	1747.499997	-0.002
40	1717.499998	-0.001	1747.499998	-0.001
50	1717.499998	-0.001	1747.499998	-0.001

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 4			
	Channel Bandwidth: 20 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
3.7	1720.000004	0.002	1745.000002	0.001
3.15	1720.000003	0.002	1745.000003	0.002
4.26	1720.000002	0.001	1745.000003	0.002

Note: The applicant defined the normal working voltage is from 3.15 Vdc to 4.26 Vdc.

Frequency Error vs. Temperature

Temp. (°C)	LTE Band 4			
	Channel Bandwidth: 20 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	1720.000004	0.002	1745.000004	0.002
-20	1720.000001	0.001	1745.000003	0.002
-10	1720.000004	0.002	1745.000003	0.002
0	1720.000004	0.002	1745.000003	0.001
10	1720.000003	0.001	1745.000003	0.002
20	1719.999997	-0.002	1744.999997	-0.001
30	1719.999997	-0.002	1744.999997	-0.002
40	1719.999999	-0.001	1744.999999	-0.001
50	1719.999997	-0.002	1744.999997	-0.001

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 66			
	Channel Bandwidth: 1.4 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
3.7	1710.700002	0.001	1779.300003	0.001
3.15	1710.700004	0.002	1779.300004	0.002
4.26	1710.700002	0.001	1779.300003	0.002

Note: The applicant defined the normal working voltage is from 3.15 Vdc to 4.26 Vdc.

Frequency Error vs. Temperature

Temp. (°C)	LTE Band 66			
	Channel Bandwidth: 1.4 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	1710.700003	0.002	1779.300002	0.001
-20	1710.700002	0.001	1779.300002	0.001
-10	1710.700002	0.001	1779.300004	0.002
0	1710.700002	0.001	1779.300003	0.002
10	1710.700002	0.001	1779.300004	0.002
20	1710.699998	-0.001	1779.299998	-0.001
30	1710.699999	-0.001	1779.299999	-0.001
40	1710.699999	-0.001	1779.299999	-0.001
50	1710.699997	-0.002	1779.299997	-0.002

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 66			
	Channel Bandwidth: 3 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
3.7	1711.500004	0.002	1778.500003	0.002
3.15	1711.500003	0.001	1778.500001	0.001
4.26	1711.500003	0.002	1778.500002	0.001

Note: The applicant defined the normal working voltage is from 3.15 Vdc to 4.26 Vdc.

Frequency Error vs. Temperature

Temp. (°C)	LTE Band 66			
	Channel Bandwidth: 3 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	1711.500002	0.001	1778.500001	0.001
-20	1711.500002	0.001	1778.500002	0.001
-10	1711.500003	0.002	1778.500003	0.002
0	1711.500002	0.001	1778.500003	0.002
10	1711.500002	0.001	1778.500002	0.001
20	1711.499997	-0.002	1778.499996	-0.002
30	1711.499999	-0.001	1778.499996	-0.002
40	1711.499997	-0.002	1778.499998	-0.001
50	1711.499999	-0.001	1778.499998	-0.001

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 66			
	Channel Bandwidth: 5 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
3.7	1712.500002	0.001	1777.500002	0.001
3.15	1712.500002	0.001	1777.500002	0.001
4.26	1712.500002	0.001	1777.500004	0.002

Note: The applicant defined the normal working voltage is from 3.15 Vdc to 4.26 Vdc.

Frequency Error vs. Temperature

Temp. (°C)	LTE Band 66			
	Channel Bandwidth: 5 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	1712.500002	0.001	1777.500002	0.001
-20	1712.500001	0.001	1777.500001	0.001
-10	1712.500003	0.002	1777.500002	0.001
0	1712.500001	0.001	1777.500002	0.001
10	1712.500004	0.002	1777.500003	0.002
20	1712.499998	-0.001	1777.499996	-0.002
30	1712.499998	-0.001	1777.499998	-0.001
40	1712.499998	-0.001	1777.499999	-0.001
50	1712.499998	-0.001	1777.499999	-0.001

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 66			
	Channel Bandwidth: 10 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
3.7	1715.000001	0.001	1775.000002	0.001
3.15	1715.000002	0.001	1775.000002	0.001
4.26	1715.000002	0.001	1775.000001	0.001

Note: The applicant defined the normal working voltage is from 3.15 Vdc to 4.26 Vdc.

Frequency Error vs. Temperature

Temp. (°C)	LTE Band 66			
	Channel Bandwidth: 10 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	1715.000002	0.001	1775.000003	0.001
-20	1715.000004	0.002	1775.000002	0.001
-10	1715.000003	0.002	1775.000003	0.002
0	1715.000002	0.001	1775.000003	0.002
10	1715.000003	0.002	1775.000002	0.001
20	1714.999997	-0.002	1774.999999	-0.001
30	1714.999999	-0.001	1774.999999	-0.001
40	1714.999998	-0.001	1774.999997	-0.002
50	1714.999998	-0.001	1774.999996	-0.002

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 66			
	Channel Bandwidth: 15 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
3.7	1717.500003	0.002	1772.500002	0.001
3.15	1717.500002	0.001	1772.500003	0.001
4.26	1717.500003	0.002	1772.500001	0.001

Note: The applicant defined the normal working voltage is from 3.15 Vdc to 4.26 Vdc.

Frequency Error vs. Temperature

Temp. (°C)	LTE Band 66			
	Channel Bandwidth: 15 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	1717.500002	0.001	1772.500004	0.002
-20	1717.500003	0.002	1772.500004	0.002
-10	1717.500003	0.002	1772.500002	0.001
0	1717.500004	0.002	1772.500003	0.002
10	1717.500002	0.001	1772.500001	0.001
20	1717.499996	-0.002	1772.499997	-0.002
30	1717.499996	-0.002	1772.499996	-0.002
40	1717.499997	-0.002	1772.499997	-0.002
50	1717.499997	-0.002	1772.499998	-0.001

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 66			
	Channel Bandwidth: 20 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
3.7	1720.000004	0.002	1770.000001	0.001
3.15	1720.000003	0.002	1770.000002	0.001
4.26	1720.000003	0.002	1770.000002	0.001

Note: The applicant defined the normal working voltage is from 3.15 Vdc to 4.26 Vdc.

Frequency Error vs. Temperature

Temp. (°C)	LTE Band 66			
	Channel Bandwidth: 20 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	1720.000003	0.002	1770.000002	0.001
-20	1720.000001	0.001	1770.000002	0.001
-10	1720.000002	0.001	1770.000003	0.002
0	1720.000003	0.002	1770.000002	0.001
10	1720.000004	0.002	1770.000003	0.002
20	1719.999997	-0.002	1769.999998	-0.001
30	1719.999996	-0.002	1769.999998	-0.001
40	1719.999998	-0.001	1769.999997	-0.002
50	1719.999998	-0.001	1769.999999	-0.001

4.4 Occupied Bandwidth Measurement

4.4.1 Limits of Occupied Bandwidth Measurement

The width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage 0.5 % of the total mean power of a given emission.

4.4.2 Test Procedure

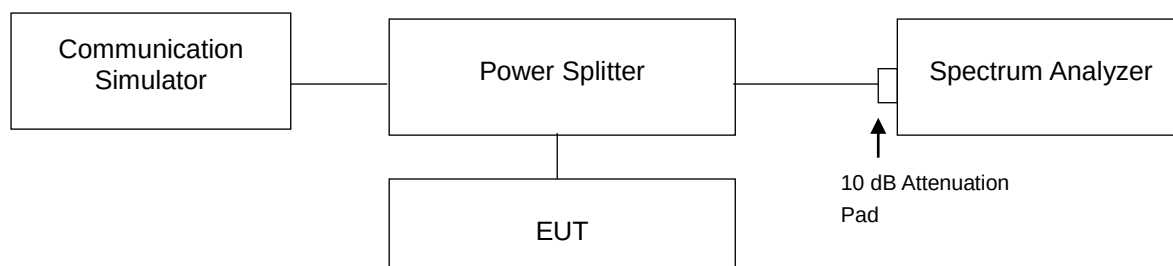
The EUT makes a call to the communication simulator. All measurements were done at low, middle and high operational frequency range. The communication simulator station system controlled a EUT to export maximum output power under transmission mode and specific channel frequency.

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

- 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.
- The nominal RBW shall be in the range of 1% to 5% of the anticipated OBW, and the VBW shall be set $\geq 3 \times \text{RBW}$.
- 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.
- 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.
- Set spectrum analyzer detection mode to peak, and the trace mode to max hold.
- 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).
- 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.
- 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.
- 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

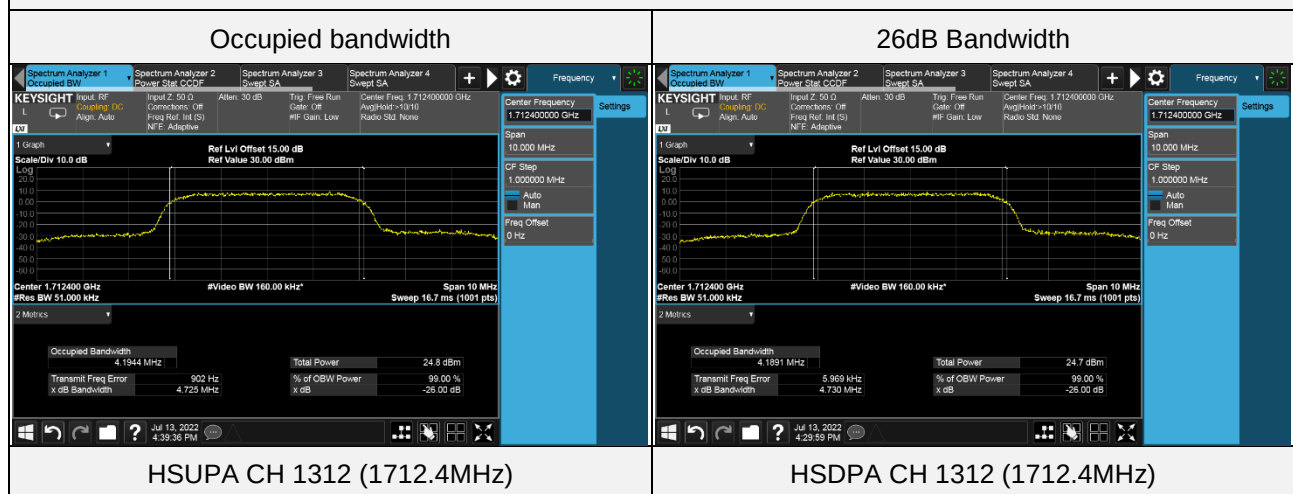


4.4.4 Test Result

WCDMA Band 4

Test Condition	Channel	Frequency (MHz)	Occupied bandwidth (MHz)	26dB Bandwidth (MHz)
WCDMA	1312	1712.4	4.19	4.71
WCDMA	1413	1732.6	4.16	4.67
WCDMA	1513	1752.6	4.17	4.71
HSDPA	1312	1712.4	4.19	4.73
HSDPA	1413	1732.6	4.15	4.70
HSDPA	1513	1752.6	4.18	4.69
HSUPA	1312	1712.4	4.19	4.73
HSUPA	1413	1732.6	4.15	4.69
HSUPA	1513	1752.6	4.16	4.70

Spectrum Plot of Worst Value

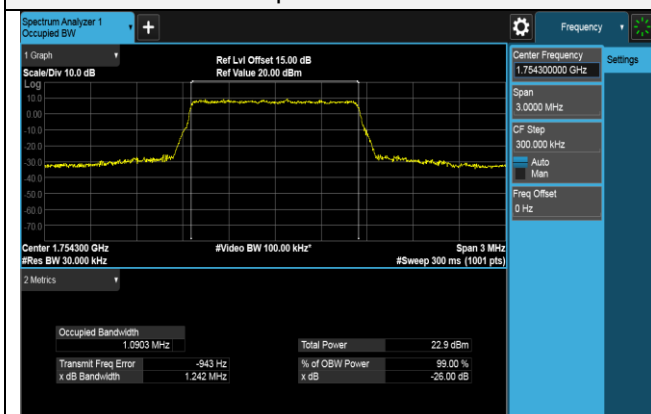


LTE Band 4 (Channel Bandwidth 1.4MHz)

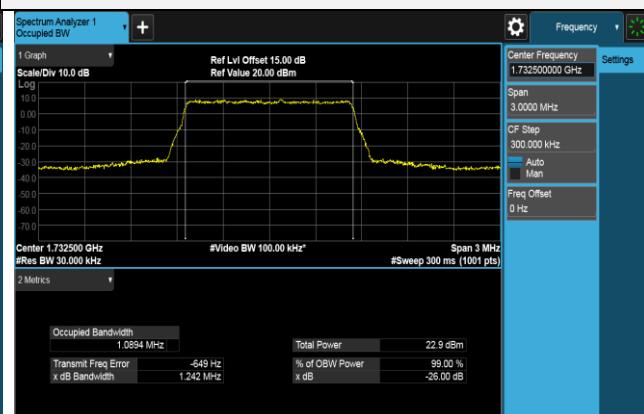
Test Condition	Channel	Frequency (MHz)	Occupied bandwidth (MHz)	26 dB Bandwidth (MHz)
QPSK	19957	1710.7	1.0878	1.239
QPSK	20175	1732.5	1.0894	1.242
QPSK	20393	1754.3	1.0883	1.242
16QAM	19957	1710.7	1.0888	1.242
16QAM	20175	1732.5	1.0875	1.239
16QAM	20393	1754.3	1.0903	1.242

Spectrum Plot of Worst Value

Occupied bandwidth



26 dB Bandwidth



16QAM CH 20393 (1754.3MHz)

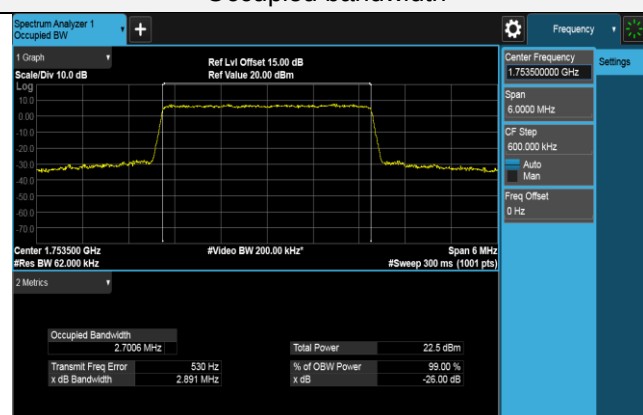
QPSK CH 20175 (1732.5MHz)

LTE Band 4 (Channel Bandwidth 3MHz)

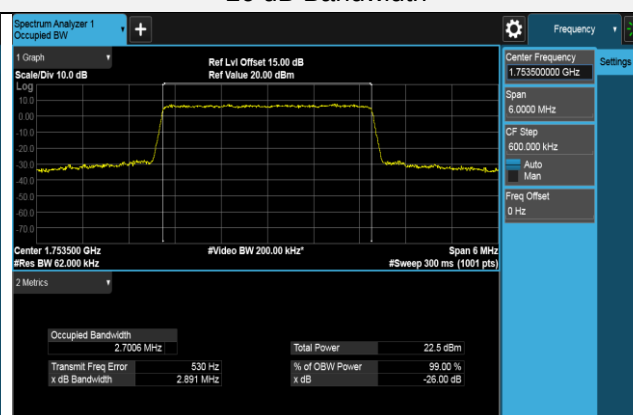
Test Condition	Channel	Frequency (MHz)	Occupied bandwidth (MHz)	26 dB Bandwidth (MHz)
QPSK	19965	1711.5	2.6985	2.886
QPSK	20175	1732.5	2.6973	2.890
QPSK	20385	1753.5	2.7006	2.891
16QAM	19965	1711.5	2.6977	2.883
16QAM	20175	1732.5	2.6990	2.890
16QAM	20385	1753.5	2.6992	2.887

Spectrum Plot of Worst Value

Occupied bandwidth



26 dB Bandwidth



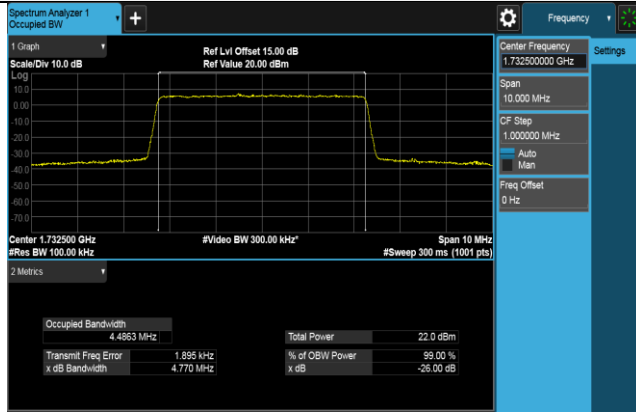
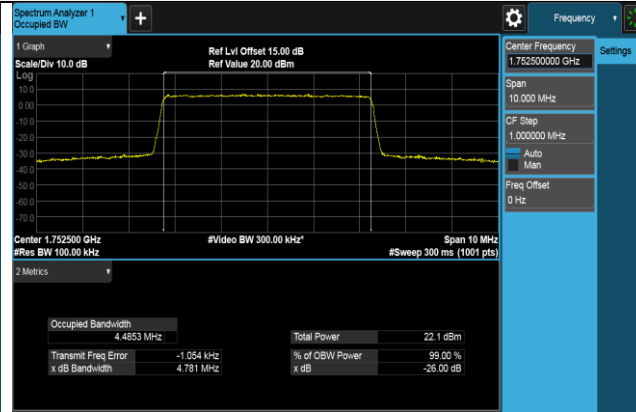
QPSK CH 20385 (1753.5MHz)

QPSK CH 20385 (1753.5MHz)

LTE Band 4 (Channel Bandwidth 5MHz)

Test Condition	Channel	Frequency (MHz)	Occupied bandwidth (MHz)	26 dB Bandwidth (MHz)
QPSK	19975	1712.5	4.4826	4.774
QPSK	20175	1732.5	4.4848	4.770
QPSK	20375	1752.5	4.4853	4.781
16QAM	19975	1712.5	4.4860	4.777
16QAM	20175	1732.5	4.4863	4.770
16QAM	20375	1752.5	4.4847	4.774

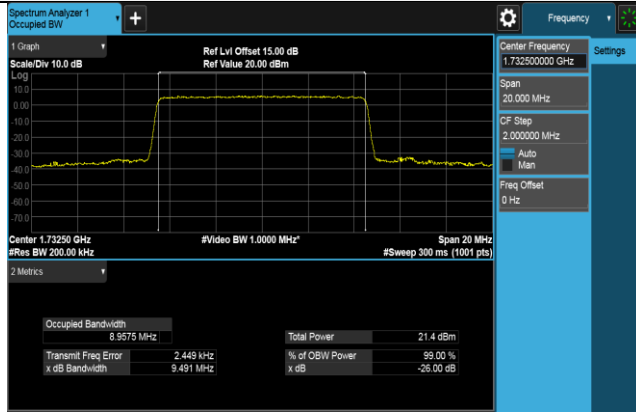
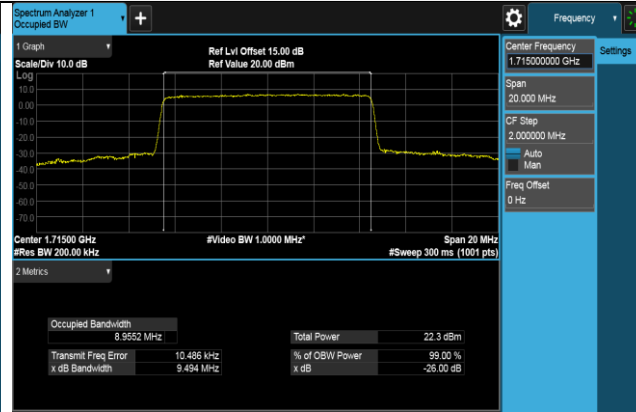
Spectrum Plot of Worst Value

Occupied bandwidth	26 dB Bandwidth
 Center Frequency 1.73250000 GHz Span 10.000 MHz CF Step 1.000000 MHz Freq Offset 0 Hz Center 1.732500 GHz #Video BW 300.00 kHz #Sweep 300 ms (1001 pts) Occupied Bandwidth 4.4863 MHz Total Power 22.0 dBm Transmit Freq Error 1.895 kHz % of OBW Power 99.00 % x dB Bandwidth 4.770 MHz x dB -26.00 dB	 Center Frequency 1.75250000 GHz Span 10.000 MHz CF Step 1.000000 MHz Freq Offset 0 Hz Center 1.752500 GHz #Video BW 300.00 kHz #Sweep 300 ms (1001 pts) Occupied Bandwidth 4.4853 MHz Total Power 22.1 dBm Transmit Freq Error -1.054 kHz % of OBW Power 99.00 % x dB Bandwidth 4.781 MHz x dB -26.00 dB
16QAM CH 20175 (1732.5MHz)	QPSK CH 20375 (1752.5MHz)

LTE Band 4 (Channel Bandwidth 10 MHz)

Test Condition	Channel	Frequency (MHz)	Occupied bandwidth (MHz)	26 dB Bandwidth (MHz)
QPSK	20000	1715	8.9552	9.494
QPSK	20175	1732.5	8.9575	9.491
QPSK	20350	1750	8.9499	9.476
16QAM	20000	1715	8.9529	9.488
16QAM	20175	1732.5	8.9543	9.477
16QAM	20350	1750	8.9532	9.485

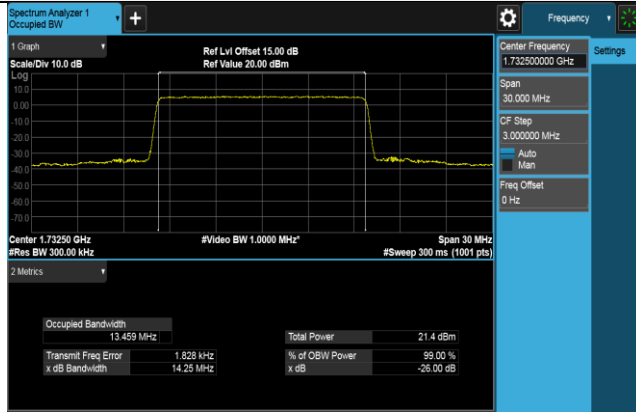
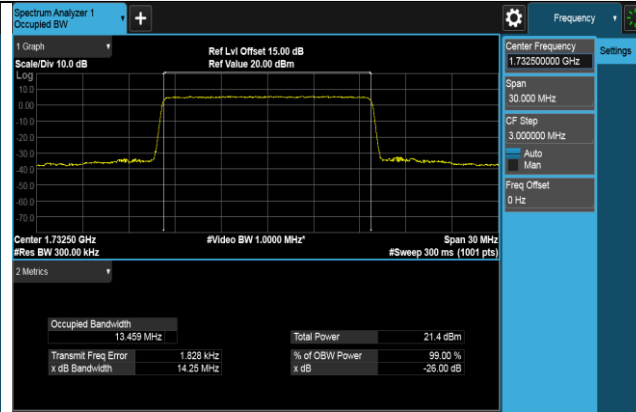
Spectrum Plot of Worst Value

Occupied bandwidth	26 dB Bandwidth
 Center Frequency: 1.732500000 GHz Span: 20.000 MHz CF Step: 2.0000000 MHz Ref Lvl Offset: 15.00 dB Ref Value: 20.00 dBm Center: 1.73250 GHz #Video BW: 1.0000 MHz Span: 20 MHz #Sweep: 300 ms (1001 pts) Occupied Bandwidth: 8.9575 MHz Total Power: 21.4 dBm Transmit Freq Error: 2.449 kHz % of OBW Power: 99.00 % x dB Bandwidth: 9.491 MHz x dB: -26.00 dB	 Center Frequency: 1.715000000 GHz Span: 20.000 MHz CF Step: 2.0000000 MHz Ref Lvl Offset: 15.00 dB Ref Value: 20.00 dBm Center: 1.71500 GHz #Video BW: 1.0000 MHz Span: 20 MHz #Sweep: 300 ms (1001 pts) Occupied Bandwidth: 8.9552 MHz Total Power: 22.3 dBm Transmit Freq Error: 10.486 kHz % of OBW Power: 99.00 % x dB Bandwidth: 9.494 MHz x dB: -26.00 dB
QPSK CH 20175 (1732.5MHz)	QPSK CH 20000 (1715MHz)

LTE Band 4 (Channel Bandwidth 15MHz)

Test Condition	Channel	Frequency (MHz)	Occupied bandwidth (MHz)	26 dB Bandwidth (MHz)
QPSK	20025	1717.5	13.4439	14.229
QPSK	20175	1732.5	13.4591	14.248
QPSK	20325	1747.5	13.4535	14.220
16QAM	20025	1717.5	13.4425	14.227
16QAM	20175	1732.5	13.4570	14.227
16QAM	20325	1747.5	13.4529	14.231

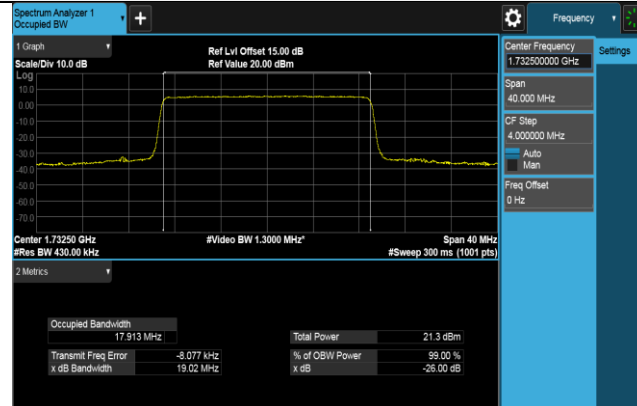
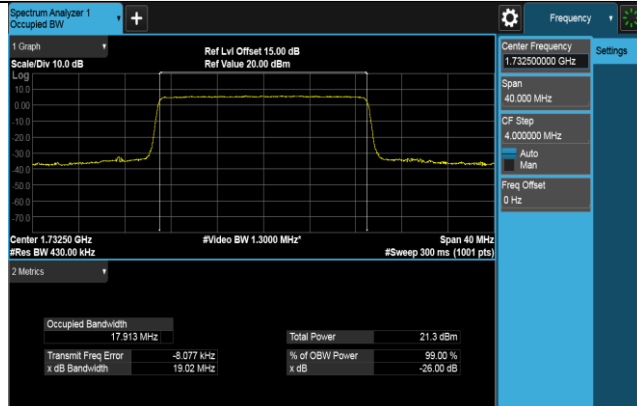
Spectrum Plot of Worst Value

Occupied bandwidth	26 dB Bandwidth
 Center Frequency 1.732500000 GHz Span 30.000 MHz CF Step 3.0000000 MHz Freq Offset 0 Hz Center 1.73250 GHz #Video BW 1.0000 MHz Span 30 MHz #Sweep 300 ms (1001 pts) 2 Metrics Occupied Bandwidth 13.459 MHz Total Power 21.4 dBm Transmit Freq Error 1.828 kHz % of OBW Power 99.00 % x dB Bandwidth 14.25 MHz x dB -26.00 dB	 Center Frequency 1.732500000 GHz Span 30.000 MHz CF Step 3.0000000 MHz Freq Offset 0 Hz Center 1.73250 GHz #Video BW 1.0000 MHz Span 30 MHz #Sweep 300 ms (1001 pts) 2 Metrics Occupied Bandwidth 13.459 MHz Total Power 21.4 dBm Transmit Freq Error 1.828 kHz % of OBW Power 99.00 % x dB Bandwidth 14.25 MHz x dB -26.00 dB
QPSK CH 20175 (1732.5MHz)	QPSK CH 20175 (1732.5MHz)

LTE Band 4 (Channel Bandwidth 20MHz)

Test Condition	Channel	Frequency (MHz)	Occupied bandwidth (MHz)	26 dB Bandwidth (MHz)
QPSK	20050	1720	17.8955	19.017
QPSK	20175	1732.5	17.9079	19.020
QPSK	20300	1745	17.9069	19.008
16QAM	20050	1720	17.8895	19.010
16QAM	20175	1732.5	17.9133	19.024
16QAM	20300	1745	17.8998	19.009

Spectrum Plot of Worst Value

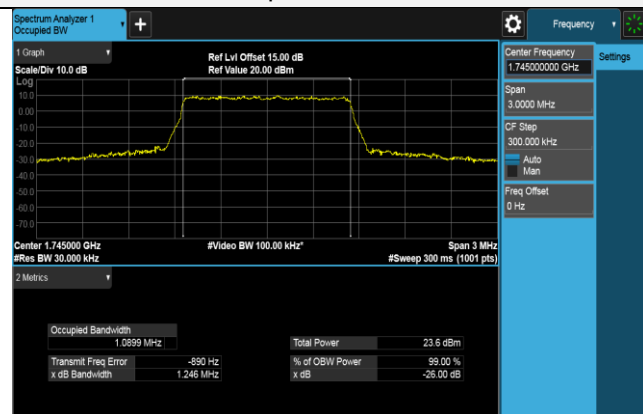
Occupied bandwidth	26 dB Bandwidth
	
16QAM CH 20175 (1732.5MHz)	16QAM CH 20175 (1732.5MHz)

LTE Band 66 (Channel Bandwidth 1.4MHz)

Test Condition	Channel	Frequency (MHz)	Occupied bandwidth (MHz)	26 dB Bandwidth (MHz)
QPSK	131979	1710.7	1.0887	1.251
QPSK	132322	1745	1.0899	1.246
QPSK	132665	1779.3	1.0897	1.249
16QAM	131979	1710.7	1.0893	1.252
16QAM	132322	1745	1.0893	1.244
16QAM	132665	1779.3	1.0891	1.247

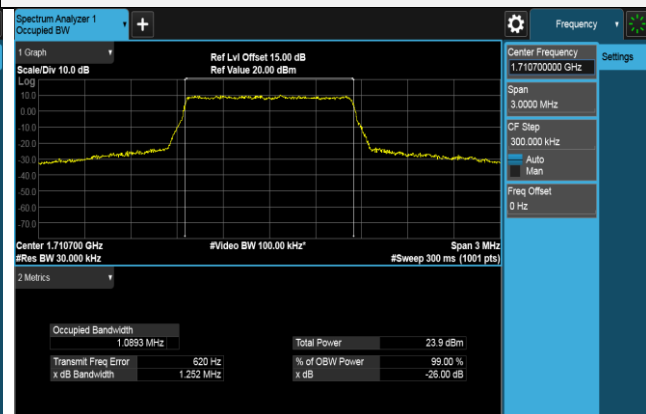
Spectrum Plot of Worst Value

Occupied bandwidth



QPSK CH 132322 (1745MHz)

26 dB Bandwidth

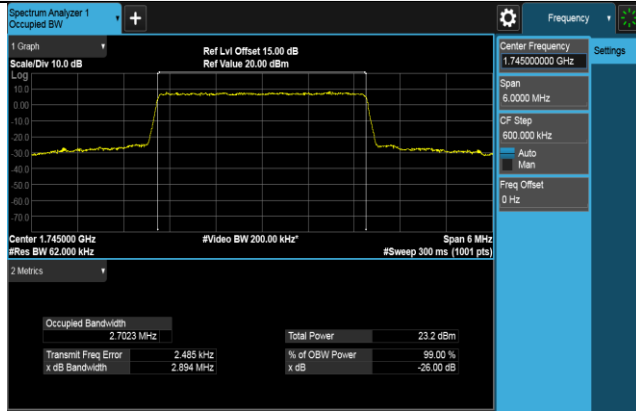
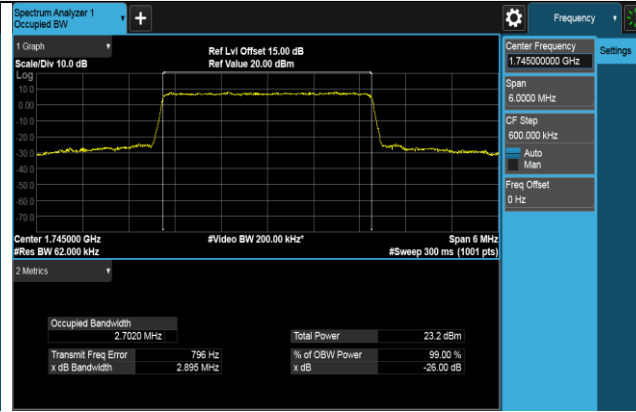


16QAM CH 131979 (1710.7MHz)

LTE Band 66 (Channel Bandwidth 3MHz)

Test Condition	Channel	Frequency (MHz)	Occupied bandwidth (MHz)	26 dB Bandwidth (MHz)
QPSK	131987	1711.5	2.7004	2.893
QPSK	132322	1745	2.7020	2.895
QPSK	132657	1778.5	2.6995	2.894
16QAM	131987	1711.5	2.6999	2.893
16QAM	132322	1745	2.7023	2.894
16QAM	132657	1778.5	2.6995	2.894

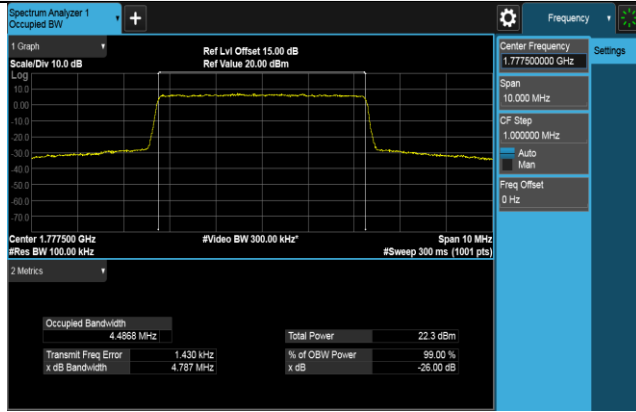
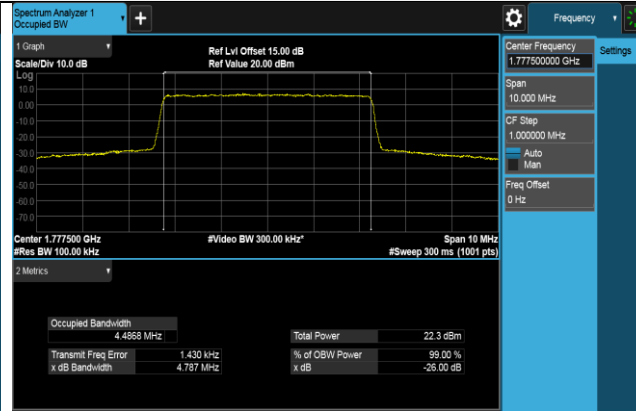
Spectrum Plot of Worst Value

Occupied bandwidth	26 dB Bandwidth
	
16QAM CH 132322 (1745MHz)	QPSK CH 132322 (1745MHz)

LTE Band 66 (Channel Bandwidth 5MHz)

Test Condition	Channel	Frequency (MHz)	Occupied bandwidth (MHz)	26 dB Bandwidth (MHz)
QPSK	131997	1712.5	4.4840	4.773
QPSK	132322	1745	4.4855	4.771
QPSK	132647	1777.5	4.4868	4.787
16QAM	131997	1712.5	4.4854	4.771
16QAM	132322	1745	4.4867	4.779
16QAM	132647	1777.5	4.4866	4.778

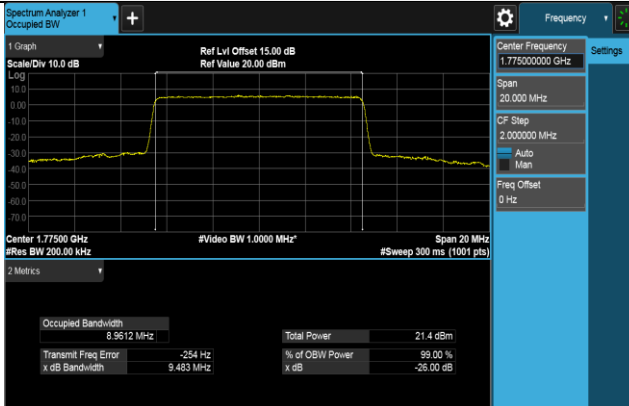
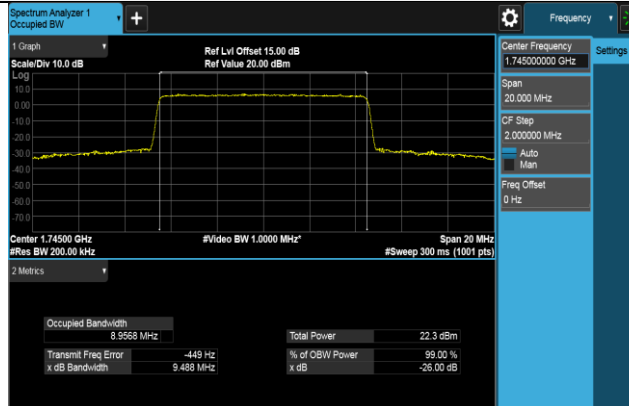
Spectrum Plot of Worst Value

Occupied bandwidth	26 dB Bandwidth
	
QPSK CH 132647 (1777.5MHz)	QPSK CH 132647 (1777.5MHz)

LTE Band 66 (Channel Bandwidth 10MHz)

Test Condition	Channel	Frequency (MHz)	Occupied bandwidth (MHz)	26 dB Bandwidth (MHz)
QPSK	132022	1715	8.9523	9.483
QPSK	132322	1745	8.9568	9.488
QPSK	132622	1775	8.9538	9.484
16QAM	132022	1715	8.9525	9.486
16QAM	132322	1745	8.9572	9.476
16QAM	132622	1775	8.9612	9.483

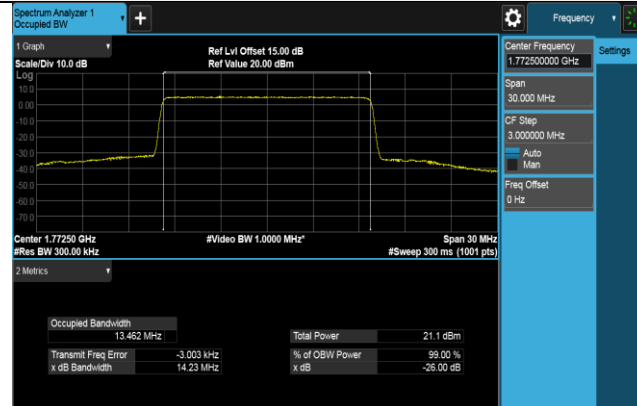
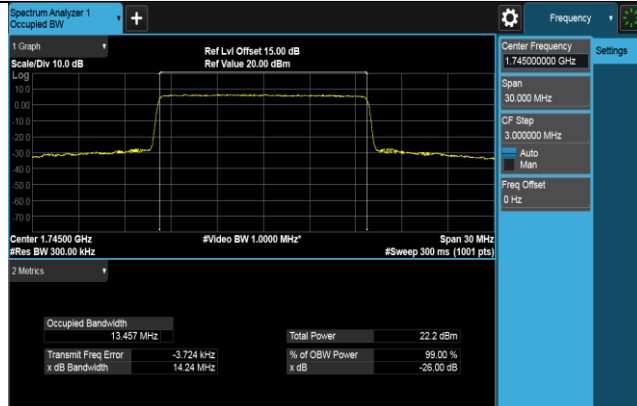
Spectrum Plot of Worst Value

Occupied bandwidth	26 dB Bandwidth
 Center Frequency: 1.77500000 GHz Span: 20.000 MHz CF Step: 2.000000 MHz Freq Offset: 0 Hz Occupied Bandwidth: 8.9612 MHz Total Power: 21.4 dBm Transmit Freq Error: -254 Hz x dB Bandwidth: 9.483 MHz	 Center Frequency: 1.74500000 GHz Span: 20.000 MHz CF Step: 2.000000 MHz Freq Offset: 0 Hz Occupied Bandwidth: 8.9568 MHz Total Power: 22.3 dBm Transmit Freq Error: -449 Hz x dB Bandwidth: 9.488 MHz
16QAM CH 132622 (1775MHz)	QPSK CH 132322 (1745MHz)

LTE Band 66 (Channel Bandwidth 15MHz)

Test Condition	Channel	Frequency (MHz)	Occupied bandwidth (MHz)	26 dB Bandwidth (MHz)
QPSK	132047	1717.5	13.4421	14.240
QPSK	132322	1745	13.4538	14.236
QPSK	132597	1772.5	13.4588	14.226
16QAM	132047	1717.5	13.4499	14.236
16QAM	132322	1745	13.4570	14.241
16QAM	132597	1772.5	13.4616	14.227

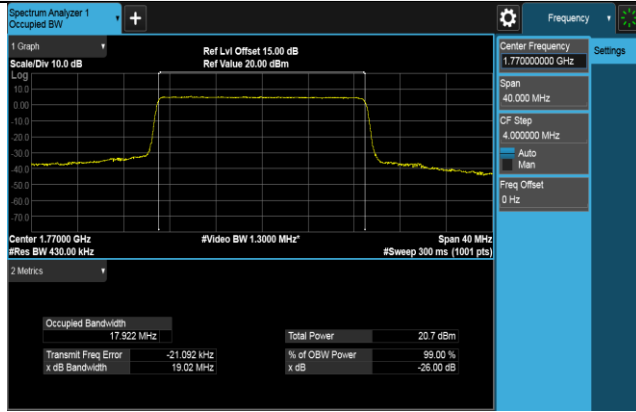
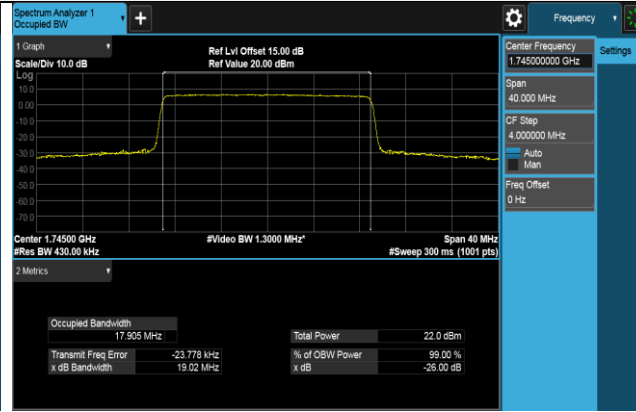
Spectrum Plot of Worst Value

Occupied bandwidth	26 dB Bandwidth
	
16QAM CH 132597 (1772.5MHz)	16QAM CH 132322 (1745MHz)

LTE Band 66 (Channel Bandwidth 20MHz)

Test Condition	Channel	Frequency (MHz)	Occupied bandwidth (MHz)	26 dB Bandwidth (MHz)
QPSK	132072	1720	17.8963	19.018
QPSK	132322	1745	17.9052	19.022
QPSK	132572	1770	17.9220	19.020
16QAM	132072	1720	17.9032	19.014
16QAM	132322	1745	17.9017	19.016
16QAM	132572	1770	17.9210	19.017

Spectrum Plot of Worst Value

Occupied bandwidth	26 dB Bandwidth
	
QPSK CH 132572 (1770MHz)	QPSK CH 132322 (1745MHz)

4.5 Channel Edge / Out-of-Band Emissions Measurement

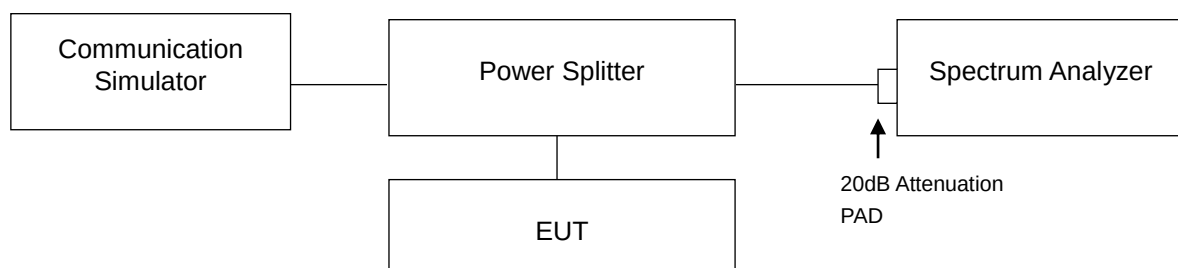
4.5.1 Limits of Band Edge / Out-of-Band Emissions Measurement

For WCDMA Band 4, LTE Band 4, LTE Band 66:

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.

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

4.5.2 Test Setup



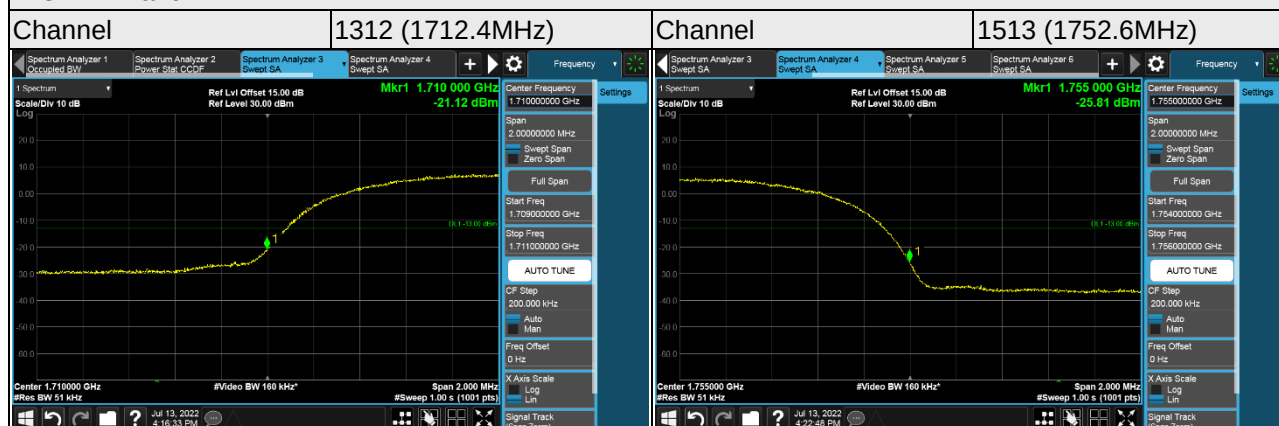
4.5.3 Test Procedures

- All measurements were done at low and high operational frequency range.
- The center frequency of spectrum is the band edge frequency and span is 5 MHz. RB of the spectrum is 51 kHz and VB of the spectrum is 160 kHz (WCDMA / HSDPA / HSUPA).
- The center frequency of spectrum is the band edge frequency and span is 1 MHz. RB of the spectrum is 15 kHz and VB of the spectrum is 51 kHz (LTE Bandwidth 1.4 MHz).
- The center frequency of spectrum is the band edge frequency and span is 1 MHz. RB of the spectrum is 30 kHz and VB of the spectrum is 100 kHz (LTE Bandwidth 3 MHz).
- The center frequency of spectrum is the band edge frequency and span is 1 MHz. RB of the spectrum is 51 kHz and VB of the spectrum is 160 kHz (LTE Bandwidth 5 MHz).
- The center frequency of spectrum is the band edge frequency and span is 1 MHz. RB of the spectrum is 100 kHz and VB of the spectrum is 300 kHz (LTE Bandwidth 10 MHz).
- The center frequency of spectrum is the band edge frequency and span is 1 MHz. RB of the spectrum is 150 kHz and VB of the spectrum is 470 kHz (LTE Bandwidth 15 MHz).
- The center frequency of spectrum is the band edge frequency and span is 1 MHz. RB of the spectrum is 200 kHz and VB of the spectrum is 1 MHz (LTE Bandwidth 20 MHz).
- Record the max. trace plot into the test report.

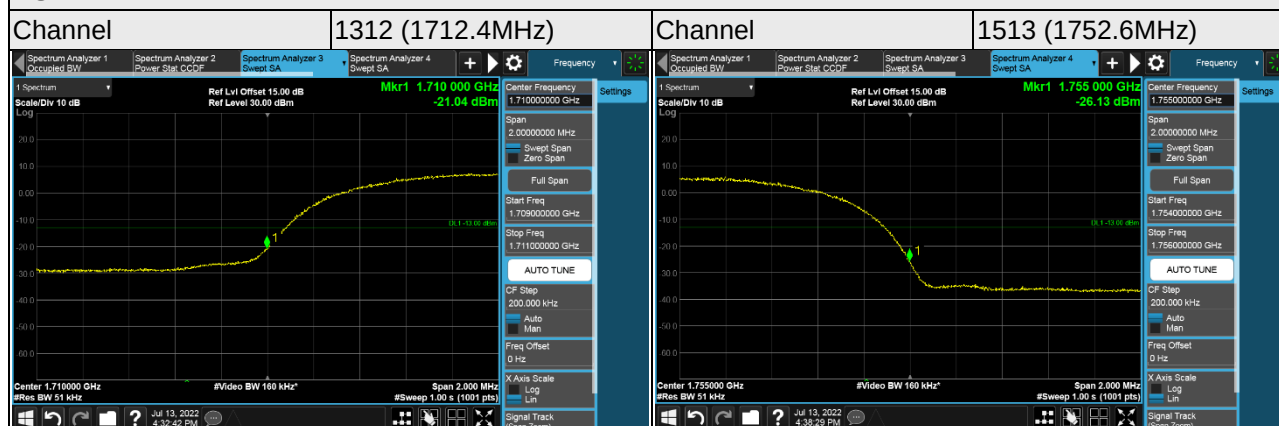
4.5.4 Test Results

Band Edge

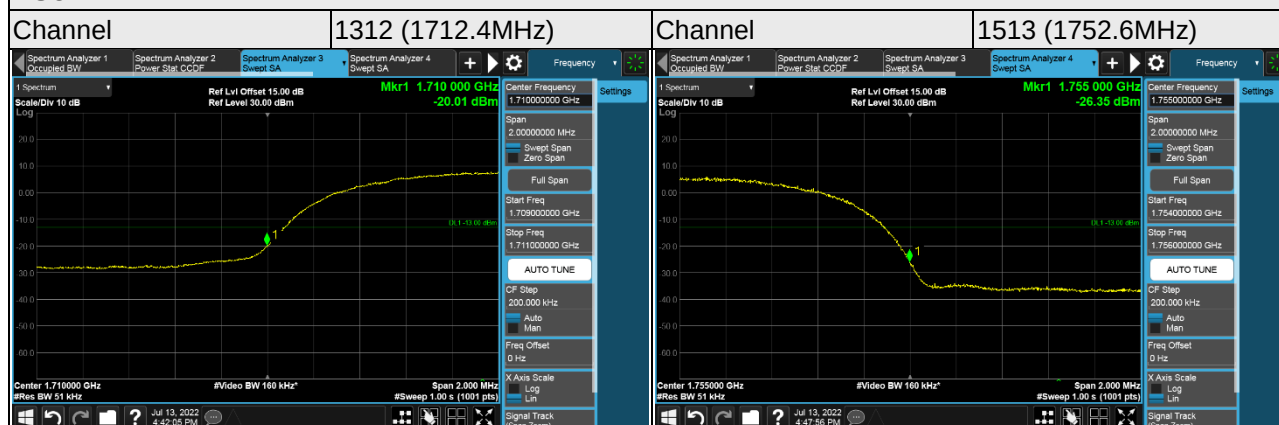
WCDMA Band 4



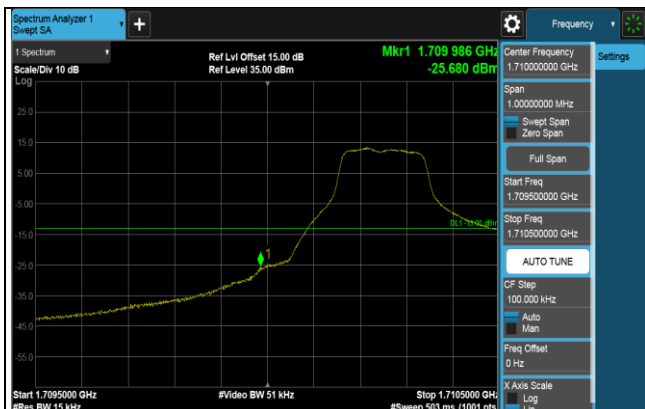
HSDPA



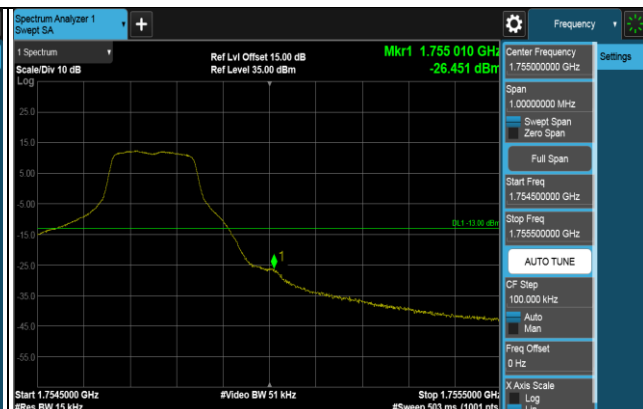
HSUPA



LTE Band 4 (Channel Bandwidth 1.4MHz)



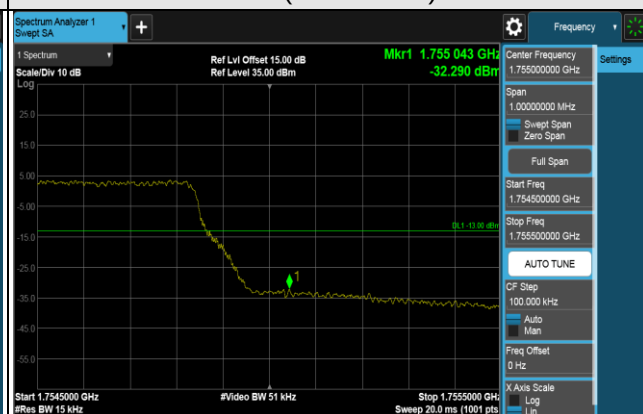
1RB (1710.7MHz)



1RB (1754.3MHz)

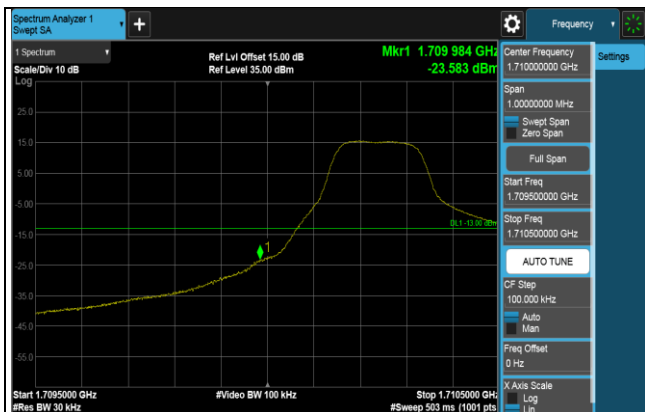


FULL (1710.7MHz)

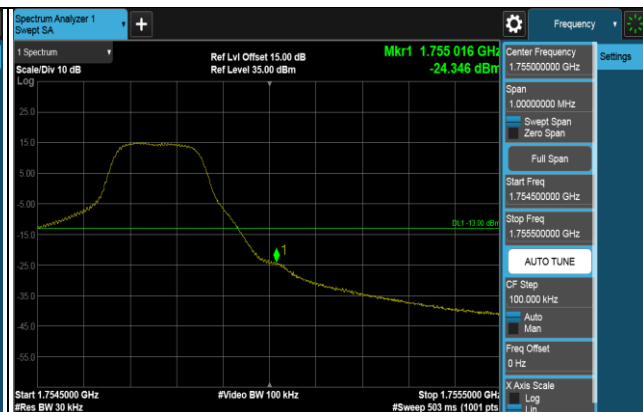


FULL (1754.3MHz)

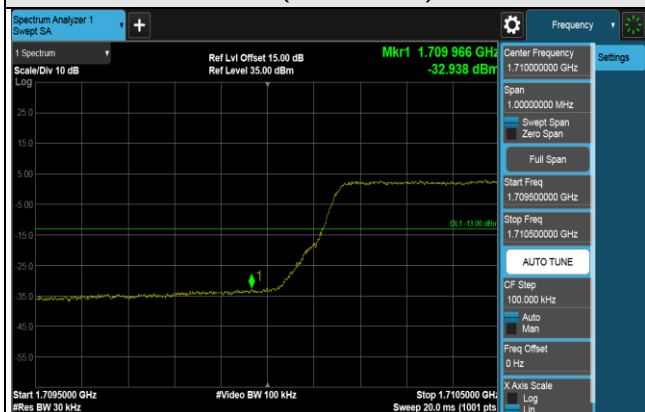
LTE Band 4 (Channel Bandwidth 3MHz)



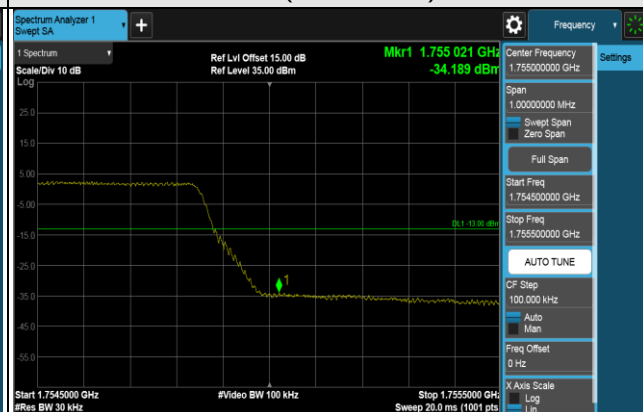
1RB (1711.5MHz)



1RB (1753.5MHz)

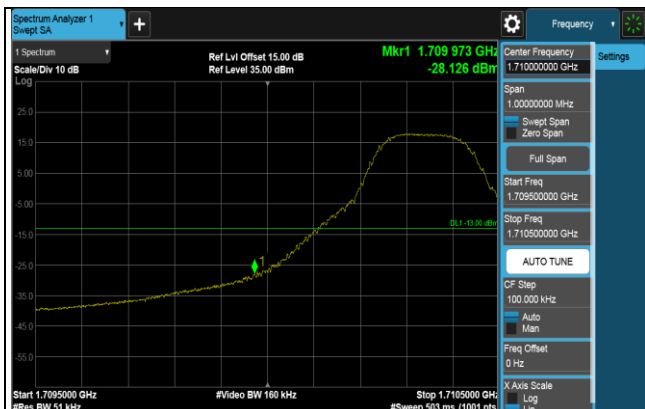


FULL (1711.5MHz)



FULL (1753.5MHz)

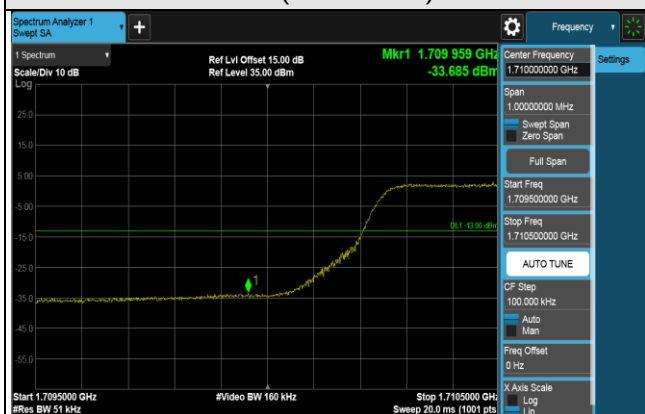
LTE Band 4 (Channel Bandwidth 5MHz)



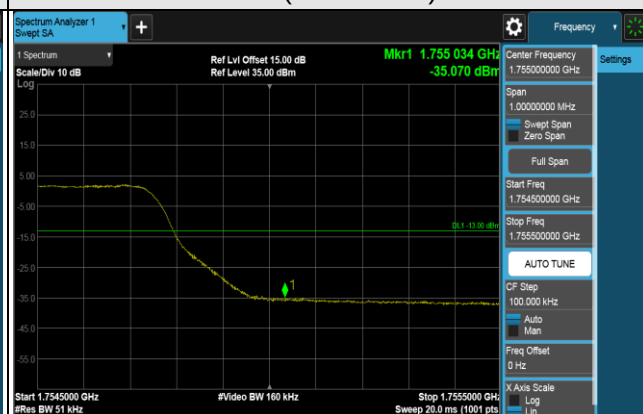
1RB (1712.5MHz)



1RB (1752.5MHz)

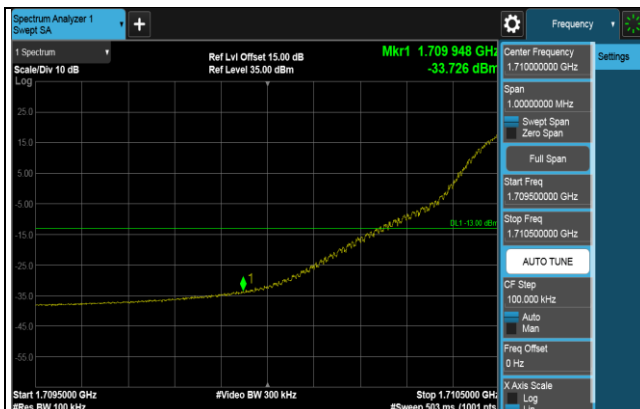


FULL (1712.5MHz)

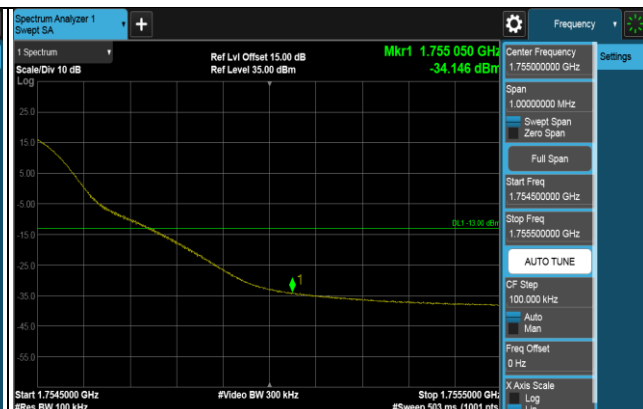


FULL (1752.5MHz)

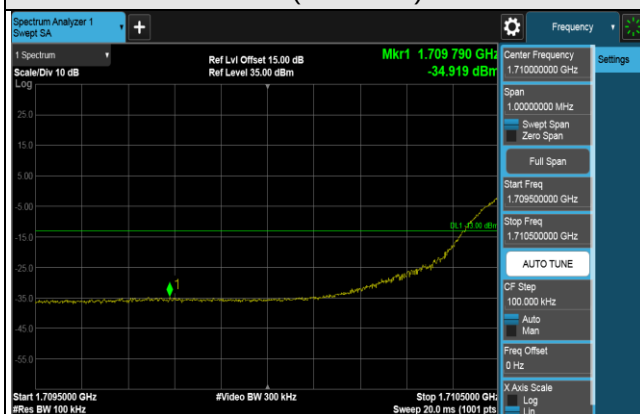
LTE Band 4 (Channel Bandwidth 10MHz)



1RB (1715MHz)



1RB (1750MHz)

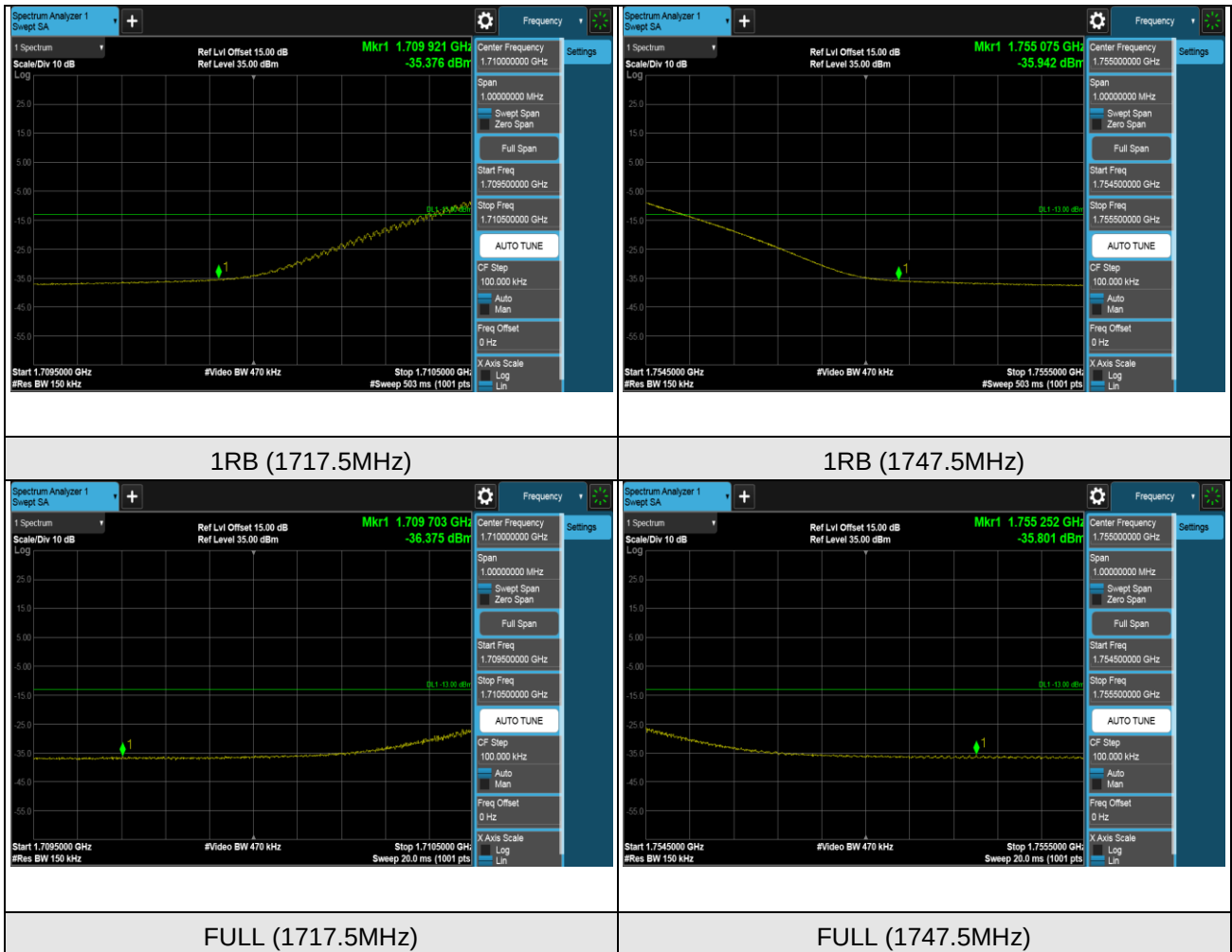


FULL (1715MHz)

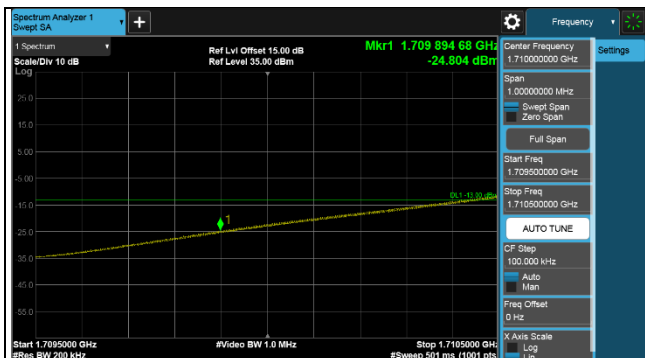


FULL (1750MHz)

LTE Band 4 (Channel Bandwidth 15MHz)

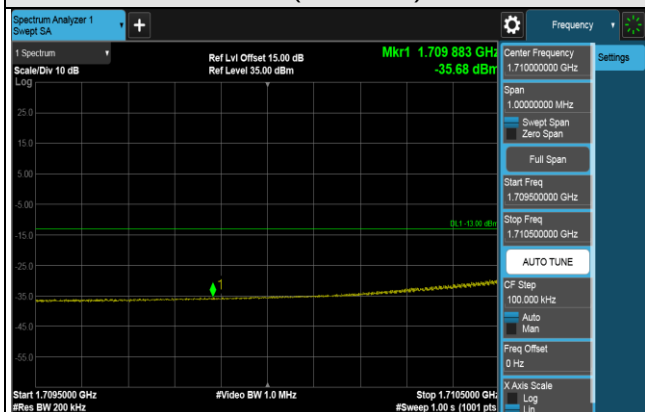


LTE Band 4 (Channel Bandwidth 20MHz)



1RB (1720MHz)

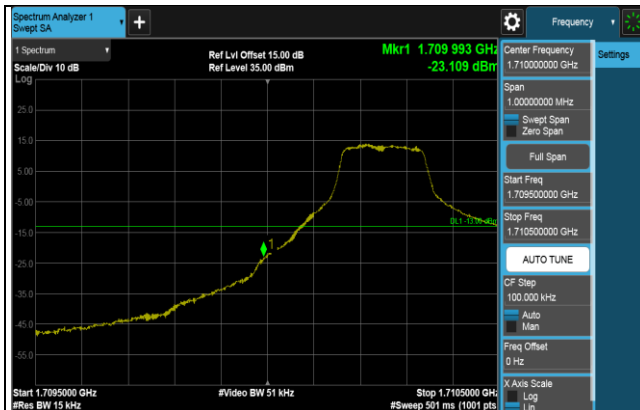
1RB (1745MHz)



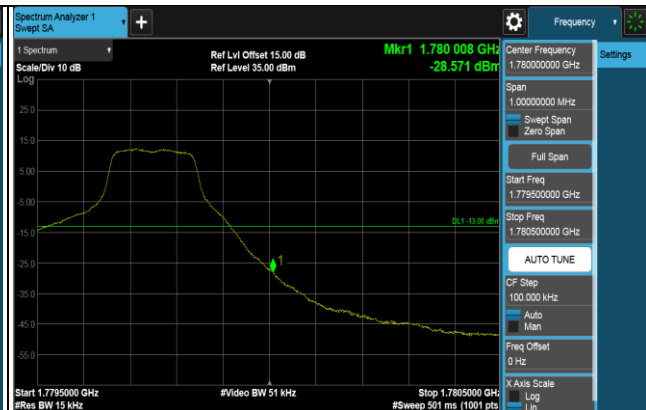
FULL (1720MHz)

FULL (1745MHz)

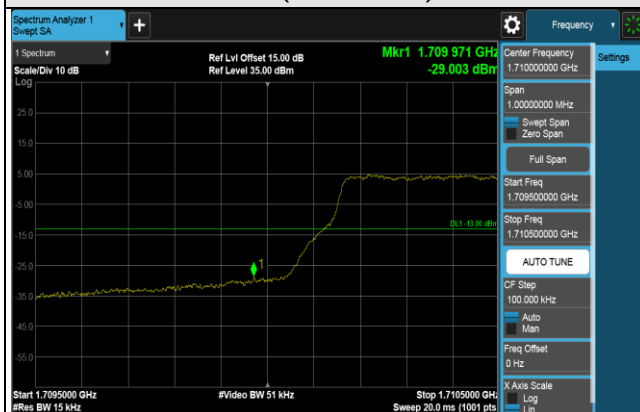
LTE Band 66 (Channel Bandwidth 1.4MHz)



1RB (1710.7MHz)



1RB (1779.3MHz)

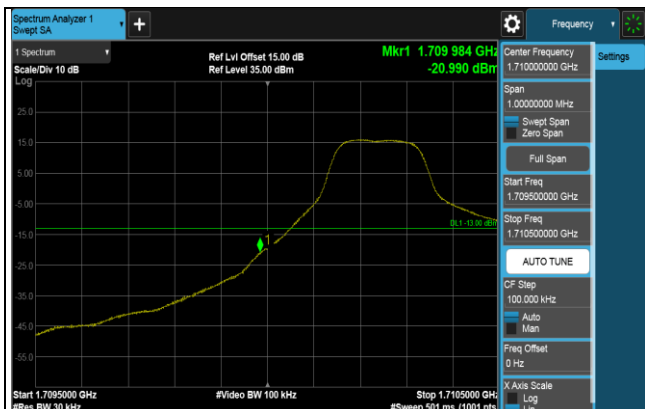


FULL (1710.7MHz)



FULL (1779.3MHz)

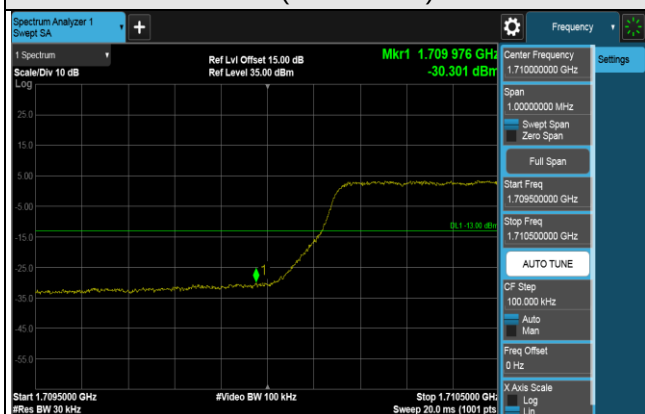
LTE Band 66 (Channel Bandwidth 3MHz)



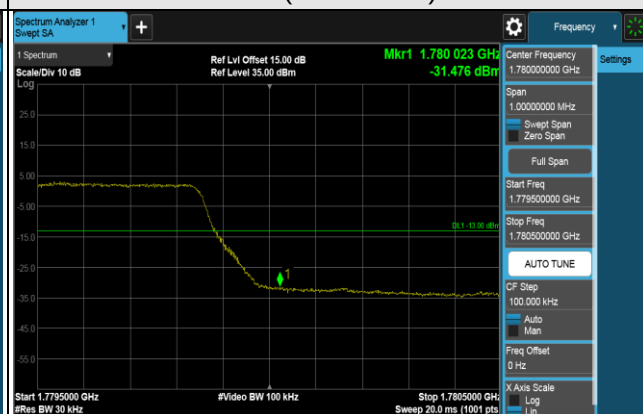
1RB (1711.5MHz)



1RB (1778.5MHz)

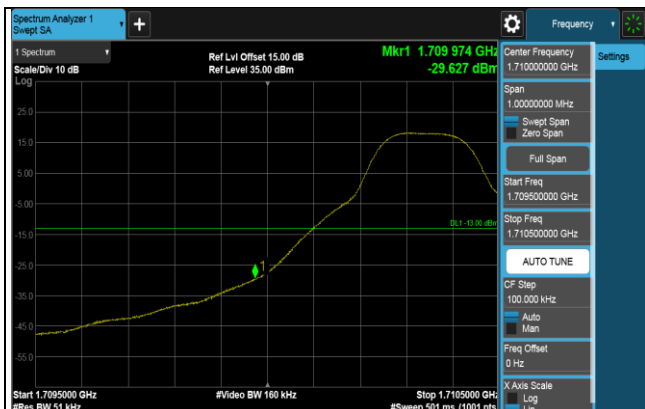


FULL (1711.5MHz)

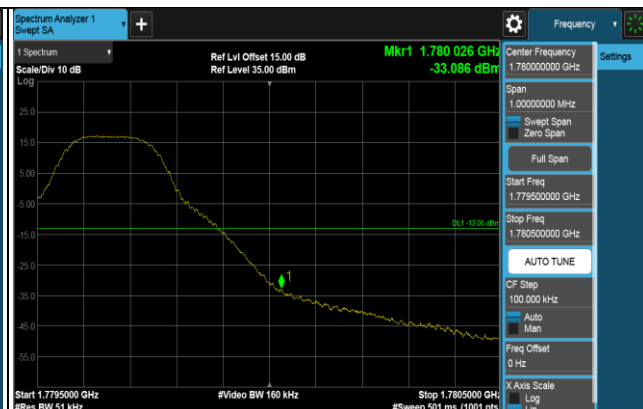


FULL (1778.5MHz)

LTE Band 66 (Channel Bandwidth 5MHz)



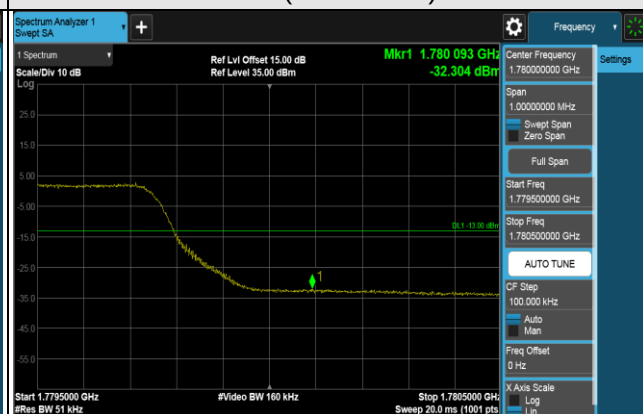
1RB (1712.5MHz)



1RB (1777.5MHz)

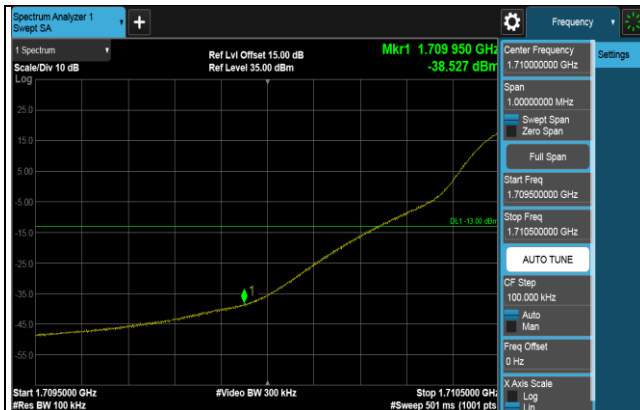


FULL (1712.5MHz)

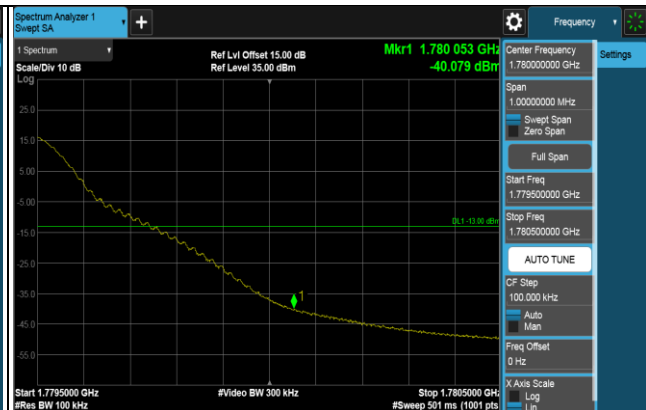


FULL (1777.5MHz)

LTE Band 66 (Channel Bandwidth 10MHz)



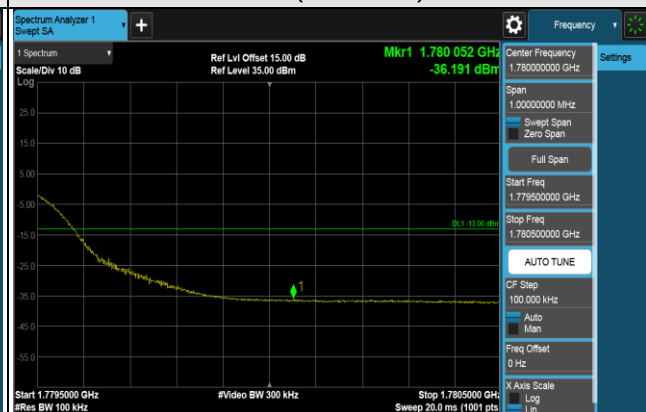
1RB (1715MHz)



1RB (1775MHz)

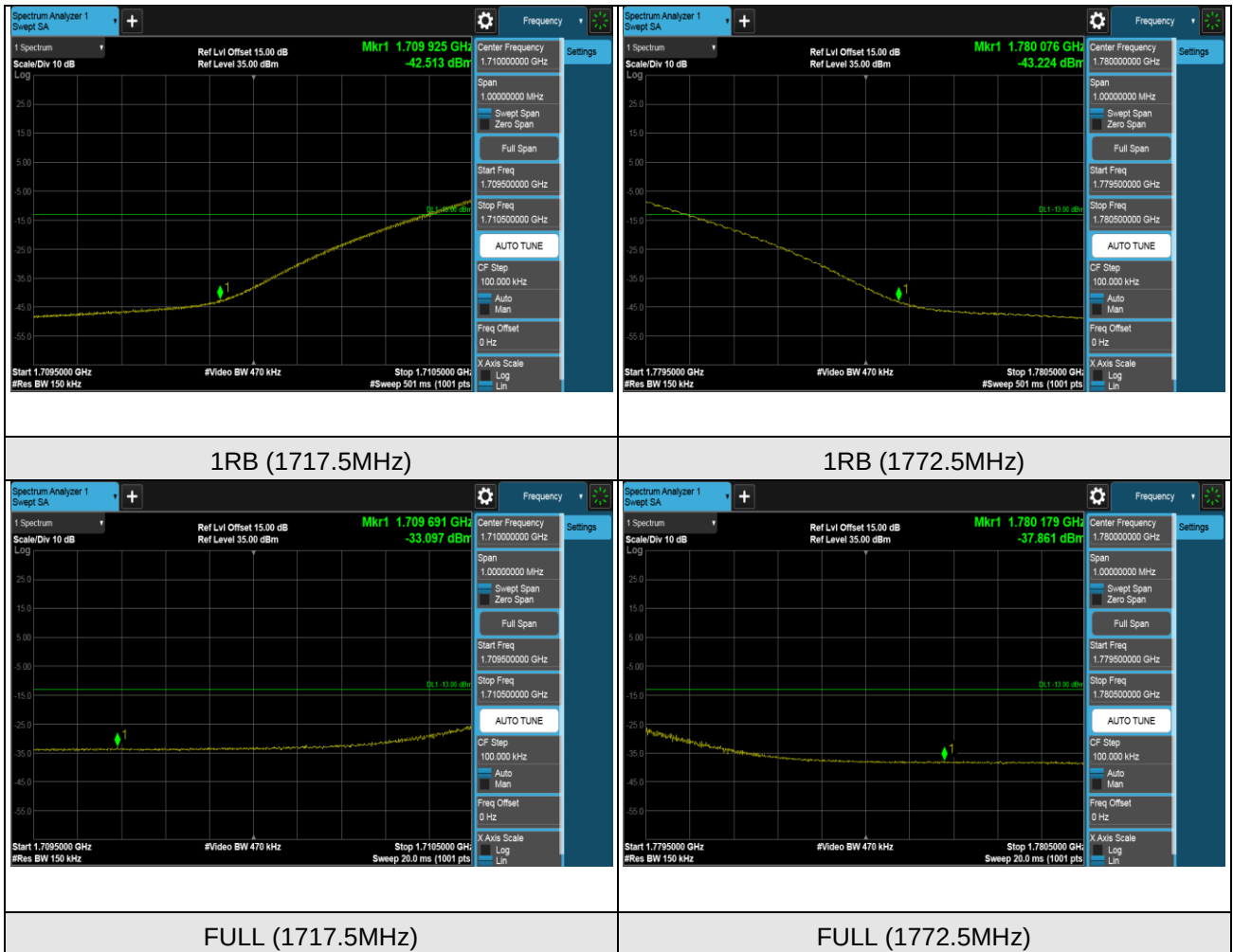


FULL (1715MHz)



FULL (1775MHz)

LTE Band 66 (Channel Bandwidth 15MHz)



LTE Band 66 (Channel Bandwidth 20MHz)



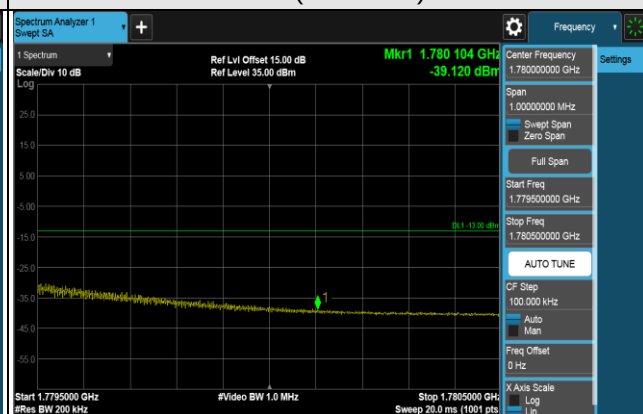
1RB (1720MHz)



1RB (1770MHz)



FULL (1720MHz)



FULL (1770MHz)