

FCC Test Report (Part 90 – LTE B14/B26)

Report No.: RFBHKI-WTW-P21120244A-3

FCC ID: NKRUMC-MT2731CBN

Test Model: UMC-MT2731CBN

Received Date: Nov. 01, 2021

Test Date: Jan. 17 ~ Feb. 24, 2022

Issued Date: Jan. 02, 2025

Applicant: Wistron NeWeb Corporation

Address: 20 Park Ave. II, Hsinchu Science Park, Hsinchu 308, Taiwan

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

Lab Address: No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan

Test Location: No. 19, Hwa Ya 2nd Rd., Wen Hwa Vil., Kwei Shan Dist., Taoyuan City
33383, TAIWAN

**FCC Registration /
Designation Number:** 788550 / TW0003



This report is governed by, and incorporates by reference, the Conditions of Testing as posted at the date of issuance of this report at <http://www.bureauveritas.com/home/about-us/our-business/cps/about-us/terms-conditions/> and is intended for your exclusive use. Any copying or replication of this report to or for any other person or entity, or use of our name or trademark, is permitted only with our prior written permission. This report sets forth our findings solely with respect to the test samples identified herein. The results set forth in this report are not indicative or representative of the quality or characteristics of the lot from which a test sample was taken or any similar or identical product unless specifically and expressly noted. Our report includes all of the tests requested by you and the results thereof based upon the information that you provided to us. Measurement uncertainty is only provided upon request for accredited tests. Statements of conformity are based on simple acceptance criteria without taking measurement uncertainty into account, unless otherwise requested in writing. You have 60 days from date of issuance of this report to notify us of any material error or omission caused by our negligence or if you require measurement uncertainty; provided, however, that such notice shall be in writing and shall specifically address the issue you wish to raise. A failure to raise such issue within the prescribed time shall constitute your unqualified acceptance of the completeness of this report, the tests conducted and the correctness of the report contents.

Table of Contents

Release Control Record	3
1 Certificate of Conformity	4
2 Summary of Test Results	5
2.1 Measurement Uncertainty	5
2.2 Test Site and Instruments	6
3 General Information	7
3.1 General Description of EUT	7
3.2 Configuration of System under Test	9
3.2.1 Description of Support Units	9
3.3 Test Mode Applicability and Tested Channel Detail	10
3.4 EUT Operating Conditions	13
3.5 General Description of Applied Standards and References	13
4 Test Types and Results	14
4.1 Output Power Measurement	14
4.1.1 Limits of Output Power Measurement	14
4.1.2 Test Procedures	14
4.1.3 Test Setup	14
4.1.4 Test Results	15
4.2 Modulation Characteristics Measurement	27
4.2.1 Limits of Modulation Characteristics	27
4.2.2 Test Procedure	27
4.2.3 Test Setup	27
4.2.4 Test Results	28
4.3 Frequency Stability Measurement	30
4.3.1 Limits of Frequency Stability Measurement	30
4.3.2 Test Procedure	30
4.3.3 Test Setup	30
4.3.4 Test Results	31
4.4 Occupied Bandwidth Measurement	37
4.4.1 Limits of Occupied Bandwidth Measurement	37
4.4.2 Test Procedure	37
4.4.3 Test Setup	37
4.4.4 Test Result	38
4.5 Emission Mask Measurement	44
4.5.1 Limits of Emission Mask Measurement	44
4.5.2 Test Setup	44
4.5.3 Test Procedures	44
4.5.4 Test Results	45
4.6 Conducted Spurious Emissions	54
4.6.1 Limits of Conducted Spurious Emissions Measurement	54
4.6.2 Test Setup	54
4.6.3 Test Procedure	54
4.6.4 Test Results	55
4.7 Radiated Emission Measurement	63
4.7.1 Limits of Radiated Emission Measurement	63
4.7.2 Test Procedure	63
4.7.3 Deviation from Test Standard	63
4.7.4 Test Setup	64
4.7.5 Test Results	65
5 Pictures of Test Arrangements	77
Appendix – Information of the Testing Laboratories	78

Release Control Record

Issue No.	Description	Date Issued
RFBHKI-WTW-P21120244A-3	Original release	Jan. 02, 2025

1 Certificate of Conformity

Product: Cellular module

Brand: WNC

Test Model: UMC-MT2731CBN

Sample Status: Engineering sample

Applicant: Wistron NeWeb Corporation

Test Date: Jan. 17 ~ Feb. 24, 2022

Standards: FCC Part 90, Subpart I, S

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 : Celine Chou , **Date:** Jan. 02, 2025
Celine Chou / Senior Specialist

Approved by : Jeremy Lin , **Date:** Jan. 02, 2025
Jeremy Lin / Project Engineer

2 Summary of Test Results

Applied Standard: FCC Part 90 & Part 2			
FCC Clause	Test Item	Result	Remarks
2.1046 90.635 (b)	Effective Radiated Power	Pass	Meet the requirement of limit.
2.1047	Modulation Characteristics	Pass	Meet the requirement of limit.
2.1055 90.213	Frequency Stability	Pass	Meet the requirement of limit.
2.1049 90.209	Occupied Bandwidth	Pass	Meet the requirement of limit.
90.691	Emission Mask	Pass	Meet the requirement of limit.
2.1051 90.691	Conducted Spurious Emissions	Pass	Meet the requirement of limit.
2.1053 90.691	Radiated Spurious Emissions	Pass	Meet the requirement of limit. Minimum passing margin is -16.89dB at 1586.00MHz.

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

2.1 Measurement Uncertainty

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

Measurement	Frequency	Expanded Uncertainty (k=2) ($\pm$)
Radiated Emissions up to 1 GHz	9kHz ~ 30MHz	3.04 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

2.2 Test Site and Instruments

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Spectrum Analyzer Agilent	N9010A	MY52220314	Dec. 03, 2021	Dec. 02, 2022
Spectrum Analyzer ROHDE & SCHWARZ	FSU43	101261	Apr. 12, 2021	Apr. 11, 2022
Broadband Horn Antenna SCHWARZBECK	BBHA 9170	148	Nov. 14, 2021	Nov. 13, 2022
HORN Antenna SCHWARZBECK	BBHA 9120D	9120D-969	Nov. 14, 2021	Nov. 13, 2022
BILOG Antenna SCHWARZBECK	VULB 9168	9168-472	Oct. 28, 2021	Oct. 27, 2022
Fixed Attenuator WOKEN	MDCS18N-10	MDCS18N-10-01	Apr. 13, 2021	Apr. 12, 2022
Loop Antenna TESEQ	HLA 6121	45745	Jul. 21, 2021	Jul. 20, 2022
Preamplifier EMCI	EMC001340	980201	Sep. 15, 2021	Sep. 14, 2022
Preamplifier EMCI	EMC 012645	980115	Oct. 05, 2021	Oct. 04, 2022
Preamplifier EMCI	EMC 184045	980116	Oct. 05, 2021	Oct. 04, 2022
Preamplifier EMCI	EMC 330H	980112	Oct. 05, 2021	Oct. 04, 2022
RF Coaxial Cable EMCI	EMC104-SM-SM-800 0	171005	Oct. 05, 2021	Oct. 04, 2022
RF Coaxial Cable HUBER+SUHNNER	SUCOFLEX 104	EMC104-SM-SM-1000 (140807)	Oct. 05, 2021	Oct. 04, 2022
RF Coaxial Cable WOKEN	8D-FB	Cable-Ch10-01	Oct. 05, 2021	Oct. 04, 2022
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
Temperature & Humidity Chamber TERCHY	HRM-120RF	931022	Jan. 03, 2022	Jan. 02, 2023
True RMS Clamp Meter Fluke	325	31130711WS	Jun. 02, 2021	Jun. 01, 2022
DC power supply Keysight	U8002A	MY56330015	NA	NA
Radio Communication Analyzer Anritsu	MT8821C	6272278310	Jun. 23, 2021	Jun. 22, 2022

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.

3 General Information

3.1 General Description of EUT

Product	Cellular module			
Brand	WNC			
Test Model	UMC-MT2731CBN			
Sample Status	Engineering sample			
Power Supply Rating	4.0Vdc			
Modulation Type	QPSK, 16QAM, 64QAM			
Operating Frequency	LTE Band 14 (Channel Bandwidth 5MHz)	790.5MHz ~ 795.5MHz		
	LTE Band 14 (Channel Bandwidth 10MHz)	793.0MHz		
	LTE Band 26 (Channel Bandwidth 1.4MHz)	814.7MHz ~ 823.3MHz		
	LTE Band 26 (Channel Bandwidth 3MHz)	815.5MHz ~ 822.5MHz		
	LTE Band 26 (Channel Bandwidth 5MHz)	816.5MHz ~ 821.5MHz		
	LTE Band 26 (Channel Bandwidth 10MHz)	819.0MHz		
Max. ERP Power		QPSK	16QAM	64QAM
	LTE Band 14 (Channel Bandwidth 5MHz)	214.783mW (23.32dBm)	185.780mW (22.69dBm)	153.109mW (21.85dBm)
	LTE Band 14 (Channel Bandwidth 10MHz)	201.372mW (23.04dBm)	185.353mW (22.68dBm)	150.314mW (21.77dBm)
	LTE Band 26 (Channel Bandwidth 1.4MHz)	205.116mW (23.12dBm)	175.388mW (22.44dBm)	136.773mW (21.36dBm)
	LTE Band 26 (Channel Bandwidth 3MHz)	210.378mW (23.23dBm)	181.552mW (22.59dBm)	134.586mW (21.29dBm)
	LTE Band 26 (Channel Bandwidth 5MHz)	202.768mW (23.07dBm)	181.552mW (22.59dBm)	132.130mW (21.21dBm)
	LTE Band 26 (Channel Bandwidth 10MHz)	211.349mW (23.25dBm)	182.390mW (22.61dBm)	134.586mW (21.29dBm)
		QPSK	16QAM	64QAM
Emission Designator	LTE Band 14 (Channel Bandwidth 5MHz)	4M50G7D	4M50D7W	4M50D7W
	LTE Band 14 (Channel Bandwidth 10MHz)	8M98G7D	8M98D7W	8M98D7W
	LTE Band 26 (Channel Bandwidth 1.4MHz)	1M09G7D	1M09D7W	1M09D7W
	LTE Band 26 (Channel Bandwidth 3MHz)	2M69G7D	2M69D7W	2M69D7W
	LTE Band 26 (Channel Bandwidth 5MHz)	4M50G7D	4M49D7W	4M49D7W
	LTE Band 26 (Channel Bandwidth 10MHz)	8M97G7D	8M97D7W	8M97D7W
Antenna Type	Refer to note			
Antenna Connector	Refer to note			
Accessory Device	NA			
Cable Supplied	NA			

Note:

1. This report is issued as a duplicate report to the original BV CPS report no.: RFBHKL-WTW-P21120244-3. The difference compared with original report is adding new antenna (antenna type is same and gain is lower than original one). Due to no effect on any test item, we didn't re-test.
2. The antenna information is listed as below.

Original antenna (For support unit only)

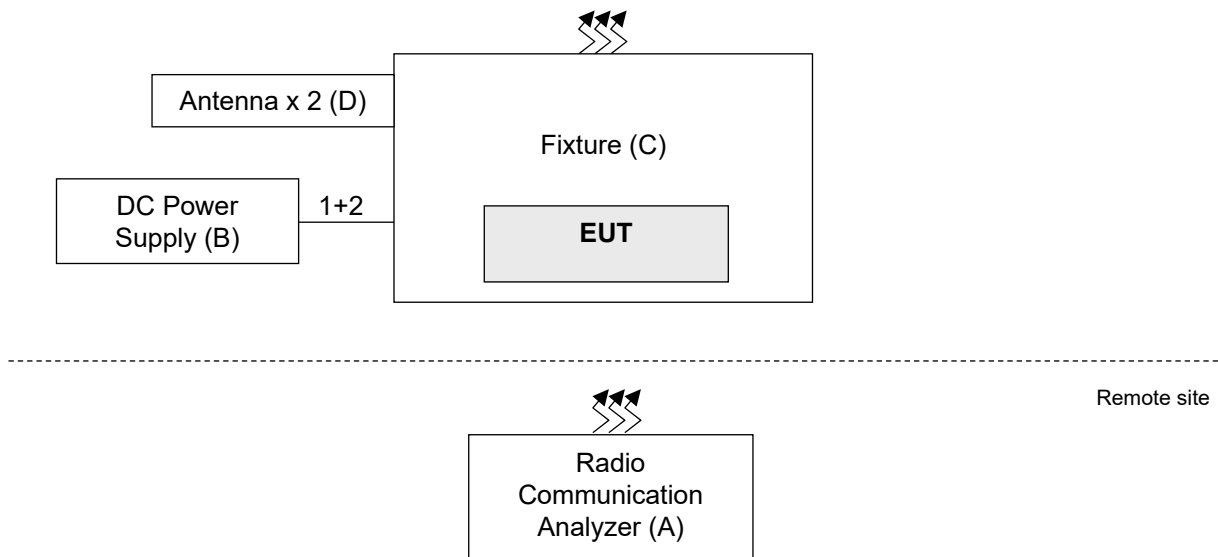
Brand		WNC											
Model		RF21S00802A											
Type	Connector	Gain (dBi)											
		GSM 850	GSM 1900	LTE B2	LTE B4	LTE B5	LTE B7	LTE B12	LTE B14	LTE B17	LTE B25	LTE B26	LTE B66
Dipole	SMA	1.82	1.80	1.80	1.57	1.82	2.15	2.02	2.02	2.02	1.80	1.82	1.57

New antenna (For support unit only)

Brand		TE				
Model		ANT-LTE-WS-SMA				
Type	Connector	Band	Excluding Cable Loss Ant. Gain (dBi)	Cable Length	Cable Loss (dB)	Ant. Net Gain (dBi)
Dipole	SMA	GSM 850	3.40	10ft	2.06	1.34
		GSM 1900	5.90		4.15	1.75
		LTE B2	5.90		4.15	1.75
		LTE B4	5.90		4.35	1.55
		LTE B5	3.40		2.06	1.34
		LTE B7	4.10		3.05	1.05
		LTE B12	4.10		2.10	2.00
		LTE B14	4.10		2.10	2.00
		LTE B17	4.10		2.10	2.00
		LTE B25	5.90		4.15	1.75
		LTE B26	3.40		2.06	1.34
		LTE B66	5.90		4.35	1.55

* 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



3.2.1 Description of Support Units

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

ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Radio Communication Analyzer	Anritsu	MT8821C	6261806803	NA	-
B.	DC Power Supply	JIN YIH Technology	SP3051	SP30512050388	NA	-
C.	Fixture	NA	NA	NA	NA	Provided by manufacturer
D.	Antenna x 2	WNC	RF21S00802A	NA	NA	Provided by manufacturer

Note:

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

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	DC Power Cable	1	1.8	N	0	-
2.	DC Cable	1	0.12	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 14	Z-plane
LTE Band 26	Z-plane

LTE Band 14

EUT Configure Mode	Test item	Available channel	Tested channel	Channel Bandwidth	Modulation	RB #
-	ERP	23305 to 23355	23305 (790.5MHz), 23330 (793.0MHz), 23355 (795.5MHz)	5MHz	QPSK / 16QAM / 64QAM	1 Half Full
		23330	23330 (793.0MHz)	10MHz	QPSK / 16QAM / 64QAM	1 Half Full
-	Modulation Characteristics	23330	23330 (793.0MHz)	10MHz	QPSK / 16QAM / 64QAM	Full
-	Frequency Stability	23305 to 23355	23305 (790.5MHz), 23355 (795.5MHz)	5MHz	QPSK	Full
		23330	23330 (793.0MHz)	10MHz	QPSK	Full
-	Occupied Bandwidth	23305 to 23355	23305 (790.5MHz), 23330 (793.0MHz), 23355 (795.5MHz)	5MHz	QPSK	Full
		23330	23330 (793.0MHz)	10MHz	QPSK	Full
-	Emission Mask	23305 to 23355	23305 (790.5MHz), 23330 (793.0MHz), 23355 (795.5MHz)	5MHz	QPSK	1 Half Full
		23330	23330 (793.0MHz)	10MHz	QPSK	1 Half Full
-	Conducted Emission	23305 to 23355	23305 (790.5MHz), 23330 (793.0MHz), 23355 (795.5MHz)	5MHz	QPSK	1
		23330	23330 (793.0MHz)	10MHz	QPSK	1
-	Radiated Emission	23305 to 23355	23305 (790.5MHz), 23330 (793.0MHz), 23355 (795.5MHz)	5MHz	QPSK	1
		23330	23330 (793.0MHz)	10MHz	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 36.521-1 Section 6.6.3.1.4.1, choose the lowest, 5MHz & highest channel bandwidth for final test.
3. The output power for QPSK, 16QAM and 64QAM, measured value of QPSK is higher than 16QAM, and 64QAM mode. Therefore, only Modulation characteristics, occupied bandwidth and Peak to average ratio items had been tested under QPSK, 16QAM and 64QAM modes, the other test items were performed under worse mode according to the maximum output power.

LTE Band 26

EUT Configure Mode	Test item	Available channel	Tested channel	Channel Bandwidth	Modulation	RB #
-	ERP	26697 to 26783	26697 (814.7MHz), 26740 (819.0MHz), 26783 (823.3MHz)	1.4MHz	QPSK / 16QAM / 64QAM	1 Half Full
		26705 to 26775	26705 (815.5MHz), 26740 (819.0MHz), 26775 (822.5MHz)	3MHz	QPSK / 16QAM / 64QAM	1 Half Full
		26715 to 26765	26715 (816.5MHz), 26740 (819.0MHz), 26765 (821.5MHz)	5MHz	QPSK / 16QAM / 64QAM	1 Half Full
		26740	26740 (819.0MHz)	10MHz	QPSK / 16QAM / 64QAM	1 Half Full
-	Modulation Characteristics	26740	26740 (819.0MHz)	10MHz	QPSK / 16QAM / 64QAM	Full
-	Frequency Stability	26697 to 26783	26697 (814.7MHz), 26783 (823.3MHz)	1.4MHz	QPSK	Full
		26705 to 26775	26705 (815.5MHz), 26775 (822.5MHz)	3MHz	QPSK	Full
		26715 to 26765	26715 (816.5MHz), 26765 (821.5MHz)	5MHz	QPSK	Full
		26740	26740 (819.0MHz)	10MHz	QPSK	Full
-	Occupied Bandwidth	26697 to 26783	26697 (814.7MHz), 26740 (819.0MHz), 26783 (823.3MHz)	1.4MHz	QPSK / 16QAM / 64QAM	Full
		26705 to 26775	26705 (815.5MHz), 26740 (819.0MHz), 26775 (822.5MHz)	3MHz	QPSK / 16QAM / 64QAM	Full
		26715 to 26765	26715 (816.5MHz), 26740 (819.0MHz), 26765 (821.5MHz)	5MHz	QPSK / 16QAM / 64QAM	Full
		26740	26740 (819.0MHz)	10MHz	QPSK / 16QAM / 64QAM	Full
-	Emission Masks	26697 to 26783	26697 (814.7MHz), 26783 (823.3MHz)	1.4MHz	QPSK	1 Half Full
		26705 to 26775	26705 (815.5MHz), 26775 (822.5MHz)	3MHz	QPSK	1 Half Full
		26715 to 26765	26715 (816.5MHz), 26765 (821.5MHz)	5MHz	QPSK	1 Half Full
		26740	26740 (819.0MHz)	10MHz	QPSK	1 Half Full

EUT Configure Mode	Test item	Available channel	Tested channel	Channel Bandwidth	Modulation	RB #
-	Conducted Emission	26697 to 26783	26697 (814.7MHz), 26740 (819.0MHz), 26783 (823.3MHz)	1.4MHz	QPSK	1
		26705 to 26775	26705 (815.5MHz), 26740 (819.0MHz), 26775 (822.5MHz)	3MHz	QPSK	1
		26715 to 26765	26715 (816.5MHz), 26740 (819.0MHz), 26765 (821.5MHz)	5MHz	QPSK	1
		26740	26740 (819.0MHz)	10MHz	QPSK	1
-	Radiated Emission	26697 to 26783	26697 (814.7MHz), 26740 (819.0MHz), 26783 (823.3MHz)	1.4MHz	QPSK	1
		26715 to 26765	26715 (816.5MHz), 26740 (819.0MHz), 26765 (821.5MHz)	5MHz	QPSK	1
		26740	26740 (819.0MHz)	10MHz	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 36.521-1 Section 6.6.3.1.4.1, choose the lowest, 5MHz & highest channel bandwidth for final test.
3. The output power for QPSK, 16QAM and 64QAM, measured value of QPSK is higher than 16QAM, and 64QAM mode. Therefore, only Modulation characteristics, occupied bandwidth and Peak to average ratio items had been tested under QPSK, 16QAM and 64QAM modes, the other test items were performed under worse mode according to the maximum output power.

Test Condition:

Test Item	Environmental Conditions	Input Power	Tested By
ERP	25deg. C, 60%RH	4.0Vdc	James Yang
Modulation characteristics	25deg. C, 60%RH	4.0Vdc	James Yang
Frequency Stability	25deg. C, 60%RH	4.0Vdc	James Yang
Occupied Bandwidth	25deg. C, 60%RH	4.0Vdc	James Yang
Emission Mask	25deg. C, 60%RH	4.0Vdc	James Yang
Conducted Emission	25deg. C, 60%RH	4.0Vdc	James Yang
Radiated Emission	22deg. C, 64%RH	4.0Vdc	Vincent Chen

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:

Test Standard:

FCC 47 CFR Part 2

FCC 47 CFR Part 90

ANSI/TIA/EIA-603-E 2016

ANSI 63.26-2015

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

References Test Guidance:

KDB 971168 D01 Power Meas License Digital Systems v03r01

KDB 971168 D02 Misc Rev Approv License Devices v02r01

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 LTE Band 14:

Control stations and mobile stations transmitting in the 758-768 MHz band and the 788-798 MHz band are limited to 30 watts ERP. Portable stations (hand-held devices) transmitting in the 758-768 MHz band and the 788-798 MHz band are limited to 3 watts ERP.

For LTE Band 26:

The output power shall be according to the specific rule Part 90.635 that "Mobile station are limited to 100 watts e.r.p".

4.1.2 Test Procedures

Conducted Power Measurement:

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

Maximum EIRP / 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)

LTE Band 14				
BW	MCS Index	RB Size	RB Offset	Mid
		Channel		23330
		Frequency (MHz)		793
10M	QPSK	1	0	23.16
		1	24	23.17
		1	49	23.07
		25	0	22.05
		25	12	22.67
		25	25	22.03
		50	0	22.58
10M	16QAM	1	0	22.32
		1	24	22.81
		1	49	22.54
		25	0	21.37
		25	12	21.50
		25	25	21.43
		50	0	21.28
10M	64QAM	1	0	21.39
		1	24	21.90
		1	49	21.04
		25	0	20.38
		25	12	20.55
		25	25	20.23
		50	0	20.30

LTE Band 14						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		23305	23330	23355
		Frequency (MHz)		790.5	793	795.5
5M	QPSK	1	0	23.12	23.00	22.95
		1	12	23.45	23.28	23.31
		1	24	23.16	23.12	22.94
		12	0	22.33	22.61	22.56
		12	6	22.38	22.67	22.61
		12	13	22.32	22.34	22.14
		25	0	22.30	22.33	22.31
5M	16QAM	1	0	22.34	22.06	22.38
		1	12	22.68	22.57	22.82
		1	24	22.50	22.54	22.22
		12	0	21.38	21.65	21.17
		12	6	21.36	21.12	21.39
		12	13	21.35	21.39	21.40
		25	0	21.25	21.39	21.19
5M	64QAM	1	0	21.31	21.25	21.53
		1	12	21.79	21.79	21.98
		1	24	21.34	21.13	21.63
		12	0	20.33	20.53	20.18
		12	6	20.34	20.05	20.42
		12	13	20.22	20.37	19.96
		25	0	20.27	20.23	19.99

LTE Band 26				
BW	MCS Index	RB Size	RB Offset	Mid
		Channel		26740
		Frequency (MHz)		819
10M	QPSK	1	0	23.45
		1	24	23.58
		1	49	23.30
		25	0	22.37
		25	12	22.39
		25	25	22.16
		50	0	22.31
10M	16QAM	1	0	22.40
		1	24	22.94
		1	49	22.35
		25	0	21.43
		25	12	21.04
		25	25	20.98
		50	0	21.40
10M	64QAM	1	0	21.26
		1	24	21.38
		1	49	21.62
		25	0	20.01
		25	12	20.47
		25	25	20.00
		50	0	20.33

LTE Band 26						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		26715	26740	26765
		Frequency (MHz)		816.5	819	821.5
5M	QPSK	1	0	23.37	23.26	23.23
		1	12	23.37	23.23	23.40
		1	24	23.34	23.07	23.08
		12	0	22.46	22.38	22.04
		12	6	22.27	22.24	22.16
		12	13	22.10	22.13	22.00
		25	0	22.43	22.51	22.35
5M	16QAM	1	0	22.77	22.31	22.65
		1	12	22.92	22.88	22.75
		1	24	22.59	22.42	22.36
		12	0	21.30	21.03	21.49
		12	6	21.57	21.12	21.45
		12	13	21.06	21.48	21.36
		25	0	21.31	21.03	21.15
5M	64QAM	1	0	21.54	21.11	21.17
		1	12	21.43	21.43	21.41
		1	24	21.23	21.45	21.21
		12	0	20.51	20.43	20.10
		12	6	20.16	20.28	20.19
		12	13	20.38	20.37	20.28
		25	0	20.28	20.31	20.36

LTE Band 26						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		26705	26740	26775
		Frequency (MHz)		815.5	819	822.5
3M	QPSK	1	0	23.45	22.90	22.93
		1	7	23.45	23.56	23.09
		1	14	22.91	22.99	23.16
		8	0	22.04	22.58	22.05
		8	3	22.43	22.25	22.35
		8	7	22.25	22.44	22.48
		15	0	22.00	22.50	22.01
3M	16QAM	1	0	22.27	22.68	22.19
		1	7	22.92	22.82	22.45
		1	14	22.57	22.42	22.66
		8	0	21.36	21.29	21.29
		8	3	21.24	21.40	21.19
		8	7	21.04	21.04	21.07
		15	0	21.08	21.27	21.36
3M	64QAM	1	0	21.28	21.48	21.38
		1	7	21.49	21.47	21.41
		1	14	21.19	21.07	21.62
		8	0	20.59	20.26	20.51
		8	3	19.96	20.22	20.35
		8	7	20.30	20.34	20.29
		15	0	20.08	20.10	20.02

LTE Band 26						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		26697	26740	26783
		Frequency (MHz)		814.7	819	823.3
1.4M	QPSK	1	0	23.09	23.29	23.41
		1	2	23.14	23.45	23.12
		1	5	22.76	23.13	23.31
		3	0	22.08	22.49	22.04
		3	1	22.52	22.59	22.19
		3	3	22.21	22.07	22.32
		6	0	22.32	22.15	22.28
1.4M	16QAM	1	0	22.77	22.70	22.38
		1	2	22.68	22.74	22.46
		1	5	22.50	22.63	22.46
		3	0	21.18	21.17	21.10
		3	1	21.35	21.34	21.29
		3	3	21.12	21.34	21.03
		6	0	21.02	21.48	21.30
1.4M	64QAM	1	0	21.13	21.15	21.45
		1	2	21.64	21.69	21.58
		1	5	21.33	21.45	21.34
		3	0	20.24	20.59	20.49
		3	1	20.52	19.96	20.41
		3	3	20.15	20.10	20.22
		6	0	20.24	20.50	20.29

ERP Power (dBm)

LTE Band 14				
BW	MCS Index	RB Size	RB Offset	Mid
		Channel		23330
		Frequency (MHz)		793
10M	QPSK	1	0	23.03
		1	24	23.04
		1	49	22.94
		25	0	21.92
		25	12	22.54
		25	25	21.90
		50	0	22.45
10M	16QAM	1	0	22.19
		1	24	22.68
		1	49	22.41
		25	0	21.24
		25	12	21.37
		25	25	21.30
		50	0	21.15
10M	64QAM	1	0	21.26
		1	24	21.77
		1	49	20.91
		25	0	20.25
		25	12	20.42
		25	25	20.10
		50	0	20.17

*ERP = Conducted + antenna gain (2.02dBi) - 2.15

LTE Band 14						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		23305	23330	23355
		Frequency (MHz)		790.5	793	795.5
5M	QPSK	1	0	22.99	22.87	22.82
		1	12	23.32	23.15	23.18
		1	24	23.03	22.99	22.81
		12	0	22.20	22.48	22.43
		12	6	22.25	22.54	22.48
		12	13	22.19	22.21	22.01
		25	0	22.17	22.20	22.18
5M	16QAM	1	0	22.21	21.93	22.25
		1	12	22.55	22.44	22.69
		1	24	22.37	22.41	22.09
		12	0	21.25	21.52	21.04
		12	6	21.23	20.99	21.26
		12	13	21.22	21.26	21.27
		25	0	21.12	21.26	21.06
5M	64QAM	1	0	21.18	21.12	21.40
		1	12	21.66	21.66	21.85
		1	24	21.21	21.00	21.50
		12	0	20.20	20.40	20.05
		12	6	20.21	19.92	20.29
		12	13	20.09	20.24	19.83
		25	0	20.14	20.10	19.86

*ERP = Conducted + antenna gain (2.02dBi) - 2.15

LTE Band 26				
BW	MCS Index	RB Size	RB Offset	Mid
		Channel		26740
		Frequency (MHz)		819
10M	QPSK	1	0	23.12
		1	24	23.25
		1	49	22.97
		25	0	22.04
		25	12	22.06
		25	25	21.83
		50	0	21.98
10M	16QAM	1	0	22.07
		1	24	22.61
		1	49	22.02
		25	0	21.10
		25	12	20.71
		25	25	20.65
		50	0	21.07
10M	64QAM	1	0	20.93
		1	24	21.05
		1	49	21.29
		25	0	19.68
		25	12	20.14
		25	25	19.67
		50	0	20.00

*ERP = Conducted + antenna gain (1.82dBi) - 2.15

LTE Band 26						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		26715	26740	26765
		Frequency (MHz)		816.5	819	821.5
5M	QPSK	1	0	23.04	22.93	22.90
		1	12	23.04	22.90	23.07
		1	24	23.01	22.74	22.75
		12	0	22.13	22.05	21.71
		12	6	21.94	21.91	21.83
		12	13	21.77	21.80	21.67
		25	0	22.10	22.18	22.02
5M	16QAM	1	0	22.44	21.98	22.32
		1	12	22.59	22.55	22.42
		1	24	22.26	22.09	22.03
		12	0	20.97	20.70	21.16
		12	6	21.24	20.79	21.12
		12	13	20.73	21.15	21.03
		25	0	20.98	20.70	20.82
5M	64QAM	1	0	21.21	20.78	20.84
		1	12	21.10	21.10	21.08
		1	24	20.90	21.12	20.88
		12	0	20.18	20.10	19.77
		12	6	19.83	19.95	19.86
		12	13	20.05	20.04	19.95
		25	0	19.95	19.98	20.03

*ERP = Conducted + antenna gain (1.82dBi) - 2.15

LTE Band 26						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		26705	26740	26775
		Frequency (MHz)		815.5	819	822.5
3M	QPSK	1	0	23.12	22.57	22.60
		1	7	23.12	23.23	22.76
		1	14	22.58	22.66	22.83
		8	0	21.71	22.25	21.72
		8	3	22.10	21.92	22.02
		8	7	21.92	22.11	22.15
		15	0	21.67	22.17	21.68
3M	16QAM	1	0	21.94	22.35	21.86
		1	7	22.59	22.49	22.12
		1	14	22.24	22.09	22.33
		8	0	21.03	20.96	20.96
		8	3	20.91	21.07	20.86
		8	7	20.71	20.71	20.74
		15	0	20.75	20.94	21.03
3M	64QAM	1	0	20.95	21.15	21.05
		1	7	21.16	21.14	21.08
		1	14	20.86	20.74	21.29
		8	0	20.26	19.93	20.18
		8	3	19.63	19.89	20.02
		8	7	19.97	20.01	19.96
		15	0	19.75	19.77	19.69

*ERP = Conducted + antenna gain (1.82dBi) - 2.15

LTE Band 26						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		26697	26740	26783
		Frequency (MHz)		814.7	819	823.3
1.4M	QPSK	1	0	22.76	22.96	23.08
		1	2	22.81	23.12	22.79
		1	5	22.43	22.80	22.98
		3	0	21.75	22.16	21.71
		3	1	22.19	22.26	21.86
		3	3	21.88	21.74	21.99
		6	0	21.99	21.82	21.95
1.4M	16QAM	1	0	22.44	22.37	22.05
		1	2	22.35	22.41	22.13
		1	5	22.17	22.30	22.13
		3	0	20.85	20.84	20.77
		3	1	21.02	21.01	20.96
		3	3	20.79	21.01	20.70
		6	0	20.69	21.15	20.97
1.4M	64QAM	1	0	20.80	20.82	21.12
		1	2	21.31	21.36	21.25
		1	5	21.00	21.12	21.01
		3	0	19.91	20.26	20.16
		3	1	20.19	19.63	20.08
		3	3	19.82	19.77	19.89
		6	0	19.91	20.17	19.96

*ERP = Conducted + antenna gain (1.82dBi) - 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



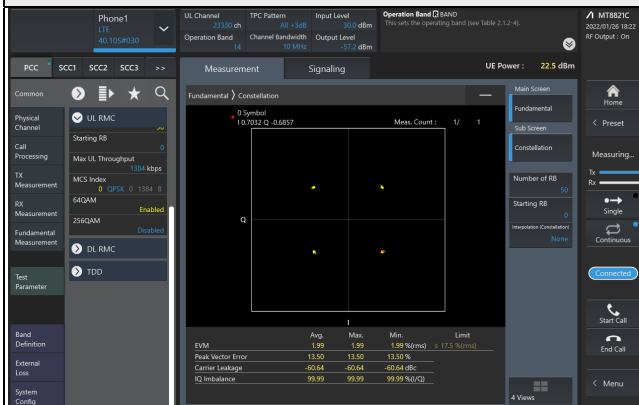
4.2.4 Test Results

LTE Band 14

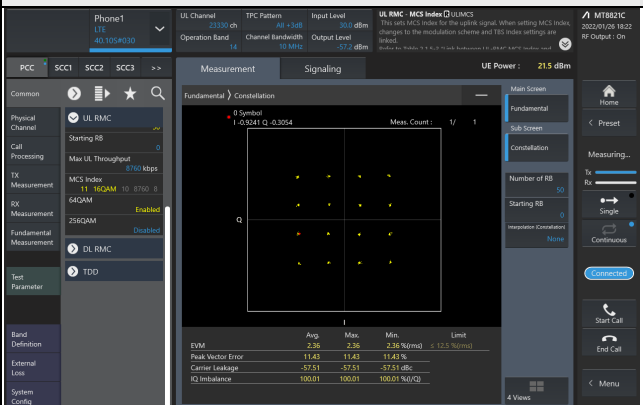
Spectrum Plot of Measurement Value

Channel: 23330 / Frequency (MHz): 793.0MHz

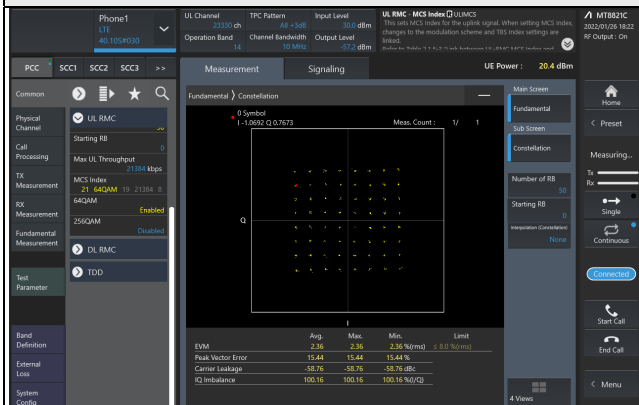
QPSK



16QAM



64QAM

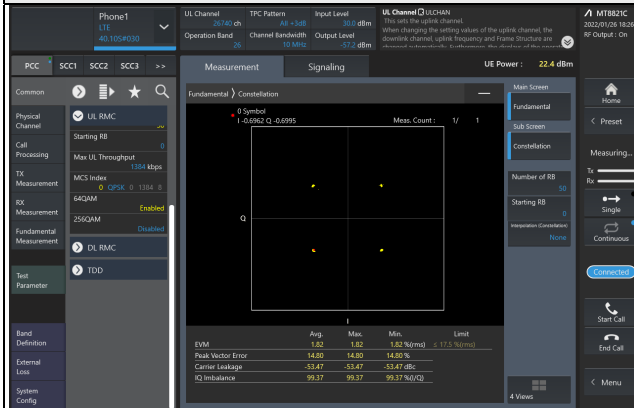


LTE Band 26

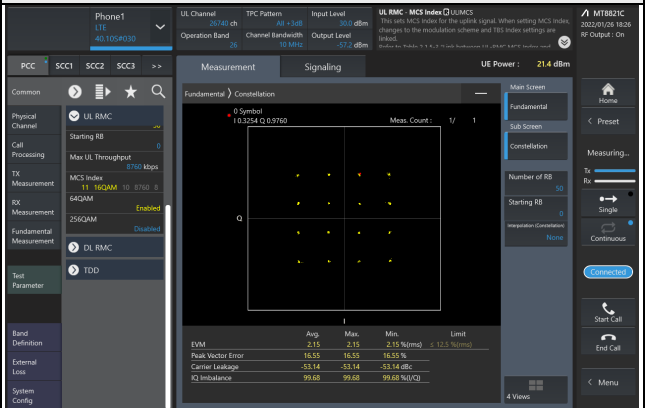
Spectrum Plot of Measurement Value

Channel: 26740 / Frequency (MHz): 819.0MHz

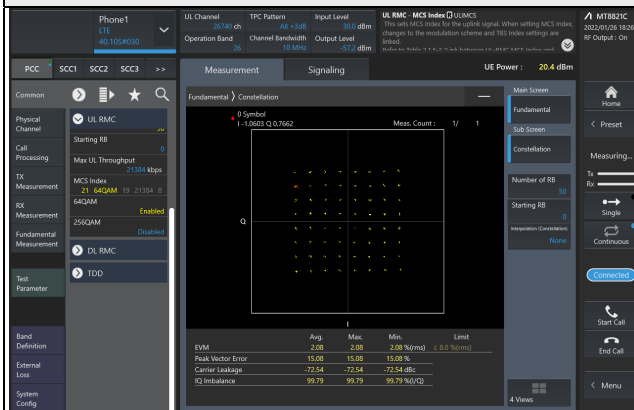
QPSK



16QAM



64QAM



4.3 Frequency Stability Measurement

4.3.1 Limits of Frequency Stability Measurement

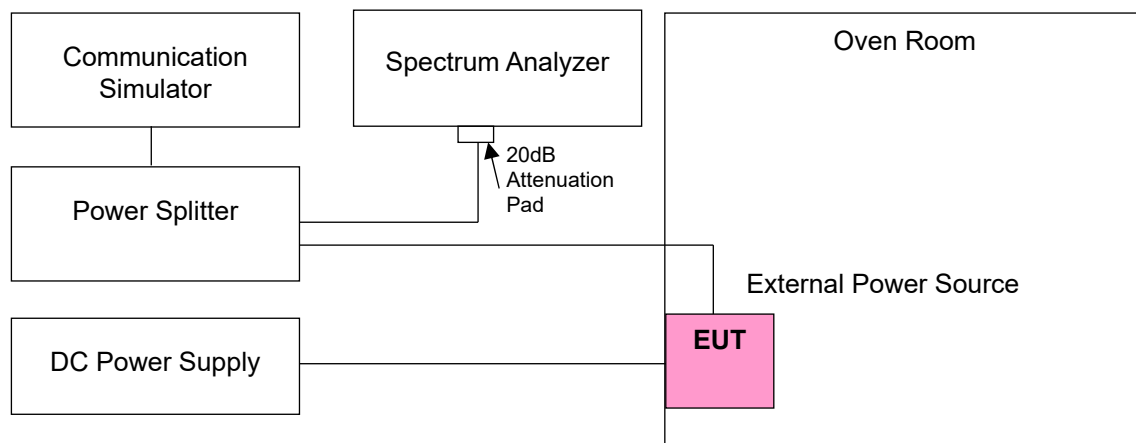
1.5 ppm is for base and fixed station. 2.5 ppm is for mobile station.

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 (Vdc)	LTE Band 14			
	Channel Bandwidth: 5MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
4.0	790.500003	0.004	795.500001	0.001
3.4	790.500003	0.004	795.500004	0.005
4.6	790.500001	0.001	795.500004	0.005

Note: The applicant defined the normal working voltage is from 3.4Vdc to 4.6Vdc.

Frequency Error vs. Temperature

Temp. (°C)	LTE Band 14			
	Channel Bandwidth: 5 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-40	790.500003	0.004	795.500001	0.001
-30	790.500004	0.005	795.500003	0.004
-20	790.500002	0.003	795.500002	0.003
-10	790.500003	0.004	795.500004	0.005
0	790.500002	0.003	795.500001	0.001
10	790.500001	0.001	795.500003	0.004
20	790.499997	-0.004	795.499999	-0.001
30	790.499998	-0.003	795.499996	-0.005
40	790.499997	-0.004	795.499996	-0.005
50	790.499997	-0.004	795.499999	-0.001
60	790.499997	-0.004	795.499996	-0.005
70	790.499999	-0.001	795.499997	-0.004
80	790.499996	-0.005	795.499996	-0.005
85	790.499998	-0.003	795.499999	-0.001

Frequency Error vs. Voltage

Voltage (Vdc)	LTE Band 14	
	Channel Bandwidth: 10 MHz	
	Frequency (MHz)	Frequency Error (ppm)
4.0	793.000003	0.004
3.4	793.000002	0.003
4.6	793.000002	0.003

Note: The applicant defined the normal working voltage is from 3.4Vdc to 4.6Vdc.

Frequency Error vs. Temperature

Temp. (°C)	LTE Band 14	
	Channel Bandwidth: 10 MHz	
	Frequency (MHz)	Frequency Error (ppm)
-40	793.000001	0.001
-30	793.000004	0.005
-20	793.000001	0.001
-10	793.000001	0.001
0	793.000002	0.003
10	793.000001	0.001
20	792.999998	-0.003
30	792.999996	-0.005
40	792.999997	-0.004
50	792.999997	-0.004
60	792.999996	-0.005
70	792.999998	-0.003
80	792.999996	-0.005
85	792.999996	-0.005

Frequency Error vs. Voltage

Voltage (Vdc)	LTE Band 26			
	Channel Bandwidth: 1.4 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
4.0	814.700003	0.004	823.300001	0.001
3.4	814.700003	0.004	823.300003	0.004
4.6	814.700004	0.005	823.300002	0.002

Note: The applicant defined the normal working voltage is from 3.4Vdc to 4.6Vdc.

Frequency Error vs. Temperature

Temp. (°C)	LTE Band 26			
	Channel Bandwidth: 1.4 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-40	814.700003	0.004	823.300003	0.004
-30	814.700001	0.001	823.300002	0.002
-20	814.700001	0.001	823.300003	0.004
-10	814.700001	0.001	823.300003	0.004
0	814.700004	0.005	823.300001	0.001
10	814.700002	0.002	823.300004	0.005
20	814.699996	-0.005	823.299997	-0.004
30	814.699997	-0.004	823.299996	-0.005
40	814.699997	-0.004	823.299997	-0.004
50	814.699999	-0.001	823.299999	-0.001
60	814.699998	-0.002	823.299997	-0.004
70	814.699998	-0.002	823.299997	-0.004
80	814.699999	-0.001	823.299997	-0.004
85	814.699996	-0.005	823.299996	-0.005

Frequency Error vs. Voltage

Voltage (Vdc)	LTE Band 26			
	Channel Bandwidth: 3MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
4.0	815.500001	0.001	822.500003	0.004
3.4	815.500004	0.005	822.500001	0.001
4.6	815.500003	0.004	822.500001	0.001

Note: The applicant defined the normal working voltage is from 3.4Vdc to 4.6Vdc.

Frequency Error vs. Temperature

Temp. (°C)	LTE Band 26			
	Channel Bandwidth: 3MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-40	815.500004	0.005	822.500004	0.005
-30	815.500003	0.004	822.500001	0.001
-20	815.500002	0.002	822.500004	0.005
-10	815.500001	0.001	822.500001	0.001
0	815.500002	0.002	822.500001	0.001
10	815.500003	0.004	822.500003	0.004
20	815.499999	-0.001	822.499999	-0.001
30	815.499999	-0.001	822.499996	-0.005
40	815.499996	-0.005	822.499999	-0.001
50	815.499996	-0.005	822.499999	-0.001
60	815.499997	-0.004	822.499998	-0.002
70	815.499999	-0.001	822.499999	-0.001
80	815.499997	-0.004	822.499998	-0.002
85	815.499997	-0.004	822.499997	-0.004

Frequency Error vs. Voltage

Voltage (Vdc)	LTE Band 26			
	Channel Bandwidth: 5MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
4.0	816.500004	0.005	821.500004	0.005
3.4	816.500003	0.004	821.500002	0.002
4.6	816.500001	0.001	821.500001	0.001

Note: The applicant defined the normal working voltage is from 3.4Vdc to 4.6Vdc.

Frequency Error vs. Temperature

Temp. (°C)	LTE Band 26			
	Channel Bandwidth: 5MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-40	816.500002	0.002	821.500003	0.004
-30	816.500004	0.005	821.500003	0.004
-20	816.500002	0.002	821.500001	0.001
-10	816.500004	0.005	821.500003	0.004
0	816.500003	0.004	821.500001	0.001
10	816.500003	0.004	821.500001	0.001
20	816.499997	-0.004	821.499996	-0.005
30	816.499997	-0.004	821.499999	-0.001
40	816.499999	-0.001	821.499997	-0.004
50	816.499997	-0.004	821.499998	-0.002
60	816.499996	-0.005	821.499996	-0.005
70	816.499998	-0.002	821.499996	-0.005
80	816.499996	-0.005	821.499999	-0.001
85	816.499996	-0.005	821.499999	-0.001

Frequency Error vs. Voltage

Voltage (Vdc)	LTE Band 26	
	Channel Bandwidth: 10 MHz	
	Frequency (MHz)	Frequency Error (ppm)
4.0	819.000004	0.005
3.4	819.000004	0.005
4.6	819.000004	0.005

Note: The applicant defined the normal working voltage is from 3.4Vdc to 4.6Vdc.

Frequency Error vs. Temperature

Temp. (°C)	LTE Band 26	
	Channel Bandwidth: 10 MHz	
	Frequency (MHz)	Frequency Error (ppm)
-40	819.000004	0.005
-30	819.000003	0.004
-20	819.000003	0.004
-10	819.000004	0.005
0	819.000004	0.005
10	819.000004	0.005
20	818.999996	-0.005
30	818.999997	-0.004
40	818.999997	-0.004
50	818.999997	-0.004
60	818.999999	-0.001
70	818.999998	-0.002
80	818.999997	-0.004
85	818.999999	-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.

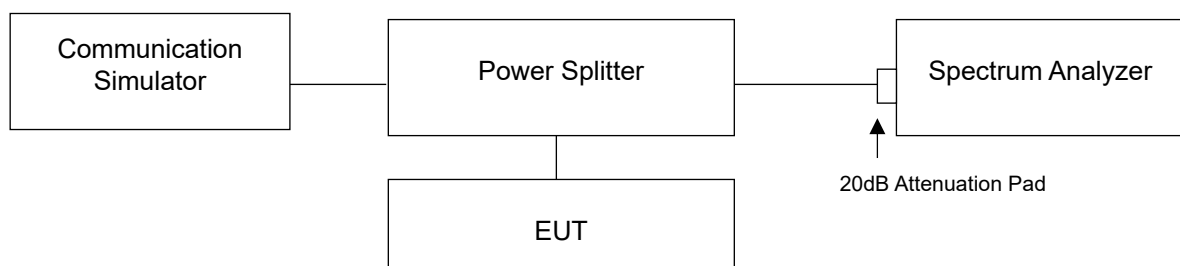
4.4.2 Test Procedure

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.

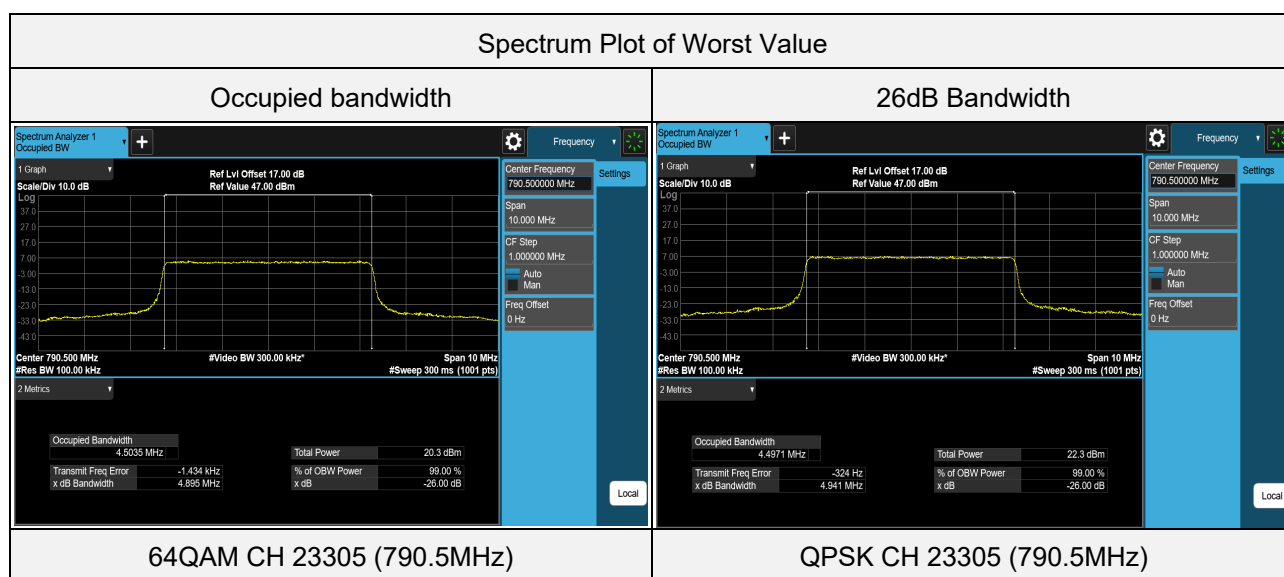
4.4.3 Test Setup



4.4.4 Test Result

LTE Band 14 (Channel Bandwidth 5MHz)

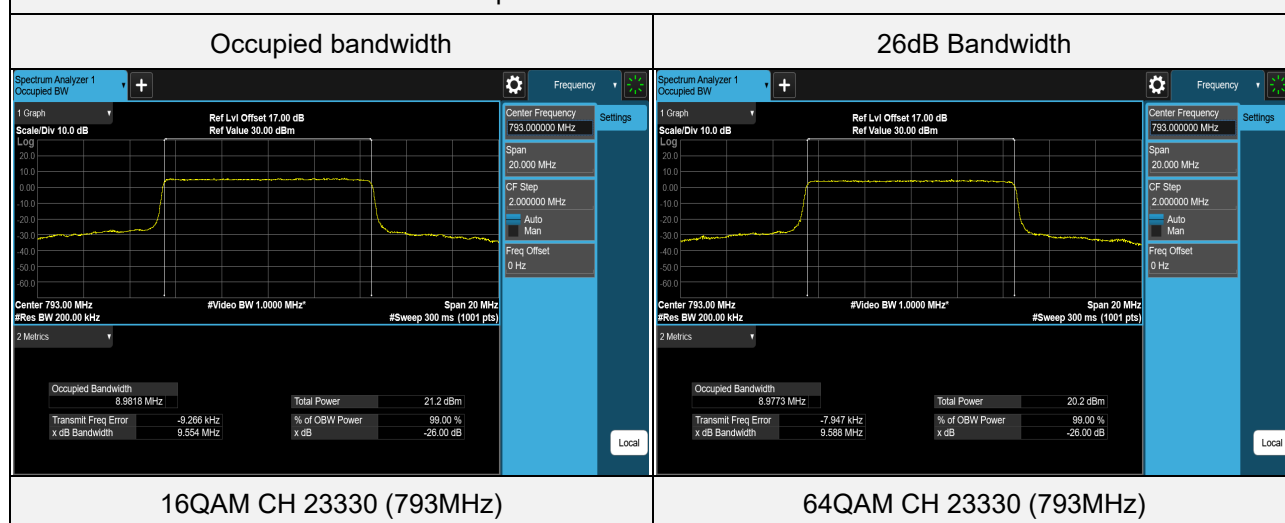
Test Condition	Channel	Frequency (MHz)	Occupied bandwidth (MHz)	26dB Bandwidth (MHz)
QPSK	23305	790.5	4.4971	4.941
QPSK	23330	793	4.5003	4.897
QPSK	23355	795.5	4.4950	4.875
16QAM	23305	790.5	4.4977	4.884
16QAM	23330	793	4.4945	4.877
16QAM	23355	795.5	4.4905	4.868
64QAM	23305	790.5	4.5035	4.895
64QAM	23330	793	4.4963	4.868
64QAM	23355	795.5	4.4952	4.892



LTE Band 14 (Channel Bandwidth 10MHz)

Test Condition	Channel	Frequency (MHz)	Occupied bandwidth (MHz)	26dB Bandwidth (MHz)
QPSK	23330	793	8.9815	9.566
16QAM	23330	793	8.9818	9.554
64QAM	23330	793	8.9773	9.588

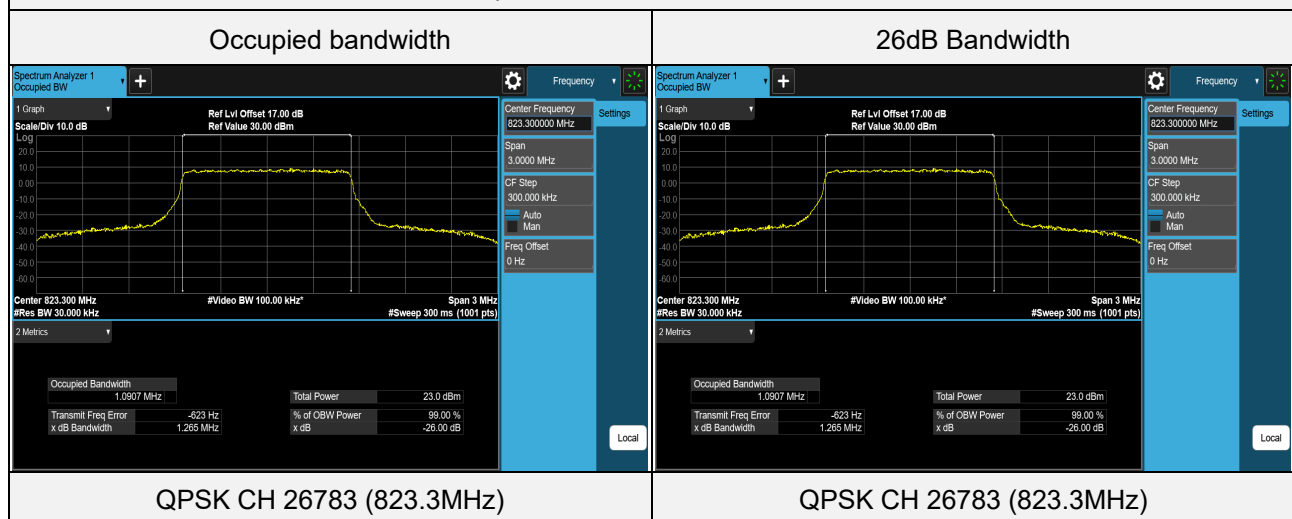
Spectrum Plot of Worst Value



LTE Band 26 (Channel Bandwidth 1.4MHz)

Test Condition	Channel	Frequency (MHz)	Occupied bandwidth (MHz)	26dB Bandwidth (MHz)
QPSK	26697	814.7	1.0871	1.252
QPSK	26740	819	1.0902	1.258
QPSK	26783	823.3	1.0907	1.265
16QAM	26697	814.7	1.0880	1.261
16QAM	26740	819	1.0871	1.250
16QAM	26783	823.3	1.0872	1.250
64QAM	26697	814.7	1.0854	1.257
64QAM	26740	819	1.0881	1.255
64QAM	26783	823.3	1.0866	1.253

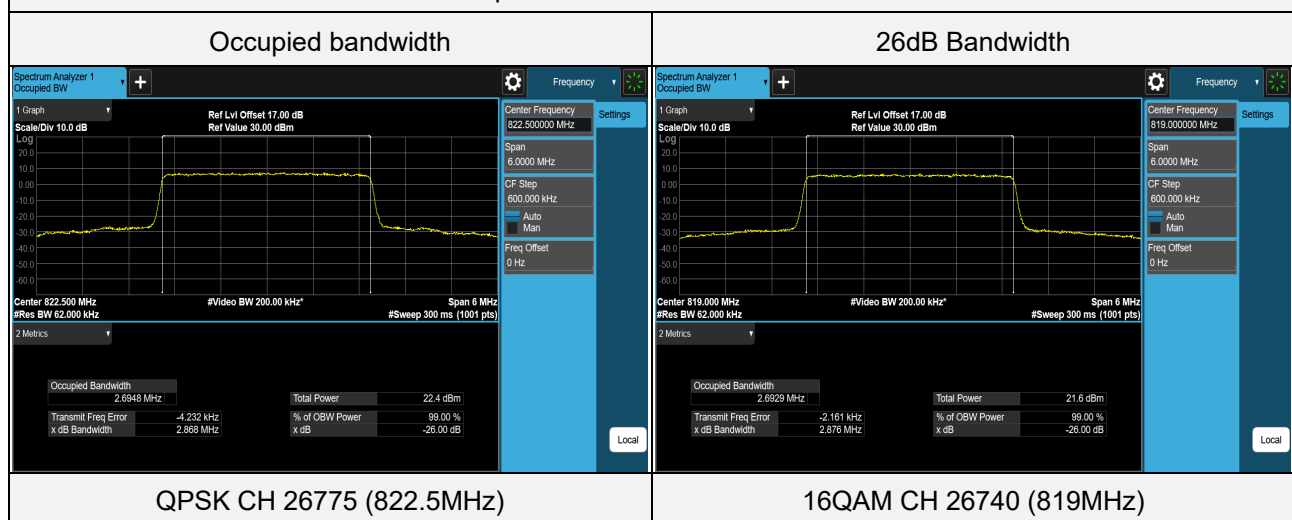
Spectrum Plot of Worst Value



LTE Band 26 (Channel Bandwidth 3MHz)

Test Condition	Channel	Frequency (MHz)	Occupied bandwidth (MHz)	26dB Bandwidth (MHz)
QPSK	26705	815.5	2.6913	2.873
QPSK	26740	819	2.6931	2.873
QPSK	26775	822.5	2.6948	2.868
16QAM	26705	815.5	2.6916	2.872
16QAM	26740	819	2.6929	2.876
16QAM	26775	822.5	2.6908	2.874
64QAM	26705	815.5	2.6923	2.860
64QAM	26740	819	2.6901	2.859
64QAM	26775	822.5	2.6916	2.857

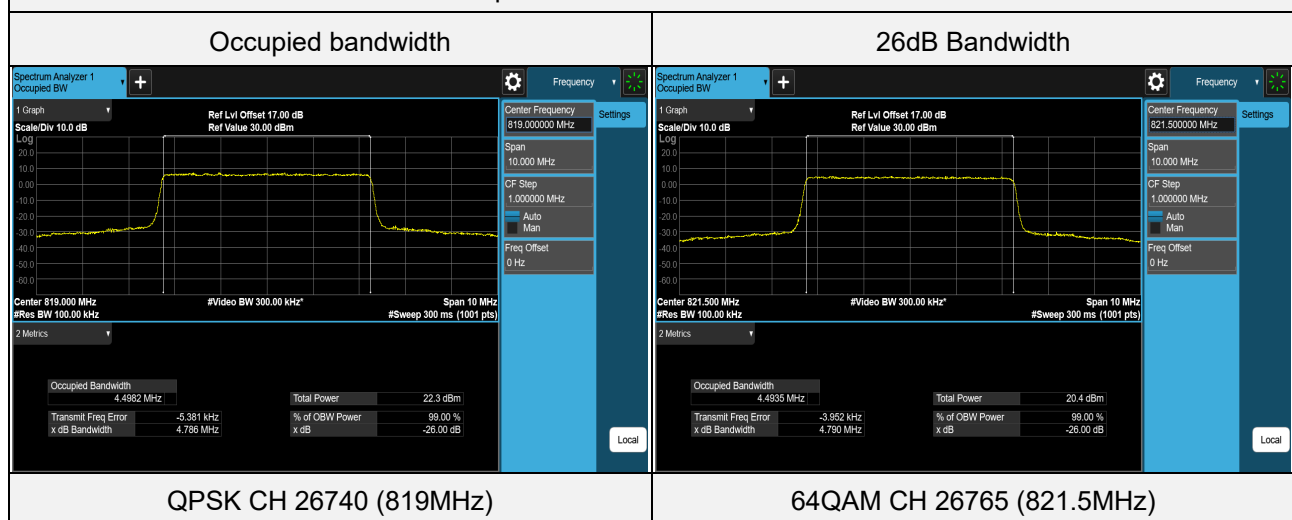
Spectrum Plot of Worst Value



LTE Band 26 (Channel Bandwidth 5MHz)

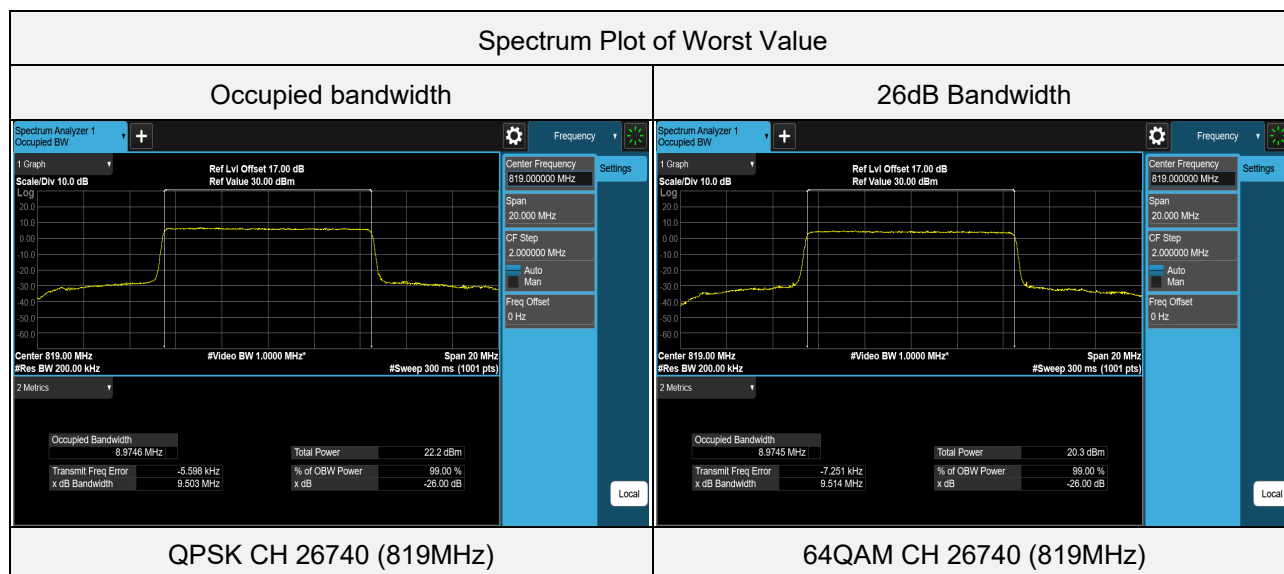
Test Condition	Channel	Frequency (MHz)	Occupied bandwidth (MHz)	26dB Bandwidth (MHz)
QPSK	26715	816.5	4.4903	4.783
QPSK	26740	819	4.4982	4.786
QPSK	26765	821.5	4.4915	4.787
16QAM	26715	816.5	4.4893	4.765
16QAM	26740	819	4.4934	4.777
16QAM	26765	821.5	4.4912	4.774
64QAM	26715	816.5	4.4928	4.777
64QAM	26740	819	4.4943	4.771
64QAM	26765	821.5	4.4935	4.790

Spectrum Plot of Worst Value



LTE Band 26 (Channel Bandwidth 10MHz)

Test Condition	Channel	Frequency (MHz)	Occupied bandwidth (MHz)	26dB Bandwidth (MHz)
QPSK	26740	819	8.9746	9.503
16QAM	26740	819	8.9738	9.505
64QAM	26740	819	8.9745	9.514



4.5 Emission Mask Measurement

4.5.1 Limits of Emission Mask Measurement

For LTE Band 14:

According to FCC part 90.543 (e), For operations in the 758-768 MHz and the 788-798 MHz bands, the power of any emission outside the licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, in accordance with the following:

- (1) On all frequencies between 769-775 MHz and 799-805 MHz, by a factor not less than $65 + 10 \log (P)$ dB in a 6.25 kHz band segment, for mobile and portable stations.
- (2) On any frequency between 775-788 MHz, above 805 MHz, and below 758 MHz, by at least $43 + 10 \log (P)$ dB.

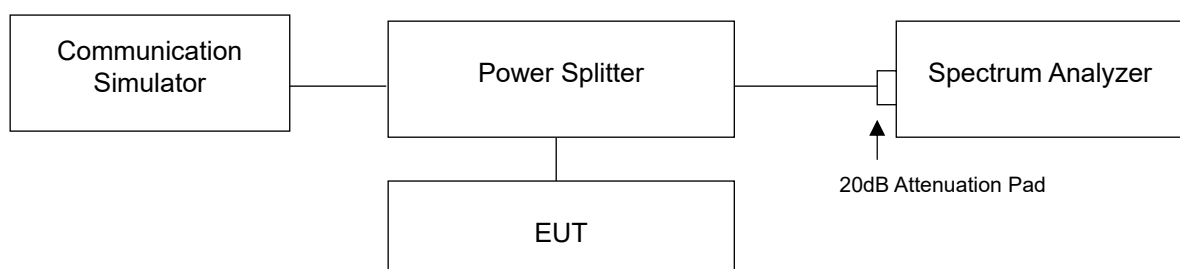
For LTE Band 26:

According to FCC part 90.691 shall be tested the emission mask. For any frequency removed from the EA licensee's frequency block by up to and including 37.5 kHz, the power of any emission shall be attenuated below the transmitter power (P) in watts by at least $116 \log_{10}(f/6.1)$ decibels or $50 + 10 \log_{10}(P)$ decibels or 80 decibels, whichever is the lesser attenuation, where f is the frequency removed from the center of the outer channel in the block in kilohertz and where f is greater than 12.5 kHz.

For any frequency removed from the EA licensee's frequency block greater than 37.5 kHz, the power of any emission shall be attenuated below the transmitter power (P) in watts by at least $43 + 10 \log_{10}(P)$ decibels or 80 decibels, whichever is the lesser attenuation, where f is the frequency removed from the center of the outer channel in the block in kilohertz and where f is greater than 37.5 kHz.

For § 90.691(a), RBW=300 Hz for offset less than 37.5 kHz from channel edge and RBW=100 kHz for offsets greater than 37.5 kHz is allowed, tested in accordance with FCC KDB 971168 D02 section VIII.

4.5.2 Test Setup



4.5.3 Test Procedures

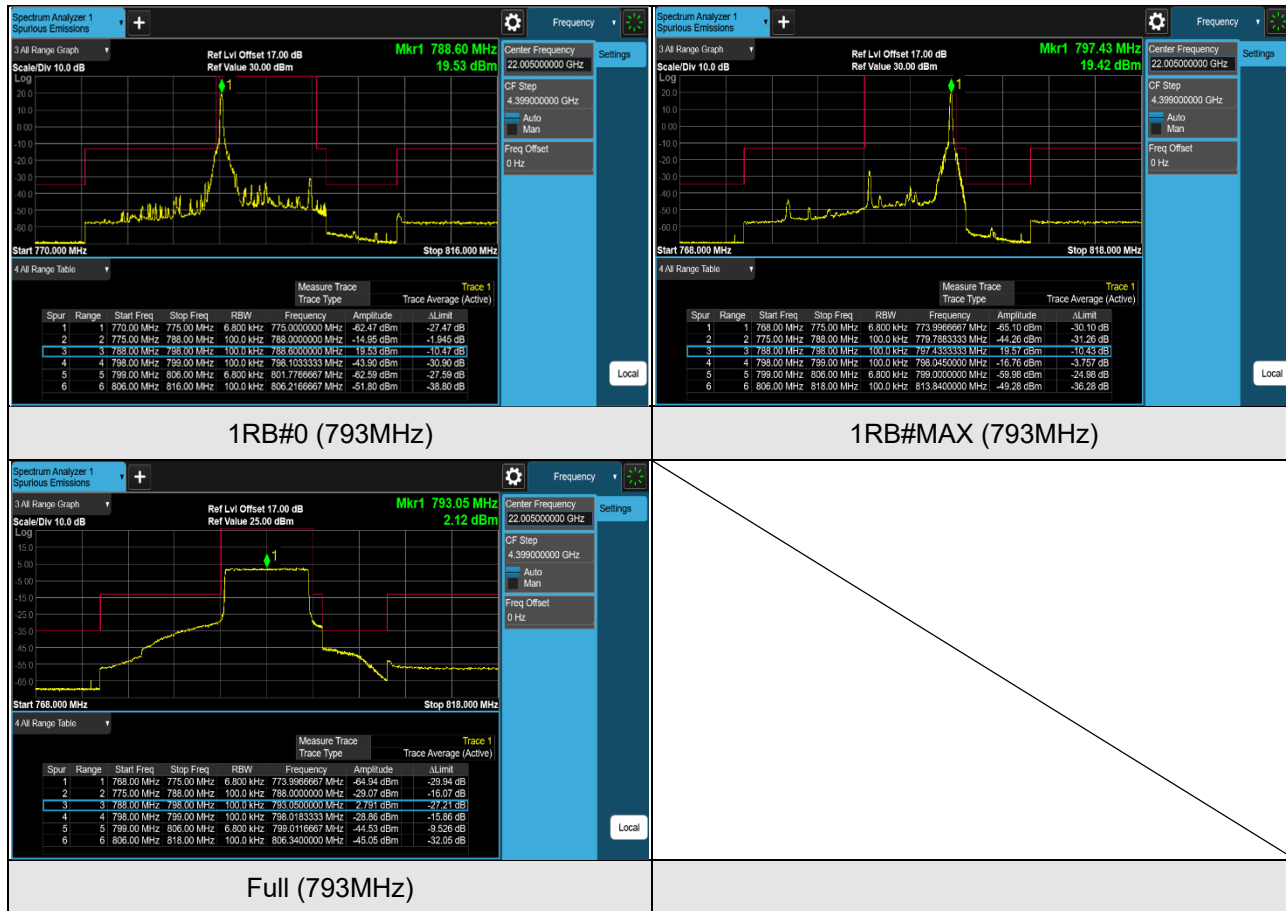
- a. The measurement used the power splitter via EUT RF power connector between simulation base station and spectrum analyzer.
- b. Record the test plot.

4.5.4 Test Results

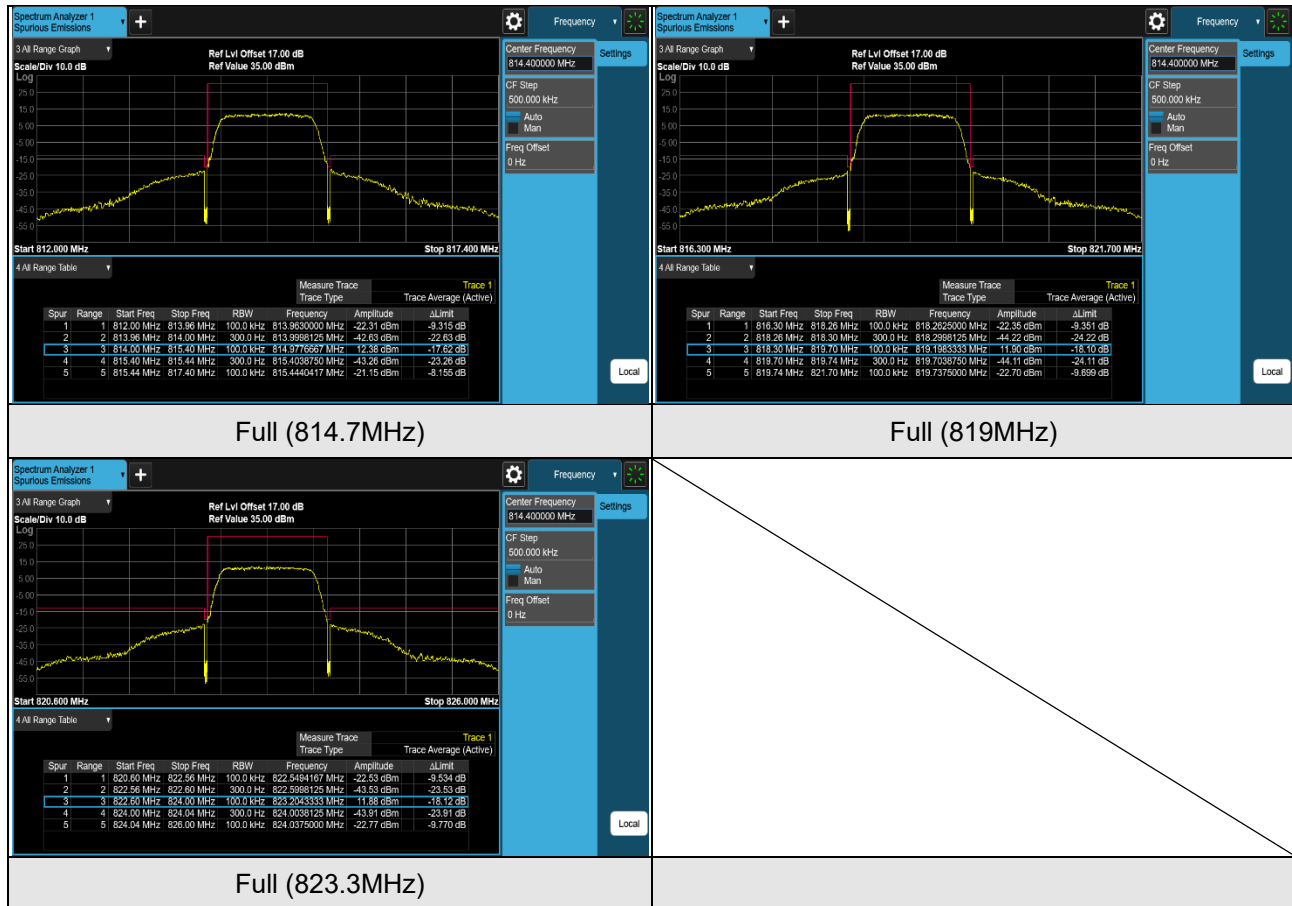
LTE Band 14 (Channel Bandwidth 5MHz)

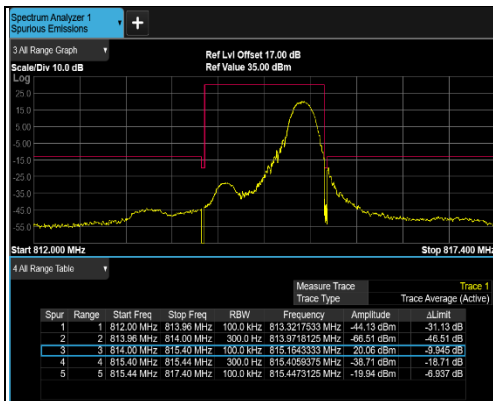


LTE Band 14 (Channel Bandwidth 10MHz)

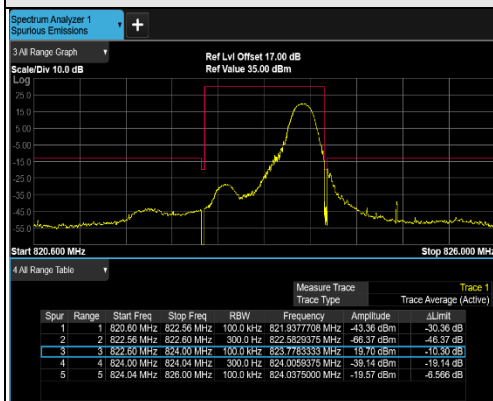


LTE Band 26 (Channel Bandwidth 1.4MHz)

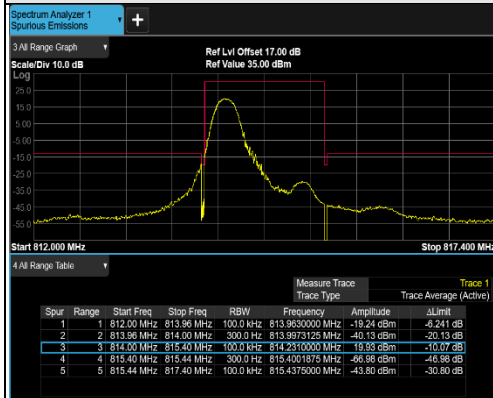




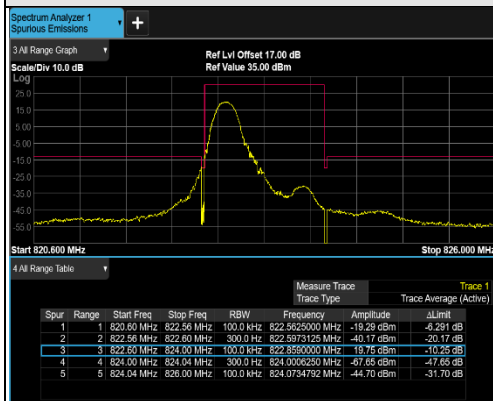
1RB#MAX (814.7MHz)



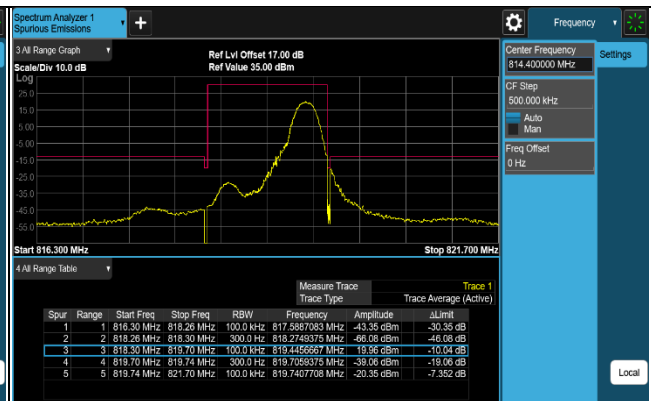
1RB#MAX (823.3MHz)



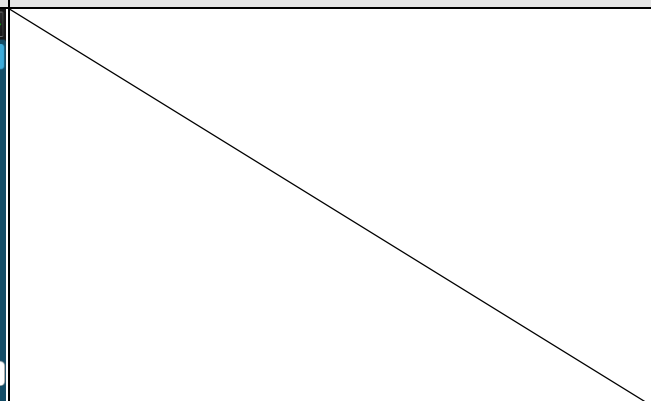
1RB#0 (814.7MHz)



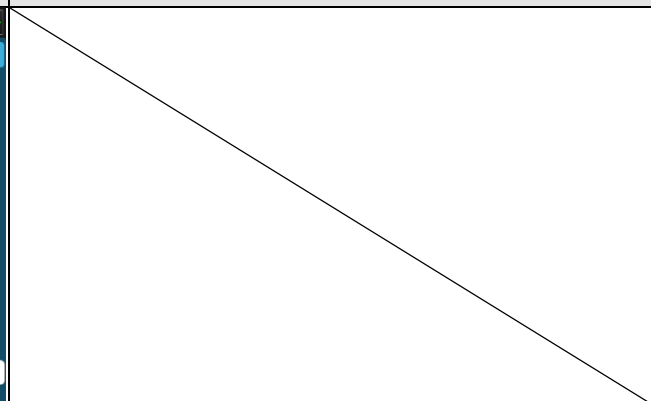
1RB#0 (823.3MHz)



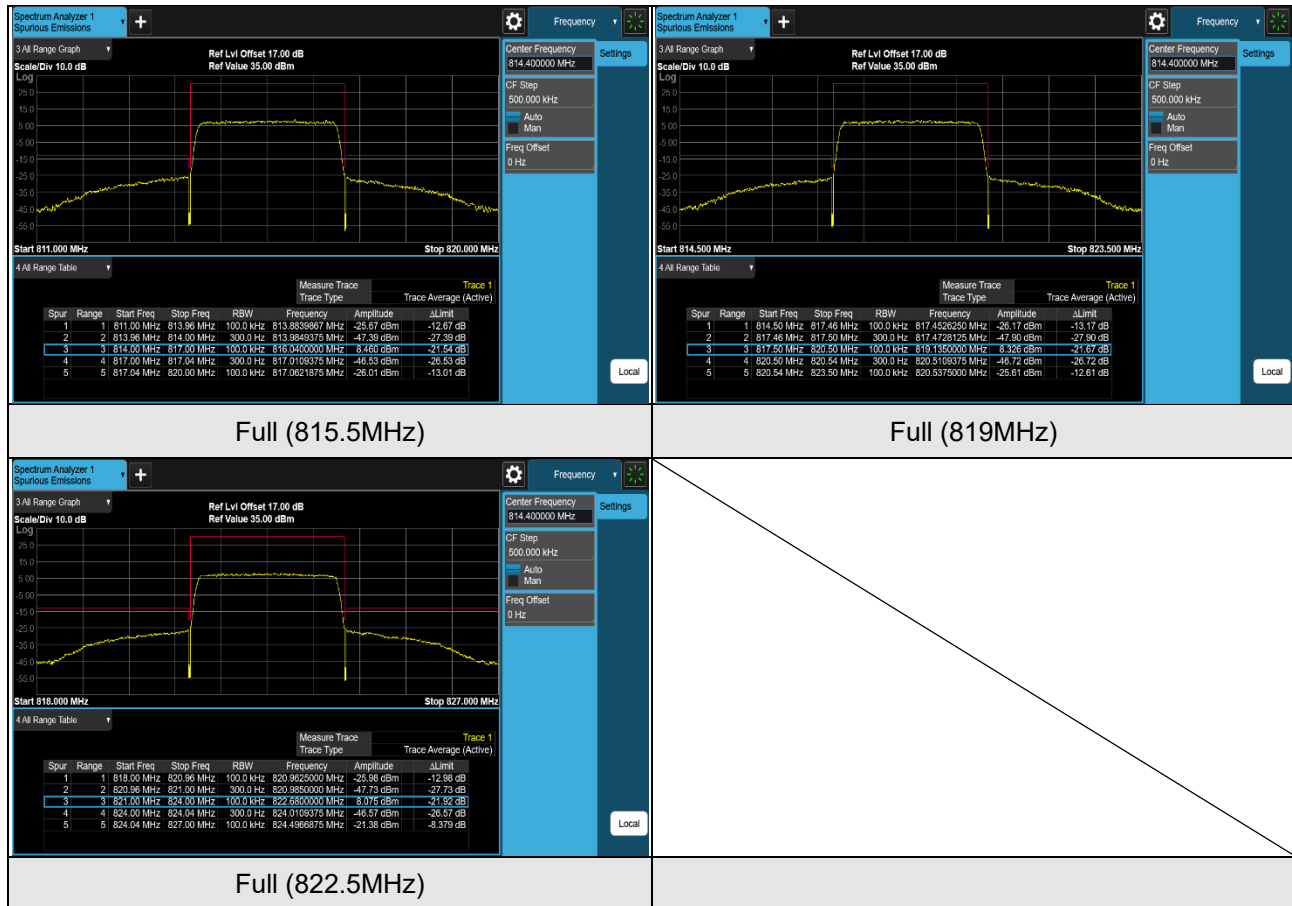
1RB#MAX (819MHz)

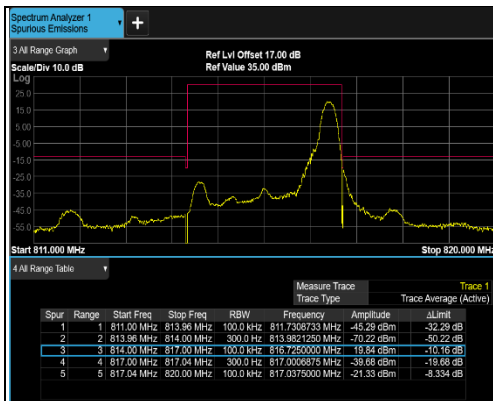


1RB#0 (819MHz)

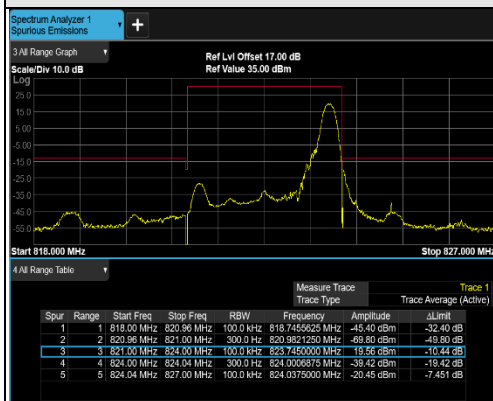


LTE Band 26 (Channel Bandwidth 3MHz)

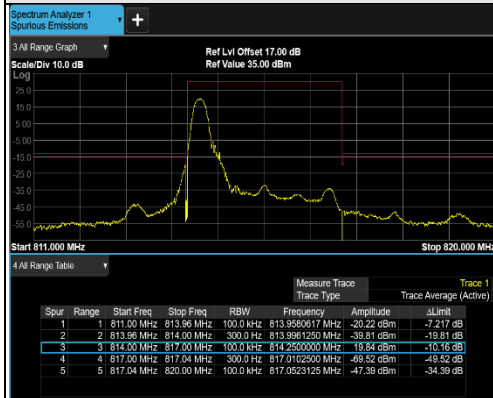




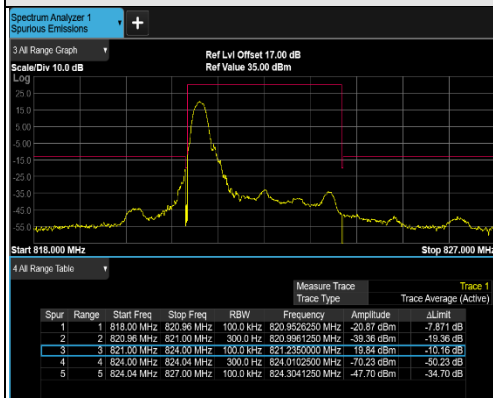
1RB#MAX (815.5MHz)



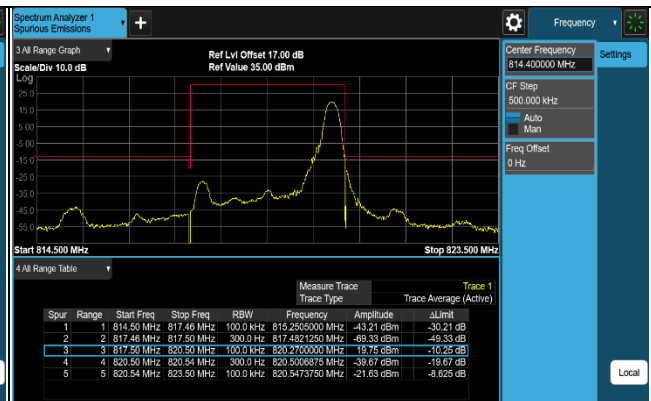
1RB#MAX (822.5MHz)



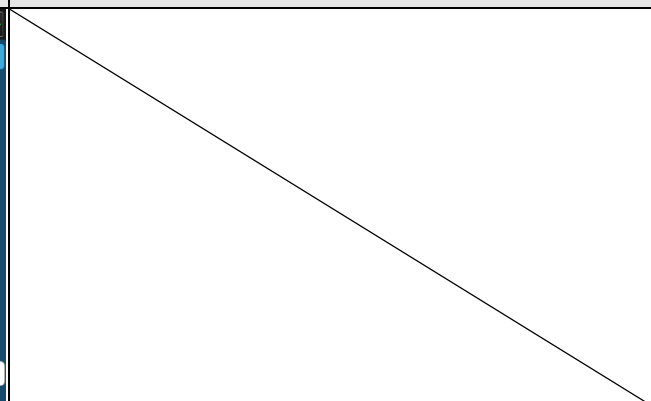
1RB#0 (815.5MHz)



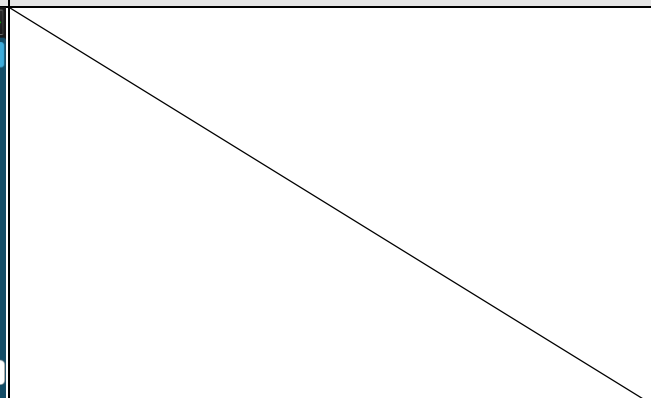
1RB#0 (822.5MHz)



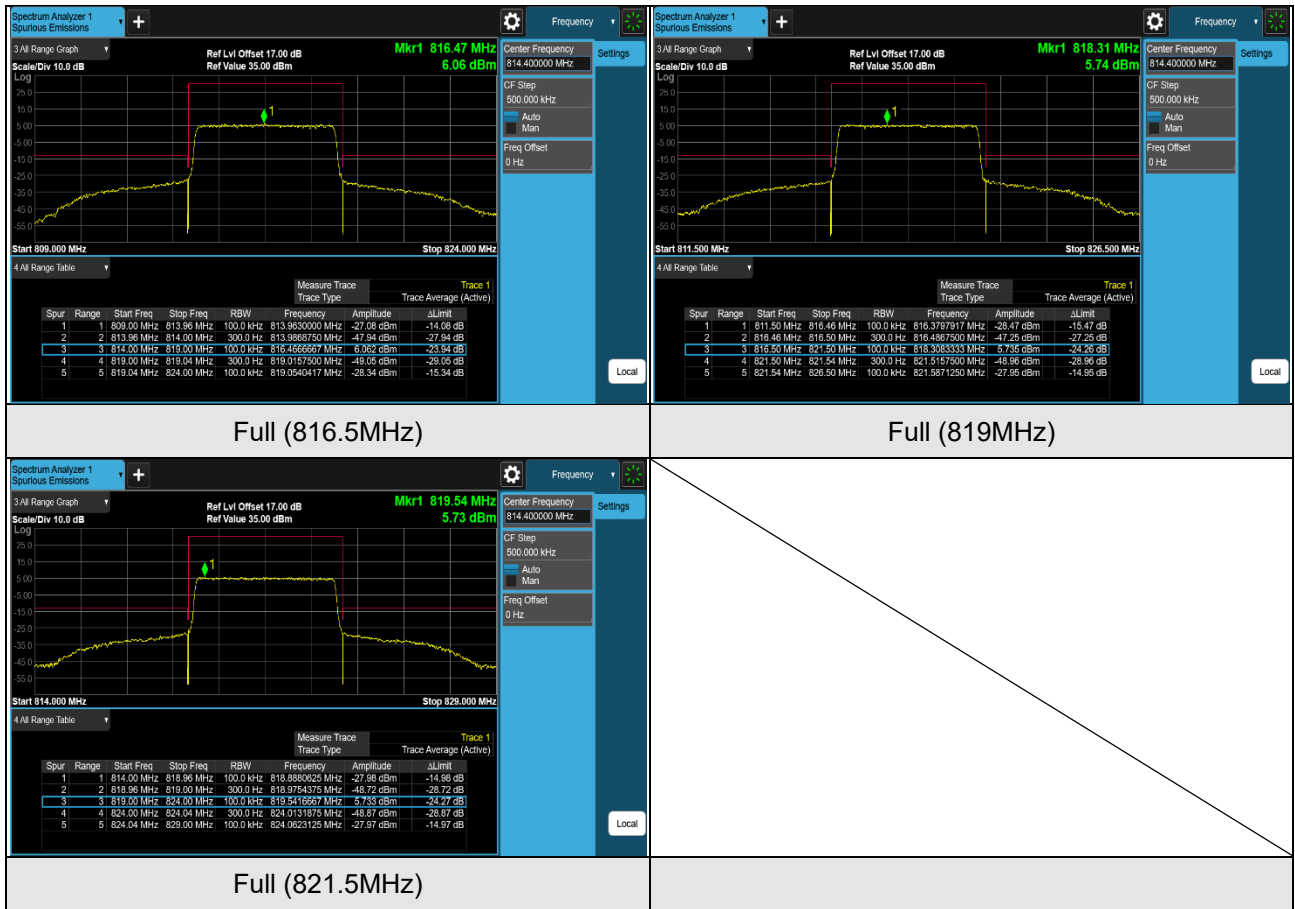
1RB#MAX (819MHz)

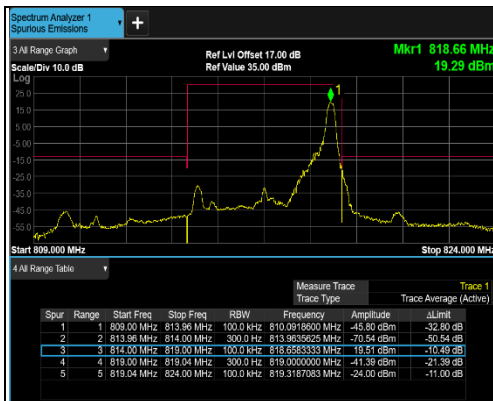


1RB#0 (819MHz)

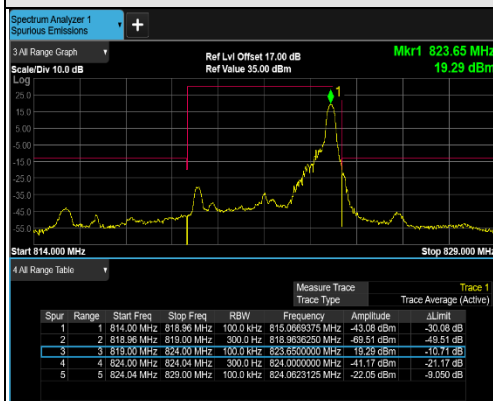


LTE Band 26 (Channel Bandwidth 5MHz)

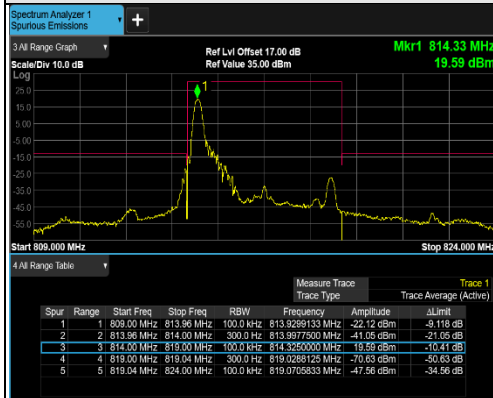




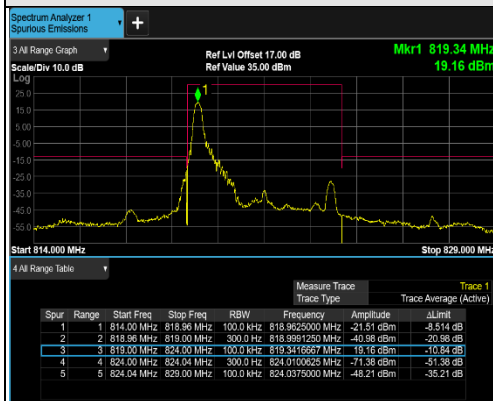
1RB#MAX (816.5MHz)



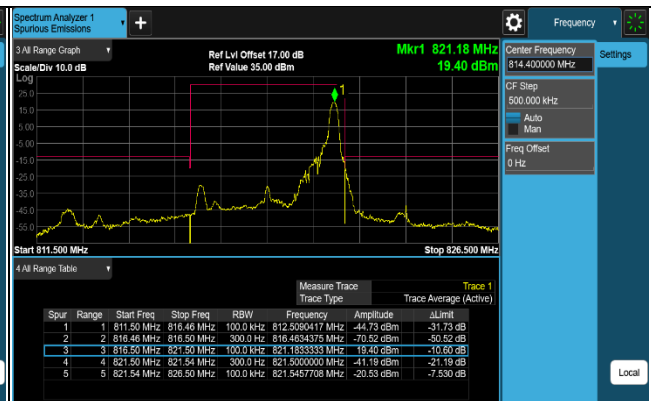
1RB#MAX (821.5MHz)



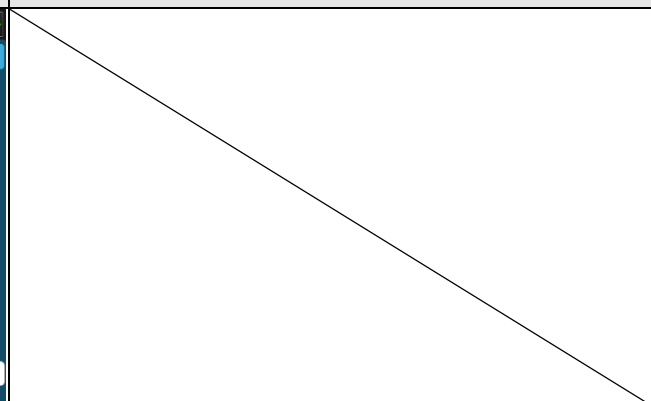
1RB#0 (816.5MHz)



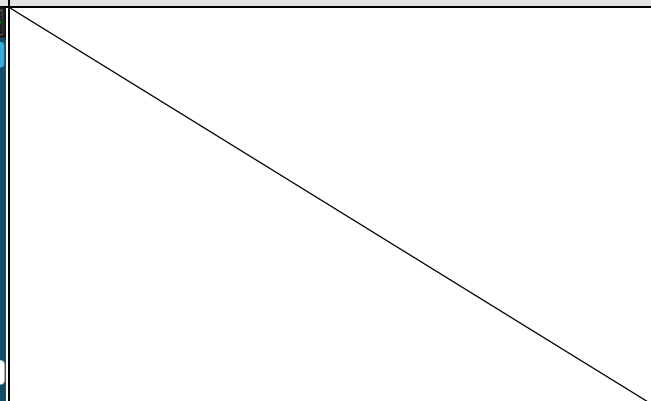
1RB#0 (821.5MHz)



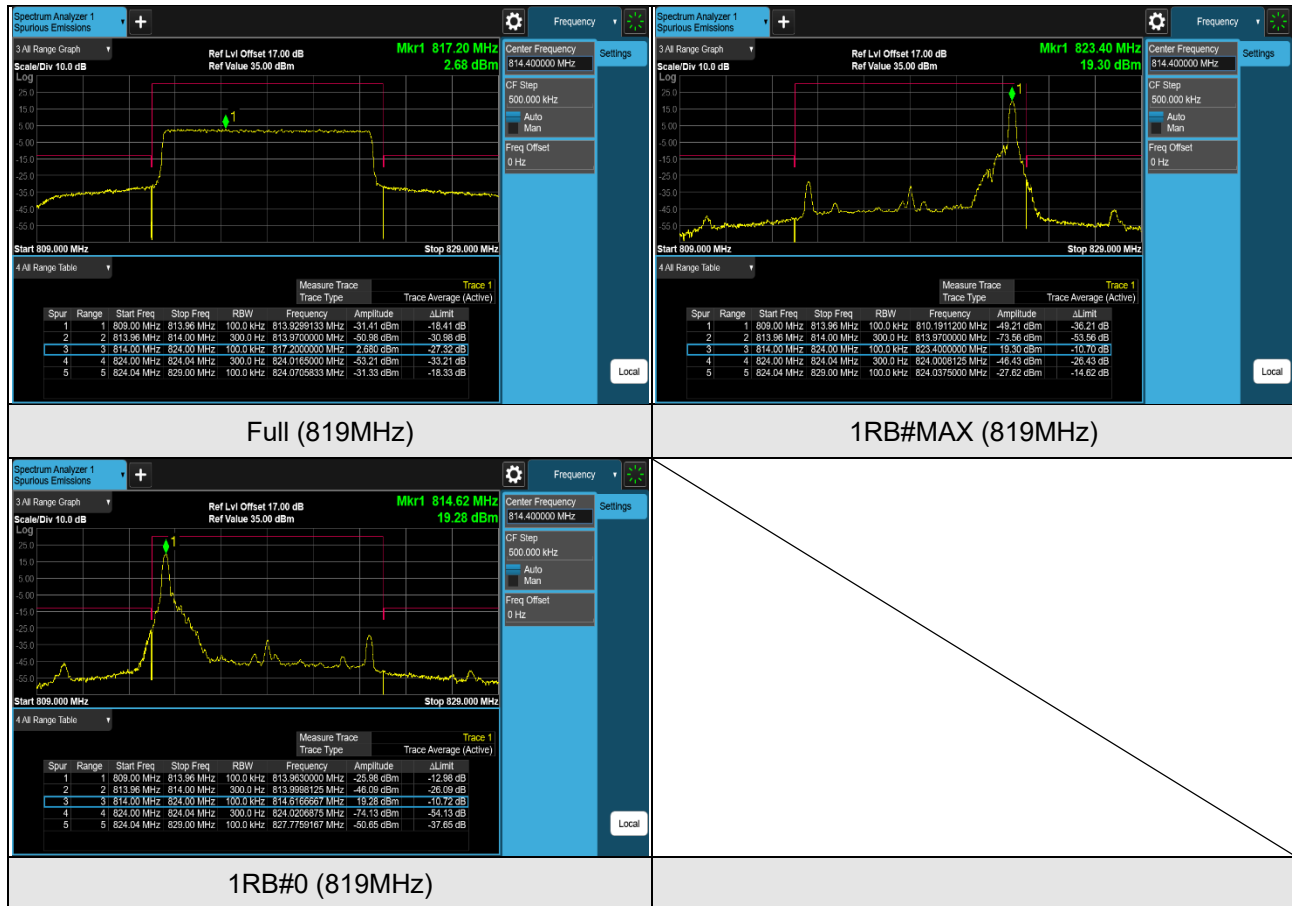
1RB#MAX (819MHz)



1RB#0 (819MHz)



LTE Band 26 (Channel Bandwidth 10MHz)



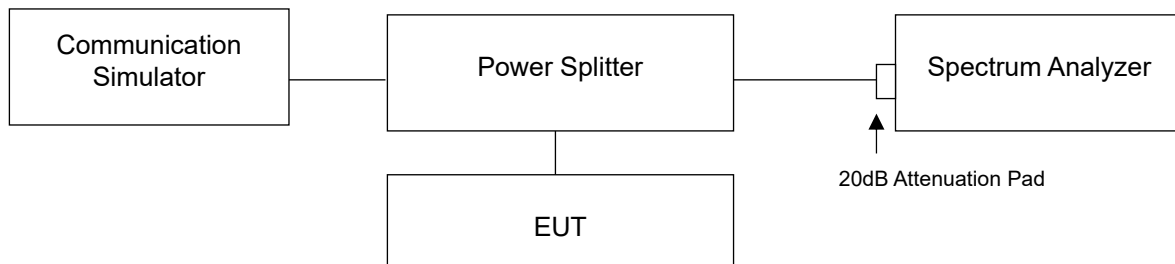
4.6 Conducted Spurious Emissions

4.6.1 Limits of Conducted Spurious Emissions Measurement

The power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) by at least $43 + 10 \log_{10}(P)$ dB. The limit of emission equal to -13dBm .

For operations in the 758-775 MHz and 788-805 MHz bands, all emissions including harmonics in the band 1559-1610 MHz shall be limited to -70 dBW/MHz . The limit of emissions is equal to -40 dBm .

4.6.2 Test Setup

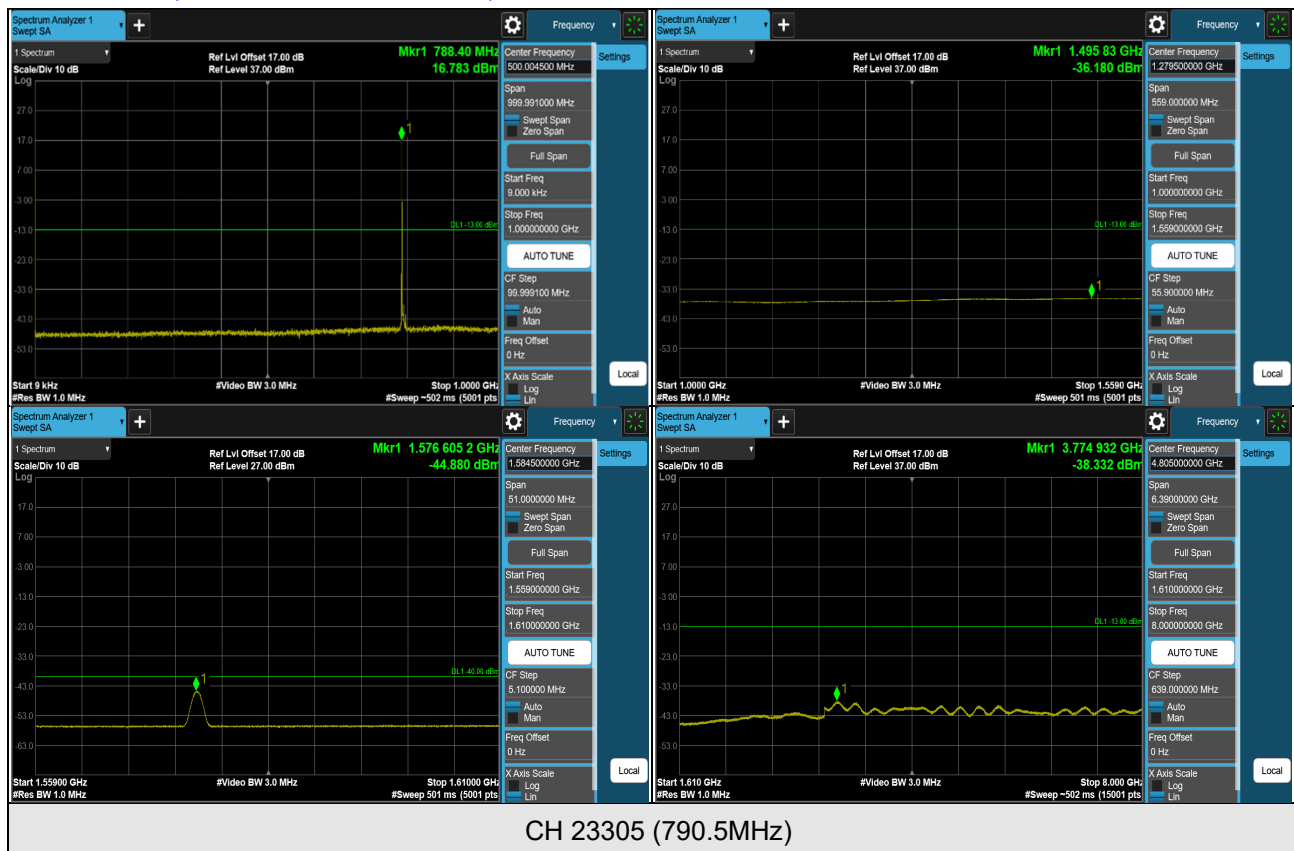


4.6.3 Test Procedure

- a. All measurements were done at low, middle and high channels operational frequency range.
- a. Measuring frequency range is from 9kHz to 8GHz / 9GHz. 20dB attenuation pad is connected with spectrum. RBW=1MHz and VBW=3MHz are used for conducted emission measurement.

4.6.4 Test Results

LTE Band 14 (Channel Bandwidth 5MHz)

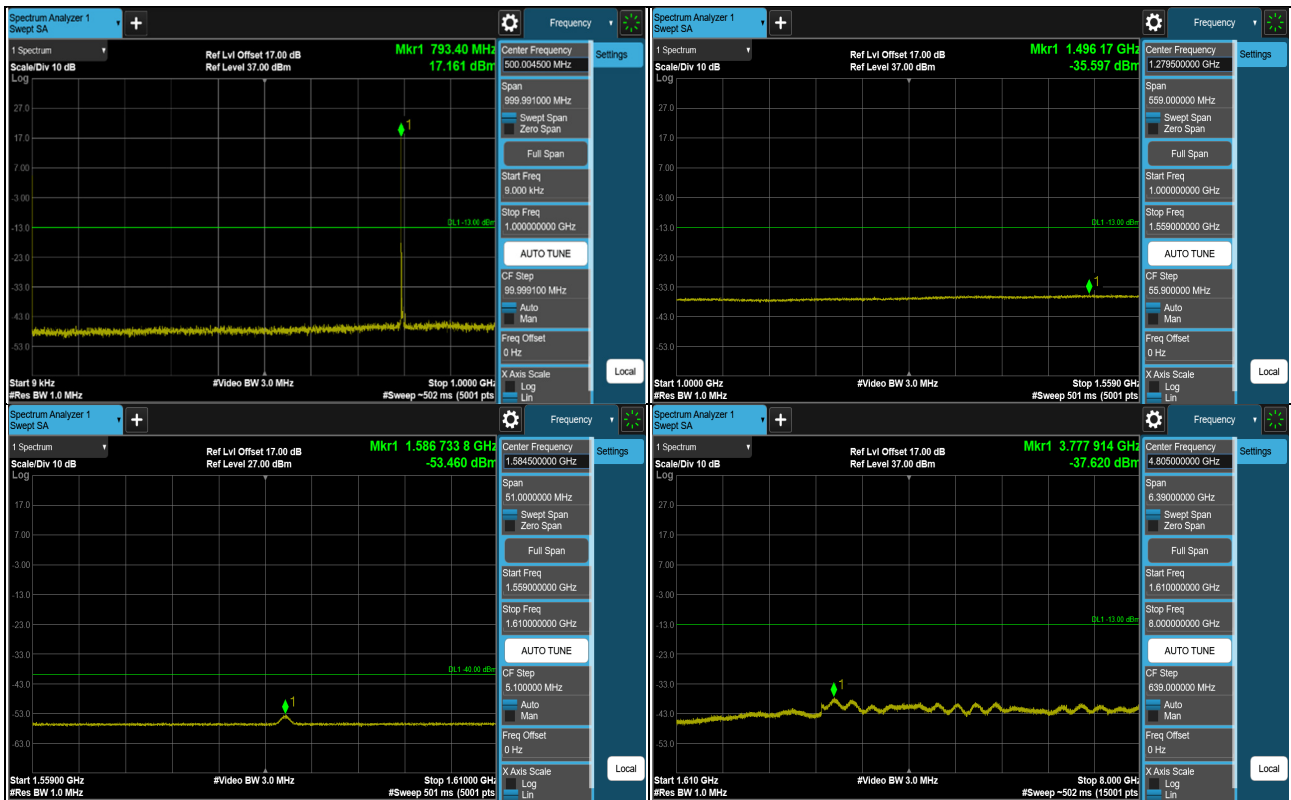


*The 9kHz signal over the limit is from Spectrum.



CH 23330 (793MHz)

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



CH 23355 (795.5MHz)

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