FCC Test Report
(ENDC: n66+Band 5/13)

Report No.:	RFBFJZ-WTW-P21050403-15
FCC ID:	V65C6930
Test Model:	C6930
Received Date:	May 18, 2021
Test Date:	Jun. 26 ~ Aug. 06, 2021
Issued Date:	Aug. 11, 2021
Applicant:	Kyocera Corporation c/o Kyocera International, Inc.
Address:	8611 Balboa Avenue, San Diego, CA 92123
Issued By:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch Lin Kou Laboratories
Lab Address:	No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan
Test Location:	No. 19, Hwa Ya 2nd Rd., Wen Hwa Vil., Kwei Shan Dist., Taoyuan City 33383, Taiwan
FCC Registration / Designation Number:	788550 / TW0003

Testing Laboratory
2021

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Release Control Record

Issue No.	Description	Date Issued
RFBFJZ-WTW-P21050403-15	Original release	Aug. 11, 2021

1 Certificate of Conformity

Product:	SmartPhone
Brand:	Kyocera
Test Model:	C6930
Sample Status:	Engineering sample
Applicant:	Kyocera Corporation c/o Kyocera International, Inc.
Test Date:	Jun. 26 ~ Aug. 06, 2021
Standards:	FCC Part 22, Subpart H FCC Part 27, Subpart C, D, F, L

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

Prepared by : Pettie Chen , **Date:** Aug. 11, 2021

Pettie Chen / Senior Specialist

Approved by : Bruce Chen , **Date:** Aug. 11, 2021

Bruce Chen / Senior Engineer

2 Summary of Test Results

For 5GNR n66:

Applied Standard: FCC Part 27 & Part 2			
FCC Clause	Test Item	Result	Remarks
2.1046 27.50 (d)(4)	Equivalent Isotropically Radiated Power	Pass	Meet the requirement of limit.
2.1047	Modulation Characteristics	Pass	Meet the requirement of limit.
27.50 (d)(5)	Peak To Average Ratio	Pass	Meet the requirement of limit.
2.1055 27.54	Frequency Stability Stay with the authorized bands of operation	Pass	Meet the requirement of limit.
2.1049	Occupied Bandwidth	Pass	Meet the requirement.
2.1051 27.53 (h)	Band Edge Measurements	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 -27.03dB at 75.59MHz.

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

For LTE Band 5:

Applied Standard: FCC Part 22 & Part 2			
FCC Clause	Test Item	Result	Remarks
2.1046 22.913 (a)	Effective radiated power	Pass	Meet the requirement of limit.
2.1047	Modulation Characteristics	Pass	Refer to Note 1
22.913 (d)	Peak To Average Ratio	Pass	Refer to Note 1
2.1055 22.355	Frequency Stability	Pass	Refer to Note 1
2.1049	Occupied Bandwidth	Pass	Refer to Note 1
22.917	Band Edge Measurements	Pass	Refer to Note 1
2.1051 22.917	Conducted Spurious Emissions	Pass	Refer to Note 1
2.1053 22.917	Radiated Spurious Emissions	Pass	Meet the requirement of limit. Minimum passing margin is -29.53dB at 30.00MHz.

Note:

1. This report is a partial report. Therefore, only test item of Effective radiated power and Radiated Spurious Emissions tests were performed for this report. Other testing data please refer to BV CPS report no.: RFBFJZ-WTW-P21050403-8.
2. Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

For LTE Band 13:

Applied Standard: FCC Part 27 & Part 2			
FCC Clause	Test Item	Result	Remarks
2.1046 27.50(b)	Equivalent Radiated Power	Pass	Meet the requirement of limit.
2.1047	Modulation Characteristics	Pass	Refer to Note 1
----	Peak To Average Ratio	Pass	Refer to Note 1
2.1055 27.54	Frequency Stability Stay with the authorized bands of operation	Pass	Refer to Note 1
2.1049	Occupied Bandwidth	Pass	Refer to Note 1
2.1051 27.53(c)	Band Edge / Out of Band Emissions Measurements	Pass	Refer to Note 1
2.1051 27.53 (c)(f)	Conducted Spurious Emissions	Pass	Refer to Note 1
2.1053 27.53(c)(f)	Radiated Spurious Emissions	Pass	Meet the requirement of limit. Minimum passing margin is -16.50dB at 1564.00MHz.

Note:
1. This report is a partial report. Therefore, only test item of Equivalent Radiated Power and Radiated Spurious Emissions tests were performed for this report. Other testing data please refer to BV CPS report no.: RFBFJZ-WTW-P21050403-10.
2. Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

2.1 Measurement Uncertainty

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

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

2.2 Test Site and Instruments

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Test Receiver KEYSIGHT	N9038A	MY55420137	Apr. 09, 2021	Apr. 08, 2022
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100039	Jun. 10, 2021	Jun. 09, 2022
Spectrum Analyzer ROHDE & SCHWARZ	FSW43	101866	Dec. 14, 2020	Dec. 13, 2021
MXG Vector signal generator Agilent	N5182B	MY53050430	Nov. 25, 2020	Nov. 24, 2021
Radio Communication Analyzer Anritsu	MT8821C	6261806803	Jan. 22, 2021	Jan. 21, 2022
Universal Radio Communication Tester R&S	CMU200	101095	Nov. 18, 2020	Nov. 17, 2021
HORN Antenna SCHWARZBECK	BBHA 9120D	9120D-969	Nov. 22, 2020	Nov. 21, 2021
BILOG Antenna SCHWARZBECK	VULB9168	9168-160	Nov. 06, 2020	Nov. 05, 2021
HORN Antenna SCHWARZBECK	BBHA 9120 D	9120D-1169	Nov. 22, 2020	Nov. 21, 2021
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170241	Nov. 22, 2020	Nov. 21, 2021
Preamplifier Agilent (Below 1GHz)	8447D	2944A10638	Jun. 05, 2021	Jun. 04, 2022
Preamplifier Agilent (Above 1GHz)	8449B	3008A02367	Feb. 17, 2021	Feb. 16, 2022
RF signal cable HUBER+SUHNER&EMCI	SUCOFLEX 104 & EMC104-SM-SM8000	CABLE-CH9-02 (248780+171006)	Jan. 16, 2021	Jan. 15, 2022
RF signal cable HUBER+SUHNER	SUCOFLEX 104	CABLE-CH9-(250795/4)	Jan. 16, 2021	Jan. 15, 2022
RF signal cable Woken	8D-FB	Cable-CH9-01	Jun. 05, 2021	Jun. 04, 2022
Software BV ADT	ADT_Radiated_V7.6.15.9.5	NA	NA	NA
Antenna Tower EMCO	2070/2080	512.835.4684	NA	NA
Turn Table EMCO	2087-2.03	NA	NA	NA
Antenna Tower &Turn BV ADT	AT100	AT93021705	NA	NA
Turn Table BV ADT	TT100	TT93021705	NA	NA
Turn Table Controller BV ADT	SC100	SC93021705	NA	NA
Boresight Antenna Fixture	FBA-01	FBA-SIP01	NA	NA
Standard Temperature And Humidity Chamber GIANT FORCE	GTH-120-40-CP-AR	MAA1306-019	Sep. 10, 2020	Sep. 09, 2021

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
JFW 20dB attenuation	50HF-020-SMA	NA	NA	NA
True RMS Clamp Meter Fluke	325	31130711WS	Jun. 02, 2021	Jun. 01, 2022
DC power supply Keysight	U8002A	MY56330015	NA	NA

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

3 General Information

3.1 General Description of EUT

Product	SmartPhone
Brand	Kyocera
Test Model	C6930
Sample Status	Engineering sample
Power Supply Rating	3.87Vdc from battery 5Vdc / 9Vdc / 12Vdc from adapter

n66

Modulation Type	$\pi/2$ BPSK, QPSK, 16QAM, 64QAM, 256QAM					
Waveform Type	CP-OFDM, DFT-s-OFDM					
Operating Frequency	n66 (Channel Bandwidth 5MHz)	1712.5MHz ~ 1777.5MHz				
	n66 (Channel Bandwidth 10MHz)	1715.0MHz ~ 1775.0MHz				
	n66 (Channel Bandwidth 15MHz)	1717.5MHz ~ 1772.5MHz				
	n66 (Channel Bandwidth 20MHz)	1720.0MHz ~ 1770.0MHz				
Max. EIRP Power		$\pi/2$ BPSK	QPSK	16QAM	64QAM	256QAM
	n66 (Channel Bandwidth 5MHz)	399.025mW (26.01dBm)	403.645mW (26.06dBm)	328.095mW (25.16dBm)	253.513mW (24.04dBm)	119.950mW (20.79dBm)
	n66 (Channel Bandwidth 10MHz)	401.791mW (26.04dBm)	406.443mW (26.09dBm)	328.852mW (25.17dBm)	250.035mW (23.98dBm)	119.950mW (20.79dBm)
	n66 (Channel Bandwidth 15MHz)	399.025mW (26.01dBm)	410.204mW (26.13dBm)	327.341mW (25.15dBm)	249.459mW (23.97dBm)	120.781mW (20.82dBm)
	n66 (Channel Bandwidth 20MHz)	406.443mW (26.09dBm)	415.911mW (26.19dBm)	333.426mW (25.23dBm)	254.097mW (24.05dBm)	122.180mW (20.87dBm)
Emission Designator		$\pi/2$ BPSK	QPSK	16QAM	64QAM	256QAM
	n66 (Channel Bandwidth 5MHz)	4M48G7D	4M47G7D	4M47D7W	4M48D7W	4M47D7W
	n66 (Channel Bandwidth 10MHz)	9M22G7D	9M30G7D	9M29D7W	9M30D7W	9M30D7W
	n66 (Channel Bandwidth 15MHz)	14M1G7D	14M1G7D	14M1D7W	14M1D7W	14M1D7W
	n66 (Channel Bandwidth 20MHz)	18M9G7D	19M0G7D	19M0D7W	19M0D7W	19M0D7W

LTE Band

Modulation Type	QPSK, 16QAM, 64QAM, 256QAM					
Operating Frequency	LTE Band 5	Channel Bandwidth 1.4MHz	824.7MHz ~ 848.3MHz			
		Channel Bandwidth 3MHz	825.5MHz ~ 847.5MHz			
		Channel Bandwidth 5MHz	826.5MHz ~ 846.5MHz			
		Channel Bandwidth 10MHz	829.0MHz ~ 844.0MHz			
	LTE Band 13	Channel Bandwidth 5MHz	779.5MHz ~ 784.5MHz			
		Channel Bandwidth 10MHz	782.0MHz			
Max. ERP Power			QPSK	16QAM	64QAM	256QAM
	LTE Band 5	Channel Bandwidth 1.4MHz	62.087mW (17.93dBm)	51.404mW (17.11dBm)	40.458mW (16.07dBm)	20.701mW (13.16dBm)
		Channel Bandwidth 3MHz	60.814mW (17.84dBm)	51.168mW (17.09dBm)	38.815mW (15.89dBm)	20.137mW (13.04dBm)
		Channel Bandwidth 5MHz	61.518mW (17.89dBm)	51.050mW (17.08dBm)	38.548mW (15.86dBm)	20.091mW (13.03dBm)
		Channel Bandwidth 10MHz	63.533mW (18.03dBm)	52.000mW (17.16dBm)	39.537mW (15.97dBm)	20.941mW (13.21dBm)
	LTE Band 13	Channel Bandwidth 5MHz	58.884mW (17.70dBm)	50.350mW (17.02dBm)	48.084mW (16.82dBm)	20.941mW (13.21dBm)
		Channel Bandwidth 10MHz	59.156mW (17.72dBm)	51.286mW (17.10dBm)	44.566mW (16.49dBm)	21.429mW (13.31dBm)
Antenna Type	Refer to Note as below					
Antenna Connector	Refer to Note as below					

Accessory Device	Refer to Note as below
Cable Supplied	Refer to Note as below

Note:

1. The EUT contains following accessory devices.

Battery	
Brand	KYOCERA
Model	SCP-75LBPS
Rating	3.87 V typ / 4500 mAh/17.5 Wh typ

Adapter	
Brand	KYOCERA Corporation
Model	SCP-49ADT
Input Power	AC 100-240V, 50/60Hz 0.4A
Output Power	DC 5.0V, 1.8A / 9.0V, 1.8A / 12.0V, 1.2A

USB Cable	
Brand	KYOCERA Corporation
Model	SCP-24SDC
Signal Line	1m shielded Type A to Type C USB cable

2. The following antennas were provided to the EUT.

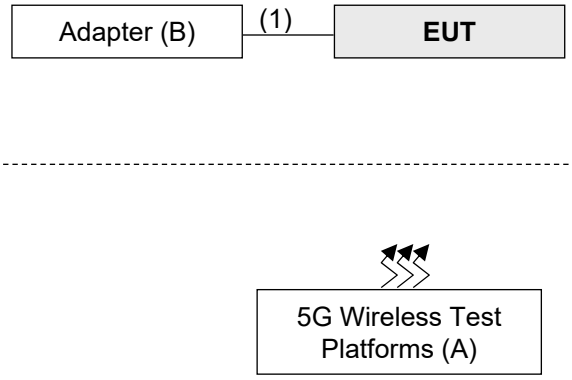
Band	Freq. Range (MHz)	Gain (dBi)
n66	1712.5 ~ 1777.5	2.3 (Tx1), -0.5 (Tx2) (diversity)
LTE Band 5	824.7 ~ 848.3	-3.5 (Tx1)
LTE Band 13	779.5 ~ 784.5	-3.4 (Tx1)

* 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. The EUT supports the following ENDC configuration.

	FCC 5G FR1			ENDC
	Band	SCS	Bandwidth (MHz)	
5GNR	n2	15kHz	5/10/15/20	Band 5/13
	n5	15kHz	5/10/15/20	Band 2/48/66
	n66	15kHz	5/10/15/20	Band 5/13
	n71	15kHz	5/10/15/20	Band 2/66

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.	5G Wireless Test Platforms	Keysight	E7515B	MY58300759	NA	-
B.	Adapter	KYOCERA	SCP-49ADT	NA	NA	Accessory

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.	Type A to Type C USB cable	1	1	Y	0	Accessory

3.3 Test Mode Applicability and Tested Channel Detail

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

Band	Radiated Emission
n66	X-plane
LTE Band 5	X-plane
LTE Band 13	X-plane

n66

EUT Configure Mode	Test Item	Available Channel	Tested Channel	Channel Bandwidth	Modulation	Mode
-	EIRP	342500 to 355500	342500 (1712.5MHz), 349000 (1745.0MHz), 355500 (1777.5MHz)	5MHz	$\pi/2$ BPSK / QPSK / 16QAM / 64QAM / 256QAM	1 RB / 1 RB Offset 1 RB / 13 RB Offset 1 RB / 23 RB Offset 12 RB / 0 RB Offset 12 RB / 7 RB Offset 12 RB / 13 RB Offset 25 RB / 0 RB Offset
		343000 to 355000	343000 (1715.0MHz), 349000 (1745.0MHz), 355000 (1775.0MHz)	10MHz	$\pi/2$ BPSK / QPSK / 16QAM / 64QAM / 256QAM	1 RB / 1 RB Offset 1 RB / 26 RB Offset 1 RB / 50 RB Offset 25 RB / 0 RB Offset 25 RB / 14 RB Offset 25 RB / 27 RB Offset 50 RB / 0 RB Offset
		343500 to 354500	343500 (1717.5MHz), 349000 (1745.0MHz), 354500 (1772.5MHz)	15MHz	$\pi/2$ BPSK / QPSK / 16QAM / 64QAM / 256QAM	1 RB / 1 RB Offset 1 RB / 40 RB Offset 1 RB / 77 RB Offset 36 RB / 0 RB Offset 36 RB / 22 RB Offset 36 RB / 43 RB Offset 75 RB / 0 RB Offset
		344000 to 354000	344000 (1720.0MHz), 349000 (1745.0MHz), 354000 (1770.0MHz)	20MHz	$\pi/2$ BPSK / QPSK / 16QAM / 64QAM / 256QAM	1 RB / 1 RB Offset 1 RB / 53 RB Offset 1 RB / 104 RB Offset 50RB / 0 RB Offset 50 RB / 28 RB Offset 50 RB / 56 RB Offset 100 RB / 0 RB Offset
-	Modulation Characteristics	344000 to 354000	349000 (1745.0MHz)	40MHz	$\pi/2$ BPSK / QPSK / 16QAM / 64QAM / 256QAM	106 RB / 0 RB Offset

EUT Configure Mode	Test Item	Available Channel	Tested Channel	Channel Bandwidth	Modulation	Mode
-	Frequency Stability	342500 to 355500	342500 (1712.5MHz), 355500 (1777.5MHz)	5MHz	QPSK	25 RB / 0 RB Offset
		343000 to 355000	343000 (1715.0MHz), 355000 (1775.0MHz)	10MHz	QPSK	52 RB / 0 RB Offset
		343500 to 354500	343500 (1717.5MHz), 354500 (1772.5MHz)	15MHz	QPSK	79 RB / 0 RB Offset
		344000 to 354000	344000 (1720.0MHz), 354000 (1770.0MHz)	20MHz	QPSK	106 RB / 0 RB Offset
-	Emission Bandwidth	342500 to 355500	342500 (1712.5MHz), 349000 (1745.0MHz), 355500 (1777.5MHz)	5MHz	$\pi/2$ BPSK / QPSK / 16QAM / 64QAM / 256QAM	25 RB / 0 RB Offset
		343000 to 355000	343000 (1715.0MHz), 349000 (1745.0MHz), 355000 (1775.0MHz)	10MHz	$\pi/2$ BPSK / QPSK / 16QAM / 64QAM / 256QAM	52 RB / 0 RB Offset
		343500 to 354500	343500 (1717.5MHz), 349000 (1745.0MHz), 354500 (1772.5MHz)	15MHz	$\pi/2$ BPSK / QPSK / 16QAM / 64QAM / 256QAM	79 RB / 0 RB Offset
		344000 to 354000	344000 (1720.0MHz), 349000 (1745.0MHz), 354000 (1770.0MHz)	20MHz	$\pi/2$ BPSK / QPSK / 16QAM / 64QAM / 256QAM	106 RB / 0 RB Offset
-	Band Edge	342500 to 355500	342500 (1712.5MHz), 355500 (1777.5MHz)	5MHz	QPSK	1 RB / 0 RB Offset 1 RB / 23 RB Offset 25 RB / 0 RB Offset
		343000 to 355000	343000 (1715.0MHz), 355000 (1775.0MHz)	10MHz	QPSK	1 RB / 0 RB Offset 1 RB / 50 RB Offset 50 RB / 0 RB Offset
		343500 to 354500	343500 (1717.5MHz), 354500 (1772.5MHz)	15MHz	QPSK	1 RB / 0 RB Offset 1 RB / 77 RB Offset 75 RB / 0 RB Offset
		344000 to 354000	344000 (1720.0MHz), 354000 (1770.0MHz)	20MHz	QPSK	1 RB / 0 RB Offset 1 RB / 104 RB Offset 100 RB / 0 RB Offset
-	Peak to Average Ratio	342500 to 355500	342500 (1712.5MHz), 349000 (1745.0MHz), 355500 (1777.5MHz)	5MHz	$\pi/2$ BPSK / QPSK / 16QAM / 64QAM / 256QAM	1 RB / 0 RB Offset
		343000 to 355000	343000 (1715.0MHz), 349000 (1745.0MHz), 355000 (1775.0MHz)	10MHz	$\pi/2$ BPSK / QPSK / 16QAM / 64QAM / 256QAM	1 RB / 0 RB Offset
		343500 to 354500	343500 (1717.5MHz), 349000 (1745.0MHz), 354500 (1772.5MHz)	15MHz	$\pi/2$ BPSK / QPSK / 16QAM / 64QAM / 256QAM	1 RB / 0 RB Offset
		344000 to 354000	344000 (1720.0MHz), 349000 (1745.0MHz), 354000 (1770.0MHz)	20MHz	$\pi/2$ BPSK / QPSK / 16QAM / 64QAM / 256QAM	1 RB / 0 RB Offset

EUT Configure Mode	Test Item	Available Channel	Tested Channel	Channel Bandwidth	Modulation	Mode
-	Conducted Emission	342500 to 355500	342500 (1712.5MHz), 349000 (1745.0MHz), 355500 (1777.5MHz)	5MHz	QPSK	1 RB / 1 RB Offset
		343000 to 355000	343000 (1715.0MHz), 349000 (1745.0MHz), 355000 (1775.0MHz)	10MHz	QPSK	1 RB / 1 RB Offset
		343500 to 354500	343500 (1717.5MHz), 349000 (1745.0MHz), 354500 (1772.5MHz)	15MHz	QPSK	1 RB / 1 RB Offset
		344000 to 354000	344000 (1720.0MHz), 349000 (1745.0MHz), 354000 (1770.0MHz)	20MHz	QPSK	1 RB / 1 RB Offset
-	Radiated Emission Below 1GHz	344000 to 354000	354000 (1770.0MHz)	20MHz	QPSK	1 RB / 1 RB Offset
-	Radiated Emission Above 1GHz	342500 to 355500	342500 (1712.5MHz), 349000 (1745.0MHz), 355500 (1777.5MHz)	5MHz	QPSK	1 RB / 1 RB Offset
		344000 to 354000	344000 (1720.0MHz), 349000 (1745.0MHz), 354000 (1770.0MHz)	20MHz	QPSK	1 RB / 1 RB Offset

Note:

1. Only output power, modulation characteristics, occupied bandwidth and Peak to average ratio items had been tested under $\pi/2$ BPSK, QPSK, 16QAM, 64QAM and 256QAM modes, the other test items were performed under worst mode according to the maximum output power.
2. For radiated emission, according to 3GPP 38.521-1 Section 6.5.3.1.4, choose the lowest, middlest & highest channel bandwidth for final test.
3. For radiated emissions below 1 GHz, select the worst radiated emission channel (above 1GHz) for final testing.

LTE Band 5

EUT Configure Mode	Test item	Available channel	Tested channel	Channel Bandwidth	Modulation	Mode
-	ERP	20407 to 20643	20407(824.7MHz), 20525(836.5MHz), 20643(848.3MHz)	1.4MHz	QPSK / 16QAM / 64QAM / 256QAM	1 RB / 0 RB Offset 1 RB / 2 RB Offset 1 RB / 5 RB Offset 3 RB / 0 RB Offset 3 RB / 1 RB Offset 3 RB / 3 RB Offset 6 RB / 0 RB Offset
		20415 to 20635	20415(825.5MHz), 20525(836.5MHz), 20635(847.5MHz)	3MHz	QPSK / 16QAM / 64QAM / 256QAM	1 RB / 0 RB Offset 1 RB / 7 RB Offset 1 RB / 14 RB Offset 8 RB / 0 RB Offset 8 RB / 3 RB Offset 8 RB / 7 RB Offset 15 RB / 0 RB Offset
		20425 to 20625	20425(826.5MHz), 20525(836.5MHz), 20625(846.5MHz)	5MHz	QPSK / 16QAM / 64QAM / 256QAM	1 RB / 0 RB Offset 1 RB / 12 RB Offset 1 RB / 24 RB Offset 12 RB / 0 RB Offset 12 RB / 6 RB Offset 12 RB / 13 RB Offset 25 RB / 0 RB Offset
		20450 to 20600	20450(829.0MHz), 20525(836.5MHz), 20600(844.0MHz)	10MHz	QPSK / 16QAM / 64QAM / 256QAM	1 RB / 0 RB Offset 1 RB / 24 RB Offset 1 RB / 49 RB Offset 25 RB / 0 RB Offset 25 RB / 12 RB Offset 25 RB / 25 RB Offset 50 RB / 0 RB Offset
-	Radiated Emission Below 1GHz	20425 to 20625	20625(846.5MHz)	5MHz	QPSK	1 RB / 0 RB Offset
-	Radiated Emission Above 1GHz	20407 to 20643	20407(824.7MHz), 20525(836.5MHz), 20643(848.3MHz)	1.4MHz	QPSK	1 RB / 0 RB Offset
		20425 to 20625	20425(826.5MHz), 20525(836.5MHz), 20625(846.5MHz)	5MHz	QPSK	1 RB / 0 RB Offset
		20450 to 20600	20450(829.0MHz), 20525(836.5MHz), 20600(844.0MHz)	10MHz	QPSK	1 RB / 0 RB Offset

Note:

1. The measured output power for QPSK mode is higher than the measured output power for 16QAM, 64QAM and 256QAM modes. Therefore, only Modulation characteristics, occupied bandwidth and Peak to average ratio items had been tested under QPSK, 16QAM, 64QAM and 256QAM modes, the other test items were performed under QPSK mode only.
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. For radiated emissions below 1 GHz, select the worst radiated emission channel (above 1GHz) for final testing.

LTE Band 13

EUT Configure Mode	Test item	Available channel	Tested channel	Channel Bandwidth	Modulation	Mode
-	ERP	23205 to 23255	23205(779.5MHz), 23230(782.0MHz), 23255(784.5MHz)	5MHz	QPSK / 16QAM / 64QAM / 256QAM	1 RB / 0 RB Offset 1 RB / 12 RB Offset 1 RB / 24 RB Offset 12 RB / 0 RB Offset 12 RB / 6 RB Offset 12 RB / 13 RB Offset 25 RB / 0 RB Offset
		23230	23230(782.0MHz)	10MHz	QPSK / 16QAM / 64QAM / 256QAM	1 RB / 0 RB Offset 1 RB / 24 RB Offset 1 RB / 49 RB Offset 25 RB / 0 RB Offset 25 RB / 12 RB Offset 25 RB / 25 RB Offset 50 RB / 0 RB Offset
-	Radiated Emission Below 1GHz	23230	23230(782.0MHz)	10MHz	QPSK	1 RB / 0 RB Offset
-	Radiated Emission Above 1GHz	23205 to 23255	23205(779.5MHz), 23230(782.0MHz), 23255(784.5MHz)	5MHz	QPSK	1 RB / 0 RB Offset
		23230	23230(782.0MHz)	10MHz	QPSK	1 RB / 0 RB Offset

Note:

1. The measured output power for QPSK mode is higher than the measured output power for 16QAM, 64QAM and 256QAM modes. Therefore, only Modulation characteristics, occupied bandwidth and Peak to average ratio items had been tested under QPSK, 16QAM, 64QAM and 256QAM modes, the other test items were performed under QPSK mode only.
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. For radiated emissions below 1 GHz, select the worst radiated emission channel (above 1GHz) for final testing.

Test Condition:

Test Item	Environmental Conditions	Input Power	Tested By
ERP / EIRP	25deg. C, 60%RH	120Vac, 60Hz	James Yang
Modulation Characteristics	25deg. C, 60%RH	120Vac, 60Hz	James Yang
Frequency Stability	25deg. C, 60%RH	3.87Vdc	James Yang
Occupied Bandwidth	25deg. C, 60%RH	120Vac, 60Hz	James Yang
Band Edge	25deg. C, 60%RH	120Vac, 60Hz	James Yang
Peak To Average Ratio	25deg. C, 60%RH	120Vac, 60Hz	James Yang
Conducted Emission	25deg. C, 60%RH	120Vac, 60Hz	James Yang
Radiated Emission	22deg. C, 66%RH	120Vac, 60Hz	Greg Lin

3.4 EUT Operating Conditions

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

3.5 General Description of Applied Standards 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 22

FCC 47 CFR Part 27

ANSI/TIA/EIA-603-D-2010

ANSI/TIA/EIA-603-E 2016

ANSI 63.26-2015

References Test Guidance:

KDB 971168 D01 Power Meas License Digital Systems v03r01

KDB 971168 D02 Misc Rev Approv License Devices v02r01

KDB 940660 D01 Part 96 CBRS Eqpt v02

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 n66:
Mobile / Portable station are limited to 1 watts e.i.r.p.

For LTE Band 5:
Mobile / Portable station are limited to 7 watts e.r.p.

For LTE Band 13:
Control and mobile stations in the 698-746 MHz, 746-757 MHz, 787-788 MHz and 805-806 MHz band are limited to 30 watts ERP.
Portable stations (hand-held devices) in the 600 MHz uplink band and the 698-746 MHz band, and fixed and mobile stations in the 600 MHz uplink, 746-757 MHz,787-788 MHz and 805-806 MHz band are limited to 3 watts ERP.

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:

$EIRP = P_{Meas} + G_T$

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

where

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

P_{Meas} measured transmitter output power or PSD, in dBm or dBW

G_T gain of the transmitting antenna, in dBd (ERP) or dBi (EIRP)

4.1.3 Test Setup

Conducted Power Measurement:

4.1.4 Test Results

Conducted Output Power (dBm)

5GNR Band 66						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		344000	349000	354000
		Frequency (MHz)		1720	1745	1770
20M	$\pi/2$ BPSK	1	1	23.71	23.54	23.79
20M	QPSK	1	1	23.75	23.65	23.89
		1	53	23.66	23.56	23.81
		1	104	23.51	23.43	23.70
		50	0	22.79	22.62	22.86
		50	28	23.53	23.35	23.61
		50	56	22.59	22.47	22.70
		100	0	22.69	22.64	22.82
20M	16QAM	1	1	22.77	22.68	22.93
20M	64QAM	1	1	21.65	21.63	21.75
20M	256QAM	1	1	18.44	18.41	18.57
BW	MCS Index	Channel		343500	349000	354500
		Frequency (MHz)		1717.5	1745	1772.5
15M	$\pi/2$ BPSK	1	1	23.71	23.49	23.69
15M	QPSK	1	1	23.71	23.59	23.83
		1	40	23.62	23.50	23.72
		1	77	23.51	23.40	23.65
		36	0	22.72	22.53	22.77
		36	22	23.44	23.29	23.55
		36	43	22.56	22.39	22.61
		75	0	22.64	22.62	22.80
15M	16QAM	1	1	22.68	22.67	22.85
15M	64QAM	1	1	21.56	21.59	21.67
15M	256QAM	1	1	18.41	18.33	18.52

5GNR Band 66						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		343000	349000	355000
		Frequency (MHz)		1715	1745	1775
10M	$\pi/2$ BPSK	1	1	23.64	23.53	23.74
10M	QPSK	1	1	23.71	23.63	23.79
		1	26	23.59	23.54	23.75
		1	50	23.50	23.37	23.60
		25	0	22.73	22.56	22.85
		25	14	23.48	23.28	23.51
		25	27	22.49	22.44	22.69
		50	0	22.61	22.60	22.78
10M	16QAM	1	1	22.73	22.64	22.87
10M	64QAM	1	1	21.65	21.63	21.68
10M	256QAM	1	1	18.41	18.39	18.49
BW	MCS Index	Channel		342500	349000	355500
		Frequency (MHz)		1712.5	1745	1777.5
5M	$\pi/2$ BPSK	1	1	23.61	23.45	23.71
5M	QPSK	1	1	23.75	23.64	23.76
		1	13	23.64	23.54	23.71
		1	23	23.51	23.37	23.68
		12	0	22.70	22.60	22.84
		12	7	23.51	23.28	23.59
		12	13	22.59	22.37	22.62
		25	0	22.65	22.58	22.74
5M	16QAM	1	1	22.74	22.67	22.86
5M	64QAM	1	1	21.63	21.61	21.74
5M	256QAM	1	1	18.36	18.32	18.49

LTE Band 5						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		20450	20525	20600
		Frequency (MHz)		829	836.5	844
10M	QPSK	1	0	23.66	23.66	23.68
		1	24	23.65	23.60	23.65
		1	49	23.45	23.44	23.60
		25	0	22.64	22.71	22.81
		25	12	22.75	22.57	22.80
		25	25	22.58	22.64	22.78
		50	0	22.71	22.57	22.67
10M	16QAM	1	0	22.63	22.61	22.63
		1	24	22.66	22.58	22.63
		1	49	22.73	22.81	22.80
		25	0	21.85	21.65	21.76
		25	12	21.74	21.68	21.52
		25	25	21.50	21.62	21.80
		50	0	21.57	21.82	21.69
10M	64QAM	1	0	21.43	21.62	21.62
		1	24	21.47	21.44	21.60
		1	49	21.50	21.33	21.44
		25	0	20.64	20.46	20.52
		25	12	20.51	20.49	20.41
		25	25	20.80	20.72	20.62
		50	0	20.58	20.60	20.48
10M	256QAM	1	0	18.71	18.70	18.78
		1	24	18.51	18.71	18.66
		1	49	18.62	18.86	18.63
		25	0	18.54	18.49	18.43
		25	12	18.52	18.75	18.66
		25	25	18.49	18.59	18.41
		50	0	18.69	18.75	18.77

LTE Band 5						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		20425	20525	20625
		Frequency (MHz)		826.5	836.5	846.5
5M	QPSK	1	0	23.48	23.54	23.47
		1	12	23.52	23.41	23.36
		1	24	23.53	23.46	23.39
		12	0	22.58	22.45	22.48
		12	6	22.51	22.67	22.44
		12	13	22.57	22.48	22.28
		25	0	22.63	22.76	22.44
5M	16QAM	1	0	22.69	22.69	22.48
		1	12	22.73	22.63	22.48
		1	24	22.58	22.71	22.35
		12	0	21.72	21.65	21.66
		12	6	21.67	21.42	21.68
		12	13	21.65	21.62	21.58
		25	0	21.33	21.62	21.42
5M	64QAM	1	0	21.45	21.30	21.23
		1	12	21.31	21.25	21.27
		1	24	21.21	21.51	21.28
		12	0	20.51	20.43	20.43
		12	6	20.41	20.42	20.45
		12	13	20.71	20.47	20.38
		25	0	20.34	20.55	20.32
5M	256QAM	1	0	18.65	18.67	18.58
		1	12	18.48	18.68	18.63
		1	24	18.53	18.52	18.64
		12	0	18.43	18.48	18.46
		12	6	18.55	18.67	18.65
		12	13	18.50	18.43	18.60
		25	0	18.44	18.52	18.63

LTE Band 5						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		20415	20525	20635
		Frequency (MHz)		825.5	836.5	847.5
3M	QPSK	1	0	23.48	23.47	23.49
		1	7	23.35	23.48	23.32
		1	14	23.28	23.49	23.28
		8	0	22.44	22.55	22.34
		8	3	22.54	22.68	22.40
		8	7	22.69	22.68	22.51
		15	0	22.42	22.39	22.50
3M	16QAM	1	0	22.63	22.54	22.62
		1	7	22.63	22.74	22.59
		1	14	22.42	22.31	22.66
		8	0	21.45	21.46	21.67
		8	3	21.42	21.73	21.51
		8	7	21.57	21.57	21.47
		15	0	21.48	21.53	21.42
3M	64QAM	1	0	21.54	21.39	21.17
		1	7	21.11	21.20	21.33
		1	14	21.51	21.39	21.36
		8	0	20.34	20.71	20.35
		8	3	20.49	20.50	20.37
		8	7	20.31	20.67	20.53
		15	0	20.54	20.53	20.25
3M	256QAM	1	0	18.52	18.49	18.39
		1	7	18.34	18.51	18.50
		1	14	18.54	18.63	18.50
		8	0	18.34	18.69	18.64
		8	3	18.50	18.49	18.38
		8	7	18.36	18.33	18.56
		15	0	18.67	18.54	18.38

LTE Band 5						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		20407	20525	20643
		Frequency (MHz)		824.7	836.5	848.3
1.4M	QPSK	1	0	23.50	23.51	23.58
		1	2	23.46	23.36	23.51
		1	5	23.25	23.33	23.33
		3	0	23.46	23.58	23.50
		3	1	23.41	23.56	23.51
		3	3	23.54	23.50	23.52
		6	0	22.35	22.50	22.43
1.4M	16QAM	1	0	22.50	22.58	22.35
		1	2	22.74	22.60	22.45
		1	5	22.48	22.39	22.37
		3	0	22.57	22.44	22.46
		3	1	22.50	22.60	22.46
		3	3	22.50	22.76	22.33
		6	0	21.35	21.56	21.50
1.4M	64QAM	1	0	21.52	21.45	21.52
		1	2	21.24	21.39	21.30
		1	5	21.33	21.51	21.39
		3	0	21.33	21.41	21.62
		3	1	21.44	21.61	21.44
		3	3	21.38	21.43	21.72
		6	0	20.37	20.63	20.31
1.4M	256QAM	1	0	18.56	18.79	18.46
		1	2	18.33	18.34	18.58
		1	5	18.67	18.73	18.54
		3	0	18.62	18.39	18.30
		3	1	18.55	18.48	18.49
		3	3	18.52	18.43	18.33
		6	0	18.45	18.81	18.67

LTE Band 13				
BW	MCS Index	RB Size	RB Offset	Mid
		Channel		23230
		Frequency (MHz)		782
10M	QPSK	1	0	22.75
		1	24	23.27
		1	49	22.89
		25	0	21.79
		25	12	22.00
		25	25	21.77
		50	0	21.76
10M	16QAM	1	0	22.37
		1	24	22.65
		1	49	21.83
		25	0	21.10
		25	12	21.25
		25	25	20.82
		50	0	20.88
10M	64QAM	1	0	21.91
		1	24	22.04
		1	49	21.47
		25	0	20.93
		25	12	20.82
		25	25	20.88
		50	0	20.30
10M	256QAM	1	0	18.49
		1	24	18.86
		1	49	18.34
		25	0	18.17
		25	12	18.49
		25	25	18.17
		50	0	18.55

LTE Band 13						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		23205	23230	23255
		Frequency (MHz)		779.5	782	784.5
5M	QPSK	1	0	22.74	22.78	22.73
		1	12	23.03	23.25	23.07
		1	24	22.75	22.77	22.72
		12	0	21.73	21.75	21.77
		12	6	22.01	21.86	21.75
		12	13	21.87	21.84	21.72
		25	0	21.75	21.84	21.76
5M	16QAM	1	0	22.27	22.21	22.43
		1	12	22.24	22.25	22.57
		1	24	21.75	21.84	21.79
		12	0	20.89	20.84	20.96
		12	6	21.14	21.20	21.04
		12	13	20.76	20.71	20.73
		25	0	20.73	20.75	20.77
5M	64QAM	1	0	22.37	22.17	21.87
		1	12	22.21	22.36	22.11
		1	24	21.26	21.31	20.97
		12	0	20.93	20.80	20.58
		12	6	20.80	20.85	20.83
		12	13	20.41	20.75	20.41
		25	0	20.45	20.33	20.03
5M	256QAM	1	0	18.02	17.92	18.35
		1	12	18.32	18.73	18.76
		1	24	18.44	18.43	18.21
		12	0	18.10	18.56	18.27
		12	6	18.53	18.31	18.37
		12	13	18.35	18.38	17.92
		25	0	18.17	18.15	18.62

EIRP / ERP Power (dBm)

NR Band 66						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		344000	349000	354000
		Frequency (MHz)		1720	1745	1770
20M	$\pi/2$ BPSK	1	1	26.01	25.84	26.09
20M	QPSK	1	1	26.05	25.95	26.19
		1	53	25.96	25.86	26.11
		1	104	25.81	25.73	26.00
		50	0	25.09	24.92	25.16
		50	28	25.83	25.65	25.91
		50	56	24.89	24.77	25.00
		100	0	24.99	24.94	25.12
20M	16QAM	1	1	25.07	24.98	25.23
20M	64QAM	1	1	23.95	23.93	24.05
20M	256QAM	1	1	20.74	20.71	20.87
BW	MCS Index	Channel		343500	349000	354500
		Frequency (MHz)		1717.5	1745	1772.5
15M	$\pi/2$ BPSK	1	1	26.01	25.79	25.99
15M	QPSK	1	1	26.01	25.89	26.13
		1	40	25.92	25.80	26.02
		1	77	25.81	25.70	25.95
		36	0	25.02	24.83	25.07
		36	22	25.74	25.59	25.85
		36	43	24.86	24.69	24.91
		75	0	24.94	24.92	25.10
15M	16QAM	1	1	24.98	24.97	25.15
15M	64QAM	1	1	23.86	23.89	23.97
15M	256QAM	1	1	20.71	20.63	20.82

*EIRP = Conducted + antenna gain (2.3dBi)

NR Band 66						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		343000	349000	355000
		Frequency (MHz)		1715	1745	1775
10M	$\pi/2$ BPSK	1	1	25.94	25.83	26.04
10M	QPSK	1	1	26.01	25.93	26.09
		1	26	25.89	25.84	26.05
		1	50	25.80	25.67	25.90
		25	0	25.03	24.86	25.15
		25	14	25.78	25.58	25.81
		25	27	24.79	24.74	24.99
		50	0	24.91	24.90	25.08
10M	16QAM	1	1	25.03	24.94	25.17
10M	64QAM	1	1	23.95	23.93	23.98
10M	256QAM	1	1	20.71	20.69	20.79
BW	MCS Index	Channel		342500	349000	355500
		Frequency (MHz)		1712.5	1745	1777.5
5M	$\pi/2$ BPSK	1	1	25.91	25.75	26.01
5M	QPSK	1	1	26.05	25.94	26.06
		1	13	25.94	25.84	26.01
		1	23	25.81	25.67	25.98
		12	0	25.00	24.90	25.14
		12	7	25.81	25.58	25.89
		12	13	24.89	24.67	24.92
		25	0	24.95	24.88	25.04
5M	16QAM	1	1	25.04	24.97	25.16
5M	64QAM	1	1	23.93	23.91	24.04
5M	256QAM	1	1	20.66	20.62	20.79

*EIRP = Conducted + antenna gain (2.3dBi)

LTE Band 5						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		20450	20525	20600
		Frequency (MHz)		829	836.5	844
10M	QPSK	1	0	18.01	18.01	18.03
		1	24	18.00	17.95	18.00
		1	49	17.80	17.79	17.95
		25	0	16.99	17.06	17.16
		25	12	17.10	16.92	17.15
		25	25	16.93	16.99	17.13
		50	0	17.06	16.92	17.02
10M	16QAM	1	0	16.98	16.96	16.98
		1	24	17.01	16.93	16.98
		1	49	17.08	17.16	17.15
		25	0	16.20	16.00	16.11
		25	12	16.09	16.03	15.87
		25	25	15.85	15.97	16.15
		50	0	15.92	16.17	16.04
10M	64QAM	1	0	15.78	15.97	15.97
		1	24	15.82	15.79	15.95
		1	49	15.85	15.68	15.79
		25	0	14.99	14.81	14.87
		25	12	14.86	14.84	14.76
		25	25	15.15	15.07	14.97
		50	0	14.93	14.95	14.83
10M	256QAM	1	0	13.06	13.05	13.13
		1	24	12.86	13.06	13.01
		1	49	12.97	13.21	12.98
		25	0	12.89	12.84	12.78
		25	12	12.87	13.10	13.01
		25	25	12.84	12.94	12.76
		50	0	13.04	13.10	13.12

*ERP = Conducted + antenna gain (-3.5dBi)-2.15

LTE Band 5						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		20425	20525	20625
		Frequency (MHz)		826.5	836.5	846.5
5M	QPSK	1	0	17.83	17.89	17.82
		1	12	17.87	17.76	17.71
		1	24	17.88	17.81	17.74
		12	0	16.93	16.80	16.83
		12	6	16.86	17.02	16.79
		12	13	16.92	16.83	16.63
		25	0	16.98	17.11	16.79
5M	16QAM	1	0	17.04	17.04	16.83
		1	12	17.08	16.98	16.83
		1	24	16.93	17.06	16.70
		12	0	16.07	16.00	16.01
		12	6	16.02	15.77	16.03
		12	13	16.00	15.97	15.93
		25	0	15.68	15.97	15.77
5M	64QAM	1	0	15.80	15.65	15.58
		1	12	15.66	15.60	15.62
		1	24	15.56	15.86	15.63
		12	0	14.86	14.78	14.78
		12	6	14.76	14.77	14.80
		12	13	15.06	14.82	14.73
		25	0	14.69	14.90	14.67
5M	256QAM	1	0	13.00	13.02	12.93
		1	12	12.83	13.03	12.98
		1	24	12.88	12.87	12.99
		12	0	12.78	12.83	12.81
		12	6	12.90	13.02	13.00
		12	13	12.85	12.78	12.95
		25	0	12.79	12.87	12.98

*ERP = Conducted + antenna gain (-3.5dBi)-2.15

LTE Band 5						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		20415	20525	20635
		Frequency (MHz)		825.5	836.5	847.5
3M	QPSK	1	0	17.83	17.82	17.84
		1	7	17.70	17.83	17.67
		1	14	17.63	17.84	17.63
		8	0	16.79	16.90	16.69
		8	3	16.89	17.03	16.75
		8	7	17.04	17.03	16.86
		15	0	16.77	16.74	16.85
3M	16QAM	1	0	16.98	16.89	16.97
		1	7	16.98	17.09	16.94
		1	14	16.77	16.66	17.01
		8	0	15.80	15.81	16.02
		8	3	15.77	16.08	15.86
		8	7	15.92	15.92	15.82
		15	0	15.83	15.88	15.77
3M	64QAM	1	0	15.89	15.74	15.52
		1	7	15.46	15.55	15.68
		1	14	15.86	15.74	15.71
		8	0	14.69	15.06	14.70
		8	3	14.84	14.85	14.72
		8	7	14.66	15.02	14.88
		15	0	14.89	14.88	14.60
3M	256QAM	1	0	12.87	12.84	12.74
		1	7	12.69	12.86	12.85
		1	14	12.89	12.98	12.85
		8	0	12.69	13.04	12.99
		8	3	12.85	12.84	12.73
		8	7	12.71	12.68	12.91
		15	0	13.02	12.89	12.73

*ERP = Conducted + antenna gain (-3.5dBi)-2.15

LTE Band 5						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		20407	20525	20643
		Frequency (MHz)		824.7	836.5	848.3
1.4M	QPSK	1	0	17.85	17.86	17.93
		1	2	17.81	17.71	17.86
		1	5	17.60	17.68	17.68
		3	0	17.81	17.93	17.85
		3	1	17.76	17.91	17.86
		3	3	17.89	17.85	17.87
		6	0	16.70	16.85	16.78
1.4M	16QAM	1	0	16.85	16.93	16.70
		1	2	17.09	16.95	16.80
		1	5	16.83	16.74	16.72
		3	0	16.92	16.79	16.81
		3	1	16.85	16.95	16.81
		3	3	16.85	17.11	16.68
		6	0	15.70	15.91	15.85
1.4M	64QAM	1	0	15.87	15.80	15.87
		1	2	15.59	15.74	15.65
		1	5	15.68	15.86	15.74
		3	0	15.68	15.76	15.97
		3	1	15.79	15.96	15.79
		3	3	15.73	15.78	16.07
		6	0	14.72	14.98	14.66
1.4M	256QAM	1	0	12.91	13.14	12.81
		1	2	12.68	12.69	12.93
		1	5	13.02	13.08	12.89
		3	0	12.97	12.74	12.65
		3	1	12.90	12.83	12.84
		3	3	12.87	12.78	12.68
		6	0	12.80	13.16	13.02

*ERP = Conducted + antenna gain (-3.5dBi)-2.15

LTE Band 13				
BW	MCS Index	RB Size	RB Offset	Mid
		Channel		23230
		Frequency (MHz)		782
10M	QPSK	1	0	17.20
		1	24	17.72
		1	49	17.34
		25	0	16.24
		25	12	16.45
		25	25	16.22
		50	0	16.21
10M	16QAM	1	0	16.82
		1	24	17.10
		1	49	16.28
		25	0	15.55
		25	12	15.70
		25	25	15.27
		50	0	15.33
10M	64QAM	1	0	16.36
		1	24	16.49
		1	49	15.92
		25	0	15.38
		25	12	15.27
		25	25	15.33
		50	0	14.75
10M	256QAM	1	0	12.94
		1	24	13.31
		1	49	12.79
		25	0	12.62
		25	12	12.94
		25	25	12.62
		50	0	13.00

*ERP = Conducted + antenna gain (-3.4dBi)-2.15

LTE Band 13						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		23205	23230	23255
		Frequency (MHz)		779.5	782	784.5
5M	QPSK	1	0	17.19	17.23	17.18
		1	12	17.48	17.70	17.52
		1	24	17.20	17.22	17.17
		12	0	16.18	16.20	16.22
		12	6	16.46	16.31	16.20
		12	13	16.32	16.29	16.17
		25	0	16.20	16.29	16.21
5M	16QAM	1	0	16.72	16.66	16.88
		1	12	16.69	16.70	17.02
		1	24	16.20	16.29	16.24
		12	0	15.34	15.29	15.41
		12	6	15.59	15.65	15.49
		12	13	15.21	15.16	15.18
		25	0	15.18	15.20	15.22
5M	64QAM	1	0	16.82	16.62	16.32
		1	12	16.66	16.81	16.56
		1	24	15.71	15.76	15.42
		12	0	15.38	15.25	15.03
		12	6	15.25	15.30	15.28
		12	13	14.86	15.20	14.86
		25	0	14.90	14.78	14.48
5M	256QAM	1	0	12.47	12.37	12.80
		1	12	12.77	13.18	13.21
		1	24	12.89	12.88	12.66
		12	0	12.55	13.01	12.72
		12	6	12.98	12.76	12.82
		12	13	12.80	12.83	12.37
		25	0	12.62	12.60	13.07

*ERP = Conducted + antenna gain (-3.4dBi)-2.15

4.2 Modulation Characteristics Measurement

4.2.1 Limits of Modulation Characteristics Measurement

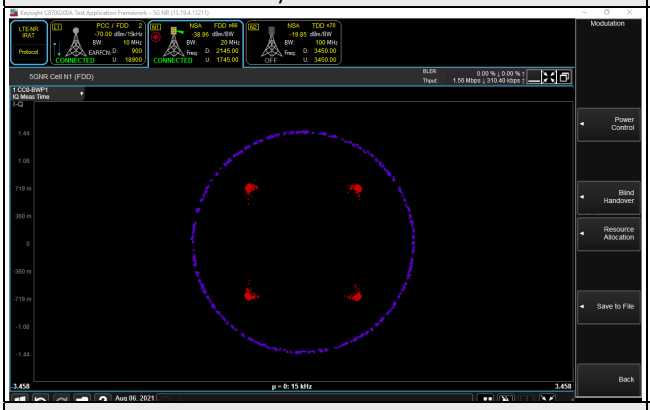
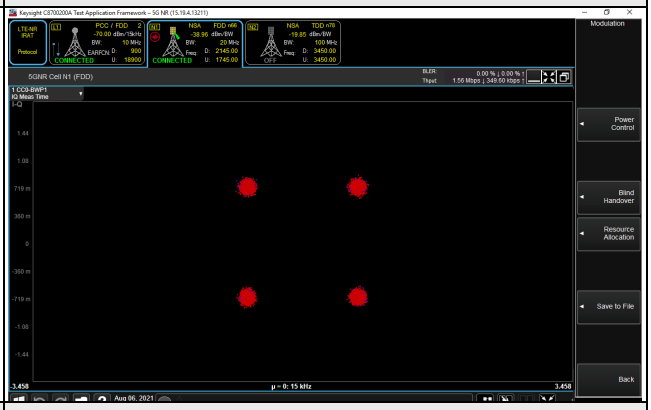
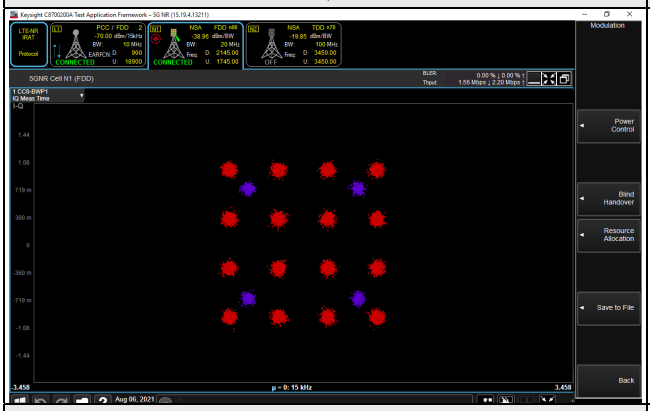
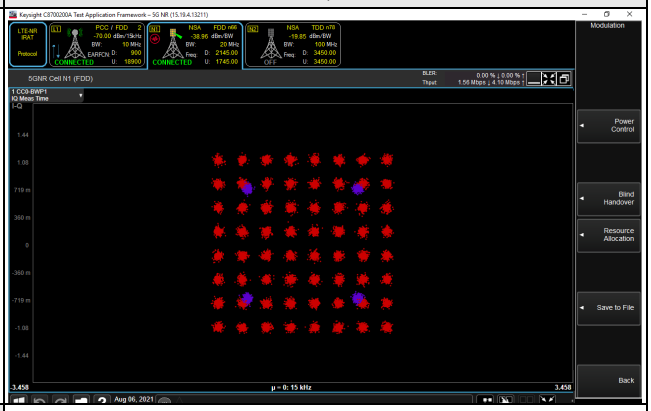
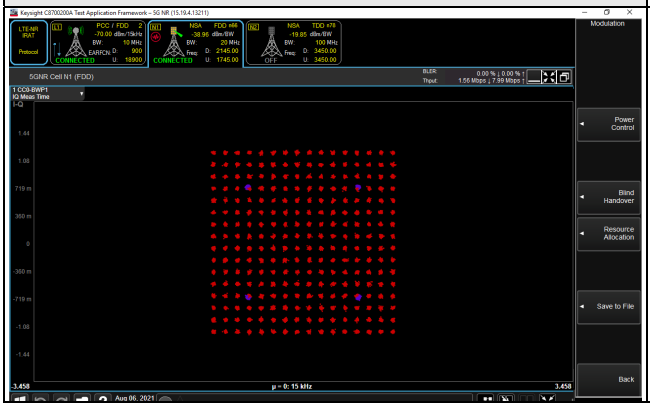
N/A

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

n66	
Spectrum Plot of Measurement Value	
Channel: 349000 / Frequency (MHz): 1745.0 MHz	
$\pi/2$ BPSK	QPSK
	
16QAM	64QAM
	
256QAM	
	

4.3 Frequency Stability Measurement

4.3.1 Limits of Frequency Stability Measurement

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

4.3.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
5G Wireless Test Platforms Keysight	E7515B	MY60102114	May 21, 2021	May 20, 2022
Temperature & Humidity Chamber TERCHY	HRM-120RF	931022	Dec. 24, 2020	Dec. 23, 2021
Digital Multimeter Fluke	87-III	70360742	Jun. 24, 2021	Jun. 23, 2022
DC Power Supply Topward	6306A	727263	NA	NA

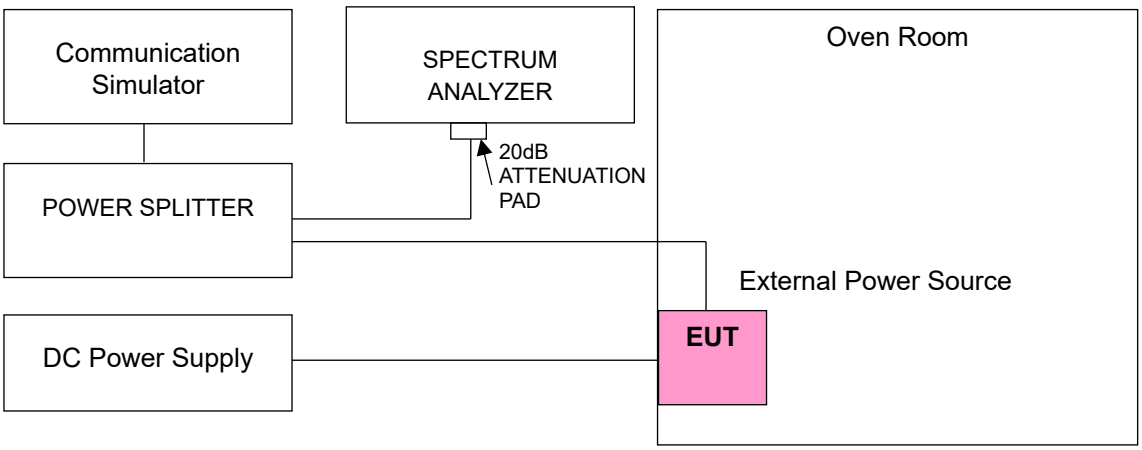
Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

4.3.3 Test Procedure

a. Device is placed at the oven room. The oven room could control the temperatures and humidity. Power warm up is at least 15 min and power applied should perform before recording frequency error.
b. EUT is connected the external power supply to control the DC input power. The test voltage range is from minimum to maximum working voltage. Each step shall be record the frequency error rate.
c. The temperature range step is 10 degrees in this test items. All temperature levels shall be hold the ±0.5 ℃ during the measurement testing. The each temperature step shall be at least 0.5 hours, consider the EUT could be test under the stability condition.

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

4.3.4 Test Setup



4.3.5 Test Results

Frequency Error vs. Voltage

Voltage (Vdc)	n66			
	Channel Bandwidth: 5 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
3.87	1712.500014	0.008	1777.500000	0.011
3.28	1712.500039	0.023	1777.500000	0.021
4.45	1712.500028	0.016	1777.500000	0.014

Note: The applicant defined the normal working voltage is from 3.28Vdc to 4.45Vdc.

Frequency Error vs. Temperature

Temp. (℃)	n66			
	Channel Bandwidth: 5 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	1712.500028	0.016	1777.500000	0.017
-20	1712.500027	0.016	1777.500000	0.017
-10	1712.500025	0.015	1777.500000	0.006
0	1712.500028	0.016	1777.500000	0.006
10	1712.500014	0.008	1777.500000	0.006
20	1712.499978	-0.013	1777.500000	-0.015
30	1712.499985	-0.009	1777.500000	-0.012
40	1712.499979	-0.012	1777.500000	-0.012
50	1712.499976	-0.014	1777.500000	-0.006
60	1712.499965	-0.020	1777.500000	-0.011

Frequency Error vs. Voltage

Voltage (Vdc)	n66			
	Channel Bandwidth: 10 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
3.87	1715.000027	0.016	1775.000020	0.011
3.28	1715.000039	0.023	1775.000013	0.007
4.45	1715.000030	0.018	1775.000015	0.008

Note: The applicant defined the normal working voltage is from 3.28Vdc to 4.45Vdc.

Frequency Error vs. Temperature

Temp. (℃)	n66			
	Channel Bandwidth: 10 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	1715.000033	0.019	1775.000020	0.011
-20	1715.000029	0.017	1775.000016	0.009
-10	1715.000026	0.015	1775.000037	0.021
0	1715.000040	0.023	1775.000030	0.017
10	1715.000032	0.019	1775.000010	0.006
20	1714.999964	-0.021	1774.999974	-0.015
30	1714.999986	-0.008	1774.999976	-0.014
40	1714.999974	-0.015	1774.999968	-0.018
50	1714.999987	-0.008	1774.999962	-0.021
60	1714.999975	-0.015	1774.999977	-0.013

Frequency Error vs. Voltage

Voltage (Vdc)	n66			
	Channel Bandwidth: 15 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
3.87	1717.500024	0.014	1772.500018	0.010
3.28	1717.500040	0.023	1772.500019	0.011
4.45	1717.500014	0.008	1772.500024	0.014

Note: The applicant defined the normal working voltage is from 3.28Vdc to 4.45Vdc.

Frequency Error vs. Temperature

Temp. (℃)	n66			
	Channel Bandwidth: 15 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	1717.500037	0.022	1772.500028	0.016
-20	1717.500035	0.020	1772.500025	0.014
-10	1717.500020	0.012	1772.500037	0.021
0	1717.500019	0.011	1772.500031	0.017
10	1717.500020	0.012	1772.500034	0.019
20	1717.499967	-0.019	1772.499977	-0.013
30	1717.499977	-0.013	1772.499968	-0.018
40	1717.499969	-0.018	1772.499974	-0.015
50	1717.499988	-0.007	1772.499985	-0.008
60	1717.499974	-0.015	1772.499978	-0.012

Frequency Error vs. Voltage

Voltage (Vdc)	n66			
	Channel Bandwidth: 20 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
3.87	1720.000034	0.020	1770.000019	0.011
3.28	1720.000022	0.013	1770.000012	0.007
4.45	1720.000017	0.010	1770.000012	0.007

Note: The applicant defined the normal working voltage is from 3.28Vdc to 4.45Vdc.

Frequency Error vs. Temperature

Temp. (℃)	n66			
	Channel Bandwidth: 20 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	1720.000014	0.008	1770.000036	0.020
-20	1720.000010	0.006	1770.000039	0.022
-10	1720.000018	0.011	1770.000022	0.012
0	1720.000013	0.008	1770.000022	0.012
10	1720.000035	0.020	1770.000024	0.014
20	1719.999980	-0.012	1769.999977	-0.013
30	1719.999979	-0.012	1769.999984	-0.009
40	1719.999987	-0.008	1769.999978	-0.012
50	1719.999971	-0.017	1769.999984	-0.009
60	1719.999976	-0.014	1769.999969	-0.017

4.4 Occupied Bandwidth Measurement

4.4.1 Limits of Occupied Bandwidth Measurement

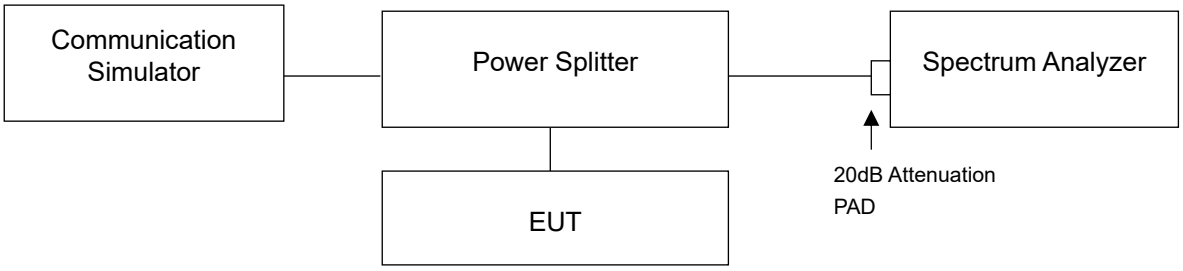
The occupied bandwidth (OBW), that is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 % of the total mean power radiated by a given emission.

4.4.2 Test Procedure

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. Measurement method, please refer to section 5.4.4 of ANSI C63.26. Use OBW measurement function of Spectrum analyzer to measure 99 % occupied bandwidth.

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

4.4.3 Test Setup

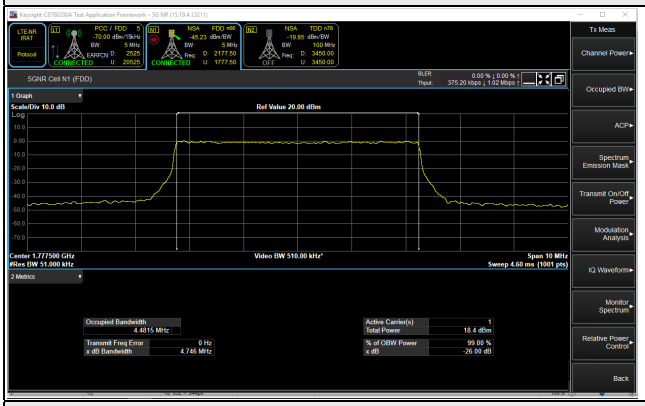
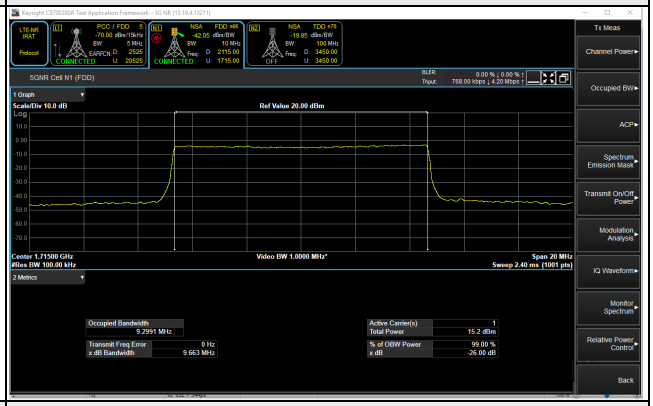
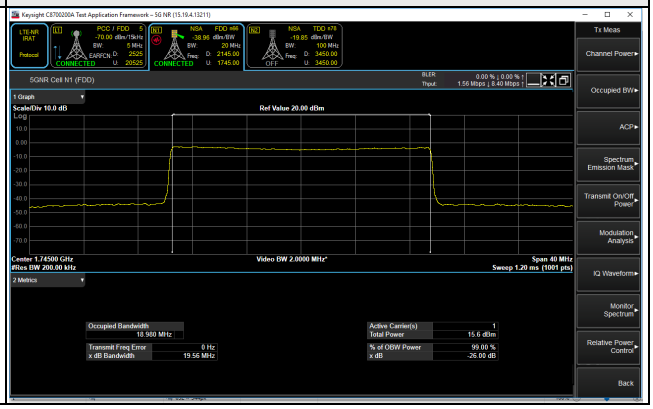


4.4.4 Test Result

Occupied Bandwidth

n66

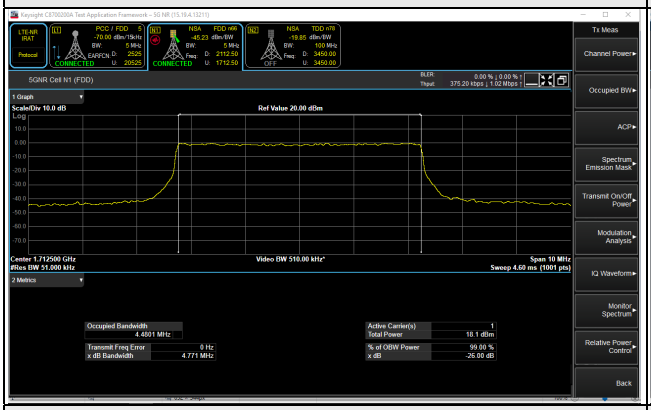
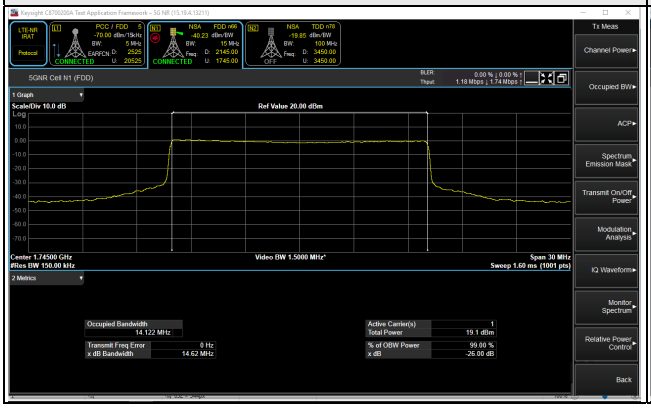
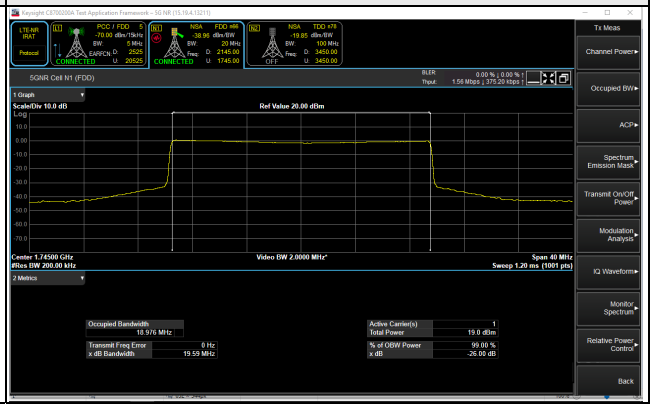
n66, Channel Bandwidth 5MHz						
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)				
		$\pi/2$ BPSK	QPSK	16QAM	64QAM	256QAM
342500	1712.5	4.48	4.47	4.47	4.48	4.47
349000	1745.0	4.47	4.47	4.47	4.48	4.47
355500	1777.5	4.47	4.47	4.47	4.48	4.47
n66, Channel Bandwidth 10MHz						
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)				
		$\pi/2$ BPSK	QPSK	16QAM	64QAM	256QAM
343000	1715.0	9.21	9.30	9.29	9.30	9.30
349000	1745.0	9.22	9.30	9.29	9.30	9.30
355000	1775.0	9.21	9.29	9.29	9.29	9.30
n66, Channel Bandwidth 15MHz						
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)				
		$\pi/2$ BPSK	QPSK	16QAM	64QAM	256QAM
343500	1717.5	13.99	14.13	14.12	14.12	14.13
349000	1745.0	14.05	14.13	14.12	14.13	14.13
354500	1772.5	14.05	14.12	14.12	14.12	14.12
n66, Channel Bandwidth 20MHz						
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)				
		$\pi/2$ BPSK	QPSK	16QAM	64QAM	256QAM
344000	1720.0	18.68	18.97	18.97	18.97	18.97
349000	1745.0	18.88	18.98	18.98	18.98	18.98
354000	1770.0	18.81	18.92	18.91	18.92	18.92

Spectrum Plot of Worst Value	
5MHz / 64QAM	10MHz / 256QAM
	
15MHz / 256QAM	20MHz / 256QAM
	

26dB Bandwidth

n66

n66, Channel Bandwidth 5MHz						
Channel	Frequency (MHz)	26dB Bandwidth (MHz)				
		$\pi/2$ BPSK	QPSK	16QAM	64QAM	256QAM
342500	1712.5	4.76	4.73	4.73	4.77	4.71
349000	1745.0	4.75	4.76	4.73	4.76	4.71
355500	1777.5	4.75	4.75	4.73	4.75	4.70
n66, Channel Bandwidth 10MHz						
Channel	Frequency (MHz)	26dB Bandwidth (MHz)				
		$\pi/2$ BPSK	QPSK	16QAM	64QAM	256QAM
343000	1715.0	9.27	9.66	9.65	9.66	9.66
349000	1745.0	9.28	9.65	9.66	9.65	9.67
355000	1775.0	9.28	9.65	9.61	9.64	9.64
n66, Channel Bandwidth 15MHz						
Channel	Frequency (MHz)	26dB Bandwidth (MHz)				
		$\pi/2$ BPSK	QPSK	16QAM	64QAM	256QAM
343500	1717.5	13.89	14.60	14.61	14.59	14.58
349000	1745.0	13.88	14.61	14.62	14.61	14.60
354500	1772.5	13.89	14.61	14.61	14.60	14.59
n66, Channel Bandwidth 20MHz						
Channel	Frequency (MHz)	26dB Bandwidth (MHz)				
		$\pi/2$ BPSK	QPSK	16QAM	64QAM	256QAM
344000	1720.0	18.48	19.57	19.56	19.55	19.54
349000	1745.0	18.51	19.59	19.58	19.56	19.56
354000	1770.0	18.48	19.57	19.57	19.56	19.56

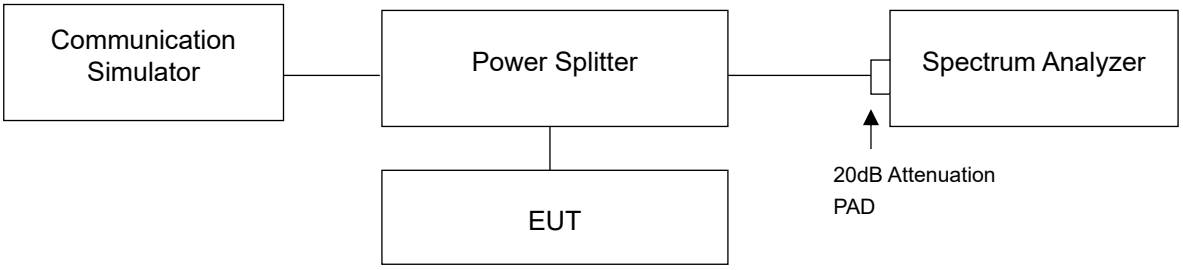
Spectrum Plot of Worst Value	
5MHz / 64QAM	10MHz / 256QAM
	
15MHz / 16QAM	20MHz / QPSK
	

4.5 Band Edge Measurement

4.5.1 Limits of Band Edge Measurement

Power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB. In the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed.

4.5.2 Test Setup

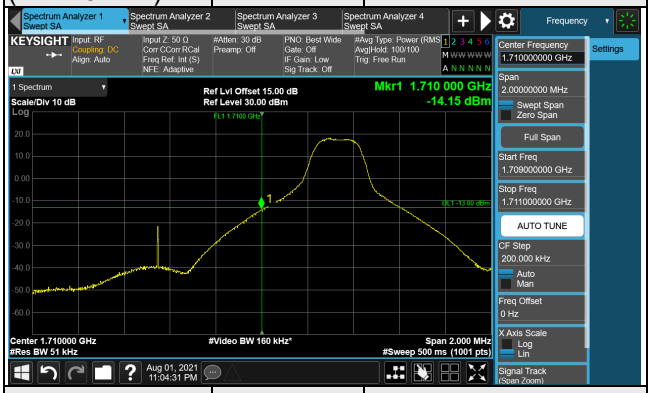
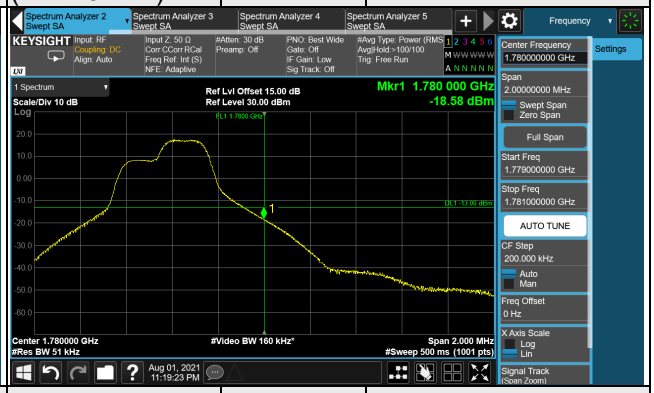
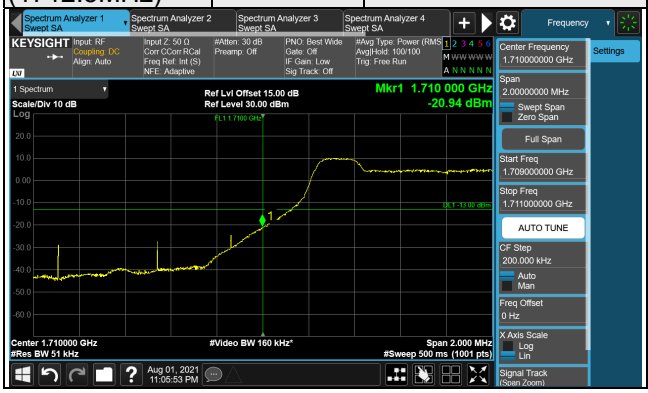


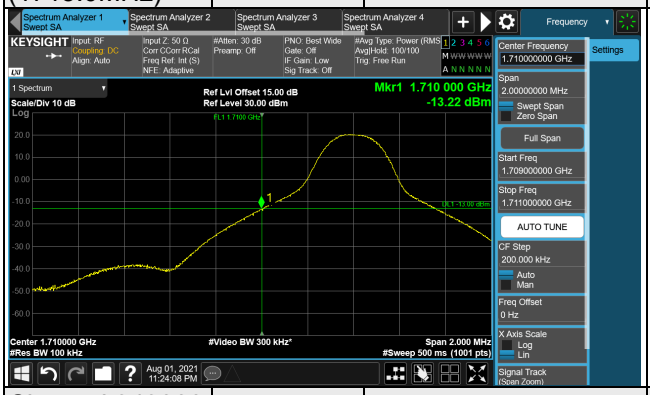
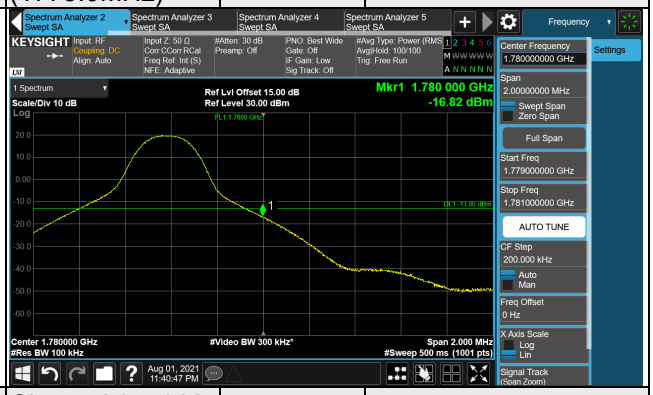
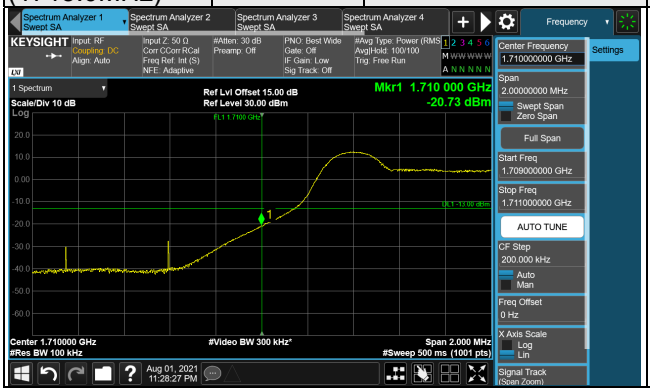
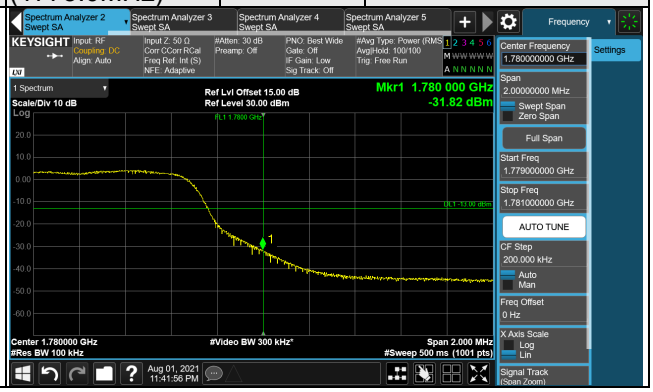
4.5.3 Test Procedures

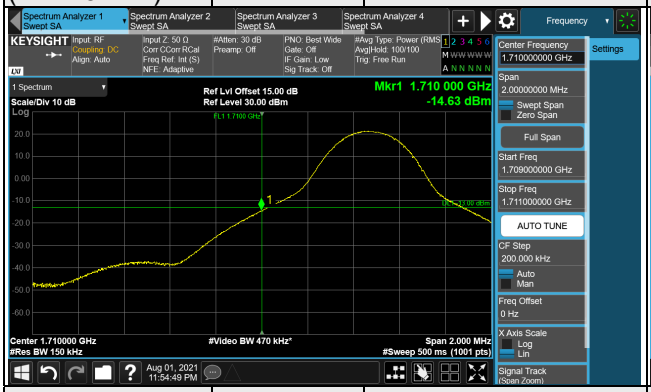
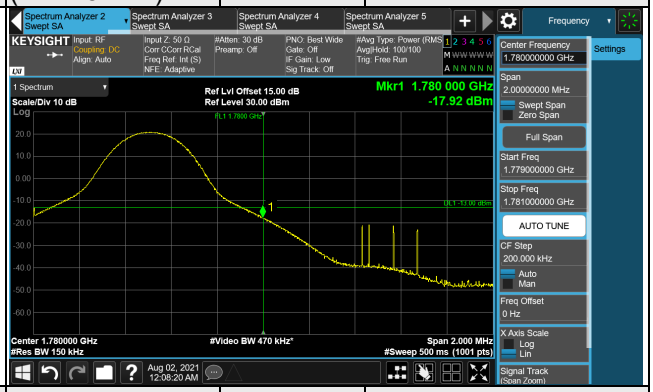
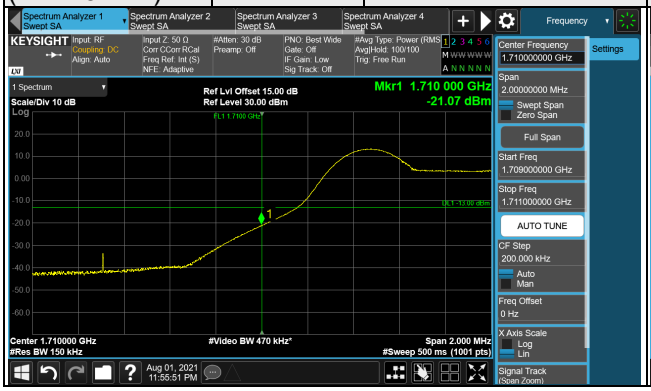
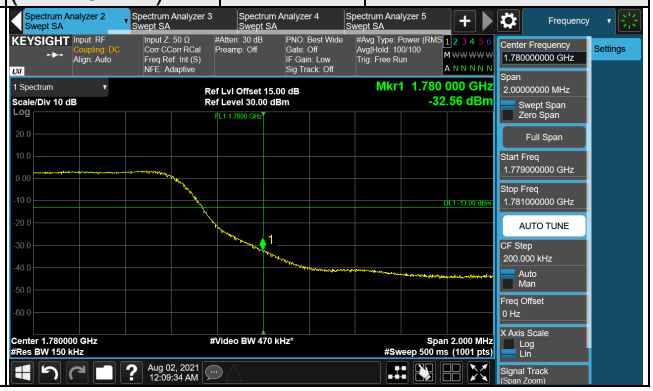
a. All measurements were done at low and high operational frequency range.
b. The center frequency of spectrum is the band edge frequency and span is 2MHz. RB of the spectrum is 51kHz and VB of the spectrum is 160kHz (5GNR Channel Bandwidth 5MHz).
c. The center frequency of spectrum is the band edge frequency and span is 2MHz. RB of the spectrum is 100kHz and VB of the spectrum is 300kHz (5GNR Channel Bandwidth 10MHz).
d. The center frequency of spectrum is the band edge frequency and span is 2MHz. RB of the spectrum is 150kHz and VB of the spectrum is 470kHz (5GNR Channel Bandwidth 15MHz).
e. The center frequency of spectrum is the band edge frequency and span is 2MHz. RB of the spectrum is 200kHz and VB of the spectrum is 620kHz (5GNR Channel Bandwidth 20MHz).
f. The emission operations in the 40 MHz channel BW mode of 5GNR, the 1% range channel edge using a 300 kHz bandwidth on the spectrum analyzer, the correction factor is further improved by 10 log(400/300) = 1.25dB, the spectrum reading value is added with the correction factor to determine whether the limit is met. Measurement method refers to ANSI C63.26 section 5.7.2.

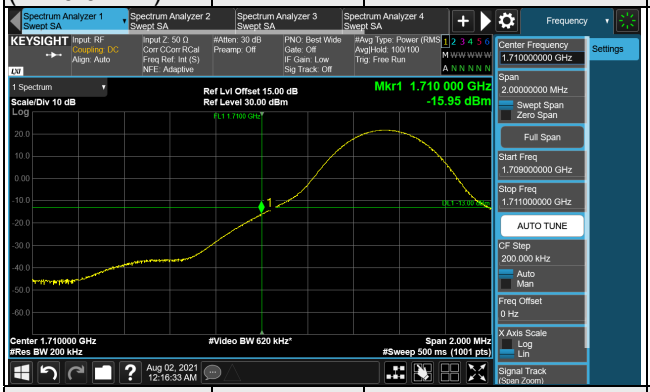
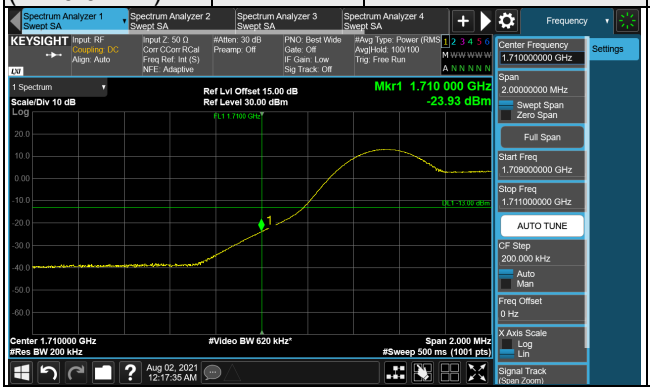
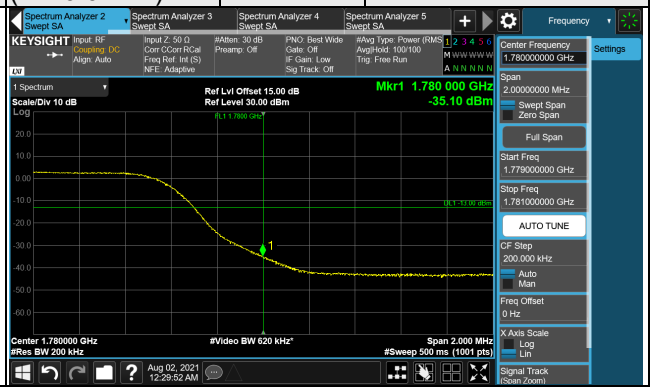
4.5.4 Test Results

n66
Band edge:

Channel Bandwidth: 5MHz					
Channel 342500 (1712.5MHz)	QPSK	1 RB / 0 RB Offset	Channel 355500 (1777.5MHz)	QPSK	1 RB / 23 RB Offset
					
Channel 342500 (1712.5MHz)	QPSK	25 RB / 0 RB Offset	Channel 355500 (1777.5MHz)	QPSK	25 RB / 0 RB Offset
					

Channel Bandwidth: 10MHz					
Channel 343000 (1715.0MHz)	QPSK	1 RB / 0 RB Offset	Channel 355000 (1775.0MHz)	QPSK	1 RB / 50 RB Offset
					
Channel 343000 (1715.0MHz)	QPSK	50 RB / 0 RB Offset	Channel 355000 (1775.0MHz)	QPSK	50 RB / 0 RB Offset
					

Channel Bandwidth: 15MHz					
Channel 343500 (1717.5MHz)	QPSK	1 RB / 0 RB Offset	Channel 354500 (1772.5MHz)	QPSK	1 RB / 77 RB Offset
					
Channel 343500 (1717.5MHz)	QPSK	75 RB / 0 RB Offset	Channel 354500 (1772.5MHz)	QPSK	75 RB / 0 RB Offset
					

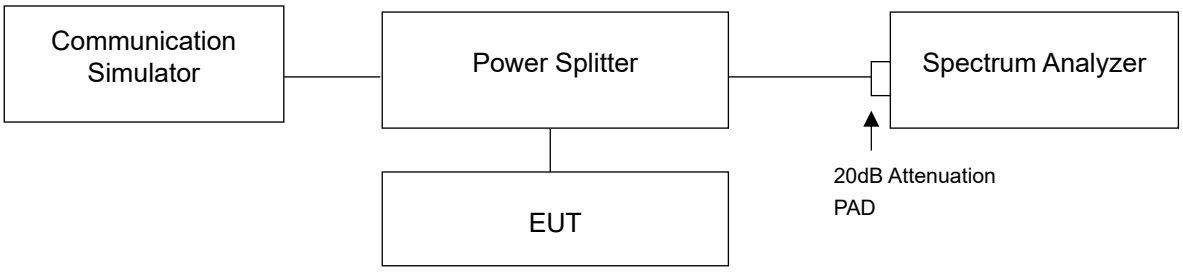
Channel Bandwidth: 20MHz					
Channel 344000 (1720.0MHz)	QPSK	1 RB / 0 RB Offset	Channel 354000 (1770.0MHz)	QPSK	1 RB / 104 RB Offset
					
Channel 344000 (1720.0MHz)	QPSK	100 RB / 0 RB Offset	Channel 354000 (1770.0MHz)	QPSK	100 RB / 0 RB Offset
					

4.6 Peak to Average Ratio

4.6.1 Limits of Peak to Average Ratio Measurement

In measuring transmissions in this band using an average power technique, the peak to-average ratio (PAR) of the transmission may not exceed 13 dB

4.6.2 Test Setup



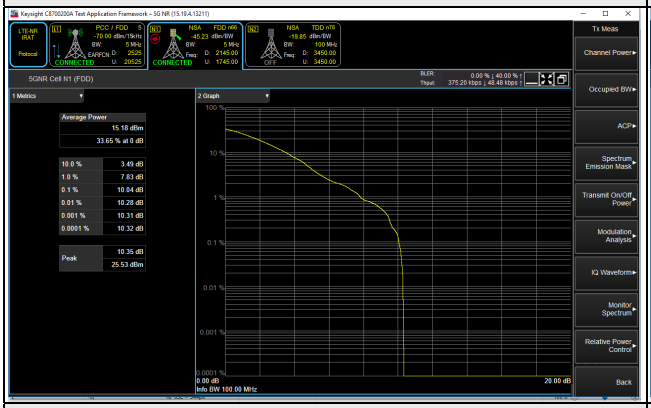
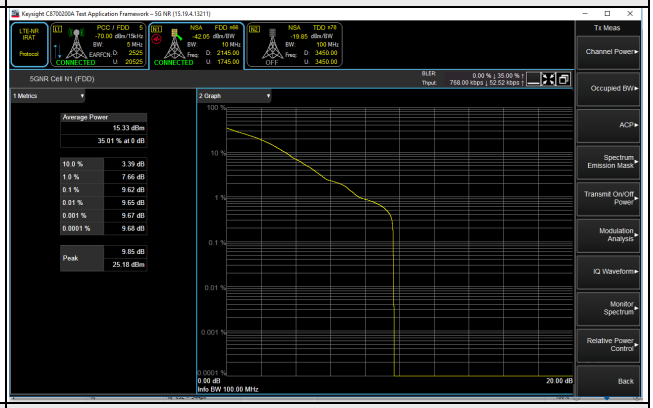
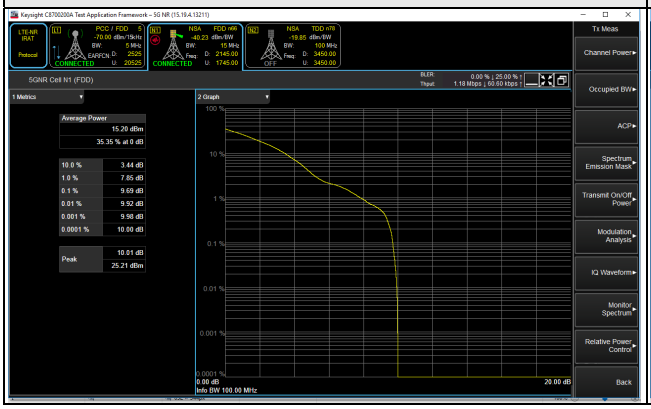
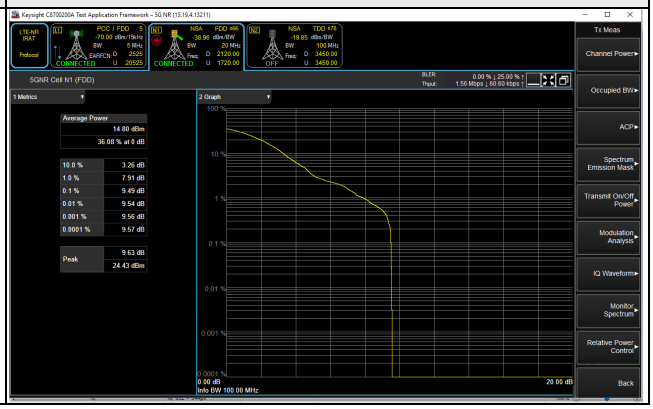
4.6.3 Test Procedures

a. Set resolution/measurement bandwidth ≥ signal's occupied bandwidth;
b. Set the number of counts to a value that stabilizes the measured CCDF curve;
c. Record the maximum PAPR level associated with a probability of 0.1%.

4.6.4 Test Results

n66

n66, Channel Bandwidth 5MHz						
Channel	Frequency (MHz)	Peak To Average Ratio (dB)				
		$\pi/2$ BPSK	QPSK	16QAM	64QAM	256QAM
342500	1712.5	3.28	6.62	6.49	6.81	9.55
349000	1745.0	3.50	7.07	7.13	7.25	10.04
355500	1777.5	3.39	6.98	6.64	7.32	9.68
n66, Channel Bandwidth 10MHz						
Channel	Frequency (MHz)	Peak To Average Ratio (dB)				
		$\pi/2$ BPSK	QPSK	16QAM	64QAM	256QAM
343000	1715.0	3.28	5.86	6.46	6.63	9.48
349000	1745.0	3.47	6.07	6.77	6.72	9.62
355000	1775.0	3.33	6.05	6.64	7.13	8.51
n66, Channel Bandwidth 15MHz						
Channel	Frequency (MHz)	Peak To Average Ratio (dB)				
		$\pi/2$ BPSK	QPSK	16QAM	64QAM	256QAM
343500	1717.5	3.30	5.90	6.38	6.73	9.48
349000	1745.0	3.44	6.21	7.20	7.27	9.69
354500	1772.5	3.34	5.80	6.53	7.12	8.97
n66, Channel Bandwidth 20MHz						
Channel	Frequency (MHz)	Peak To Average Ratio (dB)				
		$\pi/2$ BPSK	QPSK	16QAM	64QAM	256QAM
344000	1720.0	3.30	5.94	6.31	6.47	9.49
349000	1745.0	3.45	6.65	6.50	6.54	8.99
354000	1770.0	3.32	6.64	6.12	6.67	8.81

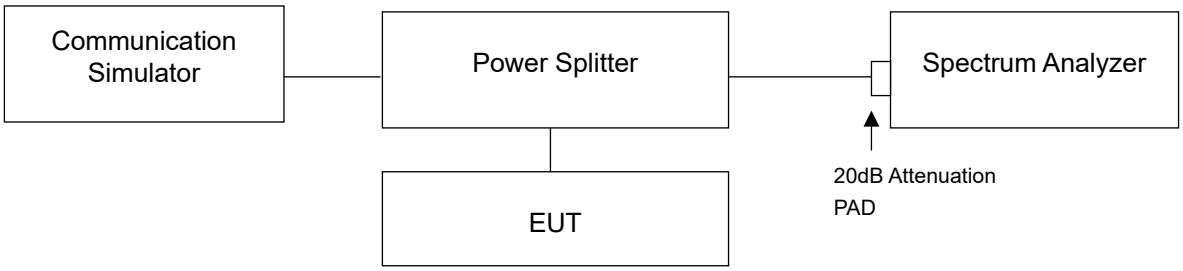
Spectrum Plot of Worst Value	
5MHz / 256QAM	10MHz / 256QAM
	
15MHz / 256QAM	20MHz / 256QAM
	

4.7 Conducted Spurious Emissions

4.7.1 Limits of Conducted Spurious Emissions Measurement

For n66:
In the FCC 27.53(h),On any frequency outside a licensee's frequency block, The power of any emission shall be attenuated below the transmitter power (P) by at least 43 + 10 log (P) dB. The emission limit equal to –13dBm.

4.7.2 Test Setup

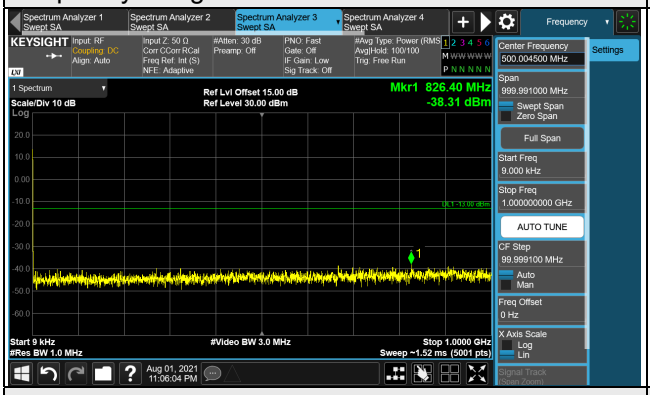
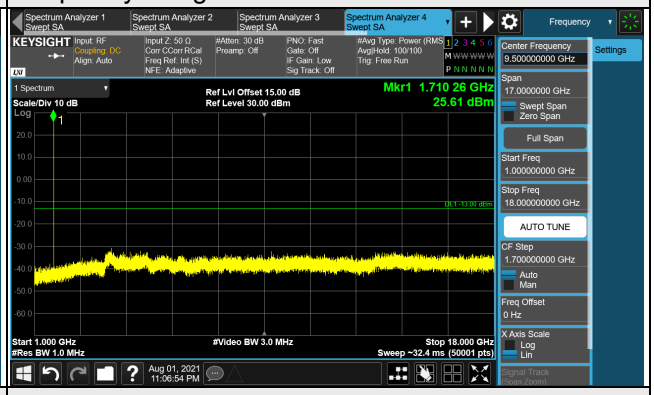
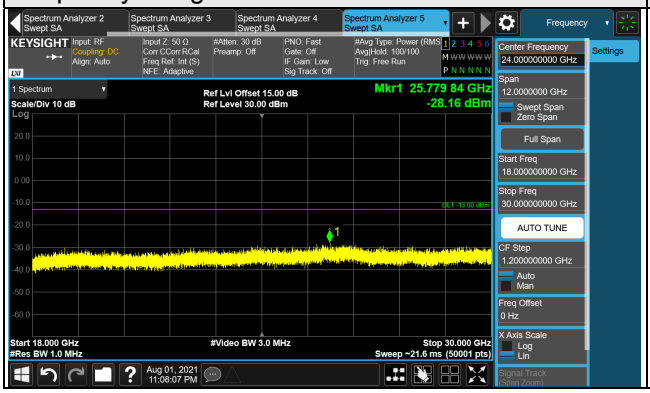


4.7.3 Test Procedure

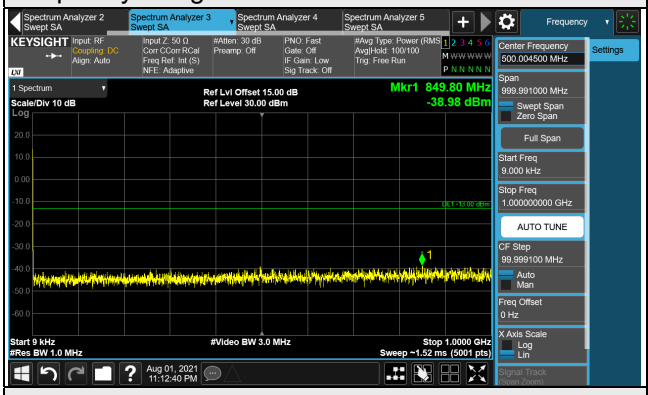
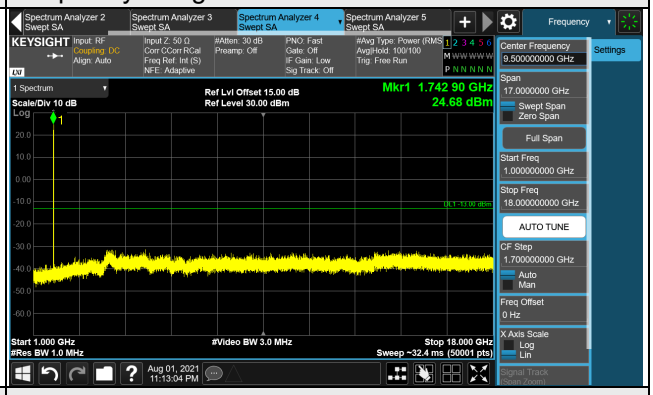
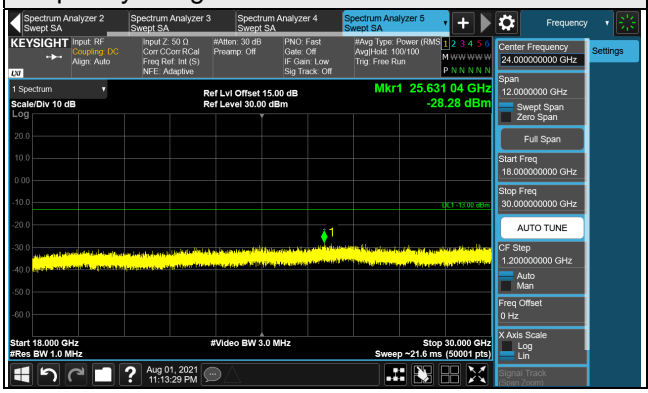
a. The EUT makes a phone call to the communication simulator. All measurements were done at low, middle and high operational frequency range.
b. Measuring frequency range is from 9kHz to 20GHz. 20dB attenuation pad is connected with spectrum. RBW=1MHz and VBW=3MHz from 9kHz to 20GHz is used for conducted emission measurement.

4.7.4 Test Results

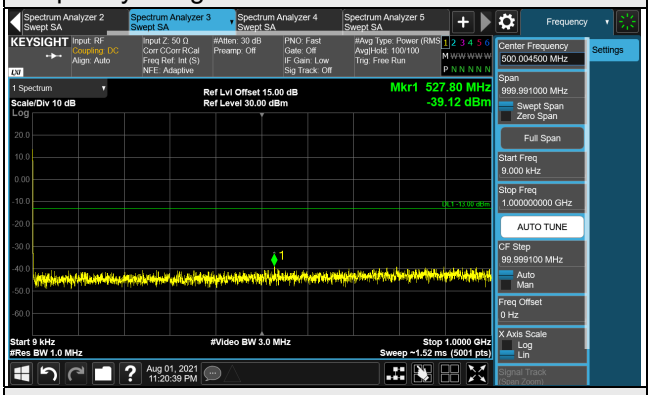
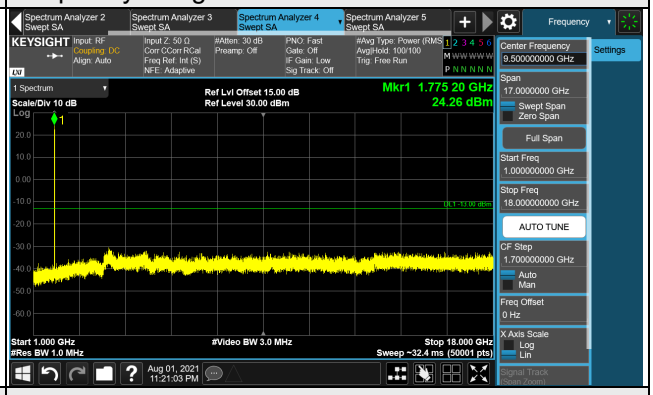
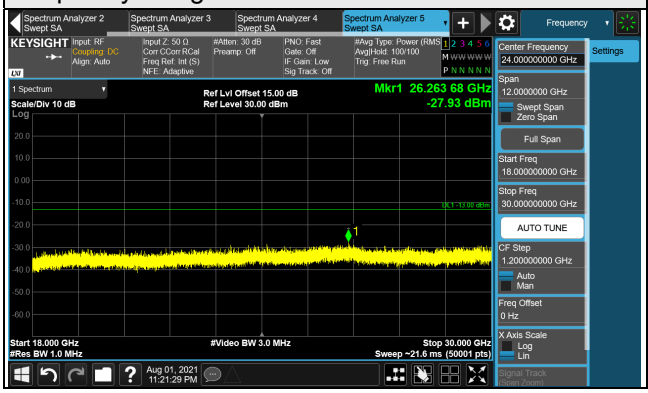
n66

Channel Bandwidth: 5MHz	
Channel 342500 (1712.5MHz)	
Frequency Range : 9kHz~1GHz	Frequency Range : 1GHz~18GHz
	
Frequency Range : 18GHz~30GHz	
	

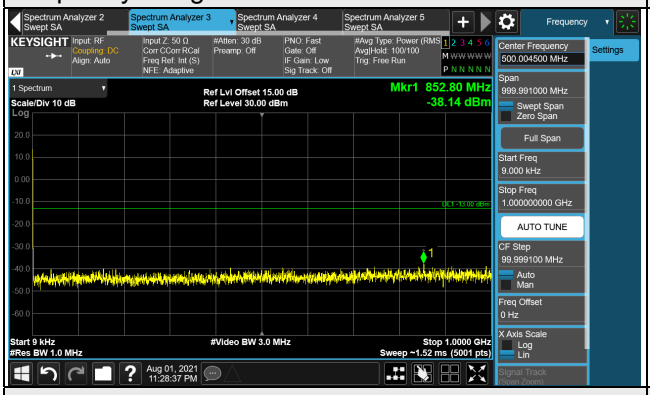
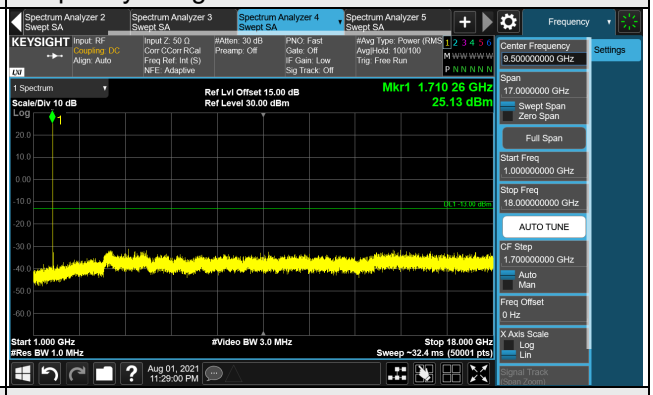
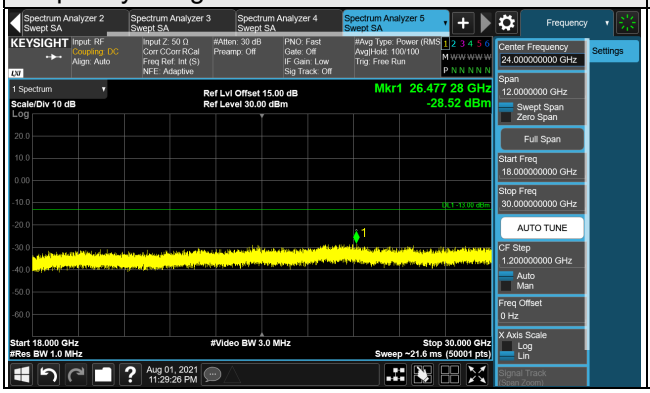
*The 9 kHz tone is from the spectrum analyzer.

Channel 349000 (1745.0MHz)	
Frequency Range : 9kHz~1GHz	Frequency Range : 1GHz~18GHz
	
Frequency Range : 18GHz~30GHz	
	

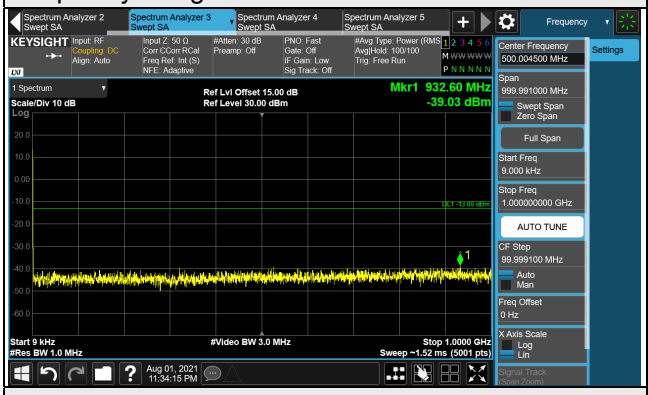
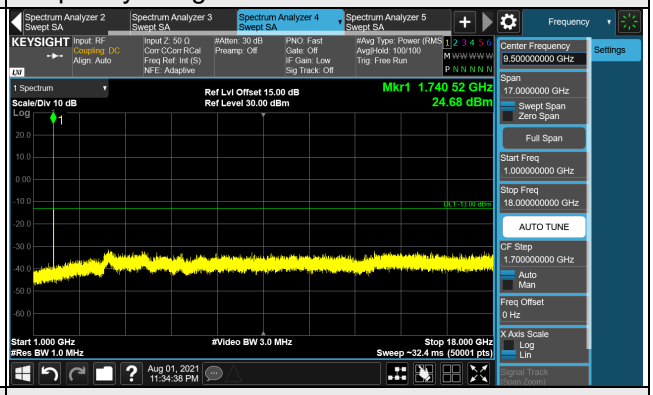
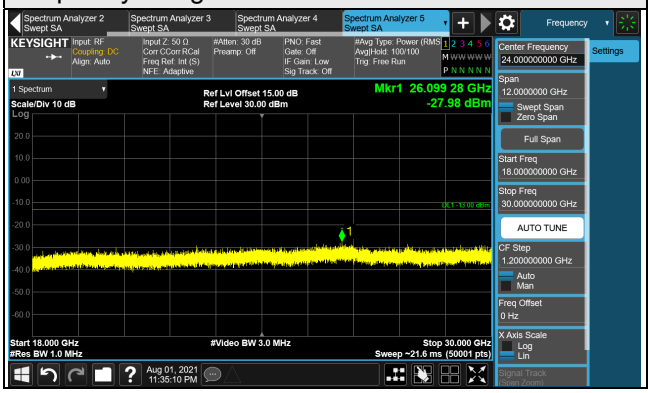
*The 9 kHz tone is from the spectrum analyzer.

Channel 355500 (1777.5MHz)	
Frequency Range : 9kHz~1GHz	Frequency Range : 1GHz~18GHz
	
Frequency Range : 18GHz~30GHz	
	

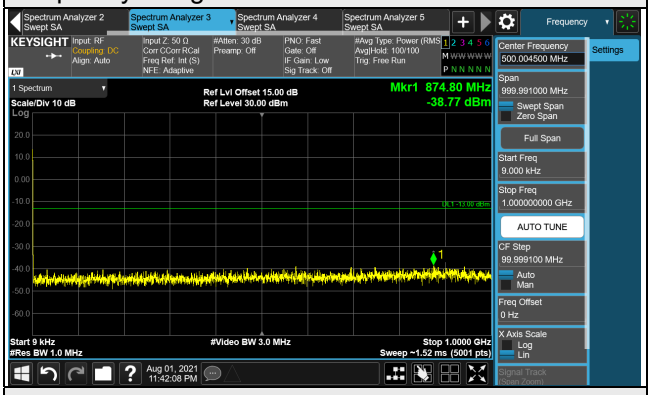
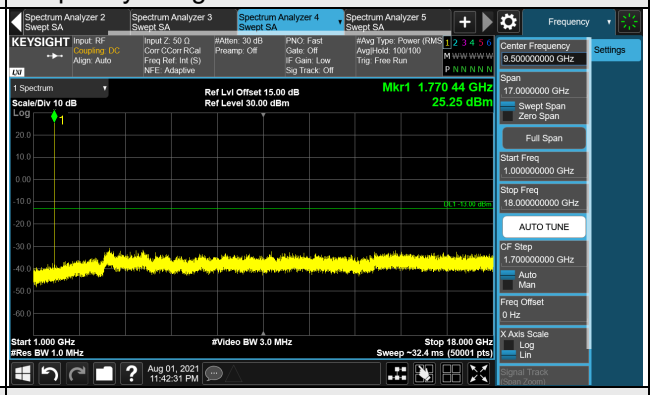
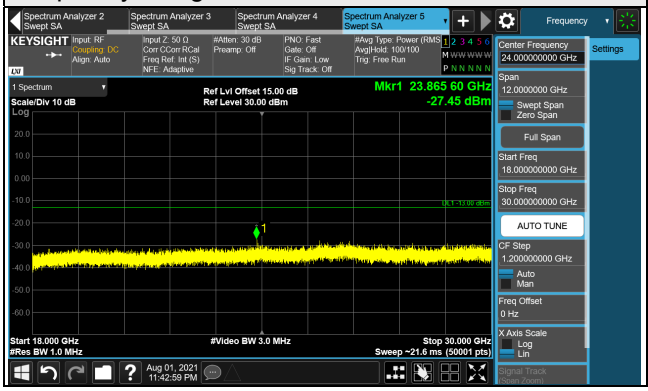
*The 9 kHz tone is from the spectrum analyzer.

Channel Bandwidth: 10MHz	
Channel 343000 (1715.0MHz)	
Frequency Range : 9kHz~1GHz	Frequency Range : 1GHz~18GHz
	
Frequency Range : 18GHz~30GHz	
	

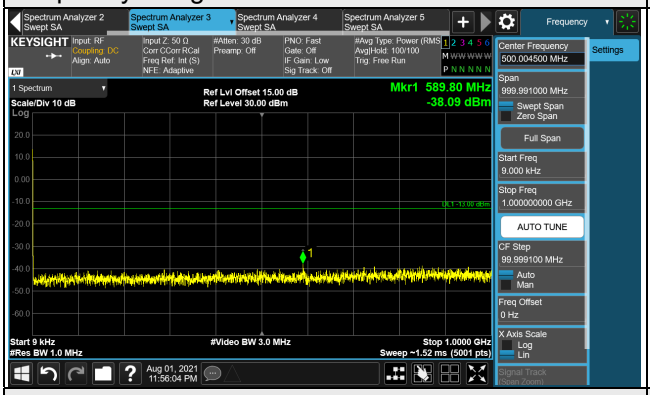
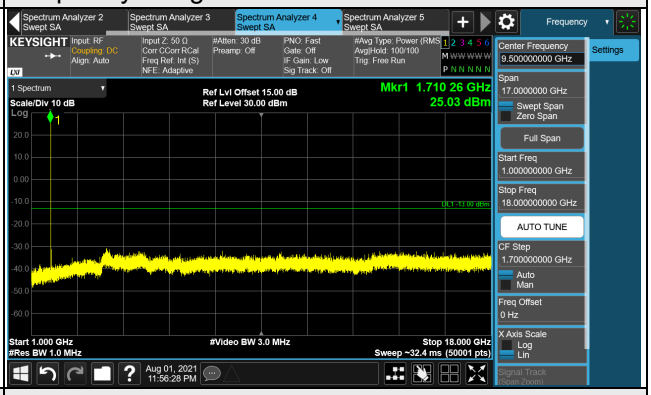
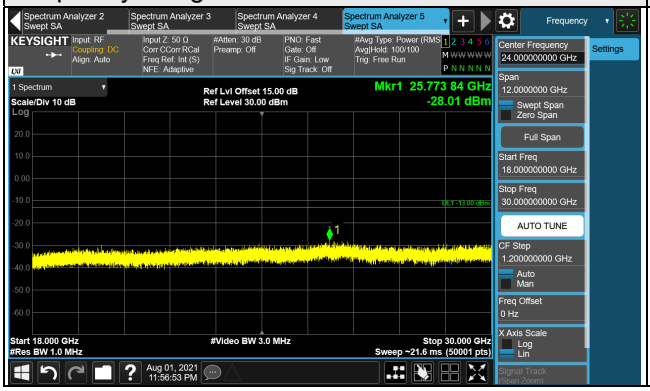
*The 9 kHz tone is from the spectrum analyzer.

Channel 349000 (1745.0MHz)	
Frequency Range : 9kHz~1GHz	Frequency Range : 1GHz~18GHz
	
Frequency Range : 18GHz~30GHz	
	

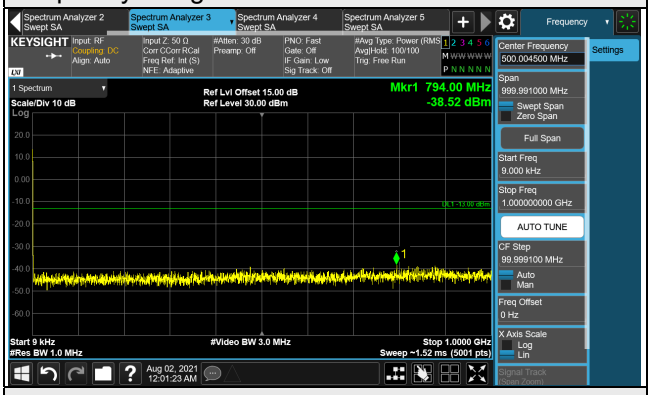
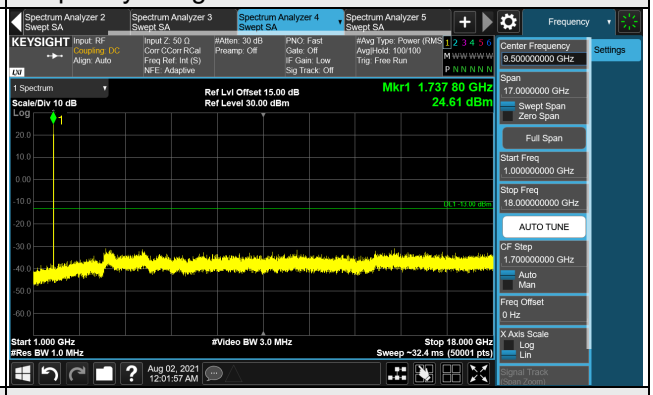
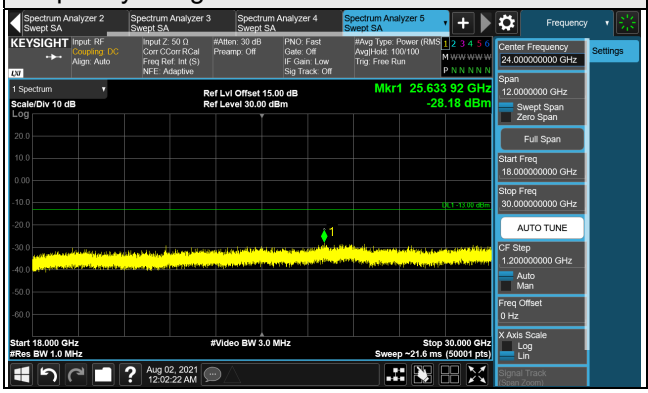
*The 9 kHz tone is from the spectrum analyzer.

Channel 355000 (1775.0MHz)	
Frequency Range : 9kHz~1GHz	Frequency Range : 1GHz~18GHz
	
Frequency Range : 18GHz~30GHz	
	

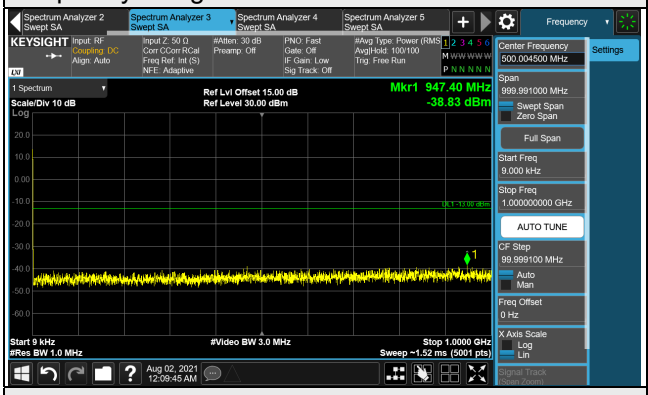
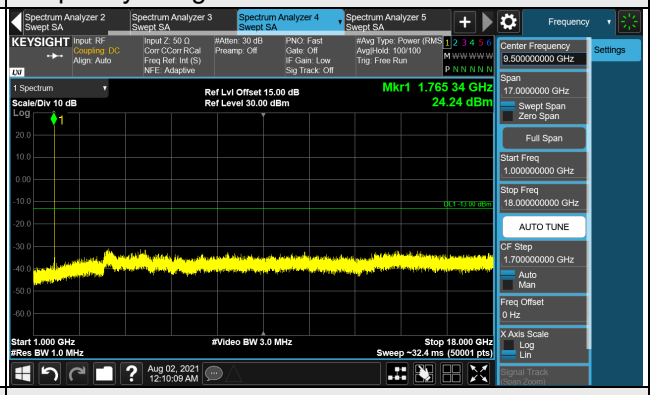
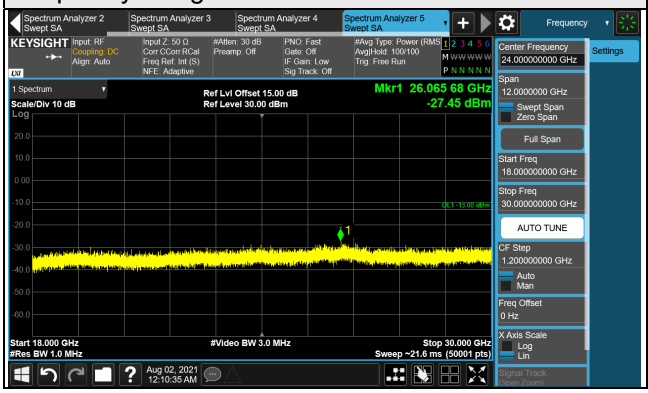
*The 9 kHz tone is from the spectrum analyzer.

Channel Bandwidth: 15MHz	
Channel 343500 (1717.5MHz)	
Frequency Range : 9kHz~1GHz	Frequency Range : 1GHz~18GHz
	
Frequency Range : 18GHz~30GHz	
	

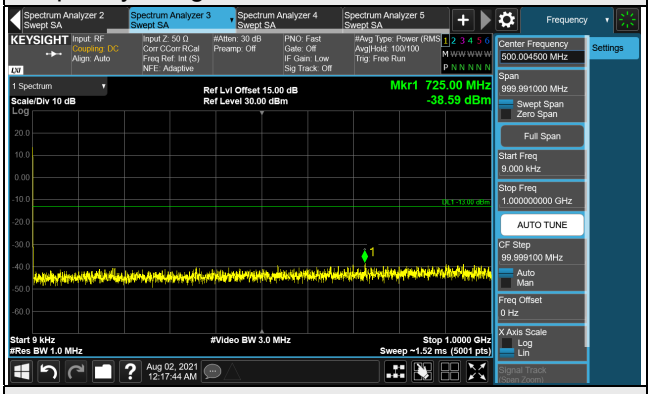
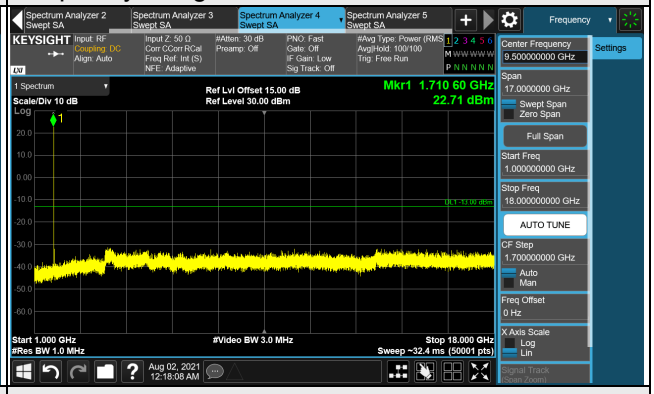
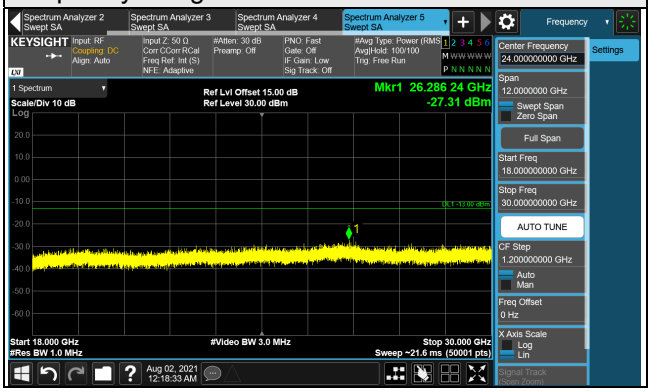
*The 9 kHz tone is from the spectrum analyzer.

Channel 349000 (1745.0MHz)	
Frequency Range : 9kHz~1GHz	Frequency Range : 1GHz~18GHz
	
Frequency Range : 18GHz~30GHz	
	

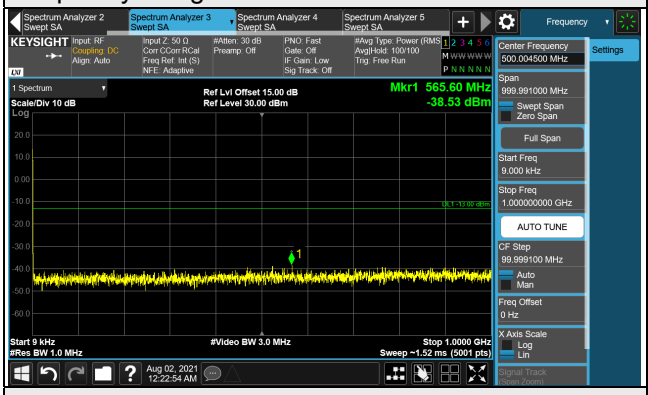
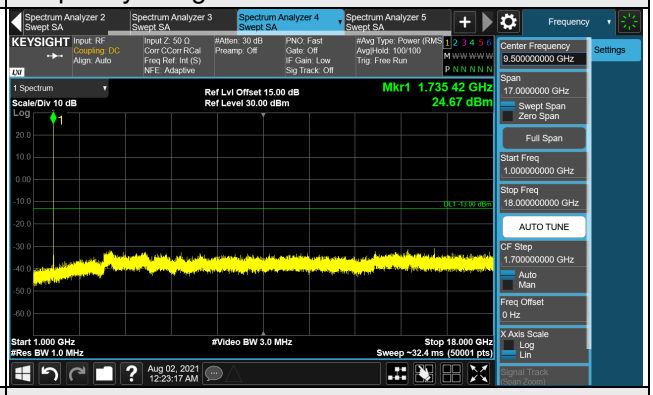
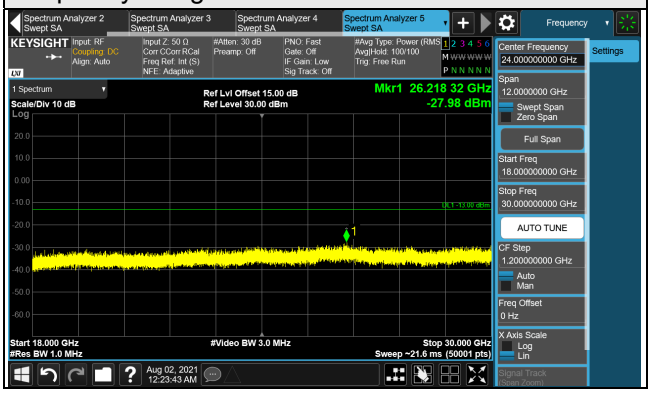
*The 9 kHz tone is from the spectrum analyzer.

Channel 354500 (1772.5MHz)	
Frequency Range : 9kHz~1GHz	Frequency Range : 1GHz~18GHz
	
Frequency Range : 18GHz~30GHz	
	

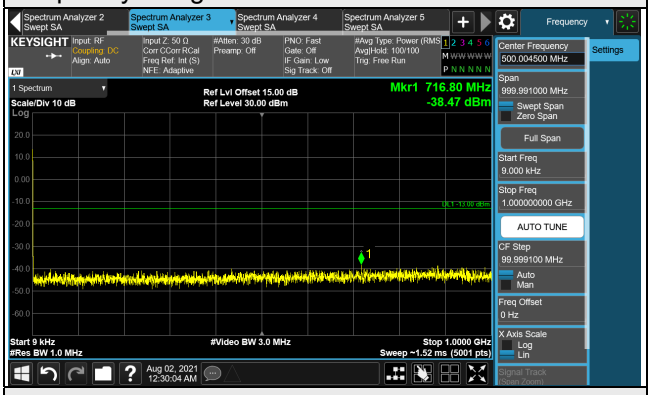
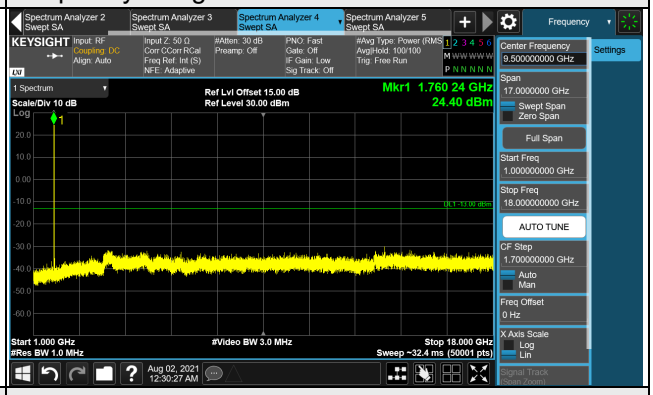
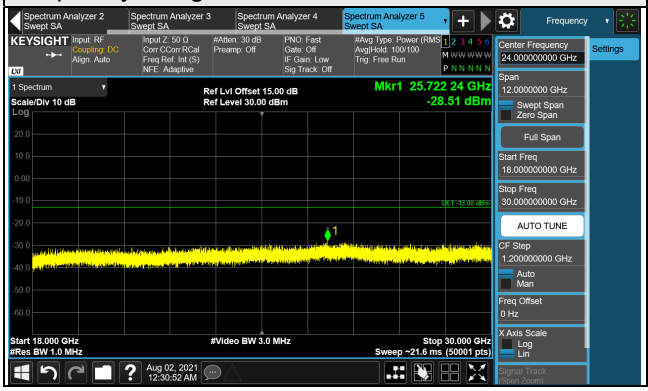
*The 9 kHz tone is from the spectrum analyzer.

Channel Bandwidth: 20MHz	
Channel 344000 (1720.0MHz)	
Frequency Range : 9kHz~1GHz	Frequency Range : 1GHz~18GHz
	
Frequency Range : 18GHz~30GHz	
	

*The 9 kHz tone is from the spectrum analyzer.

Channel 349000 (1745.0MHz)	
Frequency Range : 9kHz~1GHz	Frequency Range : 1GHz~18GHz
	
Frequency Range : 18GHz~30GHz	
	

*The 9 kHz tone is from the spectrum analyzer.

Channel 354000 (1770.0MHz)	
Frequency Range : 9kHz~1GHz	Frequency Range : 1GHz~18GHz
	
Frequency Range : 18GHz~30GHz	
	

*The 9 kHz tone is from the spectrum analyzer.

4.8 Radiated Emission Measurement

4.8.1 Limits of Radiated Emission Measurement

For n66, LTE Band 5:
The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB. The emission limit equal to –13dBm.

For LTE Band 13:
According to FCC 27.53(c)(2) for on any frequency outside the 777-787 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least 43 + 10 log (P) dB.

According to FCC 27.53(f) for operations in the 746-758 MHz, 775-788 MHz, and 805-806 MHz bands, emissions in the band 1559-1610 MHz shall be limited to -70 dBW/MHz. The limit of emissions is equal to -40 dBm

4.8.2 Test Procedure

a. Substitution method is used for E.I.R.P measurement. In the semi-anechoic chamber, EUT placed on the 0.8m(below or equal 1GHz) and/or 1.5m(above 1GHz) height of Turn Table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1m to 4m to find the maximum polar radiated power. The “Read Value” is the spectrum reading the maximum power value.
b. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
c. Perform a field strength measurement and record the worse read value, is the field strength value via a spectrum reading obtained corrected for antenna factor, cable loss and pre-amplifier factor and then mathematically convert the measured field strength level to EIRP/ERP level.
d. Following C63.26 section 5.5 and 5.2.7.
   - EIRP (dBm) = E (dBμV/m) + 20log(D) - 104.8; where D is the measurement distance (in the far field region) in m.
   - ERP (dBm) = E (dBμV/m) + 20log(D) - 104.8 - 2.15; where D is the measurement distance (in the far field region) in m.

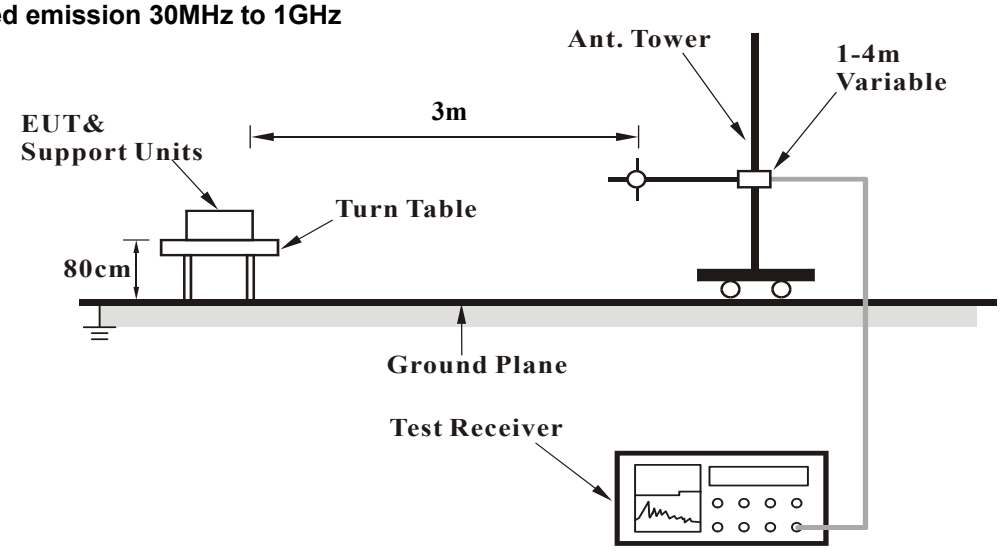
Note:
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1MHz/3MHz.
2. The emission levels were against the limit of frequency range 9 kHz ~ 30 MHz:
   The amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required to be report.

4.8.3 Deviation from Test Standard

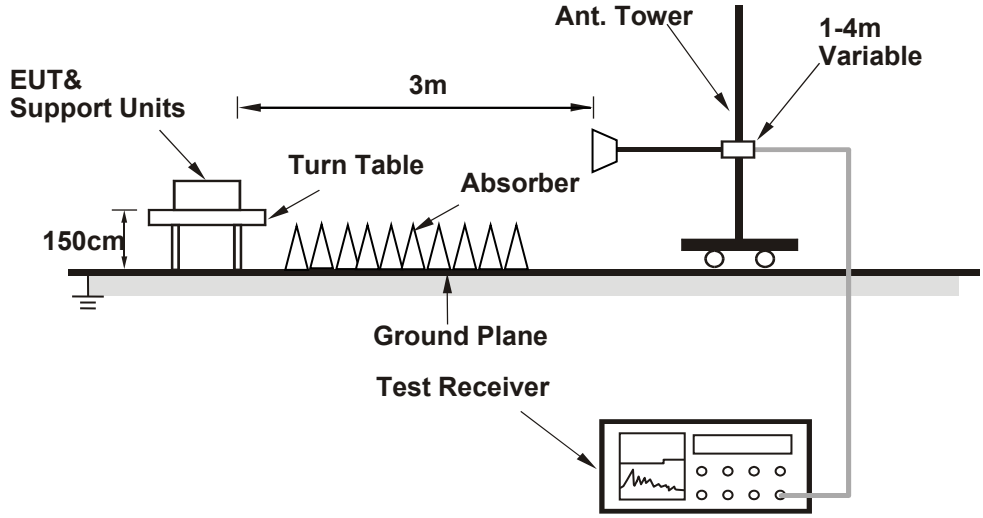
No deviation.

4.8.4 Test Setup

For radiated emission 30MHz to 1GHz



For radiated emission above 1GHz



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

4.8.5 Test Results

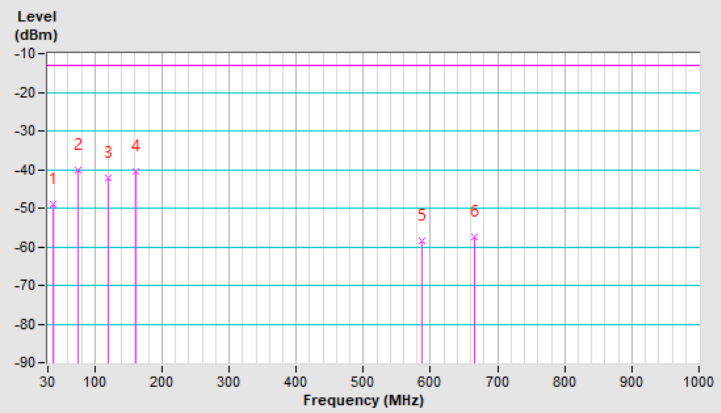
Below 1GHz
n66, Channel Bandwidth: 20MHz

Mode	TX channel 354000 (1770.0MHz)	Frequency Range	Below 1000 MHz
Environmental Conditions	22deg. C, 66%RH	Input Power	120Vac, 60Hz
Tested By	Greg Lin		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	38.73	-48.89	-13.00	-35.89	1.25 H	277	55.97	-104.86
2	**75.59**	**-40.03**	**-13.00**	**-27.03**	**1.00 H**	**277**	**67.54**	**-107.57**
3	120.21	-42.25	-13.00	-29.25	1.50 H	277	64.00	-106.25
4	161.92	-40.59	-13.00	-27.59	1.25 H	277	63.15	-103.74
5	586.78	-58.44	-13.00	-45.44	1.25 H	176	37.35	-95.79
6	665.35	-57.59	-13.00	-44.59	1.00 H	48	36.95	-94.54

Remarks:

1. EIRP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8
3. Margin value = EIRP – Limit value
4. The other EIRP levels were very low against the limit.

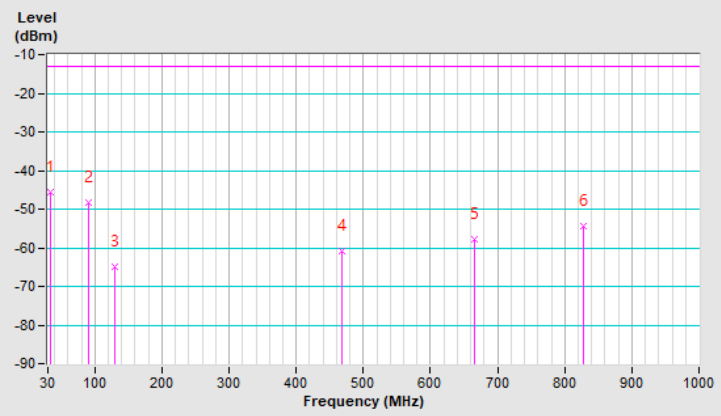


Mode	TX channel 354000 (1770.0MHz)	Frequency Range	Below 1000 MHz
Environmental Conditions	22deg. C, 66%RH	Input Power	120Vac, 60Hz
Tested By	Greg Lin		

Antenna Polarity & Test Distance : Vertical at 3m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	33.88	-45.74	-13.00	-32.74	1.00 V	322	59.56	-105.30
2	90.14	-48.41	-13.00	-35.41	1.25 V	97	61.46	-109.87
3	129.91	-64.75	-13.00	-51.75	1.25 V	208	40.49	-105.24
4	468.44	-60.92	-13.00	-47.92	1.50 V	266	37.21	-98.13
5	665.35	-57.89	-13.00	-44.89	1.00 V	301	36.65	-94.54
6	828.31	-54.53	-13.00	-41.53	1.25 V	177	36.76	-91.29

Remarks:

1. EIRP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8
3. Margin value = EIRP – Limit value
4. The other EIRP levels were very low against the limit.



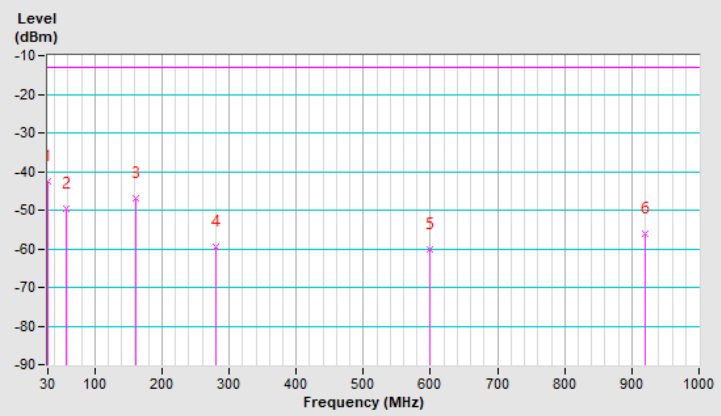
LTE Band 5, Channel Bandwidth: 5MHz

Mode	TX channel 20625 (846.5MHz)	Frequency Range	Below 1000 MHz
Environmental Conditions	22deg. C, 66%RH	Input Power	120Vac, 60Hz
Tested By	Greg Lin		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	**30.00**	**-42.53**	**-13.00**	**-29.53**	**1.00 H**	**94**	**65.10**	**-107.63**
2	57.16	-49.62	-13.00	-36.62	1.25 H	94	57.15	-106.77
3	160.95	-46.84	-13.00	-33.84	1.00 H	94	59.13	-105.97
4	281.23	-59.62	-13.00	-46.62	1.00 H	94	45.04	-104.66
5	598.42	-60.18	-13.00	-47.18	1.00 H	153	37.45	-97.63
6	919.49	-56.09	-13.00	-43.09	1.50 H	296	35.22	-91.31

Remarks:

1. ERP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8 - 2.15
3. Margin value = ERP – Limit value
4. The other ERP levels were very low against the limit.

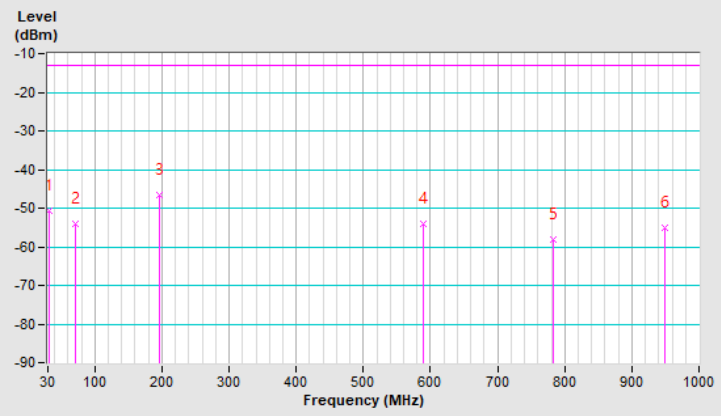


Mode	TX channel 20625 (846.5MHz)	Frequency Range	Below 1000 MHz
Environmental Conditions	22deg. C, 66%RH	Input Power	120Vac, 60Hz
Tested By	Greg Lin		

Antenna Polarity & Test Distance : Vertical at 3m								
No	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	31.94	-50.83	-13.00	-37.83	1.00 V	121	56.82	-107.65
2	71.71	-54.10	-13.00	-41.10	1.25 V	237	54.65	-108.75
3	195.87	-46.70	-13.00	-33.70	1.00 V	16	62.14	-108.84
4	588.72	-54.09	-13.00	-41.09	1.50 V	188	43.79	-97.88
5	783.69	-58.28	-13.00	-45.28	1.25 V	281	35.82	-94.10
6	949.56	-54.94	-13.00	-41.94	1.00 V	10	35.99	-90.93

Remarks:

1. ERP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8 - 2.15
3. Margin value = ERP – Limit value
4. The other ERP levels were very low against the limit.



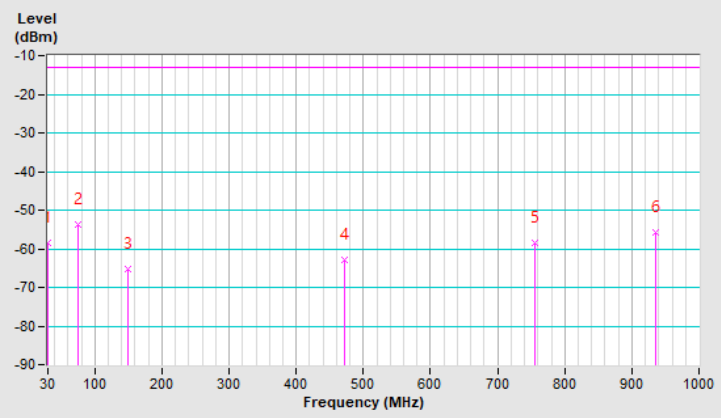
LTE Band 13, Channel Bandwidth: 10MHz

Mode	TX channel 23230 (782MHz)	Frequency Range	Below 1000 MHz
Environmental Conditions	22deg. C, 66%RH	Input Power	120Vac, 60Hz
Tested By	Greg Lin		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	30.00	-58.33	-13.00	-45.33	1.00 H	318	49.30	-107.63
2	75.59	-53.89	-13.00	-40.89	1.00 H	301	55.83	-109.72
3	149.31	-65.37	-13.00	-52.37	1.50 H	110	40.73	-106.10
4	471.35	-62.87	-13.00	-49.87	1.25 H	261	37.37	-100.24
5	755.56	-58.36	-13.00	-45.36	1.00 H	218	36.47	-94.83
6	935.98	-55.61	-13.00	-42.61	1.00 H	78	35.45	-91.06

Remarks:

1. ERP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8 - 2.15
3. Margin value = ERP – Limit value
4. The other ERP levels were very low against the limit.

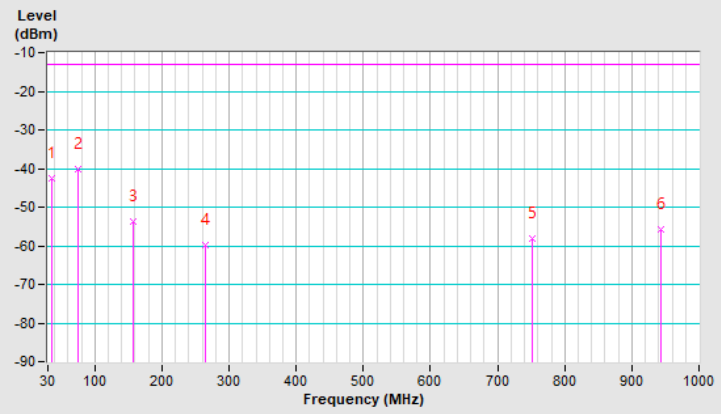


Mode	TX channel 23230 (782MHz)	Frequency Range	Below 1000 MHz
Environmental Conditions	22deg. C, 66%RH	Input Power	120Vac, 60Hz
Tested By	Greg Lin		

Antenna Polarity & Test Distance : Vertical at 3m								
No	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	36.79	-42.43	-13.00	-29.43	1.00 V	258	64.82	-107.25
2	74.62	-40.11	-13.00	-27.11	1.50 V	240	69.36	-109.47
3	158.04	-53.81	-13.00	-40.81	1.25 V	242	52.12	-105.93
4	263.77	-59.97	-13.00	-46.97	1.00 V	258	45.58	-105.55
5	751.68	-58.17	-13.00	-45.17	1.00 V	270	36.83	-95.00
6	943.74	-55.74	-13.00	-42.74	1.00 V	268	35.28	-91.02

Remarks:

1. ERP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8 - 2.15
3. Margin value = ERP – Limit value
4. The other ERP levels were very low against the limit.



Above 1GHz
n66, Channel Bandwidth: 5MHz

Mode	TX channel 342500 (1712.5MHz)	Frequency Range	1GHz ~ 18GHz
Environmental Conditions	22deg. C, 66%RH	Input Power	120Vac, 60Hz
Tested By	Greg Lin		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	3425.00	-49.53	-13.00	-36.53	1.28 H	339	43.64	-93.17
Antenna Polarity & Test Distance : Vertical at 3m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	3425.00	-50.82	-13.00	-37.82	2.76 V	161	42.35	-93.17

Remarks:

1. EIRP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8
3. Margin value = EIRP – Limit value
4. The other EIRP levels were very low against the limit.

Mode	TX channel 349000 (1745.0MHz)	Frequency Range	1GHz ~ 18GHz
Environmental Conditions	22deg. C, 66%RH	Input Power	120Vac, 60Hz
Tested By	Greg Lin		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	3490.00	-49.54	-13.00	-36.54	1.20 H	336	43.12	-92.66
Antenna Polarity & Test Distance : Vertical at 3m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	3490.00	-50.40	-13.00	-37.40	2.77 V	164	42.26	-92.66

Remarks:

1. EIRP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8
3. Margin value = EIRP – Limit value
4. The other EIRP levels were very low against the limit.

Mode	TX channel 355500 (1777.5MHz)	Frequency Range	1GHz ~ 18GHz
Environmental Conditions	22deg. C, 66%RH	Input Power	120Vac, 60Hz
Tested By	Greg Lin		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	3555.00	-48.76	-13.00	-35.76	1.21 H	332	43.46	-92.22
Antenna Polarity & Test Distance : Vertical at 3m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	3555.00	-49.68	-13.00	-36.68	2.76 V	159	42.54	-92.22

Remarks:

1. EIRP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8
3. Margin value = EIRP – Limit value
4. The other EIRP levels were very low against the limit.

n66, Channel Bandwidth: 20MHz

Mode	TX channel 344000 (1720.0MHz)	Frequency Range	1GHz ~ 18GHz
Environmental Conditions	22deg. C, 66%RH	Input Power	120Vac, 60Hz
Tested By	Greg Lin		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	3440.00	-49.72	-13.00	-36.72	1.21 H	333	43.36	-93.08
Antenna Polarity & Test Distance : Vertical at 3m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	3440.00	-50.65	-13.00	-37.65	2.80 V	165	42.43	-93.08

Remarks:

1. EIRP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8
3. Margin value = EIRP – Limit value
4. The other EIRP levels were very low against the limit.

Mode	TX channel 349000 (1745.0MHz)	Frequency Range	1GHz ~ 18GHz
Environmental Conditions	22deg. C, 66%RH	Input Power	120Vac, 60Hz
Tested By	Greg Lin		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	3490.00	-49.52	-13.00	-36.52	1.28 H	334	43.14	-92.66
Antenna Polarity & Test Distance : Vertical at 3m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	3490.00	-49.98	-13.00	-36.98	2.86 V	161	42.68	-92.66

Remarks:

1. EIRP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8
3. Margin value = EIRP – Limit value
4. The other EIRP levels were very low against the limit.

Mode	TX channel 354000 (1770.0MHz)	Frequency Range	1GHz ~ 18GHz
Environmental Conditions	22deg. C, 66%RH	Input Power	120Vac, 60Hz
Tested By	Greg Lin		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	3540.00	-48.67	-13.00	-35.67	1.24 H	338	43.63	-92.30
Antenna Polarity & Test Distance : Vertical at 3m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	3540.00	-50.02	-13.00	-37.02	2.77 V	159	42.28	-92.30

Remarks:

1. EIRP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8
3. Margin value = EIRP – Limit value
4. The other EIRP levels were very low against the limit.

LTE Band 5, Channel Bandwidth: 1.4MHz

Mode	TX channel 20407 (824.7MHz)	Frequency Range	1GHz ~ 18GHz
Environmental Conditions	22deg. C, 66%RH	Input Power	120Vac, 60Hz
Tested By	Greg Lin		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1649.40	-55.87	-13.00	-42.87	1.83 H	296	46.16	-102.03
Antenna Polarity & Test Distance : Vertical at 3m								
No	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1649.40	-59.17	-13.00	-46.17	1.55 V	309	42.86	-102.03

Remarks:

1. ERP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8 - 2.15
3. Margin value = ERP – Limit value
4. The other ERP levels were very low against the limit.

Mode	TX channel 20525 (836.5MHz)	Frequency Range	1GHz ~ 18GHz
Environmental Conditions	22deg. C, 66%RH	Input Power	120Vac, 60Hz
Tested By	Greg Lin		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1673.00	-55.97	-13.00	-42.97	1.88 H	301	45.99	-101.96
Antenna Polarity & Test Distance : Vertical at 3m								
No	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1673.00	-59.29	-13.00	-46.29	1.46 V	313	42.67	-101.96

Remarks:

1. ERP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8 - 2.15
3. Margin value = ERP – Limit value
4. The other ERP levels were very low against the limit.

Mode	TX channel 20643 (848.3MHz)	Frequency Range	1GHz ~ 18GHz
Environmental Conditions	22deg. C, 66%RH	Input Power	120Vac, 60Hz
Tested By	Greg Lin		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1696.60	-55.95	-13.00	-42.95	1.78 H	297	45.94	-101.89
Antenna Polarity & Test Distance : Vertical at 3m								
No	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1696.60	-59.23	-13.00	-46.23	1.53 V	307	42.66	-101.89

Remarks:

1. ERP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8 - 2.15
3. Margin value = ERP – Limit value
4. The other ERP levels were very low against the limit.

LTE Band 5, Channel Bandwidth: 5MHz

Mode	TX channel 20425 (826.5MHz)	Frequency Range	1GHz ~ 18GHz
Environmental Conditions	22deg. C, 66%RH	Input Power	120Vac, 60Hz
Tested By	Greg Lin		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1653.00	-55.88	-13.00	-42.88	1.78 H	299	46.15	-102.03
Antenna Polarity & Test Distance : Vertical at 3m								
No	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1653.00	-58.92	-13.00	-45.92	1.48 V	311	43.11	-102.03

Remarks:

1. ERP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8 - 2.15
3. Margin value = ERP – Limit value
4. The other ERP levels were very low against the limit.

Mode	TX channel 20525 (836.5MHz)	Frequency Range	1GHz ~ 18GHz
Environmental Conditions	22deg. C, 66%RH	Input Power	120Vac, 60Hz
Tested By	Greg Lin		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1673.00	-55.98	-13.00	-42.98	1.85 H	306	45.98	-101.96
Antenna Polarity & Test Distance : Vertical at 3m								
No	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1673.00	-59.09	-13.00	-46.09	1.53 V	314	42.87	-101.96

Remarks:

1. ERP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8 - 2.15
3. Margin value = ERP – Limit value
4. The other ERP levels were very low against the limit.

Mode	TX channel 20625 (846.5MHz)	Frequency Range	1GHz ~ 18GHz
Environmental Conditions	22deg. C, 66%RH	Input Power	120Vac, 60Hz
Tested By	Greg Lin		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1693.00	-55.78	-13.00	-42.78	1.83 H	294	46.12	-101.90
Antenna Polarity & Test Distance : Vertical at 3m								
No	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1693.00	-59.28	-13.00	-46.28	1.47 V	309	42.62	-101.90

Remarks:

1. ERP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8 - 2.15
3. Margin value = ERP – Limit value
4. The other ERP levels were very low against the limit.

LTE Band 5, Channel Bandwidth: 10MHz

Mode	TX channel 20450 (829.0MHz)	Frequency Range	1GHz ~ 18GHz
Environmental Conditions	22deg. C, 66%RH	Input Power	120Vac, 60Hz
Tested By	Greg Lin		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1658.00	-56.30	-13.00	-43.30	1.83 H	294	45.71	-102.01
Antenna Polarity & Test Distance : Vertical at 3m								
No	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1658.00	-59.19	-13.00	-46.19	1.47 V	308	42.82	-102.01

Remarks:

1. ERP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8 - 2.15
3. Margin value = ERP – Limit value
4. The other ERP levels were very low against the limit.

Mode	TX channel 20525 (836.5MHz)	Frequency Range	1GHz ~ 18GHz
Environmental Conditions	22deg. C, 66%RH	Input Power	120Vac, 60Hz
Tested By	Greg Lin		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1673.00	-56.00	-13.00	-43.00	1.82 H	291	45.96	-101.96
Antenna Polarity & Test Distance : Vertical at 3m								
No	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1673.00	-58.88	-13.00	-45.88	1.49 V	10	43.08	-101.96

Remarks:

1. ERP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8 - 2.15
3. Margin value = ERP – Limit value
4. The other ERP levels were very low against the limit.

Mode	TX channel 20600 (844.0MHz)	Frequency Range	1GHz ~ 18GHz
Environmental Conditions	22deg. C, 66%RH	Input Power	120Vac, 60Hz
Tested By	Greg Lin		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1688.00	-56.07	-13.00	-43.07	1.83 H	299	45.84	-101.91
Antenna Polarity & Test Distance : Vertical at 3m								
No	Frequency (MHz)	ERP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1688.00	-58.87	-13.00	-45.87	1.48 V	303	43.04	-101.91

Remarks:

1. ERP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8 - 2.15
3. Margin value = ERP – Limit value
4. The other ERP levels were very low against the limit.

LTE Band 13, Channel Bandwidth: 5MHz

Mode	TX channel 23205 (779.5MHz)	Frequency Range	1GHz ~ 18GHz
Environmental Conditions	22deg. C, 66%RH	Input Power	120Vac, 60Hz
Tested By	Greg Lin		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1559.00	-56.60	-40.00	-16.60	1.71 H	287	43.30	-99.90
Antenna Polarity & Test Distance : Vertical at 3m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1559.00	-56.80	-40.00	-16.80	1.40 V	333	43.10	-99.90

Remarks:

1. EIRP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8
3. Margin value = EIRP – Limit value
4. The other EIRP levels were very low against the limit.

Mode	TX channel 23230 (782.0MHz)	Frequency Range	1GHz ~ 18GHz
Environmental Conditions	22deg. C, 66%RH	Input Power	120Vac, 60Hz
Tested By	Greg Lin		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1564.00	-56.90	-40.00	-16.90	1.74 H	288	43.00	-99.90
Antenna Polarity & Test Distance : Vertical at 3m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1564.00	-57.20	-40.00	-17.20	1.46 V	333	42.70	-99.90

Remarks:

1. EIRP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8
3. Margin value = EIRP – Limit value
4. The other EIRP levels were very low against the limit.

Mode	TX channel 23255 (784.5MHz)	Frequency Range	1GHz ~ 18GHz
Environmental Conditions	22deg. C, 66%RH	Input Power	120Vac, 60Hz
Tested By	Greg Lin		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1569.00	-58.90	-40.00	-18.90	1.77 H	286	41.10	-100.00
Antenna Polarity & Test Distance : Vertical at 3m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1569.00	-57.30	-40.00	-17.30	1.43 V	337	42.70	-100.00

Remarks:

1. EIRP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8
3. Margin value = EIRP – Limit value
4. The other EIRP levels were very low against the limit.

LTE Band 13, Channel Bandwidth: 10MHz

Mode	TX channel 23230 (782.0MHz)	Frequency Range	1GHz ~ 18GHz
Environmental Conditions	22deg. C, 66%RH	Input Power	120Vac, 60Hz
Tested By	Greg Lin		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	**1564.00**	**-56.50**	**-40.00**	**-16.50**	**1.81 H**	**288**	**43.40**	**-99.90**
Antenna Polarity & Test Distance : Vertical at 3m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1564.00	-57.20	-40.00	-17.20	1.41 V	327	42.70	-99.90

Remarks:

1. EIRP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8
3. Margin value = EIRP – Limit value
4. The other EIRP levels were very low against the limit.

5 Pictures of Test Arrangements

Please refer to the attached file (Test Setup Photo).

Appendix – Information of the Testing Laboratories

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are FCC recognized accredited test firms and accredited and approved according to ISO/IEC 17025.

If you have any comments, please feel free to contact us at the following:

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The address and road map of all our labs can be found in our web site also.

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