

## FCC Test Report (ENDC: n12 + LTE B2/B66)

**Report No.:** RFBFLF-WTW-P21010278-24

**FCC ID:** MSQI007D

**Test Model:** ASUS\_I007D

**Received Date:** Jan. 04, 2021

**Test Date:** Feb. 26 ~ Apr. 19, 2021

**Issued Date:** Apr. 19, 2021

**Applicant:** ASUSTeK COMPUTER INC.

**Address:** 1F., No. 15, Lide Rd., Beitou Dist., Taipei City 112, Taiwan

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

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

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

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



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### Release Control Record

Issue No.	Description	Date Issued
RFBFLF-WTW-P21010278-24	Original release	Apr. 19, 2021

## 1 Certificate of Conformity

**Product:** EXP21 Smartphone

**Brand:** ASUS

**Test Model:** ASUS\_I007D

**Sample Status:** Engineering sample

**Applicant:** ASUSTeK COMPUTER INC.

**Test Date:** Feb. 26 ~ Apr. 19, 2021

**Standards:** FCC Part 24, Subpart E  
FCC Part 27, Subpart C, H, 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 :** Celine Chou , **Date:** Apr. 19, 2021  
Celine Chou / Senior Specialist

**Approved by :** Bruce Chen , **Date:** Apr. 19, 2021  
Bruce Chen / Senior Project Engineer

## 2 Summary of Test Results

For n12

Applied Standard: FCC Part 27 & Part 2			
FCC Clause	Test Item	Result	Remarks
2.1046 27.50 (c)	Equivalent Radiated Power	Pass	Meet the requirement of limit.
2.1047	Modulation Characteristics	Pass	Meet the requirement of limit.
----	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 of limit.
2.1051 27.53 (g)	Band Edge Measurements	Pass	Meet the requirement of limit.
2.1051 27.53 (g)	Conducted Spurious Emissions	Pass	Meet the requirement of limit.
2.1053 27.53 (g)	Radiated Spurious Emissions	Pass	Meet the requirement of limit. Minimum passing margin is -39.80dB at 1417.00MHz.

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

For LTE Band 2

Applied Standard: FCC Part 24 & Part 2			
FCC Clause	Test Item	Result	Remarks
2.1046 24.232	Effective Isotropically Radiated Power	Pass	Meet the requirement of limit.
2.1046 24.232 (d)	Peak To Average Ratio	Pass	Refer to Note 1
2.1047	Modulation Characteristics	Pass	Refer to Note 1
2.1055 24.235	Frequency Stability	Pass	Refer to Note 1
2.1049	Occupied Bandwidth	Pass	Refer to Note 1
24.238	Band Edge Measurements	Pass	Refer to Note 1
2.1051 24.238	Conducted Spurious Emissions	Pass	Refer to Note 1
2.1053 24.238	Radiated Spurious Emissions	Pass	Meet the requirement of limit. Minimum passing margin is -32.40dB at 3818.60MHz.

Note:

1. This report is a partial report. Therefore, only test item of Transmitter Output Power and Effective Isotropically Radiated Power and Radiated Spurious Emissions tests were performed for this report. Other testing data please refer to BV CPS report no.: RFBFLF-WTW-P21010278-10.
2. Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

For LTE Band 66

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	Refer to Note 1
27.50 (d)(5)	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 (h)	Band Edge / Out of Band Emissions Measurements	Pass	Refer to Note 1
2.1051 27.53 (h)	Conducted Spurious Emissions	Pass	Refer to Note 1
2.1053 27.53 (h)	Radiated Spurious Emissions	Pass	Meet the requirement of limit. Minimum passing margin is -33.50dB at 3540.00MHz.

Note:

1. This report is a partial report. Therefore, only test item of Transmitter Output Power and Equivalent Isotropically Radiated Power and Radiated Spurious Emissions tests were performed for this report. Other testing data please refer to BV CPS report no.: RFBFLF-WTW-P21010278-11.
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. 16, 2020	Apr. 15, 2021
			Apr. 09, 2021	Apr. 08, 2022
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100039	Jun. 12, 2020	Jun. 11, 2021
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
5G Wireless Test Platforms Keysight	E7515B	MY60102114	May 28, 2020	May 27, 2021
BILOG Antenna SCHWARZBECK	VULB9168	9168-472	Nov. 06, 2020	Nov. 05, 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. 08, 2020	Jun. 07, 2021
Preamplifier Agilent (Above 1GHz)	8449B	3008A02367	Feb. 17, 2021	Feb. 16, 2022
RF signal cable HUBER+SUHNER&EMCI	SUCOFLEX 104 & EMC104-SM-SM80 00	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. 08, 2020	Jun. 07, 2021
Software BV ADT	ADT_Radiated_ V7.6.15.9.5	NA	NA	NA
Antenna Tower EMCO	2070/2080	512.835.4684	NA	NA
Turn Table EMCO	2087-2.03	NA	NA	NA
Antenna Tower & Turn BV ADT	AT100	AT93021705	NA	NA
Turn Table BV ADT	TT100	TT93021705	NA	NA
Turn Table Controller BV ADT	SC100	SC93021705	NA	NA
Boresight Antenna Fixture	FBA-01	FBA-SIP01	NA	NA
Standard Temperature And Humidity Chamber GIANT FORCE	GTH-120-40-CP-A R	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. 06, 2020	Jun. 05, 2021
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	EXP21 Smartphone
Brand	ASUS
Test Model	ASUS_I007D
Sample Status	Engineering sample
Power Supply Rating	7.74 Vdc (Battery) 5 Vdc / 9 Vdc / 12 Vdc / 15Vdc / 20Vdc (Adapter)

#### n12

Modulation Type	$\pi/2$ BPSK, QPSK, 16QAM, 64QAM, 256QAM					
Waveform Type	CP-OFDM, DFT-s-OFDM					
Operating Frequency	n12 (Channel Bandwidth 5MHz)	701.5MHz ~ 713.5MHz				
	n12 (Channel Bandwidth 10MHz)	704.0MHz ~ 711.0MHz				
	n12 (Channel Bandwidth 15MHz)	706.5MHz ~ 708.5MHz				
Max. ERP Power		$\pi/2$ BPSK	QPSK	16QAM	64QAM	256QAM
	n12 (Channel Bandwidth 5MHz)	114.025mW (20.57dBm)	115.611mW (20.63dBm)	90.157mW (19.55dBm)	63.533mW (18.03dBm)	40.551mW (16.08dBm)
	n12 (Channel Bandwidth 10MHz)	114.288mW (20.58dBm)	116.145mW (20.65dBm)	88.716mW (19.48dBm)	63.096mW (18.00dBm)	40.458mW (16.07dBm)
	n12 (Channel Bandwidth 15MHz)	115.611mW (20.63dBm)	116.950mW (20.68dBm)	90.782mW (19.58dBm)	64.269mW (18.08dBm)	40.551mW (16.08dBm)
Emission Designator		$\pi/2$ BPSK	QPSK	16QAM	64QAM	256QAM
	n12 (Channel Bandwidth 5MHz)	4M47G7D	4M47G7D	4M48D7W	4M47D7W	4M47D7W
	n12 (Channel Bandwidth 10MHz)	9M21G7D	9M29G7D	9M29D7W	9M29D7W	9M29D7W
	n12 (Channel Bandwidth 15MHz)	14M0G7D	14M1G7D	14M1D7W	14M1D7W	14M1D7W

### LTE Band

Modulation Type	QPSK, 16QAM, 64QAM, 256QAM				
Operating Frequency	LTE Band 2 (Channel Bandwidth 1.4MHz)	1850.7MHz ~ 1909.3MHz			
	LTE Band 2 (Channel Bandwidth 3MHz)	1851.5MHz ~ 1908.5MHz			
	LTE Band 2 (Channel Bandwidth 5MHz)	1852.5MHz ~ 1907.5MHz			
	LTE Band 2 (Channel Bandwidth 10MHz)	1855.0MHz ~ 1905.0MHz			
	LTE Band 2 (Channel Bandwidth 15MHz)	1857.5MHz ~ 1902.5MHz			
	LTE Band 2 (Channel Bandwidth 20MHz)	1860.0MHz ~ 1900.0MHz			
	LTE Band 66 (Channel Bandwidth 1.4MHz)	1710.7MHz ~ 1779.3MHz			
	LTE Band 66 (Channel Bandwidth 3MHz)	1711.5MHz ~ 1778.5MHz			
	LTE Band 66 (Channel Bandwidth 5MHz)	1712.5MHz ~ 1777.5MHz			
	LTE Band 66 (Channel Bandwidth 10MHz)	1715.0MHz ~ 1775.0MHz			
	LTE Band 66 (Channel Bandwidth 15MHz)	1717.5MHz ~ 1772.5MHz			
	LTE Band 66 (Channel Bandwidth 20MHz)	1720.0MHz ~ 1770.0MHz			
Max. EIRP Power		QPSK	16QAM	64QAM	256QAM
	LTE Band 2 (Channel Bandwidth 1.4MHz)	168.655mW (22.27dBm)	138.995mW (21.43dBm)	107.152mW (20.30dBm)	50.933mW (17.07dBm)
	LTE Band 2 (Channel Bandwidth 3MHz)	167.494mW (22.24dBm)	136.458mW (21.35dBm)	108.893mW (20.37dBm)	50.003mW (16.99dBm)
	LTE Band 2 (Channel Bandwidth 5MHz)	165.196mW (22.18dBm)	133.352mW (21.25dBm)	106.905mW (20.29dBm)	49.659mW (16.96dBm)
	LTE Band 2 (Channel Bandwidth 10MHz)	169.434mW (22.29dBm)	138.676mW (21.42dBm)	105.925mW (20.25dBm)	51.168mW (17.09dBm)
	LTE Band 2 (Channel Bandwidth 15MHz)	166.725mW (22.22dBm)	141.579mW (21.51dBm)	107.895mW (20.33dBm)	51.761mW (17.14dBm)
	LTE Band 2 (Channel Bandwidth 20MHz)	176.604mW (22.47dBm)	139.316mW (21.44dBm)	107.647mW (20.32dBm)	52.360mW (17.19dBm)
	LTE Band 66 (Channel Bandwidth 1.4MHz)	157.761mW (21.98dBm)	123.310mW (20.91dBm)	103.039mW (20.13dBm)	42.170mW (16.25dBm)
	LTE Band 66 (Channel Bandwidth 3MHz)	156.315mW (21.94dBm)	125.603mW (20.99dBm)	100.462mW (20.02dBm)	48.195mW (16.83dBm)
	LTE Band 66 (Channel Bandwidth 5MHz)	157.398mW (21.97dBm)	128.529mW (21.09dBm)	100.000mW (20.00dBm)	45.920mW (16.62dBm)
	LTE Band 66 (Channel Bandwidth 10MHz)	152.055mW (21.82dBm)	123.027mW (20.90dBm)	97.949mW (19.91dBm)	47.206mW (16.74dBm)
	LTE Band 66 (Channel Bandwidth 15MHz)	158.489mW (22.00dBm)	125.026mW (20.97dBm)	105.196mW (20.22dBm)	48.306mW (16.84dBm)
	LTE Band 66 (Channel Bandwidth 20MHz)	159.956mW (22.04dBm)	127.644mW (21.06dBm)	100.925mW (20.04dBm)	47.643mW (16.78dBm)
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.

Product	Brand	Model	Description
Battery	SCUD	C21P2002	Rating: 7.74Vdc, 15.2Wh
Adapter	AOHAI	A320Q-200325C-US	I/P: 100-240Vac, 50/60Hz, 1.5A O/P: 5Vdc, 3A; 9Vdc, 3A; 12Vdc, 3A; 15Vdc, 3A; 20Vdc, 3.25A
Type A to Type C USB Cable	Luxshare	LA9U2026-CS-R	0.5m
Type C to Type C Cable	Luxshare	LA9UC006-CS-R	1.2m
Bluetooth Earphone	Bang & Olufsen	EQ Earbud R	FCC ID: TTUBEOPLAYEQR IC: 3775B-BEOPLAYEQR
		EQ Earbud L	FCC ID: TTUBEOPLAYEQL IC: 3775B-BEOPLAYEQL
Bluetooth Earphone Charging Case	Bang & Olufsen	EQ Charging case	I/P: 5Vdc/500mA O/P: 5Vdc/ R170mA; L170mA

2. The following antennas were provided to the EUT.

Ant. No.	Brand	Model	Ant. Type	Connecter	Frequency Range
Ant 0	ASUS	ZS675KW	PIFA	LCP+lpex	610-960MHz, 1710-2690MHz
Ant 1	ASUS	ZS675KW	PIFA	LCP+lpex	1427-1510MHz, 1710-2690MHz
Ant 2	ASUS	ZS675KW	PIFA	LCP+lpex	610-960MHz, 1427-1510MHz, 1710-2690MHz
Ant 3	INPAQ	ZS675KW	PIFA	lpex	1575-1610MHz, 2400-2500MHz, 5150-5850MHz, 5925-7125MHz
Ant 4	INPAQ	ZS675KW	PIFA	lpex	1176±10MHz, 2400-2500MHz, 5150-5850MHz, 5925-7125MHz
Ant 5	INPAQ	ZS675KW	PIFA	LCP+lpex	3300-4000MHz, 4400-5000MHz
Ant 6	INPAQ	ZS675KW	PIFA	lpex	1427-1510MHz, 2400-2500MHz, 5150-5850MHz, 5925-7125MHz
Ant 7	INPAQ	ZS675KW	PIFA	LCP+lpex	3300-4000MHz, 4400-5000MHz
Ant 8	ASUS	ZS675KW	PIFA	LCP+lpex	1427-1510MHz, 1710-2690MHz
Ant 9	ASUS	ZS675KW	PIFA	LCP+lpex	1710-2690MHz
Ant 10	INPAQ	ZS675KW	PIFA	lpex	3300-4000MHz, 4400-5000MHz
Ant 11	INPAQ	ZS675KW	PIFA	lpex	3300-4000MHz, 4400-5000MHz

2G / 3G Band													
Band	Freq. Range (MHz)	Gain (dBi)											
		Ant. 0	Ant. 1	Ant. 2	Ant. 3	Ant. 4	Ant. 5	Ant. 6	Ant. 7	Ant. 8	Ant. 9	Ant. 10	Ant. 11
GSM-850	824 ~ 849	-1.891		-4.526									
GSM-1900	1850 ~ 1910		-1.887	-1.394						-2.89579			
WCDMA B2	1850 ~ 1910		-1.887	-1.394						-2.89579			
WCDMA B4	1710 ~ 1755		-2.884	-3.228						-3.13552			
WCDMA B5	824 ~ 849	-1.891		-4.526									
CDMA BC0	815 ~ 849	-1.891		-4.526									
CDMA BC1	1850 ~ 1910		-1.887	-1.394						-2.89579			
CDMA BC10	806 ~ 901	-1.891		-4.526									

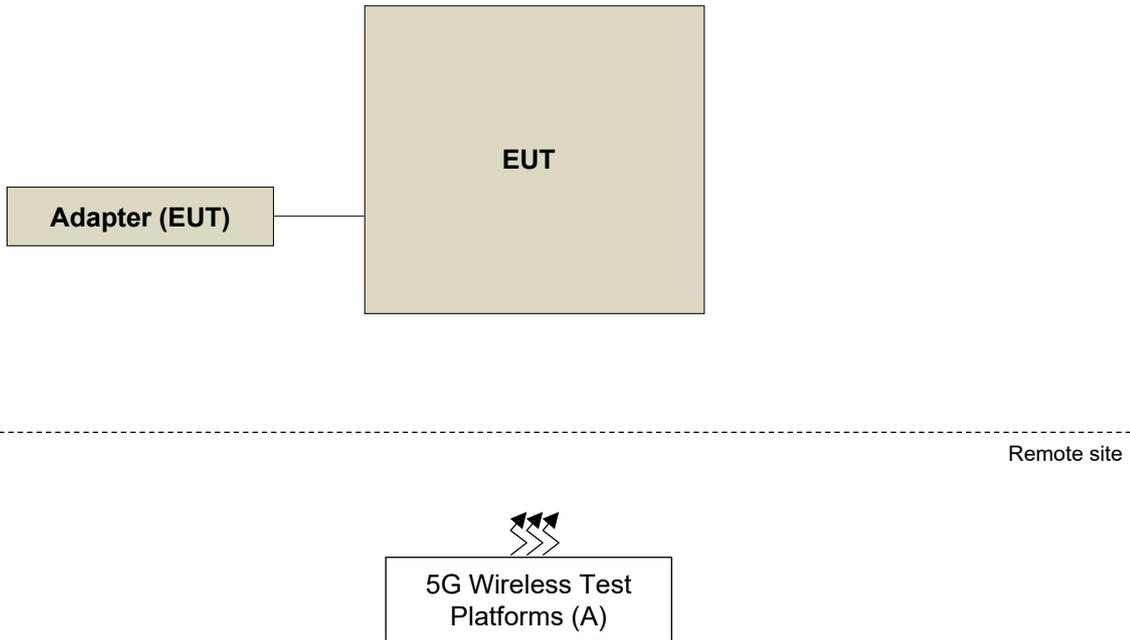
LTE Band													
Band	Freq. Range (MHz)	Gain (dBi)											
		Ant. 0	Ant. 1	Ant. 2	Ant. 3	Ant. 4	Ant. 5	Ant. 6	Ant. 7	Ant. 8	Ant. 9	Ant. 10	Ant. 11
LTE B2	1850 ~ 1910		-1.887	-1.394						-2.89579	-1.804		
LTE B4	1710 ~ 1755		-2.884	-3.228						-3.13552	-1.706		
LTE B5	824 ~ 849	-1.891		-4.526									
LTE B7	2500 ~ 2570		0.185	-0.657						-0.50837	-1.117		
LTE B12	698 ~ 716	-2.135		-4.343									
LTE B13	777 ~ 787	-4.37		-8.13									
LTE B14	788 ~ 798	-4.37		-7.931									
LTE B17	704 ~ 716	-2.135		-4.343									
LTE B25	1850 ~ 1915		-1.887	-1.394						-2.89579			
LTE B26	814 ~ 849	-1.891		-4.526									
LTE B30	2305 ~ 2315		-1.326	-2.669						-1.28433			
LTE B66	1710 ~ 1780		-2.884	-2.478						-3.0668	-1.685		
LTE B71	663 ~ 698	-5.741		-7.388									
T-LTE B38	2570 ~ 2620		0.724	-0.912						-0.59557			
T-LTE B40	2300 ~ 2400		-1.326	-2.669						-1.28433			
T-LTE B41	2496 ~ 2690		1.143	-0.657						-0.59557			
T-LTE B42	3400 ~ 3600						0.313		0.5277			-2.493	-0.35195
T-LTE B43	3600 ~ 3800						-0.434		0.5277			-0.477	-0.161
T-LTE B48	3550 ~ 3700						-0.434		0.5277			-0.477	-0.161
5G FR1 Band													
Band	Freq. Range (MHz)	Gain (dBi)											
		Ant. 0	Ant. 1	Ant. 2	Ant. 3	Ant. 4	Ant. 5	Ant. 6	Ant. 7	Ant. 8	Ant. 9	Ant. 10	Ant. 11
n2	1850 ~ 1910		-1.887	-1.394						-2.89579	-1.804		
n5	824 ~ 849	-1.891		-4.526									
n7	2500 ~ 2570		0.185	-0.657						-0.50837	-1.117		
n12	699 ~ 716	-2.135		-4.343									
n13	777 ~ 787	-4.37		-8.13									
n14	788 ~ 798	-4.37		-7.931									
n25	1850 ~ 1915		-1.887	-1.394						-2.89579	-1.627		
n26	814 ~ 849	-1.891		-4.526									
n30	2305 ~ 2315		-1.326	-2.669						-1.28433			
n38	2570 ~ 2620		0.724	-0.912						-0.59557	-1.3		
n41	2496 ~ 2690		1.143	-0.657						-0.59557	-0.076		
n66	1710 ~ 1780		-2.884	-2.478						-3.0668	-1.685		
n71	663 ~ 698	-5.741		-7.388									
n77	3300 ~ 4200						0.313		0.5277			2.017	0.19902
n78	3300 ~ 3800						0.313		0.5277			2.017	-0.161

\* 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.

5GNR	FCC 5G FR1			ENDC
	Band	SCS	Bandwidth (MHz)	
	n2	15kHz	5/10/15/20	Band 5/12/13/14/30/66
	n5	15kHz	5/10/15/20	Band 2/7/12/30/48/66
	n7	15kHz	5/10/15/20/25/30/40	Band 2/5/12/13/66
	n12	15kHz	5/10/15	Band 2/66
	n14	15kHz	5/10	Band 2
	n25	15kHz	5/10/15/20/25/30/40	Band 12/66
	n30	15kHz	5/10	Band 2/5/66
	n38	30kHz	20/30/40	Band 2/4/5/12/66/71
	n41	30kHz	20/30/40/50/60/80/90/100	Band 2/4/12/25/26/66
	n66	15kHz	5/10/15/20/30/40	Band 2/5/7/12/13/14/30/48/71
	n71	15kHz	5/10/15/20	Band 2/7/66
	n77	30kHz	20/30/40/50/60/70/80/90/100	Band 7/41
	n78	30kHz	20/30/40/50/60/70/80/90/100	Band 2/4/5/7/12/13/38/66/71

### 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	-

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.

### 3.3 Test Mode Applicability and Tested Channel Detail

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

Band	Radiated Emission
n12	Y-plane
LTE Band 2	Y-plane
LTE Band 66	Y-plane

n12

EUT Configure Mode	Test item	Available channel	Tested channel	Channel Bandwidth	Modulation	Mode
-	ERP	140300 to 142700	140300 (701.5MHz), 141500 (707.5MHz), 142700 (713.5MHz)	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
		140800 to 142700	140800 (704.0MHz), 141500 (707.5MHz), 142200 (711.0MHz)	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
		141300 to 142700	141300 (706.5MHz), 141500 (707.5MHz), 141700 (708.5MHz)	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
-	Modulation characteristics	141300 to 142700	141500 (707.5MHz)	15MHz	$\pi/2$ BPSK / QPSK / 16QAM / 64QAM / 256QAM	79 RB / 0 RB Offset
-	Frequency Stability	140300 to 142700	140300 (701.5MHz), 142700 (713.5MHz)	5MHz	QPSK	25 RB / 0 RB Offset
		140800 to 142700	140800 (704.0MHz), 142200 (711.0MHz)	10MHz	QPSK	52 RB / 0 RB Offset
		141300 to 142700	141300 (706.5MHz), 141700 (708.5MHz)	15MHz	QPSK	79 RB / 0 RB Offset
-	Emission Bandwidth	140300 to 142700	140300 (701.5MHz), 141500 (707.5MHz), 142700 (713.5MHz)	5MHz	$\pi/2$ BPSK / QPSK / 16QAM / 64QAM / 256QAM	25 RB / 0 RB Offset
		140800 to 142700	140800 (704.0MHz), 141500 (707.5MHz), 142200 (711.0MHz)	10MHz	$\pi/2$ BPSK / QPSK / 16QAM / 64QAM / 256QAM	52 RB / 0 RB Offset
		141300 to 142700	141300 (706.5MHz), 141500 (707.5MHz), 141700 (708.5MHz)	15MHz	$\pi/2$ BPSK / QPSK / 16QAM / 64QAM / 256QAM	79 RB / 0 RB Offset

EUT Configure Mode	Test item	Available channel	Tested channel	Channel Bandwidth	Modulation	Mode
-	Band Edge	140300 to 142700	140300 (701.5MHz), 142700 (713.5MHz)	5MHz	QPSK	1 RB / 0 RB Offset 1 RB / 24 RB Offset 25 RB / 0 RB Offset
		140800 to 142700	140800 (704.0MHz), 142200 (711.0MHz)	10MHz	QPSK	1 RB / 0 RB Offset 1 RB / 51 RB Offset 52 RB / 0 RB Offset
		141300 to 142700	141300 (706.5MHz), 141700 (708.5MHz)	15MHz	QPSK	1 RB / 0 RB Offset 1 RB / 78 RB Offset 79 RB / 0 RB Offset
-	Peak to Average Ratio	140300 to 142700	140300 (701.5MHz), 141500 (707.5MHz), 142700 (713.5MHz)	5MHz	$\pi/2$ BPSK / QPSK / 16QAM / 64QAM / 256QAM	1 RB / 1 RB Offset
		140800 to 142700	140800 (704.0MHz), 141500 (707.5MHz), 142200 (711.0MHz)	10MHz	$\pi/2$ BPSK / QPSK / 16QAM / 64QAM / 256QAM	1 RB / 1 RB Offset
		141300 to 142700	141300 (706.5MHz), 141500 (707.5MHz), 141700 (708.5MHz)	15MHz	$\pi/2$ BPSK / QPSK / 16QAM / 64QAM / 256QAM	1 RB / 1 RB Offset
-	Conducted Emission	140300 to 142700	140300 (701.5MHz), 141500 (707.5MHz), 142700 (713.5MHz)	5MHz	QPSK	1 RB / 1 RB Offset
		140800 to 142700	140800 (704.0MHz), 141500 (707.5MHz), 142200 (711.0MHz)	10MHz	QPSK	1 RB / 1 RB Offset
		141300 to 142700	141300 (706.5MHz), 141500 (707.5MHz), 141700 (708.5MHz)	15MHz	QPSK	1 RB / 1 RB Offset
-	Radiated Emission Below 1GHz	141300 to 142700	141700 (708.5MHz)	15MHz	QPSK	1 RB / 1 RB Offset
-	Radiated Emission Above 1GHz	140300 to 142700	140300 (701.5MHz), 141500 (707.5MHz), 142700 (713.5MHz)	5MHz	QPSK	1 RB / 1 RB Offset
		141300 to 142700	141300 (706.5MHz), 141500 (707.5MHz), 141700 (708.5MHz)	15MHz	QPSK	1 RB / 1 RB Offset

Note:

1. For radiated emission below 1GHz, select the worst radiated emission channel (above 1GHz) for final testing.
2. For radiated emission above 1GHz, according to 3GPP 38.521-1 Section 6.5.3.1.4, choose the lowest and highest channel bandwidth for final test.
3. 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 worse mode according to the maximum output power.

LTE Band 2

EUT Configure Mode	Test item	Available channel	Tested Channel	Channel Bandwidth	Modulation	Mode
-	EIRP	18607 to 19193	18607 (1850.7MHz), 18900 (1880.0MHz), 19193 (1909.3MHz)	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
		18615 to 19185	18615 (1851.5MHz), 18900 (1880.0MHz), 19185 (1908.5MHz)	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
		18625 to 19175	18625 (1852.5MHz), 18900 (1880.0MHz), 19175 (1907.5MHz)	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
		18650 to 19150	18650 (1855.0MHz), 18900 (1880.0MHz), 19150 (1905.0MHz)	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
		18675 to 19125	18675 (1857.5MHz), 18900 (1880.0MHz), 19125 (1902.5MHz)	15MHz	QPSK / 16QAM / 64QAM / 256QAM	1 RB / 0 RB Offset 1 RB / 37 RB Offset 1 RB / 74 RB Offset 36 RB / 0 RB Offset 36 RB / 19 RB Offset 36 RB / 39 RB Offset 75 RB / 0 RB Offset
		18700 to 19100	18700 (1860.0MHz), 18900 (1880.0MHz), 19100 (1900.0MHz)	20MHz	QPSK / 16QAM / 64QAM / 256QAM	1 RB / 0 RB Offset 1 RB / 50 RB Offset 1 RB / 99 RB Offset 50 RB / 0 RB Offset 50 RB / 25 RB Offset 50 RB / 50 RB Offset 100 RB / 0 RB Offset

EUT Configure Mode	Test item	Available channel	Tested Channel	Channel Bandwidth	Modulation	Mode
-	Radiated Emission Below 1GHz	18607 to 19193	19193 (1909.3MHz)	1.4MHz	QPSK	1 RB / 0 RB Offset
-	Radiated Emission Above 1GHz	18607 to 19193	18607 (1850.7MHz), 18900 (1880.0MHz), 19193 (1909.3MHz)	1.4MHz	QPSK	1 RB / 0 RB Offset
		18625 to 19175	18625 (1852.5MHz), 18900 (1880.0MHz), 19175 (1907.5MHz)	5MHz	QPSK	1 RB / 0 RB Offset
		18700 to 19100	18700 (1860.0MHz), 18900 (1880.0MHz), 19100 (1900.0MHz)	20MHz	QPSK	1 RB / 0 RB Offset

Note:

1. For radiated emission below 1GHz, select the worst radiated emission channel (above 1GHz) for final testing.
2. For radiated emission above 1GHz, according to 3GPP 36.521 Section 6.6.3.1.4, choose the lowest, 5MHz & highest channel bandwidth for final test.
3. The output power for QPSK, 16QAM, 64QAM and 256QAM, measured value of QPSK is higher than 16QAM, 64QAM and 256QAM mode. Therefore the radiated emission test items was performed under QPSK mode only.

LTE Band 66

EUT Configure Mode	Test Item	Available Channel	Tested Channel	Channel Bandwidth	Modulation	Mode
-	EIRP	131979 to 132665	131979 (1710.7MHz), 132322 (1745.0MHz), 132665 (1779.3MHz)	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
		131987 to 132657	131987 (1711.5MHz), 132322 (1745.0MHz), 132657 (1778.5MHz)	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
		131997 to 132647	131997 (1712.5MHz), 132322 (1745.0MHz), 132647 (1777.5MHz)	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
		132022 to 132622	132022 (1715.0MHz), 132322 (1745.0MHz), 132622 (1775.0MHz)	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
		132047 to 132597	132047 (1717.5MHz), 132322 (1745.0MHz), 132597 (1772.5MHz)	15MHz	QPSK / 16QAM / 64QAM / 256QAM	1 RB / 0 RB Offset 1 RB / 37 RB Offset 1 RB / 74 RB Offset 36 RB / 0 RB Offset 36 RB / 19 RB Offset 36 RB / 39 RB Offset 75 RB / 0 RB Offset
		132072 to 132572	132072 (1720.0MHz), 132322 (1745.0MHz), 132572 (1770.0MHz)	20MHz	QPSK / 16QAM / 64QAM / 256QAM	1 RB / 0 RB Offset 1 RB / 50 RB Offset 1 RB / 99 RB Offset 50 RB / 0 RB Offset 50 RB / 25 RB Offset 50 RB / 50 RB Offset 100 RB / 0 RB Offset

EUT Configure Mode	Test Item	Available Channel	Tested Channel	Channel Bandwidth	Modulation	Mode
-	Radiated Emission Below 1GHz	132072 to 132572	132572 (1770.0MHz)	20MHz	QPSK	1 RB / 0 RB Offset
-	Radiated Emission Above 1GHz	131979 to 132665	131979 (1710.7MHz), 132322 (1745.0MHz), 132665 (1779.3MHz)	1.4MHz	QPSK	1 RB / 0 RB Offset
		131997 to 132647	131997 (1712.5MHz), 132322 (1745.0MHz), 132647 (1777.5MHz)	5MHz	QPSK	1 RB / 0 RB Offset
		132072 to 132572	132072 (1720.0MHz), 132322 (1745.0MHz), 132572 (1770.0MHz)	20MHz	QPSK	1 RB / 0 RB Offset

**Note:**

1. For radiated emission below 1GHz, select the worst radiated emission channel (above 1GHz) for final testing.
2. For radiated emission above 1GHz, according to 3GPP 36.521 Section 6.6.3.1.4, choose the lowest, 5MHz & highest channel bandwidth for final test.
3. The output power for QPSK, 16QAM, 64QAM and 256QAM, measured value of QPSK is higher than 16QAM, 64QAM and 256QAM mode. Therefore the radiated emission test items was performed under QPSK mode only.

**Test Condition:**

Test Item	Environmental Conditions	Input Power	Tested By
EIRP / ERP	25deg. C, 60%RH	120Vac, 60Hz	James Yang
Modulation Characteristics	25deg. C, 60%RH	120Vac, 60Hz	James Yang
Frequency Stability	25deg. C, 60%RH	7.74Vdc	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	23deg. C, 67%RH 25deg. C, 65%RH	120Vac, 60Hz	Adair Peng Tank Wu

### **3.4 EUT Operating Conditions**

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

### **3.5 General Description of Applied Standards and References**

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

#### **Test Standard:**

**FCC 47 CFR Part 2**

**FCC 47 CFR Part 24**

**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**

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

## 4 Test Types and Results

### 4.1 Output Power Measurement

#### 4.1.1 Limits of Output Power Measurement

For n12:

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.

For LTE Band 2:

Mobile / Portable station are limited to 2 watts e.i.r.p.

For LTE Band 66:

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

#### 4.1.2 Test Procedures

##### Conducted Power Measurement:

The EUT was set up for the maximum power with 5GNR and LTE link data modulation and link up with simulator. Set the EUT to transmit under low, middle and high channel and record the power level shown on simulator.

##### Maximum EIRP / ERP

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

$$\text{EIRP} = P_{\text{Meas}} + G_{\text{T}}$$

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

where

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

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

$G_{\text{T}}$  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)

NR Band 12						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		141300	141500	141700
		Frequency (MHz)		706.5	707.5	708.5
15M	$\pi/2$ BPSK	1	1	24.74	24.89	24.80
		1	40	24.73	24.84	24.75
		1	77	24.68	24.91	24.66
		36	0	24.01	24.29	24.17
		36	22	24.66	24.85	24.76
		36	43	24.05	24.30	24.09
		75	0	24.03	24.27	24.18
15M	QPSK	1	1	24.82	24.96	24.86
		1	40	24.77	24.92	24.82
		1	77	24.78	24.93	24.76
		36	0	23.56	23.88	23.73
		36	22	24.74	24.90	24.80
		36	43	23.55	23.88	23.69
		75	0	23.61	23.79	23.72
15M	16QAM	1	1	23.53	23.86	23.67
15M	64QAM	1	1	22.02	22.36	22.15
15M	256QAM	1	1	19.97	20.36	20.16
BW	MCS Index	Channel		140800	141500	142200
		Frequency (MHz)		704	707.5	711
10M	$\pi/2$ BPSK	1	1	24.68	24.86	24.70
		1	26	24.64	24.76	24.71
		1	50	24.68	24.86	24.60
		25	0	23.97	24.19	24.16
		25	14	24.56	24.79	24.75
		25	27	24.01	24.30	24.03
		50	0	23.95	24.19	24.10
10M	QPSK	1	1	24.74	24.92	24.76
		1	26	24.77	24.90	24.79
		1	50	24.76	24.93	24.72
		25	0	23.49	23.79	23.73
		25	14	24.66	24.86	24.70
		25	27	23.52	23.82	23.64
		50	0	23.57	23.74	23.64
10M	16QAM	1	1	23.45	23.76	23.65
10M	64QAM	1	1	21.97	22.28	22.10
10M	256QAM	1	1	19.87	20.35	20.13

NR Band 12						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		140300	141500	142700
		Frequency (MHz)		701.5	707.5	713.5
5M	$\pi/2$ BPSK	1	1	24.74	24.80	24.72
		1	13	24.64	24.76	24.69
		1	23	24.60	24.85	24.58
		12	0	23.93	24.25	24.10
		12	7	24.62	24.85	24.67
		12	13	24.03	24.29	24.07
		25	0	23.98	24.27	24.08
5M	QPSK	1	1	24.76	24.87	24.78
		1	13	24.74	24.91	24.72
		1	23	24.77	24.85	24.71
		12	0	23.49	23.86	23.63
		12	7	24.73	24.80	24.74
		12	13	23.51	23.83	23.59
		25	0	23.53	23.75	23.64
5M	16QAM	1	1	23.50	23.83	23.67
5M	64QAM	1	1	21.92	22.31	22.10
5M	256QAM	1	1	19.93	20.36	20.10

LTE Band 2						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		18700	18900	19100
		Frequency (MHz)		1860	1880	1900
20M	QPSK	1	0	23.87	23.77	23.71
		1	50	23.63	23.47	23.72
		1	99	23.68	23.42	23.71
		50	0	22.55	22.79	22.61
		50	25	22.75	22.59	22.67
		50	50	22.60	22.68	22.73
		100	0	22.84	22.44	22.72
20M	16QAM	1	0	22.75	22.63	22.84
		1	50	22.58	22.58	22.54
		1	99	22.60	22.76	22.57
		50	0	21.63	21.46	21.74
		50	25	21.63	21.53	21.35
		50	50	21.47	21.31	21.42
		100	0	21.36	21.68	21.42
20M	64QAM	1	0	21.50	21.64	21.60
		1	50	21.67	21.72	21.66
		1	99	21.65	21.69	21.69
		50	0	20.68	20.47	20.52
		50	25	20.55	20.39	20.43
		50	50	20.34	20.47	20.47
		100	0	20.50	20.58	20.58
20M	256QAM	1	0	18.58	18.42	18.38
		1	50	18.23	18.41	18.33
		1	99	18.28	17.97	18.15
		50	0	18.10	18.07	17.89
		50	25	18.30	18.15	18.31
		50	50	18.24	18.43	18.28
		100	0	18.15	18.17	18.03

LTE Band 2						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		18675	18900	19125
		Frequency (MHz)		1857.5	1880	1902.5
15M	QPSK	1	0	23.49	23.38	23.61
		1	37	23.50	23.49	23.58
		1	74	23.60	23.57	23.46
		36	0	22.79	22.55	22.72
		36	19	22.53	22.53	22.58
		36	39	22.53	22.64	22.56
		75	0	22.67	22.64	22.50
15M	16QAM	1	0	22.78	22.90	22.83
		1	37	22.61	22.59	22.44
		1	74	22.37	22.60	22.62
		36	0	21.50	21.38	21.41
		36	19	21.40	21.51	21.28
		36	39	21.28	21.45	21.41
		75	0	21.33	21.41	21.35
15M	64QAM	1	0	21.73	21.61	21.45
		1	37	21.60	21.41	21.43
		1	74	21.44	21.38	21.69
		36	0	20.45	20.66	20.66
		36	19	20.62	20.49	20.50
		36	39	20.51	20.35	20.45
		75	0	20.50	20.54	20.47
15M	256QAM	1	0	18.17	18.14	18.54
		1	37	18.32	18.18	18.00
		1	74	18.00	18.13	18.17
		36	0	17.30	17.30	17.18
		36	19	17.30	16.92	17.11
		36	39	17.31	17.34	17.19
		75	0	17.33	16.92	17.03

LTE Band 2						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		18650	18900	19150
		Frequency (MHz)		1855	1880	1905
10M	QPSK	1	0	23.54	23.68	23.42
		1	24	23.48	23.46	23.41
		1	49	23.60	23.47	23.58
		25	0	22.48	22.38	22.67
		25	12	22.35	22.44	22.45
		25	25	22.46	22.31	22.66
		50	0	22.55	22.44	22.54
10M	16QAM	1	0	22.81	22.55	22.69
		1	24	22.61	22.56	22.59
		1	49	22.75	22.52	22.69
		25	0	21.37	21.54	21.46
		25	12	21.48	21.30	21.24
		25	25	21.31	21.30	21.32
		50	0	21.23	21.45	21.31
10M	64QAM	1	0	21.53	21.53	21.64
		1	24	21.57	21.36	21.59
		1	49	21.33	21.29	21.42
		25	0	20.44	20.27	20.41
		25	12	20.37	20.51	20.25
		25	25	20.67	20.36	20.51
		50	0	20.36	20.35	20.42
10M	256QAM	1	0	18.37	18.48	18.33
		1	24	17.87	18.07	17.93
		1	49	17.90	18.05	17.89
		25	0	17.05	17.21	17.24
		25	12	17.02	17.14	17.13
		25	25	17.14	17.33	17.18
		50	0	16.96	16.80	17.20

LTE Band 2						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		18625	18900	19175
		Frequency (MHz)		1852.5	1880	1907.5
5M	QPSK	1	0	23.57	23.46	23.39
		1	12	23.50	23.49	23.31
		1	24	23.54	23.51	23.42
		12	0	22.57	22.60	22.45
		12	6	22.39	22.58	22.42
		12	13	22.58	22.24	22.24
		25	0	22.60	22.38	22.39
5M	16QAM	1	0	22.50	22.52	22.51
		1	12	22.64	22.50	22.38
		1	24	22.49	22.62	22.42
		12	0	21.31	21.37	21.54
		12	6	21.55	21.37	21.45
		12	13	21.42	21.25	21.31
		25	0	21.40	21.28	21.56
5M	64QAM	1	0	21.36	21.61	21.33
		1	12	21.50	21.25	21.35
		1	24	21.38	21.41	21.68
		12	0	20.55	20.41	20.58
		12	6	20.31	20.36	20.55
		12	13	20.44	20.48	20.37
		25	0	20.51	20.50	20.63
5M	256QAM	1	0	18.21	18.01	18.14
		1	12	18.04	18.34	17.80
		1	24	18.36	18.18	17.89
		12	0	17.47	17.14	17.22
		12	6	17.40	16.84	17.33
		12	13	17.01	16.97	16.96
		25	0	17.23	17.10	17.03

LTE Band 2						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		18615	18900	19185
		Frequency (MHz)		1851.5	1880	1908.5
3M	QPSK	1	0	23.47	23.49	23.59
		1	7	23.27	23.34	23.36
		1	14	23.63	23.56	23.45
		8	0	22.52	22.59	22.35
		8	3	22.40	22.57	22.42
		8	7	22.40	22.37	22.38
		15	0	22.56	22.47	22.69
3M	16QAM	1	0	22.62	22.74	22.54
		1	7	22.67	22.46	22.58
		1	14	22.41	22.54	22.62
		8	0	21.43	21.30	21.40
		8	3	21.32	21.50	21.35
		8	7	21.15	21.40	21.31
		15	0	21.24	21.43	21.29
3M	64QAM	1	0	21.49	21.56	21.57
		1	7	21.56	21.76	21.67
		1	14	21.31	21.39	21.66
		8	0	20.28	20.29	20.48
		8	3	20.38	20.22	20.26
		8	7	20.27	20.40	20.24
		15	0	20.56	20.67	20.37
3M	256QAM	1	0	18.30	18.31	17.94
		1	7	18.03	18.07	18.18
		1	14	18.38	18.16	18.16
		8	0	17.12	17.16	16.93
		8	3	17.09	17.02	17.45
		8	7	17.42	17.24	17.44
		15	0	17.37	17.02	17.39

LTE Band 2						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		18607	18900	19193
		Frequency (MHz)		1850.7	1880	1909.3
1.4M	QPSK	1	0	23.51	23.43	23.47
		1	2	23.59	23.40	23.54
		1	5	23.41	23.22	23.26
		3	0	23.58	23.59	23.56
		3	1	23.66	23.49	23.54
		3	3	23.52	23.47	23.36
		6	0	22.49	22.32	22.68
1.4M	16QAM	1	0	22.82	22.50	22.66
		1	2	22.37	22.42	22.51
		1	5	22.55	22.38	22.43
		3	0	22.35	22.42	22.56
		3	1	22.51	22.29	22.32
		3	3	22.50	22.57	22.37
		6	0	21.37	21.38	21.40
1.4M	64QAM	1	0	21.69	21.42	21.48
		1	2	21.44	21.33	21.44
		1	5	21.48	21.50	21.39
		3	0	21.48	21.51	21.35
		3	1	21.43	21.30	21.27
		3	3	21.42	21.32	21.39
		6	0	20.43	20.55	20.42
1.4M	256QAM	1	0	18.24	17.95	18.46
		1	2	17.98	18.13	18.32
		1	5	17.91	18.12	18.10
		3	0	18.25	18.32	18.37
		3	1	18.22	18.01	18.02
		3	3	18.08	18.08	18.13
		6	0	17.15	17.37	17.08

LTE Band 66						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		132072	132322	132572
		Frequency (MHz)		1720	1745	1770
20M	QPSK	1	0	23.16	23.66	23.72
		1	50	23.20	23.58	23.70
		1	99	22.71	23.27	23.36
		50	0	22.50	22.40	22.73
		50	25	22.44	22.56	22.63
		50	50	22.20	22.57	22.63
		100	0	22.31	22.51	22.63
20M	16QAM	1	0	22.74	22.73	22.47
		1	50	22.66	22.59	22.48
		1	99	22.44	22.62	22.74
		50	0	21.52	21.66	21.58
		50	25	21.27	21.48	21.41
		50	50	21.42	21.53	21.34
		100	0	21.20	21.45	21.54
20M	64QAM	1	0	21.32	21.66	21.72
		1	50	21.30	21.67	21.55
		1	99	21.21	21.44	21.49
		50	0	20.46	20.59	20.79
		50	25	20.37	20.69	20.60
		50	50	20.48	20.61	20.68
		100	0	20.31	20.81	20.64
20M	256QAM	1	0	17.79	17.99	18.46
		1	50	17.94	18.29	18.32
		1	99	17.51	17.52	18.08
		50	0	16.95	17.16	17.51
		50	25	16.97	17.36	17.46
		50	50	16.83	17.38	17.46
		100	0	17.10	17.30	17.26

LTE Band 66						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		132047	132322	132597
		Frequency (MHz)		1717.5	1745	1772.5
15M	QPSK	1	0	23.33	23.48	23.69
		1	37	23.17	23.28	23.54
		1	74	22.82	23.11	23.36
		36	0	22.24	22.51	22.88
		36	19	22.17	22.38	22.75
		36	39	22.08	22.56	22.66
		75	0	22.25	22.44	22.47
15M	16QAM	1	0	22.40	22.40	22.47
		1	37	22.48	22.36	22.54
		1	74	22.43	22.30	22.65
		36	0	21.20	21.66	21.51
		36	19	21.54	21.47	21.40
		36	39	21.10	21.47	21.60
		75	0	21.46	21.74	21.42
15M	64QAM	1	0	21.08	21.77	21.91
		1	37	21.20	21.43	21.51
		1	74	21.01	21.53	21.49
		36	0	20.59	20.63	20.66
		36	19	20.49	20.68	20.73
		36	39	20.39	20.75	20.79
		75	0	20.51	20.83	20.59
15M	256QAM	1	0	17.71	18.16	18.52
		1	37	17.69	18.24	18.27
		1	74	17.63	17.79	17.88
		36	0	16.79	16.84	17.36
		36	19	17.00	17.11	17.26
		36	39	16.94	16.96	17.38
		75	0	16.88	17.06	17.46

LTE Band 66						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		132022	132322	132622
		Frequency (MHz)		1715	1745	1775
10M	QPSK	1	0	23.08	23.50	23.49
		1	24	22.94	23.50	23.47
		1	49	22.79	23.15	23.26
		25	0	22.29	22.26	22.72
		25	12	22.37	22.34	22.70
		25	25	22.03	22.30	22.54
		50	0	22.30	22.43	22.81
10M	16QAM	1	0	22.34	22.32	22.46
		1	24	22.58	22.41	22.39
		1	49	22.18	22.43	22.40
		25	0	21.09	21.49	21.39
		25	12	21.23	21.28	21.33
		25	25	21.26	21.43	21.30
		50	0	21.31	21.61	21.31
10M	64QAM	1	0	21.03	21.46	21.60
		1	24	21.10	21.41	21.53
		1	49	20.82	21.35	21.50
		25	0	20.28	20.81	20.60
		25	12	20.44	20.45	20.64
		25	25	20.25	20.71	20.51
		50	0	20.43	20.63	20.57
10M	256QAM	1	0	17.57	18.15	18.42
		1	24	17.84	17.89	18.11
		1	49	17.06	17.72	17.46
		25	0	16.68	17.06	17.23
		25	12	17.13	16.88	17.18
		25	25	16.65	16.74	17.35
		50	0	17.21	16.96	17.57

LTE Band 66						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		131997	132322	132647
		Frequency (MHz)		1712.5	1745	1777.5
5M	QPSK	1	0	23.14	23.65	23.63
		1	12	23.22	23.41	23.62
		1	24	22.45	22.93	23.06
		12	0	22.28	22.46	22.62
		12	6	22.32	22.45	22.70
		12	13	22.16	22.26	22.60
		25	0	22.15	22.44	22.53
5M	16QAM	1	0	22.52	22.30	22.64
		1	12	22.37	22.23	22.78
		1	24	22.22	22.29	22.38
		12	0	21.29	21.52	21.54
		12	6	21.19	21.71	21.58
		12	13	21.15	21.28	21.25
		25	0	21.14	21.55	21.46
5M	64QAM	1	0	21.03	21.68	21.62
		1	12	21.10	21.49	21.60
		1	24	21.02	21.32	21.67
		12	0	20.45	20.67	20.53
		12	6	20.06	20.65	20.67
		12	13	20.33	20.35	20.48
		25	0	20.20	20.70	20.79
5M	256QAM	1	0	17.91	18.30	18.30
		1	12	17.84	17.89	18.14
		1	24	17.29	17.31	18.08
		12	0	16.66	17.02	16.84
		12	6	16.79	16.85	17.31
		12	13	16.85	17.11	16.74
		25	0	16.68	16.96	17.32

LTE Band 66						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		131987	132322	132657
		Frequency (MHz)		1711.5	1745	1778.5
3M	QPSK	1	0	22.97	23.42	23.58
		1	7	22.77	23.28	23.62
		1	14	22.51	22.87	23.14
		8	0	22.25	22.37	22.63
		8	3	22.34	22.55	22.56
		8	7	22.37	22.44	22.47
		15	0	22.13	22.42	22.66
3M	16QAM	1	0	22.58	22.40	22.68
		1	7	22.27	22.34	22.62
		1	14	22.44	22.52	22.66
		8	0	21.04	21.43	21.41
		8	3	21.38	21.31	21.35
		8	7	21.24	21.43	21.59
		15	0	21.45	21.20	21.44
3M	64QAM	1	0	21.44	21.70	21.54
		1	7	21.13	21.57	21.64
		1	14	20.96	21.29	21.43
		8	0	20.53	20.68	20.41
		8	3	20.31	20.64	20.34
		8	7	20.15	20.50	20.74
		15	0	20.15	20.53	20.54
3M	256QAM	1	0	17.85	17.97	18.24
		1	7	17.75	18.03	18.51
		1	14	17.19	17.52	17.73
		8	0	16.87	17.09	17.31
		8	3	16.91	17.19	16.89
		8	7	16.92	16.89	16.93
		15	0	16.78	16.93	17.23

LTE Band 66						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		131979	132322	132665
		Frequency (MHz)		1710.7	1745	1779.3
1.4M	QPSK	1	0	23.16	23.57	23.64
		1	2	23.03	23.25	23.60
		1	5	22.73	23.01	23.41
		3	0	23.11	23.56	23.67
		3	1	23.34	23.27	23.54
		3	3	23.37	23.52	23.64
		6	0	22.29	22.41	22.48
1.4M	16QAM	1	0	22.53	22.55	22.51
		1	2	22.37	22.40	22.31
		1	5	22.38	22.21	22.39
		3	0	22.35	22.59	22.45
		3	1	22.11	22.37	22.29
		3	3	22.29	22.34	22.21
		6	0	21.34	21.34	21.37
1.4M	64QAM	1	0	21.27	21.53	21.47
		1	2	21.28	21.63	21.47
		1	5	21.10	21.51	21.66
		3	0	21.21	21.49	21.49
		3	1	21.09	21.58	21.82
		3	3	21.13	21.74	21.67
		6	0	20.14	20.75	20.54
1.4M	256QAM	1	0	17.64	17.70	17.93
		1	2	17.52	17.70	17.78
		1	5	17.29	17.23	17.74
		3	0	17.71	17.72	17.78
		3	1	17.83	17.49	17.59
		3	3	17.17	17.08	17.34
		6	0	16.88	17.11	16.82

**EIRP / ERP Power (dBm)**

NR Band 12						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		141300	141500	141700
		Frequency (MHz)		706.5	707.5	708.5
15M	$\pi/2$ BPSK	1	1	20.46	20.61	20.52
		1	40	20.45	20.56	20.47
		1	77	20.40	20.63	20.38
		36	0	19.73	20.01	19.89
		36	22	20.38	20.57	20.48
		36	43	19.77	20.02	19.81
		75	0	19.75	19.99	19.90
15M	QPSK	1	1	20.54	20.68	20.58
		1	40	20.49	20.64	20.54
		1	77	20.50	20.65	20.48
		36	0	19.28	19.60	19.45
		36	22	20.46	20.62	20.52
		36	43	19.27	19.60	19.41
		75	0	19.33	19.51	19.44
15M	16QAM	1	1	19.25	19.58	19.39
15M	64QAM	1	1	17.74	18.08	17.87
15M	256QAM	1	1	15.69	16.08	15.88
BW	MCS Index	Channel		140800	141500	142200
		Frequency (MHz)		704	707.5	711
10M	$\pi/2$ BPSK	1	1	20.40	20.58	20.42
		1	26	20.36	20.48	20.43
		1	50	20.40	20.58	20.32
		25	0	19.69	19.91	19.88
		25	14	20.28	20.51	20.47
		25	27	19.73	20.02	19.75
		50	0	19.67	19.91	19.82
10M	QPSK	1	1	20.46	20.64	20.48
		1	26	20.49	20.62	20.51
		1	50	20.48	20.65	20.44
		25	0	19.21	19.51	19.45
		25	14	20.38	20.58	20.42
		25	27	19.24	19.54	19.36
		50	0	19.29	19.46	19.36
10M	16QAM	1	1	19.17	19.48	19.37
10M	64QAM	1	1	17.69	18.00	17.82
10M	256QAM	1	1	15.59	16.07	15.85

NR Band 12						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		140300	141500	142700
		Frequency (MHz)		701.5	707.5	713.5
5M	$\pi/2$ BPSK	1	1	20.46	20.52	20.44
		1	13	20.36	20.48	20.41
		1	23	20.32	20.57	20.30
		12	0	19.65	19.97	19.82
		12	7	20.34	20.57	20.39
		12	13	19.75	20.01	19.79
		25	0	19.70	19.99	19.80
5M	QPSK	1	1	20.48	20.59	20.50
		1	13	20.46	20.63	20.44
		1	23	20.49	20.57	20.43
		12	0	19.21	19.58	19.35
		12	7	20.45	20.52	20.46
		12	13	19.23	19.55	19.31
		25	0	19.25	19.47	19.36
5M	16QAM	1	1	19.22	19.55	19.39
5M	64QAM	1	1	17.64	18.03	17.82
5M	256QAM	1	1	15.65	16.08	15.82

LTE Band 2						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		18700	18900	19100
		Frequency (MHz)		1860	1880	1900
20M	QPSK	1	0	22.47	22.38	22.31
		1	50	22.24	22.07	22.33
		1	99	22.29	22.03	22.31
		50	0	21.15	21.39	21.22
		50	25	21.36	21.20	21.28
		50	50	21.21	21.29	21.34
		100	0	21.44	21.04	21.32
20M	16QAM	1	0	21.36	21.23	21.44
		1	50	21.19	21.19	21.14
		1	99	21.21	21.37	21.18
		50	0	20.23	20.07	20.34
		50	25	20.23	20.14	19.96
		50	50	20.07	19.92	20.02
		100	0	19.97	20.28	20.03
20M	64QAM	1	0	20.11	20.25	20.20
		1	50	20.28	20.32	20.26
		1	99	20.26	20.30	20.29
		50	0	19.29	19.07	19.12
		50	25	19.15	19.00	19.04
		50	50	18.95	19.08	19.08
		100	0	19.10	19.19	19.19
20M	256QAM	1	0	17.19	17.02	16.99
		1	50	16.84	17.02	16.94
		1	99	16.89	16.58	16.76
		50	0	16.71	16.68	16.50
		50	25	16.91	16.76	16.92
		50	50	16.85	17.04	16.89
		100	0	16.76	16.77	16.64

LTE Band 2						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		18675	18900	19125
		Frequency (MHz)		1857.5	1880	1902.5
15M	QPSK	1	0	22.10	21.99	22.22
		1	37	22.11	22.10	22.19
		1	74	22.20	22.18	22.06
		36	0	21.39	21.16	21.33
		36	19	21.13	21.14	21.19
		36	39	21.13	21.25	21.17
		75	0	21.28	21.25	21.11
15M	16QAM	1	0	21.39	21.51	21.44
		1	37	21.22	21.19	21.05
		1	74	20.97	21.21	21.23
		36	0	20.10	19.99	20.01
		36	19	20.01	20.12	19.88
		36	39	19.89	20.05	20.02
		75	0	19.94	20.02	19.95
15M	64QAM	1	0	20.33	20.22	20.06
		1	37	20.21	20.02	20.04
		1	74	20.04	19.99	20.30
		36	0	19.06	19.26	19.27
		36	19	19.23	19.09	19.10
		36	39	19.12	18.96	19.06
		75	0	19.11	19.14	19.08
15M	256QAM	1	0	16.78	16.75	17.14
		1	37	16.93	16.79	16.61
		1	74	16.60	16.74	16.77
		36	0	15.90	15.91	15.78
		36	19	15.90	15.52	15.72
		36	39	15.91	15.94	15.79
		75	0	15.94	15.52	15.64

LTE Band 2						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		18650	18900	19150
		Frequency (MHz)		1855	1880	1905
10M	QPSK	1	0	22.15	22.29	22.02
		1	24	22.08	22.07	22.02
		1	49	22.21	22.07	22.18
		25	0	21.09	20.99	21.27
		25	12	20.95	21.05	21.05
		25	25	21.07	20.92	21.27
		50	0	21.16	21.04	21.14
10M	16QAM	1	0	21.42	21.16	21.30
		1	24	21.22	21.17	21.19
		1	49	21.36	21.13	21.29
		25	0	19.98	20.14	20.07
		25	12	20.09	19.91	19.85
		25	25	19.92	19.90	19.93
		50	0	19.83	20.06	19.92
10M	64QAM	1	0	20.14	20.13	20.25
		1	24	20.18	19.97	20.20
		1	49	19.94	19.89	20.02
		25	0	19.05	18.88	19.02
		25	12	18.98	19.12	18.86
		25	25	19.28	18.96	19.12
		50	0	18.97	18.96	19.03
10M	256QAM	1	0	16.98	17.09	16.94
		1	24	16.47	16.68	16.53
		1	49	16.50	16.66	16.49
		25	0	15.66	15.82	15.84
		25	12	15.63	15.75	15.73
		25	25	15.75	15.94	15.78
		50	0	15.57	15.41	15.81

LTE Band 2						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		18625	18900	19175
		Frequency (MHz)		1852.5	1880	1907.5
5M	QPSK	1	0	22.18	22.07	22.00
		1	12	22.10	22.10	21.92
		1	24	22.15	22.12	22.03
		12	0	21.18	21.21	21.06
		12	6	21.00	21.19	21.02
		12	13	21.19	20.85	20.85
		25	0	21.21	20.98	20.99
5M	16QAM	1	0	21.11	21.13	21.12
		1	12	21.25	21.10	20.99
		1	24	21.10	21.23	21.02
		12	0	19.92	19.98	20.15
		12	6	20.16	19.98	20.06
		12	13	20.03	19.86	19.92
		25	0	20.01	19.88	20.17
5M	64QAM	1	0	19.96	20.21	19.94
		1	12	20.11	19.86	19.96
		1	24	19.98	20.02	20.29
		12	0	19.15	19.01	19.18
		12	6	18.92	18.97	19.16
		12	13	19.04	19.09	18.98
		25	0	19.11	19.11	19.23
5M	256QAM	1	0	16.82	16.62	16.74
		1	12	16.65	16.94	16.41
		1	24	16.96	16.79	16.49
		12	0	16.07	15.75	15.83
		12	6	16.00	15.45	15.93
		12	13	15.62	15.58	15.57
		25	0	15.83	15.70	15.63

LTE Band 2						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		18615	18900	19185
		Frequency (MHz)		1851.5	1880	1908.5
3M	QPSK	1	0	22.08	22.10	22.20
		1	7	21.87	21.95	21.97
		1	14	22.24	22.17	22.06
		8	0	21.13	21.20	20.96
		8	3	21.01	21.18	21.03
		8	7	21.01	20.97	20.99
		15	0	21.16	21.07	21.30
3M	16QAM	1	0	21.22	21.35	21.14
		1	7	21.28	21.06	21.19
		1	14	21.02	21.15	21.22
		8	0	20.04	19.91	20.01
		8	3	19.93	20.10	19.96
		8	7	19.76	20.01	19.92
		15	0	19.85	20.03	19.90
3M	64QAM	1	0	20.09	20.16	20.17
		1	7	20.16	20.37	20.28
		1	14	19.92	20.00	20.26
		8	0	18.88	18.90	19.08
		8	3	18.98	18.82	18.87
		8	7	18.87	19.01	18.85
		15	0	19.17	19.27	18.97
3M	256QAM	1	0	16.91	16.92	16.55
		1	7	16.63	16.68	16.78
		1	14	16.99	16.77	16.76
		8	0	15.73	15.76	15.54
		8	3	15.70	15.63	16.06
		8	7	16.02	15.85	16.04
		15	0	15.97	15.63	16.00

LTE Band 2						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		18607	18900	19193
		Frequency (MHz)		1850.7	1880	1909.3
1.4M	QPSK	1	0	22.11	22.04	22.08
		1	2	22.19	22.01	22.15
		1	5	22.02	21.82	21.87
		3	0	22.18	22.20	22.17
		3	1	22.27	22.09	22.15
		3	3	22.13	22.08	21.96
		6	0	21.10	20.92	21.29
1.4M	16QAM	1	0	21.43	21.11	21.26
		1	2	20.98	21.03	21.11
		1	5	21.16	20.99	21.04
		3	0	20.96	21.03	21.17
		3	1	21.11	20.90	20.93
		3	3	21.10	21.18	20.97
		6	0	19.98	19.98	20.00
1.4M	64QAM	1	0	20.30	20.03	20.09
		1	2	20.04	19.93	20.05
		1	5	20.09	20.10	19.99
		3	0	20.09	20.11	19.96
		3	1	20.03	19.90	19.87
		3	3	20.03	19.93	19.99
		6	0	19.04	19.16	19.03
1.4M	256QAM	1	0	16.85	16.55	17.07
		1	2	16.59	16.74	16.93
		1	5	16.52	16.72	16.71
		3	0	16.86	16.93	16.97
		3	1	16.82	16.62	16.63
		3	3	16.69	16.69	16.73
		6	0	15.76	15.97	15.69

LTE Band 66						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		132072	132322	132572
		Frequency (MHz)		1720	1745	1770
20M	QPSK	1	0	21.47	21.97	22.04
		1	50	21.51	21.90	22.02
		1	99	21.02	21.58	21.67
		50	0	20.81	20.71	21.05
		50	25	20.76	20.88	20.95
		50	50	20.52	20.89	20.95
		100	0	20.63	20.83	20.95
20M	16QAM	1	0	21.06	21.05	20.78
		1	50	20.98	20.90	20.79
		1	99	20.76	20.94	21.06
		50	0	19.84	19.97	19.89
		50	25	19.59	19.80	19.73
		50	50	19.74	19.84	19.66
		100	0	19.52	19.77	19.86
20M	64QAM	1	0	19.64	19.98	20.04
		1	50	19.62	19.98	19.86
		1	99	19.52	19.76	19.80
		50	0	18.78	18.91	19.11
		50	25	18.68	19.01	18.91
		50	50	18.80	18.92	19.00
		100	0	18.63	19.13	18.96
20M	256QAM	1	0	16.11	16.31	16.78
		1	50	16.25	16.60	16.64
		1	99	15.82	15.83	16.40
		50	0	15.27	15.48	15.83
		50	25	15.28	15.68	15.77
		50	50	15.15	15.70	15.78
		100	0	15.42	15.62	15.57

LTE Band 66						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		132047	132322	132597
		Frequency (MHz)		1717.5	1745	1772.5
15M	QPSK	1	0	21.64	21.80	22.00
		1	37	21.48	21.60	21.86
		1	74	21.13	21.43	21.68
		36	0	20.56	20.83	21.20
		36	19	20.48	20.70	21.06
		36	39	20.39	20.88	20.97
		75	0	20.56	20.76	20.79
15M	16QAM	1	0	20.71	20.71	20.79
		1	37	20.80	20.67	20.85
		1	74	20.75	20.62	20.97
		36	0	19.52	19.98	19.82
		36	19	19.86	19.79	19.72
		36	39	19.42	19.78	19.91
		75	0	19.77	20.05	19.73
15M	64QAM	1	0	19.40	20.08	20.22
		1	37	19.52	19.74	19.82
		1	74	19.33	19.85	19.81
		36	0	18.91	18.95	18.98
		36	19	18.80	18.99	19.05
		36	39	18.70	19.07	19.10
		75	0	18.82	19.15	18.91
15M	256QAM	1	0	16.02	16.47	16.84
		1	37	16.00	16.56	16.58
		1	74	15.95	16.11	16.20
		36	0	15.11	15.16	15.67
		36	19	15.32	15.43	15.57
		36	39	15.26	15.28	15.70
		75	0	15.19	15.38	15.78

LTE Band 66						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		132022	132322	132622
		Frequency (MHz)		1715	1745	1775
10M	QPSK	1	0	21.39	21.81	21.81
		1	24	21.26	21.82	21.79
		1	49	21.10	21.46	21.57
		25	0	20.60	20.58	21.03
		25	12	20.69	20.66	21.01
		25	25	20.35	20.61	20.86
		50	0	20.61	20.74	21.12
10M	16QAM	1	0	20.66	20.64	20.78
		1	24	20.90	20.72	20.71
		1	49	20.50	20.75	20.71
		25	0	19.41	19.81	19.71
		25	12	19.55	19.60	19.64
		25	25	19.57	19.74	19.61
		50	0	19.62	19.93	19.62
10M	64QAM	1	0	19.35	19.77	19.91
		1	24	19.42	19.72	19.84
		1	49	19.14	19.67	19.82
		25	0	18.59	19.12	18.92
		25	12	18.75	18.77	18.95
		25	25	18.57	19.02	18.83
		50	0	18.75	18.94	18.89
10M	256QAM	1	0	15.89	16.47	16.74
		1	24	16.15	16.20	16.43
		1	49	15.37	16.04	15.78
		25	0	15.00	15.38	15.55
		25	12	15.45	15.19	15.50
		25	25	14.97	15.06	15.66
		50	0	15.53	15.28	15.89

LTE Band 66						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		131997	132322	132647
		Frequency (MHz)		1712.5	1745	1777.5
5M	QPSK	1	0	21.45	21.97	21.95
		1	12	21.54	21.73	21.93
		1	24	20.76	21.25	21.38
		12	0	20.60	20.77	20.94
		12	6	20.64	20.76	21.01
		12	13	20.47	20.57	20.91
		25	0	20.47	20.76	20.84
5M	16QAM	1	0	20.84	20.62	20.95
		1	12	20.68	20.54	21.09
		1	24	20.53	20.61	20.69
		12	0	19.60	19.83	19.85
		12	6	19.51	20.03	19.89
		12	13	19.47	19.59	19.57
		25	0	19.46	19.87	19.77
5M	64QAM	1	0	19.34	20.00	19.93
		1	12	19.41	19.81	19.91
		1	24	19.34	19.63	19.99
		12	0	18.76	18.99	18.85
		12	6	18.37	18.96	18.99
		12	13	18.64	18.67	18.80
		25	0	18.51	19.02	19.10
5M	256QAM	1	0	16.22	16.62	16.62
		1	12	16.15	16.20	16.46
		1	24	15.60	15.63	16.39
		12	0	14.98	15.34	15.15
		12	6	15.10	15.17	15.63
		12	13	15.17	15.43	15.05
		25	0	15.00	15.27	15.64

LTE Band 66						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		131987	132322	132657
		Frequency (MHz)		1711.5	1745	1778.5
3M	QPSK	1	0	21.28	21.74	21.90
		1	7	21.09	21.60	21.94
		1	14	20.83	21.18	21.45
		8	0	20.57	20.68	20.95
		8	3	20.65	20.86	20.87
		8	7	20.68	20.75	20.78
		15	0	20.45	20.74	20.98
3M	16QAM	1	0	20.89	20.72	20.99
		1	7	20.59	20.65	20.94
		1	14	20.76	20.84	20.98
		8	0	19.36	19.75	19.73
		8	3	19.69	19.62	19.67
		8	7	19.56	19.74	19.91
		15	0	19.76	19.52	19.76
3M	64QAM	1	0	19.75	20.02	19.86
		1	7	19.45	19.89	19.96
		1	14	19.28	19.61	19.75
		8	0	18.84	19.00	18.73
		8	3	18.63	18.96	18.66
		8	7	18.46	18.81	19.05
		15	0	18.47	18.84	18.85
3M	256QAM	1	0	16.17	16.29	16.56
		1	7	16.07	16.35	16.83
		1	14	15.51	15.84	16.04
		8	0	15.18	15.40	15.62
		8	3	15.23	15.51	15.21
		8	7	15.24	15.21	15.25
		15	0	15.09	15.25	15.54

LTE Band 66						
BW	MCS Index	RB Size	RB Offset	Low	Mid	High
		Channel		131979	132322	132665
		Frequency (MHz)		1710.7	1745	1779.3
1.4M	QPSK	1	0	21.48	21.89	21.96
		1	2	21.35	21.57	21.92
		1	5	21.04	21.33	21.73
		3	0	21.42	21.88	21.98
		3	1	21.66	21.58	21.86
		3	3	21.68	21.83	21.96
		6	0	20.60	20.73	20.80
1.4M	16QAM	1	0	20.85	20.87	20.83
		1	2	20.68	20.71	20.63
		1	5	20.70	20.53	20.71
		3	0	20.66	20.91	20.76
		3	1	20.42	20.69	20.61
		3	3	20.60	20.66	20.53
		6	0	19.65	19.65	19.69
1.4M	64QAM	1	0	19.59	19.85	19.79
		1	2	19.59	19.95	19.79
		1	5	19.41	19.83	19.98
		3	0	19.53	19.81	19.81
		3	1	19.40	19.89	20.13
		3	3	19.44	20.05	19.98
		6	0	18.46	19.07	18.86
1.4M	256QAM	1	0	15.96	16.01	16.25
		1	2	15.84	16.02	16.10
		1	5	15.60	15.55	16.06
		3	0	16.03	16.04	16.10
		3	1	16.14	15.81	15.91
		3	3	15.49	15.40	15.65
		6	0	15.19	15.43	15.13

## 4.2 Modulation Characteristics Measurement

### 4.2.1 Limits of Modulation Characteristics

N/A

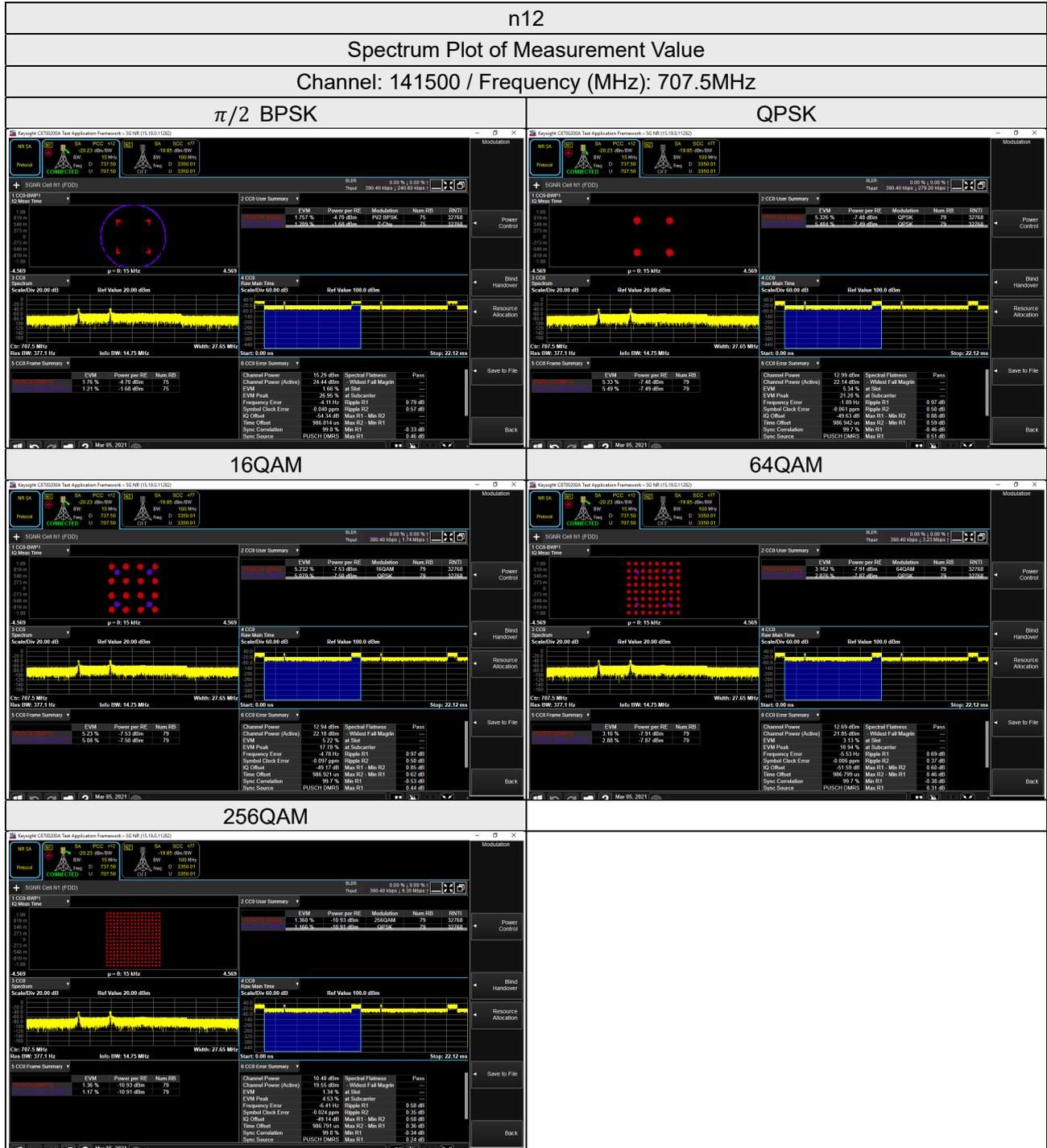
### 4.2.2 Test Procedure

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

### 4.2.3 Test Setup



## 4.2.4 Test Results



### 4.3 Frequency Stability Measurement

#### 4.3.1 Limits of Frequency Stability Measurement

The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

#### 4.3.2 Test Procedure

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

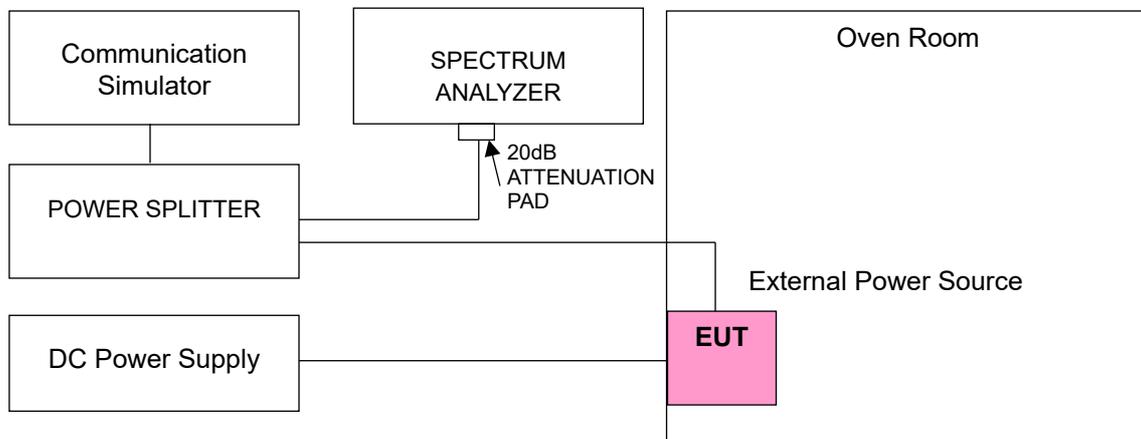
Note: The frequency error was recorded frequency error from the communication simulator.

#### 4.3.3 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
5G Wireless Test Platforms Keysight	E7515B	MY60102114	May 28, 2020	May 27, 2021
Temperature & Humidity Chamber TERCHY	HRM-120RF	931022	Dec. 24, 2020	Dec. 23, 2021
Digital Multimeter Fluke	87-III	70360742	Jun. 23, 2020	Jun. 22, 2021
DC Power Supply Topward	6306A	727263	NA	NA

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

#### 4.3.4 Conducted Setup



### 4.3.5 Test Results

#### Frequency Error vs. Voltage

Voltage (Vdc)	n12			
	Channel Bandwidth 5 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
8.90	701.500002	0.003	713.500000	0.005
7.74	701.500002	0.003	713.500000	0.004
6.58	701.500002	0.002	713.500000	0.003

Note: The applicant defined the normal working voltage is from 6.58Vdc to 8.90Vdc.

#### Frequency Error vs. Temperature

Temp. (°C)	n12			
	Channel Bandwidth 5 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	701.500004	0.005	713.500000	0.003
-20	701.500002	0.003	713.500000	0.006
-10	701.500002	0.003	713.500000	0.003
0	701.500003	0.004	713.500000	0.004
10	701.499999	-0.002	713.500000	-0.005
20	701.499997	-0.005	713.500000	-0.004
30	701.499996	-0.006	713.500000	-0.002
40	701.499997	-0.005	713.500000	-0.005
50	701.499996	-0.006	713.500000	-0.006

Frequency Error vs. Voltage

Voltage (Vdc)	n12			
	Channel Bandwidth 10 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
8.90	704.000003	0.004	711.000002	0.003
7.74	704.000004	0.006	711.000003	0.004
6.58	704.000002	0.003	711.000004	0.005

Note: The applicant defined the normal working voltage is from 6.58Vdc to 8.90Vdc.

Frequency Error vs. Temperature

Temp. (°C)	n12			
	Channel Bandwidth 10 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	704.000003	0.004	711.000003	0.004
-20	704.000002	0.002	711.000002	0.002
-10	704.000003	0.004	711.000002	0.003
0	704.000002	0.003	711.000003	0.004
10	703.999996	-0.006	710.999996	-0.006
20	703.999998	-0.004	710.999998	-0.002
30	703.999998	-0.003	710.999996	-0.005
40	703.999997	-0.005	710.999997	-0.005
50	703.999996	-0.006	710.999999	-0.002

Frequency Error vs. Voltage

Voltage (Vdc)	n12			
	Channel Bandwidth 15 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
8.90	706.500003	0.004	708.500002	0.003
7.74	706.500004	0.006	708.500001	0.002
6.58	706.500002	0.003	708.500003	0.005

Note: The applicant defined the normal working voltage is from 6.58Vdc to 8.90Vdc.

Frequency Error vs. Temperature

Temp. (°C)	n12			
	Channel Bandwidth 15 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	706.500002	0.003	708.500004	0.005
-20	706.500002	0.003	708.500001	0.002
-10	706.500002	0.003	708.500002	0.003
0	706.500004	0.006	708.500004	0.005
10	706.499996	-0.005	708.499999	-0.002
20	706.499998	-0.003	708.499998	-0.004
30	706.499996	-0.005	708.499997	-0.004
40	706.499998	-0.003	708.499997	-0.005
50	706.499997	-0.004	708.499996	-0.006

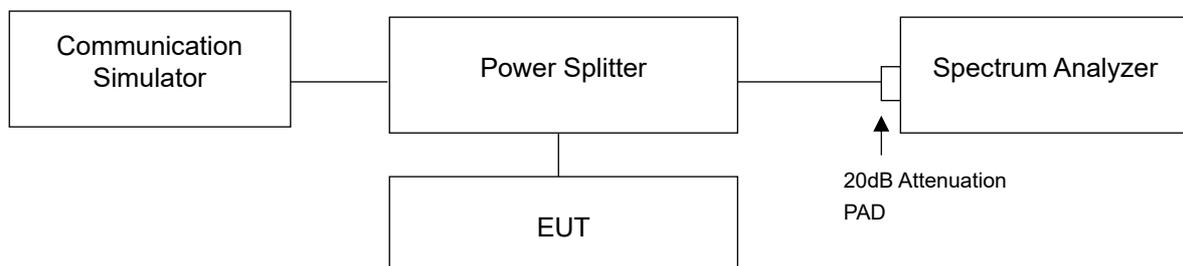
## 4.4 Occupied Bandwidth Measurement

### 4.4.1 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.

### 4.4.2 Test Setup



#### 4.4.3 Test Result

##### Occupied Bandwidth

n12, Channel Bandwidth 5MHz						
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)				
		$\pi/2$ BPSK	QPSK	16QAM	64QAM	256QAM
140300	701.5	4.47	4.47	4.48	4.47	4.47
141500	707.5	4.47	4.47	4.47	4.47	4.47
142700	713.5	4.47	4.47	4.47	4.47	4.47
n12, Channel Bandwidth 10MHz						
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)				
		$\pi/2$ BPSK	QPSK	16QAM	64QAM	256QAM
140800	704.0	9.18	9.29	9.28	9.28	9.29
141500	707.5	9.21	9.28	9.29	9.28	9.26
142200	711.0	9.21	9.28	9.29	9.29	9.28
n12, Channel Bandwidth 15MHz						
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)				
		$\pi/2$ BPSK	QPSK	16QAM	64QAM	256QAM
141300	706.5	13.94	14.11	14.11	14.10	14.11
141500	707.5	13.98	14.11	14.11	14.11	14.11
141700	708.5	13.94	14.11	14.11	14.07	14.10

## Spectrum Plot of Worst Value

### 5MHz / 16QAM



### 10MHz / 16QAM



### 15MHz / 256QAM



26dB Bandwidth

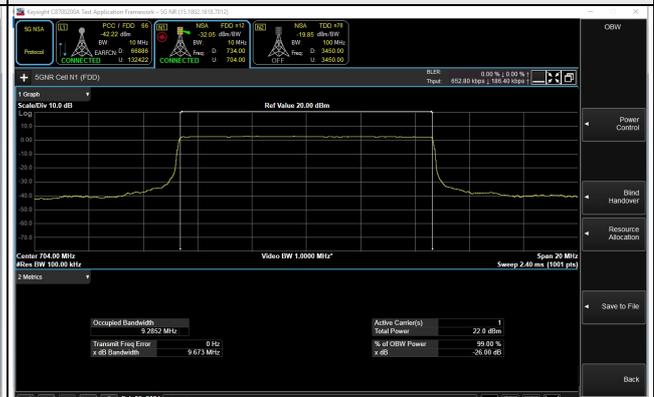
n12, Channel Bandwidth 5MHz						
Channel	Frequency (MHz)	26dB Bandwidth (MHz)				
		$\pi/2$ BPSK	QPSK	16QAM	64QAM	256QAM
140300	701.5	4.74	4.74	4.77	4.78	4.72
141500	707.5	4.73	4.77	4.76	4.73	4.73
142700	713.5	4.74	4.70	4.73	4.70	4.71
n12, Channel Bandwidth 10MHz						
Channel	Frequency (MHz)	26dB Bandwidth (MHz)				
		$\pi/2$ BPSK	QPSK	16QAM	64QAM	256QAM
140800	704.0	9.25	9.67	9.69	9.65	9.64
141500	707.5	9.28	9.66	9.64	9.64	9.64
142200	711.0	9.29	9.63	9.67	9.63	9.64
n12, Channel Bandwidth 15MHz						
Channel	Frequency (MHz)	26dB Bandwidth (MHz)				
		$\pi/2$ BPSK	QPSK	16QAM	64QAM	256QAM
141300	706.5	13.88	14.63	14.62	14.60	14.62
141500	707.5	13.87	14.63	14.61	14.61	14.61
141700	708.5	13.88	14.62	14.63	14.58	14.61

## Spectrum Plot of Worst Value

### 5MHz / 64QAM



### 10MHz / QPSK



### 15MHz / QPSK

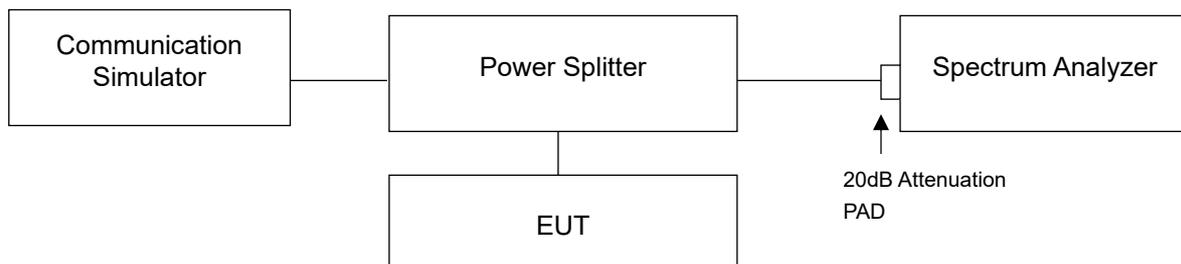


## 4.5 Band Edge Measurement

### 4.5.1 Limits of Band Edge Measurement

According to FCC 27.53(g) for operations in the 600 MHz band and the 698-746 MHz band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least  $43 + 10 \log (P)$  dB. Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kilohertz or greater.

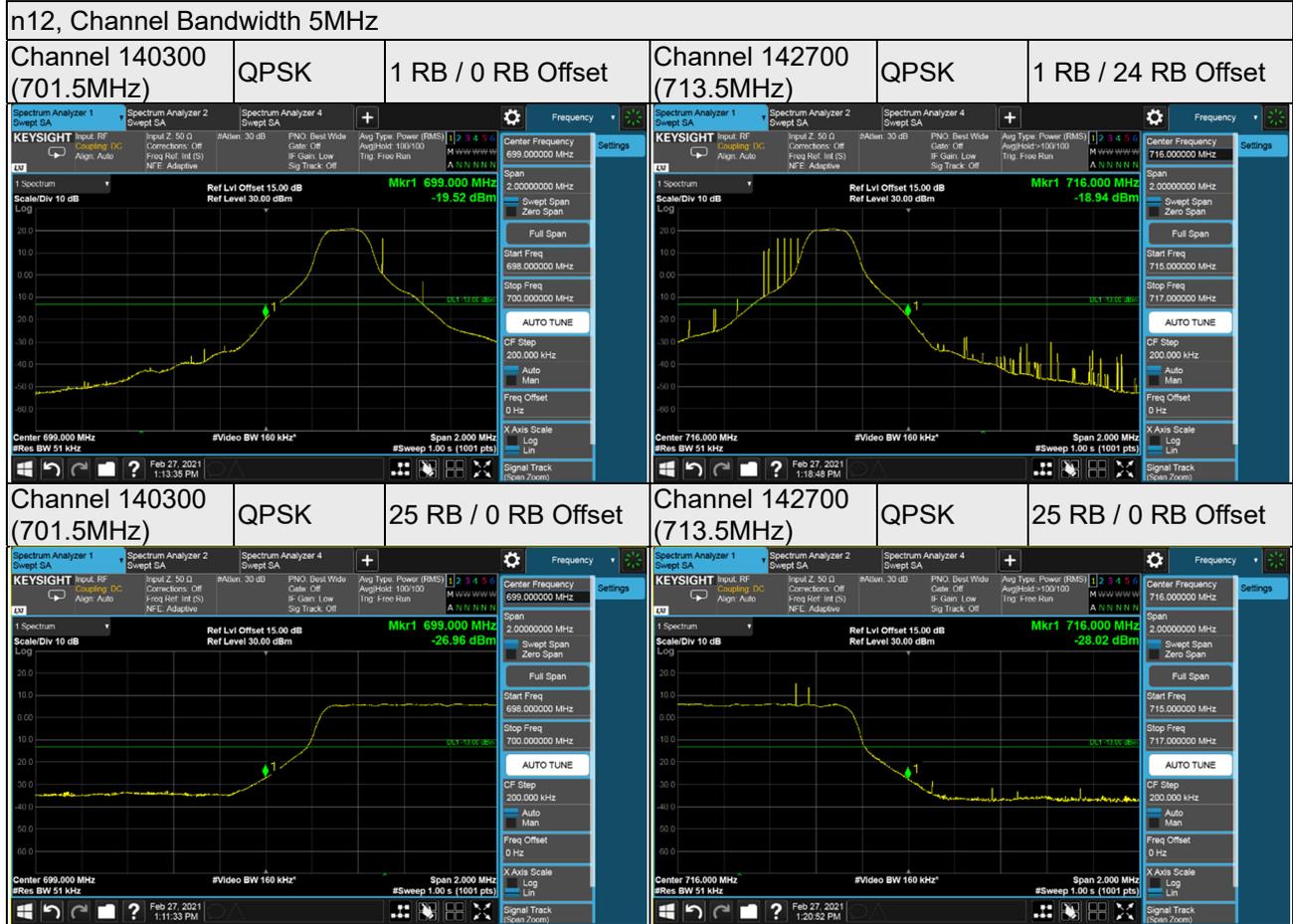
### 4.5.2 Test Setup



### 4.5.3 Test Procedures

- All measurements were done at low and high operational frequency range.
- The center frequency of spectrum is the band edge frequency and span is 2MHz. RB of the spectrum is 51kHz and VB of the spectrum is 160kHz (Channel Bandwidth 5MHz).
- 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 (Channel Bandwidth 10MHz).
- 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 (Channel Bandwidth 15MHz).
- Record the max trace plot into the test report.

### 4.5.4 Test Results



n12, Channel Bandwidth 10MHz

Channel 140800  
(704.0MHz)

QPSK

1 RB / 0 RB Offset

Channel 142200  
(711.0MHz)

QPSK

1 RB / 51 RB Offset



Channel 140800  
(704.0MHz)

QPSK

52 RB / 0 RB Offset

Channel 142200  
(711.0MHz)

QPSK

52 RB / 0 RB Offset



n12, Channel Bandwidth 15MHz

Channel 141300 (706.5MHz)	QPSK	1 RB / 0 RB Offset	Channel 141700 (708.5MHz)	QPSK	1 RB / 78 RB Offset
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Channel 141300 (706.5MHz)	QPSK	79 RB / 0 RB Offset
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Channel 141700 (708.5MHz)	QPSK	79 RB / 0 RB Offset
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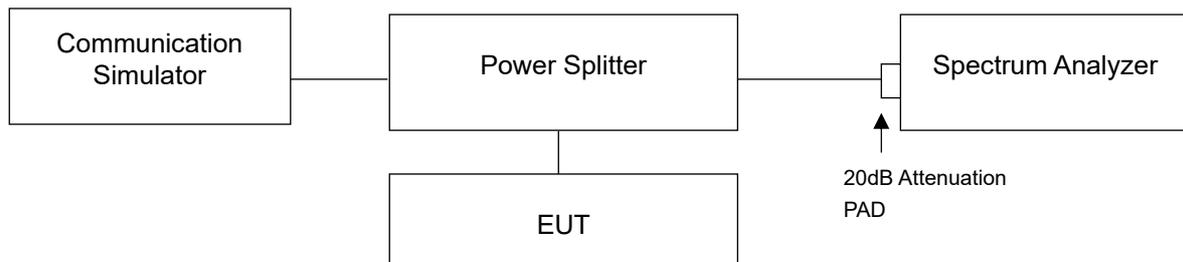


## 4.6 Peak to Average Ratio

### 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

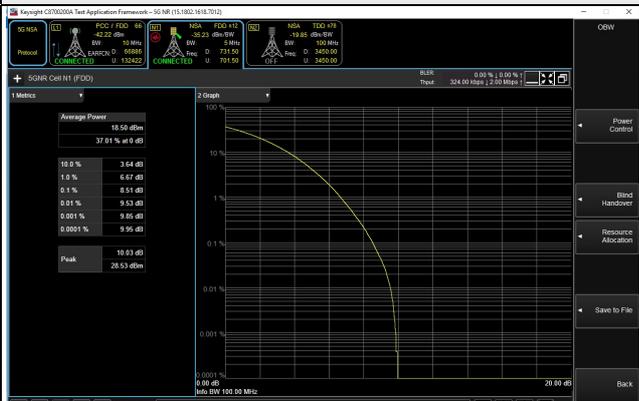
- Set resolution/measurement bandwidth  $\geq$  signal's occupied bandwidth;
- Set the number of counts to a value that stabilizes the measured CCDF curve;
- Record the maximum PAPR level associated with a probability of 0.1%.

#### 4.6.4 Test Results

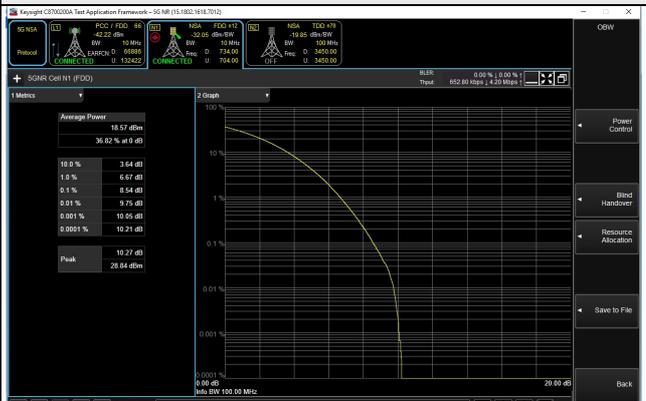
n12, Channel Bandwidth 5MHz						
Channel	Frequency (MHz)	Peak To Average Ratio (dB)				
		$\pi/2$ BPSK	QPSK	16QAM	64QAM	256QAM
140300	701.5	3.85	6.53	6.62	7.13	8.51
141500	707.5	3.86	6.53	6.66	7.17	8.37
142700	713.5	3.86	6.52	6.68	7.13	8.40
n12, Channel Bandwidth 10MHz						
Channel	Frequency (MHz)	Peak To Average Ratio (dB)				
		$\pi/2$ BPSK	QPSK	16QAM	64QAM	256QAM
140800	704.0	3.92	6.65	6.65	7.08	8.54
141500	707.5	3.94	6.68	6.68	7.07	8.52
142200	711.0	3.93	6.66	6.69	7.09	8.51
n12, Channel Bandwidth 15MHz						
Channel	Frequency (MHz)	Peak To Average Ratio (dB)				
		$\pi/2$ BPSK	QPSK	16QAM	64QAM	256QAM
141300	706.5	3.85	6.63	6.60	7.19	8.43
141500	707.5	3.84	6.64	6.62	7.19	8.38
141700	708.5	3.83	6.64	6.67	7.21	8.50

## Spectrum Plot of Worst Value

### 5MHz / 256QAM



### 10MHz / 256QAM



### 15MHz / 256QAM

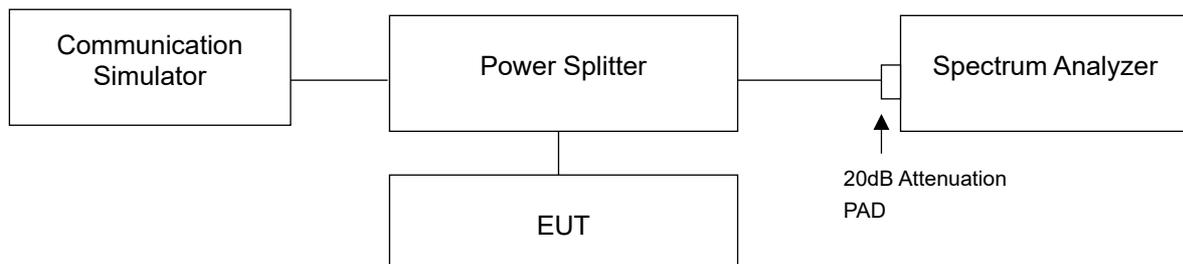


## 4.7 Conducted Spurious Emissions

### 4.7.1 Limits of Conducted Spurious Emissions Measurement

According to FCC 27.53(g) for operations in the 600 MHz band and the 698-746 MHz band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least  $43 + 10 \log (P)$  dB. Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kilohertz or greater.

### 4.7.2 Test Setup



### 4.7.3 Test Procedure

- The EUT makes a phone call to the communication simulator. All measurements were done at low, middle and high operational frequency range.
- Measuring frequency range is from 9kHz to 10GHz. 20dB attenuation pad is connected with spectrum. RBW=1MHz and VBW=3MHz are used for conducted emission measurement.