FCC Test Report
(Part 24 – GSM, WCDMA Band 2, LTE Band 2)

Report No.: RFBFJZ-WTW-P21050403-9

FCC ID: V65C6930

Test Model: C6930

Received Date: May 09, 2021

Test Date: May 09 ~ Aug. 09, 2021

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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

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Release Control Record

Issue No.	Description	Date Issued
RFBFJZ-WTW-P21050403-9	Original release	Aug. 09, 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: May 09 ~ Aug. 09, 2021

Standards: FCC Part 24, Subpart E

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. 09, 2021

Pettie Chen / Senior Specialist

Approved by : Bruce Chen , **Date:** Aug. 09, 2021

Bruce Chen / Senior Engineer

2 Summary of Test Results

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	Meet the requirement of limit.
2.1047	Modulation Characteristics	Pass	Meet the requirement
2.1055 24.235	Frequency Stability	Pass	Meet the requirement of limit.
2.1049	Occupied Bandwidth	Pass	Meet the requirement of limit.
24.238	Band Edge Measurements	Pass	Meet the requirement of limit.
2.1051 24.238	Conducted Spurious Emissions	Pass	Meet the requirement of limit.
2.1053 24.238	Radiated Spurious Emissions	Pass	Meet the requirement of limit. Minimum passing margin is -27.21dB at 35.82MHz.

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

2.1 Measurement Uncertainty

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

Measurement	Frequency	Expanded Uncertainty (k=2) (±)
Radiated Emissions up to 1 GHz	9kHz ~ 30MHz	3.04 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. 12, 2020	Jun. 11, 2021
			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. 08, 2020	Jun. 07, 2021
			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-SM800 0	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
			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. 06, 2020	Jun. 05, 2021
			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				
Modulation Type	GSM, GPRS: GMSK EDGE: 8PSK WCDMA: BPSK, QPSK HSDPA: BPSK HSUPA: QPSK LTE: QPSK, 16QAM, 64QAM, 256QAM				
Operating Frequency	GSM/GPRS/EDGE	1850.2MHz ~ 1909.8MHz			
	WCDMA Band 2	1852.4MHz ~ 1907.6MHz			
	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			
Max. EIRP Power	GSM	622.300mW (27.94dBm)			
	EDGE	262.422mW (24.19dBm)			
	WCDMA Band 2	195.434mW (22.91dBm)			
		QPSK	16QAM	64QAM	256QAM
	LTE Band 2 (Channel Bandwidth 1.4MHz)	183.654mW (22.64dBm)	151.705mW (21.81dBm)	119.674mW (20.78dBm)	60.395mW (17.81dBm)
	LTE Band 2 (Channel Bandwidth 3MHz)	181.970mW (22.60dBm)	152.757mW (21.84dBm)	120.226mW (20.80dBm)	60.117mW (17.79dBm)
	LTE Band 2 (Channel Bandwidth 5MHz)	178.649mW (22.52dBm)	151.705mW (21.81dBm)	121.339mW (20.84dBm)	60.534mW (17.82dBm)
	LTE Band 2 (Channel Bandwidth 10MHz)	179.887mW (22.55dBm)	151.705mW (21.81dBm)	119.674mW (20.78dBm)	61.376mW (17.88dBm)
	LTE Band 2 (Channel Bandwidth 15MHz)	181.134mW (22.58dBm)	154.882mW (21.90dBm)	122.180mW (20.87dBm)	61.094mW (17.86dBm)
	LTE Band 2 (Channel Bandwidth 20MHz)	184.927mW (22.67dBm)	154.882mW (21.90dBm)	123.027mW (20.90dBm)	62.230mW (17.94dBm)

Emission Designator	GSM/GPRS	247KGXW			
	EDGE	244KG7W			
	WCDMA Band 2	4M17F9W			
		QPSK	16QAM	64QAM	256QAM
	LTE Band 2 (Channel Bandwidth 1.4MHz)	1M09G7D	1M09D7W	1M09D7W	1M09D7W
	LTE Band 2 (Channel Bandwidth 3MHz)	2M70G7D	2M70D7W	2M70D7W	2M70D7W
	LTE Band 2 (Channel Bandwidth 5MHz)	4M49G7D	4M50D7W	4M49D7W	4M49D7W
	LTE Band 2 (Channel Bandwidth 10MHz)	8M98G7D	8M98D7W	8M98D7W	8M99D7W
	LTE Band 2 (Channel Bandwidth 15MHz)	13M5G7D	13M5D7W	13M5D7W	13M5D7W
	LTE Band 2 (Channel Bandwidth 20MHz)	18M0G7D	18M0D7W	18M0D7W	18M0D7W
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

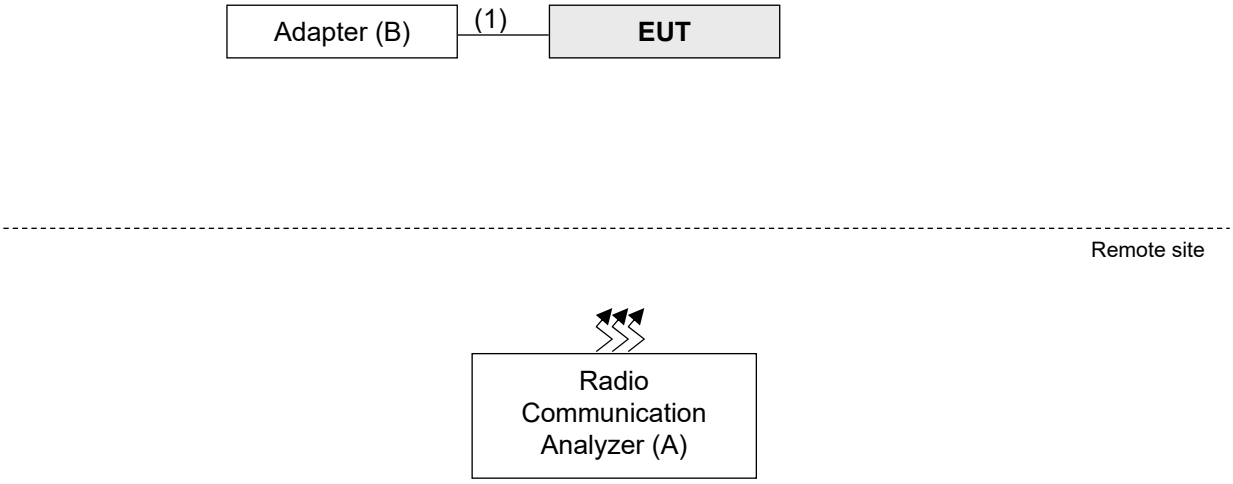
USB Cable	
Brand	KYOCERA Corporation
Model	SCP-24SDC
Signal Line	1m shielded Type A to Type C USB cable

2. The following antennas were provided to the EUT.

Band	Freq. Range (MHz)	Gain (dBi)
GSM 1900	1850.2 ~ 1909.8	-0.8
WCDMA Band 2	1852.4 ~ 1907.6	-0.8
LTE Band 2	1850.7 ~ 1909.3	-0.8 (Tx1), -1.3 (Tx2) (diversity)

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

3.2 Configuration of System under Test



3.2.1 Description of Support Units

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

ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Radio Communication Analyzer	Anritsu	MT8821C	6261806803	NA	-
B.	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 as the table below. Following channel(s) was (were) selected for the final test as listed below:

Band	Radiated Emission
GSM	X-plane
WCDMA Band 2	X-plane
LTE Band 2	Y-plane

GSM Mode

EUT Configure Mode	Test Item	Available Channel	Tested Channel	Mode
-	EIRP	512 to 810	512 (1850.2MHz), 661 (1880.0MHz), 810 (1909.8MHz)	GSM, GPRS, EDGE
-	Modulation Characteristics	512 to 810	661 (1880.0MHz)	GSM, GPRS, EDGE
-	Frequency Stability	512 to 810	512 (1850.2MHz), 810 (1909.8MHz)	GSM, EDGE
-	Occupied Bandwidth	512 to 810	512 (1850.2MHz), 661 (1880.0MHz), 810 (1909.8MHz)	GSM, GPRS, EDGE
-	Band Edge	512 to 810	512(1850.2MHz), 810(1909.8MHz)	GSM, GPRS, EDGE
-	Peak To Average Ratio	512 to 810	512 (1850.2MHz), 661 (1880.0MHz), 810 (1909.8MHz)	GSM, GPRS, EDGE
-	Conducted Emission	512 to 810	512 (1850.2MHz), 661 (1880.0MHz), 810 (1909.8MHz)	GSM, GPRS, EDGE
-	Radiated Emission Below 1GHz	512 to 810	810 (1909.8MHz)	GSM
-	Radiated Emission Above 1GHz	512 to 810	512 (1850.2MHz), 661 (1880.0MHz), 810 (1909.8MHz)	GSM, EDGE

Note: For radiated emission below 1GHz, select the worst radiated emission channel (above 1GHz) for final testing.

WCDMA Band 2

EUT Configure Mode	Test Item	Available Channel	Tested Channel	Mode
-	EIRP	9262 to 9538	9262 (1852.4MHz), 9400 (1880.0MHz), 9538 (1907.6MHz)	WCDMA, HSDPA, HSUPA
-	Modulation Characteristics	9262 to 9538	9400 (1880.0MHz)	WCDMA, HSDPA, HSUPA
-	Frequency Stability	9262 to 9538	9262 (1852.4MHz), 9538 (1907.6MHz)	WCDMA
-	Occupied Bandwidth	9262 to 9538	9262 (1852.4MHz), 9400 (1880.0MHz), 9538 (1907.6MHz)	WCDMA, HSDPA, HSUPA
-	Band Edge	9262 to 9538	9262 (1852.4MHz), 9538 (1907.6MHz)	WCDMA, HSDPA, HSUPA
-	Peak To Average Ratio	9262 to 9538	9262 (1852.4MHz), 9400 (1880.0MHz), 9538 (1907.6MHz)	WCDMA, HSDPA, HSUPA
-	Conducted Emission	9262 to 9538	9262 (1852.4MHz), 9400 (1880.0MHz), 9538 (1907.6MHz)	WCDMA, HSDPA, HSUPA
-	Radiated Emission Below 1GHz	9262 to 9538	9400 (1880.0MHz)	WCDMA
-	Radiated Emission Above 1GHz	9262 to 9538	9262 (1852.4MHz), 9400 (1880.0MHz), 9538 (1907.6MHz)	WCDMA

Note: For radiated emission below 1GHz, select the worst radiated emission channel (above 1GHz) for final testing.

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
-	Modulation Characteristics	18700 to 19100	18900 (1880.0MHz)	20MHz	QPSK / 16QAM / 64QAM / 256QAM	100 RB / 0 RB Offset

EUT Configure Mode	Test item	Available channel	Tested Channel	Channel Bandwidth	Modulation	Mode
-	Frequency Stability	18607 to 19193	18607 (1850.7MHz), 19193 (1909.3MHz)	1.4MHz	QPSK	6 RB / 0 RB Offset
		18615 to 19185	18615 (1851.5MHz), 19185 (1908.5MHz)	3MHz	QPSK	15 RB / 0 RB Offset
		18625 to 19175	18625 (1852.5MHz), 19175 (1907.5MHz)	5MHz	QPSK	25 RB / 0 RB Offset
		18650 to 19150	18650 (1855.0MHz), 19150 (1905.0MHz)	10MHz	QPSK	50 RB / 0 RB Offset
		18675 to 19125	18675 (1857.5MHz), 19125 (1902.5MHz)	15MHz	QPSK	75 RB / 0 RB Offset
		18700 to 19100	18700 (1860.0MHz), 19100 (1900.0MHz)	20MHz	QPSK	100 RB / 0 RB Offset
-	Occupied Bandwidth	18607 to 19193	18607 (1850.7MHz), 18900 (1880.0MHz), 19193 (1909.3MHz)	1.4MHz	QPSK / 16QAM / 64QAM / 256QAM	6 RB / 0RB Offset
		18615 to 19185	18615 (1851.5MHz), 18900 (1880.0MHz), 19185 (1908.5MHz)	3MHz	QPSK / 16QAM / 64QAM / 256QAM	15 RB / 0RB Offset
		18625 to 19175	18625 (1852.5MHz), 18900 (1880.0MHz), 19175 (1907.5MHz)	5MHz	QPSK / 16QAM / 64QAM / 256QAM	25RB / 0RB Offset
		18650 to 19150	18650 (1855.0MHz), 18900 (1880.0MHz), 19150 (1905.0MHz)	10MHz	QPSK / 16QAM / 64QAM / 256QAM	50RB / 0RB Offset
		18675 to 19125	18675 (1857.5MHz), 18900 (1880.0MHz), 19125 (1902.5MHz)	15MHz	QPSK / 16QAM / 64QAM / 256QAM	75 RB / 0 RB Offset
		18700 to 19100	18700 (1860.0MHz), 18900 (1880.0MHz), 19100 (1900.0MHz)	20MHz	QPSK / 16QAM / 64QAM / 256QAM	100 RB / 0 RB Offset
-	Band Edge	18607 to 19193	18607 (1850.7MHz), 19193 (1909.3MHz)	1.4MHz	QPSK	1 RB / 0 RB Offset 1 RB / 5 RB Offset 6 RB / 0 RB Offset
		18615 to 19185	18615 (1851.5MHz), 19185 (1908.5MHz)	3MHz	QPSK	1 RB / 0 RB Offset 1 RB / 14 RB Offset 15 RB / 0 RB Offset
		18625 to 19175	18625 (1852.5MHz), 19175 (1907.5MHz)	5MHz	QPSK	1 RB / 0 RB Offset 1 RB / 24 RB Offset 25 RB / 0 RB Offset
		18650 to 19150	18650 (1855.0MHz), 19150 (1905.0MHz)	10MHz	QPSK	1 RB / 0 RB Offset 1 RB / 49 RB Offset 50 RB / 0 RB Offset
		18675 to 19125	18675 (1857.5MHz), 19125 (1902.5MHz)	15MHz	QPSK	1 RB / 0 RB Offset 1 RB / 74 RB Offset 75 RB / 0 RB Offset
		18700 to 19100	18700 (1860.0MHz), 19100 (1900.0MHz)	20MHz	QPSK	1 RB / 0 RB Offset 1 RB / 99 RB Offset 100 RB / 0 RB Offset

EUT Configure Mode	Test item	Available channel	Tested Channel	Channel Bandwidth	Modulation	Mode
-	Peak to Average Ratio	18607 to 19193	18607 (1850.7MHz), 18900 (1880.0MHz), 19193 (1909.3MHz)	1.4MHz	QPSK / 16QAM / 64QAM / 256QAM	3 RB / 0 RB Offset
		18615 to 19185	18615 (1851.5MHz), 18900 (1880.0MHz), 19185 (1908.5MHz)	3MHz	QPSK / 16QAM / 64QAM / 256QAM	1 RB / 14 RB Offset
		18625 to 19175	18625 (1852.5MHz), 18900 (1880.0MHz), 19175 (1907.5MHz)	5MHz	QPSK / 16QAM / 64QAM / 256QAM	1 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
		18675 to 19125	18675 (1857.5MHz), 18900 (1880.0MHz), 19125 (1902.5MHz)	15MHz	QPSK / 16QAM / 64QAM / 256QAM	1 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
-	Conducted Emission	18607 to 19193	18607 (1850.7MHz), 18900 (1880.0MHz), 19193 (1909.3MHz)	1.4MHz	QPSK	1 RB / 0 RB Offset
		18615 to 19185	18615 (1851.5MHz), 18900 (1880.0MHz), 19185 (1908.5MHz)	3MHz	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
		18650 to 19150	18650 (1855.0MHz), 18900 (1880.0MHz), 19150 (1905.0MHz)	10MHz	QPSK	1 RB / 0 RB Offset
		18675 to 19125	18675 (1857.5MHz), 18900 (1880.0MHz), 19125 (1902.5MHz)	15MHz	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

EUT Configure Mode	Test item	Available channel	Tested Channel	Channel Bandwidth	Modulation	Mode
-	Radiated Emission Below 1GHz	18700 to 19100	18900 (1880.0MHz)	20MHz	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 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.

Test Condition:

Test Item	Environmental Conditions	Input Power	Tested By
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	Hans 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

ANSI/TIA/EIA-603-E 2016

ANSI 63.26-2015

References Test Guidance:

KDB 971168 D01 Power Meas License Digital Systems v03r01

All test items have been performed 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

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

4.1.2 Test Procedures

Conducted Power Measurement:

The EUT was set up for the maximum power with GSM, WCDMA, 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)

Band	GSM1900		
Channel	512	661	810
Frequency	1850.2	1880	1909.8
GSM	**28.74**	28.61	28.65
GPRS 1Tx Slot	28.68	28.55	28.60
GPRS 2Tx Slot	25.78	25.64	25.69
GPRS 3Tx Slot	23.82	23.69	23.75
GPRS 4Tx Slot	22.64	22.51	22.56
EDGE 1Tx Slot (MCS9)	24.99	24.86	24.92
EDGE 2Tx Slot (MCS9)	21.62	21.47	21.52
EDGE 3Tx Slot (MCS9)	19.82	19.69	19.75
EDGE 4Tx Slot (MCS9)	18.59	18.46	18.51

Band	WCDMA II		
TX Channel	9262	9400	9538
Rx Channel	9662	9800	9938
Frequency	1852.4	1880	1907.6
RMC 12.2K	**23.71**	23.59	23.53
HSDPA Subtest-1	22.71	22.61	22.48
HSDPA Subtest-2	22.69	22.59	22.52
HSDPA Subtest-3	22.24	22.13	22.14
HSDPA Subtest-4	22.25	22.08	22.09
HSUPA Subtest-1	22.73	22.53	22.48
HSUPA Subtest-2	20.75	20.55	20.48
HSUPA Subtest-3	21.62	21.53	21.49
HSUPA Subtest-4	20.63	20.52	20.43
HSUPA Subtest-5	22.70	22.60	22.50

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	23.42	23.47	23.36
		1	50	23.33	23.38	23.27
		1	99	23.29	23.34	23.23
		50	0	22.59	22.64	22.53
		50	25	22.52	22.57	22.46
		50	50	22.44	22.49	22.38
		100	0	22.48	22.53	22.42
20M	16QAM	1	0	22.65	22.70	22.59
		1	50	22.61	22.66	22.55
		1	99	22.53	22.58	22.47
		50	0	21.61	21.66	21.55
		50	25	21.54	21.59	21.48
		50	50	21.47	21.52	21.41
		100	0	21.48	21.53	21.42
20M	64QAM	1	0	21.65	21.70	21.59
		1	50	21.59	21.64	21.53
		1	99	21.57	21.62	21.51
		50	0	20.56	20.61	20.50
		50	25	20.52	20.57	20.46
		50	50	20.46	20.51	20.40
		100	0	20.53	20.58	20.47
20M	256QAM	1	0	18.69	18.74	18.63
		1	50	18.63	18.68	18.57
		1	99	18.57	18.62	18.51
		50	0	18.61	18.66	18.55
		50	25	18.56	18.61	18.50
		50	50	18.47	18.52	18.41
		100	0	18.53	18.58	18.47

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	23.37	23.38	23.30
		1	37	23.33	23.31	23.25
		1	74	23.23	23.33	23.20
		36	0	22.49	22.56	22.43
		36	19	22.52	22.55	22.43
		36	39	22.40	22.45	22.33
		75	0	22.39	22.46	22.38
15M	16QAM	1	0	22.63	22.70	22.58
		1	37	22.61	22.63	22.47
		1	74	22.47	22.51	22.41
		36	0	21.53	21.65	21.50
		36	19	21.53	21.58	21.47
		36	39	21.45	21.45	21.40
		75	0	21.42	21.50	21.36
15M	64QAM	1	0	21.58	21.67	21.57
		1	37	21.55	21.59	21.45
		1	74	21.55	21.60	21.48
		36	0	20.51	20.59	20.50
		36	19	20.43	20.57	20.37
		36	39	20.37	20.43	20.34
		75	0	20.52	20.50	20.46
15M	256QAM	1	0	18.65	18.66	18.58
		1	37	18.63	18.60	18.55
		1	74	18.48	18.55	18.43
		36	0	18.53	18.64	18.49
		36	19	18.46	18.58	18.50
		36	39	18.42	18.52	18.33
		75	0	18.52	18.49	18.42

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	23.32	23.31	23.35
		1	24	23.20	23.15	23.11
		1	49	23.20	23.19	23.04
		25	0	22.57	22.58	22.40
		25	12	22.50	22.40	22.45
		25	25	22.29	22.28	22.26
		50	0	22.35	22.45	22.37
10M	16QAM	1	0	22.55	22.50	22.53
		1	24	22.61	22.53	22.49
		1	49	22.40	22.54	22.29
		25	0	21.44	21.53	21.50
		25	12	21.50	21.46	21.46
		25	25	21.29	21.36	21.28
		50	0	21.40	21.37	21.24
10M	64QAM	1	0	21.51	21.57	21.41
		1	24	21.51	21.58	21.37
		1	49	21.40	21.51	21.44
		25	0	20.45	20.44	20.38
		25	12	20.41	20.44	20.41
		25	25	20.26	20.44	20.23
		50	0	20.32	20.35	20.35
10M	256QAM	1	0	18.68	18.51	18.59
		1	24	18.50	18.58	18.46
		1	49	18.50	18.55	18.41
		25	0	18.55	18.50	18.38
		25	12	18.43	18.48	18.31
		25	25	18.34	18.33	18.31
		50	0	18.42	18.43	18.35

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	23.32	23.26	23.22
		1	12	23.19	23.28	22.93
		1	24	23.12	23.15	22.96
		12	0	22.57	22.46	22.41
		12	6	22.36	22.39	22.19
		12	13	22.42	22.35	22.14
		25	0	22.23	22.35	22.27
5M	16QAM	1	0	22.42	22.54	22.43
		1	12	22.53	22.61	22.33
		1	24	22.44	22.43	22.36
		12	0	21.38	21.47	21.43
		12	6	21.47	21.34	21.42
		12	13	21.30	21.45	21.33
		25	0	21.40	21.33	21.24
5M	64QAM	1	0	21.42	21.64	21.49
		1	12	21.44	21.52	21.42
		1	24	21.40	21.47	21.41
		12	0	20.40	20.51	20.26
		12	6	20.38	20.55	20.40
		12	13	20.46	20.31	20.26
		25	0	20.46	20.43	20.32
5M	256QAM	1	0	18.62	18.57	18.51
		1	12	18.44	18.57	18.44
		1	24	18.36	18.59	18.34
		12	0	18.52	18.55	18.41
		12	6	18.45	18.46	18.41
		12	13	18.36	18.52	18.39
		25	0	18.48	18.40	18.22

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	23.40	23.39	23.23
		1	7	23.28	23.23	23.18
		1	14	23.22	23.09	23.04
		8	0	22.47	22.50	22.34
		8	3	22.41	22.49	22.36
		8	7	22.30	22.37	22.27
		15	0	22.36	22.43	22.40
3M	16QAM	1	0	22.58	22.64	22.45
		1	7	22.48	22.59	22.47
		1	14	22.51	22.46	22.36
		8	0	21.54	21.47	21.42
		8	3	21.44	21.44	21.33
		8	7	21.38	21.40	21.24
		15	0	21.38	21.48	21.29
3M	64QAM	1	0	21.45	21.60	21.36
		1	7	21.53	21.57	21.51
		1	14	21.42	21.39	21.36
		8	0	20.43	20.49	20.36
		8	3	20.42	20.41	20.44
		8	7	20.40	20.42	20.20
		15	0	20.40	20.49	20.24
3M	256QAM	1	0	18.59	18.59	18.51
		1	7	18.59	18.45	18.54
		1	14	18.39	18.57	18.50
		8	0	18.51	18.51	18.55
		8	3	18.41	18.44	18.35
		8	7	18.34	18.47	18.29
		15	0	18.47	18.48	18.28

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	23.35	23.31	23.17
		1	2	23.17	23.30	23.12
		1	5	23.16	23.25	23.15
		3	0	23.38	23.44	23.37
		3	1	23.42	23.42	23.22
		3	3	23.29	23.27	23.17
		6	0	22.41	22.34	22.34
1.4M	16QAM	1	0	22.61	22.59	22.42
		1	2	22.48	22.53	22.45
		1	5	22.35	22.45	22.39
		3	0	22.50	22.61	22.37
		3	1	22.34	22.49	22.25
		3	3	22.28	22.46	22.26
		6	0	21.36	21.44	21.33
1.4M	64QAM	1	0	21.58	21.55	21.40
		1	2	21.48	21.45	21.31
		1	5	21.33	21.49	21.44
		3	0	21.44	21.51	21.33
		3	1	21.44	21.45	21.34
		3	3	21.25	21.42	21.23
		6	0	20.41	20.41	20.29
1.4M	256QAM	1	0	18.57	18.51	18.45
		1	2	18.55	18.61	18.43
		1	5	18.42	18.49	18.40
		3	0	18.46	18.56	18.42
		3	1	18.37	18.41	18.33
		3	3	18.40	18.30	18.26
		6	0	18.38	18.56	18.28

EIRP Power (dBm)

Band	GSM1900		
Channel	512	661	810
Frequency	1850.2	1880	1909.8
GSM	**27.94**	27.81	27.85
GPRS 1Tx Slot	27.88	27.75	27.80
GPRS 2Tx Slot	24.98	24.84	24.89
GPRS 3Tx Slot	23.02	22.89	22.95
GPRS 4Tx Slot	21.84	21.71	21.76
EDGE 1Tx Slot (MCS9)	**24.19**	24.06	24.12
EDGE 2Tx Slot (MCS9)	20.82	20.67	20.72
EDGE 3Tx Slot (MCS9)	19.02	18.89	18.95
EDGE 4Tx Slot (MCS9)	17.79	17.66	17.71

Band	WCDMA II		
TX Channel	9262	9400	9538
Rx Channel	9662	9800	9938
Frequency	1852.4	1880	1907.6
RMC 12.2K	**22.91**	22.79	22.73
HSDPA Subtest-1	21.91	21.81	21.68
HSDPA Subtest-2	21.89	21.79	21.72
HSDPA Subtest-3	21.44	21.33	21.34
HSDPA Subtest-4	21.45	21.28	21.29
HSUPA Subtest-1	21.93	21.73	21.68
HSUPA Subtest-2	19.95	19.75	19.68
HSUPA Subtest-3	20.82	20.73	20.69
HSUPA Subtest-4	19.83	19.72	19.63
HSUPA Subtest-5	21.90	21.80	21.70

*EIRP = Conducted + antenna gain (-0.8dBi)

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	22.62	**22.67**	22.56
		1	50	22.53	22.58	22.47
		1	99	22.49	22.54	22.43
		50	0	21.79	21.84	21.73
		50	25	21.72	21.77	21.66
		50	50	21.64	21.69	21.58
		100	0	21.68	21.73	21.62
20M	16QAM	1	0	21.85	21.90	21.79
		1	50	21.81	21.86	21.75
		1	99	21.73	21.78	21.67
		50	0	20.81	20.86	20.75
		50	25	20.74	20.79	20.68
		50	50	20.67	20.72	20.61
		100	0	20.68	20.73	20.62
20M	64QAM	1	0	20.85	20.90	20.79
		1	50	20.79	20.84	20.73
		1	99	20.77	20.82	20.71
		50	0	19.76	19.81	19.70
		50	25	19.72	19.77	19.66
		50	50	19.66	19.71	19.60
		100	0	19.73	19.78	19.67
20M	256QAM	1	0	17.89	17.94	17.83
		1	50	17.83	17.88	17.77
		1	99	17.77	17.82	17.71
		50	0	17.81	17.86	17.75
		50	25	17.76	17.81	17.70
		50	50	17.67	17.72	17.61
		100	0	17.73	17.78	17.67

*EIRP = Conducted + antenna gain (-0.8dBi)

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	22.57	22.58	22.50
		1	37	22.53	22.51	22.45
		1	74	22.43	22.53	22.40
		36	0	21.69	21.76	21.63
		36	19	21.72	21.75	21.63
		36	39	21.60	21.65	21.53
		75	0	21.59	21.66	21.58
15M	16QAM	1	0	21.83	21.90	21.78
		1	37	21.81	21.83	21.67
		1	74	21.67	21.71	21.61
		36	0	20.73	20.85	20.70
		36	19	20.73	20.78	20.67
		36	39	20.65	20.65	20.60
		75	0	20.62	20.70	20.56
15M	64QAM	1	0	20.78	20.87	20.77
		1	37	20.75	20.79	20.65
		1	74	20.75	20.80	20.68
		36	0	19.71	19.79	19.70
		36	19	19.63	19.77	19.57
		36	39	19.57	19.63	19.54
		75	0	19.72	19.70	19.66
15M	256QAM	1	0	17.85	17.86	17.78
		1	37	17.83	17.80	17.75
		1	74	17.68	17.75	17.63
		36	0	17.73	17.84	17.69
		36	19	17.66	17.78	17.70
		36	39	17.62	17.72	17.53
		75	0	17.72	17.69	17.62

*EIRP = Conducted + antenna gain (-0.8dBi)

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	22.52	22.51	22.55
		1	24	22.40	22.35	22.31
		1	49	22.40	22.39	22.24
		25	0	21.77	21.78	21.60
		25	12	21.70	21.60	21.65
		25	25	21.49	21.48	21.46
		50	0	21.55	21.65	21.57
10M	16QAM	1	0	21.75	21.70	21.73
		1	24	21.81	21.73	21.69
		1	49	21.60	21.74	21.49
		25	0	20.64	20.73	20.70
		25	12	20.70	20.66	20.66
		25	25	20.49	20.56	20.48
		50	0	20.60	20.57	20.44
10M	64QAM	1	0	20.71	20.77	20.61
		1	24	20.71	20.78	20.57
		1	49	20.60	20.71	20.64
		25	0	19.65	19.64	19.58
		25	12	19.61	19.64	19.61
		25	25	19.46	19.64	19.43
		50	0	19.52	19.55	19.55
10M	256QAM	1	0	17.88	17.71	17.79
		1	24	17.70	17.78	17.66
		1	49	17.70	17.75	17.61
		25	0	17.75	17.70	17.58
		25	12	17.63	17.68	17.51
		25	25	17.54	17.53	17.51
		50	0	17.62	17.63	17.55

*EIRP = Conducted + antenna gain (-0.8dBi)

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	22.52	22.46	22.42
		1	12	22.39	22.48	22.13
		1	24	22.32	22.35	22.16
		12	0	21.77	21.66	21.61
		12	6	21.56	21.59	21.39
		12	13	21.62	21.55	21.34
		25	0	21.43	21.55	21.47
5M	16QAM	1	0	21.62	21.74	21.63
		1	12	21.73	21.81	21.53
		1	24	21.64	21.63	21.56
		12	0	20.58	20.67	20.63
		12	6	20.67	20.54	20.62
		12	13	20.50	20.65	20.53
		25	0	20.60	20.53	20.44
5M	64QAM	1	0	20.62	20.84	20.69
		1	12	20.64	20.72	20.62
		1	24	20.60	20.67	20.61
		12	0	19.60	19.71	19.46
		12	6	19.58	19.75	19.60
		12	13	19.66	19.51	19.46
		25	0	19.66	19.63	19.52
5M	256QAM	1	0	17.82	17.77	17.71
		1	12	17.64	17.77	17.64
		1	24	17.56	17.79	17.54
		12	0	17.72	17.75	17.61
		12	6	17.65	17.66	17.61
		12	13	17.56	17.72	17.59
		25	0	17.68	17.60	17.42

*EIRP = Conducted + antenna gain (-0.8dBi)

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	22.60	22.59	22.43
		1	7	22.48	22.43	22.38
		1	14	22.42	22.29	22.24
		8	0	21.67	21.70	21.54
		8	3	21.61	21.69	21.56
		8	7	21.50	21.57	21.47
		15	0	21.56	21.63	21.60
3M	16QAM	1	0	21.78	21.84	21.65
		1	7	21.68	21.79	21.67
		1	14	21.71	21.66	21.56
		8	0	20.74	20.67	20.62
		8	3	20.64	20.64	20.53
		8	7	20.58	20.60	20.44
		15	0	20.58	20.68	20.49
3M	64QAM	1	0	20.65	20.80	20.56
		1	7	20.73	20.77	20.71
		1	14	20.62	20.59	20.56
		8	0	19.63	19.69	19.56
		8	3	19.62	19.61	19.64
		8	7	19.60	19.62	19.40
		15	0	19.60	19.69	19.44
3M	256QAM	1	0	17.79	17.79	17.71
		1	7	17.79	17.65	17.74
		1	14	17.59	17.77	17.70
		8	0	17.71	17.71	17.75
		8	3	17.61	17.64	17.55
		8	7	17.54	17.67	17.49
		15	0	17.67	17.68	17.48

*EIRP = Conducted + antenna gain (-0.8dBi)

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	22.55	22.51	22.37
		1	2	22.37	22.50	22.32
		1	5	22.36	22.45	22.35
		3	0	22.58	22.64	22.57
		3	1	22.62	22.62	22.42
		3	3	22.49	22.47	22.37
		6	0	21.61	21.54	21.54
1.4M	16QAM	1	0	21.81	21.79	21.62
		1	2	21.68	21.73	21.65
		1	5	21.55	21.65	21.59
		3	0	21.70	21.81	21.57
		3	1	21.54	21.69	21.45
		3	3	21.48	21.66	21.46
		6	0	20.56	20.64	20.53
1.4M	64QAM	1	0	20.78	20.75	20.60
		1	2	20.68	20.65	20.51
		1	5	20.53	20.69	20.64
		3	0	20.64	20.71	20.53
		3	1	20.64	20.65	20.54
		3	3	20.45	20.62	20.43
		6	0	19.61	19.61	19.49
1.4M	256QAM	1	0	17.77	17.71	17.65
		1	2	17.75	17.81	17.63
		1	5	17.62	17.69	17.60
		3	0	17.66	17.76	17.62
		3	1	17.57	17.61	17.53
		3	3	17.60	17.50	17.46
		6	0	17.58	17.76	17.48

*EIRP = Conducted + antenna gain (-0.8dBi)

4.2 Modulation Characteristics Measurement

4.2.1 Limits of Modulation Characteristics

N/A

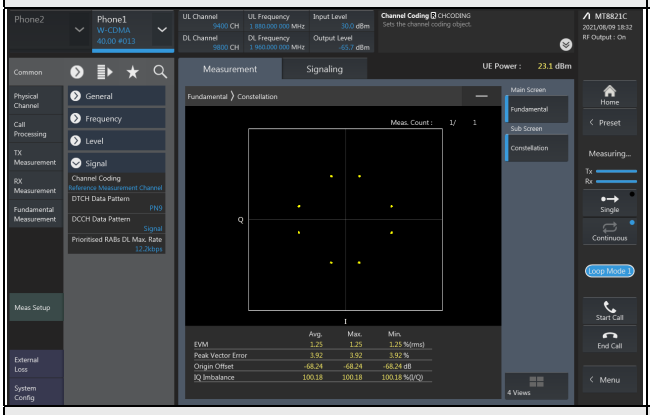
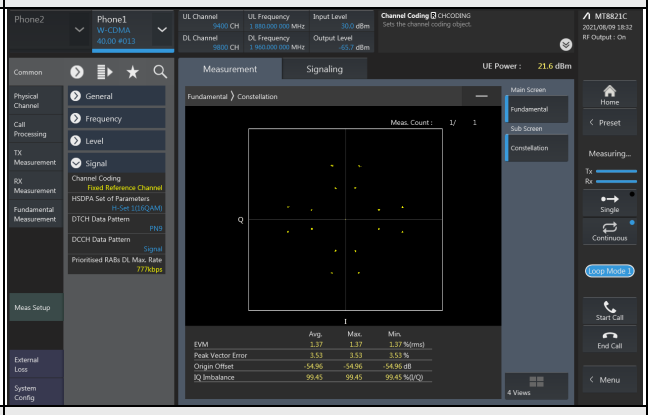
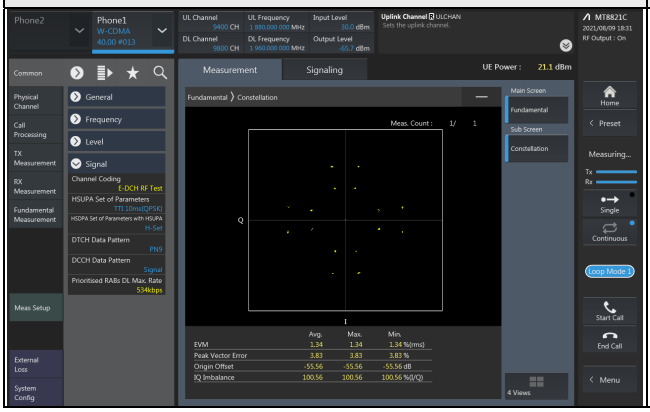
4.2.2 Test Procedure

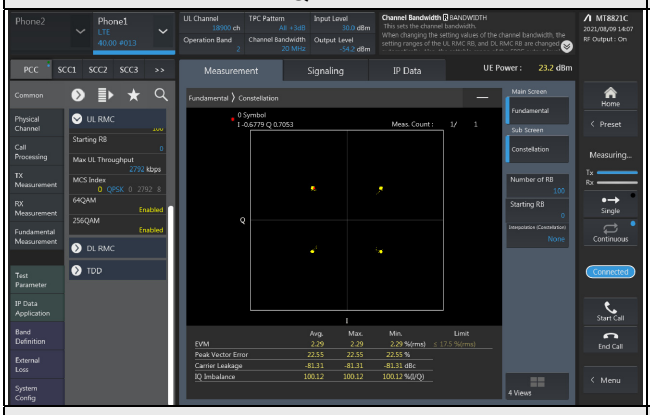
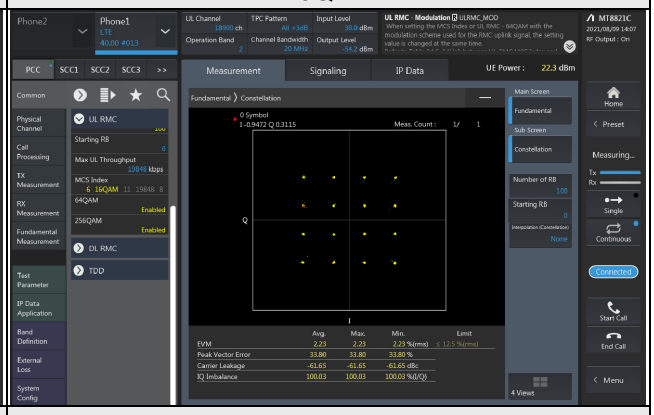
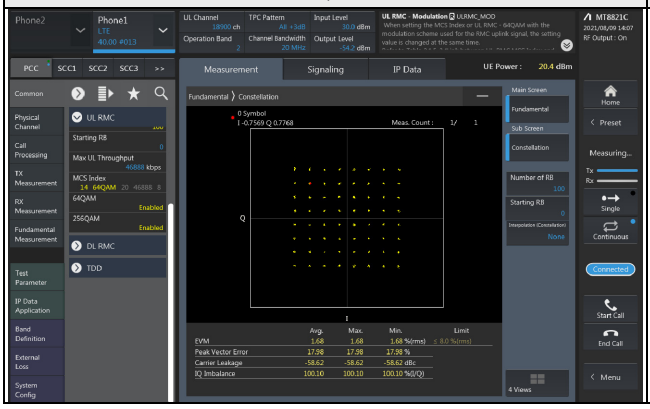
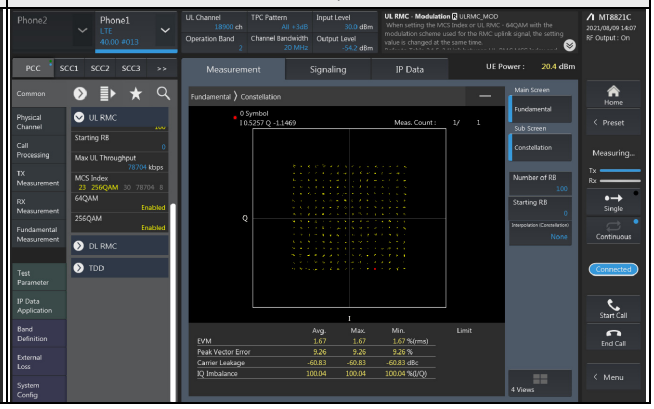
Connect the EUT to Communication Simulator via the antenna connector, The frequency band is set as EUT supported Modulation and Channels, the EUT output is matched with 50 ohm load, the waveform quality and constellation of the EUT was tested.

4.2.3 Test Setup

4.2.4 Test Results

GSM	
Spectrum Plot of Measurement Value	
Channel: 661 / Frequency (MHz): 1880.0MHz	
GSM	GPRS
EDGE	

WCDMA Band 2	
Spectrum Plot of Measurement Value	
Channel: 9400 / Frequency (MHz): 1880.0MHz	
WCDMA	HSDPA
	
HSUPA	
	

LTE Band 2	
Spectrum Plot of Measurement Value	
Channel: 18900 / Frequency (MHz): 1880.0MHz	
QPSK	16QAM
	
64QAM	256QAM
	

4.3 Frequency Stability Measurement

4.3.1 Limits of Frequency Stabiliity 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 ±0.5 ℃ during the measurement testing. The each temperature step shall be at least 0.5 hours, consider the EUT could be test under the stability condition.

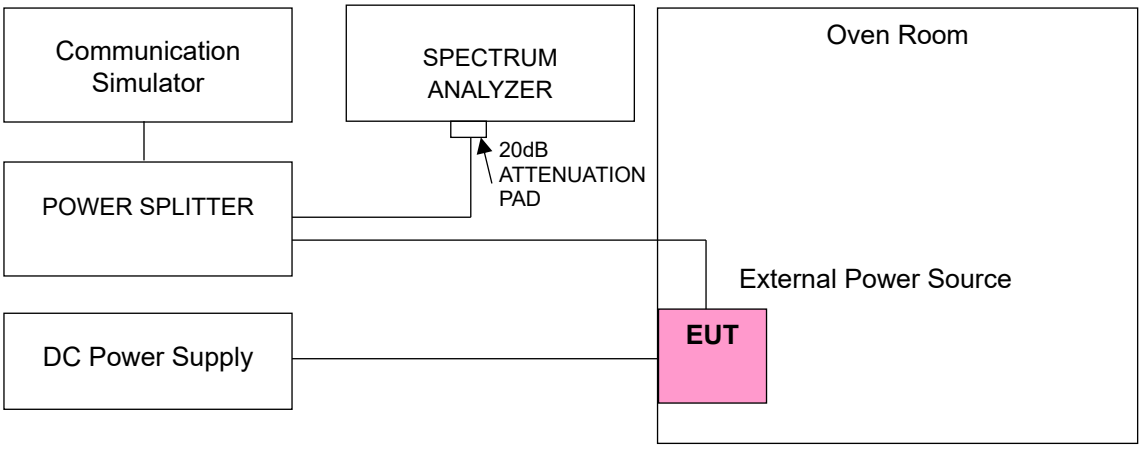
Note: The frequency error was recorded frequency error from the communication simulator.

4.3.3 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Radio Communication Analyzer Anritsu	MT8821C	6261806803	Jan. 22, 2021	Jan. 21, 2022
Temperature & Humidity Chamber TERCHY	HRM-120RF	931022	Dec. 24, 2020	Dec. 23, 2021
Digital Multimeter Fluke	87-III	70360755	Jul. 10, 2020	Jul. 09, 2021
			Jul. 08, 2021	Jul. 07, 2022
DC Power Supply Topward	6306A	727263	NA	NA

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

4.3.4 Conducted Setup



4.3.5 Test Results

Frequency Error vs. Voltage

Voltage (Vdc)	GSM			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
3.87	1850.200038	0.021	1909.800040	0.021
3.28	1850.200023	0.012	1909.800011	0.006
4.45	1850.200026	0.014	1909.800032	0.017

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

Frequency Error vs. Temperature

Temp. (℃)	GSM			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	1850.200025	0.014	1909.800034	0.018
-20	1850.200018	0.010	1909.800040	0.021
-10	1850.200040	0.022	1909.800037	0.019
0	1850.200010	0.005	1909.800030	0.016
10	1850.200022	0.012	1909.800021	0.011
20	1850.199966	-0.018	1909.799960	-0.021
30	1850.199986	-0.008	1909.799966	-0.018
40	1850.199984	-0.009	1909.799971	-0.015
50	1850.199986	-0.008	1909.799979	-0.011
60	1850.199976	-0.013	1909.799963	-0.019

Frequency Error vs. Voltage

Voltage (Vdc)	EDGE			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
3.87	1850.200034	0.018	1909.800027	0.014
3.28	1850.200033	0.018	1909.800027	0.014
4.45	1850.200011	0.006	1909.800038	0.020

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

Frequency Error vs. Temperature

Temp. (℃)	EDGE			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	1850.200033	0.018	1909.800020	0.010
-20	1850.200037	0.020	1909.800018	0.009
-10	1850.200032	0.017	1909.800039	0.020
0	1850.200025	0.014	1909.800035	0.018
10	1850.200040	0.022	1909.800028	0.015
20	1850.199975	-0.014	1909.799989	-0.006
30	1850.199964	-0.019	1909.799966	-0.018
40	1850.199972	-0.015	1909.799967	-0.017
50	1850.199972	-0.015	1909.799968	-0.017
60	1850.199990	-0.005	1909.799971	-0.015

Frequency Error vs. Voltage

Voltage (Vdc)	WCDMA Band 2			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
3.87	1852.400030	0.016	1907.600040	0.021
3.28	1852.400026	0.014	1907.600011	0.006
4.45	1852.400033	0.018	1907.600032	0.017

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

Frequency Error vs. Temperature

Temp. (℃)	WCDMA Band 2			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	1852.400000	0.000	1907.600034	0.018
-20	1852.400015	0.008	1907.600040	0.021
-10	1852.400029	0.016	1907.600037	0.019
0	1852.400022	0.012	1907.600030	0.016
10	1852.400015	0.008	1907.600021	0.011
20	1852.399960	-0.022	1907.599960	-0.021
30	1852.399983	-0.009	1907.599966	-0.018
40	1852.399971	-0.016	1907.599971	-0.015
50	1852.399989	-0.006	1907.599979	-0.011
60	1852.399990	-0.005	1907.599963	-0.019

Frequency Error vs. Voltage

Voltage (Vdc)	LTE Band 2			
	Channel Bandwidth 1.4 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
3.87	1850.700016	0.009	1909.300000	0.018
3.28	1850.700040	0.022	1909.300010	0.005
4.45	1850.700027	0.015	1909.300015	0.008

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

Frequency Error vs. Temperature

Temp. (℃)	LTE Band 2			
	Channel Bandwidth 1.4 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	1850.700031	0.017	1909.300012	0.006
-20	1850.700030	0.016	1909.300015	0.008
-10	1850.700023	0.012	1909.300039	0.020
0	1850.700040	0.022	1909.300028	0.015
10	1850.700011	0.006	1909.300026	0.014
20	1850.699967	-0.018	1909.299972	-0.015
30	1850.699963	-0.020	1909.299984	-0.008
40	1850.699960	-0.022	1909.299960	-0.021
50	1850.699980	-0.011	1909.299968	-0.017
60	1850.699968	-0.017	1909.299963	-0.019

Frequency Error vs. Voltage

Voltage (Vdc)	LTE Band 2			
	Channel Bandwidth 3MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
3.87	1851.500022	0.012	1908.500017	0.009
3.28	1851.500036	0.019	1908.500031	0.016
4.45	1851.500017	0.009	1908.500029	0.015

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

Frequency Error vs. Temperature

Temp. (℃)	LTE Band 2			
	Channel Bandwidth 3MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	1851.500038	0.021	1908.500012	0.006
-20	1851.500032	0.017	1908.500011	0.006
-10	1851.500029	0.016	1908.500030	0.016
0	1851.500019	0.010	1908.500035	0.018
10	1851.500036	0.019	1908.500025	0.013
20	1851.499968	-0.017	1908.499984	-0.008
30	1851.499961	-0.021	1908.499989	-0.006
40	1851.499965	-0.019	1908.499967	-0.017
50	1851.499975	-0.014	1908.499969	-0.016
60	1851.499990	-0.005	1908.499966	-0.018

Frequency Error vs. Voltage

Voltage (Vdc)	LTE Band 2			
	Channel Bandwidth 5 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
3.87	1852.500013	0.007	1907.500019	0.010
3.28	1852.500030	0.016	1907.500013	0.007
4.45	1852.500034	0.018	1907.500038	0.020

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

Frequency Error vs. Temperature

Temp. (℃)	LTE Band 2			
	Channel Bandwidth 5 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	1852.500022	0.012	1907.500019	0.010
-20	1852.500028	0.015	1907.500016	0.008
-10	1852.500031	0.017	1907.500015	0.008
0	1852.500026	0.014	1907.500032	0.017
10	1852.500035	0.019	1907.500012	0.006
20	1852.499977	-0.012	1907.499981	-0.010
30	1852.499963	-0.020	1907.499976	-0.013
40	1852.499987	-0.007	1907.499973	-0.014
50	1852.499966	-0.018	1907.499976	-0.013
60	1852.499974	-0.014	1907.499968	-0.017

Frequency Error vs. Voltage

Voltage (Vdc)	LTE Band 2			
	Channel Bandwidth 10 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
3.87	1855.000038	0.020	1905.000034	0.018
3.28	1855.000032	0.017	1905.000016	0.008
4.45	1855.000023	0.012	1905.000025	0.013

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

Frequency Error vs. Temperature

Temp. (℃)	LTE Band 2			
	Channel Bandwidth 10 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	1855.000017	0.009	1905.000022	0.012
-20	1855.000016	0.009	1905.000024	0.013
-10	1855.000036	0.019	1905.000036	0.019
0	1855.000025	0.013	1905.000031	0.016
10	1855.000035	0.019	1905.000019	0.010
20	1854.999974	-0.014	1904.999982	-0.009
30	1854.999985	-0.008	1904.999967	-0.017
40	1854.999990	-0.005	1904.999964	-0.019
50	1854.999973	-0.015	1904.999985	-0.008
60	1854.999978	-0.012	1904.999984	-0.008

Frequency Error vs. Voltage

Voltage (Vdc)	LTE Band 2			
	Channel Bandwidth 15 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
3.87	1857.500023	0.012	1902.500017	0.009
3.28	1857.500021	0.011	1902.500022	0.012
4.45	1857.500027	0.015	1902.500022	0.012

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

Frequency Error vs. Temperature

Temp. (℃)	LTE Band 2			
	Channel Bandwidth 15 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	1857.500026	0.014	1902.500030	0.016
-20	1857.500028	0.015	1902.500037	0.019
-10	1857.500010	0.005	1902.500037	0.019
0	1857.500016	0.009	1902.500026	0.014
10	1857.500014	0.008	1902.500036	0.019
20	1857.499971	-0.016	1902.499976	-0.013
30	1857.499973	-0.015	1902.499962	-0.020
40	1857.499970	-0.016	1902.499986	-0.007
50	1857.499964	-0.019	1902.499968	-0.017
60	1857.499969	-0.017	1902.499988	-0.006

Frequency Error vs. Voltage

Voltage (Vdc)	LTE Band 2			
	Channel Bandwidth 20 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
3.87	1860.000024	0.013	1900.000011	0.006
3.28	1860.000033	0.018	1900.000030	0.016
4.45	1860.000039	0.021	1900.000027	0.014

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

Frequency Error vs. Temperature

Temp. (℃)	LTE Band 2			
	Channel Bandwidth 20 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-30	1860.000031	0.017	1900.000029	0.015
-20	1860.000027	0.015	1900.000036	0.019
-10	1860.000038	0.020	1900.000034	0.018
0	1860.000011	0.006	1900.000022	0.012
10	1860.000038	0.020	1900.000017	0.009
20	1859.999982	-0.010	1899.999973	-0.014
30	1859.999968	-0.017	1899.999968	-0.017
40	1859.999969	-0.017	1899.999970	-0.016
50	1859.999970	-0.016	1899.999976	-0.013
60	1859.999980	-0.011	1899.999964	-0.019

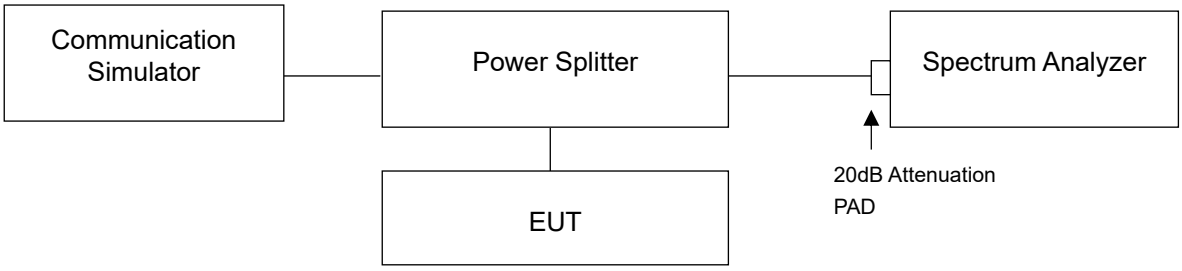
4.4 Occupied Bandwidth Measurement

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



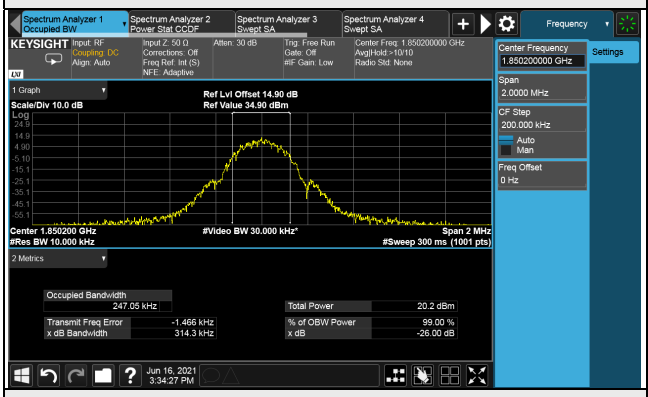
4.4.3 Test Result

Occupied Bandwidth

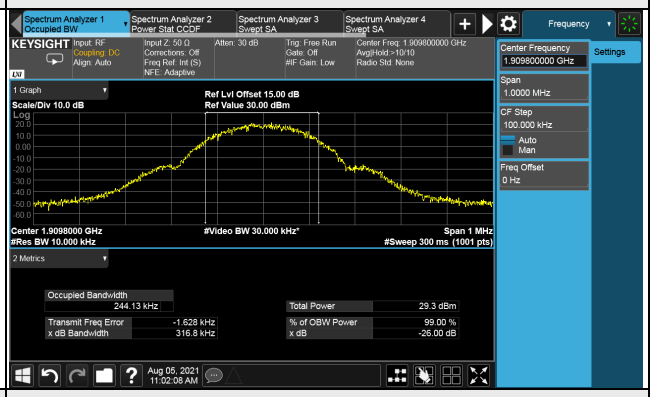
Channel	Frequency (MHz)	99% Occupied Bandwidth (kHz)		
		GSM	GPRS	EDGE
512	1850.2	247.05	243.58	243.30
661	1880.0	246.33	243.94	244.12
810	1909.8	242.10	244.13	243.87

Spectrum Plot of Worst Value

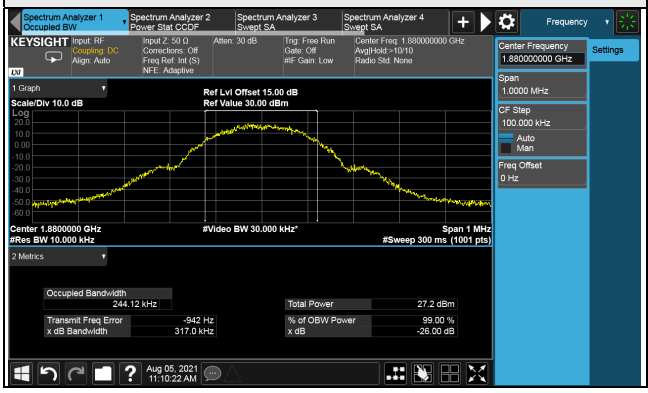
GSM



GPRS



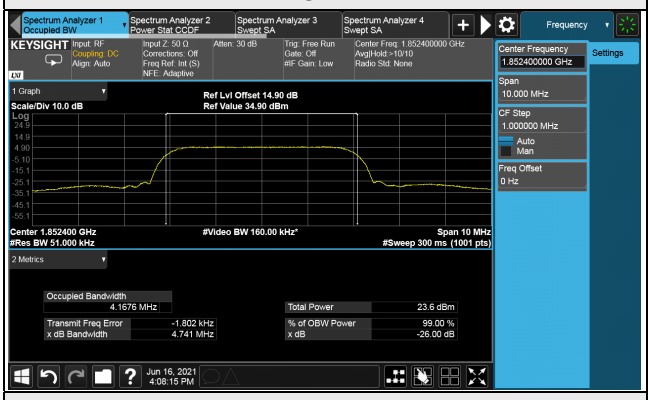
EDGE



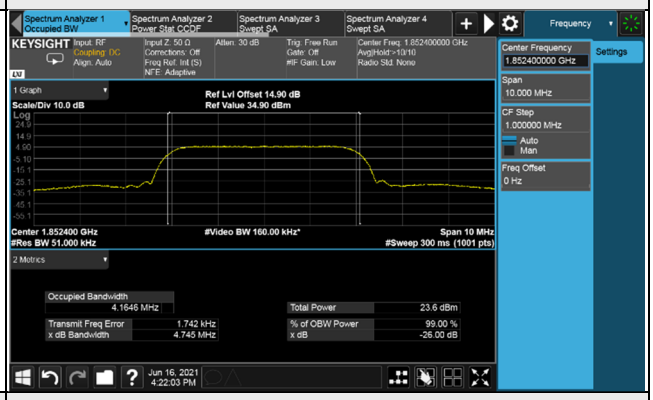
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)		
		WCDMA	HSDPA	HSUPA
9262	1852.4	4.17	4.16	4.16
9400	1880.0	4.16	4.16	4.16
9538	1907.6	4.16	4.16	4.16

Spectrum Plot of Worst Value

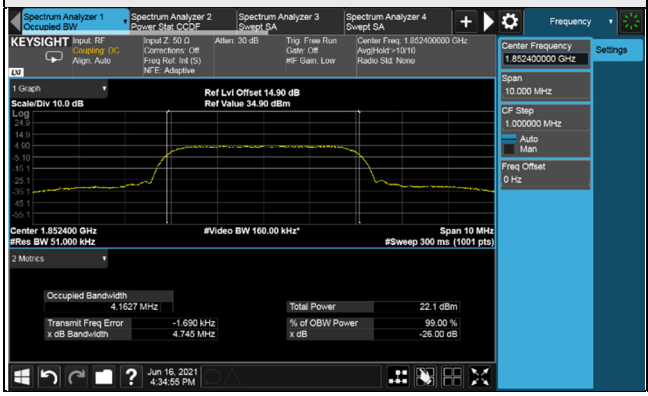
WCDMA



HSDPA



HSUPA

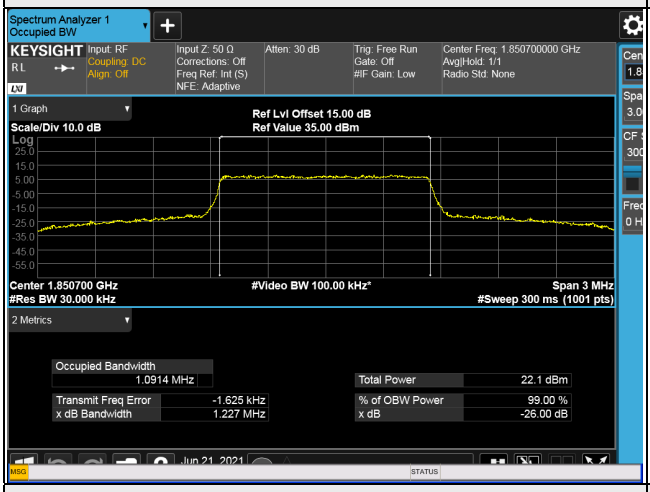


LTE Band 2, Channel Bandwidth 1.4MHz					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)			
		QPSK	16QAM	64QAM	256QAM
18607	1850.7	1.09	1.09	1.09	1.09
18900	1880.0	1.09	1.09	1.09	1.09
19193	1909.3	1.09	1.09	1.09	1.08
LTE Band 2, Channel Bandwidth 3MHz					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)			
		QPSK	16QAM	64QAM	256QAM
18615	1851.5	2.70	2.70	2.70	2.70
18900	1880.0	2.70	2.70	2.70	2.69
19185	1908.5	2.70	2.70	2.70	2.70
LTE Band 2, Channel Bandwidth 5MHz					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)			
		QPSK	16QAM	64QAM	256QAM
18625	1852.5	4.49	4.49	4.49	4.49
18900	1880.0	4.49	4.50	4.49	4.49
19175	1907.5	4.49	4.50	4.49	4.48
LTE Band 2, Channel Bandwidth 10MHz					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)			
		QPSK	16QAM	64QAM	256QAM
18650	1855.0	8.97	8.98	8.98	8.98
18900	1880.0	8.97	8.98	8.98	8.99
19150	1905.0	8.98	8.97	8.97	8.97
LTE Band 2, Channel Bandwidth 15MHz					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)			
		QPSK	16QAM	64QAM	256QAM
18675	1857.5	13.48	13.46	13.47	13.47
18900	1880.0	13.47	13.46	13.46	13.49
19125	1902.5	13.45	13.43	13.43	13.45

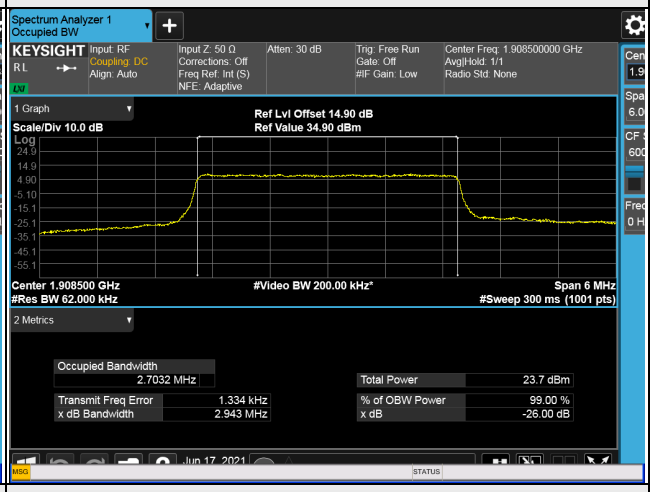
LTE Band 2, Channel Bandwidth 20MHz					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)			
		QPSK	16QAM	64QAM	256QAM
18700	1860.0	17.96	17.99	17.98	17.98
18900	1880.0	17.95	17.97	17.96	17.99
19100	1900.0	17.91	17.93	17.93	17.97

Spectrum Plot of Worst Value

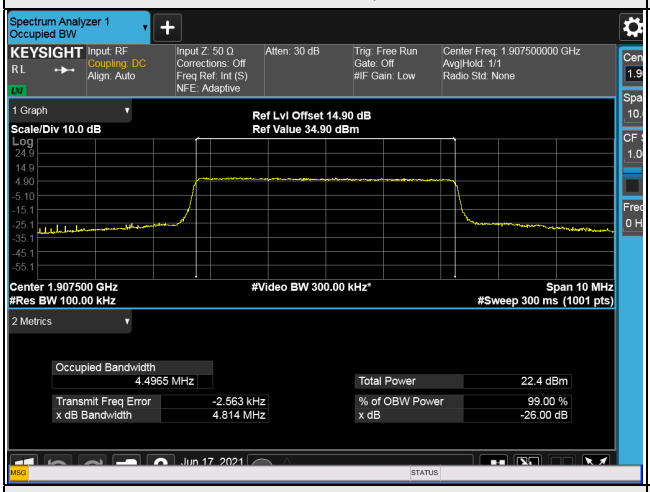
1.4MHz / 64QAM



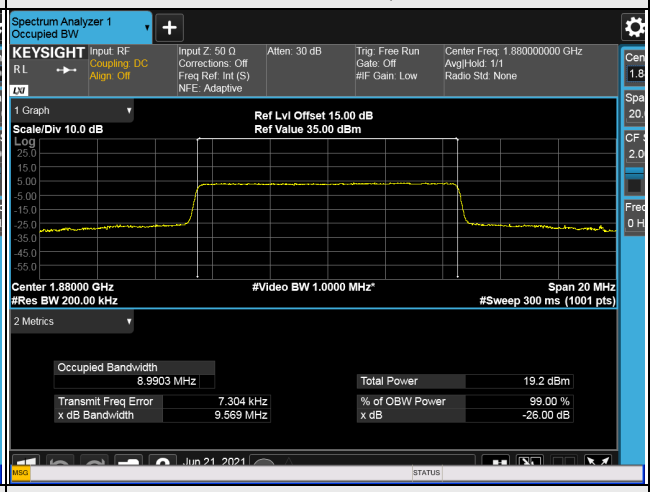
3MHz / QPSK



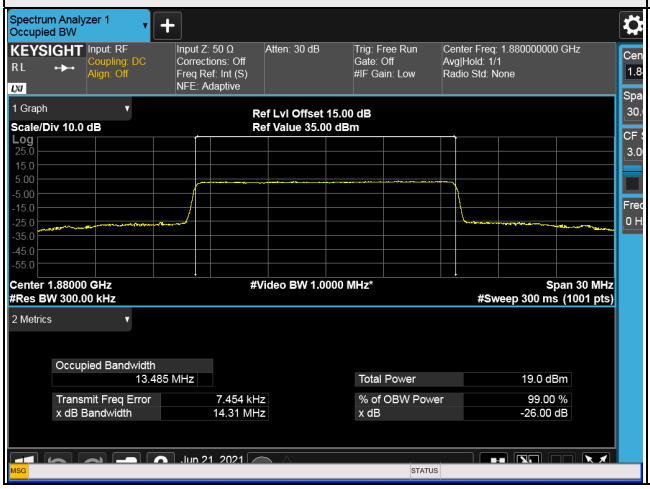
5MHz / 16QAM



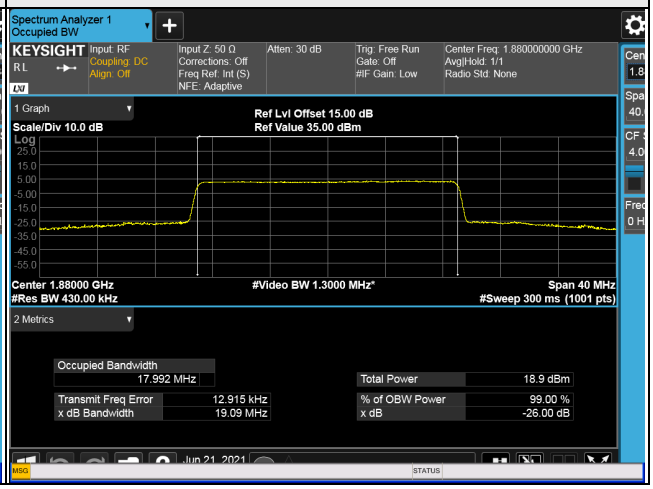
10MHz / 256QAM



15MHz / 256QAM



20MHz / 256QAM

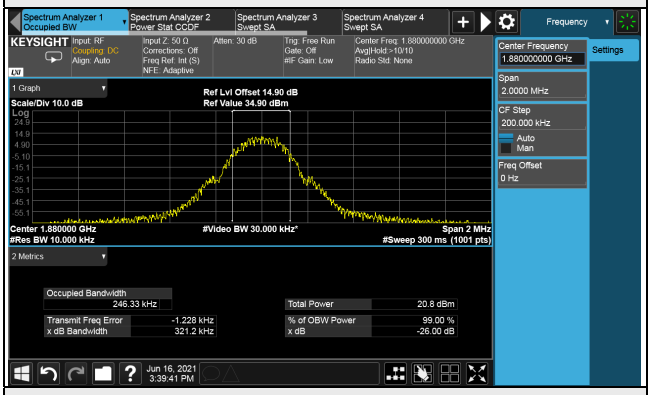


26dB Bandwidth

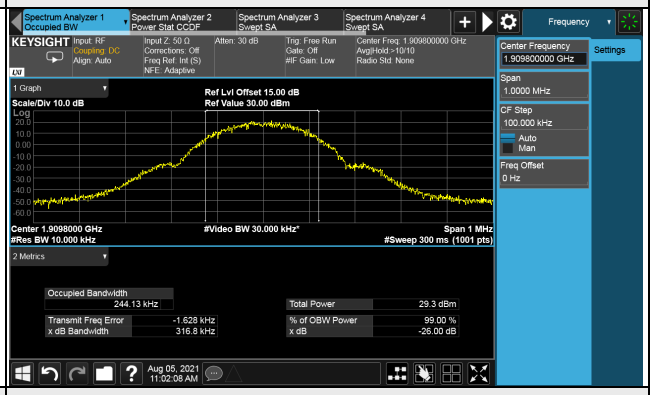
Channel	Frequency (MHz)	26dB Bandwidth (kHz)		
		GSM	GPRS	EDGE
512	1850.2	314.30	316.80	312.30
661	1880.0	321.20	315.00	317.00
810	1909.8	302.40	316.80	315.10

Spectrum Plot of Worst Value

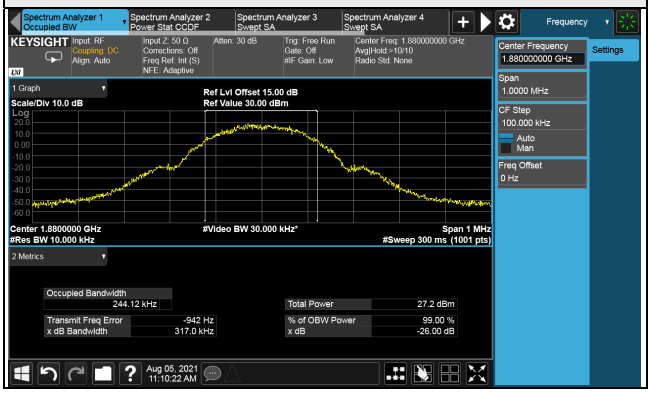
GSM



GPRS



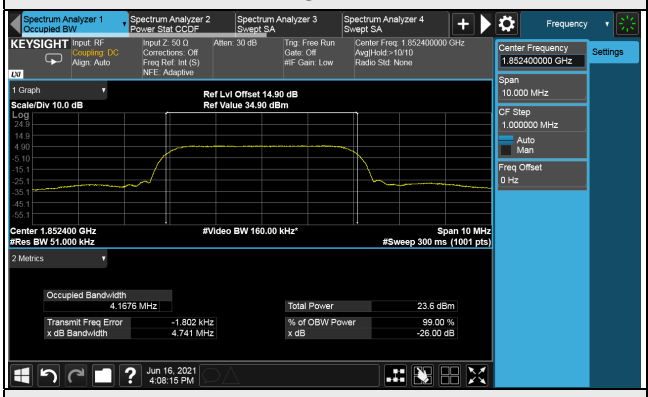
EDGE



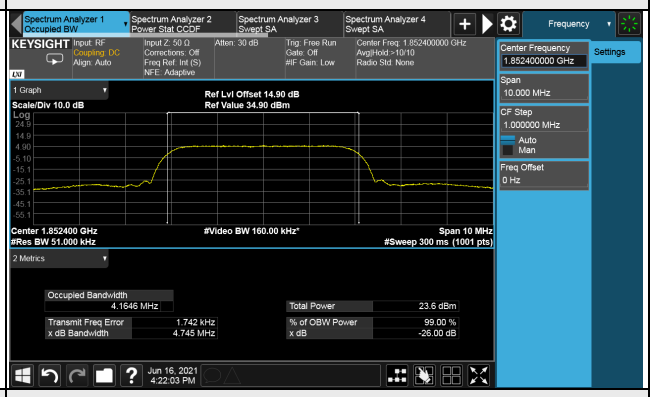
Channel	Frequency (MHz)	26dB Bandwidth (MHz)		
		WCDMA	HSDPA	HSUPA
9262	1852.4	4.74	4.75	4.75
9400	1880.0	4.72	4.72	4.72
9538	1907.6	4.73	4.73	4.73

Spectrum Plot of Worst Value

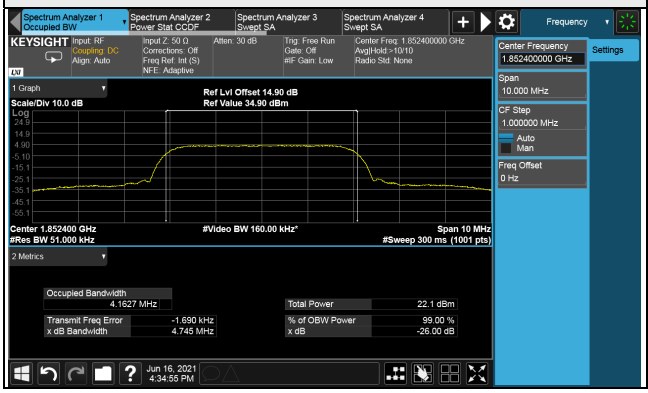
WCDMA



HSDPA



HSUPA

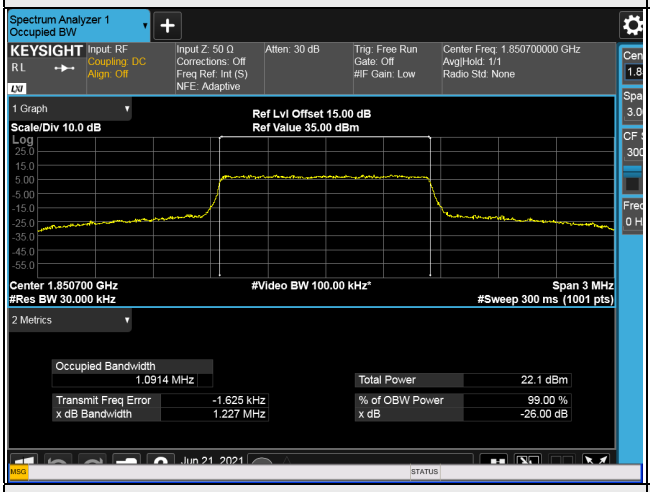


LTE Band 2, Channel Bandwidth 1.4MHz					
Channel	Frequency (MHz)	26dB Bandwidth (MHz)			
		QPSK	16QAM	64QAM	256QAM
18607	1850.7	1.21	1.21	1.23	1.22
18900	1880.0	1.21	1.21	1.21	1.20
19193	1909.3	1.23	1.22	1.22	1.20
LTE Band 2, Channel Bandwidth 3MHz					
Channel	Frequency (MHz)	26dB Bandwidth (MHz)			
		QPSK	16QAM	64QAM	256QAM
18615	1851.5	2.91	2.92	2.92	2.85
18900	1880.0	2.93	2.92	2.91	2.81
19185	1908.5	2.94	2.93	2.91	2.83
LTE Band 2, Channel Bandwidth 5MHz					
Channel	Frequency (MHz)	26dB Bandwidth (MHz)			
		QPSK	16QAM	64QAM	256QAM
18625	1852.5	4.81	4.84	4.81	4.87
18900	1880.0	4.81	4.80	4.81	4.71
19175	1907.5	4.84	4.81	4.80	4.68
LTE Band 2, Channel Bandwidth 10MHz					
Channel	Frequency (MHz)	26dB Bandwidth (MHz)			
		QPSK	16QAM	64QAM	256QAM
18650	1855.0	9.53	9.55	9.54	9.57
18900	1880.0	9.52	9.53	9.54	9.57
19150	1905.0	9.51	9.52	9.52	9.53
LTE Band 2, Channel Bandwidth 15MHz					
Channel	Frequency (MHz)	26dB Bandwidth (MHz)			
		QPSK	16QAM	64QAM	256QAM
18675	1857.5	14.29	14.28	14.27	14.27
18900	1880.0	14.26	14.26	14.27	14.31
19125	1902.5	14.25	14.23	14.25	14.24

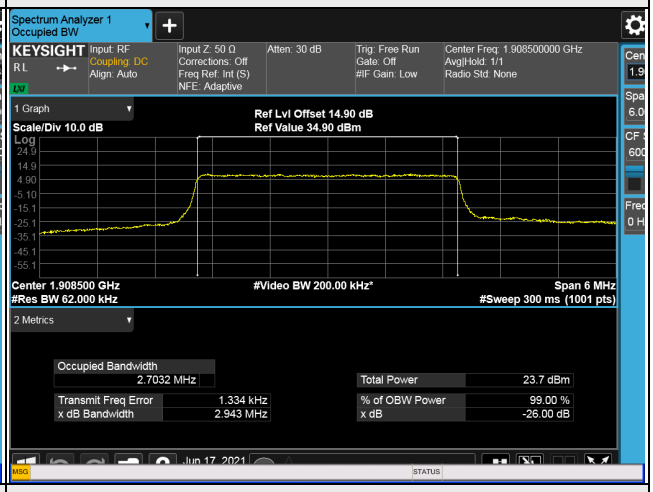
LTE Band 2, Channel Bandwidth 20MHz					
Channel	Frequency (MHz)	26dB Bandwidth (MHz)			
		QPSK	16QAM	64QAM	256QAM
18700	1860.0	19.06	19.08	19.06	19.06
18900	1880.0	19.04	19.04	19.05	19.09
19100	1900.0	19.03	19.05	19.02	19.07

Spectrum Plot of Worst Value

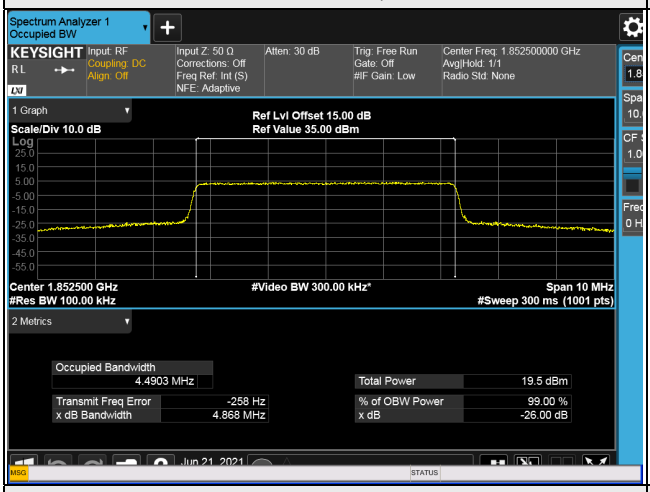
1.4MHz / 64QAM



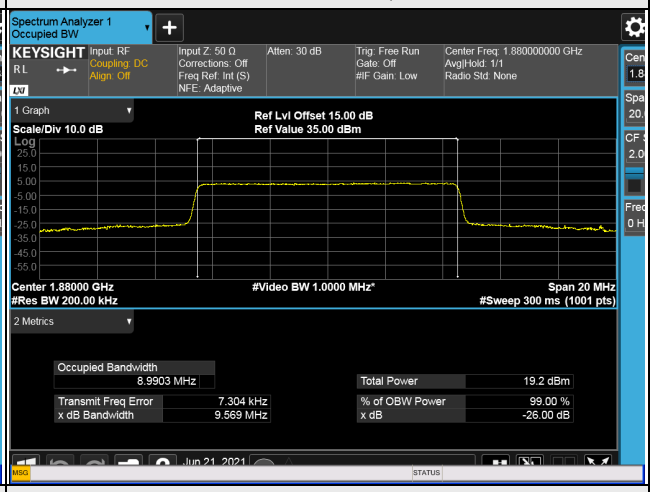
3MHz / QPSK



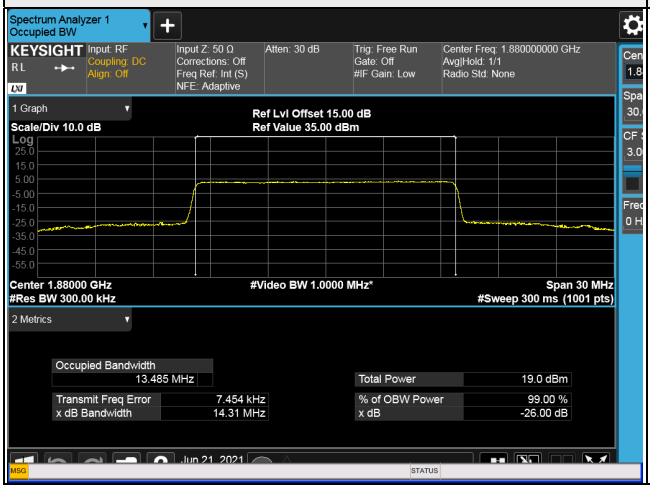
5MHz / 256QAM



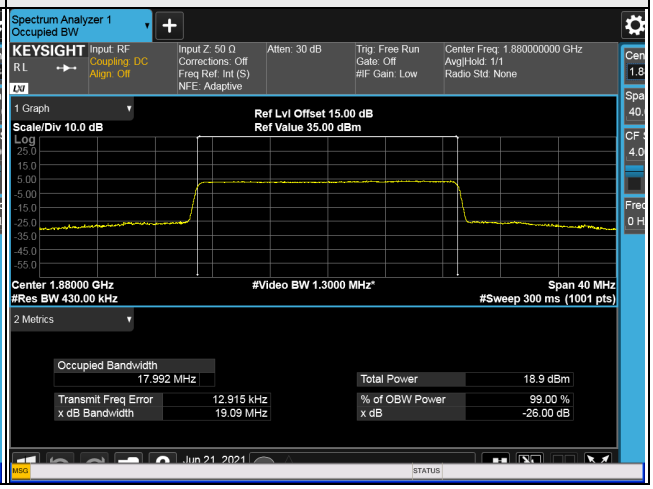
10MHz / 256QAM



15MHz / 256QAM



20MHz / 256QAM

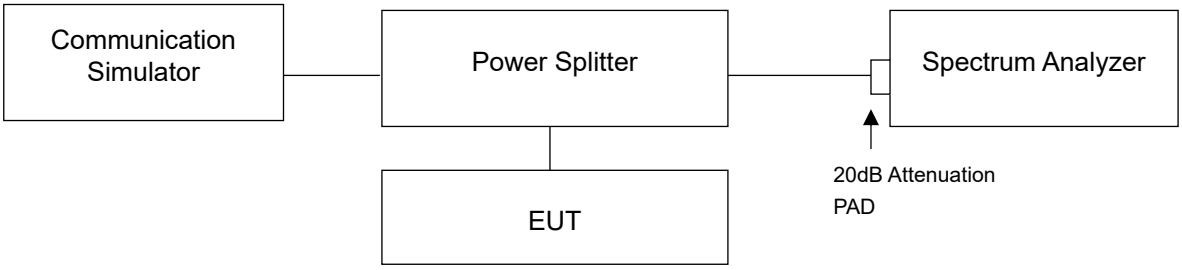


4.5 Band Edge Measurement

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.

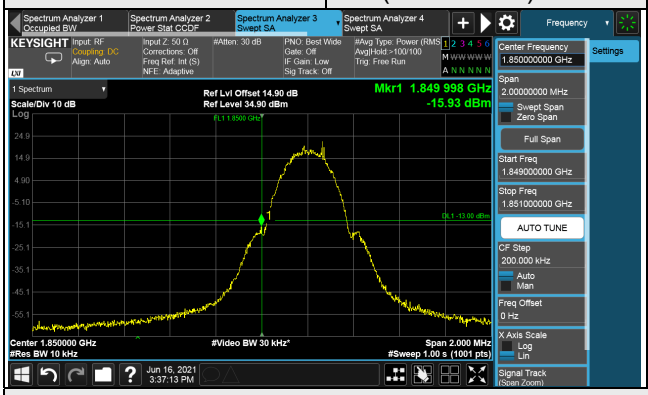
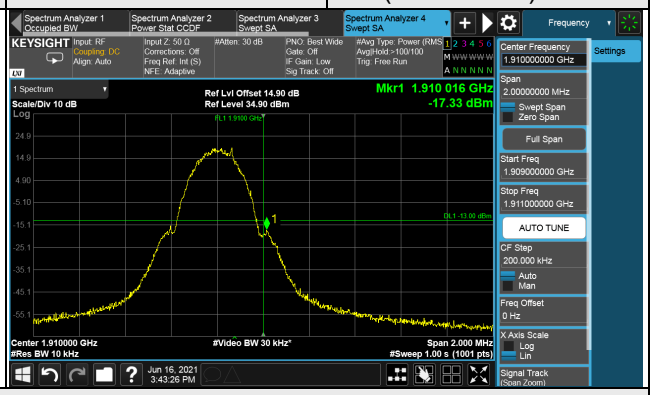
4.5.2 Test Setup

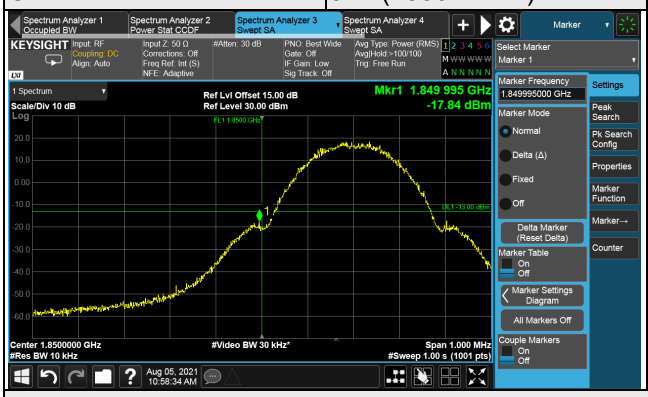


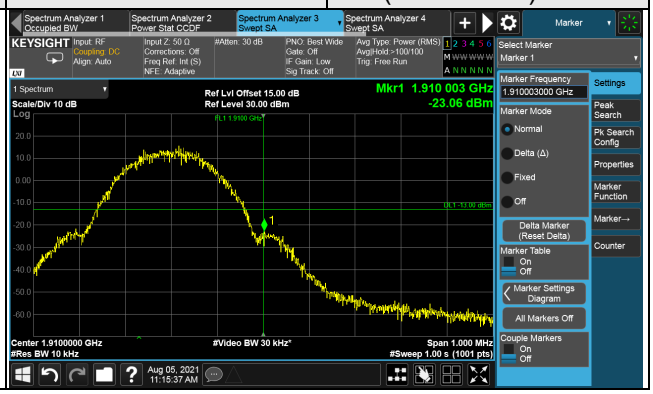
4.5.3 Test Procedures

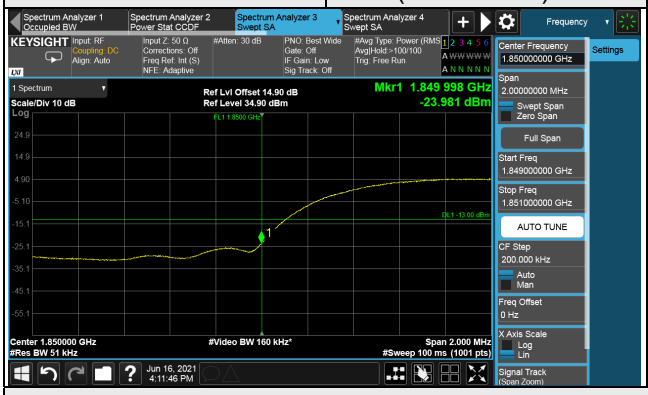
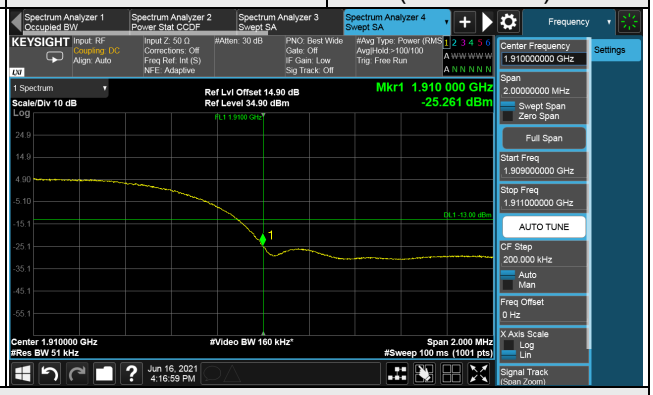
a. All measurements were done at low and high operational frequency range.
b. The center frequency of spectrum is the band edge frequency and span is 2MHz/1MHz. RB of the spectrum is 10kHz and VB of the spectrum is 30kHz (GSM / GPRS / EDGE).
c. The center frequency of spectrum is the band edge frequency and span is 2MHz. RB of the spectrum is 51kHz and VB of the spectrum is 160kHz (WCDMA / HSDPA / HSUPA).
d. The center frequency of spectrum is the band edge frequency and span is 1MHz. RB of the spectrum is 15kHz and VB of the spectrum is 51kHz (LTE Channel Bandwidth 1.4MHz).
e. The center frequency of spectrum is the band edge frequency and span is 1MHz. RB of the spectrum is 30kHz and VB of the spectrum is 100kHz (LTE Channel Bandwidth 3MHz).
f. The center frequency of spectrum is the band edge frequency and span is 1MHz. RB of the spectrum is 51kHz and VB of the spectrum is 160kHz (LTE Channel Bandwidth 5MHz).
g. The center frequency of spectrum is the band edge frequency and span is 1MHz. RB of the spectrum is 100kHz and VB of the spectrum is 300kHz (LTE Channel Bandwidth 10MHz).
h. The center frequency of spectrum is the band edge frequency and span is 1MHz. RB of the spectrum is 150kHz and VB of the spectrum is 470kHz (LTE Channel Bandwidth 15MHz).
i. The center frequency of spectrum is the band edge frequency and span is 1MHz. RB of the spectrum is 200kHz and VB of the spectrum is 1MHz (LTE Channel Bandwidth 20MHz).
j. Record the max trace plot into the test report.

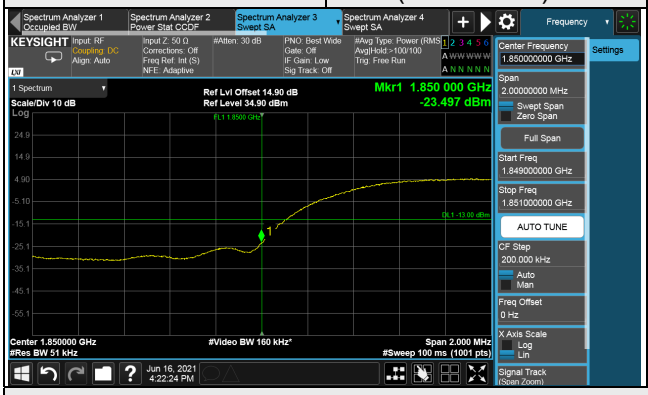
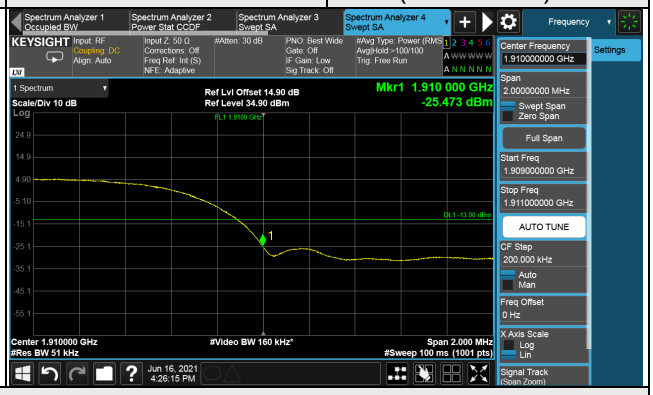
4.5.4 Test Results

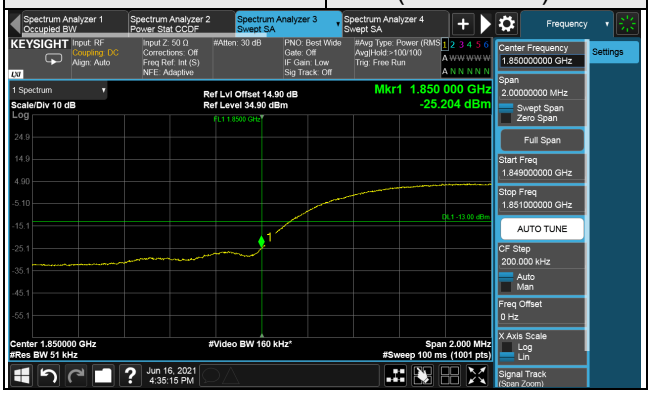
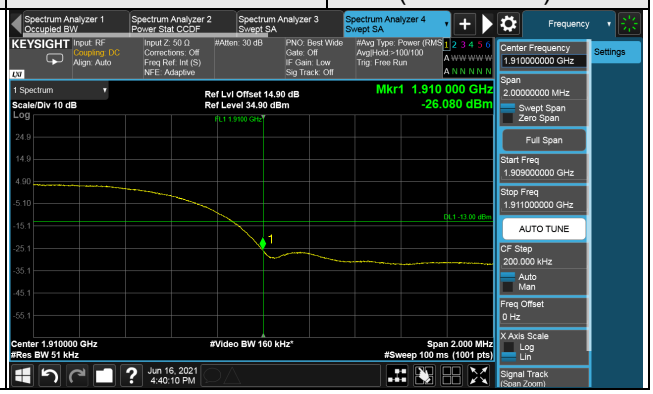
GSM			
Channel	512 (1850.2MHz)	Channel	810 (1909.8MHz)
			

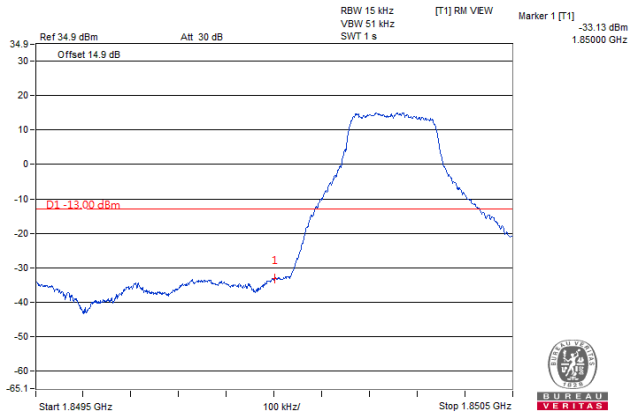
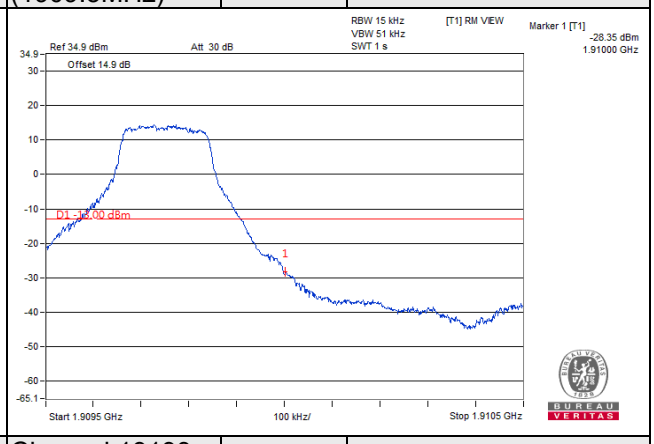
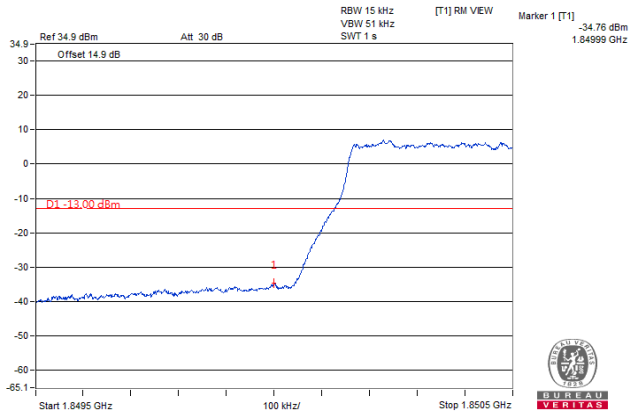
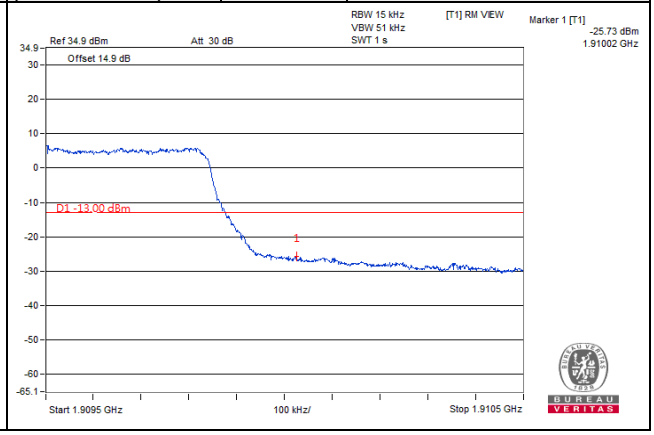
GPRS			
Channel	512 (1850.2MHz)	Channel	810 (1909.8MHz)
			

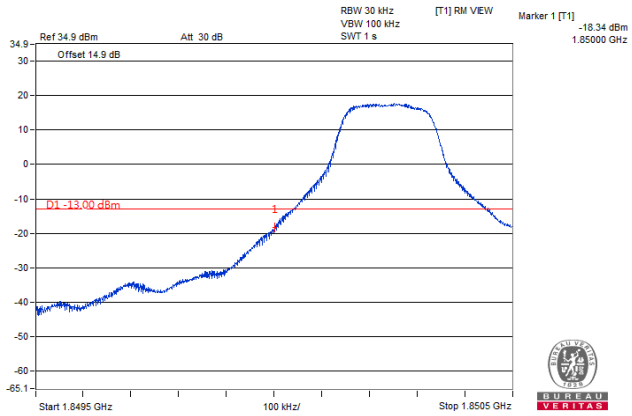
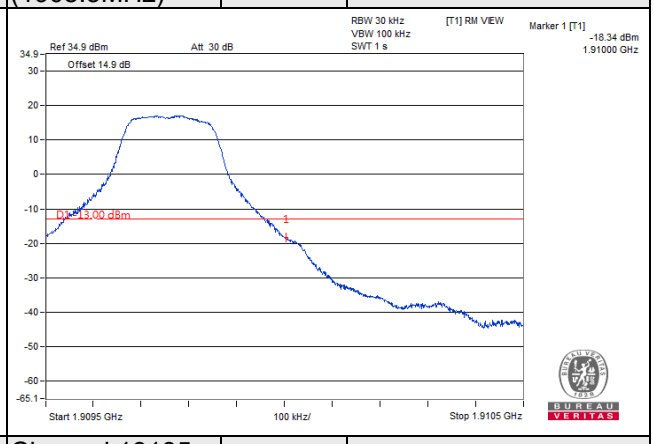
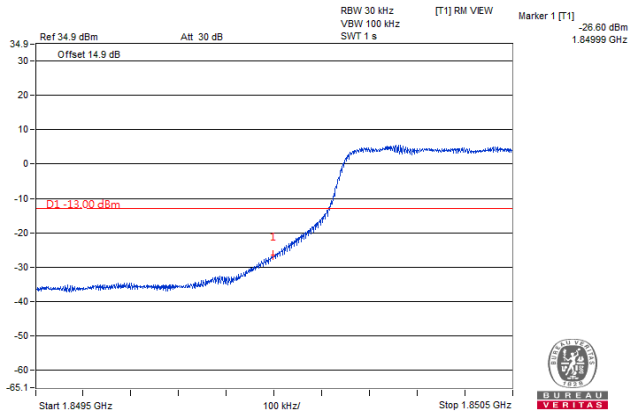
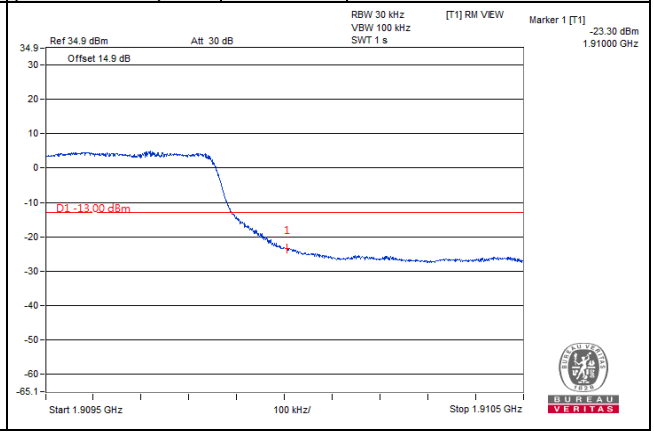
EDGE			
Channel	512 (1850.2MHz)	Channel	810 (1909.8MHz)
			

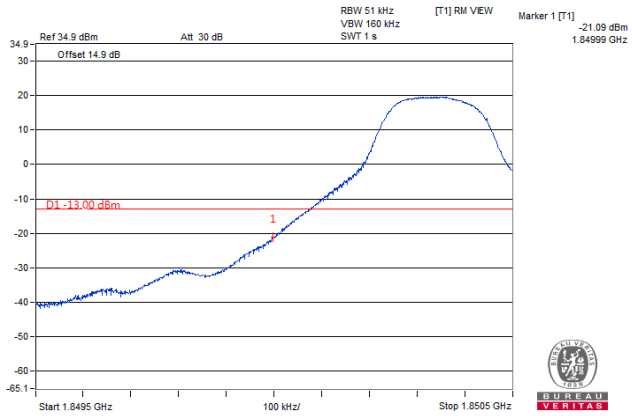
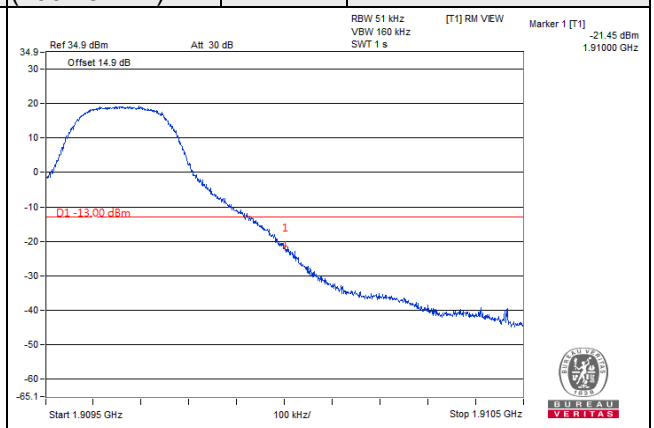
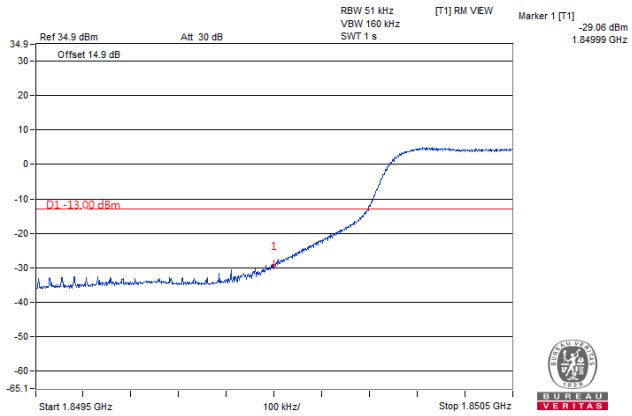
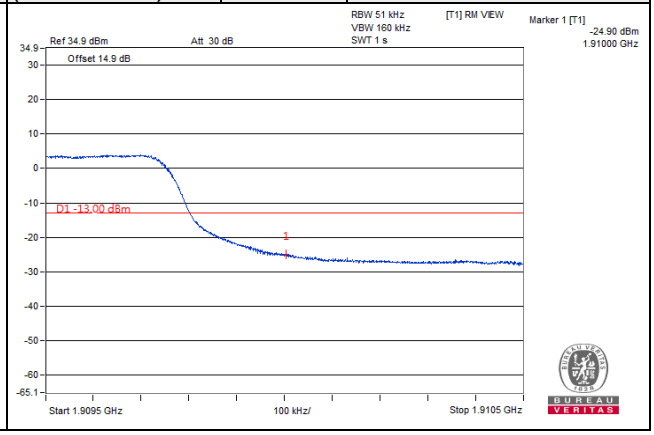
WCDMA			
Channel	9262 (1852.4MHz)	Channel	9538 (1907.6MHz)
			

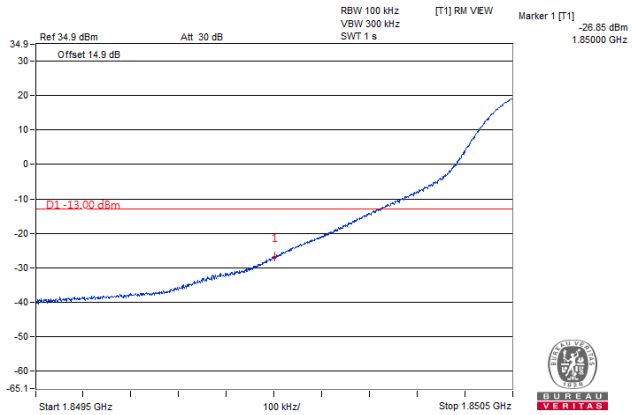
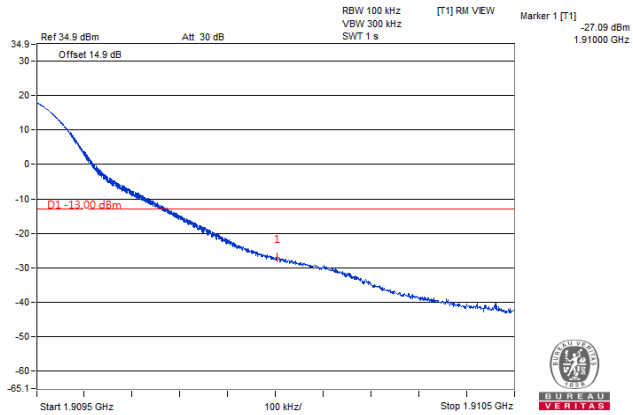
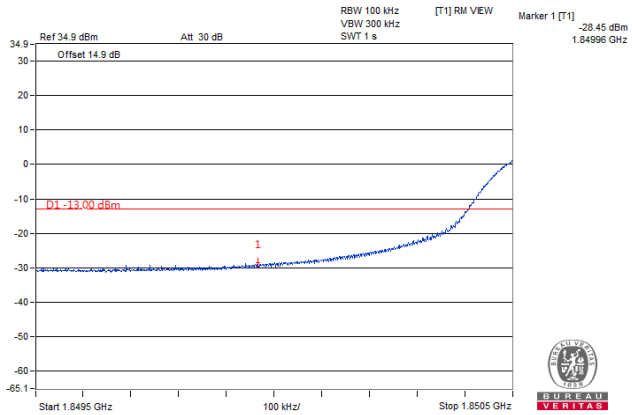
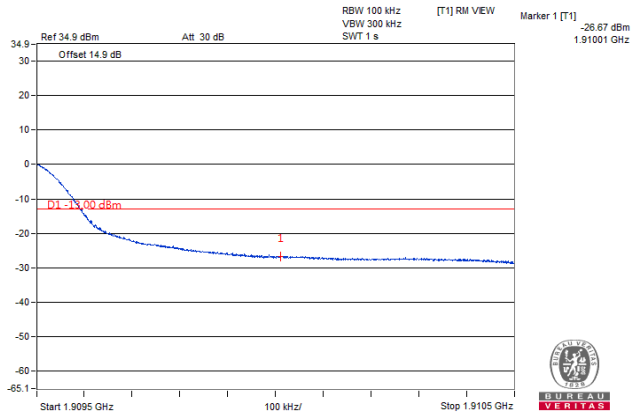
HSDPA			
Channel	9262 (1852.4MHz)	Channel	9538 (1907.6MHz)
			

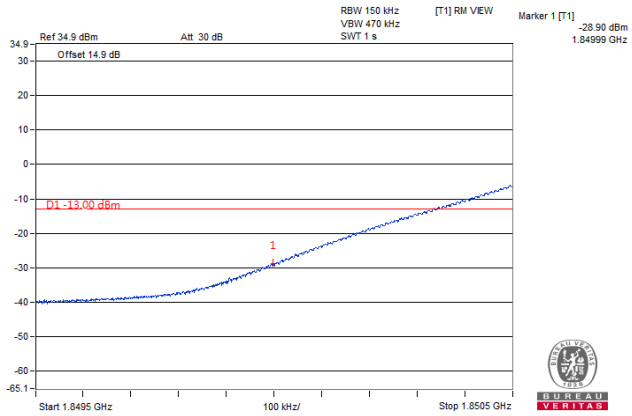
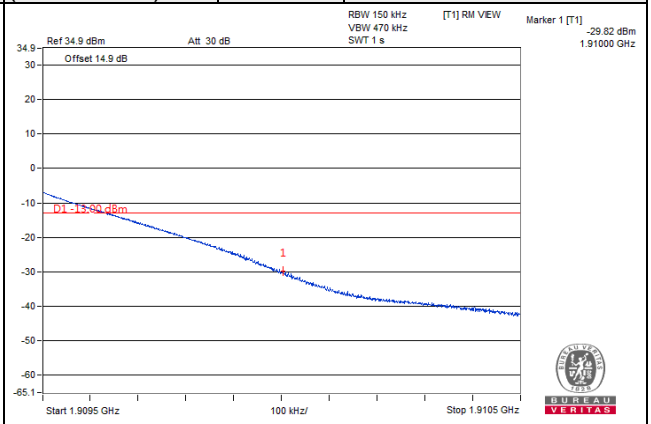
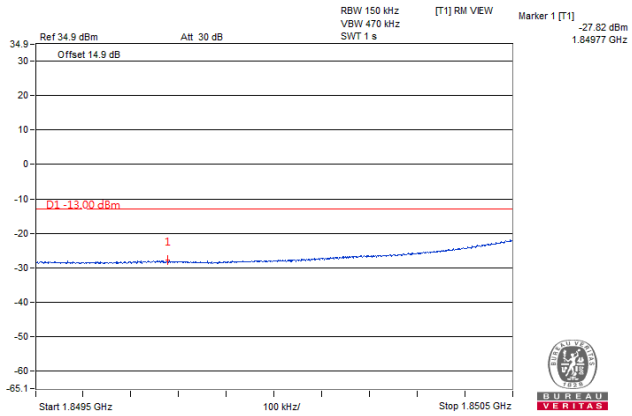
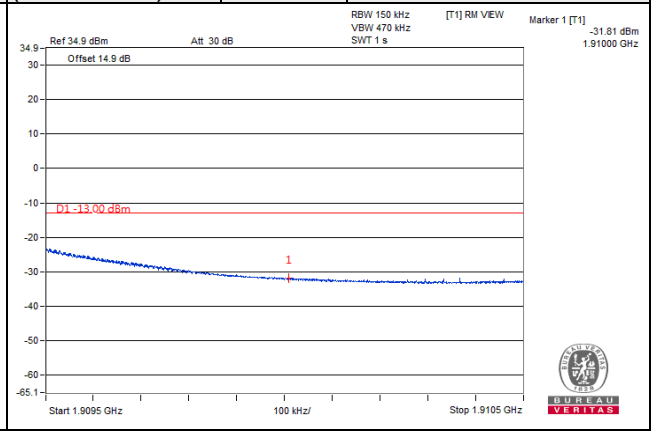
HSUPA			
Channel	9262 (1852.4MHz)	Channel	9538 (1907.6MHz)
			

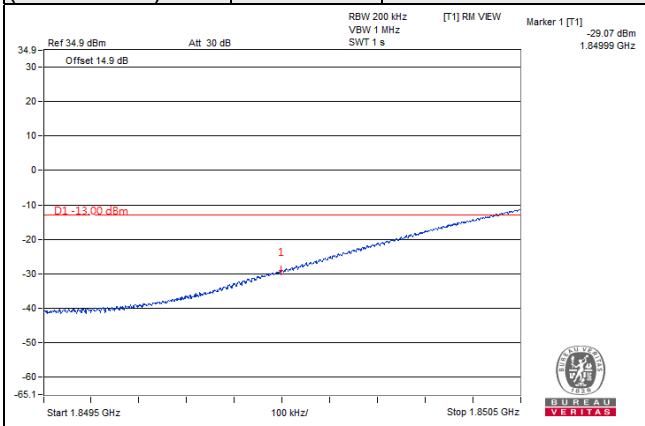
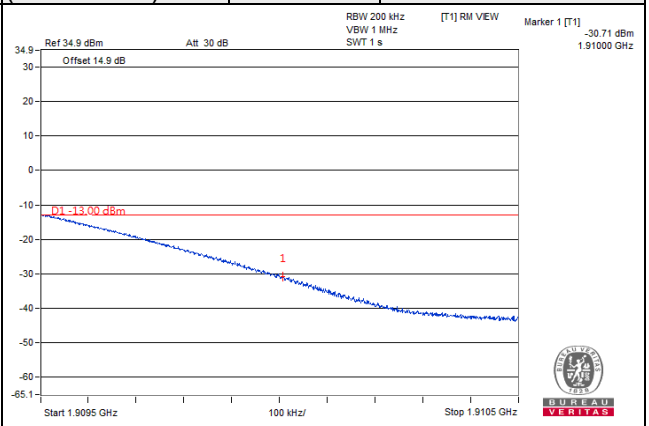
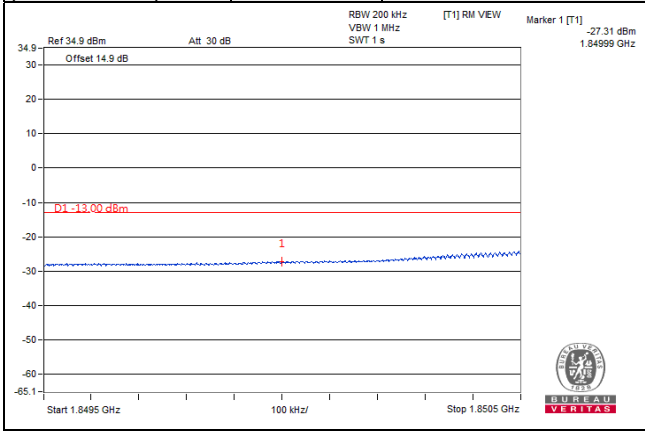
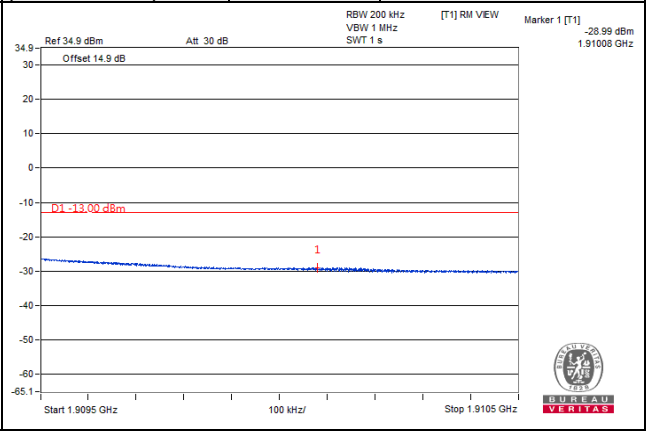
LTE Band 2, Channel Bandwidth 1.4MHz					
Channel 18607 (1850.7MHz)	QPSK	1 RB / 0 RB Offset	Channel 19193 (1909.3MHz)	QPSK	1 RB / 5 RB Offset
					
Channel 18607 (1850.7MHz)	QPSK	6 RB / 0 RB Offset	Channel 19193 (1909.3MHz)	QPSK	6 RB / 0 RB Offset
					

LTE Band 2, Channel Bandwidth 3MHz					
Channel 18615 (1851.5MHz)	QPSK	1 RB / 0 RB Offset	Channel 19185 (1908.5MHz)	QPSK	1 RB / 14 RB Offset
					
Channel 18615 (1851.5MHz)	QPSK	15 RB / 0 RB Offset	Channel 19185 (1908.5MHz)	QPSK	15 RB / 0 RB Offset
					

LTE Band 2, Channel Bandwidth 5MHz					
Channel 18625 (1852.5MHz)	QPSK	1 RB / 0 RB Offset	Channel 19175 (1907.5MHz)	QPSK	1 RB / 24 RB Offset
					
Channel 18625 (1852.5MHz)	QPSK	25 RB / 0 RB Offset	Channel 19175 (1907.5MHz)	QPSK	25 RB / 0 RB Offset
					

LTE Band 2, Channel Bandwidth 10MHz					
Channel 18650 (1855.0MHz)	QPSK	1 RB / 0 RB Offset	Channel 19150 (1905.0MHz)	QPSK	1 RB / 49 RB Offset
					
Channel 18650 (1855.0MHz)	QPSK	50 RB / 0 RB Offset	Channel 19150 (1905.0MHz)	QPSK	50 RB / 0 RB Offset
					

LTE Band 2, Channel Bandwidth 15MHz					
Channel 18675 (1857.5MHz)	QPSK	1 RB / 0 RB Offset	Channel 19125 (1902.5MHz)	QPSK	1 RB / 74 RB Offset
					
Channel 18675 (1857.5MHz)	QPSK	75 RB / 0 RB Offset	Channel 19125 (1902.5MHz)	QPSK	75 RB / 0 RB Offset
					

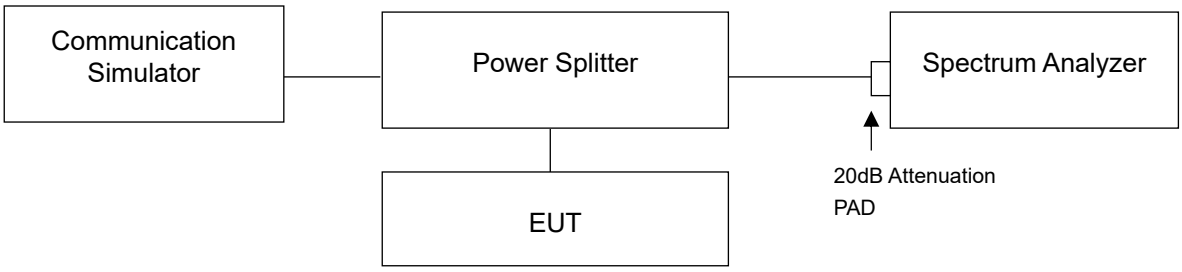
LTE Band 2, Channel Bandwidth 20MHz					
Channel 18700 (1860.0MHz)	QPSK	1 RB / 0 RB Offset	Channel 19100 (1900.0MHz)	QPSK	1 RB / 99 RB Offset
					
Channel 18700 (1860.0MHz)	QPSK	100 RB / 0 RB Offset	Channel 19100 (1900.0MHz)	QPSK	100 RB / 0 RB Offset
					

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

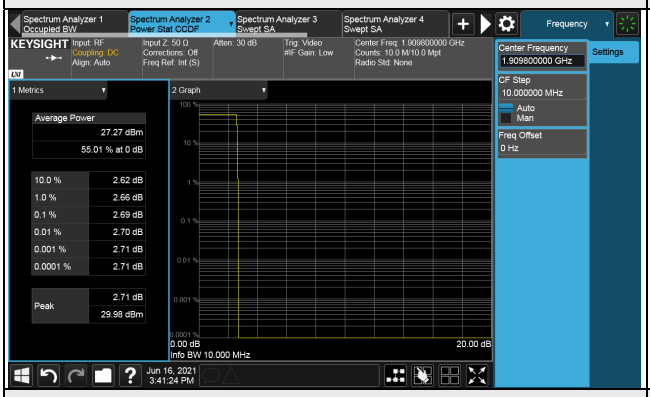
a. Set resolution/measurement bandwidth ≥ signal's occupied bandwidth;
b. Set the number of counts to a value that stabilizes the measured CCDF curve;
c. Record the maximum PAPR level associated with a probability of 0.1%.

4.6.4 Test Results

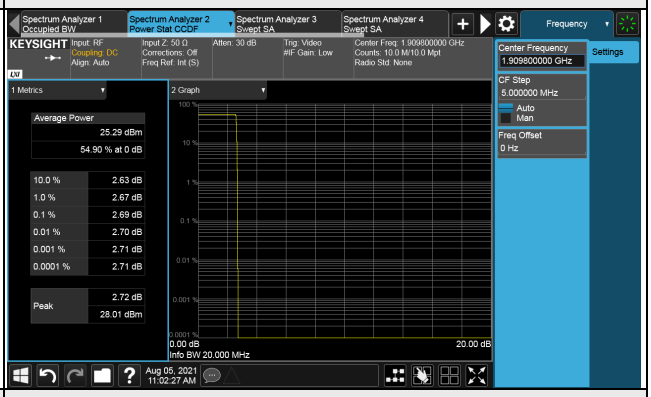
Channel	Frequency (MHz)	Peak To Average Ratio (dB)		
		GSM	GPRS	EDGE
512	1850.2	2.64	2.65	2.67
661	1880.0	2.65	2.67	2.67
810	1909.8	2.69	2.69	2.68

Spectrum Plot of Worst Value

GSM



GPRS

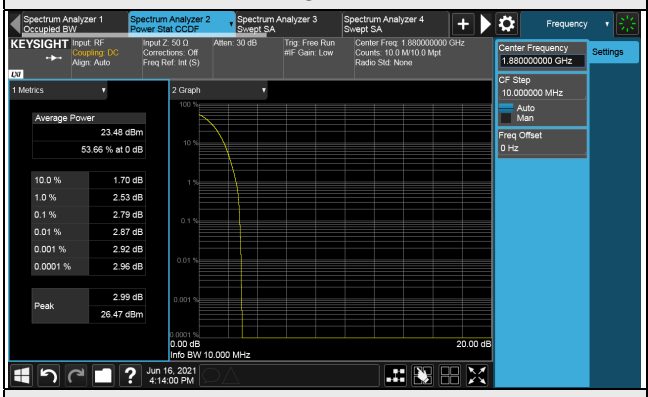


EDGE

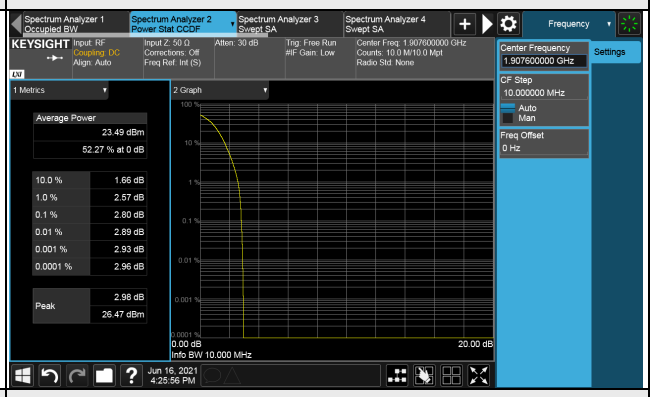
Channel	Frequency (MHz)	Peak To Average Ratio (dB)		
		WCDMA	HSDPA	HSUPA
9262	1852.4	2.67	2.66	3.71
9400	1880.0	2.79	2.78	3.84
9538	1907.6	2.78	2.80	3.81

Spectrum Plot of Worst Value

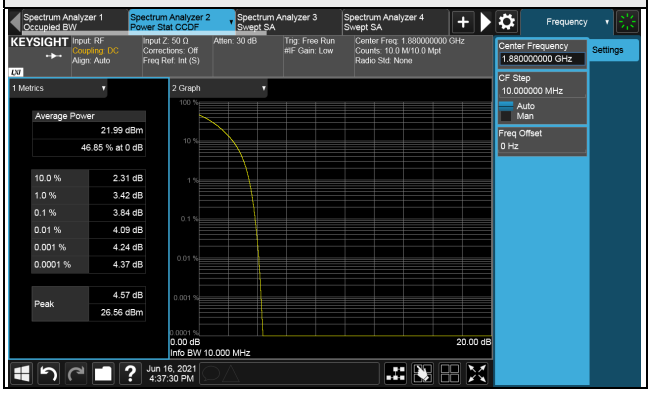
WCDMA



HSDPA



HSUPA

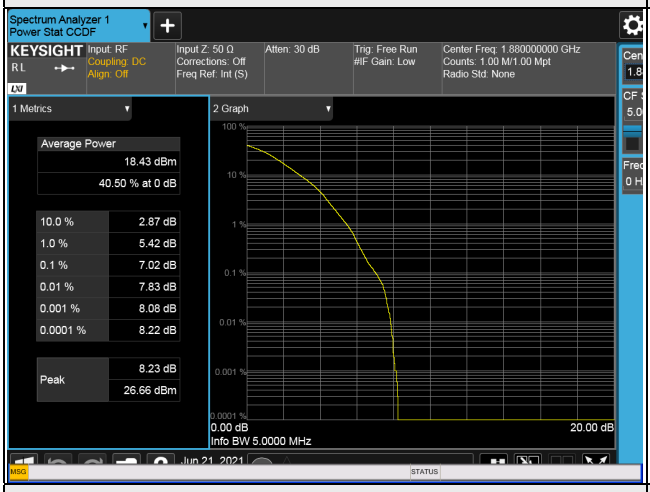


LTE Band 2, Channel Bandwidth 1.4MHz					
Channel	Frequency (MHz)	Peak To Average Ratio (dB)			
		QPSK	16QAM	64QAM	256QAM
18607	1850.7	3.89	5.32	6.65	6.73
18900	1880.0	3.95	5.16	6.51	7.02
19193	1909.3	4.01	4.93	6.60	6.96
LTE Band 2, Channel Bandwidth 3MHz					
Channel	Frequency (MHz)	Peak To Average Ratio (dB)			
		QPSK	16QAM	64QAM	256QAM
18615	1851.5	3.67	5.23	6.41	6.91
18900	1880.0	3.66	4.99	6.45	7.10
19185	1908.5	3.73	4.96	6.40	7.08
LTE Band 2, Channel Bandwidth 5MHz					
Channel	Frequency (MHz)	Peak To Average Ratio (dB)			
		QPSK	16QAM	64QAM	256QAM
18625	1852.5	3.61	5.28	6.46	6.91
18900	1880.0	3.68	4.97	6.40	7.05
19175	1907.5	3.68	5.13	6.37	7.21
LTE Band 2, Channel Bandwidth 10MHz					
Channel	Frequency (MHz)	Peak To Average Ratio (dB)			
		QPSK	16QAM	64QAM	256QAM
18650	1855.0	3.55	5.24	6.43	6.91
18900	1880.0	3.60	5.00	6.39	7.04
19150	1905.0	3.61	5.44	6.77	6.90
LTE Band 2, Channel Bandwidth 15MHz					
Channel	Frequency (MHz)	Peak To Average Ratio (dB)			
		QPSK	16QAM	64QAM	256QAM
18675	1857.5	3.42	5.32	6.33	6.91
18900	1880.0	3.50	5.29	6.49	6.53
19125	1902.5	3.54	5.25	7.09	7.12

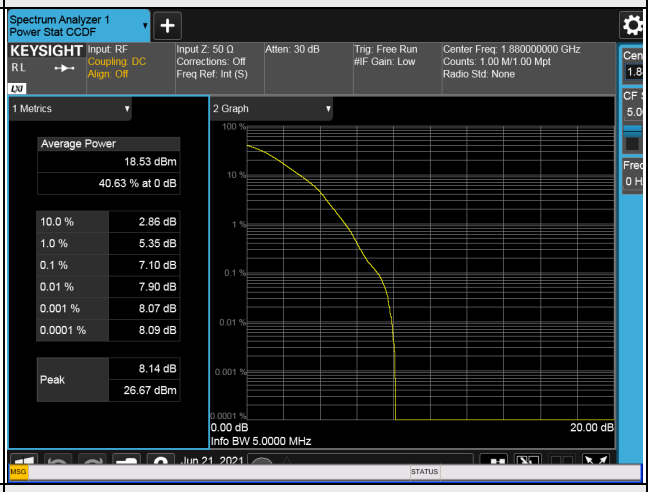
LTE Band 2, Channel Bandwidth 20MHz					
Channel	Frequency (MHz)	Peak To Average Ratio (dB)			
		QPSK	16QAM	64QAM	256QAM
18700	1860.0	3.43	5.30	6.44	7.01
18900	1880.0	3.47	5.21	6.60	7.01
19100	1900.0	3.51	5.36	6.92	6.93

Spectrum Plot of Worst Value

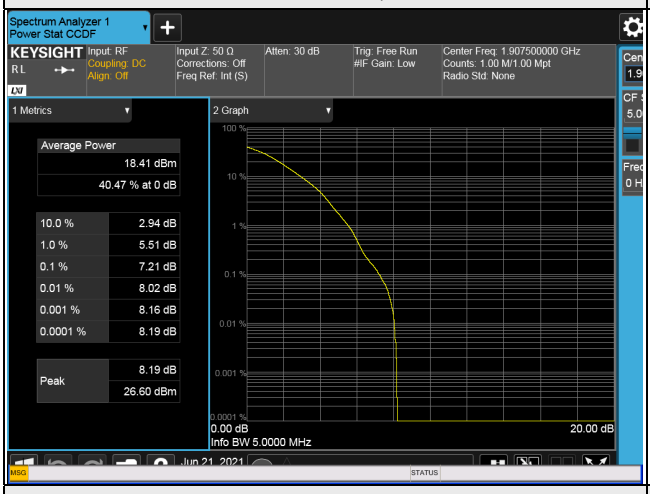
1.4MHz / 256QAM



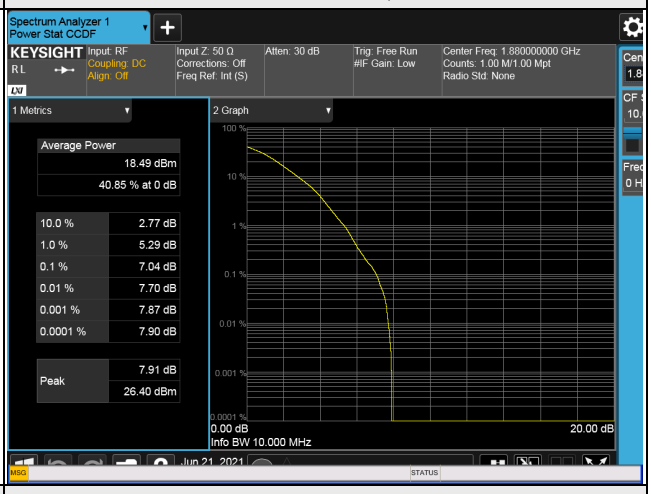
3MHz / 256QAM



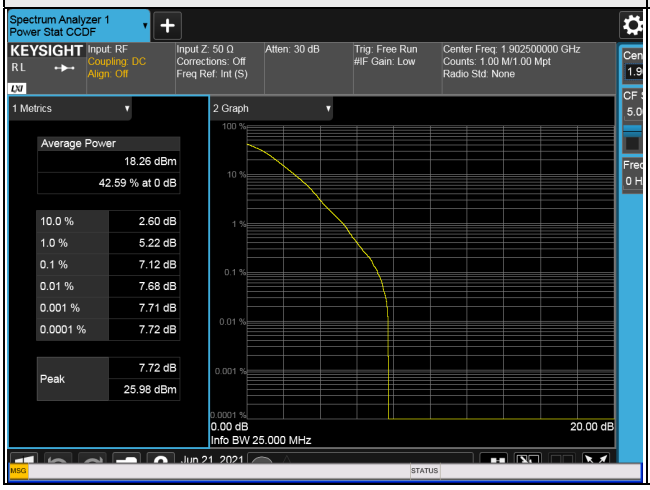
5MHz / 256QAM



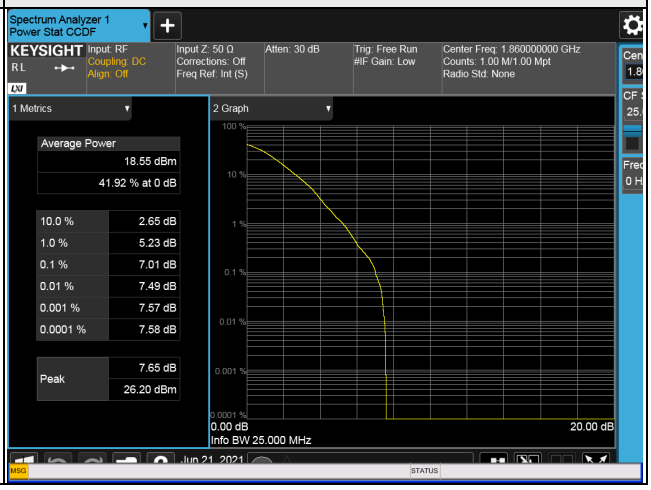
10MHz / 256QAM



15MHz / 256QAM



20MHz / 256QAM

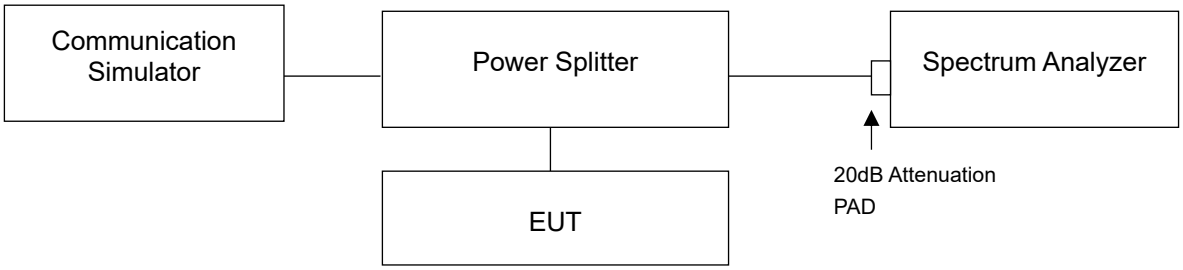


4.7 Conducted Spurious Emissions

4.7.1 Limits of Conducted Spurious Emissions Measurement

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.

4.7.2 Test Setup

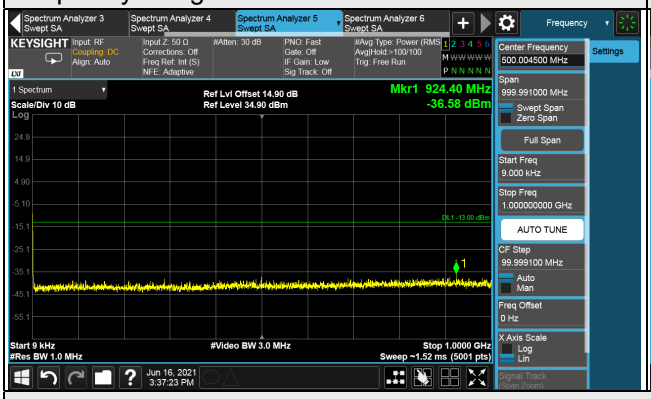
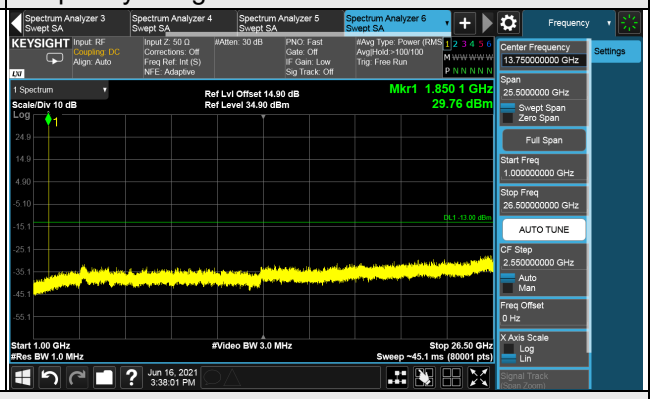
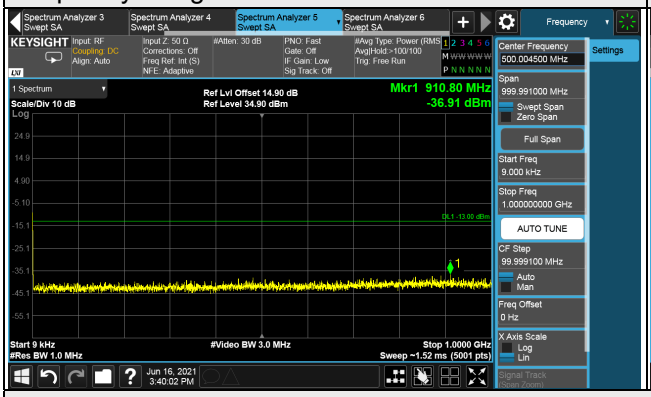
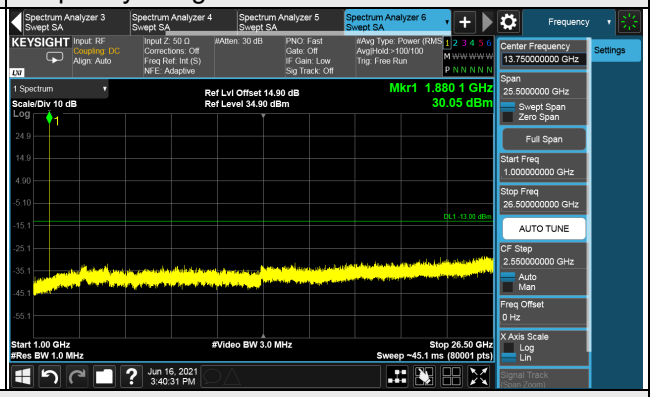
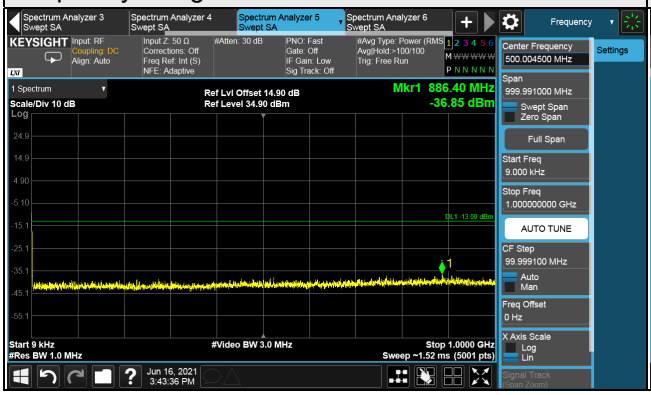
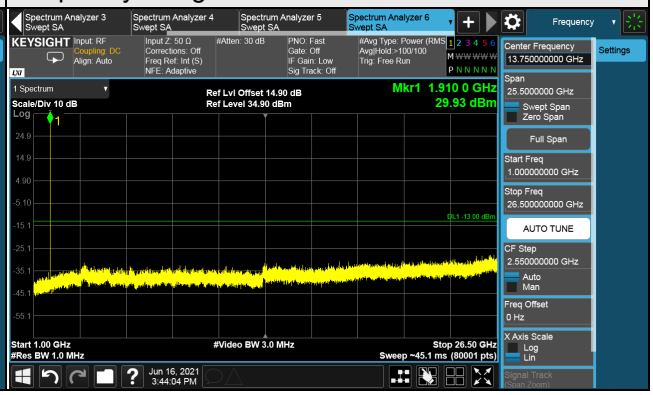


4.7.3 Test Procedure

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 / 26.5GHz. 20dB attenuation pad is connected with spectrum. RBW=1MHz and VBW=3MHz are used for conducted emission measurement.

4.7.4 Test Results

GSM	
Channel 512 (1850.2MHz)	
Frequency Range : 9kHz ~ 1GHz	Frequency Range : 1GHz ~ 26.5GHz
	
Channel 661 (1880.0MHz)	
Frequency Range : 9kHz ~ 1GHz	Frequency Range : 1GHz ~ 26.5GHz
	
Channel 810 (1909.8MHz)	
Frequency Range : 9kHz ~ 1GHz	Frequency Range : 1GHz ~ 26.5GHz
	

*The 9 kHz tone is from the spectrum analyzer.