FCC Radio Test Report

FCC ID: R9C-CPH2365

This report concerns: Original Grant

Project No.	:	2108C136
Equipment	:	Mobile Phone
Brand Name	:	OPPO
Test Model	:	CPH2365
Series Model	:	N/A
Applicant	:	Guangdong OPPO Mobile Telecommunications Corp., Ltd.
Address	:	NO.18 Haibin Road, Wusha Village, Chang'an Town, Dongguan City, Guangdong, China
Manufacturer	:	Guangdong OPPO Mobile Telecommunications Corp., Ltd.
Address	:	NO.18 Haibin Road, Wusha Village, Chang'an Town, Dongguan City, Guangdong, China
Factory	:	Guangdong OPPO Mobile Telecommunications Corp., Ltd.
Address	:	NO.18 Haibin Road, Wusha Village, Chang'an Town, Dongguan City, Guangdong, China
Date of Receipt	:	Dec. 23, 2020
Date of Test	:	Dec. 24, 2020 ~ Aug. 24, 2021
Issued Date	:	Aug. 30, 2021
Report Version	:	R00
Test Sample	:	Engineering Sample No.: DG20201225140 for conducted, DG2020122314 for radiated.
Standard(s)	:	47 CFR FCC Part 22 Subpart H 47 CFR FCC Part 2 ANSI/TIA/EIA-603-E-2016 FCC KDB 971168 D01 Power Meas License Digital Systems v03r01

The above equipment has been tested and found compliance with the requirement of the relative standards by BTL Inc.

Vegeta Li

Prepared by : Vegeta Li

Steven Lu

Approved by : Steven Lu

ACCREDITED

TESTING CERT #5123.02

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Declaration

BTL represents to the client that testing is done in accordance with standard procedures as applicable and that test instruments used has been calibrated with standards traceable to international standard(s) and/or national standard(s).

BTL's reports apply only to the specific samples tested under conditions. It is manufacture's responsibility to ensure that additional production units of this model are manufactured with the identical electrical and mechanical components. **BTL** shall have no liability for any declarations, inferences or generalizations drawn by the client or others from **BTL** issued reports.

The report must not be used by the client to claim product certification, approval, or endorsement by NIST, A2LA, or any agency of the U.S. Government.

This report is the confidential property of the client. As a mutual protection to the clients, the public and ourselves, the test report shall not be reproduced, except in full, without our written approval.

BTL's laboratory quality assurance procedures are in compliance with the **ISO/IEC 17025** requirements, and accredited by the conformity assessment authorities listed in this test report.

BTL is not responsible for the sampling stage, so the results only apply to the sample as received.

The information, data and test plan are provided by manufacturer which may affect the validity of results, so it is manufacturer's responsibility to ensure that the apparatus meets the essential requirements of applied standards and in all the possible configurations as representative of its intended use.

Limitation

For the use of the authority's logo is limited unless the Test Standard(s)/Scope(s)/Item(s) mentioned in this test report is (are) included in the conformity assessment authorities acceptance respective.
Please note that the measurement uncertainty is provided for informational purpose only and is not use in determining the Pass/Fail results.

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REPORT ISSUED HISTORY

Report Version	Description	Issued Date
R00	Original Issue.	Aug. 30, 2021

1. SUMMARY OF TEST RESULTS

Test procedures according to the technical standard(s):

FCC Part 22 Subpart H & Part 2			
Standard(s) Section	**Test Item**	**Judgment**	**Remark**
2.1046 22.913(a)(5)	Effective Radiated Power	PASS	------
2.1049	Occupied Bandwidth	PASS	------
2.1051 22.917(a)	Conducted Spurious Emissions	PASS	------
2.1053 22.917(a)	Radiated Spurious Emissions	PASS	------
22.917(a)	Band Edge Measurements	PASS	------
-	Peak To Average Ratio	PASS	Record Only
2.1055 22.355	Frequency Stability	PASS	------

Note:

(1) “N/A” denotes test is not applicable in this test report.

1.1 TEST FACILITY

The test facilities used to collect the test data in this report is at the location of No. 3 Jinshagang 1st Rd. Shixia, Dalang Town, Dongguan City, Guangdong, People's Republic of China.
BTL's Test Firm Registration Number for FCC: 357015
BTL's Designation Number for FCC: CN1240

1.2 MEASUREMENT UNCERTAINTY

ISO/IEC 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report. The measurement uncertainties given below are based on a 95% confidence level (based on a coverage factor (k=2))
The BTL measurement uncertainty as below table:

A. Radiated Measurement:

Test Site	Method	Measurement Frequency Range	Ant. H / V	U,(dB)
DG-CB03 (3m)	CISPR	9KHz ~ 30MHz	-	2.36
		30MHz ~ 200MHz	V	4.36
		30MHz ~ 200MHz	H	3.32
		200MHz ~ 1,000MHz	V	4.08
		200MHz ~ 1,000MHz	H	3.96

Test Site	Method	Measurement Frequency Range	U,(dB)
DG-CB03 (3m)	CISPR	1GHz ~ 6GHz	3.80
		6GHz ~ 18GHz	4.82

B. Other Measurement:

Parameter	Uncertainty
Spectrum Bandwidth	±3.8 %
Maximum Output Power	±0.95 dB
Power Spectral Density	±0.86 dB
Frequency Stability	±0.16 dB
Temperature	±0.08 °C
Time	±0.58 %
Supply voltages	±0.3 %

Note: Unless specifically mentioned, the uncertainty of measurement has not been taken into account to declare the compliance or non-compliance to the specification.

1.3 TEST ENVIRONMENT CONDITIONS

Test Item	Temperature	Humidity	Test Voltage	Tested By
Output Power & ERP	21.6°C	43%	DC 3.87V	Tate Liu
Occupied Bandwidth	21.6°C	43%	DC 3.87V	Tate Liu
Conducted Spurious Emissions	21.6°C	43%	DC 3.87V	Tate Liu
Radiated Spurious Emissions	26°C	52%	AC 120V/60Hz	Hayden Chen
Band Edge	22.4°C	45%	DC 3.87V	Tate Liu
Peak to Average Ratio	22.4°C	45%	DC 3.87V	Tate Liu
Frequency Stability	Normal & Extreme	45%	Normal & Extreme	Tate Liu

2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

Equipment	Mobile Phone				
Brand Name	OPPO				
Test Model	CPH2365				
Series Model	N/A				
Model Difference(s)	N/A				
Hardware Version	11				
Software Version	ColorOS V11.1				
Power Source	1. DC Voltage supplied from AC adapter. Model: VCB3HAUH 2. Supplied from Li-ion Polymer battery. 1# Manufacturer / Model: Sunwoda / BLP851 2# Manufacturer / Model: TWS / BLP851 3. Supplied from USB port.				
Power Rating	1. I/P:100-240V~ 50/60Hz 1.2A O/P: 5V⎓2A or 5-11V⎓3A MAX 2. 3.87Vdc, 4880mAh 3. DC 5V				
IEMI No.	Radiated	864213050020910			
	Conducted	864213050021272			
Modulation Type	GSM		GMSK		
	EDGE/GPRS		GMSK, 8PSK		
	WCDMA/HSDPA/HSUPA		UL: QPSK DL: QPSK, 16QAM		
	LTE		UL: QPSK,16QAM,64QAM DL: QPSK,16QAM,64QAM		
Max. ERP	GSM 850 / GPRS 850		GMSK	27.86	dBm
	EDGE 850		8PSK	21.18	dBm
	WCDMA Band V		QPSK	17.64	dBm
	HSDPA Band V		QPSK	16.80	dBm
	HSUPA Band V		QPSK	16.76	dBm
	LTE	Channel Bandwidth (MHz)	QPSK (dBm)	16QAM (dBm)	64QAM (dBm)
	Band 5	1.4	18.16	17.38	16.48
		3	18.12	17.43	16.53
		5	18.23	17.49	16.46
		10	18.36	17.62	16.74
	Band 26	1.4	16.78	15.92	14.96
		3	16.65	15.91	14.99
		5	16.85	15.95	15.03
		10	17.05	16.13	15.24
		15	16.97	16.35	15.64

Note:

1. For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.

2. Channel List:

GSM 850				
Test Frequency ID	UARFCN	Frequency of Uplink (MHz)	UARFCN	Frequency of Downlink (MHz)
Low Range	128	824.2	137	869.2
Mid Range	190	836.6	199	881.6
High Range	251	848.8	260	893.8

WCDMA Band V				
Test Frequency ID	UARFCN	Frequency of Uplink (MHz)	UARFCN	Frequency of Downlink (MHz)
Low Range	4132	826.4	4357	871.4
Mid Range	4182	836.4	4407	881.4
High Range	4233	846.6	4458	891.6

LTE Band 5					
Test Frequency ID	Bandwidth (MHz)	N_{UL}	Frequency of Uplink (MHz)	N_{DL}	Frequency of Downlink (MHz)
Low Range	1.4	20407	824.7	2407	869.7
	3	20415	825.5	2415	870.5
	5	20425	826.5	2425	871.5
	10	20450	829	2450	874
Mid Range	1.4/3/5/10	20525	836.5	2525	881.5
High Range	1.4	20643	848.3	2643	893.3
	3	20635	847.5	2635	892.5
	5	20625	846.5	2625	891.5
	10	20600	844	2600	889

LTE Band 26					
Test Frequency ID	Bandwidth (MHz)	N_{UL}	Frequency of Uplink (MHz)	N_{DL}	Frequency of Downlink (MHz)
Low Range	1.4	26797	824.7	8797	869.7
	3	26805	825.5	8805	870.5
	5	26815	826.5	8815	871.5
	10	26840	829	8840	874
	15	26865	831.5	8865	876.5
Mid Range	1.4/3/5/10/15	26915	836.5	8915	881.5
High Range	1.4	27033	848.3	9033	893.3
	3	27025	847.5	9025	892.5
	5	27015	846.5	9015	891.5
	10	26990	844	8990	889
	15	26965	841.5	8965	886.5

3. Table for Filed Antenna:

Main Antenna

Brand	Model Name	Antenna Type	Connector	Gain (dBi)	Note
N/A	N/A	PIFA	N/A	-3.6	GSM 850
N/A	N/A	PIFA	N/A	-3.6	WCDMA Band V
N/A	N/A	PIFA	N/A	-3.6	LTE Band 5
N/A	N/A	PIFA	N/A	-4.7	LTE Band 26

Second Antenna

Brand	Model Name	Antenna Type	Connector	Gain (dBi)	Note
N/A	N/A	PIFA	N/A	-3.5	GSM 850
N/A	N/A	PIFA	N/A	-7.5	WCDMA Band V
N/A	N/A	PIFA	N/A	-3.5	LTE Band 5
N/A	N/A	PIFA	N/A	-3.1	LTE Band 26

Note: The antenna gain is provided by the manufacturer.

2.2 DESCRIPTION OF TEST MODES

Following mode(s) is (were) found to be the worst case(s) and selected for the final test.

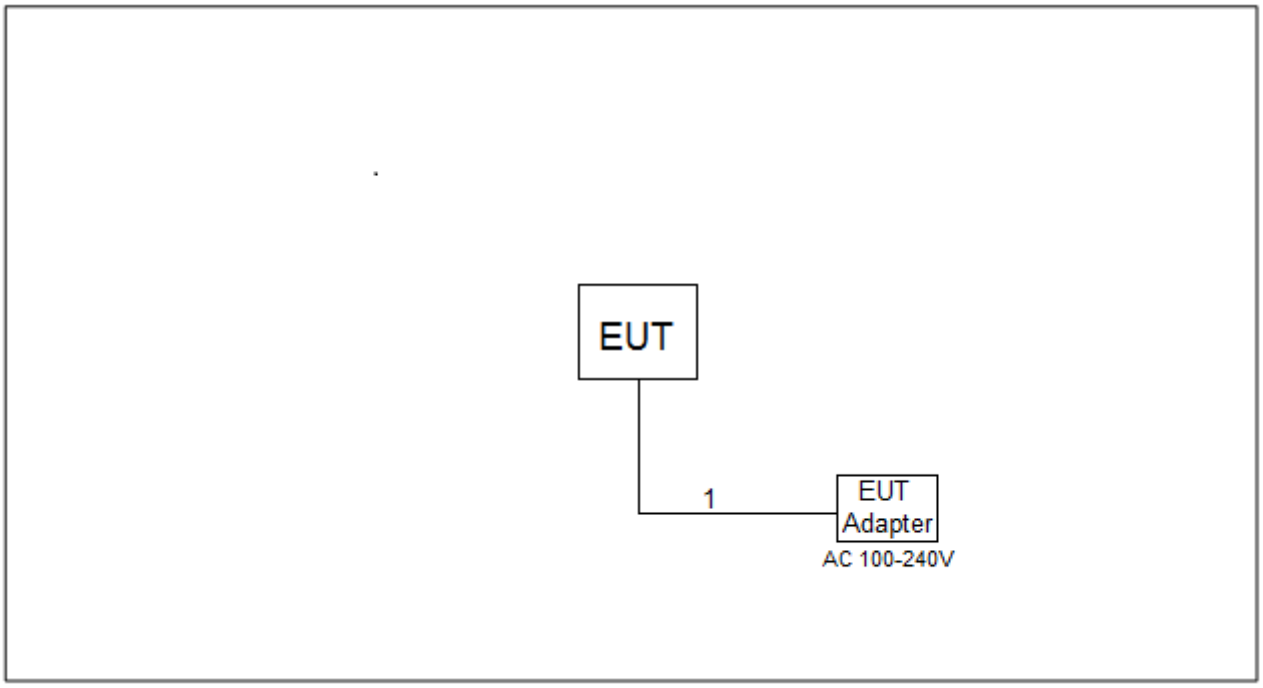
GSM MODE			
Test Item	Available Channel	Tested Channel	Mode
Output Power & ERP	128 to 251	128, 190, 251	GSM, GPRS, EDGE
Occupied Bandwidth	128 to 251	128, 190, 251	GSM, EDGE
Conducted Spurious Emissions	128 to 251	190	GSM, EDGE
Radiated Spurious Emissions	128 to 251	190	GSM
Band Edge	128 to 251	128, 251	GSM, EDGE
Peak to Average Ratio	128 to 251	128, 190, 251	GSM, EDGE
Frequency Stability	128 to 251	190	GSM

WCDMA BAND V MODE			
Test Item	Available Channel	Tested Channel	Mode
Output Power & ERP	4132 to 4233	4132, 4182, 4233	WCDMA, HSDPA, HSUPA
Occupied Bandwidth	4132 to 4233	4132, 4182, 4233	WCDMA, HSDPA, HSUPA
Conducted Spurious Emissions	4132 to 4233	4182	WCDMA
Radiated Spurious Emissions	4132 to 4233	4182	WCDMA
Band Edge	4132 to 4233	4132, 4233	WCDMA, HSDPA, HSUPA
Peak to Average Ratio	4132 to 4233	4132, 4182, 4233	WCDMA, HSDPA, HSUPA
Frequency Stability	4132 to 4233	4182	WCDMA

LTE BAND 5 MODE					
Test Item	Available Channel	Tested Channel	Channel Bandwidth	Modulation	Mode
Output Power & ERP	20407 to 20643	20407, 20525, 20643	1.4MHz	QPSK, 16QAM,64QAM	1RB/3RB/6RB
	20415 to 20635	20415, 20525, 20635	3MHz	QPSK, 16QAM,64QAM	1RB/8RB/15RB
	20425 to 20625	20425, 20525, 20625	5MHz	QPSK, 16QAM,64QAM	1RB/12RB/25RB
	20450 to 20600	20450, 20525, 20600	10MHz	QPSK, 16QAM,64QAM	1RB/25RB/50RB
Occupied Bandwidth	20407 to 20643	20407, 20525, 20643	1.4MHz	QPSK, 16QAM,64QAM	6RB
	20415 to 20635	20415, 20525, 20635	3MHz	QPSK, 16QAM,64QAM	15RB
	20425 to 20625	20425, 20525, 20625	5MHz	QPSK, 16QAM,64QAM	25RB
	20450 to 20600	20450, 20525, 20600	10MHz	QPSK, 16QAM,64QAM	50RB
Conducted Spurious Emissions	20407 to 20643	20525	1.4MHz	QPSK	1RB
	20425 to 20625	20525	5MHz	QPSK	1RB
	20450 to 20600	20525	10MHz	QPSK	1RB
Radiated Spurious Emissions	20407 to 20643	20525	1.4MHz	QPSK	1RB
	20425 to 20625	20525	5MHz	QPSK	1RB
	20450 to 20600	20525	10MHz	QPSK	1RB
Band Edge	20407 to 20643	20407, 20643	1.4MHz	QPSK	1RB/6RB
	20415 to 20635	20415, 20635	3MHz	QPSK	1RB/15RB
	20425 to 20625	20425, 20625	5MHz	QPSK	1RB/25RB
	20450 to 20600	20450, 20600	10MHz	QPSK	1RB/50RB
Peak To Average Ratio	20407 to 20643	20407, 20525, 20643	1.4MHz	QPSK, 16QAM,64QAM	1RB
	20415 to 20635	20415, 20525, 20635	3MHz	QPSK, 16QAM,64QAM	1RB
	20425 to 20625	20425, 20525, 20625	5MHz	QPSK, 16QAM,64QAM	1RB
	20450 to 20600	20450, 20525, 20600	10MHz	QPSK, 16QAM,64QAM	1RB
Frequency Stability	20407 to 20643	20525	1.4MHz	QPSK	1RB
	20415 to 20635	20525	3MHz	QPSK	1RB
	20425 to 20625	20525	5MHz	QPSK	1RB
	20450 to 20600	20525	10MHz	QPSK	1RB

LTE BAND 26 MODE					
Test Item	Available Channel	Tested Channel	Channel Bandwidth	Modulation	Mode
Output Power & ERP	26797 to 27033	26797, 26915, 27033	1.4MHz	QPSK, 16QAM, 64QAM	1RB/3RB/6RB
	26805 to 27025	26805, 26915, 27025	3MHz	QPSK, 16QAM, 64QAM	1RB/8RB/15RB
	26815 to 27015	26815, 26915, 27015	5MHz	QPSK, 16QAM, 64QAM	1RB/12RB/25RB
	26840 to 26990	26840, 26915, 26990	10MHz	QPSK, 16QAM, 64QAM	1RB/25RB/50RB
	26865 to 26965	26865, 26915, 26965	15MHz	QPSK, 16QAM, 64QAM	1RB/36RB/75RB
Occupied Bandwidth	26797 to 27033	26797, 26915, 27033	1.4MHz	QPSK, 16QAM, 64QAM	6RB
	26805 to 27025	26805, 26915, 27025	3MHz	QPSK, 16QAM, 64QAM	15RB
	26815 to 27015	26815, 26915, 27015	5MHz	QPSK, 16QAM, 64QAM	25RB
	26840 to 26990	26840, 26915, 26990	10MHz	QPSK, 16QAM, 64QAM	50RB
	26865 to 26965	26865, 26915, 26965	15MHz	QPSK, 16QAM, 64QAM	75RB
Conducted Spurious Emissions	26815 to 27015	226915	1.4MHz	QPSK	1RB
	26815 to 27015	226915	5MHz	QPSK	1RB
	26865 to 26965	226915	15MHz	QPSK	1RB
Radiated Spurious Emissions	26815 to 27015	226915	1.4MHz	QPSK	1RB
	26815 to 27015	226915	5MHz	QPSK	1RB
	26865 to 26965	226915	15MHz	QPSK	1RB
Band Edge	26797 to 27033	26797, 27033	1.4MHz	QPSK	1RB
					6RB
	26805 to 27025	26805, 27025	3MHz	QPSK	1RB
					15RB
	26815 to 27015	26815, 27015	5MHz	QPSK	1RB
					25RB
	26840 to 26990	26840, 26990	10MHz	QPSK	1RB
					50RB
	26865 to 26965	26865, 26965	15MHz	QPSK	1RB
					75RB
Peak To Average Ratio	26797 to 27033	26797, 26915, 27033	1.4MHz	QPSK, 16QAM, 64QAM	1RB
	26805 to 27025	26805, 26915, 27025	3MHz	QPSK, 16QAM, 64QAM	1RB
	26815 to 27015	26815, 26915, 27015	5MHz	QPSK, 16QAM, 64QAM	1RB
	26840 to 26990	26840, 26915, 26990	10MHz	QPSK, 16QAM, 64QAM	1RB
	26865 to 26965	26865, 26915, 26965	15MHz	QPSK, 16QAM, 64QAM	1RB
Frequency Stability	26797 to 27033	226915	1.4MHz	QPSK	1RB
	26805 to 27025	226915	3MHz	QPSK	1RB
	26815 to 27015	226915	5MHz	QPSK	1RB
	26840 to 26990	226915	10MHz	QPSK	1RB
	26865 to 26965	226915	15MHz	QPSK	1RB

2.3 BLOCK DIGRAM SHOWING THE CONFIGURATIONOFSYSTEMTESTED



2.4 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.

Item	Equipment	Mfr/Brand	Model/Type No.	Series No.
-	-	-	-	-

Item	Cable Type	Shielded Type	Ferrite Core	Length
1	USB Cable	NO	NO	1m

3. TEST RESULT

3.1 OUTPUT POWER MEASUREMENT

3.1.1 LIMIT

Mobile / Portable station are limited to 7 watts e.r.p.

3.1.2 TEST PROCEDURE

The testing follows FCC KDB 971168 v03r01 Section 5.

EIRP / ERP:

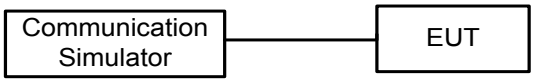
EIRP = Output Power + Antenan gain
ERP = EIPR - 2.15dBi

Output Power:

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

3.1.3 TEST SETUP LAYOUT

Output Power Measurement



3.1.4 TEST DEVIATION

No deviation

3.1.5 TEST RESULTS

Please refer to the APPENDIX A.

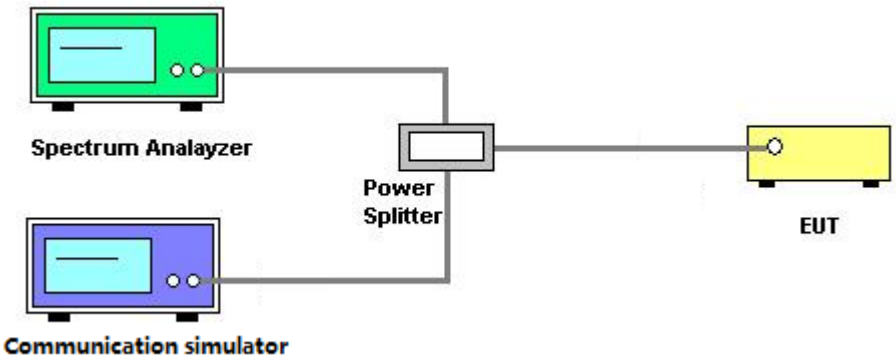
3.2 OCCUPIED BANDWIDTH MEASUREMENT

3.2.1 TEST PROCEDURE

The testing follows FCC KDB 971168 v03r01 Section 4.

1. 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. Use OBW measurement function of Spectrum analyzer to measure 99 % occupied bandwidth and 26dB bandwidth.
2. The EUT was connected to spectrum analyzer and system simulator via a power divider.
3. RBW=(1% ~ 5%)*EBW
   VBW⩾3* RBW
4. Set spectrum analyzer with Peak detector.

3.2.2 TEST SETUP LAYOUT



3.2.3 TEST DEVIATION

No deviation

3.2.4 TEST RESULTS

Please refer to the APPENDIX B.

3.3 CONDUCTED SPURIOUS EMISSIONS MEASUREMENT

3.3.1 LIMIT

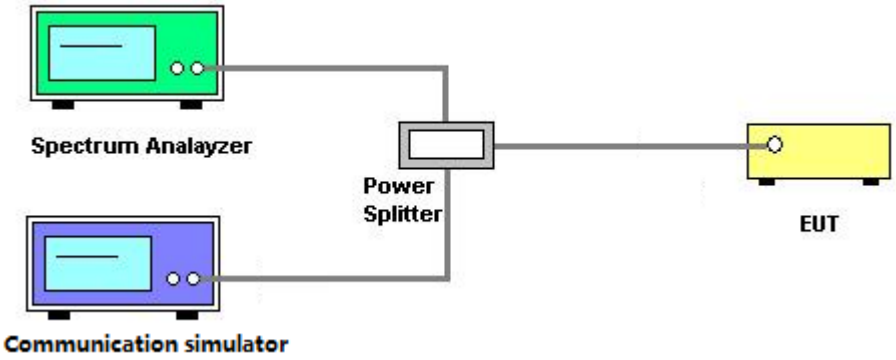
The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB. The emission limit equal to -13dBm.

3.3.2 TEST PROCEDURES

The testing follows FCC KDB 971168 v03r01 Section 6.

1. The EUT was connected to spectrum analyzer and system simulator via a power divider.
2. The band edges of low and high channels for the highest RF powers were measured. Set RBW>=1% EBW in the 1MHz band immediately outside and adjacent to the band edge.
3. Set spectrum analyzer with Peak detector.
4. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

3.3.3 TEST SETUP LAYOUT



3.3.4 TEST DEVIATION

No deviation

3.3.5 TEST RESULTS

Please refer to the APPENDIX C.

3.4 RADIATED SPURIOUS EMISSIONS MEASUREMENT

3.4.1 LIMIT

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.

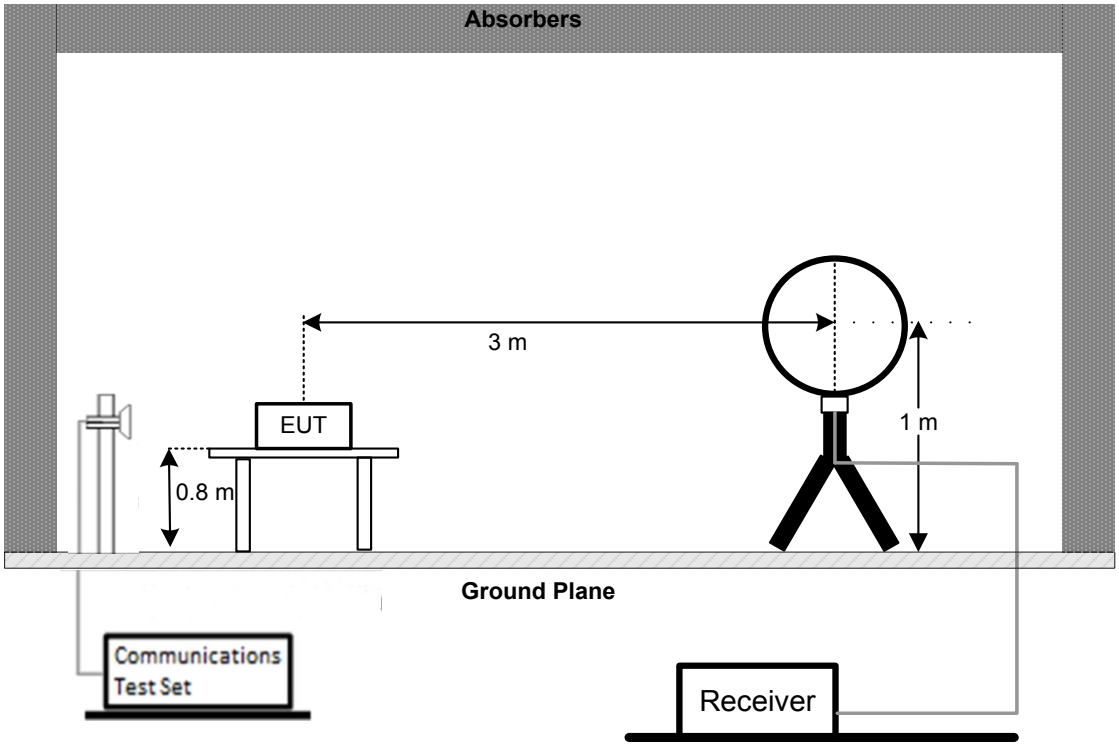
3.4.2 TEST PROCEDURES

The testing follows FCC KDB 971168 v03r01 Section 6.2.

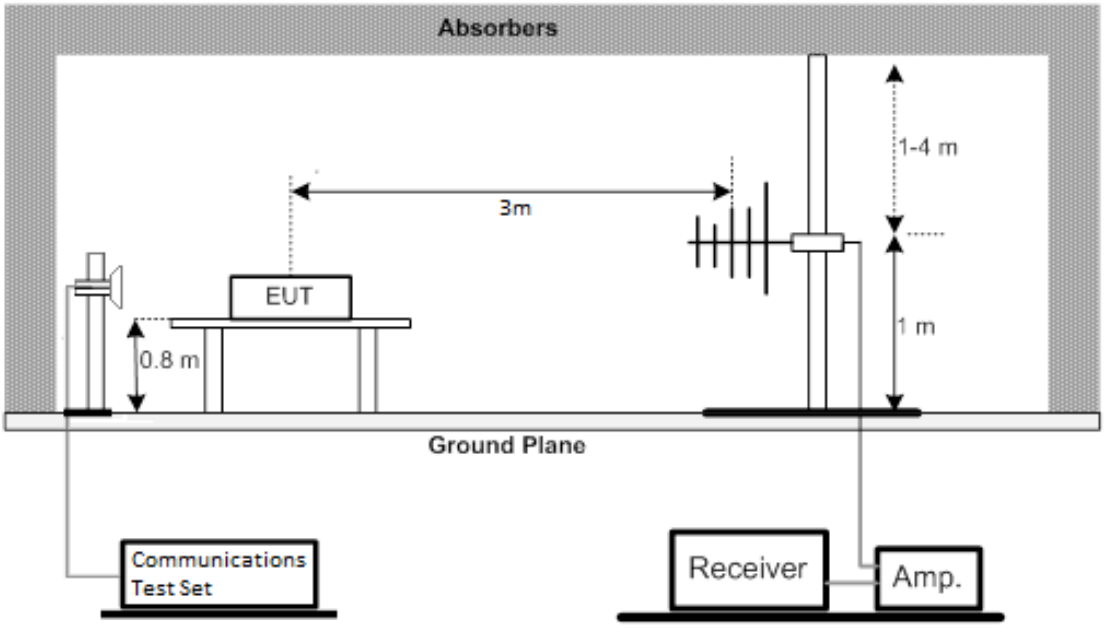
1. Substitution method is used for E.I.R.P measurement. In the semi-anechoic chamber, EUT placed on the 0.8m height of Turn Table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1m to 4m to find the maximum polar radiated power. The “Read Value” is the spectrum reading the maximum power value.
2. The substitution horn antenna is substituted for EUT at the same position and signals generator export the CW signal to the substitution antenna via a TX cable. Rotated the Turn Table and moved receiving antenna to find the maximum radiation power. Adjust output power level of S.G to get a Value of spectrum reading equal to “Read Value “ of step a. Record the power level of S.G
3. EIRP = Output power level of S.G – TX cable loss + Antenna gain of substitution horn.
4. ERP can be calculated form EIRP by subtracting the gain of dipole, ERP = EIPR - 2.15dBi.
5. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1MHz/3MHz.

3.4.3 TEST SETUP LAYOUT

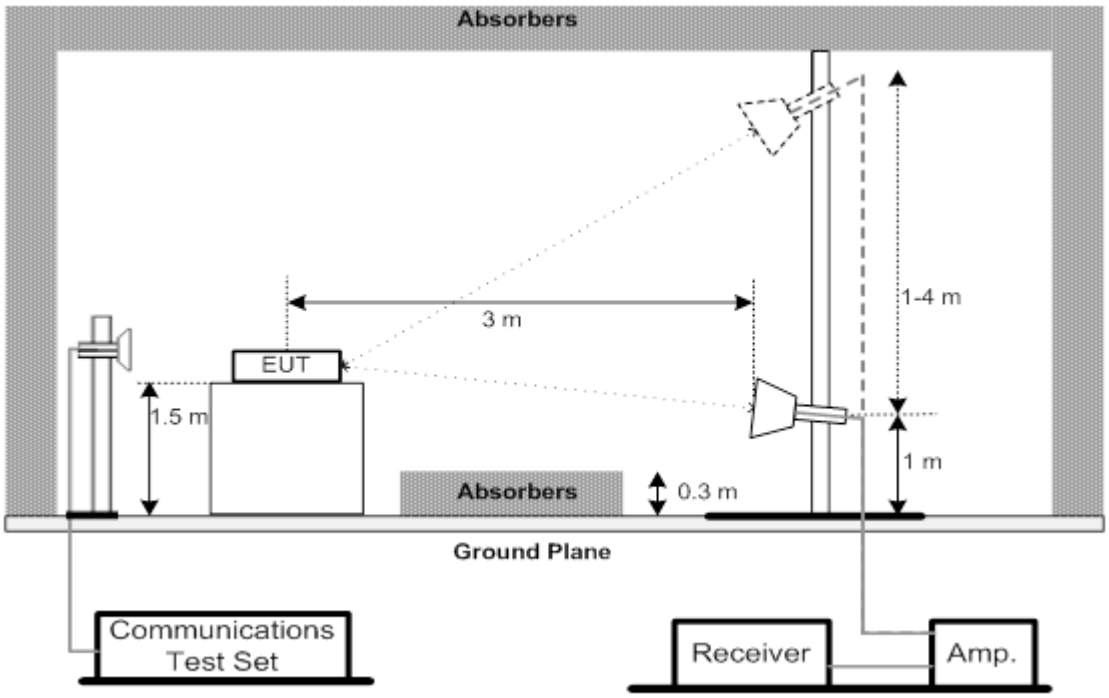
Below 30MHz



30MHz to 1000MHz



Above 1GHz



3.4.4 TEST DEVIATION

No deviation

3.4.5 TEST RESULTS (9KHZ TO 30MHZ)

Please refer to the APPENDIX D.

3.4.6 TEST RESULTS (30MHZ TO 1000MHZ)

Please refer to the APPENDIX E.

3.4.7 TEST RESULTS (ABOVE 1000MHZ)

Please refer to the APPENDIX F.

3.5 BAND EDGE MEASUREMENT

3.5.1 LIMIT

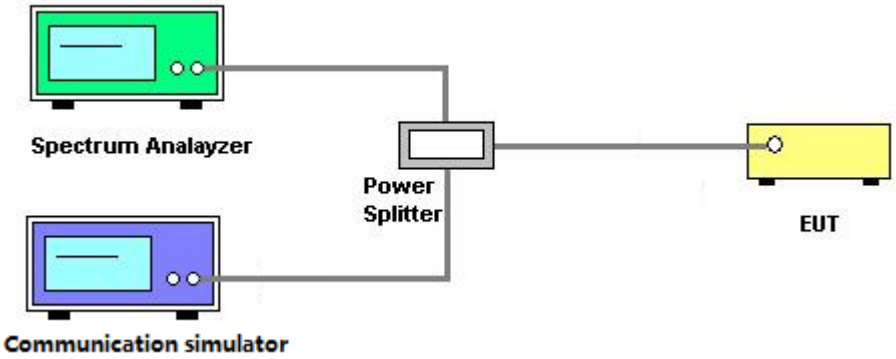
A Power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB. In the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the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

3.5.2 TEST PROCEDURES

The testing follows FCC KDB 971168 v03r01 Section 6.

1. All measurements were done at low and high operational frequency range.
2. Record the max trace plot into the test report.

3.5.3 TEST SETUP LAYOUT



3.5.4 TEST DEVIATION

No deviation

3.5.5 TEST RESULTS

Please refer to the APPENDIX G.

3.6 PEAK TO AVERAGE RATIO MEASUREMENT

3.6.1 LIMIT

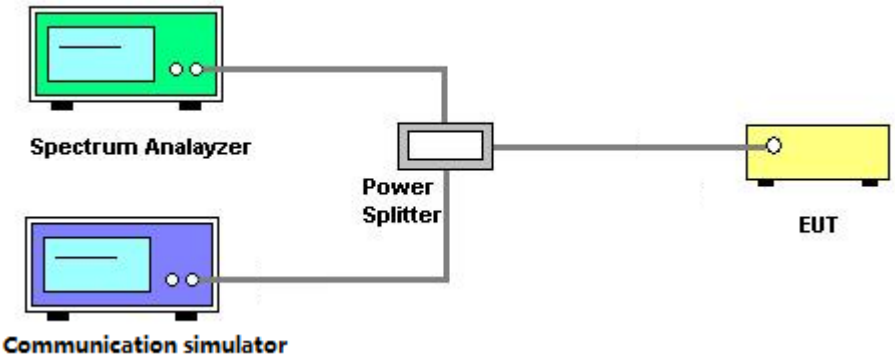
In measuring transmissions in this band using an average power technique, the peak to-average ratio (PAR) of the transmission may not exceed 13 dB.

3.6.2 TEST PROCEDURES

The testing follows FCC KDB 971168 v03r01 Section 5.7.

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

3.6.3 TEST SETUP LAYOUT



3.6.4 TEST DEVIATION

No deviation

3.6.5 TEST RESULTS

Please refer to the APPENDIX H.

3.7 FREQUENCY STABILITY MEASUREMENT

3.7.1 LIMIT

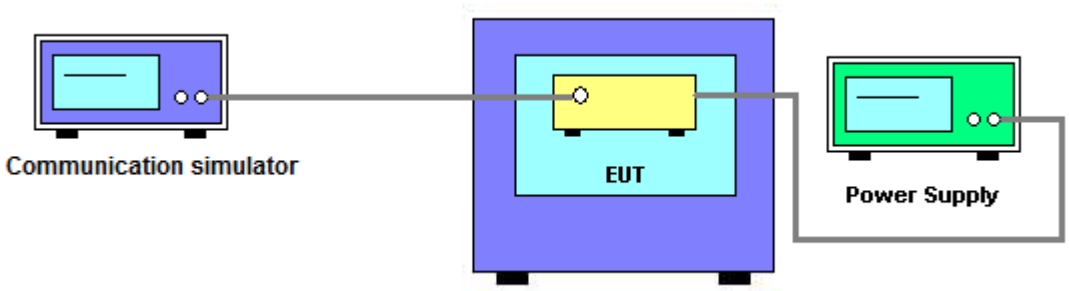
±1.5 ppm is for base and fixed station. ±2.5 ppm is for mobile station.

3.7.2 TEST PROCEDURES

The testing follows FCC KDB 971168 v03r01 Section 9.

1. 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.
2. 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.
3. The temperature range step is 10 degrees in this test items. All temperature levels shall be hold the ±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.
4. The frequency error was recorded frequency error from the communication simulator.

3.7.3 TEST SETUP LAYOUT



3.7.4 TEST DEVIATION

No deviation

3.7.5 TEST RESULTS

Please refer to the APPENDIX I.

4. LIST OF MEASUREMENT EQUIPMENTS

Radiated Spurious Emission Measurement					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Antenna	Schwarzbeck	VULB9160	9160-3231	Apr. 14, 2022
2	Amplifier	Agilent	8449B	3008A02334	Feb. 27, 2022
3	High Pass Filter	Wairrwright Instruments Gmbh	WHK 1.5/15G-10ST	11	Feb. 27, 2022
4	Band Reject Filter	Wairrwright Instruments Gmbh	WRCG 1710/1785-1690/1805-60/12SS	38	Feb. 27, 2022
5	Band Reject Filter	Wairrwright Instruments Gmbh	WRCG 824/849-810/863-60/9SS	7	Feb. 27, 2022
6	Band Reject Filter	Wairrwright Instruments Gmbh	WRCG 880/915-860/935-60/9SS	14	Feb. 27, 2022
7	Band Reject Filter	Wairrwright Instruments Gmbh	WRCG 1850/1910-1830/1930-60/10SS	17	Feb. 27, 2022
8	High Pass Filter	Wairrwright Instruments Gmbh	WHK3.1/18G-10SS	24	Feb. 27, 2022
9	Wireless Communication Test SET	Agilent	E5515C	MY48364183	Feb. 28, 2022
10	Microwave Preamplifier With Adaptor	EMC INSTRUMENT	EMC2654045	980039 & HA01	Feb. 28, 2022
11	Receiver	Agilent	N9038A	MY52130039	Mar. 19, 2022
12	wideband radio communication tester	R&S	CMW500	152372	Feb. 27, 2022
13	High pass filter	KANGMAIWEI	ZHPF-M3-12.75G-3869	B2015073763	Feb. 07, 2022
14	High pass filter	KANGMAIWEI	ZHPF-M1000-4000-1	B2015073762	Feb. 07, 2022
15	High pass filter	KANGMAIWEI	ZHPF-M6-186-1727	B2015073764	Feb. 07, 2022
16	Cable	emci	LMR-400(30MHz-1GHz) (8m+5m)	N/A	May 20, 2022
17	Cable	mitron	B10-01-01-12M	18072744	Oct. 16, 2021
18	Controller	ETS-Lindgren	2090	N/A	N/A
19	Measurement Software	Farad	EZ-EMC Ver.NB-03A1-01	N/A	N/A
20	Loop Antenna	EM	EM-6876-1	230	Oct. 16, 2021
21	Double Ridged Guide Antenna	ETS	3115	75846	Mar. 17, 2022
22	Broad-Band Horn Antenna	Schwarzbeck	BBHA 9170	9170319	Jun. 30, 2022

Conducted Measurement					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Wireless Communication Test SET	Agilent	E5515C	MY48364183	Feb. 28, 2022
2	EXA Spectrum Analyzer	Agilent	N9010A	MY50520044	Feb. 28, 2022
3	POWER SPLITTER	Mini-Circuits	ZFRSC-123-S+	331000910-1	Feb. 27, 2022
4	wideband radio communication tester	R&S	CMW500	152372	Feb. 27, 2022

Frequency Stability Measurement					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Wireless Communication Test SET	Agilent	E5515C	MY48364183	Feb. 28, 2022
2*	Multi-output DC Power Supply	GW Instek	GPC-3030DN	EK880675	Jul. 25, 2023
3	POWER SPLITTER	Mini-Circuits	ZFRSC-123-S+	331000910-1	Feb. 27, 2022
4	wideband radio communication tester	R&S	CMW500	152372	Feb. 27, 2022
5	Const Temp,& Humidity Chamber	Bell	BTH-50C	20170306001	Feb. 27, 2022

Remark: “N/A” denotes no model name, serial no. or calibration specified.
“*” calibration period of equipment list is three year.
Except * item, all calibration period of equipment list is one year.

APPENDIX A - OUTPUT POWER

Output Power (dBm):

GSM850		128CH	190CH	251CH
		824.2MHz	836.6MHz	848.8MHz
GSM (CS)		33.36	33.45	33.47
GPRS/EDGE (GMSK)	1 Tx Slot	33.61	33.34	33.38
	2 Tx Slot	31.3	31.12	31.15
	3 Tx Slot	28.92	28.74	28.79
	4 Tx Slot	28.25	28.16	28.02
EDGE (8PSK)	1 Tx Slot	26.67	26.87	26.93
	2 Tx Slot	24.84	24.93	24.60
	3 Tx Slot	23.68	23.91	23.85
	4 Tx Slot	22.83	22.88	23.00

Modulation	Band	WCDMA Band V		
	Tx Channel	4132CH	4182CH	4233CH
	Frequency	826.4MHz	836.4MHz	846.6MHz
QPSK	RMC 12.2K	23.62	23.61	23.57
	RMC 64K	23.63	23.65	23.56
	RMC 144K	23.63	23.63	23.55
	RMC 384K	23.62	23.63	23.58
	HSDPA Subtest-1	22.34	22.38	22.37
	HSDPA Subtest-2	22.46	22.38	22.36
	HSDPA Subtest-3	21.93	21.37	21.84
	HSDPA Subtest-4	21.91	21.58	21.85
	HSUPA Subtest-1	22.44	22.42	22.37
	HSUPA Subtest-2	20.41	20.46	20.36
	HSUPA Subtest-3	21.44	21.43	21.37
	HSUPA Subtest-4	20.42	20.47	20.37
	HSUPA Subtest-5	22.44	22.41	22.38

LTE Band / BW	Modulation	RB Size	RB Offset	Low CH	Mid CH	High CH
				20407CH	20525CH	20643CH
				824.7MHz	836.5MHz	848.3MHz
5 / 1.4M	QPSK	1	0	23.84	23.64	23.73
		1	2	23.91	23.67	23.75
		1	5	23.77	23.59	23.74
		3	0	23.80	23.61	23.70
		3	1	23.87	23.65	23.75
		3	2	23.76	23.59	23.70
		6	0	22.82	22.60	22.71
	16QAM	1	0	22.85	22.76	23.12
		1	2	22.92	22.81	23.13
		1	5	22.85	22.73	23.12
		3	0	23.01	22.67	22.88
		3	1	23.07	22.69	22.89
		3	2	22.93	22.62	22.87
		6	0	22.03	21.76	21.63
	64QAM	1	0	21.93	21.89	22.13
		1	2	21.99	22.01	22.23
		1	5	21.84	21.97	22.12
		3	0	21.98	21.68	22.03
		3	1	22.03	21.71	22.07
		3	2	21.91	21.64	22.05
		6	0	21.18	20.80	20.70

LTE Band / BW	Modulation	RB Size	RB Offset	Low CH	Mid CH	High CH
				20415CH	20525CH	20635CH
				825.5MHz	836.5MHz	847.5MHz
5 / 3M	QPSK	1	0	23.81	23.73	23.67
		1	7	23.81	23.73	23.76
		1	14	23.87	23.56	23.71
		8	0	22.93	22.62	22.64
		8	4	22.83	22.67	22.77
		8	7	22.85	22.60	22.75
		15	0	22.83	22.68	22.75
	16QAM	1	0	22.82	23.18	22.73
		1	7	22.88	23.13	22.82
		1	14	22.82	22.94	22.74
		8	0	22.01	21.70	21.71
		8	4	21.93	21.74	21.79
		8	7	21.94	21.64	21.79
		15	0	21.84	21.67	21.71
	64QAM	1	0	22.26	21.80	21.95
		1	7	22.28	21.92	22.01
		1	14	22.27	21.70	21.97
		8	0	20.98	20.72	20.59
		8	4	20.92	20.81	20.72
		8	7	20.94	20.71	20.70
		15	0	20.84	20.77	20.76

LTE Band / BW	Modulation	RB Size	RB Offset	Low CH	Mid CH	High CH
				20425CH	20525CH	20625CH
				826.5MHz	836.5MHz	846.5MHz
5 / 5M	QPSK	1	0	23.98	23.75	23.74
		1	13	23.98	23.67	23.76
		1	24	23.96	23.60	23.79
		12	0	22.87	22.71	22.77
		12	6	22.90	22.70	22.74
		12	11	22.86	22.60	22.83
		25	0	22.91	22.67	22.70
	16QAM	1	0	23.10	23.24	22.81
		1	13	23.10	23.18	22.84
		1	24	23.09	23.12	22.89
		12	0	21.90	21.80	21.82
		12	6	22.00	21.80	21.75
		12	11	21.91	21.71	21.82
		25	0	21.90	21.73	21.65
	64QAM	1	0	21.84	22.19	21.94
		1	13	21.88	22.21	22.00
		1	24	21.84	22.09	22.04
		12	0	20.89	20.70	20.78
		12	6	20.98	20.71	20.76
		12	11	20.91	20.60	20.81
		25	0	20.90	20.74	20.72

LTE Band / BW	Modulation	RB Size	RB Offset	Low CH	Mid CH	High CH
				20450CH	20525CH	20600CH
				829.0MHz	836.5MHz	844.0MHz
5 / 10M	QPSK	1	0	24.02	24.00	23.85
		1	25	23.76	23.68	23.66
		1	49	24.11	23.90	23.55
		25	0	22.96	22.79	22.72
		25	13	23.00	22.73	22.73
		25	25	22.93	22.70	22.81
		50	0	22.92	22.75	22.81
	16QAM	1	0	23.05	23.37	22.89
		1	25	22.80	22.98	22.66
		1	49	23.13	23.25	22.96
		25	0	21.97	21.80	21.78
		25	13	21.98	21.70	21.78
		25	25	21.94	21.67	21.88
		50	0	21.86	21.75	21.79
	64QAM	1	0	22.49	22.31	22.19
		1	25	22.20	22.02	22.03
		1	49	22.15	22.18	22.10
		25	0	21.04	20.94	20.75
		25	13	21.06	20.84	20.69
		25	25	20.96	20.72	20.80
		50	0	20.91	20.71	20.76

LTE Band / BW	Modulation	RB Size	RB Offset	Low CH	Mid CH	High CH
				CH26797	CH26915	CH27033
				824.7MHz	836.5MHz	848.3MHz
26 / 1.4M	QPSK	1	0	23.52	23.05	23.32
		1	2	23.63	23.11	23.39
		1	5	23.49	23.09	23.36
		3	0	23.55	23.07	23.33
		3	1	23.57	23.10	23.36
		3	2	23.46	23.09	23.30
		6	0	22.40	22.10	22.31
	16QAM	1	0	22.54	22.19	22.73
		1	2	22.60	22.32	22.77
		1	5	22.51	22.26	22.71
		3	0	22.68	22.16	22.50
		3	1	22.75	22.22	22.52
		3	2	22.59	22.16	22.48
		6	0	21.63	21.29	21.25
	64QAM	1	0	21.64	21.33	21.71
		1	2	21.69	21.41	21.81
		1	5	21.49	21.41	21.69
		3	0	21.66	21.05	21.64
		3	1	21.71	21.13	21.69
		3	2	21.59	21.08	21.64
		6	0	20.73	20.21	20.29

LTE Band / BW	Modulation	RB Size	RB Offset	Low CH	Mid CH	High CH
				CH26805	CH26915	CH27025
				825.5MHz	836.5MHz	847.5MHz
26 / 3M	QPSK	1	0	23.45	23.10	23.32
		1	7	23.50	23.17	23.34
		1	14	23.38	23.11	23.30
		8	0	22.44	22.14	22.38
		8	4	22.48	22.15	22.36
		8	7	22.47	22.14	22.38
		15	0	22.49	22.11	22.34
	16QAM	1	0	22.65	22.11	22.68
		1	7	22.61	22.18	22.75
		1	14	22.48	22.11	22.76
		8	0	21.55	21.29	21.37
		8	4	21.58	21.30	21.43
		8	7	21.53	21.26	21.42
		15	0	21.47	21.21	21.39
	64QAM	1	0	21.84	21.50	21.35
		1	7	21.77	21.54	21.56
		1	14	21.63	21.52	21.45
		8	0	20.41	20.23	20.34
		8	4	20.46	20.22	20.41
		8	7	20.47	20.23	20.41
		15	0	20.52	20.16	20.38

LTE Band / BW	Modulation	RB Size	RB Offset	Low CH	Mid CH	High CH
				CH26815	CH26915	CH27015
				826.5MHz	836.5MHz	846.5MHz
26 / 5M	QPSK	1	0	23.70	23.22	23.27
		1	13	23.55	23.22	23.38
		1	24	23.41	23.18	23.45
		12	0	22.56	22.18	22.28
		12	6	22.48	22.16	22.31
		12	11	22.50	22.18	22.37
		25	0	22.45	22.20	22.33
	16QAM	1	0	22.80	22.72	22.34
		1	13	22.65	22.73	22.45
		1	24	22.57	22.69	22.46
		12	0	21.61	21.37	21.31
		12	6	21.55	21.32	21.34
		12	11	21.55	21.34	21.39
		25	0	21.48	21.27	21.26
	64QAM	1	0	21.88	21.16	21.59
		1	13	21.74	21.16	21.73
		1	24	21.64	21.14	21.74
		12	0	20.58	20.26	20.24
		12	6	20.50	20.22	20.26
		12	11	20.50	20.21	20.29
		25	0	20.46	20.15	20.26

LTE Band / BW	Modulation	RB Size	RB Offset	Low CH	Mid CH	High CH
				CH26840	CH26915	CH26990
				829MHz	836.5MHz	844MHz
26 / 10M	QPSK	1	0	23.90	23.58	23.27
		1	25	23.36	23.14	23.10
		1	49	23.49	23.48	23.60
		25	0	22.48	22.27	22.13
		25	13	22.41	22.23	22.20
		25	25	22.41	22.28	22.38
		50	0	22.44	22.29	22.29
	16QAM	1	0	22.85	22.56	22.76
		1	25	22.38	22.15	22.54
		1	49	22.47	22.44	22.98
		25	0	21.62	21.30	21.16
		25	13	21.53	21.27	21.23
		25	25	21.51	21.33	21.36
		50	0	21.48	21.28	21.30
	64QAM	1	0	22.09	21.96	21.54
		1	25	21.58	21.58	21.32
		1	49	21.70	21.87	21.83
		25	0	20.56	20.32	20.21
		25	13	20.47	20.28	20.31
		25	25	20.47	20.30	20.50
		50	0	20.46	20.28	20.33

LTE Band / BW	Modulation	RB Size	RB Offset	Low CH	Mid CH	High CH
				CH26865	CH26915	CH26965
				831.5MHz	836.5MHz	841.5MHz
26 / 15M	QPSK	1	0	23.82	23.58	23.45
		1	38	23.32	23.02	23.05
		1	74	23.52	23.44	23.81
		36	0	22.62	22.45	22.42
		36	18	22.36	22.20	22.26
		36	39	22.06	22.05	22.16
		75	0	22.37	22.27	22.28
	16QAM	1	0	23.20	23.07	22.42
		1	38	22.68	22.56	22.01
		1	74	22.95	22.95	22.71
		36	0	21.68	21.41	21.42
		36	18	21.43	21.14	21.27
		36	39	21.09	21.02	21.17
		75	0	21.39	21.25	21.27
	64QAM	1	0	22.49	22.03	21.63
		1	38	21.99	21.50	21.23
		1	74	22.29	21.93	21.97
		36	0	20.63	20.50	20.51
		36	18	20.40	20.27	20.34
		36	39	20.02	20.10	20.27
		75	0	20.43	20.29	20.31

ERP (dBm):

GSM850		128CH	190CH	251CH
		824.2MHz	836.6MHz	848.8MHz
GSM (CS)		27.61	27.70	27.72
GPRS/EDGE (GMSK)	1 Tx Slot	27.86	27.59	27.63
	2 Tx Slot	25.55	25.37	25.40
	3 Tx Slot	23.17	22.99	23.04
	4 Tx Slot	22.50	22.41	22.27
EDGE (8PSK)	1 Tx Slot	20.92	21.12	21.18
	2 Tx Slot	19.09	19.18	18.85
	3 Tx Slot	17.93	18.16	18.10
	4 Tx Slot	17.08	17.13	17.25

Modulation	Band	WCDMA Band V		
	Tx Channel	4132CH	4182CH	4233CH
	Frequency	826.4MHz	836.4MHz	846.6MHz
QPSK	RMC 12.2K	19.72	19.71	19.67
	RMC 64K	19.73	19.75	19.66
	RMC 144K	19.73	19.73	19.65
	RMC 384K	19.72	19.73	19.68
	HSDPA Subtest-1	18.44	18.48	18.47
	HSDPA Subtest-2	18.56	18.48	18.46
	HSDPA Subtest-3	18.03	17.47	17.94
	HSDPA Subtest-4	18.01	17.68	17.95
	HSUPA Subtest-1	18.54	18.52	18.47
	HSUPA Subtest-2	16.51	16.56	16.46
	HSUPA Subtest-3	17.54	17.53	17.47
	HSUPA Subtest-4	16.52	16.57	16.47
	HSUPA Subtest-5	18.54	18.51	18.48

LTE Band / BW	Modulation	RB Size	RB Offset	Low CH	Mid CH	High CH
				20407CH	20525CH	20643CH
				824.7MHz	836.5MHz	848.3MHz
5 / 1.4M	QPSK	1	0	18.09	17.89	17.98
		1	2	18.16	17.92	18.00
		1	5	18.02	17.84	17.99
		3	0	18.05	17.86	17.95
		3	1	18.12	17.90	18.00
		3	2	18.01	17.84	17.95
		6	0	17.07	16.85	16.96
	16QAM	1	0	17.10	17.01	17.37
		1	2	17.17	17.06	17.38
		1	5	17.10	16.98	17.37
		3	0	17.26	16.92	17.13
		3	1	17.32	16.94	17.14
		3	2	17.18	16.87	17.12
		6	0	16.28	16.01	15.88
	64QAM	1	0	16.18	16.14	16.38
		1	2	16.24	16.26	16.48
		1	5	16.09	16.22	16.37
		3	0	16.23	15.93	16.28
		3	1	16.28	15.96	16.32
		3	2	16.16	15.89	16.30
		6	0	15.43	15.05	14.95

LTE Band / BW	Modulation	RB Size	RB Offset	Low CH	Mid CH	High CH
				20415CH	20525CH	20635CH
				825.5MHz	836.5MHz	847.5MHz
5 / 3M	QPSK	1	0	18.06	17.98	17.92
		1	7	18.06	17.98	18.01
		1	14	18.12	17.81	17.96
		8	0	17.18	16.87	16.89
		8	4	17.08	16.92	17.02
		8	7	17.10	16.85	17.00
		15	0	17.08	16.93	17.00
	16QAM	1	0	17.07	17.43	16.98
		1	7	17.13	17.38	17.07
		1	14	17.07	17.19	16.99
		8	0	16.26	15.95	15.96
		8	4	16.18	15.99	16.04
		8	7	16.19	15.89	16.04
		15	0	16.09	15.92	15.96
	64QAM	1	0	16.51	16.05	16.20
		1	7	16.53	16.17	16.26
		1	14	16.52	15.95	16.22
		8	0	15.23	14.97	14.84
		8	4	15.17	15.06	14.97
		8	7	15.19	14.96	14.95
		15	0	15.09	15.02	15.01

LTE Band / BW	Modulation	RB Size	RB Offset	Low CH	Mid CH	High CH
				20425CH	20525CH	20625CH
				826.5MHz	836.5MHz	846.5MHz
5 / 5M	QPSK	1	0	18.23	18.00	17.99
		1	13	18.23	17.92	18.01
		1	24	18.21	17.85	18.04
		12	0	17.12	16.96	17.02
		12	6	17.15	16.95	16.99
		12	11	17.11	16.85	17.08
		25	0	17.16	16.92	16.95
	16QAM	1	0	17.35	17.49	17.06
		1	13	17.35	17.43	17.09
		1	24	17.34	17.37	17.14
		12	0	16.15	16.05	16.07
		12	6	16.25	16.05	16.00
		12	11	16.16	15.96	16.07
		25	0	16.15	15.98	15.90
	64QAM	1	0	16.09	16.44	16.19
		1	13	16.13	16.46	16.25
		1	24	16.09	16.34	16.29
		12	0	15.14	14.95	15.03
		12	6	15.23	14.96	15.01
		12	11	15.16	14.85	15.06
		25	0	15.15	14.99	14.97

LTE Band / BW	Modulation	RB Size	RB Offset	Low CH	Mid CH	High CH
				20450CH	20525CH	20600CH
				829.0MHz	836.5MHz	844.0MHz
5 / 10M	QPSK	1	0	18.27	18.25	18.10
		1	25	18.01	17.93	17.91
		1	49	18.36	18.15	17.80
		25	0	17.21	17.04	16.97
		25	13	17.25	16.98	16.98
		25	25	17.18	16.95	17.06
		50	0	17.17	17.00	17.06
	16QAM	1	0	17.30	17.62	17.14
		1	25	17.05	17.23	16.91
		1	49	17.38	17.50	17.21
		25	0	16.22	16.05	16.03
		25	13	16.23	15.95	16.03
		25	25	16.19	15.92	16.13
		50	0	16.11	16.00	16.04
	64QAM	1	0	16.74	16.56	16.44
		1	25	16.45	16.27	16.28
		1	49	16.40	16.43	16.35
		25	0	15.29	15.19	15.00
		25	13	15.31	15.09	14.94
		25	25	15.21	14.97	15.05
		50	0	15.16	14.96	15.01

LTE Band / BW	Modulation	RB Size	RB Offset	Low CH	Mid CH	High CH
				CH26797	CH26915	CH27033
				824.7MHz	836.5MHz	848.3MHz
26 / 1.4M	QPSK	1	0	16.67	16.20	16.47
		1	2	16.78	16.26	16.54
		1	5	16.64	16.24	16.51
		3	0	16.70	16.22	16.48
		3	1	16.72	16.25	16.51
		3	2	16.61	16.24	16.45
		6	0	15.55	15.25	15.46
	16QAM	1	0	15.69	15.34	15.88
		1	2	15.75	15.47	15.92
		1	5	15.66	15.41	15.86
		3	0	15.83	15.31	15.65
		3	1	15.90	15.37	15.67
		3	2	15.74	15.31	15.63
		6	0	14.78	14.44	14.40
	64QAM	1	0	14.79	14.48	14.86
		1	2	14.84	14.56	14.96
		1	5	14.64	14.56	14.84
		3	0	14.81	14.20	14.79
		3	1	14.86	14.28	14.84
		3	2	14.74	14.23	14.79
		6	0	13.88	13.36	13.44

LTE Band / BW	Modulation	RB Size	RB Offset	Low CH	Mid CH	High CH
				CH26805	CH26915	CH27025
				825.5MHz	836.5MHz	847.5MHz
26 / 3M	QPSK	1	0	16.60	16.25	16.47
		1	7	16.65	16.32	16.49
		1	14	16.53	16.26	16.45
		8	0	15.59	15.29	15.53
		8	4	15.63	15.30	15.51
		8	7	15.62	15.29	15.53
		15	0	15.64	15.26	15.49
	16QAM	1	0	15.80	15.26	15.83
		1	7	15.76	15.33	15.90
		1	14	15.63	15.26	15.91
		8	0	14.70	14.44	14.52
		8	4	14.73	14.45	14.58
		8	7	14.68	14.41	14.57
		15	0	14.62	14.36	14.54
	64QAM	1	0	14.99	14.65	14.50
		1	7	14.92	14.69	14.71
		1	14	14.78	14.67	14.60
		8	0	13.56	13.38	13.49
		8	4	13.61	13.37	13.56
		8	7	13.62	13.38	13.56
		15	0	13.67	13.31	13.53

LTE Band / BW	Modulation	RB Size	RB Offset	Low CH	Mid CH	High CH
				CH26815	CH26915	CH27015
				826.5MHz	836.5MHz	846.5MHz
26 / 5M	QPSK	1	0	16.85	16.37	16.42
		1	13	16.70	16.37	16.53
		1	24	16.56	16.33	16.60
		12	0	15.71	15.33	15.43
		12	6	15.63	15.31	15.46
		12	11	15.65	15.33	15.52
		25	0	15.60	15.35	15.48
	16QAM	1	0	15.95	15.87	15.49
		1	13	15.80	15.88	15.60
		1	24	15.72	15.84	15.61
		12	0	14.76	14.52	14.46
		12	6	14.70	14.47	14.49
		12	11	14.70	14.49	14.54
		25	0	14.63	14.42	14.41
	64QAM	1	0	15.03	14.31	14.74
		1	13	14.89	14.31	14.88
		1	24	14.79	14.29	14.89
		12	0	13.73	13.41	13.39
		12	6	13.65	13.37	13.41
		12	11	13.65	13.36	13.44
		25	0	13.61	13.30	13.41

LTE Band / BW	Modulation	RB Size	RB Offset	Low CH	Mid CH	High CH
				CH26840	CH26915	CH26990
				829MHz	836.5MHz	844MHz
26 / 10M	QPSK	1	0	17.05	16.73	16.42
		1	25	16.51	16.29	16.25
		1	49	16.64	16.63	16.75
		25	0	15.63	15.42	15.28
		25	13	15.56	15.38	15.35
		25	25	15.56	15.43	15.53
		50	0	15.59	15.44	15.44
	16QAM	1	0	16.00	15.71	15.91
		1	25	15.53	15.30	15.69
		1	49	15.62	15.59	16.13
		25	0	14.77	14.45	14.31
		25	13	14.68	14.42	14.38
		25	25	14.66	14.48	14.51
		50	0	14.63	14.43	14.45
	64QAM	1	0	15.24	15.11	14.69
		1	25	14.73	14.73	14.47
		1	49	14.85	15.02	14.98
		25	0	13.71	13.47	13.36
		25	13	13.62	13.43	13.46
		25	25	13.62	13.45	13.65
		50	0	13.61	13.43	13.48

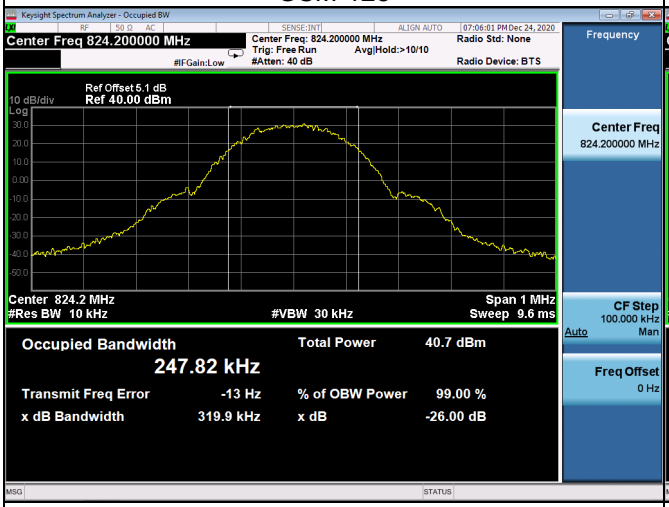
LTE Band / BW	Modulation	RB Size	RB Offset	Low CH	Mid CH	High CH
				CH26865	CH26915	CH26965
				831.5MHz	836.5MHz	841.5MHz
26 / 15M	QPSK	1	0	16.97	16.73	16.60
		1	38	16.47	16.17	16.20
		1	74	16.67	16.59	16.96
		36	0	15.77	15.60	15.57
		36	18	15.51	15.35	15.41
		36	39	15.21	15.20	15.31
		75	0	15.52	15.42	15.43
	16QAM	1	0	16.35	16.22	15.57
		1	38	15.83	15.71	15.16
		1	74	16.10	16.10	15.86
		36	0	14.83	14.56	14.57
		36	18	14.58	14.29	14.42
		36	39	14.24	14.17	14.32
		75	0	14.54	14.40	14.42
	64QAM	1	0	15.64	15.18	14.78
		1	38	15.14	14.65	14.38
		1	74	15.44	15.08	15.12
		36	0	13.78	13.65	13.66
		36	18	13.55	13.42	13.49
		36	39	13.17	13.25	13.42
		75	0	13.58	13.44	13.46

APPENDIX B - OCCUPIED BANDWIDTH

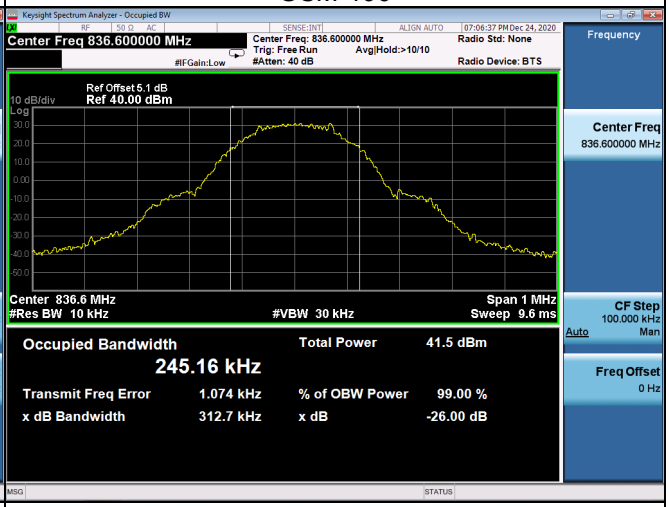
GSM850					
GSM			EDGE		
CS			8PSK		
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)
128	824.2	0.2478	128	824.2	0.3199
190	836.6	0.2452	190	836.6	0.3127
251	848.8	0.2440	251	848.8	0.3129
Channel	Frequency (MHz)	26dB Bandwidth (MHz)	Channel	Frequency (MHz)	26dB Bandwidth (MHz)
128	824.2	0.2445	128	824.2	0.3128
190	836.6	0.2427	190	836.6	0.3118
251	848.8	0.2478	251	848.8	0.3207

Spectrum Plot

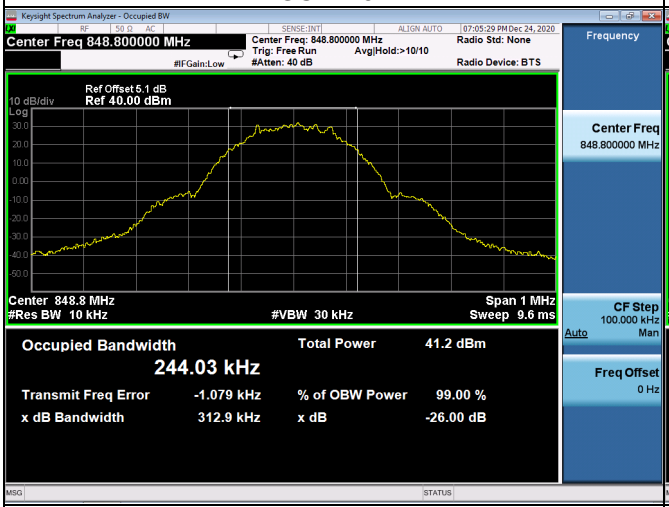
GSM-128



GSM-190



GSM-251



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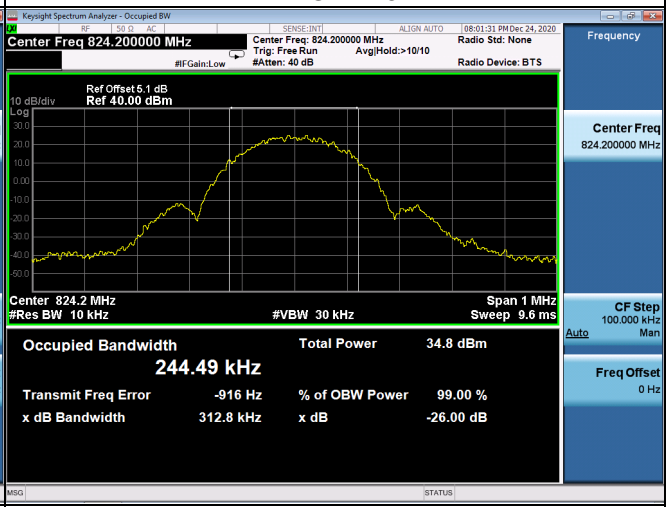

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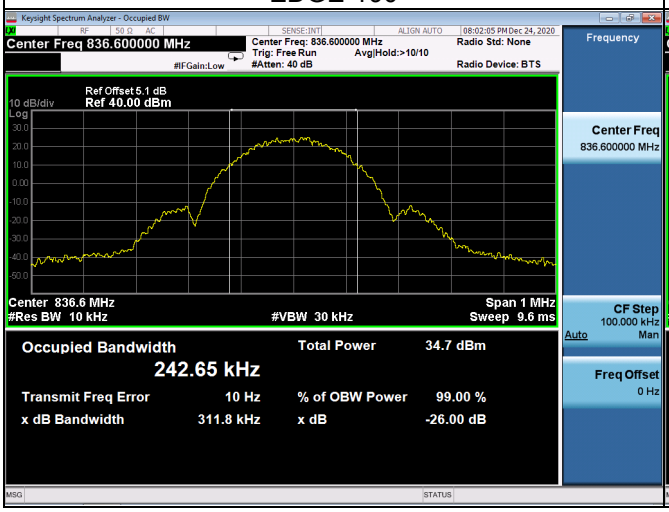
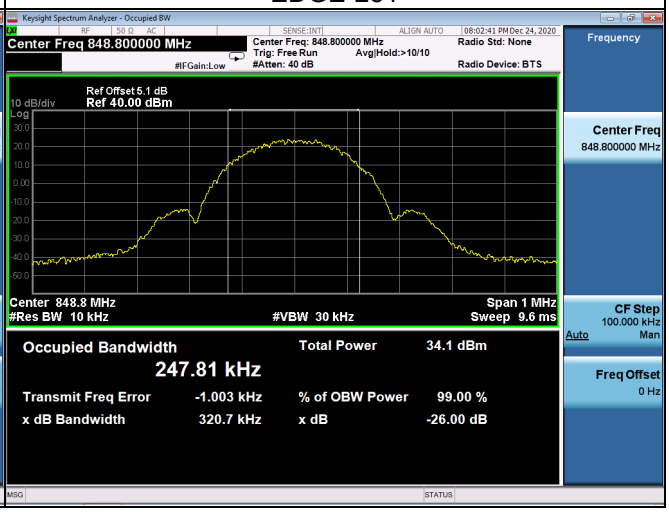


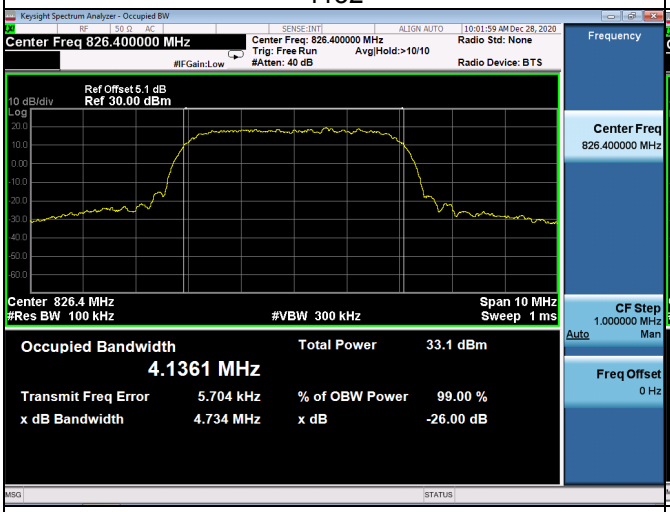
EDGE-251



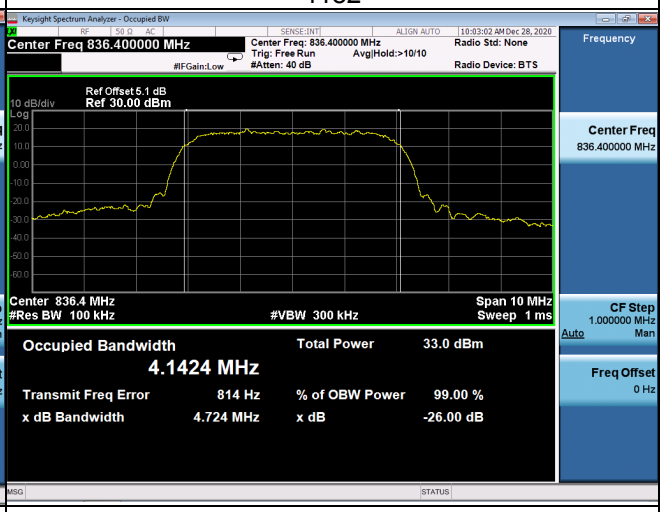
WCDMA Band V_WCDMA					
QPSK					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	Channel	Frequency (MHz)	26dB Bandwidth (MHz)
4132	826.4	4.1361	4132	826.4	4.734
4182	836.4	4.1424	4182	836.4	4.724
4233	846.6	4.1379	4233	846.6	4.724

Spectrum Plot

4132



4182



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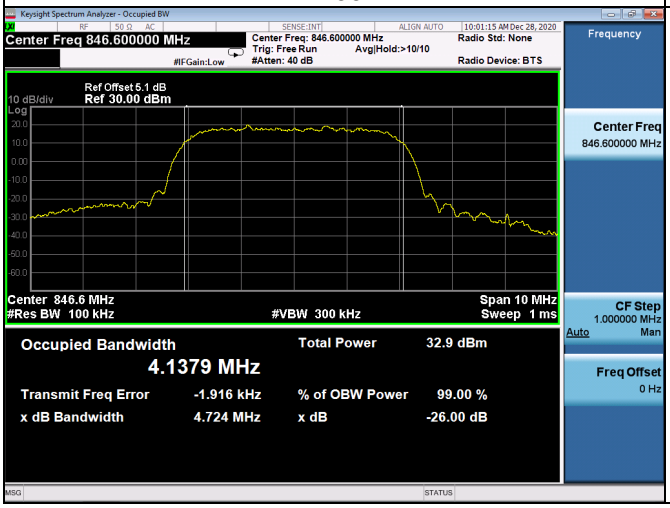

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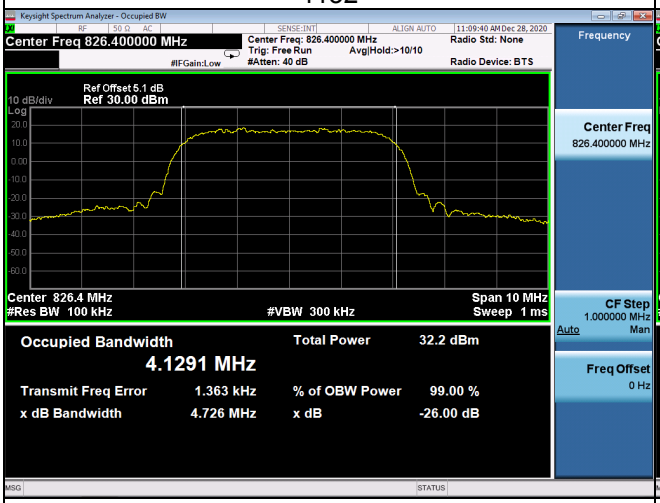
WCDMA Band V_HSDPA					
QPSK					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	Channel	Frequency (MHz)	26dB Bandwidth (MHz)
4132	826.4	4.1291	4132	826.4	4.726
4182	836.4	4.1367	4182	836.4	4.728
4233	846.6	4.1375	4233	846.6	4.726

Spectrum Plot

4132



4182

4233

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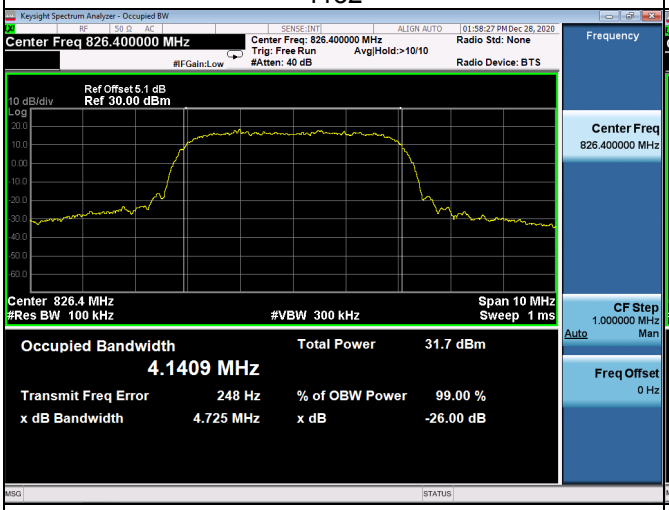
WCDMA Band V_HSUPA					
QPSK					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	Channel	Frequency (MHz)	26dB Bandwidth (MHz)
4132	826.4	4.1409	4132	826.4	4.725
4182	836.4	4.1311	4182	836.4	4.731
4233	846.6	4.1522	4233	846.6	4.719

Spectrum Plot

4132



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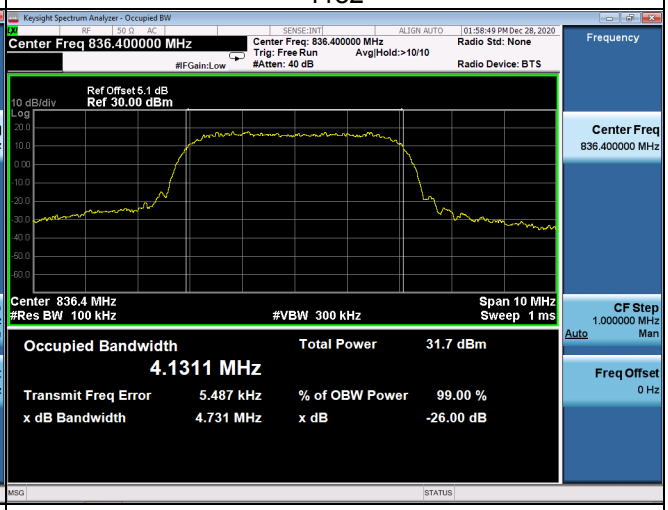

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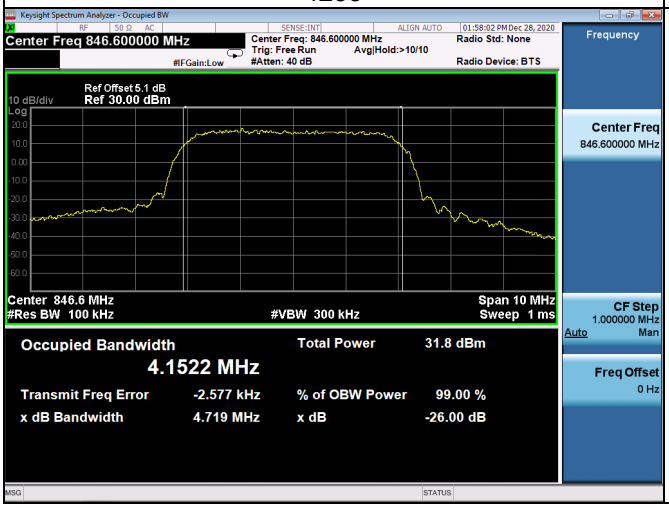

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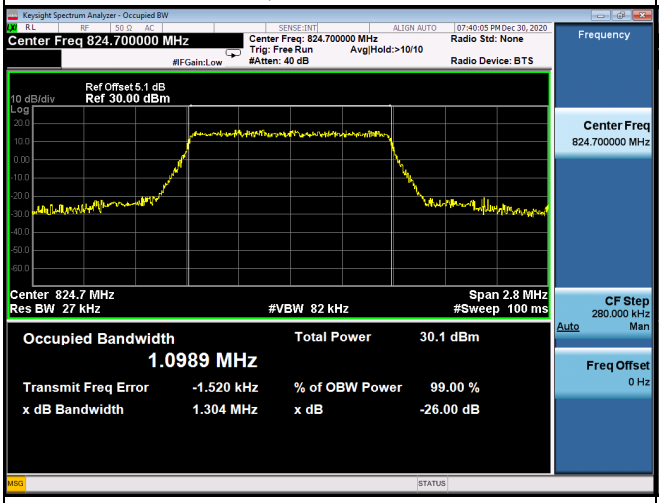
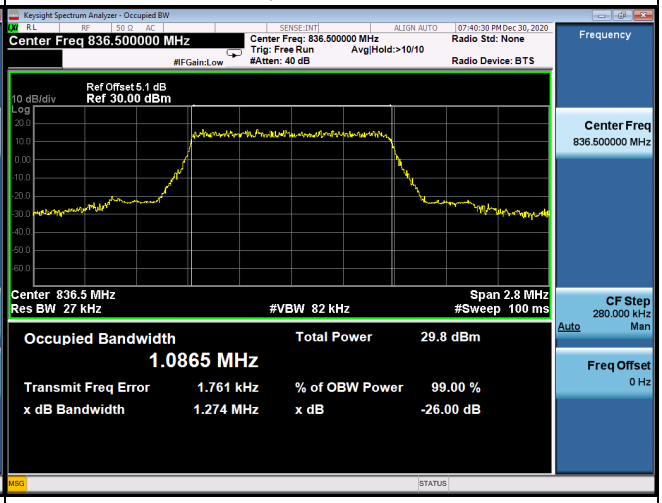
LTE Band 5_1.4M					
QPSK					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	Channel	Frequency (MHz)	26dB Bandwidth (MHz)
20407	824.7	1.0989	20407	824.7	1.304
20525	836.5	1.0865	20525	836.5	1.274
20643	848.3	1.0919	20643	848.3	1.311
16QAM					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	Channel	Frequency (MHz)	26dB Bandwidth (MHz)
20407	824.7	1.0885	20407	824.7	1.292
20525	836.5	1.0921	20525	836.5	1.287
20643	848.3	1.0963	20643	848.3	1.294
64QAM					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	Channel	Frequency (MHz)	26dB Bandwidth (MHz)
20407	824.7	1.0895	20407	824.7	1.262
20525	836.5	1.0894	20525	836.5	1.293
20643	848.3	1.0847	20643	848.3	1.270

Spectrum Plot

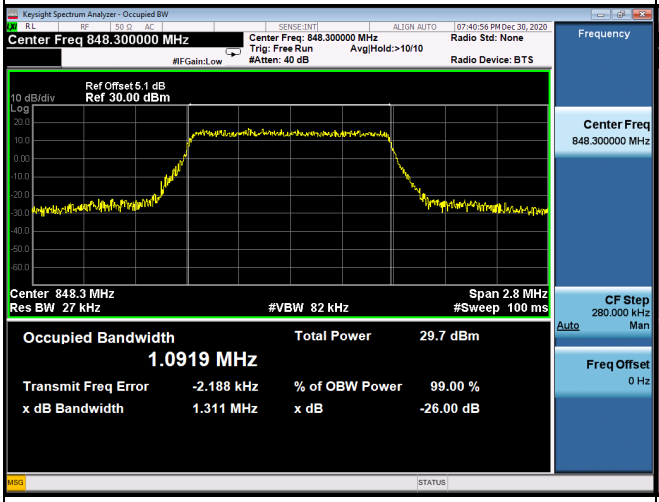
QPSK-20407



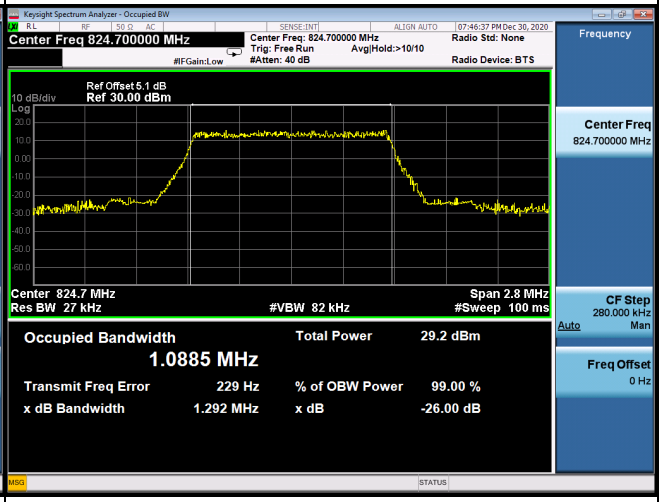
QPSK-20525



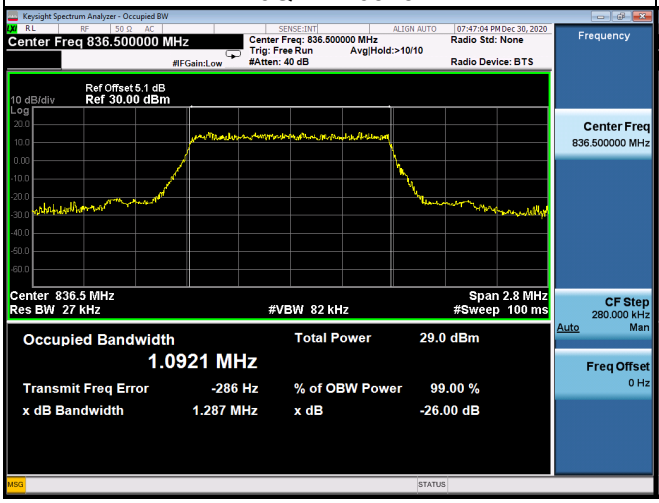
QPSK-20643



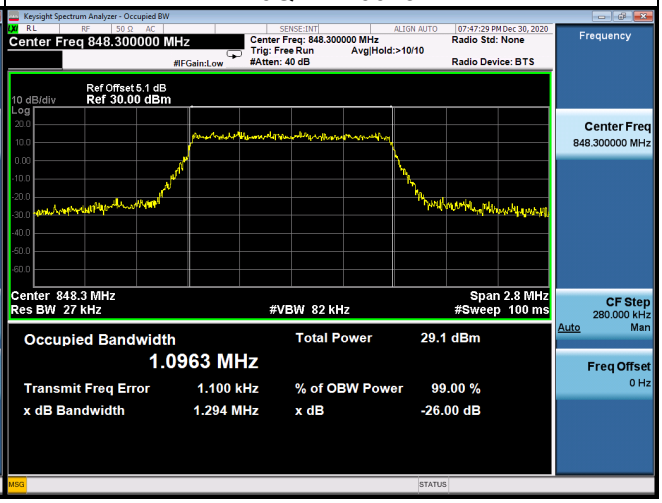
16QAM-20407

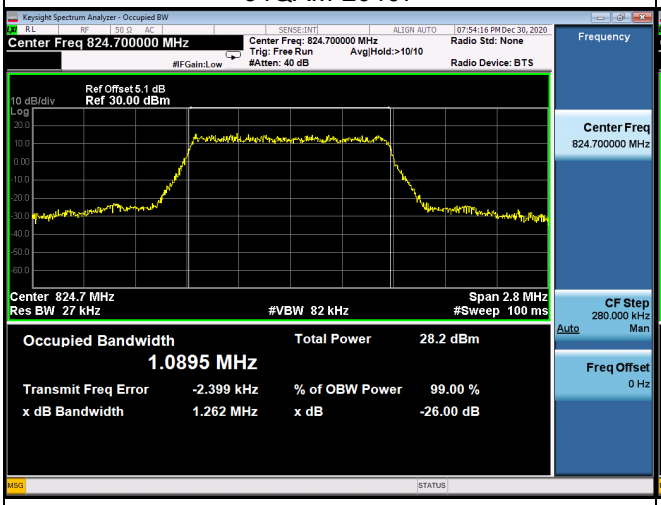
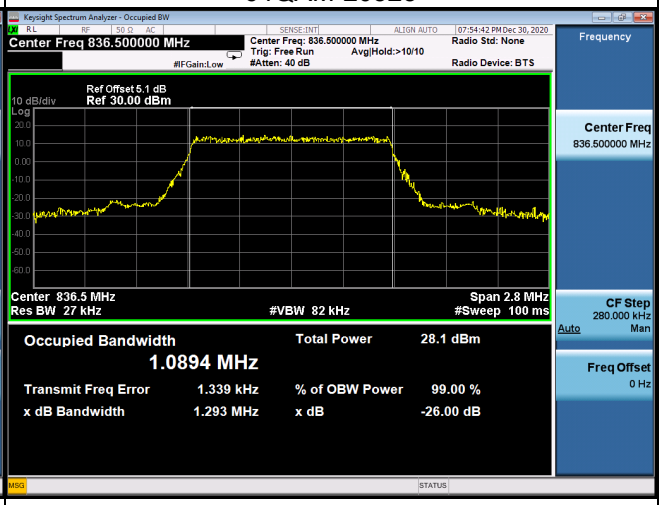


16QAM-20525



16QAM-20643



Spectrum Plot	
64QAM-20407	64QAM-20525
	
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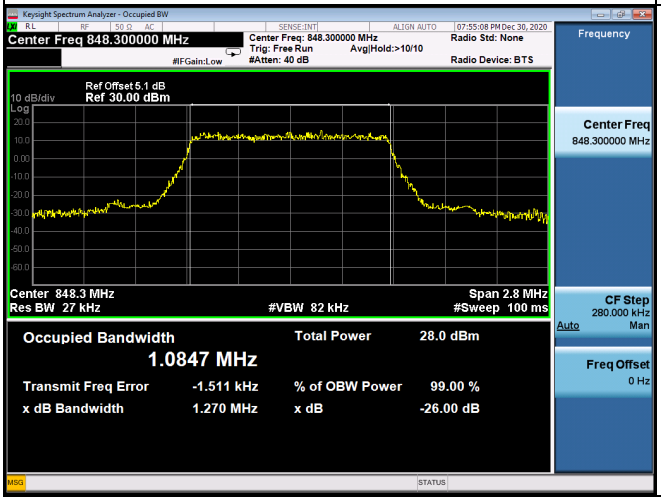
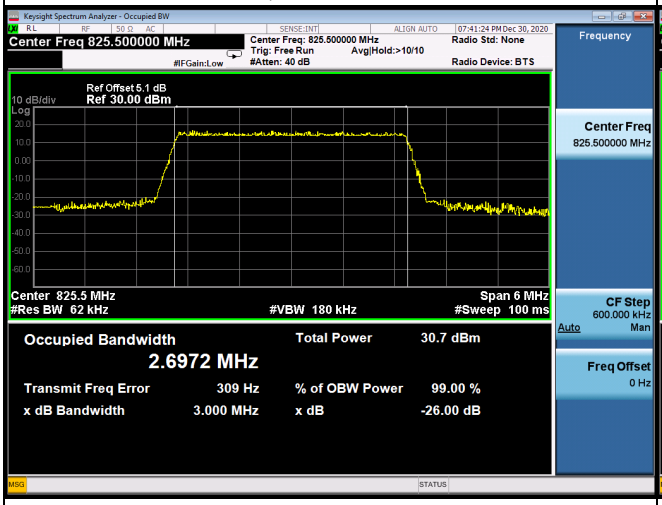
	-

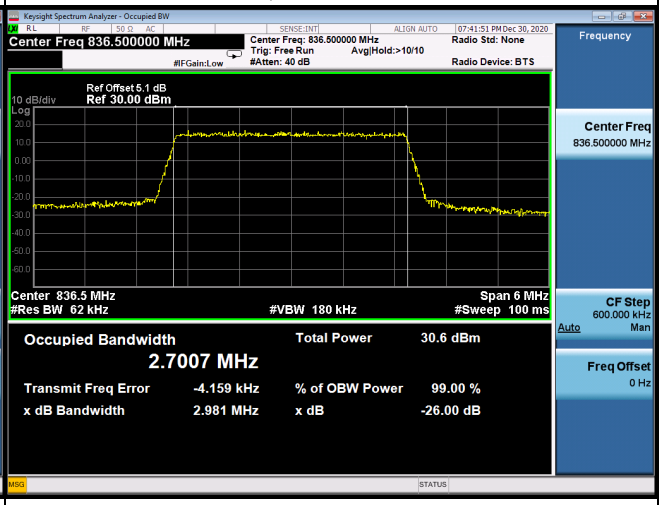
LTE Band 5_3M					
QPSK					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	Channel	Frequency (MHz)	26dB Bandwidth (MHz)
20415	825.5	2.6972	20415	825.5	3.000
20525	836.5	2.7007	20525	836.5	2.981
20635	847.5	2.7024	20635	847.5	2.983
16QAM					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	Channel	Frequency (MHz)	26dB Bandwidth (MHz)
20415	825.5	2.6971	20415	825.5	2.994
20525	836.5	2.6975	20525	836.5	2.990
20635	847.5	2.6943	20635	847.5	2.983
64QAM					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	Channel	Frequency (MHz)	26dB Bandwidth (MHz)
20415	825.5	2.7052	20415	825.5	2.983
20525	836.5	2.7028	20525	836.5	2.976
20635	847.5	2.6948	20635	847.5	2.979

Spectrum Plot

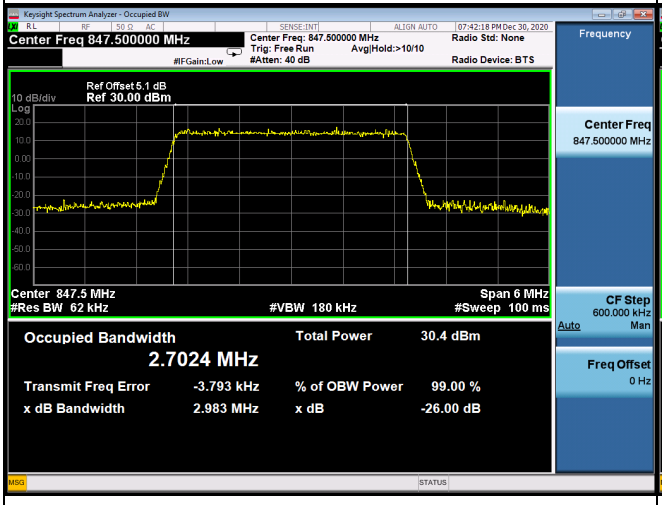
QPSK-20415



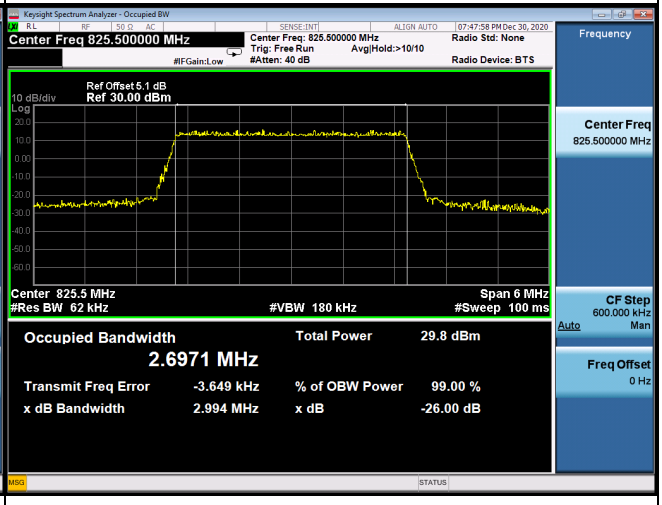
QPSK-20525



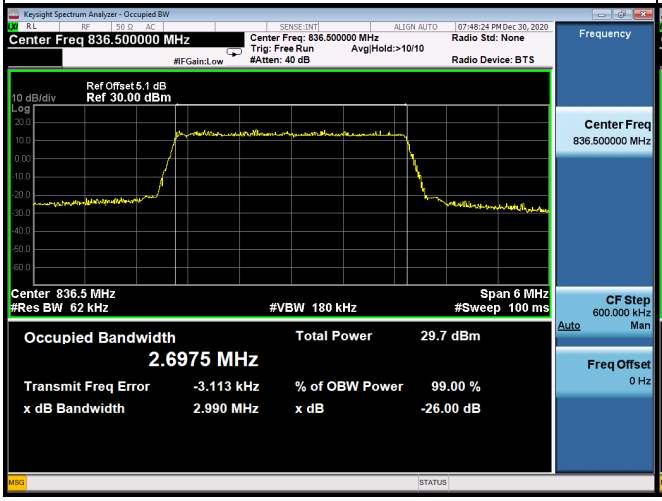
QPSK-20635



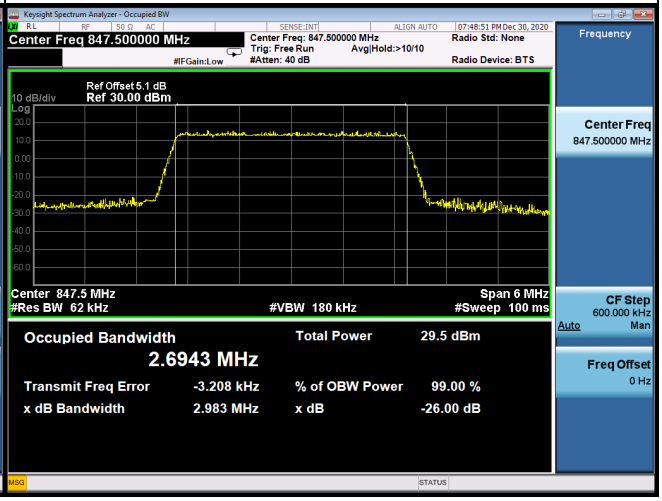
16QAM-20415

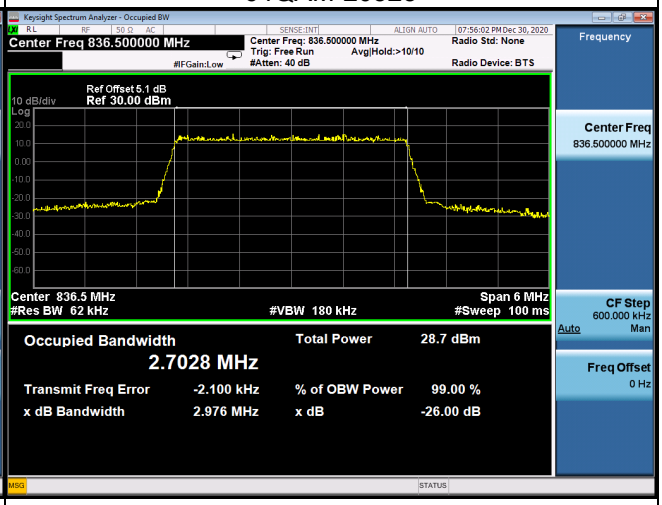
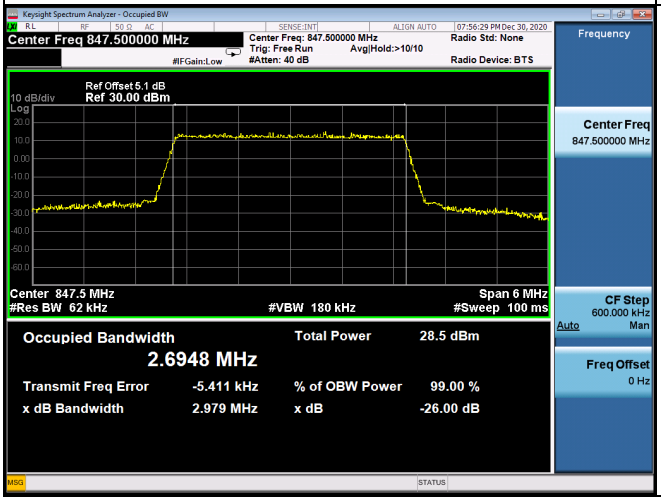


16QAM-20525



16QAM-20635



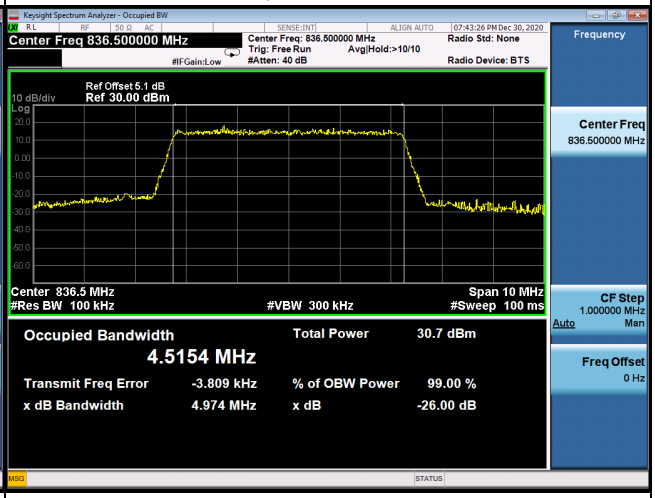
Spectrum Plot	
64QAM-20415	64QAM-20525
	
64QAM-20635	-
	-

LTE Band 5_5M					
QPSK					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	Channel	Frequency (MHz)	26dB Bandwidth (MHz)
20425	826.5	4.5206	20425	826.5	5.033
20525	836.5	4.5154	20525	836.5	4.974
20625	846.5	4.5020	20625	846.5	4.982
16QAM					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	Channel	Frequency (MHz)	26dB Bandwidth (MHz)
20425	826.5	4.5043	20425	826.5	5.003
20525	836.5	4.4983	20525	836.5	4.991
20625	846.5	4.5042	20625	846.5	4.945
64QAM					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	Channel	Frequency (MHz)	26dB Bandwidth (MHz)
20425	826.5	4.5108	20425	826.5	4.989
20525	836.5	4.5117	20525	836.5	5.031
20625	846.5	4.5122	20625	846.5	4.992

Spectrum Plot

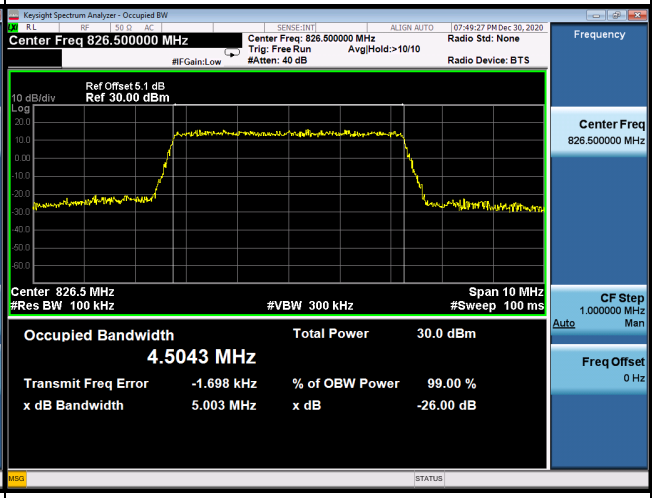
QPSK-20425

QPSK-20525

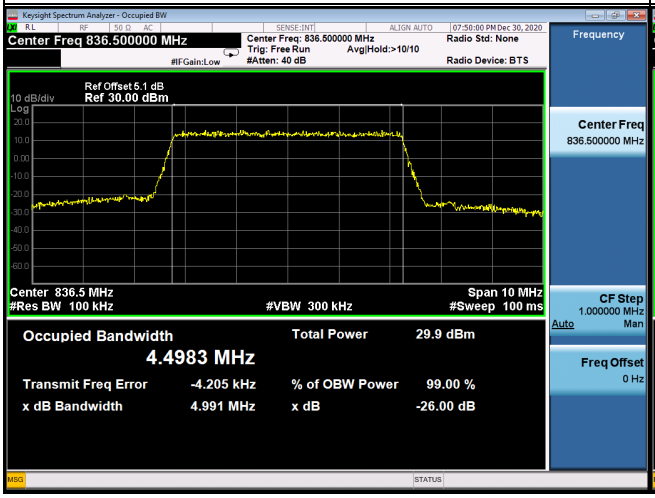


QPSK-20625

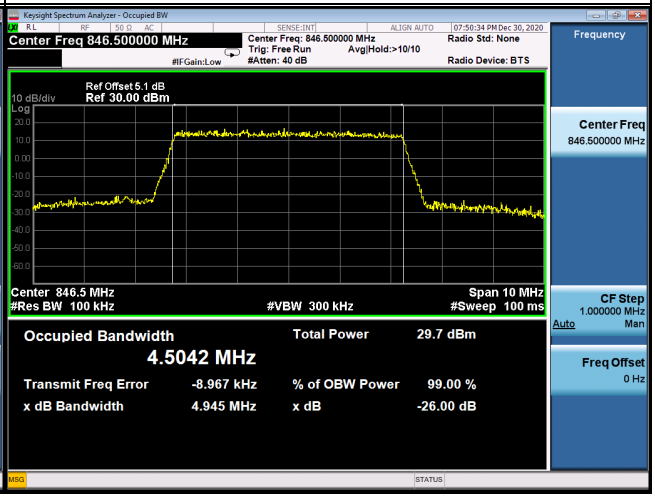
16QAM-20425

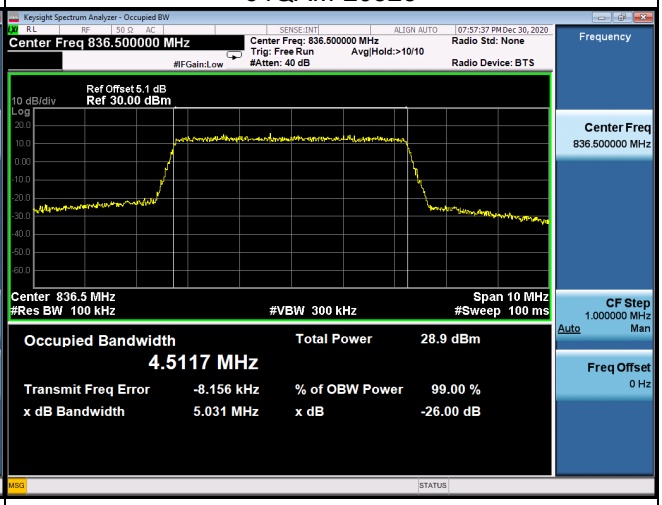
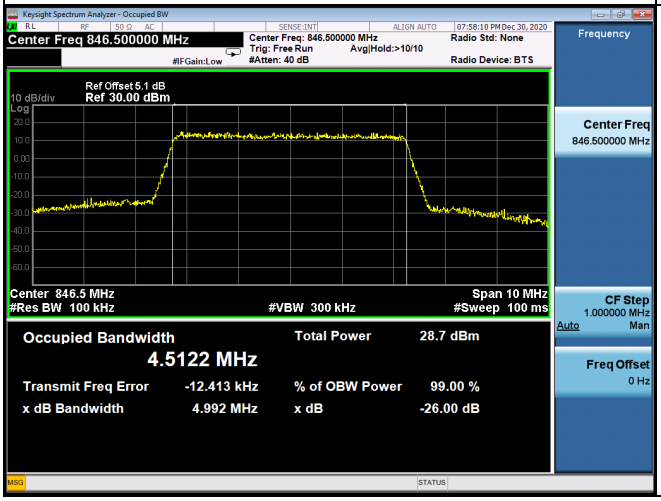


16QAM-20525



16QAM-20625

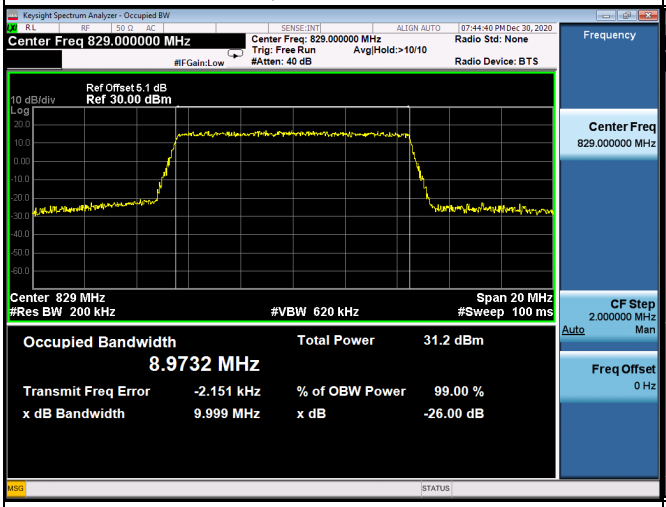


Spectrum Plot	
64QAM-20425	64QAM-20525
	
64QAM-20625	-
	-

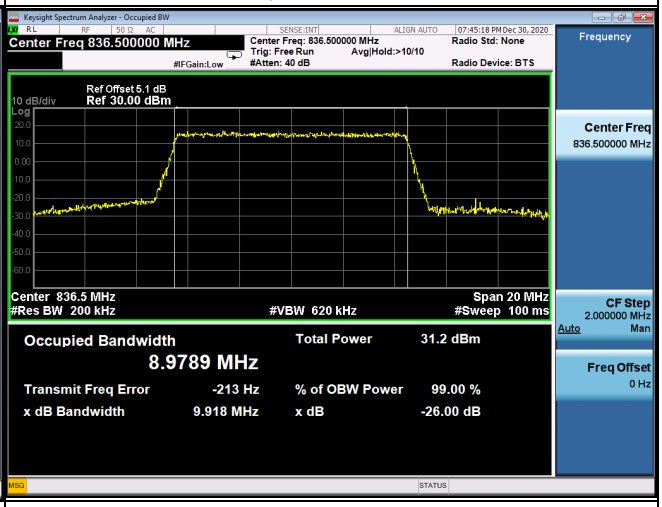
LTE Band 5_10M					
QPSK					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	Channel	Frequency (MHz)	26dB Bandwidth (MHz)
20450	829.0	8.9732	20450	829.0	9.999
20525	836.5	8.9789	20525	836.5	9.918
20600	844.0	8.9784	20600	844.0	9.878
16QAM					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	Channel	Frequency (MHz)	26dB Bandwidth (MHz)
20450	829.0	8.9660	20450	829.0	9.908
20525	836.5	8.9768	20525	836.5	9.857
20600	844.0	8.9543	20600	844.0	9.868
64QAM					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	Channel	Frequency (MHz)	26dB Bandwidth (MHz)
20450	829.0	8.9722	20450	829.0	9.873
20525	836.5	8.9766	20525	836.5	9.820
20600	844.0	8.9584	20600	844.0	9.949

Spectrum Plot

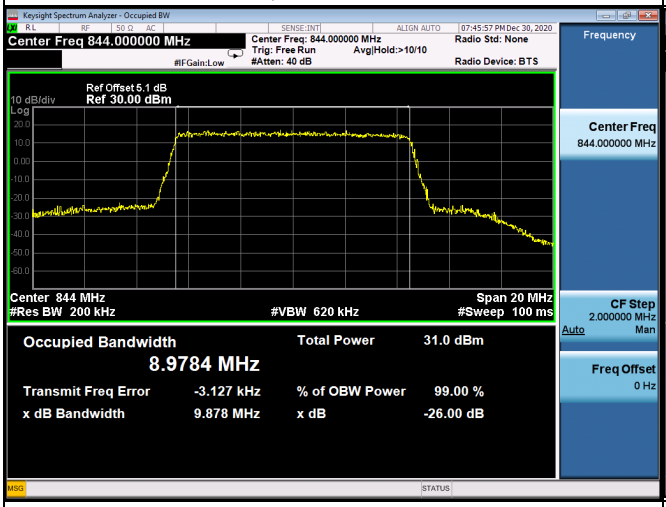
QPSK-20450



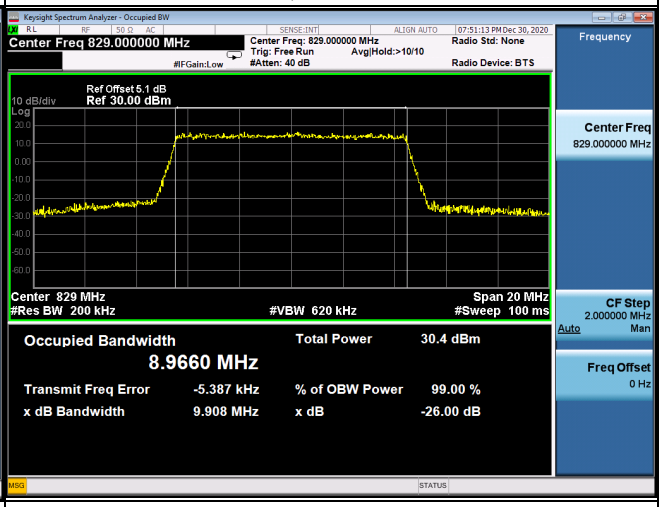
QPSK-20525



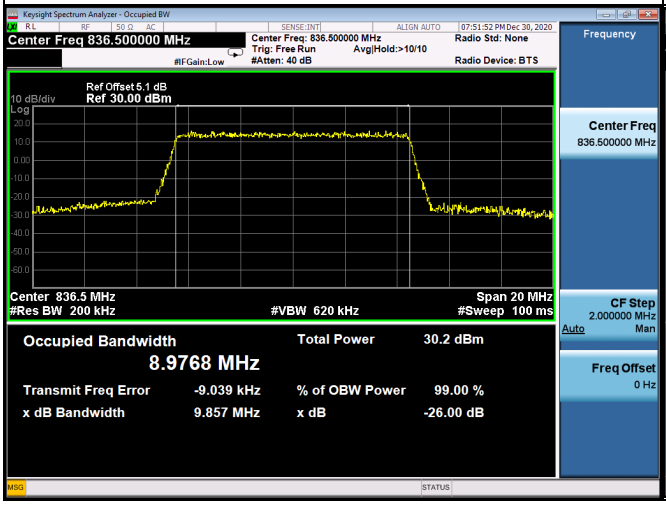
QPSK-20600



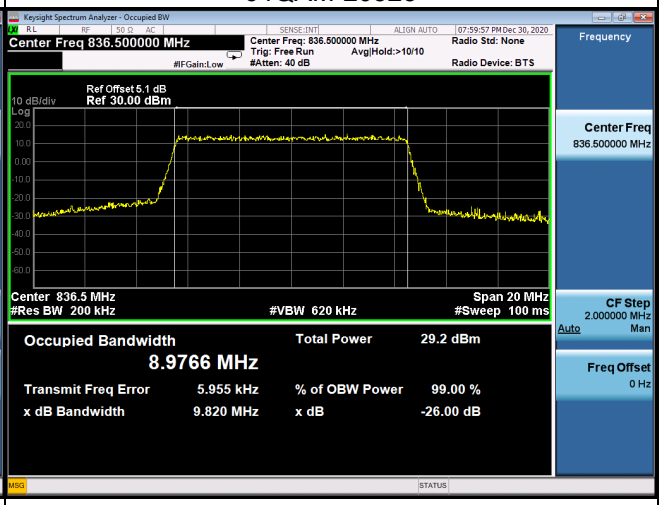
16QAM-20450



16QAM-20525



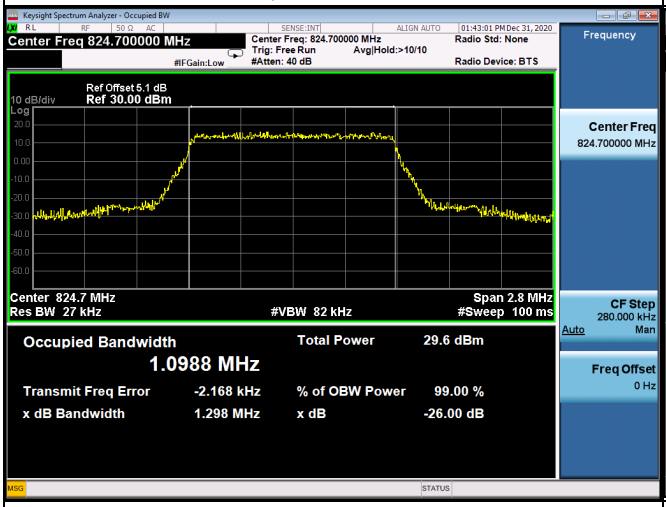
16QAM-20600

Spectrum Plot	
64QAM-20450	64QAM-20525
	
64QAM-20600	-
	-

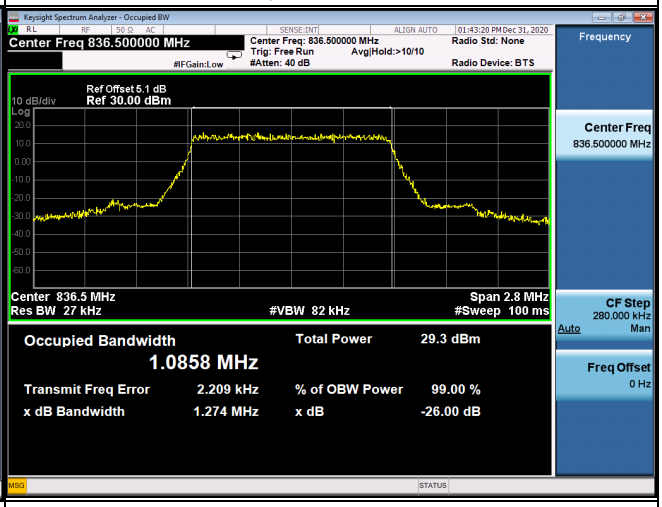
LTE Band 26_1.4M					
QPSK					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	Channel	Frequency (MHz)	26dB Bandwidth (MHz)
26797	824.7	1.0988	26797	824.7	1.298
26915	836.5	1.0858	26915	836.5	1.274
27033	848.3	1.0907	27033	848.3	1.306
16QAM					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	Channel	Frequency (MHz)	26dB Bandwidth (MHz)
26797	824.7	1.0954	26797	824.7	1.296
26915	836.5	1.0898	26915	836.5	1.300
27033	848.3	1.0901	27033	848.3	1.290
64QAM					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	Channel	Frequency (MHz)	26dB Bandwidth (MHz)
26797	824.7	1.0859	26797	824.7	1.270
26915	836.5	1.0851	26915	836.5	1.272
27033	848.3	1.0899	27033	848.3	1.309

Spectrum Plot

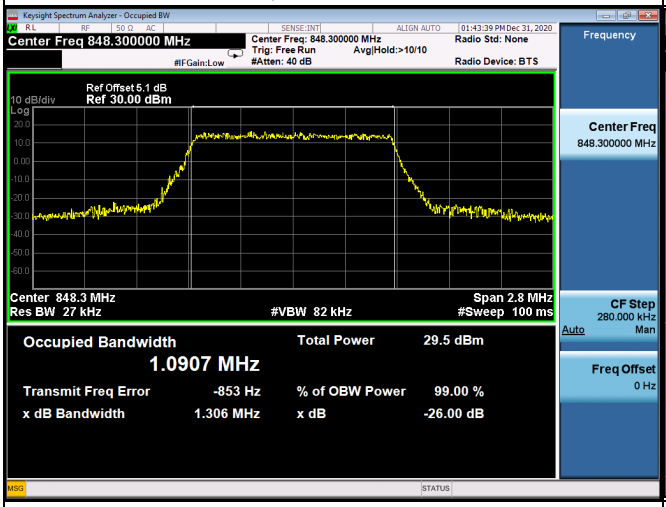
QPSK-26797



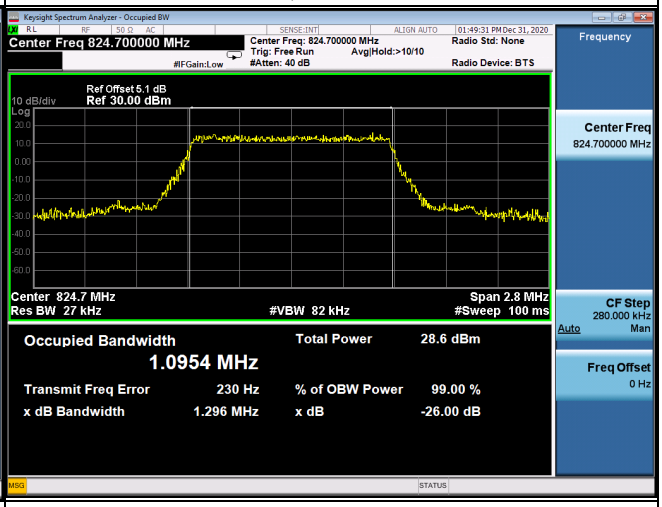
QPSK-26915



QPSK-27033

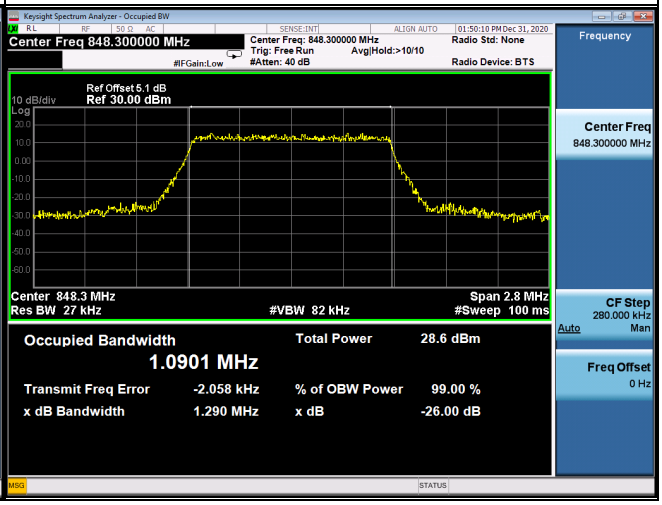


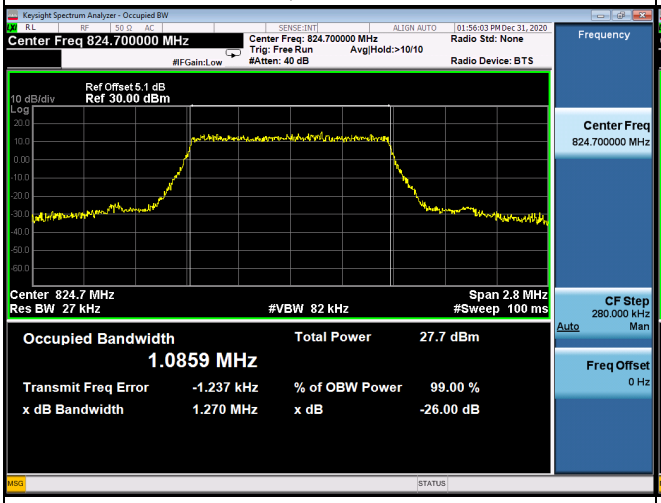
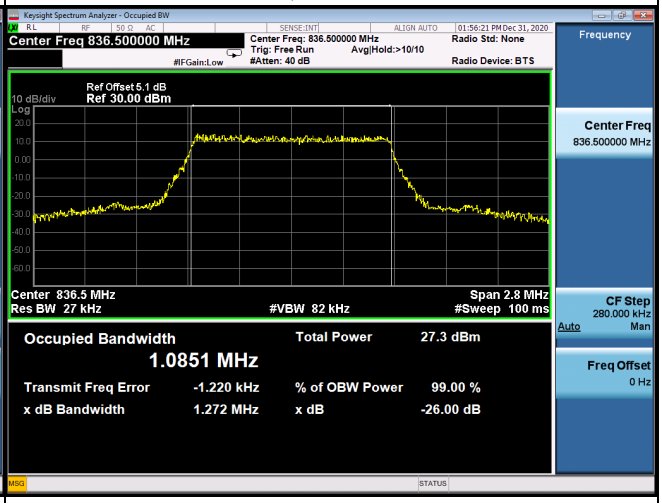
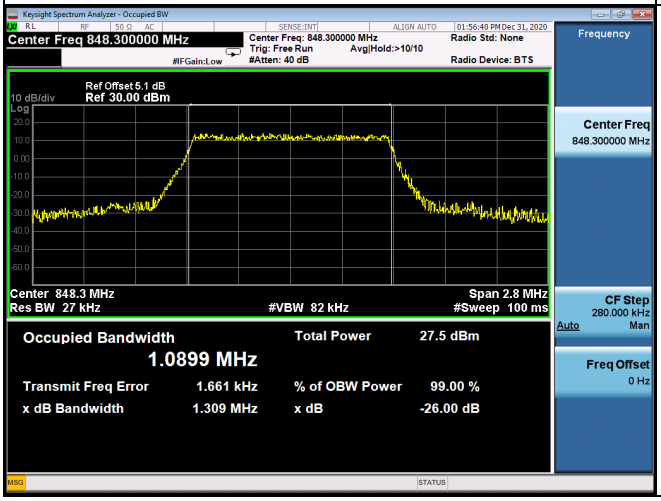
16QAM-26797



16QAM-26915

16QAM-27033

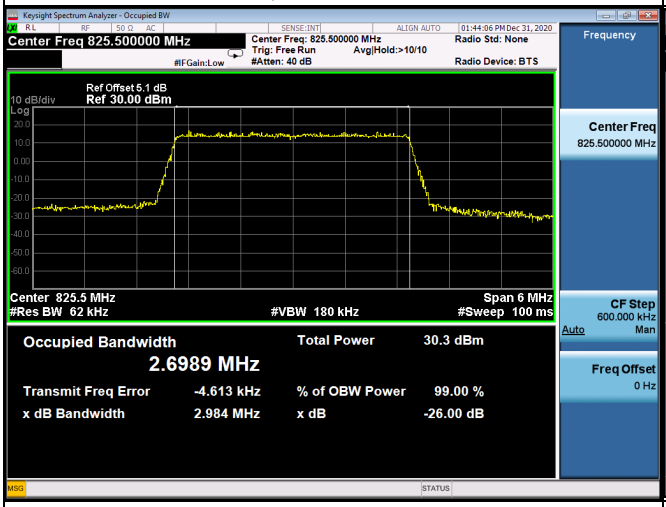


Spectrum Plot	
64QAM-26797	64QAM-26915
	
64QAM-27033	-
	-

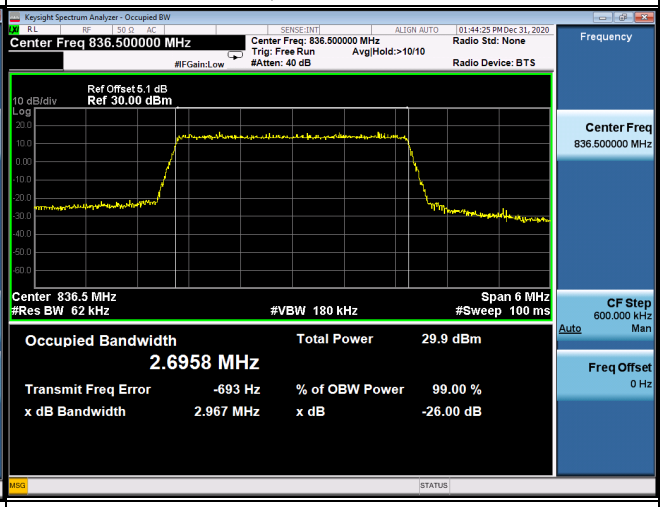
LTE Band 26_3M					
QPSK					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	Channel	Frequency (MHz)	26dB Bandwidth (MHz)
26805	825.5	2.6989	26805	825.5	2.984
26915	836.5	2.6958	26915	836.5	2.967
27025	847.5	2.6984	27025	847.5	3.004
16QAM					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	Channel	Frequency (MHz)	26dB Bandwidth (MHz)
26805	825.5	2.7020	26805	825.5	2.977
26915	836.5	2.6967	26915	836.5	2.993
27025	847.5	2.7058	27025	847.5	2.967
64QAM					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	Channel	Frequency (MHz)	26dB Bandwidth (MHz)
26805	825.5	2.6915	26805	825.5	2.980
26915	836.5	2.6941	26915	836.5	2.989
27025	847.5	2.7036	27025	847.5	2.988

Spectrum Plot

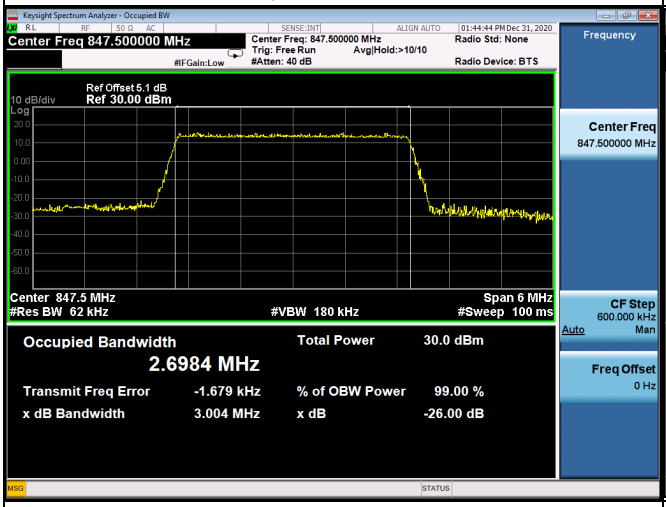
QPSK-26805



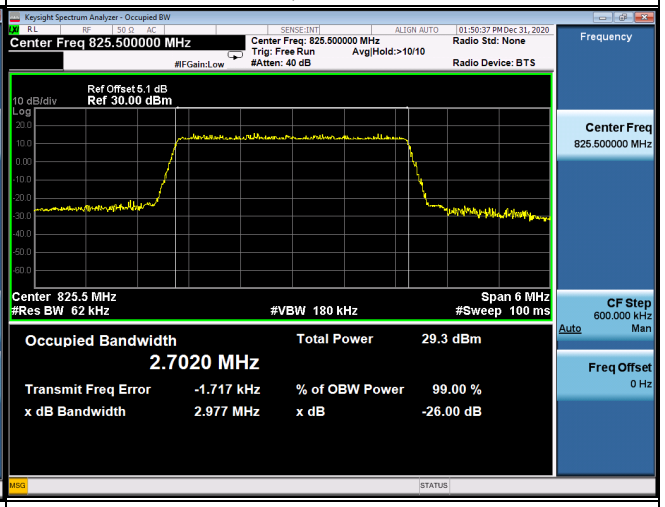
QPSK-26915



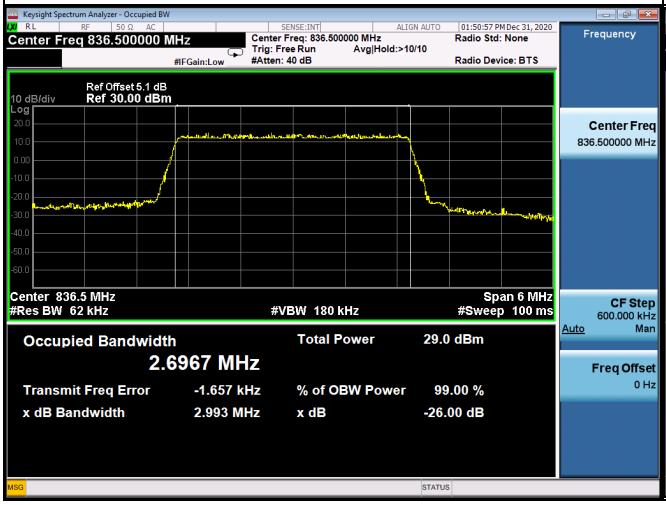
QPSK-27025



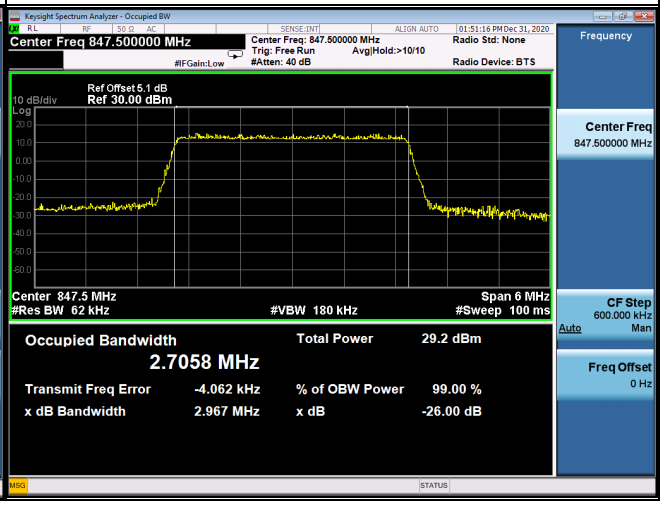
16QAM-26805

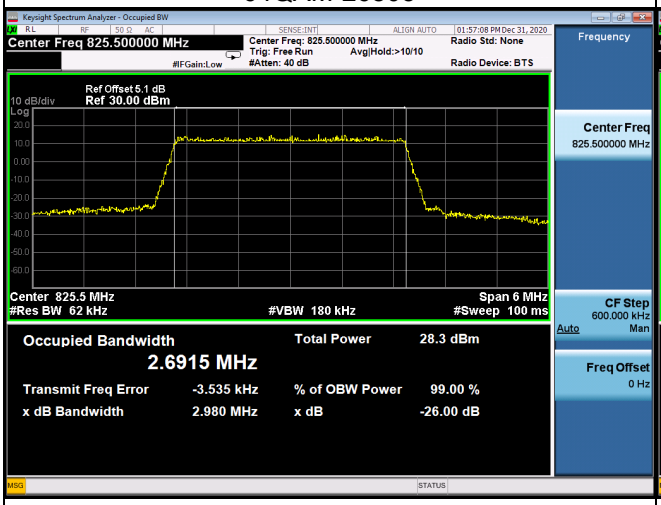
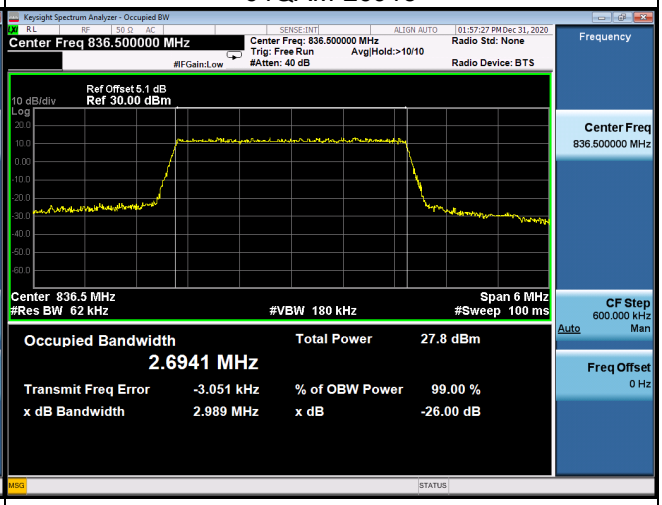
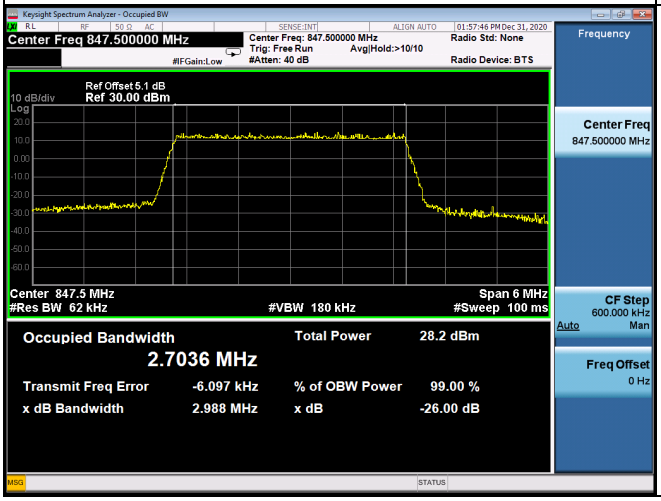


16QAM-26915



16QAM-27025

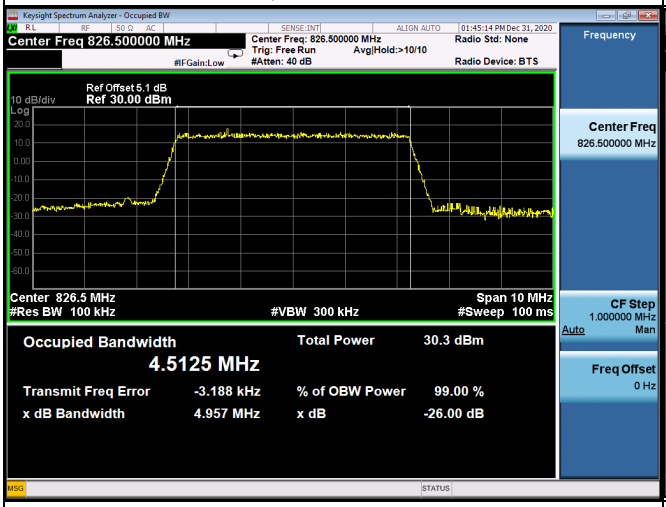


Spectrum Plot	
64QAM-26805	64QAM-26915
	
64QAM-27025	-
	-

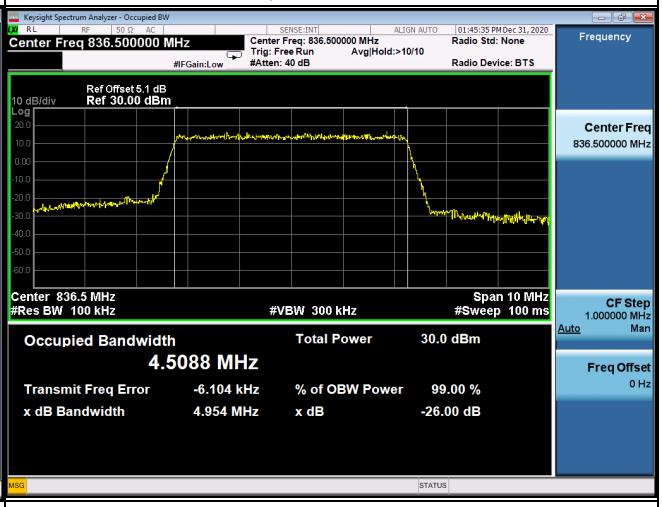
LTE Band 26_5M					
QPSK					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	Channel	Frequency (MHz)	26dB Bandwidth (MHz)
26815	826.5	4.5125	26815	826.5	4.957
26915	836.5	4.5088	26915	836.5	4.954
27015	846.5	4.5102	27015	846.5	4.994
16QAM					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	Channel	Frequency (MHz)	26dB Bandwidth (MHz)
26815	826.5	4.4988	26815	826.5	4.982
26915	836.5	4.5044	26915	836.5	5.003
27015	846.5	4.4965	27015	846.5	5.034
64QAM					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	Channel	Frequency (MHz)	26dB Bandwidth (MHz)
26815	826.5	4.5039	26815	826.5	4.999
26915	836.5	4.5134	26915	836.5	5.015
27015	846.5	4.5036	27015	846.5	4.980

Spectrum Plot

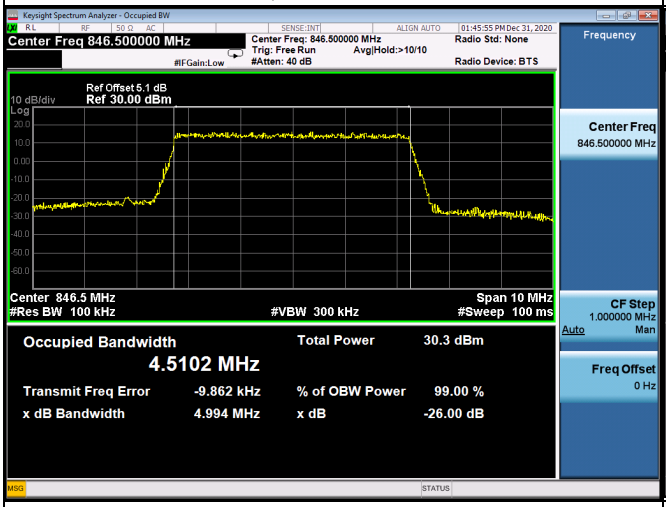
QPSK-26815



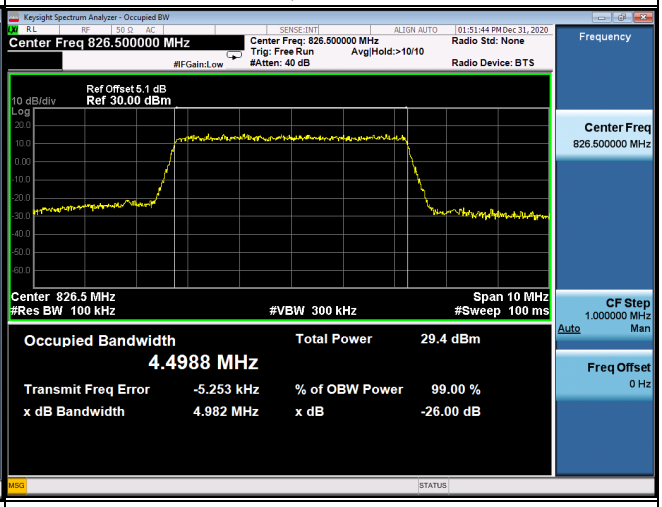
QPSK-26915



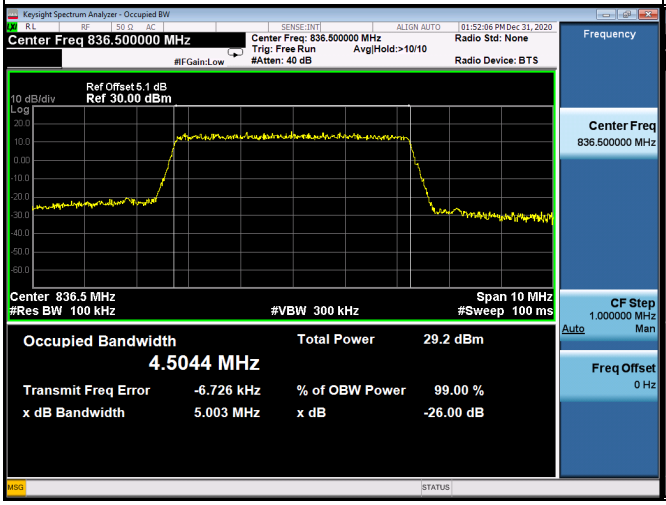
QPSK-27015



16QAM-26815



16QAM-26915



16QAM-27015