

FCC Radio Test Report

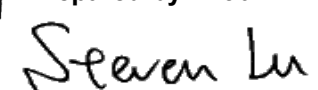
FCC ID: R9C-CPH1941

This report concerns: Original Grant

Project No. : 1909C106
Equipment : Mobile Phone
Brand Name : OPPO
Test Model : CPH1941
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 : Sep. 19, 2019
Date of Test : Sep. 19, 2019 ~ Oct. 21, 2019
Issued Date : Oct. 24, 2019
Report Version : R00
Test Sample : Engineering Sample No.: DG2019091936 for conducted, DG20190920152 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.



Prepared by : Paul Li


Approved by : Steven Lu



Certificate #5123.02

Add: No.3, Jinshagang 1st Road, Shixia, Dalang Town,Dongguan, Guangdong, China.

Tel: +86-769-8318-3000

Web: www.newbtl.com

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.

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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.

Table of Contents	Page
REPORT ISSUED HISTORY	5
1 . SUMMARY OF TEST RESULTS	6
1.1 TEST FACILITY	7
1.2 MEASUREMENT UNCERTAINTY	7
1.3 TEST ENVIRONMENT CONDITIONS	7
2 . GENERAL INFORMATION	8
2.1 GENERAL DESCRIPTION OF EUT	8
2.2 DESCRIPTION OF TEST MODES	11
2.3 BLOCK DIGRAM SHOWING THE CONFIGURATIONOFSYSTEMTESTED	14
3.4 DESCRIPTION OF SUPPORT UNITS	14
3 . TEST RESULT	15
3.1 OUTPUT POWER MEASUREMENT	15
3.1.1 LIMIT	15
3.1.2 TEST PROCEDURE	15
3.1.3 TEST SETUP LAYOUT	15
3.1.4 TEST DEVIATION	15
3.1.5 TEST RESULTS	15
3.2 OCCUPIED BANDWIDTH MEASUREMENT	16
3.2.1 TEST PROCEDURE	16
3.2.2 TEST SETUP LAYOUT	16
3.2.3 TEST DEVIATION	16
3.2.4 TEST RESULTS	16
3.3 CONDUCTED SPURIOUS EMISSIONS MEASUREMENT	17
3.3.1 LIMIT	17
3.3.2 TEST PROCEDURES	17
3.3.3 TEST SETUP LAYOUT	17
3.3.4 TEST DEVIATION	17
3.3.5 TEST RESULTS	17
3.4 RADIATED SPURIOUS EMISSIONS MEASUREMENT	18
3.4.1 LIMIT	18
3.4.2 TEST PROCEDURES	18
3.4.3 TEST SETUP LAYOUT	19
3.4.4 TEST DEVIATION	20
3.4.5 TEST RESULTS (9KHZ TO 30MHZ)	20
3.4.6 TEST RESULTS (30MHZ TO 1000MHZ)	20
3.4.7 TEST RESULTS (ABOVE 1000MHZ)	20
3.5 BAND EDGE MEASUREMENT	21
3.5.1 LIMIT	21

Table of Contents	Page
3.5.2 TEST PROCEDURES	21
3.5.3 TEST SETUP LAYOUT	21
3.5.4 TEST DEVIATION	21
3.5.5 TEST RESULTS	21
3.6 PEAK TO AVERAGE RATIO MEASUREMENT	22
3.6.1 LIMIT	22
3.6.2 TEST PROCEDURES	22
3.6.3 TEST SETUP LAYOUT	22
3.6.4 TEST DEVIATION	22
3.6.5 TEST RESULTS	22
3.7 FREQUENCY STABILITY MEASUREMENT	23
3.7.1 LIMIT	23
3.7.2 TEST PROCEDURES	23
3.7.3 TEST SETUP LAYOUT	23
3.7.4 TEST DEVIATION	23
3.7.5 TEST RESULTS	23
5. LIST OF MEASUREMENT EQUIPMENTS	24
APPENDIX A - OUTPUT POWER	26
APPENDIX B - OCCUPIED BANDWIDTH	39
APPENDIX C - CONDUCTED SPURIOUS EMISSIONS	72
APPENDIX D - RADIATED SPURIOUS EMISSIONS (9KHZ TO 30MHZ)	81
APPENDIX E - RADIATED SPURIOUS EMISSIONS (30MHZ TO 1000MHZ)	86
APPENDIX F - RADIATED SPURIOUS EMISSIONS (ABOVE 1000MHZ)	123
APPENDIX G - BAND EDGE	160
APPENDIX H - PEAK TO AVERAGE RATIO	172
APPENDIX I - FREQUENCY STABILITY	195

REPORT ISSUED HISTORY

Report Version	Description	Issued Date
R00	Original Issue.	Oct. 24, 2019

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 Road, Shixia, Dalang Town, Dongguan, Guangdong, 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	V	3.79
		9KHz ~ 30MHz	H	3.57
		30MHz ~ 200MHz	V	4.88
		30MHz ~ 200MHz	H	4.14
		200MHz ~ 1,000MHz	V	4.62
		200MHz ~ 1,000MHz	H	4.80

Test Site	Method	Measurement Frequency Range	U,(dB)
DG-CB03 (3m)	CISPR	1GHz ~ 6GHz	4.58
		6GHz ~ 18GHz	5.18

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	23.4°C	41.5%	DC 3.87V	Vegeta Li
Occupied Bandwidth	23.4°C	41.5%	DC 3.87V	Vegeta Li
Conducted Spurious Emissions	23.4°C	41.5%	DC 3.87V	Vegeta Li
Radiated Spurious Emissions	24°C	68%	AC 120V/60Hz	Berton Luo
Band Edge	23.4°C	41.5%	DC 3.87V	Vegeta Li
Peak to Average Ratio	23.4°C	41.5%	DC 3.87V	Vegeta Li
Frequency Stability	Normal and Extreme			Vegeta Li

2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

Equipment	Mobile Phone			
Brand Name	OPPO			
Test Model	CPH1941			
Series Model	N/A			
Model Difference(s)	N/A			
Hardware Version	11			
Software Version	ColorOS V6.0.1			
Firmware Version	TBD			
Power Source	1. DC Voltage supplied from AC/DC adapter. 1# Model: OP52KAUH 2# Model: OP52JAUH 3# Model: OP52YAUH 2. Supplied from Li-ion Polymer battery. 1# Factory / Model: NVT / BLP727 (NA-P727-92) 2# Factory / Model: Desay / BLP727 (DA-P727-923) 3# Factory / Model: Sunwoda / BLP727 (XA-P727-922) 4# Factory / Model: Desay / BLP727 (DD-P727-918) 5# Factory / Model: Desay / BLP727 (DA-P727-931) 3. Supplied from USB port.			
Power Rating	1. I/P:100-240V~ 50/60Hz 0.4A O/P:5V --- 2A 2. 3.87Vdc, 5000mAh/19.35Wh 3. DC 5V			
IEMI No.	Radiated	868467040020432		
	Conducted	868467040020648		
Modulation Type	GSM/GPRS		GMSK	
	EDGE		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	31.26 dBm
	EDGE 850		8PSK	25.55 dBm
	WCDMA Band V		QPSK	19.78 dBm
	HSDPA Band V		QPSK	19.79 dBm
	HSUPA Band V		QPSK	19.72 dBm
	LTE Band 5 (Channel Bandwidth: 1.4MHz)		QPSK	22.47 dBm
			16QAM	22.06 dBm
			64QAM	20.84 dBm
	LTE Band 5 (Channel Bandwidth: 3MHz)		QPSK	22.51 dBm
			16QAM	22.10 dBm
			64QAM	20.81 dBm
	LTE Band 5 (Channel Bandwidth: 5MHz)		QPSK	22.66 dBm
			16QAM	22.24 dBm
			64QAM	20.78 dBm
	LTE Band 5 (Channel Bandwidth: 10MHz)		QPSK	22.71 dBm
			16QAM	22.17 dBm
			64QAM	20.87 dBm

Max. ERP	LTE Band 26 (Channel Bandwidth: 1.4MHz)	QPSK	22.35	dBm
		16QAM	21.75	dBm
		64QAM	20.88	dBm
	LTE Band 26 (Channel Bandwidth: 3MHz)	QPSK	22.31	dBm
		16QAM	21.73	dBm
		64QAM	20.94	dBm
	LTE Band 26 (Channel Bandwidth: 5MHz)	QPSK	22.44	dBm
		16QAM	21.93	dBm
		64QAM	20.79	dBm
	LTE Band 26 (Channel Bandwidth: 10MHz)	QPSK	22.21	dBm
		16QAM	21.62	dBm
		64QAM	20.74	dBm
	LTE Band 26 (Channel Bandwidth: 15MHz)	QPSK	22.20	dBm
		16QAM	21.74	dBm
		64QAM	21.03	dBm

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	Internal	N/A	0.5	GSM 850
N/A	N/A	Internal	N/A	0.5	WCDMA Band V
N/A	N/A	Internal	N/A	0.5	LTE Band 5
N/A	N/A	Internal	N/A	0.5	LTE Band 26

Second Antenna

Brand	Model Name	Antenna Type	Connector	Gain (dBi)	Note
N/A	N/A	Internal	N/A	0.5	GSM 850
N/A	N/A	Internal	N/A	0.5	WCDMA Band V
N/A	N/A	Internal	N/A	0.5	LTE Band 5
N/A	N/A	Internal	N/A	0.5	LTE Band 26

2.2 DESCRIPTION OF TEST MODES

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

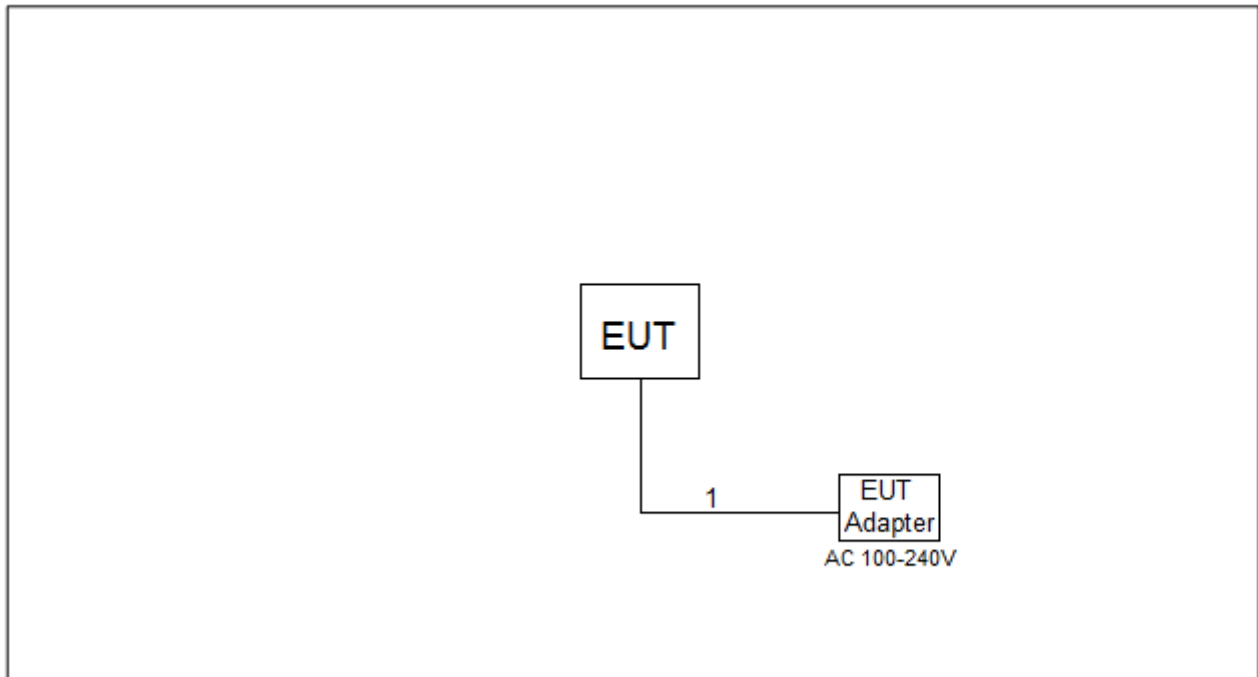
GSM MODE			
Test Item	Available Channel	Tested Channel	Mode
Output Power & ERP	128 to 251	128, 190, 251	GSM, GPRS, EDGE
Occupied Bandwidth	128 to 251	128, 190, 251	GSM, EDGE
Conducted Spurious Emissions	128 to 251	190	GSM, EDGE
Radiated Spurious Emissions	128 to 251	190	GSM, EDGE
Band Edge	128 to 251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



3.4 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	DC 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 5.0.

EIRP / ERP:

$EIRP = \text{Output Power} + \text{Antenan gain}$

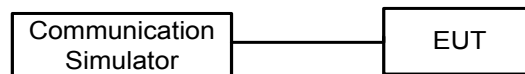
$ERP = EIPR - 2.15\text{dBi}$

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.

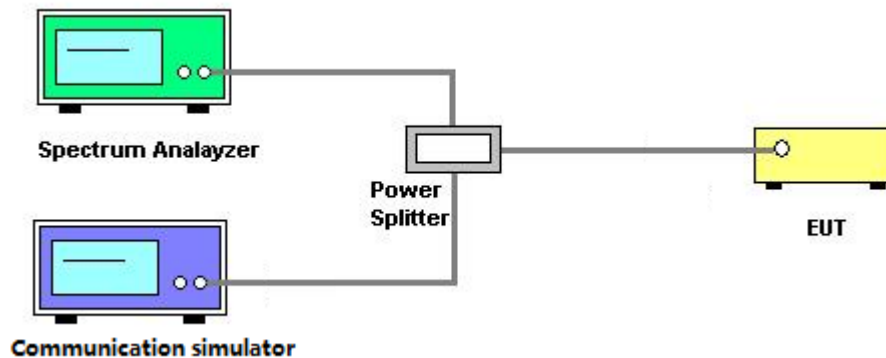
3.2 OCCUPIED BANDWIDTH MEASUREMENT

3.2.1 TEST PROCEDURE

The testing follows FCC KDB 971168 v03r01 Section 4.0.

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. $RBW = (1\% \sim 5\%) * EBW$
 $VBW \geq 3 * RBW$
4. Set spectrum analyzer with RMS 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

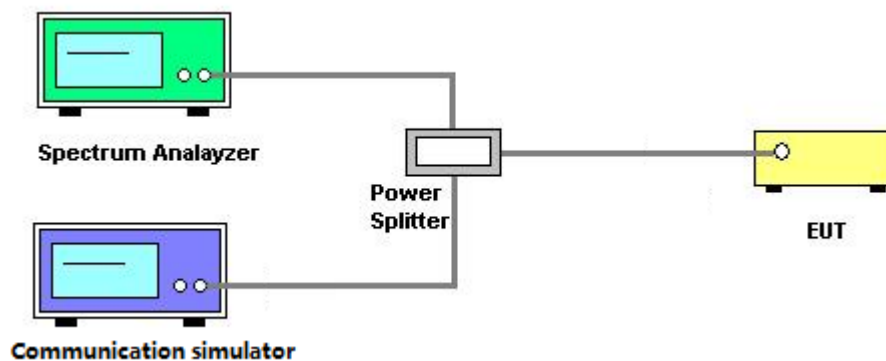
The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB. The emission limit equal to -13dBm.

3.3.2 TEST PROCEDURES

The testing follows FCC KDB 971168 v03r01 Section 6.0.

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 $\geq 1\%$ EBW in the 1MHz band immediately outside and adjacent to the band edge.
3. Set spectrum analyzer with RMS 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.

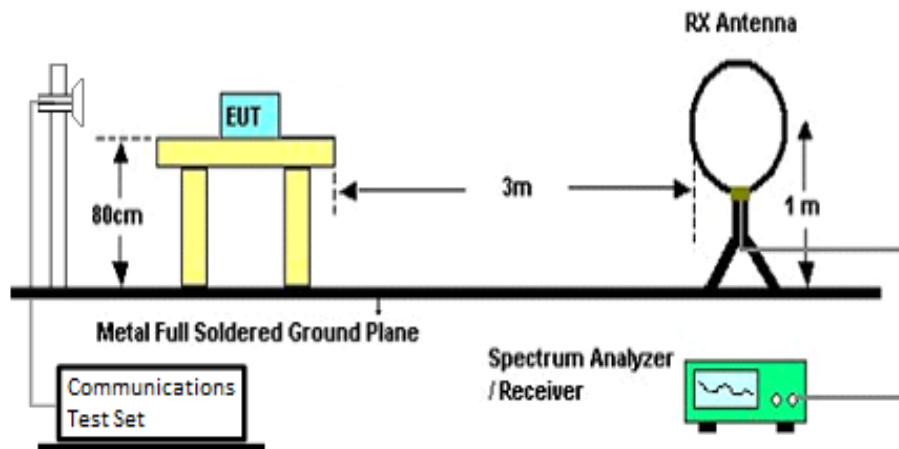
3.4.2 TEST PROCEDURES

The testing follows FCC KDB 971168 v03r01 Section 5.8.

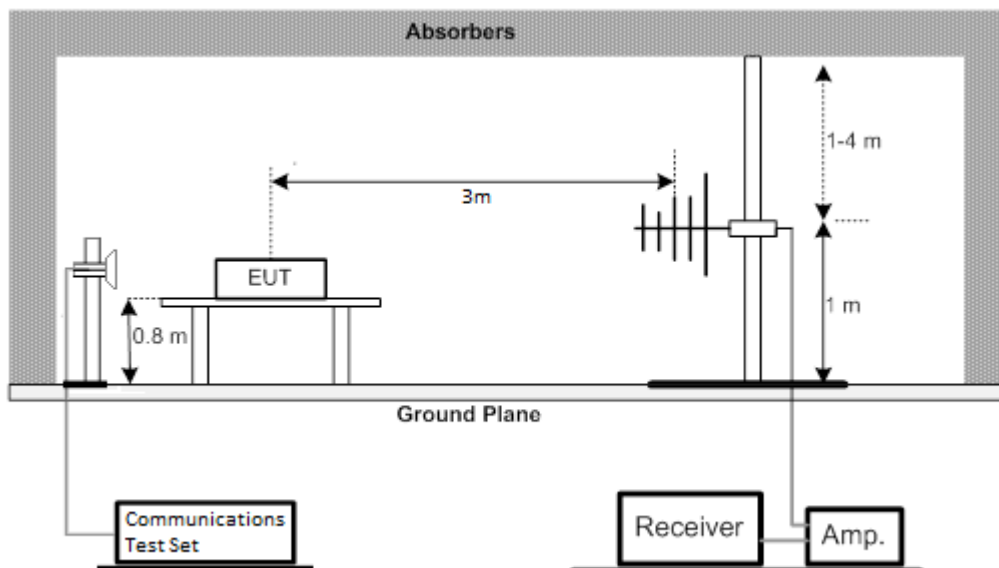
1. Substitution method is used for E.I.R.P measurement. In the semi-anechoic chamber, EUT placed on the 0.8m height of Turn Table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 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. $EIRP = \text{Output power level of S.G} - \text{TX cable loss} + \text{Antenna gain of substitution horn}.$
4. ERP can be calculated form EIRP by subtracting the gain of dipole, $ERP = EIPR - 2.15\text{dBi}.$
5. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1MHz/3MHz.

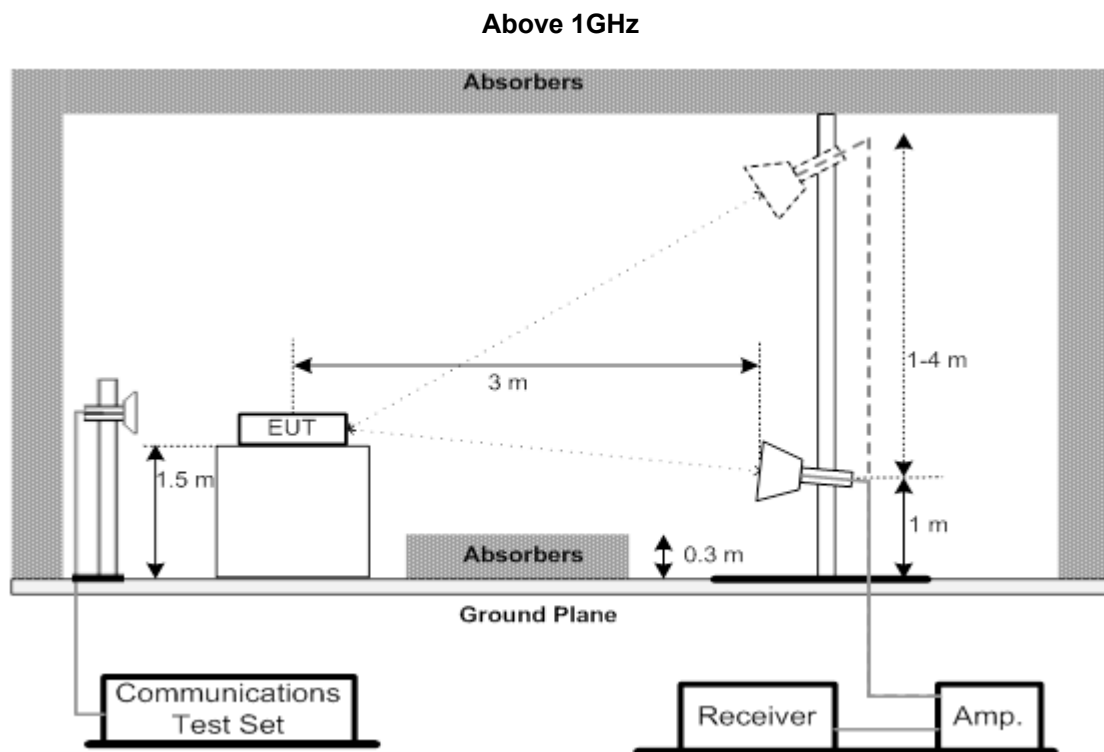
3.4.3 TEST SETUP LAYOUT

Below 30MHz



30MHz to 1000MHz





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

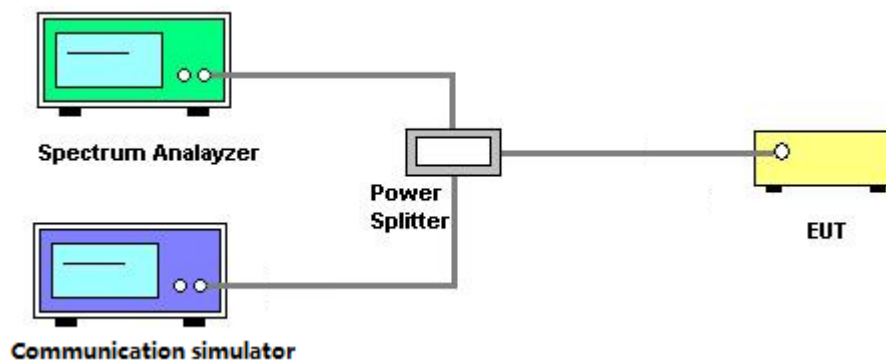
A Power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB. In the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the 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 6.0.

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

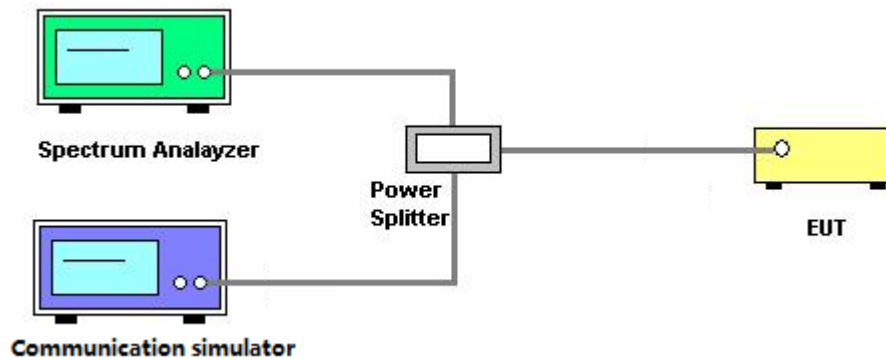
In measuring transmissions in this band using an average power technique, the peak to-average ratio (PAR) of the transmission may not exceed 13 dB.

3.6.2 TEST PROCEDURES

The testing follows FCC KDB 971168 v03r01 Section 5.7.

1. Set resolution/measurement bandwidth $\geq$ 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

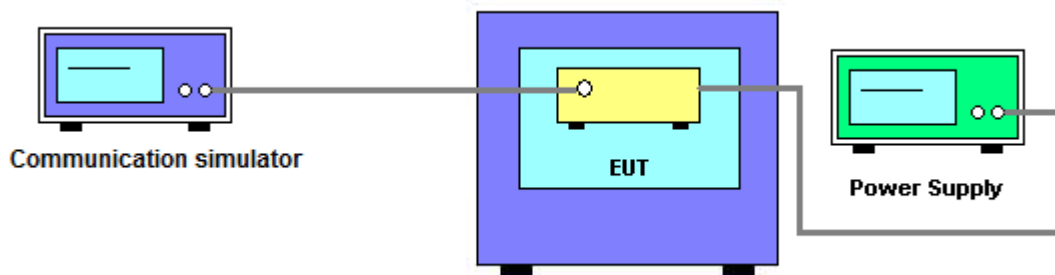
± 1.5 ppm is for base and fixed station. ± 2.5 ppm is for mobile station.

3.7.2 TEST PROCEDURES

The testing follows FCC KDB 971168 v03r01 Section 9.0.

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 $\pm 0.5^{\circ}\text{C}$ during the measurement testing. The each temperature step shall be at least 0.5 hours, consider the EUT could be test under the stability condition.
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.

5. LIST OF MEASUREMENT EQUIPMENTS

Radiated Spurious Emission Measurement					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Antenna	Schwarzbeck	VULB9160	9160-3232	Mar. 09, 2020
2	Amplifier	Agilent	8449B	3008A02274	Mar. 10, 2020
3	HighPass Filter	Wairwright Instruments Gmbh	WHK 1.5/15G-10ST	11	Mar. 10, 2020
4	Band Reject Filter	Wairwright Instruments Gmbh	WRCG 1710/1785-1690/1805-60/12SS	38	Mar. 10, 2020
5	Band Reject Filter	Wairwright Instruments Gmbh	WRCG 824/849-810/863-60/9SS	7	Mar. 10, 2020
6	Band Reject Filter	Wairwright Instruments Gmbh	WRCG 880/915-860/935-60/9SS	14	Mar. 10, 2020
7	Band Reject Filter	Wairwright Instruments Gmbh	WRCG 1850/1910-1830/1930-60/10SS	17	Mar. 10, 2020
8	HighPass Filter	Wairwright Instruments Gmbh	WHK3.1/18G-10SS	24	Mar. 10, 2020
9	Wireless Communication Test SET	Agilent	E5515C	MY48364183	Mar. 10, 2020
10	Microwave Preamplifier With Adaptor	EMC INSTRUMENT	EMC2654045	980039 & HA01	Mar. 10, 2020
11	Receiver	Agilent	N9038A	MY52130039	Aug. 03, 2020
12	wideband radio communication tester	R&S	CMW500	152372	Mar. 10, 2020
13	High pass filter	KANGMAIWEI	ZHPF-M3-12.75G-3869	B2015073763	Feb. 12, 2020
14	High pass filter	KANGMAIWEI	ZHPF-M1000-4000-1	B2015073762	Feb. 12, 2020
15	High pass filter	KANGMAIWEI	ZHPF-M6-186-1727	B2015073764	Feb. 12, 2020
16	Cable	emci	LMR-400(30MHz-1GHz)(8m+5m)	N/A	May. 24, 2020
17	Cable	mitron	B10-01-01-12M	18072744	Jun. 29, 2020
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	Jan. 15, 2020
21	Double Ridged Guide Antenna	ETS	3115	75789	Mar. 09, 2020
22	Broad-Band Horn Antenna	Schwarzbeck	BBHA 9170	9170319	Jun. 23, 2020

Conducted Measurement					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Wireless Communication Test SET	Agilent	E5515C	MY48364183	Mar. 10, 2020
2	EXA Spectrum Analyzer	Agilent	N9010A	MY50520044	Mar. 10, 2020
3	POWER SPLITTER	Mini-Circuits	ZFRSC-123-S+	331000910-1	Mar. 10, 2020
4	wideband radio communication tester	R&S	CMW500	152372	Mar. 10, 2020

Frequency Stability Measurement					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Wireless Communication Test SET	Agilent	E5515C	MY48364183	Mar. 10, 2020
2	Multi-output DC Power Supply	GW Instek	GPC-3030DN	EK880675	Sep. 26, 2020
3	POWER SPLITTER	Mini-Circuits	ZFRSC-123-S+	331000910-1	Mar. 10, 2020
4	wideband radio communication tester	R&S	CMW500	152372	Mar. 10, 2020
5	Const Temp,& Humidity Chamber	Bell	BTH-50C	20170306001	Mar. 10, 2020

Remark: "N/A" denotes no model name, serial no. or calibration specified.

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)		32.84	32.76	32.84
GPRS/EDGE (GMSK)	1 Tx Slot	32.88	32.78	32.91
	2 Tx Slot	30.29	30.00	30.06
	3 Tx Slot	28.31	28.24	28.28
	4 Tx Slot	27.05	26.92	26.86
EDGE (8PSK)	1 Tx Slot	27.2	27.03	26.95
	2 Tx Slot	24.72	24.49	24.97
	3 Tx Slot	23.68	23.64	24.03
	4 Tx Slot	23.09	22.96	22.87

Modulation	Band	WCDMA Band V		
	Tx Channel	4132CH	4182CH	4233CH
	Frequency	826.4MHz	836.4MHz	846.6MHz
QPSK	RMC 12.2K	21.34	21.37	21.42
	RMC 64K	21.33	21.36	21.35
	RMC 144K	21.35	21.4	21.41
	RMC 384K	21.41	21.39	21.43
	HSDPA Subtest-1	21.36	21.39	21.35
	HSDPA Subtest-2	21.42	21.44	21.41
	HSDPA Subtest-3	20.39	20.43	20.48
	HSDPA Subtest-4	20.3	20.44	20.42
	HSUPA Subtest-1	20.72	20.75	20.81
	HSUPA Subtest-2	18.4	18.46	18.38
	HSUPA Subtest-3	19.42	19.37	19.44
	HSUPA Subtest-4	18.41	18.39	18.37
	HSUPA Subtest-5	21.37	21.34	21.31

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	24.08	24.01	24.10
		1	2	24.12	24.06	24.12
		1	5	24.04	23.97	24.05
		3	0	24.01	23.93	24.09
		3	1	24.10	23.98	24.12
		3	2	24.08	23.98	24.12
		6	0	23.32	23.20	23.25
	16QAM	1	0	23.38	23.37	23.66
		1	2	23.46	23.43	23.71
		1	5	23.37	23.35	23.64
		3	0	23.49	23.28	23.48
		3	1	23.58	23.35	23.53
		3	2	23.56	23.34	23.51
		6	0	22.55	22.40	22.25
	64QAM	1	0	22.21	22.14	22.38
		1	2	22.33	22.21	22.49
		1	5	22.21	22.19	22.37
		3	0	22.20	21.89	22.28
		3	1	22.27	21.96	22.34
		3	2	22.23	21.91	22.27
		6	0	21.40	21.05	21.01

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	24.16	24.07	24.01
		1	7	24.11	24.13	24.04
		1	14	24.04	24.02	24.06
		8	0	23.36	23.23	23.26
		8	4	23.41	23.28	23.27
		8	7	23.25	23.19	23.21
		15	0	23.36	23.26	23.23
	16QAM	1	0	23.34	23.74	23.40
		1	7	23.27	23.75	23.39
		1	14	23.19	23.65	23.35
		8	0	22.54	22.39	22.36
		8	4	22.55	22.41	22.38
		8	7	22.39	22.33	22.32
		15	0	22.44	22.37	22.25
	64QAM	1	0	22.46	22.14	22.25
		1	7	22.39	22.23	22.25
		1	14	22.29	22.17	22.25
		8	0	21.21	21.09	20.96
		8	4	21.25	21.11	21.00
		8	7	21.09	21.05	20.94
		15	0	21.12	21.06	21.03

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	24.31	24.12	24.16
		1	13	24.16	24.08	24.12
		1	24	24.15	24.02	24.17
		12	0	23.39	23.29	23.32
		12	6	23.35	23.31	23.30
		12	11	23.35	23.28	23.25
		25	0	23.37	23.28	23.26
	16QAM	1	0	23.65	23.89	23.55
		1	13	23.50	23.89	23.48
		1	24	23.58	23.81	23.48
		12	0	22.52	22.48	22.39
		12	6	22.51	22.48	22.38
		12	11	22.47	22.42	22.36
		25	0	22.45	22.36	22.28
	64QAM	1	0	22.16	22.41	22.37
		1	13	22.04	22.43	22.36
		1	24	22.12	22.32	22.38
		12	0	21.23	21.03	21.10
		12	6	21.23	21.01	21.11
		12	11	21.19	20.97	21.08
		25	0	21.14	21.01	21.05

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	24.36	24.33	24.19
		1	25	24.09	24.05	24.02
		1	49	24.07	24.08	24.09
		25	0	23.44	23.32	23.23
		25	13	23.40	23.27	23.33
		25	25	23.29	23.22	23.25
		50	0	23.34	23.30	23.29
	16QAM	1	0	23.48	23.82	23.44
		1	25	23.32	23.68	23.37
		1	49	23.28	23.74	23.33
		25	0	22.45	22.42	22.37
		25	13	22.44	22.36	22.43
		25	25	22.37	22.32	22.36
		50	0	22.38	22.32	22.36
	64QAM	1	0	22.52	22.30	22.28
		1	25	22.42	22.17	22.25
		1	49	22.40	22.25	22.27
		25	0	21.17	21.14	21.06
		25	13	21.18	21.14	21.15
		25	25	21.14	21.08	21.10
		50	0	21.11	21.09	21.06

LTE Band / BW	Modulation	RB Size	RB Offset	Low CH	Mid CH	High CH
				26797CH	26915CH	27033CH
				824.7MHz	836.5MHz	848.3MHz
26 / 1.4M	QPSK	1	0	23.91	23.69	23.55
		1	2	23.93	23.73	23.58
		1	5	24.00	23.69	23.56
		3	0	23.89	23.77	23.59
		3	1	23.90	23.73	23.59
		3	2	23.91	23.73	23.57
		6	0	23.24	22.98	22.81
	16QAM	1	0	23.26	23.10	22.93
		1	2	23.40	23.17	23.00
		1	5	23.38	23.07	22.91
		3	0	23.08	22.90	22.78
		3	1	23.10	22.89	22.78
		3	2	23.11	22.91	22.79
		6	0	22.23	22.08	21.77
	64QAM	1	0	22.34	22.39	22.08
		1	2	22.44	22.51	22.17
		1	5	22.43	22.39	22.07
		3	0	22.44	22.27	22.05
		3	1	22.51	22.36	22.15
		3	2	22.53	22.34	22.11
		6	0	21.29	21.04	21.31

LTE Band / BW	Modulation	RB Size	RB Offset	Low CH	Mid CH	High CH
				26805CH	26915CH	27025CH
				825.5MHz	836.5MHz	847.5MHz
26 / 3M	QPSK	1	0	23.94	23.79	23.69
		1	7	23.94	23.71	23.62
		1	14	23.96	23.75	23.63
		8	0	23.20	23.03	22.90
		8	4	23.21	23.02	22.93
		8	7	23.15	22.97	22.86
		15	0	23.22	23.03	22.90
	16QAM	1	0	23.32	23.24	23.09
		1	7	23.35	23.16	22.92
		1	14	23.38	23.17	23.01
		8	0	22.29	22.16	22.00
		8	4	22.25	22.14	21.99
		8	7	22.25	22.10	21.93
		15	0	22.20	22.13	21.91
	64QAM	1	0	22.41	22.17	22.29
		1	7	22.59	22.29	22.28
		1	14	22.47	22.18	22.19
		8	0	21.31	21.16	21.03
		8	4	21.34	21.21	21.05
		8	7	21.29	21.13	21.01
		15	0	21.21	21.12	21.09

LTE Band / BW	Modulation	RB Size	RB Offset	Low CH	Mid CH	High CH
				26815CH	26915CH	27015CH
				826.5MHz	836.5MHz	846.5MHz
26 / 5M	QPSK	1	0	23.94	23.89	23.77
		1	13	24.09	23.91	23.80
		1	24	24.01	23.75	23.65
		12	0	23.20	23.09	22.97
		12	6	23.22	23.05	22.99
		12	11	23.18	23.06	22.99
		25	0	23.17	23.07	22.92
	16QAM	1	0	23.47	23.14	23.25
		1	13	23.58	23.19	23.23
		1	24	23.44	23.08	23.08
		12	0	22.35	22.14	22.07
		12	6	22.37	22.12	22.10
		12	11	22.34	22.12	22.07
		25	0	22.25	22.09	22.01
	64QAM	1	0	22.07	22.42	22.35
		1	13	22.21	22.44	22.39
		1	24	22.12	22.34	22.29
		12	0	21.28	21.07	21.18
		12	6	21.29	21.09	21.17
		12	11	21.27	21.04	21.15
		25	0	21.19	21.08	21.09

LTE Band / BW	Modulation	RB Size	RB Offset	Low CH	Mid CH	High CH
				26840CH	26915CH	26990CH
				829MHz	836.5MHz	844MHz
26 / 10M	QPSK	1	0	23.79	23.86	23.69
		1	25	23.78	23.80	23.71
		1	49	23.75	23.76	23.55
		25	0	23.22	23.09	22.97
		25	13	23.19	23.12	22.99
		25	25	23.13	23.01	22.96
		50	0	23.14	23.03	22.91
	16QAM	1	0	23.27	23.07	23.22
		1	25	23.23	22.98	23.15
		1	49	23.21	22.98	23.00
		25	0	22.25	22.15	22.04
		25	13	22.24	22.16	22.02
		25	25	22.17	22.08	22.02
		50	0	22.19	22.13	21.93
	64QAM	1	0	22.21	22.31	22.32
		1	25	22.19	22.25	22.39
		1	49	22.23	22.29	22.27
		25	0	21.28	21.22	21.09
		25	13	21.27	21.21	21.18
		25	25	21.24	21.14	21.12
		50	0	21.22	21.09	21.01

LTE Band / BW	Modulation	RB Size	RB Offset	Low CH	Mid CH	High CH
				26865CH	26915CH	26965CH
				831.5MHz	836.5MHz	841.5MHz
26 / 15M	QPSK	1	0	23.85	23.75	23.85
		1	38	23.83	23.74	23.80
		1	74	23.77	23.71	23.57
		36	0	23.08	23.04	22.98
		36	18	23.09	23.04	22.99
		36	39	23.10	23.04	23.01
		75	0	23.08	23.04	22.94
	16QAM	1	0	23.06	23.25	23.39
		1	38	23.04	23.21	23.35
		1	74	22.96	23.19	23.12
		36	0	22.18	22.15	22.17
		36	18	22.19	22.16	22.15
		36	39	22.19	22.16	22.16
		75	0	22.14	22.06	22.01
	64QAM	1	0	22.45	22.21	22.64
		1	38	22.42	22.18	22.68
		1	74	22.31	22.19	22.57
		36	0	21.25	21.23	21.09
		36	18	21.23	21.21	21.06
		36	39	21.17	21.14	21.11
		75	0	21.16	21.13	21.08

ERP (dBm):

GSM850		128CH	190CH	251CH
		824.2MHz	836.6MHz	848.8MHz
GSM (CS)		31.19	31.11	31.19
GPRS/EDGE (GMSK)	1 Tx Slot	31.23	31.13	31.26
	2 Tx Slot	28.64	28.35	28.41
	3 Tx Slot	26.66	26.59	26.63
	4 Tx Slot	25.40	25.27	25.21
EDGE (8PSK)	1 Tx Slot	25.55	25.38	25.30
	2 Tx Slot	23.07	22.84	23.32
	3 Tx Slot	22.03	21.99	22.38
	4 Tx Slot	21.44	21.31	21.22

Modulation	Band	WCDMA Band V		
	Tx Channel	4132CH	4182CH	4233CH
	Frequency	826.4MHz	836.4MHz	846.6MHz
QPSK	RMC 12.2K	19.69	19.72	19.77
	RMC 64K	19.68	19.71	19.70
	RMC 144K	19.70	19.75	19.76
	RMC 384K	19.76	19.74	19.78
	HSDPA Subtest-1	19.71	19.74	19.70
	HSDPA Subtest-2	19.77	19.79	19.76
	HSDPA Subtest-3	18.74	18.78	18.83
	HSDPA Subtest-4	18.65	18.79	18.77
	HSUPA Subtest-1	19.07	19.10	19.16
	HSUPA Subtest-2	16.75	16.81	16.73
	HSUPA Subtest-3	17.77	17.72	17.79
	HSUPA Subtest-4	16.76	16.74	16.72
	HSUPA Subtest-5	19.72	19.69	19.66

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	22.43	22.36	22.45
		1	2	22.47	22.41	22.47
		1	5	22.39	22.32	22.40
		3	0	22.36	22.28	22.44
		3	1	22.45	22.33	22.47
		3	2	22.43	22.33	22.47
		6	0	21.67	21.55	21.60
	16QAM	1	0	21.73	21.72	22.01
		1	2	21.81	21.78	22.06
		1	5	21.72	21.70	21.99
		3	0	21.84	21.63	21.83
		3	1	21.93	21.70	21.88
		3	2	21.91	21.69	21.86
		6	0	20.90	20.75	20.60
	64QAM	1	0	20.56	20.49	20.73
		1	2	20.68	20.56	20.84
		1	5	20.56	20.54	20.72
		3	0	20.55	20.24	20.63
		3	1	20.62	20.31	20.69
		3	2	20.58	20.26	20.62
		6	0	19.75	19.40	19.36

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	22.51	22.42	22.36
		1	7	22.46	22.48	22.39
		1	14	22.39	22.37	22.41
		8	0	21.71	21.58	21.61
		8	4	21.76	21.63	21.62
		8	7	21.60	21.54	21.56
		15	0	21.71	21.61	21.58
	16QAM	1	0	21.69	22.09	21.75
		1	7	21.62	22.10	21.74
		1	14	21.54	22.00	21.70
		8	0	20.89	20.74	20.71
		8	4	20.90	20.76	20.73
		8	7	20.74	20.68	20.67
		15	0	20.79	20.72	20.60
	64QAM	1	0	20.81	20.49	20.60
		1	7	20.74	20.58	20.60
		1	14	20.64	20.52	20.60
		8	0	19.56	19.44	19.31
		8	4	19.60	19.46	19.35
		8	7	19.44	19.40	19.29
		15	0	19.47	19.41	19.38

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	22.66	22.47	22.51
		1	13	22.51	22.43	22.47
		1	24	22.50	22.37	22.52
		12	0	21.74	21.64	21.67
		12	6	21.70	21.66	21.65
		12	11	21.70	21.63	21.60
		25	0	21.72	21.63	21.61
	16QAM	1	0	22.00	22.24	21.90
		1	13	21.85	22.24	21.83
		1	24	21.93	22.16	21.83
		12	0	20.87	20.83	20.74
		12	6	20.86	20.83	20.73
		12	11	20.82	20.77	20.71
		25	0	20.80	20.71	20.63
	64QAM	1	0	20.51	20.76	20.72
		1	13	20.39	20.78	20.71
		1	24	20.47	20.67	20.73
		12	0	19.58	19.38	19.45
		12	6	19.58	19.36	19.46
		12	11	19.54	19.32	19.43
		25	0	19.49	19.36	19.40

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	22.71	22.68	22.54
		1	25	22.44	22.40	22.37
		1	49	22.42	22.43	22.44
		25	0	21.79	21.67	21.58
		25	13	21.75	21.62	21.68
		25	25	21.64	21.57	21.60
		50	0	21.69	21.65	21.64
	16QAM	1	0	21.83	22.17	21.79
		1	25	21.67	22.03	21.72
		1	49	21.63	22.09	21.68
		25	0	20.80	20.77	20.72
		25	13	20.79	20.71	20.78
		25	25	20.72	20.67	20.71
		50	0	20.73	20.67	20.71
	64QAM	1	0	20.87	20.65	20.63
		1	25	20.77	20.52	20.60
		1	49	20.75	20.60	20.62
		25	0	19.52	19.49	19.41
		25	13	19.53	19.49	19.50
		25	25	19.49	19.43	19.45
		50	0	19.46	19.44	19.41

LTE Band / BW	Modulation	RB Size	RB Offset	Low CH	Mid CH	High CH
				26797CH	26915CH	27033CH
				824.7MHz	836.5MHz	848.3MHz
26 / 1.4M	QPSK	1	0	22.26	22.04	21.90
		1	2	22.28	22.08	21.93
		1	5	22.35	22.04	21.91
		3	0	22.24	22.12	21.94
		3	1	22.25	22.08	21.94
		3	2	22.26	22.08	21.92
		6	0	21.59	21.33	21.16
	16QAM	1	0	21.61	21.45	21.28
		1	2	21.75	21.52	21.35
		1	5	21.73	21.42	21.26
		3	0	21.43	21.25	21.13
		3	1	21.45	21.24	21.13
		3	2	21.46	21.26	21.14
		6	0	20.58	20.43	20.12
	64QAM	1	0	20.69	20.74	20.43
		1	2	20.79	20.86	20.52
		1	5	20.78	20.74	20.42
		3	0	20.79	20.62	20.40
		3	1	20.86	20.71	20.50
		3	2	20.88	20.69	20.46
		6	0	19.64	19.39	19.66

LTE Band / BW	Modulation	RB Size	RB Offset	Low CH	Mid CH	High CH
				26805CH	26915CH	27025CH
				825.5MHz	836.5MHz	847.5MHz
26 / 3M	QPSK	1	0	22.29	22.14	22.04
		1	7	22.29	22.06	21.97
		1	14	22.31	22.10	21.98
		8	0	21.55	21.38	21.25
		8	4	21.56	21.37	21.28
		8	7	21.50	21.32	21.21
		15	0	21.57	21.38	21.25
	16QAM	1	0	21.67	21.59	21.44
		1	7	21.70	21.51	21.27
		1	14	21.73	21.52	21.36
		8	0	20.64	20.51	20.35
		8	4	20.60	20.49	20.34
		8	7	20.60	20.45	20.28
		15	0	20.55	20.48	20.26
	64QAM	1	0	20.76	20.52	20.64
		1	7	20.94	20.64	20.63
		1	14	20.82	20.53	20.54
		8	0	19.66	19.51	19.38
		8	4	19.69	19.56	19.40
		8	7	19.64	19.48	19.36
		15	0	19.56	19.47	19.44

LTE Band / BW	Modulation	RB Size	RB Offset	Low CH	Mid CH	High CH
				26815CH	26915CH	27015CH
				826.5MHz	836.5MHz	846.5MHz
26 / 5M	QPSK	1	0	22.29	22.24	22.12
		1	13	22.44	22.26	22.15
		1	24	22.36	22.10	22.00
		12	0	21.55	21.44	21.32
		12	6	21.57	21.40	21.34
		12	11	21.53	21.41	21.34
		25	0	21.52	21.42	21.27
	16QAM	1	0	21.82	21.49	21.60
		1	13	21.93	21.54	21.58
		1	24	21.79	21.43	21.43
		12	0	20.70	20.49	20.42
		12	6	20.72	20.47	20.45
		12	11	20.69	20.47	20.42
		25	0	20.60	20.44	20.36
	64QAM	1	0	20.42	20.77	20.70
		1	13	20.56	20.79	20.74
		1	24	20.47	20.69	20.64
		12	0	19.63	19.42	19.53
		12	6	19.64	19.44	19.52
		12	11	19.62	19.39	19.50
		25	0	19.54	19.43	19.44

LTE Band / BW	Modulation	RB Size	RB Offset	Low CH	Mid CH	High CH
				26840CH	26915CH	26990CH
				829MHz	836.5MHz	844MHz
26 / 10M	QPSK	1	0	22.14	22.21	22.04
		1	25	22.13	22.15	22.06
		1	49	22.10	22.11	21.90
		25	0	21.57	21.44	21.32
		25	13	21.54	21.47	21.34
		25	25	21.48	21.36	21.31
		50	0	21.49	21.38	21.26
	16QAM	1	0	21.62	21.42	21.57
		1	25	21.58	21.33	21.50
		1	49	21.56	21.33	21.35
		25	0	20.60	20.50	20.39
		25	13	20.59	20.51	20.37
		25	25	20.52	20.43	20.37
		50	0	20.54	20.48	20.28
	64QAM	1	0	20.56	20.66	20.67
		1	25	20.54	20.60	20.74
		1	49	20.58	20.64	20.62
		25	0	19.63	19.57	19.44
		25	13	19.62	19.56	19.53
		25	25	19.59	19.49	19.47
		50	0	19.57	19.44	19.36

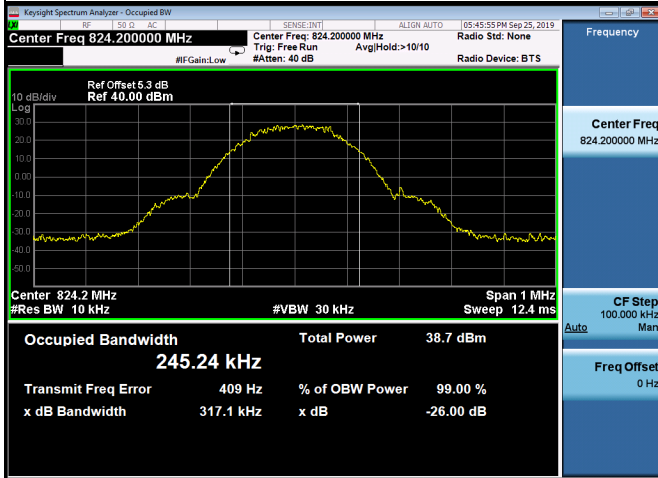
LTE Band / BW	Modulation	RB Size	RB Offset	Low CH	Mid CH	High CH
				26865CH	26915CH	26965CH
				831.5MHz	836.5MHz	841.5MHz
26 / 15M	QPSK	1	0	22.20	22.10	22.20
		1	38	22.18	22.09	22.15
		1	74	22.12	22.06	21.92
		36	0	21.43	21.39	21.33
		36	18	21.44	21.39	21.34
		36	39	21.45	21.39	21.36
		75	0	21.43	21.39	21.29
	16QAM	1	0	21.41	21.60	21.74
		1	38	21.39	21.56	21.70
		1	74	21.31	21.54	21.47
		36	0	20.53	20.50	20.52
		36	18	20.54	20.51	20.50
		36	39	20.54	20.51	20.51
		75	0	20.49	20.41	20.36
	64QAM	1	0	20.80	20.56	20.99
		1	38	20.77	20.53	21.03
		1	74	20.66	20.54	20.92
		36	0	19.60	19.58	19.44
		36	18	19.58	19.56	19.41
		36	39	19.52	19.49	19.46
		75	0	19.51	19.48	19.43

APPENDIX B - OCCUPIED BANDWIDTH

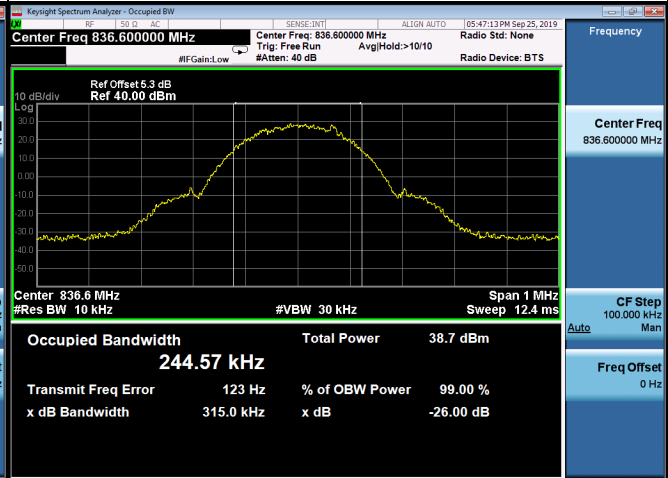
GSM850					
GSM			EDGE		
CS			8PSK		
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)
128	824.2	0.245	128	824.2	0.246
190	836.6	0.245	190	836.6	0.246
251	848.8	0.245	251	848.8	0.251
Channel	Frequency (MHz)	26dB Bandwidth (MHz)	Channel	Frequency (MHz)	26dB Bandwidth (MHz)
128	824.2	0.317	128	824.2	0.314
190	836.6	0.315	190	836.6	0.313
251	848.8	0.314	251	848.8	0.315

Spectrum Plot

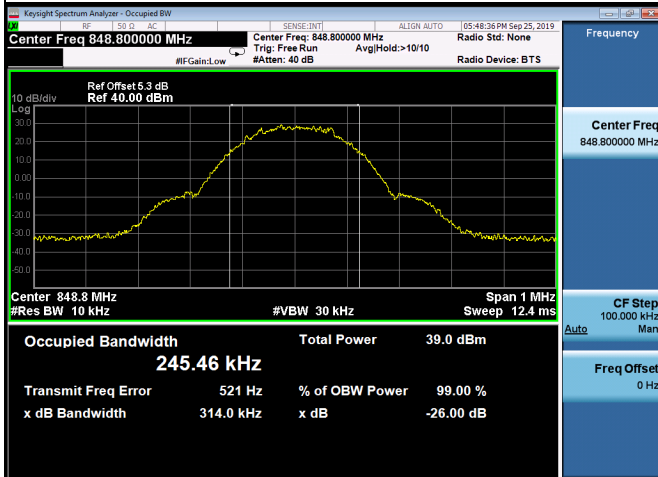
GSM-128



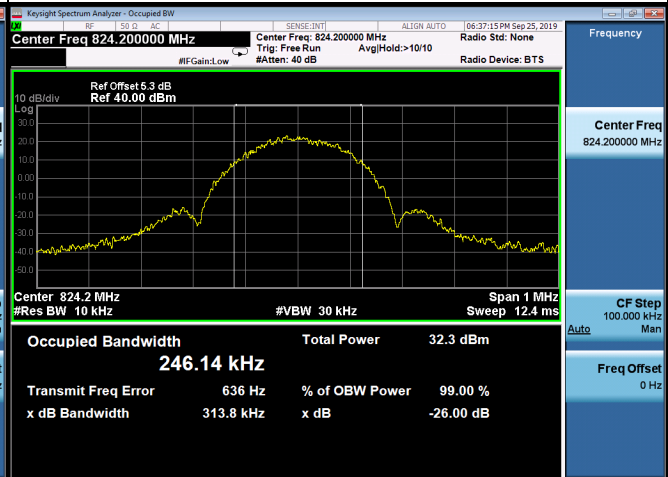
GSM-190



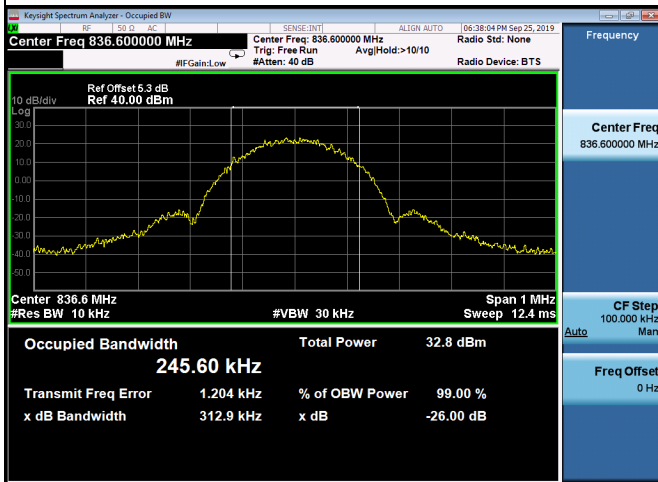
GSM-251



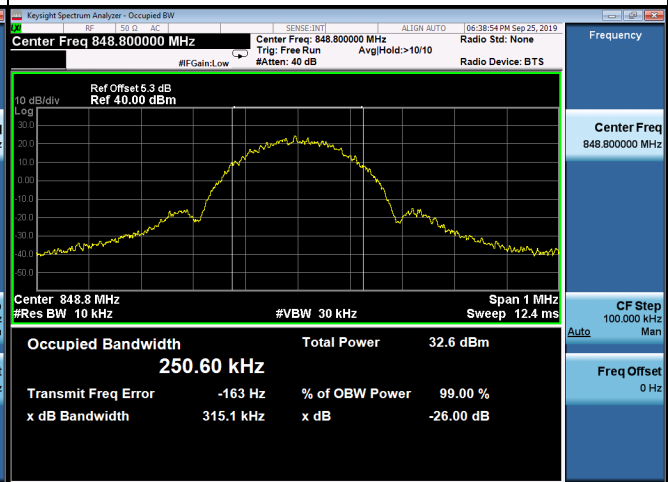
EDGE-128



EDGE-190



EDGE-251

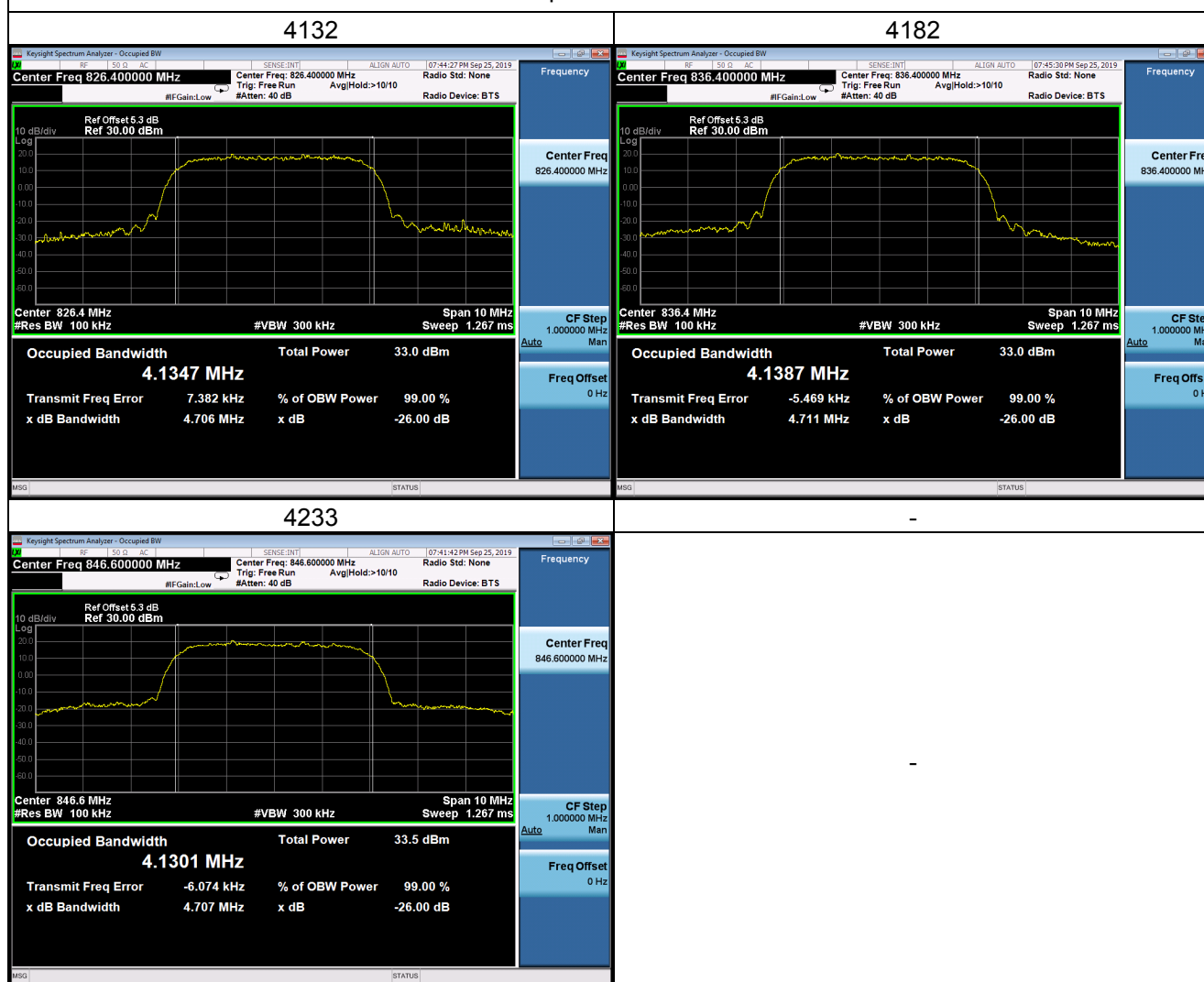


WCDMA Band V_WCDMA

QPSK

Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	Channel	Frequency (MHz)	26dB Bandwidth (MHz)
4132	826.4	4.135	4132	826.4	4.706
4182	836.4	4.139	4182	836.4	4.711
4233	846.6	4.130	4233	846.6	4.707

Spectrum Plot



WCDMA Band V_HSDPA					
QPSK					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	Channel	Frequency (MHz)	26dB Bandwidth (MHz)
4132	826.4	4.135	4132	826.4	4.717
4182	836.4	4.150	4182	836.4	4.725
4233	846.6	4.126	4233	846.6	4.716

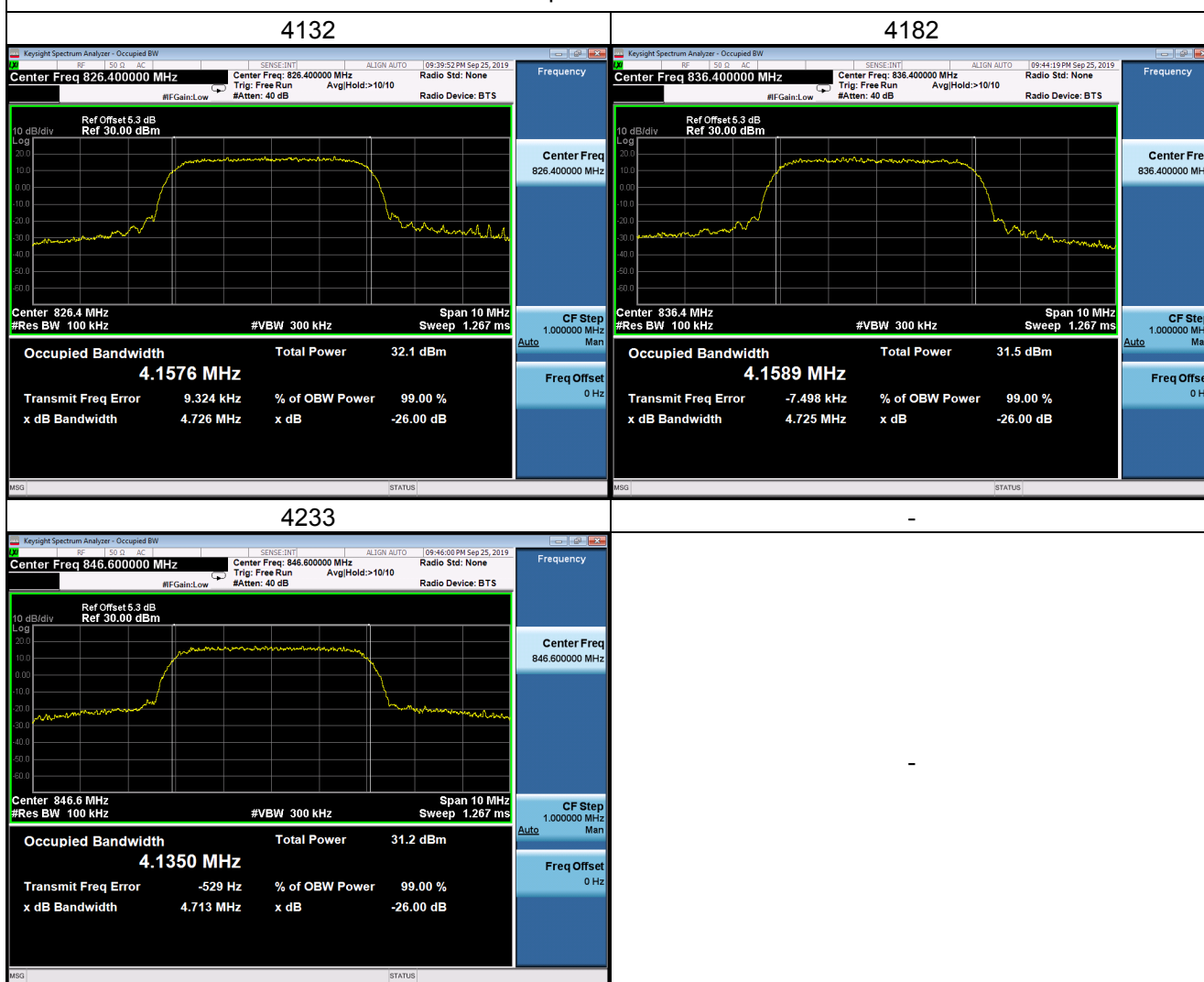


WCDMA Band V_HSUPA

QPSK

Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	Channel	Frequency (MHz)	26dB Bandwidth (MHz)
4132	826.4	4.158	4132	826.4	4.726
4182	836.4	4.160	4182	836.4	4.725
4233	846.6	4.135	4233	846.6	4.713

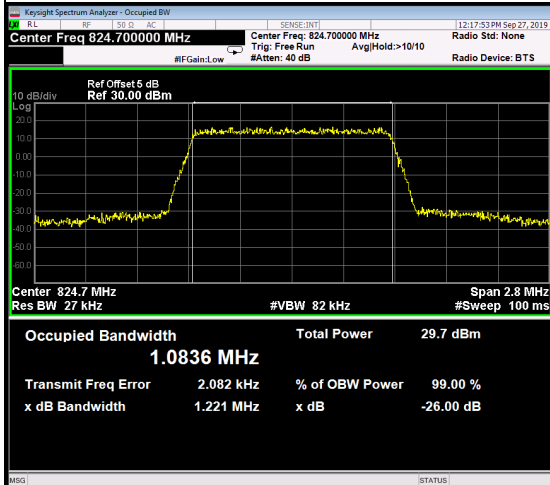
Spectrum Plot



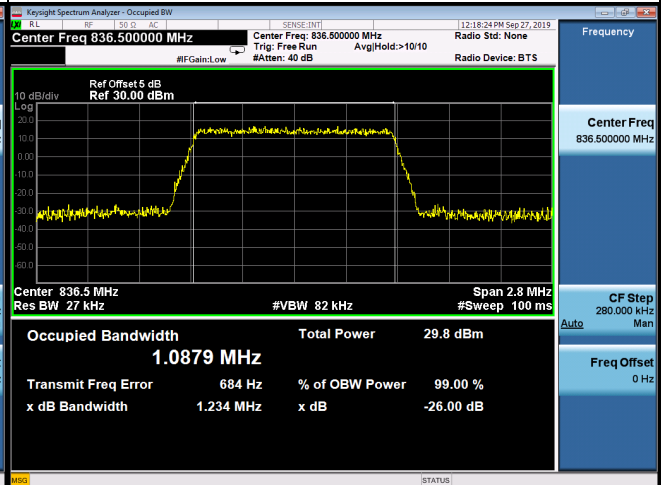
LTE Band 5_1.4M					
QPSK					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	Channel	Frequency (MHz)	26dB Bandwidth (MHz)
20407	824.7	1.084	20407	824.7	1.221
20525	836.5	1.088	20525	836.5	1.234
20643	848.3	1.093	20643	848.3	1.237
16QAM					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	Channel	Frequency (MHz)	26dB Bandwidth (MHz)
20407	824.7	1.088	20407	824.7	1.226
20525	836.5	1.082	20525	836.5	1.236
20643	848.3	1.090	20643	848.3	1.237
64QAM					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	Channel	Frequency (MHz)	26dB Bandwidth (MHz)
20407	824.7	1.086	20407	824.7	1.224
20525	836.5	1.086	20525	836.5	1.232
20643	848.3	1.093	20643	848.3	1.241

Spectrum Plot

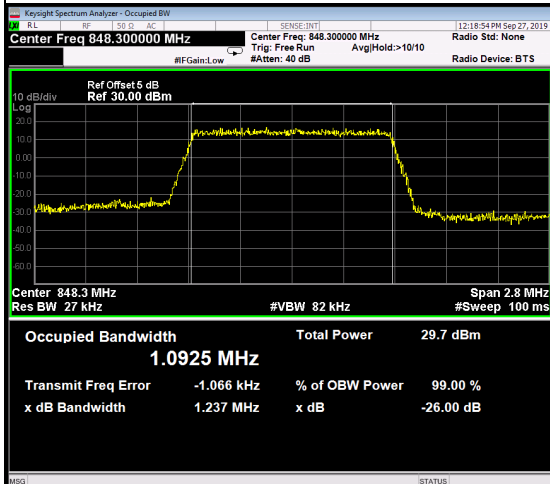
QPSK-20407



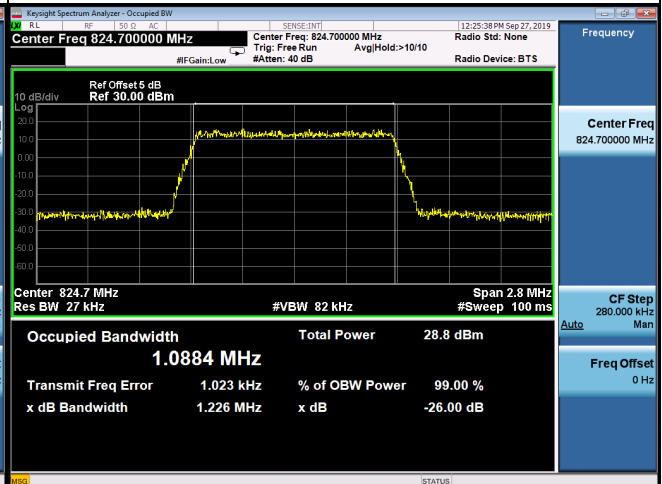
QPSK-20525



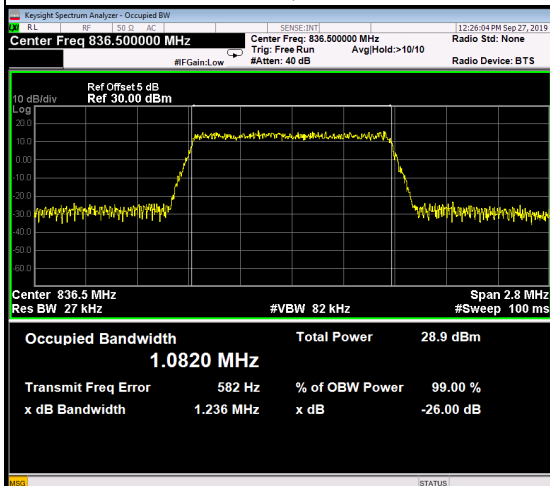
QPSK-20643



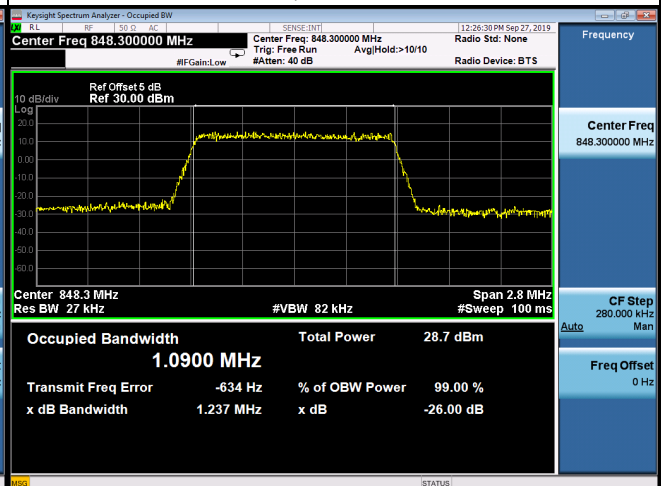
16QAM-20407



16QAM-20525

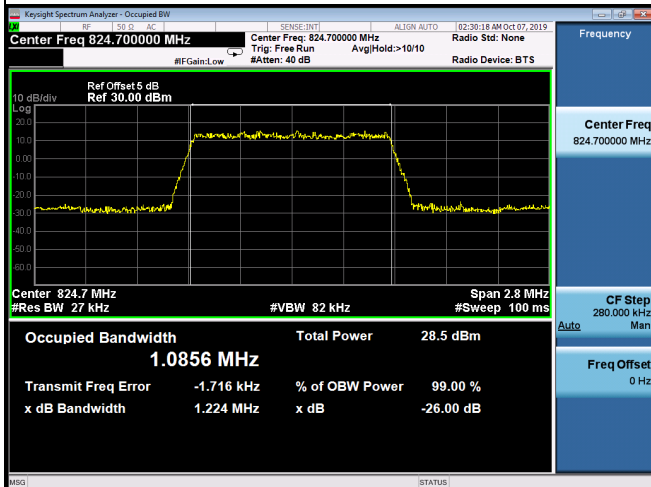


16QAM-20643

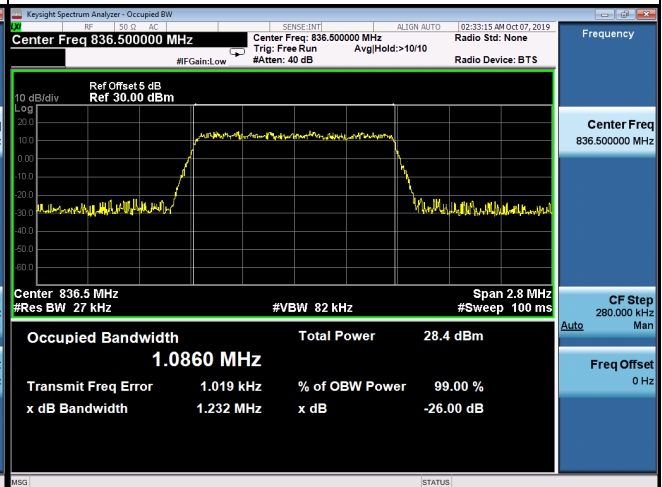


Spectrum Plot

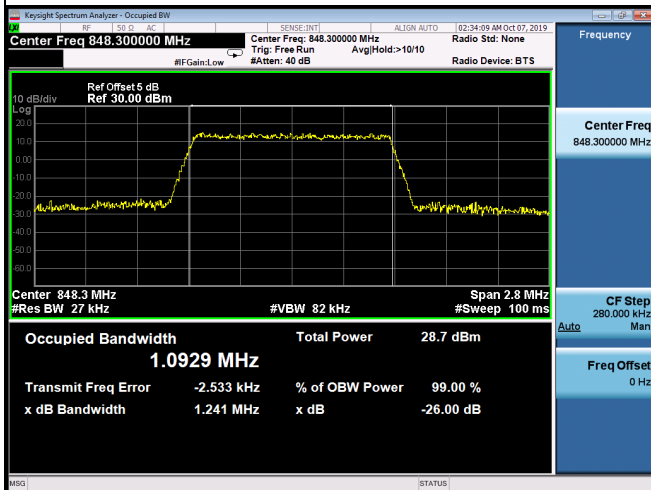
64QAM-20407



64QAM-20525



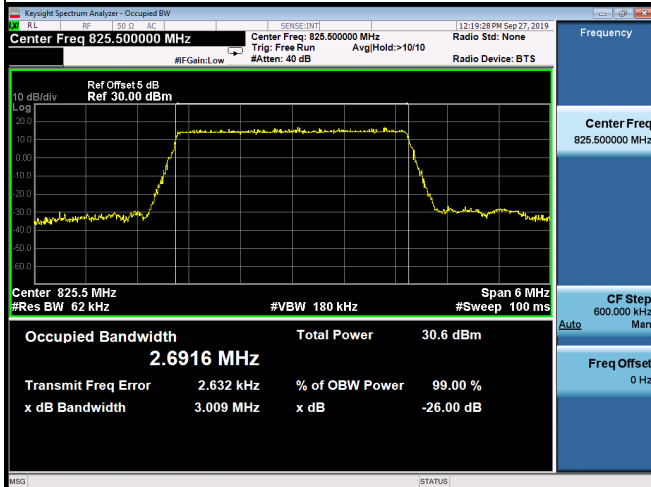
64QAM-20643



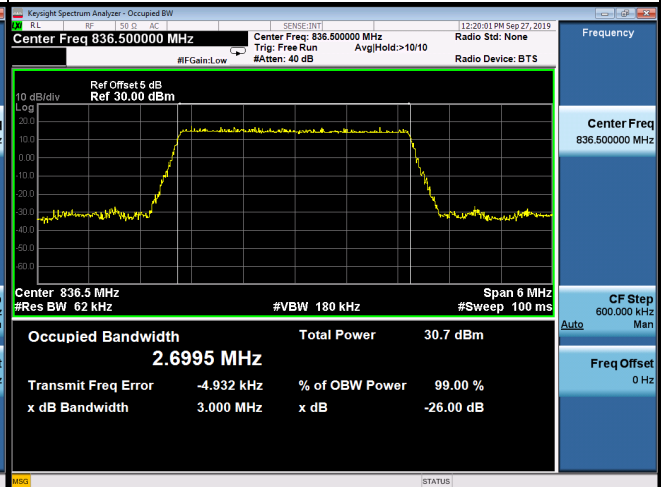
LTE Band 5_3M					
QPSK					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	Channel	Frequency (MHz)	26dB Bandwidth (MHz)
20415	825.5	2.692	20415	825.5	3.009
20525	836.5	2.700	20525	836.5	3.000
20635	847.5	2.698	20635	847.5	3.014
16QAM					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	Channel	Frequency (MHz)	26dB Bandwidth (MHz)
20415	825.5	2.704	20415	825.5	2.997
20525	836.5	2.700	20525	836.5	2.982
20635	847.5	2.693	20635	847.5	2.986
64QAM					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	Channel	Frequency (MHz)	26dB Bandwidth (MHz)
20415	825.5	2.707	20415	825.5	2.995
20525	836.5	2.699	20525	836.5	2.979
20635	847.5	2.699	20635	847.5	2.990

Spectrum Plot

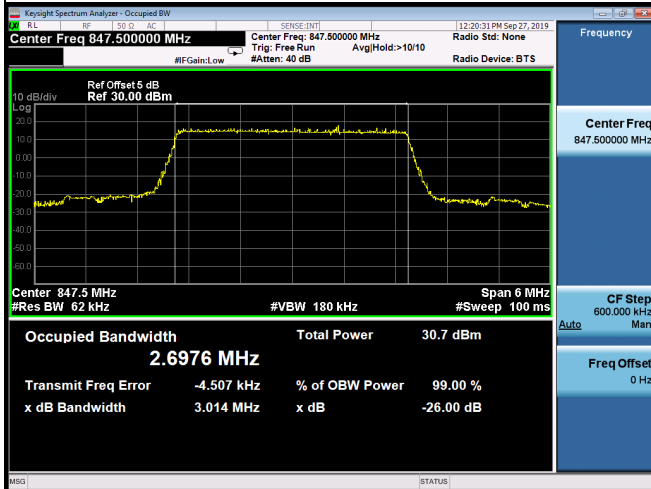
QPSK-20415



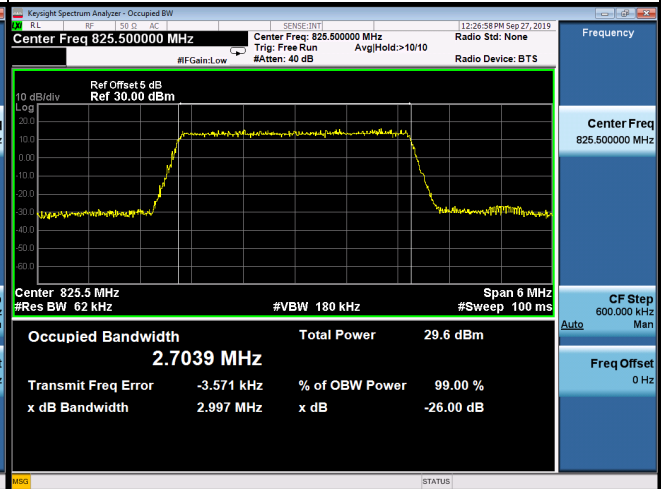
QPSK-20525



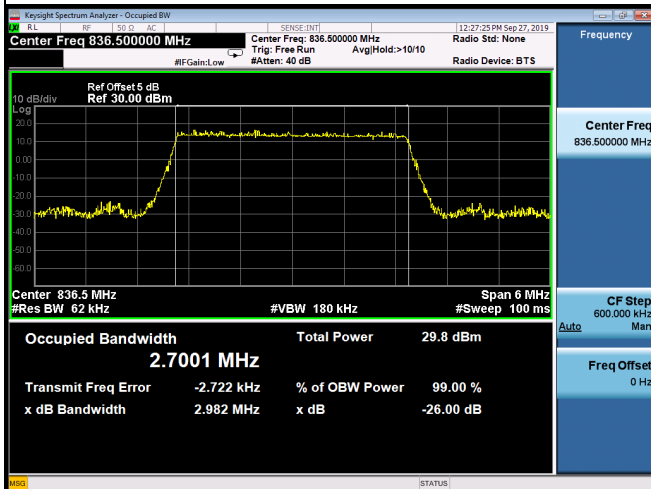
QPSK-20635



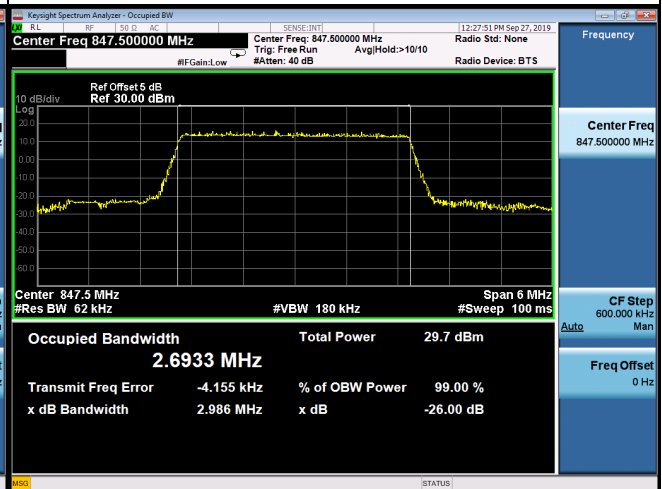
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16QAM-20525

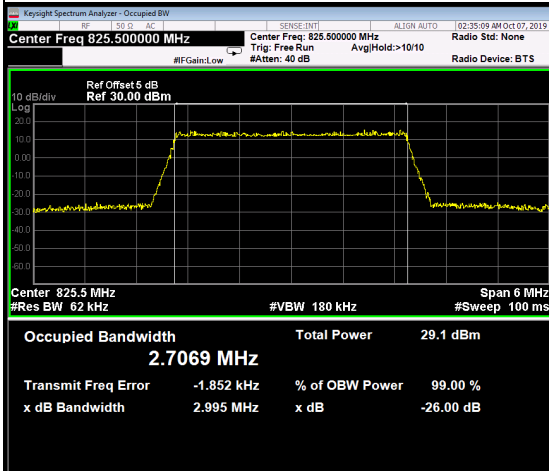


16QAM-20635

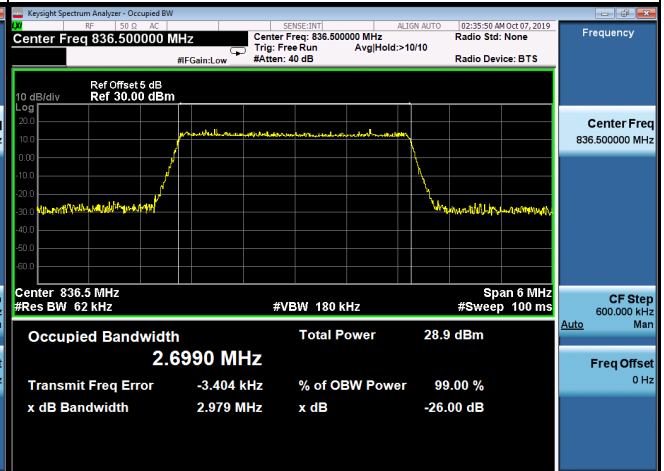


Spectrum Plot

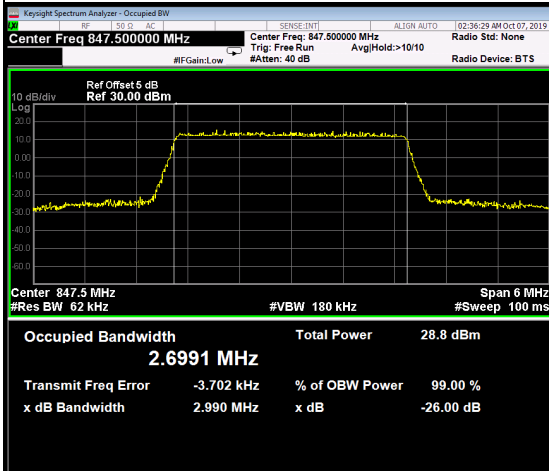
64QAM-20415



64QAM-20525



64QAM-20635



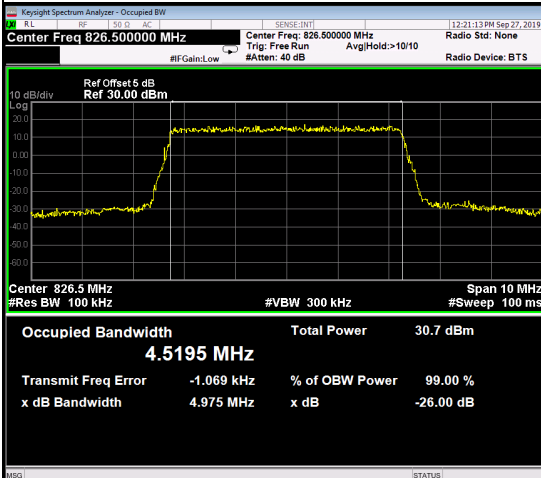
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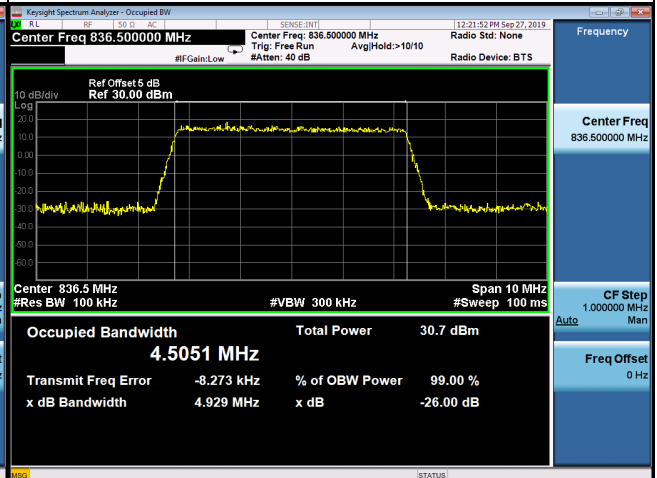
LTE Band 5_5M					
QPSK					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	Channel	Frequency (MHz)	26dB Bandwidth (MHz)
20425	826.5	4.520	20425	826.5	4.975
20525	836.5	4.505	20525	836.5	4.929
20625	846.5	4.503	20625	846.5	4.927
16QAM					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	Channel	Frequency (MHz)	26dB Bandwidth (MHz)
20425	826.5	4.504	20425	826.5	4.948
20525	836.5	4.497	20525	836.5	4.939
20625	846.5	4.494	20625	846.5	4.903
64QAM					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	Channel	Frequency (MHz)	26dB Bandwidth (MHz)
20425	826.5	4.507	20425	826.5	4.960
20525	836.5	4.514	20525	836.5	4.947
20625	846.5	4.496	20625	846.5	4.978

Spectrum Plot

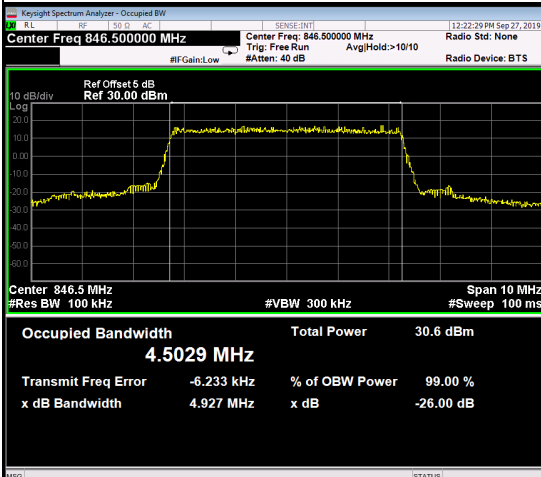
QPSK-20425



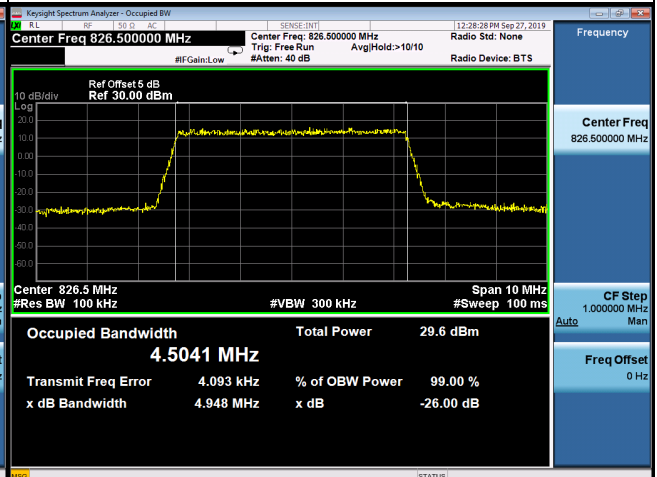
QPSK-20525



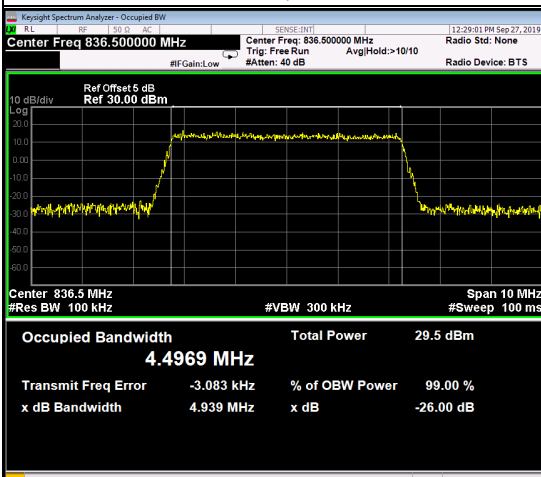
QPSK-20625



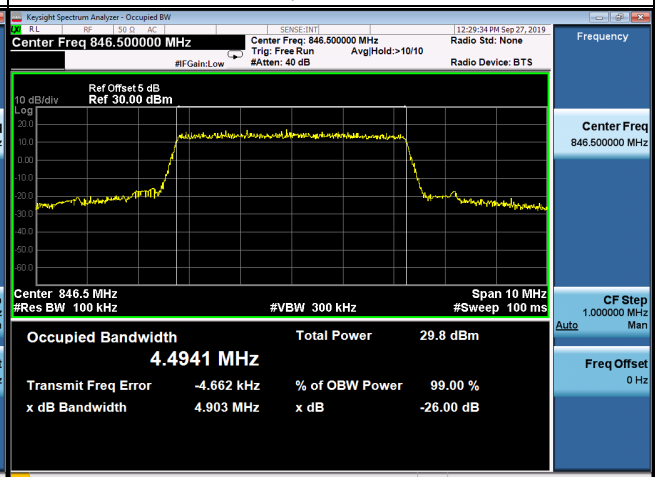
16QAM-20425



16QAM-20525

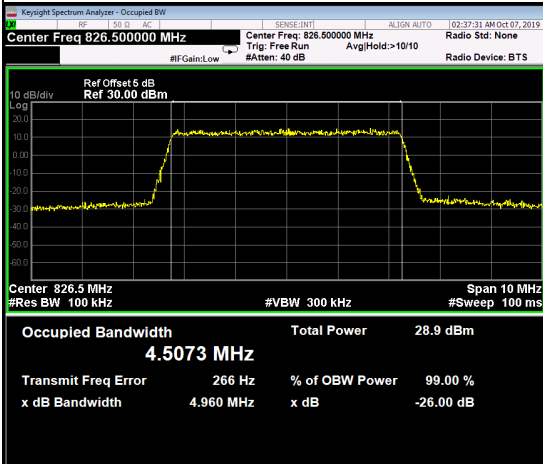


16QAM-20625

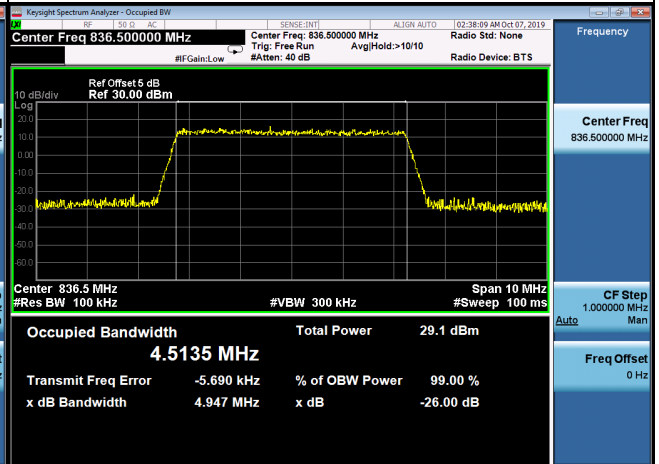


Spectrum Plot

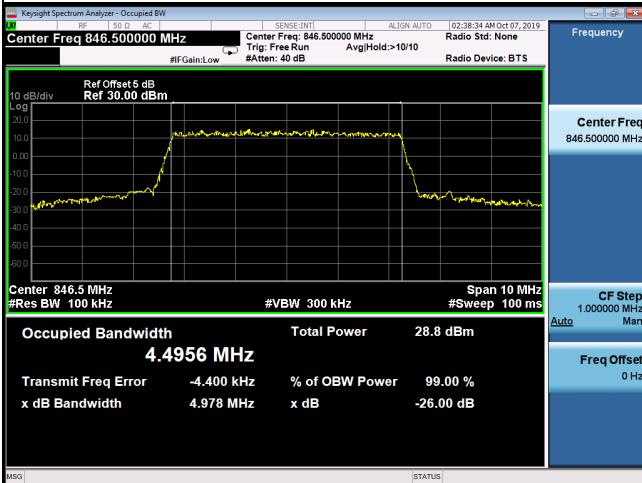
64QAM-20425



64QAM-20525



64QAM-20625



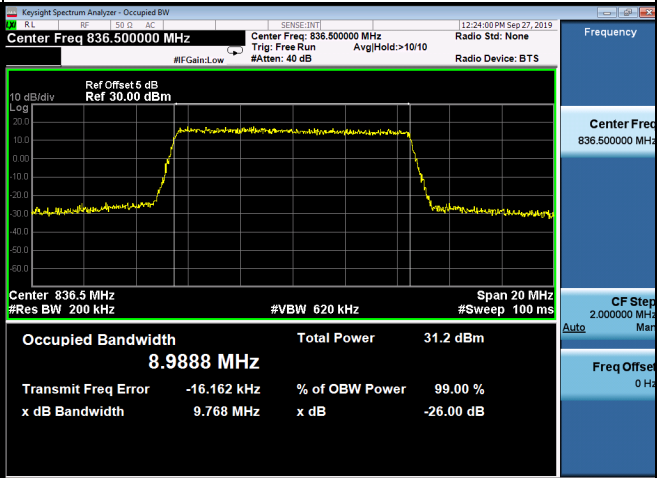
LTE Band 5_10M					
QPSK					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	Channel	Frequency (MHz)	26dB Bandwidth (MHz)
20450	829.0	8.956	20450	829.0	9.846
20525	836.5	8.989	20525	836.5	9.768
20600	844.0	8.987	20600	844.0	9.863
16QAM					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	Channel	Frequency (MHz)	26dB Bandwidth (MHz)
20450	829.0	8.953	20450	829.0	9.810
20525	836.5	8.968	20525	836.5	9.806
20600	844.0	8.969	20600	844.0	9.697
64QAM					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	Channel	Frequency (MHz)	26dB Bandwidth (MHz)
20450	829.0	8.959	20450	829.0	9.793
20525	836.5	8.961	20525	836.5	9.789
20600	844.0	8.981	20600	844.0	9.799

Spectrum Plot

QPSK-20450



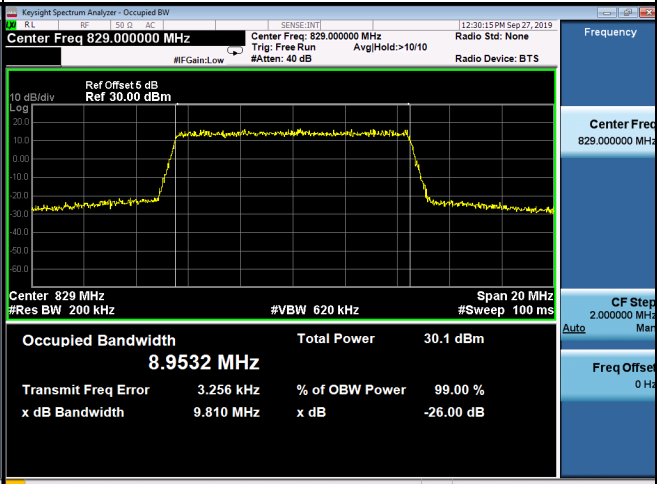
QPSK-20525



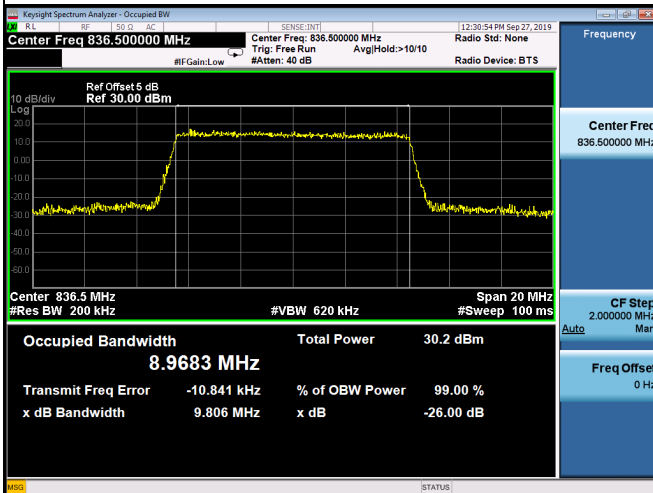
QPSK-20600



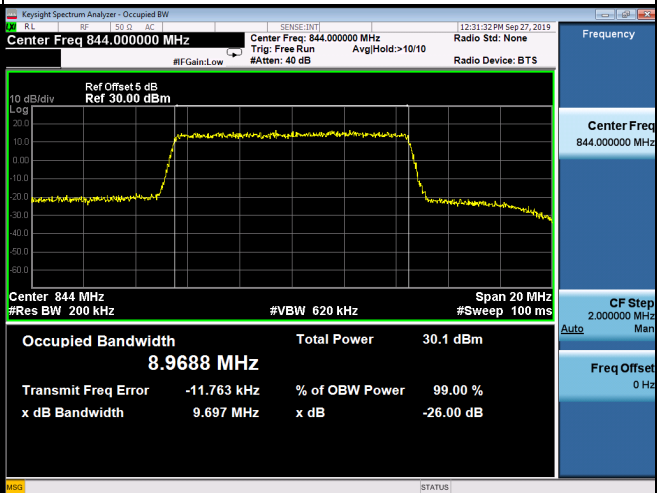
16QAM-20450



16QAM-20525

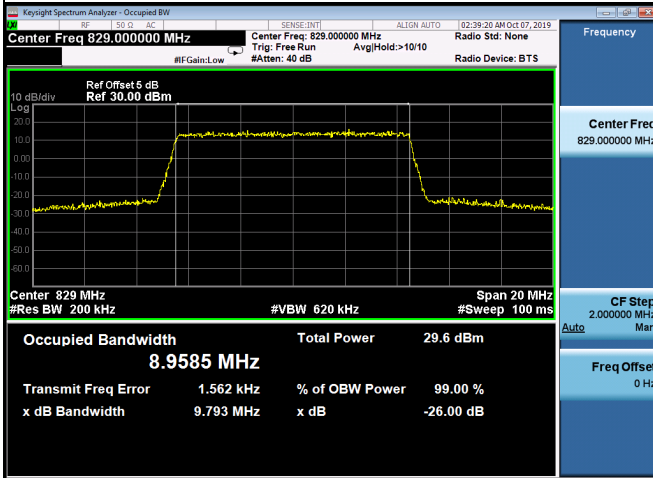


16QAM-20600

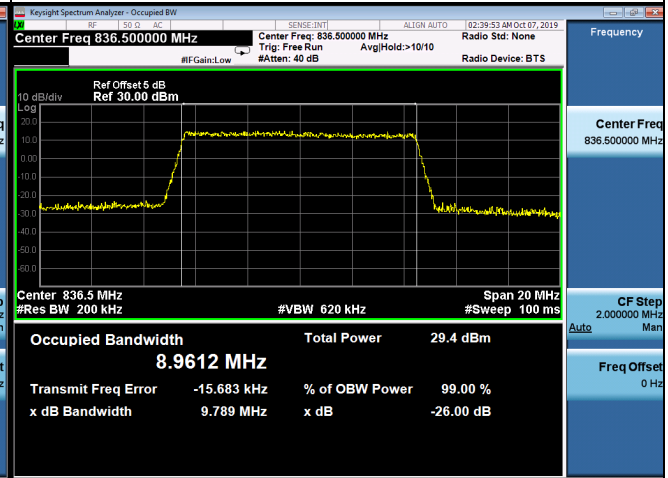


Spectrum Plot

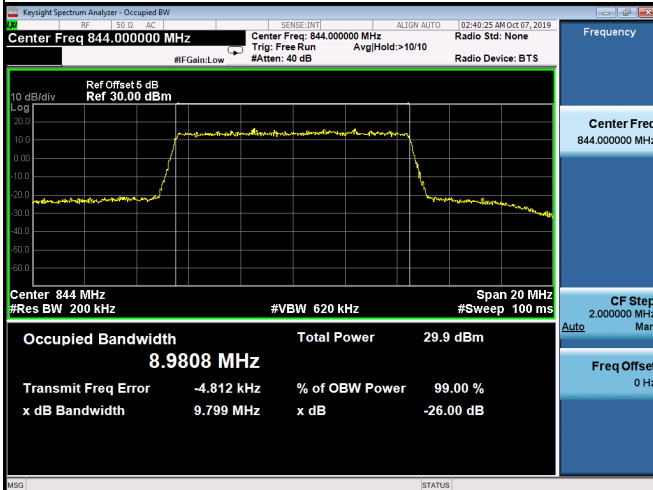
64QAM-20450



64QAM-20525



64QAM-20600



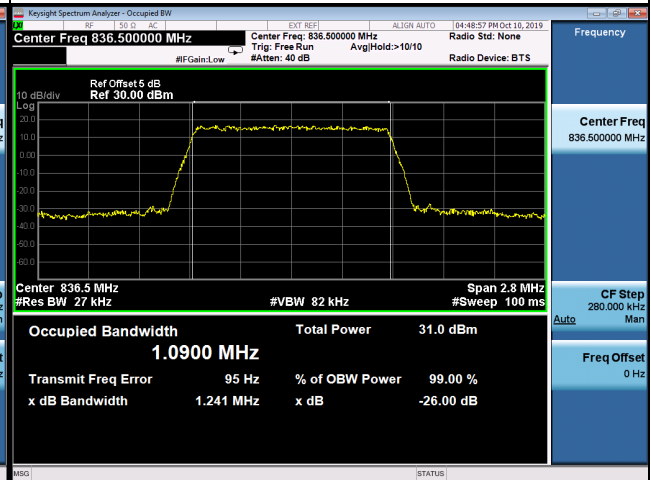
LTE Band 26_1.4M					
QPSK					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	Channel	Frequency (MHz)	26dB Bandwidth (MHz)
26797	824.7	1.0844	26797	824.7	1.2340
26915	836.5	1.0900	26915	836.5	1.2410
27033	848.3	1.0947	27033	848.3	1.2280
16QAM					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	Channel	Frequency (MHz)	26dB Bandwidth (MHz)
26797	824.7	1.0912	26797	824.7	1.2360
26915	836.5	1.0867	26915	836.5	1.2210
27033	848.3	1.0892	27033	848.3	1.2320
64QAM					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	Channel	Frequency (MHz)	26dB Bandwidth (MHz)
26797	824.7	1.0840	26797	824.7	1.2240
26915	836.5	1.0853	26915	836.5	1.2190
27033	848.3	1.0927	27033	848.3	1.2410

Spectrum Plot

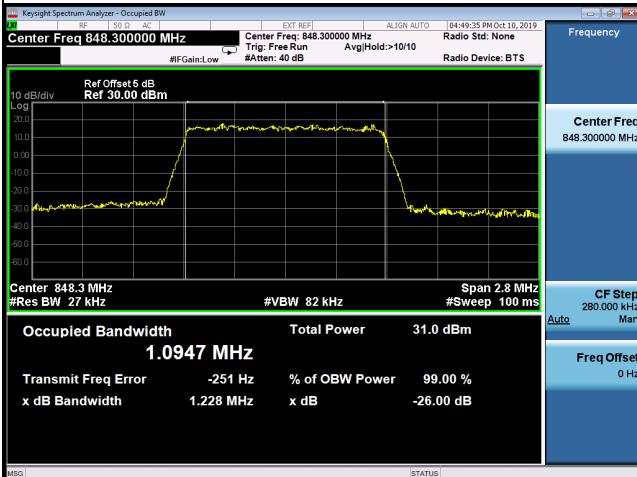
QPSK-26797



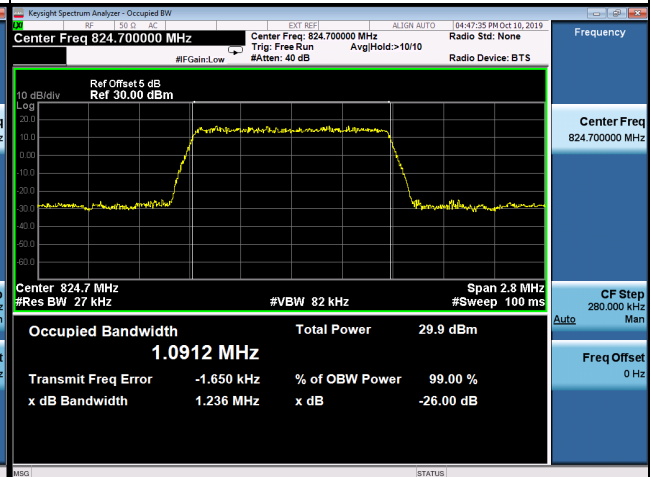
QPSK-26915



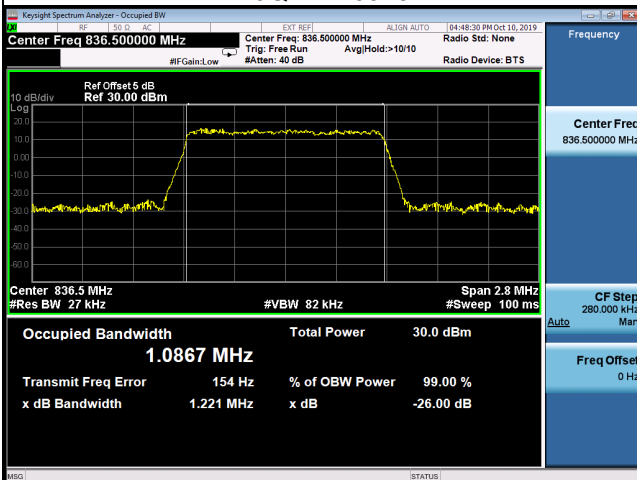
QPSK-27033



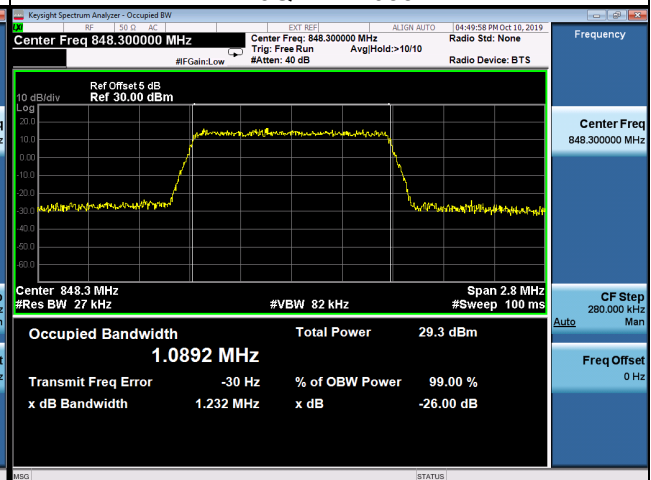
16QAM-26797



16QAM-26915

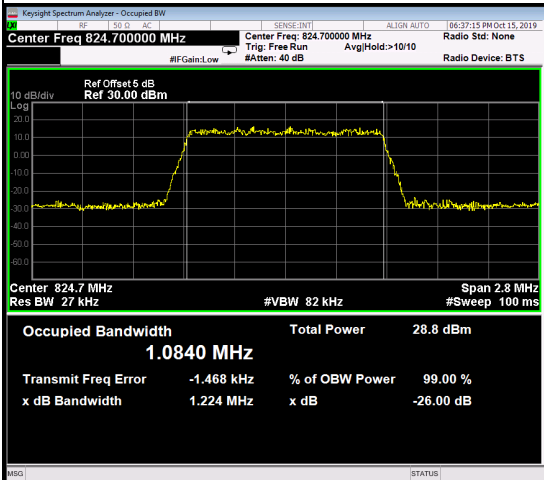


16QAM-27033

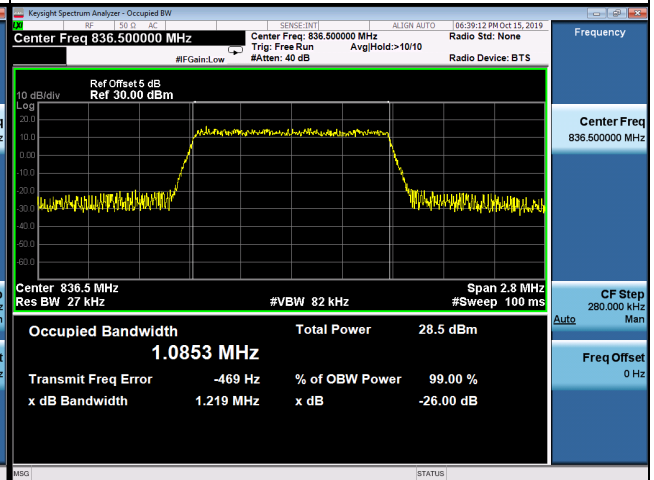


Spectrum Plot

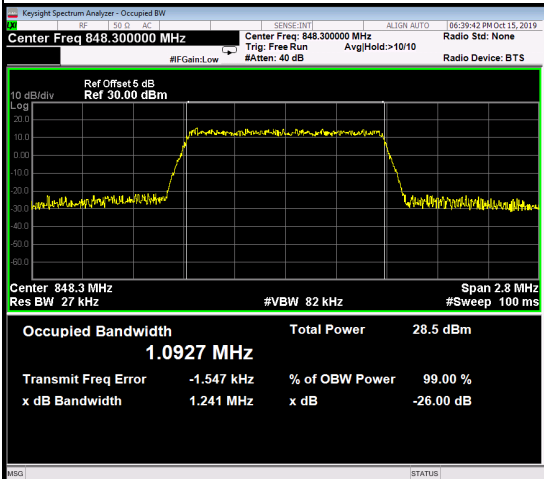
64QAM-26797



64QAM-26915



64QAM-27033



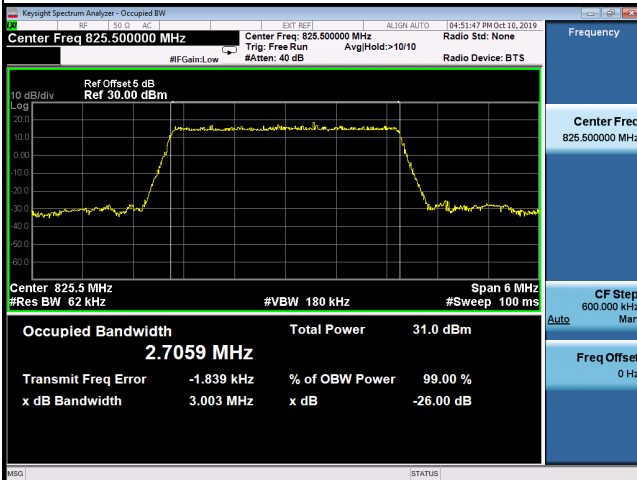
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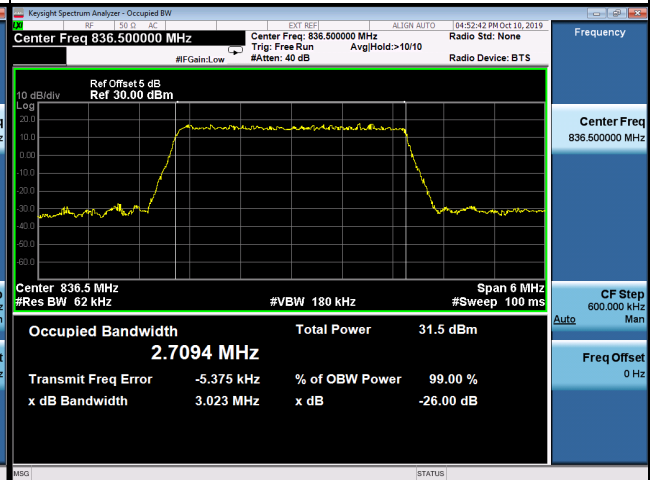
LTE Band 26_3M					
QPSK					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	Channel	Frequency (MHz)	26dB Bandwidth (MHz)
26805	825.5	2.7059	26805	825.5	3.0030
26915	836.5	2.7094	26915	836.5	3.0230
27025	847.5	2.7074	27025	847.5	3.0010
16QAM					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	Channel	Frequency (MHz)	26dB Bandwidth (MHz)
26805	825.5	2.7065	26805	825.5	2.9900
26915	836.5	2.6974	26915	836.5	2.9990
27025	847.5	2.7018	27025	847.5	3.0190
64QAM					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	Channel	Frequency (MHz)	26dB Bandwidth (MHz)
26805	825.5	2.7033	26805	825.5	2.9960
26915	836.5	2.6968	26915	836.5	2.9620
27025	847.5	2.7000	27025	847.5	2.9980

Spectrum Plot

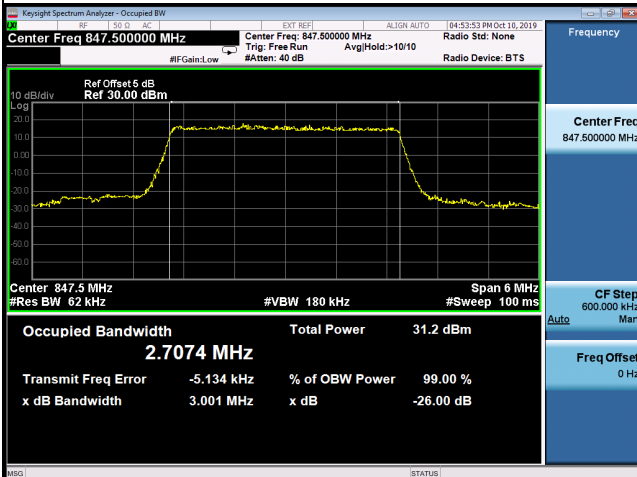
QPSK-26805



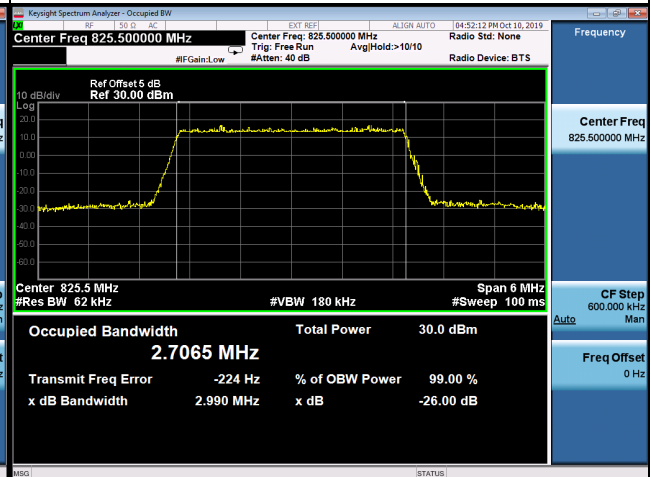
QPSK-26915



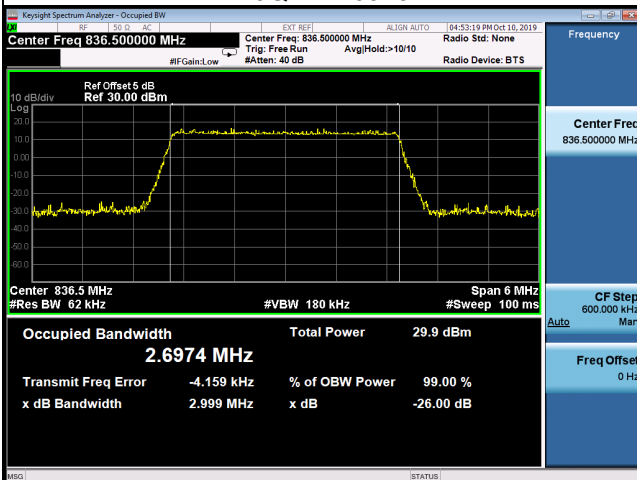
QPSK-27025



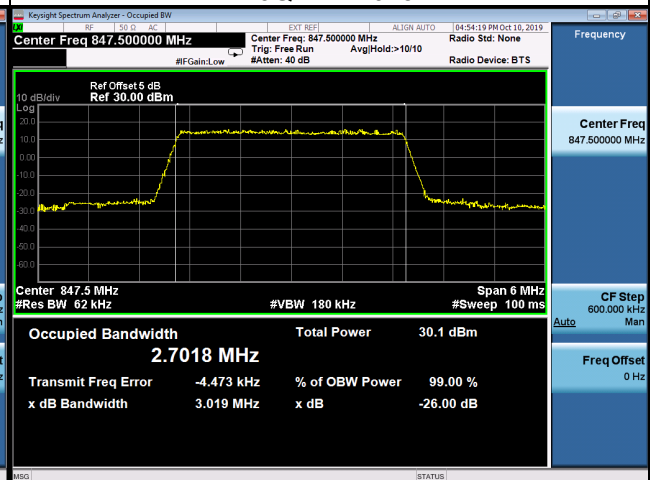
16QAM-26805



16QAM-26915

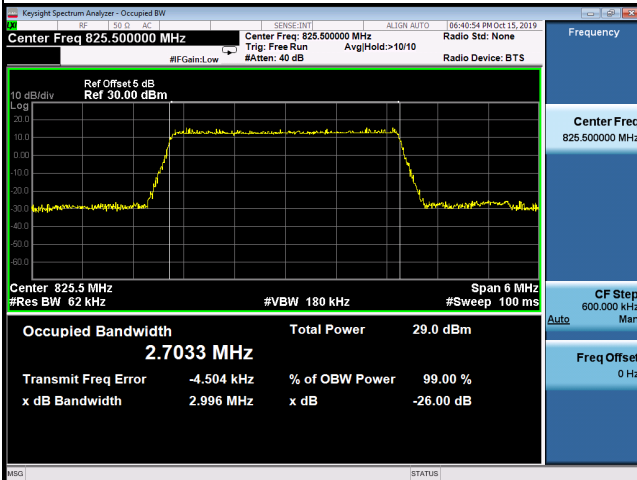


16QAM-27025

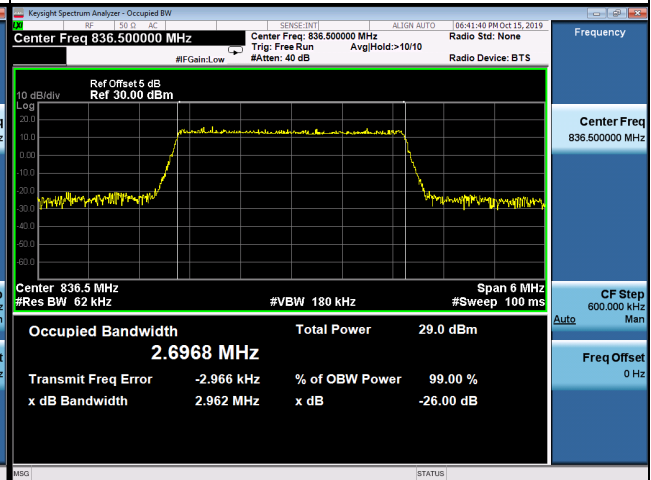


Spectrum Plot

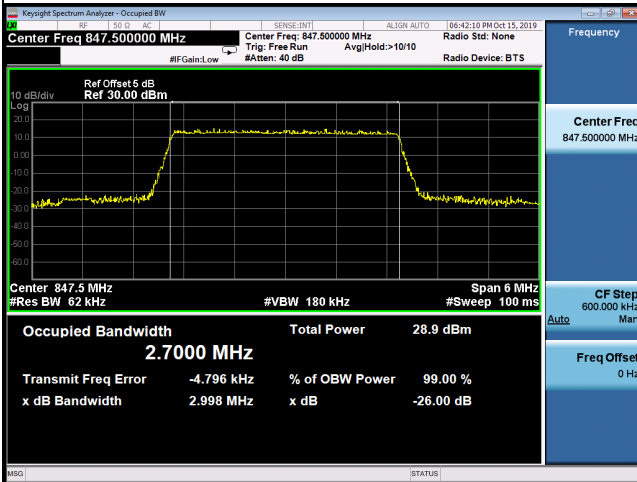
64QAM-26805



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	4.5188	26815	826.5	4.9710
26915	836.5	4.5077	26915	836.5	4.9910
27015	846.5	4.4916	27015	846.5	4.9500
16QAM					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	Channel	Frequency (MHz)	26dB Bandwidth (MHz)
26815	826.5	4.5015	26815	826.5	4.9350
26915	836.5	4.5171	26915	836.5	4.9490
27015	846.5	4.5045	27015	846.5	4.9720
64QAM					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	Channel	Frequency (MHz)	26dB Bandwidth (MHz)
26815	826.5	4.4978	26815	826.5	4.9520
26915	836.5	4.5193	26915	836.5	4.9360
27015	846.5	4.5013	27015	846.5	4.9640