FCC CFR47 PART 22 SUBPART H
FCC CFR47 PART 24 SUBPART E
FCC CFR47 PART 27 SUBPART M

WWAN

CERTIFICATION TEST REPORT

FOR

GSM/WCDMA/LTE Phone + BT/BLE , ANT+ and DTS b/g/n

MODEL NUMBER : SM-J810G/DS, SM-J810GF/DS

FCC ID: A3LSMJ810G

REPORT NUMBER: 4788490168-E5V1

ISSUE DATE: JUN 07, 2018

Prepared for
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ACCREDITED
Testing Laboratory

TL-637

Revision History

Rev.	Issue Date	Revisions	Revised By
V1	06/07/18	Initial issue	Hoonpyo Lee

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME:	SAMSUNG ELECTRONICS CO., LTD.
EUT DESCRIPTION:	GSM/WCDMA/LTE Phone + BT/BLE , ANT+ and DTS b/g/n
MODEL NUMBER:	SM-J810G/DS, SM-J810GF/DS
SERIAL NUMBER:	R38K30RGB8V (RADIATED, Original); R38K30RGFGK (CONDUCTED, Original); R38K30TBXPR (RADIATED, Spot check test);
DATE TESTED:	APR 30, 2018 - MAY 10, 2018 (Original); MAY 24, 2018 (Spot check test)

APPLICABLE STANDARDS	
STANDARD	**TEST RESULTS**
FCC PART 22H, 24 and 27M	Pass

UL Korea, Ltd. tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by UL Korea, Ltd. based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

Note: The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by UL Korea, Ltd. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL Korea, Ltd. will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by IAS, any agency of the Federal Government, or any agency of any government.

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Suwon Lab Engineer
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1.1. INTRODUCTION OF TEST DATA REUSE

This report referenced from the FCC ID: A3LSMJ810Y WWAN(FCC CFR 47 Part 22/24/27). And the applicant takes full responsibility that the test data as referenced in this report represent compliance for this FCC ID.

1.2. DIFFERENCE

The FCC ID: A3LSMJ810G shares the same enclosure and circuit board as FCC ID: A3LSMJ810Y. The WWAN antennas and surrounding circuitry and layout are identical between these two units for re-used bands.

After confirming through preliminary radiated emissions that the performance of the FCC ID: A3LSMJ810Y remains representative of FCC ID: A3LSMJ810G. The test data of FCC ID: A3LSMJ810Y being submitted for this application to cover WWAN features.

- Re-use bands - GSM850, GSM1900, WCDMA Band 5, WCDMA Band 2, LTE Band 5, LTE Band 41.

1.3. SPOT CHECK VERIFICATION DATA

Band	Test Item	Worst Mode	Frequency	Test Limit	Original model SM-J810Y/DS Results FCC ID : A3LSMJ810Y	Spot check model SM-J810G/DS Results FCC ID : A3LSMJ810G	Deviation	Remark
GSM850	ERP	GPRS	848.8 MHz	38.50 dBm	27.48 dBm	27.82 dBm	0.34 dB	
	RSE	GPRS	848.8 MHz	-13.00 dBm	-40.70 dBm	-50.10 dBm	-9.40 dB	3th Harmonic
GSM1900	EIRP	GPRS	1880 MHz	33.00 dBm	26.16 dBm	25.94 dBm	-0.22 dB	
	RSE	GPRS	1850.2 MHz	-13.00 dBm	-43.00 dBm	-44.10 dBm	-1.10 dB	3th Harmonic
WCDMA Band 2	EIRP	REL99	1852.4 MHz	33.00 dBm	19.36 dBm	18.82 dBm	-0.54 dB	
	RSE	HSDPA	1852.4 MHz	-13.00 dBm	-51.00 dBm	-50.30 dBm	0.70 dB	2nd Harmonic
WCDMA Band 5	ERP	REL99	846.6 MHz	38.50 dBm	17.90 dBm	17.13 dBm	-0.77 dB	
	RSE	REL99	846.6 MHz	-13.00 dBm	-60.90 dBm	-63.80 dBm	-2.90 dB	2nd Harmonic
LTE Band 5	ERP	10M QPSK	844 MHz	38.50 dBm	19.12 dBm	18.36 dBm	-0.76 dB	
	RSE	10M QPSK	844 MHz	-13.00 dBm	-52.50 dBm	-58.30 dBm	-5.80 dB	2nd Harmonic
LTE Band 41	EIRP	10M 16QAM	2593 MHz	33.00 dBm	22.83 dBm	24.06 dBm	1.23 dB	
	RSE	10M 16QAM	2501 MHz	-25.00 dBm	-36.30 dBm	-41.10 dBm	-4.80 dB	3rd Harmonic

Comparison of two models, upper deviation is within 3dB range and all test results are under FCC Technical Limits.

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1.4. REFERENCE DETAIL

Reference application that contains the reused reference data.

Equipment Class	Reference FCC ID	Type Grant/Permissive Change	Reference Application	Folder Test/RF Exposure	Report Tittle / Section
DTS	A3LSMJ810Y	Grant	4788468750-E1V2	Test	FCC Report DTS WLAN / All sections
			4788468750-E2V2	Test	FCC Report BLE All sections
DSS	A3LSMJ810Y	Grant	4788468750-E3V2	Test	FCC Report BT / All sections
DXX	A3LSMJ810Y	Grant	4788468750-E4V2	Test	FCC Report ANT+ / All sections
PCE	A3LSMJ810Y	Grant	4788468750-E5V2	Test	FCC Report WWAN / All sections for GSM, WCDMA, LTE Band 5/41

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2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with following methods.

1. FCC CFR 47 Part 2.
2. FCC CFR 47 Part 22.
3. FCC CFR 47 Part 24.
4. FCC CFR 47 Part 27.
5. ANSI TIA-603-E, 2016
6. KDB 971168 D01 Power Meas License Digital Systems v03r01

3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do,16675, Korea. Line conducted emissions are measured only at the 218 address. The following table identifies which facilities were utilized for radiated emission measurements documented in this report. Specific facilities are also identified in the test results sections.

218 Maeyeong-ro
☒ Chamber 1
☒ Chamber 2
☐ Chamber 3

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4. CALIBRATION AND UNCERTAINTY

4.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

4.2. SAMPLE CALCULATION

Where relevant, the following sample calculation is provided:

EIRP = PSA reading with EUT worst orientation (dBm) + Path loss (dB) – cable loss(between the SG and substitution antenna) + Substitution Antenna Factor (dBi)

ERP = PSA reading with EUT worst orientation (dBm) + Path loss (dB) – cable loss(between the SG and substitution antenna)

(Path loss = Signal generator output – PSA reading with substitution antenna)

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4.3. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

PARAMETER	UNCERTAINTY
Conducted Disturbance, 0.15 to 30 MHz	2.32 dB
Radiated Disturbance, Below 1GHz	3.86 dB
Radiated Disturbance, Above 1 GHz	5.97 dB

Uncertainty figures are valid to a confidence level of 95%.

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5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is a GSM/WCDMA/LTE Phone + BT/BLE , ANT+ and DTS b/g/n.
This test report addresses the WWAN operational mode.

5.2. MAXIMUM OUTPUT POWER

The transmitter has a maximum radiated ERP / EIRP output powers as follows:

GSM

FCC Part 22/24				
Band	Frequency Range	Modulation	Radiated	
	[MHz]	Peak	Avg [dBm]	Avg [mW]
GSM850	824~849	GMSK		
		GPRS	27.48	559.76
		EGPRS	20.80	120.23
GSM1900	1850~1910	GMSK		
		GPRS	26.16	413.05
		EGPRS	21.19	131.52

WCDMA

FCC Part 22/24				
Band	Frequency Range	Modulation	Radiated	
	[MHz]	Peak	Avg [dBm]	Avg [mW]
Band 5	824~849	REL99	17.90	61.66
		HSDPA	16.54	45.08
Band 2	1850~1910	REL99	19.36	86.30
		HSDPA	18.47	70.31

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LTE Band 5

FCC Part 22					
Band	Frequency Range [MHz]	BandWidth [MHz]	Modulation Peak	Radiated	
				Avg [dBm]	Avg [mW]
Band 5	824 ~ 849	10	QPSK	19.12	81.66
			16QAM	18.01	63.24
		5	QPSK	18.35	68.39
			16QAM	17.91	61.80
		3	QPSK	18.40	69.18
			16QAM	17.71	59.02
		1.4	QPSK	18.43	69.66
			16QAM	17.56	57.02

LTE Band 41

FCC Part 27					
Band	Frequency Range [MHz]	BandWidth [MHz]	Modulation	Radiated	
				Avg [dBm]	Avg [mW]
Band 41	2496-2690	20	QPSK	21.43	139.00
			16QAM	21.90	154.88
		15	QPSK	22.54	179.47
			16QAM	21.78	150.66
		10	QPSK	21.90	154.88
			16QAM	22.83	191.87
		5	QPSK	21.44	139.32
			16QAM	20.97	125.03

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5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes a internal antenna for the [List the bands supported] with a maximum peak gain as follow:

Band	Peak Gain (dBi)
GSM850 / WCDMA Band 5 / LTE Band 5	-5.62
GSM1900 / WCDMA Band 2	-3.83
LTE Band 41	-1.63

5.4. WORST-CASE ORIENTATION

For GSM850 / WCDMA Band 5 / LTE 5 / LTE 41, the fundamental of the EUT was investigated in three orthogonal orientations X, Y and Z it was determined that Z orientation was worst-case orientation; therefore, all final radiated testing was performed with the EUT in Z orientation.

For GSM1900 / WCDMA Band, the fundamental of the EUT was investigated in three orthogonal orientations X, Y and Z it was determined that X orientation was worst-case orientation; therefore, all final radiated testing was performed with the EUT in X orientation.

Note : All radiated spurious tests were performed connected with earphone and charger for evaluation of worst case mode.(For erp/eirp tests, the EUT didn't connected with earphone and charger)

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5.5. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	**Manufacturer**	**Model**	**Serial Number**	**FCC ID**
Charger	SAMSUNG	EP-TA50IWE	RC3J329DS-A- E	N/A
Data Cable	SAMSUNG	ECB-DU68WE	N/A	N/A
Earphone	SAMSUNG	EHS61ASFWE	N/A	N/A

I/O CABLES

I/O Cable List						
Cable No	**Port**	**# of identical ports**	**Connector Type**	**Cable Type**	**Cable Length (m)**	**Remarks**
1	DC Power	1	Mini-USB	Shielded	1.2m	N/A
2	Audio	2	Mini-Jack	Unshielded	1.2m	N/A

TEST SETUP

The EUT is continuously communicated to the call box during the tests.

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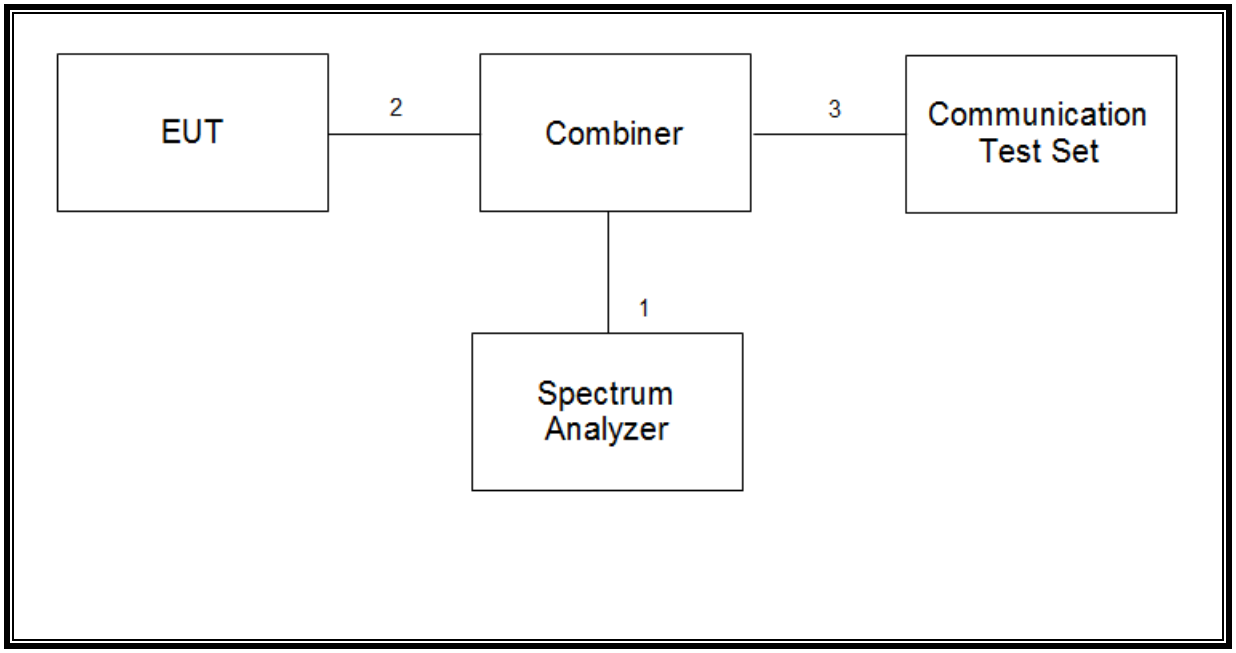
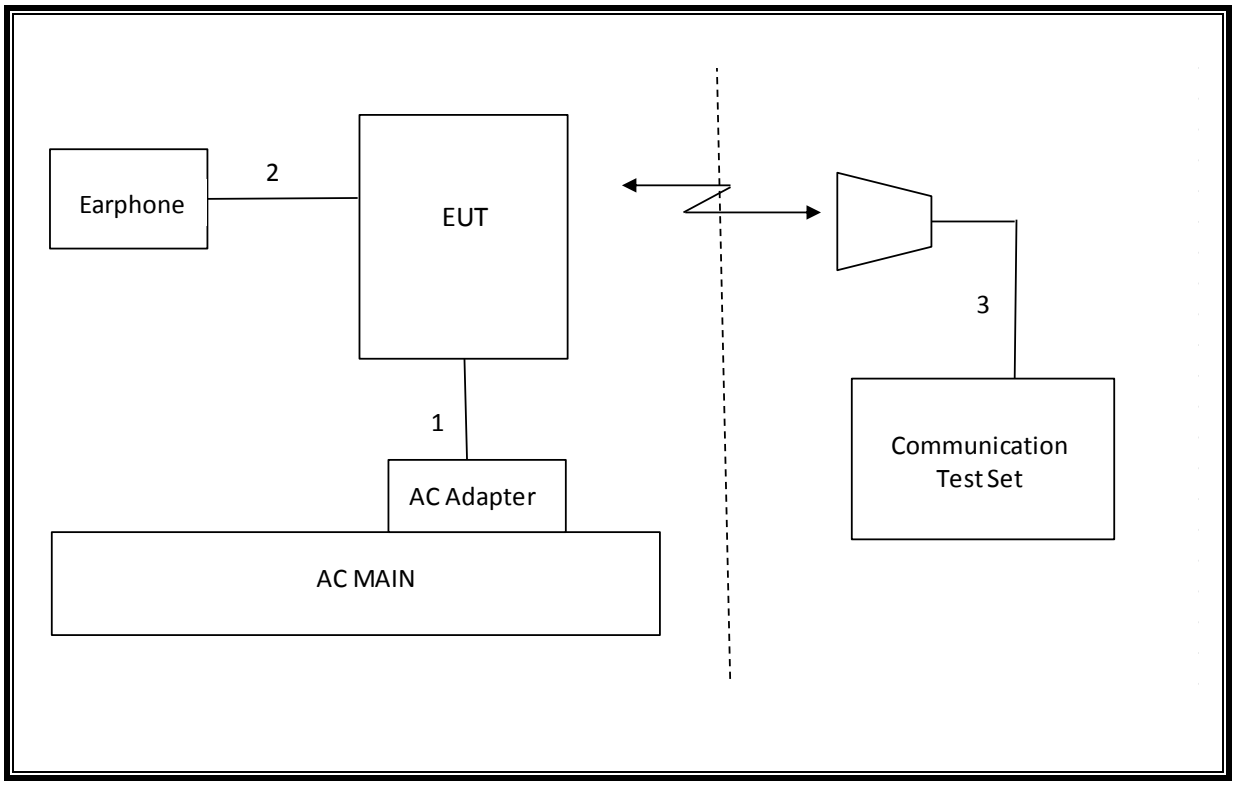
SETUP DIAGRAM FOR TESTS (CONDUCTED TEST SETUP)



SETUP DIAGRAM FOR TESTS (RADIATED TEST SETUP)



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6. TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment was utilized for the tests documented in this report:

Test Equipment List				
Description	**Manufacturer**	**Model**	**S/N**	**Cal Due**
Antenna, Tuned Dipole 400~1000 MHz	ETS	3121D DB4	00164753	06-30-19
Antenna, Horn, 40 GHz	ETS	3116C	00166155	12-04-19
Preamplifier	ETS	3116C-PA	00168841	11-13-19
Antenna, Horn, 40 GHz	ETS	3116C	00168645	12-04-19
Antenna, Bilog, 30MHz-1GHz	SCHWARZBECK	VULB9163	750	08-31-19
Antenna, Bilog, 30MHz-1GHz	SCHWARZBECK	VULB9163	845	08-31-19
Antenna, Bilog, 30MHz-1GHz	SCHWARZBECK	VULB9163	749	09-14-19
Antenna, Horn, 18 GHz	ETS	3115	00167211	10-14-18
Antenna, Horn, 18 GHz	ETS	3115	00161451	03-10-19
Antenna, Horn, 18 GHz	ETS	3117	00168724	05-31-19
Antenna, Horn, 18 GHz	ETS	3117	00205959	11-29-18
Antenna, Horn, 18 GHz	ETS	3117	00168717	05-31-19
Combiner	WEINSCHEL	1575	2152	08-08-18
Communications Test Set	R&S	CMW500	115331	08-07-18
DC Power Supply	Agilent / HP	E3640A	MY54226395	08-07-18
Preamplifier, 1000 MHz	Sonoma	310N	341282	08-09-18
Preamplifier, 1000 MHz	Sonoma	310N	370599	08-10-18
Preamplifier, 1000 MHz	Sonoma	310N	351741	08-07-18
Preamplifier, 18 GHz	Miteq	AFS42-00101800-25-S-42	1876511	08-08-18
Preamplifier, 18 GHz	Miteq	AFS42-00101800-25-S-42	2029169	08-11-18
Preamplifier, 18 GHz	Miteq	AFS42-00101800-25-S-42	1896138	08-08-18
Spectrum Analyzer, 44 GHz	Agilent / HP	N9030A	MY54490312	08-08-18
EMI Test Receive, 40 GHz	R&S	ESU40	100439	08-08-18
EMI Test Receive, 40 GHz	R&S	ESU40	100457	08-08-18
EMI Test Receive, 44 GHz	R&S	ESW40	101590	08-09-18
High Pass Filter 1.2GHz	Micro-Tronics	HPM50108-02	G005	08-09-18
High Pass Filter 1.2GHz	Micro-Tronics	HPM50108-02	G006	08-08-18
High Pass Filter 2.8GHz	Micro-Tronics	HPM50111-02	010	08-09-18
High Pass Filter 2.8GHz	Micro-Tronics	HPM50111-02	011	08-08-18
High Pass Filter 4GHz	Micro-Tronics	HPM50118-02	G001	08-09-18
High Pass Filter 4GHz	Micro-Tronics	HPM50118-02	G002	08-08-18
Attenuator	PASTERNACK	PE7087-10	A009	08-08-18
Attenuator	PASTERNACK	PE7087-10	A001	08-08-18
Attenuator	PASTERNACK	PE7087-10	A008	08-08-18
Attenuator	PASTERNACK	PE7087-10	2	08-10-18
Attenuator	PASTERNACK	PE7395-10	A011	02-12-19
Antenna, Loop, 9kHz-30MHz	R&S	HFH2-Z2	100418	10-26-19
Temperature Chamber	ESPEC	SH-642	93001109	08-08-18
UL Software				
Description	**Manufacturer**	**Model**	**Version**	
Antenna port test software	UL	CLT	Ver 2.4	

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7. SUMMARY TABLE

FCC Part Section	Test Description	Test Limit	Test Condition	Test Result
2.1049	Occupied Band width (99%)	N/A	Conducted	Pass
22.917(a) 24.238(a)	Band Edge / Conducted Spurious Emission	-13dBm		Pass
27.53(m)	Conducted Spurious Emission	-25 dBm		Pass
27.53(m)	Emission mask	Section 9.2.2		Pass
2.1046	Conducted output power	N/A		See the RF exposure test report. (4788468750-S1 FCC Report SAR)
22.355 24.235 27.54	Frequency Stability	2.5PPM		Pass
22.913(a)(2)	Effective Radiated Power	38.5 dBm	Radiated	Pass
24.232(c) 27.50(h)(2)	Equivalent Isotropic Radiated Power	33dBm		Pass
22.917(a) 24.238(a)	Radiated Spurious Emission	-13dBm		Pass
27.53 (m)		-25dBm		Pass

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FCC Rule Part	Frequency Range [MHz]	Output Power [W]	Frequency Tolerance	Emission Designator	Emission Bandwidth [MHz]	Communication Type
GSM						
22H	824.2 - 848.8	0.560	2.5 ppm	247KGXW		GSM850
22H	824.2 - 848.8	0.120	2.5 ppm	253KG7W		EDGE850
24E	1850.2 - 1909.8	0.413	2.5 ppm	247KGXW		GSM1900
24E	1850.2 - 1909.8	0.132	2.5 ppm	248KG7W		EDGE1900
WCDMA						
22H	826.4 - 846.6	0.062	2.5 ppm	4M14F9W		WCDMA B5
24E	1852.4 - 1907.6	0.086	2.5 ppm	4M16F9W		WCDMA B2
LTE Band 5						
22H	829.0 - 844.0	0.082	2.5 ppm	8M96G7W	10	QPSK
22H	829.0 - 844.0	0.063	2.5 ppm	8M97D7W	10	16QAM
LTE Band 41						
27M	2506.0 - 2680.0	0.139	2.5 ppm	17M9G7W	20	QPSK
27M	2506.0 - 2680.0	0.155	2.5 ppm	17M9D7W	20	16QAM
27M	2503.5 - 2682.5	0.179	2.5 ppm	13M4G7W	15	QPSK
27M	2501.0 - 2685.0	0.192	2.5 ppm	8M97D7W	10	16QAM

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8. PEAK TO AVERAGE RATIO

Test Procedure

Per KDB 971168 D01 Power Meas License Digital Systems v03r01;

The transmitter output was connected to a CMW500 Test Set and configured to operate at maximum power. The PAR were measured on the Spectrum Analyzer.

Test Spec

In addition, when the transmitter power is measured in terms of average value, the peak-to-average ratio of the power shall not exceed 13 dB.

8.1. CONDUCTED PEAK TO AVERAGE RESULT

GSM

Band	Channel	f [MHz]	Mode	Ratio [dB]	Limit [dB]
GSM850	190	836.6	GPRS	0.46	13.00
			EGPRS	3.40	
GSM1900	661	1880.0	GPRS	0.35	
			EGPRS	3.48	

WCDMA

Band	Channel	f [MHz]	Mode	Ratio [dB]	Limit [dB]
Band 5	4183	836.6	REL99	2.93	13.00
			HSDPA	3.09	
Band 2	9400	1880.0	REL99	2.83	
			HSDPA	2.97	

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LTE 5

Band	BW [MHz]	Channel	f [MHz]	Mode	Ratio [dB]	Limit [dB]
Band 5	10	20525	836.5	QPSK	3.42	13.00
				16QAM	4.21	
	5			QPSK	3.42	
				16QAM	4.17	
	3			QPSK	3.44	
				16QAM	4.23	
	1.4			QPSK	3.46	
				16QAM	4.24	

LTE 41

Band	BW [MHz]	Channel	f [MHz]	Mode	Ratio [dB]	Limit [dB]
Band 41	20	40620	2593	QPSK	4.64	13.00
				16QAM	6.10	
	15			QPSK	5.32	
				16QAM	6.09	
	10			QPSK	4.71	
				16QAM	6.12	
	5			QPSK	5.31	
				16QAM	5.89	

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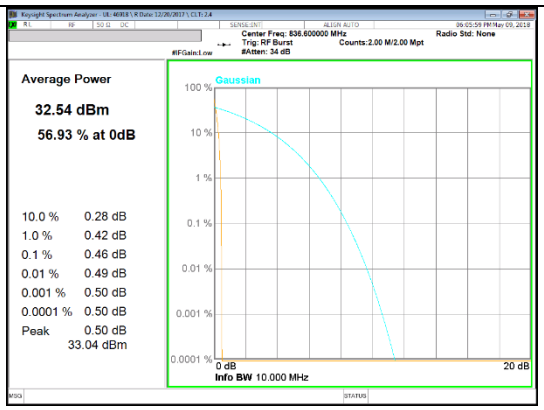
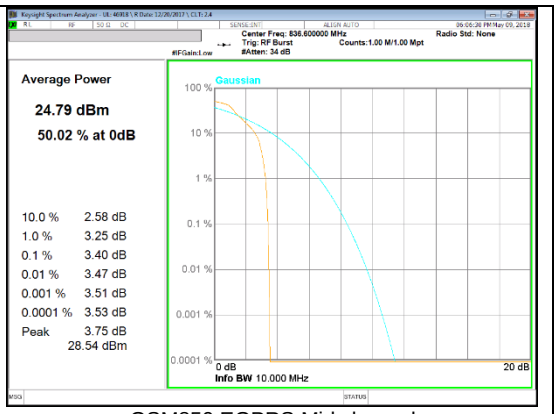
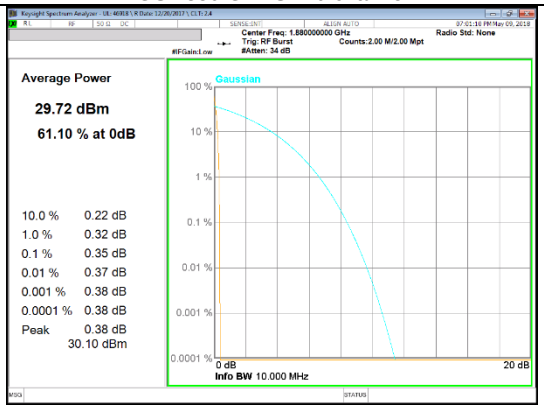
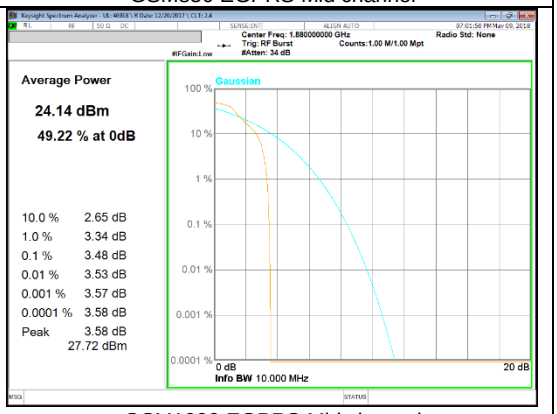
8.2. CONDUCTED PEAK TO AVERAGE PLOTS

GSM

GSM 850	 GSM850 GPRS Mid channel	 GSM850 EGPRS Mid channel
GSM 1900	 GSM1900 GPRS Mid channel	 GSM1900 EGPRS Mid channel

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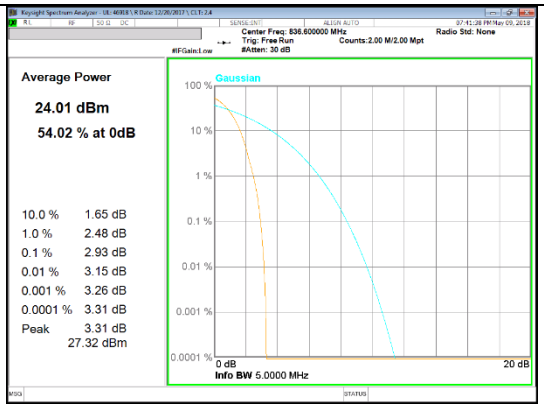
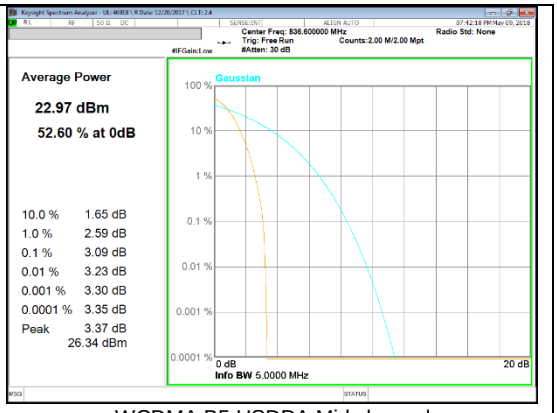
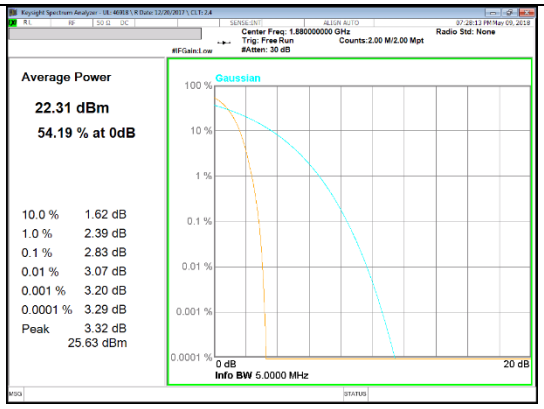
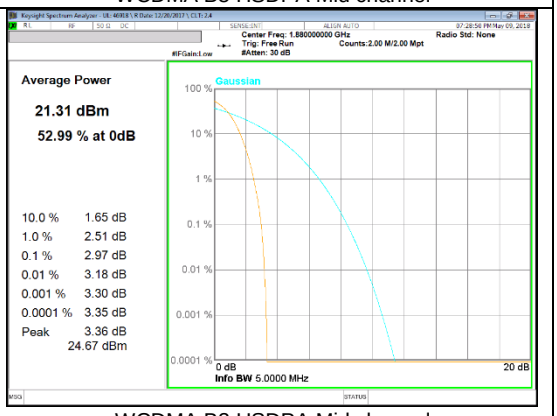
WCDMA

WCDMA Band 5	 WCDMA B5 REL99 Mid channel	 WCDMA B5 HSDPA Mid channel
WCDMA Band 2	 WCDMA B2 REL99 Mid channel	 WCDMA B2 HSDPA Mid channel

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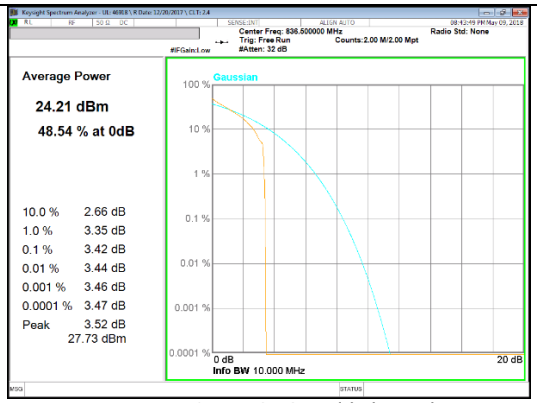
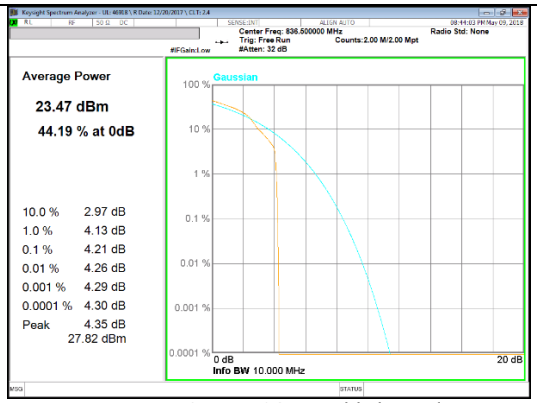
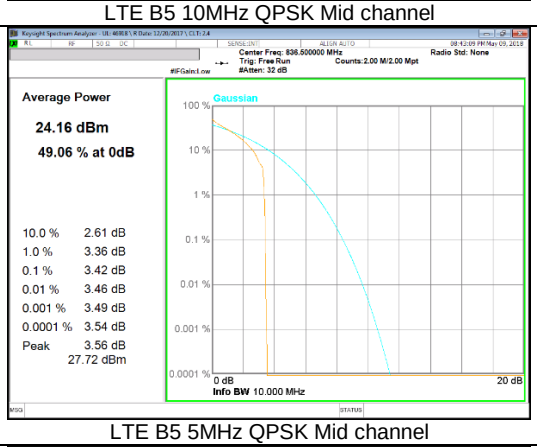
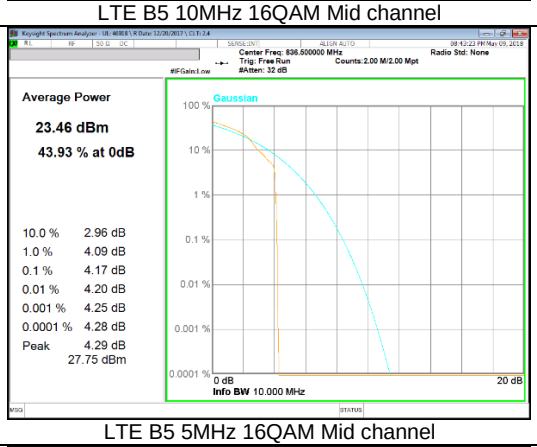
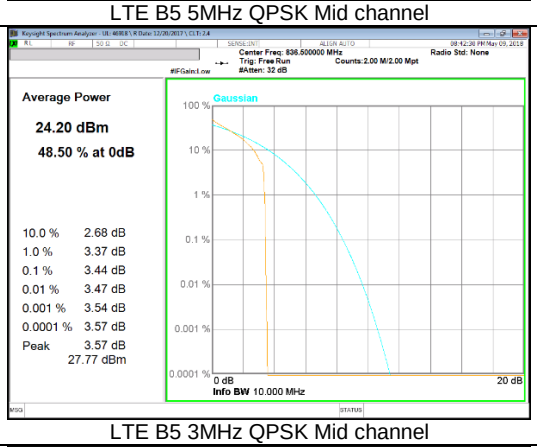
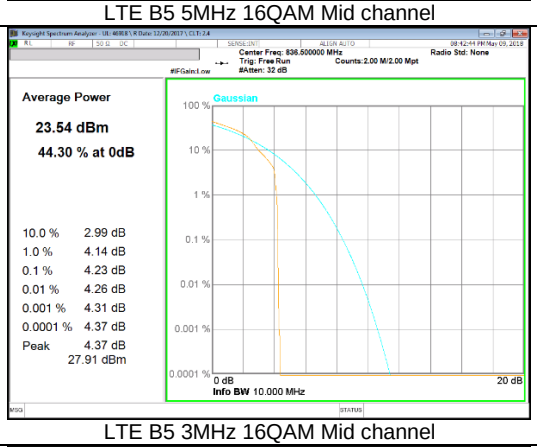
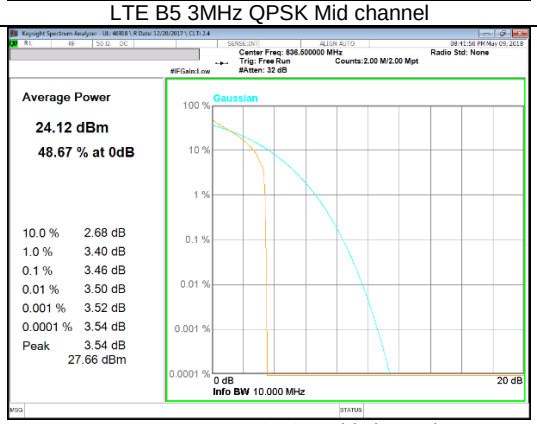
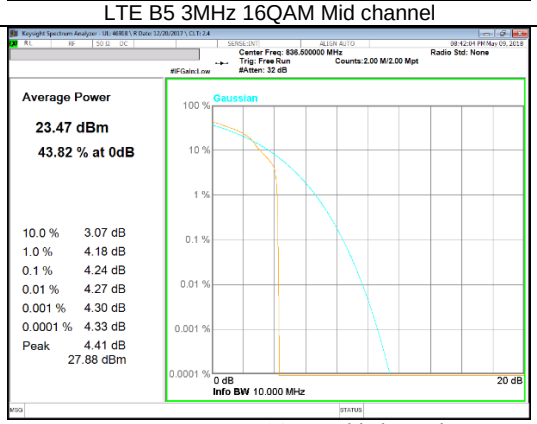
LTE Band 5

LTE Band 5 10 MHz	 LTE B5 10MHz QPSK Mid channel	 LTE B5 10MHz 16QAM Mid channel
LTE Band 5 5 MHz	 LTE B5 5MHz QPSK Mid channel	 LTE B5 5MHz 16QAM Mid channel
LTE Band 5 3 MHz	 LTE B5 3MHz QPSK Mid channel	 LTE B5 3MHz 16QAM Mid channel
LTE Band 5 1.4 MHz	 LTE B5 1.4MHz QPSK Mid channel	 LTE B5 1.4MHz 16QAM Mid channel

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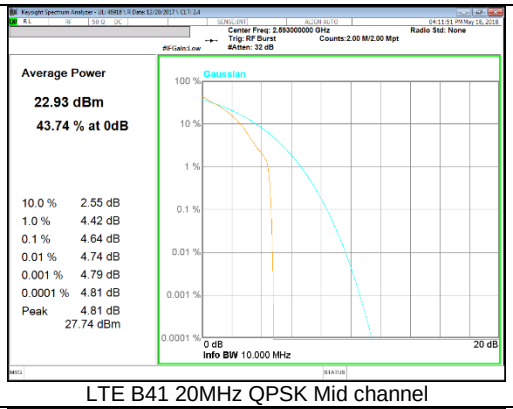
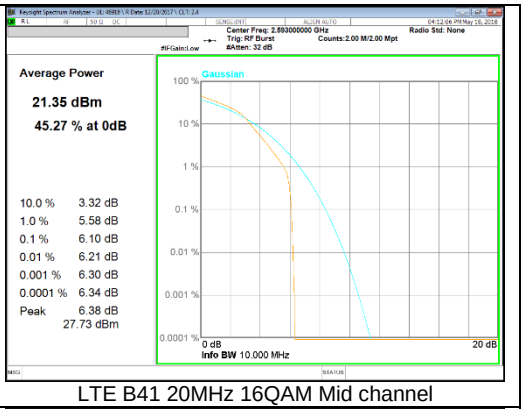
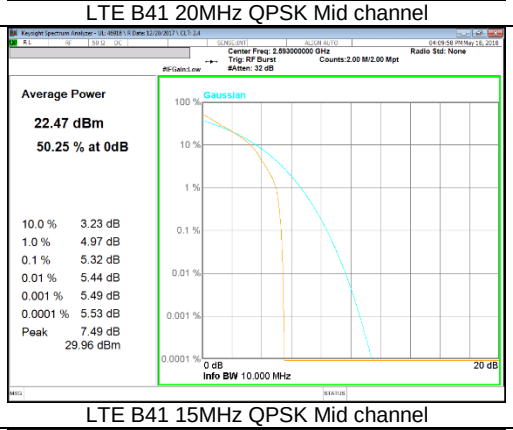
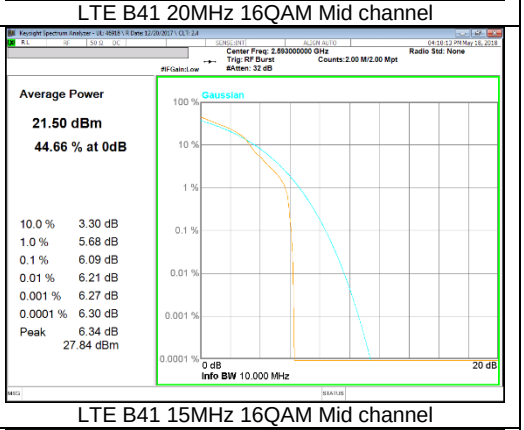
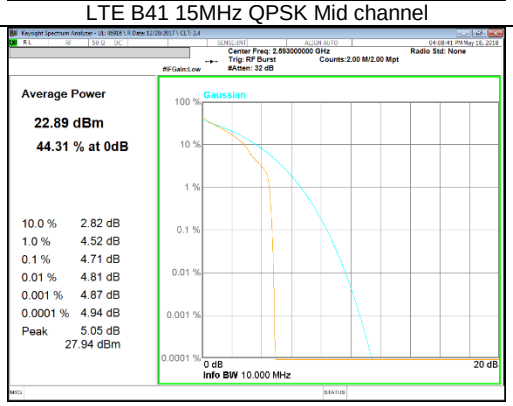
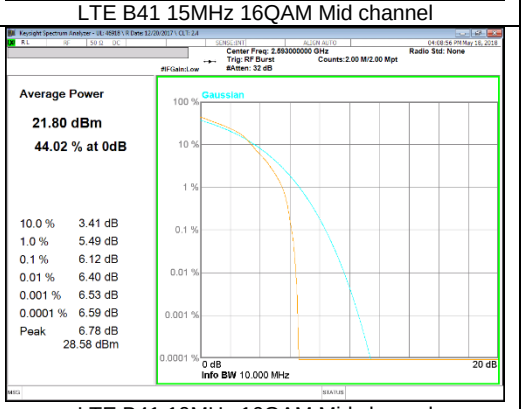
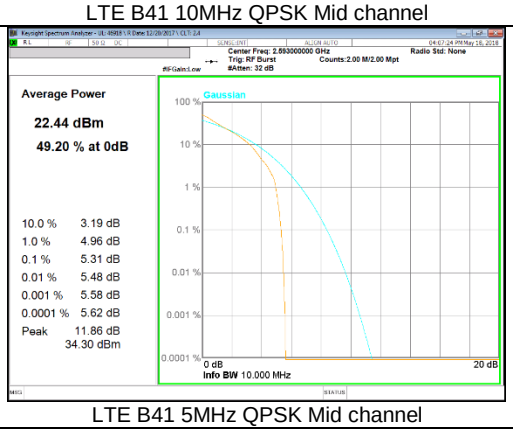
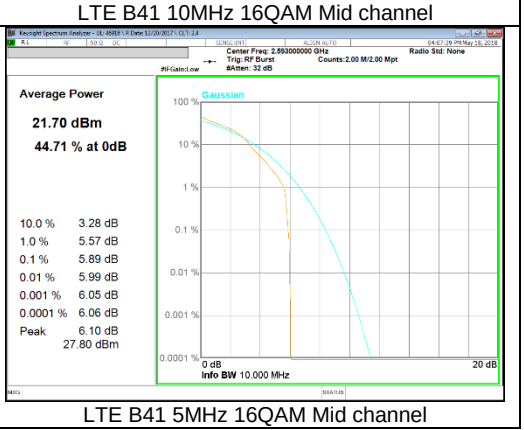
LTE Band 41

LTE Band 41 20 MHz	 LTE B41 20MHz QPSK Mid channel	 LTE B41 20MHz 16QAM Mid channel
LTE Band 41 15 MHz	 LTE B41 15MHz QPSK Mid channel	 LTE B41 15MHz 16QAM Mid channel
LTE Band 41 10 MHz	 LTE B41 10MHz QPSK Mid channel	 LTE B41 10MHz 16QAM Mid channel
LTE Band 41 5 MHz	 LTE B41 5MHz QPSK Mid channel	 LTE B41 5MHz 16QAM Mid channel

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9. LIMITS AND CONDUCTED RESULTS

9.1. OCCUPIED BANDWIDTH

RULE PART(S)

FCC: §2.1049

LIMITS

For reporting purposes only

TEST PROCEDURE

The transmitter output was connected to a calibrated coaxial cable and coupler, the other end of which was connected to a spectrum analyzer. The occupied bandwidth was measured with the spectrum analyzer at the low, middle and high channel in each band. The -26dB bandwidth was also measured and recorded.

(KDB 971168 D01 Power Meas License Digital Systems v03r01)

9.1.1. OCCUPIED BANDWIDTH RESULTS

GSM

Band	Mode	Channel	f [MHz]	99% BW [KHz]	26dB BW [KHz]
GSM850	GPRS	128	824.2	246.89	321.6
		190	836.6	244.07	307.4
		251	848.8	247.27	313.2
	EGPRS	128	1850.2	253.01	318.7
		190	1880.0	251.36	314.3
		251	1909.8	233.67	290.2
GSM1900	GPRS	512	1850.2	243.41	321.1
		661	1880.0	242.62	319.9
		810	1909.8	246.91	319.7
	EGPRS	512	1850.2	247.78	310.9
		661	1880.0	241.26	310.3
		810	1909.8	229.61	293.3

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WCDMA

Band	Mode	Channel	f [MHz]	99% BW [MHz]	26dB BW [MHz]
Band 5	REL99	4132	826.4	4.1325	4.681
		4183	836.6	4.1367	4.674
		4233	846.6	4.1326	4.691
	HSDPA	4132	826.4	4.1225	4.689
		4183	836.6	4.1369	4.671
		4233	846.6	4.1267	4.657
Band 2	REL99	9262	1852.4	4.1366	4.709
		9400	1880.0	4.1411	4.707
		9538	1907.6	4.1558	4.701
	HSDPA	9262	1852.4	4.1353	4.681
		9400	1880.0	4.1492	4.673
		9538	1907.6	4.1524	4.697

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LTE Band 5

Band	BW [MHz]	Channel	f [MHz]	Mode	99% BW [MHz]	26dB BW [MHz]
Band 5	10	20450	829.0	QPSK	8.9365	9.859
				16QAM	8.9279	9.836
		20524	836.5	QPSK	8.9568	9.822
				16QAM	8.9537	9.798
		20599	844.0	QPSK	8.9431	9.818
				16QAM	8.9668	9.814
	5	20425	826.5	QPSK	4.5044	4.958
				16QAM	4.4874	4.950
		20524	836.5	QPSK	4.4890	4.948
				16QAM	4.4902	4.948
		20624	846.5	QPSK	4.4869	4.926
				16QAM	4.4795	4.920
	3	20415	825.5	QPSK	2.6889	2.976
				16QAM	2.6917	2.958
		20524	836.5	QPSK	2.6940	2.976
				16QAM	2.6938	2.978
		20634	847.5	QPSK	2.6928	2.958
				16QAM	2.6849	2.974
	1.4	20407	824.7	QPSK	1.0947	1.299
				16QAM	1.0847	1.273
		20524	836.5	QPSK	1.0839	1.278
				16QAM	1.0841	1.273
		20624	848.3	QPSK	1.0897	1.311
				16QAM	1.0949	1.299

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LTE Band 41

Band	BW [MHz]	Channel	f [MHz]	Mode	99% BW [MHz]	26dB BW [MHz]
Band 41	20	35970	2506.0	QPSK	17.877	20.29
				16QAM	17.852	19.10
		40620	2593.0	QPSK	17.900	19.44
				16QAM	17.885	19.21
		41490	2680.0	QPSK	17.858	19.55
				16QAM	17.843	19.41
	15	39725	2503.5	QPSK	13.409	14.58
				16QAM	13.412	14.55
		40620	2593.0	QPSK	13.423	14.58
				16QAM	13.446	14.78
		41515	2682.5	QPSK	13.427	14.64
				16QAM	13.435	15.15
	10	39700	2501.0	QPSK	8.9711	10.18
				16QAM	8.9588	9.963
		40620	2593.0	QPSK	8.9445	9.789
				16QAM	8.9714	9.720
		41540	2685.0	QPSK	8.9460	9.824
				16QAM	8.9459	9.792
	5	39675	2498.5	QPSK	4.4854	4.971
				16QAM	4.4792	4.962
		40620	2593.0	QPSK	4.4925	5.065
				16QAM	4.4806	4.925
		41565	2687.5	QPSK	4.4997	5.120
				16QAM	4.4922	4.950

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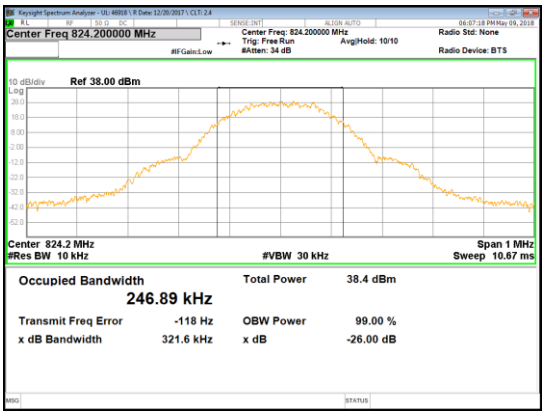
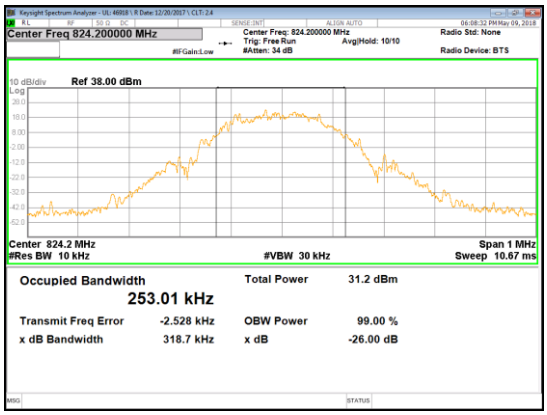
9.1.2. OCCUPIED BANDWIDTH PLOTS

GSM 850

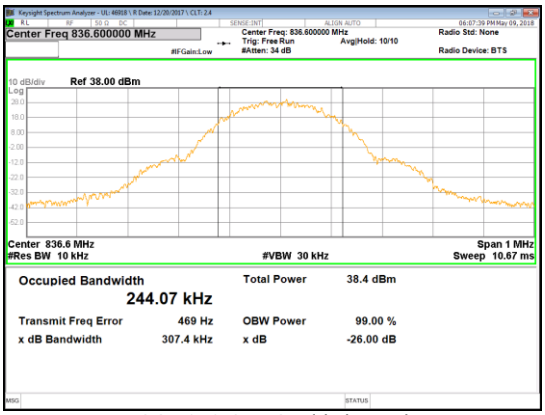
GSM 850



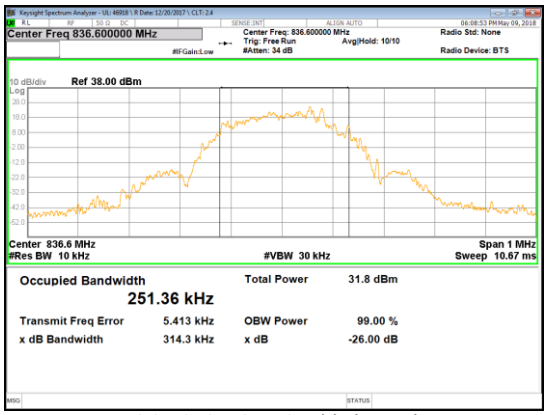
GSM850 GPRS Low channel



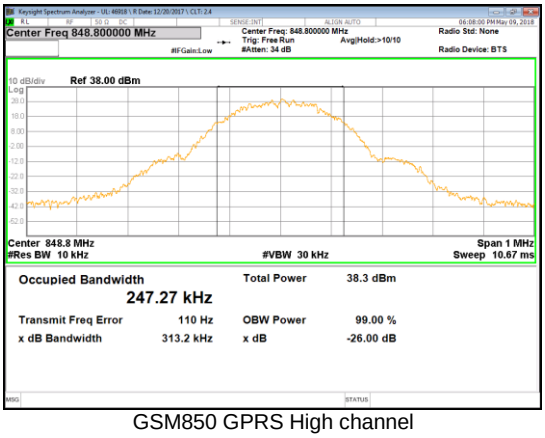
GSM850 EGPRS Low channel



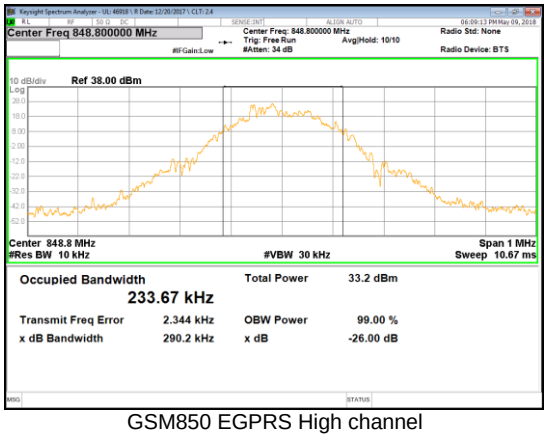
GSM850 GPRS Mid channel



GSM850 EGPRS Mid channel



GSM850 GPRS High channel



GSM850 EGPRS High channel

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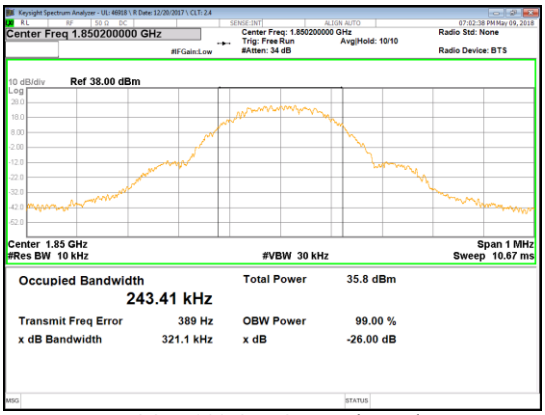
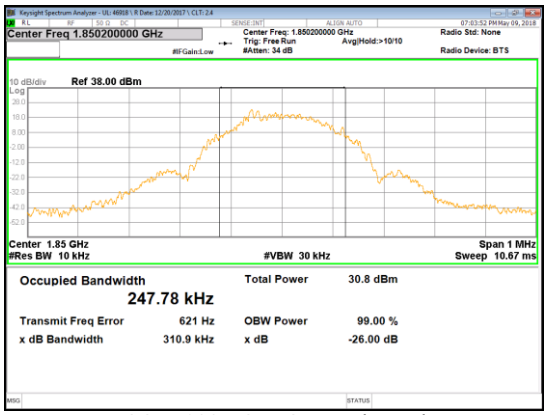
GSM 1900

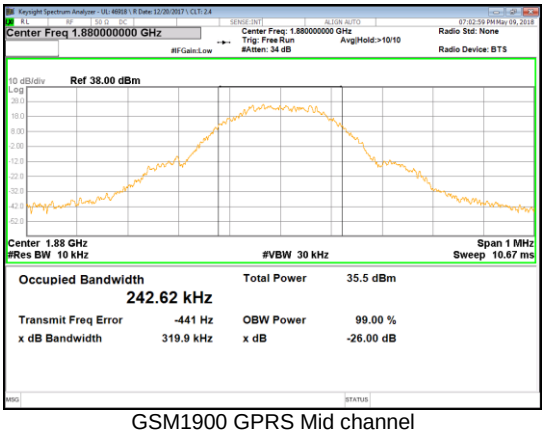
GSM 1900



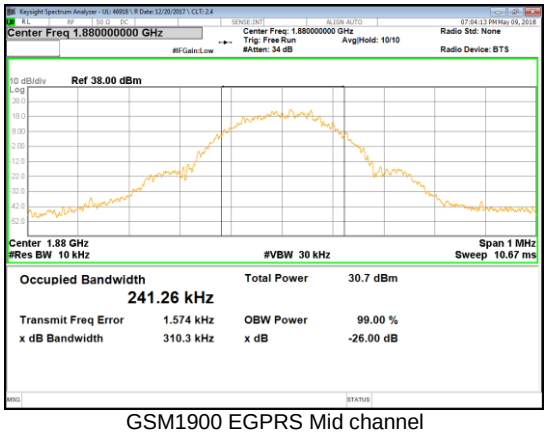
GSM1900 GPRS Low channel



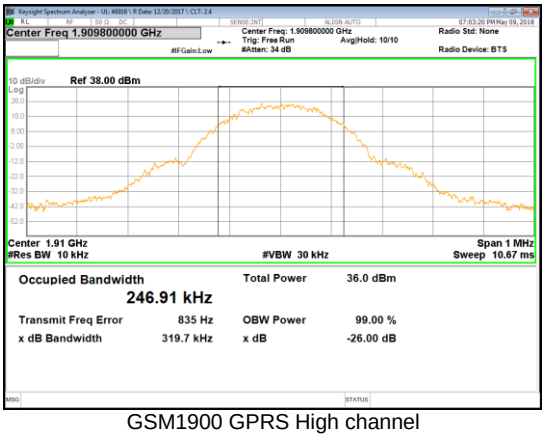
GSM1900 EGPRS Low channel



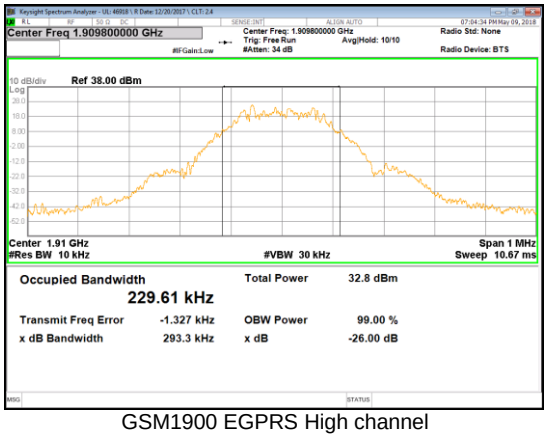
GSM1900 GPRS Mid channel



GSM1900 EGPRS Mid channel



GSM1900 GPRS High channel



GSM1900 EGPRS High channel

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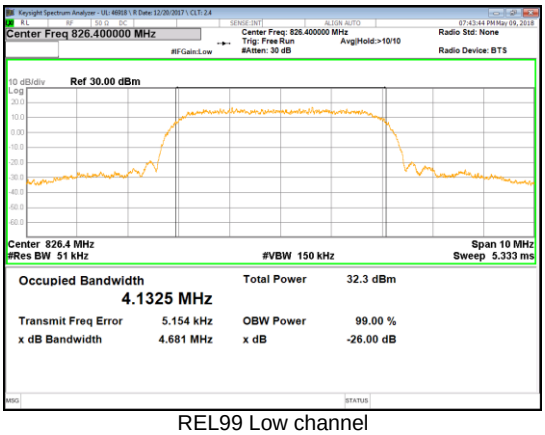
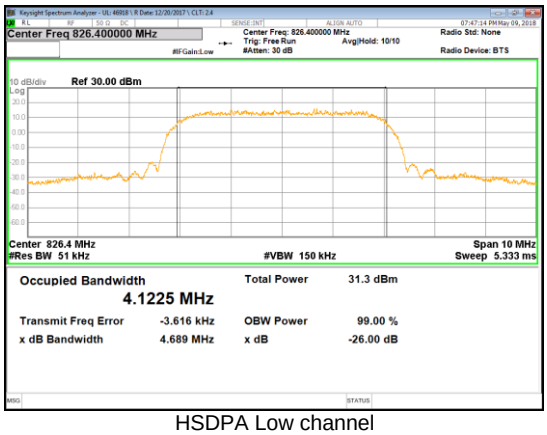
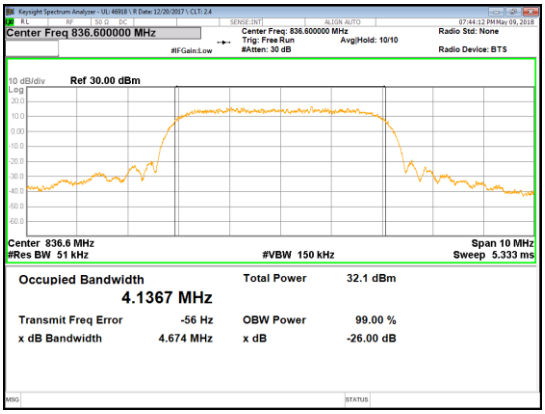
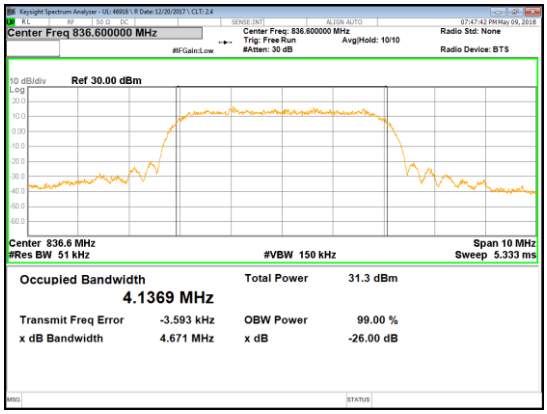
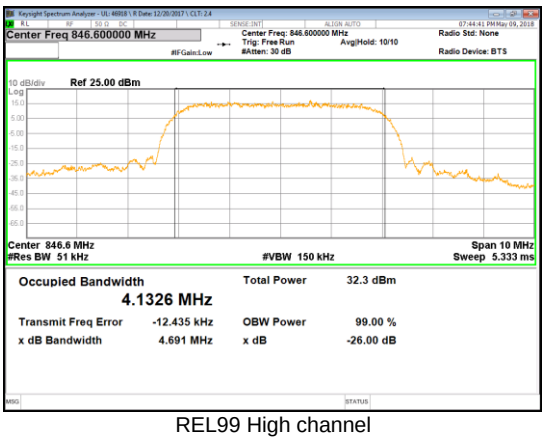
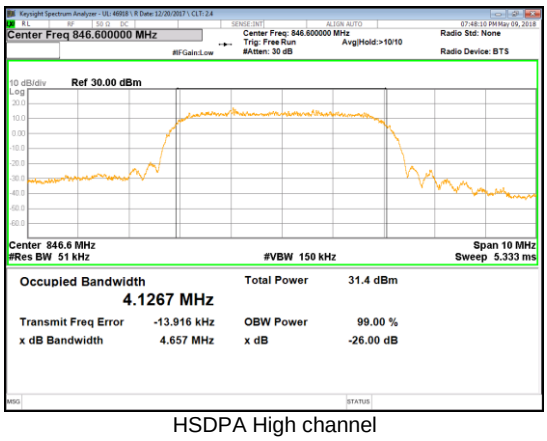
WCDMA Band 5

Band 5	 REL99 Low channel	 HSDPA Low channel
	 REL99 Mid channel	 HSDPA Mid channel
	 REL99 High channel	 HSDPA High channel

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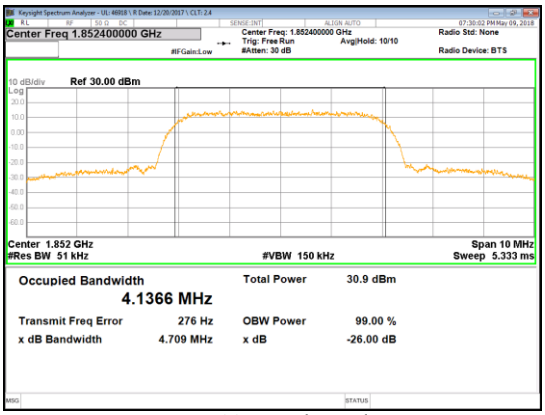
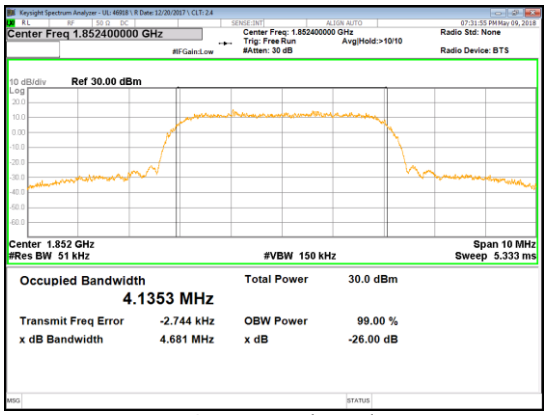
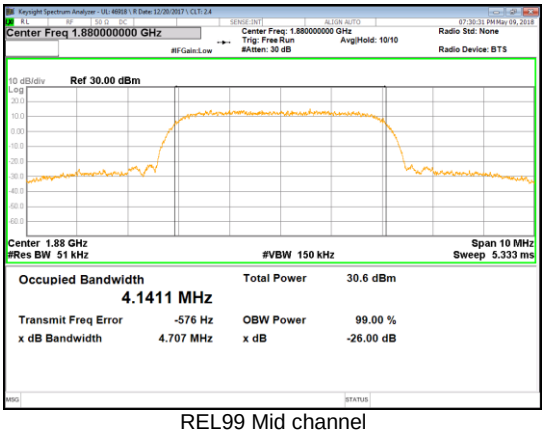
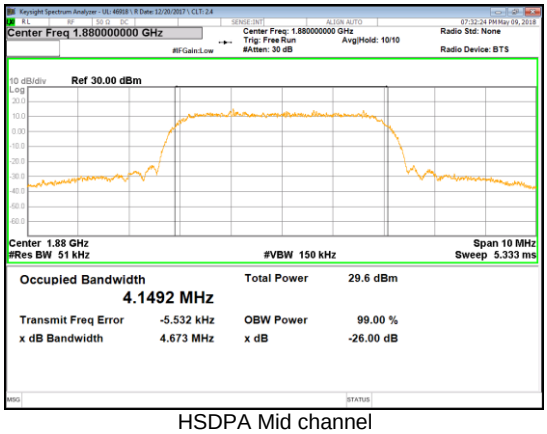
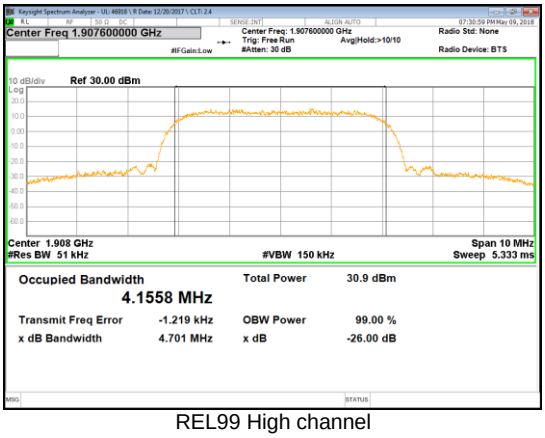
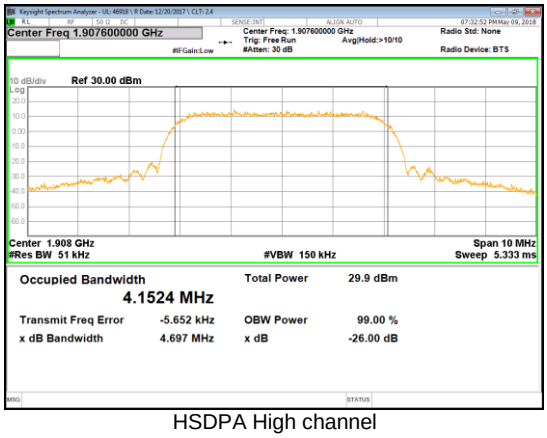
WCDMA Band 2

Band 2	 REL99 Low channel	 HSDPA Low channel
	 REL99 Mid channel	 HSDPA Mid channel
	 REL99 High channel	 HSDPA High channel

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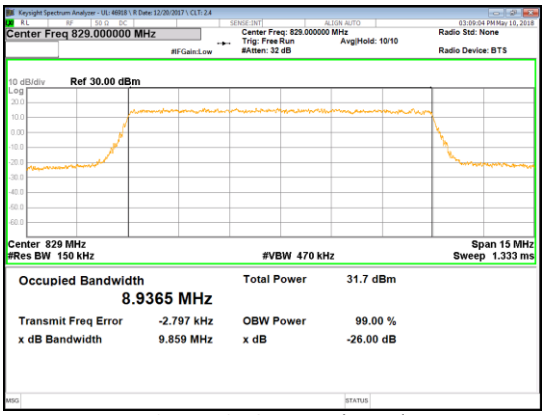
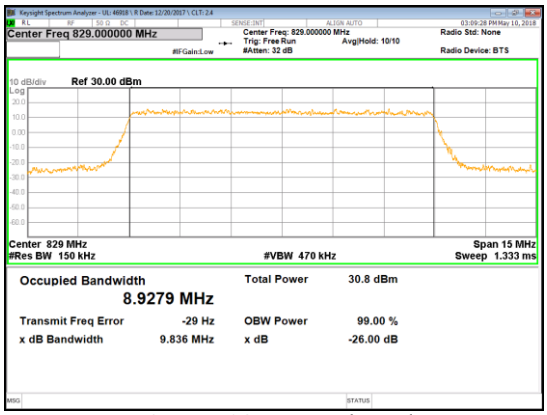
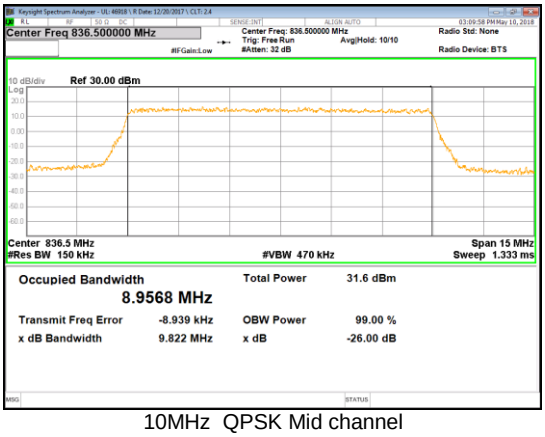
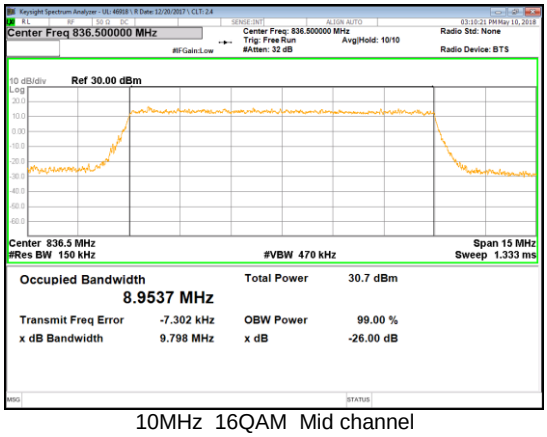
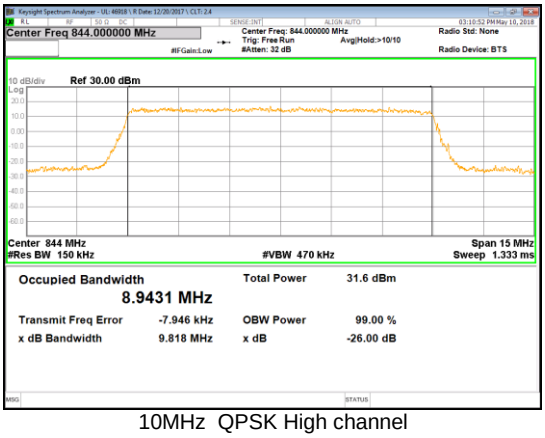
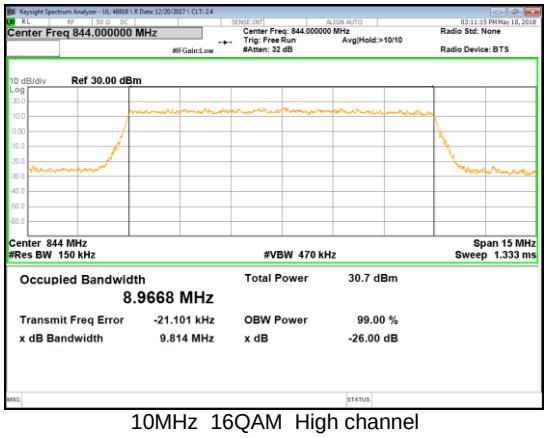
LTE Band 5

Band 5 10MHz	 10MHz QPSK Low channel	 10MHz 16QAM Low channel
	 10MHz QPSK Mid channel	 10MHz 16QAM Mid channel
	 10MHz QPSK High channel	 10MHz 16QAM High channel

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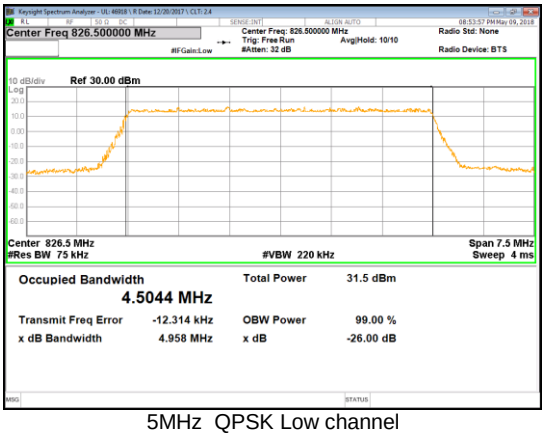
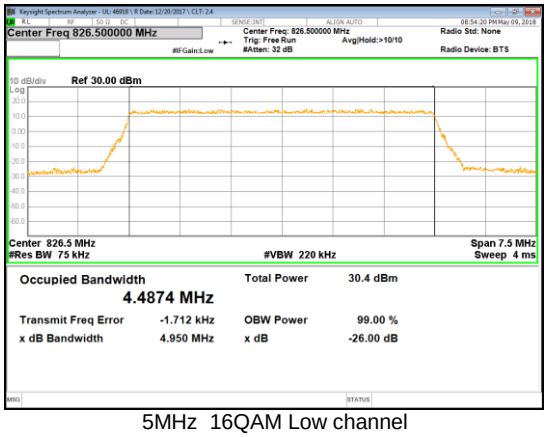
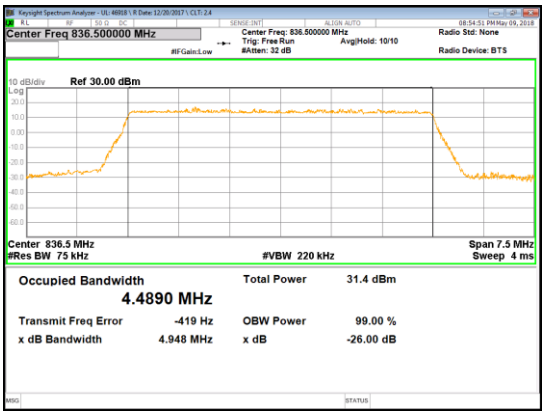
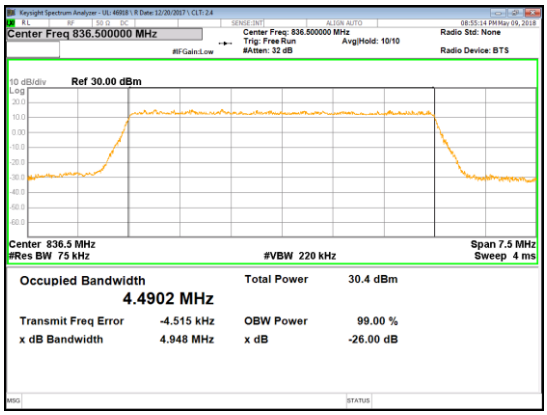
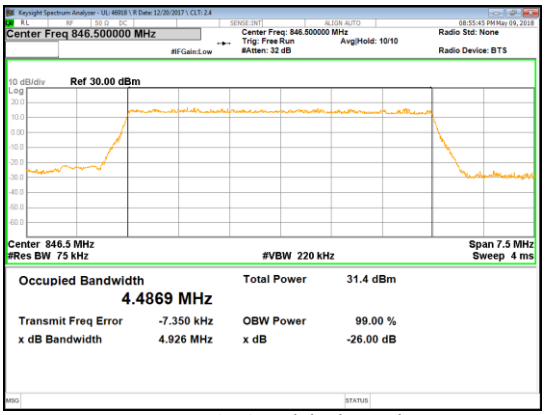
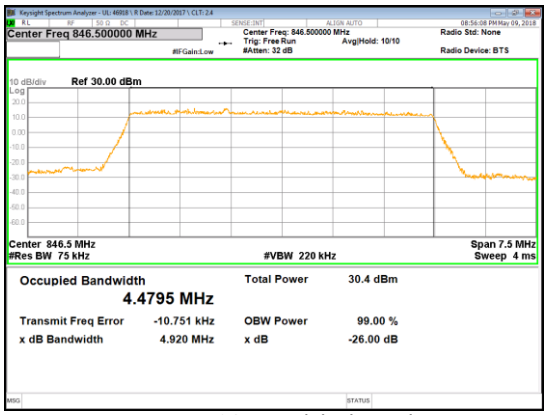
Band 5 5MHz	 5MHz QPSK Low channel	 5MHz 16QAM Low channel
	 5MHz QPSK Mid channel	 5MHz 16QAM Mid channel
	 5MHz QPSK High channel	 5MHz 16QAM High channel

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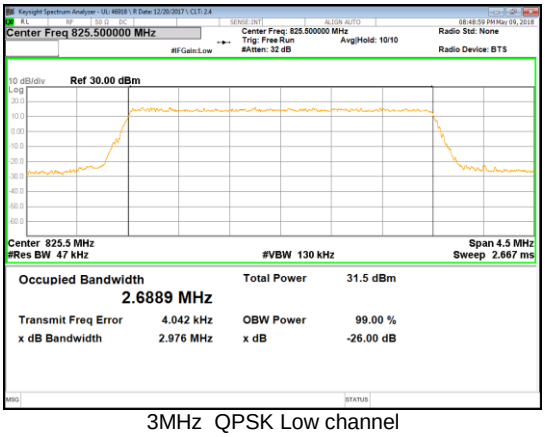
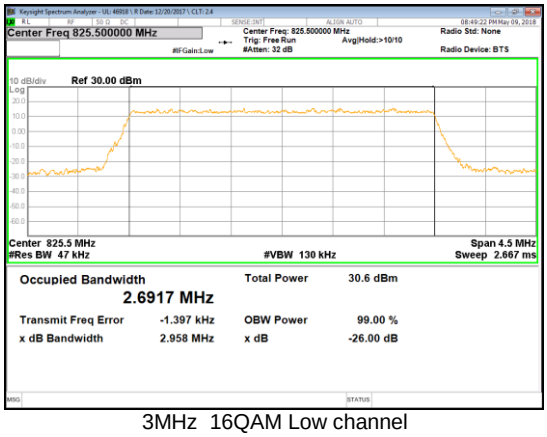
Band 5

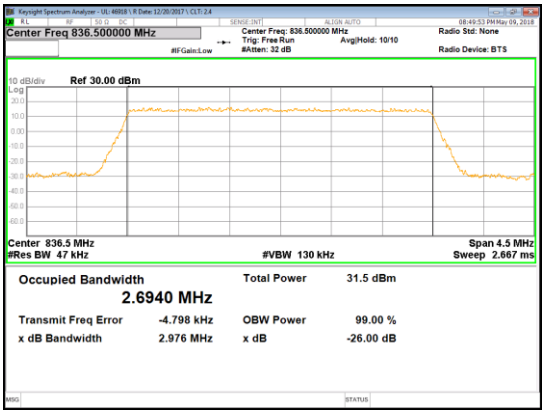
3MHz



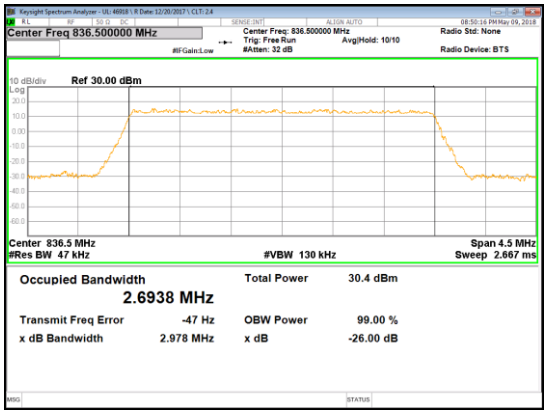
3MHz QPSK Low channel



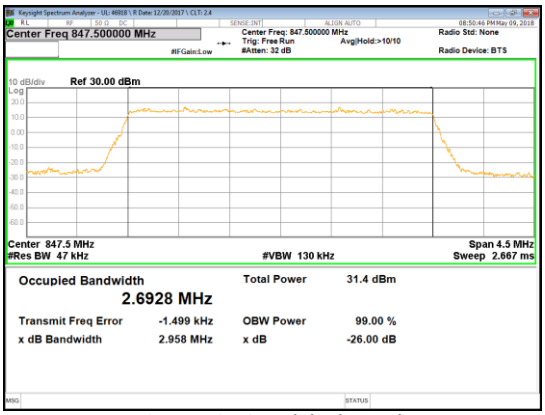
3MHz 16QAM Low channel



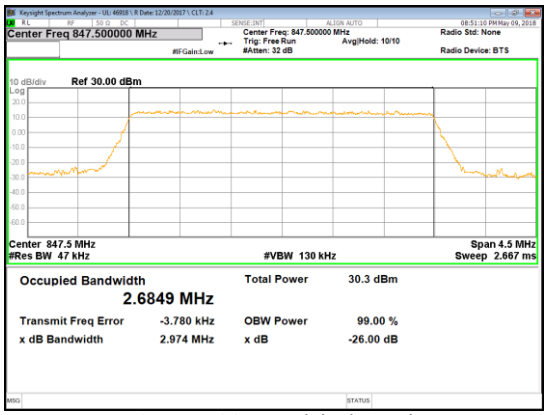
3MHz QPSK Mid channel



3MHz 16QAM Mid channel



3MHz QPSK High channel



3MHz 16QAM High channel

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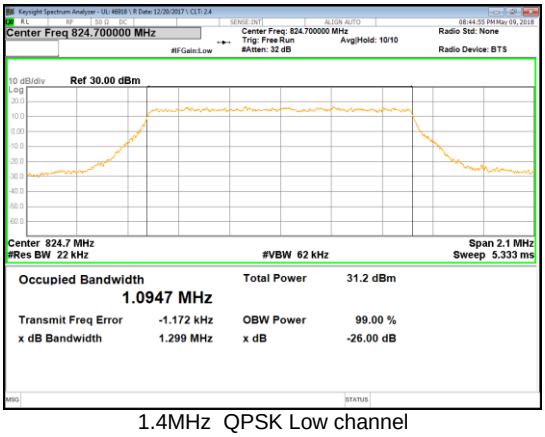
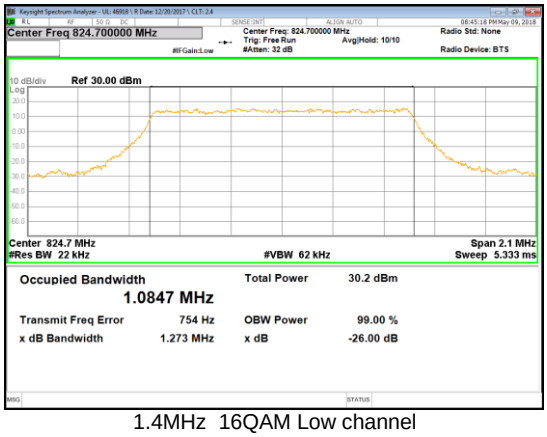
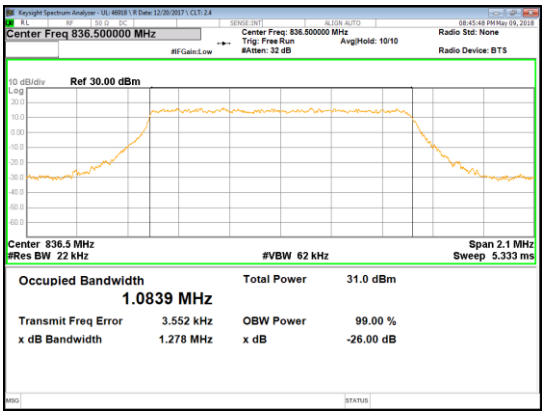
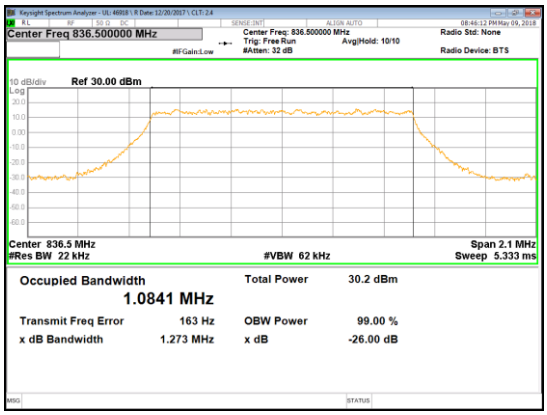
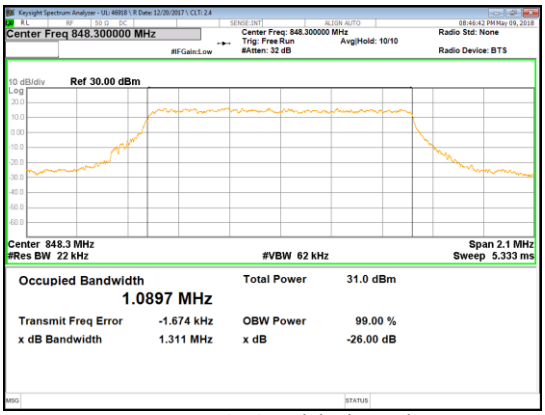
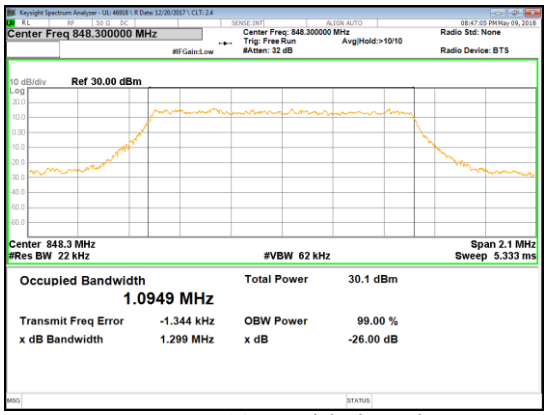
Band 5 1.4MHz	 1.4MHz QPSK Low channel	 1.4MHz 16QAM Low channel
	 1.4MHz QPSK Mid channel	 1.4MHz 16QAM Mid channel
	 1.4MHz QPSK High channel	 1.4MHz 16QAM High channel

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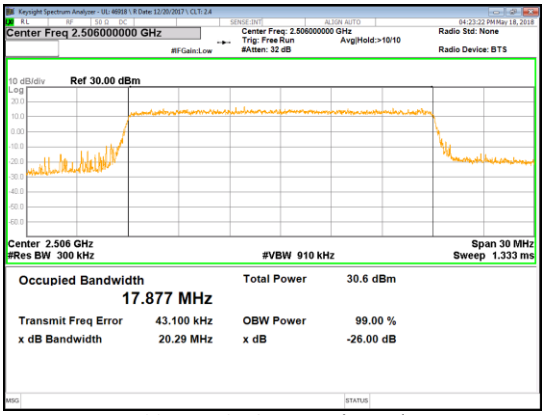
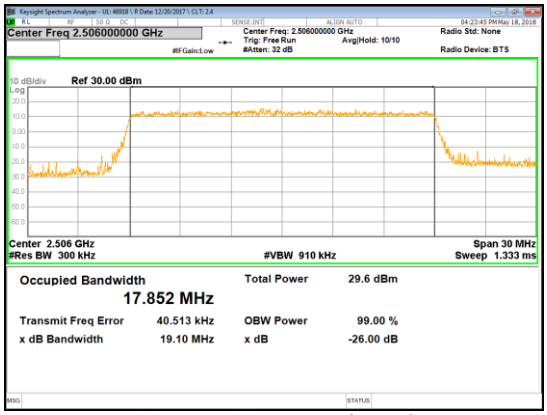
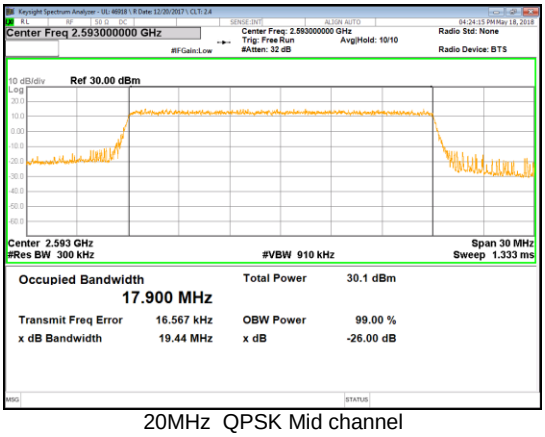
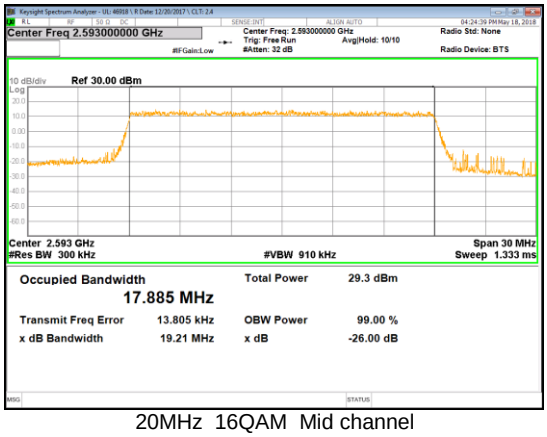
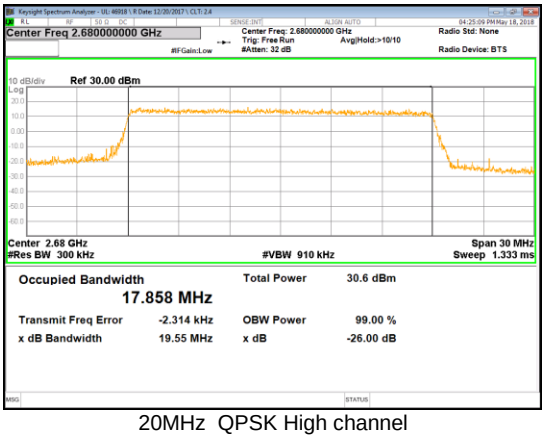
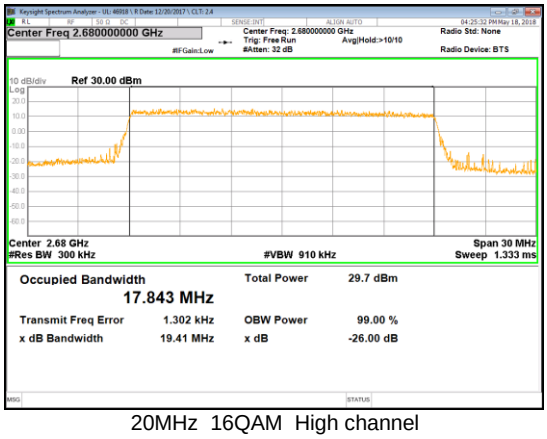
LTE Band 41

Band 41 20MHz	 20MHz QPSK Low channel	 20MHz 16QAM Low channel
	 20MHz QPSK Mid channel	 20MHz 16QAM Mid channel
	 20MHz QPSK High channel	 20MHz 16QAM High channel

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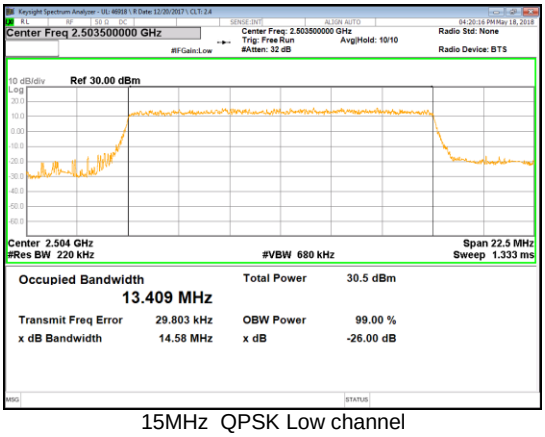
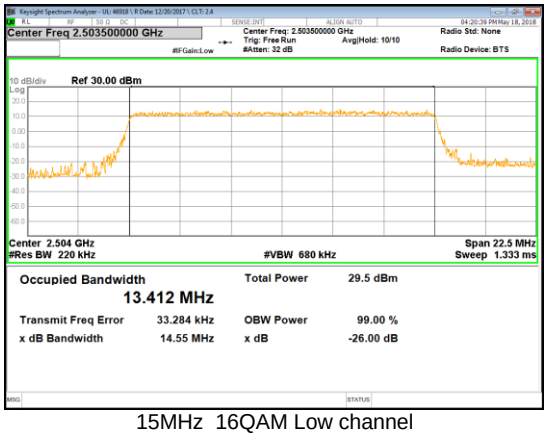
Band 41

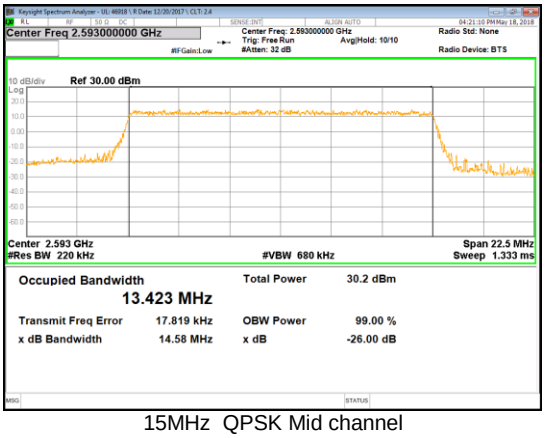
15MHz



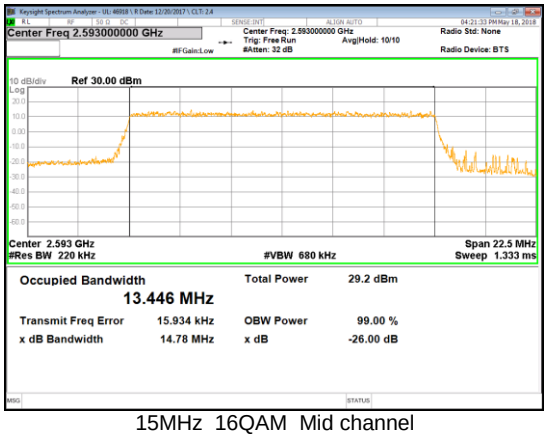
15MHz QPSK Low channel



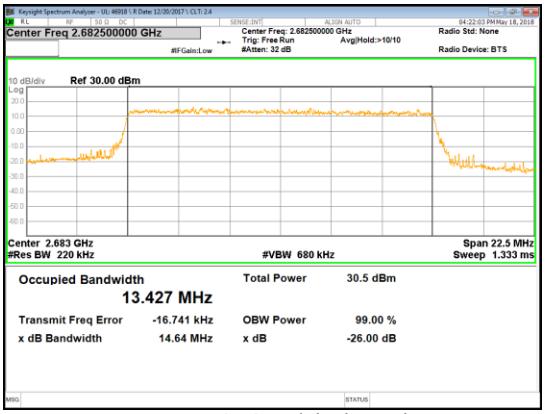
15MHz 16QAM Low channel



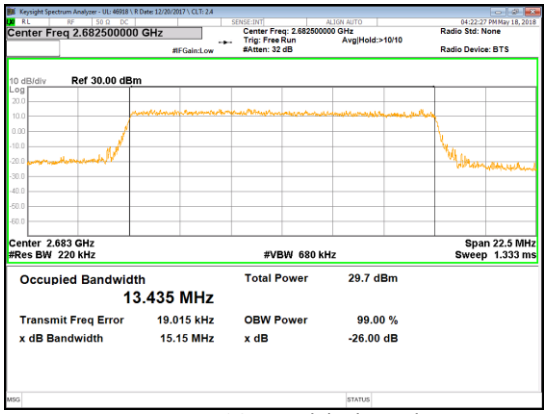
15MHz QPSK Mid channel



15MHz 16QAM Mid channel



15MHz QPSK High channel



15MHz 16QAM High channel

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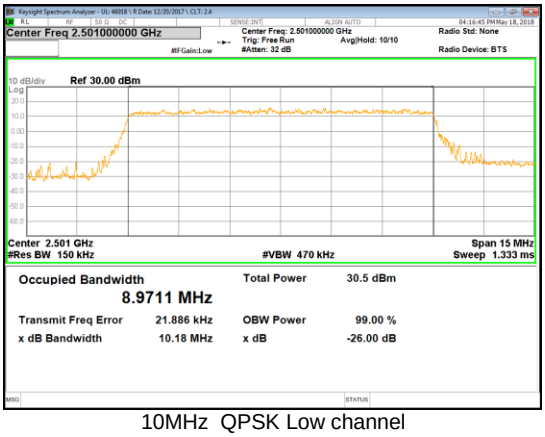
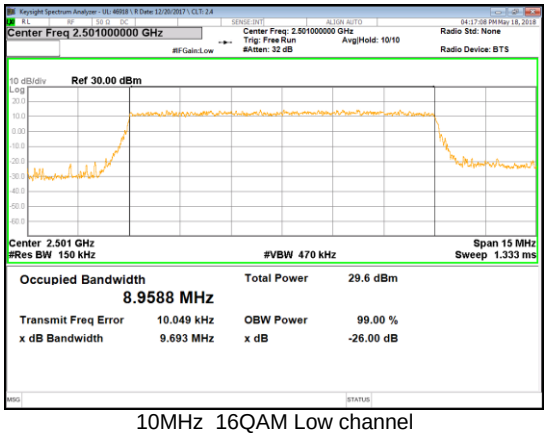
Band 41

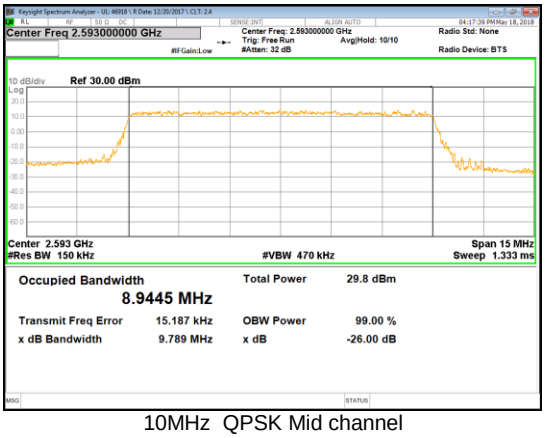
10MHz



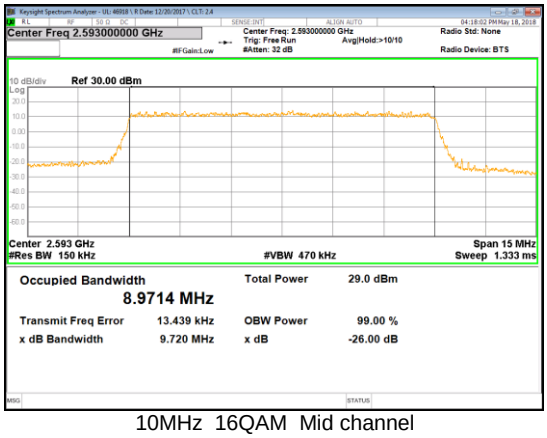
10MHz QPSK Low channel



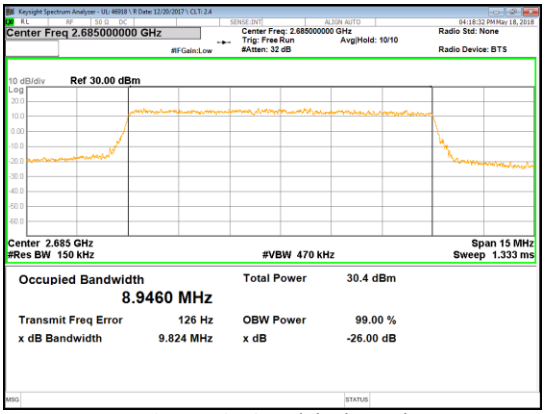
10MHz 16QAM Low channel



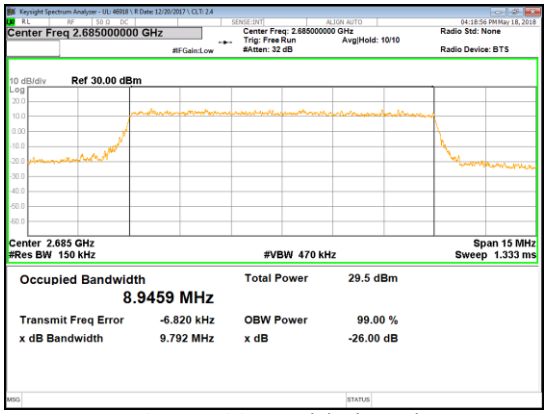
10MHz QPSK Mid channel



10MHz 16QAM Mid channel



10MHz QPSK High channel



10MHz 16QAM High channel

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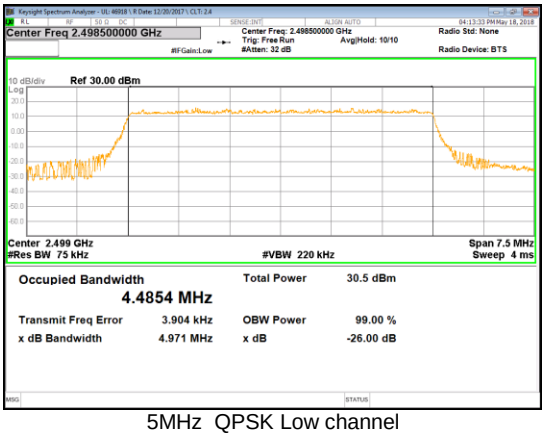
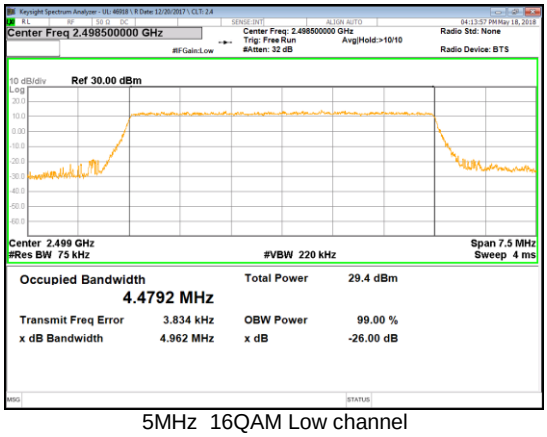
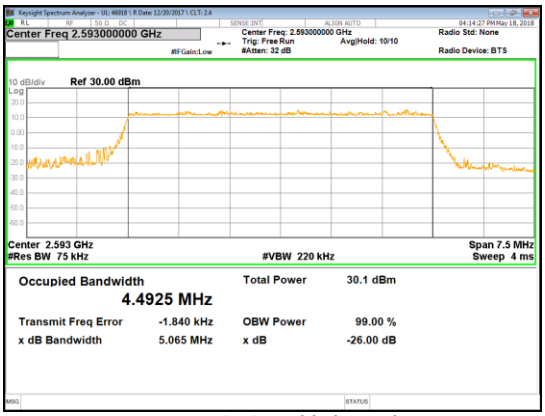
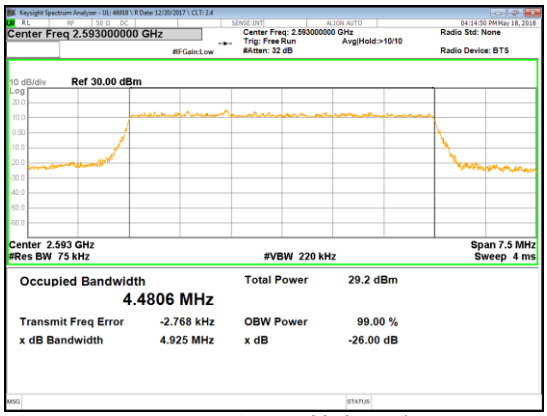
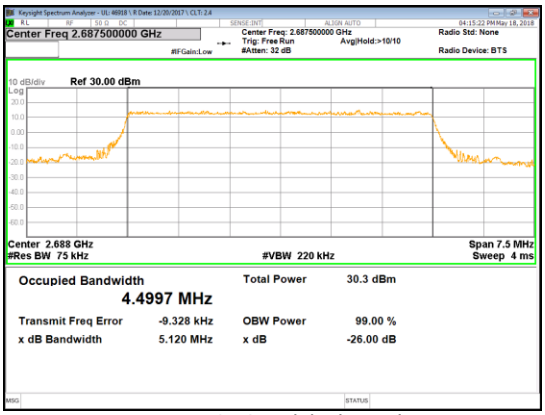
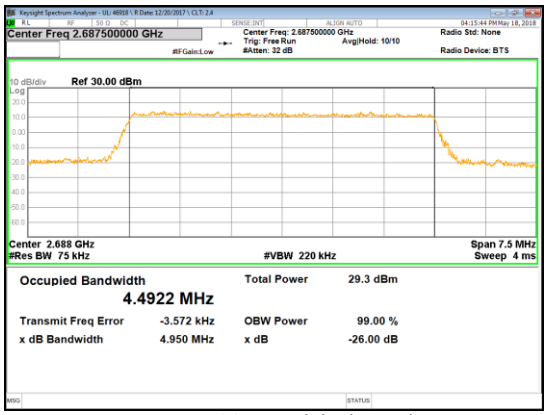
Band 41 5MHz	 5MHz QPSK Low channel	 5MHz 16QAM Low channel
	 5MHz QPSK Mid channel	 5MHz 16QAM Mid channel
	 5MHz QPSK High channel	 5MHz 16QAM High channel

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9.2. BAND EDGE EMISSIONS

RULE PART(S)

FCC: §22.359, §24.238, §27.53

LIMITS

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.

Part 27.53(m) For mobile digital stations, the attenuation factor shall be not less than 40 + 10 log (P) dB on all frequencies between the channel edge and 5 megahertz from the channel edge, 43 + 10 log (P) dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and 55 + 10 log (P) dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(6) of this section. In addition, the attenuation factor shall not be less that 43 + 10 log (P) dB on all frequencies between 2490.5 MHz and 2496 MHz and 55 + 10 log (P) dB at or below 2490.5 MHz. Mobile Satellite Service licensees operating on frequencies below 2495 MHz may also submit a documented interference complaint against BRS licensees operating on channel BRS Channel 1 on the same terms and conditions as adjacent channel BRS or EBS licensees.

TEST PROCEDURE

Per KDB 971168 D01 Power Meas License Digital Systems v03r01
The transmitter output was connected to a CMW500 Test Set and configured to operate at maximum power. The band edge emissions were measured at the required operating frequencies in each band on the Spectrum Analyzer.

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GSM

a) Set the RBW = 1 ~ 5% of OBW(GSM850 – 8.2KHz, GSM1900 – 9.1KHz)

b) Set VBW ≥ 3 × RBW;

c) Set span ≥ 1.5 times the OBW;

d) Sweep time = 1S ;

e) Detector = RMS;

f) Ensure that the number of measurement points ≥ 2*Span/RBW;

g) Trace mode = Average(100);

h) Add duty cycle correction factor (9dB)

WCDMA/LTE

b) Set the RBW = 1 ~ 1.5 % of OBW(Typically limited to a minimum RBW of 1% of the OBW)

b) Set VBW ≥ 3 × RBW;

c) Set span ≥ 1.5 times the OBW;

d) Sweep time = Auto;

e) Detector = RMS;

f) Ensure that the number of measurement points ≥ 2*Span/RBW;

g) Trace mode = Average (100);

NOTE1

LTE Band 41 - Duty cycle correction factor(2.25dB) already applied on the plot.

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RESULTS

GSM

Band	Mode	Side	f [MHz]	Level [dBm]	Limit [dBm]
GSM850	GPRS	Lower	823.982	-15.632	-13.00
		Upper	849.023	-15.530	
	EGPRS	Lower	823.987	-25.065	
		Upper	849.023	-22.054	
GSM1900	GPRS	Lower	1849.982	-19.127	
		Upper	1910.023	-18.140	
	EGPRS	Lower	1849.992	-24.347	
		Upper	1910.008	-22.989	

WCDMA

Band	Mode	Side	f [MHz]	Level [dBm]	Limit [dBm]
Band 5	REL99	Lower	824.000	-25.296	-13.00
		Upper	849.000	-26.813	
	HSDPA	Lower	824.000	-29.230	
		Upper	849.000	-28.916	
Band 2	REL99	Lower	1850.000	-24.951	
		Upper	1910.000	-26.284	
	HSDPA	Lower	1850.000	-28.974	
		Upper	1910.000	-28.190	

LTE 41

Please refer to Emission Mask Plots.

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LTE 5

Bandwidth	Mode	Side	RB Status	f [MHz]	Level [dBm]	Limit [dBm]
10 MHz	QPSK	Lower	1RB	824.000	-33.420	-13.00
			FRB	824.000	-28.969	
		Upper	1RB	849.000	-29.234	
			FRB	849.000	-32.337	
	16QAM	Lower	1RB	824.000	-33.556	
			FRB	824.000	-31.558	
		Upper	1RB	849.000	-28.631	
			FRB	849.000	-33.291	
5 MHz	QPSK	Lower	1RB	824.000	-20.251	
			FRB	824.000	-29.145	
		Upper	1RB	849.000	-20.180	
			FRB	849.000	-28.932	
	16QAM	Lower	1RB	824.000	-22.590	
			FRB	824.000	-29.514	
		Upper	1RB	849.000	-19.060	
			FRB	849.000	-30.573	
3 MHz	QPSK	Lower	1RB	824.000	-19.643	
			FRB	824.000	-28.837	
		Upper	1RB	849.000	-19.136	
			FRB	849.000	-27.972	
	16QAM	Lower	1RB	824.000	-20.532	
			FRB	824.000	-29.060	
		Upper	1RB	849.000	-19.598	
			FRB	849.000	-29.491	
1.4 MHz	QPSK	Lower	1RB	824.000	-21.584	
			FRB	824.000	-29.643	
		Upper	1RB	849.000	-21.243	
			FRB	849.000	-29.853	
	16QAM	Lower	1RB	824.000	-23.248	
			FRB	824.000	-30.896	
		Upper	1RB	849.000	-23.964	
			FRB	849.000	-31.294	

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