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

WWAN

CERTIFICATION TEST REPORT

FOR

WCDMA/LTE Tablet + BT/BLE and DTS/UNII a/b/g/n/ac

MODEL NUMBER : SM-W707N0, SM-W708N0, SM-W708

FCC ID: A3LSMW707

REPORT NUMBER: 16K22598-E5

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: SAMSUNG ELECTRONICS CO., LTD.

EUT DESCRIPTION: WCDMA/LTE Tablet + BT/BLE and DTS/UNII a/b/g/n/ac

MODEL NUMBER: SM-W707N0, SM-W708N0, SM-W708

SERIAL NUMBER: R34GC00603 (RADIATED); R34GC0064S (CONDUCTED)

DATE TESTED: JAN 14, 2016 - JAN 21, 2016

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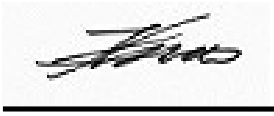

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2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with TIA-603-D, FCC CFR 47 Part 22, FCC CFR Part 24 and FCC CFR Part 27.

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

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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)

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	4.14 dB
Radiated Disturbance, Above 1 GHz	5.97 dB

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

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is a WCDMA/LTE Tablet + BT/BLE and DTS/UNII a/b/g/n/ac.

SM-W707N0, SM-W708N0 and SM-W708 are same hardware and only difference is Window OS version. SM-W707N0 is Window Home version and SM-W708N0, SM-W708 are Window Professional version.
Also SM-W708 support non-USA band enabled by S/W.(LTE Band20, WCDMA Band8).
SM-W707N0 was used for the test.

5.2. MAXIMUM OUTPUT POWER (WCDMA)

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

FCC Part 22/24						
Band	Frequency Range	Modulation	Conducted		Radiated	
	[MHz]	Peak	Avg [dBm]	Avg [mW]	Avg [dBm]	Avg [mW]
Band 5	824~849	REL99	22.77	189.23	21.21	132.13
		HSDPA	22.64	183.65	21.20	131.83
		HSUPA	22.68	185.35		
Band 2	1850~1910	REL99	20.75	118.85	17.71	59.02
		HSDPA	20.77	119.40	16.56	45.29
		HSUPA	20.70	117.49		

5.3. MAXIMUM OUTPUT POWER (LTE)

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

LTE Band 17

FCC Part 27							
Band	Frequency Range [MHz]	BandWidth [MHz]	Modulation Peak	Conducted		Radiated	
				Avg [dBm]	Avg [mW]	Avg [dBm]	Avg [mW]
Band 17	704 ~ 716	10	QPSK	22.58	181.13	18.01	63.24
			16QAM	21.61	144.88	17.04	50.58
		5	QPSK	22.73	187.50	18.44	69.82
			16QAM	21.63	145.55	17.50	56.23

LTE Band 5

FCC Part 22							
Band	Frequency Range [MHz]	BandWidth [MHz]	Modulation Peak	Conducted		Radiated	
				Avg [dBm]	Avg [mW]	Avg [dBm]	Avg [mW]
Band 5	824 ~ 849	10	QPSK	23.37	217.27	20.89	122.74
			16QAM	22.50	177.83	19.84	96.38
		5	QPSK	23.20	208.93	20.91	123.31
			16QAM	22.50	177.83	19.93	98.40
		3	QPSK	23.44	220.80	21.06	127.64
			16QAM	22.50	177.83	20.24	105.68
		1.4	QPSK	23.48	222.84	18.19	65.92
			16QAM	22.50	177.83	17.33	54.08

DESCRIPTION OF AVAILABLE ANTENNAS

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

Frequency (MHz)	Peak Gain (dBi)
WCDMA Band 5 / LTE Band 5 824 ~ 849 MHz	1.69
GSM1900 / WCDMA Band 2 1850 ~ 1910 MHz	-0.36
LTE Band 17 704 ~ 716 MHz	-0.25

5.4. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
Charger	SAMSUNG	EP-TA300	R37GB7ZGHD1SE3	N/A
Data Cable	SAMSUNG	EP-DW700CWE	N/A	N/A
Earphone	SAMSUNG	EO-HS3303WE	N/A	N/A

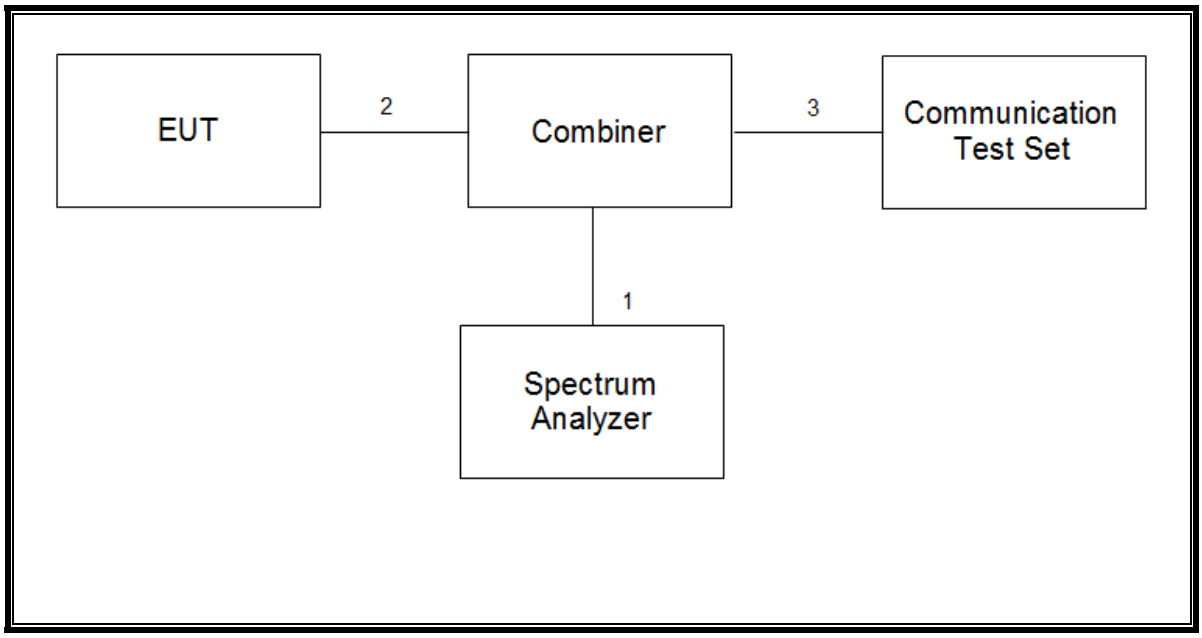
I/O CABLES

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	0.8m	N/A
2	Audio	1	Mini-Jack	Unshielded	1.0m	N/A

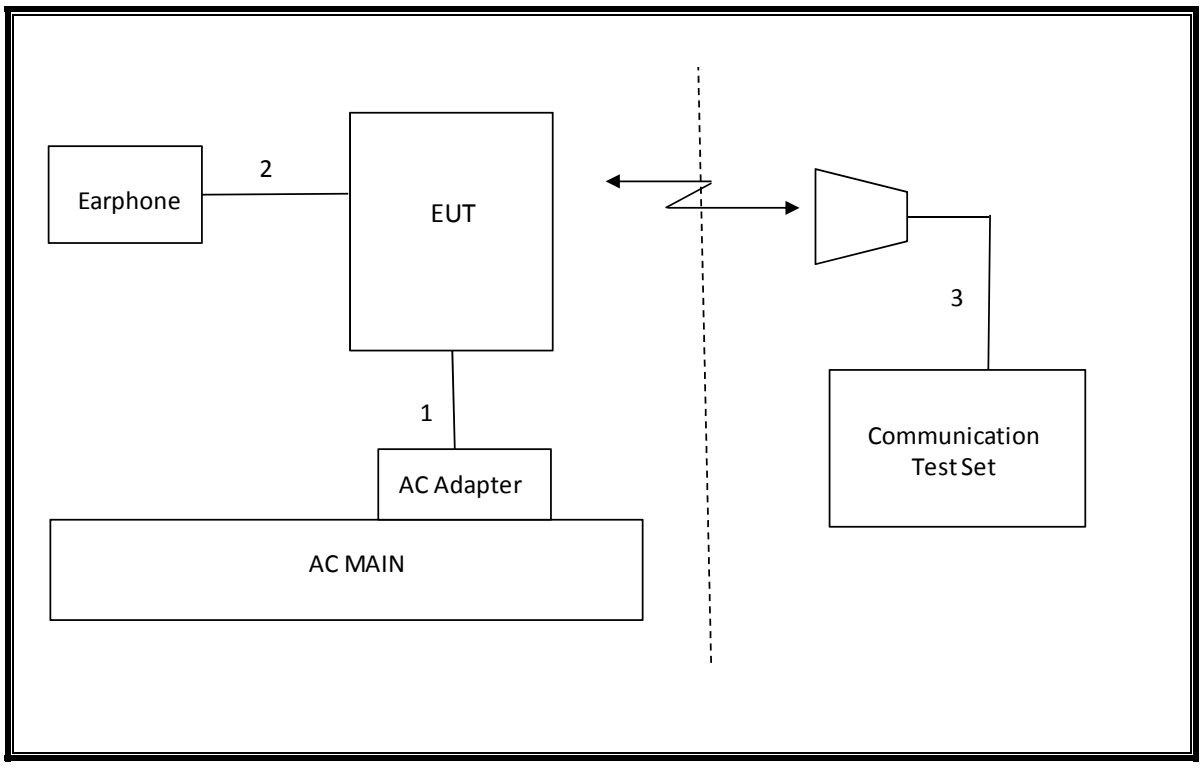
TEST SETUP

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

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	07-28-16
Antenna, Horn, 40 GHz	ETS	3116C	00166155	09-23-16
Antenna, Horn, 40 GHz	ETS	3116C-PA	00168841	08-24-17
Antenna, Bilog, 30MHz-1GHz	SCHWARZBECK	VULB9163	750	11-17-16
Antenna, Bilog, 30MHz-1GHz	SCHWARZBECK	VULB9163	749	04-25-17
Antenna, Horn, 18 GHz	ETS	3115	00167211	09-26-16
Antenna, Horn, 18 GHz	ETS	3115	00161451	05-17-17
Antenna, Horn, 18 GHz	ETS	3117	00168724	06-17-17
Antenna, Horn, 18 GHz	ETS	3117	00168717	06-17-17
Combiner	WEINSCHEL	1575	2151	08-20-16
Communications Test Set	R&S	CMW500	150312	08-18-16
Communications Test Set	R&S	CMW500	115331	08-18-16
Communications Test Set	R&S	CMW500	102271	08-18-16
DC Power Supply	Agilent / HP	E3640A	MY54226395	08-18-16
Preamplifier, 1000 MHz	Sonoma	310N	341282	08-18-16
Preamplifier, 1000 MHz	Sonoma	310N	351741	08-18-16
Preamplifier, 18 GHz	Miteq	AFS42-00101800-25-S-42	1876511	08-18-16
Preamplifier, 18 GHz	Miteq	AFS42-00101800-25-S-42	1896138	08-18-16
Spectrum Analyzer, 44 GHz	Agilent / HP	N9030A	MY54170614	08-19-16
Spectrum Analyzer, 44 GHz	Agilent / HP	N9030A	MY54490312	08-19-16
Bluetooth Tester	TESCOM	TC-3000C	3000C000546	08-18-16
Average Power Sensor	R&S	NRZ-Z91	102681	08-18-16
Average Power Sensor	Agilent / HP	U2000	MY54270007	08-18-16
EMI Test Receive, 40 GHz	R&S	ESU40	100439	08-19-16
EMI Test Receive, 40 GHz	R&S	ESU40	100457	08-19-16
EMI Test Receive, 3 GHz	R&S	ESR3	101832	08-19-16
Attenuator / Switch driver	HP	11713A	3748A04272	N/A
Low Pass Filter 3GHz	Micro-Tronics	LPS17541	009	08-18-16
Low Pass Filter 3GHz	Micro-Tronics	LPS17541	015	08-18-16
High Pass Filter 5GHz	Micro-Tronics	HPS17542	009	08-18-16
High Pass Filter 6GHz	Micro-Tronics	HPM17543	010	08-18-16
High Pass Filter 5GHz	Micro-Tronics	HPS17542	016	08-18-16
High Pass Filter 6GHz	Micro-Tronics	HPM17543	015	08-18-16
LISN	R&S	ENV-216	101836	08-19-16
LISN	R&S	ENV-216	101837	08-19-16

7. Summary Table

FCC Part Section	Test Description	Test Limit	Test Condition	Test Result	Note
2.1049	Occupied Band width (99%)	N/A	Conducted	Pass	9.0051 MHz
22.917(a) 24.238(a) 27.53(g)	Band Edge / Conducted Spurious Emission	-13dBm		Pass	-15.083 dBm
2.1046	Conducted output power	N/A		Pass	23.48 dBm
22.355 24.235 27.54	Frequency Stability	2.5PPM		Pass	-0.030 PPM
22.913(a)(2)	Effective Radiated Power	38 dBm	Radiated	Pass	21.21 dBm
27.50(c)(10)		34.77 dBm		Pass	18.44 dBm
24.232(c)	Equivalent Isotropic Radiated Power	33dBm		Pass	17.71 dBm
22.917(a) 24.238(a) 27.53(g)	Radiated Spurious Emission	-13dBm		Pass	-30.4 dBm

FCC Rule Part	Frequency Range [MHz]	Output Power [W]	Frequency Tolerance	Emission Designator	Emission Bandwidth [MHz]	Communication Type
WCDMA						
22H	826.4 - 846.6	0.132	2.5 ppm	4M08F9W		WCDMA
24E	1852.4 - 1907.6	0.059	2.5 ppm	4M07F9W		WCDMA
LTE Band 5						
22H	829.0 - 844.0	0.123	2.5 ppm	8M98G7W	10	QPSK
22H	829.0 - 844.0	0.096	2.5 ppm	8M98D7W	10	16QAM
22H	825.5 - 847.5	0.128	2.5 ppm	2M69G7W	3	QPSK
22H	825.5 - 847.5	0.106	2.5 ppm	2M69D7W	3	16QAM
LTE Band 17						
27H	709.0 - 711.0	0.063	2.5 ppm	8M98G7W	10	QPSK
27H	709.0 - 711.0	0.051	2.5 ppm	9M00D7W	10	16QAM
27H	706.5 - 713.5	0.070	2.5 ppm	4M49G7W	5	QPSK
27H	706.5 - 713.5	0.056	2.5 ppm	4M50D7W	5	16QAM

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8. RF POWER OUTPUT VERIFICATION

8.1. UMTS REL 99

Release 99 Setup Procedures used to establish the test signals

The following tests were completed according to the test requirements outlined in section 5.2 of the 3GPP TS34.121-1 specification. The DUT supports power Class 3, which has a nominal maximum output power of 24 dBm (+1.7/-3.7).

Mode	Subtest	Rel99
WCDMA General Settings	Loopback Mode	Test Mode 2
	Rel99 RMC	12.2kbps RMC
	Power Control Algorithm	Algorithm2
	βc/βd	8/15

HSDPA Setup Procedures used to establish the test signals

The following 4 Sub-tests were completed according to Release 7 procedures in section 5.2 of 3GPP TS34.121. A summary of these settings are illustrated below:

	Mode	HSDPA	HSDPA	HSDPA	HSDPA
	Subtest	1	2	3	4
W-CDMA General Settings	Loopback Mode	Test Mode 1			
	Rel99 RMC	12.2kbps RMC			
	HSDPA FRC	H-Set 1			
	Power Control Algorithm	Algorithm 2			
	βc	2/15	11/15	15/15	15/15
	βd	15/15	15/15	8/15	4/15
	Bd (SF)	64			
	βc/βd	2/15	12/15	15/8	15/4
	βhs	4/15	24/15	30/15	30/15
	MPR (dB)	0	0	0.5	0.5
HSDPA Specific Settings	D_{ACK}	8			
	D_{NAK}	8			
	DCQI	8			
	Ack-Nack repetition factor	3			
	CQI Feedback (Table 5.2B.4)	4ms			
	CQI Repetition Factor (Table 5.2B.4)	2			
	Ahs=βhs/βc	30/15			

HSPA (HSDPA & HSUPA) Setup Procedures used to establish the test signals

The following 5 Sub-tests were completed according to Release 6 procedures in section 5.2 of 3GPP TS34.121. A summary of these settings are illustrated below:

	Mode	HSPA				
	Subtest	1	2	3	4	5
WCDMA General Settings	Loopback Mode	Test Mode 1				
	Rel99 RMC	12.2 kbps RMC				
	HSDPA FRC	H-Set 1				
	HSUPA Test	HSPA				
	Power Control Algorithm	Algorithm 2				Algorithm 1
	βc	11/15	6/15	15/15	2/15	15/15
	βd	15/15	15/15	9/15	15/15	0
	βec	209/225	12/15	30/15	2/15	5/15
	βc/βd	11/15	6/15	15/9	2/15	15/1
	βhs	22/15	12/15	30/15	4/15	5/15
	βed	1309/225	94/75	47/15	56/75	47/15
	CM (dB)	1	3	2	3	1
	MPR (dB)	0	2	1	2	0
HSDPA Specific Settings	DACK	8				0
	DNAK	8				0
	DCQI	8				0
	Ack-Nack repetition factor	3				
	CQI Feedback (Table 5.2B.4)	4ms				
	CQI Repetition Factor (Table 5.2B.4)	2				
	Ahs = βhs/βc	30/15				
HSUPA Specific Settings	E-DPDCCH	6	8	8	5	7
	DHARQ	0	0	0	0	0
	AG Index	20	12	15	17	21
	ETFCI (from 34.121 Table C.11.1.3)	75	67	92	71	81
	Associated Max UL Data Rate kbps	242.1	174.9	482.8	205.8	308.9
	Reference E-TFCIs	5	5	2	5	1
	Reference E-TFCI	11	11	11	11	67
	Reference E-TFCI PO	4	4	4	4	18
	Reference E-TFCI	67	67	92	67	67
	Reference E-TFCI PO	18	18	18	18	18
	Reference E-TFCI	71	71	71	71	71
	Reference E-TFCI PO	23	23	23	23	23
	Reference E-TFCI	75	75	75	75	75
	Reference E-TFCI PO	26	26	26	26	26
	Reference E-TFCI	81	81	81	81	81
	Reference E-TFCI PO	27	27	27	27	27
	Maximum Channelisation Codes	2xSF2				SF4

DC-HSDPA Setup Procedures used to establish the test signals

The following tests were completed according to procedures in section 7.3.13 of 3GPP TS34.108 v9.5.0. A summary of these settings are illustrated below:

Downlink Physical Channels are set as per 3GPP TS34.121-1 v9.0.0 E.5.0

Table E.5.0: Levels for HSDPA connection setup

Parameter During Connection setup	Unit	Value
P-CPICH_Ec/Ior	dB	-10
P-CCPCH and SCH_Ec/Ior	dB	-12
PICH _Ec/Ior	dB	-15
HS-PDSCH	dB	off
HS-SCCH_1	dB	off
DPCH_Ec/Ior	dB	-5
OCNS_Ec/Ior	dB	-3.1

Call is set up as per 3GPP TS34.108 v9.5.0 sub clause 7.3.13

The configurations of the fixed reference channels for HSDPA RF tests are described in 3GPP TS 34.121, annex C for FDD and 3GPP TS 34.122.

Table C.8.1.12: Fixed Reference Channel H-Set 12

Parameter	Unit	Value
Nominal Avg. Inf. Bit Rate	kbps	60
Inter-TTI Distance	TTI's	1
Number of HARQ Processes	Processes	6
Information Bit Payload (N_{INF})	Bits	120
Number Code Blocks	Blocks	1
Binary Channel Bits Per TTI	Bits	960
Total Available SML's in UE	SML's	19200
Number of SML's per HARQ Proc.	SML's	3200
Coding Rate		0.15
Number of Physical Channel Codes	Codes	1
Modulation		QPSK
Note 1: The RMC is intended to be used for DC-HSDPA mode and both cells shall transmit with identical parameters as listed in the table.		
Note 2: Maximum number of transmission is limited to 1, i.e., retransmission is not allowed. The redundancy and constellation version 0 shall be used.		

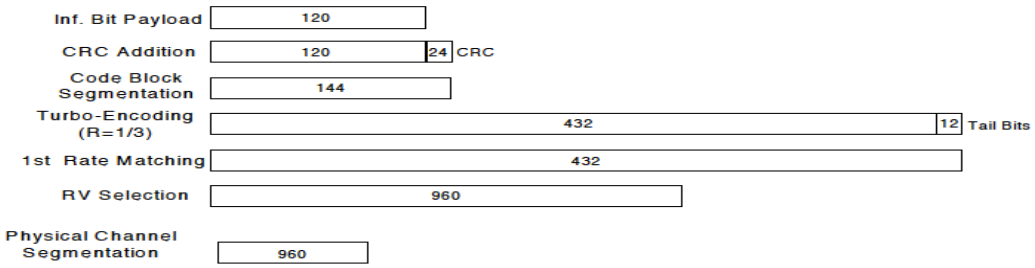

Figure C.8.19: Coding rate for Fixed reference Channel H-Set 12 (QPSK)

The following 4 Sub-tests for HSDPA were completed according to Release 8 procedures in section 5.2 of 3GPP TS34.121. A summary of subtest settings are illustrated below:

	Mode	HSDPA	HSDPA	HSDPA	HSDPA
	Subtest	1	2	3	4
WCDMA General Settings	Loopback Mode	Test Mode 1			
	Rel99 RMC	12.2kbps RMC			
	HSDPA FRC	H-Set 1			
	Power Control Algorithm	Algorithm2			
	βc	2/15	11/15	15/15	15/15
	βd	15/15	15/15	8/15	4/15
	βd (SF)	64			
	βc/βd	2/15	11/15	15/8	15/4
	βhs	4/15	24/15	30/15	30/15
	MPR (dB)	0	0	0.5	0.5
HSDPA Specific Settings	DACK	8			
	DNAK	8			
	DCQI	8			
	Ack-Nack Repetition factor	3			
	CQI Feedback	4ms			
	CQI Repetition Factor	2			
	Ahs = βhs/ βc	30/15			

HSPA+

Since 16QAM is not used for uplink, the uplink Category and release is same as HSUPA, i.e., CAT 6 Rel 6. Therefore, the RF conducted power is not measured.

8.1.1. WCDMA OUTPUT POWER RESULT

WCDMA Band 5 Measured Results

Band	Mode		UL Ch No.	Freq. [MHz]	MPR [dB]	Avg Pwr [dBm]
W-CDMA Band V	Rel 99	RMC, 12.2 kbps	4132	826.4	0	22.71
			4183	836.6	0	22.77
			4233	846.6	0	22.64
	HSDPA	Subtest 1	4132	826.4	0	22.64
			4183	836.6	0	22.64
			4233	846.6	0	22.64
		Subtest 2	4132	826.4	0	22.39
			4183	836.6	0	22.54
			4233	846.6	0	22.55
		Subtest 3	4132	826.4	0.5	22.16
			4183	836.6	0.5	22.29
			4233	846.6	0.5	22.23
		Subtest 4	4132	826.4	0.5	21.99
			4183	836.6	0.5	22.12
			4233	846.6	0.5	22.11
	HSUPA	Subtest 1	4132	826.4	0	22.34
			4183	836.6	0	22.50
			4233	846.6	0	22.48
		Subtest 2	4132	826.4	2	20.49
			4183	836.6	2	20.68
			4233	846.6	2	20.60
		Subtest 3	4132	826.4	1	21.53
			4183	836.6	1	21.65
			4233	846.6	1	21.62
		Subtest 4	4132	826.4	2	20.77
			4183	836.6	2	20.93
			4233	846.6	2	20.88
		Subtest 5	4132	826.4	0	22.57
			4183	836.6	0	22.68
			4233	846.6	0	22.67

WCDMA Band 2 Measured Results

Band	Mode		UL Ch No.	Freq. [MHz]	MPR [dB]	Avg Pwr [dBm]
W-CDMA Band II	Rel 99	RMC, 12.2 kbps	9262	1852.4	0	20.75
			9400	1880.0	0	20.52
			9538	1907.6	0	20.70
	HSDPA	Subtest 1	9262	1852.4	0	20.77
			9400	1880.0	0	20.50
			9538	1907.6	0	20.75
		Subtest 2	9262	1852.4	0	20.65
			9400	1880.0	0	20.40
			9538	1907.6	0	20.54
		Subtest 3	9262	1852.4	0.5	20.46
			9400	1880.0	0.5	20.12
			9538	1907.6	0.5	20.33
		Subtest 4	9262	1852.4	0.5	20.27
			9400	1880.0	0.5	19.92
			9538	1907.6	0.5	20.12
	HSUPA	Subtest 1	9262	1852.4	0	19.47
			9400	1880.0	0	19.18
			9538	1907.6	0	19.33
		Subtest 2	9262	1852.4	2	18.76
			9400	1880.0	2	18.45
			9538	1907.6	2	18.65
		Subtest 3	9262	1852.4	1	19.72
			9400	1880.0	1	19.41
			9538	1907.6	1	19.61
		Subtest 4	9262	1852.4	2	18.94
			9400	1880.0	2	18.60
			9538	1907.6	2	18.70
		Subtest 5	9262	1852.4	0	20.70
			9400	1880.0	0	20.42
			9538	1907.6	0	20.59

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8.2. LTE OUTPUT VERIFICATION

The following tests were conducted according to the test requirements outlined in section 6.2 of the 3GPP TS36.101 specification.
UE Power Class: 3 (23 +/- 2dBm). The allowed Maximum Power Reduction (MPR) for the maximum output power due to higher order modulation and transmit bandwidth configuration (resource blocks) is specified in Table 6.2.3-1 of the 3GPP TS36.101.

Table 6.2.3-1: Maximum Power Reduction (MPR) for Power Class 3

Modulation	Channel bandwidth / Transmission bandwidth (RB)						MPR (dB)
	1.4 MHz	3.0 MHz	5 MHz	10 MHz	15 MHz	20 MHz	
QPSK	> 5	> 4	> 8	> 12	> 16	> 18	≤ 1
16 QAM	≤ 5	≤ 4	≤ 8	≤ 12	≤ 16	≤ 18	≤ 1
16 QAM	> 5	> 4	> 8	> 12	> 16	> 18	≤ 2

The allowed A-MPR values specified below in Table 6.2.4.-1 of 3GPP TS36.101 are in addition to the allowed MPR requirements. All the measurements below were performed with A-MPR disabled, by using Network Signalling Value of “NS_01”.

Table 6.2.4-1: Additional Maximum Power Reduction (A-MPR)

Network Signalling value	Requirements (sub-clause)	E-UTRA Band	Channel bandwidth (MHz)	Resources Blocks (N_{RB})	A-MPR (dB)
NS_01	6.6.2.1.1	Table 5.5-1	1.4, 3, 5, 10, 15, 20	Table 5.6-1	NA
NS_03	6.6.2.2.1	2, 4,10, 23, 25, 35, 36	3	>5	≤ 1
			5	>6	≤ 1
			10	>6	≤ 1
			15	>8	≤ 1
			20	>10	≤ 1
NS_04	6.6.2.2.2	41	5	>6	≤ 1
			10, 15, 20	See Table 6.2.4-4	
NS_05	6.6.3.3.1	1	10,15,20	≥ 50	≤ 1
NS_06	6.6.2.2.3	12, 13, 14, 17	1.4, 3, 5, 10	Table 5.6-1	n/a
NS_07	6.6.2.2.3 6.6.3.3.2	13	10	Table 6.2.4-2	Table 6.2.4-2
NS_08	6.6.3.3.3	19	10, 15	> 44	≤ 3
NS_09	6.6.3.3.4	21	10, 15	> 40	≤ 1
				> 55	≤ 2
NS_10		20	15, 20	Table 6.2.4-3	Table 6.2.4-3
NS_11	6.6.2.2.1	23[1]	1.4, 3, 5, 10	Table 6.2.4-5	Table 6.2.4-5
..					
NS_32	-	-	-	-	-
Note 1: Applies to the lower block of Band 23, i.e. a carrier placed in the 2000-2010 MHz region.					

8.2.1. LTE OUTPUT POWER RESULT

LTE Band 17 Measured Results

BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Avg Pwr (dBm)
					23790
					710 MHz
10	QPSK	1	0	0	22.56
		1	25	0	22.58
		1	49	0	22.53
		25	0	1	21.63
		25	12	1	21.59
		25	25	1	21.62
		50	0	1	21.64
	16QAM	1	0	1	21.52
		1	25	1	21.61
		1	49	1	21.52
		25	0	2	20.78
		25	12	2	20.74
		25	25	2	20.74
		50	0	2	20.81
BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Avg Pwr (dBm)
					23790
					710 MHz
5	QPSK	1	0	0	22.73
		1	12	0	22.64
		1	24	0	22.66
		12	0	1	21.72
		12	7	1	21.71
		12	13	1	21.69
		25	0	1	21.72
	16QAM	1	0	1	21.63
		1	12	1	21.54
		1	24	1	21.53
		12	0	2	20.81
		12	7	2	20.76
		12	13	2	20.78
		25	0	2	20.80

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LTE Band 5

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Avg Pwr [dBm] Max. Power		
						829 MHz	836.5 MHz	844 MHz
LTE Band 5	10	QPSK	1	0	0	23.17	23.37	23.32
			1	25	0	23.08	23.26	23.20
			1	49	0	23.09	23.24	23.18
			25	0	1	22.18	22.22	22.19
			25	12	1	22.10	22.16	22.11
			25	25	1	22.15	22.18	22.10
			50	0	1	22.15	22.17	22.18
		16QAM	1	0	1	22.08	22.50	22.23
			1	25	1	22.03	22.50	22.05
			1	49	1	21.99	22.48	21.99
			25	0	2	21.20	21.23	21.28
			25	12	2	21.16	21.20	21.19
			25	25	2	21.18	21.16	21.18
			50	0	2	21.17	21.17	21.15

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Avg Pwr [dBm] Max. Power		
						826.5 MHz	836.5 MHz	846.5 MHz
LTE Band 5	5	QPSK	1	0	0	23.08	23.15	22.97
			1	12	0	23.18	23.20	23.00
			1	24	0	23.09	23.12	22.89
			12	0	1	22.10	22.09	22.02
			12	7	1	22.04	22.02	21.98
			12	13	1	22.08	22.06	22.00
			25	0	1	22.08	22.07	21.99
		16QAM	1	0	1	21.98	22.30	22.50
			1	12	1	22.01	22.36	22.50
			1	24	1	21.95	22.25	22.50
			12	0	2	21.17	21.22	21.13
			12	7	2	21.12	21.24	21.07
			12	13	2	21.16	21.24	21.11
			25	0	2	21.23	21.14	21.01

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Avg Pwr [dBm] Max. Power		
						825.5 MHz	836.5 MHz	847.5 MHz
LTE Band 5	3	QPSK	1	0	0	23.28	23.39	23.26
			1	8	0	23.36	23.44	23.37
			1	14	0	23.25	23.36	23.19
			8	0	1	22.21	22.17	22.11
			8	4	1	22.20	22.20	22.10
			8	7	1	22.18	22.19	22.09
			15	0	1	22.15	22.16	22.12
		16QAM	1	0	1	22.13	22.50	22.12
			1	8	1	22.18	22.50	22.21
			1	14	1	22.08	22.50	22.08
			8	0	2	21.28	21.07	21.38
			8	4	2	21.35	21.17	21.37
			8	7	2	21.30	21.15	21.39
			15	0	2	21.27	21.29	21.17

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Avg Pwr [dBm] Max. Power		
						824.7 MHz	836.5 MHz	848.3 MHz
LTE Band 5	1.4	QPSK	1	0	0	23.48	23.48	23.33
			1	3	0	23.04	23.08	22.95
			1	5	0	23.47	23.48	23.35
			3	0	0	23.28	23.28	23.18
			3	1	0	23.13	23.11	23.09
			3	3	0	23.13	23.15	23.00
			6	0	1	22.12	22.15	22.02
		16QAM	1	0	1	22.38	22.50	22.18
			1	3	1	21.90	22.23	21.77
			1	5	1	22.32	22.50	22.18
			3	0	1	22.30	22.36	22.32
			3	1	1	22.16	22.19	22.20
			3	3	1	22.18	22.15	22.12
			6	0	2	21.34	21.03	21.40

9. PEAK TO AVERAGE RATIO

Test Procedure

Per KDB 971168 D01 Power Meas License Digital Systems v02r02;

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.

9.1. CONDUCTED PEAK TO AVERAGE RESULT

WCDMA

Band	Channel	f [MHz]	Mode	Ratio [dB]	Limit [dB]
Band 5	4183	836.6	REL99	3.28	13.00
			HSDPA	3.34	
Band 2	9400	1880.0	REL99	3.27	
			HSDPA	3.32	

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LTE

Band	BW [MHz]	Channel	f [MHz]	Mode	Ratio [dB]	Limit [dB]
Band 17	10	23790	710	QPSK	4.48	13.00
				16QAM	5.34	
	5			QPSK	4.40	
				16QAM	5.28	
Band 5	10	20525	836.5	QPSK	4.49	
				16QAM	5.39	
	5			QPSK	4.37	
				16QAM	5.33	
	3			QPSK	4.45	
				16QAM	5.31	
	1.4			QPSK	4.62	
				16QAM	5.63	

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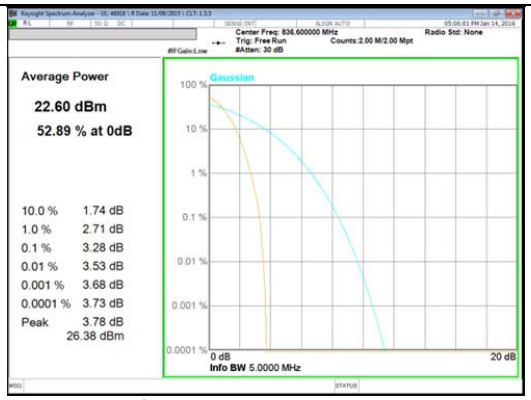
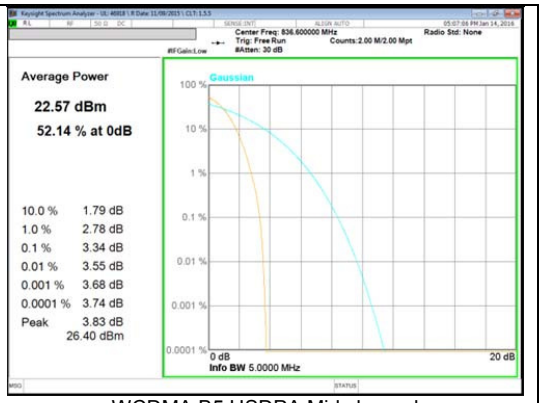
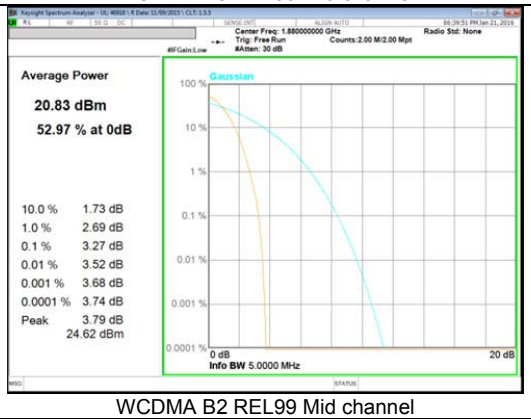
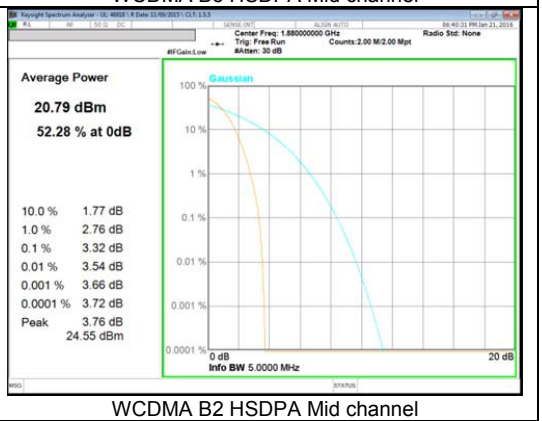
9.2. CONDUCTED PEAK TO AVERAGE PLOTS

WCDMA

<table>
<tr><td rowspan="2">WCDMA Band 5</td><td> 

WCDMA B5 REL99 Mid channel</td><td> 

WCDMA B5 HSDPA Mid channel</td></tr>
<tr><td>WCDMA Band 2</td><td> 

WCDMA B2 REL99 Mid channel</td><td> 

WCDMA B2 HSDPA Mid channel</td></tr>
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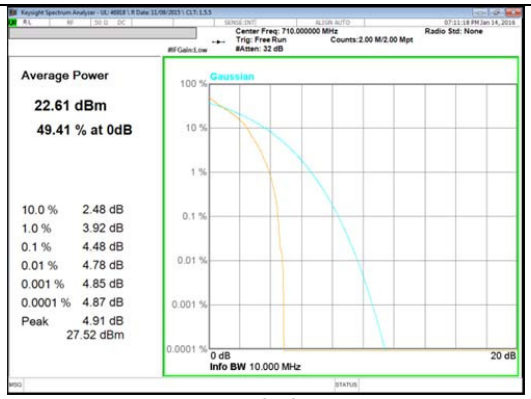
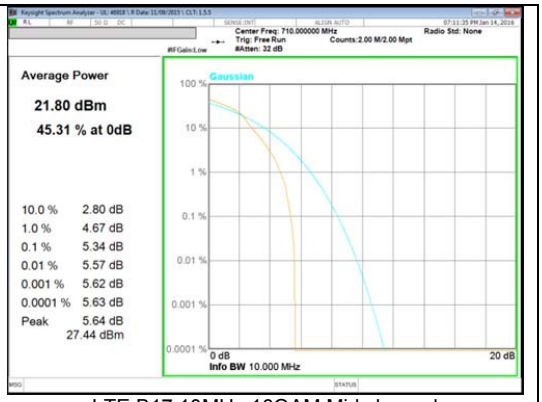
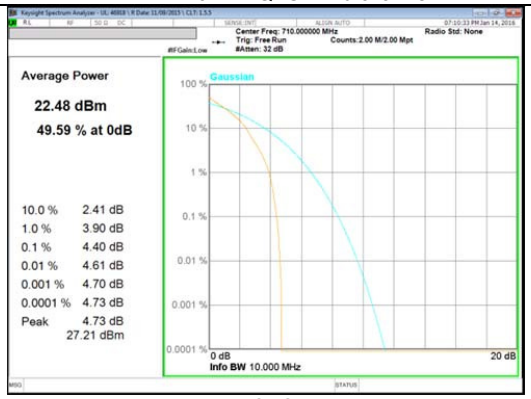
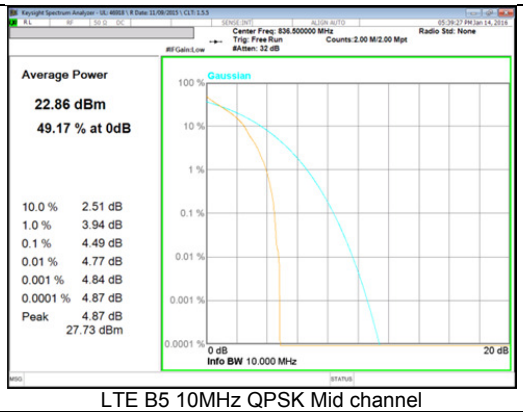
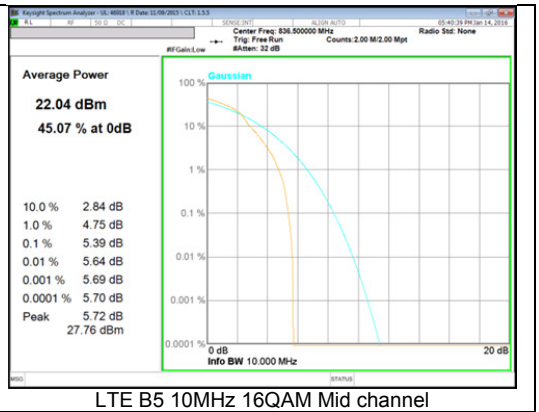
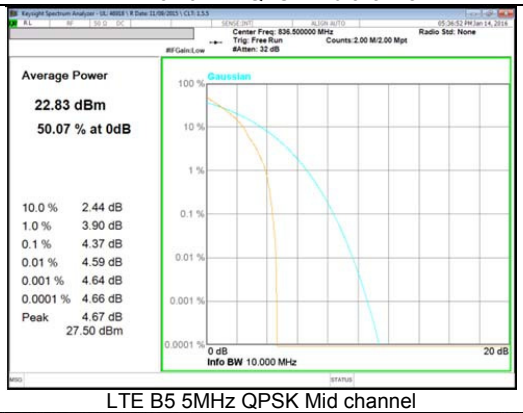
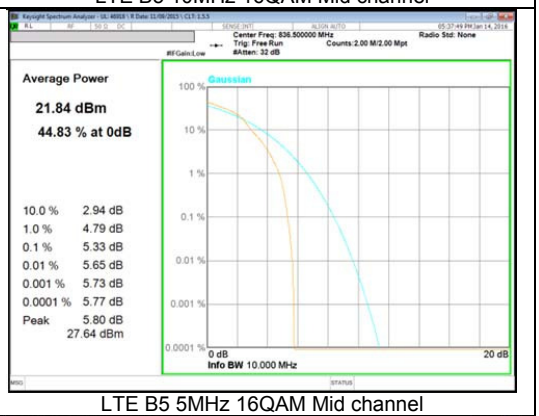
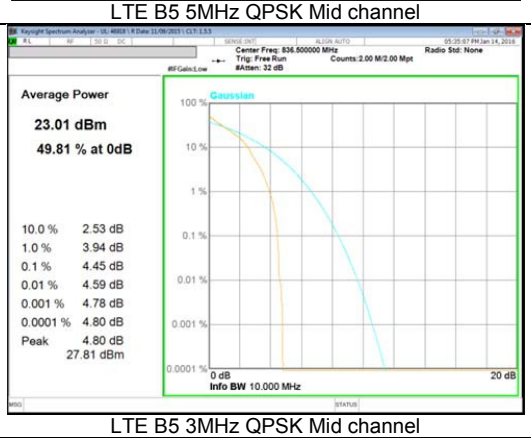
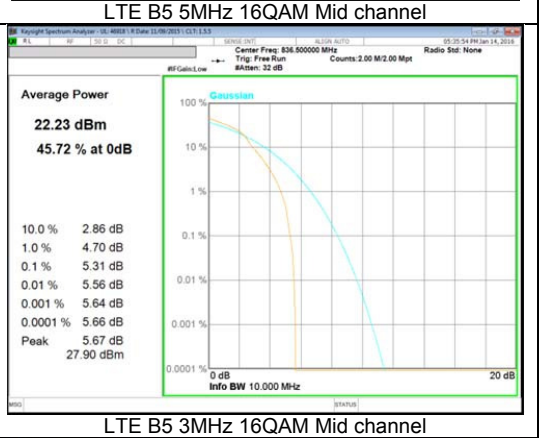
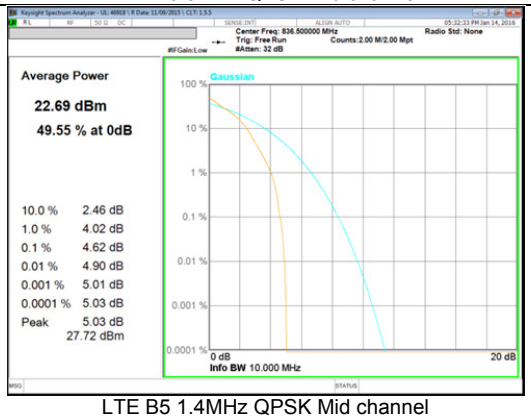
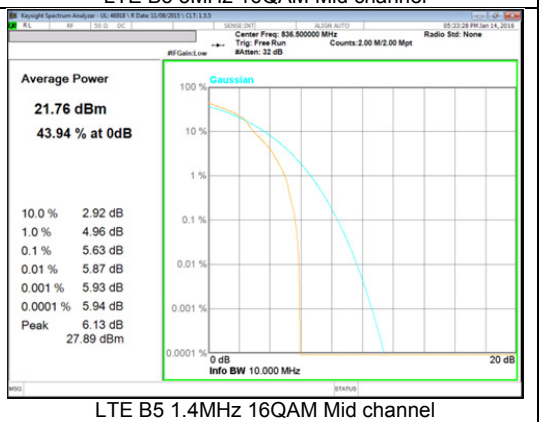
LTE Band 17

LTE Band 17 10 MHz	 LTE B17 10MHz QPSK Mid channel	 LTE B17 10MHz 16QAM Mid channel
LTE Band 17 5 MHz	 LTE B17 5MHz QPSK Mid channel	 LTE B17 5MHz 16QAM Mid channel

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

10. LIMITS AND CONDUCTED RESULTS

10.1. 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 v02r02)

10.1.1. OCCUPIED BANDWIDTH RESULTS

WCDMA

Band	Mode	Channel	f [MHz]	99% BW [MHz]	26dB BW [MHz]
Band 5	REL99	4132	826.4	4.0690	4.615
		4183	836.6	4.0740	4.604
		4233	846.6	4.0696	4.611
	HSDPA	4132	826.4	4.0546	4.579
		4183	836.6	4.0818	4.612
		4233	846.6	4.0508	4.590
Band 2	REL99	9262	1852.4	4.0739	4.632
		9400	1880.0	4.0689	4.626
		9538	1907.6	4.0576	4.620
	HSDPA	9262	1852.4	4.0727	4.628
		9400	1880.0	4.0606	4.605
		9538	1907.6	4.0726	4.609

LTE Band 17

Band	BW [MHz]	Channel	f [MHz]	Mode	99% BW [MHz]	26dB BW [MHz]
Band 17	10	23780	709.0	QPSK	8.9625	10.11
				16QAM	8.9705	10.07
		23790	710.0	QPSK	8.9723	10.32
				16QAM	8.9595	10.13
		23799	711.0	QPSK	8.9764	10.11
				16QAM	9.0051	10.35
	5	23755	706.5	QPSK	4.4828	5.056
				16QAM	4.4826	4.995
		23790	710.0	QPSK	4.4904	4.993
				16QAM	4.4926	5.041
		23824	713.5	QPSK	4.4915	5.018
				16QAM	4.4966	5.100

LTE Band 5

Band	BW [MHz]	Channel	f [MHz]	Mode	99% BW [MHz]	26dB BW [MHz]
Band 5	10	20450	829.0	QPSK	8.9778	10.24
				16QAM	8.9584	10.24
		20524	836.5	QPSK	8.9682	10.10
				16QAM	8.9752	10.19
		20599	844.0	QPSK	8.9595	10.12
				16QAM	8.9608	10.03
	5	20425	826.5	QPSK	4.4885	5.056
				16QAM	4.4926	5.054
		20524	836.5	QPSK	4.4845	5.009
				16QAM	4.4893	5.014
		20624	846.5	QPSK	4.4864	5.007
				16QAM	4.4939	5.109
	3	20415	825.5	QPSK	2.6844	2.990
				16QAM	2.6806	2.942
		20524	836.5	QPSK	2.6881	2.971
				16QAM	2.6841	2.982
		20634	847.5	QPSK	2.6828	2.956
				16QAM	2.6857	2.985
	1.4	20407	824.7	QPSK	1.0859	1.304
				16QAM	1.0861	1.324
		20524	836.5	QPSK	1.0799	1.281
				16QAM	1.0848	1.298
		20624	848.3	QPSK	1.0855	1.297
				16QAM	1.0910	1.320

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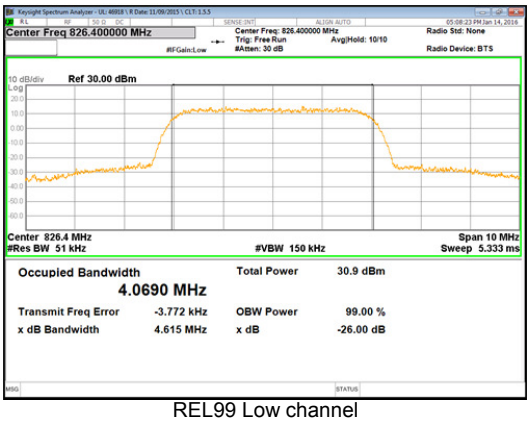
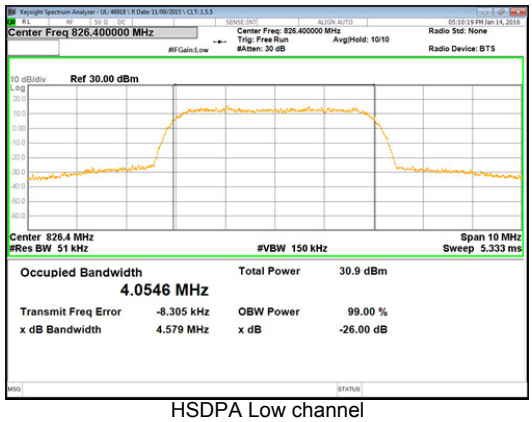
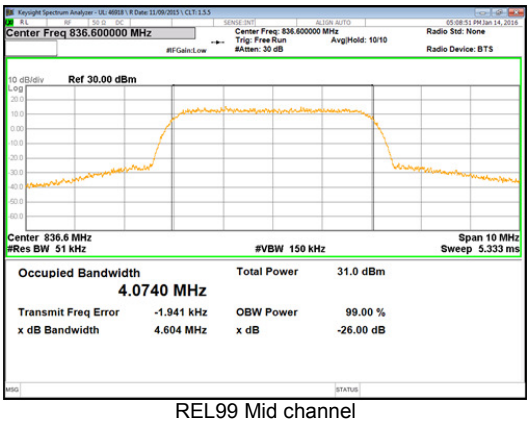
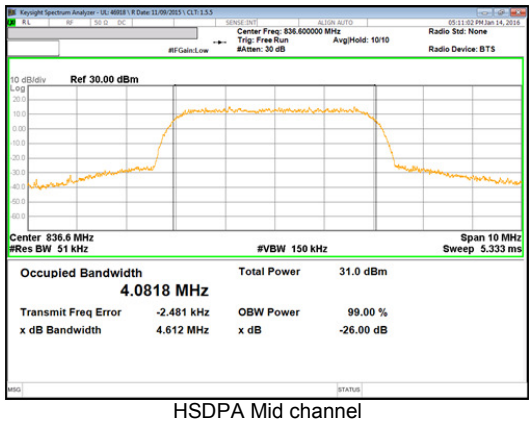
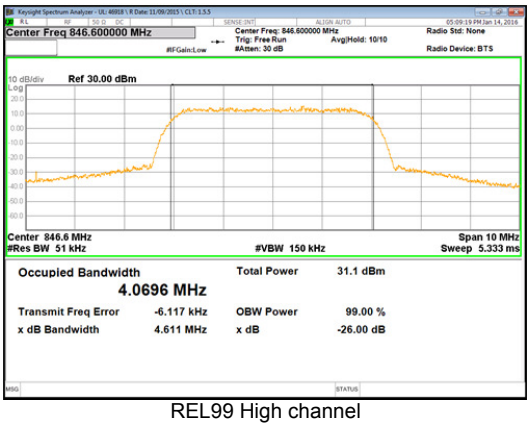
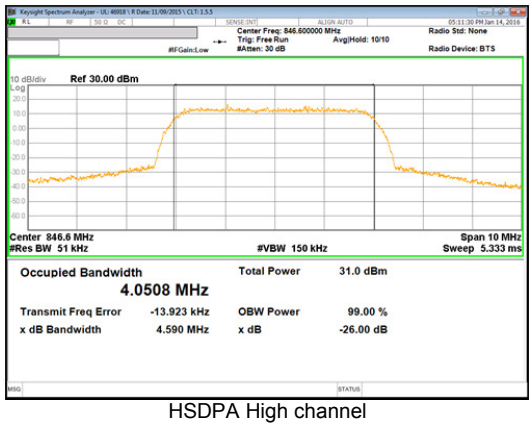
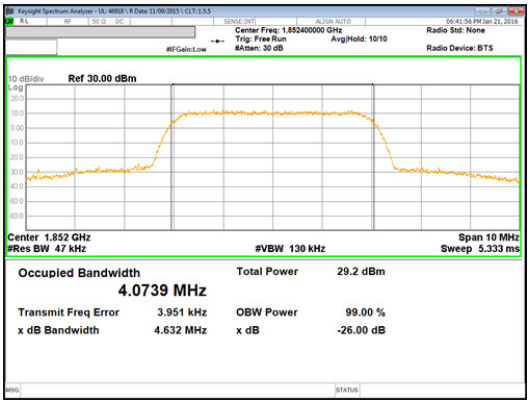
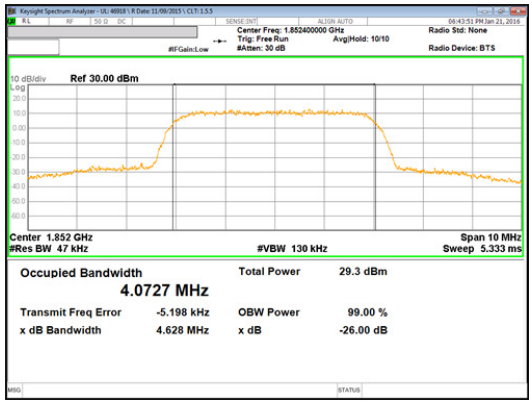
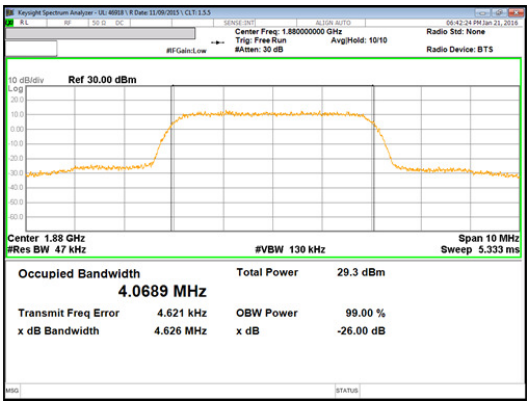
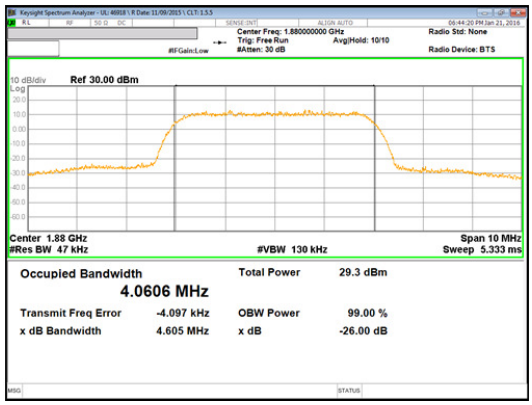
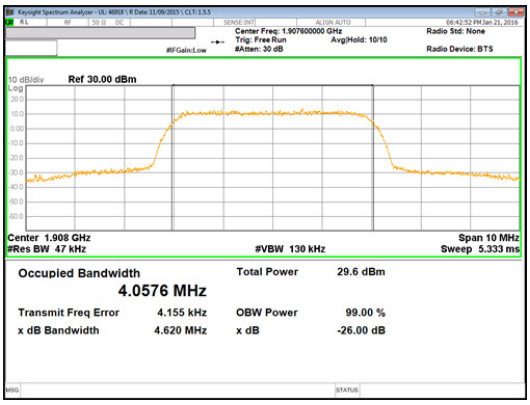
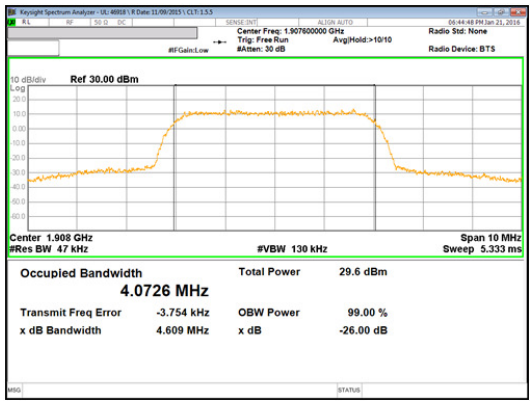
10.1.2. OCCUPIED BANDWIDTH PLOTS

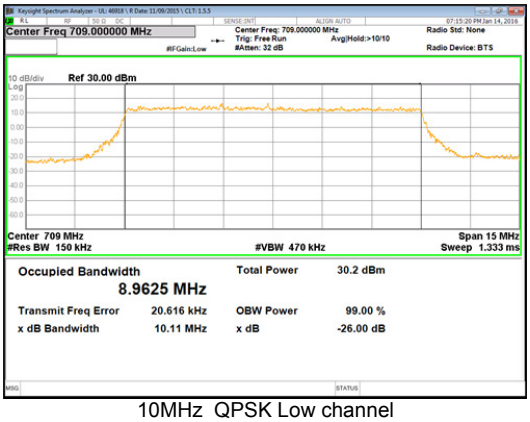
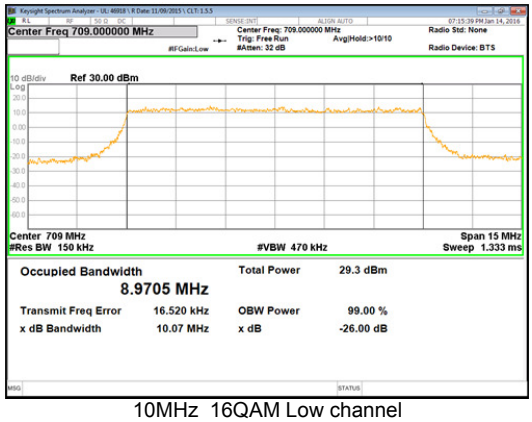
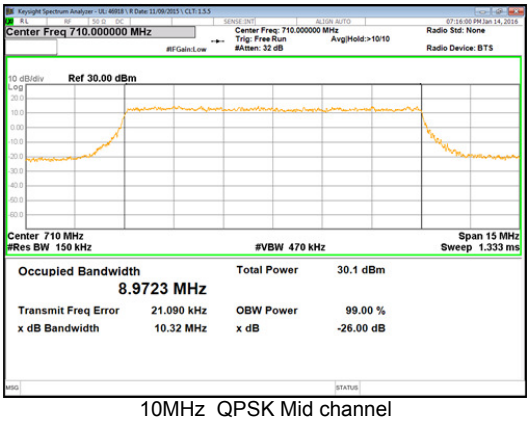
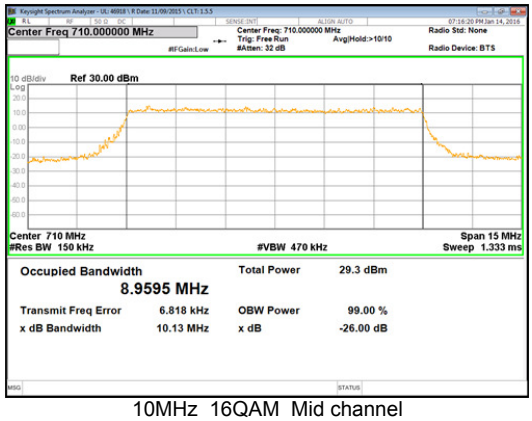
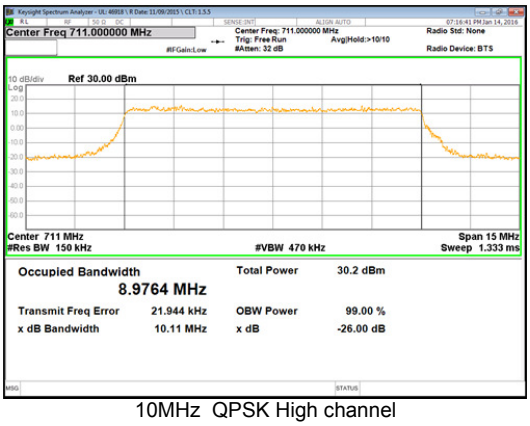
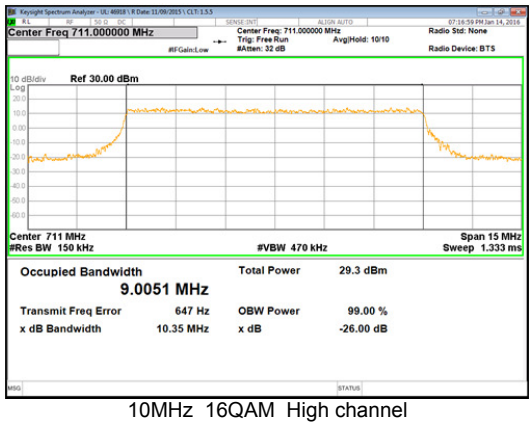
WCDMA Band 5

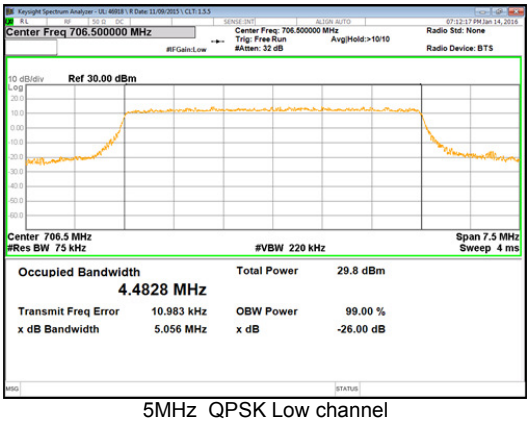
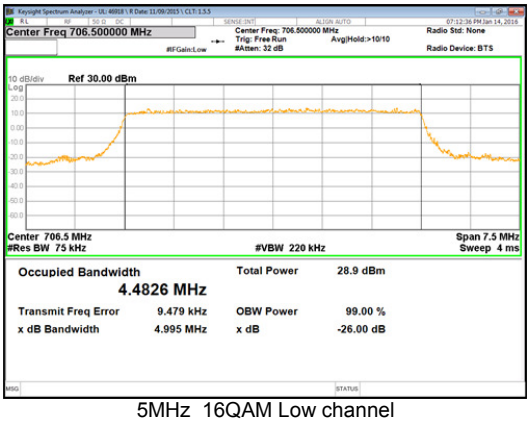
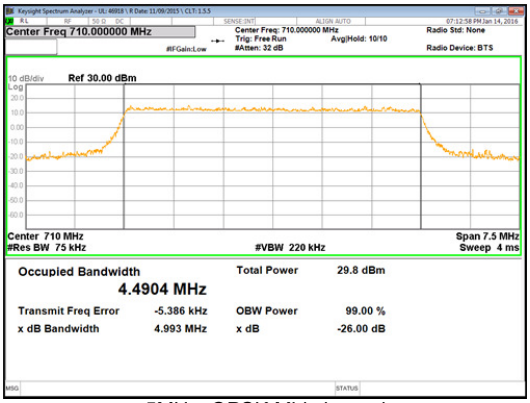
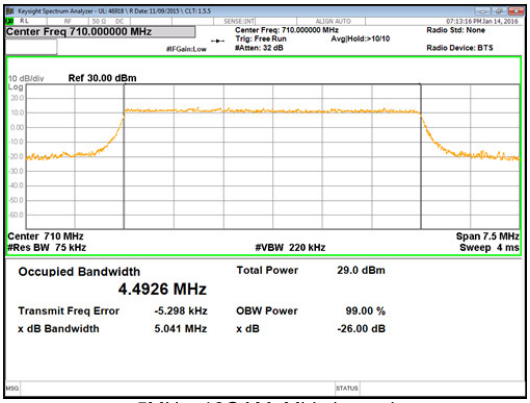
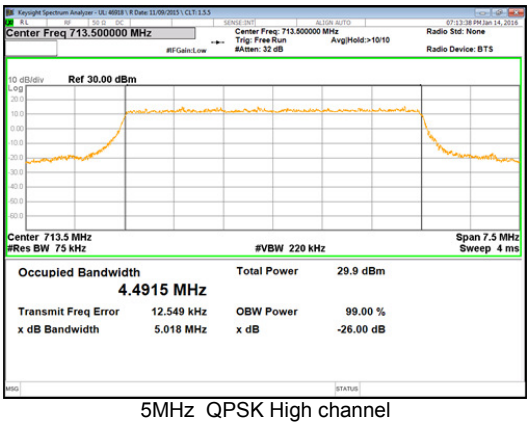
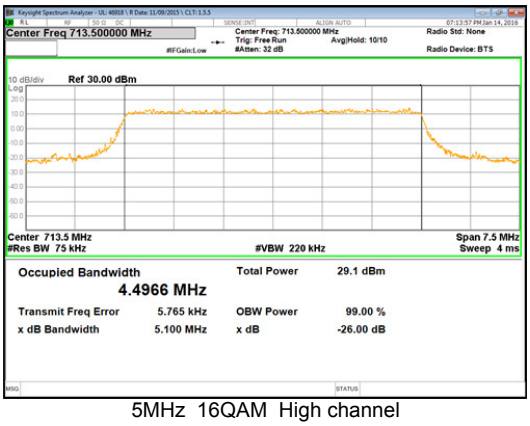
Band 5	 REL99 Low channel	 HSDPA Low channel
	 REL99 Mid channel	 HSDPA Mid channel
	 REL99 High channel	 HSDPA High channel

WCDMA Band 2

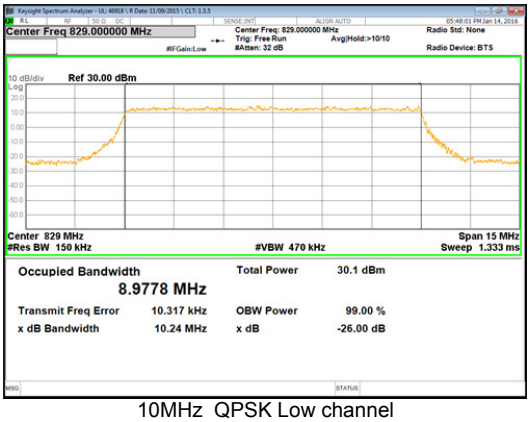
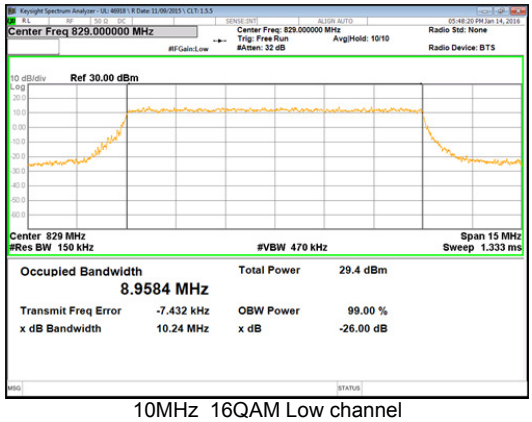
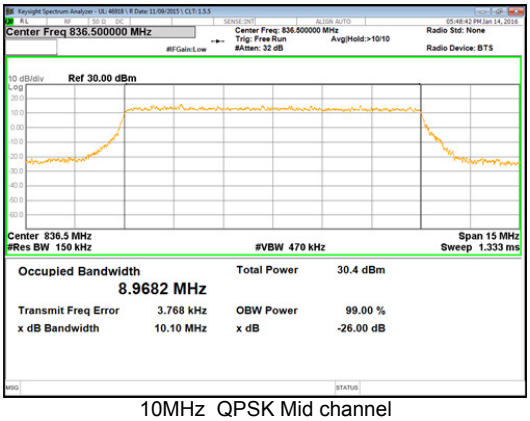
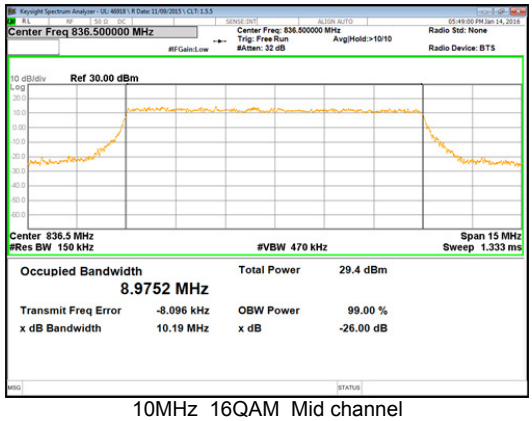
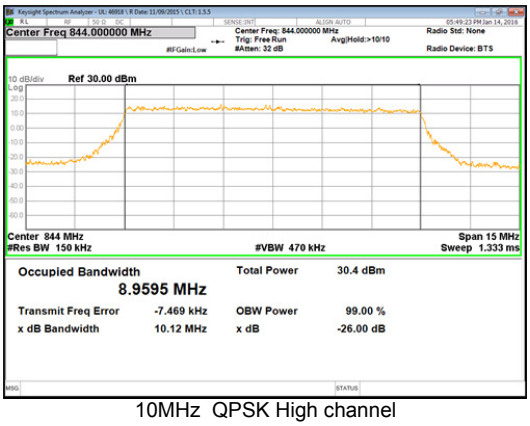
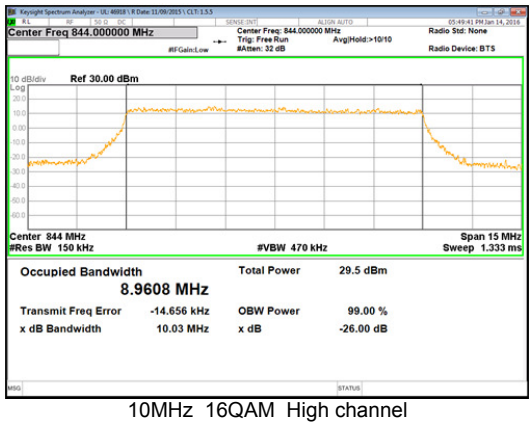
Band 2	 REL99 Low channel	 HSDPA Low channel
	 REL99 Mid channel	 HSDPA Mid channel
	 REL99 High channel	 HSDPA High channel

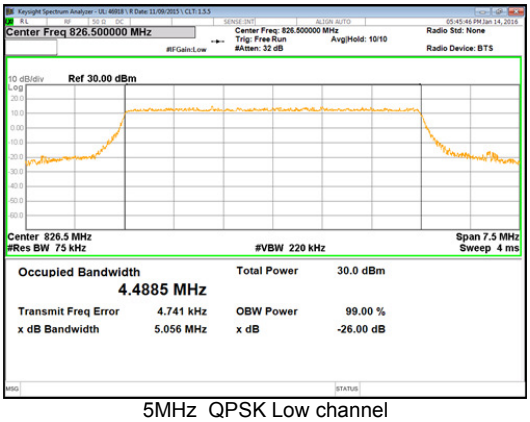
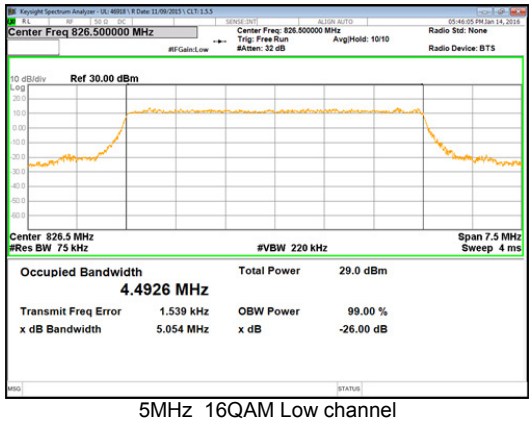
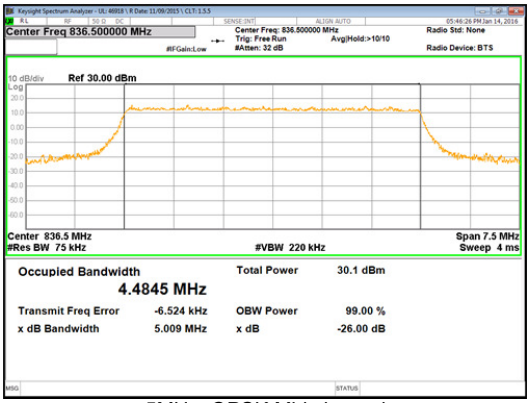
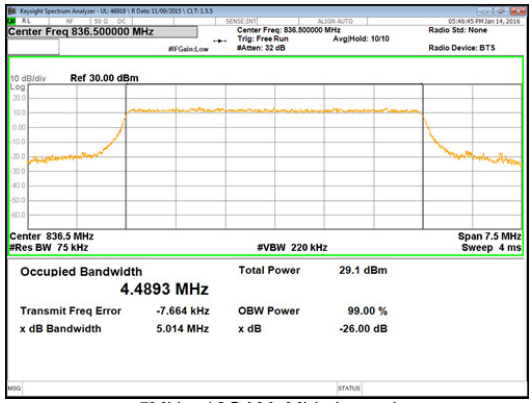
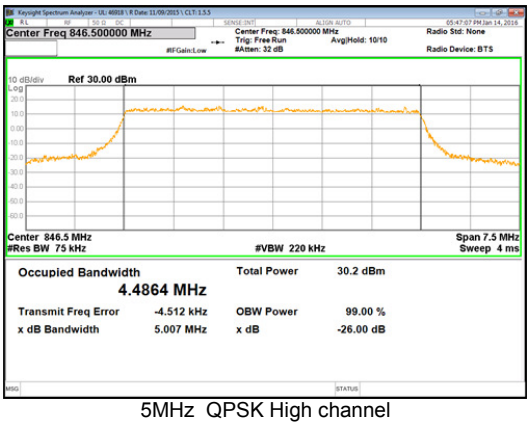
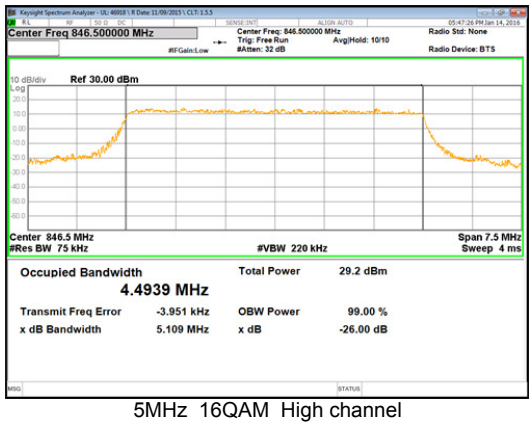
LTE Band 17

Band 17 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

Band 17 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

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

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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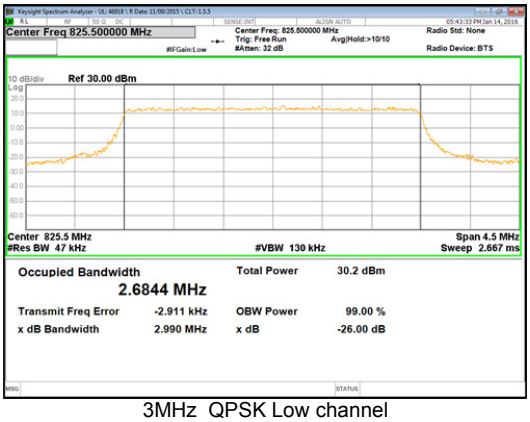
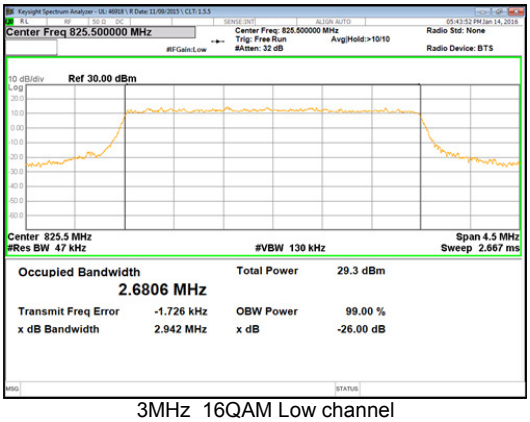
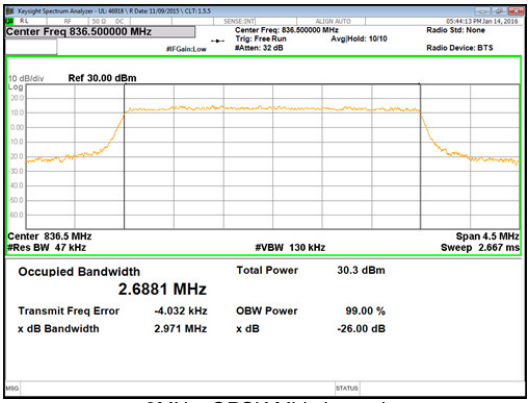
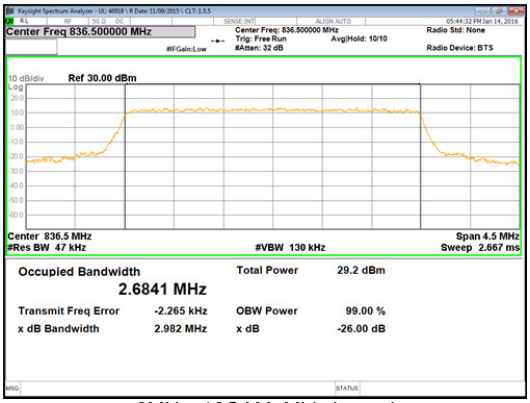
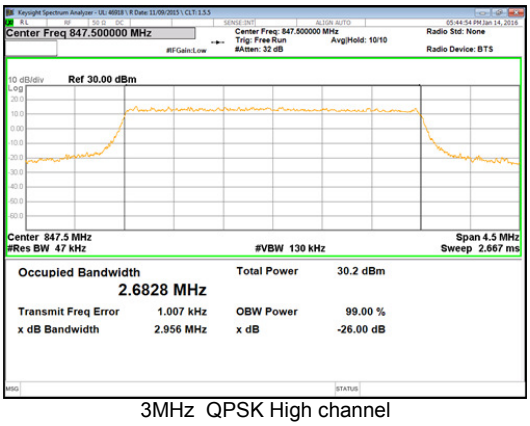
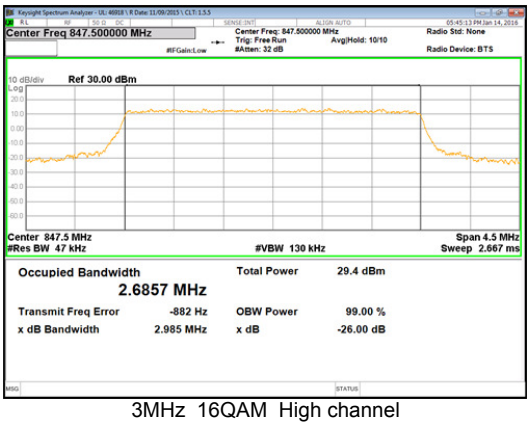
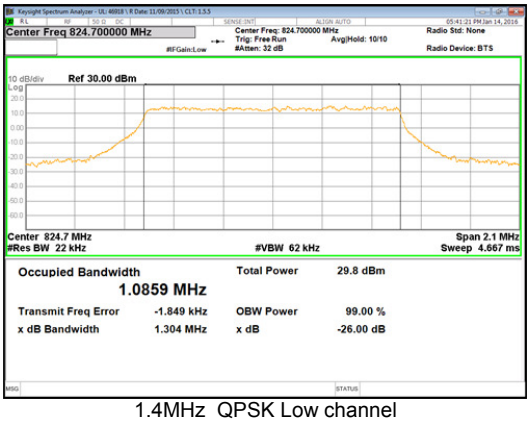
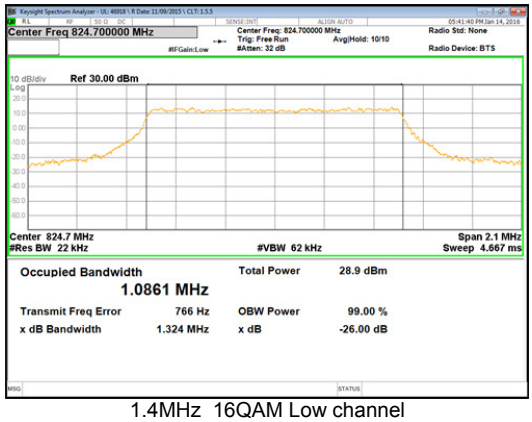
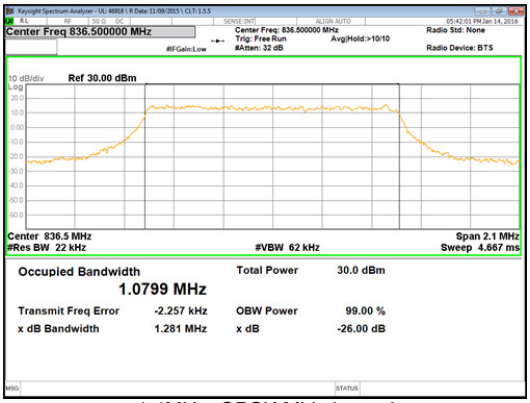
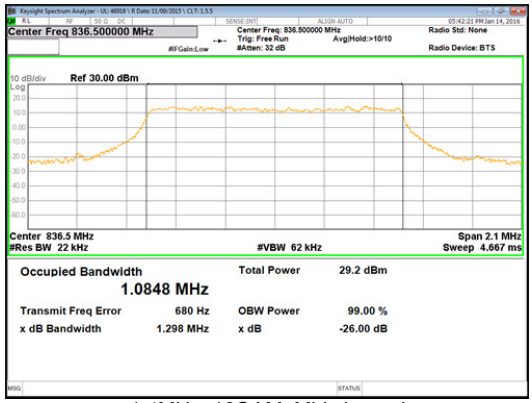
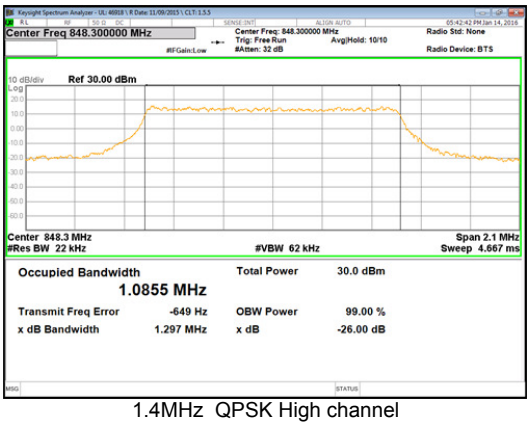
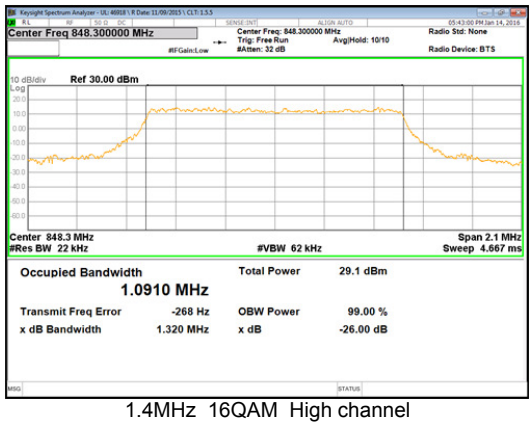
Band 5 3MHz	 3MHz QPSK Low channel	 3MHz 16QAM Low channel
	 3MHz QPSK Mid channel	 3MHz 16QAM Mid channel
	 3MHz QPSK High channel	 3MHz 16QAM High channel

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

10.2. BAND EDGE EMISSIONS

RULE PART(S)

FCC: §22.359, §24.238 and §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.

TEST PROCEDURE

Per KDB 971168 D01 Power Meas License Digital Systems v02r02
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.

RESULTS

WCDMA

Band	Mode	Side	f [MHz]	Level [dBm]	Limit [dBm]
Band 5	REL99	Lower	824.000	-28.827	-13.00
		Upper	849.000	-32.495	
	HSDPA	Lower	824.000	-29.946	
		Upper	849.000	-32.232	
Band 2	REL99	Lower	1850.000	-30.860	
		Upper	1910.000	-32.591	
	HSDPA	Lower	1850.000	-30.152	
		Upper	1910.000	-32.297	

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LTE 17

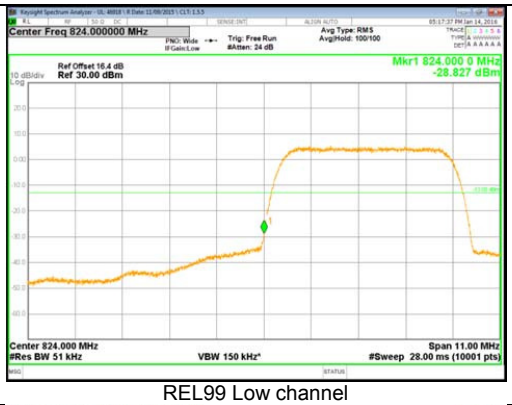
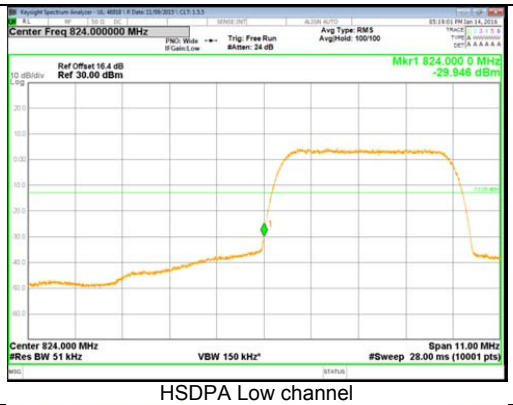
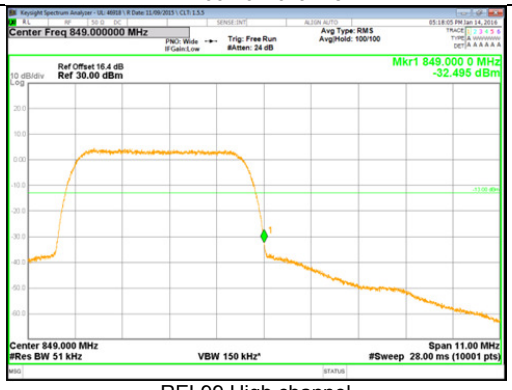
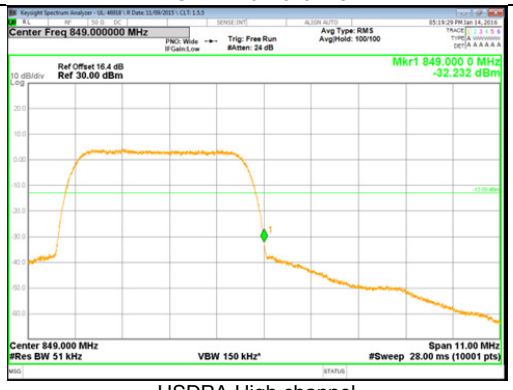
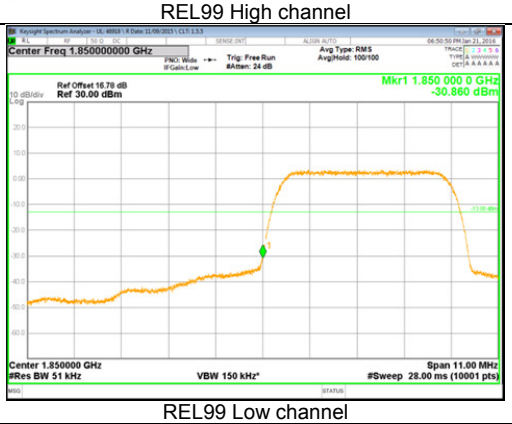
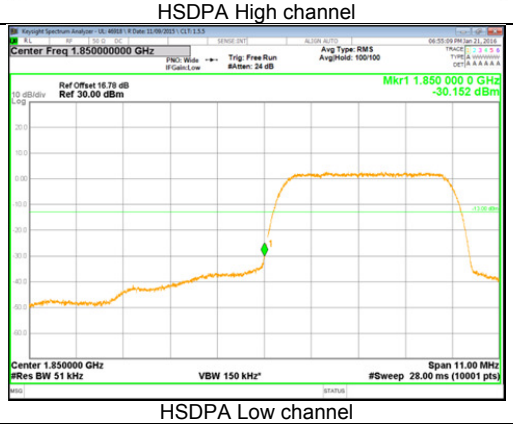
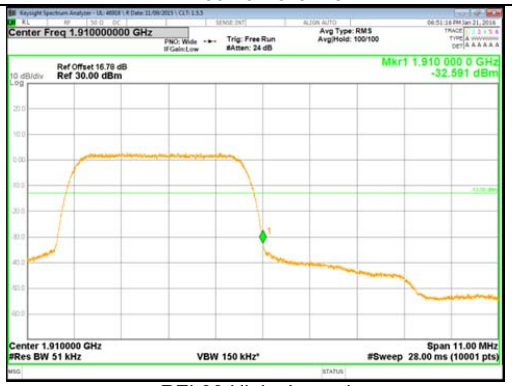
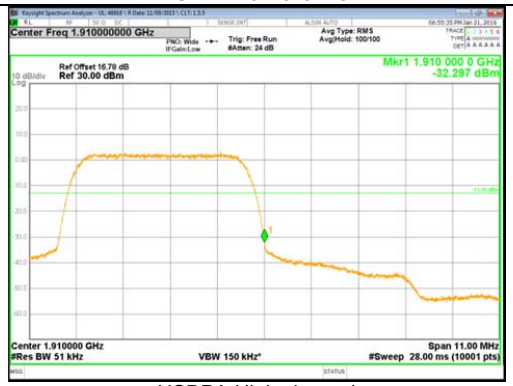
Bandwidth	Mode	Side	RB Status	f [MHz]	Level [dBm]	Limit [dBm]
10 MHz	QPSK	Lower	1RB	704.000	-16.184	-13.00
			FRB	704.000	-27.670	
		Upper	1RB	716.000	-16.439	
			FRB	716.000	-26.432	
	16QAM	Lower	1RB	704.000	-17.954	
			FRB	704.000	-29.663	
		Upper	1RB	716.000	-15.803	
			FRB	716.000	-27.848	
5 MHz	QPSK	Lower	1RB	704.000	-15.252	
			FRB	704.000	-27.193	
		Upper	1RB	716.000	-15.486	
			FRB	716.000	-25.829	
	16QAM	Lower	1RB	704.000	-17.176	
			FRB	704.000	-28.722	
		Upper	1RB	716.000	-15.666	
			FRB	716.000	-26.709	

LTE 5

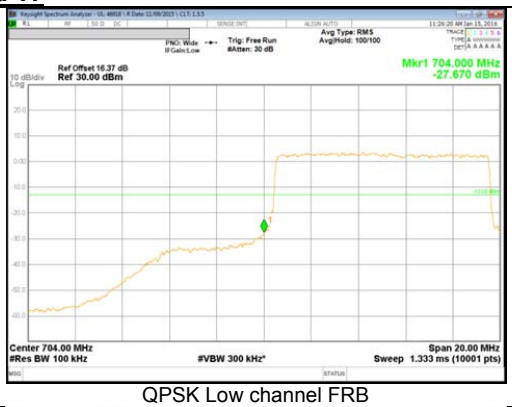
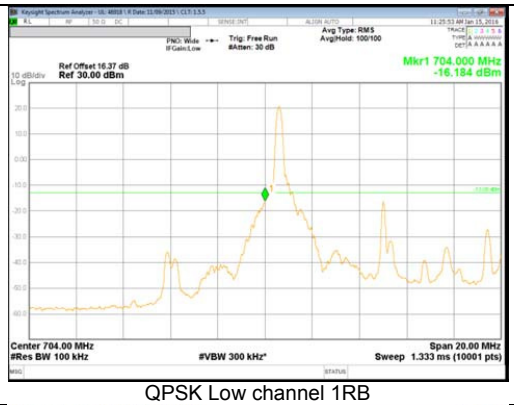
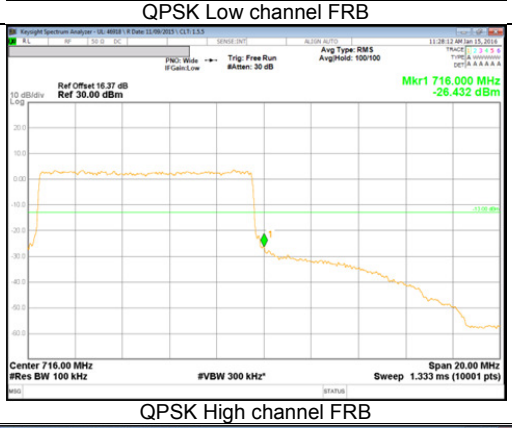
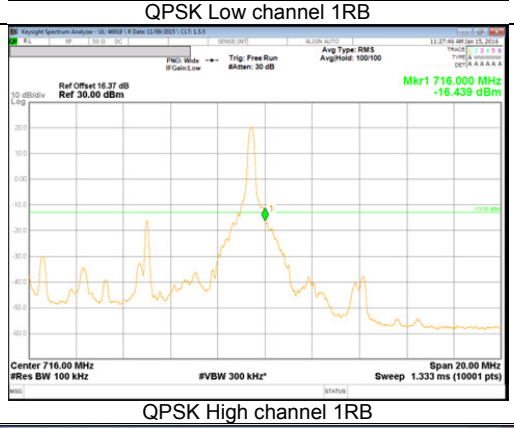
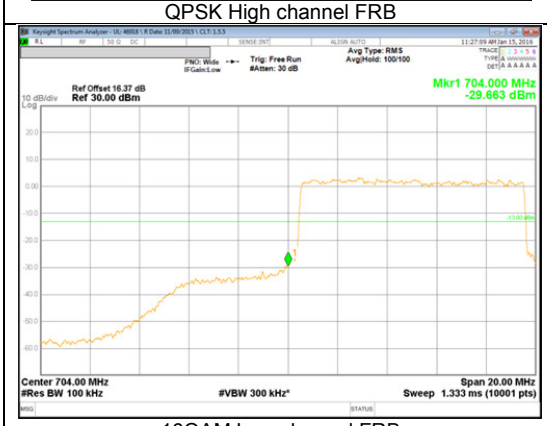
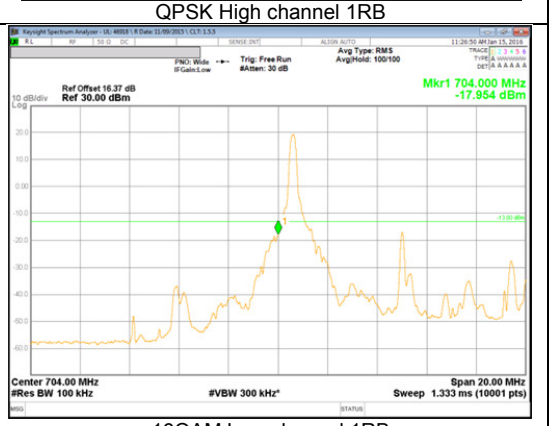
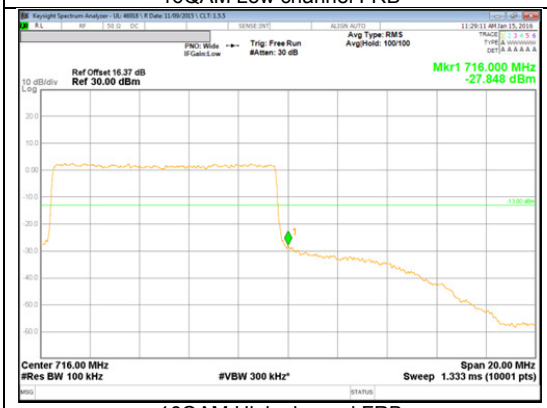
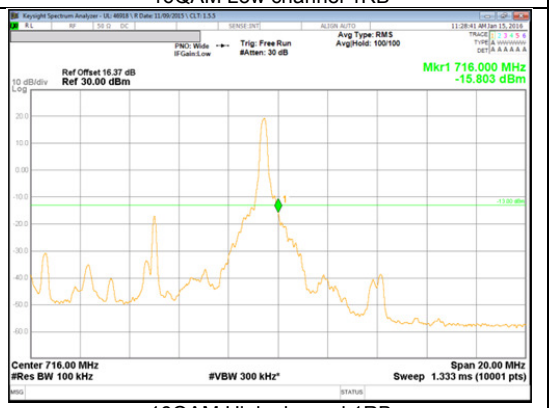
Bandwidth	Mode	Side	RB Status	f [MHz]	Level [dBm]	Limit [dBm]
10 MHz	QPSK	Lower	1RB	824.000	-16.445	-13.00
			FRB	824.000	-28.622	
		Upper	1RB	849.000	-15.956	
			FRB	849.000	-30.154	
	16QAM	Lower	1RB	824.000	-17.677	
			FRB	824.000	-30.148	
		Upper	1RB	849.000	-17.193	
			FRB	849.000	-29.772	
5 MHz	QPSK	Lower	1RB	824.000	-16.029	
			FRB	824.000	-29.113	
		Upper	1RB	849.000	-15.083	
			FRB	849.000	-28.846	
	16QAM	Lower	1RB	824.000	-15.774	
			FRB	824.000	-29.189	
		Upper	1RB	849.000	-16.366	
			FRB	849.000	-29.513	
3 MHz	QPSK	Lower	1RB	824.000	-17.113	
			FRB	824.000	-27.243	
		Upper	1RB	849.000	-15.565	
			FRB	849.000	-28.668	
	16QAM	Lower	1RB	824.000	-17.646	
			FRB	824.000	-29.251	
		Upper	1RB	849.000	-18.046	
			FRB	849.000	-29.701	
1.4 MHz	QPSK	Lower	1RB	824.000	-21.435	
			FRB	824.000	-28.459	
		Upper	1RB	849.000	-22.129	
			FRB	849.000	-27.523	
	16QAM	Lower	1RB	824.000	-22.233	
			FRB	824.000	-28.639	
		Upper	1RB	849.000	-22.329	
			FRB	849.000	-28.123	

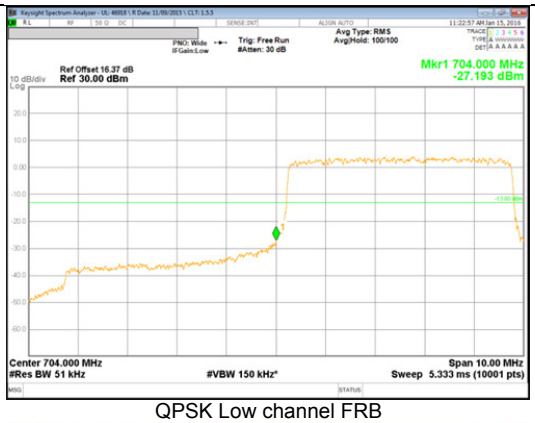
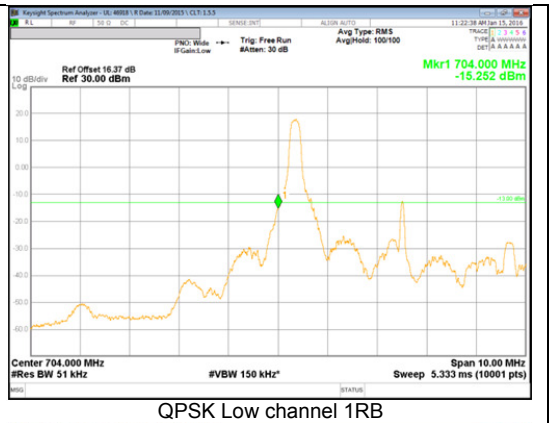
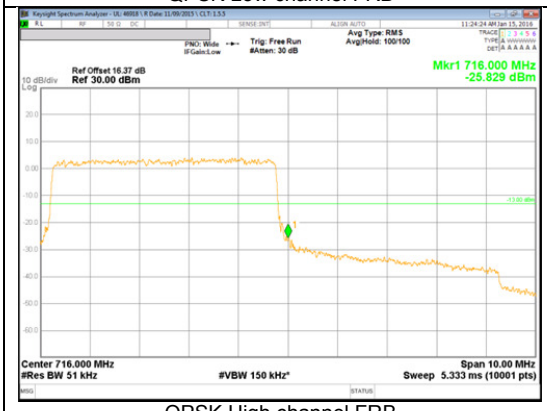
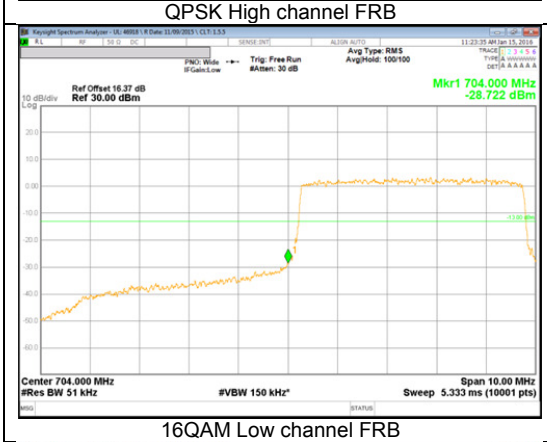
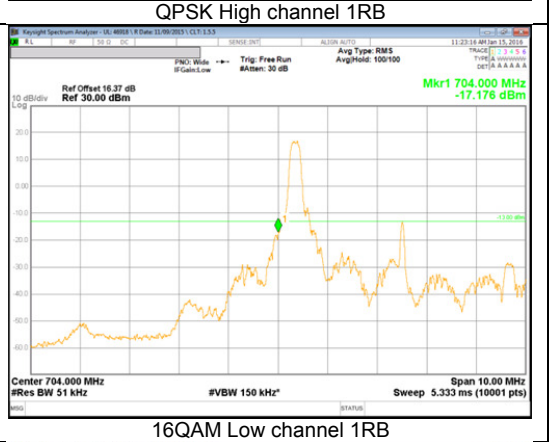
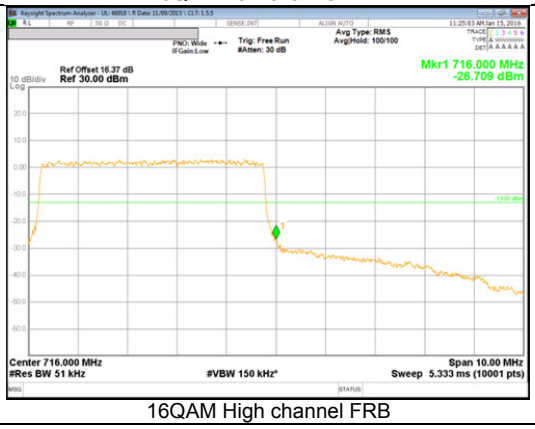
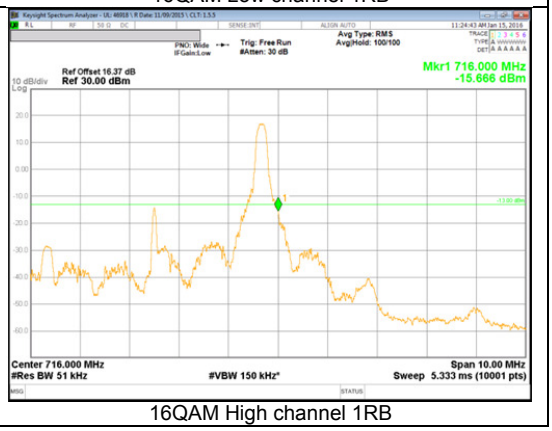
10.2.1. BAND EDGE PLOTS

WCDMA

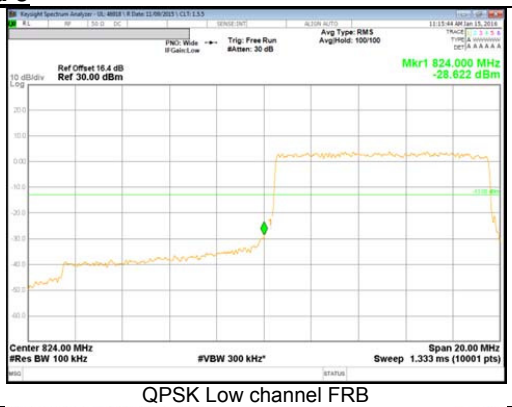
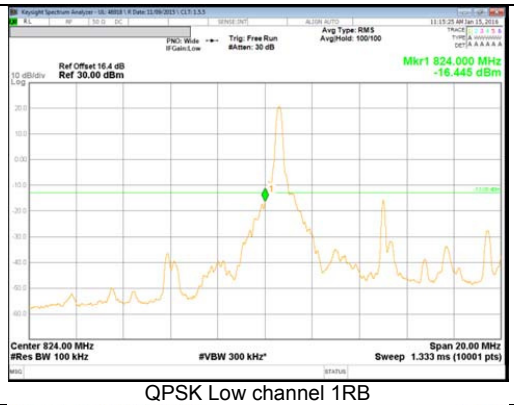
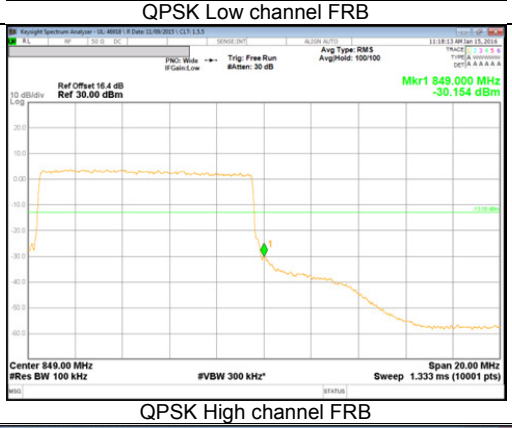
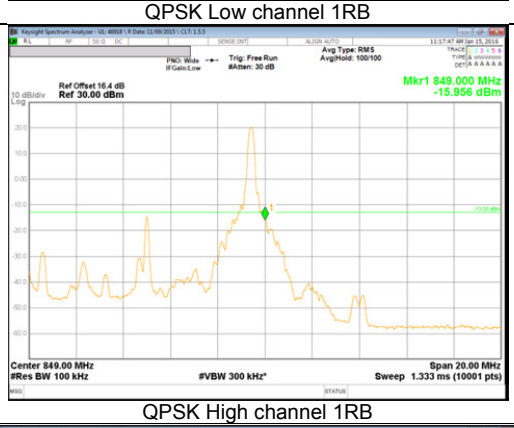
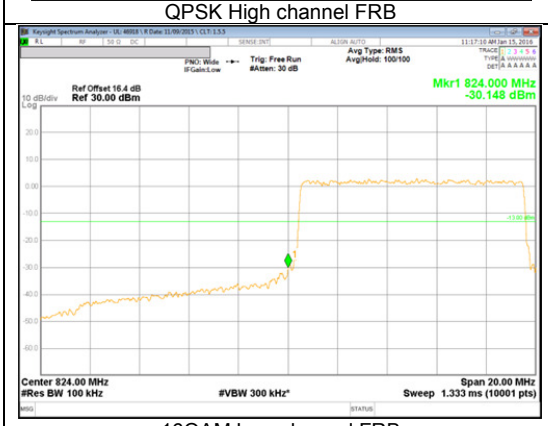
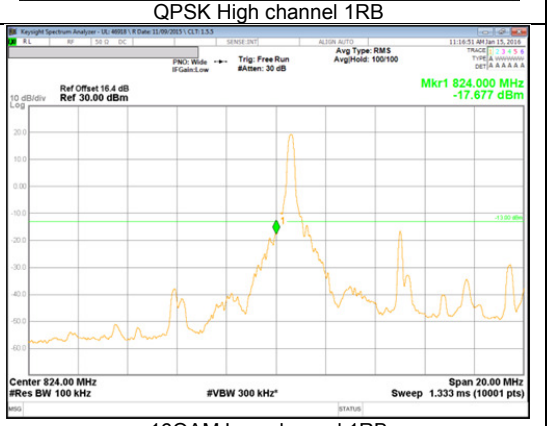
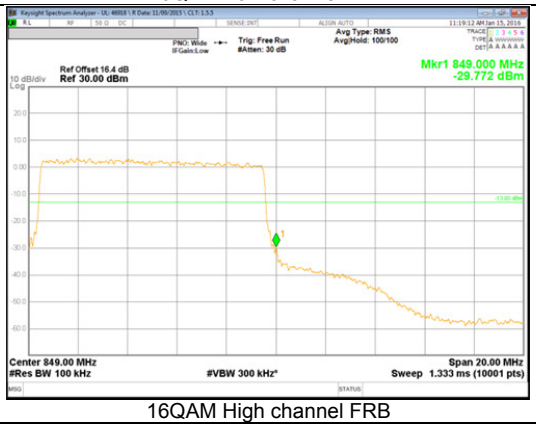
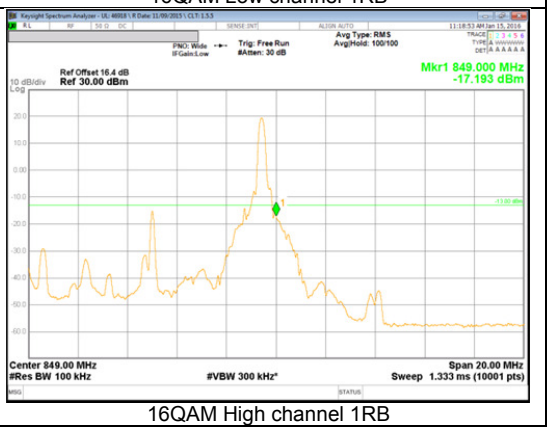
Band 5	 REL99 Low channel	 HSDPA Low channel
	 REL99 High channel	 HSDPA High channel
Band 2	 REL99 Low channel	 HSDPA Low channel
	 REL99 High channel	 HSDPA High channel

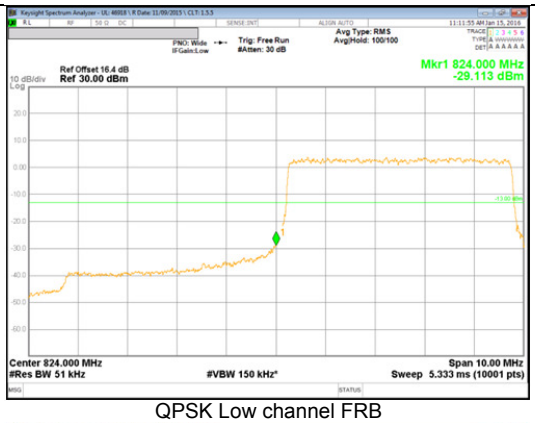
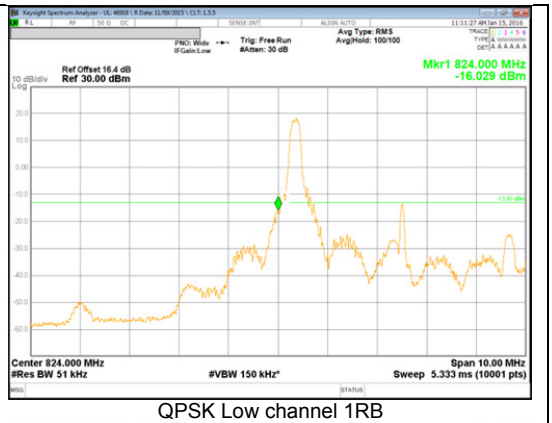
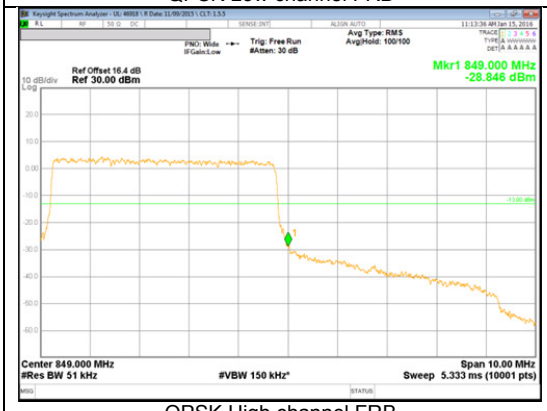
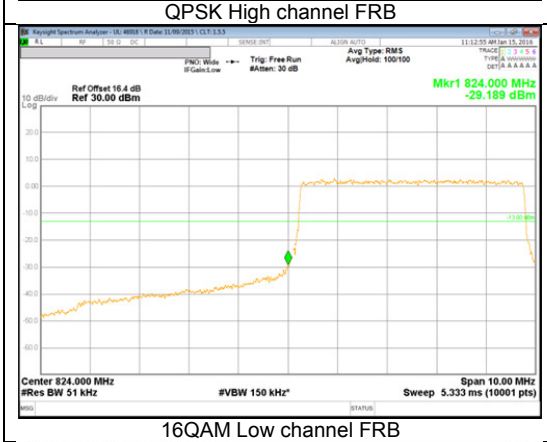
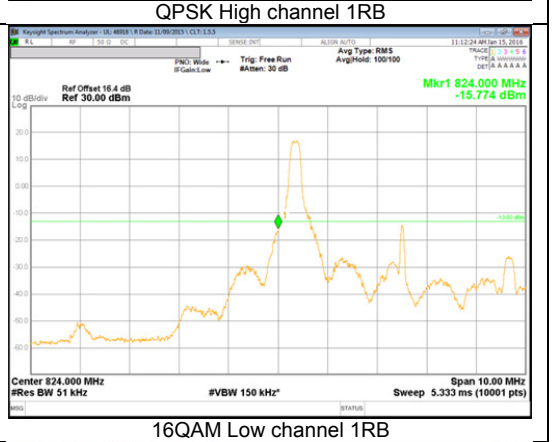
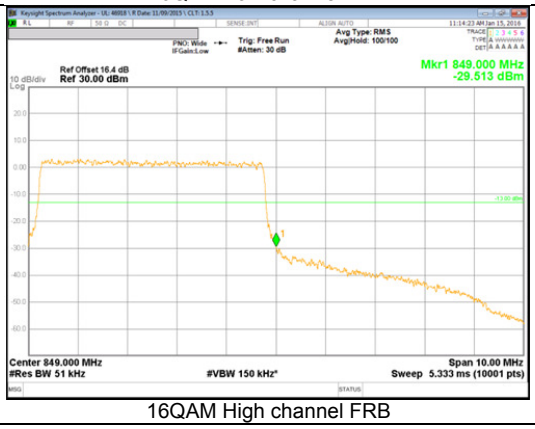
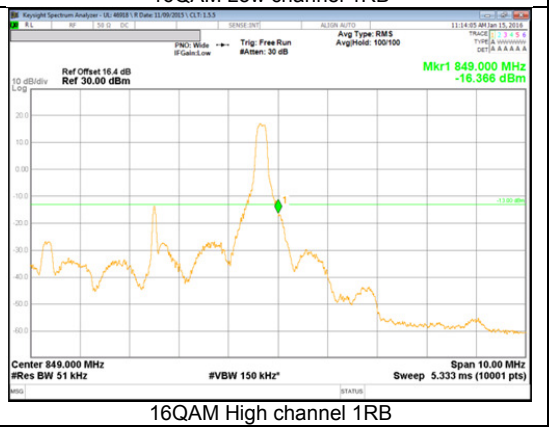
LTE Band 17

Band 17 10MHz	 QPSK Low channel FRB	 QPSK Low channel 1RB
	 QPSK High channel FRB	 QPSK High channel 1RB
	 16QAM Low channel FRB	 16QAM Low channel 1RB
	 16QAM High channel FRB	 16QAM High channel 1RB

Band 17 5MHz	 QPSK Low channel FRB	 QPSK Low channel 1RB
	 QPSK High channel FRB	 QPSK High channel 1RB
	 16QAM Low channel FRB	 16QAM Low channel 1RB
	 16QAM High channel FRB	 16QAM High channel 1RB

LTE Band 5

Band 5 10MHz	 QPSK Low channel FRB	 QPSK Low channel 1RB
	 QPSK High channel FRB	 QPSK High channel 1RB
	 16QAM Low channel FRB	 16QAM Low channel 1RB
	 16QAM High channel FRB	 16QAM High channel 1RB

Band 5 5MHz	 QPSK Low channel FRB	 QPSK Low channel 1RB
	 QPSK High channel FRB	 QPSK High channel 1RB
	 16QAM Low channel FRB	 16QAM Low channel 1RB
	 16QAM High channel FRB	 16QAM High channel 1RB