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

WWAN

CERTIFICATION TEST REPORT

FOR

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

MODEL NUMBER : SM-G600S

FCC ID: A3LSMG600S

REPORT NUMBER: 16K23462-E4V2

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Prepared for
SAMSUNG ELECTRONICS CO., LTD.
129 SAMSUNG-RO, YEONGTONG-GU, SUWON-SI,
GYEONGGI-DO, 16677, KOREA

Prepared by
UL Korea, Ltd. Suwon Laboratory
218 Maeyeong-ro, Yeongtong-gu,
Suwon-si, Gyeonggi-do, 16675, Korea
TEL: (031) 337-9902
FAX: (031) 213-5433

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TABLE OF CONTENTS

1. ATTESTATION OF TEST RESULTS 5

2. TEST METHODOLOGY 6

3. FACILITIES AND ACCREDITATION 6

4. CALIBRATION AND UNCERTAINTY 6

4.1. MEASURING INSTRUMENT CALIBRATION 6

4.2. SAMPLE CALCULATION 6

4.3. MEASUREMENT UNCERTAINTY 6

5. EQUIPMENT UNDER TEST 7

5.1. DESCRIPTION OF EUT 7

5.2. MAXIMUM OUTPUT POWER (GSM) 7

5.3. MAXIMUM OUTPUT POWER (WCDMA) 7

5.4. MAXIMUM OUTPUT POWER (LTE) 8

5.5. DESCRIPTION OF TEST SETUP 10

6. TEST AND MEASUREMENT EQUIPMENT 12

7. Summary Table 13

8. RF POWER OUTPUT VERIFICATION 14

8.1. GSM/GPRS/EDGE 14

8.1.1. GSM OUTPUT POWER RESULT 15

8.2. UMTS REL 99 16

8.2.1. WCDMA OUTPUT POWER RESULT 20

8.3. LTE OUTPUT VERIFICATION 22

8.3.1. LTE OUTPUT POWER RESULT 23

9. PEAK TO AVERAGE RATIO 25

9.1. CONDUCTED PEAK TO AVERAGE RESULT 25

9.2. CONDUCTED PEAK TO AVERAGE PLOTS 27

10. LIMITS AND CONDUCTED RESULTS 30

10.1. OCCUPIED BANDWIDTH 30

10.1.1. OCCUPIED BANDWIDTH RESULTS 30

10.1.2. OCCUPIED BANDWIDTH PLOTS 32

10.2. BAND EDGE EMISSIONS 41

10.2.1. BAND EDGE PLOTS 44

10.3. OUT OF BAND EMISSIONS 52

10.3.1. OUT OF BAND EMISSIONS RESULT 53

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10.3.2. OUT OF BAND EMISSIONS PLOTS 56
10.4. FREQUENCY STABILITY 65
10.4.1. FREQUENCY STABILITY RESULTS 66

11. RADIATED TEST RESULTS 71
11.1. RADIATED POWER (ERP & EIRP) 71
11.1.1. ERP/EIRP Results 72
11.1.2. ERP/EIRP DATA 75
11.2. FIELD STRENGTH OF SPURIOUS RADIATION 84
11.2.1. SPURIOUS RADIATION PLOTS 85

12. SETUP PHOTOS 94

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME:	SAMSUNG ELECTRONICS CO., LTD.
EUT DESCRIPTION:	GSM/WCDMA/LTE Phone + BT/BLE, DTS b/g/n, ANT+ and NFC
MODEL NUMBER:	SM-G600S
SAMPLE IMEI NUMBER:	3599 3607 0010 91, 3599 3607 0010 94 (RADIATED); 3599 3607 0010 93 (CONDUCTED)
DATE TESTED:	MAY 16, 2016 - JUN 02, 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.

Approved & Released For
UL Korea, Ltd. By:



CY Choi
Suwon Lab Engineer
UL Korea, Ltd.

Tested By:



Junwhan Lee
Suwon Lab Engineer
UL Korea, Ltd.

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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%.

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5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is GSM/WCDMA/LTE Phone + BT/BLE, DTS b/g/n, ANT+ and NFC.

5.2. MAXIMUM OUTPUT POWER (GSM)

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]
GSM1900	1850~1910	GMSK	30.75	1188.50		
		GPRS	30.82	1207.81	31.31	1352.07
		EGPRS	25.51	355.63	26.72	469.89

5.3. 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	23.04	201.37	16.69	46.67
		HSDPA	21.96	157.04	16.41	43.75
		HSUPA	22.00	158.49		
Band 2	1850~1910	REL99	22.23	167.11	21.96	157.04
		HSDPA	21.74	149.28	21.41	138.36
		HSUPA	21.78	150.66		

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5.4. 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	23.53	225.42	7.52	5.65
			16QAM	22.99	199.07	7.50	5.62
		5	QPSK	23.43	220.29	4.93	3.11
			16QAM	22.40	173.78	4.95	3.13

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	24.27	267.30	14.25	26.61
			16QAM	23.48	222.84	13.70	23.44
		5	QPSK	24.16	260.62	14.20	26.30
			16QAM	23.34	215.77	13.66	23.23
		3	QPSK	23.80	239.88	13.80	23.99
			16QAM	23.30	213.80	13.30	21.38
		1.4	QPSK	23.78	238.78	11.25	13.34
			16QAM	23.64	231.21	10.79	11.99

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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	-2.48
GSM1900 / WCDMA Band 2 1850 ~ 1910 MHz	-0.19
LTE Band 17 704 ~ 716 MHz	-5.68

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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-TA50KWK	DK1GB23VS/A-E	N/A
Data Cable	SAMSUNG	EP-DG920UWE	N/A	N/A
Earphone	SAMSUNG	EHS64AVFWE	N/A	N/A

I/O CABLES

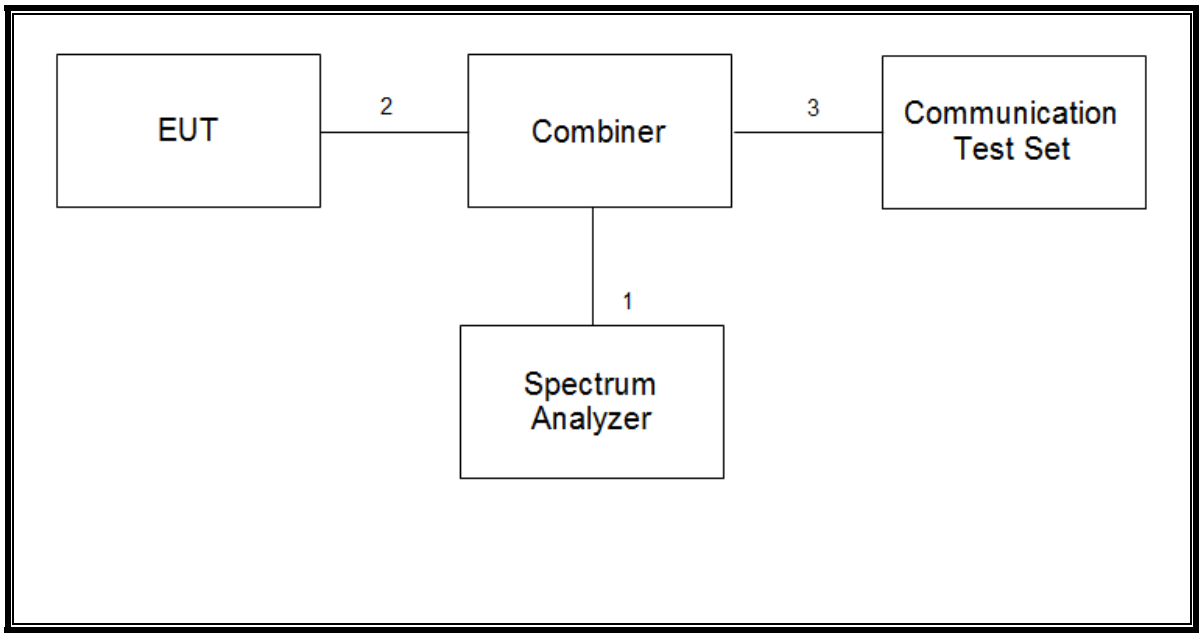
I/O Cable List						
Cable No	Port	# of identical ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	DC Power	1	Mini-USB	Shielded	0.8m	N/A
2	Audio	1	Mini-Jack	Unshielded	1.0m	N/A

TEST SETUP

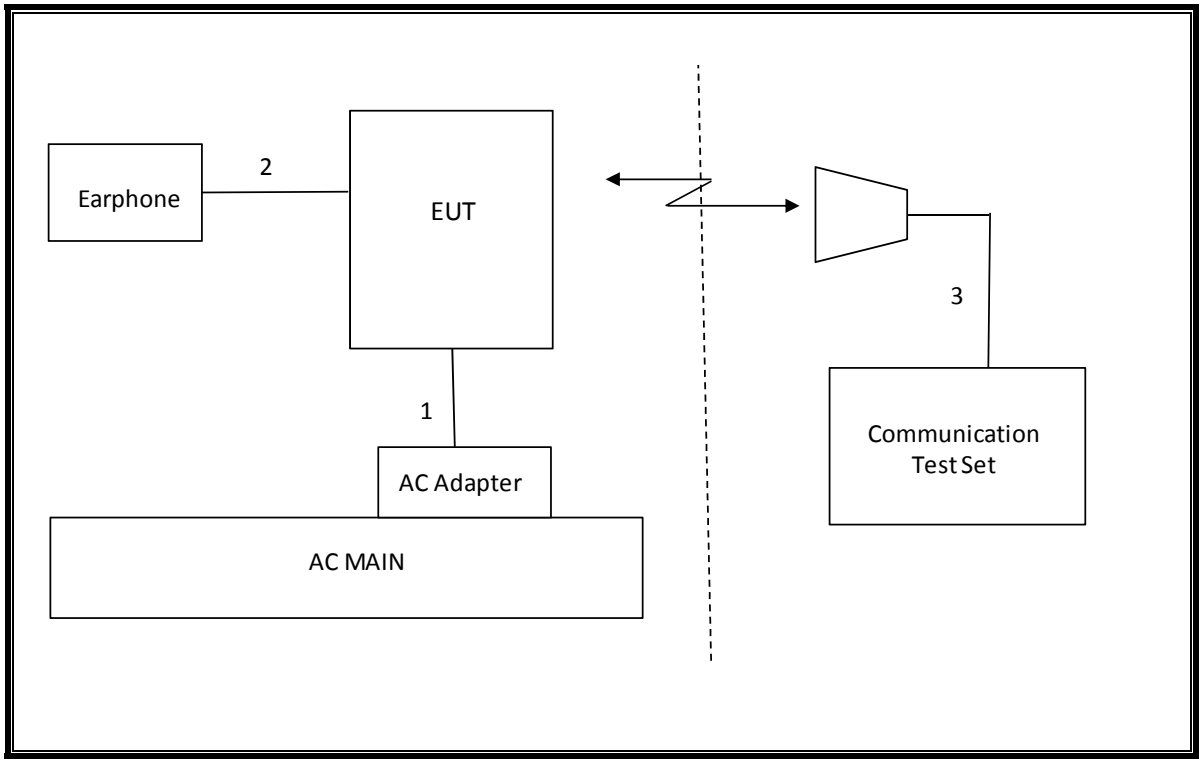
The EUT is continuously communicated to the call box during the tests.

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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	07-28-16
Antenna, Horn, 40 GHz	ETS	3116C	00166155	11-30-17
Antenna, Horn, 40 GHz	ETS	3116C-PA	00168841	12-15-17
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	09-20-16
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	2152	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
Attenuator	PASTERNACK	PE7087-10	A009	08-19-16

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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	8.9879 MHz
22.917(a) 24.238(a) 27.53(g)	Band Edge / Conducted Spurious Emission	-13dBm		Pass	-14.109dBm
2.1046	Conducted output power	N/A		Pass	30.82 dBm
22.355 24.235 27.54	Frequency Stability	2.5PPM		Pass	-0.017PPM
22.913(a)(2)	Effective Radiated Power	38 dBm	Radiated	Pass	16.69 dBm
27.50(c)(10)		34.77dBm		Pass	7.52 dBm
24.232(c)	Equivalent Isotropic Radiated Power	33dBm		Pass	31.31 dBm
22.917(a) 24.238(a) 27.53(g)	Radiated Spurious Emission	-13dBm		Pass	-37.4 dBm

FCC Rule Part	Frequency Range [MHz]	Output Power [W]	Frequency Tolerance	Emission Designator	Emission Bandwidth	Communication Type
GSM						
24E	1850.2 - 1909.8	1.352	2.5 ppm	250KGXW		GSM1900
	1850.2 - 1909.8	0.470	2.5 ppm	246KG7W		EGSM1900
WCDMA						
22H	826.4 - 846.6	0.047	2.5 ppm	4M17F9W		WCDMA BAND5
24E	1852.4 - 1907.6	0.157	2.5 ppm	4M17F9W		WCDMA BAND2
LTE Band 5						
22H	829.0 - 844.0	0.027	2.5 ppm	8M99G7W	10	QPSK
22H	829.0 - 844.0	0.023	2.5 ppm	8M98D7W	10	16QAM
LTE Band 17						
27H	709.0 - 711.0	0.006	2.5 ppm	8M98G7W	10	QPSK
27H	709.0 - 711.0	0.006	2.5 ppm	8M99D7W	10	16QAM

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8. RF POWER OUTPUT VERIFICATION

8.1. GSM/GPRS/EDGE

Function: Menu select > GSM Mobile Station > GSM 850/900/1800/1900
Press Connection control to choose the different menus
Press RESET > choose all to reset all settings
Connection Press Signal Off to turn off the signal and change settings
Network Support > GSM+GPRS or GSM+EGPRS
Main Service > Packet Data
Service selection > Test Mode A – Auto Slot Config. off
MS Signal Press Slot Config bottom on the right twice to select and change the number of time slots and power setting
> Slot configuration > Uplink/Gamma
> 33 dBm for GPRS 850/900
> 30 dBm for GPRS1800/1900
BS Signal Enter the same channel number for TCH channel (test channel) and BCCH channel
Frequency Offset > + 0 Hz
Mode > BCCH and TCH
BCCH Level > -85 dBm (May need to adjust if link is not stable)
BCCH Channel > choose desire test channel [Enter the same channel number for TCH channel (test channel) and BCCH channel]
Channel Type > Off
P0> 4 dB
Slot Config > Unchanged (if already set under MS Signal)
TCH > choose desired test channel
Hopping > Off
Main Timeslot > 3 (Default)
Network Coding Scheme > CS4 (GPRS) and MCS5 ~ MCS9 (EGPRS)
Bit Stream > 2E9-1PSR Bit Pattern
AF/RF Enter appropriate offsets for Ext. Att. Output and Ext. Att. Input
Connection Press Signal On to turn on the signal and change settings

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8.1.1. GSM OUTPUT POWER RESULT

GSM1900 Measured Results

Band	Mode	Coding Scheme	Time Slots	Ch No.	Freq. [MHz]	Max. Power	
						Burst Pwr [dBm]	Frame Pwr [dBm]
1900	GSM (Voice)	CS1	1	512	1850.2	30.75	21.72
				661	1880.0	30.49	21.46
				810	1909.8	30.43	21.40
	GPRS (GMSK)	CS1	1	512	1850.2	30.82	21.79
				661	1880.0	30.55	21.52
				810	1909.8	30.49	21.46
			2	512	1850.2	26.56	20.54
				661	1880.0	26.51	20.49
				810	1909.8	26.53	20.51
			3	512	1850.2	26.30	22.04
				661	1880.0	26.45	22.19
				810	1909.8	26.22	21.96
			4	512	1850.2	24.25	21.24
				661	1880.0	24.33	21.32
				810	1909.8	24.17	21.16
	EGPRS (8PSK)	MCS5	1	512	1850.2	25.51	16.48
				661	1880.0	25.40	16.37
				810	1909.8	25.35	16.32
			2	512	1850.2	23.94	17.92
				661	1880.0	23.86	17.84
				810	1909.8	23.81	17.79
			3	512	1850.2	21.91	17.65
				661	1880.0	22.00	17.74
				810	1909.8	21.85	17.59
			4	512	1850.2	20.43	17.42
				661	1880.0	20.40	17.39
				810	1909.8	20.30	17.29

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8.2. 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			

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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

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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	Proces ses	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.		

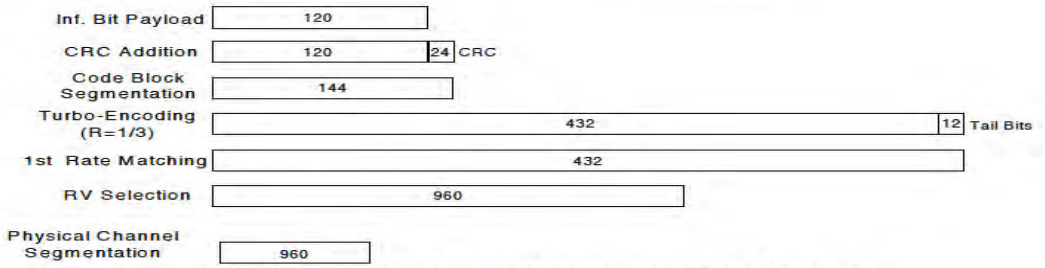


Figure C.8.19: Coding rate for Fixed reference Channel H-Set 12 (QPSK)

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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.

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8.2.1. 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	22.74
			4183	836.6	0	23.04
			4233	846.6	0	22.88
	HSDPA	Subtest 1	4132	826.4	0	21.69
			4183	836.6	0	21.92
			4233	846.6	0	21.96
		Subtest 2	4132	826.4	0	21.29
			4183	836.6	0	21.57
			4233	846.6	0	21.37
		Subtest 3	4132	826.4	0	21.20
			4183	836.6	0	21.44
			4233	846.6	0	21.26
		Subtest 4	4132	826.4	0	20.97
			4183	836.6	0	21.44
			4233	846.6	0	21.27
	HSUPA	Subtest 1	4132	826.4	0	21.20
			4183	836.6	0	21.76
			4233	846.6	0	21.72
		Subtest 2	4132	826.4	0	20.60
			4183	836.6	0	20.55
			4233	846.6	0	20.64
		Subtest 3	4132	826.4	0	20.29
			4183	836.6	0	20.81
			4233	846.6	0	20.00
		Subtest 4	4132	826.4	0	21.22
			4183	836.6	0	21.04
			4233	846.6	0	21.26
		Subtest 5	4132	826.4	0	21.68
			4183	836.6	0	22.00
			4233	846.6	0	21.91

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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	22.02
			9400	1880.0	0	22.15
			9538	1907.6	0	22.23
	HSDPA	Subtest 1	9262	1852.4	0	21.53
			9400	1880.0	0	21.74
			9538	1907.6	0	21.71
		Subtest 2	9262	1852.4	0	21.14
			9400	1880.0	0	21.33
			9538	1907.6	0	21.33
		Subtest 3	9262	1852.4	0	20.90
			9400	1880.0	0	20.84
			9538	1907.6	0	21.15
		Subtest 4	9262	1852.4	0	20.99
			9400	1880.0	0	20.82
			9538	1907.6	0	20.93
	HSUPA	Subtest 1	9262	1852.4	0	21.27
			9400	1880.0	0	21.52
			9538	1907.6	0	21.12
		Subtest 2	9262	1852.4	0	19.88
			9400	1880.0	0	20.00
			9538	1907.6	0	19.80
		Subtest 3	9262	1852.4	0	20.27
			9400	1880.0	0	20.26
			9538	1907.6	0	20.60
		Subtest 4	9262	1852.4	0	20.51
			9400	1880.0	0	20.64
			9538	1907.6	0	20.90
		Subtest 5	9262	1852.4	0	21.54
			9400	1880.0	0	21.77
			9538	1907.6	0	21.78

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8.3. 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.					

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8.3.1. 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	23.28
		1	25	0	23.24
		1	49	0	23.53
		25	0	2	20.68
		25	12	2	20.69
		25	25	2	20.75
		50	0	2	20.65
	16QAM	1	0	1	22.69
		1	25	1	22.99
		1	49	1	22.90
		25	0	2	20.81
		25	12	2	20.65
		25	25	2	20.83
		50	0	2	20.77
BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Avg Pwr (dBm)
					23790
					710 MHz
5	QPSK	1	0	0	23.17
		1	12	0	23.43
		1	24	0	22.94
		12	0	2	20.59
		12	7	2	20.56
		12	13	2	20.74
		25	0	2	20.64
	16QAM	1	0	1	22.40
		1	12	1	22.31
		1	24	1	22.31
		12	0	2	20.52
		12	7	2	20.63
		12	13	2	20.80
		25	0	2	20.64

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LTE Band 5 Measured Results

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	23.92	23.88	24.27
			1	25	0	24.00	23.61	23.66
			1	49	0	23.48	23.63	23.44
			25	0	2	21.32	21.11	21.21
			25	12	2	21.31	21.20	21.08
			25	25	2	21.10	21.46	21.04
			50	0	2	21.17	21.21	21.25
		16QAM	1	0	1	23.02	23.27	23.33
			1	25	1	23.48	23.17	23.28
			1	49	1	23.28	23.13	22.61
			25	0	3	20.94	20.64	20.76
			25	12	3	20.82	20.69	20.58
			25	25	3	20.69	21.12	20.63
			50	0	3	20.69	20.75	20.73
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	23.41	23.51	23.56
			1	12	0	23.70	23.84	23.65
			1	24	0	23.99	24.16	23.54
			12	0	2	21.01	21.07	21.11
			12	7	2	21.25	20.91	21.14
			12	13	2	21.50	21.12	21.08
			25	0	2	21.29	21.16	21.09
		16QAM	1	0	1	23.03	22.93	23.34
			1	12	1	22.84	22.77	23.32
			1	24	1	23.10	23.14	23.14
			12	0	3	20.55	20.78	20.65
			12	7	3	20.77	20.32	20.60
			12	13	3	21.10	20.45	20.57
			25	0	3	20.99	20.50	20.56
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	23.53	23.58	23.56
			1	8	0	23.59	23.70	23.59
			1	14	0	23.80	23.78	23.39
			8	0	2	21.01	21.11	21.18
			8	4	2	21.03	20.96	21.05
			8	7	2	21.05	20.94	21.03
			15	0	2	21.14	21.03	21.09
		16QAM	1	0	1	22.91	22.77	22.92
			1	8	1	23.30	23.18	22.50
			1	14	1	23.28	23.23	22.44
			8	0	3	20.66	20.25	20.73
			8	4	3	20.80	20.22	20.62
			8	7	3	20.72	20.15	20.57
			15	0	3	20.61	20.59	20.57
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	23.78	23.49	23.49
			1	3	0	23.71	23.54	23.52
			1	5	0	23.66	23.44	23.37
			3	0	0	23.64	23.41	23.52
			3	1	0	23.65	23.53	23.50
			3	3	0	23.69	23.54	23.51
			6	0	2	21.09	21.13	20.95
		16QAM	1	0	1	23.37	22.83	23.22
			1	3	1	23.47	23.03	23.13
			1	5	1	23.64	22.92	23.21
			3	0	1	22.71	23.03	22.78
			3	1	1	22.87	23.06	22.82
			3	3	1	22.79	23.01	22.85
			6	0	3	20.51	20.69	20.61

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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

GSM

Band	Channel	f [MHz]	Mode	Ratio [dB]	Limit [dB]
GSM1900	661	1880.0	GPRS	2.85	13.00
			EGPRS	5.75	

WCDMA

Band	Channel	f [MHz]	Mode	Ratio [dB]	Limit [dB]
Band 5	4183	836.6	REL99	2.75	13.00
			HSDPA	3.05	
Band 2	9400	1880.0	REL99	2.95	
			HSDPA	3.08	

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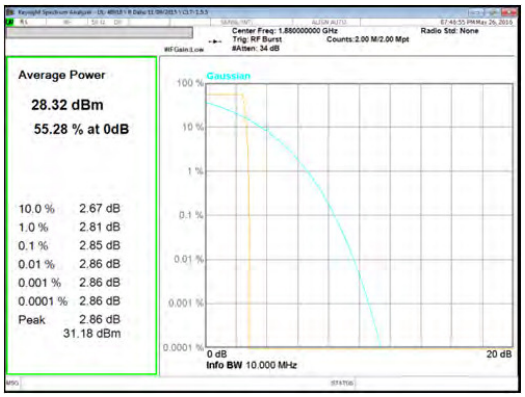
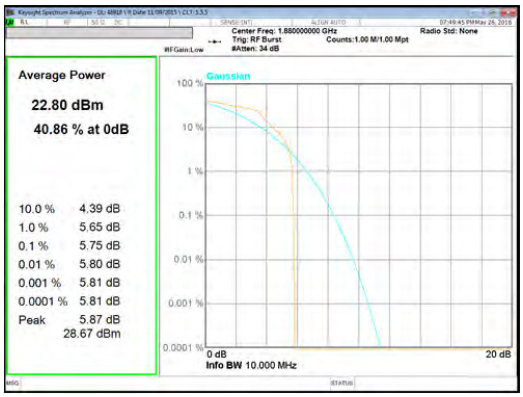
LTE

Band	BW [MHz]	Channel	f [MHz]	Mode	Ratio [dB]	Limit [dB]
Band 17	10	23790	710	QPSK	3.12	13.00
				16QAM	3.45	
	5			QPSK	3.29	
				16QAM	3.48	
Band 5	10	20525	836.5	QPSK	3.05	
				16QAM	3.24	
	5			QPSK	2.82	
				16QAM	3.84	
	3			QPSK	3.06	
				16QAM	3.32	
	1.4			QPSK	3.09	
				16QAM	3.48	

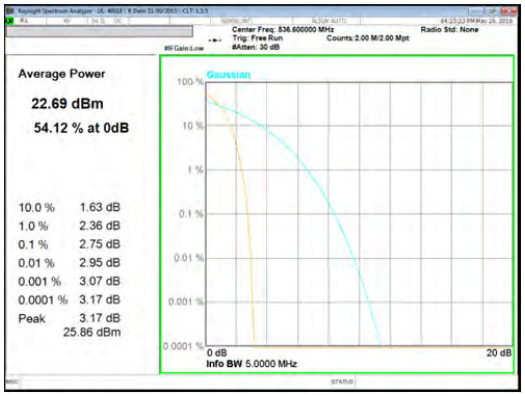
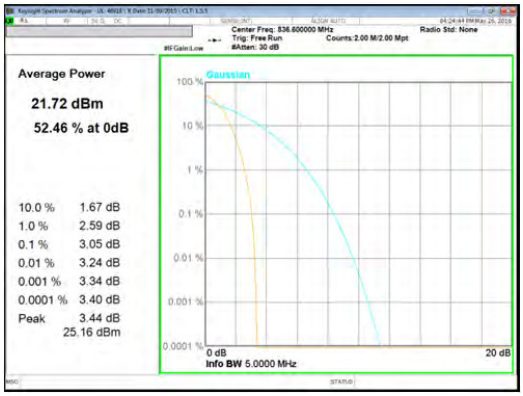
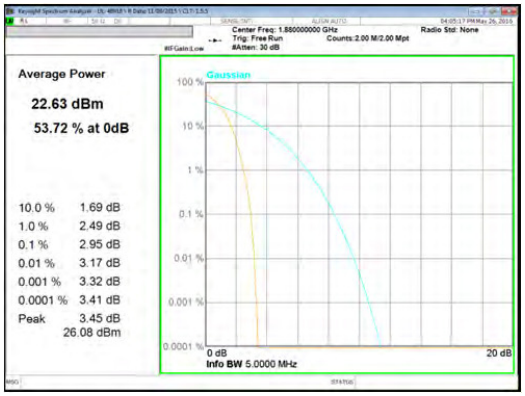
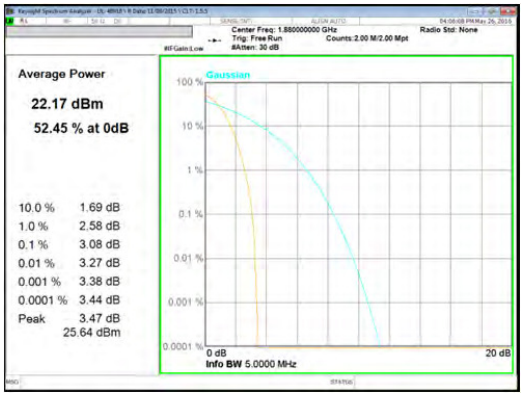
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9.2. CONDUCTED PEAK TO AVERAGE PLOTS

GSM

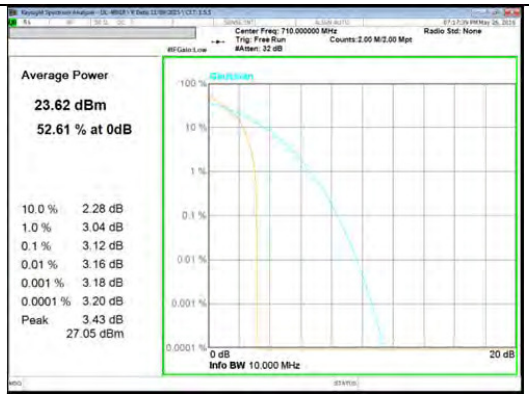
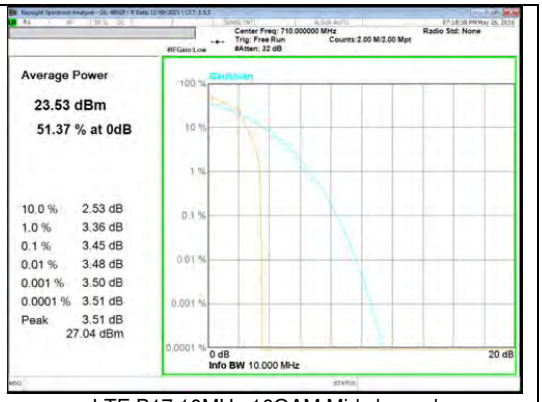
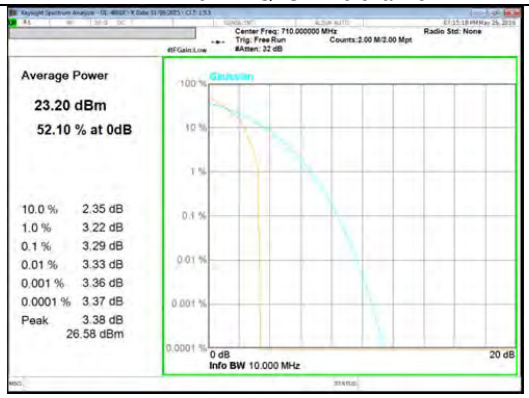
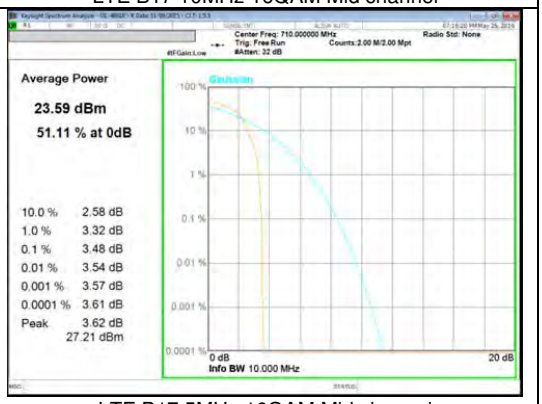
GSM 1900	 GSM1900 GPRS Mid channel	 GSM1900 EGPRS Mid channel

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

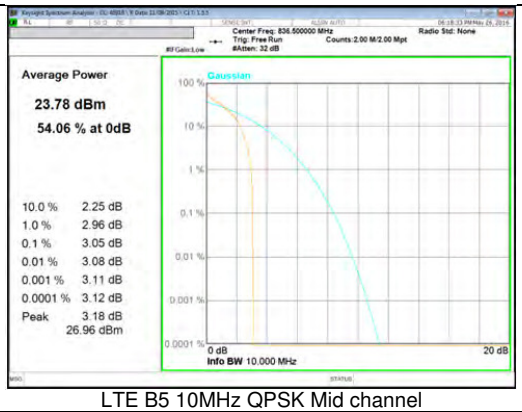
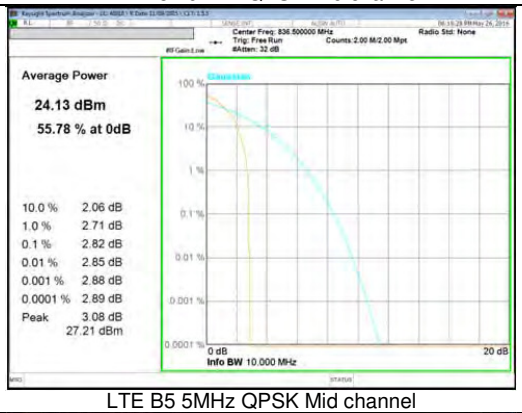
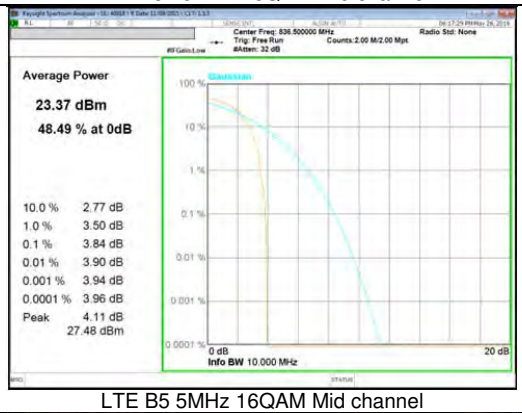
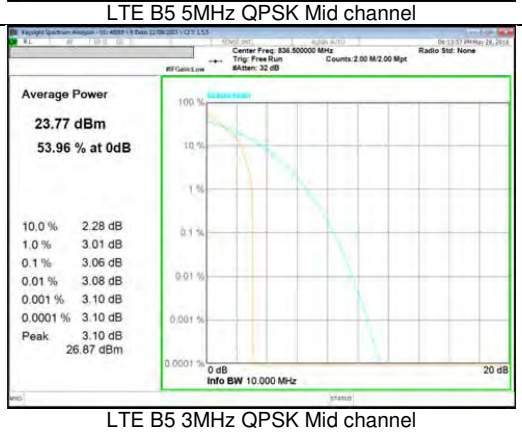
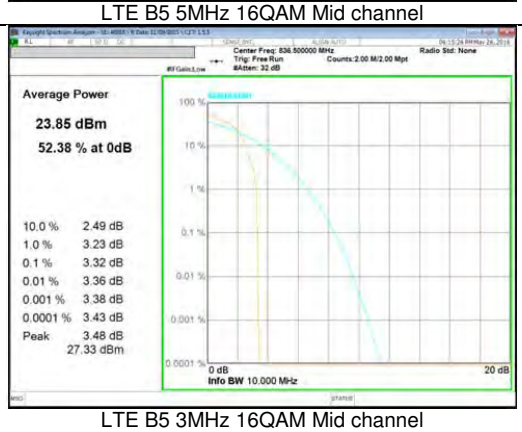
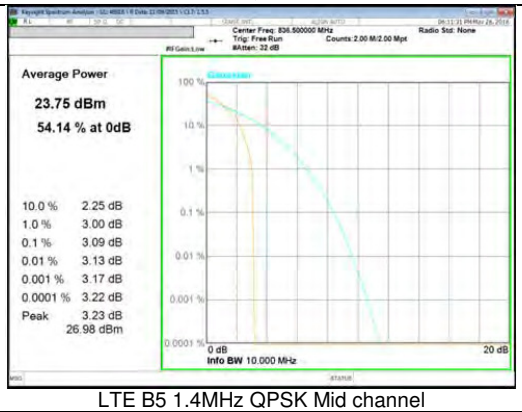
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LTE Band 17

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

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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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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

GSM

Band	Mode	Channel	f [MHz]	99% BW [KHz]	26dB BW [KHz]
GSM1900	GPRS	512	1850.2	246.31	315.6
		661	1880.0	240.00	310.0
		810	1909.8	249.85	320.2
	EGPRS	512	1850.2	245.56	300.4
		661	1880.0	242.59	298.9
		810	1909.8	240.59	305.9

WCDMA

Band	Mode	Channel	f [MHz]	99% BW [MHz]	26dB BW [MHz]
Band 5	REL99	4132	826.4	4.1654	4.626
		4183	836.6	4.1620	4.627
		4233	846.6	4.1538	4.620
	HSDPA	4132	826.4	4.1564	4.610
		4183	836.6	4.1568	4.619
		4233	846.6	4.1431	4.619
Band 2	REL99	9262	1852.4	4.1661	4.623
		9400	1880.0	4.1636	4.620
		9538	1907.6	4.1712	4.626
	HSDPA	9262	1852.4	4.1660	4.618
		9400	1880.0	4.1642	4.609
		9538	1907.6	4.1721	4.608

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LTE Band 17

Band	BW [MHz]	Channel	f [MHz]	Mode	99% BW [MHz]	26dB BW [MHz]
Band 17	10	23780	709.0	QPSK	8.9643	9.845
				16QAM	8.9489	9.817
		23790	710.0	QPSK	8.9808	9.849
				16QAM	8.9490	9.792
		23799	711.0	QPSK	8.9596	9.773
				16QAM	8.9879	9.857
	5	23755	706.5	QPSK	4.4872	5.007
				16QAM	4.4992	4.989
		23790	710.0	QPSK	4.4908	4.914
				16QAM	4.4993	4.977
		23824	713.5	QPSK	4.4975	4.934
				16QAM	4.5022	4.961

LTE Band 5

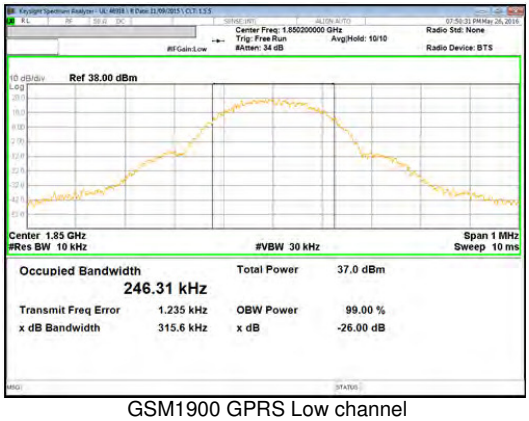
Band	BW [MHz]	Channel	f [MHz]	Mode	99% BW [MHz]	26dB BW [MHz]
Band 5	10	20450	829.0	QPSK	8.9867	9.872
				16QAM	8.9730	9.807
		20524	836.5	QPSK	8.9805	9.820
				16QAM	8.9574	9.819
		20599	844.0	QPSK	8.9651	9.839
				16QAM	8.9812	9.803
	5	20425	826.5	QPSK	4.4996	4.973
				16QAM	4.5037	4.979
		20524	836.5	QPSK	4.5009	4.991
				16QAM	4.4993	4.956
		20624	846.5	QPSK	4.4897	4.916
				16QAM	4.4972	4.985
	3	20415	825.5	QPSK	2.6940	2.959
				16QAM	2.7022	2.961
		20524	836.5	QPSK	2.6951	2.968
				16QAM	2.6918	2.959
		20634	847.5	QPSK	2.6967	2.978
				16QAM	2.6900	2.987
	1.4	20407	824.7	QPSK	1.0804	1.273
				16QAM	1.0852	1.269
		20524	836.5	QPSK	1.0861	1.292
				16QAM	1.0902	1.288
		20624	848.3	QPSK	1.0798	1.275
				16QAM	1.0846	1.294

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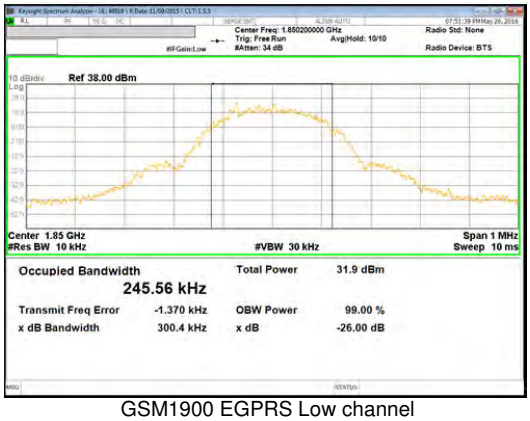
10.1.2. OCCUPIED BANDWIDTH PLOTS

GSM 1900

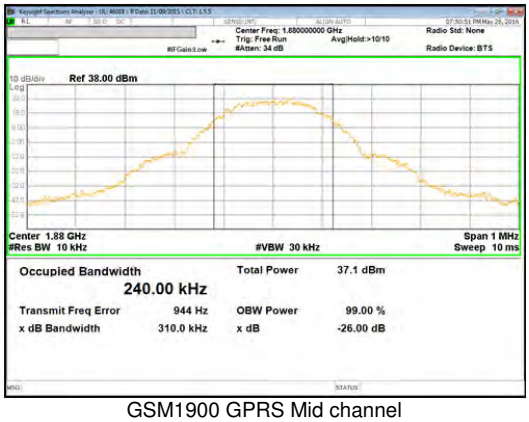
GSM



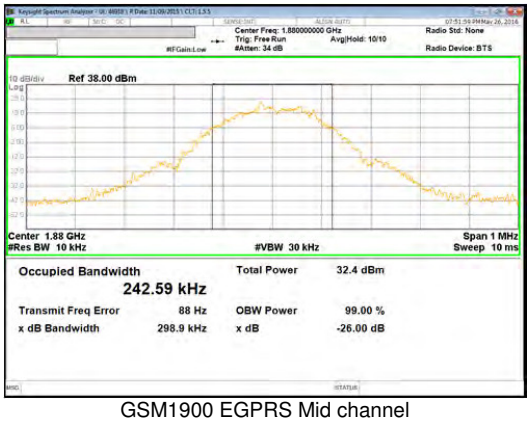
GSM1900 GPRS Low channel



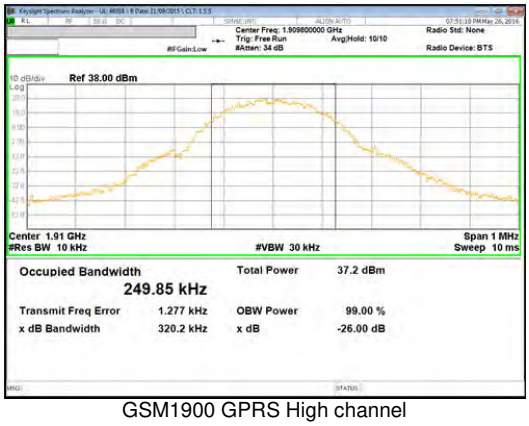
GSM1900 EGPRS Low channel



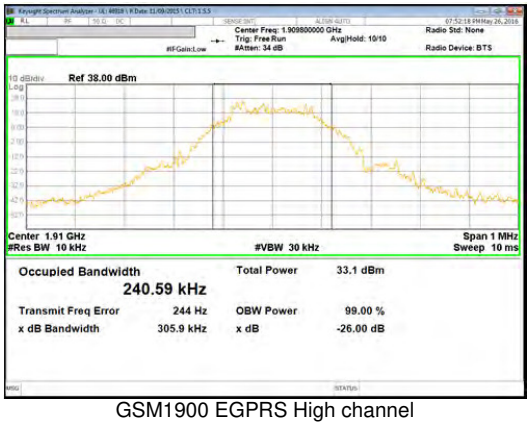
GSM1900 GPRS Mid channel



GSM1900 EGPRS Mid channel



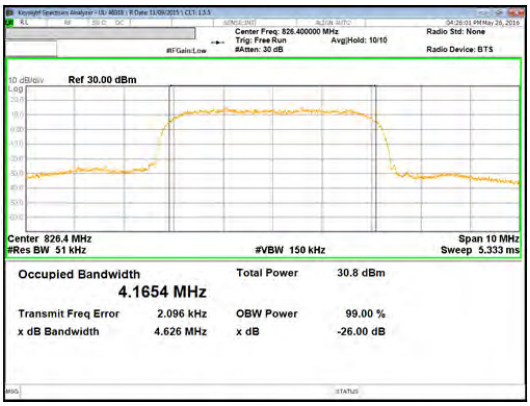
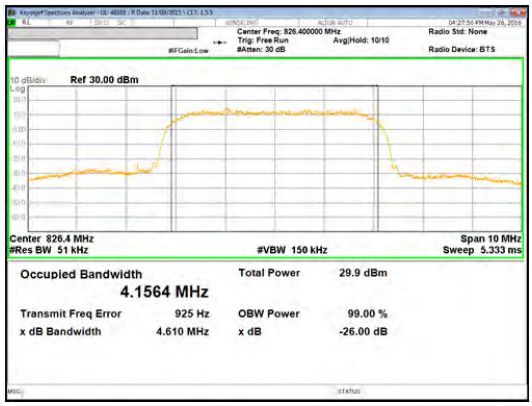
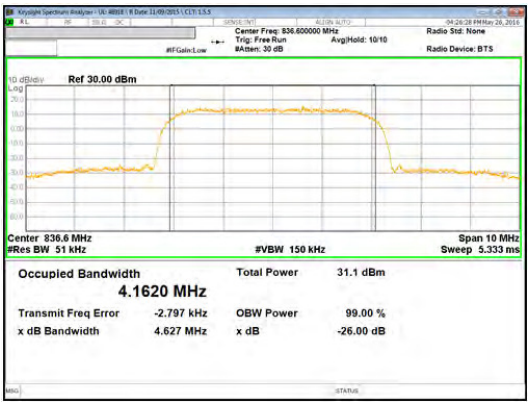
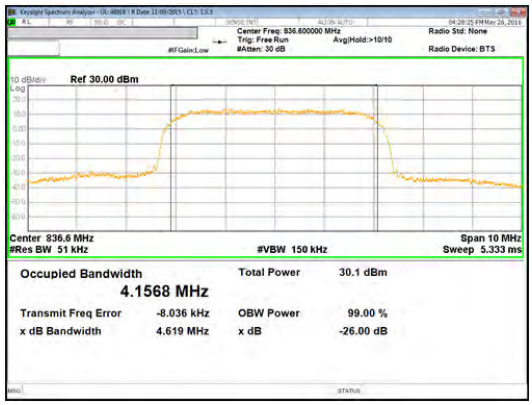
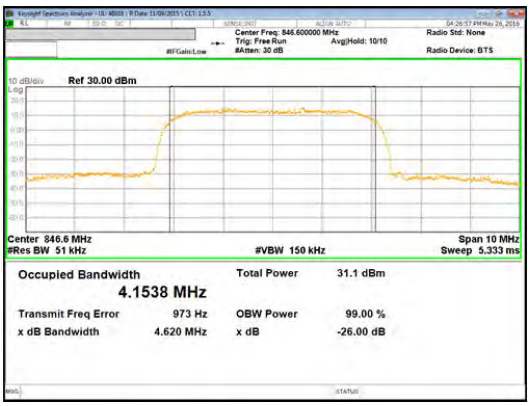
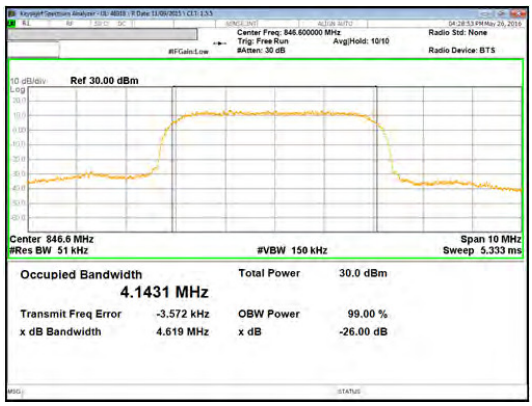
GSM1900 GPRS High channel



GSM1900 EGPRS High channel

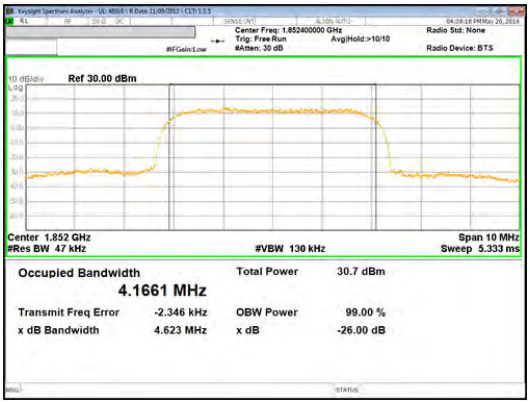
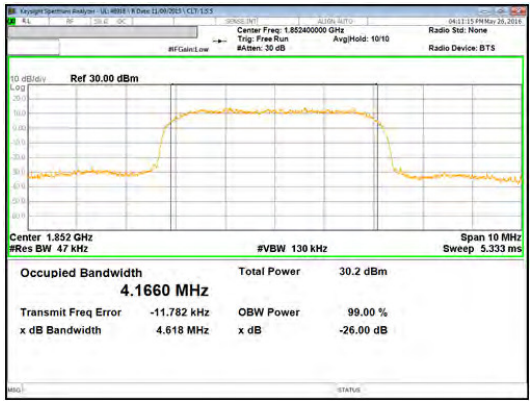
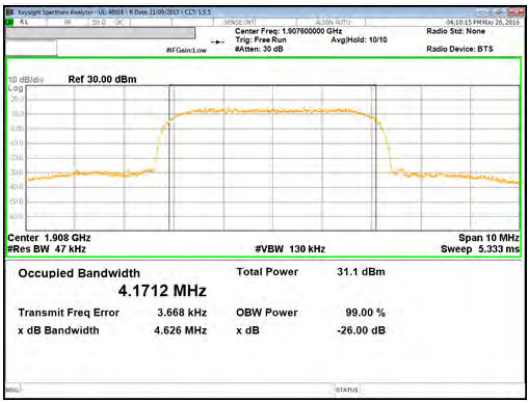
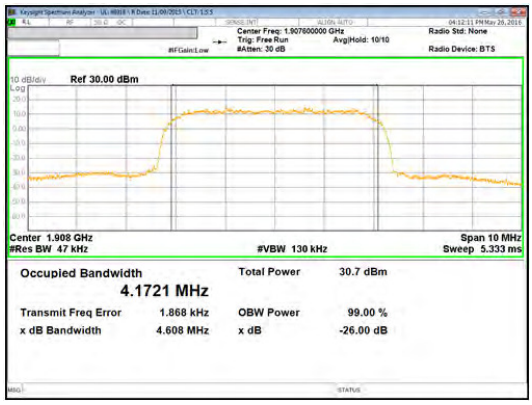
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WCDMA Band 5

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

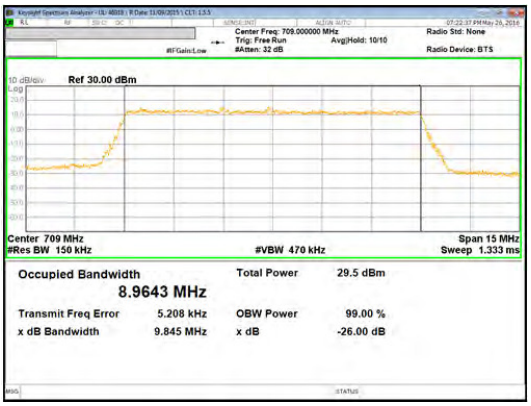
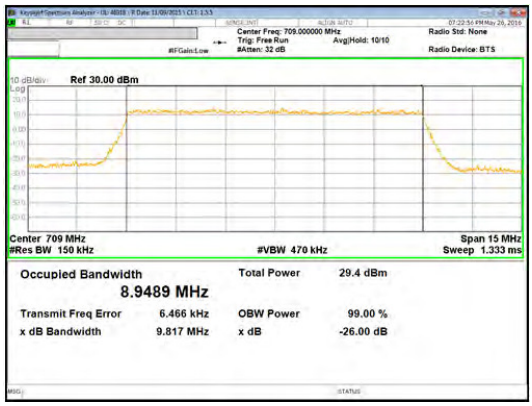
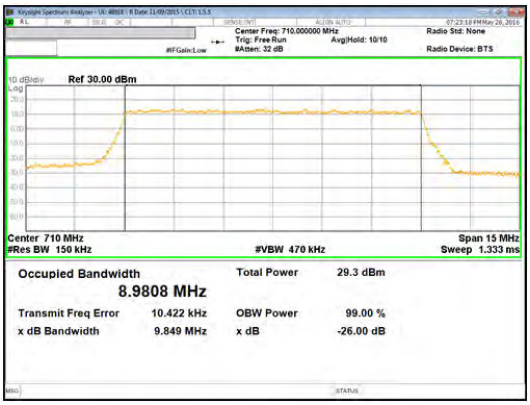
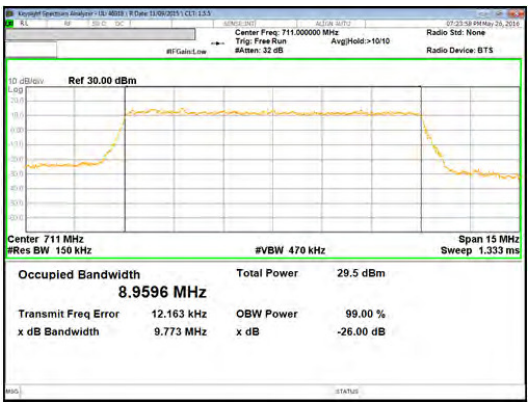
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WCDMA Band 2

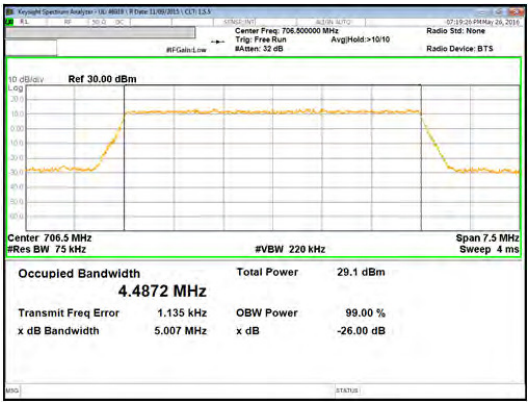
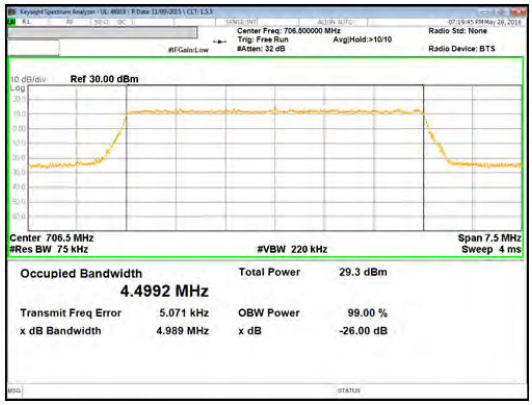
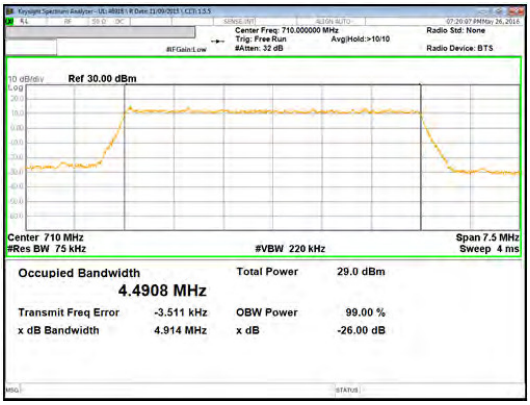
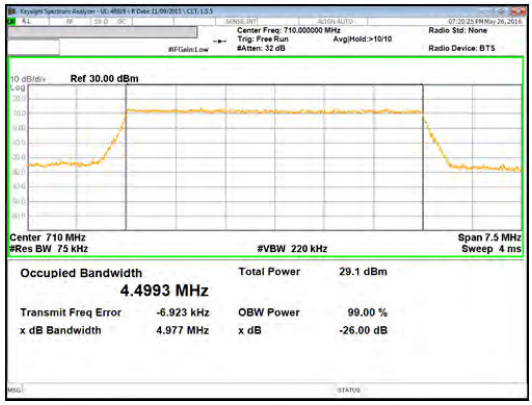
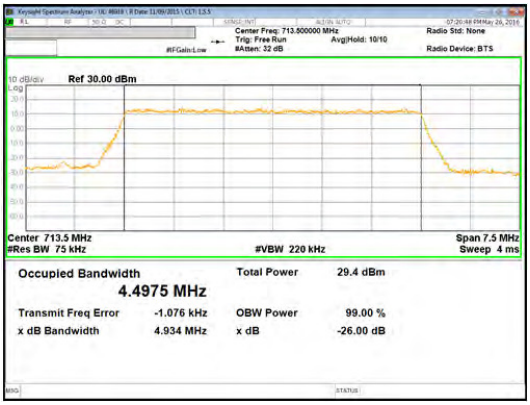
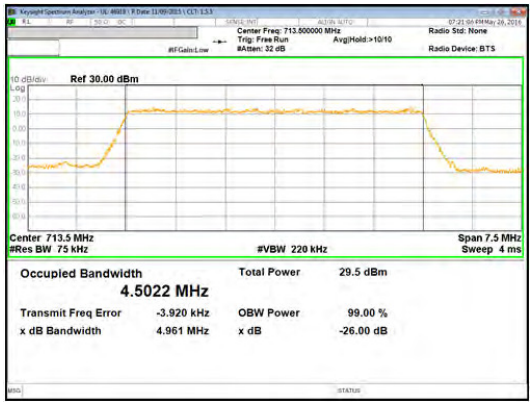
Band 2	 REL99 Low channel	 HSDPA Low channel
	 REL99 Mid channel	 HSDPA Mid channel
	 REL99 High channel	 HSDPA High channel

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LTE Band 17

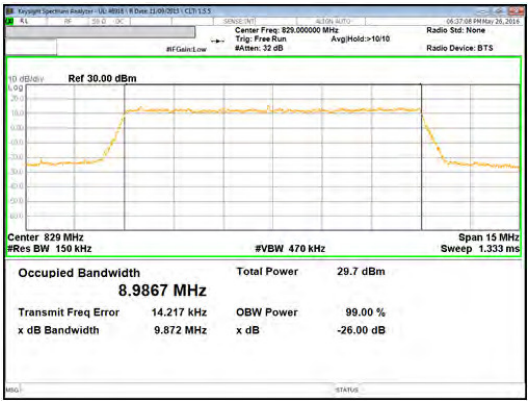
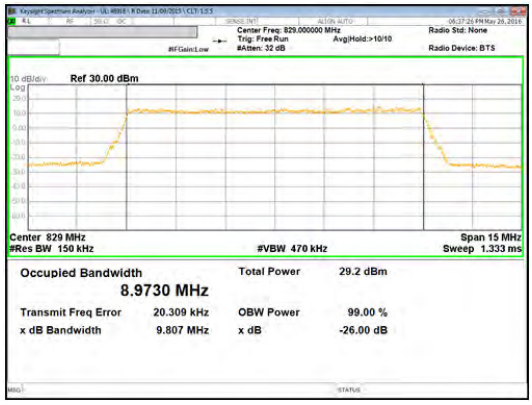
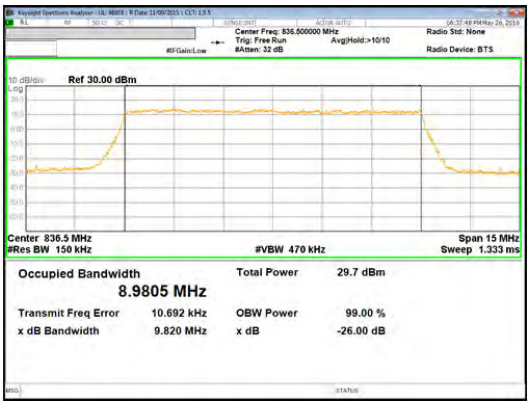
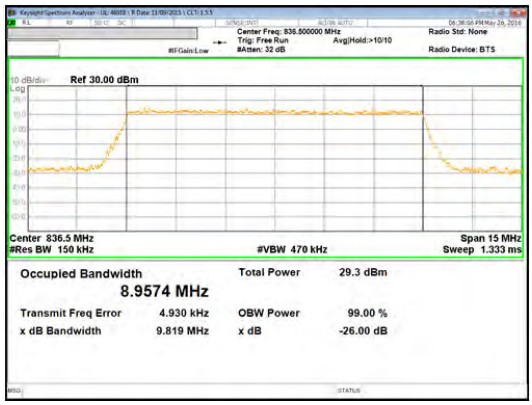
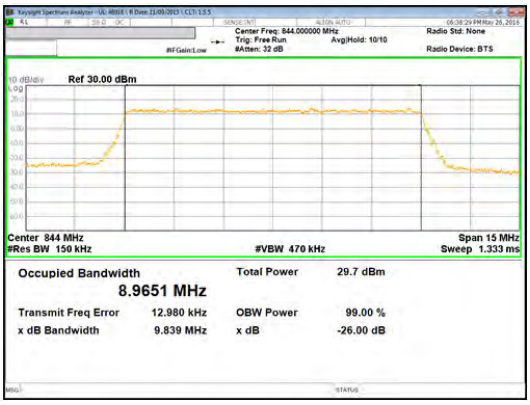
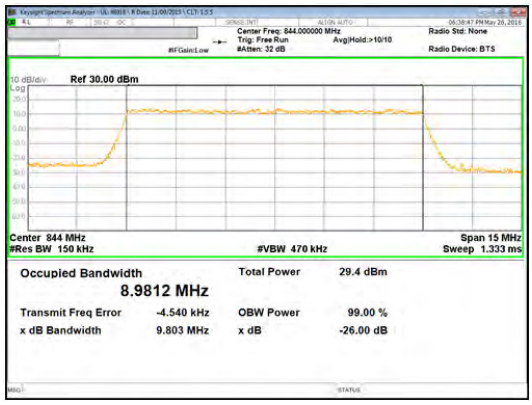
Band 17 10MHz	 10MHz QPSK Low channel	 10MHz 16QAM Low channel
	 10MHz QPSK Mid channel	 10MHz 16QAM Mid channel
	 10MHz QPSK High channel	 10MHz 16QAM High channel

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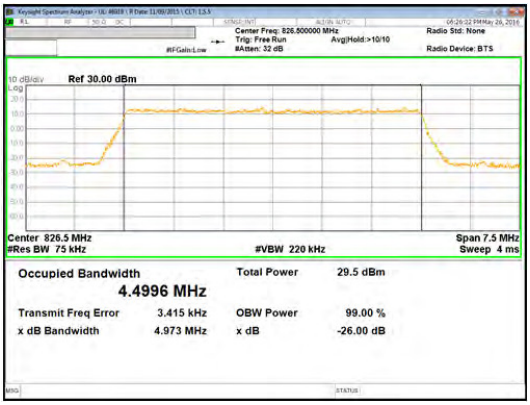
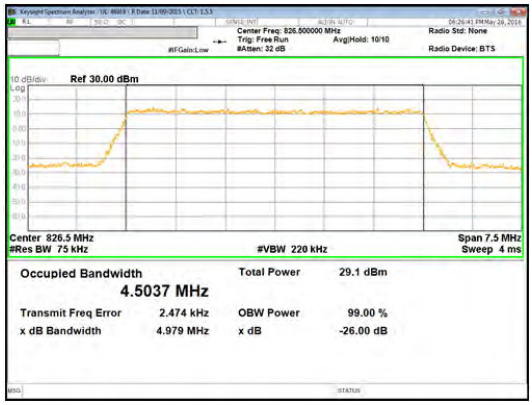
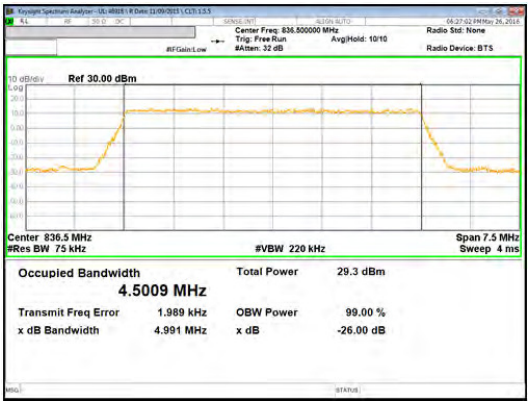
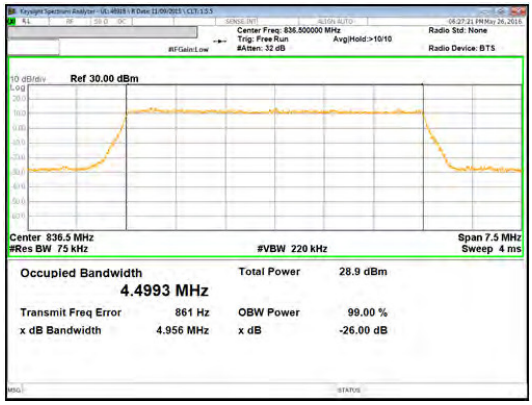
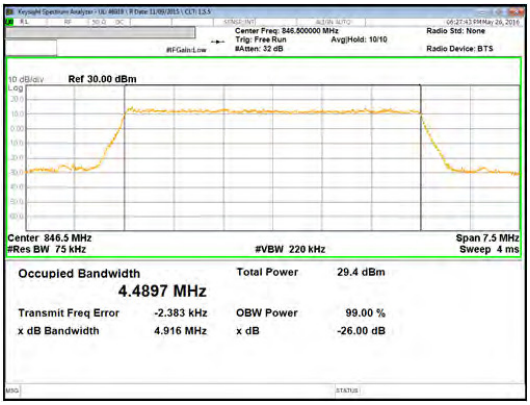
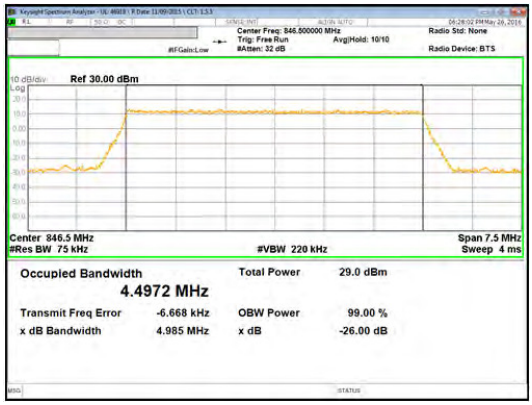
Band 17 5MHz	 5MHz QPSK Low channel	 5MHz 16QAM Low channel
	 5MHz QPSK Mid channel	 5MHz 16QAM Mid channel
	 5MHz QPSK High channel	 5MHz 16QAM High channel

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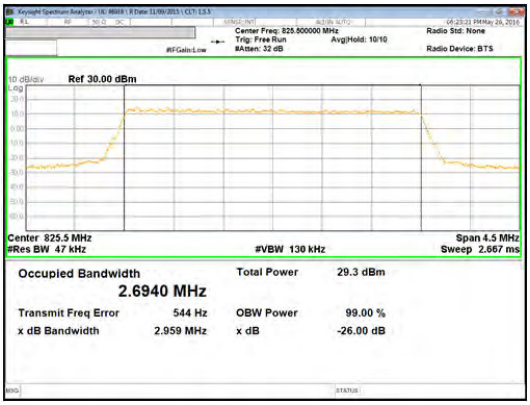
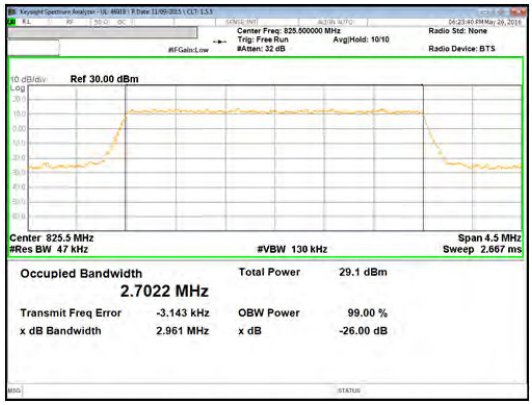
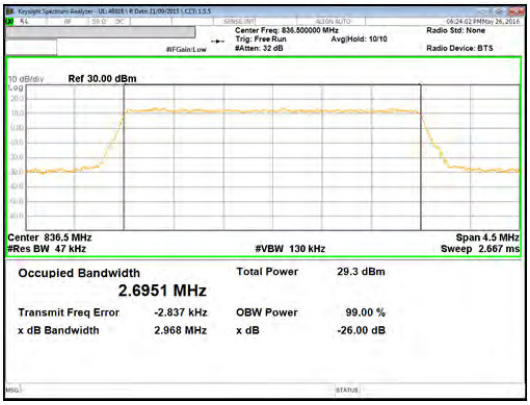
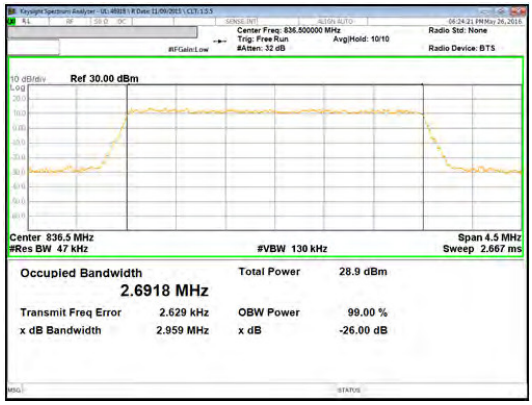
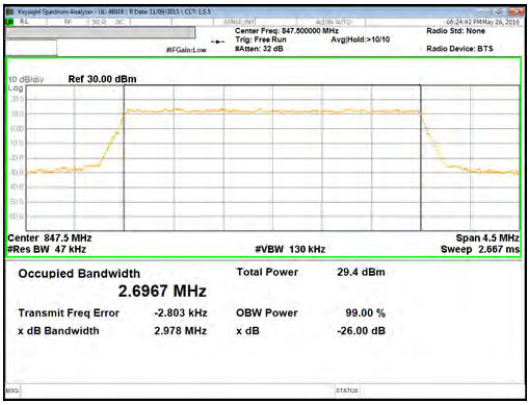
LTE Band 5

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

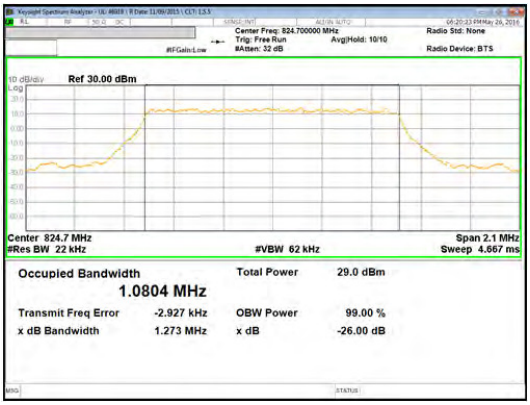
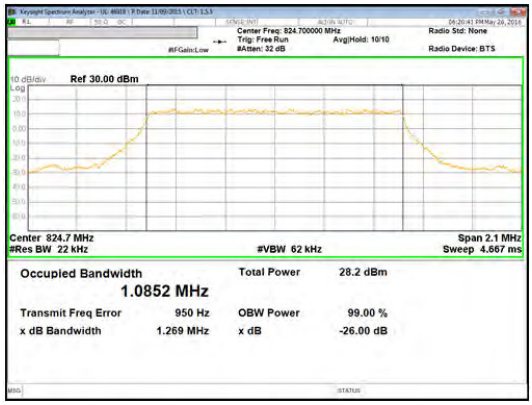
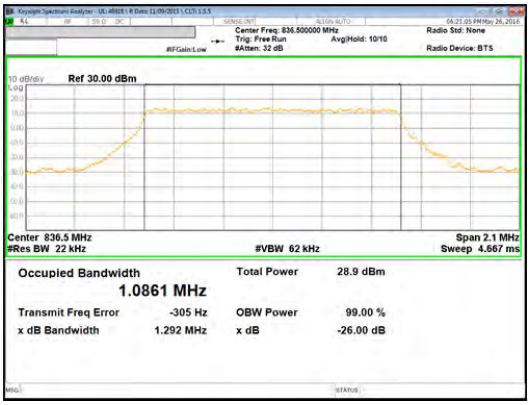
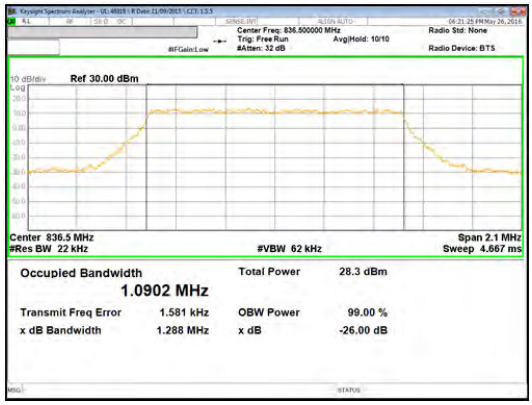
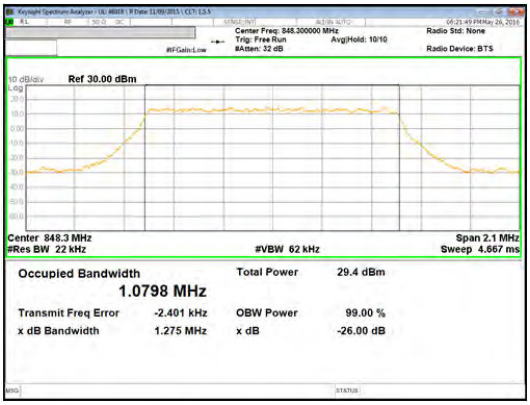
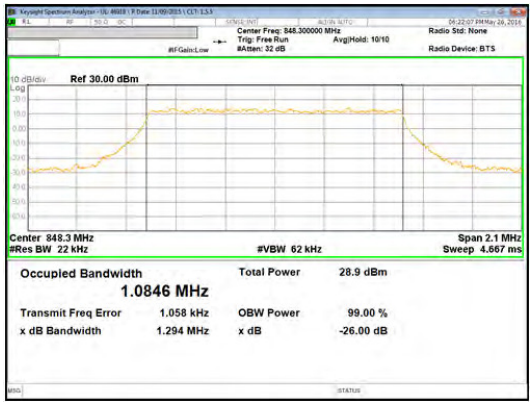
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Band 5 5MHz	 5MHz QPSK Low channel	 5MHz 16QAM Low channel
	 5MHz QPSK Mid channel	 5MHz 16QAM Mid channel
	 5MHz QPSK High channel	 5MHz 16QAM High channel

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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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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

GSM

Band	Mode	Side	f [MHz]	Level [dBm]	Limit [dBm]
GSM1900	GPRS	Lower	1849.982	-16.500	-13.00
		Upper	1910.013	-15.256	
	EGPRS	Lower	1849.992	-20.899	
		Upper	1910.013	-24.044	

WCDMA

Band	Mode	Side	f [MHz]	Level [dBm]	Limit [dBm]
Band 5	REL99	Lower	824	-32.121	-13.00
		Upper	849	-39.123	
	HSDPA	Lower	824	-34.030	
		Upper	849	-38.029	
Band 2	REL99	Lower	1850	-34.374	
		Upper	1910	-38.091	
	HSDPA	Lower	1850	-35.044	
		Upper	1910	-37.854	

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LTE 17

Bandwidth	Mode	Side	RB Status	f [MHz]	Level [dBm]	Limit [dBm]
10 MHz	QPSK	Lower	1RB	704.000	-27.205	-13.00
			FRB	704.000	-29.767	
		Upper	1RB	716.000	-24.389	
			FRB	716.000	-30.128	
	16QAM	Lower	1RB	704.000	-32.609	
			FRB	704.000	-29.822	
		Upper	1RB	716.000	-24.382	
			FRB	716.000	-30.965	
5 MHz	QPSK	Lower	1RB	704.000	-16.574	
			FRB	704.000	-28.990	
		Upper	1RB	716.000	-16.403	
			FRB	716.000	-30.228	
	16QAM	Lower	1RB	704.000	-18.537	
			FRB	704.000	-26.893	
		Upper	1RB	716.000	-16.808	
			FRB	716.000	-28.414	

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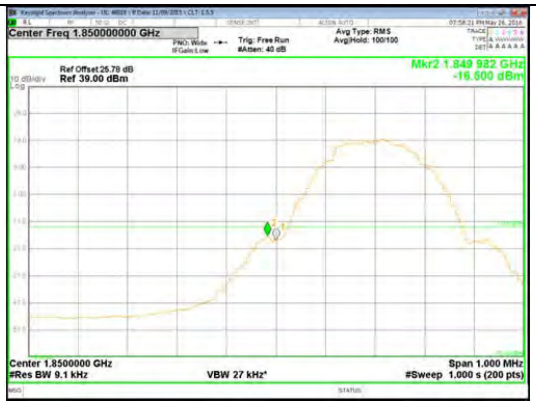
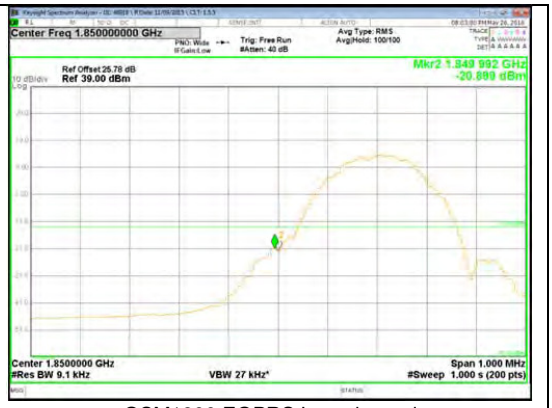
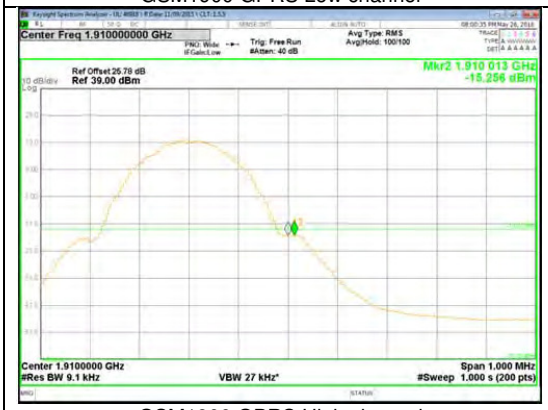
LTE 5

Bandwidth	Mode	Side	RB Status	f [MHz]	Level [dBm]	Limit [dBm]
10 MHz	QPSK	Lower	1RB	824.000	-30.937	-13.00
			FRB	824.000	-29.260	
		Upper	1RB	849.000	-22.522	
			FRB	849.000	-30.671	
	16QAM	Lower	1RB	824.000	-30.045	
			FRB	824.000	-29.367	
		Upper	1RB	849.000	-26.672	
			FRB	849.000	-31.892	
5 MHz	QPSK	Lower	1RB	824.000	-19.958	
			FRB	824.000	-26.867	
		Upper	1RB	849.000	-17.528	
			FRB	849.000	-28.623	
	16QAM	Lower	1RB	824.000	-19.955	
			FRB	824.000	-28.246	
		Upper	1RB	849.000	-17.987	
			FRB	849.000	-29.257	
3 MHz	QPSK	Lower	1RB	824.000	-17.577	
			FRB	824.000	-26.535	
		Upper	1RB	849.000	-15.714	
			FRB	849.000	-29.106	
	16QAM	Lower	1RB	824.000	-16.067	
			FRB	824.000	-28.284	
		Upper	1RB	849.000	-14.109	
			FRB	849.000	-28.017	
1.4 MHz	QPSK	Lower	1RB	824.000	-21.690	
			FRB	824.000	-30.417	
		Upper	1RB	849.000	-20.208	
			FRB	849.000	-28.968	
	16QAM	Lower	1RB	824.000	-23.183	
			FRB	824.000	-30.309	
		Upper	1RB	849.000	-16.489	
			FRB	849.000	-28.026	

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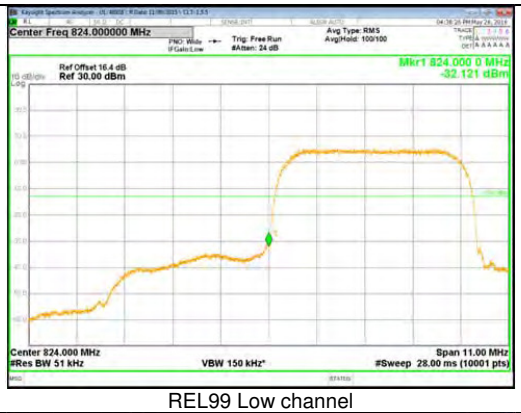
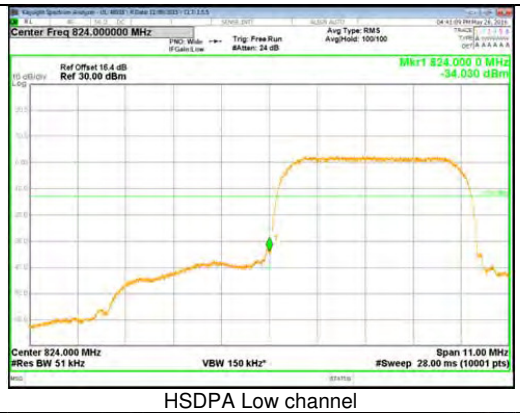
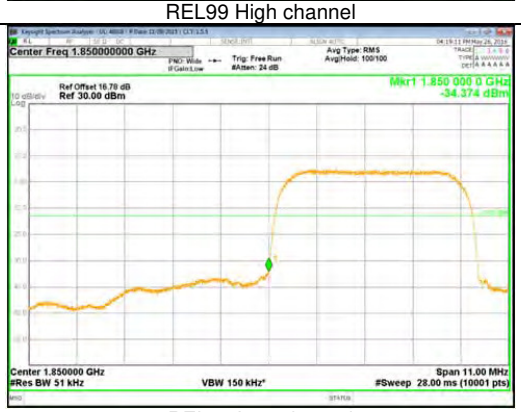
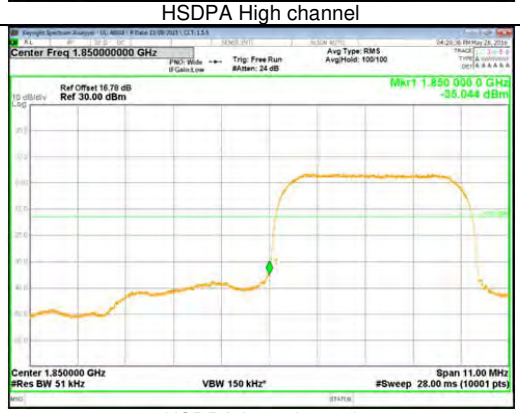
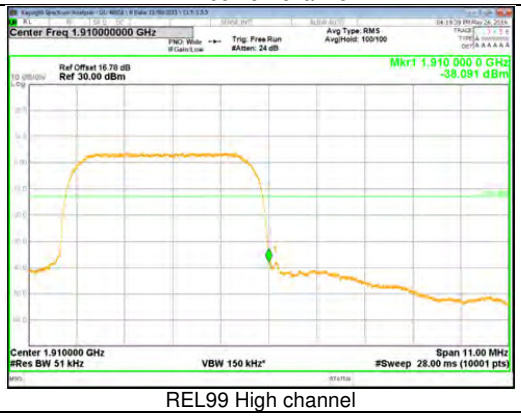
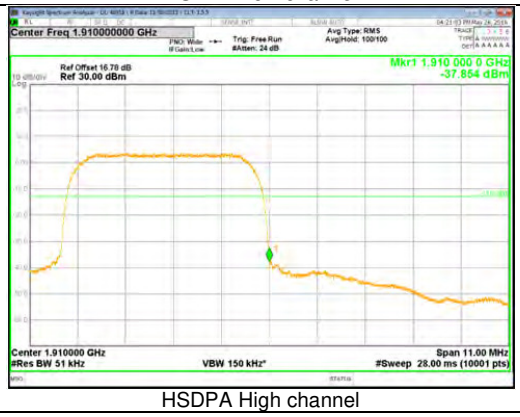
10.2.1. BAND EDGE PLOTS

GSM

GSM 1900	 GSM1900 GPRS Low channel	 GSM1900 EGPRS Low channel
	 GSM1900 GPRS High channel	 GSM1900 EGPRS High channel

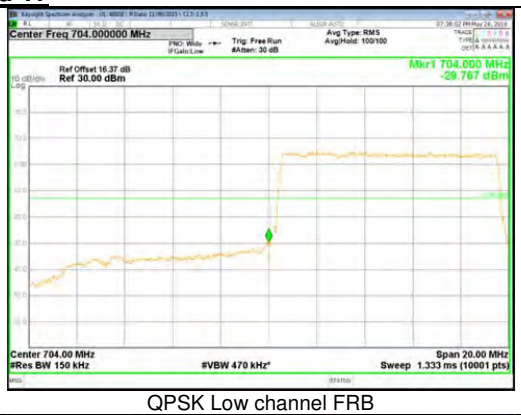
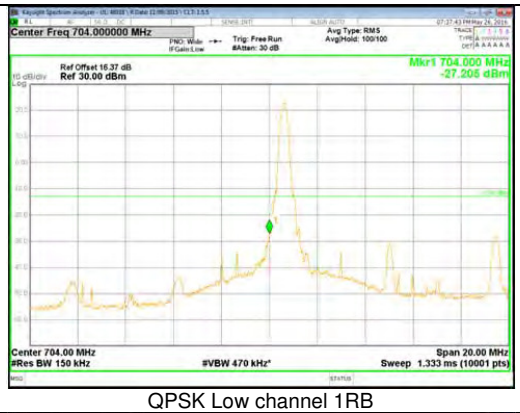
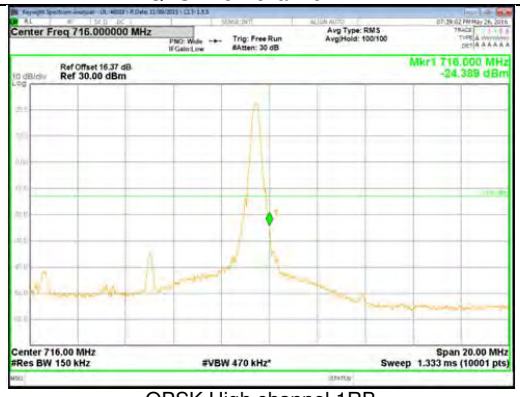
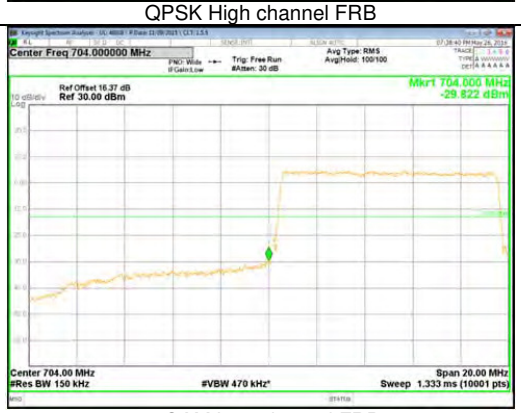
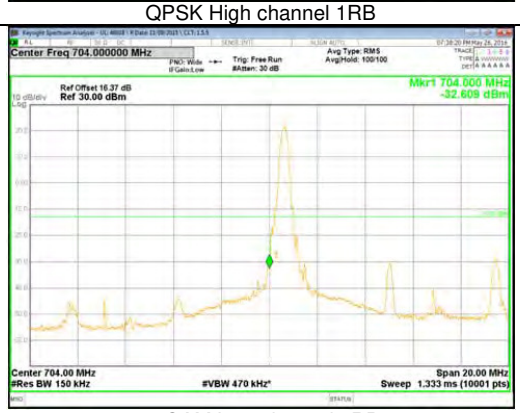
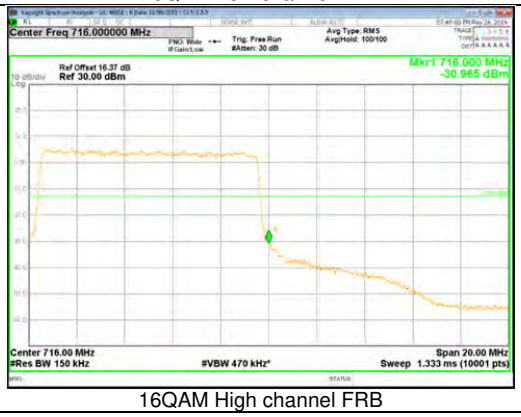
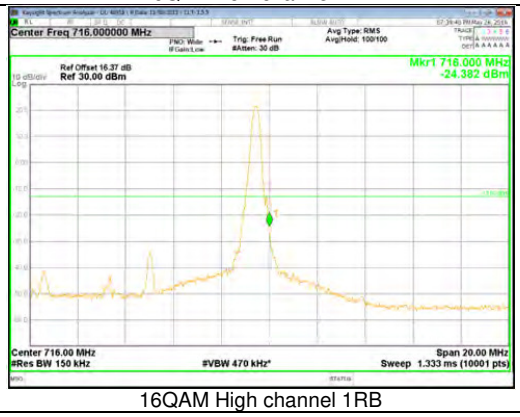
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WCDMA

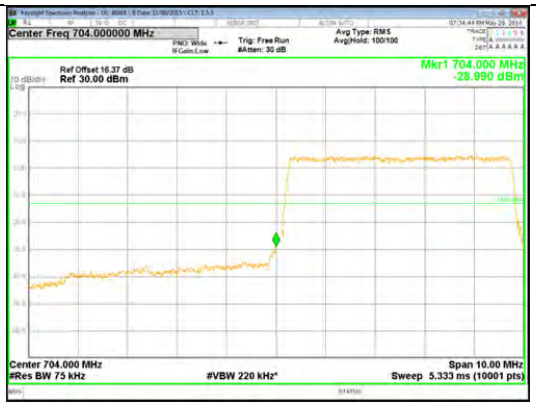
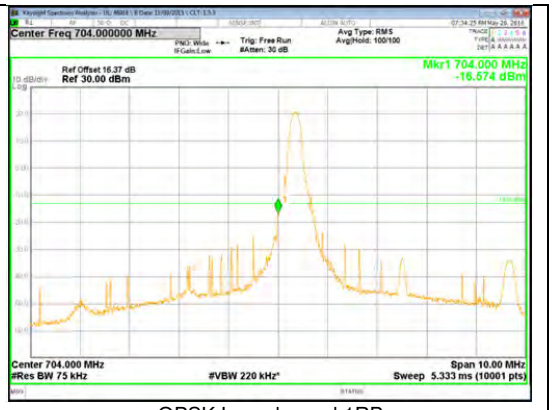
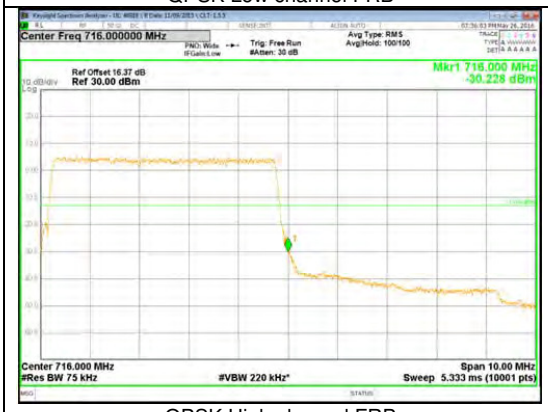
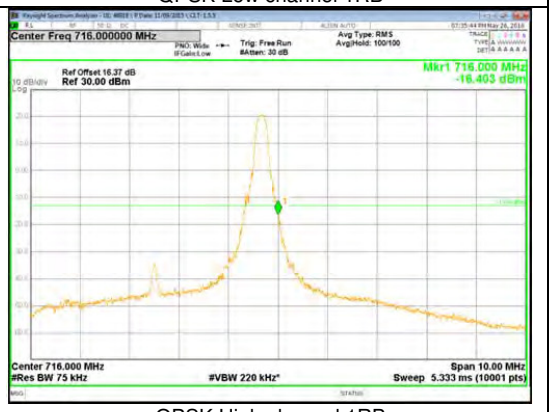
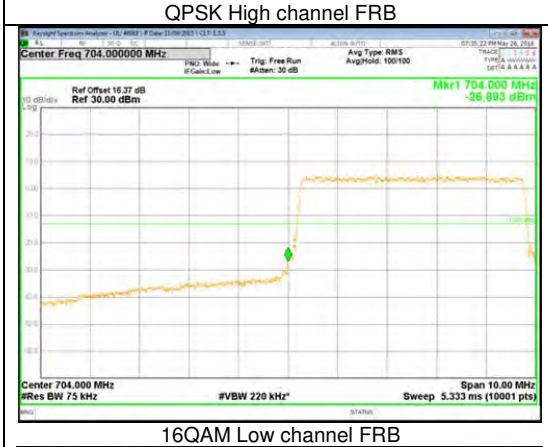
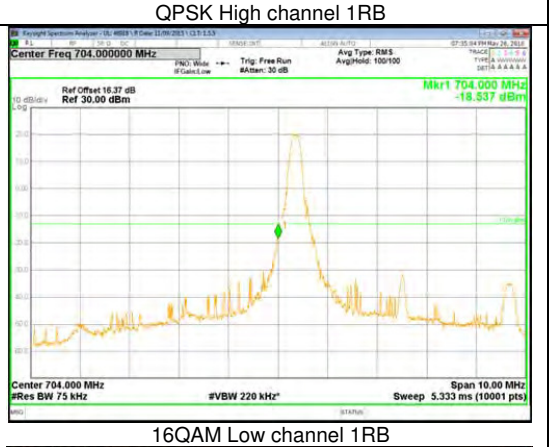
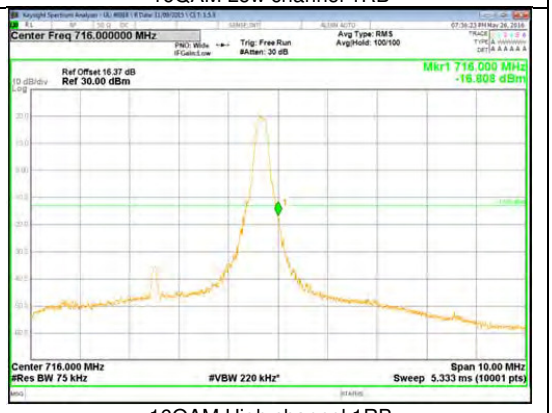
Band 5	 REL99 Low channel	 HSDPA Low channel
	 REL99 High channel	 HSDPA High channel
Band 2	 REL99 Low channel	 HSDPA Low channel
	 REL99 High channel	 HSDPA High channel

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LTE Band 17

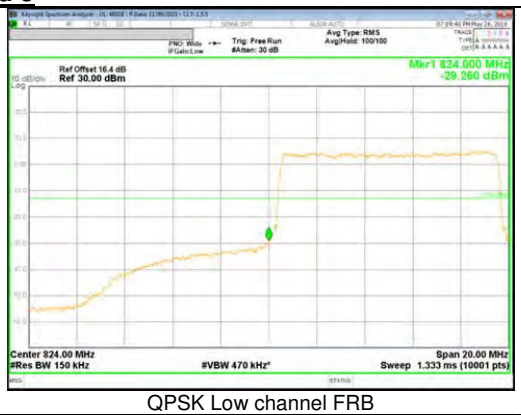
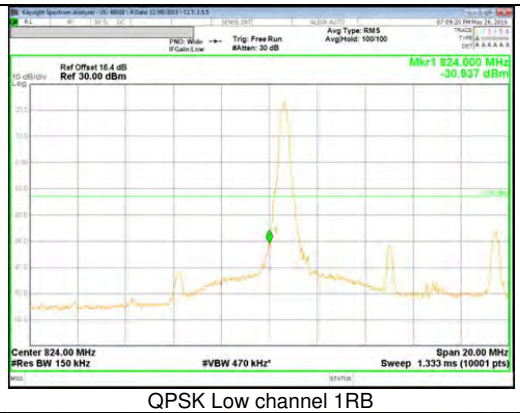
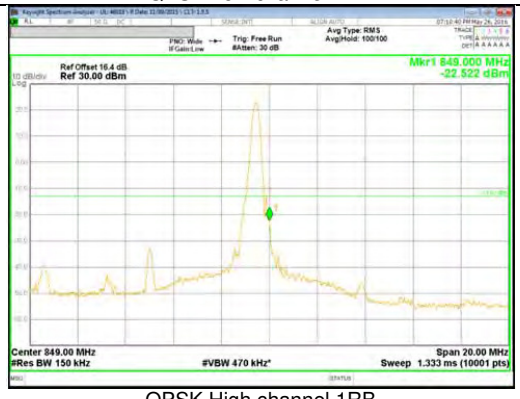
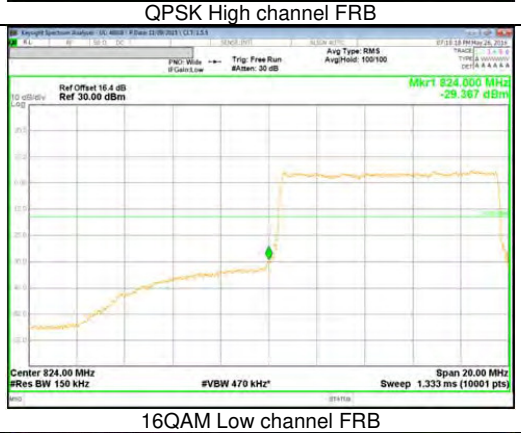
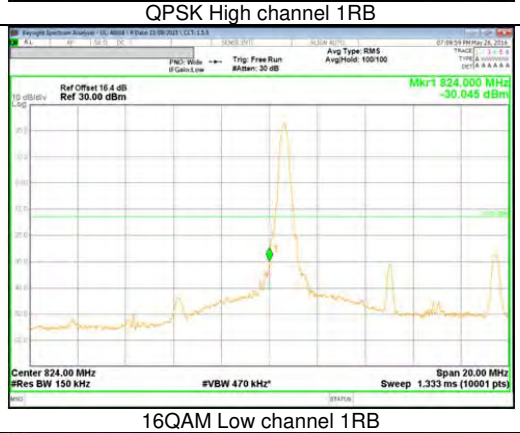
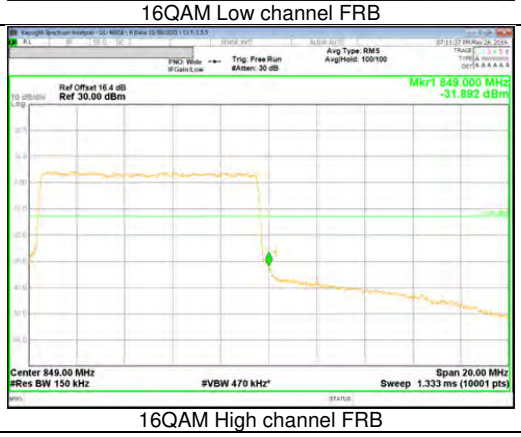
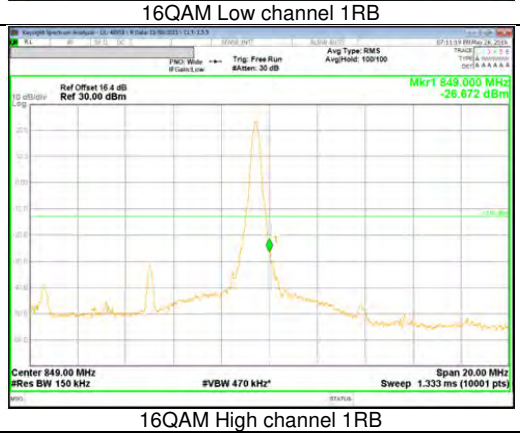
Band 17 10MHz	 QPSK Low channel FRB	 QPSK Low channel 1RB
	 QPSK High channel FRB	 QPSK High channel 1RB
	 16QAM Low channel FRB	 16QAM Low channel 1RB
	 16QAM High channel FRB	 16QAM High channel 1RB

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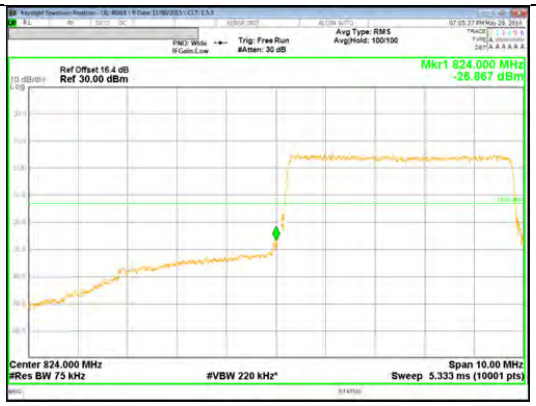
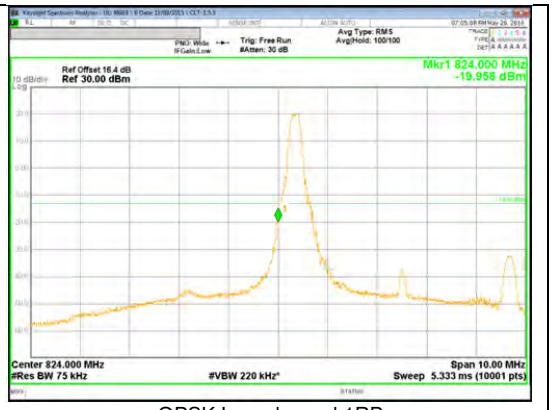
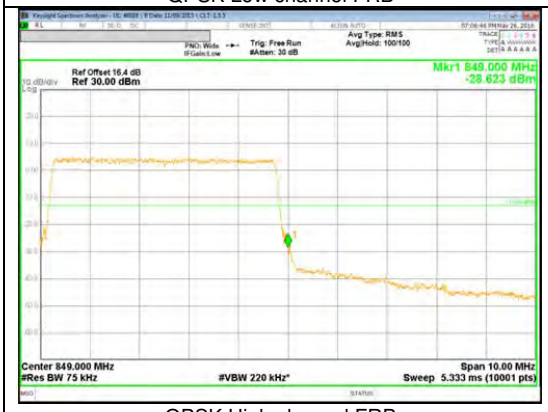
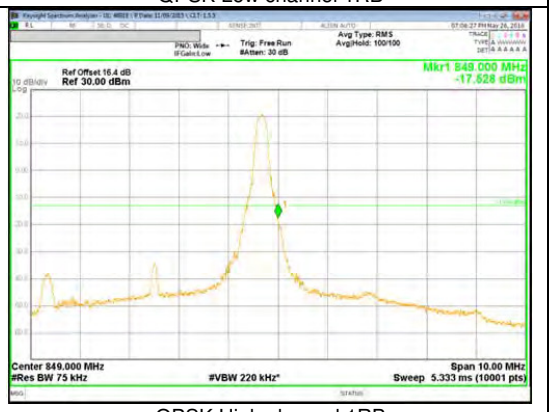
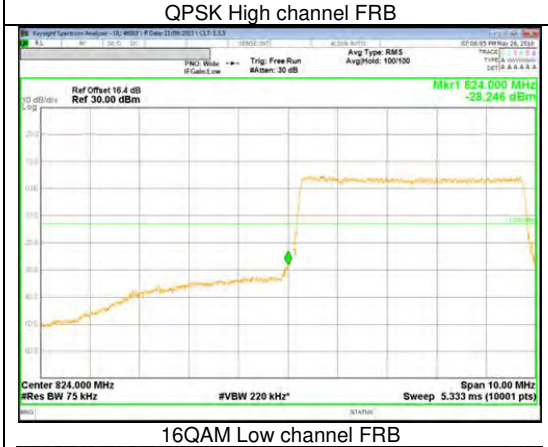
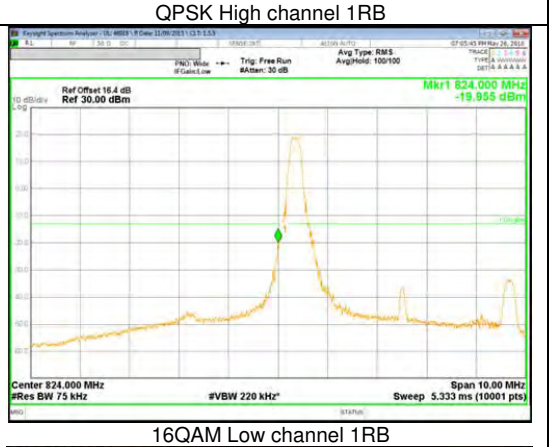
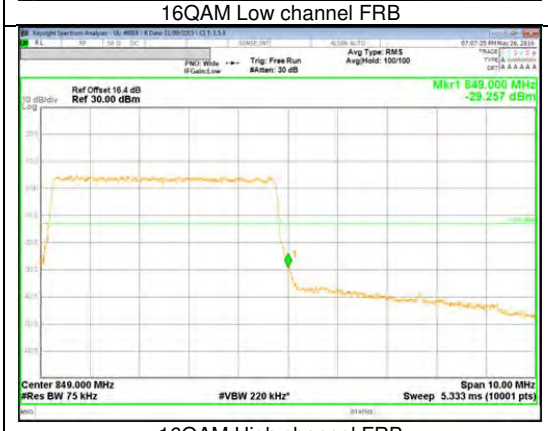
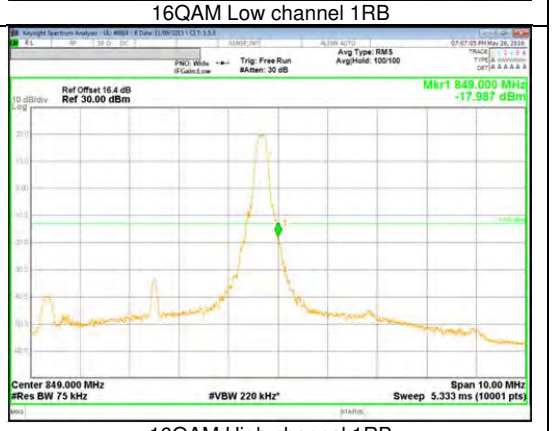
Band 17 5MHz	 QPSK Low channel FRB	 QPSK Low channel 1RB
	 QPSK High channel FRB	 QPSK High channel 1RB
	 16QAM Low channel FRB	 16QAM Low channel 1RB
	 16QAM High channel FRB	 16QAM High channel 1RB

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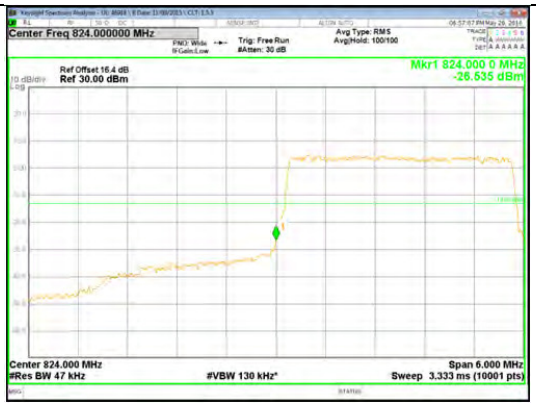
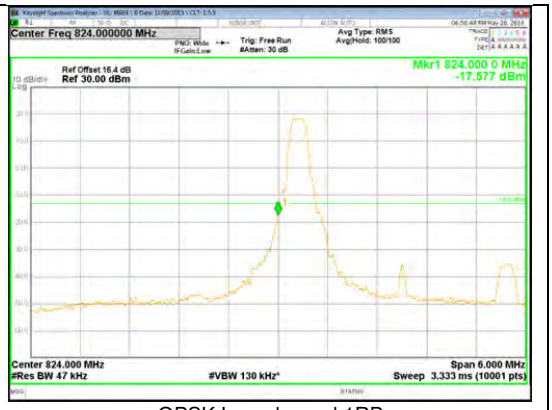
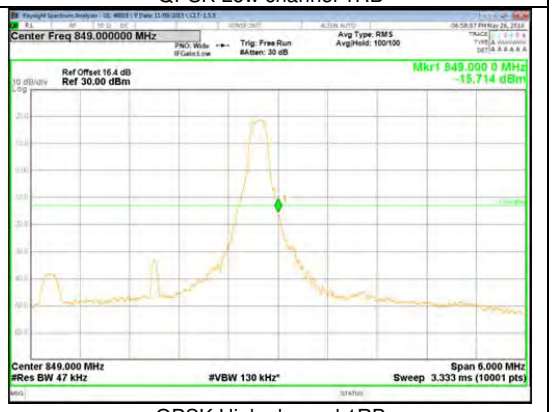
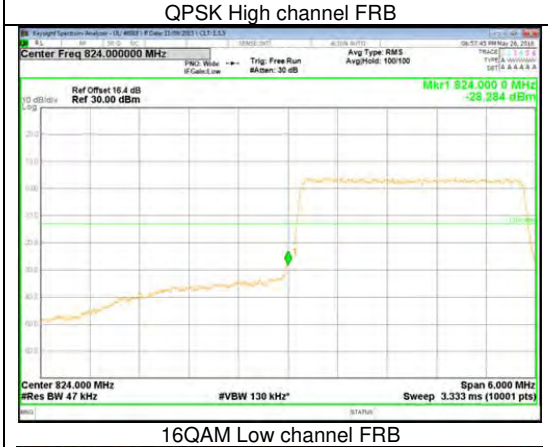
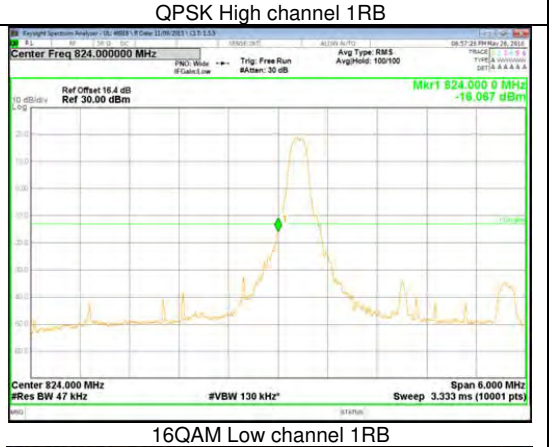
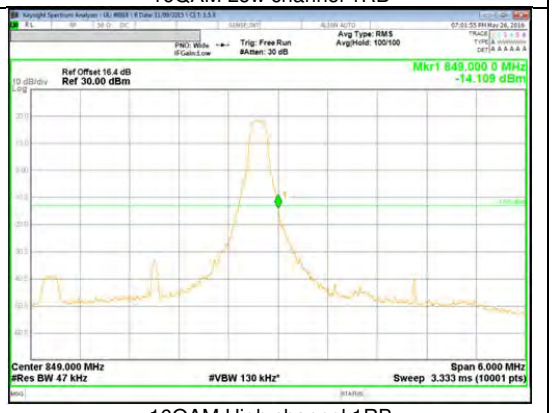
LTE Band 5

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

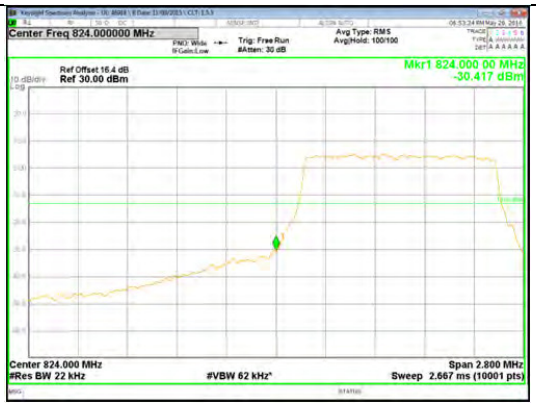
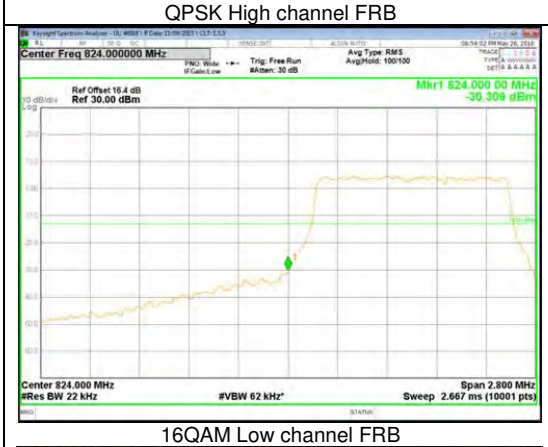
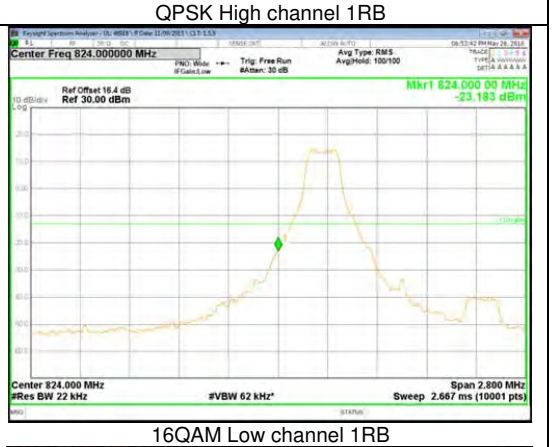
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Band 5 5MHz	 QPSK Low channel FRB	 QPSK Low channel 1RB
	 QPSK High channel FRB	 QPSK High channel 1RB
	 16QAM Low channel FRB	 16QAM Low channel 1RB
	 16QAM High channel FRB	 16QAM High channel 1RB

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Band 5 3MHz	 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

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Band 5 1.4MHz	 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

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10.3. OUT OF BAND EMISSIONS

RULE PART(S)

FCC: §2.1051, §22.901, §22.917, §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 RF output of the transmitter was connected to a spectrum analyzer through a calibrated coaxial cable. Sufficient scans were taken to show the out-of-band Emissions, if any, up to 10th harmonic. Multiple sweeps were recorded in maximum hold mode using a peak detector to ensure that the worst-case emissions were caught.

RESULTS

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10.3.1. OUT OF BAND EMISSIONS RESULT

GSM

Band	Mode	f [MHz]	Spurious [dBm]	Limit [dBm]
GSM1900	GPRS	1850.2	-23.63	-13.00
		1880.0	-23.69	
		1909.8	-23.88	
	EGPRS	1850.2	-24.02	
		1880.0	-23.15	
		1909.8	-24.23	

WCDMA

Band	Mode	f [MHz]	Spurious [dBm]	Limit [dBm]
Band 5	REL99	826.4	-34.07	-13.00
		836.6	-34.34	
		846.6	-35.12	
	HSDPA	826.4	-34.31	
		836.6	-33.01	
		846.6	-33.52	
Band 2	REL99	1852.4	-34.31	
		1880.0	-33.31	
		1907.6	-33.40	
	HSDPA	1852.4	-33.84	
		1880.0	-33.34	
		1907.6	-33.33	

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LTE 17

Bandwidth	Mode	f [MHz]	Spurious [dBm]	Limit [dBm]
10 MHz	QPSK	709.0	-28.49	-13.00
		710.0	-28.36	
		711.0	-28.04	
	16QAM	709.0	-28.64	
		710.0	-29.28	
		711.0	-29.63	
5 MHz	QPSK	706.5	-28.71	
		710.0	-29.10	
		713.5	-28.68	
	16QAM	706.5	-29.04	
		710.0	-28.12	
		713.5	-28.72	

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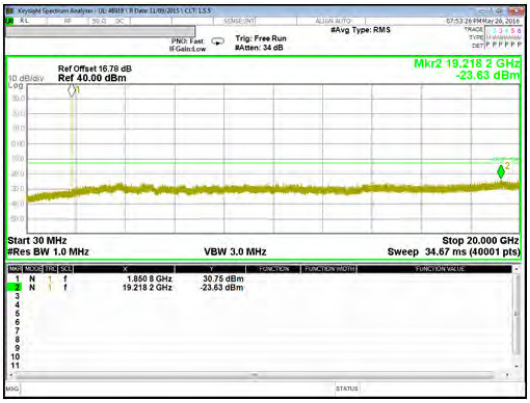
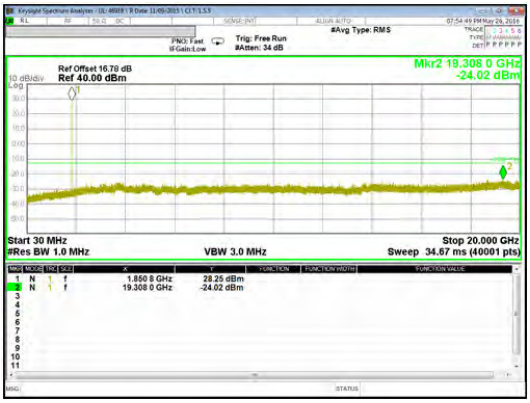
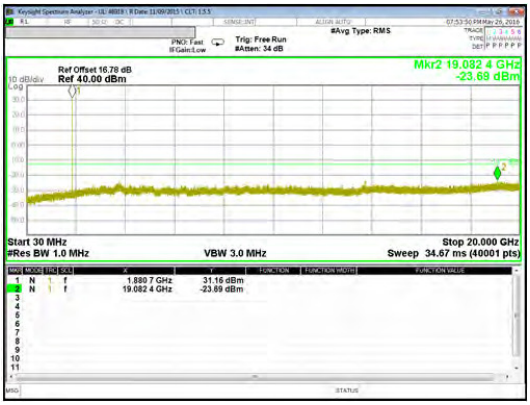
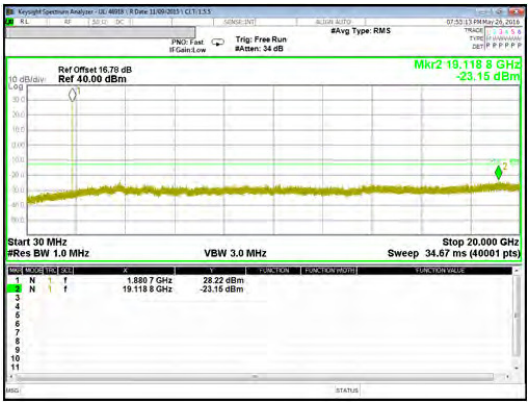
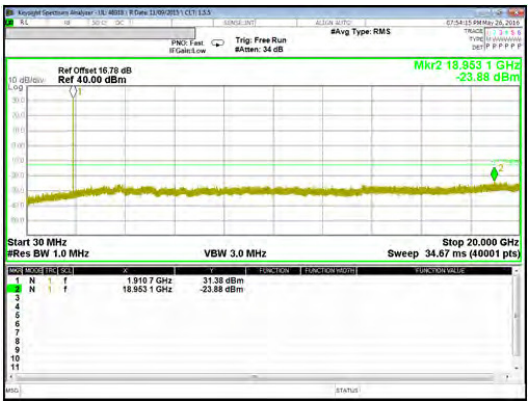
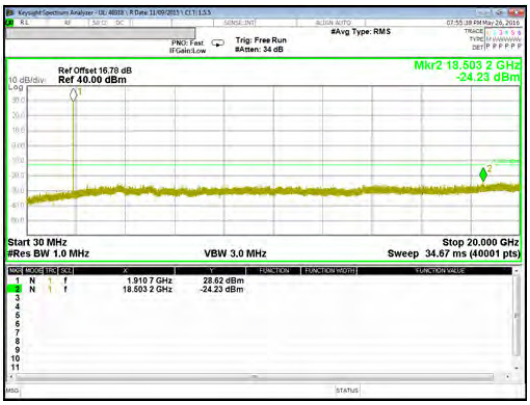
LTE 5

Bandwidth	Mode	f [MHz]	Spurious [dBm]	Limit [dBm]
10 MHz	QPSK	829.0	-29.46	-13.00
		836.5	-28.94	
		844.0	-28.58	
	16QAM	829.0	-29.03	
		836.5	-28.90	
		844.0	-28.96	
5 MHz	QPSK	826.5	-29.05	
		836.5	-28.48	
		846.5	-28.01	
	16QAM	826.5	-28.84	
		836.5	-29.13	
		846.5	-28.80	
3 MHz	QPSK	825.5	-28.75	
		836.5	-28.17	
		847.5	-28.77	
	16QAM	825.5	-28.80	
		836.5	-28.87	
		847.5	-28.52	
1.4 MHz	QPSK	824.7	-28.42	
		836.5	-28.83	
		848.3	-28.26	
	16QAM	824.7	-28.34	
		836.5	-27.87	
		848.3	-28.89	

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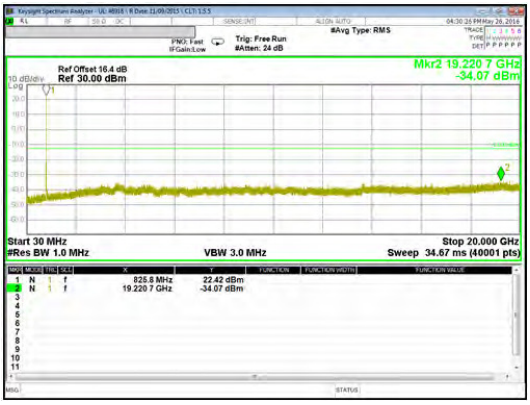
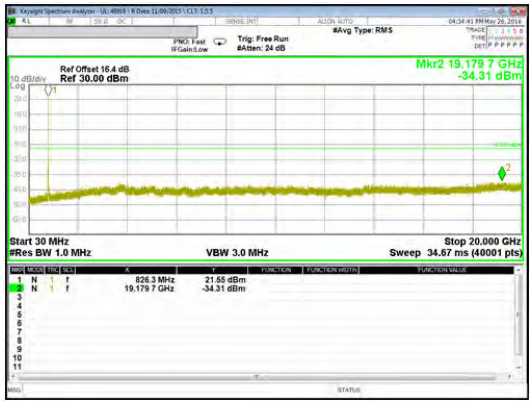
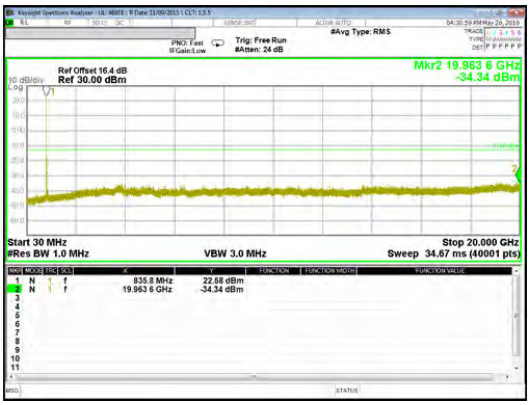
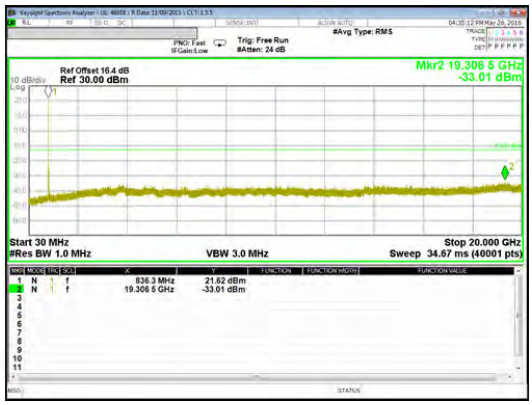
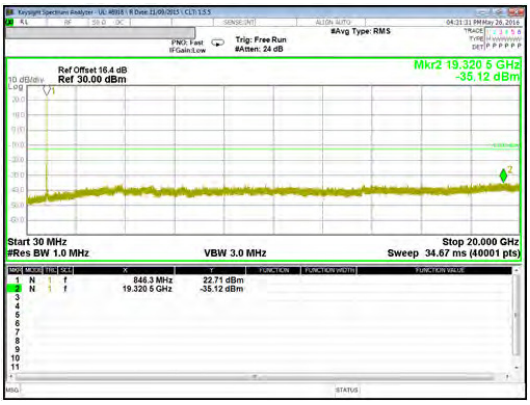
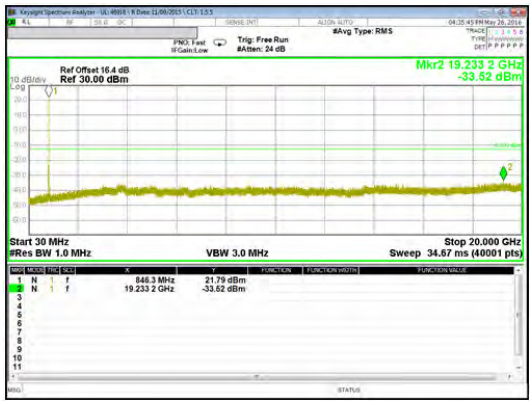
10.3.2. OUT OF BAND EMISSIONS PLOTS

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

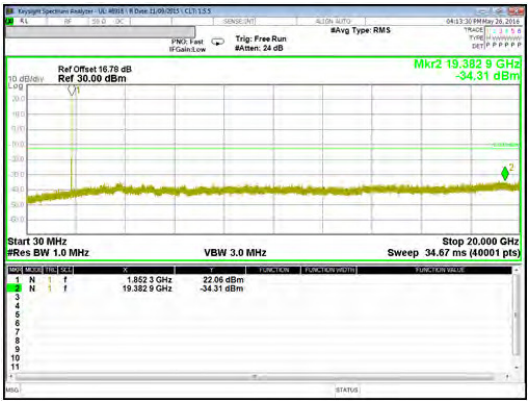
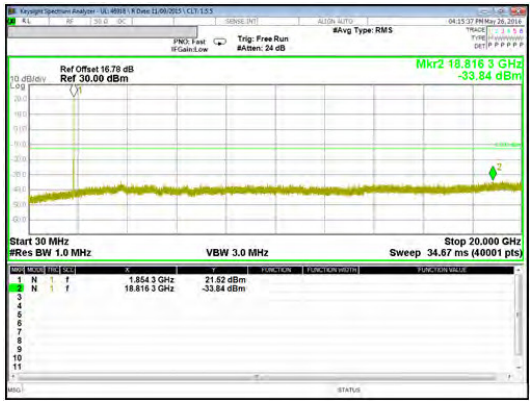
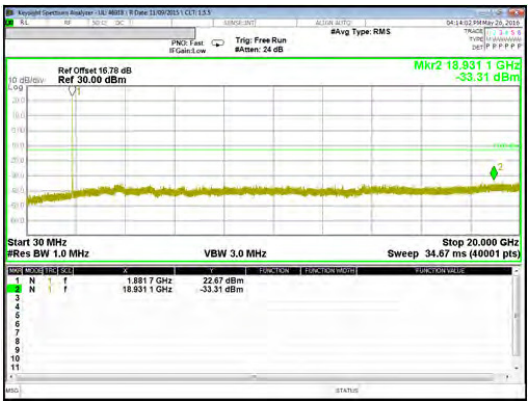
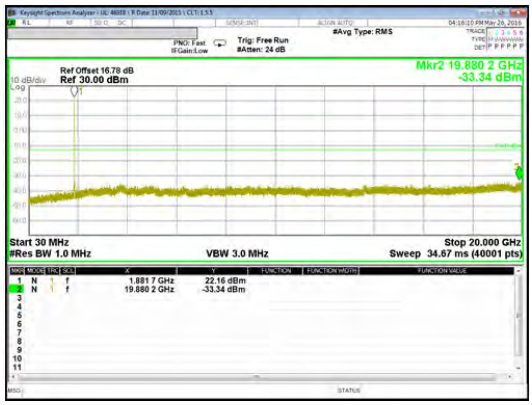
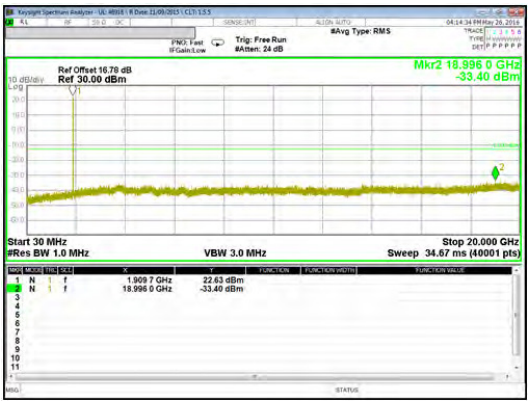
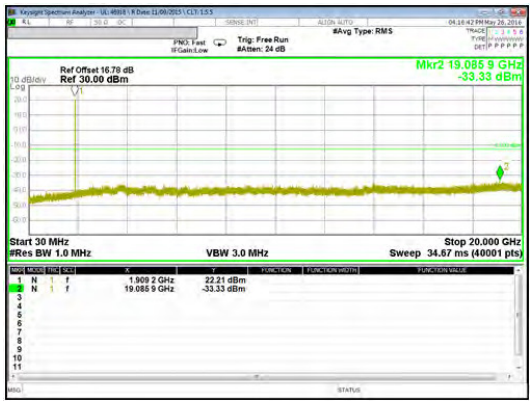
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WCDMA Band 5

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

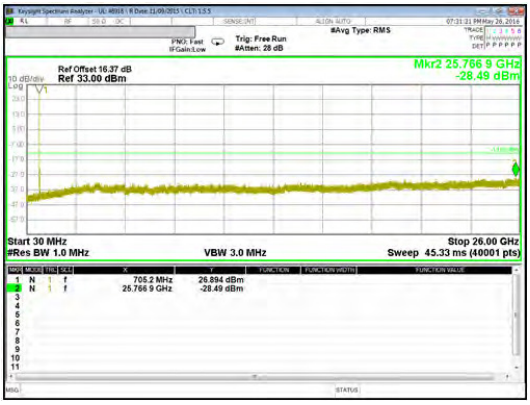
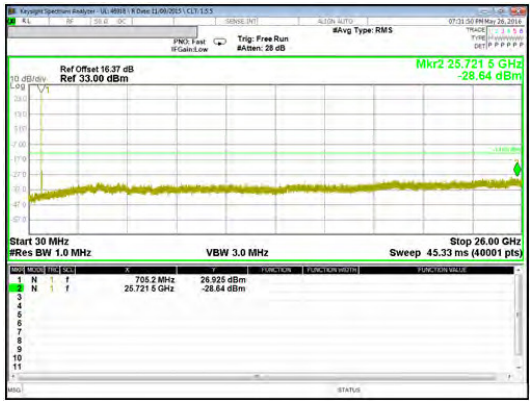
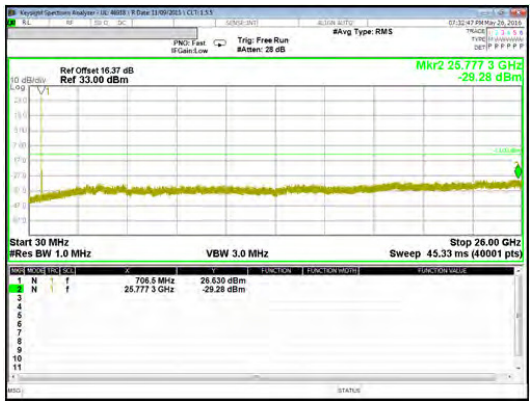
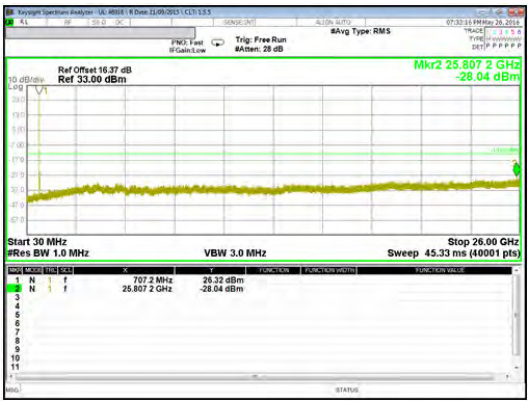
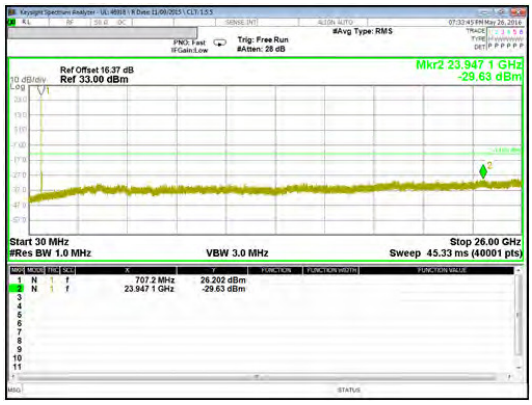
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WCDMA Band 2

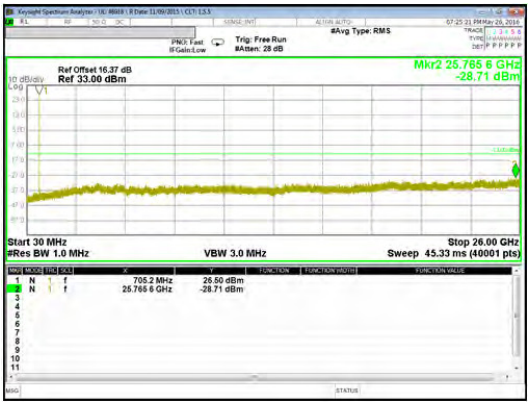
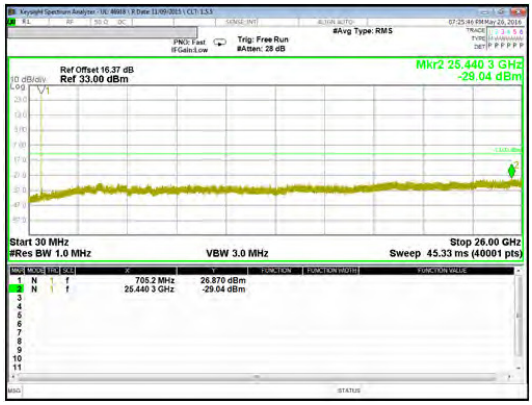
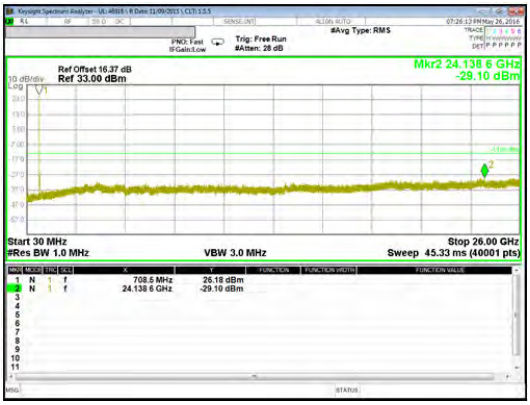
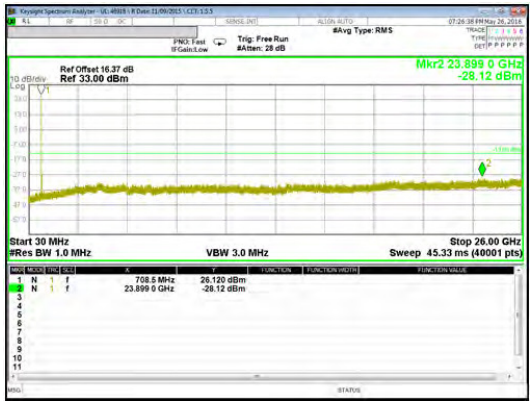
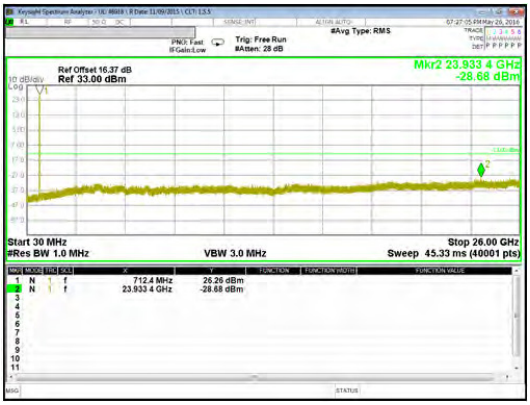
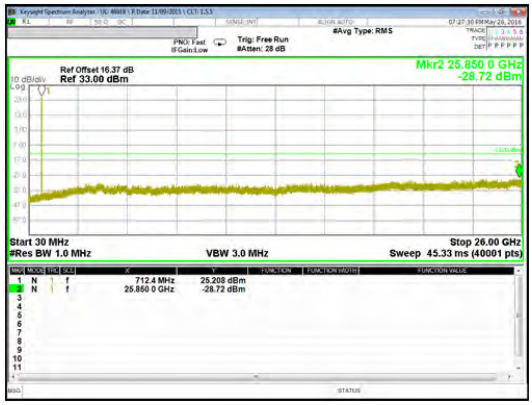
Band 2	 REL99 Low channel	 HSDPA Low channel
	 REL99 Mid channel	 HSDPA Mid channel
	 REL99 High channel	 HSDPA High channel

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LTE Band 17

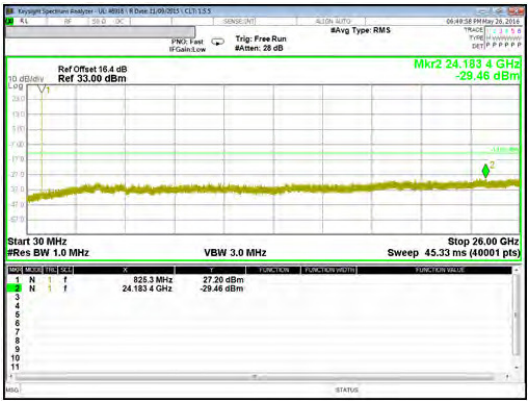
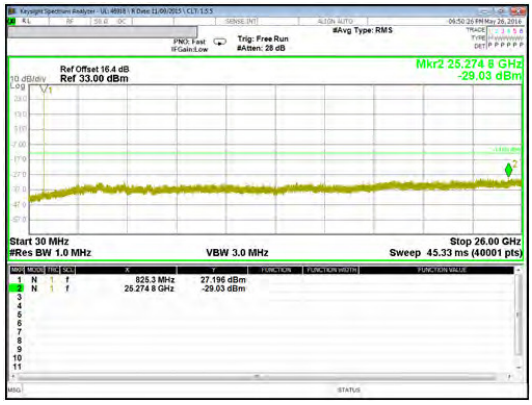
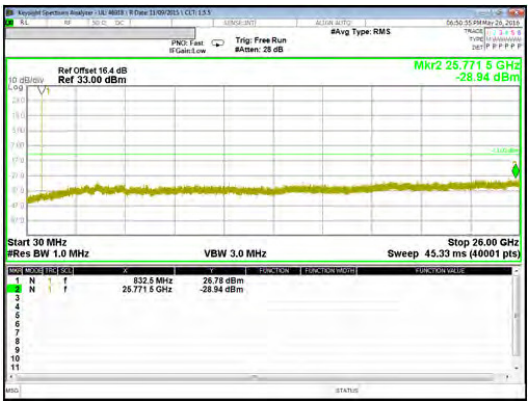
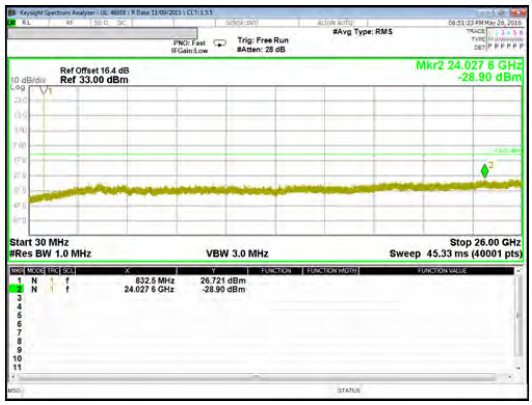
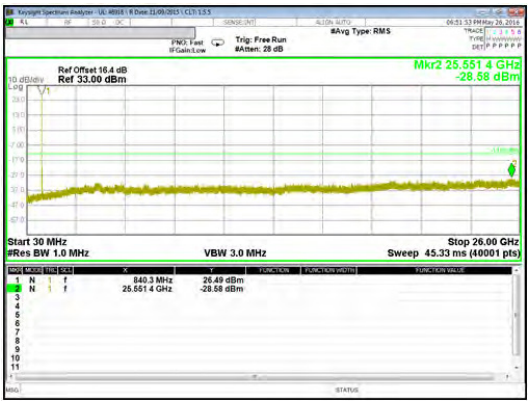
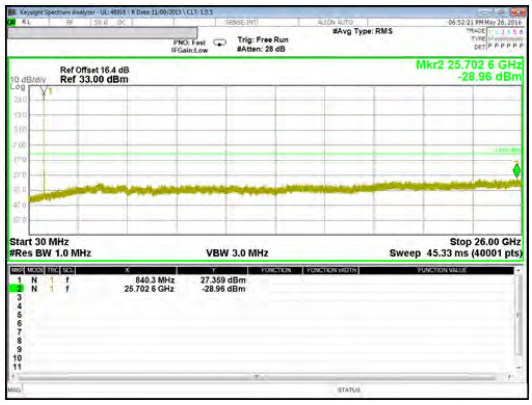
Band 17 10MHz	 QPSK Low channel	 16QAM Low channel
	 QPSK Mid channel	 16QAM Mid channel
	 QPSK High channel	 16QAM High channel

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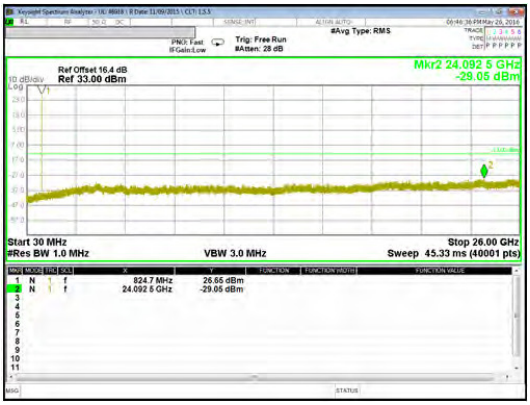
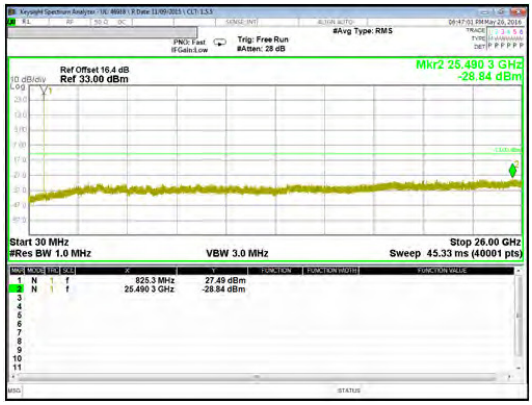
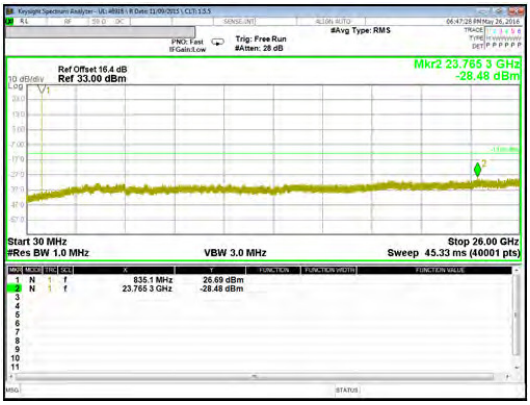
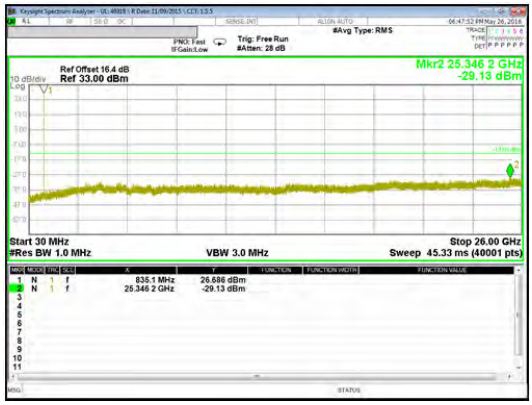
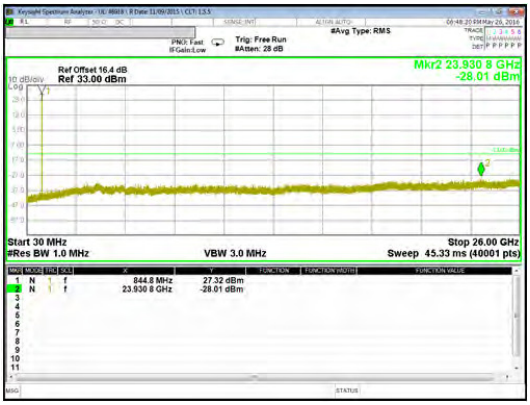
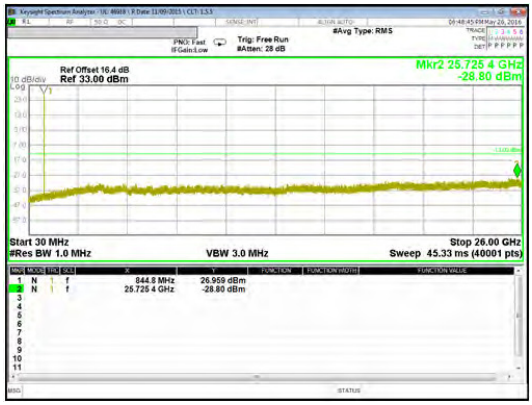
Band 17 5MHz	 QPSK Low channel	 16QAM Low channel
	 QPSK Mid channel	 16QAM Mid channel
	 QPSK High channel	 16QAM High channel

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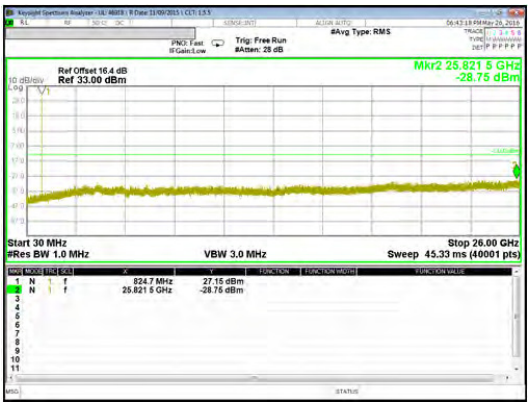
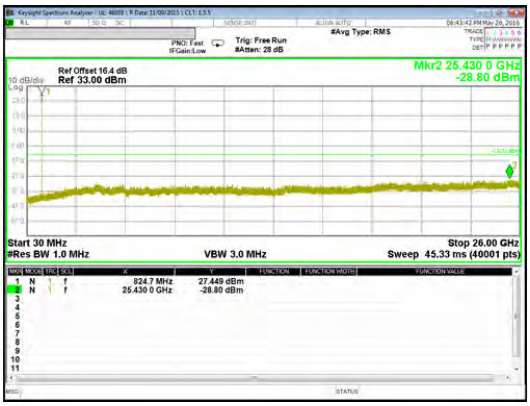
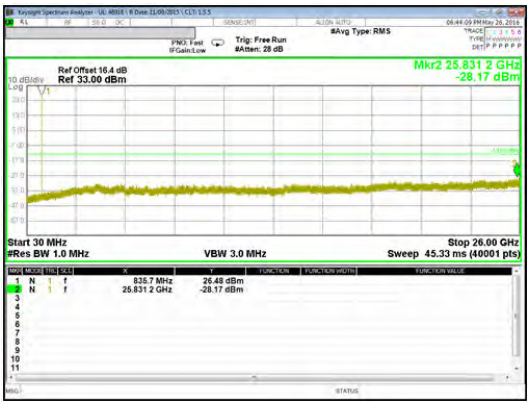
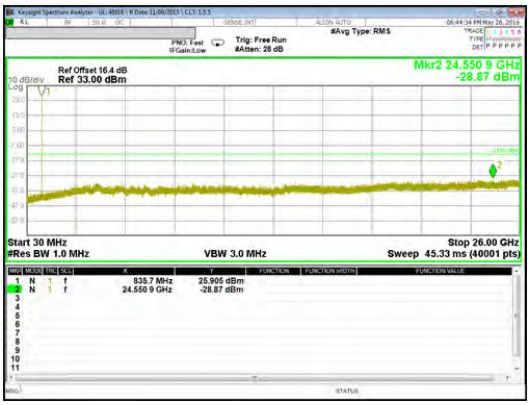
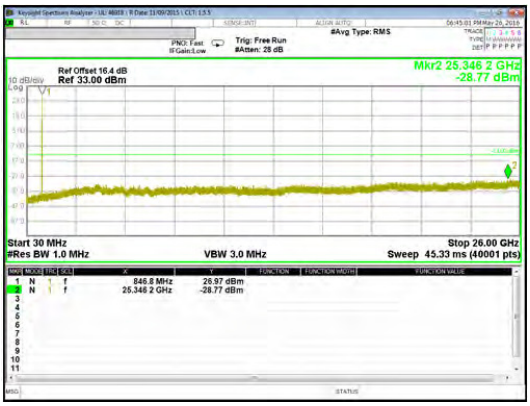
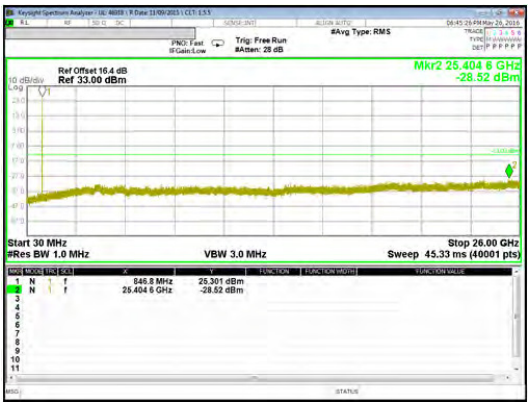
LTE Band 5

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

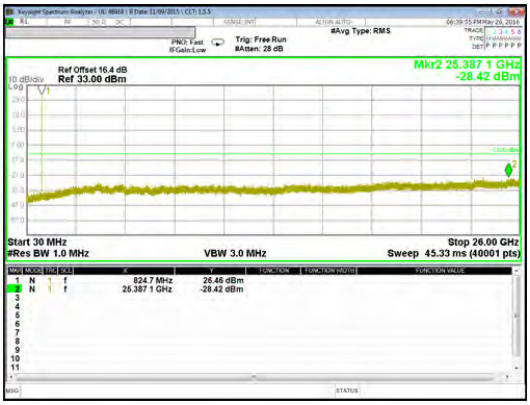
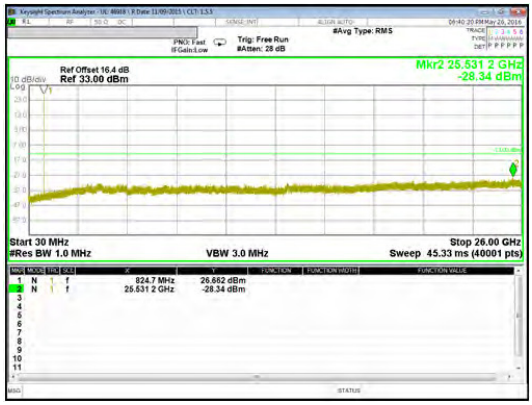
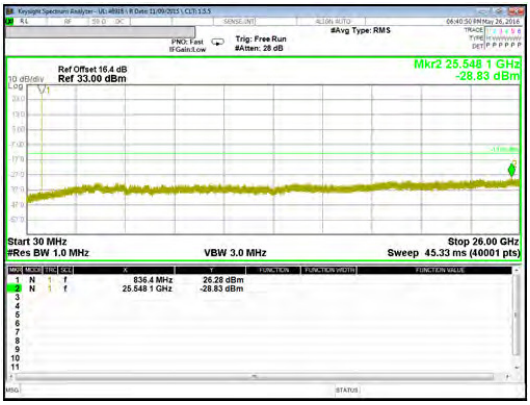
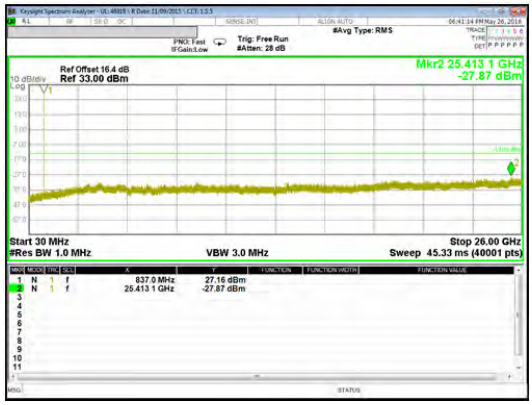
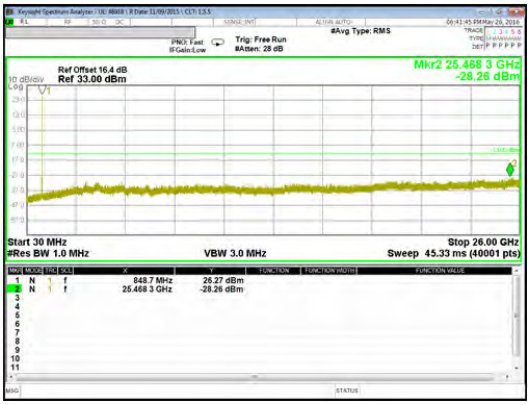
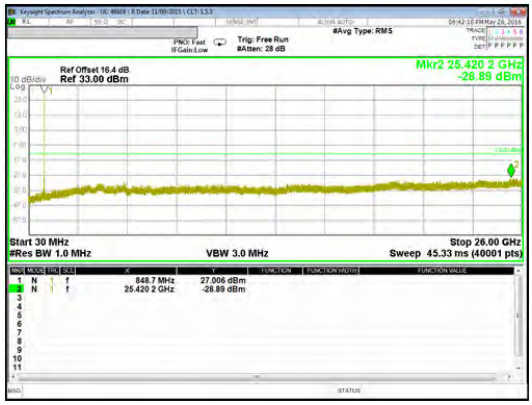
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Band 5 5MHz	 QPSK Low channel	 16QAM Low channel
	 QPSK Mid channel	 16QAM Mid channel
	 QPSK High channel	 16QAM High channel

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

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

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10.4. FREQUENCY STABILITY

RULE PART(S)

FCC: §2.1055, §22.355, §24.235 and §27.54

LIMITS

§22.355 - The carrier frequency shall not depart from the reference frequency in excess of ±2.5 ppm for mobile stations.

§24.235 - The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

§27.54 - The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

TEST PROCEDURE

Per KDB 971168 D01 Power Meas License Digital Systems v02r02

RESULTS

See the following pages.

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10.4.1. FREQUENCY STABILITY RESULTS

LTE Band 17, Channel 23790, Frequency 710.0 MHz

Reference Frequency: LTE Band 17 Mid Channel 710.0 MHz @ 20ºC Limit: +- 2.5 ppm = 1775.000 Hz				
Power Supply	**Environment**	**Frequency Deviation Measureed with Time Elapse**		
[Vdc]	**Temperature [*C]**	**[MHz]**	**Delta [ppm]**	**Limit [ppm]**
3.80	50	710.00001436	0.003	2.5
3.80	40	710.00001585	0.001	2.5
3.80	30	710.00001648	0.000	2.5
3.80	***20***	710.00001682	***0***	***2.5***
3.80	10	710.00001639	0.001	2.5
3.80	0	710.00001827	-0.002	2.5
3.80	-10	710.00001694	0.000	2.5
3.80	-20	710.00001875	-0.003	2.5
3.80	-30	710.00001439	0.003	2.5

Reference Frequency: LTE Band 17 Mid Channel 710.0 MHz @ 20ºC Limit: +- 2.5 ppm = 1775.000 Hz				
Power Supply	**Environment**	**Frequency Deviation Measureed with Time Elapse**		
[Vdc]	**Temperature [*C]**	**[MHz]**	**Delta [ppm]**	**Limit [ppm]**
3.85	***20***	**710.00001682**	***0***	***2.5***
4.40	20	710.00001518	0.002	2.5
3.60	20	710.00001386	0.004	2.5

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LTE Band 5, Channel 20524, Frequency 836.5 MHz

Reference Frequency: LTE Band 5 Mid Channel 836.5 MHz @ 20ºC Limit: +- 2.5 ppm = 2091.250 Hz				
Power Supply	**Environment**	**Frequency Deviation Measureed with Time Elapse**		
[Vdc]	**Temperature [*C]**	**[MHz]**	**Delta [ppm]**	**Limit [ppm]**
3.80	50	836.50001857	-0.001	2.5
3.80	40	836.50001734	0.000	2.5
3.80	30	836.50002084	-0.004	2.5
3.80	***20***	836.50001751	***0***	***2.5***
3.80	10	836.50001687	0.001	2.5
3.80	0	836.50001820	-0.001	2.5
3.80	-10	836.50001938	-0.002	2.5
3.80	-20	836.50002028	-0.003	2.5
3.80	-30	836.50001592	0.002	2.5

Reference Frequency: LTE Band 5 Mid Channel 836.5 MHz @ 20ºC Limit: +- 2.5 ppm = 2091.250 Hz				
Power Supply	**Environment**	**Frequency Deviation Measureed with Time Elapse**		
[Vdc]	**Temperature [*C]**	**[MHz]**	**Delta [ppm]**	**Limit [ppm]**
3.85	***20***	**836.50001751**	***0***	***2.5***
4.40	20	836.50001713	0.000	2.5
3.60	20	836.50001997	-0.003	2.5

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WCDMA Band 5, Channel 4183, Frequency 836.6 MHz

Reference Frequency: WCDMA Band 5 Mid Channel 836.6 MHz @ 20ºC Limit: +- 2.5 ppm = 2091.500 Hz				
Power Supply	Environment	Frequency Deviation Measureed with Time Elapse		
[Vdc]	Temperature [*C]	[MHz]	Delta [ppm]	Limit [ppm]
3.80	50	836.60003624	-0.017	2.5
3.80	40	836.60002753	-0.007	2.5
3.80	30	836.60003611	-0.017	2.5
3.80	***20***	836.60002168	***0***	***2.5***
3.80	10	836.60002016	0.002	2.5
3.80	0	836.60002249	-0.001	2.5
3.80	-10	836.60002136	0.000	2.5
3.80	-20	836.60001625	0.006	2.5
3.80	-30	836.60001893	0.003	2.5

Reference Frequency: WCDMA Band 5 Mid Channel 836.6 MHz @ 20ºC Limit: +- 2.5 ppm = 2091.500 Hz				
Power Supply	Environment	Frequency Deviation Measureed with Time Elapse		
[Vdc]	Temperature [*C]	[MHz]	Delta [ppm]	Limit [ppm]
3.85	***20***	**836.60002168**	***0***	***2.5***
4.40	20	836.60001536	0.008	2.5
3.60	20	836.60001785	0.005	2.5

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WCDMA Band 2, Channel 9400, Frequency 1880.0 MHz

Reference Frequency: WCDMA Band 2 Mid Channel 1880.0 MHz @ 20ºC Limit: +- 2.5 ppm = 4700.000 Hz				
Power Supply	Environment	Frequency Deviation Measureed with Time Elapse		
[Vdc]	Temperature [*C]	[MHz]	Delta [ppm]	Limit [ppm]
3.80	50	1880.00001878	-0.002	2.5
3.80	40	1880.00001927	-0.002	2.5
3.80	30	1880.00001769	-0.002	2.5
3.80	***20***	1880.00001477	***0***	***2.5***
3.80	10	1880.00001369	0.001	2.5
3.80	0	1880.00001621	-0.001	2.5
3.80	-10	1880.00001537	0.000	2.5
3.80	-20	1880.00001440	0.000	2.5
3.80	-30	1880.00001643	-0.001	2.5

Reference Frequency: WCDMA Band 2 Mid Channel 1880.0 MHz @ 20ºC Limit: +- 2.5 ppm = 4700.000 Hz				
Power Supply	Environment	Frequency Deviation Measureed with Time Elapse		
[Vdc]	Temperature [*C]	[MHz]	Delta [ppm]	Limit [ppm]
3.85	***20***	**1880.00001477**	***0***	***2.5***
4.40	20	1880.00001169	0.002	2.5
3.60	20	1880.00001576	-0.001	2.5

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GSM 1900, Channel 661, Frequency 1880.0 MHz

Reference Frequency: GSM1900 Mid Channel 1880.0 MHz @ 20ºC Limit: +- 2.5 ppm = 4700.000 Hz				
Power Supply	**Environment**	**Frequency Deviation Measureed with Time Elapse**		
[Vdc]	**Temperature [*C]**	**[MHz]**	**Delta [ppm]**	**Limit [ppm]**
3.80	50	1880.00001816	-0.001	2.5
3.80	40	1880.00001127	0.002	2.5
3.80	30	1880.00001237	0.002	2.5
3.80	***20***	1880.00001581	***0***	***2.5***
3.80	10	1880.00001569	0.000	2.5
3.80	0	1880.00001318	0.001	2.5
3.80	-10	1880.00001644	0.000	2.5
3.80	-20	1880.00001572	0.000	2.5
3.80	-30	1880.00001635	0.000	2.5

Reference Frequency: GSM1900 Mid Channel 1880.0 MHz @ 20ºC Limit: +- 2.5 ppm = 4700.000 Hz				
Power Supply	**Environment**	**Frequency Deviation Measureed with Time Elapse**		
[Vdc]	**Temperature [*C]**	**[MHz]**	**Delta [ppm]**	**Limit [ppm]**
3.85	***20***	**1880.00001581**	***0***	***2.5***
4.40	20	1880.00001654	0.000	2.5
3.60	20	1880.00001736	-0.001	2.5

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11. RADIATED TEST RESULTS

11.1. RADIATED POWER (ERP & EIRP)

RULE PART(S)

FCC: §2.1046, §22.913, §24.232 and §27.50

LIMITS

22.913(a) - The ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts.

24.232(c) - Mobile/portable stations are limited to 2 watts e.i.r.p. peak power and the equipment must employ means to limit the power to the minimum necessary for successful communications.

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

TEST PROCEDURE

ANSI / TIA / EIA 603D Clause 2.2.17; MXA setting reference to 971168 D01 v02r02

For peak power measurement with a MXA:

a) Set the RBW ≥ OBW; b) Set VBW ≥ 3 × RBW; c) Set span ≥ 2 x RBW; d) Sweep time = auto couple; e) Detector = peak; f) Ensure that the number of measurement points ≥ span/RBW; g) Trace mode = max hold;

For average power measurement with a MXA:

a) Set span to at least 1.5 times the OBW; b) Set RBW = 1-5% of the OBW, not to exceed 1 MHz; c) Set VBW ≥ 3 x RBW; d) Set number of points in sweep ≥ 2 × span / RBW; e) Sweep time = auto-couple; f) Detector = RMS (power averaging); g) Use free run trigger If burst duty cycle ≥ 98; h) Use trigger to capture bursts If burst duty cycle < 98; i) Trace average at least 100 traces in power averaging (*i.e.*, RMS) mode. j) Compute the power by integrating the spectrum across the OBW of the signal using the instrument's band power measurement function.

TEST RESULTS

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11.1.1. ERP/EIRP Results

GSM

Band	Mode	Channel	f [MHz]	ERP / EIRP	
				[dBm]	[mW]
GSM1900	GPRS	512	1850.2	31.19	1315.22
		661	1880.0	31.31	1352.07
		810	1909.8	31.25	1333.52
	EGPRS	512	1850.2	26.22	418.79
		661	1880.0	26.72	469.89
		810	1909.8	26.52	448.75

WCDMA

Band	Mode	Channel	f [MHz]	ERP / EIRP	
				[dBm]	[mW]
Band 5	REL99	4132	826.4	16.69	46.67
		4183	836.6	15.71	37.24
		4233	846.6	16.61	45.81
	HSDPA	4132	826.4	15.64	36.64
		4183	836.6	15.51	35.56
		4233	846.6	16.41	43.75
Band 2	REL99	9262	1852.4	21.53	142.23
		9400	1880.0	21.94	156.31
		9538	1907.6	21.96	157.04
	HSDPA	9262	1852.4	21.08	128.23
		9400	1880.0	21.07	127.94
		9538	1907.6	21.41	138.36

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LTE Band 17

Band	BW [MHz]	Mode	RB/RB Size	f [MHz]	ERP / EIRP	
			Full RB		[dBm]	[mW]
Band 17	10	QPSK	50/0	709.0	6.72	4.70
			50/0	710.0	6.62	4.59
			50/0	711.0	7.52	5.65
		16QAM	50/0	709.0	6.54	4.51
			50/0	710.0	6.56	4.53
			50/0	711.0	7.50	5.62
	5	QPSK	25/0	706.5	4.93	3.11
			25/0	710.0	4.08	2.56
			25/0	713.5	3.54	2.26
		16QAM	25/0	706.5	4.95	3.13
			25/0	710.0	4.12	2.58
			25/0	713.5	3.49	2.23

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LTE Band 5

Band	BW [MHz]	Mode	RB/RB Size	f [MHz]	ERP / EIRP	
			Full RB		[dBm]	[mW]
Band 5	10	QPSK	50/0	829.0	14.25	26.61
			50/0	836.5	13.96	24.89
			50/0	844.0	14.08	25.59
		16QAM	50/0	829.0	13.70	23.44
			50/0	836.5	13.55	22.65
			50/0	844.0	13.66	23.23
	5	QPSK	25/0	826.5	14.20	26.30
			25/0	836.5	13.80	23.99
			25/0	846.5	12.99	19.91
		16QAM	25/0	826.5	13.66	23.23
			25/0	836.5	13.34	21.58
			25/0	846.5	13.02	20.04
	3	QPSK	15/0	825.5	13.80	23.99
			15/0	836.5	13.76	23.77
			15/0	847.5	13.44	22.08
		16QAM	15/0	825.5	13.06	20.23
			15/0	836.5	13.16	20.70
			15/0	847.5	13.30	21.38
	1.4	QPSK	6/0	824.7	11.25	13.34
			6/0	836.5	9.24	8.39
			6/0	848.3	10.61	11.51
		16QAM	6/0	824.7	10.79	11.99
			6/0	836.5	8.70	7.41
			6/0	848.3	10.58	11.43

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11.1.2. ERP/EIRP DATA

GSM 1900

GSM

GSM1900
GPRS

High Frequency Substitution Measurement
UL Korea, Ltd. Suwon Laboratory Chamber 2

Company: Samsung
Project #: 16K23462
Date: 05-16-16
Test Engineer: YH Lim
Configuration: EUT ONLY, X Position
Mode: GPRS 1900MHz

Test Equipment:
Receiving: 3117[00168724] and Chamber 1 SMA Cables
Substitution: 3115[00161451] Substitution, 3m SMA Cable Warehouse

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1850.20	17.5	V	1.60	8.80	24.66	33.0	-8.3	
1850.20	24.0	H	1.60	8.80	31.19	33.0	-1.8	
Mid Ch								
1880.00	18.2	V	1.62	8.62	25.17	33.0	-7.8	
1880.00	24.3	H	1.62	8.62	31.31	33.0	-1.7	
High Ch								
1909.80	18.2	V	1.63	8.44	25.05	33.0	-7.9	
1909.80	24.4	H	1.63	8.44	31.25	33.0	-1.7	

Rev. 3.17.11

GSM

GSM1900
EGPRS

High Frequency Substitution Measurement
UL Korea, Ltd. Suwon Laboratory Chamber 2

Company: Samsung
Project #: 16K23462
Date: 05-16-16
Test Engineer: Chan Park
Configuration: EUT ONLY, X Position
Mode: EGPRS 1900MHz

Test Equipment:
Receiving: 3117[00168724] and Chamber 1 SMA Cables
Substitution: 3115[00161451] Substitution, 3m SMA Cable Warehouse

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1850.20	12.7	V	1.60	8.80	19.93	33.0	-13.1	
1850.20	19.0	H	1.60	8.80	26.22	33.0	-6.8	
Mid Ch								
1880.00	13.2	V	1.62	8.62	20.18	33.0	-12.8	
1880.00	19.7	H	1.62	8.62	26.72	33.0	-6.3	
High Ch								
1909.80	13.2	V	1.63	8.44	20.02	33.0	-13.0	
1909.80	19.7	H	1.63	8.44	26.52	33.0	-6.5	

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WCDMA Band 5

WCDMA

Band 5
REL99

High Frequency Substitution Measurement
UL Korea, Ltd. Suwon Laboratory Chamber 2

Company: Samsung
Project #: 16K23462
Date: 05-20-16
Test Engineer: JH park
Configuration: EUT ONLY, Z Position
Mode: Rel 99_850 MHz

Test Equipment:
Receiving: VULB9163-749, and 3m Chamber N-type Cable (Setup this one for testing EUT)
Substitution: Dipole S/N: 00164753, 3m SMA Cable Warehouse.

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
826.40	19.30	V	1.1	-1.5	16.69	38.5	-21.8	
826.40	12.42	H	1.1	-1.5	9.81	38.5	-28.6	
Mid Ch								
836.60	18.20	V	1.1	-1.4	15.71	38.5	-22.7	
836.60	13.82	H	1.1	-1.4	11.33	38.5	-27.1	
High Ch								
846.60	18.99	V	1.1	-1.3	16.61	38.5	-21.8	
846.60	15.09	H	1.1	-1.3	12.71	38.5	-25.7	

Rev. 3.17.11

WCDMA

Band 5
HSDPA

High Frequency Substitution Measurement
UL Korea, Ltd. Suwon Laboratory Chamber 2

Company: Samsung
Project #: 16K23462
Date: 05-20-16
Test Engineer: JH park
Configuration: EUT ONLY, Z Position
Mode: HSDPA_850 MHz

Test Equipment:
Receiving: VULB9163-749, and 3m Chamber N-type Cable (Setup this one for testing EUT)
Substitution: Dipole S/N: 00164753, 3m SMA Cable Warehouse.

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
826.40	18.25	V	1.1	-1.5	15.64	38.5	-22.8	
826.40	12.44	H	1.1	-1.5	9.83	38.5	-28.6	
Mid Ch								
836.60	18.00	V	1.1	-1.4	15.51	38.5	-22.9	
836.60	10.59	H	1.1	-1.4	8.10	38.5	-30.4	
High Ch								
846.60	18.79	V	1.1	-1.3	16.41	38.5	-22.0	
846.60	11.45	H	1.1	-1.3	9.07	38.5	-29.4	

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WCDMA Band 2

WCDMA

Band 2
REL99

High Frequency Substitution Measurement
UL Korea, Ltd. Suwon Laboratory Chamber 2

Company: Samsung
Project #: 16K23462
Date: 05-16-16
Test Engineer: Chan Park
Configuration: EUT ONLY, X Position
Mode: REL99_1900 MHz

Test Equipment:
Receiving: 3117[00168724] and Chamber 1 SMA Cables
Substitution: 3115[00161451] Substitution, 3m SMA Cable Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
1852.40	9.78	V	1.60	8.79	16.97	33.0	-16.0	
1852.40	14.34	H	1.60	8.79	21.53	33.0	-11.5	
Mid Ch								
1880.00	11.91	V	1.62	8.62	18.91	33.0	-14.1	
1880.00	14.94	H	1.62	8.62	21.94	33.0	-11.1	
High Ch								
1907.60	11.04	V	1.63	8.45	17.86	33.0	-15.1	
1907.60	15.14	H	1.63	8.45	21.96	33.0	-11.0	

Rev. 3.17.11
Note: For Band 4 EIRP limit is 30dBm

WCDMA

Band 2
HSDPA

High Frequency Substitution Measurement
UL Korea, Ltd. Suwon Laboratory Chamber 2

Company: Samsung
Project #: 16K23462
Date: 05-16-16
Test Engineer: Chan Park
Configuration: EUT ONLY, X Position
Mode: HSDPA_1900 MHz

Test Equipment:
Receiving: 3117[00168724] and Chamber 1 SMA Cables
Substitution: 3115[00161451] Substitution, 3m SMA Cable Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
1852.40	8.84	V	1.60	8.79	16.03	33.0	-17.0	
1852.40	13.89	H	1.60	8.79	21.08	33.0	-11.9	
Mid Ch								
1880.00	11.34	V	1.62	8.62	18.34	33.0	-14.7	
1880.00	14.07	H	1.62	8.62	21.07	33.0	-11.9	
High Ch								
1907.60	10.61	V	1.63	8.45	17.43	33.0	-15.6	
1907.60	14.59	H	1.63	8.45	21.41	33.0	-11.6	

Rev. 3.17.11
Note: For Band 4 EIRP limit is 30dBm

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LTE Band 17

LTE Band 17 10MHz QPSK

High Frequency Substitution Measurement
UL Korea, Ltd. Suwon Laboratory Chamber 2

Company: Samsung
Project #: 16K23462
Date: 05-23-16
Test Engineer: YH Lim
Configuration: EUT / Z-Position
Mode: LTE Band 17, QPSK, 10MHz

Test Equipment:
Receiving: VULB9163-750, and 3m Chamber N-type Cable (Setup this one for testing EUT)
Substitution: Dipole S/N: 00164753, 3m SMA Cable Warehouse.

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
709.00	9.32	V	1.0	-1.6	6.72	34.8	-28.1	
709.00	2.29	H	1.0	-1.6	-0.31	34.8	-35.1	
Mid Ch								
710.00	9.22	V	1.0	-1.6	6.62	34.8	-28.2	
710.00	1.90	H	1.0	-1.6	-0.70	34.8	-35.5	
High Ch								
711.00	10.12	V	1.0	-1.6	7.52	34.8	-27.3	
711.00	2.20	H	1.0	-1.6	-0.40	34.8	-35.2	

Rev. 3.17.11
Note: For Band 13/17 ERP limit is 34.77dBm; For Band 26 limit is 50dBm

LTE Band 17 10MHz 16QAM

High Frequency Substitution Measurement
UL Korea, Ltd. Suwon Laboratory Chamber 2

Company: Samsung
Project #: 16K23462
Date: 05-23-16
Test Engineer: YH Lim
Configuration: EUT / Z-Position
Mode: LTE Band 17 16QAM, 10MHz

Test Equipment:
Receiving: VULB9163-750, and 3m Chamber N-type Cable (Setup this one for testing EUT)
Substitution: Dipole S/N: 00164753, 3m SMA Cable Warehouse.

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
709.00	9.14	V	1.0	-1.6	6.54	34.8	-28.2	
709.00	2.27	H	1.0	-1.6	-0.33	34.8	-35.1	
Mid Ch								
710.00	9.16	V	1.0	-1.6	6.56	34.8	-28.2	
710.00	1.96	H	1.0	-1.6	-0.64	34.8	-35.4	
High Ch								
711.00	10.10	V	1.0	-1.6	7.50	34.8	-27.3	
711.00	2.25	H	1.0	-1.6	-0.35	34.8	-35.1	

Rev. 3.17.11
Note: For Band 13/17 ERP limit is 34.77dBm; For Band 26 limit is 50dBm

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LTE Band 17 5MHz QPSK

High Frequency Substitution Measurement
UL Korea, Ltd. Suwon Laboratory Chamber 2

Company: Samsung
Project #: 16K23462
Date: 05-20-16
Test Engineer: JH Park
Configuration: EUT / Z-Position
Mode: LTE Band 17, QPSK , 5MHz

Test Equipment:
Receiving: VULB9163-750, and 3m Chamber N-type Cable (Setup this one for testing EUT)
Substitution: Dipole S/N: 00164753, 3m SMA Cable Warehouse.

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
706.50	7.53	V	1.0	-1.6	4.93	34.8	-29.8	
706.50	5.97	H	1.0	-1.6	3.37	34.8	-31.4	
Mid Ch								
710.00	6.68	V	1.0	-1.6	4.08	34.8	-30.7	
710.00	5.66	H	1.0	-1.6	3.06	34.8	-31.7	
High Ch								
713.50	6.14	V	1.0	-1.6	3.54	34.8	-31.2	
713.50	6.09	H	1.0	-1.6	3.49	34.8	-31.3	

Rev. 3.17.11
Note: For Band 13/17 ERP limit is 34.77dBm; For Band 26 limit is 50dBm

LTE Band 17 5MHz 16QAM

High Frequency Substitution Measurement
UL Korea, Ltd. Suwon Laboratory Chamber 2

Company: Samsung
Project #: 16K23462
Date: 05-20-16
Test Engineer: JH Park
Configuration: EUT / Z-Position
Mode: LTE Band 17 16QAM, 5MHz

Test Equipment:
Receiving: VULB9163-750, and 3m Chamber N-type Cable (Setup this one for testing EUT)
Substitution: Dipole S/N: 00164753, 3m SMA Cable Warehouse.

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
706.50	7.55	V	1.0	-1.6	4.95	34.8	-29.8	
706.50	6.00	H	1.0	-1.6	3.40	34.8	-31.4	
Mid Ch								
710.00	6.72	V	1.0	-1.6	4.12	34.8	-30.7	
710.00	5.63	H	1.0	-1.6	3.03	34.8	-31.7	
High Ch								
713.50	6.09	V	1.0	-1.6	3.49	34.8	-31.3	
713.50	6.42	H	1.0	-1.6	3.82	34.8	-31.0	

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Note: For Band 13/17 ERP limit is 34.77dBm; For Band 26 limit is 50dBm

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LTE Band 5

LTE Band 5 10MHz QPSK

High Frequency Substitution Measurement
UL Korea, Ltd. Suwon Laboratory Chamber 2

Company: Samsung
Project #: 16K23462
Date: 05-26-16
Test Engineer: YH Lim
Configuration: EUT ONLY, Z Position
Mode: TX, LTE BAND 5, 10MHz BW,QPSK

Test Equipment:
Receiving: VULB9163-749, and 3m Chamber N-type Cable (Setup this one for testing EUT)
Substitution: Dipole S/N: 00164753, 3m SMA Cable Warehouse.

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
829.00	16.83	V	1.1	-1.5	14.25	38.5	-24.2	
829.00	9.28	H	1.1	-1.5	6.70	38.5	-31.8	
Mid Ch								
836.50	16.45	V	1.1	-1.4	13.96	38.5	-24.5	
836.50	9.57	H	1.1	-1.4	7.08	38.5	-31.4	
High Ch								
844.00	16.47	V	1.1	-1.3	14.08	38.5	-24.4	
844.00	8.54	H	1.1	-1.3	6.12	38.5	-32.3	

Rev. 3.17.11
Note: For Band 13/17 ERP limit is 34.77dBm; For Band 26 limit is 50dBm

LTE Band 5 10MHz 16QAM

High Frequency Substitution Measurement
UL Korea, Ltd. Suwon Laboratory Chamber 2

Company: Samsung
Project #: 16K23462
Date: 05-26-16
Test Engineer: YH Lim
Configuration: EUT ONLY, Z Position
Mode: LTE5 10MHz FUND 16QAM

Test Equipment:
Receiving: VULB9163-749, and 3m Chamber N-type Cable (Setup this one for testing EUT)
Substitution: Dipole S/N: 00164753, 3m SMA Cable Warehouse.

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
829.00	16.28	V	1.1	-1.5	13.70	38.5	-24.8	
829.00	9.72	H	1.1	-1.5	7.14	38.5	-31.3	
Mid Ch								
836.50	16.06	V	1.1	-1.4	13.55	38.5	-24.9	
836.50	9.04	H	1.1	-1.4	6.53	38.5	-31.9	
High Ch								
844.00	16.08	V	1.1	-1.3	13.66	38.5	-24.8	
844.00	8.13	H	1.1	-1.3	5.71	38.5	-32.7	

Rev. 3.17.11
Note: For Band 13/17 ERP limit is 34.77dBm; For Band 26 limit is 50dBm

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LTE Band 5 5MHz QPSK

High Frequency Substitution Measurement
UL Korea, Ltd. Suwon Laboratory Chamber 2

Company: Samsung
Project #: 16K23462
Date: 05-26-16
Test Engineer: YH Lim
Configuration: EUT ONLY, Z Position
Mode: LTE5 5MHz FUND QPSK

Test Equipment:
Receiving: VULB9163-749, and 3m Chamber N-type Cable (Setup this one for testing EUT)
Substitution: Dipole S/N: 00164753, 3m SMA Cable Warehouse.

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
826.50	16.80	V	1.1	-1.5	14.20	38.5	-24.3	
826.50	8.27	H	1.1	-1.5	5.67	38.5	-32.8	
Mid Ch								
836.50	16.29	V	1.1	-1.4	13.80	38.5	-24.7	
836.50	9.82	H	1.1	-1.4	7.33	38.5	-31.1	
High Ch								
846.50	15.87	V	1.6	-1.3	12.99	38.5	-25.5	
846.50	9.03	H	1.6	-1.3	6.15	38.5	-32.3	

Rev. 3.17.11
Note: For Band 13/17 ERP limit is 34.77dBm; For Band 26 limit is 50dBm

LTE Band 5 5MHz 16QAM

High Frequency Substitution Measurement
UL Korea, Ltd. Suwon Laboratory Chamber 2

Company: Samsung
Project #: 16K23462
Date: 05-26-16
Test Engineer: YH Lim
Configuration: EUT ONLY, Z Position
Mode: LTE5 5MHz FUND 16QAM

Test Equipment:
Receiving: VULB9163-749, and 3m Chamber N-type Cable (Setup this one for testing EUT)
Substitution: Dipole S/N: 00164753, 3m SMA Cable Warehouse.

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
826.50	16.26	V	1.1	-1.5	13.66	38.5	-24.8	
826.50	7.79	H	1.1	-1.5	5.19	38.5	-33.3	
Mid Ch								
836.50	15.83	V	1.1	-1.4	13.34	38.5	-25.1	
836.50	9.26	H	1.1	-1.4	6.77	38.5	-31.7	
High Ch								
846.50	15.40	V	1.1	-1.3	13.02	38.5	-25.4	
846.50	8.47	H	1.1	-1.3	6.09	38.5	-32.4	

Rev. 3.17.11
Note: For Band 13/17 ERP limit is 34.77dBm; For Band 26 limit is 50dBm

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LTE Band 5 3MHz QPSK

High Frequency Substitution Measurement
UL Korea, Ltd. Suwon Laboratory Chamber 2

Company: Samsung
Project #: 16K23462
Date: 05-26-16
Test Engineer: YH Lim
Configuration: EUT ONLY, Z Position
Mode: LTE5 3MHz FUND QPSK

Test Equipment:
Receiving: VULB9163-749, and 3m Chamber N-type Cable (Setup this one for testing EUT)
Substitution: Dipole S/N: 00164753, 3m SMA Cable Warehouse.

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
825.50	16.40	V	1.1	-1.5	13.80	38.5	-24.7	
825.50	8.87	H	1.1	-1.5	6.27	38.5	-32.2	
Mid Ch								
836.50	16.25	V	1.1	-1.4	13.76	38.5	-24.7	
836.50	8.46	H	1.1	-1.4	5.97	38.5	-32.5	
High Ch								
847.50	16.32	V	1.6	-1.3	13.44	38.5	-25.0	
847.50	8.84	H	1.6	-1.3	5.96	38.5	-32.5	

Rev. 3.17.11
Note: For Band 13/17 ERP limit is 34.77dBm; For Band 26 limit is 50dBm

LTE Band 5 3MHz 16QAM

High Frequency Substitution Measurement
UL Korea, Ltd. Suwon Laboratory Chamber 2

Company: Samsung
Project #: 16K23462
Date: 05-26-16
Test Engineer: YH Lim
Configuration: EUT ONLY, Z Position
Mode: LTE5 3MHz FUND 16QAM

Test Equipment:
Receiving: VULB9163-749, and 3m Chamber N-type Cable (Setup this one for testing EUT)
Substitution: Dipole S/N: 00164753, 3m SMA Cable Warehouse.

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
825.50	15.66	V	1.1	-1.5	13.06	38.5	-25.4	
825.50	8.18	H	1.1	-1.5	5.58	38.5	-32.9	
Mid Ch								
836.50	15.65	V	1.1	-1.4	13.16	38.5	-25.3	
836.50	7.93	H	1.1	-1.4	5.44	38.5	-33.0	
High Ch								
847.50	15.68	V	1.1	-1.3	13.30	38.5	-25.2	
847.50	9.24	H	1.1	-1.3	6.86	38.5	-31.6	

Rev. 3.17.11
Note: For Band 13/17 ERP limit is 34.77dBm; For Band 26 limit is 50dBm

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LTE Band 5 1.4MHz QPSK

High Frequency Substitution Measurement
UL Korea, Ltd. Suwon Laboratory Chamber 2

Company: Samsung
Project #: 16K23462
Date: 05-26-16
Test Engineer: YH Lim
Configuration: EUT ONLY, Z Position
Mode: LTE5 1.4MHz FUND QPSK

Test Equipment:
Receiving: VULB9163-749, and 3m Chamber N-type Cable (Setup this one for testing EUT)
Substitution: Dipole S/N: 00164753, 3m SMA Cable Warehouse.

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
824.70	13.85	V	1.1	-1.5	11.25	38.5	-27.2	
824.70	6.60	H	1.1	-1.5	4.00	38.5	-34.5	
Mid Ch								
836.50	11.74	V	1.1	-1.4	9.24	38.5	-29.2	
836.50	6.39	H	1.1	-1.4	3.90	38.5	-34.6	
High Ch								
848.30	13.49	V	1.6	-1.3	10.61	38.5	-27.8	
848.30	7.46	H	1.6	-1.3	4.58	38.5	-33.9	

Rev. 3.17.11
Note: For Band 13/17 ERP limit is 34.77dBm; For Band 26 limit is 50dBm

LTE Band 5 1.4MHz 16QAM

High Frequency Substitution Measurement
UL Korea, Ltd. Suwon Laboratory Chamber 2

Company: Samsung
Project #: 16K23462
Date: 05-26-16
Test Engineer: YH Lim
Configuration: EUT ONLY, Z Position
Mode: LTE5 1.4MHz FUND 16QAM

Test Equipment:
Receiving: VULB9163-749, and 3m Chamber N-type Cable (Setup this one for testing EUT)
Substitution: Dipole S/N: 00164753, 3m SMA Cable Warehouse.

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
824.70	13.39	V	1.1	-1.5	10.79	38.5	-27.7	
824.70	6.16	H	1.1	-1.5	3.56	38.5	-34.9	
Mid Ch								
836.50	11.19	V	1.1	-1.4	8.70	38.5	-29.8	
836.50	6.00	H	1.1	-1.4	3.51	38.5	-34.9	
High Ch								
848.30	12.96	V	1.1	-1.3	10.58	38.5	-27.9	
848.30	6.98	H	1.1	-1.3	4.60	38.5	-33.9	

Rev. 3.17.11
Note: For Band 13/17 ERP limit is 34.77dBm; For Band 26 limit is 50dBm

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11.2. FIELD STRENGTH OF SPURIOUS RADIATION

RULE PART(S)

FCC: §2.1053, §22.917, §24.238 and §27. 53

LIMIT

Part 22.917(a) & Part 24.238(a) 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

For Cellular equipment - Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater. In the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (i.e. 100 kHz or 1 percent of emission bandwidth, as specified). The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

For PCS equipment - Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or greater. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (i.e. 1 MHz or 1 percent of emission bandwidth, as specified). The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

RESULTS

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11.2.1. SPURIOUS RADIATION PLOTS

GSM 1900

GSM

GSM1900
GPRS

UL Korea, Ltd Suwon Laboratory
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 16K23462
Date: 05-20-16
Test Engineer: JH Park
Configuration: EUT / AC Adapter / Earphone, X Position
Mode: GPRS 1900

Chamber: Chamber 2 | Pre-amplifer: AFS42 | Filter: Filter 1 | Limit: Part 24

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 1850.2MHz									
3.7004	-7.1	V	3.0	40.5	1.0	-46.6	-13.0	-33.6	
5.5506	-2.1	V	3.0	40.8	1.0	-41.9	-13.0	-28.9	
7.4008	-2.3	V	3.0	40.8	1.0	-42.0	-13.0	-29.0	
3.7000	-5.0	H	3.0	40.5	1.0	-44.4	-13.0	-31.4	
5.5506	-5.1	H	3.0	40.8	1.0	-44.9	-13.0	-31.9	
7.4008	-3.3	H	3.0	40.8	1.0	-43.1	-13.0	-30.1	
Mid Ch, 1880.0MHz									
3.7600	-5.6	V	3.0	40.5	1.0	-45.2	-13.0	-32.2	
5.6400	-5.0	V	3.0	40.8	1.0	-44.8	-13.0	-31.8	
7.5200	2.3	V	3.0	40.7	1.0	-37.4	-13.0	-24.4	
3.7600	-5.3	H	3.0	40.5	1.0	-44.9	-13.0	-31.9	
5.6400	-4.4	H	3.0	40.8	1.0	-44.2	-13.0	-31.2	
7.5200	-2.8	H	3.0	40.7	1.0	-42.6	-13.0	-29.6	
High Ch, 1909.8 MHz									
3.8196	-2.8	V	3.0	40.6	1.0	-42.4	-13.0	-29.4	
5.7294	-3.4	V	3.0	40.8	1.0	-43.2	-13.0	-30.2	
7.6392	0.2	V	3.0	40.7	1.0	-39.4	-13.0	-26.4	
3.8196	0.9	H	3.0	40.6	1.0	-38.7	-13.0	-25.7	
5.7294	-4.6	H	3.0	40.8	1.0	-44.4	-13.0	-31.4	
7.6392	0.3	H	3.0	40.7	1.0	-39.4	-13.0	-26.4	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

GSM

GSM1900
EGPRS

UL Korea, Ltd Suwon Laboratory
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 16K23462
Date: 05-20-16
Test Engineer: JH Park
Configuration: EUT / AC Adapter / Earphone, X Position
Mode: EGPRS 1900 MHz

Chamber: Chamber 2 | Pre-amplifer: AFS42 | Filter: Filter 1 | Limit: Part 24

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 1850.2MHz									
3.7004	-14.1	V	3.0	40.5	1.0	-53.6	-13.0	-40.6	
5.5506	-10.3	V	3.0	40.8	1.0	-50.1	-13.0	-37.1	
7.4008	-9.4	V	3.0	40.8	1.0	-49.2	-13.0	-36.2	
3.7000	-11.5	H	3.0	40.5	1.0	-51.0	-13.0	-38.0	
5.5500	-11.2	H	3.0	40.8	1.0	-51.0	-13.0	-38.0	
7.4000	-10.2	H	3.0	40.8	1.0	-50.0	-13.0	-37.0	
Mid Ch, 1880.0MHz									
3.7600	-16.4	V	3.0	40.5	1.0	-56.0	-13.0	-43.0	
5.6400	-11.0	V	3.0	40.8	1.0	-50.8	-13.0	-37.8	
7.5200	-7.5	V	3.0	40.7	1.0	-47.2	-13.0	-34.2	
3.7600	-9.9	H	3.0	40.5	1.0	-49.4	-13.0	-36.4	
5.6400	-11.3	H	3.0	40.8	1.0	-51.1	-13.0	-38.1	
7.5200	-9.3	H	3.0	40.7	1.0	-49.0	-13.0	-36.0	
High Ch, 1909.8 MHz									
3.8196	-12.9	V	3.0	40.6	1.0	-52.5	-13.0	-39.5	
5.7294	-12.9	V	3.0	40.8	1.0	-52.7	-13.0	-39.7	
7.6392	-8.6	V	3.0	40.7	1.0	-48.2	-13.0	-35.2	
3.8196	-9.2	H	3.0	40.6	1.0	-48.8	-13.0	-35.8	
5.7294	-12.3	H	3.0	40.8	1.0	-52.1	-13.0	-39.1	
7.6392	-9.2	H	3.0	40.7	1.0	-48.9	-13.0	-35.9	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

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WCDMA Band 5

WCDMA

Band 5
REL99

UL Korea, Ltd Suwon Laboratory
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 16K23462
Date: 05-20-16
Test Engineer: JH Park
Configuration: EUT / AC Adapter / Earphone / Z Position
Mode: Tx, REL99,850MHz

Chamber	Pre-amplifer	Filter	Limit
Chamber 2	AFS42	Filter 1	Part 22

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 826.40MHz									
1.6520	-14.1	V	3.0	39.1	1.0	-52.2	-13.0	-39.2	
2.4790	-17.4	V	3.0	39.5	1.0	-55.9	-13.0	-42.9	
3.3056	-16.3	V	3.0	40.1	1.0	-55.4	-13.0	-42.4	
1.6520	-16.8	H	3.0	39.1	1.0	-54.9	-13.0	-41.9	
2.4790	-18.6	H	3.0	39.5	1.0	-57.1	-13.0	-44.1	
3.3056	-16.5	H	3.0	40.1	1.0	-55.6	-13.0	-42.6	
Mid Ch, 836.6MHz									
1.6732	-16.6	V	3.0	39.1	1.0	-54.7	-13.0	-41.7	
2.5098	-18.1	V	3.0	39.5	1.0	-56.6	-13.0	-43.6	
3.3464	-16.4	V	3.0	40.1	1.0	-55.5	-13.0	-42.5	
1.6732	-17.6	H	3.0	39.1	1.0	-55.8	-13.0	-42.8	
2.5098	-18.5	H	3.0	39.5	1.0	-57.1	-13.0	-44.1	
3.3464	-16.7	H	3.0	40.1	1.0	-55.8	-13.0	-42.8	
High Ch, 846.6MHz									
1.6932	-16.0	V	3.0	39.1	1.0	-54.2	-13.0	-41.2	
2.5390	-16.9	V	3.0	39.6	1.0	-55.5	-13.0	-42.5	
3.3860	-15.9	V	3.0	40.2	1.0	-55.1	-13.0	-42.1	
1.6932	-16.2	H	3.0	39.1	1.0	-54.4	-13.0	-41.4	
2.5390	-18.4	H	3.0	39.6	1.0	-57.0	-13.0	-44.0	
3.3860	-16.4	H	3.0	40.2	1.0	-55.5	-13.0	-42.5	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

WCDMA

Band 5
HSDPA

UL Korea, Ltd Suwon Laboratory
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 16K23462
Date: 05-20-16
Test Engineer: JH Park
Configuration: EUT / AC Adapter / Earphone / Z Position
Mode: Tx, HSDPA,850MHz

Chamber	Pre-amplifer	Filter	Limit
Chamber 2	AFS42	Filter 1	Part 22

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 826.40MHz									
1.6520	-17.3	V	3.0	39.1	1.0	-55.4	-13.0	-42.4	
2.4790	-17.7	V	3.0	39.5	1.0	-56.2	-13.0	-43.2	
3.3056	-15.8	V	3.0	40.1	1.0	-54.9	-13.0	-41.9	
1.6520	-16.4	H	3.0	39.1	1.0	-54.5	-13.0	-41.5	
2.4790	-18.3	H	3.0	39.5	1.0	-56.8	-13.0	-43.8	
3.3056	-16.5	H	3.0	40.1	1.0	-55.6	-13.0	-42.6	
Mid Ch, 836.6MHz									
1.6732	-17.2	V	3.0	39.1	1.0	-55.3	-13.0	-42.3	
2.5098	-17.2	V	3.0	39.5	1.0	-55.7	-13.0	-42.7	
3.3464	-15.9	V	3.0	40.1	1.0	-55.0	-13.0	-42.0	
1.6732	-17.1	H	3.0	39.1	1.0	-55.2	-13.0	-42.2	
2.5098	-18.2	H	3.0	39.5	1.0	-56.7	-13.0	-43.7	
3.3464	-16.2	H	3.0	40.1	1.0	-55.4	-13.0	-42.4	
High Ch, 846.6MHz									
1.6932	-16.8	V	3.0	39.1	1.0	-54.9	-13.0	-41.9	
2.5390	-17.9	V	3.0	39.6	1.0	-56.5	-13.0	-43.5	
3.3860	-15.7	V	3.0	40.2	1.0	-54.9	-13.0	-41.9	
1.6932	-17.3	H	3.0	39.1	1.0	-55.4	-13.0	-42.4	
2.5390	-18.3	H	3.0	39.6	1.0	-56.8	-13.0	-43.8	
3.3860	-16.1	H	3.0	40.2	1.0	-55.3	-13.0	-42.3	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

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WCDMA Band 2

WCDMA

Band 2
REL99

UL Korea, Ltd Suwon Laboratory
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 16K23462
Date: 05-16-16
Test Engineer: Chan Park
Configuration: EUT / AC Adapter / Earphone / X Position
Mode: Tx, REL99,1900MHz

Chamber	Pre-amplifer	Filter	Limit
Chamber 2	AFS42	Filter 1	Part 24

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 1852.4MHz									
3.7048	-14.8	V	3.0	40.5	1.0	-54.3	-13.0	-41.3	
5.5572	-11.5	V	3.0	40.8	1.0	-51.3	-13.0	-38.3	
7.4096	-9.1	V	3.0	40.8	1.0	-48.9	-13.0	-35.9	
3.7048	-15.1	H	3.0	40.5	1.0	-54.6	-13.0	-41.6	
5.5572	-11.5	H	3.0	40.8	1.0	-51.3	-13.0	-38.3	
7.4096	-8.6	H	3.0	40.8	1.0	-48.3	-13.0	-35.3	
Mid Ch, 1880MHz									
3.7600	-14.7	V	3.0	40.5	1.0	-54.2	-13.0	-41.2	
5.6400	-11.4	V	3.0	40.8	1.0	-51.2	-13.0	-38.2	
7.5200	-8.7	V	3.0	40.7	1.0	-48.4	-13.0	-35.4	
3.7600	-14.9	H	3.0	40.5	1.0	-54.5	-13.0	-41.5	
5.6400	-11.4	H	3.0	40.8	1.0	-51.2	-13.0	-38.2	
7.5200	-8.6	H	3.0	40.7	1.0	-48.4	-13.0	-35.4	
High Ch, 1907.6MHz									
3.8152	-13.8	V	3.0	40.6	1.0	-53.3	-13.0	-40.3	
5.7228	-11.3	V	3.0	40.8	1.0	-51.1	-13.0	-38.1	
7.6304	-8.5	V	3.0	40.7	1.0	-48.2	-13.0	-35.2	
3.8152	-14.5	H	3.0	40.6	1.0	-54.1	-13.0	-41.1	
5.7228	-11.5	H	3.0	40.8	1.0	-51.3	-13.0	-38.3	
7.6304	-8.5	H	3.0	40.7	1.0	-48.2	-13.0	-35.2	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

WCDMA

Band 2
HSDPA

UL Korea, Ltd Suwon Laboratory
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 16K23462
Date: 05-16-16
Test Engineer: Chan Park
Configuration: EUT / AC Adapter / Earphone / X Position
Mode: Tx, HSDPA,1900MHz

Chamber	Pre-amplifer	Filter	Limit
Chamber 2	AFS42	Filter 1	Part 24

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 1852.4MHz									
3.7048	-14.9	V	3.0	40.5	1.0	-54.4	-13.0	-41.4	
5.5572	-11.6	V	3.0	40.8	1.0	-51.4	-13.0	-38.4	
7.4096	-9.2	V	3.0	40.8	1.0	-49.0	-13.0	-36.0	
3.7048	-15.5	H	3.0	40.5	1.0	-55.0	-13.0	-42.0	
5.5572	-11.7	H	3.0	40.8	1.0	-51.5	-13.0	-38.5	
7.4096	-8.9	H	3.0	40.8	1.0	-48.7	-13.0	-35.7	
Mid Ch, 1880MHz									
3.7600	-14.8	V	3.0	40.5	1.0	-54.3	-13.0	-41.3	
5.6400	-11.6	V	3.0	40.8	1.0	-51.4	-13.0	-38.4	
7.5200	-8.7	V	3.0	40.7	1.0	-48.5	-13.0	-35.5	
3.7600	-15.5	H	3.0	40.5	1.0	-55.0	-13.0	-42.0	
5.6400	-11.6	H	3.0	40.8	1.0	-51.4	-13.0	-38.4	
7.5200	-8.8	H	3.0	40.7	1.0	-48.5	-13.0	-35.5	
High Ch, 1907.6MHz									
3.8152	-14.1	V	3.0	40.6	1.0	-53.7	-13.0	-40.7	
5.7228	-11.6	V	3.0	40.8	1.0	-51.4	-13.0	-38.4	
7.6304	-8.8	V	3.0	40.7	1.0	-48.5	-13.0	-35.5	
3.8152	-15.0	H	3.0	40.6	1.0	-54.6	-13.0	-41.6	
5.7228	-11.8	H	3.0	40.8	1.0	-51.6	-13.0	-38.6	
7.6304	-8.7	H	3.0	40.7	1.0	-48.4	-13.0	-35.4	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

UL Korea, Ltd. Suwon Laboratory FORM ID: FCC_22/24/27
218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16675 , Korea TEL: (031) 337-9902 FAX: (031) 213-5433
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LTE Band 17

LTE Band 17 10MHz QPSK

UL Korea, Ltd Suwon Laboratory
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 16K23462
Date: 05-23-16
Test Engineer: YH Lim
Configuration: EUT / AC Adapter / Ear Phone / Z-Position
Mode: TX, LTE BAND 17, 10MHz BW, QPSK

Chamber	Pre-amplifer	Filter	Limit
Chamber 2	AFS42	Filter 1	FCC Part 27

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Channel (709MHz)									
1.4180	-13.8	V	3.0	39.0	1.0	-51.8	-13.0	-38.8	
2.1270	-24.0	V	3.0	39.3	1.0	-62.3	-13.0	-49.3	
2.8360	-23.9	V	3.0	39.7	1.0	-62.6	-13.0	-49.6	
1.4180	-19.3	H	3.0	39.0	1.0	-57.3	-13.0	-44.3	
2.1270	-24.0	H	3.0	39.3	1.0	-62.3	-13.0	-49.3	
2.8360	-24.0	H	3.0	39.7	1.0	-62.7	-13.0	-49.7	
Mid Channel (710MHz)									
1.4200	-13.9	V	3.0	39.0	1.0	-51.9	-13.0	-38.9	
2.1300	-24.9	V	3.0	39.3	1.0	-63.2	-13.0	-50.2	
2.8400	-24.4	V	3.0	39.7	1.0	-63.1	-13.0	-50.1	
1.4200	-16.3	H	3.0	39.0	1.0	-54.3	-13.0	-41.3	
2.1300	-25.3	H	3.0	39.3	1.0	-63.6	-13.0	-50.6	
2.8400	-24.1	H	3.0	39.7	1.0	-62.8	-13.0	-49.8	
High Channel (711MHz)									
1.4220	-13.6	V	3.0	39.0	1.0	-51.6	-13.0	-38.6	
2.1330	-25.0	V	3.0	39.3	1.0	-63.3	-13.0	-50.3	
2.8440	-24.1	V	3.0	39.7	1.0	-62.8	-13.0	-49.8	
1.4220	-15.9	H	3.0	39.0	1.0	-53.9	-13.0	-40.9	
2.1330	-25.0	H	3.0	39.3	1.0	-63.3	-13.0	-50.3	
2.8440	-23.7	H	3.0	39.7	1.0	-62.5	-13.0	-49.5	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

LTE Band 17 10MHz 16QAM

UL Korea, Ltd Suwon Laboratory
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 16K23462
Date: 05-23-16
Test Engineer: YH Lim
Configuration: EUT / AC Adapter / Ear Phone / Z-Position
Mode: TX, LTE BAND 17, 10MHz BW,16QAM

Chamber	Pre-amplifer	Filter	Limit
Chamber 2	AFS42	Filter 1	FCC Part 27

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Channel (709MHz)									
1.4180	-15.5	V	3.0	39.0	1.0	-53.5	-13.0	-40.5	
2.1270	-24.2	V	3.0	39.3	1.0	-62.6	-13.0	-49.6	
2.8360	-23.5	V	3.0	39.7	1.0	-62.2	-13.0	-49.2	
1.4180	-18.6	H	3.0	39.0	1.0	-56.7	-13.0	-43.7	
2.1270	-24.8	H	3.0	39.3	1.0	-63.1	-13.0	-50.1	
2.8360	-24.1	H	3.0	39.7	1.0	-62.9	-13.0	-49.9	
Mid Channel (710MHz)									
1.4200	-16.2	V	3.0	39.0	1.0	-54.3	-13.0	-41.3	
2.1300	-24.2	V	3.0	39.3	1.0	-62.6	-13.0	-49.6	
2.8400	-24.8	V	3.0	39.7	1.0	-63.5	-13.0	-50.5	
1.4200	-17.8	H	3.0	39.0	1.0	-55.8	-13.0	-42.8	
2.1300	-25.4	H	3.0	39.3	1.0	-63.8	-13.0	-50.8	
2.8400	-24.0	H	3.0	39.7	1.0	-62.8	-13.0	-49.8	
High Channel (711MHz)									
1.4220	-16.1	V	3.0	39.0	1.0	-54.1	-13.0	-41.1	
2.1330	-24.9	V	3.0	39.3	1.0	-63.2	-13.0	-50.2	
2.8440	-23.9	V	3.0	39.7	1.0	-62.6	-13.0	-49.6	
1.4220	-17.5	H	3.0	39.0	1.0	-55.6	-13.0	-42.6	
2.1330	-25.1	H	3.0	39.3	1.0	-63.4	-13.0	-50.4	
2.8440	-23.8	H	3.0	39.7	1.0	-62.5	-13.0	-49.5	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

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LTE Band 17 5MHz QPSK

UL Korea, Ltd Suwon Laboratory
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 16K23462
Date: 05-23-16
Test Engineer: YH Lim
Configuration: EUT / AC Adapter / Ear Phone / Z-Position
Mode: TX, LTE BAND 17, 5MHz BW, QPSK

Chamber	Pre-amplifer	Filter	Limit
Chamber 2	AFS42	Filter 1	FCC Part 27

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Channel (706.5MHz)									
1.4130	-20.9	V	3.0	39.0	1.0	-58.9	-13.0	-45.9	
2.1195	-24.5	V	3.0	39.3	1.0	-62.8	-13.0	-49.8	
2.8260	-23.1	V	3.0	39.7	1.0	-61.9	-13.0	-48.9	
1.4130	-24.2	H	3.0	39.0	1.0	-62.2	-13.0	-49.2	
2.1195	-25.2	H	3.0	39.3	1.0	-63.6	-13.0	-50.6	
2.8260	-24.7	H	3.0	39.7	1.0	-63.4	-13.0	-50.4	
Mid Channel (710MHz)									
1.4200	-15.3	V	3.0	39.0	1.0	-53.3	-13.0	-40.3	
2.1300	-24.7	V	3.0	39.3	1.0	-63.0	-13.0	-50.0	
2.8400	-24.2	V	3.0	39.7	1.0	-62.9	-13.0	-49.9	
1.4200	-17.7	H	3.0	39.0	1.0	-55.8	-13.0	-42.8	
2.1300	-25.7	H	3.0	39.3	1.0	-64.1	-13.0	-51.1	
2.8400	-24.5	H	3.0	39.7	1.0	-63.2	-13.0	-50.2	
High Channel (713.5MHz)									
1.4270	-13.1	V	3.0	39.0	1.0	-51.1	-13.0	-38.1	
2.1405	-23.5	V	3.0	39.3	1.0	-61.8	-13.0	-48.8	
2.8540	-23.9	V	3.0	39.7	1.0	-62.6	-13.0	-49.6	
1.4270	-20.4	H	3.0	39.0	1.0	-58.4	-13.0	-45.4	
2.1405	-23.3	H	3.0	39.3	1.0	-61.6	-13.0	-48.6	
2.8540	-24.6	H	3.0	39.7	1.0	-63.3	-13.0	-50.3	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

LTE Band 17 5MHz 16QAM

UL Korea, Ltd Suwon Laboratory
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 16K23462
Date: 05-23-16
Test Engineer: YH Lim
Configuration: EUT / AC Adapter / Ear Phone / Z-Position
Mode: TX, LTE BAND 17, 5MHz BW,16QAM

Chamber	Pre-amplifer	Filter	Limit
Chamber 2	AFS42	Filter 1	FCC Part 27

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Channel (706.5MHz)									
1.4130	-21.6	V	3.0	39.0	1.0	-59.6	-13.0	-46.6	
2.1195	-24.4	V	3.0	39.3	1.0	-62.7	-13.0	-49.7	
2.8260	-23.6	V	3.0	39.7	1.0	-62.4	-13.0	-49.4	
1.4130	-25.2	H	3.0	39.0	1.0	-63.2	-13.0	-50.2	
2.1195	-25.8	H	3.0	39.3	1.0	-64.1	-13.0	-51.1	
2.8260	-25.0	H	3.0	39.7	1.0	-63.7	-13.0	-50.7	
Mid Channel (710MHz)									
1.4200	-16.9	V	3.0	39.0	1.0	-54.9	-13.0	-41.9	
2.1300	-24.8	V	3.0	39.3	1.0	-63.1	-13.0	-50.1	
2.8400	-24.5	V	3.0	39.7	1.0	-63.2	-13.0	-50.2	
1.4200	-19.0	H	3.0	39.0	1.0	-57.0	-13.0	-44.0	
2.1300	-25.9	H	3.0	39.3	1.0	-64.3	-13.0	-51.3	
2.8400	-24.6	H	3.0	39.7	1.0	-63.3	-13.0	-50.3	
High Channel (713.5MHz)									
1.4270	-15.4	V	3.0	39.0	1.0	-53.4	-13.0	-40.4	
2.1405	-24.1	V	3.0	39.3	1.0	-62.4	-13.0	-49.4	
2.8540	-24.4	V	3.0	39.7	1.0	-63.1	-13.0	-50.1	
1.4270	-19.0	H	3.0	39.0	1.0	-57.0	-13.0	-44.0	
2.1405	-23.9	H	3.0	39.3	1.0	-62.2	-13.0	-49.2	
2.8540	-24.8	H	3.0	39.7	1.0	-63.6	-13.0	-50.6	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

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LTE Band 5

LTE Band 5 10MHz QPSK

UL Korea, Ltd Suwon Laboratory
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 16K23462
Date: 05-26-16
Test Engineer: YH Lim
Configuration: EUT / AC Adapter / Earphone, Z Position
Mode: TX, LTE BAND 5, 10MHz BW,QPSK

Chamber	Pre-amplifer	Filter	Limit
Chamber 2	AFS42	Filter 1	Part 22

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Channel (829MHz)									
1.6580	-13.8	V	3.0	39.1	1.0	-51.9	-13.0	-38.9	
2.4870	-21.6	V	3.0	39.5	1.0	-60.1	-13.0	-47.1	
3.3160	-16.9	V	3.0	40.1	1.0	-56.0	-13.0	-43.0	
1.6580	-16.0	H	3.0	39.1	1.0	-54.1	-13.0	-41.1	
2.4870	-22.2	H	3.0	39.5	1.0	-60.7	-13.0	-47.7	
3.3160	-17.6	H	3.0	40.1	1.0	-56.7	-13.0	-43.7	
Mid Channel (836.5MHz)									
1.6730	-17.1	V	3.0	39.1	1.0	-55.2	-13.0	-42.2	
2.5090	-22.6	V	3.0	39.5	1.0	-61.2	-13.0	-48.2	
3.3460	-19.7	V	3.0	40.1	1.0	-58.8	-13.0	-45.8	
1.6730	-19.2	H	3.0	39.1	1.0	-57.3	-13.0	-44.3	
2.5090	-23.8	H	3.0	39.5	1.0	-62.4	-13.0	-49.4	
3.3460	-20.5	H	3.0	40.1	1.0	-59.7	-13.0	-46.7	
High Channel (844MHz)									
1.6880	-11.0	V	3.0	39.1	1.0	-49.1	-13.0	-36.1	
2.5320	-22.5	V	3.0	39.5	1.0	-61.0	-13.0	-48.0	
3.3760	-19.1	V	3.0	40.2	1.0	-58.3	-13.0	-45.3	
1.6880	-12.1	H	3.0	39.1	1.0	-50.2	-13.0	-37.2	
2.5320	-23.8	H	3.0	39.5	1.0	-62.3	-13.0	-49.3	
3.3760	-19.6	H	3.0	40.2	1.0	-58.8	-13.0	-45.8	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

LTE Band 5 10MHz 16QAM

UL Korea, Ltd Suwon Laboratory
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 16K23462
Date: 05-26-16
Test Engineer: YH Lim
Configuration: EUT / AC Adapter / Earphone, Z Position
Mode: TX, LTE BAND 5, 10MHz BW,16QAM

Chamber	Pre-amplifer	Filter	Limit
Chamber 2	AFS42	Filter 1	Part 22

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Channel (829MHz)									
1.6580	-14.9	V	3.0	39.1	1.0	-53.0	-13.0	-40.0	
2.4870	-22.5	V	3.0	39.5	1.0	-61.0	-13.0	-48.0	
3.3160	-17.8	V	3.0	40.1	1.0	-57.0	-13.0	-44.0	
1.6580	-16.8	H	3.0	39.1	1.0	-54.9	-13.0	-41.9	
2.4870	-23.0	H	3.0	39.5	1.0	-61.5	-13.0	-48.5	
3.3160	-18.6	H	3.0	40.1	1.0	-57.7	-13.0	-44.7	
Mid Channel (836.5MHz)									
1.6730	-18.7	V	3.0	39.1	1.0	-56.8	-13.0	-43.8	
2.5090	-23.1	V	3.0	39.5	1.0	-61.7	-13.0	-48.7	
3.3460	-19.9	V	3.0	40.1	1.0	-59.0	-13.0	-46.0	
1.6730	-20.1	H	3.0	39.1	1.0	-58.2	-13.0	-45.2	
2.5090	-24.2	H	3.0	39.5	1.0	-62.7	-13.0	-49.7	
3.3460	-21.3	H	3.0	40.1	1.0	-60.4	-13.0	-47.4	
High Channel (844MHz)									
1.6880	-12.8	V	3.0	39.1	1.0	-50.9	-13.0	-37.9	
2.5320	-23.1	V	3.0	39.5	1.0	-61.7	-13.0	-48.7	
3.3760	-20.1	V	3.0	40.2	1.0	-59.3	-13.0	-46.3	
1.6880	-13.7	H	3.0	39.1	1.0	-51.9	-13.0	-38.9	
2.5320	-24.1	H	3.0	39.5	1.0	-62.7	-13.0	-49.7	
3.3760	-20.1	H	3.0	40.2	1.0	-59.3	-13.0	-46.3	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

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LTE Band 5 5MHz QPSK

UL Korea, Ltd Suwon Laboratory
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 16K23462
Date: 05-26-16
Test Engineer: YH Lim
Configuration: EUT / AC Adapter / Earphone, Z Position
Mode: TX, LTE BAND 5, 5MHz BW,QPSK

Chamber	Pre-amplifer	Filter	Limit
Chamber 2	AFS42	Filter 1	Part 22

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Channel (826.5MHz)									
1.6530	-14.3	V	3.0	39.1	1.0	-52.5	-13.0	-39.5	
2.4790	-18.6	V	3.0	39.5	1.0	-57.1	-13.0	-44.1	
3.3060	-17.3	V	3.0	40.1	1.0	-56.4	-13.0	-43.4	
1.6530	-16.8	H	3.0	39.1	1.0	-54.9	-13.0	-41.9	
2.4790	-21.2	H	3.0	39.5	1.0	-59.7	-13.0	-46.7	
3.3060	-17.0	H	3.0	40.1	1.0	-56.1	-13.0	-43.1	
Mid Channel (836.5MHz)									
1.6730	-17.1	V	3.0	39.1	1.0	-55.2	-13.0	-42.2	
2.5090	-23.1	V	3.0	39.5	1.0	-61.6	-13.0	-48.6	
3.3460	-19.5	V	3.0	40.1	1.0	-58.7	-13.0	-45.7	
1.6730	-19.2	H	3.0	39.1	1.0	-57.3	-13.0	-44.3	
2.5090	-24.0	H	3.0	39.5	1.0	-62.5	-13.0	-49.5	
3.3460	-20.9	H	3.0	40.1	1.0	-60.1	-13.0	-47.1	
High Channel (846.5MHz)									
1.6930	-13.2	V	3.0	39.1	1.0	-51.3	-13.0	-38.3	
2.5390	-21.3	V	3.0	39.6	1.0	-59.9	-13.0	-46.9	
3.3860	-19.1	V	3.0	40.2	1.0	-58.3	-13.0	-45.3	
1.6930	-15.8	H	3.0	39.1	1.0	-53.9	-13.0	-40.9	
2.5390	-23.4	H	3.0	39.6	1.0	-62.0	-13.0	-49.0	
3.3860	-20.1	H	3.0	40.2	1.0	-59.3	-13.0	-46.3	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

LTE Band 5 5MHz 16QAM

UL Korea, Ltd Suwon Laboratory
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 16K23462
Date: 05-26-16
Test Engineer: YH Lim
Configuration: EUT / AC Adapter / Earphone, Z Position
Mode: TX, LTE BAND 5, 5MHz BW,16QAM

Chamber	Pre-amplifer	Filter	Limit
Chamber 2	AFS42	Filter 1	Part 22

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Channel (826.5MHz)									
1.6530	-15.0	V	3.0	39.1	1.0	-53.1	-13.0	-40.1	
2.4790	-19.8	V	3.0	39.5	1.0	-58.3	-13.0	-45.3	
3.3060	-17.9	V	3.0	40.1	1.0	-57.0	-13.0	-44.0	
1.6530	-17.3	H	3.0	39.1	1.0	-55.4	-13.0	-42.4	
2.4790	-21.8	H	3.0	39.5	1.0	-60.3	-13.0	-47.3	
3.3060	-17.3	H	3.0	40.1	1.0	-56.4	-13.0	-43.4	
Mid Channel (836.5MHz)									
1.6730	-17.8	V	3.0	39.1	1.0	-55.9	-13.0	-42.9	
2.5090	-23.3	V	3.0	39.5	1.0	-61.9	-13.0	-48.9	
3.3460	-20.0	V	3.0	40.1	1.0	-59.1	-13.0	-46.1	
1.6730	-20.6	H	3.0	39.1	1.0	-58.8	-13.0	-45.8	
2.5090	-24.4	H	3.0	39.5	1.0	-62.9	-13.0	-49.9	
3.3460	-20.4	H	3.0	40.1	1.0	-59.5	-13.0	-46.5	
High Channel (846.5MHz)									
1.6930	-14.0	V	3.0	39.1	1.0	-52.1	-13.0	-39.1	
2.5390	-21.7	V	3.0	39.6	1.0	-60.3	-13.0	-47.3	
3.3860	-19.3	V	3.0	40.2	1.0	-58.5	-13.0	-45.5	
1.6930	-16.7	H	3.0	39.1	1.0	-54.8	-13.0	-41.8	
2.5390	-23.7	H	3.0	39.6	1.0	-62.2	-13.0	-49.2	
3.3860	-20.3	H	3.0	40.2	1.0	-59.5	-13.0	-46.5	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

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LTE Band 5 3MHz QPSK

UL Korea, Ltd Suwon Laboratory
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 16K23462
Date: 05-26-16
Test Engineer: YH Lim
Configuration: EUT / AC Adapter / Earphone, Z Position
Mode: TX, LTE BAND 5, 3MHz BW,QPSK

Chamber	Pre-amplifer	Filter	Limit
Chamber 2	AFS42	Filter 1	Part 22

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Channel (825.5MHz)									
1.6510	-11.7	V	3.0	39.1	1.0	-49.8	-13.0	-36.8	
2.4675	-24.8	V	3.0	39.5	1.0	-63.3	-13.0	-50.3	
3.3020	-17.4	V	3.0	40.1	1.0	-56.5	-13.0	-43.5	
1.6510	-15.0	H	3.0	39.1	1.0	-53.1	-13.0	-40.1	
2.4675	-25.3	H	3.0	39.5	1.0	-63.8	-13.0	-50.8	
3.3020	-18.1	H	3.0	40.1	1.0	-57.2	-13.0	-44.2	
Mid Channel (836.5MHz)									
1.6730	-18.3	V	3.0	39.1	1.0	-56.4	-13.0	-43.4	
2.5090	-22.9	V	3.0	39.5	1.0	-61.4	-13.0	-48.4	
3.3460	-19.2	V	3.0	40.1	1.0	-58.4	-13.0	-45.4	
1.6730	-19.1	H	3.0	39.1	1.0	-57.2	-13.0	-44.2	
2.5090	-24.6	H	3.0	39.5	1.0	-63.2	-13.0	-50.2	
3.3460	-20.7	H	3.0	40.1	1.0	-59.8	-13.0	-46.8	
High Channel (847.5MHz)									
1.6950	-16.9	V	3.0	39.1	1.0	-55.0	-13.0	-42.0	
2.5425	-22.0	V	3.0	39.6	1.0	-60.5	-13.0	-47.5	
3.3900	-20.0	V	3.0	40.2	1.0	-59.2	-13.0	-46.2	
1.6950	-19.6	H	3.0	39.1	1.0	-57.7	-13.0	-44.7	
2.5425	-24.5	H	3.0	39.6	1.0	-63.1	-13.0	-50.1	
3.3900	-19.3	H	3.0	40.2	1.0	-58.5	-13.0	-45.5	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

LTE Band 5 3MHz 16QAM

UL Korea, Ltd Suwon Laboratory
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 16K23462
Date: 05-26-16
Test Engineer: YH Lim
Configuration: EUT / AC Adapter / Earphone, Z Position
Mode: TX, LTE BAND 5, 3MHz BW,16QAM

Chamber	Pre-amplifer	Filter	Limit
Chamber 2	AFS42	Filter 1	Part 22

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Channel (825.5MHz)									
1.6510	-12.8	V	3.0	39.1	1.0	-50.9	-13.0	-37.9	
2.4675	-25.2	V	3.0	39.5	1.0	-63.8	-13.0	-50.8	
3.3020	-17.6	V	3.0	40.1	1.0	-56.7	-13.0	-43.7	
1.6510	-15.8	H	3.0	39.1	1.0	-53.9	-13.0	-40.9	
2.4675	-25.6	H	3.0	39.5	1.0	-64.1	-13.0	-51.1	
3.3020	-18.4	H	3.0	40.1	1.0	-57.5	-13.0	-44.5	
Mid Channel (836.5MHz)									
1.6730	-18.4	V	3.0	39.1	1.0	-56.5	-13.0	-43.5	
2.5090	-23.2	V	3.0	39.5	1.0	-61.7	-13.0	-48.7	
3.3460	-20.0	V	3.0	40.1	1.0	-59.2	-13.0	-46.2	
1.6730	-19.6	H	3.0	39.1	1.0	-57.8	-13.0	-44.8	
2.5090	-24.8	H	3.0	39.5	1.0	-63.4	-13.0	-50.4	
3.3460	-21.0	H	3.0	40.1	1.0	-60.1	-13.0	-47.1	
High Channel (847.5MHz)									
1.6950	-17.4	V	3.0	39.1	1.0	-55.5	-13.0	-42.5	
2.5425	-22.8	V	3.0	39.6	1.0	-61.4	-13.0	-48.4	
3.3900	-20.6	V	3.0	40.2	1.0	-59.7	-13.0	-46.7	
1.6950	-19.9	H	3.0	39.1	1.0	-58.0	-13.0	-45.0	
2.5425	-24.7	H	3.0	39.6	1.0	-63.3	-13.0	-50.3	
3.3900	-20.1	H	3.0	40.2	1.0	-59.3	-13.0	-46.3	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

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LTE Band 5 1.4MHz QPSK

UL Korea, Ltd Suwon Laboratory
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 16K23462
Date: 05-26-16
Test Engineer: YH Lim
Configuration: EUT / AC Adapter / Earphone, Z Position
Mode: TX, LTE BAND 5, 1.4MHz BW,QPSK

Chamber	Pre-amplifer	Filter	Limit
Chamber 2	AFS42	Filter 1	Part 22

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Channel (824.7MHz)									
1.6494	-11.7	V	3.0	39.1	1.0	-49.8	-13.0	-36.8	
2.4741	-21.0	V	3.0	39.5	1.0	-59.5	-13.0	-46.5	
3.2988	-16.6	V	3.0	40.1	1.0	-55.7	-13.0	-42.7	
1.6494	-14.0	H	3.0	39.1	1.0	-52.1	-13.0	-39.1	
2.4741	-21.7	H	3.0	39.5	1.0	-60.2	-13.0	-47.2	
3.2988	-15.6	H	3.0	40.1	1.0	-54.7	-13.0	-41.7	
Mid Channel (836.5MHz)									
1.6730	-16.4	V	3.0	39.1	1.0	-54.5	-13.0	-41.5	
2.5090	-21.3	V	3.0	39.5	1.0	-59.8	-13.0	-46.8	
3.3460	-19.4	V	3.0	40.1	1.0	-58.5	-13.0	-45.5	
1.6730	-18.3	H	3.0	39.1	1.0	-56.4	-13.0	-43.4	
2.5090	-23.8	H	3.0	39.5	1.0	-62.3	-13.0	-49.3	
3.3460	-21.0	H	3.0	40.1	1.0	-60.1	-13.0	-47.1	
High Channel (848.3MHz)									
1.6966	-20.4	V	3.0	39.1	1.0	-58.5	-13.0	-45.5	
2.5449	-24.1	V	3.0	39.6	1.0	-62.6	-13.0	-49.6	
3.3932	-18.7	V	3.0	40.2	1.0	-57.9	-13.0	-44.9	
1.6966	-24.0	H	3.0	39.1	1.0	-62.1	-13.0	-49.1	
2.5449	-24.6	H	3.0	39.6	1.0	-63.2	-13.0	-50.2	
3.3932	-18.7	H	3.0	40.2	1.0	-57.9	-13.0	-44.9	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

LTE Band 5 1.4MHz 16QAM

UL Korea, Ltd Suwon Laboratory
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 16K23462
Date: 05-26-16
Test Engineer: YH Lim
Configuration: EUT / AC Adapter / Earphone, Z Position
Mode: TX, LTE BAND 5, 1.4MHz BW,16QAM

Chamber	Pre-amplifer	Filter	Limit
Chamber 2	AFS42	Filter 1	Part 22

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Channel (824.7MHz)									
1.6494	-13.0	V	3.0	39.1	1.0	-51.1	-13.0	-38.1	
2.4741	-20.0	V	3.0	39.5	1.0	-58.5	-13.0	-45.5	
3.2988	-17.7	V	3.0	40.1	1.0	-56.8	-13.0	-43.8	
1.6494	-14.6	H	3.0	39.1	1.0	-52.7	-13.0	-39.7	
2.4741	-21.9	H	3.0	39.5	1.0	-60.4	-13.0	-47.4	
3.2988	-16.1	H	3.0	40.1	1.0	-55.2	-13.0	-42.2	
Mid Channel (836.5MHz)									
1.6730	-17.0	V	3.0	39.1	1.0	-55.1	-13.0	-42.1	
2.5090	-22.1	V	3.0	39.5	1.0	-60.7	-13.0	-47.7	
3.3460	-19.7	V	3.0	40.1	1.0	-58.8	-13.0	-45.8	
1.6730	-19.7	H	3.0	39.1	1.0	-57.8	-13.0	-44.8	
2.5090	-23.9	H	3.0	39.5	1.0	-62.4	-13.0	-49.4	
3.3460	-21.3	H	3.0	40.1	1.0	-60.4	-13.0	-47.4	
High Channel (848.3MHz)									
1.6966	-20.9	V	3.0	39.1	1.0	-59.0	-13.0	-46.0	
2.5449	-24.2	V	3.0	39.6	1.0	-62.8	-13.0	-49.8	
3.3932	-19.5	V	3.0	40.2	1.0	-58.7	-13.0	-45.7	
1.6966	-24.6	H	3.0	39.1	1.0	-62.7	-13.0	-49.7	
2.5449	-24.7	H	3.0	39.6	1.0	-63.2	-13.0	-50.2	
3.3932	-19.4	H	3.0	40.2	1.0	-58.6	-13.0	-45.6	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

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