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

CERTIFICATION TEST REPORT

FOR

GSM/WCDMA/LTE Phone + Bluetooth, 2.4GHz DTS & NFC

MODEL NUMBER : SM-G388F

FCC ID: A3LSMG388F

REPORT NUMBER: 15K19845-E5

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Prepared for
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1. ATTESTATION OF TEST RESULTS

COMPANY NAME:	SAMSUNG ELECTRONICS CO., LTD.
EUT DESCRIPTION:	GSM/WCDMA/LTE Phone + Bluetooth, 2.4GHz DTS & NFC
MODEL NUMBER:	SM-G388F
SERIAL NUMBER:	R38G10B0RAZ (RADIATED); R38G10B0NMN (CONDUCTED)
DATE TESTED:	JANUARY 24 - FEBRUARY 01, 2015

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

Ji Ho Choi
Suwon Lab Manager
UL Korea, Ltd.

Tested By:

CY Choi
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-C, FCC CFR 47 Part 22, FCC CFR Part 24.

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, 443-823, 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 a GSM/WCDMA/LTE Phone + Bluetooth, 2.4GHz DTS & 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(MHz)	Modulation Peak	Conducted		Radiated	
			Avg (dBm)	Avg (mW)	Avg (dBm)	Avg (mW)
GSM850	824~849	GMSK	33.5	2238.7		
	824~849	GPRS	33.5	2238.7	25.8	380.2
	824~849	EGPRS	27.4	549.5	22.7	186.2
GSM1900	1850~1910	GMSK	29.7	933.3		
	1850~1910	GPRS	29.7	933.3	29.4	871.0
	1850~1910	EGPRS	27.0	501.2	27.9	616.6

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(MHz)	Modulation Peak	Conducted		Radiated	
			Avg (dBm)	Avg (mW)	Avg (dBm)	Avg (mW)
Band 5	824~849	REL99	23.0	199.5	17.7	58.9
	824~849	HSDPA	23.3	213.8	17.2	52.5
	824~849	HSUPA	23.3	213.8		
Band 2	1850~1910	REL99	22.6	182.0	23.0	199.5
	1850~1910	HSDPA	22.6	182.0	21.7	147.9
	1850~1910	HSUPA	22.4	173.8		

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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:

FCC Part 22 (10MHz Bandwidth)							
Band	Frequency Range(MHz)	BandWidth (MHz)	Modulation Peak	Conducted		Radiated	
				Avg (dBm)	Avg(mW)	Avg (dBm)	Avg(mW)
LTE5	824~849 824~849	10MHz 10MHz	QPSK	23.1	204.2	16.8	47.9
			16QAM	22.7	186.2	15.9	38.9

FCC Part 22 (5MHz Bandwidth)							
Band	Frequency Range(MHz)	BandWidth (MHz)	Modulation Peak	Conducted		Radiated	
				Avg (dBm)	Avg(mW)	Avg (dBm)	Avg(mW)
LTE5	824~849 824~849	5MHz 5MHz	QPSK	23.1	204.2	18.9	77.6
			16QAM	22.7	186.2	17.7	58.9

FCC Part 22 (3MHz Bandwidth)							
Band	Frequency Range(MHz)	BandWidth (MHz)	Modulation Peak	Conducted		Radiated	
				Avg (dBm)	Avg(mW)	Avg (dBm)	Avg(mW)
LTE5	824~849 824~849	3MHz 3MHz	QPSK	23.0	199.5	18.5	70.8
			16QAM	22.6	182.0	17.5	56.2

FCC Part 22 (1.4MHz Bandwidth)							
Band	Frequency Range(MHz)	BandWidth (MHz)	Modulation Peak	Conducted		Radiated	
				Avg (dBm)	Avg(mW)	Avg (dBm)	Avg(mW)
LTE5	824~849 824~849	1.4MHz 1.4MHz	QPSK	23.2	208.9	22.6	182.0
			16QAM	22.6	182.0	22.8	190.5

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5.5. DESCRIPTION OF AVAILABLE ANTENNAS

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

Frequency (MHz)	Peak Gain (dBi)
GSM 850 / WCDMA & LTE Band 5 824~849MHz	-1.23
GSM 1900 / WCDMA Band 2 1850~1910MHz	0.43

5.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	**Manufacturer**	**Model**	**Serial Number**	**FCC ID**
Charger	SAMSUNG	ETA0U10EBE	N/A	N/A
Data Cable	SAMSUNG	GH39-01710A	N/A	N/A
Earphone	SAMSUNG	GH59-11129H	N/A	N/A

I/O CABLES (CONDUCTED SETUP)

I/O Cable List						
Cable No	**Port**	**# of identical ports**	**Connector Type**	**Cable Type**	**Cable Length (m)**	**Remarks**
1	RF Out	1	Spectrum Analyzer	Shielded	0.2m	NA
2	Antenna Port	1	EUT	Shielded	0.5m	NA
3	RF In/Out	1	Communication Test Set	Shielded	0.5m	NA

I/O CABLES (RADIATED SETUP)

I/O CABLE LIST						
Cable No.	**Port**	**# of Identical Ports**	**Connector Type**	**Cable Type**	**Cable Length**	**Remarks**
1	USB	1	AC Adapter	Shielded	0.8m	No
2	Jack	1	Headset	Un-shielded	1.0m	No
3	RF In/out	1	Communication Test Set	Shielded	2.0m	Yes

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

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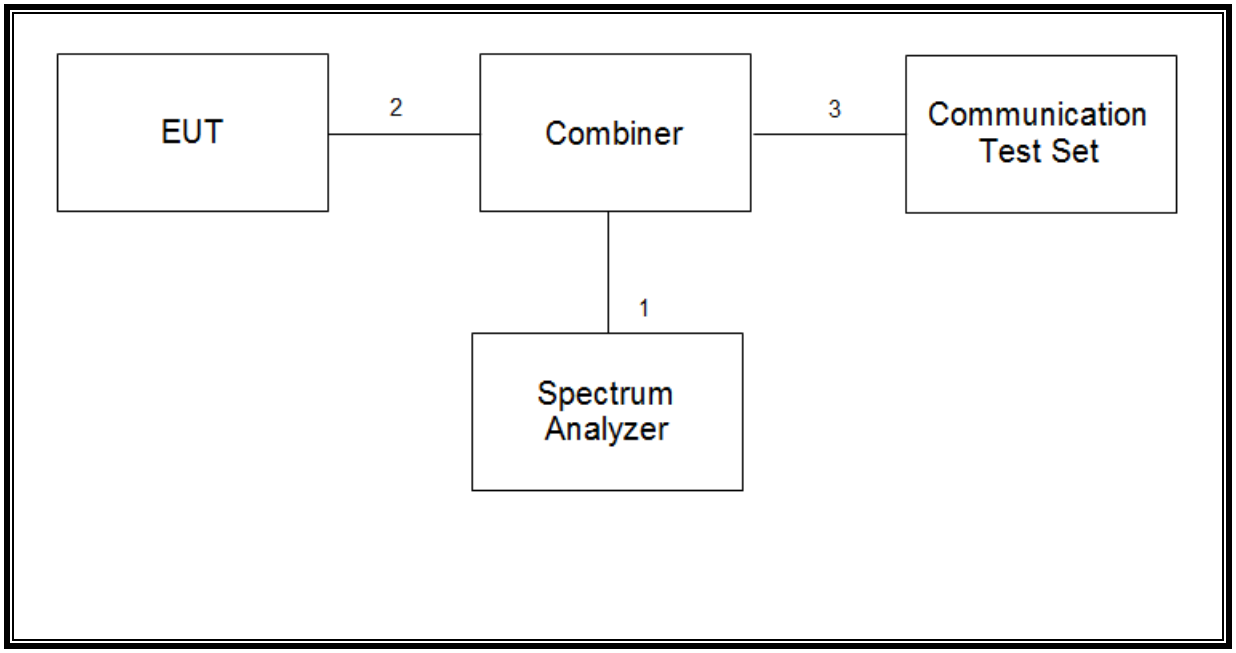
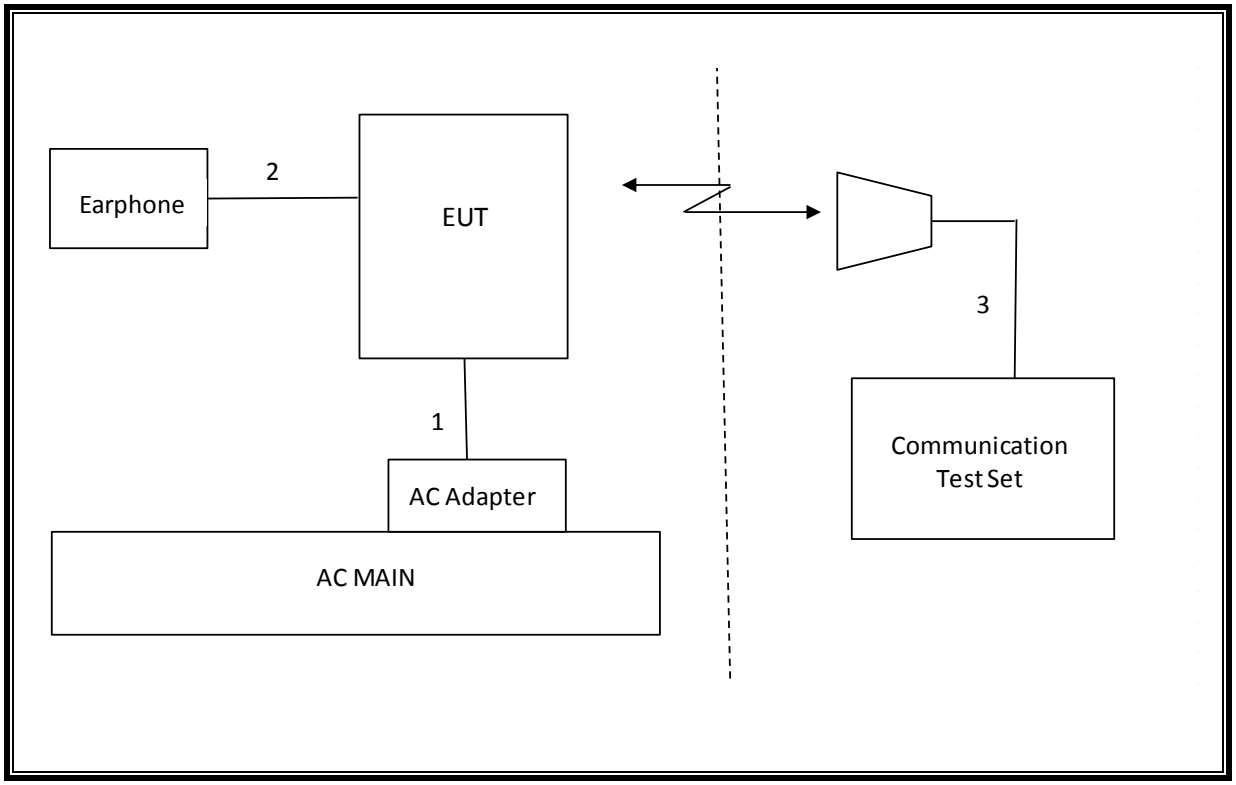
SETUP DIAGRAM FOR TESTS (CONDUCTED TEST SETUP)



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	07-29-11
Antenna, Bilog, 30MHz-1GHz	SCHWARZBECK	VULB9163	950	11-17-15
Antenna, Horn, 18 GHz	ETS	3115	00167211	09-20-15
Antenna, Horn, 40 GHz	ETS	3116C	00166255	09-23-15
Antenna, Horn, 40 GHz	ETS	3116C-PA	00168841	09-29-15
Preamplifier, 1000 MHz	Sonoma	310N	341282	11-17-15
Preamplifier, 18 GHz	Miteq	AFS42-00101800-25-S-42	1876511	11-18-15
Spectrum Analyzer, 44 GHz	Agilent / HP	N9030A	MY54170614	09-23-15
Communications Test Set	R&S	CMW500	150312	08-13-15
Average Power Sensor	R&S	NRZ-Z91	102681	11-17-15
Average Power Sensor	Agilent / HP	U2000	MY54270007	09-23-15
EMI Test Receive, 40 GHz	R&S	ESU40	100439	11-17-15
EMI Test Receive, 3 GHz	R&S	ESR3	101832	11-17-15
Attenuator / Switch driver	HP	11713A	3748A04272	N/A
Low Pass Filter 3GHz	Micro-Tronics	LPS17541	009	11-17-15
High Pass Filter 5GHz	Micro-Tronics	HPS17542	009	11-17-15
High Pass Filter 6GHz	Micro-Tronics	HPM17543	010	11-17-15
Combiner	WEINSCHEL	1575	2153	11-17-15
Temperature Chamber	ESPEC	SH-642	93001109	11-13-15
DC Power Supply	Agilent / HP	E3640A	MY54226395	09-23-15

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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	17.91 MHz
22.917(a) 24.238(a) 27.53(g) 90.691	Band Edge / Conducted Spurious Emission	-13dBm		Pass	-15.03 dBm
2.1046	Conducted output power	N/A		Pass	24.1 dBm
22.355 24.235 27.54 90.213	Frequency Stability	2.5PPM		Pass	0.011 PPM
22.913(a)(2)	Effective Radiated Power	38 dBm	Radiated	Pass	21.46 dBm
27.50(c)(10)		34.77 dBm		Pass	21.49 dBm
24.232(c) 27.50(h)(2)	Equivalent Isotropic Radiated Power	33dBm		Pass	25.71 dBm
27.50(d)(4)		30dBm		Pass	26.03 dBm
22.917(a) 24.238(a) 27.53(g)	Radiated Spurious Emission	-13dBm		Pass	-34.3 dBm

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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

GSM850 Measured Results

Band	Mode	Coding Scheme	Time Slots	Ch No.	Freq. (MHz)	Burst Pwr (dBm)	Frame Pwr (dBm)
850	GSM (Voice)	CS1	1	128	824.2	33.2	24.2
				190	836.6	33.2	24.1
				251	848.8	33.5	24.5
	GPRS (GMSK)	CS1	1	128	824.2	33.2	24.1
				190	836.6	33.1	24.1
				251	848.8	33.5	24.5
			2	128	824.2	30.8	24.8
				190	836.6	30.8	24.7
				251	848.8	31.1	25.1
			3	**128**	**824.2**	**28.9**	**24.6**
				190	**836.6**	**28.8**	**24.5**
				251	**848.8**	**29.2**	**24.9**
			4	128	824.2	26.9	23.9
				190	836.6	26.9	23.9
				251	848.8	27.2	24.2
	EGPRS (8PSK)	MCS5	1	128	824.2	27.0	17.9
				190	836.6	26.7	17.7
				251	848.8	27.4	18.3
			2	128	824.2	25.3	19.3
				190	836.6	25.2	19.1
				251	848.8	25.7	19.6
			3	128	824.2	23.4	19.2
				190	836.6	23.2	18.9
				251	848.8	23.8	19.6
			4	128	824.2	21.4	18.4
				190	836.6	21.1	18.0
				251	848.8	21.8	18.8

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GSM1900 Measured Results

Band	Mode	Coding Scheme	Time Slots	Ch No.	Freq. (MHz)	Burst Pwr (dBm)	Frame Pwr (dBm)
1900	GSM (Voice)	CS1	1	512	1850.2	29.7	20.7
				661	1880.0	29.7	20.7
				810	1909.8	29.7	20.7
	GPRS (GMSK)	CS1	1	512	1850.2	29.7	20.6
				661	1880.0	29.7	20.7
				810	1909.8	29.7	20.7
			2	**512**	**1850.2**	**27.8**	**21.8**
				661	**1880.0**	**27.8**	**21.8**
				810	**1909.8**	**27.8**	**21.8**
			3	512	1850.2	25.8	21.6
				661	1880.0	25.9	21.7
				810	1909.8	25.9	21.6
			4	512	1850.2	23.9	20.9
				661	1880.0	24.0	21.0
				810	1909.8	23.9	20.9
	EGPRS (8PSK)	MCS5	1	512	1850.2	26.7	17.7
				661	1880.0	27.0	18.0
				810	1909.8	27.0	17.9
			2	512	1850.2	25.2	19.2
				661	1880.0	25.5	19.5
				810	1909.8	25.4	19.4
			3	512	1850.2	23.0	18.7
				661	1880.0	23.3	19.0
				810	1909.8	23.3	19.0
			4	512	1850.2	20.9	17.8
				661	1880.0	21.1	18.1
				810	1909.8	21.0	18.0

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8.2. UMTS REL 99

TEST PROCEDURE

The following summary of these settings are illustrated below:

	Mode	Rel99
	Subtest	-
WCDMA General Settings	Loopback Mode	Test Mode 1
	Rel99 RMC	12.2kbps RMC
	HSDPA FRC	Not Applicable
	HSUPA Test	Not Applicable
	Power Control Algorithm	Algorithm2
	βc	Not Applicable
	βd	Not Applicable
	βec	Not Applicable
	βc/βd	8/15
	βhs	Not Applicable
	βed	Not Applicable

8.2.1. UMTS REL 99 OUTPUT POWER RESULT

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	N/A	23.0
			4183	836.6	N/A	23.0
			4233	846.6	N/A	23.0

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	N/A	22.5
			9400	1880.0	N/A	22.4
			9538	1907.6	N/A	22.6

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8.3. UMTS HSDPA

The following 4 Sub-tests were completed according to Release 5 procedures in section 5.2 of 3GPP TS34.121. A summary of these settings are illustrated below:

	Mode	Rel5 HSDPA			
	Subtest	1	2	3	4
WCDMA General Settings	Loopback Mode	Test Mode 1			
	Rel99 RMC	12.2kbps RMC			
	HSDPA FRC	H-Set1			
	Power Control Algorithm	Algorithm 2			
	βc	2/15	12/15	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			

8.3.1. UMTS HSDPA OUTPUT POWER RESULT

Band	Mode		UL Ch No.	Freq. (MHz)	MPR (dB)	Avg Pwr (dBm)
W-CDMA Band V	HSDPA	Subtest 1	4132	826.4	0	23.0
			4183	836.6	0	22.9
			4233	846.6	0	22.8
		Subtest 2	4132	826.4	0	23.3
			4183	836.6	0	23.2
			4233	846.6	0	23.2
		Subtest 3	4132	826.4	0.5	22.9
			4183	836.6	0.5	23.0
			4233	846.6	0.5	23.0
		Subtest 4	4132	826.4	0.5	23.0
			4183	836.6	0.5	23.0
			4233	846.6	0.5	23.0

Band	Mode		UL Ch No.	Freq. (MHz)	MPR (dB)	Avg Pwr (dBm)
W-CDMA Band II	HSDPA	Subtest 1	9262	1852.4	0	22.2
			9400	1880.0	0	22.1
			9538	1907.6	0	22.0
		Subtest 2	9262	1852.4	0	22.6
			9400	1880.0	0	22.5
			9538	1907.6	0	22.6
		Subtest 3	9262	1852.4	0.5	22.2
			9400	1880.0	0.5	22.2
			9538	1907.6	0.5	22.3
		Subtest 4	9262	1852.4	0.5	22.3
			9400	1880.0	0.5	22.2
			9538	1907.6	0.5	22.3

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8.4. UMTS HSUPA

TEST PROCEDURE

The following summary of these settings are illustrated below: (ETSI TS 134.121-1 Table C.11.1)

	Mode	Rel6 HSUPA	Rel6 HSUPA	Rel6 HSUPA	Rel6 HSUPA	Rel6 HSUPA
	Subtest	1	2	3	4	5
WCDMA General Settings	Loopback Mode	Test Mode 1				
	P-CPICH (dB)	-10				
	P-CCPCH (dB)	-12				
	SCH (dB)	-12				
	PICH(dB)	-15				
	DPCH (dB)	-9				
	HS-SCCH_1 (dB)	-8				
	HS-PDSCH (dB)	-3				
	Rel99 RMC	12.2kbps RMC				
	HSDPA FRC	H-Set1				
	HSUPA Test	HSUPA Loopback				
	Power Control Algorithm	Algorithm2				
	Bc	11/15	6/15	15/15	2/15	15/15
	Bd	15/15	15/15	9/15	15/15	15/15
	Bec	209/225	12/15	30/15	2/15	5/15
	βc/βd	11/15	6/15	15/9	2/15	15/15
	Bhs	22/15	12/15	30/15	4/15	30/15
	βed (note1)	1309/225	94/75	47/15 47/15	56/75	134/15
	MPR	0	2	1	2	0
HSDPA Specific Settings	DACK	8				
	DNAK	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				
HSUPA Specific Settings	D E-DPCCH	6	8	8	5	7
	DHARQ	0	0	0	0	0
	AG Index	20	12	15	17	21
	Reference E-TFCIs	5	5	2	5	5
	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	E-TFCI 11 E-TFCI PO 4 E-TFCI 67 E-TFCI PO 18 E-TFCI 71 E-TFCI PO 23 E-TFCI 75 E-TFCI PO 26 E-TFCI 81 E-TFCI PO 27		E-TFCI 11 E-TFCI PO 4 E-TFCI 92 E-TFCI PO 18	E-TFCI 11 E-TFCI PO 4 E-TFCI 67 E-TFCI PO 18 E-TFCI 71 E-TFCI PO 23 E-TFCI 75 E-TFCI PO 26 E-TFCI 81 E-TFCI PO 27	

Note1: βed cannot be set directly, it is set by Absolute Grant Value.

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8.4.1. UMTS HSUPA OUTPUT POWER RESULT

Band	Mode		UL Ch No.	Freq. (MHz)	MPR (dB)	Avg Pwr (dBm)
W-CDMA Band V	HSUPA	Subtest 1	4132	826.4	0	22.3
			4183	836.6	0	22.8
			4233	846.6	0	22.8
		Subtest 2	4132	826.4	2	21.4
			4183	836.6	2	21.3
			4233	846.6	2	21.3
		Subtest 3	4132	826.4	1	21.9
			4183	836.6	1	21.7
			4233	846.6	1	21.7
		Subtest 4	4132	826.4	2	21.4
			4183	836.6	2	21.4
			4233	846.6	2	21.3
		Subtest 5	4132	826.4	0	23.3
			4183	836.6	0	23.3
			4233	846.6	0	23.3

Band	Mode		UL Ch No.	Freq. (MHz)	MPR (dB)	Avg Pwr (dBm)
W-CDMA Band II	HSUPA	Subtest 1	9262	1852.4	0	22.3
			9400	1880.0	0	22.2
			9538	1907.6	0	22.3
		Subtest 2	9262	1852.4	2	20.5
			9400	1880.0	2	20.4
			9538	1907.6	2	20.7
		Subtest 3	9262	1852.4	1	21.1
			9400	1880.0	1	20.9
			9538	1907.6	1	21.0
		Subtest 4	9262	1852.4	2	20.4
			9400	1880.0	2	20.2
			9538	1907.6	2	20.4
		Subtest 5	9262	1852.4	0	22.4
			9400	1880.0	0	22.4
			9538	1907.6	0	22.4

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8.5. 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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8.5.1. LTE OUTPUT RESULT

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Meas. MPR	Avg Pwr (dBm)		
							829 MHz	836.5 MHz	844 MHz
LTE Band 5	10	QPSK	1	0	0	0	23.0	23.1	23.0
			1	25	0	0	23.0	23.1	22.9
			1	49	0	0	23.0	23.1	23.0
			25	0	1	1	22.1	22.0	22.0
			25	12	1	1	22.1	22.0	21.9
			25	25	1	1	22.0	22.0	21.9
			50	0	1	1	22.1	22.0	21.9
		16QAM	1	0	1	0	22.2	22.7	22.3
			1	25	1	1	22.2	22.6	22.2
			1	49	1	1	22.2	22.6	22.2
			25	0	2	2	21.2	21.1	21.2
			25	12	2	2	21.2	21.2	21.2
			25	25	2	2	21.2	21.2	21.2
			50	0	2	2	21.2	21.2	21.1
Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Meas. MPR	Avg Pwr (dBm)		
							826.5 MHz	836.5 MHz	846.5 MHz
LTE Band 5	5	QPSK	1	0	0	0	22.9	23.1	23.0
			1	12	0	0	23.0	23.1	23.0
			1	24	0	0	23.0	23.1	23.0
			12	0	1	1	22.0	22.0	22.0
			12	6	1	1	22.1	22.0	22.0
			12	11	1	1	22.1	22.1	22.0
			25	0	1	1	22.0	22.0	21.9
		16QAM	1	0	1	0	22.1	22.5	22.7
			1	12	1	0	22.2	22.5	22.7
			1	24	1	0	22.3	22.6	22.7
			12	0	2	2	21.2	21.2	21.1
			12	6	2	2	21.2	21.3	21.1
			12	11	2	2	21.2	21.3	21.2
			25	0	2	2	21.2	21.1	21.0
Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Meas. MPR	Avg Pwr (dBm)		
							825.5 MHz	836.5 MHz	847.5 MHz
LTE Band 5	3	QPSK	1	0	0	0	22.9	23.0	22.8
			1	7	0	0	22.9	23.0	22.9
			1	14	0	0	23.0	23.0	22.9
			8	0	1	1	22.0	22.1	22.0
			8	4	1	1	22.0	22.1	22.0
			8	7	1	1	22.1	22.1	22.0
			15	0	1	1	22.0	22.0	21.9
		16QAM	1	0	1	0	22.1	22.6	22.1
			1	7	1	0	22.1	22.6	22.1
			1	14	1	1	22.1	22.5	22.1
			8	0	2	2	21.2	21.1	21.4
			8	4	2	2	21.2	21.1	21.4
			8	7	2	2	21.2	21.1	21.4
			15	0	2	2	21.1	21.2	21.0

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LTE Band 5 Measured Results (continued)

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Meas. MPR	Avg Pwr (dBm)		
							824.7 MHz	836.5 MHz	848.3 MHz
LTE Band 5	1.4	QPSK	1	0	0	0	23.0	23.0	22.9
			1	2	0	0	23.0	23.1	22.9
			1	5	0	0	23.1	23.1	22.9
			3	0	0	0	23.1	23.2	23.1
			3	1	0	0	23.1	23.2	23.1
			3	2	0	0	23.1	23.2	23.1
			6	0	1	1	22.2	22.2	22.1
		16QAM	1	0	1	1	22.4	22.6	22.1
			1	2	1	1	22.4	22.6	22.2
			1	5	1	1	22.4	22.6	22.1
			3	0	1	1	22.1	22.2	22.3
			3	1	1	1	22.2	22.2	22.3
			3	2	1	1	22.2	22.3	22.3
			6	0	2	2	21.4	21.2	21.4

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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

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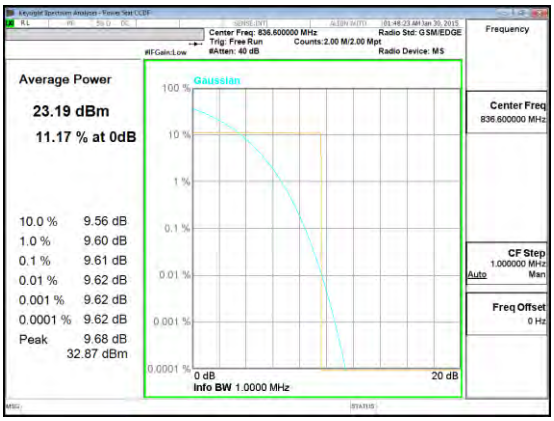
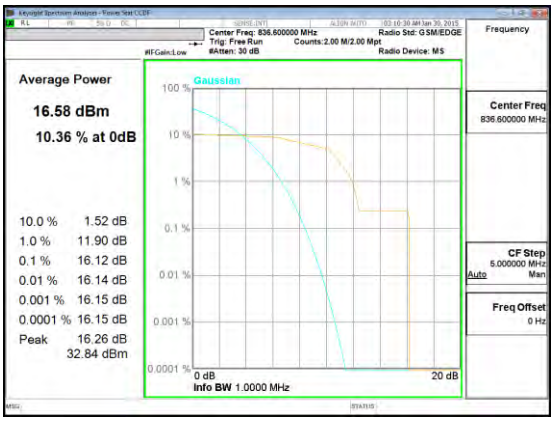
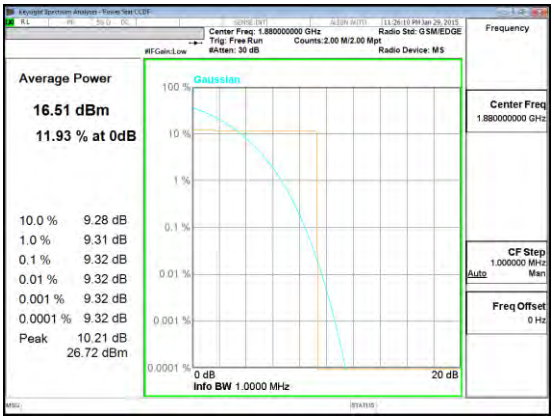
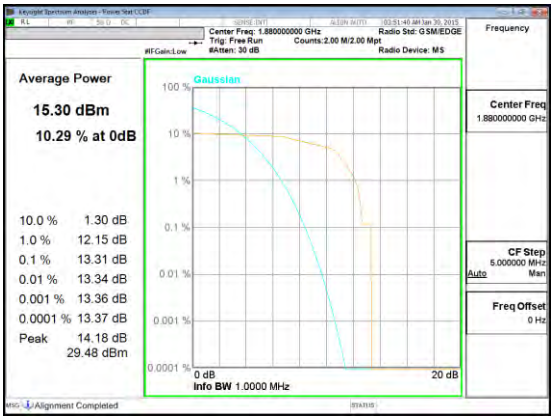
GSM

Band 850	 GPRS Mid channel	 EGPRS Mid channel
Band 1900	 GPRS Mid channel	 EGPRS Mid channel

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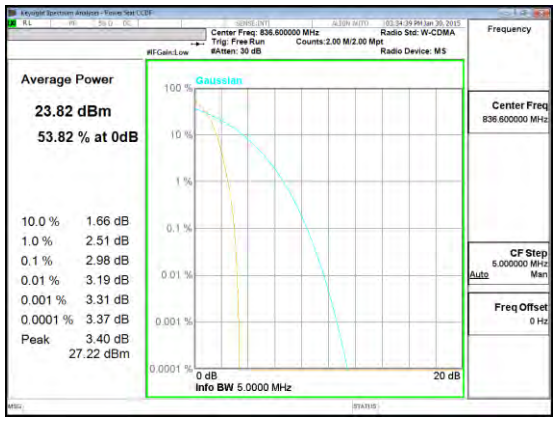
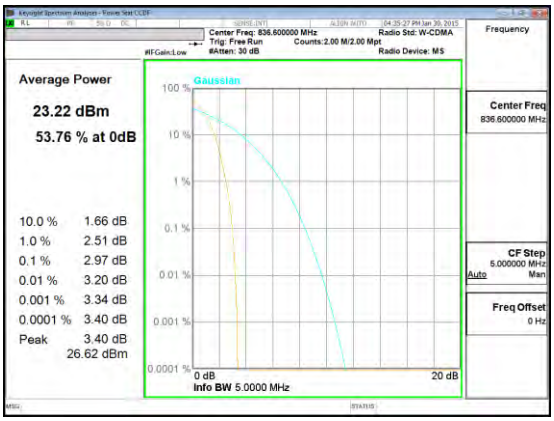
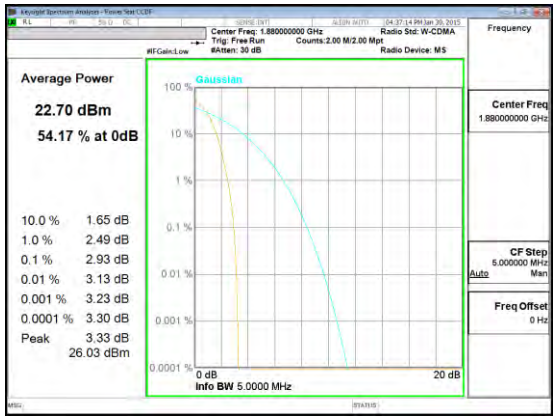
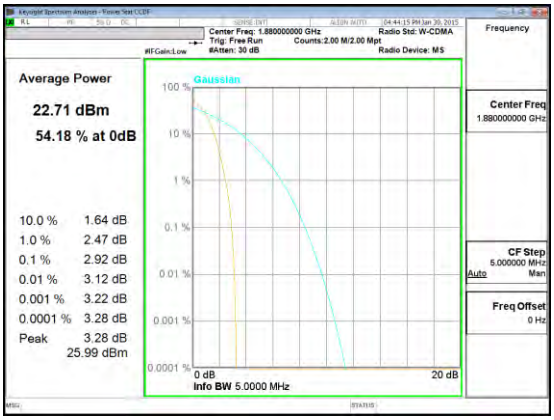
WCDMA

Band 850	 REL99 Mid channel	 HSDPA Mid channel
Band 1900	 REL99 Mid channel	 HSDPA Mid channel

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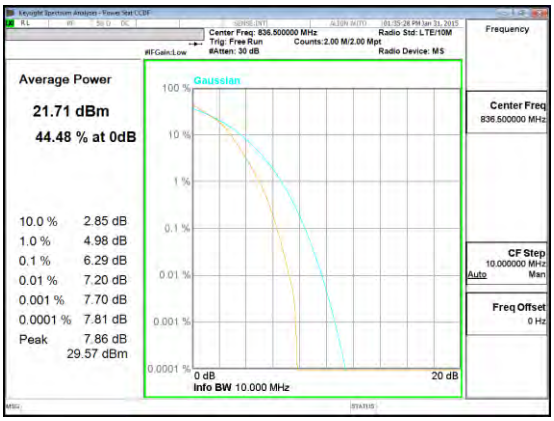
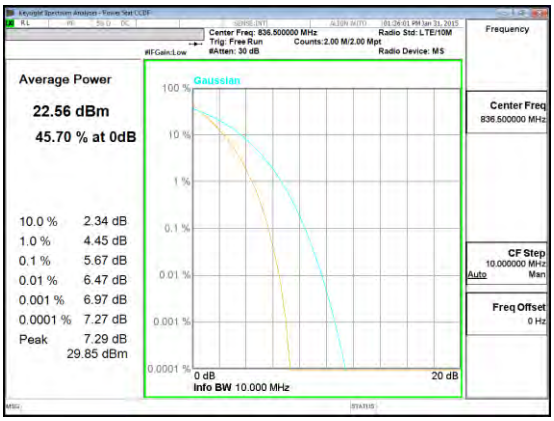
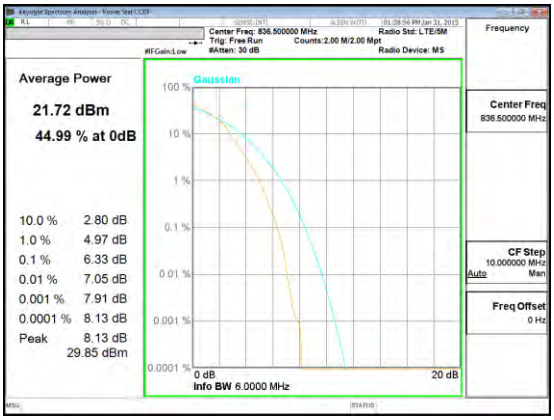
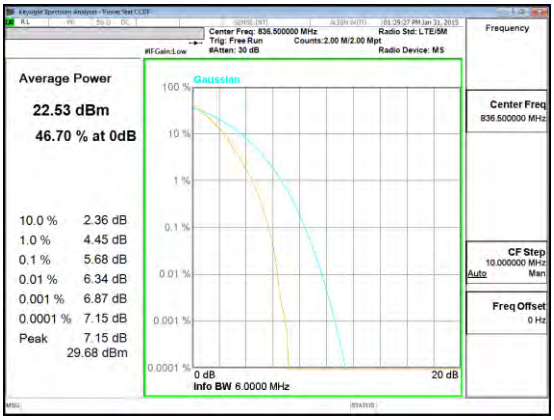
LTE

Band LTE5	 10MHz 16QAM Mid channel	 10MHz QPSK Mid channel
Band LTE5	 5MHz 16QAM Mid channel	 5MHz QPSK Mid channel

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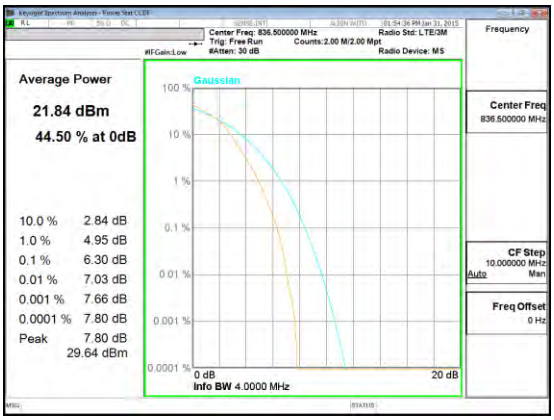
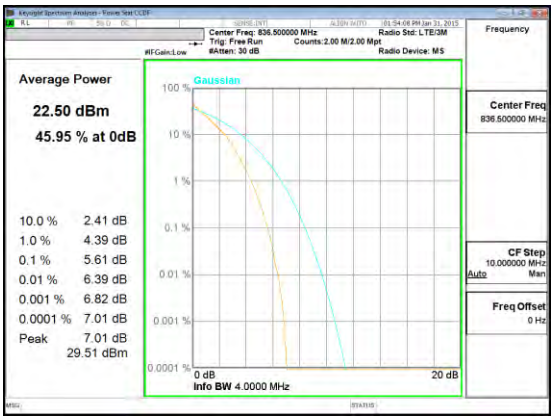
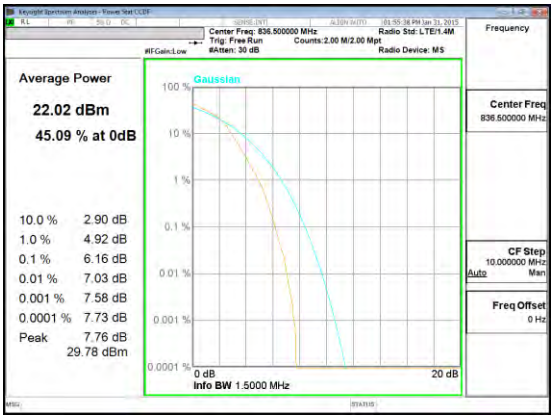
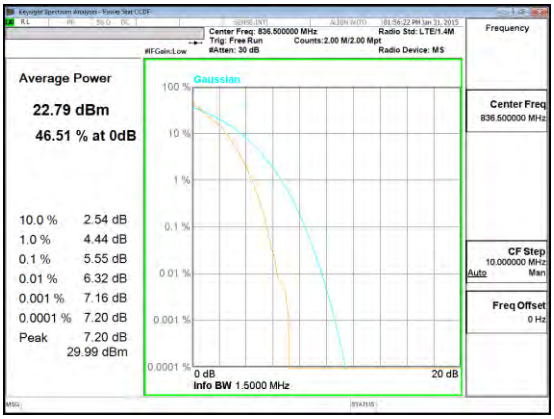
Band LTE5	 3MHz 16QAM Mid channel	 3MHz QPSK Mid channel
Band LTE5	 1.4MHz 16QAM Mid channel	 1.4MHz QPSK Mid channel

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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)

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10.1.1. OCCUPIED BANDWIDTH RESULTS

GSM

Band	Mode	Channel	f (MHz)	99% BW (KHz)	-26dB BW (KHz)
GSM850	GPRS	128	824.2	245.13	322.40
		190	836.6	244.11	318.00
		251	848.8	245.77	321.40
	EGPRS	128	824.2	262.12	311.60
		190	836.6	252.83	323.70
		251	848.8	257.90	319.40
GSM1900	GPRS	512	1850.2	241.06	313.60
		661	1880.0	244.61	322.50
		810	1909.8	244.00	324.10
	EGPRS	512	1850.2	244.31	323.90
		661	1880.0	239.86	311.40
		810	1909.8	242.44	325.90

WCDMA

Band	Mode	Channel	f (MHz)	99% BW (MHz)	-26dB BW (MHz)
Band 5	REL99	4132	826.4	4.131	4.704
		4183	836.6	4.141	4.714
		4233	846.6	4.133	4.721
	HSDPA	4132	826.4	4.133	4.701
		4183	836.6	4.138	4.711
		4233	846.6	4.135	4.719
Band 2	REL99	9262	1850.2	4.136	4.708
		9400	1880.0	4.137	4.704
		9538	1909.8	4.122	4.692
	HSDPA	9262	1850.2	4.143	4.723
		9400	1880.0	4.139	4.693
		9538	1909.8	4.127	4.699

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LTE

Band	BW(MHz)	Mode	RB/RB Size	f (MHz)	99% BW (MHz)	-26dB BW (MHz)
Band 5	10	QPSK	50/0	829.0	8.971	10.51
			50/0	836.5	9.004	10.61
			50/0	844.0	8.966	10.39
		16QAM	50/0	829.0	8.963	10.28
			50/0	836.5	9.009	10.51
			50/0	844.0	8.979	10.44
	5	QPSK	25/0	826.5	4.510	5.263
			25/0	836.5	4.513	5.237
			25/0	846.5	4.503	5.176
		16QAM	25/0	826.5	4.505	5.202
			25/0	836.5	4.507	5.255
			25/0	846.5	4.498	5.251
	3	QPSK	15/0	825.5	2.717	3.294
			15/0	836.5	2.716	3.336
			15/0	847.5	2.716	3.307
		16QAM	15/0	825.5	2.710	3.314
			15/0	836.5	2.744	3.497
			15/0	847.5	2.709	3.282
	1.4	QPSK	6/0	824.7	1.100	1.513
			6/0	836.5	1.095	1.500
			6/0	848.3	1.102	1.524
		16QAM	6/0	824.7	1.092	1.501
			6/0	836.5	1.113	1.598
			6/0	848.3	1.105	1.567

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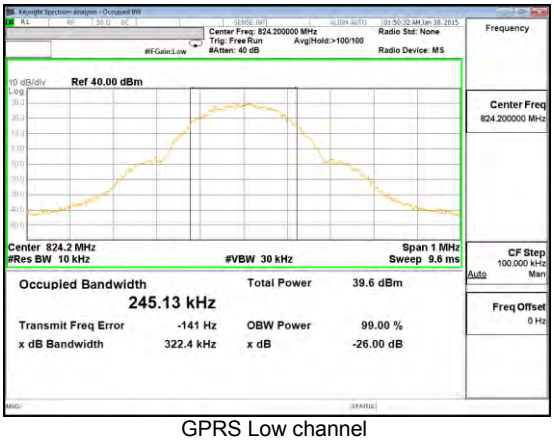
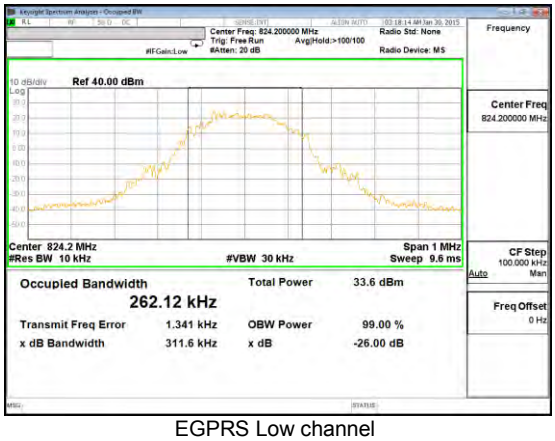
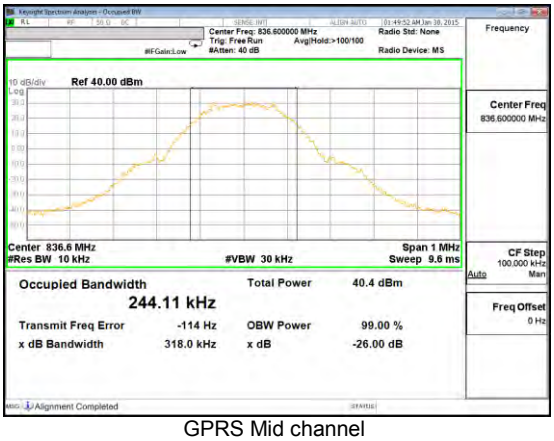
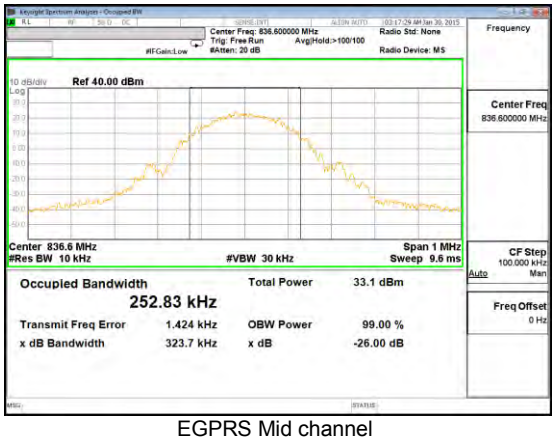
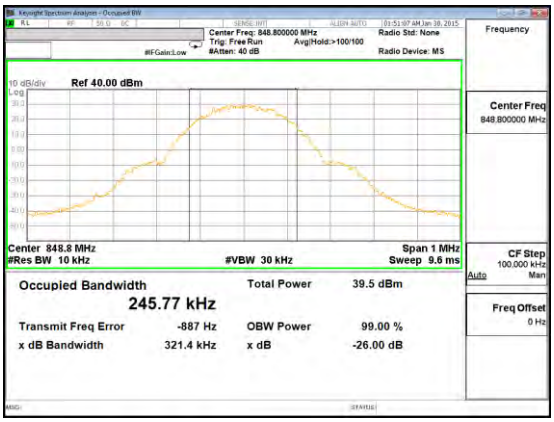
10.1.2. OCCUPIED BANDWIDTH PLOTS

GSM 850

Band 850	 GPRS Low channel	 EGPRS Low channel
	 GPRS Mid channel	 EGPRS Mid channel
	 GPRS High channel	 EGPRS High channel

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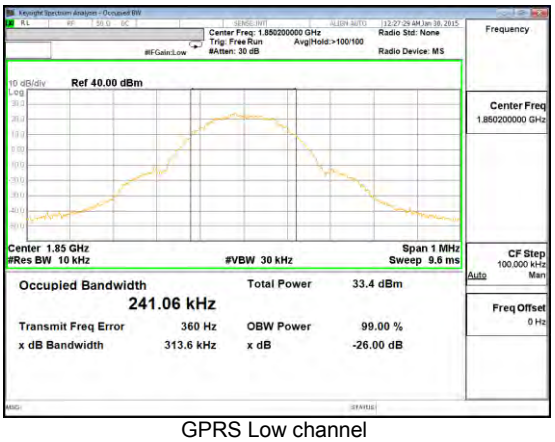
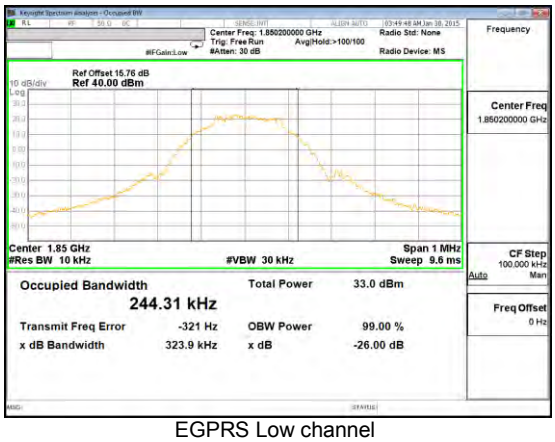
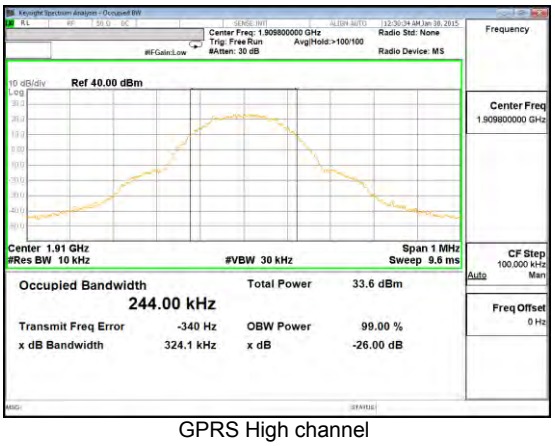
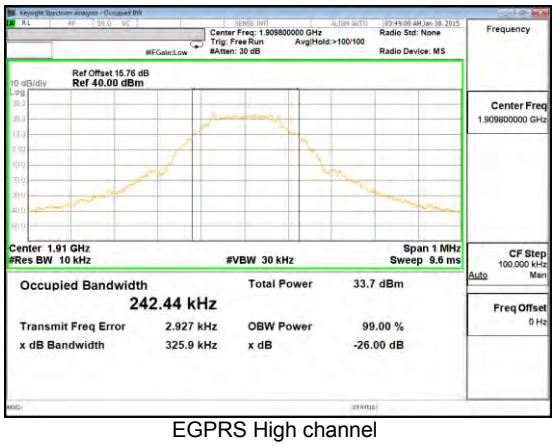
GSM 1900

Band 1900	 GPRS Low channel	 EGPRS Low channel
	 GPRS Mid channel	 EGPRS Mid channel
	 GPRS High channel	 EGPRS High channel

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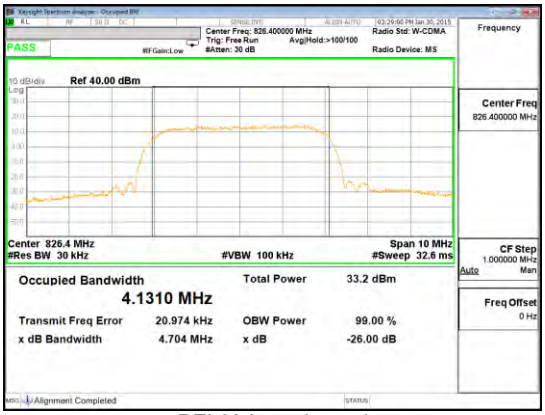
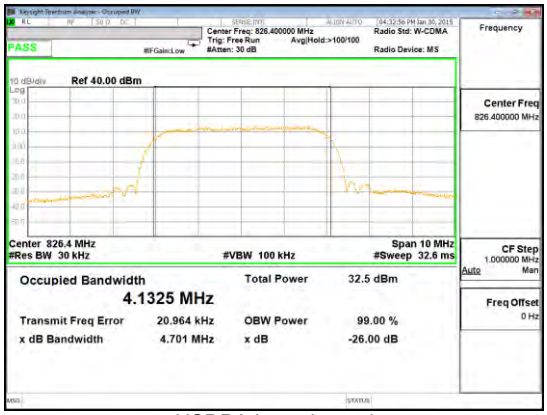
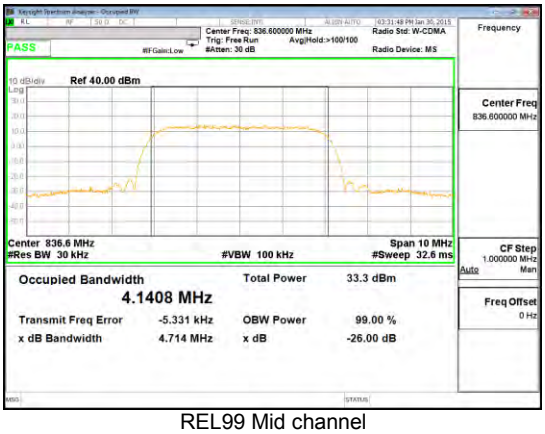
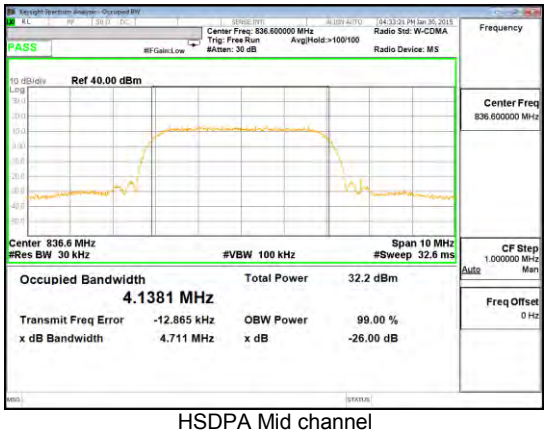
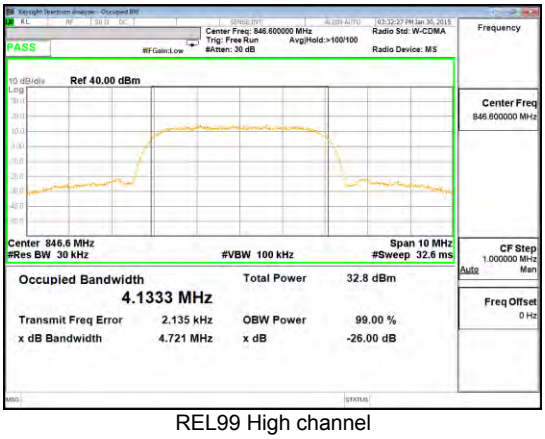
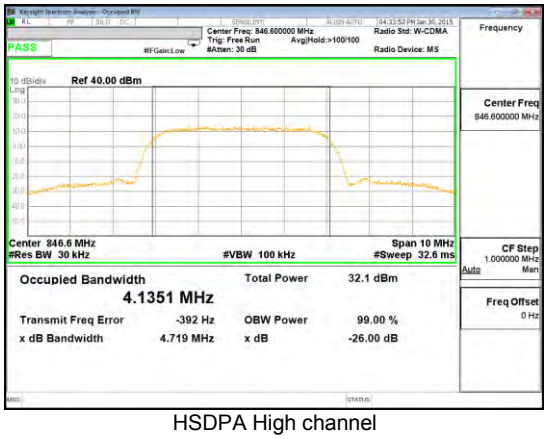
WCDMA Band 5

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

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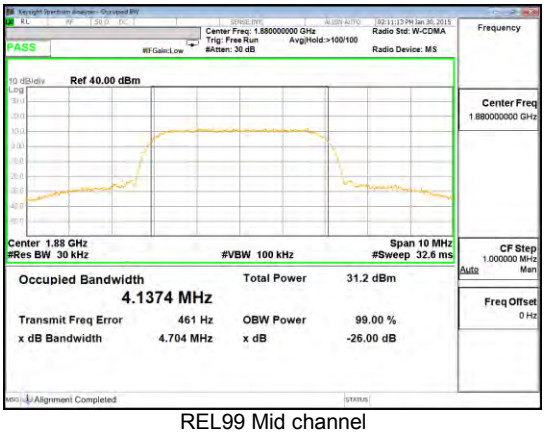
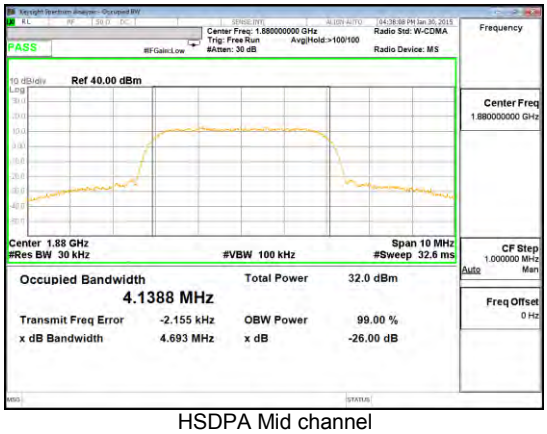
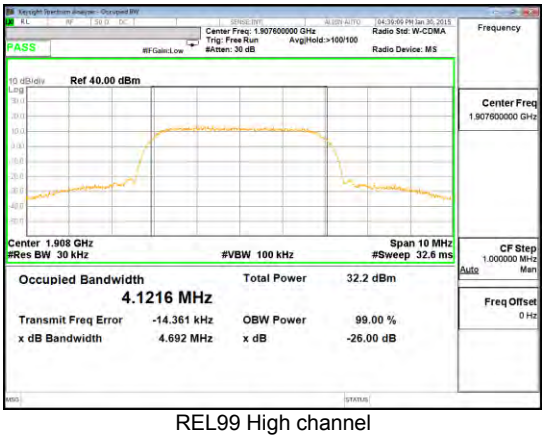
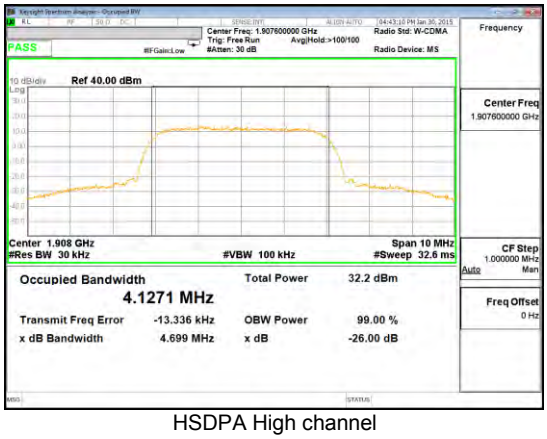
WCDMA Band 2

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

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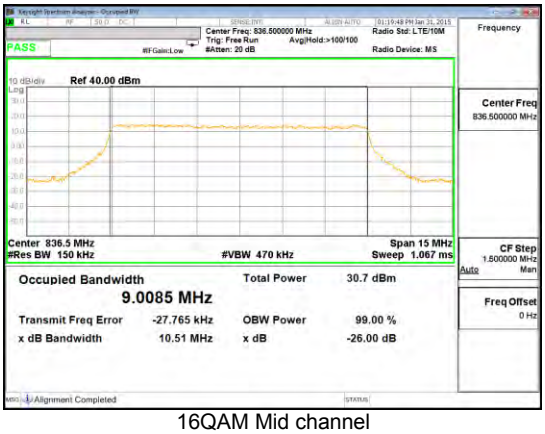
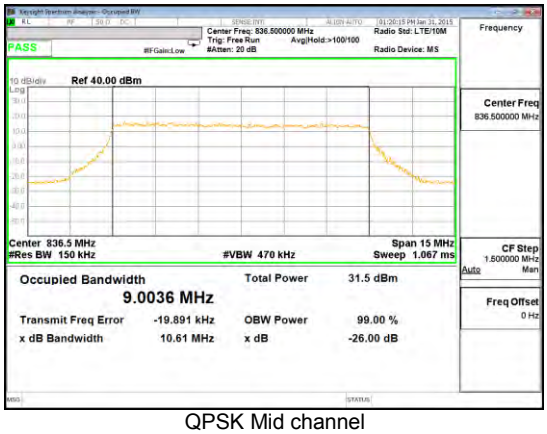
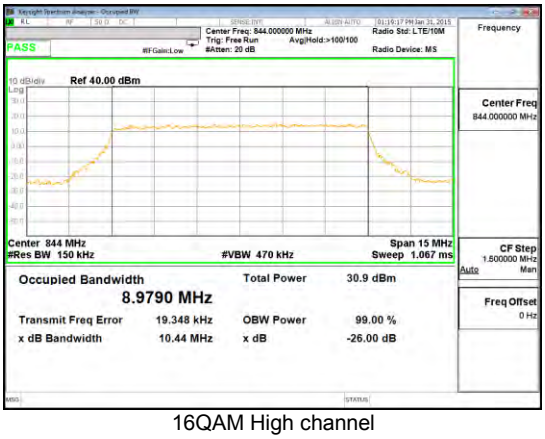
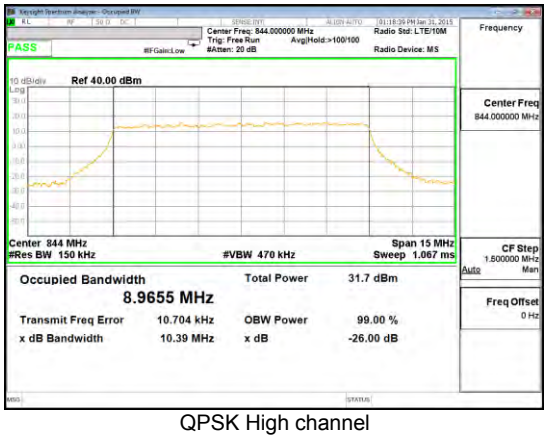
LTE Band 5

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

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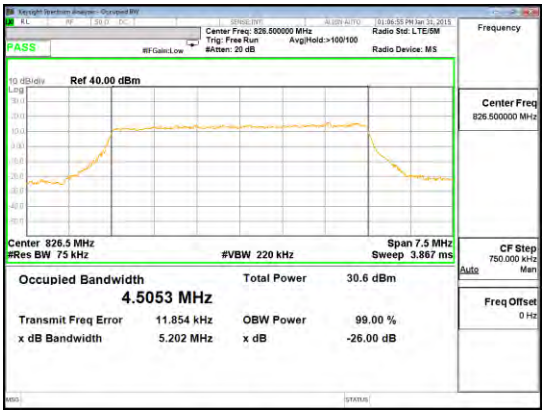
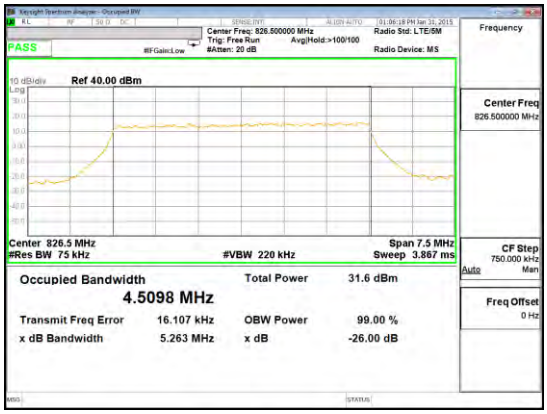
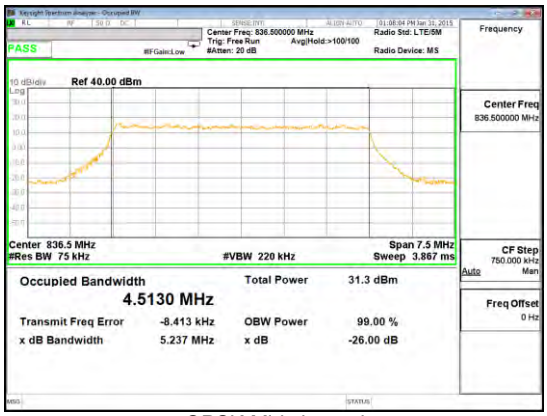
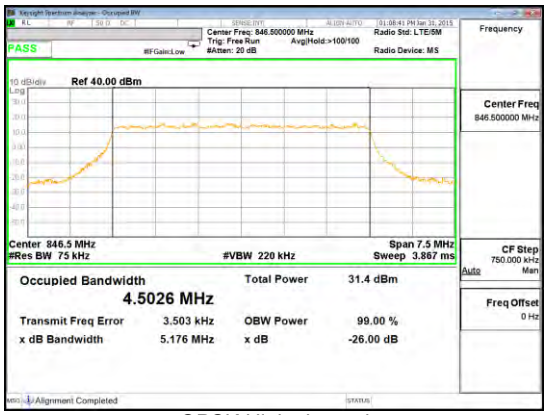
Band 5 5MHz	 16QAM Low channel	 QPSK Low channel
	 16QAM Mid channel	 QPSK Mid channel
	 16QAM High channel	 QPSK High channel

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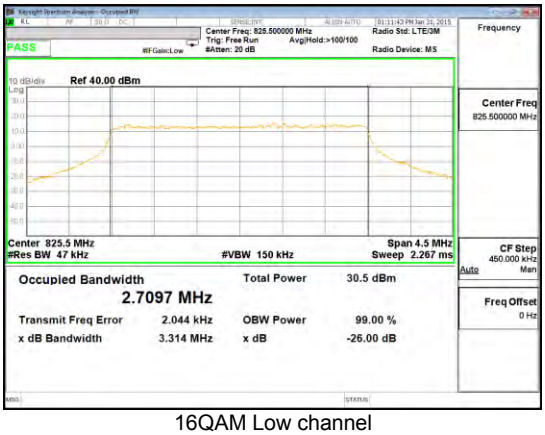
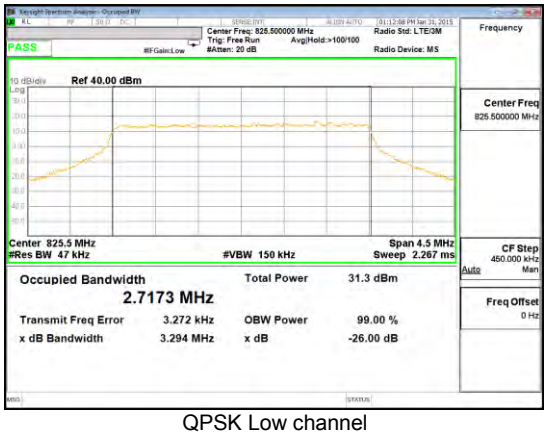
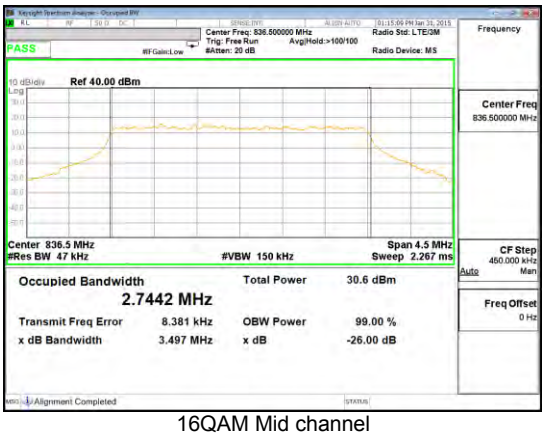
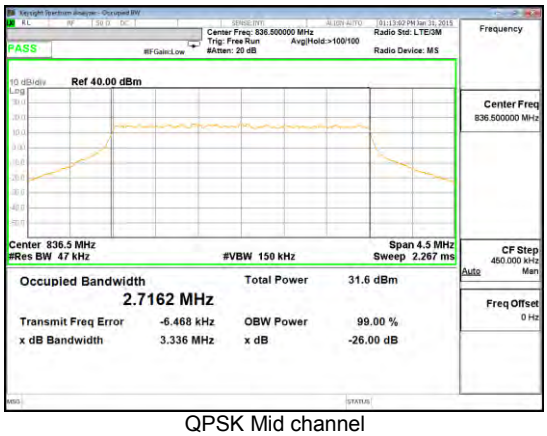
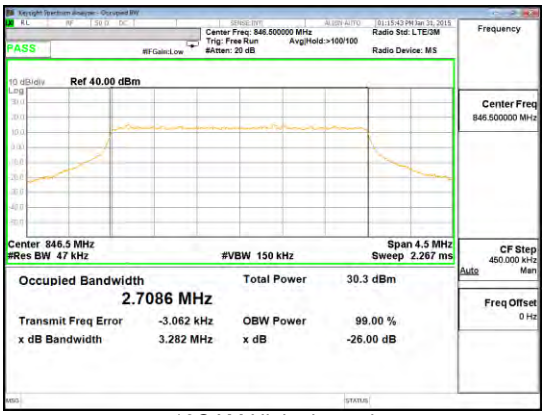
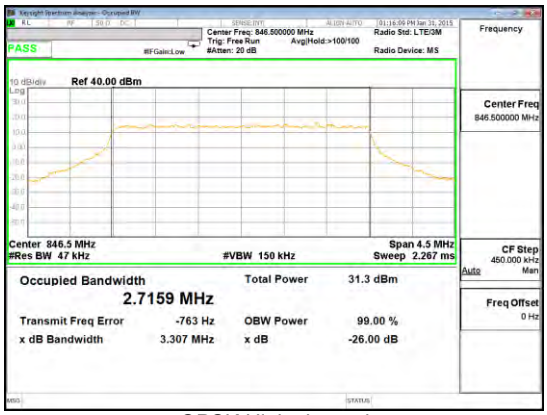
Band 5 3MHz	 16QAM Low channel	 QPSK Low channel
	 16QAM Mid channel	 QPSK Mid channel
	 16QAM High channel	 QPSK High channel

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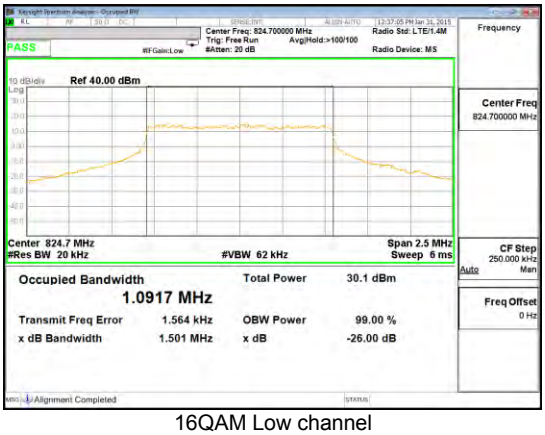
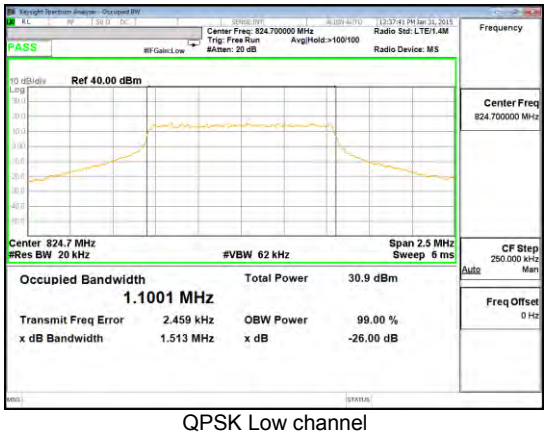
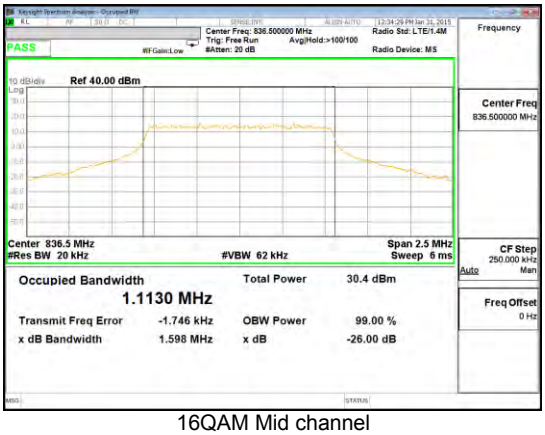
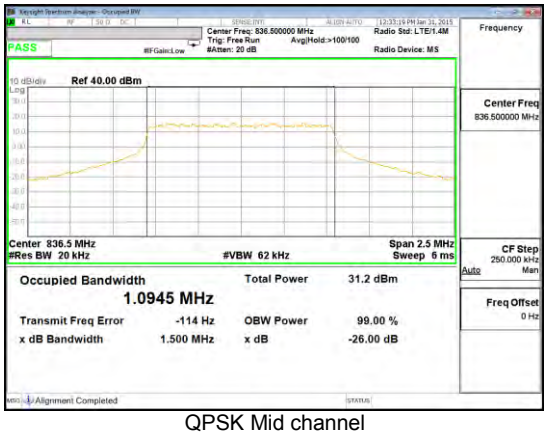
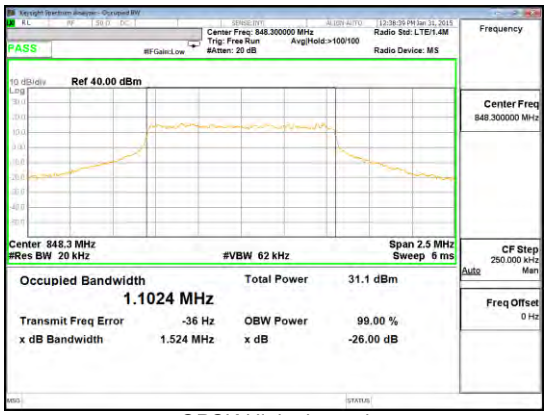
Band 5 1.4MHz	 16QAM Low channel	 QPSK Low channel
	 16QAM Mid channel	 QPSK Mid channel
	 16QAM High channel	 QPSK High channel

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10.2. BAND EDGE EMISSIONS

RULE PART(S)

FCC: §22.359, §24.238

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

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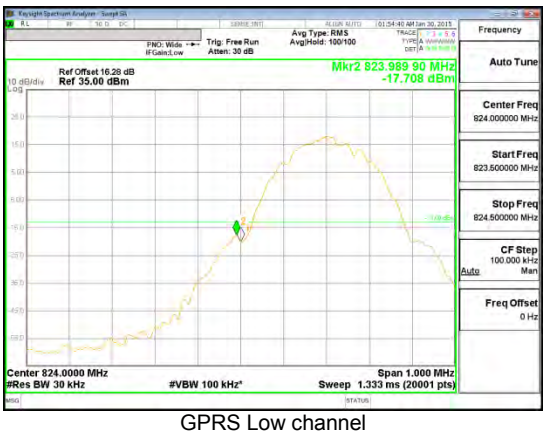
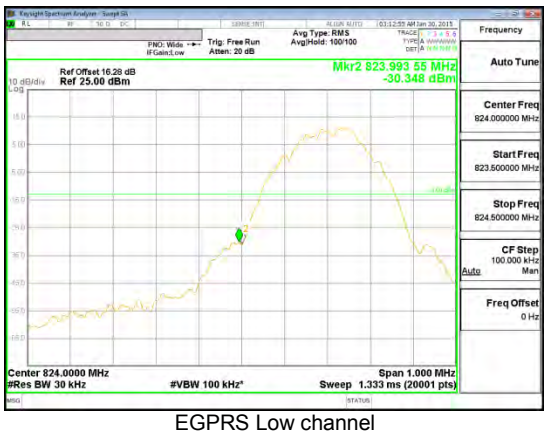
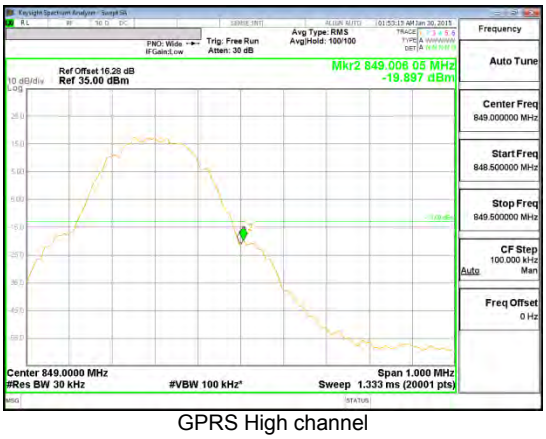
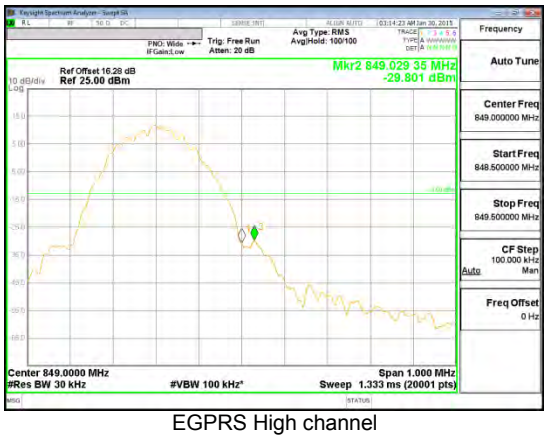
10.2.1. BAND EDGE PLOTS

GSM 850

Band 850	 GPRS Low channel	 EGPRS Low channel
	 GPRS High channel	 EGPRS High channel

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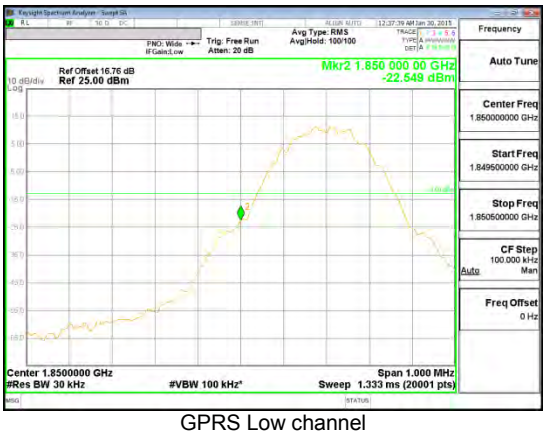
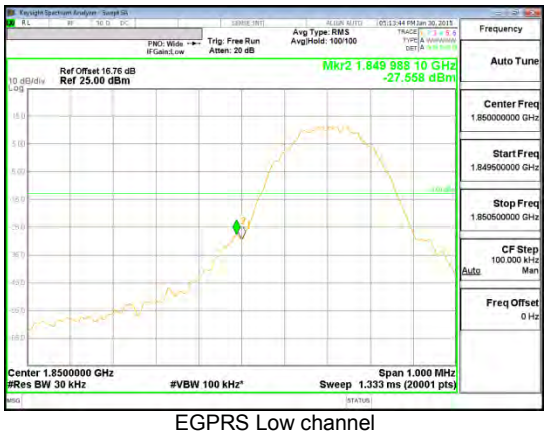
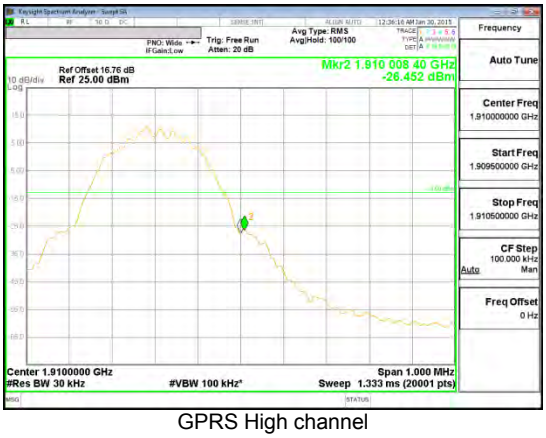
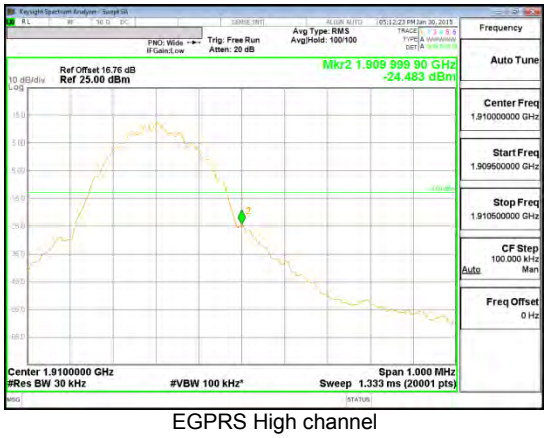
GSM 1900

Band 1900	 GPRS Low channel	 EGPRS Low channel
	 GPRS High channel	 EGPRS High channel

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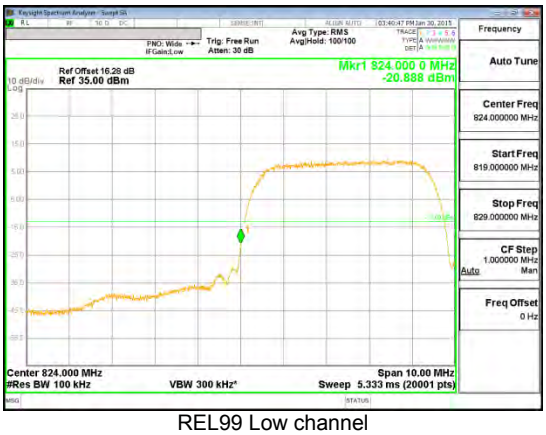
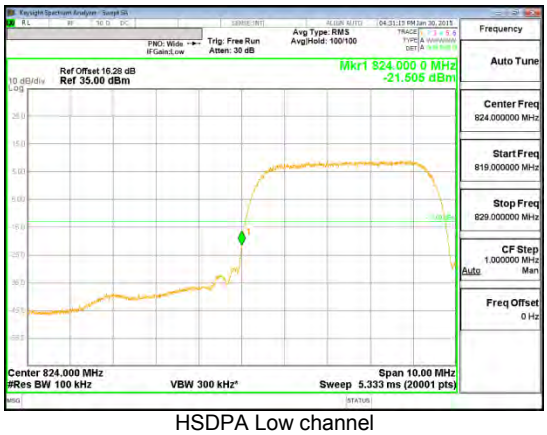
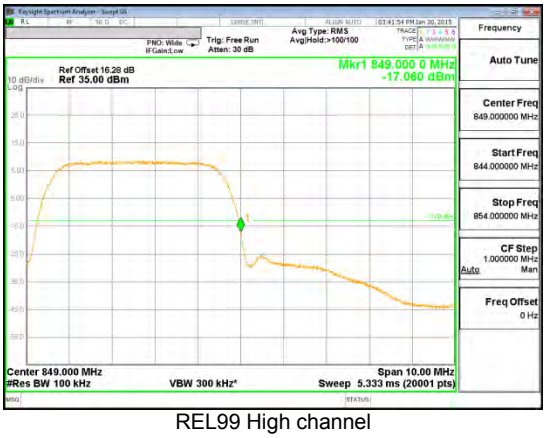
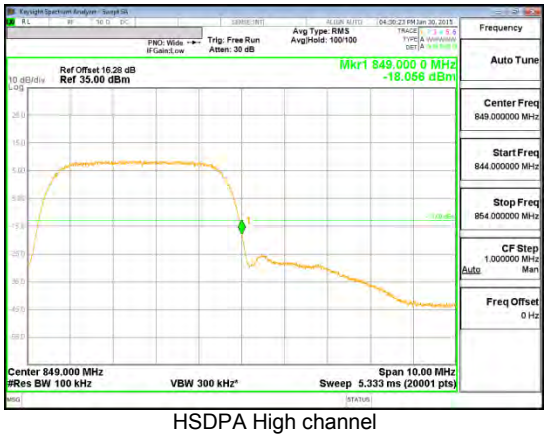
WCDMA Band 5

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

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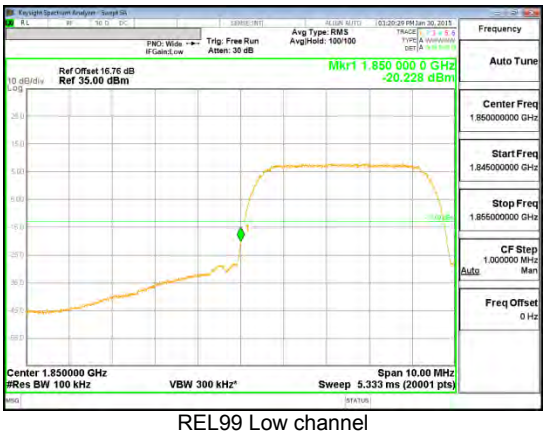
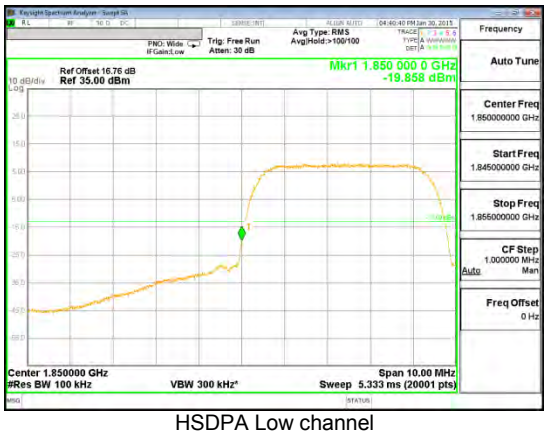
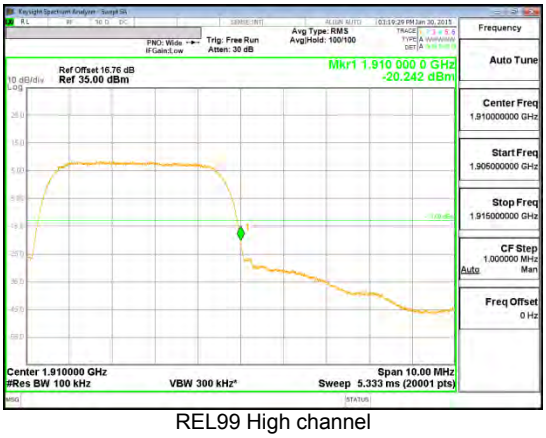
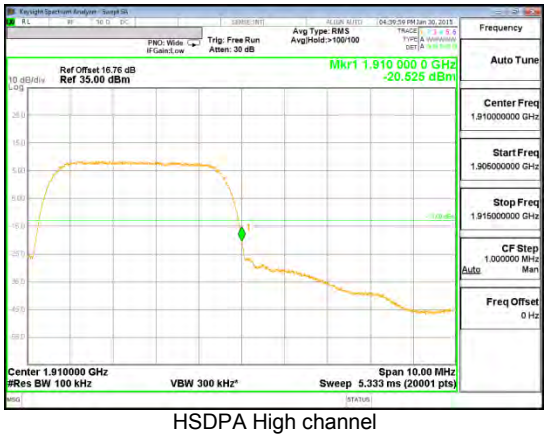
WCDMA Band 2

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

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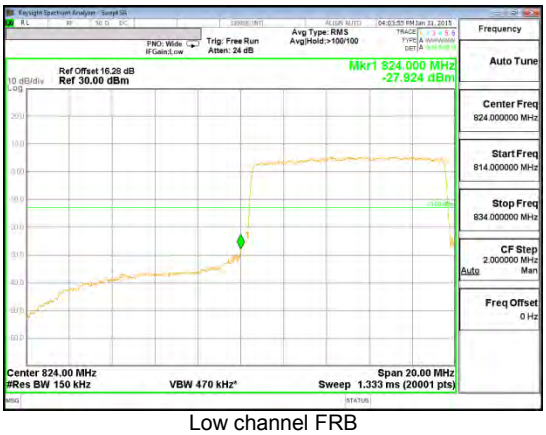
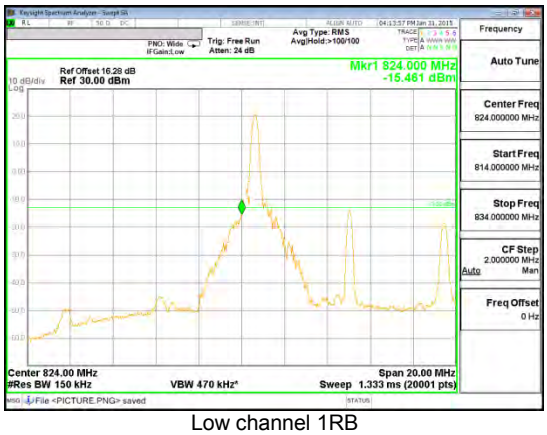
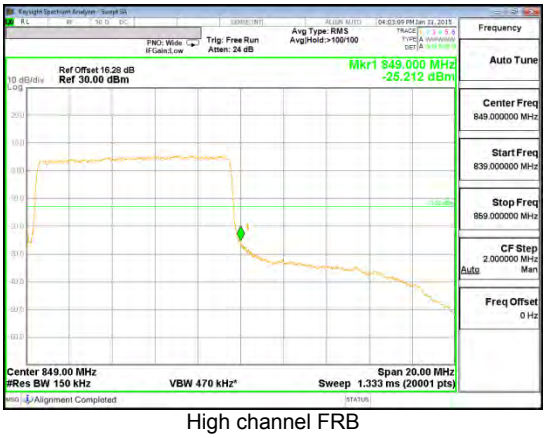
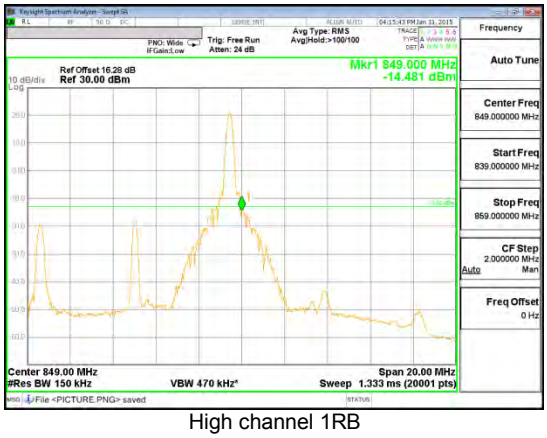
LTE Band 5

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

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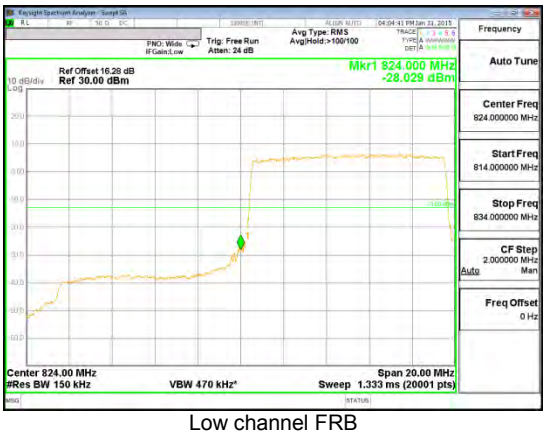
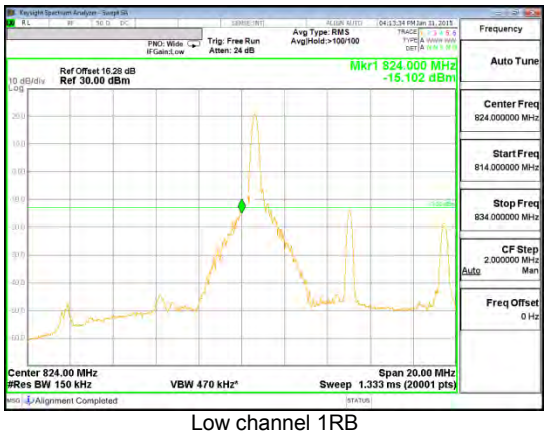
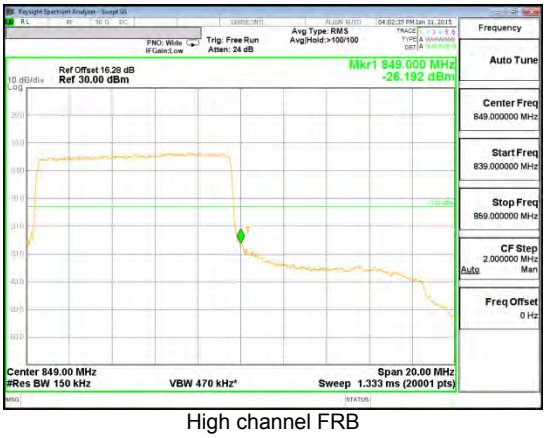
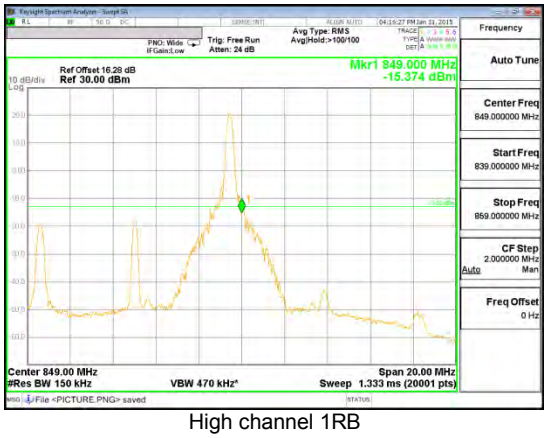
Band 5 10MHz QPSK	 Low channel FRB	 Low channel 1RB
	 High channel FRB	 High channel 1RB

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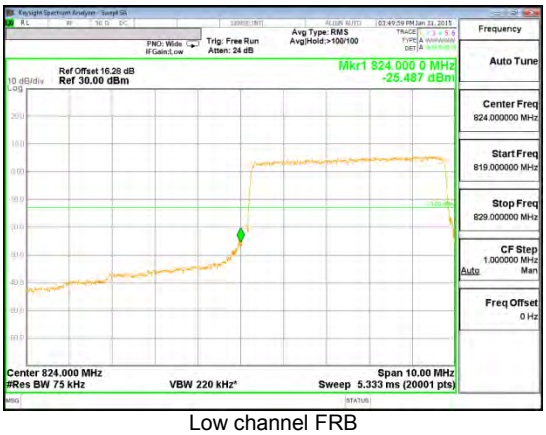
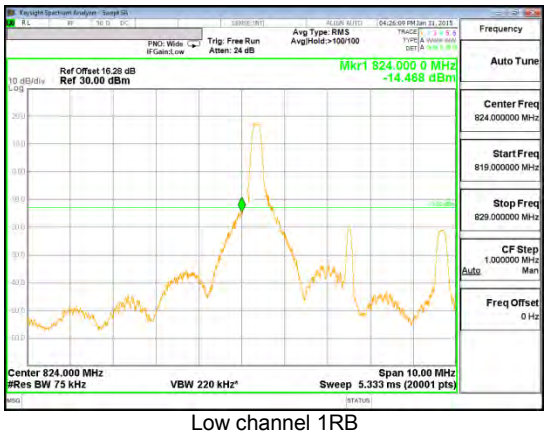
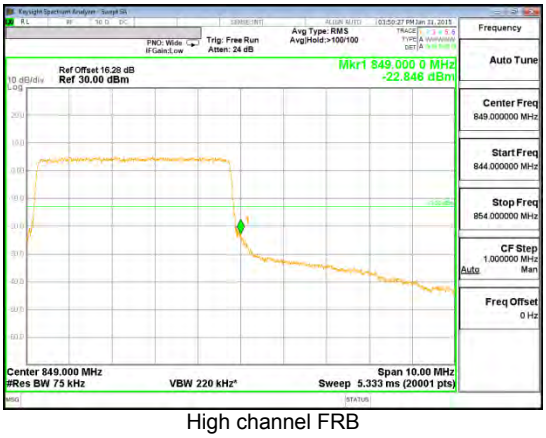
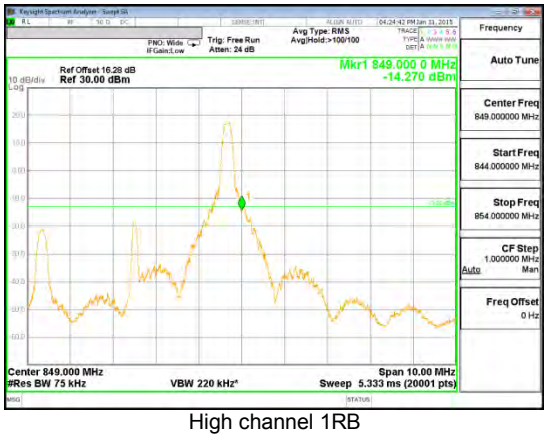
Band 5 5MHz 16QAM	 Low channel FRB	 Low channel 1RB
	 High channel FRB	 High channel 1RB

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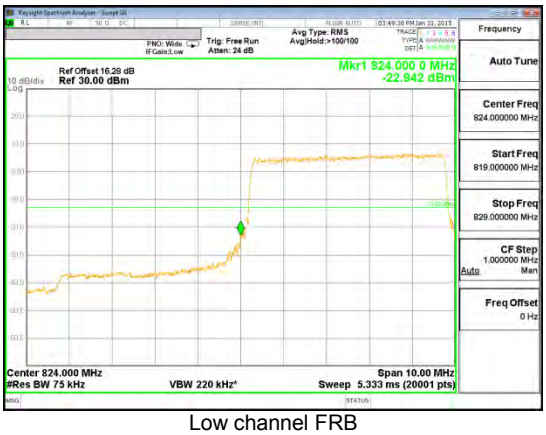
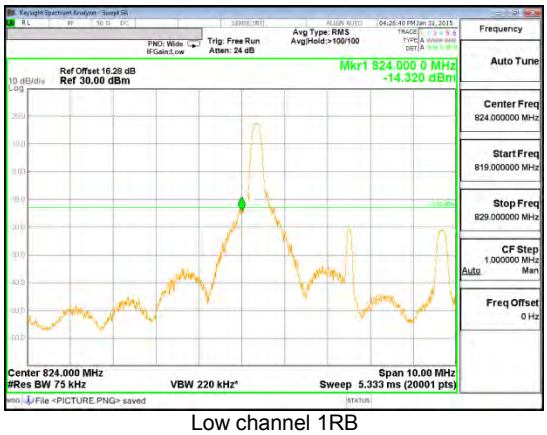
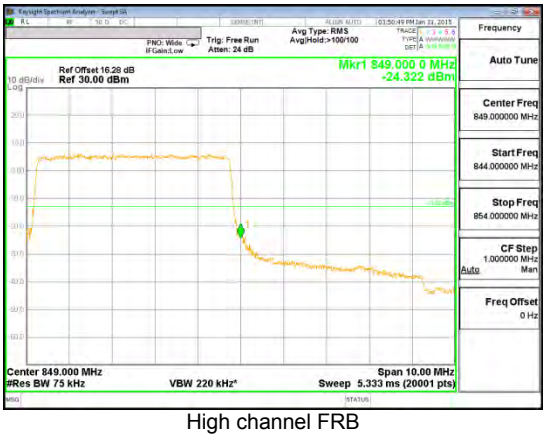
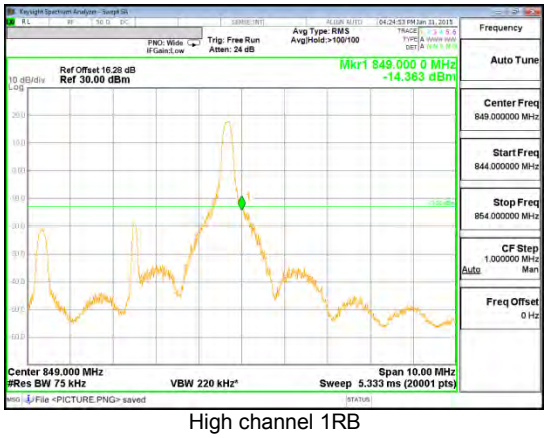
Band 5 5MHz QPSK	 Low channel FRB	 Low channel 1RB
	 High channel FRB	 High channel 1RB

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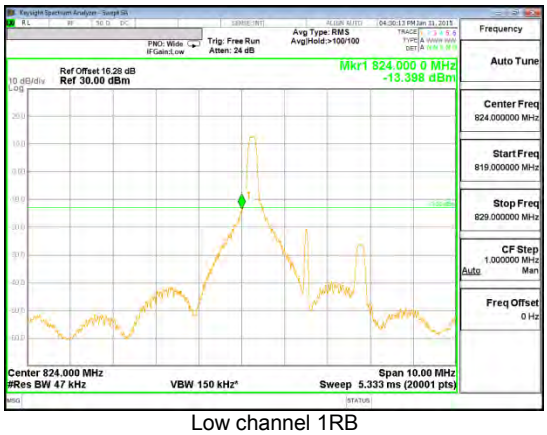
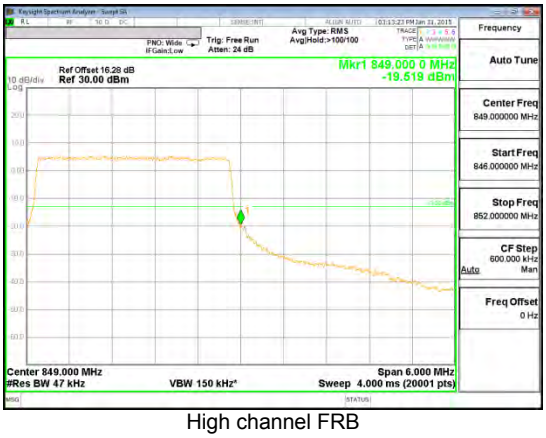
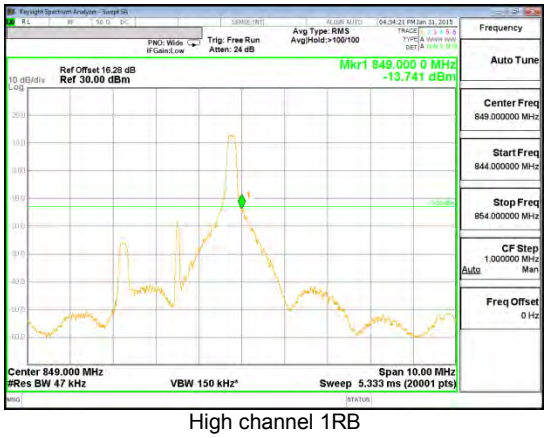
Band 5 3MHz 16QAM	 Low channel FRB	 Low channel 1RB
	 High channel FRB	 High channel 1RB

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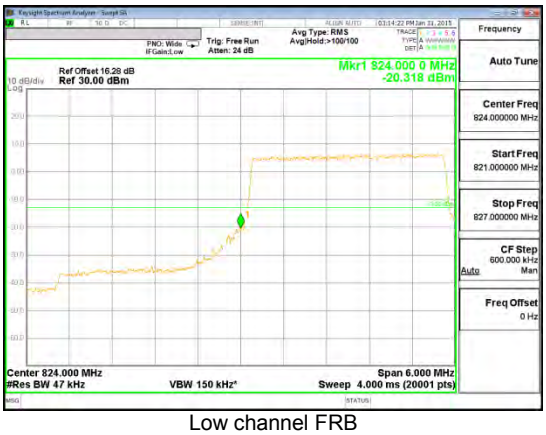
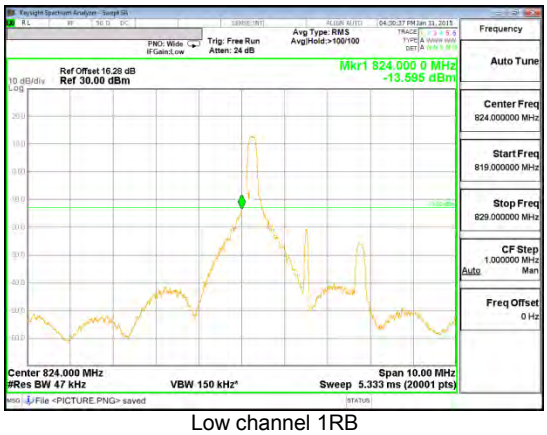
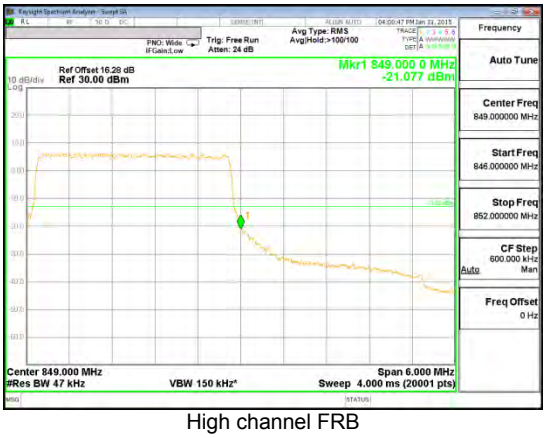
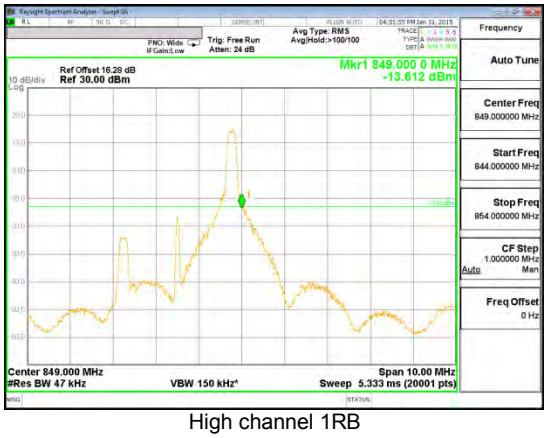
Band 5 3MHz QPSK	 Low channel FRB	 Low channel 1RB
	 High channel FRB	 High channel 1RB

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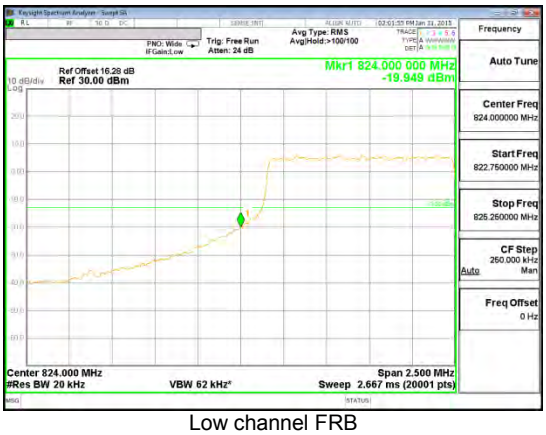
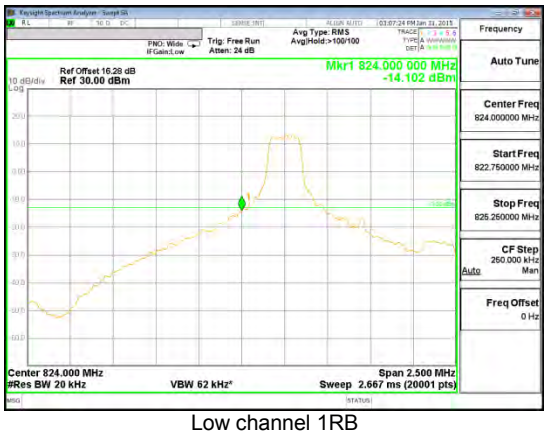
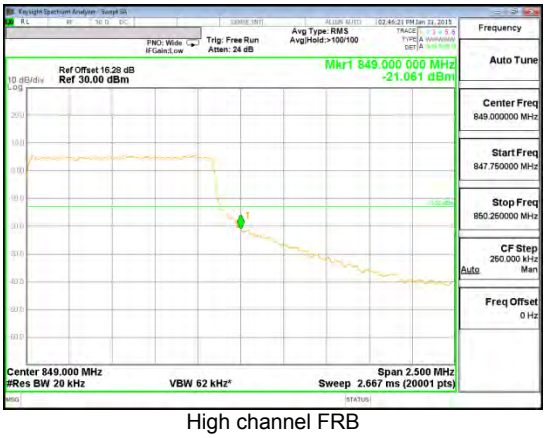
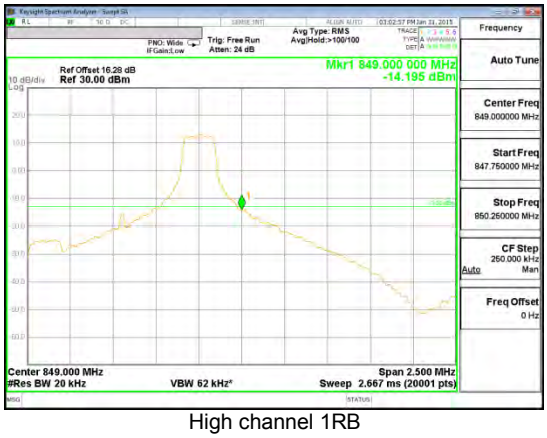
Band 5 1.4MHz 16QAM	 Low channel FRB	 Low channel 1RB
	 High channel FRB	 High channel 1RB

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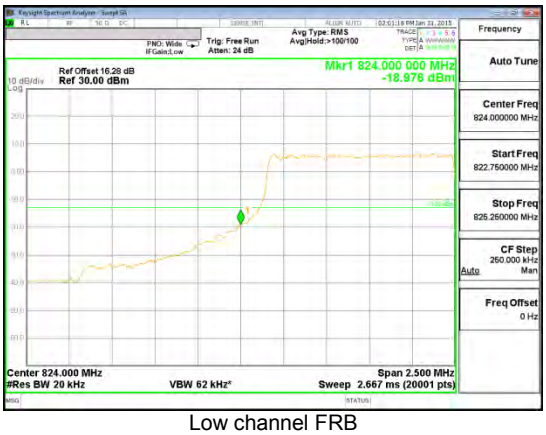
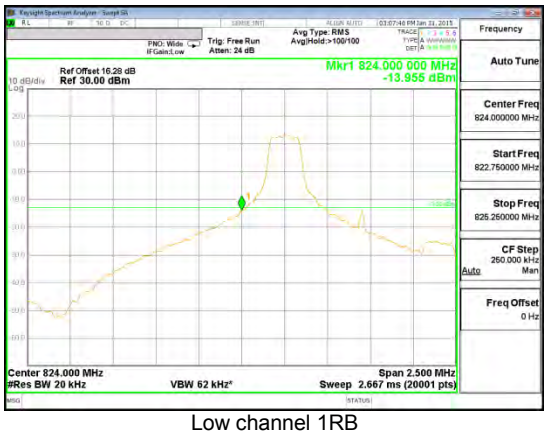
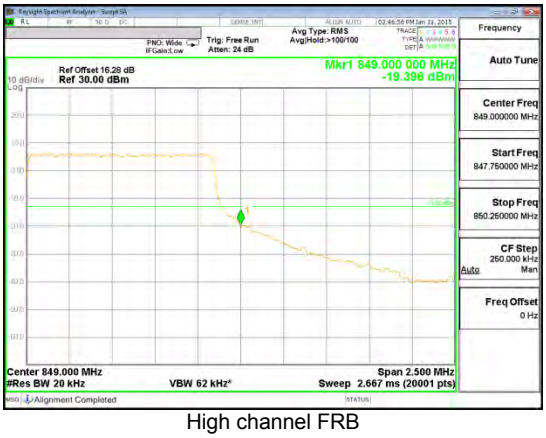
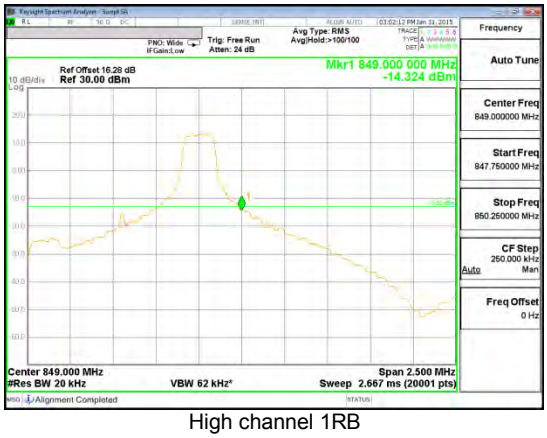
Band 5 1.4MHz QPSK	 Low channel FRB	 Low channel 1RB
	 High channel FRB	 High channel 1RB

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10.3. OUT OF BAND EMISSIONS

RULE PART(S)

FCC: §2.1051, §22.901, §22.917, §24.238

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)	Spur (dBm)	Spec (dBm)	Delta (dB)
GSM850	GPRS	824.2	-27.39	-13.00	14.39
		836.6	-27.18	-13.00	14.18
		848.8	-27.31	-13.00	14.31
	EGPRS	824.2	-26.84	-13.00	13.84
		836.6	-26.92	-13.00	13.92
		848.8	-27.81	-13.00	14.81
GSM1900	GPRS	1850.2	-27.38	-13.00	14.38
		1880.0	-27.47	-13.00	14.47
		1909.8	-27.62	-13.00	14.62
	EGPRS	1850.2	-26.84	-13.00	13.84
		1880.0	-27.25	-13.00	14.25
		1909.8	-27.15	-13.00	14.15

WCDMA

Band	Mode	f (MHz)	Spur (dBm)	Spec (dBm)	Delta (dB)
Band 5	REL99	826.4	-28.19	-13.00	15.19
		836.6	-27.56	-13.00	14.56
		846.6	-27.55	-13.00	14.55
	HSDPA	826.4	-27.19	-13.00	14.19
		836.6	-27.29	-13.00	14.29
		846.6	-27.59	-13.00	14.59
Band 2	REL99	1850.2	-26.28	-13.00	13.28
		1880.0	-26.35	-13.00	13.35
		1909.8	-26.08	-13.00	13.08
	HSDPA	1850.2	-26.06	-13.00	13.09
		1880.0	-24.80	-13.00	11.80
		1909.8	-26.95	-13.00	13.95

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LTE

Band	BW(MHz)	Mode	f (MHz)	Spur (dBm)	Spec (dBm)	Delta (dB)
Band 5	10	QPSK	829.0	-34.29	-13.00	21.29
			836.5	-33.54	-13.00	20.54
			844.0	-34.77	-13.00	21.77
		16QAM	829.0	-34.22	-13.00	21.22
			836.5	-34.45	-13.00	21.45
			844.0	-33.72	-13.00	20.72
	5	QPSK	826.5	-33.72	-13.00	20.72
			836.5	-33.34	-13.00	20.34
			846.5	-33.75	-13.00	20.75
		16QAM	826.5	-33.90	-13.00	20.90
			836.5	-34.02	-13.00	21.02
			846.5	-33.51	-13.00	20.51
	3	QPSK	825.5	-34.29	-13.00	21.29
			836.5	-34.14	-13.00	21.14
			847.5	-33.52	-13.00	20.52
		16QAM	825.5	-34.03	-13.00	21.03
			836.5	-33.70	-13.00	20.70
			847.5	-34.10	-13.00	21.10
	1.4	QPSK	824.7	-34.19	-13.00	21.19
			836.5	-34.42	-13.00	21.42
			848.3	-33.45	-13.00	20.45
		16QAM	824.7	-34.41	-13.00	21.41
			836.5	-34.27	-13.00	21.27
			848.3	-34.03	-13.00	21.03

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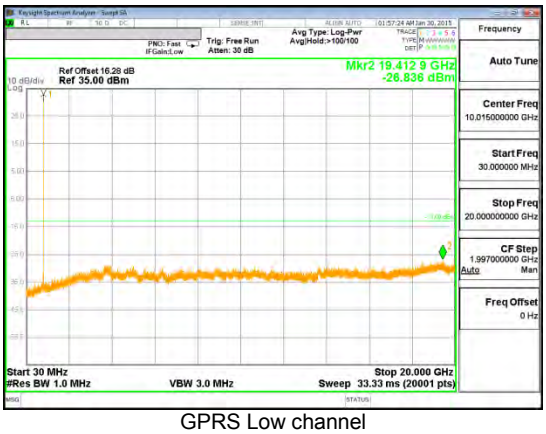
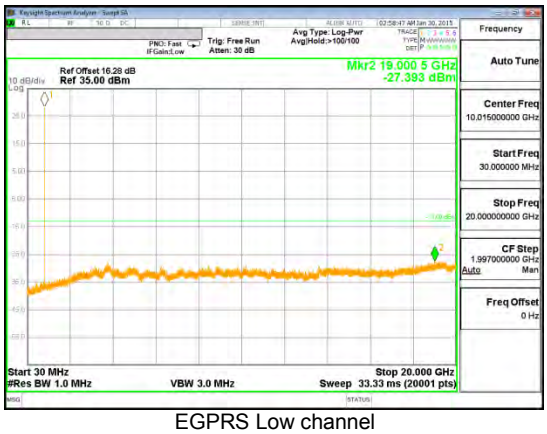
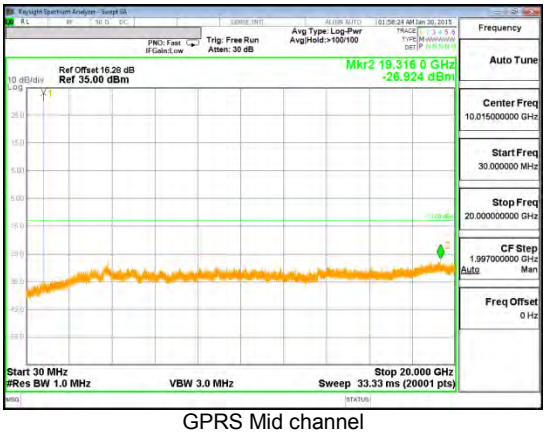
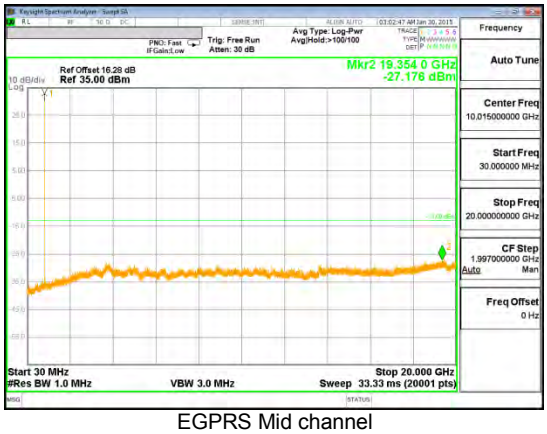
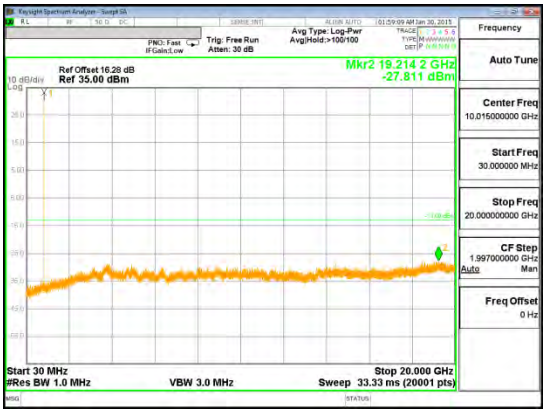
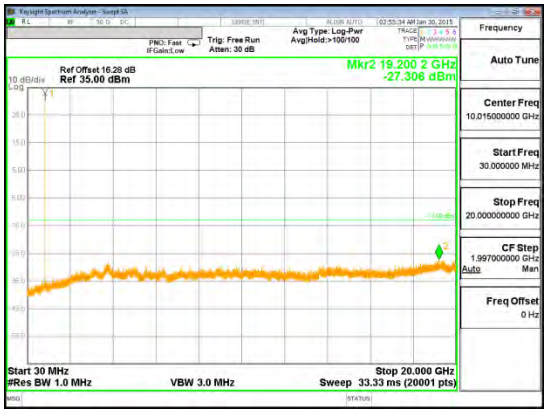
10.3.2. OUT OF BAND EMISSIONS PLOTS

GSM 850

Band 850	 GPRS Low channel	 EGPRS Low channel
	 GPRS Mid channel	 EGPRS Mid channel
	 GPRS High channel	 EGPRS High channel

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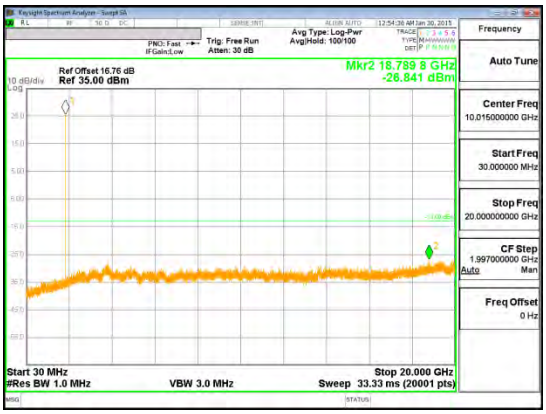
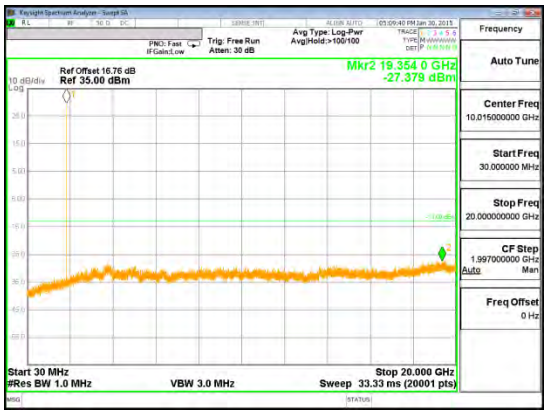
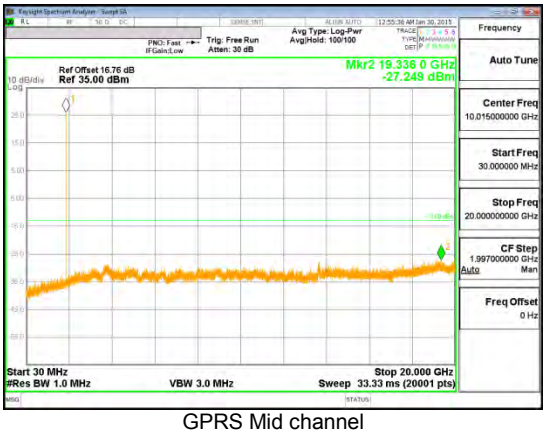
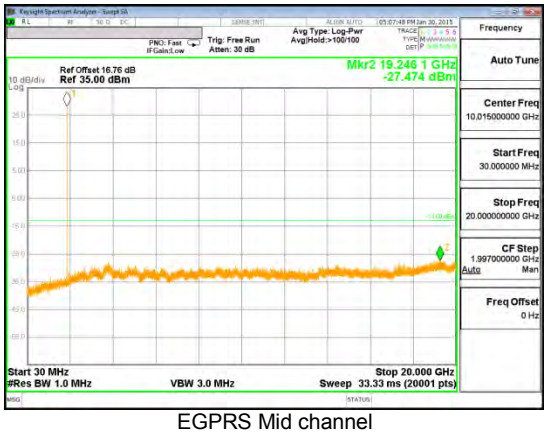
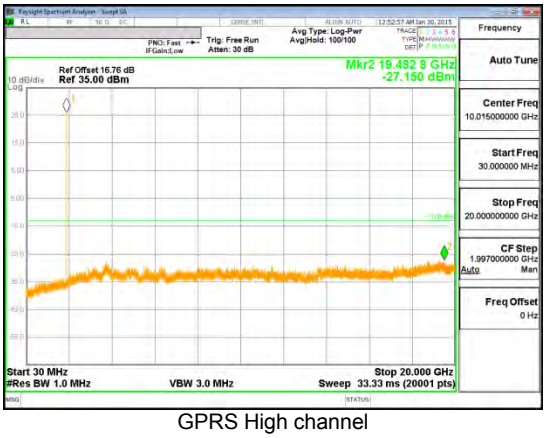
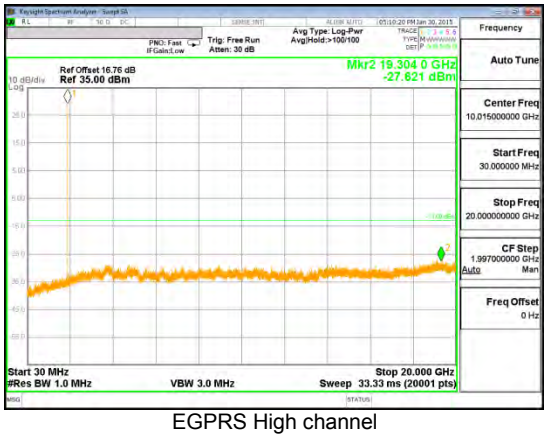
GSM 1900

Band 1900	 GPRS Low channel	 EGPRS Low channel
	 GPRS Mid channel	 EGPRS Mid channel
	 GPRS High channel	 EGPRS High channel

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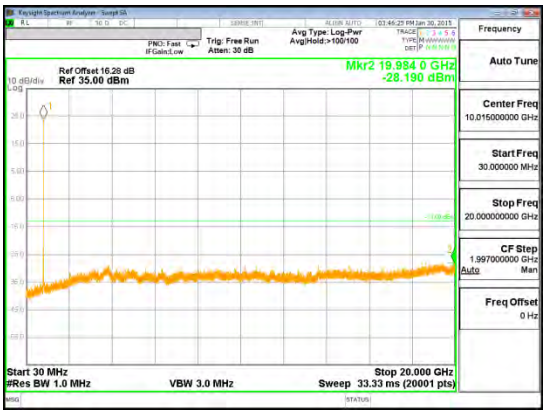
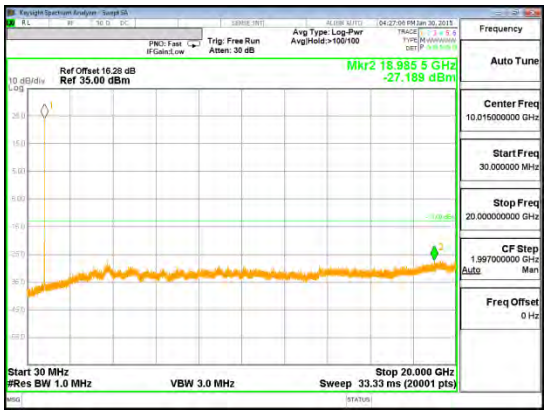
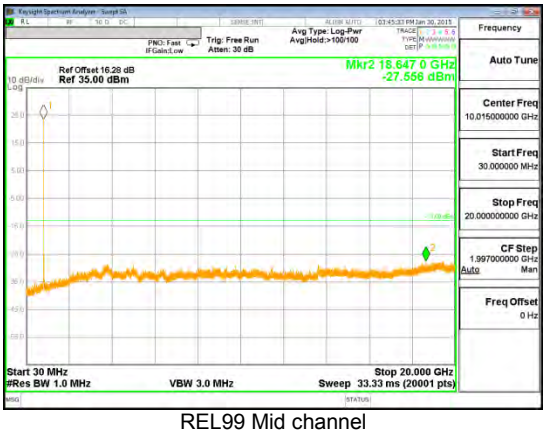
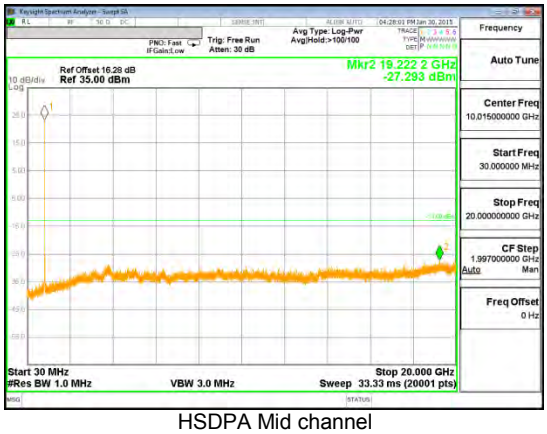
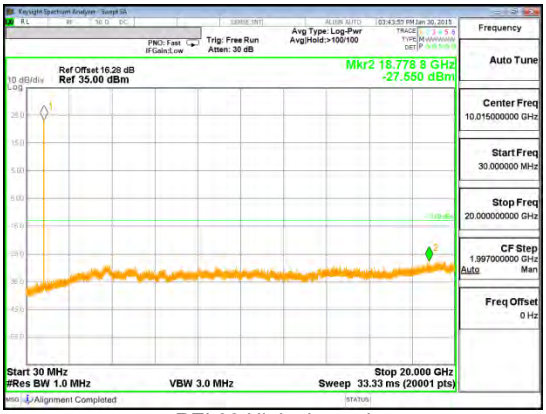
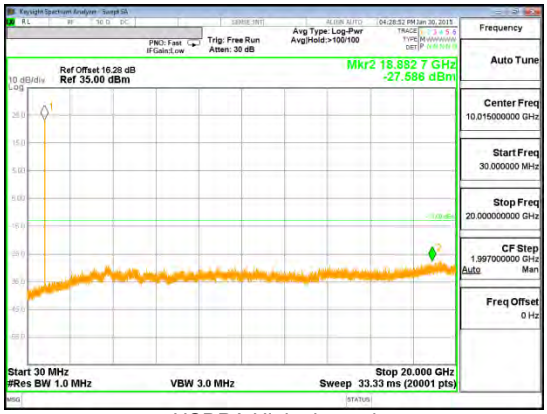
WCDMA Band 5

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

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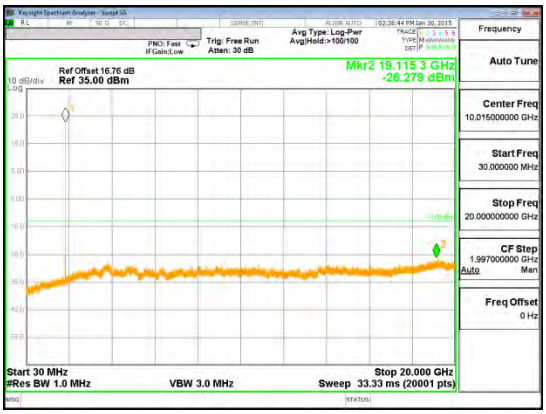
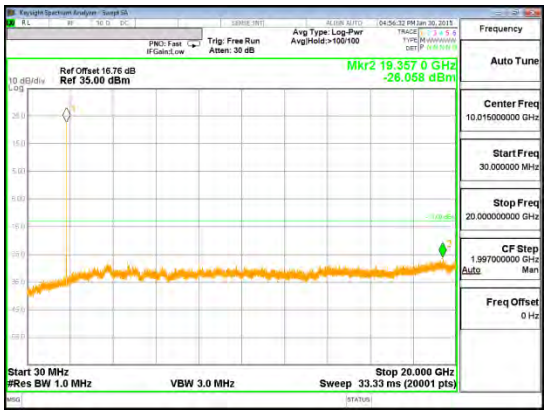
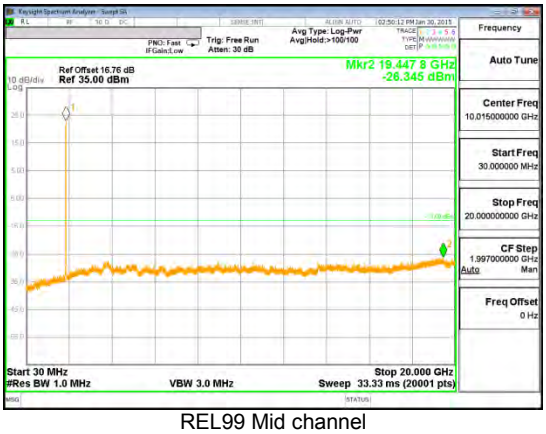
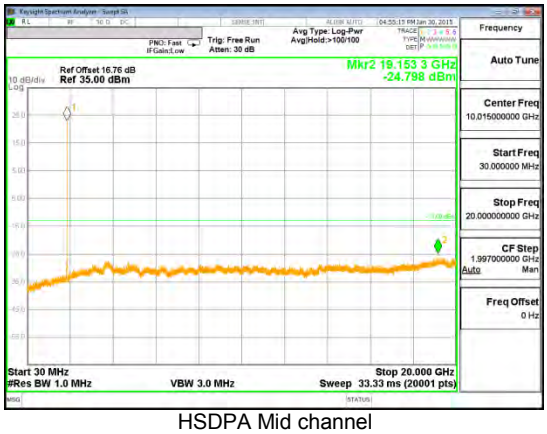
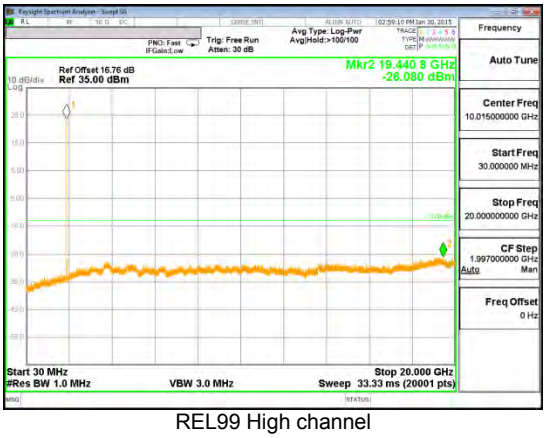
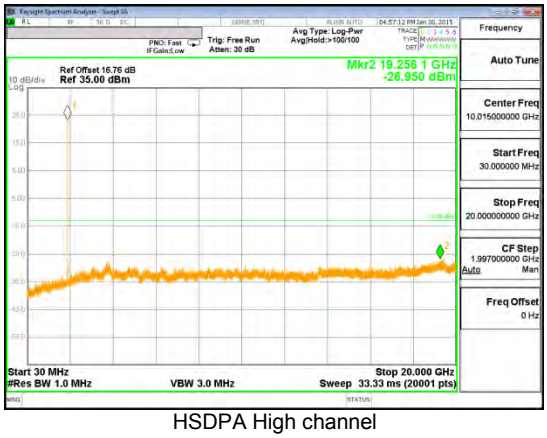
WCDMA Band 2

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

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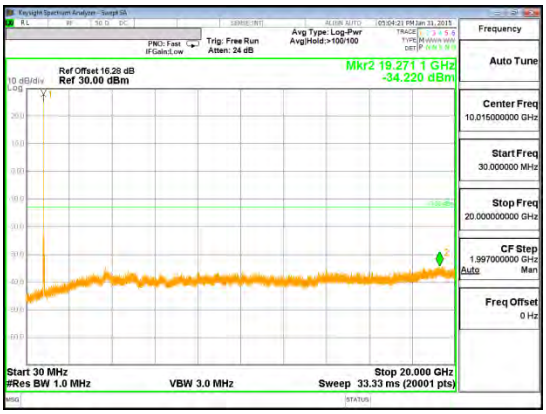
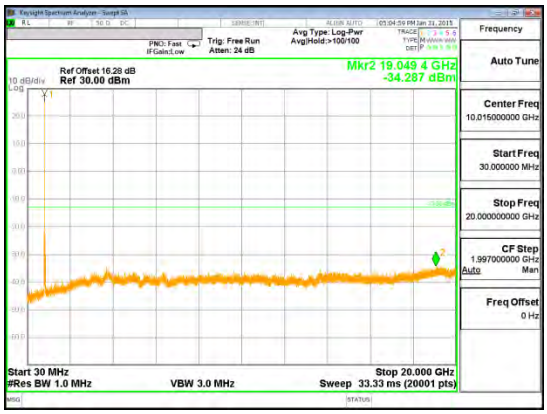
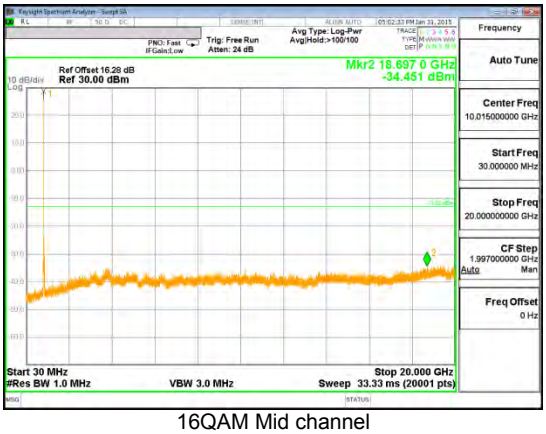
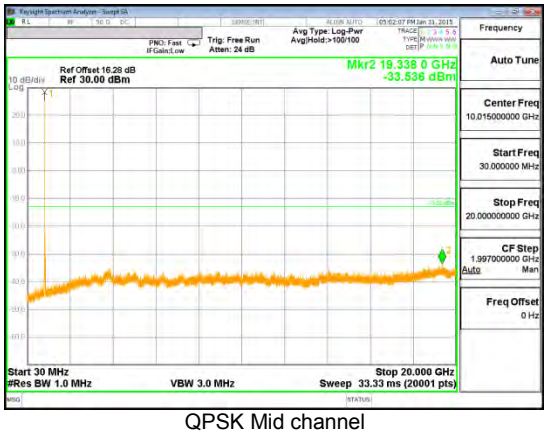
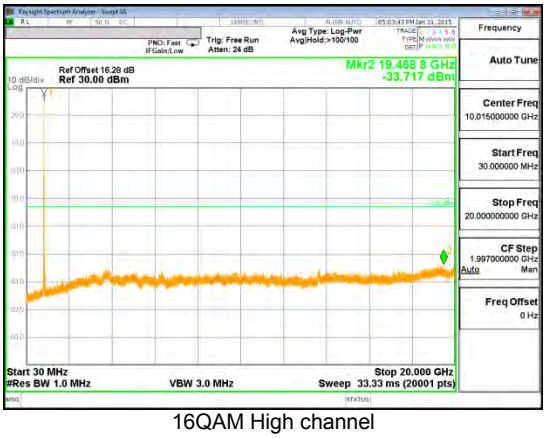
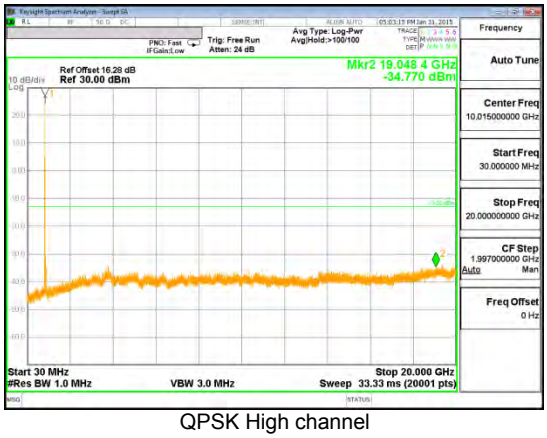
LTE Band 5

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

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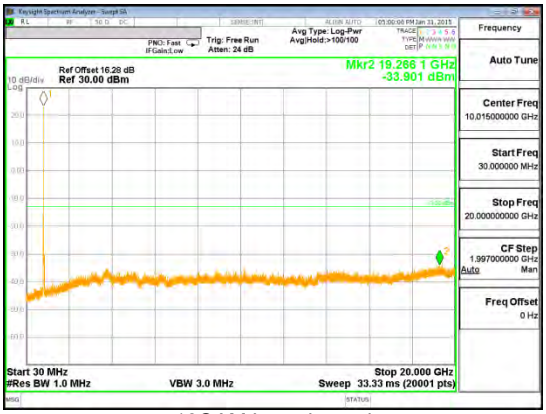
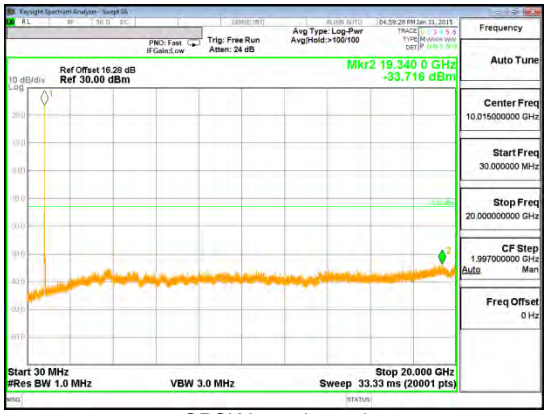
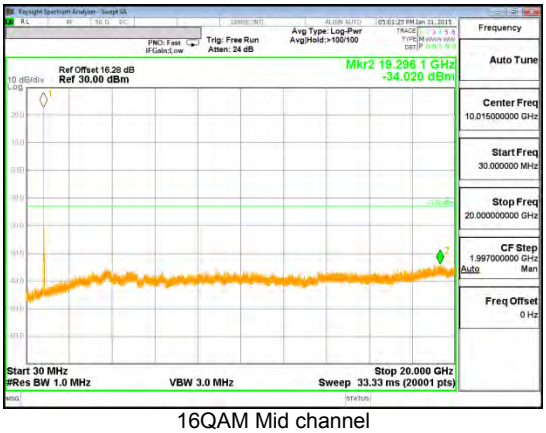
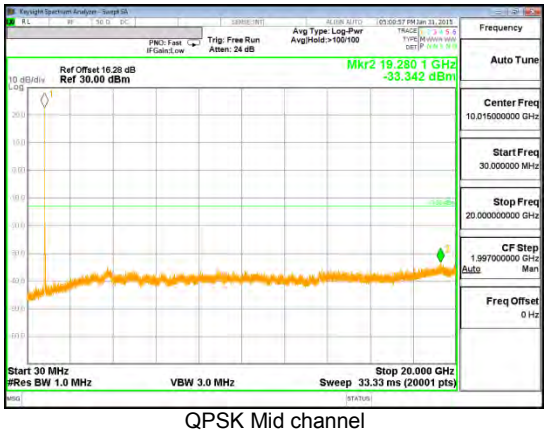
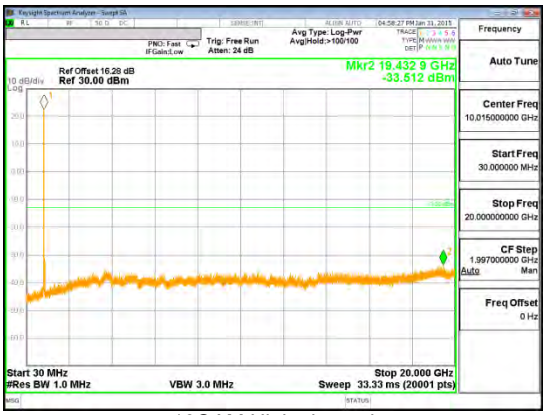
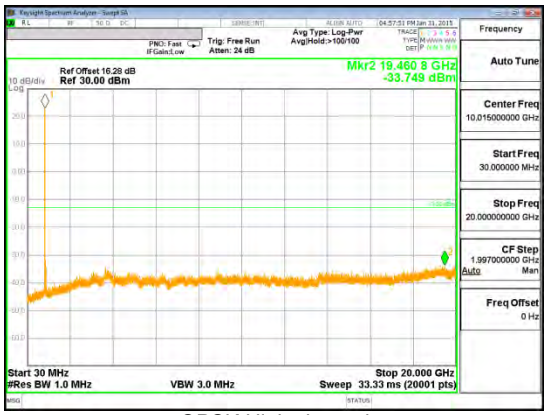
Band 5 5MHz	 16QAM Low channel	 QPSK Low channel
	 16QAM Mid channel	 QPSK Mid channel
	 16QAM High channel	 QPSK High channel

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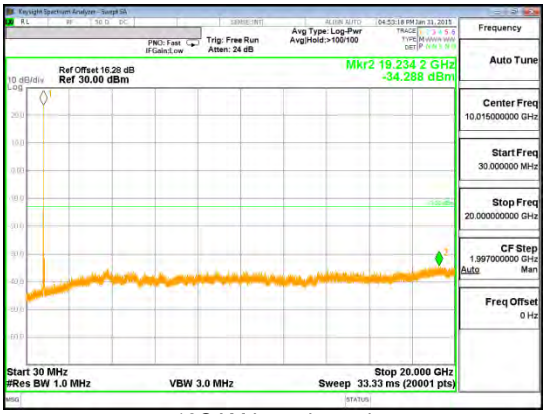
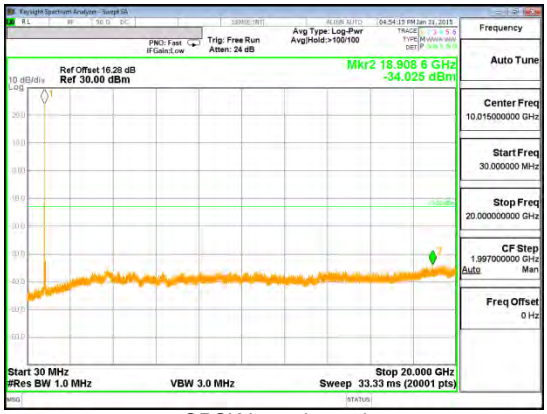
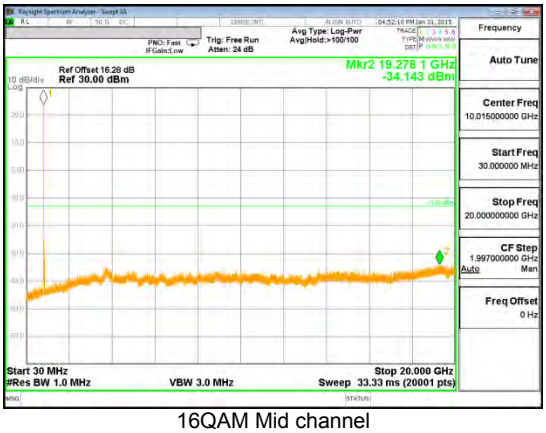
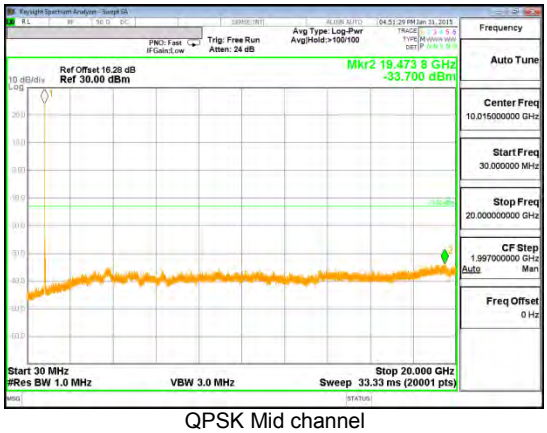
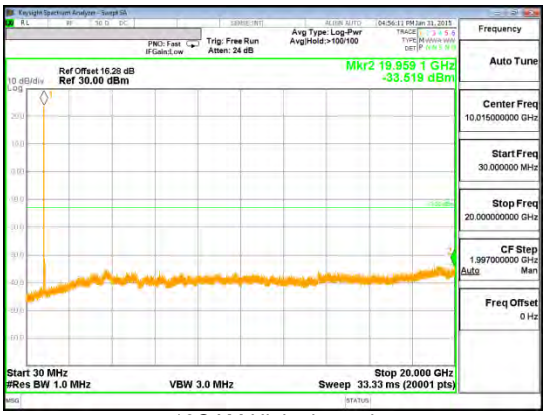
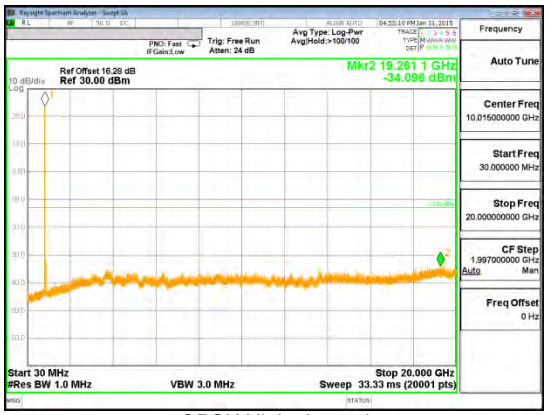
Band 5 3MHz	 16QAM Low channel	 QPSK Low channel
	 16QAM Mid channel	 QPSK Mid channel
	 16QAM High channel	 QPSK High channel

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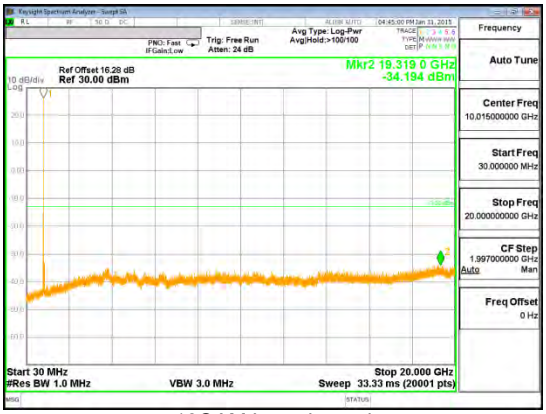
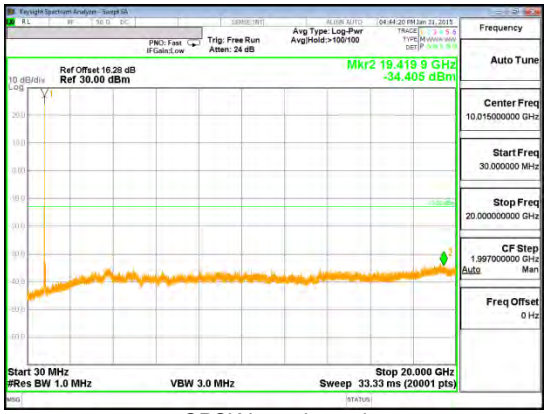
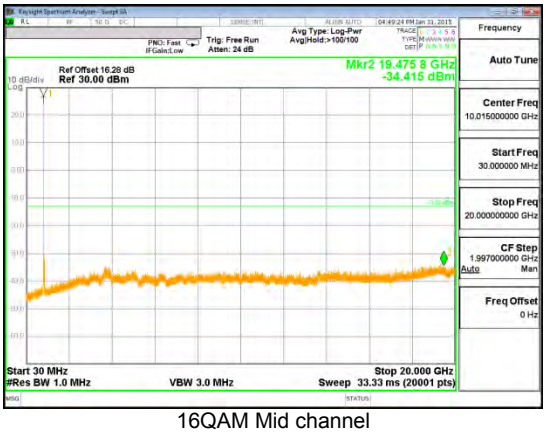
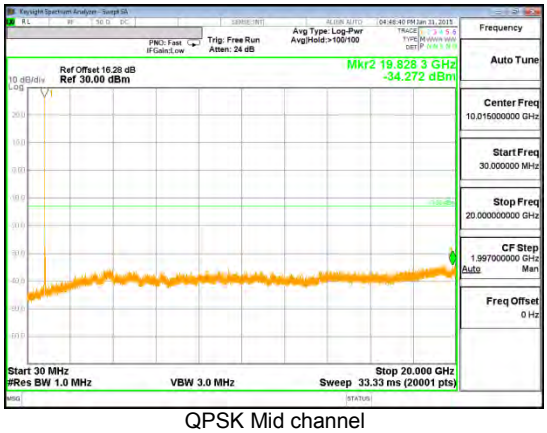
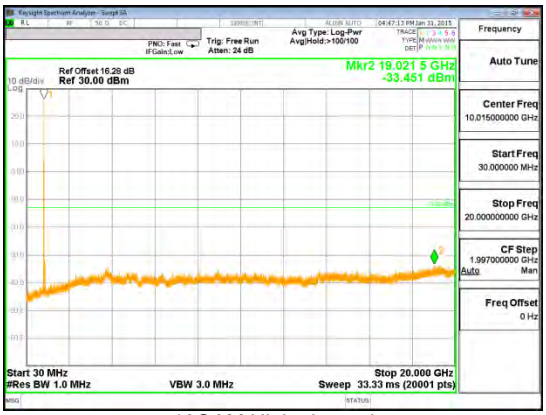
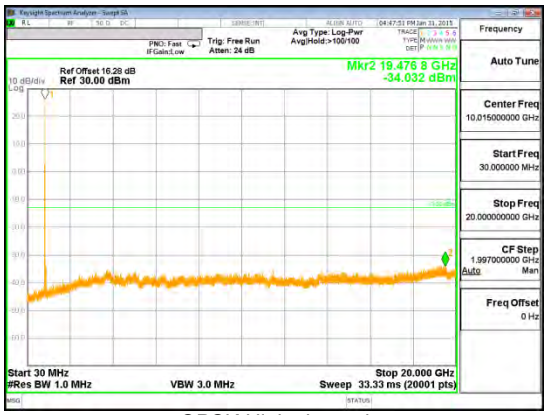
Band 5 1.4MHz	 16QAM Low channel	 QPSK Low channel
	 16QAM Mid channel	 QPSK Mid channel
	 16QAM High channel	 QPSK High channel

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10.4. FREQUENCY STABILITY

RULE PART(S)

FCC: §2.1055, §22.355, §24.235

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.

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

GPRS 850, Channel 661, Frequency 1800MHz

Reference Frequency: Cell Mid Channel 836.5 MHz @ 20ºC Limit: +- 2.5 ppm = 2091.250 Hz				
Power Supply (Vdc)	Environment Temperature (*C)	Frequency Deviation Measureed with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
3.80	50	836.59998085	-0.009	2.5
3.80	40	836.60001905	-0.055	2.5
3.80	30	836.60001853	-0.054	2.5
3.80	***20***	***836.59997304***	***0***	***2.5***
3.80	10	836.59998102	-0.010	2.5
3.80	0	836.59997805	-0.006	2.5
3.80	-10	836.59998328	-0.012	2.5
3.80	-20	836.59998276	-0.012	2.5
3.80	-30	836.59997692	-0.005	2.5

Reference Frequency: Cell Mid Channel 836.5 MHz @ 20ºC Limit: +- 2.5 ppm = 2091.250 Hz				
Power Supply (Vdc)	Environment Temperature (*C)	Frequency Deviation Measureed with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
3.80	***20***	***836.59997304***	***0***	***2.5***
4.20	20	836.59998083	-0.009	2.5
3.40	20	836.59997539	-0.003	2.5

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GPRS 1900, Channel 190, Frequency 836.6MHz

Reference Frequency: PCS Mid Channel 1880 MHz @ 20ºC Limit: +- 2.5 ppm = 4700.000 Hz				
Power Supply (Vdc)	Environment Temperature (*C)	Frequency Deviation Measureed with Time Elapse (MHz)	Delta (ppm)	Limit (ppm)
3.80	50	1879.99996197	0.006	2.5
3.80	40	1880.00002492	-0.028	2.5
3.80	30	1880.00002873	-0.030	2.5
3.80	***20***	**1879.99997298**	***0***	***2.5***
3.80	10	1879.99997624	-0.002	2.5
3.80	0	1879.99997520	-0.001	2.5
3.80	-10	1879.99998192	-0.005	2.5
3.80	-20	1879.99997601	-0.002	2.5
3.80	-30	1879.99997072	0.001	2.5

Reference Frequency: PCS Mid Channel 1880 MHz @ 20ºC Limit: +- 2.5 ppm = 4700.000 Hz				
Power Supply (Vdc)	Environment Temperature (*C)	Frequency Deviation Measureed with Time Elapse (MHz)	Delta (ppm)	Limit (ppm)
3.80	***20***	**1879.99997298**	***0***	***2.5***
4.20	20	1879.99997767	-0.002	2.5
3.40	20	1879.99996976	0.002	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

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 603C Clause 2.2.17; MXA setting reference to 971168 D01 v02r02

For peak power measurement with a PSA:

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 PSA:

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
GSM850	GPRS	512	824.2	25.76	376.3
		661	836.6	25.43	348.7
		810	848.8	25.07	321.1
	EGPRS	512	824.2	21.95	156.5
		661	836.6	22.04	159.8
		810	848.8	22.74	187.8
GSM1900	GPRS	512	1850.2	26.65	462.2
		661	1880.0	29.41	873.0
		810	1909.8	28.40	692.3
	EGPRS	512	1850.2	27.85	609.3
		661	1880.0	25.43	349.1
		810	1909.8	22.59	181.7

WCDMA

Band	Mode	Channel	f (MHz)	ERP / EIRP	
				dBm	mW
Band 5	REL99	826.4	-28.19	17.73	59.2
		836.6	-27.56	17.36	54.4
		846.6	-27.55	16.35	43.1
	HSDPA	826.4	-27.19	17.21	52.5
		836.6	-27.29	14.05	25.4
		846.6	-27.59	10.85	12.1
Band 2	REL99	1850.2	-26.28	19.75	94.4
		1880.0	-26.35	22.75	188.4
		1909.8	-26.08	23.02	200.6
	HSDPA	1850.2	-26.06	21.04	127.0
		1880.0	-24.80	21.66	146.6
		1909.8	-26.95	20.33	108.0

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LTE

Band	BW (MHz)	Mode	RB/RB Size	f (MHz)	ERP / EIRP	
			50/0		dBm	mW
Band 5	10	QPSK	50/0	829.0	16.84	48.3
			50/0	836.5	15.54	35.8
			50/0	844.0	14.71	29.6
		16QAM	50/0	829.0	15.92	39.1
			50/0	836.5	15.05	32.0
			25/0	844.0	14.05	25.4
	5	QPSK	25/0	826.5	18.87	77.0
			25/0	836.5	16.84	48.3
			25/0	846.5	16.74	47.2
		16QAM	25/0	826.5	17.56	57.0
			25/0	836.5	17.74	59.4
			15/0	846.5	16.81	47.9
	3	QPSK	15/0	825.5	18.33	68.0
			15/0	836.5	18.46	70.1
			15/0	847.5	17.41	55.1
		16QAM	15/0	825.5	16.55	45.1
			15/0	836.5	17.46	55.7
			6/0	847.5	16.96	49.6
	1.4	QPSK	6/0	824.7	22.56	180.1
			6/0	836.5	21.46	139.8
			6/0	848.3	21.28	134.4
		16QAM	6/0	824.7	22.83	191.7
			6/0	836.5	21.67	146.7
				848.3	20.09	102.0

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11.1.1. ERP/EIRP DATA

GSM

Band
GSM850
GPRS

High Frequency Substitution Measurement
UL Korea, Ltd. Suwon Laboratory Chamber 1

Company: Samsung
Project #: 15K19845
Date: 01-29-15
Test Engineer: Steven.Kim
Configuration: EUT ONLY, X Position
Mode: GPRS 850 MHz

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)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
824.20	19.37	V	1.1	-1.6	16.75	38.5	-21.7	
824.20	24.57	H	1.1	-1.6	21.95	38.5	-16.5	
Mid Ch								
836.60	20.50	V	1.1	-1.4	18.01	38.5	-20.4	
836.60	24.53	H	1.1	-1.4	22.04	38.5	-16.4	
High Ch								
848.80	19.43	V	1.1	-1.3	17.07	38.5	-21.4	
848.80	25.10	H	1.1	-1.3	22.74	38.5	-15.7	

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

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GSM

Band
GSM850
EGPRS

High Frequency Substitution Measurement
UL Korea, Ltd. Suwon Laboratory Chamber 1

Company: Samsung
Project #: 15K19845
Date: 01-29-15
Test Engineer: Steven.Kim
Configuration: EUT ONLY, X Position
Mode: GPRS 850 MHz

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)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
824.20	18.14	V	1.1	-1.6	15.52	38.5	-22.9	
824.20	28.38	H	1.1	-1.6	25.76	38.5	-12.7	
Mid Ch								
836.60	15.72	V	1.1	-1.4	13.23	38.5	-25.2	
836.60	27.92	H	1.1	-1.4	25.43	38.5	-13.0	
High Ch								
848.80	19.65	V	1.1	-1.3	17.29	38.5	-21.2	
848.80	27.43	H	1.1	-1.3	25.07	38.5	-13.4	

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

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GSM

Band
GSM1900
GPRS

High Frequency Fundamental Measurement
UL Korea, Ltd. Suwon Laboratory Chamber 1

Company: Samsung
Project #: 15K19845
Date: 01-29-15
Test Engineer: Steven.Kim
Configuration: EUT ONLY, X Position
Mode: GPRS 1900MHz

Test Equipment:
Receiving: 3117, and Chamber 1 SMA Cables
Substitution: 3115 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	16.2	V	1.60	9.12	23.76	33.0	-9.2	
1850.20	19.1	H	1.60	9.12	26.65	33.0	-6.4	
Mid Ch								
1880.00	18.2	V	1.62	8.98	25.58	33.0	-7.4	
1880.00	22.1	H	1.62	8.98	29.41	33.0	-3.6	
High Ch								
1909.80	18.6	V	1.63	8.83	25.79	33.0	-7.2	
1909.80	21.2	H	1.63	8.83	28.40	33.0	-4.6	

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GSM

Band
GSM1900
EGPRS

High Frequency Fundamental Measurement
UL Korea, Ltd. Suwon Laboratory Chamber 1

Company: Samsung
Project #: 15K19845
Date: 01-29-15
Test Engineer: Steven.Kim
Configuration: EUT ONLY, X Position
Mode: EGPRS 1900MHz

Test Equipment:
Receiving: 3117, and Chamber 1 SMA Cables
Substitution: 3115 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	17.3	V	1.60	9.12	24.81	33.0	-8.2	
1850.20	20.3	H	1.60	9.12	27.85	33.0	-5.2	
Mid Ch								
1880.00	18.2	V	1.62	8.98	25.53	33.0	-7.5	
1880.00	18.1	H	1.62	8.98	25.43	33.0	-7.6	
High Ch								
1909.80	18.6	V	1.63	8.83	25.79	33.0	-7.2	
1909.80	15.4	H	1.63	8.83	22.59	33.0	-10.4	

Rev. 3.17.11

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WCDMA

Band 5
REL99

High Frequency Substitution Measurement
UL Korea, Ltd. Suwon Laboratory Chamber 1

Company: Samsung
Project #: 15K19845
Date: 01-29-15
Test Engineer: Steven.Kim
Configuration: EUT ONLY, X Position
Mode: REL99 850MHz

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)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
826.40	20.34	V	1.1	-1.5	17.73	38.5	-20.7	
826.40	8.24	H	1.1	-1.5	5.63	38.5	-32.8	
Mid Ch								
836.60	19.85	V	1.1	-1.4	17.36	38.5	-21.1	
836.60	9.31	H	1.1	-1.4	6.82	38.5	-31.6	
High Ch								
846.60	18.73	V	1.1	-1.3	16.35	38.5	-22.1	
846.60	8.84	H	1.1	-1.3	6.46	38.5	-32.0	

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WCDMA

Band 5
HSDPA

High Frequency Substitution Measurement
UL Korea, Ltd. Suwon Laboratory Chamber 1

Company: Samsung
Project #: 15K19845
Date: 01-29-15
Test Engineer: Steven.Kim
Configuration: EUT ONLY, X Position
Mode: HSDPA 850MHz

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)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
826.40	11.11	V	1.1	-1.5	8.50	38.5	-30.0	
826.40	19.82	H	1.1	-1.5	17.21	38.5	-21.2	
Mid Ch								
836.60	10.98	V	1.1	-1.4	8.49	38.5	-30.0	
836.60	16.54	H	1.1	-1.4	14.05	38.5	-24.4	
High Ch								
846.60	10.80	V	1.1	-1.3	8.42	38.5	-30.0	
846.60	13.23	H	1.1	-1.3	10.85	38.5	-27.6	

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WCDMA

Band 2
REL99

High Frequency Fundamental Measurement
UL Korea, Ltd. Suwon Laboratory Chamber 1

Company: Samsung
Project #: 15K19845
Date: 01-29-15
Test Engineer: Steven.Kim
Configuration: EUT ONLY, X Position
Mode: WCDMA_1900 MHz_Rel 99

Test Equipment:
Receiving: 3117, and Chamber 1 SMA Cables
Substitution: 3115 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	9.17	V	1.60	9.12	16.69	33.0	-16.3	
1852.40	12.23	H	1.60	9.12	19.75	33.0	-13.3	
Mid Ch								
1880.00	12.97	V	1.62	8.98	20.33	33.0	-12.7	
1880.00	15.39	H	1.62	8.98	22.75	33.0	-10.3	
High Ch								
1907.60	9.69	V	1.63	8.83	16.89	33.0	-16.1	
1907.60	15.82	H	1.63	8.83	23.02	33.0	-10.0	

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

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WCDMA

Band 2
HSDPA

High Frequency Fundamental Measurement
UL Korea, Ltd. Suwon Laboratory Chamber 1

Company: Samsung
Project #: 15K19845
Date: 01-29-15
Test Engineer: Steven.Kim
Configuration: EUT ONLY, X Position
Mode: HSDPA_1900 MHz

Test Equipment:
Receiving: 3117, and Chamber 1 SMA Cables
Substitution: 3115 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	4.76	V	1.60	9.12	12.28	33.0	-20.7	
1852.40	13.52	H	1.60	9.12	21.04	33.0	-12.0	
Mid Ch								
1880.00	7.26	V	1.62	8.98	14.62	33.0	-18.4	
1880.00	14.30	H	1.62	8.98	21.66	33.0	-11.3	
High Ch								
1907.60	7.94	V	1.63	8.83	15.14	33.0	-17.9	
1907.60	13.13	H	1.63	8.83	20.33	33.0	-12.7	

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

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LTE

Band 5
10MHz
QPSK

High Frequency Substitution Measurement
UL Korea, Ltd. Suwon Laboratory Chamber 1

Company: Samsung
Project #: 15K19845
Date: 01-28-15
Test Engineer: Steven.Kim
Configuration: EUT ONLY, X Position
Mode: TX, LTE BAND 5, 10MHz BW,QPSK

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)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
829.00	13.03	V	1.1	-1.5	10.45	38.5	-28.0	
829.00	19.42	H	1.1	-1.5	16.84	38.5	-21.6	
Mid Ch								
836.50	10.90	V	1.1	-1.4	8.41	38.5	-30.0	
836.50	18.03	H	1.1	-1.4	15.54	38.5	-22.9	
High Ch								
844.00	10.23	V	1.1	-1.3	7.84	38.5	-30.6	
844.00	17.13	H	1.1	-1.3	14.71	38.5	-23.7	

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
10MHz
16QAM

High Frequency Substitution Measurement
UL Korea, Ltd. Suwon Laboratory Chamber 1

Company: Samsung
Project #: 15K19845
Date: 01-28-15
Test Engineer: Steven.Kim
Configuration: EUT ONLY, X Position
Mode: LTE5 10MHz FUND 16QAM

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)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
829.00	12.79	V	1.1	-1.5	10.21	38.5	-28.2	
829.00	18.50	H	1.1	-1.5	15.92	38.5	-22.5	
Mid Ch								
836.50	10.94	V	1.1	-1.4	8.43	38.5	-30.0	
836.50	17.56	H	1.1	-1.4	15.05	38.5	-23.4	
High Ch								
844.00	9.33	V	1.1	-1.3	6.91	38.5	-31.5	
844.00	16.47	H	1.1	-1.3	14.05	38.5	-24.4	

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
5MHz
QPSK

High Frequency Substitution Measurement
UL Korea, Ltd. Suwon Laboratory Chamber 1

Company: Samsung
Project #: 15K19845
Date: 01-28-15
Test Engineer: Steven.Kim
Configuration: EUT ONLY, X Position
Mode: LTE5 5MHz FUND QPSK

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)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
826.50	15.76	V	1.1	-1.5	13.16	38.5	-25.3	
826.50	21.47	H	1.1	-1.5	18.87	38.5	-19.6	
Mid Ch								
836.50	14.87	V	1.1	-1.4	12.38	38.5	-26.1	
836.50	19.33	H	1.1	-1.4	16.84	38.5	-21.6	
High Ch								
846.50	14.63	V	1.6	-1.3	11.75	38.5	-26.7	
846.50	19.62	H	1.6	-1.3	16.74	38.5	-21.7	

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
16QAM

High Frequency Substitution Measurement
UL Korea, Ltd. Suwon Laboratory Chamber 1

Company: Samsung
Project #: 15K19845
Date: 01-28-15
Test Engineer: Steven.Kim
Configuration: EUT ONLY, X Position
Mode: LTE5 5MHz FUND 16QAM

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)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
826.50	14.63	V	1.1	-1.5	12.03	38.5	-26.4	
826.50	20.16	H	1.1	-1.5	17.56	38.5	-20.9	
Mid Ch								
836.50	13.76	V	1.1	-1.4	11.27	38.5	-27.2	
836.50	20.23	H	1.1	-1.4	17.74	38.5	-20.7	
High Ch								
846.50	12.50	V	1.1	-1.3	10.12	38.5	-28.3	
846.50	19.19	H	1.1	-1.3	16.81	38.5	-21.6	

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
3MHz
QPSK

High Frequency Substitution Measurement
UL Korea, Ltd. Suwon Laboratory Chamber 1

Company: Samsung
Project #: 15K19845
Date: 01-28-15
Test Engineer: Steven.Kim
Configuration: EUT ONLY, X Position
Mode: LTE5 3MHz FUND QPSK

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)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
825.50	17.37	V	1.1	-1.5	14.77	38.5	-23.7	
825.50	20.93	H	1.1	-1.5	18.33	38.5	-20.1	
Mid Ch								
836.50	16.37	V	1.1	-1.4	13.88	38.5	-24.6	
836.50	20.95	H	1.1	-1.4	18.46	38.5	-20.0	
High Ch								
847.50	13.12	V	1.6	-1.3	10.24	38.5	-28.2	
847.50	20.29	H	1.6	-1.3	17.41	38.5	-21.0	

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
16QAM

High Frequency Substitution Measurement
UL Korea, Ltd. Suwon Laboratory Chamber 1

Company: Samsung
Project #: 15K19845
Date: 01-28-15
Test Engineer: Steven.Kim
Configuration: EUT ONLY, X Position
Mode: LTE5 3MHz FUND 16QAM

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)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
825.50	15.76	V	1.1	-1.5	13.16	38.5	-25.3	
825.50	19.15	H	1.1	-1.5	16.55	38.5	-21.9	
Mid Ch								
836.50	15.22	V	1.1	-1.4	12.73	38.5	-25.7	
836.50	19.95	H	1.1	-1.4	17.46	38.5	-21.0	
High Ch								
847.50	14.64	V	1.1	-1.3	12.26	38.5	-26.2	
847.50	19.34	H	1.1	-1.3	16.96	38.5	-21.5	

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 1

Company: Samsung
Project #: 15K19845
Date: 01-28-15
Test Engineer: Steven.Kim
Configuration: EUT ONLY, X Position
Mode: LTE5 1.4MHz FUND QPSK

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)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
824.70	17.61	V	1.1	-1.5	15.01	38.5	-23.4	
824.70	25.16	H	1.1	-1.5	22.56	38.5	-15.9	
Mid Ch								
836.50	18.52	V	1.1	-1.4	16.03	38.5	-22.4	
836.50	23.95	H	1.1	-1.4	21.46	38.5	-17.0	
High Ch								
844.30	17.68	V	1.6	-1.3	14.80	38.5	-23.6	
844.30	24.16	H	1.6	-1.3	21.28	38.5	-17.2	

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
16QAM

High Frequency Substitution Measurement
UL Korea, Ltd. Suwon Laboratory Chamber 1

Company: Samsung
Project #: 15K19845
Date: 01-28-15
Test Engineer: Steven.Kim
Configuration: EUT ONLY, X Position
Mode: LTE5 1.4MHz FUND 16QAM

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)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
824.70	18.43	V	1.1	-1.5	15.83	38.5	-22.6	
824.70	25.43	H	1.1	-1.5	22.83	38.5	-15.6	
Mid Ch								
836.50	18.37	V	1.1	-1.4	15.88	38.5	-22.6	
836.50	24.16	H	1.1	-1.4	21.67	38.5	-16.8	
High Ch								
844.30	17.30	V	1.1	-1.3	14.92	38.5	-23.5	
844.30	22.47	H	1.1	-1.3	20.09	38.5	-18.4	

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

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11.2. FIELD STRENGTH OF SPURIOUS RADIATION

RULE PART(S)

FCC: §2.1053, §22.917, §24.238

LIMIT

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

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

Band
GSM850
GPRS

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

Company: Samsung
Project #: 15K19845
Date: 01-29-15
Test Engineer: Steven.Kim
Configuration: EUT / AC Adapter / Earphone, X Position
Mode: GPRS 850 MHz

Chamber	Pre-amplifer	Filter	Limit
Chamber 1	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, 824.2MHz									
1.648	19.6	V	3.0	40.2	1.0	-19.5	-13.0	-6.5	
2.473	3.8	V	3.0	40.1	1.0	-35.3	-13.0	-22.3	
3.297	-12.7	V	3.0	39.6	1.0	-51.3	-13.0	-38.3	
1.648	21.8	H	3.0	40.2	1.0	-17.4	-13.0	-4.4	
2.473	-6.4	H	3.0	40.1	1.0	-45.5	-13.0	-32.5	
3.297	-17.0	H	3.0	39.6	1.0	-55.6	-13.0	-42.6	
Mid Ch, 836.6MHz									
1.673	5.4	V	3.0	40.2	1.0	-33.8	-13.0	-20.8	
2.510	-7.3	V	3.0	40.1	1.0	-46.4	-13.0	-33.4	
3.346	-18.3	V	3.0	39.6	1.0	-56.8	-13.0	-43.8	
1.673	-3.6	H	3.0	40.2	1.0	-42.8	-13.0	-29.8	
2.510	-2.0	H	3.0	40.1	1.0	-41.1	-13.0	-28.1	
3.346	-20.9	H	3.0	39.6	1.0	-59.5	-13.0	-46.5	
High Ch, 848.8MHz									
1.698	14.3	V	3.0	40.2	1.0	-24.9	-13.0	-11.9	
2.547	-0.8	V	3.0	40.1	1.0	-39.9	-13.0	-26.9	
3.395	-17.3	V	3.0	39.5	1.0	-55.8	-13.0	-42.8	
1.698	1.6	H	3.0	40.2	1.0	-37.6	-13.0	-24.6	
2.547	1.1	H	3.0	40.1	1.0	-38.0	-13.0	-25.0	
3.395	-17.1	H	3.0	39.5	1.0	-55.6	-13.0	-42.6	

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

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GSM

Band
GSM850
EGPRS

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

Company: Samsung
Project #: 15K19845
Date: 01-29-15
Test Engineer: Steven.Kim
Configuration: EUT / AC Adapter / Earphone, X Position
Mode: EGPRS 850 MHz

Chamber	Pre-amplifer	Filter	Limit
Chamber 1	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, 824.2MHz									
1.648	-1.6	V	3.0	40.2	1.0	-40.8	-13.0	-27.8	
2.473	-9.1	V	3.0	40.1	1.0	-48.2	-13.0	-35.2	
3.297	-20.0	V	3.0	39.6	1.0	-58.6	-13.0	-45.6	
1.648	-4.6	H	3.0	40.2	1.0	-43.8	-13.0	-30.8	
2.473	-10.1	H	3.0	40.1	1.0	-49.2	-13.0	-36.2	
3.297	-20.2	H	3.0	39.6	1.0	-58.8	-13.0	-45.8	
Mid Ch, 836.6MHz									
1.673	2.1	V	3.0	40.2	1.0	-37.1	-13.0	-24.1	
2.510	-6.8	V	3.0	40.1	1.0	-45.9	-13.0	-32.9	
3.346	-23.6	V	3.0	39.6	1.0	-62.1	-13.0	-49.1	
1.673	-2.6	H	3.0	40.2	1.0	-41.8	-13.0	-28.8	
2.510	-4.7	H	3.0	40.1	1.0	-43.8	-13.0	-30.8	
3.346	-23.1	H	3.0	39.6	1.0	-61.7	-13.0	-48.7	
High Ch, 848.8MHz									
1.698	-4.3	V	3.0	40.2	1.0	-43.5	-13.0	-30.5	
2.547	-1.5	V	3.0	40.1	1.0	-40.6	-13.0	-27.6	
3.395	-19.8	V	3.0	39.5	1.0	-58.3	-13.0	-45.3	
1.698	-6.1	H	3.0	40.2	1.0	-45.2	-13.0	-32.2	
2.547	-6.4	H	3.0	40.1	1.0	-45.5	-13.0	-32.5	
3.395	-20.7	H	3.0	39.5	1.0	-59.2	-13.0	-46.2	

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

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GSM

Band
GSM1900
GPRS

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

Company: Samsung
Project #: 15K19845
Date: 01-29-15
Test Engineer: Steven.Kim
Configuration: EUT / AC Adapter / Earphone, X Position
Mode: GPRS 1900

Chamber	Pre-amplifer	Filter	Limit
Chamber 1	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, 1850.2MHz									
3.700	-2.3	V	3.0	39.2	1.0	-40.5	-13.0	-27.5	
5.551	-3.1	V	3.0	40.0	1.0	-42.1	-13.0	-29.1	
7.401	5.0	V	3.0	39.2	1.0	-33.2	-13.0	-20.2	
3.700	-2.2	H	3.0	39.2	1.0	-40.4	-13.0	-27.4	
5.550	0.7	H	3.0	40.0	1.0	-38.2	-13.0	-25.2	
7.400	-0.4	H	3.0	39.2	1.0	-38.6	-13.0	-25.6	
Mid Ch, 1880.0MHz									
3.760	-6.6	V	3.0	39.1	1.0	-44.7	-13.0	-31.7	
5.640	-9.4	V	3.0	39.9	1.0	-48.3	-13.0	-35.3	
7.520	-2.4	V	3.0	39.1	1.0	-40.6	-13.0	-27.6	
3.760	-4.6	H	3.0	39.1	1.0	-42.7	-13.0	-29.7	
5.640	-5.8	H	3.0	39.9	1.0	-44.7	-13.0	-31.7	
7.520	-3.4	H	3.0	39.1	1.0	-41.6	-13.0	-28.6	
High Ch, 1909.8 MHz									
3.820	-2.3	V	3.0	39.0	1.0	-40.3	-13.0	-27.3	
5.729	-2.0	V	3.0	39.9	1.0	-40.9	-13.0	-27.9	
7.639	0.3	V	3.0	39.1	1.0	-37.8	-13.0	-24.8	
3.820	0.0	H	3.0	39.0	1.0	-38.0	-13.0	-25.0	
5.729	0.5	H	3.0	39.9	1.0	-38.4	-13.0	-25.4	
7.639	-1.3	H	3.0	39.1	1.0	-39.4	-13.0	-26.4	

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

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GSM

Band
GSM1900
EGPRS

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

Company: Samsung
Project #: 15K19845
Date: 01-29-15
Test Engineer: Steven.Kim
Configuration: EUT / AC Adapter / Earphone, X Position
Mode: EGPRS 1900 MHz

Chamber	Pre-amplifer	Filter	Limit
Chamber 1	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, 1850.2MHz									
3.700	-9.7	V	3.0	39.2	1.0	-47.9	-13.0	-34.9	
5.551	-9.3	V	3.0	40.0	1.0	-48.3	-13.0	-35.3	
7.401	-4.5	V	3.0	39.2	1.0	-42.7	-13.0	-29.7	
3.700	-10.3	H	3.0	39.2	1.0	-48.5	-13.0	-35.5	
5.550	-7.5	H	3.0	40.0	1.0	-46.5	-13.0	-33.5	
7.400	-5.7	H	3.0	39.2	1.0	-43.9	-13.0	-30.9	
Mid Ch, 1880.0MHz									
3.760	-11.6	V	3.0	39.1	1.0	-49.6	-13.0	-36.6	
5.640	-9.9	V	3.0	39.9	1.0	-48.9	-13.0	-35.9	
7.520	-4.7	V	3.0	39.1	1.0	-42.8	-13.0	-29.8	
3.760	-9.0	H	3.0	39.1	1.0	-47.1	-13.0	-34.1	
5.640	-5.8	H	3.0	39.9	1.0	-44.7	-13.0	-31.7	
7.520	-4.9	H	3.0	39.1	1.0	-43.0	-13.0	-30.0	
High Ch, 1909.8 MHz									
3.820	-5.3	V	3.0	39.0	1.0	-43.3	-13.0	-30.3	
5.729	-4.1	V	3.0	39.9	1.0	-43.0	-13.0	-30.0	
7.639	-1.2	V	3.0	39.1	1.0	-39.3	-13.0	-26.3	
3.820	-2.7	H	3.0	39.0	1.0	-40.7	-13.0	-27.7	
5.729	-3.5	H	3.0	39.9	1.0	-42.4	-13.0	-29.4	
7.639	-4.0	H	3.0	39.1	1.0	-42.1	-13.0	-29.1	

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

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WCDMA

Band 5
REL99

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

Company: Samsung
Project #: 15K19845
Date: 01-29-15
Test Engineer: Steven.Kim
Configuration: EUT / AC Adapter / Earphone, X Position
Mode: WCDMA_Rel 99_ 850

Chamber	Pre-amplifer	Filter	Limit
Chamber 1	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, 826.40MHz									
1.652	-6.1	V	3.0	40.2	1.0	-45.3	-13.0	-32.3	
2.479	-19.2	V	3.0	40.1	1.0	-58.3	-13.0	-45.3	
3.306	-21.7	V	3.0	39.6	1.0	-60.3	-13.0	-47.3	
1.652	-15.9	H	3.0	40.2	1.0	-55.1	-13.0	-42.1	
2.479	-17.8	H	3.0	40.1	1.0	-56.8	-13.0	-43.8	
3.306	-21.8	H	3.0	39.6	1.0	-60.4	-13.0	-47.4	
Mid Ch, 836.6MHz									
1.673	-5.5	V	3.0	40.2	1.0	-44.7	-13.0	-31.7	
2.510	-18.9	V	3.0	40.1	1.0	-58.0	-13.0	-45.0	
3.346	-21.8	V	3.0	39.6	1.0	-60.3	-13.0	-47.3	
1.673	-11.6	H	3.0	40.2	1.0	-50.8	-13.0	-37.8	
2.510	-19.5	H	3.0	40.1	1.0	-58.5	-13.0	-45.5	
3.346	-22.0	H	3.0	39.6	1.0	-60.6	-13.0	-47.6	
High Ch, 846.6MHz									
1.693	-6.7	V	3.0	40.2	1.0	-45.9	-13.0	-32.9	
2.539	-19.7	V	3.0	40.1	1.0	-58.8	-13.0	-45.8	
3.386	-20.3	V	3.0	39.5	1.0	-58.8	-13.0	-45.8	
1.693	-16.3	H	3.0	40.2	1.0	-55.5	-13.0	-42.5	
2.539	-25.4	H	3.0	40.1	1.0	-64.5	-13.0	-51.5	
3.386	-19.9	H	3.0	39.5	1.0	-58.4	-13.0	-45.4	

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

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WCDMA

Band 5
HSDPA

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

Company: Samsung
Project #: 15K19845
Date: 01-29-15
Test Engineer: Steven.Kim
Configuration: EUT / AC Adapter / Earphone, X Position
Mode: WCDMA_Rel 99_ 850

Chamber	Pre-amplifer	Filter	Limit
Chamber 1	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, 826.40MHz									
1.652	-11.8	V	3.0	40.2	1.0	-50.9	-13.0	-37.9	
2.479	-20.1	V	3.0	40.1	1.0	-59.1	-13.0	-46.1	
3.306	-22.0	V	3.0	39.6	1.0	-60.6	-13.0	-47.6	
1.652	-10.5	H	3.0	40.2	1.0	-49.7	-13.0	-36.7	
2.479	-19.5	H	3.0	40.1	1.0	-58.6	-13.0	-45.6	
3.306	-22.4	H	3.0	39.6	1.0	-61.0	-13.0	-48.0	
Mid Ch, 836.6MHz									
1.673	-15.2	V	3.0	40.2	1.0	-54.4	-13.0	-41.4	
2.510	-19.0	V	3.0	40.1	1.0	-58.0	-13.0	-45.0	
3.346	13.9	V	3.0	39.6	1.0	-24.6	-13.0	-11.6	
1.673	-13.2	H	3.0	40.2	1.0	-52.3	-13.0	-39.3	
2.510	-19.4	H	3.0	40.1	1.0	-58.4	-13.0	-45.4	
3.346	-21.7	H	3.0	39.6	1.0	-60.3	-13.0	-47.3	
High Ch, 846.6MHz									
1.693	-15.7	V	3.0	40.2	1.0	-54.9	-13.0	-41.9	
2.539	-20.1	V	3.0	40.1	1.0	-59.2	-13.0	-46.2	
3.386	-20.5	V	3.0	39.5	1.0	-59.0	-13.0	-46.0	
1.693	-18.2	H	3.0	40.2	1.0	-57.4	-13.0	-44.4	
2.539	-20.9	H	3.0	40.1	1.0	-59.9	-13.0	-46.9	
3.386	-20.6	H	3.0	39.5	1.0	-59.1	-13.0	-46.1	

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

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WCDMA

Band 2
REL99

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

Company: Samsung
Project #: 15K19845
Date: 01-29-15
Test Engineer: Steven.Kim
Configuration: EUT / AC Adapter / Earphone, X Position
Mode: Tx, 1900MHz WCDMA

Chamber	Pre-amplifer	Filter	Limit
Chamber 1	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									
3.705	-9.4	V	3.0	39.2	1.0	-47.5	-13.0	-34.5	
5.557	-9.4	V	3.0	40.0	1.0	-48.4	-13.0	-35.4	
7.409	4.7	V	3.0	39.2	1.0	-33.5	-13.0	-20.5	
3.705	-9.5	H	3.0	39.2	1.0	-47.7	-13.0	-34.7	
5.557	-8.0	H	3.0	40.0	1.0	-47.0	-13.0	-34.0	
7.409	1.0	H	3.0	39.2	1.0	-37.2	-13.0	-24.2	
Mid Ch, 1880MHz									
3.760	-8.5	V	3.0	39.1	1.0	-46.6	-13.0	-33.6	
5.640	-3.7	V	3.0	39.9	1.0	-42.7	-13.0	-29.7	
7.520	8.0	V	3.0	39.1	1.0	-30.2	-13.0	-17.2	
3.760	-6.8	H	3.0	39.1	1.0	-44.9	-13.0	-31.9	
5.640	-6.8	H	3.0	39.9	1.0	-45.7	-13.0	-32.7	
7.520	-2.0	H	3.0	39.1	1.0	-40.2	-13.0	-27.2	
High Ch, 1907.6MHz									
3.815	-7.3	V	3.0	39.0	1.0	-45.3	-13.0	-32.3	
5.723	-7.8	V	3.0	39.9	1.0	-46.7	-13.0	-33.7	
7.630	10.9	V	3.0	39.1	1.0	-27.2	-13.0	-14.2	
3.815	-8.8	H	3.0	39.0	1.0	-46.8	-13.0	-33.8	
5.723	-8.4	H	3.0	39.9	1.0	-47.3	-13.0	-34.3	
7.630	3.3	H	3.0	39.1	1.0	-34.8	-13.0	-21.8	

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

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WCDMA

Band 2
HSDPA

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

Company: Samsung
Project #: 15K19845
Date: 01-29-15
Test Engineer: Steven.Kim
Configuration: EUT / AC Adapter / Earphone, X Position
Mode: Tx, 1900MHz HSDPA

Chamber	Pre-amplifer	Filter	Limit
Chamber 1	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									
3.705	-7.5	V	3.0	39.2	1.0	-45.6	-13.0	-32.6	
5.557	-8.0	V	3.0	40.0	1.0	-46.9	-13.0	-33.9	
7.409	-1.6	V	3.0	39.2	1.0	-39.8	-13.0	-26.8	
3.705	-9.4	H	3.0	39.2	1.0	-47.6	-13.0	-34.6	
5.557	-6.3	H	3.0	40.0	1.0	-45.3	-13.0	-32.3	
7.409	5.4	H	3.0	39.2	1.0	-32.8	-13.0	-19.8	
Mid Ch, 1880MHz									
3.760	-7.5	V	3.0	39.1	1.0	-45.6	-13.0	-32.6	
5.640	-9.8	V	3.0	39.9	1.0	-48.7	-13.0	-35.7	
7.520	4.9	V	3.0	39.1	1.0	-33.3	-13.0	-20.3	
3.760	-12.4	H	3.0	39.1	1.0	-50.5	-13.0	-37.5	
5.640	-6.3	H	3.0	39.9	1.0	-45.2	-13.0	-32.2	
7.520	6.5	H	3.0	39.1	1.0	-31.6	-13.0	-18.6	
High Ch, 1907.6MHz									
3.815	-3.4	V	3.0	39.0	1.0	-41.4	-13.0	-28.4	
5.723	-8.8	V	3.0	39.9	1.0	-47.7	-13.0	-34.7	
7.630	2.7	V	3.0	39.1	1.0	-35.4	-13.0	-22.4	
3.815	-2.9	H	3.0	39.0	1.0	-40.9	-13.0	-27.9	
5.723	-2.8	H	3.0	39.9	1.0	-41.7	-13.0	-28.7	
7.630	6.6	H	3.0	39.1	1.0	-31.6	-13.0	-18.6	

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

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LTE

Band 5
10MHz
QPSK

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

Company: Samsung
Project #: 15K19845
Date: 01-28-15
Test Engineer: Steven.Kim
Configuration: EUT / AC Adapter / Earphone, X Position
Mode: TX, LTE BAND 5, 10MHz BW,QPSK

Chamber	Pre-amplifer	Filter	Limit
Chamber 1	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 Channel (829MHz)									
1.658	-14.3	V	3.0	40.2	1.0	-53.5	-13.0	-40.5	
2.487	-11.7	V	3.0	40.1	1.0	-50.7	-13.0	-37.7	
3.316	-14.4	V	3.0	39.6	1.0	-53.0	-13.0	-40.0	
1.658	-13.1	H	3.0	40.2	1.0	-52.3	-13.0	-39.3	
2.487	-11.7	H	3.0	40.1	1.0	-50.8	-13.0	-37.8	
3.316	-13.5	H	3.0	39.6	1.0	-52.1	-13.0	-39.1	
Mid Channel (836.5MHz)									
1.673	-13.7	V	3.0	40.2	1.0	-52.9	-13.0	-39.9	
2.509	-11.5	V	3.0	40.1	1.0	-50.5	-13.0	-37.5	
3.346	-14.1	V	3.0	39.6	1.0	-52.7	-13.0	-39.7	
1.673	-13.7	H	3.0	40.2	1.0	-52.9	-13.0	-39.9	
2.509	-12.0	H	3.0	40.1	1.0	-51.0	-13.0	-38.0	
3.346	-14.5	H	3.0	39.6	1.0	-53.0	-13.0	-40.0	
High Channel (844MHz)									
1.688	-14.5	V	3.0	40.2	1.0	-53.7	-13.0	-40.7	
2.532	-12.5	V	3.0	40.1	1.0	-51.6	-13.0	-38.6	
3.376	-12.8	V	3.0	39.5	1.0	-51.4	-13.0	-38.4	
1.688	-12.7	H	3.0	40.2	1.0	-51.9	-13.0	-38.9	
2.532	-12.4	H	3.0	40.1	1.0	-51.5	-13.0	-38.5	
3.376	-12.5	H	3.0	39.5	1.0	-51.0	-13.0	-38.0	

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

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LTE

Band 5
10MHz
16QAM

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

Company: Samsung
Project #: 15K19845
Date: 01-28-15
Test Engineer: Steven.Kim
Configuration: EUT / AC Adapter / Earphone, X Position
Mode: TX, LTE BAND 5, 10MHz BW,16QAM

Chamber	Pre-amplifer	Filter	Limit
Chamber 1	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 Channel (829MHz)									
1.658	-13.0	V	3.0	40.2	1.0	-52.2	-13.0	-39.2	
2.487	-10.4	V	3.0	40.1	1.0	-49.4	-13.0	-36.4	
3.316	-13.7	V	3.0	39.6	1.0	-52.3	-13.0	-39.3	
1.658	-12.7	H	3.0	40.2	1.0	-51.9	-13.0	-38.9	
2.487	-11.7	H	3.0	40.1	1.0	-50.8	-13.0	-37.8	
3.316	-13.7	H	3.0	39.6	1.0	-52.3	-13.0	-39.3	
Mid Channel (836.5MHz)									
1.673	-13.3	V	3.0	40.2	1.0	-52.5	-13.0	-39.5	
2.509	-10.4	V	3.0	40.1	1.0	-49.4	-13.0	-36.4	
3.346	-13.6	V	3.0	39.6	1.0	-52.1	-13.0	-39.1	
1.673	-10.7	H	3.0	40.2	1.0	-49.9	-13.0	-36.9	
2.509	-11.4	H	3.0	40.1	1.0	-50.4	-13.0	-37.4	
3.346	-13.7	H	3.0	39.6	1.0	-52.3	-13.0	-39.3	
High Channel (844MHz)									
1.688	-13.9	V	3.0	40.2	1.0	-53.1	-13.0	-40.1	
2.532	-11.4	V	3.0	40.1	1.0	-50.4	-13.0	-37.4	
3.376	-12.2	V	3.0	39.5	1.0	-50.7	-13.0	-37.7	
1.688	-12.7	H	3.0	40.2	1.0	-51.9	-13.0	-38.9	
2.532	-12.2	H	3.0	40.1	1.0	-51.3	-13.0	-38.3	
3.376	-12.3	H	3.0	39.5	1.0	-50.9	-13.0	-37.9	

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 #: 15K19845
Date: 01-28-15
Test Engineer: Steven.Kim
Configuration: EUT / AC Adapter / Earphone, X Position
Mode: TX, LTE BAND 5, 5MHz BW,QPSK

Chamber	Pre-amplifer	Filter	Limit
Chamber 1	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 Channel (826.5MHz)									
1.653	-15.4	V	3.0	40.2	1.0	-54.6	-13.0	-41.6	
2.479	-12.7	V	3.0	40.1	1.0	-51.8	-13.0	-38.8	
3.306	-15.4	V	3.0	39.6	1.0	-54.0	-13.0	-41.0	
1.653	-14.7	H	3.0	40.2	1.0	-53.8	-13.0	-40.8	
2.479	-13.3	H	3.0	40.1	1.0	-52.4	-13.0	-39.4	
3.306	-15.6	H	3.0	39.6	1.0	-54.2	-13.0	-41.2	
Mid Channel (836.5MHz)									
1.673	-11.4	V	3.0	40.2	1.0	-50.6	-13.0	-37.6	
2.509	-12.2	V	3.0	40.1	1.0	-51.2	-13.0	-38.2	
3.346	-15.0	V	3.0	39.6	1.0	-53.6	-13.0	-40.6	
1.673	-14.7	H	3.0	40.2	1.0	-53.9	-13.0	-40.9	
2.509	-13.3	H	3.0	40.1	1.0	-52.4	-13.0	-39.4	
3.346	-15.1	H	3.0	39.6	1.0	-53.7	-13.0	-40.7	
High Channel (846.5MHz)									
1.693	-11.7	V	3.0	40.2	1.0	-50.9	-13.0	-37.9	
2.539	-12.8	V	3.0	40.1	1.0	-51.8	-13.0	-38.8	
3.386	-13.9	V	3.0	39.5	1.0	-52.4	-13.0	-39.4	
1.693	-9.4	H	3.0	40.2	1.0	-48.6	-13.0	-35.6	
2.539	-14.0	H	3.0	40.1	1.0	-53.1	-13.0	-40.1	
3.386	-13.8	H	3.0	39.5	1.0	-52.3	-13.0	-39.3	

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

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LTE

Band 5
5MHz
16QAM

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

Company: Samsung
Project #: 15K19845
Date: 01-28-15
Test Engineer: Steven.Kim
Configuration: EUT / AC Adapter / Earphone, X Position
Mode: TX, LTE BAND 5, 5MHz BW,16QAM

Chamber	Pre-amplifer	Filter	Limit
Chamber 1	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 Channel (826.5MHz)									
1.653	-15.0	V	3.0	40.2	1.0	-54.2	-13.0	-41.2	
2.479	-12.8	V	3.0	40.1	1.0	-51.9	-13.0	-38.9	
3.306	-14.9	V	3.0	39.6	1.0	-53.5	-13.0	-40.5	
1.653	-12.8	H	3.0	40.2	1.0	-52.0	-13.0	-39.0	
2.479	-13.6	H	3.0	40.1	1.0	-52.7	-13.0	-39.7	
3.306	-15.6	H	3.0	39.6	1.0	-54.2	-13.0	-41.2	
Mid Channel (836.5MHz)									
1.673	-13.8	V	3.0	40.2	1.0	-53.0	-13.0	-40.0	
2.509	-11.8	V	3.0	40.1	1.0	-50.9	-13.0	-37.9	
3.346	-15.2	V	3.0	39.6	1.0	-53.8	-13.0	-40.8	
1.673	-8.3	H	3.0	40.2	1.0	-47.5	-13.0	-34.5	
2.509	-12.8	H	3.0	40.1	1.0	-51.8	-13.0	-38.8	
3.346	-15.5	H	3.0	39.6	1.0	-54.0	-13.0	-41.0	
High Channel (846.5MHz)									
1.693	-13.6	V	3.0	40.2	1.0	-52.8	-13.0	-39.8	
2.539	-13.1	V	3.0	40.1	1.0	-52.2	-13.0	-39.2	
3.386	-13.6	V	3.0	39.5	1.0	-52.1	-13.0	-39.1	
1.693	-11.7	H	3.0	40.2	1.0	-50.8	-13.0	-37.8	
2.539	-13.6	H	3.0	40.1	1.0	-52.7	-13.0	-39.7	
3.386	-14.1	H	3.0	39.5	1.0	-52.6	-13.0	-39.6	

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 #: 15K19845
Date: 01-28-15
Test Engineer: Steven.Kim
Configuration: EUT / AC Adapter / Earphone, X Position
Mode: TX, LTE BAND 5, 3MHz BW,QPSK

Chamber	Pre-amplifer	Filter	Limit
Chamber 1	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 Channel (825.5MHz)									
1.651	-16.0	V	3.0	40.2	1.0	-55.1	-13.0	-42.1	
2.468	-15.4	V	3.0	40.1	1.0	-54.5	-13.0	-41.5	
3.302	-17.4	V	3.0	39.6	1.0	-56.1	-13.0	-43.1	
1.651	-12.4	H	3.0	40.2	1.0	-51.6	-13.0	-38.6	
2.468	-15.9	H	3.0	40.1	1.0	-54.9	-13.0	-41.9	
3.302	-17.4	H	3.0	39.6	1.0	-56.0	-13.0	-43.0	
Mid Channel (836.5MHz)									
1.673	-12.9	V	3.0	40.2	1.0	-52.1	-13.0	-39.1	
2.509	-14.6	V	3.0	40.1	1.0	-53.6	-13.0	-40.6	
3.346	-17.3	V	3.0	39.6	1.0	-55.9	-13.0	-42.9	
1.673	-8.2	H	3.0	40.2	1.0	-47.4	-13.0	-34.4	
2.509	-15.3	H	3.0	40.1	1.0	-54.4	-13.0	-41.4	
3.346	-18.0	H	3.0	39.6	1.0	-56.5	-13.0	-43.5	
High Channel (847.5MHz)									
1.695	-12.6	V	3.0	40.2	1.0	-51.8	-13.0	-38.8	
2.543	-15.7	V	3.0	40.1	1.0	-54.8	-13.0	-41.8	
3.390	-15.7	V	3.0	39.5	1.0	-54.3	-13.0	-41.3	
1.695	-10.0	H	3.0	40.2	1.0	-49.2	-13.0	-36.2	
2.543	-16.2	H	3.0	40.1	1.0	-55.3	-13.0	-42.3	
3.390	-16.0	H	3.0	39.5	1.0	-54.5	-13.0	-41.5	

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

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LTE

Band 5
3MHz
16QAM

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

Company: Samsung
Project #: 15K19845
Date: 01-28-15
Test Engineer: Steven.Kim
Configuration: EUT / AC Adapter / Earphone, X Position
Mode: TX, LTE BAND 5, 3MHz BW,16QAM

Chamber	Pre-amplifer	Filter	Limit
Chamber 1	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 Channel (825.5MHz)									
1.651	-16.8	V	3.0	40.2	1.0	-55.9	-13.0	-42.9	
2.468	-15.3	V	3.0	40.1	1.0	-54.4	-13.0	-41.4	
3.302	-17.9	V	3.0	39.6	1.0	-56.5	-13.0	-43.5	
1.651	-11.9	H	3.0	40.2	1.0	-51.1	-13.0	-38.1	
2.468	-16.0	H	3.0	40.1	1.0	-55.1	-13.0	-42.1	
3.302	-17.7	H	3.0	39.6	1.0	-56.3	-13.0	-43.3	
Mid Channel (836.5MHz)									
1.673	-13.7	V	3.0	40.2	1.0	-52.9	-13.0	-39.9	
2.509	-13.4	V	3.0	40.1	1.0	-52.4	-13.0	-39.4	
3.346	-16.8	V	3.0	39.6	1.0	-55.4	-13.0	-42.4	
1.673	-7.8	H	3.0	40.2	1.0	-47.0	-13.0	-34.0	
2.509	-15.0	H	3.0	40.1	1.0	-54.0	-13.0	-41.0	
3.346	-17.3	H	3.0	39.6	1.0	-55.8	-13.0	-42.8	
High Channel (847.5MHz)									
1.695	-13.3	V	3.0	40.2	1.0	-52.5	-13.0	-39.5	
2.543	-14.7	V	3.0	40.1	1.0	-53.8	-13.0	-40.8	
3.390	-15.4	V	3.0	39.5	1.0	-53.9	-13.0	-40.9	
1.695	-10.2	H	3.0	40.2	1.0	-49.4	-13.0	-36.4	
2.543	-15.6	H	3.0	40.1	1.0	-54.7	-13.0	-41.7	
3.390	-15.7	H	3.0	39.5	1.0	-54.2	-13.0	-41.2	

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 #: 15K19845
Date: 01-28-15
Test Engineer: Steven.Kim
Configuration: EUT / AC Adapter / Earphone, X Position
Mode: TX, LTE BAND 5, 1.4MHz BW,QPSK

Chamber	Pre-amplifer	Filter	Limit
Chamber 1	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 Channel (824.7MHz)									
1.649	-12.7	V	3.0	40.2	1.0	-51.9	-13.0	-38.9	
2.474	-17.4	V	3.0	40.1	1.0	-56.5	-13.0	-43.5	
3.299	-20.2	V	3.0	39.6	1.0	-58.8	-13.0	-45.8	
1.649	-10.1	H	3.0	40.2	1.0	-49.3	-13.0	-36.3	
2.474	-18.0	H	3.0	40.1	1.0	-57.1	-13.0	-44.1	
3.299	-20.4	H	3.0	39.6	1.0	-59.0	-13.0	-46.0	
Mid Channel (836.5MHz)									
1.673	-10.8	V	3.0	40.2	1.0	-50.0	-13.0	-37.0	
2.509	-16.9	V	3.0	40.1	1.0	-56.0	-13.0	-43.0	
3.346	-19.9	V	3.0	39.6	1.0	-58.5	-13.0	-45.5	
1.673	-5.4	H	3.0	40.2	1.0	-44.6	-13.0	-31.6	
2.509	-17.3	H	3.0	40.1	1.0	-56.4	-13.0	-43.4	
3.346	-20.0	H	3.0	39.6	1.0	-58.5	-13.0	-45.5	
High Channel (844.3MHz)									
1.689	-16.4	V	3.0	40.2	1.0	-55.6	-13.0	-42.6	
2.533	-17.9	V	3.0	40.1	1.0	-57.0	-13.0	-44.0	
3.377	-19.9	V	3.0	39.5	1.0	-58.4	-13.0	-45.4	
1.689	-12.2	H	3.0	40.2	1.0	-51.4	-13.0	-38.4	
2.533	-18.6	H	3.0	40.1	1.0	-57.6	-13.0	-44.6	
3.377	-19.7	H	3.0	39.5	1.0	-58.2	-13.0	-45.2	

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

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LTE

Band 5
1.4MHz
16QAM

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

Company: Samsung
Project #: 15K19845
Date: 01-28-15
Test Engineer: Steven.Kim
Configuration: EUT / AC Adapter / Earphone, X Position
Mode: TX, LTE BAND 5, 1.4MHz BW,16QAM

Chamber	Pre-amplifer	Filter	Limit
Chamber 1	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 Channel (824.7MHz)									
1.649	-26.6	V	3.0	40.2	1.0	-65.8	-13.0	-52.8	
2.474	-28.2	V	3.0	40.1	1.0	-67.3	-13.0	-54.3	
3.299	-26.1	V	3.0	39.6	1.0	-64.7	-13.0	-51.7	
1.649	-20.5	H	3.0	40.2	1.0	-59.7	-13.0	-46.7	
2.474	-29.7	H	3.0	40.1	1.0	-68.7	-13.0	-55.7	
3.299	-26.9	H	3.0	39.6	1.0	-65.5	-13.0	-52.5	
Mid Channel (836.5MHz)									
1.673	-22.4	V	3.0	40.2	1.0	-61.5	-13.0	-48.5	
2.509	-27.3	V	3.0	40.1	1.0	-66.3	-13.0	-53.3	
3.346	-25.6	V	3.0	39.6	1.0	-64.2	-13.0	-51.2	
1.673	-19.4	H	3.0	40.2	1.0	-58.6	-13.0	-45.6	
2.509	-29.3	H	3.0	40.1	1.0	-68.4	-13.0	-55.4	
3.346	-26.9	H	3.0	39.6	1.0	-65.4	-13.0	-52.4	
High Channel (844.3MHz)									
1.689	-28.7	V	3.0	40.2	1.0	-67.9	-13.0	-54.9	
2.533	-27.9	V	3.0	40.1	1.0	-67.0	-13.0	-54.0	
3.377	-27.3	V	3.0	39.5	1.0	-65.8	-13.0	-52.8	
1.689	-27.9	H	3.0	40.2	1.0	-67.0	-13.0	-54.0	
2.533	-29.2	H	3.0	40.1	1.0	-68.2	-13.0	-55.2	
3.377	-25.8	H	3.0	39.5	1.0	-64.3	-13.0	-51.3	

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

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