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

CERTIFICATION TEST REPORT

FOR

GSM/WCDMA/LTE Phone + Bluetooth, WLAN 2.4GHz b/g/n & NFC

MODEL NUMBER: SM-G530M

FCC ID: A3LSMG530M

REPORT NUMBER: 14I18800-E1

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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, WLAN 2.4GHz b/g/n & NFC
MODEL:	SM-G530M
SERIAL NUMBER:	1935734(Radiated) & 1935735(Conducted)
DATE TESTED:	SEP 10 -18, 2014

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

UL Verification Services Inc. 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 Verification Services Inc. 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 Verification Services Inc. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL Verification Services Inc. 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 NVLAP, NIST, any agency of the Federal Government, or any agency of any government.

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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, and FCC CFR Part 24

3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 47173 and 47266 Benicia Street, Fremont, California, USA. Line conducted emissions are measured only at the 47173 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.

47173 Benicia Street	47266 Benicia Street
☐ Chamber A	☐ Chamber D
☒ Chamber B	☐ Chamber E
☒ Chamber C	☐ Chamber F

UL Verification Services Inc. is accredited by NVLAP, Laboratory Code 200065-0. The full scope of accreditation can be viewed at http://ts.nist.gov/standards/scopes/2000650.htm.

4. CALIBRATION AND UNCERTAINTY

4.1. MEASURING INSTRUMENT CALIBRATION

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

4.2. SAMPLE CALCULATION

Where relevant, the following sample calculation is provided:

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

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

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

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4.3. MEASUREMENT UNCERTAINTY

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

PARAMETER	UNCERTAINTY
Conducted Disturbance, 0.15 to 30 MHz	3.52 dB
Radiated Disturbance, 30 to 27000 MHz	4.94 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, WLAN 2.4GHz b/g/n & NFC

5.2. MAXIMUM OUTPUT POWER

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

FCC Part 22/2 4/27						
Band	Frequency Range(MHz)	Modulation mW	Conducted		Radiated	
			AVG dBm)	AVG (mW)	AVG (dBm)	AVG (mW)
GSM850	824~849	GMSK	33	1995.26		
	824~849	GPRS	33	1995.26	29.62	915.59
	824~849	EGPRS	26.7	467.74	24.01	251.88
GSM1900	1850~1910	GMSK	29.8	954.99		
	1850~1910	GPRS	29.8	954.99	27.54	567.94
	1850~1910	EGPRS	26.5	446.68	27.13	515.94
Band 5	824~849	REL99	22.8	190.55	20.33	107.92
	824~849	HSDPA	21.7	147.91	19.32	85.47
	824~849	HSUPA	21.7	147.91		
	824~849	DC-HSDPA	21.6	144.54		
Band 2	1850~1910	REL99	22.6	181.97	20.67	116.71
	1850~1910	HSDPA	21.7	147.91	20.28	106.56
	1850~1910	HSUPA	21.6	144.54		
	1850~1910	DS-HSDPA	21.7	147.91		

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5.3. MAXIMUM OUTPUT POWER (LTE)

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

FCC Part 22/2 4/27							
Band	Frequency Range(MHz)	BandWidth (MHz)	Modulation	Conducted		Radiated	
			mW	AVG	mW	AVG	Peak
LTE5	824~849	10MHz	QPSK	22.2	165.96	18.81	75.98
	824~849	10MHz	16QAM	21.3	134.90	18.02	63.34

FCC Part 22/2 4/27							
Band	Frequency Range(MHz)	BandWidth (MHz)	Modulation	Conducted		Radiated	
			mW	AVG	mW	AVG	Peak
LTE5	824~849	5MHz	QPSK	22.2	165.96	19.08	80.85
	824~849	5MHz	16QAM	21.7	147.91	17.95	62.33

FCC Part 22/2 4/27							
Band	Frequency Range(MHz)	BandWidth (MHz)	Modulation	Conducted		Radiated	
			mW	AVG	mW	AVG	Peak
LTE5	824~849	3MHz	QPSK	22.3	169.82	19.45	88.04
	824~849	3MHz	16QAM	21.4	138.04	18.59	72.23

FCC Part 22/2 4/27							
Band	Frequency Range(MHz)	BandWidth (MHz)	Modulation	Conducted		Radiated	
			mW	AVG	mW	AVG	Peak
LTE5	824~849	1.4MHz	QPSK	22.3	169.82	19.95	98.79
	824~849	1.4MHz	16QAM	21.4	138.04	18.77	75.28

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FCC Part 22/2 4/27							
Band	Frequency Range(MHz)	BandWidth (MHz)	Modulation	Conducted		Radiated	
			mW	AVG	mW	AVG	Peak
LTE2	1850~1910	20MHz	QPSK	22.8	190.55	22.85	192.75
	1850~1910	20MHz	16QAM	21.9	154.88	21.11	129.12

FCC Part 22/2 4/27							
Band	Frequency Range(MHz)	BandWidth (MHz)	Modulation	Conducted		Radiated	
			mW	AVG	mW	AVG	Peak
LTE2	1850~1910	15MHz	QPSK	22.8	190.55	22.2	165.96
	1850~1910	15MHz	16QAM	21.8	151.36	21.48	140.6

FCC Part 22/2 4/27							
Band	Frequency Range(MHz)	BandWidth (MHz)	Modulation	Conducted		Radiated	
			mW	AVG	mW	AVG	Peak
LTE2	1850~1910	10MHz	QPSK	22.8	190.55	22	158.49
	1850~1910	10MHz	16QAM	21.8	151.36	21.65	146.22

FCC Part 22/2 4/27							
Band	Frequency Range(MHz)	BandWidth (MHz)	Modulation	Conducted		Radiated	
			mW	AVG	mW	AVG	Peak
LTE2	1850~1910	5MHz	QPSK	22.9	194.98	22.97	198.15
	1850~1910	5MHz	16QAM	22.0	158.49	21.9	154.88

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5.4. 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)
Band 5, 824~849MHz	-2.16
Band 2, 1850~1910MHz	0.96

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5.5. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
AC Adapter	Samsung	SM-G530M	ETA0U83EWE	N/A
Headset	Samsung	SM-G530M	EHS61ASWE	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	None	NA
2	Antenna Port	1	EUT	Shielded	0.1m	NA
3	RF In/Out	1	Communication Test Set	Shielded	1m	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	Un-shielded	1.2m	No
2	Jack	1	Headset	Shielded	1m	No
3	RF In/out	1	Communication Test Set	Un-shielded	2m	Yes

TEST SETUP

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

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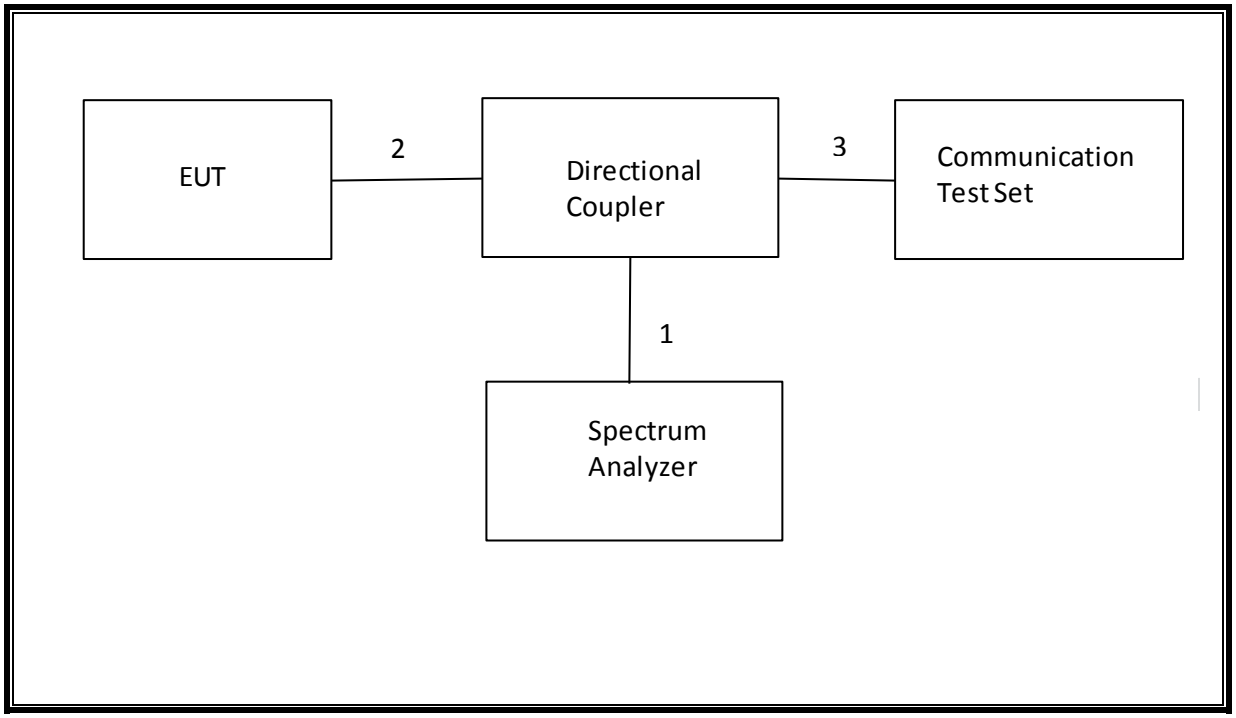
SETUP DIAGRAM FOR TESTS (CONDUCTED TEST SETUP)



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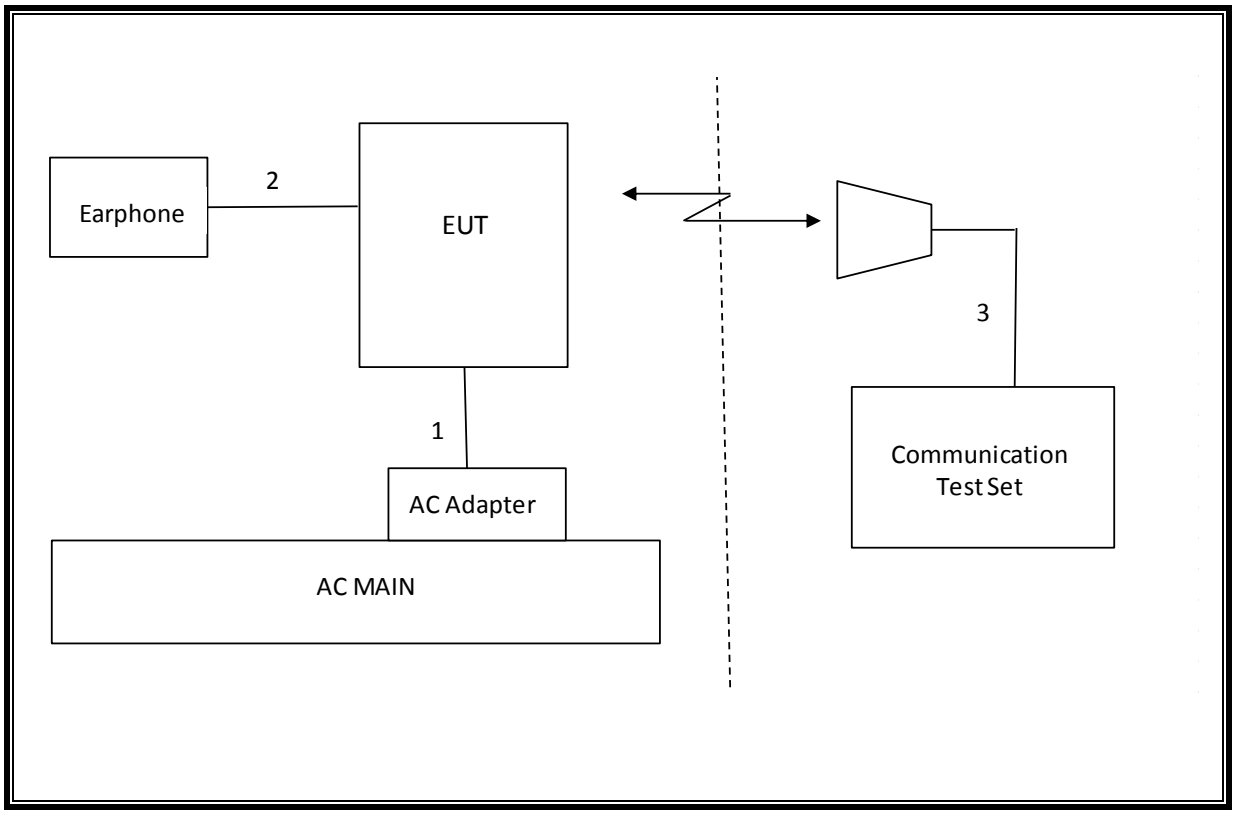
SETUP DIAGRAM FOR TESTS (RADIATED TEST SETUP)



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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**	**Asset**	**Cal Due**
Spectrum Analyzer, 44 GHz	Agilent / HP	E4446A	C01179	02/26/15
Antenna, Bilog, 2 GHz	Sunol Sciences	JB1	A012712	03/04/15
Antenna, Horn, 18 GHz	EMCO	3115	C00783	10/25/14
Antenna, Horn, 18 GHz	EMCO	3115	C00784	10/25/14
Highpass Filter, 2.7 GHz	Micro-Tronics	HPM13194	N02687	CNR
Highpass Filter, 1.5 GHz	Micro-Tronics	HPM13193	N02688	CNR
Temperature / Humidity Chamber	Thermotron	SE 600-10-10	C00930	01/09/15
Communications Test Set	R&S	CMW500	135385	07/10/15
DC power supply, 8 V @ 3 A or 15 V	Agilent / HP	E3610A	None	CNR
Antenna, Tuned Dipole 400~1000	ETS	3121C DB4	1629	01/23/15
Directional Coupler	RF-Lambda	RFDC5M06G15	None	CNR
Antenna, Horn, 26.5 GHz	ARA	MWH-1826/B	C00589	12/17/14

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7. Summary Table

FCC Part Section	RSS Section(s)	Test Description	Test Limit	Test Condition	Test Result	Note
2.1049	N/A	Occupied Band width (99%)	N/A	Conducted	Pass	17.856 MHz
22.917(a) 24.238(a)	RSS-132(4.5.1) RSS-133(6.5.1)	Band Edge / Conducted Spurious Emission	-13dBm		Pass	-17.22 dBm
2.1046	N/A	Conducted output power	N/A		Pass	33 dBm
22.355 24.235	RSS-132(4.3) RSS-133(6.3)	Frequency Stability	2.5PPM		Pass	0.05 PPM
22.913(a)(2)	RSS-132(4.4)	Effective Radiated Power	38 dBm	Radiated	Pass	29.62 dBm
24.232(c)	RSS-133(6.4)	Equivalent Isotropic Radiated Power	33dBm		Pass	27.54 dBm
22.917(a) 24.238(a)	RSS-132(4.5.1) RSS-133(6.5.1)	Radiated Spurious Emission	-13dBm		Pass	-29.5 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

Mode	Coding Scheme	Time Slots	Ch No.	Freq. (MHz)	Burst Pwr (dBm)	Frame Pwr (dBm)
GSM (Voice)	CS1	1	128	824.2	33.0	24.0
			190	836.6	33.0	24.0
			251	848.8	33.0	24.0
GPRS (GMSK)	CS1	1	128	824.2	33.0	24.0
			190	836.6	33.0	24.0
			251	848.8	33.0	24.0
		2	128	824.2	28.2	22.2
			190	836.6	28.2	22.2
			251	848.8	28.3	22.3
		3	128	824.2	27.0	22.7
			190	836.6	27.0	22.7
			251	848.8	27.0	22.7
		4	128	824.2	25.5	22.5
			190	836.6	25.5	22.5
			251	848.8	25.4	22.4
EGPRS (8PSK)	MCS5	1	128	824.2	26.6	17.6
			190	836.6	26.7	17.7
			251	848.8	26.6	17.6
		2	128	824.2	25.1	19.1
			190	836.6	25.2	19.2
			251	848.8	25.1	19.1
		3	128	824.2	22.1	17.8
			190	836.6	22.2	17.9
			251	848.8	22.2	17.9
		4	128	824.2	22.0	19.0
			190	836.6	22.1	19.1
			251	848.8	22.1	19.1

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Mode	Coding Scheme	Time Slots	Ch No.	Freq. (MHz)	Burst Pwr (dBm)	Frame Pwr (dBm)
GSM (Voice)	CS1	1	512	1850.2	29.8	20.8
			661	1880.0	29.4	20.4
			810	1909.8	29.7	20.7
GPRS (GMSK)	CS1	1	512	1850.2	29.8	20.8
			661	1880.0	29.4	20.4
			810	1909.8	29.7	20.7
		2	512	1850.2	26.0	20.0
			661	1880.0	25.6	19.6
			810	1909.8	25.9	19.9
		3	512	1850.2	23.8	19.5
			661	1880.0	23.5	19.2
			810	1909.8	23.8	19.5
		4	512	1850.2	22.7	19.7
			661	1880.0	22.3	19.3
			810	1909.8	22.6	19.6
EGPRS (8PSK)	MCS5	1	512	1850.2	26.5	17.5
			661	1880.0	26.2	17.2
			810	1909.8	26.4	17.4
		2	512	1850.2	25.0	19.0
			661	1880.0	24.6	18.6
			810	1909.8	24.9	18.9
		3	512	1850.2	22.0	17.7
			661	1880.0	21.7	17.4
			810	1909.8	22.0	17.7
		4	512	1850.2	22.0	19.0
			661	1880.0	21.6	18.6
			810	1909.8	21.9	18.9

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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	Ch.	f(MHz)	Conducted Power (dBm)
				Avg (dBm)
Band 5	REL99	4132	826.4	22.8
		4183	836.6	22.8
		4233	846.6	22.7
Band 2	REL99	9262	1852.4	22.6
		9400	1880	22.4
		9538	1907.6	22.5

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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			

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8.3.1. UMTS HSDPA OUTPUT POWER RESULT

Band	Mode	UL Ch No.	Freq. (MHz)	MPR	Avg Pwr (dBm)
W-CDMA Band V	Subtest 1	4132	826.4	0	21.7
		4183	836.6	0	21.5
		4233	846.6	0	21.6
	Subtest 2	4132	826.4	0	21.5
		4183	836.6	0	21.5
		4233	846.6	0	21.6
	Subtest 3	4132	826.4	0.5	21.1
		4183	836.6	0.5	21.2
		4233	846.6	0.5	21.0
	Subtest 4	4132	826.4	0.5	21.1
		4183	836.6	0.5	21.1
		4233	846.6	0.5	21.1

Band	Mode	UL Ch No.	Freq. (MHz)	MPR	Avg Pwr (dBm)
W-CDMA Band II	Subtest 1	9262	1852.4	0	21.6
		9400	1880.0	0	21.3
		9538	1907.6	0	21.7
	Subtest 2	9262	1852.4	0	21.6
		9400	1880.0	0	21.4
		9538	1907.6	0	21.6
	Subtest 3	9262	1852.4	0.5	21.2
		9400	1880.0	0.5	20.9
		9538	1907.6	0.5	21.0
	Subtest 4	9262	1852.4	0.5	21.2
		9400	1880.0	0.5	20.9
		9538	1907.6	0.5	21.0

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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	Avg Pwr (dBm)
W-CDMA Band V	Subtest 1	4132	826.4	0	21.7
		4183	836.6	0	21.6
		4233	846.6	0	21.4
	Subtest 2	4132	826.4	2	20.3
		4183	836.6	2	20.1
		4233	846.6	2	20.5
	Subtest 3	4132	826.4	1	20.3
		4183	836.6	1	20.3
		4233	846.6	1	20.3
	Subtest 4	4132	826.4	2	20.5
		4183	836.6	2	20.4
		4233	846.6	2	20.5
	Subtest 5	4132	826.4	0	21.7
		4183	836.6	0	21.7
		4233	846.6	0	21.7

Band	Mode	UL Ch No.	Freq. (MHz)	MPR	Avg Pwr (dBm)
W-CDMA Band II	Subtest 1	9262	1852.4	0	21.4
		9400	1880.0	0	21.2
		9538	1907.6	0	21.4
	Subtest 2	9262	1852.4	2	20.0
		9400	1880.0	2	19.8
		9538	1907.6	2	20.4
	Subtest 3	9262	1852.4	1	20.5
		9400	1880.0	1	20.1
		9538	1907.6	1	20.4
	Subtest 4	9262	1852.4	2	20.5
		9400	1880.0	2	20.1
		9538	1907.6	2	20.5
	Subtest 5	9262	1852.4	0	21.6
		9400	1880.0	0	21.4
		9538	1907.6	0	21.6

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8.5. DC-HSDPA

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

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

Table E.5.0: Levels for HSDPA connection setup

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

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

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

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

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

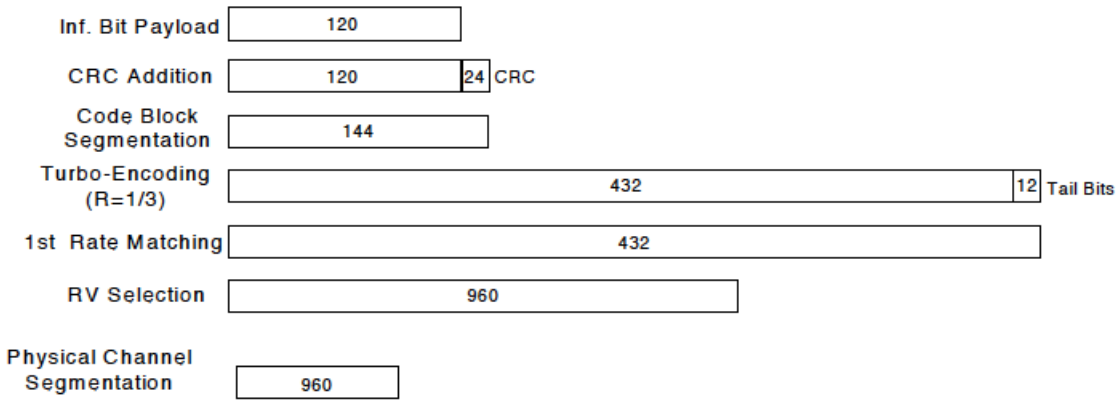

Figure C.8.19: Coding rate for Fixed reference Channel H-Set 12 (QPSK)

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The following 4 Sub-tests for HSDPA were completed according to Release 6 procedures in section 5.2 of 3GPP TS34.121. A summary of subtest settings are illustrated below:

	Mode	Rel6 HSDPA	Rel6 HSDPA	Rel6 HSDPA	Rel6 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	Algorithm2			
	βc	2/15	12/15	15/15	15/15
	βd	15/15	15/15	8/15	4/15
	βd (SF)	64			
	βc/βd	2/15	12/15	15/8	15/4
	βhs	4/15	24/15	30/15	30/15
	MPR	0	0	0.5	0.5
HSDPA Specific Settings	DACK	8			
	DNAK	8			
	DCQI	8			
	Ack-Nack Repetition factor	3			
	CQI Feedback	4ms			
	CQI Repetition Factor	2			
	Ahs = βhs/ βc	30/15			

Up commands are set continuously to set the UE to Max power.

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8.5.1. UMTS DC-HSDPA OUTPUT POWER RESULT

Band	Mode	UL Ch No.	Freq. (MHz)	MPR	Avg Pwr (dBm)
W-CDMA Band V	Subtest 1	4132	826.4	0	21.6
		4183	836.6	0	21.5
		4233	846.6	0	21.6
	Subtest 2	4132	826.4	0	21.5
		4183	836.6	0	21.5
		4233	846.6	0	21.6
	Subtest 3	4132	826.4	0.5	21.1
		4183	836.6	0.5	21.2
		4233	846.6	0.5	21.0
	Subtest 4	4132	826.4	0.5	21.1
		4183	836.6	0.5	21.1
		4233	846.6	0.5	21.1

Band	Mode	UL Ch No.	Freq. (MHz)	MPR	Avg Pwr (dBm)
W-CDMA Band II	Subtest 1	9262	1852.4	0	21.6
		9400	1880.0	0	21.3
		9538	1907.6	0	21.7
	Subtest 2	9262	1852.4	0	21.6
		9400	1880.0	0	21.4
		9538	1907.6	0	21.6
	Subtest 3	9262	1852.4	0.5	21.2
		9400	1880.0	0.5	20.9
		9538	1907.6	0.5	21.0
	Subtest 4	9262	1852.4	0.5	21.2
		9400	1880.0	0.5	20.9
		9538	1907.6	0.5	21.0

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8.6. LTE OUTPUT VERIFICATION

8.6.1. LTE OUTPUT RESULT

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Avg Pwr (dBm)		
						18700	18900	19100
						1860 MHz	1880 MHz	1900 MHz
LTE Band 2	20	QPSK	1	0	0	22.82	22.71	22.67
			1	49	0	22.75	22.59	22.52
			1	99	0	22.66	22.64	22.58
			50	0	1	21.65	21.44	21.46
			50	24	1	21.60	21.39	21.46
			50	50	1	21.55	21.34	21.46
			100	0	1	21.63	21.45	21.47
		16QAM	1	0	1	21.93	21.83	21.82
			1	49	1	21.86	21.70	21.74
			1	99	1	21.77	21.71	21.77
			50	0	2	20.67	20.51	20.39
			50	24	2	20.61	20.46	20.40
			50	50	2	20.60	20.39	20.48
			100	0	2	20.66	20.49	20.45
Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Avg Pwr (dBm)		
						18675	18900	19125
						1857.5 MHz	1880 MHz	1902.5 MHz
LTE Band 2	15	QPSK	1	0	0	22.78	22.61	22.59
			1	37	0	22.62	22.54	22.52
			1	74	0	22.63	22.57	22.55
			36	0	1	21.67	21.44	21.50
			36	20	1	21.59	21.41	21.51
			36	39	1	21.58	21.43	21.48
			75	0	1	21.58	21.39	21.46
		16QAM	1	0	1	21.47	21.83	21.61
			1	37	1	21.28	21.75	21.60
			1	74	1	21.29	21.76	21.55
			36	0	2	20.72	20.53	20.47
			36	20	2	20.64	20.52	20.47
			36	39	2	20.64	20.52	20.44
			75	0	2	20.65	20.47	20.45

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Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Avg Pwr (dBm)		
						18650	18900	19150
						1855 MHz	1880 MHz	1905 MHz
LTE Band 2	10	QPSK	1	0	0	22.84	22.59	22.53
			1	25	0	22.72	22.57	22.57
			1	49	0	22.72	22.46	22.66
			25	0	1	21.76	21.48	21.50
			25	12	1	21.69	21.44	21.50
			25	25	1	21.66	21.46	21.59
			50	0	1	21.66	21.38	21.56
		16QAM	1	0	1	21.52	21.82	21.16
			1	25	1	21.35	21.76	21.17
			1	49	1	21.34	21.71	21.25
			25	0	2	20.80	20.54	20.59
			25	12	2	20.75	20.56	20.61
			25	25	2	20.69	20.55	20.66
			50	0	2	20.66	20.44	20.60

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Avg Pwr (dBm)		
						18625	18900	19175
						1852.5 MHz	1880 MHz	1907.5 MHz
LTE Band 2	5	QPSK	1	0	0	22.85	22.69	22.63
			1	12	0	22.78	22.67	22.61
			1	24	0	22.72	22.57	22.68
			12	0	1	21.84	21.57	21.67
			12	7	1	21.80	21.52	21.72
			12	13	1	21.77	21.56	21.70
			25	0	1	21.75	21.47	21.61
		16QAM	1	0	1	21.43	21.68	21.95
			1	12	1	21.37	21.69	21.95
			1	24	1	21.31	21.55	21.92
			12	0	2	20.85	20.64	20.67
			12	7	2	20.79	20.65	20.68
			12	13	2	20.79	20.63	20.66
			25	0	2	20.85	20.52	20.56

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Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Avg Pwr (dBm)		
						20450	20525	20600
						829 MHz	836.5 MHz	844 MHz
LTE Band 5	10	QPSK	1	0	0	22.02	22.08	22.15
			1	24	0	22.05	22.08	22.11
			1	49	0	22.03	22.14	22.17
			25	0	1	21.21	21.12	21.16
			25	12	1	21.12	21.10	21.07
			25	24	1	21.09	21.04	21.13
			50	0	1	21.09	21.01	21.01
		16QAM	1	0	1	21.00	21.32	21.00
			1	24	1	21.00	21.34	21.00
			1	49	1	21.00	21.42	21.00
			25	0	2	20.30	20.28	20.40
			25	12	2	20.21	20.27	20.29
			25	24	2	20.20	20.24	20.31
			50	0	2	20.17	20.16	20.25

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Avg Pwr (dBm)		
						20425	20525	20625
						826.5 MHz	836.5 MHz	846.5 MHz
LTE Band 5	5	QPSK	1	0	0	22.09	22.20	22.15
			1	12	0	22.12	22.19	22.19
			1	24	0	22.12	22.15	22.25
			12	0	1	21.26	21.23	21.19
			12	6	1	21.19	21.21	21.20
			12	11	1	21.24	21.17	21.24
			25	0	1	21.13	21.12	21.15
		16QAM	1	0	1	21.00	21.39	21.53
			1	12	1	21.00	21.39	21.61
			1	24	1	21.00	21.36	21.65
			12	0	2	20.29	20.43	20.33
			12	6	2	20.22	20.41	20.34
			12	11	2	20.33	20.38	20.36
			25	0	2	20.25	20.30	20.21

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Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Avg Pwr (dBm)		
						20415	20525	20635
						825.5 MHz	836.5 MHz	847.5 MHz
LTE Band 5	3	QPSK	1	0	0	22.07	22.26	22.17
			1	7	0	22.01	22.16	22.14
			1	14	0	22.05	22.14	22.22
			6	0	1	21.31	21.25	21.25
			6	3	1	21.29	21.23	21.28
			6	5	1	21.29	21.21	21.27
			15	0	1	21.22	21.18	21.30
		16QAM	1	0	1	21.00	21.44	21.00
			1	7	1	21.00	21.40	21.00
			1	14	1	21.00	21.40	21.00
			6	0	2	20.39	20.22	20.54
			6	3	2	20.37	20.19	20.56
			6	5	2	20.35	20.19	20.58
			15	0	2	20.35	20.42	20.35

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Avg Pwr (dBm)		
						20407	20525	20643
						824.7 MHz	836.5 MHz	848.3 MHz
LTE Band 5	1.4	QPSK	1	0	0	22.19	22.17	22.31
			1	2	0	22.11	22.12	22.24
			1	5	0	22.14	22.14	22.32
			3	0	0	22.17	22.20	22.30
			3	1	0	22.15	22.16	22.30
			3	2	0	22.15	22.15	22.29
			6	0	1	21.29	21.20	21.35
		16QAM	1	0	1	21.01	21.41	21.12
			1	2	1	21.00	21.42	21.08
			1	5	1	21.02	21.41	21.17
			3	0	1	21.28	21.23	21.33
			3	1	1	21.24	21.17	21.30
			3	2	1	21.24	21.15	21.32
			6	0	2	20.40	20.21	20.51

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9. PEAK TO AVERAGE RATIO

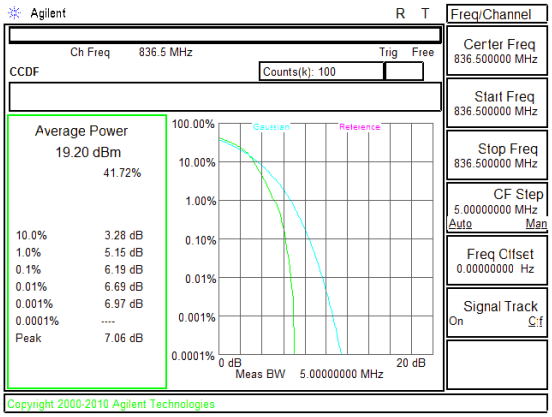
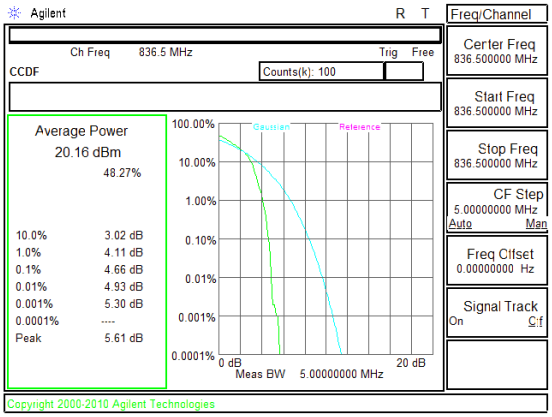
Test Procedure

Per KDB 971168 D01 Power Meas License Digital Systems v02r01

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

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

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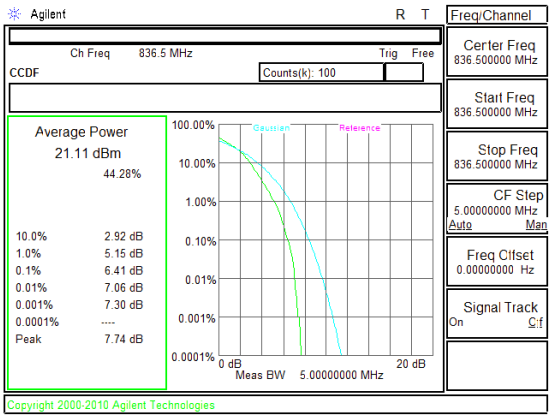
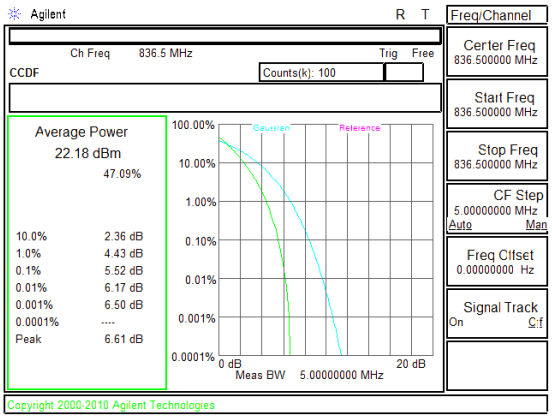
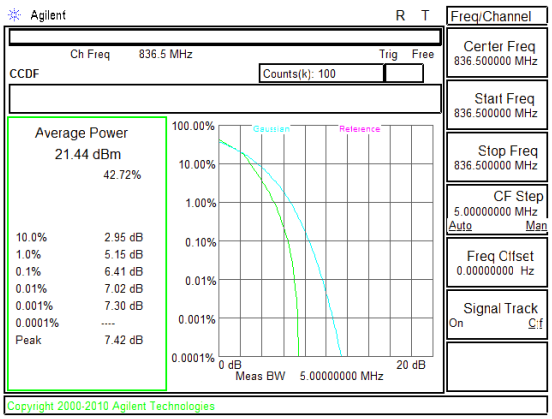
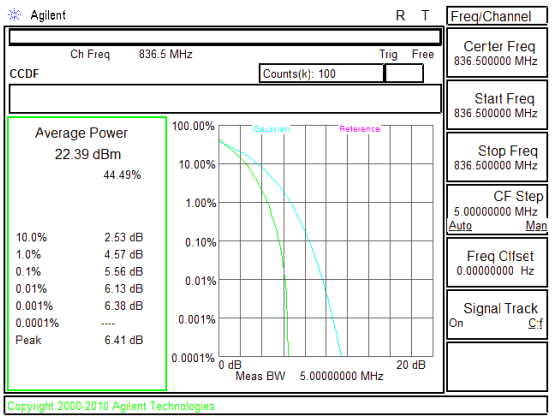
Band LTE5 5MHz 16QAM	 Band LTE5 5MHz 16QAM Mid channel	 Band LTE5 5MHz QPSK Mid channel

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

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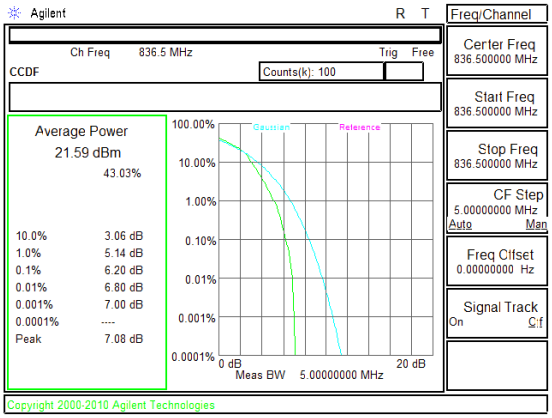
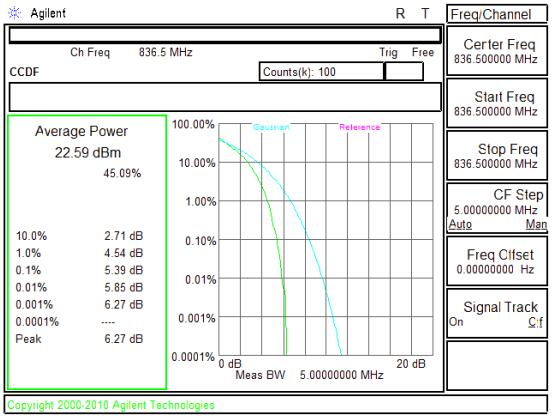
Band LTE5 1.4MHz 16QAM	 Band LTE5 1.4MHz 16QAM Mid channel	 Band LTE5 1.4MHz QPSK Mid channel

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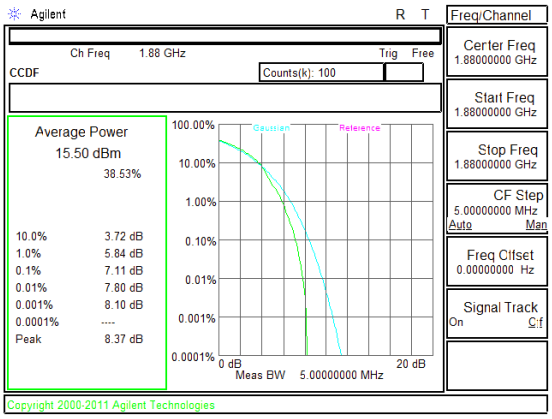
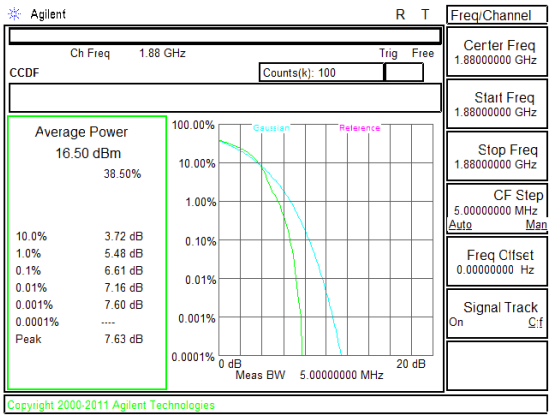
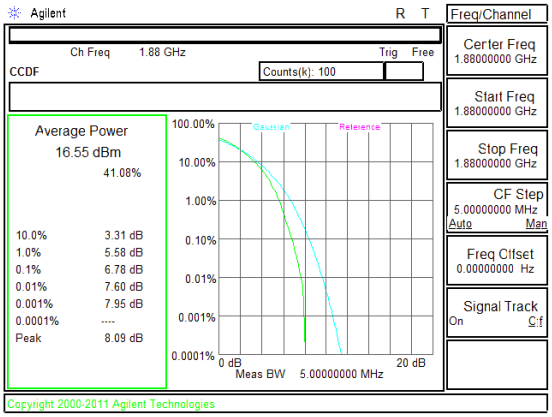
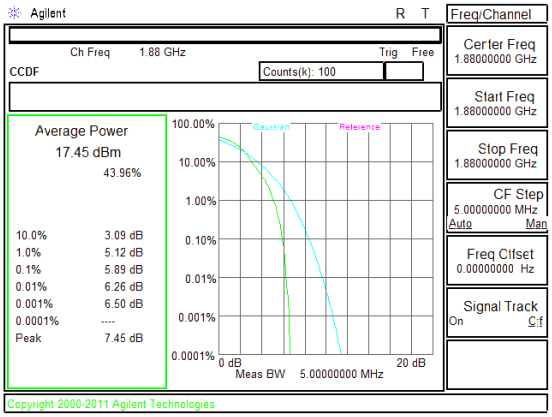
Band LTE2 20MHz 16QAM	 Band LTE2 20MHz 16QAM Mid channel	 Band LTE2 20MHz QPSK Mid channel

Band LTE2 15MHz 16QAM	 Band LTE2 15MHz 16QAM Mid channel	 Band LTE2 15MHz QPSK Mid channel

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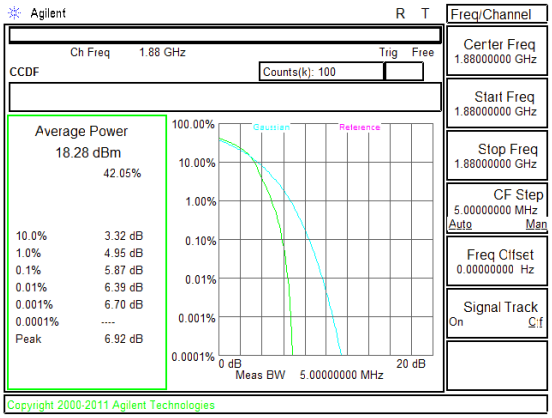
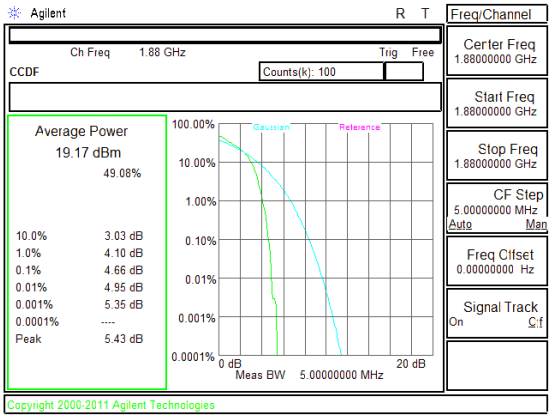
Band LTE2 10MHz 16QAM	 Band LTE2 10MHz 16QAM Mid channel	 Band LTE2 10MHz QPSK Mid channel

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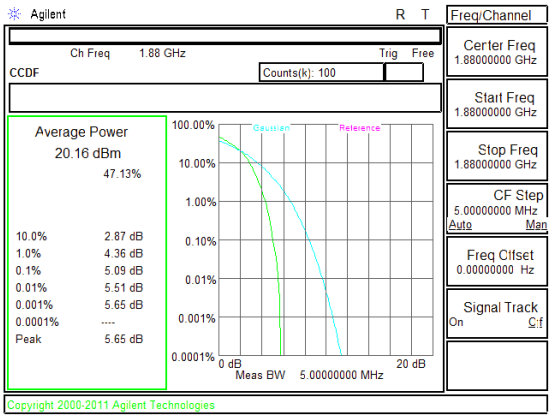
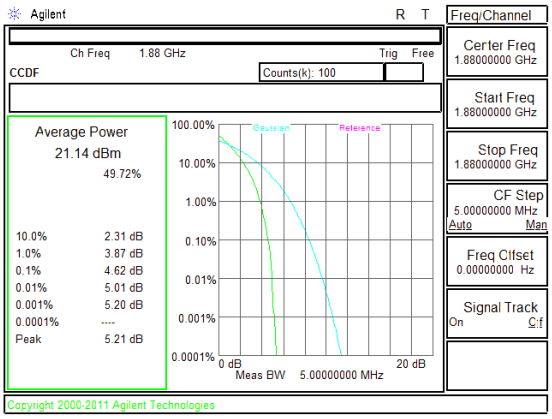
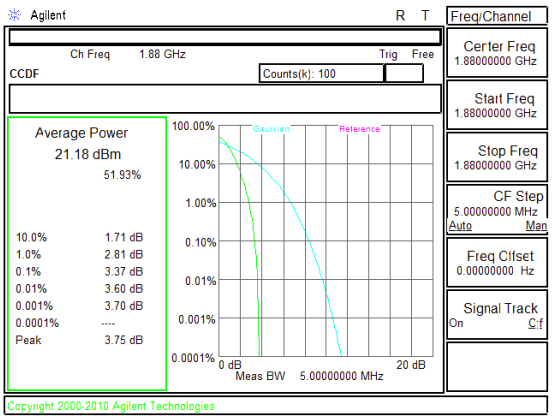
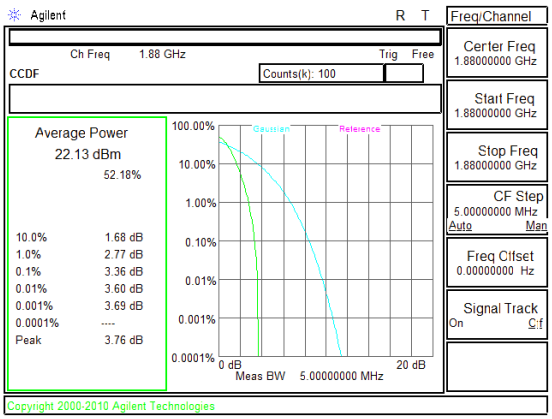
Band LTE2 5MHz 16QAM	 Band LTE2 5MHz 16QAM Mid channel	 Band LTE2 5MHz QPSK Mid channel

Band Band 2 HSDPA	 Band WCDMA B2 HSDPA	 Band WCDMA B2 REL99

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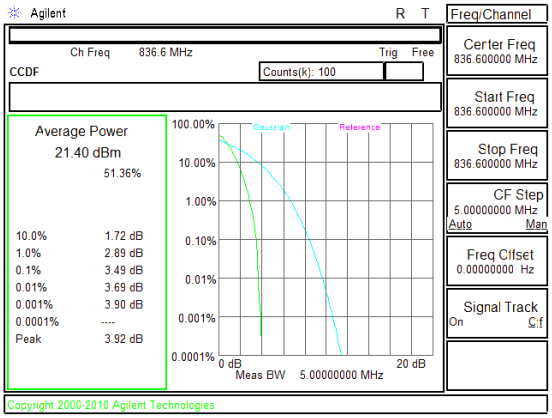
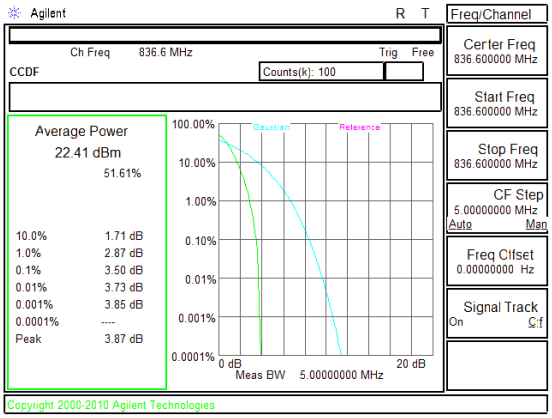
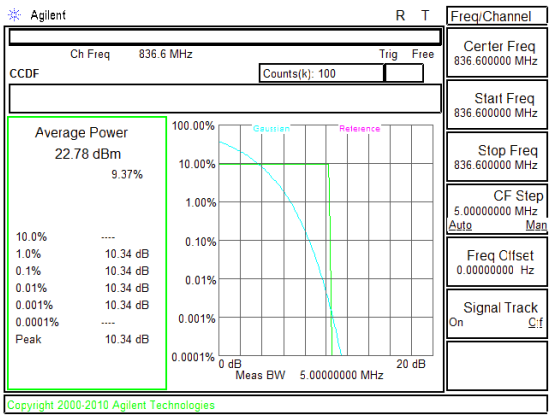
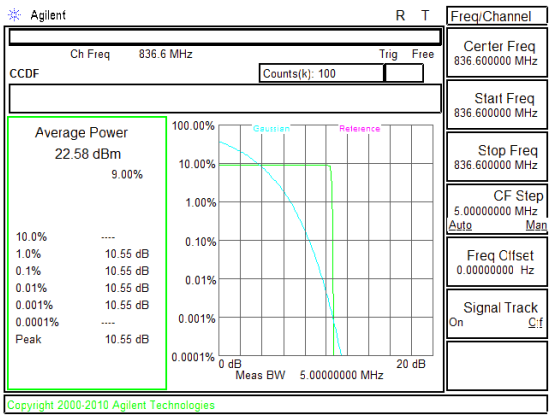
Band Band 5 HSDPA	 Band WCDMA B5 HSDPA	 Band WCDMA B5 REL99
Band GSM850	 GPRS	 EGPRS

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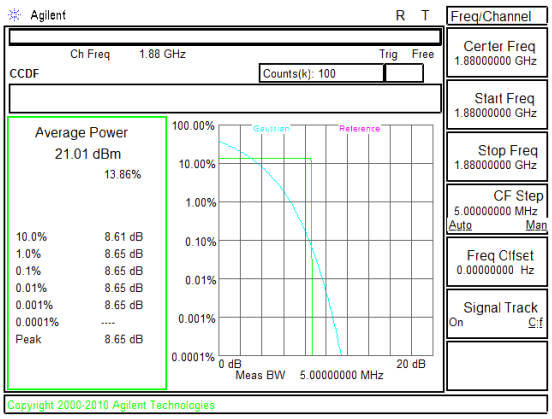
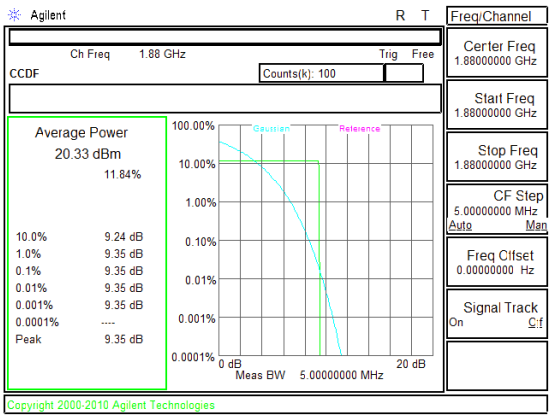
Band GSM1900	 GPRS	 EGPRS

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10. LIMITS AND CONDUCTED RESULTS

10.1. OCCUPIED BANDWIDTH

RULE PART(S)

FCC: §2.1049

IC: RSS-132, 4.5; RSS-133, 6.5

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 v02r01 - 06/07/2013)

MODES TESTED

GSM, WCDMA, LTE Band 5, LTE Band 2

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10.1.1. OCCUPIED BANDWIDTH RESULTS

Band	Mode	Channel	f (MHz)	99% BW (KHz)	-26dB BW (KHz)
GSM850	GPRS	128	824.2	244.07	322.58
		190	836.6	244.83	324.14
		251	848.8	245.2	323.92
	EGPRS	128	824.2	244.82	318.01
		190	836.6	243.94	320.21
		251	848.8	242.01	315.96
GSM1900	GPRS	512	1850.2	245.08	321.59
		661	1880	245.96	314.43
		810	1909.8	243.79	314.17
	EGPRS	512	1850.2	244.31	319.92
		661	1880	239.78	315.29
		810	1909.8	241.68	313.22

Band	Mode	Channel	f (MHz)	99% BW (MHz)	-26dB BW (MHz)
Band 5	REL99	4132	826.4	4.16	4.68
		4183	836.6	4.15	4.67
		4233	846.6	4.14	4.68
	HSDPA	4132	826.4	4.18	4.66
		4183	836.6	4.16	4.66
		4233	846.6	4.17	4.68
Band 2	REL99	9262	1852.4	4.17	4.69
		9400	1880	4.16	4.69
		9538	1907.6	4.15	4.7
	HSDPA	9262	1852.4	4.15	4.69
		9400	1880	4.15	4.68
		9538	1907.6	4.16	4.68

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10.1.2. LTE OCCUPIED BANDWIDTH RESULTS

Band	BW(MHz)	Mode	RB/RB Size	f (MHz)	99% BW (MHz)	-26dB BW (MHz)
LTE5	10	QPSK	50/0	829	8.98	10.02
			50/0	836.5	9.02	10.04
			50/0	844	9.03	10.05
		16QAM	50/0	829	8.99	9.92
			50/0	836.5	9.02	9.97
			50/0	844	9.00	10.03
Band	BW(MHz)	Mode	RB/RB Size	f (MHz)	99% BW (MHz)	-26dB BW (MHz)
LTE5	5	QPSK	25/0	826.5	4.51	5.01
			25/0	836.5	4.52	4.97
			25/0	846.5	4.51	4.99
		16QAM	25/0	826.5	4.52	4.99
			25/0	836.5	4.51	5.01
			25/0	846.5	4.52	5.01
Band	BW(MHz)	Mode	RB/RB Size	f (MHz)	99% BW (MHz)	-26dB BW (MHz)
LTE5	3	QPSK	15/0	825.5	2.7	2.95
			15/0	836.5	2.69	2.93
			15/0	847.5	2.69	2.94
		16QAM	15/0	825.5	2.69	2.94
			15/0	836.5	2.69	2.94
			15/0	847.5	2.69	2.93
Band	BW(MHz)	Mode	RB/RB Size	f (MHz)	99% BW (MHz)	-26dB BW (MHz)
LTE5	1.4	QPSK	6/0	824.7	1.08	1.26
			6/0	836.5	1.08	1.26
			6/0	848.3	1.09	1.24
		16QAM	6/0	824.7	1.08	1.23
			6/0	836.5	1.08	1.26
			6/0	848.3	1.08	1.26

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Band	BW(MHz)	Mode	RB/RB Size	f (MHz)	99% BW (MHz)	-26dB BW (MHz)
LTE2	20	QPSK	100/0	1860	17.82	18.877
			100/0	1880	17.779	18.852
			100/0	1900	17.856	18.867
		16QAM	100/0	1860	17.831	18.811
			100/0	1880	17.808	19.158
			100/0	1900	17.818	18.862
Band	BW(MHz)	Mode	RB/RB Size	f (MHz)	99% BW (MHz)	-26dB BW (MHz)
LTE2	15	QPSK	75/0	1857.5	13.489	14.751
			75/0	1880	13.475	14.687
			75/0	1902.5	13.474	14.708
		16QAM	75/0	1857.5	13.5	14.627
			75/0	1880	13.447	14.579
			75/0	1902.5	13.454	14.497
Band	BW(MHz)	Mode	RB/RB Size	f (MHz)	99% BW (MHz)	-26dB BW (MHz)
LTE2	10	QPSK	50/0	1855	8.934	9.624
			50/0	1880	8.932	9.483
			50/0	1905	8.94	9.584
		16QAM	50/0	1855	8.929	9.474
			50/0	1880	8.931	9.65
			50/0	1905	8.943	9.77
Band	BW(MHz)	Mode	RB/RB Size	f (MHz)	99% BW (MHz)	-26dB BW (MHz)
LTE2	5	QPSK	25/0	1852.5	4.446	4.876
			25/0	1880	4.463	4.903
			25/0	1907.5	4.476	4.939
		16QAM	25/0	1852.5	4.458	4.968
			25/0	1880	4.462	4.946
			25/0	1907.5	4.471	5.774

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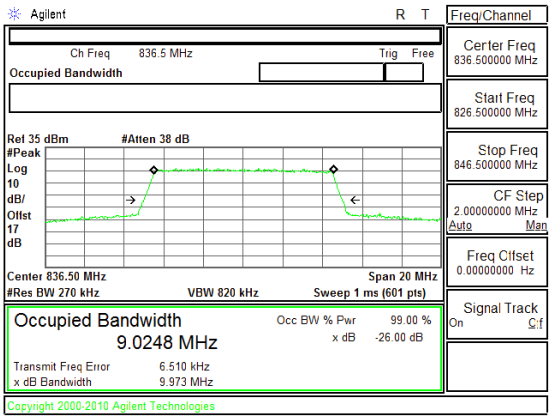
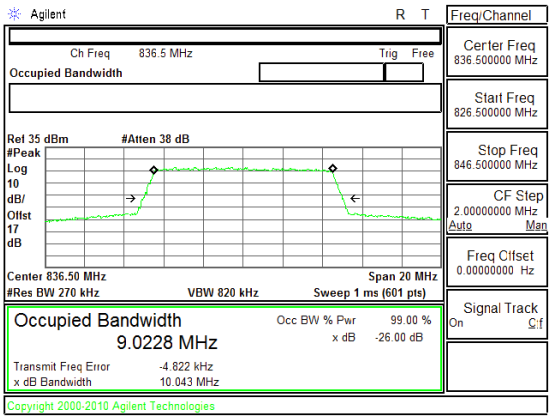
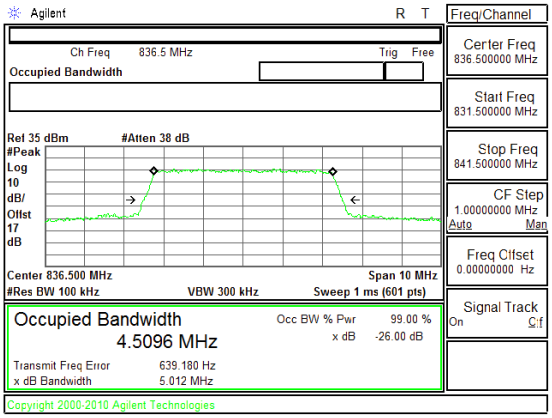
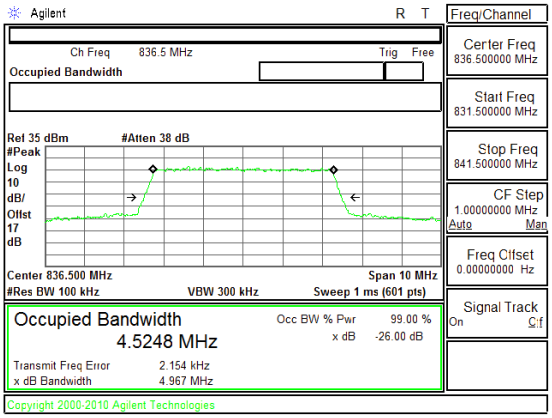
10.1.3. OCCUPIED BANDWIDTH PLOTS

Band LTE5 10MHz 16QAM	 Band LTE5 10MHz OBW 16QAM Mid Channel FRB.gif	 Band LTE5 10MHz OBW QPSK Mid Channel FRB.gif
Band LTE5 5MHz 16QAM	 Band LTE5 5MHz OBW 16QAM Mid Channel FRB.gif	 Band LTE5 5MHz OBW QPSK Mid Channel FRB.gif

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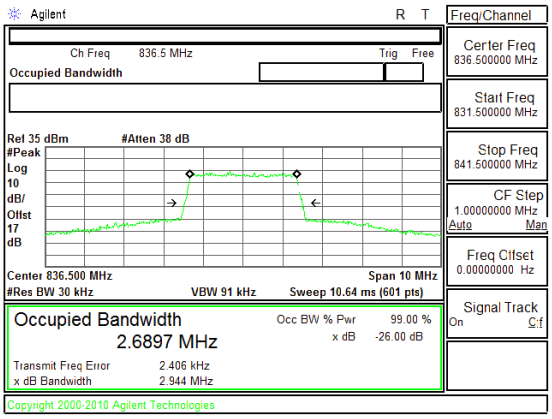
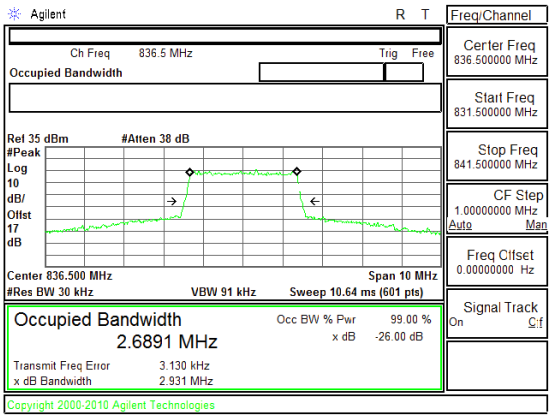
Band LTE5 3MHz 16QAM

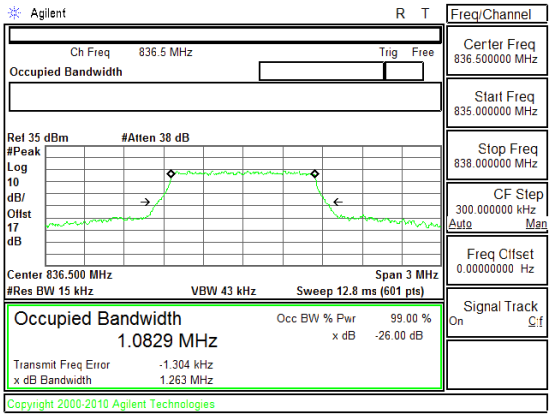


Band LTE5 3MHz OBW 16QAM Mid Channel FRB.gif

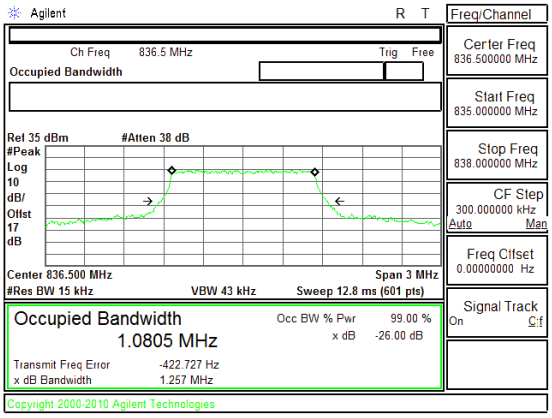


Band LTE5 3MHz OBW QPSK Mid Channel FRB.gif

Band LTE5 1.4MHz 16QAM



Band LTE5 1.4MHz OBW 16QAM Mid Channel FRB.gif



Band LTE5 1.4MHz OBW QPSK Mid Channel FRB.gif

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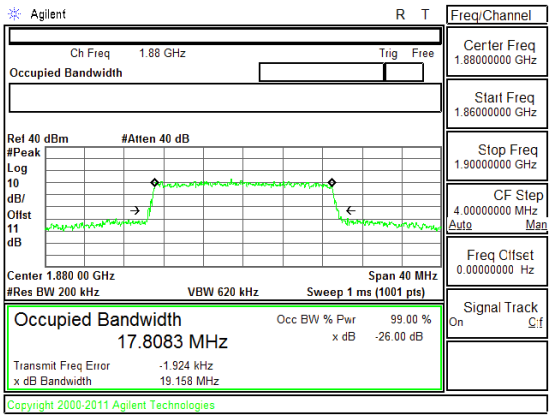
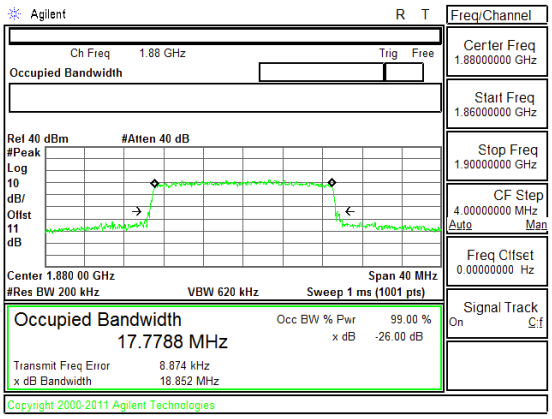
Band LTE2 20MHz 16QAM

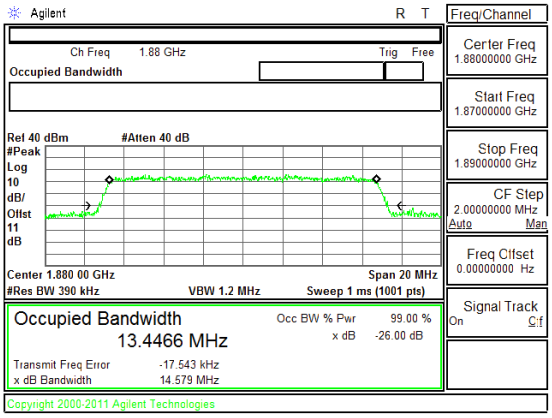


Band LTE2 20MHz OBW 16QAM Mid Channel FRB.gif

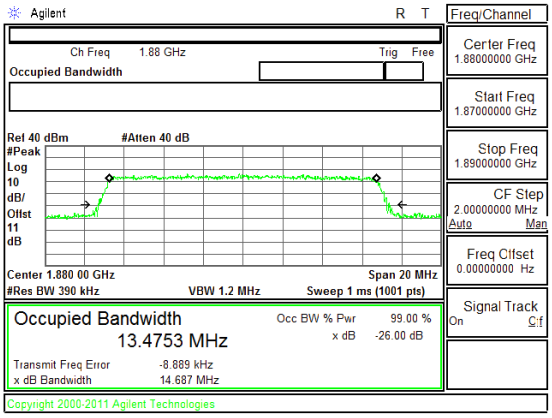


Band LTE2 20MHz OBW QPSK Mid Channel FRB.gif

Band LTE2 15MHz 16QAM



Band LTE2 15MHz OBW 16QAM Mid Channel FRB.gif



Band LTE2 15MHz OBW QPSK Mid Channel FRB.gif

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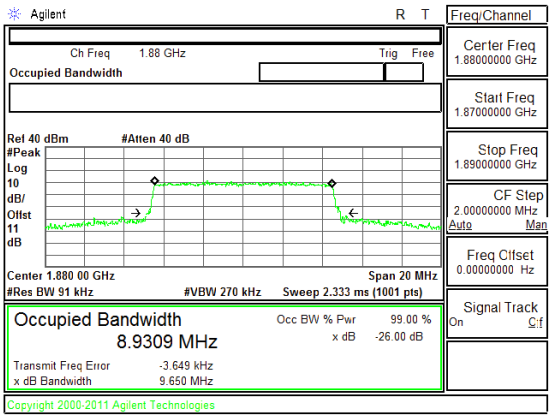
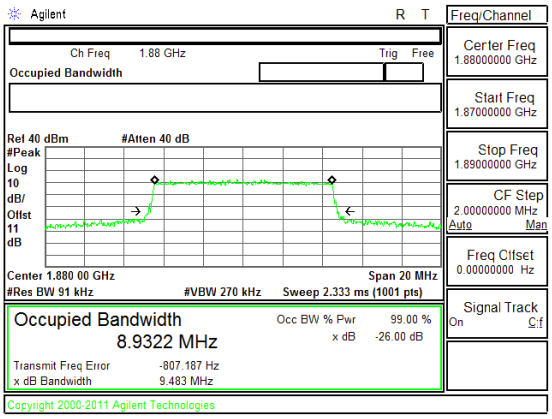
Band LTE2 10MHz 16QAM

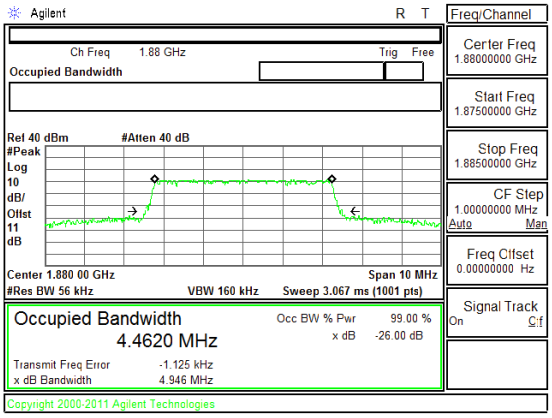


Band LTE2 10MHz OBW 16QAM Mid Channel FRB.gif

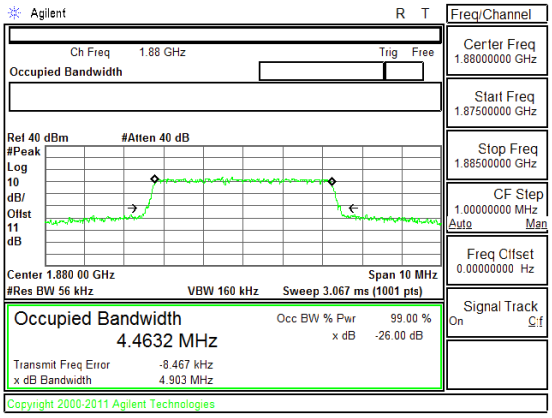


Band LTE2 10MHz OBW QPSK Mid Channel FRB.gif

Band LTE2 5MHz 16QAM



Band LTE2 5MHz OBW 16QAM Mid Channel FRB.gif



Band LTE2 5MHz OBW QPSK Mid Channel FRB.gif

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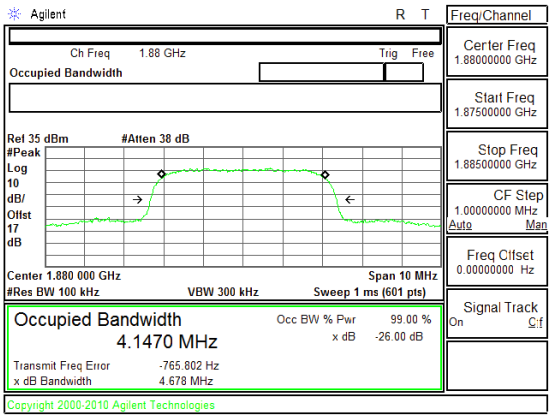
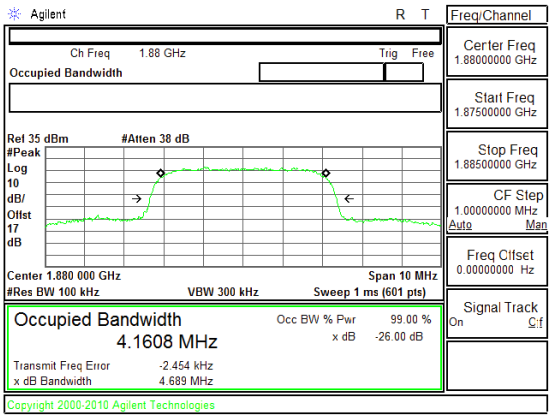
Band

Band 2

HSDPA



Band WCDMA B2 HSDPA OBW

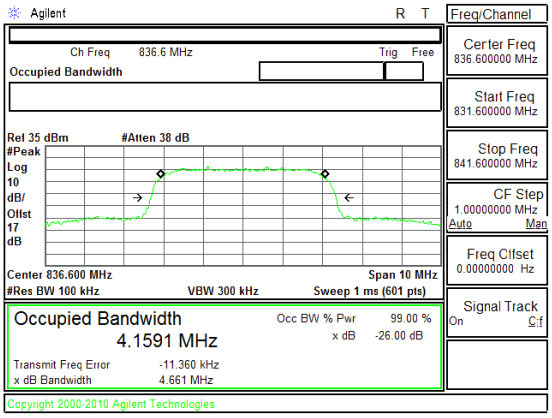


Band WCDMA B2 REL99 OBW

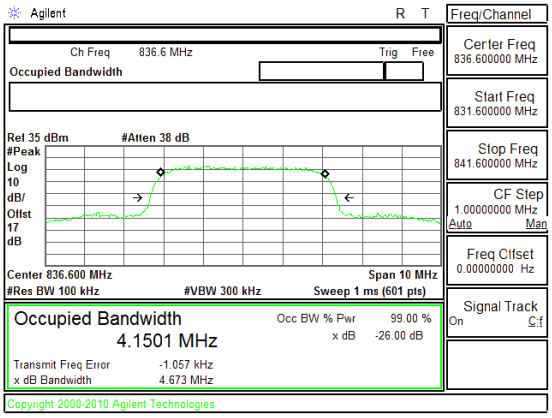
Band

Band 5

HSDPA



Band WCDMA B5 HSDPA OBW



Band WCDMA B5 REL99 OBW

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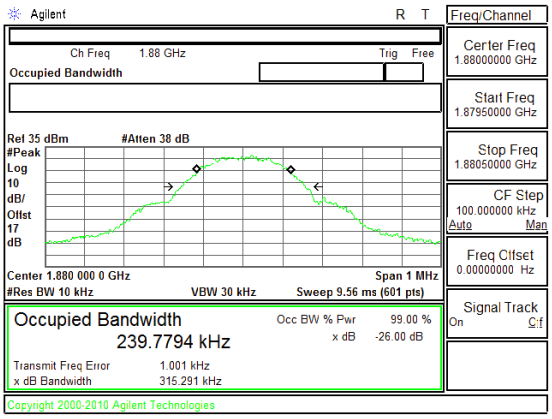
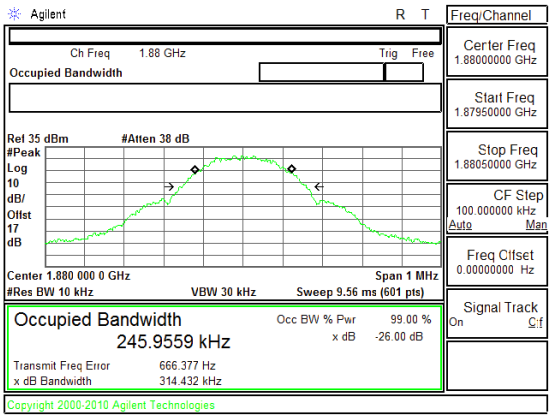
Band GSM 1900 EGPRS

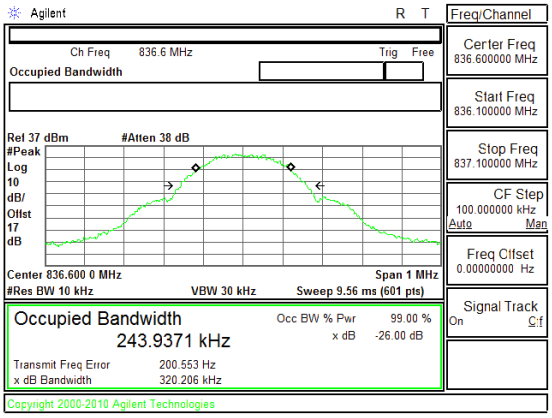


Band GSM1900 EGPRS OBW Mid channel

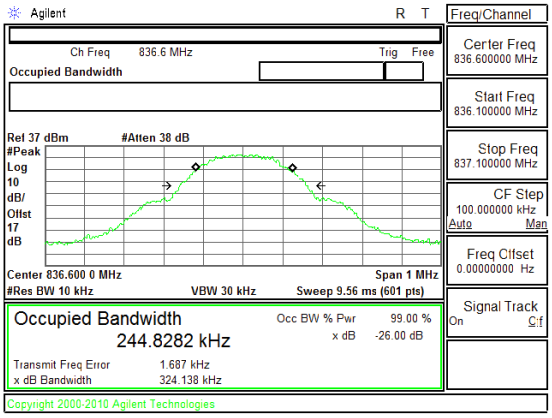


Band GSM1900 GPRS OBW Mid channel

Band GSM 850 EGPRS



Band GSM850 EGPRS OBW Mid channel



Band GSM850 GPRS OBW Mid 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 v02r01
The transmitter output was connected to an Agilent 8960 or 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.

MODES TESTED

GSM, WCDMA, LTE Band 5, LTE Band 2

RESULTS

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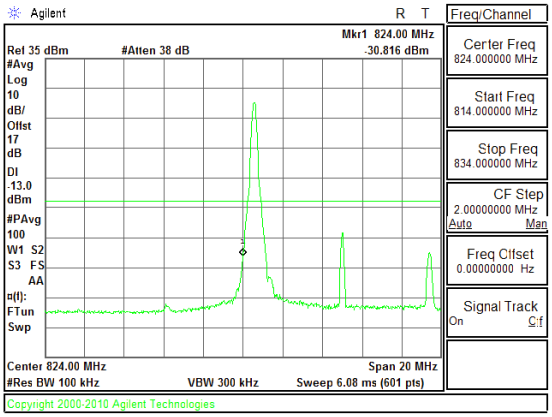
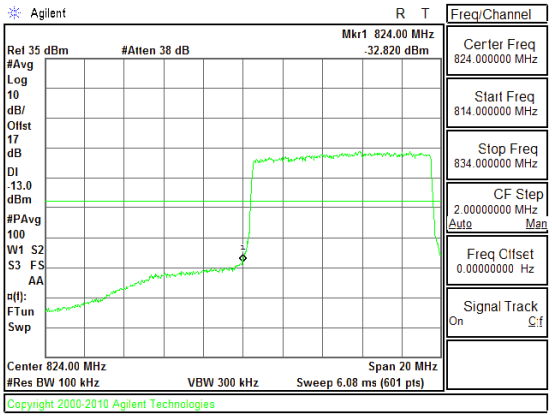
10.2.1. BAND EDGE PLOTS

LTE Band 5

Band LTE5 10MHz 16QAM	 Band LTE5 10MHz CBE 16QAM Low Channel 1RB.gif	 Band LTE5 10MHz CBE 16QAM Low Channel FRB.gif

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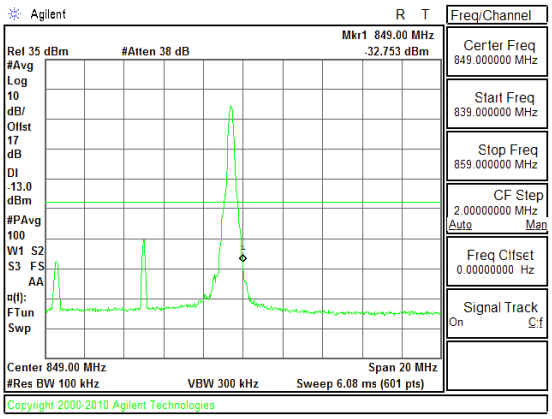
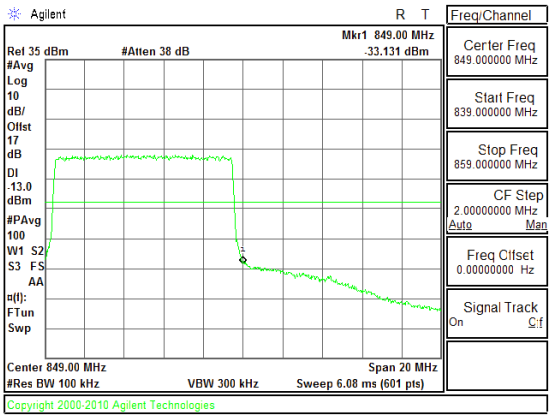
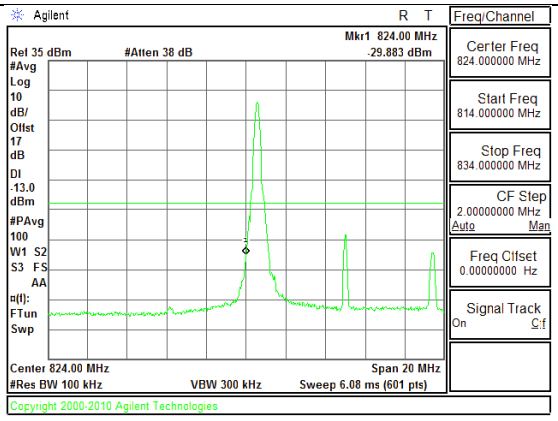
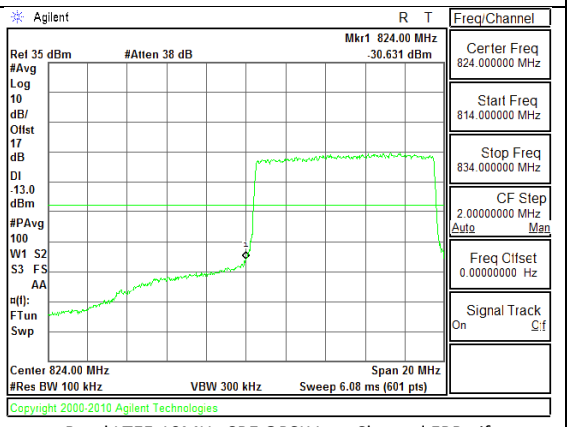
Band LTE5 10MHz 16QAM	 Band LTE5 10MHz CBE 16QAM High Channel 1RB.gif	 Band LTE5 10MHz CBE 16QAM High Channel FRB.gif
Band LTE5 10MHz QPSK	 Band LTE5 10MHz CBE QPSK Low Channel 1RB.gif	 Band LTE5 10MHz CBE QPSK Low Channel FRB.gif

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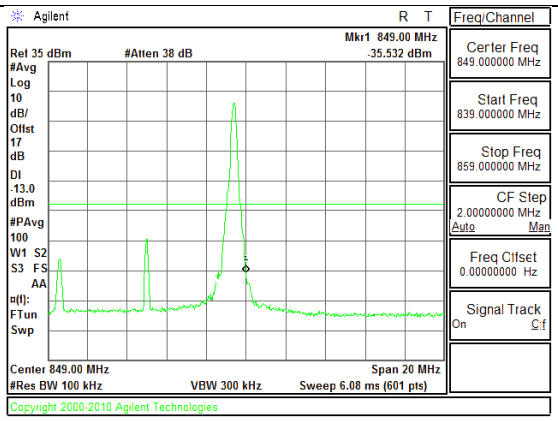
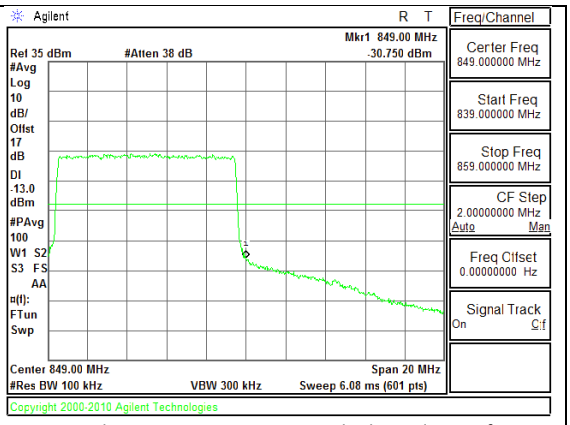
Band LTE5 10MHz QPSK

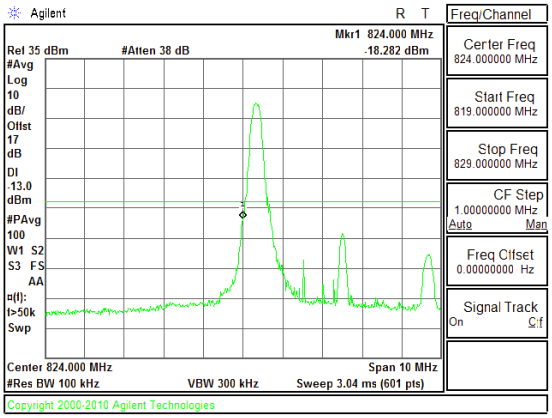


Band LTE5 10MHz CBE QPSK High Channel 1RB.gif

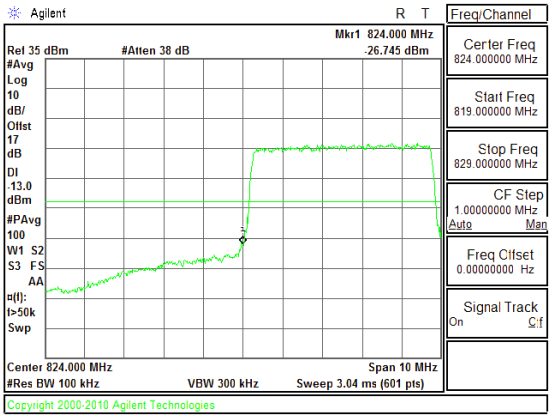


Band LTE5 10MHz CBE QPSK High Channel FRB.gif

Band LTE5 5MHz 16QAM



Band LTE5 5MHz CBE 16QAM Low Channel 1RB.gif



Band LTE5 5MHz CBE 16QAM Low Channel FRB.gif

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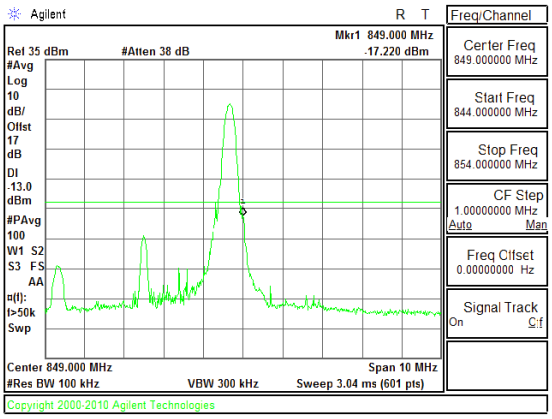
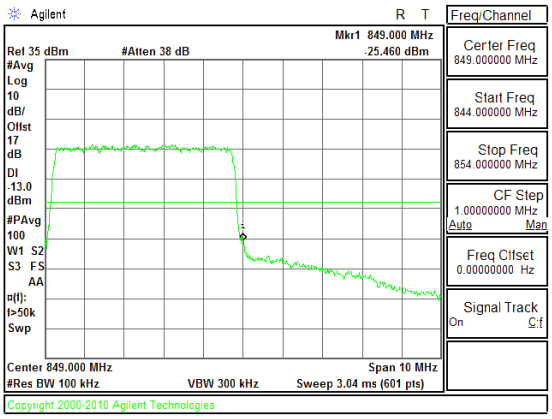
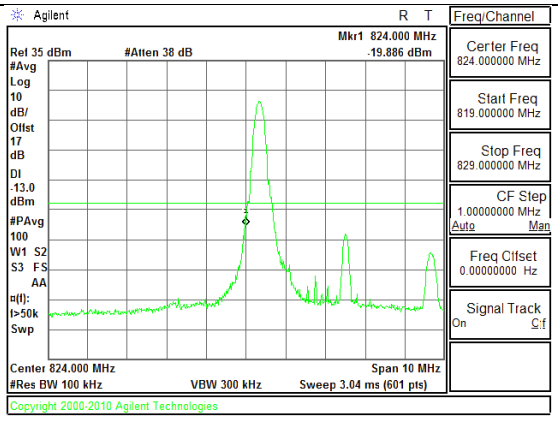
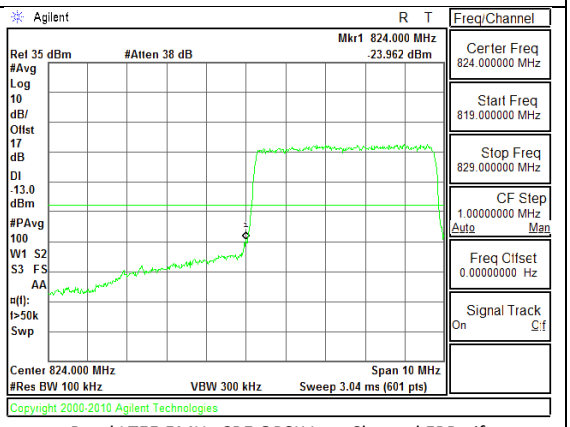
Band LTE5 5MHz 16QAM	 Band LTE5 5MHz CBE 16QAM High Channel 1RB.gif	 Band LTE5 5MHz CBE 16QAM High Channel FRB.gif
Band LTE5 5MHz QPSK	 Band LTE5 5MHz CBE QPSK Low Channel 1RB.gif	 Band LTE5 5MHz CBE QPSK Low Channel FRB.gif

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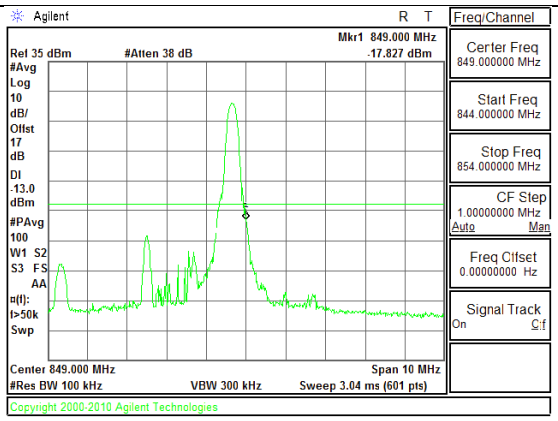
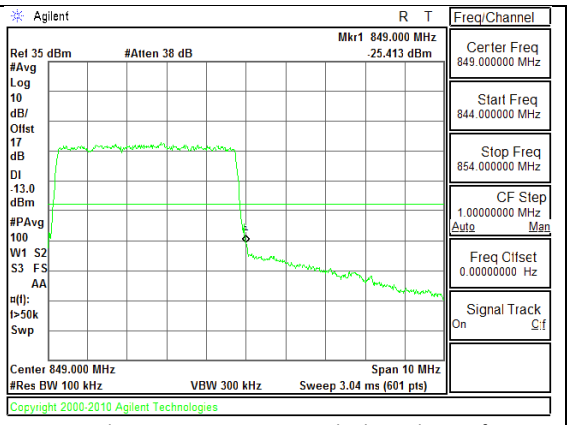
Band LTE5 5MHz QPSK

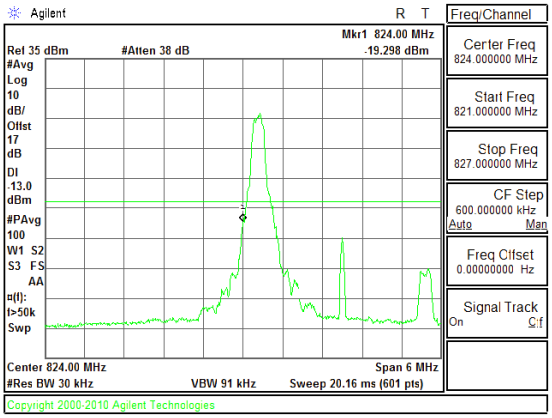


Band LTE5 5MHz CBE QPSK High Channel 1RB.gif



Band LTE5 5MHz CBE QPSK High Channel FRB.gif

Band LTE5 3MHz 16QAM



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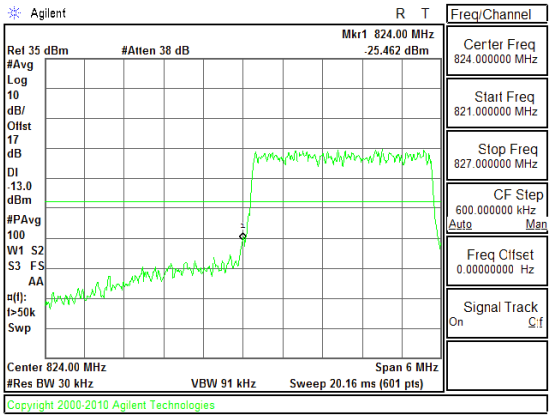

Band LTE5 3MHz CBE 16QAM Low Channel FRB.gif

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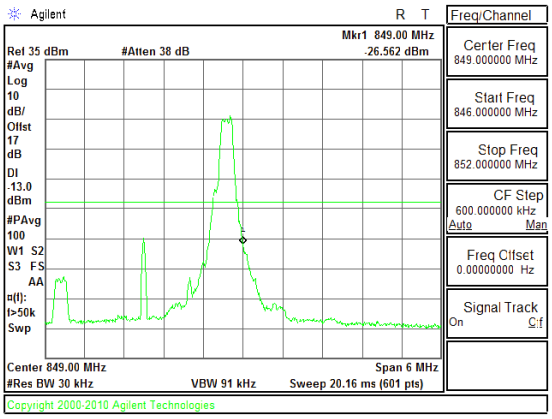
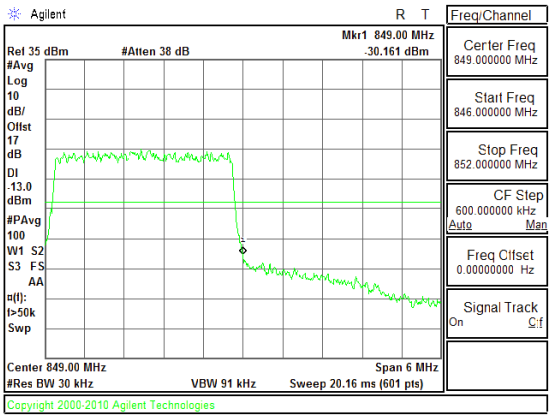
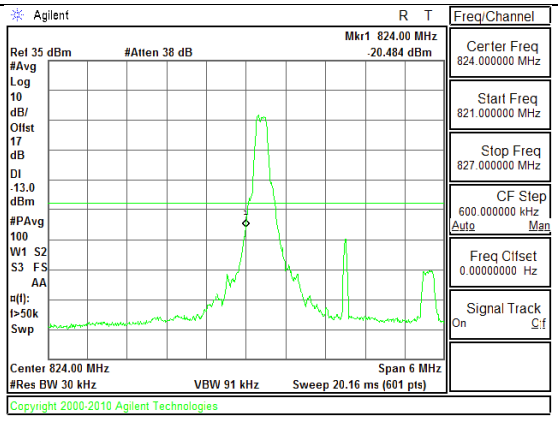
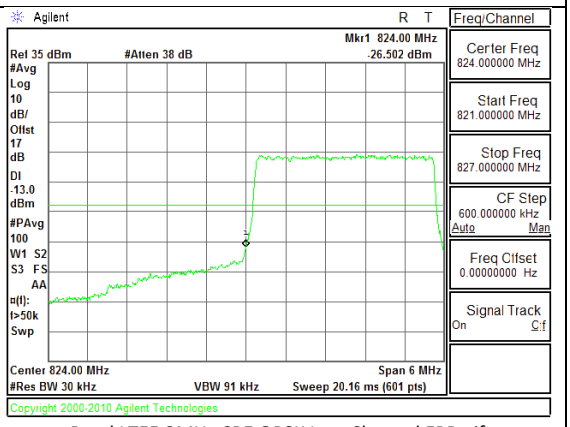
Band LTE5 3MHz 16QAM	 Band LTE5 3MHz CBE 16QAM High Channel 1RB.gif	 Band LTE5 3MHz CBE 16QAM High Channel FRB.gif
Band LTE5 3MHz QPSK	 Band LTE5 3MHz CBE QPSK Low Channel 1RB.gif	 Band LTE5 3MHz CBE QPSK Low Channel FRB.gif

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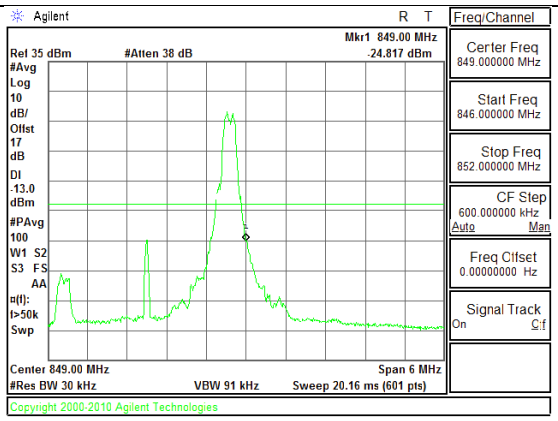
Band

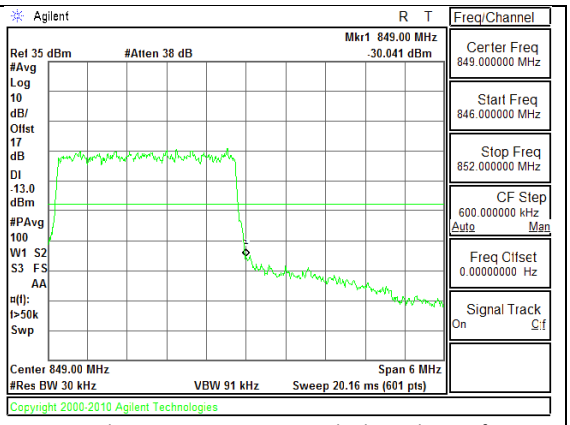
LTE5

3MHz

QPSK



Band LTE5 3MHz CBE QPSK High Channel 1RB.gif



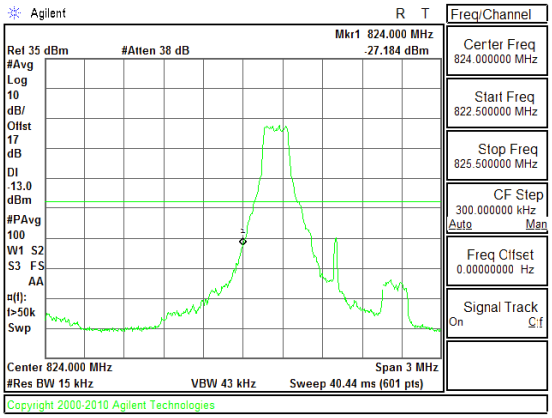
Band LTE5 3MHz CBE QPSK High Channel FRB.gif

Band

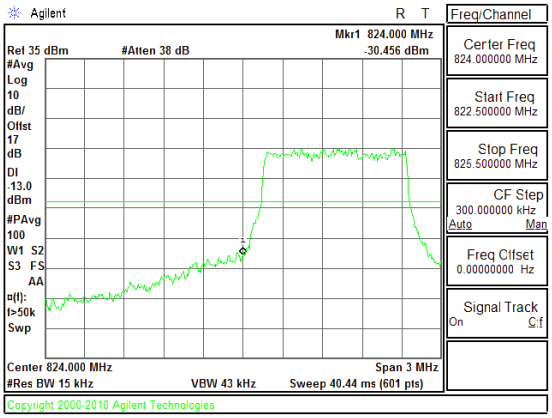
LTE5

1.4MHz

16QAM



Band LTE5 1.4MHz CBE 16QAM Low Channel 1RB.gif



Band LTE5 1.4MHz CBE 16QAM Low Channel FRB.gif

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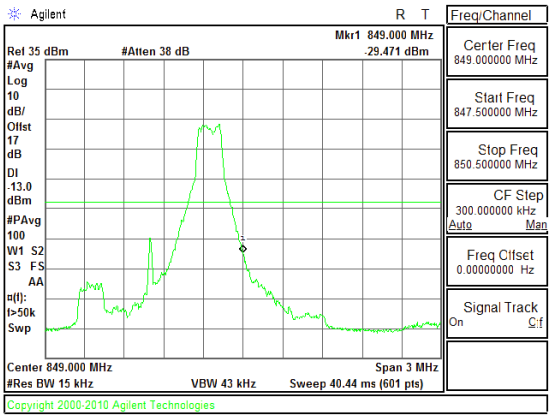
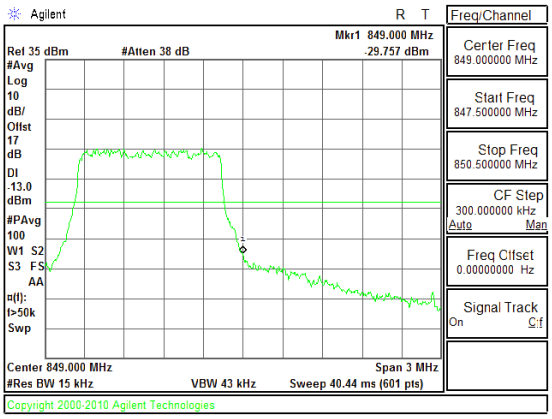
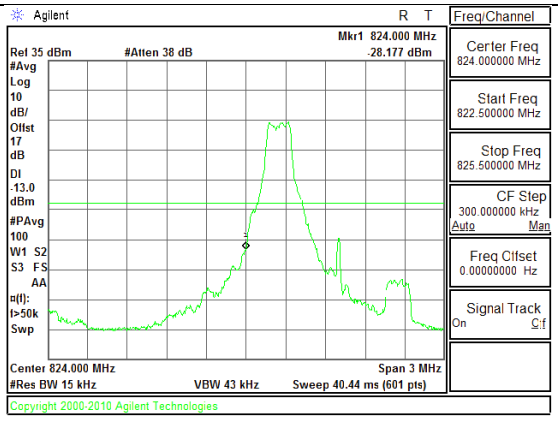
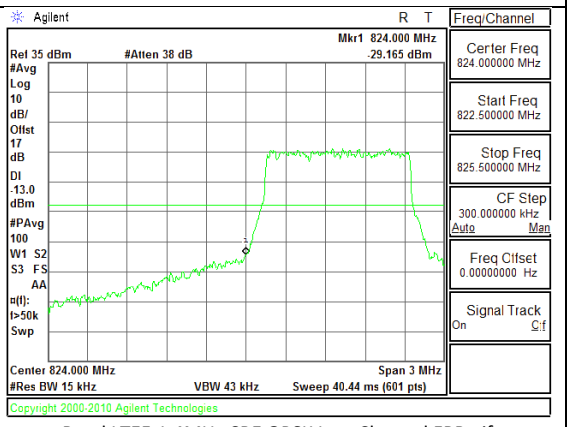
Band LTE5 1.4MHz 16QAM	 Band LTE5 1.4MHz CBE 16QAM High Channel 1RB.gif	 Band LTE5 1.4MHz CBE 16QAM High Channel FRB.gif
Band LTE5 1.4MHz QPSK	 Band LTE5 1.4MHz CBE QPSK Low Channel 1RB.gif	 Band LTE5 1.4MHz CBE QPSK Low Channel FRB.gif

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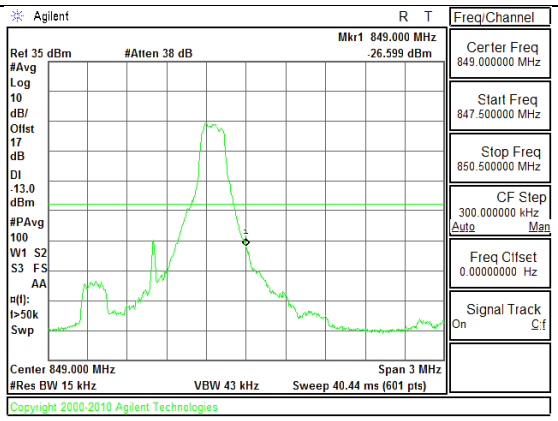
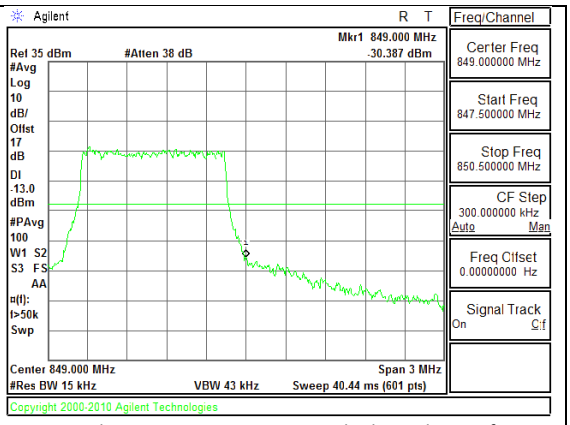
Band LTE5 1.4MHz QPSK	 Band LTE5 1.4MHz CBE QPSK High Channel 1RB.gif	 Band LTE5 1.4MHz CBE QPSK High Channel FRB.gif

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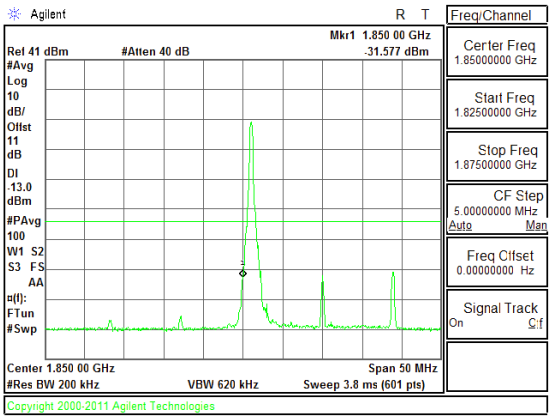
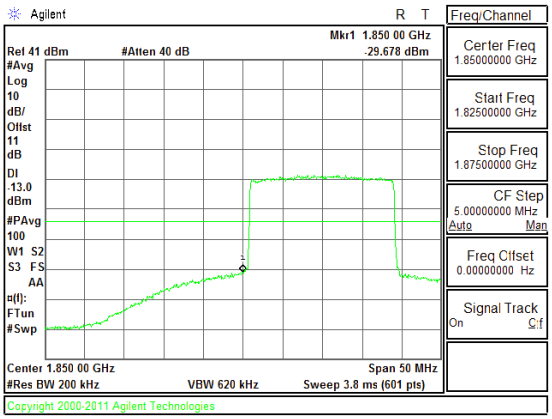
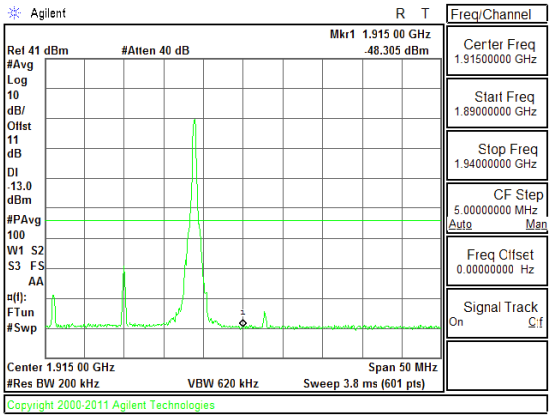
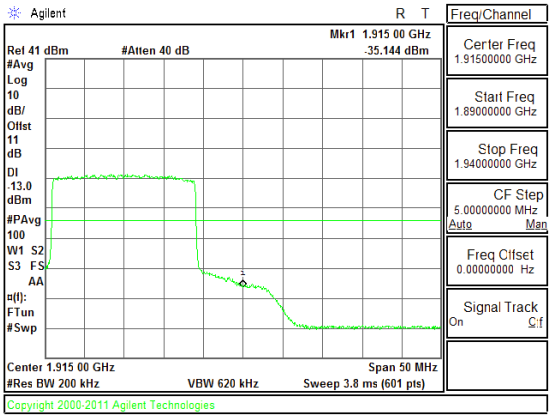
LTE Band 2

Band LTE2 20MHz 16QAM	 Band LTE2 20MHz CBE 16QAM Low Channel 1RB.gif	 Band LTE2 20MHz CBE 16QAM Low Channel FRB.gif
Band LTE2 20MHz 16QAM	 Band LTE2 20MHz CBE 16QAM High Channel 1RB.gif	 Band LTE2 20MHz CBE 16QAM High Channel FRB.gif

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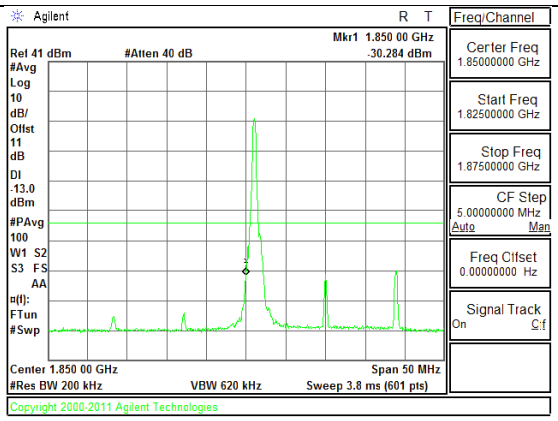
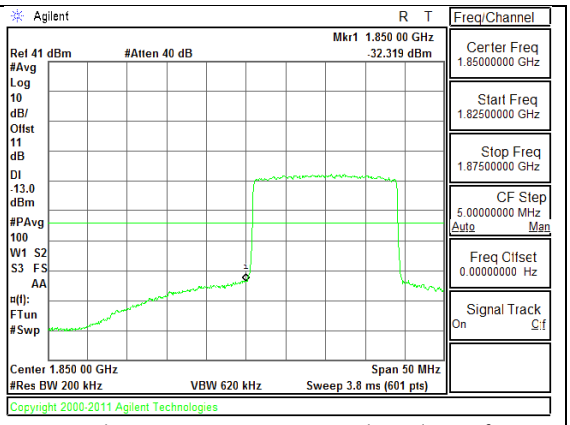
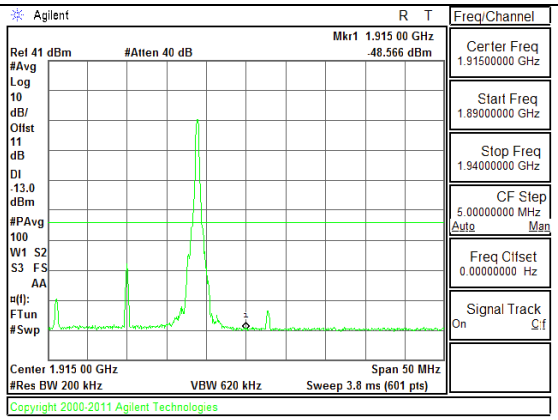
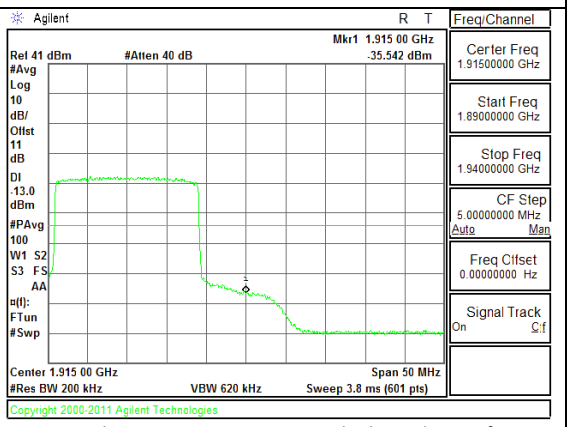
Band LTE2 20MHz QPSK	 Band LTE2 20MHz CBE QPSK Low Channel 1RB.gif	 Band LTE2 20MHz CBE QPSK Low Channel FRB.gif
Band LTE2 20MHz QPSK	 Band LTE2 20MHz CBE QPSK High Channel 1RB.gif	 Band LTE2 20MHz CBE QPSK High Channel FRB.gif

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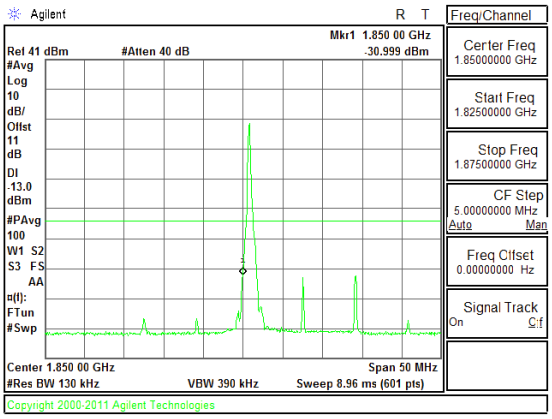
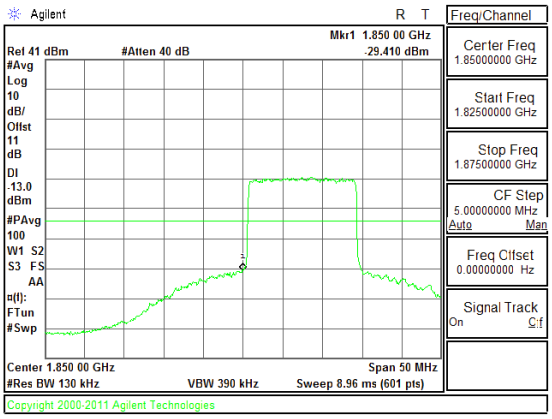
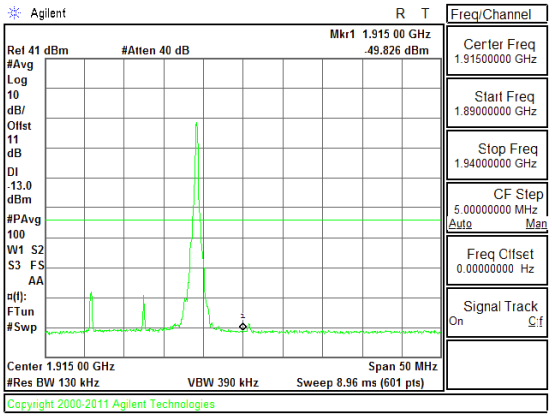
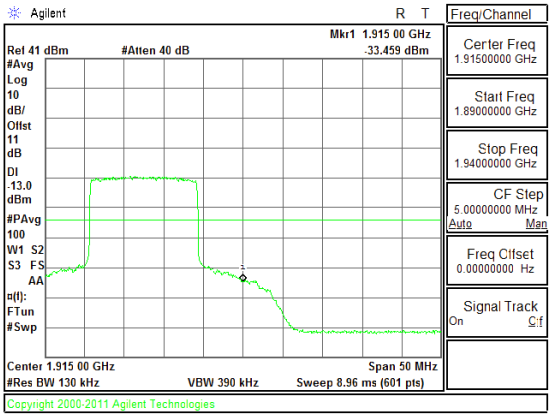
Band LTE2 15MHz 16QAM	 Band LTE2 15MHz CBE 16QAM Low Channel 1RB.gif	 Band LTE2 15MHz CBE 16QAM Low Channel FRB.gif
Band LTE2 15MHz 16QAM	 Band LTE2 15MHz CBE 16QAM High Channel 1RB.gif	 Band LTE2 15MHz CBE 16QAM High Channel FRB.gif

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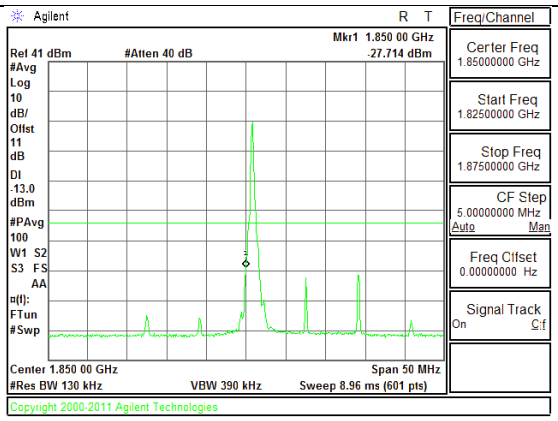
Band LTE2 15MHz QPSK



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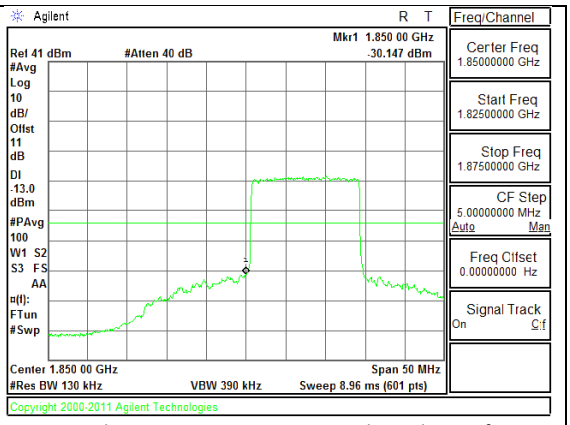

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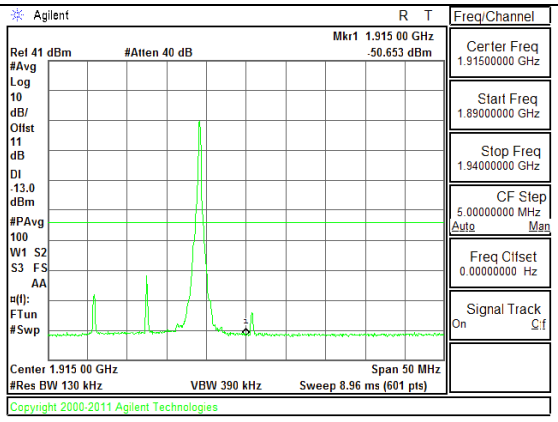
Band LTE2 15MHz QPSK



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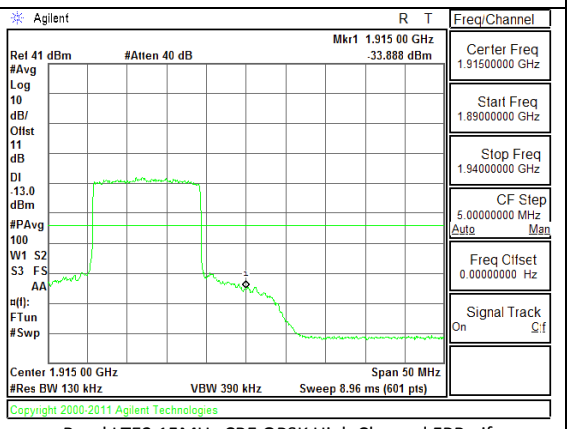

Band LTE2 15MHz CBE QPSK High Channel FRB.gif

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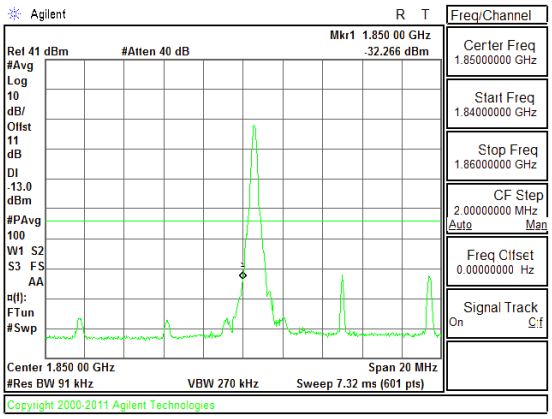
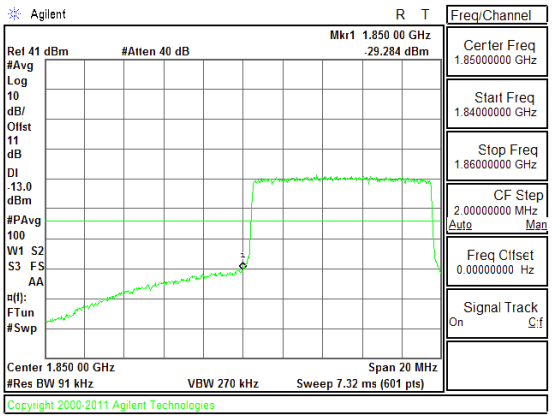
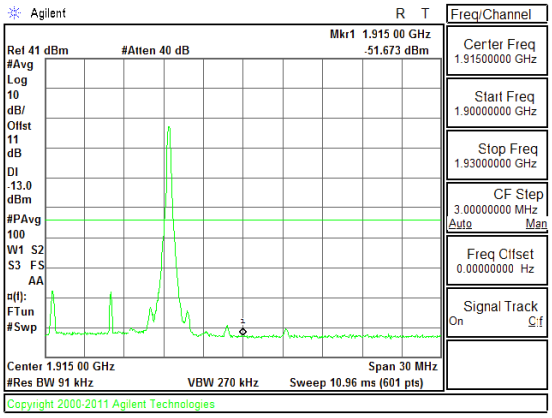
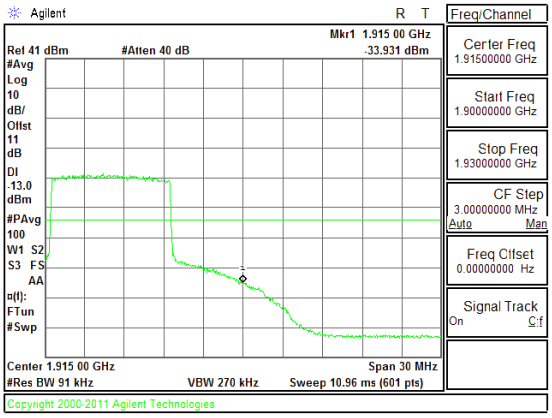
Band LTE2 10MHz 16QAM	 Band LTE2 10MHz CBE 16QAM Low Channel 1RB.gif	 Band LTE2 10MHz CBE 16QAM Low Channel FRB.gif
Band LTE2 10MHz 16QAM	 Band LTE2 10MHz CBE 16QAM High Channel 1RB.gif	 Band LTE2 10MHz CBE 16QAM High Channel FRB.gif

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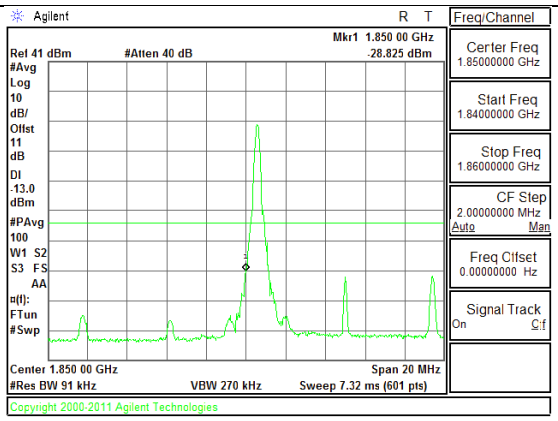
Band LTE2 10MHz QPSK



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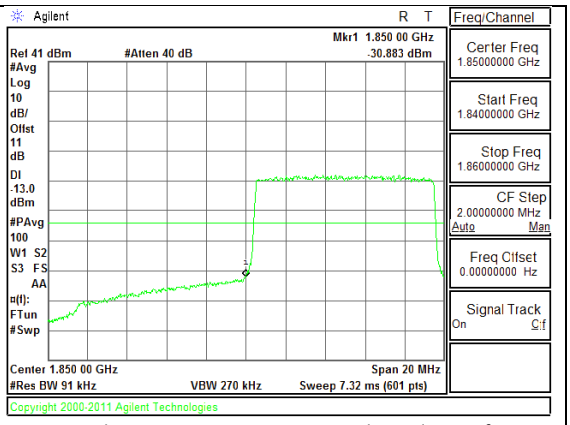
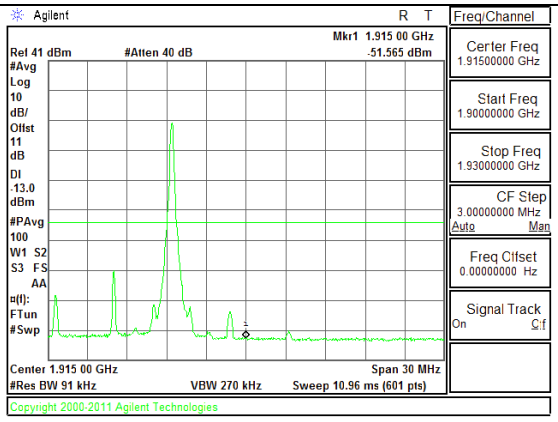
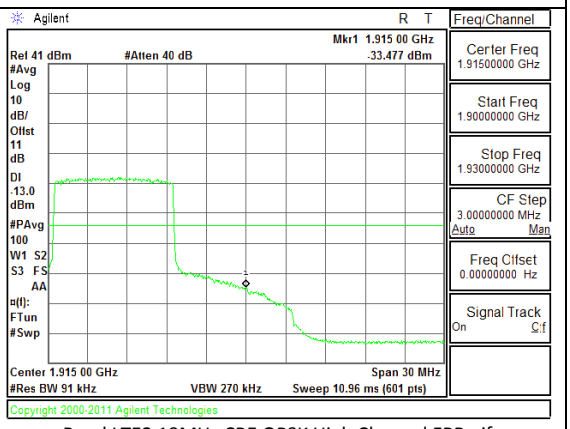


Band LTE2 10MHz CBE QPSK Low Channel FRB.gif

Band LTE2 10MHz QPSK



Band LTE2 10MHz CBE QPSK High Channel 1RB.gif



Band LTE2 10MHz CBE QPSK High Channel FRB.gif

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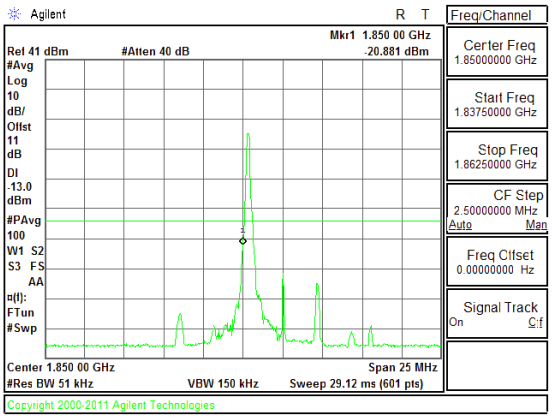
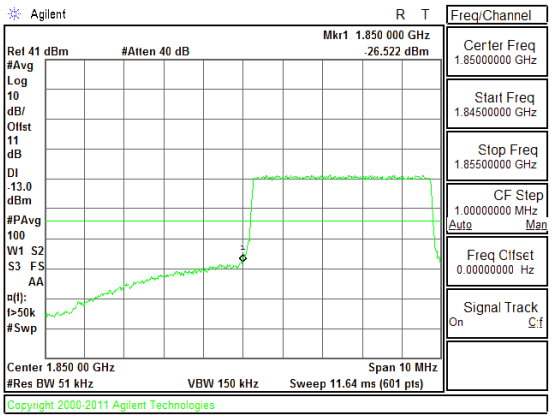
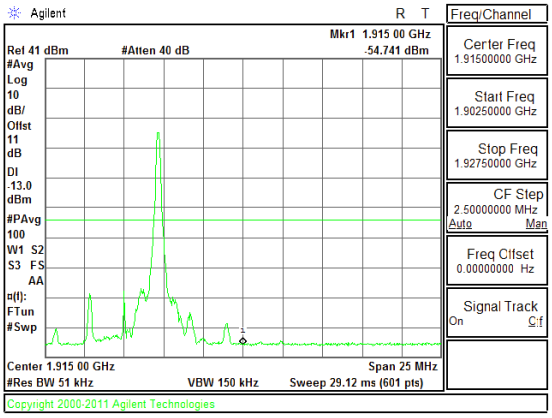
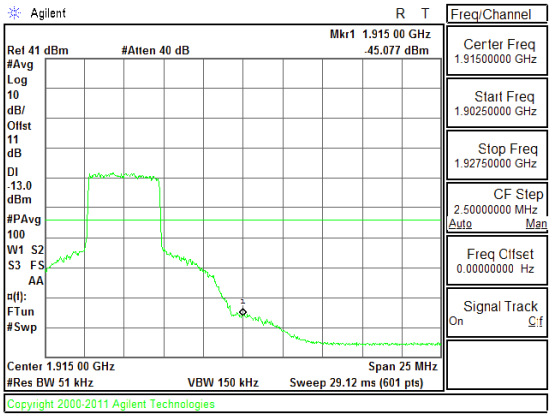
Band LTE2 5MHz 16QAM	 Band LTE2 5MHz CBE 16QAM Low Channel 1RB.gif	 Band LTE2 5MHz CBE 16QAM Low Channel FRB.gif
Band LTE2 5MHz 16QAM	 Band LTE2 5MHz CBE 16QAM High Channel 1RB.gif	 Band LTE2 5MHz CBE 16QAM High Channel FRB.gif

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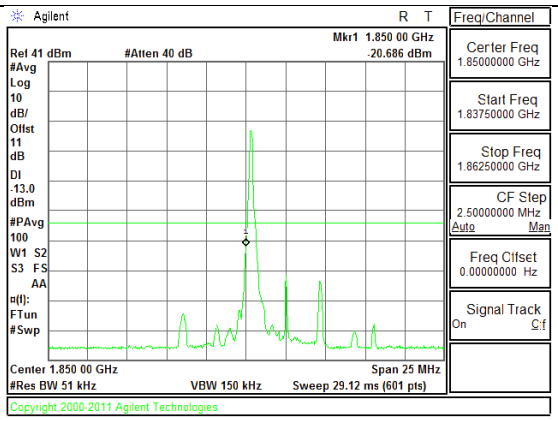
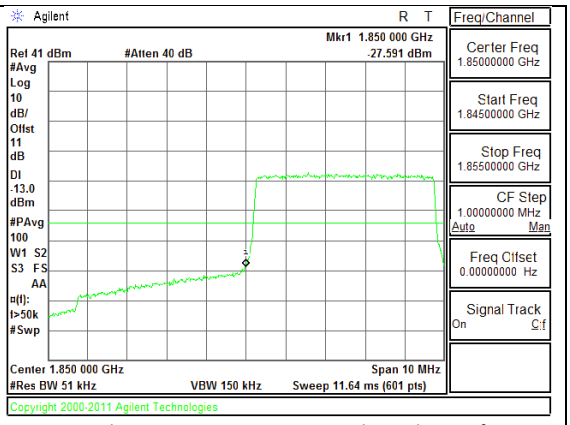
Band LTE2 5MHz QPSK

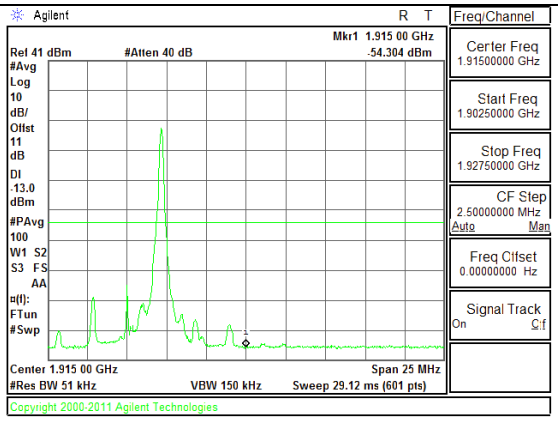


Band LTE2 5MHz CBE QPSK Low Channel 1RB.gif



Band LTE2 5MHz CBE QPSK Low Channel FRB.gif

Band LTE2 5MHz QPSK



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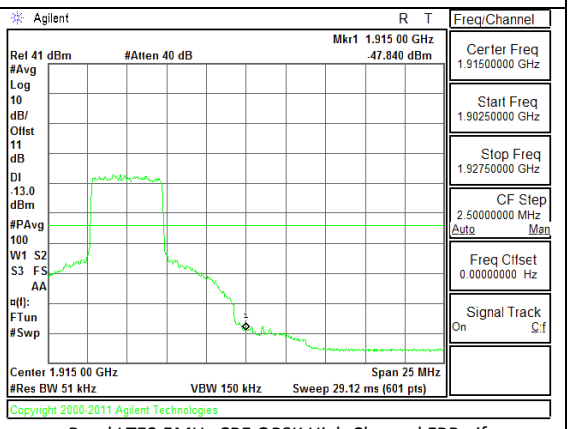

Band LTE2 5MHz CBE QPSK High Channel FRB.gif

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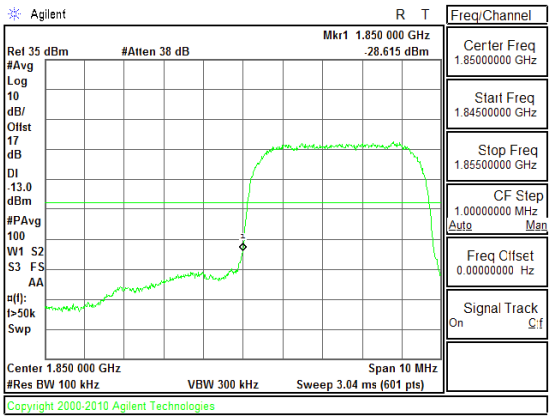
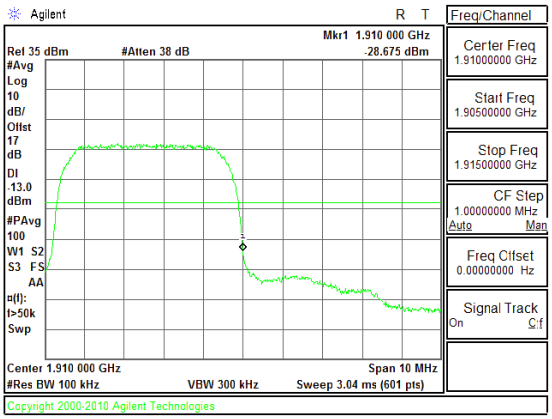
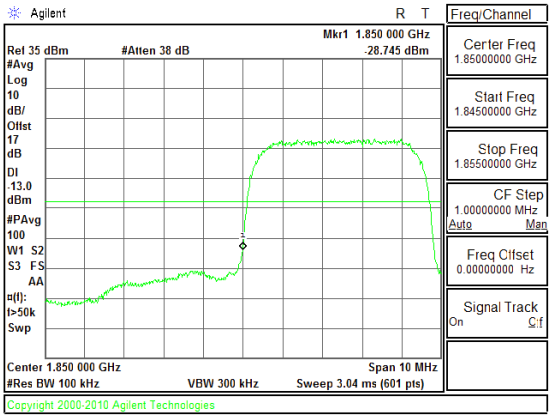
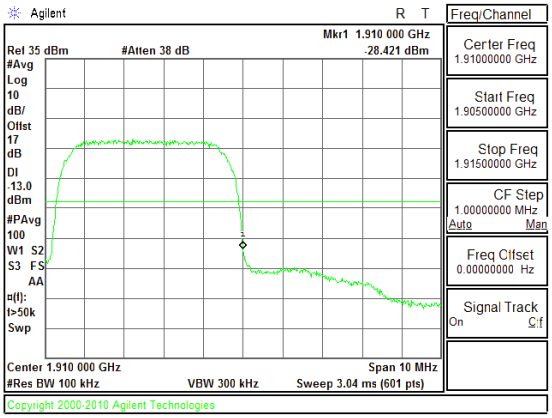
WCDMA

Band Band 2 HSDPA	 Band WCDMA B2 HSDPA CBE	 Band WCDMA B2 HSDPA CBE
Band Band 2 REL99	 Band WCDMA B2 REL99 CBE	 Band WCDMA B2 REL99 CBE

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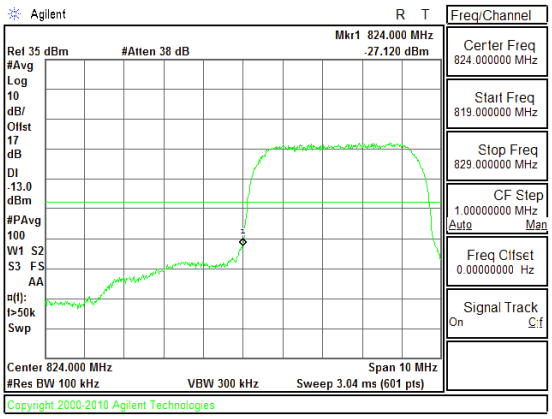
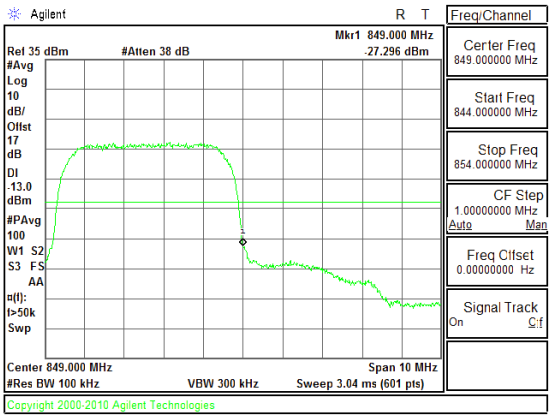
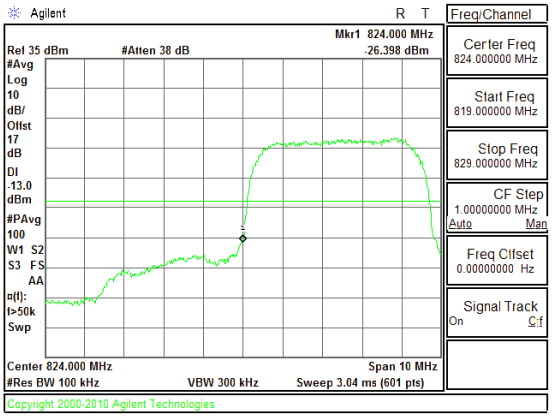
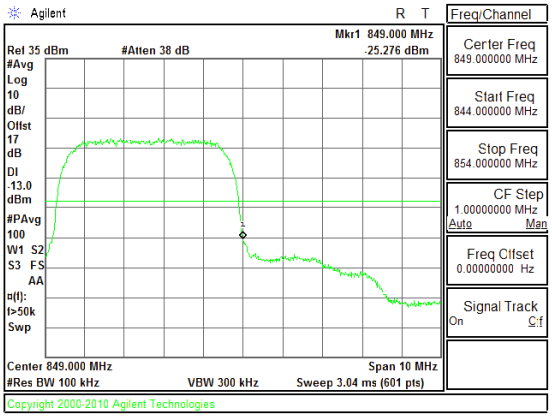
Band Band 5 HSDPA	 Band WCDMA B5 HSDPA CBE	 Band WCDMA B5 HSDPA CBE
Band Band 5 REL99	 Band WCDMA B5 REL99 CBE	 Band WCDMA B5 REL99 CBE

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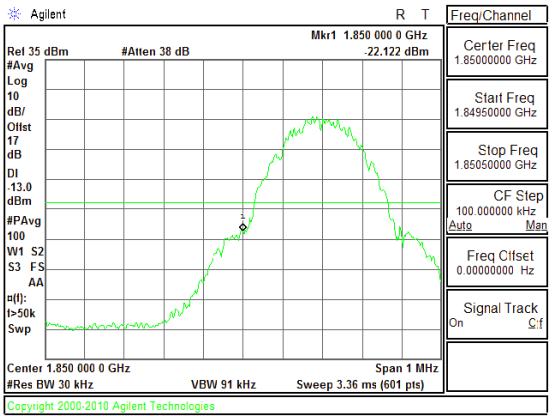
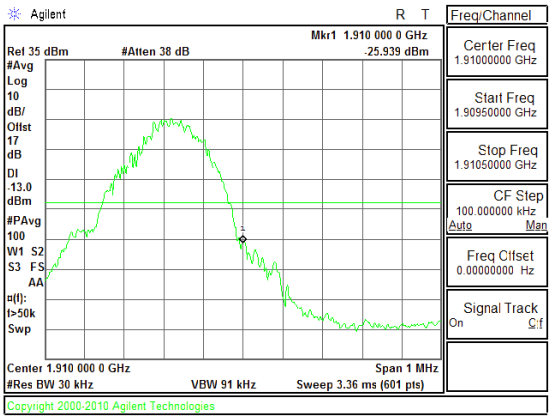
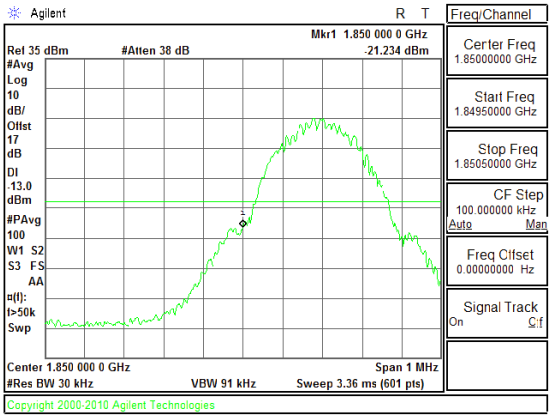
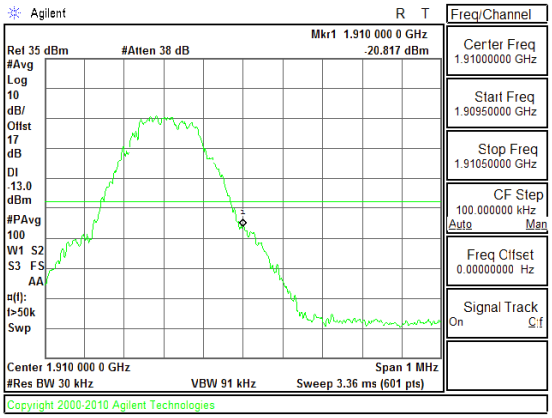
GSM

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

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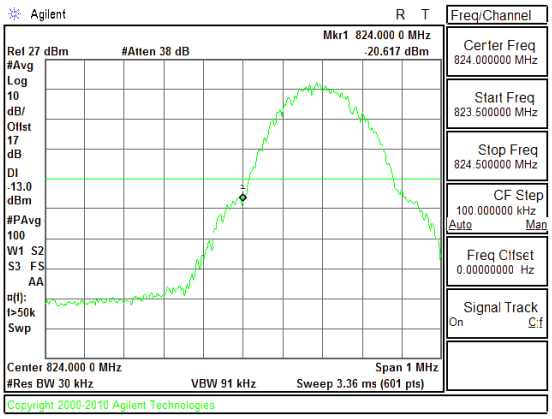
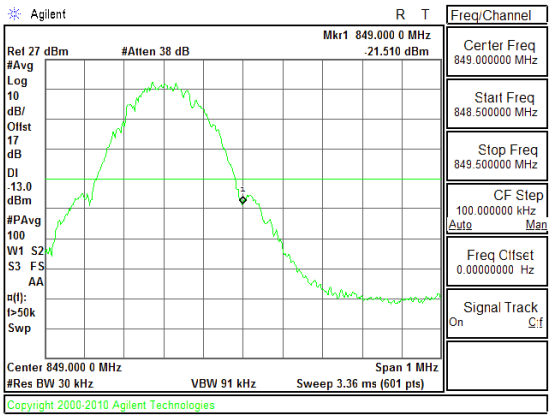
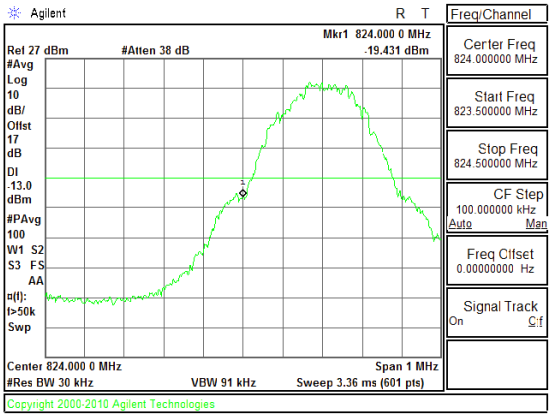
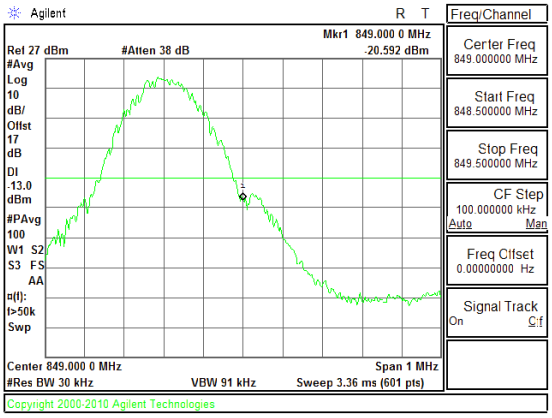
Band GSM 850 EGPRS	 Band GSM850 EGPRS CBE Low channel	 Band GSM850 EGPRS CBE High channel
Band GSM 850 GPRS	 Band GSM850 GPRS CBE Low channel	 Band GSM850 GPRS CBE High channel

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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 v02r01

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.

MODES TESTED

GSM, WCDMA, LTE Band 5, LTE Band 2

RESULTS

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10.3.1. OUT OF BAND EMISSIONS RESULT

Band	BW (MHz)	Mode	f (MHz)	Spur (dBm)	Spec (dBm)	Delta (dB)
LTE5	10	QPSK	829	-29.74	-13	-16.74
			836.5	-31.25	-13	-18.25
			844	-31.27	-13	-18.27
		16QAM	829	-31.25	-13	-18.25
			836.5	-30.35	-13	-17.35
			844	-29.82	-13	-16.82
Band	BW (MHz)	Mode	f (MHz)	Spur (dBm)	Spec (dBm)	Delta (dB)
LTE5	5	QPSK	826.5	-30.46	-13	-17.46
			836.5	-30.59	-13	-17.59
			846.5	-32.41	-13	-19.41
		16QAM	826.5	-31.41	-13	-18.41
			836.5	-30.58	-13	-17.58
			846.5	-31.23	-13	-18.23
Band	BW (MHz)	Mode	f (MHz)	Spur (dBm)	Spec (dBm)	Delta (dB)
LTE5	3	QPSK	825.5	-31.76	-13	-18.76
			836.5	-31.3	-13	-18.3
			847.5	-30.47	-13	-17.47
		16QAM	825.5	-32.24	-13	-19.24
			836.5	-29.49	-13	-16.49
			847.5	-30.57	-13	-17.57
Band	BW (MHz)	Mode	f (MHz)	Spur (dBm)	Spec (dBm)	Delta (dB)
LTE5	1.4	QPSK	824.7	-31.37	-13	-18.37
			836.5	-33.3	-13	-20.3
			848.3	-32.18	-13	-19.18
		16QAM	824.7	-31.29	-13	-18.29
			836.5	-31.54	-13	-18.54
			848.3	-32.01	-13	-19.01

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Band	BW (MHz)	Mode	f (MHz)	Spur (dBm)	Spec (dBm)	Delta (dB)
LTE2	20	QPSK	1860	-22.65	-13	-9.65
			1880	-23.87	-13	-10.87
			1900	-22.76	-13	-9.76
		16QAM	1860	-23.58	-13	-10.58
			1880	-23.23	-13	-10.23
			1900	-22.59	-13	-9.59
Band	BW (MHz)	Mode	f (MHz)	Spur (dBm)	Spec (dBm)	Delta (dB)
LTE2	15	QPSK	1857.5	-22.08	-13	-9.08
			1880	-21.77	-13	-8.77
			1902.5	-22.72	-13	-9.72
		16QAM	1857.5	-23.26	-13	-10.26
			1880	-23.03	-13	-10.03
			1902.5	-21.96	-13	-8.96
Band	BW (MHz)	Mode	f (MHz)	Spur (dBm)	Spec (dBm)	Delta (dB)
LTE2	10	QPSK	1855	-23.32	-13	-10.32
			1880	-22.1	-13	-9.1
			1905	-22.92	-13	-9.92
		16QAM	1855	-23	-13	-10
			1880	-23.47	-13	-10.47
			1905	-23.23	-13	-10.23
Band	BW (MHz)	Mode	f (MHz)	Spur (dBm)	Spec (dBm)	Delta (dB)
LTE2	5	QPSK	1852.5	-21.41	-13	-8.41
			1880	-22.4	-13	-9.4
			1907.5	-21.71	-13	-8.71
		16QAM	1852.5	-23.02	-13	-10.02
			1880	-21.86	-13	-8.86
			1907.5	-22.31	-13	-9.31

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Band	Mode	f (MHz)	Spur (dBm)	Spec (dBm)	Delta (dB)
GSM850	GPRS	824.2	-31.38	-13	-18.38
		836.6	-31.45	-13	-18.45
		848.8	-31.53	-13	-18.53
	EGPRS	824.2	-30.23	-13	-17.23
		836.6	-30.19	-13	-17.19
		848.8	-30.17	-13	-17.17
GSM1900	GPRS	1850.2	-20.66	-13	-7.66
		1880	-21	-13	-8
		1909.8	-21.03	-13	-8.03
	EGPRS	1850.2	-21.77	-13	-8.77
		1880	-21.43	-13	-8.43
		1909.8	-21.58	-13	-8.58
Band 5	REL99	826.4	-31.18	-13	-18.18
		836.6	-30.98	-13	-17.98
		846.6	-32.4	-13	-19.4
	HSDPA	826.4	-31.29	-13	-18.29
		836.6	-30.01	-13	-17.01
		846.6	-31.5	-13	-18.5
Band 2	REL99	1852.4	-22.06	-13	-9.06
		1880	-20.8	-13	-7.8
		1907.6	-23.95	-13	-10.95
	HSDPA	1852.4	-20.66	-13	-7.66
		1880	-20.61	-13	-7.61
		1907.6	-21.96	-13	-8.96

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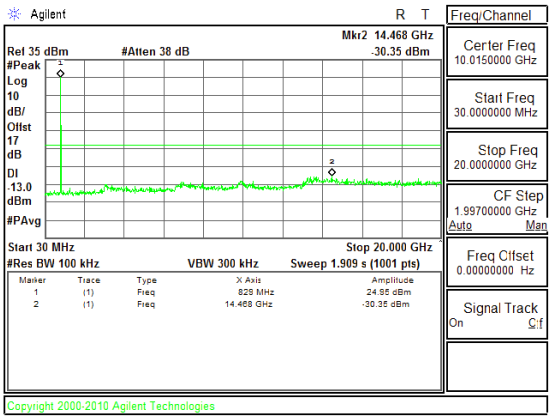
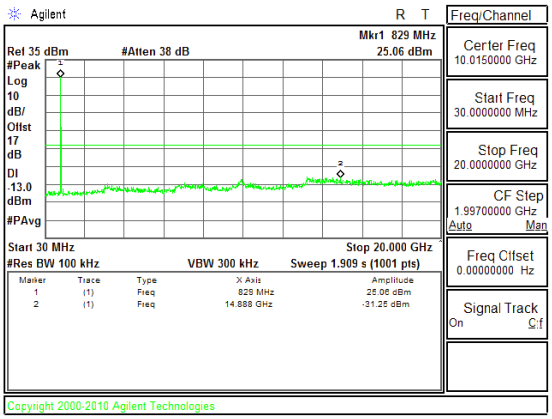
10.3.2. OUT OF BAND EMISSIONS PLOTS

Band LTE5 10MHz 16QAM

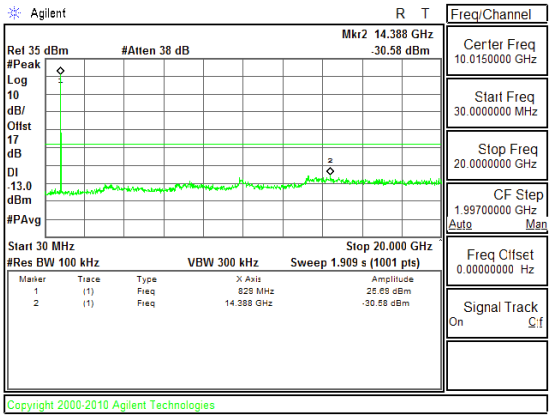


Band LTE5 10MHz CSE 16QAM Mid channel

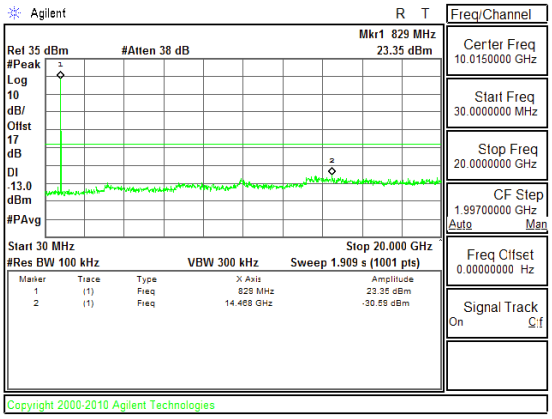


Band LTE5 10MHz CSE QPSK Mid channel

Band LTE5 5MHz 16QAM



Band LTE5 5MHz CSE 16QAM Mid channel



Band LTE5 5MHz CSE QPSK Mid channel

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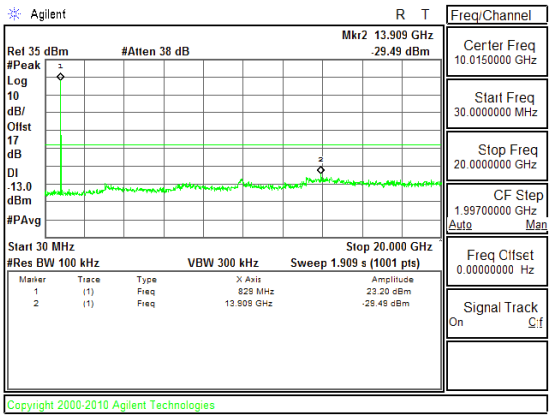
Band

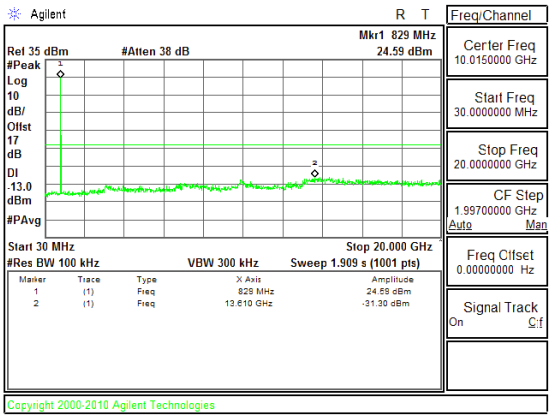
LTE5

3MHz

16QAM



Band LTE5 3MHz CSE 16QAM Mid channel



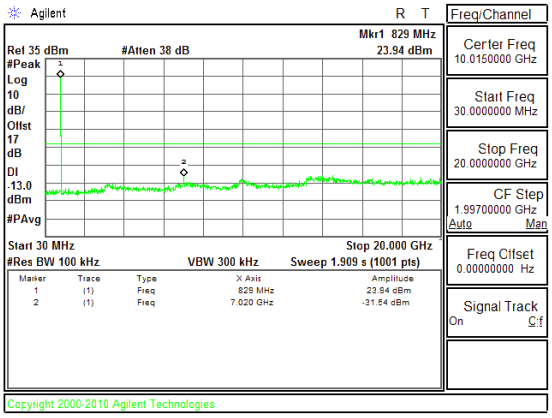
Band LTE5 3MHz CSE QPSK Mid channel

Band

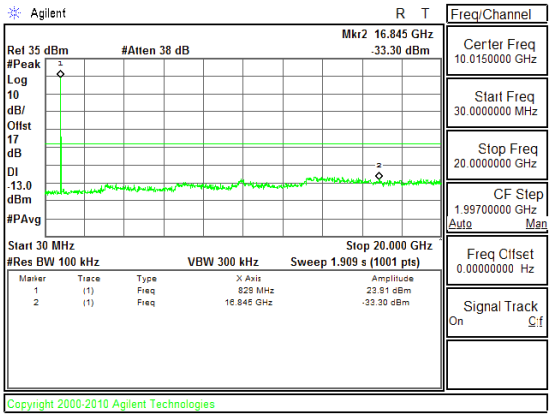
LTE5

1.4MHz

16QAM



Band LTE5 1.4MHz CSE 16QAM Mid channel



Band LTE5 1.4MHz CSE QPSK Mid channel

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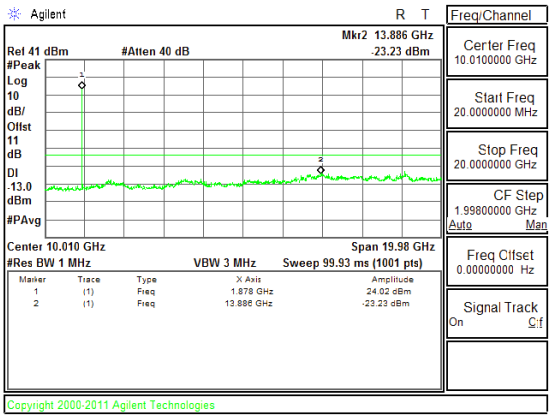
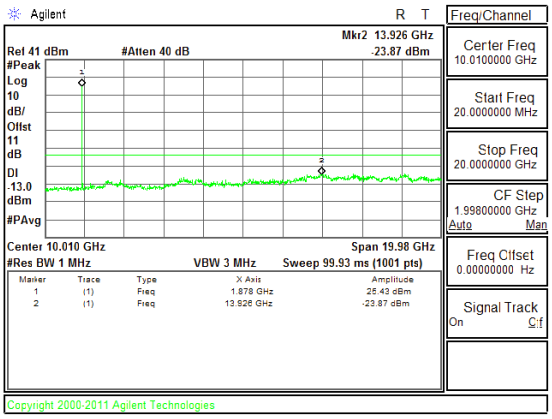
Band LTE2 20MHz 16QAM

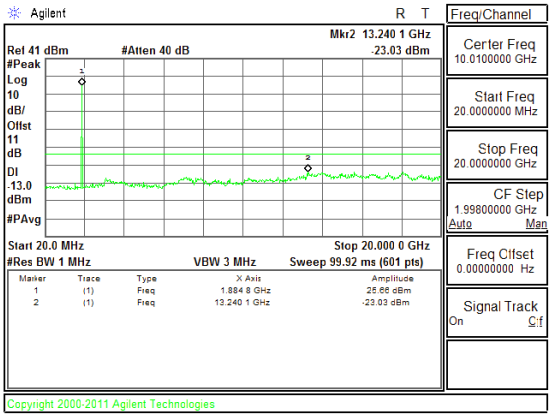


Band LTE2 20MHz CSE 16QAM Mid channel

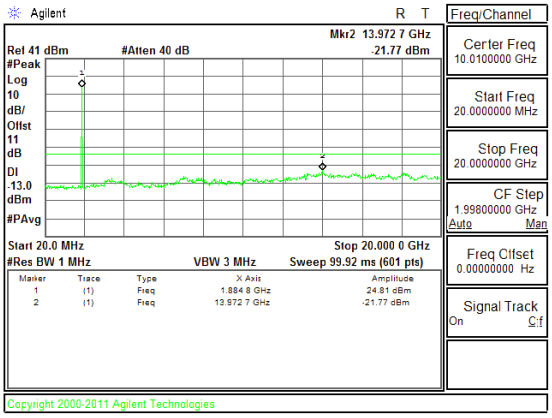


Band LTE2 20MHz CSE QPSK Mid channel

Band LTE2 15MHz 16QAM



Band LTE2 15MHz CSE 16QAM Mid channel



Band LTE2 15MHz CSE QPSK Mid channel

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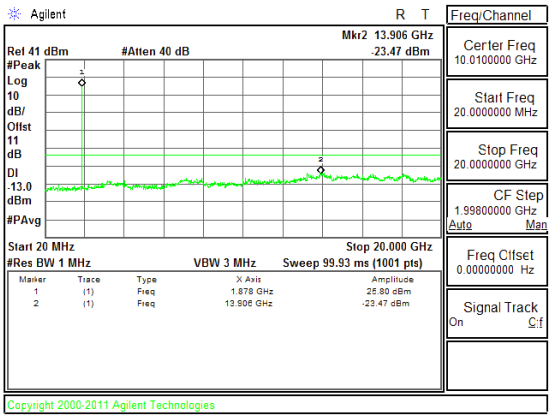
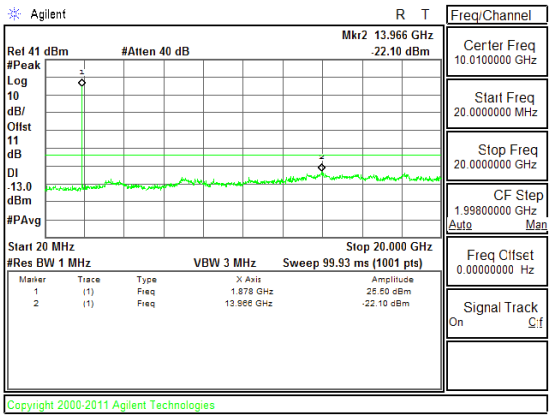
Band LTE2 10MHz 16QAM

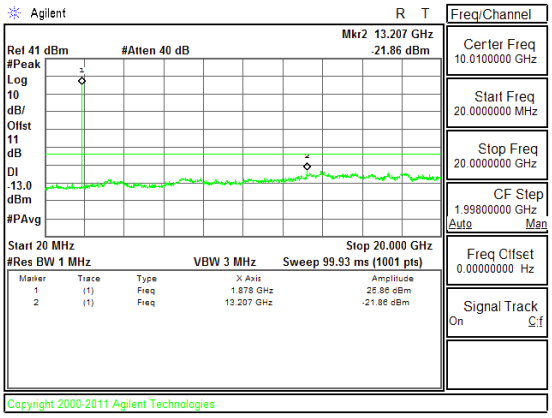


Band LTE2 10MHz CSE 16QAM Mid channel

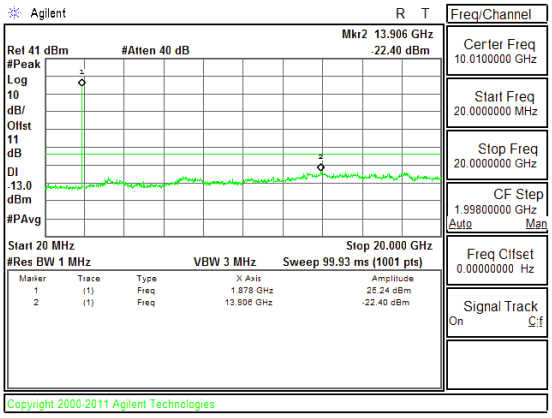


Band LTE2 10MHz CSE QPSK Mid channel

Band LTE2 5MHz 16QAM



Band LTE2 5MHz CSE 16QAM Mid channel



Band LTE2 5MHz CSE QPSK Mid channel

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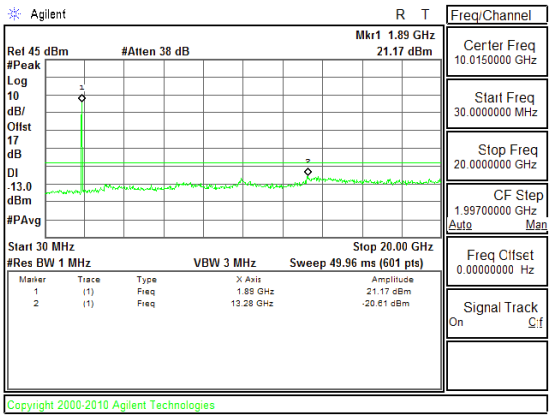
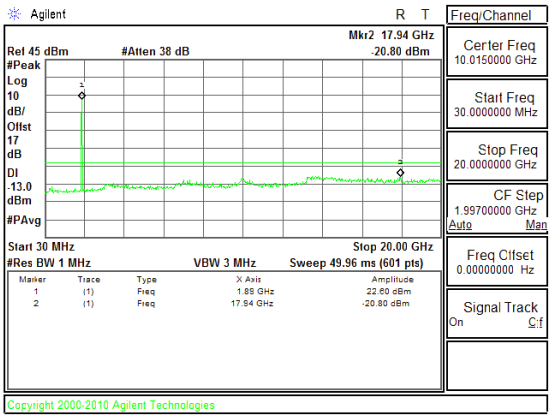
Band

Band 2

HSDPA



Band WCDMA B2 HSDPA CSE

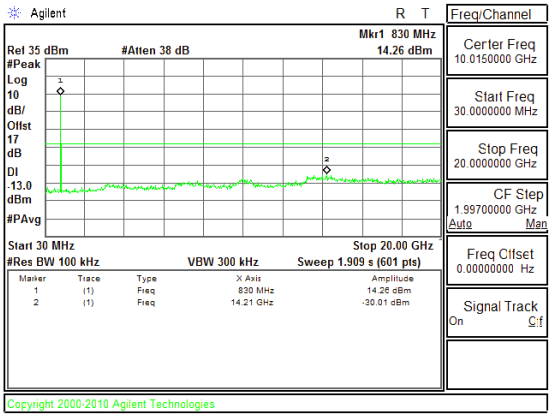


Band WCDMA B2 REL99 CSE

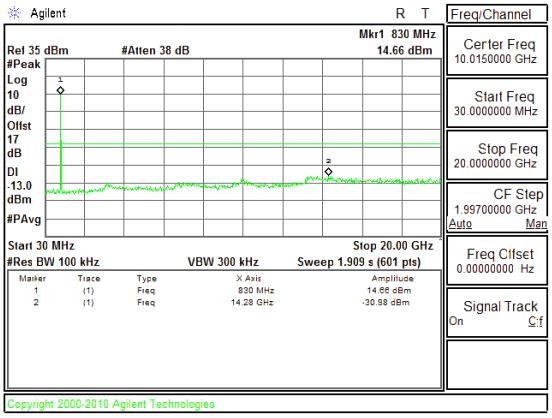
Band

Band 5

HSDPA



Band WCDMA B5 HSDPA CSE



Band WCDMA B5 REL99 CSE

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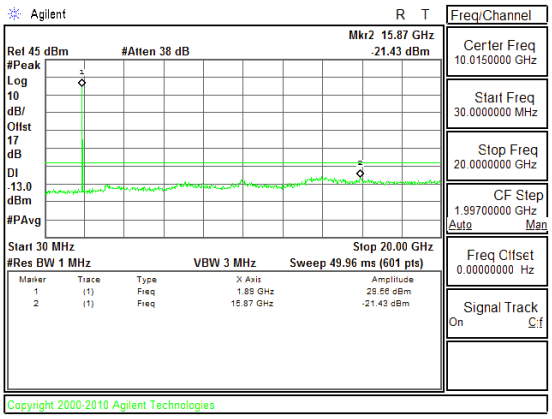
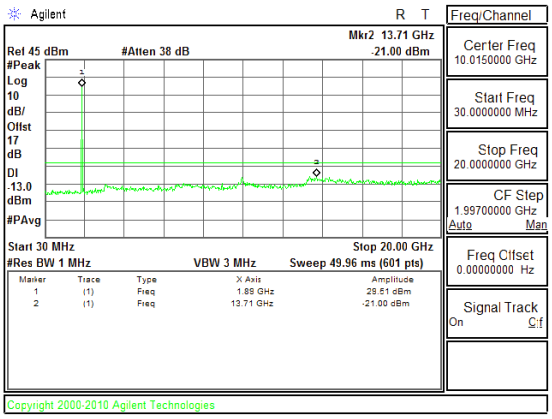
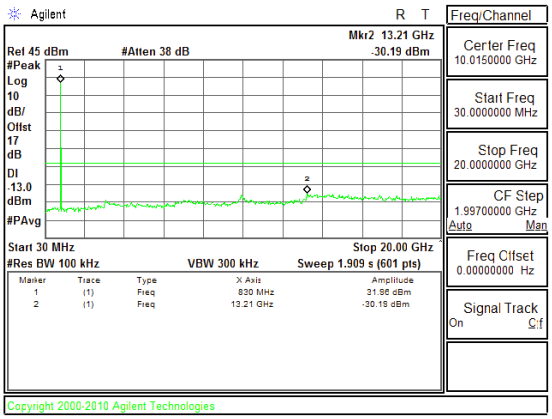
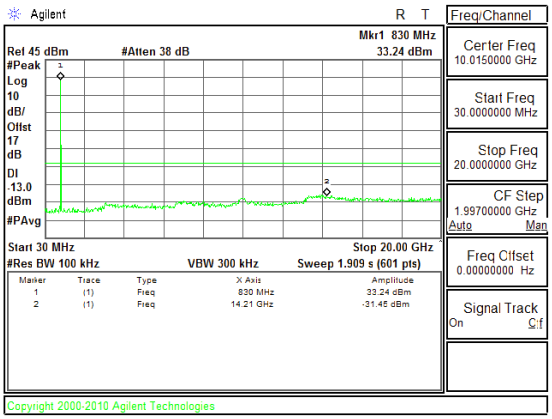
Band GSM1900 EGPRS	 Band GSM1900 EGPRS CSE Mid channel	 Band GSM1900 GPRS CSE Mid channel
Band GSM850 EGPRS	 Band GSM850 EGPRS CSE Mid channel	 Band GSM850 GPRS CSE Mid channel

UL VERIFICATION SERVICES INC.
47173 BENICIA STREET, FREMONT, CA 94538, USA
TEL: (510) 771-1000
FAX: (510) 661-0888

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10.4. FREQUENCY STABILITY

RULE PART(S)

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

LIMITS

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

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

TEST PROCEDURE

Per KDB 971168 D01 Power Meas License Digital Systems v02r01

MODES TESTED

GSM, WCDMA, LTE Band 5, LTE Band 2

RESULTS

See the following pages.

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10.4.1. FREQUENCY STABILITY RESULTS

GPRS 1900, Channel 661 Freq: 1880MHz– MID CHANNEL

Reference Frequency: PCS Mid Channel		1880	MHz @ 20°C	
Limit: to stay +- 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	1880.000018	0.000	2.5
3.80	40	1880.000019	0.000	2.5
3.80	30	1880.000019	0.000	2.5
3.80	***20***	**1880.000019**	**0**	***2.5***
3.80	10	1880.000024	-0.003	2.5
3.80	0	1879.999986	0.017	2.5
3.80	-10	1880.000018	0.000	2.5
3.80	-20	1880.000018	0.000	2.5
3.80	-30	1879.999982	0.019	2.5

Reference Frequency: PCS Mid Channel		1880	MHz @ 20°C	
Limit: to stay +- 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***	***1880.000019***	***0***	***2.5***
4.30	20	1880.000019	*0.000*	2.5
3.20	20	1880.000019	*0.000*	2.5

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GPRS 850 CELL BAND, – MID CHANNEL190, Frequency 836.6MHz

Reference Frequency: PCS Mid Channel		836.6	MHz @ 20°C	
Limit: to stay +- 2.5 ppm =		2091.500	Hz	
Power Supply (Vdc)	**Environment Temperature (°C)**	**Frequency Deviation Measureed with Time Elapse**		
		(MHz)	**Delta (ppm)**	**Limit (ppm)**
3.80	50	836.600016	0.000	2.5
3.80	40	836.600017	0.000	2.5
3.80	30	836.599974	0.050	2.5
3.80	***20***	**836.600016**	**0**	***2.5***
3.80	10	836.600016	0.000	2.5
3.80	0	836.600016	0.001	2.5
3.80	-10	836.600019	-0.003	2.5
3.80	-20	836.600035	-0.023	2.5
3.80	-30	836.599991	0.030	2.5

Reference Frequency: PCS Mid Channel		836.6	MHz @ 20°C	
Limit: to stay +- 2.5 ppm =		2091.500	Hz	
Power Supply (Vdc)	**Environment Temperature (°C)**	**Frequency Deviation Measureed with Time Elapse**		
		(MHz)	**Delta (ppm)**	**Limit (ppm)**
3.80	***20***	***836.600016***	***0***	***2.5***
4.30	20	836.6000183	*-0.002*	2.5
3.20	20	836.600018	*-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; PSA setting reference to 971168 D01 v02r01

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.

MODES TESTED

GSM, WCDMA, LTE Band 5, LTE Band 2

TEST RESULTS

11.1.1. ERP/EIRP Results

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Band	Mode	Channel	f(MHz)	ERP / EIRP	
				dBm	mW
Band 2	REL99	9262	1852.4	20.67	116.71
		9400	1880	19.61	91.41
		9538	1907.6	20.01	100.28
	HSDPA	9262	1852.4	19.61	91.31
		9400	1880	20.28	106.56
		9538	1907.6	17.84	60.8

Band	Mode	Channel	f(MHz)	ERP / EIRP	
				dBm	mW
Band 5	REL99	4132	826.4	19.00	79.47
		4183	836.6	19.60	91.24
		4233	846.6	20.33	107.92
	HSDPA	4132	826.4	17.86	61.04
		4183	836.6	18.32	67.9
		4233	846.6	19.32	85.47

Band	Mode	Channel	f(MHz)	ERP / EIRP	
				dBm	mW
GSM1900	GPRS	512	1850.2	26.66	463.02
		661	1880	27.54	567.94
		810	1909.8	27.20	525.29
	EGPRS	512	1850.2	26.26	422.47
		661	1880	27.13	515.94
		810	1909.8	26.47	443.51

Band	Mode	Channel	f(MHz)	ERP / EIRP	
				dBm	mW
GSM850	GPRS	128	824.2	27.91	618.59
		190	836.6	29.24	838.69
		251	848.8	29.62	915.59
	EGPRS	128	824.2	21.51	141.45
		190	836.6	22.79	189.98
		251	848.8	24.01	251.88

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11.1.2. LTE ERP/EIRP Results

Band	BW (MHz)	Mode	RB/RB Size	f (MHz)	ERP / EIRP	
					dBm	mW
LTE5	10	QPSK	1/0	829	16.64	46.16
			1/0	836.5	17.72	59.09
			1/0	844	18.81	75.98
		16QAM	1/0	829	15.85	38.49
			1/0	836.5	17.08	50.99
			1/0	844	18.02	63.34

Band	BW (MHz)	Mode	RB/RB Size	f (MHz)	ERP / EIRP	
					dBm	mW
LTE5	5	QPSK	1/0	826.5	16.82	48.12
			1/0	836.5	17.77	59.77
			1/0	846.5	19.08	80.85
		16QAM	1/0	826.5	15.86	38.57
			1/0	836.5	16.60	45.66
			1/0	846.5	17.95	62.33

Band	BW (MHz)	Mode	RB/RB Size	f (MHz)	ERP / EIRP	
					dBm	mW
LTE5	3	QPSK	1/0	825.5	16.76	47.46
			1/0	836.5	17.76	59.63
			1/0	847.5	19.45	88.04
		16QAM	1/0	825.5	15.62	36.5
			1/0	836.5	16.87	48.58
			1/0	847.5	18.59	72.23

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Band	BW (MHz)	Mode	RB/RB Size	f (MHz)	ERP / EIRP	
					dBm	mW
LTE5	1.4	QPSK	1/0	824.7	16.91	49.12
			1/0	836.5	18.28	67.22
			1/0	848.3	19.95	98.79
		16QAM	1/0	824.7	16.04	40.21
			1/0	836.5	16.33	42.9
			1/0	848.3	18.77	75.28

Band	BW (MHz)	Mode	RB/RB Size	f (MHz)	ERP / EIRP	
					dBm	mW
LTE2	20	QPSK	1/0	1860	22.85	192.75
			1/0	1880	21.33	135.83
			1/0	1900	20.95	124.45
		16QAM	1/0	1860	21.11	129.12
			1/0	1880	21.06	127.64
			1/0	1900	19.81	95.72

Band	BW (MHz)	Mode	RB/RB Size	f (MHz)	ERP / EIRP	
					dBm	mW
LTE2	15	QPSK	1/0	1857.5	22.05	160.32
			1/0	1880	21.84	152.76
			1/0	1902.5	22.2	165.96
		16QAM	1/0	1857.5	21.48	140.6
			1/0	1880	20.75	118.85
			1/0	1902.5	21.44	139.32

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Band	BW (MHz)	Mode	RB/RB Size	f (MHz)	ERP / EIRP	
					dBm	mW
LTE2	10	QPSK	1/0	1855	22	158.49
			1/0	1880	21.98	157.76
			1/0	1905	22.31	170.22
		16QAM	1/0	1855	21.65	146.22
			1/0	1880	20.97	125.03
			1/0	1905	21.52	141.91

Band	BW (MHz)	Mode	RB/RB Size	f (MHz)	ERP / EIRP	
					dBm	mW
LTE2	5	QPSK	1/0	1852.5	22.38	172.98
			1/0	1880	22.06	160.69
			1/0	1907.5	22.97	198.15
		16QAM	1/0	1852.5	21.76	149.97
			1/0	1880	20.87	122.18
			1/0	1907.5	21.9	154.88

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11.1.3. ERP/EIRP PLOTS

LTE Band 5

Band

LTE5

10MHz

16QAM

High Frequency Substitution Measurement
UL Verification Services, Inc. Chamber B

Company: Samsung
Project #: 14I18800
Date: 09/11/14
Test Engineer: G. Chan
Configuration: EUT Y-pos
Mode: LTE 10M 16QAM

Test Equipment:
Receiving: Hybrid T243, and Chamber B SMA Cables
Substitution: Dipole T416 Substitution, 4ft 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								
829.00	11.96	V	0.8		11.16	38.5	-27.3	
829.00	16.65	H	0.8		15.85	38.5	-22.6	
Mid Ch								
836.50	11.05	V	0.8		10.25	38.5	-28.3	
836.50	17.88	H	0.8		17.08	38.5	-21.4	
High Ch								
844.00	10.94	V	0.8		10.14	38.5	-28.4	
844.00	18.82	H	0.8		18.02	38.5	-20.5	

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

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Band

LTE5

10MHz

QPSK

High Frequency Substitution Measurement
UL Verification Services, Inc. Chamber B

Company: Samsung
Project #: 14I18800
Date: 09/11/14
Test Engineer: G. Chan
Configuration: EUT Y-pos
Mode: LTE 10M QPSK

Test Equipment:
Receiving: Hybrid T243, and Chamber B SMA Cables
Substitution: Dipole T416 Substitution, 4ft 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								
829.00	12.90	V	0.8		12.10	38.5	-26.4	
829.00	17.44	H	0.8		16.64	38.5	-21.9	
Mid Ch								
836.50	11.52	V	0.8		10.72	38.5	-27.8	
836.50	18.52	H	0.8		17.72	38.5	-20.8	
High Ch								
844.00	10.27	V	0.8		9.47	38.5	-29.0	
844.00	19.61	H	0.8		18.81	38.5	-19.7	

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

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Band

LTE5

5MHz

16QAM

High Frequency Substitution Measurement
UL Verification Services, Inc. Chamber B

Company: Samsung
Project #: 14I18800
Date: 09/11/14
Test Engineer: G. Chan
Configuration: EUT Y-pos
Mode: LTE 5M 16QAM

Test Equipment:
Receiving: Hybrid T243, and Chamber B SMA Cables
Substitution: Dipole T416 Substitution, 4ft 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								
826.50	12.22	V	0.8		11.42	38.5	-27.1	
826.50	16.66	H	0.8		15.86	38.5	-22.6	
Mid Ch								
836.50	12.07	V	0.8		11.27	38.5	-27.2	
836.50	17.40	H	0.8		16.60	38.5	-21.9	
High Ch								
846.50	11.76	V	0.8		10.96	38.5	-27.5	
846.50	18.75	H	0.8		17.95	38.5	-20.6	

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

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Band

LTE5

5MHz

QPSK

High Frequency Substitution Measurement
UL Verification Services, Inc. Chamber B

Company: Samsung
Project #: 14I18800
Date: 09/11/14
Test Engineer: G. Chan
Configuration: EUT Y-pos
Mode: LTE 5M QPSK

Test Equipment:
Receiving: Hybrid T243, and Chamber B SMA Cables
Substitution: Dipole T416 Substitution, 4ft 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								
826.50	13.03	V	0.8		12.23	38.5	-26.3	
826.50	17.62	H	0.8		16.82	38.5	-21.7	
Mid Ch								
836.50	13.24	V	0.8		12.44	38.5	-26.1	
836.50	18.57	H	0.8		17.77	38.5	-20.7	
High Ch								
846.50	12.64	V	0.8		11.84	38.5	-26.7	
846.50	19.88	H	0.8		19.08	38.5	-19.4	

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

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Band

LTE5

3MHz

16QAM

High Frequency Substitution Measurement
UL Verification Services, Inc. Chamber B

Company: Samsung
Project #: 14I18800
Date: 09/11/14
Test Engineer: G. Chan
Configuration: EUT Y-pos
Mode: LTE 3M 16QAM

Test Equipment:
Receiving: Hybrid T243, and Chamber B SMA Cables
Substitution: Dipole T416 Substitution, 4ft 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								
825.50	11.69	V	0.8		10.89	38.5	-27.6	
825.50	16.42	H	0.8		15.62	38.5	-22.9	
Mid Ch								
836.50	11.01	V	0.8		10.21	38.5	-28.3	
836.50	17.67	H	0.8		16.87	38.5	-21.6	
High Ch								
847.50	9.45	V	0.8		8.65	38.5	-29.9	
847.50	19.39	H	0.8		18.59	38.5	-19.9	

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

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Band

LTE5

3MHz

QPSK

High Frequency Substitution Measurement
UL Verification Services, Inc. Chamber B

Company: Samsung
Project #: 14I18800
Date: 09/11/14
Test Engineer: G. Chan
Configuration: EUT Y-pos
Mode: LTE 3M QPSK

Test Equipment:
Receiving: Hybrid T243, and Chamber B SMA Cables
Substitution: Dipole T416 Substitution, 4ft 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								
825.50	12.68	V	0.8		11.88	38.5	-26.6	
825.50	17.56	H	0.8		16.76	38.5	-21.7	
Mid Ch								
836.50	8.13	V	0.8		7.33	38.5	-31.2	
836.50	18.56	H	0.8		17.76	38.5	-20.7	
High Ch								
847.50	8.65	V	0.8		7.85	38.5	-30.7	
847.50	20.25	H	0.8		19.45	38.5	-19.1	

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

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Band

LTE5

1.4MHz

16QAM

High Frequency Substitution Measurement
UL Verification Services, Inc. Chamber B

Company: Samsung
Project #: 14I18800
Date: 09/11/14
Test Engineer: G. Chan
Configuration: EUT Y-pos
Mode: LTE 1.4M 16QAM

Test Equipment:
Receiving: Hybrid T243, and Chamber B SMA Cables
Substitution: Dipole T416 Substitution, 4ft 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								
824.70	11.34	V	0.8		10.54	38.5	-28.0	
824.70	16.84	H	0.8		16.04	38.5	-22.5	
Mid Ch								
836.50	10.81	V	0.8		10.01	38.5	-28.5	
836.50	17.13	H	0.8		16.33	38.5	-22.2	
High Ch								
848.30	10.14	V	0.8		9.34	38.5	-29.2	
848.30	19.57	H	0.8		18.77	38.5	-19.7	

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

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Band

LTE5

1.4MHz

QPSK

High Frequency Substitution Measurement
UL Verification Services, Inc. Chamber B

Company: Samsung
Project #: 14I18800
Date: 09/11/14
Test Engineer: G. Chan
Configuration: EUT Y-pos
Mode: LTE 1.4M QPSK

Test Equipment:
Receiving: Hybrid T243, and Chamber B SMA Cables
Substitution: Dipole T416 Substitution, 4ft 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								
824.70	12.56	V	0.8		11.76	38.5	-26.7	
824.70	17.71	H	0.8		16.91	38.5	-21.6	
Mid Ch								
836.50	11.05	V	0.8		10.25	38.5	-28.3	
836.50	19.08	H	0.8		18.28	38.5	-20.2	
High Ch								
848.30	10.28	V	0.8		9.48	38.5	-29.0	
848.30	20.75	H	0.8		19.95	38.5	-18.6	

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

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LTE Band 2

Band

LTE2

20MHz

16QAM

High Frequency Substitution Measurement
UL Verification Services, Inc. Chamber C

Company: Samsung
Project #: 14I18800
Date: 09/12/14
Test Engineer: J. Hsu
Configuration: Y EUT w/ AC Charger
Mode: LTE 2 20MHz 16QAM FUND

Test Equipment:
Receiving: Horn T119, and Chamber C SMA Cables
Substitution: Horn T59 Substitution, 4ft 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								
1860.00	14.11	V	0.9	7.9	21.11	33.0	-11.9	
1860.00	13.60	H	0.9	7.9	20.60	33.0	-12.4	
Mid Ch								
1880.00	14.06	V	0.9	7.9	21.06	33.0	-11.9	
1880.00	13.40	H	0.9	7.9	20.40	33.0	-12.6	
High Ch								
1900.00	12.76	V	0.9	7.9	19.81	33.0	-13.2	
1900.00	12.10	H	0.9	7.9	19.15	33.0	-13.9	

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

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Band

LTE2

20MHz

QPSK

High Frequency Substitution Measurement
UL Verification Services, Inc. Chamber C

Company: Samsung
Project #: 14I18800
Date: 09/12/14
Test Engineer: J. Hsu
Configuration: Y EUT w/ AC Charger
Mode: LTE 2 20MHz QPSK FUND

Test Equipment:
Receiving: Horn T119, and Chamber C SMA Cables
Substitution: Horn T59 Substitution, 4ft 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								
1860.00	15.85	V	0.9	7.9	22.85	33.0	-10.2	
1860.00	14.60	H	0.9	7.9	21.60	33.0	-11.4	
Mid Ch								
1880.00	14.33	V	0.9	7.9	21.33	33.0	-11.7	
1880.00	14.20	H	0.9	7.9	21.20	33.0	-11.8	
High Ch								
1900.00	13.90	V	0.9	7.9	20.95	33.0	-12.1	
1900.00	13.05	H	0.9	7.9	20.10	33.0	-12.9	

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

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Band

LTE2

15MHz

16QAM

High Frequency Substitution Measurement
UL Verification Services, Inc. Chamber C

Company: Samsung
Project #: 14I18800
Date: 09/12/14
Test Engineer: R. Alegre
Configuration: EUT w/ AC Charger
Mode: LTE 2 15MHz 16QAM FUND

Test Equipment:
Receiving: Horn T119, and Chamber C SMA Cables
Substitution: Horn T59 Substitution, 4ft 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								
1857.50	14.48	V	0.9	7.9	21.48	33.0	-11.5	
1857.50	13.01	H	0.9	7.9	20.01	33.0	-13.0	
Mid Ch								
1880.00	13.75	V	0.9	7.9	20.75	33.0	-12.3	
1880.00	13.44	H	0.9	7.9	20.44	33.0	-12.6	
High Ch								
1902.50	14.39	V	0.9	7.9	21.44	33.0	-11.6	
1902.50	13.66	H	0.9	7.9	20.71	33.0	-12.3	

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

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Band

LTE2

15MHz

QPSK

High Frequency Substitution Measurement
UL Verification Services, Inc. Chamber C

Company: Samsung
Project #: 14I18800
Date: 09/12/14
Test Engineer: R. Alegre
Configuration: EUT w/ AC Charger
Mode: LTE 2 15MHz QPSK FUND

Test Equipment:
Receiving: Horn T119, and Chamber C SMA Cables
Substitution: Horn T59 Substitution, 4ft 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								
1857.50	15.05	V	0.9	7.9	22.05	33.0	-11.0	
1857.50	14.12	H	0.9	7.9	21.12	33.0	-11.9	
Mid Ch								
1880.00	14.84	V	0.9	7.9	21.84	33.0	-11.2	
1880.00	14.21	H	0.9	7.9	21.21	33.0	-11.8	
High Ch								
1902.50	15.15	V	0.9	7.9	22.20	33.0	-10.8	
1902.50	14.68	H	0.9	7.9	21.73	33.0	-11.3	

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

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Band

LTE2

10MHz

16QAM

High Frequency Substitution Measurement
UL Verification Services, Inc. Chamber C

Company: Samsung
Project #: 14I18800
Date: 09/12/14
Test Engineer: R. Alegre
Configuration: EUT w/ AC Charger
Mode: LTE 2 10MHz 16QAM FUND

Test Equipment:
Receiving: Horn T119, and Chamber C SMA Cables
Substitution: Horn T59 Substitution, 4ft 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								
1855.00	14.65	V	0.9	7.9	21.65	33.0	-11.4	
1855.00	13.02	H	0.9	7.9	20.02	33.0	-13.0	
Mid Ch								
1880.00	13.97	V	0.9	7.9	20.97	33.0	-12.0	
1880.00	13.55	H	0.9	7.9	20.55	33.0	-12.5	
High Ch								
1905.00	14.47	V	0.9	7.9	21.52	33.0	-11.5	
1905.00	13.87	H	0.9	7.9	20.92	33.0	-12.1	

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

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Band

LTE2

10MHz

QPSK

High Frequency Substitution Measurement
UL Verification Services, Inc. Chamber C

Company: Samsung
Project #: 14I18800
Date: 09/12/14
Test Engineer: R. Alegre
Configuration: EUT w/ AC Charger
Mode: LTE 2 10MHz QPSK FUND

Test Equipment:
Receiving: Horn T119, and Chamber C SMA Cables
Substitution: Horn T59 Substitution, 4ft 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								
1855.00	15.00	V	0.9	7.9	22.00	33.0	-11.0	
1855.00	14.07	H	0.9	7.9	21.07	33.0	-11.9	
Mid Ch								
1880.00	14.98	V	0.9	7.9	21.98	33.0	-11.0	
1880.00	14.48	H	0.9	7.9	21.48	33.0	-11.5	
High Ch								
1905.00	15.26	V	0.9	7.9	22.31	33.0	-10.7	
1905.00	14.79	H	0.9	7.9	21.84	33.0	-11.2	

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

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Band

LTE2

5MHz

16QAM

High Frequency Substitution Measurement
UL Verification Services, Inc. Chamber C

Company: Samsung
Project #: 14I18800
Date: 09/12/14
Test Engineer: R. Alegre
Configuration: EUT w/ AC Charger
Mode: LTE 2 5MHz 16QAM FUND

Test Equipment:
Receiving: Horn T119, and Chamber C SMA Cables
Substitution: Horn T59 Substitution, 4ft 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								
1852.50	14.76	V	0.9	7.9	21.76	33.0	-11.2	
1852.50	13.94	H	0.9	7.9	20.94	33.0	-12.1	
Mid Ch								
1880.00	13.87	V	0.9	7.9	20.87	33.0	-12.1	
1880.00	13.59	H	0.9	7.9	20.59	33.0	-12.4	
High Ch								
1907.50	14.85	V	0.9	7.9	21.90	33.0	-11.1	
1907.50	13.90	H	0.9	7.9	20.95	33.0	-12.1	

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

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Band

LTE2

5MHz

QPSK

High Frequency Substitution Measurement
UL Verification Services, Inc. Chamber C

Company: Samsung
Project #: 14I18800
Date: 09/12/14
Test Engineer: R. Alegre
Configuration: EUT w/ AC Charger
Mode: LTE 2 5MHz QPSK FUND

Test Equipment:
Receiving: Horn T119, and Chamber C SMA Cables
Substitution: Horn T59 Substitution, 4ft 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								
1852.50	15.38	V	0.9	7.9	22.38	33.0	-10.6	
1852.50	14.75	H	0.9	7.9	21.75	33.0	-11.3	
Mid Ch								
1880.00	15.06	V	0.9	7.9	22.06	33.0	-10.9	
1880.00	14.68	H	0.9	7.9	21.68	33.0	-11.3	
High Ch								
1907.50	15.92	V	0.9	7.9	22.97	33.0	-10.0	
1907.50	14.88	H	0.9	7.9	21.93	33.0	-11.1	

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

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WCDMA

Band

Band 2

HSDPA

High Frequency Substitution Measurement
UL Verification Services, Inc. Chamber B

Company: Samsung
Project #: 14I18800
Date: 09/11/14
Test Engineer: G. Chan
Configuration: EUT Y-pos
Mode: WCDMA Band 2 HSDPA

Test Equipment:
Receiving: Horn T345, and Chamber B SMA Cables
Substitution: Horn T961 Substitution, 4ft 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	12.11	V	0.8	8.3	19.61	33.0	-13.4	
1852.40	5.56	H	0.8	8.3	13.06	33.0	-19.9	
Mid Ch								
1880.00	12.78	V	0.8	8.3	20.28	33.0	-12.7	
1880.00	3.98	H	0.8	8.3	11.48	33.0	-21.5	
High Ch								
1907.60	10.34	V	0.8	8.3	17.84	33.0	-15.2	
1907.60	6.18	H	0.8	8.3	13.68	33.0	-19.3	

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

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Band

Band 2

REL99

High Frequency Substitution Measurement
UL Verification Services, Inc. Chamber B

Company: Samsung
Project #: 14I18800
Date: 09/11/14
Test Engineer: G. Chan
Configuration: EUT Y-pos
Mode: WCDMA Band 2 REL99

Test Equipment:
Receiving: Horn T345, and Chamber B SMA Cables
Substitution: Horn T961 Substitution, 4ft 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	13.17	V	0.8	8.3	20.67	33.0	-12.3	
1852.40	6.56	H	0.8	8.3	14.06	33.0	-18.9	
Mid Ch								
1880.00	12.11	V	0.8	8.3	19.61	33.0	-13.4	
1880.00	5.77	H	0.8	8.3	13.27	33.0	-19.7	
High Ch								
1907.60	12.51	V	0.8	8.3	20.01	33.0	-13.0	
1907.60	7.96	H	0.8	8.3	15.46	33.0	-17.5	

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

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Band

Band 5

HSDPA

High Frequency Substitution Measurement
UL Verification Services, Inc. Chamber B

Company: Samsung
Project #: 14I18800
Date: 09/11/14
Test Engineer: O. Stoelting
Configuration: Y-pos EUT
Mode: WCDMA Band 5 HSDPA

Test Equipment:
Receiving: Sunol T243, and 3m Chamber B N-type Cable
Substitution: Dipole S/N: 00022117, 4ft SMA Cable (SN # 245200 001) 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	14.06	V	0.9	0.0	13.17	38.5	-25.3	
826.40	18.76	H	0.9	0.0	17.86	38.5	-20.6	
Mid Ch								
836.60	14.11	V	0.9	0.0	13.22	38.5	-25.2	
836.60	19.22	H	0.9	0.0	18.32	38.5	-20.1	
High Ch								
846.60	14.43	V	0.9	0.0	13.54	38.5	-24.9	
846.60	20.22	H	0.9	0.0	19.32	38.5	-19.1	

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

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Band

Band 5

REL99

High Frequency Substitution Measurement
UL Verification Services, Inc. Chamber C

Company: Samsung
Project #: 14I18800
Date: 09/11/14
Test Engineer: O. Stoelting
Configuration: Y-pos EUT
Mode: WCDMA Band 5 Rel 99

Test Equipment:
Receiving: Sunol T243, and 3m Chamber B N-type Cable
Substitution: Dipole S/N: 00022117, 4ft SMA Cable (SN # 245200 001) 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	15.99	V	0.9	0.0	15.09	38.5	-23.4	
826.40	19.90	H	0.9	0.0	19.00	38.5	-19.4	
Mid Ch								
836.60	15.20	V	0.9	0.0	14.30	38.5	-24.2	
836.60	20.50	H	0.9	0.0	19.60	38.5	-18.8	
High Ch								
846.60	15.35	V	0.9	0.0	14.45	38.5	-24.0	
846.60	21.23	H	0.9	0.0	20.33	38.5	-18.1	

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

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GSM

Band

GSM 1900

EGPRS

High Frequency Substitution Measurement
UL Verification Services, Inc. Chamber B

Company: Samsung
Project #: 14I18800
Date: 09/11/14
Test Engineer: G. Chan
Configuration: EUT Y pos
Mode: GSM EGPRS 1900

Test Equipment:
Receiving: Horn T345, and Chamber B SMA Cables
Substitution: Horn T961 Substitution, 4ft 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								
1850.20	18.76	V	0.8	8.3	26.26	33.0	-6.7	
1850.20	12.22	H	0.8	8.3	19.72	33.0	-13.3	
Mid Ch								
1880.00	19.63	V	0.8	8.3	27.13	33.0	-5.9	
1880.00	12.36	H	0.8	8.3	19.86	33.0	-13.1	
High Ch								
1909.80	18.97	V	0.8	8.3	26.47	33.0	-6.5	
1909.80	14.73	H	0.8	8.3	22.23	33.0	-10.8	

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

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Band

GSM 1900

GPRS

High Frequency Substitution Measurement
UL Verification Services, Inc. Chamber B

Company: Samsung
Project #: 14I18800
Date: 09/11/14
Test Engineer: G. Chan
Configuration: EUT Y pos
Mode: GSM GPRS 1900

Test Equipment:
Receiving: Horn T345, and Chamber B SMA Cables
Substitution: Horn T961 Substitution, 4ft 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								
1850.20	19.16	V	0.8	8.3	26.66	33.0	-6.3	
1850.20	13.48	H	0.8	8.3	20.98	33.0	-12.0	
Mid Ch								
1880.00	20.04	V	0.8	8.3	27.54	33.0	-5.5	
1880.00	13.50	H	0.8	8.3	21.00	33.0	-12.0	
High Ch								
1909.80	19.70	V	0.8	8.3	27.20	33.0	-5.8	
1909.80	15.39	H	0.8	8.3	22.89	33.0	-10.1	

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

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Band

GSM 850

EGPRS

High Frequency Substitution Measurement
UL Verification Services, Inc. Chamber B

Company: Samsung
Project #: 14I18800
Date: 09/11/14
Test Engineer: O. Stoelting
Configuration: Y-pos EUT
Mode: EGPRS850

Test Equipment:
Receiving: Sunol T243, and 5m Chamber B N-type Cable
Substitution: Dipole S/N: 00022117, 4ft SMA Cable (SN # 245200 001) 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	11.57	V	0.9	0.0	10.67	38.5	-27.8	
824.20	22.41	H	0.9	0.0	21.51	38.5	-16.9	
Mid Ch								
836.60	18.28	V	0.9	0.0	17.38	38.5	-21.1	
836.60	23.69	H	0.9	0.0	22.79	38.5	-15.7	
High Ch								
848.80	18.79	V	0.9	0.0	17.89	38.5	-20.6	
848.80	24.91	H	0.9	0.0	24.01	38.5	-14.4	

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

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Band

GSM 850

GPRS

High Frequency Substitution Measurement
UL Verification Services, Inc. Chamber B

Company: Samsung
Project #: 14I18800
Date: 09/11/14
Test Engineer: O. Stoelting
Configuration: Y-pos EUT
Mode: GPRS850

Test Equipment:
Receiving: Sunol T243, and 5m Chamber B N-type Cable
Substitution: Dipole S/N: 00022117, 4ft SMA Cable (SN # 245200 001) 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	24.69	V	0.9	0.0	23.79	38.5	-14.7	
824.20	28.81	H	0.9	0.0	27.91	38.5	-10.5	
Mid Ch								
836.60	18.96	V	0.9	0.0	18.06	38.5	-20.4	
836.60	30.14	H	0.9	0.0	29.24	38.5	-9.2	
High Ch								
848.80	24.92	V	0.9	0.0	24.02	38.5	-14.4	
848.80	30.52	H	0.9	0.0	29.62	38.5	-8.8	

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, and §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.

MODES TESTED

GSM, WCDMA, LTE Band 5, LTE Band 2

RESULTS

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701I
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11.2.1. SPURIOUS RADIATION PLOTS

LTE Band 5

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 14I18800
Date: 09/13/14
Test Engineer: R. Alegre
Configuration: EUT w/ AC Charger + HS
Mode: LTE5 16QAM 10MHz Harm

Chamber	Pre-amplifer	Filter	Limit
3m Chamber	T34 8449B	Filter 1	Part 22

Band: LTE5 10MHz 16QAM

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 829MHz									
1.658	-28.7	V	3.0	37.4	1.0	-65.0	-13.0	-52.0	
2.487	-24.0	V	3.0	36.4	1.0	-59.4	-13.0	-46.4	
3.316	-21.2	V	3.0	35.8	1.0	-56.0	-13.0	-43.0	
1.658	-28.4	H	3.0	37.4	1.0	-64.8	-13.0	-51.8	
2.487	-25.5	H	3.0	36.4	1.0	-60.9	-13.0	-47.9	
3.316	-21.6	H	3.0	35.8	1.0	-56.4	-13.0	-43.4	
Mid Ch, 836.5MHz									
1.673	-28.0	V	3.0	37.3	1.0	-64.3	-13.0	-51.3	
2.510	-23.0	V	3.0	36.4	1.0	-58.4	-13.0	-45.4	
3.346	-21.6	V	3.0	35.8	1.0	-56.4	-13.0	-43.4	
1.673	-28.3	H	3.0	37.3	1.0	-64.7	-13.0	-51.7	
2.510	-25.3	H	3.0	36.4	1.0	-60.6	-13.0	-47.6	
3.346	-21.7	H	3.0	35.8	1.0	-56.4	-13.0	-43.4	
High Ch, 844MHz									
1.688	-28.0	V	3.0	37.3	1.0	-64.3	-13.0	-51.3	
2.532	-23.7	V	3.0	36.3	1.0	-59.0	-13.0	-46.0	
3.376	-21.3	V	3.0	35.7	1.0	-56.0	-13.0	-43.0	
1.688	-27.7	H	3.0	37.3	1.0	-64.0	-13.0	-51.0	
2.532	-25.0	H	3.0	36.3	1.0	-60.4	-13.0	-47.4	
3.376	-22.1	H	3.0	35.7	1.0	-56.9	-13.0	-43.9	

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

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Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 14I18800
Date: 09/13/14
Test Engineer: R. Alegre
Configuration: EUT w/ AC Charger + HS
Mode: LTE5 QPSK 10MHz Harm

Chamber	Pre-amplifer	Filter	Limit
3m Chamber	T34 8449B	Filter 1	Part 22

Band: LTE5 10MHz QPSK

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 829MHz									
1.658	-27.8	V	3.0	37.4	1.0	-64.2	-13.0	-51.2	
2.487	-23.7	V	3.0	36.4	1.0	-59.0	-13.0	-46.0	
3.316	-20.5	V	3.0	35.8	1.0	-55.3	-13.0	-42.3	
1.658	-27.6	H	3.0	37.4	1.0	-64.0	-13.0	-51.0	
2.487	-25.8	H	3.0	36.4	1.0	-61.1	-13.0	-48.1	
3.316	-21.1	H	3.0	35.8	1.0	-55.8	-13.0	-42.8	
Mid Ch, 836.5MHz									
1.673	-27.3	V	3.0	37.3	1.0	-63.6	-13.0	-50.6	
2.510	-22.6	V	3.0	36.4	1.0	-57.9	-13.0	-44.9	
3.346	-21.1	V	3.0	35.8	1.0	-55.8	-13.0	-42.8	
1.673	-27.3	H	3.0	37.3	1.0	-63.7	-13.0	-50.7	
2.510	-24.3	H	3.0	36.4	1.0	-59.7	-13.0	-46.7	
3.346	-21.0	H	3.0	35.8	1.0	-55.8	-13.0	-42.8	
High Ch, 844MHz									
1.688	-27.0	V	3.0	37.3	1.0	-63.3	-13.0	-50.3	
2.532	-23.6	V	3.0	36.3	1.0	-58.9	-13.0	-45.9	
3.376	-20.4	V	3.0	35.7	1.0	-55.2	-13.0	-42.2	
1.688	-27.7	H	3.0	37.3	1.0	-64.0	-13.0	-51.0	
2.532	-25.5	H	3.0	36.3	1.0	-60.8	-13.0	-47.8	
3.376	-21.8	H	3.0	35.7	1.0	-56.5	-13.0	-43.5	

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

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Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 14I18800
Date: 09/13/14
Test Engineer: R. Alegre
Configuration: EUT w/ AC Charger + HS
Mode: LTE5 16QAM 5MHz Harm

Chamber	Pre-amplifer	Filter	Limit
3m Chamber	T34 8449B	Filter 1	Part 22

Band
LTE5
5MHz
16QAM

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 826.5MHz									
1.653	-27.6	V	3.0	37.4	1.0	-63.9	-13.0	-50.9	
2.480	-23.5	V	3.0	36.4	1.0	-58.9	-13.0	-45.9	
3.306	-21.0	V	3.0	35.8	1.0	-55.8	-13.0	-42.8	
1.653	-28.8	H	3.0	37.4	1.0	-65.1	-13.0	-52.1	
2.480	-24.0	H	3.0	36.4	1.0	-59.4	-13.0	-46.4	
3.306	-22.4	H	3.0	35.8	1.0	-57.2	-13.0	-44.2	
Mid Ch, 836.5MHz									
1.673	-27.3	V	3.0	37.3	1.0	-63.6	-13.0	-50.6	
2.510	-23.9	V	3.0	36.4	1.0	-59.2	-13.0	-46.2	
3.346	-21.1	V	3.0	35.8	1.0	-55.8	-13.0	-42.8	
1.673	-27.6	H	3.0	37.3	1.0	-63.9	-13.0	-50.9	
2.510	-25.1	H	3.0	36.4	1.0	-60.5	-13.0	-47.5	
3.346	-21.1	H	3.0	35.8	1.0	-55.8	-13.0	-42.8	
High Ch, 846.5MHz									
1.693	-26.8	V	3.0	37.3	1.0	-63.1	-13.0	-50.1	
2.540	-23.3	V	3.0	36.3	1.0	-58.6	-13.0	-45.6	
3.386	-20.7	V	3.0	35.7	1.0	-55.4	-13.0	-42.4	
1.693	-27.2	H	3.0	37.3	1.0	-63.5	-13.0	-50.5	
2.540	-24.4	H	3.0	36.3	1.0	-59.8	-13.0	-46.8	
3.386	-22.0	H	3.0	35.7	1.0	-56.7	-13.0	-43.7	

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

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Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 14I18800
Date: 09/13/14
Test Engineer: R. Alegre
Configuration: EUT w/ AC Charger + HS
Mode: LTE5 QPSK 5MHz Harm

Chamber	Pre-amplifer	Filter	Limit
3m Chamber	T34 8449B	Filter 1	Part 22

Band: LTE5 5MHz QPSK

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 826.5MHz									
1.653	-28.0	V	3.0	37.4	1.0	-64.3	-13.0	-51.3	
2.480	-23.3	V	3.0	36.4	1.0	-58.7	-13.0	-45.7	
3.306	-21.4	V	3.0	35.8	1.0	-56.2	-13.0	-43.2	
1.653	-26.8	H	3.0	37.4	1.0	-63.2	-13.0	-50.2	
2.480	-25.0	H	3.0	36.4	1.0	-60.3	-13.0	-47.3	
3.306	-22.2	H	3.0	35.8	1.0	-57.0	-13.0	-44.0	
Mid Ch, 836.5MHz									
1.673	-26.8	V	3.0	37.3	1.0	-63.1	-13.0	-50.1	
2.510	-23.5	V	3.0	36.4	1.0	-58.8	-13.0	-45.8	
3.346	-21.5	V	3.0	35.8	1.0	-56.3	-13.0	-43.3	
1.673	-28.4	H	3.0	37.3	1.0	-64.7	-13.0	-51.7	
2.510	-24.8	H	3.0	36.4	1.0	-60.2	-13.0	-47.2	
3.346	-20.9	H	3.0	35.8	1.0	-55.7	-13.0	-42.7	
High Ch, 846.5MHz									
1.693	-27.3	V	3.0	37.3	1.0	-63.6	-13.0	-50.6	
2.540	-22.7	V	3.0	36.3	1.0	-58.0	-13.0	-45.0	
3.386	-21.3	V	3.0	35.7	1.0	-56.0	-13.0	-43.0	
1.693	-26.9	H	3.0	37.3	1.0	-63.2	-13.0	-50.2	
2.540	-25.2	H	3.0	36.3	1.0	-60.6	-13.0	-47.6	
3.386	-21.5	H	3.0	35.7	1.0	-56.2	-13.0	-43.2	

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

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Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 14I18800
Date: 09/13/14
Test Engineer: R. Alegre
Configuration: EUT w/ AC Charger + HS
Mode: LTE5 16QAM 3MHz Harm

Chamber	Pre-amplifer	Filter	Limit
3m Chamber	T34 8449B	Filter 1	Part 22

Band
LTE5
3MHz
16QAM

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 825.5MHz									
1.651	-28.3	V	3.0	37.4	1.0	-64.6	-13.0	-51.6	
2.477	-22.8	V	3.0	36.4	1.0	-58.2	-13.0	-45.2	
3.302	-20.6	V	3.0	35.8	1.0	-55.4	-13.0	-42.4	
1.651	-27.7	H	3.0	37.4	1.0	-64.1	-13.0	-51.1	
2.477	-25.2	H	3.0	36.4	1.0	-60.6	-13.0	-47.6	
3.302	-21.4	H	3.0	35.8	1.0	-56.2	-13.0	-43.2	
Mid Ch, 836.5MHz									
1.673	-27.2	V	3.0	37.3	1.0	-63.6	-13.0	-50.6	
2.510	-22.4	V	3.0	36.4	1.0	-57.7	-13.0	-44.7	
3.346	-20.8	V	3.0	35.8	1.0	-55.5	-13.0	-42.5	
1.673	-27.3	H	3.0	37.3	1.0	-63.6	-13.0	-50.6	
2.510	-24.4	H	3.0	36.4	1.0	-59.7	-13.0	-46.7	
3.346	-22.1	H	3.0	35.8	1.0	-56.8	-13.0	-43.8	
High Ch, 847.5MHz									
1.695	-27.2	V	3.0	37.3	1.0	-63.5	-13.0	-50.5	
2.543	-23.5	V	3.0	36.3	1.0	-58.9	-13.0	-45.9	
3.390	-20.3	V	3.0	35.7	1.0	-55.0	-13.0	-42.0	
1.695	-28.1	H	3.0	37.3	1.0	-64.4	-13.0	-51.4	
2.543	-25.0	H	3.0	36.3	1.0	-60.3	-13.0	-47.3	
3.390	-21.1	H	3.0	35.7	1.0	-55.8	-13.0	-42.8	

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

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Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 14I18800
Date: 09/13/14
Test Engineer: R. Alegre
Configuration: EUT w/ AC Charger + HS
Mode: LTE5 QPSK 3MHz Harm

Chamber	Pre-amplifer	Filter	Limit
3m Chamber	T34 8449B	Filter 1	Part 22

Band: LTE5 3MHz QPSK

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 825.5MHz									
1.651	-27.5	V	3.0	37.4	1.0	-63.9	-13.0	-50.9	
2.477	-23.3	V	3.0	36.4	1.0	-58.7	-13.0	-45.7	
3.302	-20.0	V	3.0	35.8	1.0	-54.8	-13.0	-41.8	
1.651	-28.0	H	3.0	37.4	1.0	-64.4	-13.0	-51.4	
2.477	-24.4	H	3.0	36.4	1.0	-59.8	-13.0	-46.8	
3.302	-21.5	H	3.0	35.8	1.0	-56.3	-13.0	-43.3	
Mid Ch, 836.5MHz									
1.673	-27.8	V	3.0	37.3	1.0	-64.1	-13.0	-51.1	
2.510	-22.4	V	3.0	36.4	1.0	-57.7	-13.0	-44.7	
3.346	-21.6	V	3.0	35.8	1.0	-56.4	-13.0	-43.4	
1.673	-26.7	H	3.0	37.3	1.0	-63.1	-13.0	-50.1	
2.510	-24.7	H	3.0	36.4	1.0	-60.0	-13.0	-47.0	
3.346	-21.9	H	3.0	35.8	1.0	-56.6	-13.0	-43.6	
High Ch, 847.5MHz									
1.695	-27.0	V	3.0	37.3	1.0	-63.3	-13.0	-50.3	
2.543	-23.5	V	3.0	36.3	1.0	-58.8	-13.0	-45.8	
3.390	-20.3	V	3.0	35.7	1.0	-55.0	-13.0	-42.0	
1.695	-27.3	H	3.0	37.3	1.0	-63.6	-13.0	-50.6	
2.543	-24.5	H	3.0	36.3	1.0	-59.9	-13.0	-46.9	
3.390	-22.2	H	3.0	35.7	1.0	-56.9	-13.0	-43.9	

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

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Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 14I18800
Date: 09/13/14
Test Engineer: R. Alegre
Configuration: EUT w/ AC Charger + HS
Mode: LTE5 1.4MHz 16QAM HARM

Chamber	Pre-amplifer	Filter	Limit
3m Chamber	T34 8449B	Filter 1	Part 22

Band
LTE5
1.4MHz
16QAM

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 824.7MHz									
1.649	-27.5	V	3.0	37.4	1.0	-63.9	-13.0	-50.9	
2.474	-24.3	V	3.0	36.4	1.0	-59.7	-13.0	-46.7	
3.299	-21.5	V	3.0	35.8	1.0	-56.3	-13.0	-43.3	
1.649	-28.7	H	3.0	37.4	1.0	-65.1	-13.0	-52.1	
2.474	-25.6	H	3.0	36.4	1.0	-61.0	-13.0	-48.0	
3.299	-20.7	H	3.0	35.8	1.0	-55.5	-13.0	-42.5	
Mid Ch, 836.5MHz									
1.673	-27.5	V	3.0	37.3	1.0	-63.9	-13.0	-50.9	
2.510	-23.6	V	3.0	36.4	1.0	-58.9	-13.0	-45.9	
3.346	-22.4	V	3.0	35.8	1.0	-57.2	-13.0	-44.2	
1.673	-28.2	H	3.0	37.3	1.0	-64.5	-13.0	-51.5	
2.510	-24.8	H	3.0	36.4	1.0	-60.2	-13.0	-47.2	
3.346	-21.7	H	3.0	35.8	1.0	-56.5	-13.0	-43.5	
High Ch, 848.3MHz									
1.697	-28.1	V	3.0	37.3	1.0	-64.4	-13.0	-51.4	
2.545	-22.8	V	3.0	36.3	1.0	-58.1	-13.0	-45.1	
3.393	-21.6	V	3.0	35.7	1.0	-56.3	-13.0	-43.3	
1.697	-27.1	H	3.0	37.3	1.0	-63.4	-13.0	-50.4	
2.545	-25.8	H	3.0	36.3	1.0	-61.2	-13.0	-48.2	
3.393	-21.4	H	3.0	35.7	1.0	-56.1	-13.0	-43.1	

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

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Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 14I18800
Date: 09/13/14
Test Engineer: R. Alegre
Configuration: EUT w/ AC Charger + HS
Mode: LTE5 1.4MHz QPSK HARM

Chamber	Pre-amplifer	Filter	Limit
3m Chamber	T34 8449B	Filter 1	Part 22

Band: LTE5 1.4MHz QPSK

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 824.7MHz									
1.649	-26.9	V	3.0	37.4	1.0	-63.3	-13.0	-50.3	
2.474	-23.7	V	3.0	36.4	1.0	-59.1	-13.0	-46.1	
3.299	-20.6	V	3.0	35.8	1.0	-55.4	-13.0	-42.4	
1.649	-27.6	H	3.0	37.4	1.0	-63.9	-13.0	-50.9	
2.474	-25.0	H	3.0	36.4	1.0	-60.4	-13.0	-47.4	
3.299	-20.7	H	3.0	35.8	1.0	-55.5	-13.0	-42.5	
Mid Ch, 836.5MHz									
1.673	-27.3	V	3.0	37.3	1.0	-63.6	-13.0	-50.6	
2.510	-22.4	V	3.0	36.4	1.0	-57.8	-13.0	-44.8	
3.346	-21.5	V	3.0	35.8	1.0	-56.3	-13.0	-43.3	
1.673	-27.4	H	3.0	37.3	1.0	-63.7	-13.0	-50.7	
2.510	-25.0	H	3.0	36.4	1.0	-60.4	-13.0	-47.4	
3.346	-21.2	H	3.0	35.8	1.0	-56.0	-13.0	-43.0	
High Ch, 848.3MHz									
1.697	-27.5	V	3.0	37.3	1.0	-63.8	-13.0	-50.8	
2.545	-23.2	V	3.0	36.3	1.0	-58.5	-13.0	-45.5	
3.393	-21.1	V	3.0	35.7	1.0	-55.8	-13.0	-42.8	
1.697	-26.7	H	3.0	37.3	1.0	-63.0	-13.0	-50.0	
2.545	-25.3	H	3.0	36.3	1.0	-60.6	-13.0	-47.6	
3.393	-21.4	H	3.0	35.7	1.0	-56.1	-13.0	-43.1	

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

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LTE Band 2

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 14I8800
Date: 09/12/14
Test Engineer: J. Hsu
Configuration: EUT w/ AC Adaptor + HS, Y-pos
Mode: LTE2 16QAM 15MHz Harm

Chamber	Pre-amplifer	Filter	Limit
3m Chamber	T34 8449B	Filter 1	Part 24

Band
LTE2
20MHz
16QAM

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 1860MHz									
3.720	-14.7	V	3.0	35.4	1.0	-49.0	-13.0	-36.0	
5.580	-9.6	V	3.0	34.7	1.0	-43.3	-13.0	-30.3	
7.440	-12.3	V	3.0	34.9	1.0	-46.2	-13.0	-33.2	
3.720	-12.6	H	3.0	35.4	1.0	-47.0	-13.0	-34.0	
5.580	-2.3	H	3.0	34.7	1.0	-36.0	-13.0	-23.0	
7.440	-11.0	H	3.0	34.9	1.0	-44.9	-13.0	-31.9	
Mid Ch,1880MHz									
3.760	-15.1	V	3.0	35.3	1.0	-49.4	-13.0	-36.4	
5.640	-5.3	V	3.0	34.7	1.0	-39.0	-13.0	-26.0	
7.520	-11.1	V	3.0	34.9	1.0	-45.0	-13.0	-32.0	
3.760	-10.4	H	3.0	35.3	1.0	-44.7	-13.0	-31.7	
5.640	-1.3	H	3.0	34.7	1.0	-35.0	-13.0	-22.0	
7.520	-10.1	H	3.0	34.9	1.0	-44.0	-13.0	-31.0	
High Ch, 1900MHz									
3.800	-15.8	V	3.0	35.3	1.0	-50.1	-13.0	-37.1	
5.700	-5.6	V	3.0	34.7	1.0	-39.3	-13.0	-26.3	
7.600	-11.4	V	3.0	34.9	1.0	-45.3	-13.0	-32.3	
3.800	-9.1	H	3.0	35.3	1.0	-43.4	-13.0	-30.4	
5.700	-0.4	H	3.0	34.7	1.0	-34.2	-13.0	-21.2	
7.600	-8.2	H	3.0	34.9	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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Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 14I8800
Date: 09/12/14
Test Engineer: J. Hsu
Configuration: EUT w/ AC Adaptor + HS, Y-pos
Mode: LTE2 QPSK 15MHz Harm

Chamber	Pre-amplifer	Filter	Limit
3m Chamber	T34 8449B	Filter 1	Part 24

Band: LTE2 20MHz QPSK

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 1860MHz									
3.720	-14.8	V	3.0	35.4	1.0	-49.1	-13.0	-36.1	
5.580	-10.0	V	3.0	34.7	1.0	-43.8	-13.0	-30.8	
7.440	-13.0	V	3.0	34.9	1.0	-46.9	-13.0	-33.9	
3.720	-13.1	H	3.0	35.4	1.0	-47.5	-13.0	-34.5	
5.580	-1.9	H	3.0	34.7	1.0	-35.6	-13.0	-22.6	
7.440	-11.9	H	3.0	34.9	1.0	-45.9	-13.0	-32.9	
Mid Ch,1880MHz									
3.760	-14.4	V	3.0	35.3	1.0	-48.7	-13.0	-35.7	
5.640	-5.6	V	3.0	34.7	1.0	-39.4	-13.0	-26.4	
7.520	-9.2	V	3.0	34.9	1.0	-43.1	-13.0	-30.1	
3.760	-10.0	H	3.0	35.3	1.0	-44.3	-13.0	-31.3	
5.640	-0.6	H	3.0	34.7	1.0	-34.4	-13.0	-21.4	
7.520	-9.1	H	3.0	34.9	1.0	-43.0	-13.0	-30.0	
High Ch, 1900MHz									
3.800	-16.8	V	3.0	35.3	1.0	-51.1	-13.0	-38.1	
5.700	-3.5	V	3.0	34.7	1.0	-37.2	-13.0	-24.2	
7.600	-11.5	V	3.0	34.9	1.0	-45.4	-13.0	-32.4	
3.800	-8.9	H	3.0	35.3	1.0	-43.2	-13.0	-30.2	
5.700	-0.7	H	3.0	34.7	1.0	-34.4	-13.0	-21.4	
7.600	-8.2	H	3.0	34.9	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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Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 14I8800
Date: 09/12/14
Test Engineer: J. Hsu
Configuration: EUT w/ AC Adaptor + HS, Y-pos
Mode: LTE2 16QAM 15MHz Harm

Chamber	Pre-amplifer	Filter	Limit
3m Chamber	T34 8449B	Filter 1	Part 24

Band: LTE2 15MHz 16QAM

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 1857.5MHz									
3.715	-22.2	V	3.0	35.4	1.0	-56.6	-13.0	-43.6	
5.573	-19.8	V	3.0	34.7	1.0	-53.5	-13.0	-40.5	
7.430	-16.6	V	3.0	34.9	1.0	-50.5	-13.0	-37.5	
3.715	-20.3	H	3.0	35.4	1.0	-54.7	-13.0	-41.7	
5.573	-18.9	H	3.0	34.7	1.0	-52.6	-13.0	-39.6	
7.430	-16.2	H	3.0	34.9	1.0	-50.1	-13.0	-37.1	
Mid Ch,1880MHz									
3.760	-21.9	V	3.0	35.3	1.0	-56.2	-13.0	-43.2	
5.640	-18.8	V	3.0	34.7	1.0	-52.5	-13.0	-39.5	
7.520	-16.9	V	3.0	34.9	1.0	-50.8	-13.0	-37.8	
3.760	-18.6	H	3.0	35.3	1.0	-52.9	-13.0	-39.9	
5.640	-16.7	H	3.0	34.7	1.0	-50.5	-13.0	-37.5	
7.520	-16.1	H	3.0	34.9	1.0	-50.0	-13.0	-37.0	
High Ch, 1902.5MHz									
3.805	-22.1	V	3.0	35.3	1.0	-56.4	-13.0	-43.4	
5.708	-17.4	V	3.0	34.7	1.0	-51.2	-13.0	-38.2	
7.610	-16.3	V	3.0	34.9	1.0	-50.2	-13.0	-37.2	
3.805	-16.8	H	3.0	35.3	1.0	-51.1	-13.0	-38.1	
5.708	-13.9	H	3.0	34.7	1.0	-47.6	-13.0	-34.6	
7.610	-15.6	H	3.0	34.9	1.0	-49.5	-13.0	-36.5	

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

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Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 14I8800
Date: 09/12/14
Test Engineer: J. Hsu
Configuration: EUT w/ AC Adaptor + HS, Y-pos
Mode: LTE2 QPSK 15MHz Harm

Chamber	Pre-amplifer	Filter	Limit
3m Chamber	T34 8449B	Filter 1	Part 24

Band: LTE2 15MHz QPSK

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 1857.5MHz									
3.715	-21.6	V	3.0	35.4	1.0	-55.9	-13.0	-42.9	
5.573	-20.6	V	3.0	34.7	1.0	-54.3	-13.0	-41.3	
7.430	-16.7	V	3.0	34.9	1.0	-50.6	-13.0	-37.6	
3.715	-19.0	H	3.0	35.4	1.0	-53.4	-13.0	-40.4	
5.573	-18.0	H	3.0	34.7	1.0	-51.7	-13.0	-38.7	
7.430	-14.9	H	3.0	34.9	1.0	-48.8	-13.0	-35.8	
Mid Ch,1880MHz									
3.760	-20.3	V	3.0	35.3	1.0	-54.6	-13.0	-41.6	
5.640	-19.2	V	3.0	34.7	1.0	-52.9	-13.0	-39.9	
7.520	-16.5	V	3.0	34.9	1.0	-50.5	-13.0	-37.5	
3.760	-18.7	H	3.0	35.3	1.0	-53.0	-13.0	-40.0	
5.640	-16.5	H	3.0	34.7	1.0	-50.2	-13.0	-37.2	
7.520	-16.0	H	3.0	34.9	1.0	-50.0	-13.0	-37.0	
High Ch, 1902.5MHz									
3.805	-21.4	V	3.0	35.3	1.0	-55.7	-13.0	-42.7	
5.708	-17.4	V	3.0	34.7	1.0	-51.1	-13.0	-38.1	
7.610	-16.1	V	3.0	34.9	1.0	-50.0	-13.0	-37.0	
3.805	-14.5	H	3.0	35.3	1.0	-48.8	-13.0	-35.8	
5.708	-14.6	H	3.0	34.7	1.0	-48.3	-13.0	-35.3	
7.610	-16.0	H	3.0	34.9	1.0	-49.9	-13.0	-36.9	

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

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Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 14I8800
Date: 09/12/14
Test Engineer: J. Hsu
Configuration: EUT w/ AC Adaptor + HS, Y-pos
Mode: LTE2 16QAM 10MHz Harm

Chamber	Pre-amplifer	Filter	Limit
3m Chamber	T34 8449B	Filter 1	Part 24

Band: LTE2 10MHz 16QAM

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 1855MHz									
3.710	-15.0	V	3.0	35.4	1.0	-49.4	-13.0	-36.4	
5.565	-6.4	V	3.0	34.7	1.0	-40.1	-13.0	-27.1	
7.420	-11.7	V	3.0	34.9	1.0	-45.6	-13.0	-32.6	
3.710	-12.6	H	3.0	35.4	1.0	-46.9	-13.0	-33.9	
5.565	-1.4	H	3.0	34.7	1.0	-35.1	-13.0	-22.1	
7.420	-12.6	H	3.0	34.9	1.0	-46.5	-13.0	-33.5	
Mid Ch,1880MHz									
3.760	-14.1	V	3.0	35.3	1.0	-48.5	-13.0	-35.5	
5.640	-2.9	V	3.0	34.7	1.0	-36.7	-13.0	-23.7	
7.520	-10.1	V	3.0	34.9	1.0	-44.1	-13.0	-31.1	
3.760	-9.8	H	3.0	35.3	1.0	-44.2	-13.0	-31.2	
5.640	0.0	H	3.0	34.7	1.0	-33.7	-13.0	-20.7	
7.520	-8.9	H	3.0	34.9	1.0	-42.8	-13.0	-29.8	
High Ch, 1905MHz									
3.810	-15.2	V	3.0	35.3	1.0	-49.5	-13.0	-36.5	
5.715	-6.0	V	3.0	34.7	1.0	-39.8	-13.0	-26.8	
7.620	-9.7	V	3.0	34.9	1.0	-43.6	-13.0	-30.6	
3.810	-7.3	H	3.0	35.3	1.0	-41.6	-13.0	-28.6	
5.715	-0.8	H	3.0	34.7	1.0	-34.5	-13.0	-21.5	
7.620	-5.2	H	3.0	34.9	1.0	-39.1	-13.0	-26.1	

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

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701I
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Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 14I8800
Date: 09/12/14
Test Engineer: J. Hsu
Configuration: EUT w/ AC Adaptor + HS, Y-pos
Mode: LTE2 QPSK 10MHz Harm

Chamber	Pre-amplifer	Filter	Limit
3m Chamber	T34 8449B	Filter 1	Part 24

Band	f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch, 1855MHz									
LTE2	3.710	-15.4	V	3.0	35.4	1.0	-49.8	-13.0	-36.8	
	5.565	-6.9	V	3.0	34.7	1.0	-40.7	-13.0	-27.7	
10MHz	7.420	-11.7	V	3.0	34.9	1.0	-45.6	-13.0	-32.6	
	3.710	-12.6	H	3.0	35.4	1.0	-47.0	-13.0	-34.0	
	5.565	-2.0	H	3.0	34.7	1.0	-35.7	-13.0	-22.7	
QPSK	7.420	-8.6	H	3.0	34.9	1.0	-42.5	-13.0	-29.5	
	Mid Ch,1880MHz									
	3.760	-14.1	V	3.0	35.3	1.0	-48.4	-13.0	-35.4	
	5.640	-2.8	V	3.0	34.7	1.0	-36.5	-13.0	-23.5	
	7.520	-9.3	V	3.0	34.9	1.0	-43.2	-13.0	-30.2	
	3.760	-9.6	H	3.0	35.3	1.0	-43.9	-13.0	-30.9	
	5.640	-0.4	H	3.0	34.7	1.0	-34.2	-13.0	-21.2	
	7.520	-8.5	H	3.0	34.9	1.0	-42.4	-13.0	-29.4	
	High Ch, 1905MHz									
	3.810	-14.7	V	3.0	35.3	1.0	-49.0	-13.0	-36.0	
	5.715	-5.0	V	3.0	34.7	1.0	-38.7	-13.0	-25.7	
	7.620	-8.4	V	3.0	34.9	1.0	-42.4	-13.0	-29.4	
	3.810	-6.8	H	3.0	35.3	1.0	-41.1	-13.0	-28.1	
	5.715	0.3	H	3.0	34.7	1.0	-33.5	-13.0	-20.5	
	7.620	-6.6	H	3.0	34.9	1.0	-40.5	-13.0	-27.5	

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

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701I
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Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 14I8800
Date: 09/12/14
Test Engineer: J. Hsu
Configuration: EUT w/ AC Adaptor + HS, Y-pos
Mode: LTE2 16QAM 5MHz Harm

Chamber	Pre-amplifer	Filter	Limit
3m Chamber	T34 8449B	Filter 1	Part 24

Band
LTE2
5MHz
16QAM

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 1852.5MHz									
3.705	-15.0	V	3.0	35.4	1.0	-49.4	-13.0	-36.4	
5.558	-5.4	V	3.0	34.7	1.0	-39.1	-13.0	-26.1	
7.410	-11.2	V	3.0	34.9	1.0	-45.1	-13.0	-32.1	
3.705	-12.2	H	3.0	35.4	1.0	-46.6	-13.0	-33.6	
5.558	-1.7	H	3.0	34.7	1.0	-35.4	-13.0	-22.4	
7.410	-9.6	H	3.0	34.9	1.0	-43.5	-13.0	-30.5	
Mid Ch,1880MHz									
3.760	-14.6	V	3.0	35.3	1.0	-48.9	-13.0	-35.9	
5.640	-3.1	V	3.0	34.7	1.0	-36.9	-13.0	-23.9	
7.520	-9.2	V	3.0	34.9	1.0	-43.1	-13.0	-30.1	
3.760	-10.8	H	3.0	35.3	1.0	-45.1	-13.0	-32.1	
5.640	-0.2	H	3.0	34.7	1.0	-33.9	-13.0	-20.9	
7.520	-8.3	H	3.0	34.9	1.0	-42.3	-13.0	-29.3	
High Ch, 1907.5MHz									
3.815	-17.0	V	3.0	35.3	1.0	-51.3	-13.0	-38.3	
5.723	-1.1	V	3.0	34.7	1.0	-34.8	-13.0	-21.8	
7.630	-7.8	V	3.0	34.9	1.0	-41.8	-13.0	-28.8	
3.815	-8.6	H	3.0	35.3	1.0	-42.9	-13.0	-29.9	
5.723	1.7	H	3.0	34.7	1.0	-32.0	-13.0	-19.0	
7.630	-5.2	H	3.0	34.9	1.0	-39.1	-13.0	-26.1	

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

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Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 14I8800
Date: 09/12/14
Test Engineer: J. Hsu
Configuration: EUT w/ AC Adaptor + HS, Y-pos
Mode: LTE2 QPSK 5MHz Harm

Chamber	Pre-amplifer	Filter	Limit
3m Chamber	T34 8449B	Filter 1	Part 24

Band: LTE2 5MHz QPSK

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 1852.5MHz									
3.705	-15.2	V	3.0	35.4	1.0	-49.6	-13.0	-36.6	
5.558	-5.6	V	3.0	34.7	1.0	-39.4	-13.0	-26.4	
7.410	-9.8	V	3.0	34.9	1.0	-43.7	-13.0	-30.7	
3.705	-12.5	H	3.0	35.4	1.0	-46.9	-13.0	-33.9	
5.558	-2.2	H	3.0	34.7	1.0	-35.9	-13.0	-22.9	
7.410	-13.3	H	3.0	34.9	1.0	-47.2	-13.0	-34.2	
Mid Ch,1880MHz									
3.760	-13.9	V	3.0	35.3	1.0	-48.3	-13.0	-35.3	
5.640	-3.2	V	3.0	34.7	1.0	-36.9	-13.0	-23.9	
7.520	-9.5	V	3.0	34.9	1.0	-43.4	-13.0	-30.4	
3.760	-9.9	H	3.0	35.3	1.0	-44.2	-13.0	-31.2	
5.640	-0.5	H	3.0	34.7	1.0	-34.3	-13.0	-21.3	
7.520	-8.1	H	3.0	34.9	1.0	-42.1	-13.0	-29.1	
High Ch, 1907.5MHz									
3.815	-17.6	V	3.0	35.3	1.0	-51.9	-13.0	-38.9	
5.723	-0.5	V	3.0	34.7	1.0	-34.2	-13.0	-21.2	
7.630	-6.1	V	3.0	34.9	1.0	-40.0	-13.0	-27.0	
3.815	-8.5	H	3.0	35.3	1.0	-42.8	-13.0	-29.8	
5.723	-9.0	H	3.0	34.7	1.0	-42.7	-13.0	-29.7	
7.630	-4.1	H	3.0	34.9	1.0	-38.0	-13.0	-25.0	

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

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WCDMA

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 14I18800
Date: 09/13/14
Test Engineer: R. Alegre
Configuration: EUT w/ AC Charger + HS
Mode: HSDPA_B2

Chamber	Pre-amplifer	Filter	Limit
3m Chamber	T34 8449B	Filter 1	Part 24

Band

Band 2

HSDPA

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	-20.3	V	3.0	35.4	1.0	-54.7	-13.0	-41.7	
5.557	-9.4	V	3.0	34.7	1.0	-43.2	-13.0	-30.2	
7.410	-13.2	V	3.0	34.9	1.0	-47.1	-13.0	-34.1	
3.705	-18.4	H	3.0	35.4	1.0	-52.8	-13.0	-39.8	
5.557	-6.6	H	3.0	34.7	1.0	-40.4	-13.0	-27.4	
7.410	-11.0	H	3.0	34.9	1.0	-44.9	-13.0	-31.9	
Mid Ch, 1880MHz									
3.760	-19.0	V	3.0	35.3	1.0	-53.4	-13.0	-40.4	
5.640	-4.9	V	3.0	34.7	1.0	-38.7	-13.0	-25.7	
7.520	-13.1	V	3.0	34.9	1.0	-47.0	-13.0	-34.0	
3.760	-15.4	H	3.0	35.3	1.0	-49.7	-13.0	-36.7	
5.640	-7.6	H	3.0	34.7	1.0	-41.3	-13.0	-28.3	
7.520	-12.6	H	3.0	34.9	1.0	-46.5	-13.0	-33.5	
High Ch, 1907.6MHz									
3.815	-19.7	V	3.0	35.3	1.0	-53.9	-13.0	-40.9	
5.723	-4.8	V	3.0	34.7	1.0	-38.5	-13.0	-25.5	
7.630	-11.7	V	3.0	34.9	1.0	-45.6	-13.0	-32.6	
3.815	-11.1	H	3.0	35.3	1.0	-45.4	-13.0	-32.4	
5.723	2.2	H	3.0	34.7	1.0	-31.5	-13.0	-18.5	
7.630	-12.5	H	3.0	34.9	1.0	-46.5	-13.0	-33.5	

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

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Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 14I18800
Date: 09/13/14
Test Engineer: R. Alegre
Configuration: EUT w/ AC Charger + HS
Mode: Rel99_B2

Chamber	Pre-amplifer	Filter	Limit
3m Chamber	T34 8449B	Filter 1	Part 24

Band

Band 2

REL99

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	-19.7	V	3.0	35.4	1.0	-54.1	-13.0	-41.1	
5.557	-7.8	V	3.0	34.7	1.0	-41.5	-13.0	-28.5	
7.410	-12.9	V	3.0	34.9	1.0	-46.8	-13.0	-33.8	
3.705	-18.2	H	3.0	35.4	1.0	-52.6	-13.0	-39.6	
5.557	-5.8	H	3.0	34.7	1.0	-39.5	-13.0	-26.5	
7.410	-11.6	H	3.0	34.9	1.0	-45.5	-13.0	-32.5	
Mid Ch, 1880MHz									
3.760	-18.9	V	3.0	35.3	1.0	-53.3	-13.0	-40.3	
5.640	-6.5	V	3.0	34.7	1.0	-40.3	-13.0	-27.3	
7.520	-12.6	V	3.0	34.9	1.0	-46.5	-13.0	-33.5	
3.760	-16.9	H	3.0	35.3	1.0	-51.2	-13.0	-38.2	
5.640	-6.7	H	3.0	34.7	1.0	-40.5	-13.0	-27.5	
7.520	-12.0	H	3.0	34.9	1.0	-46.0	-13.0	-33.0	
High Ch, 1907.6MHz									
3.815	-20.4	V	3.0	35.3	1.0	-54.7	-13.0	-41.7	
5.723	4.2	V	3.0	34.7	1.0	-29.5	-13.0	-16.5	
7.630	-12.7	V	3.0	34.9	1.0	-46.6	-13.0	-33.6	
3.815	-10.8	H	3.0	35.3	1.0	-45.1	-13.0	-32.1	
5.723	3.1	H	3.0	34.7	1.0	-30.6	-13.0	-17.6	
7.630	-12.1	H	3.0	34.9	1.0	-46.1	-13.0	-33.1	

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

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Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 14I18800
Date: 09/13/14
Test Engineer: R. Alegre
Configuration: EUT w/ AC Charger + HS
Mode: HSDPA_B5

Chamber	Pre-amplifer	Filter	Limit
3m Chamber	T34 8449B	Filter 1	Part 22

Band

Band 5

HSDPA

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 826.4MHz									
1.653	-28.3	V	3.0	37.4	1.0	-64.7	-13.0	-51.7	
2.479	-24.5	V	3.0	36.4	1.0	-59.8	-13.0	-46.8	
3.306	-21.3	V	3.0	35.8	1.0	-56.1	-13.0	-43.1	
1.653	-28.1	H	3.0	37.4	1.0	-64.5	-13.0	-51.5	
2.479	-24.3	H	3.0	36.4	1.0	-59.7	-13.0	-46.7	
3.306	-21.1	H	3.0	35.8	1.0	-55.9	-13.0	-42.9	
Mid Ch, 836.6MHz									
1.673	-28.6	V	3.0	37.3	1.0	-64.9	-13.0	-51.9	
2.510	-24.1	V	3.0	36.4	1.0	-59.4	-13.0	-46.4	
3.346	-21.2	V	3.0	35.8	1.0	-56.0	-13.0	-43.0	
1.673	-27.6	H	3.0	37.3	1.0	-63.9	-13.0	-50.9	
2.510	-25.8	H	3.0	36.4	1.0	-61.1	-13.0	-48.1	
3.346	-22.3	H	3.0	35.8	1.0	-57.0	-13.0	-44.0	
High Ch, 846.6MHz									
1.693	-28.0	V	3.0	37.3	1.0	-64.3	-13.0	-51.3	
2.540	-23.3	V	3.0	36.3	1.0	-58.7	-13.0	-45.7	
3.386	-21.0	V	3.0	35.7	1.0	-55.7	-13.0	-42.7	
1.693	-28.0	H	3.0	37.3	1.0	-64.3	-13.0	-51.3	
2.540	-24.0	H	3.0	36.3	1.0	-59.4	-13.0	-46.4	
3.386	-22.4	H	3.0	35.7	1.0	-57.1	-13.0	-44.1	

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

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Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 14I18800
Date: 09/13/14
Test Engineer: R. Alegre
Configuration: EUT w/ AC Charger + HS
Mode: REL99_B5

Chamber	Pre-amplifer	Filter	Limit
3m Chamber	T34 8449B	Filter 1	Part 22

Band

Band 5

REL99

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 826.4MHz									
1.653	-27.3	V	3.0	37.4	1.0	-63.6	-13.0	-50.6	
2.479	-23.5	V	3.0	36.4	1.0	-58.9	-13.0	-45.9	
3.306	-21.6	V	3.0	35.8	1.0	-56.3	-13.0	-43.3	
1.653	-27.7	H	3.0	37.4	1.0	-64.1	-13.0	-51.1	
2.479	-24.6	H	3.0	36.4	1.0	-60.0	-13.0	-47.0	
3.306	-22.0	H	3.0	35.8	1.0	-56.7	-13.0	-43.7	
Mid Ch, 836.6MHz									
1.673	-27.6	V	3.0	37.3	1.0	-63.9	-13.0	-50.9	
2.510	-23.7	V	3.0	36.4	1.0	-59.0	-13.0	-46.0	
3.346	-21.7	V	3.0	35.8	1.0	-56.4	-13.0	-43.4	
1.673	-27.8	H	3.0	37.3	1.0	-64.2	-13.0	-51.2	
2.510	-25.0	H	3.0	36.4	1.0	-60.4	-13.0	-47.4	
3.346	-21.7	H	3.0	35.8	1.0	-56.4	-13.0	-43.4	
High Ch, 846.6MHz									
1.693	-27.8	V	3.0	37.3	1.0	-64.1	-13.0	-51.1	
2.540	-22.2	V	3.0	36.3	1.0	-57.5	-13.0	-44.5	
3.386	-21.2	V	3.0	35.7	1.0	-55.9	-13.0	-42.9	
1.693	-27.5	H	3.0	37.3	1.0	-63.8	-13.0	-50.8	
2.540	-24.2	H	3.0	36.3	1.0	-59.5	-13.0	-46.5	
3.386	-21.7	H	3.0	35.7	1.0	-56.4	-13.0	-43.4	

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

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GSM

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 14I18800
Date: 09/13/14
Test Engineer: R. Alegre
Configuration: EUT w/ AC Charger + HS
Mode: EGPRS1900

Chamber	Pre-amplifer	Filter	Limit
3m Chamber	T34 8449B	Filter 1	Part 24

Band: GSM 1900 EGPRS

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	-19.3	V	3.0	35.4	1.0	-53.7	-13.0	-40.7	
5.551	-13.2	V	3.0	34.7	1.0	-46.9	-13.0	-33.9	
7.401	-11.6	V	3.0	34.9	1.0	-45.6	-13.0	-32.6	
3.700	-15.7	H	3.0	35.4	1.0	-50.1	-13.0	-37.1	
5.551	-14.8	H	3.0	34.7	1.0	-48.6	-13.0	-35.6	
7.401	-8.8	H	3.0	34.9	1.0	-42.7	-13.0	-29.7	
Mid Ch, 1880.0MHz									
3.760	-18.2	V	3.0	35.3	1.0	-52.5	-13.0	-39.5	
5.640	-12.5	V	3.0	34.7	1.0	-46.3	-13.0	-33.3	
7.520	-10.2	V	3.0	34.9	1.0	-44.1	-13.0	-31.1	
3.760	-18.3	H	3.0	35.3	1.0	-52.7	-13.0	-39.7	
5.640	-13.2	H	3.0	34.7	1.0	-46.9	-13.0	-33.9	
7.520	-11.5	H	3.0	34.9	1.0	-45.5	-13.0	-32.5	
High Ch, 1909.8MHz									
3.820	-11.5	V	3.0	35.3	1.0	-45.8	-13.0	-32.8	
5.729	-6.3	V	3.0	34.7	1.0	-40.0	-13.0	-27.0	
7.639	-10.9	V	3.0	35.0	1.0	-44.8	-13.0	-31.8	
3.820	-11.9	H	3.0	35.3	1.0	-46.2	-13.0	-33.2	
5.729	-12.2	H	3.0	34.7	1.0	-46.0	-13.0	-33.0	
7.639	-11.3	H	3.0	35.0	1.0	-45.2	-13.0	-32.2	

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

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Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 14I18800
Date: 09/13/14
Test Engineer: R. Alegre
Configuration: EUT w/ AC Charger + HS
Mode: GPRS1900

Chamber	Pre-amplifer	Filter	Limit
3m Chamber	T34 8449B	Filter 1	Part 24

Band	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									
GSM 1900	3.700	-19.4	V	3.0	35.4	1.0	-53.8	-13.0	-40.8	
	5.551	-13.8	V	3.0	34.7	1.0	-47.5	-13.0	-34.5	
	7.401	-11.5	V	3.0	34.9	1.0	-45.5	-13.0	-32.5	
	3.700	-16.0	H	3.0	35.4	1.0	-50.4	-13.0	-37.4	
GPRS	5.551	-14.9	H	3.0	34.7	1.0	-48.6	-13.0	-35.6	
	7.401	-8.8	H	3.0	34.9	1.0	-42.8	-13.0	-29.8	
	Mid Ch, 1880.0MHz									
	3.760	-17.9	V	3.0	35.3	1.0	-52.3	-13.0	-39.3	
	5.640	-13.6	V	3.0	34.7	1.0	-47.4	-13.0	-34.4	
	7.520	-10.3	V	3.0	34.9	1.0	-44.2	-13.0	-31.2	
	3.760	-18.6	H	3.0	35.3	1.0	-52.9	-13.0	-39.9	
	5.640	-12.5	H	3.0	34.7	1.0	-46.2	-13.0	-33.2	
	7.520	-12.1	H	3.0	34.9	1.0	-46.0	-13.0	-33.0	
	High Ch, 1909.8MHz									
	3.820	-10.9	V	3.0	35.3	1.0	-45.2	-13.0	-32.2	
	5.729	-5.9	V	3.0	34.7	1.0	-39.6	-13.0	-26.6	
	7.639	-10.8	V	3.0	35.0	1.0	-44.8	-13.0	-31.8	
	3.820	-11.9	H	3.0	35.3	1.0	-46.1	-13.0	-33.1	
	5.729	-12.8	H	3.0	34.7	1.0	-46.6	-13.0	-33.6	
	7.639	-10.7	H	3.0	35.0	1.0	-44.7	-13.0	-31.7	

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

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701I
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888
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Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 14I18800
Date: 09/13/14
Test Engineer: R. Alegre
Configuration: EUT w/ AC Charger + HS
Mode: EGPRS 850

Chamber	Pre-amplifer	Filter	Limit
3m Chamber	T34 8449B	Filter 1	Part 22

Band	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									
GSM 850	1.648	-17.1	V	3.0	37.4	1.0	-53.5	-13.0	-40.5	
	2.473	-14.9	V	3.0	36.4	1.0	-50.3	-13.0	-37.3	
	3.297	-21.8	V	3.0	35.8	1.0	-56.6	-13.0	-43.6	
	1.648	-17.4	H	3.0	37.4	1.0	-53.7	-13.0	-40.7	
EGPRS	2.473	-16.0	H	3.0	36.4	1.0	-51.4	-13.0	-38.4	
	3.297	-21.7	H	3.0	35.8	1.0	-56.5	-13.0	-43.5	
	Mid Ch, 836.6MHz									
	1.673	-18.7	V	3.0	37.3	1.0	-55.0	-13.0	-42.0	
	2.510	-14.5	V	3.0	36.4	1.0	-49.9	-13.0	-36.9	
	3.346	-20.5	V	3.0	35.8	1.0	-55.3	-13.0	-42.3	
	1.673	-17.5	H	3.0	37.3	1.0	-53.8	-13.0	-40.8	
	2.510	-14.9	H	3.0	36.4	1.0	-50.3	-13.0	-37.3	
	3.346	-21.0	H	3.0	35.8	1.0	-55.7	-13.0	-42.7	
	High Ch, 848.8MHz									
	1.698	-16.8	V	3.0	37.3	1.0	-53.1	-13.0	-40.1	
	2.547	-14.9	V	3.0	36.3	1.0	-50.2	-13.0	-37.2	
	3.395	-21.2	V	3.0	35.7	1.0	-55.9	-13.0	-42.9	
	1.698	-18.8	H	3.0	37.3	1.0	-55.1	-13.0	-42.1	
	2.547	-14.9	H	3.0	36.3	1.0	-50.2	-13.0	-37.2	
	3.395	-21.6	H	3.0	35.7	1.0	-56.3	-13.0	-43.3	

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

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	2.473	-14.9	V	3.0	36.4	1.0	-50.3	-13.0	-37.3	
	3.297	-21.4	V	3.0	35.8	1.0	-56.2	-13.0	-43.2	
	1.648	-16.5	H	3.0	37.4	1.0	-52.9	-13.0	-39.9	
GPRS	2.473	-15.8	H	3.0	36.4	1.0	-51.2	-13.0	-38.2	
	3.297	-21.0	H	3.0	35.8	1.0	-55.8	-13.0	-42.8	
	Mid Ch, 836.6MHz									
	1.673	-18.8	V	3.0	37.3	1.0	-55.2	-13.0	-42.2	
	2.510	-13.6	V	3.0	36.4	1.0	-48.9	-13.0	-35.9	
	3.346	-20.5	V	3.0	35.8	1.0	-55.3	-13.0	-42.3	
	1.673	-16.7	H	3.0	37.3	1.0	-53.0	-13.0	-40.0	
	2.510	-14.1	H	3.0	36.4	1.0	-49.5	-13.0	-36.5	
	3.346	-21.9	H	3.0	35.8	1.0	-56.6	-13.0	-43.6	
	High Ch, 848.8MHz									
	1.698	-16.7	V	3.0	37.3	1.0	-53.0	-13.0	-40.0	
	2.547	-14.9	V	3.0	36.3	1.0	-50.2	-13.0	-37.2	
	3.395	-21.7	V	3.0	35.7	1.0	-56.4	-13.0	-43.4	
	1.698	-18.2	H	3.0	37.3	1.0	-54.5	-13.0	-41.5	
	2.547	-14.0	H	3.0	36.3	1.0	-49.4	-13.0	-36.4	
	3.395	-21.0	H	3.0	35.7	1.0	-55.7	-13.0	-42.7	

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