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

CERTIFICATION TEST REPORT

FOR

GSM/WCDMA/LTE Tablet + Bluetooth + DTS/UNII a/b/g/n and ANT+

MODEL NUMBER: SM-P355M

FCC ID: A3LSMP355M

REPORT NUMBER: 15I20033-E1

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Prepared for

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Revision History

Rev.	Issue Date	Revisions	Revised By
-	03/18/15	Initial Issue	P. Zhang

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME:	**SAMSUNG ELECTRONICS CO., LTD.**
EUT DESCRIPTION:	**GSM/WCDMA/LTE Tablet + Bluetooth, DTS/UNII a/b/g/n and ANT+**
MODEL:	**SM-P355M**
SERIAL NUMBER:	**2064503Conducted); 2064500 (Radiated)**
DATE TESTED:	**FEB 23 – MARCH 11, 2015**

APPLICABLE STANDARDS	
STANDARD	**TEST RESULTS**
FCC PART 22H, 24E and 27L	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, FCC CFR Part 24, FCC CFR 47 Part 27.

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	47266 Benicia Street
☒ Chamber A	☐ Chamber D	☒ Chamber G
☐ Chamber B	☐ Chamber E	☐ Chamber H
☐ 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)

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 26000 MHz	4.94 dB

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

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

EUT is a GSM/WCDMA/LTE Tablet + Bluetooth, DTS/UNII a/b/g/n and ANT+

5.2. MAXIMUM OUTPUT POWER

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

FCC Part 22/24/27						
Band	Frequency Range(MHz)	Modulation	Conducted		Radiated	
			AVG(dBm)	AVG(mW)	AVG(dBm)	AVG(mW)
GSM850	824~849	GPRS	32.9	1949.84	32.72	1870.7
	824~849	EGPRS	27.5	562.34	28.82	762.1
GSM1900	1850~1910	GPRS	29.3	851.14	32.55	1798.9
	1850~1910	EGPRS	26.0	398.11	28.86	769.1
Band 5	824~849	REL99	22.9	194.98	21.98	157.8
	824~849	HSDPA	22.8	190.55	21.20	131.8
Band 4	1710~1755	REL99	22.5	177.83	25.54	358.1
	1710~1755	HSDPA	22.4	173.78	25.49	354.0
Band 2	1850~1910	REL99	22.5	177.83	24.76	299.2
	1850~1910	HSDPA	22.5	177.83	24.63	290.4

5.3. MAXIMUM OUTPUT POWER (LTE)

FCC Part 27							
Band	Frequency Range(MHz)	BandWidth (MHz)	Modulation	Conducted		Radiated	
				AVG(dBm)	AVG(mW)	AVG(dBm)	AVG(mW)
LTE4	1710~1755	20MHz	QPSK	23.0	199.53	25.81	381.1
			16QAM	22.0	158.49	24.89	308.3
		15MHz	QPSK	23.0	199.53	25.78	378.4
			16QAM	22.0	158.49	24.84	304.8
		10MHz	QPSK	23.0	199.53	25.90	389.0
			16QAM	22.0	158.49	25.01	317.0
		5MHz	QPSK	23.0	199.53	25.89	388.2
			16QAM	21.9	154.88	24.98	314.8
		3MHz	QPSK	22.9	194.98	25.88	387.3
			16QAM	21.9	154.88	24.96	313.3
		1.4MHz	QPSK	22.9	194.98	25.90	389.0
			16QAM	21.9	154.88	24.97	314.1

FCC Part 24							
Band	Frequency Range(MHz)	BandWidth (MHz)	Modulation mW	Conducted		Radiated	
				AVG(dBm)	AVG(mW)	AVG(dBm)	AVG(mW)
LTE2	1850~1910	20MHz	QPSK	23.0	199.53	24.83	304.1
			16QAM	21.8	151.36	23.87	243.8
		15MHz	QPSK	23.0	199.53	24.88	307.6
			16QAM	22.20	165.96	23.94	247.7
		10MHz	QPSK	23.0	199.53	24.78	300.6
			16QAM	21.9	154.88	23.72	235.5
		5MHz	QPSK	22.90	194.98	24.82	303.4
			16QAM	21.80	151.36	23.96	248.9
		3MHz	QPSK	22.80	190.55	24.86	306.2
			16QAM	21.7	147.91	23.94	247.7
		1.4MHz	QPSK	23.0	199.53	24.86	306.2
			16QAM	22.00	158.49	23.88	244.3

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	0.12
Band 4, 1710~1755MHz	-1.66
Band 2, 1850~1910MHz	-1.06

5.5. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
AC Adapter	SAMSUNG		N/A	N/A
Headset	SAMSUNG	N/A	N/A	N/A

I/O CABLES (CONDUCTED SETUP)

I/O Cable List						
Cable No	Port	# of identical ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	RF Out	1	Spectrum Analyzer	Shielded	None	NA
2	Antenna Port	1	EUT	Shielded	0.1m	NA
3	RF In/Out	1	Communication Test Set	Shielded	1m	NA

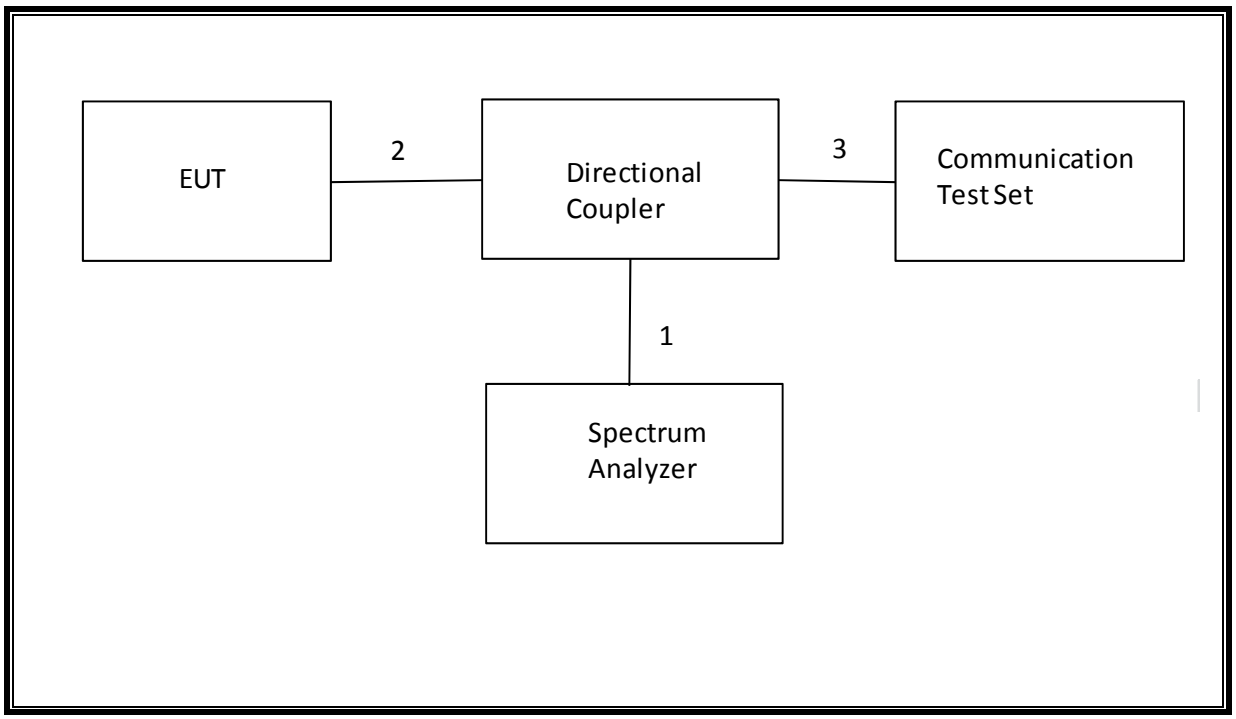
I/O CABLES (RADIATED SETUP)

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

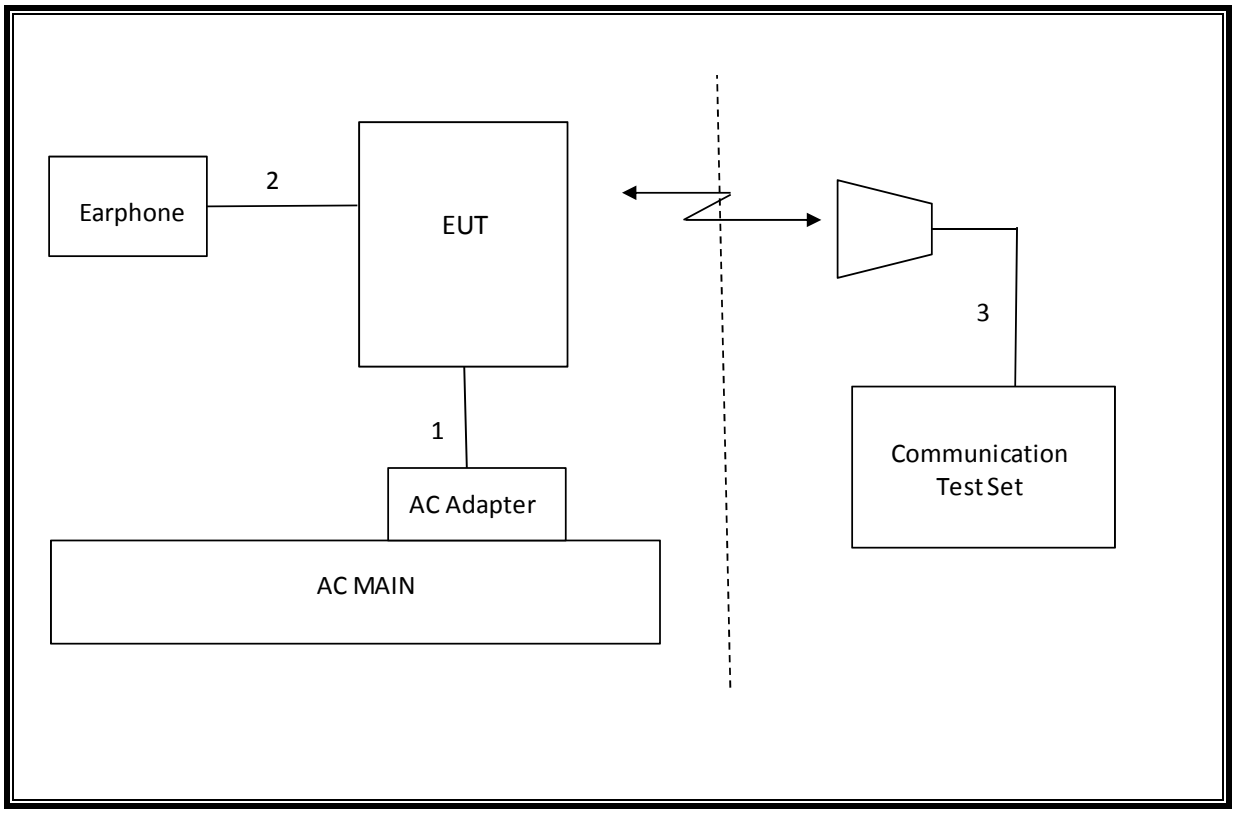
TEST SETUP

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

SETUP DIAGRAM FOR TESTS (CONDUCTED TEST SETUP)



SETUP DIAGRAM FOR TESTS (RADIATED TEST SETUP)



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	02/26/16
Antenna, Bilog, 2 GHz	Sunol Sciences	JB1	C01011	08/14/15
Antenna, Horn, 18 GHz	EMCO	3115	C00783	10/25/15
Antenna, Horn, 18 GHz	EMCO	3115	C00784	10/25/15
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	01/09/16
Communications Test Set	R&S	CMW500	T159	07/02/15
DC power supply, 8 V @ 3 A or 15 V	Agilent / HP	E3610A	None	CNR
Vector signal generator, 6 GHz	Agilent / HP	E4438C	None	07/06/15
Antenna, Tuned Dipole 400~1000	ETS	3121C DB4	C00993	02/14/16
Directional Coupler	RF-Lambda	RFDC5M06G15	None	CNR
Antenna, Horn, 26.5 GHz	ARA	MWH-1826/B	C00589	12/17/15
Multimeter	Fluke	26111	74320701	4/15/2015

Test Equipment List			
Description	Manufacturer	Model	Version
Radiated Software	UL	UL EMC	Version 9.5, 07/22/14
Conducted Software	UL	UL EMC	Version 9.5, 05/17/14
CLT Software	UL	UL RF	Version 1.0, 02/02/15
Antenna Port Software	UL	UL RF	Version 2.1.1.1, 1/20/15

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	17.92MHz
22.917(a) 24.238(a) 27.53(g) 90.691	RSS-132(4.5.1) RSS-133(6.5.1) RSS-139(6.5.1)	Band Edge / Conducted Spurious Emission	-13dBm		Pass	-16.12dBm
2.1046	N/A	Conducted output power	N/A		Pass	32.9 dBm
22.355 24.235 27.54 90.213	RSS-132(4.3) RSS-133(6.3) RSS-139(6.3) RSS-199(4.3)	Frequency Stability	2.5PPM		Pass	0.094PPM
22.913(a)(2)	RSS-132(4.4)	Effective Radiated Power	38 dBm	Radiated	Pass	32.72 dBm
24.232(c) 27.50(h)(2)	RSS-133(6.4) RSS-199(4.4)	Equivalent Isotropic Radiated Power	33dBm		Pass	32.55dBm
27.50(d)(4)	RSS-139(6.4)		30dBm		Pass	25.9dBm
22.917(a) 24.238(a) 27.53(g)	RSS-132(4.5.1) RSS-133(6.5.1) RSS-139(6.5.1)	Radiated Spurious Emission	-13dBm		Pass	-34.7dBm

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

8.1.1. GSM OUTPUT POWER RESULT

Band	Mode	Ch.	f(MHz)	1 time slot	2 time slot	3 time slot	4 time slot
				AVG (dBm)	AVG (dBm)	AVG (dBm)	AVG (dBm)
GSM850	GMSK	128	824.2	32.9			
		190	836.6	32.9			
		251	848.8	32.7			
	GPRS	128	824.2	32.8	30.2	28.4	26.5
		190	836.6	32.9	30.2	28.6	26.5
		251	848.8	32.7	30.1	28.4	26.5
	EGPRS	128	824.2	27.5	25.5	23.5	21.6
		190	836.6	27.5	25.5	23.5	21.5
		251	848.8	27.5	25.5	23.5	21.6
GSM1900	GMSK	512	1850.2	29.0			
		661	1880	29.1			
		810	1909.8	29.3			
	GPRS	512	1850.2	29.0	27.3	25.6	23.5
		661	1880	29.2	27.3	25.7	23.5
		810	1909.8	29.3	27.3	25.6	23.5
	EGPRS	512	1850.2	26.0	24.5	23.0	21.3
		661	1880	26.0	24.5	23.0	21.4
		810	1909.8	26.0	24.5	23.0	21.1

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	22.9
		4183	836.6	22.8
		4233	846.6	22.7
Band 4	REL99	1312	1712.4	22.5
		1413	1732.6	22.5
		1513	1752.6	22.5
Band 2	REL99	9262	1852.4	22.5
		9400	1880	22.5
		9538	1907.6	22.5

8.3. UMTS HSDPA

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

	Mode	Rel5 HSDPA			
	Subtest	1	2	3	4
WCDMA General Settings	Loopback Mode	Test Mode 1			
	Rel99 RMC	12.2kbps RMC			
	HSDPA FRC	H-Set1			
	Power Control Algorithm	Algorithm 2			
	βc	2/15	12/15	15/15	15/15
	βd	15/15	15/15	8/15	4/15
	Bd (SF)	64			
	βc/βd	2/15	12/15	15/8	15/4
	βhs	4/15	24/15	30/15	30/15
	MPR (dB)	0	0	0.5	0.5
HSDPA Specific Settings	D_{ACK}	8			
	D_{NAK}	8			
	DCQI	8			
	Ack-Nack repetition factor	3			
	CQI Feedback (Table 5.2B.4)	4ms			
	CQI Repetition Factor (Table 5.2B.4)	2			
	Ahs =βhs/βc	30/15			

8.3.1. UMTS HSDPA OUTPUT POWER RESULT

Band	Mode	UL Ch No.	Freq. (MHz)	MPR	Avg Pwr (dBm)
W-CDMA Band V	Subtest 1	4132	826.4	0	22.7
		4183	836.6	0	22.8
		4233	846.6	0	22.8
	Subtest 2	4132	826.4	0	22.7
		4183	836.6	0	22.7
		4233	846.6	0	22.7
	Subtest 3	4132	826.4	0.5	22.3
		4183	836.6	0.5	22.3
		4233	846.6	0.5	22.2
	Subtest 4	4132	826.4	0.5	22.2
		4183	836.6	0.5	22.3
		4233	846.6	0.5	22.3

Band	Mode	UL Ch No.	Freq. (MHz)	MPR	Avg Pwr (dBm)
W-CDMA Band IV	Subtest 1	1312	1712.4	0	22.3
		1413	1732.6	0	22.4
		1513	1752.6	0	22.4
	Subtest 2	1312	1712.4	0	22.4
		1413	1732.6	0	22.3
		1513	1752.6	0	22.3
	Subtest 3	1312	1712.4	0.5	22.0
		1413	1732.6	0.5	22.0
		1513	1752.6	0.5	22.0
	Subtest 4	1312	1712.4	0.5	21.8
		1413	1732.6	0.5	21.9
		1513	1752.6	0.5	22.0

Band	Mode	UL Ch No.	Freq. (MHz)	MPR	Avg Pwr (dBm)
W-CDMA Band II	Subtest 1	9262	1852.4	0	22.4
		9400	1880.0	0	22.5
		9538	1907.6	0	22.5
	Subtest 2	9262	1852.4	0	22.4
		9400	1880.0	0	22.5
		9538	1907.6	0	22.3
	Subtest 3	9262	1852.4	0.5	22.0
		9400	1880.0	0.5	22.0
		9538	1907.6	0.5	22.0
	Subtest 4	9262	1852.4	0.5	22.0
		9400	1880.0	0.5	22.0
		9538	1907.6	0.5	22.0

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.

8.3.2. 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	22.7
		4183	836.6	0	22.8
		4233	846.6	0	22.8
	Subtest 2	4132	826.4	2	20.9
		4183	836.6	2	20.8
		4233	846.6	2	20.7
	Subtest 3	4132	826.4	1	21.8
		4183	836.6	1	21.7
		4233	846.6	1	21.7
	Subtest 4	4132	826.4	2	20.7
		4183	836.6	2	20.7
		4233	846.6	2	20.8
	Subtest 5	4132	826.4	0	22.8
		4183	836.6	0	22.8
		4233	846.6	0	22.8

Band	Mode	UL Ch No.	Freq. (MHz)	MPR	Avg Pwr (dBm)
W-CDMA Band IV	Subtest 1	1312	1712.4	0	22.3
		1413	1732.6	0	22.4
		1513	1752.6	0	22.4
	Subtest 2	1312	1712.4	2	20.3
		1413	1732.6	2	20.4
		1513	1752.6	2	20.4
	Subtest 3	1312	1712.4	1	21.3
		1413	1732.6	1	21.3
		1513	1752.6	1	21.4
	Subtest 4	1312	1712.4	2	20.4
		1413	1732.6	2	20.5
		1513	1752.6	2	20.5
	Subtest 5	1312	1712.4	0	22.3
		1413	1732.6	0	22.3
		1513	1752.6	0	22.4

Band	Mode	UL Ch No.	Freq. (MHz)	MPR	Avg Pwr (dBm)
W-CDMA Band II	Subtest 1	9262	1852.4	0	22.4
		9400	1880.0	0	22.4
		9538	1907.6	0	22.4
	Subtest 2	9262	1852.4	2	20.4
		9400	1880.0	2	20.4
		9538	1907.6	2	20.3
	Subtest 3	9262	1852.4	1	21.2
		9400	1880.0	1	21.3
		9538	1907.6	1	21.3
	Subtest 4	9262	1852.4	2	20.3
		9400	1880.0	2	20.4
		9538	1907.6	2	20.4
	Subtest 5	9262	1852.4	0	22.5
		9400	1880.0	0	22.5
		9538	1907.6	0	22.3

8.4. LTE OUTPUT VERIFICATION

8.4.1. LTE OUTPUT RESULT

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)		
						1860 MHz	1880 MHz	1900 MHz
LTE Band 2	20	QPSK	1	0	0	23.0	23.0	22.7
			1	49	0	23.0	23.0	22.5
			1	99	0	23.0	23.0	22.9
			50	0	1	21.7	21.9	21.8
			50	24	1	21.5	21.9	21.6
			50	50	1	21.6	21.9	21.6
			100	0	1	21.6	21.8	21.7
		16QAM	1	0	1	21.6	21.6	21.8
			1	49	1	21.7	21.5	21.6
			1	99	1	21.4	21.5	21.2
			50	0	2	20.7	20.8	20.6
			50	24	2	20.6	20.9	20.5
			50	50	2	20.6	20.8	20.4
			100	0	2	20.6	20.8	20.8
Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)		
						1857.5 MHz	1880 MHz	1902.5 MHz
LTE Band 2	15	QPSK	1	0	0	22.9	23.0	22.6
			1	37	0	22.8	23.0	22.8
			1	74	0	22.8	23.0	22.5
			36	0	1	21.5	21.7	21.7
			36	20	1	21.5	21.9	21.7
			36	39	1	21.5	21.8	21.6
			75	0	1	21.5	21.7	21.6
		16QAM	1	0	1	21.9	22.2	21.8
			1	37	1	21.8	21.8	21.8
			1	74	1	21.8	21.7	21.7
			36	0	2	20.6	20.8	20.6
			36	20	2	20.6	20.8	20.6
			36	39	2	20.6	20.8	20.6
			75	0	2	20.5	21.0	20.6
Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)		
						1855 MHz	1880 MHz	1905 MHz
LTE Band 2	10	QPSK	1	0	0	22.6	23.0	23.0
			1	25	0	22.7	23.0	22.8
			1	49	0	22.5	23.0	22.7
			25	0	1	21.9	21.9	21.9
			25	12	1	21.9	22.0	21.9
			25	25	1	21.8	21.9	21.9
			50	0	1	21.8	22.0	22.0
		16QAM	1	0	1	21.5	21.9	21.6
			1	25	1	21.5	21.6	21.6
			1	49	1	21.6	21.7	21.3
			25	0	2	20.2	20.3	20.3
			25	12	2	20.3	20.4	20.3
			25	25	2	20.2	20.3	20.4
			50	0	2	20.1	20.4	20.2

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)		
						1852.5 MHz	1880 MHz	1907.5 MHz
LTE Band 2	5	QPSK	1	0	0	22.6	22.7	22.6
			1	12	0	22.6	22.7	22.9
			1	24	0	22.5	22.7	22.6
			12	0	1	21.5	21.8	21.6
			12	7	1	21.5	21.8	21.6
			12	13	1	21.5	21.8	21.6
			25	0	1	21.5	21.8	21.6
		16QAM	1	0	1	21.6	21.5	21.8
			1	12	1	21.3	21.5	21.6
			1	24	1	21.0	21.6	21.3
			12	0	2	20.3	20.9	20.6
			12	7	2	20.2	20.9	20.8
			12	13	2	20.1	20.9	20.6
			25	0	2	20.5	20.8	20.5
Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)		
						1851.5 MHz	1880 MHz	1908.5 MHz
LTE Band 2	3	QPSK	1	0	0	22.4	22.8	22.8
			1	8	0	22.5	22.8	22.7
			1	14	0	22.6	22.7	22.8
			8	0	1	21.3	21.7	21.6
			8	4	1	21.4	21.6	21.5
			8	7	1	21.4	21.6	21.5
			15	0	1	21.5	21.6	21.5
		16QAM	1	0	1	21.4	21.5	21.7
			1	8	1	21.4	21.4	21.7
			1	14	1	21.4	21.4	21.7
			8	0	2	20.7	20.6	20.6
			8	4	2	20.8	20.6	20.5
			8	7	2	20.9	20.6	20.5
			15	0	2	20.4	20.7	20.5
Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)		
						1850.7 MHz	1880 MHz	1909.3 MHz
LTE Band 2	14	QPSK	1	0	0	22.4	22.9	22.8
			1	3	0	22.4	22.8	23.0
			1	5	0	22.4	22.8	22.9
			3	0	0	22.5	22.7	22.7
			3	1	0	22.6	22.9	22.8
			3	3	0	22.4	22.7	22.7
			6	0	1	21.5	21.8	21.6
		16QAM	1	0	1	21.6	21.6	21.6
			1	3	1	21.6	21.7	21.4
			1	5	1	21.4	21.6	21.6
			3	0	1	21.5	22.0	21.7
			3	1	1	21.5	22.0	21.7
			3	3	1	21.1	22.0	21.8
			6	0	2	20.3	21.0	20.8

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)		
						1720 MHz	1732.5 MHz	1745 MHz
LTE Band 4	20	QPSK	1	0	0	23.0	23.0	23.0
			1	49	0	23.0	23.0	23.0
			1	99	0	23.0	23.0	23.0
			50	0	1	22.0	22.0	22.0
			50	24	1	22.0	22.0	22.0
			50	50	1	22.0	22.0	22.0
			100	0	1	22.0	22.0	22.0
		16QAM	1	0	1	22.0	22.0	22.0
			1	49	1	22.0	22.0	22.0
			1	99	1	22.0	22.0	22.0
			50	0	2	21.0	21.0	21.0
			50	24	2	21.0	21.0	21.0
			50	50	2	21.0	21.0	21.0
			100	0	2	21.0	21.0	21.0

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)		
						1717.5 MHz	1732.5 MHz	1747.5 MHz
LTE Band 4	15	QPSK	1	0	0	23.0	23.0	23.0
			1	37	0	23.0	23.0	22.9
			1	74	0	22.8	22.9	22.9
			36	0	1	22.0	22.0	22.0
			36	20	1	22.0	22.0	22.0
			36	39	1	21.8	21.9	21.8
			75	0	1	21.9	21.9	22.0
		16QAM	1	0	1	22.0	22.0	21.9
			1	37	1	21.9	21.9	21.8
			1	74	1	21.8	21.9	21.8
			36	0	2	21.0	21.0	21.0
			36	20	2	20.9	21.0	20.9
			36	39	2	20.8	20.8	20.9
			75	0	2	21.0	21.0	20.9

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)		
						1715 MHz	1732.5 MHz	1750 MHz
LTE Band 4	10	QPSK	1	0	0	22.9	23.0	22.9
			1	25	0	22.8	22.9	22.9
			1	49	0	22.8	22.9	22.7
			25	0	1	21.8	22.0	21.9
			25	12	1	22.0	21.9	21.8
			25	25	1	21.7	21.9	21.8
			50	0	1	21.7	21.7	21.9
		16QAM	1	0	1	21.8	21.8	21.9
			1	25	1	21.9	21.8	21.8
			1	49	1	21.8	21.9	21.7
			25	0	2	20.8	21.0	21.0
			25	12	2	20.9	21.0	20.8
			25	25	2	20.8	20.8	20.9
			50	0	2	21.0	20.9	20.9

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)		
						1712.5 MHz	1732.5 MHz	1752.5 MHz
LTE Band 4	5	QPSK	1	0	0	22.9	22.8	23.0
			1	12	0	22.9	22.8	22.7
			1	24	0	22.8	22.9	22.7
			12	0	1	21.8	21.7	21.8
			12	7	1	21.9	21.9	21.7
			12	13	1	21.8	21.7	21.8
			25	0	1	21.7	21.8	21.9
		16QAM	1	0	1	21.9	21.8	21.9
			1	12	1	21.7	21.8	21.8
			1	24	1	21.8	21.7	21.8
			12	0	2	21.0	21.1	21.1
			12	7	2	20.9	20.9	20.9
			12	13	2	20.8	20.8	20.7
			25	0	2	20.8	21.0	20.9

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)		
						1711.5 MHz	1732.5 MHz	1753.5 MHz
LTE Band 4	3	QPSK	1	0	0	22.8	22.8	22.9
			1	7	0	22.7	22.8	22.7
			1	14	0	22.8	22.8	22.7
			8	0	1	21.7	21.7	21.8
			8	4	1	21.8	21.8	21.7
			8	7	1	21.8	21.7	21.8
			15	0	1	21.7	21.8	21.8
		16QAM	1	0	1	21.8	21.8	21.9
			1	7	1	21.7	21.8	21.8
			1	14	1	21.8	21.7	21.8
			8	0	2	21.0	21.0	20.9
			8	4	2	20.9	20.8	20.8
			8	7	2	20.8	20.8	20.7
			15	0	2	20.8	20.9	20.9

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Max. Avg Pwr (dBm)		
						1710.7 MHz	1732.5 MHz	1754.3 MHz
LTE Band 4	14	QPSK	1	0	0	22.9	22.9	22.9
			1	3	0	22.9	23.0	22.8
			1	5	0	22.9	22.8	22.8
			3	0	0	21.8	21.9	22.0
			3	1	0	22.0	22.0	21.9
			3	3	0	22.0	21.8	21.8
			6	0	1	22.0	22.0	21.8
		16QAM	1	0	1	21.8	21.8	21.9
			1	3	1	21.8	21.9	21.9
			1	5	1	22.0	21.9	21.8
			3	0	1	21.0	21.0	21.0
			3	1	1	20.9	20.9	20.8
			3	3	1	20.9	20.8	20.8
			6	0	2	20.8	20.9	20.9

9. PEAK TO AVERAGE RATIO

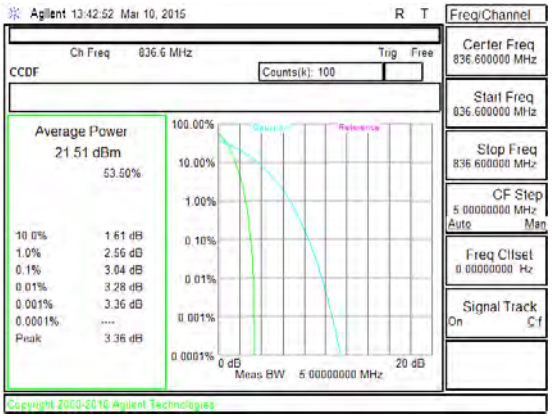
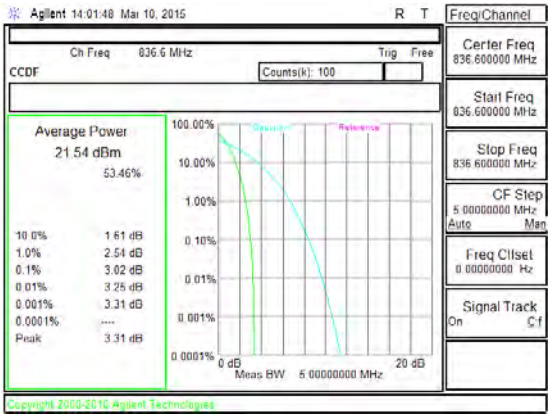
Test Procedure

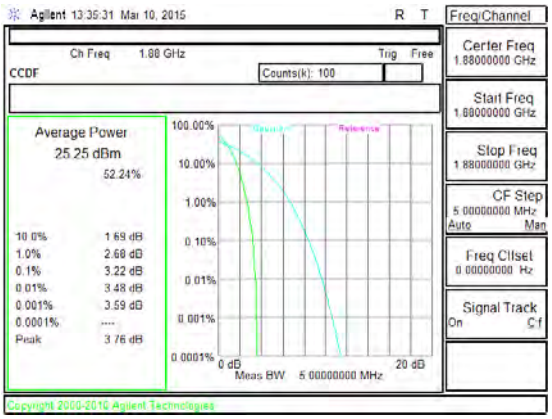
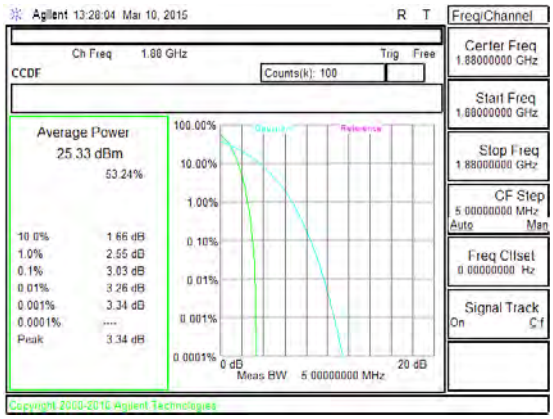
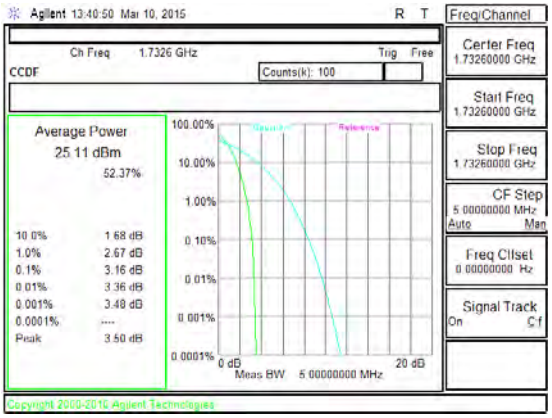
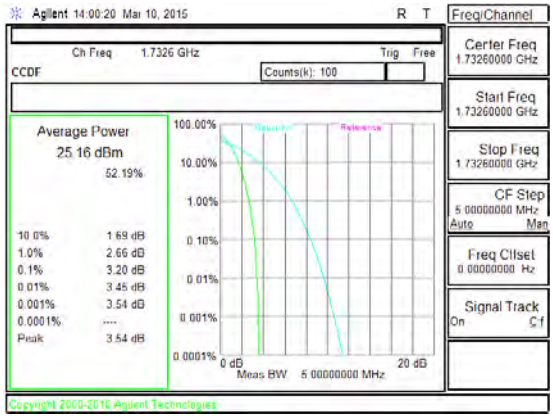
Per KDB 971168 D01 Power Meas License Digital Systems v02r02

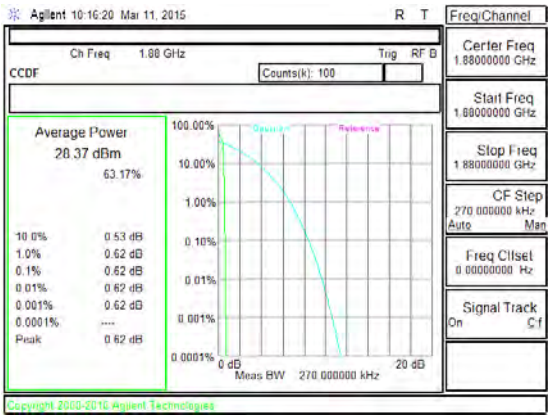
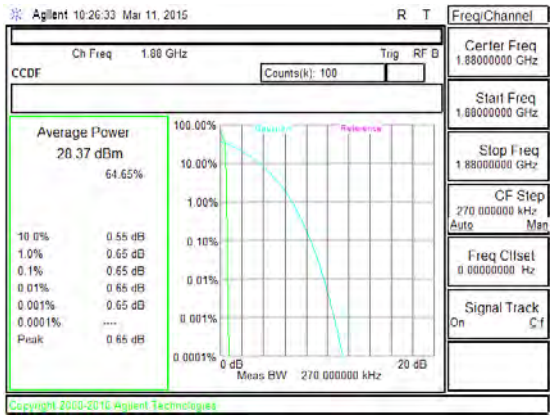
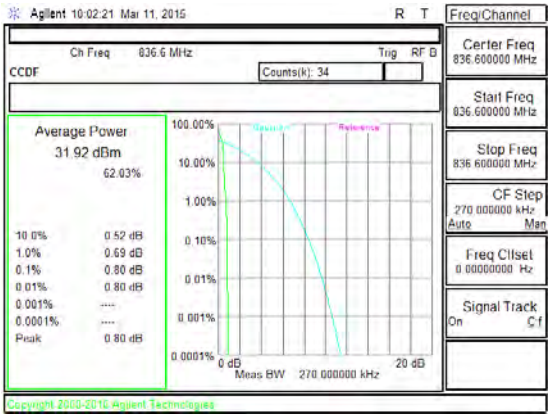
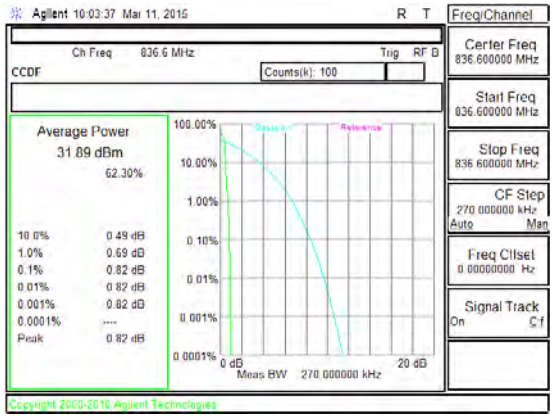
Test Spec

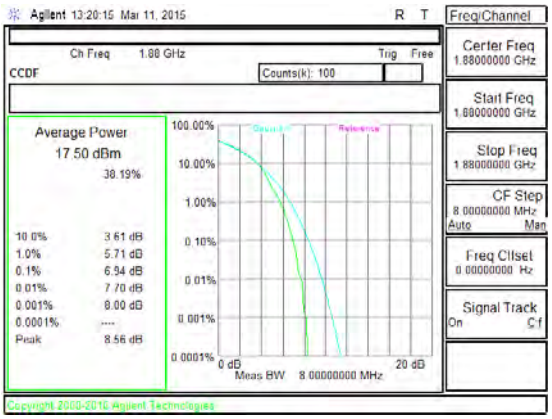
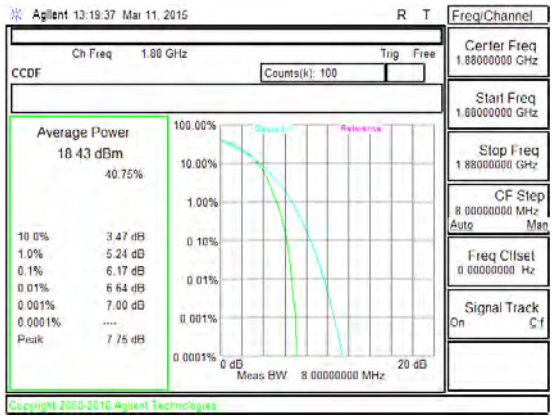
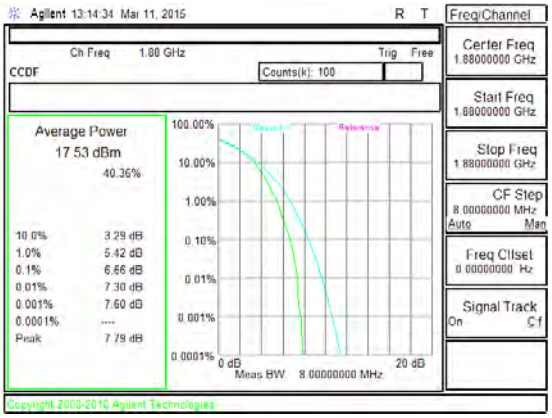
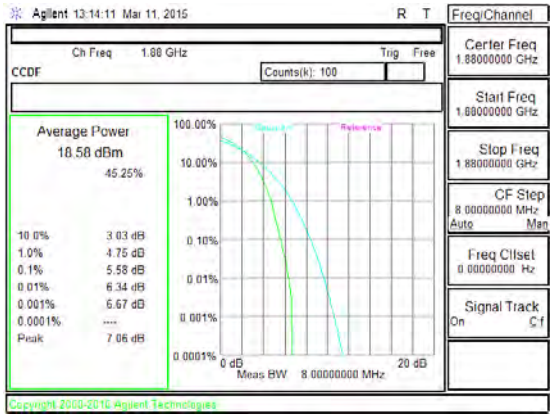
In addition, when the transmitter power is measured in terms of average value, the peak-to-average ratio of the power shall not exceed 13 dB.

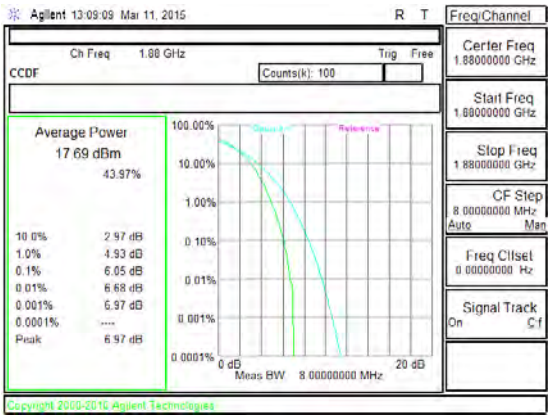
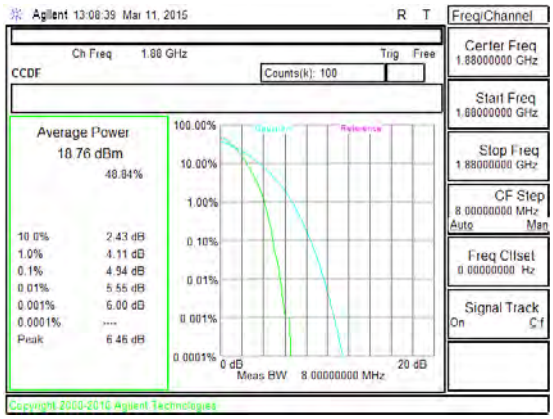
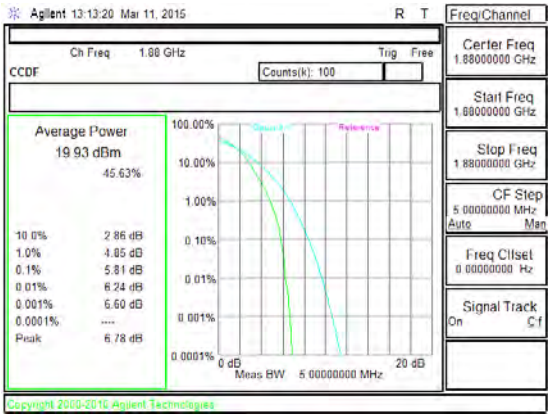
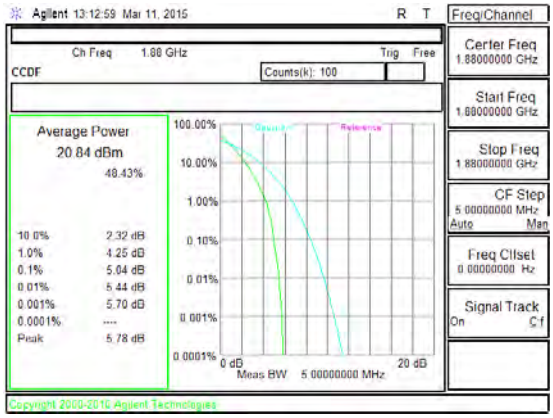
9.1. CONDUCTED PEAK TO AVERAGE RESULT

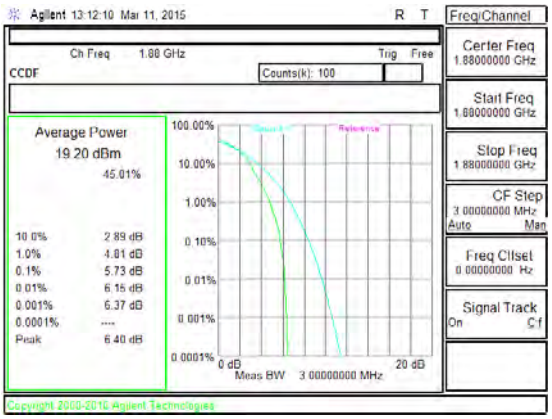
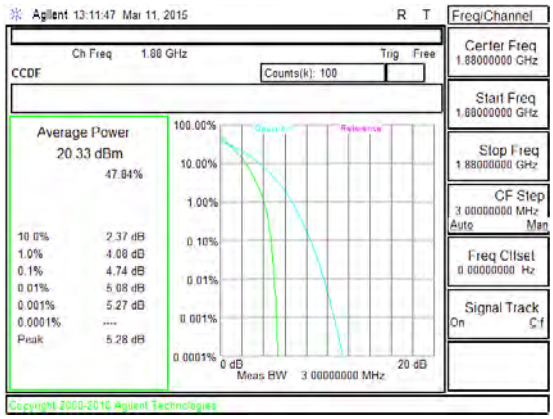
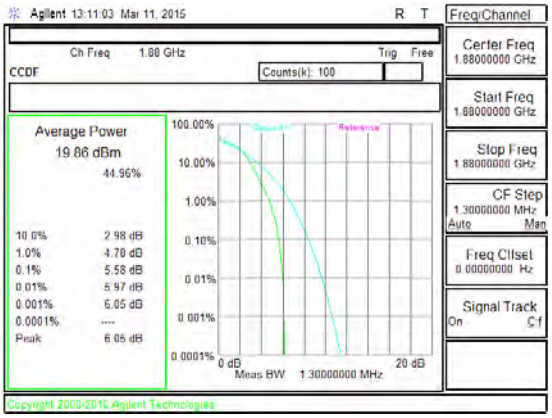
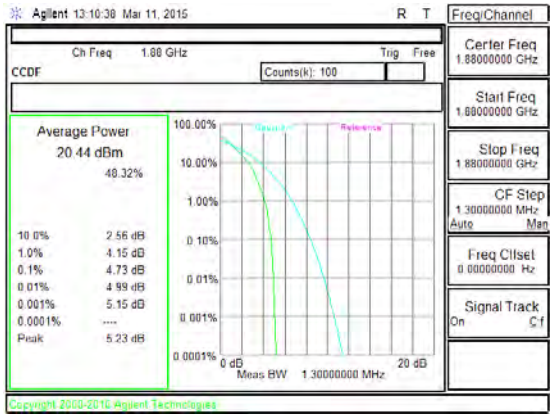
Band Band 5 HSDPA	 Band WCDMA B5 HSDPA PAR	 Band WCDMA B5 REL99 PAR

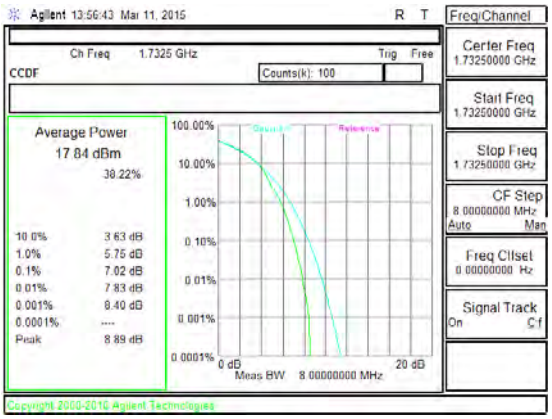
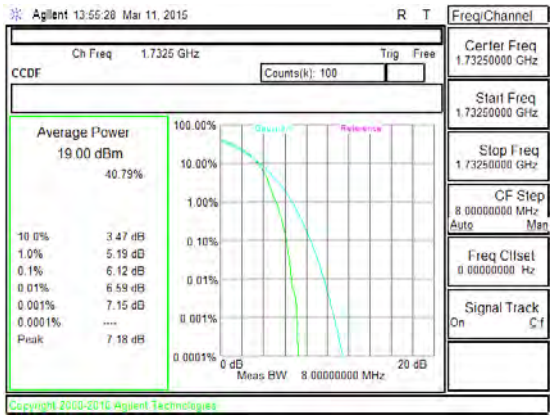
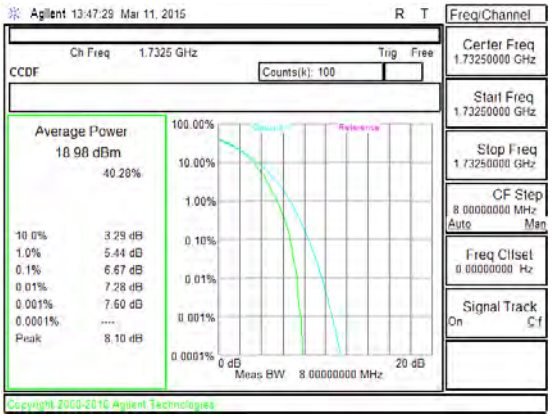
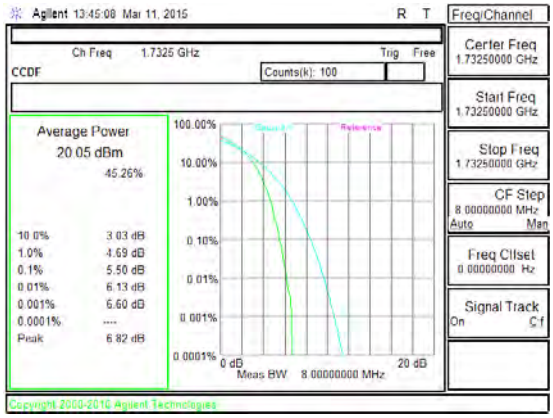
Band Band 2 HSDPA	 Band WCDMA B2 HSDPA PAR	 Band WCDMA B2 REL99 PAR
Band Band 4 HSDPA	 Band WCDMA B4 HSDPA PAR	 Band WCDMA B4 REL99 PAR

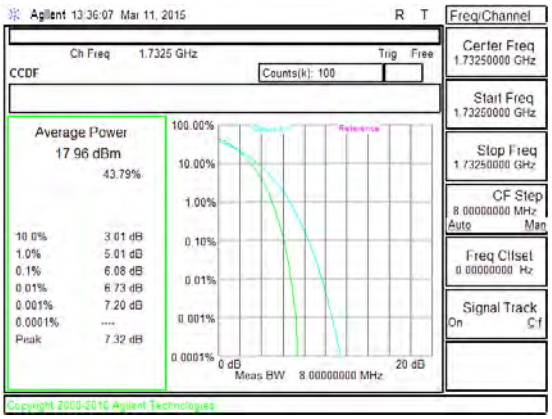
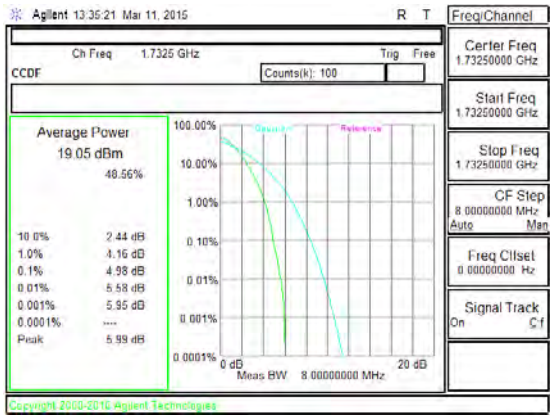
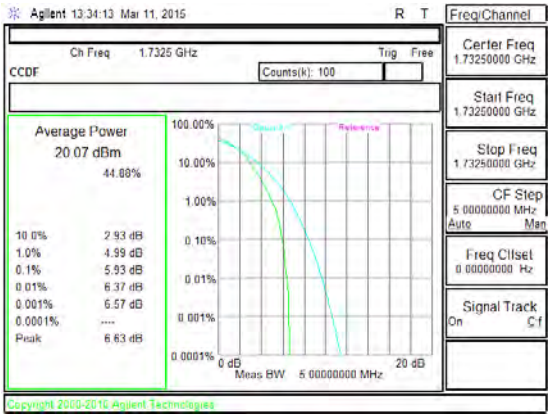
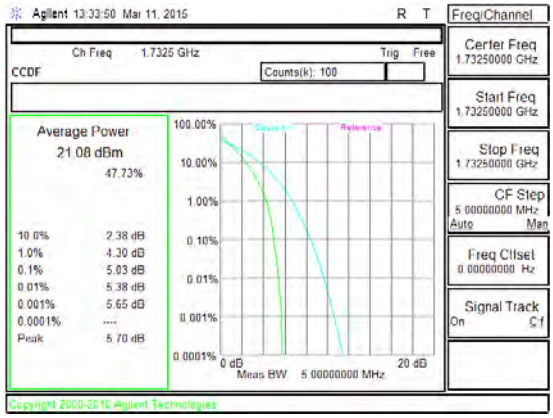
Band GSM1900	 Band GSM1900 EGPRS PAR	 Band GSM1900 GPRS PAR
Band GSM850	 Band GSM850 EGPRS PAR	 Band GSM850 GPRS PAR

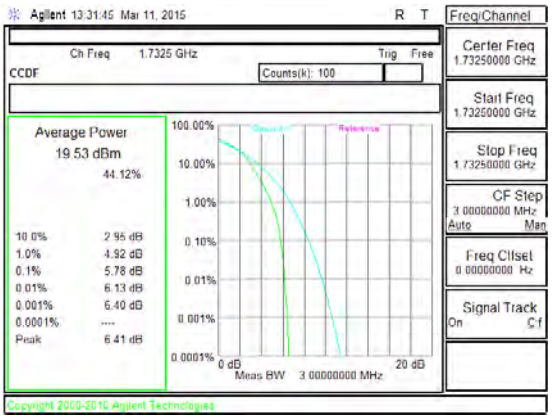
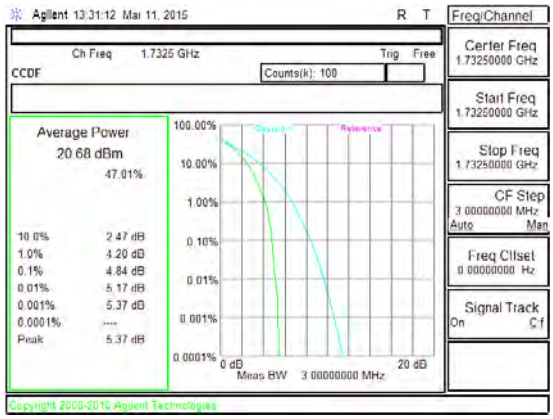
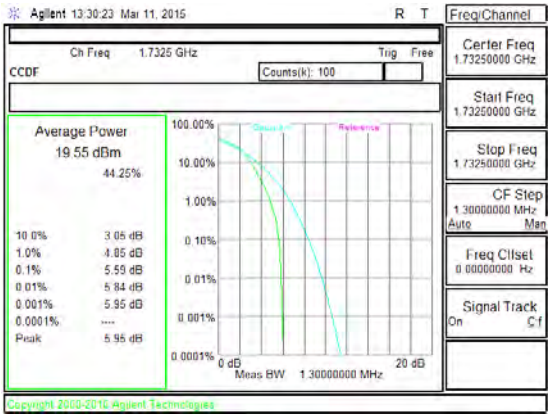
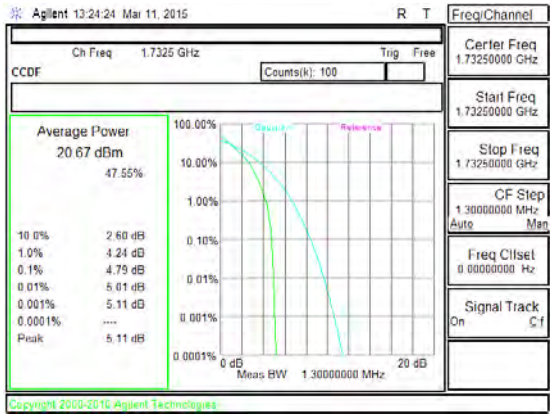
Band LTE2 20MHz	 Band LTE2 20MHz PAR 16QAM	 Band LTE2 20MHz PAR QPSK
Band LTE2 15MHz	 Band LTE2 15MHz PAR 16QAM	 Band LTE2 15MHz PAR QPSK

Band LTE2 10MHz	 Band LTE2 10MHz PAR 16QAM	 Band LTE2 10MHz PAR QPSK
Band LTE2 5MHz	 Band LTE2 5MHz PAR 16QAM	 Band LTE2 5MHz PAR QPSK

Band LTE2 3MHz	 Band LTE2 3MHz PAR 16QAM	 Band LTE2 3MHz PAR QPSK
Band LTE2 1.4MHz	 Band LTE2 1.4MHz PAR 16QAM	 Band LTE2 1.4MHz PAR QPSK

Band LTE4 20MHz	 Band LTE4 20MHz PAR 16QAM	 Band LTE4 20MHz PAR QPSK
Band LTE4 15MHz	 Band LTE4 15MHz PAR 16QAM	 Band LTE4 15MHz PAR QPSK

Band LTE4 10MHz	 Band LTE4 10MHz PAR 16QAM	 Band LTE4 10MHz PAR QPSK
Band LTE4 5MHz	 Band LTE4 5MHz PAR 16QAM	 Band LTE4 5MHz PAR QPSK

Band LTE4 3MHz	 Band LTE4 3MHz PAR 16QAM	 Band LTE4 3MHz PAR QPSK
Band LTE4 1.4MHz	 Band LTE4 1.4MHz PAR 16QAM	 Band LTE4 1.4MHz PAR QPSK

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 v02r02)

MODES TESTED

GSM, WCDMA, AND LTE

10.1.1. OCCUPIED BANDWIDTH RESULTS

Band	Mode	Channel	f (MHz)	99% BW (kHz)	-26dB BW (kHz)
GSM850	GPRS	128	824.2	247.4	318.6
		190	836.6	244.3	319.8
		251	848.8	242.6	314.1
	EGPRS	128	824.2	248.6	312.6
		190	836.6	236.3	301.6
		251	848.8	238.3	309.6
GSM1900	GPRS	512	1850.2	248.3	319.3
		661	1880	247.7	323.8
		810	1909.8	239.8	309.6
	EGPRS	512	1850.2	244.4	300.2
		661	1880	245.1	313.1
		810	1909.8	246.8	305.4
Band	Mode	Channel	f (MHz)	99% BW (MHz)	-26dB BW (MHz)
Band 5	REL99	4132	826.4	4.14	4.65
		4183	836.6	4.15	4.65
		4233	846.6	4.16	4.64
	HSDPA	4132	826.4	4.16	4.64
		4183	836.6	4.15	4.64
		4233	846.6	4.16	4.63
Band 4	REL99	1312	1712.4	4.18	4.64
		1413	1732.6	4.18	4.64
		1513	1752.6	4.18	4.64
	HSDPA	1312	1712.4	4.19	4.65
		1413	1732.6	4.16	4.64
		1513	1752.6	4.18	4.62

Band 2	REL99	9262	1852.4	4.17	4.66
		9400	1880	4.17	4.65
		9538	1907.6	4.17	4.66
	HSDPA	9262	1852.4	4.17	4.66
		9400	1880	4.18	4.64
		9538	1907.6	4.16	4.65

10.1.2. LTE OCCUPIED BANDWIDTH RESULTS

Band	BW(MHz)	Mode	RB/RB Size	f (MHz)	99% BW (MHz)	-26dB BW
LTE2	20	QPSK	100/0	1860	17.87	19.22
			100/0	1880	17.87	19.29
			100/0	1900	17.86	19.33
		16QAM	100/0	1860	17.84	19.27
			100/0	1880	17.89	19.18
			100/0	1900	17.84	19.14

Band	BW(MHz)	Mode	RB/RB Size	f (MHz)	99% BW (MHz)	-26dB BW
LTE2	15	QPSK	75/0	1857.5	13.42	14.62
			75/0	1880	13.43	14.64
			75/0	1902.5	13.44	14.47
		16QAM	75/0	1857.5	13.45	14.57
			75/0	1880	13.43	14.49
			75/0	1902.5	13.42	14.57

Band	BW(MHz)	Mode	RB/RB Size	f (MHz)	99% BW (MHz)	-26dB BW
LTE2	10	QPSK	50/0	1855	8.96	9.75
			50/0	1880	8.98	9.82
			50/0	1905	8.97	9.80
		16QAM	50/0	1855	8.96	9.70
			50/0	1880	8.96	9.80
			50/0	1905	8.98	9.83

Band	BW(MHz)	Mode	RB/RB Size	f (MHz)	99% BW (MHz)	-26dB BW
LTE2	5	QPSK	25/0	1852.5	4.51	4.98
			25/0	1880	4.50	4.97
			25/0	1907.5	4.50	4.96
		16QAM	25/0	1852.5	4.49	4.99
			25/0	1880	4.51	4.99
			25/0	1907.5	4.49	4.92

Band	BW(MHz)	Mode	RB/RB Size	f (MHz)	99% BW (MHz)	-26dB BW
LTE2	3	QPSK	15/0	1851.5	2.69	2.97
			15/0	1880	2.69	2.97
			15/0	1908.5	2.69	2.96
		16QAM	15/0	1851.5	2.68	2.97
			15/0	1880	2.69	2.97
			15/0	1908.5	2.68	2.99

Band	BW(MHz)	Mode	RB/RB Size	f (MHz)	99% BW (MHz)	-26dB BW
LTE2	1.4	QPSK	6/0	1850.7	1.09	1.27
			6/0	1880	1.09	1.29
			6/0	1909.3	1.08	1.28
		16QAM	6/0	1850.7	1.09	1.28
			6/0	1880	1.08	1.27
			6/0	1909.3	1.09	1.30

Band	BW(MHz)	Mode	RB/RB Size	f (MHz)	99% BW (MHz)	-26dB BW
LTE4	20	QPSK	100/0	1720	17.83	19.30
			100/0	1732.5	17.92	19.12
			100/0	1745	17.91	19.23
		16QAM	100/0	1720	17.87	19.39
			100/0	1732.5	17.87	19.21
			100/0	1745	17.87	19.10

Band	BW(MHz)	Mode	RB/RB Size	f (MHz)	99% BW (MHz)	-26dB BW
LTE4	15	QPSK	75/0	1717.5	13.41	14.59
			75/0	1732.5	13.41	14.60
			75/0	1747.5	13.42	14.49
		16QAM	75/0	1717.5	13.41	14.51
			75/0	1732.5	13.43	14.59
			75/0	1747.5	13.42	14.65

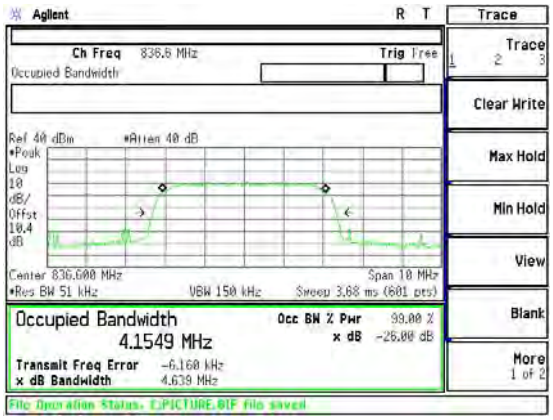
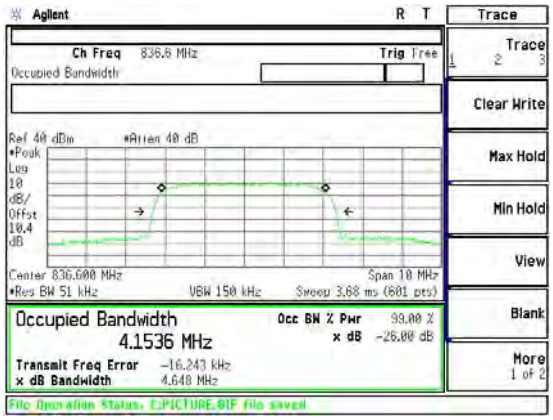
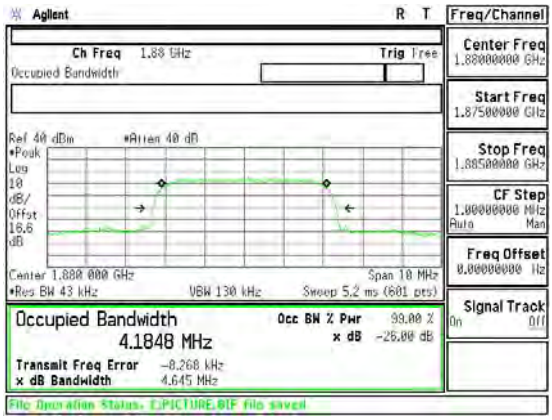
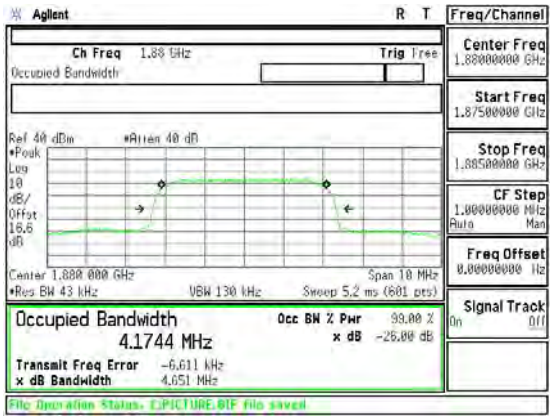
Band	BW(MHz)	Mode	RB/RB Size	f (MHz)	99% BW (MHz)	-26dB BW
LTE4	10	QPSK	50/0	1715	8.97	9.82
			50/0	1732.5	8.98	9.78
			50/0	1750	8.96	9.74
		16QAM	50/0	1715	8.96	9.78
			50/0	1732.5	8.96	9.86
			50/0	1750	8.99	9.82

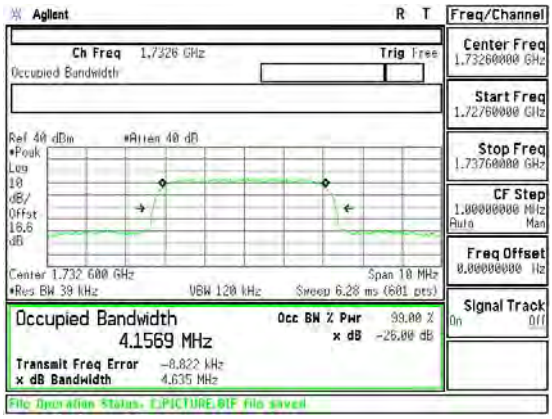
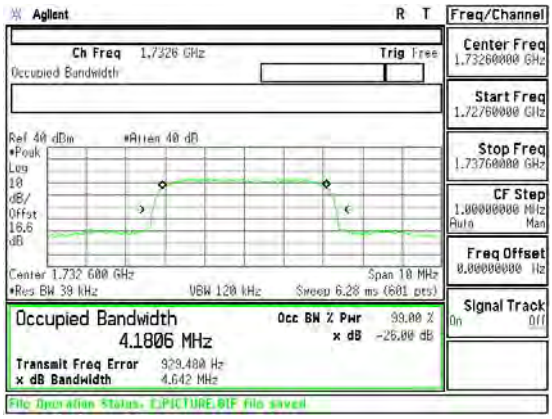
Band	BW(MHz)	Mode	RB/RB Size	f (MHz)	99% BW (MHz)	-26dB BW
LTE4	5	QPSK	25/0	1712.5	4.51	5.0
			25/0	1732.5	4.50	5.00
			25/0	1752.5	4.50	5.03
		16QAM	25/0	1712.5	4.52	4.98
			25/0	1732.5	4.50	4.94
			25/0	1752.5	4.50	4.98

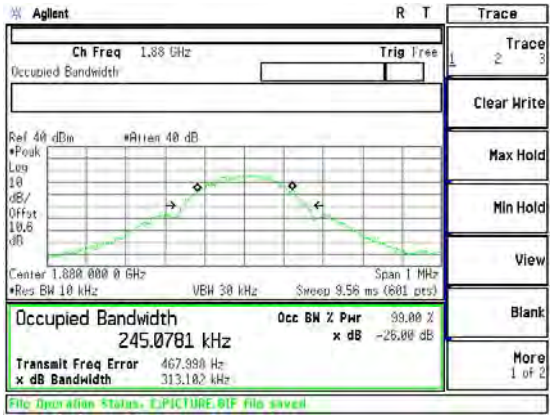
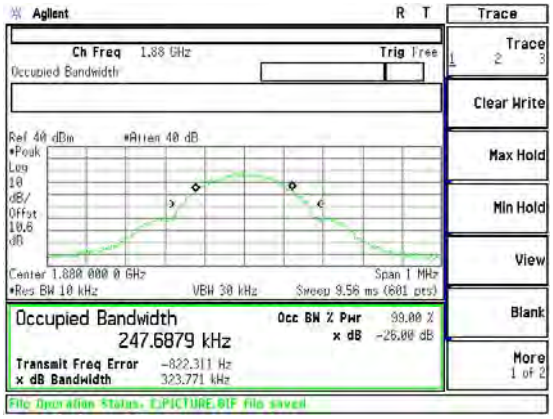
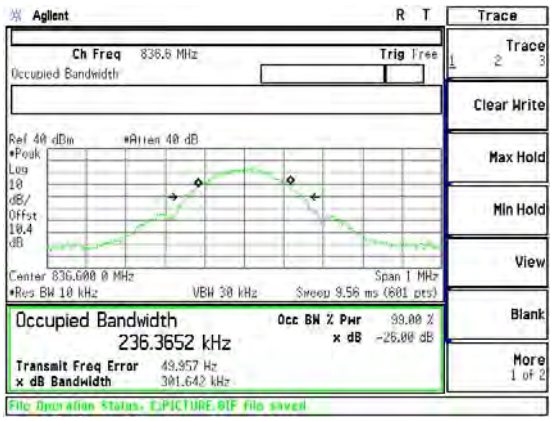
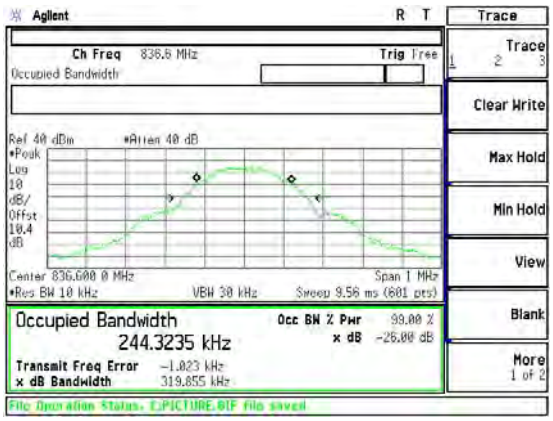
Band	BW(MHz)	Mode	RB/RB Size	f (MHz)	99% BW (MHz)	-26dB BW
LTE4	3	QPSK	15/0	1711.7	2.68	2.95
			15/0	1732.5	2.69	2.97
			15/0	1753.5	2.69	2.98
		16QAM	15/0	1711.7	2.69	2.96
			15/0	1732.5	2.69	2.96
			15/0	1753.5	2.69	3.00

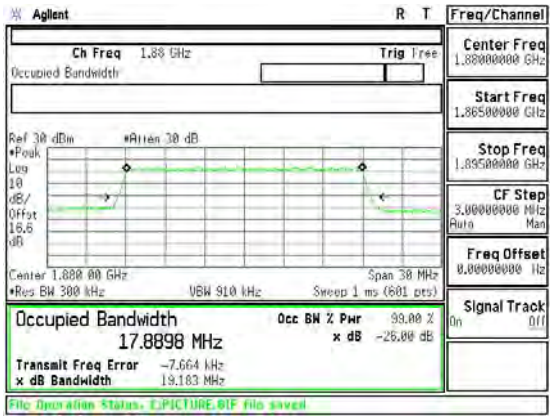
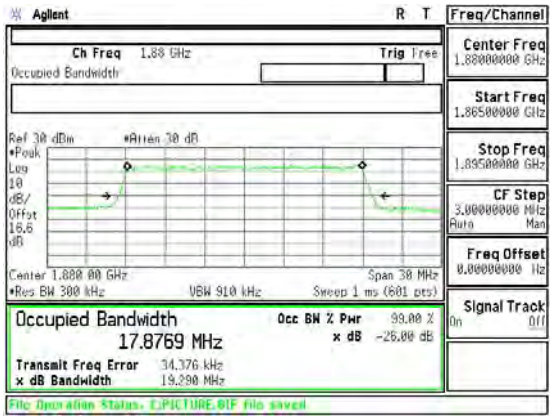
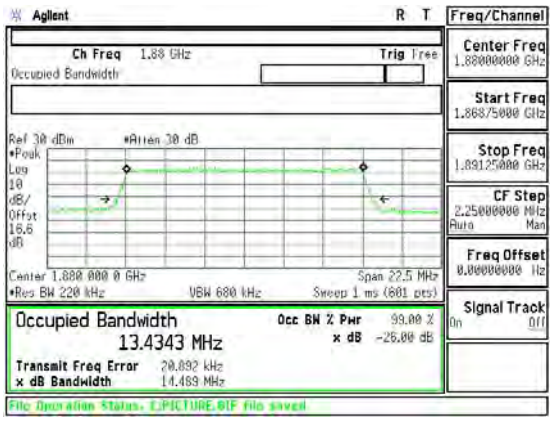
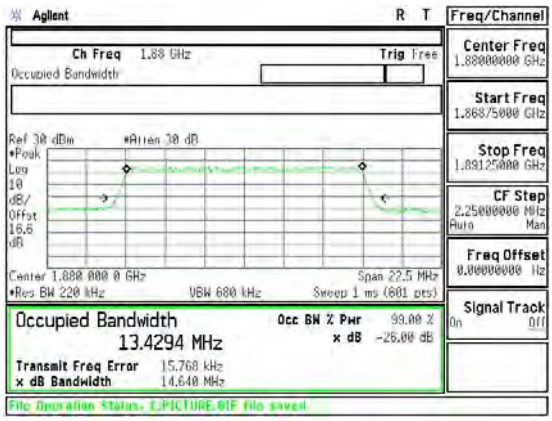
Band	BW(MHz)	Mode	RB/RB Size	f (MHz)	99% BW (MHz)	-26dB BW
LTE4	1.4	QPSK	6/0	1710.7	1.08	1.26
			6/0	1732.5	1.09	1.27
			6/0	1754.3	1.08	1.27
		16QAM	6/0	1710.7	1.09	1.28
			6/0	1732.5	1.08	1.28
			6/0	1754.3	1.09	1.29

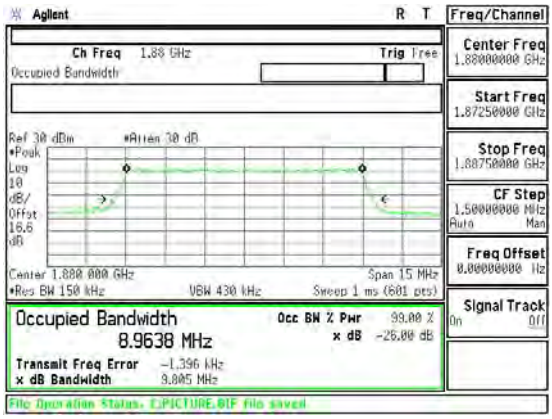
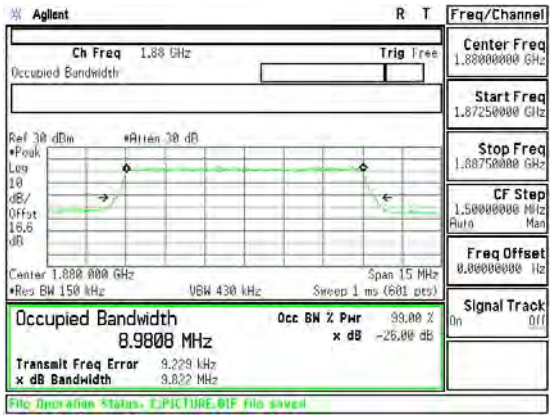
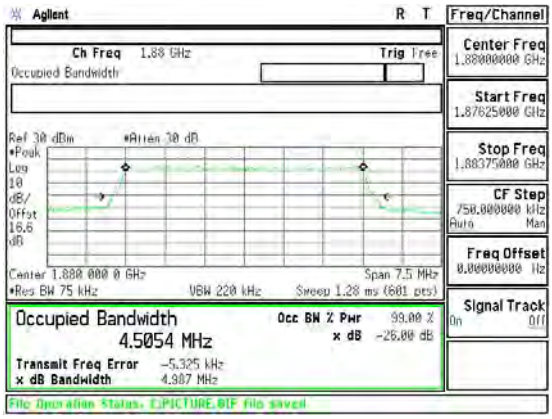
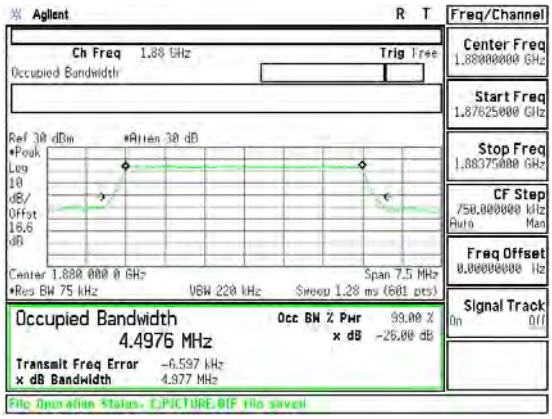
10.1.1. OCCUPIED BANDWIDTH PLOTS

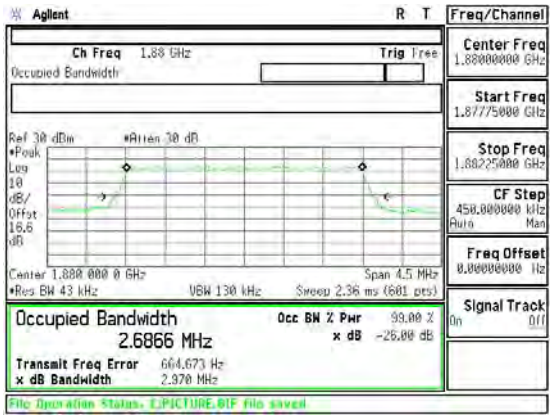
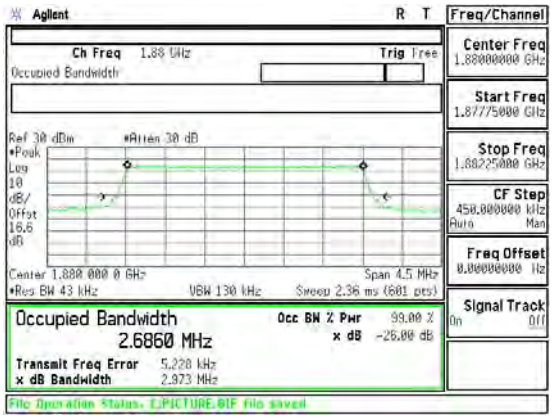
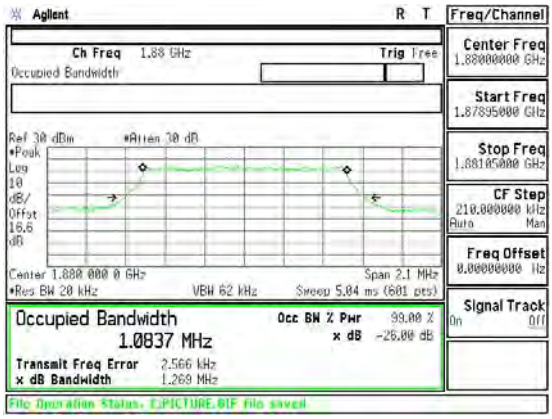
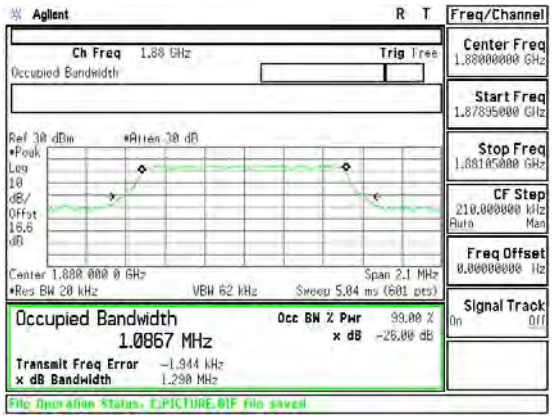
Band Band 5 HSDPA	 Band WCDMA B5 HSDPA OBW	 Band WCDMA B5 REL99 OBW
Band Band 2 HSDPA	 Band WCDMA B2 HSDPA OBW	 Band WCDMA B2 REL99 OBW

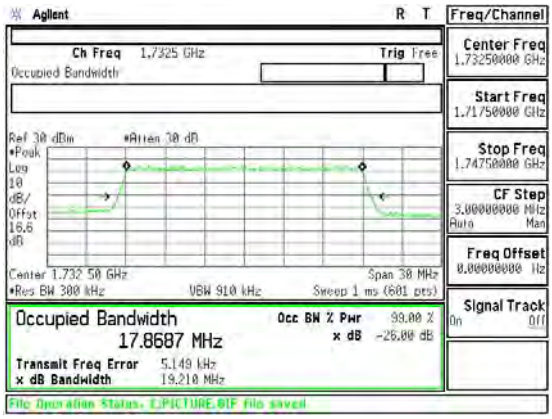
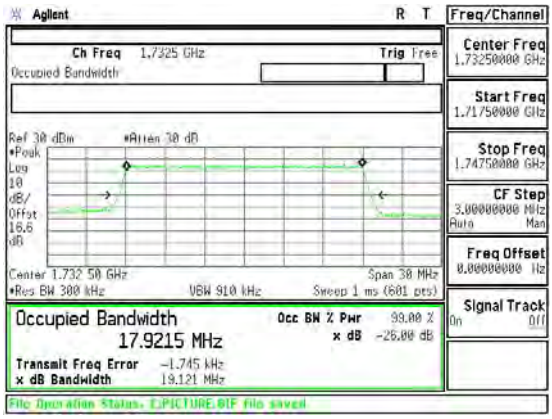
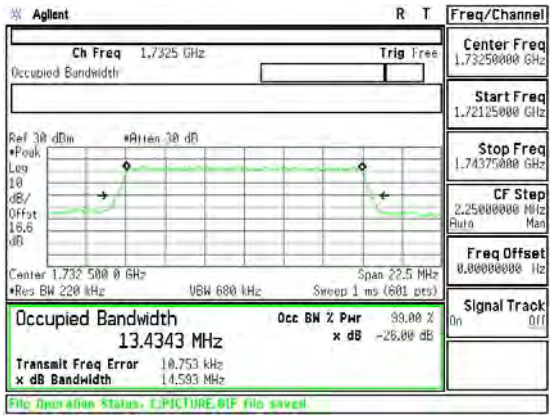
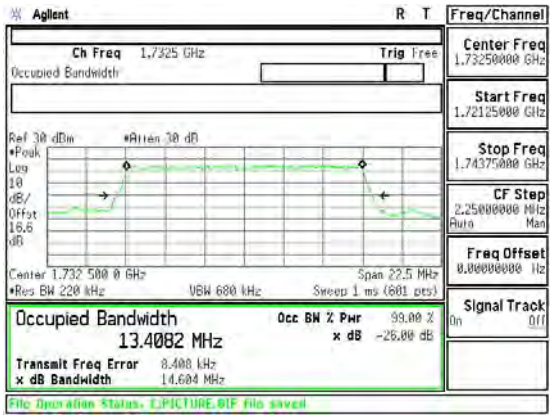
Band Band 4 HSDPA	 Band WCDMA B4 HSDPA OBW	 Band WCDMA B4 REL99 OBW

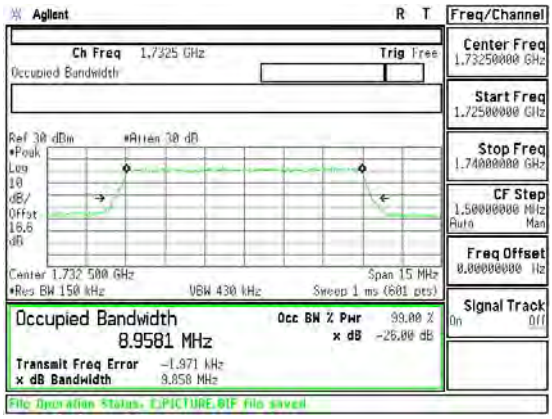
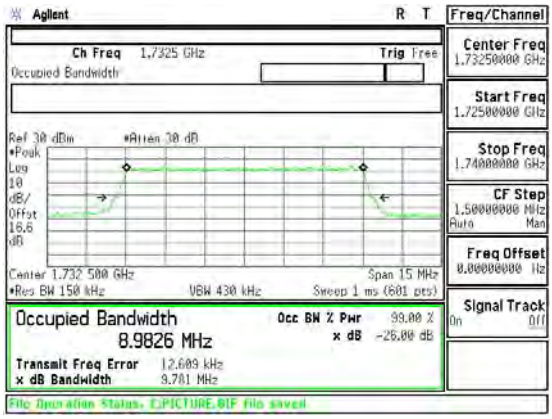
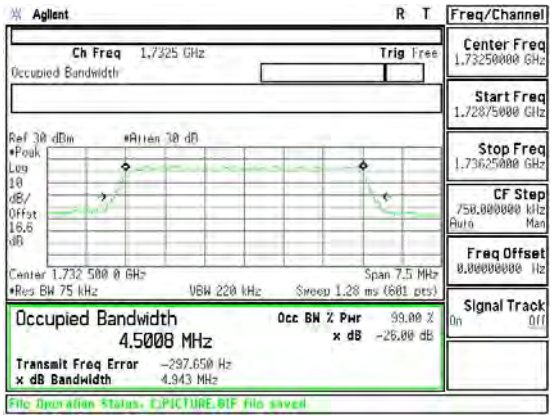
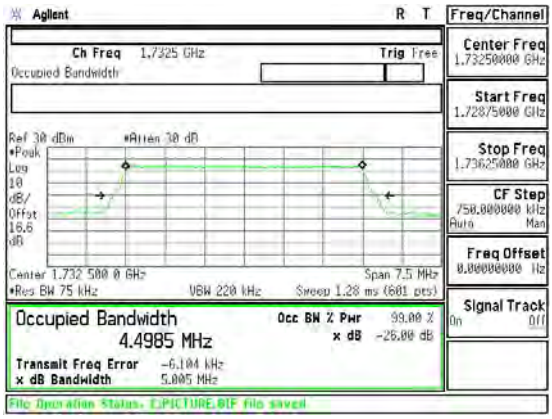
Band GSM1900	 Band GSM1900 EGPRS OBW Mid channel	 Band GSM1900 GPRS OBW Mid channel
Band GSM850	 Band GSM850 EGPRS OBW Mid channel	 Band GSM850 GPRS OBW Mid channel

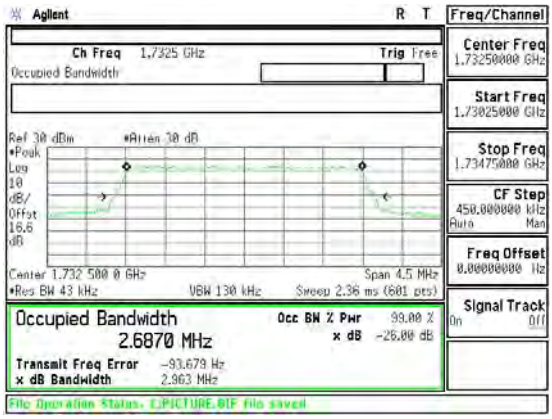
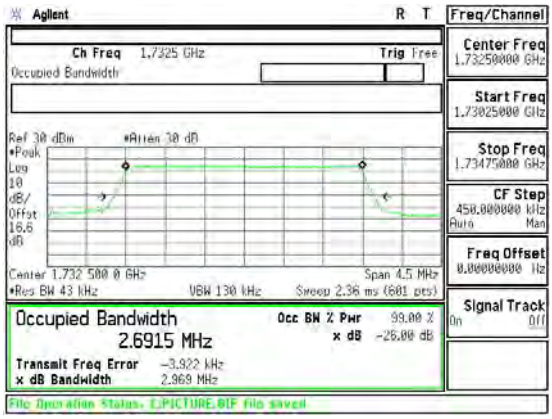
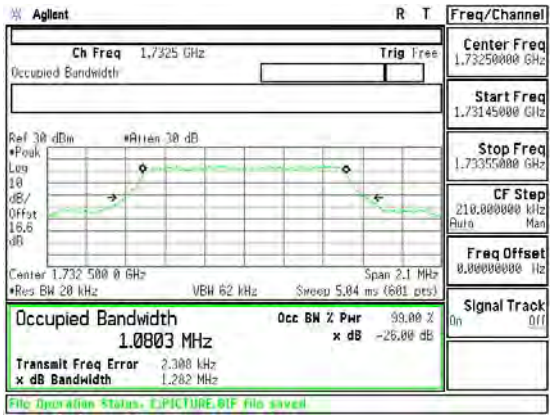
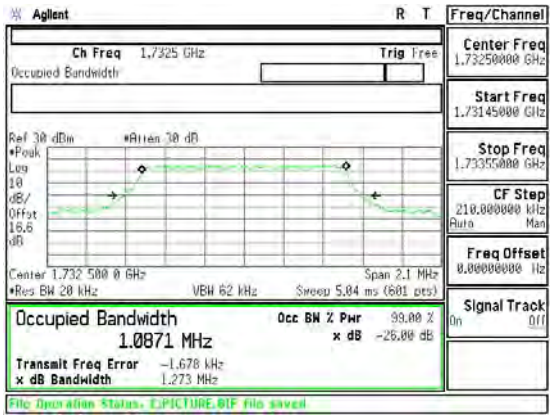
Band LTE2 20MHz	 Band LTE2 20MHz OBW 16QAM Mid Channel FRB.gif	 Band LTE2 20MHz OBW QPSK Mid Channel FRB.gif
Band LTE2 15MHz	 Band LTE2 15MHz OBW 16QAM Mid Channel FRB.gif	 Band LTE2 15MHz OBW QPSK Mid Channel FRB.gif

Band LTE2 10MHz		
	Band LTE2 10MHz OBW 16QAM Mid Channel FRB.gif	Band LTE2 10MHz OBW QPSK Mid Channel FRB.gif
Band LTE2 5MHz		
	Band LTE2 5MHz OBW 16QAM Mid Channel FRB.gif	Band LTE2 5MHz OBW QPSK Mid Channel FRB.gif

Band LTE2 3MHz	 Band LTE2 3MHz OBW 16QAM Mid Channel FRB.gif	 Band LTE2 3MHz OBW QPSK Mid Channel FRB.gif
Band LTE2 1.4MHz	 Band LTE2 1.4MHz OBW 16QAM Mid Channel FRB.gif	 Band LTE2 1.4MHz OBW QPSK Mid Channel FRB.gif

Band LTE4 20MHz	 Band LTE4 20MHz OBW 16QAM Mid Channel FRB.gif	 Band LTE4 20MHz OBW QPSK Mid Channel FRB.gif
Band LTE4 15MHz	 Band LTE4 15MHz OBW 16QAM Mid Channel FRB.gif	 Band LTE4 15MHz OBW QPSK Mid Channel FRB.gif

Band LTE4 10MHz	 Band LTE4 10MHz OBW 16QAM Mid Channel FRB.gif	 Band LTE4 10MHz OBW QPSK Mid Channel FRB.gif
Band LTE4 5MHz	 Band LTE4 5MHz OBW 16QAM Mid Channel FRB.gif	 Band LTE4 5MHz OBW QPSK Mid Channel FRB.gif

Band LTE4 3MHz	 Band LTE4 3MHz OBW 16QAM Mid Channel FRB.gif	 Band LTE4 3MHz OBW QPSK Mid Channel FRB.gif
Band LTE4 1.4MHz	 Band LTE4 1.4MHz OBW 16QAM Mid Channel FRB.gif	 Band LTE4 1.4MHz OBW QPSK Mid Channel FRB.gif

10.2. BAND EDGE EMISSIONS

RULE PART(S)

FCC: §22.359, §24.238, §27. 53

LIMITS

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

TEST PROCEDURE

Per KDB 971168 D01 Power Meas License Digital Systems v02r02

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.

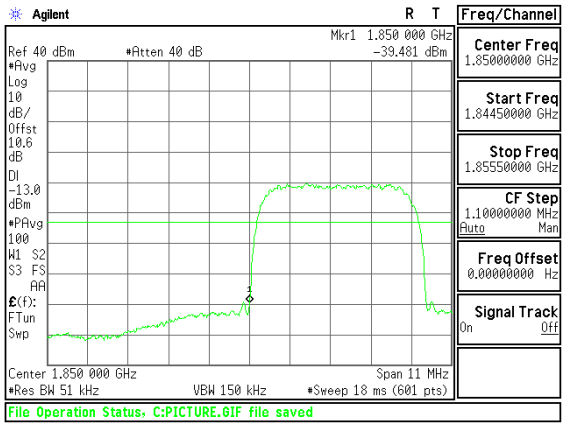
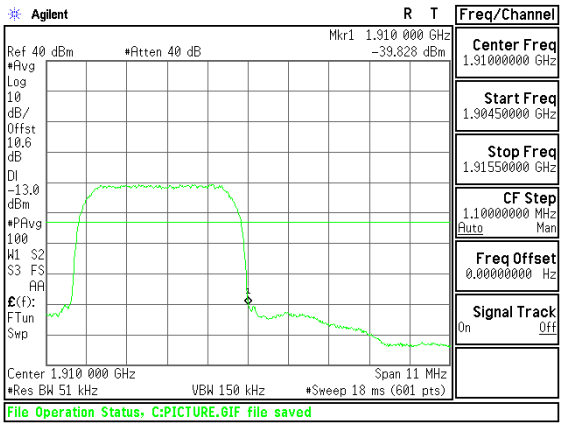
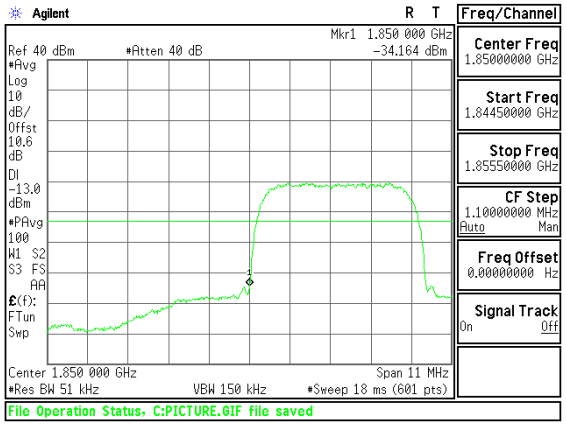
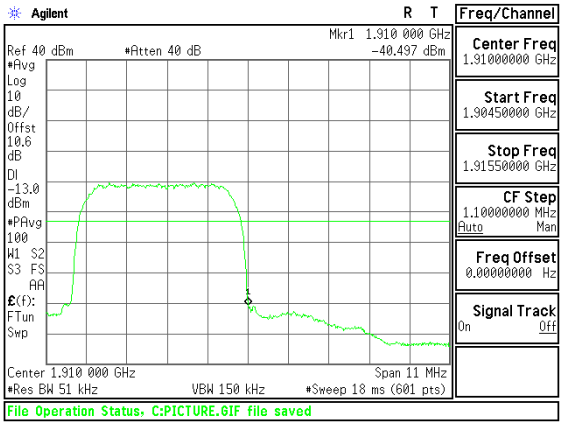
SOP

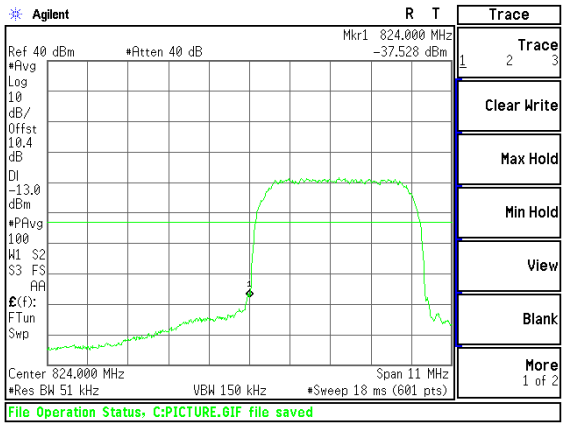
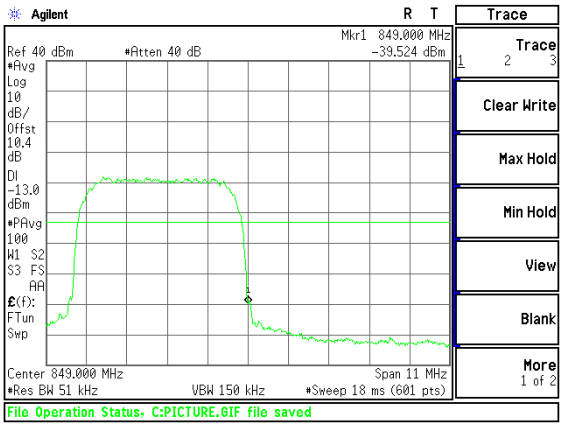
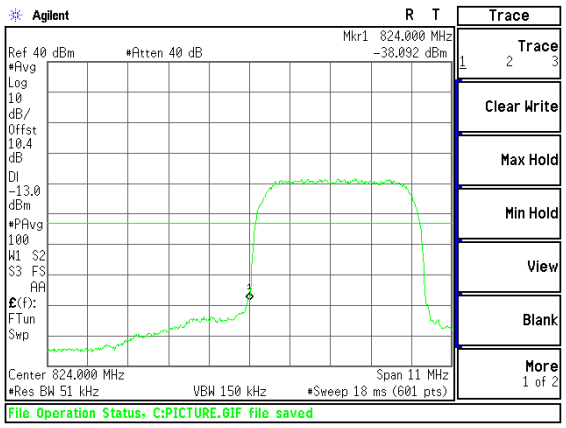
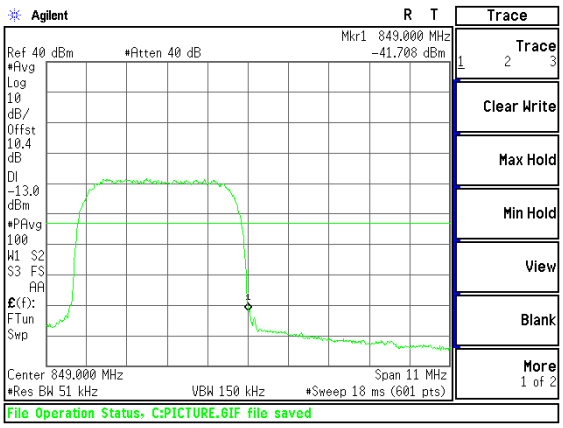
For each band edge measurement:

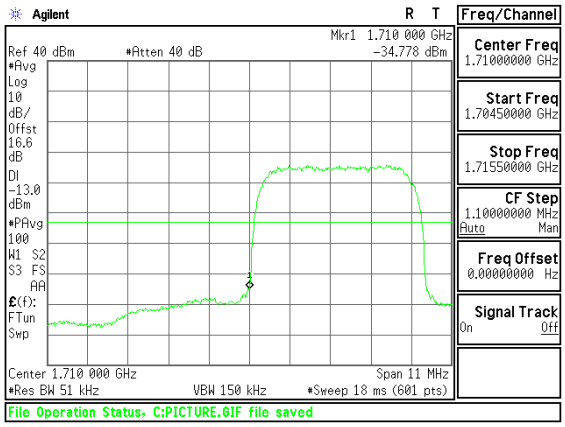
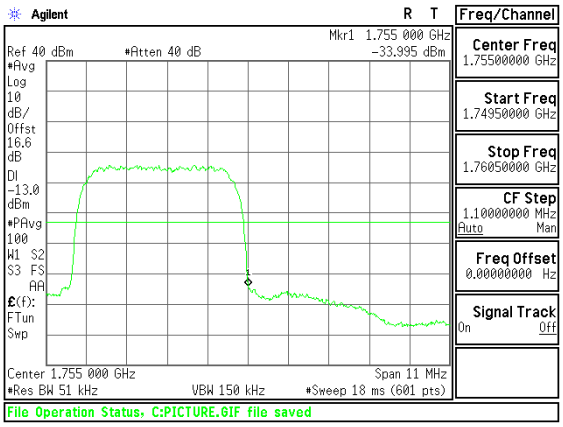
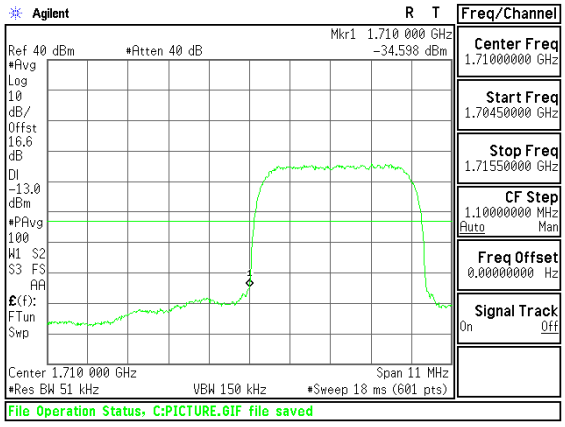
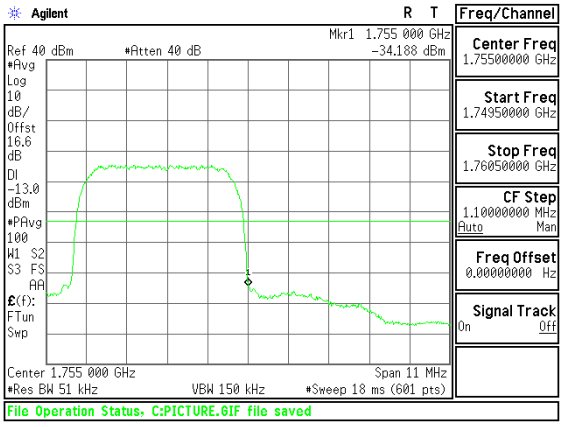
- Set the spectrum analyzer span to include the block edge frequency (824, 849, 1850, 1910 and 1915MHz)
- Set a marker to point the corresponding band edge frequency in each test case.
- Set display line at -13 dBm.
- Set resolution bandwidth to at least 1% of emission bandwidth.
- (m)(6) Compliance with these rules is based on the user of measurement instrumentation employing a resolution bandwidth of 1MHz or greater. However, in the 1MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least 1 percent of the emission bandwidth may be employed.

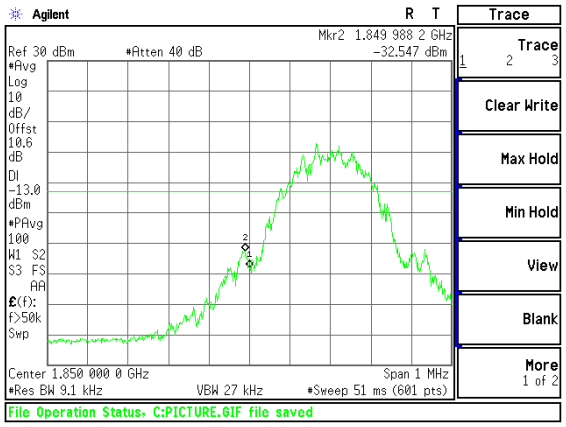
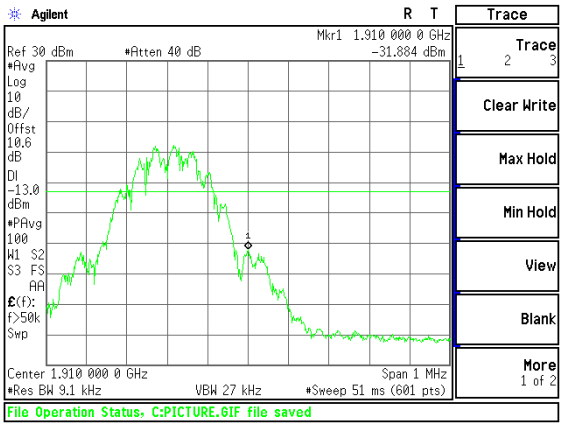
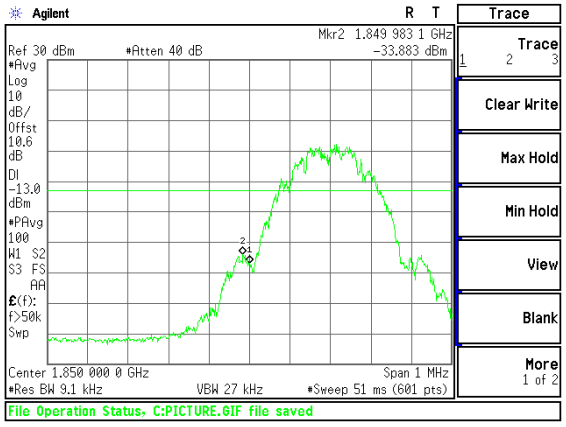
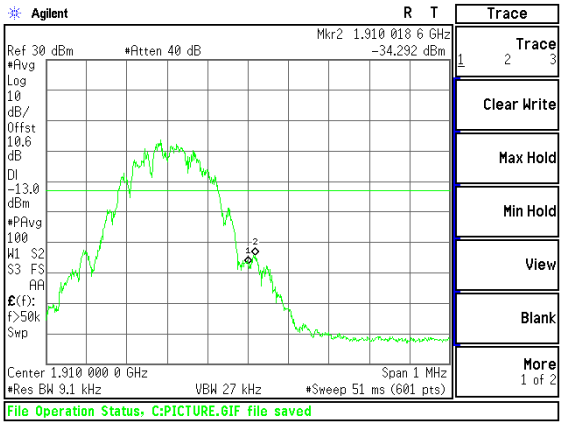
RESULTS

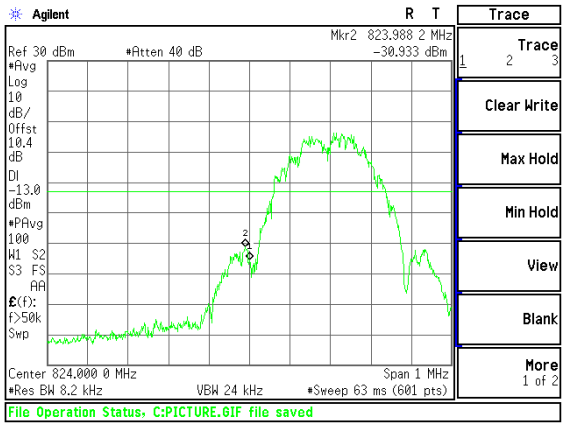
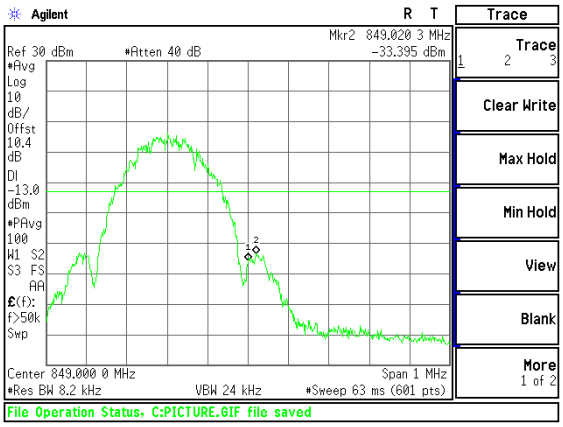
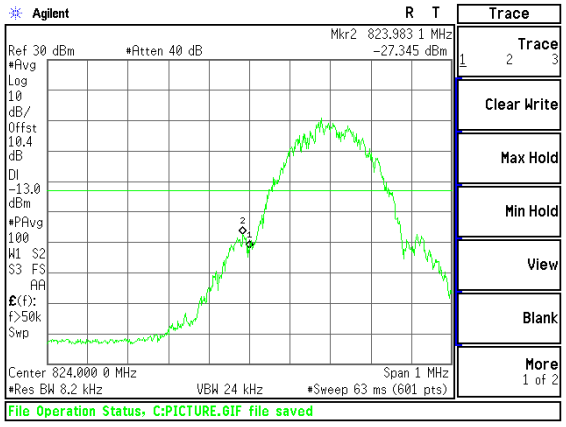
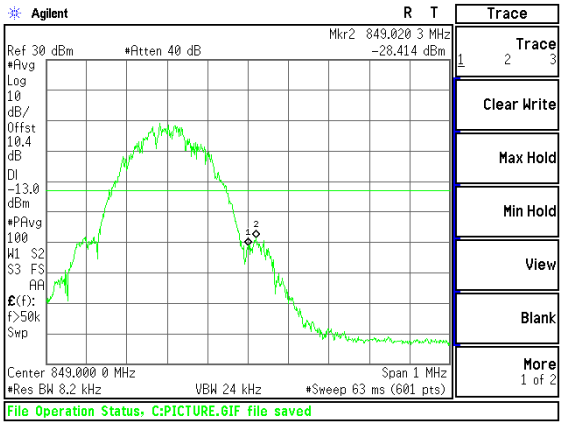
10.2.1. BAND EDGE PLOTS

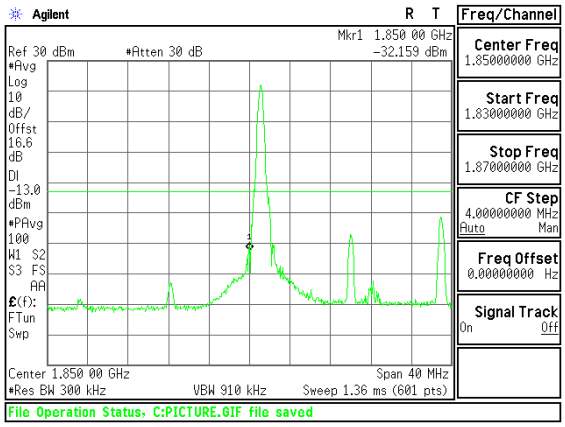
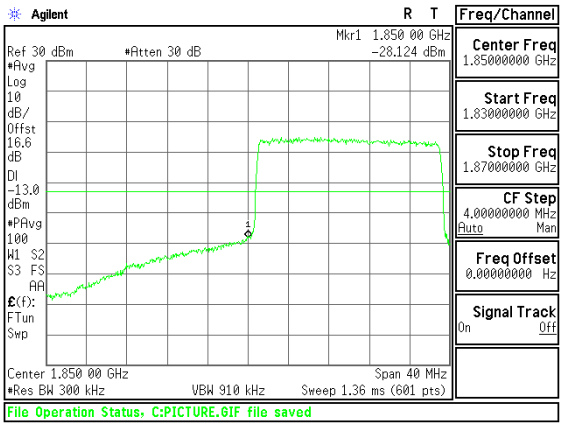
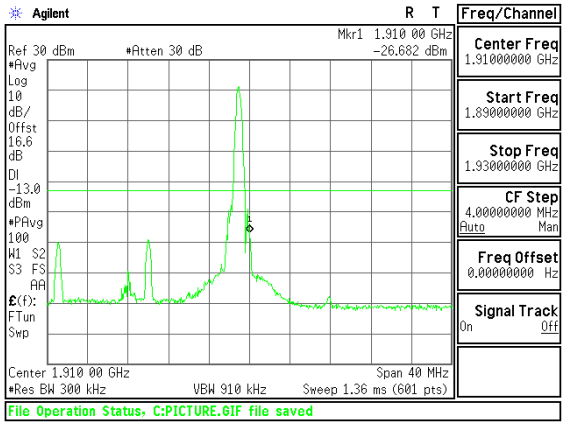
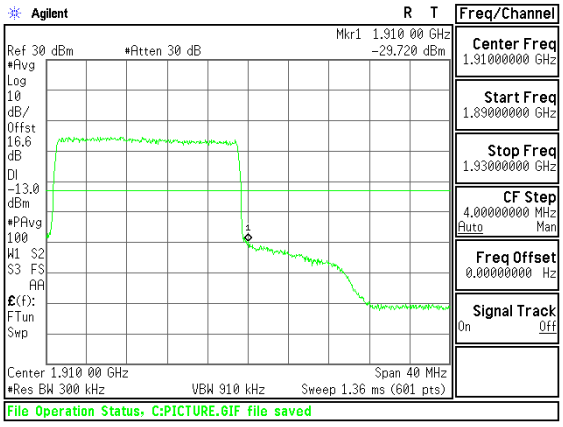
Band Band 2 HSDPA	 Band WCDMA B2 HSDPA CBE	 Band WCDMA B2 HSDPA CBE
Band Band 2 REL99	 Band WCDMA B2 REL99 CBE	 Band WCDMA B2 REL99 CBE

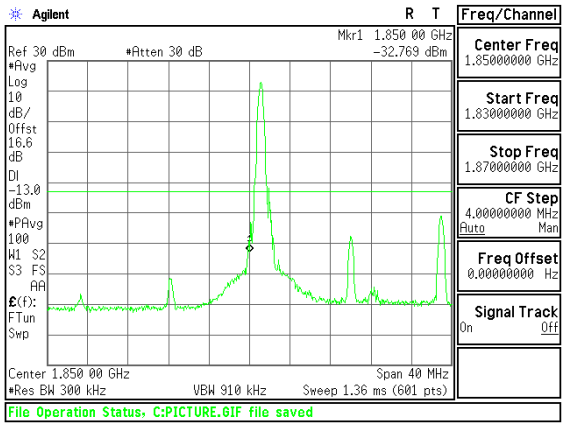
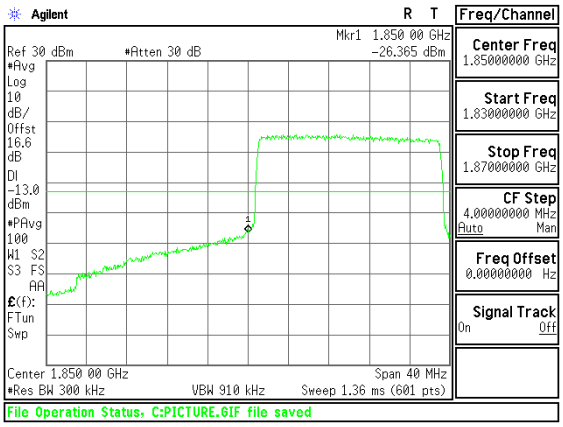
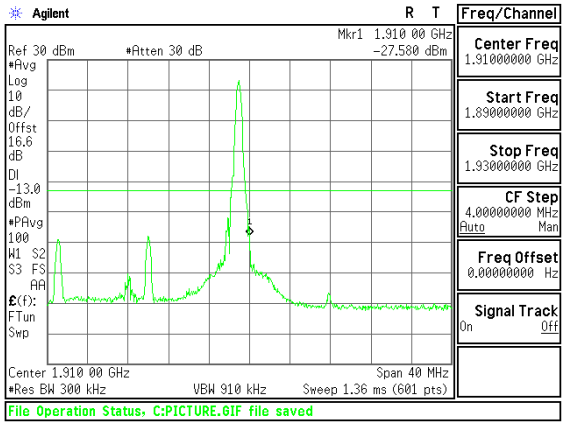
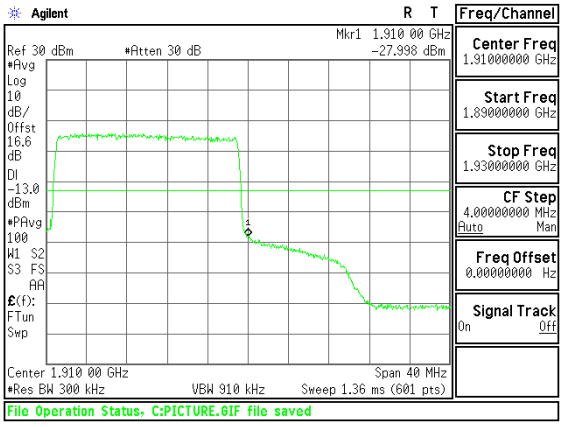
Band Band 5 HSDPA	 Band WCDMA B5 HSDPA CBE	 Band WCDMA B5 HSDPA CBE
Band Band 5 REL99	 Band WCDMA B5 REL99 CBE	 Band WCDMA B5 REL99 CBE

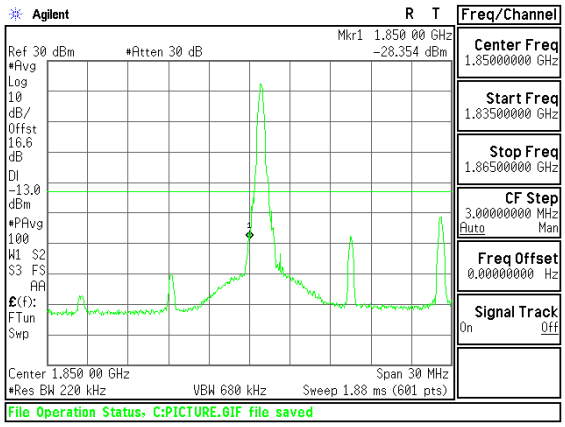
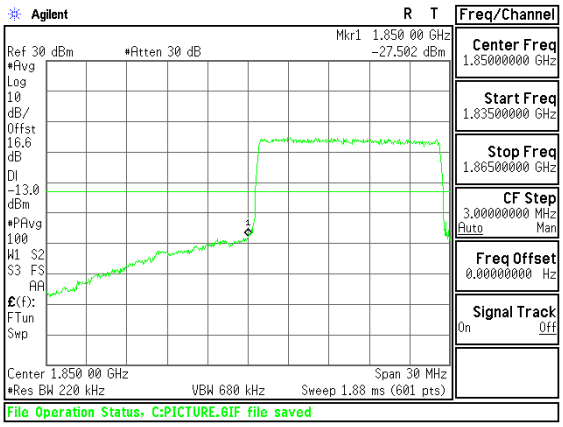
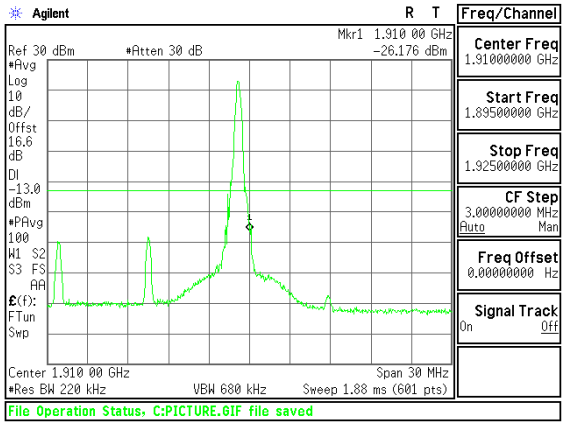
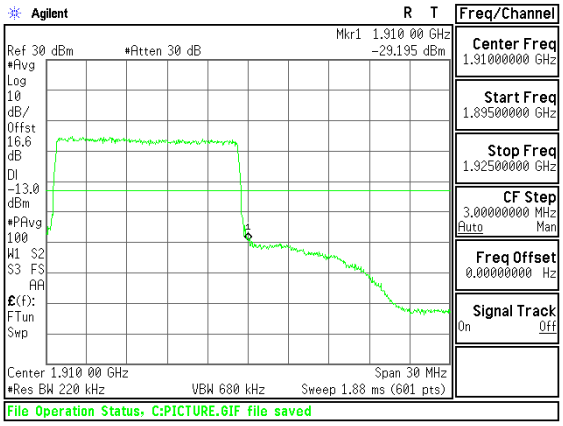
Band Band 4 HSDPA	 Band WCDMA B4 HSDPA CBE	 Band WCDMA B4 HSDPA CBE
Band Band 4 REL99	 Band WCDMA B4 REL99 CBE	 Band WCDMA B4 REL99 CBE

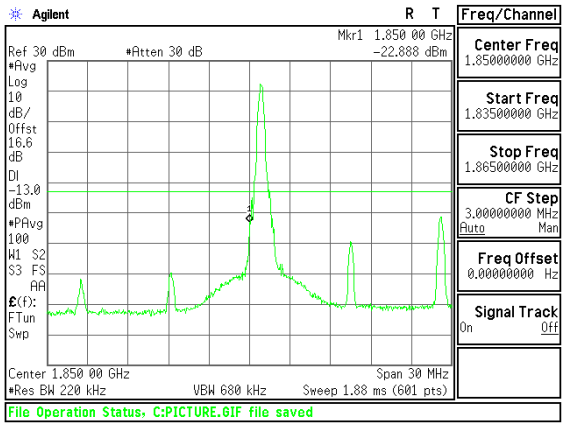
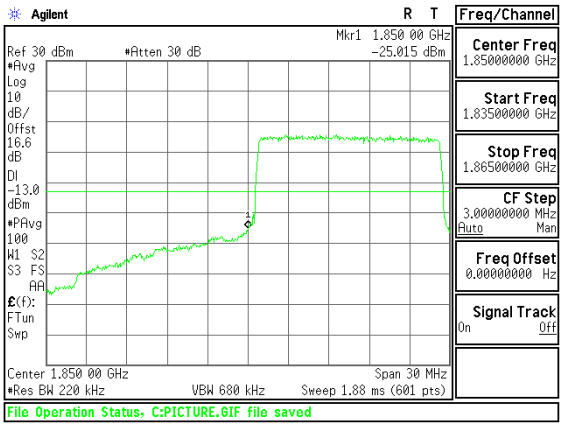
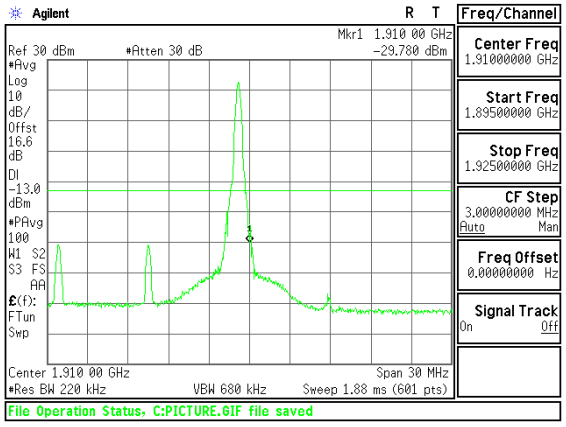
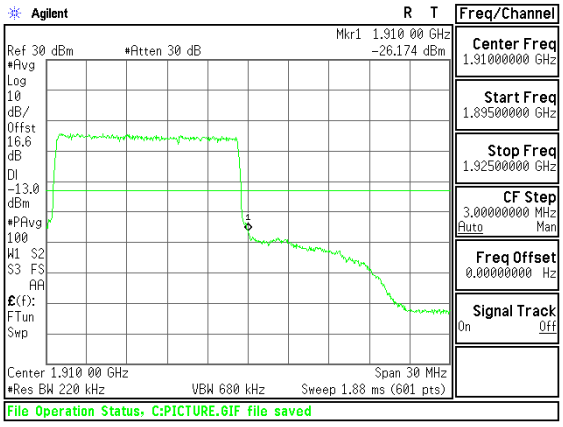
Band GSM1900 EGPRS	 Band GSM1900 EGPRS CBE Low channel	 Band GSM1900 EGPRS CBE High channel
Band GSM1900 GPRS	 Band GSM1900 GPRS CBE Low channel	 Band GSM1900 GPRS CBE High channel

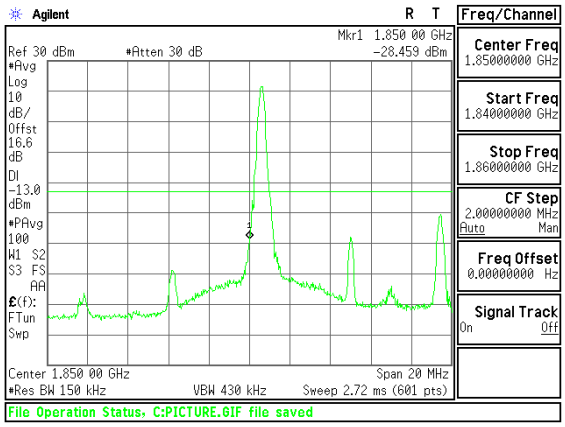
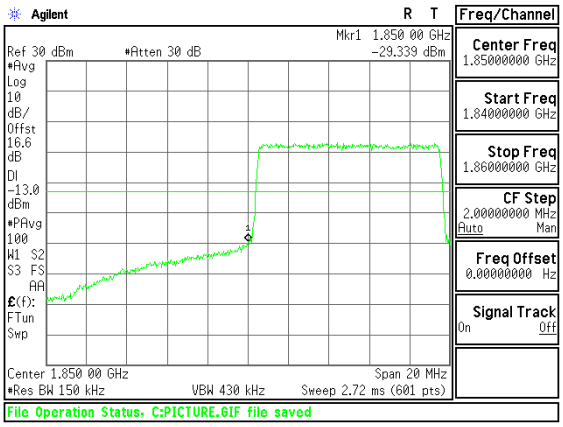
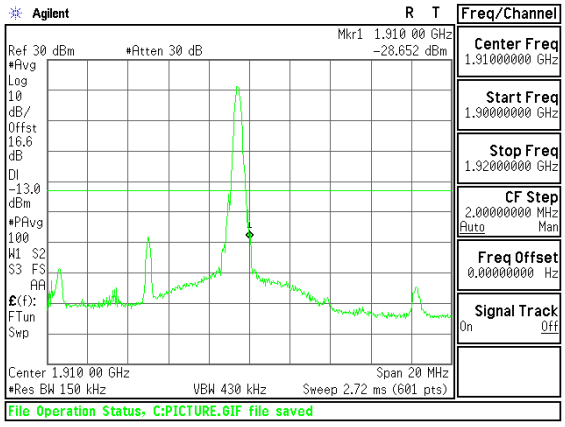
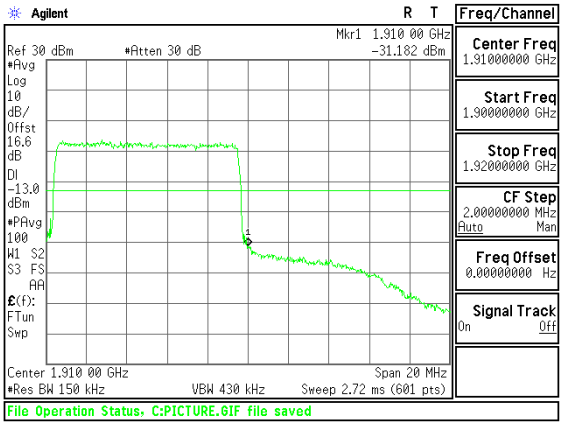
Band GSM850 EGPRS	 Band GSM850 EGPRS CBE Low channel	 Band GSM850 EGPRS CBE High channel
Band GSM850 GPRS	 Band GSM850 GPRS CBE Low channel	 Band GSM850 GPRS CBE High channel

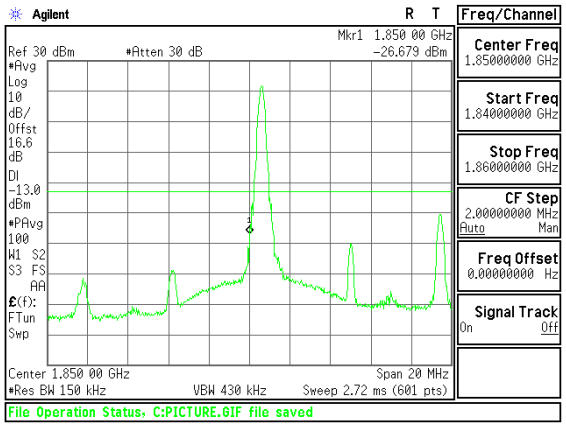
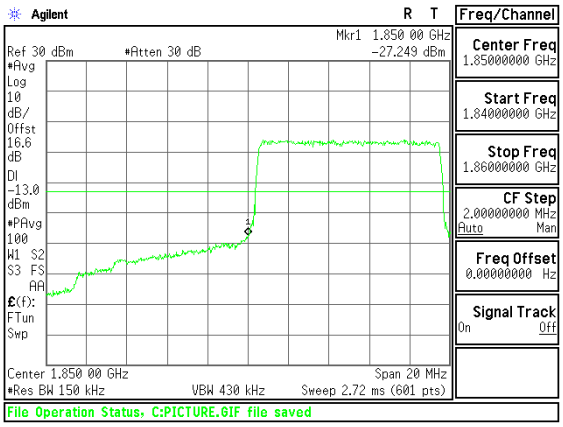
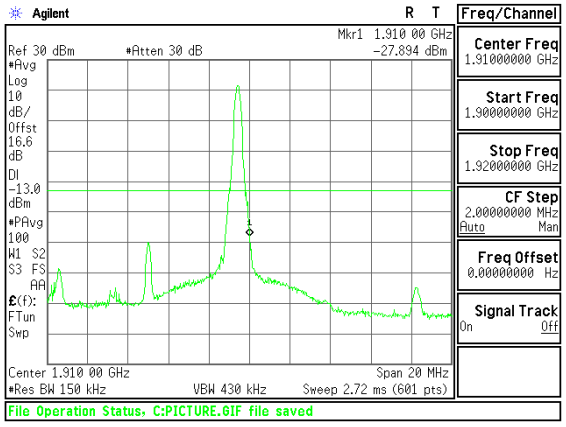
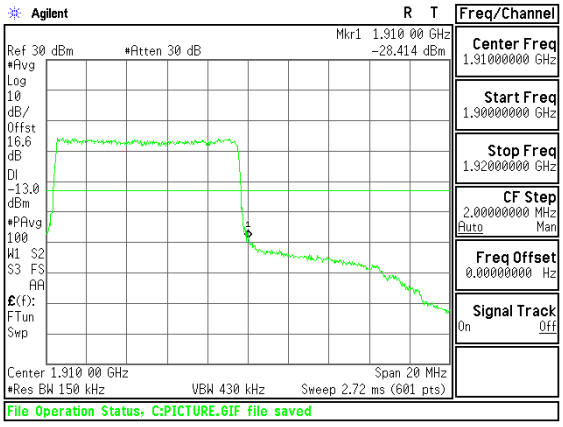
Band LTE2 20MHz 16QAM	 Band LTE2 20MHz CBE 16QAM Low Channel 1RB.gif	 Band LTE2 20MHz CBE 16QAM Low Channel FRB.gif
Band LTE2 20MHz 16QAM	 Band LTE2 20MHz CBE 16QAM High Channel 1RB.gif	 Band LTE2 20MHz CBE 16QAM High Channel FRB.gif

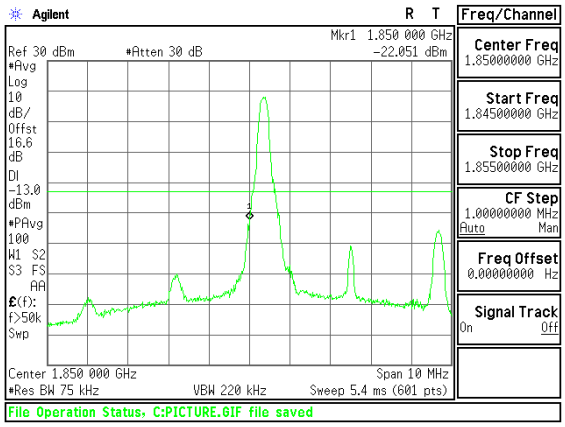
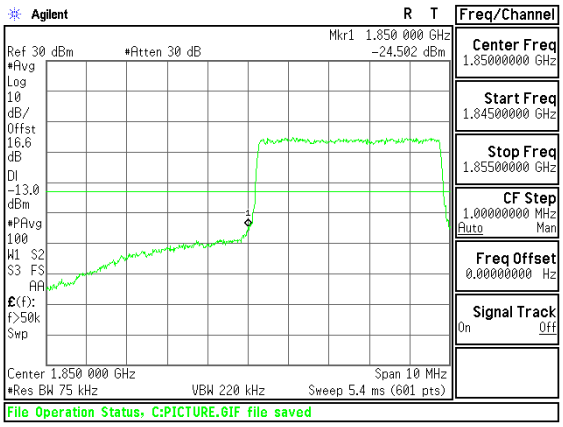
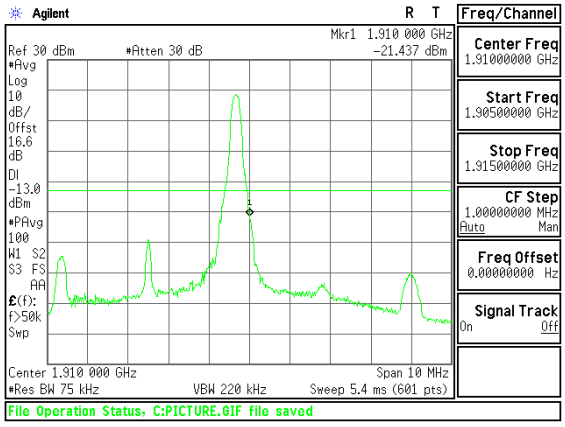
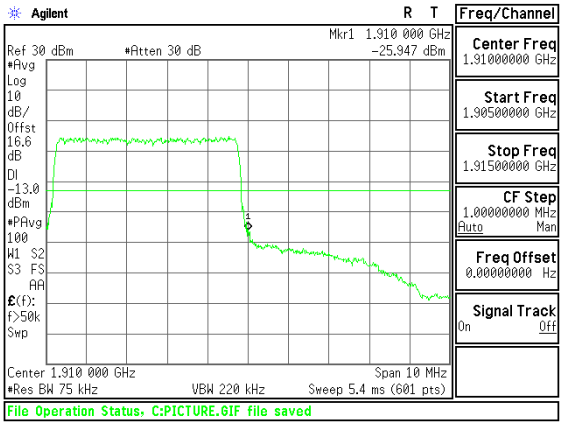
Band LTE2 20MHz QPSK	 Band LTE2 20MHz CBE QPSK Low Channel 1RB.gif	 Band LTE2 20MHz CBE QPSK Low Channel FRB.gif
Band LTE2 20MHz QPSK	 Band LTE2 20MHz CBE QPSK High Channel 1RB.gif	 Band LTE2 20MHz CBE QPSK High Channel FRB.gif

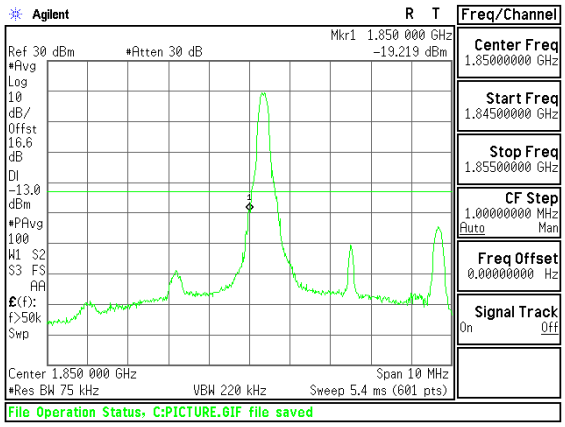
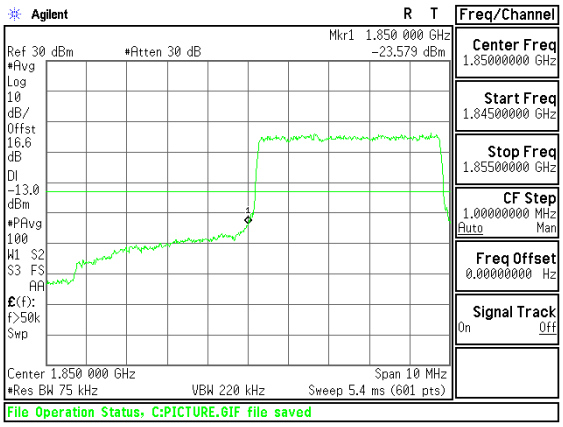
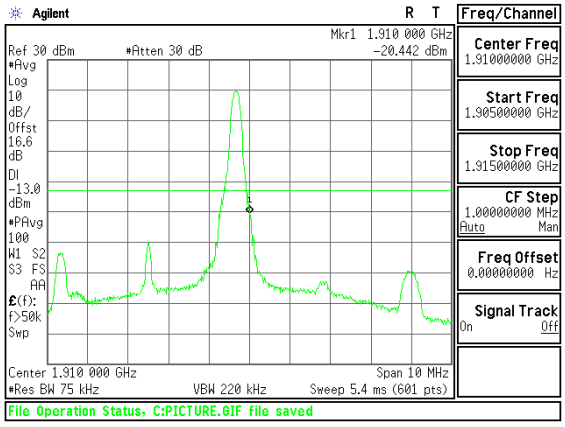
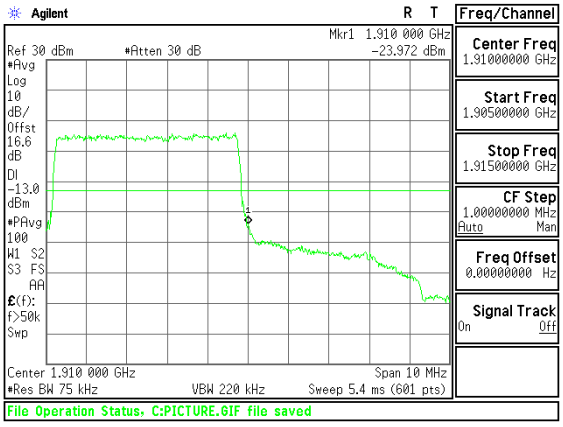
Band LTE2 15MHz 16QAM	 Band LTE2 15MHz CBE 16QAM Low Channel 1RB.gif	 Band LTE2 15MHz CBE 16QAM Low Channel FRB.gif
Band LTE2 15MHz 16QAM	 Band LTE2 15MHz CBE 16QAM High Channel 1RB.gif	 Band LTE2 15MHz CBE 16QAM High Channel FRB.gif

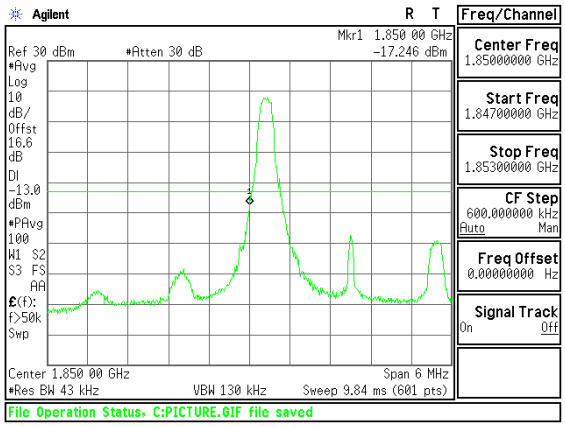
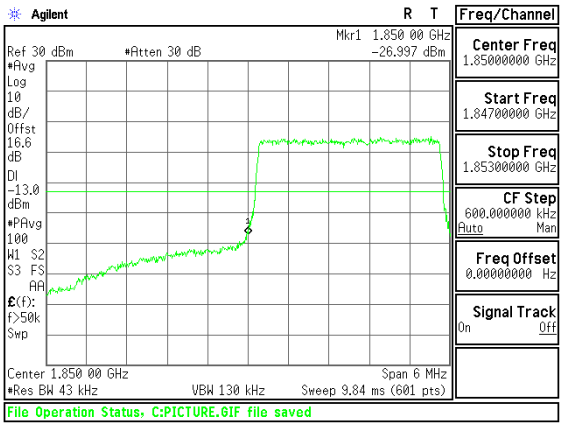
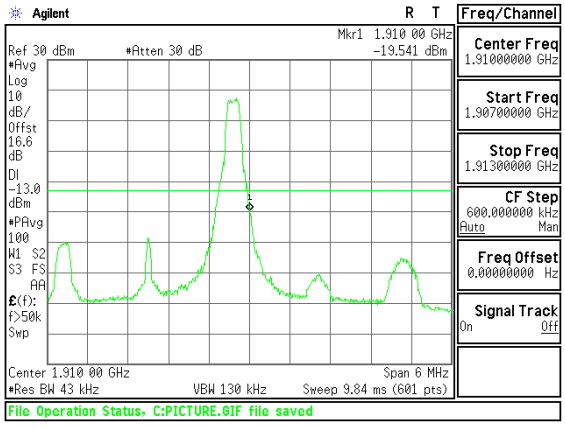
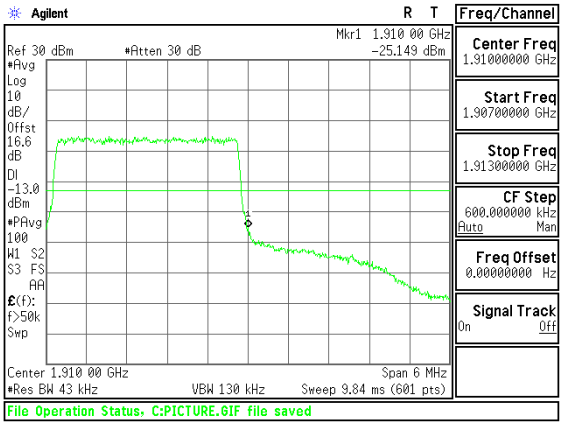
Band LTE2 15MHz QPSK	 Band LTE2 15MHz CBE QPSK Low Channel 1RB.gif	 Band LTE2 15MHz CBE QPSK Low Channel FRB.gif
Band LTE2 15MHz QPSK	 Band LTE2 15MHz CBE QPSK High Channel 1RB.gif	 Band LTE2 15MHz CBE QPSK High Channel FRB.gif

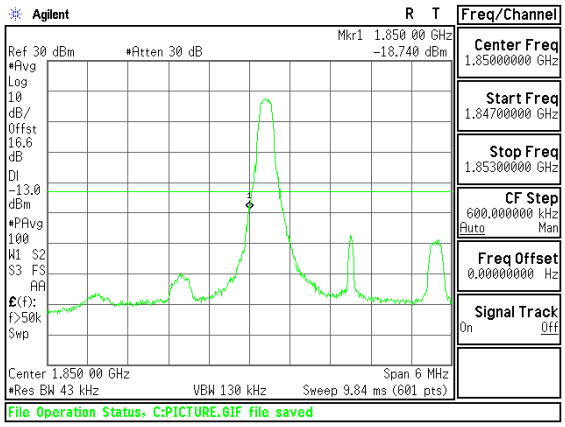
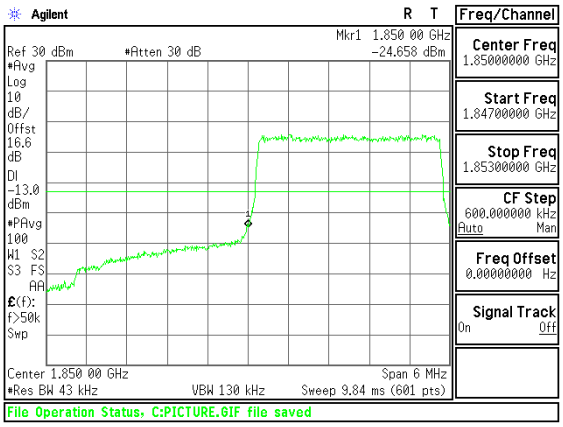
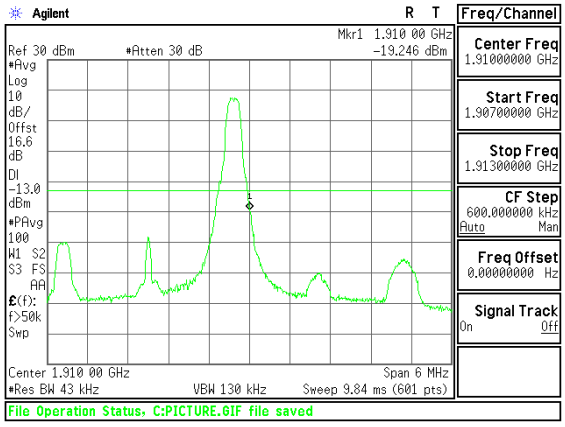
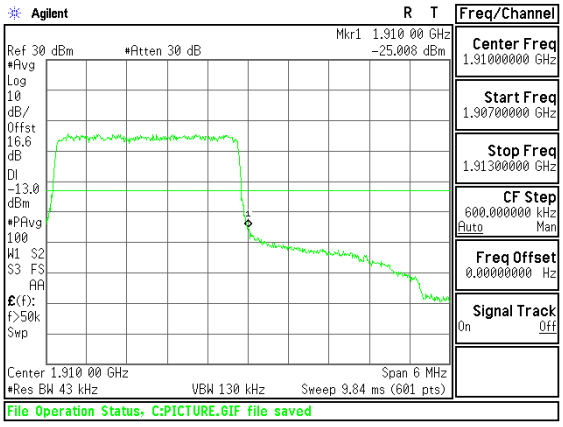
Band LTE2 10MHz 16QAM	 Band LTE2 10MHz CBE 16QAM Low Channel 1RB.gif	 Band LTE2 10MHz CBE 16QAM Low Channel FRB.gif
Band LTE2 10MHz 16QAM	 Band LTE2 10MHz CBE 16QAM High Channel 1RB.gif	 Band LTE2 10MHz CBE 16QAM High Channel FRB.gif

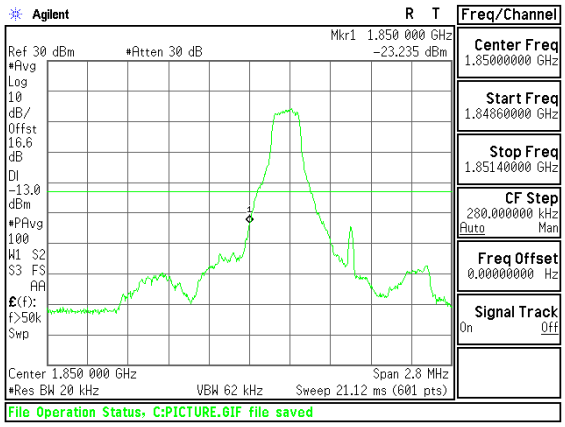
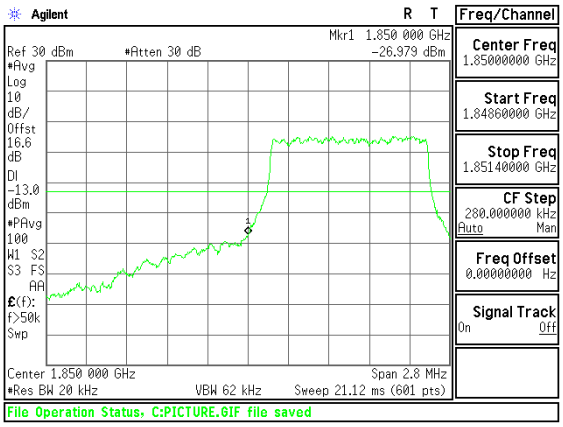
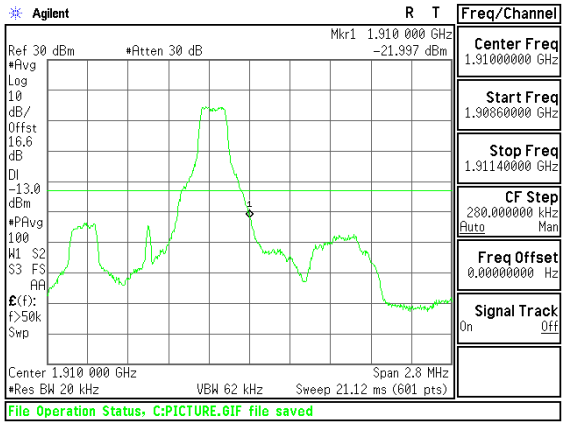
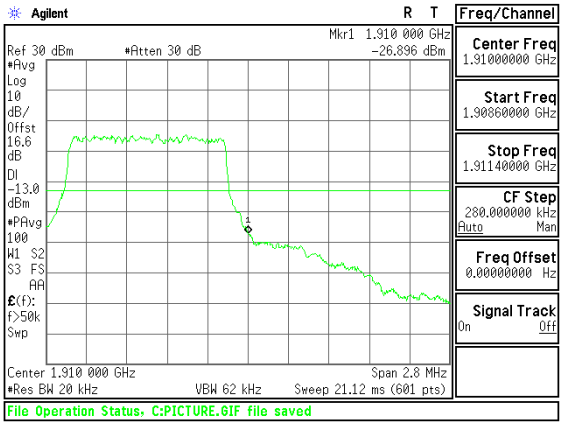
Band LTE2 10MHz QPSK	 Band LTE2 10MHz CBE QPSK Low Channel 1RB.gif	 Band LTE2 10MHz CBE QPSK Low Channel FRB.gif
Band LTE2 10MHz QPSK	 Band LTE2 10MHz CBE QPSK High Channel 1RB.gif	 Band LTE2 10MHz CBE QPSK High Channel FRB.gif

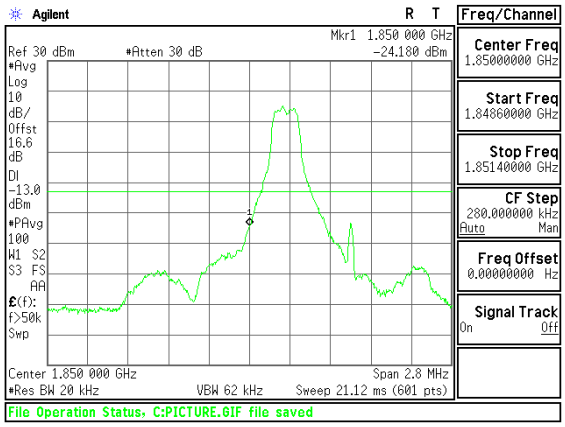
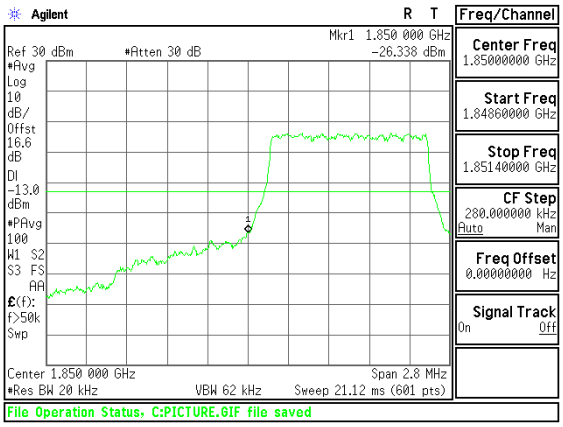
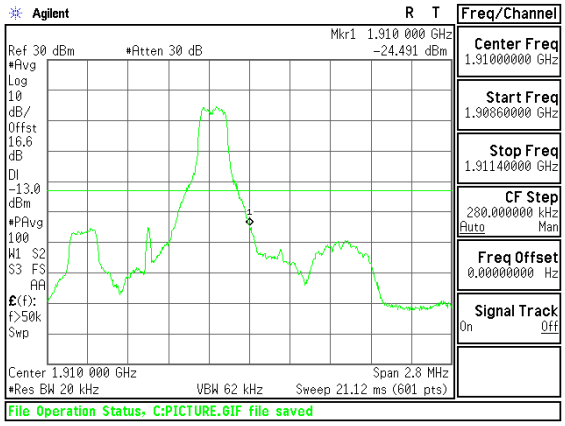
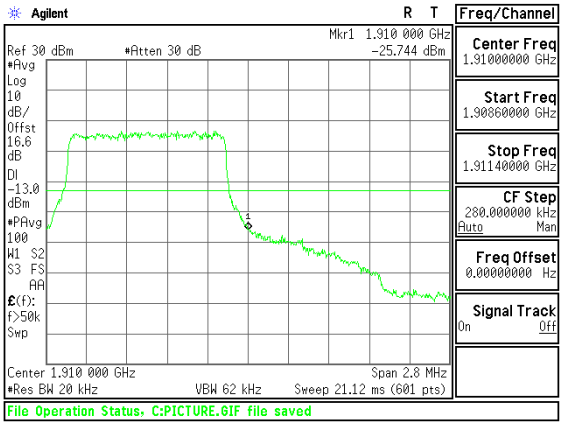
Band LTE2 5MHz 16QAM	 Band LTE2 5MHz CBE 16QAM Low Channel 1RB.gif	 Band LTE2 5MHz CBE 16QAM Low Channel FRB.gif
Band LTE2 5MHz 16QAM	 Band LTE2 5MHz CBE 16QAM High Channel 1RB.gif	 Band LTE2 5MHz CBE 16QAM High Channel FRB.gif

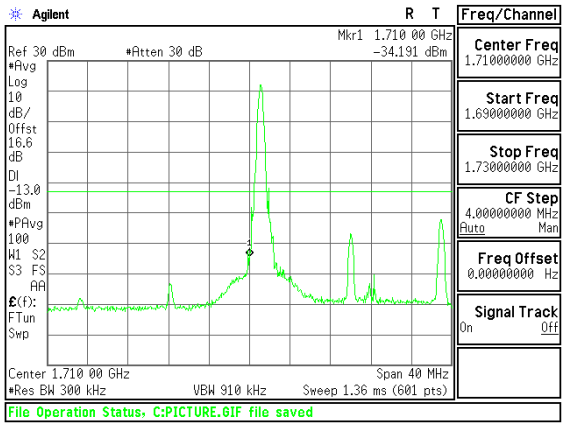
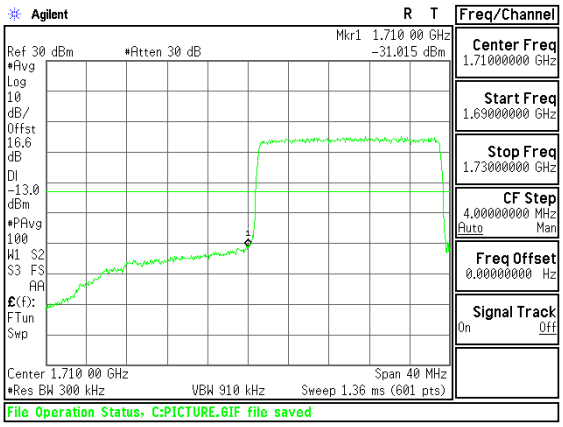
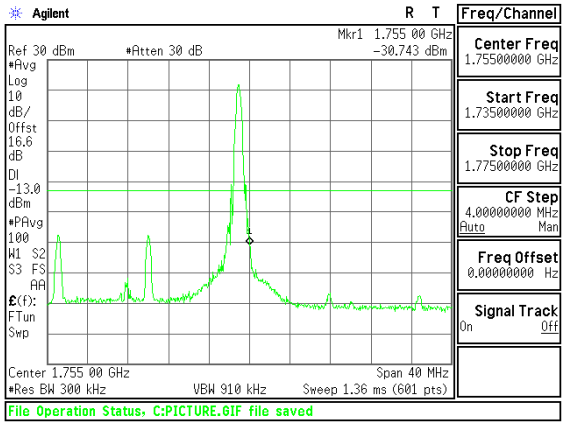
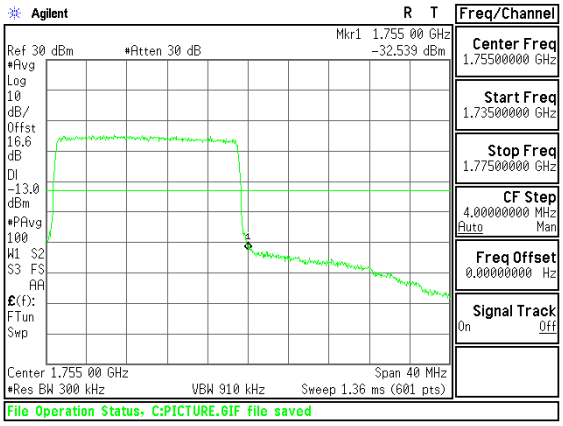
Band LTE2 5MHz QPSK	 Band LTE2 5MHz CBE QPSK Low Channel 1RB.gif	 Band LTE2 5MHz CBE QPSK Low Channel FRB.gif
Band LTE2 5MHz QPSK	 Band LTE2 5MHz CBE QPSK High Channel 1RB.gif	 Band LTE2 5MHz CBE QPSK High Channel FRB.gif

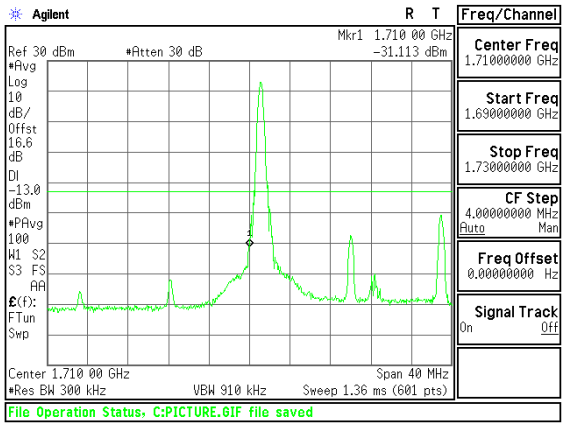
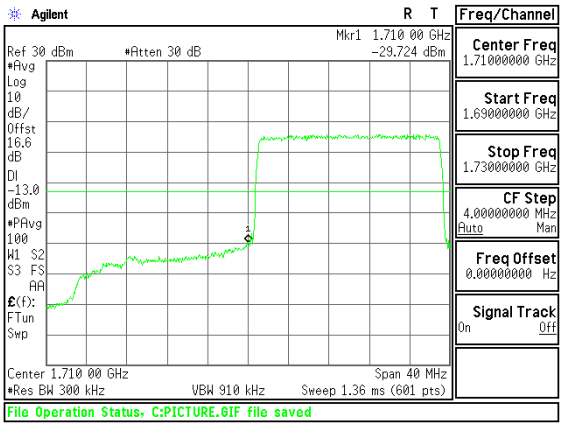
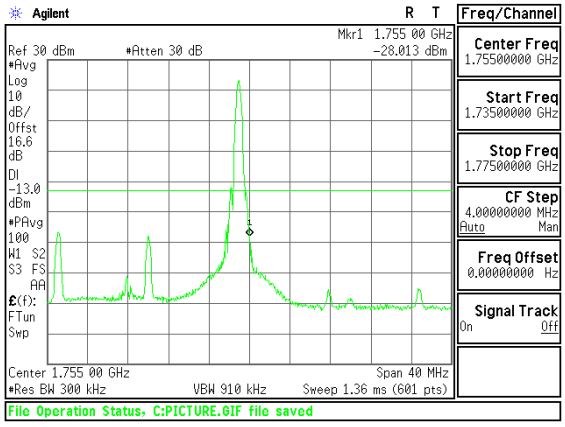
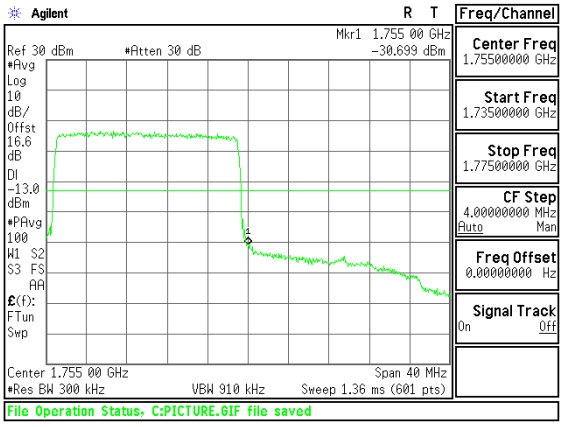
Band LTE2 3MHz 16QAM	 Band LTE2 3MHz CBE 16QAM Low Channel 1RB.gif	 Band LTE2 3MHz CBE 16QAM Low Channel FRB.gif
Band LTE2 3MHz 16QAM	 Band LTE2 3MHz CBE 16QAM High Channel 1RB.gif	 Band LTE2 3MHz CBE 16QAM High Channel FRB.gif

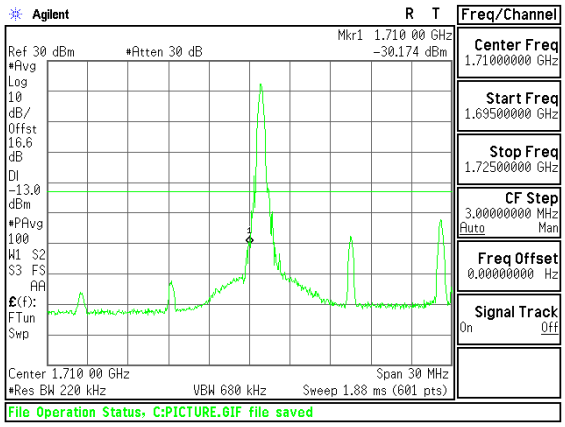
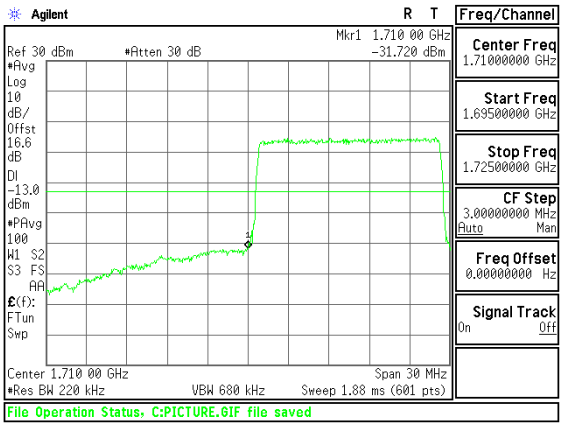
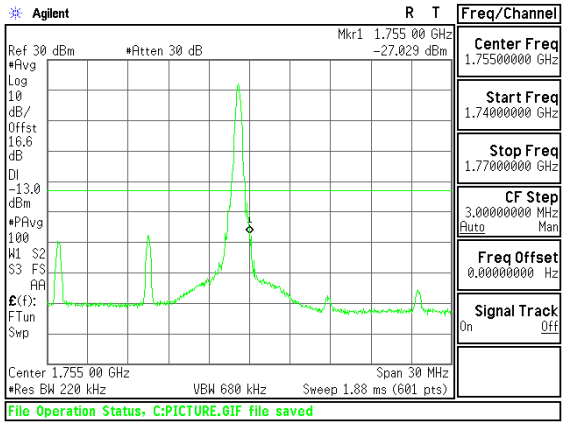
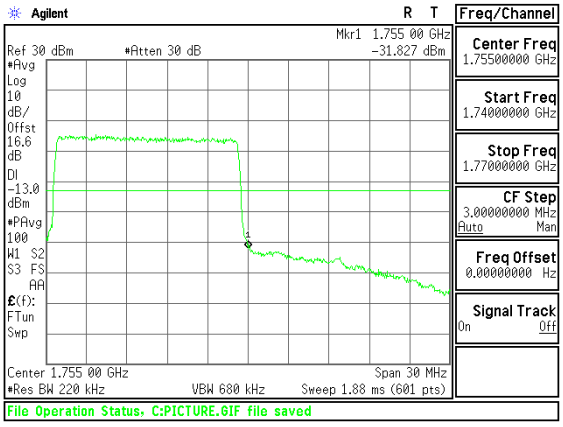
Band LTE2 3MHz QPSK	 Band LTE2 3MHz CBE QPSK Low Channel 1RB.gif	 Band LTE2 3MHz CBE QPSK Low Channel FRB.gif
Band LTE2 3MHz QPSK	 Band LTE2 3MHz CBE QPSK High Channel 1RB.gif	 Band LTE2 3MHz CBE QPSK High Channel FRB.gif

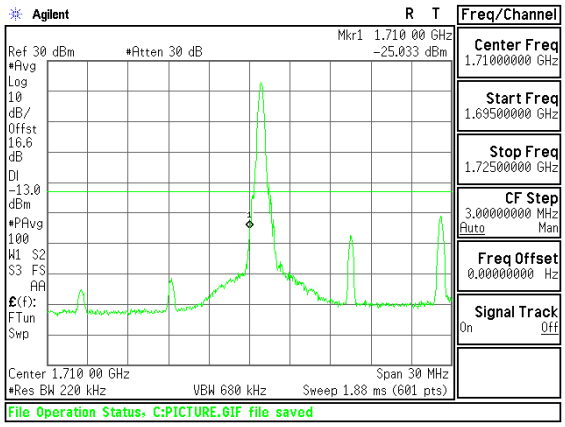
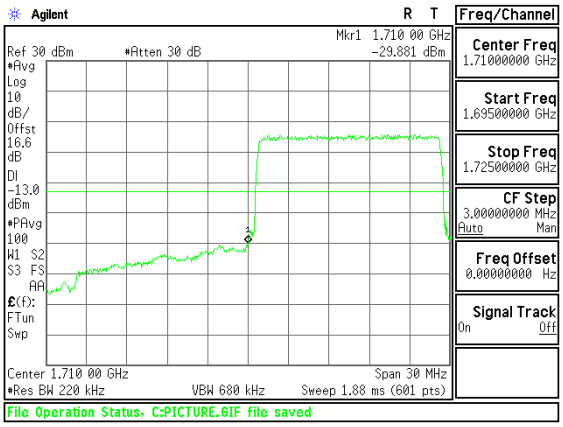
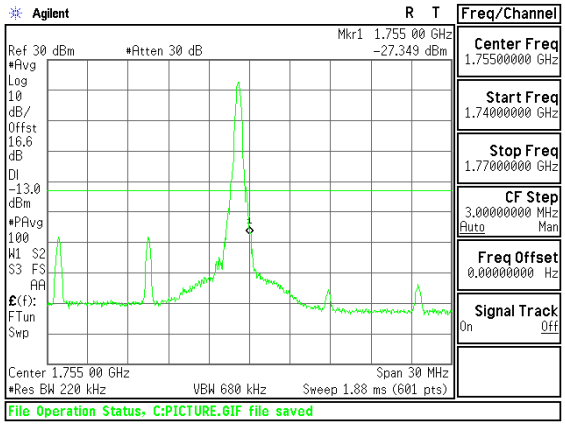
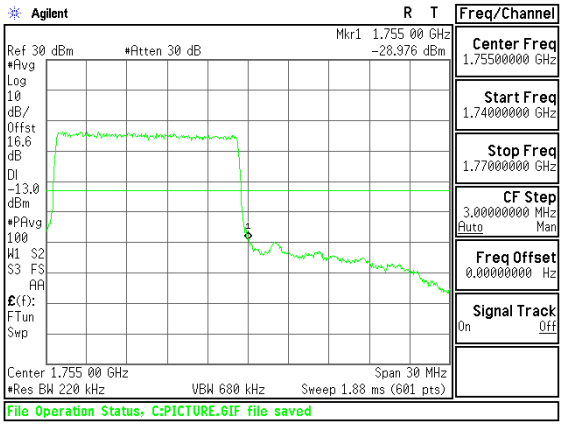
Band LTE2 1.4MHz 16QAM	 Band LTE2 1.4MHz CBE 16QAM Low Channel 1RB.gif	 Band LTE2 1.4MHz CBE 16QAM Low Channel FRB.gif
Band LTE2 1.4MHz 16QAM	 Band LTE2 1.4MHz CBE 16QAM High Channel 1RB.gif	 Band LTE2 1.4MHz CBE 16QAM High Channel FRB.gif

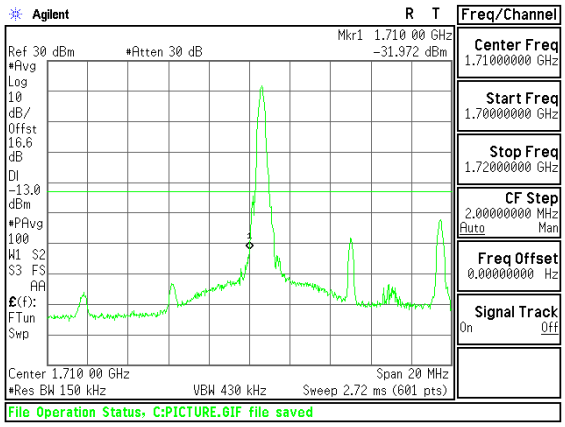
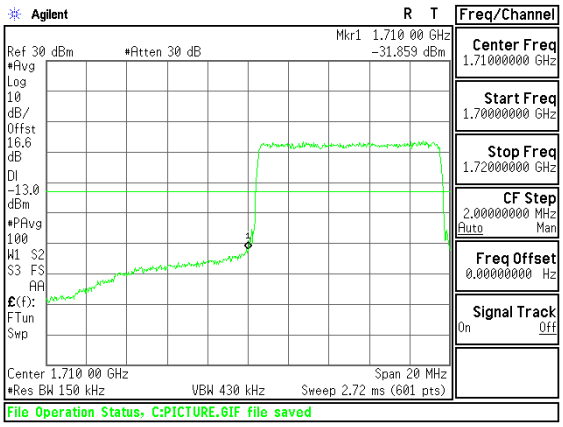
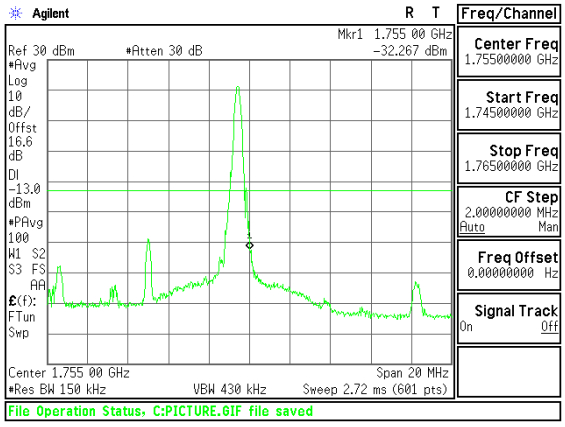
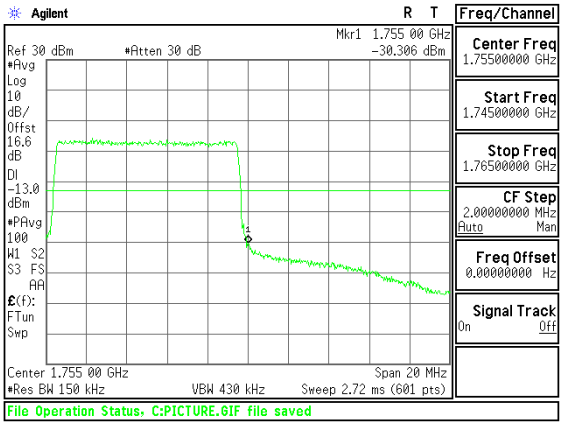
Band LTE2 1.4MHz QPSK	 Band LTE2 1.4MHz CBE QPSK Low Channel 1RB.gif	 Band LTE2 1.4MHz CBE QPSK Low Channel FRB.gif
Band LTE2 1.4MHz QPSK	 Band LTE2 1.4MHz CBE QPSK High Channel 1RB.gif	 Band LTE2 1.4MHz CBE QPSK High Channel FRB.gif

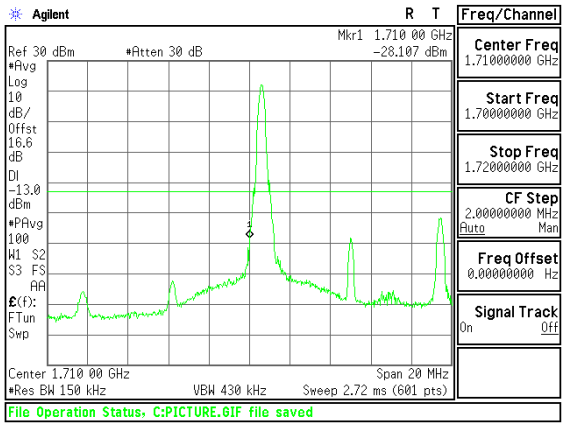
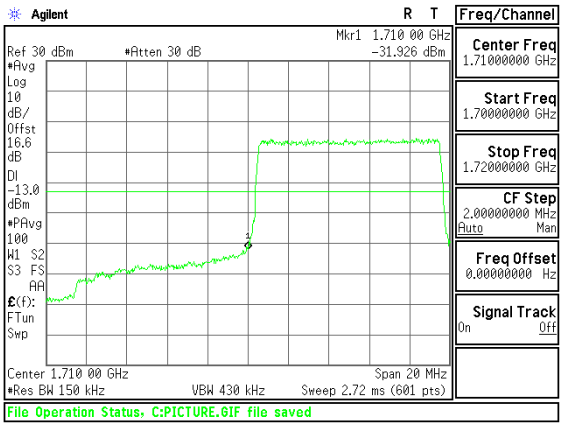
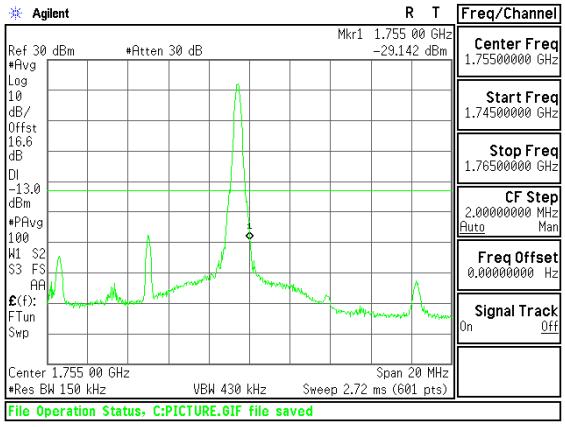
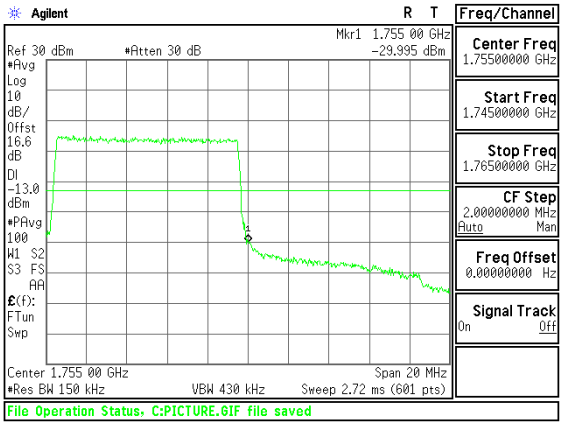
Band LTE4 20MHz 16QAM	 Band LTE4 20MHz CBE 16QAM Low Channel 1RB.gif	 Band LTE4 20MHz CBE 16QAM Low Channel FRB.gif
Band LTE4 20MHz 16QAM	 Band LTE4 20MHz CBE 16QAM High Channel 1RB.gif	 Band LTE4 20MHz CBE 16QAM High Channel FRB.gif

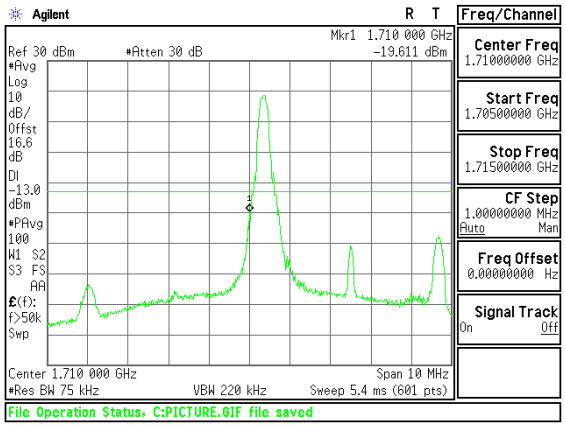
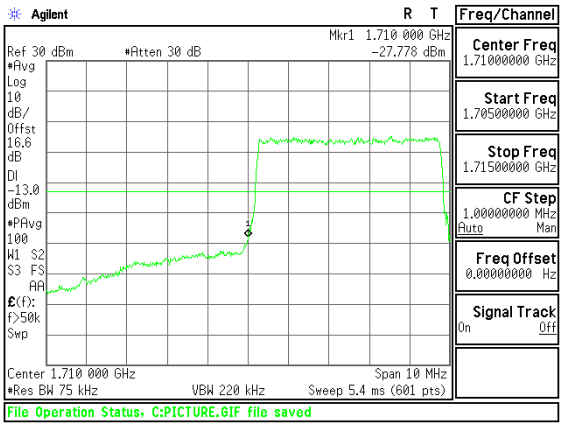
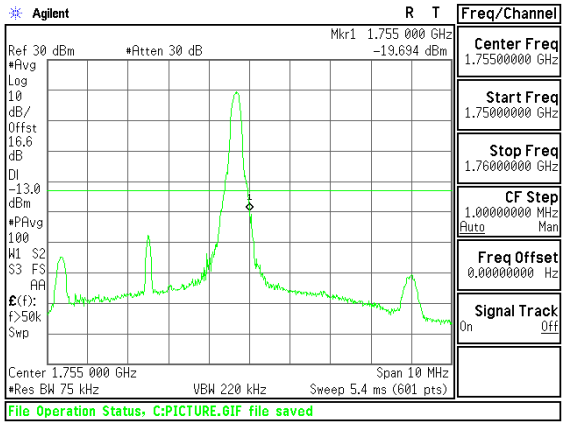
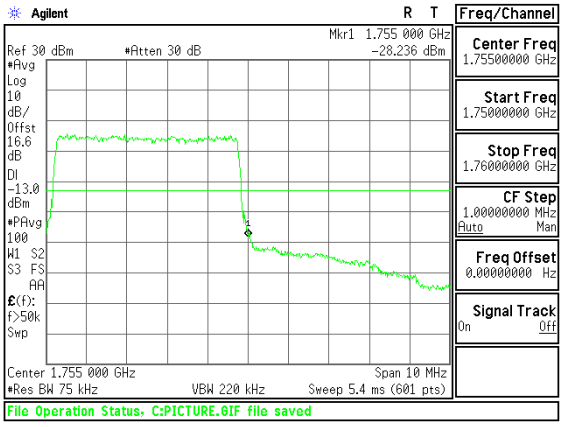
Band LTE4 20MHz QPSK	 Band LTE4 20MHz CBE QPSK Low Channel 1RB.gif	 Band LTE4 20MHz CBE QPSK Low Channel FRB.gif
Band LTE4 20MHz QPSK	 Band LTE4 20MHz CBE QPSK High Channel 1RB.gif	 Band LTE4 20MHz CBE QPSK High Channel FRB.gif

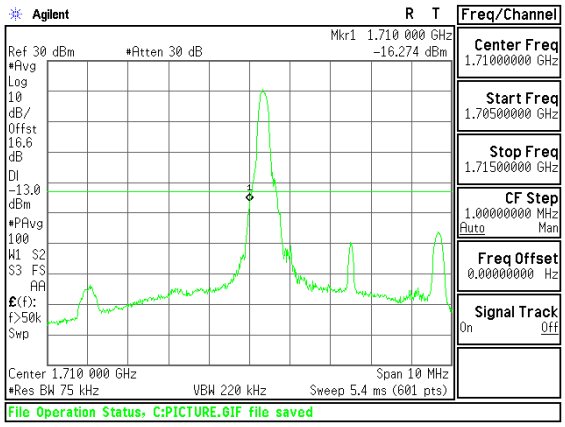
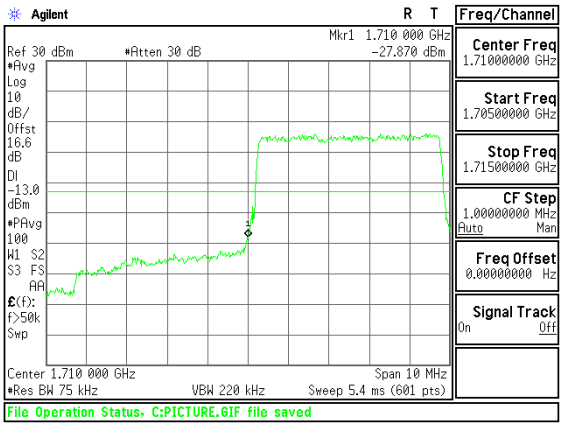
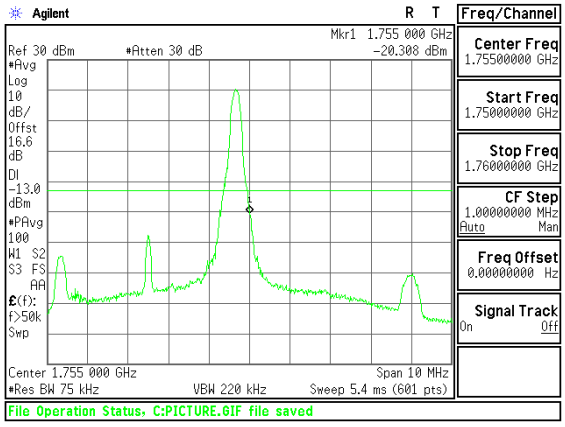
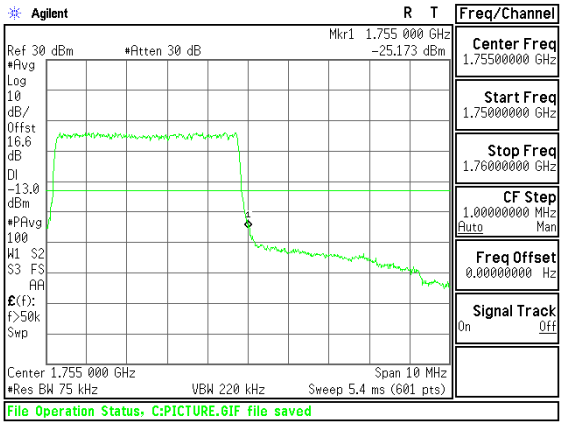
Band LTE4 15MHz 16QAM	 Band LTE4 15MHz CBE 16QAM Low Channel 1RB.gif	 Band LTE4 15MHz CBE 16QAM Low Channel FRB.gif
Band LTE4 15MHz 16QAM	 Band LTE4 15MHz CBE 16QAM High Channel 1RB.gif	 Band LTE4 15MHz CBE 16QAM High Channel FRB.gif

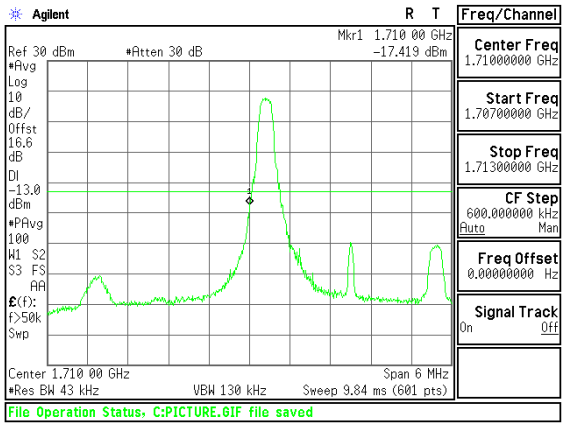
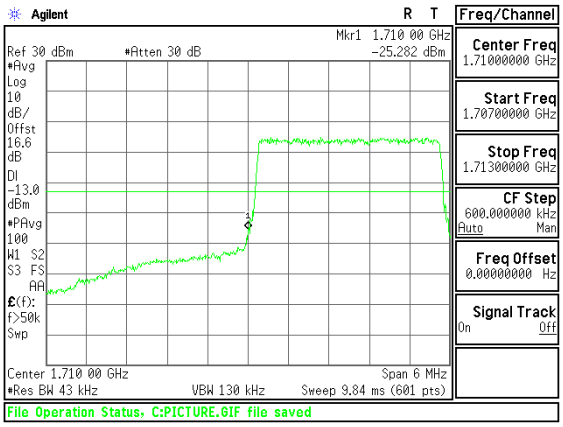
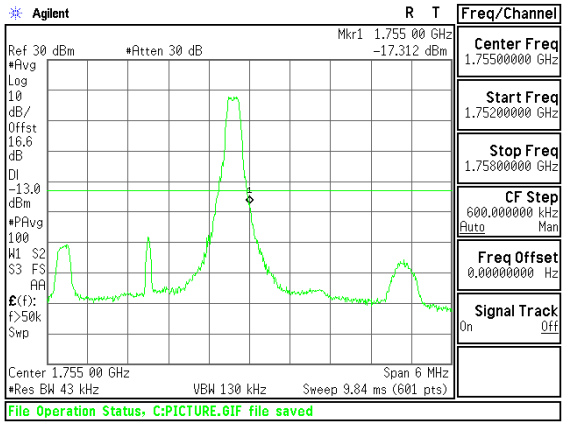
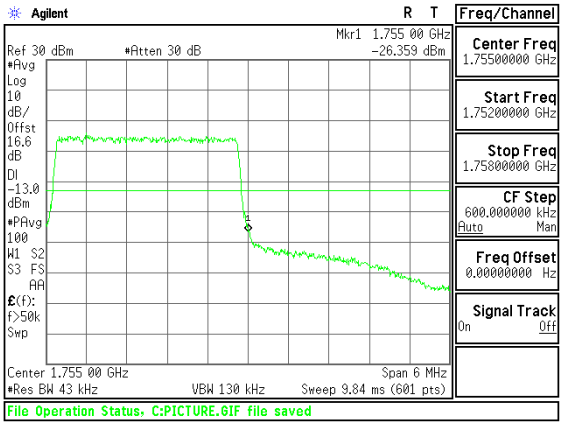
Band LTE4 15MHz QPSK	 Band LTE4 15MHz CBE QPSK Low Channel 1RB.gif	 Band LTE4 15MHz CBE QPSK Low Channel FRB.gif
Band LTE4 15MHz QPSK	 Band LTE4 15MHz CBE QPSK High Channel 1RB.gif	 Band LTE4 15MHz CBE QPSK High Channel FRB.gif

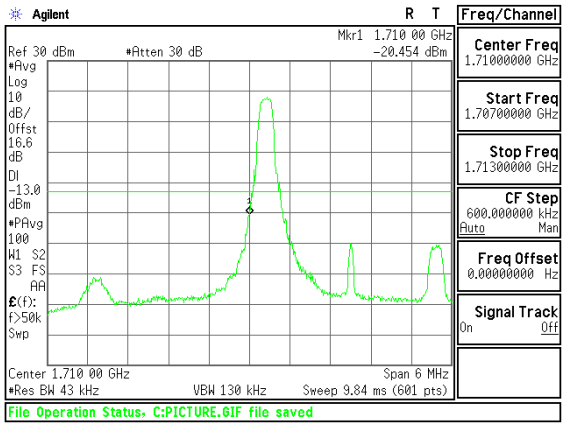
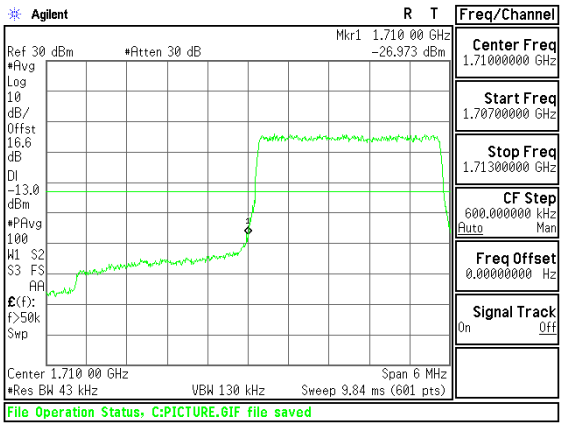
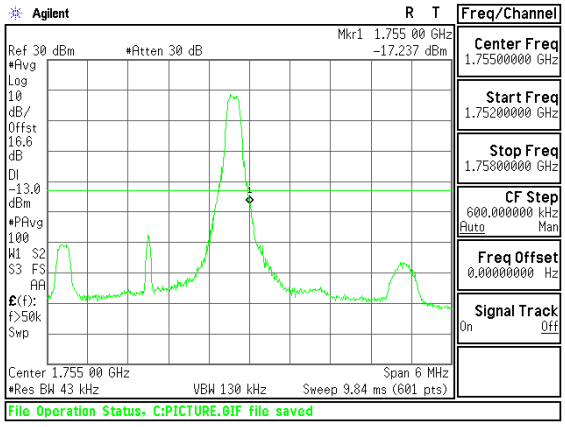
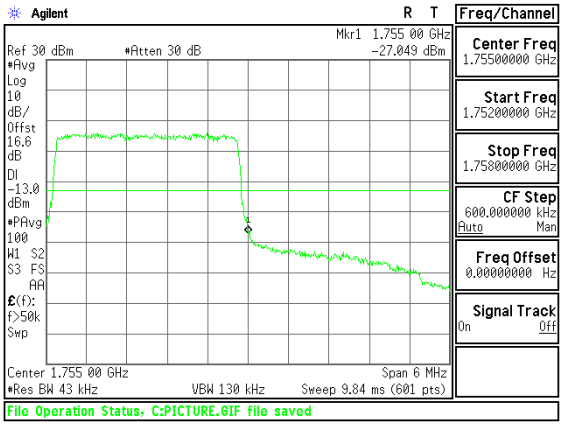
Band LTE4 10MHz 16QAM	 Band LTE4 10MHz CBE 16QAM Low Channel 1RB.gif	 Band LTE4 10MHz CBE 16QAM Low Channel FRB.gif
Band LTE4 10MHz 16QAM	 Band LTE4 10MHz CBE 16QAM High Channel 1RB.gif	 Band LTE4 10MHz CBE 16QAM High Channel FRB.gif

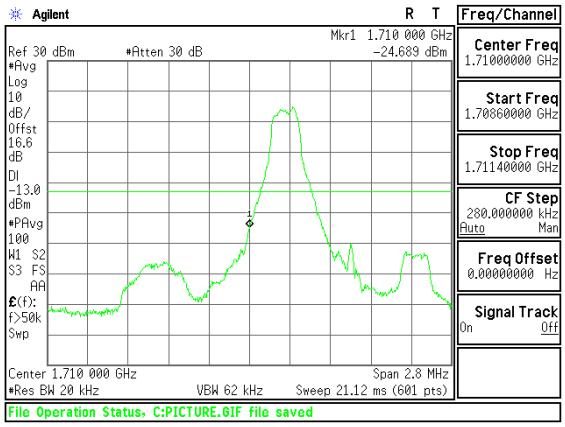
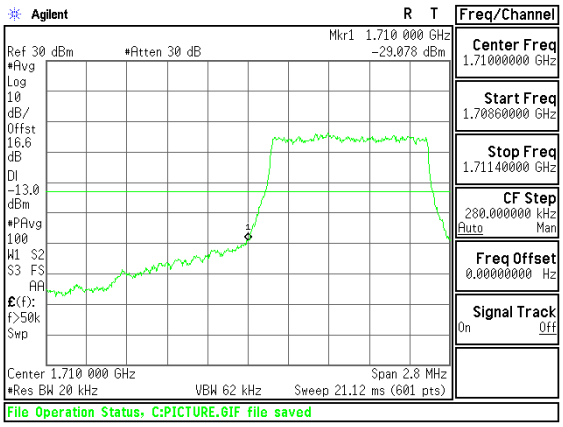
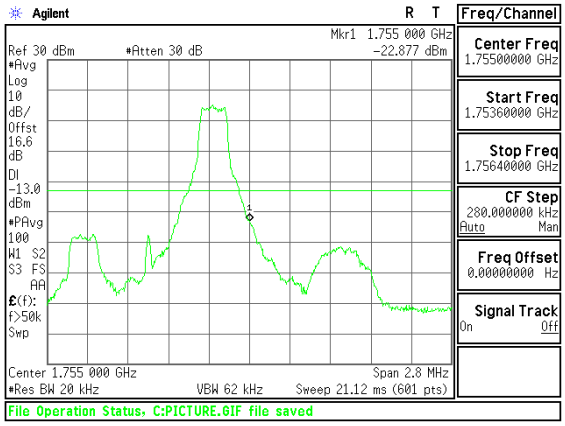
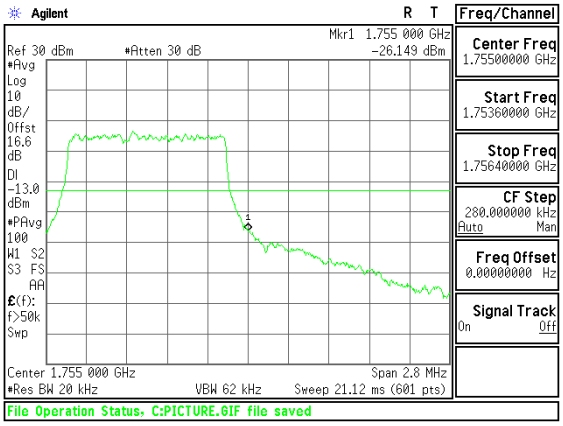
Band LTE4 10MHz QPSK	 Band LTE4 10MHz CBE QPSK Low Channel 1RB.gif	 Band LTE4 10MHz CBE QPSK Low Channel FRB.gif
Band LTE4 10MHz QPSK	 Band LTE4 10MHz CBE QPSK High Channel 1RB.gif	 Band LTE4 10MHz CBE QPSK High Channel FRB.gif

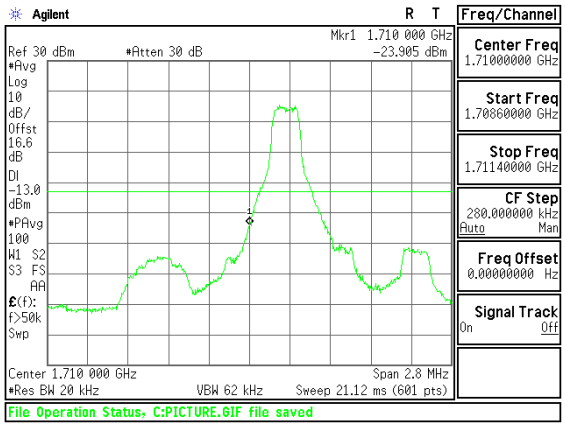
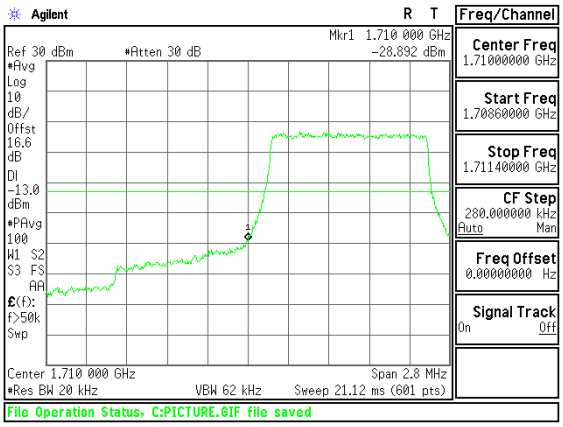
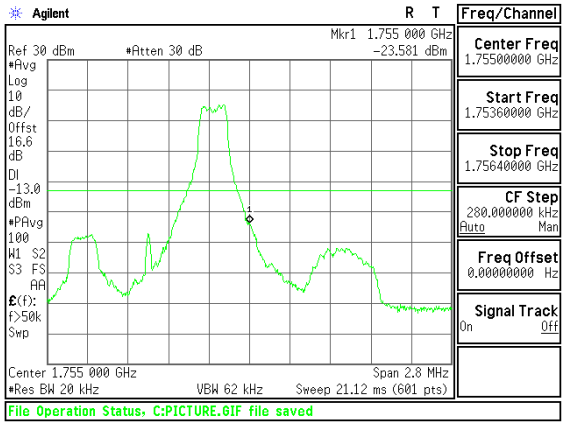
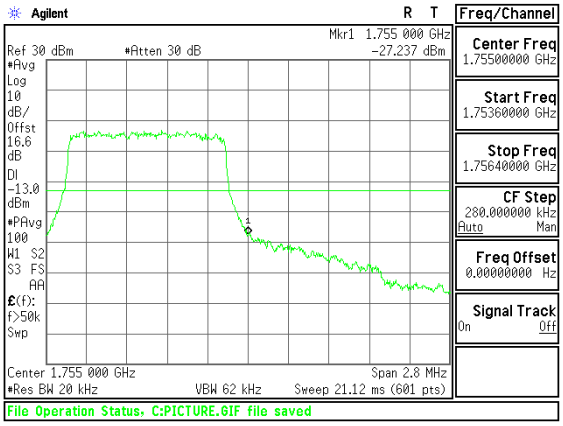
Band LTE4 5MHz 16QAM	 Band LTE4 5MHz CBE 16QAM Low Channel 1RB.gif	 Band LTE4 5MHz CBE 16QAM Low Channel FRB.gif
Band LTE4 5MHz 16QAM	 Band LTE4 5MHz CBE 16QAM High Channel 1RB.gif	 Band LTE4 5MHz CBE 16QAM High Channel FRB.gif

Band LTE4 5MHz QPSK	 Band LTE4 5MHz CBE QPSK Low Channel 1RB.gif	 Band LTE4 5MHz CBE QPSK Low Channel FRB.gif
Band LTE4 5MHz QPSK	 Band LTE4 5MHz CBE QPSK High Channel 1RB.gif	 Band LTE4 5MHz CBE QPSK High Channel FRB.gif

Band LTE4 3MHz 16QAM	 Band LTE4 3MHz CBE 16QAM Low Channel 1RB.gif	 Band LTE4 3MHz CBE 16QAM Low Channel FRB.gif
Band LTE4 3MHz 16QAM	 Band LTE4 3MHz CBE 16QAM High Channel 1RB.gif	 Band LTE4 3MHz CBE 16QAM High Channel FRB.gif

Band LTE4 3MHz QPSK	 Band LTE4 3MHz CBE QPSK Low Channel 1RB.gif	 Band LTE4 3MHz CBE QPSK Low Channel FRB.gif
Band LTE4 3MHz QPSK	 Band LTE4 3MHz CBE QPSK High Channel 1RB.gif	 Band LTE4 3MHz CBE QPSK High Channel FRB.gif

Band LTE4 1.4MHz 16QAM	 Band LTE4 1.4MHz CBE 16QAM Low Channel 1RB.gif	 Band LTE4 1.4MHz CBE 16QAM Low Channel FRB.gif
Band LTE4 1.4MHz 16QAM	 Band LTE4 1.4MHz CBE 16QAM High Channel 1RB.gif	 Band LTE4 1.4MHz CBE 16QAM High Channel FRB.gif

Band LTE4 1.4MHz QPSK	 Band LTE4 1.4MHz CBE QPSK Low Channel 1RB.gif	 Band LTE4 1.4MHz CBE QPSK Low Channel FRB.gif
Band LTE4 1.4MHz QPSK	 Band LTE4 1.4MHz CBE QPSK High Channel 1RB.gif	 Band LTE4 1.4MHz CBE QPSK High Channel FRB.gif

10.3. OUT OF BAND EMISSIONS

RULE PART(S)

FCC: §2.1051, §22.901, §22.917, §24.238, §27.53

LIMITS

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

TEST PROCEDURE

Per KDB 971168 D01 Power Meas License Digital Systems v02r02

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

SOP

For each out of band emissions measurement:

- Set display line at -13 dBm
- Set RBW & VBW to 100 kHz for the measurement below 1 GHz, and 1 MHz for the measurement above 1 GHz.

RESULTS

10.3.1. OUT OF BAND EMISSIONS RESULT

Band	BW (MHz)	Mode	f (MHz)	Spur (dBm)	Spec (dBm)	Delta (dB)
LTE2	20	QPSK	1860	-23.77	-13	-10.77
			1880	-23.65	-13	-10.65
			1900	-27.85	-13	-14.85
		16QAM	1860	-24.89	-13	-11.89
			1880	-24.39	-13	-11.39
			1900	-28.34	-13	-15.34

Band	BW (MHz)	Mode	f (MHz)	Spur (dBm)	Spec (dBm)	Delta (dB)
LTE2	15	QPSK	1857.5	-23.34	-13	-10.34
			1880	-24.46	-13	-11.46
			1902.5	-28.67	-13	-15.67
		16QAM	1857.5	-23.43	-13	-10.43
			1880	-23.36	-13	-10.36
			1902.5	-28.29	-13	-15.29

Band	BW (MHz)	Mode	f (MHz)	Spur (dBm)	Spec (dBm)	Delta (dB)
LTE2	10	QPSK	1855	-24.27	-13	-11.27
			1880	-23.71	-13	-10.71
			1905	-27.43	-13	-14.43
		16QAM	1855	-24.25	-13	-11.25
			1880	-24.11	-13	-11.11
			1905	-26.96	-13	-13.96

Band	BW (MHz)	Mode	f (MHz)	Spur (dBm)	Spec (dBm)	Delta (dB)
LTE2	5	QPSK	1852.5	-24.49	-13	-11.49
			1880	-23.07	-13	-10.07
			1907.5	-24.55	-13	-11.55
		16QAM	1852.5	-24.41	-13	-11.41
			1880	-23.73	-13	-10.73
			1907.5	-24.55	-13	-11.55

Band	BW (MHz)	Mode	f (MHz)	Spur (dBm)	Spec (dBm)	Delta (dB)
LTE2	3	QPSK	1851.5	-24.39	-13	-11.39
			1880	-22.99	-13	-9.99
			1908.5	-24.01	-13	-11.01
		16QAM	1851.5	-24.14	-13	-11.14
			1880	-22.79	-13	-9.79
			1908.5	-24.58	-13	-11.58

Band	BW (MHz)	Mode	f (MHz)	Spur (dBm)	Spec (dBm)	Delta (dB)
LTE2	1.4	QPSK	1850.7	-24.09	-13	-11.09
			1880	-24.49	-13	-11.49
			1909.3	-24.56	-13	-11.56
		16QAM	1850.7	-24.36	-13	-11.36
			1880	-24.43	-13	-11.43
			1909.3	-24.13	-13	-11.13

Band	BW (MHz)	Mode	f (MHz)	Spur (dBm)	Spec (dBm)	Delta (dB)
LTE4	20	QPSK	1720	-24.26	-13	-11.26
			1732.5	-24.58	-13	-11.58
			1745	-28.26	-13	-15.26
		16QAM	1720	-24.70	-13	-11.70
			1732.5	-24.98	-13	-11.98
			1745	-27.29	-13	-14.29

Band	BW (MHz)	Mode	f (MHz)	Spur (dBm)	Spec (dBm)	Delta (dB)
LTE4	15	QPSK	1717.5	-24.75	-13	-11.75
			1732.5	-24.37	-13	-11.37
			1747.5	-27.50	-13	-14.50
		16QAM	1717.5	-24.66	-13	-11.66
			1732.5	-24.58	-13	-11.58
			1747.5	-27.72	-13	-14.72

Band	BW (MHz)	Mode	f (MHz)	Spur (dBm)	Spec (dBm)	Delta (dB)
LTE4	10	QPSK	1715	-24.0	-13	-11.0
			1732.5	-23.80	-13	-10.80
			1750	-28.16	-13	-15.16
		16QAM	1715	-23.94	-13	-10.94
			1732.5	-23.75	-13	-10.75
			1750	-27.38	-13	-14.38

Band	BW (MHz)	Mode	f (MHz)	Spur (dBm)	Spec (dBm)	Delta (dB)
LTE4	5	QPSK	1712.5	-24.74	-13	-11.74
			1732.5	-23.88	-13	-10.88
			1752.5	-23.90	-13	-10.90
		16QAM	1712.5	-23.38	-13	-10.38
			1732.5	-24.09	-13	-11.09
			1752.5	-24.27	-13	-11.27

Band	BW (MHz)	Mode	f (MHz)	Spur (dBm)	Spec (dBm)	Delta (dB)
LTE4	3	QPSK	1711.5	-24.54	-13	-11.54
			1732.5	-24.71	-13	-11.71
			1753.5	-23.64	-13	-10.64
		16QAM	1711.5	-24.43	-13	-11.43
			1732.5	-24.34	-13	-11.34
			1753.5	-24.42	-13	-11.42

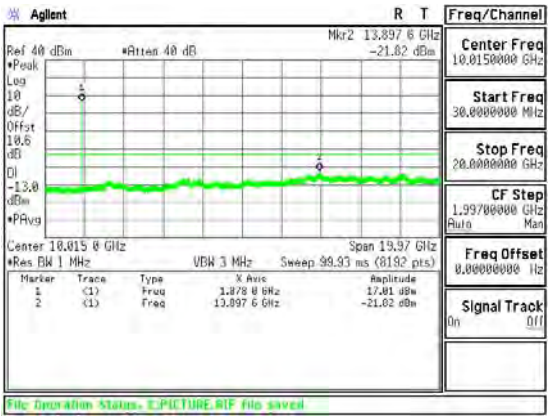
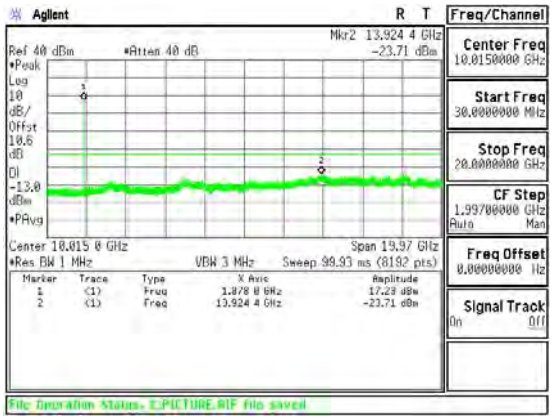
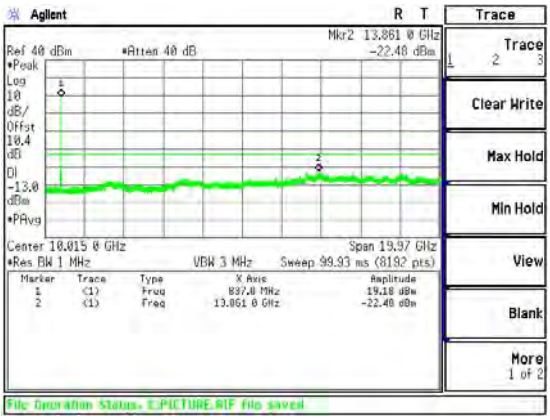
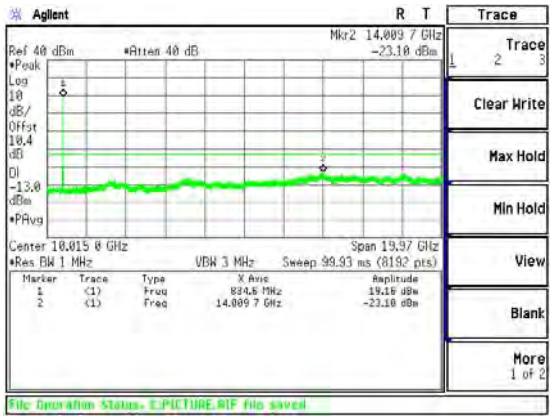
Band	BW (MHz)	Mode	f (MHz)	Spur (dBm)	Spec (dBm)	Delta (dB)
LTE4	1.4	QPSK	1710.7	-24.17	-13	-11.17
			1732.5	-24.91	-13	-11.91
			1754.3	-23.32	-13	-10.32
		16QAM	1710.7	-24.91	-13	-11.91
			1732.5	-24.59	-13	-11.59
			1754.3	-24.71	-13	-11.71

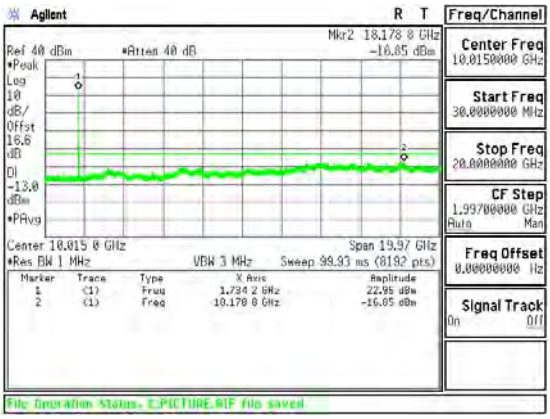
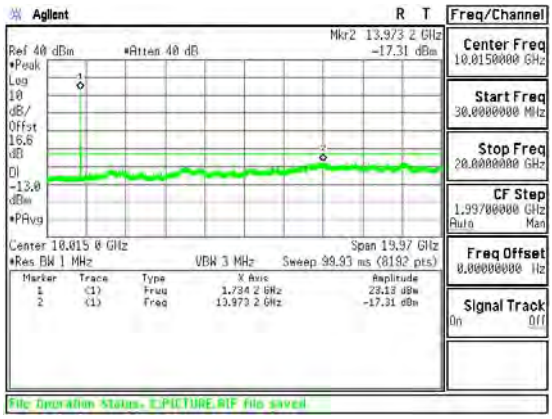
Band	Mode	f (MHz)	Spur (dBm)	Spec (dBm)	Delta (dB)
GSM850	GPRS	824.2	-23.54	-13	-10.54
		836.6	-22.97	-13	-9.97
		848.8	-23.71	-13	-10.71
	EGPRS	824.2	-22.76	-13	-9.76
		836.6	-22.84	-13	-9.84
		848.8	-23.33	-13	-9.33
GSM1900	GPRS	1850.2	-22.85	-13	-9.85
		1880	-23.13	-13	-10.13
		1909.8	-23.39	-13	-10.39
	EGPRS	1850.2	-23.10	-13	-10.10
		1880	-22.45	-13	-9.45
		1909.8	-22.97	-13	-9.97

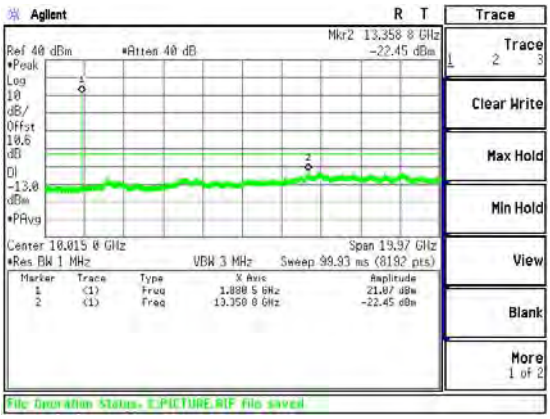
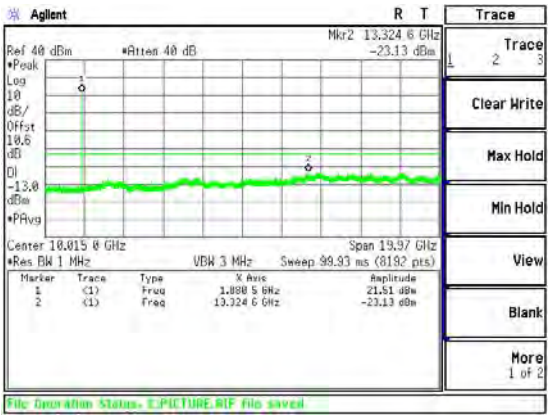
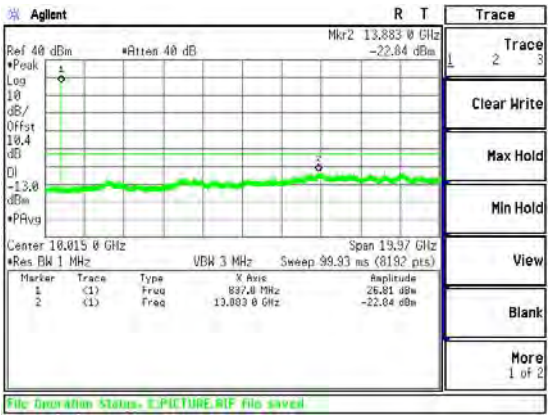
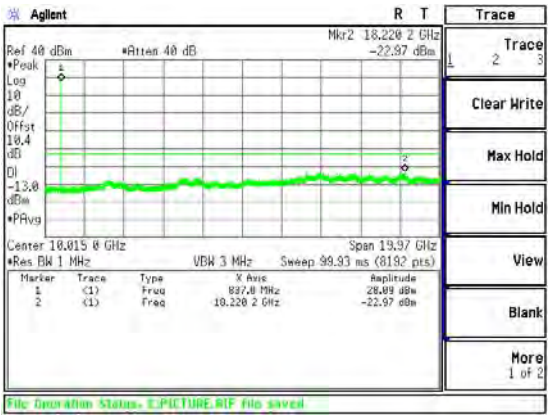
Band	Mode	f (MHz)	Spur (dBm)	Spec (dBm)	Delta (dB)
Band 5	REL99	826.4	-23.12	-13	-10.12
		836.6	-23.10	-13	-10.10
		846.6	-23.41	-13	-10.41
	HSDPA	826.4	-22.79	-13	-9.79
		836.6	-22.48	-13	-9.48
		846.6	-23.25	-13	-10.25
Band 2	REL99	1852.4	-23.21	-13	-10.21
		1880	-23.71	-13	-10.71
		1907.6	-22.39	-13	-9.39
	HSDPA	1852.4	-22.53	-13	-9.53
		1880	-21.82	-13	-8.82
		1907.6	-23.44	-13	-10.44

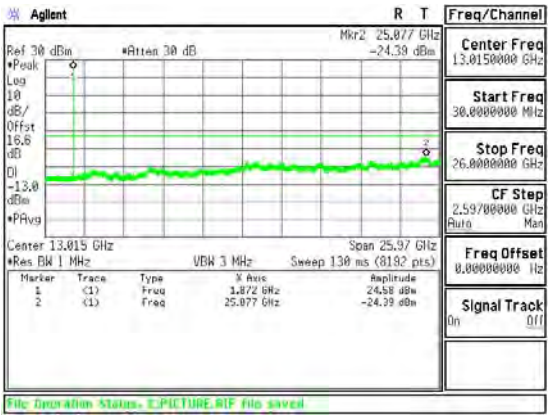
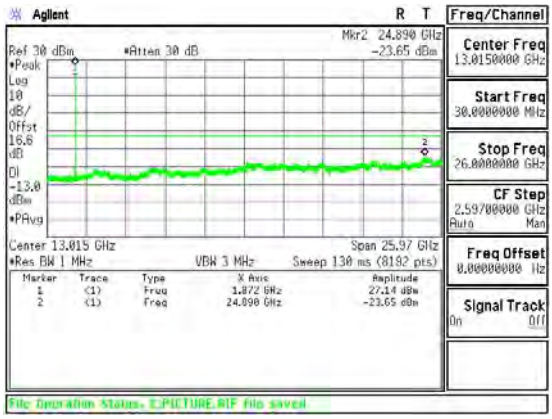
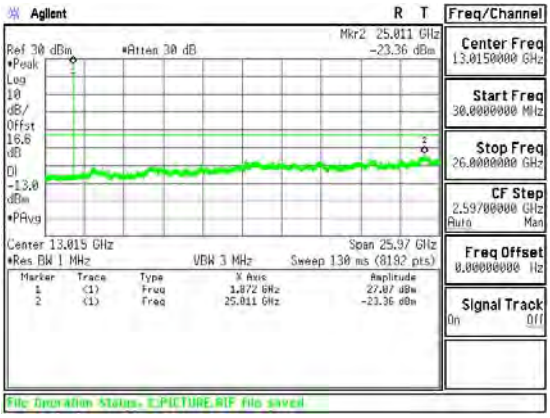
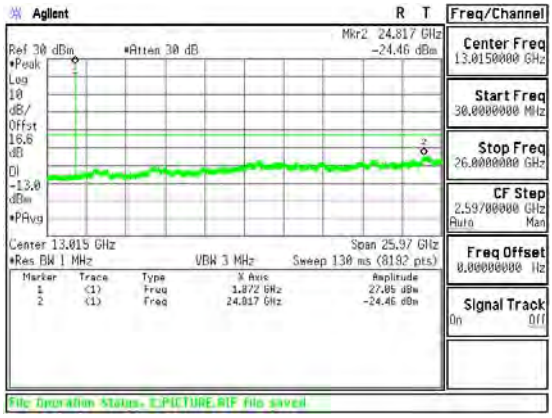
Band	Mode	f (MHz)	Spur (dBm)	Spec (dBm)	Delta (dB)
Band 4	REL99	1712.4	-17.41	-13	-4.41
		1732.6	-17.31	-13	-4.31
		1752.6	-16.95	-13	-3.95
	HSDPA	1712.4	-16.12	-13	-3.12
		1732.6	-16.85	-13	-3.85
		1752.6	-17.39	-13	-4.39

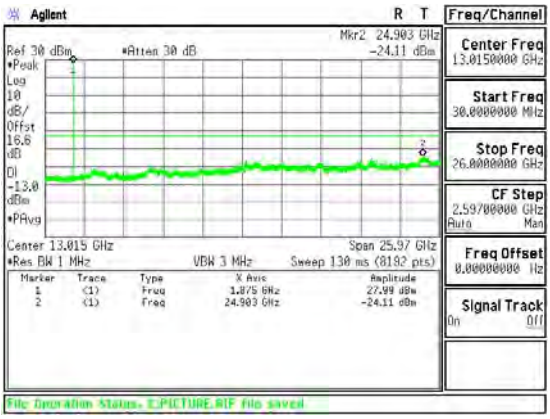
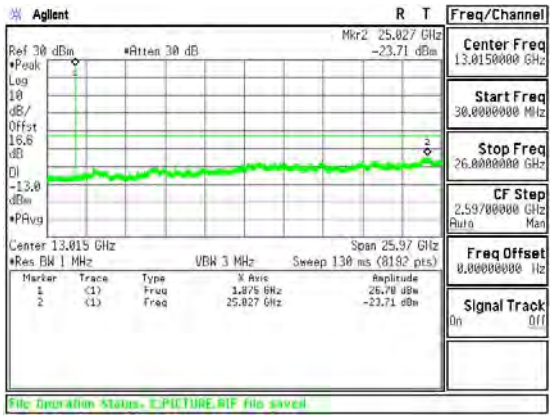
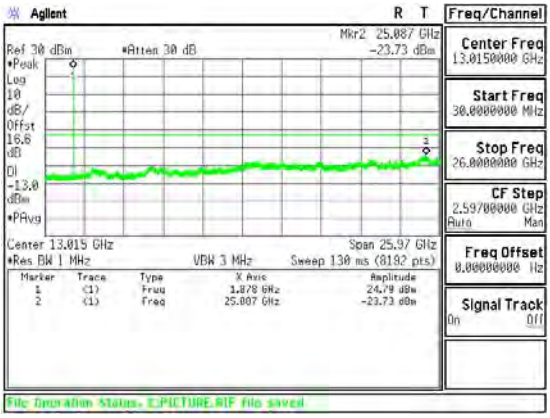
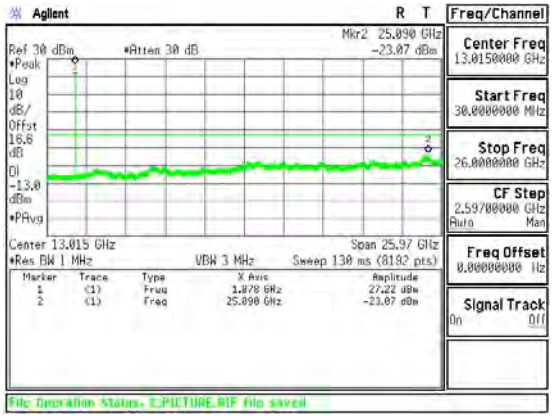
10.3.2. OUT OF BAND EMISSIONS PLOTS

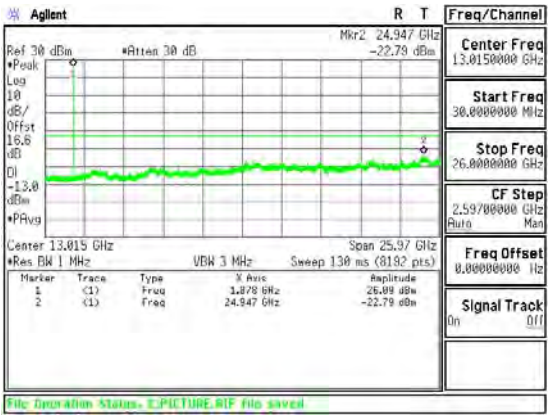
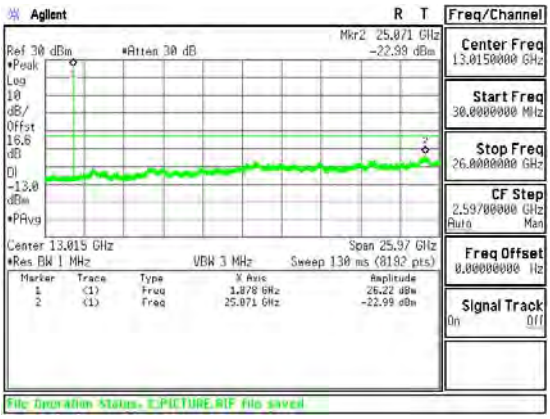
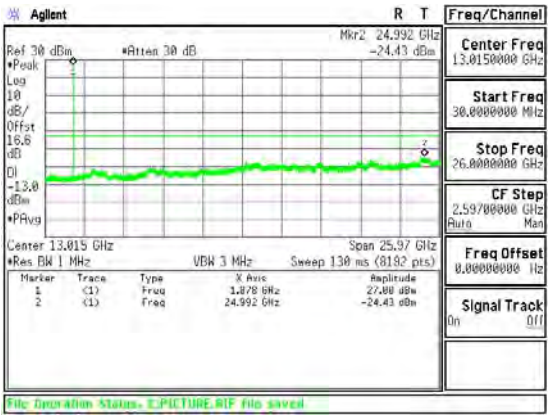
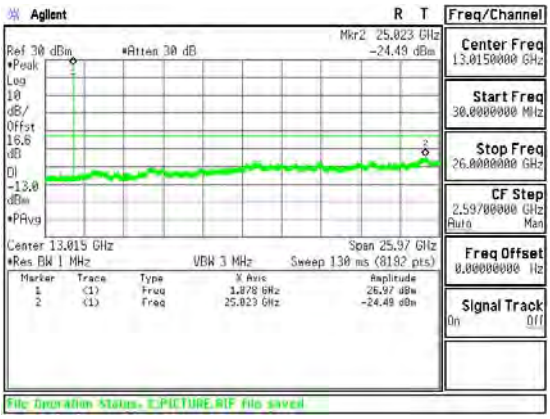
Band Band 2	 Band WCDMA B2 HSDPA CSE	 Band WCDMA B2 REL99 CSE
Band Band 5	 Band WCDMA B5 HSDPA CSE	 Band WCDMA B5 REL99 CSE

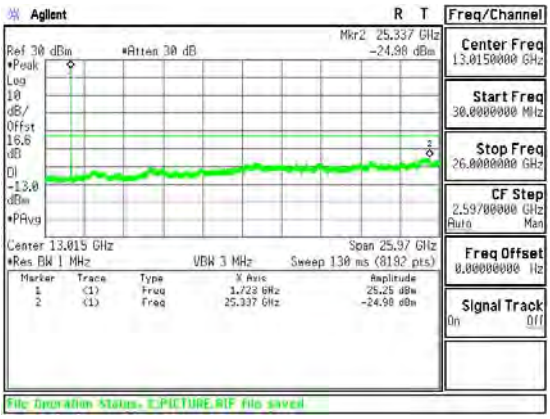
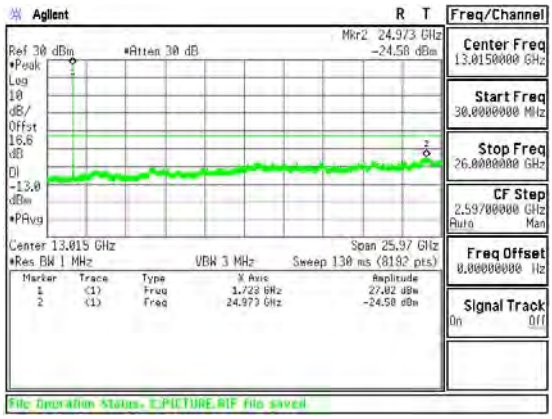
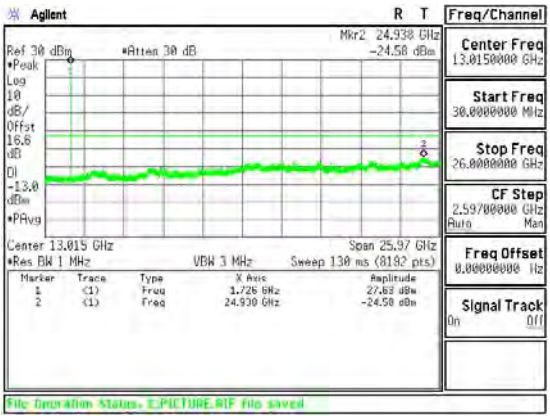
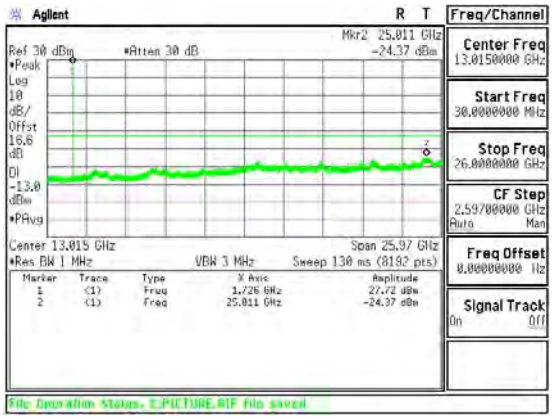
Band Band 4	 Band WCDMA B4 HSDPA CSE	 Band WCDMA B4 REL99 CSE

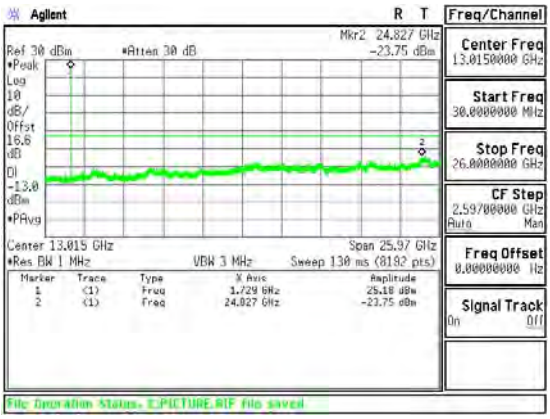
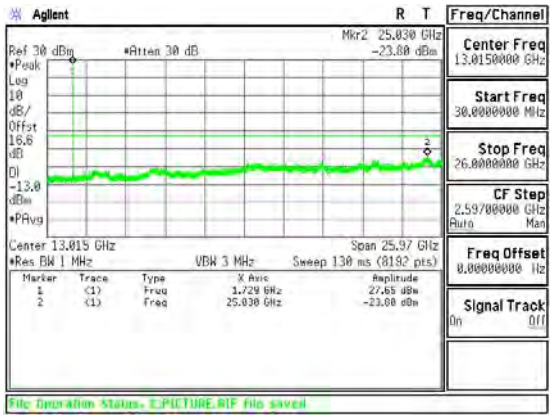
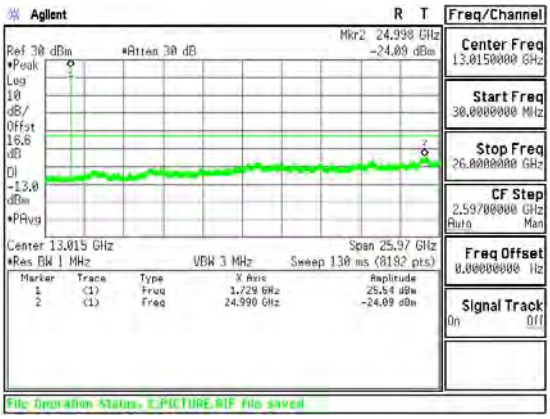
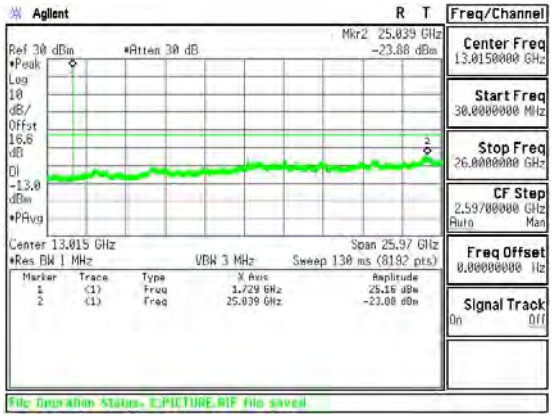
Band GSM1900	 Band GSM1900 EGPRS CSE Mid channel	 Band GSM1900 GPRS CSE Mid channel
Band GSM850	 Band GSM850 EGPRS CSE Mid channel	 Band GSM850 GPRS CSE Mid channel

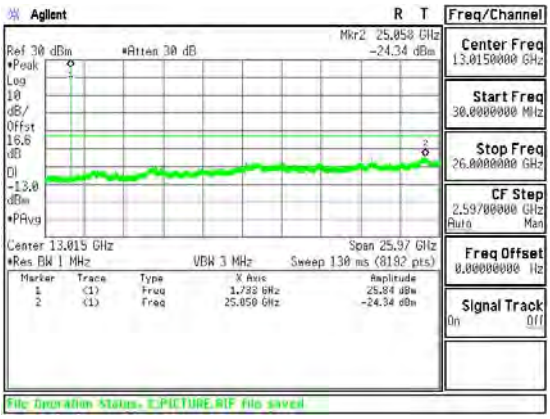
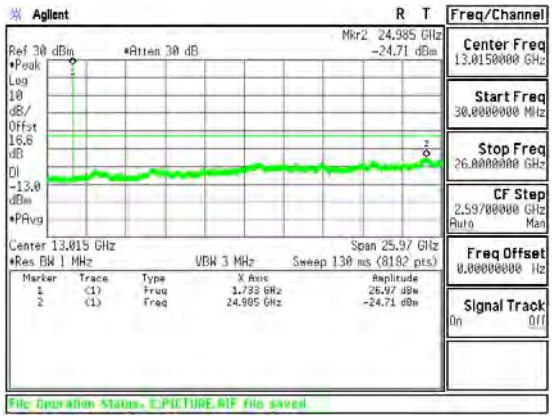
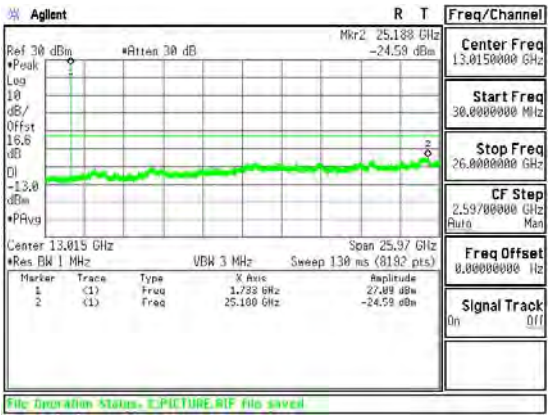
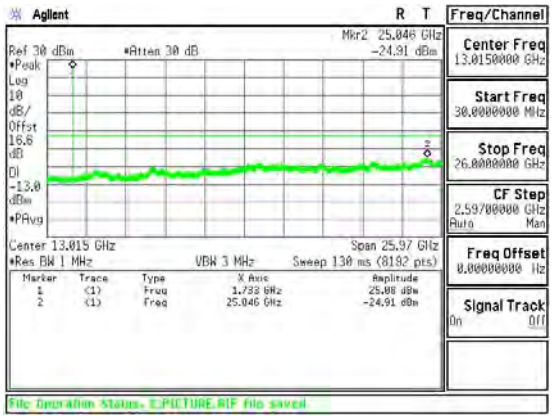
Band LTE2 20MHz	 Band LTE2 20MHz CSE 16QAM Mid channel	 Band LTE2 20MHz CSE QPSK Mid channel
Band LTE2 15MHz	 Band LTE2 15MHz CSE 16QAM Mid channel	 Band LTE1 15MHz CSE QPSK Mid channel

Band LTE2 10MHz	 Band LTE2 10MHz CSE 16QAM Mid channel	 Band LTE2 10MHz CSE QPSK Mid channel
Band LTE2 5MHz	 Band LTE2 5MHz CSE 16QAM Mid channel	 Band LTE1 5MHz CSE QPSK Mid channel

Band LTE2 3MHz	 Band LTE2 3MHz CSE 16QAM Mid channel	 Band LTE2 3MHz CSE QPSK Mid channel
Band LTE2 1.4MHz	 Band LTE2 1.4MHz CSE 16QAM Mid channel	 Band LTE2 1.4MHz CSE QPSK Mid channel

Band LTE4 20MHz	 Band LTE4 20MHz CSE 16QAM Mid channel	 Band LTE4 20MHz CSE QPSK Mid channel
Band LTE4 15MHz	 Band LTE4 15MHz CSE 16QAM Mid channel	 Band LTE4 15MHz CSE QPSK Mid channel

Band LTE4 10MHz	 Band LTE4 10MHz CSE 16QAM Mid channel	 Band LTE4 10MHz CSE QPSK Mid channel
Band LTE4 5MHz	 Band LTE4 5MHz CSE 16QAM Mid channel	 Band LTE4 5MHz CSE QPSK Mid channel

Band LTE4 3MHz	 Band LTE4 3MHz CSE 16QAM Mid channel	 Band LTE4 3MHz CSE QPSK Mid channel
Band LTE4 1.4MHz	 Band LTE4 1.4MHz CSE 16QAM Mid channel	 Band LTE4 1.4MHz CSE QPSK Mid channel

10.4. FREQUENCY STABILITY

RULE PART(S)

FCC: §2.1055, §22.355, §24.235, §27.54 and §90.213

LIMITS

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

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

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

TEST PROCEDURE

Per KDB 971168 D01 Power Meas License Digital Systems v02r02

RESULTS

See the following pages.

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	1879.999986	0.000	2.5
3.80	40	1879.999990	-0.002	2.5
3.80	30	1879.999987	0.000	2.5
3.80	***20***	**1879.999986**	**0**	***2.5***
3.80	10	1879.999988	-0.001	2.5
3.80	0	1879.999985	0.000	2.5
3.80	-10	1879.999987	-0.001	2.5
3.80	-20	1879.999989	-0.002	2.5
3.80	-30	1879.999988	-0.001	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***	***1880.000029***	***0***	***2.5***
4.30	20	1879.999953	*0.017*	2.5
3.20	20	1879.999964	*0.012*	2.5

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	**Environment**	**Frequency Deviation Measureed with Time Elapse**	
(Vdc)	**Temperature (°C)**	**(MHz)**	**Delta (ppm)**	**Limit (ppm)**
3.80	50	836.600040	-0.006	2.5
3.80	40	836.600031	0.005	2.5
3.80	30	836.600039	-0.005	2.5
3.80	***20***	**836.600035**	**0**	***2.5***
3.80	10	836.600033	0.002	2.5
3.80	0	836.600037	-0.003	2.5
3.80	-10	836.600032	0.004	2.5
3.80	-20	836.600038	-0.003	2.5
3.80	-30	836.600037	-0.003	2.5

Reference Frequency: PCS Mid Channel		836.6	MHz @ 20°C
Limit: to stay +- 2.5 ppm =		2091.500	Hz
Power Supply	**Environment**	**Frequency Deviation Measureed with Time Elapse**	
(Vdc)	**Temperature (°C)**	**(MHz)**	**Delta (ppm)**	**Limit (ppm)**
3.80	***20***	***836.600028***	***0***	***2.5***
4.30	20	836.5999558	*0.094*	2.5
End of Voltage 3.2	20	836.5999658	*0.082*	2.5

LTE4 QPSK 5MHz BW, Freq: 1732.5 MHz– MID CHANNEL

Reference Frequency: PCS Mid Channel		1732.5	MHz @ 20°C
Limit: to stay +- 2.5 ppm =		4331.250	Hz
Power Supply	Environment	Frequency Deviation Measureed with Time Elapse		
(Vdc)	Temperature (°C)	(MHz)	Delta (ppm)	Limit (ppm)
3.80	50	1732.500009	-0.001	2.5
3.80	40	1732.500007	0.000	2.5
3.80	30	1732.500008	0.000	2.5
3.80	***20***	**1732.500007**	**0**	***2.5***
3.80	10	1732.500006	0.001	2.5
3.80	0	1732.500007	0.000	2.5
3.80	-10	1732.500006	0.000	2.5
3.80	-20	1732.500006	0.001	2.5
3.80	-30	1732.500010	-0.001	2.5

Reference Frequency: PCS Mid Channel		1732.5	MHz @ 20°C
Limit: to stay +- 2.5 ppm =		4331.250	Hz
Power Supply	Environment	Frequency Deviation Measureed with Time Elapse		
(Vdc)	Temperature (°C)	(MHz)	Delta (ppm)	Limit (ppm)
3.80	***20***	***1732.500028***	***0***	***2.5***
4.30	20	1732.499959	*0.028*	2.5
End of Voltage 3.2	20	1732.499967	*0.023*	2.5

11. RADIATED TEST RESULTS

11.1. RADIATED POWER (ERP & EIRP)

RULE PART(S)

FCC: §2.1046, §22.913, §24.232, §27

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.

27.50(d) - (4) Fixed, mobile, and portable (hand-held) stations operating in the 1710-1755 MHz band and mobile and portable stations operating in the 1695-1710 MHz and 1755-1780 MHz bands are limited to 1 watt EIRP.(Band 4)

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 v02r02

For peak power measurement with a PSA:

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

For average power measurement with a PSA:

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

TEST RESULTS

11.1.1. ERP/EIRP Results

Band	Mode	Channel	f(MHz)	ERP / EIRP	
				dBm	mW
Band 2	REL99	9262	1852.4	24.76	299.2
		9400	1880	24.56	285.8
		9538	1907.6	24.55	285.1
	HSDPA	9262	1852.4	24.63	290.4
		9400	1880	24.54	284.4
		9538	1907.6	24.52	283.1

Band	Mode	Channel	f(MHz)	ERP / EIRP	
				dBm	mW
Band 4	REL99	1312	1712.4	24.69	294.4
		1413	1732.6	25.54	358.1
		1513	1752.6	25.30	338.8
	HSDPA	1312	1712.4	24.50	281.8
		1413	1732.6	25.37	344.3
		1513	1752.6	25.49	354.0

Band	Mode	Channel	f(MHz)	ERP / EIRP	
				dBm	mW
Band 5	REL99	4132	826.4	21.98	157.8
		4183	836.6	21.45	139.6
		4233	846.6	21.67	146.9
	HSDPA	4132	826.4	21.14	130.0
		4183	836.6	21.20	131.8
		4233	846.6	21.20	131.8

Band	Mode	Channel	f(MHz)	ERP / EIRP	
				dBm	mW
GSM1900	GPRS	512	1850.2	32.55	1798.9
		661	1880	32.20	1659.6
		810	1909.8	31.69	1475.7
	EGPRS	512	1850.2	28.76	751.6
		661	1880	28.86	769.1
		810	1909.8	28.56	717.8

Band	Mode	Channel	f(MHz)	ERP / EIRP	
				dBm	mW
GSM850	GPRS	128	824.2	32.68	1853.5
		190	836.6	32.70	1862.1
		251	848.8	32.72	1870.7
	EGPRS	128	824.2	28.82	762.1
		190	836.6	28.73	746.4
		251	848.8	28.78	755.1

11.1.2. LTE ERP/EIRP Results

Band	BW (MHz)	Mode	RB/RB Size	f (MHz)	ERP / EIRP	
					dBm	mW
LTE4	20	QPSK	1/0	1720	24.95	312.6
			1/0	1732.5	25.81	381.1
			1/0	1745	25.77	377.6
		16QAM	1/0	1720	24.15	260.0
			1/0	1732.5	24.82	303.4
			1/0	1745	24.89	308.3

Band	BW (MHz)	Mode	RB/RB Size	f (MHz)	ERP / EIRP	
					dBm	mW
LTE4	15	QPSK	1/0	1717.5	25.13	325.8
			1/0	1732.5	25.71	372.4
			1/0	1747.5	25.78	378.4
		16QAM	1/0	1717.5	24.09	256.4
			1/0	1732.5	24.84	304.8
			1/0	1747.5	24.84	304.8

Band	BW (MHz)	Mode	RB/RB Size	f (MHz)	ERP / EIRP	
					dBm	mW
LTE4	10	QPSK	1/0	1715	25.02	317.7
			1/0	1732.5	25.70	371.5
			1/0	1750	25.90	389.0
		16QAM	1/0	1715	24.20	263.0
			1/0	1732.5	24.95	312.6
			1/0	1750	25.01	317.0

Band	BW (MHz)	Mode	RB/RB Size	f (MHz)	ERP / EIRP	
					dBm	mW
LTE4	5	QPSK	1/0	1712.5	25.17	328.9
			1/0	1732.5	25.89	388.2
			1/0	1752.5	25.84	383.7
		16QAM	1/0	1712.5	24.31	269.8
			1/0	1732.5	24.98	314.8
			1/0	1752.5	24.86	306.2

Band	BW (MHz)	Mode	RB/RB Size	f (MHz)	ERP / EIRP	
					dBm	mW
LTE4	3	QPSK	1/0	1711.5	25.19	330.4
			1/0	1732.5	25.88	387.3
			1/0	1753.5	25.86	385.5
		16QAM	1/0	1711.5	24.33	271.0
			1/0	1732.5	24.96	313.3
			1/0	1753.5	24.87	306.9

Band	BW (MHz)	Mode	RB/RB Size	f (MHz)	ERP / EIRP	
					dBm	mW
LTE4	1.4	QPSK	1/0	1710.7	24.94	311.9
			1/0	1732.5	25.90	389.0
			1/0	1754.3	25.82	381.9
		16QAM	1/0	1710.7	24.25	266.1
			1/0	1732.5	24.93	311.8
			1/0	1754.3	24.97	314.1

Band	BW (MHz)	Mode	RB/RB Size	f (MHz)	ERP / EIRP	
					dBm	mW
LTE2	20	QPSK	1/0	1860	24.83	304.1
			1/0	1880	24.71	295.8
			1/0	1900	24.80	302.0
		16QAM	1/0	1860	23.87	243.8
			1/0	1880	23.52	224.9
			1/0	1900	23.79	239.3

Band	BW (MHz)	Mode	RB/RB Size	f (MHz)	ERP / EIRP	
					dBm	mW
LTE2	15	QPSK	1/0	1857.5	24.88	307.6
			1/0	1880	24.85	305.5
			1/0	1902.5	24.84	304.8
		16QAM	1/0	1857.5	23.94	247.7
			1/0	1880	23.76	237.7
			1/0	1902.5	23.90	245.5

Band	BW (MHz)	Mode	RB/RB Size	f (MHz)	ERP / EIRP	
					dBm	mW
LTE2	10	QPSK	1/0	1855	24.76	299.2
			1/0	1880	24.78	300.6
			1/0	1905	24.55	285.1
		16QAM	1/0	1855	23.67	232.8
			1/0	1880	23.72	235.5
			1/0	1905	23.52	224.9

Band	BW (MHz)	Mode	RB/RB Size	f (MHz)	ERP / EIRP	
					dBm	mW
LTE2	5	QPSK	1/0	1852.5	24.75	298.5
			1/0	1880	24.82	303.4
			1/0	1907.5	24.52	283.1
		16QAM	1/0	1852.5	23.72	235.5
			1/0	1880	23.96	248.9
			1/0	1907.5	23.55	226.5

Band	BW (MHz)	Mode	RB/RB Size	f (MHz)	ERP / EIRP	
					dBm	mW
LTE2	3	QPSK	1/0	1851.5	24.86	306.2
			1/0	1880	24.83	304.1
			1/0	1908.5	24.82	303.4
		16QAM	1/0	1851.5	23.94	247.7
			1/0	1880	23.92	246.6
			1/0	1908.5	23.81	240.4

Band	BW (MHz)	Mode	RB/RB Size	f (MHz)	ERP / EIRP	
					dBm	mW
LTE2	1.4	QPSK	1/0	1850.7	24.86	306.2
			1/0	1880	24.80	302.0
			1/0	1909.3	24.82	303.4
		16QAM	1/0	1850.7	23.74	236.6
			1/0	1880	23.82	241.0
			1/0	1909.3	23.88	244.3

11.1.3. ERP/EIRP DATA

Band

LTE2

20MHz

16QAM

High Frequency Substitution Measurement
UL Verification Services, Inc.

Company:	Samsung
Project #:	15I20033
Date:	2/26/2015
Test Engineer:	R. Alegre
Configuration:	EUT only
Location:	Chamber A
Mode:	LTE_16QAM Band 2 Fundamentals, 20MHz Bandwidth

Test Equpment:
Receiving: Horn T711, and Chamber A SMA Cables
Substitution: Horn T59, 4ft SMA Cable Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1860.00	8.58	V	0.9	8.0	15.74	33.0	-17.3	
1860.00	16.71	H	0.9	8.0	23.87	33.0	-9.1	
Mid Ch								
1880.00	8.30	V	0.9	8.0	15.46	33.0	-17.5	
1880.00	16.36	H	0.9	8.0	23.52	33.0	-9.5	
High Ch								
1900.00	8.68	V	0.9	8.0	15.84	33.0	-17.2	
1900.00	16.63	H	0.9	8.0	23.79	33.0	-9.2	

Band

LTE2

20MHz

QPSK

High Frequency Substitution Measurement
UL Verification Services, Inc.

Company:	Samsung
Project #:	15I20033
Date:	2/26/2015
Test Engineer:	R. Alegre
Configuration:	EUT only
Location:	Chamber A
Mode:	LTE_QPSK Band 2 Fundamentals, 20MHz Bandwidth

Test Equpment:
Receiving: Horn T711, and Chamber A SMA Cables
Substitution: Horn T59, 4ft SMA Cable Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1860.00	9.55	V	0.9	8.0	16.71	33.0	-16.3	
1860.00	17.67	H	0.9	8.0	24.83	33.0	-8.2	
Mid Ch								
1880.00	9.18	V	0.9	8.0	16.34	33.0	-16.7	
1880.00	17.55	H	0.9	8.0	24.71	33.0	-8.3	
High Ch								
1900.00	9.59	V	0.9	8.0	16.75	33.0	-16.3	
1900.00	17.64	H	0.9	8.0	24.80	33.0	-8.2	

Band

LTE2

15MHz

16QAM

High Frequency Substitution Measurement
UL Verification Services, Inc.

Company:	Samsung
Project #:	15I20033
Date:	2/26/2015
Test Engineer:	R. Alegre
Configuration:	EUT only
Location:	Chamber A
Mode:	LTE_16QAM Band 2 Fundamentals, 15MHz Bandwidth

Test Equpment:
Receiving: Horn T711, and Chamber A SMA Cables
Substitution: Horn T59, 4ft SMA Cable Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1857.50	8.58	V	0.9	8.0	15.74	33.0	-17.3	
1857.50	16.78	H	0.9	8.0	23.94	33.0	-9.1	
Mid Ch								
1880.00	8.53	V	0.9	8.0	15.69	33.0	-17.3	
1880.00	16.60	H	0.9	8.0	23.76	33.0	-9.2	
High Ch								
1902.50	8.68	V	0.9	8.0	15.84	33.0	-17.2	
1902.50	16.74	H	0.9	8.0	23.90	33.0	-9.1	

Band

LTE2

15MHz

QPSK

High Frequency Substitution Measurement
UL Verification Services, Inc.

Company:	Samsung
Project #:	15I20033
Date:	2/26/2015
Test Engineer:	R. Alegre
Configuration:	EUT only
Location:	Chamber A
Mode:	LTE_QPSK Band 2 Fundamentals, 15MHz Bandwidth

Test Equpment:
Receiving: Horn T711, and Chamber A SMA Cables
Substitution: Horn T59, 4ft SMA Cable Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1857.50	9.55	V	0.9	8.0	16.71	33.0	-16.3	
1857.50	17.72	H	0.9	8.0	24.88	33.0	-8.1	
Mid Ch								
1880.00	9.34	V	0.9	8.0	16.50	33.0	-16.5	
1880.00	17.69	H	0.9	8.0	24.85	33.0	-8.2	
High Ch								
1902.50	9.59	V	0.9	8.0	16.75	33.0	-16.3	
1902.50	17.68	H	0.9	8.0	24.84	33.0	-8.2	

Band

LTE2

10MHz

16QAM

High Frequency Substitution Measurement
UL Verification Services, Inc.

Company:	Samsung
Project #:	15I20033
Date:	2/26/2015
Test Engineer:	R. Alegre
Configuration:	EUT only
Location:	Chamber A
Mode:	LTE_16QAM Band 2 Fundamentals, 10MHz Bandwidth

Test Equpment:
Receiving: Horn T711, and Chamber A SMA Cables
Substitution: Horn T59, 4ft SMA Cable Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1855.00	8.19	V	0.9	8.0	15.35	33.0	-17.7	
1855.00	16.51	H	0.9	8.0	23.67	33.0	-9.3	
Mid Ch								
1880.00	8.45	V	0.9	8.0	15.61	33.0	-17.4	
1880.00	16.56	H	0.9	8.0	23.72	33.0	-9.3	
High Ch								
1905.00	8.60	V	0.9	8.0	15.76	33.0	-17.2	
1905.00	16.36	H	0.9	8.0	23.52	33.0	-9.5	

Band

LTE2

10MHz

QPSK

High Frequency Substitution Measurement
UL Verification Services, Inc.

Company:	Samsung
Project #:	15I20033
Date:	2/26/2015
Test Engineer:	R. Alegre
Configuration:	EUT only
Location:	Chamber A
Mode:	LTE_QPSK Band 2 Fundamentals, 10MHz Bandwidth

Test Equpment:
Receiving: Horn T711, and Chamber A SMA Cables
Substitution: Horn T59, 4ft SMA Cable Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1855.00	9.16	V	0.9	8.0	16.32	33.0	-16.7	
1855.00	17.60	H	0.9	8.0	24.76	33.0	-8.2	
Mid Ch								
1880.00	9.17	V	0.9	8.0	16.33	33.0	-16.7	
1880.00	17.62	H	0.9	8.0	24.78	33.0	-8.2	
High Ch								
1905.00	9.10	V	0.9	8.0	16.26	33.0	-16.7	
1905.00	17.39	H	0.9	8.0	24.55	33.0	-8.5	

Band

LTE2

5MHz

16QAM

High Frequency Substitution Measurement
UL Verification Services, Inc.

Company:	Samsung
Project #:	15I20033
Date:	2/26/2015
Test Engineer:	R. Alegre
Configuration:	EUT only
Location:	Chamber A
Mode:	LTE_16QAM Band 2 Fundamentals, 5MHz Bandwidth

Test Equpment:
Receiving: Horn T711, and Chamber A SMA Cables
Substitution: Horn T59, 4ft SMA Cable Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1852.50	8.33	V	0.9	8.0	15.49	33.0	-17.5	
1852.50	16.56	H	0.9	8.0	23.72	33.0	-9.3	
Mid Ch								
1880.00	8.34	V	0.9	8.0	15.50	33.0	-17.5	
1880.00	16.80	H	0.9	8.0	23.96	33.0	-9.0	
High Ch								
1907.50	8.36	V	0.9	8.0	15.52	33.0	-17.5	
1907.50	16.39	H	0.9	8.0	23.55	33.0	-9.5	

Band

LTE2

5MHz

QPSK

High Frequency Substitution Measurement
UL Verification Services, Inc.

Company:	Samsung
Project #:	15I20033
Date:	2/26/2015
Test Engineer:	R. Alegre
Configuration:	EUT only
Location:	Chamber A
Mode:	LTE_QPSK Band 2 Fundamentals, 5MHz Bandwidth

Test Equpment:
Receiving: Horn T711, and Chamber A SMA Cables
Substitution: Horn T59, 4ft SMA Cable Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1852.50	9.25	V	0.9	8.0	16.41	33.0	-16.6	
1852.50	17.59	H	0.9	8.0	24.75	33.0	-8.3	
Mid Ch								
1880.00	9.31	V	0.9	8.0	16.47	33.0	-16.5	
1880.00	17.66	H	0.9	8.0	24.82	33.0	-8.2	
High Ch								
1907.50	9.12	V	0.9	8.0	16.28	33.0	-16.7	
1907.50	17.36	H	0.9	8.0	24.52	33.0	-8.5	

Band

LTE2

3MHz

16QAM

High Frequency Substitution Measurement
UL Verification Services, Inc.

Company:	Samsung
Project #:	15I20033
Date:	2/26/2015
Test Engineer:	R. Alegre
Configuration:	EUT only
Location:	Chamber A
Mode:	LTE_16QAM Band 2 Fundamentals, 3MHz Bandwidth

Test Equpment:
Receiving: Horn T711, and Chamber A SMA Cables
Substitution: Horn T59, 4ft SMA Cable Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1851.50	8.68	V	0.9	8.0	15.84	33.0	-17.2	
1851.50	16.78	H	0.9	8.0	23.94	33.0	-9.1	
Mid Ch								
1880.00	8.36	V	0.9	8.0	15.52	33.0	-17.5	
1880.00	16.76	H	0.9	8.0	23.92	33.0	-9.1	
High Ch								
1908.50	8.63	V	0.9	8.0	15.79	33.0	-17.2	
1908.50	16.65	H	0.9	8.0	23.81	33.0	-9.2	

Band

LTE2

3MHz

QPSK

High Frequency Substitution Measurement
UL Verification Services, Inc.

Company:	Samsung
Project #:	15I20033
Date:	2/26/2015
Test Engineer:	R. Alegre
Configuration:	EUT only
Location:	Chamber A
Mode:	LTE_QPSK Band 2 Fundamentals, 3MHz Bandwidth

Test Equpment:
Receiving: Horn T711, and Chamber A SMA Cables
Substitution: Horn T59, 4ft SMA Cable Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1851.50	9.25	V	0.9	8.0	16.41	33.0	-16.6	
1851.50	17.70	H	0.9	8.0	24.86	33.0	-8.1	
Mid Ch								
1880.00	9.45	V	0.9	8.0	16.61	33.0	-16.4	
1880.00	17.67	H	0.9	8.0	24.83	33.0	-8.2	
High Ch								
1908.50	9.54	V	0.9	8.0	16.70	33.0	-16.3	
1908.50	17.66	H	0.9	8.0	24.82	33.0	-8.2	

Band

LTE2

1.4MHz

16QAM

High Frequency Substitution Measurement
UL Verification Services, Inc.

Company:	Samsung
Project #:	15I20033
Date:	2/26/2015
Test Engineer:	R. Alegre
Configuration:	EUT only
Location:	Chamber A
Mode:	LTE_16QAM Band 2 Fundamentals, 1.4MHz Bandwidth

Test Equpment:
Receiving: Horn T711, and Chamber A SMA Cables
Substitution: Horn T59, 4ft SMA Cable Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1850.70	8.50	V	0.9	8.0	15.66	33.0	-17.3	
1850.70	16.58	H	0.9	8.0	23.74	33.0	-9.3	
Mid Ch								
1880.00	8.52	V	0.9	8.0	15.68	33.0	-17.3	
1880.00	16.66	H	0.9	8.0	23.82	33.0	-9.2	
High Ch								
1909.30	8.76	V	0.9	8.0	15.92	33.0	-17.1	
1909.30	16.72	H	0.9	8.0	23.88	33.0	-9.1	

Band

LTE2

1.4MHz

QPSK

High Frequency Substitution Measurement
UL Verification Services, Inc.

Company:	Samsung
Project #:	15I20033
Date:	2/26/2015
Test Engineer:	R. Alegre
Configuration:	EUT only
Location:	Chamber A
Mode:	LTE_QPSK Band 2 Fundamentals, 1.4MHz Bandwidth

Test Equpment:
Receiving: Horn T711, and Chamber A SMA Cables
Substitution: Horn T59, 4ft SMA Cable Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1850.70	9.25	V	0.9	8.0	16.41	33.0	-16.6	
1850.70	17.70	H	0.9	8.0	24.86	33.0	-8.1	
Mid Ch								
1880.00	9.23	V	0.9	8.0	16.39	33.0	-16.6	
1880.00	17.64	H	0.9	8.0	24.80	33.0	-8.2	
High Ch								
1909.30	9.52	V	0.9	8.0	16.68	33.0	-16.3	
1909.30	17.66	H	0.9	8.0	24.82	33.0	-8.2	

Band

LTE4

20MHz

16QAM

High Frequency Substitution Measurement
UL Verification Services, Inc.

Company:	Samsung
Project #:	15I20033
Date:	2/27/2015
Test Engineer:	R.Alegre
Configuration:	EUT Only
Location:	Chamber A
Mode:	LTE_16QAM Band 4 Fundamentals, 20MHz Bandwidth

Test Equpment:
Receiving: Horn T711, and Chamber A SMA Cables
Substitution: Horn T59, 4ft SMA Cable Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1720.00	9.67	V	0.9	8.2	17.01	30.0	-13.0	
1720.00	16.81	H	0.9	8.2	24.15	30.0	-5.8	
Mid Ch								
1732.50	9.64	V	0.9	8.2	16.91	30.0	-13.1	
1732.50	17.55	H	0.9	8.2	24.82	30.0	-5.2	
High Ch								
1745.00	10.00	V	0.9	8.1	17.20	30.0	-12.8	
1745.00	17.69	H	0.9	8.1	24.89	30.0	-5.1	

Band

LTE4

20MHz

QPSK

High Frequency Substitution Measurement
UL Verification Services, Inc.

Company:	Samsung
Project #:	15I20033
Date:	2/27/2015
Test Engineer:	R.Alegre
Configuration:	EUT Only
Location:	Chamber A
Mode:	LTE_QPSK Band 4 Fundamentals, 20MHz Bandwidth

Test Equpment:
Receiving: Horn T711, and Chamber A SMA Cables
Substitution: Horn T59, 4ft SMA Cable Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1720.00	10.66	V	0.9	8.2	18.00	30.0	-12.0	
1720.00	17.61	H	0.9	8.2	24.95	30.0	-5.0	
Mid Ch								
1732.50	10.58	V	0.9	8.2	17.85	30.0	-12.1	
1732.50	18.54	H	0.9	8.2	25.81	30.0	-4.2	
High Ch								
1745.00	10.95	V	0.9	8.1	18.15	30.0	-11.9	
1745.00	18.57	H	0.9	8.1	25.77	30.0	-4.2	

Band

LTE4

15MHz

16QAM

High Frequency Substitution Measurement
UL Verification Services, Inc.

Company:	Samsung
Project #:	15I20033
Date:	2/27/2015
Test Engineer:	R.Alegre
Configuration:	EUT Only
Location:	Chamber A
Mode:	LTE_16QAM Band 4 Fundamentals, 15MHz Bandwidth

Test Equpment:
Receiving: Horn T711, and Chamber A SMA Cables
Substitution: Horn T59, 4ft SMA Cable Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1717.50	9.68	V	0.9	8.2	17.03	30.0	-13.0	
1717.50	16.74	H	0.9	8.2	24.09	30.0	-5.9	
Mid Ch								
1732.50	9.82	V	0.9	8.2	17.09	30.0	-12.9	
1732.50	17.57	H	0.9	8.2	24.84	30.0	-5.2	
High Ch								
1747.50	9.93	V	0.9	8.1	17.12	30.0	-12.9	
1747.50	17.65	H	0.9	8.1	24.84	30.0	-5.2	

Band

LTE4

15MHz

QPSK

High Frequency Substitution Measurement
UL Verification Services, Inc.

Company:	Samsung
Project #:	15I20033
Date:	2/27/2015
Test Engineer:	R.Alegre
Configuration:	EUT Only
Location:	Chamber A
Mode:	LTE_QPSK Band 4 Fundamentals, 15MHz Bandwidth

Test Equpment:
Receiving: Horn T711, and Chamber A SMA Cables
Substitution: Horn T59, 4ft SMA Cable Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1717.50	10.75	V	0.9	8.2	18.10	30.0	-11.9	
1717.50	17.78	H	0.9	8.2	25.13	30.0	-4.9	
Mid Ch								
1732.50	10.71	V	0.9	8.2	17.98	30.0	-12.0	
1732.50	18.44	H	0.9	8.2	25.71	30.0	-4.3	
High Ch								
1747.50	10.66	V	0.9	8.1	17.85	30.0	-12.1	
1747.50	18.59	H	0.9	8.1	25.78	30.0	-4.2	

Band

LTE4

10MHz

16QAM

High Frequency Substitution Measurement
UL Verification Services, Inc.

Company:	Samsung
Project #:	15I20033
Date:	2/27/2015
Test Engineer:	R.Alegre
Configuration:	EUT Only
Location:	Chamber A
Mode:	LTE_16QAM Band 4 Fundamentals, 10MHz Bandwidth

Test Equpment:
Receiving: Horn T711, and Chamber A SMA Cables
Substitution: Horn T59, 4ft SMA Cable Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1715.00	10.13	V	0.9	8.2	17.40	30.0	-12.6	
1715.00	16.93	H	0.9	8.2	24.20	30.0	-5.8	
Mid Ch								
1732.50	9.85	V	0.9	8.2	17.12	30.0	-12.9	
1732.50	17.68	H	0.9	8.2	24.95	30.0	-5.0	
High Ch								
1750.00	9.98	V	0.9	8.1	17.17	30.0	-12.8	
1750.00	17.82	H	0.9	8.1	25.01	30.0	-5.0	

Band

LTE4

10MHz

QPSK

High Frequency Substitution Measurement
UL Verification Services, Inc.

Company:	Samsung
Project #:	15I20033
Date:	2/27/2015
Test Engineer:	R.Alegre
Configuration:	EUT Only
Location:	Chamber A
Mode:	LTE_QPSK Band 4 Fundamentals, 10MHz Bandwidth

Test Equpment:
Receiving: Horn T711, and Chamber A SMA Cables
Substitution: Horn T59, 4ft SMA Cable Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1715.00	10.97	V	0.9	8.2	18.24	30.0	-11.8	
1715.00	17.75	H	0.9	8.2	25.02	30.0	-5.0	
Mid Ch								
1732.50	10.90	V	0.9	8.2	18.17	30.0	-11.8	
1732.50	18.43	H	0.9	8.2	25.70	30.0	-4.3	
High Ch								
1750.00	10.96	V	0.9	8.1	18.15	30.0	-11.8	
1750.00	18.71	H	0.9	8.1	25.90	30.0	-4.1	