



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

CERTIFICATION TEST REPORT

FOR

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

MODEL NUMBER: SM-P355C; SM-T355C; SM-P355Y

FCC ID: A3LSMP355C

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TABLE OF CONTENTS

1.	ATTESTATION OF TEST RESULTS	5
2.	TEST METHODOLOGY	6
3.	FACILITIES AND ACCREDITATION	6
4.	CALIBRATION AND UNCERTAINTY	6
4.1.	MEASURING INSTRUMENT CALIBRATION	6
4.2.	SAMPLE CALCULATION	7
4.3.	MEASUREMENT UNCERTAINTY	7
5.	EQUIPMENT UNDER TEST	8
5.1.	DESCRIPTION OF EUT	8
5.2.	MAXIMUM OUTPUT POWER.....	8
5.3.	MAXIMUM OUTPUT POWER (LTE).....	9
5.4.	DESCRIPTION OF AVAILABLE ANTENNAS	10
5.5.	DESCRIPTION OF TEST SETUP.....	11
6.	TEST AND MEASUREMENT EQUIPMENT	14
7.	Summary Table.....	15
8.	RF POWER OUTPUT VERIFICATION.....	16
8.1.	GSM/GPRS/EDGE	16
8.1.1.	GSM OUTPUT POWER RESULT	17
8.2.	UMTS REL 99.....	18
8.2.1.	UMTS REL 99 OUTPUT POWER RESULT	18
8.3.	UMTS HSDPA	19
8.3.1.	UMTS HSDPA OUTPUT POWER RESULT	20
8.4.	UMTS HSUPA	21
8.4.1.	UMTS HSUPA OUTPUT POWER RESULT	22
8.5.	LTE OUTPUT VERIFICATION.....	23
8.5.1.	LTE OUTPUT RESULT	23
9.	PEAK TO AVERAGE RATIO	25
9.1.	CONDUCTED PEAK TO AVERAGE RESULT.....	25
10.	LIMITS AND CONDUCTED RESULTS	32
10.1.	OCCUPIED BANDWIDTH	32

10.1.1.	OCCUPIED BANDWIDTH RESULTS.....	34
10.1.2.	LTE OCCUPIED BANDWIDTH RESULTS	36
10.1.1.	OCCUPIED BANDWIDTH PLOTS	38
10.2.	<i>BAND EDGE EMISSIONS</i>	43
10.2.1.	BAND EDGE PLOTS	44
10.2.2.	EMISSION MASK PLOTS	49
10.3.	<i>OUT OF BAND EMISSIONS</i>	59
10.3.1.	OUT OF BAND EMISSIONS RESULT	60
10.3.2.	OUT OF BAND EMISSIONS PLOTS.....	63
10.4.	<i>FREQUENCY STABILITY</i>	68
10.4.1.	FREQUENCY STABILITY RESULTS.....	69
11.	RADIATED TEST RESULTS	72
11.1.	<i>RADIATED POWER (ERP & EIRP)</i>	72
11.1.1.	ERP/EIRP Results.....	73
11.1.2.	LTE ERP/EIRP Results	75
11.1.3.	ERP/EIRP DATA.....	77
11.2.	<i>FIELD STRENGTH OF SPURIOUS RADIATION</i>	93
11.2.1.	SPURIOUS RADIATION DATA.....	94
12.	SETUP PHOTOS	110

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-P355C; SM-T355C; SM-P355Y
SERIAL NUMBER: 2081832 (Radiated), 2081831 (Conducted)
DATE TESTED: MARCH 20-31, 2015

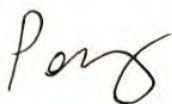
APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
FCC PART 22H, 24E and 27M	PASS

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, and 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
☐ Chamber A(IC: 2324B-1)	☐ Chamber D(IC: 2324B-4)
☐ Chamber B(IC: 2324B-2)	☐ Chamber E(IC: 2324B-5)
☒ Chamber C(IC: 2324B-3)	☐ Chamber F(IC: 2324B-6)
	☐ Chamber G(IC: 2324B-7)
	☐ Chamber H(IC: 2324B-8)

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:

$$\text{EIRP} = \text{PSA reading with EUT worst orientation (dBm)} + \text{Path loss (dB)} - \text{cable loss (dB)}$$

between the SG and substitution antenna) + Substitution Antenna Factor (dBi)

$$\text{ERP} = \text{PSA reading with EUT worst orientation (dBm)} + \text{Path loss (dB)} - \text{cable loss (dB)}$$

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 27000 MHz	4.94 dB

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

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

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

SM-P355C, SM-T355C and SM-P355Y have the same PCB design, all the chipset, component including antennas are same.

P355Y supports LTE B28, while P355C disable it by SW.

P355C support S-Pen, while T355C doesn't support S-Pen.

5.2. MAXIMUM OUTPUT POWER

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

FCC Part 22/24						
Band	Frequency Range(MHz)	Modulation Peak	Conducted		Radiated	
			Avg	mW	Avg	mW
GSM850	824~849	GMSK	31.4	1380.38		
	824~849	GPRS	31.4	1380.38	31.31	1352.07
	824~849	EGPRS	29.4	870.96	26.90	489.77
GSM1900	1850~1910	GMSK	30.8	1202.26		
	1850~1910	GPRS	30.8	1202.26	32.81	1909.85
	1850~1910	EGPRS	29.9	977.24	29.15	822.24
Band 5	824~849	REL99	23.5	223.87	23.26	211.83
	824~849	HSDPA	23.3	213.80	22.96	197.69
	824~849	HSUPA	23.3	213.80		
Band 2	1850~1910	REL99	23.2	208.93	25.88	387.25
	1850~1910	HSDPA	23.0	199.53	25.86	385.47
	1850~1910	HSUPA	23.0	199.53		

5.3. MAXIMUM OUTPUT POWER (LTE)

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

FCC Part 27							
Band	Frequency Range(MHz)	BandWidth (MHz)	Modulation Peak	Conducted		Radiated	
				Avg	mW	Avg	mW
LTE41	2555~2655	20MHz	QPSK	24.00	251.19	27.33	540.75
		20MHz	16QAM	23.00	199.53	26.37	433.51

FCC Part 22/2 4/27							
Band	Frequency Range(MHz)	BandWidth (MHz)	Modulation Peak	Conducted		Radiated	
				Avg	mW	Avg	mW
LTE41	2555~2655	15MHz	QPSK	24.00	251.19	26.80	478.63
		15MHz	16QAM	22.90	194.98	26.26	422.66

FCC Part 22/2 4/27							
Band	Frequency Range(MHz)	BandWidth (MHz)	Modulation Peak	Conducted		Radiated	
				Avg	mW	Avg	mW
LTE41	2555~2655	10MHz	QPSK	23.90	245.47	26.68	465.58
		10MHz	16QAM	22.80	190.55	25.73	374.11

FCC Part 22/2 4/27							
Band	Frequency Range(MHz)	BandWidth (MHz)	Modulation Peak	Conducted		Radiated	
				Avg	mW	Avg	mW
LTE41	2555~2655	5MHz	QPSK	24.00	251.19	26.70	467.73
		5MHz	16QAM	22.90	194.98	25.71	372.39

5.4. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes a PIFA antenna for the bands list below with a maximum peak gain as follow:

Frequency (MHz)	Peak Gain (dBi)
Band 5, 824~849MHz	0.12
Band 2, 1850~1910MHz	-1.06
LTE41, 2555~2655MHz	-1.21

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	N/A
Earphone	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

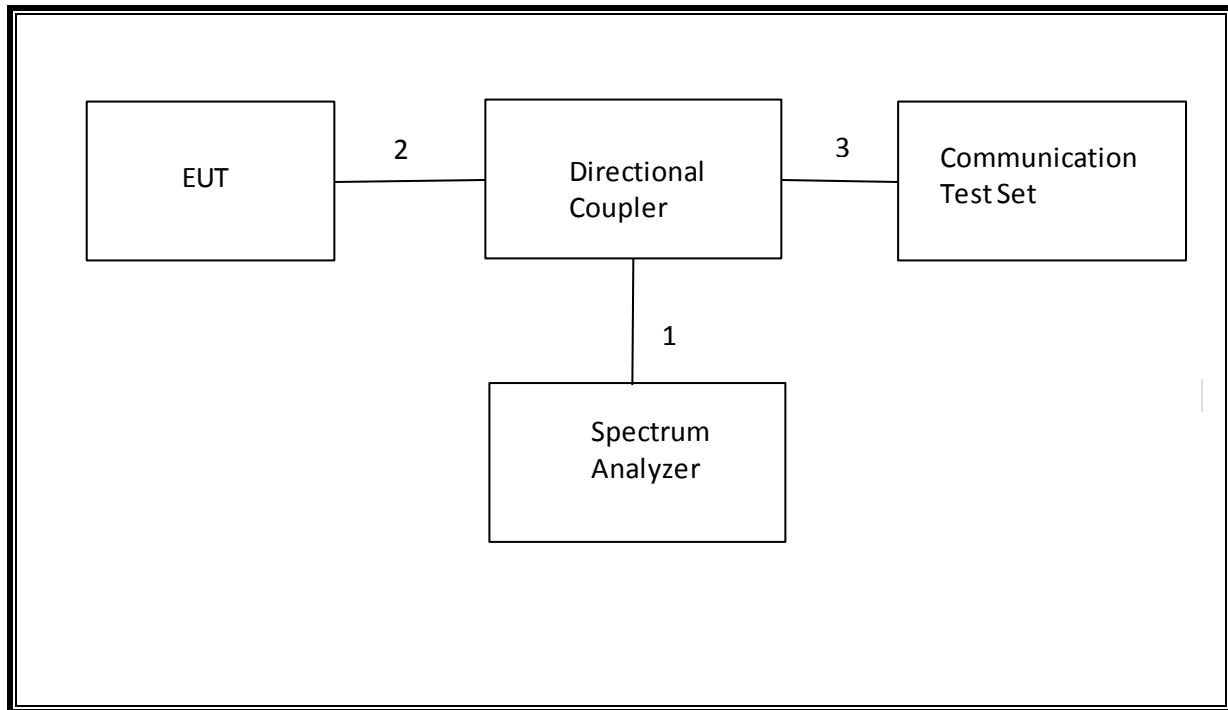
I/O CABLES (RADIATED SETUP)

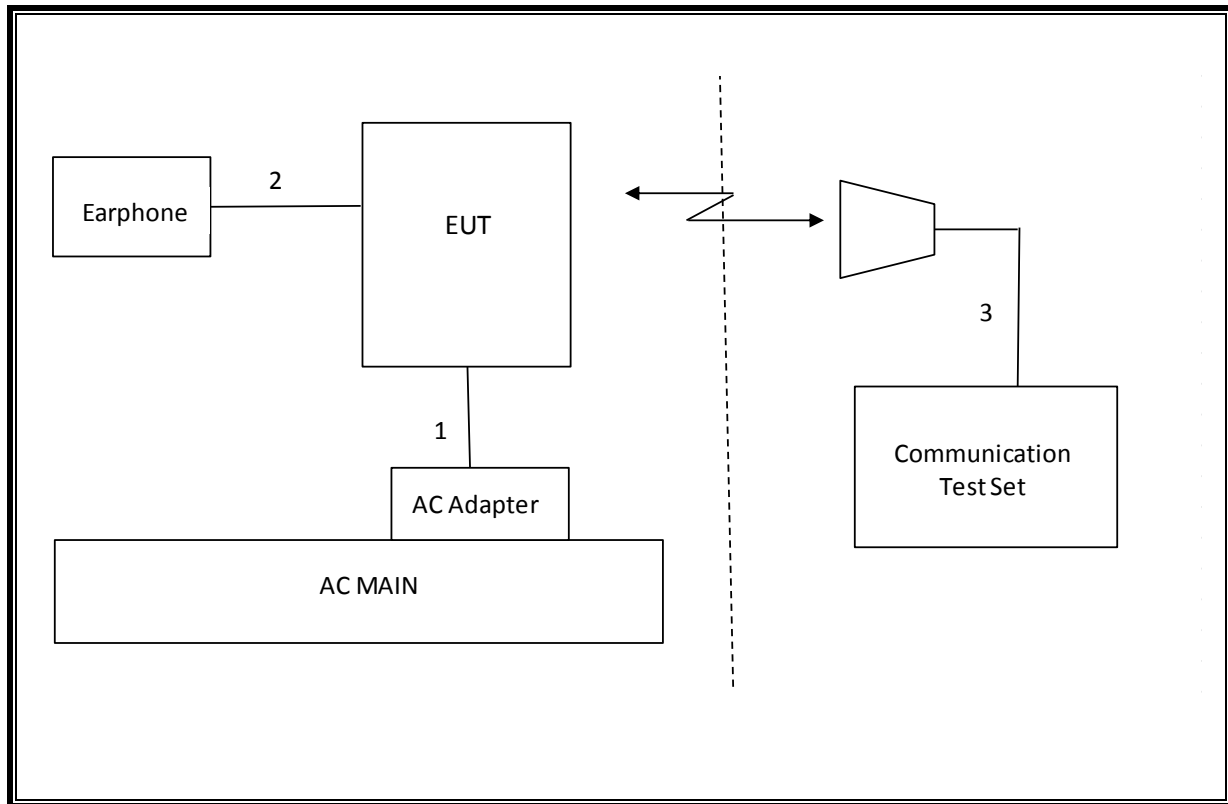
I/O CABLE LIST						
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length	Remarks
1	USB	1	AC Adapter	Un-shielded	1.2m	No
2	Jack	1	Headset	Shielded	1m	No
3	RF In/out	1	Communication Test Set	Un-shielded	2m	Yes

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	05/01/15
Antenna, Bilog, 2 GHz	Sunol Sciences	JB1	C01011	04/22/15
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	05/11/15
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	06/18/15
Antenna, Tuned Dipole 400~1000	ETS	3121C DB4	C00993	02/11/16
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 Software 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	Worst Case
2.1049	N/A	Occupied Band width (99%)	N/A	Conducted	Pass	17.985 MHz
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	-13.78 dBm(with 9dB DCCF)
27.53(m)	RSS-199(4.5)		-25dBm		Pass	-22.89dBm(with 4.44dB DCCF)
2.1046	N/A	Conducted output power	N/A		Pass	31.4 dBm
27.53(m)	RSS-199(4.5)	Emission Mask			Pass	
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	0.038 PPM
22.913(a)(2)	RSS-132(4.4)	Effective Radiated Power	38 dBm	Radiated	Pass	31.31dBm
24.232(c)	RSS-133(6.4)	Equivalent Isotropic Radiated Power	33dBm		Pass	32.81 dBm
27.50(h)(2)	RSS-199(4.4)					
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	-41.1dBm
27.53(m)	RSS-199(4.5)		-25dBm		Pass	-33.8 dBm

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
				Peak (dBm)	Peak (dBm)	Peak (dBm)	Peak (dBm)
GSM850	GMSK	128	824.2	31.4			
		190	836.6	31.1			
		251	848.8	31.1			
	GPRS	128	824.2	31.4	28.4	27.3	26.0
		190	836.6	31.1	28.2	27.1	26.0
		251	848.8	31.1	28.1	27.1	25.7
	EGPRS	128	824.2	29.4	29.2	27.9	27.0
		190	836.6	29.4	29.3	28.1	27.1
		251	848.8	29.3	29.3	28.0	27.0
GSM1900	GMSK	512	1850.2	30.5			
		661	1880	30.6			
		810	1909.8	30.8			
	GPRS	512	1850.2	30.5	27.1	24.4	23.2
		661	1880	30.6	27.3	24.5	23.2
		810	1909.8	30.8	27.3	24.3	23.1
	EGPRS	512	1850.2	29.7	27.1	25.0	24.1
		661	1880	29.8	27.1	25.0	24.0
		810	1909.8	29.9	27.2	25.1	24.0

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
	β_c	Not Applicable
	β_d	Not Applicable
	β_{ec}	Not Applicable
	β_c/β_d	8/15
	β_{hs}	Not Applicable
	β_{ed}	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	23.4
		4183	836.6	23.5
		4233	846.6	23.4
Band 2	REL99	9262	1852.4	23.1
		9400	1880	23.2
		9538	1907.6	23.0

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			
	β_c	2/15	12/15	15/15	15/15
	β_d	15/15	15/15	8/15	4/15
	Bd (SF)	64			
	β_c/β_d	2/15	12/15	15/8	15/4
	β_{hs}	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			
	$A_{hs} = \beta_{hs}/\beta_c$	30/15			

8.3.1. UMTS HSDPA OUTPUT POWER RESULT

Band	Mode	Subset	Ch.	f(MHz)	Conducted Power (dBm)
					Avg (dBm)
Band 5	HSDPA	1	4132	826.4	23.2
			4183	836.6	23.3
			4233	846.6	23.3
		2	4132	826.4	23.2
			4183	836.6	23.3
			4233	846.6	23.2
		3	4132	826.4	22.9
			4183	836.6	22.7
			4233	846.6	22.8
		4	4132	826.4	22.8
			4183	836.6	22.8
			4233	846.6	22.7
Band 2	HSDPA	1	9262	1852.4	22.9
			9400	1880	23.0
			9538	1907.6	22.9
		2	9262	1852.4	22.9
			9400	1880	22.9
			9538	1907.6	22.8
		3	9262	1852.4	22.4
			9400	1880	22.5
			9538	1907.6	22.4
		4	9262	1852.4	22.4
			9400	1880	22.4
			9538	1907.6	22.3

8.4. UMTS HSUPA

TEST PROCEDURE

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

	Mode	Rel6 HSUPA	Rel6 HSUPA	Rel6 HSUPA	Rel6 HSUPA	Rel6 HSUPA
	Subtest	1	2	3	4	5
WCDMA General Settings	Loopback Mode	Test Mode 1				
	P-CPICH (dB)	-10				
	P-CCPCH (dB)	-12				
	SCH (dB)	-12				
	PICH(dB)	-15				
	DPCH (dB)	-9				
	HS-SCCH_1 (dB)	-8				
	HS-PDSCH (dB)	-3				
	Rel99 RMC	12.2kbps RMC				
	HSDPA FRC	H-Set1				
	HSUPA Test	HSUPA Loopback				
	Power Control Algorithm	Algorithm2				
	Bc	11/15	6/15	15/15	2/15	15/15
	Bd	15/15	15/15	9/15	15/15	15/15
	Bec	209/225	12/15	30/15	2/15	5/15
	β_c/β_d	11/15	6/15	15/9	2/15	15/15
HSDPA Specific Settings	Bhs	22/15	12/15	30/15	4/15	30/15
	β_{ed} (note1)	1309/225	94/75	47/15 47/15	56/75	134/15
	MPR	0	2	1	2	0
	DACK	8				
	DNAK	8				
	DCQI	8				
	Ack-Nack repetition factor	3				
HSUPA Specific Settings	CQI Feedback (Table 5.2B.4)	4ms				
	CQI Repetition Factor (Table 5.2B.4)	2				
	Ahs = β_{hs}/β_c	30/15				
	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: β_{ed} cannot be set directly, it is set by Absolute Grant Value.

8.4.1. UMTS HSUPA OUTPUT POWER RESULT

Band	Mode	Subset	Ch.	f(MHz)	Conducted Power (dBm)
					Avg (dBm)
Band 5	HSUPA	1	4132	826.4	23.2
			4183	836.6	23.2
			4233	846.6	23.3
		2	4132	826.4	21.4
			4183	836.6	21.5
			4233	846.6	21.3
		3	4132	826.4	22.4
			4183	836.6	22.4
			4233	846.6	22.3
		4	4132	826.4	21.3
			4183	836.6	21.4
			4233	846.6	21.3
		5	4132	826.4	23.2
			4183	836.6	23.3
			4233	846.6	23.3
Band 2	HSUPA	1	9262	1852.4	22.7
			9400	1880	22.8
			9538	1907.6	22.8
		2	9262	1852.4	20.6
			9400	1880	20.6
			9538	1907.6	20.7
		3	9262	1852.4	21.8
			9400	1880	21.7
			9538	1907.6	21.7
		4	9262	1852.4	20.5
			9400	1880	20.6
			9538	1907.6	20.6
		5	9262	1852.4	22.9
			9400	1880	23.0
			9538	1907.6	22.8

8.5. LTE OUTPUT VERIFICATION**8.5.1. LTE OUTPUT RESULT**

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR			
						40340	40620	41140
						2565 MHz	2593 MHz	2645 MHz
LTE Band 41	20	QPSK	1	0	0	24.00	24.00	24.00
			1	49	0	24.00	24.00	23.70
			1	99	0	23.80	23.70	23.90
			50	0	1	22.40	22.50	22.50
			50	24	1	22.30	22.50	22.40
			50	50	1	22.40	22.50	22.30
			100	0	1	22.50	22.60	22.50
		16QAM	1	0	1	22.90	23.00	22.90
			1	49	1	23.00	23.00	22.90
			1	99	1	23.00	22.90	22.80
			50	0	2	21.90	22.00	22.00
			50	24	2	21.80	21.70	22.00
			50	50	2	21.80	21.80	21.90
			100	0	2	21.80	21.60	21.80
Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR			
						40315	40620	41165
						2562.5 MHz	2593 MHz	2647.5 MHz
LTE Band 41	15	QPSK	1	0	0	23.80	23.90	23.80
			1	37	0	23.90	24.00	23.70
			1	74	0	23.80	23.70	23.90
			36	0	1	22.30	22.50	22.40
			36	20	1	22.30	22.50	22.40
			36	39	1	22.40	22.40	22.40
			75	0	1	22.50	22.50	22.40
		16QAM	1	0	1	22.90	22.90	22.90
			1	37	1	22.80	22.90	22.80
			1	74	1	22.80	22.70	22.80
			36	0	2	21.90	22.00	21.80
			36	20	2	21.80	21.80	21.70
			36	39	2	21.90	21.80	21.70
			75	0	2	21.80	21.60	21.70

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR			
						40290	40620	41190
						2560 MHz	2593 MHz	2650 MHz
LTE Band 41	10	QPSK	1	0	0	23.70	23.90	23.80
			1	25	0	23.80	23.90	23.80
			1	49	0	23.90	23.80	23.90
			25	0	1	22.30	22.50	22.50
			25	12	1	22.40	22.50	22.30
			25	25	1	22.30	22.30	22.20
			50	0	1	22.40	22.40	22.40
		16QAM	1	0	1	22.60	22.80	22.70
			1	25	1	22.60	22.80	22.70
			1	49	1	22.60	22.60	22.70
			25	0	2	21.80	21.70	21.80
			25	12	2	21.70	21.70	21.60
			25	25	2	21.60	21.80	21.70
			50	0	2	21.60	21.60	21.70
Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR			
						40215	40620	41215
						2552.5 MHz	2593 MHz	2652.5 MHz
LTE Band 41	5	QPSK	1	0	0	23.90	24.00	23.80
			1	12	0	23.80	23.90	23.90
			1	24	0	23.80	23.90	23.90
			12	0	1	22.40	22.50	22.50
			12	7	1	22.30	22.40	22.30
			12	13	1	22.40	22.40	22.20
			25	0	1	22.30	22.40	22.30
		16QAM	1	0	1	22.70	22.90	22.70
			1	12	1	22.70	22.90	22.80
			1	24	1	22.80	22.70	22.70
			12	0	2	21.80	21.80	21.80
			12	7	2	21.60	21.70	21.70
			12	13	2	21.50	21.70	21.60
			25	0	2	21.60	21.60	21.70

9. PEAK TO AVERAGE RATIO

Test Procedure

Per KDB 971168 D01 Power Meas License Digital Systems v02r02

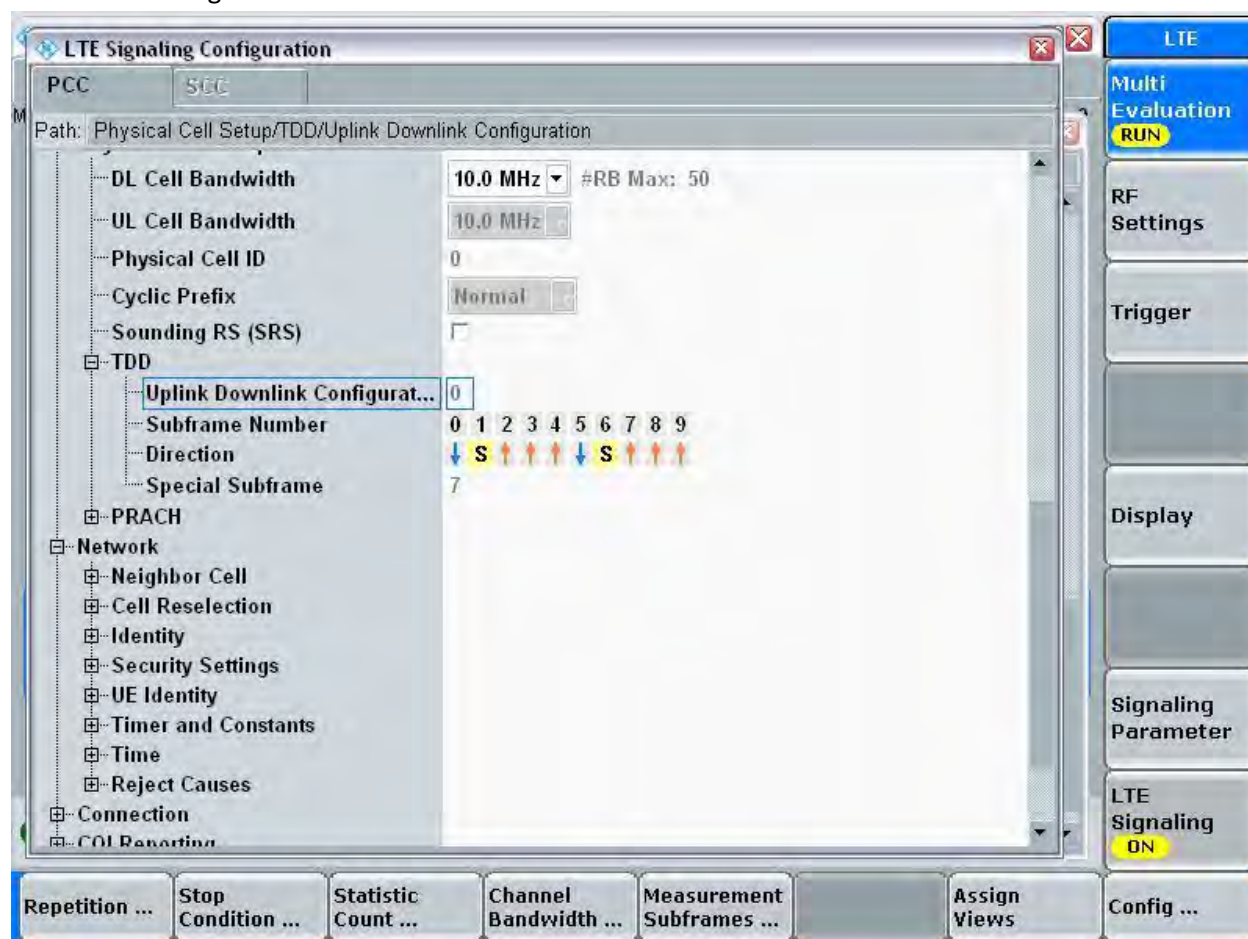
Test Spec

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.

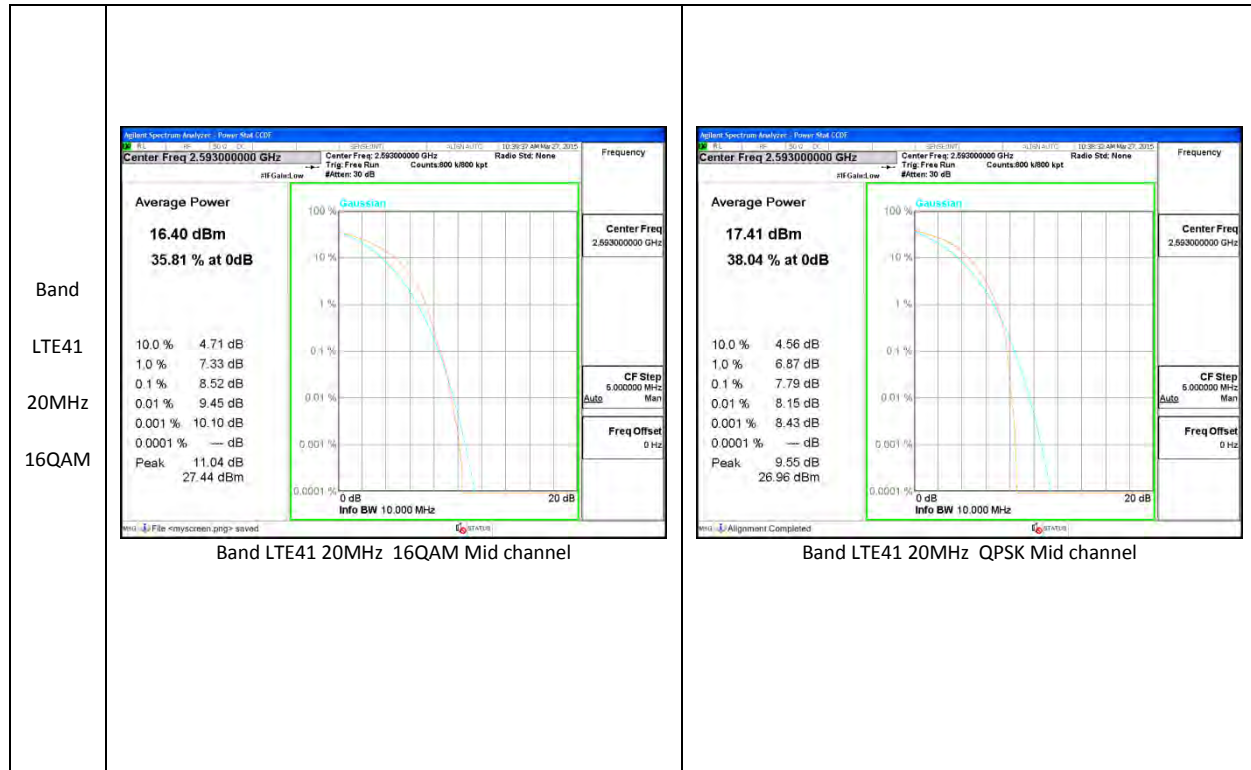
9.1. CONDUCTED PEAK TO AVERAGE RESULT

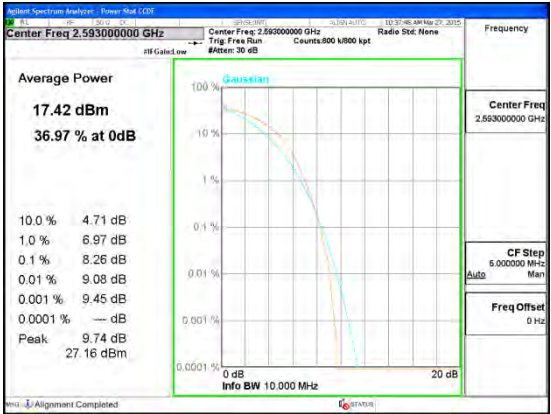
LTE Band 41

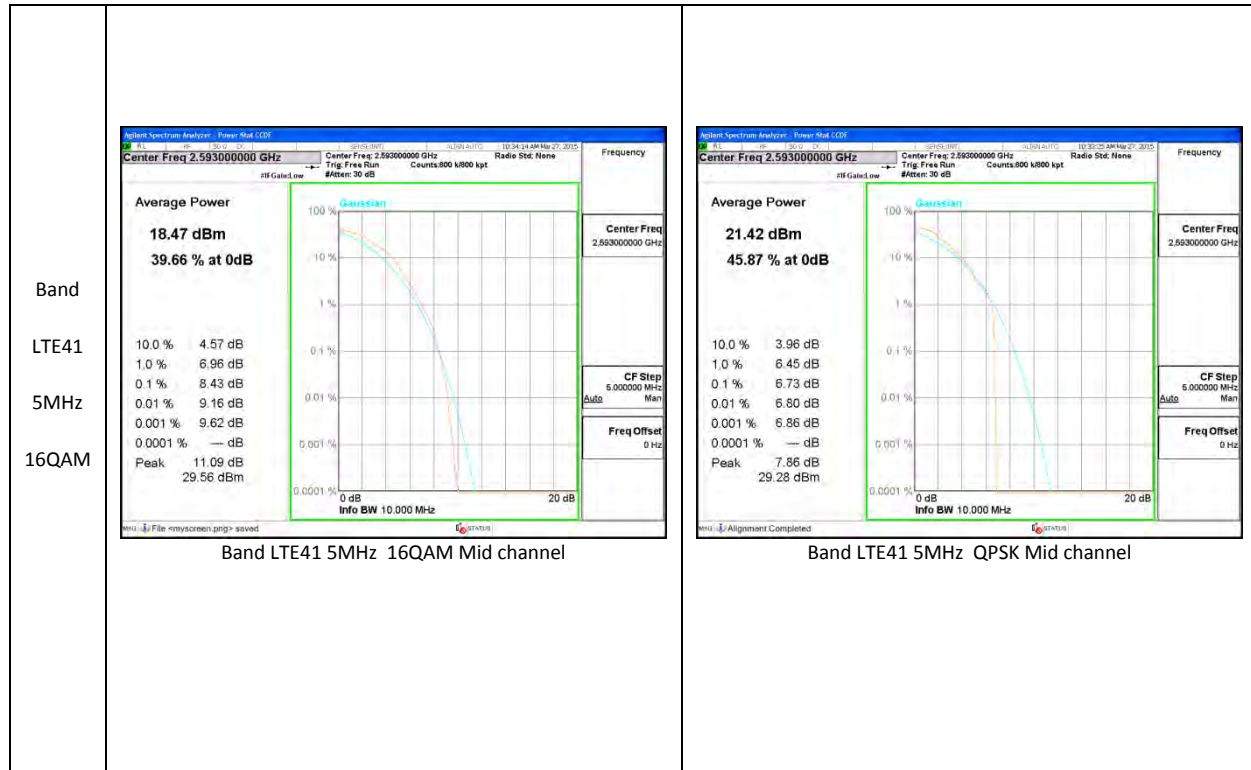
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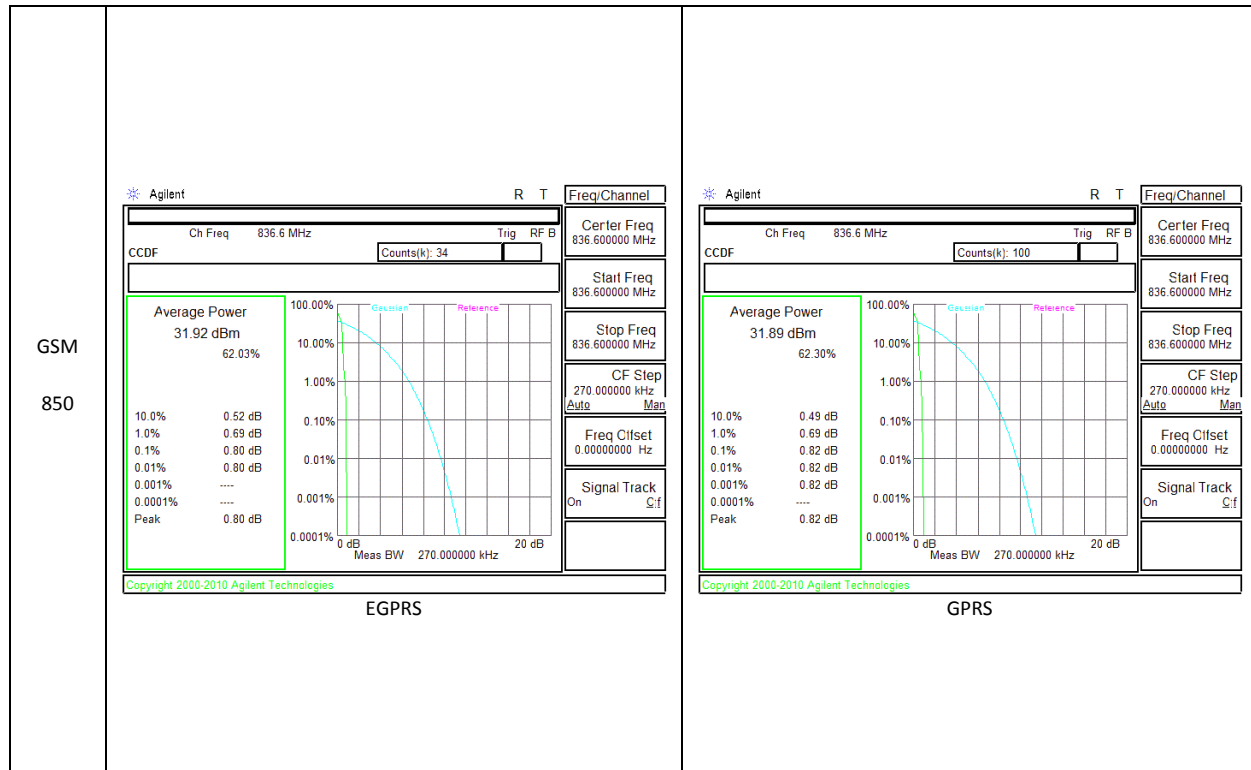


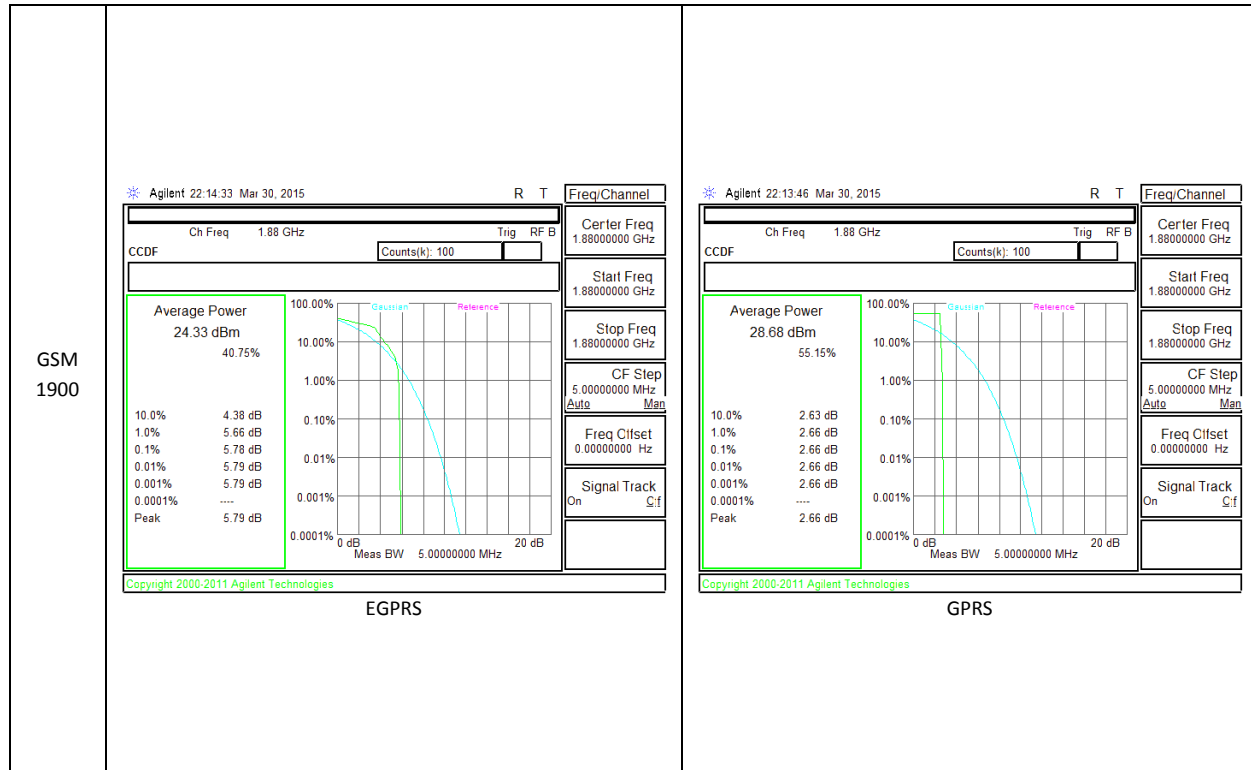
So average reading need apply 4.44dB duty cycle factor ($20\log(6/10)$).



Band LTE41 15MHz 16QAM	 Average Power 17.42 dBm 36.97 % at 0dB 10.0 % 4.71 dB 1.0 % 6.97 dB 0.1 % 8.26 dB 0.01 % 9.08 dB 0.001 % 9.45 dB 0.0001 % — dB Peak 9.74 dB 27.16 dBm CF Step 5.000000 MHz Freq Offset 0 Hz Band LTE41 15MHz 16QAM Mid channel	 Average Power 17.55 dBm 36.50 % at 0dB 10.0 % 5.00 dB 1.0 % 7.09 dB 0.1 % 7.94 dB 0.01 % 8.57 dB 0.001 % 8.96 dB 0.0001 % — dB Peak 12.60 dB 30.15 dBm CF Step 5.000000 MHz Freq Offset 0 Hz Band LTE41 15MHz QPSK Mid channel
Band LTE41 10MHz 16QAM	 Average Power 18.84 dBm 41.72 % at 0dB 10.0 % 4.33 dB 1.0 % 6.74 dB 0.1 % 8.08 dB 0.01 % 8.94 dB 0.001 % 9.50 dB 0.0001 % — dB Peak 12.45 dB 31.29 dBm CF Step 5.000000 MHz Freq Offset 0 Hz Band LTE41 10MHz 16QAM Mid channel	 Average Power 19.68 dBm 46.83 % at 0dB 10.0 % 3.79 dB 1.0 % 6.31 dB 0.1 % 7.50 dB 0.01 % 8.18 dB 0.001 % 8.83 dB 0.0001 % — dB Peak 11.43 dB 31.11 dBm CF Step 5.000000 MHz Freq Offset 0 Hz Band LTE41 10MHz QPSK Mid channel

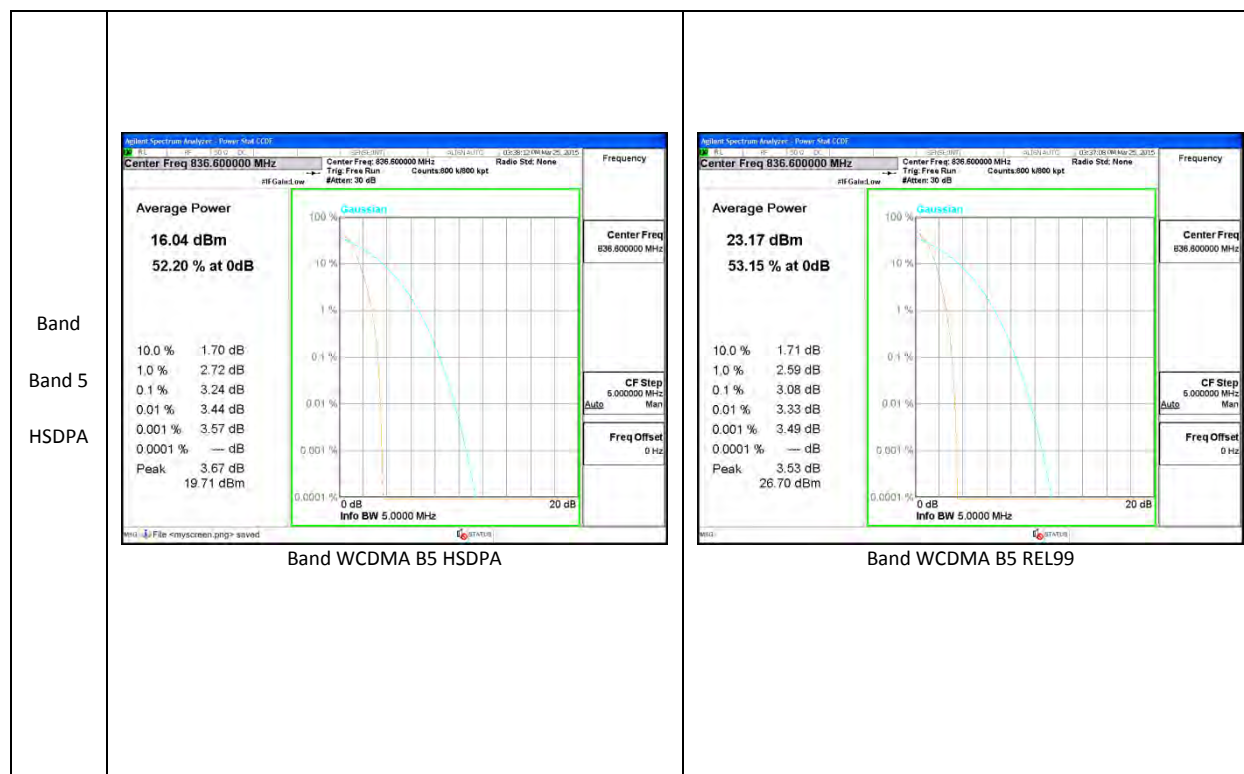


GSM



WCDMA

Band Band 2 HSDPA	 Average Power 21.78 dBm 52.45 % at 0dB 10.0 % 1.68 dB 1.0 % 2.56 dB 0.1 % 3.05 dB 0.01 % 3.28 dB 0.001 % 3.39 dB 0.0001 % — dB Peak 3.43 dB 25.21 dBm Center Freq 1.880000000 GHz Trig: Free Run Counts: 800 k/800 kpt #Aver: 30 dB CF Step 10.000000 MHz Auto Man Freq Offset 0 Hz Band WCDMA B2 HSDPA	 Average Power 22.71 dBm 53.68 % at 0dB 10.0 % 1.68 dB 1.0 % 2.48 dB 0.1 % 2.97 dB 0.01 % 3.21 dB 0.001 % 3.36 dB 0.0001 % — dB Peak 3.42 dB 26.13 dBm Center Freq 1.880000000 GHz Trig: Free Run Counts: 800 k/800 kpt #Aver: 30 dB CF Step 10.000000 MHz Auto Man Freq Offset 0 Hz Band WCDMA B2 REL99
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10. LIMITS AND CONDUCTED RESULTS

10.1. OCCUPIED BANDWIDTH

RULE PART(S)

FCC: §2.1049

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

LIMITS

For reporting purposes only

TEST PROCEDURE

The transmitter output was connected to a calibrated coaxial cable and coupler, the other end of which was connected to a spectrum analyzer. The occupied bandwidth was measured with the spectrum analyzer at the low, middle and high channel in each band. The -26dB bandwidth was also measured and recorded.

(KDB 971168 D01 Power Meas License Digital Systems v02r02)

MODES TESTED

GSM 850, GSM 1900, WCDMA Band 2, WCDMA Band 5, LTE Band 41

10.1.1. OCCUPIED BANDWIDTH RESULTS

Band	Mode	Channel	f (MHz)	99% BW (KHz)	-26dB BW (KHz)
GSM850	GMSK	128	824.2		
		190	836.6		
		251	848.8		
	GPRS	128	824.2	241.9	310.4
		190	836.6	245.6	315.2
		251	848.8	246.1	321.1
	EGPRS	128	824.2	237.8	302.2
		190	836.6	250.9	311.2
		251	848.8	244.6	326.5
GSM1900	GMSK	512	1850.2		
		661	1880		
		810	1909.8		
	GPRS	512	1850.2	243.5	317.3
		661	1880	244.4	317.2
		810	1909.8	246.9	324
	EGPRS	512	1850.2	245	318
		661	1880	241.2	310.8
		810	1909.8	239.2	308

Band	Mode	Channel	f (MHz)	99% BW (MHz)	-26dB BW (MHz)
Band 5	REL99	4132	826.4	4.157	4.642
		4183	836.6	4.14	4.651
		4233	846.6	4.138	4.632
	HSDPA	4132	826.4	4.17	4.629
		4183	836.6	4.15	4.626
		4233	846.6	4.145	4.624
	HSUPA	4132	826.4		
		4183	836.6		
		4233	846.6		
Band 2	REL99	9262	1852.4	4.171	4.665
		9400	1880	4.181	4.651
		9538	1907.6	4.181	4.664
	HSDPA	9262	1852.4	4.184	4.644
		9400	1880	4.182	4.641
		9538	1907.6	4.195	4.644
	HSUPA	9262	1852.4		
		9400	1880		
		9538	1907.6		

10.1.2. LTE OCCUPIED BANDWIDTH RESULTS

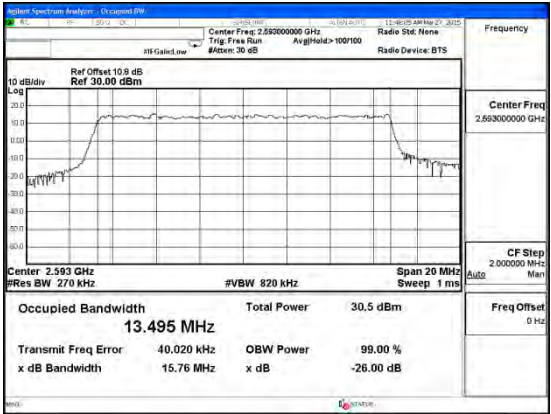
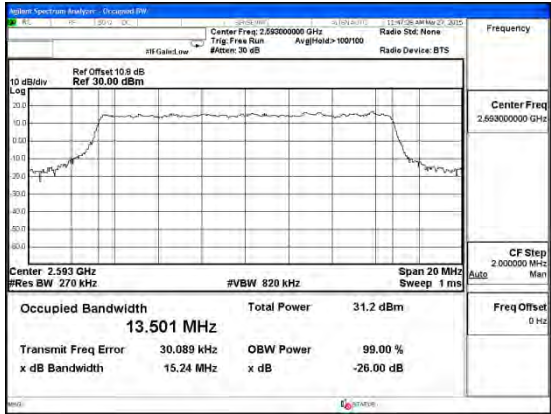
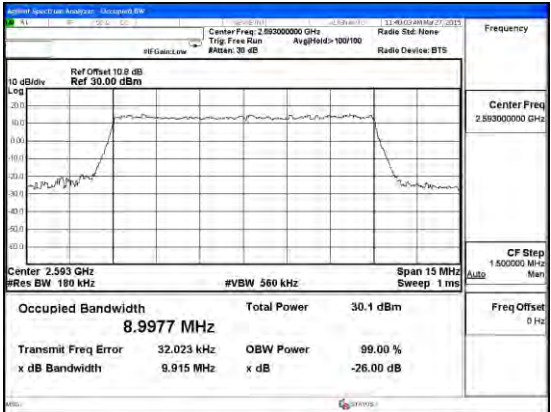
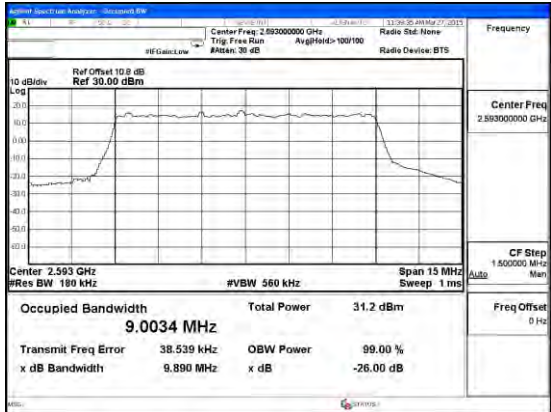
Band	BW(MHz)	Mode	RB/RB Size	f (MHz)	99% BW (MHz)	-26dB BW (MHz)
LTE41	20	QPSK	100/0	2565	17.945	19.60
			100/0	2593	17.985	20.44
			100/0	2645	17.982	19.83
		16QAM	100/0	2565	17.948	20.01
			100/0	2593	17.948	20.60
			100/0	2645	17.96	20.22

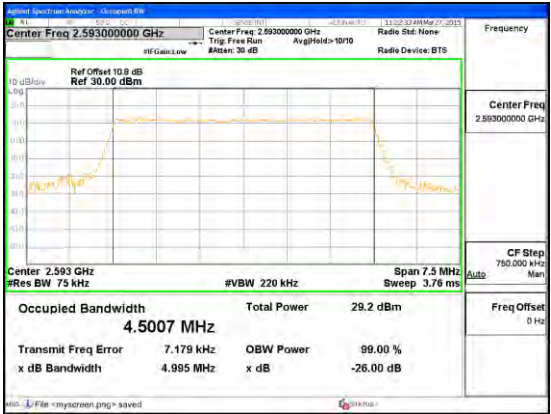
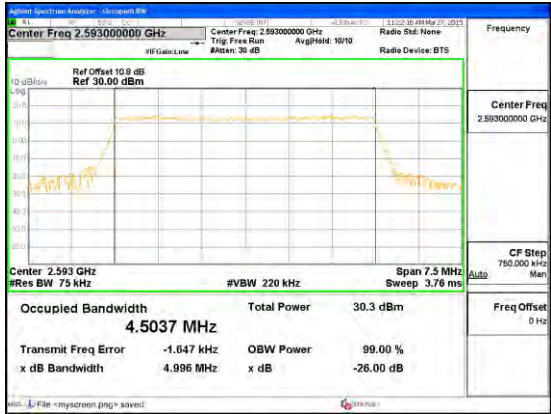
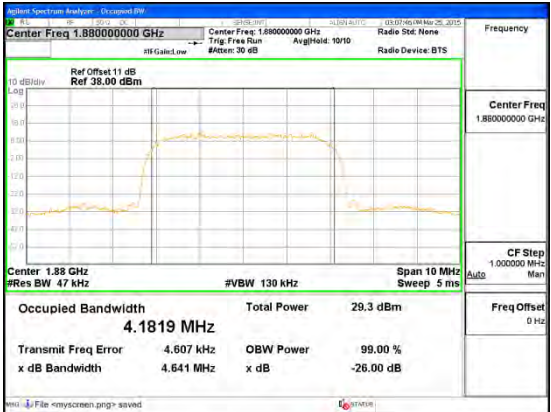
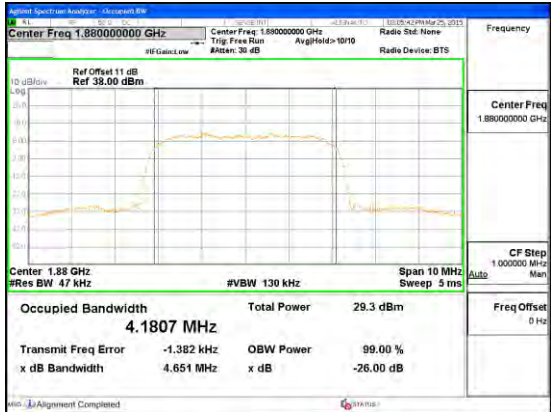
Band	BW(MHz)	Mode	RB/RB Size	f (MHz)	99% BW (MHz)	-26dB BW (MHz)
LTE41	15	QPSK	75/0	2562.5	13.474	14.82
			75/0	2593	13.501	15.24
			75/0	2647.5	13.482	14.77
		16QAM	75/0	2562.5	13.495	15.21
			75/0	2593	13.495	15.76
			75/0	2647.5	13.504	15.37

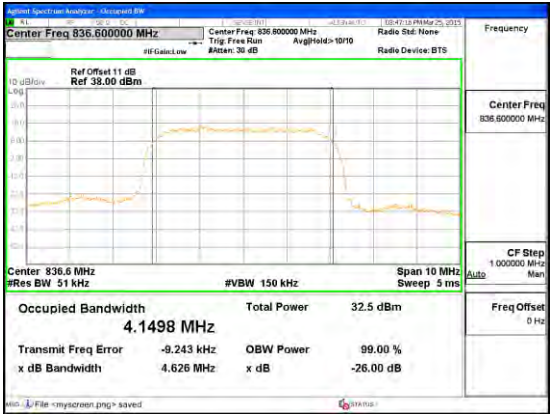
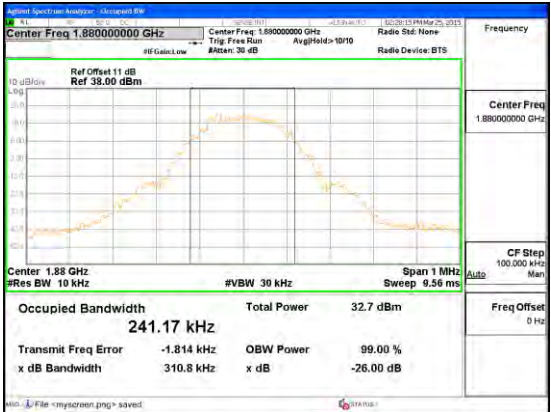
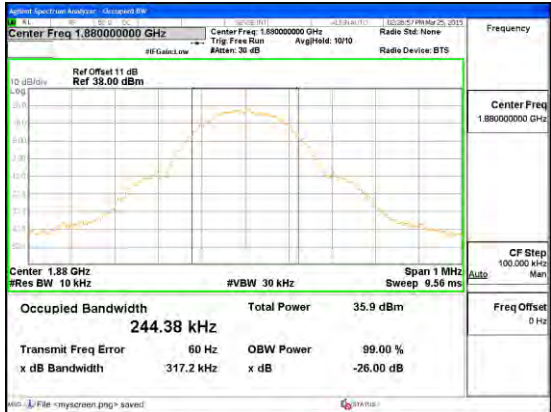
Band	BW(MHz)	Mode	RB/RB Size	f (MHz)	99% BW (MHz)	-26dB BW (MHz)
LTE41	10	QPSK	50/0	2560	8.987	10.0
			50/0	2593	9.003	9.890
			50/0	2650	8.994	9.988
		16QAM	50/0	2560	9.015	9.894
			50/0	2593	8.997	9.915
			50/0	2650	9.011	9.938

Band	BW(MHz)	Mode	RB/RB Size	f (MHz)	99% BW (MHz)	-26dB BW (MHz)
LTE41	5	QPSK	25/0	2557.5	4.496	4.953
			25/0	2593	4.503	4.996
			25/0	2652.5	4.515	5.162
		16QAM	25/0	2557.5	4.488	4.936
			25/0	2593	4.500	4.995
			25/0	2652.5	4.511	5.023

10.1.1. OCCUPIED BANDWIDTH PLOTS

Band LTE41 15MHz 16QAM	 Band LTE41 15MHz OBW 16QAM Mid Channel FRB.gif	 Band LTE41 15MHz OBW QPSK Mid Channel FRB.gif
Band LTE41 10MHz 16QAM	 Band LTE41 10MHz OBW 16QAM Mid Channel FRB.gif	 Band LTE41 10MHz OBW QPSK Mid Channel FRB.gif

Band LTE41 5MHz 16QAM	 Band LTE41 5MHz OBW 16QAM Mid Channel FRB.gif	 Band LTE41 5MHz OBW QPSK Mid Channel FRB.gif
Band Band 2 HSDPA	 Band WCDMA B2 HSDPA OBW	 Band WCDMA B2 REL99 OBW

Band Band 5 HSDPA	 Band WCDMA B5 HSDPA OBW	 Band WCDMA B5 REL99 OBW
Band GSM 1900 EGPRS	 Band GSM1900 EGPRS OBW Mid channel	 Band GSM1900 GPRS OBW Mid channel



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.

Part 27.53 m(4) For mobile digital stations, the attenuation factor shall be not less than $40 + 10 \log (P)$ dB on all frequencies between the channel edge and 5 megahertz from the channel edge, $43 + 10 \log (P)$ dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and $55 + 10 \log (P)$ dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(6) of this section. In addition, the attenuation factor shall not be less than $43 + 10 \log (P)$ dB on all frequencies between 2490.5 MHz and 2496 MHz and $55 + 10 \log (P)$ dB at or below 2490.5 MHz. Mobile Satellite Service licensees operating on frequencies below 2495 MHz may also submit a documented interference complaint against BRS licensees operating on channel BRS Channel 1 on the same terms and conditions as adjacent channel BRS or EBS licensees.

TEST PROCEDURE

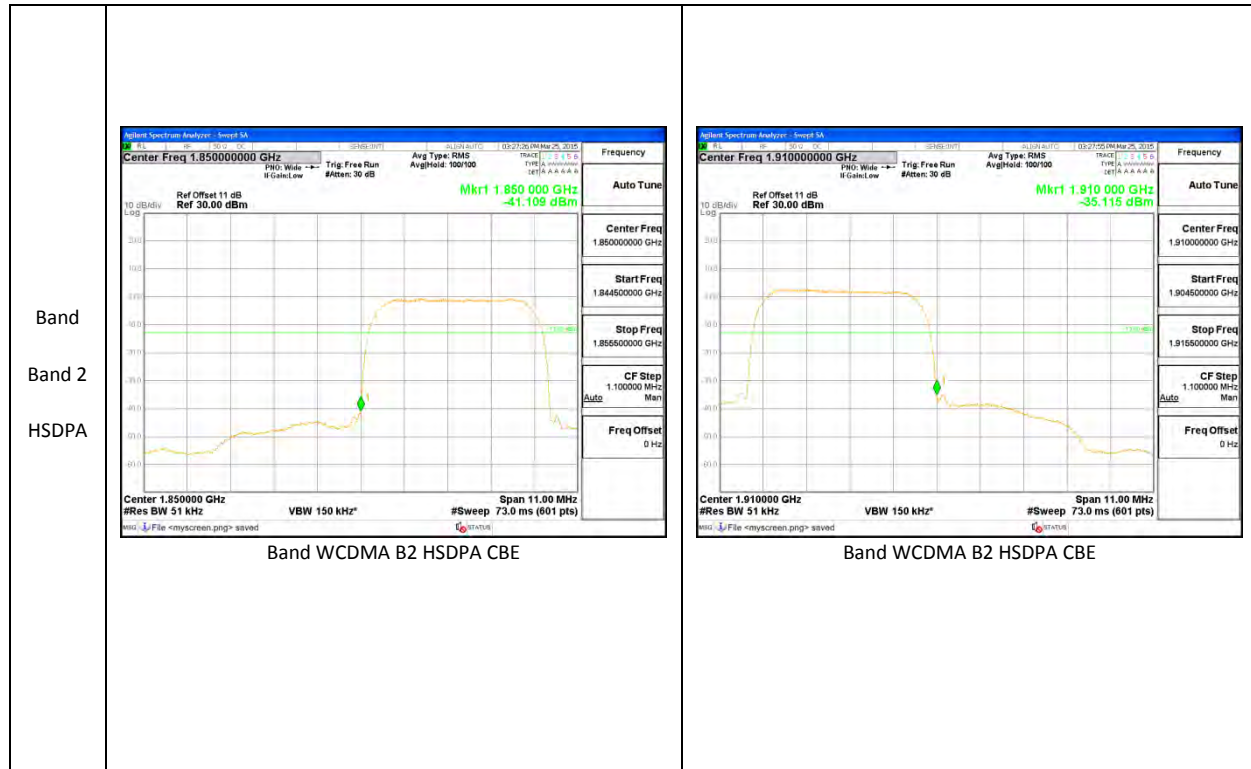
Per KDB 971168 D01 Power Meas License Digital Systems v02r02

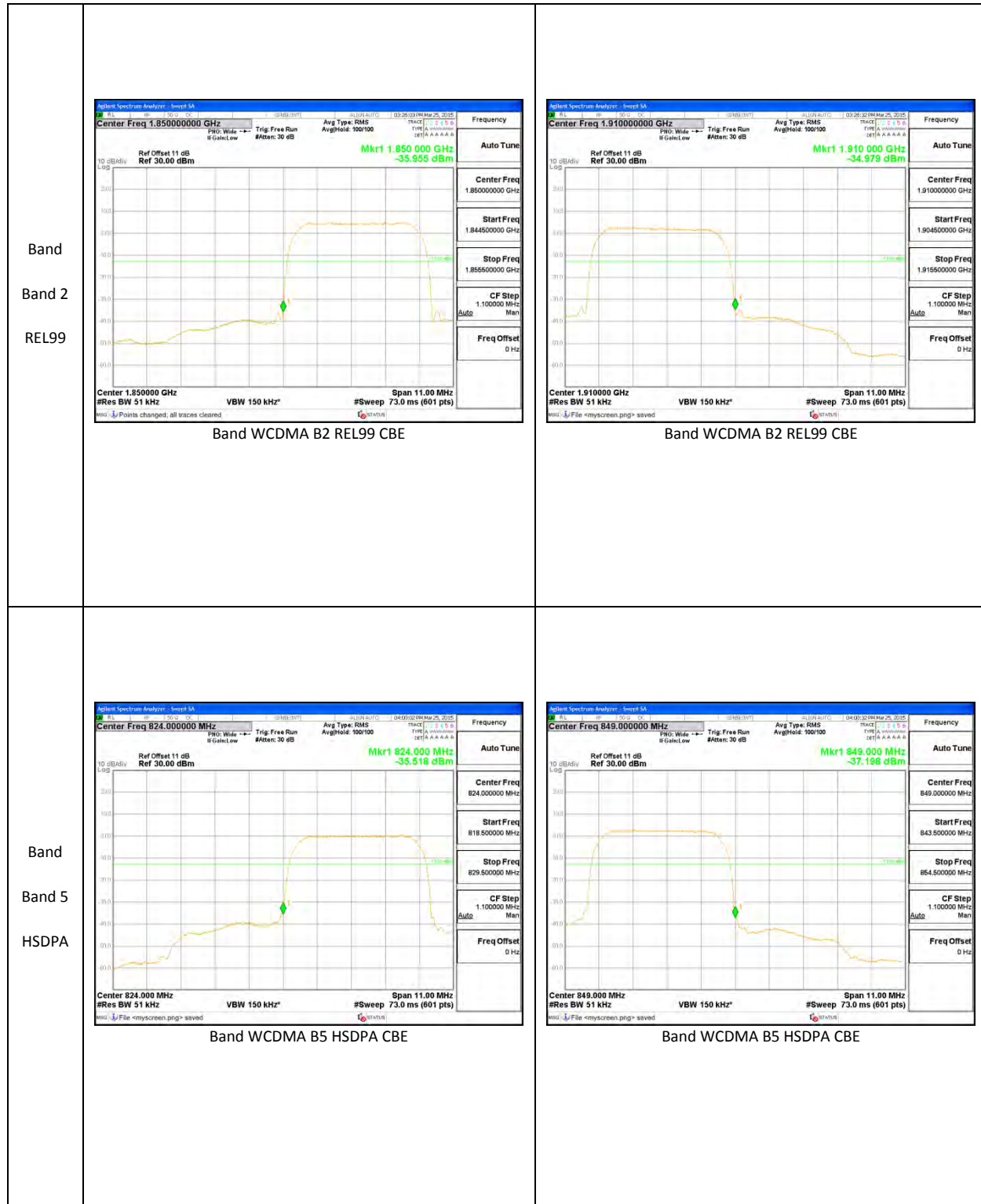
The transmitter output was connected to an Agilent 8960 or a CMW500 Test Set and configured to operate at maximum power. The band edge emissions were measured at the required operating frequencies in each band on the Spectrum Analyzer.

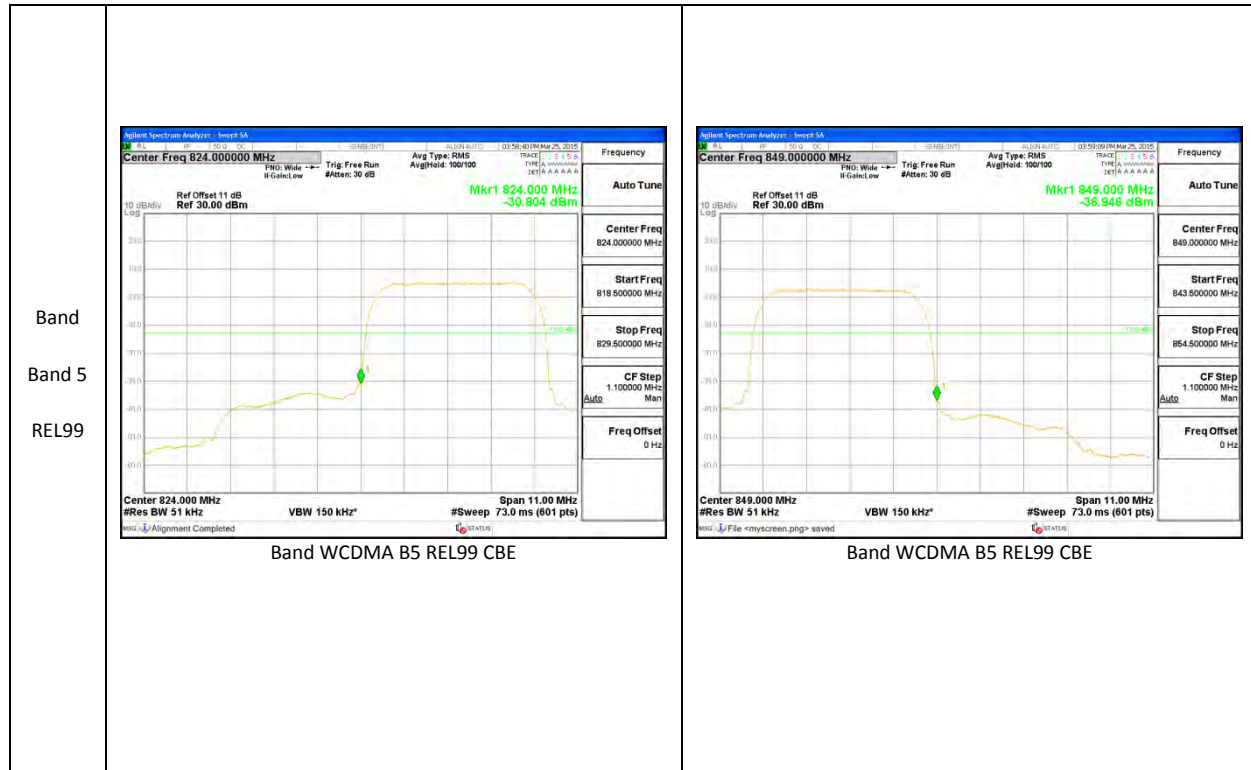
MODES TESTED

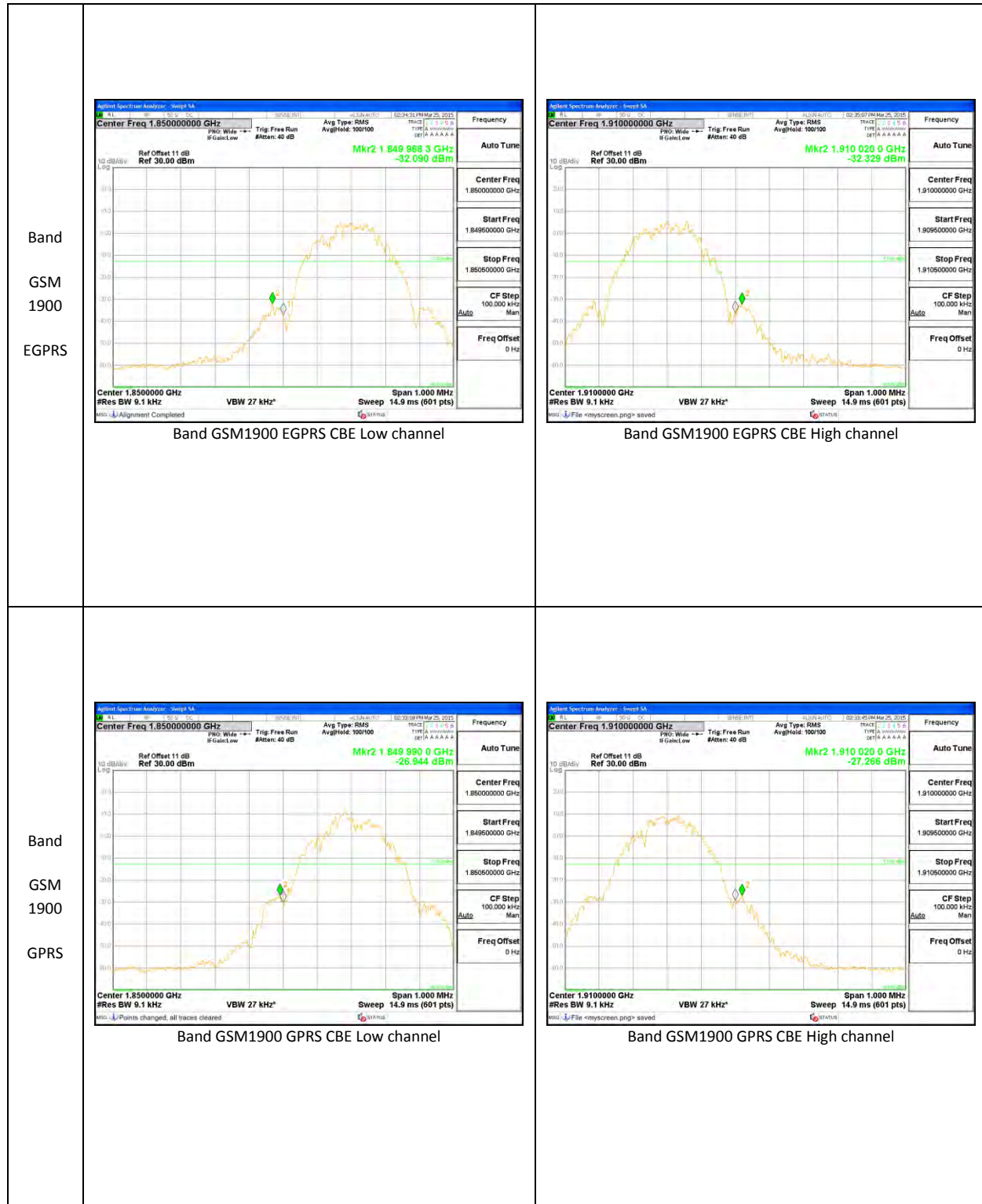
GSM 850, GSM 1900, WCDMA Band 2, WCDMA Band 5, LTE Band 41

RESULTS

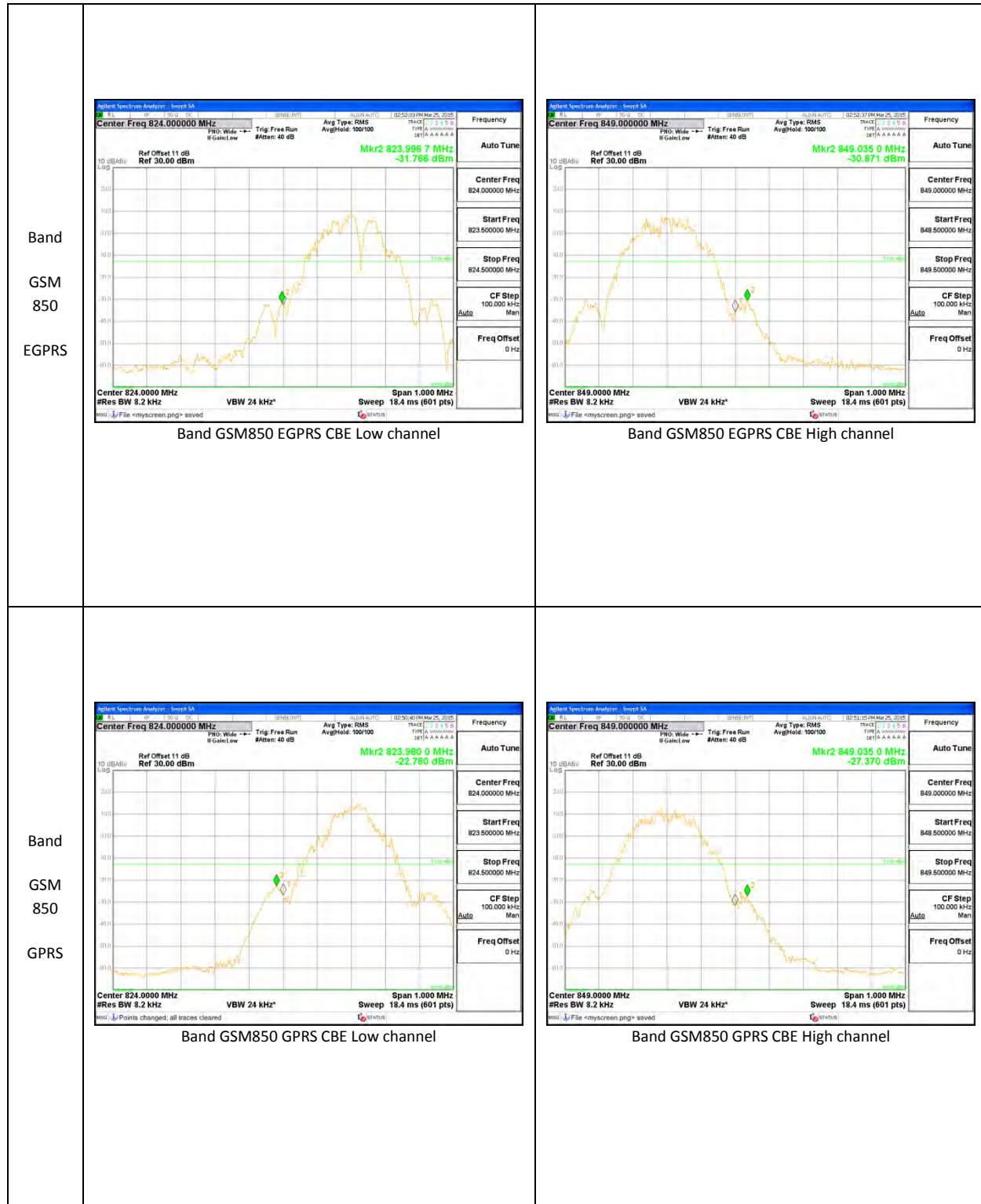
10.2.1. BAND EDGE PLOTS







Note: GSM reading need add 9dB DCCF factor due to duty cycle is 12.5% during test.

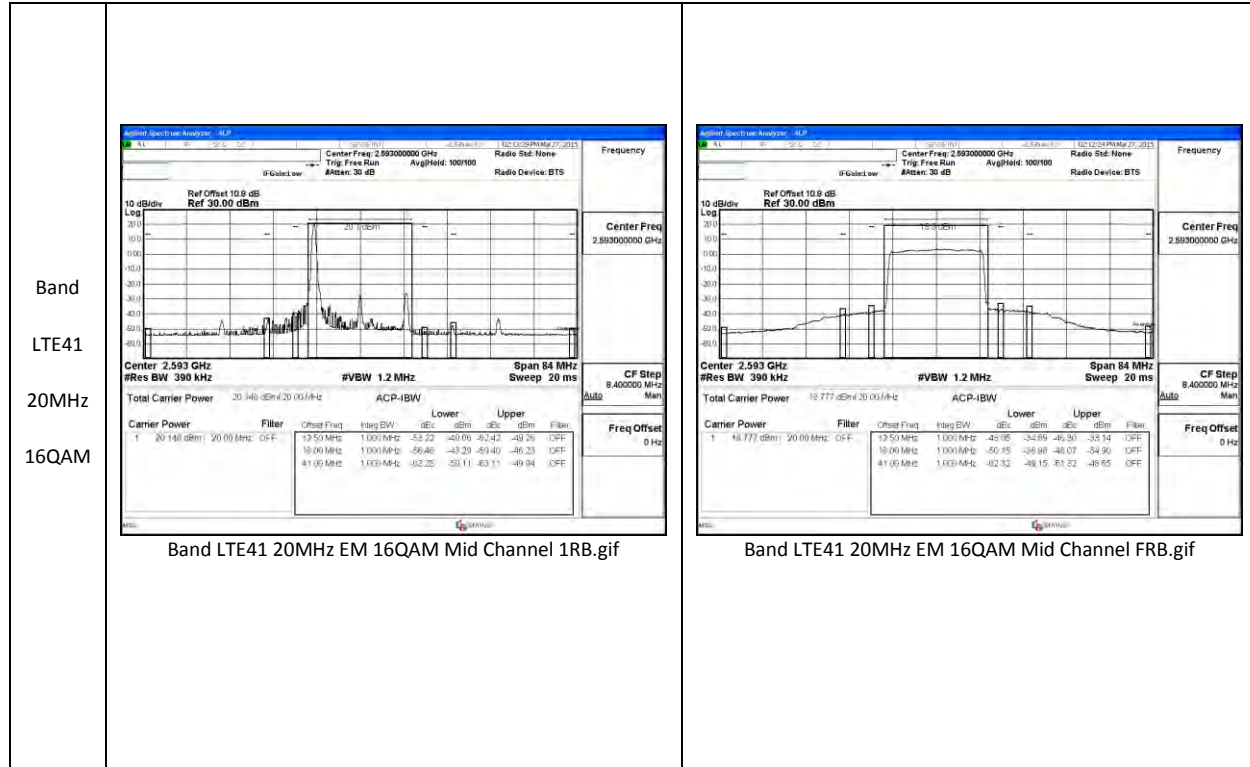


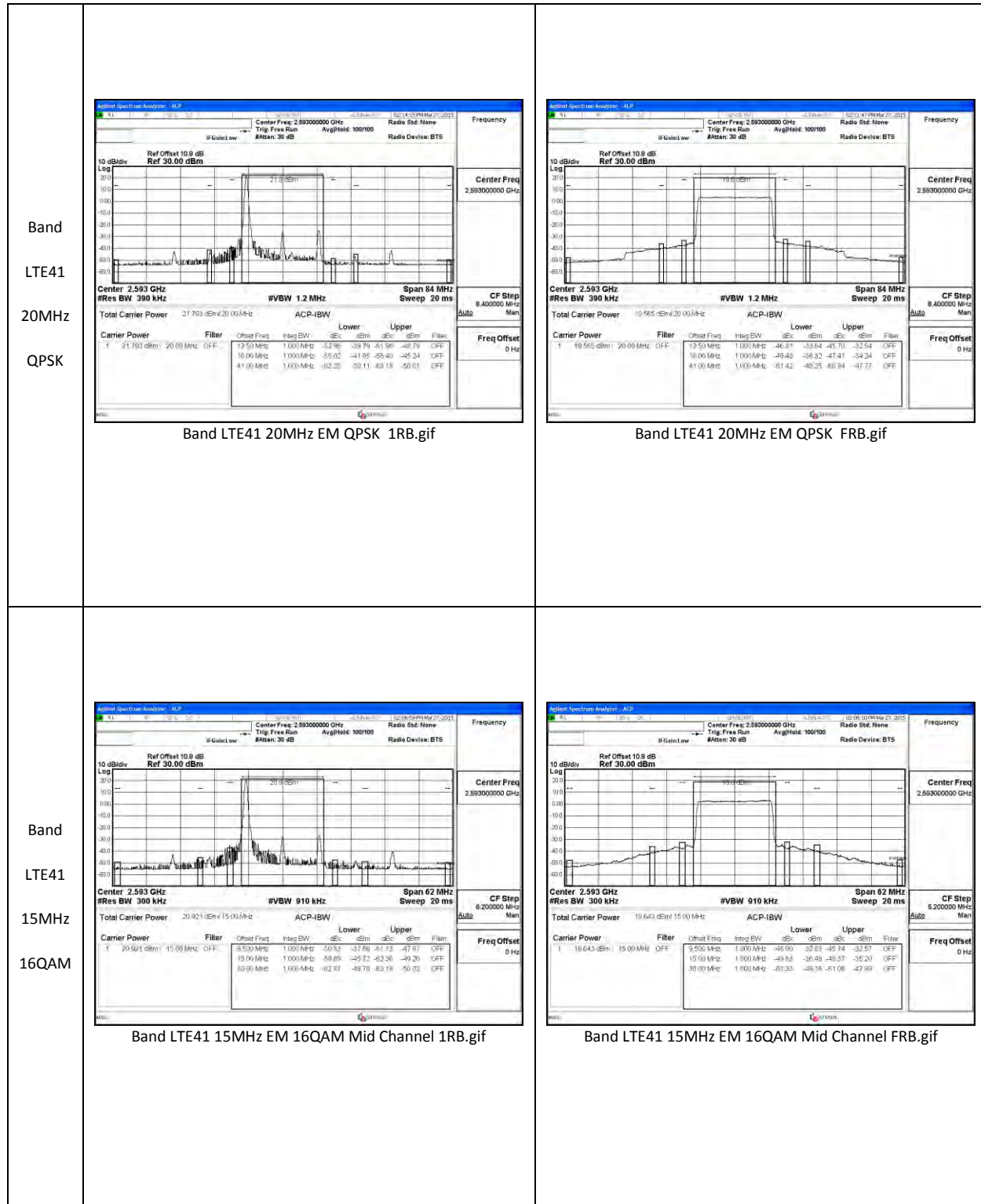
Note: GSM reading need add 9dB DCCF factor due to duty cycle is 12.5% during test.

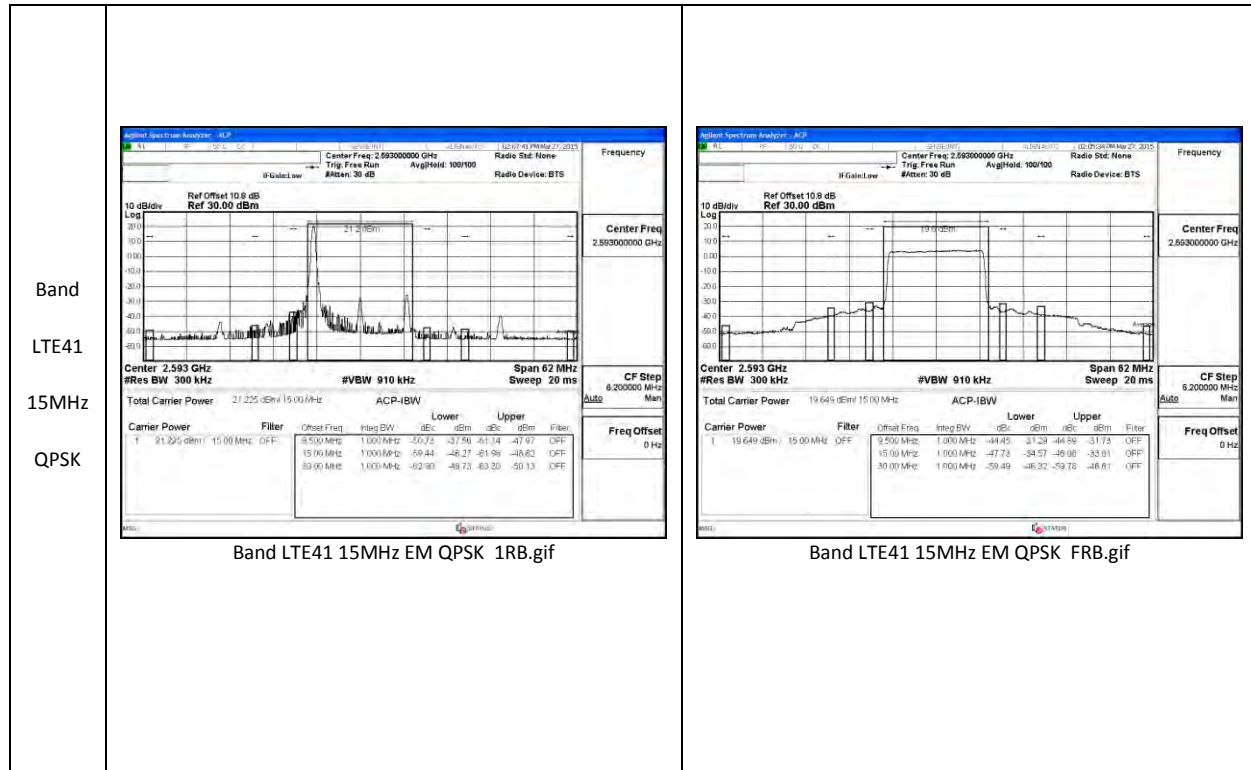
10.2.2. EMISSION MASK PLOTS

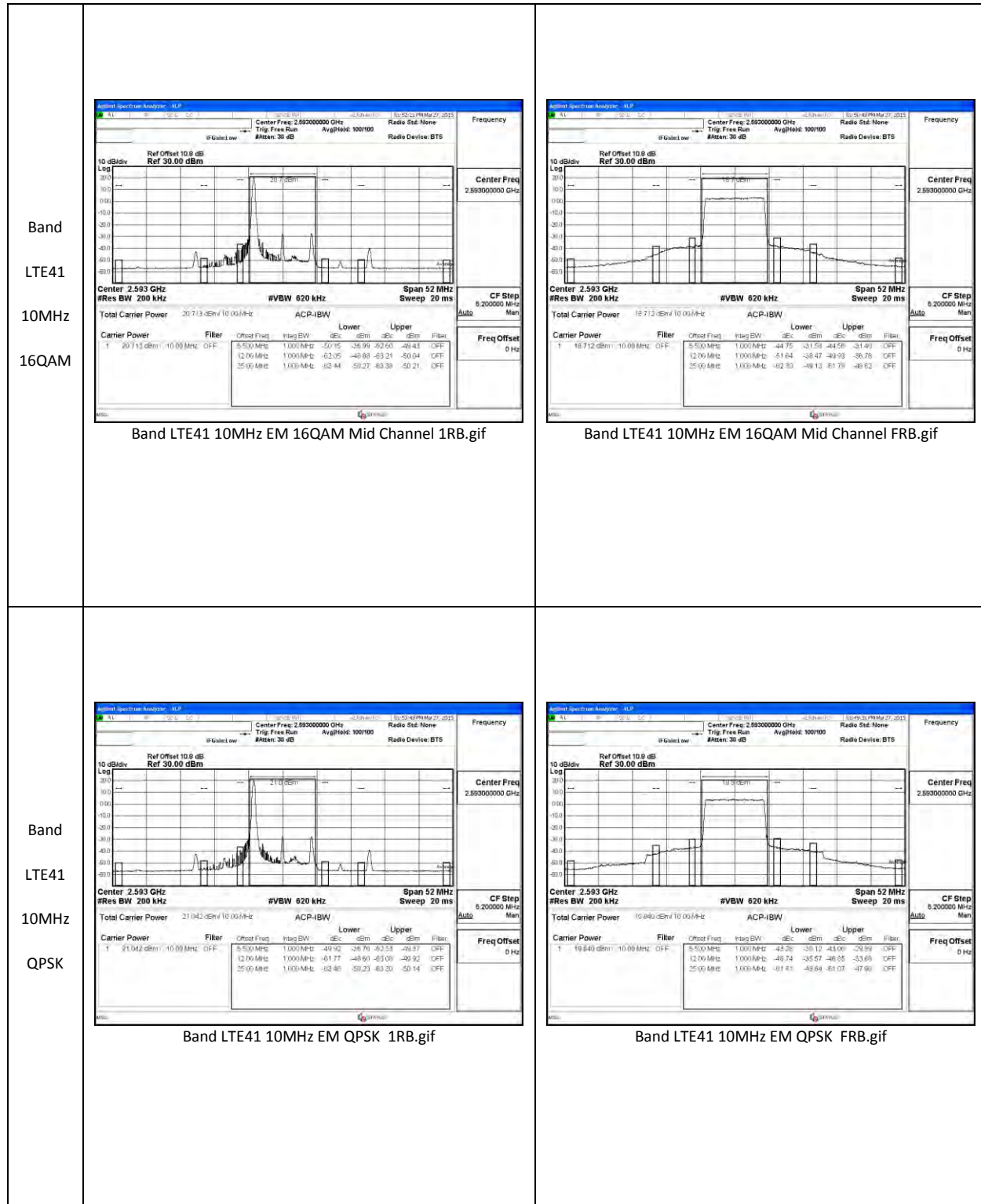
Note: Reading need apply 4.44dB duty cycle factor ($20\log(6/10)$).

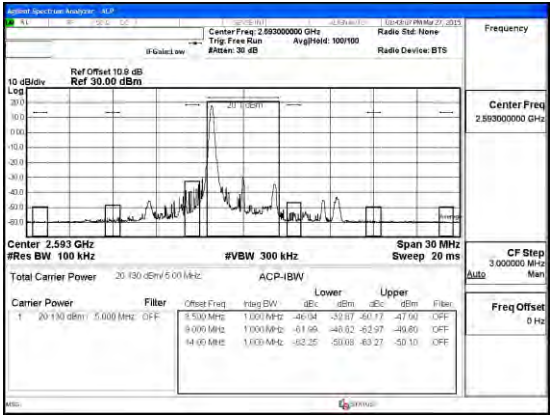
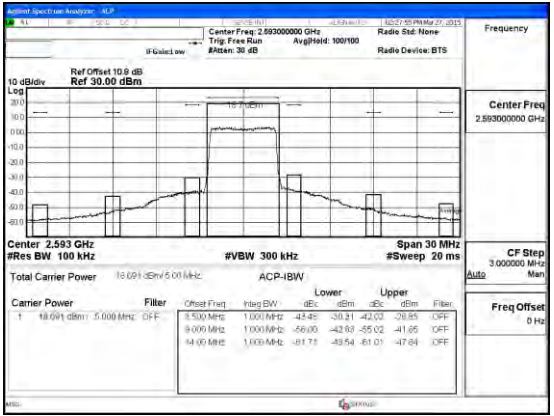
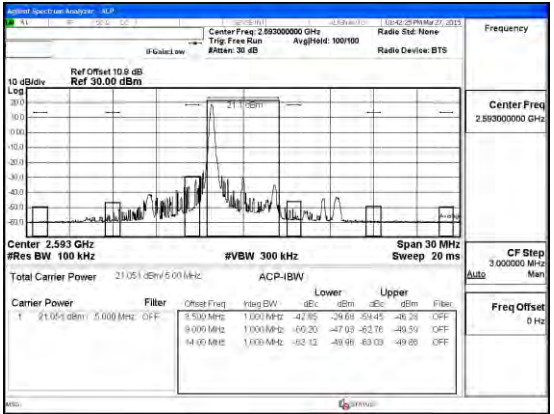
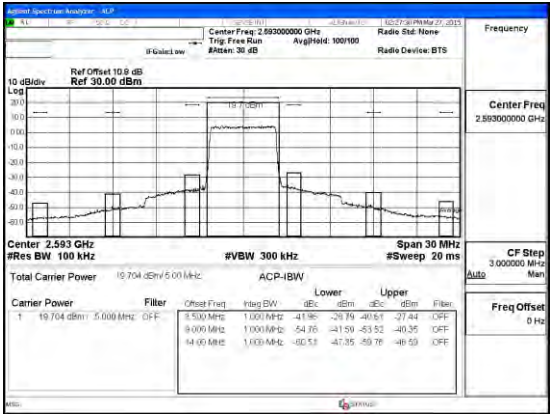
Below plots demonstrate compliance high band edge requirement.



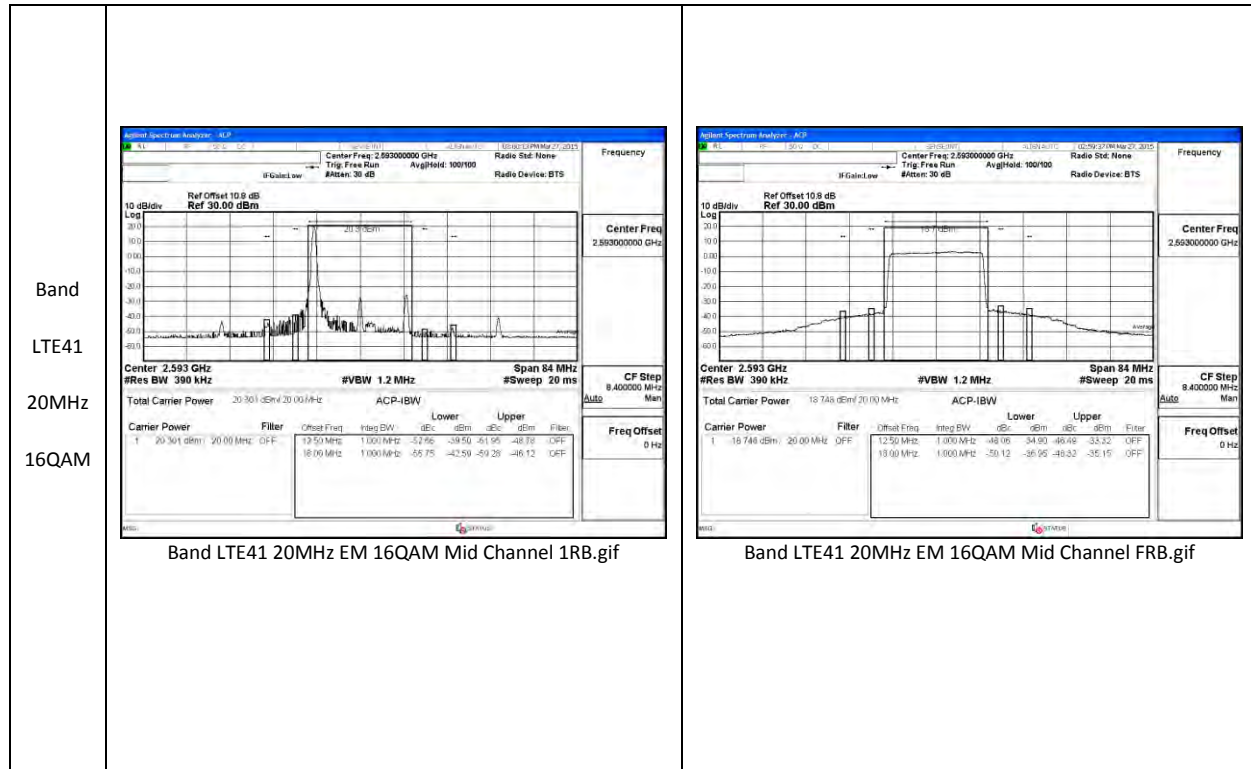


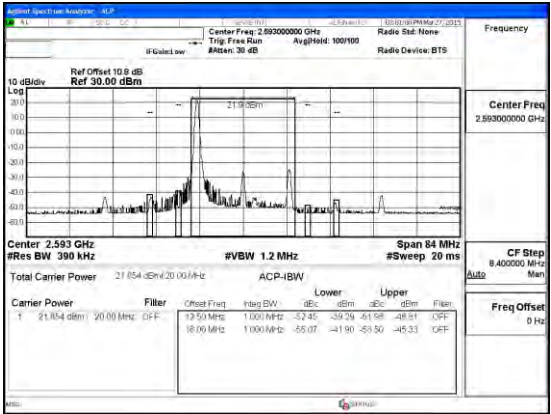
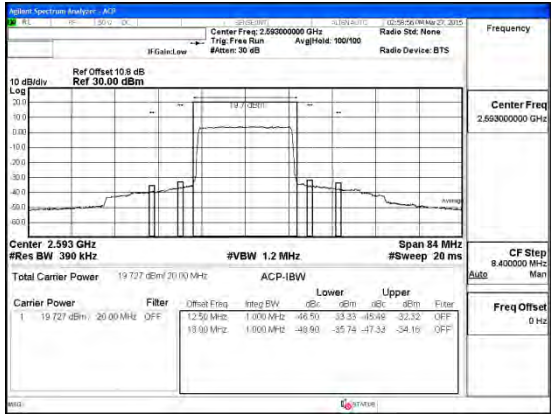
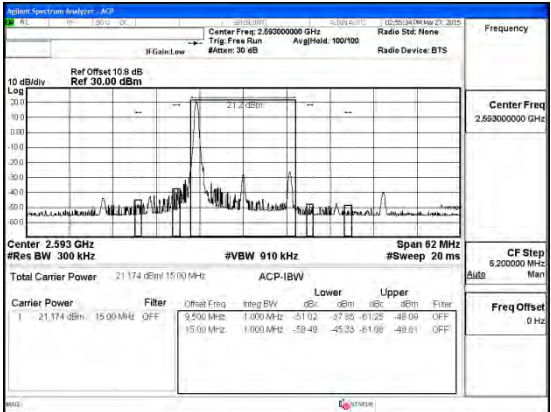
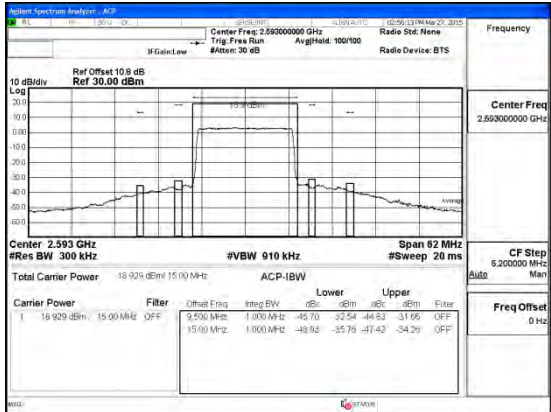


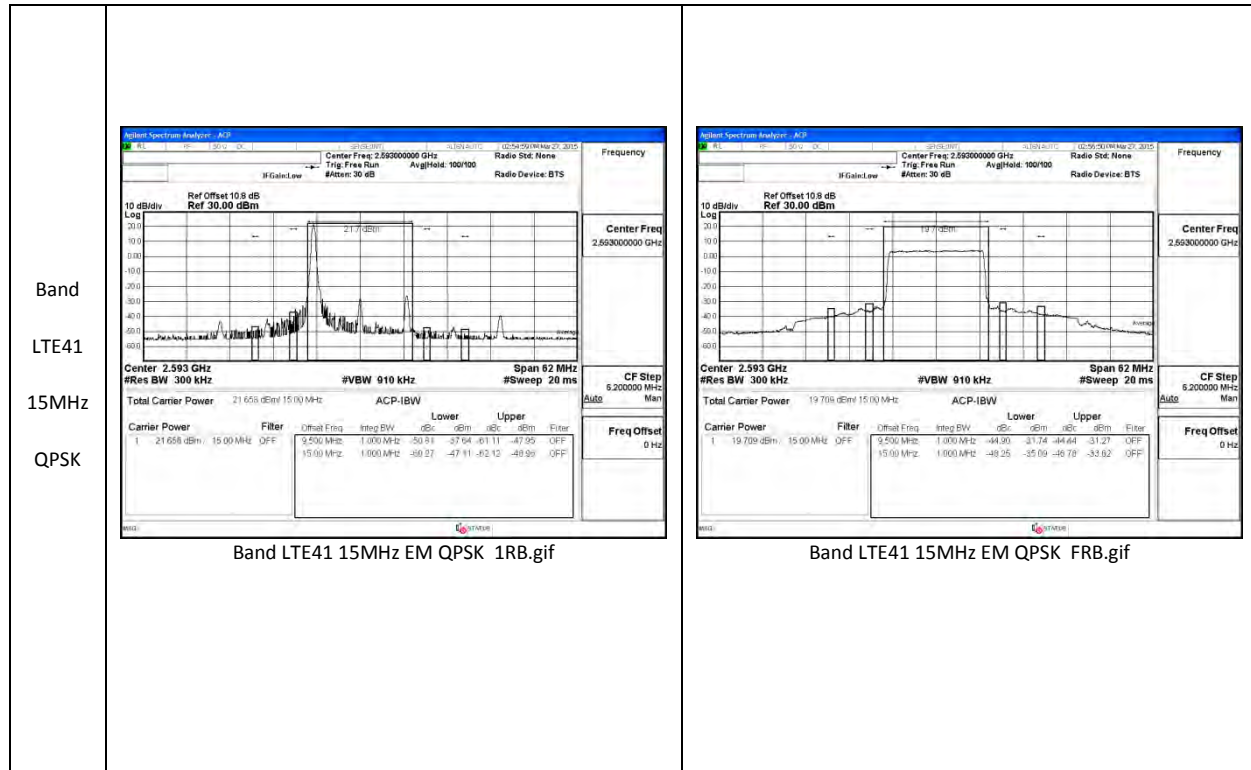


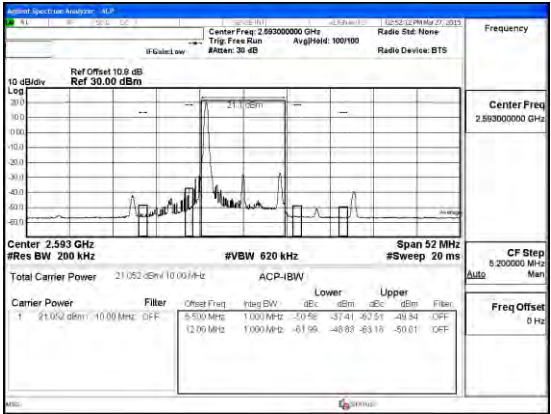
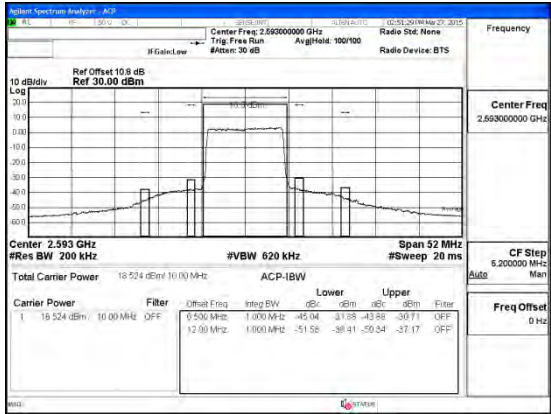
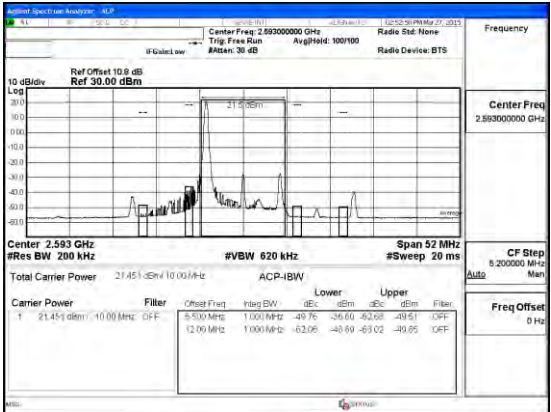
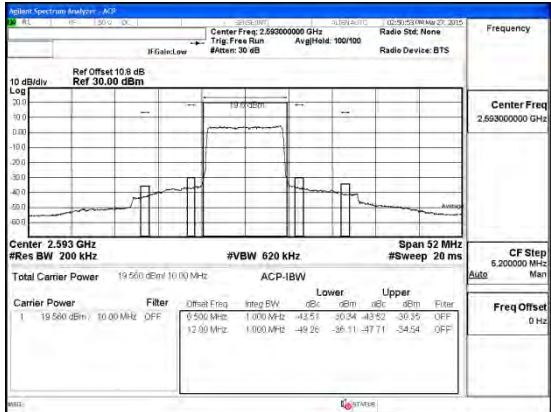
Band LTE41 5MHz 16QAM	 Band LTE41 5MHz EM 16QAM Mid Channel 1RB.gif	 Band LTE41 5MHz EM 16QAM Mid Channel FRB.gif
Band LTE41 5MHz QPSK	 Band LTE41 5MHz EM QPSK Mid Channel 1RB.gif	 Band LTE41 5MHz EM QPSK Mid Channel FRB.gif

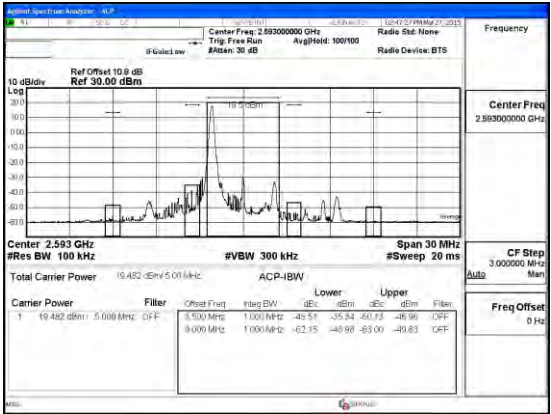
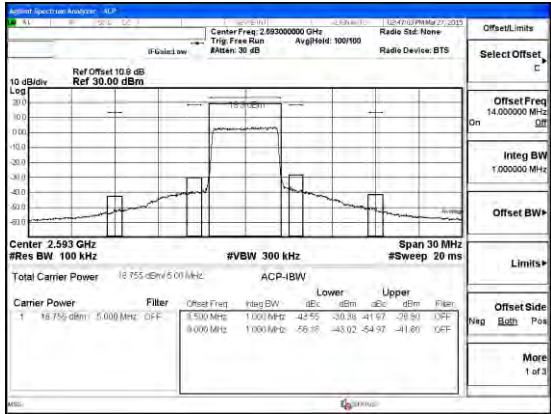
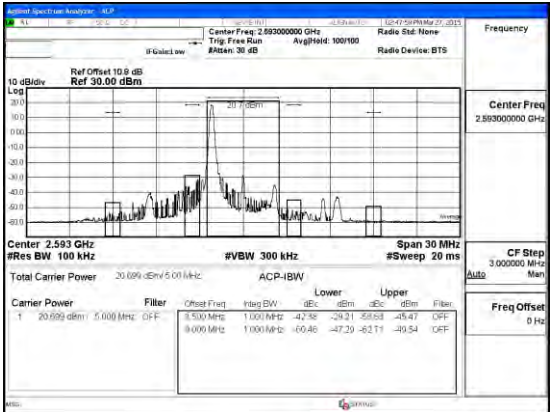
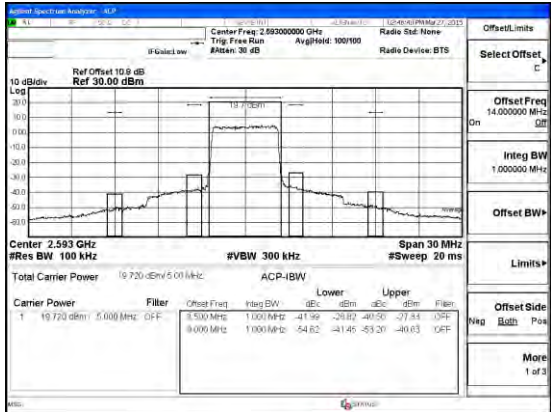
Below plots demonstrate compliance low band edge requirement.



Band LTE41 20MHz QPSK	 Band LTE41 20MHz EM QPSK 1RB.gif	 Band LTE41 20MHz EM QPSK FRB.gif
Band LTE41 15MHz 16QAM	 Band LTE41 15MHz EM 16QAM Mid Channel 1RB.gif	 Band LTE41 15MHz EM 16QAM Mid Channel FRB.gif



Band LTE41 10MHz 16QAM	 Band LTE41 10MHz EM 16QAM Mid Channel 1RB.gif	 Band LTE41 10MHz EM 16QAM Mid Channel FRB.gif
Band LTE41 10MHz QPSK	 Band LTE41 10MHz EM QPSK 1RB.gif	 Band LTE41 10MHz EM QPSK FRB.gif

Band LTE41 5MHz 16QAM	 Band LTE41 5MHz EM 16QAM Mid Channel 1RB.gif	 Band LTE41 5MHz EM 16QAM Mid Channel FRB.gif
Band LTE41 5MHz QPSK	 Band LTE41 5MHz EM QPSK Mid Channel 1RB.gif	 Band LTE41 5MHz EM QPSK Mid 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.

Part 27.53 m(4) For mobile digital stations, the attenuation factor shall be not less than $40 + 10 \log (P)$ dB on all frequencies between the channel edge and 5 megahertz from the channel edge, $43 + 10 \log (P)$ dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and $55 + 10 \log (P)$ dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(6) of this section. In addition, the attenuation factor shall not be less than $43 + 10 \log (P)$ dB on all frequencies between 2490.5 MHz and 2496 MHz and $55 + 10 \log (P)$ dB at or below 2490.5 MHz. Mobile Satellite Service licensees operating on frequencies below 2495 MHz may also submit a documented interference complaint against BRS licensees operating on channel BRS Channel 1 on the same terms and conditions as adjacent channel BRS or EBS licensees.

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.

MODES TESTED

GSM 850, GSM 1900, WCDMA Band 2, WCDMA Band 5, LTE Band 41

RESULTS

10.3.1. OUT OF BAND EMISSIONS RESULT

Band	BW (MHz)	Mode	f (MHz)	Spur (dBm)	Spec (dBm)	Delta (dB)
LTE41	20	QPSK	2565	-31.39	-25	-6.39
			2593	-31.29	-25	-6.29
			2645	-31.26	-25	-6.26
		16QAM	2565	-31.87	-25	-6.87
			2593	-31.33	-25	-6.33
			2645	-32.03	-25	-7.03

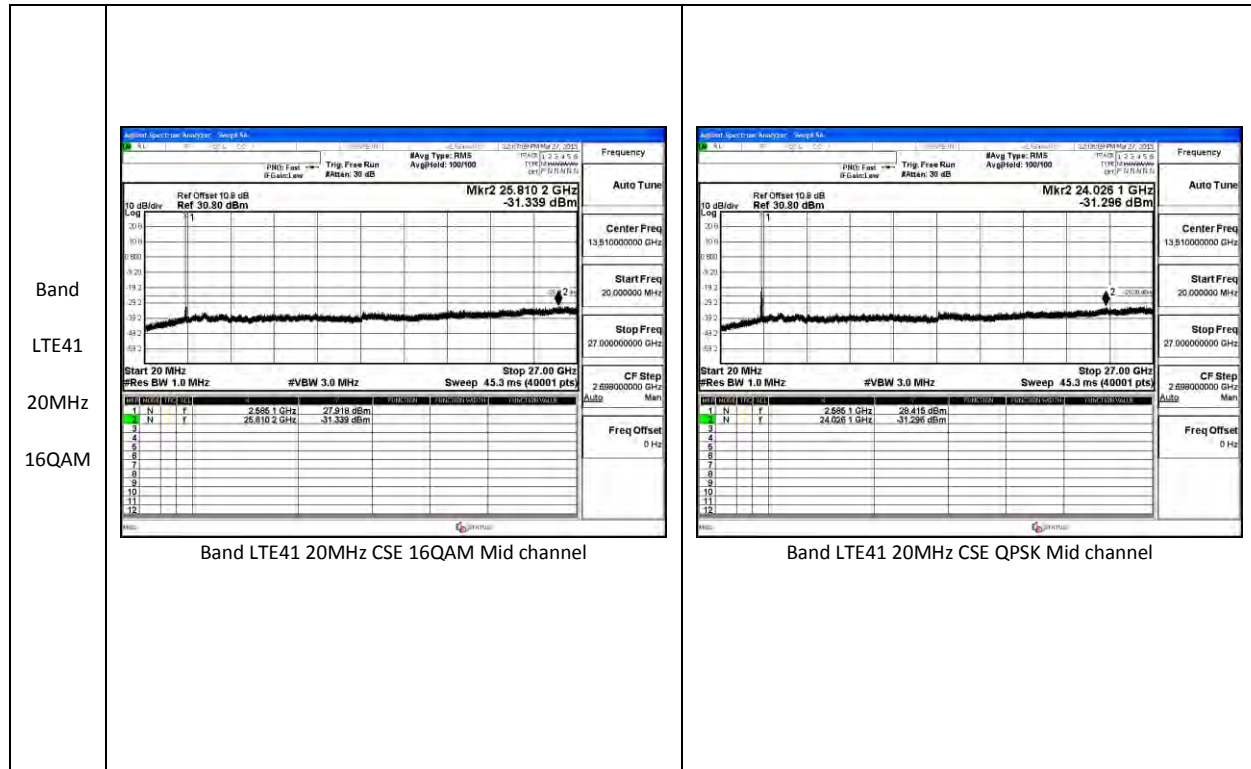
Band	BW (MHz)	Mode	f (MHz)	Spur (dBm)	Spec (dBm)	Delta (dB)
LTE41	15	QPSK	2562.5	-30.73	-25	-5.73
			2593	-31.14	-25	-6.14
			2647.5	-31.51	-25	-6.51
		16QAM	2562.5	-34.91	-25	-9.91
			2593	-34.75	-25	-9.75
			2647.5	-31.10	-25	-6.10

Band	BW (MHz)	Mode	f (MHz)	Spur (dBm)	Spec (dBm)	Delta (dB)
LTE41	10	QPSK	2560	-31.35	-25	-6.35
			2593	-30.44	-25	-5.44
			2650	-30.67	-25	-5.67
		16QAM	2560	-31.99	-25	-6.99
			2593	-31.91	-25	-6.91
			2650	-31.61	-25	-6.61

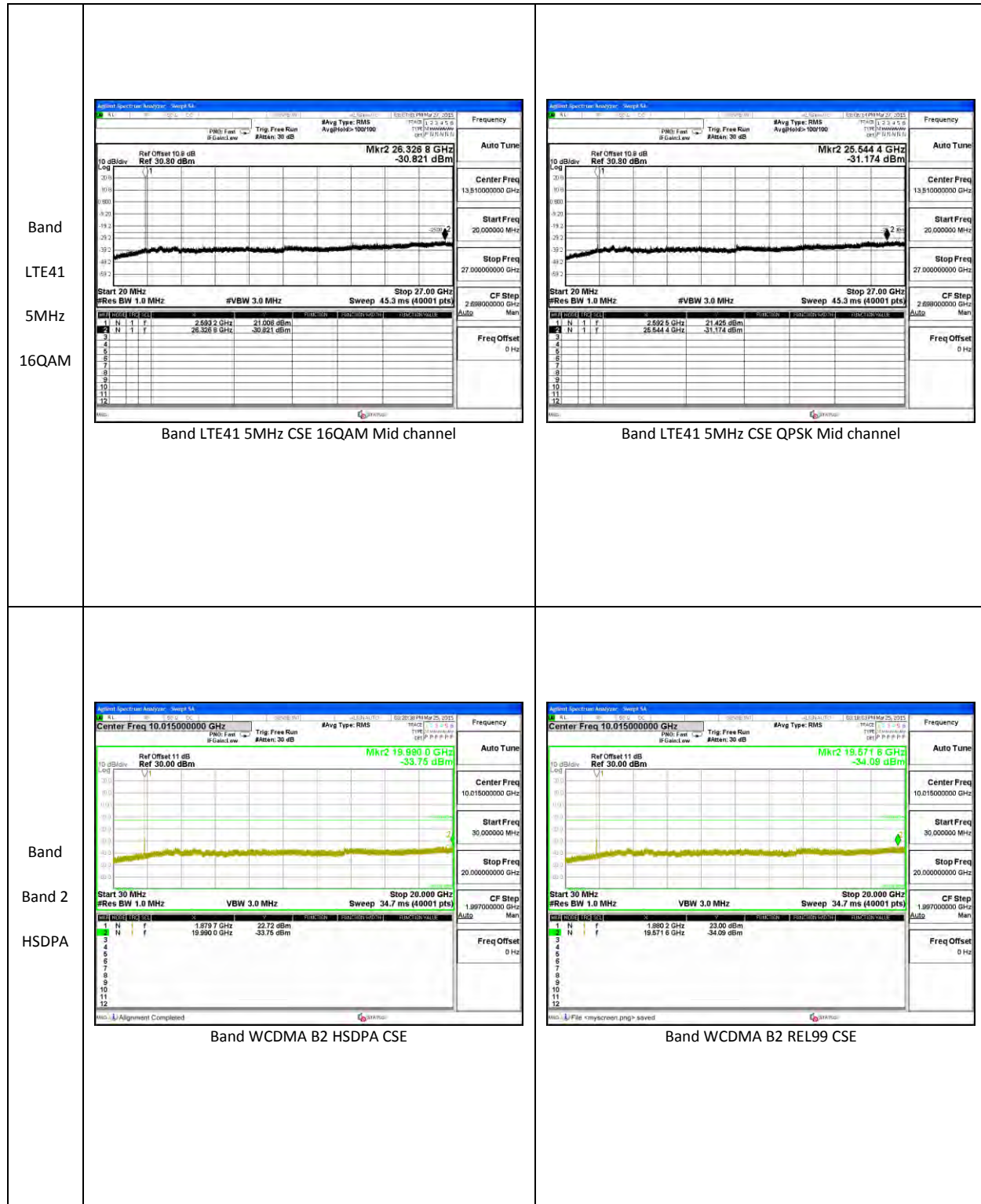
Band	BW (MHz)	Mode	f (MHz)	Spur (dBm)	Spec (dBm)	Delta (dB)
LTE41	5	QPSK	2557.5	-32.58	-25	-7.58
			2593	-31.17	-25	-6.17
			2652.5	-31.60	-25	-6.60
		16QAM	2557.5	-30.82	-25	-5.82
			2593	-30.82	-25	-5.82
			2652.5	-31.72	-25	-6.72

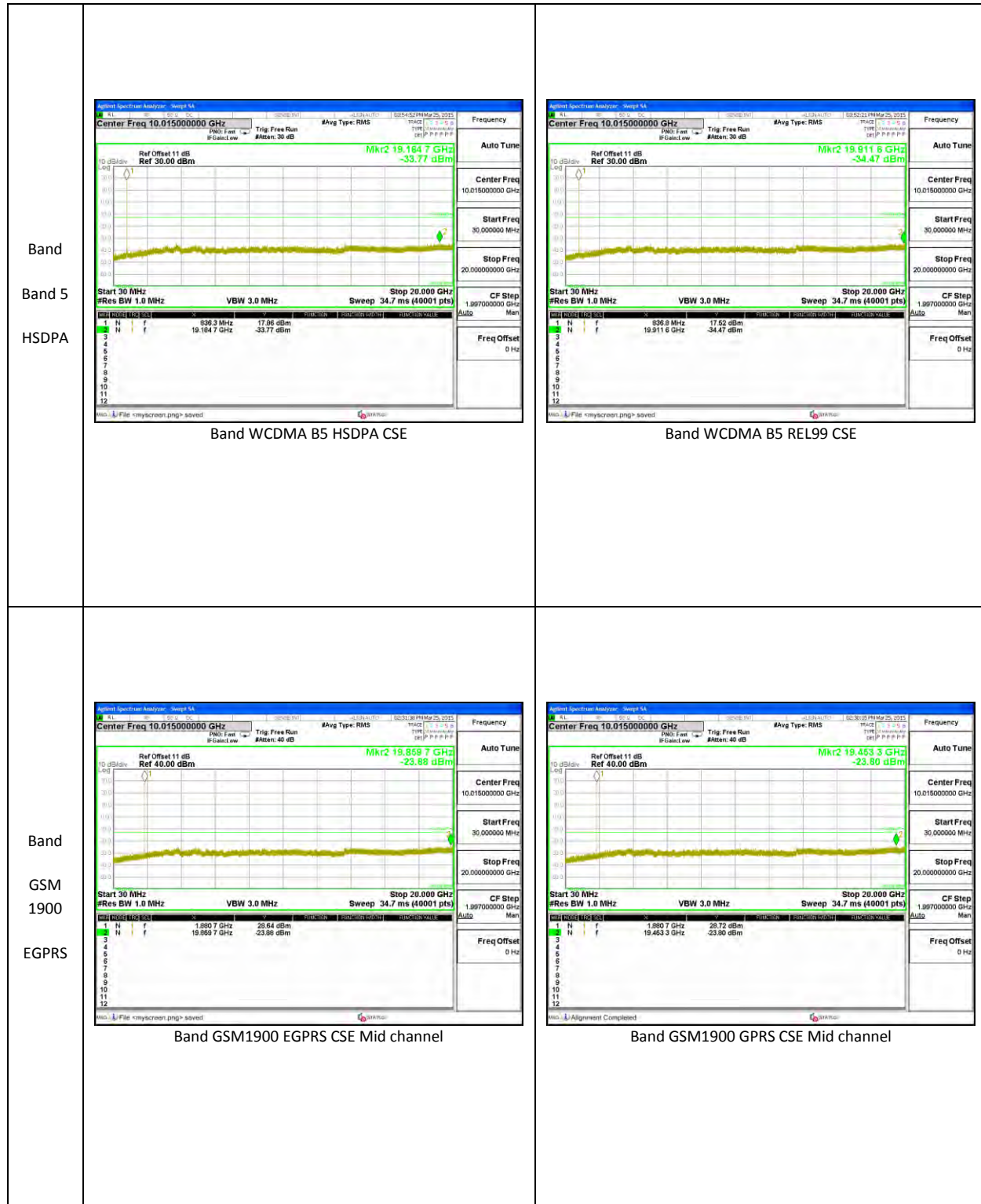
Band	Mode	f (MHz)	Spur (dBm)	Spec (dBm)	Delta (dB)
GSM850	GMSK	824.2			
		836.6			
		848.8			
	GPRS	824.2	-24.22	-13	-11.22
		836.6	-23.75	-13	-10.75
		848.8	-23.52	-13	-10.52
	EGPRS	824.2	-23.95	-13	-10.95
		836.6	-23.61	-13	-10.61
		848.8	-23.10	-13	-10.10
GSM1900	GMSK	1850.2			
		1880			
		1909.8			
	GPRS	1850.2	-24.14	-13	-11.14
		1880	-23.80	-13	-10.80
		1909.8	-23.80	-13	-10.80
	EGPRS	1850.2	-24.58	-13	-11.58
		1880	-23.88	-13	-10.88
		1909.8	-23.94	-13	-10.94

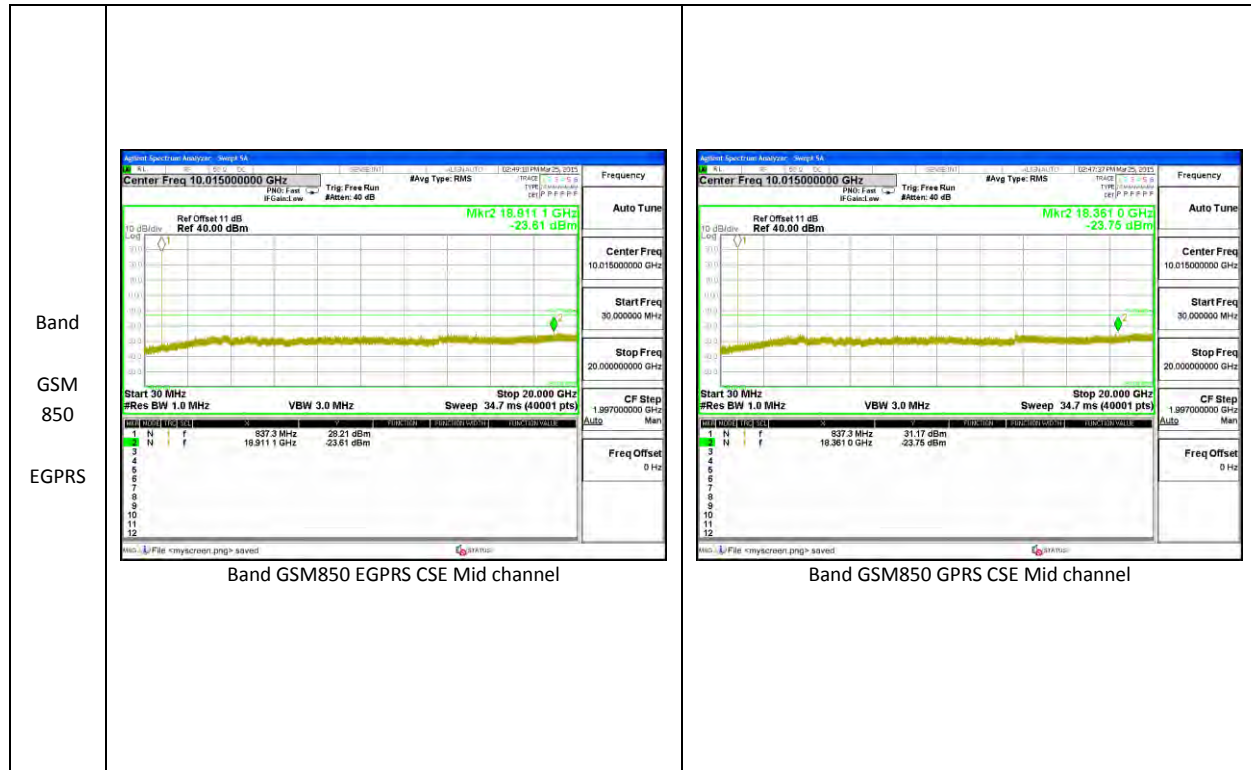
Band	Mode	f (MHz)	Spur (dBm)	Spec (dBm)	Delta (dB)
Band 5	REL99	826.4	-34.18	-13	-21.18
		836.6	-34.47	-13	-21.47
		846.6	-28.14	-13	-15.14
	HSDPA	826.4	-33.85	-13	-20.85
		836.6	-33.77	-13	-20.77
		846.6	-33.77	-13	-20.77
Band 2	REL99	1852.4	-34.09	-13	-21.09
		1880	-34.09	-13	-21.09
		1907.6	-32.45	-13	-19.45
	HSDPA	1852.4	-33.72	-13	-20.72
		1880	-33.75	-13	-20.75
		1907.6	-34.22	-13	-21.22

10.3.2. OUT OF BAND EMISSIONS PLOTS









10.4. FREQUENCY STABILITY

RULE PART(S)

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

LIMITS

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

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

§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

MODES TESTED

GSM 850, GSM 1900, LTE Band 41

RESULTS

See the following pages.

10.4.1. FREQUENCY STABILITY RESULTS**GPRS 850, Channel 190 Freq: 836.6MHz– MID CHANNEL**

Reference Frequency: PCS Mid Channel		836.6	MHz @ 20°C	
Limit: to stay +/- 2.5 ppm =		2091.500	Hz	
Power Supply (Vdc)	Environment Temperature (°C)	Frequency Deviation Measured with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
3.80	50	836.600034	-0.003	2.5
3.80	40	836.600035	-0.004	2.5
3.80	30	836.600034	-0.003	2.5
3.80	20	836.600032	0	2.5
3.80	10	836.600034	-0.003	2.5
3.80	0	836.600031	0.001	2.5
3.80	-10	836.600033	-0.002	2.5
3.80	-20	836.600031	0.000	2.5
3.80	-30	836.600033	-0.002	2.5

Reference Frequency: PCS Mid Channel			836.6	MHz @ 20°C
Limit: to stay +- 2.5 ppm =			2091.500	Hz
Power Supply (Vdc)	Environment Temperature (°C)	Frequency Deviation Measured with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
3.80	20	836.600000	0	2.5
4.37	20	836.6	0.038	2.5
3.3(End of volt)	20	836.6	0.038	2.5

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 Measured with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
3.80	50	1880.000019	0.002	2.5
3.80	40	1880.000023	0.000	2.5
3.80	30	1880.000030	-0.004	2.5
3.80	20	1880.000023	0	2.5
3.80	10	1880.000011	0.006	2.5
3.80	0	1880.000024	0.000	2.5
3.80	-10	1880.000012	0.006	2.5
3.80	-20	1880.000012	0.006	2.5
3.80	-30	1880.000020	0.002	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 Measured with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
3.80	20	1880.000000	0	2.5
4.37	20	1880	0.012	2.5
3.3(End of volt)	20	1880	0.012	2.5

LTE41 Channel 40620 Freq: 2593 MHz– MID CHANNEL done

Reference Frequency: Cellular Mid Channel 2592.999996MHz @ 20°C Limit: to stay +/- 2.5 ppm = 6482.500 Hz				
Power Supply (Vdc)	Environment Temperature (°C)	Frequency Deviation Measured with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
3.80	50	2592.999991	0.000	2.5
3.80	40	2592.999994	-0.001	2.5
3.80	30	2592.999995	-0.002	2.5
3.80	20	2592.999990	0	2.5
3.80	10	2593.000012	-0.008	2.5
3.80	0	2593.000005	-0.006	2.5
3.80	-10	2593.000009	-0.007	2.5
3.80	-20	2593.000009	-0.007	2.5
3.80	-30	2593.000006	-0.006	2.5

Reference Frequency: Cellular Mid Channel 2592.999996 MHz @ 20°C Limit: to stay +/- 2.5 ppm = 6482.500 Hz				
Power Supply (Vdc)	Environment Temperature (°C)	Frequency Deviation Measured with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
3.80	20	2593.000000	0	2.5
4.37	20	2593.000000	0.000	2.5
End Of Voltage 3.3	20	2593.000000	0.000	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(h) - (2) Mobile stations are limited to 2.0 watts EIRP. All user stations are limited to 2.0 watts transmitter output power.(LTE B41 & 7)

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 $\geq$ OBW; b) Set VBW $\geq 3 \times$ RBW; c) Set span $\geq 2 \times$ RBW; d) Sweep time = auto couple; e) Detector = peak; f) Ensure that the number of measurement points $\geq$ 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 $\geq 3 \times$ RBW; d) Set number of points in sweep $\geq 2 \times$ span / RBW; e) Sweep time = auto-couple; f) Detector = RMS (power averaging); g) Use free run trigger If burst duty cycle ≥ 98 ; h) Use trigger to capture bursts If burst duty cycle < 98 ; i) Trace average at least 100 traces in power averaging (i.e., RMS) mode. j) Compute the power by integrating the spectrum across the OBW of the signal using the instrument's band power measurement function.

MODES TESTED

GSM 850, GSM 1900, WCDMA Band 2, WCDMA Band 5, LTE Band 41

TEST RESULTS**11.1.1. ERP/EIRP Results**

Band	Mode	Channel	f(MHz)	ERP / EIRP	
				dBm	mW
Band 2	REL99	9262	1852.4	25.88	387.25
		9400	1880	25.36	343.55
		9538	1907.6	25.70	371.53
	HSDPA	9262	1852.4	25.86	385.47
		9400	1880	25.33	341.19
		9538	1907.6	25.68	369.82
	HSUPA	9262	1852.4		
		9400	1880		
		9538	1907.6		

Band	Mode	Channel	f(MHz)	ERP / EIRP	
				dBm	mW
Band 5	REL99	4132	826.4	20.92	123.59
		4183	836.6	23.26	211.83
		4233	846.6	22.16	164.43
	HSDPA	4132	826.4	20.12	102.80
		4183	836.6	22.96	197.69
		4233	846.6	21.86	153.46
	HSUPA	4132	826.4		
		4183	836.6		
		4233	846.6		

Band	Mode	Channel	f(MHz)	ERP / EIRP	
				dBm	mW
GSM1900	GMSK	512	1850.2		
		661	1880		
		810	1909.8		
	GPRS	512	1850.2	32.81	1909.85
		661	1880	32.21	1663.41
		810	1909.8	30.78	1196.74
	EGPRS	512	1850.2	29.15	822.24
		661	1880	27.79	601.17
		810	1909.8	29.07	807.23

Band	Mode	Channel	f(MHz)	ERP / EIRP	
				dBm	mW
GSM850	GMSK	128	824.2		
		190	836.6		
		251	848.8		
	GPRS	128	824.2	30.03	1006.93
		190	836.6	31.31	1352.07
		251	848.8	30.47	114.29
	EGPRS	128	824.2	26.90	489.77
		190	836.6	26.87	486.40
		251	848.8	26.61	458.14

11.1.2. LTE ERP/EIRP Results

Band	BW (MHz)	Mode	RB/RB Size	f (MHz)	ERP / EIRP	
					dBm	mW
LTE41	20	QPSK	1/0	2565	25.92	390.84
			1/0	2593	27.33	540.75
			1/0	2645	25.91	389.94
		16QAM	1/0	2565	24.95	312.60
			1/0	2593	26.37	433.51
			1/0	2645	24.93	311.17

Band	BW (MHz)	Mode	RB/RB Size	f (MHz)	ERP / EIRP	
					dBm	mW
LTE41	15	QPSK	1/0	2562.5	26.17	413.99
			1/0	2593	26.80	478.63
			1/0	2647.5	25.72	373.25
		16QAM	1/0	2562.5	25.37	344.34
			1/0	2593	26.26	422.66
			1/0	2647.5	24.81	302.69

Band	BW (MHz)	Mode	RB/RB Size	f (MHz)	ERP / EIRP	
					dBm	mW
LTE41	10	QPSK	1/0	2560	25.76	376.70
			1/0	2593	26.68	465.58
			1/0	2650	25.79	379.31
		16QAM	1/0	2560	24.73	297.16
			1/0	2593	25.73	374.11
			1/0	2650	24.74	297.85

Band	BW (MHz)	Mode	RB/RB Size	f (MHz)	ERP / EIRP	
					dBm	mW
LTE41	5	QPSK	1/0	2557.5	25.80	380.18
			1/0	2593	26.70	467.73
			1/0	2652.5	25.78	378.44
		16QAM	1/0	2557.5	24.68	293.76
			1/0	2593	25.71	468.81
			1/0	2652.5	24.77	299.91

11.1.3. ERP/EIRP DATA**LTE Band 41**

Band LTE41 20MHz 16QAM	High Frequency Substitution Measurement UL Verification Services, Inc. Chamber C								
	Company:		Samsung						
	Project #:		15I20358						
	Date:		03/25/15						
	Test Engineer:		R. Alegre						
	Configuration:		X-pos EUT						
	Mode:		LTE 41 20M 16QAM						
	Test Equipment:								
	Receiving: Horn T119, and Chamber C SMA Cables								
	Substitution: Horn T59 Substitution, 8ft SMA Cable Warehouse								
	f	SG reading	Ant. Pol.	Cable Loss	Antenna Gain	EIRP	Limit	Margin	Notes
	MHz	(dBm)	(H/V)	(dB)	(dBi)	(dBm)	(dBm)	(dB)	
	Low Ch								
	2565.00	12.72	V	0.9	9.5	21.37	33.0	-11.6	
	2565.00	16.30	H	0.9	9.5	24.95	33.0	-8.1	
	Mid Ch								
	2593.00	12.70	V	0.9	9.5	21.35	33.0	-11.7	
	2593.00	17.72	H	0.9	9.5	26.37	33.0	-6.6	
	High Ch								
	2625.00	13.22	V	0.9	9.5	21.87	33.0	-11.1	
	2625.00	16.28	H	0.9	9.5	24.93	33.0	-8.1	
Rev. 3.17.11 Note: For Band 4 EIRP limit is 30dBm									

Band

LTE41

15MHz

16QAM

High Frequency Substitution Measurement

UL Verification Services, Inc. Chamber C

Company:

Project #:

Date:

Test Engineer:

Configuration:

Mode:

Test Equipment:

Receiving: Horn T119, and Chamber C SMA Cables

Substitution: Horn T59 Substitution, 8ft SMA Cable Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
2562.50	12.49	V	0.9	9.5	21.14	33.0	-11.9	
2562.50	16.72	H	0.9	9.5	25.37	33.0	-7.6	
Mid Ch								
2593.00	12.65	V	0.9	9.5	21.30	33.0	-11.7	
2593.00	17.61	H	0.9	9.5	26.26	33.0	-6.7	
High Ch								
2627.50	13.31	V	0.9	9.5	21.96	33.0	-11.0	
2627.50	16.16	H	0.9	9.5	24.81	33.0	-8.2	

Rev. 3.17.11

Note: For Band 4 EIRP limit is 30dBm

Band LTE41 15MHz QPSK	High Frequency Substitution Measurement UL Verification Services, Inc. Chamber C																																																																																																	
	Company:		Samsung																																																																																															
	Project #:		15I20358																																																																																															
	Date:		03/25/15																																																																																															
	Test Engineer:		R. Alegre																																																																																															
	Configuration:		X-pos EUT																																																																																															
	Mode:		LTE 41 15M QPSK																																																																																															
	Test Equipment:																																																																																																	
	Receiving: Horn T119, and Chamber C SMA Cables																																																																																																	
	Substitution: Horn T59 Substitution, 8ft SMA Cable Warehouse																																																																																																	
<table border="1"> <thead> <tr> <th>f MHz</th> <th>SG reading (dBm)</th> <th>Ant. Pol. (H/V)</th> <th>Cable Loss (dB)</th> <th>Antenna Gain (dBi)</th> <th>EIRP (dBm)</th> <th>Limit (dBm)</th> <th>Margin (dB)</th> <th>Notes</th> </tr> </thead> <tbody> <tr> <td colspan="9">Low Ch</td> </tr> <tr> <td>2562.50</td> <td>13.56</td> <td>V</td> <td>0.9</td> <td>9.5</td> <td>22.21</td> <td>33.0</td> <td>-10.8</td> <td></td> </tr> <tr> <td>2562.50</td> <td>17.52</td> <td>H</td> <td>0.9</td> <td>9.5</td> <td>26.17</td> <td>33.0</td> <td>-6.8</td> <td></td> </tr> <tr> <td colspan="9">Mid Ch</td> </tr> <tr> <td>2593.00</td> <td>13.64</td> <td>V</td> <td>0.9</td> <td>9.5</td> <td>22.29</td> <td>33.0</td> <td>-10.7</td> <td></td> </tr> <tr> <td>2593.00</td> <td>18.15</td> <td>H</td> <td>0.9</td> <td>9.5</td> <td>26.80</td> <td>33.0</td> <td>-6.2</td> <td></td> </tr> <tr> <td colspan="9">High Ch</td> </tr> <tr> <td>2627.50</td> <td>14.16</td> <td>V</td> <td>0.9</td> <td>9.5</td> <td>22.81</td> <td>33.0</td> <td>-10.2</td> <td></td> </tr> <tr> <td>2627.50</td> <td>17.07</td> <td>H</td> <td>0.9</td> <td>9.5</td> <td>25.72</td> <td>33.0</td> <td>-7.3</td> <td></td> </tr> </tbody> </table>									f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes	Low Ch									2562.50	13.56	V	0.9	9.5	22.21	33.0	-10.8		2562.50	17.52	H	0.9	9.5	26.17	33.0	-6.8		Mid Ch									2593.00	13.64	V	0.9	9.5	22.29	33.0	-10.7		2593.00	18.15	H	0.9	9.5	26.80	33.0	-6.2		High Ch									2627.50	14.16	V	0.9	9.5	22.81	33.0	-10.2		2627.50	17.07	H	0.9	9.5	25.72	33.0	-7.3	
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes																																																																																										
Low Ch																																																																																																		
2562.50	13.56	V	0.9	9.5	22.21	33.0	-10.8																																																																																											
2562.50	17.52	H	0.9	9.5	26.17	33.0	-6.8																																																																																											
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2593.00	13.64	V	0.9	9.5	22.29	33.0	-10.7																																																																																											
2593.00	18.15	H	0.9	9.5	26.80	33.0	-6.2																																																																																											
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2627.50	14.16	V	0.9	9.5	22.81	33.0	-10.2																																																																																											
2627.50	17.07	H	0.9	9.5	25.72	33.0	-7.3																																																																																											
Rev. 3.17.11																																																																																																		
Note: For Band 4 EIRP limit is 30dBm																																																																																																		

Band

LTE41

10MHz

16QAM

High Frequency Substitution Measurement

UL Verification Services, Inc. Chamber C

Company:

Samsung

Project #:

15I20358

Date:

03/25/15

Test Engineer:

R. Alegre

Configuration:

X-pos EUT

Mode:

LTE 41 10M 16QAM

Test Equipment:

Receiving: Horn T119, and Chamber C SMA Cables

Substitution: Horn T59 Substitution, 8ft SMA Cable Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
2560.00	12.57	V	0.9	9.5	21.17	33.0	-11.8	
2560.00	16.13	H	0.9	9.5	24.73	33.0	-8.3	
Mid Ch								
2593.00	12.74	V	0.9	9.5	21.34	33.0	-11.7	
2593.00	17.13	H	0.9	9.5	25.73	33.0	-7.3	
High Ch								
2630.00	13.31	V	0.9	9.5	21.91	33.0	-11.1	
2630.00	16.14	H	0.9	9.5	24.74	33.0	-8.3	

Rev. 3.17.11

Note: For Band 4 EIRP limit is 30dBm

Band LTE41 5MHz 16QAM	High Frequency Substitution Measurement UL Verification Services, Inc. Chamber C								
	Company:		Samsung						
	Project #:		15I20358						
	Date:		03/25/15						
	Test Engineer:		R. Alegre						
	Configuration:		X-pos EUT						
	Mode:		LTE 41 5M 16QAM						
	Test Equipment:								
	Receiving: Horn T119, and Chamber C SMA Cables								
	Substitution: Horn T59 Substitution, 8ft SMA Cable Warehouse								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch									
2557.50	12.57	V	0.9	9.5	21.17	33.0	-11.8		
2557.50	16.08	H	0.9	9.5	24.68	33.0	-8.3		
Mid Ch									
2593.00	12.78	V	0.9	9.5	21.38	33.0	-11.6		
2593.00	17.11	H	0.9	9.5	25.71	33.0	-7.3		
High Ch									
2632.50	13.25	V	0.9	9.5	21.85	33.0	-11.2		
2632.50	16.17	H	0.9	9.5	24.77	33.0	-8.2		
Rev. 3.17.11 Note: For Band 4 EIRP limit is 30dBm									

High Frequency Substitution Measurement UL Verification Services, Inc. Chamber C								
Company:	Samsung							
Project #:	15I20358							
Date:	3/23/2015							
Test Engineer:	R. Alegre							
Configuration:	EUT Only							
Location:	Chamber C							
Mode:	Rel99 B2							
Test Equipment:								
Receiving: Horn T119, and Chamber C SMA Cables								
Substitution: Horn T59 Substitution, 4ft SMA Cable Warehouse								
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
1852.40	5.74	V	0.9	8.0	12.85	33.0	-20.2	
1852.40	18.77	H	0.9	8.0	25.88	33.0	-7.1	
Mid Ch								
1880.00	8.20	V	0.9	8.0	15.31	33.0	-17.7	
1880.00	18.25	H	0.9	8.0	25.36	33.0	-7.6	
High Ch								
1907.60	8.08	V	0.9	8.0	15.19	33.0	-17.8	
1907.60	18.59	H	0.9	8.0	25.70	33.0	-7.3	
Rev. 3.17.11								
Note: For Band 4 EIRP limit is 30dBm								

Band
Band 5
HSDPA

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

Company: Samsung
Project #: 15I20358
Date: 03/24/15
Test Engineer: R.Alegre
Configuration: EUT only
Mode: REL99 B5 FUND

Test Equipment:

Receiving: Sunol T185, and 3m Chamber C N-type Cable
Substitution: Dipole T273, 4ft SMA Cable Warehouse.

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
826.40	21.82	V	0.9	0.0	20.92	38.5	-17.5	
826.40	15.22	H	0.9	0.0	14.32	38.5	-24.1	
Mid Ch								
836.60	24.16	V	0.9	0.0	23.26	38.5	-15.2	
836.60	16.15	H	0.9	0.0	15.25	38.5	-23.2	
High Ch								
846.60	23.06	V	0.9	0.0	22.16	38.5	-16.3	
846.60	15.40	H	0.9	0.0	14.50	38.5	-23.9	

Rev. 3.17.11

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

Band Band 5 REL99	High Frequency Substitution Measurement UL Verification Services, Inc. Chamber C								
	Company:		Samsung						
	Project #:		15I20358						
	Date:		03/24/15						
	Test Engineer:		R.Alegre						
	Configuration:		EUT only						
	Mode:		WCDMA Band 5 HSDPA						
	Test Equipment:								
	Receiving: Sunol T185, and 3m Chamber C N-type Cable								
	Substitution: Dipole T273, 4ft SMA Cable Warehouse.								
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
	Low Ch								
	826.40	21.02	V	0.9	0.0	20.12	38.5	-18.3	
	826.40	14.43	H	0.9	0.0	13.53	38.5	-24.9	
	Mid Ch								
	836.60	23.86	V	0.9	0.0	22.96	38.5	-15.5	
	836.60	15.85	H	0.9	0.0	14.95	38.5	-23.5	
	High Ch								
	846.60	22.76	V	0.9	0.0	21.86	38.5	-16.6	
	846.60	14.88	H	0.9	0.0	13.98	38.5	-24.5	
Rev. 3.17.11 Note: For Band 13/17 ERP limit is 34.77dBm; For Band 26 limit is 50dBm									

GSM

High Frequency Substitution Measurement UL Verification Services, Inc. Chamber C								
Company:	Samsung							
Project #:	15I20358							
Date:	3/27/2015							
Test Engineer:	R. Alegre (2081833)							
Configuration:	EUT Only							
Location:	Chamber C							
Mode:	EGPRS 1900							
Test Equipment:								
Receiving: Horn T119 and Chamber C SMA Cables								
Substitution: Horn T59 Substitution, 4ft SMA Cable Warehouse								
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
1850.20	15.64	V	0.9	8.0	22.75	33.0	-10.3	
1850.20	22.04	H	0.9	8.0	29.15	33.0	-3.8	
Mid Ch								
1880.00	15.33	V	0.9	8.0	22.44	33.0	-10.6	
1880.00	20.68	H	0.9	8.0	27.79	33.0	-5.2	
High Ch								
1909.80	15.44	V	0.9	8.0	22.55	33.0	-10.5	
1909.80	21.96	H	0.9	8.0	29.07	33.0	-3.9	
Rev. 3.17.11 Note: For Band 4 EIRP limit is 30dBm								

Band

GSM

1900

GPRS

High Frequency Substitution Measurement

UL Verification Services, Inc. Chamber C

Company:

Project #:

Date:

Test Engineer:

Configuration:

Location:

Mode:

Samsung

15I20358

3/24/2015

R. Alegre

EUT Only

Chamber C

GPRS 1900

Test Equipment:

Receiving: Horn T119 and Chamber C SMA Cables

Substitution: Horn T59 Substitution, 4ft SMA Cable Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
1850.20	18.06	V	0.9	8.0	25.17	33.0	-7.8	
1850.20	25.70	H	0.9	8.0	32.81	33.0	-0.2	
Mid Ch								
1880.00	17.88	V	0.9	8.0	24.99	33.0	-8.0	
1880.00	25.10	H	0.9	8.0	32.21	33.0	-0.8	
High Ch								
1909.80	18.05	V	0.9	8.0	25.16	33.0	-7.8	
1909.80	23.67	H	0.9	8.0	30.78	33.0	-2.2	

Rev. 3.17.11

Note: For Band 4 EIRP limit is 30dBm

Band

GSM

850

EGPRS

High Frequency Substitution Measurement

UL Verification Services, Inc. Chamber C

Company:

Project #:

Date:

Test Engineer:

Configuration:

Mode:

Samsung

15I20358

03/27/15

Charles Vergonio

Y-pos EUT Only

EGPRS850

Test Equipment:

Receiving: Sunol T185, and 3m Chamber C N-type Cable

Substitution: Dipole T273, 4ft SMA Cable Warehouse.

f	SG reading	Ant. Pol.	Cable Loss	Antenna Gain	ERP	Limit	Margin	Notes
MHz	(dBm)	(H/V)	(dB)	(dBd)	(dBm)	(dBm)	(dB)	
Low Ch								
824.20	27.80	V	0.9	0.0	26.90	38.5	-11.5	
824.20	22.59	H	0.9	0.0	21.69	38.5	-16.8	
Mid Ch								
836.60	27.77	V	0.9	0.0	26.87	38.5	-11.6	
836.60	22.90	H	0.9	0.0	22.00	38.5	-16.4	
High Ch								
848.80	27.51	V	0.9	0.0	26.61	38.5	-11.8	
848.80	22.65	H	0.9	0.0	21.75	38.5	-16.7	

Rev. 3.17.11

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

Band

GSM

850

GPRS

High Frequency Substitution Measurement

UL Verification Services, Inc. Chamber C

Company:

Project #:

Date:

Test Engineer:

Configuration:

Mode:

Samsung

15I20358

03/24/15

R.Alegre

EUT Only

GPRS850

Test Equipment:

Receiving: Sunol T185, and 3m Chamber C N-type Cable

Substitution: Dipole T273, 4ft SMA Cable Warehouse.

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
824.20	30.93	V	0.9	0.0	30.03	38.5	-8.4	
824.20	26.76	H	0.9	0.0	25.86	38.5	-12.6	
Mid Ch								
836.60	32.21	V	0.9	0.0	31.31	38.5	-7.1	
836.60	26.92	H	0.9	0.0	26.02	38.5	-12.4	
High Ch								
848.80	31.37	V	0.9	0.0	30.47	38.5	-8.0	
848.80	26.78	H	0.9	0.0	25.88	38.5	-12.6	

Rev. 3.17.11

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

11.2. FIELD STRENGTH OF SPURIOUS RADIATION**RULE PART(S)**

FCC: §2.1053, §22.917, §24.238, §27.53 and §90.691

LIMIT

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

Part 27.53 m(4) For mobile digital stations, the attenuation factor shall be not less than $40 + 10 \log (P)$ dB on all frequencies between the channel edge and 5 megahertz from the channel edge, $43 + 10 \log (P)$ dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and $55 + 10 \log (P)$ dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(6) of this section. In addition, the attenuation factor shall not be less than $43 + 10 \log (P)$ dB on all frequencies between 2490.5 MHz and 2496 MHz and $55 + 10 \log (P)$ dB at or below 2490.5 MHz. Mobile Satellite Service licensees operating on frequencies below 2495 MHz may also submit a documented interference complaint against BRS licensees operating on channel BRS Channel 1 on the same terms and conditions as adjacent channel BRS or EBS licensees.

TEST PROCEDURE

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

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

MODES TESTED

GSM 850, GSM 1900, WCDMA Band 2, WCDMA Band 5, LTE Band 41

11.2.1. SPURIOUS RADIATION DATA**LTE Band 41**

UL Verification Services Above 1GHz High Frequency Substitution Measurement										
Company:		Samsung								
Project #:		15I20358								
Date:		03/25/15								
Test Engineer:		R. Alegre								
Configuration:		X-pos EUT/AC Charger/Headset								
Mode:		LTE band 41, 20MHz BW 16QAM HARM								
Chamber		Pre-amplifier		Filter		Limit				
3m Chamber		T145 8449B		Filter 1		Part 27				
Band	f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
LTE 41 20MHz 16QAM	Low Ch, (2565 MHz)									
	5.130	-9.2	V	3.0	35.5	1.0	-43.6	-25.0	-18.6	
	7.695	-6.7	V	3.0	35.7	1.0	-41.5	-25.0	-16.5	
	10.260	-10.2	V	3.0	36.0	1.0	-45.2	-25.0	-20.2	
	5.130	-0.5	H	3.0	35.5	1.0	-35.0	-25.0	-10.0	
	7.695	-0.7	H	3.0	35.7	1.0	-35.4	-25.0	-10.4	
	10.260	-9.6	H	3.0	36.0	1.0	-44.7	-25.0	-19.7	
	Mid Ch, (2593 MHz)									
	5.186	-6.3	V	3.0	35.4	1.0	-40.7	-25.0	-15.7	
	7.779	-4.1	V	3.0	35.8	1.0	-38.8	-25.0	-13.8	
	10.372	-10.3	V	3.0	35.8	1.0	-45.1	-25.0	-20.1	
	5.186	-3.9	H	3.0	35.4	1.0	-38.3	-25.0	-13.3	
	7.779	-4.0	H	3.0	35.8	1.0	-38.8	-25.0	-13.8	
	10.372	-9.8	H	3.0	35.8	1.0	-44.6	-25.0	-19.6	
	High Ch, (2625 MHz)									
	5.250	-12.6	V	3.0	35.4	1.0	-47.0	-25.0	-22.0	
	7.875	-9.8	V	3.0	35.8	1.0	-44.7	-25.0	-19.7	
	10.500	-10.5	V	3.0	35.7	1.0	-45.2	-25.0	-20.2	
	5.250	-11.1	H	3.0	35.4	1.0	-45.5	-25.0	-20.5	
	7.875	-7.7	H	3.0	35.8	1.0	-42.5	-25.0	-17.5	
	10.500	-8.5	H	3.0	35.7	1.0	-43.2	-25.0	-18.2	
	Rev. 03.03.09									
	Note: No other emissions were detected above the system noise floor.									

UL Verification Services Above 1GHz High Frequency Substitution Measurement										
Company:	Samsung									
Project #:	15I20358									
Date:	03/25/15									
Test Engineer:	R. Alegre									
Configuration:	X-pos EUT/AC Charger/Headset									
Mode:	LTE band 41, 20MHz BW QPSK HARM									
Chamber Pre-amplifier Filter Limit 3m Chamber T145 8449B Filter 1 Part 27										
Band	f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
LTE41 20MHz QPSK	Low Ch, (2565 MHz)									
	5.130	-8.8	V	3.0	35.5	1.0	-43.3	-25.0	-18.3	
	7.695	-6.4	V	3.0	35.7	1.0	-41.1	-25.0	-16.1	
	10.260	-10.0	V	3.0	36.0	1.0	-45.0	-25.0	-20.0	
	5.130	0.3	H	3.0	35.5	1.0	-34.2	-25.0	-9.2	
	7.695	-0.2	H	3.0	35.7	1.0	-35.0	-25.0	-10.0	
	10.260	-9.2	H	3.0	36.0	1.0	-44.3	-25.0	-19.3	
	Mid Ch, (2593 MHz)									
	5.186	-6.0	V	3.0	35.4	1.0	-40.5	-25.0	-15.5	
	7.779	-3.6	V	3.0	35.8	1.0	-38.4	-25.0	-13.4	
	10.372	-9.9	V	3.0	35.8	1.0	-44.8	-25.0	-19.8	
	5.186	-3.4	H	3.0	35.4	1.0	-37.8	-25.0	-12.8	
	7.779	-3.5	H	3.0	35.8	1.0	-38.3	-25.0	-13.3	
	10.372	-9.4	H	3.0	35.8	1.0	-44.2	-25.0	-19.2	
	High Ch, (2625 MHz)									
	5.250	-12.1	V	3.0	35.4	1.0	-46.6	-25.0	-21.6	
	7.875	-9.3	V	3.0	35.8	1.0	-44.1	-25.0	-19.1	
	10.500	-10.0	V	3.0	35.7	1.0	-44.6	-25.0	-19.6	
5.250	-10.8	H	3.0	35.4	1.0	-45.2	-25.0	-20.2		
7.875	-7.1	H	3.0	35.8	1.0	-41.9	-25.0	-16.9		
10.500	-8.0	H	3.0	35.7	1.0	-42.7	-25.0	-17.7		
Rev. 03.03.09 Note: No other emissions were detected above the system noise floor.										

UL Verification Services Above 1GHz High Frequency Substitution Measurement																																																																																																																																																																																																																																																							
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UL Verification Services Above 1GHz High Frequency Substitution Measurement										
Company:	Samsung									
Project #:	15I20358									
Date:	03/25/15									
Test Engineer:	R. Alegre									
Configuration:	X-pos EUT/AC Charger/Headset									
Mode:	TX, LTE band 41, 15MHz, QPSK									
Chamber Pre-amplifier Filter Limit 3m Chamber T145 8449B Filter 1 Part 27										
Band	f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
LTE41 15MHz QPSK	Low Ch, (2562.5 MHz)									
	5.125	-8.9	V	3.0	35.5	1.0	-43.3	-25.0	-18.3	
	7.688	-5.9	V	3.0	35.7	1.0	-40.6	-25.0	-15.6	
	10.250	-10.6	V	3.0	36.0	1.0	-45.6	-25.0	-20.6	
	5.125	0.6	H	3.0	35.5	1.0	-33.9	-25.0	-8.9	
	7.688	0.1	H	3.0	35.7	1.0	-34.6	-25.0	-9.6	
	10.250	-9.5	H	3.0	36.0	1.0	-44.5	-25.0	-19.5	
	Mid Ch, (2593 MHz)									
	5.186	-7.9	V	3.0	35.4	1.0	-42.3	-25.0	-17.3	
	7.779	-3.3	V	3.0	35.8	1.0	-38.0	-25.0	-13.0	
	10.372	-9.8	V	3.0	35.8	1.0	-44.6	-25.0	-19.6	
	5.186	-2.8	H	3.0	35.4	1.0	-37.2	-25.0	-12.2	
	7.779	-3.1	H	3.0	35.8	1.0	-37.9	-25.0	-12.9	
	10.372	-9.1	H	3.0	35.8	1.0	-44.0	-25.0	-19.0	
	High Ch, (2627.5 MHz)									
	5.255	-9.3	V	3.0	35.4	1.0	-43.7	-25.0	-18.7	
	7.883	-3.0	V	3.0	35.8	1.0	-37.9	-25.0	-12.9	
	10.510	-9.9	V	3.0	35.7	1.0	-44.5	-25.0	-19.5	
5.255	-10.7	H	3.0	35.4	1.0	-45.2	-25.0	-20.2		
7.883	-6.8	H	3.0	35.8	1.0	-41.6	-25.0	-16.6		
10.510	-7.4	H	3.0	35.7	1.0	-42.1	-25.0	-17.1		
Rev. 03.03.09 Note: No other emissions were detected above the system noise floor.										

[illegible]

UL Verification Services Above 1GHz High Frequency Substitution Measurement																	
Company:		Samsung															
Project #:		15120358															
Date:		03/25/15															
Test Engineer:		R. Alegre															
Configuration:		X-pos EUT/AC Charger/Headset															
Mode:		TX, LTE band 41, 10MHz, QPSK															

UL Verification Services Above 1GHz High Frequency Substitution Measurement																	
Company:		Samsung															
Project #:		15I20358															
Date:		03/25/15															
Test Engineer:		R. Alegre															
Configuration:		X-pos EUT/AC Charger/Headset															
Mode:		TX, LTE band 41, 5MHz, 16QAM															

UL Verification Services Above 1GHz High Frequency Substitution Measurement										
Company:		Samsung								
Project #:		15I20358								
Date:		03/25/15								
Test Engineer:		R. Alegre								
Configuration:		X-pos EUT/AC Charger/Headset								
Mode:		TX, LTE band 41, 5MHz, QPSK								
Chamber		Pre-amplifier		Filter		Limit				
3m Chamber		T145 8449B		Filter 1		Part 27				
Band	f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
LTE41 5MHz QPSK	Low Ch, (2557.5 MHz)									
	5.115	-8.8	V	3.0	35.5	1.0	-43.3	-25.0	-18.3	
	7.673	-5.9	V	3.0	35.7	1.0	-40.6	-25.0	-15.6	
	10.230	-10.6	V	3.0	36.0	1.0	-45.6	-25.0	-20.6	
	5.115	0.7	H	3.0	35.5	1.0	-33.8	-25.0	-8.8	
	7.673	0.3	H	3.0	35.7	1.0	-34.4	-25.0	-9.4	
	10.230	-9.5	H	3.0	36.0	1.0	-44.6	-25.0	-19.6	
	Mid Ch, (2593 MHz)									
	5.186	-7.7	V	3.0	35.4	1.0	-42.1	-25.0	-17.1	
	7.779	-3.4	V	3.0	35.8	1.0	-38.2	-25.0	-13.2	
	10.372	-9.8	V	3.0	35.8	1.0	-44.6	-25.0	-19.6	
	5.186	-2.9	H	3.0	35.4	1.0	-37.3	-25.0	-12.3	
	7.779	-3.0	H	3.0	35.8	1.0	-37.8	-25.0	-12.8	
	10.372	-9.0	H	3.0	35.8	1.0	-43.9	-25.0	-18.9	
	High Ch, (2632.5 MHz)									
	5.265	-9.2	V	3.0	35.4	1.0	-43.7	-25.0	-18.7	
	7.898	-3.0	V	3.0	35.8	1.0	-37.8	-25.0	-12.8	
	10.530	-9.8	V	3.0	35.7	1.0	-44.5	-25.0	-19.5	
5.265	-10.5	H	3.0	35.4	1.0	-44.9	-25.0	-19.9		
7.898	-6.5	H	3.0	35.8	1.0	-41.3	-25.0	-16.3		
10.530	-7.8	H	3.0	35.7	1.0	-42.5	-25.0	-17.5		
Rev. 03.03.09										
Note: No other emissions were detected above the system noise floor.										

WCDMA

UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement										
Company: Samsung Project #: 15I20358 Date: 03/26/15 Test Engineer: R. Alegre Configuration: EUT w/ AC Charger + HS Mode: HSDPA_B2										
Chamber 3m Chamber		Pre-amplifier T34 8449B		Filter Filter 1		Limit Part 24				
Band	f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch, 1852.4MHz									
	3.705	-19.7	V	3.0	35.4	1.0	-54.1	-13.0	-41.1	
Band 2	5.557	-16.3	V	3.0	34.7	1.0	-50.0	-13.0	-37.0	
	7.410	-13.2	V	3.0	34.9	1.0	-47.1	-13.0	-34.1	
HSDPA	3.705	-19.2	H	3.0	35.4	1.0	-53.6	-13.0	-40.6	
	5.557	-16.2	H	3.0	34.7	1.0	-49.9	-13.0	-36.9	
	7.410	-12.7	H	3.0	34.9	1.0	-46.6	-13.0	-33.6	
	Mid Ch, 1880MHz									
	3.760	-16.4	V	3.0	35.3	1.0	-50.7	-13.0	-37.7	
	5.640	-15.5	V	3.0	34.7	1.0	-49.2	-13.0	-36.2	
	7.520	-12.4	V	3.0	34.9	1.0	-46.3	-13.0	-33.3	
	3.760	-19.4	H	3.0	35.3	1.0	-53.7	-13.0	-40.7	
	5.640	-15.2	H	3.0	34.7	1.0	-49.0	-13.0	-36.0	
	7.520	-12.6	H	3.0	34.9	1.0	-46.5	-13.0	-33.5	
	High Ch, 1907.6MHz									
	3.815	-19.1	V	3.0	35.3	1.0	-53.4	-13.0	-40.4	
	5.723	-15.4	V	3.0	34.7	1.0	-49.2	-13.0	-36.2	
	7.630	-12.3	V	3.0	34.9	1.0	-46.3	-13.0	-33.3	
	3.815	-19.3	H	3.0	35.3	1.0	-53.6	-13.0	-40.6	
	5.723	-14.8	H	3.0	34.7	1.0	-48.5	-13.0	-35.5	
	7.630	-10.8	H	3.0	34.9	1.0	-44.8	-13.0	-31.8	
Rev. 03.03.09 Note: No other emissions were detected above the system noise floor.										

UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement									
Company:		Samsung							
Project #:		15I20358							
Date:		03/26/15							
Test Engineer:		R.Alegre							
Configuration:		EUT w/ AC Charger + HS							
Mode:		Rel99_B2							
Chamber		Pre-amplifier		Filter		Limit			
3m Chamber		T34 8449B		Filter 1		Part 24			
f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 1852.4MHz									
3.705	-19.4	V	3.0	35.4	1.0	-53.8	-13.0	-40.8	
5.557	-16.3	V	3.0	34.7	1.0	-50.0	-13.0	-37.0	
7.410	-12.5	V	3.0	34.9	1.0	-46.4	-13.0	-33.4	
3.705	-18.6	H	3.0	35.4	1.0	-53.0	-13.0	-40.0	
5.557	-15.6	H	3.0	34.7	1.0	-49.3	-13.0	-36.3	
7.410	-12.3	H	3.0	34.9	1.0	-46.2	-13.0	-33.2	
Mid Ch, 1880MHz									
3.760	-16.1	V	3.0	35.3	1.0	-50.4	-13.0	-37.4	
5.640	-15.3	V	3.0	34.7	1.0	-49.0	-13.0	-36.0	
7.520	-12.3	V	3.0	34.9	1.0	-46.2	-13.0	-33.2	
3.760	-18.9	H	3.0	35.3	1.0	-53.3	-13.0	-40.3	
5.640	-15.0	H	3.0	34.7	1.0	-48.8	-13.0	-35.8	
7.520	-12.2	H	3.0	34.9	1.0	-46.1	-13.0	-33.1	
High Ch, 1907.6MHz									
3.815	-18.9	V	3.0	35.3	1.0	-53.2	-13.0	-40.2	
5.723	-15.3	V	3.0	34.7	1.0	-49.0	-13.0	-36.0	
7.630	-12.1	V	3.0	34.9	1.0	-46.1	-13.0	-33.1	
3.815	-19.3	H	3.0	35.3	1.0	-53.6	-13.0	-40.6	
5.723	-14.9	H	3.0	34.7	1.0	-48.6	-13.0	-35.6	
7.630	-10.8	H	3.0	34.9	1.0	-44.7	-13.0	-31.7	
Rev. 03.03.09 Note: No other emissions were detected above the system noise floor.									

UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement									
Company:	Samsung								
Project #:	15I20358								
Date:	03/26/15								
Test Engineer:	R. Alegre								
Configuration:	EUT w/ AC Charger + HS								
Mode:	HSDPA_B5								
Chamber Pre-amplifier Filter Limit 3m Chamber T34 8449B Filter 1 Part 22									
f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 826.4MHz									
1.653	-25.7	V	3.0	37.4	1.0	-62.1	-13.0	-49.1	
2.479	-21.9	V	3.0	36.4	1.0	-57.3	-13.0	-44.3	
3.306	-19.9	V	3.0	35.8	1.0	-54.7	-13.0	-41.7	
1.653	-24.9	H	3.0	37.4	1.0	-61.3	-13.0	-48.3	
2.479	-23.7	H	3.0	36.4	1.0	-59.1	-13.0	-46.1	
3.306	-21.1	H	3.0	35.8	1.0	-55.9	-13.0	-42.9	
Mid Ch, 836.6MHz									
1.673	-25.3	V	3.0	37.3	1.0	-61.7	-13.0	-48.7	
2.510	-22.8	V	3.0	36.4	1.0	-58.1	-13.0	-45.1	
3.346	-20.2	V	3.0	35.8	1.0	-54.9	-13.0	-41.9	
1.673	-26.5	H	3.0	37.3	1.0	-62.8	-13.0	-49.8	
2.510	-23.9	H	3.0	36.4	1.0	-59.3	-13.0	-46.3	
3.346	-20.9	H	3.0	35.8	1.0	-55.6	-13.0	-42.6	
High Ch, 846.6MHz									
1.693	-26.2	V	3.0	37.3	1.0	-62.5	-13.0	-49.5	
2.540	-22.7	V	3.0	36.3	1.0	-58.0	-13.0	-45.0	
3.386	-20.5	V	3.0	35.7	1.0	-55.2	-13.0	-42.2	
1.693	-25.3	H	3.0	37.3	1.0	-61.7	-13.0	-48.7	
2.540	-23.4	H	3.0	36.3	1.0	-58.7	-13.0	-45.7	
3.386	-21.2	H	3.0	35.7	1.0	-55.9	-13.0	-42.9	
Rev. 03.03.09 Note: No other emissions were detected above the system noise floor.									

UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement										
Company: Project #: Date: Test Engineer: Configuration: Mode:		Samsung 15I20358 03/26/15 R.Alegre EUT w/ AC Charger + HS REL99_B5								
		Chamber		Pre-amplifier		Filter		Limit		
		3m Chamber		T34 8449B		Filter 1		Part 22		
Band	f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch, 826.4MHz									
	1.653	-25.6	V	3.0	37.4	1.0	-62.0	-13.0	-49.0	
Band 5	2.479	-21.8	V	3.0	36.4	1.0	-57.1	-13.0	-44.1	
	3.306	-20.2	V	3.0	35.8	1.0	-55.0	-13.0	-42.0	
REL99	1.653	-24.6	H	3.0	37.4	1.0	-61.0	-13.0	-48.0	
	2.479	-23.4	H	3.0	36.4	1.0	-58.8	-13.0	-45.8	
	3.306	-20.8	H	3.0	35.8	1.0	-55.6	-13.0	-42.6	
	Mid Ch, 836.6MHz									
	1.673	-25.0	V	3.0	37.3	1.0	-61.3	-13.0	-48.3	
	2.510	-22.3	V	3.0	36.4	1.0	-57.7	-13.0	-44.7	
	3.346	-19.9	V	3.0	35.8	1.0	-54.7	-13.0	-41.7	
	1.673	-26.1	H	3.0	37.3	1.0	-62.5	-13.0	-49.5	
	2.510	-24.0	H	3.0	36.4	1.0	-59.4	-13.0	-46.4	
	3.346	-20.5	H	3.0	35.8	1.0	-55.3	-13.0	-42.3	
	High Ch, 846.6MHz									
	1.693	-25.9	V	3.0	37.3	1.0	-62.2	-13.0	-49.2	
	2.540	-22.3	V	3.0	36.3	1.0	-57.6	-13.0	-44.6	
	3.386	-20.6	V	3.0	35.7	1.0	-55.3	-13.0	-42.3	
	1.693	-25.1	H	3.0	37.3	1.0	-61.5	-13.0	-48.5	
	2.540	-23.1	H	3.0	36.3	1.0	-58.4	-13.0	-45.4	
	3.386	-21.0	H	3.0	35.7	1.0	-55.7	-13.0	-42.7	
Rev. 03.03.09 Note: No other emissions were detected above the system noise floor.										

GSM

UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement										
Company: Samsung Project #: 15I20358 Date: 03/27/15 Test Engineer: Charles Vergonio Configuration: EUT w/ AC Adaptor and HS Mode: EGPRS1900 Harm										
Chamber 3m Chamber		Pre-amplifier T34 8449B		Filter Filter 1		Limit Part 24				
Band	f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
GSM 1900 EGPRS	Low Ch, 1850.2MHz									
	3.700	-18.9	V	3.0	35.4	1.0	-53.3	-13.0	-40.3	
	5.551	-16.6	V	3.0	34.7	1.0	-50.3	-13.0	-37.3	
	7.401	-12.0	V	3.0	34.9	1.0	-45.9	-13.0	-32.9	
	3.700	-18.9	H	3.0	35.4	1.0	-53.3	-13.0	-40.3	
	5.551	-15.5	H	3.0	34.7	1.0	-49.2	-13.0	-36.2	
	7.401	-11.6	H	3.0	34.9	1.0	-45.5	-13.0	-32.5	
	Mid Ch, 1880.0MHz									
	3.760	-18.6	V	3.0	35.3	1.0	-53.0	-13.0	-40.0	
	5.640	-15.3	V	3.0	34.7	1.0	-49.0	-13.0	-36.0	
	7.520	-12.4	V	3.0	34.9	1.0	-46.3	-13.0	-33.3	
	3.760	-19.7	H	3.0	35.3	1.0	-54.1	-13.0	-41.1	
	5.640	-15.2	H	3.0	34.7	1.0	-48.9	-13.0	-35.9	
	7.520	-10.9	H	3.0	34.9	1.0	-44.9	-13.0	-31.9	
	High Ch, 1909.8MHz									
	3.820	-18.7	V	3.0	35.3	1.0	-53.0	-13.0	-40.0	
	5.729	-14.8	V	3.0	34.7	1.0	-48.6	-13.0	-35.6	
	7.639	-11.2	V	3.0	35.0	1.0	-45.2	-13.0	-32.2	
	3.820	-18.4	H	3.0	35.3	1.0	-52.7	-13.0	-39.7	
	5.729	-14.4	H	3.0	34.7	1.0	-48.1	-13.0	-35.1	
	7.639	-11.1	H	3.0	35.0	1.0	-45.1	-13.0	-32.1	
	Rev. 03.03.09 Note: No other emissions were detected above the system noise floor.									

UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement										
Company: Project #: Date: Test Engineer: Configuration: Mode:		Samsung 15I20358 03/26/15 R.Alegre EUT w/ AC Adaptor and HS GPRS1900 Harm								
		Chamber	Pre-amplifier	Filter	Limit					
		3m Chamber	T34 8449B	Filter 1	Part 24					
Band	f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
GSM 1900 GPRS	Low Ch, 1850.2MHz									
	3.700	-20.2	V	3.0	35.4	1.0	-54.6	-13.0	-41.6	
	5.551	-15.2	V	3.0	34.7	1.0	-48.9	-13.0	-35.9	
	7.401	-7.2	V	3.0	34.9	1.0	-41.1	-13.0	-28.1	
	3.700	-20.0	H	3.0	35.4	1.0	-54.4	-13.0	-41.4	
	5.551	-15.1	H	3.0	34.7	1.0	-48.8	-13.0	-35.8	
	7.401	-12.0	H	3.0	34.9	1.0	-45.9	-13.0	-32.9	
	Mid Ch, 1880.0MHz									
	3.760	-19.3	V	3.0	35.3	1.0	-53.6	-13.0	-40.6	
	5.640	-13.8	V	3.0	34.7	1.0	-47.5	-13.0	-34.5	
	7.520	-12.3	V	3.0	34.9	1.0	-46.2	-13.0	-33.2	
	3.760	-19.3	H	3.0	35.3	1.0	-53.7	-13.0	-40.7	
	5.640	-12.9	H	3.0	34.7	1.0	-46.6	-13.0	-33.6	
	7.520	-11.9	H	3.0	34.9	1.0	-45.9	-13.0	-32.9	
	High Ch, 1909.8MHz									
	3.820	-19.7	V	3.0	35.3	1.0	-54.0	-13.0	-41.0	
	5.729	-11.1	V	3.0	34.7	1.0	-44.9	-13.0	-31.9	
	7.639	-10.6	V	3.0	35.0	1.0	-44.6	-13.0	-31.6	
3.820	-20.0	H	3.0	35.3	1.0	-54.3	-13.0	-41.3		
5.729	-13.8	H	3.0	34.7	1.0	-47.5	-13.0	-34.5		
7.639	-11.1	H	3.0	35.0	1.0	-45.1	-13.0	-32.1		
Rev. 03.03.09 Note: No other emissions were detected above the system noise floor.										

UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement										
Company:		Samsung								
Project #:		15I20358								
Date:		03/27/15								
Test Engineer:		Charles Vergonio								
Configuration:		EUT w/ AC Charger + HS								
Mode:		EGPRS 850								
Chamber 3m Chamber Pre-amplifier T34 8449B Filter Filter 1 Limit Part 22										
Band	f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
GSM 850 EGPRS	Low Ch, 824.2MHz									
	1.648	-15.7	V	3.0	37.4	1.0	-52.0	-13.0	-39.0	
	2.473	-21.7	V	3.0	36.4	1.0	-57.1	-13.0	-44.1	
	3.297	-21.0	V	3.0	35.8	1.0	-55.8	-13.0	-42.8	
	1.648	-18.0	H	3.0	37.4	1.0	-54.3	-13.0	-41.3	
	2.473	-24.9	H	3.0	36.4	1.0	-60.3	-13.0	-47.3	
	3.297	-21.4	H	3.0	35.8	1.0	-56.2	-13.0	-43.2	
	Mid Ch, 836.6MHz									
	1.673	-17.5	V	3.0	37.3	1.0	-53.8	-13.0	-40.8	
	2.510	-22.8	V	3.0	36.4	1.0	-58.1	-13.0	-45.1	
	3.346	-20.7	V	3.0	35.8	1.0	-55.4	-13.0	-42.4	
	1.673	-17.4	H	3.0	37.3	1.0	-53.8	-13.0	-40.8	
	2.510	-26.1	H	3.0	36.4	1.0	-61.4	-13.0	-48.4	
	3.346	-20.7	H	3.0	35.8	1.0	-55.5	-13.0	-42.5	
	High Ch, 848.8MHz									
	1.698	-20.0	V	3.0	37.3	1.0	-56.3	-13.0	-43.3	
	2.547	-22.7	V	3.0	36.3	1.0	-58.1	-13.0	-45.1	
	3.395	-21.3	V	3.0	35.7	1.0	-56.0	-13.0	-43.0	
1.698	-19.6	H	3.0	37.3	1.0	-55.9	-13.0	-42.9		
2.547	-25.2	H	3.0	36.3	1.0	-60.6	-13.0	-47.6		
3.395	-21.5	H	3.0	35.7	1.0	-56.2	-13.0	-43.2		
Rev. 03.03.09 Note: No other emissions were detected above the system noise floor.										

UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement										
Company:	Samsung									
Project #:	15I20358									
Date:	03/26/15									
Test Engineer:	R.Alegre									
Configuration:	EUT w/ AC Charger + HS									
Mode:	GPRS 850									
Chamber		Pre-amplifier		Filter		Limit				
3m Chamber		T34 8449B		Filter 1		Part 22				
Band	f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch, 824.2MHz									
GSM	1.648	-14.3	V	3.0	37.4	1.0	-50.7	-13.0	-37.7	
	2.473	-21.0	V	3.0	36.4	1.0	-56.4	-13.0	-43.4	
	3.297	-19.9	V	3.0	35.8	1.0	-54.7	-13.0	-41.7	
GPRS	1.648	-15.6	H	3.0	37.4	1.0	-52.0	-13.0	-39.0	
	2.473	-23.2	H	3.0	36.4	1.0	-58.6	-13.0	-45.6	
	3.297	-20.3	H	3.0	35.8	1.0	-55.1	-13.0	-42.1	
	Mid Ch, 836.6MHz									
	1.673	-15.4	V	3.0	37.3	1.0	-51.7	-13.0	-38.7	
	2.510	-21.8	V	3.0	36.4	1.0	-57.1	-13.0	-44.1	
	3.346	-20.4	V	3.0	35.8	1.0	-55.1	-13.0	-42.1	
	1.673	-15.2	H	3.0	37.3	1.0	-51.5	-13.0	-38.5	
	2.510	-24.0	H	3.0	36.4	1.0	-59.4	-13.0	-46.4	
	3.346	-21.0	H	3.0	35.8	1.0	-55.8	-13.0	-42.8	
	High Ch, 848.8MHz									
	1.698	-19.6	V	3.0	37.3	1.0	-55.9	-13.0	-42.9	
	2.547	-22.0	V	3.0	36.3	1.0	-57.4	-13.0	-44.4	
	3.395	-20.6	V	3.0	35.7	1.0	-55.3	-13.0	-42.3	
	1.698	-18.0	H	3.0	37.3	1.0	-54.3	-13.0	-41.3	
	2.547	-23.8	H	3.0	36.3	1.0	-59.1	-13.0	-46.1	
	3.395	-21.1	H	3.0	35.7	1.0	-55.8	-13.0	-42.8	
Rev. 03.03.09										
Note: No other emissions were detected above the system noise floor.										