



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

CERTIFICATION TEST REPORT

FOR

GSM/WCDMA/LTE Phone + Bluetooth, DTS/UNII a/b/g/n/ac, ANT & NFC

MODEL NUMBER: SM-N750S, SM-N750K, SM-N750L

FCC ID: A3LSMN750KOR

IC: 649E-SMN750KOR

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: SAMSUNG ELECTRONICS CO., LTD.

EUT DESCRIPTION: GSM/WCDMA/LTE Phone + Bluetooth, DTS/UNII a/b/g/n/ac, ANT & NFC

MODEL: SM-N750S, SM-N750K, SM-N750L

SERIAL NUMBER: FL-029-C (RADIATED & CONDUCTED)

DATE TESTED: JANUARY 29 – FEBRUARY 3, 2014

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
FCC PART 22H, 24E and 27H	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 Benicia Street, Fremont, California, USA.

UL Verification Services Inc. is accredited by NVLAP, Laboratory Code 200065-0. The full scope of accreditation can be viewed at <http://www.ccsemc.com>.

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:

$$\text{EIRP} = \text{PSA reading with EUT worst orientation (dBm)} + \text{Path loss (dB)} - \text{cable loss (between the SG and substitution antenna)} + \text{Substitution Antenna Factor (dBi)}$$

$$\text{ERP} = \text{PSA reading with EUT worst orientation (dBm)} + \text{Path loss (dB)} - \text{cable loss (between the SG and substitution antenna)}$$

$$(\text{Path loss} = \text{Signal generator output} - \text{PSA reading with substitution antenna})$$

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 18000 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 Phone + Bluetooth, DTS/UNII a/b/g/n/ac, ANT & NFC

5.2. MAXIMUM OUTPUT POWER

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

FCC Part 22/2 4/27						
Band	Frequency Range(MHz)	Modulation Peak	Conducted		Radiated	
			Peak (dBm)	Peak(mW)	Peak (dBm)	Peak(mW)
GSM1900	1850~1910	GMSK	29.6	912		
	1850~1910	GPRS	29.6	912	27.73	592.93

FCC Part 24						
Band	Frequency Range(MHz)	Modulation Peak	Conducted		Radiated	
			Avg (dBm)	Avg(mW)	Avg (dBm)	Avg(mW)
Band 2	1850~1910	REL99	22.3	169.8	22.81	190.99
	1850~1910	HSDPA	21.4	138	21.37	137.09
	1850~1910	HSUPA	21.4	138		

FCC Part 22						
Band	Frequency Range(MHz)	Modulation Peak	Conducted		Radiated	
			Avg (dBm)	Avg(mW)	Avg (dBm)	Avg(mW)
Band 5	824 ~ 849	REL99	23.5	223.9	20.66	116.4
	824 ~ 849	HSDPA	22.0	158.5	20.00	100
	824 ~ 849	HSUPA	21.7	147.9		

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 (dBm)	Avg(mW)	Avg (dBm)	Avg(mW)
LTE17	704~716	10MHz	QPSK	23.00	199.5	13.571	22.76
			16QAM	21.87	153.8	12.681	18.54

FCC Part 27							
Band	Frequency Range(MHz)	BandWidth (MHz)	Modulation Peak	Conducted		Radiated	
				Avg (dBm)	Avg(mW)	Avg (dBm)	Avg(mW)
LTE17	704~716	5MHz	QPSK	23.00	199.5	14.291	26.86
			16QAM	21.88	154.2	12.521	17.87

FCC Part 22							
Band	Frequency Range(MHz)	BandWidth (MHz)	Modulation Peak	Conducted		Radiated	
				Avg (dBm)	Avg(mW)	Avg (dBm)	Avg(mW)
LTE5	824~849	10MHz	QPSK	23.50	223.9	21.07	127.9
			16QAM	22.50	177.8	19.93	98.40

FCC Part 22							
Band	Frequency Range(MHz)	BandWidth (MHz)	Modulation Peak	Conducted		Radiated	
				Avg (dBm)	Avg(mW)	Avg (dBm)	Avg(mW)
LTE5	824~849	5MHz	QPSK	23.49	223.4	21.86	153.5
			16QAM	22.49	177.4	20.86	121.9

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 2, 1850~1910MHz	-2.0
Band5, 824~849MHz	-4.18
LTE17, 704~716MHz	-10.5

5.5. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
AC Adapter	Samsung	SM-N750S	DK4DA09TS	N/A
Earphone	Samsung	SM-N750S	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

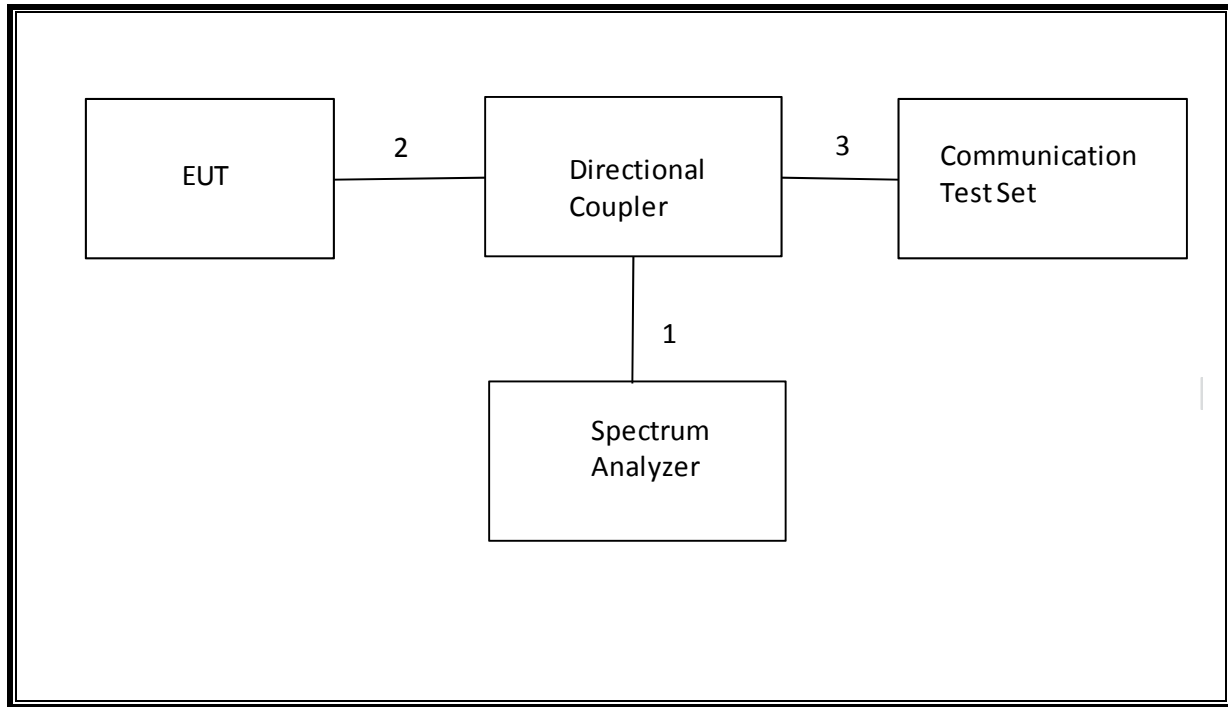
I/O CABLES (RADIATED SETUP)

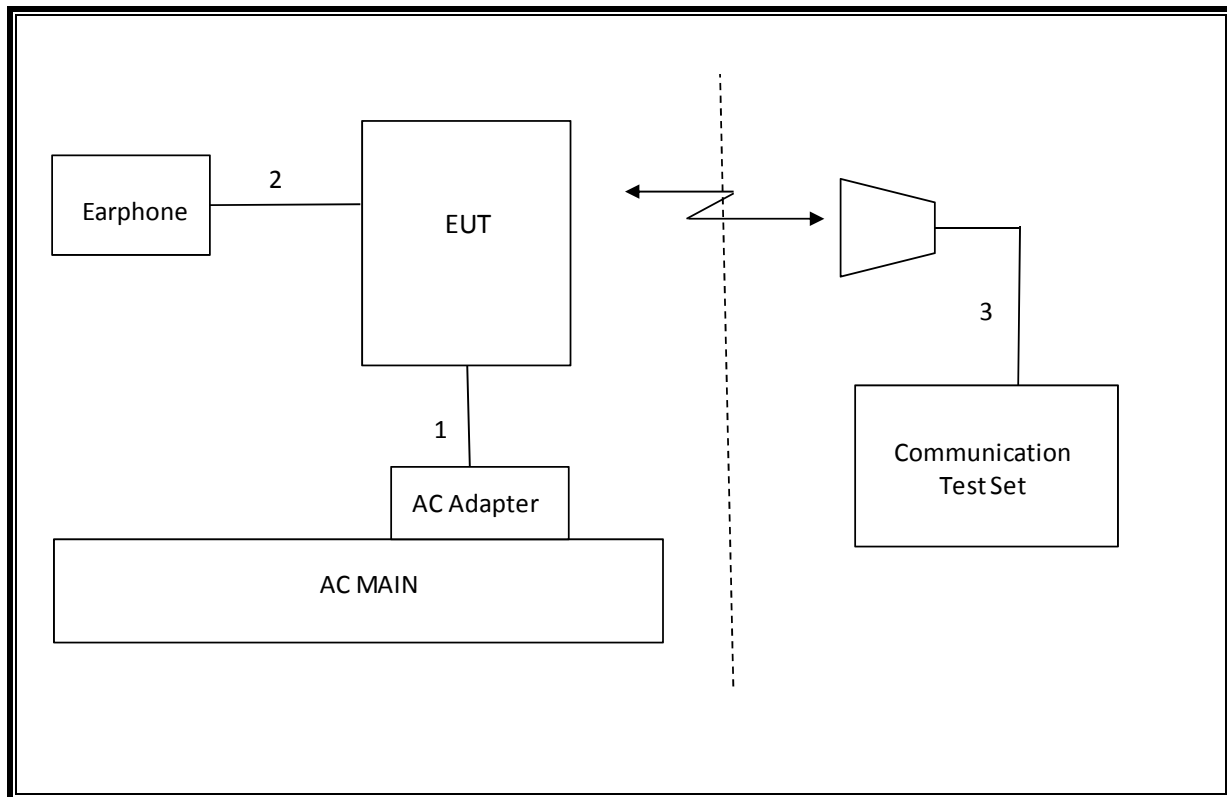
I/O CABLE LIST						
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length	Remarks
1	USB	1	AC Adapter	Un-shielded	1.2m	No
2	Jack	1	Headset	Shielded	1m	No
3	RF In/out	1	Communication Test Set	Un-shielded	2m	Yes

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	02/26/14
Antenna, Bilog, 2 GHz	Sunol Sciences	JB1	C01011	08/14/14
Antenna, Horn, 18 GHz	EMCO	3115	C00783	10/25/14
Antenna, Horn, 18 GHz	EMCO	3115	C00784	10/25/14
Highpass Filter, 2.7 GHz	Micro-Tronics	HPM13194	N02687	CNR
Highpass Filter, 1.5 GHz	Micro-Tronics	HPM13193	N02688	CNR
Temperature / Humidity Chamber	Thermotron	SE 600-10-10	C00930	01/09/15
Communications Test Set	R&S	CMW500	T159	07/02/14
DC power supply, 8 V @ 3 A or 15 V	Agilent / HP	E3610A	None	CNR
Vector signal generator, 6 GHz	Agilent / HP	E4438C	None	07/06/14
Antenna, Tuned Dipole 400~1000	ETS	3121C DB4	C00993	02/14/14
Directional Coupler	RF-Lambda	RFDC5M06G15	None	CNR

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	9.094MHz
22.917(a) 24.238(a) 27.53(g)	RSS-132(4.5.1) RSS-133(6.5.1) RSS-130(4.6)	Band Edge / Conducted Spurious Emission	-13dBm		Pass	-17.178dBm
2.1046	N/A	Conducted output power	N/A		Pass	29.6dBm
22.355 24.235 27.54	RSS-132(4.3) RSS-133(6.3) RSS-130(4.2)	Frequency Stability	2.5PPM		Pass	0.016PPM
22.913(a)(2)	RSS-132(4.4)	Effective Radiated Power	38 dBm	Radiated	Pass	20.66dBm
27.50(b)(10)	RSS-130(4.4)		34.77 dBm		Pass	
24.232(c)	RSS-133(6.4)	Equivalent Isotropic Radiated Power	33dBm		Pass	27.73dBm
22.917(a) 24.238(a) 27.53(g)	RSS-132(4.5.1) RSS-133(6.5.1) RSS-130(4.6)	Radiated Spurious Emission	-13dBm		Pass	-44.7dBm

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 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)
GSM1900	GMSK	512	1850.2	29.4			
		661	1880	29.6			
		810	1909.8	29.5			
	GPRS	512	1850.2	29.4	27.9	27.0	25.7
		661	1880	29.6	28.0	27.0	25.9
		810	1909.8	29.5	28.0	27.0	25.8

8.2. UMTS REL 99

TEST PROCEDURE

The following summary of these settings are illustrated below:

WCDMA General Settings	Mode	Rel99
	Subtest	-
	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	UL Ch No.	Freq. (MHz)	Avg Pwr (dBm)
W-CDMA Band V	Rel 99 (RMC, 12.2 kbps)	4132	826.4	23.5
		4183	836.6	23.2
		4233	846.6	23.2

Band	Mode	UL Ch No.	Freq. (MHz)	Avg Pwr (dBm)
W-CDMA Band II	Rel 99 (RMC, 12.2 kbps)	9262	1852.4	22.3
		9400	1880.0	22.3
		9538	1907.6	22.0

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

HSDPA

Band	Mode	UL Ch No.	Freq. (MHz)	MPR	Avg Pwr (dBm)
W-CDMA Band V	Subtest 1	4132	826.4	0	21.9
		4183	836.6	0	21.6
		4233	846.6	0	21.6
	Subtest 2	4132	826.4	1	22.0
		4183	836.6	1	21.5
		4233	846.6	1	21.4
	Subtest 3	4132	826.4	1.5	21.6
		4183	836.6	1.5	21.3
		4233	846.6	1.5	21.2
	Subtest 4	4132	826.4	1.5	21.6
		4183	836.6	1.5	21.3
		4233	846.6	1.5	21.2

Band	Mode	UL Ch No.	Freq. (MHz)	MPR	Avg Pwr (dBm)
W-CDMA Band II	Subtest 1	9262	1852.4	0	21.2
		9400	1880.0	0	21.4
		9538	1907.6	0	21.1
	Subtest 2	9262	1852.4	1	20.7
		9400	1880.0	1	20.8
		9538	1907.6	1	20.7
	Subtest 3	9262	1852.4	1.5	20.1
		9400	1880.0	1.5	20.2
		9538	1907.6	1.5	20.2
	Subtest 4	9262	1852.4	1.5	19.5
		9400	1880.0	1.5	19.5
		9538	1907.6	1.5	19.4

8.3.2. 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	56/75	134/15
	MPR	0	2	1	2	0
	DACK	8				
	DNAK	8				
	DCQI	8				
	Ack-Nack repetition factor	3				
	CQI Feedback (Table 5.2B.4)	4ms				
HSUPA Specific Settings	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.

8.3.3. UMTS HSUPA OUTPUT POWER RESULT

HSUPA

Band	Mode	UL Ch No.	Freq. (MHz)	MPR	Avg Pwr (dBm)
WCDMA Band V	Subtest 1	4132	826.4	0	21.3
		4183	836.6	0	21.3
		4233	846.6	0	21.2
	Subtest 2	4132	826.4	2	20.5
		4183	836.6	2	20.6
		4233	846.6	2	20.4
	Subtest 3	4132	826.4	1	20.5
		4183	836.6	1	20.3
		4233	846.6	1	20.4
	Subtest 4	4132	826.4	2	20.9
		4183	836.6	2	20.8
		4233	846.6	2	20.9
	Subtest 5	4132	826.4	0	21.7
		4183	836.6	0	21.7
		4233	846.6	0	21.5

Band	Mode	UL Ch No.	Freq. (MHz)	MPR	Avg Pwr (dBm)
W-CDMA Band II	Subtest 1	9262	1852.4	0	21.4
		9400	1880.0	0	21.4
		9538	1907.6	0	21.3
	Subtest 2	9262	1852.4	2	20.5
		9400	1880.0	2	20.4
		9538	1907.6	2	20.4
	Subtest 3	9262	1852.4	1	20.7
		9400	1880.0	1	20.7
		9538	1907.6	1	20.8
	Subtest 4	9262	1852.4	2	20.6
		9400	1880.0	2	20.6
		9538	1907.6	2	20.4
	Subtest 5	9262	1852.4	0	21.4
		9400	1880.0	0	21.4
		9538	1907.6	0	21.2

8.4. LTE OUTPUT VERIFICATION

8.4.1. LTE OUTPUT RESULT

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Avg Pwr (dBm)
						23790
						710 MHz
LTE Band 17	10	QPSK	1	0	0	23.00
			1	25	0	22.66
			1	49	0	21.83
			25	0	1	22.00
			25	12	1	21.80
			25	25	1	21.76
			50	0	1	21.51
		16QAM	1	0	1	21.87
			1	25	1	21.64
			1	49	1	20.79
			25	0	2	21.07
			25	12	2	20.80
			25	25	2	20.28
			50	0	2	20.50
Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Avg Pwr (dBm)
						23790
						710 MHz
LTE Band 17	5	QPSK	1	0	0	23.00
			1	12	0	22.57
			1	24	0	22.08
			12	0	1	21.88
			12	7	1	21.64
			12	13	1	21.38
			25	0	1	21.59
		16QAM	1	0	1	21.88
			1	12	1	21.38
			1	24	1	20.92
			12	0	2	20.98
			12	7	2	20.70
			12	13	2	20.45
			25	0	2	20.72

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Avg Pwr (dBm)		
						20450	20525	20600
						829 MHz	836.5 MHz	844 MHz
LTE Band 5	10	QPSK	1	0	0	23.49	23.50	23.50
			1	25	0	23.48	23.50	23.49
			1	49	0	23.49	23.50	23.50
			25	0	1	22.50	22.50	22.50
			25	12	1	22.45	22.45	22.45
			25	25	1	22.43	22.44	22.45
			50	0	1	22.45	22.45	22.45
		16QAM	1	0	1	22.45	22.46	22.46
			1	25	1	22.49	22.50	22.50
			1	49	1	22.50	22.50	22.49
			25	0	2	21.50	21.50	21.48
			25	12	2	21.49	21.49	21.50
			25	25	2	21.44	21.44	21.43
			50	0	2	21.45	21.46	21.45
Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Avg Pwr (dBm)		
						20425	20525	20625
						826.5 MHz	836.5 MHz	846.5 MHz
LTE Band 5	5	QPSK	1	0	0	23.42	23.49	23.47
			1	12	0	23.40	23.48	23.46
			1	24	0	23.40	23.49	23.43
			12	0	1	22.41	22.50	22.44
			12	7	1	22.41	22.48	22.42
			12	13	1	22.49	22.47	22.44
			25	0	1	22.46	22.47	22.41
		16QAM	1	0	1	22.45	22.47	22.46
			1	12	1	22.41	22.48	22.42
			1	24	1	22.46	22.47	22.49
			12	0	2	21.43	21.46	21.49
			12	7	2	21.48	21.44	21.39
			12	13	2	21.46	21.44	21.40
			25	0	2	21.42	21.45	21.46

9. PEAK TO AVERAGE RATIO

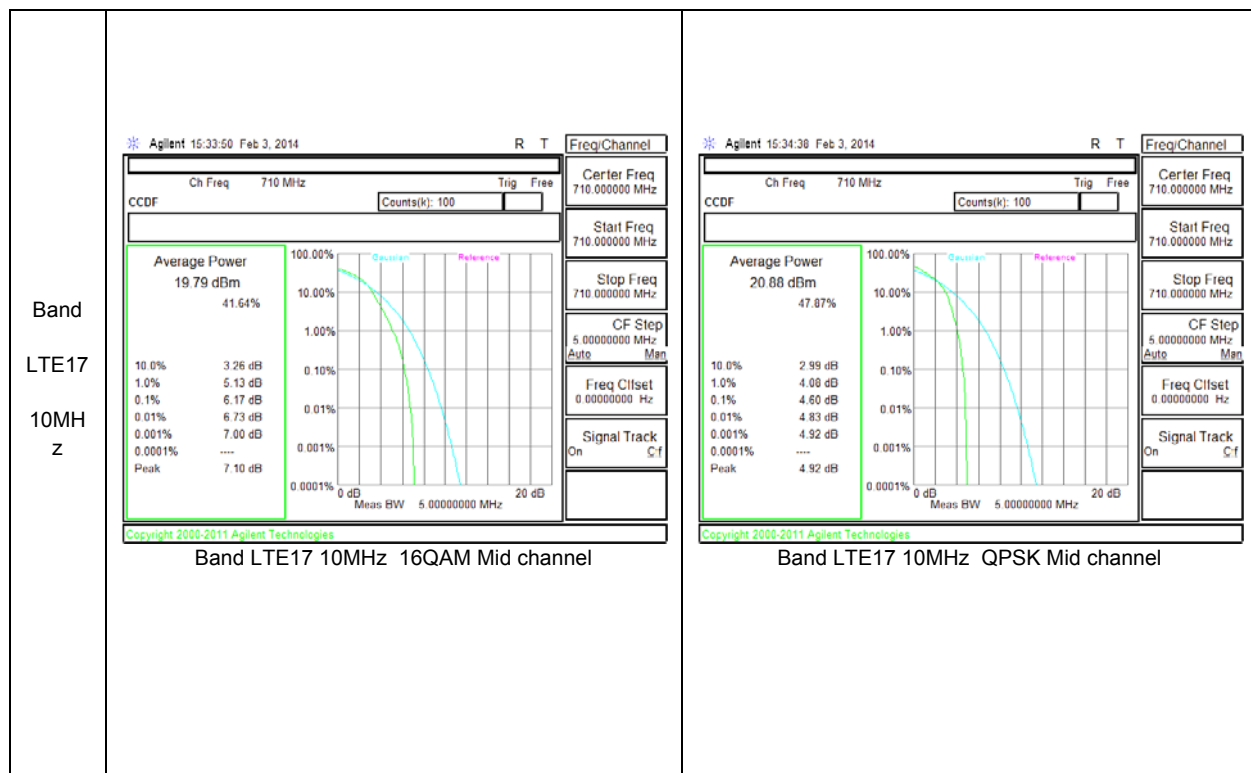
Test Procedure

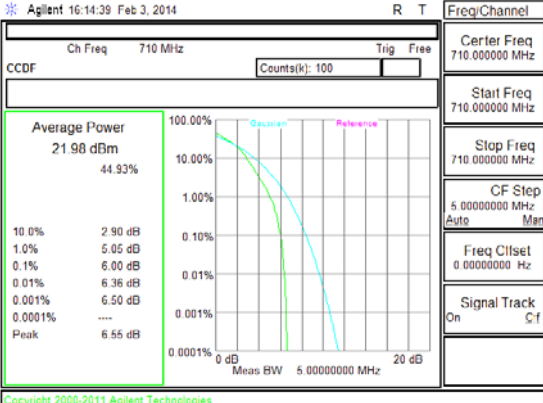
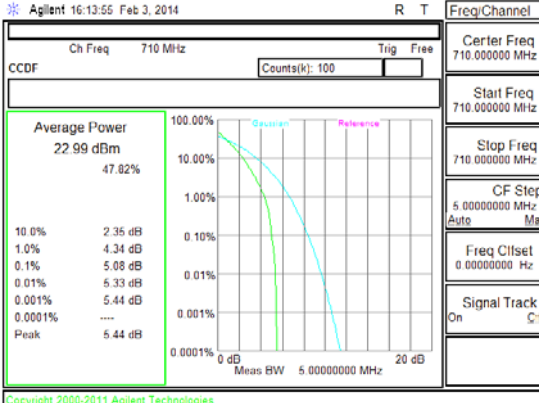
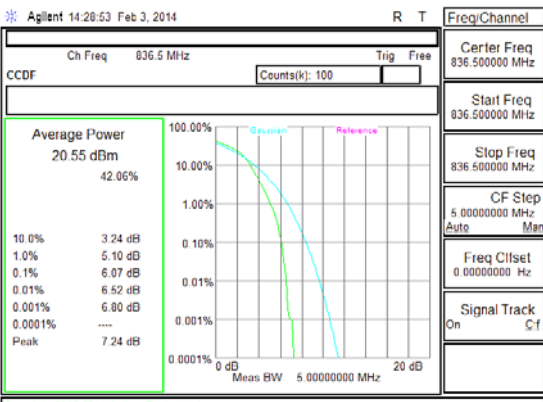
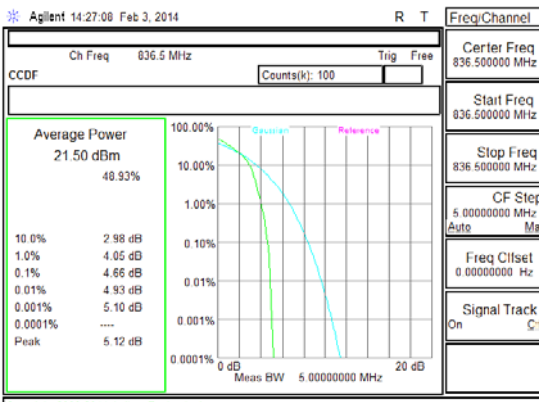
Per KDB 971168 D01 Power Meas License Digital Systems v02r01

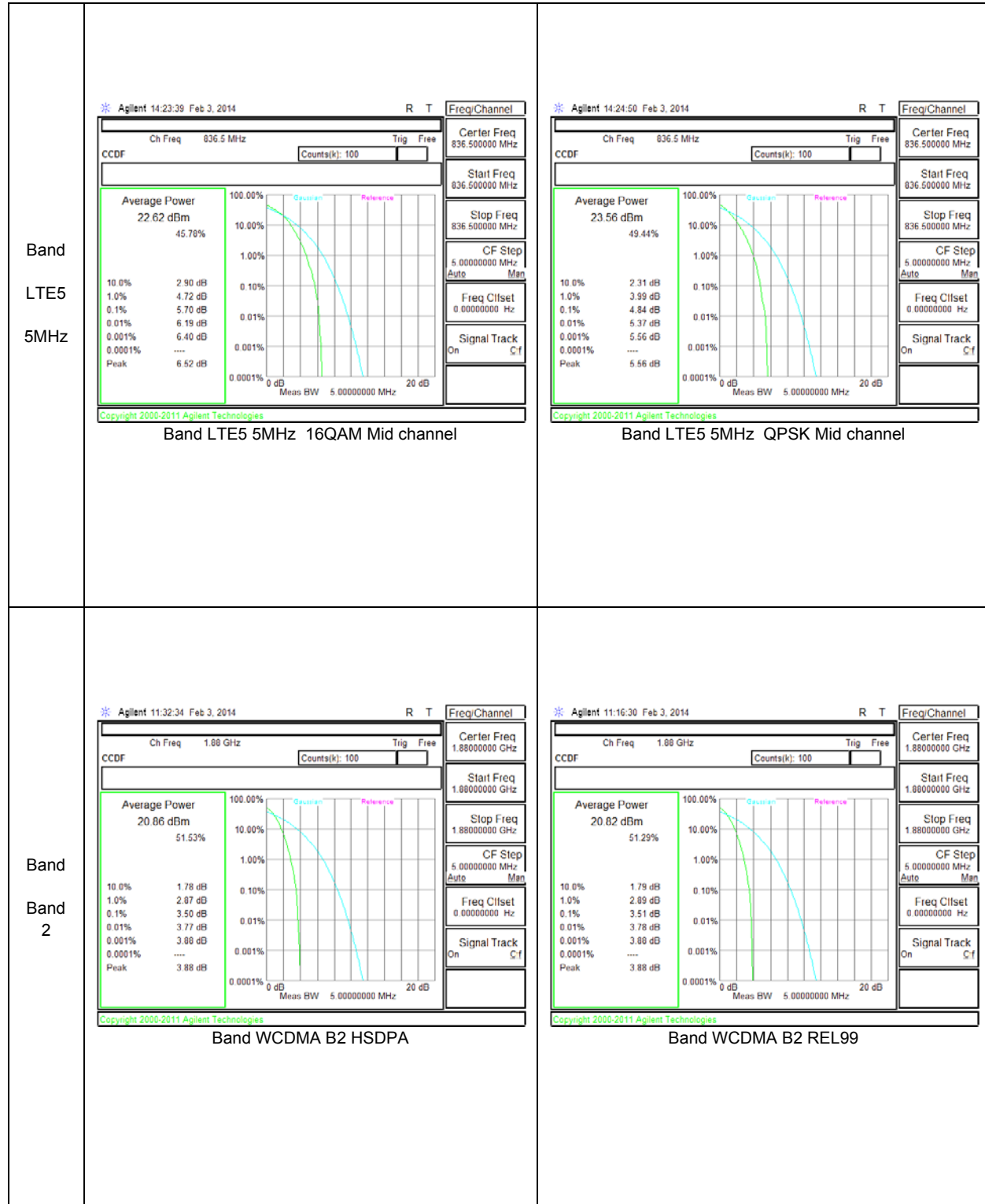
Test Spec

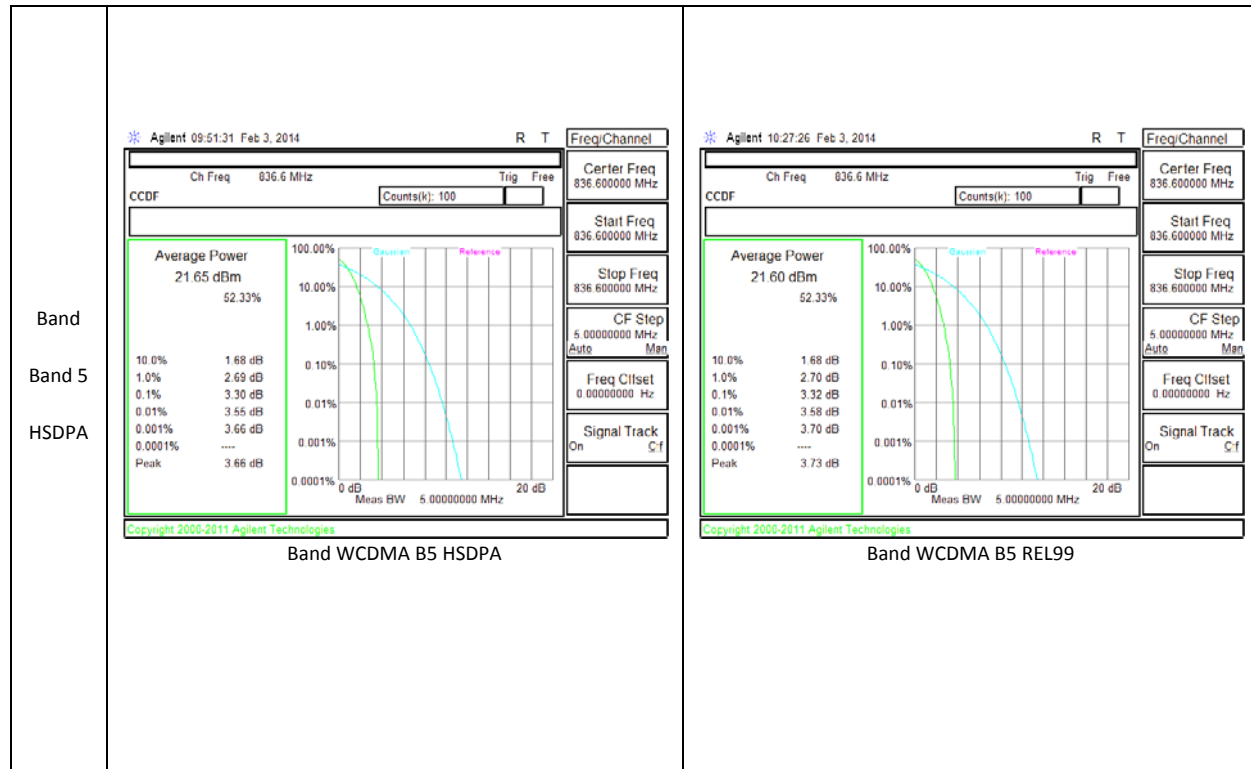
In addition, when the transmitter power is measured in terms of average value, the peak-to-average ratio of the power shall not exceed 13 dB.

9.1. CONDUCTED PEAK TO AVERAGE RESULT



Band LTE17 5MHz	 Agilent 16:14:39 Feb 3, 2014 Ch Freq 710 MHz CCDF Average Power 21.98 dBm 44.93% 10.0% 2.90 dB 1.0% 5.05 dB 0.1% 6.00 dB 0.01% 6.36 dB 0.001% 6.50 dB 0.0001% 6.55 dB Peak 6.55 dB Meas BW 5.00000000 MHz 20 dB Copyright 2000-2011 Agilent Technologies Band LTE17 5MHz 16QAM Mid channel	 Agilent 16:13:55 Feb 3, 2014 Ch Freq 710 MHz CCDF Average Power 22.99 dBm 47.82% 10.0% 2.35 dB 1.0% 4.34 dB 0.1% 5.08 dB 0.01% 5.33 dB 0.001% 5.44 dB 0.0001% 5.44 dB Peak 5.44 dB Meas BW 5.00000000 MHz 20 dB Copyright 2000-2011 Agilent Technologies Band LTE17 5MHz QPSK Mid channel
Band LTE5 10MHz Z	 Agilent 14:28:53 Feb 3, 2014 Ch Freq 836.5 MHz CCDF Average Power 20.55 dBm 42.06% 10.0% 3.24 dB 1.0% 5.10 dB 0.1% 6.07 dB 0.01% 6.52 dB 0.001% 6.80 dB 0.0001% 7.24 dB Peak 7.24 dB Meas BW 5.00000000 MHz 20 dB Copyright 2000-2011 Agilent Technologies Band LTE5 10MHz 16QAM Mid channel	 Agilent 14:27:08 Feb 3, 2014 Ch Freq 836.5 MHz CCDF Average Power 21.50 dBm 48.93% 10.0% 2.98 dB 1.0% 4.05 dB 0.1% 4.66 dB 0.01% 4.93 dB 0.001% 5.10 dB 0.0001% 5.12 dB Peak 5.12 dB Meas BW 5.00000000 MHz 20 dB Copyright 2000-2011 Agilent Technologies Band LTE5 10MHz QPSK Mid channel





10. LIMITS AND CONDUCTED RESULTS

10.1. OCCUPIED BANDWIDTH

RULE PART(S)

FCC: §2.1049

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

LIMITS

For reporting purposes only

TEST PROCEDURE

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

(KDB 971168 D01 Power Meas License Digital Systems v02r01 - 06/07/2013)

10.1.1. OCCUPIED BANDWIDTH RESULTS

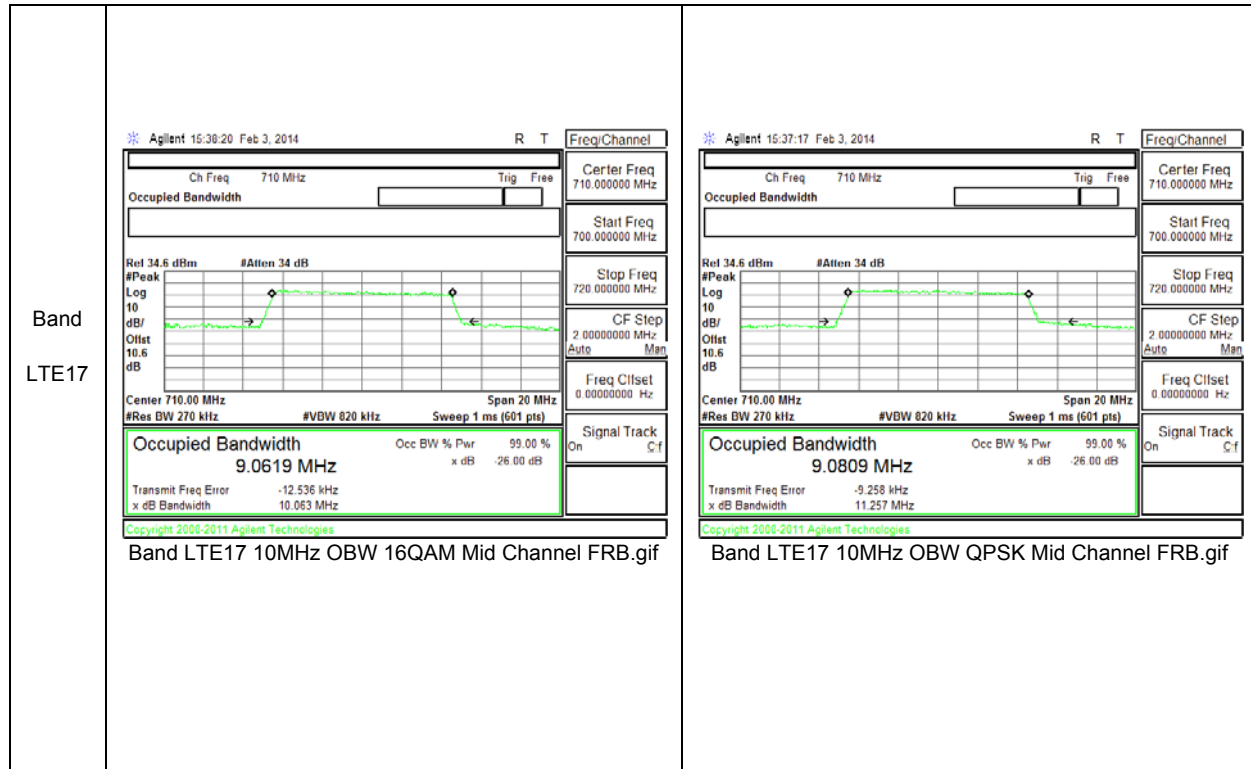
Band	Mode	Channel	f (MHz)	99% BW (KHz)	-26dB BW (KHz)
GSM1900	GPRS	512	1850.2	250.3	314.4
		661	1880	246.9	320.9
		810	1909.8	237.1	313.6
Band 2	REL99	9275	1852.6	4165	4691
		9400	1880	4171	4688
		9525	1907.4	4177	4690
	HSDPA	9275	1852.6	4163	4684
		9400	1880	4156	4683
		9525	1907.4	4175	4685
Band 5	REL99	4145	826.6	4160	4693
		4183	836.6	4192	4698
		4220	846.4	4169	4692
	HSDPA	4145	826.6	4163	4710
		4183	836.6	4184	4696
		4220	846.4	4156	4679

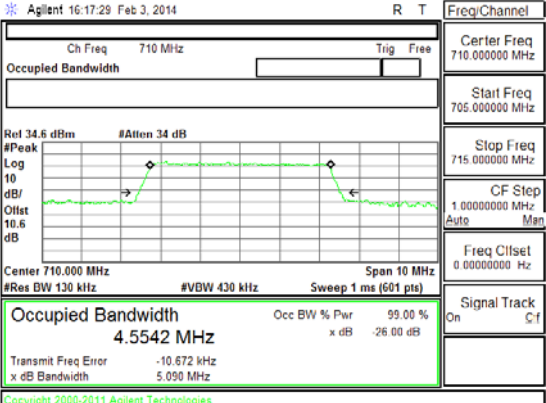
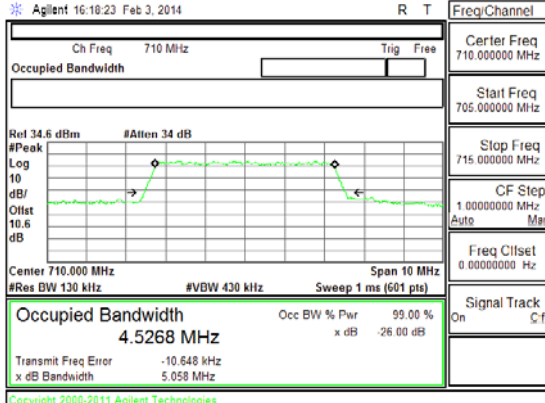
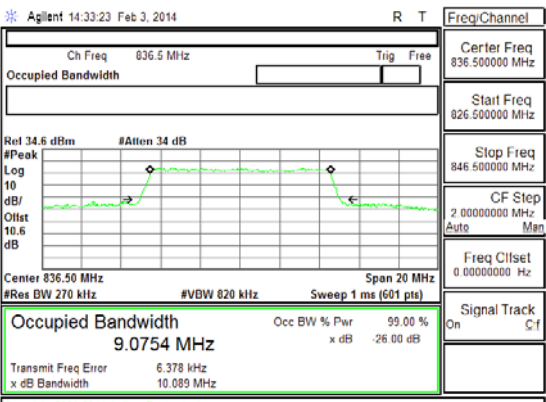
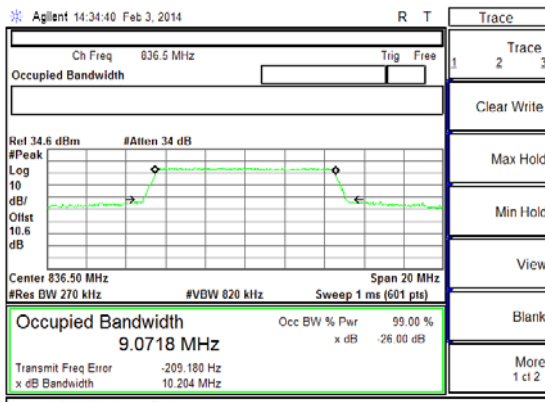
10.1.2. LTE OCCUPIED BANDWIDTH RESULTS

Band	BW(MHz)	Mode	RB/RB	f (MHz)	99% BW (MHz)	-26dB BW (MHz)
LTE17	10	QPSK	50/0	709	9.093	11.497
			50/0	710	9.081	11.257
			50/0	711	9.077	10.102
		16QAM	50/0	709	9.089	12.926
			50/0	710	9.062	10.063
			50/0	711	9.080	10.093
Band	BW(MHz)	Mode	RB/RB	f (MHz)	99% BW (MHz)	-26dB BW (MHz)
LTE17	5	QPSK	25/0	706.5	4.537	5.087
			25/0	710	4.527	5.058
			25/0	713.5	4.542	5.059
		16QAM	25/0	706.5	4.558	5.087
			25/0	710	4.554	5.090
			25/0	713.5	4.543	5.072

Band	BW(MHz)	Mode	RB/RB	f (MHz)	99% BW (MHz)	-26dB BW (MHz)
LTE5	10	QPSK	50/0	829	9.094	13.509
			50/0	836.5	9.072	10.204
			50/0	844	9.061	10.034
		16QAM	50/0	829	9.060	12.423
			50/0	836.5	9.075	10.089
			50/0	844	9.073	10.219
Band	BW(MHz)	Mode	RB/RB	f (MHz)	99% BW (MHz)	-26dB BW (MHz)
LTE5	5	QPSK	25/0	826.5	4.595	7.291
			25/0	836.5	4.547	5.043
			25/0	846.5	4.544	6.601
		16QAM	25/0	826.5	4.577	8.033
			25/0	836.5	4.534	5.118
			25/0	846.5	4.547	6.282

10.1.1. OCCUPIED BANDWIDTH PLOTS



Band LTE17 5MHz	 Agilent 16:17:29 Feb 3, 2014 Ch Freq 710 MHz Center Freq 710.000000 MHz Start Freq 705.000000 MHz Stop Freq 715.000000 MHz CF Step 1.00000000 MHz Freq Cllset 0.00000000 Hz Occupied Bandwidth 4.5542 MHz Occ BW % Pwr 99.00 % x dB -26.00 dB Transmit Freq Error -10.672 kHz x dB Bandwidth 5.090 MHz Copyright 2000-2011 Agilent Technologies Band LTE17 5MHz OBW 16QAM Mid Channel FRB.gif	 Agilent 16:18:23 Feb 3, 2014 Ch Freq 710 MHz Center Freq 710.000000 MHz Start Freq 705.000000 MHz Stop Freq 715.000000 MHz CF Step 1.00000000 MHz Freq Cllset 0.00000000 Hz Occupied Bandwidth 4.5268 MHz Occ BW % Pwr 99.00 % x dB -26.00 dB Transmit Freq Error -10.648 kHz x dB Bandwidth 5.058 MHz Copyright 2000-2011 Agilent Technologies Band LTE17 5MHz OBW QPSK Mid Channel FRB.gif
Band LTE5 10MHz Z	 Agilent 14:33:23 Feb 3, 2014 Ch Freq 836.5 MHz Center Freq 836.500000 MHz Start Freq 826.500000 MHz Stop Freq 846.500000 MHz CF Step 2.00000000 MHz Freq Cllset 0.00000000 Hz Occupied Bandwidth 9.0754 MHz Occ BW % Pwr 99.00 % x dB -26.00 dB Transmit Freq Error 6.378 kHz x dB Bandwidth 10.089 MHz Copyright 2000-2011 Agilent Technologies Band LTE5 10MHz OBW 16QAM Mid Channel FRB.gif	 Agilent 14:34:40 Feb 3, 2014 Ch Freq 836.5 MHz Center Freq 836.500000 MHz Start Freq 826.500000 MHz Stop Freq 846.500000 MHz CF Step 2.00000000 MHz Freq Cllset 0.00000000 Hz Occupied Bandwidth 9.0718 MHz Occ BW % Pwr 99.00 % x dB -26.00 dB Transmit Freq Error -209.180 Hz x dB Bandwidth 10.204 MHz Copyright 2000-2011 Agilent Technologies Band LTE5 10MHz OBW QPSK Mid Channel FRB.gif

Band LTE5 5MHz	Agilent 13:46:11 Feb 3, 2014 R T Freq/Channel Ch Freq 836.5 MHz Trig Free Center Freq 836.500000 MHz Occupied Bandwidth Start Freq 831.500000 MHz Stop Freq 841.500000 MHz CF Step 1.00000000 MHz Auto Man Freq Cllset 0.00000000 Hz Center 836.500 MHz Span 10 MHz #Res BW 130 kHz #VBW 430 kHz Sweep 1 ms (601 pts) Occupied Bandwidth 4.5335 MHz Occ BW % Pwr 99.00 % x dB -26.00 dB Transmit Freq Error -1.093 kHz x dB Bandwidth 5.118 MHz Copyright 2000-2011 Agilent Technologies Band LTE5 5MHz OBW 16QAM Mid Channel FRB.gif	Agilent 13:45:28 Feb 3, 2014 R T Freq/Channel Ch Freq 836.5 MHz Trig Free Center Freq 836.500000 MHz Occupied Bandwidth Start Freq 831.500000 MHz Stop Freq 841.500000 MHz CF Step 1.00000000 MHz Auto Man Freq Cllset 0.00000000 Hz Center 836.500 MHz Span 10 MHz #Res BW 130 kHz #VBW 430 kHz Sweep 1 ms (601 pts) Occupied Bandwidth 4.5471 MHz Occ BW % Pwr 99.00 % x dB -26.00 dB Transmit Freq Error 4.903 kHz x dB Bandwidth 5.043 MHz Copyright 2000-2011 Agilent Technologies Band LTE5 5MHz OBW QPSK Mid Channel FRB.gif
Band Band 2	Agilent 11:37:16 Feb 3, 2014 R T Freq/Channel Ch Freq 1.880 GHz Trig Free Center Freq 1.88000000 GHz Occupied Bandwidth Start Freq 1.87500000 GHz Stop Freq 1.88500000 GHz CF Step 1.00000000 MHz Auto Man Freq Cllset 0.00000000 Hz Center 1.880 000 GHz Span 10 MHz #Res BW 100 kHz #VBW 300 kHz Sweep 1 ms (601 pts) Occupied Bandwidth 4.1560 MHz Occ BW % Pwr 99.00 % x dB -26.00 dB Transmit Freq Error -3.637 kHz x dB Bandwidth 4.683 MHz Copyright 2000-2011 Agilent Technologies Band WCDMA B2 HSDPA OBW	Agilent 11:01:06 Feb 3, 2014 R T Freq/Channel Ch Freq 1.880 GHz Trig Free Center Freq 1.88000000 GHz Occupied Bandwidth Start Freq 1.87500000 GHz Stop Freq 1.88500000 GHz CF Step 1.00000000 MHz Auto Man Freq Cllset 0.00000000 Hz Center 1.880 000 GHz Span 10 MHz #Res BW 100 kHz #VBW 300 kHz Sweep 1 ms (601 pts) Occupied Bandwidth 4.1711 MHz Occ BW % Pwr 99.00 % x dB -26.00 dB Transmit Freq Error 1.043 kHz x dB Bandwidth 4.688 MHz Copyright 2000-2011 Agilent Technologies Band WCDMA B2 REL99 OBW

Band Band 5	Agilent 09:54:28 Feb 3, 2014 Ch Freq 836.6 MHz Occupied Bandwidth Rel 34.5 dBm #Peak Log 10 dB/ Offset 10.6 dB Center 836.600 MHz Span 10 MHz #Res BW 100 kHz #VBW 300 kHz Sweep 1 ms (601 pts) Occupied Bandwidth 4.1836 MHz Transmit Freq Error -2.864 kHz x dB Bandwidth 4.636 MHz Occ BW % Per 99.00% x dB -26.00 dB Sweep Time 1.000 ms Span 10 MHz Points 601 Band WCDMA B5 HSDPA OBW	Agilent 10:30:48 Feb 3, 2014 Ch Freq 836.6 MHz Occupied Bandwidth Rel 34.5 dBm #Peak Log 10 dB/ Offset 10.6 dB Center 836.600 MHz Span 10 MHz #Res BW 100 kHz #VBW 300 kHz Sweep 1 ms (601 pts) Occupied Bandwidth 4.1922 MHz Transmit Freq Error 3.032 kHz x dB Bandwidth 4.636 MHz Occ BW % Per 99.00% x dB -26.00 dB Sweep Time 1.000 ms Span 10 MHz Points 601 Band WCDMA B5 REL99 OBW
Band GSM1 900 GPRS	Agilent 09:00:12 Feb 3, 2014 Ch Freq 1.88 GHz Occupied Bandwidth Rel 34.5 dBm #Peak Log 10 dB/ Offset 10.6 dB Center 1.880 000 0 GHz Span 1 MHz #Res BW 6.8 kHz #VBW 22 kHz Sweep 20.6 ms (601 pts) Occupied Bandwidth 246.9265 kHz Transmit Freq Error 744.179 Hz x dB Bandwidth 320.891 kHz Occ BW % Per 99.00% x dB -26.00 dB Sweep Time 20.6 ms Span 1 MHz Signal Track On Band GSM1900 GPRS OBW Mid channel	Agilent 09:00:12 Feb 3, 2014 Ch Freq 1.88 GHz Occupied Bandwidth Rel 34.5 dBm #Peak Log 10 dB/ Offset 10.6 dB Center 1.880 000 0 GHz Span 1 MHz #Res BW 6.8 kHz #VBW 22 kHz Sweep 20.6 ms (601 pts) Occupied Bandwidth 246.9265 kHz Transmit Freq Error 744.179 Hz x dB Bandwidth 320.891 kHz Occ BW % Per 99.00% x dB -26.00 dB Sweep Time 20.6 ms Span 1 MHz Signal Track On Band GSM1900 GPRS OBW Mid channel

10.2. BAND EDGE EMISSIONS

RULE PART(S)

FCC: §22.359, §24.238, §27

LIMITS

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

TEST PROCEDURE

Per KDB 971168 D01 Power Meas License Digital Systems v02r01

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

For each band edge measurement:

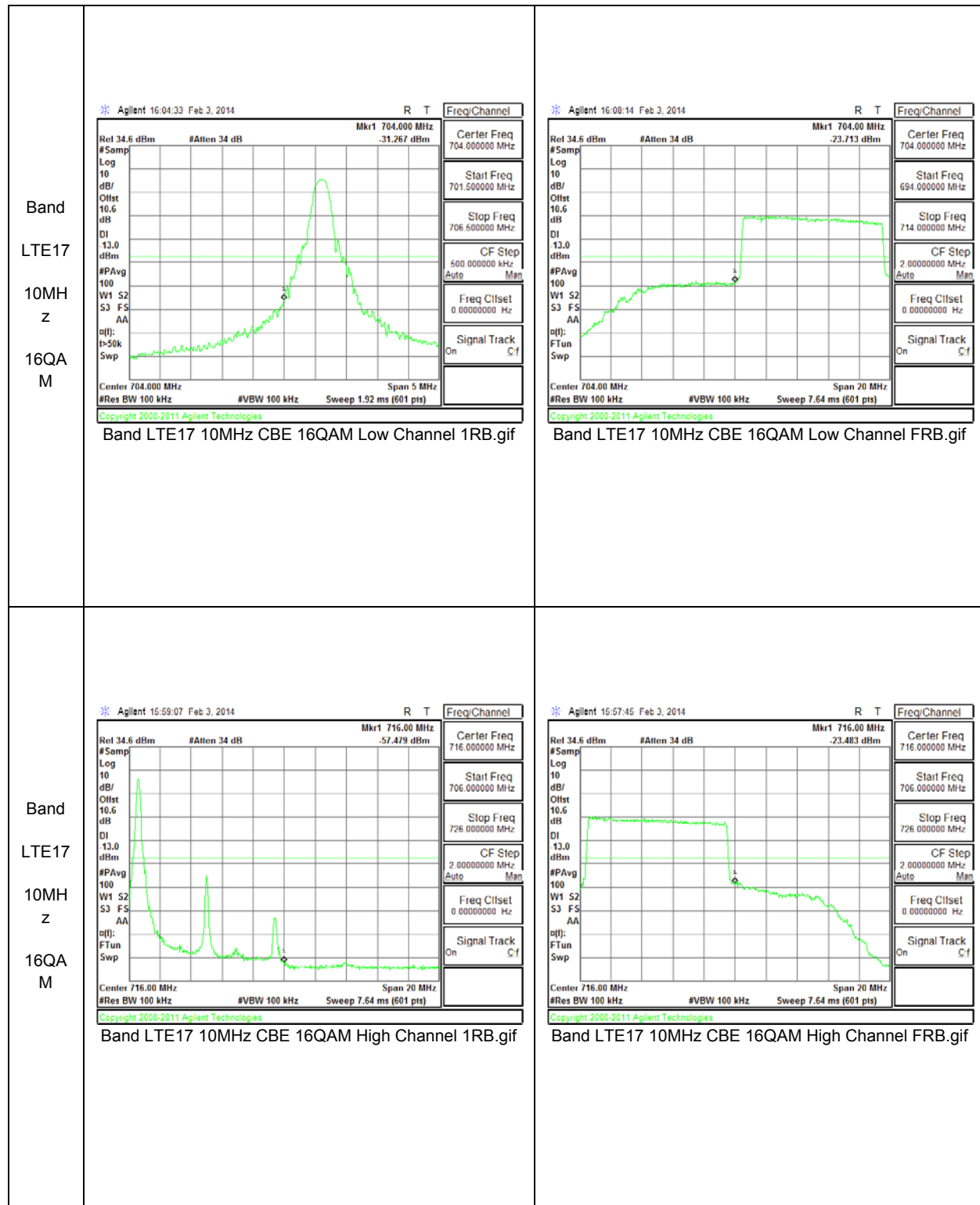
- Set the spectrum analyzer span to include the block edge frequency (824, 849, 1850, 1910 and 1915MHz)
- Set a marker to point the corresponding band edge frequency in each test case.
- Set display line at -13 dBm.
- Set resolution bandwidth to at least 1% of emission bandwidth.
- (m)(6) Compliance 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.

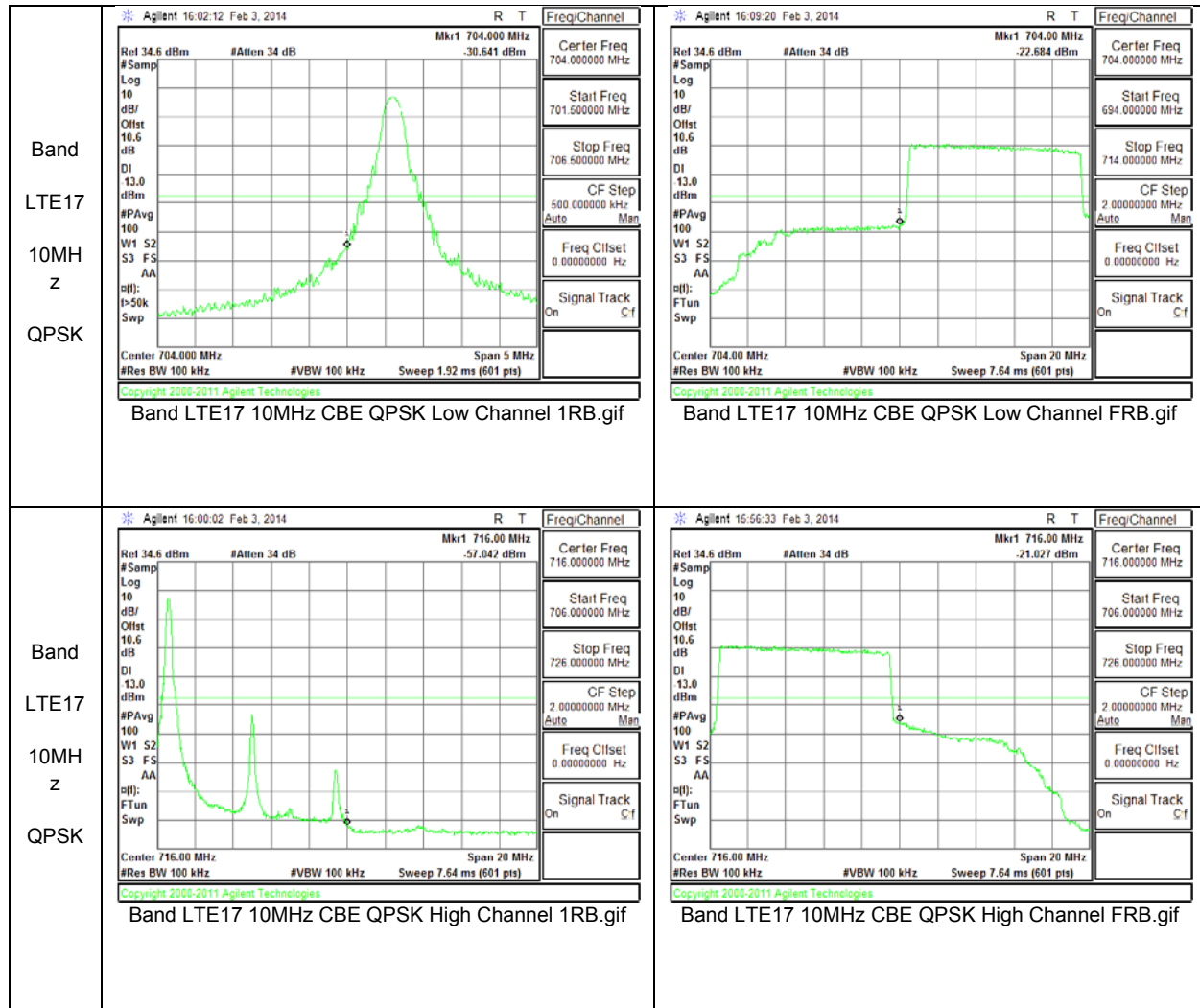
MODES TESTED

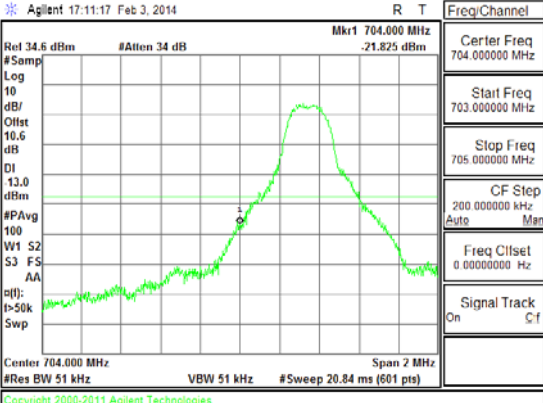
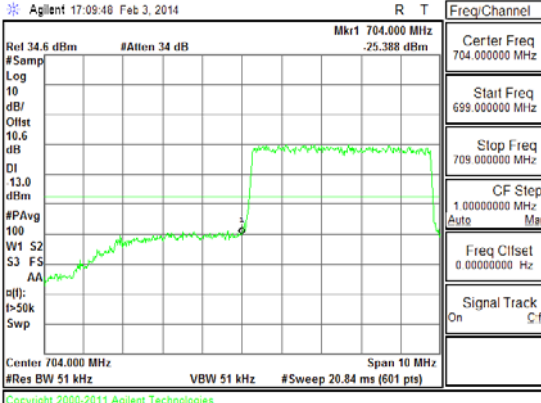
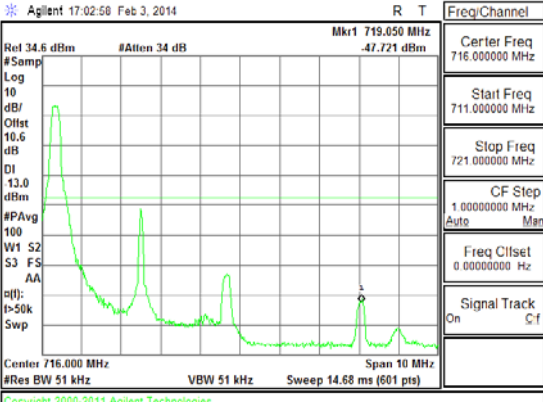
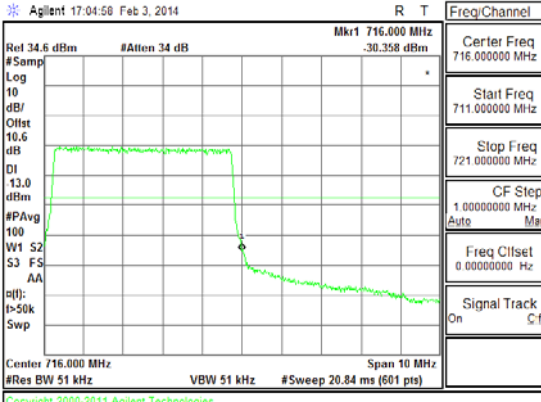
GSM 1900 / WCDMA B2&B5 / LTE B5 & 17

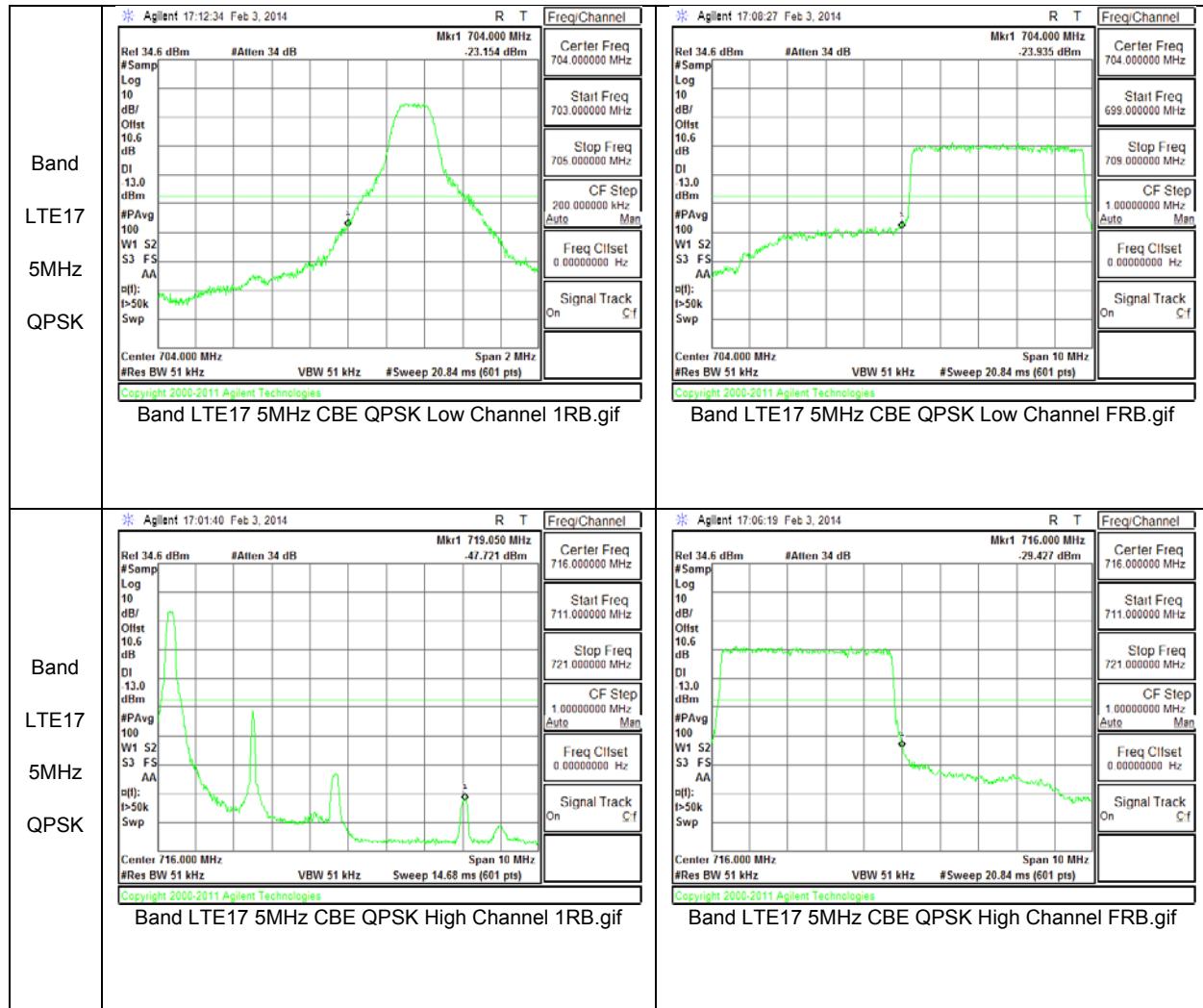
RESULTS

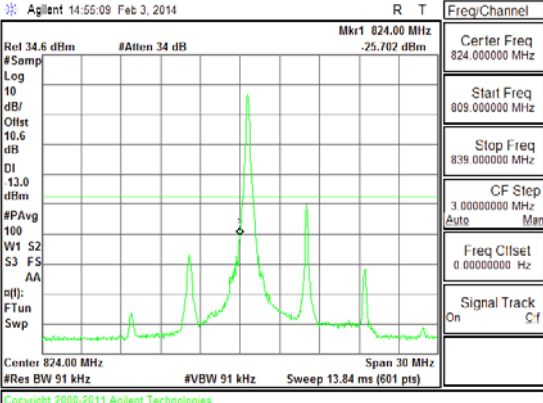
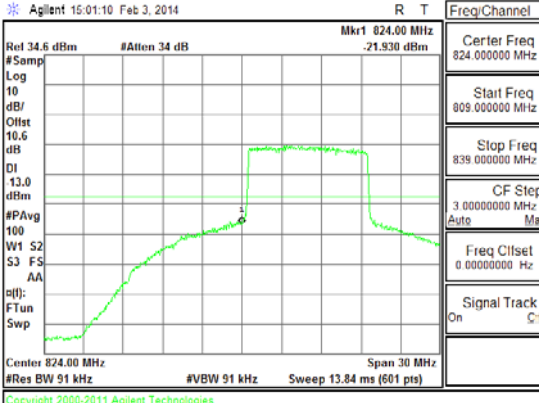
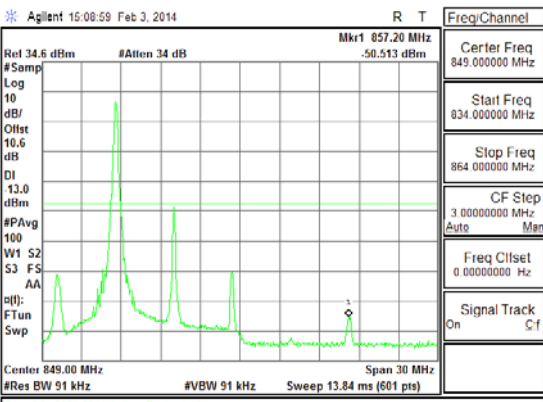
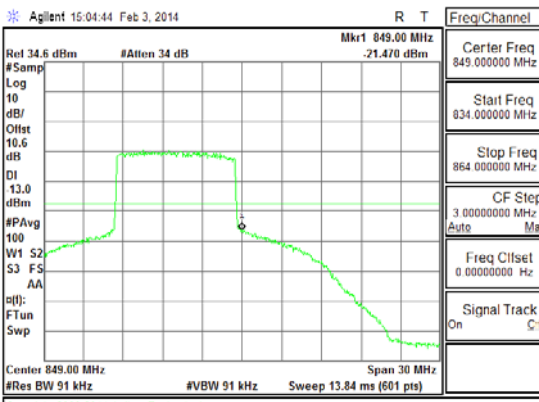
10.2.1. BAND EDGE PLOTS

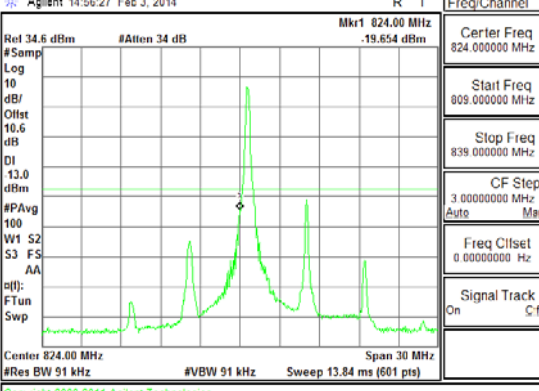
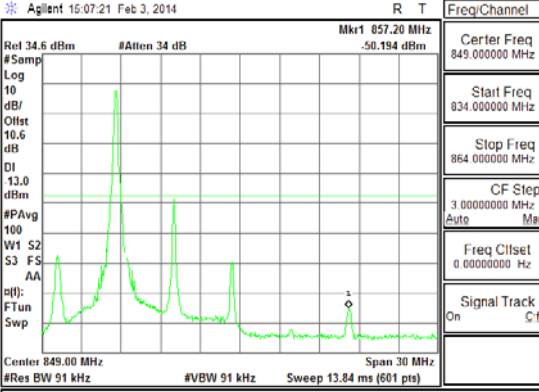
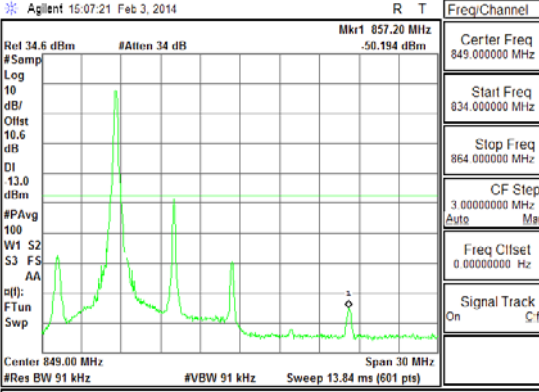
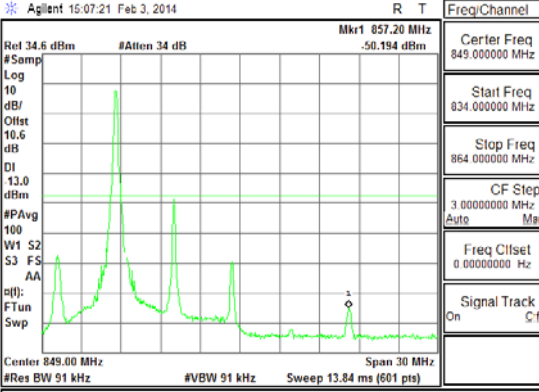




Band LTE17 5MHz 16QAM	 Agilent 17:11:17 Feb 3, 2014 R T Freq/Channel Rel 34.6 dBm #Atten 34 dB Mkr1 704.000 MHz Center Freq 704.000000 MHz #Samp Log 10 dB/ 10.6 dB Offset 13.0 dBm DI 13.0 dBm #PAvg 100 W1 S2 S3 FS AA Start Freq 703.000000 MHz Stop Freq 705.000000 MHz CF Step 200.000000 MHz Auto Man Freq Cllset 0.0000000 Hz Signal Track On C/F Center 704.000 MHz Span 2 MHz #Res BW 51 kHz VBW 51 kHz #Sweep 20.84 ms (601 pts) Copyright 2000-2011 Agilent Technologies Band LTE17 5MHz CBE 16QAM Low Channel 1RB.gif	 Agilent 17:09:48 Feb 3, 2014 R T Freq/Channel Rel 34.6 dBm #Atten 34 dB Mkr1 704.000 MHz Center Freq 704.000000 MHz #Samp Log 10 dB/ 10.6 dB Offset 13.0 dBm DI 13.0 dBm #PAvg 100 W1 S2 S3 FS AA Start Freq 699.000000 MHz Stop Freq 709.000000 MHz CF Step 1.00000000 MHz Auto Man Freq Cllset 0.0000000 Hz Signal Track On C/F Center 704.000 MHz Span 10 MHz #Res BW 51 kHz VBW 51 kHz #Sweep 20.84 ms (601 pts) Copyright 2000-2011 Agilent Technologies Band LTE17 5MHz CBE 16QAM Low Channel FRB.gif
Band LTE17 5MHz 16QAM	 Agilent 17:02:58 Feb 3, 2014 R T Freq/Channel Rel 34.6 dBm #Atten 34 dB Mkr1 716.050 MHz Center Freq 716.000000 MHz #Samp Log 10 dB/ 10.6 dB Offset 13.0 dBm DI 13.0 dBm #PAvg 100 W1 S2 S3 FS AA Start Freq 711.000000 MHz Stop Freq 721.000000 MHz CF Step 1.00000000 MHz Auto Man Freq Cllset 0.0000000 Hz Signal Track On C/F Center 716.000 MHz Span 10 MHz #Res BW 51 kHz VBW 51 kHz Sweep 14.68 ms (601 pts) Copyright 2000-2011 Agilent Technologies Band LTE17 5MHz CBE 16QAM High Channel 1RB.gif	 Agilent 17:04:58 Feb 3, 2014 R T Freq/Channel Rel 34.6 dBm #Atten 34 dB Mkr1 716.000 MHz Center Freq 716.000000 MHz #Samp Log 10 dB/ 10.6 dB Offset 13.0 dBm DI 13.0 dBm #PAvg 100 W1 S2 S3 FS AA Start Freq 711.000000 MHz Stop Freq 721.000000 MHz CF Step 1.00000000 MHz Auto Man Freq Cllset 0.0000000 Hz Signal Track On C/F Center 716.000 MHz Span 10 MHz #Res BW 51 kHz VBW 51 kHz #Sweep 20.84 ms (601 pts) Copyright 2000-2011 Agilent Technologies Band LTE17 5MHz CBE 16QAM High Channel FRB.gif



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

Band LTE5 10MHz Z QPSK	 Agilent 14:56:27 Feb 3, 2014 R T Freq/Channel Rel 34.6 dBm #Atten 34 dB Mkr1 824.00 MHz Center Freq 824.000000 MHz Start Freq 809.000000 MHz Stop Freq 839.000000 MHz CF Step 3.00000000 MHz Auto Man Freq Ciset 0.00000000 Hz Signal Track On Cf Center 824.00 MHz #VBW 91 kHz Span 30 MHz Sweep 13.84 ms (601 pts) Copyright 2000-2011 Agilent Technologies Band LTE5 10MHz CBE QPSK Low Channel 1RB.gif
Band LTE5 10MHz Z QPSK	 Agilent 14:59:54 Feb 3, 2014 R T Freq/Channel Rel 34.6 dBm #Atten 34 dB Mkr1 824.00 MHz Center Freq 824.000000 MHz Start Freq 809.000000 MHz Stop Freq 839.000000 MHz CF Step 3.00000000 MHz Auto Man Freq Ciset 0.00000000 Hz Signal Track On Cf Center 824.00 MHz #VBW 91 kHz Span 30 MHz Sweep 13.84 ms (601 pts) Copyright 2000-2011 Agilent Technologies Band LTE5 10MHz CBE QPSK Low Channel FRB.gif
Band LTE5 10MHz Z QPSK	 Agilent 15:07:21 Feb 3, 2014 R T Freq/Channel Rel 34.6 dBm #Atten 34 dB Mkr1 857.20 MHz Center Freq 849.000000 MHz Start Freq 834.000000 MHz Stop Freq 864.000000 MHz CF Step 3.00000000 MHz Auto Man Freq Ciset 0.00000000 Hz Signal Track On Cf Center 849.00 MHz #VBW 91 kHz Span 30 MHz Sweep 13.84 ms (601 pts) Copyright 2000-2011 Agilent Technologies Band LTE5 10MHz CBE QPSK High Channel 1RB.gif
Band LTE5 10MHz Z QPSK	 Agilent 15:06:07 Feb 3, 2014 R T Freq/Channel Rel 34.6 dBm #Atten 34 dB Mkr1 849.00 MHz Center Freq 849.000000 MHz Start Freq 834.000000 MHz Stop Freq 864.000000 MHz CF Step 3.00000000 MHz Auto Man Freq Ciset 0.00000000 Hz Signal Track On Cf Center 849.00 MHz #VBW 91 kHz Span 30 MHz Sweep 13.84 ms (601 pts) Copyright 2000-2011 Agilent Technologies Band LTE5 10MHz CBE QPSK High Channel FRB.gif

Band
LTE5
5MHz
16QAM

Agilent 14:07:36 Feb 3, 2014

Rel 34.6 dBm #Atten 34 dB Mkr1 824.00 MHz -18.218 dBm

Center Freq 824.000000 MHz

Start Freq 814.000000 MHz

Stop Freq 834.000000 MHz

CF Step 2.00000000 MHz

Freq C1set 0.00000000 Hz

Signal Track On

Center 824.00 MHz #Res BW 43 kHz Sweep 41.28 ms (601 pts) Span 20 MHz

Copyright 2000-2011 Agilent Technologies

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

Agilent 14:13:19 Feb 3, 2014

Rel 34.6 dBm #Atten 34 dB Mkr1 824.00 MHz -20.789 dBm

Center Freq 824.000000 MHz

Start Freq 814.000000 MHz

Stop Freq 834.000000 MHz

CF Step 2.00000000 MHz

Freq C1set 0.00000000 Hz

Signal Track On

Center 824.00 MHz #Res BW 43 kHz Sweep 41.28 ms (601 pts) Span 20 MHz

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

Band
LTE5
5MHz
16QAM

Agilent 14:15:53 Feb 3, 2014

Rel 34.6 dBm #Atten 34 dB Mkr1 853.00 MHz -48.484 dBm

Center Freq 849.000000 MHz

Start Freq 839.000000 MHz

Stop Freq 859.000000 MHz

CF Step 2.00000000 MHz

Freq C1set 0.00000000 Hz

Signal Track On

Center 849.00 MHz #Res BW 43 kHz Sweep 41.28 ms (601 pts) Span 20 MHz

Copyright 2000-2011 Agilent Technologies

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

Agilent 14:20:49 Feb 3, 2014

Rel 34.6 dBm #Atten 34 dB Mkr1 849.00 MHz -21.567 dBm

Center Freq 849.000000 MHz

Start Freq 839.000000 MHz

Stop Freq 859.000000 MHz

CF Step 2.00000000 MHz

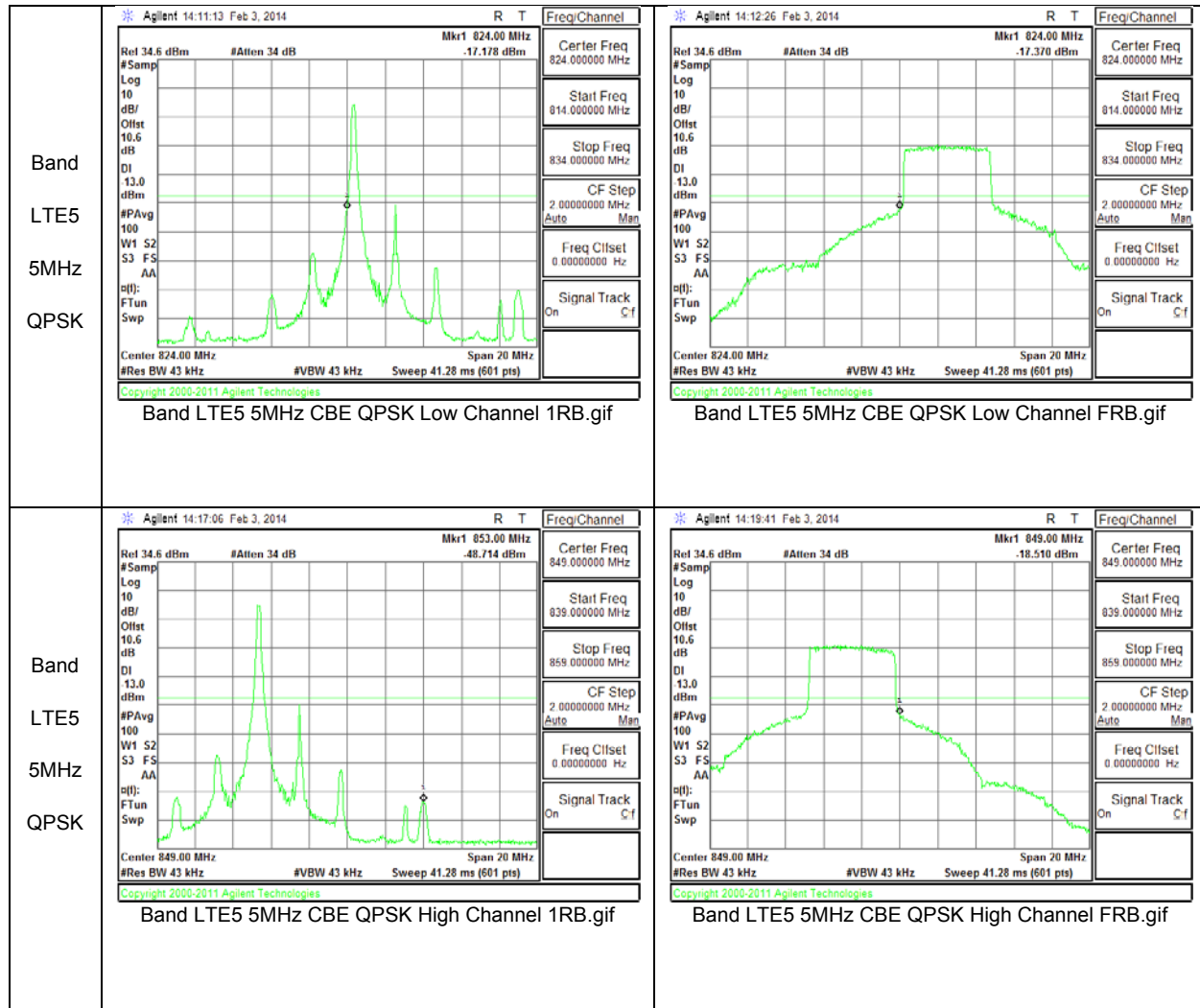
Freq C1set 0.00000000 Hz

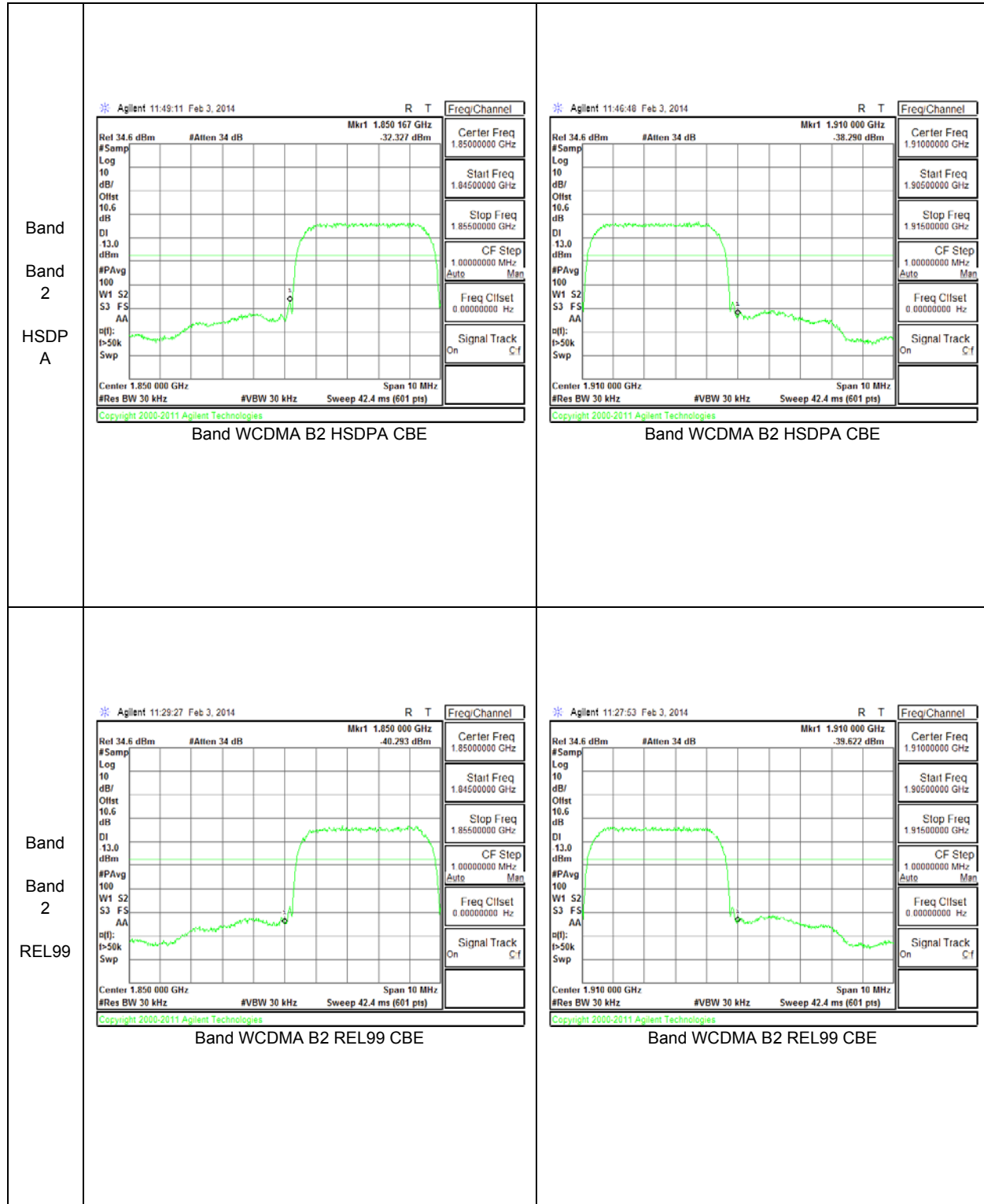
Signal Track On

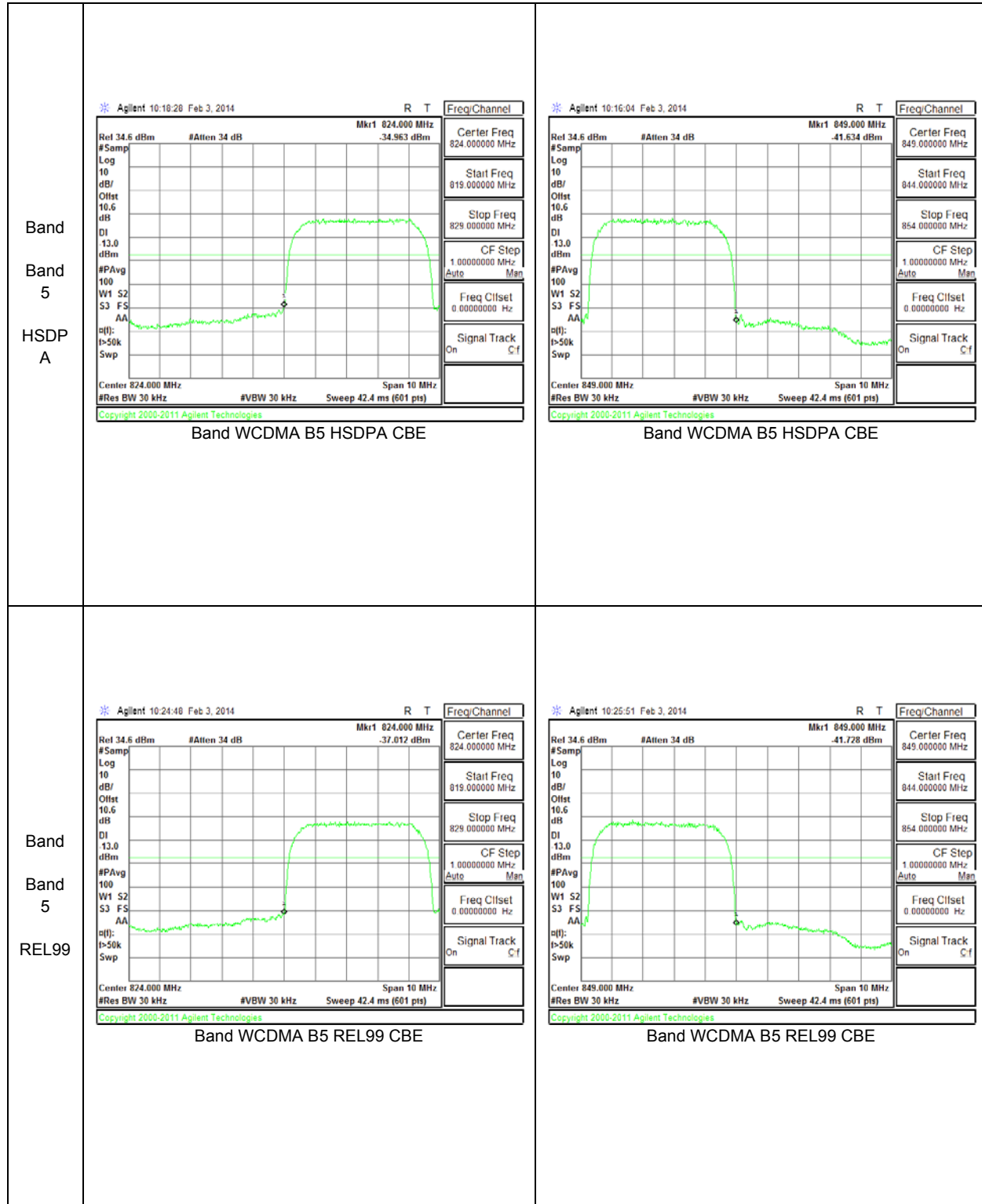
Center 849.00 MHz #Res BW 43 kHz Sweep 41.28 ms (601 pts) Span 20 MHz

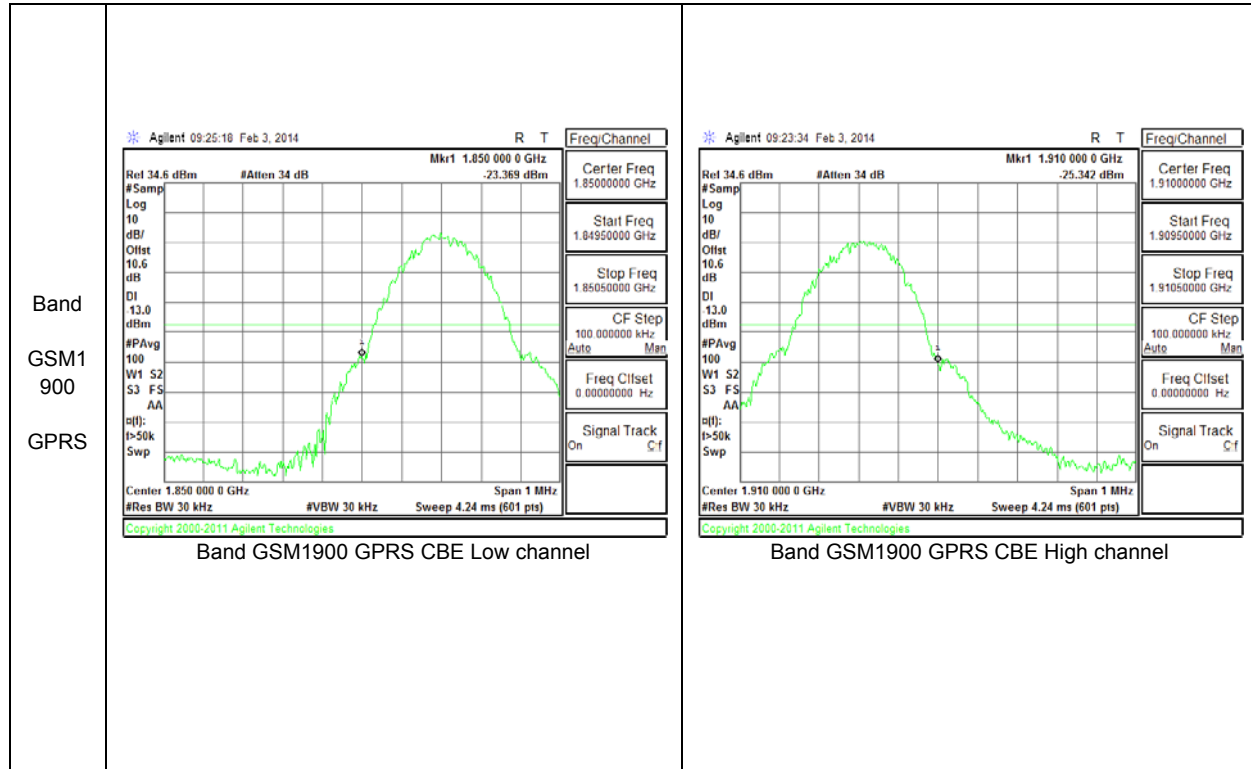
Copyright 2000-2011 Agilent Technologies

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









10.3. OUT OF BAND EMISSIONS

RULE PART(S)

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

LIMITS

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

TEST PROCEDURE

Per KDB 971168 D01 Power Meas License Digital Systems v02r01

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

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.

MODES TESTED

GSM 1900 / WCDMA B2&B5 / LTE B5 & 17

RESULTS

10.3.1. OUT OF BAND EMISSIONS RESULT

Band	BW (MHz)	Mode	f (MHz)	Spur (dBm)	Spec (dBm)	Delta (dB)
LTE17	10	QPSK	709	-31.73	-13	-18.73
			710	-31.41	-13	-18.41
			711	-31.80	-13	-18.8
		16QAM	709	-31.56	-13	-18.56
			710	-31.36	-13	-18.36
			711	-31.50	-13	-18.5

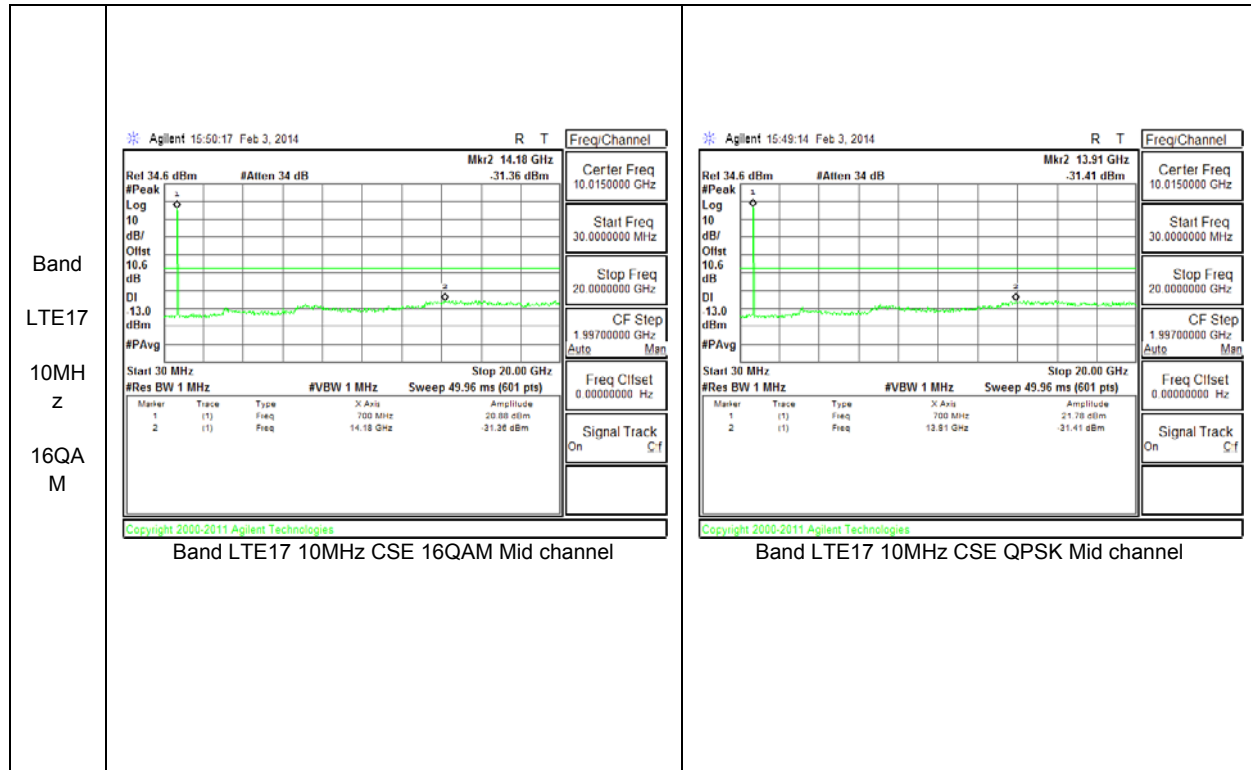
Band	BW (MHz)	Mode	f (MHz)	Spur (dBm)	Spec (dBm)	Delta (dB)
LTE17	5	QPSK	706.5	-30.88	-13	-17.88
			710	-31.10	-13	-18.1
			713.5	-32.06	-13	-19.06
		16QAM	706.5	-30.97	-13	-17.97
			710	-31.64	-13	-18.64
			713.5	-32.49	-13	-19.49

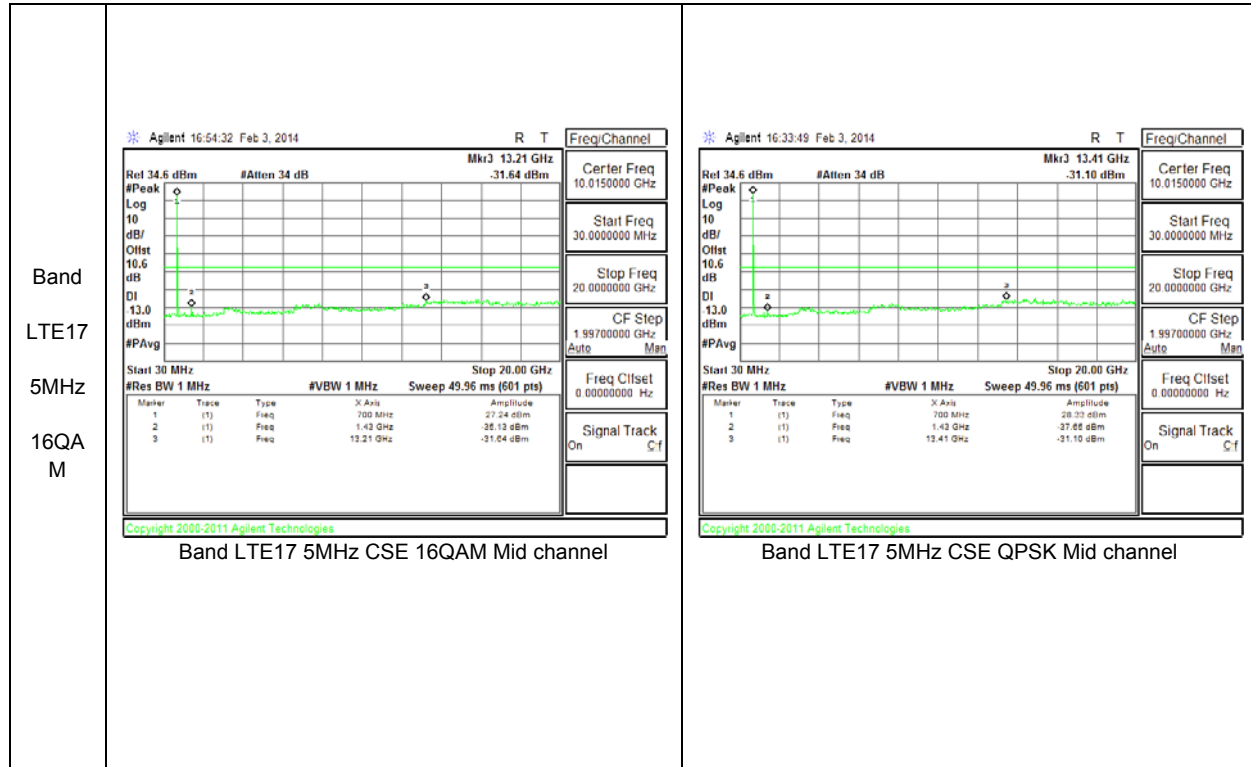
Band	BW (MHz)	Mode	f (MHz)	Spur (dBm)	Spec (dBm)	Delta (dB)
LTE5	10	QPSK	829	-31.47	-13	-18.47
			836.5	-30.42	-13	-17.42
			844	-30.24	-13	-17.24
		16QAM	829	-30.70	-13	-17.7
			836.5	-30.72	-13	-17.72
			844	-30.99	-13	-17.99

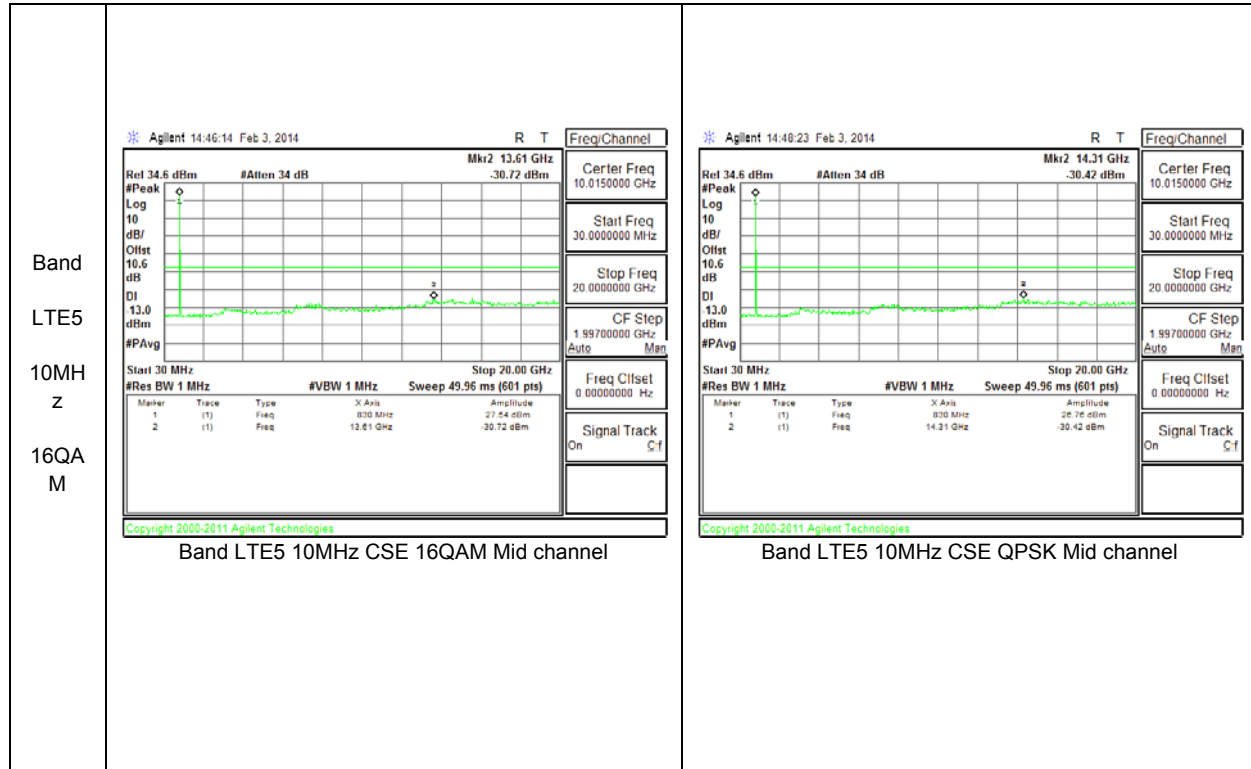
Band	BW (MHz)	Mode	f (MHz)	Spur (dBm)	Spec (dBm)	Delta (dB)
LTE5	5	QPSK	826.5	-31.96	-13	-18.96
			836.5	-31.28	-13	-18.28
			846.5	-30.79	-13	-17.79
		16QAM	826.5	-31.48	-13	-18.48
			836.5	-31.93	-13	-18.93
			846.5	-31.09	-13	-18.09

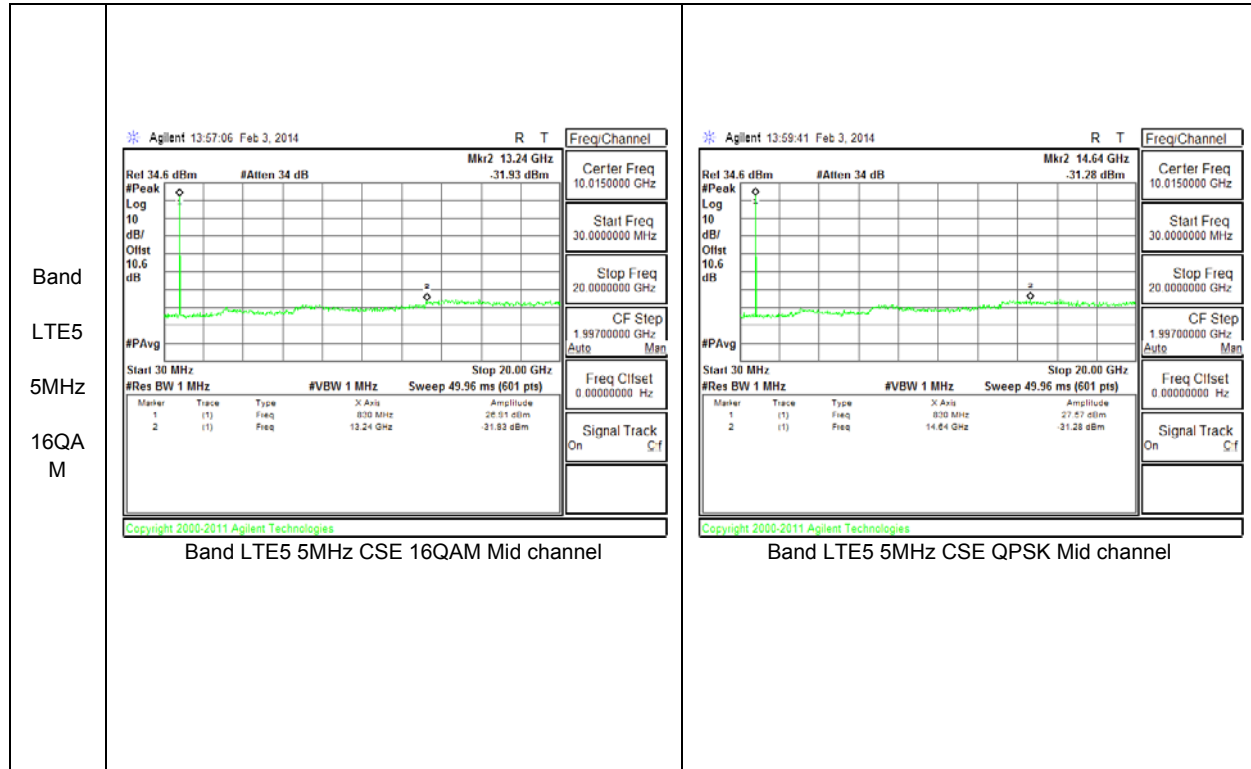
Band	Mode	f (MHz)	Spur (dBm)	Spec (dBm)	Delta (dB)
GSM1900	GPRS	1850.2	-30.99	-13	-17.99
		1880	-30.41	-13	-17.41
		1909.8	-30.38	-13	-17.38
Band 2	REL99	1852.4	-31.92	-13	-18.92
		1880	-31.13	-13	-18.13
		1907.6	-30.76	-13	-17.76
	HSDPA	1852.4	-30.60	-13	-17.6
		1880	-30.35	-13	-17.35
		1907.6	-31.27	-13	-18.27
Band 5	REL99	826.6	-30.51	-13	-17.51
		836.6	-30.92	-13	-17.92
		846.4	-30.85	-13	-17.85
	HSDPA	826.6	-31.35	-13	-18.35
		836.6	-31.25	-13	-18.25
		846.4	-31.38	-13	-18.38

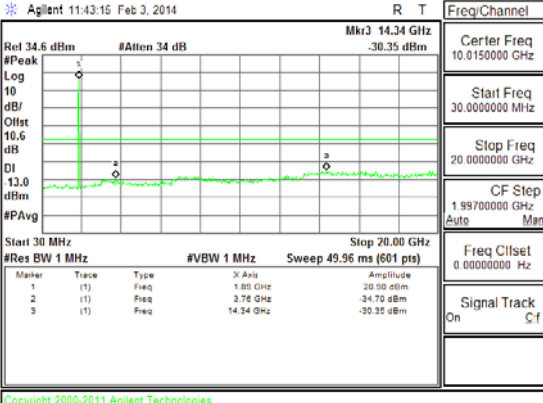
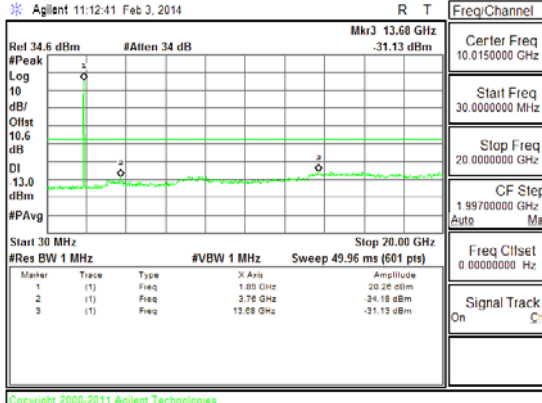
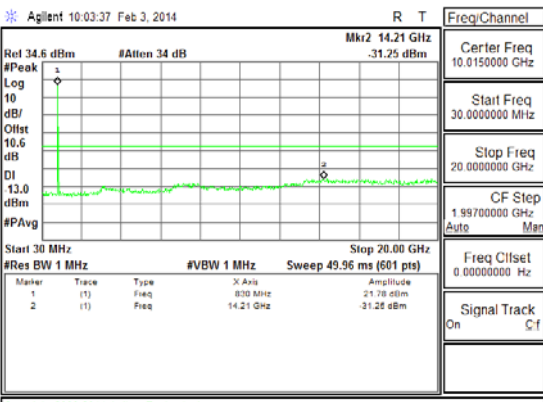
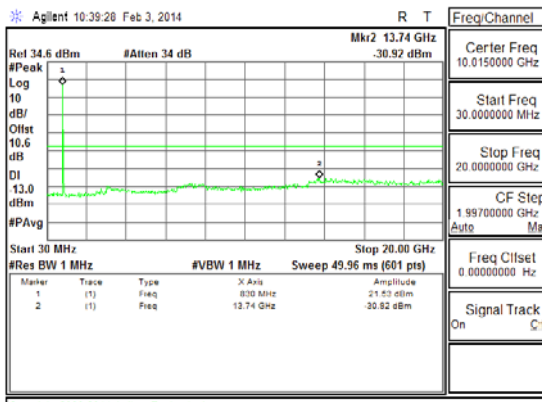
10.3.2. OUT OF BAND EMISSIONS PLOTS

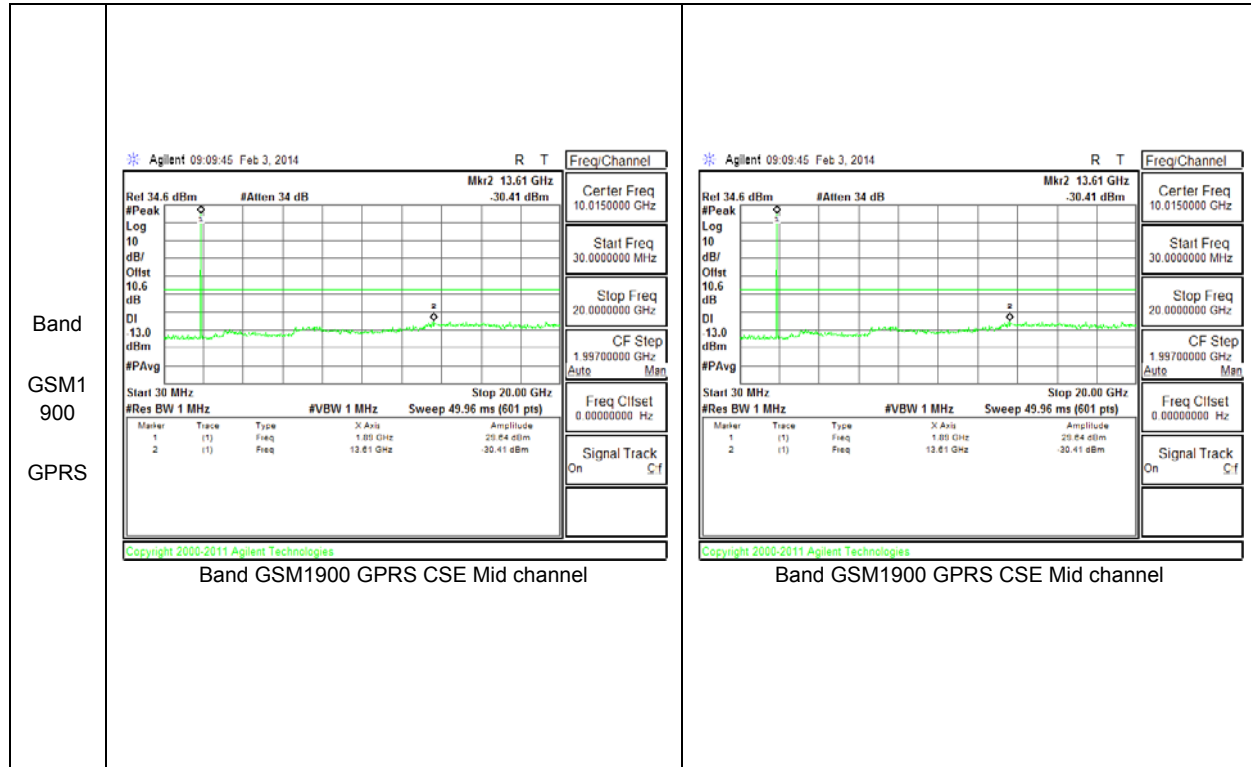








Band Band 2 HSDPA	 Copyright 2000-2011 Agilent Technologies Band WCDMA B2 HSDPA CSE	 Copyright 2000-2011 Agilent Technologies Band WCDMA B2 REL99 CSE
Band Band 5	 Copyright 2000-2011 Agilent Technologies Band WCDMA B5 HSDPA CSE	 Copyright 2000-2011 Agilent Technologies Band WCDMA B5 REL99 CSE



10.4. FREQUENCY STABILITY

RULE PART(S)

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

LIMITS

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

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

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

TEST PROCEDURE

Per KDB 971168 D01 Power Meas License Digital Systems v02r01

Frequency Stability vs Temperature:

The EUT is placed inside a temperature chamber. The temperature is set to 20°C and allowed to stabilize. After sufficient soak time, the transmitting frequency error is measured. The temperature is increased by 10 degrees, allowed to stabilize and soak, and then the measurement is repeated. This is repeated until +50°C is reached. Reference power supply voltage for these tests is 3.7Vdc.

Frequency Stability vs Voltage:

The peak frequency error is recorded (worst-case). The test voltage ranges from 3.50 to 4.26 VDC.

MODES TESTED

GSM 1900 / WCDMA B2&B5 / LTE B5 & 17

RESULTS

See the following pages.

10.4.1. FREQUENCY STABILITY RESULTS

PCS Band Freq: 1880MHz– MID CHANNEL

Reference Frequency: PCS Mid Channel 1880MHz @ 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)
3.70	50	1880.000016	-0.001	2.5
3.70	40	1880.000018	-0.002	2.5
3.70	30	1880.000015	-0.001	2.5
3.70	20	1880.000014	0	2.5
3.70	10	1880.000012	0.001	2.5
3.70	0	1880.000013	0.001	2.5
3.70	-10	1880.000002	-0.003	2.5
3.70	-20	1880.000023	-0.005	2.5
3.70	-30	1880.000021	-0.004	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)
3.70	20	1880.000014	0	2.5
4.20	20	1880.000013	0.001	2.5
3.30	20	1880.000017	-0.002	2.5

CELL BAND

Reference Frequency: Cell Mid Channel 836.6 MHz @ 20°C				
Limit: +- 2.5 ppm = 2091.500 Hz				
Power Supply (Vdc)	Environment Temperature (°C)	Frequency Deviation Measured with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
3.70	50	836.600005	0.002	2.5
3.70	40	836.600008	-0.001	2.5
3.70	30	836.600006	0.001	2.5
3.70	20	836.600007	0	2.5
3.70	10	836.600005	0.002	2.5
3.70	0	836.600004	0.004	2.5
3.70	-10	836.600011	-0.005	2.5
3.70	-20	836.600014	-0.008	2.5
3.70	-30	836.600009	-0.002	2.5

Reference Frequency: Cell Mid Channel 836.6 MHz @ 20°C				
Limit: +- 2.5 ppm = 2091.500 Hz				
Power Supply (Vdc)	Environment Temperature (°C)	Frequency Deviation Measured with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
3.70	20	836.600007	0.00000	2.5
4.20	20	836.600008	-0.00120	2.5
3.30	20	836.600006	0.00120	2.5

LTE 17

Reference Frequency: Cellular Mid Channel 710.000056 MHz @ 20°C				
Limit: to stay +- 2.5 ppm = 1775.000 Hz				
Power Supply (Vdc)	Environment Temperature (°C)	Frequency Deviation Measured with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
3.80	50	710.000002	0.005	2.5
3.80	40	710.000008	-0.004	2.5
3.80	30	710.000010	-0.006	2.5
3.80	20	710.000006	0	2.5
3.80	10	710.000007	-0.002	2.5
3.80	0	710.000006	0.000	2.5
3.80	-10	710.000006	-0.001	2.5
3.80	-20	710.000002	0.005	2.5
3.80	-30	710.000009	-0.005	2.5

Reference Frequency: Cellular Mid Channel 710.000056 MHz @ 20°C				
Limit: to stay +- 2.5 ppm = 1775.000 Hz				
Power Supply (Vdc)	Environment Temperature (°C)	Frequency Deviation Measured with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
3.80	20	710.000006	0	2.5
4.30	20	710.000000	0.008	2.5
3.30	20	710.000008	-0.003	2.5

LTE 5

Reference Frequency: Cellular Mid Channel 836.500002 MHz @ 20°C Limit: to stay +/- 2.5 ppm = 2091.250 Hz				
Power Supply (Vdc)	Environment Temperature (°C)	Frequency Deviation Measured with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
3.80	50	836.500001	0.001	2.5
3.80	40	836.500000	0.002	2.5
3.80	30	836.500007	-0.006	2.5
3.80	20	836.500002	0	2.5
3.80	10	836.500001	0.001	2.5
3.80	0	836.500001	0.002	2.5
3.80	-10	836.500009	-0.008	2.5
3.80	-20	836.500008	-0.007	2.5
3.80	-30	836.500010	-0.009	2.5

Reference Frequency: Cellular Mid Channel 710.000056 MHz @ 20°C Limit: to stay +/- 2.5 ppm = 2091.250 Hz				
Power Supply (Vdc)	Environment Temperature (°C)	Frequency Deviation Measured with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
3.80	20	836.500002	0	2.5
4.30	20	836.500015	-0.016	2.5
3.30	20	836.500011	-0.011	2.5

11. RADIATED TEST RESULTS

11.1. RADIATED POWER (ERP & EIRP)

RULE PART(S)

FCC: §2.1046, §22.913, §24.232

LIMITS

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

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

TEST PROCEDURE

ANSI / TIA / EIA 603C Clause 2.2.17

MODES TESTED

GSM 1900 / WCDMA B2&B5 / LTE B5 & 17

TEST RESULTS

11.1.1. ERP/EIRP Results

Band	Mode	Channel	f(MHz)	ERP / EIRP	
				dBm	mW
Band 2	REL99	9275	1852.6	22.81	190.99
		9400	1880	20.61	115.08
		9525	1907.4	21.12	129.42
	HSDPA	9275	1852.6	21.37	137.09
		9400	1880	20.35	108.39
		9525	1907.4	20.73	118.3

Band	Mode	Channel	f(MHz)	ERP / EIRP	
				dBm	mW
Band 5	REL99	4145	826.6	20.66	116.4
		4183	836.6	18.52	71.1
		4220	846.4	17.02	50.4
	HSDPA	4145	826.6	20.00	100
		4183	836.6	17.46	55.7
		4220	846.4	15.87	38.6

Band	Mode	Channel	f(MHz)	ERP / EIRP	
				dBm	mW
GSM1900	GPRS	512	1850.2	27.69	587.49
		661	1880	27.73	592.93
		810	1909.8	26.45	441.57

11.1.2. LTE ERP/EIRP Results

Band	BW (MHz)	Mode	RB/RB Size	f (MHz)	ERP / EIRP	
					dBm	mW
LTE17	10	QPSK	1/0	709	13.171	20.75
			1/0	710	13.571	22.76
			1/0	711	12.511	17.83
		16QAM	1/0	709	12.681	18.54
			1/0	710	12.551	17.99
			1/0	711	12.361	17.22

Band	BW (MHz)	Mode	RB/RB Size	f (MHz)	ERP / EIRP	
					dBm	mW
LTE17	5	QPSK	1/0	706.5	13.36	21.68
			1/0	710	14.29	26.86
			1/0	713.5	13.16	20.71
		16QAM	1/0	706.5	11.11	12.91
			1/0	710	12.47	17.66
			1/0	713.5	12.52	17.87

Band	BW (MHz)	Mode	RB/RB Size	f (MHz)	ERP / EIRP	
					dBm	mW
LTE5	10	QPSK	1/0	829	21.07	127.9
			1/0	836.5	19.00	79.43
			1/0	844	19.23	83.77
		16QAM	1/0	829	19.93	98.40
			1/0	836.5	18.53	71.29
			1/0	844	18.84	76.58

Band	BW (MHz)	Mode	RB/RB Size	f (MHz)	ERP / EIRP	
					dBm	mW
LTE5	5	QPSK	1/0	826.5	21.86	153.5
			1/0	836.5	21.45	139.6
			1/0	846.5	20.58	114.3
		16QAM	1/0	826.5	20.86	121.9
			1/0	836.5	20.56	113.8
			1/0	846.5	19.43	87.7

Band
LTE17
10MHz
z
QPSK

High Frequency Substitution Measurement
Compliance Certification Services Chamber C

Company:

Project #:

Date:

Test Engineer:

Configuration:

Mode:

SAMSUNG

14U17012

01/30/13

CHARLES VERGONIO

EUT Only

LTE Band 17_10MHz_ QPSK,

Test Equipment:

Receiving: Sunol T345, and 3m Chamber N-type Cable (Setup this one for testing EUT)

Substitution: Dipole S/N: 00022117, 4ft SMA Cable (SN # 245200 001) Warehouse.

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
709.00	11.85	V	0.5	0.0	11.35	38.5	-27.1	
709.00	13.67	H	0.5	0.0	13.17	38.5	-25.3	
Mid Ch								
710.00	12.15	V	0.5	0.0	11.65	38.5	-26.8	
710.00	14.07	H	0.5	0.0	13.57	38.5	-24.9	
High Ch								
711.00	11.36	V	0.5	0.0	10.86	38.5	-27.6	
711.00	13.01	H	0.5	0.0	12.51	38.5	-25.9	

Rev. 3.17.11

Band
LTE17
5MHz
16QAM

High Frequency Substitution Measurement
Compliance Certification Services Chamber C

Company: SAMSUNG
Project #: 14U17012
Date: 01/30/13
Test Engineer: CHARLES VERGONIO
Configuration: EUT Only
Mode: LTE Band 17_5MHz_ 16QAM

Test Equipment:

Receiving: Sunol T345, and 3m Chamber N-type Cable (Setup this one for testing EUT)
Substitution: Dipole S/N: 00022117, 4ft SMA Cable (SN # 245200 001) Warehouse.

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
706.50	11.61	V	0.5	0.0	11.11	38.5	-27.3	
706.50	11.41	H	0.5	0.0	10.91	38.5	-27.5	
Mid Ch								
710.00	11.01	V	0.5	0.0	10.51	38.5	-27.9	
710.00	12.97	H	0.5	0.0	12.47	38.5	-26.0	
High Ch								
713.50	12.02	V	0.5	0.0	11.52	38.5	-26.9	
713.50	13.02	H	0.5	0.0	12.52	38.5	-25.9	

Rev. 3.17.11

Band

LTE5

10MHz
Z

16QAM

High Frequency Substitution Measurement
Compliance Certification Services Chamber C

Company: SAMSUNG
Project #: 14U17012
Date: 01/30/13
Test Engineer: CHARLES VERGONIO
Configuration: EUT Only
Mode: LTE Band 5_10MHz_ 16QAM

Test Equipment:

Receiving: Sunol T345, and 3m Chamber N-type Cable (Setup this one for testing EUT)
Substitution: Dipole S/N: 00022117, 4ft SMA Cable (SN # 245200 001) Warehouse.

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
829.00	20.43	V	0.5	0.0	19.93	38.5	-18.5	
829.00	18.40	H	0.5	0.0	17.90	38.5	-20.5	
Mid Ch								
836.50	19.03	V	0.5	0.0	18.53	38.5	-19.9	
836.50	17.40	H	0.5	0.0	16.90	38.5	-21.5	
High Ch								
844.00	16.69	V	0.5	0.0	16.19	38.5	-22.3	
844.00	19.34	H	0.5	0.0	18.84	38.5	-19.6	

Rev. 3.17.11

Band

Band

2

REL99

High Frequency Fundamental Measurement

Compliance Certification Services Chamber C

Company:

Project #:

Date:

Test Engineer:

Configuration:

Mode:

Samsung

14U17012

01/29/14

Trina Noor

EUT ONLY, X Position

REL99 1900MHz

Test Equipment:

Receiving: T119, and Chamber C SMA Cables

Substitution: Horn T711 Substitution, 4ft SMA Cable (244639001) Warehouse

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1.853	16.3	V	0.85	4.60	20.05	33.0	-13.0	
1.853	19.1	H	0.85	4.60	22.81	33.0	-10.2	
Mid Ch								
1.880	16.1	V	0.85	4.60	19.81	33.0	-13.2	
1.880	16.9	H	0.85	4.60	20.61	33.0	-12.4	
High Ch								
1.907	13.6	V	0.85	4.60	17.38	33.0	-15.6	
1.907	17.4	H	0.85	4.60	21.12	33.0	-11.9	

Rev. 3.17.11

11.2. FIELD STRENGTH OF SPURIOUS RADIATION

RULE PART(S)

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

LIMIT

§22.917 (e) and §24.238 (a): Out of band emissions. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log (P)$ dB

TEST PROCEDURE

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

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

MODES TESTED

GSM 1900 / WCDMA B2&B5 / LTE B5 & 17

RESULTS

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 14U17012
Date: 01/31/14
Test Engineer: Charles Vergonio
Configuration: X Position, AC Charger
Mode: TX, LTE BAND 17, 10MHz BW, 16QAM

Chamber	Pre-amplifier	Filter	Limit
3m Chamber	T34 8449B	Filter 1	Part 27

Band	f	SG reading	Ant. Pol.	Distance	Preamp	Filter	EIRP	Limit	Delta	Notes
	GHz	(dBm)	(H/V)	(m)	(dB)	(dB)	(dBm)	(dBm)	(dB)	
LTE17 10MH z 16QA M	Low Channel (709MHz)									
	1.418	-28.8	V	3.0	37.8	1.0	-65.6	-13.0	-52.6	
	2.127	-23.9	V	3.0	36.7	1.0	-59.6	-13.0	-46.6	
	2.836	-23.7	V	3.0	36.2	1.0	-58.9	-13.0	-45.9	
	1.418	-28.4	H	3.0	37.8	1.0	-65.1	-13.0	-52.1	
	2.127	-25.5	H	3.0	36.7	1.0	-61.2	-13.0	-48.2	
	2.836	-25.3	H	3.0	36.2	1.0	-60.5	-13.0	-47.5	
	Mid Channel (710MHz)									
	1.420	-29.3	V	3.0	37.8	1.0	-66.0	-13.0	-53.0	
	2.130	-24.0	V	3.0	36.7	1.0	-59.7	-13.0	-46.7	
	2.840	-24.4	V	3.0	36.2	1.0	-59.6	-13.0	-46.6	
	1.420	-29.0	H	3.0	37.8	1.0	-65.8	-13.0	-52.8	
	2.130	-25.9	H	3.0	36.7	1.0	-61.6	-13.0	-48.6	
	2.840	-25.4	H	3.0	36.2	1.0	-60.6	-13.0	-47.6	
	High Channel (711MHz)									
	1.422	-28.9	V	3.0	37.8	1.0	-65.6	-13.0	-52.6	
	2.133	-23.7	V	3.0	36.7	1.0	-59.4	-13.0	-46.4	
	2.844	-23.8	V	3.0	36.2	1.0	-59.0	-13.0	-46.0	
1.422	-28.1	H	3.0	37.8	1.0	-64.8	-13.0	-51.8		
2.133	-25.2	H	3.0	36.7	1.0	-60.9	-13.0	-47.9		
2.844	-25.1	H	3.0	36.2	1.0	-60.3	-13.0	-47.3		

Rev. 03.03.09

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

1.0

Compliance Certification Services Above 1GHz High Frequency Substitution Measurement																																																																																																																																																																																																																																					
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Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company:
Project #:
Date:
Test Engineer:
Configuration:
Mode:

Samsung
 14U17012
 01/31/14
 Charles Vergonio
 X Position, AC Charger
 TX, LTE BAND 17, 5MHz BW, 16QAM

Chamber
 3m Chamber

Pre-amplifier
 T34 8449B

Filter
 Filter 1

Limit
 Part 27

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Channel (706.5MHz)									
1.413	-29.3	V	3.0	37.8	1.0	-66.0	-13.0	-53.0	
2.120	-24.7	V	3.0	36.7	1.0	-60.4	-13.0	-47.4	
2.826	-24.4	V	3.0	36.2	1.0	-59.5	-13.0	-46.5	
1.413	-29.0	H	3.0	37.8	1.0	-65.8	-13.0	-52.8	
2.120	-25.2	H	3.0	36.7	1.0	-60.9	-13.0	-47.9	
2.826	-24.4	H	3.0	36.2	1.0	-59.6	-13.0	-46.6	
Mid Channel (710MHz)									
1.420	-29.3	V	3.0	37.8	1.0	-66.1	-13.0	-53.1	
2.130	-24.4	V	3.0	36.7	1.0	-60.1	-13.0	-47.1	
2.840	-24.3	V	3.0	36.2	1.0	-59.4	-13.0	-46.4	
1.420	-29.0	H	3.0	37.8	1.0	-65.7	-13.0	-52.7	
2.130	-25.0	H	3.0	36.7	1.0	-60.7	-13.0	-47.7	
2.840	-24.3	H	3.0	36.2	1.0	-59.4	-13.0	-46.4	
High Channel (713.5MHz)									
1.688	-26.2	V	3.0	37.3	1.0	-62.5	-13.0	-49.5	
2.532	-23.6	V	3.0	36.3	1.0	-59.0	-13.0	-46.0	
3.376	-22.8	V	3.0	35.7	1.0	-57.5	-13.0	-44.5	
1.688	-26.6	H	3.0	37.3	1.0	-62.9	-13.0	-49.9	
2.532	-24.8	H	3.0	36.3	1.0	-60.2	-13.0	-47.2	
3.376	-22.5	H	3.0	35.7	1.0	-57.3	-13.0	-44.3	

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

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company:
Project #:
Date:
Test Engineer:
Configuration:
Mode:

Samsung
 14U17012
 01/31/14
 Charles Vergonio
 X Position, AC Charger
 TX, LTE BAND 17, 5MHz BW,QPSK

Chamber

3m Chamber

Pre-amplifier

T34 8449B

Filter

Filter 1

Limit

Part 27

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Channel (706.5MHz)									
1.413	-28.7	V	3.0	37.8	1.0	-65.5	-13.0	-52.5	
2.120	-24.7	V	3.0	36.7	1.0	-60.4	-13.0	-47.4	
2.826	-23.5	V	3.0	36.2	1.0	-58.7	-13.0	-45.7	
1.413	-29.3	H	3.0	37.8	1.0	-66.0	-13.0	-53.0	
2.120	-25.7	H	3.0	36.7	1.0	-61.4	-13.0	-48.4	
2.826	-25.0	H	3.0	36.2	1.0	-60.2	-13.0	-47.2	
Mid Channel (710MHz)									
1.420	-28.9	V	3.0	37.8	1.0	-65.7	-13.0	-52.7	
2.130	-24.4	V	3.0	36.7	1.0	-60.1	-13.0	-47.1	
2.840	-24.3	V	3.0	36.2	1.0	-59.5	-13.0	-46.5	
1.420	-29.4	H	3.0	37.8	1.0	-66.2	-13.0	-53.2	
2.130	-25.1	H	3.0	36.7	1.0	-60.8	-13.0	-47.8	
2.840	-25.0	H	3.0	36.2	1.0	-60.2	-13.0	-47.2	
High Channel (713.5MHz)									
1.688	-25.9	V	3.0	37.3	1.0	-62.2	-13.0	-49.2	
2.532	-23.5	V	3.0	36.3	1.0	-58.9	-13.0	-45.9	
3.376	-21.8	V	3.0	35.7	1.0	-56.6	-13.0	-43.6	
1.688	-26.7	H	3.0	37.3	1.0	-63.0	-13.0	-50.0	
2.532	-25.1	H	3.0	36.3	1.0	-60.5	-13.0	-47.5	
3.376	-22.6	H	3.0	35.7	1.0	-57.4	-13.0	-44.4	

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

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Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company:
Project #:
Date:
Test Engineer:
Configuration:
Mode:

Samsung
 14U17012
 01/31/14
 Charles Vergonio
 X Position, AC Charger
 TX, LTE BAND 5, 10MHz BW,QPSK

Chamber

3m Chamber

Pre-amplifier

T34 8449B

Filter

Filter 1

Limit

Part 27

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Channel (829MHz)									
1.658	-30.5	V	3.0	37.4	1.0	-66.9	-13.0	-53.9	
2.487	-24.2	V	3.0	36.4	1.0	-59.6	-13.0	-46.6	
3.316	-21.0	V	3.0	35.8	1.0	-55.8	-13.0	-42.8	
1.658	-30.4	H	3.0	37.4	1.0	-66.8	-13.0	-53.8	
2.487	-25.9	H	3.0	36.4	1.0	-61.3	-13.0	-48.3	
3.316	-20.5	H	3.0	35.8	1.0	-55.3	-13.0	-42.3	
Mid Channel (836.5MHz)									
1.673	-30.1	V	3.0	37.3	1.0	-66.5	-13.0	-53.5	
2.509	-23.0	V	3.0	36.4	1.0	-58.4	-13.0	-45.4	
3.346	-20.9	V	3.0	35.8	1.0	-55.6	-13.0	-42.6	
1.673	-30.5	H	3.0	37.3	1.0	-66.9	-13.0	-53.9	
2.509	-24.0	H	3.0	36.4	1.0	-59.4	-13.0	-46.4	
3.346	-21.3	H	3.0	35.8	1.0	-56.1	-13.0	-43.1	
High Channel (844MHz)									
1.688	-29.6	V	3.0	37.3	1.0	-65.9	-13.0	-52.9	
2.532	-23.7	V	3.0	36.3	1.0	-59.0	-13.0	-46.0	
3.376	-20.9	V	3.0	35.7	1.0	-55.6	-13.0	-42.6	
1.688	-30.3	H	3.0	37.3	1.0	-66.6	-13.0	-53.6	
2.532	-24.8	H	3.0	36.3	1.0	-60.1	-13.0	-47.1	
3.376	-22.0	H	3.0	35.7	1.0	-56.7	-13.0	-43.7	

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

Compliance Certification Services									
Above 1GHz High Frequency Substitution Measurement									
Company:	Samsung								
Project #:	14U17012								
Date:	01/31/14								
Test Engineer:	Charles Vergonio								
Configuration:	X Position, AC Charger								
Mode:	TX, LTE BAND 5, 5MHz BW, 16QAM								
Chamber			Pre-amplifier		Filter		Limit		
3m Chamber ▾			T34 8449B ▾		Filter 1 ▾		Part 27 ▾		
f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Channel (826.5MHz)									
1.653	-29.8	V	3.0	37.4	1.0	-66.1	-13.0	-53.1	
2.479	-24.3	V	3.0	36.4	1.0	-59.7	-13.0	-46.7	
3.306	-19.8	V	3.0	35.8	1.0	-54.6	-13.0	-41.6	
1.653	-29.1	H	3.0	37.4	1.0	-65.5	-13.0	-52.5	
2.479	-25.8	H	3.0	36.4	1.0	-61.2	-13.0	-48.2	
3.306	-21.7	H	3.0	35.8	1.0	-56.5	-13.0	-43.5	
Mid Channel (836.5MHz)									
1.673	-29.3	V	3.0	37.3	1.0	-65.6	-13.0	-52.6	
2.509	-23.8	V	3.0	36.4	1.0	-59.2	-13.0	-46.2	
3.346	-21.0	V	3.0	35.8	1.0	-55.8	-13.0	-42.8	
1.673	-30.2	H	3.0	37.3	1.0	-66.6	-13.0	-53.6	
2.509	-25.3	H	3.0	36.4	1.0	-60.7	-13.0	-47.7	
3.346	-20.6	H	3.0	35.8	1.0	-55.4	-13.0	-42.4	
High Channel (846.5MHz)									
1.693	-29.2	V	3.0	37.3	1.0	-65.5	-13.0	-52.5	
2.539	-23.4	V	3.0	36.3	1.0	-58.7	-13.0	-45.7	
3.386	-21.0	V	3.0	35.7	1.0	-55.7	-13.0	-42.7	
1.693	-29.5	H	3.0	37.3	1.0	-65.8	-13.0	-52.8	
2.539	-25.0	H	3.0	36.3	1.0	-60.3	-13.0	-47.3	
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.

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company:
Project #:
Date:
Test Engineer:
Configuration:
Mode:

Samsung
 14U17012
 01/31/14
 Charles Vergonio
 X Position, AC Charger
 TX, LTE BAND 5, 5MHz BW,QPSK

Chamber
 3m Chamber

Pre-amplifier
 T34 8449B

Filter
 Filter 1

Limit
 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
	Low Channel (826.5MHz)									
	1.653	-29.9	V	3.0	37.4	1.0	-66.2	-13.0	-53.2	
LTE5	2.479	-24.6	V	3.0	36.4	1.0	-60.0	-13.0	-47.0	
	3.306	-21.3	V	3.0	35.8	1.0	-56.1	-13.0	-43.1	
5MHz	1.653	-30.2	H	3.0	37.4	1.0	-66.6	-13.0	-53.6	
	2.479	-25.9	H	3.0	36.4	1.0	-61.3	-13.0	-48.3	
QPSK	3.306	-21.5	H	3.0	35.8	1.0	-56.3	-13.0	-43.3	
	Mid Channel (836.5MHz)									
	1.673	-30.0	V	3.0	37.3	1.0	-66.3	-13.0	-53.3	
	2.509	-23.2	V	3.0	36.4	1.0	-58.6	-13.0	-45.6	
	3.346	-21.8	V	3.0	35.8	1.0	-56.5	-13.0	-43.5	
	1.673	-29.9	H	3.0	37.3	1.0	-66.2	-13.0	-53.2	
	2.509	-24.4	H	3.0	36.4	1.0	-59.8	-13.0	-46.8	
	3.346	-21.2	H	3.0	35.8	1.0	-56.0	-13.0	-43.0	
	High Channel (846.5MHz)									
	1.693	-29.9	V	3.0	37.3	1.0	-66.2	-13.0	-53.2	
	2.539	-23.4	V	3.0	36.3	1.0	-58.7	-13.0	-45.7	
	3.386	-21.7	V	3.0	35.7	1.0	-56.4	-13.0	-43.4	
	1.693	-29.8	H	3.0	37.3	1.0	-66.1	-13.0	-53.1	
	2.539	-25.0	H	3.0	36.3	1.0	-60.3	-13.0	-47.3	
	3.386	-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.

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: Samsung

Project #: 14U17012

Date: 01/31/14

Test Engineer: Charles Vergonio

Configuration: X Position, AC Charger

Mode: WCDMA_HSDPA 1900

Test Case: 14U17012

Test Item: 14U17012

Test Result: Pass

Chamber	Pre-amplifier	Filter	Limit
3m Chamber	T343 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	-24.4	V	3.0	35.4	1.0	-58.8	-13.0	-45.8	
5.557	-22.4	V	3.0	34.7	1.0	-56.1	-13.0	-43.1	
7.409	-18.1	V	3.0	34.9	1.0	-52.0	-13.0	-39.0	
3.705	-25.1	H	3.0	35.4	1.0	-59.5	-13.0	-46.5	
5.557	-19.4	H	3.0	34.7	1.0	-53.2	-13.0	-40.2	
7.409	-17.9	H	3.0	34.9	1.0	-51.8	-13.0	-38.8	
Mid Ch, 1880.0MHz									
3.760	-24.7	V	3.0	35.3	1.0	-59.0	-13.0	-46.0	
5.640	-21.9	V	3.0	34.7	1.0	-55.6	-13.0	-42.6	
7.520	-18.1	V	3.0	34.9	1.0	-52.0	-13.0	-39.0	
3.760	-23.3	H	3.0	35.3	1.0	-57.7	-13.0	-44.7	
5.640	-21.1	H	3.0	34.7	1.0	-54.8	-13.0	-41.8	
7.520	-16.6	H	3.0	34.9	1.0	-50.5	-13.0	-37.5	
High Ch, 1907.6 MHz									
3.820	-24.5	V	3.0	35.3	1.0	-58.8	-13.0	-45.8	
5.723	-21.9	V	3.0	34.7	1.0	-55.7	-13.0	-42.7	
7.630	-17.9	V	3.0	34.9	1.0	-51.8	-13.0	-38.8	
3.820	-23.8	H	3.0	35.3	1.0	-58.0	-13.0	-45.0	
5.723	-21.4	H	3.0	34.7	1.0	-55.1	-13.0	-42.1	
7.630	-17.0	H	3.0	34.9	1.0	-50.9	-13.0	-37.9	

Rev. 03.03.09

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

Compliance Certification Services Above 1GHz High Frequency Substitution Measurement										
Company:	Samsung									
Project #:	14U17012									
Date:	01/29/14									
Test Engineer:	T.Noor									
Configuration:	X Position, AC Charger									
Mode:	WCDMA_REL_99 1900									
Chamber Pre-amplifier Filter Limit 3m Chamber T343 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
Band Band 2 REL99	Low Ch, 1852.4MHz									
	3.705	-21.0	V	3.0	35.4	1.0	-55.4	-13.0	-42.4	
	5.557	-15.5	V	3.0	34.7	1.0	-49.2	-13.0	-36.2	
	7.409	-11.2	V	3.0	34.9	1.0	-45.1	-13.0	-32.1	
	3.705	-19.3	H	3.0	35.4	1.0	-53.7	-13.0	-40.7	
	5.557	-14.3	H	3.0	34.7	1.0	-48.0	-13.0	-35.0	
	7.409	-11.9	H	3.0	34.9	1.0	-45.8	-13.0	-32.8	
	Mid Ch, 1880.0MHz									
	3.760	-20.7	V	3.0	35.3	1.0	-55.1	-13.0	-42.1	
	5.640	-15.0	V	3.0	34.7	1.0	-48.7	-13.0	-35.7	
	7.520	-14.3	V	3.0	34.9	1.0	-48.3	-13.0	-35.3	
	3.760	-18.6	H	3.0	35.3	1.0	-52.9	-13.0	-39.9	
	5.640	-14.6	H	3.0	34.7	1.0	-48.3	-13.0	-35.3	
	7.520	-12.8	H	3.0	34.9	1.0	-46.7	-13.0	-33.7	
	High Ch, 1907.6 MHz									
	3.820	-19.9	V	3.0	35.3	1.0	-54.2	-13.0	-41.2	
	5.723	-15.1	V	3.0	34.7	1.0	-48.9	-13.0	-35.9	
	7.630	-10.8	V	3.0	34.9	1.0	-44.7	-13.0	-31.7	
	3.820	-20.4	H	3.0	35.3	1.0	-54.7	-13.0	-41.7	
	5.723	-14.4	H	3.0	34.7	1.0	-48.2	-13.0	-35.2	
	7.630	-11.1	H	3.0	34.9	1.0	-45.1	-13.0	-32.1	
	Rev. 03.03.09									
	Note: No other emissions were detected above the system noise floor.									

Compliance Certification Services Above 1GHz High Frequency Substitution Measurement										
Company:	Samsung									
Project #:	14U17012									
Date:	01/31/14									
Test Engineer:	Charles Vergonio									
Configuration:	X Position, AC Charger									
Mode:	GPRS 1900									
Chamber Pre-amplifier Filter Limit 3m Chamber T343 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
GSM1 900 GPRS	Low Ch, 1850MHz									
	3.700	-21.2	V	3.0	35.4	1.0	-55.6	-13.0	-42.6	
	5.550	-19.2	V	3.0	34.7	1.0	-52.9	-13.0	-39.9	
	7.400	-14.9	V	3.0	34.9	1.0	-48.8	-13.0	-35.8	
	3.700	-21.8	H	3.0	35.4	1.0	-56.2	-13.0	-43.2	
	5.550	-18.0	H	3.0	34.7	1.0	-51.8	-13.0	-38.8	
	7.400	-13.6	H	3.0	34.9	1.0	-47.6	-13.0	-34.6	
	Mid Ch, 1880.0MHz									
	3.760	-21.1	V	3.0	35.3	1.0	-55.5	-13.0	-42.5	
	5.640	-19.1	V	3.0	34.7	1.0	-52.8	-13.0	-39.8	
	7.520	-14.9	V	3.0	34.9	1.0	-48.8	-13.0	-35.8	
	3.760	-21.7	H	3.0	35.3	1.0	-56.1	-13.0	-43.1	
	5.640	-18.0	H	3.0	34.7	1.0	-51.7	-13.0	-38.7	
	7.520	-13.7	H	3.0	34.9	1.0	-47.6	-13.0	-34.6	
	High Ch, 1909.8 MHz									
	3.822	-20.8	V	3.0	35.3	1.0	-55.1	-13.0	-42.1	
	5.729	-18.8	V	3.0	34.7	1.0	-52.5	-13.0	-39.5	
	7.640	-14.7	V	3.0	35.0	1.0	-48.6	-13.0	-35.6	
3.822	-21.4	H	3.0	35.3	1.0	-55.6	-13.0	-42.6		
5.729	-17.6	H	3.0	34.7	1.0	-51.4	-13.0	-38.4		
7.640	-13.0	H	3.0	35.0	1.0	-47.0	-13.0	-34.0		
Rev. 03.03.09										

Compliance Certification Services Above 1GHz High Frequency Substitution Measurement									
Company:		Samsung							
Project #:		14U17012							
Date:		01/31/14							
Test Engineer:		Charles Vergonio							
Configuration:		X Position, AC Charger							
Mode:		WCDMA_HSDPA_850							
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, 826.40MHz									
1.652	-30.3	V	3.0	37.4	1.0	-66.7	-13.0	-53.7	
2.479	-24.7	V	3.0	36.4	1.0	-60.1	-13.0	-47.1	
3.306	-21.3	V	3.0	35.8	1.0	-56.1	-13.0	-43.1	
Band 5									
1.652	-29.8	H	3.0	37.4	1.0	-66.1	-13.0	-53.1	
2.479	-26.0	H	3.0	36.4	1.0	-61.4	-13.0	-48.4	
3.306	-21.7	H	3.0	35.8	1.0	-56.5	-13.0	-43.5	
HSDPA									
Mid Ch, 836.6MHz									
1.673	-29.5	V	3.0	37.3	1.0	-65.9	-13.0	-52.9	
2.510	-24.1	V	3.0	36.4	1.0	-59.4	-13.0	-46.4	
3.346	-21.4	V	3.0	35.8	1.0	-56.2	-13.0	-43.2	
1.673	-30.5	H	3.0	37.3	1.0	-66.8	-13.0	-53.8	
2.510	-25.5	H	3.0	36.4	1.0	-60.9	-13.0	-47.9	
3.346	-21.7	H	3.0	35.8	1.0	-56.5	-13.0	-43.5	
High Ch, 846.6MHz									
1.693	-29.6	V	3.0	37.3	1.0	-65.9	-13.0	-52.9	
2.539	-22.6	V	3.0	36.3	1.0	-58.0	-13.0	-45.0	
3.386	-21.0	V	3.0	35.7	1.0	-55.7	-13.0	-42.7	
1.693	-29.7	H	3.0	37.3	1.0	-66.0	-13.0	-53.0	
2.539	-24.5	H	3.0	36.3	1.0	-59.8	-13.0	-46.8	
3.386	-21.9	H	3.0	35.7	1.0	-56.6	-13.0	-43.6	
Rev: 03.03.09									
Note: No other emissions were detected above the system noise floor.									

Compliance Certification Services Above 1GHz High Frequency Substitution Measurement									
Company:		Samsung							
Project #:		14U17012							
Date:		01/31/14							
Test Engineer:		Charles Vergonio							
Configuration:		X Position, AC Charger							
Mode:		WCDMA_REL99_850							
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, 826.40MHz									
1.652	-29.7	V	3.0	37.4	1.0	-66.1	-13.0	-53.1	
2.479	-23.9	V	3.0	36.4	1.0	-59.3	-13.0	-46.3	
3.306	-21.5	V	3.0	35.8	1.0	-56.3	-13.0	-43.3	
Band 5									
1.652	-30.6	H	3.0	37.4	1.0	-67.0	-13.0	-54.0	
2.479	-25.7	H	3.0	36.4	1.0	-61.0	-13.0	-48.0	
3.306	-21.3	H	3.0	35.8	1.0	-56.1	-13.0	-43.1	
REL99									
Mid Ch, 836.6MHz									
1.673	-29.9	V	3.0	37.3	1.0	-66.2	-13.0	-53.2	
2.510	-24.0	V	3.0	36.4	1.0	-59.4	-13.0	-46.4	
3.346	-20.8	V	3.0	35.8	1.0	-55.6	-13.0	-42.6	
1.673	-30.0	H	3.0	37.3	1.0	-66.3	-13.0	-53.3	
2.510	-25.2	H	3.0	36.4	1.0	-60.6	-13.0	-47.6	
3.346	-21.8	H	3.0	35.8	1.0	-55.6	-13.0	-43.6	
High Ch, 846.6MHz									
1.693	-29.9	V	3.0	37.3	1.0	-66.2	-13.0	-53.2	
2.539	-23.0	V	3.0	36.3	1.0	-58.3	-13.0	-45.3	
3.386	-20.6	V	3.0	35.7	1.0	-55.3	-13.0	-42.3	
1.693	-30.1	H	3.0	37.3	1.0	-66.4	-13.0	-53.4	
2.539	-24.6	H	3.0	36.3	1.0	-59.9	-13.0	-46.9	
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.									