



**FCC CFR47 PART 27 SUBPART L
FCC CFR47 PART 27 SUBPART H**

C2PC CERTIFICATION TEST REPORT

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

MODEL NUMBER: SM-G530M

FCC ID: A3LSMG530M

REPORT NUMBER: 14I19179-E1

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Prepared for
SAMSUNG ELECTRONICS CO., LTD.
416, MAETAN 3-DONG, YEONGTONG-GU
SUWON-CITY, GYEONGGI-DO 443-742, SOUTH KOREA

Prepared by
UL VERIFICATION SERVICES INC.
47173 BENICIA STREET
FREMONT, CA 94538, U.S.A.
TEL: (510) 771-1000
FAX: (510) 661-0888



NVLAP LAB CODE 200065-0

Revision History

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--	10/21/14	Initial issue	P. Zhang

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: SAMSUNG ELECTRONICS CO., LTD.
EUT DESCRIPTION: GSM/WCDMA/LTE Phone + Bluetooth, WLAN 2.4GHz b/g/n & NFC
MODEL: SM-G530M
SERIAL NUMBER: 1935734(Radiated) & 1935735(Conducted)
DATE TESTED: OCT 20-21, 2014

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
FCC PART 27L, H	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.

Approved & Released For
UL Verification Services Inc. By:



PENG ZHANG
CONSUMER TECHNOLOGY DIVISION
PROJECT LEAD
UL Verification Services Inc.

Tested By:



STEVEN TRAN
CONSUMER TECHNOLOGY DIVISION
LAB ENGINEER
UL Verification Services Inc.

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with TIA-603-C 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
<input type="checkbox"/> Chamber A	<input type="checkbox"/> Chamber D
<input checked="" type="checkbox"/> Chamber B	<input type="checkbox"/> Chamber E
<input checked="" type="checkbox"/> Chamber C	<input type="checkbox"/> Chamber F

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

4. CALIBRATION AND UNCERTAINTY

4.1. MEASURING INSTRUMENT CALIBRATION

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

4.2. SAMPLE CALCULATION

Where relevant, the following sample calculation is provided:

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

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

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

4.3. MEASUREMENT UNCERTAINTY

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

PARAMETER	UNCERTAINTY
Conducted Disturbance, 0.15 to 30 MHz	3.52 dB
Radiated Disturbance, 30 to 26000 MHz	4.94 dB

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

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is a GSM/WCDMA/LTE Phone + Bluetooth, WLAN 2.4GHz b/g/n & NFC.

5.2. MAXIMUM OUTPUT POWER (LTE)

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

FCC Part 22/2 4/27							
Band	Frequency Range(MHz)	BandWidth (MHz)	Modulation mW	Conducted		Radiated	
				AVG(dBm)	AVG(mW)	AVG(dBm)	AVG(mW)
LTE17	704~716	10MHz	QPSK	22.00	158.49	20.36	108.67
	704~716	10MHz	16QAM	20.60	114.82	19.07	80.74

FCC Part 22/2 4/27							
Band	Frequency Range(MHz)	BandWidth (MHz)	Modulation mW	Conducted		Radiated	
				AVG(dBm)	AVG(mW)	AVG(dBm)	AVG(mW)
LTE17	704~716	5MHz	QPSK	22.10	162.18	20.69	117.25
	704~716	5MHz	16QAM	20.50	112.20	19.80	95.52

FCC Part 22/2 4/27							
Band	Frequency Range(MHz)	BandWidth (MHz)	Modulation mW	Conducted		Radiated	
				AVG(dBm)	AVG(mW)	AVG(dBm)	AVG(mW)
LTE4	1710~1755	20MHz	QPSK	22.70	186.21	22.71	186.64
	1710~1755	20MHz	16QAM	21.80	151.36	21.28	134.28

FCC Part 22/2 4/27							
Band	Frequency Range(MHz)	BandWidth (MHz)	Modulation mW	Conducted		Radiated	
				AVG(dBm)	AVG(mW)	AVG(dBm)	AVG(mW)
LTE4	1710~1755	15MHz	QPSK	22.60	181.97	22.74	187.93
	1710~1755	15MHz	16QAM	21.60	144.54	21.63	145.55

FCC Part 22/2 4/27							
Band	Frequency Range(MHz)	BandWidth (MHz)	Modulation mW	Conducted		Radiated	
				AVG(dBm)	AVG(mW)	AVG(dBm)	AVG(mW)
LTE4	1710~1755	10MHz	QPSK	22.60	181.97	22.97	198.15
	1710~1755	10MHz	16QAM	21.80	151.36	22.06	160.69

FCC Part 22/2 4/27							
Band	Frequency Range(MHz)	BandWidth (MHz)	Modulation mW	Conducted		Radiated	
				AVG(dBm)	AVG(mW)	AVG(dBm)	AVG(mW)
LTE4	1710~1755	5MHz	QPSK	22.70	186.21	22.92	195.88
	1710~1755	5MHz	16QAM	21.70	147.91	21.63	145.55

FCC Part 22/2 4/27							
Band	Frequency Range(MHz)	BandWidth (MHz)	Modulation mW	Conducted		Radiated	
				AVG(dBm)	AVG(mW)	AVG(dBm)	AVG(mW)
LTE4	1710~1755	3MHz	QPSK	22.60	181.97	22.57	180.72
	1710~1755	3MHz	16QAM	21.80	151.36	21.48	140.6

FCC Part 22/2 4/27							
Band	Frequency Range(MHz)	BandWidth (MHz)	Modulation mW	Conducted		Radiated	
				AVG(dBm)	AVG(mW)	AVG(dBm)	AVG(mW)
LTE4	1710~1755	1.4MHz	QPSK	22.60	181.97	22.83	191.87
	1710~1755	1.4MHz	16QAM	21.70	147.91	21.4	138.04

5.3. 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)
LTE4, 1710~1755MHz	-1.83
LTE17, 704~716MHz	-2.68

5.4. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
AC Adapter	Samsung	SM-G530M	ETA0U83EWE	N/A
Headset	Samsung	SM-G530M	EHS61ASWE	N/A

I/O CABLES (CONDUCTED SETUP)

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

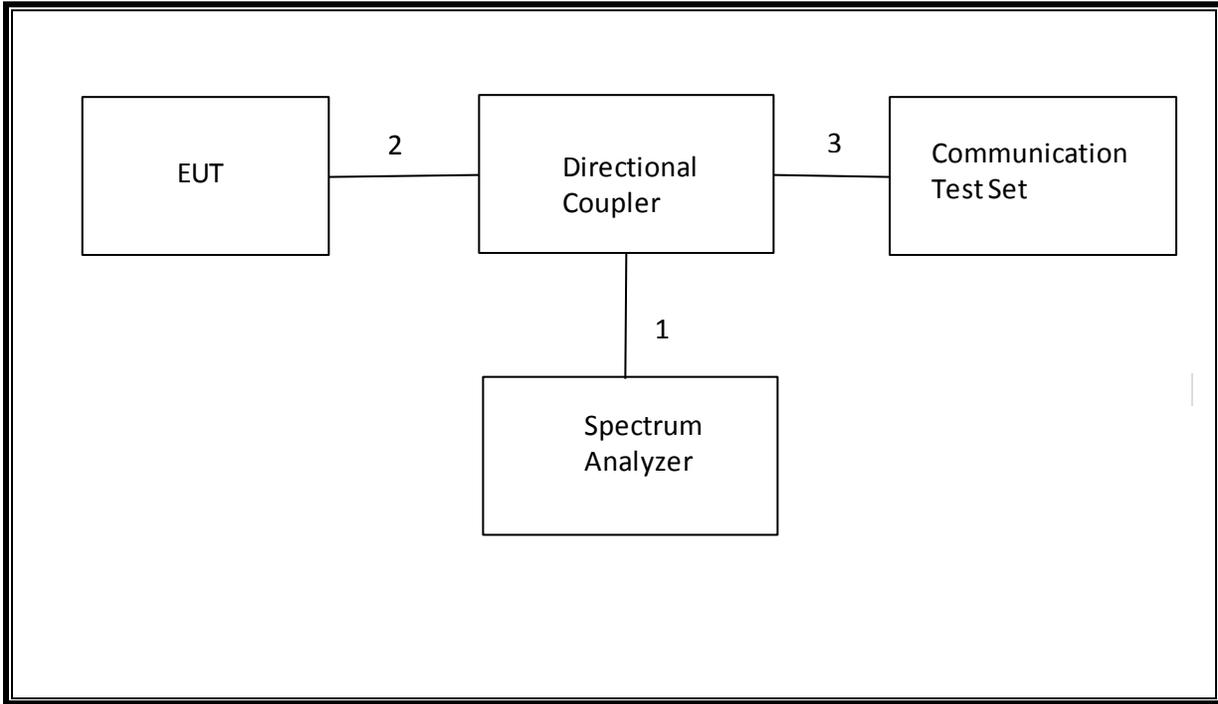
I/O CABLES (RADIATED SETUP)

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

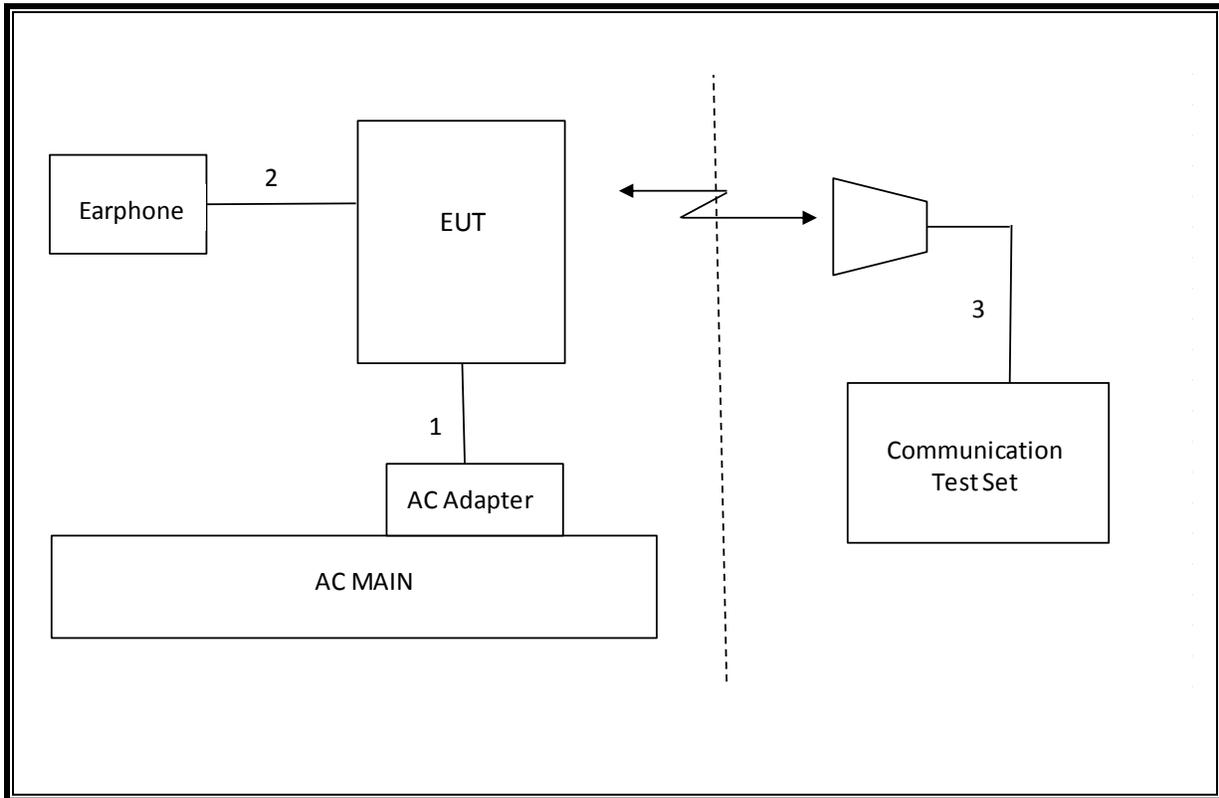
TEST SETUP

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

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	02/26/15
Antenna, Bilog, 2 GHz	Sunol Sciences	JB1	C01011	08/14/15
Antenna, Horn, 18 GHz	EMCO	3115	C00783	10/25/14
Antenna, Horn, 18 GHz	EMCO	3115	C00784	10/25/14
Highpass Filter, 2.7 GHz	Micro-Tronics	HPM13194	N02687	CNR
Highpass Filter, 1.5 GHz	Micro-Tronics	HPM13193	N02688	CNR
Temperature / Humidity Chamber	Thermotron	SE 600-10-10	C00930	01/09/15
Communications Test Set	R&S	CMW500	T159	07/02/15
DC power supply, 8 V @ 3 A or 15 V	Agilent / HP	E3610A	None	CNR
Vector signal generator, 6 GHz	Agilent / HP	E4438C	None	07/06/15
Antenna, Tuned Dipole 400~1000	ETS	3121C DB4	C00993	02/14/15
Directional Coupler	RF-Lambda	RFDC5M06G15	None	CNR
Antenna, Horn, 26.5 GHz	ARA	MWH-1826/B	C00589	12/17/14

7. Summary Table

FCC Part Section	RSS Section(s)	Test Description	Test Limit	Test Condition	Test Result	Note
2.1049	N/A	Occupied Band width (99%)	N/A	Conducted	Pass	17.8374MHz
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	-19.2dBm
2.1046	N/A	Conducted output power	N/A		Pass	22.70dBm
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	0.004PPM
27.50(b)(10)	N/A	Effective Radiated Power	34.77 dBm		Pass	20.69dBm
27.50(d)(4)	RSS-139(6.4)	Equivalent Isotropic Radiated Power	30dBm		Pass	22.97dBm
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	-38.6dBm

8.1. LTE OUTPUT VERIFICATION

8.1.1. 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	22.00
			1	25	0	22.00
			1	49	0	22.00
			25	0	1	20.90
			25	12	1	21.00
			25	25	1	21.10
			50	0	1	21.00
		16QAM	1	0	1	20.50
			1	25	1	20.60
			1	49	1	20.50
			25	0	2	20.00
			25	12	2	20.00
			25	25	2	20.10
			50	0	2	20.00
Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Avg Pwr (dBm)
						23790
						710 MHz
LTE Band 17	5	QPSK	1	0	0	22.10
			1	12	0	22.00
			1	24	0	22.00
			12	0	1	21.00
			12	7	1	21.00
			12	13	1	21.00
			25	0	1	21.00
		16QAM	1	0	1	20.50
			1	12	1	20.50
			1	24	1	20.50
			12	0	2	20.00
			12	7	2	20.00
			12	13	2	20.00
			25	0	2	20.10

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Avg Pwr (dBm)		
						20050	20175	20300
						1720 MHz	1732.5 MHz	1745 MHz
LTE Band 4	20	QPSK	1	0	0	22.40	22.50	22.60
			1	49	0	22.30	22.60	22.70
			1	99	0	22.50	22.70	22.50
			50	0	1	21.20	21.30	21.50
			50	24	1	21.20	21.40	21.50
			50	50	1	21.20	21.40	21.40
			100	0	1	21.30	21.40	21.50
		16QAM	1	0	1	21.50	21.50	21.80
			1	49	1	21.50	21.70	21.80
			1	99	1	21.50	21.70	21.80
			50	0	2	20.30	20.30	20.50
			50	24	2	20.30	20.40	20.40
			50	50	2	20.20	20.50	20.40
			100	0	2	20.30	20.30	20.40
Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Avg Pwr (dBm)		
						20025	20175	20325
						1717.5 MHz	1732.5 MHz	1747.5 MHz
LTE Band 4	15	QPSK	1	0	0	22.40	22.50	22.60
			1	37	0	22.30	22.60	22.60
			1	74	0	22.40	22.70	22.40
			36	0	1	21.20	21.30	21.50
			36	20	1	21.20	21.40	21.50
			36	39	1	21.30	21.50	21.50
			75	0	1	21.10	21.50	21.40
		16QAM	1	0	1	21.60	21.50	21.30
			1	37	1	21.50	21.50	21.30
			1	74	1	21.60	21.60	21.10
			36	0	2	20.30	20.30	20.60
			36	20	2	20.30	20.40	20.40
			36	39	2	20.30	20.40	20.50
			75	0	2	20.20	20.30	20.40
Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Avg Pwr (dBm)		
						20000	20175	20350
						1715 MHz	1732.5 MHz	1750 MHz
LTE Band 4	10	QPSK	1	0	0	22.30	22.50	22.60
			1	25	0	22.30	22.60	22.50
			1	49	0	22.40	22.60	22.50

			25	0	1	21.30	21.50	21.50
			25	12	1	21.30	21.50	21.60
			25	25	1	21.40	21.50	21.50
			50	0	1	21.20	21.40	21.50
		16QAM	1	0	1	21.00	21.60	21.20
			1	25	1	20.90	21.70	21.20
			1	49	1	21.00	21.80	21.00
			25	0	2	20.30	20.50	20.60
			25	12	2	20.40	20.50	20.70
			25	25	2	20.40	20.60	20.60
			50	0	2	20.40	20.30	20.60
Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Avg Pwr (dBm)		
						19975	20175	20375
						1712.5 MHz	1732.5 MHz	1752.5 MHz
LTE Band 4	5	QPSK	1	0	0	22.30	22.60	22.60
			1	12	0	22.30	22.60	22.50
			1	24	0	22.30	22.70	22.50
			12	0	1	21.50	21.50	21.60
			12	7	1	21.40	21.50	21.60
			12	13	1	21.40	21.60	21.60
			25	0	1	21.30	21.50	21.60
		16QAM	1	0	1	20.90	21.70	21.20
			1	12	1	20.80	21.70	21.10
			1	24	1	20.80	21.70	21.10
			12	0	2	20.40	20.60	20.70
			12	7	2	20.40	20.60	20.60
			12	13	2	20.40	20.70	20.60
			25	0	2	20.30	20.50	20.60
Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Avg Pwr (dBm)		
						19965	20175	20385
						1711.5 MHz	1732.5 MHz	1753.5 MHz
LTE Band 4	3	QPSK	1	0	0	22.30	22.60	22.60
			1	8	0	22.30	22.70	22.50
			1	14	0	22.30	22.70	22.50
			8	0	1	21.40	21.60	21.60
			8	4	1	21.30	21.60	21.50
			8	7	1	21.40	21.60	21.50
			15	0	1	21.30	21.60	21.60
		16QAM	1	0	1	21.00	21.70	21.20
			1	8	1	20.90	21.80	21.10

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Avg Pwr (dBm)		
						19957	20175	20393
						1710.7 MHz	1732.5 MHz	1754.3 MHz
			1	14	1	20.90	21.80	21.00
			8	0	2	20.50	20.60	20.60
			8	4	2	20.40	20.50	20.50
			8	7	2	20.40	20.50	20.60
			15	0	2	20.40	20.60	20.50
LTE Band 4	1.4	QPSK	1	0	0	22.50	22.60	22.60
			1	3	0	22.30	22.50	22.60
			1	5	0	22.40	22.60	22.50
			3	0	0	22.30	22.60	22.60
			3	1	0	22.40	22.60	22.50
			3	3	0	22.40	22.60	22.60
		16QAM	6	0	1	21.50	21.55	21.60
			1	0	1	21.20	21.10	21.50
			1	3	1	21.20	21.10	21.40
			1	5	1	21.30	21.10	21.40
			3	0	1	21.30	21.70	21.50
			3	1	1	21.30	21.70	21.50
			3	3	1	21.50	21.70	21.50
			6	0	2	20.50	20.70	20.60

9. PEAK TO AVERAGE RATIO

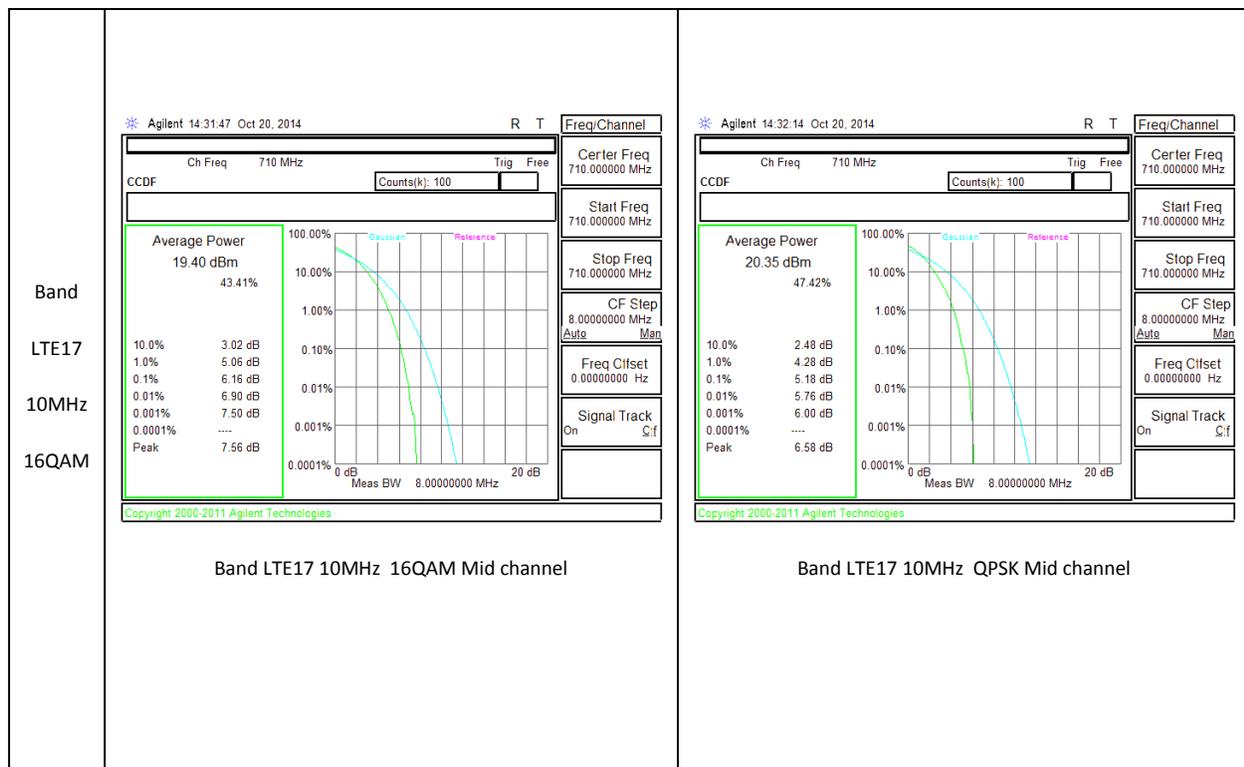
Test Procedure

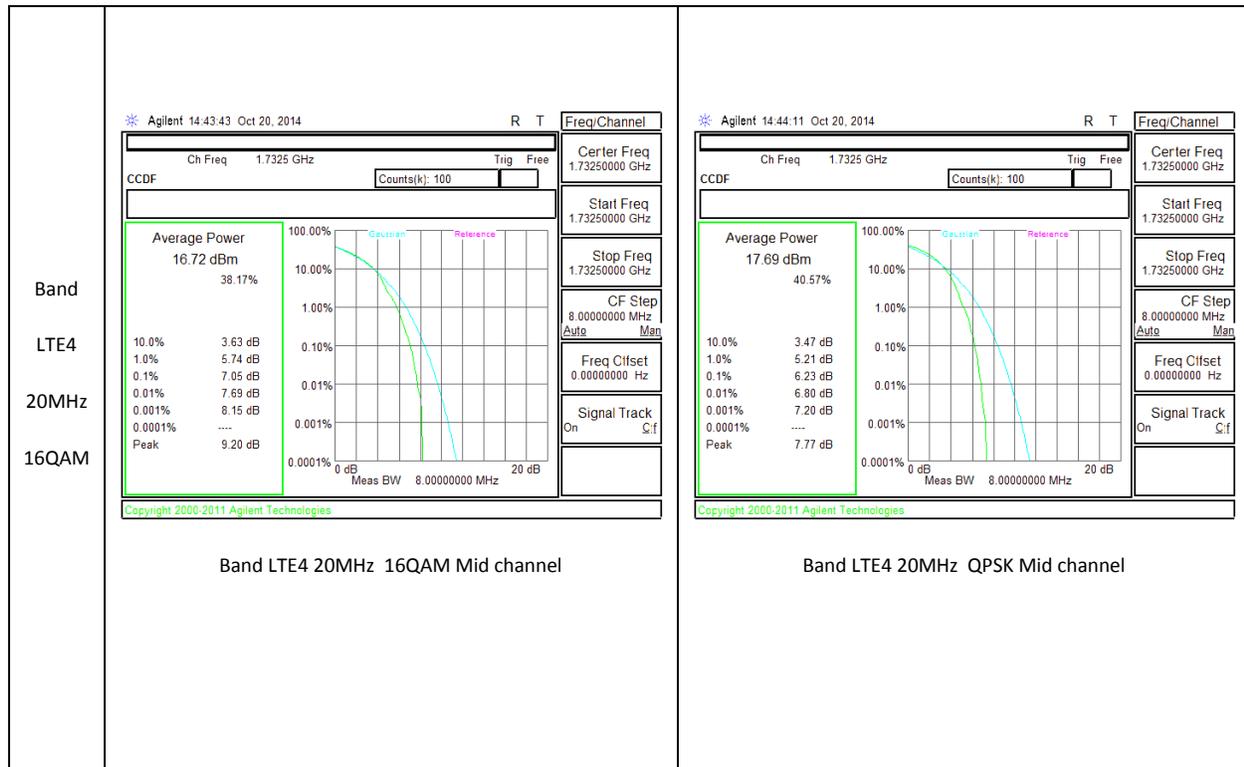
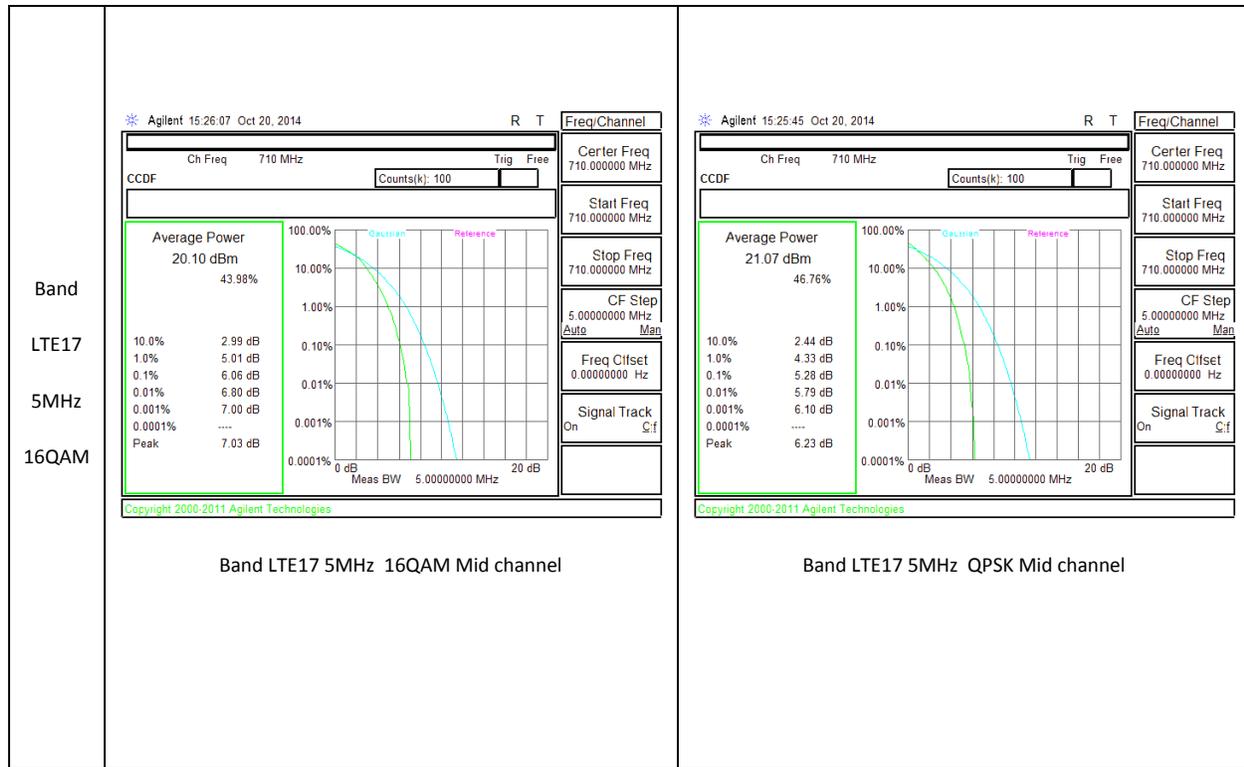
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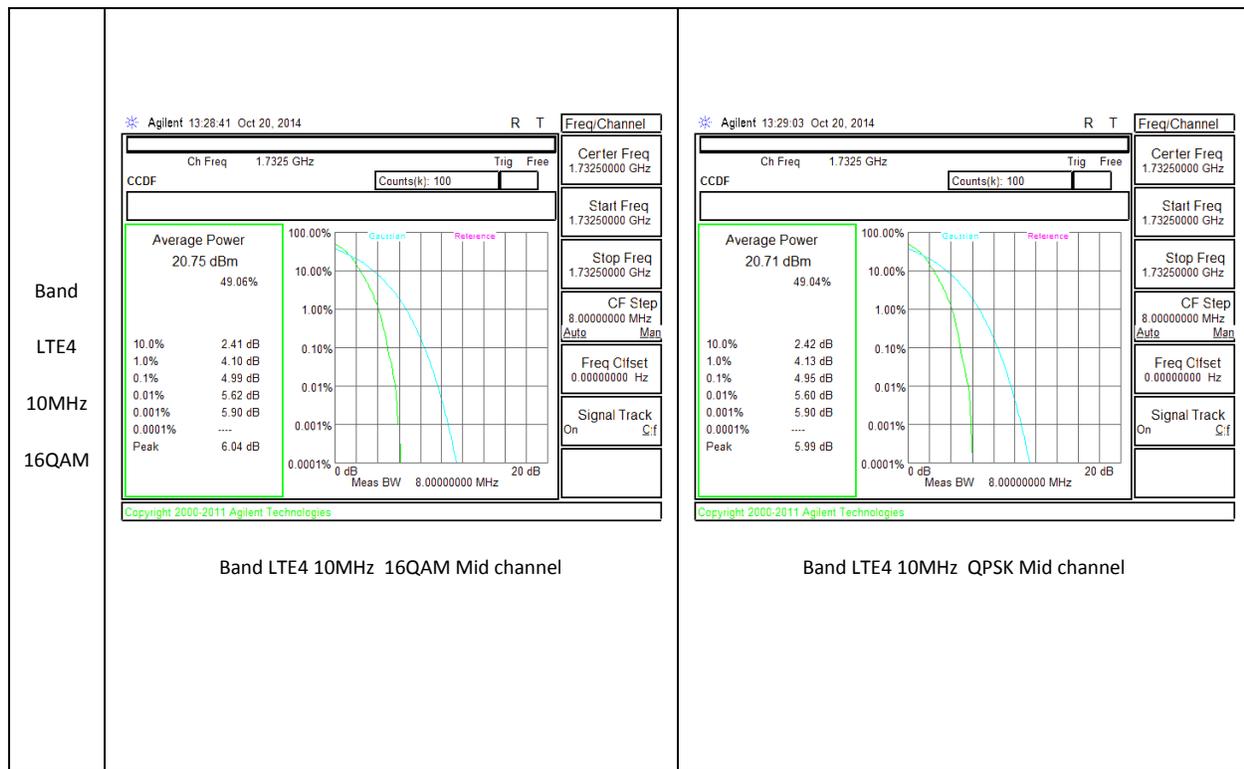
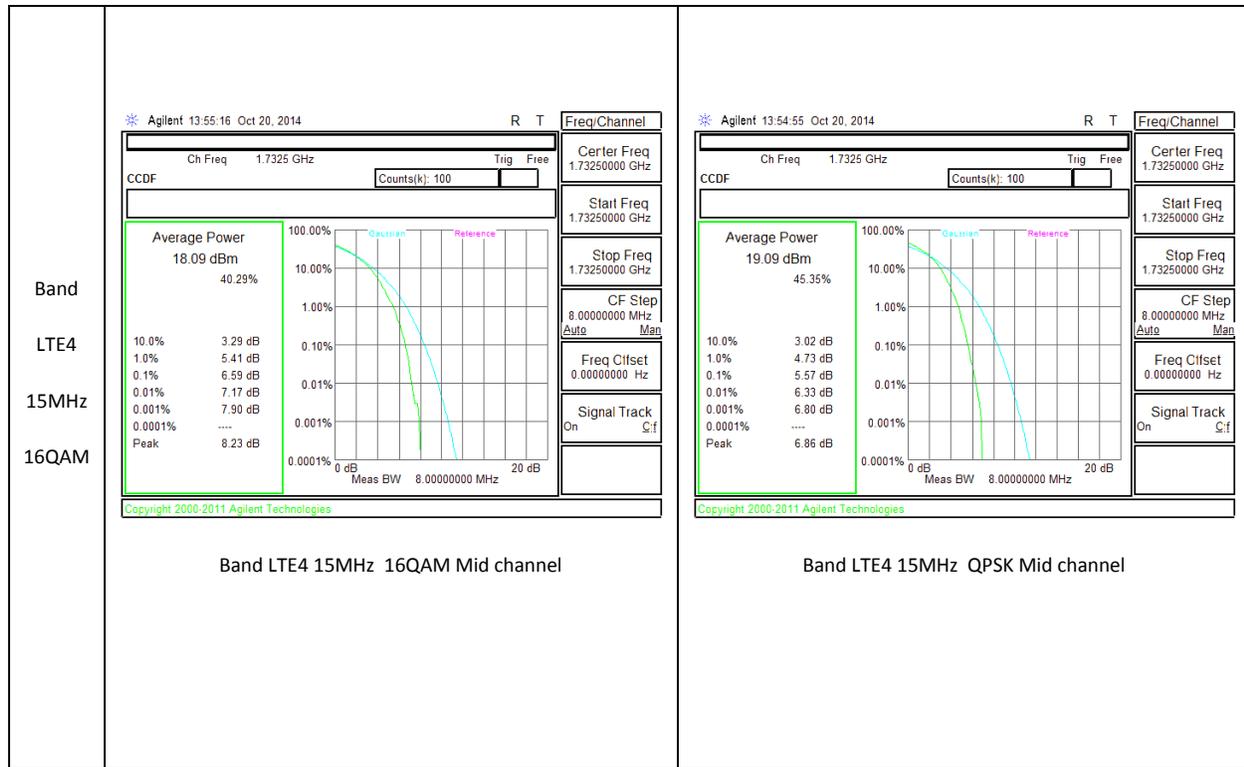
Test Spec

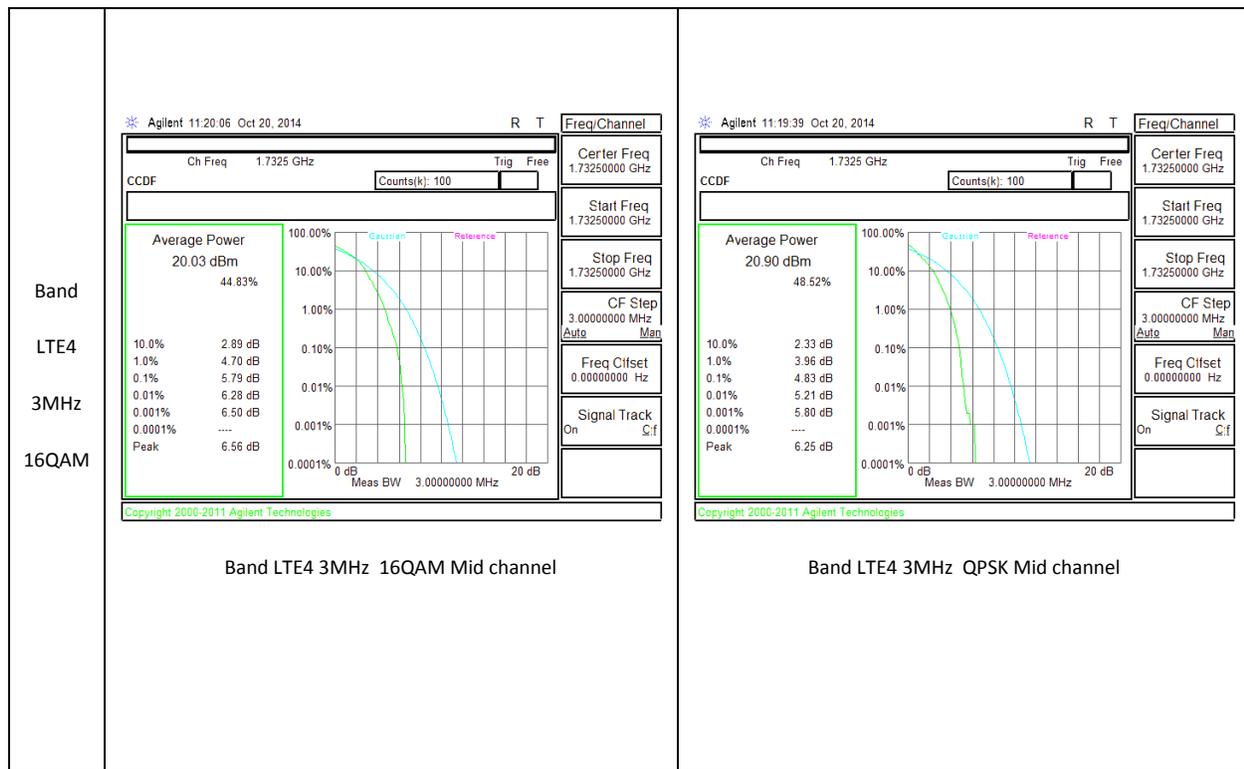
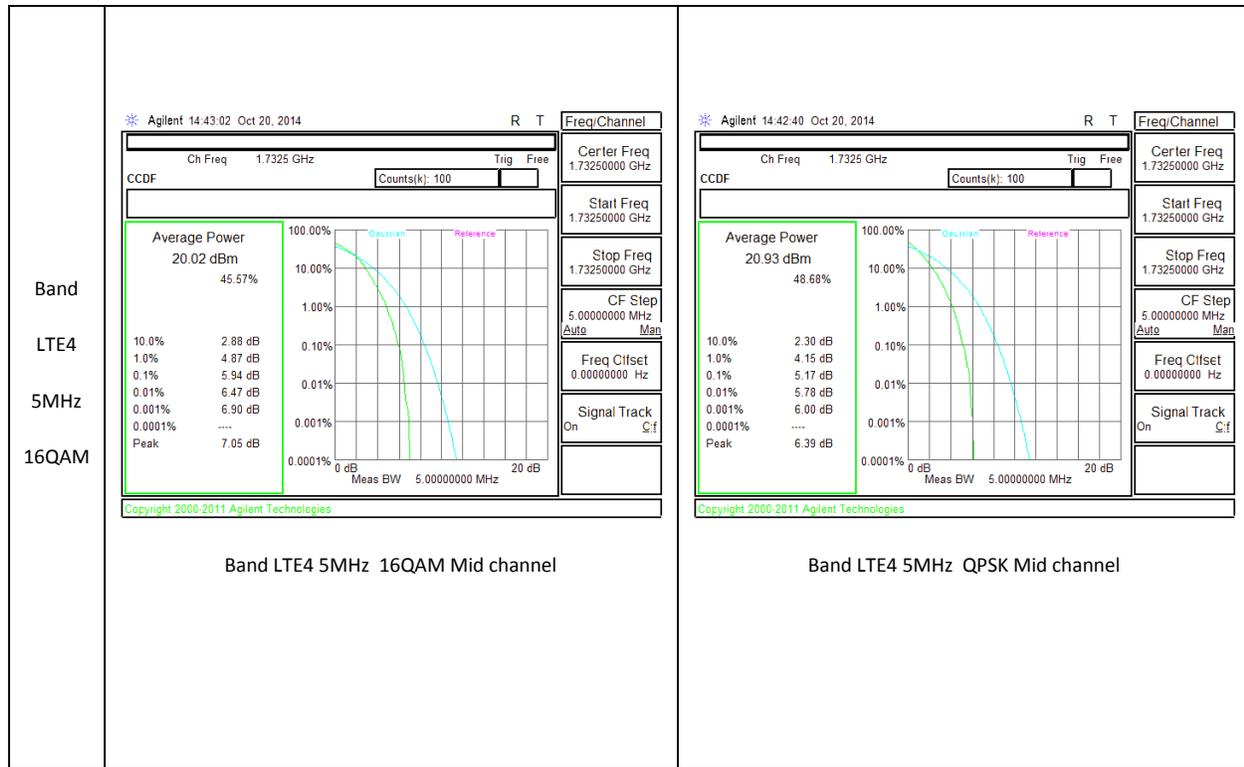
In addition, when the transmitter power is measured in terms of average value, the peak-to-average ratio of the power shall not exceed 13 dB.

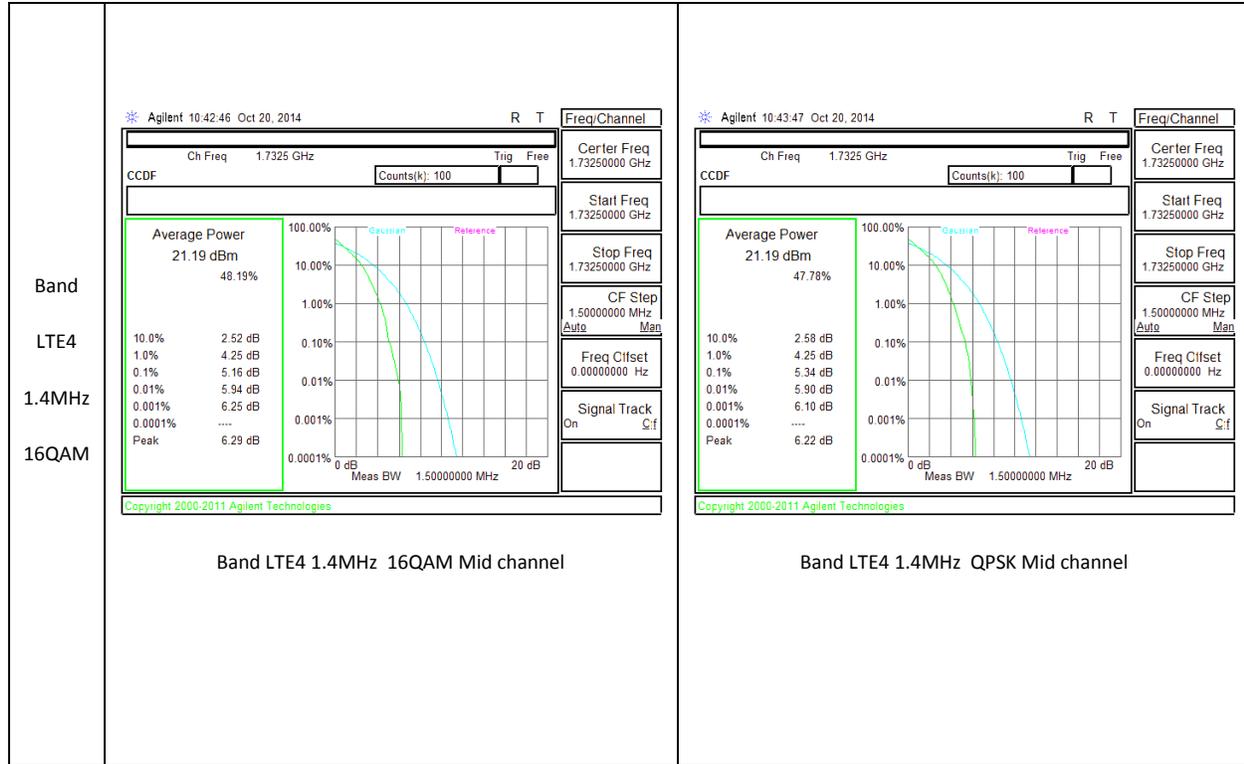
9.1. CONDUCTED PEAK TO AVERAGE RESULT











10. LIMITS AND CONDUCTED RESULTS

10.1. OCCUPIED BANDWIDTH

RULE PART(S)

FCC: §2.1049

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

LIMITS

For reporting purposes only

TEST PROCEDURE

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

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

MODES TESTED

10.1.1. LTE OCCUPIED BANDWIDTH RESULTS

Band	BW(MHz)	Mode	RB/RB Size	f (MHz)	99% BW (MHz)	-26dB BW (MHz)
LTE17	10	QPSK	50/0	709	8.9684	9.769
			50/0	710	8.9762	9.833
			50/0	711	8.95	9.695
		16QAM	50/0	709	8.9747	9.802
			50/0	710	8.9841	9.779
			50/0	711	8.9805	9.665

Band	BW(MHz)	Mode	RB/RB Size	f (MHz)	99% BW (MHz)	-26dB BW (MHz)
LTE17	5	QPSK	25/0	706.5	4.4749	4.923
			25/0	710	4.4752	4.88
			25/0	713.5	4.4641	4.902
		16QAM	25/0	706.5	4.4775	4.956
			25/0	710	4.4786	4.921
			25/0	713.5	4.4583	4.889

Band	BW(MHz)	Mode	RB/RB Size	f (MHz)	99% BW (MHz)	-26dB BW (MHz)
LTE4	20	QPSK	100/0	1720	17.8065	18.975
			100/0	1732.5	17.8158	19.19
			100/0	1745	17.7664	19.072
		16QAM	100/0	1720	17.807	18.727
			100/0	1732.5	17.8374	19.001
			100/0	1745	17.8135	18.994

Band	BW(MHz)	Mode	RB/RB Size	f (MHz)	99% BW (MHz)	-26dB BW (MHz)
LTE4	15	QPSK	75/0	1717.5	12.2924	14.483
			75/0	1732.5	13.4165	14.402
			75/0	1747.5	13.3577	14.325
		16QAM	75/0	1717.5	13.3743	14.431
			75/0	1732.5	13.4058	14.312
			75/0	1747.5	13.3763	14.249

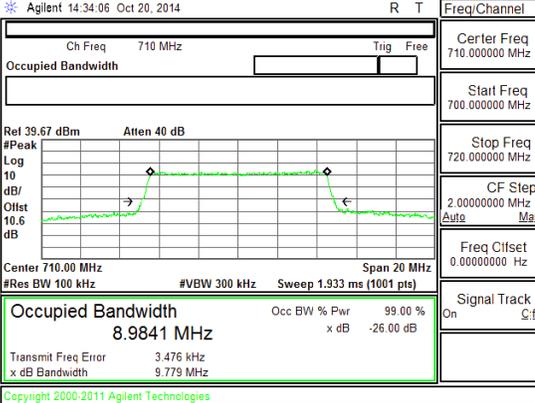
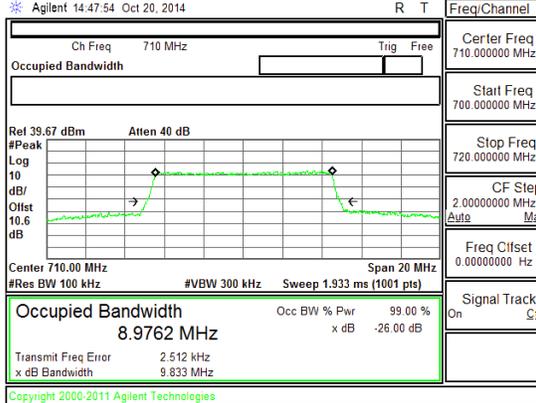
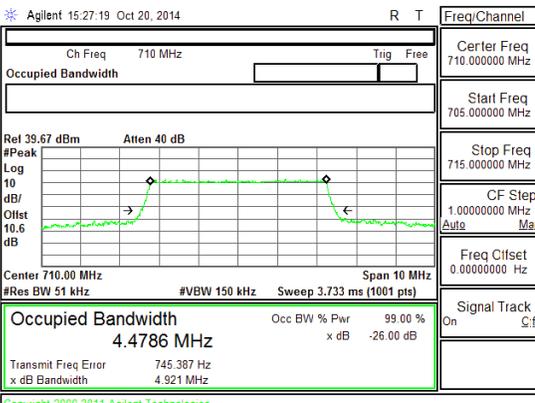
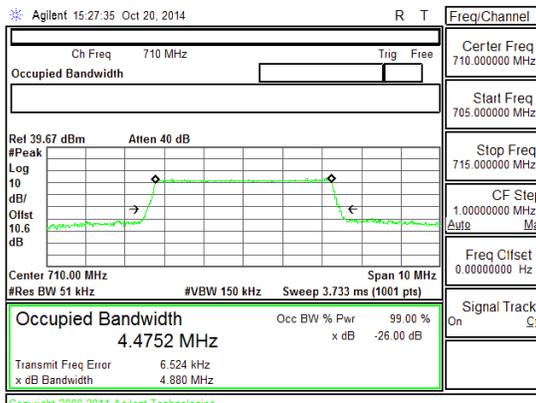
Band	BW(MHz)	Mode	RB/RB Size	f (MHz)	99% BW (MHz)	-26dB BW (MHz)
LTE4	10	QPSK	50/0	1715	8.9354	9.802
			50/0	1732.5	8.9462	9.726
			50/0	1750	8.924	9.591
		16QAM	50/0	1715	8.9429	9.699
			50/0	1732.5	8.9204	9.648
			50/0	1750	8.9257	9.635

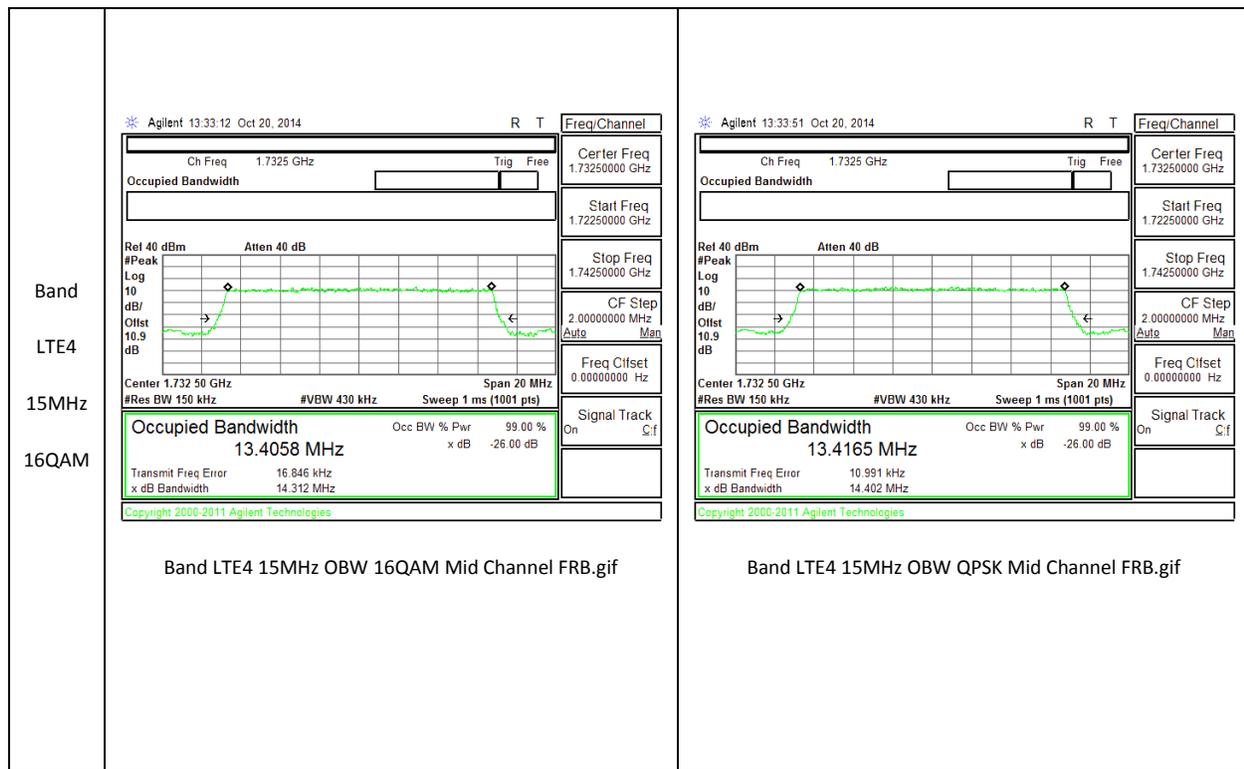
Band	BW(MHz)	Mode	RB/RB Size	f (MHz)	99% BW (MHz)	-26dB BW (MHz)
LTE4	5	QPSK	25/0	1712.5	4.4671	4.93
			25/0	1732.5	4.4682	4.901
			25/0	1752.5	4.4676	4.898
		16QAM	25/0	1712.5	4.48	4.915
			25/0	1732.5	4.4724	4.914
			25/0	1752.5	4.4702	4.854

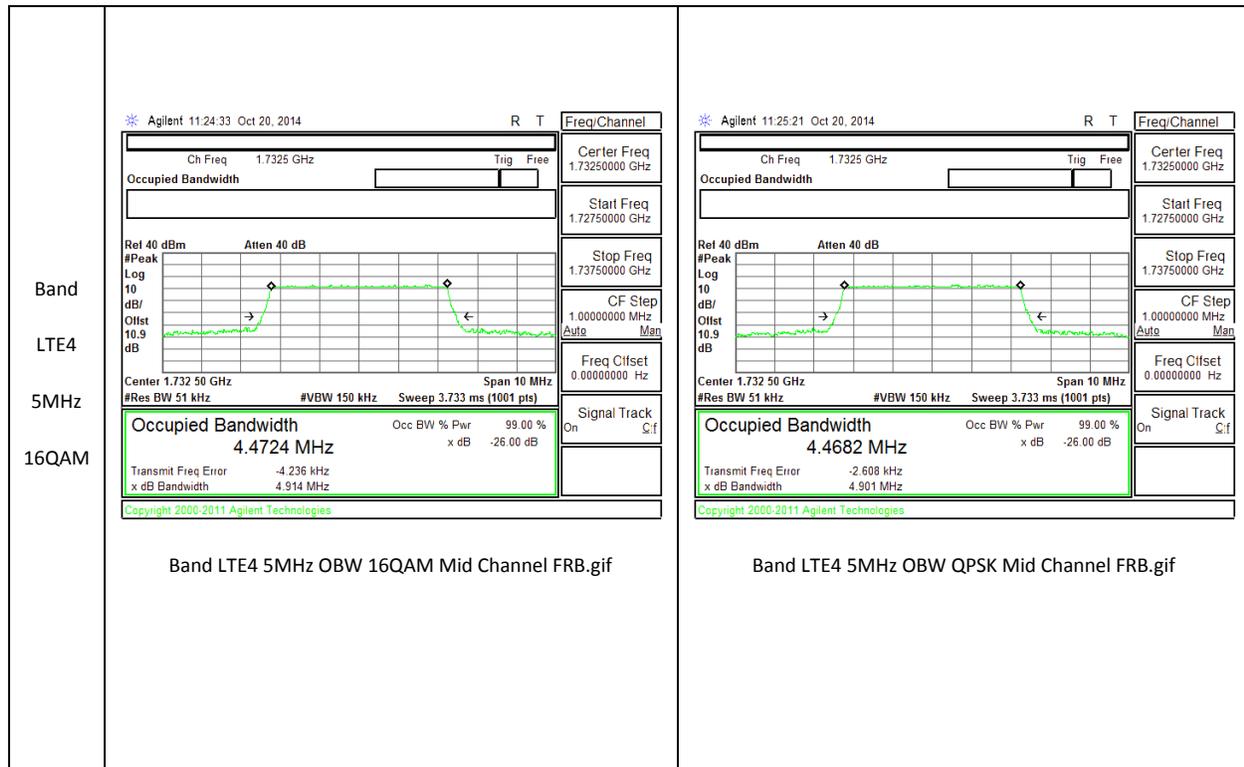
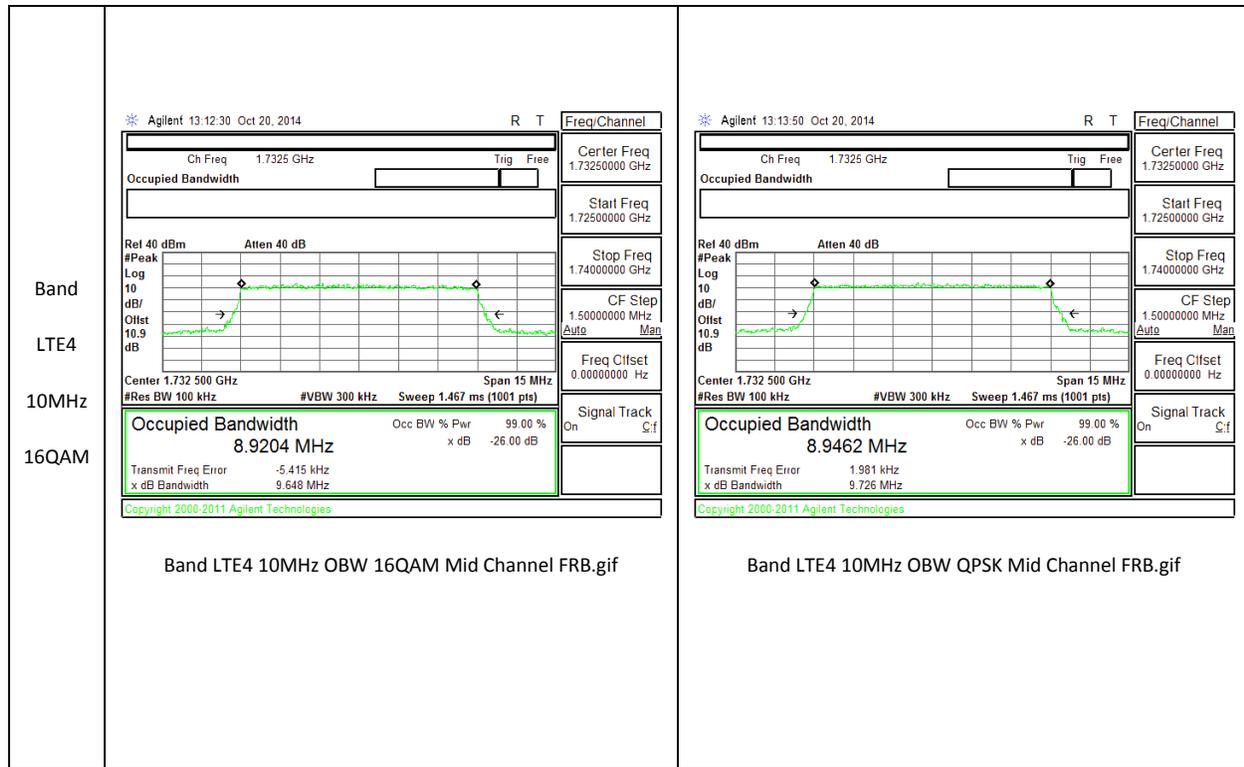
Band	BW(MHz)	Mode	RB/RB Size	f (MHz)	99% BW (MHz)	-26dB BW (MHz)
LTE4	3	QPSK	15/0	1711.5	2.6813	2.945
			15/0	1732.5	2.6838	2.946
			15/0	1753.5	2.6796	2.931
		16QAM	15/0	1711.5	2.686	2.953
			15/0	1732.5	2.6811	2.939
			15/0	1753.5	2.6832	2.939

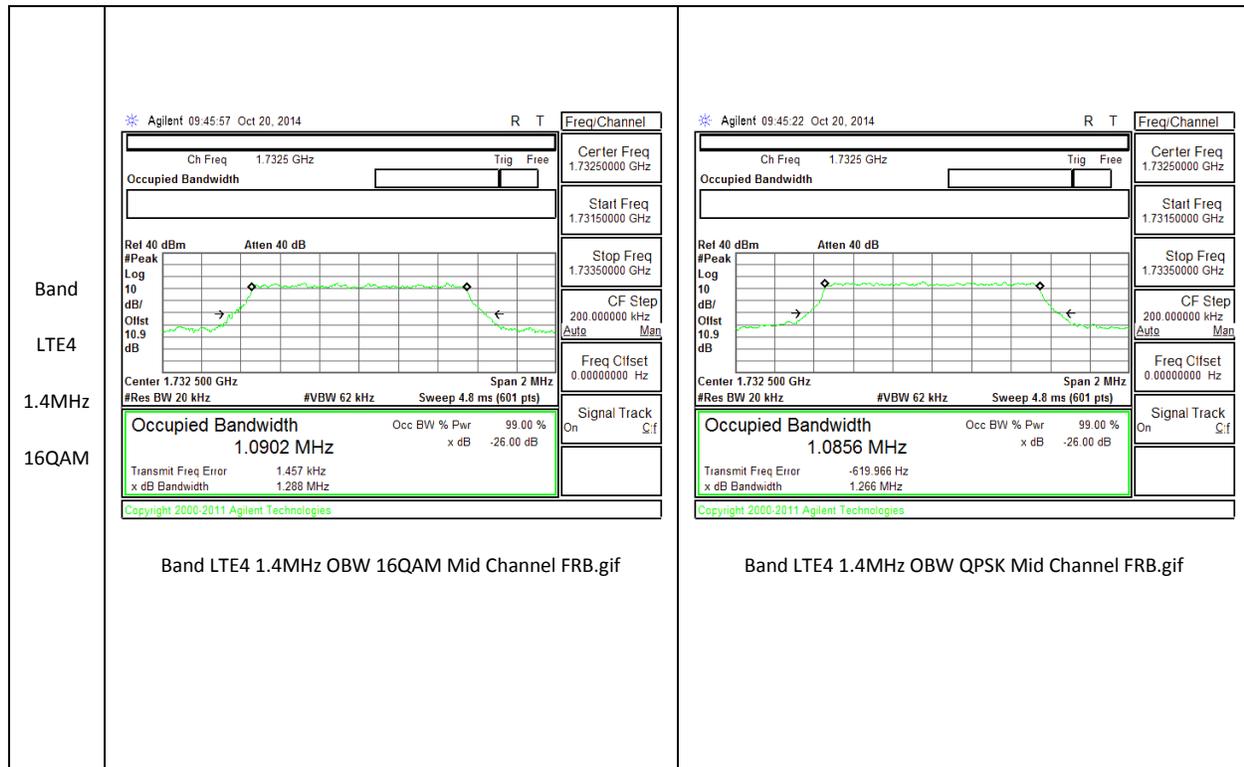
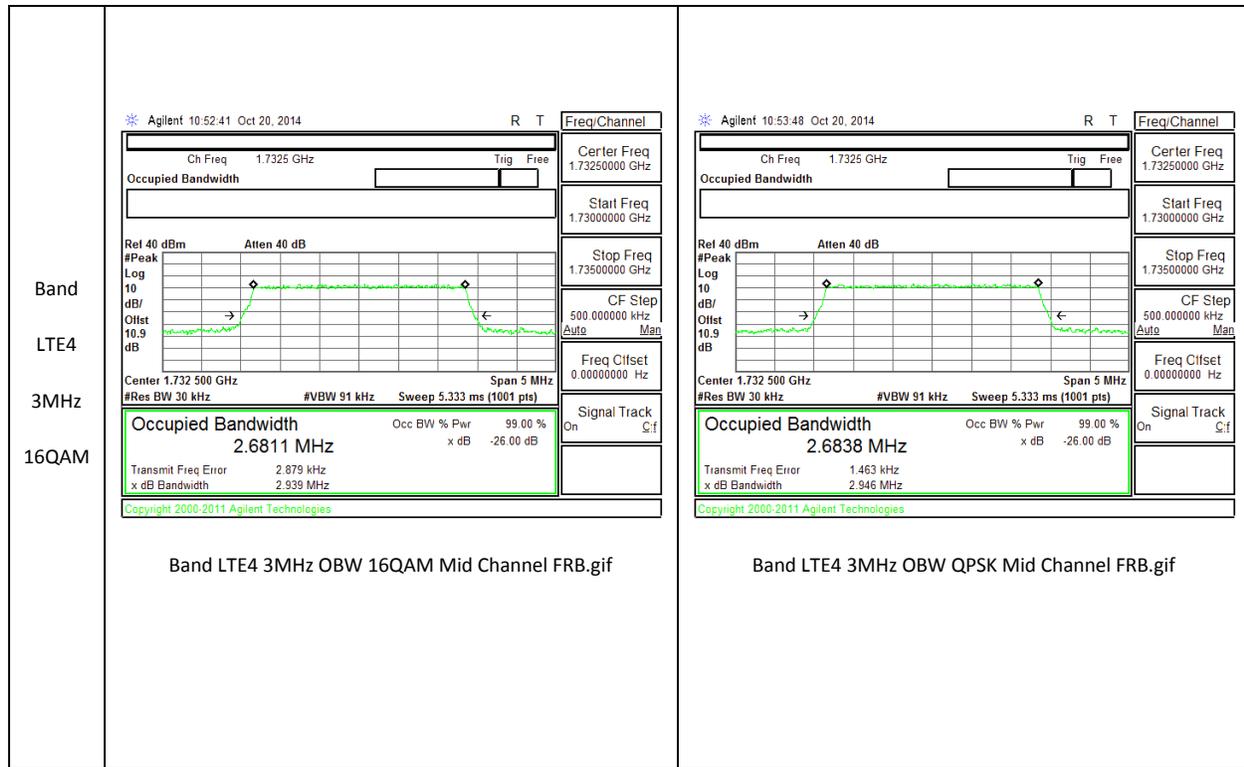
Band	BW(MHz)	Mode	RB/RB Size	f (MHz)	99% BW (MHz)	-26dB BW (MHz)
LTE4	1.4	QPSK	6/0	1710.7	1.0902	1.299
			6/0	1732.5	1.0856	1.266
			6/0	1754.3	1.0847	1.274
		16QAM	6/0	1710.7	1.0882	1.273
			6/0	1732.5	1.0902	1.288
			6/0	1754.3	1.0853	1.279

10.1.2. OCCUPIED BANDWIDTH PLOTS

<p>Band LTE17 10MHz 16QAM</p>	 <p>Agilent 14:34:06 Oct 20, 2014</p> <p>Ch Freq 710 MHz Trig Free</p> <p>Center Freq 710.000000 MHz</p> <p>Start Freq 700.000000 MHz</p> <p>Stop Freq 720.000000 MHz</p> <p>CF Step 2.00000000 MHz Auto Man</p> <p>Freq Cfsset 0.00000000 Hz</p> <p>Signal Track On C.f</p> <p>Center 710.00 MHz Span 20 MHz</p> <p>#Res BW 100 kHz #VBW 300 kHz Sweep 1.933 ms (1001 pts)</p> <p>Occupied Bandwidth 8.9841 MHz Occ BW % Pwr 99.00 % x dB -26.00 dB</p> <p>Transmit Freq Error 3.476 kHz</p> <p>x dB Bandwidth 9.779 MHz</p> <p>Copyright 2000-2011 Agilent Technologies</p> <p>Band LTE17 10MHz OBW 16QAM Mid Channel FRB.gif</p>	 <p>Agilent 14:47:54 Oct 20, 2014</p> <p>Ch Freq 710 MHz Trig Free</p> <p>Center Freq 710.000000 MHz</p> <p>Start Freq 700.000000 MHz</p> <p>Stop Freq 720.000000 MHz</p> <p>CF Step 2.00000000 MHz Auto Man</p> <p>Freq Cfsset 0.00000000 Hz</p> <p>Signal Track On C.f</p> <p>Center 710.00 MHz Span 20 MHz</p> <p>#Res BW 100 kHz #VBW 300 kHz Sweep 1.933 ms (1001 pts)</p> <p>Occupied Bandwidth 8.9762 MHz Occ BW % Pwr 99.00 % x dB -26.00 dB</p> <p>Transmit Freq Error 2.512 kHz</p> <p>x dB Bandwidth 9.833 MHz</p> <p>Copyright 2000-2011 Agilent Technologies</p> <p>Band LTE17 10MHz OBW QPSK Mid Channel FRB.gif</p>
<p>Band LTE17 5MHz 16QAM</p>	 <p>Agilent 15:27:19 Oct 20, 2014</p> <p>Ch Freq 710 MHz Trig Free</p> <p>Center Freq 710.000000 MHz</p> <p>Start Freq 705.000000 MHz</p> <p>Stop Freq 715.000000 MHz</p> <p>CF Step 1.00000000 MHz Auto Man</p> <p>Freq Cfsset 0.00000000 Hz</p> <p>Signal Track On C.f</p> <p>Center 710.00 MHz Span 10 MHz</p> <p>#Res BW 51 kHz #VBW 150 kHz Sweep 3.733 ms (1001 pts)</p> <p>Occupied Bandwidth 4.4786 MHz Occ BW % Pwr 99.00 % x dB -26.00 dB</p> <p>Transmit Freq Error 745.387 Hz</p> <p>x dB Bandwidth 4.921 MHz</p> <p>Copyright 2000-2011 Agilent Technologies</p> <p>Band LTE17 5MHz OBW 16QAM Mid Channel FRB.gif</p>	 <p>Agilent 15:27:35 Oct 20, 2014</p> <p>Ch Freq 710 MHz Trig Free</p> <p>Center Freq 710.000000 MHz</p> <p>Start Freq 705.000000 MHz</p> <p>Stop Freq 715.000000 MHz</p> <p>CF Step 1.00000000 MHz Auto Man</p> <p>Freq Cfsset 0.00000000 Hz</p> <p>Signal Track On C.f</p> <p>Center 710.00 MHz Span 10 MHz</p> <p>#Res BW 51 kHz #VBW 150 kHz Sweep 3.733 ms (1001 pts)</p> <p>Occupied Bandwidth 4.4752 MHz Occ BW % Pwr 99.00 % x dB -26.00 dB</p> <p>Transmit Freq Error 6.524 kHz</p> <p>x dB Bandwidth 4.880 MHz</p> <p>Copyright 2000-2011 Agilent Technologies</p> <p>Band LTE17 5MHz OBW QPSK Mid Channel FRB.gif</p>







10.2. BAND EDGE EMISSIONS

RULE PART(S)

FCC: §27. 53

LIMITS

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

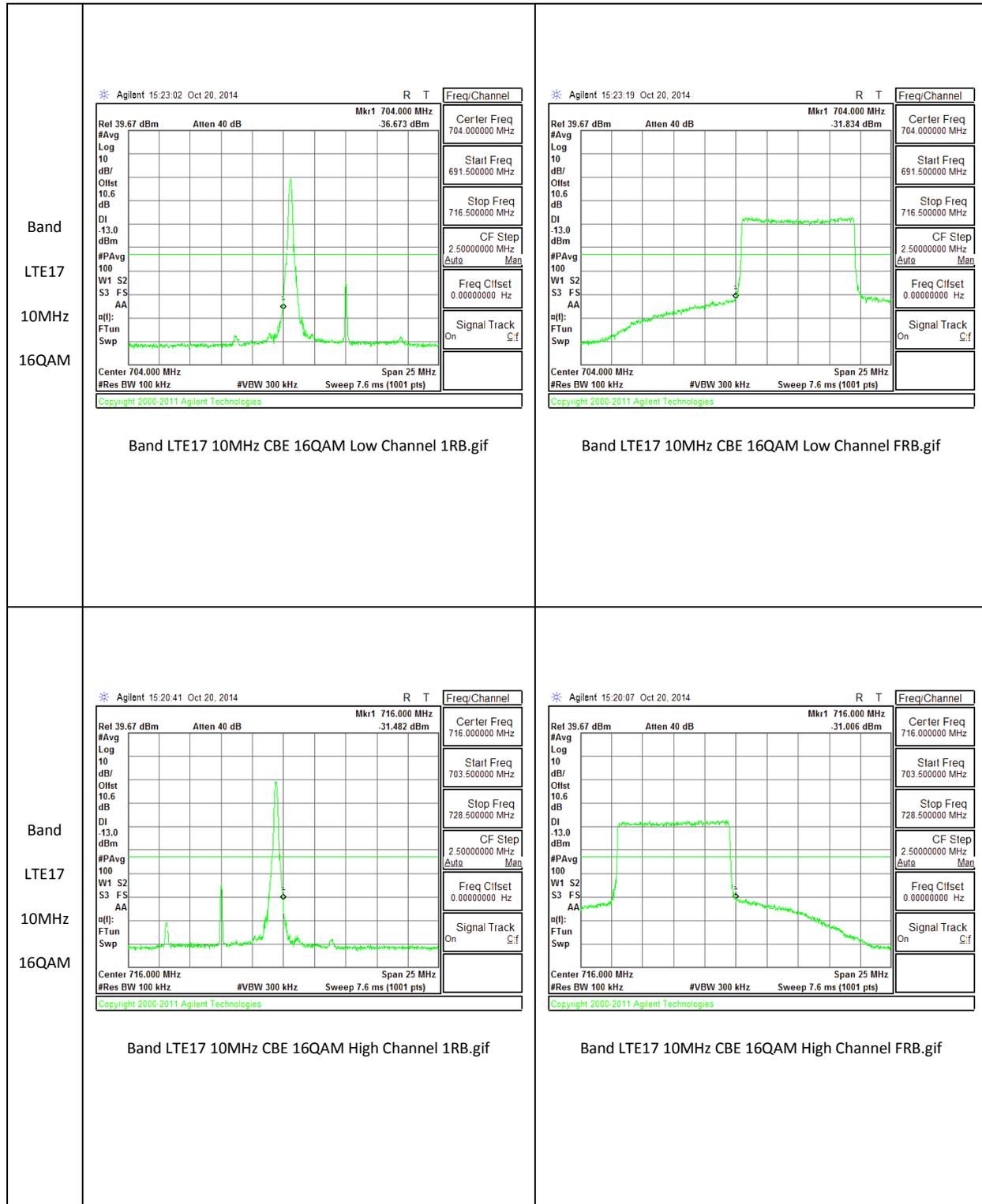
TEST PROCEDURE

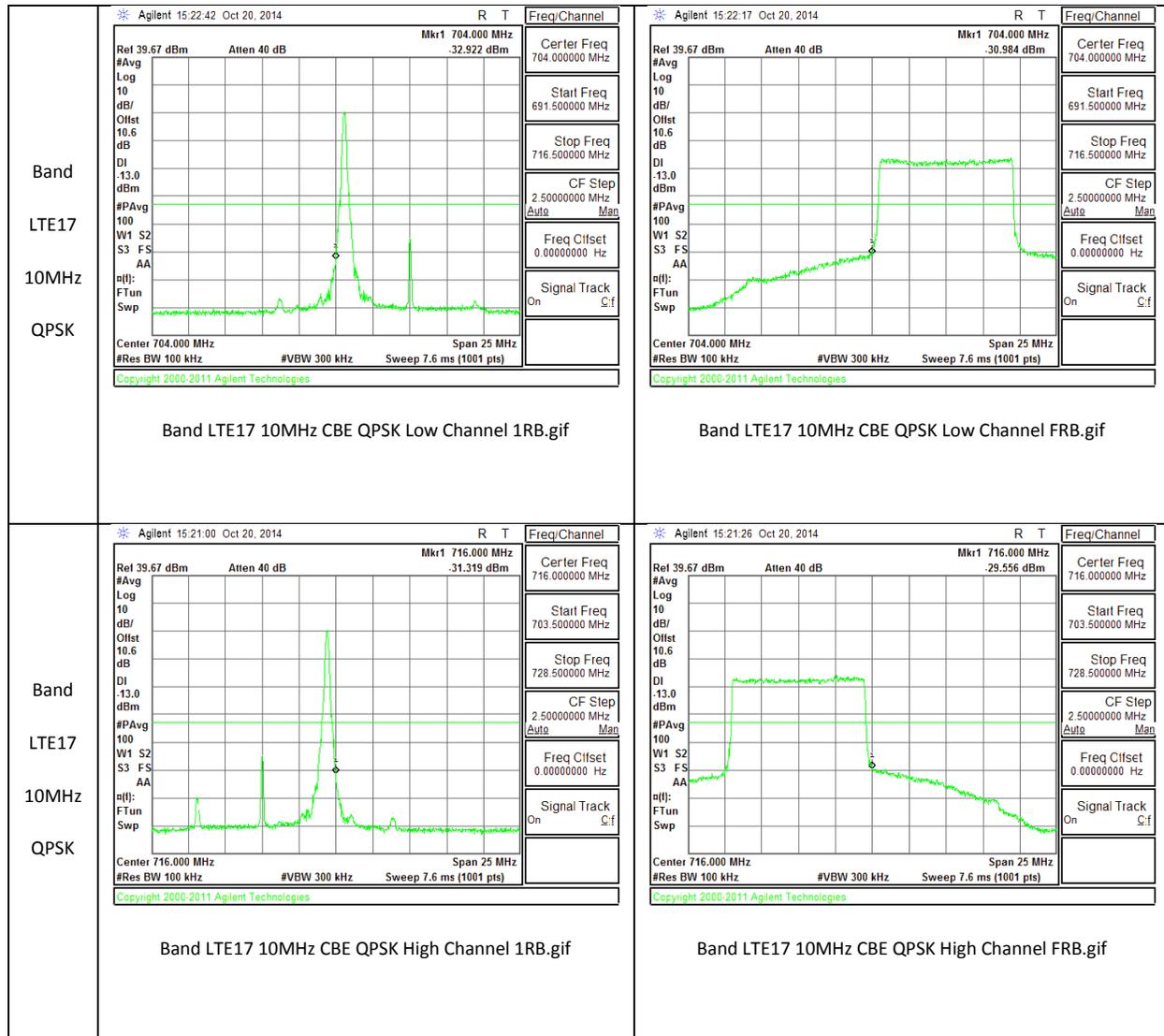
Per KDB 971168 D01 Power Meas License Digital Systems v02r01

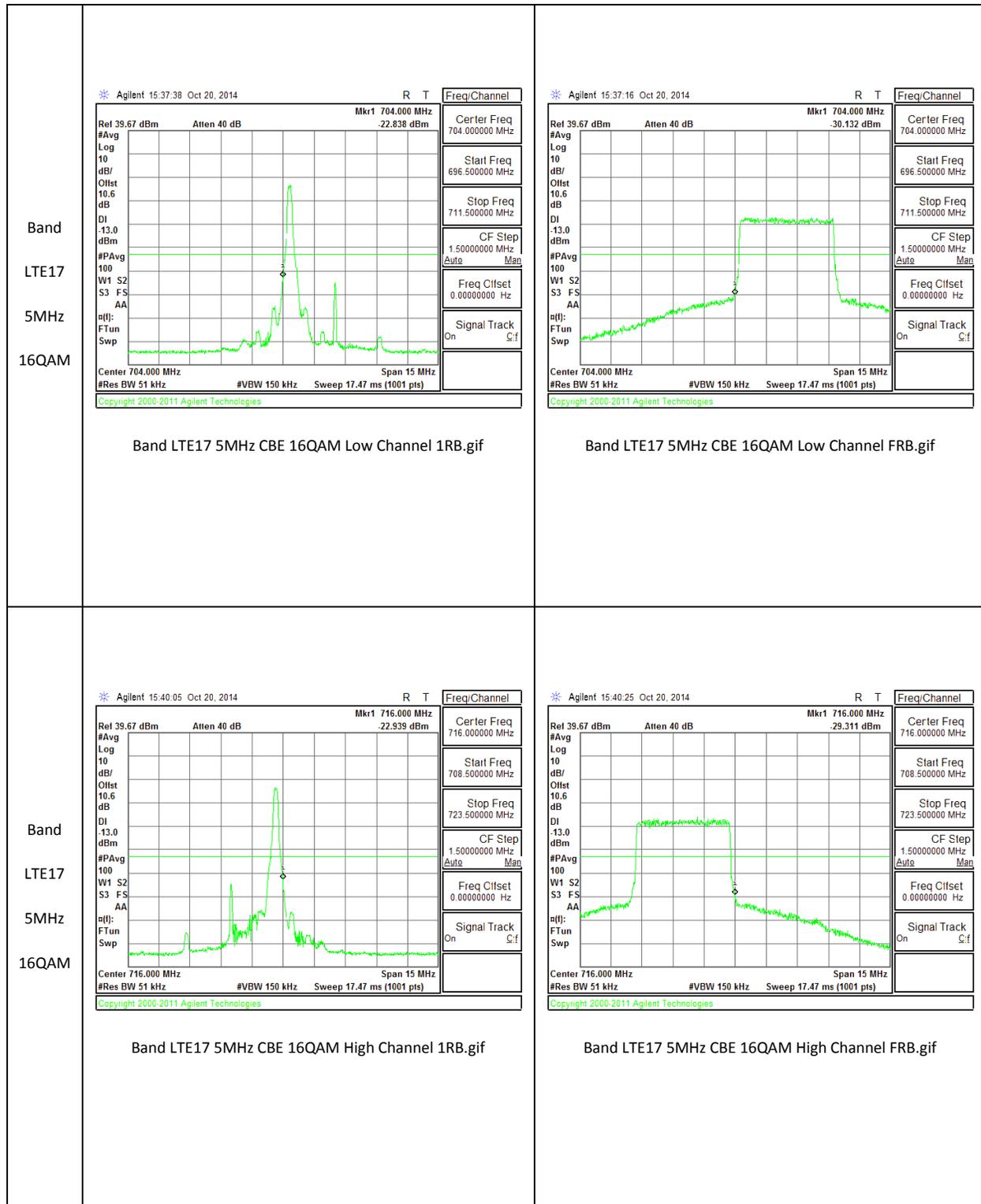
The transmitter output was connected to an Agilent 8960 or a CMW500 Test Set and configured to operate at maximum power. The band edge emissions were measured at the required operating frequencies in each band on the Spectrum Analyzer.

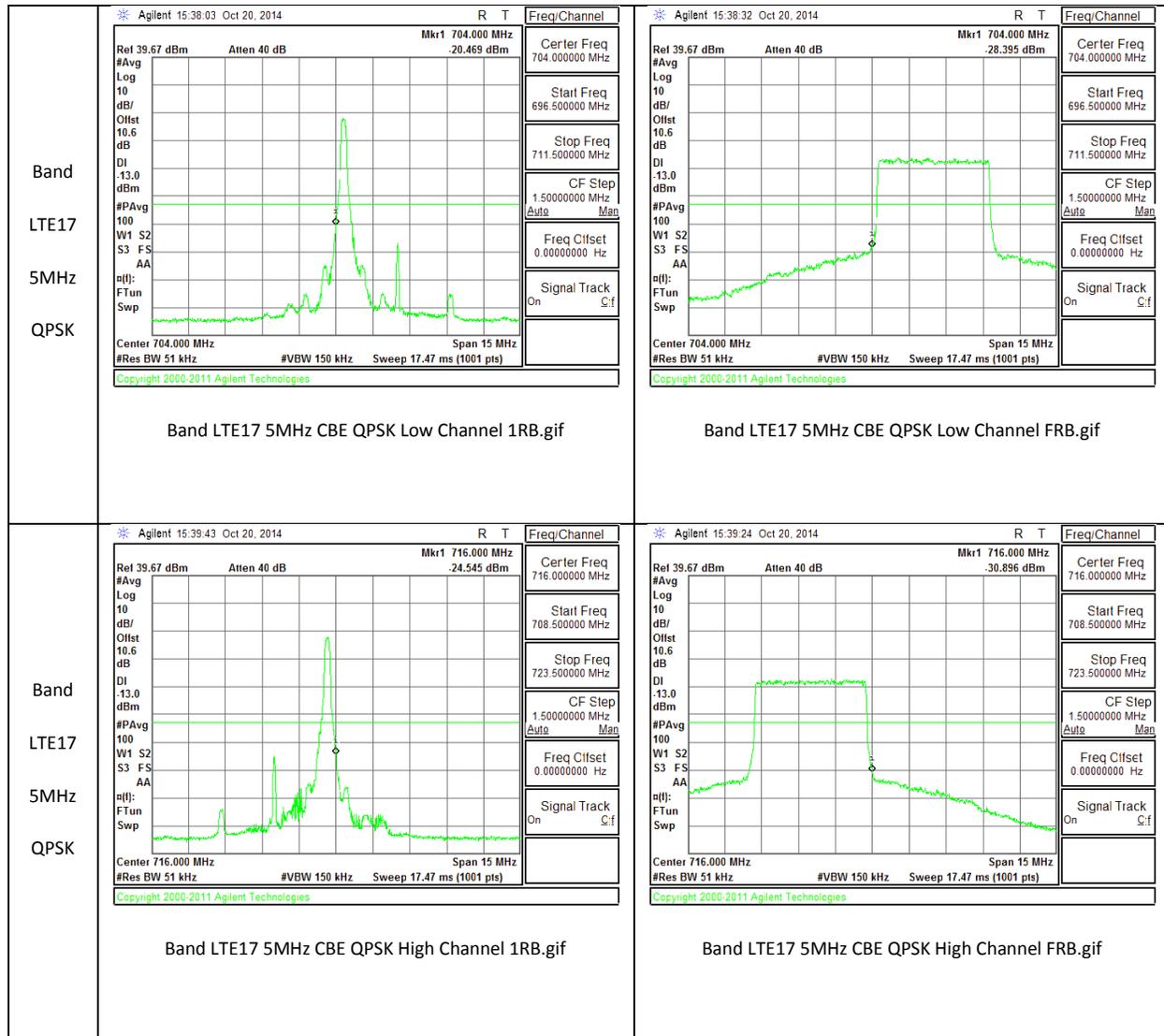
RESULTS

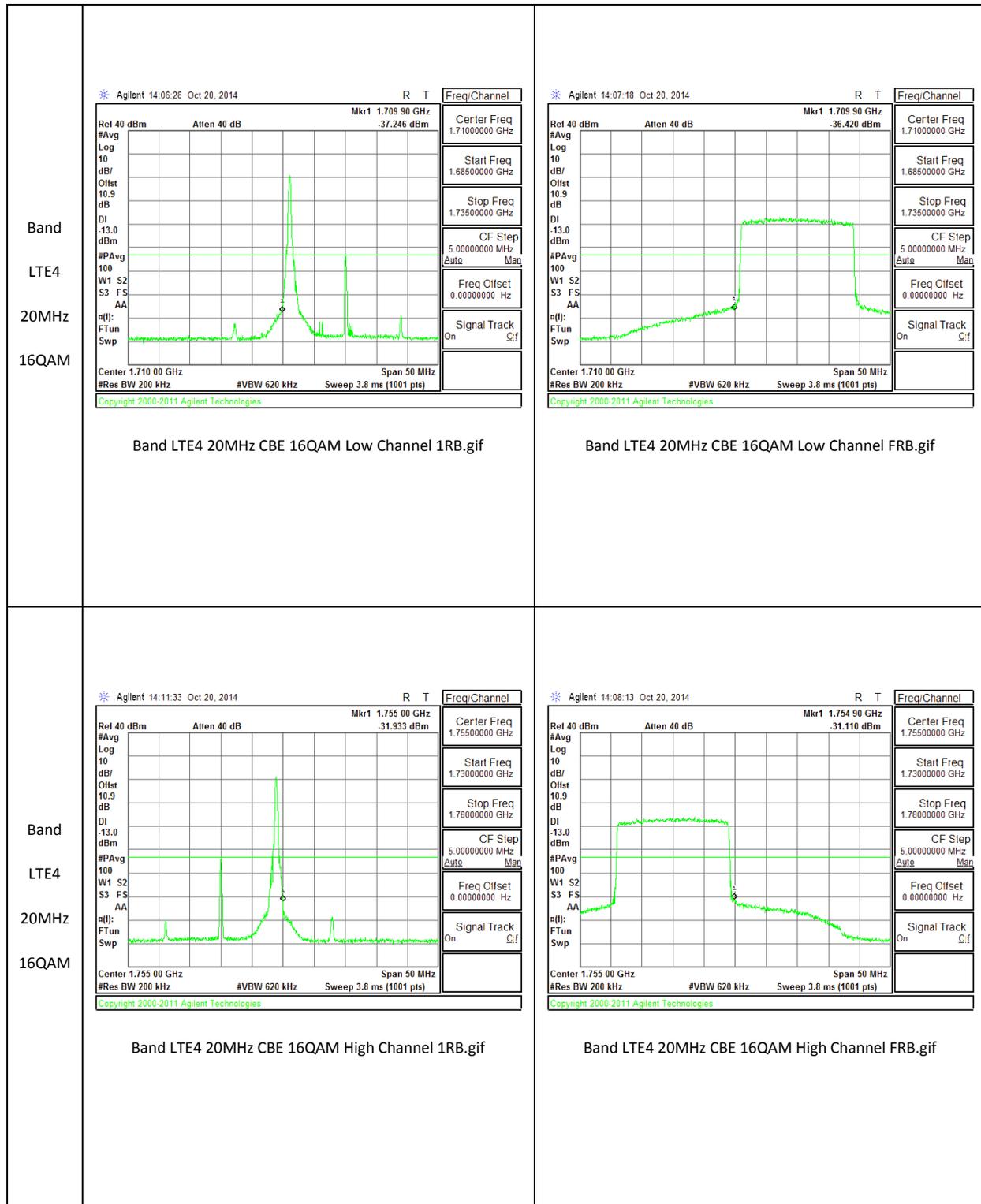
10.2.1. BAND EDGE PLOTS

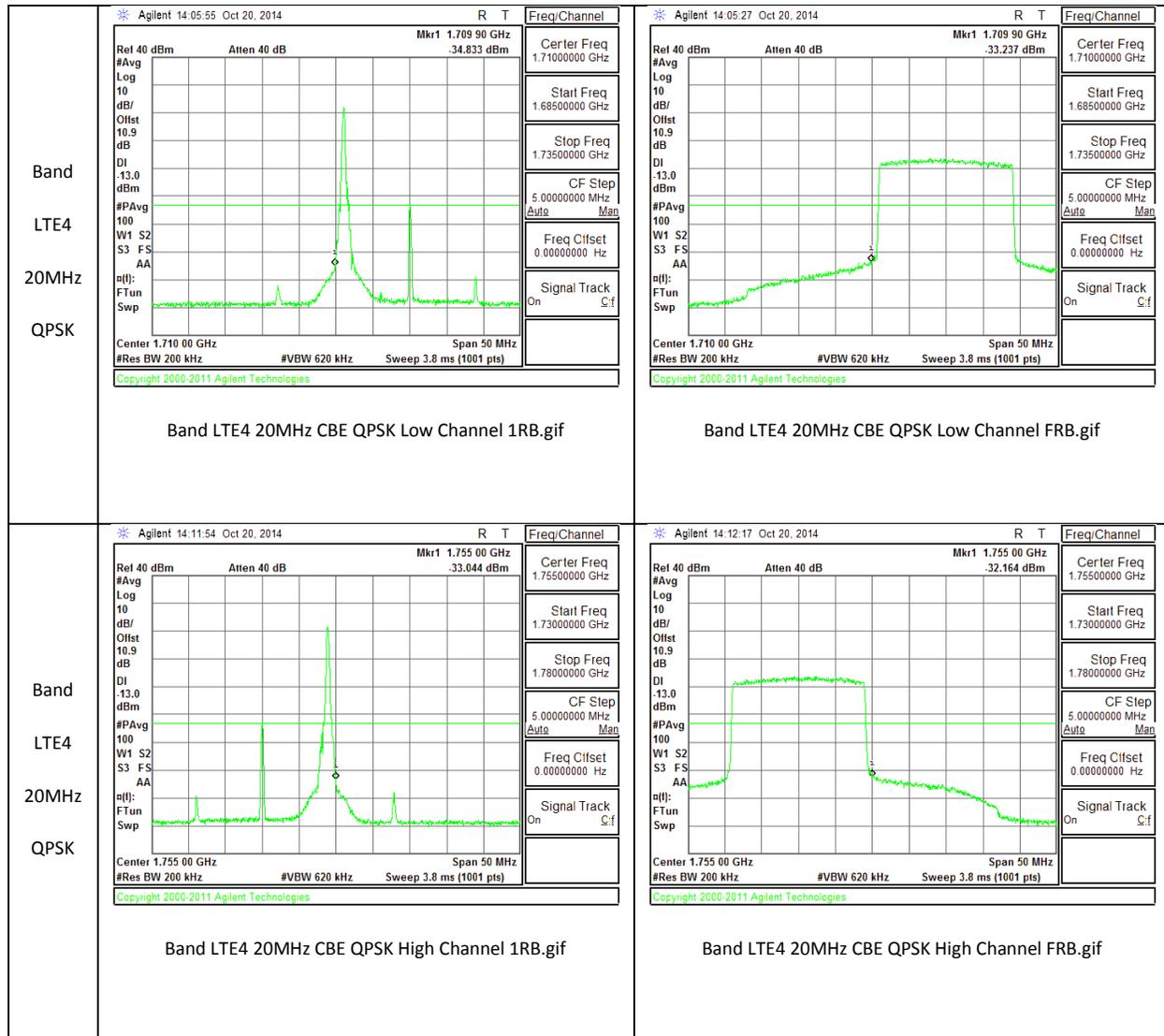


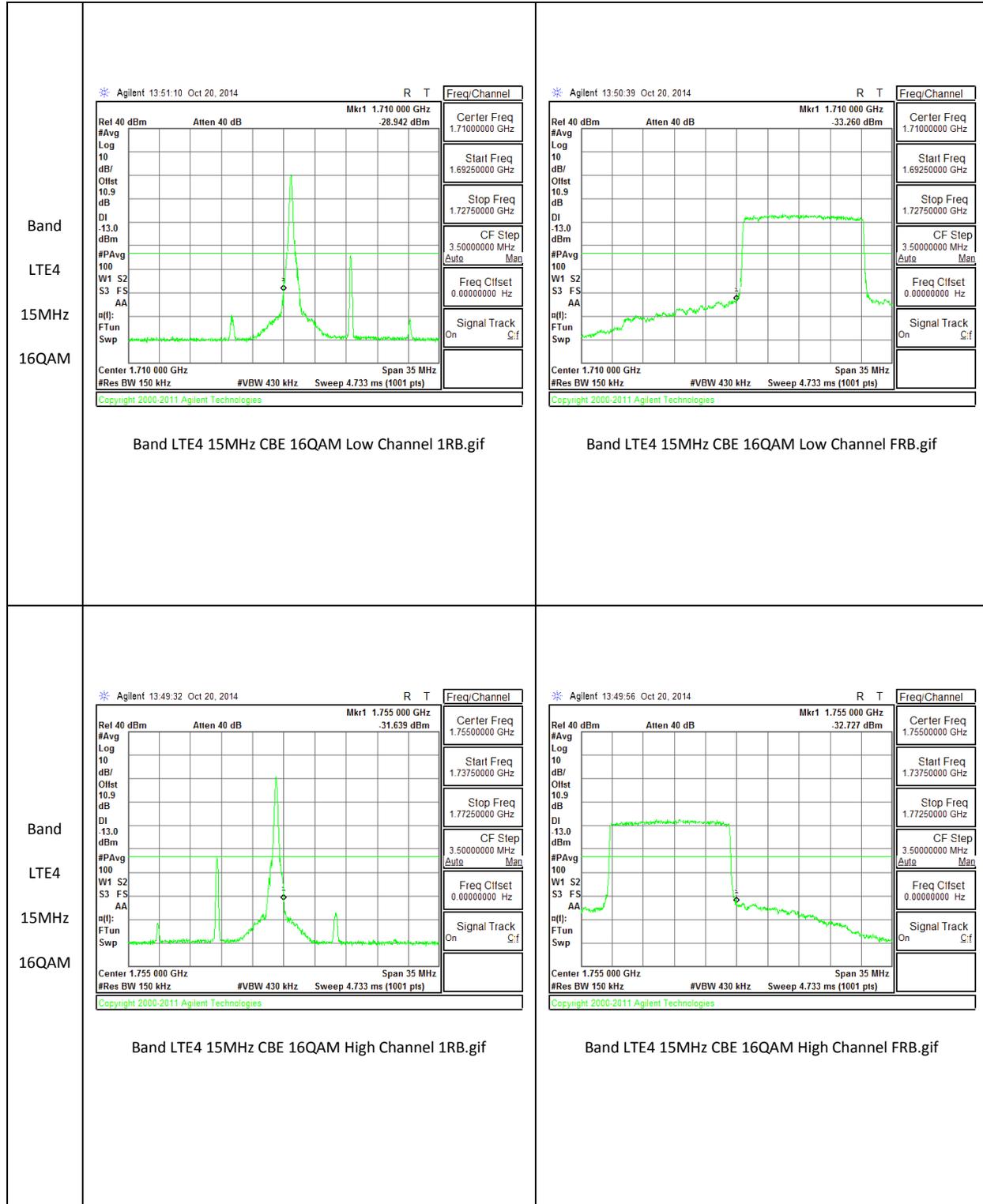


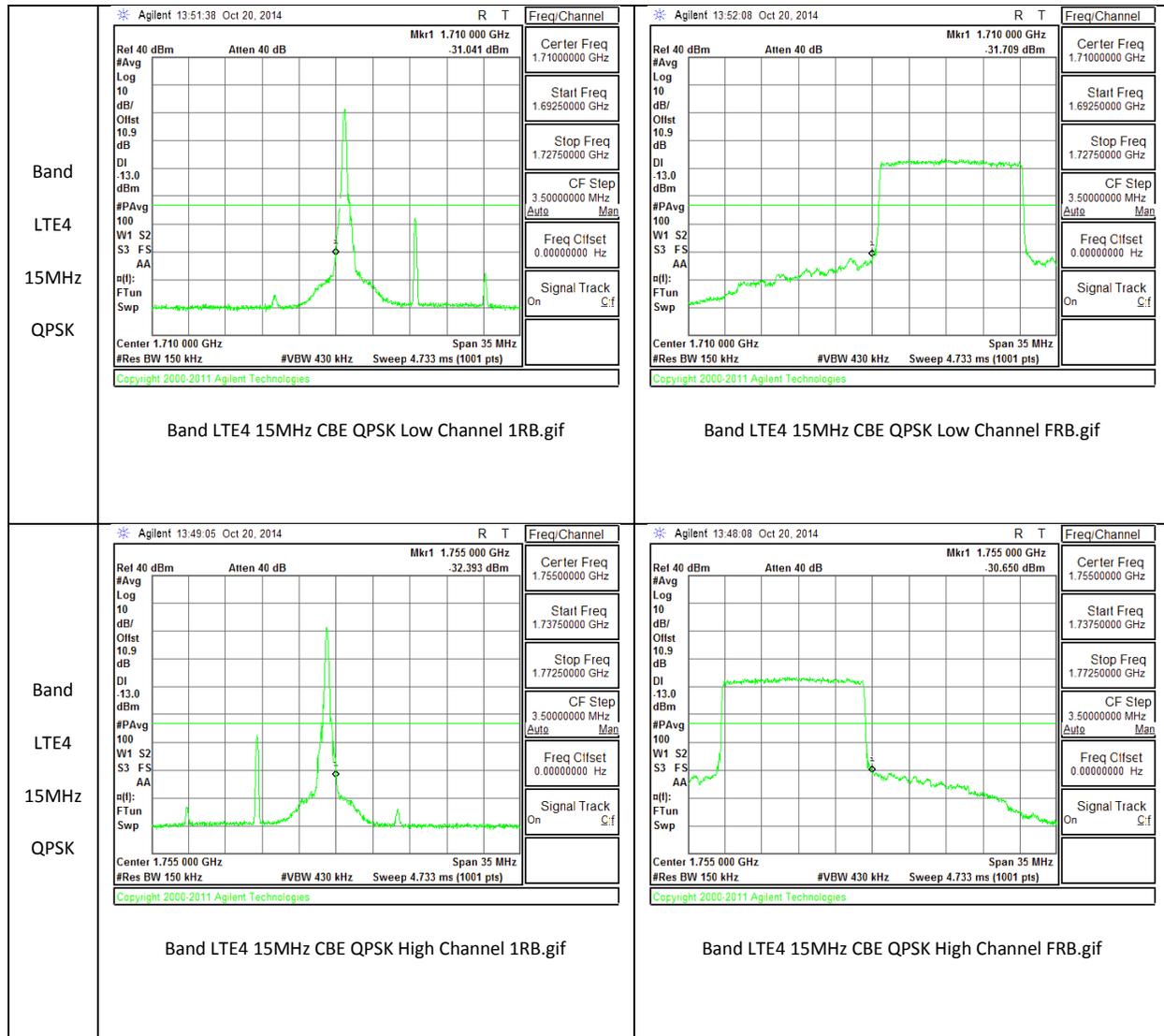


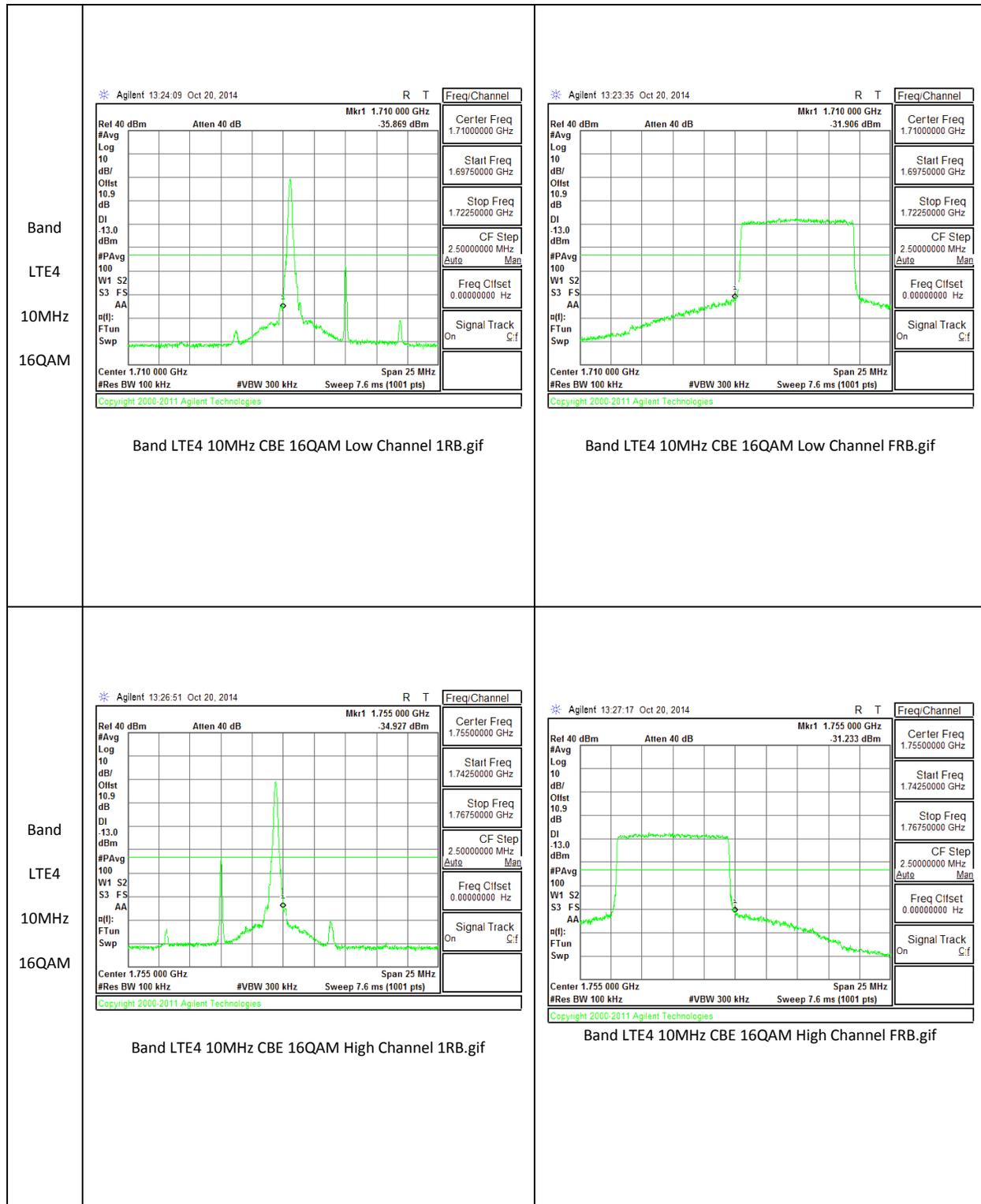


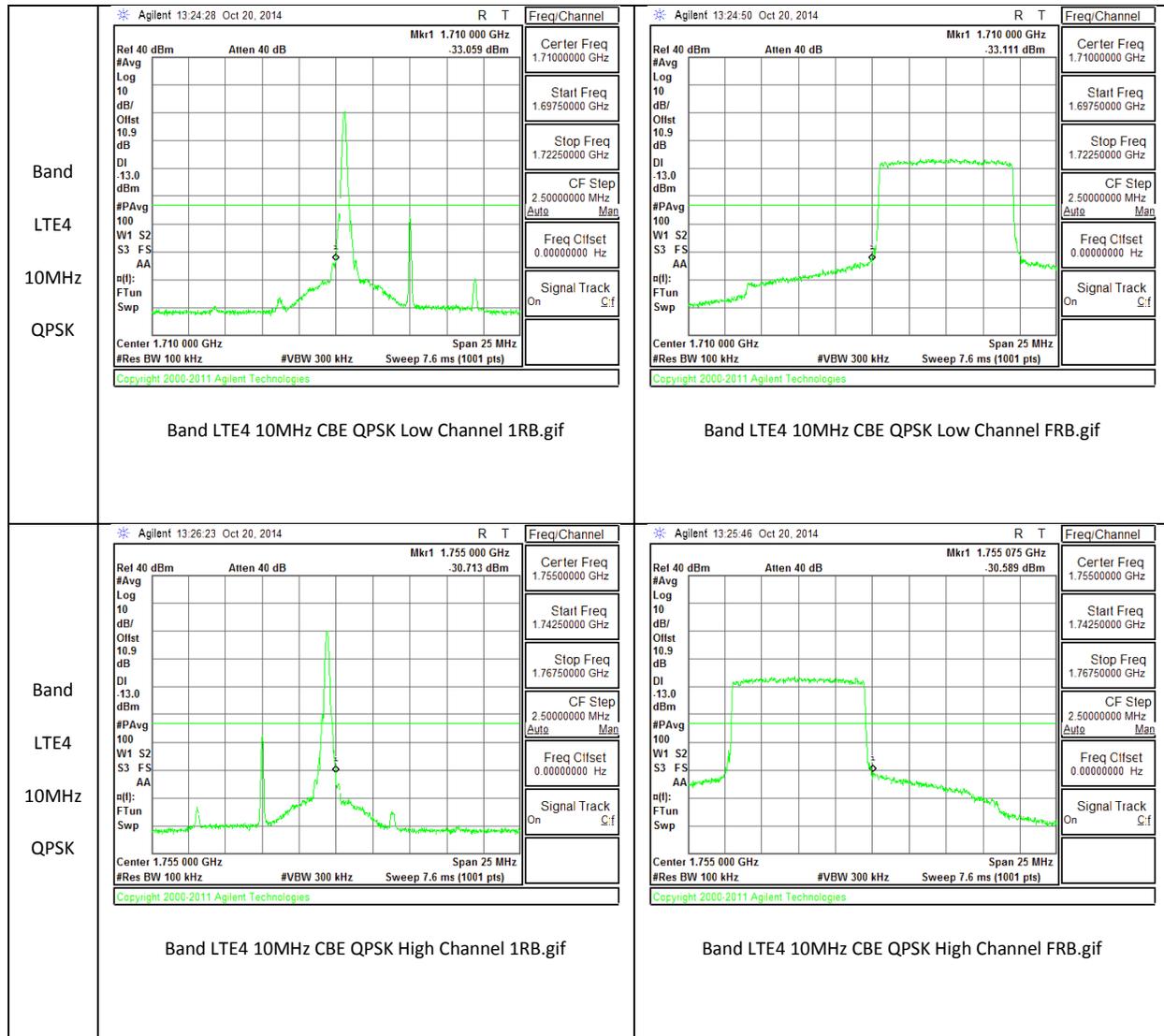


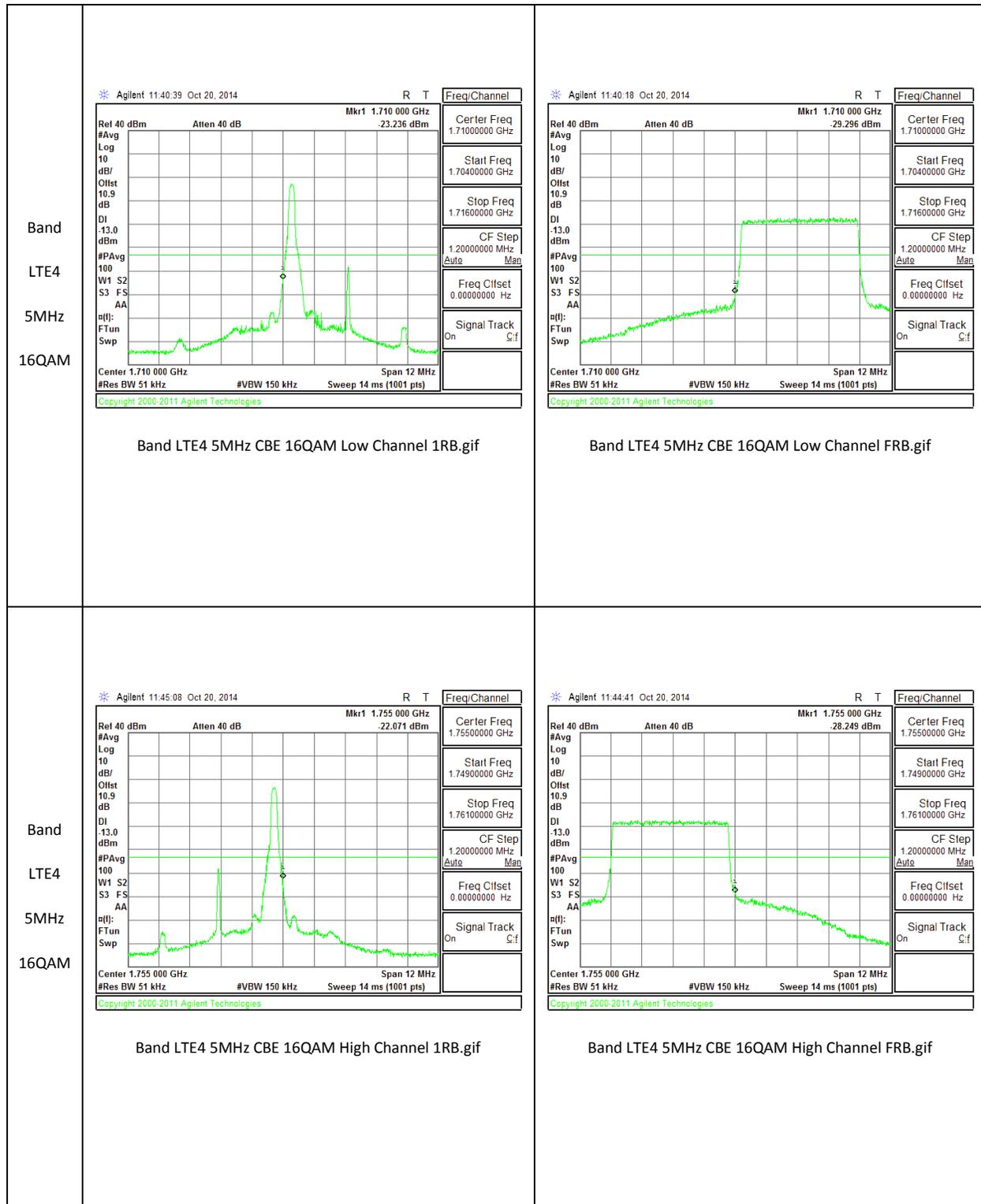


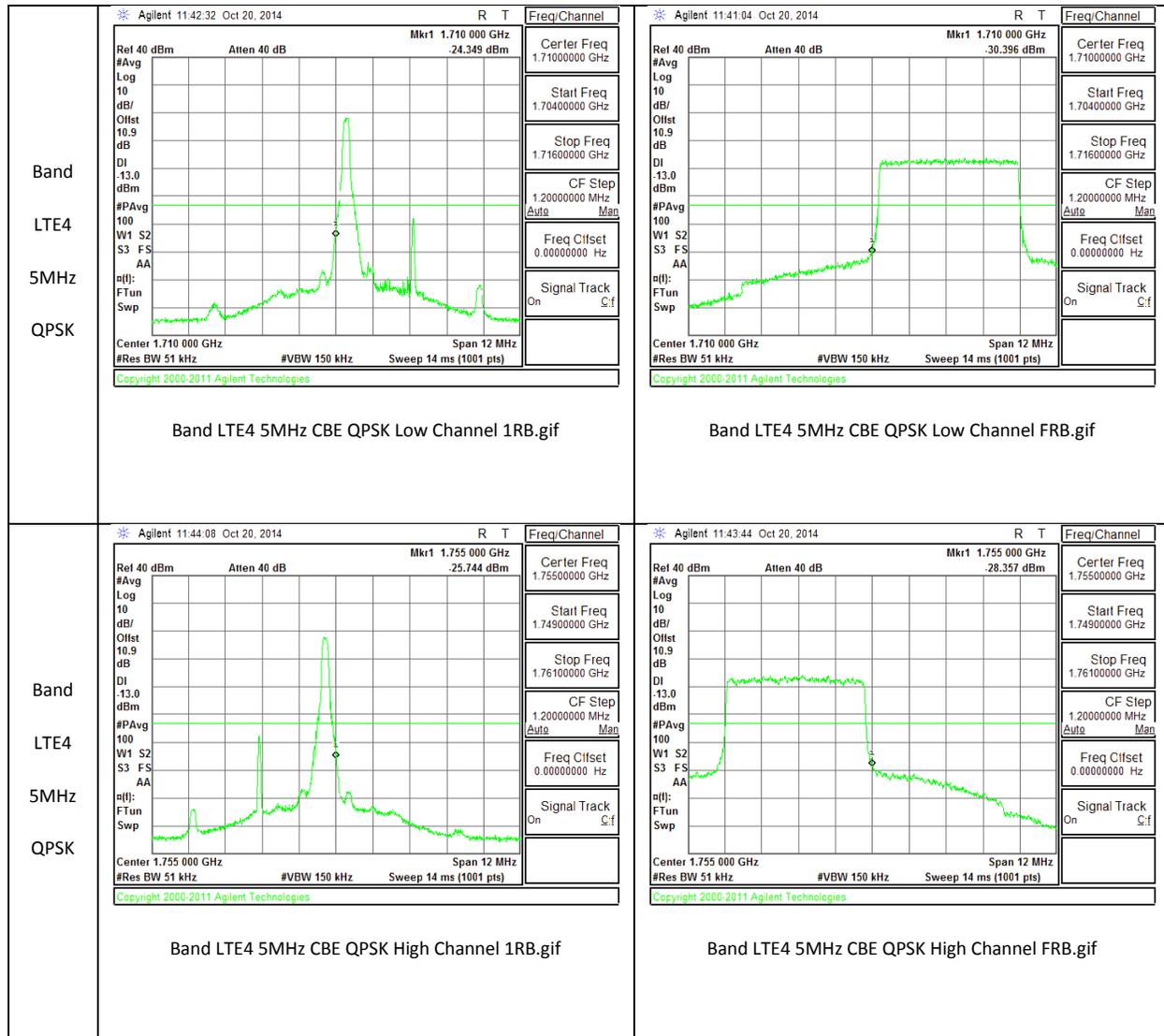


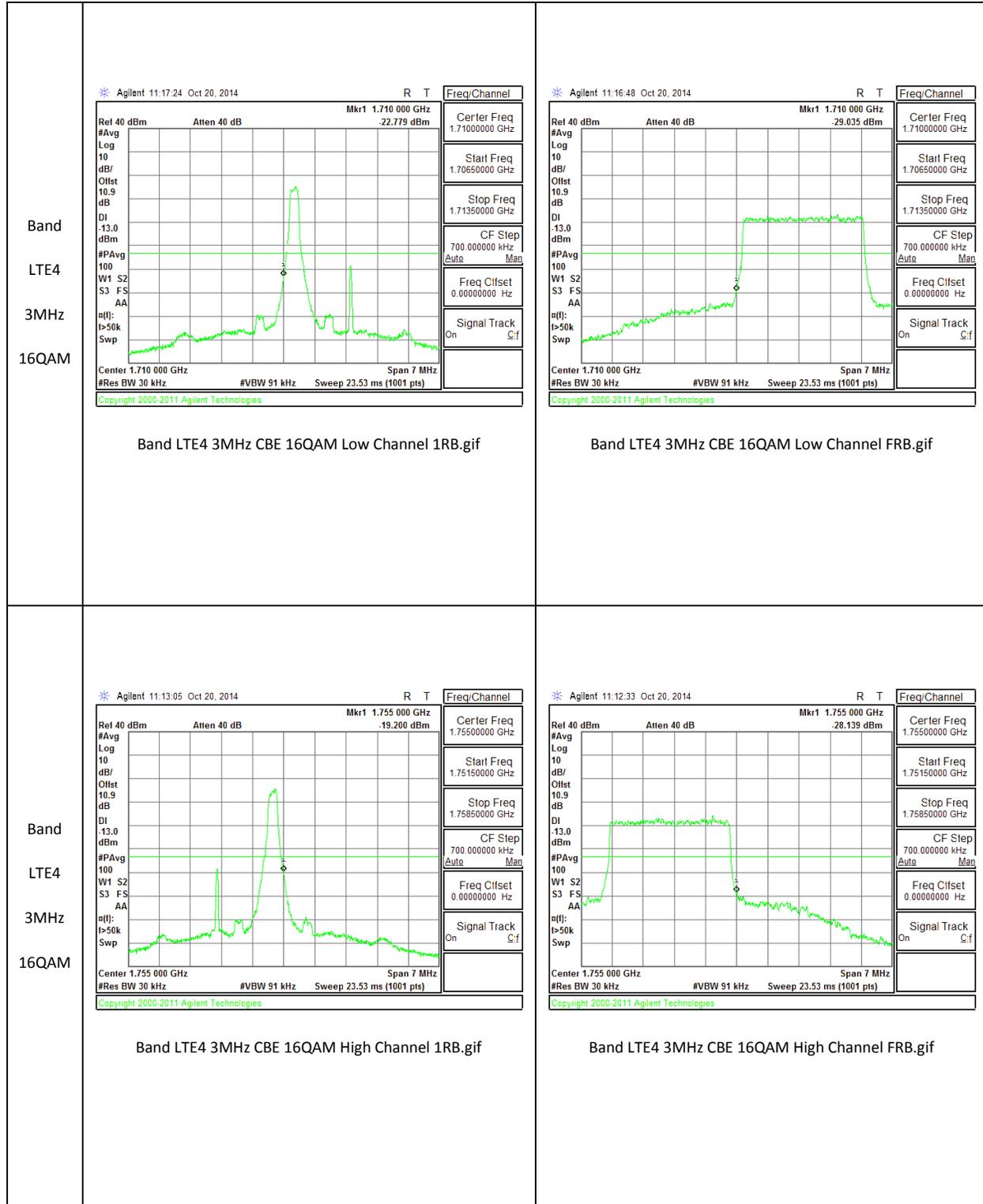


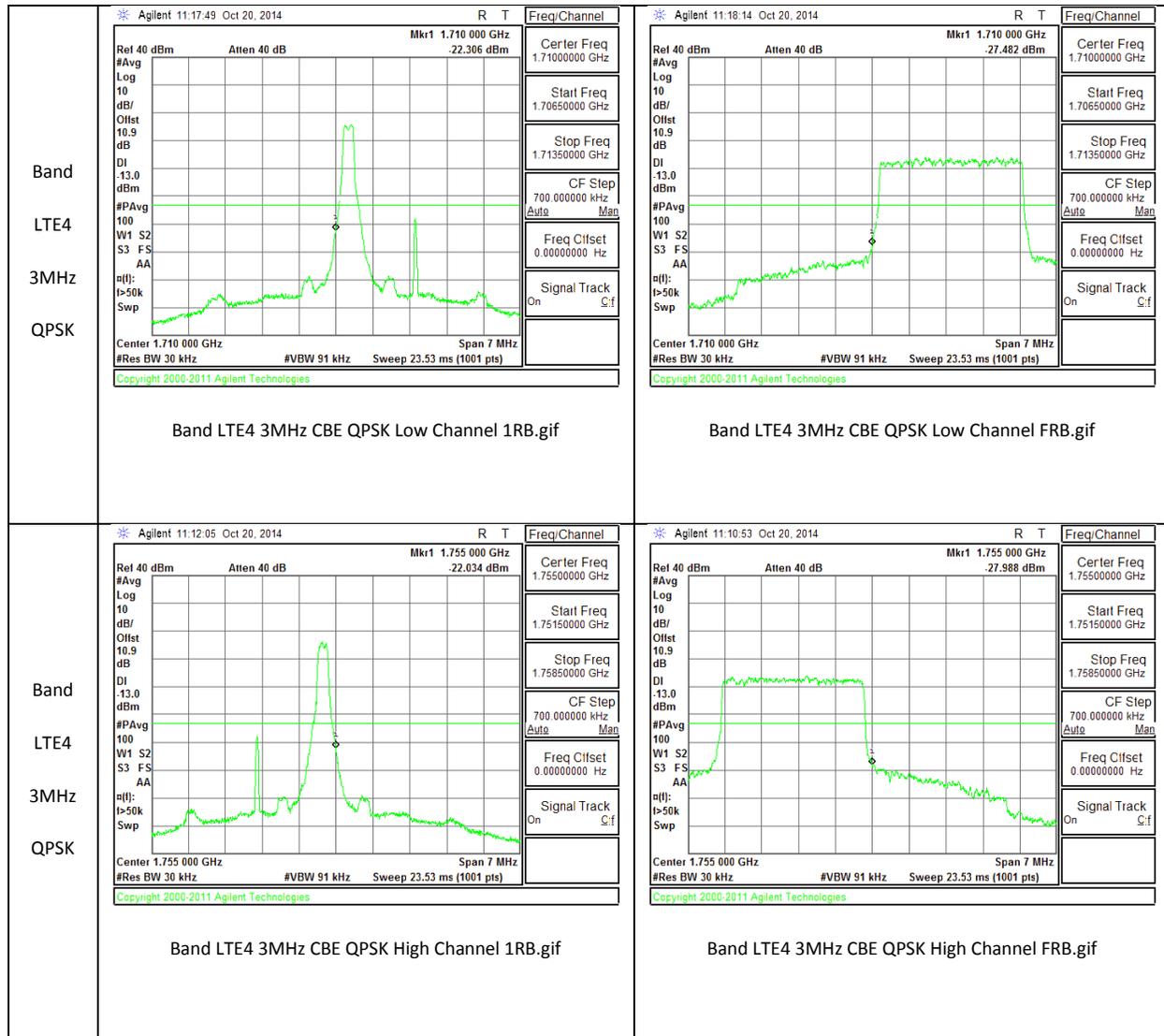


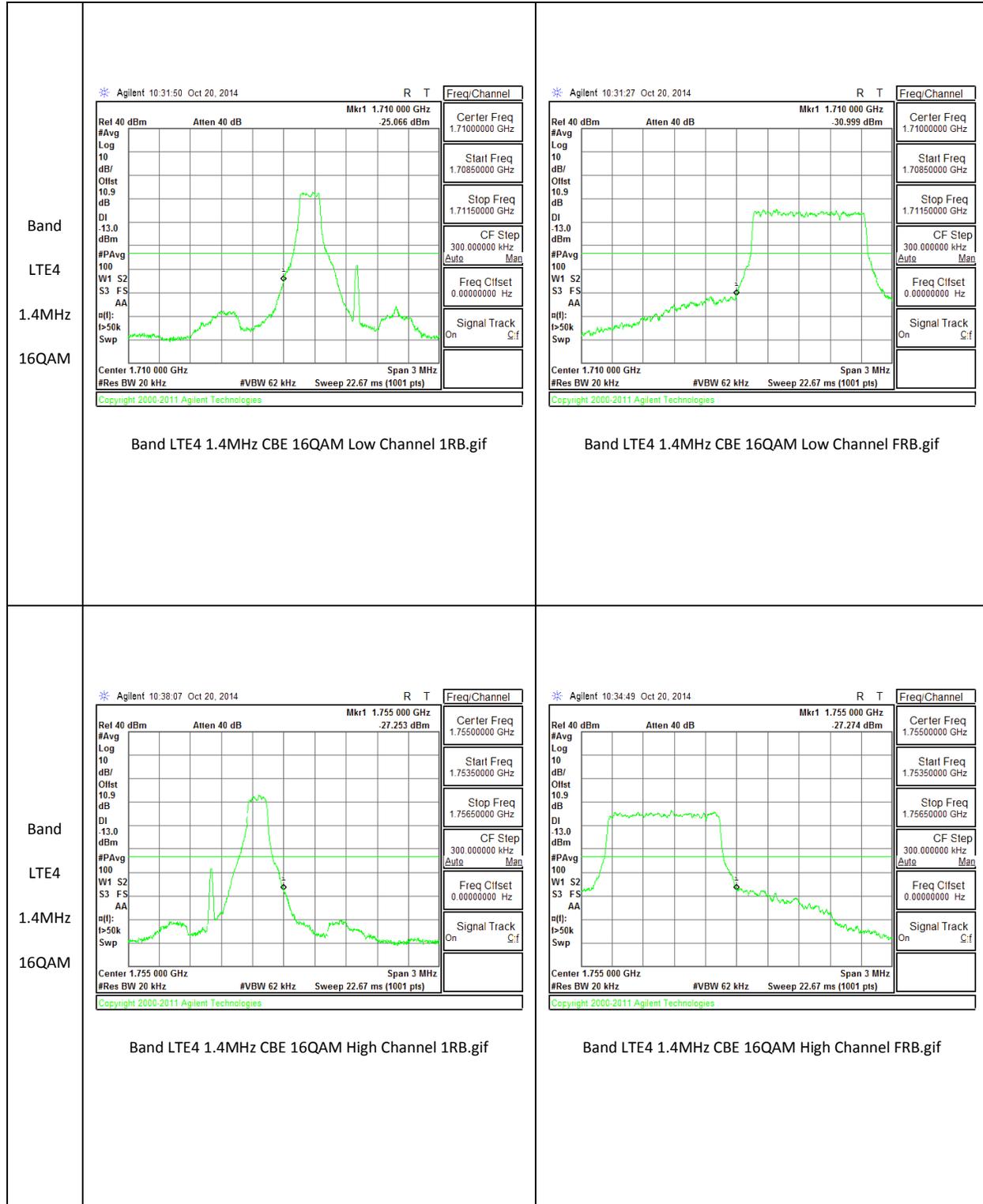












Band LTE4 1.4MHz QPSK		<p>Agilent 10:30:55 Oct 20, 2014</p> <p>Center Freq 1.71000000 GHz</p> <p>Start Freq 1.70850000 GHz</p> <p>Stop Freq 1.71150000 GHz</p> <p>CF Step 300.000000 kHz</p> <p>Freq Offset 0.00000000 Hz</p> <p>Signal Track On</p>
	<p>Band LTE4 1.4MHz CBE QPSK Low Channel 1RB.gif</p>	
Band LTE4 1.4MHz QPSK		<p>Agilent 10:30:25 Oct 20, 2014</p> <p>Center Freq 1.71000000 GHz</p> <p>Start Freq 1.70850000 GHz</p> <p>Stop Freq 1.71150000 GHz</p> <p>CF Step 300.000000 kHz</p> <p>Freq Offset 0.00000000 Hz</p> <p>Signal Track On</p>
	<p>Band LTE4 1.4MHz CBE QPSK Low Channel FRB.gif</p>	
Band LTE4 1.4MHz QPSK		<p>Agilent 10:39:08 Oct 20, 2014</p> <p>Center Freq 1.75500000 GHz</p> <p>Start Freq 1.75350000 GHz</p> <p>Stop Freq 1.75650000 GHz</p> <p>CF Step 300.000000 kHz</p> <p>Freq Offset 0.00000000 Hz</p> <p>Signal Track On</p>
	<p>Band LTE4 1.4MHz CBE QPSK High Channel 1RB.gif</p>	
Band LTE4 1.4MHz QPSK		<p>Agilent 10:38:43 Oct 20, 2014</p> <p>Center Freq 1.75500000 GHz</p> <p>Start Freq 1.75350000 GHz</p> <p>Stop Freq 1.75650000 GHz</p> <p>CF Step 300.000000 kHz</p> <p>Freq Offset 0.00000000 Hz</p> <p>Signal Track On</p>
	<p>Band LTE4 1.4MHz CBE QPSK High Channel FRB.gif</p>	

10.3. OUT OF BAND EMISSIONS

RULE PART(S)

FCC: §27.53

LIMITS

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

TEST PROCEDURE

Per KDB 971168 D01 Power Meas License Digital Systems 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.

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	-22.93	-13	-9.93
			710	-23.01	-13	-10.01
			711	-21.75	-13	-8.75
		16QAM	709	-23.49	-13	-10.49
			710	-22.64	-13	-9.64
			711	-25.62	-13	-12.62

Band	BW (MHz)	Mode	f (MHz)	Spur (dBm)	Spec (dBm)	Delta (dB)
LTE17	5	QPSK	706.5	-22.28	-13	-9.28
			710	-25.76	-13	-12.76
			713.5	-21.69	-13	-8.69
		16QAM	706.5	-22.91	-13	-9.91
			710	-25.81	-13	-12.81
			713.5	-26.71	-13	-13.71

Band	BW (MHz)	Mode	f (MHz)	Spur (dBm)	Spec (dBm)	Delta (dB)
LTE4	20	QPSK	1720	-22.71	-13	-9.71
			1732.5	-22.71	-13	-9.71
			1745	-25.82	-13	-12.82
		16QAM	1720	-22.69	-13	-9.69
			1732.5	-22.37	-13	-9.37
			1745	-22.74	-13	-9.74

Band	BW (MHz)	Mode	f (MHz)	Spur (dBm)	Spec (dBm)	Delta (dB)
LTE4	15	QPSK	1717.5	-24.64	-13	-11.64
			1732.5	-24.56	-13	-11.56
			1747.5	-23.27	-13	-10.27
		16QAM	1717.5	-23.2	-13	-10.2
			1732.5	-25.54	-13	-12.54
			1747.5	-24.1	-13	-11.1

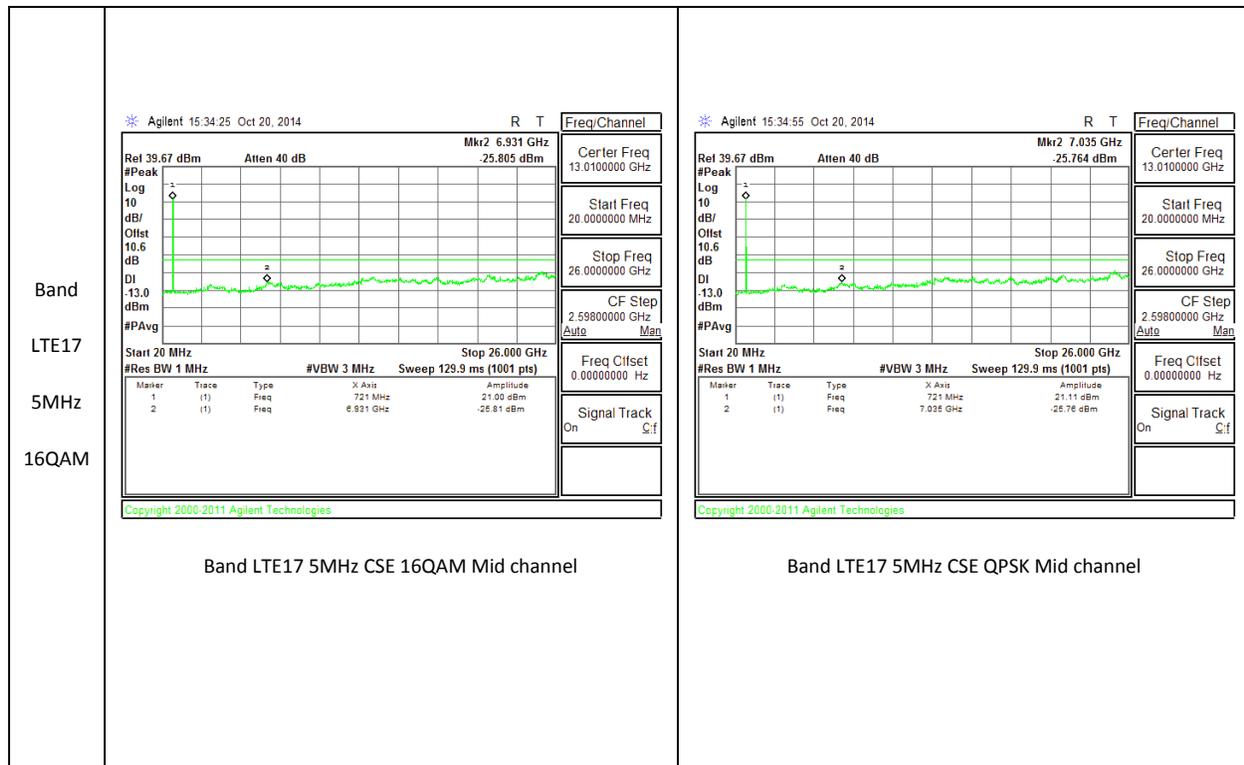
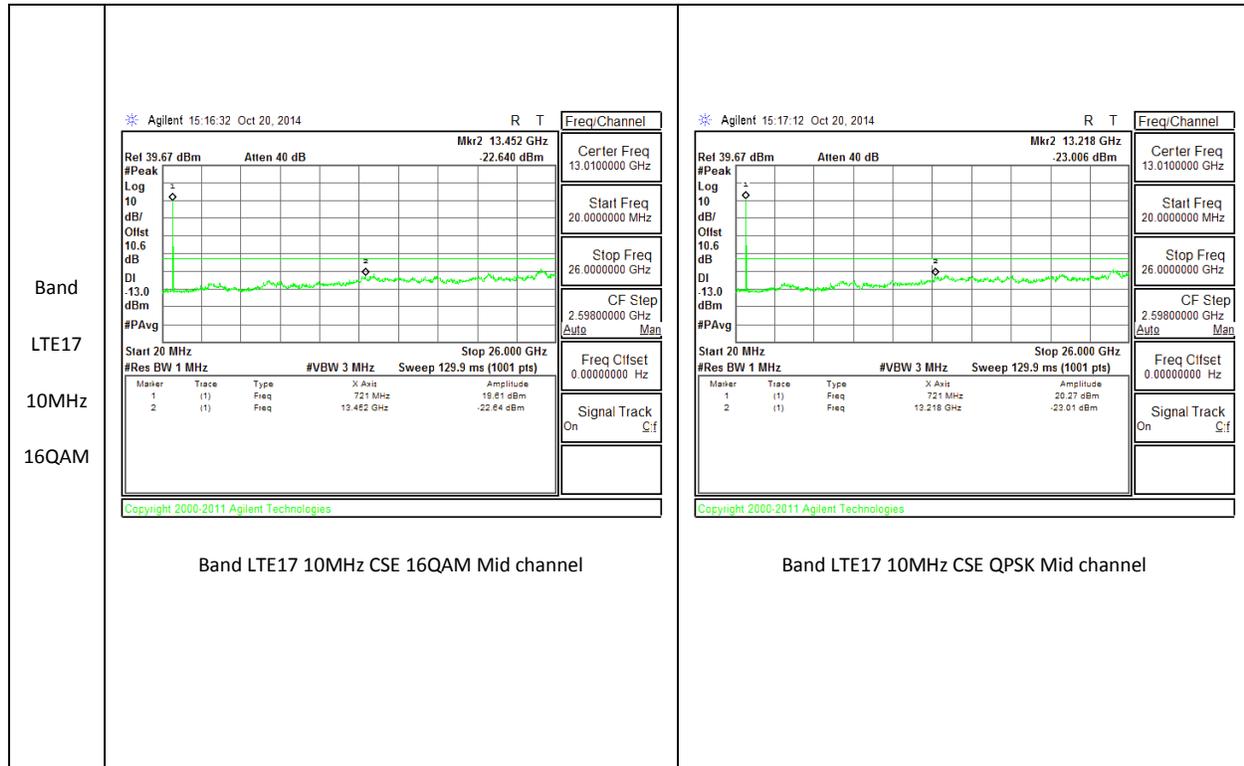
Band	BW (MHz)	Mode	f (MHz)	Spur (dBm)	Spec (dBm)	Delta (dB)
LTE4	10	QPSK	1715	-24.98	-13	-11.98
			1732.5	-22.3	-13	-9.3
			1750	-23.38	-13	-10.38
		16QAM	1715	-22.35	-13	-9.35
			1732.5	-22.48	-13	-9.48
			1750	-22.56	-13	-9.56

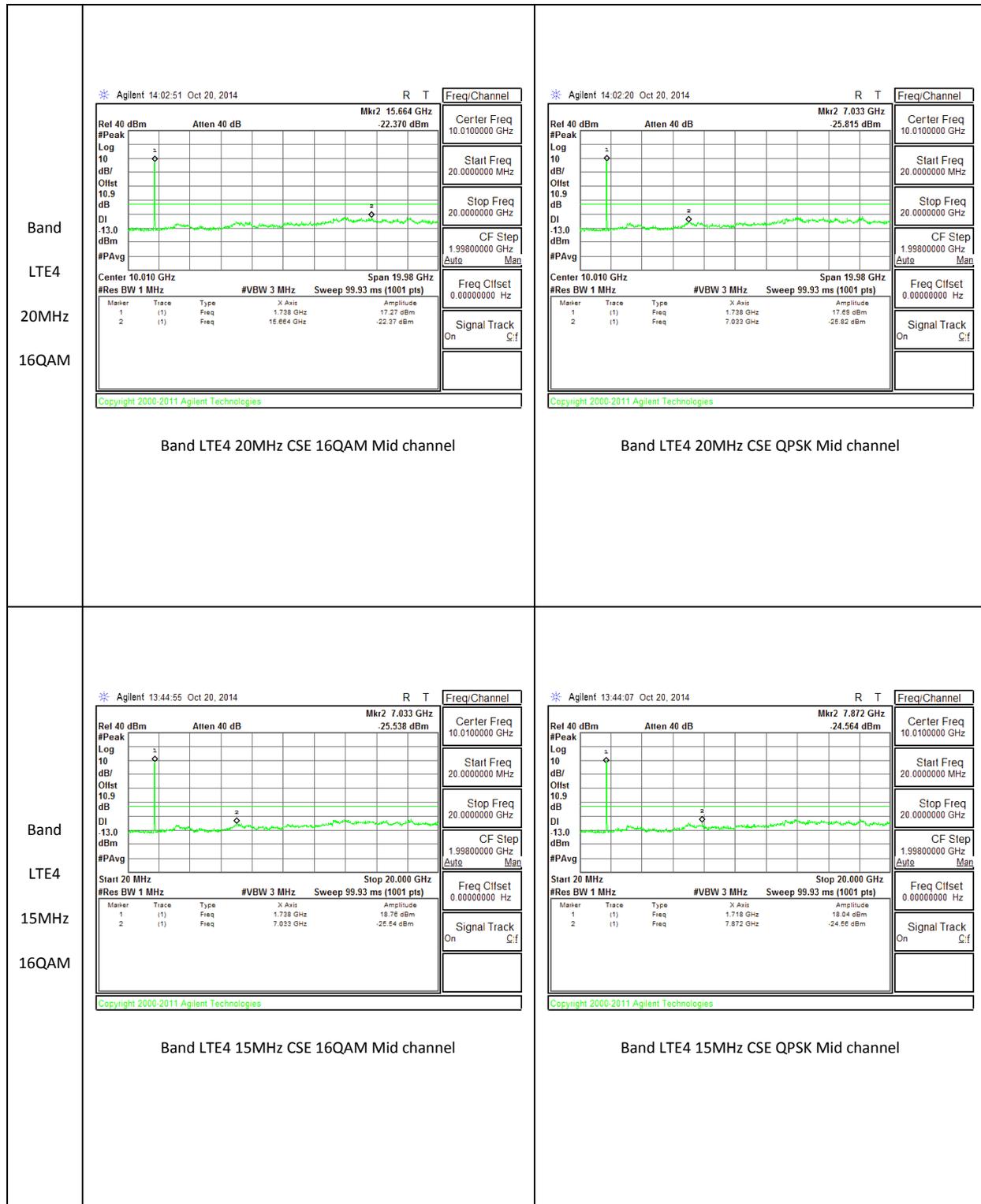
Band	BW (MHz)	Mode	f (MHz)	Spur (dBm)	Spec (dBm)	Delta (dB)
LTE4	5	QPSK	1712.5	-24.14	-13	-11.14
			1732.5	-26.1	-13	-13.1
			1752.5	-28.62	-13	-15.62
		16QAM	1712.5	-22.86	-13	-9.86
			1732.5	-25.81	-13	-12.81
			1752.5	-22.56	-13	-9.56

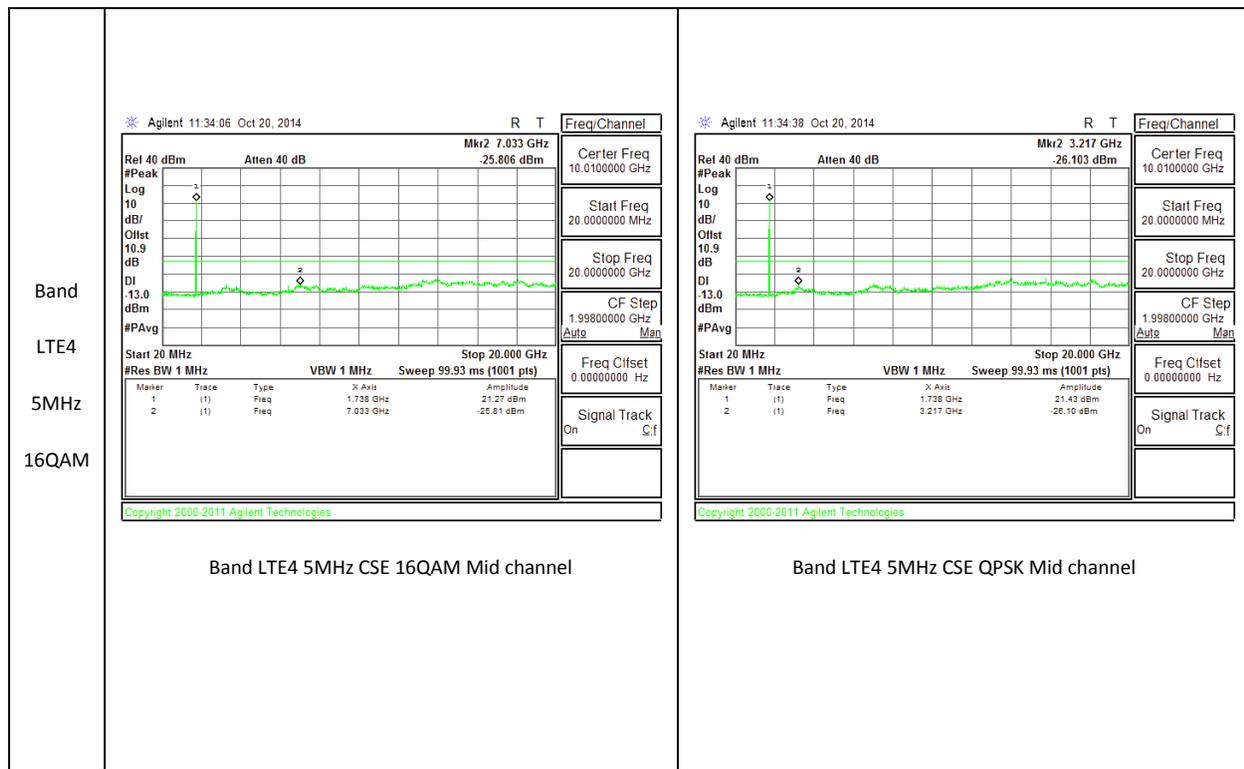
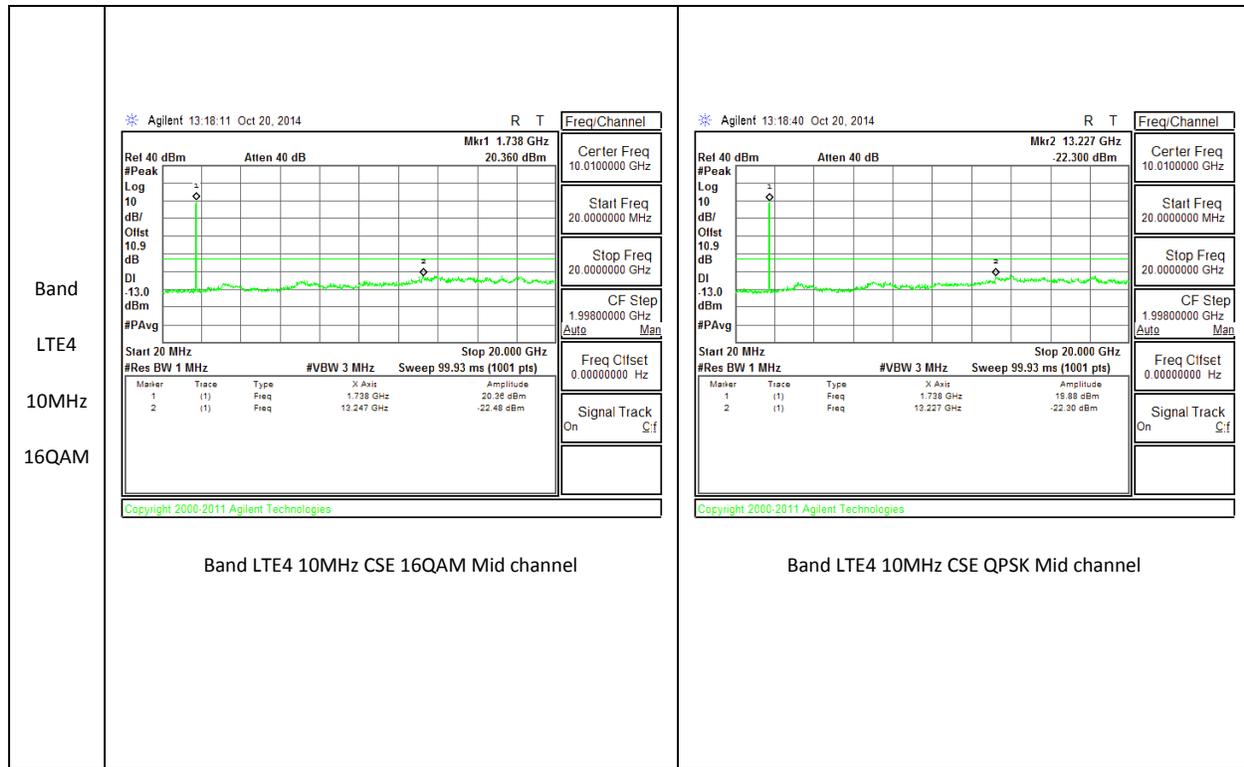
Band	BW (MHz)	Mode	f (MHz)	Spur (dBm)	Spec (dBm)	Delta (dB)
LTE4	3	QPSK	1711.5	-22.59	-13	-9.59
			1732.5	-23.11	-13	-10.11
			1753.5	-26.26	-13	-13.26
		16QAM	1711.5	-25.12	-13	-12.12
			1732.5	-22.38	-13	-9.38
			1753.5	-25.08	-13	-12.08

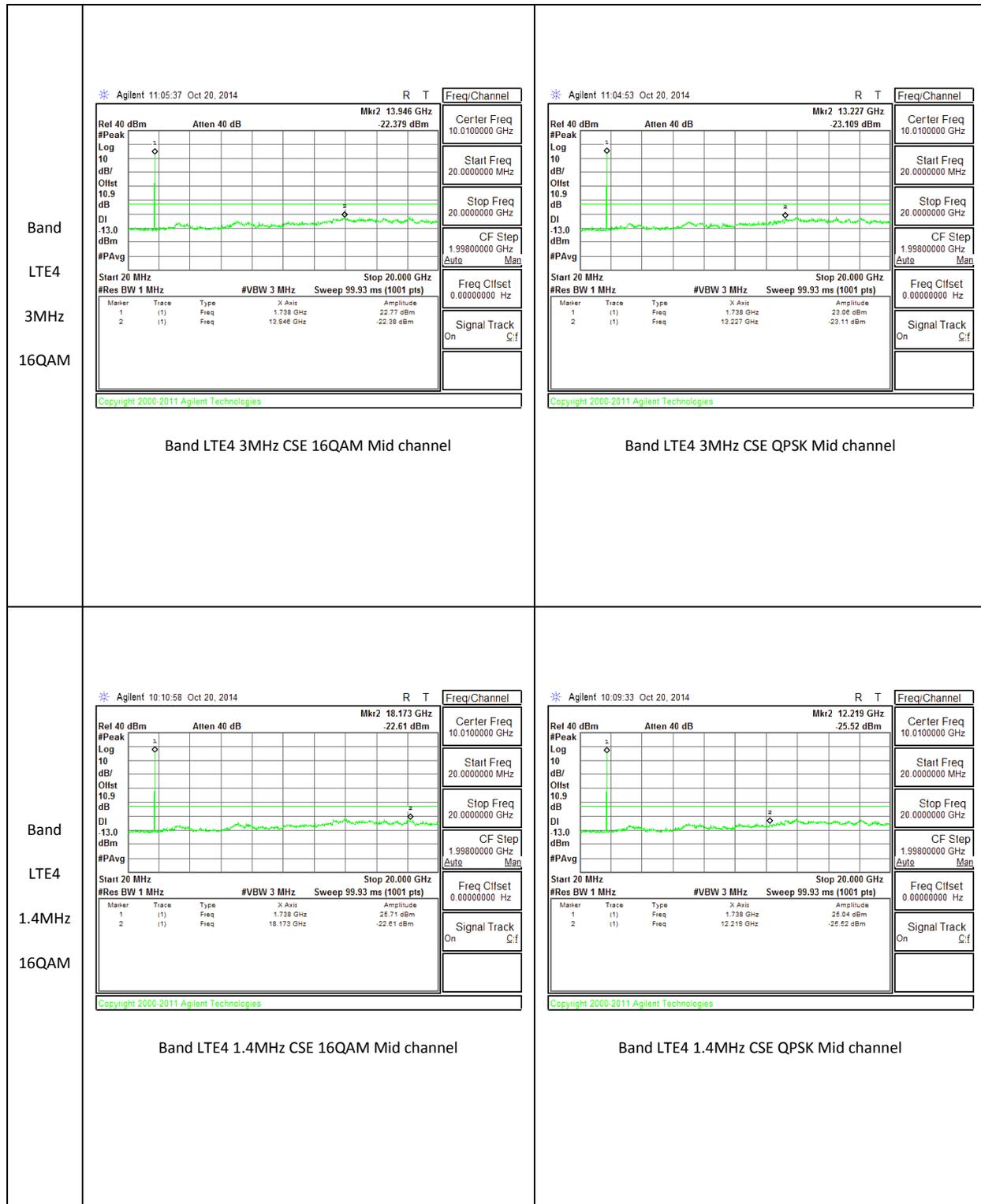
Band	BW (MHz)	Mode	f (MHz)	Spur (dBm)	Spec (dBm)	Delta (dB)
LTE4	1.4	QPSK	1710.7	-25.33	-13	-12.33
			1732.5	-25.52	-13	-12.52
			1754.3	-23.05	-13	-10.05
		16QAM	1710.7	-25.32	-13	-12.32
			1732.5	-22.61	-13	-9.61
			1754.3	-22.2	-13	-9.2

10.3.2. OUT OF BAND EMISSIONS PLOTS









10.4. FREQUENCY STABILITY

RULE PART(S)

FCC: §27.54

LIMITS

§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

MODES TESTED

- LTE Bands 4, 17

RESULTS

See the following pages.

10.4.1. FREQUENCY STABILITY RESULTS

LTE BAND 17 – MID CHANNEL

Reference Frequency: PCS Mid Channel 709.999998 MHz @ 20°C				
Limit: within the authorized block or +/- 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	709.999999	-0.001	2.5
3.80	40	709.999999	-0.001	2.5
3.80	30	710.000001	-0.004	2.5
3.80	20	709.999998	0	2.5
3.80	10	709.999998	0.000	2.5
3.80	0	709.999999	-0.001	2.5
3.80	-10	710.000001	-0.004	2.5
3.80	-20	709.999999	-0.001	2.5
3.80	-30	709.999999	-0.001	2.5

Reference Frequency: PCS Mid Channel 709.999998 MHz @ 20°C				
Limit: within the authorized block or +/- 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	709.999998	0.00000	2.5
4.30	20	709.999997	0.00141	2.5
3.20	20	709.999998	0.00000	2.5

LTE BAND 4 – MID CHANNEL

Reference Frequency: PCS Mid Channel 1732.500002MHz @ 20°C				
Limit: within the authorized block or +- 2.5 ppm = 4331.250 Hz				
Power Supply (Vdc)	Environment Temperature (*C)	Frequency Deviation Measured with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
3.80	50	1732.500004	-0.001	2.5
3.80	40	1732.500003	-0.001	2.5
3.80	30	1732.500002	0.000	2.5
3.80	20	1732.500002	0	2.5
3.80	10	1732.500002	0.000	2.5
3.80	0	1732.500003	-0.001	2.5
3.80	-10	1732.500005	-0.002	2.5
3.80	-20	1732.500003	-0.001	2.5
3.80	-30	1732.500002	0.000	2.5

Reference Frequency: PCS Mid Channel 1732.500002 MHz @ 20°C				
Limit: within the authorized block or +- 2.5 ppm = 4331.250 Hz				
Power Supply (Vdc)	Environment Temperature (*C)	Frequency Deviation Measured with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
3.80	20	1732.500002	0.00000	2.5
4.30	20	1732.500004	-0.00115	2.5
3.20	20	1732.500006	-0.00231	2.5

11. RADIATED TEST RESULTS

11.1. RADIATED POWER (ERP & EIRP)

RULE PART(S)

FCC: §27

LIMITS

27.50(c) - (10) Portable stations (hand-held devices) are limited to 3 watts ERP; (LTE B17)

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

TEST PROCEDURE

ANSI / TIA / EIA 603C Clause 2.2.17; PSA setting reference to 971168 D01 v02r01

For peak power measurement with a PSA:

a) Set the RBW \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.

TEST RESULTS

11.1.1. LTE ERP/EIRP Results

Band	BW (MHz)	Mode	RB/RB Size	f (MHz)	ERP / EIRP	
					dBm	mW
LTE17	10	QPSK	1/0	709	19.49	88.94
			1/0	710	19.29	84.94
			1/0	711	20.36	108.67
		16QAM	1/0	709	18.40	69.2
			1/0	710	18.30	67.62
			1/0	711	19.07	80.74

Band	BW (MHz)	Mode	RB/RB Size	f (MHz)	ERP / EIRP	
					dBm	mW
LTE17	5	QPSK	1/0	706.5	19.67	92.7
			1/0	710	19.54	89.97
			1/0	713.5	20.69	117.25
		16QAM	1/0	706.5	18.65	73.3
			1/0	710	18.28	67.31
			1/0	713.5	19.80	95.52

Band	BW (MHz)	Mode	RB/RB Size	f (MHz)	ERP / EIRP	
					dBm	mW
LTE4	20	QPSK	1/0	1720	21.24	133.05
			1/0	1732.5	22.71	186.64
			1/0	1745	22.14	163.68
		16QAM	1/0	1720	20.15	103.51
			1/0	1732.5	21.28	134.28
			1/0	1745	21.11	129.12

Band	BW (MHz)	Mode	RB/RB Size	f (MHz)	ERP / EIRP	
					dBm	mW
LTE4	15	QPSK	1/0	1717.5	21.45	139.64
			1/0	1732.5	22.74	187.93
			1/0	1747.5	22.21	166.34
		16QAM	1/0	1717.5	20.27	106.41
			1/0	1732.5	21.63	145.55
			1/0	1747.5	21.12	129.42

Band	BW (MHz)	Mode	RB/RB Size	f (MHz)	ERP / EIRP	
					dBm	mW
LTE4	10	QPSK	1/0	1715	21.63	145.55
			1/0	1732.5	22.97	198.15
			1/0	1750	22.45	175.79
		16QAM	1/0	1715	20.93	123.88
			1/0	1732.5	22.06	160.69
			1/0	1750	21.68	147.23

Band	BW (MHz)	Mode	RB/RB Size	f (MHz)	ERP / EIRP	
					dBm	mW
LTE4	5	QPSK	1/0	1712.5	21.55	142.89
			1/0	1732.5	22.92	195.88
			1/0	1752.5	22.59	181.55
		16QAM	1/0	1712.5	20.66	116.41
			1/0	1732.5	21.61	144.88
			1/0	1752.5	21.63	145.55

Band	BW (MHz)	Mode	RB/RB Size	f (MHz)	ERP / EIRP	
					dBm	mW
LTE4	3	QPSK	1/0	1711.5	21.29	134.59
			1/0	1732.5	22.57	180.72
			1/0	1753.5	22.06	160.69
		16QAM	1/0	1711.5	20.36	108.64
			1/0	1732.5	21.48	140.6
			1/0	1753.5	21.26	133.66

Band	BW (MHz)	Mode	RB/RB Size	f (MHz)	ERP / EIRP	
					dBm	mW
LTE4	1.4	QPSK	1/0	1710.7	21.19	131.52
			1/0	1732.5	22.83	191.87
			1/0	1754.3	22.13	163.31
		16QAM	1/0	1710.7	20.17	103.99
			1/0	1732.5	21.4	138.04
			1/0	1754.3	21.07	127.94

11.1.2. ERP/EIRP DATA

		High Frequency Substitution Measurement UL Verification Services, Inc. Chamber C								
		Company:	Samsung							
		Project #:	14119179							
		Date:	10/20/14							
		Test Engineer:	R. Alegre							
		Configuration:	EUT only							
		Mode:	LTE17 10MHz 16QAM							
		Test Equipment:	Receiving: Hybrid T185, and Chamber C SMA Cables							
			Substitution: Dipole S/N: 00022117, 4ft SMA Cable (SN # 245200 001) Warehouse.							
Band		f	SG reading	Ant. Pol.	Cable Loss	Antenna Gain	ERP	Limit	Margin	Notes
LTE17		MHz	(dBm)	(H/V)	(dB)	(dBd)	(dBm)	(dBm)	(dB)	
10MHz		Low Ch								
16QAM		709.00	8.74	V	0.9	0.0	7.84	34.8	-26.9	
		709.00	19.30	H	0.9	0.0	18.40	34.8	-16.4	
		Mid Ch								
		710.00	8.62	V	0.9	0.0	7.72	34.8	-27.0	
		710.00	19.20	H	0.9	0.0	18.30	34.8	-16.5	
		High Ch								
		711.00	8.36	V	0.9	0.0	7.46	34.8	-27.3	
		711.00	19.97	H	0.9	0.0	19.07	34.8	-15.7	
		Rev. 3.17.11								
		Note: For Band 13/17 ERP limit is 34.77dBm; For Band 26 limit is 50dBm								

Band LTE17 10MHz QPSK	High Frequency Substitution Measurement UL Verification Services, Inc. Chamber C																																																																																																	
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Band LTE17 5MHz QPSK	High Frequency Substitution Measurement UL Verification Services, Inc. Chamber C																																																																																																	
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Band LTE4 20MHz 16QAM	High Frequency Substitution Measurement UL Verification Services, Inc. Chamber C																																																																																										
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			<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 (dBd)</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>1710.70</td> <td>9.78</td> <td>V</td> <td>0.90</td> <td>8.30</td> <td>17.18</td> <td>30.0</td> <td>-12.8</td> <td></td> </tr> <tr> <td>1710.70</td> <td>13.79</td> <td>H</td> <td>0.90</td> <td>8.30</td> <td>21.19</td> <td>30.0</td> <td>-8.8</td> <td></td> </tr> <tr> <td colspan="9">Mid Ch</td> </tr> <tr> <td>1732.50</td> <td>10.38</td> <td>V</td> <td>0.90</td> <td>8.30</td> <td>17.78</td> <td>30.0</td> <td>-12.2</td> <td></td> </tr> <tr> <td>1732.50</td> <td>15.43</td> <td>H</td> <td>0.90</td> <td>8.30</td> <td>22.83</td> <td>30.0</td> <td>-7.2</td> <td></td> </tr> <tr> <td colspan="9">High Ch</td> </tr> <tr> <td>1754.30</td> <td>10.19</td> <td>V</td> <td>0.90</td> <td>7.90</td> <td>17.19</td> <td>30.0</td> <td>-12.8</td> <td></td> </tr> <tr> <td>1754.30</td> <td>15.13</td> <td>H</td> <td>0.90</td> <td>7.90</td> <td>22.13</td> <td>30.0</td> <td>-7.9</td> <td></td> </tr> </tbody> </table>							f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes	Low Ch									1710.70	9.78	V	0.90	8.30	17.18	30.0	-12.8		1710.70	13.79	H	0.90	8.30	21.19	30.0	-8.8		Mid Ch									1732.50	10.38	V	0.90	8.30	17.78	30.0	-12.2		1732.50	15.43	H	0.90	8.30	22.83	30.0	-7.2		High Ch									1754.30	10.19	V	0.90	7.90	17.19	30.0	-12.8		1754.30	15.13	H	0.90	7.90	22.13	30.0	-7.9	
	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes																																																																																										
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Rev. 3.17.11		Note: For Band 4 EIRP limit is 30dBm																																																																																																	

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.

TEST PROCEDURE

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

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

RESULTS

11.2.1. SPURIOUS RADIATION DATA

UL Verification Services, Inc. Above 1GHz High Frequency Substitution Measurement											
Company:		Samsung									
Project #:		14119179									
Date:		10/20/14									
Test Engineer:		O. Stoelting									
Configuration:		EUT w/ AC charger, headset									
Mode:		LTE17 10M 16QAM HARM									
Chamber		Pre-amplifer			Filter			Limit			
3m Chamber		T34 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	
LTE17 10MHz 16QAM	Low Ch, 709MHz										
	1.418	-21.2	V	3.0	37.8	1.0	-58.0	-13.0	-45.0		
	2.127	-28.1	V	3.0	36.7	1.0	-63.8	-13.0	-50.8		
	2.836	-27.1	V	3.0	36.2	1.0	-62.3	-13.0	-49.3		
	1.418	-20.4	H	3.0	37.8	1.0	-57.1	-13.0	-44.1		
	2.127	-29.7	H	3.0	36.7	1.0	-65.4	-13.0	-52.4		
	2.836	-27.7	H	3.0	36.2	1.0	-62.9	-13.0	-49.9		
	Mid Ch, 710MHz										
	1.420	-20.1	V	3.0	37.8	1.0	-56.8	-13.0	-43.8		
2.130	-28.8	V	3.0	36.7	1.0	-64.5	-13.0	-51.5			
2.840	-27.2	V	3.0	36.2	1.0	-62.3	-13.0	-49.3			
1.420	-18.2	H	3.0	37.8	1.0	-55.0	-13.0	-42.0			
2.130	-29.9	H	3.0	36.7	1.0	-65.5	-13.0	-52.5			
2.840	-27.8	H	3.0	36.2	1.0	-63.0	-13.0	-50.0			
High Ch, 711MHz											
1.422	-18.9	V	3.0	37.8	1.0	-55.7	-13.0	-42.7			
2.133	-28.9	V	3.0	36.7	1.0	-64.6	-13.0	-51.6			
2.844	-27.4	V	3.0	36.2	1.0	-62.6	-13.0	-49.6			
1.422	-17.1	H	3.0	37.8	1.0	-53.9	-13.0	-40.9			
2.133	-29.7	H	3.0	36.7	1.0	-65.4	-13.0	-52.4			
2.844	-27.9	H	3.0	36.2	1.0	-63.1	-13.0	-50.1			
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 #:		14119179								
Date:		10/20/14								
Test Engineer:		O. Stoelting								
Configuration:		EUT w/ AC charger, headset								
Mode:		LTE17 10M QPSK HARM								
Chamber		Pre-amplifer			Filter		Limit			
3m Chamber		T34 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
LTE17 10MHz QPSK	Low Ch,709MHz									
	1.418	-21.6	V	3.0	37.8	1.0	-58.4	-13.0	-45.4	
	2.127	-29.1	V	3.0	36.7	1.0	-64.8	-13.0	-51.8	
	2.836	-27.6	V	3.0	36.2	1.0	-62.8	-13.0	-49.8	
	1.418	-20.4	H	3.0	37.8	1.0	-57.2	-13.0	-44.2	
	2.127	-29.7	H	3.0	36.7	1.0	-65.4	-13.0	-52.4	
	2.836	-28.4	H	3.0	36.2	1.0	-63.6	-13.0	-50.6	
	Mid Ch,710MHz									
	1.420	-19.8	V	3.0	37.8	1.0	-56.5	-13.0	-43.5	
	2.130	-28.7	V	3.0	36.7	1.0	-64.4	-13.0	-51.4	
	2.840	-27.5	V	3.0	36.2	1.0	-62.7	-13.0	-49.7	
	1.420	-17.7	H	3.0	37.8	1.0	-54.4	-13.0	-41.4	
2.130	-29.5	H	3.0	36.7	1.0	-65.2	-13.0	-52.2		
2.840	-27.9	H	3.0	36.2	1.0	-63.1	-13.0	-50.1		
High Ch, 711MHz										
1.422	-18.5	V	3.0	37.8	1.0	-55.2	-13.0	-42.2		
2.133	-29.0	V	3.0	36.7	1.0	-64.7	-13.0	-51.7		
2.844	-27.2	V	3.0	36.2	1.0	-62.4	-13.0	-49.4		
1.422	-17.1	H	3.0	37.8	1.0	-53.9	-13.0	-40.9		
2.133	-29.7	H	3.0	36.7	1.0	-65.4	-13.0	-52.4		
2.844	-27.9	H	3.0	36.2	1.0	-63.1	-13.0	-50.1		
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 #:		14119179								
Date:		10/20/14								
Test Engineer:		O. Stoelting								
Configuration:		X Position, EUT and AC Adapter								
Mode:		TX, LTE B17 5MHz 16QAM								
Chamber		Pre-amplifier			Filter		Limit			
3m Chamber		T345 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
LTE17 5MHz 16QAM	Low Ch, (706.5MHz)									
	1.413	-20.7	V	3.0	31.0	1.0	-50.7	-13.0	-37.7	
	2.120	-29.3	V	3.0	29.6	1.0	-57.9	-13.0	-44.9	
	2.826	-27.8	V	3.0	27.4	1.0	-54.2	-13.0	-41.2	
	1.413	-22.0	H	3.0	31.0	1.0	-52.0	-13.0	-39.0	
	2.120	-30.5	H	3.0	29.6	1.0	-59.1	-13.0	-46.1	
	2.826	-28.6	H	3.0	27.4	1.0	-55.0	-13.0	-42.0	
	Mid Ch, (710MHz)									
	1.420	-17.4	V	3.0	31.0	1.0	-47.4	-13.0	-34.4	
	2.130	-25.9	V	3.0	29.5	1.0	-54.4	-13.0	-41.4	
	2.840	-24.7	V	3.0	27.4	1.0	-51.0	-13.0	-38.0	
	1.420	-18.8	H	3.0	31.0	1.0	-48.8	-13.0	-35.8	
	2.130	-20.3	H	3.0	29.5	1.0	-48.9	-13.0	-35.9	
	2.840	-19.4	H	3.0	27.4	1.0	-45.8	-13.0	-32.8	
	High Ch, (713.5MHz)									
	1.427	-20.6	V	3.0	31.0	1.0	-50.5	-13.0	-37.5	
	2.141	-28.6	V	3.0	29.5	1.0	-57.1	-13.0	-44.1	
	2.854	-26.7	V	3.0	27.3	1.0	-53.0	-13.0	-40.0	
1.427	-22.0	H	3.0	31.0	1.0	-51.9	-13.0	-38.9		
2.141	-29.6	H	3.0	29.5	1.0	-58.1	-13.0	-45.1		
2.854	-27.3	H	3.0	27.3	1.0	-53.6	-13.0	-40.6		
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 #:		14119179								
Date:		10/20/14								
Test Engineer:		O. Stoelting								
Configuration:		X Position, EUT and AC Adapter								
Mode:		TX, LTE B17 5MHz QPSK								
Chamber		Pre-amplifier			Filter		Limit			
3m Chamber		T345 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
	Low Ch, (706.5MHz)									
LTE17	1.413	-17.7	V	3.0	31.0	1.0	-47.6	-13.0	-34.6	
	2.120	-27.3	V	3.0	29.6	1.0	-55.9	-13.0	-42.9	
5MHz	2.826	-25.9	V	3.0	27.4	1.0	-52.3	-13.0	-39.3	
	1.413	-20.5	H	3.0	31.0	1.0	-50.5	-13.0	-37.5	
	2.120	-30.2	H	3.0	29.6	1.0	-58.7	-13.0	-45.7	
QPSK	2.826	-28.5	H	3.0	27.4	1.0	-54.9	-13.0	-41.9	
	Mid Ch, (710MHz)									
	1.420	-17.7	V	3.0	31.0	1.0	-47.6	-13.0	-34.6	
	2.130	-25.5	V	3.0	29.5	1.0	-54.0	-13.0	-41.0	
	2.840	-22.3	V	3.0	27.4	1.0	-48.6	-13.0	-35.6	
	1.420	-20.3	H	3.0	31.0	1.0	-50.3	-13.0	-37.3	
	2.130	-20.6	H	3.0	29.5	1.0	-49.1	-13.0	-36.1	
	2.840	-18.2	H	3.0	27.4	1.0	-44.6	-13.0	-31.6	
	High Ch, (713.5MHz)									
	1.427	-27.7	V	3.0	31.0	1.0	-57.6	-13.0	-44.6	
	2.141	-26.6	V	3.0	29.5	1.0	-55.1	-13.0	-42.1	
	2.854	-23.3	V	3.0	27.3	1.0	-49.6	-13.0	-36.6	
	1.427	-30.4	H	3.0	31.0	1.0	-60.3	-13.0	-47.3	
	2.141	-29.5	H	3.0	29.5	1.0	-58.0	-13.0	-45.0	
	2.854	-28.2	H	3.0	27.3	1.0	-54.5	-13.0	-41.5	
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 #:		14119179								
Date:		10/20/14								
Test Engineer:		Jude Semana								
Configuration:		X Position w/AC charger and headphones								
Mode:		TX, LTE band 4, 20MHz BW, 16QAM								
Chamber		Pre-amplifier		Filter		Limit				
5m Chamber A		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
LTE4 20MHz 16QAM	Low Ch, (1720 MHz)									
	3.440	-35.3	V	3.0	26.4	1.0	-60.8	-13.0	-47.8	
	5.160	-38.2	V	3.0	24.3	1.0	-61.5	-13.0	-48.5	
	6.880	-37.5	V	3.0	23.2	1.0	-59.7	-13.0	-46.7	
	3.440	-31.3	H	3.0	26.4	1.0	-56.8	-13.0	-43.8	
	5.160	-36.8	H	3.0	24.3	1.0	-60.1	-13.0	-47.1	
	6.880	-36.9	H	3.0	23.2	1.0	-59.1	-13.0	-46.1	
	Mid Ch, (1732.5 MHz)									
	3.465	-31.0	V	3.0	26.4	1.0	-56.4	-13.0	-43.4	
	5.198	-39.1	V	3.0	24.3	1.0	-62.4	-13.0	-49.4	
	6.930	-37.9	V	3.0	23.1	1.0	-60.1	-13.0	-47.1	
	3.465	-32.5	H	3.0	26.4	1.0	-57.9	-13.0	-44.9	
	5.198	-38.1	H	3.0	24.3	1.0	-61.4	-13.0	-48.4	
	6.930	-36.9	H	3.0	23.1	1.0	-59.0	-13.0	-46.0	
	High Ch, (1745 MHz)									
	3.490	-33.7	V	3.0	26.4	1.0	-59.0	-13.0	-46.0	
	5.235	-39.4	V	3.0	24.3	1.0	-62.6	-13.0	-49.6	
	6.980	-38.2	V	3.0	23.1	1.0	-60.3	-13.0	-47.3	
3.490	-33.4	H	3.0	26.4	1.0	-58.8	-13.0	-45.8		
5.235	-37.6	H	3.0	24.3	1.0	-60.9	-13.0	-47.9		
6.980	-37.4	H	3.0	23.1	1.0	-59.5	-13.0	-46.5		
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 #:		14119179								
Date:		10/20/14								
Test Engineer:		Jude Semana								
Configuration:		X Position w/AC charger and headphones								
Mode:		TX, LTE band 4, 20MHz BW, QPSK								
Chamber		Pre-amplifier		Filter		Limit				
5m Chamber A		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
	Low Ch, (1720 MHz)									
LTE4	3.440	-35.0	V	3.0	26.4	1.0	-60.5	-13.0	-47.5	
	5.160	-38.0	V	3.0	24.3	1.0	-61.4	-13.0	-48.4	
20MHz	6.880	-37.2	V	3.0	23.2	1.0	-59.4	-13.0	-46.4	
	3.440	-31.2	H	3.0	26.4	1.0	-56.7	-13.0	-43.7	
QPSK	5.160	-36.6	H	3.0	24.3	1.0	-60.0	-13.0	-47.0	
	6.880	-36.7	H	3.0	23.2	1.0	-58.9	-13.0	-45.9	
	Mid Ch, (1732.5 MHz)									
	3.465	-30.3	V	3.0	26.4	1.0	-55.7	-13.0	-42.7	
	5.198	-38.5	V	3.0	24.3	1.0	-61.8	-13.0	-48.8	
	6.930	-37.8	V	3.0	23.1	1.0	-59.9	-13.0	-46.9	
	3.465	-31.9	H	3.0	26.4	1.0	-57.3	-13.0	-44.3	
	5.198	-38.1	H	3.0	24.3	1.0	-61.4	-13.0	-48.4	
	6.930	-36.9	H	3.0	23.1	1.0	-59.0	-13.0	-46.0	
	High Ch, (1745 MHz)									
	3.490	-33.3	V	3.0	26.4	1.0	-58.7	-13.0	-45.7	
	5.235	-39.6	V	3.0	24.3	1.0	-62.9	-13.0	-49.9	
	6.980	-38.2	V	3.0	23.1	1.0	-60.3	-13.0	-47.3	
	3.490	-33.0	H	3.0	26.4	1.0	-58.3	-13.0	-45.3	
	5.235	-37.6	H	3.0	24.3	1.0	-60.9	-13.0	-47.9	
	6.980	-37.4	H	3.0	23.1	1.0	-59.6	-13.0	-46.6	
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 #:		14119179								
Date:		10/20/14								
Test Engineer:		Jude Semana								
Configuration:		X Position w/AC charger and headphones								
Mode:		TX, LTE band 4, 15MHz BW, 16QAM								
Chamber		Pre-amplifier		Filter		Limit				
5m Chamber A		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
LTE4 15MHz 16QAM	Low Ch, (1717.5 MHz)									
	3.435	-35.6	V	3.0	26.5	1.0	-61.0	-13.0	-48.0	
	5.153	-37.9	V	3.0	24.3	1.0	-61.3	-13.0	-48.3	
	6.870	-38.0	V	3.0	23.2	1.0	-60.1	-13.0	-47.1	
	3.435	-33.2	H	3.0	26.5	1.0	-58.6	-13.0	-45.6	
	5.153	-37.0	H	3.0	24.3	1.0	-60.3	-13.0	-47.3	
	6.870	-36.7	H	3.0	23.2	1.0	-58.9	-13.0	-45.9	
	Mid Ch, (1732.5 MHz)									
	3.465	-30.1	V	3.0	26.4	1.0	-55.6	-13.0	-42.6	
	5.198	-39.8	V	3.0	24.3	1.0	-63.1	-13.0	-50.1	
	6.930	-37.5	V	3.0	23.1	1.0	-59.7	-13.0	-46.7	
	3.465	-30.7	H	3.0	26.4	1.0	-56.2	-13.0	-43.2	
	5.198	-37.8	H	3.0	24.3	1.0	-61.1	-13.0	-48.1	
	6.930	-37.1	H	3.0	23.1	1.0	-59.3	-13.0	-46.3	
	High Ch, (1747.5 MHz)									
	3.495	-33.2	V	3.0	26.4	1.0	-58.5	-13.0	-45.5	
	5.243	-39.5	V	3.0	24.3	1.0	-62.8	-13.0	-49.8	
	6.990	-38.0	V	3.0	23.1	1.0	-60.1	-13.0	-47.1	
3.495	-35.3	H	3.0	26.4	1.0	-60.6	-13.0	-47.6		
5.243	-37.4	H	3.0	24.3	1.0	-60.6	-13.0	-47.6		
6.990	-37.3	H	3.0	23.1	1.0	-59.4	-13.0	-46.4		
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 #:		14119179								
Date:		10/20/14								
Test Engineer:		Jude Semana								
Configuration:		X Position w/AC charger and headphones								
Mode:		TX, LTE band 4, 15MHz BW, QPSK								
Chamber		Pre-amplifier		Filter		Limit				
5m Chamber A		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
	Low Ch, (1717.5 MHz)									
LTE4	3.435	-35.6	V	3.0	26.5	1.0	-61.1	-13.0	-48.1	
	5.153	-37.3	V	3.0	24.3	1.0	-60.7	-13.0	-47.7	
15MHz	6.870	-37.9	V	3.0	23.2	1.0	-60.0	-13.0	-47.0	
	3.435	-32.4	H	3.0	26.5	1.0	-57.8	-13.0	-44.8	
QPSK	5.153	-33.1	H	3.0	24.3	1.0	-56.5	-13.0	-43.5	
	6.870	-31.3	H	3.0	23.2	1.0	-53.5	-13.0	-40.5	
	Mid Ch, (1732.5 MHz)									
	3.465	-29.5	V	3.0	26.4	1.0	-54.9	-13.0	-41.9	
	5.198	-39.8	V	3.0	24.3	1.0	-63.1	-13.0	-50.1	
	6.930	-37.3	V	3.0	23.1	1.0	-59.4	-13.0	-46.4	
	3.465	-30.0	H	3.0	26.4	1.0	-55.4	-13.0	-42.4	
	5.198	-38.0	H	3.0	24.3	1.0	-61.3	-13.0	-48.3	
	6.930	-37.2	H	3.0	23.1	1.0	-59.3	-13.0	-46.3	
	High Ch, (1747.5 MHz)									
	3.495	-33.1	V	3.0	26.4	1.0	-58.5	-13.0	-45.5	
	5.243	-39.5	V	3.0	24.3	1.0	-62.8	-13.0	-49.8	
	6.990	-37.6	V	3.0	23.1	1.0	-59.7	-13.0	-46.7	
	3.495	-35.2	H	3.0	26.4	1.0	-60.5	-13.0	-47.5	
	5.243	-37.5	H	3.0	24.3	1.0	-60.7	-13.0	-47.7	
	6.990	-37.4	H	3.0	23.1	1.0	-59.5	-13.0	-46.5	
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 #:		14119179								
Date:		10/20/14								
Test Engineer:		Jude Semana								
Configuration:		EUT, AC charger, and Earphone								
Mode:		TX, LTE band 4, 10MHz BW, 16QAM								
Chamber		Pre-amplifier			Filter		Limit			
5m Chamber A		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
Low Ch, (1715 MHz)										
LTE4	3.430	-35.4	V	3.0	30.4	1.0	-64.8	-13.0	-51.8	
	5.145	-38.3	V	3.0	28.8	1.0	-66.1	-13.0	-53.1	
10MHz	6.860	-36.9	V	3.0	27.1	1.0	-63.1	-13.0	-50.1	
	3.430	-30.9	H	3.0	30.4	1.0	-60.3	-13.0	-47.3	
16QAM	5.145	-36.9	H	3.0	28.8	1.0	-64.7	-13.0	-51.7	
	6.860	-36.9	H	3.0	27.1	1.0	-63.0	-13.0	-50.0	
Mid Ch, (1732.5 MHz)										
	3.465	-32.5	V	3.0	30.4	1.0	-61.9	-13.0	-48.9	
	5.198	-38.7	V	3.0	28.7	1.0	-66.4	-13.0	-53.4	
	6.930	-37.9	V	3.0	27.1	1.0	-64.0	-13.0	-51.0	
	3.465	-34.0	H	3.0	30.4	1.0	-63.4	-13.0	-50.4	
	5.198	-37.9	H	3.0	28.7	1.0	-65.6	-13.0	-52.6	
	6.930	-37.1	H	3.0	27.1	1.0	-63.1	-13.0	-50.1	
High Ch, (1750 MHz)										
	3.500	-33.3	V	3.0	30.4	1.0	-62.7	-13.0	-49.7	
	5.250	-40.1	V	3.0	28.7	1.0	-67.8	-13.0	-54.8	
	7.000	-38.1	V	3.0	27.0	1.0	-64.1	-13.0	-51.1	
	3.500	-31.3	H	3.0	30.4	1.0	-60.7	-13.0	-47.7	
	5.250	-37.5	H	3.0	28.7	1.0	-65.2	-13.0	-52.2	
	7.000	-37.4	H	3.0	27.0	1.0	-63.4	-13.0	-50.4	
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 #:		14119179									
Date:		10/20/14									
Test Engineer:		Jude Semana									
Configuration:		EUT, AC charger, and Earphone									
Mode:		TX, LTE band 4, 10MHz BW, QPSK									
Chamber		Pre-amplifier			Filter		Limit				
5m Chamber A		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	
10MHz QPSK	Low Ch, (1715 MHz)										
	LTE4	3.430	-35.4	V	3.0	30.4	1.0	-64.8	-13.0	-51.8	
		5.145	-38.4	V	3.0	28.8	1.0	-66.1	-13.0	-53.1	
		6.860	-36.6	V	3.0	27.1	1.0	-62.7	-13.0	-49.7	
		3.430	-30.5	H	3.0	30.4	1.0	-59.9	-13.0	-46.9	
		5.145	-36.9	H	3.0	28.8	1.0	-64.7	-13.0	-51.7	
		6.860	-36.8	H	3.0	27.1	1.0	-62.9	-13.0	-49.9	
	Mid Ch, (1732.5 MHz)										
		3.465	-32.1	V	3.0	30.4	1.0	-61.5	-13.0	-48.5	
		5.198	-38.7	V	3.0	28.7	1.0	-66.4	-13.0	-53.4	
		6.930	-37.8	V	3.0	27.1	1.0	-63.9	-13.0	-50.9	
		3.465	-34.2	H	3.0	30.4	1.0	-63.6	-13.0	-50.6	
		5.198	-39.2	H	3.0	28.7	1.0	-66.9	-13.0	-53.9	
		6.930	-37.6	H	3.0	27.1	1.0	-63.7	-13.0	-50.7	
	High Ch, (1750 MHz)										
		3.500	-33.0	V	3.0	30.4	1.0	-62.4	-13.0	-49.4	
		5.250	-40.2	V	3.0	28.7	1.0	-67.8	-13.0	-54.8	
		7.000	-38.3	V	3.0	27.0	1.0	-64.3	-13.0	-51.3	
	3.500	-31.4	H	3.0	30.4	1.0	-60.7	-13.0	-47.7		
	5.250	-38.3	H	3.0	28.7	1.0	-65.9	-13.0	-52.9		
	7.000	-37.3	H	3.0	27.0	1.0	-63.3	-13.0	-50.3		
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 #:		1419179									
Date:		10/20/14									
Test Engineer:		Jude Semana									
Configuration:		EUT, AC charger, and Earphone									
Mode:		TX, LTE band 4, 5MHz BW, 16 QAM									
Chamber		Pre-amplifier		Filter		Limit					
5m Chamber A		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	
16QAM	Low Ch, (1712.5 MHz)										
	LTE4	3.425	-35.2	V	3.0	30.4	1.0	-64.7	-13.0	-51.7	
		5.138	-37.9	V	3.0	28.8	1.0	-65.7	-13.0	-52.7	
	5MHz	6.850	-37.8	V	3.0	27.1	1.0	-64.0	-13.0	-51.0	
		3.425	-27.8	H	3.0	30.4	1.0	-57.2	-13.0	-44.2	
		5.138	-36.9	H	3.0	28.8	1.0	-64.7	-13.0	-51.7	
		6.850	-36.6	H	3.0	27.1	1.0	-62.7	-13.0	-49.7	
	Mid Ch, (1732.5 MHz)										
		3.465	-26.9	V	3.0	30.4	1.0	-56.3	-13.0	-43.3	
		5.198	-40.0	V	3.0	28.7	1.0	-67.7	-13.0	-54.7	
		6.930	-36.7	V	3.0	27.1	1.0	-62.8	-13.0	-49.8	
		3.465	-28.5	H	3.0	30.4	1.0	-57.9	-13.0	-44.9	
		5.198	-37.7	H	3.0	28.7	1.0	-65.4	-13.0	-52.4	
		6.930	-36.7	H	3.0	27.1	1.0	-62.8	-13.0	-49.8	
	High Ch, (1752.5 MHz)										
		3.505	-31.6	V	3.0	30.4	1.0	-60.9	-13.0	-47.9	
		5.258	-38.1	V	3.0	28.6	1.0	-65.7	-13.0	-52.7	
		7.010	-38.2	V	3.0	27.0	1.0	-64.2	-13.0	-51.2	
	3.505	-27.4	H	3.0	30.4	1.0	-56.7	-13.0	-43.7		
	5.258	-36.4	H	3.0	28.6	1.0	-64.0	-13.0	-51.0		
	7.010	-37.6	H	3.0	27.0	1.0	-63.6	-13.0	-50.6		
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 #:		1419179								
Date:		10/20/14								
Test Engineer:		Jude Semana								
Configuration:		EUT, AC charger, and Earphone								
Mode:		TX, LTE band 4, 5MHz BW, QPSK								
Chamber		Pre-amplifier		Filter		Limit				
5m Chamber A		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
	Low Ch, (1712.5 MHz)									
LTE4	3.425	-35.1	V	3.0	30.4	1.0	-64.5	-13.0	-51.5	
	5.138	-37.8	V	3.0	28.8	1.0	-65.6	-13.0	-52.6	
5MHz	6.850	-35.2	V	3.0	27.1	1.0	-61.3	-13.0	-48.3	
	3.425	-27.3	H	3.0	30.4	1.0	-56.8	-13.0	-43.8	
	5.138	-37.8	H	3.0	28.8	1.0	-65.6	-13.0	-52.6	
QPSK	6.850	-36.5	H	3.0	27.1	1.0	-62.6	-13.0	-49.6	
	Mid Ch, (1732.5 MHz)									
	3.465	-26.4	V	3.0	30.4	1.0	-55.8	-13.0	-42.8	
	5.198	-39.8	V	3.0	28.7	1.0	-67.5	-13.0	-54.5	
	6.930	-36.5	V	3.0	27.1	1.0	-62.6	-13.0	-49.6	
	3.465	-27.7	H	3.0	30.4	1.0	-57.1	-13.0	-44.1	
	5.198	-37.8	H	3.0	28.7	1.0	-65.5	-13.0	-52.5	
	6.930	-36.9	H	3.0	27.1	1.0	-62.9	-13.0	-49.9	
	High Ch, (1752.5 MHz)									
	3.505	-31.6	V	3.0	30.4	1.0	-61.0	-13.0	-48.0	
	5.258	-38.8	V	3.0	28.6	1.0	-66.4	-13.0	-53.4	
	7.010	-38.4	V	3.0	27.0	1.0	-64.4	-13.0	-51.4	
	3.505	-26.5	H	3.0	30.4	1.0	-55.9	-13.0	-42.9	
	5.258	-36.0	H	3.0	28.6	1.0	-63.6	-13.0	-50.6	
	7.010	-37.5	H	3.0	27.0	1.0	-63.4	-13.0	-50.4	
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 #:		14118800								
Date:		10/20/14								
Test Engineer:		Jude Semana								
Configuration:		EUT, AC charger, and Earphone								
Mode:		TX, LTE band 4, 3MHz BW, 16 QAM								
Chamber		Pre-amplifier		Filter		Limit				
5m Chamber A		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
LTE4 3MHz 16QAM	Low Ch, (1711.5 MHz)									
	3.423	-33.9	V	3.0	30.4	1.0	-63.4	-13.0	-50.4	
	5.135	-38.6	V	3.0	28.8	1.0	-66.3	-13.0	-53.3	
	6.846	-34.7	V	3.0	27.1	1.0	-60.9	-13.0	-47.9	
	3.423	-26.8	H	3.0	30.4	1.0	-56.3	-13.0	-43.3	
	5.135	-35.9	H	3.0	28.8	1.0	-63.7	-13.0	-50.7	
	6.846	-35.8	H	3.0	27.1	1.0	-62.0	-13.0	-49.0	
	Mid Ch, (1732.5 MHz)									
	3.465	-26.9	V	3.0	30.4	1.0	-56.3	-13.0	-43.3	
	5.198	-39.9	V	3.0	28.7	1.0	-67.6	-13.0	-54.6	
	6.930	-36.0	V	3.0	27.1	1.0	-62.1	-13.0	-49.1	
	3.465	-27.6	H	3.0	30.4	1.0	-57.0	-13.0	-44.0	
	5.198	-37.6	H	3.0	28.7	1.0	-65.3	-13.0	-52.3	
	6.930	-37.1	H	3.0	27.1	1.0	-63.2	-13.0	-50.2	
	High Ch, (1753.5 MHz)									
	3.507	-35.3	V	3.0	30.4	1.0	-64.6	-13.0	-51.6	
	5.261	-38.4	V	3.0	28.6	1.0	-66.0	-13.0	-53.0	
	7.014	-38.6	V	3.0	27.0	1.0	-64.6	-13.0	-51.6	
3.507	-28.5	H	3.0	30.4	1.0	-57.9	-13.0	-44.9		
5.261	-37.7	H	3.0	28.6	1.0	-65.4	-13.0	-52.4		
7.014	-37.7	H	3.0	27.0	1.0	-63.7	-13.0	-50.7		
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 #:		14118800								
Date:		10/20/14								
Test Engineer:		Jude Semana								
Configuration:		EUT, AC charger, and Earphone								
Mode:		TX, LTE band 4, 3MHz BW, 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)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch, (1711.5 MHz)									
LTE4	3.423	-26.7	V	3.0	30.4	1.0	-56.1	-13.0	-43.1	
	5.135	-25.0	V	3.0	28.8	1.0	-52.8	-13.0	-39.8	
3MHz	6.846	-20.8	V	3.0	27.1	1.0	-46.9	-13.0	-33.9	
	3.423	-19.2	H	3.0	30.4	1.0	-48.7	-13.0	-35.7	
QPSK	5.135	-23.3	H	3.0	28.8	1.0	-51.1	-13.0	-38.1	
	6.846	-21.7	H	3.0	27.1	1.0	-47.9	-13.0	-34.9	
	Mid Ch, (1732.5 MHz)									
	3.465	-20.1	V	3.0	30.4	1.0	-49.5	-13.0	-36.5	
	5.198	-25.7	V	3.0	28.7	1.0	-53.4	-13.0	-40.4	
	6.930	-22.2	V	3.0	27.1	1.0	-48.3	-13.0	-35.3	
	3.465	-19.3	H	3.0	30.4	1.0	-48.7	-13.0	-35.7	
	5.198	-24.6	H	3.0	28.7	1.0	-52.3	-13.0	-39.3	
	6.930	-22.9	H	3.0	27.1	1.0	-48.9	-13.0	-35.9	
	High Ch, (1753.5 MHz)									
	3.507	-27.9	V	3.0	30.4	1.0	-57.2	-13.0	-44.2	
	5.261	-23.5	V	3.0	28.6	1.0	-51.1	-13.0	-38.1	
	7.014	-24.3	V	3.0	27.0	1.0	-50.3	-13.0	-37.3	
	3.507	-20.7	H	3.0	30.4	1.0	-50.1	-13.0	-37.1	
	5.261	-24.1	H	3.0	28.6	1.0	-51.7	-13.0	-38.7	
	7.014	-23.3	H	3.0	27.0	1.0	-49.3	-13.0	-36.3	
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 #:		14118800								
Date:		10/20/14								
Test Engineer:		Jude Semana								
Configuration:		EUT, AC charger, and Earphone								
Mode:		TX, LTE band 4, 1.4MHz BW, 16 QAM								
Chamber		Pre-amplifier		Filter		Limit				
5m Chamber B		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
LTE4 1.4MHz 16QAM	Low Ch, (1710.7 MHz)									
	3.421	-15.7	V	3.0	30.4	1.0	-45.1	-13.0	-32.1	
	5.132	-17.0	V	3.0	28.8	1.0	-44.8	-13.0	-31.8	
	6.843	-16.3	V	3.0	27.1	1.0	-42.5	-13.0	-29.5	
	3.421	-12.6	H	3.0	30.4	1.0	-42.0	-13.0	-29.0	
	5.132	-13.8	H	3.0	28.8	1.0	-41.6	-13.0	-28.6	
	6.843	-12.9	H	3.0	27.1	1.0	-39.0	-13.0	-26.0	
	Mid Ch, (1732.5 MHz)									
	3.465	-16.7	V	3.0	30.4	1.0	-46.1	-13.0	-33.1	
	5.198	-10.9	V	3.0	28.7	1.0	-38.6	-13.0	-25.6	
	6.930	-18.6	V	3.0	27.1	1.0	-44.7	-13.0	-31.7	
	3.465	-12.3	H	3.0	30.4	1.0	-41.7	-13.0	-28.7	
	5.198	-12.7	H	3.0	28.7	1.0	-40.4	-13.0	-27.4	
	6.930	-16.3	H	3.0	27.1	1.0	-42.4	-13.0	-29.4	
	High Ch, (1754.3 MHz)									
	3.509	-26.0	V	3.0	30.4	1.0	-55.4	-13.0	-42.4	
	5.263	-21.6	V	3.0	28.6	1.0	-49.3	-13.0	-36.3	
	7.017	-24.9	V	3.0	27.0	1.0	-50.9	-13.0	-37.9	
3.509	-16.5	H	3.0	30.4	1.0	-45.8	-13.0	-32.8		
5.263	-19.1	H	3.0	28.6	1.0	-46.8	-13.0	-33.8		
7.017	-23.4	H	3.0	27.0	1.0	-49.4	-13.0	-36.4		
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 #:		14118800									
Date:		10/20/14									
Test Engineer:		Jude Semana									
Configuration:		EUT, AC charger, and Earphone									
Mode:		TX, LTE band 4, 1.4MHz BW, QPSK									
Chamber		Pre-amplifier			Filter		Limit				
5m Chamber A		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	
1.4MHz QPSK	Low Ch, (1710.7 MHz)										
	LTE4	3.421	-23.8	V	3.0	30.4	1.0	-53.2	-13.0	-40.2	
		5.132	-32.0	V	3.0	28.8	1.0	-59.7	-13.0	-46.7	
		6.843	-30.2	V	3.0	27.1	1.0	-56.3	-13.0	-43.3	
		3.421	-19.6	H	3.0	30.4	1.0	-49.0	-13.0	-36.0	
		5.132	-28.3	H	3.0	28.8	1.0	-56.1	-13.0	-43.1	
		6.843	-28.4	H	3.0	27.1	1.0	-54.5	-13.0	-41.5	
		Mid Ch, (1732.5 MHz)									
		3.465	-18.5	V	3.0	30.4	1.0	-47.9	-13.0	-34.9	
		5.198	-24.7	V	3.0	28.7	1.0	-52.4	-13.0	-39.4	
		6.930	-31.7	V	3.0	27.1	1.0	-57.8	-13.0	-44.8	
		3.465	-17.8	H	3.0	30.4	1.0	-47.2	-13.0	-34.2	
		5.198	-24.8	H	3.0	28.7	1.0	-52.5	-13.0	-39.5	
		6.930	-29.0	H	3.0	27.1	1.0	-55.1	-13.0	-42.1	
		High Ch, (1754.3 MHz)									
		3.509	-33.4	V	3.0	30.4	1.0	-62.8	-13.0	-49.8	
		5.263	-35.4	V	3.0	28.6	1.0	-63.0	-13.0	-50.0	
		7.017	-38.3	V	3.0	27.0	1.0	-64.2	-13.0	-51.2	
	3.509	-24.7	H	3.0	30.4	1.0	-54.0	-13.0	-41.0		
	5.263	-31.5	H	3.0	28.6	1.0	-59.1	-13.0	-46.1		
	7.017	-37.4	H	3.0	27.0	1.0	-63.4	-13.0	-50.4		
Rev. 03.03.09											
Note: No other emissions were detected above the system noise floor.											