8.2. EMISSION MASK

RULE PART(S)

§2.1051, §27.53

LIMITS

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

TEST PROCEDURE FOR FCC PART 27

(m)(6) Measurement procedure. Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 1 megahertz 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; for mobile digital stations, in the 1 megahertz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least two percent may be employed, except when the 1 megahertz band is 2495-2496 MHz, in which case a resolution bandwidth of at least one percent 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 megahertz or 1 percent of emission bandwidth, as specified; or 1 megahertz or 2 percent for mobile digital stations, except in the band 2495-2496 MHz). 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. With respect to television operations, measurements must be made of the separate visual and aural operating powers at sufficiently frequent intervals to ensure compliance with the rules.

MODES TESTED

- LTE Band 7
- LTE Band 41

RESULTS

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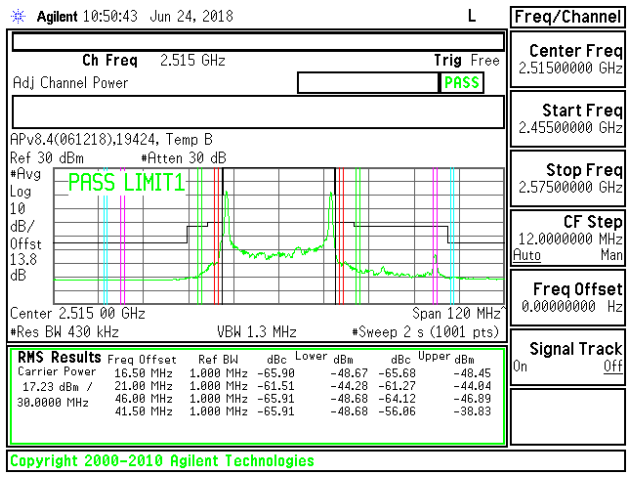
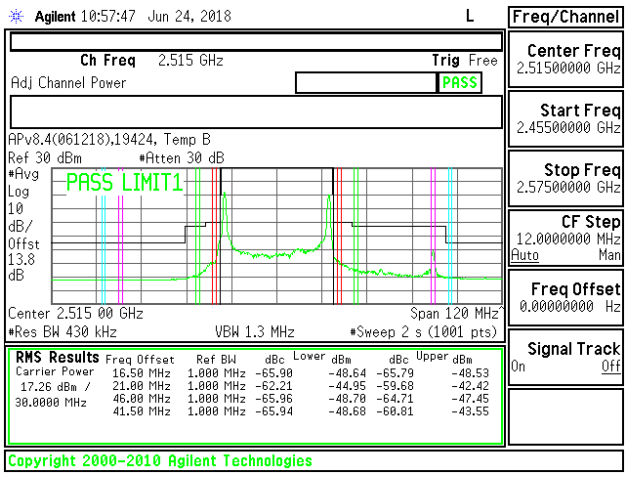
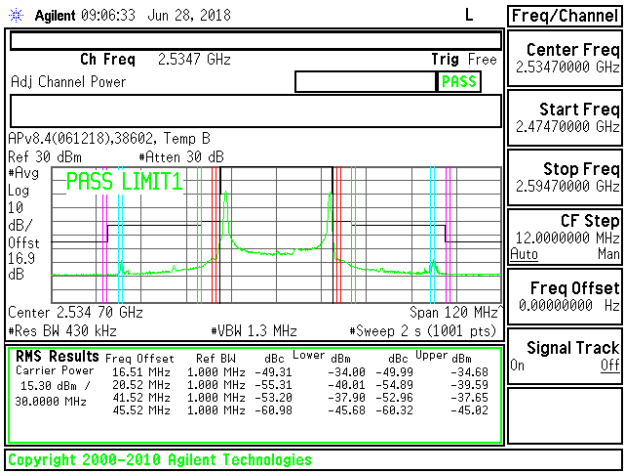
8.2.1. LTE BAND 7



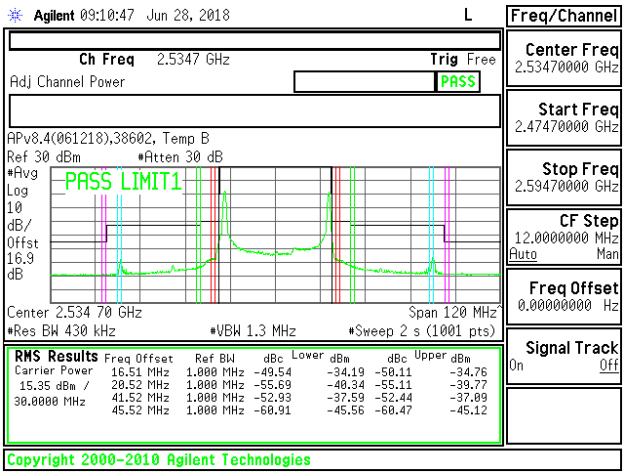
LTE B7 20MHz + 10MHz QPSK Low Ch RB1-0 + RB1-49



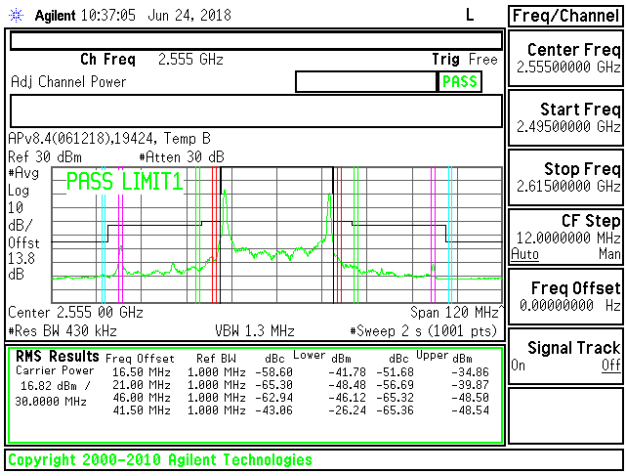
LTE B7 20MHz + 10MHz 16QAM Low Ch RB1-0 + RB1-49



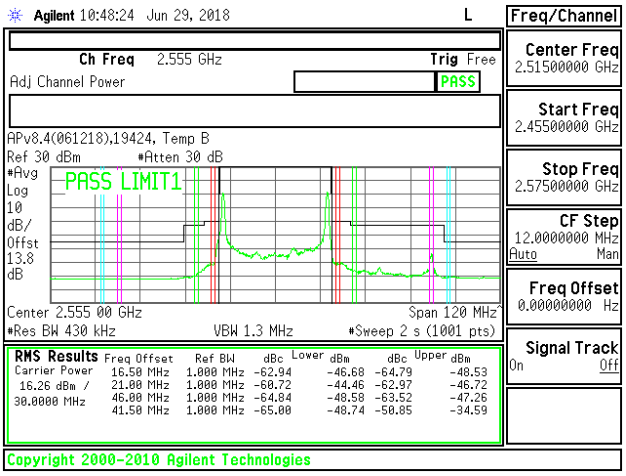
LTE B7 20MHz + 10MHz QPSK Mid Ch RB1-0 + RB1-49



LTE B7 20MHz + 10MHz 16QAM Mid Ch RB1-0 + RB1-49



LTE B7 20MHz + 10MHz QPSK High Ch RB1-0 + RB1-49



LTE B7 20MHz + 10MHz 16QAM High Ch RB1-0 + RB1-49

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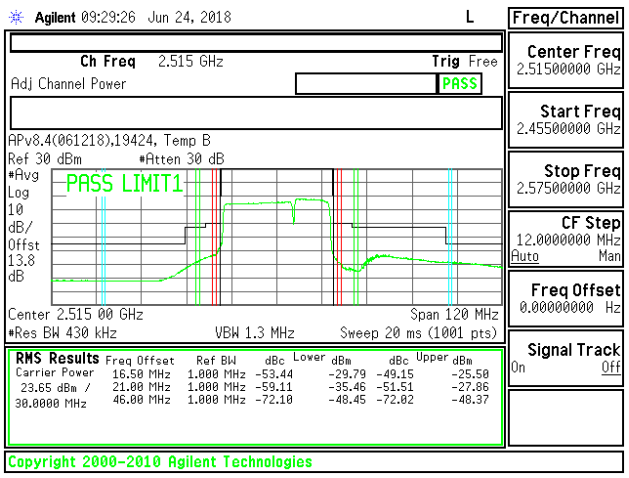
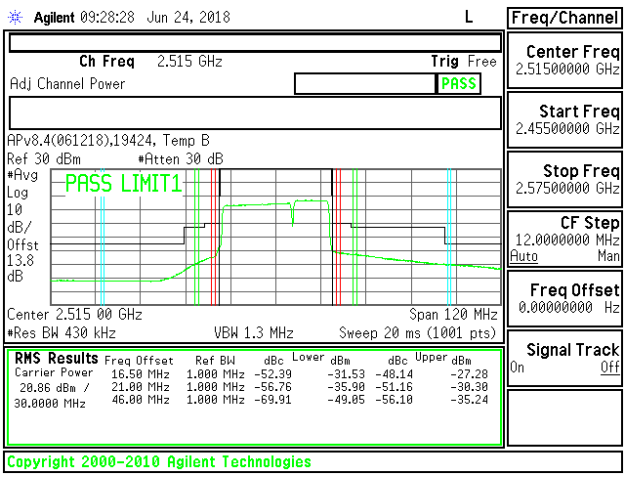
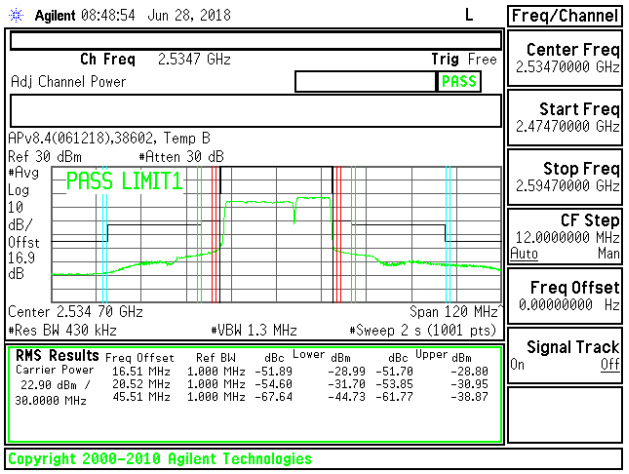


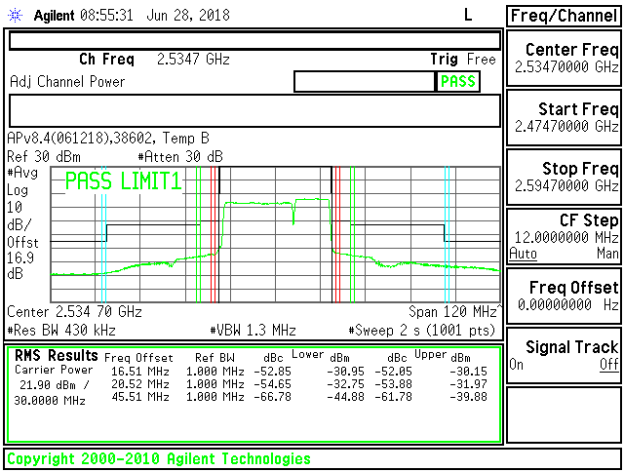
LTE B7 20MHz + 10MHz QPSK Low Ch RB100-0 + RB50-0



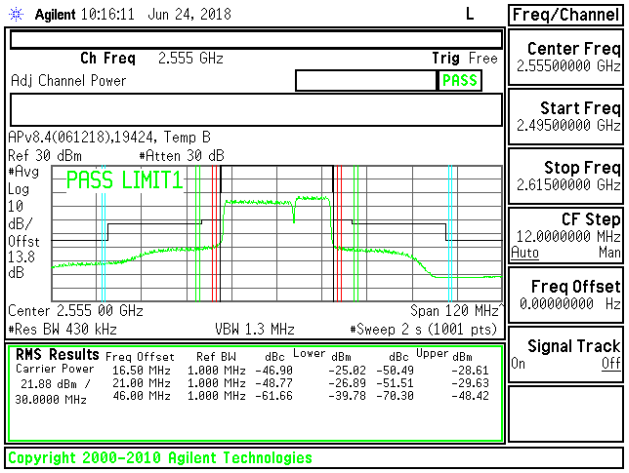
LTE B7 20MHz + 10MHz 16QAM Low Ch RB100-0 + RB50-0



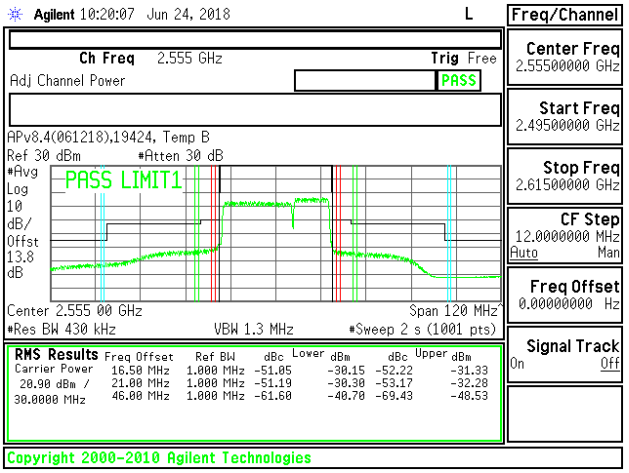
LTE B7 20MHz + 10MHz QPSK Mid Ch RB100-0 + RB50-0



LTE B7 20MHz + 10MHz 16QAM Mid Ch RB100-0 + RB50-0



LTE B7 20MHz + 10MHz QPSK High Ch RB100-0 + RB50-0



LTE B7 20MHz + 10MHz 16QAM High Ch RB100-0 + RB50-0

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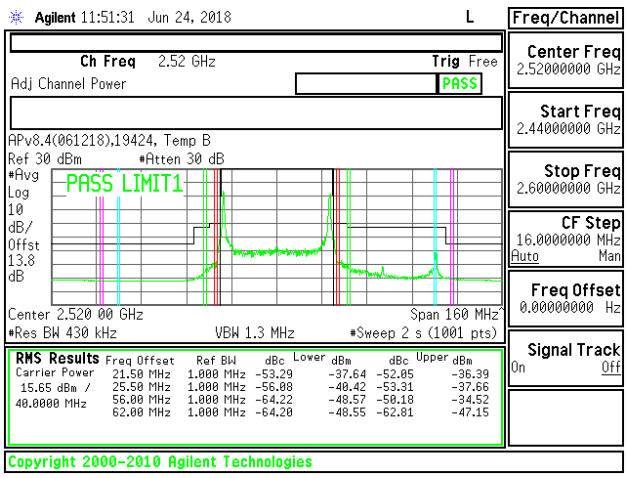
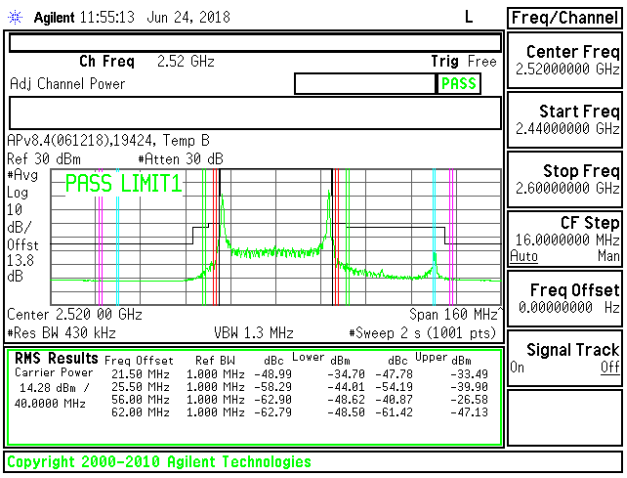
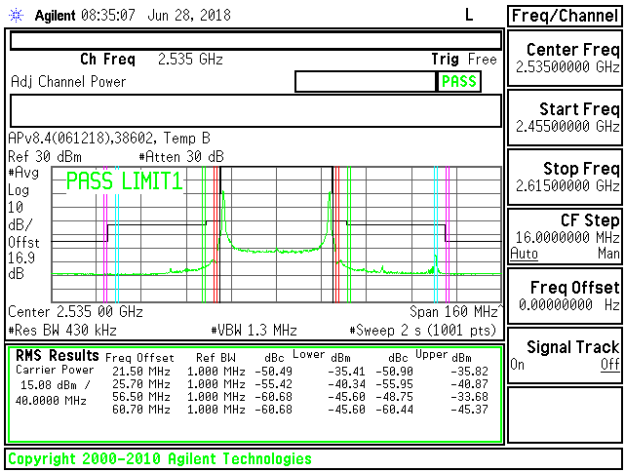


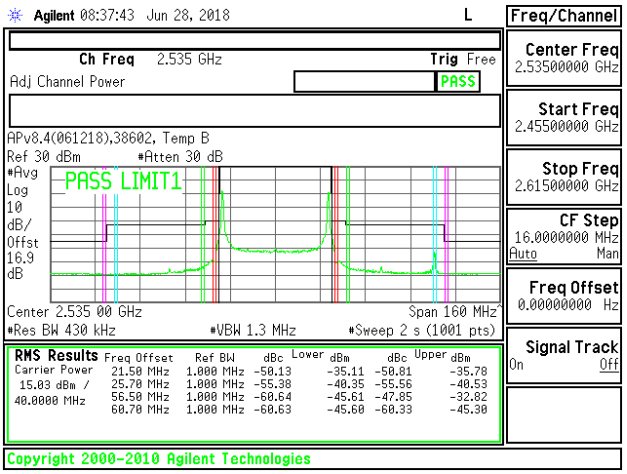
LTE B7 20MHz + 20MHz QPSK Low Ch RB1-0 + RB1-99



LTE B7 20MHz + 20MHz 16QAM Low Ch RB1-0 + RB1-99



LTE B7 20MHz + 20MHz QPSK Mid Ch RB1-0 + RB1-99



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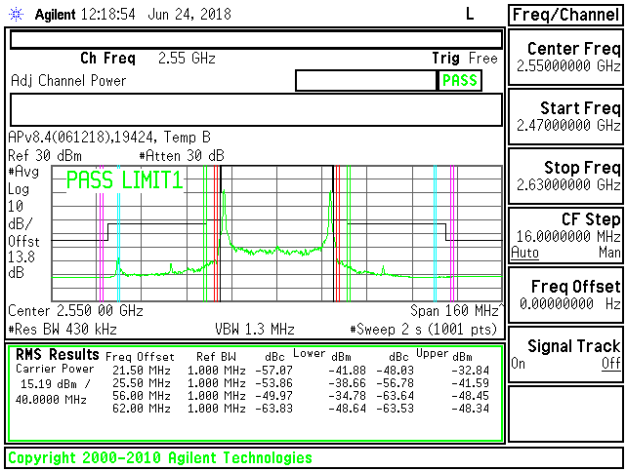
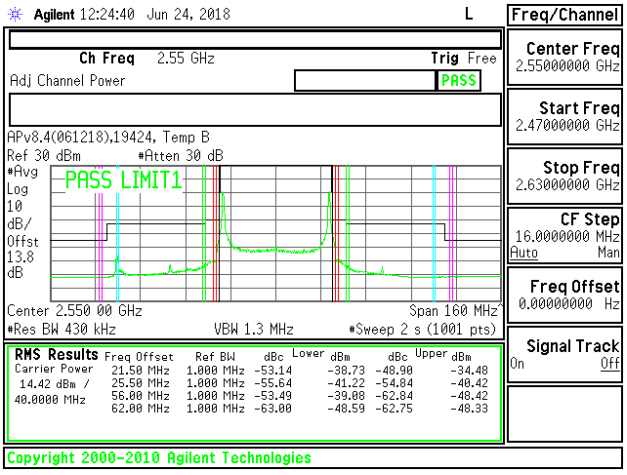


LTE B7 20MHz + 20MHz QPSK High Ch RB1-0 + RB1-99



LTE B7 20MHz + 20MHz 16QAM High Ch RB1-0 + RB1-99

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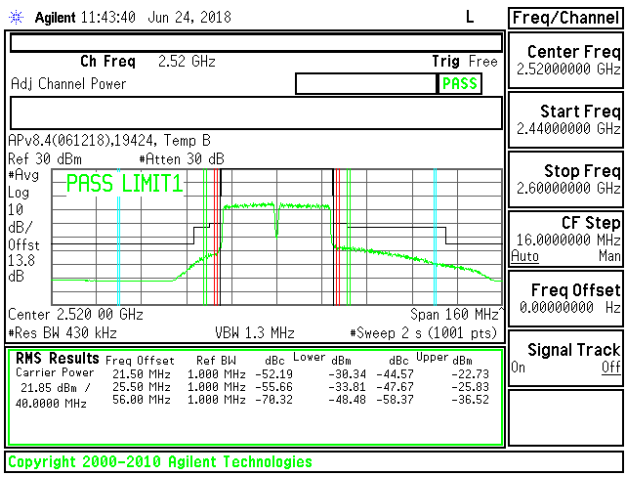
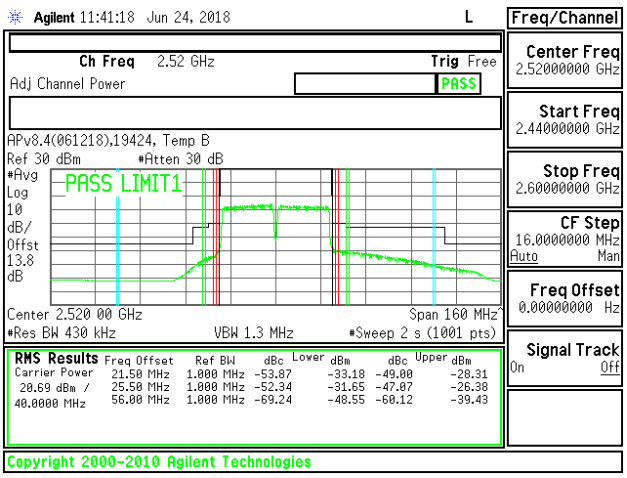
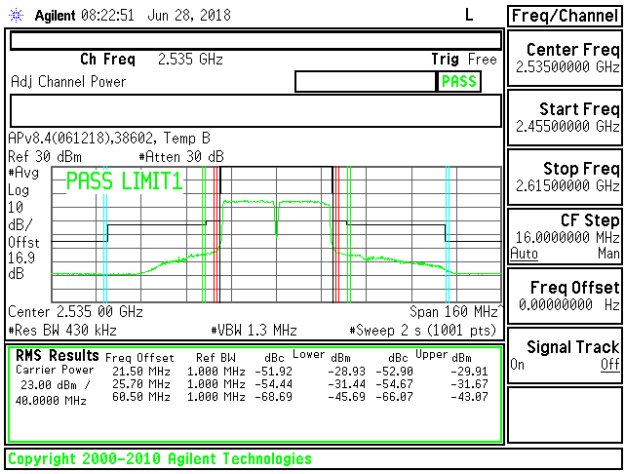


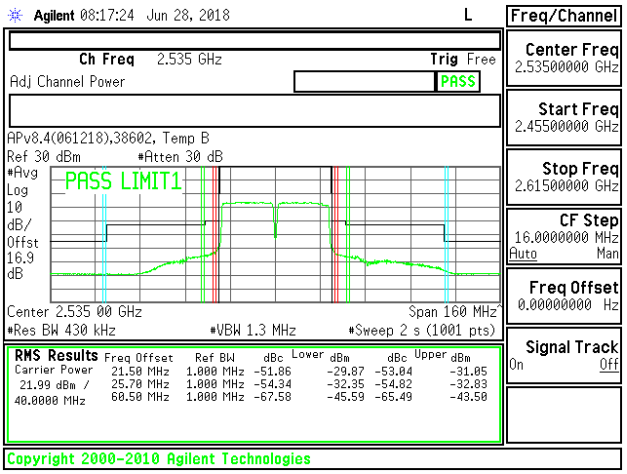
LTE B7 20MHz + 20MHz QPSK Low Ch RB100-0 + RB100-0



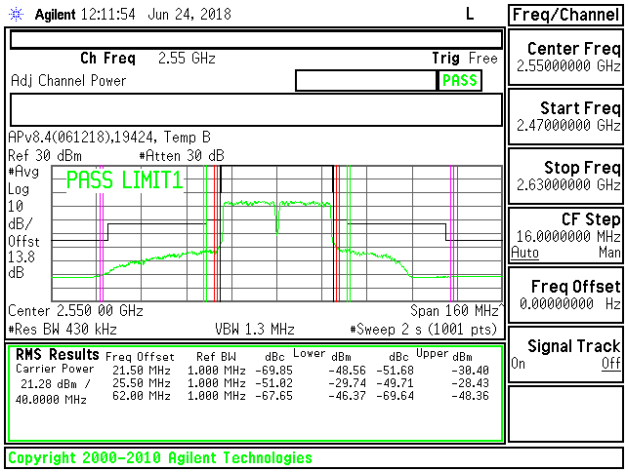
LTE B7 20MHz + 20MHz 16QAM Low Ch RB100-0 + RB100-0



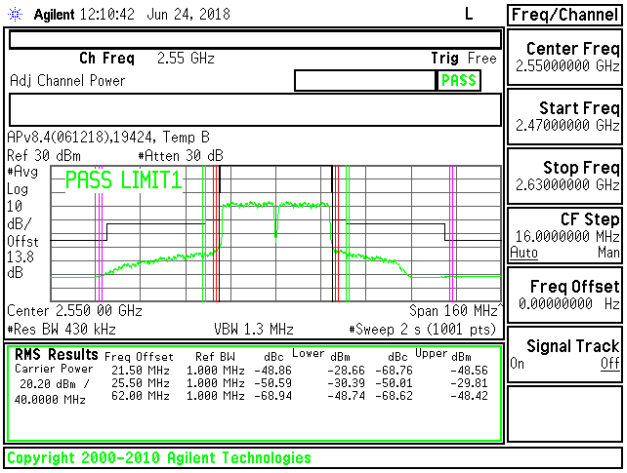
LTE B7 20MHz + 20MHz QPSK Mid Ch RB100-0 + RB100-0



LTE B7 20MHz + 20MHz 16QAM Mid Ch RB100-0 + RB100-0



LTE B7 20MHz + 20MHz QPSK High Ch RB100-0 + RB100-0



LTE B7 20MHz + 20MHz 16QAM High Ch RB100-0 + RB100-0

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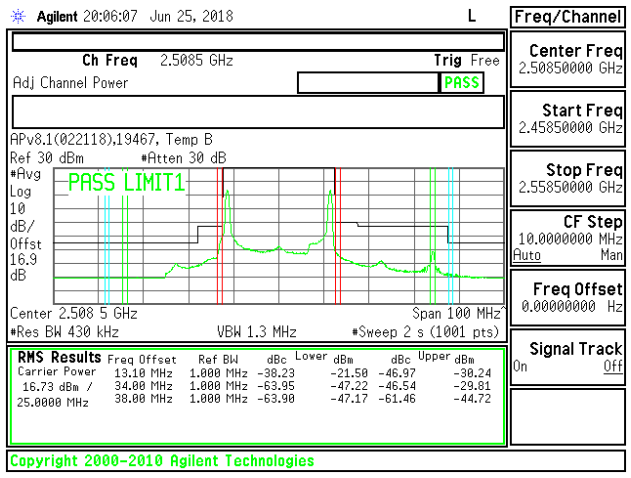
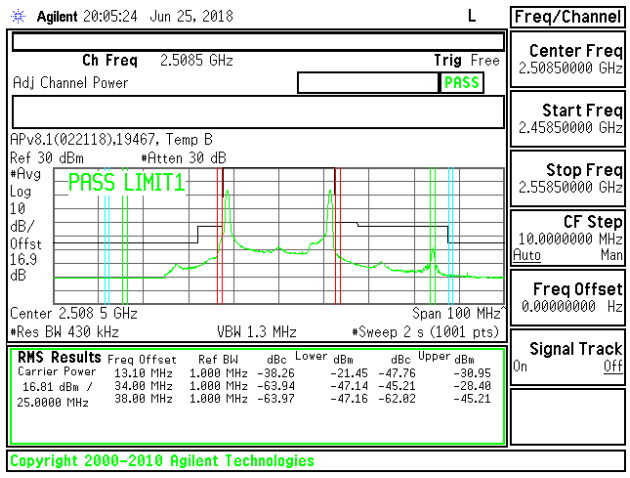
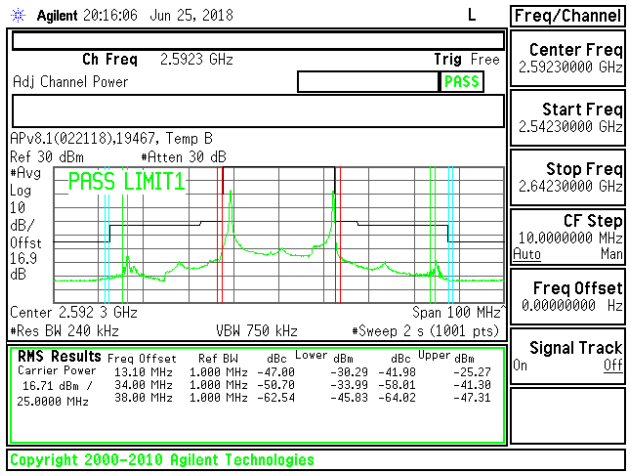
8.2.2. LTE BAND 41



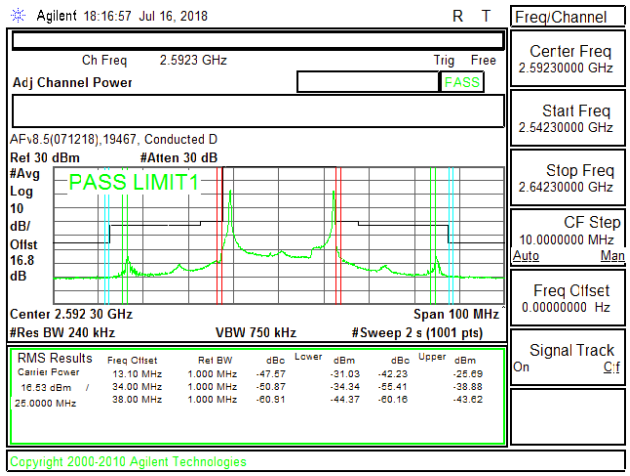
LTE B41 20MHz + 5MHz QPSK Low Ch RB1-0 + RB1-24



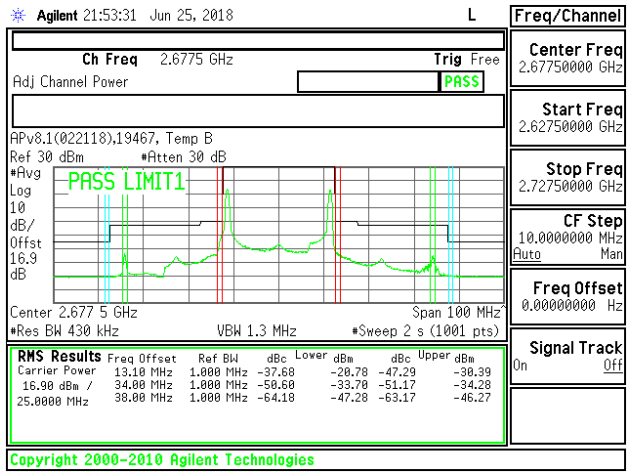
LTE B41 20MHz + 5MHz 16QAM Low Ch RB1-0 + RB1-24



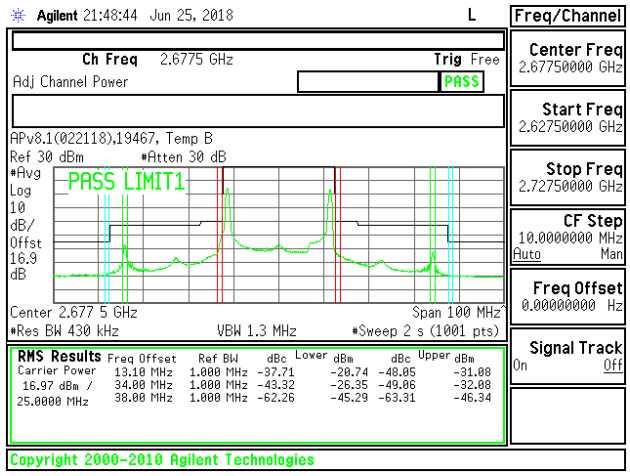
LTE B41 20MHz + 5MHz QPSK Mid Ch RB1-0 + RB1-24



LTE B41 20MHz + 5MHz 16QAM Mid Ch RB1-0 + RB1-24



LTE B41 20MHz + 5MHz QPSK High Ch RB1-0 + RB1-24



LTE B41 20MHz + 5MHz 16QAM High Ch RB1-0 + RB1-24

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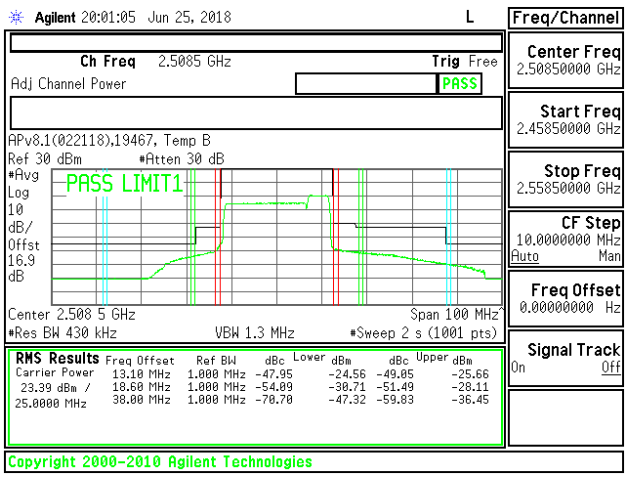
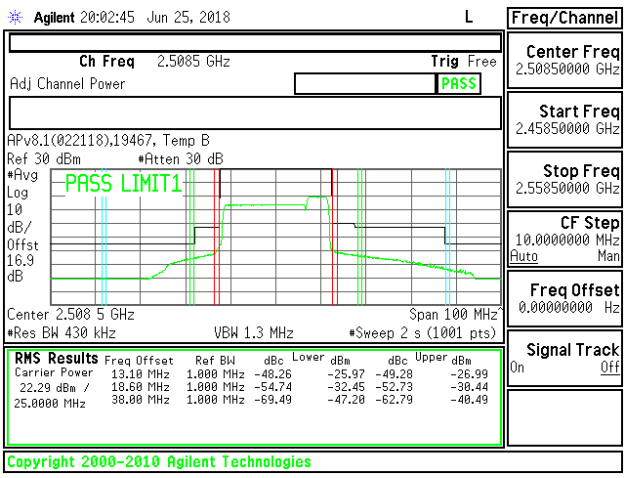
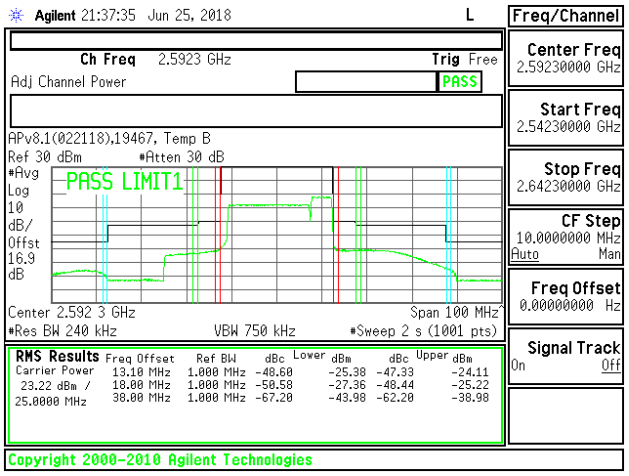


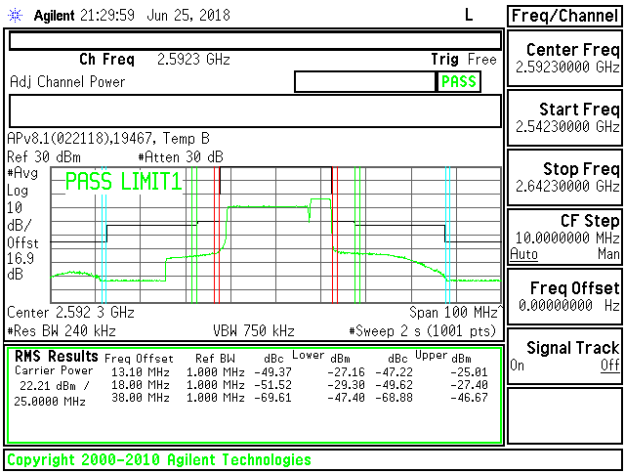
LTE B41 20MHz + 5MHz QPSK Low Ch RB100-0 + RB25-0



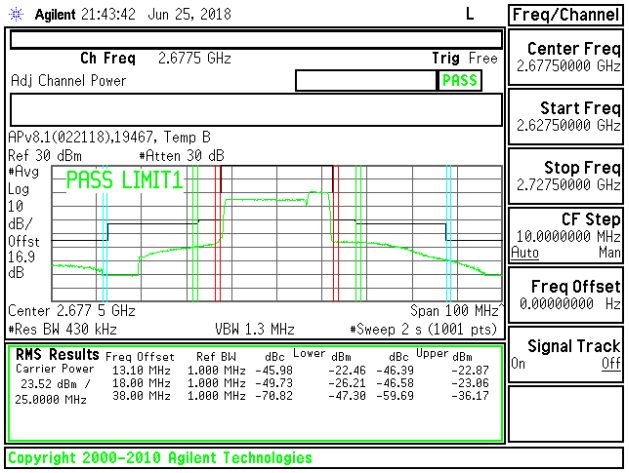
LTE B41 20MHz + 5MHz 16QAM Low Ch RB100-0 + RB25-0



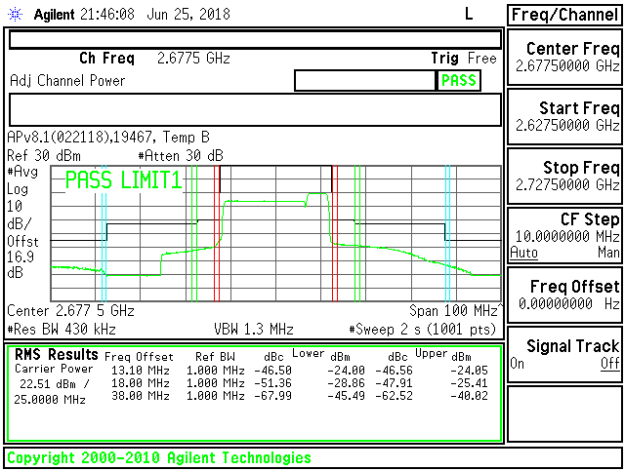
LTE B41 20MHz + 5MHz QPSK Mid Ch RB100-0 + RB25-0



LTE B41 20MHz + 5MHz 16QAM Mid Ch RB100-0 + RB25-0



LTE B41 20MHz + 5MHz QPSK High Ch RB100-0 + RB25-0



LTE B41 20MHz + 5MHz 16QAM High Ch RB100-0 + RB25-0

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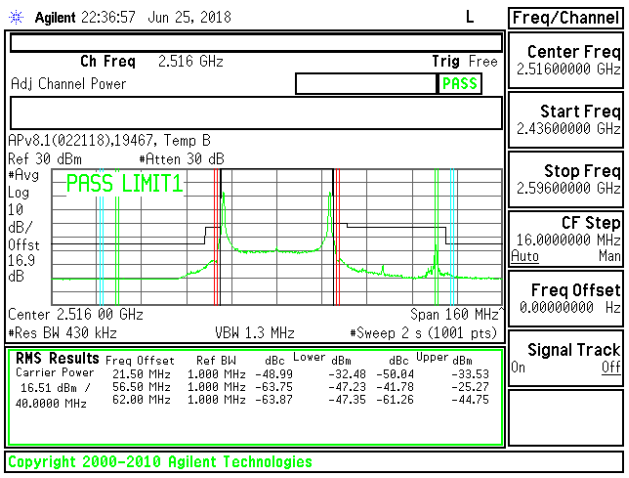
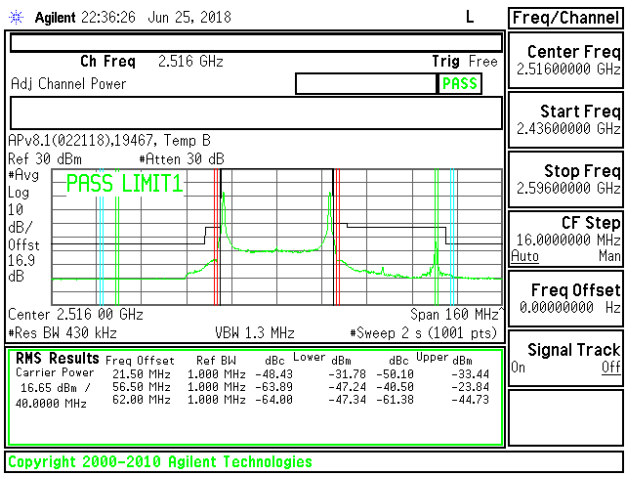
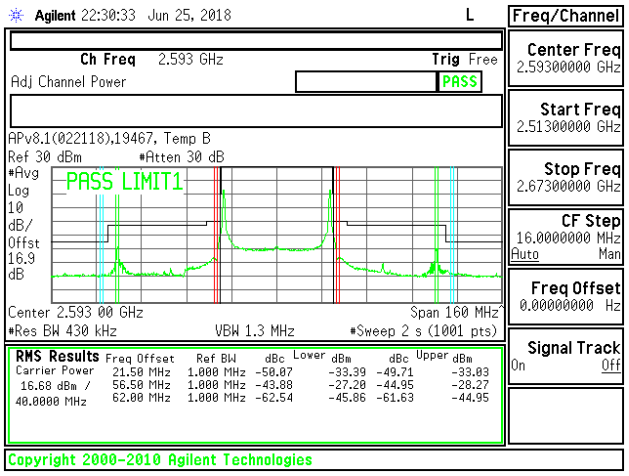


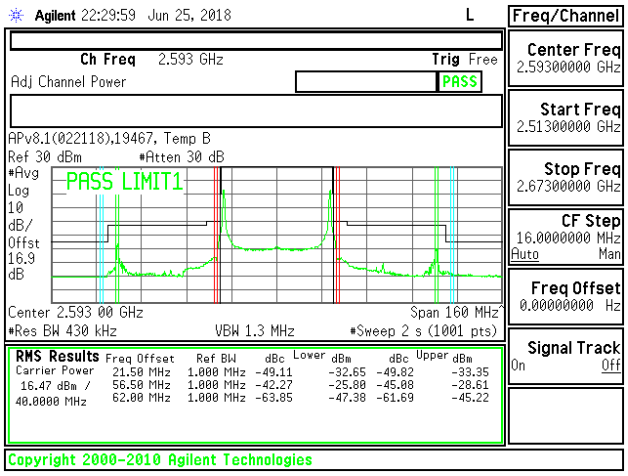
LTE B41 20MHz + 20MHz QPSK Low Ch RB1-0 + RB1-99



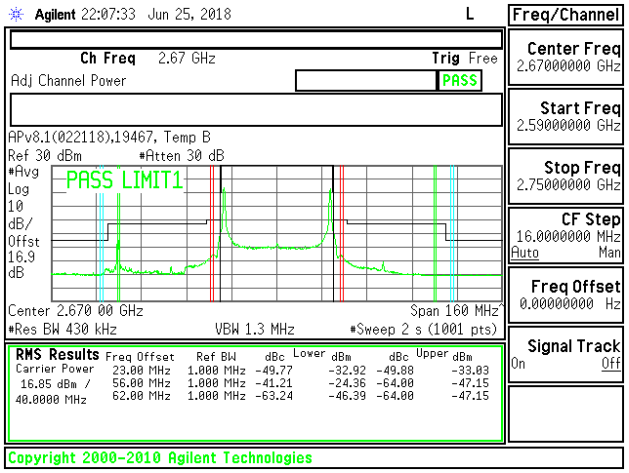
LTE B41 20MHz + 20MHz 16QAM Low Ch RB1-0 + RB1-99



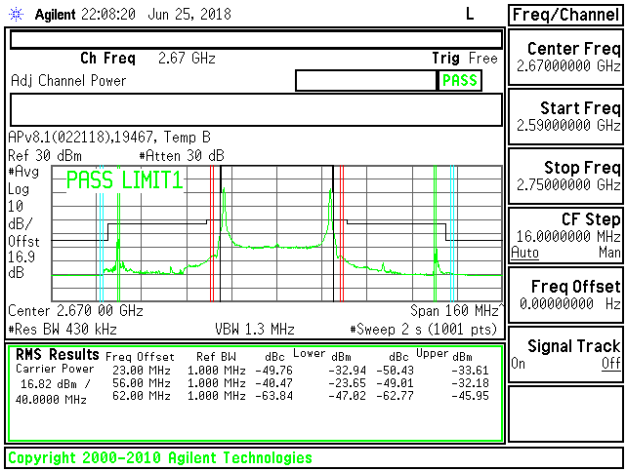
LTE B41 20MHz + 20MHz QPSK Mid Ch RB1-0 + RB1-99



LTE B41 20MHz + 20MHz 16QAM Mid Ch RB1-0 + RB1-99



LTE B41 20MHz + 20MHz QPSK High Ch RB1-0 + RB1-99



LTE B41 20MHz + 20MHz 16QAM High Ch RB1-0 + RB1-99

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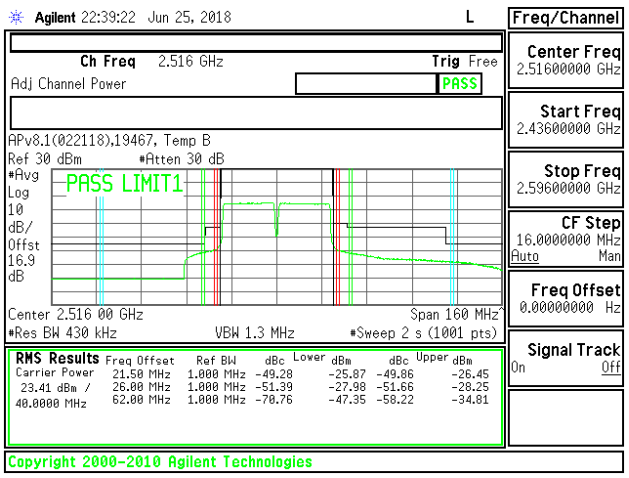
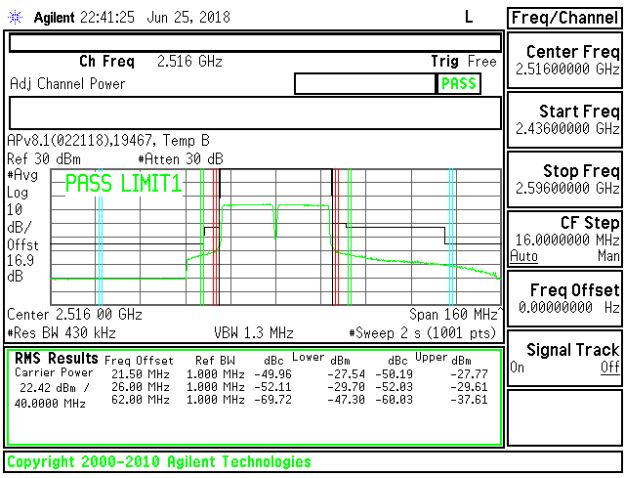
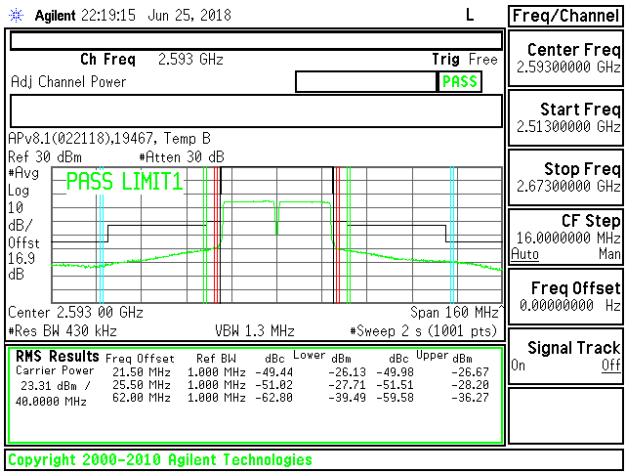


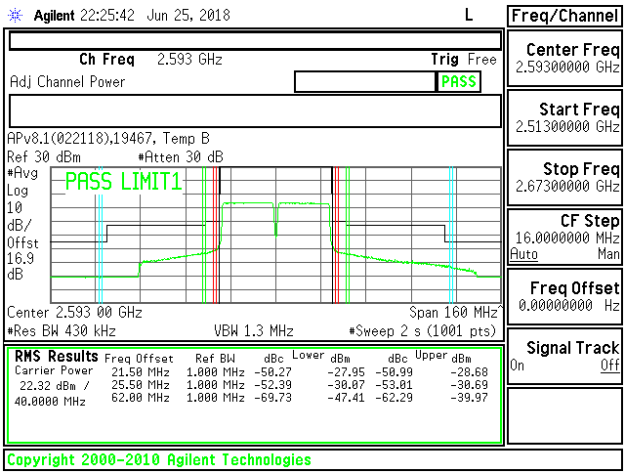
LTE B41 20MHz + 20MHz QPSK Low Ch RB100-0 + RB100-0



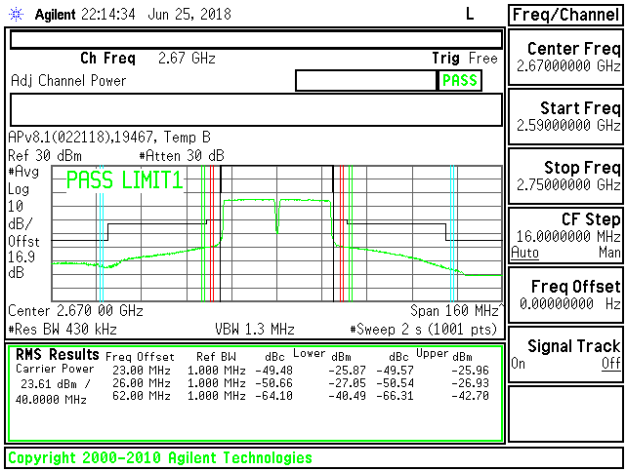
LTE B41 20MHz + 20MHz 16QAM Low Ch RB100-0 + RB100-0



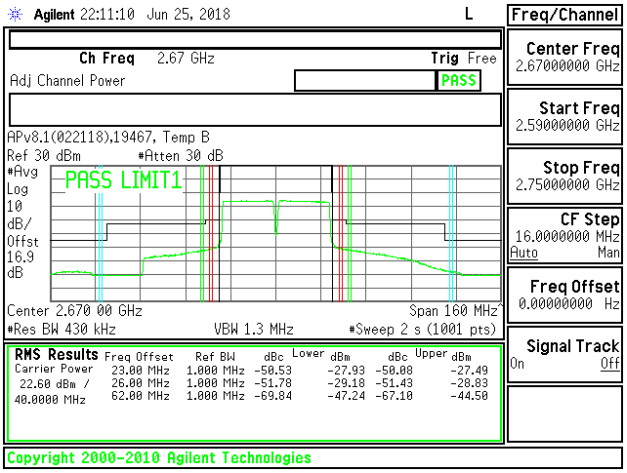
LTE B41 20MHz + 20MHz QPSK Mid Ch RB100-0 + RB100-0



LTE B41 20MHz + 20MHz 16QAM Mid Ch RB100-0 + RB100-0



LTE B41 20MHz + 20MHz QPSK High Ch RB100-0 + RB100-0



LTE B41 20MHz + 20MHz 16QAM High Ch RB100-0 + RB100-0

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8.3. OUT OF BAND EMISSIONS

RULE PART(S)

§2.1051, §27.53

LIMITS

§27.53 (m)
The minimum permissible attenuation level of any spurious emissions is 55 + 10 log (P) dB where transmitting power (P) in Watts.

TEST PROCEDURE

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 -25 dBm
- Set RBW & VBW to 100 kHz for the measurement below 1 GHz, and 1 MHz for the measurement above 1 GHz. (NOTE: Worst case set RBW/VBW to 1MHz/3MHz)

MODES TESTED

- LTE Band 7
- LTE Band 41

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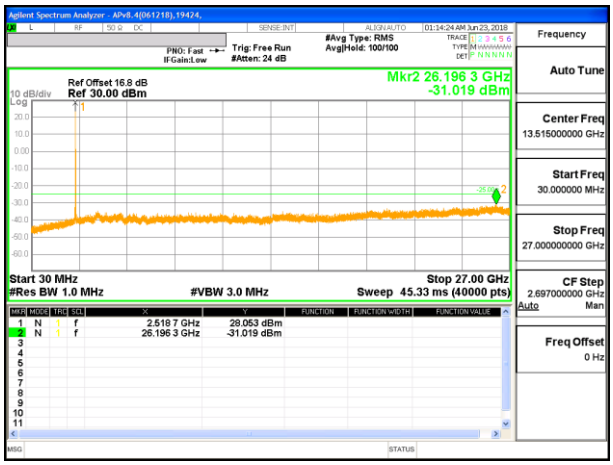
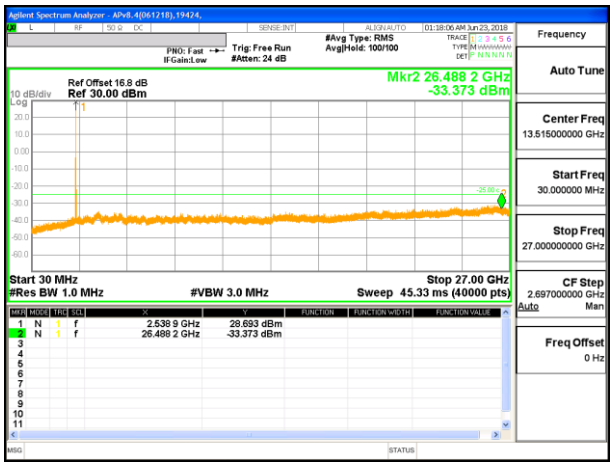
8.3.1. LTE BAND 7

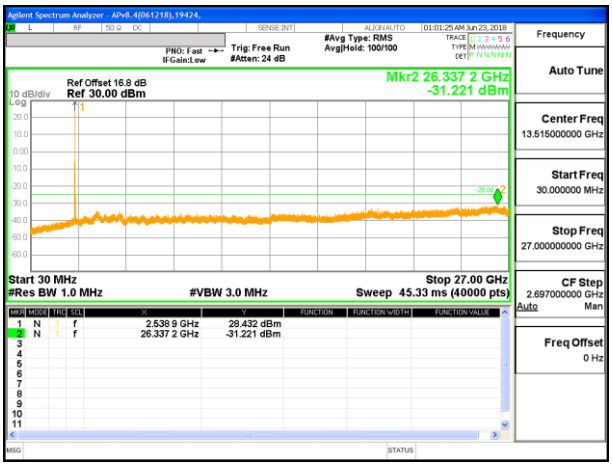


LTE B7 20MHz + 10MHz QPSK Low Ch RB1-99 + RB1-0

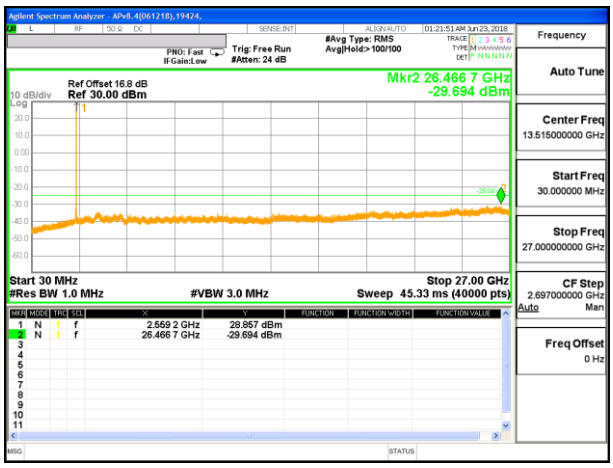
LTE B7 20MHz + 10MHz 16QAM Low Ch RB1-99 + RB1-0



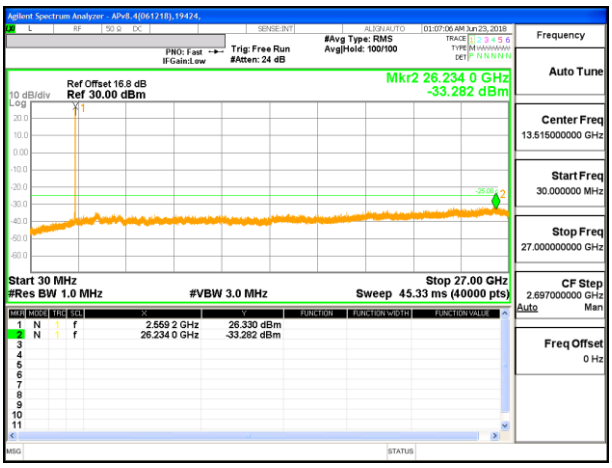
LTE B7 20MHz + 10MHz QPSK Middle Ch RB1-99 + RB1-0



LTE B7 20MHz + 10MHz 16QAM Middle Ch RB1-99 + RB1-0



LTE B7 20MHz + 10MHz QPSK High Ch RB1-99 + RB1-0



LTE B7 20MHz + 10MHz 16QAM High Ch RB1-99 + RB1-0

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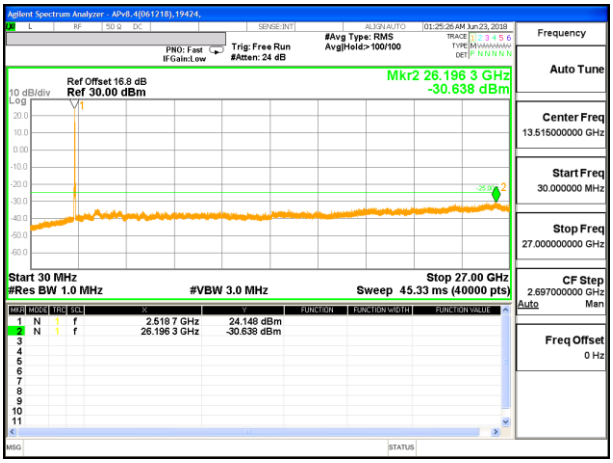
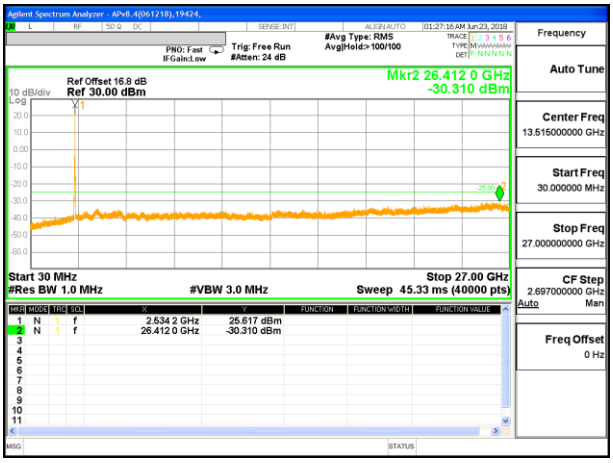
LTE B7 20MHz + 20MHz QPSK Low Ch RB1-99 + RB1-0

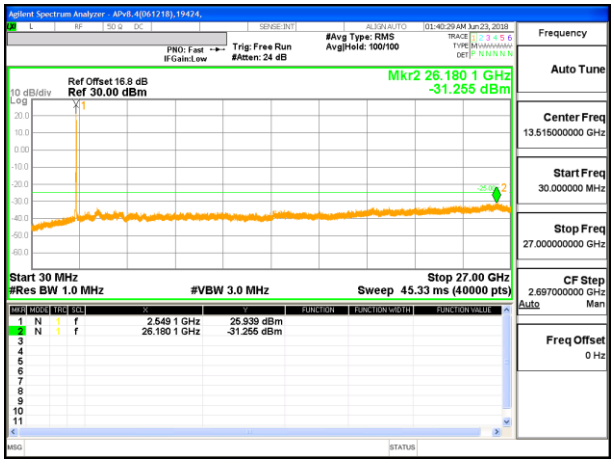


LTE B7 20MHz + 20MHz 16QAM Low Ch RB1-99 + RB1-0

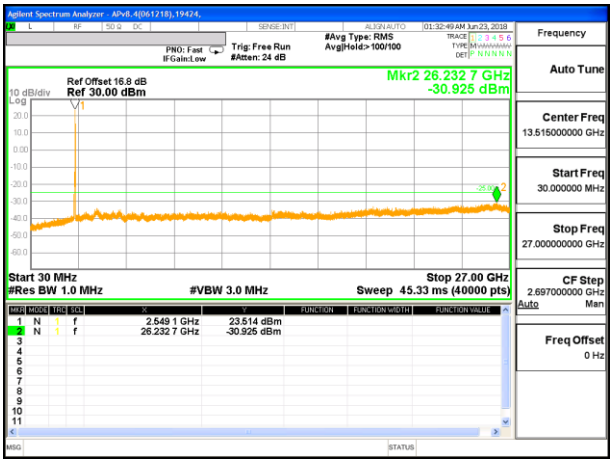
LTE B7 20MHz + 20MHz QPSK Middle Ch RB1-99 + RB1-0



LTE B7 20MHz + 20MHz 16QAM Middle Ch RB1-99 + RB1-0



LTE B7 20MHz + 20MHz QPSK High Ch RB1-99 + RB1-0



LTE B7 20MHz + 20MHz 16QAM High Ch RB1-99 + RB1-0

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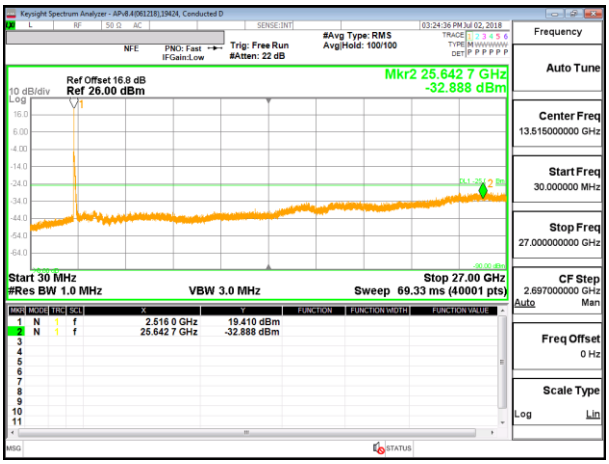
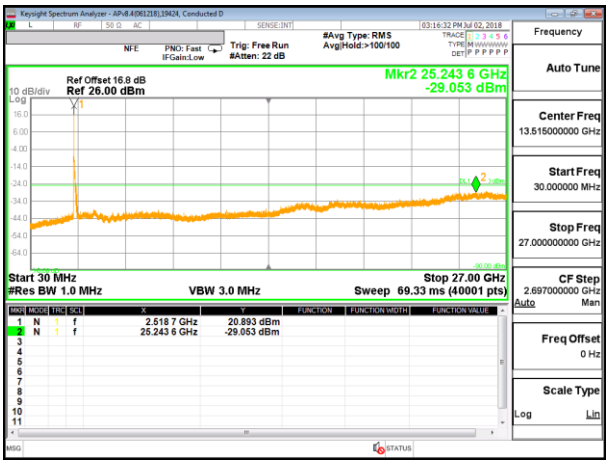
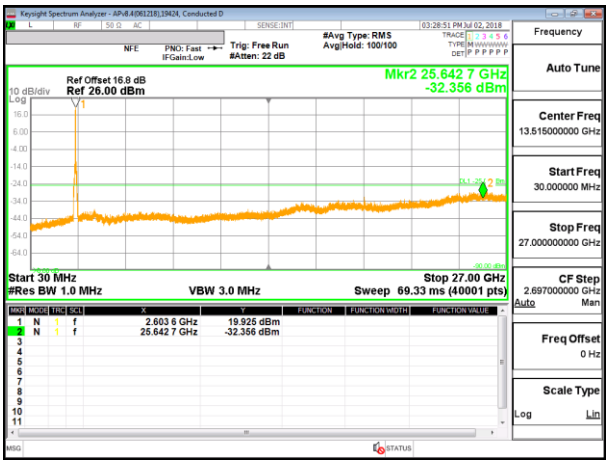
8.3.2. LTE BAND 41



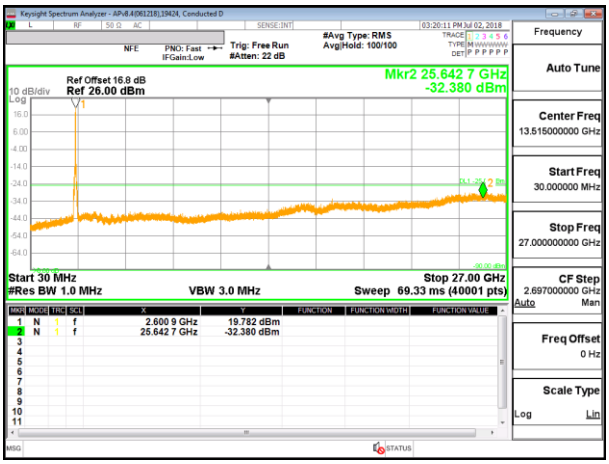
LTE B41 20MHz + 5MHz QPSK Low Ch RB1-99 + RB1-0



LTE B41 20MHz + 5MHz 16QAM Low Ch RB1-99 + RB1-0



LTE B41 20MHz + 5MHz QPSK Middle Ch RB1-99 + RB1-0



LTE B41 20MHz + 5MHz 16QAM Middle Ch RB1-99 + RB1-0

LTE B41 20MHz + 5MHz QPSK High Ch RB1-99 + RB1-0

LTE B41 20MHz + 5MHz 16QAM High Ch RB1-99 + RB1-0

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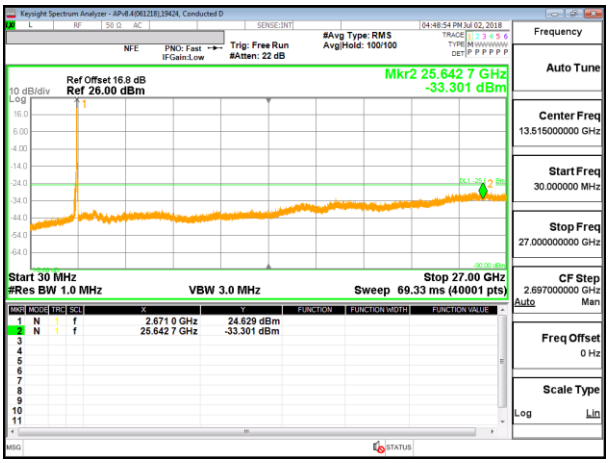
LTE B41 20MHz + 20MHz QPSK Low Ch RB1-99 + RB1-0

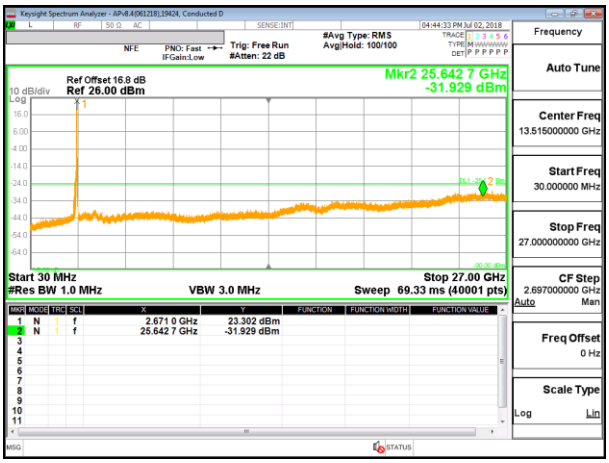
LTE B41 20MHz + 20MHz 16QAM Low Ch RB1-99 + RB1-0

LTE B41 20MHz + 20MHz QPSK Middle Ch RB1-99 + RB1-0

LTE B41 20MHz + 20MHz 16QAM Middle Ch RB1-99 + RB1-0



LTE B41 20MHz + 20MHz QPSK High Ch RB1-99 + RB1-0



LTE B41 20MHz + 20MHz 16QAM High Ch RB1-99 + RB1-0

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8.4. FREQUENCY STABILITY

RULE PART(S)

§2.1055, §27.54

LIMITS

§27.54
The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

TEST PROCEDURE

Use CMW 500 with Frequency Error measurement capability.

- Temp. = −30°C to +50°C
- Voltage = (85% - 115%)

  Low voltage, 3.23VDC, Normal, 3.8VDC and High voltage, 4.37VDC.
  End Voltage, 3.2VDC.

Frequency Stability vs Temperature:
The EUT is place inside a temperature chamber. The temperature is set to 20ºC 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 +50ºC is reached.

Frequency Stability vs Voltage:
The peak frequency error is recorded (worst-case).

MODES TESTED

- LTE Band 7
- LTE Band 41

RESULTS

See the following pages.

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8.4.1. LTE BAND 7

ID:	44366	Date:	4/3/18

QPSK, (20MHz + 10MHz BANDWIDTH)

Limit		2500	2570	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ -13dBm	F high @ -13dBm		
Temperature	Voltage	(MHz)	(MHz)		
Normal (20C)	Normal	2500.6440	2569.4400		
Extreme (50C)		2500.6441	2569.4401	63.9	0.025
Extreme (40C)		2500.6441	2569.4401	56.5	0.022
Extreme (30C)		2500.6441	2569.4401	72.5	0.029
Extreme (10C)		2500.6440	2569.4400	-49.8	-0.020
Extreme (0C)		2500.6439	2569.4399	-54.5	-0.021
Extreme (-10C)		2500.6439	2569.4399	-51.4	-0.020
Extreme (-20C)		2500.6439	2569.4399	-69.6	-0.027
Extreme (-30C)		2500.6439	2569.4399	-59.2	-0.023
20C	15%	2500.6441	2569.4401	64.6	0.025
	-15%	2500.6440	2569.4400	47.3	0.019
	End Point	2500.6440	2569.4400	33.4	0.013

QPSK, (20MHz + 20MHz BANDWIDTH)

Limit		2500	2570	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ -13dBm	F high @ -13dBm		
Temperature	Voltage	(MHz)	(MHz)		
Normal (20C)	Normal	2500.6860	2569.3660		
Extreme (50C)		2500.6861	2569.3661	50.8	0.020
Extreme (40C)		2500.6860	2569.3660	37.5	0.015
Extreme (30C)		2500.6860	2569.3660	44.4	0.017
Extreme (10C)		2500.6860	2569.3660	-43.7	-0.017
Extreme (0C)		2500.6861	2569.3661	54.3	0.021
Extreme (-10C)		2500.6860	2569.3660	-30.6	-0.012
Extreme (-20C)		2500.6860	2569.3660	37.2	0.015
Extreme (-30C)		2500.6861	2569.3661	75.9	0.030
20C	15%	2500.6860	2569.3660	-40.3	-0.016
	-15%	2500.6860	2569.3660	38.8	0.015
	End Point	2500.6861	2569.3661	54.1	0.021

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8.4.2. LTE BAND 41

ID:	44366	Date:	4/3/18

QPSK, (20MHz + 5MHz BANDWIDTH)

Limit		2496	2690	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ -13dBm	F high @ -13dBm		
Temperature	Voltage	(MHz)	(MHz)		
Normal (20C)	Normal	2496.2423	2689.7400		
Extreme (50C)		2496.2424	2689.7401	110.1	0.042
Extreme (40C)		2496.2424	2689.7401	66.8	0.026
Extreme (30C)		2496.2424	2689.7401	79.2	0.031
Extreme (10C)		2496.2424	2689.7401	95.8	0.037
Extreme (0C)		2496.2424	2689.7401	84.4	0.033
Extreme (-10C)		2496.2423	2689.7400	35.1	0.014
Extreme (-20C)		2496.2423	2689.7400	27.8	0.011
Extreme (-30C)		2496.2423	2689.7400	-26.5	-0.010
20C	15%	2496.2424	2689.7401	84.9	0.033
	-15%	2496.2424	2689.7401	91.6	0.035
	End Point	2496.2424	2689.7401	78.9	0.030

QPSK, (20MHz + 20MHz BANDWIDTH)

Limit		2496	2690	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ -13dBm	F high @ -13dBm		
Temperature	Voltage	(MHz)	(MHz)		
Normal (20C)	Normal	2496.4096	2689.5572		
Extreme (50C)		2496.4097	2689.5573	128.6	0.050
Extreme (40C)		2496.4097	2689.5573	95.5	0.037
Extreme (30C)		2496.4097	2689.5573	86.4	0.033
Extreme (10C)		2496.4096	2689.5572	-48.4	-0.019
Extreme (0C)		2496.4095	2689.5571	-75.1	-0.029
Extreme (-10C)		2496.4095	2689.5571	-50.3	-0.019
Extreme (-20C)		2496.4096	2689.5572	-49.7	-0.019
Extreme (-30C)		2496.4095	2689.5571	-56.9	-0.022
20C	15%	2496.4096	2689.5572	-23.7	-0.009
	-15%	2496.4095	2689.5571	-59.7	-0.023
	End Point	2496.4097	2689.5573	102.4	0.039

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8.5. PEAK-TO-AVERAGE POWER RATIO

LIMIT

In addition, the peak-to-average power ratio (PAPR) of the transmitter shall not exceed 13 dB for more than 0.1% of the time and shall use a signal corresponding to the highest PAPR during periods of continuous transmission.

RESULT

Test was performed on Ant 1; full resource block (FRB) for each bandwidth was used to measure as the worst case. The results from all CCDF measurements are passed with 13dB peak-to-average ratio criteria.

8.5.1. LTE BAND 7

ID:	38602	Date:	6/19/18

Band	Bandwidth (MHz)	PCC f (MHz)	SCC1 f (MHz)	Modulation	Conducted Power (dBm)		Peak-to-Average Power Ratio (dB)
					Peak	Average	
Band 7	10MHz / 20MHz	2525.6	2540.0	QPSK	31.42	23.72	7.70
				16QAM	31.26	22.91	8.35
	15 MHz / 15MHz	2527.5	2542.5	QPSK	31.23	23.77	7.46
				16QAM	31.21	22.88	8.33
	15MHz / 20MHz	2525.3	2542.4	QPSK	31.40	23.81	7.59
				16QAM	31.26	23.00	8.26
	20MHz / 10MHz	2530.1	2544.5	QPSK	31.32	23.83	7.49
				16QAM	31.36	22.69	8.67
	20MHz / 15MHz	2527.6	2544.7	QPSK	31.36	23.77	7.59
				16QAM	31.27	22.94	8.33
	20MHz / 20MHz	2525.1	2544.9	QPSK	31.27	23.94	7.33
				16QAM	31.52	22.82	8.70
Duty Cycle Correction Factor (dB) =							
Peak-to-Average Power Ratio= Peak Reading - Average Reading - Duty Cycle Correction Factor							

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8.5.2. LTE BAND 41

ID:	19424	Date:	6/19/18

Band	Bandwidth (MHz)	PCC f (MHz)	SCC1 f (MHz)	Modulation	Conducted Power (dBm)		Peak-to-Average Power Ratio (dB)
					Peak	Average	
Band 41 (FCC)	5MHz / 20MHz	2583.8	2595.5	QPSK	32.01	16.85	8.17
				16QAM	32.04	15.91	9.14
	10MHz / 20MHz	2583.6	2598.0	QPSK	32.28	16.76	8.53
				16QAM	31.99	15.79	9.21
	15MHz / 15MHz	2585.5	2600.5	QPSK	31.68	16.72	7.97
				16QAM	31.76	15.75	9.02
	15MHz / 20MHz	2583.3	2600.4	QPSK	31.66	16.69	7.98
				16QAM	31.83	15.71	9.13
	20MHz / 5MHz	2590.5	2602.2	QPSK	31.30	16.82	7.49
				16QAM	31.37	15.75	8.63
	20MHz / 10MHz	2588.1	2602.5	QPSK	31.46	15.80	8.67
				16QAM	31.37	15.75	8.63
	20MHz / 15MHz	2585.6	2602.7	QPSK	31.34	16.81	7.54
				16QAM	31.48	15.81	8.68
	20MHz / 20MHz	2583.1	2602.9	QPSK	31.31	16.80	7.52
				16QAM	31.46	15.80	8.67
Duty Cycle Correction Factor (dB) =			6.99				
Peak-to-Average Power Ratio= Peak Reading - Average Reading - Duty Cycle Correction Factor							

9. RADIATED TEST RESULTS

RULE PART(S)

§2.1053, §27.53

LIMIT

§27.53 (m)
At least 55 + 10 log (P) dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(6) of this section.

TEST PROCEDURE

KDB 971168 D01 v03r01/ D02 v02r01

MODES TESTED

- LTE Band 7
- LTE Band 41

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9.1. FIELD STRENGTH OF SPURIOUS RADIATION, ANT 1

9.1.1. LTE BAND 7

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #:
Date: 06/19/18
Test Engineer: 10649
Configuration: EUT Only
Mode: LTE Band 7, QPSK UL CA 20/10

Test Equipment:
Substitution: Horn T344 Substitution, and 8ft SMA Cable

Chamber: 3m Chamber C | Pre-amplifer: 3mChamber C | Filter: Filter | Limit: LTE B7

Frequency (GHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance	EIRP @ TX Ant End (dBm)	Preamp	Attenuator	EIRP	Limit	Delta	Notes
Low Channel (2510MHz)+2524.4MHz 1-99 1-0										
5.03	-69.6	H	3.0	-16.7	33.4	1.0	-49.1	-25.0	-24.1	
7.55	-71.3	H	3.0	-13.7	33.0	1.0	-45.7	-25.0	-20.7	
10.07	-72.3	H	3.0	-11.5	32.6	1.0	-43.1	-25.0	-18.1	
5.03	-70.4	V	3.0	-17.5	33.4	1.0	-49.9	-25.0	-24.9	
7.55	-71.2	V	3.0	-13.6	33.0	1.0	-45.6	-25.0	-20.6	
10.07	-72.5	V	3.0	-11.4	32.6	1.0	-43.0	-25.0	-18.0	
Mid Channel (2530.1MHz)+2544.5MHz 1-99 1-0										
5.07	-69.0	H	3.0	-16.0	33.4	1.0	-48.4	-25.0	-23.4	
7.61	-71.1	H	3.0	-13.4	33.0	1.0	-45.4	-25.0	-20.4	
10.15	-71.7	H	3.0	-10.8	32.6	1.0	-42.4	-25.0	-17.4	
5.07	-69.8	V	3.0	-16.9	33.4	1.0	-49.3	-25.0	-24.3	
7.61	-71.5	V	3.0	-13.8	33.0	1.0	-45.8	-25.0	-20.8	
10.15	-72.0	V	3.0	-10.8	32.6	1.0	-42.4	-25.0	-17.4	
High Channel (2550.1MHz)+2564.5MHz 1-99 1-0										
5.11	-69.5	H	3.0	-16.4	33.4	1.0	-48.8	-25.0	-23.8	
7.67	-70.6	H	3.0	-12.8	33.0	1.0	-44.8	-25.0	-19.8	
10.23	-72.5	H	3.0	-11.5	32.5	1.0	-43.0	-25.0	-18.0	
5.11	-69.1	V	3.0	-16.1	33.4	1.0	-48.5	-25.0	-23.5	
7.67	-70.3	V	3.0	-12.5	33.0	1.0	-44.5	-25.0	-19.5	
10.23	-71.8	V	3.0	-10.6	32.5	1.0	-42.1	-25.0	-17.1	

Rev. 05.21.15

LTE B7 20MHz + 10MHz QPSK

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #:
Date: 06/19/18
Test Engineer: 10649
Configuration: EUT Only
Mode: LTE Band 7, 16QAM UL CA 20/10

Test Equipment:
Substitution: Horn T344 Substitution, and 8ft SMA Cable

Chamber: 3m Chamber C | Pre-amplifer: 3mChamber C | Filter: Filter | Limit: LTE B7

Frequency (GHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance	EIRP @ TX Ant End (dBm)	Preamp	Attenuator	EIRP	Limit	Delta	Notes
Low Channel (2510MHz)+2524.4MHz 1-99 1-0										
5.03	-69.6	H	3.0	-16.7	33.4	1.0	-49.1	-25.0	-24.1	
7.55	-70.5	H	3.0	-12.9	33.0	1.0	-44.9	-25.0	-19.9	
10.07	-72.7	H	3.0	-11.9	32.6	1.0	-43.5	-25.0	-18.5	
5.03	-69.2	V	3.0	-16.3	33.4	1.0	-48.7	-25.0	-23.7	
7.55	-71.0	V	3.0	-13.4	33.0	1.0	-45.4	-25.0	-20.4	
10.07	-72.2	V	3.0	-11.1	32.6	1.0	-42.7	-25.0	-17.7	
Mid Channel (2530.1MHz)+2544.5MHz 1-99 1-0										
5.07	-68.9	H	3.0	-15.9	33.4	1.0	-48.3	-25.0	-23.3	
7.61	-70.5	H	3.0	-12.8	33.0	1.0	-44.8	-25.0	-19.8	
10.15	-71.8	H	3.0	-10.9	32.6	1.0	-42.5	-25.0	-17.5	
5.07	-69.0	V	3.0	-16.1	33.4	1.0	-48.5	-25.0	-23.5	
7.61	-69.9	V	3.0	-12.2	33.0	1.0	-44.2	-25.0	-19.2	
10.15	-72.1	V	3.0	-10.9	32.6	1.0	-42.5	-25.0	-17.5	
High Channel (2550.1MHz)+2564.5MHz 1-99 1-0										
5.11	-69.3	H	3.0	-16.2	33.4	1.0	-48.6	-25.0	-23.6	
7.67	-70.0	H	3.0	-13.0	33.0	1.0	-45.0	-25.0	-20.0	
10.23	-72.5	H	3.0	-11.5	32.5	1.0	-43.0	-25.0	-18.0	
5.11	-69.7	V	3.0	-16.7	33.4	1.0	-49.1	-25.0	-24.1	
7.67	-70.4	V	3.0	-12.6	33.0	1.0	-44.6	-25.0	-19.6	
10.23	-73.2	V	3.0	-12.0	32.5	1.0	-43.5	-25.0	-18.5	

Rev. 05.21.15

LTE B7 20MHz + 10MHz 16QAM

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #:
Date: 06/19/18
Test Engineer: 10649
Configuration: EUT Only
Mode: LTE Band 7, QPSK UL CA 20/20

Test Equipment:
Substitution: Horn T344 Substitution, and 8ft SMA Cable

Chamber: 3m Chamber C | Pre-amplifer: 3m Chamber C | Filter: Filter | Limit: LTE B7

Frequency (GHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance	EIRP @ TX Ant End (dBm)	Preamp	Attenuator	EIRP	Limit	Delta	Notes
Low Channel (2510MHz)+ 2529.8MHz 1-99 1-0										
5.04	-70.0	H	3.0	-21.9	36.1	1.0	-57.0	-25.0	-32.0	
7.56	-70.7	H	3.0	-21.0	36.3	1.0	-56.3	-25.0	-31.3	
10.08	-71.7	H	3.0	-16.3	33.4	1.0	-48.7	-25.0	-23.7	
5.04	-69.9	V	3.0	-20.3	36.3	1.0	-55.6	-25.0	-30.6	
7.56	-71.1	V	3.0	-17.5	34.8	1.0	-51.3	-25.0	-26.3	
10.08	-72.3	V	3.0	-16.3	32.1	1.0	-47.4	-25.0	-22.4	
Mid Channel (2525.1MHz)+2544.9MHz 1-99 1-0										
5.07	-69.7	H	3.0	-18.7	36.0	1.0	-53.7	-25.0	-28.7	
7.61	-71.5	H	3.0	-18.4	35.2	1.0	-52.7	-25.0	-27.7	
10.14	-72.0	H	3.0	-15.7	32.0	1.0	-46.7	-25.0	-21.7	
5.07	-69.8	V	3.0	-22.1	36.1	1.0	-57.2	-25.0	-32.2	
7.61	-71.0	V	3.0	-13.3	33.0	1.0	-45.3	-25.0	-20.3	
10.14	-72.4	V	3.0	-11.2	32.6	1.0	-42.8	-25.0	-17.8	
High Channel (2540.2MHz)+2560Mhz 1-99 1-0										
5.10	-69.5	H	3.0	-20.4	36.2	1.0	-55.6	-25.0	-30.6	
7.65	-71.1	H	3.0	-20.4	36.0	1.0	-55.4	-25.0	-30.4	
10.20	-71.3	H	3.0	-15.0	32.0	1.0	-46.1	-25.0	-21.1	
5.10	-69.5	V	3.0	-22.5	36.3	1.0	-57.7	-25.0	-32.7	
7.65	-70.9	V	3.0	-19.6	35.8	1.0	-54.5	-25.0	-29.5	
10.20	-72.7	V	3.0	-11.5	32.6	1.0	-43.1	-25.0	-18.1	

Rev. 05.21.15

LTE B7 20MHz + 20MHz QPSK

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #:
Date: 06/19/18
Test Engineer: 10649
Configuration: EUT Only
Mode: LTE Band 7, 16QAM UL CA 20/20

Test Equipment:
Substitution: Horn T344 Substitution, and 8ft SMA Cable

Chamber: 3m Chamber C | Pre-amplifer: 3m Chamber C | Filter: Filter | Limit: LTE B7

Frequency (GHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance	EIRP @ TX Ant End (dBm)	Preamp	Attenuator	EIRP	Limit	Delta	Notes
Low Channel (2510MHz)+ 2529.8MHz 1-99 1-0										
5.04	-69.7	H	3.0	-16.8	33.4	1.0	-49.2	-25.0	-24.2	
7.56	-70.6	H	3.0	-13.0	33.0	1.0	-45.0	-25.0	-20.0	
10.08	-72.3	H	3.0	-11.5	32.6	1.0	-43.1	-25.0	-18.1	
5.04	-69.1	V	3.0	-16.2	33.4	1.0	-48.6	-25.0	-23.6	
7.56	-70.4	V	3.0	-12.7	33.0	1.0	-44.8	-25.0	-19.8	
10.08	-71.6	V	3.0	-10.5	32.6	1.0	-42.1	-25.0	-17.1	
Mid Channel (2525.1MHz)+2544.9MHz 1-99 1-0										
5.07	-70.0	H	3.0	-17.0	33.4	1.0	-49.4	-25.0	-24.4	
7.61	-72.0	H	3.0	-14.3	33.0	1.0	-46.3	-25.0	-21.3	
10.14	-73.1	H	3.0	-12.2	32.6	1.0	-43.8	-25.0	-18.8	
5.07	-70.2	V	3.0	-17.3	33.4	1.0	-49.7	-25.0	-24.7	
7.61	-71.9	V	3.0	-14.2	33.0	1.0	-46.2	-25.0	-21.2	
10.14	-72.6	V	3.0	-11.4	32.6	1.0	-43.0	-25.0	-18.0	
High Channel (2540.2MHz)+2560Mhz 1-99 1-0										
5.10	-69.8	H	3.0	-16.7	33.4	1.0	-49.1	-25.0	-24.1	
7.65	-70.7	H	3.0	-12.9	33.0	1.0	-45.0	-25.0	-20.0	
10.20	-71.6	H	3.0	-10.6	32.6	1.0	-42.2	-25.0	-17.2	
5.10	-69.4	V	3.0	-16.4	33.4	1.0	-48.8	-25.0	-23.8	
7.65	-70.2	V	3.0	-12.4	33.0	1.0	-44.4	-25.0	-19.4	
10.20	-71.1	V	3.0	-9.9	32.6	1.0	-41.5	-25.0	-16.5	

Rev. 05.21.15

LTE B7 20MHz + 20MHz 16QAM

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9.1.2. LTE BAND 41

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #:
Date: 06/20/18
Test Engineer: 10649
Configuration: EUT Only
Mode: LTE Band 41, QPSK UL CA 20/5

Test Equipment:
Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber	Pre-amplifer	Filter	Limit
3m Chamber C	3m Chamber C	Filter	LTE B41

Frequency (GHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance	EIRP @ TX Ant End (dBm)	Preamp	Attenuator	EIRP	Limit	Delta	Notes
Low Channel (2506MHz) +2517.7MHz 1-99, 1-0										
5.02	-68.2	H	3.0	-15.3	33.4	1.0	-47.7	-25.0	-22.7	
7.54	-68.7	H	3.0	-11.1	33.0	1.0	-43.1	-25.0	-18.1	
10.05	-68.5	H	3.0	-7.7	32.6	1.0	-39.3	-25.0	-14.3	
5.02	-67.5	V	3.0	-14.6	33.4	1.0	-47.1	-25.0	-22.1	
7.54	-68.1	V	3.0	-10.5	33.0	1.0	-42.5	-25.0	-17.5	
10.05	-69.4	V	3.0	-8.3	32.6	1.0	-39.9	-25.0	-14.9	
Mid Channel (2590.5MHz)+2602.2MHz 1-99, 1-0										
5.19	-65.7	H	3.0	-12.5	33.4	1.0	-44.8	-25.0	-19.8	
7.79	-66.1	H	3.0	-8.2	33.0	1.0	-40.2	-25.0	-15.2	
10.39	-68.8	H	3.0	-7.6	32.4	1.0	-39.1	-25.0	-14.1	
5.19	-65.3	V	3.0	-12.1	33.4	1.0	-44.5	-25.0	-19.5	
7.79	-66.4	V	3.0	-8.4	33.0	1.0	-40.4	-25.0	-15.4	
10.39	-67.3	V	3.0	-6.0	32.4	1.0	-37.4	-25.0	-12.4	
High Channel (2675MHz)+2686.7MHz 1-99, 1-0										
5.36	-63.4	H	3.0	-9.8	33.3	1.0	-42.1	-25.0	-17.1	
8.04	-64.4	H	3.0	-6.1	33.0	1.0	-38.1	-25.0	-13.1	
10.72	-65.3	H	3.0	-3.8	32.2	1.0	-35.0	-25.0	-10.0	
5.36	-59.3	V	3.0	-5.8	33.3	1.0	-38.1	-25.0	-13.1	
8.04	-65.1	V	3.0	-6.8	33.0	1.0	-38.7	-25.0	-13.7	
10.72	-68.3	V	3.0	-6.8	32.2	1.0	-38.0	-25.0	-13.0	

Rev. 05.21.15

LTE B41 20MHz + 5MHz QPSK

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #:
Date: 06/20/18
Test Engineer: 10649
Configuration: EUT Only
Mode: LTE Band 41, 16QAM UL CA 20/5

Test Equipment:
Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber	Pre-amplifer	Filter	Limit
3m Chamber C	3m Chamber C	Filter	LTE B41

Frequency (GHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance	EIRP @ TX Ant End (dBm)	Preamp	Attenuator	EIRP	Limit	Delta	Notes
Low Channel (2506MHz) +2517.7MHz 1-99, 1-0										
5.02	-67.9	H	3.0	-15.0	33.4	1.0	-47.4	-25.0	-22.4	
7.54	-68.5	H	3.0	-10.9	33.0	1.0	-42.9	-25.0	-17.9	
10.05	-69.1	H	3.0	-8.3	32.6	1.0	-39.9	-25.0	-14.9	
5.02	-67.6	V	3.0	-14.7	33.4	1.0	-47.2	-25.0	-22.2	
7.54	-67.0	V	3.0	-9.4	33.0	1.0	-41.4	-25.0	-16.4	
10.05	-68.4	V	3.0	-7.3	32.6	1.0	-38.9	-25.0	-13.9	
Mid Channel (2590.5MHz)+2602.2MHz 1-99, 1-0										
5.19	-62.6	H	3.0	-9.4	33.4	1.0	-41.7	-25.0	-16.7	
7.79	-66.4	H	3.0	-8.5	33.0	1.0	-40.5	-25.0	-15.5	
10.39	-67.6	H	3.0	-6.4	32.4	1.0	-37.9	-25.0	-12.9	
5.19	-65.2	V	3.0	-12.0	33.4	1.0	-44.4	-25.0	-19.4	
7.79	-66.3	V	3.0	-8.3	33.0	1.0	-40.3	-25.0	-15.3	
10.39	-67.3	V	3.0	-6.0	32.4	1.0	-37.4	-25.0	-12.4	
High Channel (2675MHz)+2686.7MHz 1-99, 1-0										
5.36	-70.9	H	3.0	-17.3	33.3	1.0	-49.6	-25.0	-24.6	
8.04	-70.8	H	3.0	-12.5	33.0	1.0	-44.5	-25.0	-19.5	
10.72	-71.4	H	3.0	-9.9	32.2	1.0	-41.1	-25.0	-16.1	
5.36	-71.5	V	3.0	-18.0	33.3	1.0	-50.3	-25.0	-25.3	
8.04	-72.0	V	3.0	-13.7	33.0	1.0	-45.6	-25.0	-20.6	
10.72	-73.3	V	3.0	-11.8	32.2	1.0	-43.0	-25.0	-18.0	

Rev. 05.21.15

LTE B41 20MHz + 5MHz 16QAM

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #:
Date: 06/21/18
Test Engineer: 19459
Configuration: EUT Only
Mode: LTE Band 41, QPSK UL CA 20/20

Test Equipment:
Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber	Pre-amplifer	Filter	Limit
3m Chamber C	3m Chamber C	Filter	LTE B41

Frequency (GHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance	EIRP @ TX Ant End (dBm)	Preamp	Attenuator	EIRP	Limit	Delta	Notes
Low Channel (2506MHz) + 2525.8MHz 1-99 1-0										
5.03	-71.2	H	3.0	-18.3	33.4	1.0	-50.7	-25.0	-25.7	
7.55	-70.6	H	3.0	-13.0	33.0	1.0	-45.0	-25.0	-20.0	
10.06	-70.5	H	3.0	-9.7	32.6	1.0	-41.3	-25.0	-16.3	
5.03	-69.9	V	3.0	-17.0	33.4	1.0	-49.4	-25.0	-24.4	
7.55	-70.9	V	3.0	-13.3	33.0	1.0	-45.3	-25.0	-20.3	
10.06	-72.4	V	3.0	-11.3	32.6	1.0	-42.9	-25.0	-17.9	
Mid Channel (2583.1MHz) + 2602.9MHz 1-99 1-0										
5.19	-70.5	H	3.0	-17.3	33.4	1.0	-49.6	-25.0	-24.6	
7.78	-70.6	H	3.0	-12.7	33.0	1.0	-44.7	-25.0	-19.7	
10.37	-70.8	H	3.0	-9.7	32.4	1.0	-41.1	-25.0	-16.1	
5.19	-69.9	V	3.0	-16.7	33.4	1.0	-49.1	-25.0	-24.1	
7.78	-71.1	V	3.0	-13.1	33.0	1.0	-45.1	-25.0	-20.1	
10.37	-72.0	V	3.0	-10.7	32.4	1.0	-42.1	-25.0	-17.1	
High Channel (2660.2MHz) + 2680MHz 1-99 1-0										
5.34	-71.0	H	3.0	-17.4	33.3	1.0	-49.8	-25.0	-24.8	
8.01	-71.1	H	3.0	-12.9	33.0	1.0	-44.9	-25.0	-19.9	
10.68	-71.4	H	3.0	-8.9	32.3	1.0	-41.2	-25.0	-16.2	
5.34	-71.0	V	3.0	-17.5	33.3	1.0	-49.9	-25.0	-24.9	
8.01	-72.5	V	3.0	-14.2	33.0	1.0	-46.2	-25.0	-21.2	
10.68	-72.8	V	3.0	-11.3	32.3	1.0	-42.6	-25.0	-17.6	

Rev. 05.21.15

LTE B41 20MHz + 20MHz QPSK

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #:
Date: 06/21/18
Test Engineer: 19459
Configuration: EUT Only
Mode: LTE Band 41, 16QAM UL CA 20/20

Test Equipment:
Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber	Pre-amplifer	Filter	Limit
3m Chamber C	3m Chamber C	Filter	LTE B41

Frequency (GHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance	EIRP @ TX Ant End (dBm)	Preamp	Attenuator	EIRP	Limit	Delta	Notes
Low Channel (2506MHz) + 2525.8MHz 1-99 1-0										
5.03	-71.1	H	3.0	-18.2	33.4	1.0	-50.6	-25.0	-25.6	
7.55	-72.4	H	3.0	-14.8	33.0	1.0	-46.8	-25.0	-21.8	
10.06	-71.4	H	3.0	-10.6	32.6	1.0	-42.2	-25.0	-17.2	
5.03	-70.0	V	3.0	-17.1	33.4	1.0	-49.5	-25.0	-24.5	
7.55	-72.7	V	3.0	-15.1	33.0	1.0	-47.1	-25.0	-22.1	
10.06	-73.1	V	3.0	-12.0	32.6	1.0	-43.6	-25.0	-18.6	
Mid Channel (2583.1MHz) + 2602.9MHz 1-99 1-0										
5.19	-69.7	H	3.0	-16.5	33.4	1.0	-48.8	-25.0	-23.8	
7.78	-70.8	H	3.0	-12.9	33.0	1.0	-44.9	-25.0	-19.9	
10.37	-71.1	H	3.0	-10.0	32.4	1.0	-41.4	-25.0	-16.4	
5.19	-69.5	V	3.0	-16.3	33.4	1.0	-48.7	-25.0	-23.7	
7.78	-72.1	V	3.0	-14.1	33.0	1.0	-46.1	-25.0	-21.1	
10.37	-73.0	V	3.0	-11.7	32.4	1.0	-43.1	-25.0	-18.1	
High Channel (2660.2MHz) + 2680MHz 1-99 1-0										
5.34	-71.3	H	3.0	-17.7	33.3	1.0	-50.1	-25.0	-25.1	
8.01	-71.2	H	3.0	-13.0	33.0	1.0	-45.0	-25.0	-20.0	
10.68	-70.5	H	3.0	-9.0	32.3	1.0	-40.3	-25.0	-15.3	
5.34	-70.5	V	3.0	-17.0	33.3	1.0	-49.4	-25.0	-24.4	
8.01	-71.9	V	3.0	-13.6	33.0	1.0	-45.6	-25.0	-20.6	
10.68	-72.7	V	3.0	-11.2	32.3	1.0	-42.5	-25.0	-17.5	

Rev. 05.21.15

LTE B41 20MHz + 20MHz 16QAM

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4031B
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888
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9.2. FIELD STRENGTH OF SPURIOUS RADIATION, ANT 2

9.2.1. LTE BAND 7

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #:
Date: 06/20/18
Test Engineer: 19431
Configuration: EUT Only
Mode: LTE Band 7, QPSK UL CA 20/10

Test Equipment:
Substitution: Horn T344 Substitution, and 8ft SMA Cable

Chamber: 3m Chamber E | Pre-amplifer: 3m Chamber E | Filter: Filter | Limit: LTE B7

Frequency (GHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance	EIRP @ TX Ant End (dBm)	Preamp	Attenuator	EIRP	Limit	Delta	Notes
Low Channel (2510MHz)+2524.4MHz 1-99 1-0										
5.03	-70.0	H	3.0	-17.1	38.7	1.0	-54.8	-25.0	-29.8	
7.55	-66.2	H	3.0	-8.3	37.7	1.0	-45.1	-25.0	-20.1	
10.07	-64.5	H	3.0	-3.6	36.2	1.0	-38.8	-25.0	-13.8	
5.03	-67.7	V	3.0	-15.1	38.7	1.0	-52.7	-25.0	-27.7	
7.55	-66.4	V	3.0	-8.8	37.7	1.0	-45.5	-25.0	-20.5	
10.07	-65.5	V	3.0	-4.7	36.2	1.0	-39.8	-25.0	-14.8	
Mid Channel (2530.1MHz)+2544.5MHz 1-99 1-0										
5.07	-68.5	H	3.0	-15.5	38.7	1.0	-53.2	-25.0	-28.2	
7.61	-65.7	H	3.0	-7.8	37.7	1.0	-44.5	-25.0	-19.5	
10.15	-64.2	H	3.0	-3.3	36.2	1.0	-38.5	-25.0	-13.5	
5.07	-67.7	V	3.0	-15.0	38.7	1.0	-52.7	-25.0	-27.7	
7.61	-65.9	V	3.0	-8.2	37.7	1.0	-44.9	-25.0	-19.9	
10.15	-65.6	V	3.0	-4.7	36.2	1.0	-39.9	-25.0	-14.9	
High Channel (2550.1MHz)+2564.5MHz 1-99 1-0										
5.11	-68.7	H	3.0	-15.6	38.7	1.0	-53.3	-25.0	-28.3	
7.67	-67.6	H	3.0	-9.6	37.6	1.0	-46.2	-25.0	-21.2	
10.23	-69.9	H	3.0	-8.9	36.3	1.0	-44.2	-25.0	-19.2	
5.11	-67.7	V	3.0	-14.9	38.7	1.0	-52.6	-25.0	-27.6	
7.67	-68.0	V	3.0	-10.2	37.6	1.0	-46.8	-25.0	-21.8	
10.23	-68.3	V	3.0	-7.3	36.3	1.0	-42.6	-25.0	-17.6	

Rev. 05.21.15

LTE B7 20MHz + 10MHz QPSK

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #:
Date: 06/20/18
Test Engineer: 19431
Configuration: EUT Only
Mode: LTE Band 7, 16QAM UL CA 20/10

Test Equipment:
Substitution: Horn T344 Substitution, and 8ft SMA Cable

Chamber: 3m Chamber E | Pre-amplifer: 3m Chamber E | Filter: Filter | Limit: LTE B7

Frequency (GHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance	EIRP @ TX Ant End (dBm)	Preamp	Attenuator	EIRP	Limit	Delta	Notes
Low Channel (2510MHz)+2524.4MHz 1-99 1-0										
5.03	-67.5	H	3.0	-14.6	38.7	1.0	-52.3	-25.0	-27.3	
7.55	-67.8	H	3.0	-9.9	37.7	1.0	-46.7	-25.0	-21.7	
10.07	-65.9	H	3.0	-5.0	36.2	1.0	-40.2	-25.0	-15.2	
5.03	-69.5	V	3.0	-16.9	38.7	1.0	-54.5	-25.0	-29.5	
7.55	-67.5	V	3.0	-9.9	37.7	1.0	-46.6	-25.0	-21.6	
10.07	-67.5	V	3.0	-6.7	36.2	1.0	-41.8	-25.0	-16.8	
Mid Channel (2530.1MHz)+2544.5MHz 1-99 1-0										
5.07	-68.1	H	3.0	-15.1	38.7	1.0	-52.8	-25.0	-27.8	
7.61	-69.0	H	3.0	-11.1	37.7	1.0	-47.8	-25.0	-22.8	
10.15	-67.0	H	3.0	-6.1	36.2	1.0	-41.3	-25.0	-16.3	
5.07	-65.0	V	3.0	-12.3	38.7	1.0	-50.0	-25.0	-25.0	
7.61	-67.7	V	3.0	-10.0	37.7	1.0	-46.7	-25.0	-21.7	
10.15	-68.0	V	3.0	-7.1	36.2	1.0	-42.3	-25.0	-17.3	
High Channel (2550.1MHz)+2564.5MHz 1-99 1-0										
5.11	-68.9	H	3.0	-15.8	38.7	1.0	-53.5	-25.0	-28.5	
7.67	-68.8	H	3.0	-10.8	37.6	1.0	-47.4	-25.0	-22.4	
10.23	-66.5	H	3.0	-5.5	36.3	1.0	-40.8	-25.0	-15.8	
5.11	-68.1	V	3.0	-15.3	38.7	1.0	-53.0	-25.0	-28.0	
7.67	-67.6	V	3.0	-9.8	37.6	1.0	-46.4	-25.0	-21.4	
10.23	-66.5	V	3.0	-5.5	36.3	1.0	-40.8	-25.0	-15.8	

Rev. 05.21.15

LTE B7 20MHz + 10MHz 16QAM

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #:
Date: 06/20/18
Test Engineer: 19431
Configuration: EUT Only
Mode: LTE Band 7, QPSK UL CA 20/20

Test Equipment:
Substitution: Horn T344 Substitution, and 8ft SMA Cable

Chamber: 3m Chamber E | Pre-amplifer: 3m Chamber E | Filter: Filter | Limit: LTE B7

Frequency (GHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance	EIRP @ TX Ant End (dBm)	Preamp	Attenuator	EIRP	Limit	Delta	Notes
Low Channel (2510MHz)+ 2529.8MHz 1-99 1-0										
5.04	-65.8	H	3.0	-17.7	36.1	1.0	-52.8	-25.0	-27.8	
7.56	-65.2	H	3.0	-15.5	36.3	1.0	-50.8	-25.0	-25.8	
10.08	-67.9	H	3.0	-12.5	33.4	1.0	-44.9	-25.0	-19.9	
5.04	-65.8	V	3.0	-16.2	36.3	1.0	-51.5	-25.0	-26.5	
7.56	-66.4	V	3.0	-12.8	34.8	1.0	-46.6	-25.0	-21.6	
10.08	-67.2	V	3.0	-11.2	32.1	1.0	-42.3	-25.0	-17.3	
Mid Channel (2525.1MHz)+2544.9MHz 1-99 1-0										
5.07	-66.8	H	3.0	-15.8	36.0	1.0	-50.8	-25.0	-25.8	
7.61	-66.5	H	3.0	-13.4	35.2	1.0	-47.7	-25.0	-22.7	
10.14	-67.9	H	3.0	-11.6	32.0	1.0	-42.6	-25.0	-17.6	
5.07	-68.3	V	3.0	-20.6	36.1	1.0	-55.7	-25.0	-30.7	
7.61	-68.0	V	3.0	-10.3	37.7	1.0	-47.0	-25.0	-22.0	
10.14	-67.5	V	3.0	-6.6	36.2	1.0	-41.8	-25.0	-16.8	
High Channel (2540.2MHz)+2560MHz 1-99 1-0										
5.10	-67.7	H	3.0	-18.6	36.2	1.0	-53.8	-25.0	-28.8	
7.65	-68.1	H	3.0	-17.4	36.0	1.0	-52.4	-25.0	-27.4	
10.20	-69.2	H	3.0	-12.9	32.0	1.0	-44.0	-25.0	-19.0	
5.10	-68.4	V	3.0	-21.4	36.3	1.0	-56.6	-25.0	-31.6	
7.65	-66.9	V	3.0	-15.6	35.8	1.0	-50.5	-25.0	-25.5	
10.20	-66.2	V	3.0	-5.2	36.3	1.0	-40.5	-25.0	-15.5	

Rev. 05.21.15

LTE B7 20MHz + 20MHz QPSK

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #:
Date: 06/20/18
Test Engineer: 19431
Configuration: EUT Only
Mode: LTE Band 7, 16QAM UL CA 20/20

Test Equipment:
Substitution: Horn T344 Substitution, and 8ft SMA Cable

Chamber: 3m Chamber E | Pre-amplifer: 3m Chamber E | Filter: Filter | Limit: LTE B7

Frequency (GHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance	EIRP @ TX Ant End (dBm)	Preamp	Attenuator	EIRP	Limit	Delta	Notes
Low Channel (2510MHz)+ 2529.8MHz 1-99 1-0										
5.04	-66.5	H	3.0	-13.6	38.7	1.0	-51.2	-25.0	-26.2	
7.56	-64.9	H	3.0	-7.0	37.7	1.0	-43.8	-25.0	-18.8	
10.08	-64.5	H	3.0	-3.6	36.2	1.0	-38.8	-25.0	-13.8	
5.04	-67.8	V	3.0	-15.1	38.7	1.0	-52.8	-25.0	-27.8	
7.56	-68.3	V	3.0	-10.6	37.7	1.0	-47.4	-25.0	-22.4	
10.08	-65.9	V	3.0	-5.0	36.2	1.0	-40.2	-25.0	-15.2	
Mid Channel (2525.1MHz)+2544.9MHz 1-99 1-0										
5.07	-65.2	H	3.0	-12.2	38.7	1.0	-49.9	-25.0	-24.9	
7.61	-65.7	H	3.0	-7.8	37.7	1.0	-44.5	-25.0	-19.5	
10.14	-65.9	H	3.0	-5.0	36.2	1.0	-40.2	-25.0	-15.2	
5.07	-65.0	V	3.0	-12.3	38.7	1.0	-50.0	-25.0	-25.0	
7.61	-65.4	V	3.0	-7.7	37.7	1.0	-44.4	-25.0	-19.4	
10.14	-64.2	V	3.0	-3.3	36.2	1.0	-38.5	-25.0	-13.5	
High Channel (2540.2MHz)+2560MHz 1-99 1-0										
5.10	-63.5	H	3.0	-10.4	38.7	1.0	-48.1	-25.0	-23.1	
7.65	-63.2	H	3.0	-5.2	37.7	1.0	-41.9	-25.0	-16.9	
10.20	-63.5	H	3.0	-2.5	36.3	1.0	-37.8	-25.0	-12.8	
5.10	-64.8	V	3.0	-12.0	38.7	1.0	-49.7	-25.0	-24.7	
7.65	-64.5	V	3.0	-6.7	37.7	1.0	-43.4	-25.0	-18.4	
10.20	-64.8	V	3.0	-3.8	36.3	1.0	-39.1	-25.0	-14.1	

Rev. 05.21.15

LTE B7 20MHz + 20MHz 16QAM

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9.2.2. LTE BAND 41

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #:
Date: 06/20/18
Test Engineer: 19459
Configuration: EUT only
Mode: LTE Band 41, QPSK UL CA 20/5

Test Equipment:
Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber	Pre-amplifer	Filter	Limit
3m Chamber C	3m Chamber C	Filter	LTE B41

Frequency (GHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance	EIRP @ TX Ant End (dBm)	Preamp	Attenuator	EIRP	Limit	Delta	Notes
Low Channel (2506MHz) +2517.7MHz 1.99, 1.0										
5.02	-70.5	H	3.0	-17.6	33.4	1.0	-50.0	-25.0	-25.0	
7.54	-70.9	H	3.0	-13.3	33.0	1.0	-45.3	-25.0	-20.3	
10.05	-73.9	H	3.0	-13.1	32.6	1.0	-44.7	-25.0	-19.7	
5.02	-69.7	V	3.0	-16.8	33.4	1.0	-49.2	-25.0	-24.2	
7.54	-70.7	V	3.0	-13.0	33.0	1.0	-45.1	-25.0	-20.1	
10.05	-73.7	V	3.0	-12.6	32.6	1.0	-44.3	-25.0	-19.3	
Mid Channel (2590.5MHz)+2602.2MHz 1.99, 1.0										
5.19	-70.3	H	3.0	-17.0	33.4	1.0	-49.4	-25.0	-24.4	
7.79	-72.7	H	3.0	-14.7	33.0	1.0	-46.7	-25.0	-21.7	
10.39	-71.8	H	3.0	-10.7	32.4	1.0	-42.1	-25.0	-17.1	
5.19	-70.7	V	3.0	-17.5	33.4	1.0	-49.8	-25.0	-24.8	
7.79	-72.2	V	3.0	-14.2	33.0	1.0	-46.2	-25.0	-21.2	
10.39	-73.6	V	3.0	-12.2	32.4	1.0	-43.7	-25.0	-18.7	
High Channel (2675MHz)+2686.7MHz 1.99, 1.0										
5.36	-70.3	H	3.0	-16.7	33.3	1.0	-49.0	-25.0	-24.0	
8.04	-72.1	H	3.0	-13.9	33.0	1.0	-45.8	-25.0	-20.8	
10.72	-73.6	H	3.0	-12.1	32.2	1.0	-43.3	-25.0	-18.3	
5.36	-70.5	V	3.0	-17.0	33.3	1.0	-49.3	-25.0	-24.3	
8.04	-72.3	V	3.0	-14.0	33.0	1.0	-46.0	-25.0	-21.0	
10.72	-73.8	V	3.0	-12.2	32.2	1.0	-43.5	-25.0	-18.5	

Rev. 05.21.15

LTE B41 20MHz + 5MHz QPSK

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #:
Date: 06/20/18
Test Engineer: 19459
Configuration: EUT only
Mode: LTE Band 41, 16QAM UL CA 20/5

Test Equipment:
Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber	Pre-amplifer	Filter	Limit
3m Chamber C	3m Chamber C	Filter	LTE B41

Frequency (GHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance	EIRP @ TX Ant End (dBm)	Preamp	Attenuator	EIRP	Limit	Delta	Notes
Low Channel (2506MHz) +2517.7MHz 1.99, 1.0										
5.02	-70.5	H	3.0	-17.6	33.4	1.0	-50.0	-25.0	-25.0	
7.54	-70.3	H	3.0	-12.7	33.0	1.0	-44.7	-25.0	-19.7	
10.05	-70.8	H	3.0	-10.0	32.6	1.0	-41.7	-25.0	-16.7	
5.02	-73.8	V	3.0	-21.0	33.4	1.0	-53.4	-25.0	-28.4	
7.54	-71.1	V	3.0	-13.5	33.0	1.0	-45.5	-25.0	-20.5	
10.05	-73.7	V	3.0	-12.6	32.6	1.0	-44.2	-25.0	-19.2	
Mid Channel (2590.5MHz)+2602.2MHz 1.99, 1.0										
5.19	-70.1	H	3.0	-16.9	33.4	1.0	-49.2	-25.0	-24.2	
7.79	-72.1	H	3.0	-14.2	33.0	1.0	-46.2	-25.0	-21.2	
10.39	-73.9	H	3.0	-12.7	32.4	1.0	-44.1	-25.0	-19.1	
5.19	-69.0	V	3.0	-15.8	33.4	1.0	-48.2	-25.0	-23.2	
7.79	-72.2	V	3.0	-14.2	33.0	1.0	-46.2	-25.0	-21.2	
10.39	-72.9	V	3.0	-11.5	32.4	1.0	-43.0	-25.0	-18.0	
High Channel (2675MHz)+2686.7MHz 1.99, 1.0										
5.36	-69.4	H	3.0	-15.8	33.3	1.0	-48.1	-25.0	-23.1	
8.04	-72.3	H	3.0	-14.1	33.0	1.0	-46.0	-25.0	-21.0	
10.72	-73.3	H	3.0	-11.8	32.2	1.0	-43.0	-25.0	-18.0	
5.36	-69.9	V	3.0	-16.4	33.3	1.0	-48.7	-25.0	-23.7	
8.04	-71.6	V	3.0	-13.3	33.0	1.0	-45.3	-25.0	-20.3	
10.72	-72.9	V	3.0	-11.4	32.2	1.0	-42.6	-25.0	-17.6	

Rev. 05.21.15

LTE B41 20MHz + 5MHz 16QAM

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #:
Date: 06/20/18
Test Engineer: 19459
Configuration: EUT only
Mode: LTE Band 41, QPSK UL CA 20/20

Test Equipment:
Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber	Pre-amplifer	Filter	Limit
3m Chamber C	3m Chamber C	Filter	LTE B41

Frequency (GHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance	EIRP @ TX Ant End (dBm)	Preamp	Attenuator	EIRP	Limit	Delta	Notes
Low Channel (2506MHz) + 2525.8MHz 1.99 1.0										
5.03	-68.6	H	3.0	-15.6	33.4	1.0	-48.0	-25.0	-23.0	
7.55	-71.9	H	3.0	-14.2	33.0	1.0	-46.3	-25.0	-21.3	
10.06	-73.5	H	3.0	-12.7	32.6	1.0	-44.3	-25.0	-19.3	
5.03	-68.9	V	3.0	-16.0	33.4	1.0	-48.4	-25.0	-23.4	
7.55	-71.4	V	3.0	-13.7	33.0	1.0	-45.8	-25.0	-20.8	
10.06	-73.3	V	3.0	-12.2	32.6	1.0	-43.8	-25.0	-18.8	
Mid Channel (2583.1MHz) + 2602.9MHz 1.99 1.0										
5.19	-69.3	H	3.0	-16.1	33.4	1.0	-48.5	-25.0	-23.5	
7.78	-72.0	H	3.0	-14.1	33.0	1.0	-46.1	-25.0	-21.1	
10.37	-72.8	H	3.0	-11.6	32.4	1.0	-43.1	-25.0	-18.1	
5.19	-68.9	V	3.0	-15.7	33.4	1.0	-48.1	-25.0	-23.1	
7.78	-72.8	V	3.0	-14.8	33.0	1.0	-46.8	-25.0	-21.8	
10.37	-72.2	V	3.0	-10.9	32.4	1.0	-42.4	-25.0	-17.4	
High Channel (2660.2MHz) + 2680MHz 1.99 1.0										
5.34	-70.3	H	3.0	-16.7	33.3	1.0	-49.0	-25.0	-24.0	
8.01	-72.7	H	3.0	-14.5	33.0	1.0	-46.5	-25.0	-21.5	
10.68	-72.1	H	3.0	-10.7	32.3	1.0	-41.9	-25.0	-16.9	
5.34	-68.9	V	3.0	-15.4	33.3	1.0	-47.7	-25.0	-22.7	
8.01	-73.2	V	3.0	-14.9	33.0	1.0	-46.9	-25.0	-21.9	
10.68	-71.9	V	3.0	-10.4	32.3	1.0	-41.7	-25.0	-16.7	

Rev. 05.21.15

LTE B41 20MHz + 20MHz QPSK

High Frequency Substitution Measurement
UL Fremont Radiated Chamber

Company:
Project #:
Date: 06/20/18
Test Engineer: 19459
Configuration: EUT only
Mode: LTE Band 41, 16QAM UL CA 20/20

Test Equipment:
Substitution: Horn T59 Substitution, and 8ft SMA Cable

Chamber	Pre-amplifer	Filter	Limit
3m Chamber C	3m Chamber C	Filter	LTE B41

Frequency (GHz)	SA reading (dBm)	Ant. Pol. (H/V)	Distance	EIRP @ TX Ant End (dBm)	Preamp	Attenuator	EIRP	Limit	Delta	Notes
Low Channel (2506MHz) + 2525.8MHz 1.99 1.0										
5.03	-68.9	H	3.0	-16.0	33.4	1.0	-48.4	-25.0	-23.4	
7.55	-71.1	H	3.0	-13.5	33.0	1.0	-45.6	-25.0	-20.6	
10.06	-73.4	H	3.0	-12.6	32.6	1.0	-44.2	-25.0	-19.2	
5.03	-69.9	V	3.0	-17.1	33.4	1.0	-49.5	-25.0	-24.5	
7.55	-71.4	V	3.0	-13.8	33.0	1.0	-45.8	-25.0	-20.8	
10.06	-73.1	V	3.0	-12.0	32.6	1.0	-43.6	-25.0	-18.6	
Mid Channel (2583.1MHz) + 2602.9MHz 1.99 1.0										
5.19	-69.9	H	3.0	-16.6	33.4	1.0	-49.0	-25.0	-24.0	
7.78	-73.3	H	3.0	-15.4	33.0	1.0	-47.4	-25.0	-22.4	
10.37	-73.0	H	3.0	-11.8	32.4	1.0	-43.3	-25.0	-18.3	
5.19	-68.5	V	3.0	-15.3	33.4	1.0	-47.7	-25.0	-22.7	
7.78	-72.7	V	3.0	-14.7	33.0	1.0	-46.7	-25.0	-21.7	
10.37	-71.8	V	3.0	-10.5	32.4	1.0	-42.0	-25.0	-17.0	
High Channel (2660.2MHz) + 2680MHz 1.99 1.0										
5.34	-69.6	H	3.0	-16.0	33.3	1.0	-48.3	-25.0	-23.3	
8.01	-71.8	H	3.0	-13.6	33.0	1.0	-45.6	-25.0	-20.6	
10.68	-72.3	H	3.0	-10.9	32.3	1.0	-42.1	-25.0	-17.1	
5.34	-70.0	V	3.0	-16.5	33.3	1.0	-48.8	-25.0	-23.8	
8.01	-72.5	V	3.0	-14.2	33.0	1.0	-46.2	-25.0	-21.2	
10.68	-72.3	V	3.0	-10.8	32.3	1.0	-42.1	-25.0	-17.1	

Rev. 05.21.15

LTE B41 20MHz + 20MHz 16QAM

10. SETUP PHOTOS

Please refer to 12216366-EP1V1

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RADIATED RF MEASUREMENT SETUP FOR PORTABLE CONFIGURATION	
X-AXIS FRONT PHOTO	X-AXIS BACK PHOTO
Y-AXIS FRONT PHOTO	Y-AXIS BACK PHOTO
Z-AXIS FRONT PHOTO	Z-AXIS BACK PHOTO

END OF REPORT

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