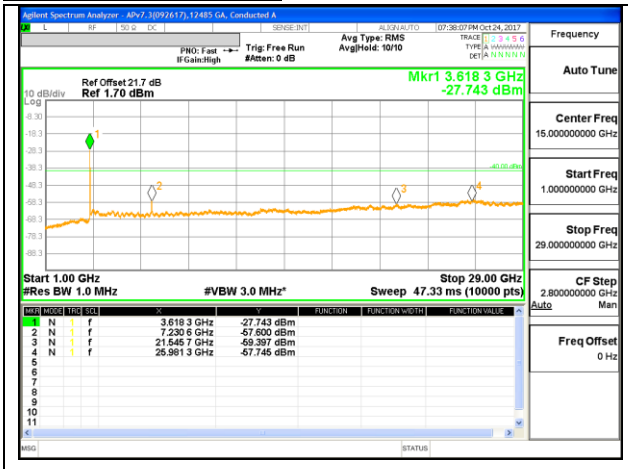
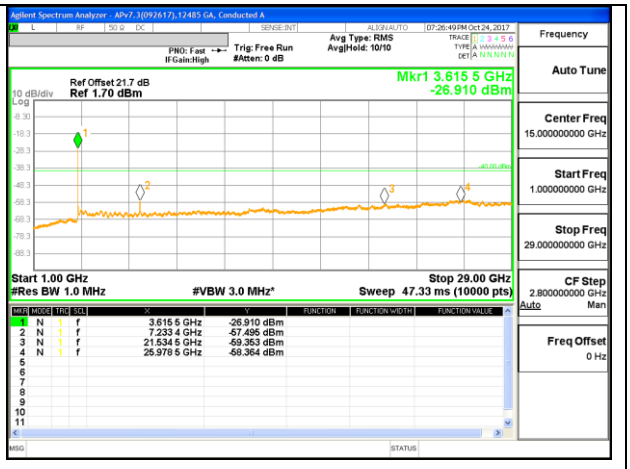
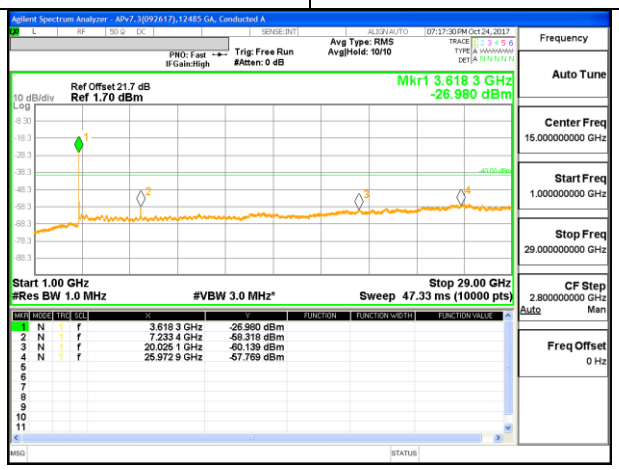
Antenna Port B 20MHz



LTE B48 20MHz QPSK Middle Channel



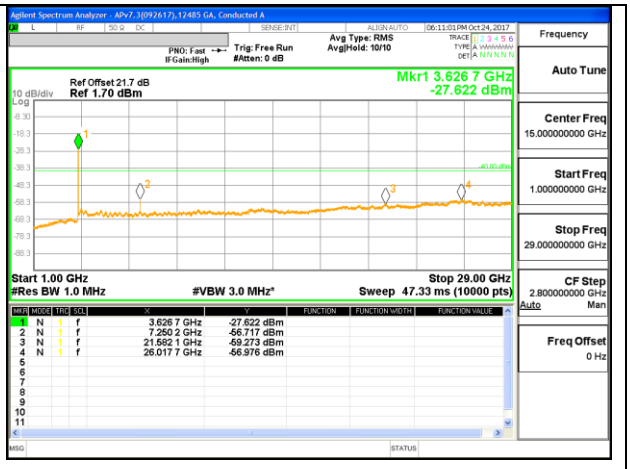
LTE B48 20MHz 16QAM Middle Channel



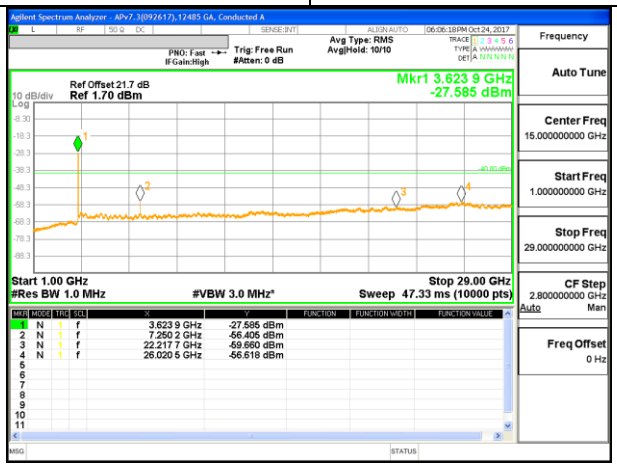
LTE B48 20MHz 64QAM Middle Channel

Antenna Port C 10MHz

LTE B48 10MHz QPSK Middle Channel

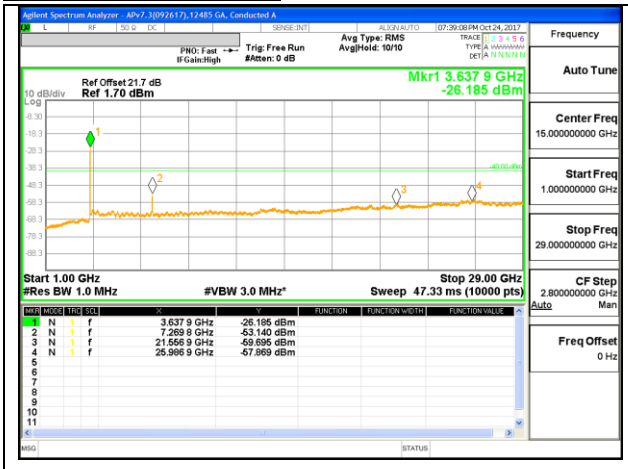


LTE B48 10MHz 16QAM Middle Channel

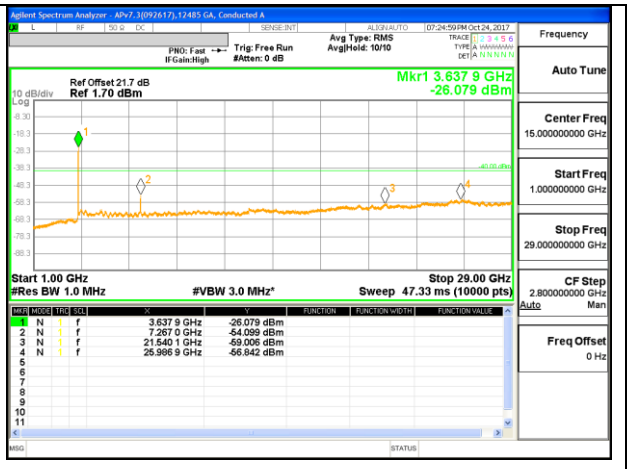


LTE B48 10MHz 64QAM Middle Channel

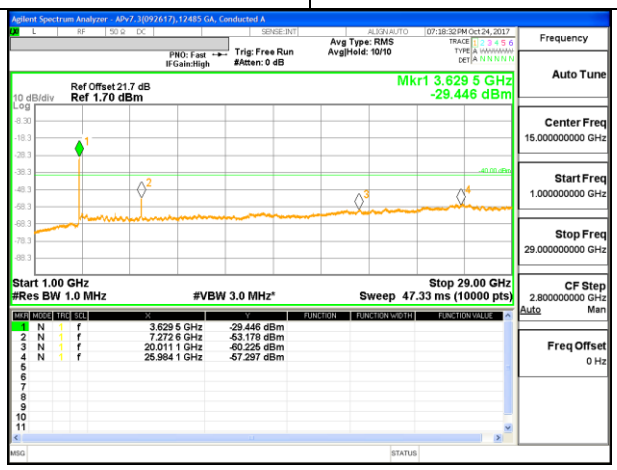
Antenna Port C 20MHz



LTE B48 20MHz QPSK Middle Channel

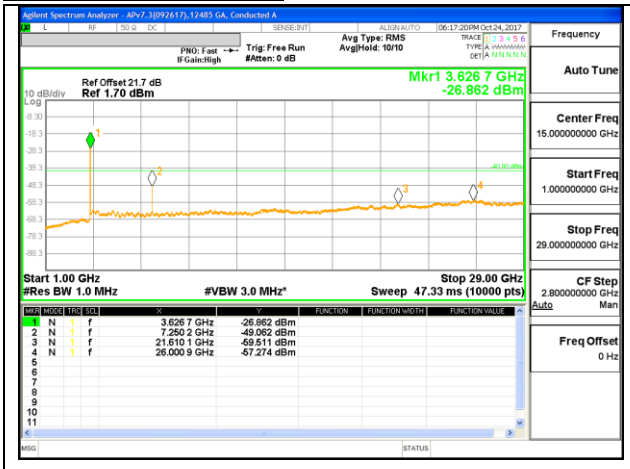


LTE B48 20MHz 16QAM Middle Channel

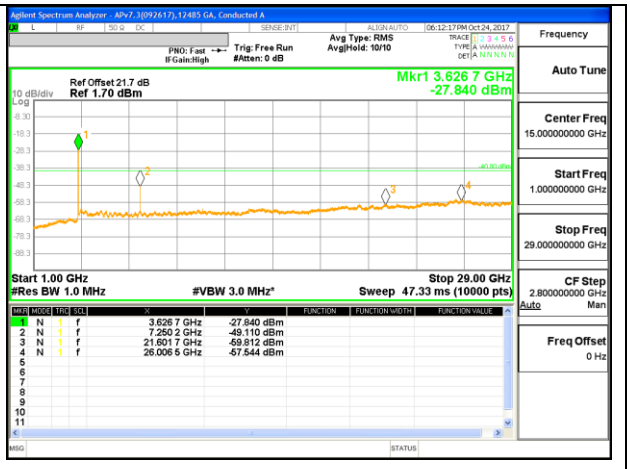


LTE B48 20MHz 64QAM Middle Channel

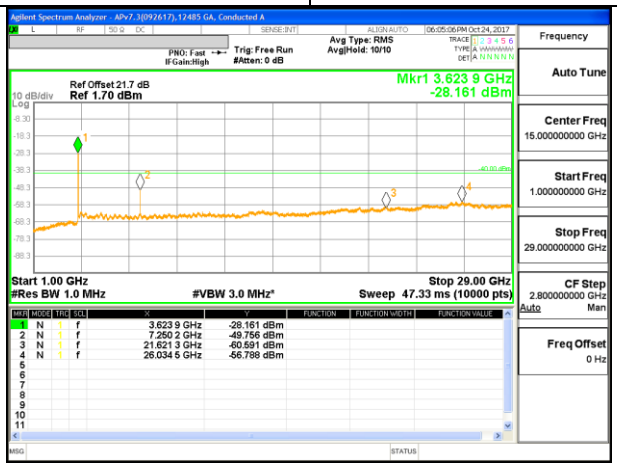
Antenna Port D 10MHz



LTE B48 10MHz QPSK Middle Channel

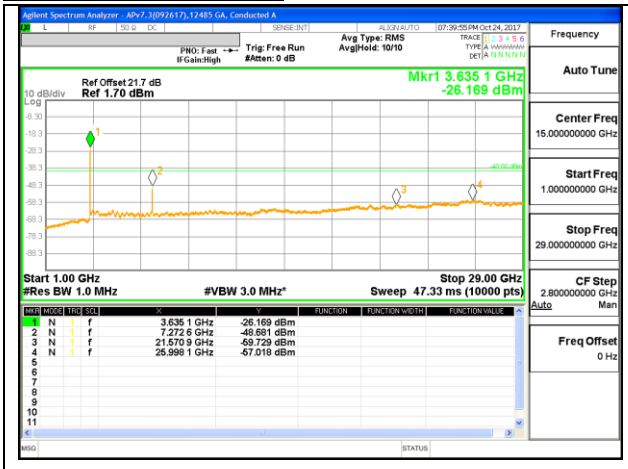


LTE B48 10MHz 16QAM Middle Channel

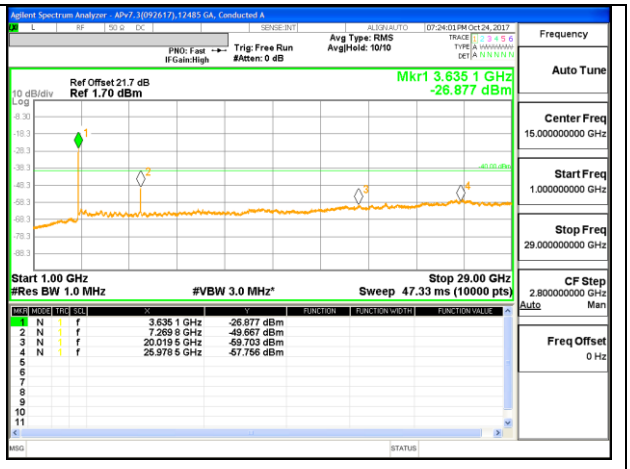


LTE B48 10MHz 64QAM Middle Channel

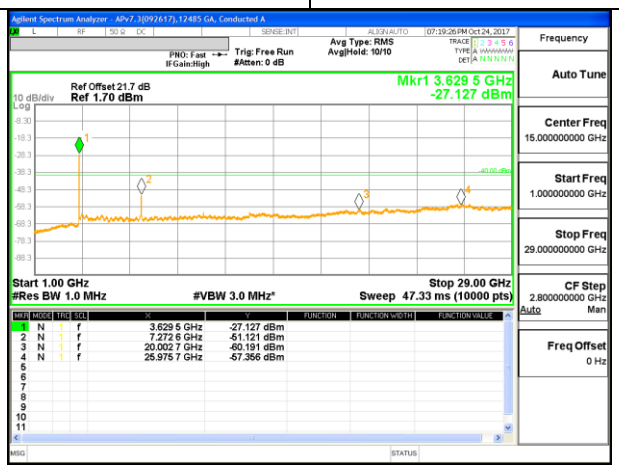
Antenna Port D 20MHz



LTE B48 20MHz QPSK Middle Channel



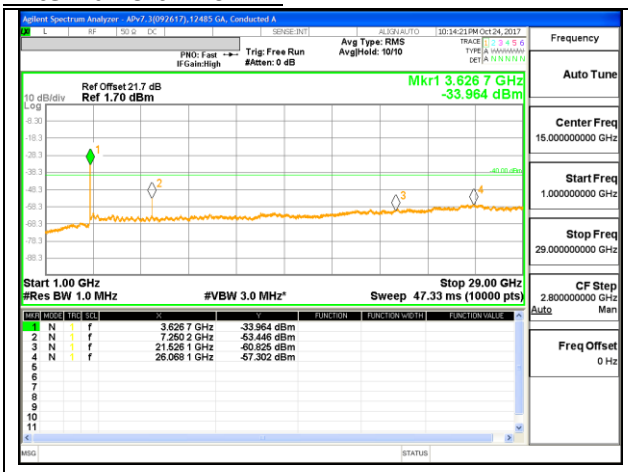
LTE B48 20MHz 16QAM Middle Channel



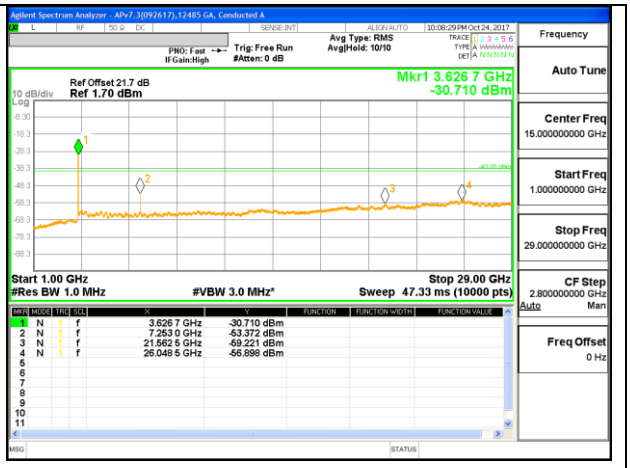
LTE B48 20MHz 64QAM Middle Channel

OUT OF BAND EMISSIONS PLOTS FOR DIRECTIONAL ANTENNA

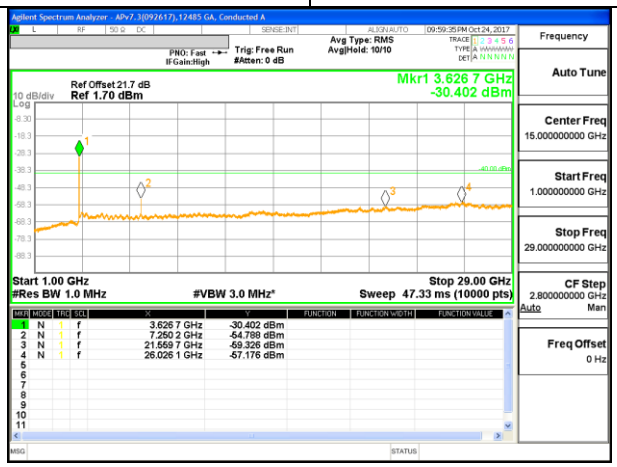
Antenna Port A 10MHz



LTE B48 10MHz QPSK Middle Channel

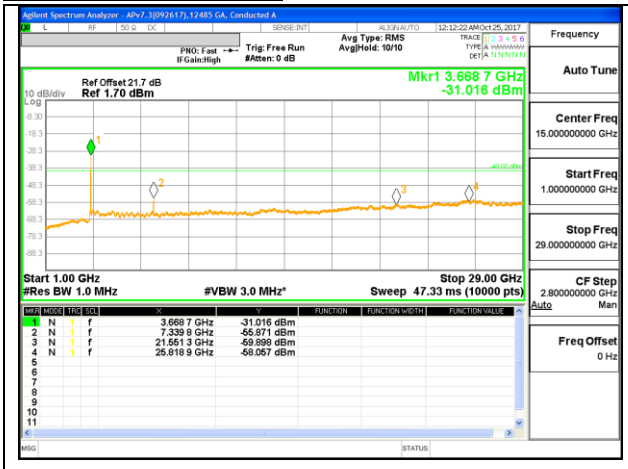


LTE B48 10MHz 16QAM Middle Channel

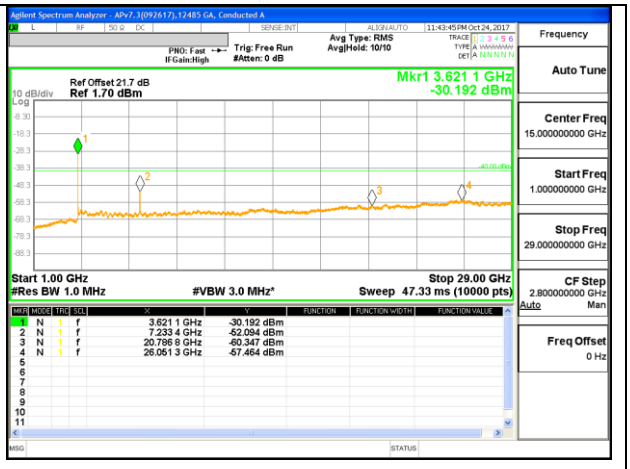


LTE B48 10MHz 64QAM Middle Channel

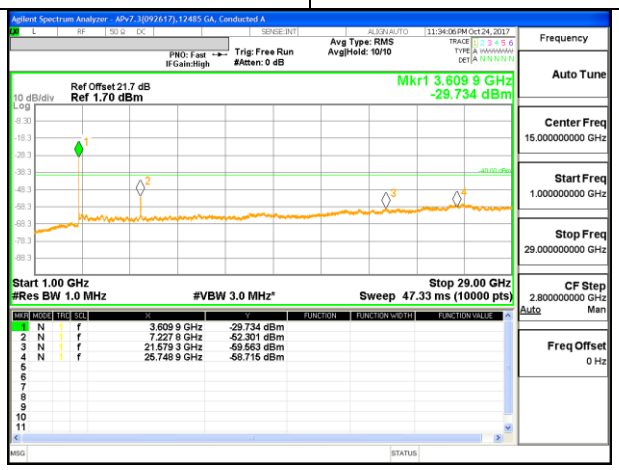
Antenna Port A 20MHz



LTE B48 20MHz QPSK Middle Channel

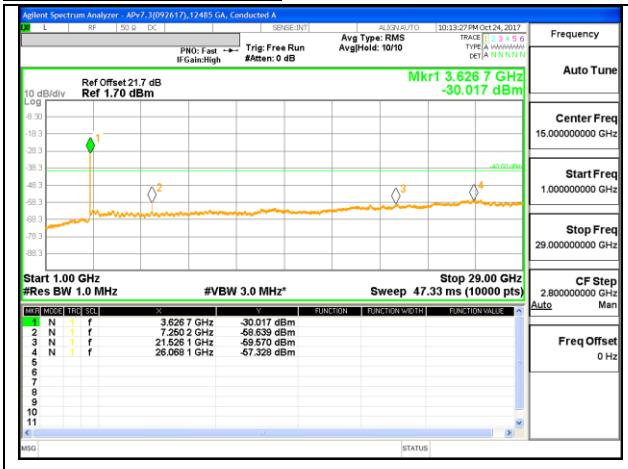


LTE B48 20MHz 16QAM Middle Channel

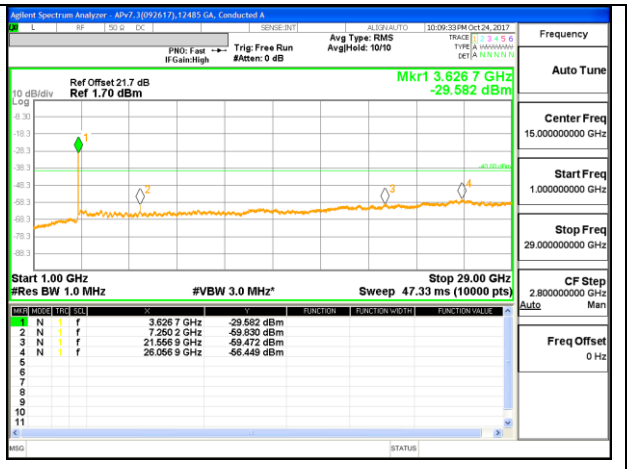


LTE B48 20MHz 64QAM Middle Channel

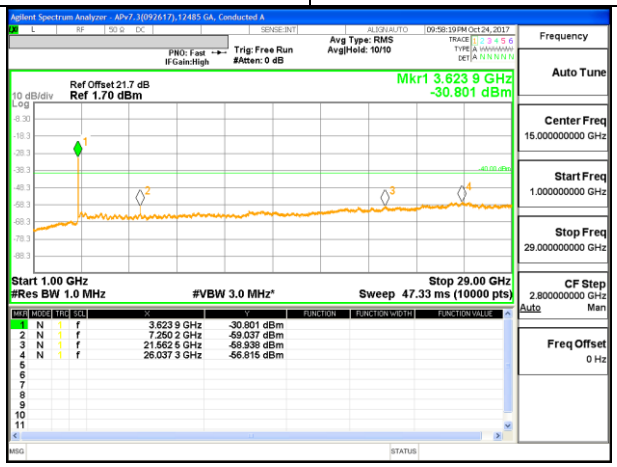
Antenna Port B 10MHz



LTE B48 10MHz QPSK Middle Channel

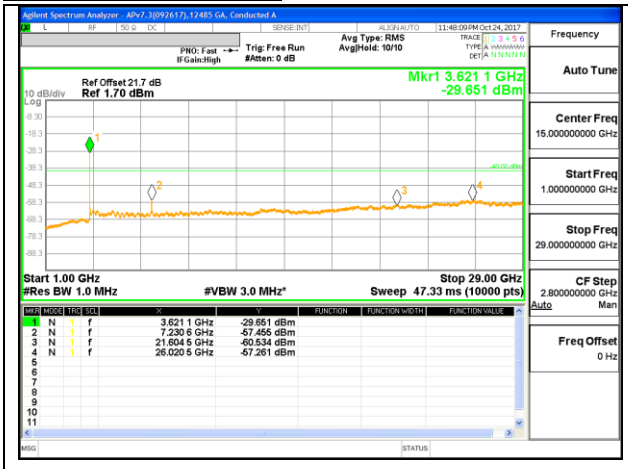


LTE B48 10MHz 16QAM Middle Channel

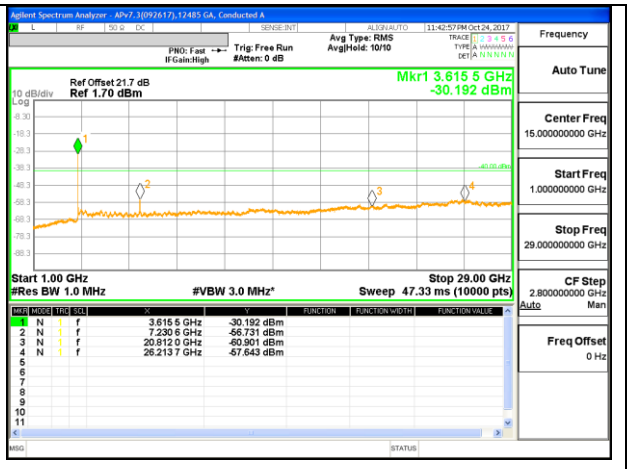


LTE B48 10MHz 64QAM Middle Channel

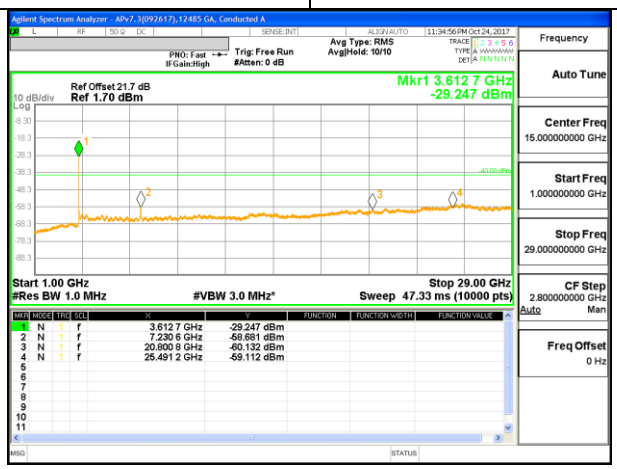
Antenna Port B 20MHz



LTE B48 20MHz QPSK Middle Channel

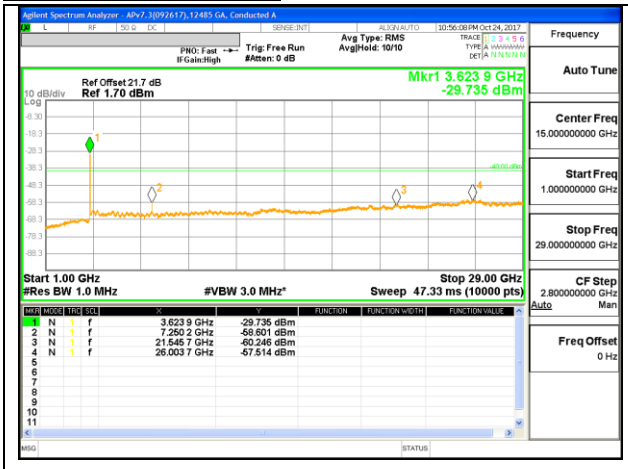


LTE B48 20MHz 16QAM Middle Channel

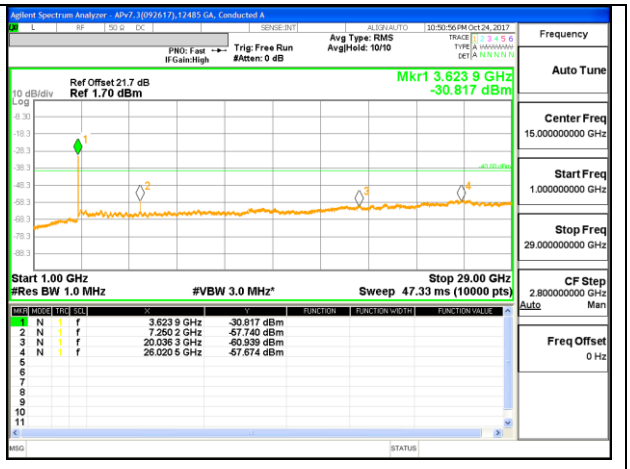


LTE B48 20MHz 64QAM Middle Channel

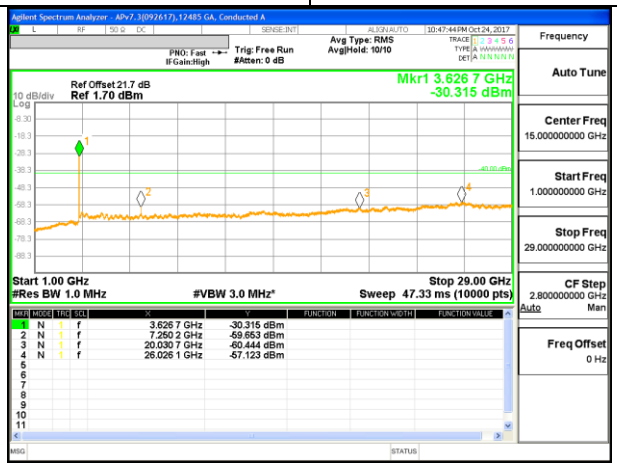
Antenna Port C 10MHz



LTE B48 10MHz QPSK Middle Channel

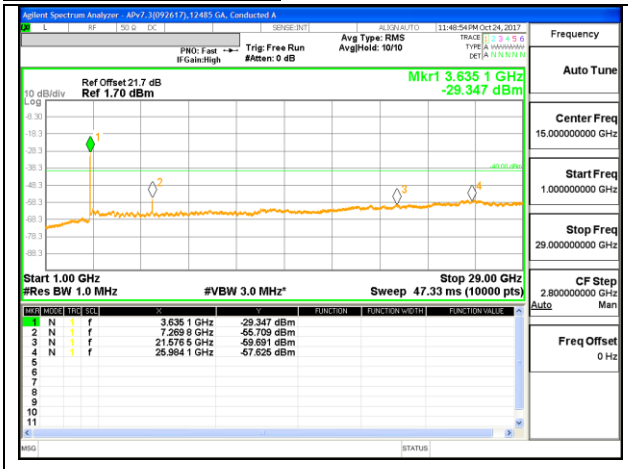


LTE B48 10MHz 16QAM Middle Channel

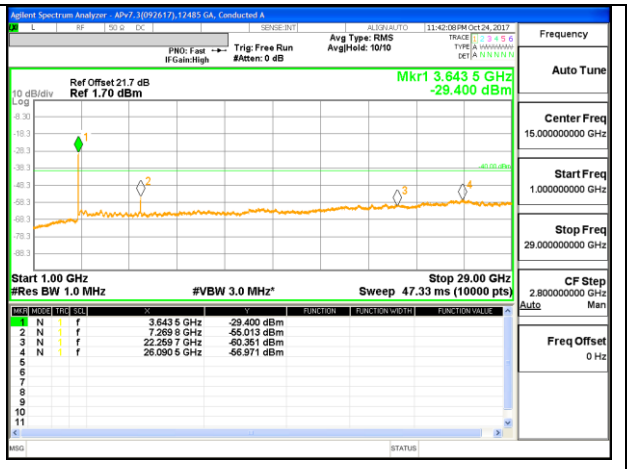


LTE B48 10MHz 64QAM Middle Channel

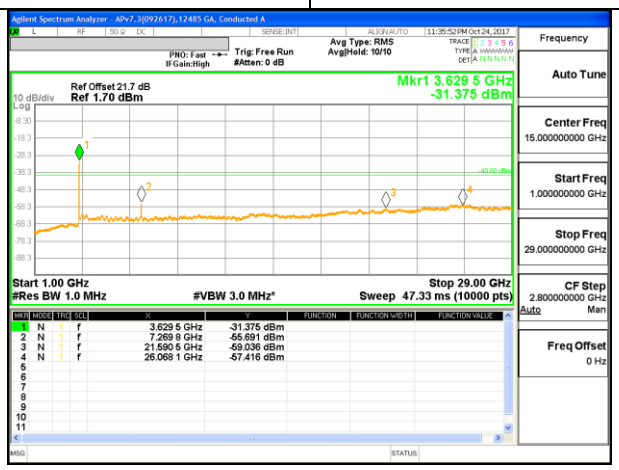
Antenna Port C 20MHz



LTE B48 20MHz QPSK Middle Channel

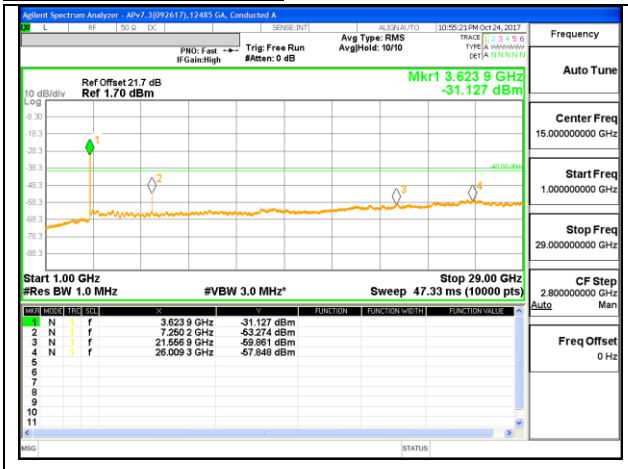


LTE B48 20MHz 16QAM Middle Channel

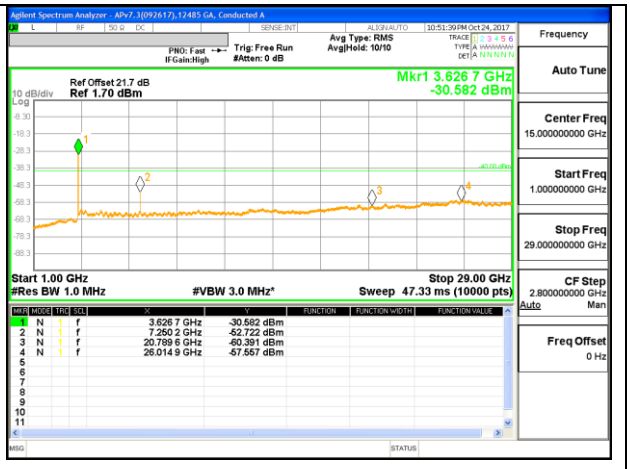


LTE B48 20MHz 64QAM Middle Channel

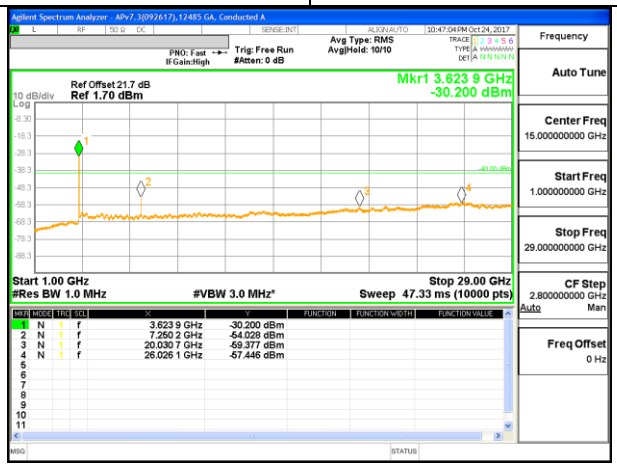
Antenna Port D 10MHz



LTE B48 10MHz QPSK Middle Channel

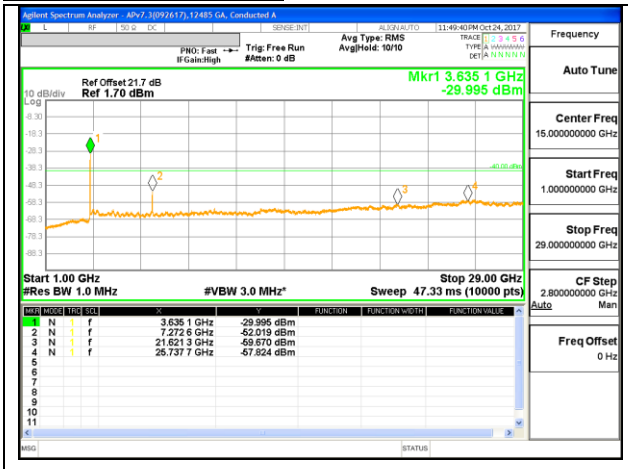


LTE B48 10MHz 16QAM Middle Channel

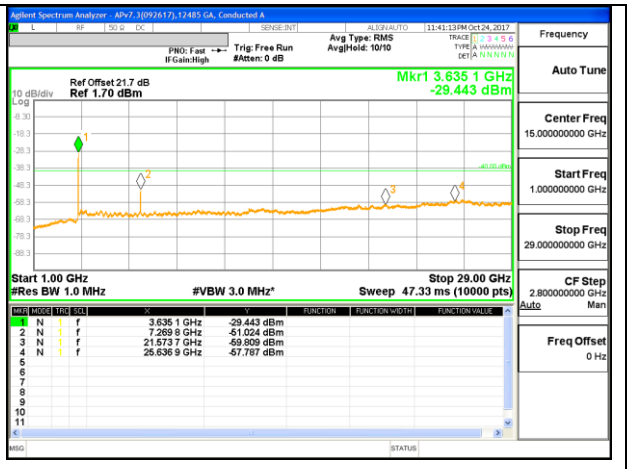


LTE B48 10MHz 64QAM Middle Channel

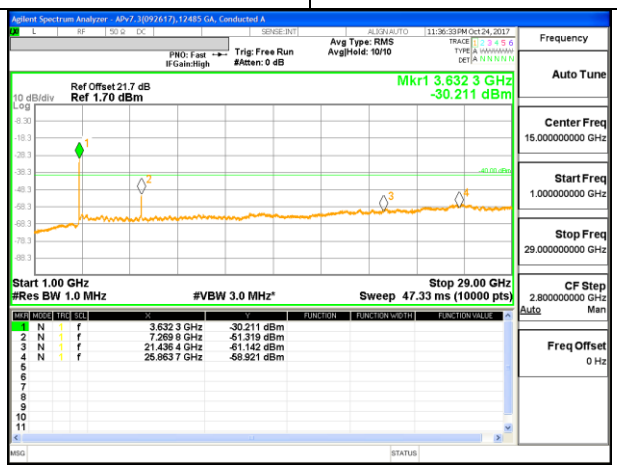
Antenna Port D 20MHz



LTE B48 20MHz QPSK Middle Channel



LTE B48 20MHz 16QAM Middle Channel



LTE B48 20MHz 64QAM Middle Channel

7.7. FREQUENCY STABILITY

RULE PART(S)

FCC: §90.213

FCC LIMITS

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

TEST PROCEDURE

Frequency must be maintained from -20 C to +55 C. The EUT is monitored at each 10 degree increment. At each temperature, the device is checked after a stabilization period required for the device to reach the temperature.

Results

Testing were performed on 20MHz 64QAM mode to represent the worst case mode.

Tested By	Gerardo Abrego
Date	10/25/2017

FREQUENCY STABILITY RESULTS

Omni 20MHz Port AB 3615MHz Mid Channel

Reference Frequency: 48 Mid Channel		3615		20 MHz @ 20°C
Power Supply	Environment	Frequency Deviation Measureed with Time Elapse		
(Vdc)	Temperature (°C)	(MHz)	Delta (ppm)	Limit (ppm)
48.00	55	3615.045000	-4.149	N/A
48.00	40	3615.030000	0.000	N/A
48.00	30	3615.030000	0.000	N/A
48.00	***20***	**3615.030000**	**0**	N/A
48.00	10	3615.045000	-4.149	N/A
48.00	0	3615.030000	0.000	N/A
48.00	-10	3615.015000	4.149	N/A
48.00	-20	3615.045000	-4.149	N/A

Omni 20MHz Port CD 3635 MHz Mid Channel

Reference Frequency: 48 Mid Channel		3635		20 MHz @ 20°C
Power Supply	Environment	Frequency Deviation Measureed with Time Elapse		
(Vdc)	Temperature (°C)	(MHz)	Delta (ppm)	Limit (ppm)
48.00	55	3635.050000	-4.127	N/A
48.00	40	3635.050000	-4.127	N/A
48.00	30	3635.050000	-4.127	N/A
48.00	***20***	**3635.035000**	**0**	N/A
48.00	10	3635.065000	-8.253	N/A
48.00	0	3635.095000	-16.506	N/A
48.00	-10	3635.080000	-12.380	N/A
48.00	-20	3635.080000	-12.380	N/A

9. RADIATED TEST RESULTS

9.1. FIELD STRENGTH OF SPURIOUS RADIATION

RULE PART(S)

FCC: §96.41

FCC LIMITS

Additional protection levels. Notwithstanding paragraph (d)(1) of this section, the conducted power of any emissions below 3530 MHz or above 3720 MHz shall not exceed −40dBm/MHz.

TEST PROCEDURE

Measurement procedure. (i) Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 1 megahertz or greater. However, in the 1 megahertz bands immediately outside and adjacent to the licensee's authorized frequency channel, a resolution bandwidth of no less than one percent of the fundamental emission bandwidth 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 reference 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

SPURIOUS RADIATION PLOTS FOR OMNI ANTENNA

LTE Band 48 Antenna AB

UL Verification Services, Inc.
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 11981177
Date: 10/19/2017
Test Engineer: 43575 OS
Configuration: EUT + DC power supply
Location: Chamber C
Mode: LTE_QPSK Band 48 Harmonics, 10MHz Bandwidth

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 3555MHz									
7110.00	-15.5	V	3.0	35.7	1.0	-50.2	-40.0	-10.2	
10665.00	-25.6	V	3.0	35.7	1.0	-60.4	-40.0	-20.4	
14220.00	-19.2	V	3.0	34.2	1.0	-52.4	-40.0	-12.4	
7110.00	-13.5	H	3.0	35.7	1.0	-48.2	-40.0	-8.2	
10665.00	-25.8	H	3.0	35.7	1.0	-60.5	-40.0	-20.5	
14220.00	-19.5	H	3.0	34.2	1.0	-52.7	-40.0	-12.7	
Mid Ch, 3625MHz									
7250.00	-16.2	V	3.0	35.7	1.0	-50.9	-40.0	-10.9	
10875.00	-19.8	V	3.0	35.6	1.0	-54.4	-40.0	-14.4	
14500.00	-20.5	V	3.0	34.1	1.0	-53.6	-40.0	-13.6	
7250.00	-16.0	H	3.0	35.7	1.0	-50.7	-40.0	-10.7	
10875.00	-24.6	H	3.0	35.6	1.0	-59.2	-40.0	-19.2	
14500.00	-21.1	H	3.0	34.1	1.0	-54.2	-40.0	-14.2	
High Ch, 3695MHz									
7390.00	-12.6	V	3.0	35.7	1.0	-47.3	-40.0	-7.3	
11085.00	-21.8	V	3.0	35.5	1.0	-56.3	-40.0	-16.3	
14780.00	-18.5	V	3.0	34.0	1.0	-51.5	-40.0	-11.5	
7390.00	-11.1	H	3.0	35.7	1.0	-45.8	-40.0	-5.8	
11085.00	-22.0	H	3.0	35.5	1.0	-56.5	-40.0	-16.5	
14780.00	-19.7	H	3.0	34.0	1.0	-52.7	-40.0	-12.7	

LTE B48 10MHz QPSK

UL Verification Services, Inc.
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 11981177
Date: 10/19/2017
Test Engineer: 43575 OS
Configuration: EUT + DC power supply
Location: Chamber C
Mode: LTE_16QAM Band 48 Harmonics, 10MHz Bandwidth

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 3555MHz									
7110.00	-15.7	V	3.0	35.7	1.0	-50.4	-40.0	-10.4	
10665.00	-25.4	V	3.0	35.7	1.0	-60.1	-40.0	-20.1	
14220.00	-19.1	V	3.0	34.2	1.0	-52.3	-40.0	-12.3	
7110.00	-13.9	H	3.0	35.7	1.0	-48.6	-40.0	-8.6	
10665.00	-25.9	H	3.0	35.7	1.0	-60.6	-40.0	-20.6	
14220.00	-18.7	H	3.0	34.2	1.0	-51.9	-40.0	-11.9	
Mid Ch, 3625MHz									
7250.00	-17.2	V	3.0	35.7	1.0	-51.9	-40.0	-11.9	
10875.00	-20.0	V	3.0	35.6	1.0	-54.6	-40.0	-14.6	
14500.00	-20.6	V	3.0	34.1	1.0	-53.7	-40.0	-13.7	
7250.00	-16.6	H	3.0	35.7	1.0	-51.3	-40.0	-11.3	
10875.00	-24.7	H	3.0	35.6	1.0	-59.3	-40.0	-19.3	
14500.00	-21.1	H	3.0	34.1	1.0	-54.2	-40.0	-14.2	
High Ch, 3695MHz									
7390.00	-12.9	V	3.0	35.7	1.0	-47.6	-40.0	-7.6	
11085.00	-21.9	V	3.0	35.5	1.0	-56.4	-40.0	-16.4	
14780.00	-18.4	V	3.0	34.0	1.0	-51.4	-40.0	-11.4	
7390.00	-11.3	H	3.0	35.7	1.0	-46.0	-40.0	-6.0	
11085.00	-22.3	H	3.0	35.5	1.0	-56.8	-40.0	-16.8	
14780.00	-20.1	H	3.0	34.0	1.0	-53.1	-40.0	-13.1	

LTE B48 10MHz 16QAM

UL Verification Services, Inc.
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 11981177
Date: 10/19/2017
Test Engineer: 43575 OS
Configuration: EUT + DC power supply
Location: Chamber C
Mode: LTE_64QAM Band 48 Harmonics, 10MHz Bandwidth

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 3555MHz									
7110.00	-16.4	V	3.0	35.7	1.0	-51.1	-40.0	-11.1	
10665.00	-25.4	V	3.0	35.7	1.0	-60.1	-40.0	-20.1	
14220.00	-19.7	V	3.0	34.2	1.0	-53.0	-40.0	-13.0	
7110.00	-13.6	H	3.0	35.7	1.0	-48.3	-40.0	-8.3	
10665.00	-25.9	H	3.0	35.7	1.0	-60.6	-40.0	-20.6	
14220.00	-19.1	H	3.0	34.2	1.0	-52.3	-40.0	-12.3	
Mid Ch, 3625MHz									
7250.00	-17.2	V	3.0	35.7	1.0	-51.9	-40.0	-11.9	
10875.00	-20.3	V	3.0	35.6	1.0	-54.9	-40.0	-14.9	
14500.00	-20.6	V	3.0	34.1	1.0	-53.8	-40.0	-13.8	
7250.00	-16.5	H	3.0	35.7	1.0	-51.2	-40.0	-11.2	
10875.00	-24.7	H	3.0	35.6	1.0	-59.3	-40.0	-19.3	
14500.00	-20.8	H	3.0	34.1	1.0	-53.9	-40.0	-13.9	
High Ch, 3695MHz									
7390.00	-12.9	V	3.0	35.7	1.0	-47.7	-40.0	-7.7	
11085.00	-22.0	V	3.0	35.5	1.0	-56.5	-40.0	-16.5	
14780.00	-18.5	V	3.0	34.0	1.0	-51.5	-40.0	-11.5	
7390.00	-11.4	H	3.0	35.7	1.0	-46.1	-40.0	-6.1	
11085.00	-22.4	H	3.0	35.5	1.0	-56.9	-40.0	-16.9	
14780.00	-20.1	H	3.0	34.0	1.0	-53.1	-40.0	-13.1	

LTE B48 10MHz 64QAM

LTE Band 48 Antenna CD

UL Verification Services, Inc.
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 11981177
Date: 10/19/2017
Test Engineer: 43575 OS
Configuration: EUT + DC power supply
Location: Chamber C
Mode: LTE_QPSK Band 48 Harmonics, 10MHz Bandwidth

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 3555MHz									
7110.00	-14.1	V	3.0	35.7	1.0	-48.8	-40.0	-8.8	
10665.00	-25.1	V	3.0	35.7	1.0	-59.8	-40.0	-19.8	
14220.00	-16.7	V	3.0	34.2	1.0	-50.0	-40.0	-10.0	
7110.00	-19.4	H	3.0	35.7	1.0	-54.1	-40.0	-14.1	
10665.00	-25.5	H	3.0	35.7	1.0	-60.2	-40.0	-20.2	
14220.00	-15.4	H	3.0	34.2	1.0	-48.6	-40.0	-8.6	
Mid Ch, 3625MHz									
7250.00	-15.3	V	3.0	35.7	1.0	-50.0	-40.0	-10.0	
10875.00	-25.6	V	3.0	35.6	1.0	-60.2	-40.0	-20.2	
14500.00	-12.6	V	3.0	34.1	1.0	-45.7	-40.0	-5.7	
7250.00	-13.1	H	3.0	35.7	1.0	-47.8	-40.0	-7.8	
10875.00	-24.2	H	3.0	35.6	1.0	-58.8	-40.0	-18.8	
14500.00	-16.9	H	3.0	34.1	1.0	-50.1	-40.0	-10.1	
High Ch, 3695MHz									
7390.00	-11.5	V	3.0	35.7	1.0	-46.2	-40.0	-6.2	
11085.00	-17.9	V	3.0	35.5	1.0	-52.4	-40.0	-12.4	
14780.00	-13.5	V	3.0	34.0	1.0	-46.5	-40.0	-6.5	
7390.00	-10.9	H	3.0	35.7	1.0	-45.6	-40.0	-5.6	
11085.00	-24.3	H	3.0	35.5	1.0	-58.8	-40.0	-18.8	
14780.00	-20.7	H	3.0	34.0	1.0	-53.8	-40.0	-13.8	

LTE B48 10MHz QPSK

UL Verification Services, Inc.
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 11981177
Date: 10/19/2017
Test Engineer: 43575 OS
Configuration: EUT + DC power supply
Location: Chamber C
Mode: LTE_16QAM Band 48 Harmonics, 10MHz Bandwidth

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 3555MHz									
7110.00	-14.6	V	3.0	35.7	1.0	-49.3	-40.0	-9.3	
10665.00	-25.8	V	3.0	35.7	1.0	-60.5	-40.0	-20.5	
14220.00	-16.7	V	3.0	34.2	1.0	-50.0	-40.0	-10.0	
7110.00	-19.9	H	3.0	35.7	1.0	-54.6	-40.0	-14.6	
10665.00	-25.3	H	3.0	35.7	1.0	-60.0	-40.0	-20.0	
14220.00	-15.6	H	3.0	34.2	1.0	-48.8	-40.0	-8.8	
Mid Ch, 3625MHz									
7250.00	-16.2	V	3.0	35.7	1.0	-50.9	-40.0	-10.9	
10875.00	-25.6	V	3.0	35.6	1.0	-60.3	-40.0	-20.3	
14500.00	-12.8	V	3.0	34.1	1.0	-45.9	-40.0	-5.9	
7250.00	-13.5	H	3.0	35.7	1.0	-48.2	-40.0	-8.2	
10875.00	-24.1	H	3.0	35.6	1.0	-58.7	-40.0	-18.7	
14500.00	-16.4	H	3.0	34.1	1.0	-49.5	-40.0	-9.5	
High Ch, 3695MHz									
7390.00	-11.4	V	3.0	35.7	1.0	-46.1	-40.0	-6.1	
11085.00	-17.3	V	3.0	35.5	1.0	-51.8	-40.0	-11.8	
14780.00	-13.6	V	3.0	34.0	1.0	-46.7	-40.0	-6.7	
7390.00	-10.5	H	3.0	35.7	1.0	-45.2	-40.0	-5.2	
11085.00	-23.8	H	3.0	35.5	1.0	-58.3	-40.0	-18.3	
14780.00	-20.8	H	3.0	34.0	1.0	-53.8	-40.0	-13.8	

LTE B48 10MHz 16QAM

UL Verification Services, Inc.
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 11981177
Date: 10/19/2017
Test Engineer: 43575 OS
Configuration: EUT + DC power supply
Location: Chamber C
Mode: LTE_64QAM Band 48 Harmonics, 10MHz Bandwidth

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 3555MHz									
7110.00	-14.7	V	3.0	35.7	1.0	-49.4	-40.0	-9.4	
10665.00	-26.0	V	3.0	35.7	1.0	-60.8	-40.0	-20.8	
14220.00	-17.2	V	3.0	34.2	1.0	-50.4	-40.0	-10.4	
7110.00	-19.8	H	3.0	35.7	1.0	-54.5	-40.0	-14.5	
10665.00	-25.6	H	3.0	35.7	1.0	-60.3	-40.0	-20.3	
14220.00	-14.4	H	3.0	34.2	1.0	-47.6	-40.0	-7.6	
Mid Ch, 3625MHz									
7250.00	-15.4	V	3.0	35.7	1.0	-50.2	-40.0	-10.2	
10875.00	-26.1	V	3.0	35.6	1.0	-60.8	-40.0	-20.8	
14500.00	-12.2	V	3.0	34.1	1.0	-45.3	-40.0	-5.3	
7250.00	-13.7	H	3.0	35.7	1.0	-48.4	-40.0	-8.4	
10875.00	-24.3	H	3.0	35.6	1.0	-58.9	-40.0	-18.9	
14500.00	-16.3	H	3.0	34.1	1.0	-49.4	-40.0	-9.4	
High Ch, 3695MHz									
7390.00	-11.2	V	3.0	35.7	1.0	-45.9	-40.0	-5.9	
11085.00	-17.5	V	3.0	35.5	1.0	-52.0	-40.0	-12.0	
14780.00	-13.5	V	3.0	34.0	1.0	-46.5	-40.0	-6.5	
7390.00	-10.8	H	3.0	35.7	1.0	-45.5	-40.0	-5.5	
11085.00	-24.4	H	3.0	35.5	1.0	-58.9	-40.0	-18.9	
14780.00	-20.8	H	3.0	34.0	1.0	-53.8	-40.0	-13.8	

LTE B48 10MHz 64QAM

LTE Band 48 Antenna ABCD

UL Verification Services, Inc.
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 11981177
Date: 10/19/2017
Test Engineer: 43575 OS
Configuration: EUT + DC Power Supply
Location: Chamber C
Mode: LTE_QPSK Band 48 Harmonics, 20MHz Bandwidth

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 3560MHz + 3580MHz									
3560 MHz									
7120.00	-13.2	V	3.0	35.7	1.0	-47.9	-40.0	-7.9	
10680.00	-24.2	V	3.0	35.7	1.0	-59.0	-40.0	-19.0	
14240.00	-21.5	V	3.0	34.2	1.0	-54.8	-40.0	-14.8	
7120.00	-14.7	H	3.0	35.7	1.0	-49.4	-40.0	-9.4	
10680.00	-26.5	H	3.0	35.7	1.0	-61.2	-40.0	-21.2	
14240.00	-19.0	H	3.0	34.2	1.0	-52.3	-40.0	-12.3	
3580 MHz									
7160.00	-18.4	V	3.0	35.7	1.0	-53.2	-40.0	-13.2	
10740.00	-24.2	V	3.0	35.7	1.0	-58.9	-40.0	-18.9	
14320.00	-8.5	V	3.0	34.2	1.0	-41.7	-40.0	-1.7	
7160.00	-15.7	H	3.0	35.7	1.0	-50.4	-40.0	-10.4	
10740.00	-24.7	H	3.0	35.7	1.0	-59.3	-40.0	-19.3	
14320.00	-13.6	H	3.0	34.2	1.0	-46.8	-40.0	-6.8	
Mid Ch, 3615MHz + 3635MHz									
3615 MHz									
7230.00	-15.0	V	3.0	35.7	1.0	-49.7	-40.0	-9.7	
10845.00	-15.7	V	3.0	35.6	1.0	-50.3	-40.0	-10.3	
14460.00	-19.7	V	3.0	34.1	1.0	-52.9	-40.0	-12.9	
7230.00	-15.9	H	3.0	35.7	1.0	-50.6	-40.0	-10.6	
10845.00	-25.4	H	3.0	35.6	1.0	-60.0	-40.0	-20.0	
14460.00	-20.0	H	3.0	34.1	1.0	-53.1	-40.0	-13.1	
3635 MHz									
7270.00	-15.4	V	3.0	35.7	1.0	-50.1	-40.0	-10.1	
10905.00	-25.0	V	3.0	35.6	1.0	-59.6	-40.0	-19.6	
14540.00	-18.0	V	3.0	34.1	1.0	-51.2	-40.0	-11.2	
7270.00	-15.8	H	3.0	35.7	1.0	-50.6	-40.0	-10.6	
10905.00	-21.9	H	3.0	35.6	1.0	-56.5	-40.0	-16.5	
14540.00	-15.8	H	3.0	34.1	1.0	-48.9	-40.0	-8.9	
High Ch, 3670MHz + 3690MHz									
3670 MHz									
7340.00	-13.6	V	3.0	35.7	1.0	-48.3	-40.0	-8.3	
11010.00	-17.1	V	3.0	35.5	1.0	-51.7	-40.0	-11.7	
14680.00	-18.2	V	3.0	34.1	1.0	-51.3	-40.0	-11.3	
7340.00	-14.1	H	3.0	35.7	1.0	-48.9	-40.0	-8.9	
11010.00	-19.3	H	3.0	35.5	1.0	-53.8	-40.0	-13.8	
14680.00	-15.7	H	3.0	34.1	1.0	-48.8	-40.0	-8.8	
3690 MHz									
7380.00	-11.0	V	3.0	35.7	1.0	-45.7	-40.0	-5.7	
11070.00	-21.8	V	3.0	35.5	1.0	-56.4	-40.0	-16.4	
14760.00	-18.3	V	3.0	34.0	1.0	-51.4	-40.0	-11.4	
7380.00	-12.2	H	3.0	35.7	1.0	-46.9	-40.0	-6.9	
11070.00	-24.0	H	3.0	35.5	1.0	-58.6	-40.0	-18.6	
14760.00	-20.3	H	3.0	34.0	1.0	-53.3	-40.0	-13.3	

LTE B48 10MHz QPSK

UL Verification Services, Inc.
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 11981177
Date: 10/19/2017
Test Engineer: 43575 OS
Configuration: EUT + DC Power Supply
Location: Chamber C
Mode: LTE_16QAM Band 48 Harmonics, 20MHz Bandwidth

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 3560MHz + 3580MHz									
3560 MHz									
7120.00	-13.4	V	3.0	35.7	1.0	-48.1	-40.0	-8.1	
10680.00	-24.1	V	3.0	35.7	1.0	-58.8	-40.0	-18.8	
14240.00	-18.1	V	3.0	34.2	1.0	-51.3	-40.0	-11.3	
7120.00	-14.6	H	3.0	35.7	1.0	-49.3	-40.0	-9.3	
10680.00	-26.5	H	3.0	35.7	1.0	-61.2	-40.0	-21.2	
14240.00	-16.8	H	3.0	34.2	1.0	-50.0	-40.0	-10.0	
3580 MHz									
7160.00	-18.5	V	3.0	35.7	1.0	-53.2	-40.0	-13.2	
10740.00	-24.6	V	3.0	35.7	1.0	-59.2	-40.0	-19.2	
14320.00	-8.1	V	3.0	34.2	1.0	-41.3	-40.0	-1.3	
7160.00	-15.4	H	3.0	35.7	1.0	-50.1	-40.0	-10.1	
10740.00	-24.7	H	3.0	35.7	1.0	-59.4	-40.0	-19.4	
14320.00	-11.9	H	3.0	34.2	1.0	-45.1	-40.0	-5.1	
Mid Ch, 3615MHz + 3635MHz									
3615 MHz									
7230.00	-15.2	V	3.0	35.7	1.0	-49.9	-40.0	-9.9	
10845.00	-15.6	V	3.0	35.6	1.0	-50.2	-40.0	-10.2	
14460.00	-19.7	V	3.0	34.1	1.0	-52.8	-40.0	-12.8	
7230.00	-15.5	H	3.0	35.7	1.0	-50.2	-40.0	-10.2	
10845.00	-23.9	H	3.0	35.6	1.0	-58.5	-40.0	-18.5	
14460.00	-20.0	H	3.0	34.1	1.0	-53.1	-40.0	-13.1	
3635 MHz									
7270.00	-15.2	V	3.0	35.7	1.0	-49.9	-40.0	-9.9	
10905.00	-25.0	V	3.0	35.6	1.0	-59.6	-40.0	-19.6	
14540.00	-18.6	V	3.0	34.1	1.0	-51.7	-40.0	-11.7	
7270.00	-15.3	H	3.0	35.7	1.0	-50.0	-40.0	-10.0	
10905.00	-22.1	H	3.0	35.6	1.0	-56.7	-40.0	-16.7	
14540.00	-15.4	H	3.0	34.1	1.0	-48.6	-40.0	-8.6	
High Ch, 3670MHz + 3690MHz									
3670 MHz									
7340.00	-13.0	V	3.0	35.7	1.0	-47.8	-40.0	-7.8	
11010.00	-17.0	V	3.0	35.5	1.0	-51.5	-40.0	-11.5	
14680.00	-18.3	V	3.0	34.1	1.0	-51.4	-40.0	-11.4	
7340.00	-14.1	H	3.0	35.7	1.0	-48.8	-40.0	-8.8	
11010.00	-19.3	H	3.0	35.5	1.0	-53.8	-40.0	-13.8	
14680.00	-15.7	H	3.0	34.1	1.0	-48.7	-40.0	-8.7	
3690 MHz									
7380.00	-11.6	V	3.0	35.7	1.0	-46.3	-40.0	-6.3	
11070.00	-21.8	V	3.0	35.5	1.0	-56.4	-40.0	-16.4	
14760.00	-18.0	V	3.0	34.0	1.0	-51.0	-40.0	-11.0	
7380.00	-13.2	H	3.0	35.7	1.0	-47.9	-40.0	-7.9	
11070.00	-25.9	H	3.0	35.5	1.0	-60.4	-40.0	-20.4	
14760.00	-20.9	H	3.0	34.0	1.0	-54.0	-40.0	-14.0	

LTE B48 10MHz 16QAM

UL Verification Services, Inc.
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 11981177
Date: 10/19/2017
Test Engineer: 43575 OS
Configuration: EUT + DC Power Supply
Location: Chamber C
Mode: LTE_64QAM Band 48 Harmonics, 20MHz Bandwidth

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 3560MHz + 3580MHz									
3560 MHz									
7120.00	-13.4	V	3.0	35.7	1.0	-48.1	-40.0	-8.1	
10680.00	-24.4	V	3.0	35.7	1.0	-59.1	-40.0	-19.1	
14240.00	-18.2	V	3.0	34.2	1.0	-51.4	-40.0	-11.4	
7120.00	-14.6	H	3.0	35.7	1.0	-49.3	-40.0	-9.3	
10680.00	-26.5	H	3.0	35.7	1.0	-61.2	-40.0	-21.2	
14240.00	-18.4	H	3.0	34.2	1.0	-51.6	-40.0	-11.6	
3580 MHz									
7160.00	-18.9	V	3.0	35.7	1.0	-53.6	-40.0	-13.6	
10740.00	-24.9	V	3.0	35.7	1.0	-59.6	-40.0	-19.6	
14320.00	-8.0	V	3.0	34.2	1.0	-41.2	-40.0	-1.2	
7160.00	-15.6	H	3.0	35.7	1.0	-50.3	-40.0	-10.3	
10740.00	-24.5	H	3.0	35.7	1.0	-59.2	-40.0	-19.2	
14320.00	-14.0	H	3.0	34.2	1.0	-47.2	-40.0	-7.2	
Mid Ch, 3615MHz + 3635MHz									
3615 MHz									
7230.00	-15.1	V	3.0	35.7	1.0	-49.8	-40.0	-9.8	
10845.00	-15.9	V	3.0	35.6	1.0	-50.5	-40.0	-10.5	
14460.00	-19.6	V	3.0	34.1	1.0	-52.7	-40.0	-12.7	
7230.00	-15.8	H	3.0	35.7	1.0	-50.5	-40.0	-10.5	
10845.00	-24.3	H	3.0	35.6	1.0	-58.9	-40.0	-18.9	
14460.00	-20.1	H	3.0	34.1	1.0	-53.3	-40.0	-13.3	
3635 MHz									
7270.00	-15.6	V	3.0	35.7	1.0	-50.3	-40.0	-10.3	
10905.00	-24.8	V	3.0	35.6	1.0	-59.4	-40.0	-19.4	
14540.00	-17.9	V	3.0	34.1	1.0	-51.0	-40.0	-11.0	
7270.00	-15.5	H	3.0	35.7	1.0	-50.2	-40.0	-10.2	
10905.00	-22.3	H	3.0	35.6	1.0	-56.9	-40.0	-16.9	
14540.00	-15.6	H	3.0	34.1	1.0	-48.7	-40.0	-8.7	
High Ch, 3670MHz + 3690MHz									
3670 MHz									
7340.00	-13.2	V	3.0	35.7	1.0	-47.9	-40.0	-7.9	
11010.00	-17.1	V	3.0	35.5	1.0	-51.6	-40.0	-11.6	
14680.00	-18.1	V	3.0	34.1	1.0	-51.2	-40.0	-11.2	
7340.00	-14.0	H	3.0	35.7	1.0	-48.7	-40.0	-8.7	
11010.00	-19.2	H	3.0	35.5	1.0	-53.7	-40.0	-13.7	
14680.00	-15.5	H	3.0	34.1	1.0	-48.6	-40.0	-8.6	
3690 MHz									
7380.00	-11.4	V	3.0	35.7	1.0	-46.1	-40.0	-6.1	
11070.00	-22.9	V	3.0	35.5	1.0	-57.4	-40.0	-17.4	
14760.00	-17.4	V	3.0	34.0	1.0	-50.5	-40.0	-10.5	
7380.00	-12.0	H	3.0	35.7	1.0	-46.8	-40.0	-6.8	
11070.00	-25.1	H	3.0	35.5	1.0	-59.7	-40.0	-19.7	
14760.00	-19.9	H	3.0	34.0	1.0	-53.0	-40.0	-13.0	

LTE B48 10MHz 64QAM

SPURIOUS RADIATION PLOTS FOR DIRECTIONAL ANTENNA

LTE Band 48 Antenna AB

UL Verification Services, Inc.
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 11981177
Date: 10/26/2017
Test Engineer: 43575 OS
Configuration: EUT + DC power supply
Location: Chamber B
Mode: LTE_QPSK Band 48 Harmonics, 10MHz Bandwidth

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 3555MHz									
7110.00	-21.3	V	3.0	35.7	1.0	-56.0	-40.0	-16.0	
10665.00	-29.2	V	3.0	35.7	1.0	-63.9	-40.0	-23.9	
14220.00	-22.4	V	3.0	34.2	1.0	-55.6	-40.0	-15.6	
7110.00	-19.0	H	3.0	35.7	1.0	-53.7	-40.0	-13.7	
10665.00	-28.3	H	3.0	35.7	1.0	-63.0	-40.0	-23.0	
14220.00	-25.2	H	3.0	34.2	1.0	-58.5	-40.0	-18.5	
Mid Ch, 3625MHz									
7250.00	-20.4	V	3.0	35.7	1.0	-55.1	-40.0	-15.1	
10875.00	-28.7	V	3.0	35.6	1.0	-63.3	-40.0	-23.3	
14500.00	-24.5	V	3.0	34.1	1.0	-57.6	-40.0	-17.6	
7250.00	-20.4	H	3.0	35.7	1.0	-55.2	-40.0	-15.2	
10875.00	-27.8	H	3.0	35.6	1.0	-62.4	-40.0	-22.4	
14500.00	-25.3	H	3.0	34.1	1.0	-58.5	-40.0	-18.5	
High Ch, 3695MHz									
7390.00	-18.6	V	3.0	35.7	1.0	-53.4	-40.0	-13.4	
11085.00	-27.6	V	3.0	35.5	1.0	-62.1	-40.0	-22.1	
14780.00	-24.8	V	3.0	34.0	1.0	-57.8	-40.0	-17.8	
7390.00	-16.3	H	3.0	35.7	1.0	-51.0	-40.0	-11.0	
11085.00	-25.0	H	3.0	35.5	1.0	-59.5	-40.0	-19.5	
14780.00	-24.5	H	3.0	34.0	1.0	-57.5	-40.0	-17.5	

LTE B48 10MHz QPSK

UL Verification Services, Inc.
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 11981177
Date: 10/26/2017
Test Engineer: 43575 OS
Configuration: EUT + DC power supply
Location: Chamber B
Mode: LTE_16QAM Band 48 Harmonics, 10MHz Bandwidth

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 3555MHz									
7110.00	-21.7	V	3.0	35.7	1.0	-56.4	-40.0	-16.4	
10665.00	-29.1	V	3.0	35.7	1.0	-63.8	-40.0	-23.8	
14220.00	-22.1	V	3.0	34.2	1.0	-55.3	-40.0	-15.3	
7110.00	-19.1	H	3.0	35.7	1.0	-53.8	-40.0	-13.8	
10665.00	-28.4	H	3.0	35.7	1.0	-63.1	-40.0	-23.1	
14220.00	-25.0	H	3.0	34.2	1.0	-58.2	-40.0	-18.2	
Mid Ch, 3625MHz									
7250.00	-20.8	V	3.0	35.7	1.0	-55.5	-40.0	-15.5	
10875.00	-28.6	V	3.0	35.6	1.0	-63.2	-40.0	-23.2	
14500.00	-24.2	V	3.0	34.1	1.0	-57.3	-40.0	-17.3	
7250.00	-20.8	H	3.0	35.7	1.0	-55.5	-40.0	-15.5	
10875.00	-28.1	H	3.0	35.6	1.0	-62.7	-40.0	-22.7	
14500.00	-25.2	H	3.0	34.1	1.0	-58.3	-40.0	-18.3	
High Ch, 3695MHz									
7390.00	-18.7	V	3.0	35.7	1.0	-53.5	-40.0	-13.5	
11085.00	-27.5	V	3.0	35.5	1.0	-62.0	-40.0	-22.0	
14780.00	-24.8	V	3.0	34.0	1.0	-57.9	-40.0	-17.9	
7390.00	-16.1	H	3.0	35.7	1.0	-50.8	-40.0	-10.8	
11085.00	-25.7	H	3.0	35.5	1.0	-60.2	-40.0	-20.2	
14780.00	-24.6	H	3.0	34.0	1.0	-57.6	-40.0	-17.6	

LTE B48 10MHz 16QAM

UL Verification Services, Inc.
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 11981177
Date: 10/26/2017
Test Engineer: 43575 OS
Configuration: EUT + DC power supply
Location: Chamber B
Mode: LTE_64QAM Band 48 Harmonics, 10MHz Bandwidth

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 3555MHz									
7110.00	-22.4	V	3.0	35.7	1.0	-57.1	-40.0	-17.1	
10665.00	-29.4	V	3.0	35.7	1.0	-64.1	-40.0	-24.1	
14220.00	-22.4	V	3.0	34.2	1.0	-55.6	-40.0	-15.6	
7110.00	-19.5	H	3.0	35.7	1.0	-54.2	-40.0	-14.2	
10665.00	-28.4	H	3.0	35.7	1.0	-63.1	-40.0	-23.1	
14220.00	-25.3	H	3.0	34.2	1.0	-58.5	-40.0	-18.5	
Mid Ch, 3625MHz									
7250.00	-20.7	V	3.0	35.7	1.0	-55.4	-40.0	-15.4	
10875.00	-28.4	V	3.0	35.6	1.0	-63.0	-40.0	-23.0	
14500.00	-24.2	V	3.0	34.1	1.0	-57.3	-40.0	-17.3	
7250.00	-20.8	H	3.0	35.7	1.0	-55.5	-40.0	-15.5	
10875.00	-28.3	H	3.0	35.6	1.0	-62.9	-40.0	-22.9	
14500.00	-25.4	H	3.0	34.1	1.0	-58.6	-40.0	-18.6	
High Ch, 3695MHz									
7390.00	-19.0	V	3.0	35.7	1.0	-53.7	-40.0	-13.7	
11085.00	-27.3	V	3.0	35.5	1.0	-61.8	-40.0	-21.8	
14780.00	-24.9	V	3.0	34.0	1.0	-57.9	-40.0	-17.9	
7390.00	-16.3	H	3.0	35.7	1.0	-51.1	-40.0	-11.1	
11085.00	-25.8	H	3.0	35.5	1.0	-60.3	-40.0	-20.3	
14780.00	-24.7	H	3.0	34.0	1.0	-57.7	-40.0	-17.7	

LTE B48 10MHz 64QAM

LTE Band 48 Antenna CD

UL Verification Services, Inc.
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 11981177
Date: 10/26/2017
Test Engineer: 43575 OS
Configuration: EUT + DC power supply
Location: Chamber B
Mode: LTE_QPSK Band 48 Harmonics, 10MHz Bandwidth

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 3555MHz									
7110.00	-21.3	V	3.0	35.7	1.0	-56.0	-40.0	-16.0	
10665.00	-28.9	V	3.0	35.7	1.0	-63.6	-40.0	-23.6	
14220.00	-23.9	V	3.0	34.2	1.0	-57.1	-40.0	-17.1	
7110.00	-18.9	H	3.0	35.7	1.0	-53.6	-40.0	-13.6	
10665.00	-28.7	H	3.0	35.7	1.0	-63.4	-40.0	-23.4	
14220.00	-24.7	H	3.0	34.2	1.0	-58.0	-40.0	-18.0	
Mid Ch, 3625MHz									
7250.00	-20.7	V	3.0	35.7	1.0	-55.4	-40.0	-15.4	
10875.00	-24.4	V	3.0	35.6	1.0	-59.0	-40.0	-19.0	
14500.00	-24.6	V	3.0	34.1	1.0	-57.7	-40.0	-17.7	
7250.00	-22.3	H	3.0	35.7	1.0	-57.0	-40.0	-17.0	
10875.00	-27.8	H	3.0	35.6	1.0	-62.4	-40.0	-22.4	
14500.00	-25.3	H	3.0	34.1	1.0	-58.4	-40.0	-18.4	
High Ch, 3695MHz									
7390.00	-16.7	V	3.0	35.7	1.0	-51.4	-40.0	-11.4	
11085.00	-27.3	V	3.0	35.5	1.0	-61.8	-40.0	-21.8	
14780.00	-23.9	V	3.0	34.0	1.0	-56.9	-40.0	-16.9	
7390.00	-18.1	H	3.0	35.7	1.0	-52.8	-40.0	-12.8	
11085.00	-26.5	H	3.0	35.5	1.0	-61.0	-40.0	-21.0	
14780.00	-23.0	H	3.0	34.0	1.0	-56.0	-40.0	-16.0	

LTE B48 10MHz QPSK

UL Verification Services, Inc.
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 11981177
Date: 10/26/2017
Test Engineer: 43575 OS
Configuration: EUT + DC power supply
Location: Chamber B
Mode: LTE_16QAM Band 48 Harmonics, 10MHz Bandwidth

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 3555MHz									
7110.00	-20.8	V	3.0	35.7	1.0	-55.5	-40.0	-15.5	
10665.00	-28.8	V	3.0	35.7	1.0	-63.5	-40.0	-23.5	
14220.00	-23.4	V	3.0	34.2	1.0	-56.6	-40.0	-16.6	
7110.00	-18.7	H	3.0	35.7	1.0	-53.4	-40.0	-13.4	
10665.00	-28.6	H	3.0	35.7	1.0	-63.3	-40.0	-23.3	
14220.00	-24.4	H	3.0	34.2	1.0	-57.7	-40.0	-17.7	
Mid Ch, 3625MHz									
7250.00	-20.8	V	3.0	35.7	1.0	-55.5	-40.0	-15.5	
10875.00	-24.3	V	3.0	35.6	1.0	-58.9	-40.0	-18.9	
14500.00	-24.7	V	3.0	34.1	1.0	-57.8	-40.0	-17.8	
7250.00	-22.2	H	3.0	35.7	1.0	-56.9	-40.0	-16.9	
10875.00	-27.6	H	3.0	35.6	1.0	-62.2	-40.0	-22.2	
14500.00	-25.3	H	3.0	34.1	1.0	-58.5	-40.0	-18.5	
High Ch, 3695MHz									
7390.00	-17.7	V	3.0	35.7	1.0	-52.4	-40.0	-12.4	
11085.00	-27.5	V	3.0	35.5	1.0	-62.0	-40.0	-22.0	
14780.00	-23.2	V	3.0	34.0	1.0	-56.2	-40.0	-16.2	
7390.00	-17.8	H	3.0	35.7	1.0	-52.6	-40.0	-12.6	
11085.00	-26.6	H	3.0	35.5	1.0	-61.1	-40.0	-21.1	
14780.00	-22.8	H	3.0	34.0	1.0	-55.9	-40.0	-15.9	

LTE B48 10MHz 16QAM

UL Verification Services, Inc.
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 11981177
Date: 10/26/2017
Test Engineer: 43575 OS
Configuration: EUT + DC power supply
Location: Chamber B
Mode: LTE_64QAM Band 48 Harmonics, 10MHz Bandwidth

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 3555MHz									
7110.00	-21.0	V	3.0	35.7	1.0	-55.7	-40.0	-15.7	
10665.00	-28.9	V	3.0	35.7	1.0	-63.6	-40.0	-23.6	
14220.00	-23.0	V	3.0	34.2	1.0	-56.3	-40.0	-16.3	
7110.00	-19.2	H	3.0	35.7	1.0	-53.9	-40.0	-13.9	
10665.00	-28.6	H	3.0	35.7	1.0	-63.3	-40.0	-23.3	
14220.00	-24.8	H	3.0	34.2	1.0	-58.0	-40.0	-18.0	
Mid Ch, 3625MHz									
7250.00	-21.0	V	3.0	35.7	1.0	-55.7	-40.0	-15.7	
10875.00	-24.7	V	3.0	35.6	1.0	-59.3	-40.0	-19.3	
14500.00	-25.0	V	3.0	34.1	1.0	-58.1	-40.0	-18.1	
7250.00	-22.2	H	3.0	35.7	1.0	-56.9	-40.0	-16.9	
10875.00	-27.7	H	3.0	35.6	1.0	-62.3	-40.0	-22.3	
14500.00	-25.3	H	3.0	34.1	1.0	-58.5	-40.0	-18.5	
High Ch, 3695MHz									
7390.00	-17.5	V	3.0	35.7	1.0	-52.2	-40.0	-12.2	
11085.00	-27.8	V	3.0	35.5	1.0	-62.3	-40.0	-22.3	
14780.00	-23.2	V	3.0	34.0	1.0	-56.2	-40.0	-16.2	
7390.00	-18.3	H	3.0	35.7	1.0	-53.1	-40.0	-13.1	
11085.00	-26.9	H	3.0	35.5	1.0	-61.4	-40.0	-21.4	
14780.00	-23.1	H	3.0	34.0	1.0	-56.1	-40.0	-16.1	

LTE B48 10MHz 64QAM

LTE Band 48 Antenna ABCD

UL Verification Services, Inc.
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 11981177
Date: 10/26/2017
Test Engineer: 43575 OS
Configuration: EUT + DC Power Supply
Location: Chamber B
Mode: LTE_QPSK Band 48 Harmonics, 20MHz Bandwidth

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 3560MHz + 3580MHz									
3560 MHz									
7120.00	-19.8	V	3.0	35.7	1.0	-54.5	-40.0	-14.5	
10680.00	-28.7	V	3.0	35.7	1.0	-63.4	-40.0	-23.4	
14240.00	-24.7	V	3.0	34.2	1.0	-57.9	-40.0	-17.9	
7120.00	-17.5	H	3.0	35.7	1.0	-52.2	-40.0	-12.2	
10680.00	-27.6	H	3.0	35.7	1.0	-62.3	-40.0	-22.3	
14240.00	-24.0	H	3.0	34.2	1.0	-57.2	-40.0	-17.2	
3580 MHz									
7160.00	-22.9	V	3.0	35.7	1.0	-57.6	-40.0	-17.6	
10740.00	-28.8	V	3.0	35.7	1.0	-63.5	-40.0	-23.5	
14320.00	-24.2	V	3.0	34.2	1.0	-57.4	-40.0	-17.4	
7160.00	-20.5	H	3.0	35.7	1.0	-55.2	-40.0	-15.2	
10740.00	-28.3	H	3.0	35.7	1.0	-63.0	-40.0	-23.0	
14320.00	-24.0	H	3.0	34.2	1.0	-57.2	-40.0	-17.2	
Mid Ch, 3615MHz + 3635MHz									
3615 MHz									
7230.00	-17.6	V	3.0	35.7	1.0	-52.4	-40.0	-12.4	
10845.00	-26.7	V	3.0	35.6	1.0	-61.3	-40.0	-21.3	
14460.00	-24.8	V	3.0	34.1	1.0	-58.0	-40.0	-18.0	
7230.00	-19.3	H	3.0	35.7	1.0	-54.0	-40.0	-14.0	
10845.00	-26.9	H	3.0	35.6	1.0	-61.5	-40.0	-21.5	
14460.00	-24.5	H	3.0	34.1	1.0	-57.7	-40.0	-17.7	
3635 MHz									
7270.00	-19.3	V	3.0	35.7	1.0	-54.1	-40.0	-14.1	
10905.00	-28.1	V	3.0	35.6	1.0	-62.7	-40.0	-22.7	
14540.00	-25.1	V	3.0	34.1	1.0	-58.2	-40.0	-18.2	
7270.00	-18.6	H	3.0	35.7	1.0	-53.3	-40.0	-13.3	
10905.00	-26.5	H	3.0	35.6	1.0	-61.1	-40.0	-21.1	
14540.00	-23.9	H	3.0	34.1	1.0	-57.0	-40.0	-17.0	
High Ch, 3670MHz + 3690MHz									
3670 MHz									
7340.00	-15.8	V	3.0	35.7	1.0	-50.5	-40.0	-10.5	
11010.00	-27.6	V	3.0	35.5	1.0	-62.2	-40.0	-22.2	
14680.00	-25.3	V	3.0	34.1	1.0	-58.4	-40.0	-18.4	
7340.00	-14.5	H	3.0	35.7	1.0	-49.3	-40.0	-9.3	
11010.00	-26.1	H	3.0	35.5	1.0	-60.7	-40.0	-20.7	
14680.00	-25.0	H	3.0	34.1	1.0	-58.1	-40.0	-18.1	
3690 MHz									
7380.00	-20.6	V	3.0	35.7	1.0	-55.3	-40.0	-15.3	
11070.00	-26.2	V	3.0	35.5	1.0	-60.7	-40.0	-20.7	
14760.00	-24.8	V	3.0	34.0	1.0	-57.8	-40.0	-17.8	
7380.00	-20.7	H	3.0	35.7	1.0	-55.4	-40.0	-15.4	
11070.00	-24.5	H	3.0	35.5	1.0	-59.0	-40.0	-19.0	
14760.00	-24.4	H	3.0	34.0	1.0	-57.4	-40.0	-17.4	

LTE B48 10MHz QPSK

UL Verification Services, Inc.
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 11981177
Date: 10/26/2017
Test Engineer: 43575 OS
Configuration: EUT + DC Power Supply
Location: Chamber B
Mode: LTE_16QAM Band 48 Harmonics, 20MHz Bandwidth

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 3560MHz + 3580MHz									
3560 MHz									
7120.00	-19.8	V	3.0	35.7	1.0	-54.5	-40.0	-14.5	
10680.00	-28.6	V	3.0	35.7	1.0	-63.3	-40.0	-23.3	
14240.00	-24.4	V	3.0	34.2	1.0	-57.6	-40.0	-17.6	
7120.00	-16.9	H	3.0	35.7	1.0	-51.6	-40.0	-11.6	
10680.00	-28.1	H	3.0	35.7	1.0	-62.8	-40.0	-22.8	
14240.00	-24.0	H	3.0	34.2	1.0	-57.2	-40.0	-17.2	
3580 MHz									
7160.00	-21.4	V	3.0	35.7	1.0	-56.1	-40.0	-16.1	
10740.00	-28.9	V	3.0	35.7	1.0	-63.5	-40.0	-23.5	
14320.00	-24.1	V	3.0	34.2	1.0	-57.3	-40.0	-17.3	
7160.00	-19.7	H	3.0	35.7	1.0	-54.4	-40.0	-14.4	
10740.00	-28.3	H	3.0	35.7	1.0	-62.9	-40.0	-22.9	
14320.00	-23.9	H	3.0	34.2	1.0	-57.1	-40.0	-17.1	
Mid Ch, 3615MHz + 3635MHz									
3615 MHz									
7230.00	-17.8	V	3.0	35.7	1.0	-52.5	-40.0	-12.5	
10845.00	-26.9	V	3.0	35.6	1.0	-61.5	-40.0	-21.5	
14460.00	-24.5	V	3.0	34.1	1.0	-57.6	-40.0	-17.6	
7230.00	-19.0	H	3.0	35.7	1.0	-53.7	-40.0	-13.7	
10845.00	-26.9	H	3.0	35.6	1.0	-61.5	-40.0	-21.5	
14460.00	-24.4	H	3.0	34.1	1.0	-57.5	-40.0	-17.5	
3635 MHz									
7270.00	-20.2	V	3.0	35.7	1.0	-54.9	-40.0	-14.9	
10905.00	-28.1	V	3.0	35.6	1.0	-62.7	-40.0	-22.7	
14540.00	-25.1	V	3.0	34.1	1.0	-58.2	-40.0	-18.2	
7270.00	-19.2	H	3.0	35.7	1.0	-53.9	-40.0	-13.9	
10905.00	-26.4	H	3.0	35.6	1.0	-61.0	-40.0	-21.0	
14540.00	-23.0	H	3.0	34.1	1.0	-56.1	-40.0	-16.1	
High Ch, 3670MHz + 3690MHz									
3670 MHz									
7340.00	-16.1	V	3.0	35.7	1.0	-50.8	-40.0	-10.8	
11010.00	-27.3	V	3.0	35.5	1.0	-61.9	-40.0	-21.9	
14680.00	-25.4	V	3.0	34.1	1.0	-58.4	-40.0	-18.4	
7340.00	-15.7	H	3.0	35.7	1.0	-50.4	-40.0	-10.4	
11010.00	-26.6	H	3.0	35.5	1.0	-61.2	-40.0	-21.2	
14680.00	-24.6	H	3.0	34.1	1.0	-57.7	-40.0	-17.7	
3690 MHz									
7380.00	-20.2	V	3.0	35.7	1.0	-54.9	-40.0	-14.9	
11070.00	-26.8	V	3.0	35.5	1.0	-61.3	-40.0	-21.3	
14760.00	-24.7	V	3.0	34.0	1.0	-57.7	-40.0	-17.7	
7380.00	-20.1	H	3.0	35.7	1.0	-54.8	-40.0	-14.8	
11070.00	-24.2	H	3.0	35.5	1.0	-58.7	-40.0	-18.7	
14760.00	-24.6	H	3.0	34.0	1.0	-57.6	-40.0	-17.6	

LTE B48 10MHz 16QAM

UL Verification Services, Inc.
Above 1GHz High Frequency Substitution Measurement

Company: Samsung
Project #: 11981177
Date: 10/26/2017
Test Engineer: 43575 OS
Configuration: EUT + DC Power Supply
Location: Chamber B
Mode: LTE_64QAM Band 48 Harmonics, 20MHz Bandwidth

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 3560MHz + 3580MHz									
3560 MHz									
7120.00	-19.7	V	3.0	35.7	1.0	-54.4	-40.0	-14.4	
10680.00	-28.4	V	3.0	35.7	1.0	-63.1	-40.0	-23.1	
14240.00	-24.6	V	3.0	34.2	1.0	-57.8	-40.0	-17.8	
7120.00	-17.4	H	3.0	35.7	1.0	-52.1	-40.0	-12.1	
10680.00	-27.5	H	3.0	35.7	1.0	-62.2	-40.0	-22.2	
14240.00	-23.9	H	3.0	34.2	1.0	-57.1	-40.0	-17.1	
3580 MHz									
7160.00	-21.8	V	3.0	35.7	1.0	-56.5	-40.0	-16.5	
10740.00	-28.6	V	3.0	35.7	1.0	-63.3	-40.0	-23.3	
14320.00	-24.0	V	3.0	34.2	1.0	-57.2	-40.0	-17.2	
7160.00	-19.9	H	3.0	35.7	1.0	-54.6	-40.0	-14.6	
10740.00	-28.2	H	3.0	35.7	1.0	-62.8	-40.0	-22.8	
14320.00	-23.1	H	3.0	34.2	1.0	-56.3	-40.0	-16.3	
Mid Ch, 3615MHz + 3635MHz									
3615 MHz									
7230.00	-18.0	V	3.0	35.7	1.0	-52.7	-40.0	-12.7	
10845.00	-26.8	V	3.0	35.6	1.0	-61.5	-40.0	-21.5	
14460.00	-24.5	V	3.0	34.1	1.0	-57.7	-40.0	-17.7	
7230.00	-19.3	H	3.0	35.7	1.0	-54.0	-40.0	-14.0	
10845.00	-26.6	H	3.0	35.6	1.0	-61.2	-40.0	-21.2	
14460.00	-24.2	H	3.0	34.1	1.0	-57.4	-40.0	-17.4	
3635 MHz									
7270.00	-20.3	V	3.0	35.7	1.0	-55.1	-40.0	-15.1	
10905.00	-28.1	V	3.0	35.6	1.0	-62.7	-40.0	-22.7	
14540.00	-25.2	V	3.0	34.1	1.0	-58.3	-40.0	-18.3	
7270.00	-19.1	H	3.0	35.7	1.0	-53.8	-40.0	-13.8	
10905.00	-26.5	H	3.0	35.6	1.0	-61.1	-40.0	-21.1	
14540.00	-23.1	H	3.0	34.1	1.0	-56.2	-40.0	-16.2	
High Ch, 3670MHz + 3690MHz									
3670 MHz									
7340.00	-16.3	V	3.0	35.7	1.0	-51.0	-40.0	-11.0	
11010.00	-27.1	V	3.0	35.5	1.0	-61.7	-40.0	-21.7	
14680.00	-25.3	V	3.0	34.1	1.0	-58.3	-40.0	-18.3	
7340.00	-15.3	H	3.0	35.7	1.0	-50.0	-40.0	-10.0	
11010.00	-26.5	H	3.0	35.5	1.0	-61.0	-40.0	-21.0	
14680.00	-25.2	H	3.0	34.1	1.0	-58.3	-40.0	-18.3	
3690 MHz									
7380.00	-20.8	V	3.0	35.7	1.0	-55.6	-40.0	-15.6	
11070.00	-27.3	V	3.0	35.5	1.0	-61.8	-40.0	-21.8	
14760.00	-24.7	V	3.0	34.0	1.0	-57.7	-40.0	-17.7	
7380.00	-20.4	H	3.0	35.7	1.0	-55.1	-40.0	-15.1	
11070.00	-24.7	H	3.0	35.5	1.0	-59.2	-40.0	-19.2	
14760.00	-24.6	H	3.0	34.0	1.0	-57.6	-40.0	-17.6	

LTE B48 10MHz 64QAM