LTE Band 26

Reference Frequency: LTE Band 26 Mid Channel		831.5	MHz @ 20°C	
Limit: to stay +- 2.5 ppm =		2078.750	Hz	
Power Supply	Environment	Frequency Deviation Measureed with Time Elapse		
(Vdc)	Temperature (°C)	(MHz)	Delta (ppm)	Limit (ppm)
0.00	50	831.500008	0.004	2.5
0.00	40	831.500011	-0.001	2.5
0.00	30	831.500009	0.002	2.5
0.00	***20***	**831.500011**	**0**	***2.5***
0.00	10	831.500009	0.002	2.5
0.00	0	831.500010	0.001	2.5
0.00	-10	831.500007	0.005	2.5
0.00	-20	831.500008	0.004	2.5
0.00	-30	831.500010	0.002	2.5

Reference Frequency: LTE Band 26 Mid Channel		831.5	MHz @ 20°C	
Limit: to stay +- 2.5 ppm =		2078.750	Hz	
Power Supply	Environment	Frequency Deviation Measured with Time Elapse		
(Vdc)	Temperature (°C)	(MHz)	Delta (ppm)	Limit (ppm)
0.00	***20***	***831.500011***	***0***	***2.5***
0.00	20	831.500000	*0.013*	2.5
0.00	20	831.500000	*0.013*	2.5

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LTE Band 30

Reference Frequency: LTE Band 30 Mid Channel		2310	MHz @ 20°C	
Limit: to stay +- 2.5 ppm =		5775.000	Hz	
Power Supply	Environment	Frequency Deviation Measureed with Time Elapse		
(Vdc)	Temperature (°C)	(MHz)	Delta (ppm)	Limit (ppm)
0.00	50	2310.000013	0.000	2.5
0.00	40	2310.000013	0.000	2.5
0.00	30	2310.000016	-0.001	2.5
0.00	***20***	**2310.000013**	**0**	***2.5***
0.00	10	2310.000016	-0.001	2.5
0.00	0	2310.000012	0.000	2.5
0.00	-10	2309.999990	0.010	2.5
0.00	-20	2310.000015	-0.001	2.5
0.00	-30	2309.999989	0.011	2.5

Reference Frequency: LTE Band 30 Mid Channel		2310	MHz @ 20°C	
Limit: to stay +- 2.5 ppm =		5775.000	Hz	
Power Supply	Environment	Frequency Deviation Measured with Time Elapse		
(Vdc)	Temperature (°C)	(MHz)	Delta (ppm)	Limit (ppm)
0.00	***20***	***2310.000013***	***0***	***2.5***
0.00	20	2310.000000	*0.006*	2.5
0.00	20	2310.000000	*0.006*	2.5

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LTE Band 41

Reference Frequency: LTE Band 41 Mid Channel		2593	MHz @ 20°C	
Limit: to stay +- 2.5 ppm =		6482.500	Hz	
Power Supply	Environment	Frequency Deviation Measureed with Time Elapse		
(Vdc)	Temperature (°C)	(MHz)	Delta (ppm)	Limit (ppm)
0.00	50	2593.000016	0.002	2.5
0.00	40	2593.000017	0.002	2.5
0.00	30	2593.000016	0.003	2.5
0.00	***20***	**2593.000022**	**0**	***2.5***
0.00	10	2593.000016	0.002	2.5
0.00	0	2593.000022	0.000	2.5
0.00	-10	2592.999988	0.013	2.5
0.00	-20	2593.000017	0.002	2.5
0.00	-30	2593.000016	0.002	2.5

Reference Frequency: LTE Band 41 Mid Channel		2593	MHz @ 20°C	
Limit: to stay +- 2.5 ppm =		6482.500	Hz	
Power Supply	Environment	Frequency Deviation Measured with Time Elapse		
(Vdc)	Temperature (°C)	(MHz)	Delta (ppm)	Limit (ppm)
0.00	***20***	***2593.000022***	***0***	***2.5***
0.00	20	2593.000000	*0.009*	2.5
0.00	20	2593.000000	*0.009*	2.5

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17. RADIATED TEST RESULTS

17.1. FIELD STRENGTH OF SPURIOUS RADIATION

RULE PART(S)

FCC: §2.1051, §22.359, §22.917, §24.238, §27.53, and §90.691
RSS-132, RSS-133, RSS-139, RSS-195, RSS-130, RSS-199

FCC LIMITS

FCC: §22.359, §22.917, §24.238, §27.53
The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log (P) dB.

§27.53 (g) For operations in the 698–746 MHz band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least 43 + 10 log (P) dB.
§27.53 (h) For operations in the 1710–1755 MHz and 2110–2155 MHz bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) by at least 43 + 10 log10(P) dB.

FCC: §90.210, and §90.691
(a)(1)For any frequency removed from the EA licensee's frequency block by up to and including 37.5 kHz, the power of any emission shall be attenuated below the transmitter power (P) in watts by at least 116 Log10 (f/6.1) decibels or 50 + 10 Log10(P) decibels or 80 decibels, whichever is the lesser attenuation, where f is the frequency removed from the center of the outer channel in the block in kilohertz and where f is greater than 12.5 kHz.

(a)(2)For any frequency removed from the EA licensee's frequency block greater than 37.5 kHz, the power of any emission shall be attenuated below the transmitter power (P) in watts by at least 43 + 10Log10 (P) decibels or 80 decibels, whichever is the lesser attenuation, where f is the frequency removed from the center of the outer channel in the block in kilohertz and where f is greater than 37.5 kHz. {NOTE: Use 100 kHz reference bandwidth.}

IC LIMITS

RSS-133, RSS-132, RSS-139 and RSS-130: The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log (P) dB.

RSS130
4.6.1 The power of any unwanted emissions in any 100 kHz bandwidth on any frequency outside the frequency range(s) within which the equipment is designed to operate shall be attenuated below the transmitter power, P (dBW), by at least 43 + 10 log10 p (watts), dB. However, in the 100 kHz band immediately outside the equipment's operating frequency range, a resolution bandwidth of 30 kHz may be employed.
4.6.2 In addition to the limit outlined in Section 4.6.1 above, equipment operating in the frequency bands 746-756 MHzand 777-787 MHz shall also comply with the following restrictions:
(a) The power of any unwanted emissions in any 6.25 kHz bandwidth for all frequencies between 763-775 MHzand 793-806 MHz shall be attenuated below the transmitter power, P (dBW), by at least:
(i) 76 + 10 log10 p (watts), dB, for base and fixed equipment, and
(ii) 65 + 10 log10 p (watts), dB, for mobile and portable equipment.

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RSS199
For mobile subscriber equipment, the power of any unwanted emissions measured as above shall be attenuated (in dB) below the transmitter power, P (dBW), by at least:

i) 40 + 10 log10 p from the channel edges to 5 MHz away,
ii) 43 + 10 log10 p between 5 MHz and X MHz from the channel edges, and
iii) 55 + 10 log10 p at X MHz and beyond from the channel edges.
iv) in addition, the attenuation shall be not be less than 43 + 10 log10 p on all frequencies between 2490.5 MHz and 2496 MHz and 55 + 10 log10 p at or below 2490.5 MHz.

TEST PROCEDURE

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

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

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17.1.1. SPURIOUS RADIATION PLOTS

WCDMA

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

Company: Microsoft
Project #: 11735596
Date: 8/14/2017
Test Engineer: 43575 OS
Configuration: EUT + AC
Location: Chamber C
Mode: Rel99 Band 2 Harmonics

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 1852.4									
3704.80	-18.5	V	3.0	33.9	1.0	-51.4	-13.0	-38.4	
5557.20	-21.1	V	3.0	33.1	1.0	-53.2	-13.0	-40.2	
7409.60	-19.7	V	3.0	32.9	1.0	-51.6	-13.0	-38.6	
3704.80	-20.5	H	3.0	33.9	1.0	-53.3	-13.0	-40.3	
5557.20	-19.8	H	3.0	33.1	1.0	-51.9	-13.0	-38.9	
7409.60	-19.8	H	3.0	32.9	1.0	-51.7	-13.0	-38.7	
Mid Ch, 1880									
3760.00	-20.9	V	3.0	33.8	1.0	-53.7	-13.0	-40.7	
5640.00	-19.1	V	3.0	33.1	1.0	-51.2	-13.0	-38.2	
7520.00	-17.5	V	3.0	32.8	1.0	-49.3	-13.0	-36.3	
3760.00	-20.6	H	3.0	33.8	1.0	-53.4	-13.0	-40.4	
5640.00	-19.3	H	3.0	33.1	1.0	-51.4	-13.0	-38.4	
7520.00	-18.6	H	3.0	32.8	1.0	-50.4	-13.0	-37.4	
High Ch, 1907.6									
3815.20	-20.7	V	3.0	33.7	1.0	-53.4	-13.0	-40.4	
5722.80	-19.8	V	3.0	33.1	1.0	-51.9	-13.0	-38.9	
7630.40	-19.4	V	3.0	32.8	1.0	-51.2	-13.0	-38.2	
3815.20	-21.1	H	3.0	33.7	1.0	-53.8	-13.0	-40.8	
5722.80	-19.4	H	3.0	33.1	1.0	-51.5	-13.0	-38.5	
7630.40	-19.3	H	3.0	32.8	1.0	-51.2	-13.0	-38.2	

B2 REL99

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

Company: Microsoft
Project #: 11735596
Date: 8/14/2017
Test Engineer: 43575 OS
Configuration: EUT + AC
Location: Chamber C
Mode: HSDPA Band 2 Harmonics

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 1852.4									
3704.80	-20.0	V	3.0	33.9	1.0	-52.9	-13.0	-39.9	
5557.20	-20.3	V	3.0	33.1	1.0	-52.4	-13.0	-39.4	
7409.60	-19.6	V	3.0	32.9	1.0	-51.4	-13.0	-38.4	
3704.80	-20.3	H	3.0	33.9	1.0	-53.2	-13.0	-40.2	
5557.20	-20.7	H	3.0	33.1	1.0	-52.8	-13.0	-39.8	
7409.60	-18.8	H	3.0	32.9	1.0	-50.6	-13.0	-37.6	
Mid Ch, 1880									
3760.00	-19.4	V	3.0	33.8	1.0	-52.2	-13.0	-39.2	
5640.00	-19.5	V	3.0	33.1	1.0	-51.6	-13.0	-38.6	
7520.00	-18.9	V	3.0	32.8	1.0	-50.8	-13.0	-37.8	
3760.00	-20.2	H	3.0	33.8	1.0	-53.0	-13.0	-40.0	
5640.00	-19.1	H	3.0	33.1	1.0	-51.2	-13.0	-38.2	
7520.00	-19.5	H	3.0	32.8	1.0	-51.3	-13.0	-38.3	
High Ch, 1907.6									
3815.20	-19.9	V	3.0	33.7	1.0	-52.7	-13.0	-39.7	
5722.80	-20.0	V	3.0	33.1	1.0	-52.1	-13.0	-39.1	
7630.40	-19.2	V	3.0	32.8	1.0	-51.1	-13.0	-38.1	
3815.20	-20.5	H	3.0	33.7	1.0	-53.3	-13.0	-40.3	
5722.80	-20.0	H	3.0	33.1	1.0	-52.1	-13.0	-39.1	
7630.40	-18.9	H	3.0	32.8	1.0	-50.7	-13.0	-37.7	

B2 HSDPA

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

Company: Microsoft
Project #: 11735596
Date: 8/14/2017
Test Engineer: 43575 OS
Configuration: EUT + AC
Location: Chamber C
Mode: Rel99 Band 5 Harmonics

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 826.4									
1652.80	-24.1	V	3.0	36.4	1.0	-59.4	-13.0	-46.4	
2479.20	-21.7	V	3.0	35.0	1.0	-55.7	-13.0	-42.7	
3305.60	-21.1	V	3.0	34.3	1.0	-54.4	-13.0	-41.4	
1652.80	-24.7	H	3.0	36.4	1.0	-60.1	-13.0	-47.1	
2479.20	-21.0	H	3.0	35.0	1.0	-55.0	-13.0	-42.0	
3305.60	-21.4	H	3.0	34.3	1.0	-54.7	-13.0	-41.7	
Mid Ch, 836.6									
1673.20	-24.6	V	3.0	36.3	1.0	-59.9	-13.0	-46.9	
2509.80	-22.2	V	3.0	34.9	1.0	-56.1	-13.0	-43.1	
3346.40	-20.9	V	3.0	34.2	1.0	-54.1	-13.0	-41.1	
1673.20	-24.1	H	3.0	36.3	1.0	-59.4	-13.0	-46.4	
2509.80	-20.3	H	3.0	34.9	1.0	-54.2	-13.0	-41.2	
3346.40	-21.6	H	3.0	34.2	1.0	-54.9	-13.0	-41.9	
High Ch, 846.6									
1693.20	-24.3	V	3.0	36.3	1.0	-59.6	-13.0	-46.6	
2539.80	-23.5	V	3.0	34.9	1.0	-57.4	-13.0	-44.4	
3386.40	-20.8	V	3.0	34.2	1.0	-54.0	-13.0	-41.0	
1693.20	-22.9	H	3.0	36.3	1.0	-58.2	-13.0	-45.2	
2539.80	-21.3	H	3.0	34.9	1.0	-55.2	-13.0	-42.2	
3386.40	-22.0	H	3.0	34.2	1.0	-55.2	-13.0	-42.2	

B5 REL99

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

Company: Microsoft
Project #: 11735596
Date: 8/14/2017
Test Engineer: 43575 OS
Configuration: EUT + AC
Location: Chamber C
Mode: HSDPA Band 5 Harmonics

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 826.4									
1652.80	-24.8	V	3.0	36.4	1.0	-60.2	-13.0	-47.2	
2479.20	-23.0	V	3.0	35.0	1.0	-57.0	-13.0	-44.0	
3305.60	-21.2	V	3.0	34.3	1.0	-54.5	-13.0	-41.5	
1652.80	-25.2	H	3.0	36.4	1.0	-60.5	-13.0	-47.5	
2479.20	-22.8	H	3.0	35.0	1.0	-56.8	-13.0	-43.8	
3305.60	-21.8	H	3.0	34.3	1.0	-55.1	-13.0	-42.1	
Mid Ch, 836.6									
1673.20	-23.6	V	3.0	36.3	1.0	-58.9	-13.0	-45.9	
2509.80	-22.5	V	3.0	34.9	1.0	-56.5	-13.0	-43.5	
3346.40	-21.0	V	3.0	34.2	1.0	-54.2	-13.0	-41.2	
1673.20	-24.5	H	3.0	36.3	1.0	-59.8	-13.0	-46.8	
2509.80	-23.1	H	3.0	34.9	1.0	-57.0	-13.0	-44.0	
3346.40	-21.3	H	3.0	34.2	1.0	-54.5	-13.0	-41.5	
High Ch, 846.6									
1693.20	-25.0	V	3.0	36.3	1.0	-60.3	-13.0	-47.3	
2539.80	-22.9	V	3.0	34.9	1.0	-56.8	-13.0	-43.8	
3386.40	-20.8	V	3.0	34.2	1.0	-54.0	-13.0	-41.0	
1693.20	-24.3	H	3.0	36.3	1.0	-59.6	-13.0	-46.6	
2539.80	-22.6	H	3.0	34.9	1.0	-56.5	-13.0	-43.5	
3386.40	-21.8	H	3.0	34.2	1.0	-55.0	-13.0	-42.0	

B5 HSDPA

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LTE Band 2

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

Company: Microsoft
Project #: 11735596
Date: 8/7/2017
Test Engineer: 43575 OS
Configuration: EUT + AC + Headset
Location: Chamber C
Mode: LTE_QPSK Band 2 Harmonics, 1.4MHz 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, 1850.7									
3701.40	-19.8	V	3.0	33.9	1.0	-52.7	-13.0	-39.7	
5552.10	-20.5	V	3.0	33.1	1.0	-52.6	-13.0	-39.6	
7402.80	-19.1	V	3.0	32.9	1.0	-50.9	-13.0	-37.9	
3701.40	-20.5	H	3.0	33.9	1.0	-53.3	-13.0	-40.3	
5552.10	-21.4	H	3.0	33.1	1.0	-53.5	-13.0	-40.5	
7402.80	-19.5	H	3.0	32.9	1.0	-51.3	-13.0	-38.3	
Mid Ch, 1880									
3760.00	-19.5	V	3.0	33.8	1.0	-52.3	-13.0	-39.3	
5640.00	-18.5	V	3.0	33.1	1.0	-50.6	-13.0	-37.6	
7520.00	-19.0	V	3.0	32.8	1.0	-50.9	-13.0	-37.9	
3760.00	-20.7	H	3.0	33.8	1.0	-53.5	-13.0	-40.5	
5640.00	-18.3	H	3.0	33.1	1.0	-50.4	-13.0	-37.4	
7520.00	-18.7	H	3.0	32.8	1.0	-50.6	-13.0	-37.6	
High Ch, 1909.3									
3818.60	-19.7	V	3.0	33.7	1.0	-52.5	-13.0	-39.5	
5727.90	-19.9	V	3.0	33.1	1.0	-52.0	-13.0	-39.0	
7637.20	-18.8	V	3.0	32.8	1.0	-50.6	-13.0	-37.6	
3818.60	-20.5	H	3.0	33.7	1.0	-53.2	-13.0	-40.2	
5727.90	-19.5	H	3.0	33.1	1.0	-51.5	-13.0	-38.5	
7637.20	-18.2	H	3.0	32.8	1.0	-50.1	-13.0	-37.1	

LTE B2 1.4MHz QPSK

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

Company: Microsoft
Project #: 11735596
Date: 8/7/2017
Test Engineer: 43575 OS
Configuration: EUT + AC + Headset
Location: Chamber C
Mode: LTE_16QAM Band 2 Harmonics, 1.4MHz 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, 1850.7									
3701.40	-19.7	V	3.0	33.9	1.0	-52.5	-13.0	-39.5	
5552.10	-19.8	V	3.0	33.1	1.0	-51.9	-13.0	-38.9	
7402.80	-19.5	V	3.0	32.9	1.0	-51.4	-13.0	-38.4	
3701.40	-20.6	H	3.0	33.9	1.0	-53.5	-13.0	-40.5	
5552.10	-20.1	H	3.0	33.1	1.0	-52.3	-13.0	-39.3	
7402.80	-18.7	H	3.0	32.9	1.0	-50.5	-13.0	-37.5	
Mid Ch, 1880									
3760.00	-20.2	V	3.0	33.8	1.0	-53.0	-13.0	-40.0	
5640.00	-19.1	V	3.0	33.1	1.0	-51.2	-13.0	-38.2	
7520.00	-18.1	V	3.0	32.8	1.0	-49.9	-13.0	-36.9	
3760.00	-20.2	H	3.0	33.8	1.0	-53.0	-13.0	-40.0	
5640.00	-19.0	H	3.0	33.1	1.0	-51.1	-13.0	-38.1	
7520.00	-19.0	H	3.0	32.8	1.0	-50.9	-13.0	-37.9	
High Ch, 1909.3									
3818.60	-19.4	V	3.0	33.7	1.0	-52.2	-13.0	-39.2	
5727.90	-19.6	V	3.0	33.1	1.0	-51.7	-13.0	-38.7	
7637.20	-18.5	V	3.0	32.8	1.0	-50.4	-13.0	-37.4	
3818.60	-21.1	H	3.0	33.7	1.0	-53.8	-13.0	-40.8	
5727.90	-20.4	H	3.0	33.1	1.0	-52.5	-13.0	-39.5	
7637.20	-18.2	H	3.0	32.8	1.0	-50.1	-13.0	-37.1	

LTE B2 1.4MHz 16QAM

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

Company: Microsoft
Project #: 11735596
Date: 8/7/2017
Test Engineer: 43575 OS
Configuration: EUT + AC + Headset
Location: Chamber C
Mode: LTE_QPSK Band 2 Harmonics, 3MHz 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, 1851.5									
3703.00	-20.0	V	3.0	33.9	1.0	-52.9	-13.0	-39.9	
5554.50	-19.5	V	3.0	33.1	1.0	-51.6	-13.0	-38.6	
7406.00	-19.1	V	3.0	32.9	1.0	-51.0	-13.0	-38.0	
3703.00	-20.0	H	3.0	33.9	1.0	-52.9	-13.0	-39.9	
5554.50	-20.7	H	3.0	33.1	1.0	-52.8	-13.0	-39.8	
7406.00	-19.0	H	3.0	32.9	1.0	-50.9	-13.0	-37.9	
Mid Ch, 1880									
3760.00	-19.9	V	3.0	33.8	1.0	-52.7	-13.0	-39.7	
5640.00	-18.1	V	3.0	33.1	1.0	-50.2	-13.0	-37.2	
7520.00	-17.0	V	3.0	32.8	1.0	-48.9	-13.0	-35.9	
3760.00	-20.4	H	3.0	33.8	1.0	-53.2	-13.0	-40.2	
5640.00	-18.3	H	3.0	33.1	1.0	-50.4	-13.0	-37.4	
7520.00	-18.1	H	3.0	32.8	1.0	-50.0	-13.0	-37.0	
High Ch, 1908.5									
3817.00	-20.3	V	3.0	33.7	1.0	-53.0	-13.0	-40.0	
5725.50	-19.0	V	3.0	33.1	1.0	-51.1	-13.0	-38.1	
7634.00	-18.1	V	3.0	32.8	1.0	-49.9	-13.0	-36.9	
3817.00	-20.0	H	3.0	33.7	1.0	-52.8	-13.0	-39.8	
5725.50	-20.1	H	3.0	33.1	1.0	-52.2	-13.0	-39.2	
7634.00	-18.2	H	3.0	32.8	1.0	-50.0	-13.0	-37.0	

LTE B2 3MHz QPSK

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

Company: Microsoft
Project #: 11735596
Date: 8/7/2017
Test Engineer: 43575 OS
Configuration: EUT + AC + Headset
Location: Chamber C
Mode: LTE_16QAM Band 2 Harmonics, 3MHz 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, 1851.5									
3703.00	-19.8	V	3.0	33.9	1.0	-52.7	-13.0	-39.7	
5554.50	-20.7	V	3.0	33.1	1.0	-52.9	-13.0	-39.9	
7406.00	-19.0	V	3.0	32.9	1.0	-50.8	-13.0	-37.8	
3703.00	-19.0	H	3.0	33.9	1.0	-51.9	-13.0	-38.9	
5554.50	-19.7	H	3.0	33.1	1.0	-51.9	-13.0	-38.9	
7406.00	-19.0	H	3.0	32.9	1.0	-50.8	-13.0	-37.8	
Mid Ch, 1880									
3760.00	-19.9	V	3.0	33.8	1.0	-52.7	-13.0	-39.7	
5640.00	-18.6	V	3.0	33.1	1.0	-50.7	-13.0	-37.7	
7520.00	-18.6	V	3.0	32.8	1.0	-50.5	-13.0	-37.5	
3760.00	-20.9	H	3.0	33.8	1.0	-53.7	-13.0	-40.7	
5640.00	-18.8	H	3.0	33.1	1.0	-50.9	-13.0	-37.9	
7520.00	-17.6	H	3.0	32.8	1.0	-49.5	-13.0	-36.5	
High Ch, 1908.5									
3817.00	-20.1	V	3.0	33.7	1.0	-52.8	-13.0	-39.8	
5725.50	-19.6	V	3.0	33.1	1.0	-51.6	-13.0	-38.6	
7634.00	-18.1	V	3.0	32.8	1.0	-49.9	-13.0	-36.9	
3817.00	-20.0	H	3.0	33.7	1.0	-52.7	-13.0	-39.7	
5725.50	-17.5	H	3.0	33.1	1.0	-49.6	-13.0	-36.6	
7634.00	-17.5	H	3.0	32.8	1.0	-49.3	-13.0	-36.3	

LTE B2 3MHz 16QAM

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

Company: Microsoft
Project #: 11735596
Date: 8/7/2017
Test Engineer: 43575 OS
Configuration: EUT + AC + Headset
Location: Chamber C
Mode: LTE_QPSK Band 2 Harmonics, 5MHz 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, 1852.5									
3705.00	-20.2	V	3.0	33.9	1.0	-53.0	-13.0	-40.0	
5557.50	-20.3	V	3.0	33.1	1.0	-52.4	-13.0	-39.4	
7410.00	-19.4	V	3.0	32.9	1.0	-51.3	-13.0	-38.3	
3705.00	-19.8	H	3.0	33.9	1.0	-52.6	-13.0	-39.6	
5557.50	-20.5	H	3.0	33.1	1.0	-52.6	-13.0	-39.6	
7410.00	-19.5	H	3.0	32.9	1.0	-51.4	-13.0	-38.4	
Mid Ch, 1880									
3760.00	-20.1	V	3.0	33.8	1.0	-52.9	-13.0	-39.9	
5640.00	-18.4	V	3.0	33.1	1.0	-50.5	-13.0	-37.5	
7520.00	-18.7	V	3.0	32.8	1.0	-50.5	-13.0	-37.5	
3760.00	-20.6	H	3.0	33.8	1.0	-53.4	-13.0	-40.4	
5640.00	-18.7	H	3.0	33.1	1.0	-50.8	-13.0	-37.8	
7520.00	-18.8	H	3.0	32.8	1.0	-50.7	-13.0	-37.7	
High Ch, 1907.5									
3815.00	-20.0	V	3.0	33.7	1.0	-52.8	-13.0	-39.8	
5722.50	-19.7	V	3.0	33.1	1.0	-51.8	-13.0	-38.8	
7630.00	-16.7	V	3.0	32.8	1.0	-48.6	-13.0	-35.6	
3815.00	-18.9	H	3.0	33.7	1.0	-51.6	-13.0	-38.6	
5722.50	-19.1	H	3.0	33.1	1.0	-51.2	-13.0	-38.2	
7630.00	-18.8	H	3.0	32.8	1.0	-50.6	-13.0	-37.6	

LTE B2 5MHz QPSK

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

Company: Microsoft
Project #: 11735596
Date: 8/7/2017
Test Engineer: 43575 OS
Configuration: EUT + AC + Headset
Location: Chamber C
Mode: LTE_16QAM Band 2 Harmonics, 5MHz 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, 1852.5									
3705.00	-19.9	V	3.0	33.9	1.0	-52.8	-13.0	-39.8	
5557.50	-20.5	V	3.0	33.1	1.0	-52.6	-13.0	-39.6	
7410.00	-18.9	V	3.0	32.9	1.0	-50.7	-13.0	-37.7	
3705.00	-20.4	H	3.0	33.9	1.0	-53.2	-13.0	-40.2	
5557.50	-20.4	H	3.0	33.1	1.0	-52.5	-13.0	-39.5	
7410.00	-19.1	H	3.0	32.9	1.0	-51.0	-13.0	-38.0	
Mid Ch, 1880									
3760.00	-20.1	V	3.0	33.8	1.0	-52.9	-13.0	-39.9	
5640.00	-19.2	V	3.0	33.1	1.0	-51.3	-13.0	-38.3	
7520.00	-18.1	V	3.0	32.8	1.0	-49.9	-13.0	-36.9	
3760.00	-19.6	H	3.0	33.8	1.0	-52.4	-13.0	-39.4	
5640.00	-19.0	H	3.0	33.1	1.0	-51.1	-13.0	-38.1	
7520.00	-18.7	H	3.0	32.8	1.0	-50.5	-13.0	-37.5	
High Ch, 1907.5									
3815.00	-20.1	V	3.0	33.7	1.0	-52.8	-13.0	-39.8	
5722.50	-19.3	V	3.0	33.1	1.0	-51.4	-13.0	-38.4	
7630.00	-17.9	V	3.0	32.8	1.0	-49.7	-13.0	-36.7	
3815.00	-19.3	H	3.0	33.7	1.0	-52.0	-13.0	-39.0	
5722.50	-19.9	H	3.0	33.1	1.0	-52.0	-13.0	-39.0	
7630.00	-18.5	H	3.0	32.8	1.0	-50.3	-13.0	-37.3	

LTE B2 5MHz 16QAM

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701H
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888

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

Company: Microsoft
Project #: 11735596
Date: 8/7/2017
Test Engineer: 43575 OS
Configuration: EUT + AC + Headset
Location: Chamber C
Mode: LTE_QPSK Band 2 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, 1855									
3710.00	-19.6	V	3.0	33.9	1.0	-52.5	-13.0	-39.5	
5565.00	-19.2	V	3.0	33.1	1.0	-51.3	-13.0	-38.3	
7420.00	-19.9	V	3.0	32.9	1.0	-51.8	-13.0	-38.8	
3710.00	-20.1	H	3.0	33.9	1.0	-53.0	-13.0	-40.0	
5565.00	-19.5	H	3.0	33.1	1.0	-51.6	-13.0	-38.6	
7420.00	-19.3	H	3.0	32.9	1.0	-51.1	-13.0	-38.1	
Mid Ch, 1880									
3760.00	-19.5	V	3.0	33.8	1.0	-52.3	-13.0	-39.3	
5640.00	-18.8	V	3.0	33.1	1.0	-50.9	-13.0	-37.9	
7520.00	-14.7	V	3.0	32.8	1.0	-46.6	-13.0	-33.6	
3760.00	-21.0	H	3.0	33.8	1.0	-53.8	-13.0	-40.8	
5640.00	-18.6	H	3.0	33.1	1.0	-50.7	-13.0	-37.7	
7520.00	-18.7	H	3.0	32.8	1.0	-50.6	-13.0	-37.6	
High Ch, 1905									
3810.00	-20.2	V	3.0	33.8	1.0	-53.0	-13.0	-40.0	
5715.00	-18.3	V	3.0	33.1	1.0	-50.4	-13.0	-37.4	
7620.00	-17.9	V	3.0	32.8	1.0	-49.7	-13.0	-36.7	
3810.00	-20.4	H	3.0	33.8	1.0	-53.1	-13.0	-40.1	
5715.00	-19.7	H	3.0	33.1	1.0	-51.7	-13.0	-38.7	
7620.00	-18.8	H	3.0	32.8	1.0	-50.7	-13.0	-37.7	

LTE B2 10MHz QPSK

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

Company: Microsoft
Project #: 11735596
Date: 8/7/2017
Test Engineer: 43575 OS
Configuration: EUT + AC + Headset
Location: Chamber C
Mode: LTE_16QAM Band 2 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, 1855									
3710.00	-19.9	V	3.0	33.9	1.0	-52.8	-13.0	-39.8	
5565.00	-20.2	V	3.0	33.1	1.0	-52.3	-13.0	-39.3	
7420.00	-19.5	V	3.0	32.9	1.0	-51.4	-13.0	-38.4	
3710.00	-20.0	H	3.0	33.9	1.0	-52.8	-13.0	-39.8	
5565.00	-19.7	H	3.0	33.1	1.0	-51.8	-13.0	-38.8	
7420.00	-19.6	H	3.0	32.9	1.0	-51.4	-13.0	-38.4	
Mid Ch, 1880									
3760.00	-20.0	V	3.0	33.8	1.0	-52.8	-13.0	-39.8	
5640.00	-19.0	V	3.0	33.1	1.0	-51.1	-13.0	-38.1	
7520.00	-15.8	V	3.0	32.8	1.0	-47.7	-13.0	-34.7	
3760.00	-21.1	H	3.0	33.8	1.0	-53.9	-13.0	-40.9	
5640.00	-19.7	H	3.0	33.1	1.0	-51.8	-13.0	-38.8	
7520.00	-18.7	H	3.0	32.8	1.0	-50.6	-13.0	-37.6	
High Ch, 1905									
3810.00	-19.1	V	3.0	33.8	1.0	-51.9	-13.0	-38.9	
5715.00	-18.9	V	3.0	33.1	1.0	-51.0	-13.0	-38.0	
7620.00	-17.1	V	3.0	32.8	1.0	-48.9	-13.0	-35.9	
3810.00	-21.0	H	3.0	33.8	1.0	-53.8	-13.0	-40.8	
5715.00	-18.9	H	3.0	33.1	1.0	-51.0	-13.0	-38.0	
7620.00	-18.2	H	3.0	32.8	1.0	-50.1	-13.0	-37.1	

LTE B2 10MHz 16QAM

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

Company: Microsoft
Project #: 11735596
Date: 8/7/2017
Test Engineer: 43575 OS
Configuration: EUT + AC + Headset
Location: Chamber C
Mode: LTE_QPSK Band 2 Harmonics, 15MHz 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, 1857.5									
3715.00	-19.9	V	3.0	33.9	1.0	-52.8	-13.0	-39.8	
5572.50	-19.0	V	3.0	33.1	1.0	-51.1	-13.0	-38.1	
7430.00	-18.0	V	3.0	32.9	1.0	-49.9	-13.0	-36.9	
3715.00	-20.7	H	3.0	33.9	1.0	-53.5	-13.0	-40.5	
5572.50	-20.1	H	3.0	33.1	1.0	-52.2	-13.0	-39.2	
7430.00	-19.1	H	3.0	32.9	1.0	-50.9	-13.0	-37.9	
Mid Ch, 1880									
3760.00	-20.0	V	3.0	33.8	1.0	-52.8	-13.0	-39.8	
5640.00	-18.6	V	3.0	33.1	1.0	-50.7	-13.0	-37.7	
7520.00	-18.3	V	3.0	32.8	1.0	-50.1	-13.0	-37.1	
3760.00	-21.0	H	3.0	33.8	1.0	-53.9	-13.0	-40.9	
5640.00	-19.0	H	3.0	33.1	1.0	-51.1	-13.0	-38.1	
7520.00	-17.5	H	3.0	32.8	1.0	-49.4	-13.0	-36.4	
High Ch, 1902.5									
3805.00	-19.5	V	3.0	33.8	1.0	-52.3	-13.0	-39.3	
5707.50	-17.7	V	3.0	33.1	1.0	-49.8	-13.0	-36.8	
7610.00	-18.7	V	3.0	32.8	1.0	-50.5	-13.0	-37.5	
3805.00	-21.1	H	3.0	33.8	1.0	-53.9	-13.0	-40.9	
5707.50	-18.3	H	3.0	33.1	1.0	-50.4	-13.0	-37.4	
7610.00	-18.4	H	3.0	32.8	1.0	-50.2	-13.0	-37.2	

LTE B2 15MHz QPSK

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

Company: Microsoft
Project #: 11735596
Date: 8/7/2017
Test Engineer: 43575 OS
Configuration: EUT + AC + Headset
Location: Chamber C
Mode: LTE_16QAM Band 2 Harmonics, 15MHz 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, 1857.5									
3715.00	-20.6	V	3.0	33.9	1.0	-53.5	-13.0	-40.5	
5572.50	-19.1	V	3.0	33.1	1.0	-51.2	-13.0	-38.2	
7430.00	-19.2	V	3.0	32.9	1.0	-51.0	-13.0	-38.0	
3715.00	-21.1	H	3.0	33.9	1.0	-54.0	-13.0	-41.0	
5572.50	-19.7	H	3.0	33.1	1.0	-51.8	-13.0	-38.8	
7430.00	-19.4	H	3.0	32.9	1.0	-51.3	-13.0	-38.3	
Mid Ch, 1880									
3760.00	-19.3	V	3.0	33.8	1.0	-52.1	-13.0	-39.1	
5640.00	-18.2	V	3.0	33.1	1.0	-50.3	-13.0	-37.3	
7520.00	-18.2	V	3.0	32.8	1.0	-50.0	-13.0	-37.0	
3760.00	-19.0	H	3.0	33.8	1.0	-51.8	-13.0	-38.8	
5640.00	-18.9	H	3.0	33.1	1.0	-51.0	-13.0	-38.0	
7520.00	-18.5	H	3.0	32.8	1.0	-50.3	-13.0	-37.3	
High Ch, 1902.5									
3805.00	-20.4	V	3.0	33.8	1.0	-53.1	-13.0	-40.1	
5707.50	-19.1	V	3.0	33.1	1.0	-51.2	-13.0	-38.2	
7610.00	-18.5	V	3.0	32.8	1.0	-50.3	-13.0	-37.3	
3805.00	-20.1	H	3.0	33.8	1.0	-52.9	-13.0	-39.9	
5707.50	-17.9	H	3.0	33.1	1.0	-50.0	-13.0	-37.0	
7610.00	-18.3	H	3.0	32.8	1.0	-50.2	-13.0	-37.2	

LTE B2 15MHz 16QAM

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

Company: Microsoft
Project #: 11735596
Date: 8/7/2017
Test Engineer: 43575 OS
Configuration: EUT + AC + Headset
Location: Chamber C
Mode: LTE_QPSK Band 2 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, 1860									
3720.00	-19.9	V	3.0	33.8	1.0	-52.7	-13.0	-39.7	
5580.00	-19.7	V	3.0	33.1	1.0	-51.8	-13.0	-38.8	
7440.00	-19.3	V	3.0	32.9	1.0	-51.1	-13.0	-38.1	
3720.00	-20.1	H	3.0	33.8	1.0	-52.9	-13.0	-39.9	
5580.00	-18.9	H	3.0	33.1	1.0	-51.0	-13.0	-38.0	
7440.00	-19.2	H	3.0	32.9	1.0	-51.1	-13.0	-38.1	
Mid Ch, 1880									
3760.00	-20.3	V	3.0	33.8	1.0	-53.1	-13.0	-40.1	
5640.00	-19.2	V	3.0	33.1	1.0	-51.3	-13.0	-38.3	
7520.00	-18.6	V	3.0	32.8	1.0	-50.5	-13.0	-37.5	
3760.00	-20.1	H	3.0	33.8	1.0	-52.9	-13.0	-39.9	
5640.00	-18.7	H	3.0	33.1	1.0	-50.8	-13.0	-37.8	
7520.00	-18.4	H	3.0	32.8	1.0	-50.2	-13.0	-37.2	
High Ch, 1900									
3800.00	-20.0	V	3.0	33.8	1.0	-52.7	-13.0	-39.7	
5700.00	-19.0	V	3.0	33.1	1.0	-51.1	-13.0	-38.1	
7600.00	-17.4	V	3.0	32.8	1.0	-49.3	-13.0	-36.3	
3800.00	-20.4	H	3.0	33.8	1.0	-53.2	-13.0	-40.2	
5700.00	-18.7	H	3.0	33.1	1.0	-50.8	-13.0	-37.8	
7600.00	-17.3	H	3.0	32.8	1.0	-49.1	-13.0	-36.1	

LTE B2 20MHz QPSK

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

Company: Microsoft
Project #: 11735596
Date: 8/7/2017
Test Engineer: 43575 OS
Configuration: EUT + AC + Headset
Location: Chamber C
Mode: LTE_16QAM Band 2 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, 1860									
3720.00	-19.9	V	3.0	33.8	1.0	-52.7	-13.0	-39.7	
5580.00	-19.2	V	3.0	33.1	1.0	-51.3	-13.0	-38.3	
7440.00	-19.3	V	3.0	32.9	1.0	-51.1	-13.0	-38.1	
3720.00	-21.0	H	3.0	33.8	1.0	-53.9	-13.0	-40.9	
5580.00	-18.7	H	3.0	33.1	1.0	-50.8	-13.0	-37.8	
7440.00	-19.0	H	3.0	32.9	1.0	-50.9	-13.0	-37.9	
Mid Ch, 1880									
3760.00	-19.3	V	3.0	33.8	1.0	-52.1	-13.0	-39.1	
5640.00	-19.1	V	3.0	33.1	1.0	-51.2	-13.0	-38.2	
7520.00	-18.9	V	3.0	32.8	1.0	-50.7	-13.0	-37.7	
3760.00	-19.7	H	3.0	33.8	1.0	-52.5	-13.0	-39.5	
5640.00	-19.3	H	3.0	33.1	1.0	-51.4	-13.0	-38.4	
7520.00	-18.4	H	3.0	32.8	1.0	-50.3	-13.0	-37.3	
High Ch, 1900									
3800.00	-20.1	V	3.0	33.8	1.0	-52.9	-13.0	-39.9	
5700.00	-19.0	V	3.0	33.1	1.0	-51.0	-13.0	-38.0	
7600.00	-18.4	V	3.0	32.8	1.0	-50.3	-13.0	-37.3	
3800.00	-20.4	H	3.0	33.8	1.0	-53.1	-13.0	-40.1	
5700.00	-18.6	H	3.0	33.1	1.0	-50.7	-13.0	-37.7	
7600.00	-18.3	H	3.0	32.8	1.0	-50.1	-13.0	-37.1	

LTE B2 20MHz 16QAM

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701H
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888

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LTE Band 4

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

Company: Microsoft
Project #: 11735596
Date: 8/7/2017
Test Engineer: 43575 OS
Configuration: EUT + AC + Headset
Location: Chamber C
Mode: LTE_QPSK Band 4 Harmonics, 1.4MHz 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, 1710.7									
3421.40	-16.9	V	3.0	34.2	1.0	-50.0	-13.0	-37.0	
5132.10	-18.4	V	3.0	33.2	1.0	-50.6	-13.0	-37.6	
6842.80	-18.7	V	3.0	32.9	1.0	-50.6	-13.0	-37.6	
3421.40	-20.8	H	3.0	34.2	1.0	-54.0	-13.0	-41.0	
5132.10	-19.5	H	3.0	33.2	1.0	-51.7	-13.0	-38.7	
6842.80	-18.9	H	3.0	32.9	1.0	-50.8	-13.0	-37.8	
Mid Ch, 1732.5									
3465.00	-19.4	V	3.0	34.1	1.0	-52.5	-13.0	-39.5	
5197.50	-18.7	V	3.0	33.2	1.0	-50.9	-13.0	-37.9	
6930.00	-17.1	V	3.0	32.9	1.0	-49.0	-13.0	-36.0	
3465.00	-18.4	H	3.0	34.1	1.0	-51.5	-13.0	-38.5	
5197.50	-19.6	H	3.0	33.2	1.0	-51.8	-13.0	-38.8	
6930.00	-19.5	H	3.0	32.9	1.0	-51.4	-13.0	-38.4	
High Ch, 1754.3									
3508.60	-20.3	V	3.0	34.1	1.0	-53.3	-13.0	-40.3	
5262.90	-19.3	V	3.0	33.2	1.0	-51.5	-13.0	-38.5	
7017.20	-19.4	V	3.0	32.9	1.0	-51.3	-13.0	-38.3	
3508.60	-20.3	H	3.0	34.1	1.0	-53.3	-13.0	-40.3	
5262.90	-19.6	H	3.0	33.2	1.0	-51.7	-13.0	-38.7	
7017.20	-19.5	H	3.0	32.9	1.0	-51.4	-13.0	-38.4	

LTE B4 1.4MHz QPSK

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

Company: Microsoft
Project #: 11735596
Date: 8/7/2017
Test Engineer: 43575 OS
Configuration: EUT + AC + Headset
Location: Chamber C
Mode: LTE_16QAM Band 4 Harmonics, 1.4MHz 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, 1710.7									
3421.40	-18.0	V	3.0	34.2	1.0	-51.1	-13.0	-38.1	
5132.10	-19.0	V	3.0	33.2	1.0	-51.2	-13.0	-38.2	
6842.80	-19.1	V	3.0	32.9	1.0	-51.0	-13.0	-38.0	
3421.40	-20.4	H	3.0	34.2	1.0	-53.6	-13.0	-40.6	
5132.10	-20.0	H	3.0	33.2	1.0	-52.2	-13.0	-39.2	
6842.80	-18.2	H	3.0	32.9	1.0	-50.1	-13.0	-37.1	
Mid Ch, 1732.5									
3465.00	-19.1	V	3.0	34.1	1.0	-52.2	-13.0	-39.2	
5197.50	-19.7	V	3.0	33.2	1.0	-51.9	-13.0	-38.9	
6930.00	-18.5	V	3.0	32.9	1.0	-50.4	-13.0	-37.4	
3465.00	-19.5	H	3.0	34.1	1.0	-52.6	-13.0	-39.6	
5197.50	-20.1	H	3.0	33.2	1.0	-52.2	-13.0	-39.2	
6930.00	-18.9	H	3.0	32.9	1.0	-50.8	-13.0	-37.8	
High Ch, 1754.3									
3508.60	-20.4	V	3.0	34.1	1.0	-53.4	-13.0	-40.4	
5262.90	-20.6	V	3.0	33.2	1.0	-52.7	-13.0	-39.7	
7017.20	-18.7	V	3.0	32.9	1.0	-50.6	-13.0	-37.6	
3508.60	-20.4	H	3.0	34.1	1.0	-53.4	-13.0	-40.4	
5262.90	-20.6	H	3.0	33.2	1.0	-52.7	-13.0	-39.7	
7017.20	-19.8	H	3.0	32.9	1.0	-51.7	-13.0	-38.7	

LTE B4 1.4MHz 16QAM

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

Company: Microsoft
Project #: 11735596
Date: 8/7/2017
Test Engineer: 43575 OS
Configuration: EUT + AC + Headset
Location: Chamber C
Mode: LTE_QPSK Band 4 Harmonics, 3MHz 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, 1711.5									
3423.00	-19.2	V	3.0	34.1	1.0	-52.4	-13.0	-39.4	
5134.50	-18.4	V	3.0	33.2	1.0	-50.6	-13.0	-37.6	
6846.00	-18.1	V	3.0	32.9	1.0	-50.0	-13.0	-37.0	
3423.00	-18.1	H	3.0	34.1	1.0	-51.3	-13.0	-38.3	
5134.50	-16.0	H	3.0	33.2	1.0	-48.2	-13.0	-35.2	
6846.00	-19.1	H	3.0	32.9	1.0	-51.0	-13.0	-38.0	
Mid Ch, 1732.5									
3465.00	-18.7	V	3.0	34.1	1.0	-51.8	-13.0	-38.8	
5197.50	-19.6	V	3.0	33.2	1.0	-51.8	-13.0	-38.8	
6930.00	-18.8	V	3.0	32.9	1.0	-50.6	-13.0	-37.6	
3465.00	-18.2	H	3.0	34.1	1.0	-51.3	-13.0	-38.3	
5197.50	-19.6	H	3.0	33.2	1.0	-51.7	-13.0	-38.7	
6930.00	-17.6	H	3.0	32.9	1.0	-49.5	-13.0	-36.5	
High Ch, 1753.5									
3507.00	-18.3	V	3.0	34.1	1.0	-51.4	-13.0	-38.4	
5260.50	-20.8	V	3.0	33.2	1.0	-53.0	-13.0	-40.0	
7014.00	-18.8	V	3.0	32.9	1.0	-50.7	-13.0	-37.7	
3507.00	-15.6	H	3.0	34.1	1.0	-48.7	-13.0	-35.7	
5260.50	-20.3	H	3.0	33.2	1.0	-52.4	-13.0	-39.4	
7014.00	-18.6	H	3.0	32.9	1.0	-50.4	-13.0	-37.4	

LTE B4 3MHz QPSK

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

Company: Microsoft
Project #: 11735596
Date: 8/7/2017
Test Engineer: 43575 OS
Configuration: EUT + AC + Headset
Location: Chamber C
Mode: LTE_16QAM Band 4 Harmonics, 3MHz 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, 1711.5									
3423.00	-19.9	V	3.0	34.1	1.0	-53.1	-13.0	-40.1	
5134.50	-19.3	V	3.0	33.2	1.0	-51.5	-13.0	-38.5	
6846.00	-18.2	V	3.0	32.9	1.0	-50.1	-13.0	-37.1	
3423.00	-18.1	H	3.0	34.1	1.0	-51.2	-13.0	-38.2	
5134.50	-17.3	H	3.0	33.2	1.0	-49.5	-13.0	-36.5	
6846.00	-18.3	H	3.0	32.9	1.0	-50.2	-13.0	-37.2	
Mid Ch, 1732.5									
3465.00	-19.9	V	3.0	34.1	1.0	-53.0	-13.0	-40.0	
5197.50	-20.1	V	3.0	33.2	1.0	-52.3	-13.0	-39.3	
6930.00	-18.1	V	3.0	32.9	1.0	-50.0	-13.0	-37.0	
3465.00	-19.4	H	3.0	34.1	1.0	-52.5	-13.0	-39.5	
5197.50	-19.7	H	3.0	33.2	1.0	-51.9	-13.0	-38.9	
6930.00	-18.4	H	3.0	32.9	1.0	-50.3	-13.0	-37.3	
High Ch, 1753.5									
3507.00	-20.1	V	3.0	34.1	1.0	-53.1	-13.0	-40.1	
5260.50	-19.9	V	3.0	33.2	1.0	-52.1	-13.0	-39.1	
7014.00	-18.9	V	3.0	32.9	1.0	-50.8	-13.0	-37.8	
3507.00	-18.0	H	3.0	34.1	1.0	-51.1	-13.0	-38.1	
5260.50	-20.6	H	3.0	33.2	1.0	-52.8	-13.0	-39.8	
7014.00	-19.3	H	3.0	32.9	1.0	-51.2	-13.0	-38.2	

LTE B4 3MHz 16QAM

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

Company: Microsoft
Project #: 11735596
Date: 8/7/2017
Test Engineer: 43575 OS
Configuration: EUT + AC + Headset
Location: Chamber C
Mode: LTE_QPSK Band 4 Harmonics, 5MHz 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, 1712.5									
3425.00	-19.6	V	3.0	34.1	1.0	-52.8	-13.0	-39.8	
5137.50	-19.1	V	3.0	33.2	1.0	-51.3	-13.0	-38.3	
6850.00	-18.4	V	3.0	32.9	1.0	-50.3	-13.0	-37.3	
3425.00	-20.2	H	3.0	34.1	1.0	-53.4	-13.0	-40.4	
5137.50	-18.5	H	3.0	33.2	1.0	-50.7	-13.0	-37.7	
6850.00	-18.2	H	3.0	32.9	1.0	-50.1	-13.0	-37.1	
Mid Ch, 1732.5									
3465.00	-18.3	V	3.0	34.1	1.0	-51.4	-13.0	-38.4	
5197.50	-19.2	V	3.0	33.2	1.0	-51.3	-13.0	-38.3	
6930.00	-19.0	V	3.0	32.9	1.0	-50.9	-13.0	-37.9	
3465.00	-20.3	H	3.0	34.1	1.0	-53.4	-13.0	-40.4	
5197.50	-19.5	H	3.0	33.2	1.0	-51.7	-13.0	-38.7	
6930.00	-19.3	H	3.0	32.9	1.0	-51.2	-13.0	-38.2	
High Ch, 1752.5									
3505.00	-19.7	V	3.0	34.1	1.0	-52.8	-13.0	-39.8	
5257.50	-19.4	V	3.0	33.2	1.0	-51.6	-13.0	-38.6	
7010.00	-19.4	V	3.0	32.9	1.0	-51.2	-13.0	-38.2	
3505.00	-16.0	H	3.0	34.1	1.0	-49.1	-13.0	-36.1	
5257.50	-19.9	H	3.0	33.2	1.0	-52.1	-13.0	-39.1	
7010.00	-19.2	H	3.0	32.9	1.0	-51.1	-13.0	-38.1	

LTE B4 5MHz QPSK

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

Company: Microsoft
Project #: 11735596
Date: 8/7/2017
Test Engineer: 43575 OS
Configuration: EUT + AC + Headset
Location: Chamber C
Mode: LTE_16QAM Band 4 Harmonics, 5MHz 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, 1712.5									
3425.00	-19.6	V	3.0	34.1	1.0	-52.8	-13.0	-39.8	
5137.50	-19.3	V	3.0	33.2	1.0	-51.5	-13.0	-38.5	
6850.00	-17.9	V	3.0	32.9	1.0	-49.8	-13.0	-36.8	
3425.00	-20.2	H	3.0	34.1	1.0	-53.4	-13.0	-40.4	
5137.50	-19.1	H	3.0	33.2	1.0	-51.3	-13.0	-38.3	
6850.00	-18.2	H	3.0	32.9	1.0	-50.1	-13.0	-37.1	
Mid Ch, 1732.5									
3465.00	-19.9	V	3.0	34.1	1.0	-53.0	-13.0	-40.0	
5197.50	-19.4	V	3.0	33.2	1.0	-51.5	-13.0	-38.5	
6930.00	-19.3	V	3.0	32.9	1.0	-51.2	-13.0	-38.2	
3465.00	-20.5	H	3.0	34.1	1.0	-53.6	-13.0	-40.6	
5197.50	-19.6	H	3.0	33.2	1.0	-51.8	-13.0	-38.8	
6930.00	-18.7	H	3.0	32.9	1.0	-50.6	-13.0	-37.6	
High Ch, 1752.5									
3505.00	-20.1	V	3.0	34.1	1.0	-53.1	-13.0	-40.1	
5257.50	-19.5	V	3.0	33.2	1.0	-51.7	-13.0	-38.7	
7010.00	-18.8	V	3.0	32.9	1.0	-50.7	-13.0	-37.7	
3505.00	-16.9	H	3.0	34.1	1.0	-49.9	-13.0	-36.9	
5257.50	-18.7	H	3.0	33.2	1.0	-50.9	-13.0	-37.9	
7010.00	-18.9	H	3.0	32.9	1.0	-50.8	-13.0	-37.8	

LTE B4 5MHz 16QAM

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

Company: Microsoft
Project #: 11735596
Date: 8/7/2017
Test Engineer: 43575 OS
Configuration: EUT + AC + Headset
Location: Chamber C
Mode: LTE_QPSK Band 4 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, 1715									
3430.00	-19.9	V	3.0	34.1	1.0	-53.0	-13.0	-40.0	
5145.00	-19.1	V	3.0	33.2	1.0	-51.3	-13.0	-38.3	
6860.00	-18.8	V	3.0	32.9	1.0	-50.7	-13.0	-37.7	
3430.00	-15.2	H	3.0	34.1	1.0	-48.3	-13.0	-35.3	
5145.00	-14.8	H	3.0	33.2	1.0	-47.0	-13.0	-34.0	
6860.00	-18.5	H	3.0	32.9	1.0	-50.3	-13.0	-37.3	
Mid Ch, 1732.5									
3465.00	-19.2	V	3.0	34.1	1.0	-52.3	-13.0	-39.3	
5197.50	-19.7	V	3.0	33.2	1.0	-51.8	-13.0	-38.8	
6930.00	-18.6	V	3.0	32.9	1.0	-50.4	-13.0	-37.4	
3465.00	-13.9	H	3.0	34.1	1.0	-47.0	-13.0	-34.0	
5197.50	-17.0	H	3.0	33.2	1.0	-49.2	-13.0	-36.2	
6930.00	-18.8	H	3.0	32.9	1.0	-50.7	-13.0	-37.7	
High Ch, 1750									
3500.00	-20.4	V	3.0	34.1	1.0	-53.5	-13.0	-40.5	
5250.00	-20.3	V	3.0	33.2	1.0	-52.4	-13.0	-39.4	
7000.00	-19.3	V	3.0	32.9	1.0	-51.2	-13.0	-38.2	
3500.00	-17.8	H	3.0	34.1	1.0	-50.9	-13.0	-37.9	
5250.00	-19.2	H	3.0	33.2	1.0	-51.4	-13.0	-38.4	
7000.00	-19.3	H	3.0	32.9	1.0	-51.2	-13.0	-38.2	

LTE B4 10MHz QPSK

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

Company: Microsoft
Project #: 11735596
Date: 8/7/2017
Test Engineer: 43575 OS
Configuration: EUT + AC + Headset
Location: Chamber C
Mode: LTE_16QAM Band 4 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, 1715									
3430.00	-20.3	V	3.0	34.1	1.0	-53.4	-13.0	-40.4	
5145.00	-19.8	V	3.0	33.2	1.0	-52.0	-13.0	-39.0	
6860.00	-18.9	V	3.0	32.9	1.0	-50.8	-13.0	-37.8	
3430.00	-17.5	H	3.0	34.1	1.0	-50.6	-13.0	-37.6	
5145.00	-15.8	H	3.0	33.2	1.0	-48.0	-13.0	-35.0	
6860.00	-18.6	H	3.0	32.9	1.0	-50.5	-13.0	-37.5	
Mid Ch, 1732.5									
3465.00	-19.5	V	3.0	34.1	1.0	-52.6	-13.0	-39.6	
5197.50	-19.2	V	3.0	33.2	1.0	-51.4	-13.0	-38.4	
6930.00	-19.2	V	3.0	32.9	1.0	-51.1	-13.0	-38.1	
3465.00	-16.3	H	3.0	34.1	1.0	-49.4	-13.0	-36.4	
5197.50	-19.6	H	3.0	33.2	1.0	-51.8	-13.0	-38.8	
6930.00	-18.7	H	3.0	32.9	1.0	-50.6	-13.0	-37.6	
High Ch, 1750									
3500.00	-20.0	V	3.0	34.1	1.0	-53.0	-13.0	-40.0	
5250.00	-19.6	V	3.0	33.2	1.0	-51.7	-13.0	-38.7	
7000.00	-18.2	V	3.0	32.9	1.0	-50.1	-13.0	-37.1	
3500.00	-18.5	H	3.0	34.1	1.0	-51.6	-13.0	-38.6	
5250.00	-20.5	H	3.0	33.2	1.0	-52.7	-13.0	-39.7	
7000.00	-19.4	H	3.0	32.9	1.0	-51.2	-13.0	-38.2	

LTE B4 10MHz 16QAM

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

Company: Microsoft
Project #: 11735596
Date: 8/7/2017
Test Engineer: 43575 OS
Configuration: EUT + AC + Headset
Location: Chamber C
Mode: LTE_QPSK Band 4 Harmonics, 15MHz 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, 1717.5									
3435.00	-19.8	V	3.0	34.1	1.0	-52.9	-13.0	-39.9	
5152.50	-16.1	V	3.0	33.2	1.0	-48.3	-13.0	-35.3	
6870.00	-18.3	V	3.0	32.9	1.0	-50.2	-13.0	-37.2	
3435.00	-15.4	H	3.0	34.1	1.0	-48.6	-13.0	-35.6	
5152.50	-15.1	H	3.0	33.2	1.0	-47.2	-13.0	-34.2	
6870.00	-18.3	H	3.0	32.9	1.0	-50.2	-13.0	-37.2	
Mid Ch, 1732.5									
3465.00	-19.2	V	3.0	34.1	1.0	-52.3	-13.0	-39.3	
5197.50	-18.7	V	3.0	33.2	1.0	-50.9	-13.0	-37.9	
6930.00	-19.0	V	3.0	32.9	1.0	-50.9	-13.0	-37.9	
3465.00	-16.6	H	3.0	34.1	1.0	-49.7	-13.0	-36.7	
5197.50	-19.6	H	3.0	33.2	1.0	-51.7	-13.0	-38.7	
6930.00	-18.7	H	3.0	32.9	1.0	-50.6	-13.0	-37.6	
High Ch, 1747.5									
3495.00	-20.4	V	3.0	34.1	1.0	-53.5	-13.0	-40.5	
5242.50	-19.6	V	3.0	33.2	1.0	-51.7	-13.0	-38.7	
6990.00	-18.3	V	3.0	32.9	1.0	-50.2	-13.0	-37.2	
3495.00	-18.0	H	3.0	34.1	1.0	-51.1	-13.0	-38.1	
5242.50	-20.2	H	3.0	33.2	1.0	-52.4	-13.0	-39.4	
6990.00	-18.5	H	3.0	32.9	1.0	-50.4	-13.0	-37.4	

LTE B4 15MHz QPSK

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

Company: Microsoft
Project #: 11735596
Date: 8/7/2017
Test Engineer: 43575 OS
Configuration: EUT + AC + Headset
Location: Chamber C
Mode: LTE_16QAM Band 4 Harmonics, 15MHz 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, 1717.5									
3435.00	-19.8	V	3.0	34.1	1.0	-52.9	-13.0	-39.9	
5152.50	-18.0	V	3.0	33.2	1.0	-50.2	-13.0	-37.2	
6870.00	-18.3	V	3.0	32.9	1.0	-50.2	-13.0	-37.2	
3435.00	-17.5	H	3.0	34.1	1.0	-50.7	-13.0	-37.7	
5152.50	-17.2	H	3.0	33.2	1.0	-49.4	-13.0	-36.4	
6870.00	-17.6	H	3.0	32.9	1.0	-49.5	-13.0	-36.5	
Mid Ch, 1732.5									
3465.00	-19.8	V	3.0	34.1	1.0	-52.9	-13.0	-39.9	
5197.50	-18.4	V	3.0	33.2	1.0	-50.6	-13.0	-37.6	
6930.00	-18.0	V	3.0	32.9	1.0	-49.9	-13.0	-36.9	
3465.00	-19.3	H	3.0	34.1	1.0	-52.4	-13.0	-39.4	
5197.50	-19.7	H	3.0	33.2	1.0	-51.9	-13.0	-38.9	
6930.00	-18.4	H	3.0	32.9	1.0	-50.2	-13.0	-37.2	
High Ch, 1747.5									
3495.00	-20.4	V	3.0	34.1	1.0	-53.5	-13.0	-40.5	
5242.50	-20.8	V	3.0	33.2	1.0	-53.0	-13.0	-40.0	
6990.00	-18.1	V	3.0	32.9	1.0	-50.0	-13.0	-37.0	
3495.00	-17.6	H	3.0	34.1	1.0	-50.7	-13.0	-37.7	
5242.50	-20.5	H	3.0	33.2	1.0	-52.7	-13.0	-39.7	
6990.00	-18.7	H	3.0	32.9	1.0	-50.6	-13.0	-37.6	

LTE B4 15MHz 16QAM

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701H
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