

Single Carrier LTE15 Band Edge Plots for Antenna Port 3 and 64QAM Modulation:

Bottom Channel_ LBE_ 1929 to 1951MHz



Bottom Channel_LBE_1928 to 1929MHz



Bottom Channel_LBE_ 1908 to 1928MHz











★ Aglont 12:29:21 6 Jun 2019 L Ref 20 dBm ●Atten 24 dB -23.667 dBm PfVog 10 19 48/ 40.4 40.4 40.4 1.997 33 GH -23.667 dBm 01 -13.0 -23.667 dBm -01 -01 -01 -01





Single Carrier LTE15 Band Edge Plots for Antenna Port 3 and 256QAM Modulation:

Bottom Channel_ LBE_ 1929 to 1951MHz



Bottom Channel_LBE_1928 to 1929MHz



Bottom Channel_LBE_ 1908 to 1928MHz



Top Channel_ UBE_ 1974 to 1996MHz



Top Channel_UBE_ 1996 to 1997MHz







Single Carrier LTE20 Band Edge Plots for Antenna Port 3 and QPSK Modulation:

Bottom Channel_ LBE_ 1929 to 1951MHz



Bottom Channel_LBE_ 1928 to 1929MHz



Bottom Channel_LBE_ 1908 to 1928MHz

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Top Channel_ UBE_ 1997 to 2017MHz * Agilent 13:10:56 6 Jun 2019 L





Single Carrier LTE20 Band Edge Plots for Antenna Port 3 and 16QAM Modulation:

Bottom Channel_ LBE_ 1929 to 1951MHz



Bottom Channel_LBE_1928 to 1929MHz



Bottom Channel_LBE_ 1908 to 1928MHz

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Res B	W 1 MHz			_	VBW 3 M	Hz	S	weep 1.0	67 ms (80	001 pts)_	

Top Channel_ UBE_ 1974 to 1996MHz



Top Channel_UBE_ 1996 to 1997MHz







Single Carrier LTE20 Band Edge Plots for Antenna Port 3 and 64QAM Modulation:

Bottom Channel_ LBE_ 1929 to 1951MHz



Bottom Channel_LBE_ 1928 to 1929MHz



Bottom Channel_LBE_ 1908 to 1928MHz











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top 2.017 00 GH

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Single Carrier LTE20 Band Edge Plots for Antenna Port 3 and 256QAM Modulation:

Bottom Channel_ LBE_ 1929 to 1951MHz



Bottom Channel_LBE_1928 to 1929MHz



Bottom Channel_LBE_ 1908 to 1928MHz















PCS Band Multicarrier LTE5 Band Edge Plots for Antenna Port 3 and QPSK Modulation:





Bottom Channel_LBE_1928 to 1929MHz



Bottom Channel_LBE_ 1908 to 1928MHz



Top Channel_ UBE_ 1974 to 1996MHz



Top Channel_UBE_ 1996 to 1997MHz







PCS Band Multicarrier LTE5 Band Edge Plots for Antenna Port 3 and 16QAM Modulation:

Bottom Channel_ LBE_ 1929 to 1951MHz



Bottom Channel_LBE_1928 to 1929MHz



Bottom Channel_LBE_ 1908 to 1928MHz





Top Channel_UBE_1996 to 1997MHz



Top Channel_ UBE_ 1997 to 2017MHz



Top Channel_ UBE_ 1974 to 1996MHz



PCS Band Multicarrier LTE5 Band Edge Plots for Antenna Port 3 and 64QAM Modulation:

Bottom Channel_ LBE_ 1929 to 1951MHz



Bottom Channel_LBE_1928 to 1929MHz



Bottom Channel_LBE_ 1908 to 1928MHz















PCS Band Multicarrier LTE5 Band Edge Plots for Antenna Port 3 and 256QAM Modulation:

Bottom Channel_ LBE_ 1929 to 1951MHz



Bottom Channel_LBE_1928 to 1929MHz



Bottom Channel_LBE_ 1908 to 1928MHz















Multiband Multicarrier LTE1.4 Band Edge Plots for Antenna Port 3 and QPSK Modulation:





Bottom Channel_LBE_1928 to 1929MHz



Bottom Channel_LBE_ 1908 to 1928MHz









Top Channel_ UBE_ 2202 to 2222MHz





Multiband Multicarrier LTE1.4 Band Edge Plots for Antenna Port 3 and 16QAM Modulation:





Bottom Channel_LBE_1928 to 1929MHz



Bottom Channel_LBE_ 1908 to 1928MHz









Top Channel_ UBE_ 2202 to 2222MHz





Multiband Multicarrier LTE1.4 Band Edge Plots for Antenna Port 3 and 64QAM Modulation:





Bottom Channel_LBE_1928 to 1929MHz



Bottom Channel_LBE_ 1908 to 1928MHz





Top Channel_ UBE_ 2201 to 2202MHz



Top Channel UBE 2202 to 2222MHz





Multiband Multicarrier LTE1.4 Band Edge Plots for Antenna Port 3 and 256QAM Modulation:





Bottom Channel_LBE_1928 to 1929MHz



Bottom Channel_LBE_ 1908 to 1928MHz









Top Channel UBE 2202 to 2222MHz





Transmitter Antenna Port Conducted Emissions

Transmitter conducted emission measurements were made at RRH antenna port 3. Measurements were performed over the 9kHz to 22GHz frequency range.

Single Carrier Test Cases

The single carrier test case was performed with the RRH operating on the PCS middle channel (1962.5MHz) and AWS middle channel (2155.0MHz) simultaneously with all LTE modulation types (QPSK, 16QAM, 64QAM and 256QAM) for all LTE bandwidths (1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz and 20MHz). The same modulation type was used for both PCS and AWS carriers.

Multicarrier Test Cases

PCS Multicarrier Multiband Test Case

In the PCS band _Three LTE5 carriers (based upon KDB 971168 D03v01) using two carriers (with minimum spacing between carrier frequencies) at the lower band edge (EARFCN 8065: 1932.5 & EARFCN 8115: 1937.5MHz) and a third carrier with maximum spacing between the other two carrier frequencies (EARFCN 8665: 1992.5MHz) at the upper band edge. In the AWS band _ Single LTE1.4 carrier at the middle channel (EARFCN 66866: 2155MHz). The smallest channel bandwidth was selected to maximize carrier power spectral density. The LTE5 PCS carrier bandwidth was chosen because it was the smallest LTE bandwidth that covers the entire PCS frequency range. The carriers were operated at maximum power (~26W/PCS carrier and 40W/AWS carrier) with at total port power of 120 watts (80W for PCS band carriers + 40W for AWS band carrier). The same modulation type was used for both PCS and AWS carriers.

AWS Multicarrier Multiband Test Case

In the AWS band: Three LTE1.4 carriers (based upon KDB 971168 D03v01) using two carriers (with minimum spacing between carrier frequencies) at the lower band edge (EARFCN 66443: 2110.7 & EARFCN 66457: 2112.1MHz) and a third carrier with maximum spacing between the other two carrier frequencies (EARFCN 67329: 2199.3MHz) at the upper band edge. In the PCS band: Single LTE1.4 carrier at the middle channel (EARFCN 8365: 1962.5MHz). The smallest channel bandwidth was selected to maximize carrier power spectral density. The carriers were operated at maximum power (80W/PCS carrier and ~13W/AWS carrier) with at total port power of 120 watts (80W for PCS band carrier + 40W for AWS band carriers). The same modulation type was used for both PCS and AWS carriers.

Multicarrier Multiband Test Case

Three LTE1.4 carriers (based upon KDB 971168 D03v01) using two carriers (with minimum spacing between carrier frequencies) at the PCS band lower band edge (EARFCN 8047: 1930.7 & EARFCN 8061: 1932.1MHz) and a third carrier with maximum spacing between the other two carrier frequencies (EARFCN 67329: 2199.3MHz) at the AWS band upper band edge. The smallest channel bandwidth was selected to maximize carrier power spectral density. The carriers were operated at maximum power (40W/PCS carrier and 40W/AWS carrier) with at total port power of 120 watts (80W for PCS band carriers + 40W for AWS band carrier). The same modulation type was used for both PCS and AWS carriers.



PCS Band Trans	mission Paran	neters	AWS Band Transmission Parameters				
Carrier	Channel	Carrier	Carrier	Channel	Carrier		
Frequency	Bandwidth	Power	Frequency	Bandwidth	Power		
1962.5MHz (Mid Ch)	LTE1.4 – LTE20	80 Watts	2154.0MHz (Mid Ch)	LTE1.4 – LTE20	40 Watts		
1932.5, 1937.5 & 1992.5MHz (BC, BC+1, and TC)	LTE5	26+26+26 Watts	2154.0MHz (Mid Ch)	LTE1.4	40 Watts		
1932.5 & 1937.5MHz (BC and BC+1)	LTE1.4	40 + 40 Watts	2199.3MHz (Top Ch)	LTE1.4	40 Watts		
1962.5MHz (Mid Ch)	LTE1.4	80 Watts	2110.7, 2112.1 & 2199.3MHz (BC, BC+1, and TC)	LTE1.4	13+13+13 Watts		

The test configuration parameters are provided below:

The power of any emission outside of the authorized operating frequency range cannot exceed -13 dBm as specified in section 24.238(a), 27.53(h)(1), RSS 133 6.5(i) and RSS 139 6.6. The limit of -19dBm was used in the certification testing. The limit is adjusted to -19dBm [-13dBm -10 log (4)] per FCC KDB 662911D01 v02r01 because the BTS may operate as a 4 port MIMO transmitter. The required measurement parameters include a 1MHz bandwidth with power measured in average value (since transmitter power was measured in average value).

Measurements were performed with a spectrum analyzer using a peak detector with max hold over 50 sweeps (except for the 20MHz to 3GHz frequency range). Measurements for the 20MHz to 3GHz frequency range were performed with the spectrum analyzer in the RMS average mode over 100 traces.

The limit for the 9kHz to 150kHz frequency range was adjusted to -49dBm to correct for a spectrum analyzer RBW of 1kHz versus required RBW of 1MHz [i.e.: -49dBm = -19dBm -10log(1MHz/1kHz)]. The limit for the 150kHz to 20MHz frequency range was adjusted to –39dBm to correct for a spectrum analyzer RBW of 10kHz versus required RBW of 1MHz [i.e.: -39dBm = -19dBm -10log(1MHz/10kHz)]. The required limit of -19dBm with a RBW of \geq 1MHz was used for all other frequency ranges.

Frequency Range	RBW	VBW	Number of Data Points	umber of Data Points Detector		Max Hold over	Offset Note (1)		
9kHz to 150kHz	1kHz	3kHz	8001	Peak	Auto	50 Sweeps	8.7dB		
150kHz to 20MHz	10kHz	30kHz	8001	Peak	Auto	50 Sweeps	8.7dB		
20MHz to 3GHz	1MHz	3MHz	8001	Average	Auto	Note (2)	40.4dB		
3GHz to 6GHz	1MHz	3MHz	8001	Peak	Auto	50 Sweeps	40.2dB		
6GHz to 18GHz	2MHz	6MHz	8192	Peak	Auto	50 Sweeps	33.1dB		
18GHz to 22GHz	1MHz	3MHz	8001	Peak	Auto	50 Sweeps	41.3dB		
1900 to 2200MHz	1MHz	3MHz	8001	Average	Auto	Note (2)	40.4dB		
Note 1: The total measurement RF path loss of the test setup (attenuators, test cables and filters) is accounted for by the spectrum analyzer									

The spectrum analyzer settings that were used for this test are summarized in the following table.

reference level offset.

Note 2: Max Hold not used and instead measurements were performed with the spectrum analyzer in the RMS average mode over 100 traces.

A low pass filter was used to reduce measurement instrumentation noise floor for the frequency ranges less than 20MHz. A high pass filter was used to reduce measurement instrumentation noise floor for the frequency ranges above 6GHz. The total measurement RF path loss of the test setup (attenuators, low pass filter, high pass filter and test cables) as shown in the table is accounted for by the spectrum analyzer reference level offset. The display line on the plots reflects the required limit. The conducted spurious emission plots/measurements are provided in the following pages.



LTE1.4 Channel Bandwidth _ QPSK _ Middle Channels (1962.5MHz and 2155MHz) Simultaneously:

9kHz to 150kHz



20MHz to 3GHz



6GHz to 18GHz



1900MHz to 2200MHz





3GHz to 6GHz







LTE1.4 Channel Bandwidth _ 16QAM _ Middle Channels (1962.5MHz and 2155MHz) Simultaneously:

9kHz to 150kHz



20MHz to 3GHz



6GHz to 18GHz



1900MHz to 2200MHz













LTE1.4 Channel Bandwidth _ 64QAM _ Middle Channels (1962.5MHz and 2155MHz) Simultaneously:

9kHz to 150kHz



20MHz to 3GHz



6GHz to 18GHz



1900MHz to 2200MHz













LTE1.4 Channel Bandwidth _ 256QAM _ Middle Channels (1962.5MHz and 2155MHz) Simultaneously:

9kHz to 150kHz



20MHz to 3GHz



6GHz to 18GHz



1900MHz to 2200MHz













LTE3 Channel Bandwidth _ QPSK _ Middle Channels (1962.5MHz and 2155MHz) Simultaneously:

9kHz to 150kHz



20MHz to 3GHz



6GHz to 18GHz



1900MHz to 2200MHz













LTE3 Channel Bandwidth _ 16QAM _ Middle Channels (1962.5MHz and 2155MHz) Simultaneously:

9kHz to 150kHz



20MHz to 3GHz



6GHz to 18GHz



1900MHz to 2200MHz





3GHz to 6GHz







LTE3 Channel Bandwidth _ 64QAM _ Middle Channels (1962.5MHz and 2155MHz) Simultaneously:

9kHz to 150kHz



20MHz to 3GHz



6GHz to 18GHz



1900MHz to 2200MHz













LTE3 Channel Bandwidth _ 256QAM _ Middle Channels (1962.5MHz and 2155MHz) Simultaneously:

9kHz to 150kHz



20MHz to 3GHz



6GHz to 18GHz



1900MHz to 2200MHz













Stop 20.00 MH

LTE5 Channel Bandwidth _ QPSK _ Middle Channels (1962.5MHz and 2155MHz) Simultaneously:

9kHz to 150kHz



20MHz to 3GHz



6GHz to 18GHz



1900MHz to 2200MHz







3GHz to 6GHz







LTE5 Channel Bandwidth _ 16QAM _ Middle Channels (1962.5MHz and 2155MHz) Simultaneously:

9kHz to 150kHz



20MHz to 3GHz



6GHz to 18GHz



1900MHz to 2200MHz







3GHz to 6GHz







Stop 20.00 MH

LTE5 Channel Bandwidth _ 64QAM _ Middle Channels (1962.5MHz and 2155MHz) Simultaneously:

9kHz to 150kHz



20MHz to 3GHz



6GHz to 18GHz



1900MHz to 2200MHz





3GHz to 6GHz







LTE5 Channel Bandwidth _ 256QAM _ Middle Channels (1962.5MHz and 2155MHz) Simultaneously:

9kHz to 150kHz



20MHz to 3GHz



6GHz to 18GHz



1900MHz to 2200MHz





3GHz to 6GHz







LTE10 Channel Bandwidth _ QPSK _ Middle Channels (1962.5MHz and 2155MHz) Simultaneously:

9kHz to 150kHz



20MHz to 3GHz



6GHz to 18GHz



1900MHz to 2200MHz













LTE10 Channel Bandwidth _ 16QAM _ Middle Channels (1962.5MHz and 2155MHz) Simultaneously:

9kHz to 150kHz



20MHz to 3GHz



6GHz to 18GHz



1900MHz to 2200MHz













Stop 20.00 MH

LTE10 Channel Bandwidth _ 64QAM _ Middle Channels (1962.5MHz and 2155MHz) Simultaneously:

9kHz to 150kHz



20MHz to 3GHz



6GHz to 18GHz



1900MHz to 2200MHz





3GHz to 6GHz







LTE10 Channel Bandwidth _ 256QAM _ Middle Channels (1962.5MHz and 2155MHz) Simultaneously:

9kHz to 150kHz



20MHz to 3GHz



6GHz to 18GHz



1900MHz to 2200MHz









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LTE15 Channel Bandwidth _ QPSK _ Middle Channels (1962.5MHz and 2155MHz) Simultaneously:

9kHz to 150kHz



20MHz to 3GHz



6GHz to 18GHz



1900MHz to 2200MHz













LTE15 Channel Bandwidth _ 16QAM _ Middle Channels (1962.5MHz and 2155MHz) Simultaneously:

9kHz to 150kHz



20MHz to 3GHz



6GHz to 18GHz



1900MHz to 2200MHz





3GHz to 6GHz







LTE15 Channel Bandwidth _ 64QAM _ Middle Channels (1962.5MHz and 2155MHz) Simultaneously:

9kHz to 150kHz



20MHz to 3GHz



6GHz to 18GHz



1900MHz to 2200MHz













LTE15 Channel Bandwidth _ 256QAM _ Middle Channels (1962.5MHz and 2155MHz) Simultaneously:

9kHz to 150kHz



20MHz to 3GHz



6GHz to 18GHz



1900MHz to 2200MHz















LTE20 Channel Bandwidth _ QPSK _ Middle Channels (1962.5MHz and 2155MHz) Simultaneously:

9kHz to 150kHz



20MHz to 3GHz



6GHz to 18GHz



1900MHz to 2200MHz





3GHz to 6GHz







LTE20 Channel Bandwidth _ 16QAM _ Middle Channels (1962.5MHz and 2155MHz) Simultaneously:

9kHz to 150kHz



20MHz to 3GHz



6GHz to 18GHz



1900MHz to 2200MHz





3GHz to 6GHz







LTE20 Channel Bandwidth _ 64QAM _ Middle Channels (1962.5MHz and 2155MHz) Simultaneously:

9kHz to 150kHz



20MHz to 3GHz



6GHz to 18GHz



1900MHz to 2200MHz





3GHz to 6GHz







LTE20 Channel Bandwidth _ 256QAM _ Middle Channels (1962.5MHz and 2155MHz) Simultaneously:

9kHz to 150kHz



20MHz to 3GHz



6GHz to 18GHz



1900MHz to 2200MHz







3GHz to 6GHz







Multicarrier PCS LTE5 & Single Carrier AWS LTE1.4 _ QPSK_ (1932.5, 1937.5, 1992.5 & 2155MHz):

9kHz to 150kHz



20MHz to 3GHz



6GHz to 18GHz



1900MHz to 2200MHz



150kHz to 20MHz



3GHz to 6GHz







Multicarrier PCS LTE5 & Single Carrier AWS LTE1.4 _ 16QAM_ (1932.5, 1937.5, 1992.5 & 2155MHz):

9kHz to 150kHz



20MHz to 3GHz



6GHz to 18GHz



1900MHz to 2200MHz



150kHz to 20MHz



3GHz to 6GHz







Multicarrier PCS LTE5 & Single Carrier AWS LTE1.4 _ 64QAM_ (1932.5, 1937.5, 1992.5 & 2155MHz):

9kHz to 150kHz



20MHz to 3GHz



6GHz to 18GHz



1900MHz to 2200MHz













Multicarrier PCS LTE5 & Single Carrier AWS LTE1.4 _ 256QAM_ (1932.5, 1937.5, 1992.5 & 2155MHz):

9kHz to 150kHz



20MHz to 3GHz



6GHz to 18GHz



1900MHz to 2200MHz







3GHz to 6GHz







Multicarrier AWS LTE1.4 & Single Carrier PCS LTE1.4 _ QPSK_ (1962.5, 2110.7, 2112.1 & 2199.3MHz):

9kHz to 150kHz



20MHz to 3GHz



6GHz to 18GHz



1900MHz to 2200MHz













Multicarrier AWS LTE1.4 & Single carrier PCS LTE1.4 _ 16QAM_ (1962.5, 2110.7, 2112.1 & 2199.3MHz):

9kHz to 150kHz



20MHz to 3GHz



6GHz to 18GHz



1900MHz to 2200MHz















Multicarrier AWS LTE1.4 & Single carrier PCS LTE1.4 _ 64QAM_ (1962.5, 2110.7, 2112.1 & 2199.3MHz):

9kHz to 150kHz



20MHz to 3GHz



6GHz to 18GHz



1900MHz to 2200MHz







3GHz to 6GHz







Multicarrier AWS LTE1.4 & Single carrier PCS LTE1.4_256QAM_(1962.5, 2110.7, 2112.1 & 2199.3MHz):

9kHz to 150kHz



20MHz to 3GHz



6GHz to 18GHz



1900MHz to 2200MHz



150kHz to 20MHz



3GHz to 6GHz







Multicarrier Multiband LTE1.4 _ QPSK_ (1930.7, 1932.1 & 2199.3MHz):

9kHz to 150kHz



20MHz to 3GHz



6GHz to 18GHz



1900MHz to 2200MHz



150kHz to 20MHz



3GHz to 6GHz



