

### Single Carrier LTE15 Band Edge Plots for Antenna Port 3 and 16QAM Modulation:

Bottom Channel\_ LBE\_ 2109 to 2131MHz



Bottom Channel\_LBE\_2108 to 2109MHz



### Bottom Channel\_LBE\_2088 to 2108MHz

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### Top Channel\_ UBE\_ 2179 to 2201MHz



### Top Channel\_ UBE\_ 2201 to 2202MHz







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

Bottom Channel\_ LBE\_ 2109 to 2131MHz



Bottom Channel\_LBE\_2108 to 2109MHz



### Bottom Channel\_LBE\_2088 to 2108MHz

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### Top Channel\_ UBE\_ 2179 to 2201MHz



### Top Channel\_UBE\_ 2201 to 2202MHz







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

Bottom Channel\_ LBE\_ 2109 to 2131MHz



Bottom Channel\_LBE\_2108 to 2109MHz



### Bottom Channel\_LBE\_2088 to 2108MHz

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### Top Channel\_ UBE\_ 2179 to 2201MHz



### Top Channel\_ UBE\_ 2201 to 2202MHz







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

Bottom Channel\_ LBE\_ 2109 to 2131MHz



Bottom Channel\_LBE\_ 2108 to 2109MHz



### Bottom Channel\_LBE\_ 2088 to 2108MHz



### Top Channel\_ UBE\_ 2179 to 2201MHz



### Top Channel\_ UBE\_ 2201 to 2202MHz







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

Bottom Channel\_ LBE\_ 2109 to 2131MHz



Bottom Channel\_LBE\_2108 to 2109MHz



### Bottom Channel\_LBE\_ 2088 to 2108MHz



### Top Channel\_ UBE\_ 2179 to 2201MHz



### Top Channel\_ UBE\_ 2201 to 2202MHz







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

Bottom Channel\_ LBE\_ 2109 to 2131MHz



Bottom Channel\_LBE\_2108 to 2109MHz



### Bottom Channel\_LBE\_2088 to 2108MHz

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### Top Channel\_ UBE\_ 2179 to 2201MHz



### Top Channel\_ UBE\_ 2201 to 2202MHz







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

Bottom Channel\_ LBE\_ 2109 to 2131MHz



Bottom Channel\_LBE\_2108 to 2109MHz



### Bottom Channel\_LBE\_2088 to 2108MHz

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### Top Channel\_ UBE\_ 2179 to 2201MHz



### Top Channel\_ UBE\_ 2201 to 2202MHz







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

Bottom Channel\_ LBE\_ 2109 to 2131MHz



Bottom Channel\_LBE\_2108 to 2109MHz



### Bottom Channel\_LBE\_2088 to 2108MHz



### Top Channel\_ UBE\_ 2179 to 2201MHz



### Top Channel\_ UBE\_ 2201 to 2202MHz







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

Bottom Channel\_ LBE\_ 2109 to 2131MHz



Bottom Channel\_LBE\_2108 to 2109MHz



### Bottom Channel\_LBE\_2088 to 2108MHz



### Top Channel\_ UBE\_ 2179 to 2201MHz



### Top Channel\_ UBE\_ 2201 to 2202MHz







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

Bottom Channel\_ LBE\_ 2109 to 2131MHz



Bottom Channel\_LBE\_2108 to 2109MHz



Bottom Channel\_LBE\_2088 to 2108MHz













202 00 GHz



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

Bottom Channel\_ LBE\_ 2109 to 2131MHz



Bottom Channel\_LBE\_2108 to 2109MHz



### Bottom Channel\_LBE\_ 2088 to 2108MHz



### Top Channel\_ UBE\_ 2179 to 2201MHz



### Top Channel\_ UBE\_ 2201 to 2202MHz







### **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.



The test configuration parameters are provided below:

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)	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 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	Detector	Sweep Time	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 measure	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. Conducted spurious emission plots/measurements are provided in Appendix A.



### Transmitter Radiated Spurious Emissions

Radiated emission measurement results are in Appendix A.

### Frequency Stability/Accuracy

Frequency Stability/Accuracy measurement results are in Appendix A.



### APPENDIX C: ANTENNA PORT WCDMA TEST DATA FOR THE PCS BAND

All conducted RF measurements in this section were made at AHFIG antenna port 3. Based on the RF power measurement results shown in Appendix A & B, Port 3 had the highest LTE RMS average power for the PCS and AWS bands (represents the worst case) and therefore it was selected for all the remaining antenna port tests. All testing in this section was performed with WCDMA modulation types. The WCDMA modulation types are setup according to 3GPP TS 25.141 UTRA Test Models (TM) as follows TM 1: QPSK, TM 5: 16QAM and TM 6: 64QAM. The test setup used is provided below.



Test Setup Used for AHFIG Conducted RF Measurements



### **RF Output Power**

RF output power has been measured in both Peak and RMS Average terms at AHFIG Antenna Port 3 at the bottom, middle and top PCS frequency channels for WCDMA modulation types (QPSK, 16QAM, 64QAM). RMS Average power was measured as described in section 5.2 of KDB 971168 D01v03r01 and ANSI C63.26-2015 sections 5.2.4.4. The peak to average power ratio (PAPR) has been measured using the signal analyzer complementary cumulative distribution function (CCDF) for a probability of 0.1% as described in section 5.7.2 of KDB971168 D01v03r01 and ANSI C63.26-2015 section 5.2.3.4. All results are presented in tabular form below. The highest values are highlighted.

Single Carrier Operation on Antenna port 3						
Modulation	Frequency _ Channel	PAPR (dB)	Average (dBm)			
	1932.4MHz _ Bottom Channel	7.25	48.73			
QPSK	1960.0MHz _ Middle Channel	7.25	48.80			
	1987.6MHz _ Top Channel	7.25	48.82			
	1932.4MHz _ Bottom Channel	7.30	48.69			
16QAM	1960.0MHz _ Middle Channel	7.35	48.75			
	1987.6MHz _ Top Channel	7.31	48.79			
	1932.4MHz _ Bottom Channel	7.34	48.66			
64QAM	1960.0MHz _ Middle Channel	7.31	48.81			
	1987.6MHz _ Top Channel	7.34	48.70			

RF output power has been measured in RMS Average terms for each PCS multicarrier test configuration to verify/document the power levels. All results are presented in tabular form below.

Measured RM	Measured RMS Average Carrier Power Level for the Multicarrier Configurations at Antenna Port 3							
Madulation	PCS Multicarrier	NCDMA	Multiband Multicarrier WCDMA					
Туре	Bottom Carriers	Top Carrier	Bottom Carriers	Top Carrier				
	1932.4 & 1937.4MHz	1987.6MHz	1932.4 & 1937.4MHz	2167.6MHz				
OPSK	46.65 dBm	44.30 dBm	48.93 dBm	46.01 dBm				
	(46.2 Watts)	(26.9 Watts)	(78.2 Watts)	(39.9 Watts)				
	Total Carrier Power in Po	CS Band is 73.1	Total Carrier Power in th	Total Carrier Power in the PCS and AWS				
	Watts or 48.64	dBm	Band is 118.1 Watts o	Band is 118.1 Watts or 50.72 dBm				
160.004	46.65 dBm	44.24 dBm	48.86 dBm	46.00 dBm				
	(46.2 Watts)	(26.5 Watts)	(76.9 Watts)	(39.8 Watts)				
16QAM	Total Carrier Power in Po	CS Band is 72.7	Total Carrier Power in the PCS and AWS					
	Watts or 48.62	dBm	Band is 116.7 Watts or 50.67 dBm					
64QAM	46.75 dBm (47.3 Watts)	44.25 dBm (26.6 Watts)	48.71 dBm (74.3 Watts)	45.85 dBm (38.5 Watts)				
	Total Carrier Power in Po Watts or 48.69	CS Band is 73.9 dBm	Total Carrier Power in the PCS and AWS Band is 112.8 Watts or 50.52 dBm					

All measurement results are provided in the following pages. The total measurement RF path loss of the test setup (attenuator and test cables) was 40.4 dB and is accounted for by the spectrum analyzer reference level offset.



### WCDMA Channel Power Plots for Antenna Port 3 and QPSK Modulation:





### Middle Channel\_ CCDF



### Top Channel\_ CCDF



### Bottom Channel\_ Average











### WCDMA Channel Power Plots for Antenna Port 3 and 16QAM Modulation:





### Middle Channel\_ CCDF



### Top Channel\_ CCDF



### Bottom Channel\_ Average











### WCDMA Channel Power Plots for Antenna Port 3 and 64QAM Modulation:





### Middle Channel\_ CCDF



### Top Channel\_ CCDF



### Bottom Channel\_ Average











### PCS Multicarrier (Carriers at 1932.4, 1937.4 & 1987.6MHz) Channel Power Plots for Antenna Port 3:

### QPSK\_1932.4 & 1937.4MHz\_Average Power



# QPSK\_ 1987.6MHz\_ Average Power Agilent 10:07:53 11 Jun 2019 ≢Atten 30 dB of 50 dBn



### 16QAM\_ 1932.4 & 1937.4MHz\_ Average Power ✤ Agilent 10:22:53 11 Jun 2019



### Agilent 10:23:52 11 Jun 2019 f 50\_dBm #Atten 30 dB fs nter 1.987 60 GHz es BW 100 kHz Span 10 MH Sweep 3.2 ms (8001 pts VBW 300 kHz Channel Power Power Spectral Density 44.24 dBm /5.0000 MHz -22.75 dBm/Hz

16QAM\_1987.6MHz\_Average Power



### 64QAM\_ 1932.4 & 1937.4MHz\_ Average Power





### Multiband Multicarrier (Carriers at 1932.4, 1937.4 & 2167.6MHz) Channel Power Plots for Antenna Port 3:

### QPSK\_1932.4 & 1937.4MHz\_ Average Power



## QPSK\_2167.6MHz\_Average Power \* Agilent 10:10:43 7 Jun 2019



## 16QAM\_ 1932.4 & 1937.4MHz\_ Average Power



### 16QAM\_2167.6MHz\_Average Power \* Aglent 08:54:36 11 Jun 2019 L





Channel Power

48.71 dBm /10.0000 MHz

Power Spectral Density

-21.29 dBm/Hz

64QAM\_ 1932.4 & 1937.4MHz\_ Average Power

## 64QAM\_2167.6MHz\_Average Power





### Emission Bandwidth (26 dB down and 99%)

Emission bandwidth measurements were made at antenna port 3 on the bottom, middle and top PCS channels. The AHFIG was operated at maximum RF output power for WCDMA modulation types (QPSK, 16QAM, 64QAM).

The 26dB emission bandwidth was measured in accordance with section 4 of FCC KDB 971168 D01v03r01 and ANSI C63.26 section 5.4. The 99% occupied bandwidth was measured in accordance with section 6.7 of RSS-Gen Issue 5. For both measurements, an occupied bandwidth built-in function in the spectrum analyzer was used. The results are provided in the following table. The largest emission bandwidth is highlighted.

Modulation	Frequency Channel	Emission Bandwidth (MHz)			
modulation		26dB	99%		
	1932.4MHz _ Bottom Channel	4.353	3.9463		
QPSK	1960.0MHz _ Middle Channel	4.364	3.9497		
	1987.6MHz _ Top Channel	4.359	3.9474		
	1932.4MHz _ Bottom Channel	4.353	3.9423		
16QAM	1960.0MHz _ Middle Channel	4.388	3.9466		
	1987.6MHz _ Top Channel	4.359	3.9425		
	1932.4MHz _ Bottom Channel	4.359	3.9375		
64QAM	1960.0MHz _ Middle Channel	4.363	3.9348		
	1987.6MHz _ Top Channel	4.362	3.9367		

Emission bandwidth measurement data are provided in the following pages.



### WCDMA Emission Bandwidth Plots at AHFIG Antenna Port 3











# Transmit Freq Error 8.097 HH2 Occupied Bandwidth 4.559 HH2







### WCDMA Emission Bandwidth Plots at AHFIG Antenna Port 3

Bottom Channel\_ 64QAM Modulation



### Middle Channel\_ 64QAM Modulation







### Antenna Port Conducted Band Edge

Conducted band edge measurements were made at RRH antenna port 3.

### Single Carrier Test Cases

The RRH was operated at the PCS band edge frequencies with all WCDMA modulation types (QPSK, 16QAM and 64QAM) at maximum power (80 watts/port and 80 watts/carrier).

### PCS Multicarrier Multiband Test Case

In the PCS band: Three carriers (based upon KDB 971168 D03v01) using two carriers (with minimum spacing between carrier frequencies) at the lower band edge (UARFCN 9662: 1932.4 & UARFCN 9687: 1937.4MHz) and a third carrier with maximum spacing between the other two carrier frequencies (UARFCN 9938: 1987.6MHz) at the upper band edge. In the AWS band: Single WCDMA carrier at the middle channel (UARFCN 3250: 2140MHz). 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.

### Multiband Multicarrier Test Case

Three WCDMA carriers (based upon KDB 971168 D03v01) using two carriers (with minimum spacing between carrier frequencies) at the PCS band lower band edge (UARFCN 9662: 1932.4 & UARFCN 9687: 1937.4MHz) and a third carrier with maximum spacing between the other two carrier frequencies (UARFCN 3388: 2167.6MHz) at the AWS band upper band edge. 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.

The power of any emission outside of the authorized operating frequency range cannot exceed -13 dBm as specified in section 24.238(a) and RSS 133 6.5(i). The limit is adjusted to -16dBm [-13dBm -10 log (2)] per FCC KDB 662911D01 v02r01 because the BTS may operate as a 2 port MIMO transmitter.

Measurements were performed with the spectrum analyzer in the RMS average mode over 100 traces. In the 1MHz bands outside and adjacent to the frequency block, a resolution bandwidth of  $\geq$ 1% of the measured emission bandwidth (51kHz) per 24.238(b) and RSS 133 6.5(i) was used. In the 1 to 2MHz frequency range outside the band edge (i.e.: 1928 to 1929MHz and 1991 to 1992MHz bands) the RBW was set to 1% of the measured emission bandwidth (51kHz) and the power integrated over 1MHz. In the 2MHz to 22MHz frequency range outside the band edge (i.e.: 1908 to 1928MHz and 1992 to 2012MHz bands) a 1MHz RBW and 3MHz VBW was used.



The results are summarized in the following table. The highest (worst case) emissions from the measurement data are provided.

Test Cases	QPSK		16QAM		64QAM	
Test cases	LBE	UBE	LBE	UBE	LBE	UBE
PCS Single Carrier at	-19 27/	-21 033	-19/193	-20 955	-20 350	-20 015
Band Edge Frequency	-13.274	21.055	19.195	20.555	20.550	20.015
PCS Multicarrier at	-10 276	-20 221	-10 770	-20 220	_10 212	-20 780
1932.4, 1937.4 & 1987.6MHz	-19.270	-20.221	-19.770	-20.339	-19.510	-20.789
Multiband Multicarrier at	-22 783	-21 600	-22 209	-22 93/	-22 328	-22 609
1932.4, 1937.4 & 2167.6MHz	-22.705	-21.000	-22.205	-22.554	-22.520	-22.005

The total measurement RF path loss of the test setup (attenuator and test cables) was 40.4 dB and is accounted for by the spectrum analyzer reference level offset. The display line on the plots reflects the required limit. Conducted band edge measurements are provided in the following pages.



### Single Carrier with QPSK Modulation at Maximum Power -Lower and Upper Band Edge Plots:

### WCDMA Carrier at BC (1932.4MHz)

### Port 3\_LBE\_1929 to 1941MHz



WCDMA Carrier at TC (1987.6MHz)

Port 3\_UBE\_1979 to 1991MHz



### Port 3\_LBE\_1928 to 1929MHz



### Port 3\_UBE\_1991 to 1992MHz



### Port 3\_LBE\_1908 to 1928MHz







### Single Carrier with 16QAM Modulation at Maximum Power -Lower and Upper Band Edge Plots:

### WCDMA Carrier at BC (1932.4MHz)

### Port 3\_LBE\_1929 to 1941MHz





WCDMA Carrier at TC (1987.6MHz)

Port 3\_UBE\_1979 to 1991MHz



### Port 3\_UBE\_1991 to 1992MHz



### Port 3\_LBE\_1908 to 1928MHz







### Single Carrier with 64QAM Modulation at Maximum Power -Lower and Upper Band Edge Plots:

### WCDMA Carrier at BC (1932.4MHz)

### Port 3\_LBE\_1929 to 1941MHz



WCDMA Carrier at TC (1987.6MHz)

Port 3\_UBE\_1979 to 1991MHz



### Port 3\_LBE\_1928 to 1929MHz



### Port 3\_UBE\_1991 to 1992MHz



### Port 3\_LBE\_1908 to 1928MHz







### PCS Band Multicarrier with QPSK Modulation at Max Power at Bottom Chs and at Top Ch -LBE & UBE Plots:

WCDMA Carriers at 1932.4, 1937.4 & 1987.6MHz

# Aglient 10:09:33 11 Jun 2019 L Ref 50 dBm •Atten 22 dB -31.668 dBm \*Hova 1.930 000 GHz -31.668 dBm 100 1.930 000 000 GHz -31.668 dBm 101 -31.668 dBm -31.668 dBm 01 -31.668 dBm -31.668 dBm 01 -31.668 dBm -31.668 dBm 02 -31.669 dBm -31.668 dBm 03 -52.68 -31.669 dBm 04 -31.669 dBm -31.669 dBm 05 -31.669 dBm -31.69 dBm 04 -31.69 dBm -31.600 dBm 05 -31.668 dBm -31.600 dBm 06 -31.668 dBm -31.600 dBm 07 -31.600 dBm -31.600 dBm 108 -31.600 dBm -31.600 dBm 108 -31.600 dBm -31.600 dBm 109 -31.600 dBm -31.600 dBm 100 -31.600 dBm -31.600 dBm 101 -31.600 dBm -31.600 dBm 102 -31.600 dBm -31.600 dBm

Port 3\_LBE\_1929 to 1941MHz

### Port 3\_LBE\_1928 to 1929MHz



WCDMA Carriers at 1932.4, 1937.4 & 1987.6MHz

### Port 3\_UBE\_1979 to 1991MHz



### Port 3\_UBE\_1991 to 1992MHz



### Port 3\_LBE\_1908 to 1928MHz







### PCS Band Multicarrier with 16QAM Modulation at Max Power at Bottom Chs and at Top Ch -LBE & UBE Plots:

WCDMA Carriers at 1932.4, 1937.4 & 1987.6MHz

## Aglient 10:25:03 11 Jun 2019 L Ref 50 dBm +Atten 22 dB -31.603 dBm How 100 10 1.930 000 000 0 GHz -31.603 dBm -31.603 dBm 10-16.0 -31.603 dBm -31.603 dBm -31.603 dBm 01-16.0 -31.603 dBm -31.603 dBm -31.603 dBm 18.41 S2 BFR -31.603 dBm -31.603 dBm -31.603 dBm 01-16.0 -31.603 dBm -31.603 dBm -31.603 dBm 19.60 -31.603 dBm -31.603 dBm -31.603 dBm<

Port 3\_LBE\_1929 to 1941MHz

### Port 3\_LBE\_1928 to 1929MHz



WCDMA Carriers at 1932.4, 1937.4 & 1987.6MHz

Port 3\_UBE\_1979 to 1991MHz



### Port 3\_UBE\_1991 to 1992MHz



### Port 3\_LBE\_1908 to 1928MHz







WCDMA Carriers at 1932.4, 1937.4 & 1987.6MHz

### PCS Band Multicarrier with 64QAM Modulation at Max Power at Bottom Chs and at Top Ch -LBE & UBE Plots:

WCDMA Carriers at 1932.4, 1937.4 & 1987.6MHz

### \_ ...\_





Port 3\_UBE\_1979 to 1991MHz



Port 3\_LBE\_1928 to 1929MHz







Port 3 L	BE 1908 t	o 1928MHz
10100_5	DL_1000 (	

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Ref 20	dBm		#Ati	ten 24 di	В			M	kr1 1.92. –19.3	7 88 GHz 318 dBm
≢Avg Log 10 dB/	Marke 1.927 -19.3	r 880000 18 dBn	0 GHz							
40.4 dB										
–16.0 dBm PAva			e Mageri Anjje	y 10-49 (pr), -44			ngan jaga matangk	*****	ب <del>ا</del> ندر به در به	
100 W1 S2 S3 FS										
AA £(f): FTun Swp										
Start 1 #Res B	.908 00 W 1 MHz	GHz			VBW 3 MI	łz	S	S weep 1.0	top 1.928 67 ms (80	600 GHz 101 pts)_





### Multiband Multicarrier with QPSK Modulation at Max Power at Bottom Chs and at Top Ch -LBE & UBE Plots:

WCDMA Carriers at 1932.4, 1937.4 & 2167.6MHz

# Aglent 10:19:17 7 Jun 2019 L Ref 50 dBm +9tten 22 dB -33:167 dBm 19 1.930000000 GHz -33:167 dBm -33:167 dBm 19 48/2 -33:167 dBm -33:167 dBm 19 1.930000000 GHz -33:167 dBm -33:167 dBm 19 -33:167 dBm -33:167 dBm -33:167 dBm 19 -34:160 dBm -34:160 dBm -34:160 dBm 19 -34:160 dBm

Port 3\_PCS LBE\_1929 to 1941MHz

### Port 3\_PCS LBE\_1928 to 1929MHz



WCDMA Carriers at 1932.4, 1937.4 & 2167.6MHz

Port 3\_AWS UBE\_2159 to 2171MHz





### Port 3\_AWS UBE\_2171 to 2172MHz

### Port 3\_PCS LBE\_1908 to 1928MHz





### Port 3\_AWS UBE\_2172 to 2192MHz



### Multiband Multicarrier with 16QAM Modulation at Max Power at Bottom Chs and at Top Ch -LBE & UBE Plots:

WCDMA Carriers at 1932.4, 1937.4 & 2167.6MHz

# Aglient 09:58:38 11 Jun 2019 L Ref 50 dBm \*Atten 22 dB -32.703 dBm \*Horg 1.930 000000 GHz -32.703 dBm 10 1.930 000000 GHz -32.703 dBm 10 -32.703 dBm -32.703 dBm 10 -32.703 dBm -32.703 dBm 11.930 0000000 GHz -32.703 dBm -32.703 dBm 11.920 00 GHz -32.703 dBm -32.703 dBm 11.

Port 3\_PCS LBE\_1929 to 1941MHz

### Port 3\_PCS LBE\_1928 to 1929MHz



WCDMA Carriers at 1932.4, 1937.4 & 2167.6MHz

Port 3\_AWS UBE\_2159 to 2171MHz





### Port 3\_AWS UBE\_2171 to 2172MHz

### Port 3\_PCS LBE\_1908 to 1928MHz





### Port 3\_AWS UBE\_2172 to 2192MHz



WCDMA Carriers at 1932.4, 1937.4 & 2167.6MHz

Multiband Multicarrier with 64QAM Modulation at Max Power at Bottom Chs and at Top Ch -LBE & UBE Plots:

WCDMA Carriers at 1932.4, 1937.4 & 2167.6MHz

### Port 3\_AWS UBE\_2159 to 2171MHz



Port 3\_PCS LBE\_1928 to 1929MHz

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100											
W1 \$2											
Start 1	1.928 000	I GHz						Stop 1.929 000 GHz			
#Res B	W 51 kHz				WBW 160	kHz		Sweep :	1.6 ms (8	001 pts)	
Char	nnel Pov	/er					P	ower Sp	ectral [	lensity	
-25.75 dBm /1.0000 MHz					-85.	75 dBr	n/Hz				



### Port 3\_AWS UBE\_2171 to 2172MHz



Port 3	PCS LBE	1908 to 1928MHz	<u>'</u>



### Port 3\_AWS UBE\_2172 to 2192MHz





### **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 (1960.0MHz) and AWS middle channel (2140.0MHz) simultaneously with all WCDMA modulation types (QPSK, 16QAM and 64QAM) at maximum power. The same modulation type was used for both PCS and AWS carriers.

### PCS Multicarrier Multiband Test Case

In the PCS band: Three carriers (based upon KDB 971168 D03v01) using two carriers (with minimum spacing between carrier frequencies) at the lower band edge (UARFCN 9662: 1932.4 & UARFCN 9687: 1937.4MHz) and a third carrier with maximum spacing between the other two carrier frequencies (UARFCN 9938: 1987.6MHz) at the upper band edge. In the AWS band: Single WCDMA carrier at the middle channel (UARFCN 3250: 2140MHz). 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 carriers (based upon KDB 971168 D03v01) using two carriers (with minimum spacing between carrier frequencies) at the lower band edge (UARFCN 3112: 2112.4 & UARFCN 3137: 2117.4MHz) and a third carrier with maximum spacing between the other two carrier frequencies (UARFCN 3388: 2167.6MHz) at the upper band edge. In the PCS band: Single WCDMA carrier at the middle channel (UARFCN 9800: 1960.0MHz). 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 carriers (based upon KDB 971168 D03v01) using two carriers (with minimum spacing between carrier frequencies) at the PCS band lower band edge (UARFCN 9662: 1932.4 & UARFCN 9687: 1937.4MHz) and a third carrier with maximum spacing between the other two carrier frequencies (UARFCN 3388: 2167.6MHz) at the AWS band upper band edge. 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.



The test configuration parameters are provided below:

PCS Band Transn	nission Paramet	ers	AWS Band Transmission Parameters			
Carrier	Channel Carrier		Carrier	Channel	Carrier	
Frequency	Bandwidth	Power	Frequency	Bandwidth	Power	
1960.0MHz (Mid Ch)	WCDMA 5M	80 Watts	2140.0MHz (Mid Ch)	WCDMA 5M	40 Watts	
1932.4, 1937.4 & 1987.6MHz (BC, BC+1, and TC)	WCDMA 5M	26+26+26 Watts	2140.0MHz (Mid Ch)	WCDMA 5M	40 Watts	
1932.4 & 1937.4MHz (BC and BC+1)	WCDMA 5M	40 + 40 Watts	2167.6MHz (Top Ch)	WCDMA 5M	40 Watts	
1960.0MHz (Mid Ch)	WCDMA 5M	80 Watts	2112.4, 2117.4 & 2167.6MHz (BC, BC+1, and TC)	WCDMA 5M	13+13+13 Watts	

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 -16dBm was used in the certification testing. The limit is adjusted to -16dBm [-13dBm -10 log (2)] per FCC KDB 662911D01 v02r01 because the BTS may operate as a 2 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 was 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 -46dBm to correct for a spectrum analyzer RBW of 1kHz versus required RBW of 1MHz [i.e.: -46dBm = -16dBm - 10log(1000kHz/1kHz)]. The limit for the 150kHz to 20MHz frequency range was adjusted to -36dBm to correct for a spectrum analyzer RBW of 10kHz versus required RBW of 1MHz [i.e.: -36dBm = -16dBm - 10log(1000kHz/10kHz)]. The required limit of -16dBm with a RBW of  $\geq 1$ MHz was used for all other frequency ranges. The spectrum analyzer settings that were used for this test are summarized in the following table.

Frequency Range	RBW	VBW	Number of Data Points	Detector	Sweep Time	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							

Note 1: The total measurement RF path loss of the test setup (attenuators, test cables and filters) is accounted for by the spectrum analyzer 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 the measurement instrumentation noise floor for the frequency ranges below 20MHz. A high pass filter was used to reduce the measurement instrumentation noise floor for the frequency range 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 (please note that the display line on the single carrier plots are mistakenly 3dB lower than required). Conducted spurious emission plots/measurements are provided in the following pages.



### Single PCS & AWS Carriers\_ QPSK \_ Middle Channels (1960.0MHz & 2140.0MHz) Simultaneously:





20MHz to 3GHz



### 6GHz to 18GHz



### 1900MHz to 2200MHz





3GHz to 6GHz







### Single PCS & AWS Carriers\_ 16QAM \_ Middle Channels (1960.0MHz & 2140.0MHz) Simultaneously:

### 9kHz to 150kHz



20MHz to 3GHz



### 6GHz to 18GHz



### 1900MHz to 2200MHz





3GHz to 6GHz







### Single PCS & AWS Carriers\_ 64QAM \_ Middle Channels (1960.0MHz & 2140.0MHz) Simultaneously:





20MHz to 3GHz



### 6GHz to 18GHz



### 1900MHz to 2200MHz





3GHz to 6GHz







### Three PCS (BCs & TC) Carriers & One AWS Carrier (MC)\_ QPSK \_ 1932.4, 1937.4, 1987.6 & 2140.0MHz:

### 9kHz to 150kHz



20MHz to 3GHz



### 6GHz to 18GHz



### 1900MHz to 2200MHz





3GHz to 6GHz







### Three PCS (BCs & TC) Carriers & One AWS Carrier (MC)\_16QAM\_1932.4, 1937.4, 1987.6 & 2140.0MHz:

### 9kHz to 150kHz



20MHz to 3GHz



### 6GHz to 18GHz



### 1900MHz to 2200MHz





3GHz to 6GHz







### Three PCS (BCs & TC) Carriers & One AWS Carrier (MC)\_64QAM\_1932.4, 1937.4, 1987.6 & 2140.0MHz:

### 9kHz to 150kHz



20MHz to 3GHz



### 6GHz to 18GHz



### 1900MHz to 2200MHz





3GHz to 6GHz







### Three AWS (BCs & TC) Carriers & One PCS Carrier (MC)\_QPSK \_ 2112.4, 2117.4, 2167.6 & 1960.0MHz:

### 9kHz to 150kHz



20MHz to 3GHz



### 6GHz to 18GHz



### 1900MHz to 2200MHz





3GHz to 6GHz







### Three AWS (BCs & TC) Carriers & One PCS Carrier (MC)\_16QAM\_2112.4, 2117.4, 2167.6 & 1960.0MHz:

### 9kHz to 150kHz



20MHz to 3GHz



### 6GHz to 18GHz



### 1900MHz to 2200MHz





3GHz to 6GHz







### Three AWS (BCs & TC) Carriers & One PCS Carrier (MC)\_64QAM\_2112.4, 2117.4, 2167.6 & 1960.0MHz:

### 9kHz to 150kHz



20MHz to 3GHz



### 6GHz to 18GHz



### 1900MHz to 2200MHz





3GHz to 6GHz







### Multicarrier Multiband WCDMA \_ QPSK\_ (1932.4, 1937.4 & 2167.4MHz):





20MHz to 3GHz



### 6GHz to 18GHz



### 1900MHz to 2200MHz





3GHz to 6GHz







### Multicarrier Multiband WCDMA \_ 16QAM\_ (1932.4, 1937.4 & 2167.4MHz):

### 9kHz to 150kHz



### 20MHz to 3GHz



### 6GHz to 18GHz



### 1900MHz to 2200MHz







3GHz to 6GHz







### Multicarrier Multiband WCDMA \_ 64QAM\_ (1932.4, 1937.4 & 2167.4MHz):

### 9kHz to 150kHz



### 20MHz to 3GHz



### 6GHz to 18GHz



### 1900MHz to 2200MHz







3GHz to 6GHz







### **Transmitter Radiated Spurious Emissions**

Radiated emission measurement results are in Appendix A.

### Frequency Stability/Accuracy

Frequency Stability/Accuracy measurement results are in Appendix A.



### APPENDIX D: ANTENNA PORT WCDMA TEST DATA FOR THE AWS BAND

All conducted RF measurements in this section were made at AHFIG antenna port 3. Based on the RF power measurement results shown in Appendix A & B, Port 3 had the highest LTE RMS average power for the PCS and AWS bands (represents the worst case) and therefore it was selected for all the remaining antenna port tests. All testing in this section was performed with WCDMA modulation types. The WCDMA modulation types are setup according to 3GPP TS 25.141 UTRA Test Models (TM) as follows TM 1: QPSK, TM 5: 16QAM and TM 6: 64QAM. The test setup used is provided below.



Test Setup Used for AHFIG Conducted RF Measurements



### **RF Output Power**

RF output power has been measured in both Peak and RMS Average terms at AHFIG Antenna Port 3 at the bottom, middle and top AWS frequency channels for WCDMA modulation types (QPSK, 16QAM, 64QAM). RMS Average power was measured as described in section 5.2 of KDB 971168 D01v03r01 and ANSI C63.26-2015 sections 5.2.4.4. The peak to average power ratio (PAPR) has been measured using the signal analyzer complementary cumulative distribution function (CCDF) for a probability of 0.1% as described in section 5.7.2 of KDB971168 D01v03r01 and ANSI C63.26-2015 section 5.2.3.4. All results are presented in tabular form below. The highest values are highlighted.

Single Carrier Operation					
Modulation	Frequency _ Channel	PAPR (dB)	Average (dBm)		
	2112.4MHz _ Bottom Channel	7.28	45.87		
QPSK	2140.0MHz _ Middle Channel	7.28	45.97		
	2167.6MHz _ Top Channel	7.27	46.06		
	2112.4MHz _ Bottom Channel	7.37	45.77		
16QAM	2140.0MHz _ Middle Channel	7.29	46.03		
	2167.6MHz _ Top Channel	7.34	45.90		
	2112.4MHz _ Bottom Channel	7.32	45.81		
64QAM	2140.0MHz _ Middle Channel	7.34	45.98		
	2167.6MHz _ Top Channel	7.31	45.89		

RF output power has been measured in RMS Average terms for each AWS multicarrier test configuration to verify/document the power levels. All results are presented in tabular form below.

Measured RM	MS Average Carrier Power	ticarrier Configurations at	Antenna Port 3		
Modulation	AWS Multicarrier	WCDMA	Multiband Multicarrier WCDMA		
Туре	Bottom Carriers	Top Carrier	Bottom Carriers	Top Carrier	
	2112.4 & 2117.4WHz	2107.6IVIHZ	1932.4 & 1937.4MHz	2107.0IVIHZ	
	43.38 dBm	41.47 dBm			
OPSK	(21.8 Watts)	(14.0 Watts)			
di on	Total Carrier Power in A	NS Band is 35.8	See Appendix A for data and test results for this test case.		
	Watts or 45.54	dBm			
	43.94 dBm	41.46 dBm			
100014	(24.8 Watts)	(14.0 Watts)			
TOQAIVI	Total Carrier Power in A	NS Band is 38.8			
	Watts or 45.89	dBm			
640414	43.86 dBm	41.50 dBm			
	(24.3 Watts)	(14.1 Watts)			
	Total Carrier Power in A	NS Band is 38.4	]		
	Watts or 45.84	dBm			

All measurement results are provided in the following pages. The total measurement RF path loss of the test setup (attenuator and test cables) was 40.4 dB and is accounted for by the spectrum analyzer reference level offset.



### WCDMA Channel Power Plots for Antenna Port 3 and QPSK Modulation:

### Bottom Channel\_ CCDF



### Middle Channel\_ CCDF



### Top Channel\_ CCDF



### Bottom Channel\_ Average





### Middle Channel\_ Average

### Top Channel\_Average





### WCDMA Channel Power Plots for Antenna Port 3 and 16QAM Modulation:

### Bottom Channel\_ CCDF



### Middle Channel\_ CCDF



### Top Channel\_ CCDF















### WCDMA Channel Power Plots for Antenna Port 3 and 64QAM Modulation:

### Bottom Channel\_ CCDF



### Middle Channel\_ CCDF



### Top Channel\_ CCDF















### AWS Multicarrier (Carriers at 2112.4, 2117.4 & 2167.6MHz) Channel Power Plots for Antenna Port 3:

### QPSK\_2112.4 & 2117.4MHz\_Average Power



# OPSK\_2167.6MHz\_Average Power Aglent 12:22:33 11 Jun 2019 L Ref 59 dBm •Reten 30 dB • •Hvag • • • 06 • • • • 0710 • • • • • 08/ •



### 16QAM\_2112.4 & 2117.4MHz\_Average Power



### 64QAM\_2112.4 & 2117.4MHz\_Average Power



### 64QAM\_2167.6MHz\_Average Power



### 16QAM\_2167.6MHz\_Average Power



### Emission Bandwidth (26 dB down and 99%)

Emission bandwidth measurements were made at antenna port 3 on the bottom, middle and top AWS channels. The AHFIG was operated at maximum RF output power for WCDMA modulation types (QPSK, 16QAM, 64QAM).

The 26dB emission bandwidth was measured in accordance with section 4 of FCC KDB 971168 D01v03r01 and ANSI C63.26 section 5.4. The 99% occupied bandwidth was measured in accordance with section 6.7 of RSS-Gen Issue 5. For both measurements, an occupied bandwidth built-in function in the spectrum analyzer was used. The results are provided in the following table. The largest emission bandwidth is highlighted.

Modulation	Frequency Channel	Emission Bandwidth (MHz)			
modulation		26dB	99%		
	2112.4MHz _ Bottom Channel	4.359	3.9488		
QPSK	2140.0MHz _ Middle Channel	4.362	3.9494		
	2167.6MHz _ Top Channel	4.362	3.9485		
	2112.4MHz _ Bottom Channel	4.352	3.9425		
16QAM	2140.0MHz _ Middle Channel	4.355	3.9442		
	2167.6MHz _ Top Channel	4.358	3.9440		
	2112.4MHz _ Bottom Channel	4.360	3.9365		
64QAM	2140.0MHz _ Middle Channel	4.365	3.9366		
	2167.6MHz _ Top Channel	4.363	3.9375		

Emission bandwidth measurement data are provided in the following pages.



### WCDMA Emission Bandwidth Plots at AHFIG Antenna Port 3

Bottom Channel\_2112.4MHz\_QPSK Modulation





### Middle Channel\_2140.0MHz\_QPSK Modulation



Top Channel_2167.6MHz	_QPSK Modulation
-----------------------	------------------









### Top Channel\_2167.6MHz\_16QAM Modulation

### Bottom Channel\_2112.4MHz\_16QAM Modulation



### WCDMA Emission Bandwidth Plots at AHFIG Antenna Port 3

Bottom Channel\_2112.4MHz\_64QAM Modulation



### Middle Channel\_2140.0MHz\_64QAM Modulation





### Top Channel\_2167.6MHz\_64QAM Modulation



### Antenna Port Conducted Band Edge

Conducted band edge measurements were made at RRH antenna port 3.

### Single Carrier Test Cases

The RRH was operated at the AWS band edge frequencies with all WCDMA modulation types (QPSK, 16QAM and 64QAM) at maximum power (40 watts/port and 40 watts/carrier).

### AWS Multicarrier Multiband Test Case

In the AWS band: Three carriers (based upon KDB 971168 D03v01) using two carriers (with minimum spacing between carrier frequencies) at the lower band edge (UARFCN 3112: 2112.4 & UARFCN 3137: 2117.4MHz) and a third carrier with maximum spacing between the other two carrier frequencies (UARFCN 3388: 2167.6MHz) at the upper band edge. In the PCS band: Single WCDMA carrier at the middle channel (UARFCN 9800: 1960.0MHz). 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.

### Multiband Multicarrier Test Case

Three WCDMA carriers (based upon KDB 971168 D03v01) using two carriers (with minimum spacing between carrier frequencies) at the PCS band lower band edge (UARFCN 9662: 1932.4 & UARFCN 9687: 1937.4MHz) and a third carrier with maximum spacing between the other two carrier frequencies (UARFCN 3388: 2167.6MHz) at the AWS band upper band edge. 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. This test case is documented in Appendix C.

The power of any emission outside of the authorized operating frequency range cannot exceed -13 dBm as specified in section 27.53(h)(1) and RSS 139 6.6. The limit is adjusted to -16dBm [-13dBm -10 log (2)] per FCC KDB 662911D01 v02r01 because the BTS may operate as a 2 port MIMO transmitter.

Measurements were performed with the spectrum analyzer in the RMS average mode over 100 traces. In the 1MHz bands outside and adjacent to the frequency block, a resolution bandwidth of 1% of the measured emission bandwidth (51kHz) per 27.53(h)(1) and RSS 139 6.6 was used. In the 1 to 2MHz frequency range outside the band edge (i.e.: 2108 to 2109MHz and 2171 to 2172MHz bands) the RBW was set to 1% of the measured emission bandwidth (51kHz) and the power integrated over 1MHz. In the 2MHz to 22MHz frequency range outside the band edge (i.e.: 2088 to 2108MHz and 2172 to 2192MHz bands) a 1MHz RBW and 3MHz VBW was used.