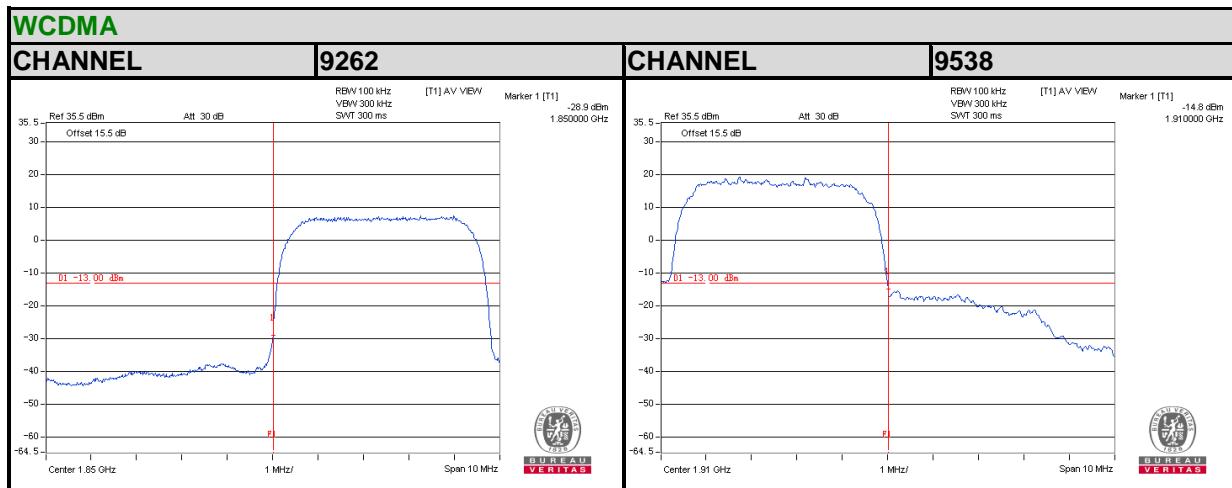




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#### 4.4.4. TEST RESULTS



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Email: [customerservice.dg@cn.bureauveritas.com](mailto:customerservice.dg@cn.bureauveritas.com)

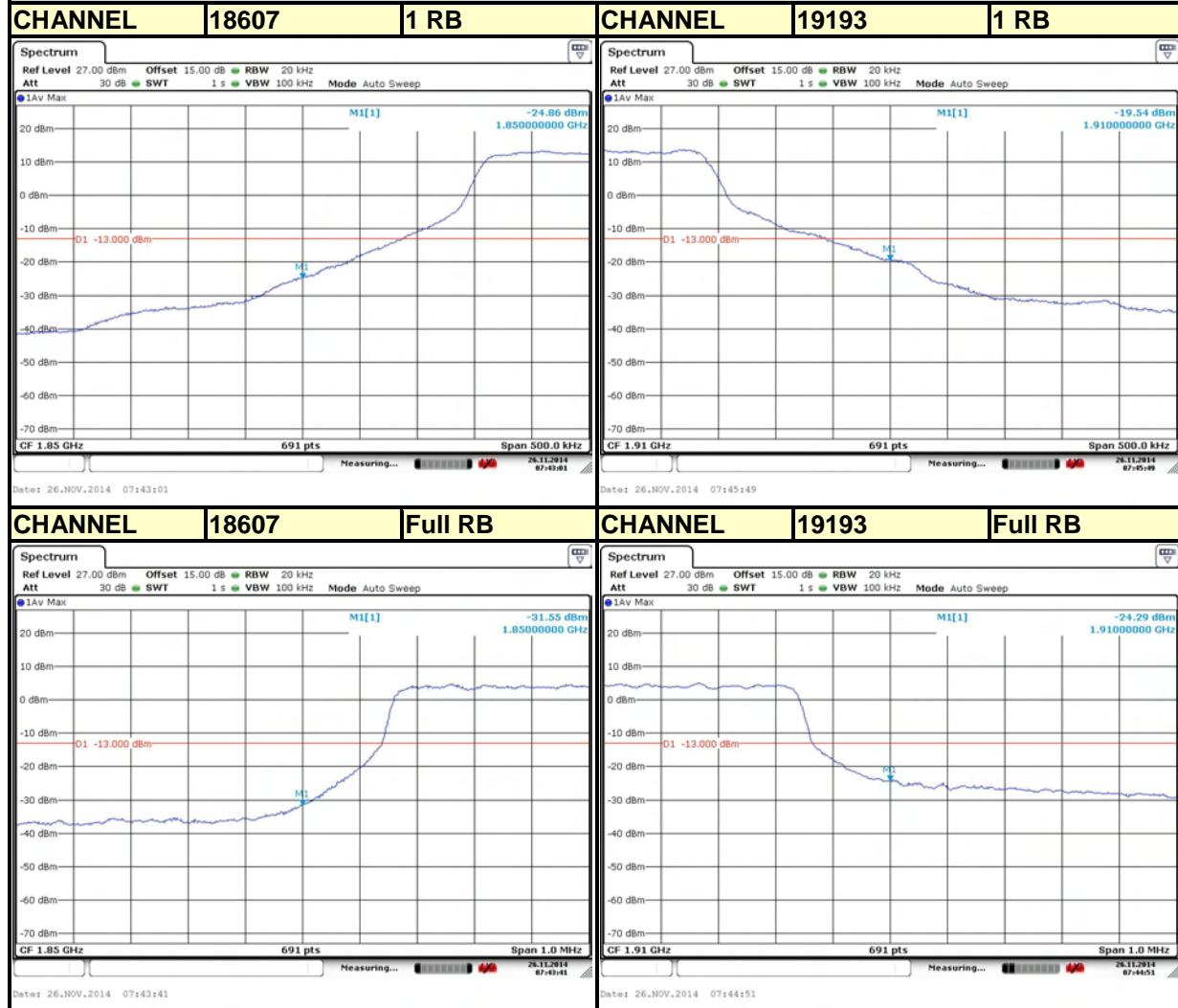


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## LTE BAND 2

Channel Bandwidth: 1.4MHz



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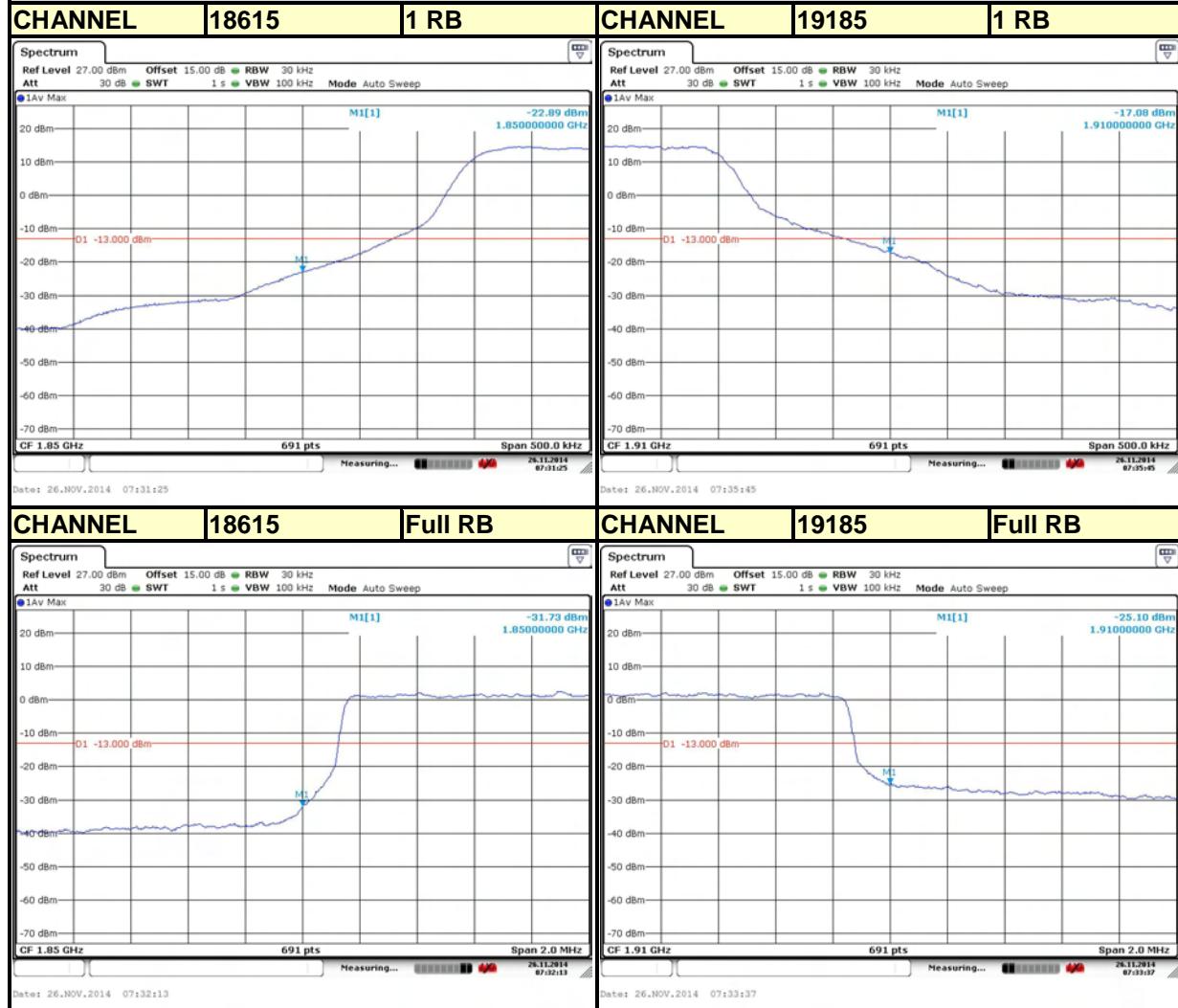


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## LTE BAND 2

Channel Bandwidth: 3MHz



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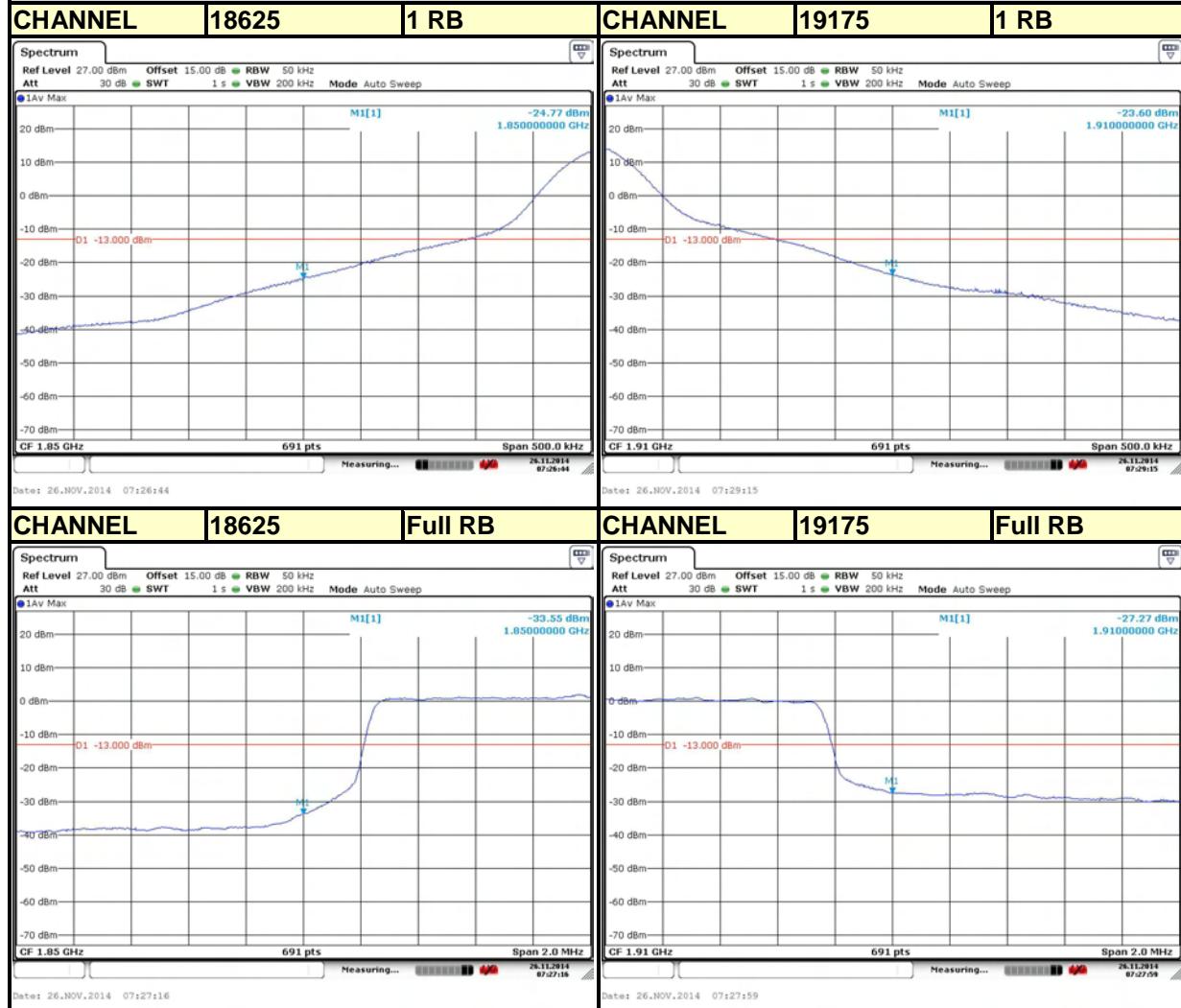


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## LTE BAND 2

Channel Bandwidth: 5MHz



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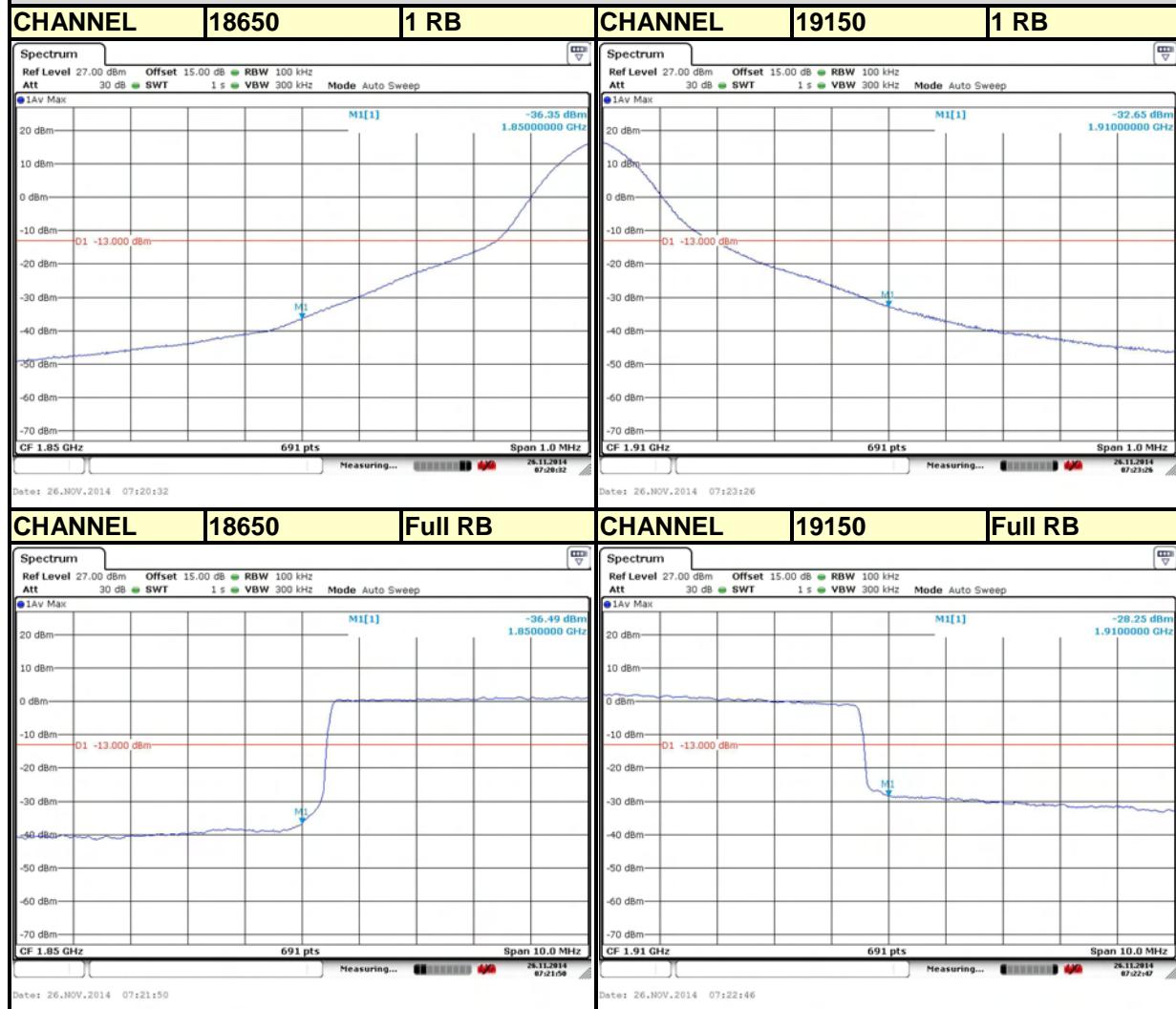


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## LTE BAND 2

### Channel Bandwidth: 10MHz



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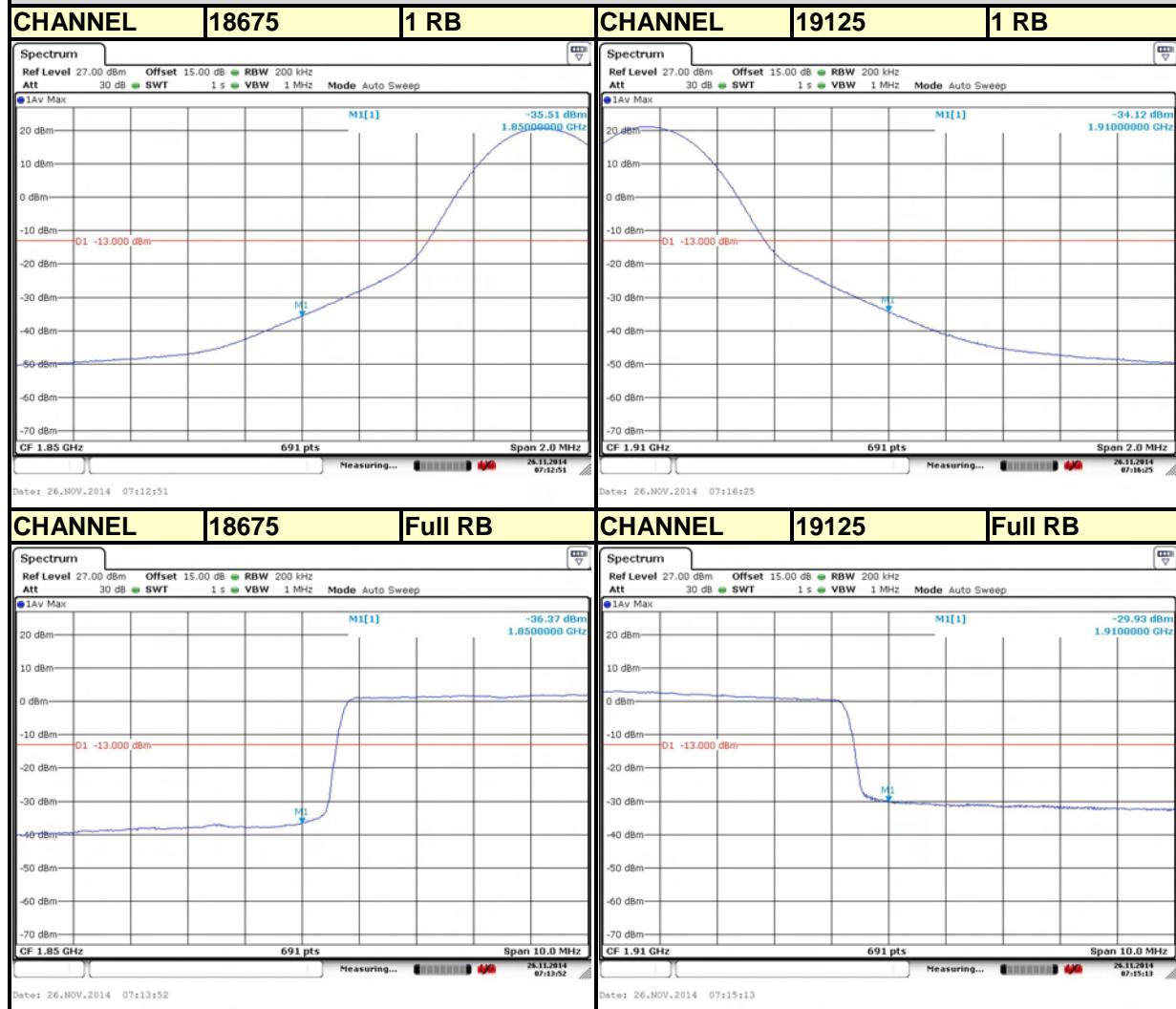


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## LTE BAND 2

### Channel Bandwidth: 15MHz



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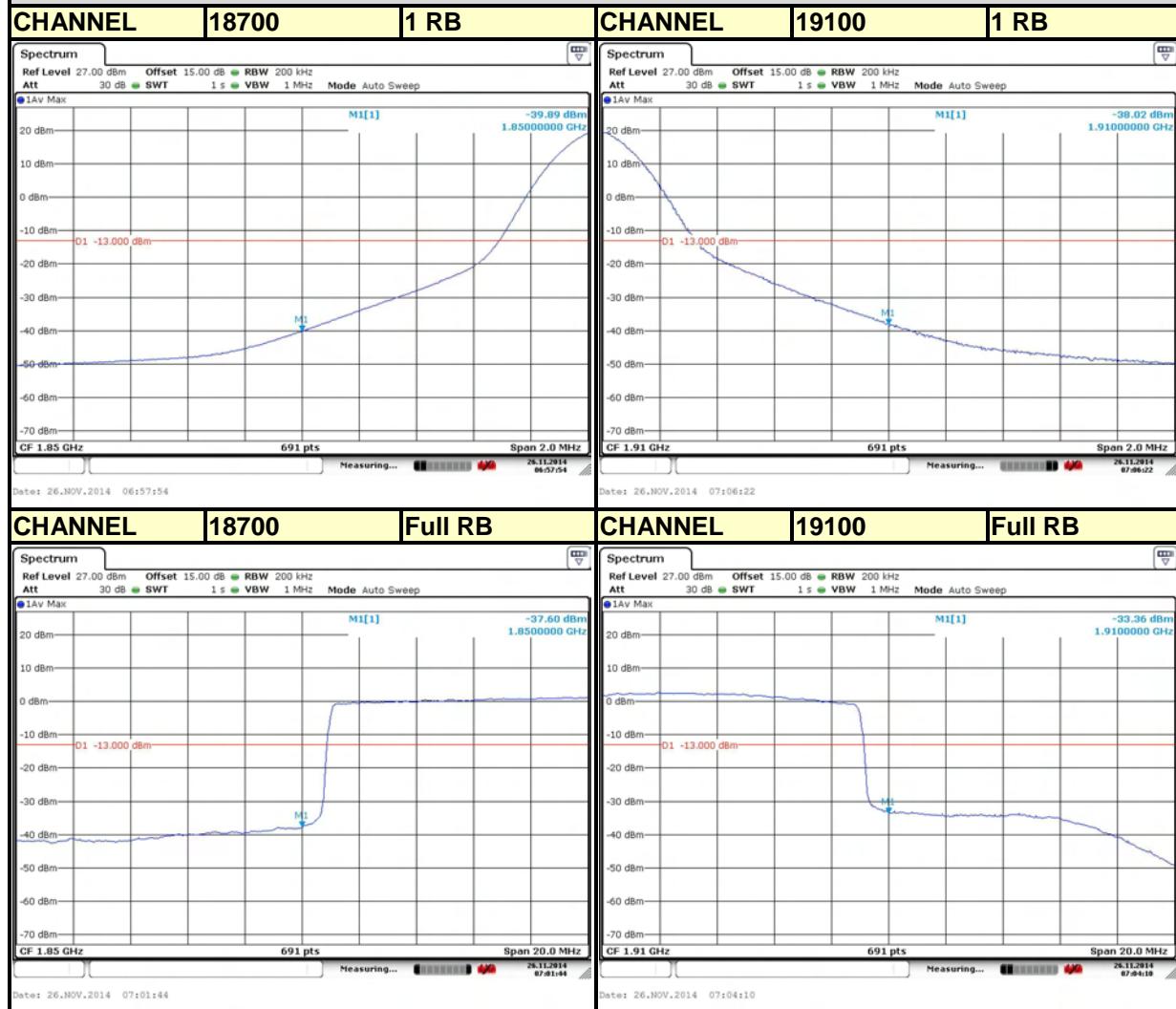


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## LTE BAND 2

### Channel Bandwidth: 20MHz



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## 4.5 CONDUCTED SPURIOUS EMISSIONS

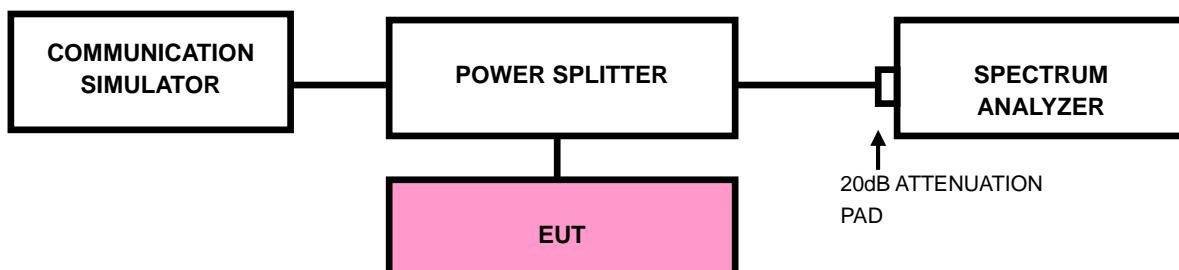
### 4.5.1 LIMITS OF CONDUCTED SPURIOUS EMISSIONS MEASUREMENT

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. The emission limit equal to  $-13\text{dBm}$ .

### 4.5.2 TEST PROCEDURE

- a. The EUT makes a phone call to the communication simulator. All measurements were done at low, middle and high operational frequency range.
- b. Measuring frequency range is from 9 kHz to 19.1GHz. 20dB attenuation pad is connected with spectrum. RBW=1MHz and VBW=3MHz is used for conducted emission measurement.

### 4.5.3 TEST SETUP





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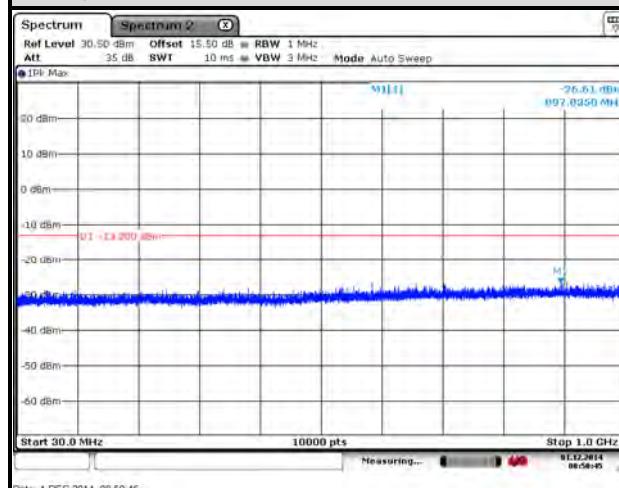
Test Report No.: RF141120N008-2

#### 4.5.4 TEST RESULTS

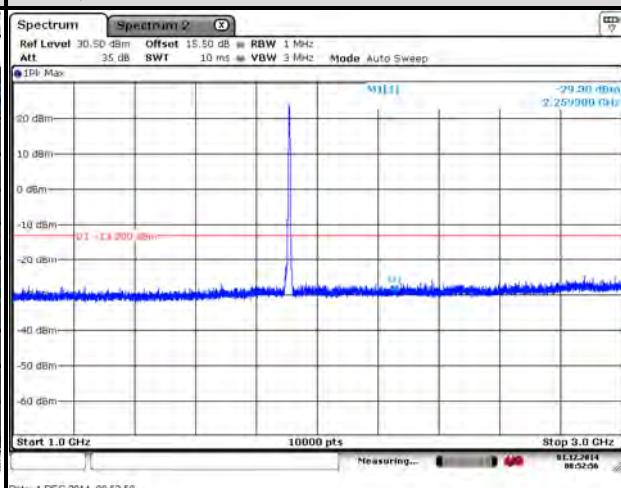
##### WCDMA

##### CHANNEL 9400

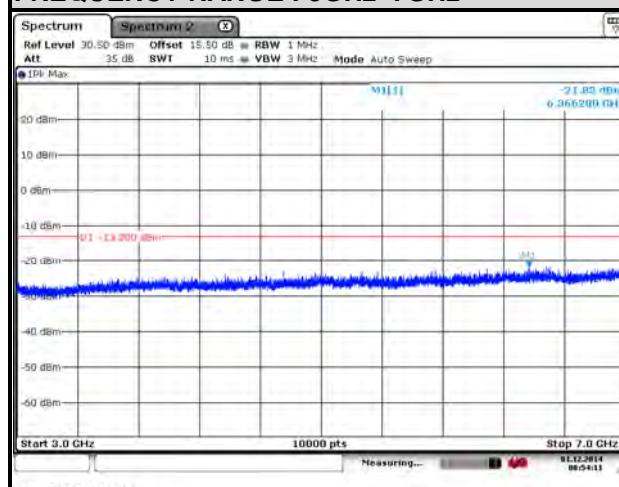
##### FREQUENCY RANGE : 30MHz~1GHz



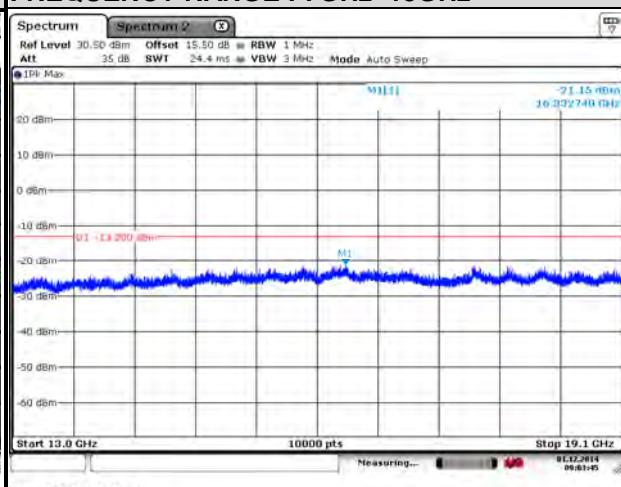
##### FREQUENCY RANGE : 1GHz~3GHz



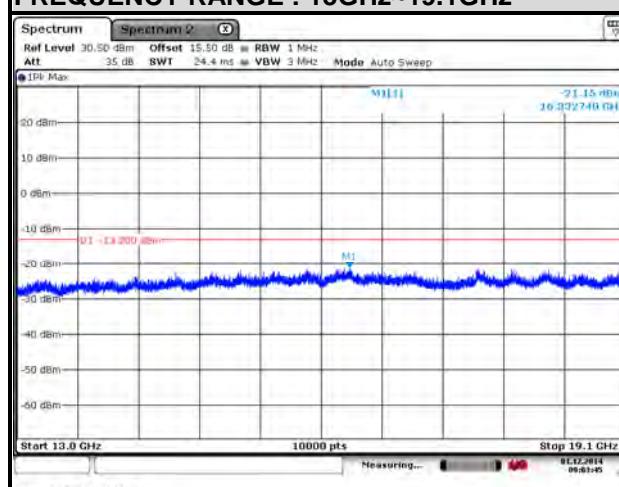
##### FREQUENCY RANGE : 3GHz~7GHz



##### FREQUENCY RANGE : 7GHz~13GHz



##### FREQUENCY RANGE : 13GHz~19.1GHz



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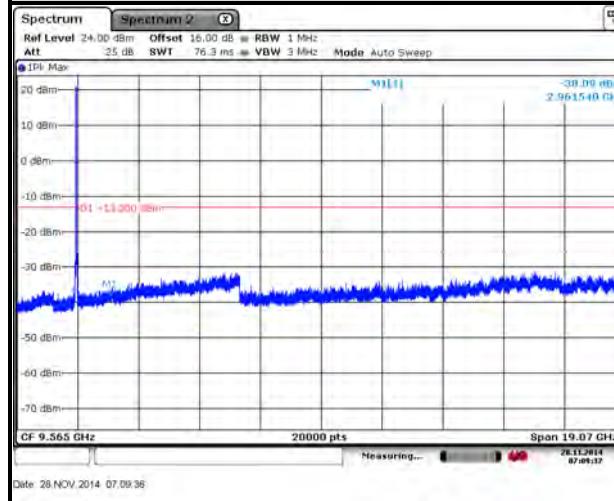
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## LTE BAND 2

### CHANNEL 18900

1.4MHz / QPSK

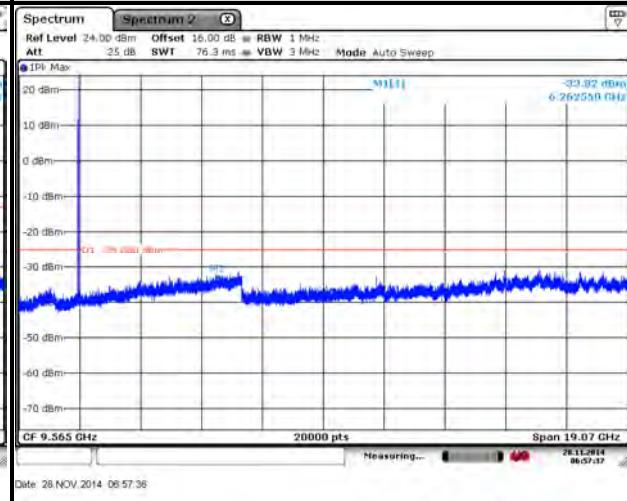
FREQUENCY RANGE : 30MHz~19.1GHz



### CHANNEL 18900

3MHz / QPSK

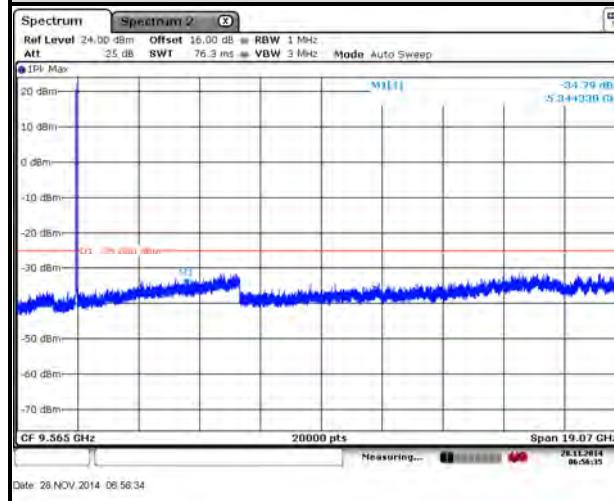
FREQUENCY RANGE : 30MHz~19.1GHz



### CHANNEL 18900

5MHz / QPSK

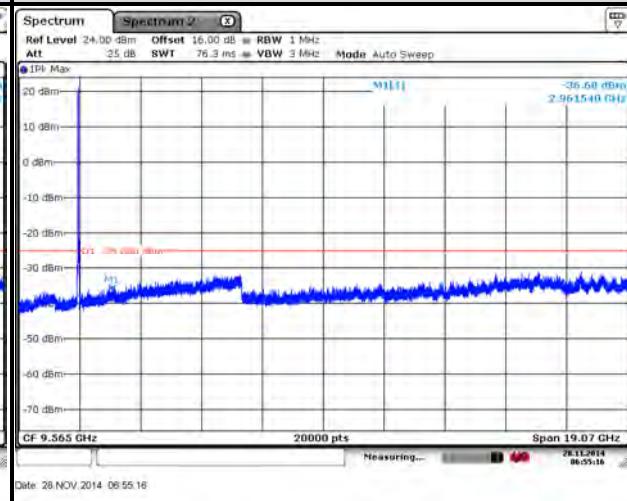
FREQUENCY RANGE : 30MHz~19.1GHz



### CHANNEL 18900

10MHz / QPSK

FREQUENCY RANGE : 30MHz~19.1GHz



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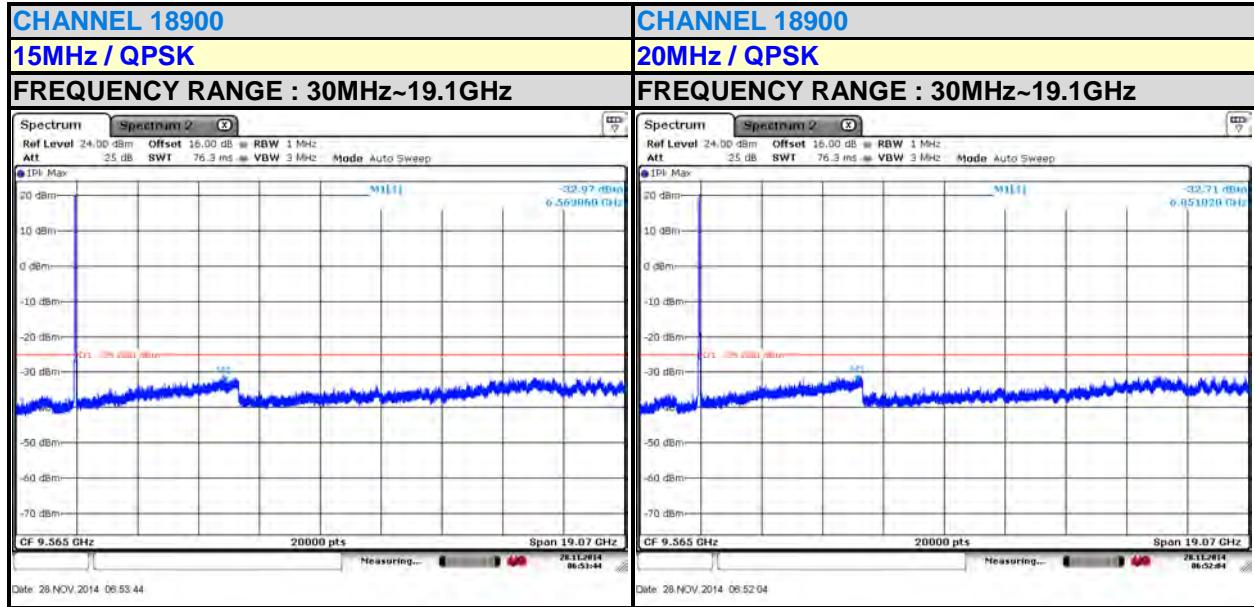
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## 4.6 RADIATED EMISSION MEASUREMENT

### 4.6.1 LIMITS OF RADIATED EMISSION MEASUREMENT

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. The emission limit equal to  $-13\text{dBm}$ .

### 4.6.2 TEST PROCEDURES

- a. Substitution method is used for E.I.R.P measurement. In the semi-anechoic chamber, EUT placed on the 0.8m height of Turn Table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1m to 4m to find the maximum polar radiated power. The “Read Value” is the spectrum reading the maximum power value.
- b. The substitution horn antenna is substituted for EUT at the same position and signals generator export the CW signal to the substitution antenna via a TX cable. Rotated the Turn Table and moved receiving antenna to find the maximum radiation power. Adjust output power level of S.G to get a Value of spectrum reading equal to “Read Value” of step a. Record the power level of S.G
- c.  $\text{EIRP} = \text{Output power level of S.G} - \text{TX cable loss} + \text{Antenna gain of substitution horn.}$

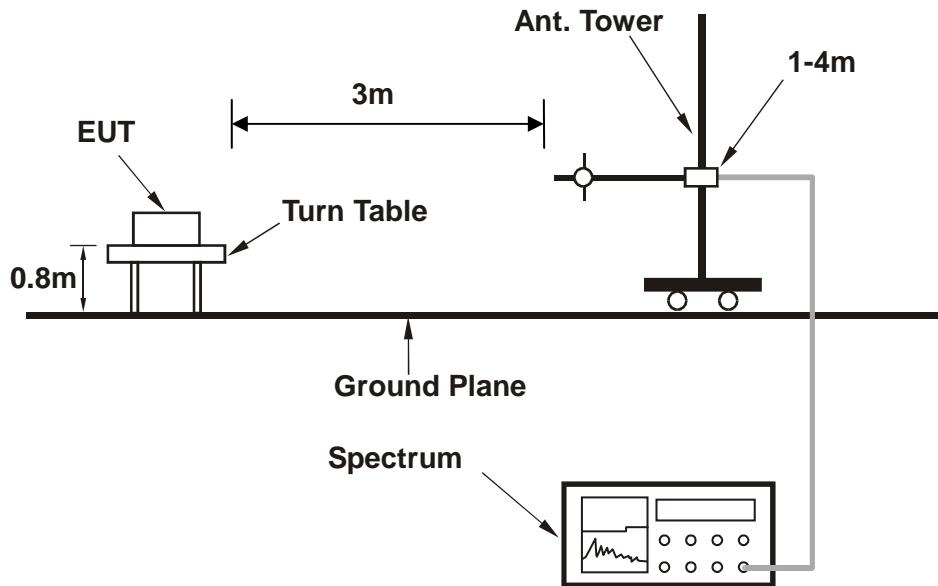
**NOTE:** The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1MHz/3MHz.

### 4.6.3 DEVIATION FROM TEST STANDARD

No deviation



#### 4.6.4 TEST SETUP



For the actual test configuration, please refer to the attached file (Test Setup Photo).



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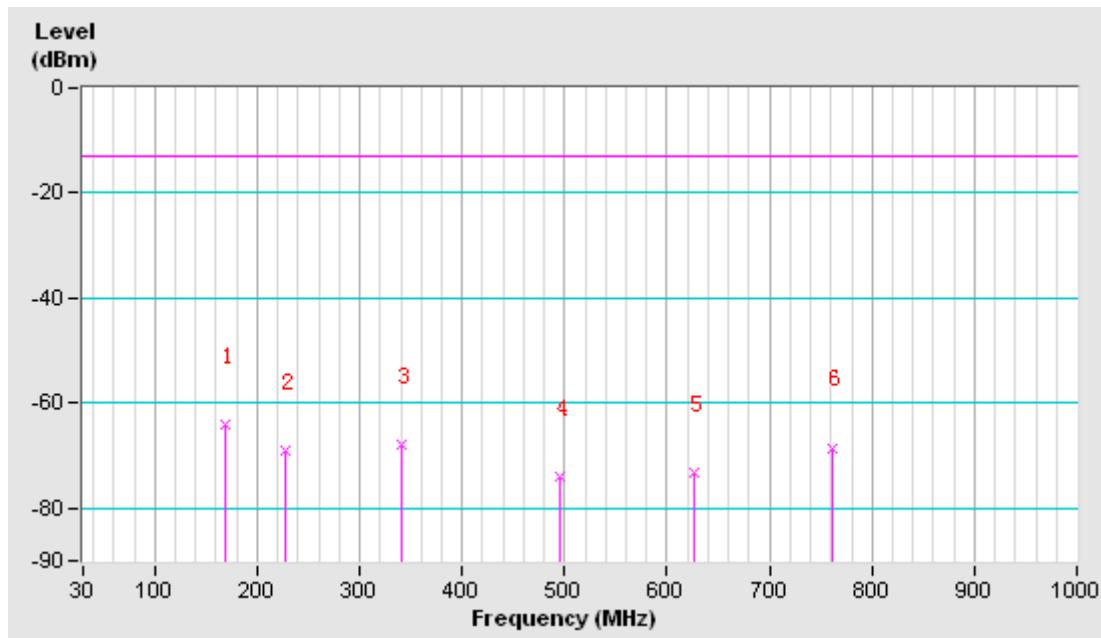
#### 4.6.5 TEST RESULTS

##### BELOW 1GHz WORST-CASE DATA : LTE BAND 2

SPURIOUS EMISSION FREQUENCY RANGE	Below 1000MHz	OPERATING CHANNEL	Channel 18900
-----------------------------------	---------------	-------------------	---------------

SPURIOUS EMISSION LEVEL				
Frequency (MHz)	Antenna Polarization	Level (dBm)	Limit (dBm)	Margin (dB)
168.35	H	-64.12	-13	-51.12
227.42	H	-68.98	-13	-55.98
340.9	H	-67.97	-13	-54.97
496.35	H	-73.99	-13	-60.99
626.92	H	-73.09	-13	-60.09
762.16	H	-68.49	-13	-55.49

NOTE: The emission behavior belongs to narrowband spurious emission.





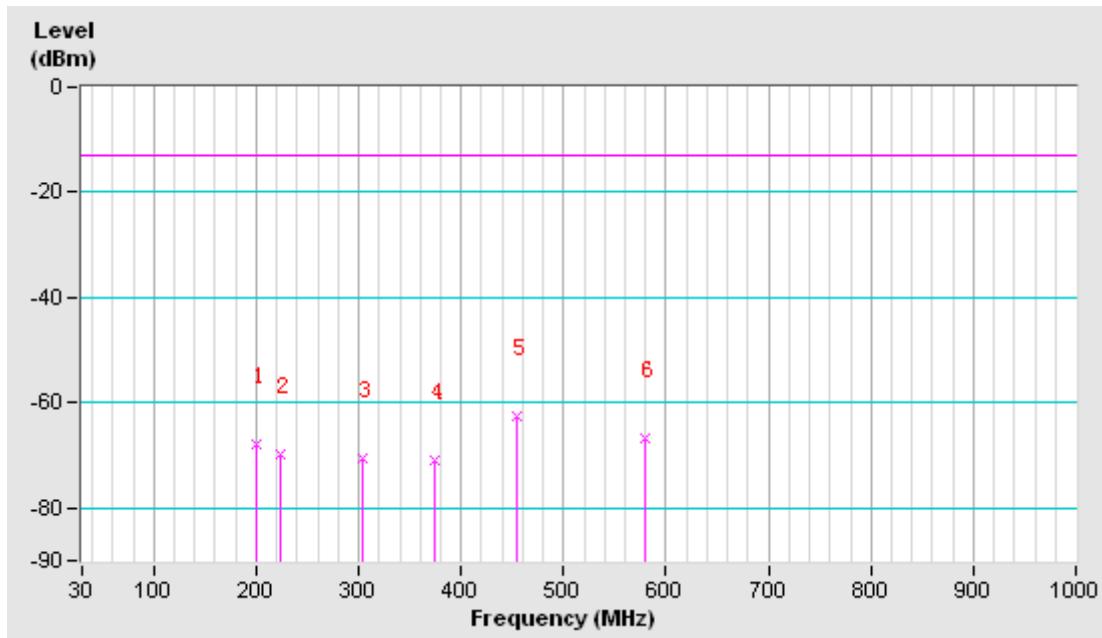
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<b>SPURIOUS EMISSION FREQUENCY RANGE</b>	Below 1000MHz	<b>OPERATING CHANNEL</b>	Channel 18900
--	---------------	--------------------------	---------------

SPURIOUS EMISSION LEVEL				
Frequency (MHz)	Antenna Polarization	Level (dBm)	Limit (dBm)	Margin (dB)
199.44	V	-67.88	-13	-54.88
224.31	V	-69.84	-13	-56.84
303.59	V	-70.66	-13	-57.66
373.54	V	-70.85	-13	-57.85
454.37	V	-62.72	-13	-49.72
580.29	V	-66.63	-13	-53.63

**NOTE:** The emission behavior belongs to narrowband spurious emission.





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Test Report No.: RF141120N008-2

**ABOVE 1GHz DATA**

**WCDMA:**

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M							
No.	Freq. (MHz)	SPA READING (dBm)	Limit (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Margin (dB)
1	3760	-62.35	-13	-50.04	2.59	-47.45	-34.45
2	5640	-60.88	-13	-43.47	3.28	-40.19	-27.19
3	7520	-55.69	-13	-35.22	4.51	-30.71	-17.71

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M							
No.	Freq. (MHz)	SPA READING (dBm)	Limit (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Margin (dB)
1	3760	-62.64	-13	-48.93	2.59	-46.34	-33.34
2	5640	-56.39	-13	-38.46	3.28	-35.18	-22.18
3	7520	-48.93	-13	-29.26	4.51	-24.75	-11.75

**REMARKS:**

1. EIRP(dBm) = S.G Power Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB)



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Test Report No.: RF141120N008-2

## LTE BAND 2

### CHANNEL BANDWIDTH: 1.4MHz / QPSK

MODE	TX channel 18900	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	24deg. C, 60%RH	INPUT POWER	DC 5V from adapter
TESTED BY	Blue Zheng		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M							
No.	Freq. (MHz)	Reading (dBm)	Limit (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Margin (dB)
1	3760	-60.79	-13	-48.47	2.59	-45.88	-32.88
2	5640	-58.81	-13	-41.16	3.28	-37.88	-24.88
3	7520	-54.68	-13	-34.20	4.51	-29.69	-16.69
4	9400	-54.51	-13	-32.99	4.06	-28.93	-15.93

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M							
No.	Freq. (MHz)	Reading (dBm)	Limit (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Margin (dB)
1	3760	-60.05	-13	-46.31	2.59	-43.72	-30.72
2	5640	-58.46	-13	-40.53	3.28	-37.25	-24.25
3	7520	-53.89	-13	-34.21	4.51	-29.70	-16.70
4	9400	-52.97	-13	-32.49	4.06	-28.43	-15.43

NOTE: EIRP (dBm) = S.G Power Value (dBm) + Correction Factor (dB).



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Test Report No.: RF141120N008-2

CHANNEL BANDWIDTH: 3MHz / QPSK

MODE	TX channel 18900		FREQUENCY RANGE		Above 1000MHz	
ENVIRONMENTAL CONDITIONS	24deg. C, 60%RH		INPUT POWER		DC 5V from adapter	
TESTED BY	Blue Zheng					

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M							
No.	Freq. (MHz)	Reading (dBm)	Limit (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Margin (dB)
1	3760	-63.15	-13	-50.85	2.59	-48.26	-35.26
2	5640	-59.01	-13	-41.39	3.28	-38.11	-25.11
3	7520	-55.16	-13	-34.68	4.51	-30.17	-17.17
4	9400	-53.94	-13	-32.42	4.06	-28.36	-15.36

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M							
No.	Freq. (MHz)	Reading (dBm)	Limit (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Margin (dB)
1	3760	-60.28	-13	-46.54	2.59	-43.95	-30.95
2	5640	-58.41	-13	-40.48	3.28	-37.20	-24.20
3	7520	-54.06	-13	-34.38	4.51	-29.87	-16.87
4	9400	-53.02	-13	-32.54	4.06	-28.48	-15.48

NOTE: EIRP (dBm) = S.G Power Value (dBm) + Correction Factor (dB).



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Test Report No.: RF141120N008-2

**CHANNEL BANDWIDTH: 5MHz / QPSK**

<b>MODE</b>	TX channel 18900	<b>FREQUENCY RANGE</b>	Above 1000MHz
<b>ENVIRONMENTAL CONDITIONS</b>	24deg. C, 60%RH	<b>INPUT POWER</b>	DC 5V from adapter
<b>TESTED BY</b>	Blue Zheng		

**ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M**

No.	Freq. (MHz)	Reading (dBm)	Limit (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Margin (dB)
1	3760	-60.05	-13	-47.73	2.59	-45.14	-32.14
2	5640	-58.48	-13	-40.80	3.28	-37.52	-24.52
3	7520	-53.84	-13	-33.36	4.51	-28.85	-15.85
4	9400	-54.05	-13	-32.53	4.06	-28.47	-15.47
5	11280	-53.34	-13	-28.79	4.19	-24.60	-11.60

**ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M**

No.	Freq. (MHz)	Reading (dBm)	Limit (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Margin (dB)
1	3760	-59.98	-13	-46.24	2.59	-43.65	-30.65
2	5640	-56.59	-13	-38.66	3.28	-35.38	-22.38
3	7520	-55.06	-13	-35.37	4.51	-30.86	-17.86
4	9400	-52.84	-13	-32.36	4.06	-28.30	-15.30
5	11280	<b>-52.46</b>	<b>-13</b>	<b>-28.69</b>	<b>4.19</b>	<b>-24.50</b>	<b>-11.50</b>

**NOTE:** EIRP (dBm) = S.G Power Value (dBm) + Correction Factor (dB).



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Test Report No.: RF141120N008-2

**CHANNEL BANDWIDTH: 10MHz / QPSK**

MODE	TX channel 18900	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	24deg. C, 60%RH	INPUT POWER	DC 5V from adapter
TESTED BY	Blue Zheng		

**ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M**

No.	Freq. (MHz)	Reading (dBm)	Limit (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Margin (dB)
1	3760	-59.99	-13	-47.67	2.59	-45.08	-32.08
2	5640	-57.35	-13	-39.54	3.28	-36.26	-23.26
3	7520	-53.26	-13	-32.78	4.51	-28.27	-15.27
4	9400	-54.61	-13	-33.09	4.06	-29.03	-16.03

**ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M**

No.	Freq. (MHz)	Reading (dBm)	Limit (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Margin (dB)
1	3760	-58.46	-13	-44.70	2.59	-42.11	-29.11
2	5640	-57.37	-13	-39.44	3.28	-36.16	-23.16
3	7520	-55.06	-13	-35.37	4.51	-30.86	-17.86
4	9400	-51.94	-13	-31.45	4.06	-27.39	-14.39

**NOTE:** EIRP (dBm) = S.G Power Value (dBm) + Correction Factor (dB).



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Test Report No.: RF141120N008-2

**CHANNEL BANDWIDTH: 15MHz / QPSK**

MODE	TX channel 18900	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	24deg. C, 60%RH	INPUT POWER	DC 5V from adapter
TESTED BY	Blue Zheng		

**ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M**

No.	Freq. (MHz)	Reading (dBm)	Limit (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Margin (dB)
1	3760	-62.48	-13	-50.17	2.59	-47.58	-34.58
2	5640	-56.69	-13	-38.81	3.28	-35.53	-22.53
3	7520	-54.64	-13	-34.16	4.51	-29.65	-16.65
4	9400	-56.48	-13	-34.95	4.06	-30.89	-17.89

**ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M**

No.	Freq. (MHz)	Reading (dBm)	Limit (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Margin (dB)
1	3760	-61.02	-13	-47.29	2.59	-44.70	-31.70
2	5640	-54.89	-13	-36.95	3.28	-33.67	-20.67
3	7520	-54.37	-13	-34.69	4.51	-30.18	-17.18
4	9400	-52.82	-13	-32.34	4.06	-28.28	-15.28

**NOTE:** EIRP (dBm) = S.G Power Value (dBm) + Correction Factor (dB).



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Test Report No.: RF141120N008-2

**CHANNEL BANDWIDTH: 20MHz / QPSK**

MODE	TX channel 18900	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	24deg. C, 60%RH	INPUT POWER	DC 5V from adapter
TESTED BY	Blue Zheng		

**ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M**

No.	Freq. (MHz)	Reading (dBm)	Limit (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Margin (dB)
1	3760	-63.42	-13	-51.12	2.59	-48.53	-35.53
2	5640	-58.46	-13	-40.77	3.28	-37.49	-24.49
3	7520	-56.76	-13	-36.29	4.51	-31.78	-18.78
4	9400	-55.02	-13	-33.50	4.06	-29.44	-16.44

**ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M**

No.	Freq. (MHz)	Reading (dBm)	Limit (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Margin (dB)
1	3760	-59.68	-13	-45.93	2.59	-43.34	-30.34
2	5640	-58.14	-13	-40.21	3.28	-36.93	-23.93
3	7520	-54.25	-13	-34.57	4.51	-30.06	-17.06
4	9400	-52.26	-13	-31.77	4.06	-27.71	-14.71

**NOTE:** EIRP (dBm) = S.G Power Value (dBm) + Correction Factor (dB).

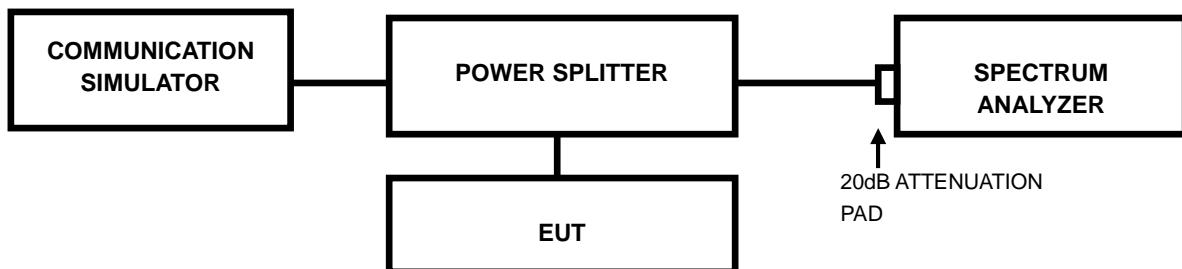


## 4.7 PEAK TO AVERAGE RATIO

### 4.7.1 LIMITS OF peak to average ratio MEASUREMENT

In measuring transmissions in this band using an average power technique, the peak to-average ratio (PAR) of the transmission may not exceed 13 dB

### 4.7.2 TEST SETUP



### 4.7.3 TEST PROCEDURES

1. Set resolution/measurement bandwidth  $\geq$  signal's occupied bandwidth;
2. Set the number of counts to a value that stabilizes the measured CCDF curve;
3. Record the maximum PAPR level associated with a probability of 0.1%.



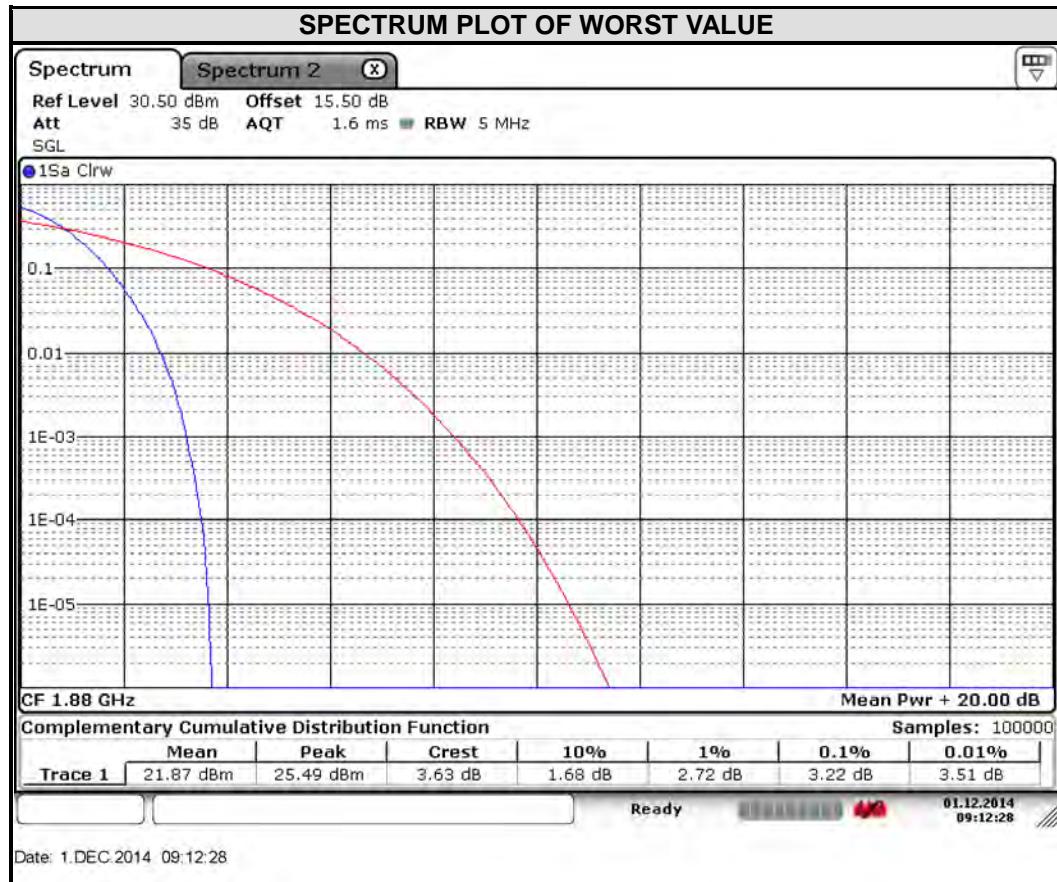
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#### 4.7.4 TEST RESULTS

##### WCDMA

CHANNEL	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
9400	1880	3.22





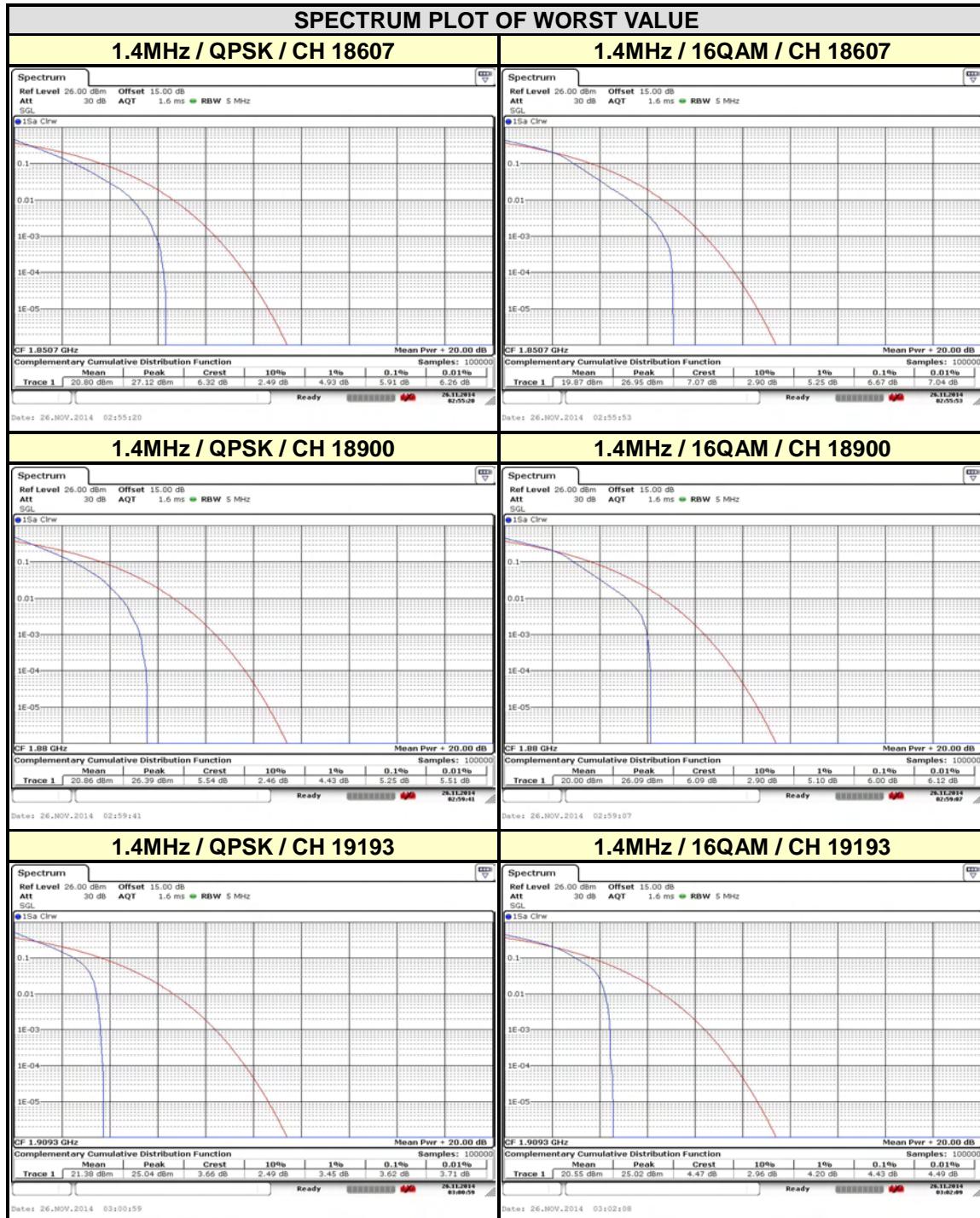
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## LTE BAND 2

### CHANNEL BANDWIDTH: 1.4MHz

CHANNEL	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)	
		QPSK	16QAM
18607	1850.7	5.91	6.67
18900	1880	5.25	6.00
19193	1909.3	3.62	4.43



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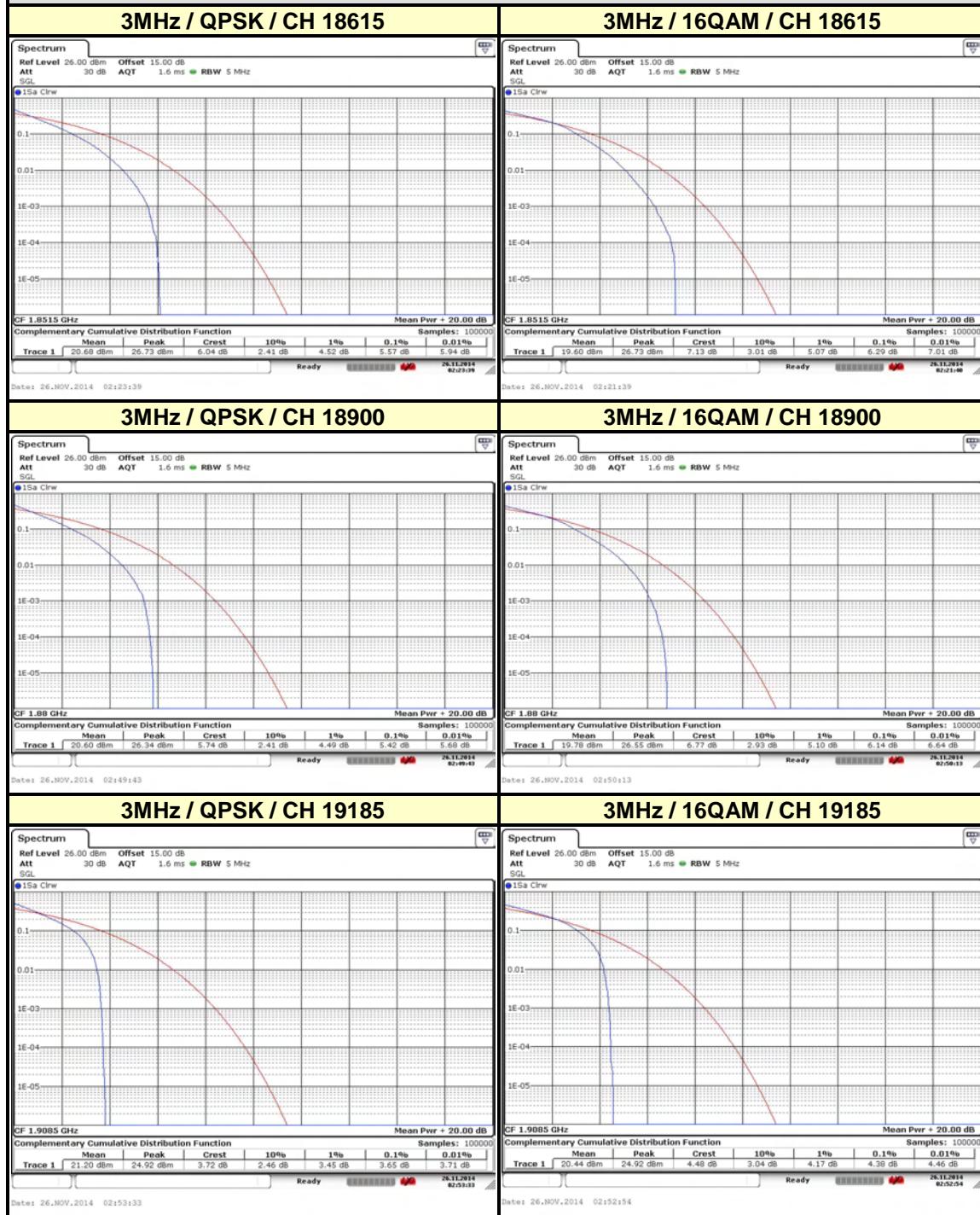
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### CHANNEL BANDWIDTH: 3MHz

CHANNEL	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)	
		QPSK	16QAM
18615	1851.5	5.57	6.29
18900	1880	5.42	6.14
19185	1908.5	3.65	4.38

### SPECTRUM PLOT OF WORST VALUE



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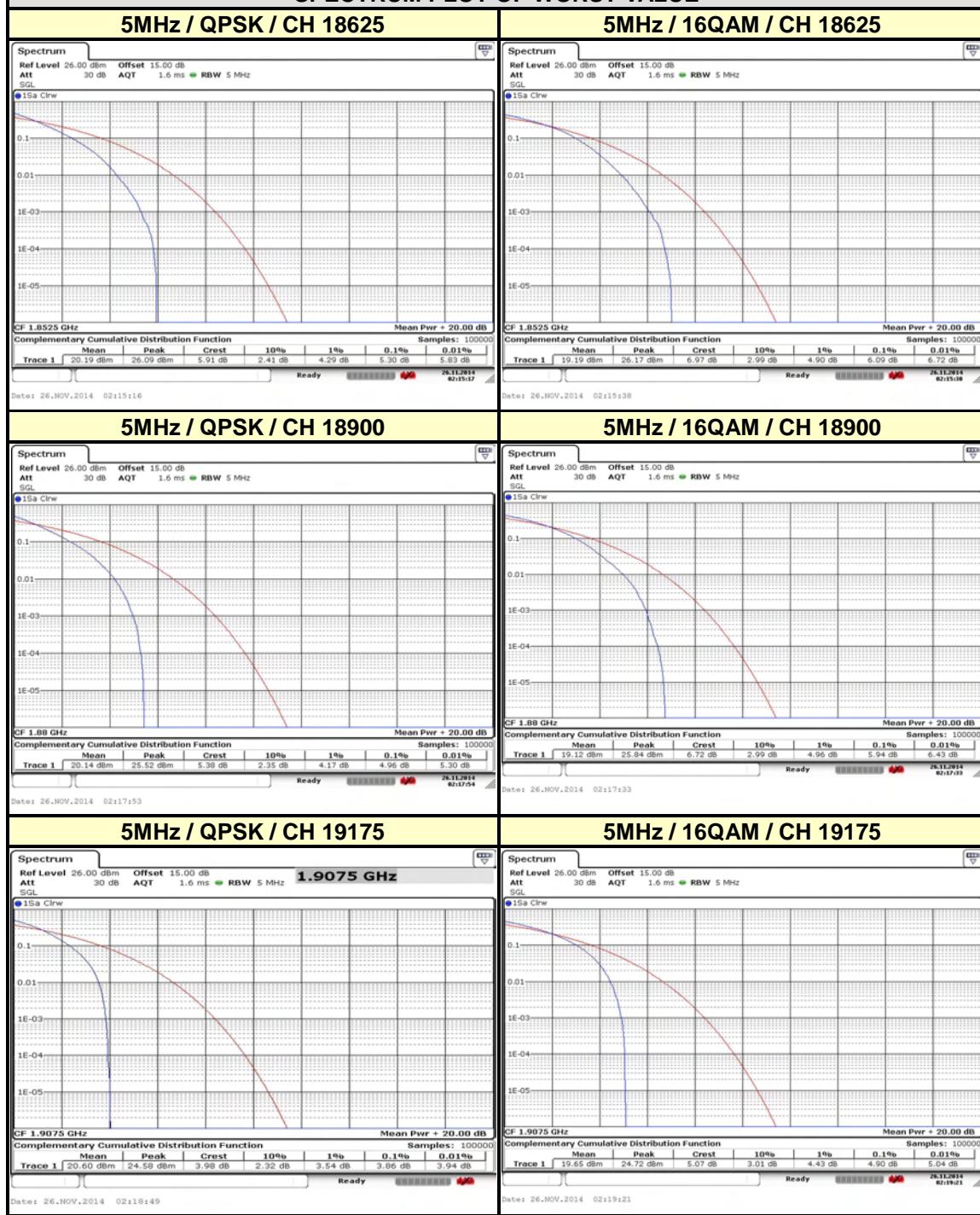
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### CHANNEL BANDWIDTH: 5MHz

CHANNEL	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)	
		QPSK	16QAM
18625	1852.5	5.30	6.09
18900	1880	4.96	5.94
19175	1907.5	3.86	4.90

### SPECTRUM PLOT OF WORST VALUE



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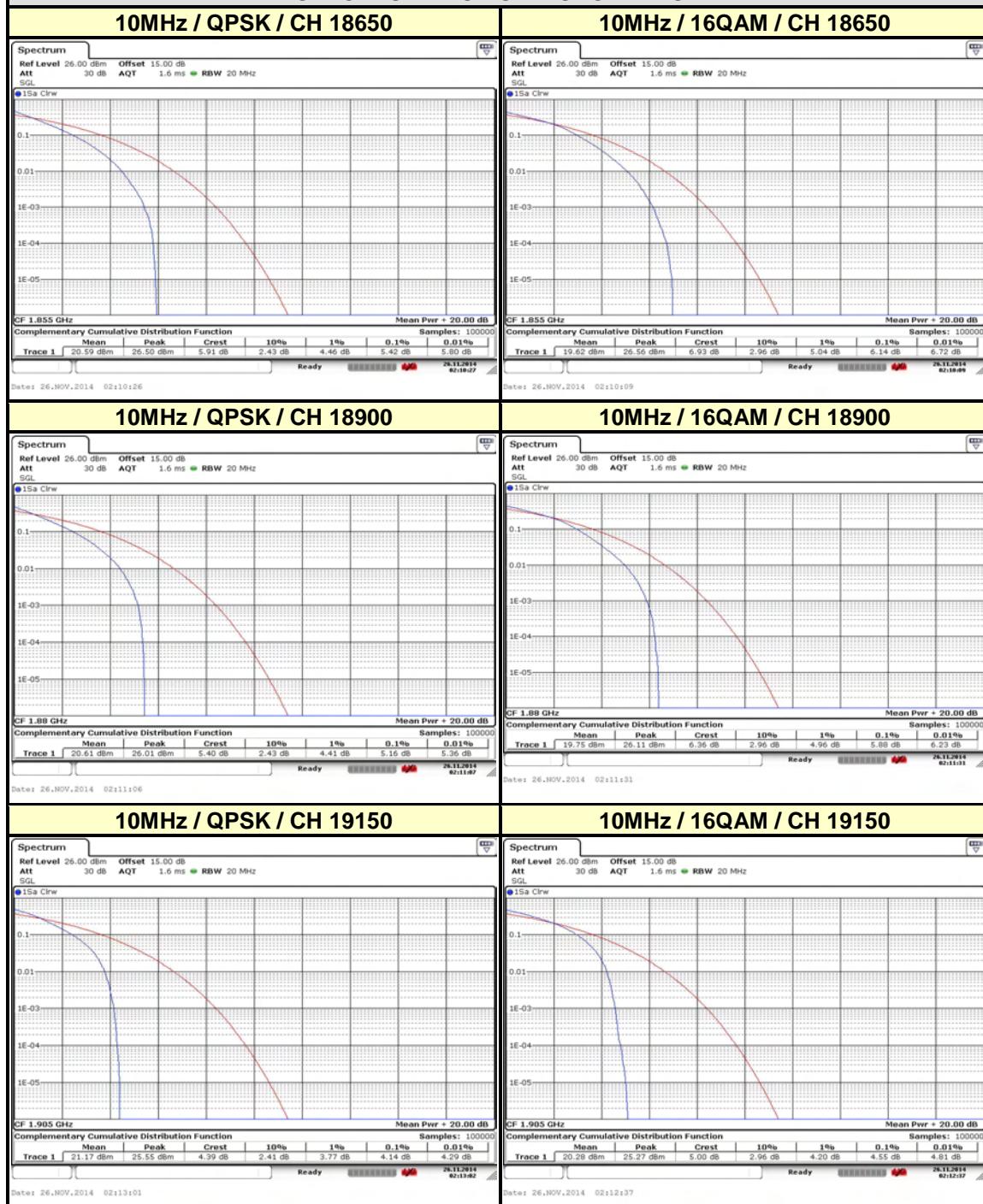
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### CHANNEL BANDWIDTH: 10MHz

CHANNEL	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)	
		QPSK	16QAM
18650	1855	5.42	6.14
18900	1880	5.16	5.88
19150	1905	4.14	4.55

### SPECTRUM PLOT OF WORST VALUE



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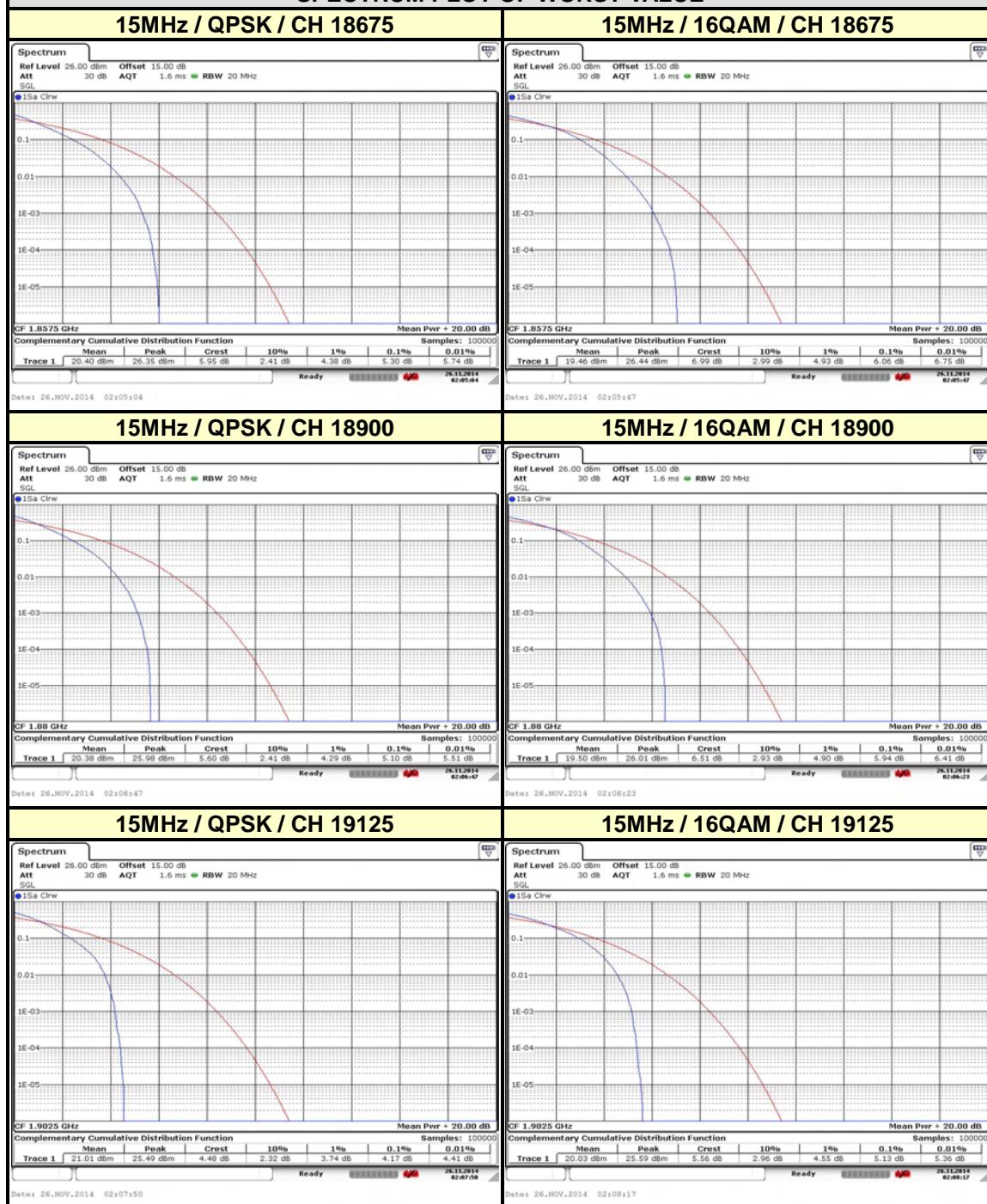
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### CHANNEL BANDWIDTH: 15MHz

CHANNEL	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)	
		QPSK	16QAM
18675	1857.5	5.30	6.06
18900	1880	5.10	5.94
19125	1902.5	4.17	5.13

### SPECTRUM PLOT OF WORST VALUE



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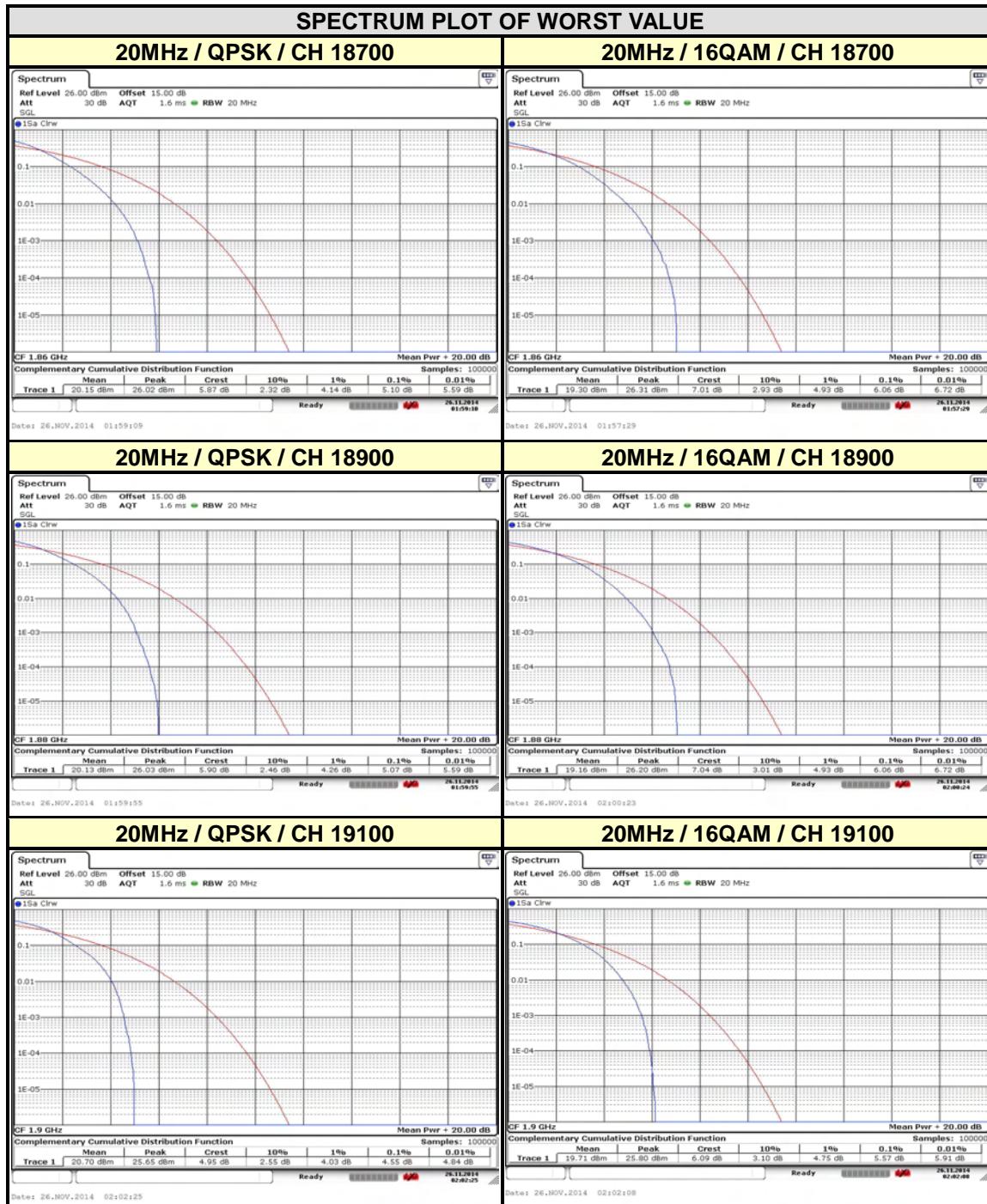
Email: [customerservice.dg@cn.bureauveritas.com](mailto:customerservice.dg@cn.bureauveritas.com)

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## CHANNEL BANDWIDTH: 20MHz

CHANNEL	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)	
		QPSK	16QAM
18700	1860	5.10	6.06
18900	1880	5.07	6.06
19100	1900	4.55	5.57



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## 5 INFORMATION ON THE TESTING LABORATORIES

We, Bureau Veritas Shenzhen Co., Ltd. Dongguan Branch, were founded in 2002 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are accredited and approved according to ISO/IEC 17025.

If you have any comments, please feel free to contact us at the following:

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Web Site: [www.adt.com.tw](http://www.adt.com.tw)

The address and road map of all our labs can be found in our web site also.



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## 6 APPENDIX A – MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB

No any modifications are made to the EUT by the lab during the test.

---END---