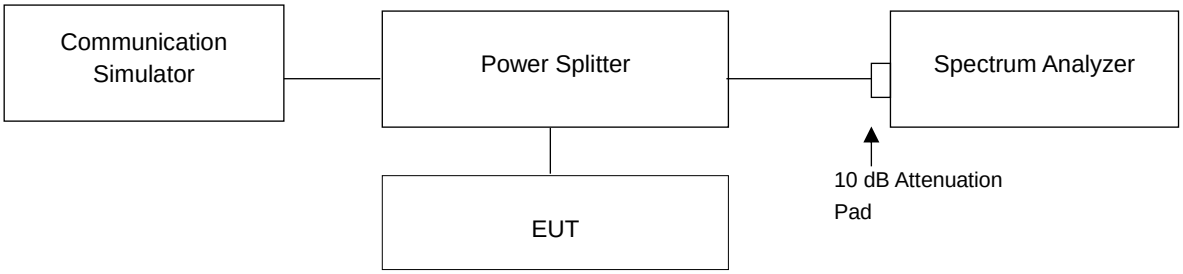
4.6 Peak to Average Ratio

4.6.1 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.

4.6.2 Test Setup



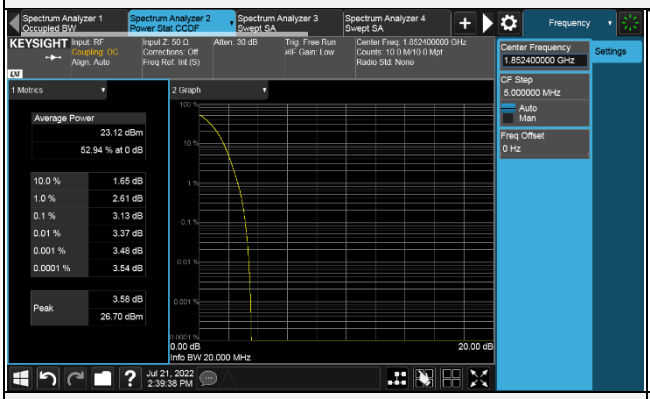
4.6.3 Test Procedures

1. Set resolution/measurement bandwidth ≥ 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 %.

4.6.4 Test Results

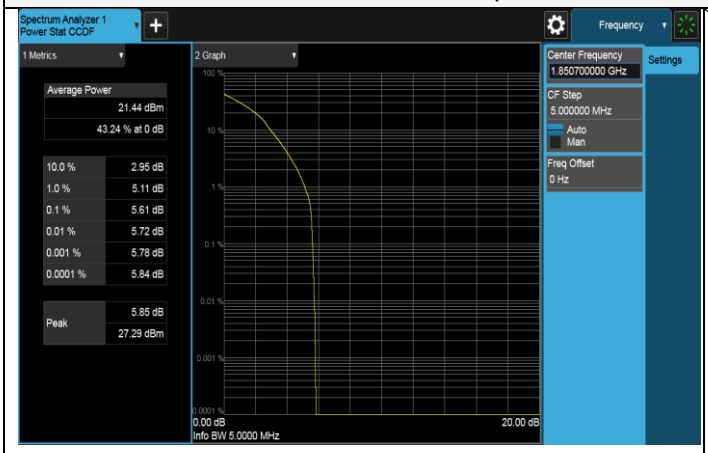
WCDMA

Test Condition	Channel	Frequency (MHz)	Measure. Value (dB)	Limit (dB)	Result
WCDMA	9262	1852.4	3.13	13	Pass
WCDMA	9400	1880.0	2.90	13	Pass
WCDMA	9538	1907.6	2.93	13	Pass
HSDPA	9262	1852.4	3.12	13	Pass
HSDPA	9400	1880.0	2.90	13	Pass
HSDPA	9538	1907.6	2.93	13	Pass
HSUPA	9262	1852.4	3.13	13	Pass
HSUPA	9400	1880.0	2.90	13	Pass
HSUPA	9538	1907.6	2.93	13	Pass

Spectrum Plot of Worst Value	
	
WCDMA CH 9262 (1852.4MHz)	

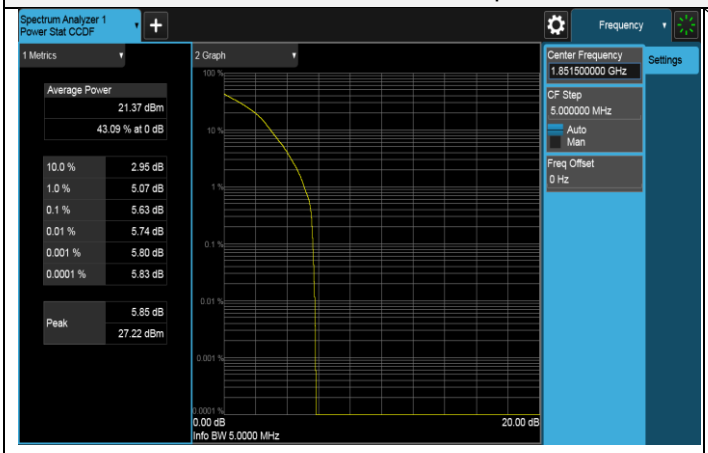
LTE Band 2 (Channel Bandwidth 1.4MHz)

Test Condition	Channel	Frequency (MHz)	Measure. Value(dB)	Limit dB	Result
QPSK	18607	1850.7	4.68	13	PASS
QPSK	18900	1880	4.17	13	PASS
QPSK	19193	1909.3	4.05	13	PASS
16QAM	18607	1850.7	5.61	13	PASS
16QAM	18900	1880	5.03	13	PASS
16QAM	19193	1909.3	5.08	13	PASS

Spectrum Plot of Worst Value	
	
16QAM CH 18607 (1850.7MHz)	

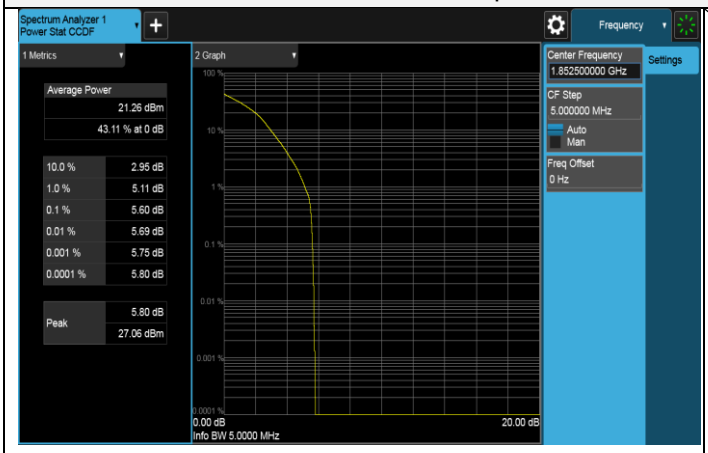
LTE Band 2 (Channel Bandwidth 3MHz)

Test Condition	Channel	Frequency (MHz)	Measure. Value(dB)	Limit dB	Result
QPSK	18615	1851.5	4.62	13	PASS
QPSK	18900	1880	4.17	13	PASS
QPSK	19185	1908.5	4.10	13	PASS
16QAM	18615	1851.5	5.63	13	PASS
16QAM	18900	1880	5.19	13	PASS
16QAM	19185	1908.5	5.10	13	PASS

Spectrum Plot of Worst Value	
	
16QAM CH 18615 (1851.5MHz)	

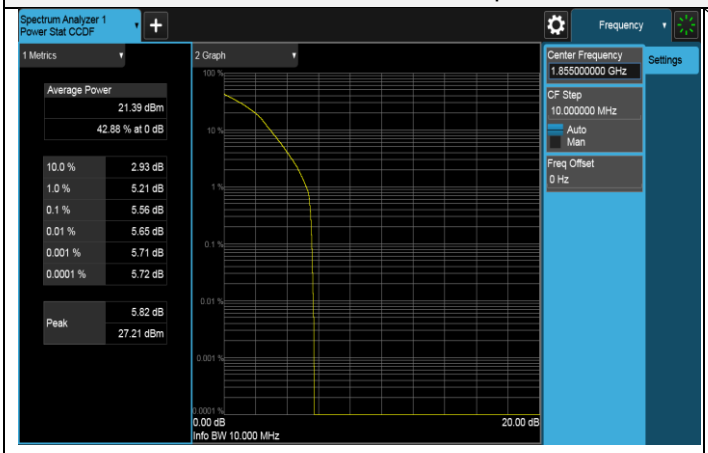
LTE Band 2 (Channel Bandwidth 5MHz)

Test Condition	Channel	Frequency (MHz)	Measure. Value(dB)	Limit dB	Result
QPSK	18625	1852.5	4.61	13	PASS
QPSK	18900	1880	4.15	13	PASS
QPSK	19175	1907.5	4.08	13	PASS
16QAM	18625	1852.5	5.60	13	PASS
16QAM	18900	1880	4.97	13	PASS
16QAM	19175	1907.5	4.95	13	PASS

Spectrum Plot of Worst Value	
	
16QAM CH 18625 (1852.5MHz)	

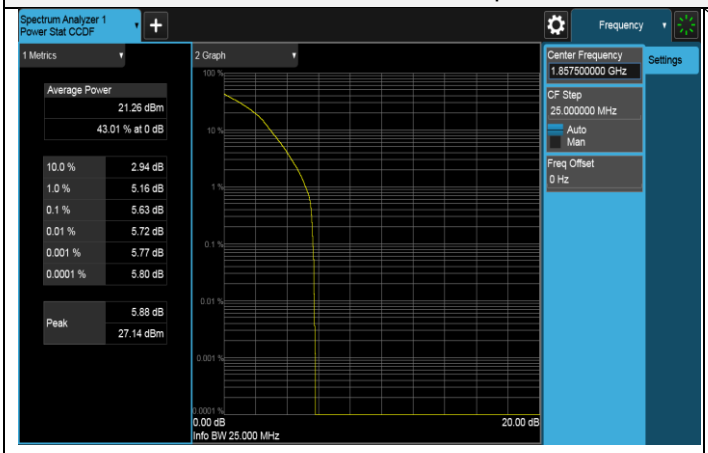
LTE Band 2 (Channel Bandwidth 10MHz)

Test Condition	Channel	Frequency (MHz)	Measure. Value(dB)	Limit dB	Result
QPSK	18650	1855	4.61	13	PASS
QPSK	18900	1880	4.18	13	PASS
QPSK	19150	1905	4.40	13	PASS
16QAM	18650	1855	5.56	13	PASS
16QAM	18900	1880	4.98	13	PASS
16QAM	19150	1905	5.31	13	PASS

Spectrum Plot of Worst Value	
	
16QAM CH 18650 (1855MHz)	

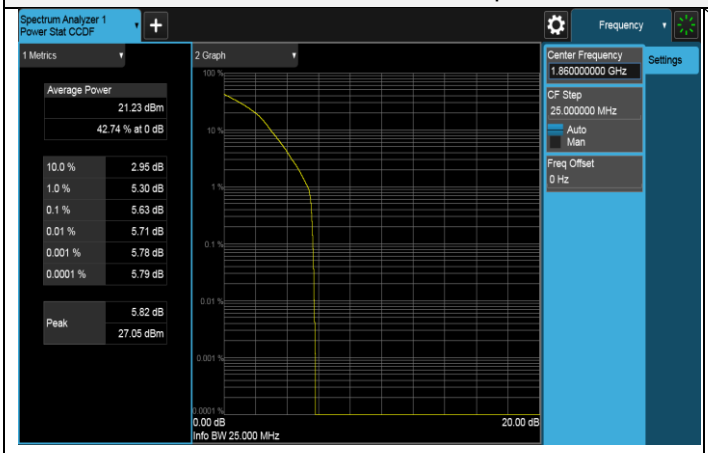
LTE Band 2 (Channel Bandwidth 15MHz)

Test Condition	Channel	Frequency (MHz)	Measure. Value(dB)	Limit dB	Result
QPSK	18675	1857.5	4.63	13	PASS
QPSK	18900	1880	4.17	13	PASS
QPSK	19125	1902.5	4.53	13	PASS
16QAM	18675	1857.5	5.63	13	PASS
16QAM	18900	1880	5.13	13	PASS
16QAM	19125	1902.5	5.46	13	PASS

Spectrum Plot of Worst Value	
	
16QAM CH 18675 (1857.5MHz)	

LTE Band 2 (Channel Bandwidth 20MHz)

Test Condition	Channel	Frequency (MHz)	Measure. Value(dB)	Limit dB	Result
QPSK	18700	1860	4.62	13	PASS
QPSK	18900	1880	4.25	13	PASS
QPSK	19100	1900	4.56	13	PASS
16QAM	18700	1860	5.63	13	PASS
16QAM	18900	1880	5.05	13	PASS
16QAM	19100	1900	5.48	13	PASS

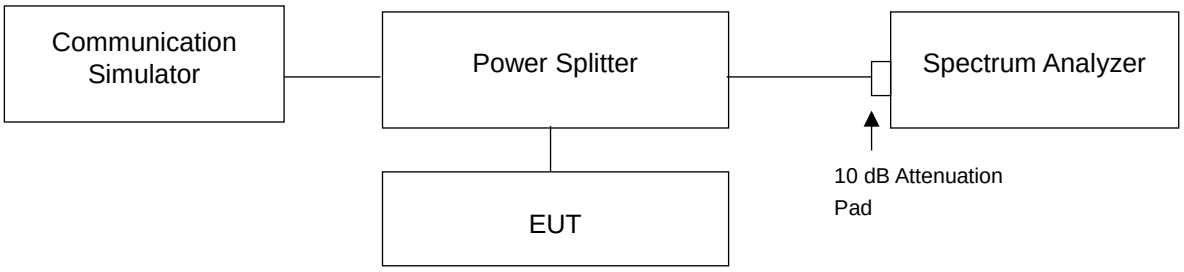
Spectrum Plot of Worst Value	
	
16QAM CH 18700 (1860MHz)	

4.7 Conducted Spurious Emissions

4.7.1 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 dBm.

4.7.2 Test Setup

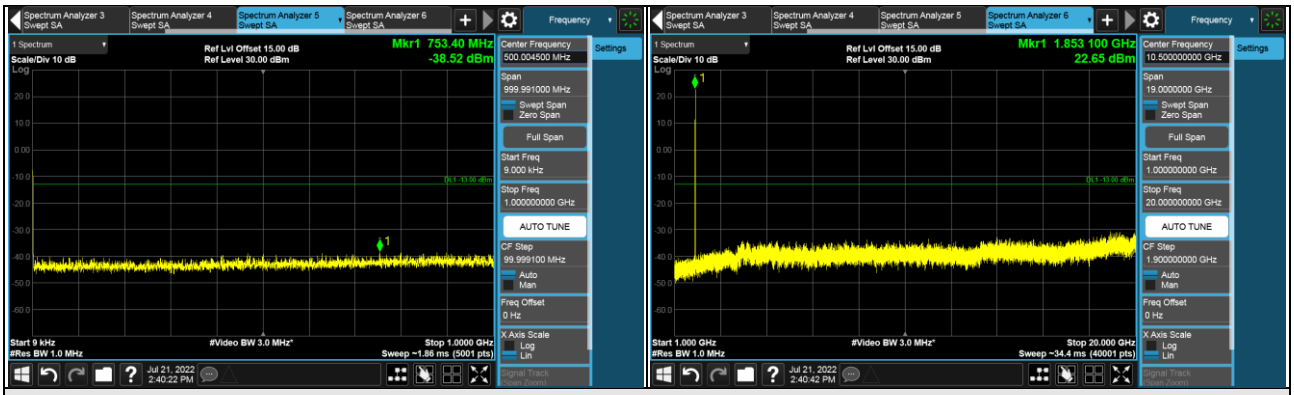


4.7.3 Test Procedure

a. The EUT makes a phone call to the communication simulator. All measurements were done at low, middle and high operational frequency range.
b. The detector of the spectrum is RMS, and if the device can be configured to transmit continuously (duty cycle ≥ 98%), set the (sweep time) > (number of points in sweep) × (symbol period) (e.g., by a factor of 10 × symbol period × number of points). Increasing the sweep time (i.e., slowing the sweep speed) will allow for averaging over multiple symbols.
c. Measuring frequency range is from 9 kHz to 1 GHz. 10 dB attenuation pad is connected with spectrum. RBW = 1 MHz and VBW = 3 MHz is used for conducted emission measurement.
d. Measuring frequency range is from 1 GHz to 20 GHz. 10 dB attenuation pad is connected with spectrum. RBW = 1 MHz and VBW = 3 MHz is used for conducted emission measurement.

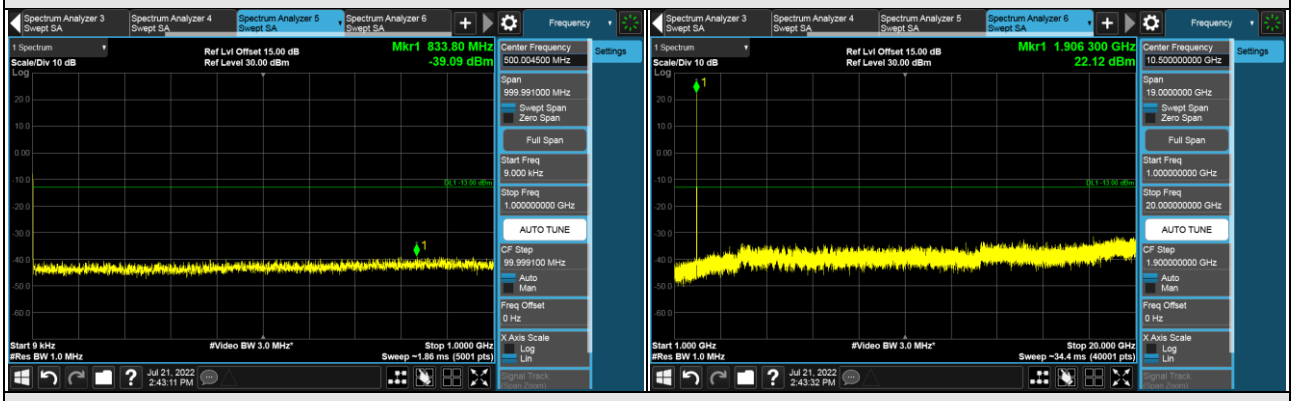
4.7.4 Test Results

WCDMA



CH 9262 (1852.4MHz)

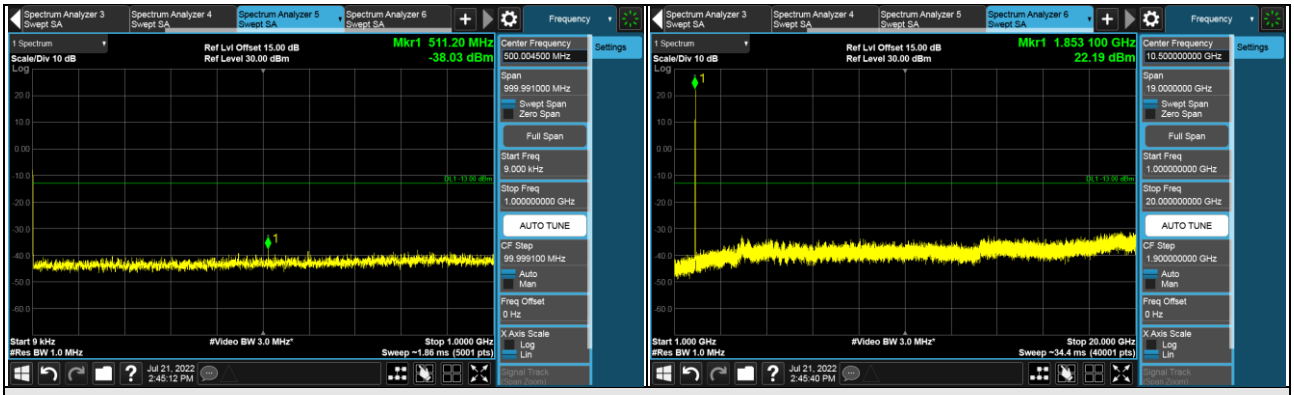
CH 9400 (1880.0MHz)



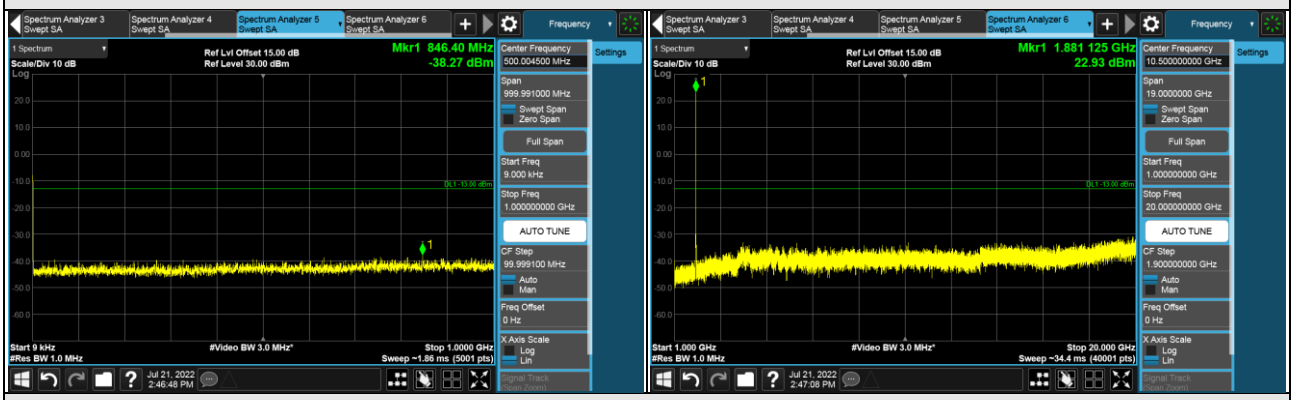
CH 9538 (1907.6MHz)

*The 9kHz signal over the limit is from Spectrum.

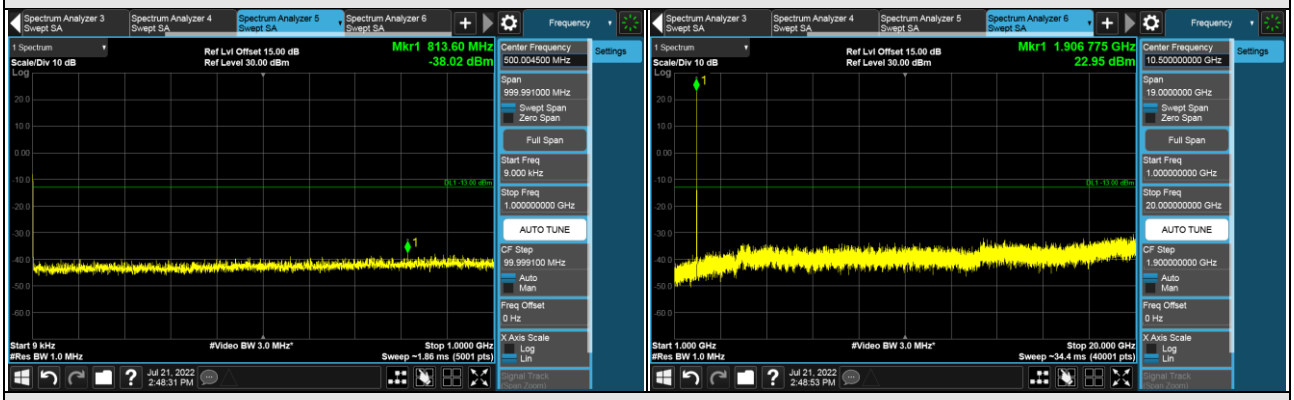
HSDPA



CH 9262 (1852.4MHz)



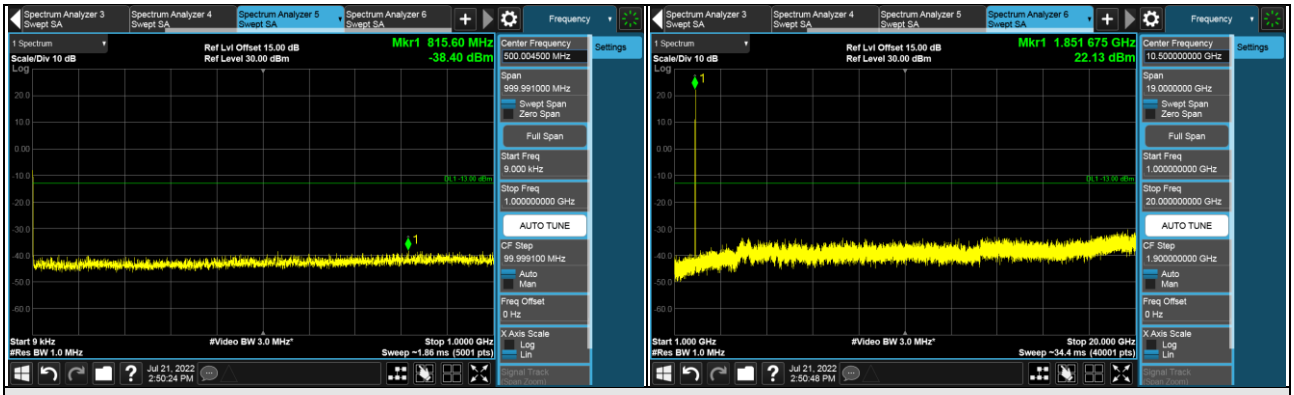
CH 9400 (1880.0MHz)



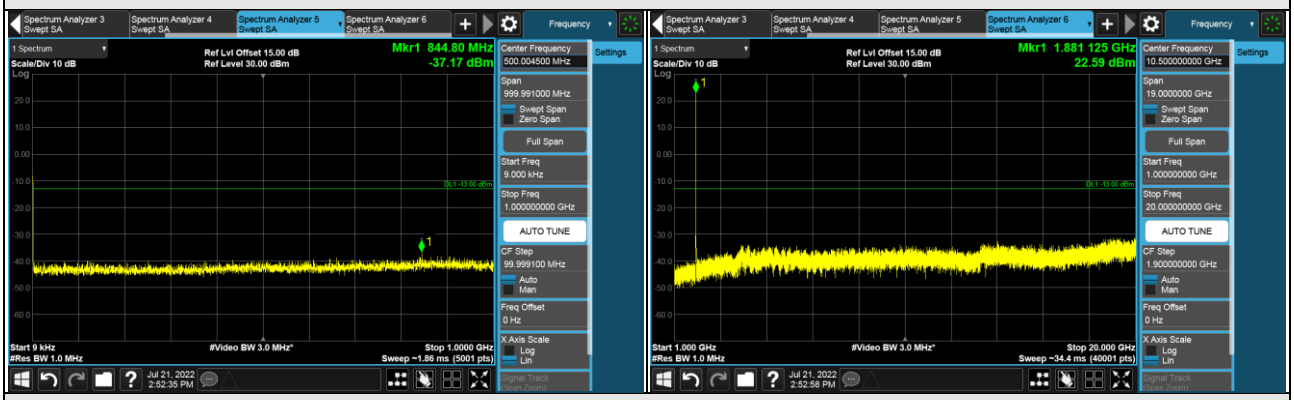
CH 9538 (1907.6MHz)

*The 9kHz signal over the limit is from Spectrum.

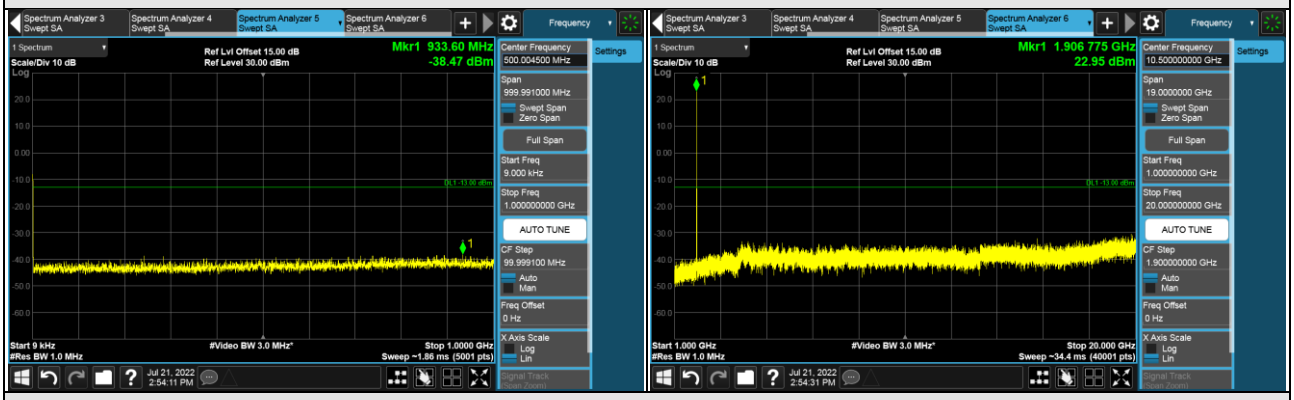
HSUPA



CH 9262 (1852.4MHz)



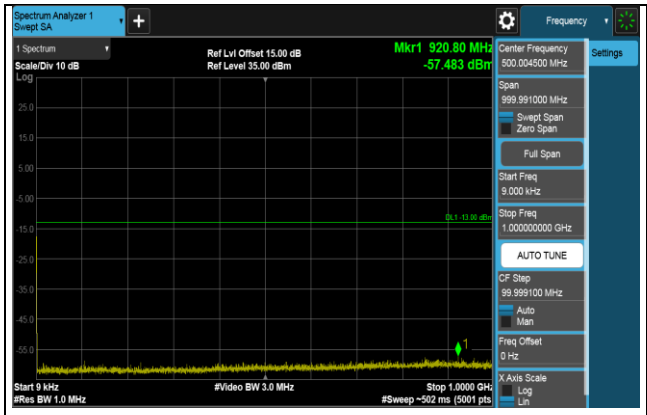
CH 9400 (1880.0MHz)

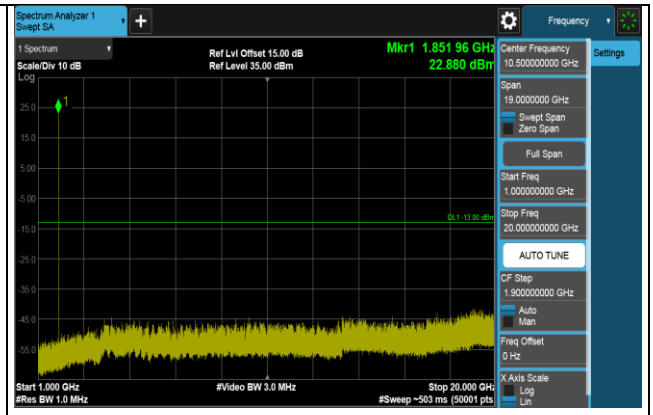


CH 9538 (1907.6MHz)

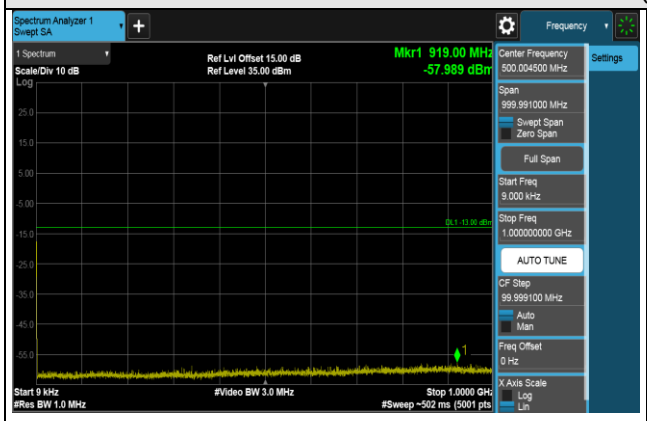
*The 9kHz signal over the limit is from Spectrum.

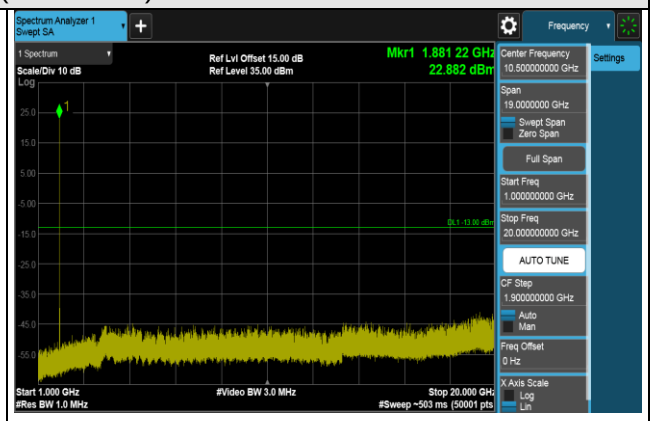
LTE Band 2 (Channel Bandwidth 1.4MHz)



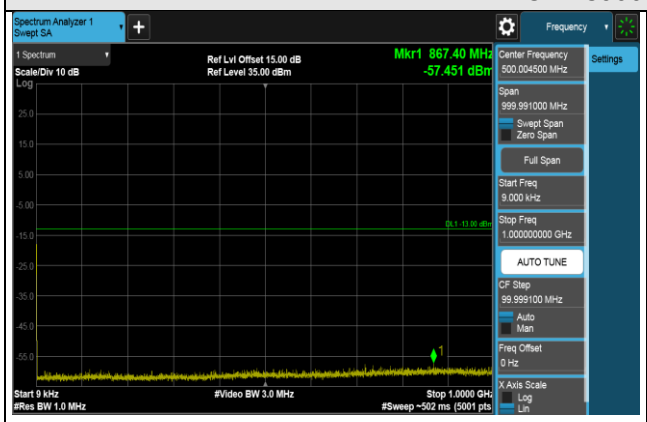


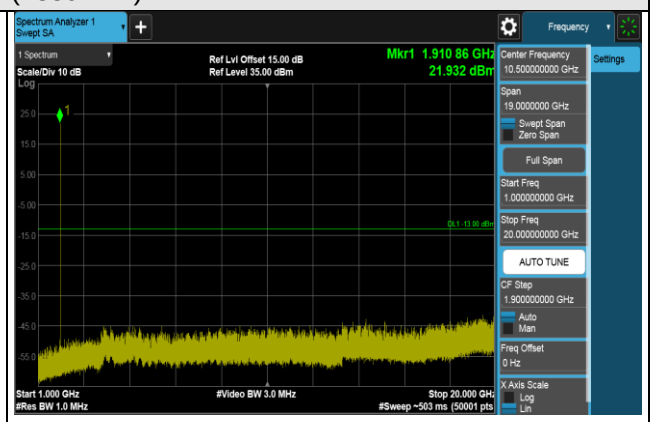
CH 18607 (1850.7MHz)





CH 18900 (1880MHz)

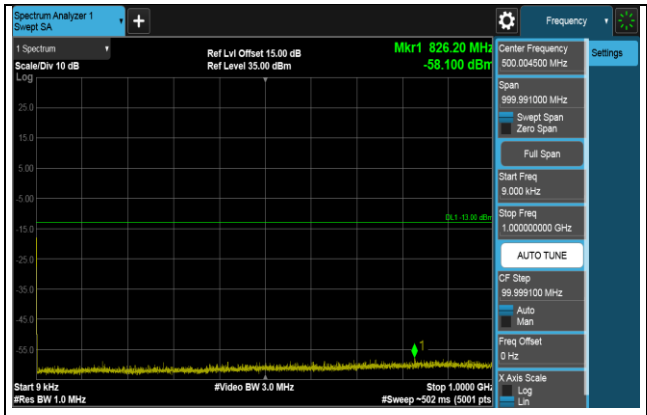


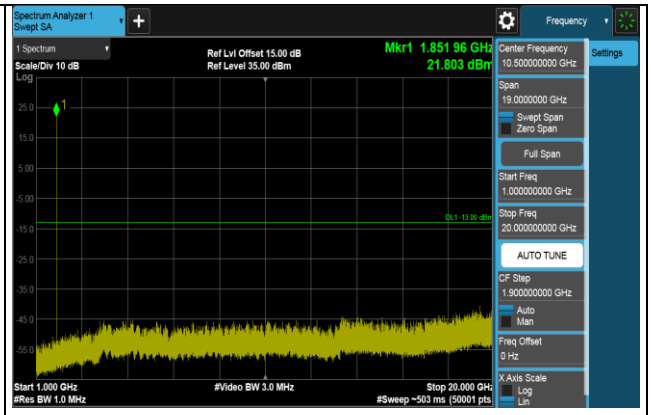


CH 19193 (1909.3MHz)

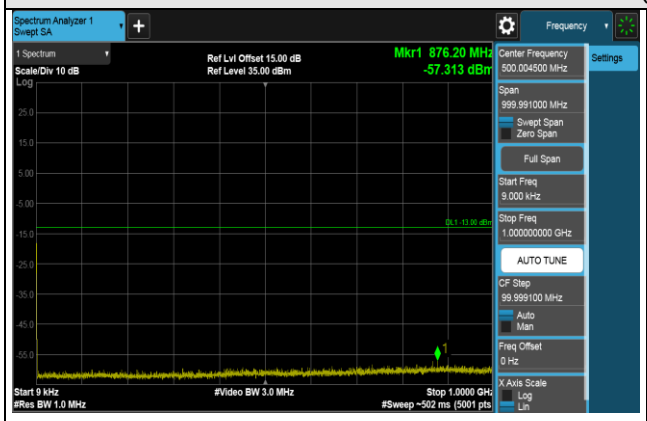
*The 9kHz signal over the limit is from Spectrum.

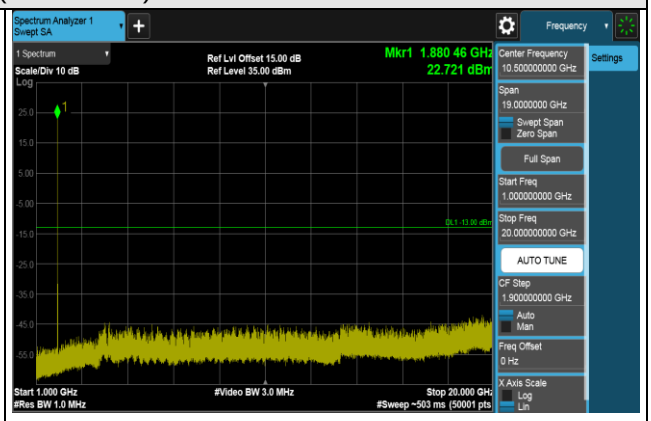
LTE Band 2 (Channel Bandwidth 3MHz)



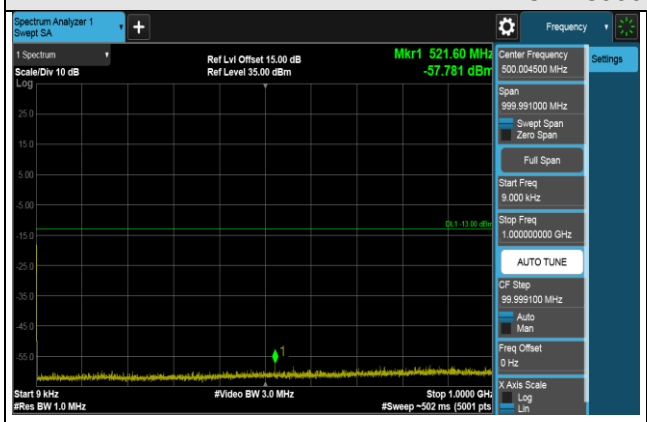


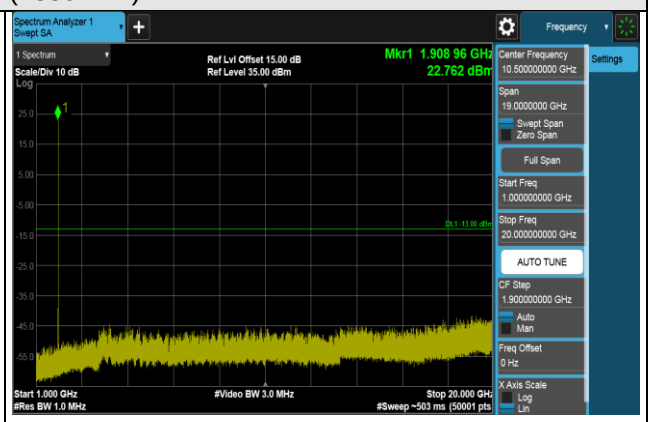
CH 18615 (1851.5MHz)





CH 18900 (1880MHz)

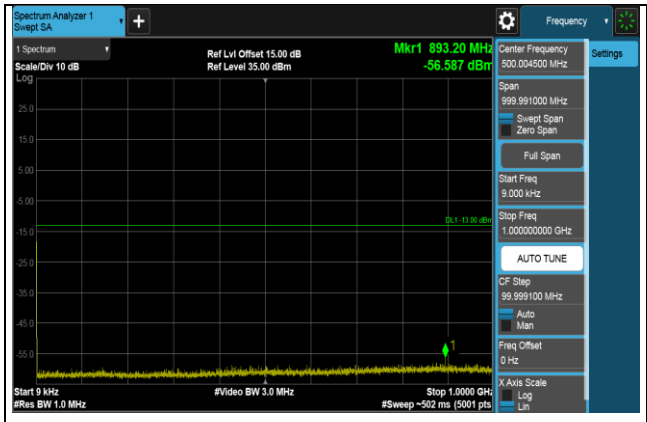


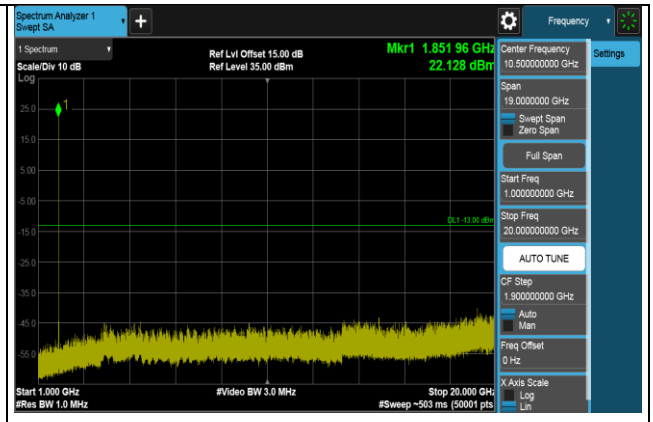


CH 19185 (1908.5MHz)

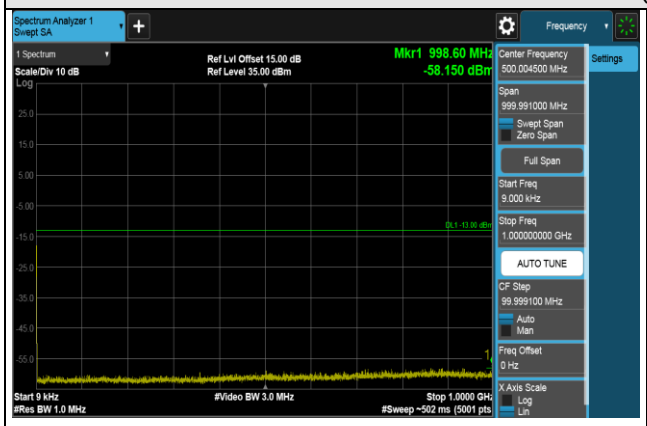
*The 9kHz signal over the limit is from Spectrum.

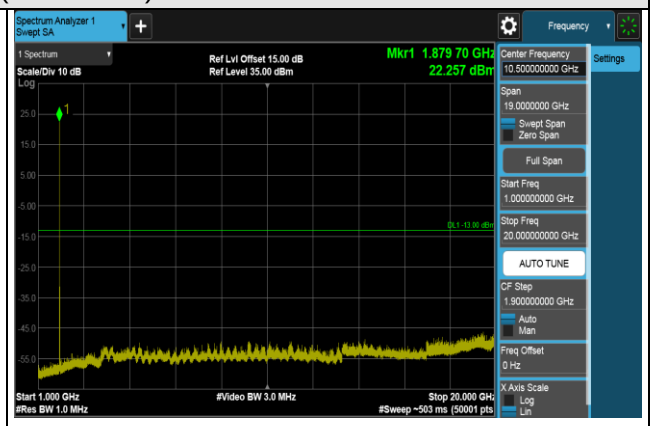
LTE Band 2 (Channel Bandwidth 5MHz)



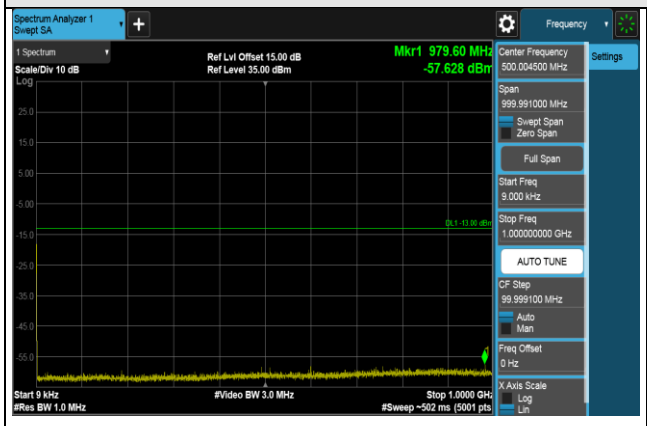


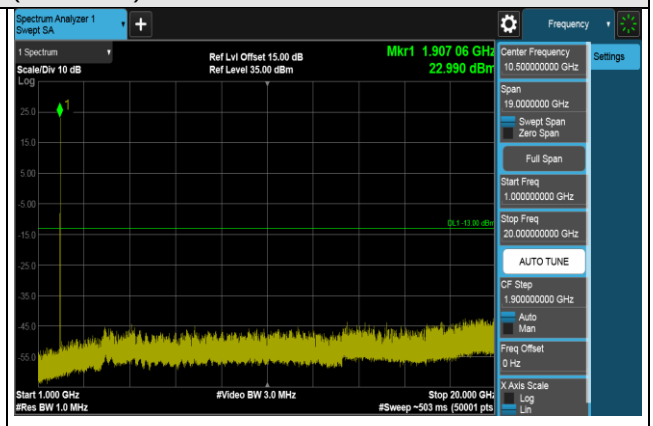
CH 18625 (1852.5MHz)





CH 18900 (1880MHz)

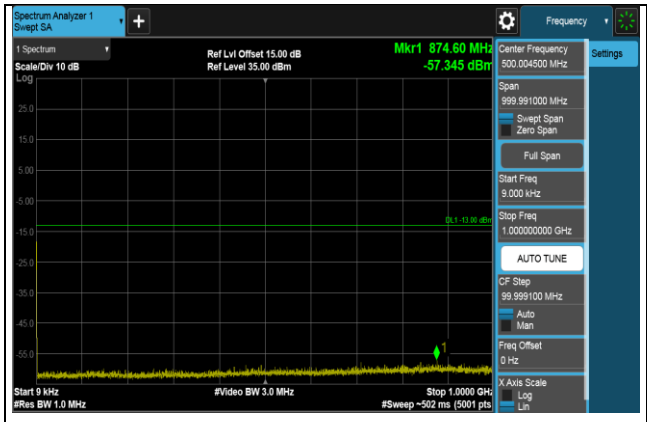


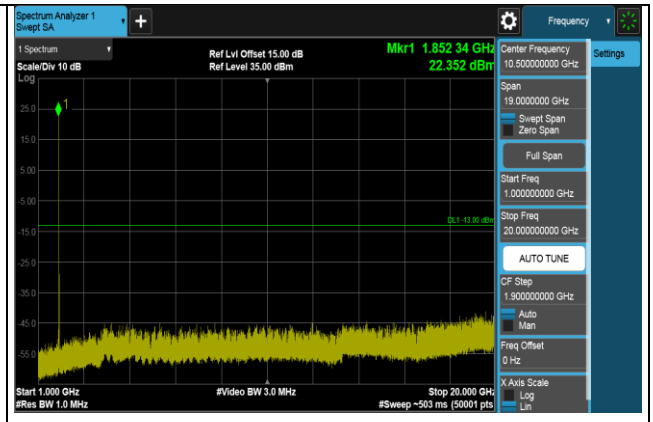


CH 19175 (1907.5MHz)

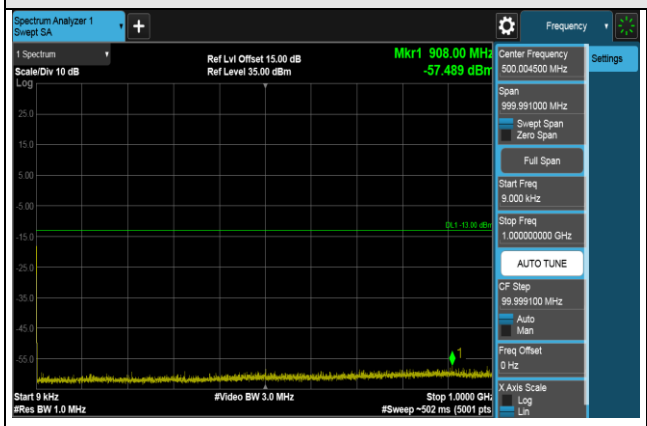
*The 9kHz signal over the limit is from Spectrum.

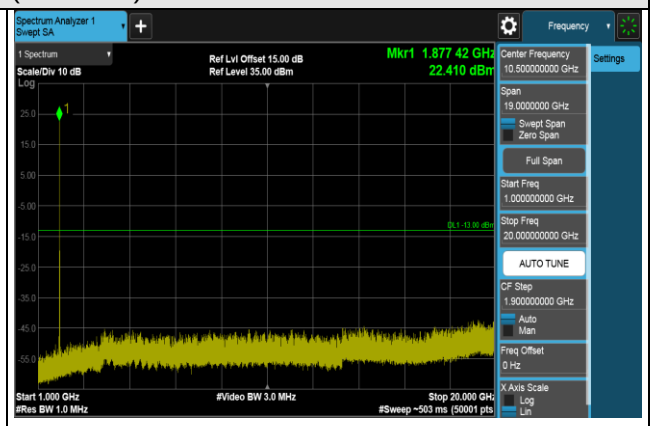
LTE Band 2 (Channel Bandwidth 10MHz)



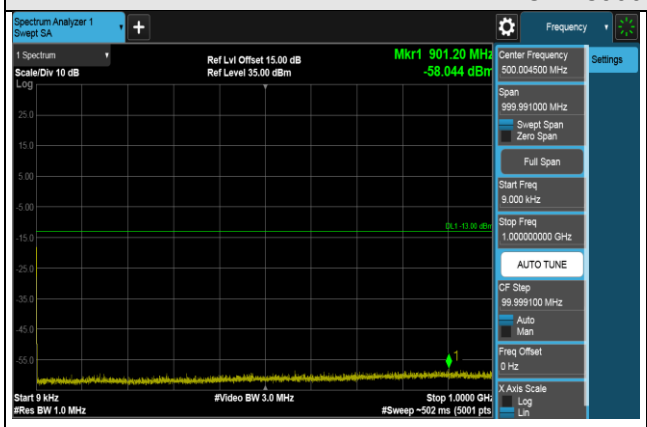


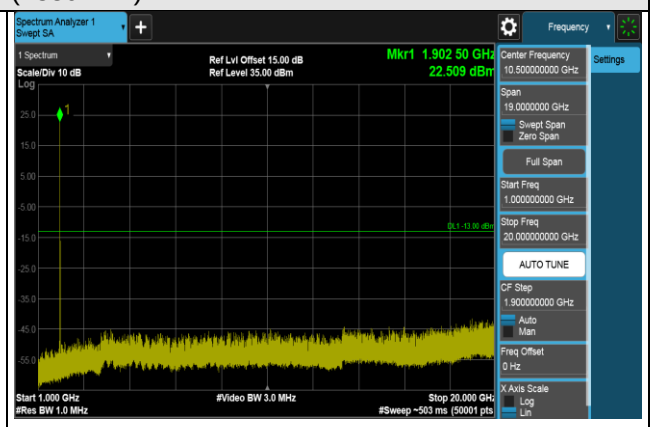
CH 18650 (1855MHz)





CH 18900 (1880MHz)

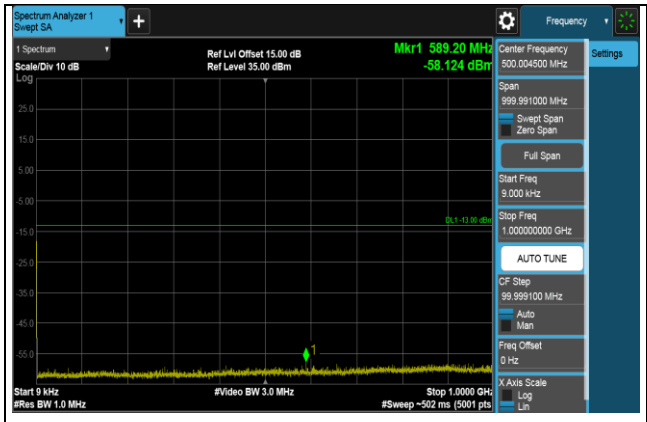


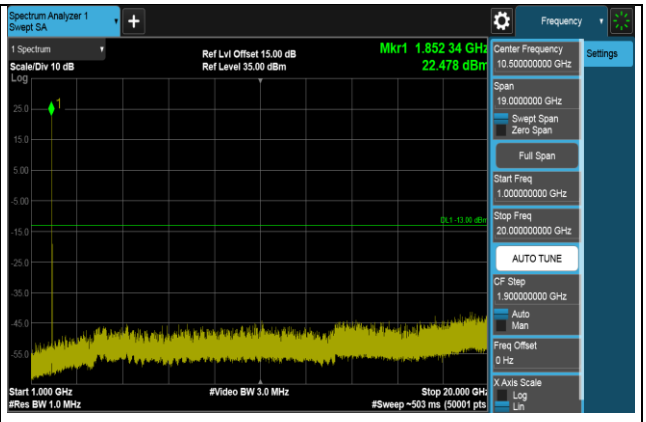


CH 19150 (1905MHz)

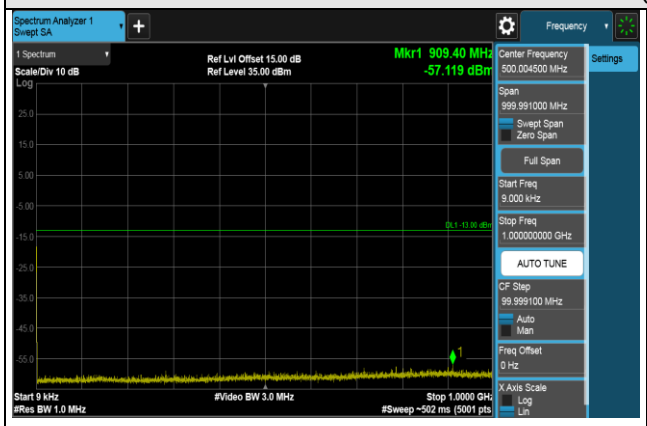
*The 9kHz signal over the limit is from Spectrum.

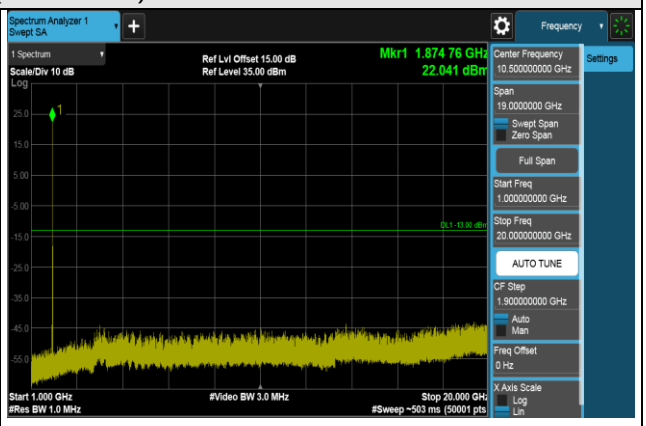
LTE Band 2 (Channel Bandwidth 15MHz)



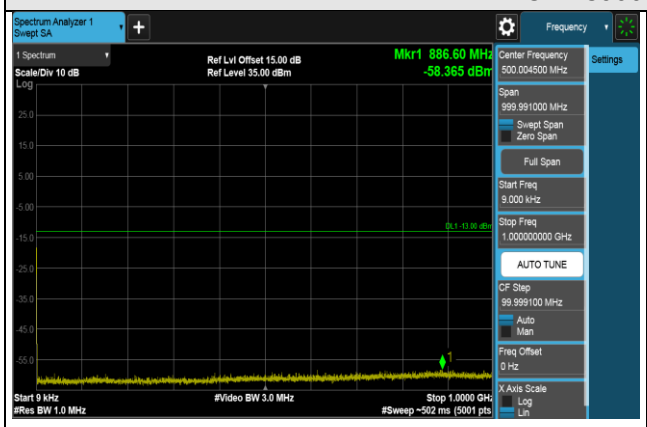


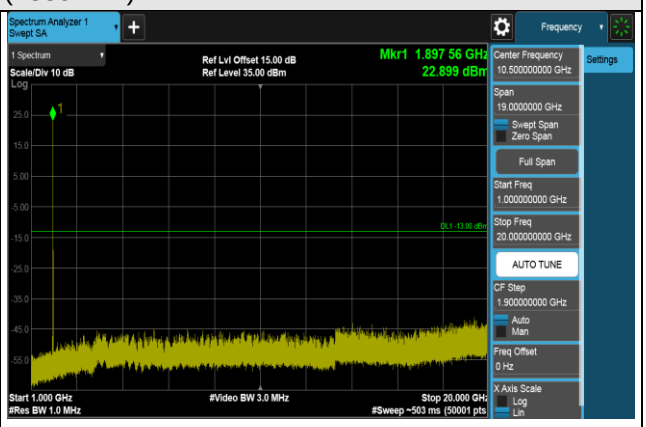
CH 18675 (1857.5MHz)





CH 18900 (1880MHz)

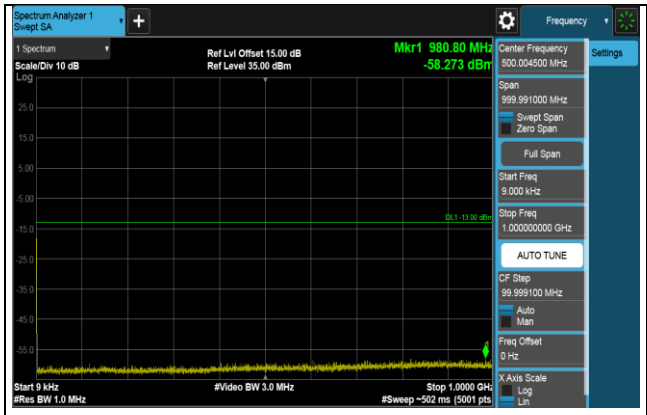


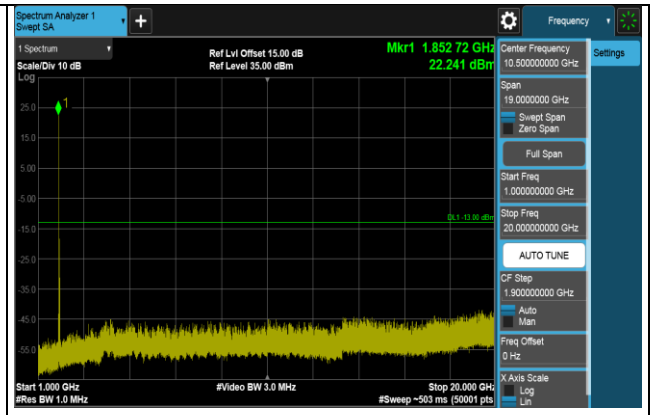


CH 19125 (1902.5MHz)

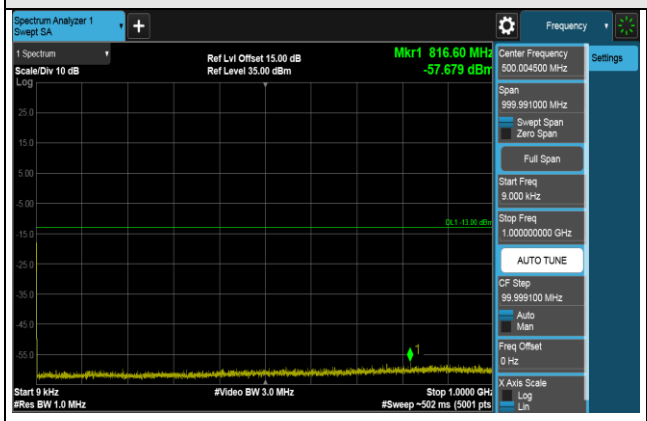
*The 9kHz signal over the limit is from Spectrum.

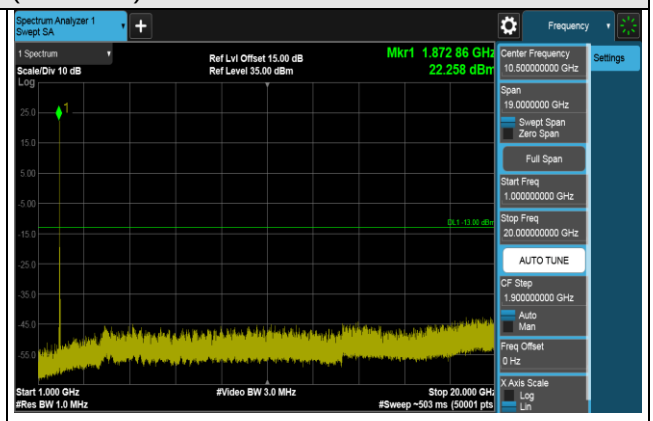
LTE Band 2 (Channel Bandwidth 20MHz)



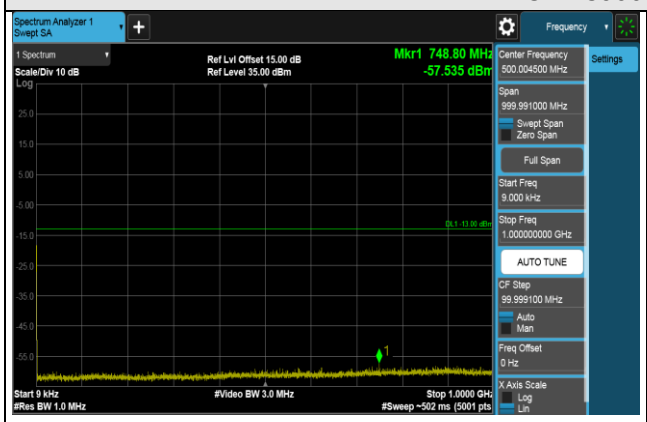


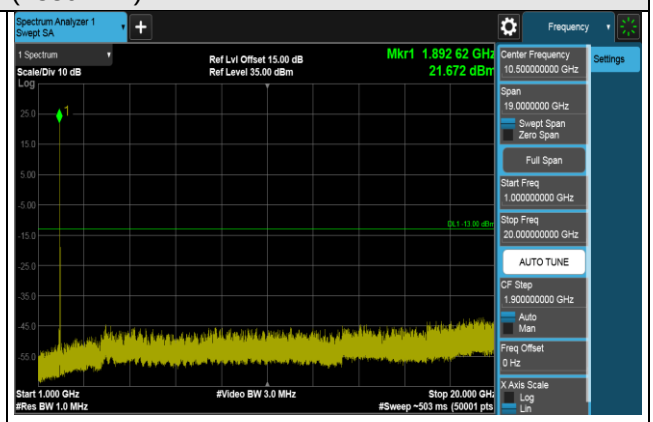
CH 18700 (1860MHz)





CH 18900 (1880MHz)





CH 19100 (1900MHz)

*The 9kHz signal over the limit is from Spectrum.

4.8 Radiated Emission Measurement

4.8.1 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 is equal to -13 dBm.

4.8.2 Test Procedure

a. In the semi-anechoic chamber, EUT placed on the 0.8m(below or equal 1GHz) and/or 1.5m(above 1GHz) 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 height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
c. Perform a field strength measurement and record the worse read value, is the field strength value via a spectrum reading obtained corrected for antenna factor, cable loss and pre-amplifier factor and then mathematically convert the measured field strength level to EIRP/ERP level.
d. Following C63.26 section 5.5 and 5.2.7
   EIRP (dBm) = E (dBμV/m) + 20log(D) - 104.8; where D is the measurement distance (in the far field region) in m.
   ERP (dBm) = E (dBμV/m) + 20log(D) - 104.8 - 2.15; where D is the measurement distance (in the far field region) in m.

NOTE:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1 MHz/3 MHz.
2. The emission levels were against the limit of frequency range 9 kHz ~ 30 MHz:

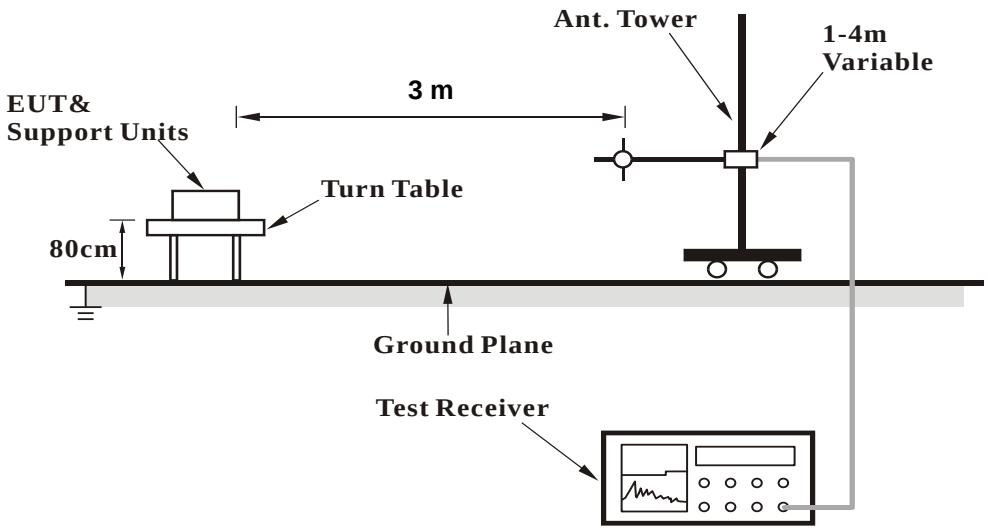
The amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required to be report.

4.8.3 Deviation from Test Standard

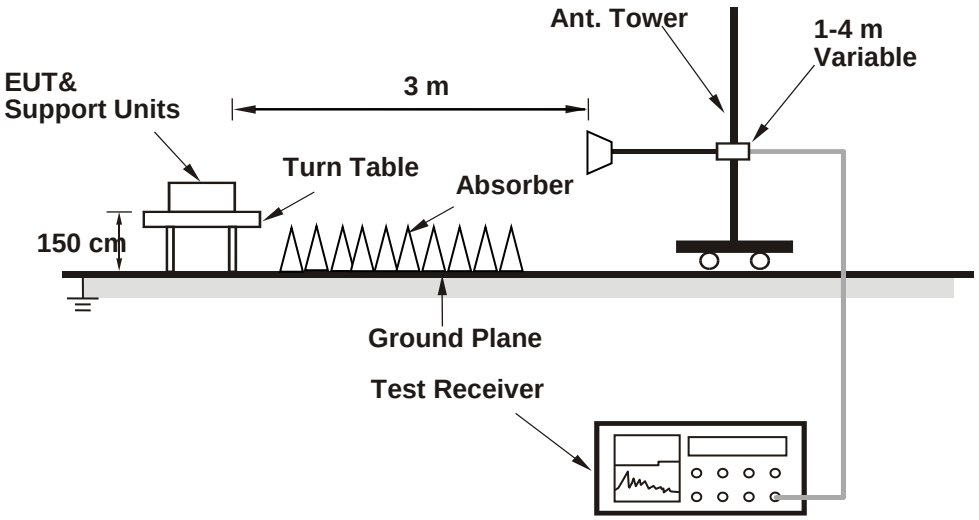
No deviation.

4.8.4 Test Setup

<Radiated Emission below or equal 1 GHz>



<Radiated Emission above 1 GHz>



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

4.8.5 Test Results

Below 1GHz

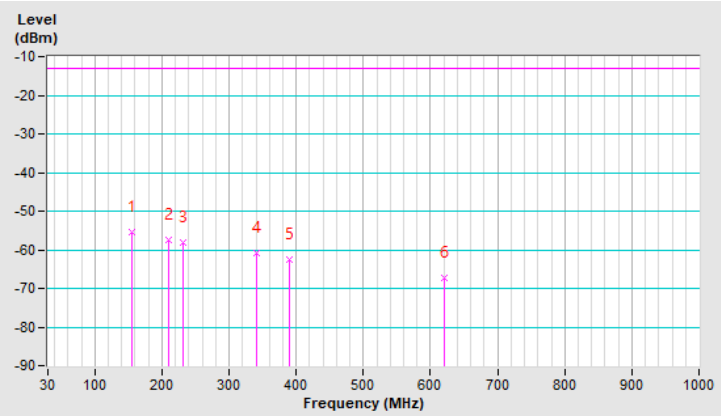
WCDMA Band 2

Mode	TX channel 9538 (1907.6MHz)	Frequency Range	Below 1000 MHz
Environmental Conditions	26deg. C, 62%RH	Input Power	120Vac, 60Hz
Tested By	Charles Hsiao		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	155.65	-55.29	-13.00	-42.29	1.75 H	140	57.47	-112.76
2	210.40	-57.42	-13.00	-44.42	1.05 H	288	58.72	-116.14
3	232.21	-58.00	-13.00	-45.00	1.54 H	200	57.29	-115.29
4	340.70	-60.83	-13.00	-47.83	1.61 H	118	50.54	-111.37
5	389.50	-62.50	-13.00	-49.50	1.47 H	344	47.71	-110.21
6	620.20	-67.14	-13.00	-54.14	1.01 H	100	38.28	-105.42

Remarks:

1. EIRP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8
3. Margin value = EIRP – Limit value
4. The other EIRP levels were very low against the limit.

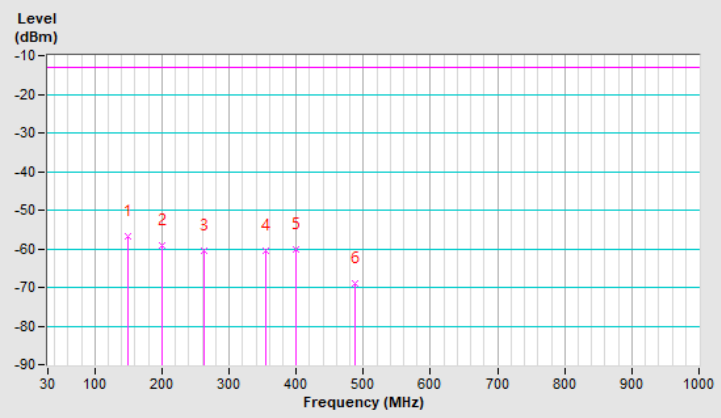


Mode	TX channel 9538 (1907.6MHz)	Frequency Range	Below 1000 MHz
Environmental Conditions	26deg. C, 62%RH	Input Power	120Vac, 60Hz
Tested By	Charles Hsiao		

Antenna Polarity & Test Distance : Vertical at 3m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	148.50	-56.76	-13.00	-43.76	1.76 V	240	56.13	-112.89
2	200.83	-59.30	-13.00	-46.30	1.35 V	105	56.94	-116.24
3	263.55	-60.44	-13.00	-47.44	1.85 V	130	53.36	-113.80
4	355.50	-60.36	-13.00	-47.36	1.15 V	345	50.79	-111.15
5	399.82	-60.32	-13.00	-47.32	1.52 V	146	49.67	-109.99
6	487.00	-69.01	-13.00	-56.01	1.28 V	338	39.11	-108.12

Remarks:

1. EIRP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8
3. Margin value = EIRP – Limit value
4. The other EIRP levels were very low against the limit.



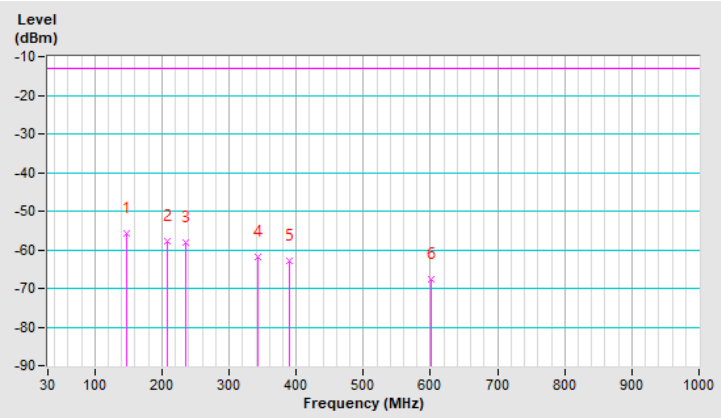
LTE Band 2 (Channel Bandwidth 20MHz)

Mode	TX channel 18900 (1880.0MHz)	Frequency Range	Below 1000 MHz
Environmental Conditions	26deg. C, 62%RH	Input Power	120Vac, 60Hz
Tested By	Charles Hsiao		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	148.30	-55.75	-13.00	-42.75	1.38 H	229	57.16	-112.91
2	208.10	-57.77	-13.00	-44.77	1.58 H	209	58.43	-116.20
3	235.56	-58.30	-13.00	-45.30	1.96 H	160	56.56	-114.86
4	343.30	-61.89	-13.00	-48.89	1.15 H	151	49.49	-111.38
5	390.50	-63.00	-13.00	-50.00	1.46 H	298	47.19	-110.19
6	600.50	-67.66	-13.00	-54.66	1.04 H	144	38.03	-105.69

Remarks:

1. EIRP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8
3. Margin value = EIRP – Limit value
4. The other EIRP levels were very low against the limit.

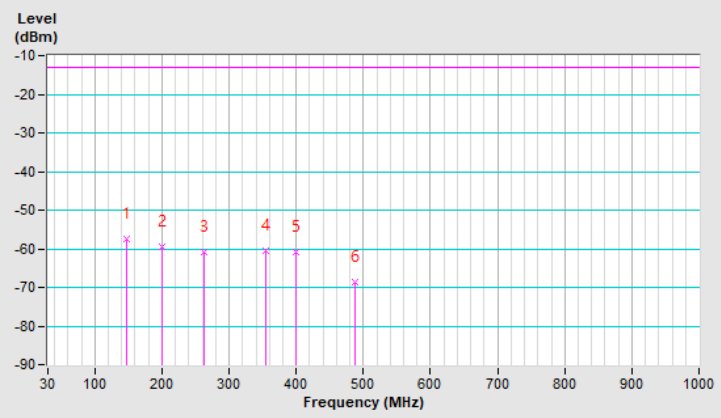


Mode	TX channel 18900 (1880.0MHz)	Frequency Range	Below 1000 MHz
Environmental Conditions	26deg. C, 62%RH	Input Power	120Vac, 60Hz
Tested By	Charles Hsiao		

Antenna Polarity & Test Distance : Vertical at 3m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	148.20	-57.44	-13.00	-44.44	1.55 V	139	55.47	-112.91
2	200.60	-59.40	-13.00	-46.40	1.05 V	209	56.84	-116.24
3	263.60	-60.77	-13.00	-47.77	1.84 V	130	53.03	-113.80
4	355.32	-60.66	-13.00	-47.66	1.58 V	77	50.49	-111.15
5	400.00	-61.00	-13.00	-48.00	1.45 V	167	48.99	-109.99
6	486.98	-68.55	-13.00	-55.55	1.23 V	73	39.57	-108.12

Remarks:

1. EIRP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8
3. Margin value = EIRP – Limit value
4. The other EIRP levels were very low against the limit.



Above 1GHz

WCDMA Band 2

Mode	TX channel 9262 (1852.4MHz)	Frequency Range	1GHz ~ 20GHz
Environmental Conditions	25deg. C, 60%RH	Input Power	120Vac, 60Hz
Tested By	Karl Lee		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	3700.00	-52.46	-13.00	-39.46	1.24 H	136	33.83	-86.29
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	3700.00	-52.22	-13.00	-39.22	2.34 V	184	34.07	-86.29

Remarks:

1. EIRP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8
3. Margin value = EIRP – Limit value
4. The other EIRP levels were very low against the limit.

Mode	TX channel 9400 (1880.0MHz)	Frequency Range	1GHz ~ 20GHz
Environmental Conditions	25deg. C, 60%RH	Input Power	120Vac, 60Hz
Tested By	Karl Lee		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	3760.00	-51.88	-13.00	-38.88	2.56 H	138	34.18	-86.06
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	3760.00	-51.87	-13.00	-38.87	2.40 V	149	34.19	-86.06

Remarks:

1. EIRP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8
3. Margin value = EIRP – Limit value
4. The other EIRP levels were very low against the limit.

Mode	TX channel 9538 (1907.6MHz)	Frequency Range	1GHz ~ 20GHz
Environmental Conditions	25deg. C, 60%RH	Input Power	120Vac, 60Hz
Tested By	Karl Lee		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	3820.00	-51.70	-13.00	-38.70	2.06 H	174	34.10	-85.80
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	3820.00	-51.88	-13.00	-38.88	2.17 V	256	33.92	-85.80

Remarks:

1. EIRP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8
3. Margin value = EIRP – Limit value
4. The other EIRP levels were very low against the limit.

LTE Band 2 (Channel Bandwidth 1.4MHz)

Mode	TX channel 18607 (1850.7MHz)	Frequency Range	1GHz ~ 20GHz
Environmental Conditions	25deg. C, 60%RH	Input Power	120Vac, 60Hz
Tested By	Karl Lee		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	5552.10	-45.30	-13.00	-32.30	1.65 H	142	37.17	-82.47
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	5552.10	-46.80	-13.00	-33.80	2.36 V	178	35.67	-82.47

Remarks:

1. EIRP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8
3. Margin value = EIRP – Limit value
4. The other EIRP levels were very low against the limit.

Mode	TX channel 18900 (1880.0MHz)	Frequency Range	1GHz ~ 20GHz
Environmental Conditions	25deg. C, 60%RH	Input Power	120Vac, 60Hz
Tested By	Karl Lee		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	5640.00	-44.58	-13.00	-31.58	1.05 H	214	37.99	-82.57
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	5640.00	-46.75	-13.00	-33.75	2.52 V	174	35.82	-82.57

Remarks:

1. EIRP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8
3. Margin value = EIRP – Limit value
4. The other EIRP levels were very low against the limit.

Mode	TX channel 19193 (1909.3MHz)	Frequency Range	1GHz ~ 20GHz
Environmental Conditions	25deg. C, 60%RH	Input Power	120Vac, 60Hz
Tested By	Karl Lee		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	5720.00	-42.98	-13.00	-29.98	1.52 H	46	39.57	-82.55
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	5720.00	-47.30	-13.00	-34.30	2.41 V	72	35.25	-82.55

Remarks:

1. EIRP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8
3. Margin value = EIRP – Limit value
4. The other EIRP levels were very low against the limit.

LTE Band 2 (Channel Bandwidth 5MHz)

Mode	TX channel 18625 (1852.5MHz)	Frequency Range	1GHz ~ 20GHz
Environmental Conditions	25deg. C, 60%RH	Input Power	120Vac, 60Hz
Tested By	Karl Lee		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	5557.50	-47.94	-13.00	-34.94	1.72 H	108	34.55	-82.49
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	3425.00	-51.66	-13.00	-38.66	1.65 V	238	35.19	-86.85

Remarks:

1. EIRP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8
3. Margin value = EIRP – Limit value
4. The other EIRP levels were very low against the limit.

Mode	TX channel 18900 (1880.0MHz)	Frequency Range	1GHz ~ 20GHz
Environmental Conditions	25deg. C, 60%RH	Input Power	120Vac, 60Hz
Tested By	Karl Lee		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	5640.00	-44.18	-13.00	-31.18	1.71 H	46	38.39	-82.57
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	5640.00	-46.82	-13.00	-33.82	3.16 V	179	35.75	-82.57

Remarks:

1. EIRP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8
3. Margin value = EIRP – Limit value
4. The other EIRP levels were very low against the limit.

Mode	TX channel 19175 (1907.5MHz)	Frequency Range	1GHz ~ 20GHz
Environmental Conditions	25deg. C, 60%RH	Input Power	120Vac, 60Hz
Tested By	Karl Lee		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	5722.50	-42.32	-13.00	-29.32	1.26 H	188	40.22	-82.54
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	5722.50	-47.56	-13.00	-34.56	2.12 V	14	34.98	-82.54

Remarks:

1. EIRP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8
3. Margin value = EIRP – Limit value
4. The other EIRP levels were very low against the limit.

LTE Band 2 (Channel Bandwidth 20MHz)

Mode	TX channel 18700 (1860.0MHz)	Frequency Range	1GHz ~ 20GHz
Environmental Conditions	25deg. C, 60%RH	Input Power	120Vac, 60Hz
Tested By	Karl Lee		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	5580.00	-47.96	-13.00	-34.96	1.42 H	149	34.57	-82.53
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	5580.00	-47.23	-13.00	-34.23	1.11 V	149	35.30	-82.53

Remarks:

1. EIRP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8
3. Margin value = EIRP – Limit value
4. The other EIRP levels were very low against the limit.

Mode	TX channel 18900 (1880.0MHz)	Frequency Range	1GHz ~ 20GHz
Environmental Conditions	25deg. C, 60%RH	Input Power	120Vac, 60Hz
Tested By	Karl Lee		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	**5640.00**	**-42.02**	**-13.00**	**-29.02**	**2.05 H**	**227**	**40.55**	**-82.57**
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	5640.00	-47.19	-13.00	-34.19	1.35 V	82	35.38	-82.57

Remarks:

1. EIRP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8
3. Margin value = EIRP – Limit value
4. The other EIRP levels were very low against the limit.

Mode	TX channel 19100 (1900.0MHz)	Frequency Range	1GHz ~ 20GHz
Environmental Conditions	25deg. C, 60%RH	Input Power	120Vac, 60Hz
Tested By	Karl Lee		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	5700.00	-45.48	-13.00	-32.48	2.53 H	72	37.14	-82.62
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	5700.00	-48.13	-13.00	-35.13	1.25 V	135	34.49	-82.62

Remarks:

1. EIRP(dBm) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB) + 20log(D) – 104.8
3. Margin value = EIRP – Limit value
4. The other EIRP levels were very low against the limit.

5 Pictures of Test Arrangements

Please refer to the attached file (Test Setup Photo).

Appendix – Information of the Testing Laboratories

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are FCC recognized accredited test firms and accredited according to ISO/IEC 17025.

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

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