

4.4 Channel Edge Measurement

4.4.1 Limits of Band Edge Measurement

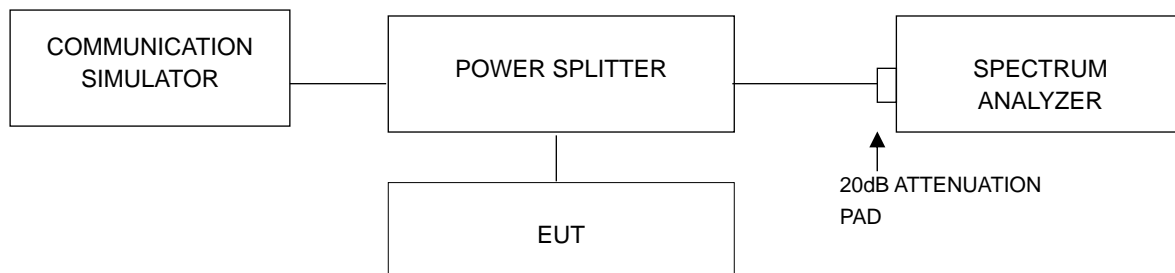
For LTE Band 66

According to FCC 27.53(h) for operations in the 1695-1710 MHz, 1710-1755 MHz, 1755-1780 MHz, 1915-1920 MHz, 1995-2000 MHz, 2000-2020 MHz, 2110-2155 MHz, 2155-2180 MHz, and 2180-2200 bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least $43 + 10 \log (P)$ dB.

For LTE Band 7, 38, 41

According to FCC 27.53(m)(4) specified that power of any emission outside of the channel edge must be attenuated below the transmitting power (P) by a factor shall be not less than $40 + 10 \log (P)$ dB on all frequencies between the channel edge and 5 megahertz from the channel edge, $43 + 10 \log (P)$ dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and $55 + 10 \log (P)$ dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth. In addition, the attenuation factor shall not be less that $43 + 10 \log (P)$ dB on all frequencies between 2490.5 MHz and 2496 MHz and $55 + 10 \log (P)$ dB at or below 2490.5 MHz. In the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least two percent may be employed, except when the 1 megahertz band is 2495-2496 MHz, in which case a resolution bandwidth of at least one percent may be employed.

4.4.2 Test Setup



4.4.3 Test Procedures

- The EUT was set up for the rated peak power. The power was measured with Spectrum Analyzer. All measurements of Emission Mask were done at 3 channels: low, middle and high operational frequency range. All measurements of Band Edge were done at 2 channels: low and high operational frequency range.(only for LTE Band 66 CA mode)
- The center frequency of spectrum is the band edge frequency and span is 1MHz. RB of the spectrum is 200kHz and VB of the spectrum is 620kHz (LTE Channel Bandwidth 10MHz+10MHz). (only for LTE Band 66 CA mode)
- The center frequency of spectrum is the band edge frequency and span is 1MHz. RB of the spectrum is 430kHz and VB of the spectrum is 1.3MHz (LTE Channel Bandwidth 20MHz+20MHz).(only for LTE Band 66 CA mode)
- For the measurement method of LTE Band 7C, 38C, Band 41C, please refer to 27.53(m)(4)(6).
- Record the max trace plot into the test report.

4.4.4 Test Results

LTE Band 7 (CA 7C)
Emission Mask:

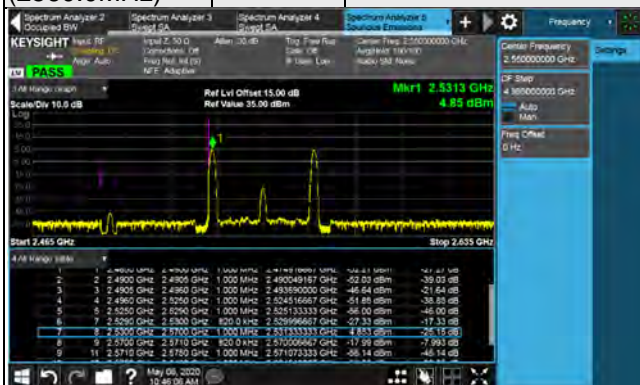
Channel Bandwidth: 20MHz+20MHz					
Channel 20850 (2510.0MHz)+ Channel 21048 (2529.8MHz)	QPSK	1 RB / 0 RB Offset+ 1 RB / 99 RB Offset	Channel 21001 (2525.1MHz)+ Channel 21199 (2544.9MHz)	QPSK	1 RB / 0 RB Offset+ 1 RB / 99 RB Offset
Channel 20850 (2510.0MHz)+ Channel 21048 (2529.8MHz)	QPSK	1 RB / 99 RB Offset+ 1 RB / 0 RB Offset	Channel 21001 (2525.1MHz)+ Channel 21199 (2544.9MHz)	QPSK	1 RB / 99 RB Offset+ 1 RB / 0 RB Offset
Channel 20850 (2510.0MHz)+ Channel 21048 (2529.8MHz)	QPSK	100 RB / 0 RB Offset	Channel 21001 (2525.1MHz)+ Channel 21199 (2544.9MHz)	QPSK	100 RB / 0 RB Offset

Channel Bandwidth: 20MHz+20MHz

Channel 21152
(2540.2MHz)+
Channel 21350
(2560.0MHz)

QPSK

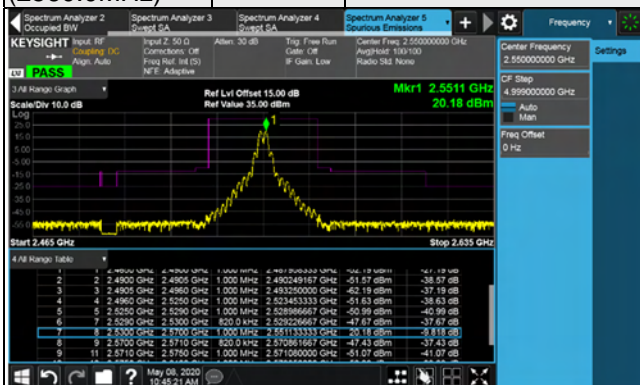
1 RB / 0 RB Offset+
1 RB / 99 RB Offset



Channel 21152
(2540.2MHz)+
Channel 21350
(2560.0MHz)

QPSK

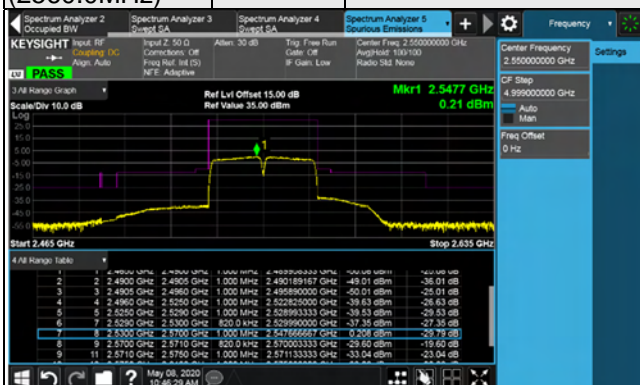
1 RB / 99 RB Offset+
1 RB / 0 RB Offset



Channel 21152
(2540.2MHz)+
Channel 21350
(2560.0MHz)

QPSK

100 RB / 0 RB Offset



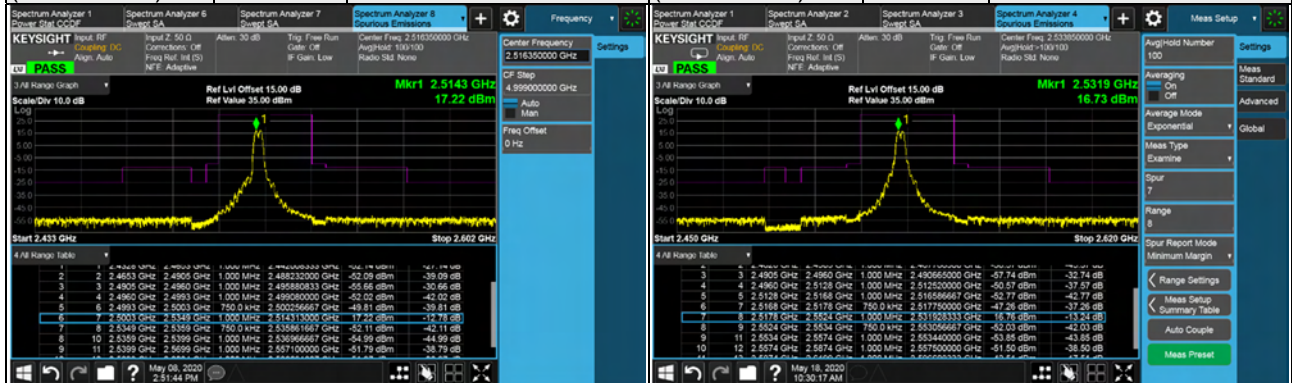
LTE Band 7 (CA 7C)
Emission Mask:

Channel Bandwidth: 15MHz+20MHz

Channel 20828 (2507.8MHz)+ Channel 20999 (2524.9MHz)	256QAM	1 RB / 0 RB Offset+ 1 RB / 99 RB Offset	Channel 21003 (2525.3MHz)+ Channel 21174 (2542.4MHz)	256QAM	1 RB / 0 RB Offset+ 1 RB / 99 RB Offset
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Channel 20828 (2507.8MHz)+ Channel 20999 (2524.9MHz)	256QAM	1 RB / 74 RB Offset+ 1 RB / 0 RB Offset	Channel 21003 (2525.3MHz)+ Channel 21174 (2542.4MHz)	256QAM	1 RB / 74 RB Offset+ 1 RB / 0 RB Offset
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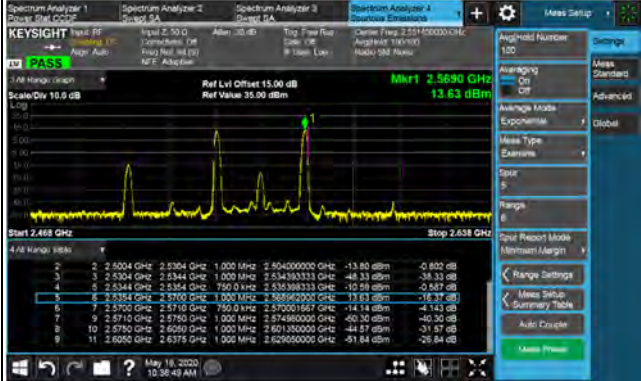


Channel 20828 (2507.8MHz)+ Channel 20999 (2524.9MHz)	256QAM	75 RB / 0 RB Offset 100 RB / 0 RB Offset	Channel 21003 (2525.3MHz)+ Channel 21174 (2542.4MHz)	256QAM	75 RB / 0 RB Offset 100 RB / 0 RB Offset
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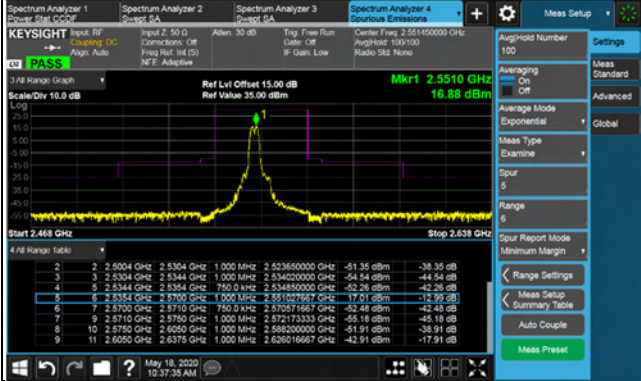


Channel Bandwidth: 15MHz+20MHz

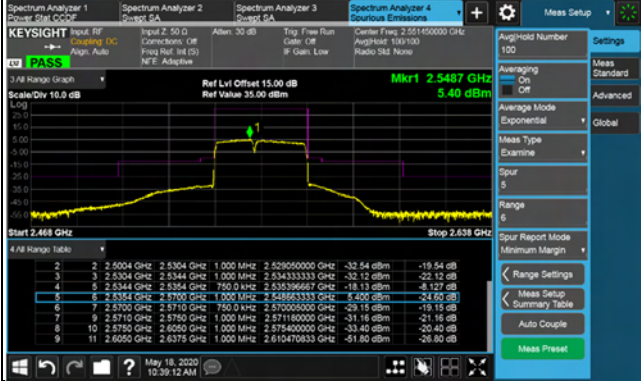
Channel 21179 (2542.9MHz)+ Channel 21350 (2560.0MHz) 256QAM 1 RB / 0 RB Offset+ 1 RB / 99 RB Offset



Channel 21179 (2542.9MHz)+ Channel 21350 (2560.0MHz) 256QAM 1 RB / 74 RB Offset+ 1 RB / 0 RB Offset



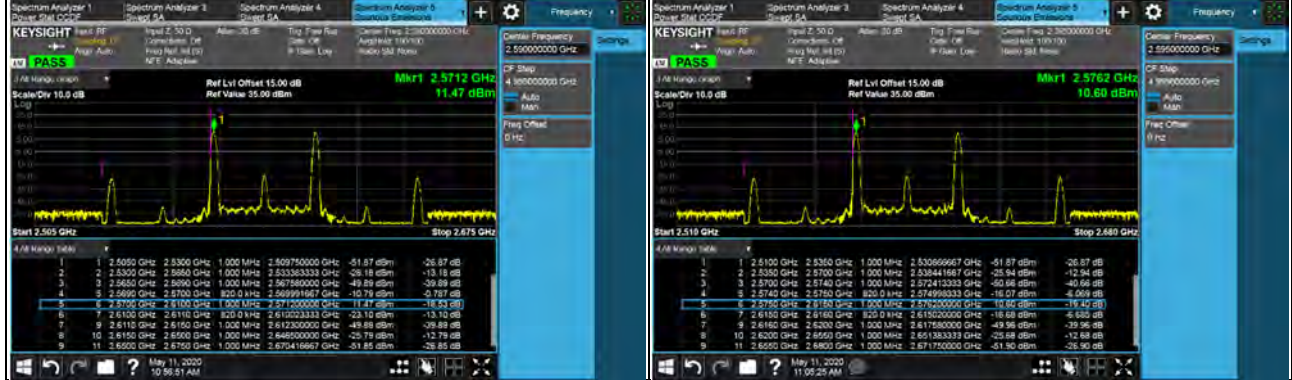
Channel 21179 (2542.9MHz)+ Channel 21350 (2560.0MHz) 256QAM 75 RB / 0 RB Offset 100 RB / 0 RB Offset



LTE Band 38 (CA 38C)
Emission Mask:

Channel Bandwidth: 20MHz+20MHz

Channel 37850 (2580.0MHz)+ Channel 38048 (2599.8MHz)	256QAM	1 RB / 0 RB Offset+ 1 RB / 99 RB Offset	Channel 37901 (2585.1MHz)+ Channel 38099 (2604.9MHz)	256QAM	1 RB / 0 RB Offset+ 1 RB / 99 RB Offset
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Channel 37850 (2580.0MHz)+ Channel 38048 (2599.8MHz)	256QAM	1 RB / 99 RB Offset+ 1 RB / 0 RB Offset	Channel 37901 (2585.1MHz)+ Channel 38099 (2604.9MHz)	256QAM	1 RB / 99 RB Offset+ 1 RB / 0 RB Offset
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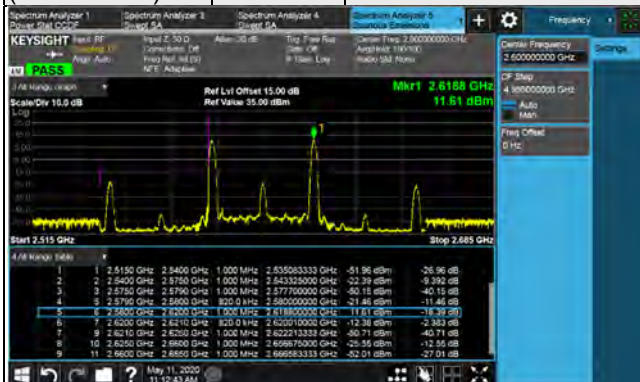


Channel 37850 (2580.0MHz)+ Channel 38048 (2599.8MHz)	256QAM	100 RB / 0 RB Offset	Channel 37901 (2585.1MHz)+ Channel 38099 (2604.9MHz)	256QAM	100 RB / 0 RB Offset
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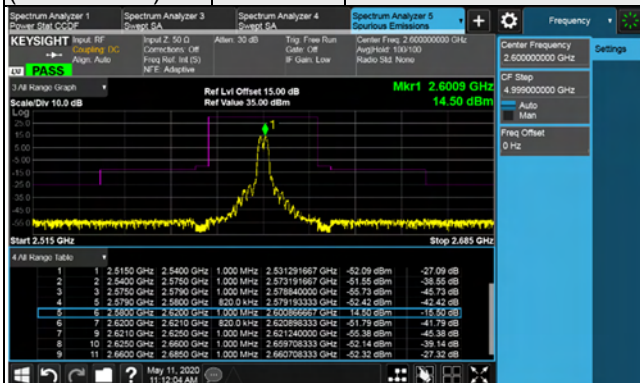


Channel Bandwidth: 20MHz+20MHz

Channel 37952
(2590.2MHz)+
Channel 38150
(2610.0MHz) 256QAM 1 RB / 0 RB Offset+
1 RB / 99 RB Offset



Channel 37952
(2590.2MHz)+
Channel 38150
(2610.0MHz) 256QAM 1 RB / 99 RB Offset+
1 RB / 0 RB Offset



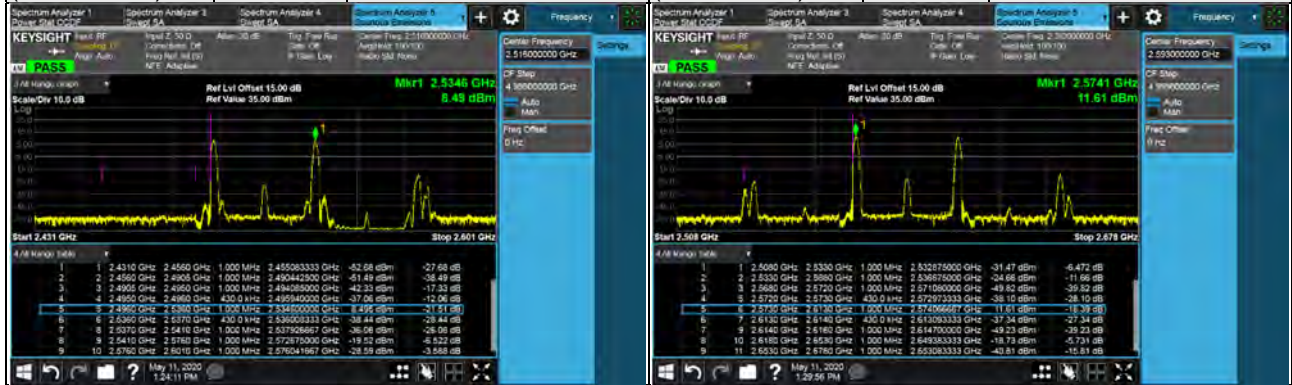
Channel 37952
(2590.2MHz)+
Channel 38150
(2610.0MHz) 256QAM 100 RB / 0 RB Offset



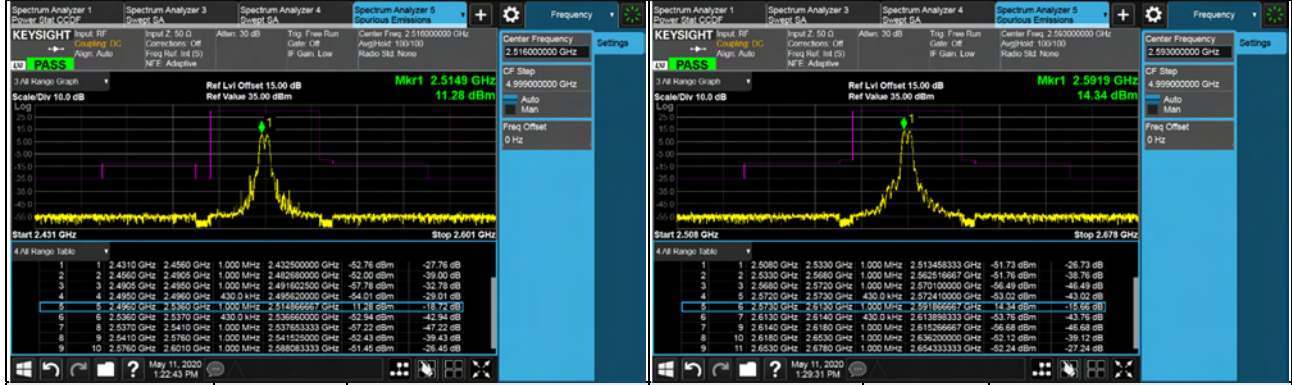
LTE Band 41 (CA 41C)
Emission Mask:

Channel Bandwidth: 20MHz+20MHz

Channel 39750 (2506.0MHz)+ Channel 39948 (2525.8MHz)	256QAM	1 RB / 0 RB Offset+ 1 RB / 99 RB Offset	Channel 40521 (2583.1MHz)+ Channel 40719 (2602.9MHz)	256QAM	1 RB / 0 RB Offset+ 1 RB / 99 RB Offset
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Channel 39750 (2506.0MHz)+ Channel 39948 (2525.8MHz)	256QAM	1 RB / 99 RB Offset+ 1 RB / 0 RB Offset	Channel 40521 (2583.1MHz)+ Channel 40719 (2602.9MHz)	256QAM	1 RB / 99 RB Offset+ 1 RB / 0 RB Offset
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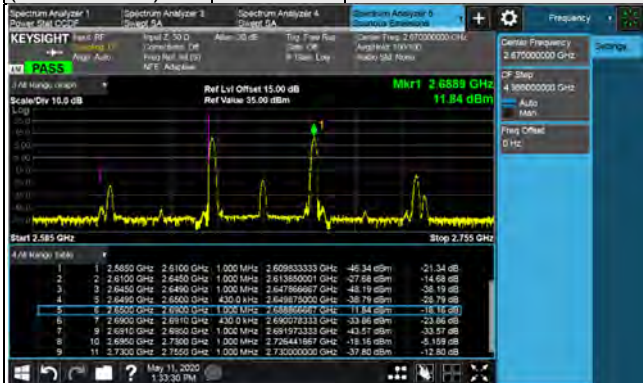


Channel 39750 (2506.0MHz)+ Channel 39948 (2525.8MHz)	256QAM	100 RB / 0 RB Offset	Channel 40521 (2583.1MHz)+ Channel 40719 (2602.9MHz)	256QAM	100 RB / 0 RB Offset
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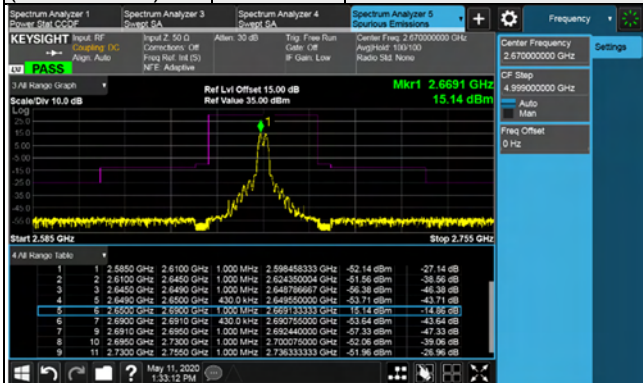


Channel Bandwidth: 20MHz+20MHz

Channel 41292 (2660.2MHz)+ Channel 41490 (2680.0MHz) 256QAM 1 RB / 0 RB Offset+ 1 RB / 99 RB Offset



Channel 41292 (2660.2MHz)+ Channel 41490 (2680.0MHz) 256QAM 1 RB / 99 RB Offset+ 1 RB / 0 RB Offset



Channel 41292 (2660.2MHz)+ Channel 41490 (2680.0MHz) 256QAM 100 RB / 0 RB Offset



LTE Band 66 (CA 66C)
Band Edge:

Channel Bandwidth: 20MHz+20MHz

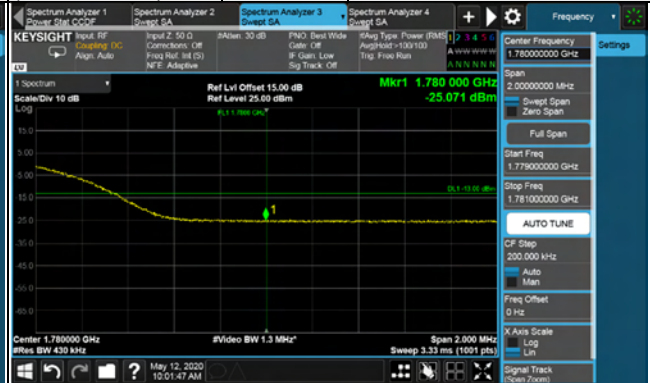
Channel 132072 (1720.0MHz)+ Channel 132270 (1739.8MHz)	256QAM	1 RB / 0 RB Offset+ 1 RB / 99 RB Offset	Channel 132374 (1750.2MHz)+ Channel 132572 (1770.0MHz)	256QAM	1 RB / 0 RB Offset+ 1 RB / 99 RB Offset
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Channel 132072 (1720.0MHz)+ Channel 132270 (1739.8MHz)	256QAM	100 RB / 0 RB Offset
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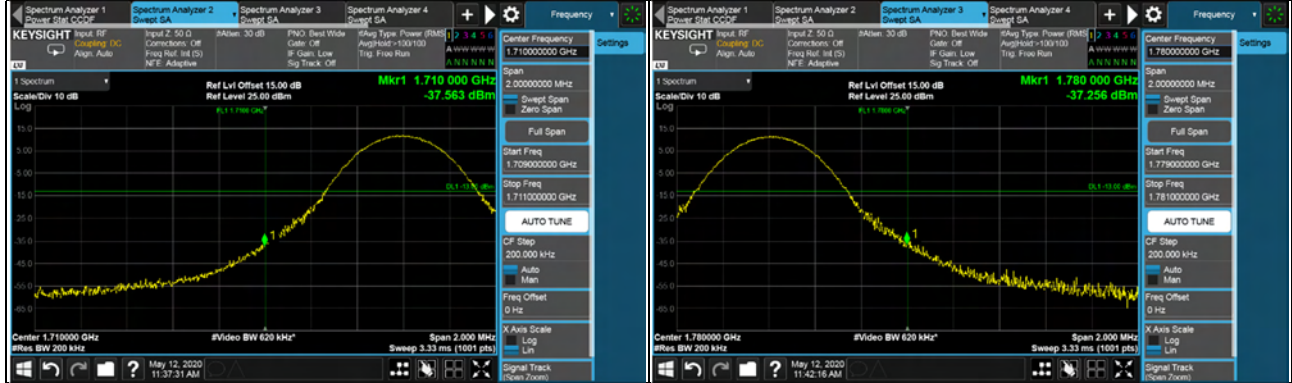
Channel 132374 (1750.2MHz)+ Channel 132572 (1770.0MHz)	256QAM	100 RB / 0 RB Offset
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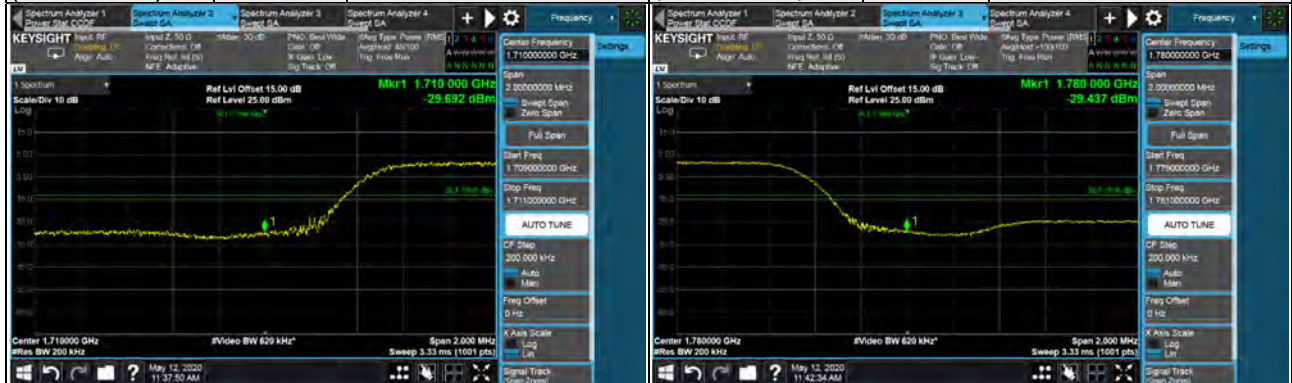
LTE Band 66 (CA 66B)
Band Edge:

Channel Bandwidth: 10MHz+10MHz

Channel 132022 (1715.0MHz)+ Channel 132121 (1724.9MHz)	256QAM	1 RB / 0 RB Offset+ 1 RB / 49 RB Offset	Channel 132523 (1765.1MHz)+ Channel 132622 (1775.0MHz)	256QAM	1 RB / 0 RB Offset+ 1 RB / 49 RB Offset
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Channel 132022 (1715.0MHz)+ Channel 132121 (1724.9MHz)	256QAM	50 RB / 0 RB Offset	Channel 132523 (1765.1MHz)+ Channel 132622 (1775.0MHz)	256QAM	50 RB / 0 RB Offset
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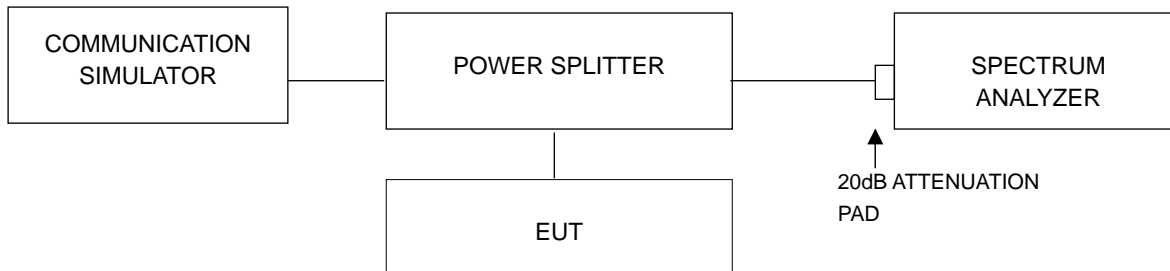


4.5 Peak to Average Ratio

4.5.1 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

4.5.2 Test Setup



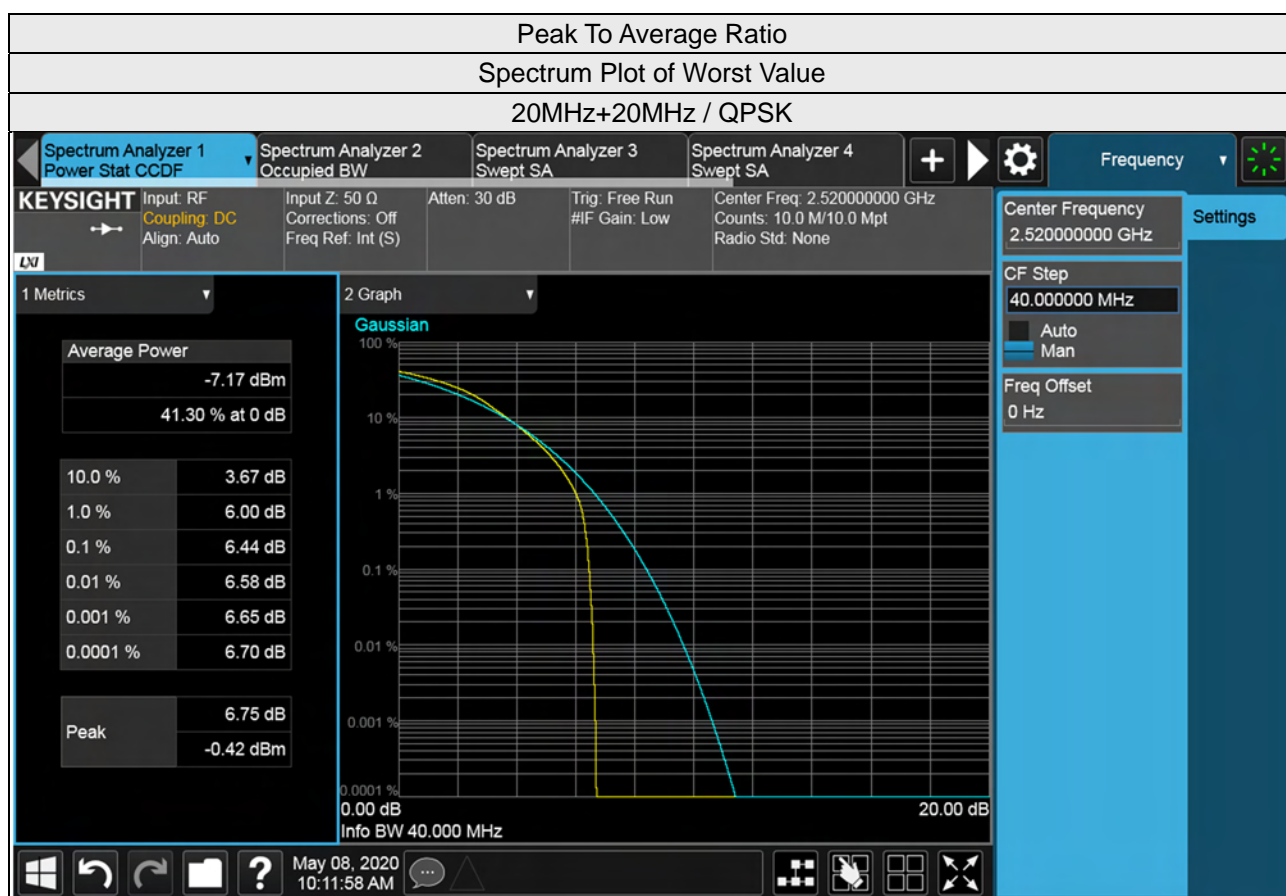
4.5.3 Test Procedures

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

4.5.4 Test Results

LTE Band 7 (CA 7C)

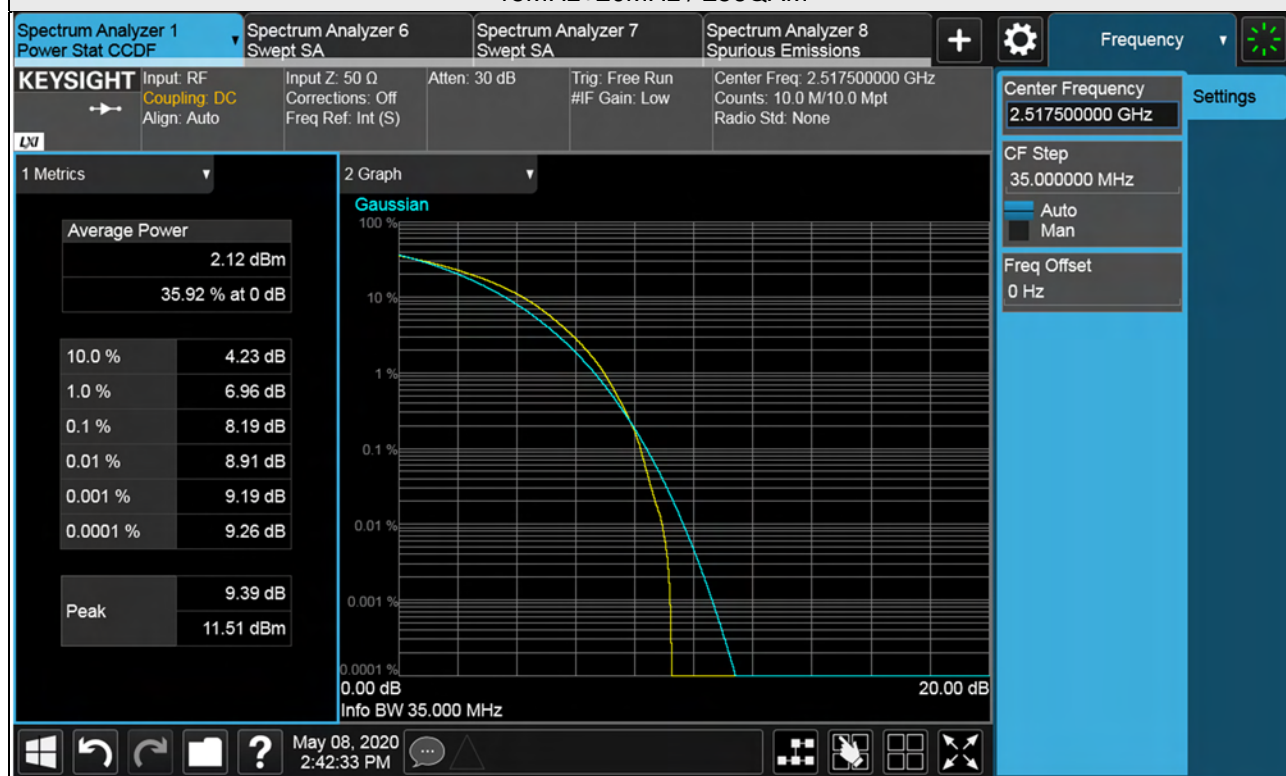
LTE Band 7 (CA 7C), Channel Bandwidth 20MHz+20MHz		
Channel	Frequency (MHz)	Peak To Average Ratio (dB)
		QPSK_Full RB
20850+21048	2510.0+2529.8	6.44
21001+21199	2525.1+2544.9	6.42
21152+21350	2540.2+2560.0	6.42



LTE Band 7 (CA 7C)

LTE Band 7 (CA 7C), Channel Bandwidth 15MHz+20MHz		
Channel	Frequency (MHz)	Peak To Average Ratio (dB)
		256QAM_Full RB
20828+20999	2507.8+2524.9	8.19
21003+21174	2525.3+2542.4	8.11
21179+21350	2542.9+2560.0	8.00

Peak To Average Ratio
Spectrum Plot of Worst Value
15MHz+20MHz / 256QAM



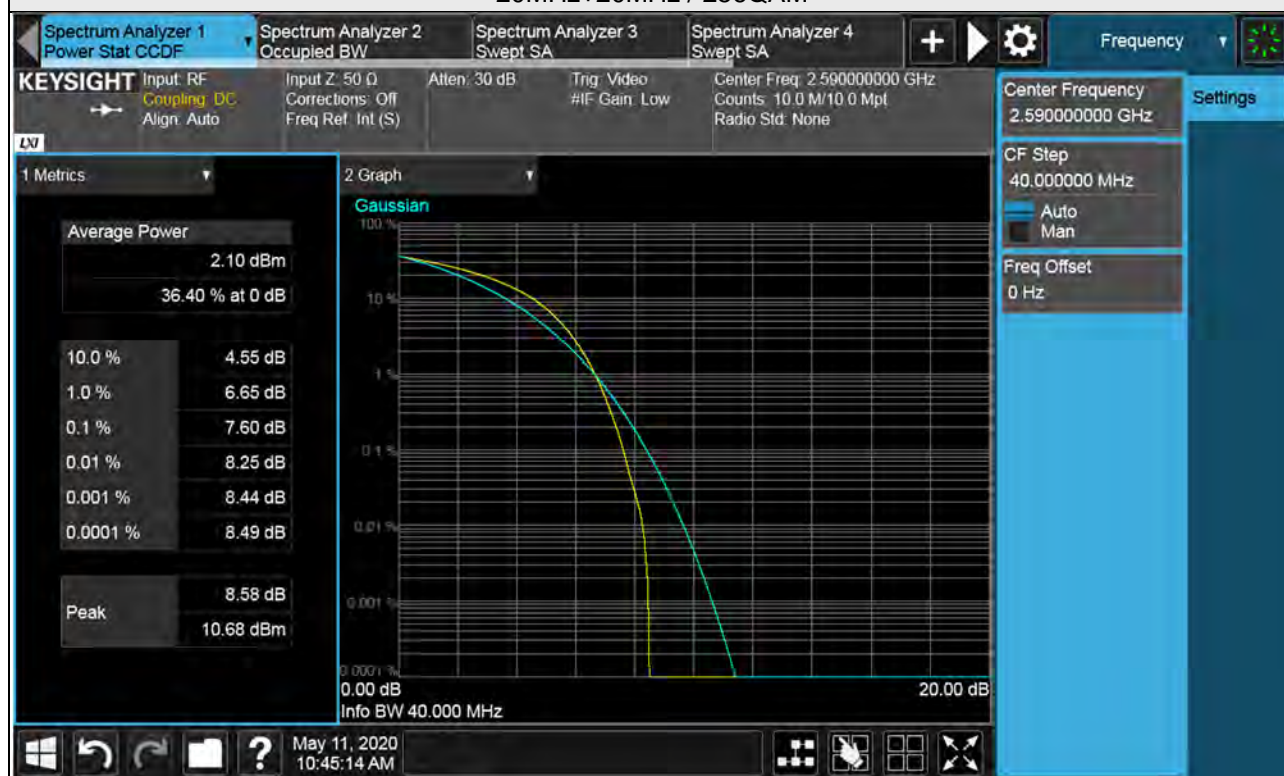
LTE Band 38 (CA 38C)

LTE Band 38 (CA 38C), Channel Bandwidth 20MHz+20MHz		
Channel	Frequency (MHz)	Peak To Average Ratio (dB)
		256QAM_Full RB
37850+38048	2580.0+2599.8	7.60
37901+38099	2585.1+2604.9	7.36
37952+38150	2590.2+2610.0	7.56

Peak To Average Ratio

Spectrum Plot of Worst Value

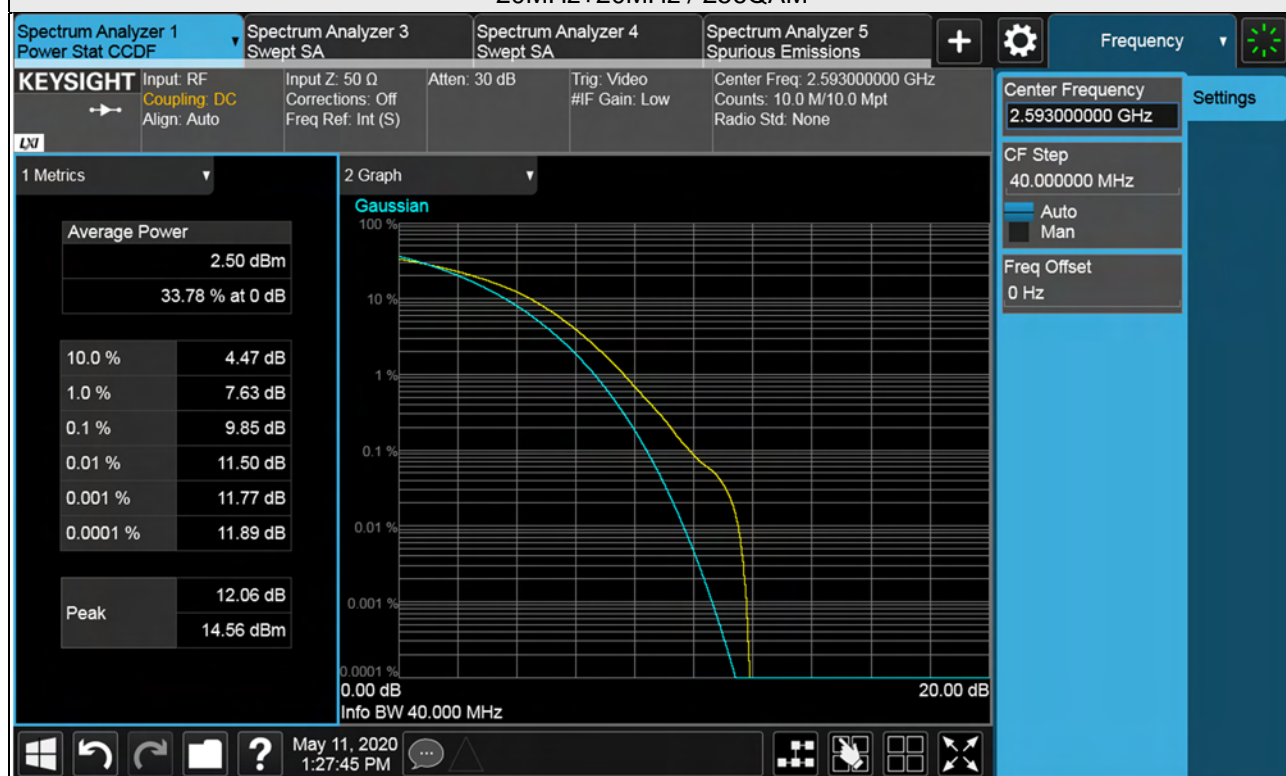
20MHz+20MHz / 256QAM



LTE Band 41 (CA 41C)

LTE Band 41 (CA 41C), Channel Bandwidth 20MHz+20MHz		
Channel	Frequency (MHz)	Peak To Average Ratio (dB)
		256QAM_Full RB
39750+39948	2506.0+2525.8	9.36
40521+40719	2583.1+2602.9	9.85
41292+41490	2660.2+2680.0	9.73

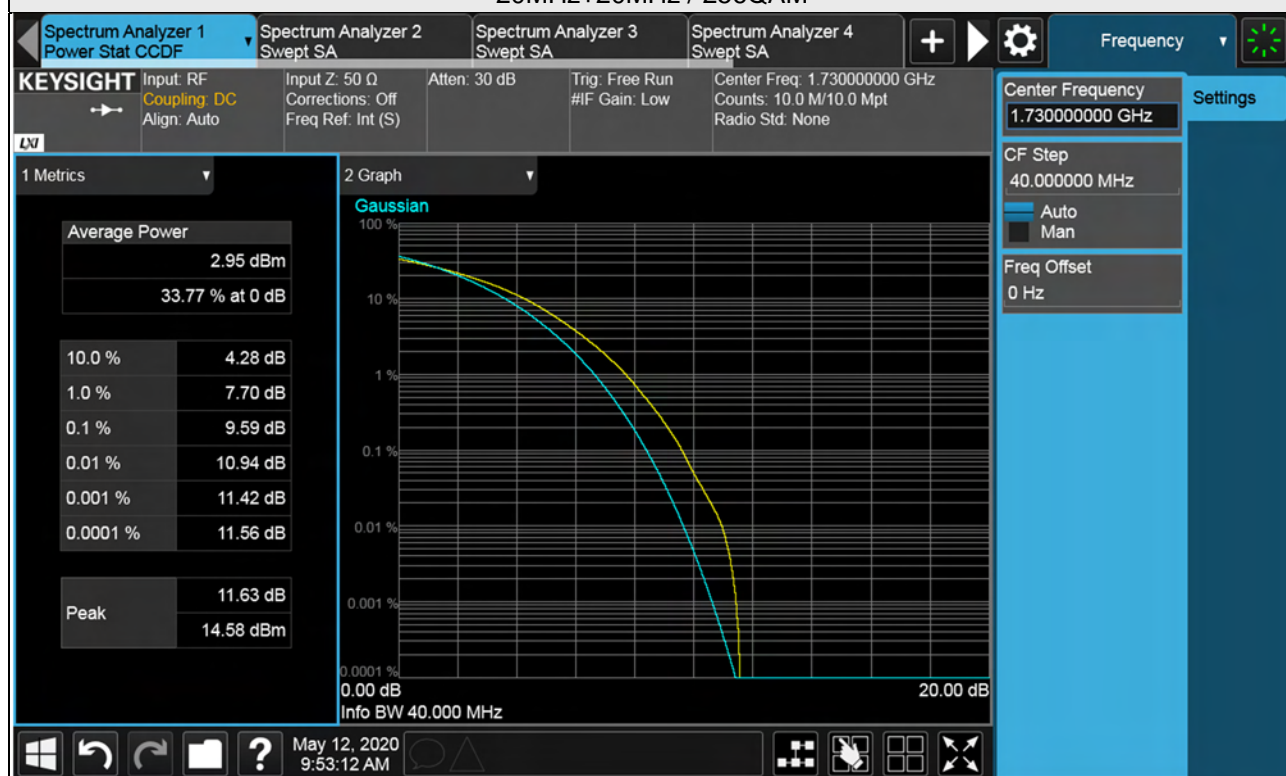
Peak To Average Ratio
Spectrum Plot of Worst Value
20MHz+20MHz / 256QAM



LTE Band 66 (CA 66C)

LTE Band 66 (CA 66C), Channel Bandwidth 20MHz+20MHz		
Channel	Frequency (MHz)	Peak To Average Ratio (dB)
		256QAM_Full RB
132072+132270	1720.0+1739.8	9.59
132323+132521	1745.1+1764.9	9.48
132374+132572	1750.2+1770.0	9.44

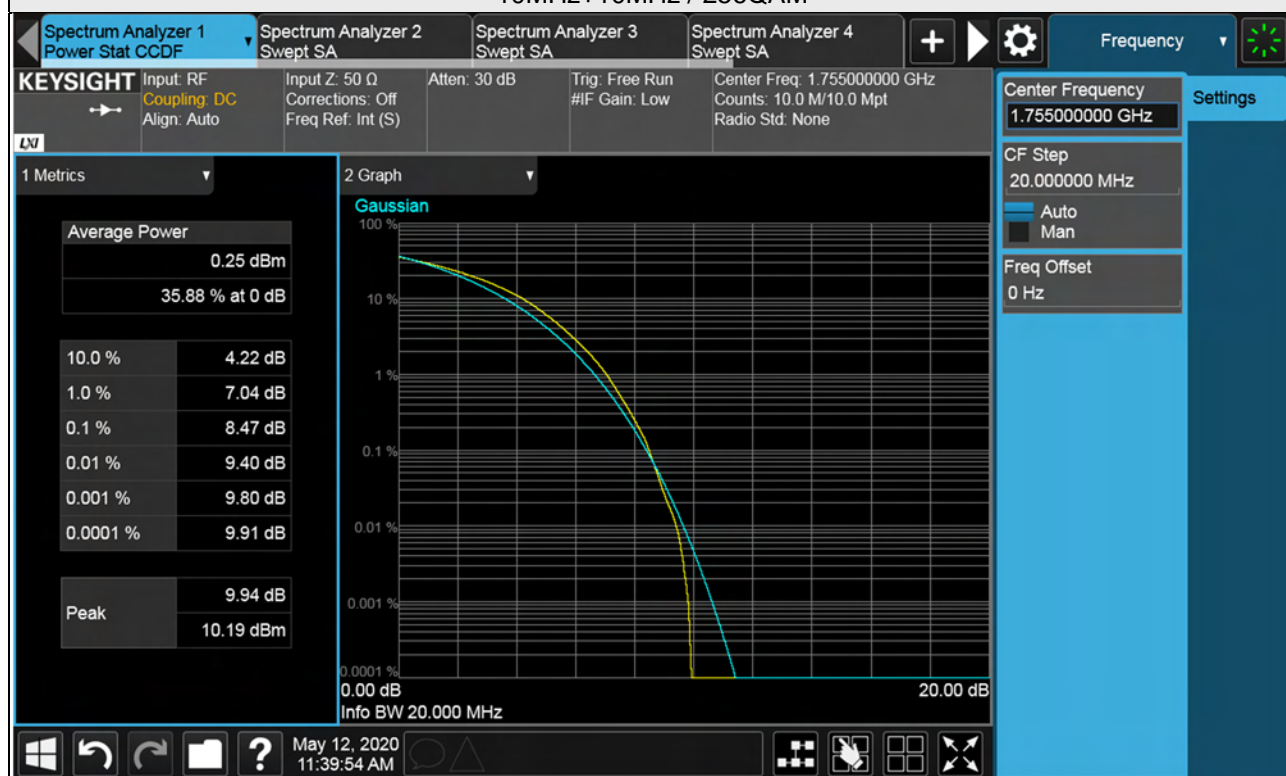
Peak To Average Ratio
Spectrum Plot of Worst Value
20MHz+20MHz / 256QAM



LTE Band 66 (CA 66B)

LTE Band 66 (CA 66B), Channel Bandwidth 10MHz+10MHz		
Channel	Frequency (MHz)	Peak To Average Ratio (dB)
		256QAM_Full RB
132022+132121	1715.0+1724.9	8.12
132373+132472	1750.1+1760.0	8.47
132523+132622	1765.1+1775.0	7.95

Peak To Average Ratio
Spectrum Plot of Worst Value
10MHz+10MHz / 256QAM



4.6 Conducted Spurious Emissions

4.6.1 Limits of Conducted Spurious Emissions Measurement

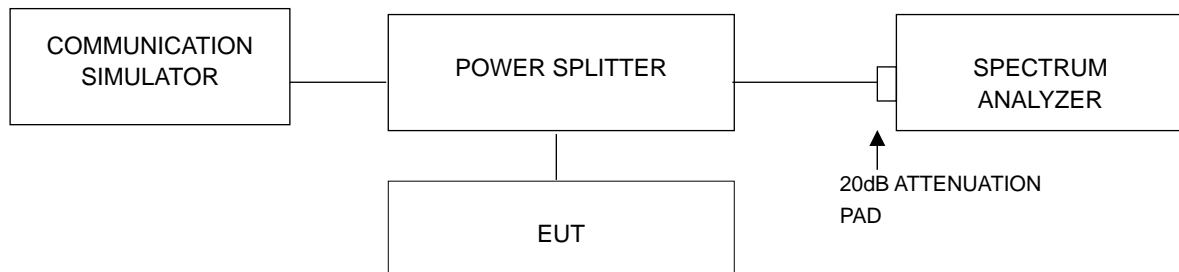
For LTE Band 66

In the FCC 27.53(h), On any frequency outside a licensee's frequency block, The power of any emission shall be attenuated below the transmitter power (P) by at least $43 + 10 \log (P)$ dB. The emission limit equal to -13dBm .

For LTE Band 7, 38, 41

In the FCC 27.53(m)(4), On any frequency outside a licensee's frequency block, The power of any emission shall be attenuated below the transmitter power (P) by at least $55 + 10 \log (P)$ dB. The emission limit equal to -25dBm .

4.6.2 Test Setup



4.6.3 Test Procedure

- a. All measurements were done at 3 channels: low, middle and high operational frequency range.
- b. When the spectrum scanned from 9kHz to 20GHz or 26.5GHz or 27GHz, it shall be connected to the attenuator with the carried frequency.

4.6.4 Test Results

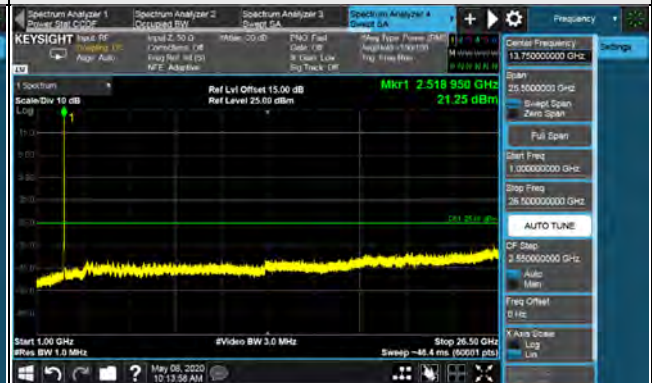
LTE Band 7 (CA 7C)

Channel Band width: 20MHz+20MHz

Channel 20850(2510.0MHz)+21048(2529.8MHz)

Frequency Range : 9kHz~1GHz

Frequency Range : 1GHz~26.5GHz



Channel 21001(2525.1MHz)+21199(2544.9MHz)

Frequency Range : 9kHz~1GHz

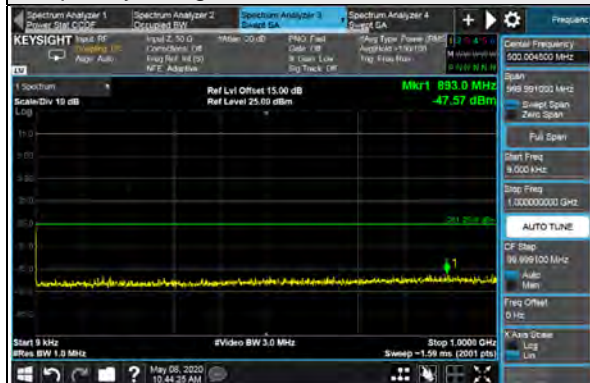
Frequency Range : 1GHz~26.5GHz



Channel 21152(2540.2MHz)+21350(2560.0MHz)

Frequency Range : 9kHz~1GHz

Frequency Range : 1GHz~26.5GHz

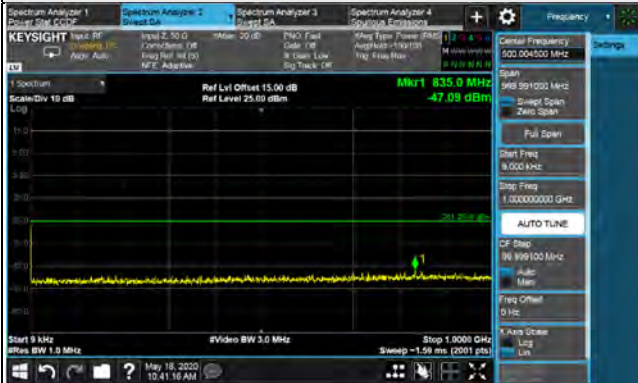


LTE Band 7 (CA 7C)

Channel Band width: 15MHz+20MHz

Channel 20828(2507.8MHz)+20999(2524.9MHz)

Frequency Range : 9kHz~1GHz



Frequency Range : 1GHz~26.5GHz



Channel 21003(2525.3MHz)+21174(2542.4MHz)

Frequency Range : 9kHz~1GHz



Frequency Range : 1GHz~26.5GHz

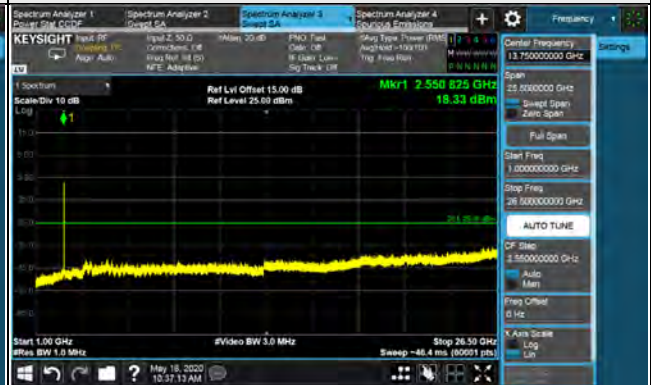


Channel 21179(2542.9MHz)+21350(2560.0MHz)

Frequency Range : 9kHz~1GHz



Frequency Range : 1GHz~26.5GHz



LTE Band 38 (CA 38C)

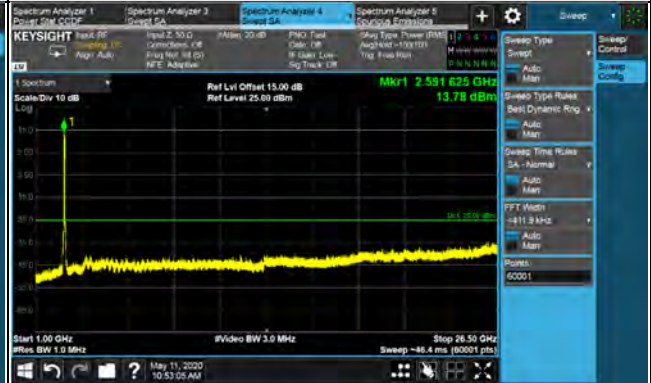
Channel Band width: 20MHz+20MHz

Channel 37850(2580.0MHz)+38048(2599.8MHz)

Frequency Range : 9kHz~1GHz



Frequency Range : 1GHz~26.5GHz

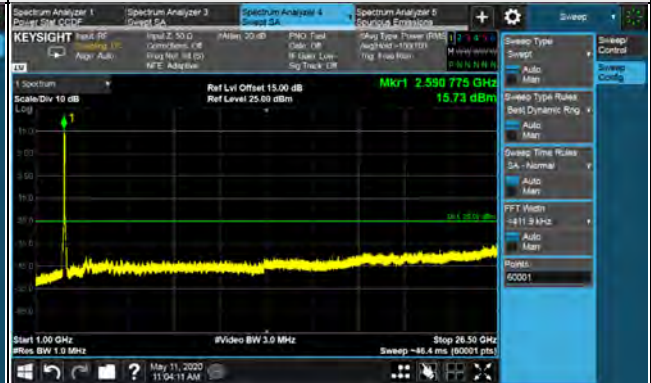


Channel 37901(2585.1MHz)+38099(2604.9MHz)

Frequency Range : 9kHz~1GHz

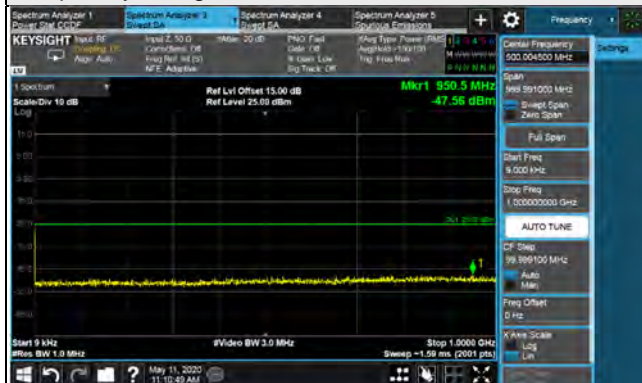


Frequency Range : 1GHz~26.5GHz



Channel 37952(2590.2MHz)+38150(2610.0MHz)

Frequency Range : 9kHz~1GHz



Frequency Range : 1GHz~26.5GHz



LTE Band 41 (CA 41C)

Channel Band width: 20MHz+20MHz

Channel 39750(2506.0MHz)+39948(2525.8MHz)

Frequency Range : 9kHz~1GHz



Frequency Range : 1GHz~27GHz



Channel 40521(2583.1MHz)+40719(2602.9MHz)

Frequency Range : 9kHz~1GHz



Frequency Range : 1GHz~27GHz

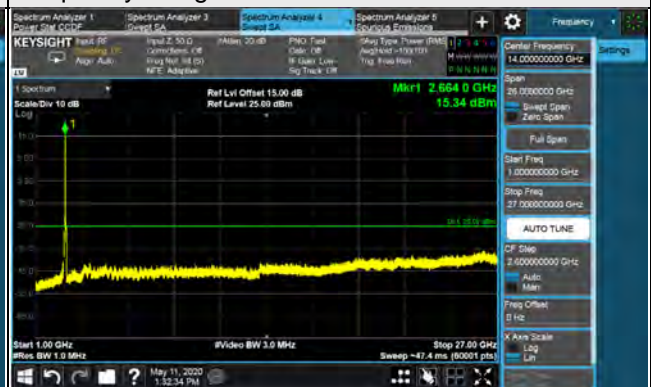


Channel 41292(2660.2MHz)+41490(2680.0MHz)

Frequency Range : 9kHz~1GHz



Frequency Range : 1GHz~27GHz



LTE Band 66 (CA 66C)

Channel Band width: 20MHz+20MHz

Channel 132072(1720.0MHz)+132270(1739.8MHz)

Frequency Range : 9kHz~1GHz



Frequency Range : 1GHz~20GHz

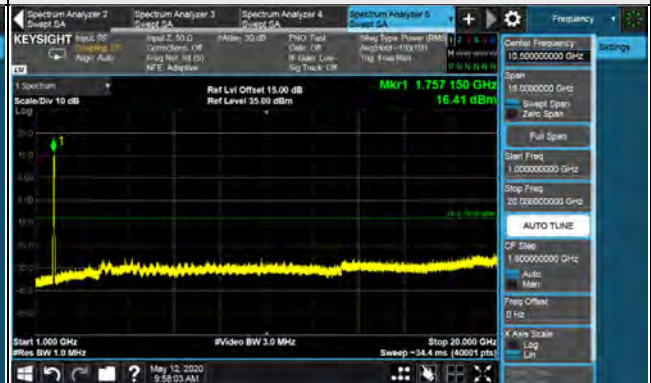


Channel 132323(1745.1MHz)+132521(1764.9MHz)

Frequency Range : 9kHz~1GHz



Frequency Range : 1GHz~20GHz

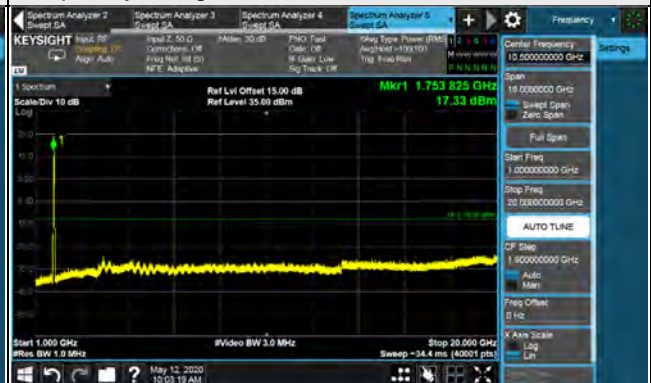


Channel 132374(1750.2MHz)+132572(1770.0MHz)

Frequency Range : 9kHz~1GHz



Frequency Range : 1GHz~20GHz



LTE Band 66 (CA 66B)

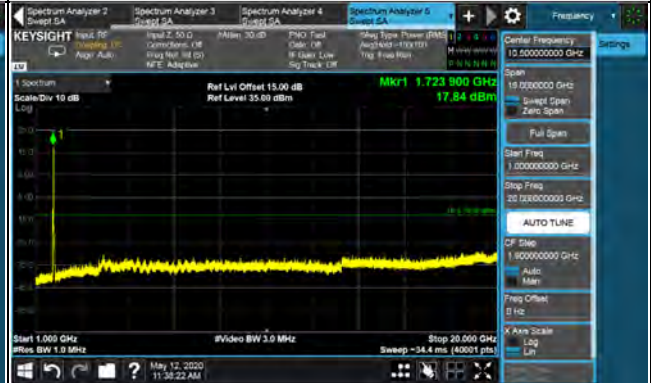
Channel Band width: 10MHz+10MHz

Channel 132022(1715.0MHz)+132121(1724.9MHz)

Frequency Range : 9kHz~1GHz



Frequency Range : 1GHz~20GHz

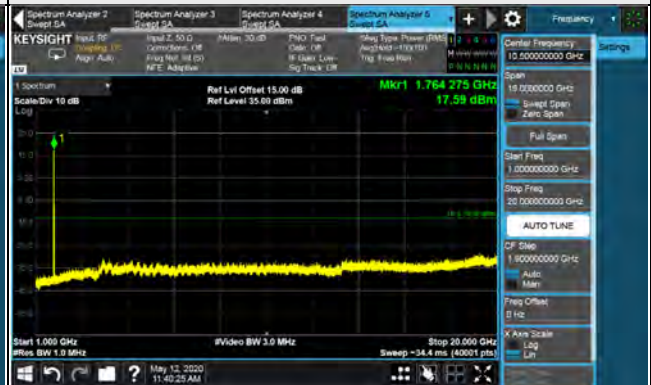


Channel 132373(1750.1MHz)+132472(1760.0MHz)

Frequency Range : 9kHz~1GHz



Frequency Range : 1GHz~20GHz

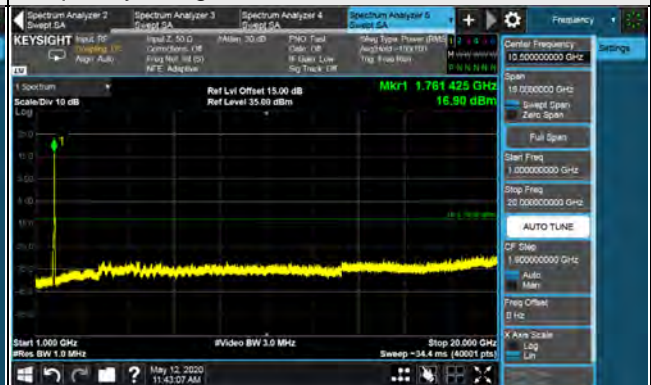


Channel 132523(1765.1MHz)+132622(1775.0MHz)

Frequency Range : 9kHz~1GHz



Frequency Range : 1GHz~20GHz



4.7 Radiated Emission Measurement

4.7.1 Limits of Radiated Emission Measurement

For LTE Band 66

According to FCC 27.53(h) for operations in the 1695-1710 MHz, 1710-1755 MHz, 1755-1780 MHz, 1915-1920 MHz, 1995-2000 MHz, 2000-2020 MHz, 2110-2155 MHz, 2155-2180 MHz, and 2180-2200 bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least $43 + 10 \log (P)$ dB.

For LTE Band 7, 38, 41

In the FCC 27.53(m) (4)(6), On any frequency outside a licensee's frequency block, The power of any emission shall be attenuated below the transmitter power (P) by at least $55 + 10 \log (P)$ dB. The emission limit equal to -25dBm .

4.7.2 Test Procedure

- a. The power was measured with R&S Spectrum Analyzer. All measurements were done at 3 channels (low, middle and high channel of operational frequency range.)
- b. Substitution method is used for E.I.R.P measurement. In the semi-anechoic chamber, EUT placed on the 0.8m (below or equal 1 GHz) and/or 1.5 m (above 1 GHz) 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.
- c. The substitution 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 b. Record the power level of S.G
- d. $\text{EIRP} = \text{Output power level of S.G} - \text{TX cable loss} + \text{Antenna gain of substitution antenna}$.

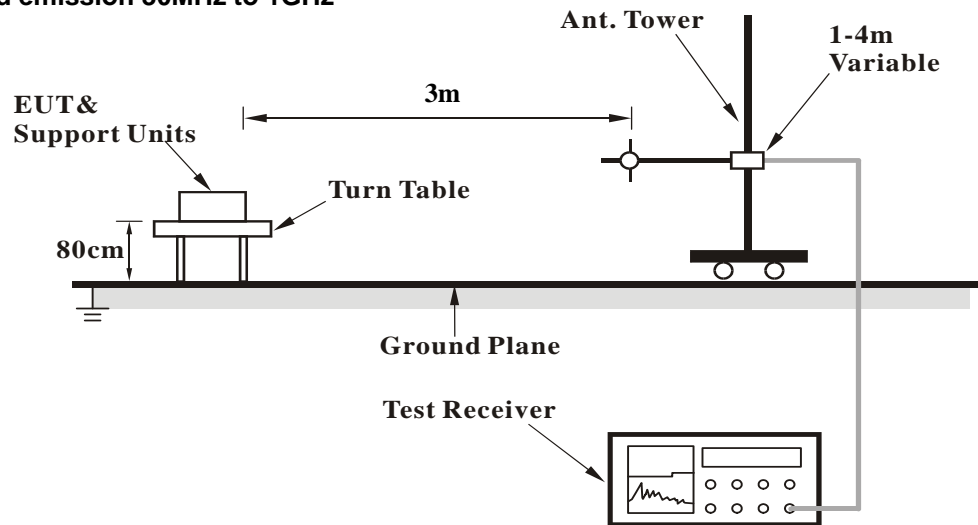
Note: The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1MHz/3MHz.

4.7.3 Deviation from Test Standard

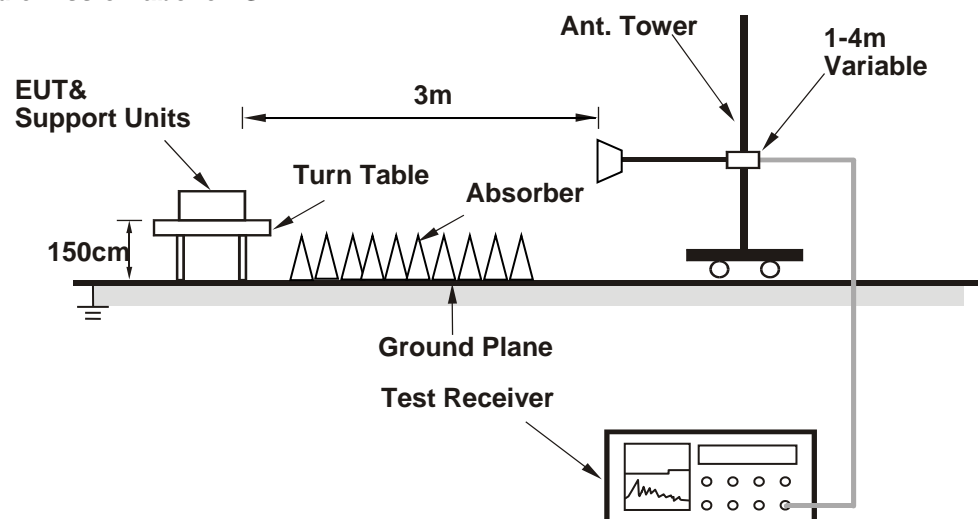
No deviation.

4.7.4 Test Setup

For radiated emission 30MHz to 1GHz



For radiated emission above 1GHz



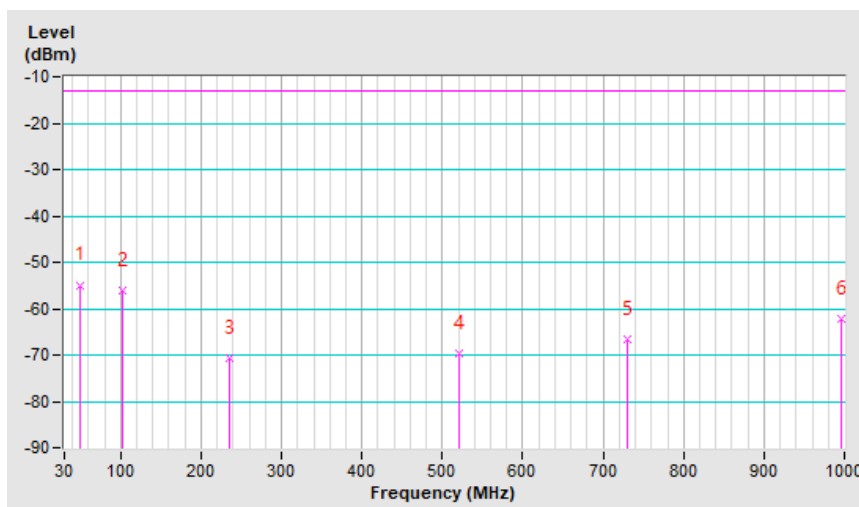
For the actual test configuration, please refer to the attached file (Test Setup Photo).

4.7.5 Test Results

Below 1GHz
LTE Band 7 (CA 7C)

Mode	TX channel 21003 (2525.3MHz)+ TX channel 21174 (2542.4MHz)	Frequency Range	Below 1000 MHz
Environmental Conditions	22deg. C, 68%RH	Input Power	120Vac, 60Hz
Tested By	Greg Lin		

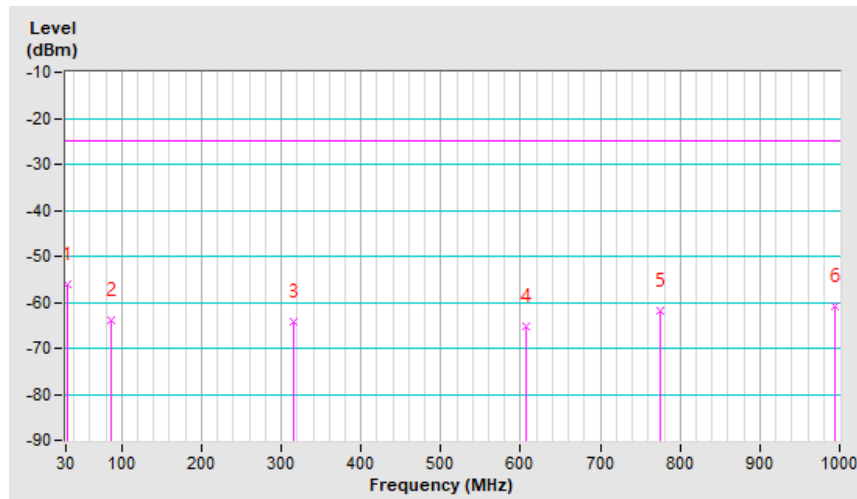
Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	50.37	-54.1	-47.0	-7.9	-54.9	-13.0	-41.9
2	101.78	-47.7	-54.4	-1.6	-56.0	-13.0	-43.0
3	235.64	-63.4	-69.1	-1.5	-70.6	-13.0	-57.6
4	520.82	-69.9	-73.4	3.8	-69.6	-13.0	-56.6
5	730.34	-70.5	-70.3	3.6	-66.7	-13.0	-53.7
6	996.12	-71.1	-65.5	3.3	-62.2	-13.0	-49.2



Mode	TX channel 21003 (2525.3MHz)+ TX channel 21174 (2542.4MHz)	Frequency Range	Below 1000 MHz
Environmental Conditions	22deg. C, 68%RH	Input Power	120Vac, 60Hz
Tested By	Greg Lin		

Antenna Polarity & Test Distance: Vertical at 3 M

No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	31.00	-45.8	-37.2	-18.8	-56.0	-25.0	-31.0
2	87.23	-57.7	-63.8	-0.1	-63.9	-25.0	-38.9
3	316.15	-64.1	-68.1	4.0	-64.1	-25.0	-39.1
4	607.15	-69.6	-68.9	3.6	-65.3	-25.0	-40.3
5	774.96	-68.9	-65.8	4.0	-61.8	-25.0	-36.8
6	994.18	-70.9	-64.2	3.4	-60.8	-25.0	-35.8

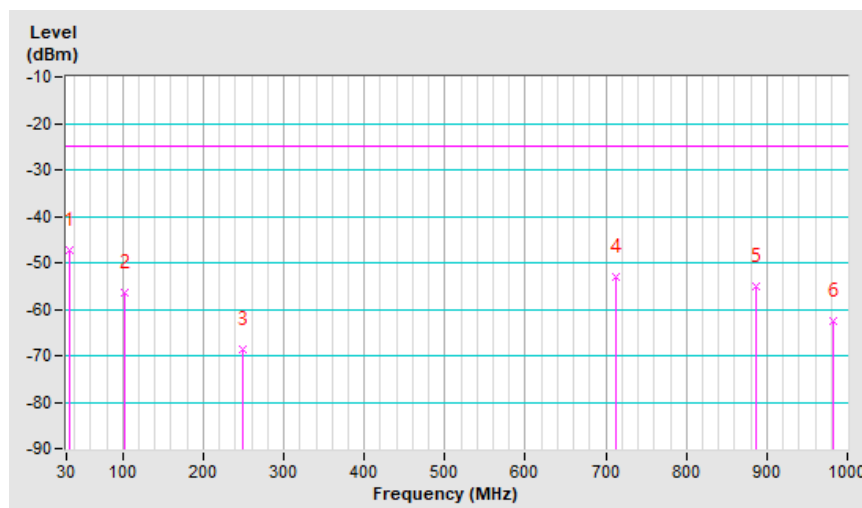


LTE Band 38 (CA 38C)

Mode	TX channel 37901 (2585.1MHz)+ TX channel 38099 (2604.9MHz)	Frequency Range	Below 1000 MHz
Environmental Conditions	22deg. C, 68%RH	Input Power	120Vac, 60Hz
Tested By	Greg Lin		

Antenna Polarity & Test Distance: Horizontal at 3 M

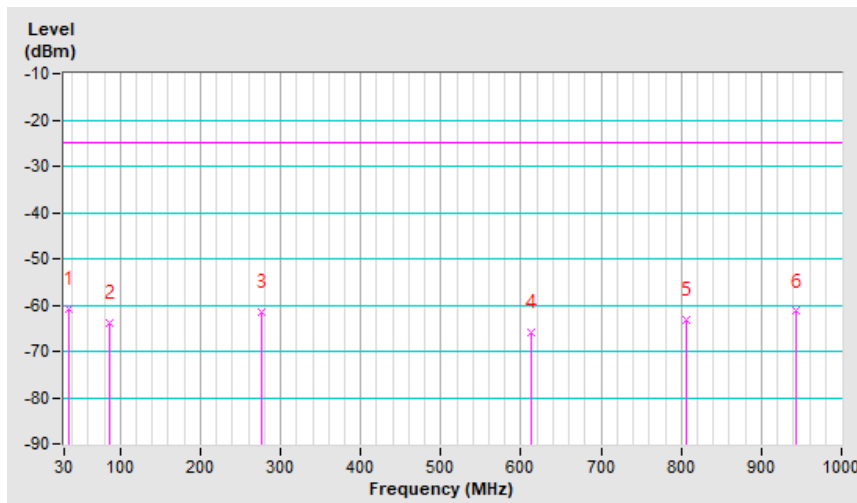
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	34.85	-58.0	-38.4	-16.5	-54.9	-25.0	-29.9
2	94.99	-42.0	-50.0	-0.9	-50.9	-25.0	-25.9
3	275.41	-61.4	-64.2	-1.6	-65.8	-25.0	-40.8
4	613.94	-69.7	-71.4	3.7	-67.7	-25.0	-42.7
5	751.68	-68.0	-67.7	3.7	-64.0	-25.0	-39.0
6	830.25	-70.4	-67.3	3.9	-63.4	-25.0	-38.4



Mode	TX channel 37901 (2585.1MHz)+ TX channel 38099 (2604.9MHz)	Frequency Range	Below 1000 MHz
Environmental Conditions	22deg. C, 68%RH	Input Power	120Vac, 60Hz
Tested By	Greg Lin		

Antenna Polarity & Test Distance: Vertical at 3 M

No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	36.82	-51.4	-45.7	-15.2	-60.9	-25.0	-35.9
2	87.23	-57.7	-63.8	-0.1	-63.9	-25.0	-38.9
3	277.35	-64.9	-60.0	-1.6	-61.6	-25.0	-36.6
4	612.00	-70.6	-69.6	3.7	-65.9	-25.0	-40.9
5	806.00	-70.1	-67.1	3.9	-63.2	-25.0	-38.2
6	943.74	-70.5	-65.1	3.7	-61.4	-25.0	-36.4

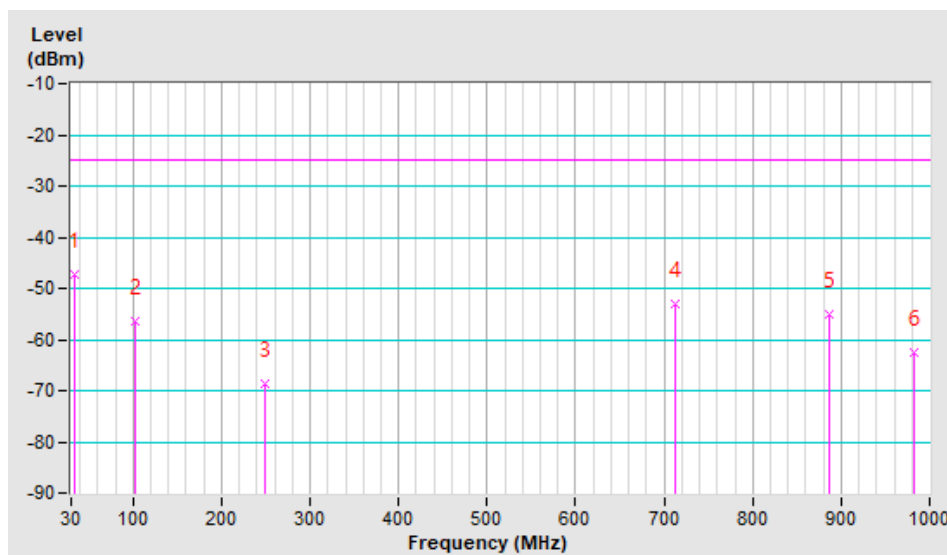


LTE Band 41 (CA 41C)

Mode	TX channel 40521 (2583.1MHz)+ TX channel 40719 (2602.9MHz)	Frequency Range	Below 1000 MHz
Environmental Conditions	22deg. C, 68%RH	Input Power	120Vac, 60Hz
Tested By	Greg Lin		

Antenna Polarity & Test Distance: Horizontal at 3 M

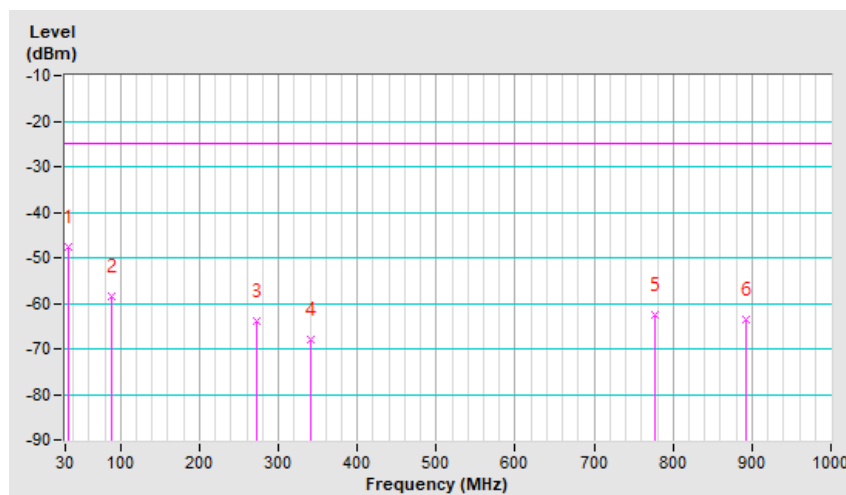
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	33.00	-50.4	-29.6	-17.7	-47.3	-25.0	-22.3
2	102.75	-48.0	-54.5	-1.8	-56.3	-25.0	-31.3
3	249.22	-62.2	-67.3	-1.4	-68.7	-25.0	-43.7
4	712.88	-56.1	-56.4	3.5	-52.9	-25.0	-27.9
5	886.51	-62.2	-58.4	3.4	-55.0	-25.0	-30.0
6	982.54	-71.5	-66.2	3.5	-62.7	-25.0	-37.7



Mode	TX channel 40521 (2583.1MHz)+ TX channel 40719 (2602.9MHz)	Frequency Range	Below 1000 MHz
Environmental Conditions	22deg. C, 68%RH	Input Power	120Vac, 60Hz
Tested By	Greg Lin		

Antenna Polarity & Test Distance: Vertical at 3 M

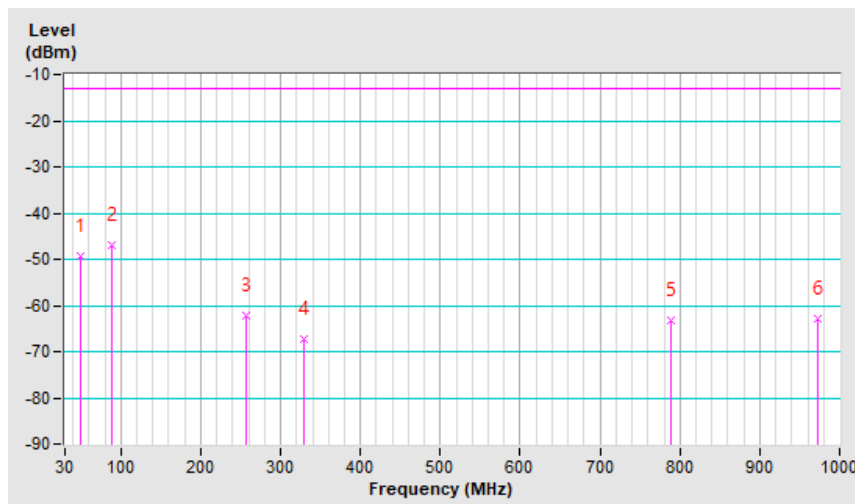
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	33.76	-37.0	-30.4	-17.2	-47.6	-25.0	-22.6
2	88.20	-52.1	-58.3	-0.2	-58.5	-25.0	-33.5
3	272.50	-66.2	-62.3	-1.5	-63.8	-25.0	-38.8
4	341.37	-67.4	-71.9	3.9	-68.0	-25.0	-43.0
5	776.90	-69.8	-66.7	4.0	-62.7	-25.0	-37.7
6	893.30	-71.8	-67.0	3.5	-63.5	-25.0	-38.5



LTE Band 66 (CA 66C)

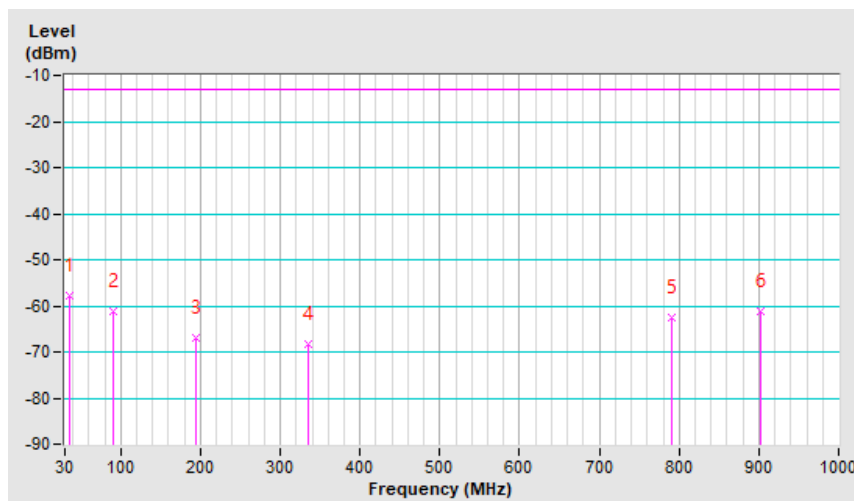
Mode	TX channel 132323 (1745.1MHz)+ TX channel 132521 (1764.9MHz)	Frequency Range	Below 1000 MHz
Environmental Conditions	22deg. C, 68%RH	Input Power	120Vac, 60Hz
Tested By	Greg Lin		

Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	50.37	-48.6	-41.5	-7.9	-49.4	-13.0	-36.4
2	89.14	-39.0	-46.7	-0.1	-46.8	-13.0	-33.8
3	256.01	-57.0	-60.7	-1.5	-62.2	-13.0	-49.2
4	328.76	-63.5	-71.4	4.1	-67.3	-13.0	-54.3
5	789.51	-68.5	-67.1	4.0	-63.1	-13.0	-50.1
6	971.87	-71.7	-66.7	3.7	-63.0	-13.0	-50.0



Mode	TX channel 132323 (1745.1MHz)+ TX channel 132521 (1764.9MHz)	Frequency Range	Below 1000 MHz
Environmental Conditions	22deg. C, 68%RH	Input Power	120Vac, 60Hz
Tested By	Greg Lin		

Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	35.82	-48.0	-41.8	-15.9	-57.7	-13.0	-44.7
2	90.14	-55.0	-61.1	-0.2	-61.3	-13.0	-48.3
3	193.93	-65.7	-64.4	-2.6	-67.0	-13.0	-54.0
4	335.55	-67.8	-72.4	4.0	-68.4	-13.0	-55.4
5	791.45	-69.4	-66.5	4.0	-62.5	-13.0	-49.5
6	903.00	-69.5	-64.7	3.6	-61.1	-13.0	-48.1



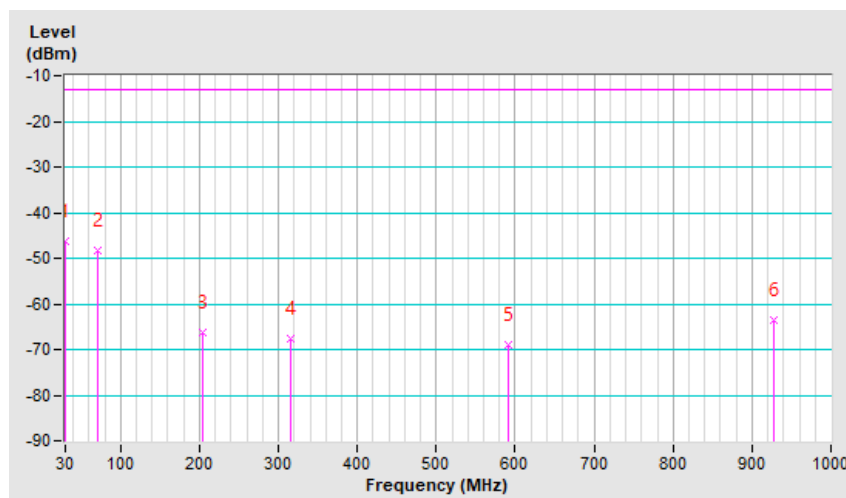
LTE Band 66 (CA 66B)

Mode	TX channel 132022 (1715.0MHz)+ TX channel 132121 (1724.9MHz)	Frequency Range	Below 1000 MHz
Environmental Conditions	22deg. C, 68%RH	Input Power	120Vac, 60Hz
Tested By	Greg Lin		

Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	30.00	-50.2	-26.8	-19.4	-46.2	-13.0	-33.2
2	71.74	-42.3	-48.1	-0.3	-48.4	-13.0	-35.4
3	204.54	-58.3	-64.3	-2.0	-66.3	-13.0	-53.3
4	316.09	-63.5	-71.5	4.0	-67.5	-13.0	-54.5
5	590.66	-70.1	-72.7	3.8	-68.9	-13.0	-55.9
6	928.22	-71.8	-67.2	3.6	-63.6	-13.0	-50.6

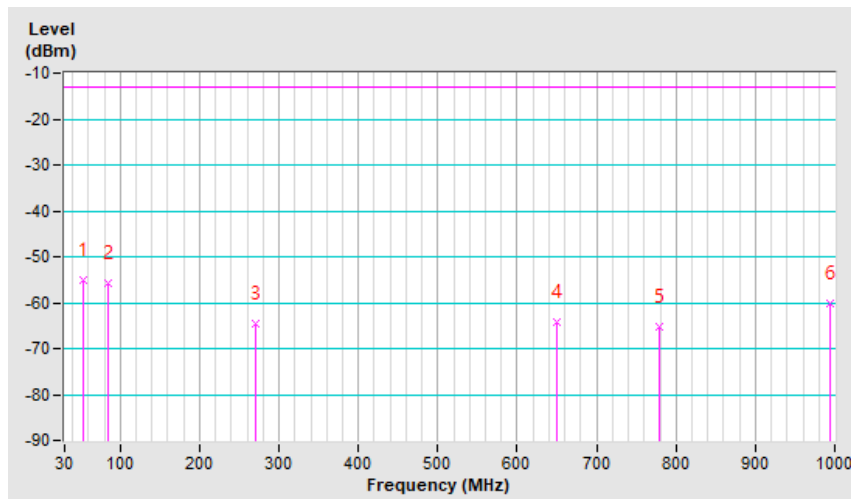
Remarks:

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



Mode	TX channel 132022 (1715.0MHz)+ TX channel 132121 (1724.9MHz)	Frequency Range	Below 1000 MHz
Environmental Conditions	22deg. C, 68%RH	Input Power	120Vac, 60Hz
Tested By	Greg Lin		

Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	54.28	-48.4	-49.5	-5.7	-55.2	-13.0	-42.2
2	85.32	-50.2	-56.0	0.3	-55.7	-13.0	-42.7
3	270.59	-66.7	-63.3	-1.4	-64.7	-13.0	-51.7
4	649.80	-69.6	-67.7	3.6	-64.1	-13.0	-51.1
5	779.81	-72.5	-69.3	4.0	-65.3	-13.0	-52.3
6	993.24	-70.1	-63.5	3.4	-60.1	-13.0	-47.1



Above 1GHz
LTE Band 7 (CA 7C)

Mode	TX channel 20828 (2507.8MHz)+ TX channel 20999 (2524.9MHz)	Frequency Range	1GHz ~ 27GHz
Environmental Conditions	22deg. C, 68%RH	Input Power	120Vac, 60Hz
Tested By	Greg Lin		

Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	5035.00	-65.3	-52.9	1.4	-51.5	-25.0	-26.5
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	5035.00	-60.9	-49.7	1.4	-48.3	-25.0	-23.3

Mode	TX channel 21003 (2525.3MHz)+ TX channel 21174 (2542.4MHz)	Frequency Range	1GHz ~ 27GHz
Environmental Conditions	22deg. C, 68%RH	Input Power	120Vac, 60Hz
Tested By	Greg Lin		

Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	5070.00	-65.7	-53.2	1.4	-51.8	-25.0	-26.8
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	5070.00	-60.8	-49.4	1.4	-48.0	-25.0	-23.0

Mode	TX channel 21179 (2542.9MHz)+ TX channel 21350 (2560.0MHz)	Frequency Range	1GHz ~ 27GHz
Environmental Conditions	22deg. C, 68%RH	Input Power	120Vac, 60Hz
Tested By	Greg Lin		

Antenna Polarity & Test Distance: Horizontal at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	5105.00	-65.3	-52.8	1.4	-51.4	-25.0	-26.4
Antenna Polarity & Test Distance: Vertical at 3 M							
No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	5105.00	-61.2	-49.5	1.4	-48.1	-25.0	-23.1

LTE Band 38 (CA 38C)

Mode	TX channel 37850 (2580.0MHz)+ TX channel 38048 (2599.8MHz)	Frequency Range	1GHz ~ 27GHz
Environmental Conditions	22deg. C, 68%RH	Input Power	120Vac, 60Hz
Tested By	Greg Lin		

Antenna Polarity & Test Distance: Horizontal at 3 M

No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	5180.00	-62.9	-51.1	1.4	-49.7	-25.0	-24.7

Antenna Polarity & Test Distance: Vertical at 3 M

No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	5180.00	-61.1	-49.0	1.4	-47.6	-25.0	-22.6

Mode	TX channel 37901 (2585.1MHz)+ TX channel 38099 (2604.9MHz)	Frequency Range	1GHz ~ 27GHz
Environmental Conditions	22deg. C, 68%RH	Input Power	120Vac, 60Hz
Tested By	Greg Lin		

Antenna Polarity & Test Distance: Horizontal at 3 M

No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	5190.00	-62.1	-50.4	1.4	-49.0	-25.0	-24.0

Antenna Polarity & Test Distance: Vertical at 3 M

No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	5190.00	-59.6	-47.4	1.4	-46.0	-25.0	-21.0

Mode	TX channel 37952 (2590.2MHz)+ TX channel 38150 (2610.0MHz)	Frequency Range	1GHz ~ 27GHz
Environmental Conditions	22deg. C, 68%RH	Input Power	120Vac, 60Hz
Tested By	Greg Lin		

Antenna Polarity & Test Distance: Horizontal at 3 M

No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	5200.00	-62.5	-50.9	1.4	-49.5	-25.0	-24.5

Antenna Polarity & Test Distance: Vertical at 3 M

No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	5200.00	-60.0	-47.7	1.4	-46.3	-25.0	-21.3

LTE Band 41 (CA 41C)

Mode	TX channel 39750 (2506.0MHz)+ TX channel 39948 (2525.8MHz)	Frequency Range	1GHz ~ 27GHz
Environmental Conditions	22deg. C, 68%RH	Input Power	120Vac, 60Hz
Tested By	Greg Lin		

Antenna Polarity & Test Distance: Horizontal at 3 M

No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	5032.00	-65.3	-52.9	1.4	-51.5	-25.0	-26.5

Antenna Polarity & Test Distance: Vertical at 3 M

No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	5032.00	-59.6	-48.4	1.4	-47.0	-25.0	-22.0

Mode	TX channel 40521 (2583.1MHz)+ TX channel 40719 (2602.9MHz)	Frequency Range	1GHz ~ 27GHz
Environmental Conditions	22deg. C, 68%RH	Input Power	120Vac, 60Hz
Tested By	Greg Lin		

Antenna Polarity & Test Distance: Horizontal at 3 M

No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	5186.00	-64.7	-53.0	1.4	-51.6	-25.0	-26.6

Antenna Polarity & Test Distance: Vertical at 3 M

No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	5186.00	-59.6	-47.4	1.4	-46.0	-25.0	-21.0

Mode	TX channel 41292 (2660.2MHz)+ TX channel 41490 (2680.0MHz)	Frequency Range	1GHz ~ 27GHz
Environmental Conditions	22deg. C, 68%RH	Input Power	120Vac, 60Hz
Tested By	Greg Lin		

Antenna Polarity & Test Distance: Horizontal at 3 M

No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	5340.00	-64.0	-51.9	1.4	-50.5	-25.0	-25.5

Antenna Polarity & Test Distance: Vertical at 3 M

No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	5340.00	-59.3	-47.9	1.4	-46.5	-25.0	-21.5

LTE Band 66 (CA 66C)

Mode	TX channel 132072 (1720.0MHz)+ TX channel 132270 (1739.8MHz)	Frequency Range	1GHz ~ 18GHz
Environmental Conditions	22deg. C, 68%RH	Input Power	120Vac, 60Hz
Tested By	Greg Lin		

Antenna Polarity & Test Distance: Horizontal at 3 M

No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	3460.00	-65.8	-57.4	1.4	-56.0	-13.0	-43.0

Antenna Polarity & Test Distance: Vertical at 3 M

No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	3460.00	-64.1	-56.3	1.4	-54.9	-13.0	-41.9

Mode	TX channel 132323 (1745.1MHz)+ TX channel 132521 (1764.9MHz)	Frequency Range	1GHz ~ 18GHz
Environmental Conditions	22deg. C, 68%RH	Input Power	120Vac, 60Hz
Tested By	Greg Lin		

Antenna Polarity & Test Distance: Horizontal at 3 M

No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	3510.00	-66.4	-58.1	1.4	-56.7	-13.0	-43.7

Antenna Polarity & Test Distance: Vertical at 3 M

No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	3510.00	-64.3	-56.6	1.4	-55.2	-13.0	-42.2

Mode	TX channel 132374 (1750.2MHz)+ TX channel 132572 (1770.0MHz)	Frequency Range	1GHz ~ 18GHz
Environmental Conditions	22deg. C, 68%RH	Input Power	120Vac, 60Hz
Tested By	Greg Lin		

Antenna Polarity & Test Distance: Horizontal at 3 M

No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	3520.00	-65.8	-57.5	1.4	-56.1	-13.0	-43.1

Antenna Polarity & Test Distance: Vertical at 3 M

No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	3520.00	-63.8	-56.1	1.4	-54.7	-13.0	-41.7

LTE Band 66 (CA 66B)

Mode	TX channel 132022 (1715.0MHz)+ TX channel 132121 (1724.9MHz)	Frequency Range	1GHz ~ 18GHz
Environmental Conditions	22deg. C, 68%RH	Input Power	120Vac, 60Hz
Tested By	Greg Lin		

Antenna Polarity & Test Distance: Horizontal at 3 M

No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	3440.00	-66.0	-57.5	1.3	-56.2	-13.0	-43.2

Antenna Polarity & Test Distance: Vertical at 3 M

No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	3440.00	-64.6	-56.6	1.3	-55.3	-13.0	-42.3

Mode	TX channel 132373 (1750.1MHz)+ TX channel 132472 (1760.0MHz)	Frequency Range	1GHz ~ 18GHz
Environmental Conditions	22deg. C, 68%RH	Input Power	120Vac, 60Hz
Tested By	Greg Lin		

Antenna Polarity & Test Distance: Horizontal at 3 M

No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	3510.00	-66.3	-58.0	1.4	-56.6	-13.0	-43.6

Antenna Polarity & Test Distance: Vertical at 3 M

No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	3510.00	-64.1	-56.4	1.4	-55.0	-13.0	-42.0

Mode	TX channel 132523 (1765.1MHz)+ TX channel 132622 (1775.0MHz)	Frequency Range	1GHz ~ 18GHz
Environmental Conditions	22deg. C, 68%RH	Input Power	120Vac, 60Hz
Tested By	Greg Lin		

Antenna Polarity & Test Distance: Horizontal at 3 M

No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	3540.00	-66.6	-58.2	1.4	-56.8	-13.0	-43.8

Antenna Polarity & Test Distance: Vertical at 3 M

No.	Freq. (MHz)	Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
1	3540.00	-64.7	-56.9	1.4	-55.5	-13.0	-42.5

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 and approved 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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