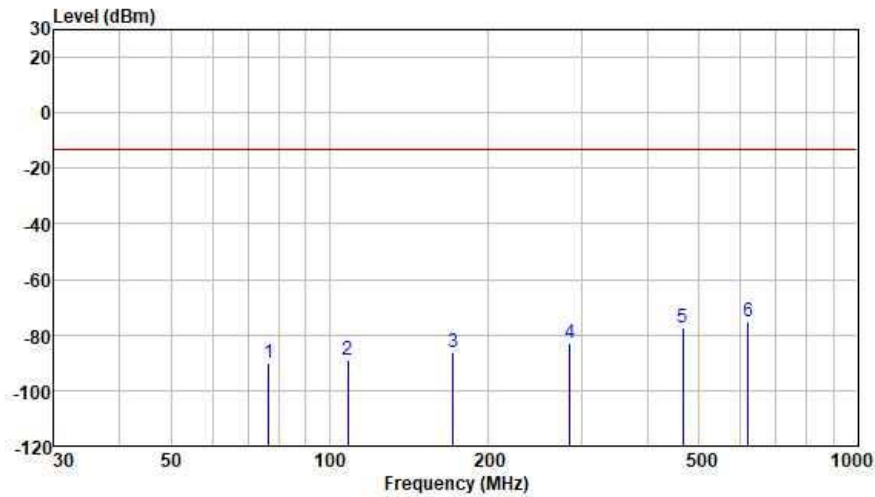


DL_1S_M_AWGN_Horizontal_30MHz~1GHz



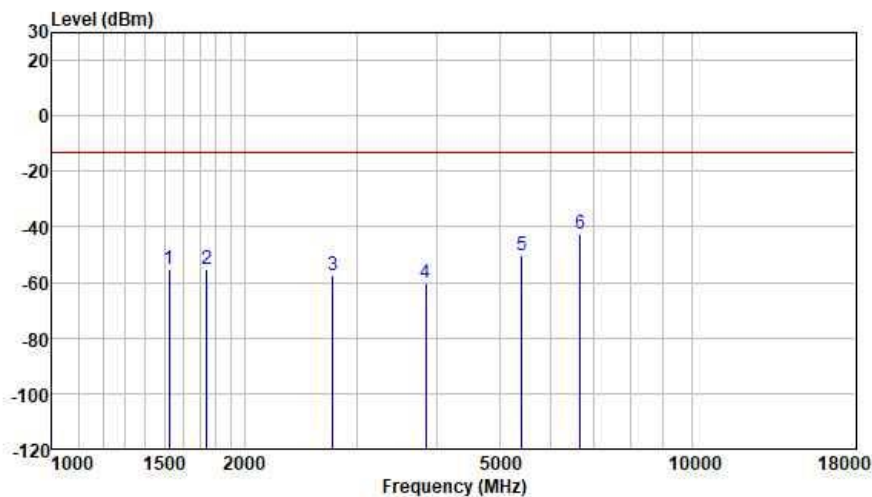
	Freq	Read Level	Correction Factor	Level	Limit Line	Over Limit	Pol/Phase
	MHz	dBm	dB	dBm	dBm	dB	
1	76.51	-81.28	-9.01	-90.29	-13.00	-77.29	HORIZONTAL
2	108.27	-79.88	-9.18	-89.06	-13.00	-76.06	HORIZONTAL
3	171.39	-79.98	-6.16	-86.14	-13.00	-73.14	HORIZONTAL
4	284.98	-80.18	-2.55	-82.73	-13.00	-69.73	HORIZONTAL
5	467.24	-77.88	0.32	-77.56	-13.00	-64.56	HORIZONTAL
6	620.71	-78.57	3.35	-75.22	-13.00	-62.22	HORIZONTAL



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DL_1S_M_AWGN_Horizontal_above 1GHz



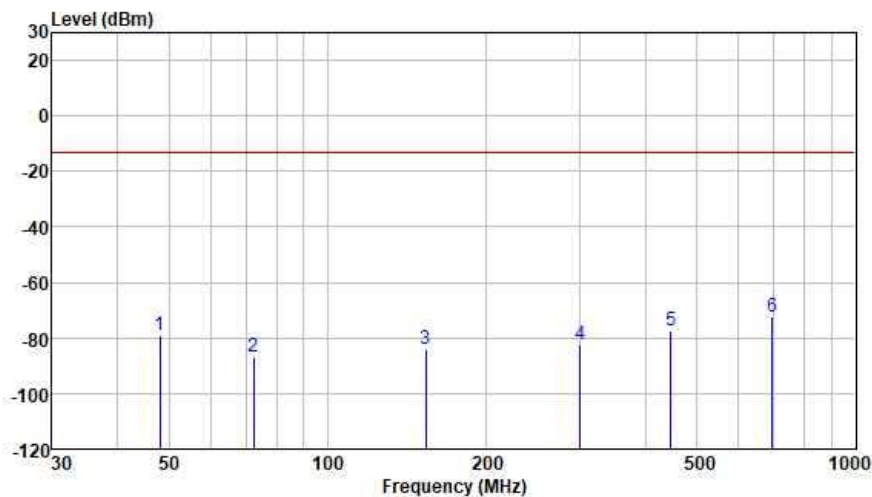
	Freq	Read Level	Correction Factor	Level	Limit Line	Over Limit	Pol/Phase
	MHz	dBm	dB	dBm	dBm	dB	
1	1525.00	-60.20	4.83	-55.37	-13.00	-42.37	HORIZONTAL
2	1746.90	-61.37	6.08	-55.29	-13.00	-42.29	HORIZONTAL
3	2742.14	-61.53	4.15	-57.38	-13.00	-44.38	HORIZONTAL
4	3834.44	-63.20	3.16	-60.04	-13.00	-47.04	HORIZONTAL
5	5424.18	-63.93	13.46	-50.47	-13.00	-37.47	HORIZONTAL
6	6679.04	-63.03	20.25	-42.78	-13.00	-29.78	HORIZONTAL



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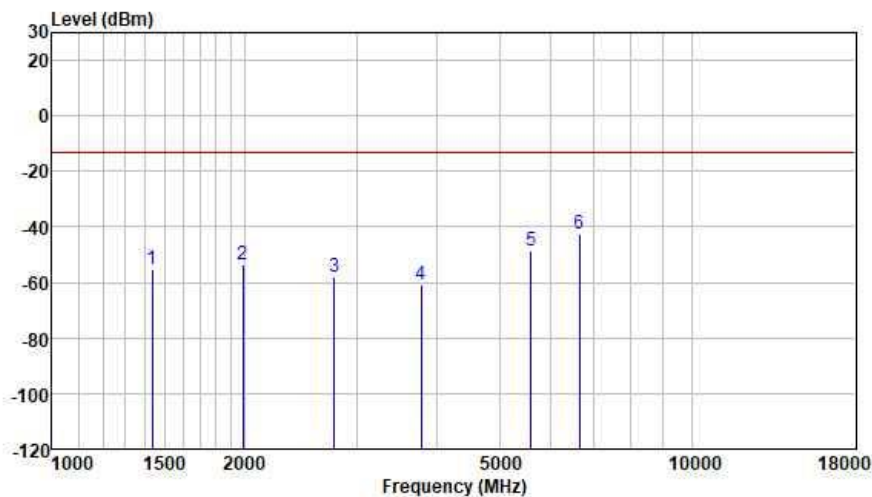
DL_1S_M_AWGN_Vertical_30MHz~1GHz



	Freq	Read Level	Correction Factor	Level	Limit Line	Over Limit	Pol/Phase
	MHz	dBm	dB	dBm	dBm	dB	
1	47.99	-69.97	-8.96	-78.93	-13.00	-65.93	VERTICAL
2	72.34	-77.79	-8.80	-86.59	-13.00	-73.59	VERTICAL
3	153.20	-80.06	-3.94	-84.00	-13.00	-71.00	VERTICAL
4	300.37	-79.46	-2.65	-82.11	-13.00	-69.11	VERTICAL
5	446.41	-78.87	1.44	-77.43	-13.00	-64.43	VERTICAL
6	694.42	-77.39	5.13	-72.26	-13.00	-59.26	VERTICAL



DL_1S_M_AWGN_Vertical_above 1GHz



	Freq	Read Level	Correction Factor	Limit Level	Limit Line	Over Limit	Pol/Phase
	MHz	dBm	dB	dBm	dBm	dB	
1	1435.19	-60.08	5.02	-55.06	-13.00	-42.06	VERTICAL
2	1989.55	-61.89	8.46	-53.43	-13.00	-40.43	VERTICAL
3	2758.04	-62.27	4.44	-57.83	-13.00	-44.83	VERTICAL
4	3768.51	-63.67	3.06	-60.61	-13.00	-47.61	VERTICAL
5	5599.41	-62.77	13.91	-48.86	-13.00	-35.86	VERTICAL
6	6659.76	-63.19	20.66	-42.53	-13.00	-29.53	VERTICAL



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3 Upper 700MHz (776-787MHz paired with 746-757MHz)

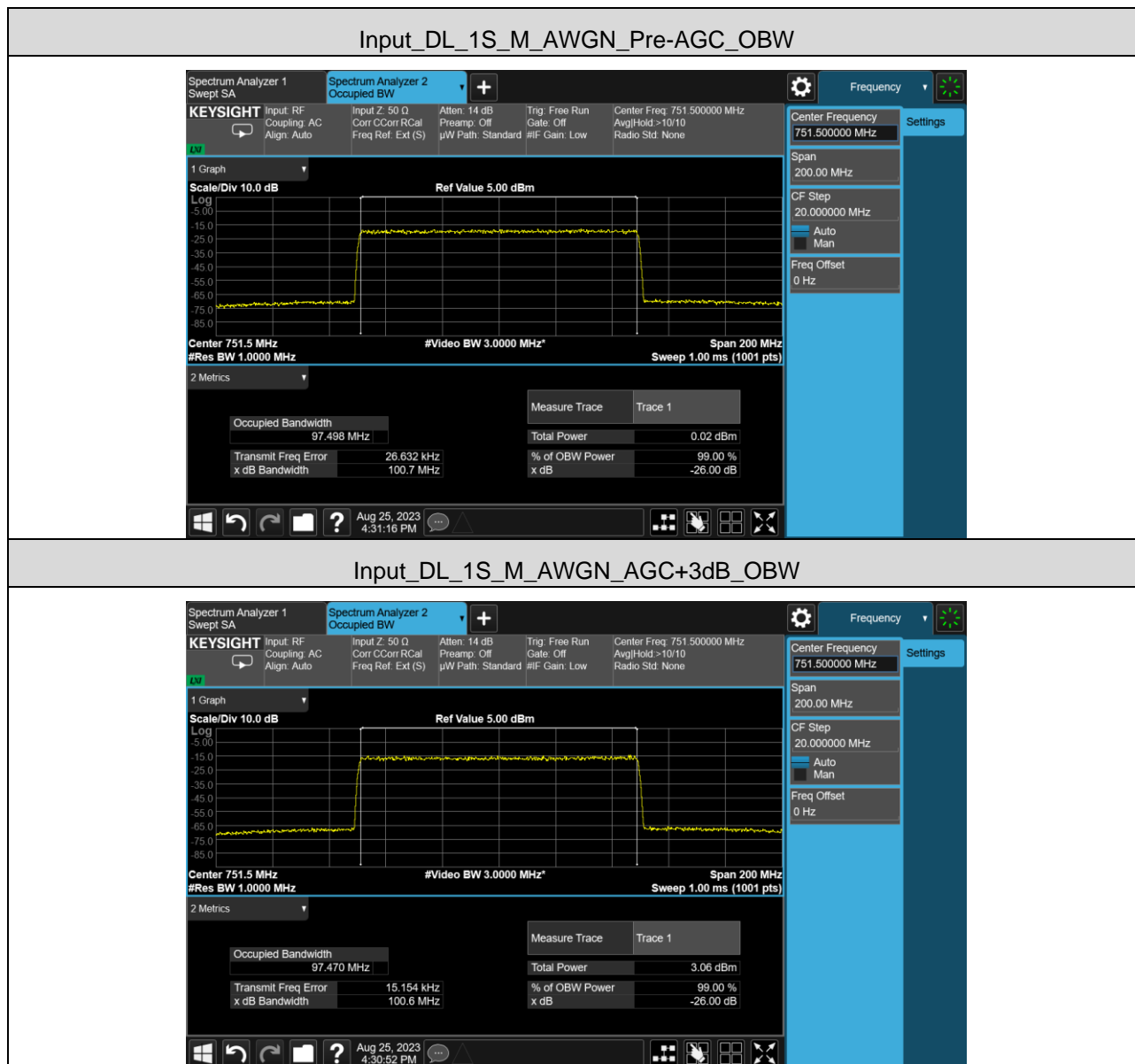
3.1 AGC threshold level

Test Conf.	AGC Threshold level
DL_1S_M_AWGN	-0.20dBm



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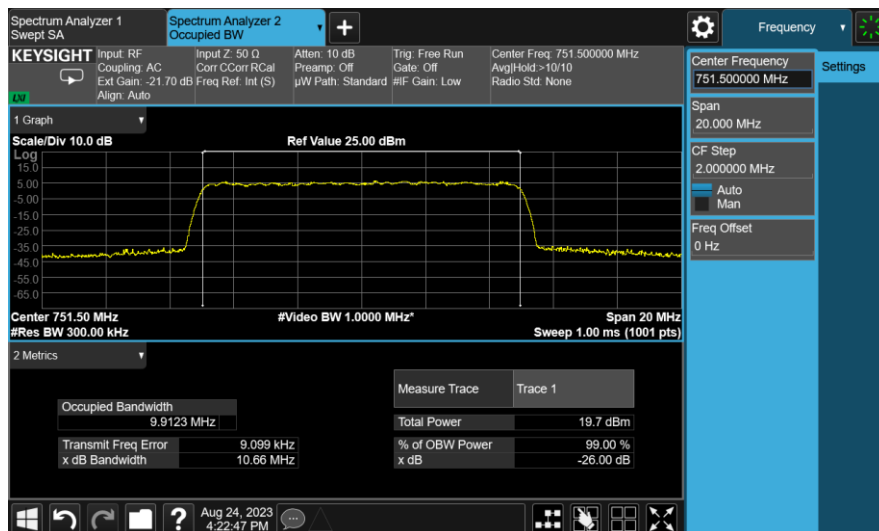
3.2 Input-versus-output signal comparison



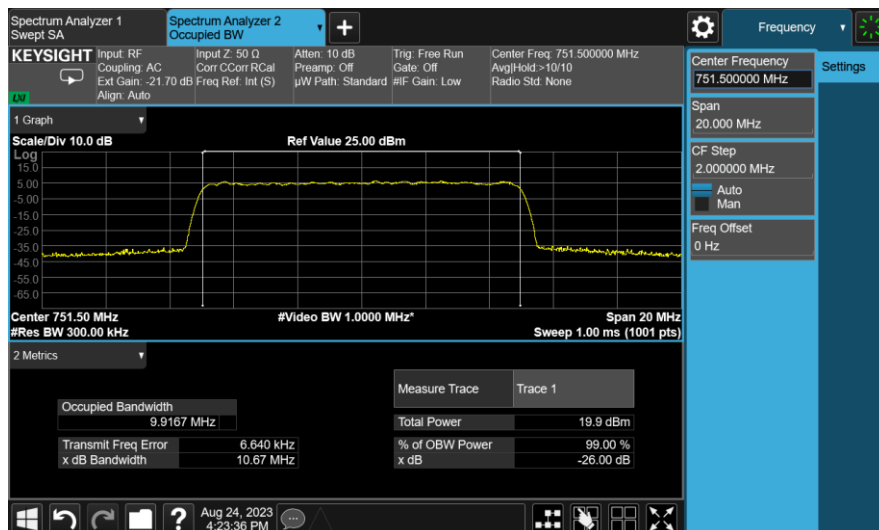
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Output_DL_1S_M_AWGN_Pre-AGC_OBW



Output_DL_1S_M_AWGN_AGC+3dB_OBW



Remark:

1. The band supports maximum channel BW is 10MHz for NR, so the output signal OBW was less than the input when 100MHz AWGN as input signal.
2. Compare the spectral plot of the input signal to the output signal affirm that they are similar (in passband and roll off characteristic features and relative spectral locations). The test result complies with the requirement.



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3.3 Mean output power and amplifier/booster gain

Test Conf.	Test Freq. f ₀ (MHz)	Signal Level	Input Power (dBm)	Output Power (dBm)	Gain (dB)	Verdict
DL_1S_AWGN	746.04	Pre-AGC	-0.20	19.75	19.95	PASS
		AGC+3dB	2.80	19.73	/	PASS

Remark:

According to the declaration from the applicant, the single antenna gain should not exceed 12.5dBi, the Directional gain = G(ANT) + 10 log (NANT) dBi = 12.5dBi+10log (2) dBi= 15.5dBi.

ERP= EIRP-2.15dB,

The total maximum ERP for the EUT is (19.75dBm+19.75dBm) +15.5dBi-2.15dB=36.45dBm (4.084W) which don't exceed the required ERP limit (1000W/MHz).



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Guangzhou Branch, Test Site: EEC Laboratory

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3.4 Out-of-band/out-of-block (including intermodulation) emissions and spurious emissions

Note: 1. The tested max conducted power for single antenna port is 19.75dBm, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least $43 + 10 \log (P)$ dB, the limit corresponds to an absolute limit of -13 dBm.

Here,

$P=19.75\text{dBm}=0.0944\text{W}$.

So the limit =

$P(\text{dBm})-[43 + 10 \log (0.0944\text{W})] = -13\text{dBm}$

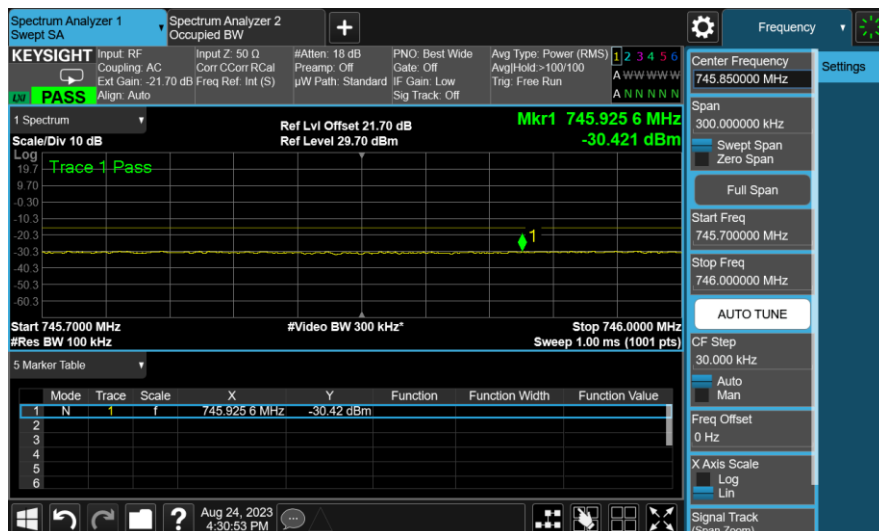
The EUT supports 2x2 MIMO and the emissions were measured at one of output port, so the limit line was set to -16.01dBm in following test plots in order to determine the test result conveniently.

2. The spurious emissions 9kHz to 30MHz were very low and not displayed in this report.

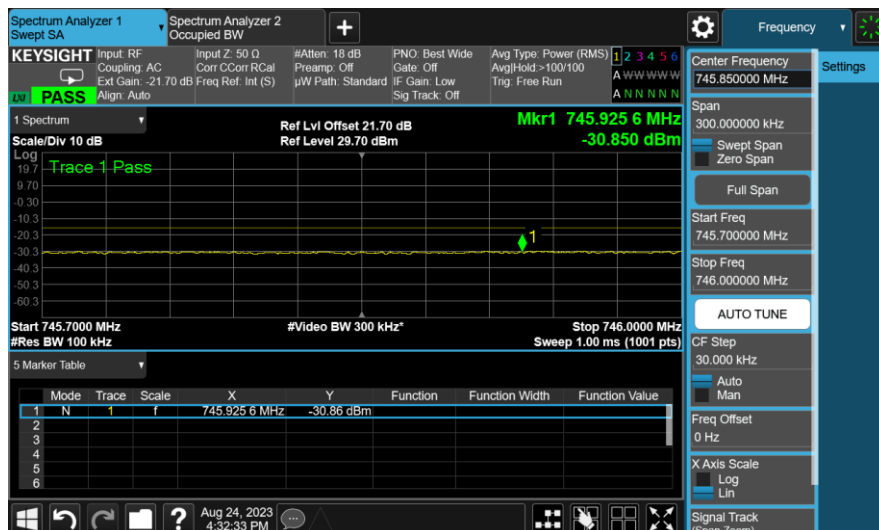


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DL_1S_B_AWGN_Pre-AGC_Out-of-band emission



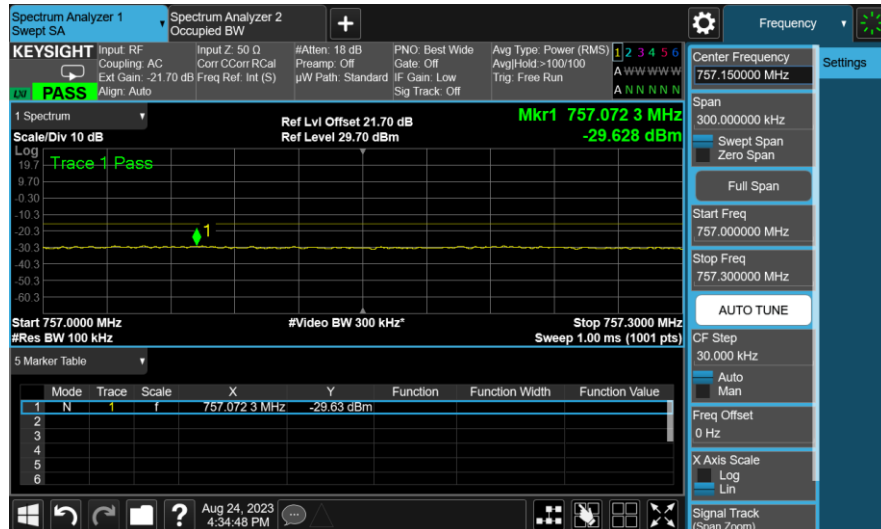
DL_1S_B_AWGN_AGC+3_Out-of-band emission



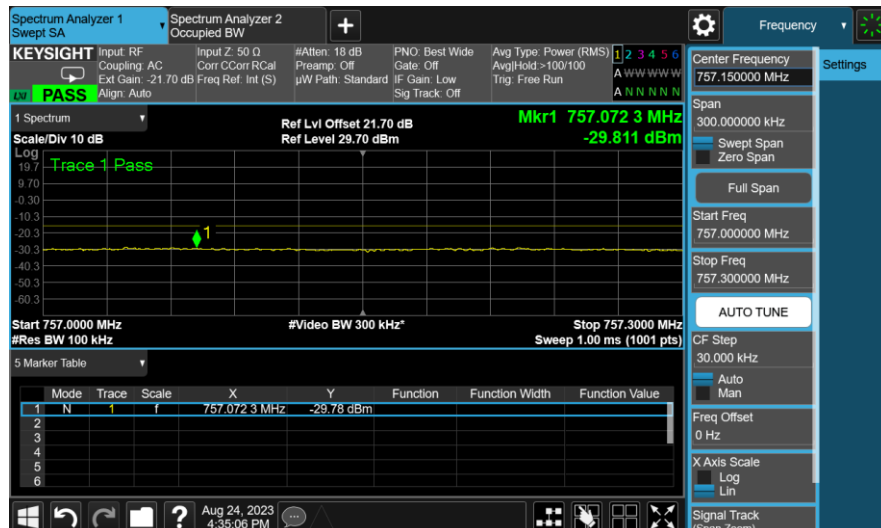
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DL_1S_T_AWGN_Pre-AGC_Out-of-band emission



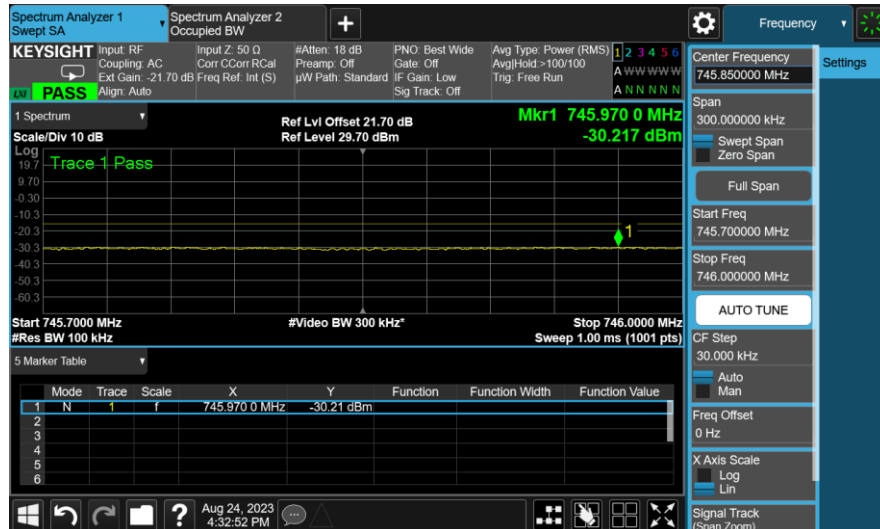
DL_1S_T_AWGN_AGC+3_Out-of-band emission



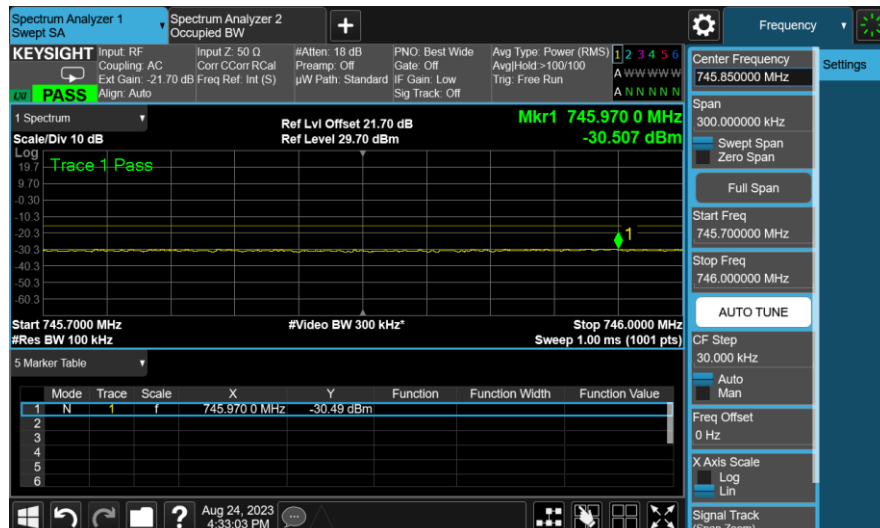
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DL_2S_B_AWGN_Pre-AGC_Out-of-band emission



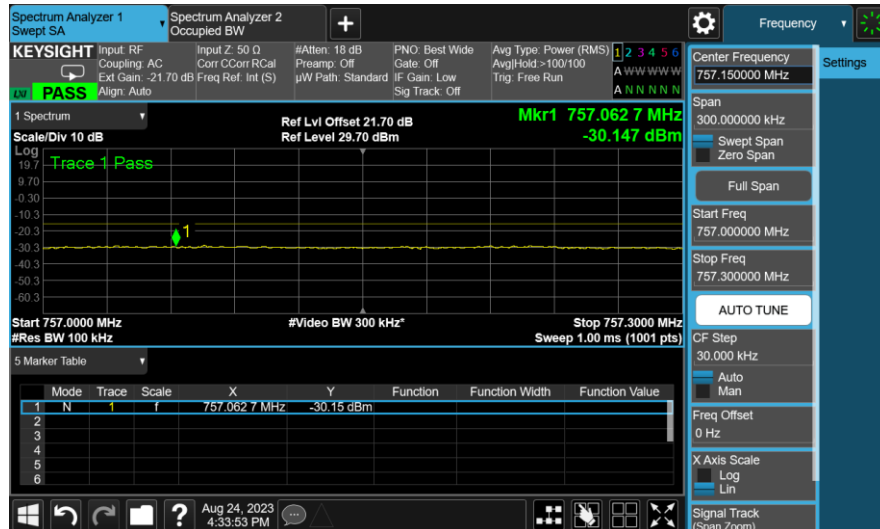
DL_2S_B_AWGN_AGC+3_Out-of-band emission



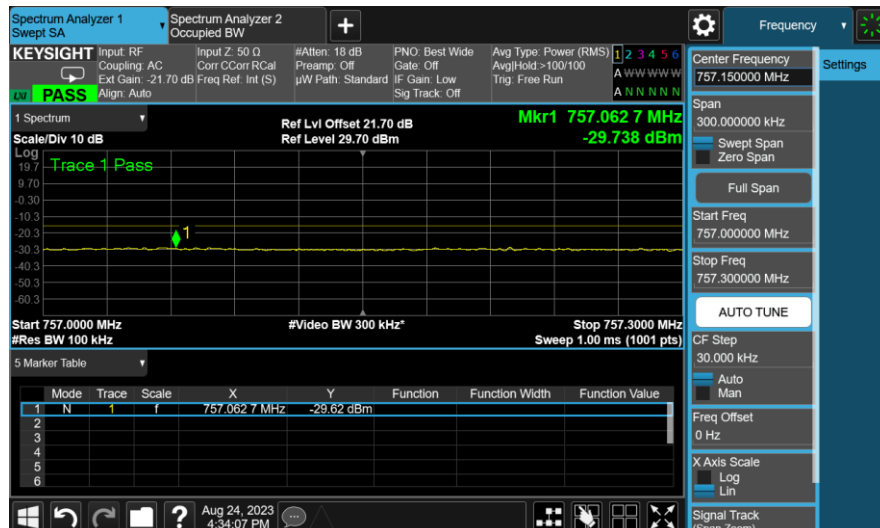
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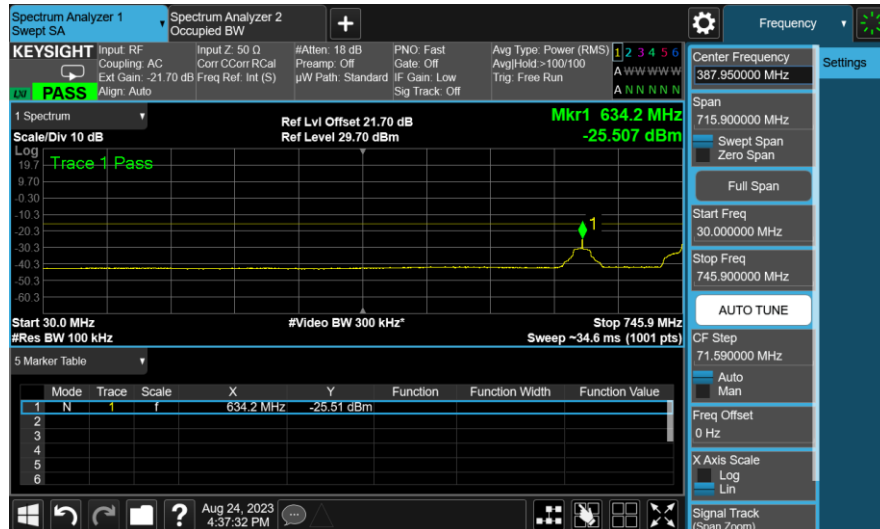
DL_2S_T_AWGN_AGC+3_Out-of-band emission



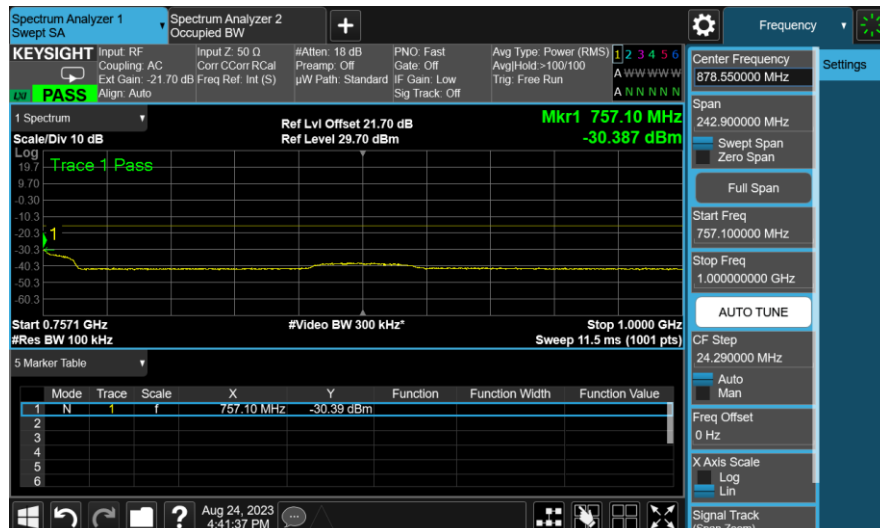
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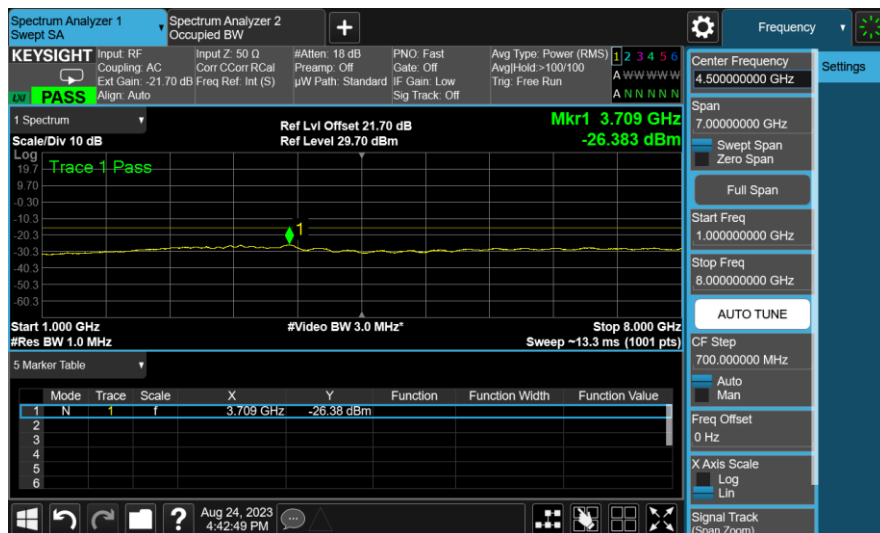
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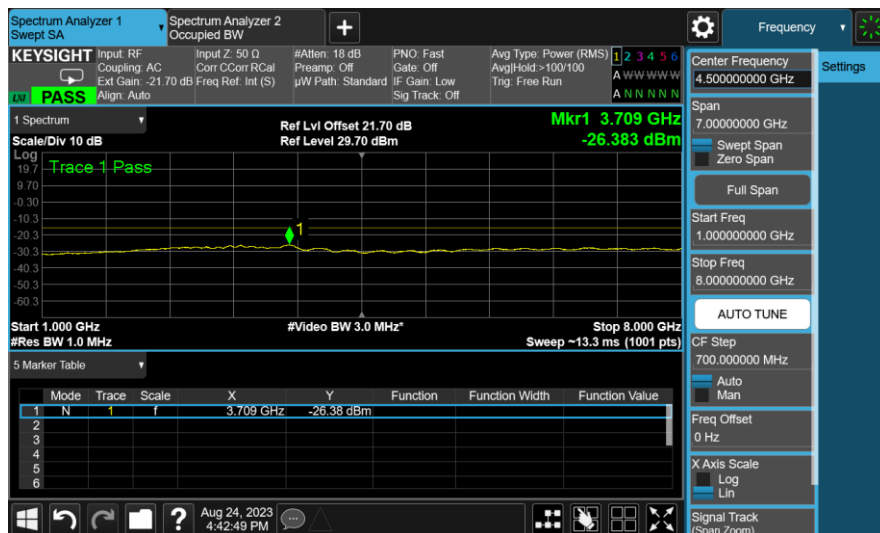
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DL_1S_B_AWGN_Pre-AGC_Spurious emission 3



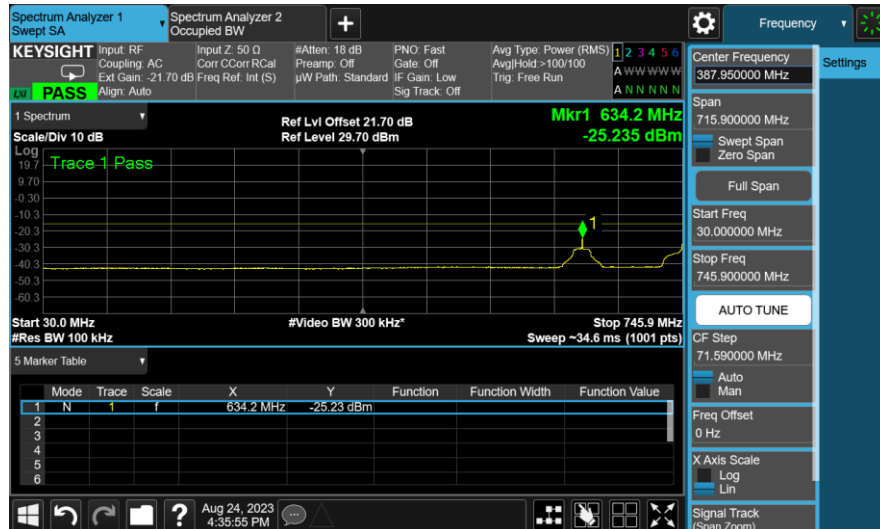
DL_1S_B_AWGN_Pre-AGC_Spurious emission 3



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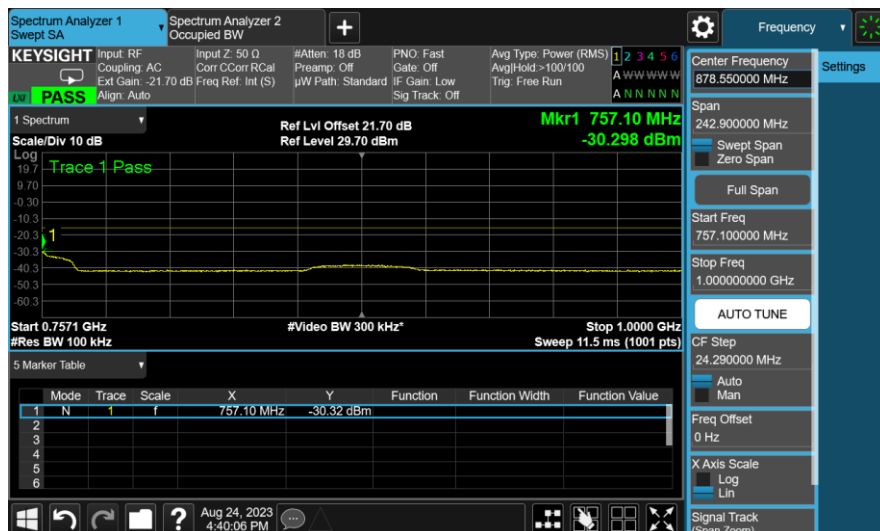
DL_1S_M_AWGN_Pre-AGC_Spurious emission 1



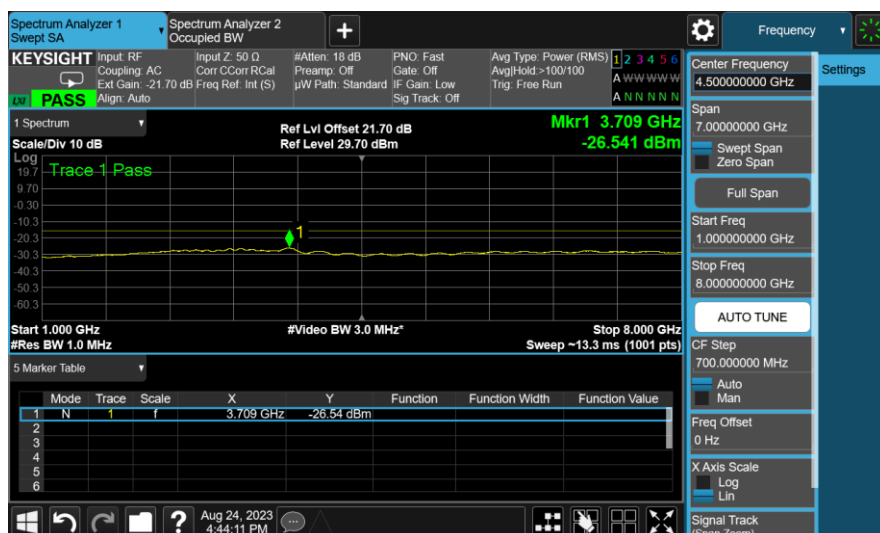
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DL_1S_M_AWGN_Pre-AGC_Spurious emission 2



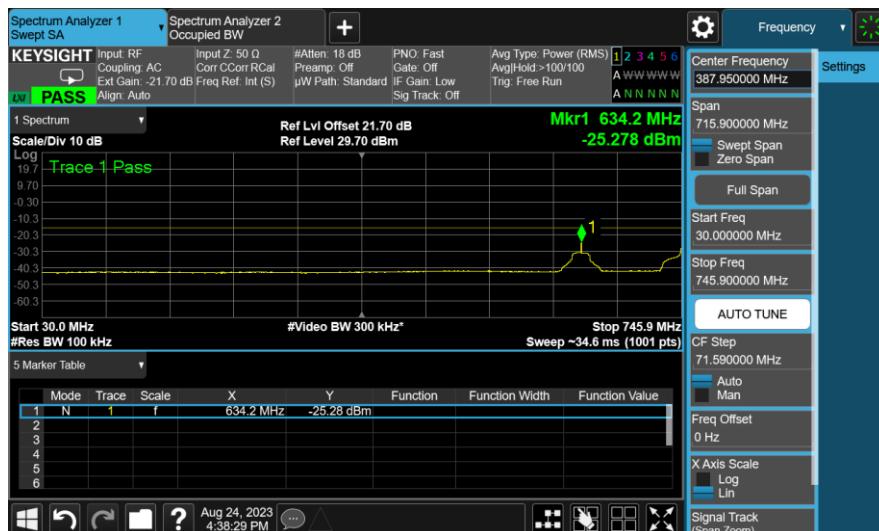
DL_1S_M_AWGN_Pre-AGC_Spurious emission 3



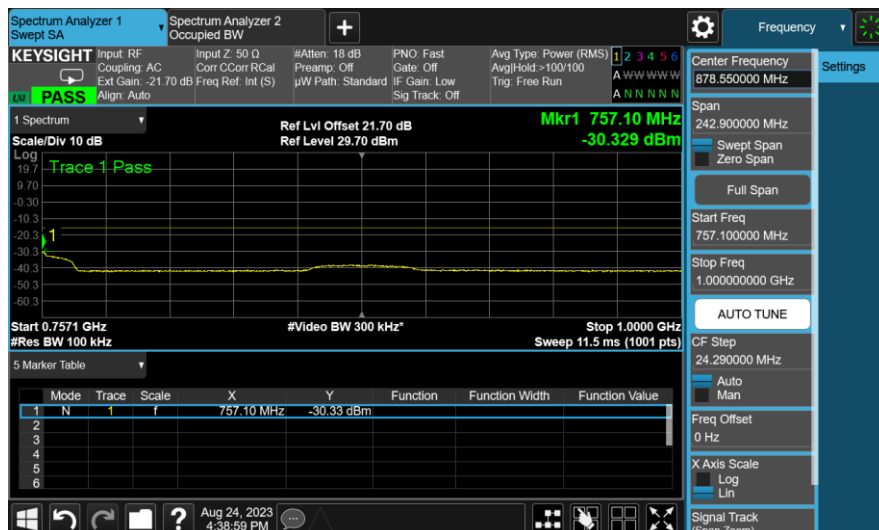
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DL_1S_T_AWGN_Pre-AGC_Spurious emission 1



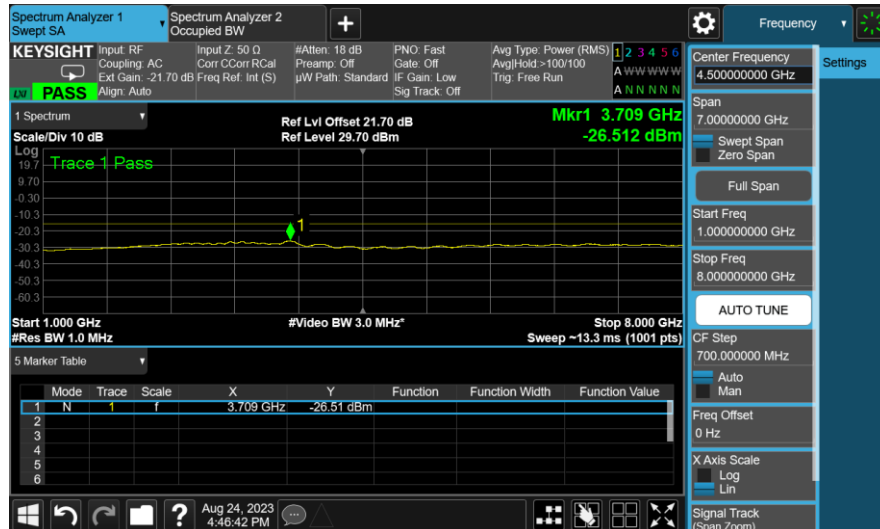
DL_1S_T_AWGN_Pre-AGC_Spurious emission 2



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DL_1S_T_AWGN_Pre-AGC_Spurious emission 3



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3.5 Frequency Stability

- Note:
1. At 10 °C intervals of temperatures between -30 °C and +50 °C at the manufacturer's rated supply voltage, here the rated supply voltage is DC 48V.
 2. At +20 °C temperature and ±15% supply voltage variations. If a product is specified to operate over a range of input voltage, then the -15% variation is applied to the lowermost voltage and the +15% is applied to the uppermost voltage.
 3. The frequency stabilities can be maintained within the authorized bands of operation. Meet the requirement.

Frequency stability vs temperature				
Temperature (°C)	Test Conf.	Frequency Error (Hz)	Tolerance (ppm)	Verdict
50	DL_1S_M_AWGN	118	0.16	PASS
40		127	0.17	PASS
30		141	0.19	PASS
20		101	0.13	PASS
10		124	0.17	PASS
0		137	0.18	PASS
-10		115	0.15	PASS
-20		132	0.18	PASS
-30		122	0.16	PASS

Frequency stability vs voltage				
Voltage (V)	Test Conf.	Frequency Error (Hz)	Tolerance (ppm)	Verdict
DC 40.8	DL_1S_M_AWGN	111	0.15	PASS
DC 48		107	0.14	PASS
DC 55.2		115	0.15	PASS



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3.6 Radiated spurious emissions

Note: 1. The tested max conducted power for single antenna port is 19.75dBm. the 2x2 MIMO total power is 19.75dBm+19.75dBm= 0.1888W.

The any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least $43 + 10 \log (P)$ dB.

Here,

$P=0.1888W$.

So the limit =

$P(dBm)- [43 + 10 \log (0.1888W)] = -13dBm$

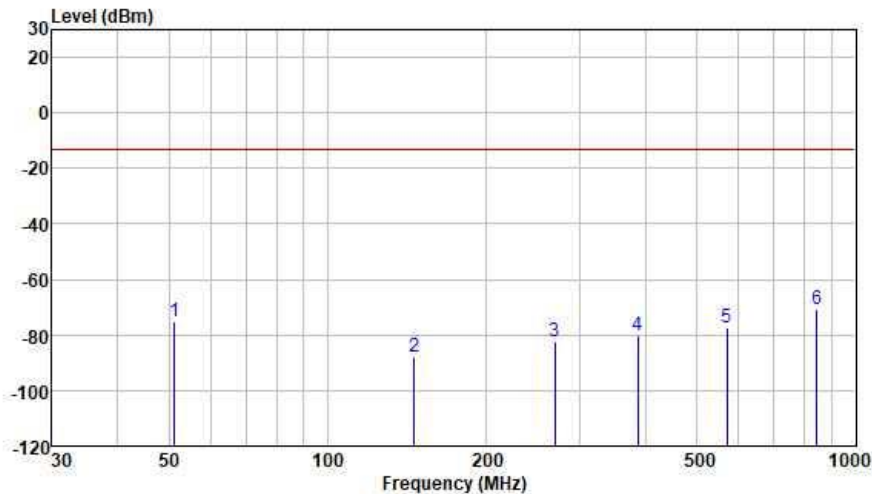
2. The radiated test performed at bottom / middle / top channel, the data with more than 20db margin, therefore, only the worst-case middle channel test data was recorded in the report.

3. The disturbance from 9kHz to 30MHz was very low and 20db below the limit, therefore, the data was not recorded in the report.



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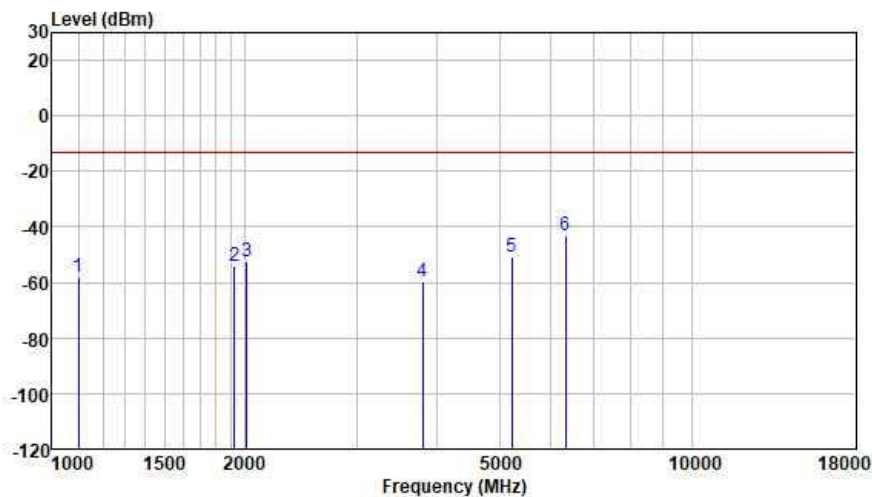
DL_1S_M_AWGN_Horizontal_30MHz~1GHz



	Freq	Read Level	Correction Factor	Level	Limit Line	Over Limit	Pol/Phase
	MHz	dBm	dB	dBm	dBm	dB	
1	51.12	-73.92	-1.35	-75.27	-13.00	-62.27	HORIZONTAL
2	145.86	-80.80	-7.37	-88.17	-13.00	-75.17	HORIZONTAL
3	269.43	-79.13	-3.10	-82.23	-13.00	-69.23	HORIZONTAL
4	386.63	-79.27	-1.10	-80.37	-13.00	-67.37	HORIZONTAL
5	570.61	-79.32	1.92	-77.40	-13.00	-64.40	HORIZONTAL
6	845.09	-78.13	7.23	-70.90	-13.00	-57.90	HORIZONTAL



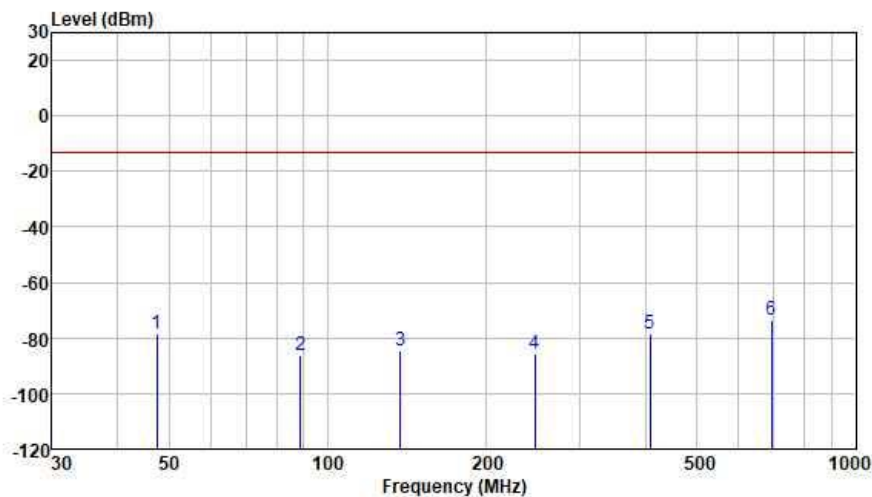
DL_1S_M_AWGN_Horizontal_above 1GHz



	Freq	Read	Correction	Limit	Over	
	MHz	Level	Factor	Line	Limit	Pol/Phase
	MHz	dBm	dB	dBm	dB	
1	1100.08	-59.84	1.67	-58.17	-13.00	-45.17 HORIZONTAL
2	1927.29	-61.14	7.25	-53.89	-13.00	-40.89 HORIZONTAL
3	2012.69	-62.57	9.85	-52.72	-13.00	-39.72 HORIZONTAL
4	3790.36	-62.93	3.28	-59.65	-13.00	-46.65 HORIZONTAL
5	5224.15	-63.43	12.41	-51.02	-13.00	-38.02 HORIZONTAL
6	6340.44	-62.65	19.32	-43.33	-13.00	-30.33 HORIZONTAL



DL_1S_M_AWGN_Vertical_30MHz~1GHz



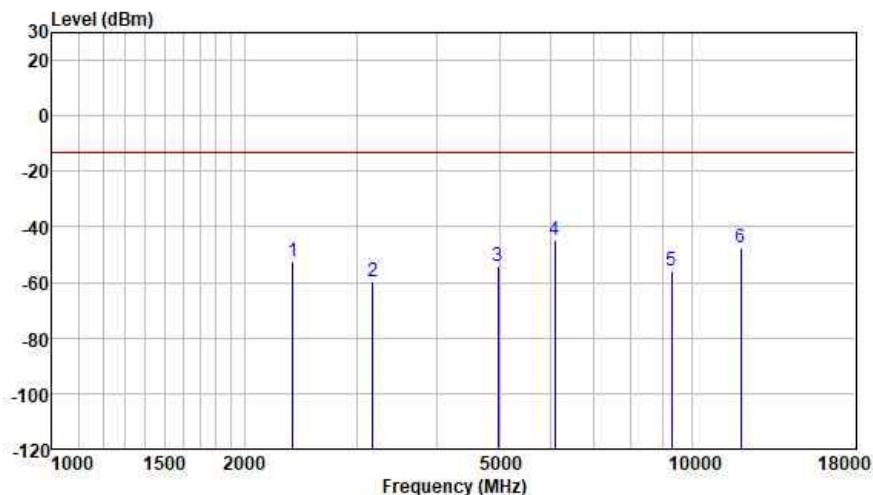
	Freq	Read Level	Correction Factor	Level	Limit Line	Over Limit	Pol/Phase
	MHz	dBm	dB	dBm	dBm	dB	
1	47.33	-68.58	-10.13	-78.71	-13.00	-65.71	VERTICAL
2	88.65	-78.10	-8.22	-86.32	-13.00	-73.32	VERTICAL
3	137.42	-80.63	-3.93	-84.56	-13.00	-71.56	VERTICAL
4	246.81	-79.55	-6.20	-85.75	-13.00	-72.75	VERTICAL
5	407.51	-78.78	0.07	-78.71	-13.00	-65.71	VERTICAL
6	691.99	-78.57	5.11	-73.46	-13.00	-60.46	VERTICAL



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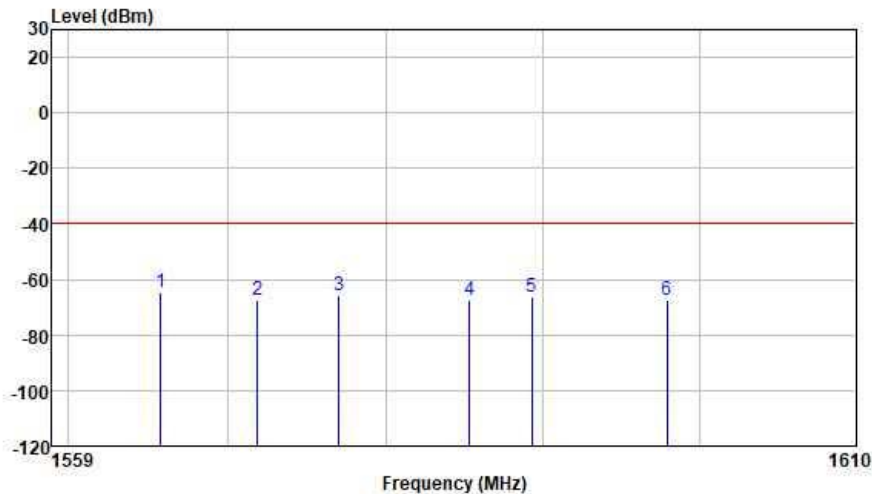
DL_1S_M_AWGN_Vertical_above 1GHz



	Freq	Read Level	Correction Factor	Level	Limit Line	Over Limit	Pol/Phase
	MHz	dBm	dB	dBm	dBm	dB	
1	2380.03	-62.15	9.87	-52.28	-13.00	-39.28	VERTICAL
2	3168.50	-62.23	2.64	-59.59	-13.00	-46.59	VERTICAL
3	4973.66	-64.14	9.92	-54.22	-13.00	-41.22	VERTICAL
4	6106.62	-64.13	19.21	-44.92	-13.00	-31.92	VERTICAL
5	9285.71	-72.69	17.15	-55.54	-13.00	-42.54	VERTICAL
6	11906.07	-69.04	21.64	-47.40	-13.00	-34.40	VERTICAL



DL_1S_M_AWGN_Horizontal_1559-1610MHz



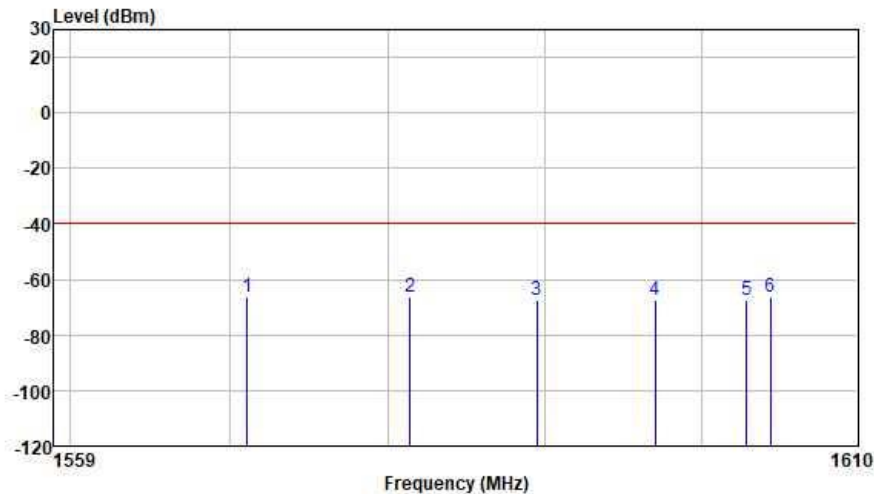
	Freq	Read Level	Correction Factor	Level	Limit Line	Over Limit	Pol/Phase
	MHz	dBm	dB	dBm	dBm	dB	
1	1565.79	-69.90	5.07	-64.83	-40.00	-24.83	HORIZONTAL
2	1571.90	-72.52	5.10	-67.42	-40.00	-27.42	HORIZONTAL
3	1577.02	-70.77	5.14	-65.63	-40.00	-25.63	HORIZONTAL
4	1585.32	-72.76	5.17	-67.59	-40.00	-27.59	HORIZONTAL
5	1589.25	-71.60	5.19	-66.41	-40.00	-26.41	HORIZONTAL
6	1597.87	-72.91	5.22	-67.69	-40.00	-27.69	HORIZONTAL



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DL_1S_M_AWGN_Vertical_1559-1610MHz



	Freq	Read Level	Correction Factor	Level	Limit Line	Over Limit	Pol/Phase
	MHz	dBm	dB	dBm	dBm	dB	
1	1571.09	-71.46	5.41	-66.05	-40.00	-26.05	VERTICAL
2	1581.39	-71.30	5.13	-66.17	-40.00	-26.17	VERTICAL
3	1589.45	-72.67	5.04	-67.63	-40.00	-27.63	VERTICAL
4	1596.99	-72.28	4.89	-67.39	-40.00	-27.39	VERTICAL
5	1602.86	-72.08	4.82	-67.26	-40.00	-27.26	VERTICAL
6	1604.41	-71.29	4.85	-66.44	-40.00	-26.44	VERTICAL



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4 FirstNet (788-798MHz paired with 758-768MHz)

4.1 AGC threshold level

Test Conf.	AGC Threshold level
DL_1S_M_AWGN	-0.10dBm



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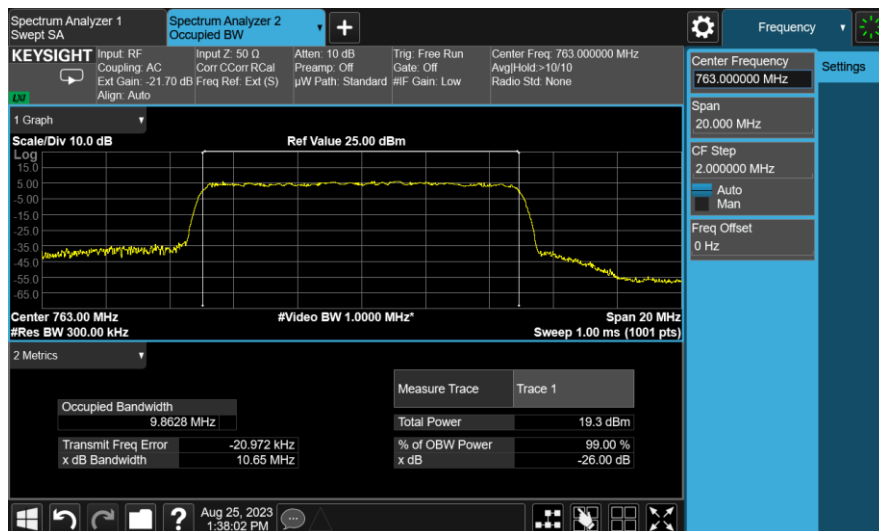
4.2 Input-versus-output signal comparison



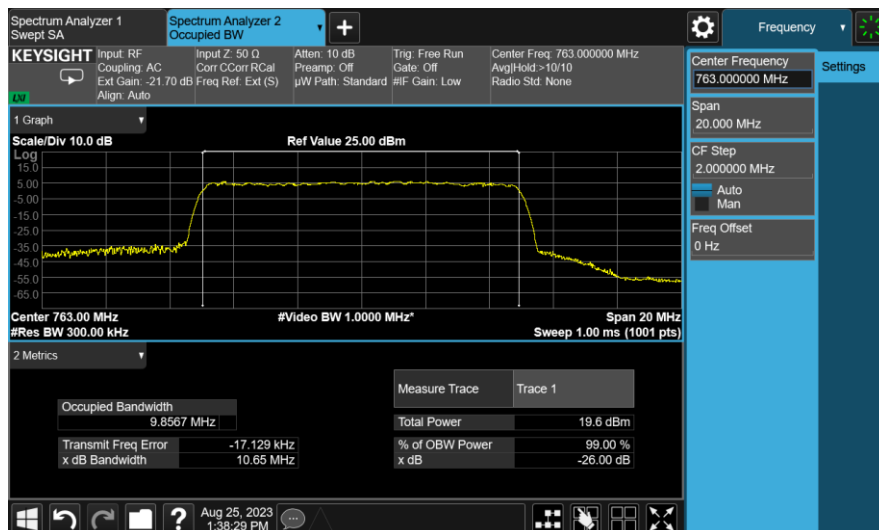
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Output_DL_1S_M_AWGN_Pre-AGC_OBW



Output_DL_1S_M_AWGN_AGC+3dB_OBW

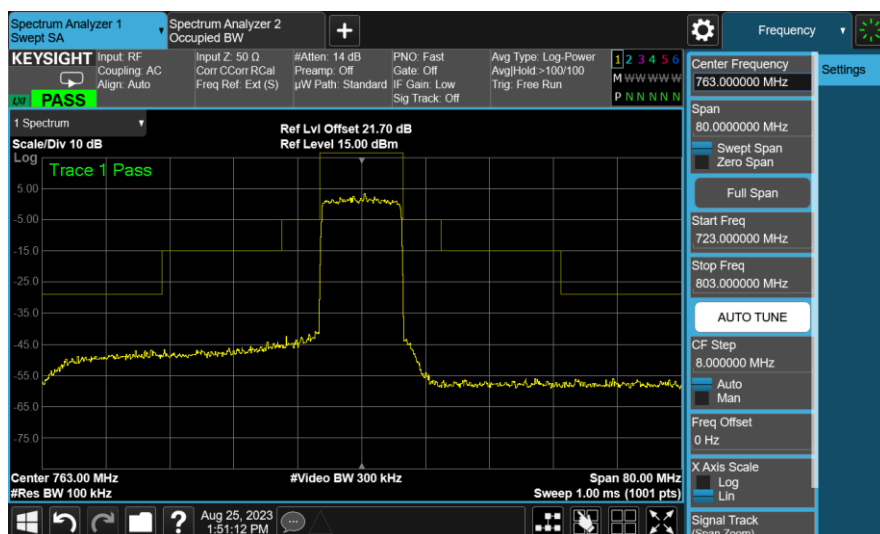


Remark:

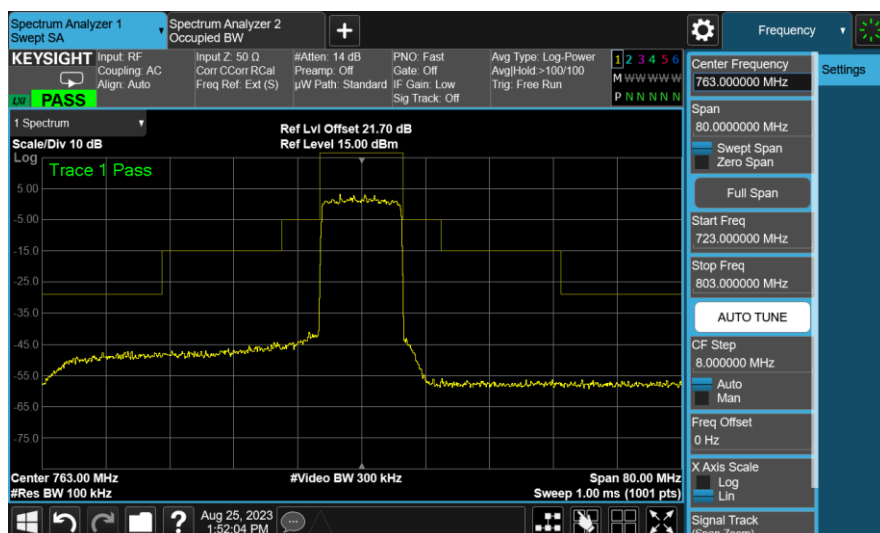
1. The band supports maximum channel BW is 10MHz for NR, so the output signal OBW was less than the input when 100MHz AWGN as input signal.
2. Compare the spectral plot of the input signal to the output signal affirm that they are similar (in passband and roll off characteristic features and relative spectral locations). The test result complies with the requirement.



Output_DL_1S_M_AWGN_Pre-AGC_Emission Mask B (10MHz)



Output_DL_1S_M_AWGN_AGC+3dB_Emission Mask B (10MHz)



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4.3 Input/output power and amplifier/booster gain

Test Conf.	Test Freq. f ₀ (MHz)	Signal Level	Input Power (dBm)	Output Power (dBm)	Gain (dB)	Verdict
DL_1S_AWGN	761.96	Pre-AGC	-0.10	20.05	20.15	PASS
		AGC+3dB	2.90	19.95	/	PASS
Remark: According to the declaration from the applicant, the single antenna gain should not exceed 12.5dBi, the Directional gain = G(ANT) + 10 log (NANT) dBi = 12.5dBi+10log (2) dBi= 15.5dBi. ERP= EIRP-2.15dB The total maximum ERP for the EUT is (20.05dBm+20.05dBm) +15.5dBi-2.15dB=36.41dBm (4.38W) which don't exceed the required ERP limit (5W).						

4.4 Noise Figure

Test Conf.	Noise Figure (dB)	Limit (dB)	Verdict
DL_1S_M_AWGN	8.43	9	PASS

4.5 Out-of-band/out-of-block (including intermodulation) emissions and spurious emissions

Note: 1. 90.543(c) Out-of-band emission limit.

the power of any emission must be reduced below the mean output power (P) by at least $43 + 10 \log (P)$ dB, Here,

$$P = 20.05 \text{ dBm} = 0.1011 \text{ W}$$

$$\text{So the limit} = P(\text{dBm}) - [43 + 10 \log (0.1011 \text{ W})] = -13 \text{ dBm}$$

The EUT supports 2x2 MIMO and the emissions were measured at one of output port, so the limit line was set to **-16.01 dBm** in following test plots in order to determine the test result conveniently.

2. 90.543e (1) limit:

On all frequencies between 769-775 MHz and 799-805 MHz, by a factor not less than $76 + 10 \log (P)$ dB in a 6.25 kHz band segment, for base and fixed stations.

$$\text{Here, } P = 20.05 \text{ dBm} = 0.1011 \text{ W}$$

$$\text{So the limit} = P(\text{dBm}) - [76 + 10 \log (0.1011 \text{ W})] = -46 \text{ dBm}$$

The EUT supports 2x2 MIMO and the emissions were measured at one of output port, so the limit line was set to **-49.01 dBm** in following test plots in order to determine the test result conveniently.

3. 90.543 (e)(3) limit:

On any frequency between 775-788 MHz, above 805 MHz, and below 758 MHz, by at least $43 + 10 \log (P)$ dB

$$\text{Here, } P = 20.05 \text{ dBm} = 0.1011 \text{ W}$$

So the limit =

$$P(\text{dBm}) - [43 + 10 \log (0.1011 \text{ W})] = -13 \text{ dBm}$$

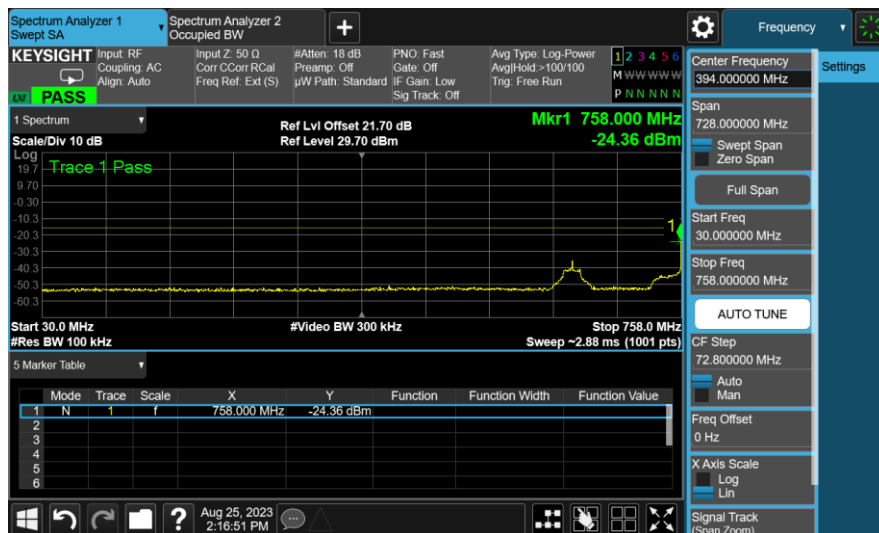
The EUT supports 2x2 MIMO and the emissions were measured at one of output port, so the limit line was set to **-16.01 dBm** in following test plots in order to determine the test result conveniently.

4. The spurious emissions 9kHz to 30MHz were very low and not displayed in this report.

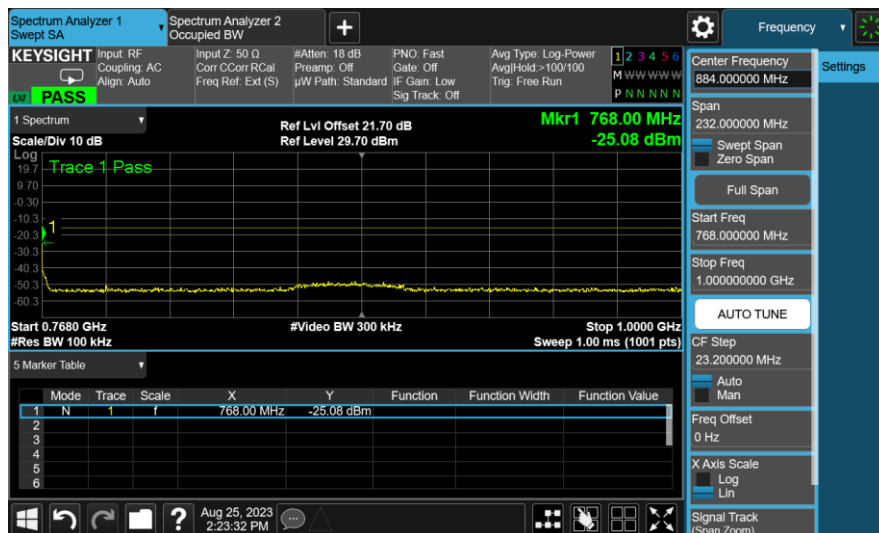


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DL_1S_M_AWGN_Pre-AGC_Spurious emission 1



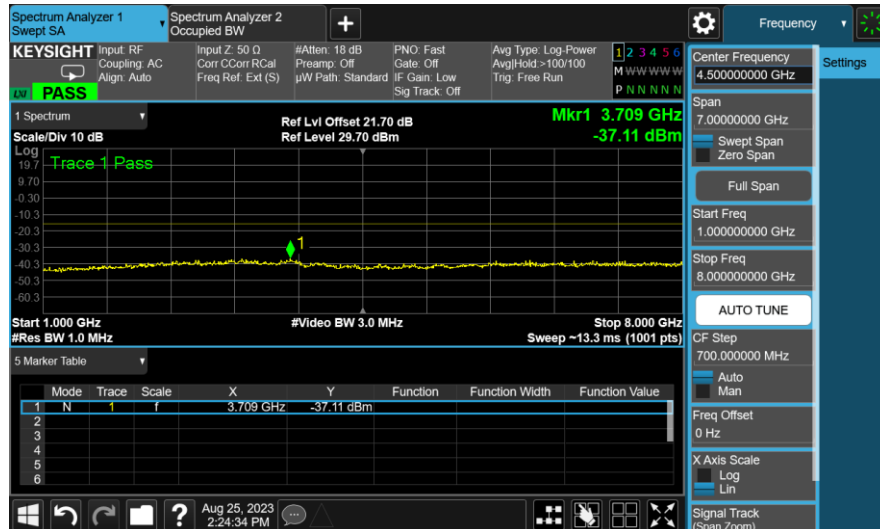
DL_1S_M_AWGN_Pre-AGC_Spurious emission 2



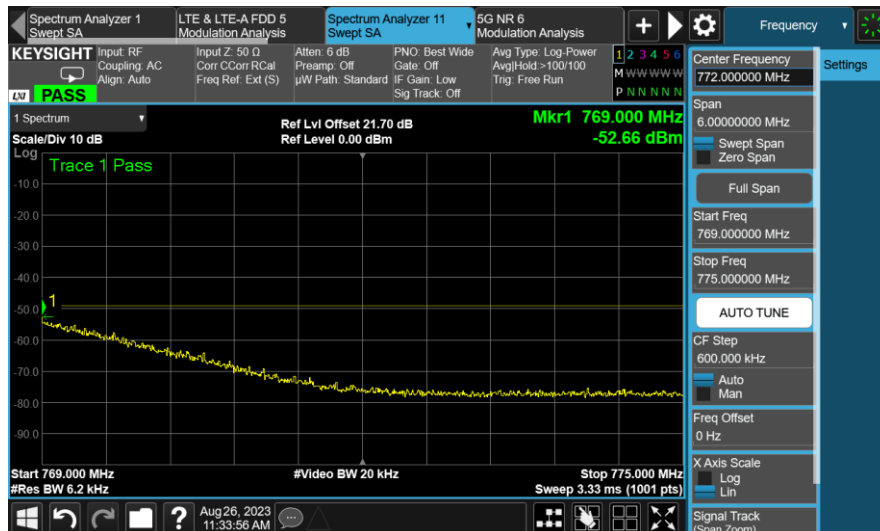
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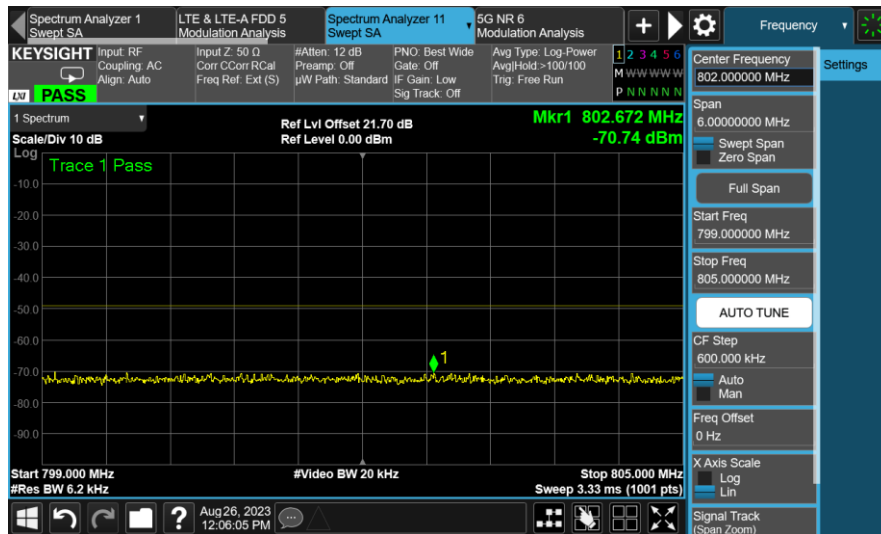
DL_1S_M_AWGN_Pre-AGC_Spurious emission 3



DL_1S_M_AWGN_Pre-AGC_Spurious emission 4



DL_1S_M_AWGN_Pre-AGC_Spurious emission 5



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4.6 Frequency Stability

- Note:
1. At 10 °C intervals of temperatures between -30 °C and +50 °C at the manufacturer's rated supply voltage, here the rated supply voltage is DC 48V.
 2. At +20 °C temperature and ±15% supply voltage variations. If a product is specified to operate over a range of input voltage, then the -15% variation is applied to the lowermost voltage and the +15% is applied to the uppermost voltage.
 3. The frequency stabilities can be maintained within the authorized bands of operation. Meet the requirement.

Frequency stability vs temperature				
Temperature (°C)	Test Conf.	Frequency Error (Hz)	Tolerance (ppm)	Verdict
50	DL_1S_M_AWGN	121	0.16	PASS
40		128	0.17	PASS
30		113	0.15	PASS
20		133	0.17	PASS
10		123	0.16	PASS
0		144	0.19	PASS
-10		120	0.16	PASS
-20		130	0.17	PASS
-30		132	0.17	PASS

Frequency stability vs voltage				
Voltage (V)	Test Conf.	Frequency Error (Hz)	Tolerance (ppm)	Verdict
DC 40.8	DL_1S_M_AWGN	130	0.17	PASS
DC 48		125	0.16	PASS
DC 55.2		123	0.16	PASS



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4.7 Radiated spurious emissions

Note: 1. 47 CFR Part 90.219(e)(3)

Spurious emissions from a signal booster must not exceed -13 dBm within any 100 kHz measurement bandwidth.

The tested max conducted power for single antenna port is 20.05dBm. the 2x2 MIMO total power is 20.05dBm+20.05dBm= 0.2021W.

The any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least $43 + 10 \log (P)$ dB.

Here,

$P=0.2021W$

So the limit =

$P(\text{dBm}) - [43 + 10 \log (0.2021W)] = -13\text{dBm}$

2. 47 CFR Part 90.543(f)

For operations in the 758-775 MHz and 788-805 MHz bands, all emissions including harmonics in the band 1559-1610 MHz shall be limited to -70 dBW/MHz (i.e. -40dBm) equivalent isotropically radiated power (EIRP) for wideband signals, and -80 dBW (i.e. -50dBm) EIRP for discrete emissions of less than 700 Hz bandwidth. For the purpose of equipment authorization, a transmitter shall be tested with an antenna that is representative of the type that will be used with the equipment in normal operation.

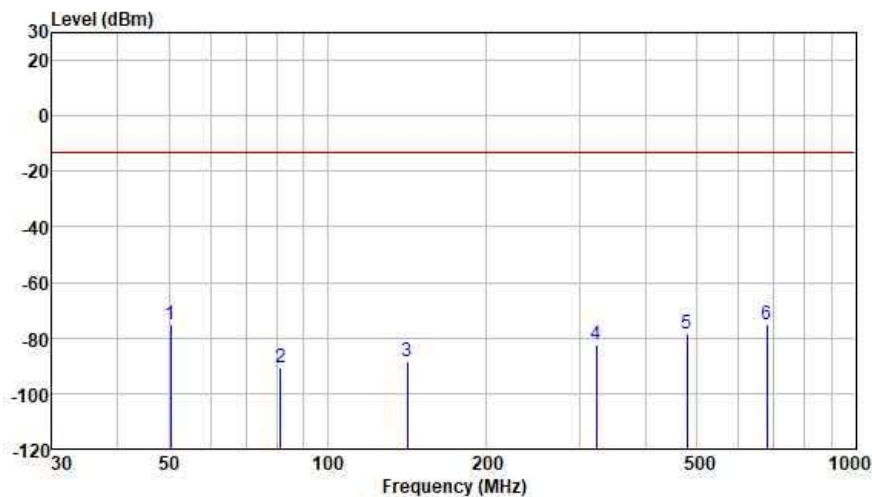
3. The radiated test performed at bottom / middle / top channel, the data with more than 20db margin, therefore, only the worst-case middle channel test data was recorded in the report.

4. The disturbance from 9kHz to 30MHz was very low and 20db below the limit, therefore, the data was not recorded in the report.



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DL_1S_M_AWGN_Horizontal_30MHz~1GHz



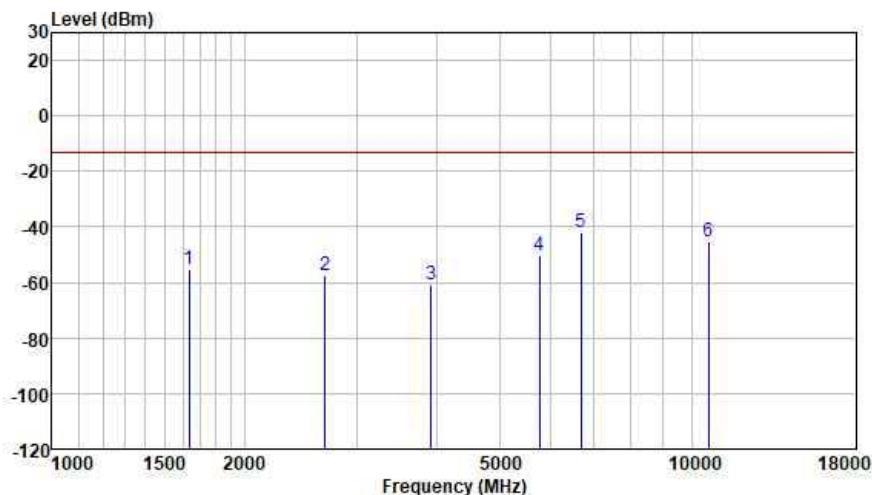
	Freq	Read	Correction	Limit	Over	
	MHz	Level	Factor	Line	Limit	Pol/Phase
	MHz	dBm	dB	dBm	dB	
1	50.41	-73.72	-1.29	-75.01	-13.00	-62.01 HORIZONTAL
2	81.21	-80.92	-9.99	-90.91	-13.00	-77.91 HORIZONTAL
3	141.33	-80.71	-7.73	-88.44	-13.00	-75.44 HORIZONTAL
4	322.19	-79.18	-2.99	-82.17	-13.00	-69.17 HORIZONTAL
5	478.85	-78.90	0.35	-78.55	-13.00	-65.55 HORIZONTAL
6	679.96	-79.55	4.14	-75.41	-13.00	-62.41 HORIZONTAL



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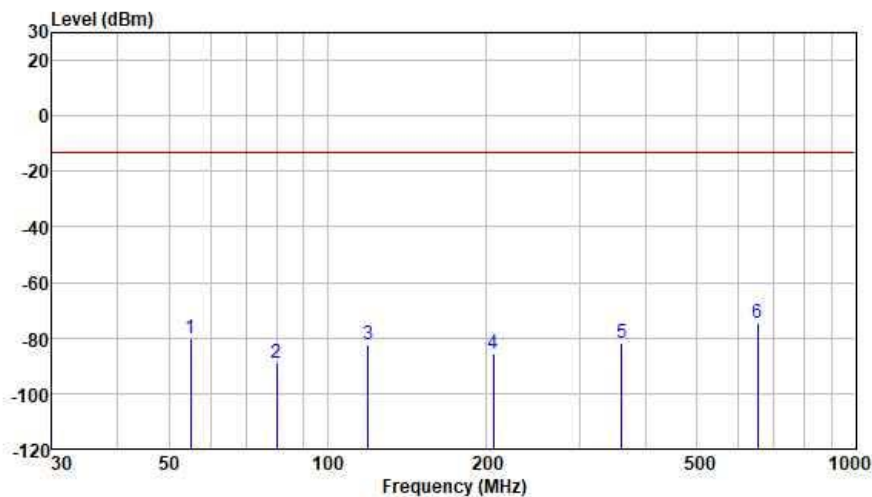
DL_1S_M_AWGN_Horizontal_above 1GHz



	Freq	Read Level	Correction Factor	Level	Limit Line	Over Limit	Pol/Phase
	MHz	dBm	dB	dBm	dBm	dB	
1	1639.27	-60.68	5.61	-55.07	-13.00	-42.07	HORIZONTAL
2	2671.73	-62.16	4.84	-57.32	-13.00	-44.32	HORIZONTAL
3	3912.81	-63.64	2.91	-60.73	-13.00	-47.73	HORIZONTAL
4	5780.30	-63.96	13.52	-50.44	-13.00	-37.44	HORIZONTAL
5	6698.37	-62.16	20.28	-41.88	-13.00	-28.88	HORIZONTAL
6	10606.15	-68.91	23.77	-45.14	-13.00	-32.14	HORIZONTAL



DL_1S_M_AWGN_Vertical_30MHz~1GHz



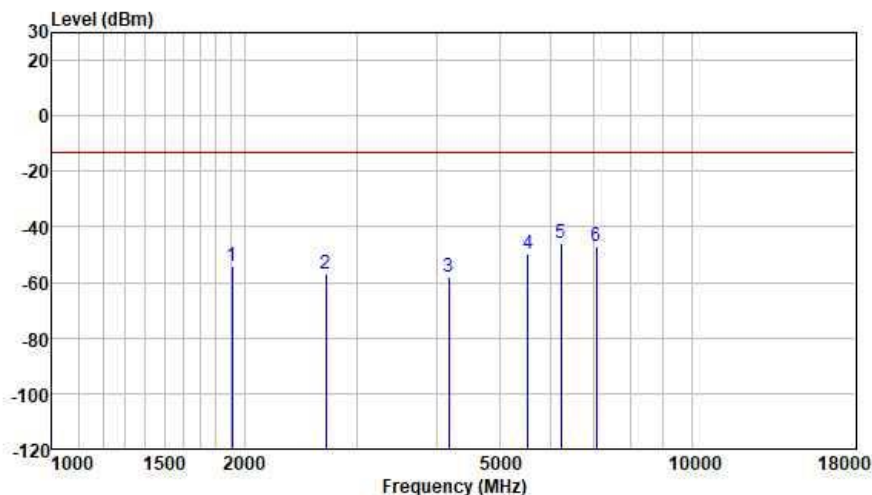
	Freq	Read Level	Correction Factor	Level	Limit Line	Over Limit	Pol/Phase
	MHz	dBm	dB	dBm	dBm	dB	
1	55.03	-76.05	-4.28	-80.33	-13.00	-67.33	VERTICAL
2	80.08	-78.72	-10.34	-89.06	-13.00	-76.06	VERTICAL
3	119.02	-78.47	-3.96	-82.43	-13.00	-69.43	VERTICAL
4	205.68	-80.22	-5.41	-85.63	-13.00	-72.63	VERTICAL
5	360.45	-79.90	-1.86	-81.76	-13.00	-68.76	VERTICAL
6	651.94	-79.19	4.73	-74.46	-13.00	-61.46	VERTICAL



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DL_1S_M_AWGN_Vertical_above 1GHz



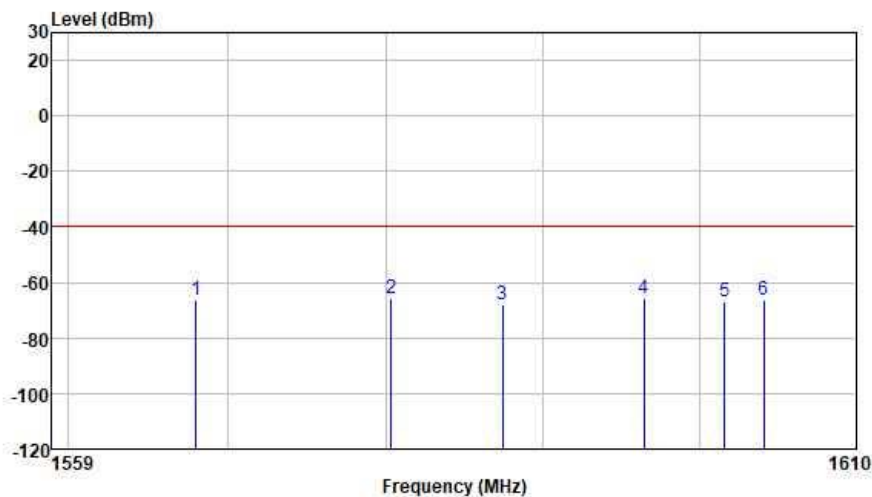
	Freq	Read Level	Correction Factor	Level	Limit Line	Over Limit	Pol/Phase
	MHz	dBm	dB	dBm	dBm	dB	
1	1910.65	-61.07	7.06	-54.01	-13.00	-41.01	VERTICAL
2	2679.46	-62.03	5.17	-56.86	-13.00	-43.86	VERTICAL
3	4169.70	-62.25	4.10	-58.15	-13.00	-45.15	VERTICAL
4	5535.05	-63.87	14.36	-49.51	-13.00	-36.51	VERTICAL
5	6231.43	-64.50	18.91	-45.59	-13.00	-32.59	VERTICAL
6	7076.52	-66.75	19.82	-46.93	-13.00	-33.93	VERTICAL



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DL_1S_M_AWGN_Horizontal_1559-1610MHz



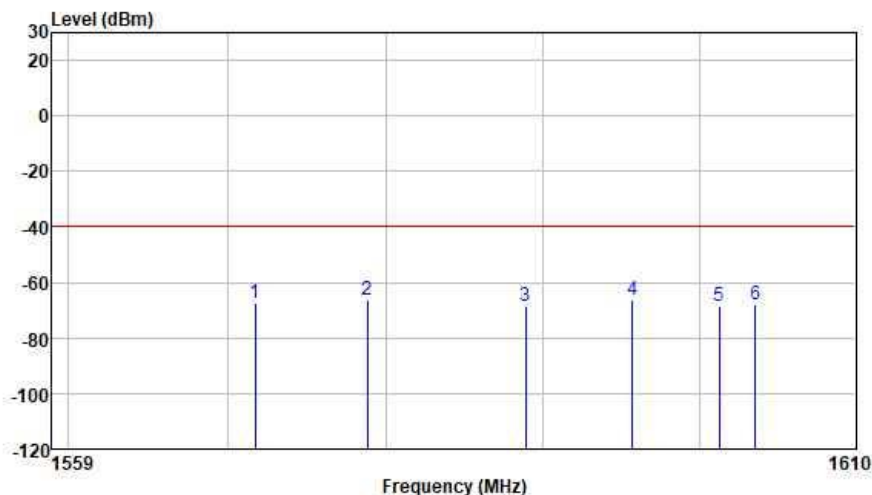
	Freq	Read Level	Correction Factor	Level	Limit Line	Over Limit	Pol/Phase
	MHz	dBm	dB	dBm	dBm	dB	
1	1568.01	-71.36	5.10	-66.26	-40.00	-26.26	HORIZONTAL
2	1580.32	-71.12	5.14	-65.98	-40.00	-25.98	HORIZONTAL
3	1587.41	-73.17	5.19	-67.98	-40.00	-27.98	HORIZONTAL
4	1596.43	-71.15	5.22	-65.93	-40.00	-25.93	HORIZONTAL
5	1601.58	-71.92	5.24	-66.68	-40.00	-26.68	HORIZONTAL
6	1604.10	-71.67	5.24	-66.43	-40.00	-26.43	HORIZONTAL



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DL_1S_M_AWGN_Vertical_1559-1610MHz



	Freq	Read Level	Correction Factor	Level	Limit Line	Over Limit	Pol/Phase
	MHz	dBm	dB	dBm	dBm	dB	
1	1571.75	-72.84	5.41	-67.43	-40.00	-27.43	VERTICAL
2	1578.80	-71.61	5.21	-66.40	-40.00	-26.40	VERTICAL
3	1588.84	-73.53	5.04	-68.49	-40.00	-28.49	VERTICAL
4	1595.66	-71.35	4.89	-66.46	-40.00	-26.46	VERTICAL
5	1601.21	-73.44	4.82	-68.62	-40.00	-28.62	VERTICAL
6	1603.54	-72.89	4.82	-68.07	-40.00	-28.07	VERTICAL



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5 ESMR (817-824MHz paired with 862-869MHz)

5.1 AGC threshold level

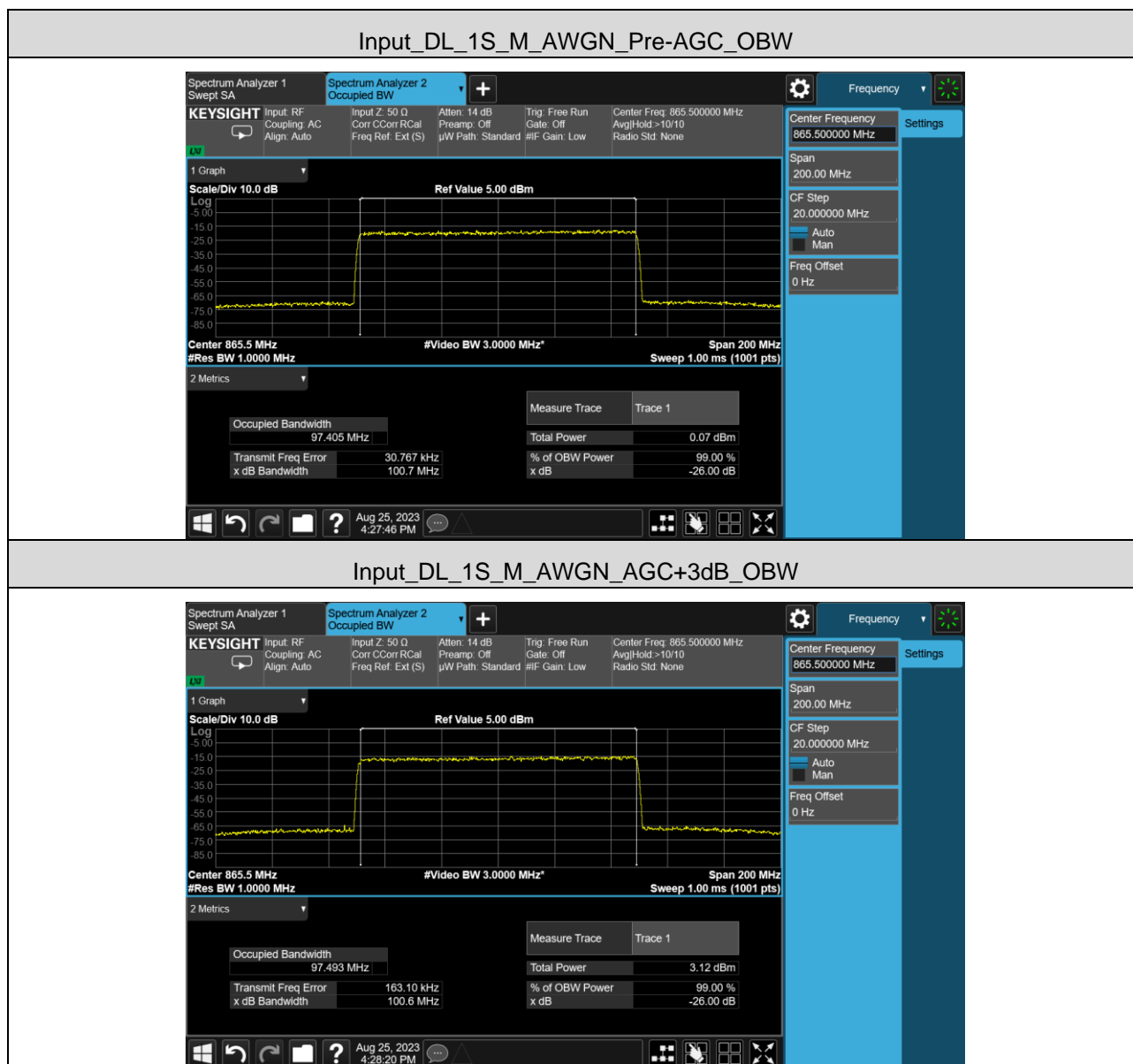
Test Conf.	AGC Threshold level
DL_1S_M_AWGN	-0.15dBm



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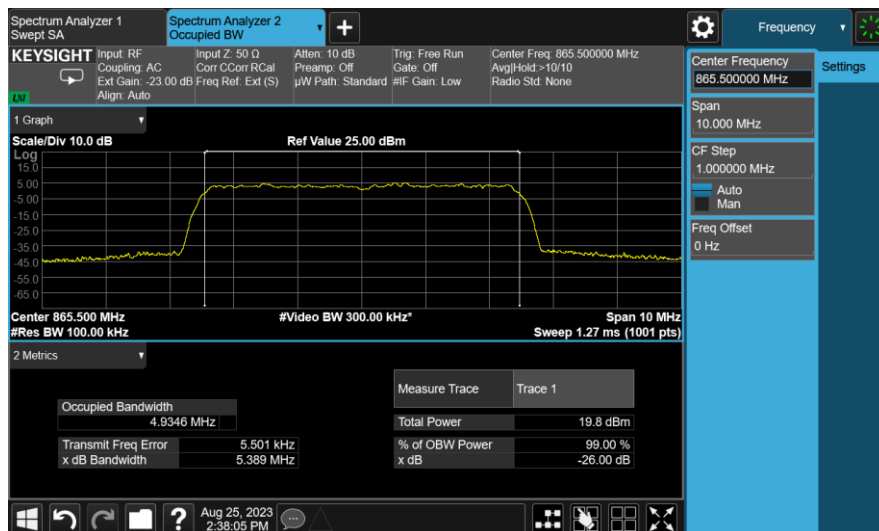
5.2 Input-versus-output signal comparison



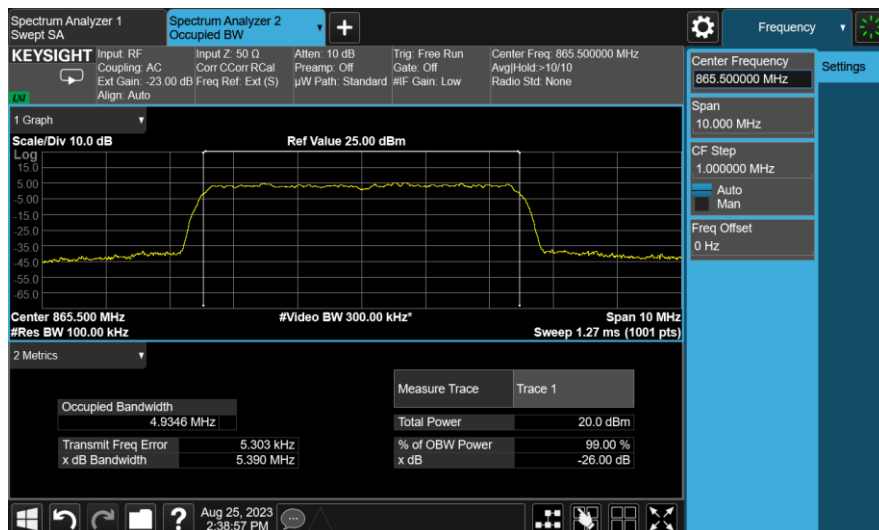
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Output_DL_1S_M_AWGN_Pre-AGC_OBW



Output_DL_1S_M_AWGN_AGC+3dB_OBW



Remark:

1. The band supports maximum channel BW is 5MHz for NR, so the output signal OBW was less than the input when 100MHz AWGN as input signal.
2. Compare the spectral plot of the input signal to the output signal affirm that they are similar (in passband and roll off characteristic features and relative spectral locations). The test result complies with the requirement.



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5.3 Mean output power and amplifier/booster gain

Test Conf.	Test Freq. f ₀ (MHz)	Signal Level	Input Power (dBm)	Output Power (dBm)	Gain (dB)	Verdict
DL_1S_AWGN	869.03	Pre-AGC	-0.15	20.11	20.35	PASS
		AGC+3dB	2.75	20.00	/	PASS

Remark:

According to the declaration from the applicant, the single antenna gain should not exceed 12.5dBi, the Directional gain = G(ANT) + 10 log (NANT) dBi = 12.5dBi+10log (2) dBi= 15.5dBi.

ERP= EIRP-2.15dB,

The total maximum ERP for the EUT is (20.11dBm+20.11dBm) +15.5dBi-2.15dB=36.47dBm (4.437W) which don't exceed the required ERP limit (1000W/MHz).



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5.4 Out-of-band/out-of-block (including intermodulation) emissions and spurious emissions

Note: 1. 90.691 a (1) Limit:

(1) For any frequency removed from the EA licensee's frequency block by up to and including 37.5 kHz, the power of any emission shall be attenuated below the transmitter power (P) in watts by at least $116 \log_{10}(f/6.1)$ decibels or $50 + 10 \log_{10}(P)$ decibels or 80 decibels, whichever is the lesser attenuation, where f is the frequency removed from the center of the outer channel in the block in kilohertz and where f is greater than 12.5 kHz.

The tested max conducted power for single antenna port is 20.35dBm, the power of any emission must be reduced below the mean output power (P) by at least $50 + 10 \log(P)$ dB
Here, $P=20.11\text{dBm}=0.1026\text{W}$.

So the limit = $P(\text{dBm}) - [50 + 10 \log(0.1026\text{W})] = -20\text{dBm}$

The EUT supports 2x2 MIMO and the emissions were measured at one of output port, so the limit line was set to -23.01dBm in following test plots in order to determine the test result conveniently.

2. 90.691 a (2) Limit:

(1) For any frequency removed from the EA licensee's frequency block greater than 37.5 kHz, the power of any emission shall be attenuated below the transmitter power (P) in watts by at least $43 + 10 \log_{10}(P)$ decibels or 80 decibels, whichever is the lesser attenuation, where f is the frequency removed from the center of the outer channel in the block in kilohertz and where f is greater than 37.5 kHz.

The tested max conducted power for single antenna port is 20.11dBm, the power of any emission must be reduced below the mean output power (P) by at least $43 + 10 \log(P)$ dB
Here, $P=20.11\text{dBm}=0.1026\text{W}$. So the limit = $P(\text{dBm}) - [43 + 10 \log(0.1026\text{W})] = -13\text{dBm}$

The EUT supports 2x2 MIMO and the emissions were measured at one of output port, so the limit line was set to -16.01dBm in following test plots in order to determine the test result conveniently.

3. The spurious emissions 9kHz to 30MHz were very low and not displayed in this report.



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