Appendix -

Test Data and Result for report

GZCR231100125302

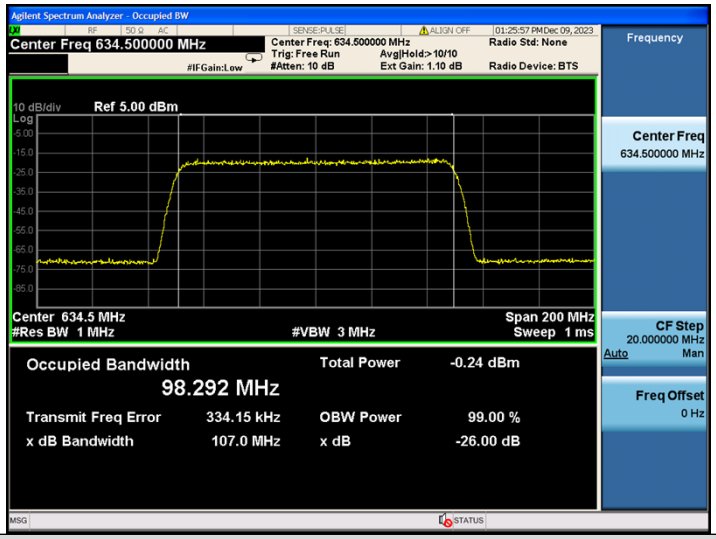
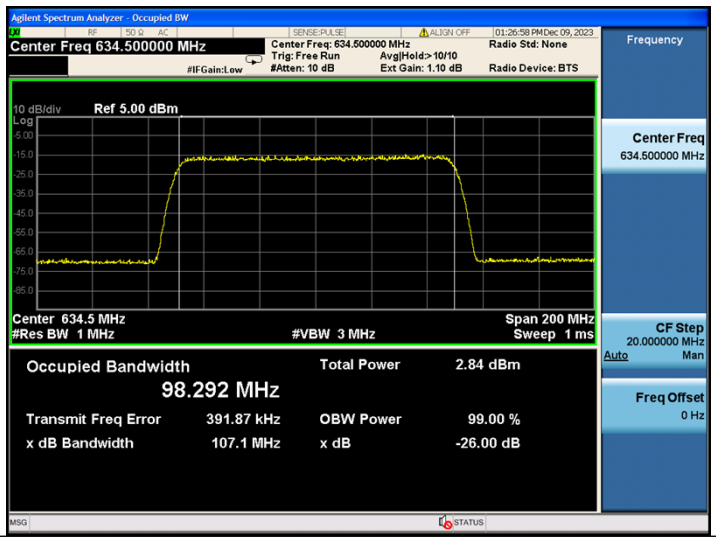
(B)

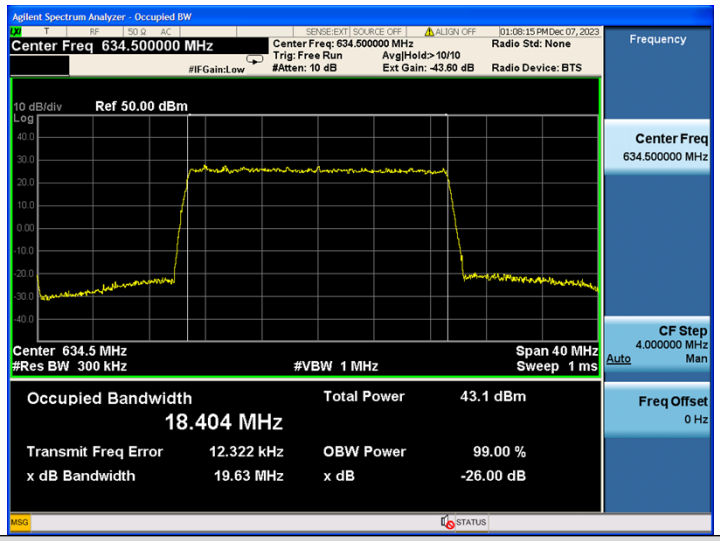
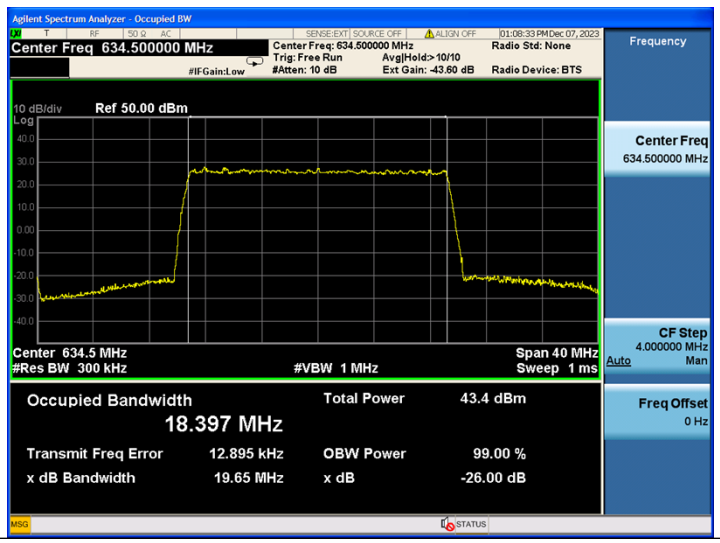
(Supplement test data for 5G NR with100 MHz AWGN signal)

No.198, Kezhu Road, Science City, Economic & Technological Development Area, Guangzhou, Guangdong, China 510663 t (86-20) 82155555 www.sgsgroup.com.cn
中国·广东·广州高新技术产业开发区科学城科珠路198号 邮编：510663 t (86-20) 82155555 sgs.china@sgs.com

1 600MHz Service (only for downlink: 617-652MHz)

1.1 Input-versus-output signal comparison

Input_DL_1S_M_AWGN_Pre-AGC_OBW

Input_DL_1S_M_AWGN_ AGC+3dB_OBW


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 20MHz 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.

1.2 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	632.75	Pre-AGC	-6.0	35.95	41.95	PASS
		AGC+3dB	-3.0	36.32	/	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 (N_{ANT}) dBi = 12.5dBi+10log (2) dBi= 15.5dBi.

ERP= EIRP-2.15dB,

The total maximum ERP for the EUT is (36.32dBm+36.32dBm) +15.5dBi-2.15dB=52.69dBm (185.79W) which don't exceed the required ERP limit (1000W/MHz).

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

Note: The tested max conducted power for single antenna port is 36.32dBm, 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=36.32dBm= 4.29W.

So the limit =

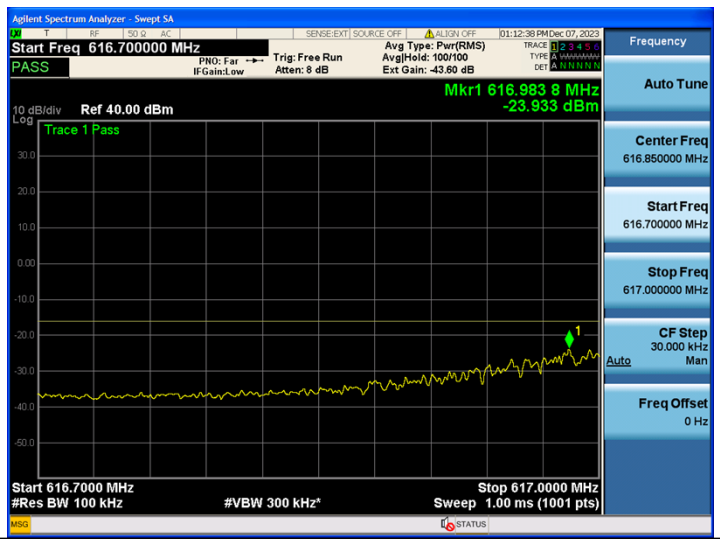
P(dBm)- [43 + 10 log (4.29W)] =-13dBm

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.

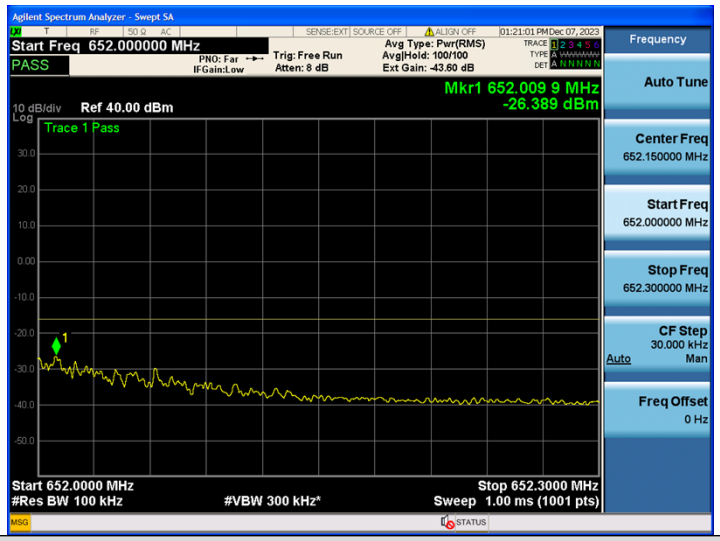
The spurious emissions from 9kHz to 30MHz was very low and 20dB below the limit, therefore, the data was not recorded in the report.

DL_1S_B_AWGN_Pre-AGC_Out-of-band emission

DL_1S_B_AWGN_AGC+3_Out-of-band emission



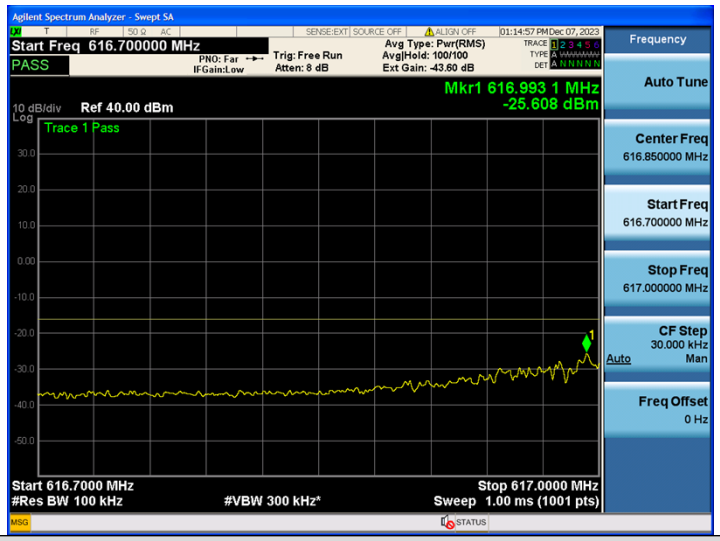
DL_1S_T_AWGN_Pre-AGC_Out-of-band emission



DL_1S_T_AWGN_AGC+3_Out-of-band emission

No.198, Kezhu Road, Science City, Economic & Technological Development Area, Guangzhou, Guangdong, China 510663 t (86-20) 82155555 www.sgsgroup.com.cn
中国·广东·广州高新技术产业开发区科学城科珠路198号 邮编：510663 t (86-20) 82155555 sgs.china@sgs.com

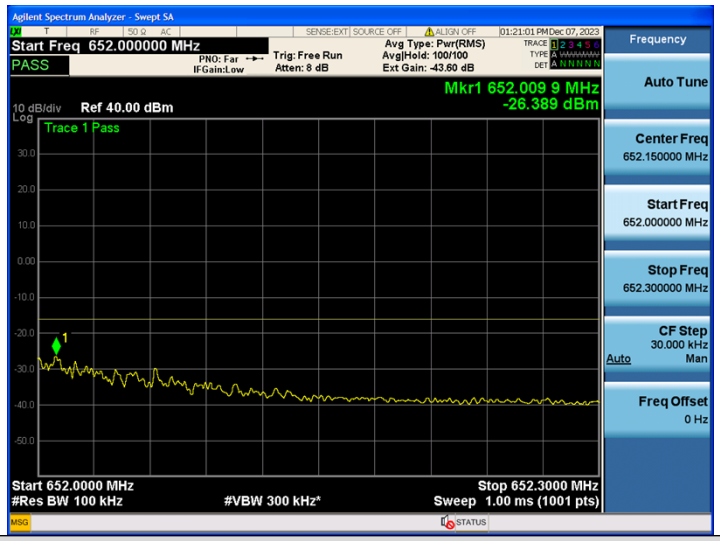
DL_2S_B_AWGN_Pre-AGC_Out-of-band emission



DL_2S_B_AWGN_AGC+3_Out-of-band emission

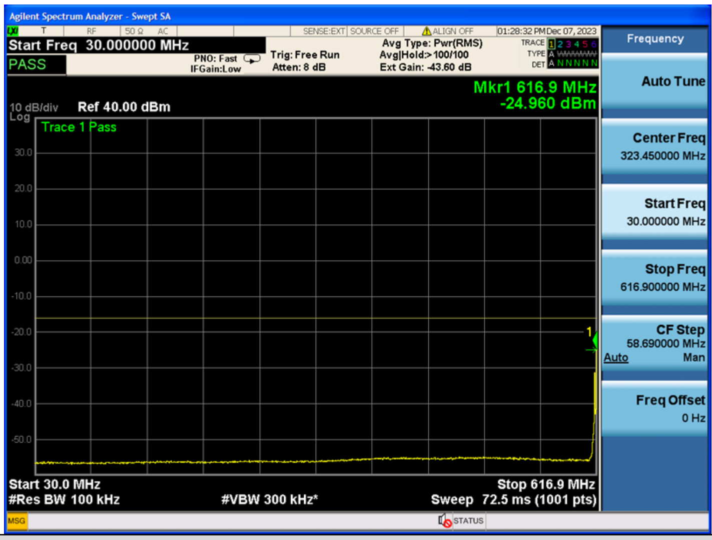
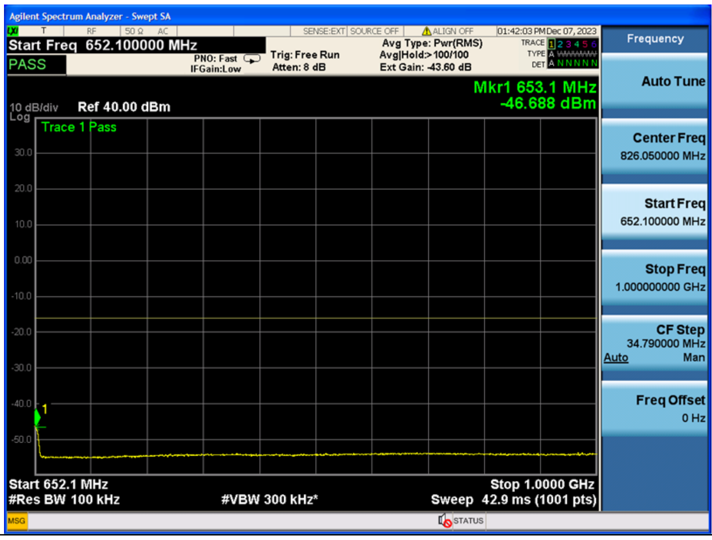
No.198, Kezhu Road, Science City, Economic & Technological Development Area, Guangzhou, Guangdong, China 510663 t (86-20) 82155555 www.sgsgroup.com.cn
中国・广东・广州高新技术产业开发区科学城科珠路198号 邮编：510663 t (86-20) 82155555 sgs.china@sgs.com

DL_2S_T_AWGN_Pre-AGC_Out-of-band emission



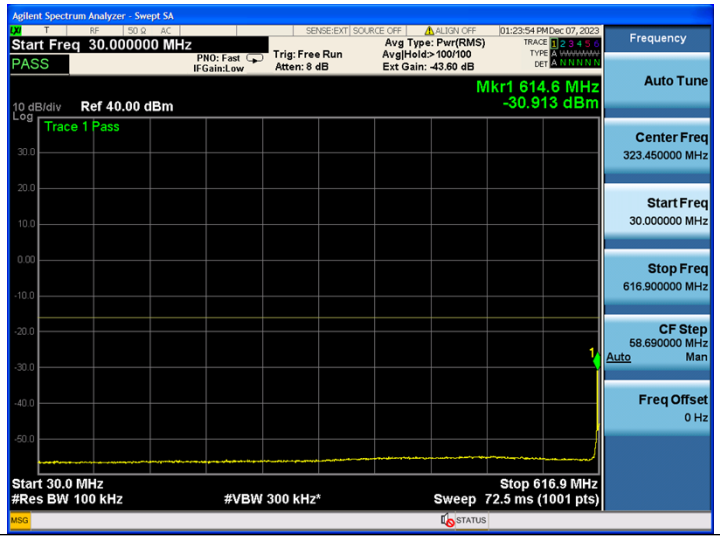
DL_2S_T_AWGN_AGC+3_Out-of-band emission

No.198, Kezhu Road, Science City, Economic & Technological Development Area, Guangzhou, Guangdong, China 510663 t (86-20) 82155555 www.sgsgroup.com.cn
中国·广东·广州高新技术产业开发区科学城科珠路198号 邮编：510663 t (86-20) 82155555 sgs.china@sgs.com

DL_1S_B_AWGN_Pre-AGC_Spurious emission 1

DL_1S_B_AWGN_Pre-AGC_Spurious emission 2


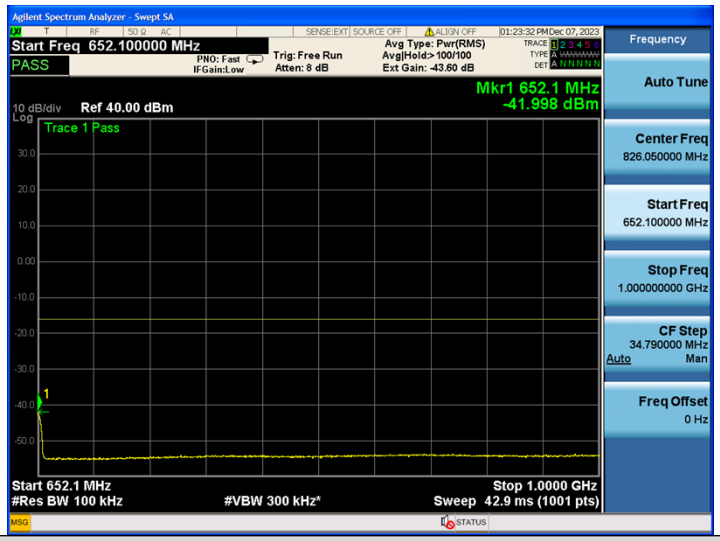
DL_1S_B_AWGN_Pre-AGC_Spurious emission 3

DL_1S_M_AWGN_Pre-AGC_Spurious emission 1



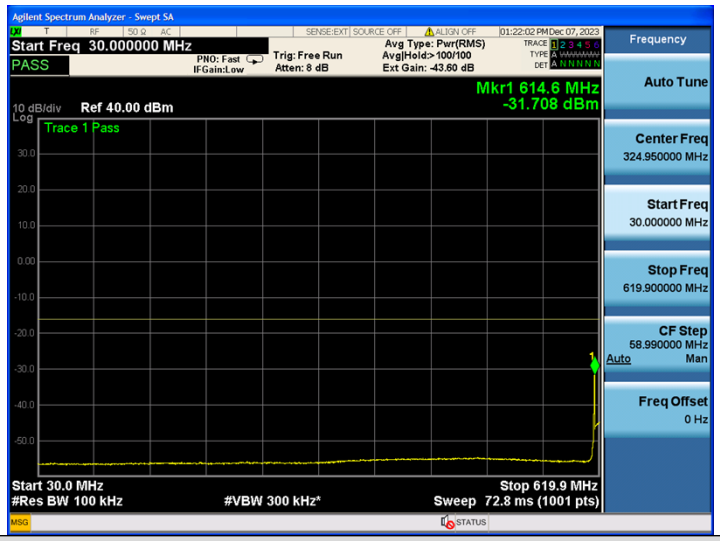
No.198, Kezhu Road, Science City, Economic & Technological Development Area, Guangzhou, Guangdong, China 510663 t (86-20) 82155555 www.sgsgroup.com.cn
中国・广东・广州高新技术产业开发区科学城科珠路198号 邮编：510663 t (86-20) 82155555 sgs.china@sgs.com

DL_1S_M_AWGN_Pre-AGC_Spurious emission 2

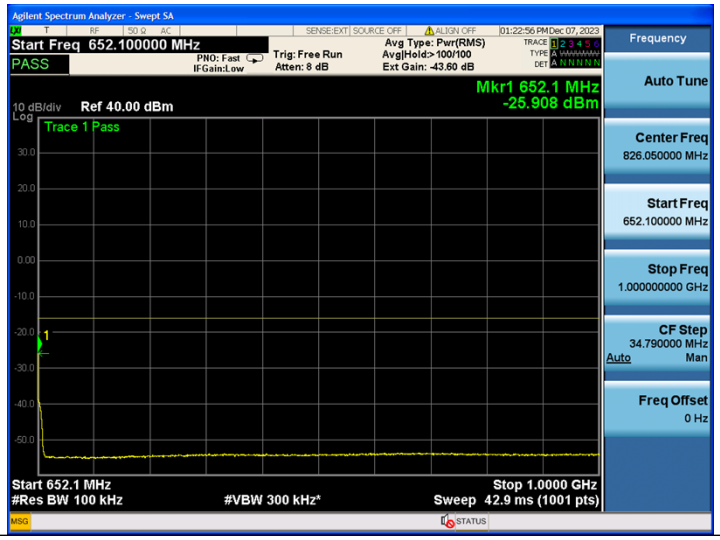


DL_1S_M_AWGN_Pre-AGC_Spurious emission 3

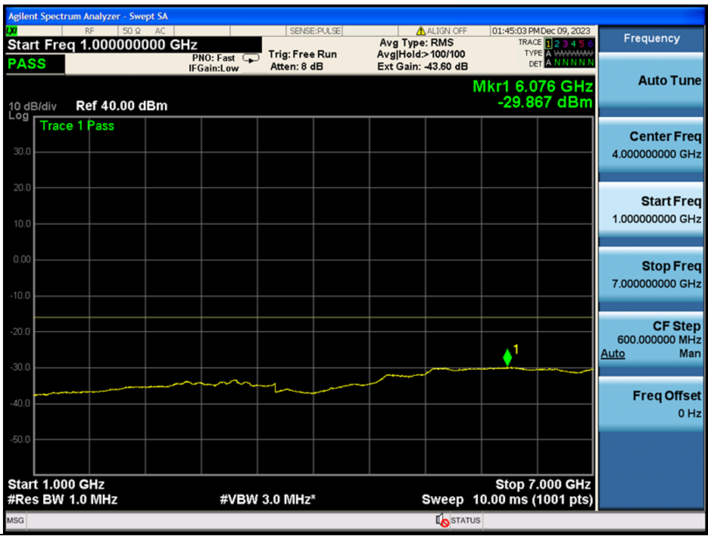
DL_1S_T_AWGN_Pre-AGC_Spurious emission 1



DL_1S_T_AWGN_Pre-AGC_Spurious emission 2



No.198, Kezhu Road, Science City, Economic & Technological Development Area, Guangzhou, Guangdong, China 510663 t (86-20) 82155555 www.sgsgroup.com.cn
中国・广东・广州高新技术产业开发区科学城科珠路198号 邮编：510663 t (86-20) 82155555 sgs.china@sgs.com

DL_1S_T_AWGN_Pre-AGC_Spurious emission 3


1.4 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 AC 110V.

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 (℃)	Test Conf.	Frequency Error (Hz)	Tolerance (ppm)	Verdict
50	DL_1S_M_AWGN	80	0.1261	PASS
40		62	0.0977	PASS
30		56	0.0883	PASS
20		53	0.0835	PASS
10		77	0.1214	PASS
0		71	0.1119	PASS
-10		64	0.1009	PASS
-20		69	0.1087	PASS
-30		47	0.0741	PASS

Frequency stability vs voltage

Voltage (V)	Test Conf.	Frequency Error (Hz)	Tolerance (ppm)	Verdict
AC 93.5	DL_1S_M_AWGN	53	0.0835	PASS
AC 110		53	0.0835	PASS
AC 126.5		53	0.0835	PASS

1.5 Radiated spurious emissions

Note: 1. The tested max conducted power for single antenna port is 43.18dBm, the 2x2 MIMO total power is 36.32dBm+36.32dBm= 8.58W.

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=8.58W,

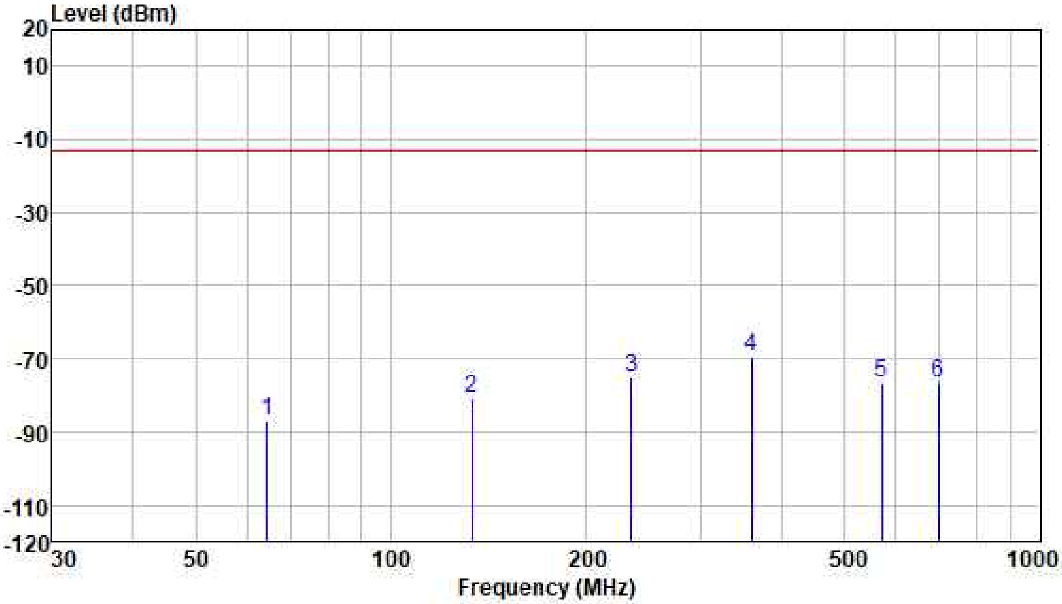
So the limit =

P(dBm)- [43 + 10 log (8.58W)] =-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.

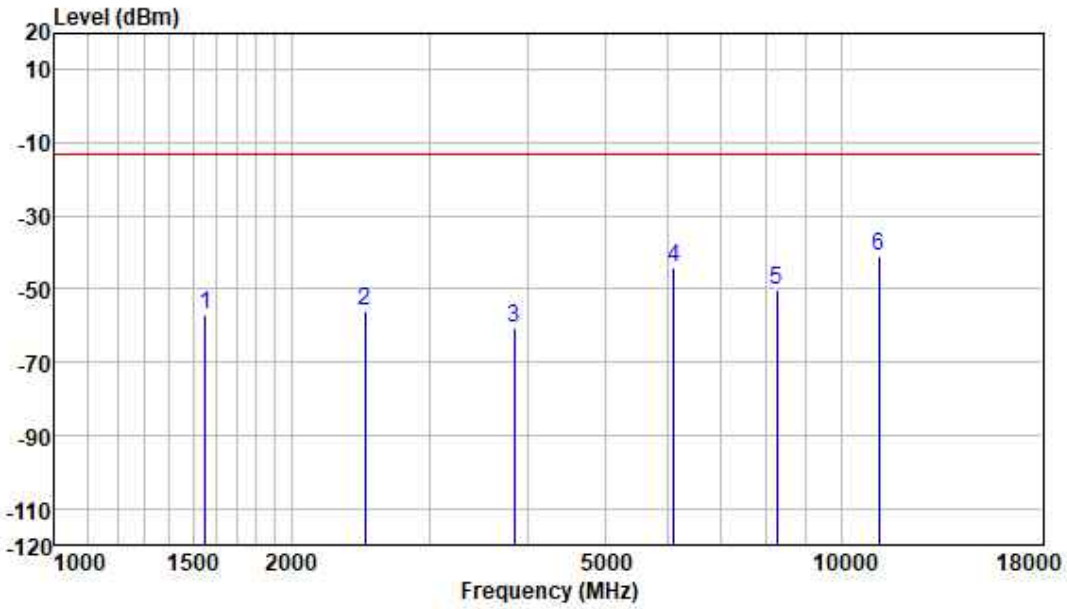
3. The disturbance 9kHz to 30MHz was very low and 20dB below the limit, therefore, the data was not recorded in the report.

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	64.21	-82.71	-4.05	-86.76	-13.00	-73.76	HORIZONTAL
2	133.15	-72.40	-8.11	-80.51	-13.00	-67.51	HORIZONTAL
3	234.99	-68.52	-6.40	-74.92	-13.00	-61.92	HORIZONTAL
4	359.19	-68.03	-1.33	-69.36	-13.00	-56.36	HORIZONTAL
5	570.61	-78.50	1.92	-76.58	-13.00	-63.58	HORIZONTAL
6	696.86	-80.81	4.32	-76.49	-13.00	-63.49	HORIZONTAL

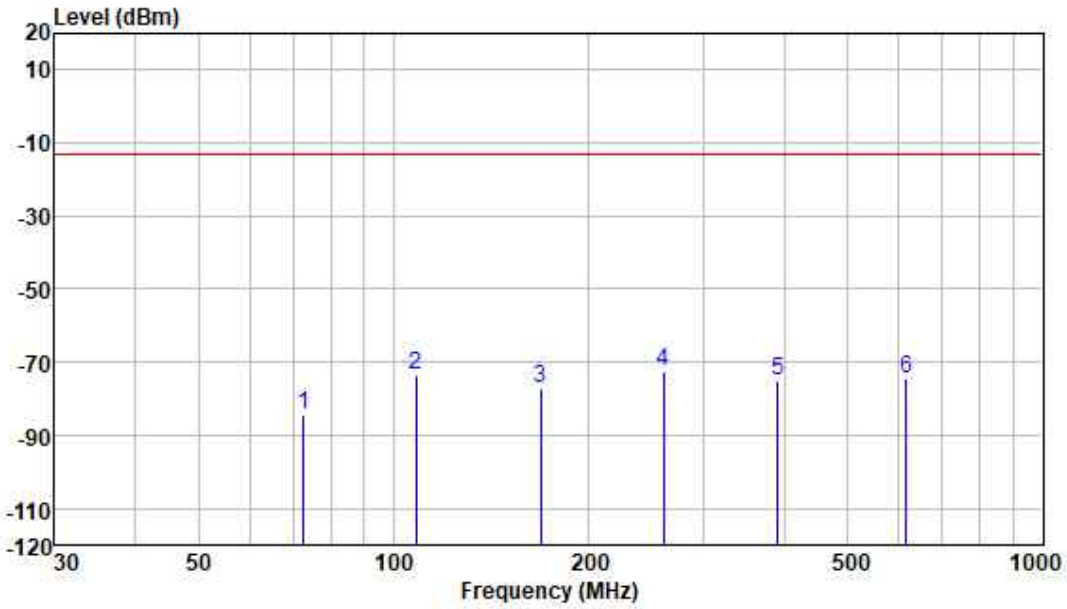
DL_1S_M_AWGN_Horizontal_above 1GHz



	Freq	Read Level	Correction Factor	Level	Limit Line	Over Limit	Pol/Phase
	MHz	dBm	dB	dBm	dBm	dB	
1	1551.68	-61.86	4.98	-56.88	-13.00	-43.88	HORIZONTAL
2	2478.31	-65.03	8.85	-56.18	-13.00	-43.18	HORIZONTAL
3	3834.44	-63.94	3.16	-60.78	-13.00	-47.78	HORIZONTAL
4	6124.29	-63.36	19.10	-44.26	-13.00	-31.26	HORIZONTAL
5	8271.88	-63.67	13.40	-50.27	-13.00	-37.27	HORIZONTAL
6	11140.31	-63.79	22.98	-40.81	-13.00	-27.81	HORIZONTAL

SGS-CSTC Standards Technical Services Co., Ltd. Guangzhou Branch
No.198, Kezhu Road, Science City, Economic & Technological Development Area, Guangzhou, Guangdong, China 510663 t (86-20) 82155555 www.sgsgroup.com.cn
中国·广东·广州高新技术产业开发区科学城科珠路198号 邮编：510663 t (86-20) 82155555 sgs.china@sgs.com

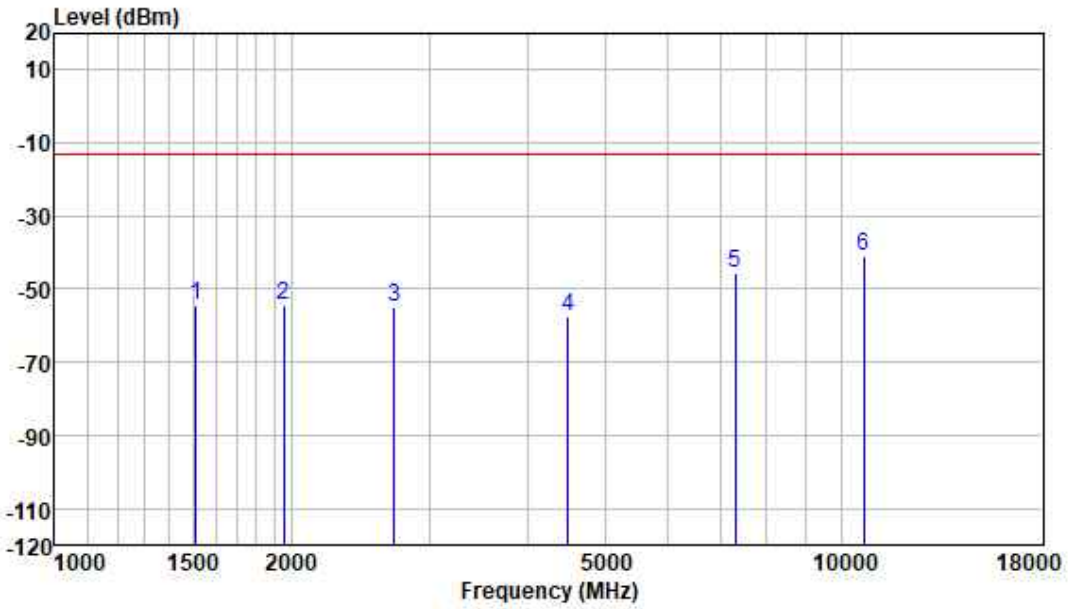
DL_1S_M_AWGN_Vertical_30MHz~1GHz



	Freq	Read Level	Correction Factor	Level	Limit Line	Over Limit	Pol/Phase
	MHz	dBm	dB	dBm	dBm	dB	
1	72.59	-75.25	-8.85	-84.10	-13.00	-71.10	VERTICAL
2	108.27	-68.93	-4.66	-73.59	-13.00	-60.59	VERTICAL
3	168.41	-73.15	-3.94	-77.09	-13.00	-64.09	VERTICAL
4	260.14	-68.10	-4.54	-72.64	-13.00	-59.64	VERTICAL
5	390.72	-74.74	-0.50	-75.24	-13.00	-62.24	VERTICAL
6	616.37	-78.94	4.34	-74.60	-13.00	-61.60	VERTICAL

SGS-CSTC Standards Technical Services Co., Ltd. Guangzhou Branch
No.198, Kezhu Road, Science City, Economic & Technological Development Area, Guangzhou, Guangdong, China 510663 t (86-20) 82155555 www.sgsgroup.com.cn
中国・广东・广州高新技术产业开发区科学城科珠路198号 邮编：510663 t (86-20) 82155555 sgs.china@sgs.com

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	1511.83	-61.32	6.77	-54.55	-13.00	-41.55	VERTICAL
2	1955.34	-62.52	7.89	-54.63	-13.00	-41.63	VERTICAL
3	2702.80	-59.77	5.02	-54.75	-13.00	-41.75	VERTICAL
4	4495.13	-63.25	5.86	-57.39	-13.00	-44.39	VERTICAL
5	7326.27	-63.58	17.76	-45.82	-13.00	-32.82	VERTICAL
6	10667.64	-65.95	24.78	-41.17	-13.00	-28.17	VERTICAL

--End of Appendix--