

EMC-ARF-05 Rev 1.1

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# Appendix -

# Test Data and Result for report GZCR231100125302

(B)

(Supplement test data for 5G NR with 100 MHz AWGN signal)



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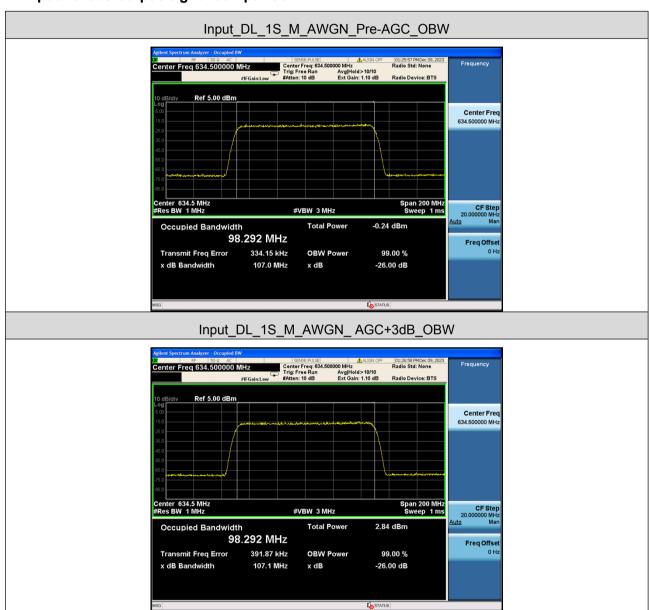
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### 1 600MHz Service (only for downlink: 617-652MHz)

#### 1.1 Input-versus-output signal comparison





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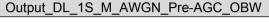
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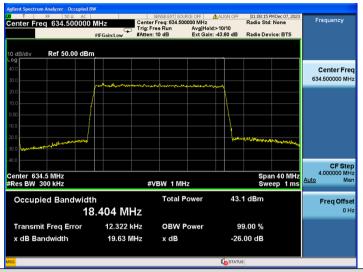
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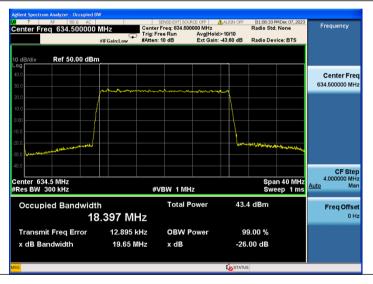


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#### Output DL 1S M AWGN AGC+3dB OBW



#### Remark:

- 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.
- 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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#### 1.2 Mean output power and amplifier/booster gain

Test Conf.	Test Freq. f <sub>0</sub> (MHz)	Signal Level	Input Power (dBm)	Output Power (dBm)	Gain (dB)	Verdict
DL_1S_AWG	632.75	Pre-AGC	-6.0	35.95	41.95	PASS
N		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).



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#### 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.



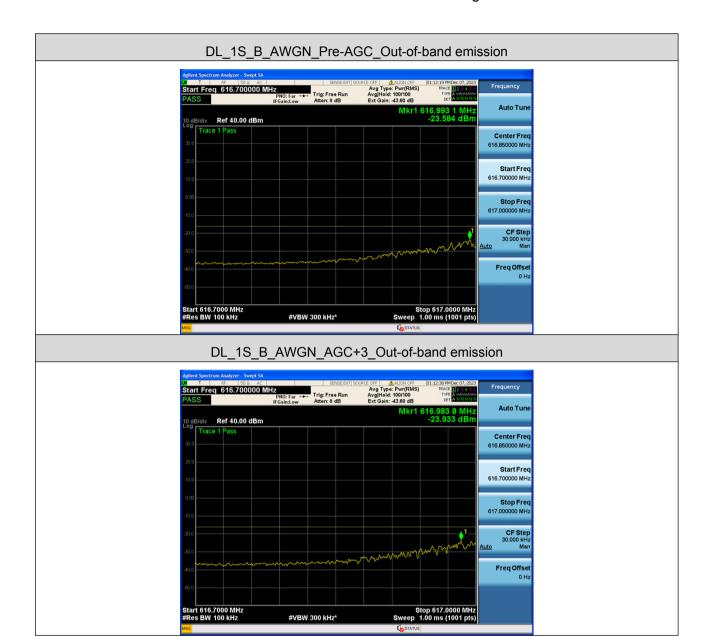
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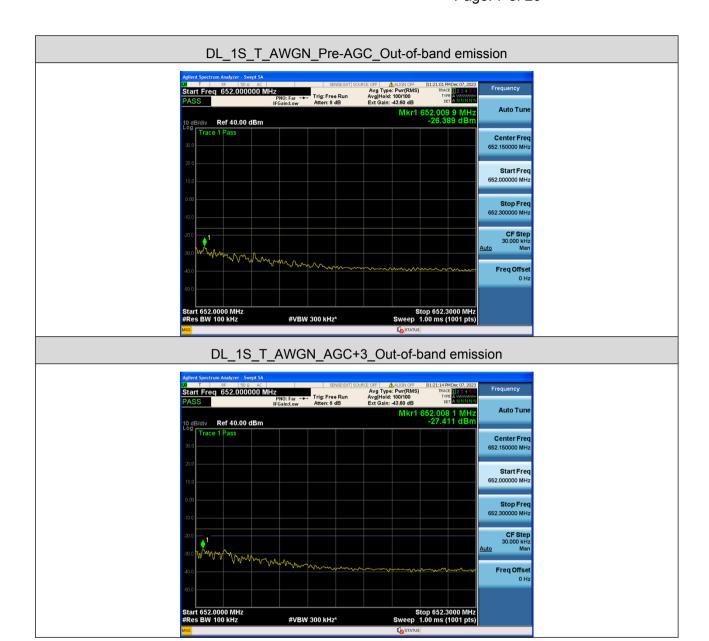
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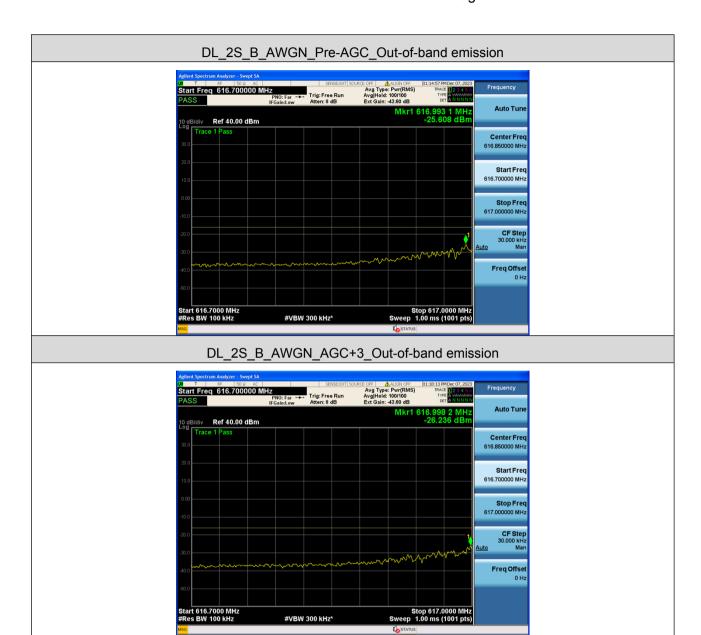
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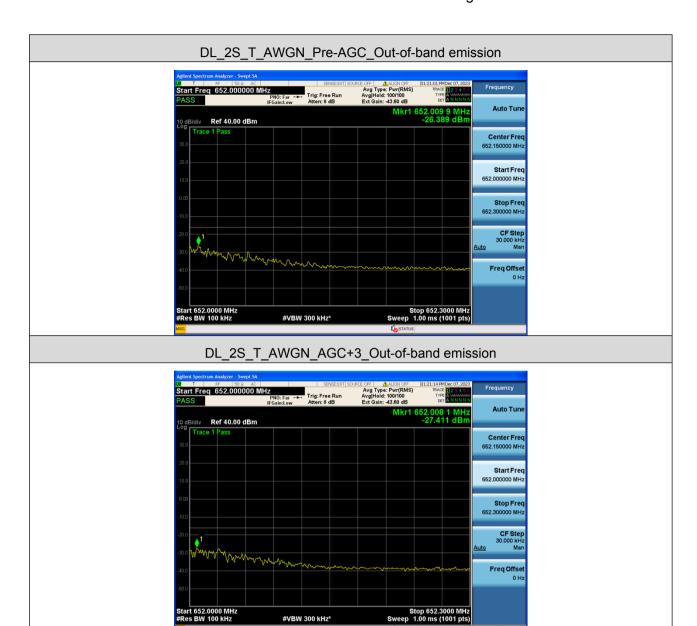
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#### DL\_1S\_B\_AWGN\_Pre-AGC\_Spurious emission 2





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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 3





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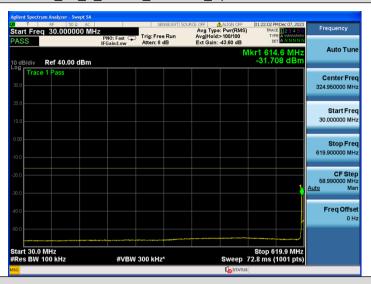
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#### DL 1S T AWGN Pre-AGC Spurious emission 2





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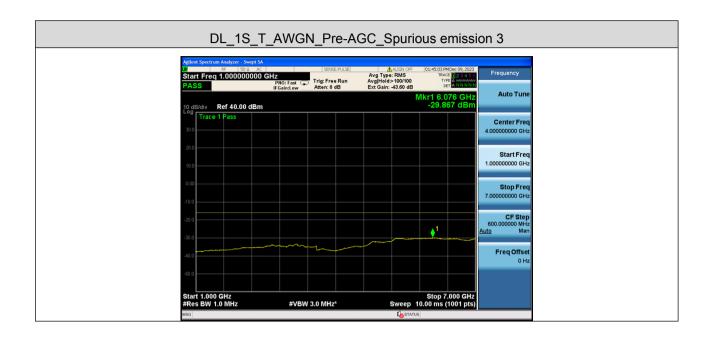
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#### 1.4 Frequency Stability

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 (°C)	Test Conf.	Frequency Error (Hz)	Tolerance (ppm)	Verdict			
50		80	0.1261	PASS			
40		62	0.0977	PASS			
30		56	0.0883	PASS			
20		53	0.0835	PASS			
10	DL_1S_M_AWG	77	0.1214	PASS			
0	N	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)	I LEST CONT		uency Error Tolerance (Hz) (ppm)					
AC 93.5		53	0.0835	PASS				
AC 110	DL_1S_M_AWG	53	0.0835	PASS				
AC 126.5	N	53	0.0835	PASS				



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#### 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.



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#### DL 1S M AWGN Horizontal 30MHz~1GHz 20 Level (dBm) 10 -10 -30 -50 -70 5 2 -90 -110 -120<sub>30</sub> 50 100 200 500 1000 Frequency (MHz) Read Correction Limit Over Freq Level Factor Level Line Limit Pol/Phase MHz dBm dB dBm dBm dB 64.21 -82.71 -4.05 -86.76 -13.00 -73.76 HORIZONTAL 1 133.15 -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 -68.03 -1.33 -69.36 -13.00 -56.36 359.19 HORIZONTAL HORIZONTAL 5 570.61 -78.50 1.92 -76.58 -13.00 -63.58 -80.81 4.32 -76.49 -13.00 -63.49 696.86 HORIZONTAL



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#### DL 1S M AWGN Horizontal above 1GHz 20 Level (dBm) 10 -10 -30 6 -50 3 -70 -90 -110 -120 1000 5000 1500 2000 10000 18000 Frequency (MHz) Read Correction Limit Over Freq Level Factor Level Line Limit Pol/Phase MHz dBm dB dBm dBm dB 1551.68 -61.86 4.98 -56.88 -13.00 -43.88 HORIZONTAL 1 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 -63.36 19.10 -44.26 -13.00 -31.26 4 6124.29 HORIZONTAL HORIZONTAL 5 8271.88 -63.67 13.40 -50.27 -13.00 -37.27 -63.79 22.98 -40.81 -13.00 -27.81 11140.31 HORIZONTAL



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#### DL 1S M AWGN Vertical 30MHz~1GHz 20 Level (dBm) 10 -10 -30 -50 -70 -90 -110 -120<sub>30</sub> 100 50 200 500 1000 Frequency (MHz) Read Correction Limit Over Freq Level Factor Level Line Limit Pol/Phase MHz dBm dB dBm dBm dB 72.59 -75.25 -8.85 -84.10 -13.00 -71.10 VERTICAL 1 108.27 -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 -68.10 -4.54 -72.64 -13.00 -59.64 260.14 VERTICAL 5 390.72 -74.74 -0.50 -75.24 -13.00 -62.24 VERTICAL -78.94 4.34 -74.60 -13.00 -61.60 616.37 VERTICAL



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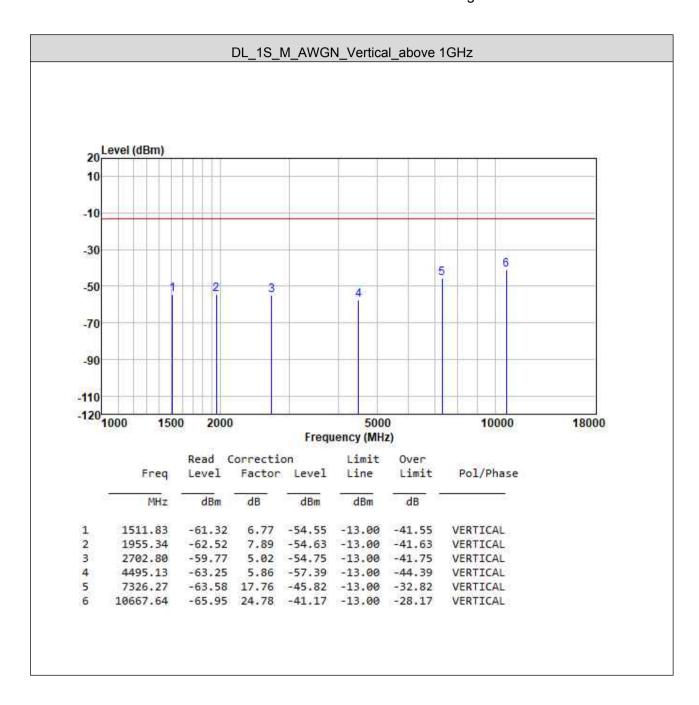
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#### -- End of Appendix--



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