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FCC ID: OJFDHRU-DHPAM-25

Appendix B

Test Data and Result Details of GZCR2103000018AT



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1 BRS/EBS (only for downlink: 2496-2690MHz)

1.1 AGC threshold level

Test Conf.	AGC Threshold level		
DL_1S_M_AWGN_AWGN	-0.10dBm		
DL_1S_M_AWGN_GSM	0.00dBm		



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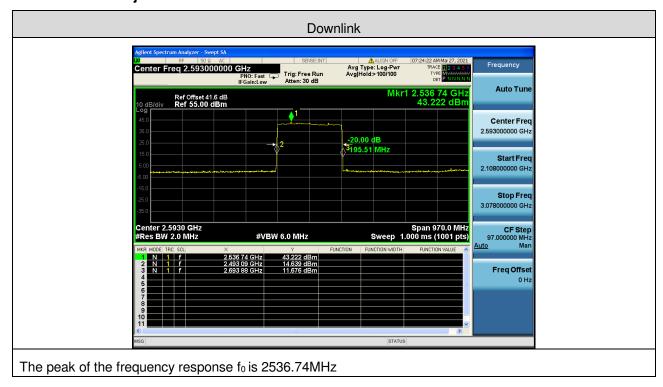
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1.2 Out-of-band rejection





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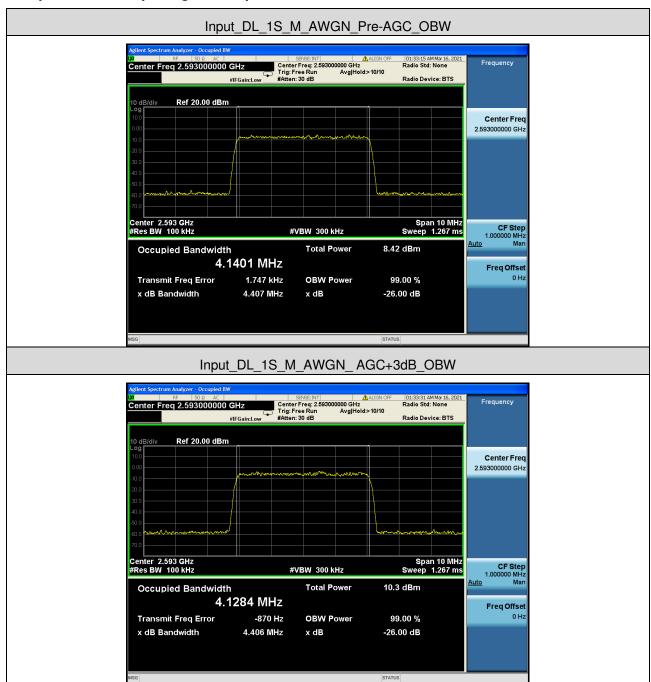
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1.3 Input-versus-output signal comparison





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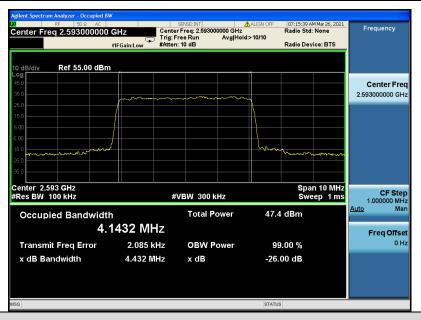
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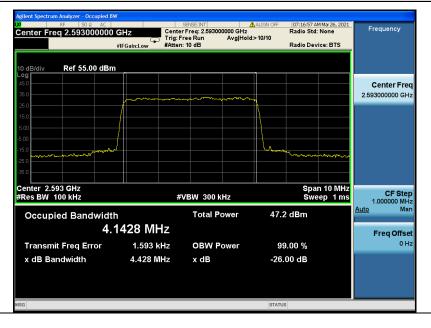
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Output_DL_1S_M_AWGN_Pre-AGC_OBW



Output_DL_1S_M_AWGN_ AGC+3dB_OBW





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Input_DL_1S_M_GSM_ AGC+3dB_OBW





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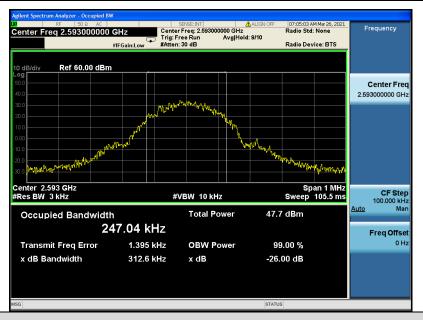
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Output DL 1S M GSM AGC+3dB OBW



Remark:

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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1.4 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		Pre-AGC	-0.20	43.00	43.20	PASS
	2536.74	AGC+3dB	2.80	42.87	/	PASS
DL_1S_GSM		Pre-AGC	-0.10	42.94	43.04	PASS
	2536.74	AGC+3dB	2.90	42.88	/	PASS

Remark:

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

The total maximum EIRP for the EUT is (43.00dBm+43.00dBm) +15.5dBi=61.51dBm (1415.8W) which don't exceed the required EIRP limit (1993W).



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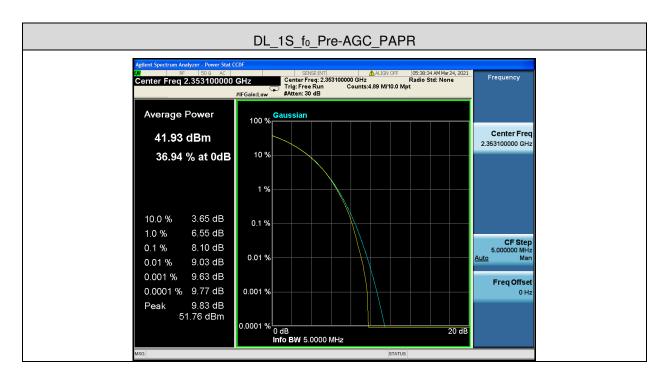
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Test Conf.	Test Freq. f ₀ (MHz)	Signal Level		Limit (dB)	Verdict
DL_1S_AWGN	2536.74	Pre-AGC	9.03	13	PASS





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

Note:

The tested max conducted power for single antenna port is 43.00dBm, 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 log10 (P) dB

Here,

P=43.00dBm=19.95W.

So the limit =

P(dBm)-[43 + 10 log (19.95W)] = -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.



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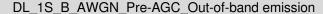
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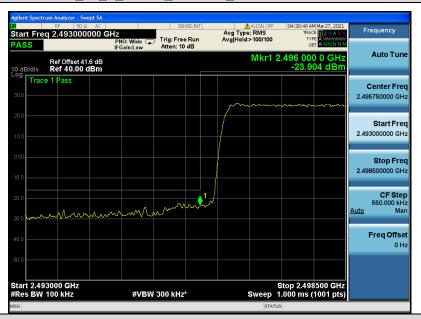
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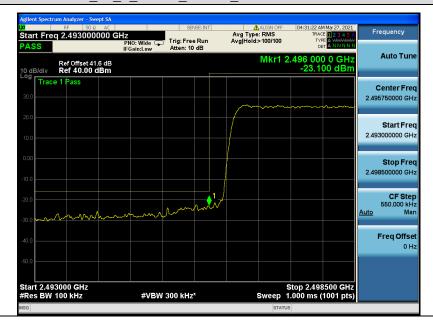
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DL 1S B AWGN AGC+3 Out-of-band emission





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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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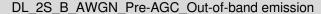
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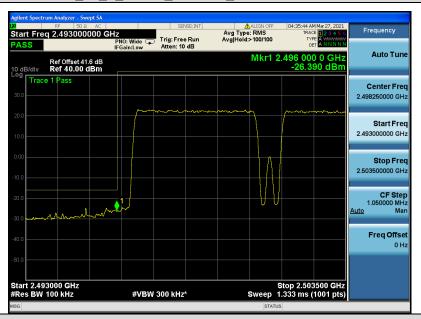
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DL 2S B AWGN AGC+3 Out-of-band emission





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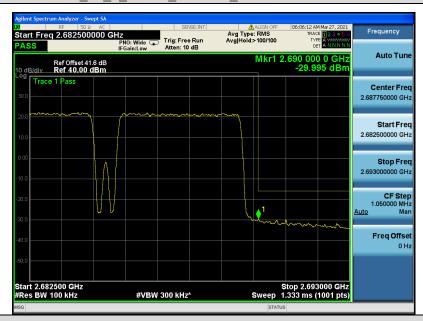
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DL 2S T AWGN Pre-AGC Out-of-band emission



DL 2S T AWGN AGC+3 Out-of-band emission





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DL_1S_B_GSM_AGC+3_Out-of-band emission





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DL_1S_T_GSM_Pre-AGC_Out-of-band emission



DL_1S_T_GSM_AGC+3_Out-of-band emission





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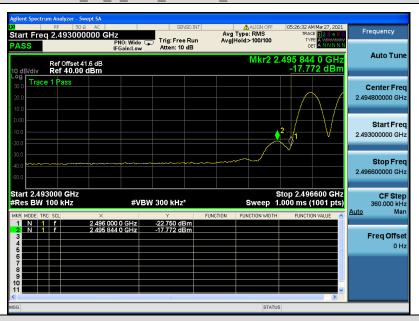
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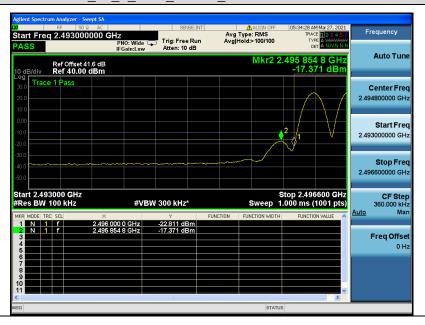
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DL_2S_B_GSM_Pre-AGC_Out-of-band emission



DL 2S B GSM AGC+3 Out-of-band emission





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DL_2S_T_GSM_AGC+3_Out-of-band emission





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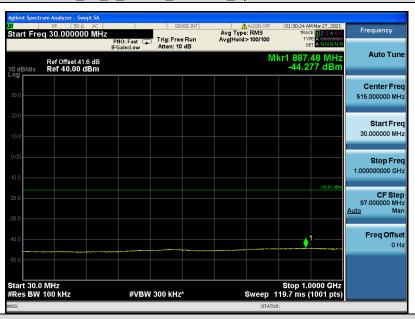
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DL_1S_B_AWGN_Pre-AGC_Spurious emission 2





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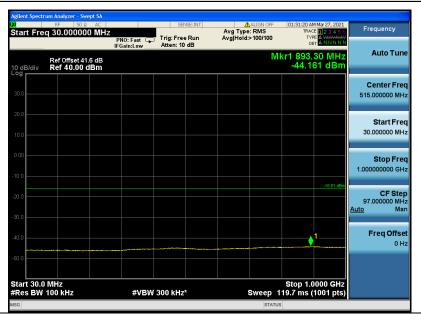
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DL_1S_B_AWGN_Pre-AGC_Spurious emission 3



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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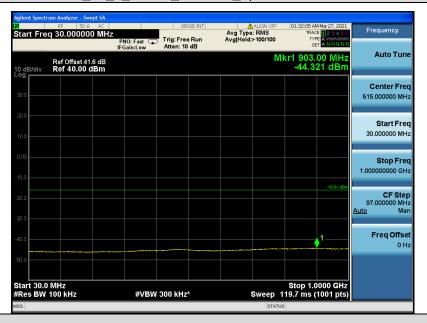
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DL_1S_T_AWGN_Pre-AGC_Spurious emission 2





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DL_1S_T_AWGN_Pre-AGC_Spurious emission 3



DL_1S_B_GSM_Pre-AGC_Spurious emission 1





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DL_1S_B_GSM_Pre-AGC_Spurious emission 2



DL_1S_B_GSM_Pre-AGC_Spurious emission 3





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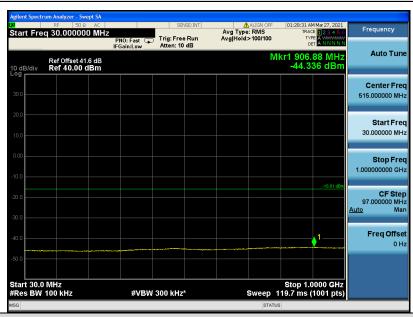
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DL_1S_M_GSM_Pre-AGC_Spurious emission 2





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1.6 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 AC 110V.
- 2. At +20 °C temperature and $\pm 15\%$ 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.
- 4. Frequency stability has been tested using an AWGN test signal and a GSM-TDMA test signal, only the worst-case was recorded in this report.



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Frequency stability vs temperature							
Temperature (°C)	Test Conf.	Test data (MHz)	Tolerance (ppm)	Verdict			
50		2593.002563	0.04	PASS			
40		2593.002147	-0.12	PASS			
30		2593.001473	-0.38	PASS			
20		2593.002453	Reference	PASS			
10	DL_1S_M_AWGN	2593.001842	-0.24	PASS			
0		2593.002734	0.11	PASS			
-10		2593.001342	-0.43	PASS			
-20		2593.001265	-0.46	PASS			
-30		2593.002573	-0.46	PASS			

Frequency stability vs voltage						
Voltage (V)	Test Conf.	Test data (MHz)	Tolerance (ppm)	Verdict		
AC 93.5		2593.002263	-0.07	PASS		
AC 110	DL_1S_M_AWGN	2593.002453	Reference	PASS		
AC 126.5		2593.002487	0.01	PASS		



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1.7 Radiated spurious emissions

Note:

1. The tested max conducted power for single antenna port is 43.00dBm, the 2x2 MIMO total power is 43.00dBm+43.00dBm=39.9W.

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 log10 (P) dB

Here,

P=39.9W,

So the limit =

P(dBm)-[43 + 10 log (39.9W)] = -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 Level (dBm) 10 13DBM -10 -30 -50 5 -70 -90 -110 -120 1000 50 100 200 500 Frequency (MHz) Limit Read Correction Over Freq Level Factor Level Line Limit Pol/Phase dBm MHz dBm dB dBm dB 34.40 -75.95 2.92 -73.03 -12.99 -60.04 HORIZONTAL 1 -2.46 -73.79 -12.99 -60.80 59.23 -71.33 HORIZONTAL 3 101.29 -64.23 -9.58 -73.81 -12.99 -60.82 HORIZONTAL 4 173.21 -57.33 -6.12 -63.45 -12.99 -50.46 HORIZONTAL 281.99 -59.39 -2.47 -61.86 -12.99 -48.87 HORIZONTAL 5 903.31 -79.47 9.25 -70.22 -12.99 -57.23 HORIZONTAL



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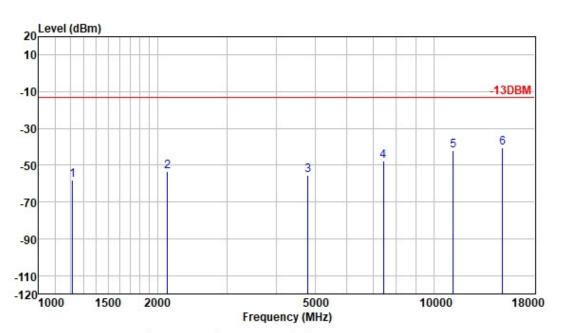
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DL 1S M AWGN Horizontal above 1GHz



		Read Correction			Limit	Over	
	Freq	Level	Factor	Level	Line	Limit	Pol/Phase
	MHz	dBm	dB	dBm	dBm	dB	-
1	1217.19	-61.14	3.34	-57.80	-12.99	-44.81	HORIZONTAL
2	2120.17	-62.61	9.44	-53.17	-12.99	-40.18	HORIZONTAL
3	4804.11	-63.80	8.29	-55.51	-12.99	-42.52	HORIZONTAL
4	7454.43	-63.73	16.11	-47.62	-12.99	-34.63	HORIZONTAL
5	11172.56	-64.85	22.71	-42.14	-12.99	-29.15	HORIZONTAL
6	14916.94	-62.16	21.69	-40.47	-12.99	-27.48	HORIZONTAL



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DL 1S M AWGN Vertical 30MHz~1GHz Level (dBm) 10 13DBM -10 -30 -50 2 5 -70 -90 -110 -120 50 100 200 1000 500 Frequency (MHz) Limit Read Correction Over Freq Level Factor Level Line Limit Pol/Phase dBm MHz dBm dB dBm dB 52.21 -62.66 -6.06 -68.72 -12.99 -55.73 VERTICAL 1 -60.57 -5.02 -65.59 -12.99 -52.60 102.72 VERTICAL 3 171.39 -70.97 -3.94 -74.91 -12.99 -61.92 VERTICAL 4 252.06 -60.65 -5.71 -66.36 -12.99 -53.37 VERTICAL 5 370.70 -66.45 -1.43 -67.88 -12.99 -54.89 VERTICAL 501.18 -72.79 1.74 -71.05 -12.99 -58.06 VERTICAL



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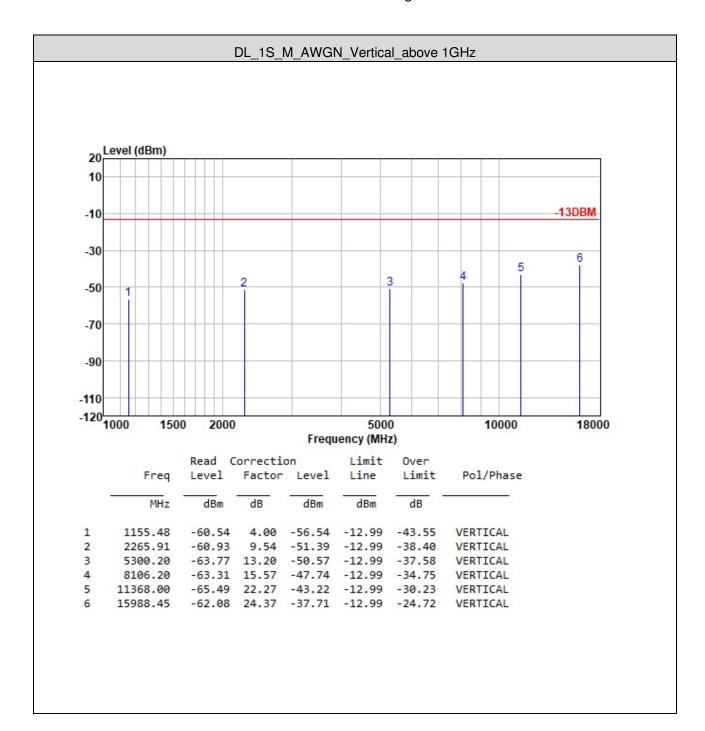
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-- End of Appendix B--



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