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Telephone: +86 (0) 20 82155555 Fax: +86 (0) 20 82075059 Email: ee.guangzhou@sgs.com Application No.: GZCR2103000017AT Page: 1 of 31 FCC ID: OJFDHRU-DHPAM-23

Appendix B Test Data and Result Details of GZCR2103000017AT



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#### 1 WCS (only for downlink: 2350-2360MHz)

#### 1.1 AGC threshold level

Test Conf.	AGC Threshold level
DL_1S_M_AWGN_AWGN	-0.13dBm
DL_1S_M_AWGN_GSM	0.06dBm

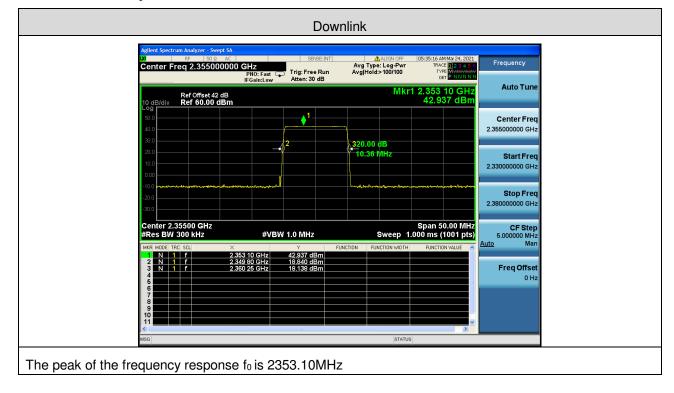


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#### 1.2 Out-of-band rejection



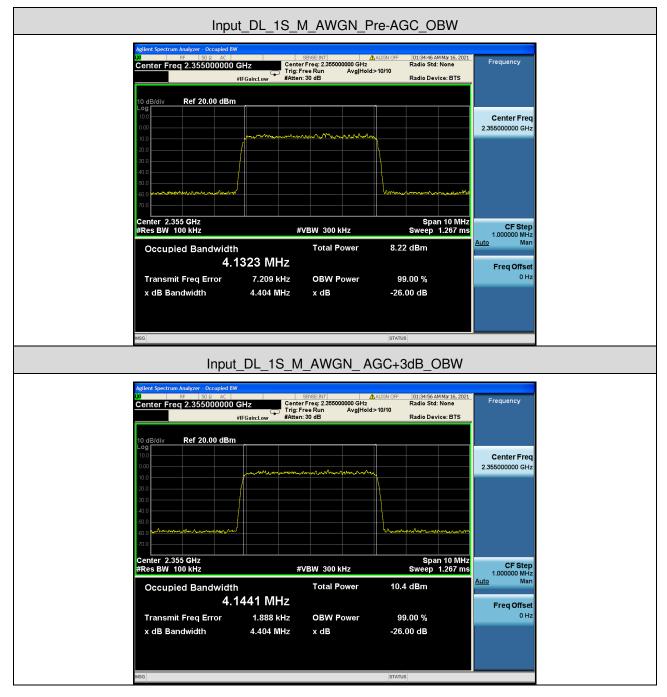


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#### 1.3 Input-versus-output signal comparison

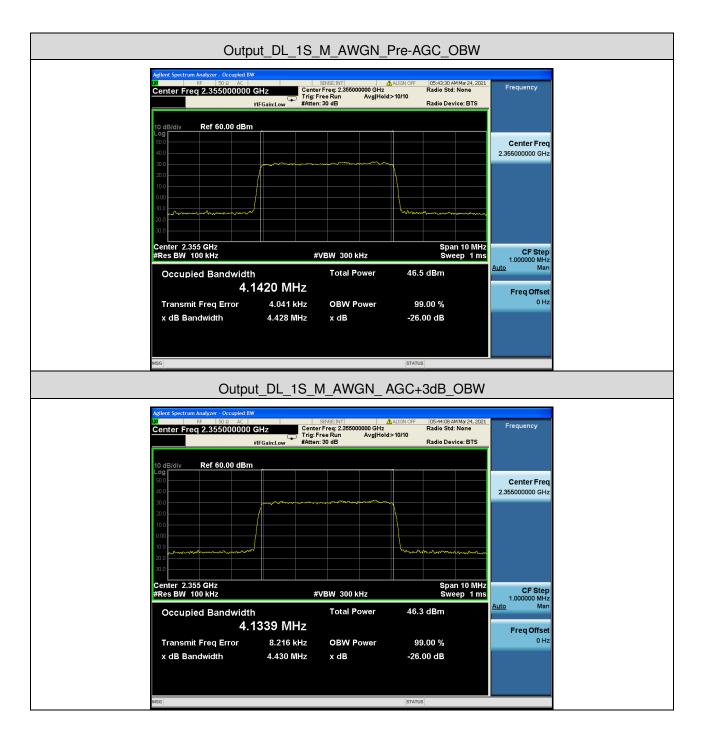




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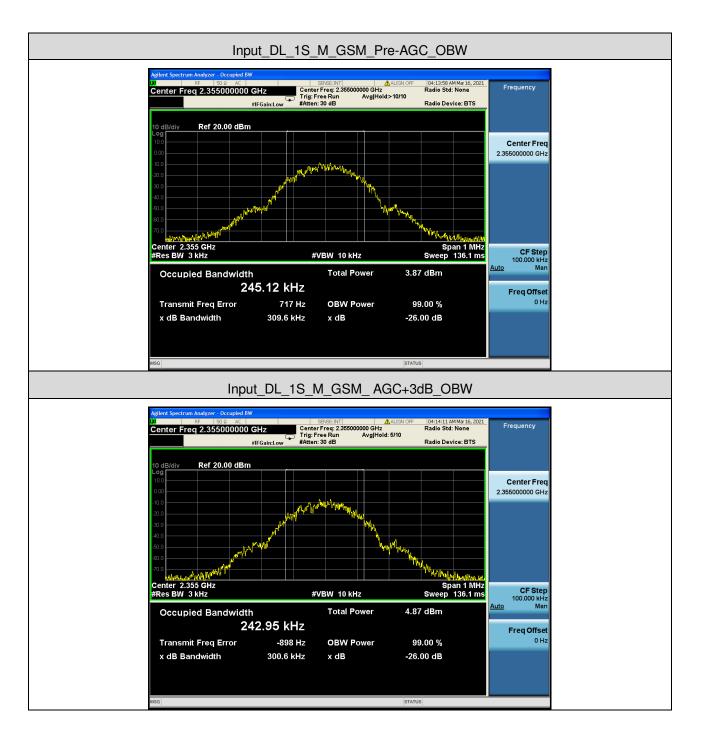




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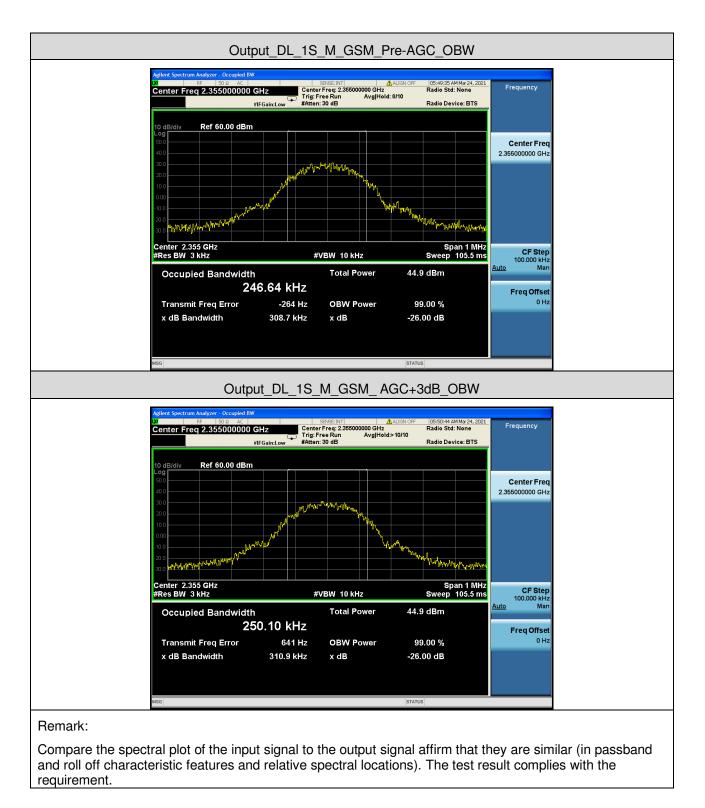




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#### 1.4 Mean output power and amplifier/booster gain

Test Conf.	Test Freq. f₀ (MHz)	Signal Level	Input Power (dBm)	Output Power (dBm)	Gain (dB)	Verdict
DL_1S_AWGN	2353.10	Pre-AGC	-0.23	43.34	43.57	PASS
		AGC+3dB	2.77	43.28	/	PASS
DL_1S_GSM	2353.10	Pre-AGC	-0.94	43.19	44.13	PASS
		AGC+3dB	2.06	43.30	/	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<sub>ANT</sub>) dBi = 12.5dBi+10log (2) dBi= 15.5dBi.

The total maximum EIRP for the EUT is (43.34dBm+43.34dBm) +15.5dBi=61.85dBm (1531.1W) which don't exceed the required EIRP limit (2000W/5MHz).

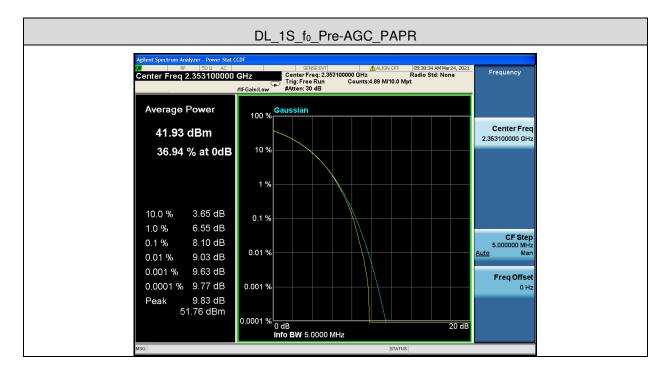


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Test Conf.	Test Freq. f₀ (MHz)	Signal Level	PAPR (dB)	V	
DL_1S_AWGN	2353.10	Pre-AGC	9.03	13	PASS





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

Note: 1. The tested max conducted power for single antenna port is 43.34dBm, the power of any emission outside a licensee's frequency band(s) shall be attenuated below the transmitter power (P) in watts (i) By a factor of not less than 43 + 10 log (P) dB on all frequencies between 2305 and 2320 MHz and on all frequencies between 2345 and 2360 MHz that are outside the licensed band(s) of operation. Here. P=43.34dBm= 21.58W. So the limit = P(dBm)- [43 + 10 log (21.58W)] =-13dBm By a factor of not less than 75 + 10 log (P) dB on all frequencies between 2320 and 2345 MHz Here. P=43.34dBm= 21.58W. So the limit = P(dBm)- [75 + 10 log (21.58W)] =-45dBm (ii) By a factor of not less than 43 + 10 log (P) dB on all frequencies between 2300 and 2305 MHz Here. P=43.34dBm= 21.58W So the limit = P(dBm)- [43 + 10 log (21.58W)] =-13dBm By a factor of not less than 70 + 10 log (P) dB on all frequencies between 2287.5 and 2300 MHz Here. P=43.34dBm= 21.58W So the limit = P(dBm)- [70 + 10 log (21.58W)] =-40dBm



By a factor of not less than 72 + 10 log (P) dB on all frequencies between 2285 and Unless otherwise agreed in writing, this document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at <a href="http://www.sgs.com/en/Terms-and-Conditions.reg.com/en/Terms-and-Conditions">http://www.sgs.com/en/Terms-and-Conditions.reg.com/en/Terms-and-Con



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2287.5 MHz Here. P=43.34dBm= 21.58W So the limit = P(dBm)- [72 + 10 log (21.58W)] =-42dBm By a factor of not less than 75 + 10 log (P) dB below 2285 MHz Here, P=43.34dBm= 21.58W So the limit = P(dBm)- [75 + 10 log (21.58W)] =-45dBm (iii) By a factor of not less than 43 + 10 log (P) dB on all frequencies between 2360 and 2362.5 MHz Here, P=43.34dBm= 21.58W So the limit = P(dBm)- [43 + 10 log (21.58W)] =-13dBm By a factor of not less than 55 + 10 log (P) dB on all frequencies between 2362.5 and 2365 MHz Here. P=43.34dBm= 21.58W So the limit = P(dBm)- [55 + 10 log (21.58W)] =-25dBm By a factor of not less than 70 + 10 log (P) dB on all frequencies between 2365 and 2367.5 MHz Here. P=43.34dBm= 21.58W So the limit = P(dBm)- [70 + 10 log (21.58W)] =-40dBm



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By a factor of not less than 72 + 10 log (P) dB on all frequencies between 2367.5 and 2370 MHz Here, P=43.34dBm= 21.58W So the limit =  $P(dBm) - [72 + 10 \log (21.58W)] = -42dBm$ By a factor of not less than 75 + 10 log (P) dB above 2370 MHz Here, P=43.34dBm= 21.58W So the limit = P(dBm)- [75 + 10 log (21.58W)] =-45dBm The EUT supports 2x2 MIMO and the emissions were measured at one of output port, so the limit lines were set to -16.01dBm/-48.01dBm/-43.01dBm/-45.01dBm/-28.01dBm Separately in following test plots in order to determine the test result conveniently. 2. Spurious emissions have been tested using an AWGN test signal and a GSM-TDMA test signal, only the worst-case was recorded in this report.

3. Spurious emissions have been tested using a single test signal sequentially tuned to the low, middle and high channels within the authorized frequency band of operation, only the worst-case was recorded in this report.



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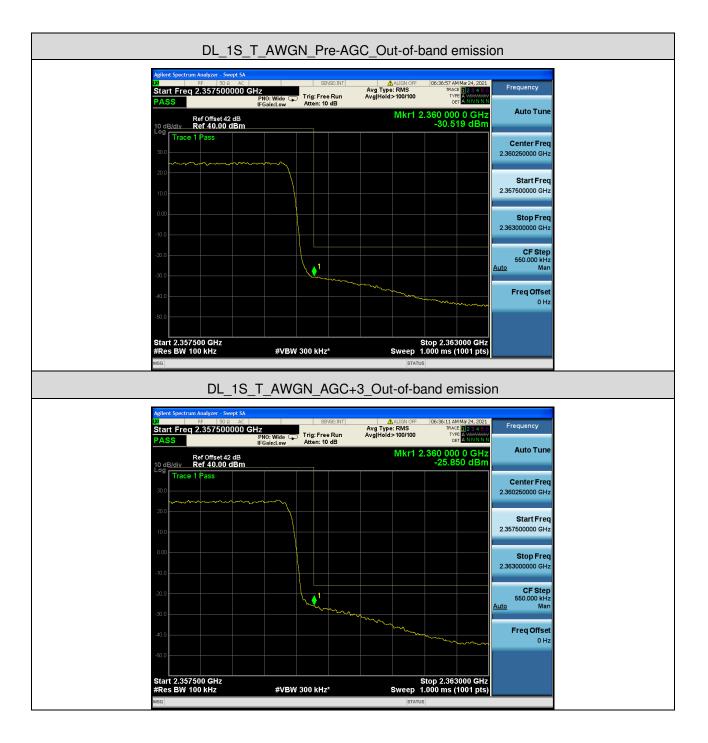




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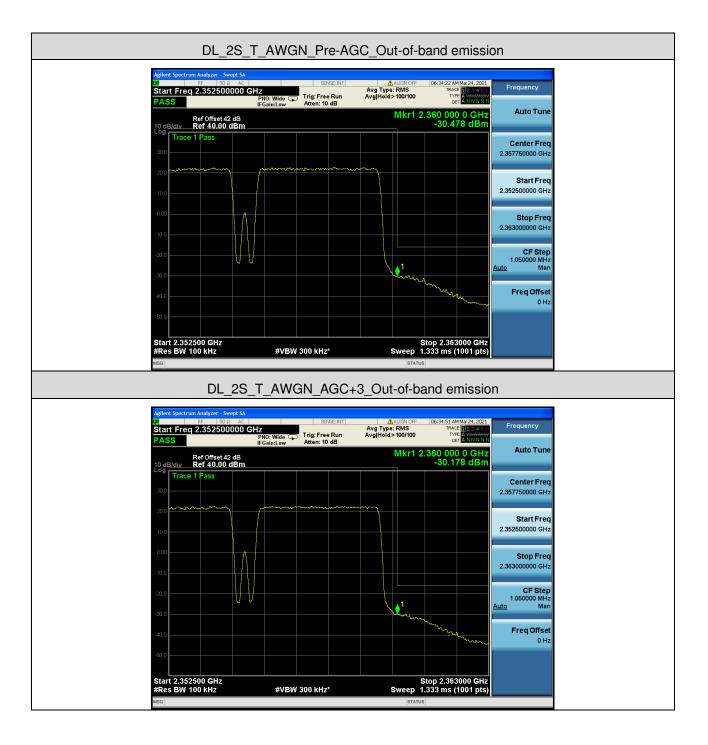








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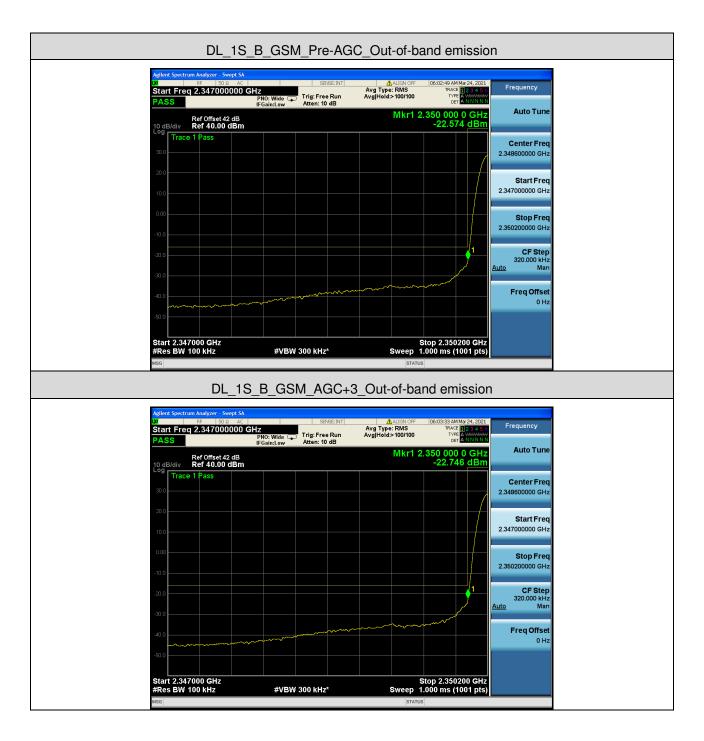




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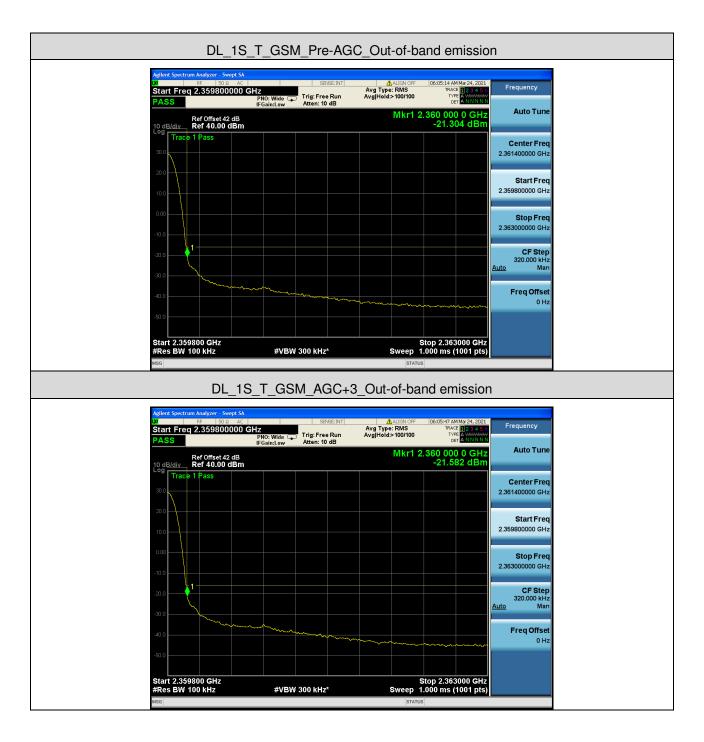




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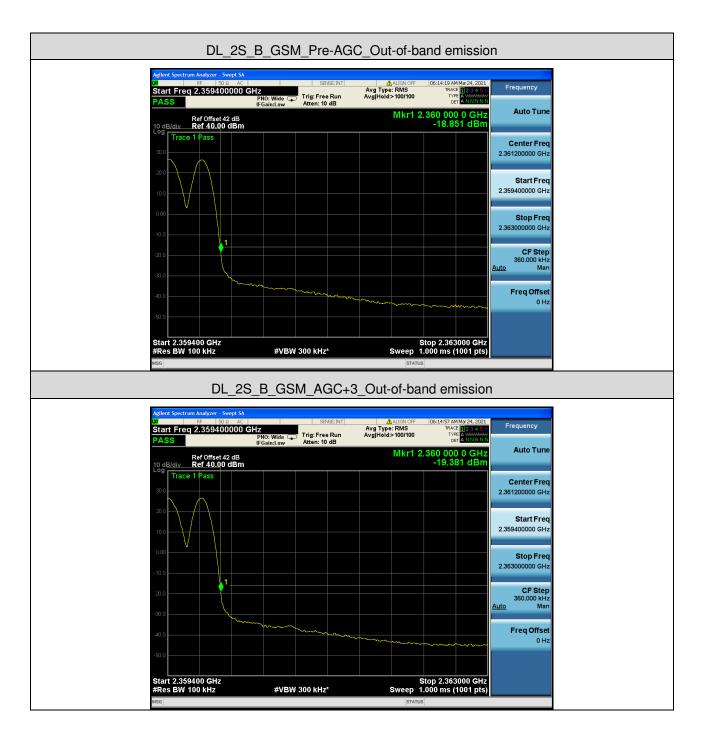




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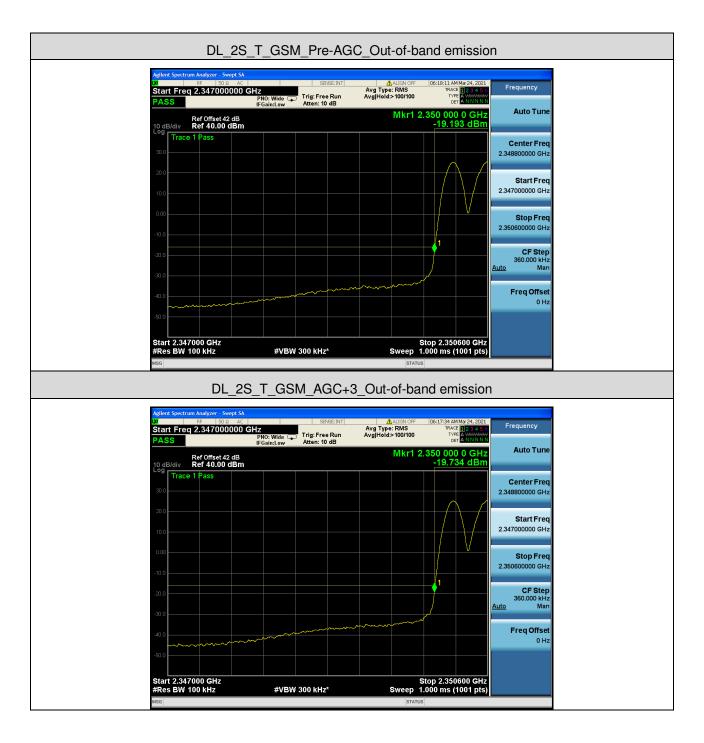




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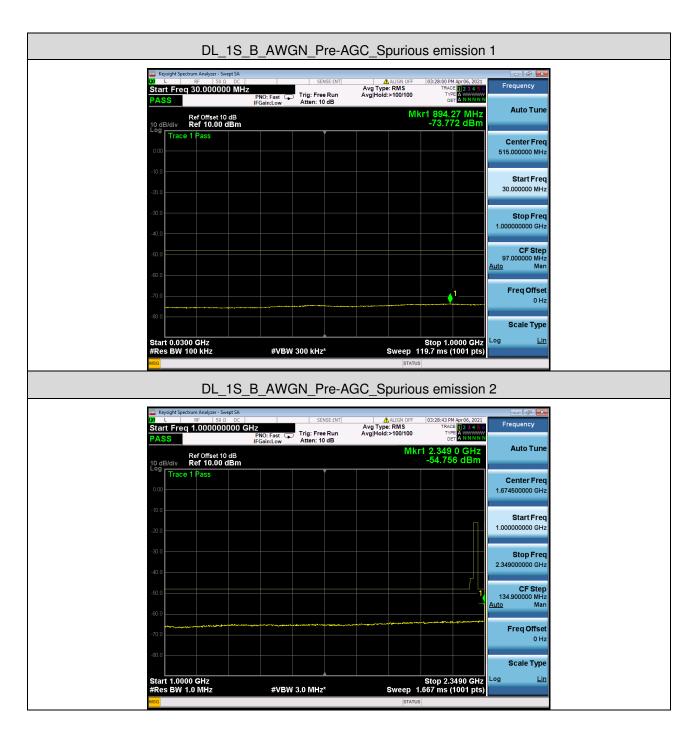




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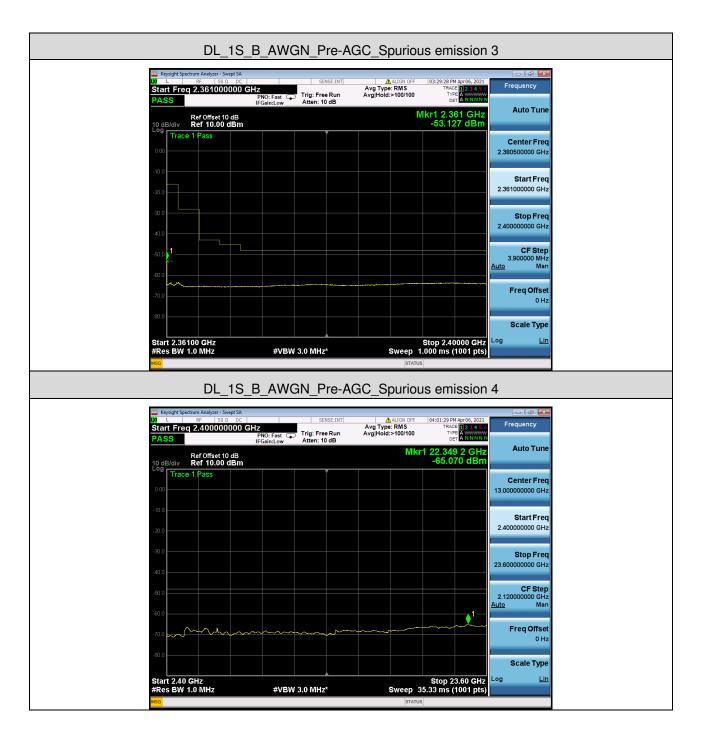
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#### 1.6 Frequency Stability

Note:

1. At 10  $^{\circ}$ C intervals of temperatures between -30  $^{\circ}$ C and +50  $^{\circ}$ 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.

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		2355.002834	-0.27	PASS	
40		2355.004532	0.45	PASS	
30		2355.003745	0.12	PASS	
20		2355.003462	Reference	PASS	
10	DL_1S_M_AWGN	2355.004582	0.48	PASS	
0		2355.003845	0.16	PASS	
-10		2355.002835	-0.27	PASS	
-20		2355.002693	-0.33	PASS	
-30		2355.002573	-0.38	PASS	

Frequency stability vs voltage					
Voltage (V)	Test Conf.	Test data (MHz)	Tolerance (ppm)	Verdict	
AC 93.5		2355.003197	-0.11	PASS	
AC 110	DL_1S_M_AWGN	2355.003462	Reference	PASS	
AC 126.5		2355.003235	0.10	PASS	



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#### 1.7 Radiated spurious emissions

Note: 1. The tested max conducted power for single antenna port is 43.34dBm, the 2x2 MIMO total power is 43.34dBm+43.34dBm= 43.16W. The power of any emission outside a licensee's frequency band(s) shall be attenuated below the transmitter power (P) in watts (i) By a factor of not less than 43 + 10 log (P) dB on all frequencies between 2305 and 2320 MHz and on all frequencies between 2345 and 2360 MHz that are outside the licensed band(s) of operation. Here. P=43.16W. So the limit = P(dBm)- [43 + 10 log (43.16W)] =-13dBm By a factor of not less than 75 + 10 log (P) dB on all frequencies between 2320 and 2345 MHz Here. P=43.16W. So the limit = P(dBm)- [75 + 10 log (43.16W)] =-45dBm (ii) By a factor of not less than 43 + 10 log (P) dB on all frequencies between 2300 and 2305 MHz Here. P=43.16W So the limit = P(dBm)- [43 + 10 log (43.16W)] =-13dBm By a factor of not less than 70 + 10 log (P) dB on all frequencies between 2287.5 and 2300 MHz Here, P=43.16W So the limit = P(dBm)- [70 + 10 log (43.16W)] =-40dBm



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By a factor of not less than 72 + 10 log (P) dB on all frequencies between 2285 and 2287.5 MHz Here. P=43.16W So the limit = P(dBm)- [72 + 10 log (43.16W)] =-42dBm By a factor of not less than 75 + 10 log (P) dB below 2285 MHz Here, P=43.16W So the limit = P(dBm)- [75 + 10 log (43.16W)] =-45dBm (iii) By a factor of not less than 43 + 10 log (P) dB on all frequencies between 2360 and 2362.5 MHz Here. P=43.16W So the limit = P(dBm)- [43 + 10 log (43.16W)] =-13dBm By a factor of not less than 55 + 10 log (P) dB on all frequencies between 2362.5 and 2365 MHz Here. P=43.16W So the limit = P(dBm)- [55 + 10 log (43.16W)] =-25dBm By a factor of not less than 70 + 10 log (P) dB on all frequencies between 2365 and 2367.5 MHz Here, P=43.16W So the limit = P(dBm)- [70 + 10 log (43.16W)] =-40dBm



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By a factor of not less than 72 + 10 log (P) dB on all frequencies between 2367.5 and 2370 MHz Here, P=43.16W So the limit = P(dBm)- [72 + 10 log (43.16W)] = -42dBmBy a factor of not less than 75 + 10 log (P) dB above 2370 MHz Here, P=43.16W So the limit = P(dBm)- [75 + 10 log (43.16W)] = -45dBm2. 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.

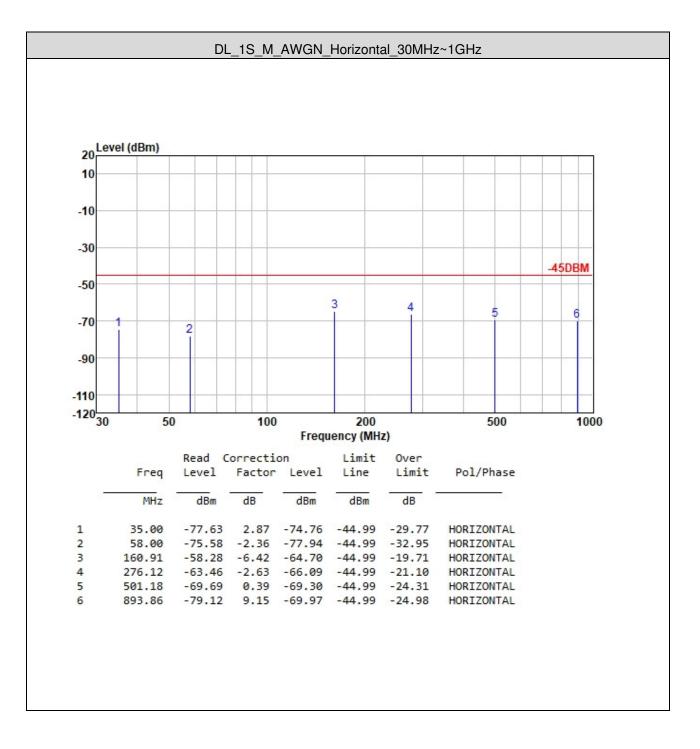
4. The strictest limit -45dBm was used for evaluating the radiated spurious emissions from 9kHz~18GHz



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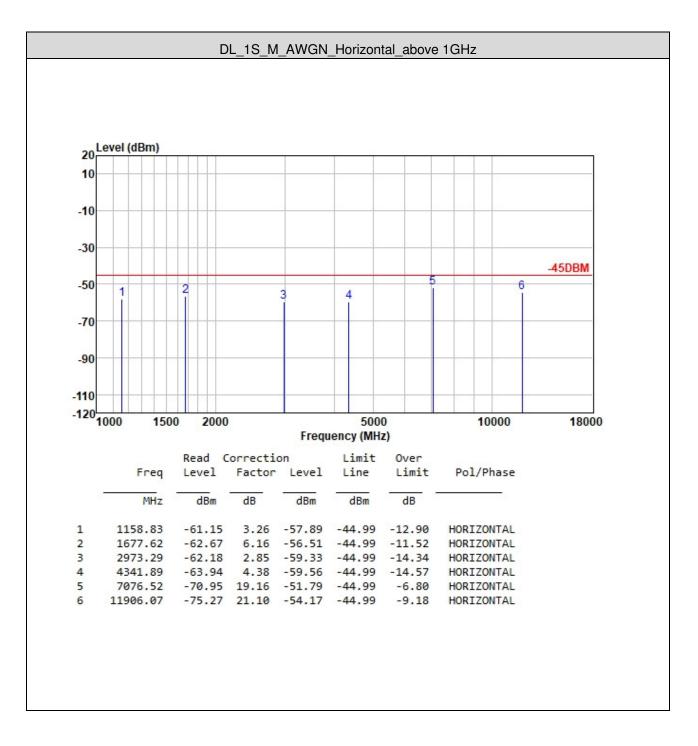




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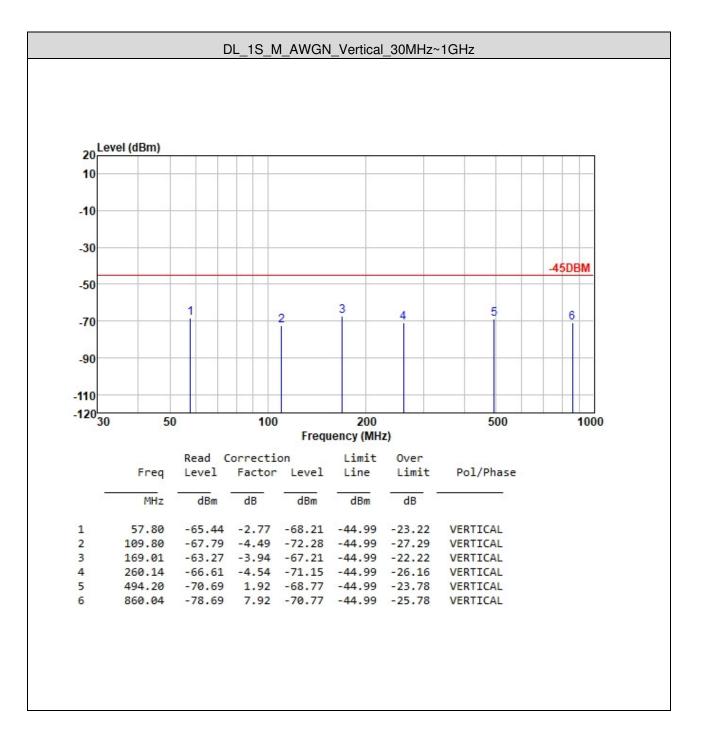




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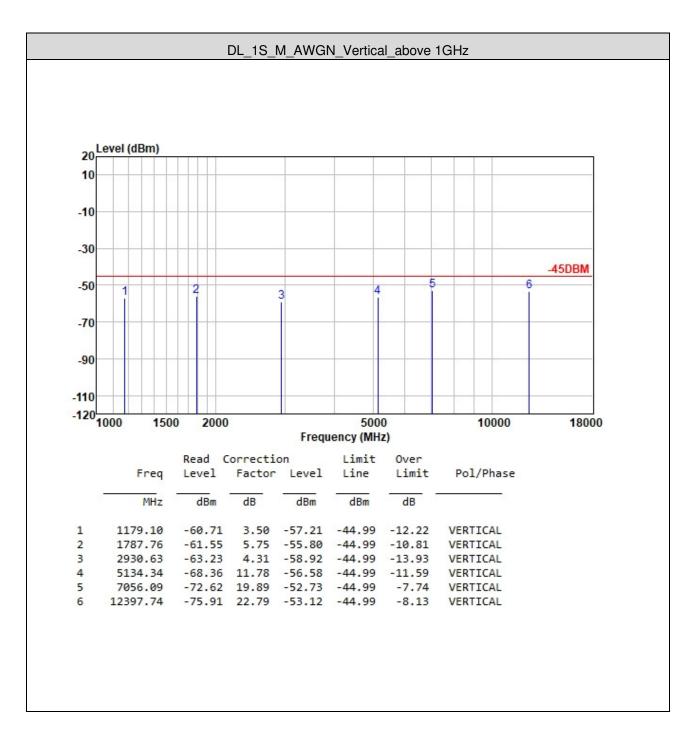




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#### --End of Appendix B--



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