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Application No.: GZCR2103000012AT
Page: 1 of 33
FCC ID: OJFDHRU-DHPAM-6

Appendix B

Test Data and Result Details of GZCR2103000012AT



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

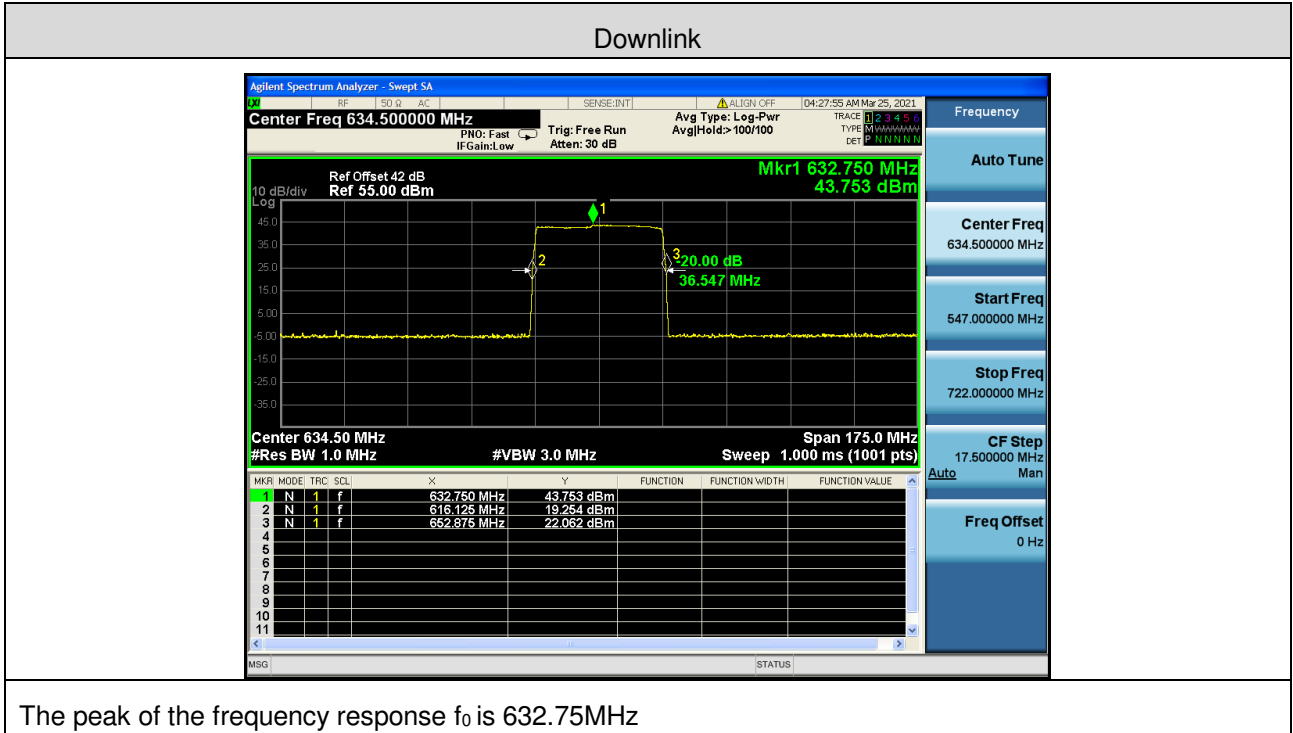
1.1 AGC threshold level

Test Conf.	AGC Threshold level
DL_1S_M_AWGN_AWGN	-0.22dBm
DL_1S_M_AWGN_GSM	-0.30dBm



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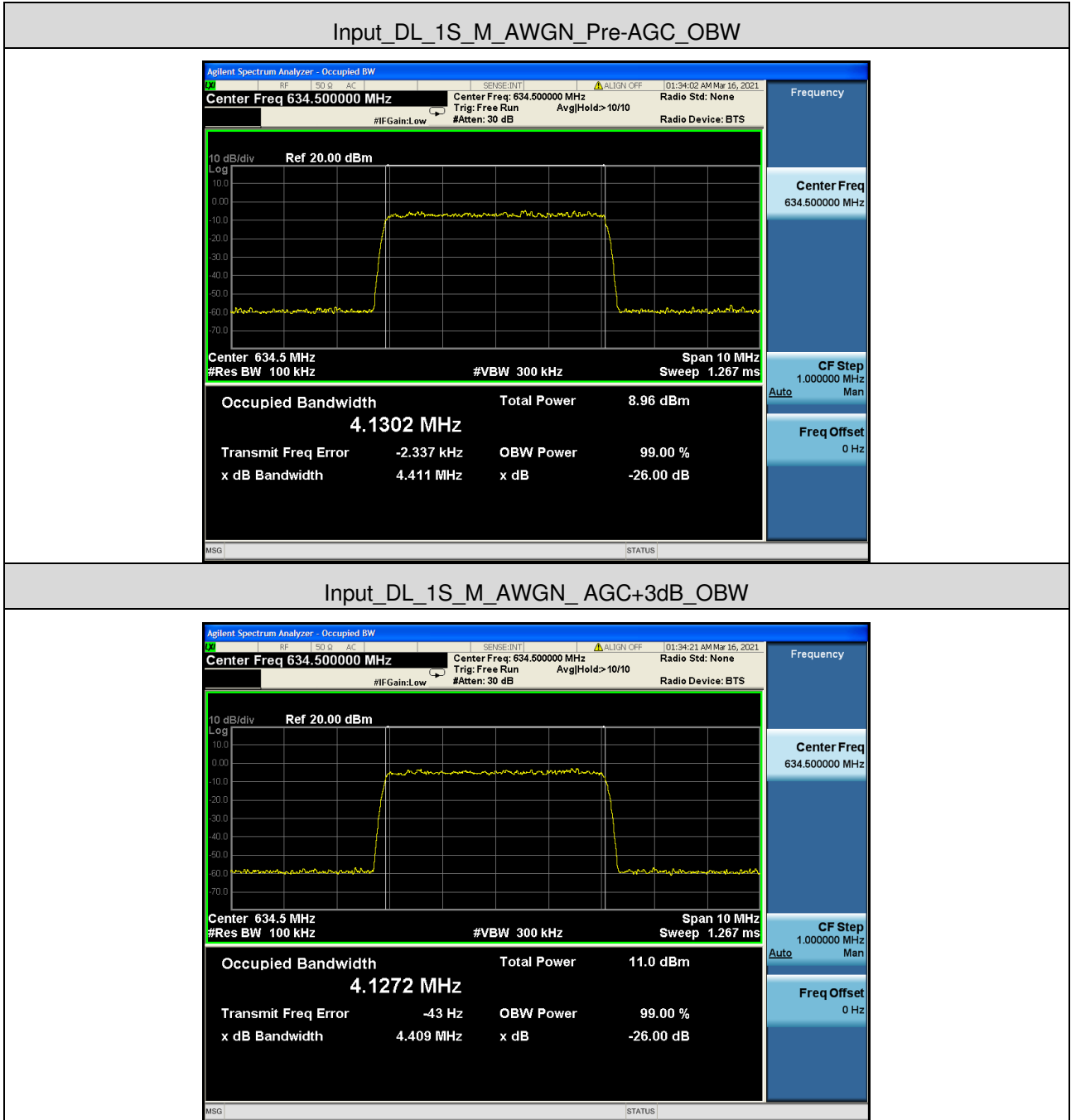
1.2 Out-of-band rejection



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 Guangzhou Branch Testing Center EEC Laboratory. 中国·广州·经济技术开发区科学城科珠路198号 邮编: 510663 t (86-20) 82155555 f (86-20) 82075058 sgs.china@sgs.com

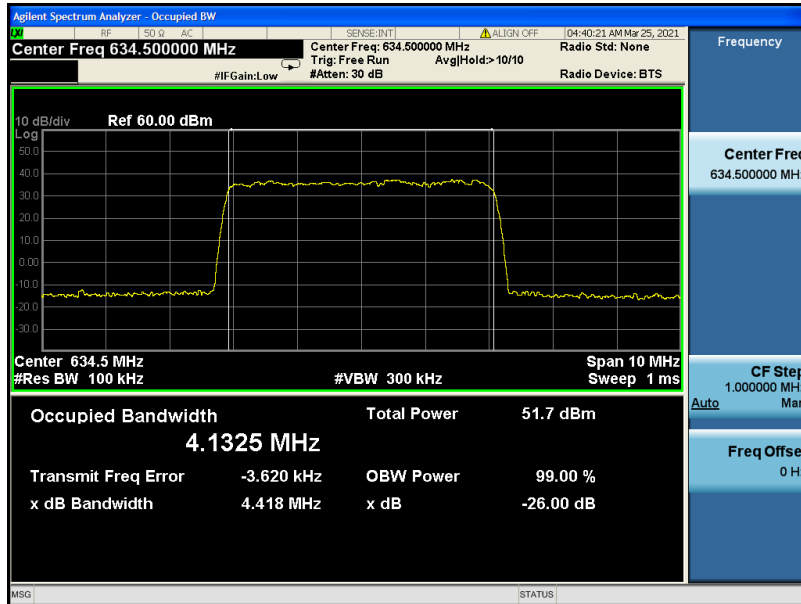
1.3 Input-versus-output signal comparison



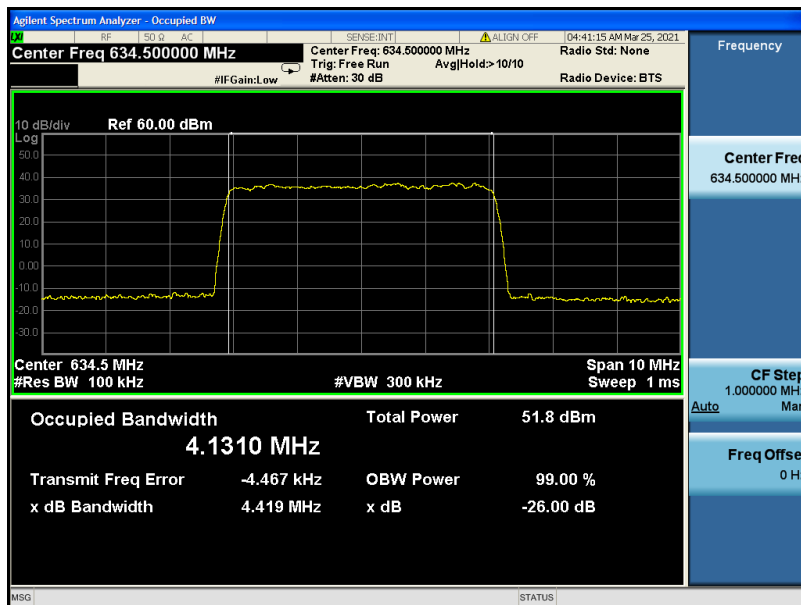
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Output_DL_1S_M_AWGN_Pre-AGC_OBW

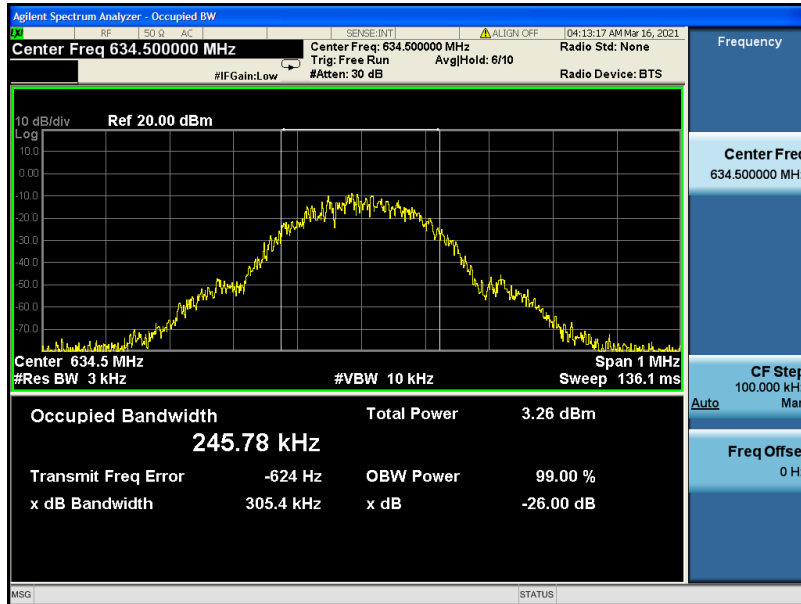


Output_DL_1S_M_AWGN_AGC+3dB_OBW

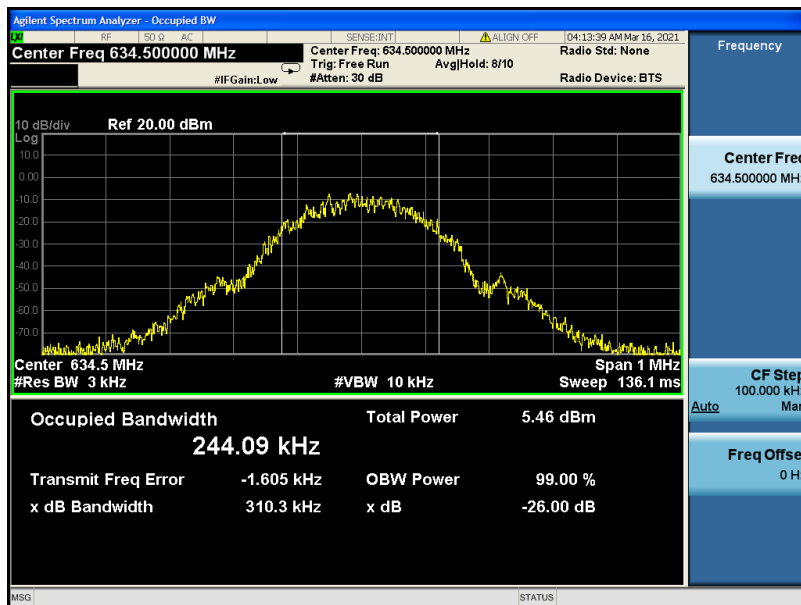


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Input_DL_1S_M_GSM_Pre-AGC_OBW

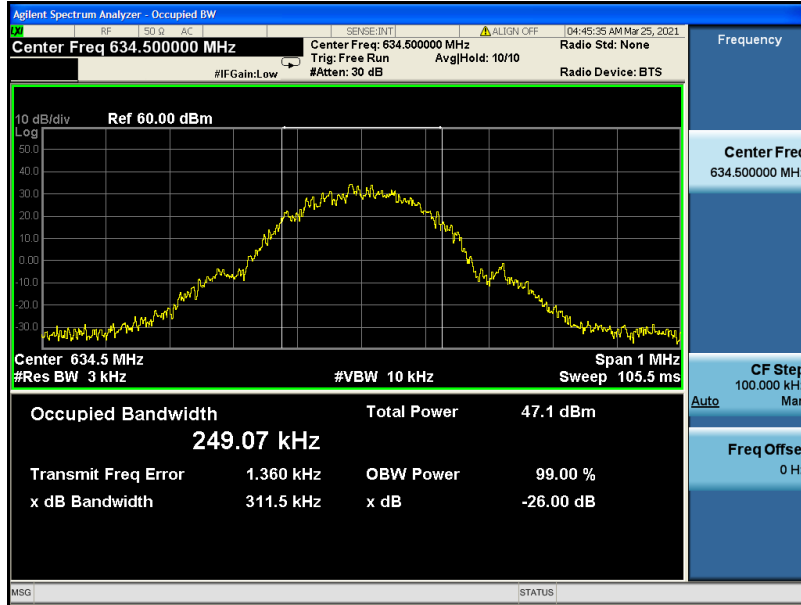


Input_DL_1S_M_GSM_AGC+3dB_OBW

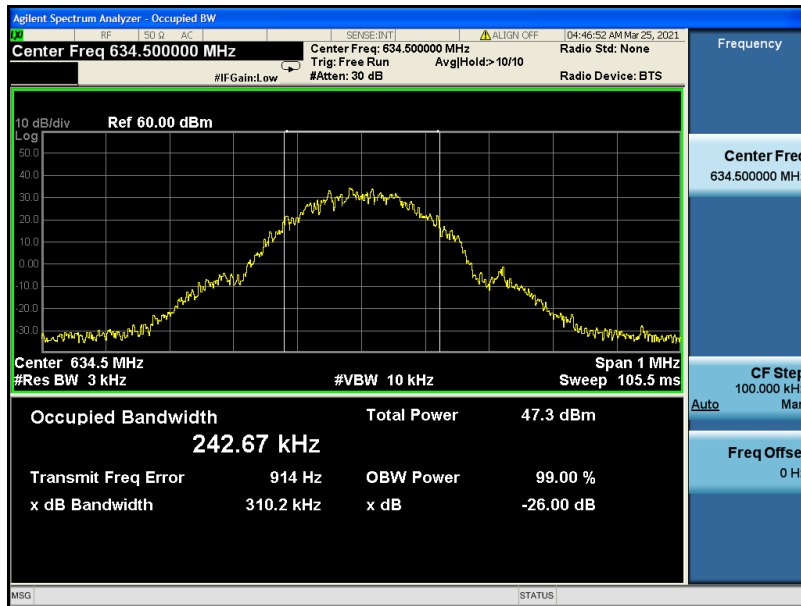


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Output_DL_1S_M_GSM_Pre-AGC_OBW



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	632.75	Pre-AGC	-0.12	43.18	43.30	PASS
		AGC+3dB	2.88	43.03	/	PASS
DL_1S_GSM	632.75	Pre-AGC	-0.20	43.09	43.29	PASS
		AGC+3dB	2.80	43.15	/	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 (43.18dBm+43.18dBm) +15.5dBi-2.15dB=59.54dBm (899.50W) which don't exceed the required ERP limit (1000W/MHz).



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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 43.18dBm, 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,

$P=43.18\text{dBm}= 20.80\text{W}$.

So the limit =

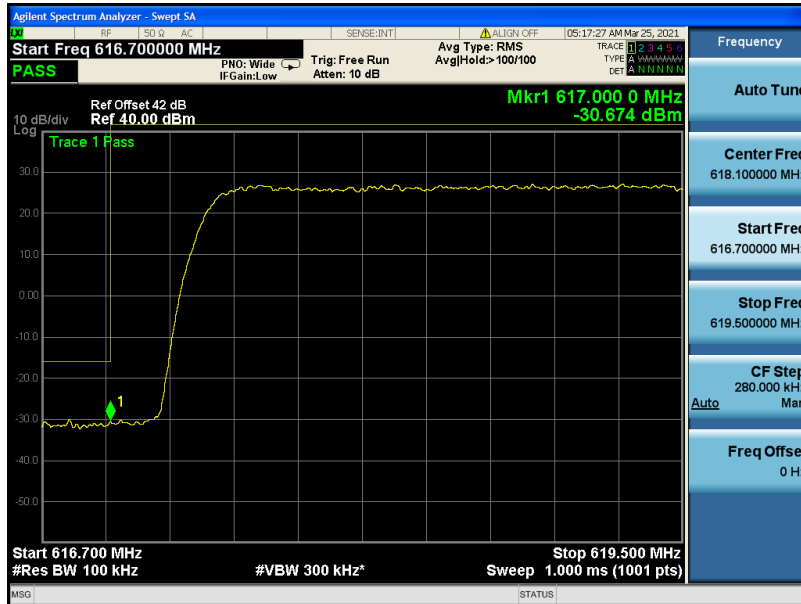
$P(\text{dBm})- [43 + 10 \log (20.80\text{W})] = -13\text{dBm}$

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.

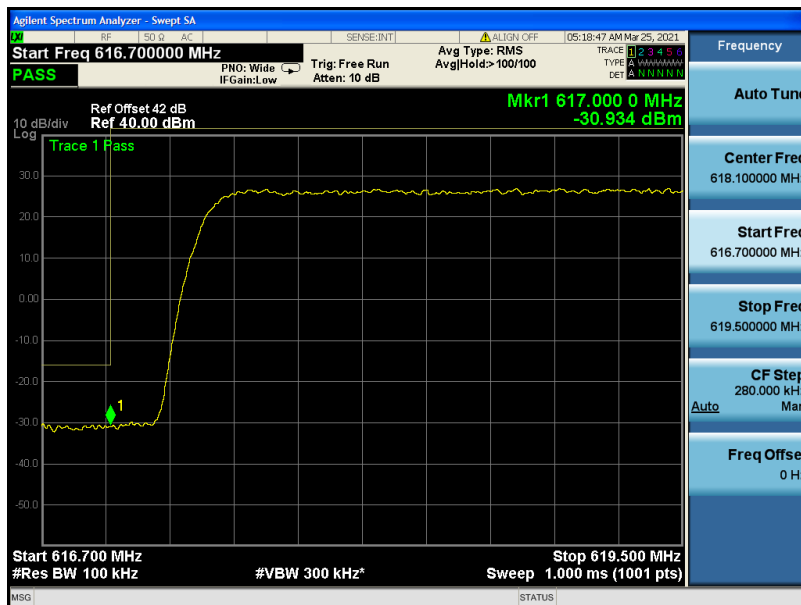


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DL_1S_B_AWGN_Pre-AGC_Out-of-band emission

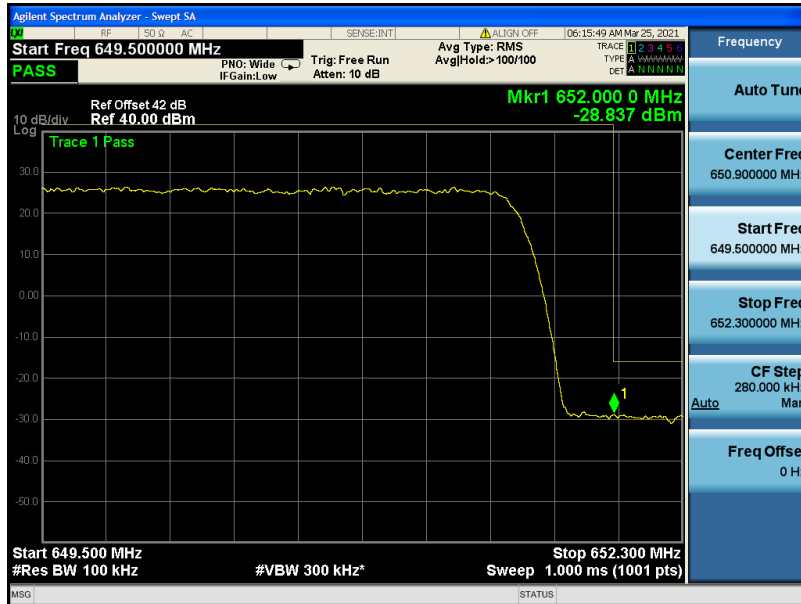


DL_1S_B_AWGN_AGC+3_Out-of-band emission

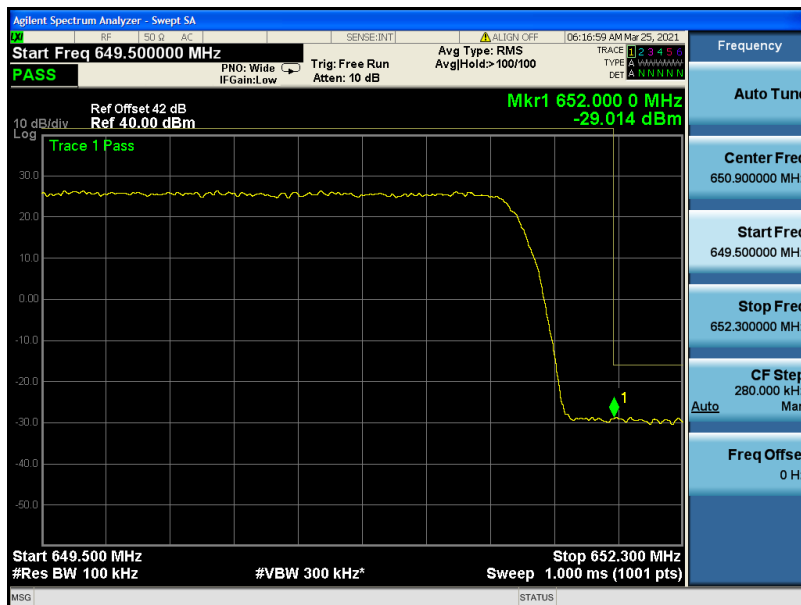


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DL_1S_T_AWGN_Pre-AGC_Out-of-band emission

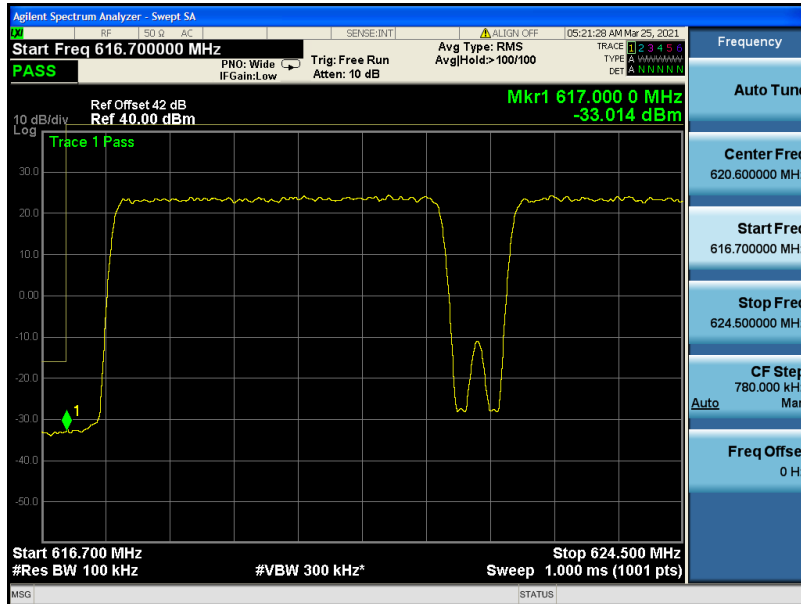


DL_1S_T_AWGN_AGC+3_Out-of-band emission

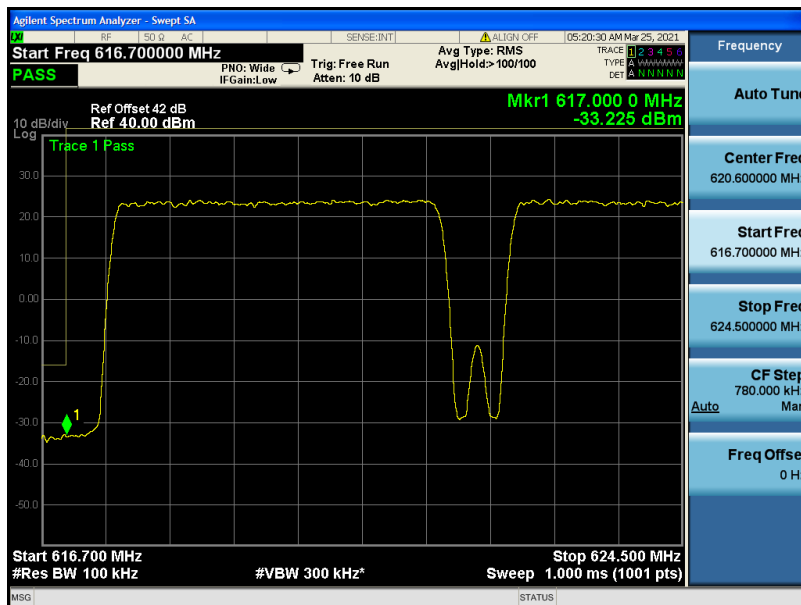


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DL_2S_B_AWGN_Pre-AGC_Out-of-band emission

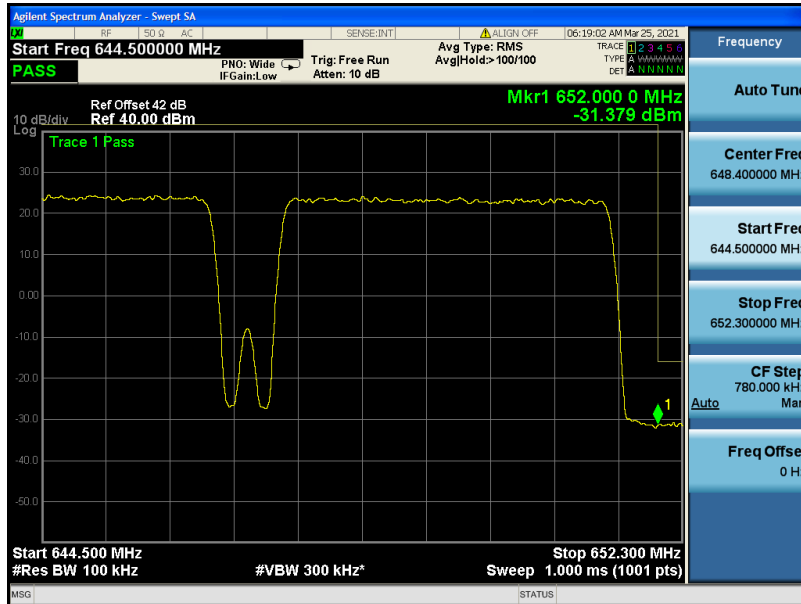


DL_2S_B_AWGN_AGC+3_Out-of-band emission

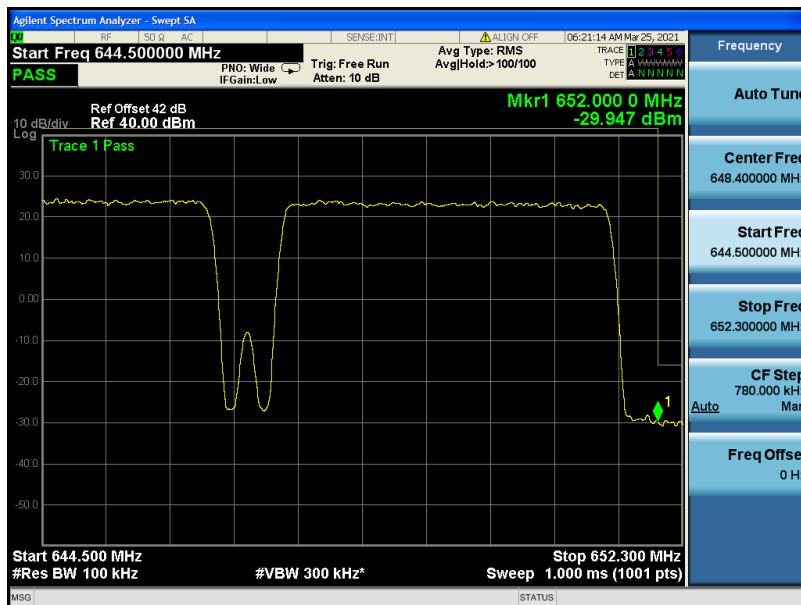


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DL_2S_T_AWGN_Pre-AGC_Out-of-band emission

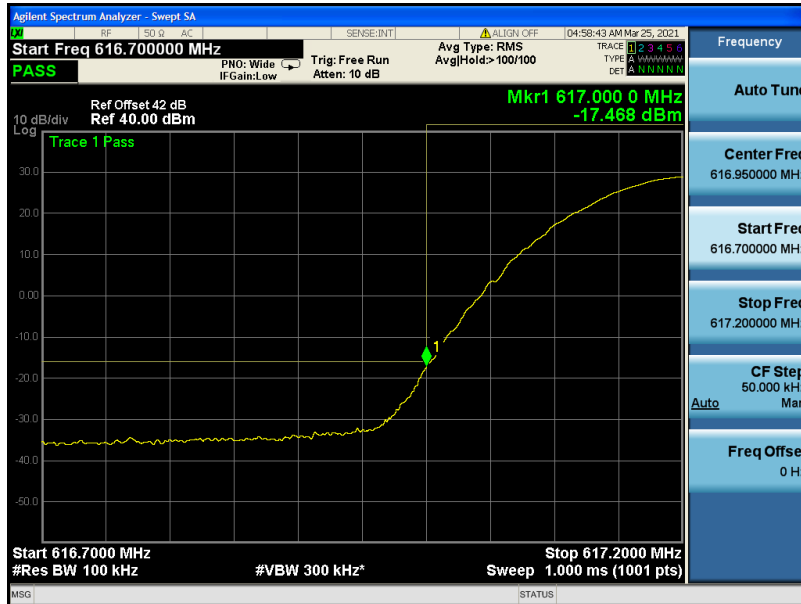


DL_2S_T_AWGN_AGC+3_Out-of-band emission

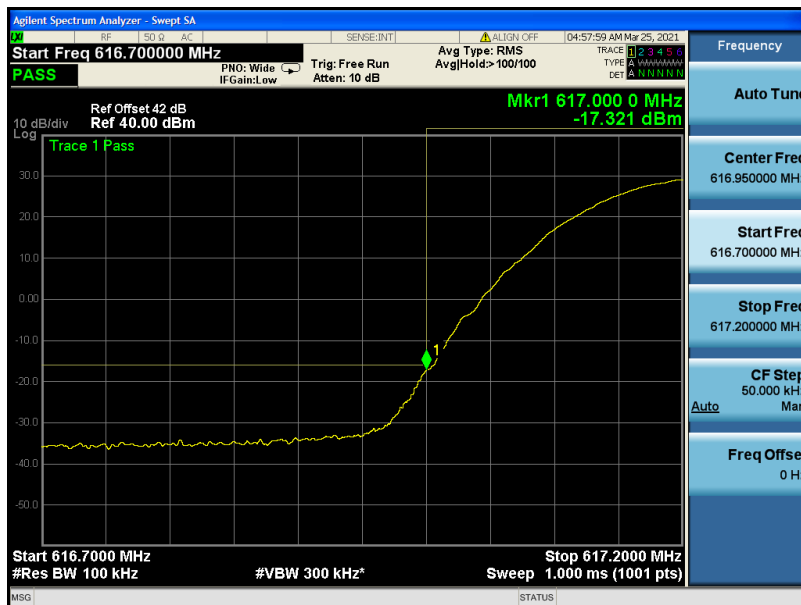


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DL_1S_B_GSM_Pre-AGC_Out-of-band emission

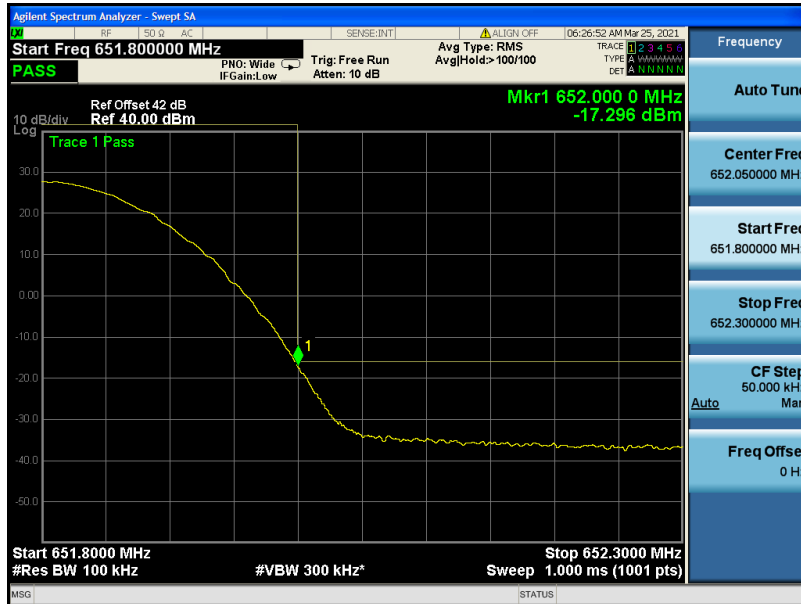


DL_1S_B_GSM_AGC+3_Out-of-band emission

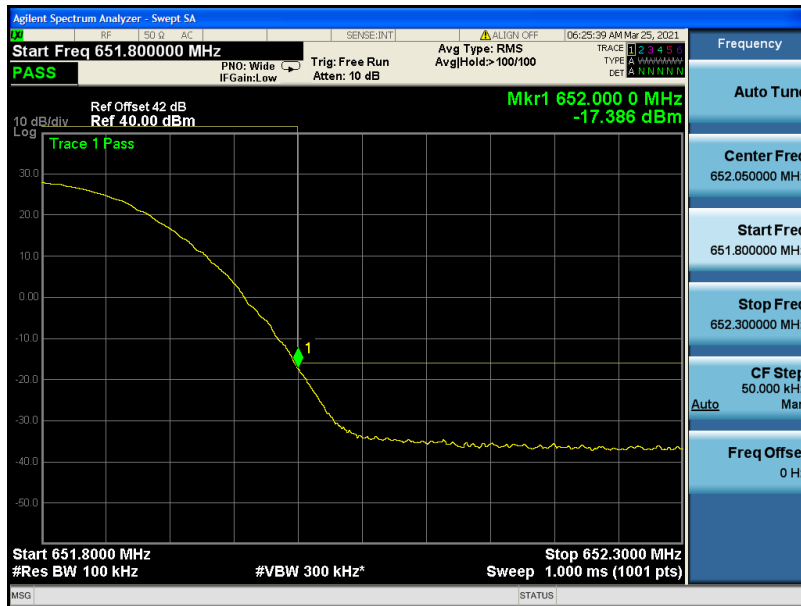


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DL_1S_T_GSM_Pre-AGC_Out-of-band emission

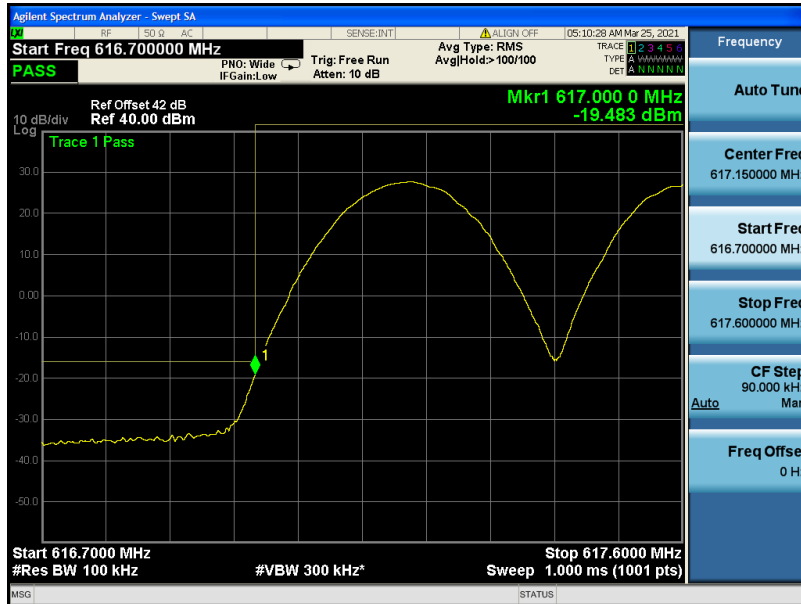


DL_1S_T_GSM_AGC+3_Out-of-band emission

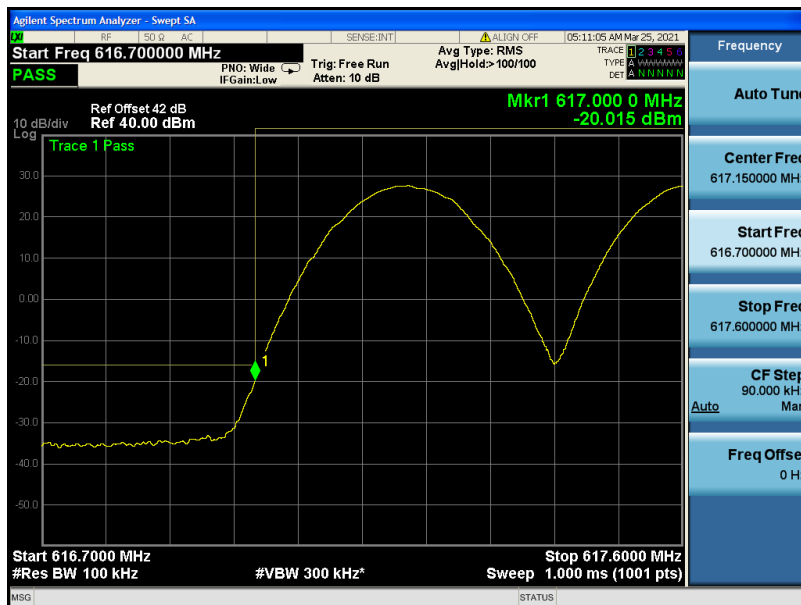


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DL_2S_B_GSM_Pre-AGC_Out-of-band emission

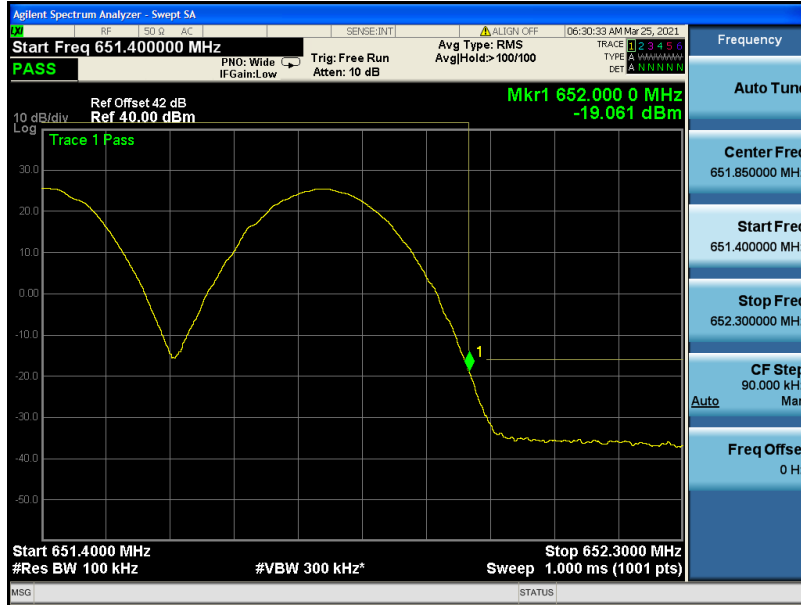


DL_2S_B_GSM_AGC+3_Out-of-band emission

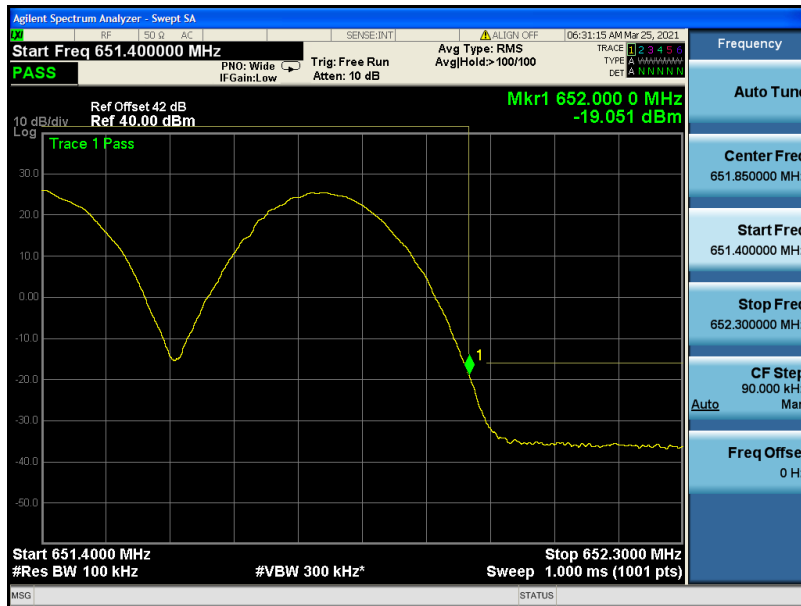


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DL_2S_T_GSM_Pre-AGC_Out-of-band emission

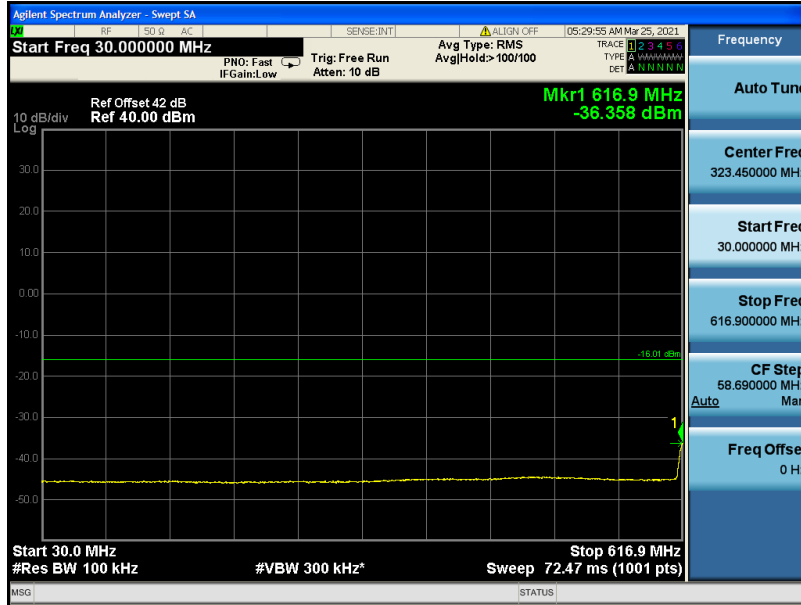


DL_2S_T_GSM_AGC+3_Out-of-band emission

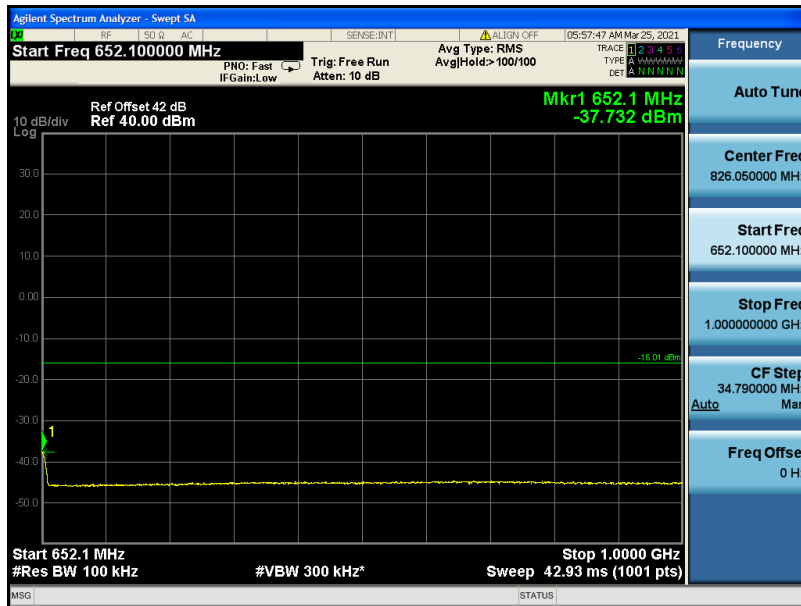


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DL_1S_B_AWGN_Pre-AGC_Spurious emission 1



DL_1S_B_AWGN_Pre-AGC_Spurious emission 2

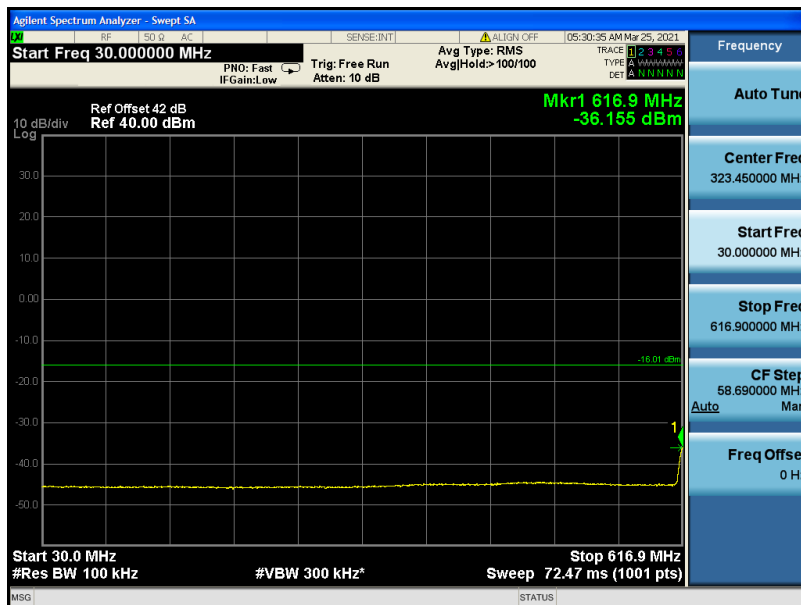


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DL_1S_B_AWGN_Pre-AGC_Spurious emission 3

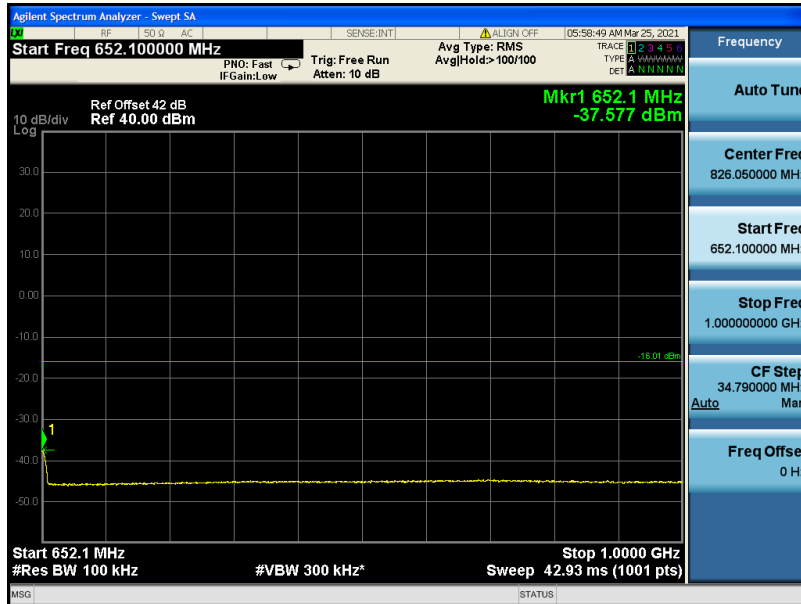


DL_1S_M_AWGN_Pre-AGC_Spurious emission 1



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DL_1S_M_AWGN_Pre-AGC_Spurious emission 2

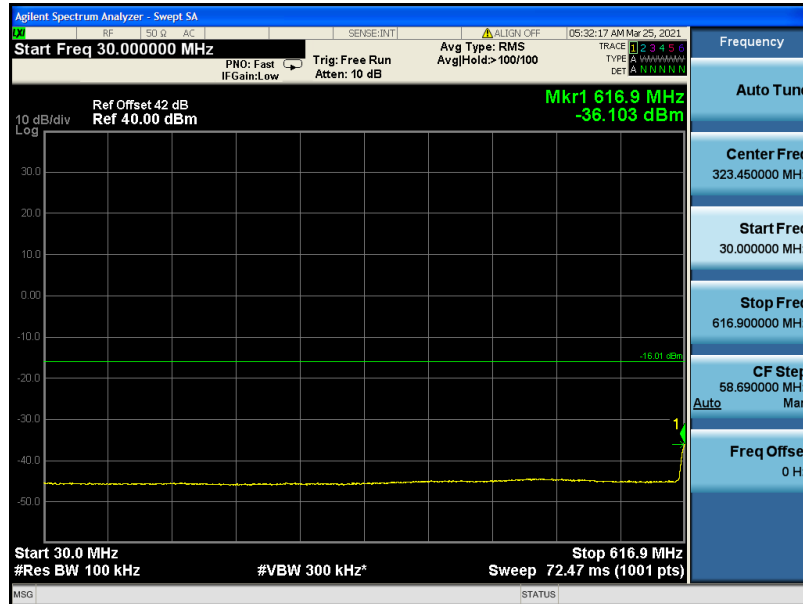


DL_1S_M_AWGN_Pre-AGC_Spurious emission 3

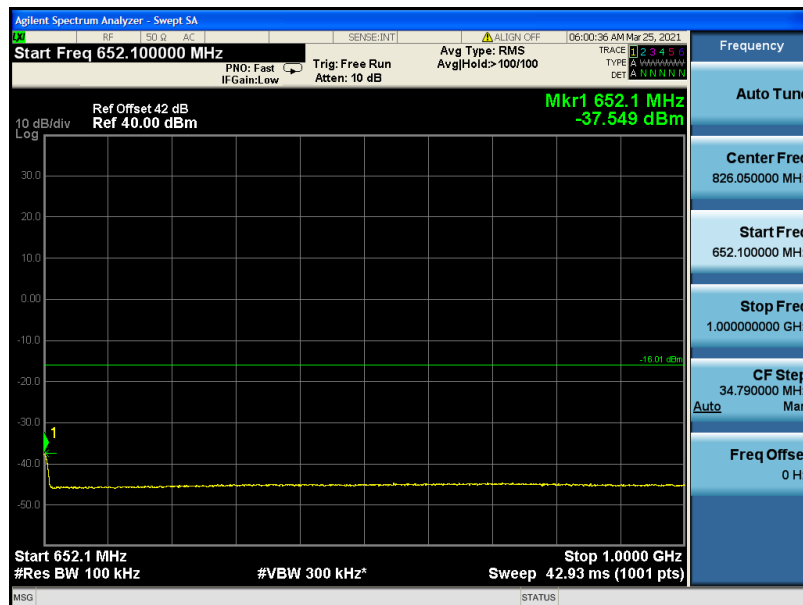


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DL_1S_T_AWGN_Pre-AGC_Spurious emission 1



DL_1S_T_AWGN_Pre-AGC_Spurious emission 2

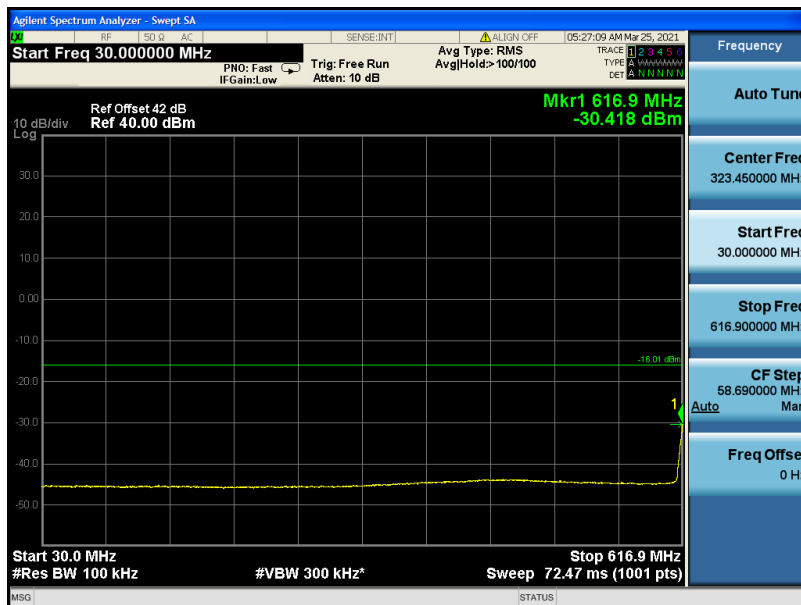


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DL_1S_T_AWGN_Pre-AGC_Spurious emission 3

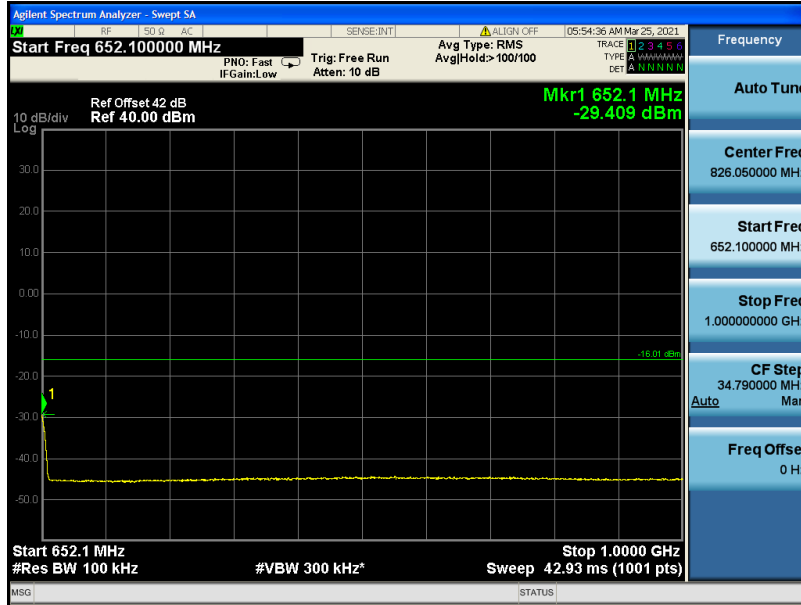


DL_1S_B_GSM_Pre-AGC_Spurious emission 1



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DL_1S_B_GSM_Pre-AGC_Spurious emission 2

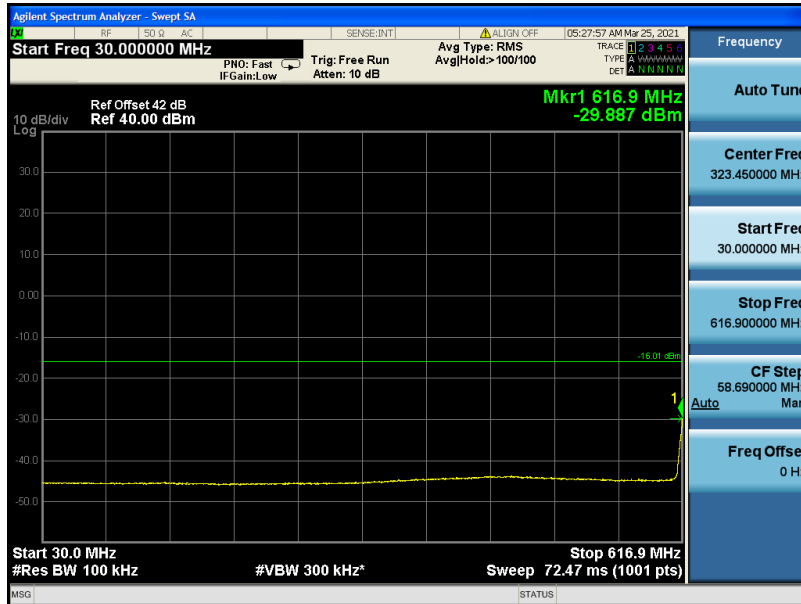


DL_1S_B_GSM_Pre-AGC_Spurious emission 3

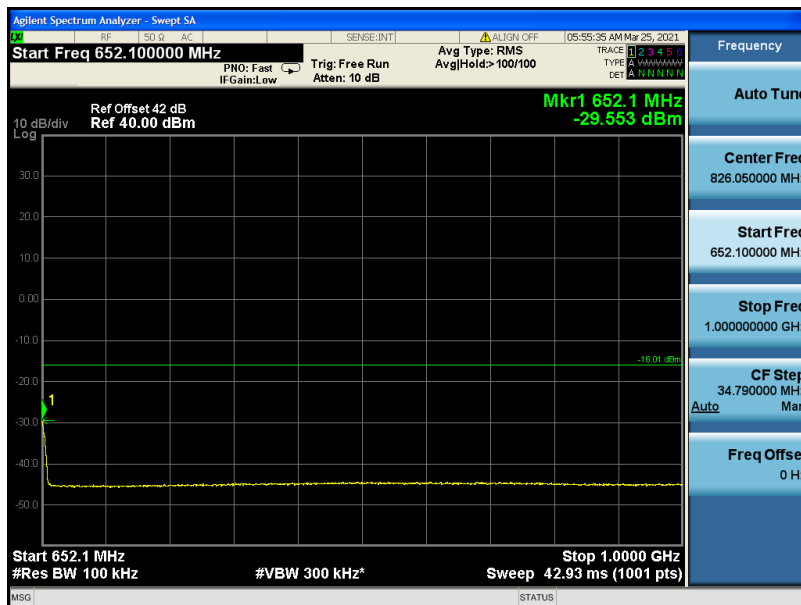


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DL_1S_M_GSM_Pre-AGC_Spurious emission 1

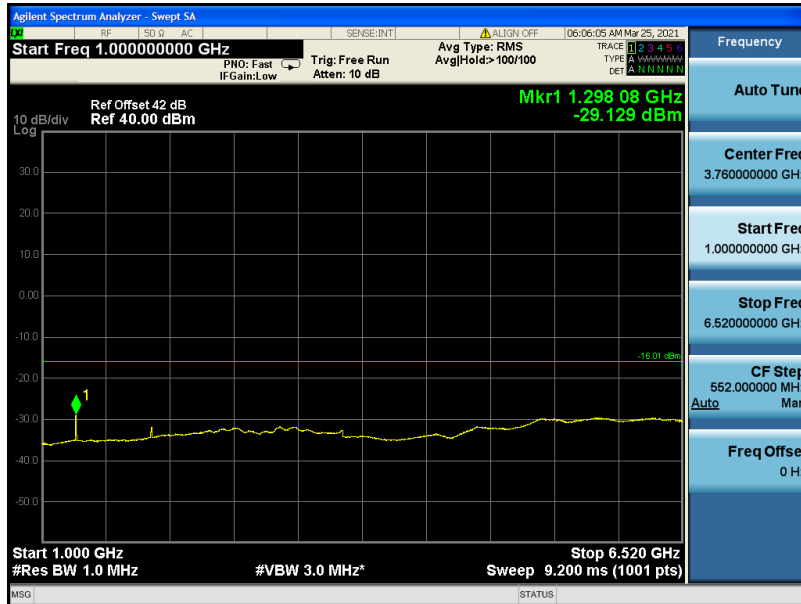


DL_1S_M_GSM_Pre-AGC_Spurious emission 2

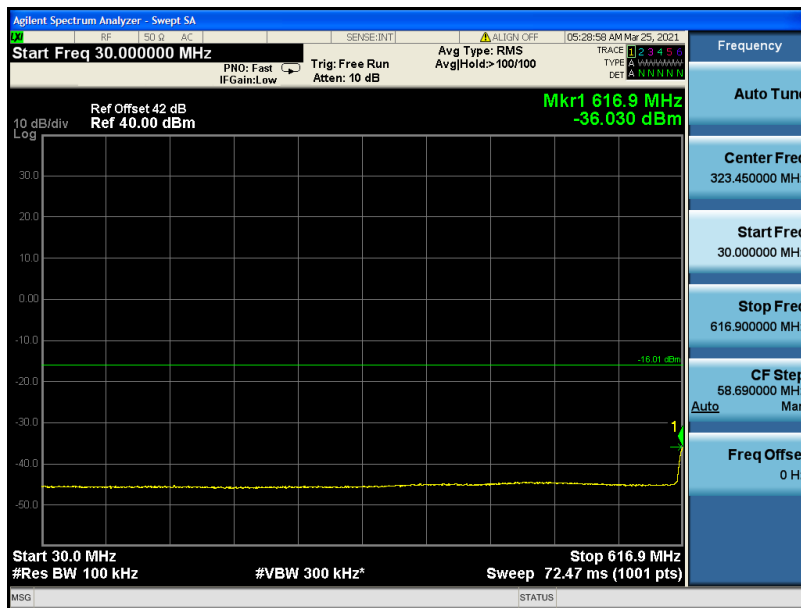


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DL_1S_M_GSM_Pre-AGC_Spurious emission 3

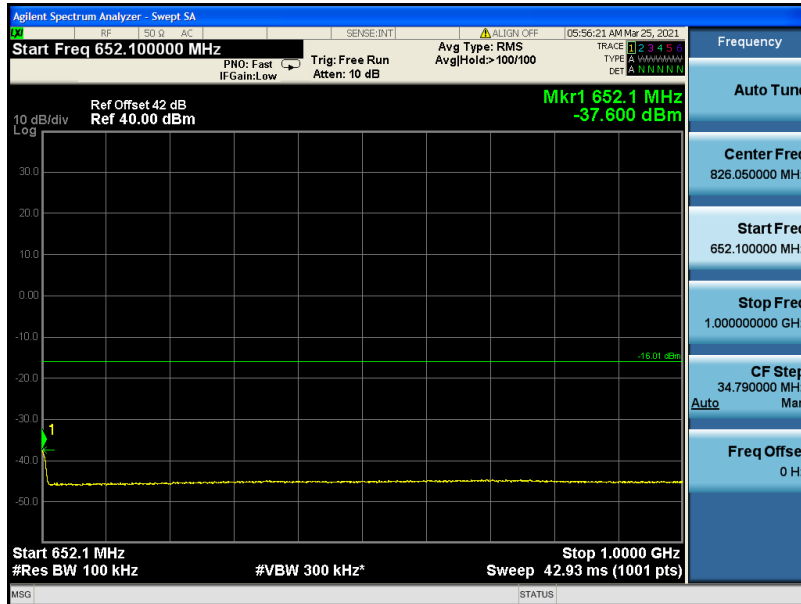


DL_1S_T_GSM_Pre-AGC_Spurious emission 1

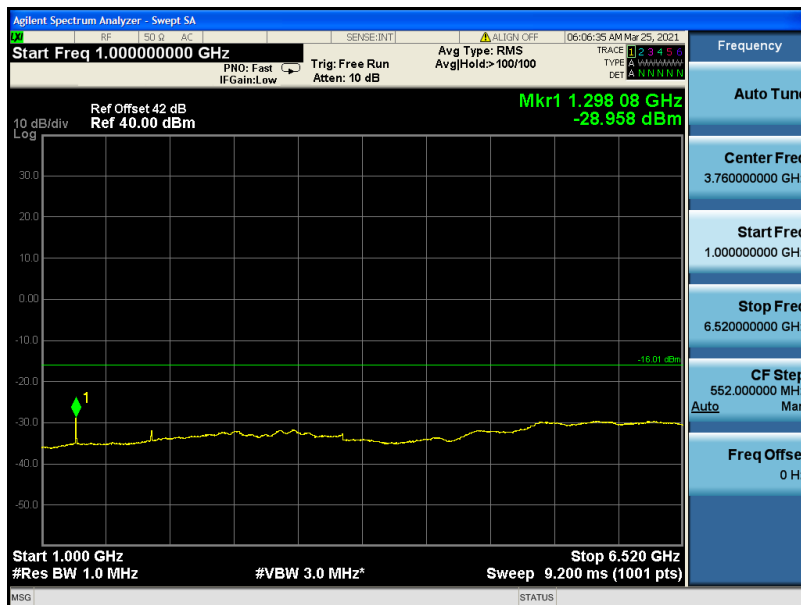


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DL_1S_T_GSM_Pre-AGC_Spurious emission 2



DL_1S_T_GSM_Pre-AGC_Spurious emission 3



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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 ±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	DL_1S_M_AWGN	634.505423	-0.33	PASS
40		634.505752	0.19	PASS
30		634.505548	-0.13	PASS
20		634.505632	Reference	PASS
10		634.505212	-0.67	PASS
0		634.505534	-0.15	PASS
-10		634.505423	-0.33	PASS
-20		634.505423	-0.33	PASS
-30		634.505753	0.19	PASS

Frequency stability vs voltage				
Voltage (V)	Test Conf.	Test data (MHz)	Tolerance (ppm)	Verdict
AC 93.5	DL_1S_M_AWGN	634.505553	-0.12	PASS
AC 110		634.505632	Reference	PASS
AC 126.5		634.505674	0.07	PASS



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1.7 Radiated spurious emissions

Note: 1. The tested max conducted power for single antenna port is 43.18dBm, the 2x2 MIMO total power is 43.18dBm+43.18dBm= 41.59W.

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,

$P=41.59W$,

So the limit =

$P(\text{dBm}) - [43 + 10 \log (41.59W)] = -13\text{dBm}$

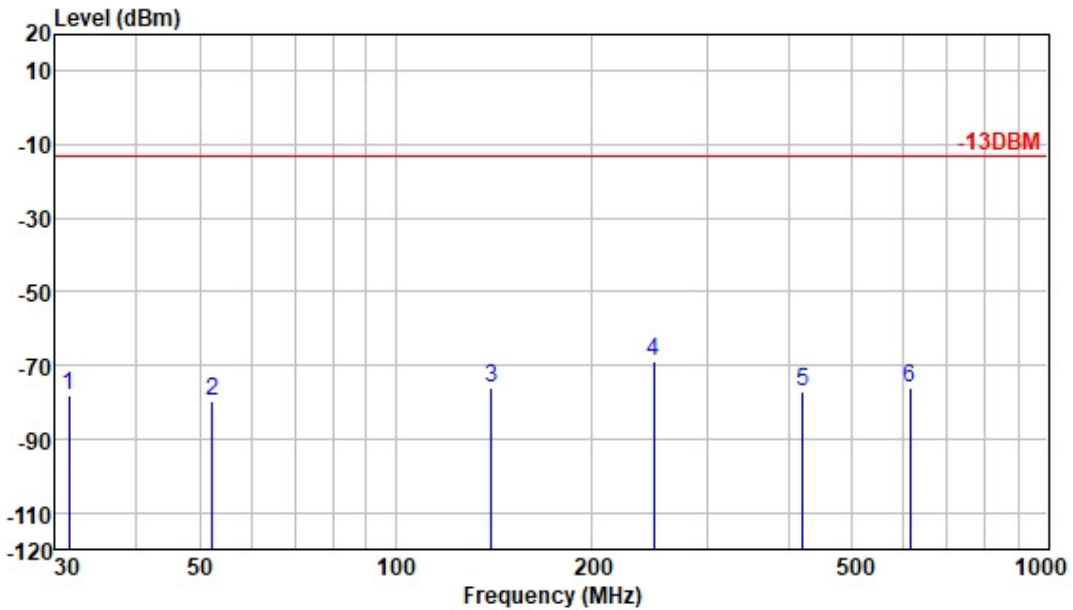
2. The radiated test performed at bottom / middle / top channel, the data with more than 20db margin, therefore, only the worst-case middle channel test data was recorded in the report.

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

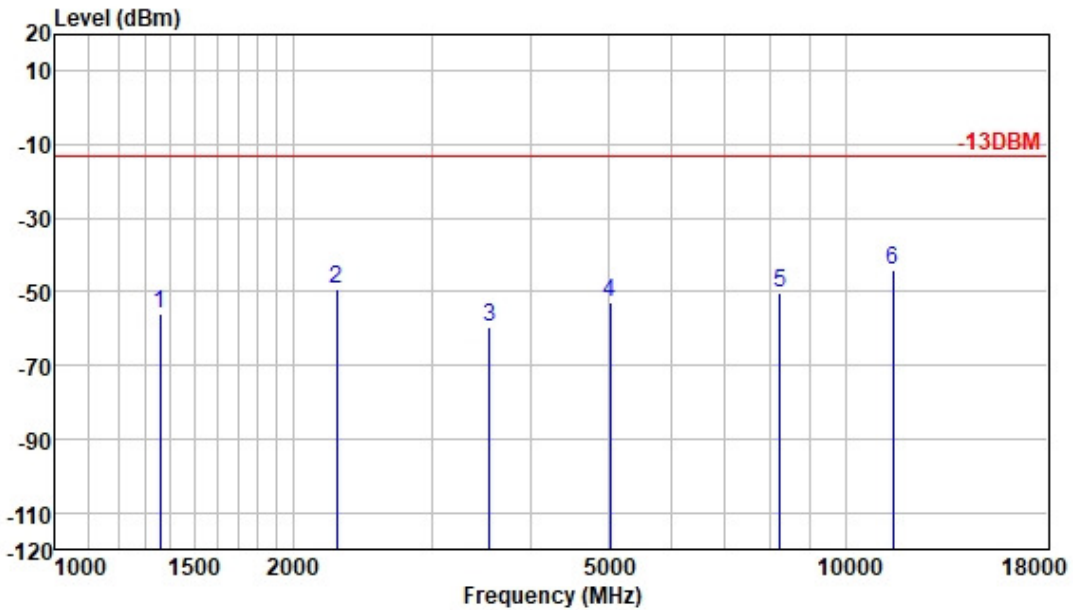


	Freq	Read Level	Correction Factor	Level	Limit Line	Over Limit	Pol/Phase
	MHz	dBm	dB	dBm	dBm	dB	
1	31.51	-81.44	3.38	-78.06	-12.99	-65.07	HORIZONTAL
2	52.21	-78.48	-1.46	-79.94	-12.99	-66.95	HORIZONTAL
3	139.85	-68.33	-7.82	-76.15	-12.99	-63.16	HORIZONTAL
4	248.55	-63.24	-5.56	-68.80	-12.99	-55.81	HORIZONTAL
5	420.58	-76.92	-0.12	-77.04	-12.99	-64.05	HORIZONTAL
6	614.21	-79.50	3.24	-76.26	-12.99	-63.27	HORIZONTAL



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DL_1S_M_AWGN_Horizontal_above 1GHz

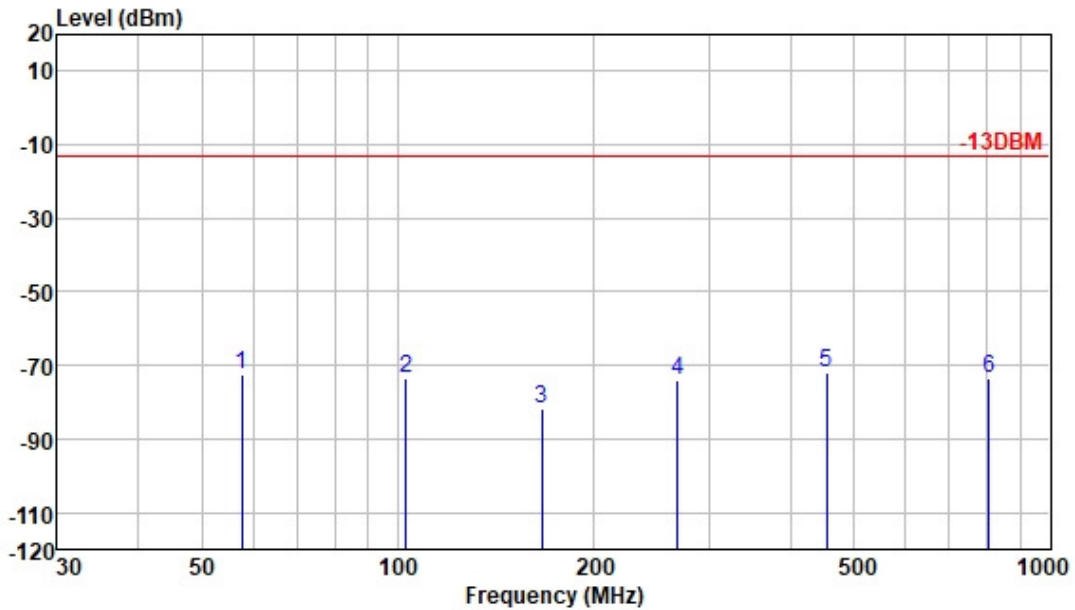


	Freq	Read Level	Correction Factor	Level	Limit Line	Over Limit	Pol/Phase
	MHz	dBm	dB	dBm	dBm	dB	
1	1358.50	-60.37	4.33	-56.04	-12.99	-43.05	HORIZONTAL
2	2265.91	-58.74	9.49	-49.25	-12.99	-36.26	HORIZONTAL
3	3536.34	-63.21	3.84	-59.37	-12.99	-46.38	HORIZONTAL
4	5031.50	-64.23	11.40	-52.83	-12.99	-39.84	HORIZONTAL
5	8248.01	-63.62	13.43	-50.19	-12.99	-37.20	HORIZONTAL
6	11467.00	-65.83	21.68	-44.15	-12.99	-31.16	HORIZONTAL



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DL_1S_M_AWGN_Vertical_30MHz~1GHz

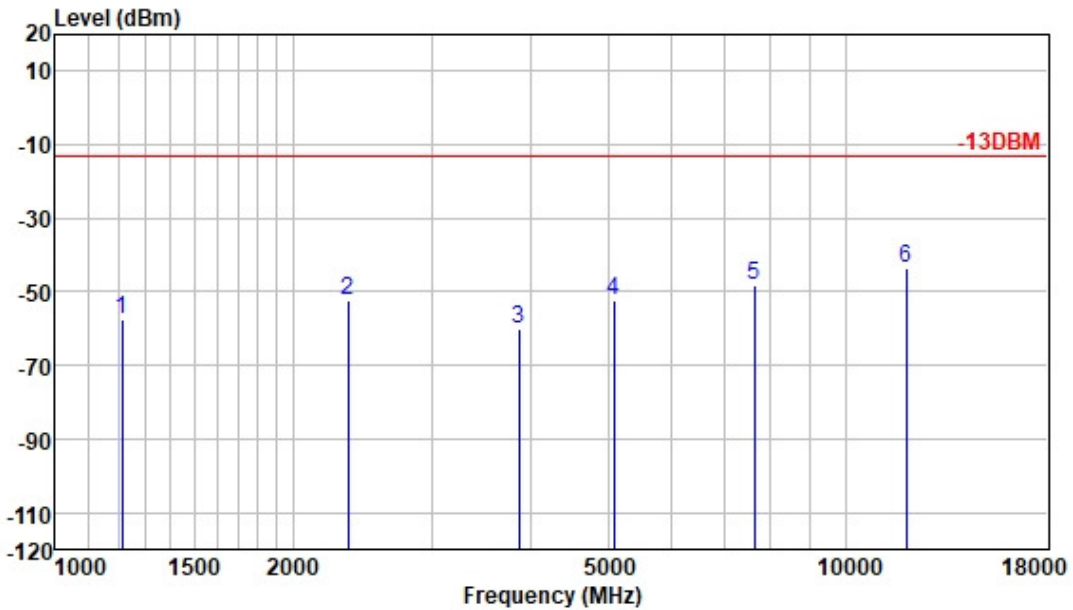


	Freq	Read Level	Correction Factor	Level	Limit Line	Over Limit	Pol/Phase
	MHz	dBm	dB	dBm	dBm	dB	
1	57.59	-69.82	-2.85	-72.67	-12.99	-59.68	VERTICAL
2	102.72	-68.42	-5.02	-73.44	-12.99	-60.45	VERTICAL
3	166.07	-78.06	-3.94	-82.00	-12.99	-69.01	VERTICAL
4	268.49	-70.41	-3.51	-73.92	-12.99	-60.93	VERTICAL
5	454.31	-73.65	1.55	-72.10	-12.99	-59.11	VERTICAL
6	804.60	-80.94	7.46	-73.48	-12.99	-60.49	VERTICAL



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DL_1S_M_AWGN_Vertical_above 1GHz



	Freq	Read	Correction	Limit	Over		
	MHz	Level	Factor	Line	Limit	Pol/Phase	
	MHz	dBm	dB	dBm	dBm		
1	1213.68	-60.76	3.25	-57.51	-12.99	-44.52	VERTICAL
2	2345.88	-61.82	9.73	-52.09	-12.99	-39.10	VERTICAL
3	3856.67	-62.87	2.98	-59.89	-12.99	-46.90	VERTICAL
4	5090.01	-63.48	11.07	-52.41	-12.99	-39.42	VERTICAL
5	7650.89	-64.70	16.44	-48.26	-12.99	-35.27	VERTICAL
6	11906.07	-65.11	21.64	-43.47	-12.99	-30.48	VERTICAL

--End of Appendix B--



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