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FCC ID: OJFDHRU-DHPAM-19

Appendix B

Test Data and Result Details of GZCR2103000015AT



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1 Broadband PCS (only for downlink: 1930-1995MHz)

1.1 AGC threshold level

Test Conf.	AGC Threshold level
DL_1S_M_AWGN_AWGN	-0.15dBm
DL_1S_M_AWGN_GSM	-0.18dBm



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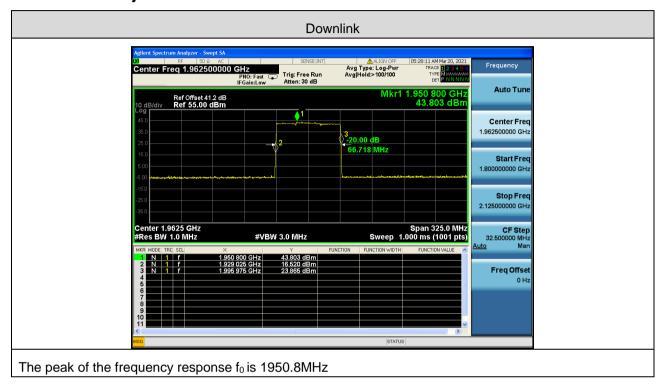


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1.2 Out-of-band rejection





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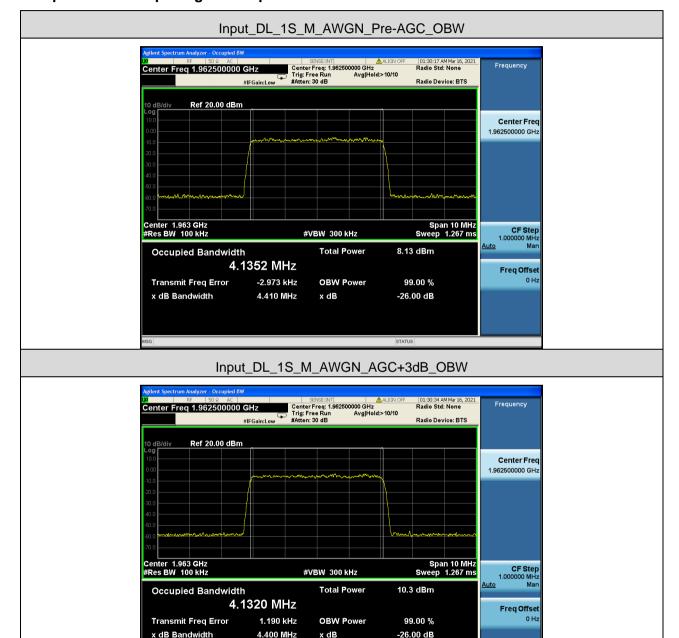


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1.3 Input-versus-output signal comparison





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Output DL 1S M AWGN Pre-AGC OBW SENSE:INTI Center Freq: 1.962500000 GHz Trig: Free Run Avg|Hold:>10/10 #Atten: 10 dB Center Freq 1.962500000 GHz Ref Offset 41.2 dB Ref 60.00 dBm Center Fred 1.962500000 GH: Center 1.963 GHz #Res BW 100 kHz Span 10 MHz Sweep 1.267 ms CF Step 1.000000 MHz #VBW 300 kHz Ma Occupied Bandwidth 4.1317 MHz Freq Offset Transmit Freq Error 1.246 kHz **OBW Power** 99.00 % -26.00 dB 4.412 MHz x dB Bandwidth Output_DL_1S_M_AWGN_AGC+3dB_OBW | SENSE INT | ALLIGN O Center Freq: 1.962500000 GHz Trig: Free Run Avg|Hold>10/10 #Atten: 10 dB 06:11:00 AM Mar 20, 2021 Radio Std: None enter Freq 1.962500000 GHz Radio Device: BTS #IFGain:Low Ref Offset 41.2 dB Ref 60.00 dBm 1 962500000 GH

#VBW 300 kHz Total Power

x dB

OBW Power

Occupied Bandwidth

Transmit Freq Error

x dB Bandwidth

4.1324 MHz

691 Hz

4.414 MHz



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Span 10 MHz Sweep 1.267 ms

47.9 dBm

99.00 %

-26.00 dB

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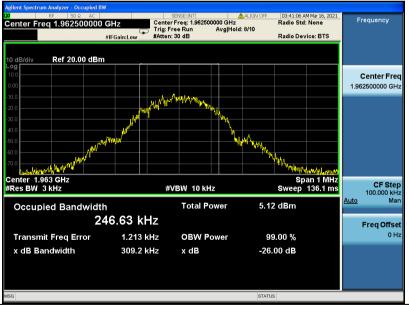


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Input_DL_1S_M_GSM_Pre-AGC_OBW SENSE:INT AALIGN C Center Freq: 1.962500000 GHz Trig: Free Run Avg|Hold:>10/10 #Atten: 30 dB Center Freq 1.962500000 GHz Ref 20.00 dBm Center Fred 1.962500000 GH: Center 1.963 GHz #Res BW 3 kHz Span 1 MHz Sweep 136.1 ms CF Step 100.000 kHz #VBW 10 kHz Occupied Bandwidth 242.06 kHz Freq Offset Transmit Freq Error 493 Hz **OBW Power** 99.00 % -26.00 dB 309.4 kHz x dB Bandwidth Input_DL_1S_M_GSM_AGC+3dB_OBW 03:41:06 AM Mar 16, 2021 Radio Std: None enter Freq 1.962500000 GHz Radio Device: BTS #IFGain:Low





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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
		Pre-AGC	-0.25	42.95	43.20	PASS
DL_1S_AWGN	1950.8	AGC+3dB	2.75	42.79	/	PASS
		Pre-AGC	-0.28	43.03	43.31	PASS
DL_1S_GSM	1950.8	AGC+3dB	2.72	43.26	/	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.

The total maximum EIRP for the EUT is (43.26dBm+43.26dBm) +15.5dBidB=61.77dBm (1503.1W) which don't exceed the required EIRP limit (1640W/MHz).



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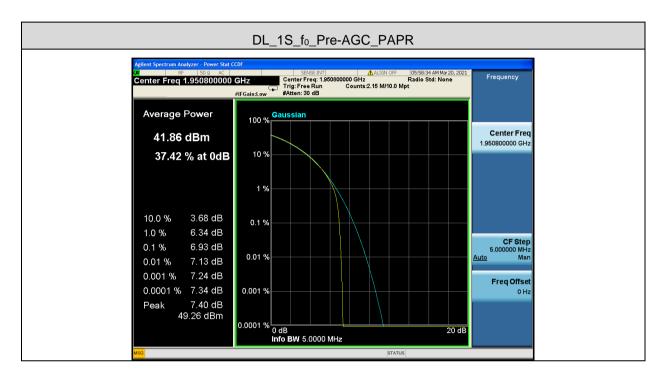


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Test Conf.	Test Freq. f ₀ (MHz)	Signal Level	PAPR (dB)	Limit (dB)	Verdict
DL_1S_AWGN	1950.8	Pre-AGC	7.13	13	PASS





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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 43.26dBm, the power of any emission must be reduced below the mean output power (P) by at least 43 + 10log (P) dB Here, P=43.26dBm= 21.18W.

So the limit = P(dBm)- [43 + 10 log (21.18W)] =-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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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 Avg Type: RMS Avg|Hold:>100/100 Start Freq 1.992500000 GHz Auto Tur 95 000 0 GH -19.260 dBr Ref Offset 41.2 dB Ref 40.00 dBm Center Free 1.995250000 GH Start Fred 1.992500000 GH: Stop Fred CF Step 550.000 kHz Freq Offset Start 1.992500 GHz #Res BW 100 kHz Stop 1.998000 GHz Sweep 1.000 ms (1001 pts) #VBW 300 kHz* DL_1S_T_AWGN_AGC+3_Out-of-band emission Avg Type: RMS Avg|Hold>100/100 tart Freq 1.992500000 GHz PNO: Wide Trig: Free Run IFGain:Low Atten: 10 dB Auto Tun 95 000 0 GHz -17.286 dBm Ref Offset 41.2 dB Ref 40.00 dBm 1 995250000 GH Start Free 1.992500000 GH 1.998000000 GH



Start 1.992500 GHz #Res BW 100 kHz

#VBW 300 kHz*

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Stop 1.998000 GHz Sweep 1.000 ms (1001 pts)

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DL 2S_B_AWGN_Pre-AGC_Out-of-band emission Avg Type: RMS Avg|Hold:>100/100 Start Freq 1.927000000 GHz Auto Tur 30 000 0 GH -28.989 dBr Ref Offset 41.2 dB Ref 40.00 dBm Center Free 1.932250000 GH Start Fred 1.927000000 GH: ΙΛ. Stop Fred 1.937500000 GH CF Step 1.050000 MHz Man Freq Offset Start 1.927000 GHz #Res BW 100 kHz Stop 1.937500 GHz Sweep 1.333 ms (1001 pts) #VBW 300 kHz* DL_2S_B_AWGN_AGC+3_Out-of-band emission Avg Type: RMS Avg|Hold>100/100 tart Freq 1.927000000 GHz PNO: Wide Trig: Free Run IFGain:Low Atten: 10 dB Auto Tun Ref Offset 41.2 dB Ref 40.00 dBm 1 932250000 GH Start Free 1.927000000 GH 1.937500000 GH



Start 1.927000 GHz #Res BW 100 kHz

#VBW 300 kHz*

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Stop 1.937500 GHz Sweep 1.333 ms (1001 pts)

or email: CN. Doccheck@sgs.com

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Freq Offse



Application No.: GZCR2103000015AT

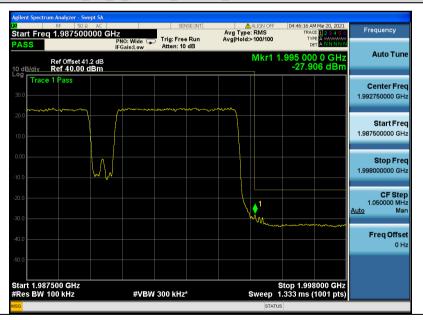
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FCC ID: OJFDHRU-DHPAM-19

DL_2S_T_AWGN_Pre-AGC_Out-of-band emission



DL_2S_T_AWGN_AGC+3_Out-of-band emission





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FCC ID: OJFDHRU-DHPAM-19

DL_1S_B_GSM_Pre-AGC_Out-of-band emission Avg Type: RMS Avg|Hold:>100/100 Start Freq 1.927000000 GHz Auto Tur 30 000 0 GH -19.934 dBr Ref Offset 41.2 dB Ref 40.00 dBm Center Free 1.928600000 GH Start Fred 1.927000000 GH: Stop Fred 1.930200000 GH CF Step 320.000 kHz Freq Offset Start 1.927000 GHz #Res BW 100 kHz Stop 1.930200 GHz Sweep 1.000 ms (1001 pts) #VBW 300 kHz* 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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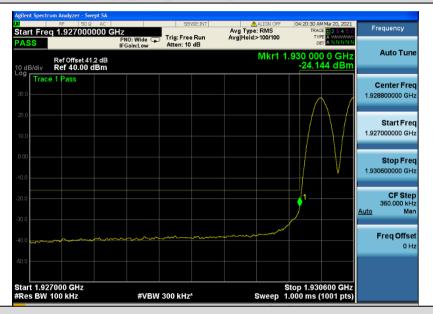


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FCC ID: OJFDHRU-DHPAM-19

DL 2S_B_GSM_Pre-AGC_Out-of-band emission



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





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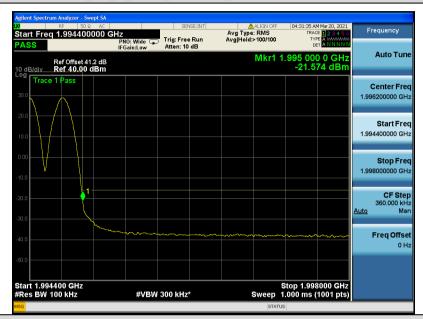


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FCC ID: OJFDHRU-DHPAM-19

DL_2S_T_GSM_Pre-AGC_Out-of-band emission



DL_2S_T_GSM_AGC+3_Out-of-band emission





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FCC ID: OJFDHRU-DHPAM-19

DL_1S_B_AWGN_Pre-AGC_Spurious emission 1



DL_1S_B_AWGN_Pre-AGC_Spurious emission 2





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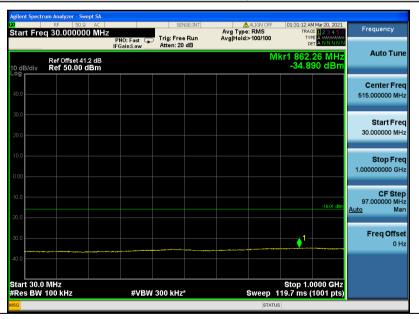
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FCC ID: OJFDHRU-DHPAM-19

DL_1S_B_AWGN_Pre-AGC_Spurious emission 3



DL_1S_M_AWGN_Pre-AGC_Spurious emission 1





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FCC ID: OJFDHRU-DHPAM-19

DL_1S_M_AWGN_Pre-AGC_Spurious emission 2



DL_1S_M_AWGN_Pre-AGC_Spurious emission 3





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FCC ID: OJFDHRU-DHPAM-19

DL_1S_T_AWGN_Pre-AGC_Spurious emission 1



DL_1S_T_AWGN_Pre-AGC_Spurious emission 2





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FCC ID: OJFDHRU-DHPAM-19

DL_1S_T_AWGN_Pre-AGC_Spurious emission 3



DL_1S_B_GSM_Pre-AGC_Spurious emission 1





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FCC ID: OJFDHRU-DHPAM-19

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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FCC ID: OJFDHRU-DHPAM-19

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 $\pm 15\%$ supply voltage variations. If a product is specified to operate over a range of input voltage, then the $\pm 15\%$ variation is applied to the lowermost voltage and the $\pm 15\%$ is applied to the uppermost voltage.
- 3. The frequency stabilities can be maintained within the authorized bands of operation and less than 1.5ppm. 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 (℃)	Test Conf.	Test data (MHz)	Tolerance (ppm)	Verdict			
50		1962.502437	-0.56	PASS			
40		1962.502347	-0.61	PASS			
30		1962.504352	0.41	PASS			
20		1962.503543	Reference	PASS			
10	DL_1S_M_AWGN	1962.503274	-0.14	PASS			
0		1962.503234	-0.16	PASS			
-10		1962.502735	-0.41	PASS			
-20		1962.502353	0.61	PASS			
-30		1962.503724	0.09	PASS			

Frequency stability vs voltage							
Voltage (V)	Test Conf.	Test data (MHz)	Tolerance (ppm)	Verdict			
AC 93.5		1962.503243	-0.15	PASS			
AC 110	DL_1S_M_AWGN	1962.503543	Reference	PASS			
AC 126.5		1962.503497	-0.23	PASS			



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1.7 Radiated spurious emissions

Note:

1.The tested max conducted power for single antenna port is 43.26dBm, the 2x2 MIMO total power is 43.26dBm+43.26dBm= 42.36W.

The power of any emission must be reduced below the mean output power (P) by at least

43 + 10log (P) dB

Here, P=42.36W.

the limit = P(dBm)- [43 + 10 log (42.36W)] =-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 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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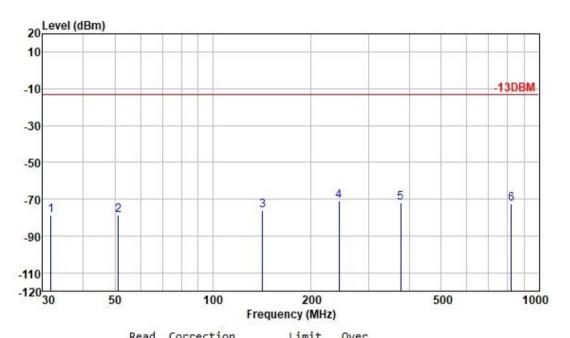


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DL_1S_M_AWGN_Horizontal_30MHz~1GHz



		Read C	orrecti	on	Limit	Over	
	Freq	Level	Factor	Level	Line	Limit	Pol/Phase
	MHz	dBm	dB	dBm	dBm	dB	
1	31.84	-82.15	3.33	-78.82	-12.99	-65.83	HORIZONTAL
2	51.12	-77.50	-1.35	-78.85	-12.99	-65.86	HORIZONTAL
3	141.83	-68.15	-7.70	-75.85	-12.99	-62.86	HORIZONTAL
4	243.38	-65.23	-5.95	-71.18	-12.99	-58.19	HORIZONTAL
5	375.94	-70.68	-1.19	-71.87	-12.99	-58.88	HORIZONTAL
6	821.71	-79.51	7.05	-72.46	-12.99	-59.47	HORIZONTAL



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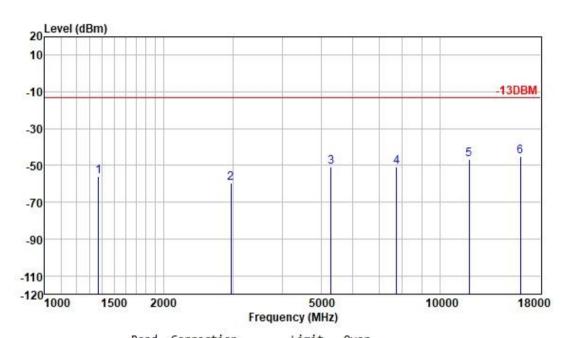
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DL_1S_M_AWGN_Horizontal_above 1GHz



		Read Correction			Limit	over	
	Freq	Level	Factor	Level	Line	Limit	Pol/Phase
	MHz	dBm	dB	dBm	dBm	dB	
1	1366.37	-60.49	4.40	-56.09	-12.99	-43.10	HORIZONTAL
2	2956.16	-62.56	3.14	-59.42	-12.99	-46.43	HORIZONTAL
3	5300.20	-63.45	12.53	-50.92	-12.99	-37.93	HORIZONTAL
4	7762.26	-65.10	14.44	-50.66	-12.99	-37.67	HORIZONTAL
5	11837.45	-68.01	21.17	-46.84	-12.99	-33.85	HORIZONTAL
6	15942.30	-68.37	23.10	-45.27	-12.99	-32.28	HORIZONTAL



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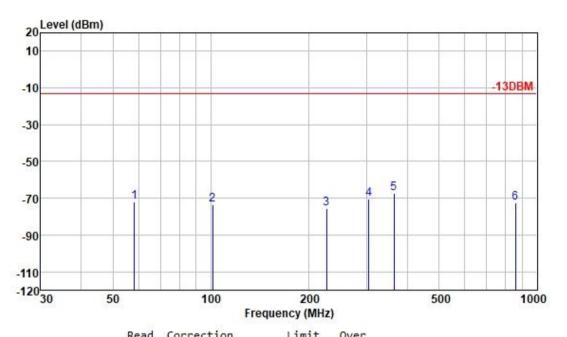


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DL_1S_M_AWGN_Vertical_30MHz~1GHz



		Read Correction			Limit	Over		
	Freq	Level	Factor	Level	Line	Limit	Pol/Phase	
	MHz	dBm	dB	dBm	dBm	dB	- 6	
1	58.20	-69.56	-2.63	-72.19	-12.99	-59.20	VERTICAL	
2	101.29	-68.64	-5.08	-73.72	-12.99	-60.73	VERTICAL	
3	226.10	-69.60	-6.15	-75.75	-12.99	-62.76	VERTICAL	
4	304.61	-67.58	-2.64	-70.22	-12.99	-57.23	VERTICAL	
5	364.26	-65.77	-1.72	-67.49	-12.99	-54.50	VERTICAL	
6	860.04	-80.42	7.92	-72.50	-12.99	-59.51	VERTICAL	



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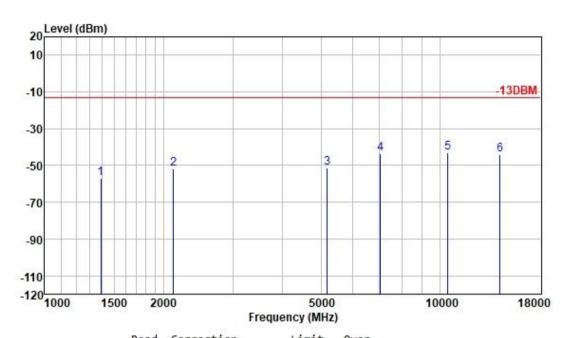


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FCC ID: OJFDHRU-DHPAM-19

DL_1S_M_AWGN_Vertical_above 1GHz



		Read C	orrection	on	Limit	Over	
	Freq	Level	Factor	Level	Line	Limit	Pol/Phase
	MHz	dBm	dB	dBm	dBm	dB	30
1	1386.26	-61.21	4.06	-57.15	-12.99	-44.16	VERTICAL
2	2120.17	-61.20	9.15	-52.05	-12.99	-39.06	VERTICAL
3	5179.05	-63.66	12.38	-51.28	-12.99	-38.29	VERTICAL
4	7056.09	-63.62	19.89	-43.73	-12.99	-30.74	VERTICAL
5	10453.97	-67.50	24.28	-43.22	-12.99	-30.23	VERTICAL
6	14160.71	-68.86	25.01	-43.85	-12.99	-30.86	VERTICAL



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2 AWS-2 & AWS-4 (only for downlink: 1995-2020MHz)

2.1 AGC threshold level

Test Conf.	AGC Threshold level
DL_1S_M_AWGN_AWGN	0.32dBm
DL_1S_M_AWGN_GSM	0.19dBm



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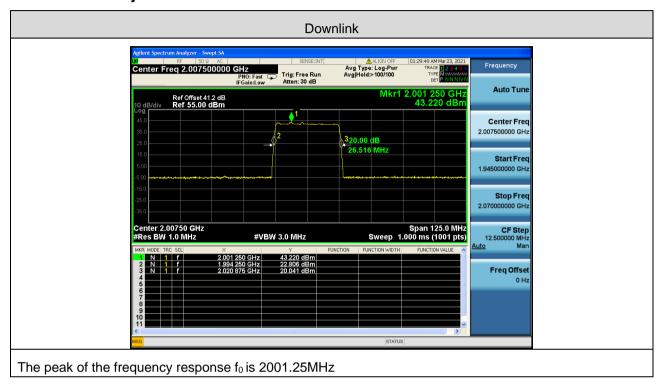


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2.2 Out-of-band rejection





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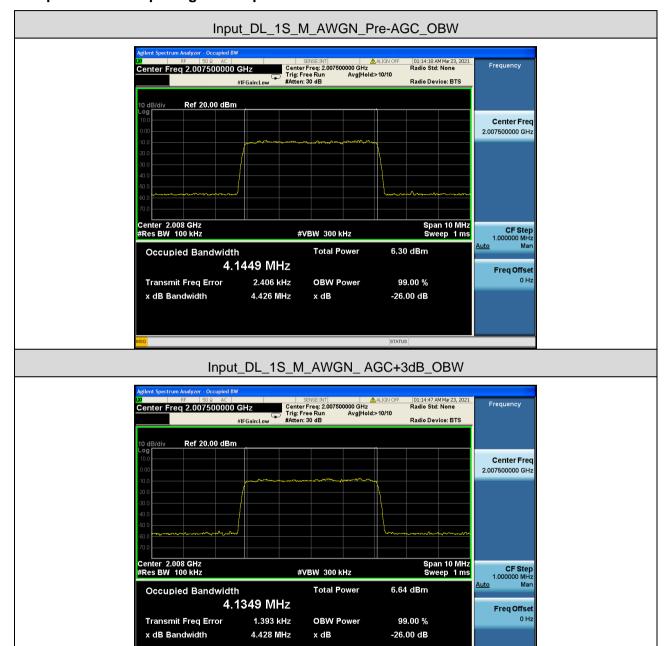


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2.3 Input-versus-output signal comparison





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Output_DL_1S_M_AWGN_Pre-AGC_OBW SENSE:INT AALIGN C Center Freq: 2.007500000 GHz Trig: Free Run Avg|Hold:>10/10 #Atten: 10 dB Center Freq 2.007500000 GHz Ref 60.00 dBm Center Fred 2.007500000 GH: Center 2.008 GHz #Res BW 100 kHz Span 10 MHz Sweep 1 ms CF Step 1.000000 MHz #VBW 300 kHz Ma Occupied Bandwidth 4.1432 MHz Freq Offset Transmit Freq Error 2.335 kHz **OBW Power** 99.00 % 4.426 MHz x dB Bandwidth -26.00 dB Output_DL_1S_M_AWGN_ AGC+3dB_OBW | SENSE INT | ALLIGN O Center Freq: 2.007500000 GHz Trig: Free Run Avg|Hold>10/10 #Atten: 10 dB 05:38:23 AM Mar 23, 2021 Radio Std: None enter Freq 2.007500000 GHz Radio Device: BTS #IFGain:Low Ref 60.00 dBm Center Free 2 007500000 GH Span 10 MHz Sweep 1 ms #VBW 300 kHz

Total Power

OBW Power

x dB

Occupied Bandwidth

Transmit Freq Error

x dB Bandwidth

4.1425 MHz

1.815 kHz

4.429 MHz

47.7 dBm

99.00 %

-26.00 dB



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Input_DL_1S_M_GSM_Pre-AGC_OBW | SENSE:INT| | ALIGN | Center Freq: 2.007500000 GHz | Trig: Free Run | Avg|Hold: 9/10 | #Atten: 30 dB Center Freq 2.007500000 GHz Ref 20.00 dBm Center Fred 2.007500000 GHz Center 2.008 GHz #Res BW 3 kHz Span 1 MHz Sweep 105.5 ms CF Step 100.000 kHz #VBW 10 kHz Occupied Bandwidth 244.98 kHz Freq Offset Transmit Freq Error -335 Hz **OBW Power** 99.00 % -26.00 dB 310.1 kHz x dB Bandwidth Input_DL_1S_M_GSM_ AGC+3dB_OBW | SENSE:NT | ALCONO Center Freq: 2.007500000 GHz Trig: Free Run Avg|Hold>10/10 #Atten: 30 dB 01:10:34 AM Mar 23, 2021 Radio Std: None enter Freq 2.007500000 GHz Radio Device: BTS #IFGain:Low Ref 20.00 dBm Center Free 2 007500000 GH Center 2.008 GHz #Res BW 3 kHz Span 1 MHz Sweep 105.5 ms CF Step 100.000 kHz #VBW 10 kHz Total Power 2.61 dBm Occupied Bandwidth 242.99 kHz Freq Offse Transmit Freq Error 1.131 kHz **OBW Power** 99.00 % 311.0 kHz x dB Bandwidth x dB -26.00 dB



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Application No.: GZCR2103000015AT

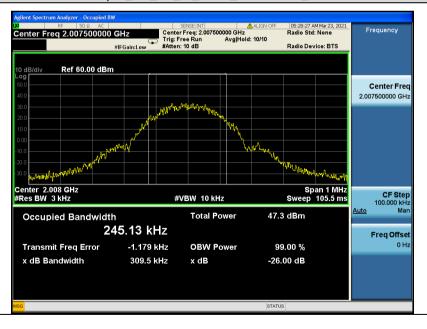
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Output_DL_1S_M_GSM_Pre-AGC_OBW



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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2.4 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
		Pre-AGC	0.22	43.06	42.84	PASS
DL_1S_AWGN	2001.25	AGC+3dB	2.78	42.87	/	PASS
DL_1S_GSM		Pre-AGC	0.10	42.95	42.85	PASS
	2001.25	AGC+3dB	2.90	43.01	/	PASS

Remark:

1. 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.

The total maximum EIRP for the EUT is (43.06dBm+43.06dBm) +15.5dBi=61.57dBm (1435.5W) which don't exceed the required EIRP limit (1640W/MHz).

2. Based on discussion in docket No. DA 13-2409 (section 26 & 47) for operation in 2000-2020MHz in downlink, only 27.50(d)(1) and 27.50(d)(2) apply.



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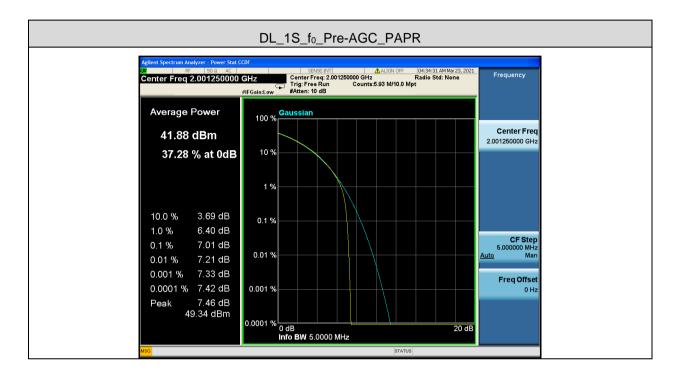


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Test Conf.	Test Freq. f ₀ (MHz)	Signal Level	PAPR (dB)	Limit (dB)	Verdict
DL_1S_AWGN	2001.25	Pre-AGC	7.21	13	PASS





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

Note:

The EUT support 2x2 MIMO, Per 662911 D01 Multiple Transmitter Output v02r01 clause (3)(a)(iii): Measure and add 10 log(NANT) dB, where NANT is the number of outputs to combine the emission measurements from multiple outputs prior to comparing to the emission limit.

Here, the factor 10 log (NANT) dB= 10 log (2) dB=3.01dB.

1. The tested max conducted power for single antenna port is 43.06dBm, the power of any emission must be reduced below the mean output power (P) by at least 43 + 10log (P) dB Here,

P=43.06dBm= 20.23W.

So the limit =

P(dBm)- [43 + 10 log (20.23W)] = -13dBm.

The EUT supports 2x2 MIMO and the both antenna port with identical out emissions, therefore only perform measurement at output port 1, the limit line was decreased 3.01dB as -16.01dBm in following test plots in order to determine the test result conveniently.

- 2. Based on discussion in docket No. DA 13-2409 (section 26 & 47) for operation in 2000-2020MHz in downlink, only 27.53(h)(1) and 27.53(h)(3) Apply.
- 3. Pretest performe at AWS-2: 1995MHz to 2000MHz block;

Pretest performe at AWS-4: 2000MHz to 2020MHz block;

Pretest performe at combined AWS-4 and AWS-2: 1995MHz to 2020MHz block;

As the emission limit of above sub-block are identical, therefore, only the worst-case combined AWS-4 and AWS-2 block test plot was record in the report.



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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 Avg Type: RMS Avg|Hold:>100/100 Start Freq 2.017500000 GHz Auto Tur 20 000 0 GH -17.691 dBr Ref Offset 41.2 dB Ref 40.00 dBm Center Free Start Fred 2.017500000 GH: Stop Fred 2.023000000 GH CF Step 550.000 kHz Freq Offset Start 2.017500 GHz #Res BW 100 kHz Stop 2.023000 GHz Sweep 1.000 ms (1001 pts) #VBW 300 kHz* DL_1S_T_AWGN_AGC+3_Out-of-band emission Avg Type: RMS Avg|Hold>100/100 tart Freq 2.017500000 GHz PNO: Wide Trig: Free Run IFGain:Low Atten: 10 dB Auto Tun 20 000 0 GHz -18.267 dBm Ref Offset 41.2 dB Ref 40.00 dBm 2 020250000 GH Start Fred 2.017500000 GH 2.023000000 GH



Start 2.017500 GHz #Res BW 100 kHz

#VBW 300 kHz*

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Stop 2.023000 GHz Sweep 1.000 ms (1001 pts)

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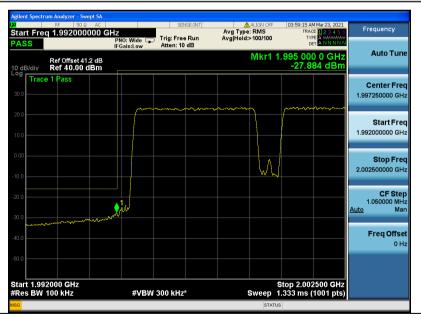
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DL 2S_B_AWGN_Pre-AGC_Out-of-band emission



DL_2S_B_AWGN_AGC+3_Out-of-band emission





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DL_2S_T_AWGN_Pre-AGC_Out-of-band emission Avg Type: RMS Avg|Hold:>100/100 Start Freq 2.012500000 GHz Auto Tur 20 000 0 GH -29.609 dBr Ref Offset 41.2 dB Ref 40.00 dBm Center Free 2.017750000 GH Start Fred 2.012500000 GH: Stop Fred 2.023000000 GH CF Step 1.050000 MHz Man Freq Offset Start 2.012500 GHz #Res BW 100 kHz Stop 2.023000 GHz Sweep 1.333 ms (1001 pts) #VBW 300 kHz* DL_2S_T_AWGN_AGC+3_Out-of-band emission Avg Type: RMS Avg|Hold>100/100 tart Freq 2.012500000 GHz PNO: Wide Trig: Free Run IFGain:Low Atten: 10 dB Mkr1 2.020 000 0 GHz -29.610 dBm Auto Tun Ref Offset 41.2 dB Ref 40.00 dBm 2 017750000 GH Start Free 2.012500000 GH



Start 2.012500 GHz #Res BW 100 kHz

#VBW 300 kHz*

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Stop 2.023000 GHz Sweep 1.333 ms (1001 pts)

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2.023000000 GH

Freq Offse



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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 Avg Type: RMS Avg|Hold:>100/100 Start Freq 1.991999996 GHz Auto Tur Ref Offset 41.2 dB Ref 40.00 dBm Center Free 1.993799998 GH Start Fred 1.991999996 GHz Stop Fred 1.995600000 GH CF Step 360.000 kHz Freq Offset Start 1.992000 GHz #Res BW 100 kHz Stop 1.995600 GHz Sweep 1.000 ms (1001 pts) #VBW 300 kHz* DL_2S_B_GSM_AGC+3_Out-of-band emission Avg Type: RMS Avg|Hold>100/100 top Freq 1.995600000 GHz PNO: Wide Trig: Free Run IFGain:Low Atten: 10 dB Auto Tun Ref Offset 41.2 dB Ref 40.00 dBm





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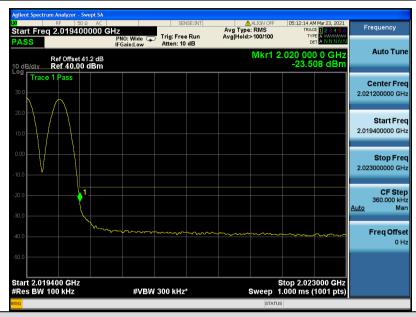


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DL_2S_T_GSM_Pre-AGC_Out-of-band emission



DL_2S_T_GSM_AGC+3_Out-of-band emission





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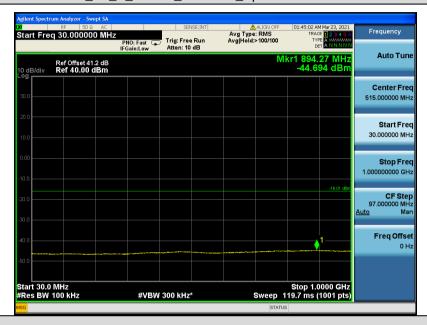


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FCC ID: OJFDHRU-DHPAM-19

DL_1S_B_AWGN_Pre-AGC_Spurious emission 1



DL_1S_B_AWGN_Pre-AGC_Spurious emission 2





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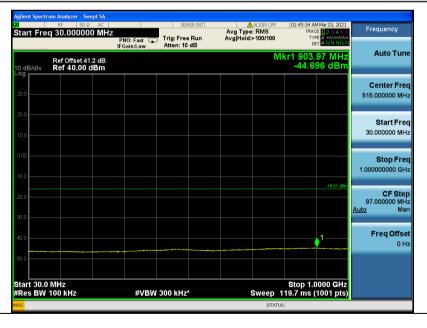
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FCC ID: OJFDHRU-DHPAM-19

DL_1S_B_AWGN_Pre-AGC_Spurious emission 3



DL_1S_M_AWGN_Pre-AGC_Spurious emission 1





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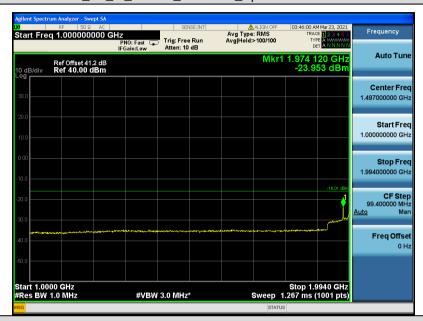


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FCC ID: OJFDHRU-DHPAM-19

DL_1S_M_AWGN_Pre-AGC_Spurious emission 2



DL_1S_M_AWGN_Pre-AGC_Spurious emission 3





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FCC ID: OJFDHRU-DHPAM-19

DL_1S_T_AWGN_Pre-AGC_Spurious emission 1



DL_1S_T_AWGN_Pre-AGC_Spurious emission 2





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FCC ID: OJFDHRU-DHPAM-19

DL_1S_T_AWGN_Pre-AGC_Spurious emission 3



DL_1S_B_GSM_Pre-AGC_Spurious emission 1





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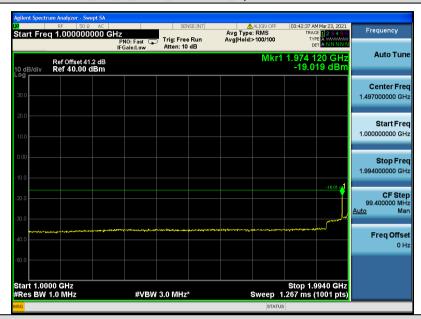


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FCC ID: OJFDHRU-DHPAM-19

DL_1S_B_GSM_Pre-AGC_Spurious emission 2



DL_1S_B_GSM_Pre-AGC_Spurious emission 3





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FCC ID: OJFDHRU-DHPAM-19

DL_1S_M_GSM_Pre-AGC_Spurious emission 1



DL_1S_M_GSM_Pre-AGC_Spurious emission 2





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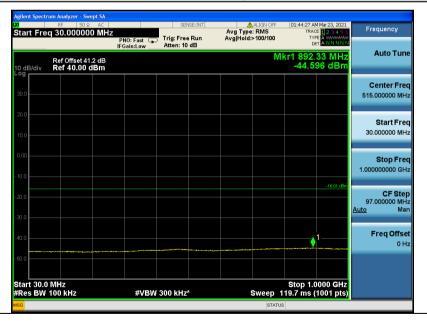
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FCC ID: OJFDHRU-DHPAM-19

DL_1S_M_GSM_Pre-AGC_Spurious emission 3



DL_1S_T_GSM_Pre-AGC_Spurious emission 1





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FCC ID: OJFDHRU-DHPAM-19

DL_1S_T_GSM_Pre-AGC_Spurious emission 2



DL_1S_T_GSM_Pre-AGC_Spurious emission 3





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2.6 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 (℃)	Test Conf.	Test data (MHz)		Verdict					
50		2007.502031	0.25	PASS					
40		2007.501836	0.15	PASS					
30		2007.501123	-0.21	PASS					
20		2007.501535	Reference	PASS					
10	DL_1S_M_AWGN	2007.501653	0.06	PASS					
0		2007.503023	0.07	PASS					
-10		2007.501023	-0.25	PASS					
-20		2007.500534	-0.05	PASS					
-30		2007.502594	0.52	PASS					

Frequency stability vs voltage								
Voltage (V)	Test Conf.	Test data (MHz)	Tolerance (ppm)	Verdict				
AC 93.5		2007.501976	0.22	PASS				
AC 110	DL_1S_M_AWGN	2007.501535	Reference	PASS				
AC 126.5		2007.500753	-0.39	PASS				



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2.7 Radiated spurious emissions

Note:

1. The tested max conducted power for single antenna port is 43.06dBm, the 2x2 MIMO total power is 43.06dBm+43.06dBm=40.46W, the power of any emission must be reduced below the mean output power (P) by at least 43 + 10log (P) dB

Here,

P=40.46W.

So the limit =

P(dBm)- [43 + 10 log (40.46W)] = -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 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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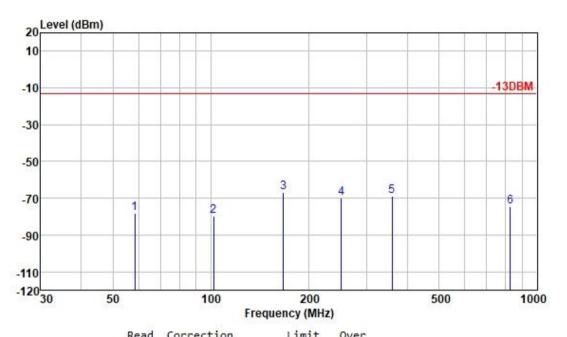


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FCC ID: OJFDHRU-DHPAM-19

DL_1S_M_AWGN_Horizontal_30MHz~1GHz



		Read C	orrecti	on	Limit	Over	
	Freq	Level	Factor	Level	Line	Limit	Pol/Phase
	MHz	dBm	dB	dBm	dBm	dB	S.
1	58.41	-75.91	-2.40	-78.31	-12.99	-65.32	HORIZONTAL
2	101.64	-69.90	-9.56	-79.46	-12.99	-66.47	HORIZONTAL
3	166.65	-60.67	-6.26	-66.93	-12.99	-53.94	HORIZONTAL
4	251.18	-64.80	-5.32	-70.12	-12.99	-57.13	HORIZONTAL
5	359.19	-67.64	-1.33	-68.97	-12.99	-55.98	HORIZONTAL
6	827.49	-81.52	7.09	-74.43	-12.99	-61.44	HORIZONTAL



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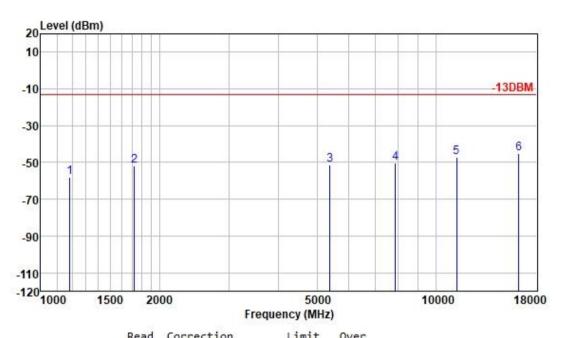
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DL_1S_M_AWGN_Horizontal_above 1GHz



		Read Correction			Limit	Over	
	Freq	Level	Factor	Level	Line	Limit	Pol/Phase
	MHz	dBm	dB	dBm	dBm	dB	a a
1	1185.94	-60.92	2.93	-57.99	-12.99	-45.00	HORIZONTAL
2	1726.82	-57.82	6.24	-51.58	-12.99	-38.59	HORIZONTAL
3	5392.92	-64.18	12.96	-51.22	-12.99	-38.23	HORIZONTAL
4	7898.05	-63.96	13.86	-50.10	-12.99	-37.11	HORIZONTAL
5	11269.86	-69.06	22.05	-47.01	-12.99	-34.02	HORIZONTAL
6	16174.37	-68.17	23.09	-45.08	-12.99	-32.09	HORIZONTAL



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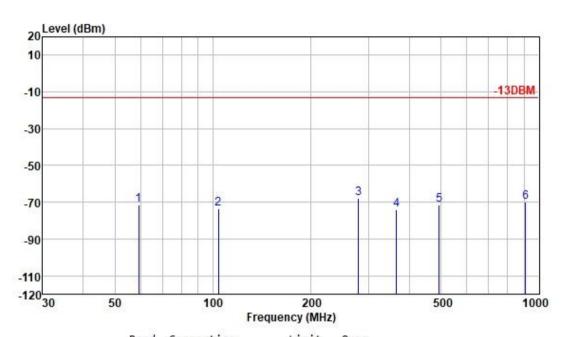
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DL_1S_M_AWGN_Vertical_30MHz~1GHz



		Read C	orrecti	on	Limit	Over	
	Freq	Level	Factor	Level	Line	Limit	Pol/Phase
	MHz	dBm	dB	dBm	dBm	dB	3
1	59.23	-69.28	-2.32	-71.60	-12.99	-58.61	VERTICAL
2	103.81	-68.71	-4.97	-73.68	-12.99	-60.69	VERTICAL
3	279.04	-64.92	-2.76	-67.68	-12.99	-54.69	VERTICAL
4	365.54	-72.46	-1.67	-74.13	-12.99	-61.14	VERTICAL
5	494.20	-73.28	1.92	-71.36	-12.99	-58.37	VERTICAL
6	909.67	-79.53	9.69	-69.84	-12.99	-56.85	VERTICAL



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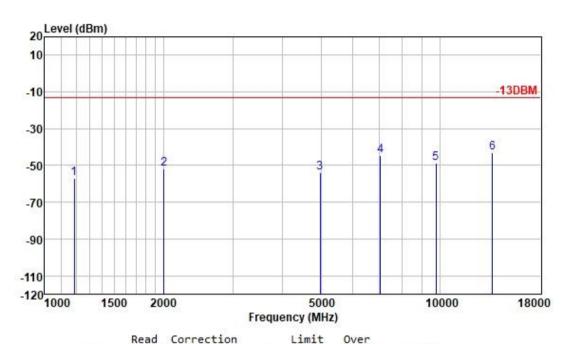
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DL_1S_M_AWGN_Vertical_above 1GHz



	Freq	Level	Factor	Level	Line	Limit	Pol/Phase
	MHz	dBm	dB	dBm	dBm	dB	30
1	1189.37	-60.40	3.18	-57.22	-12.99	-44.23	VERTICAL
2	2001.08	-60.61	8.61	-52.00	-12.99	-39.01	VERTICAL
3	4973.66	-63.64	9.92	-53.72	-12.99	-40.73	VERTICAL
4	7056.09	-64.62	19.89	-44.73	-12.99	-31.74	VERTICAL
5	9753.37	-67.30	18.61	-48.69	-12.99	-35.70	VERTICAL
6	13559.88	-69.49	26.46	-43.03	-12.99	-30.04	VERTICAL

-- End of Appendix B--



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