



**SGS-CSTC Standards Technical Services Co., Ltd.
Guangzhou Branch**

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Application No.: GZEM2011016737CR
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FCC ID: OJFDLRU1719235

Appendix B

Test Data and Result Details of GZEM2011016737CR



SGS-CSTC Standards Technical Services Co., Ltd.
Guangzhou Branch Testing Center EEC Laboratory

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1 AWS-1 (1710-1755MHz paired with 2110-2155MHz)

1.1 AGC threshold level

Test Conf.	AGC Threshold level
DL_1S_M_AWGN	-0.23dBm
DL_1S_M_GSM	-0.13dBm

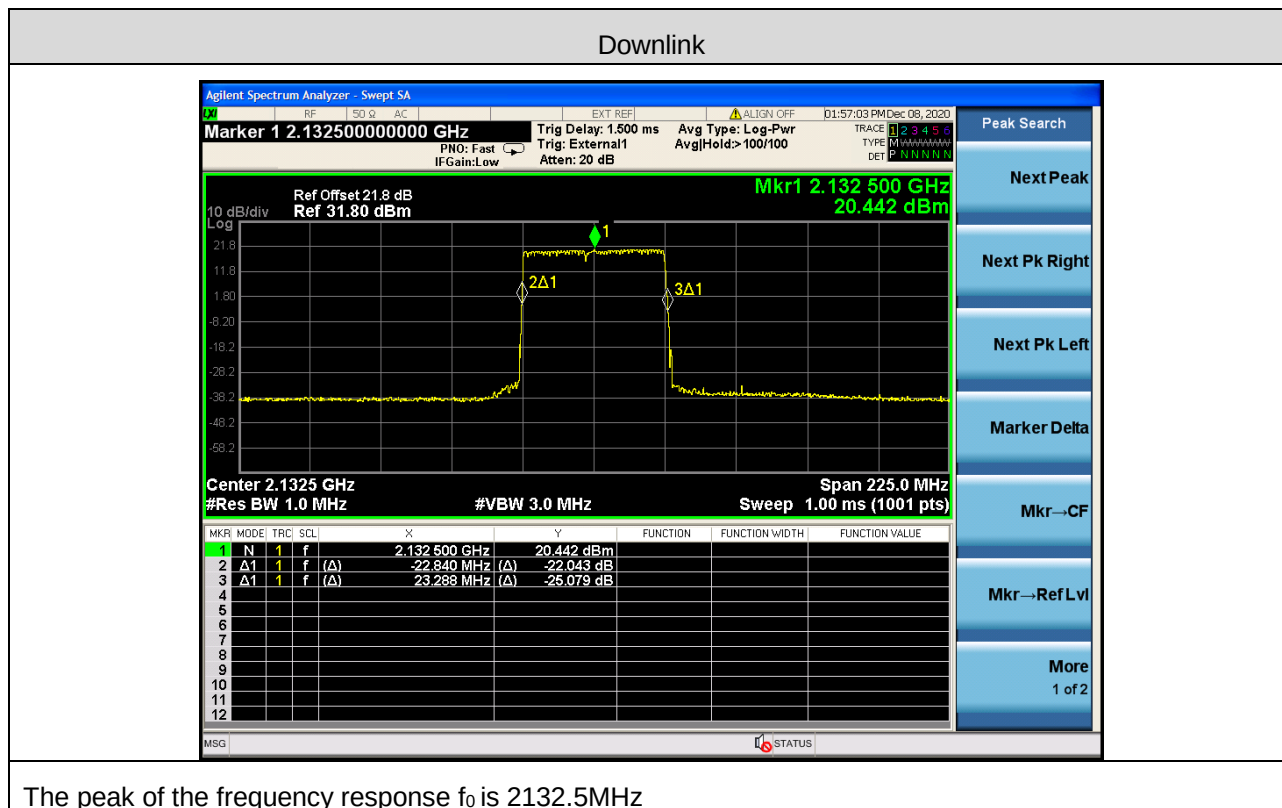


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1.2 Out-of-band rejection

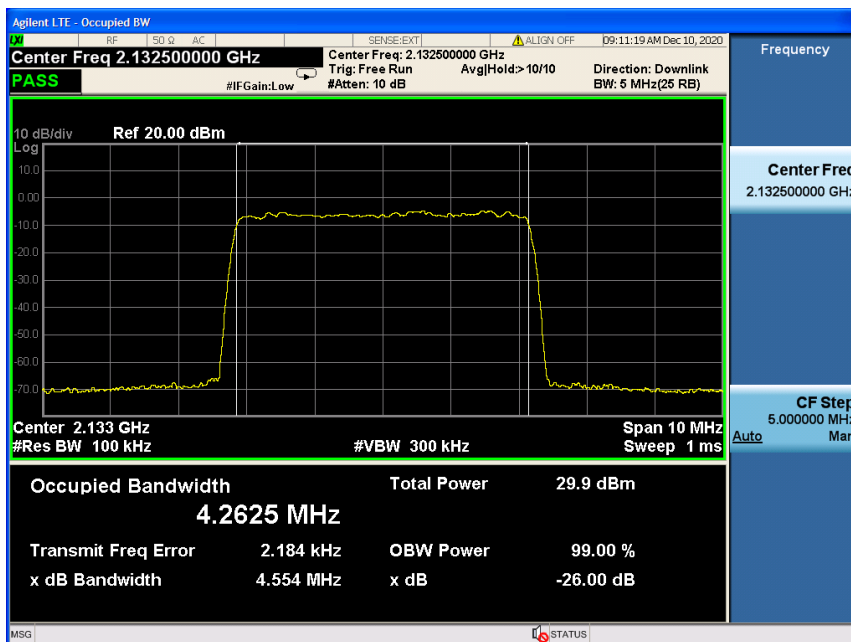


The peak of the frequency response f_0 is 2132.5MHz

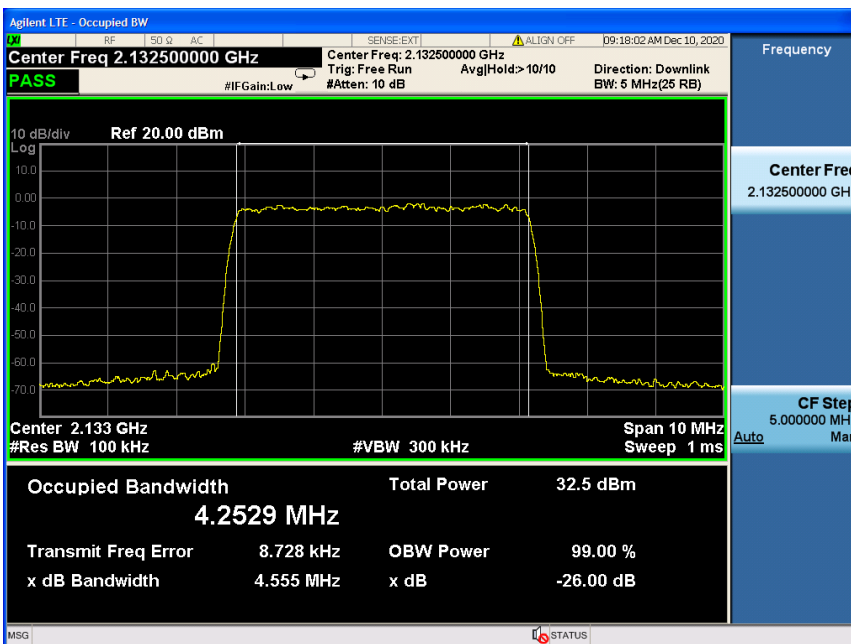


1.3 Input-versus-output signal comparison

Input_DL_1S_M_AWGN_Pre-AGC_26dB Bandwidth & 99% OBW



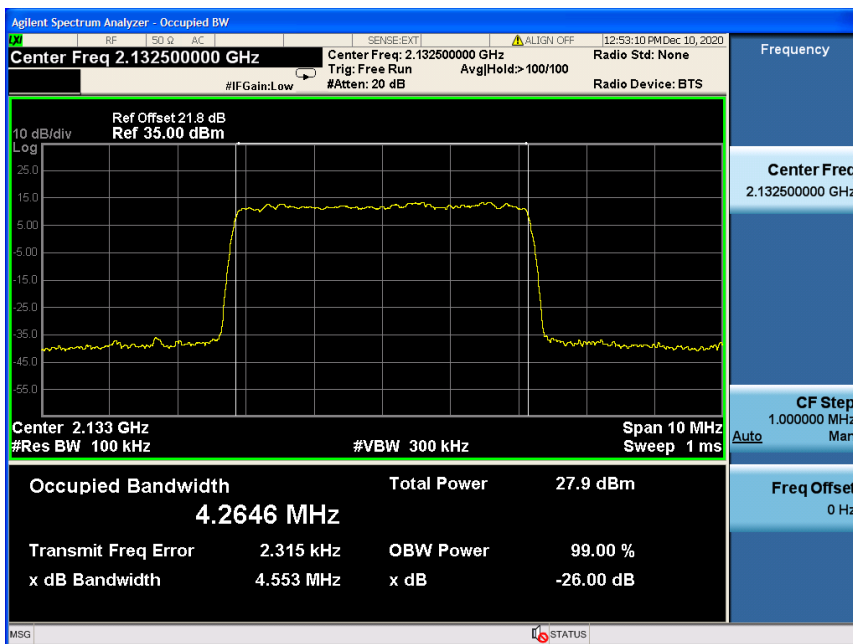
Input_DL_1S_M_AWGN_AGC+3dB_26dB Bandwidth & 99% OBW



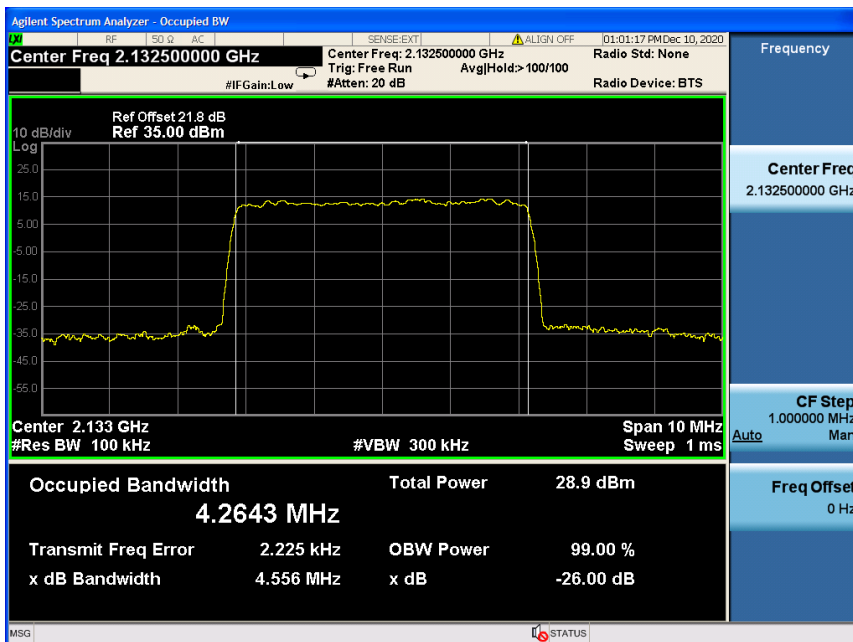
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Output_DL_1S_M_AWGN_Pre-AGC_26dB Bandwidth & 99% OBW



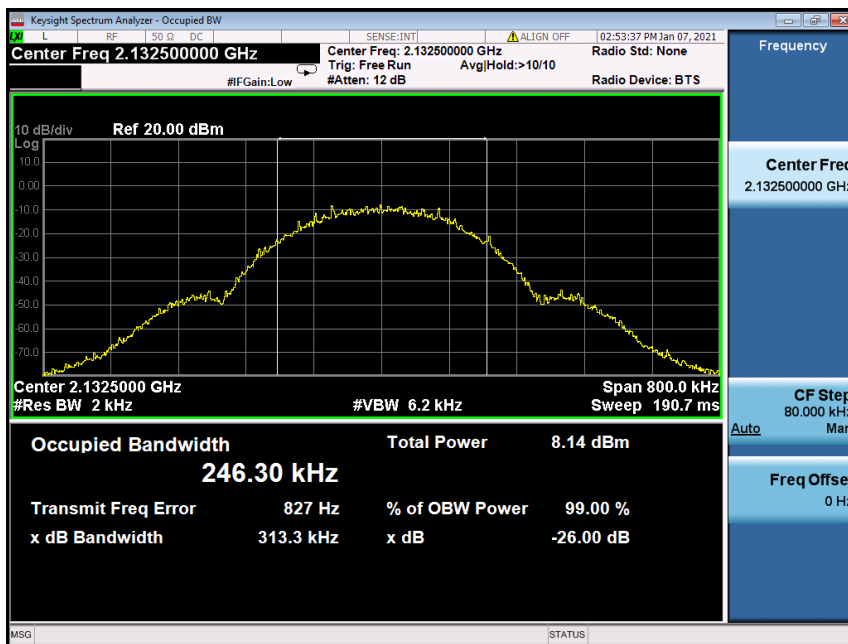
Output_DL_1S_M_AWGN_AGC+3dB_26dB Bandwidth & 99% OBW



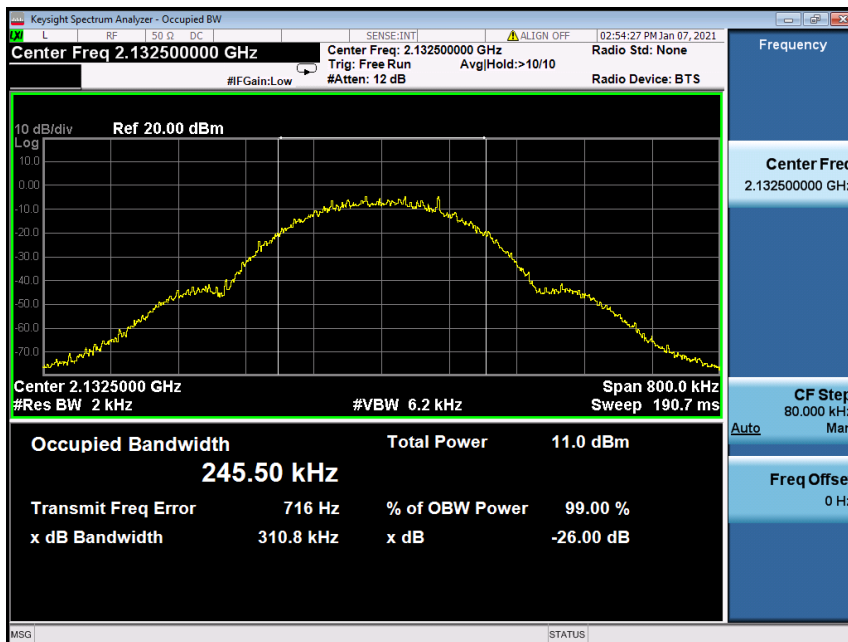
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Input_DL_1S_M_GSM_Pre-AGC_26dB Bandwidth & 99% OBW



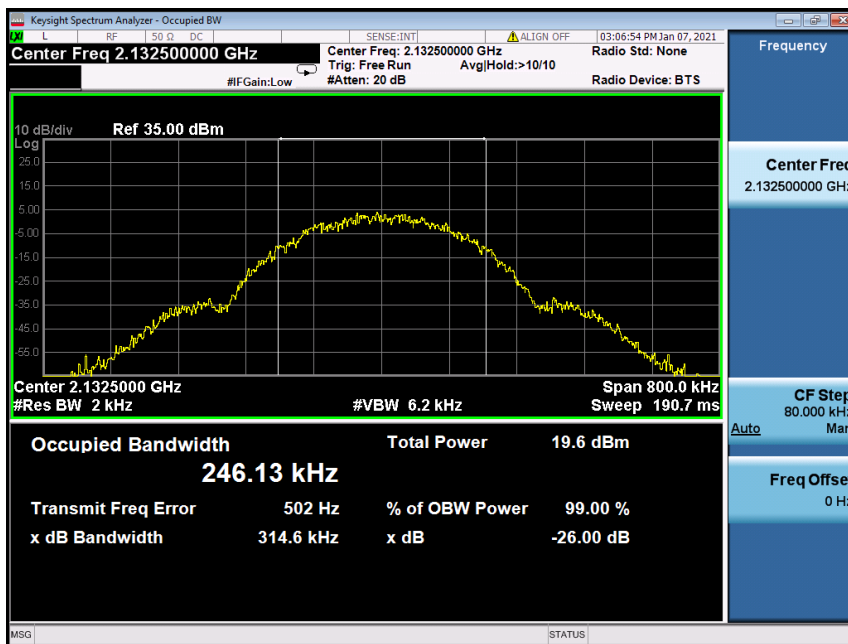
Input_DL_1S_M_GSM_AGC+3dB_26dB Bandwidth & 99% OBW



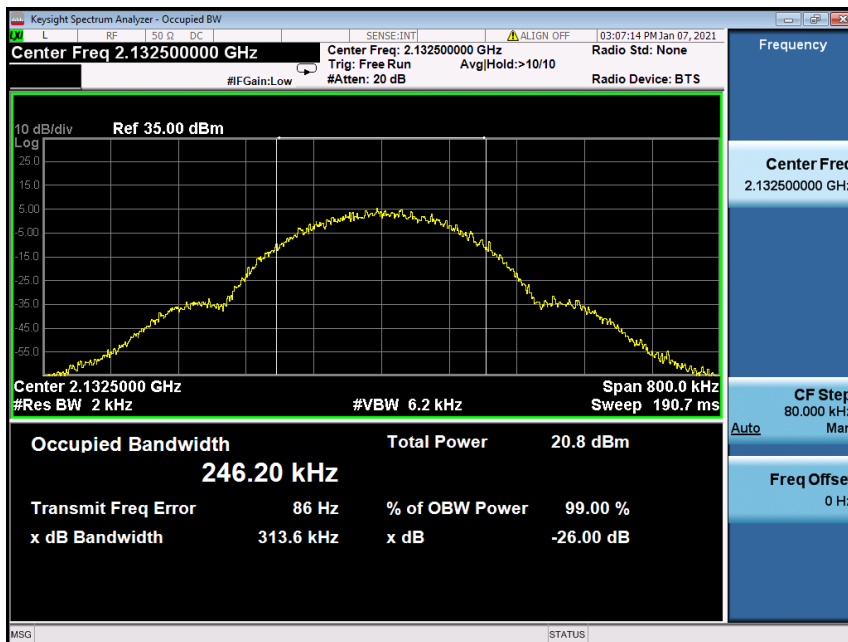
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Output_DL_1S_M_GSM_Pre-AGC_26dB Bandwidth & 99% OBW



Output_DL_1S_M_GSM_AGC+3dB_26dB Bandwidth & 99% OBW



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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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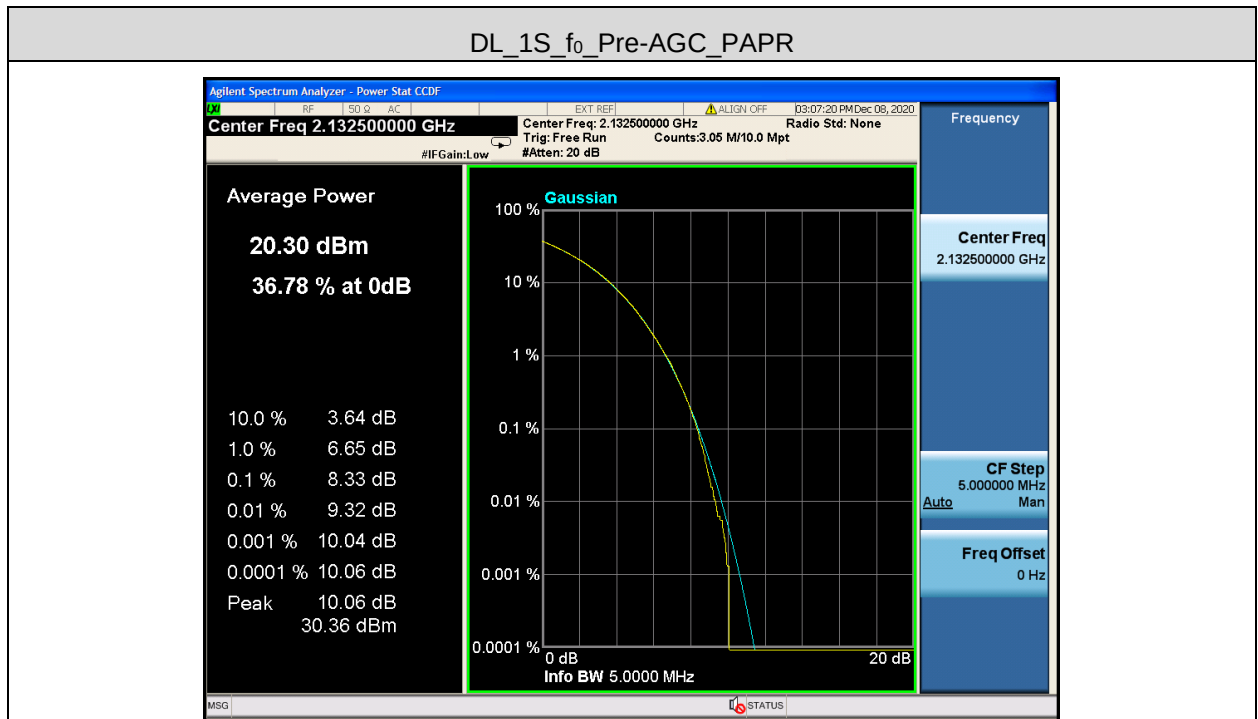
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1.4 Mean output power and amplifier/booster gain

Test Conf.	Test Freq. f ₀ (MHz)	Signal Level	Input Power (dBm)	Output Power (dBm)	Gain (dB)	Verdict
DL_1S_AWGN	2132.5	Pre-AGC	-0.26	20.21	20.47	PASS
		AGC+3dB	2.74	20.12	/	PASS
DL_1S_GSM	2132.5	Pre-AGC	-0.26	20.09	20.35	PASS
		AGC+3dB	2.74	20.14	/	PASS
Remark: According to the declaration from the applicant, the antenna gain should not exceed 12.5dBi, the Directional gain = G(ANT) + 10 log (NANT) dBi = 12.5dBi+10log (2) dBi= 15.5dBi. The total maximum EIRP for the EUT is (20.21dBm+20.21dBm) +15.5dBi=38.72dBm (7.447W) which don't exceed the required EIRP limit (1640W/MHz)						

Test Conf.	Test Freq. f_0 (MHz)	Signal Level	PAPR (dB)	Limit (dB)	Verdict
DL_1S_AWGN	2132.5	Pre-AGC	8.3	13	PASS



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 20.21dBm, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least $43 + 10 \log_{10}(P)$ dB

Here,

$P=20.21\text{dBm}=0.1050\text{W}$.

So the limit =

$P(\text{dBm})-[43 + 10 \log(0.1050\text{W})] = -13\text{dBm}$

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.

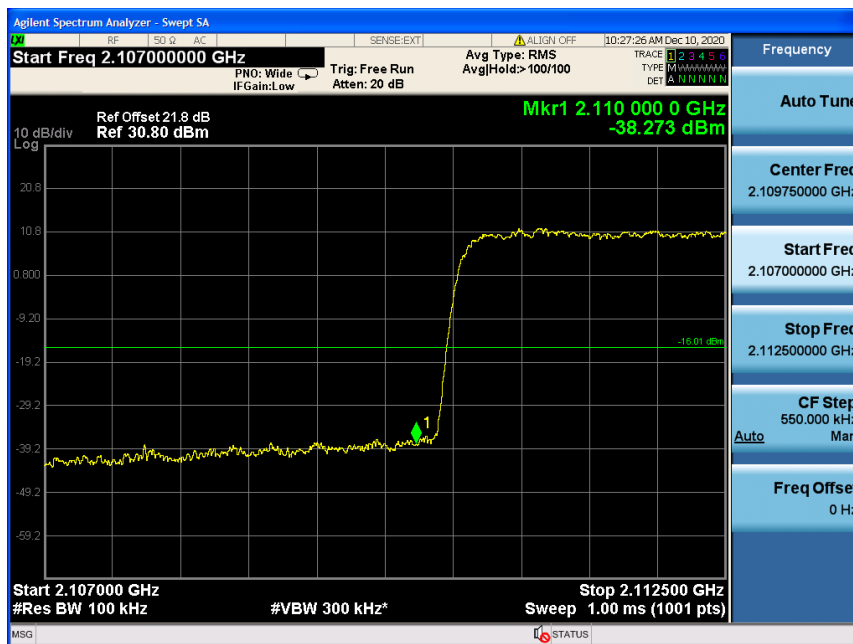
2. Out-of-band/out-of-block (including intermodulation) emissions and spurious emissions have been tested using an AWGN test signal and a GSM-TDMA test signal, only the worst-case was recorded in this report.



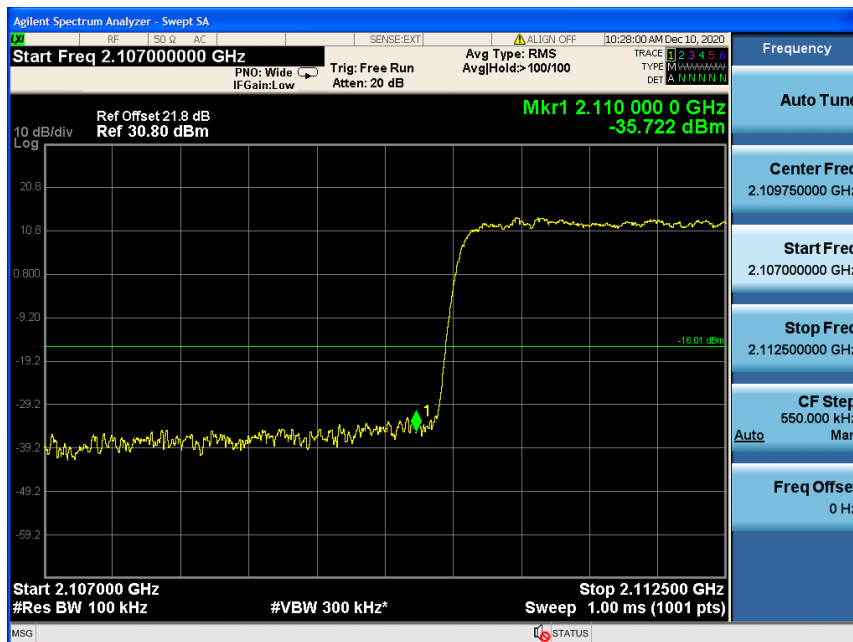
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DL_1S_B_AWGN_Pre-AGC_Out-of-band emission



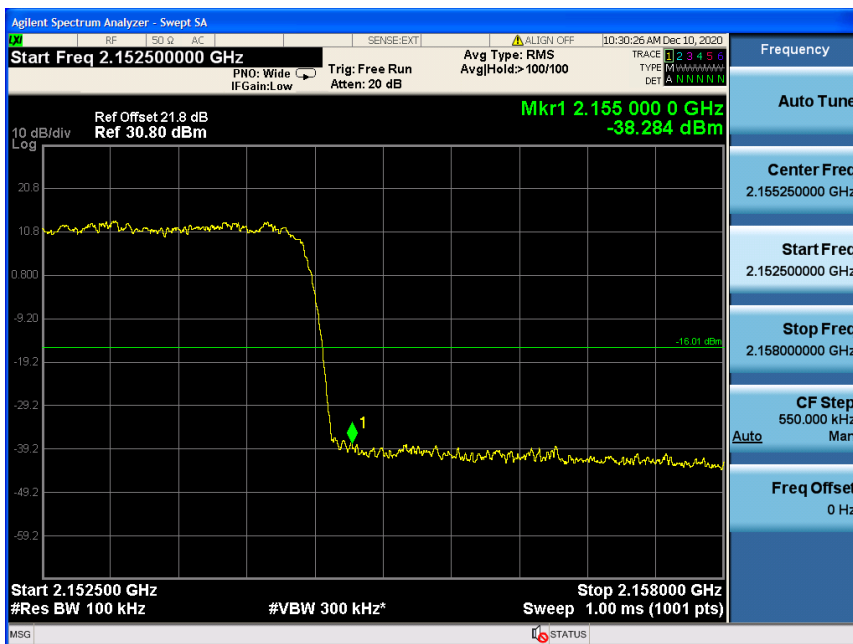
DL_1S_B_AWGN_AGC+3_Out-of-band emission



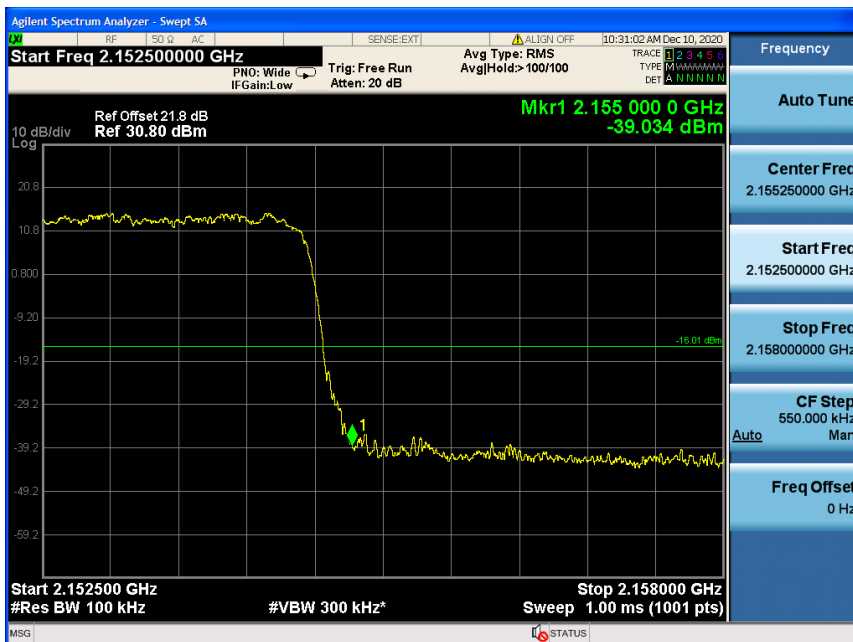
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DL_1S_T_AWGN_Pre-AGC_Out-of-band emission



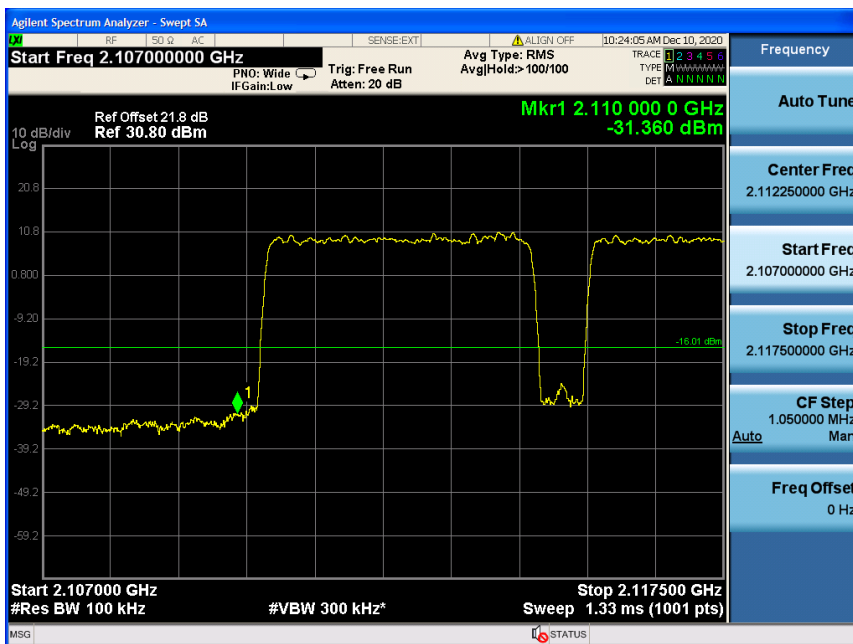
DL_1S_T_AWGN_AGC+3_Out-of-band emission



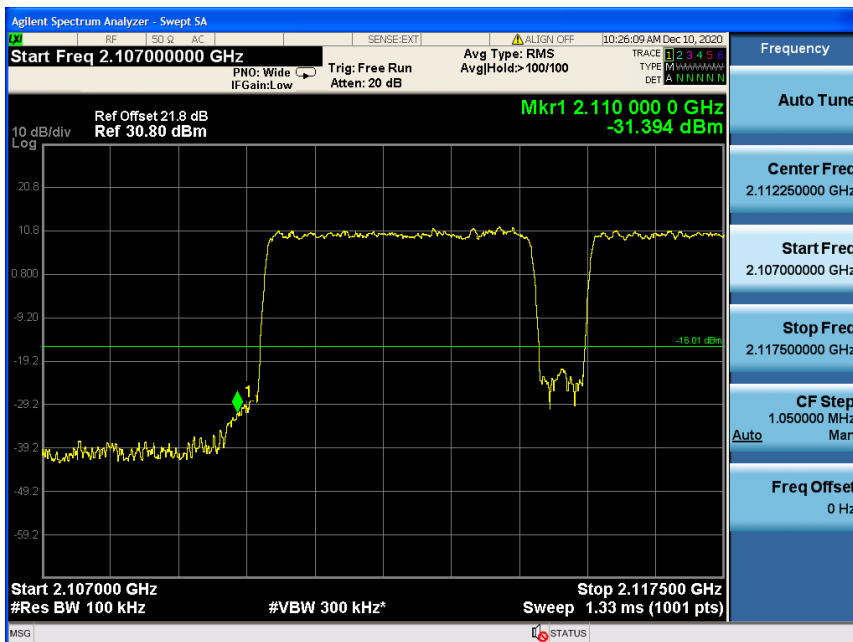
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DL_2S_B_AWGN_Pre-AGC_Out-of-band emission



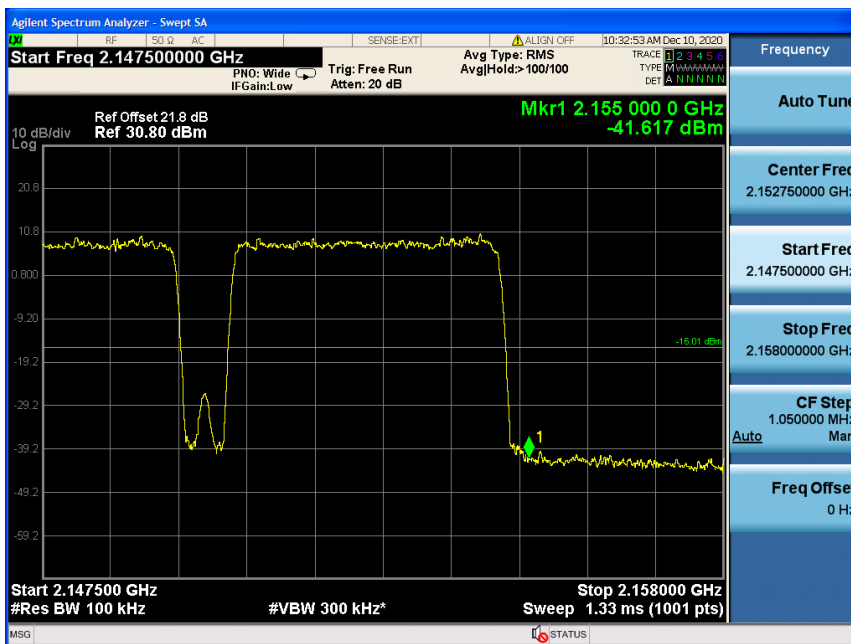
DL_2S_B_AWGN_AGC+3_Out-of-band emission



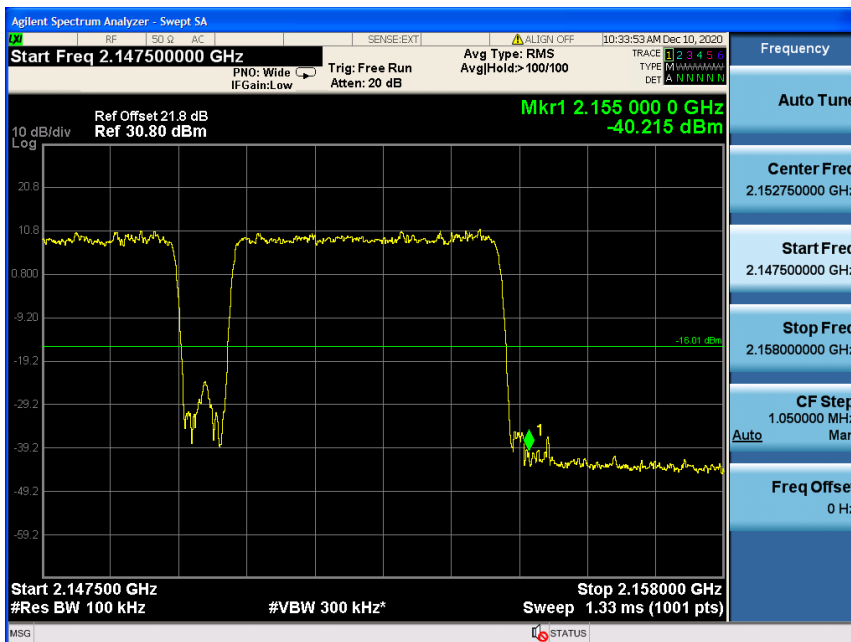
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DL_2S_T_AWGN_Pre-AGC_Out-of-band emission



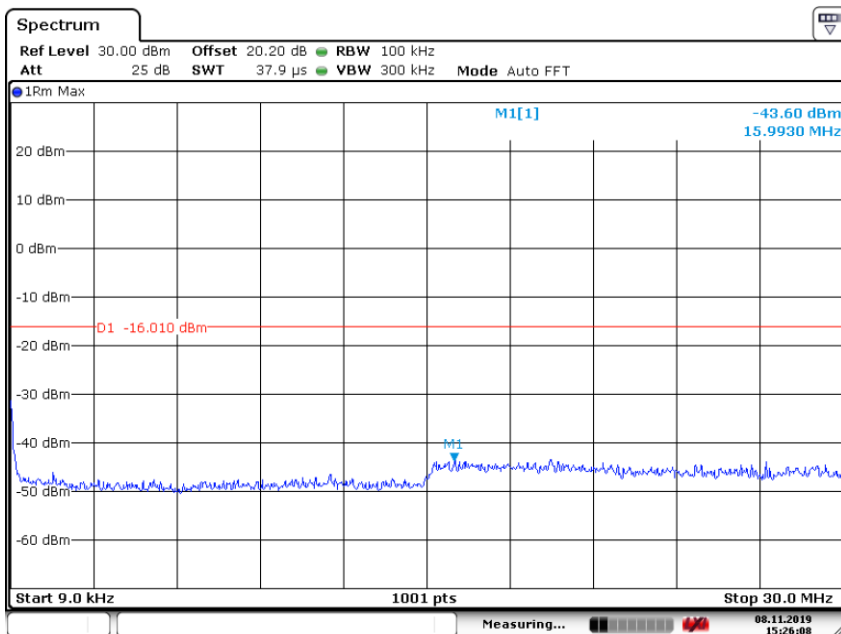
DL_2S_T_AWGN_AGC+3_Out-of-band emission



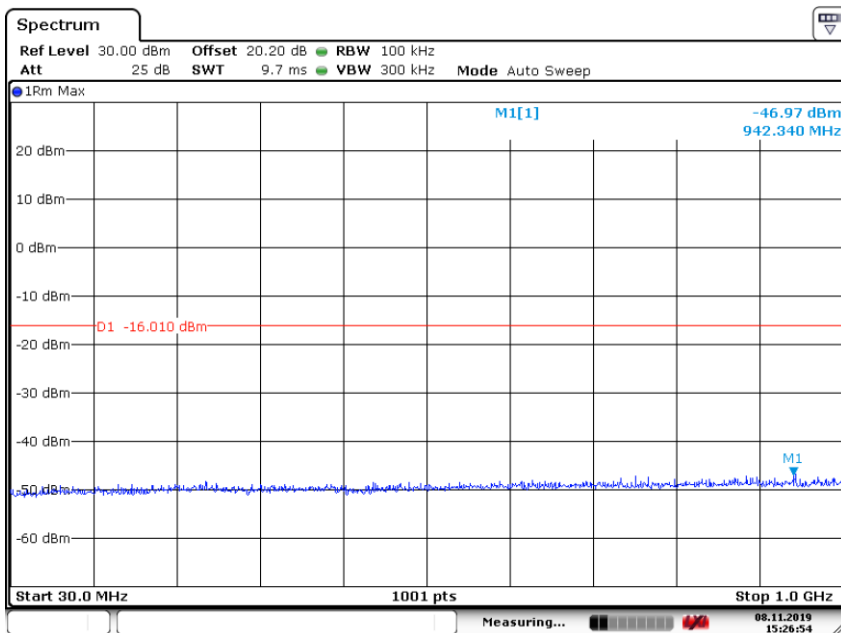
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DL_1S_B_AWGN_Pre-AGC_Spurious emission 1



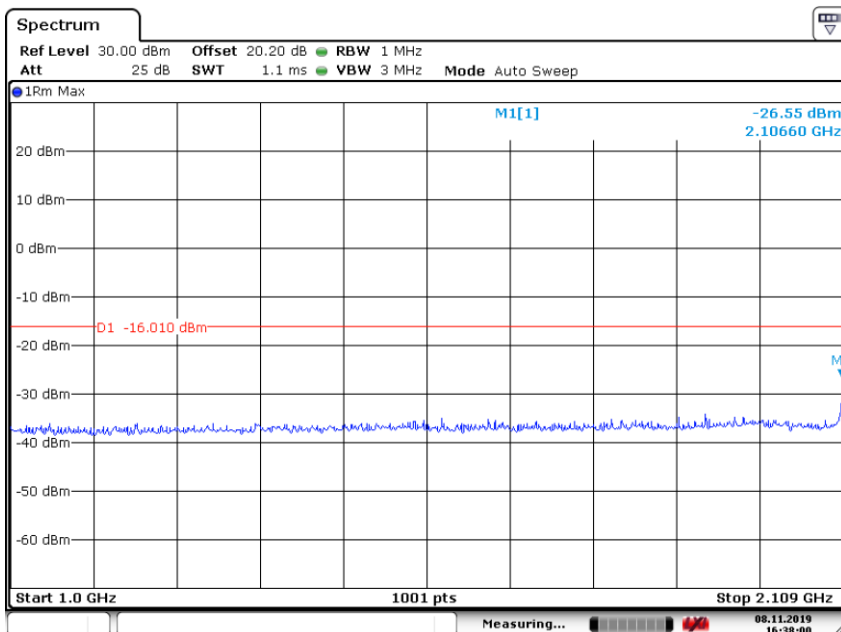
DL_1S_B_AWGN_Pre-AGC_Spurious emission 2



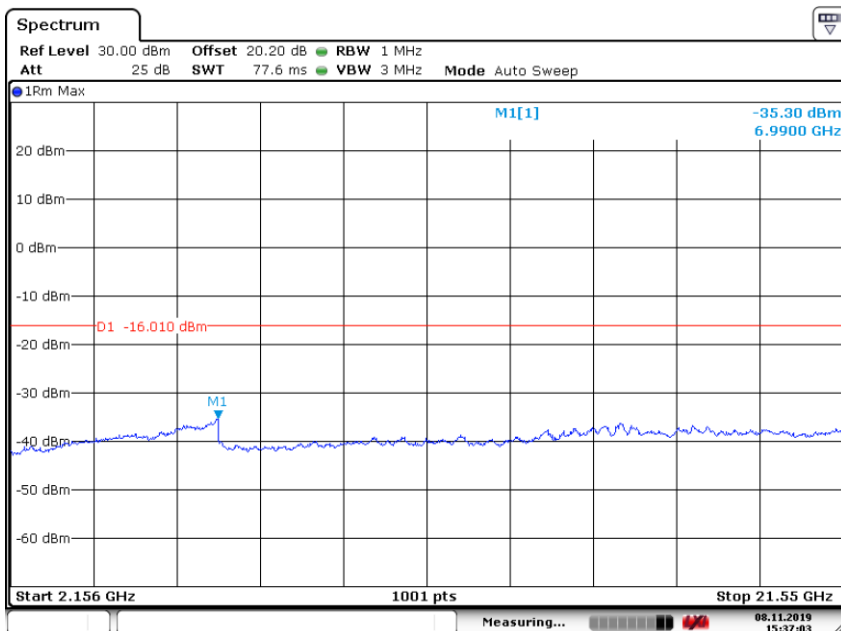
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DL_1S_B_AWGN_Pre-AGC_Spurious emission 3



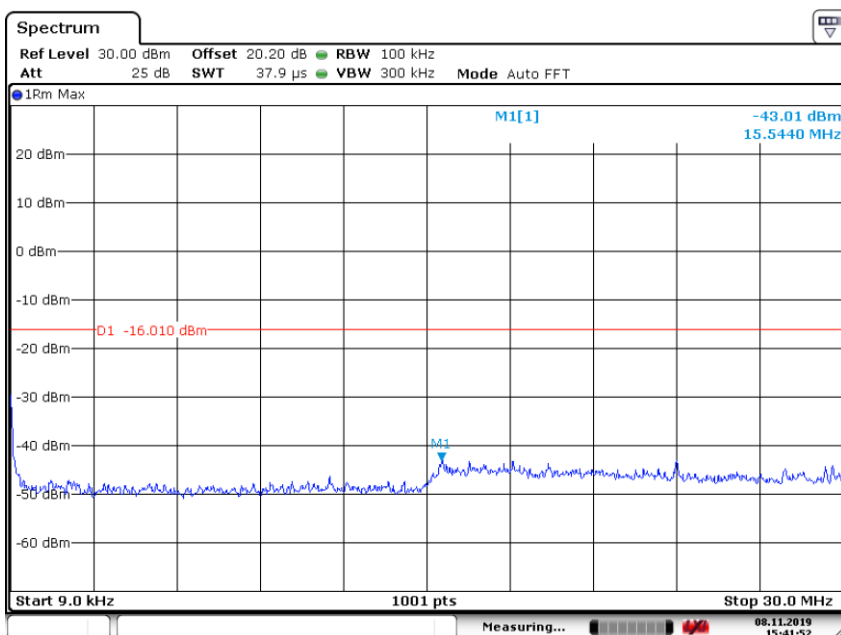
DL_1S_B_AWGN_Pre-AGC_Spurious emission 4



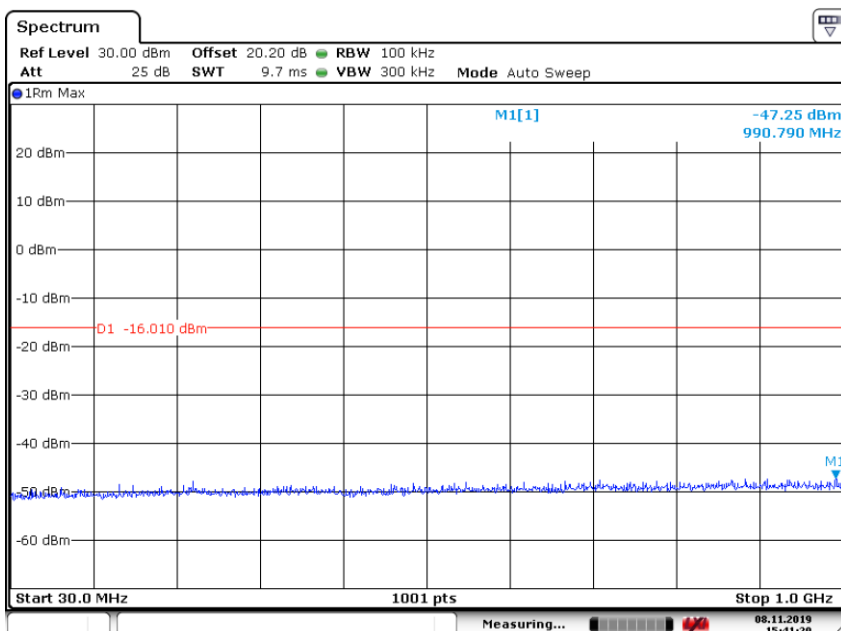
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DL_1S_M_AWGN_Pre-AGC_Spurious emission 1



DL_1S_M_AWGN_Pre-AGC_Spurious emission 2

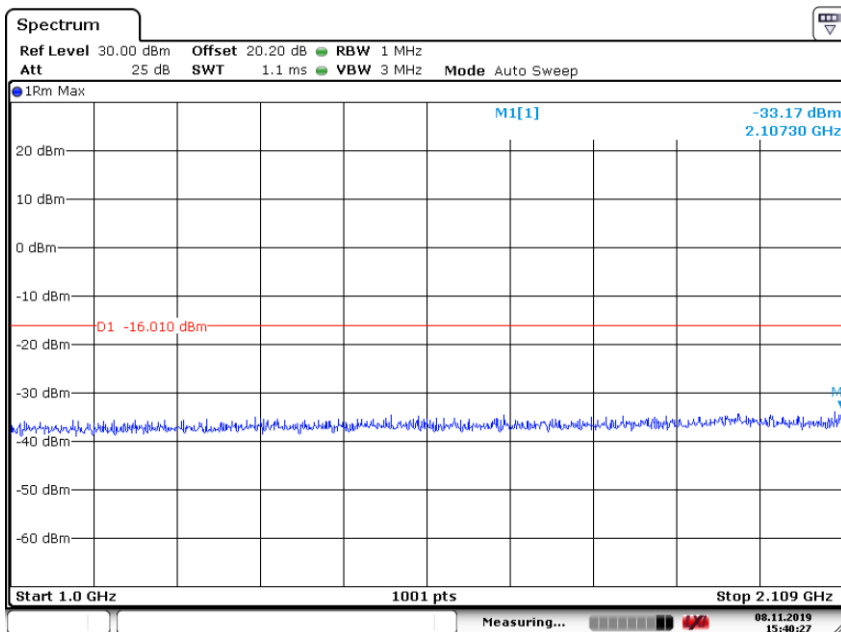


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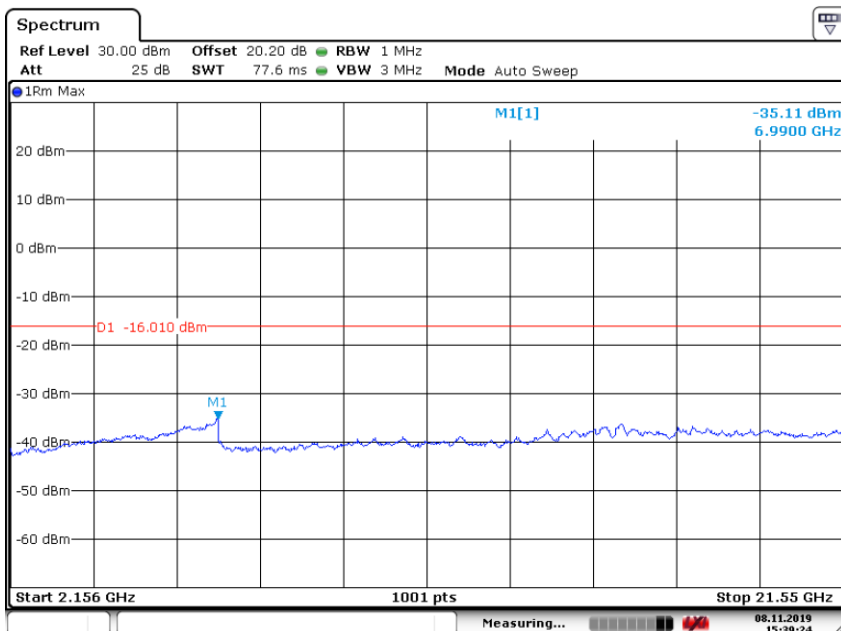
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Guangzhou Branch Testing Center EEC Laboratory, 中国·广州·经济技术开发区科学城科珠路198号 邮编: 510663 t (86-20) 82155555 f (86-20) 82075058 sgs.china@sgs.com

DL_1S_M_AWGN_Pre-AGC_Spurious emission 3



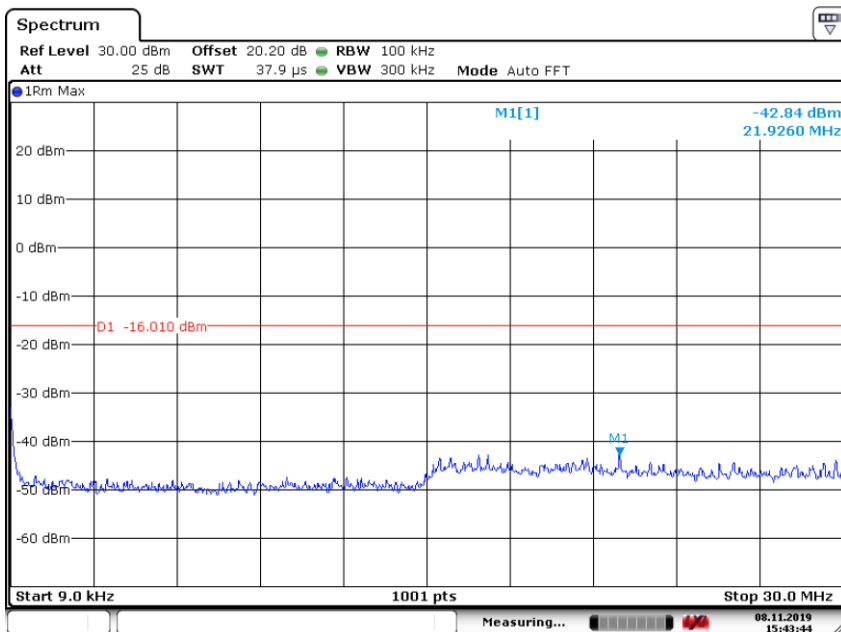
DL_1S_M_AWGN_Pre-AGC_Spurious emission 4



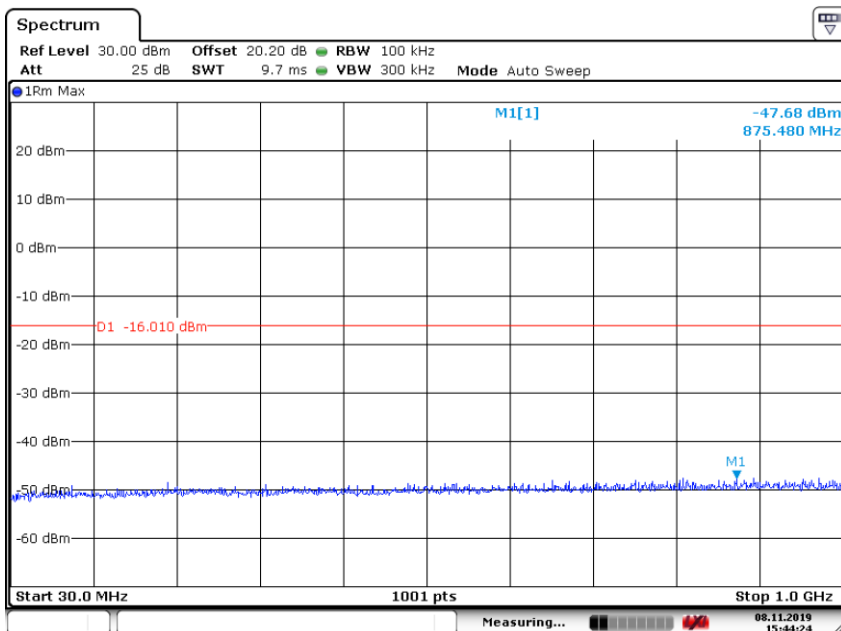
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DL_1S_T_AWGN_Pre-AGC_Spurious emission 1



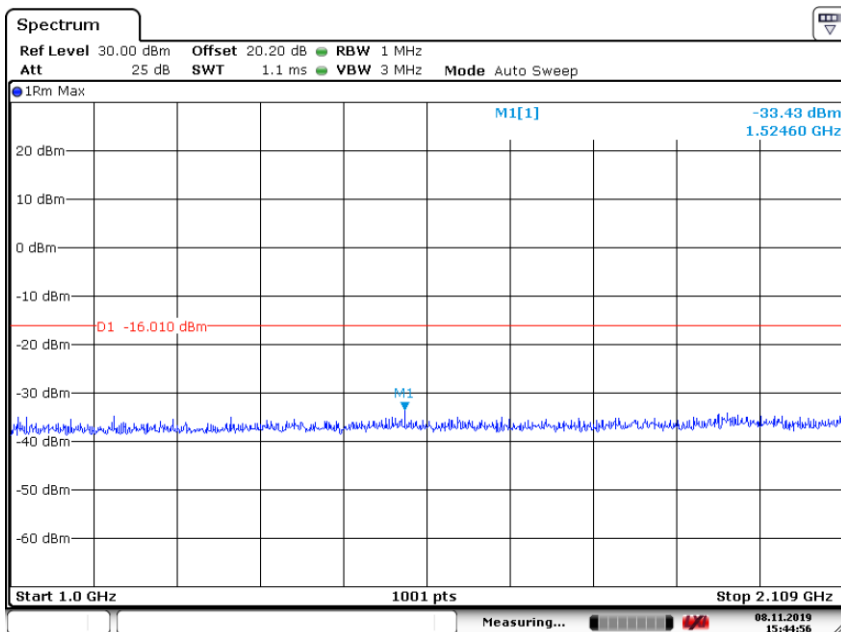
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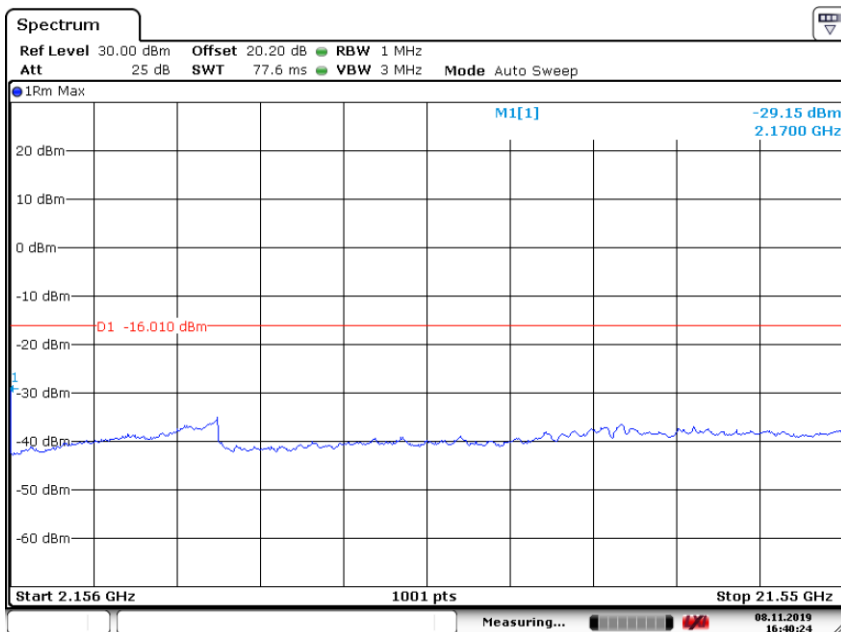
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DL_1S_T_AWGN_Pre-AGC_Spurious emission 3



DL_1S_T_AWGN_Pre-AGC_Spurious emission 4



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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 DC 48V.
 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	DL_1S_M_AWGN	2132.523564	-0.03	PASS
40		2132.523529	-0.04	PASS
30		2132.523567	-0.03	PASS
20		2132.523622	Reference	PASS
10		2132.523538	-0.04	PASS
0		2132.523435	-0.09	PASS
-10		2132.523647	0.01	PASS
-20		2132.523745	0.06	PASS
-30		2132.523572	-0.02	PASS

Frequency stability vs voltage				
Voltage (V)	Test Conf.	Test data (MHz)	Tolerance (ppm)	Verdict
DC 40.8	DL_1S_M_AWGN	2132.523567	0.05	PASS
DC 48		2132.523456	Reference	PASS
DC 55.2		2132.523678	0.11	PASS



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1.7 Radiated spurious emissions

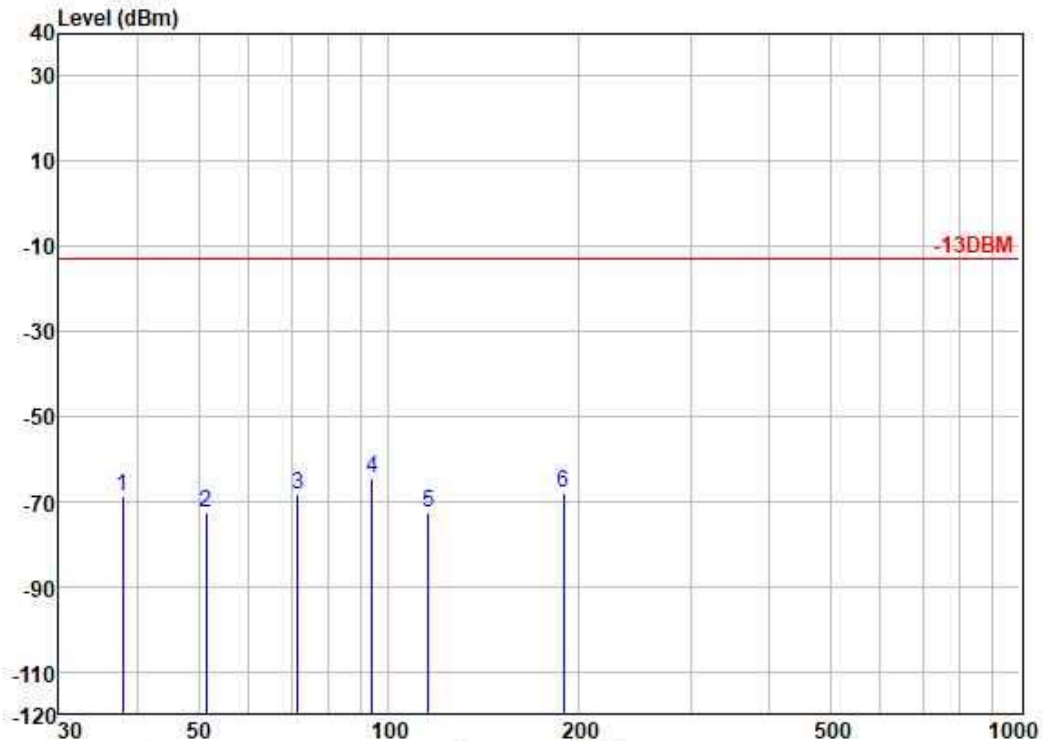
- Note:
1. The tested max conducted power for single antenna port is 20.21dBm. the 2x2 MIMO total power is 20.21dBm+20.21dBm= 0.2100W.
the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least $43 + 10 \log_{10}(P)$ dB
Here,
 $P=0.2100W$,
So the limit =
 $P(dBm) - [43 + 10 \log(0.2100W)] = -13dBm$
 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



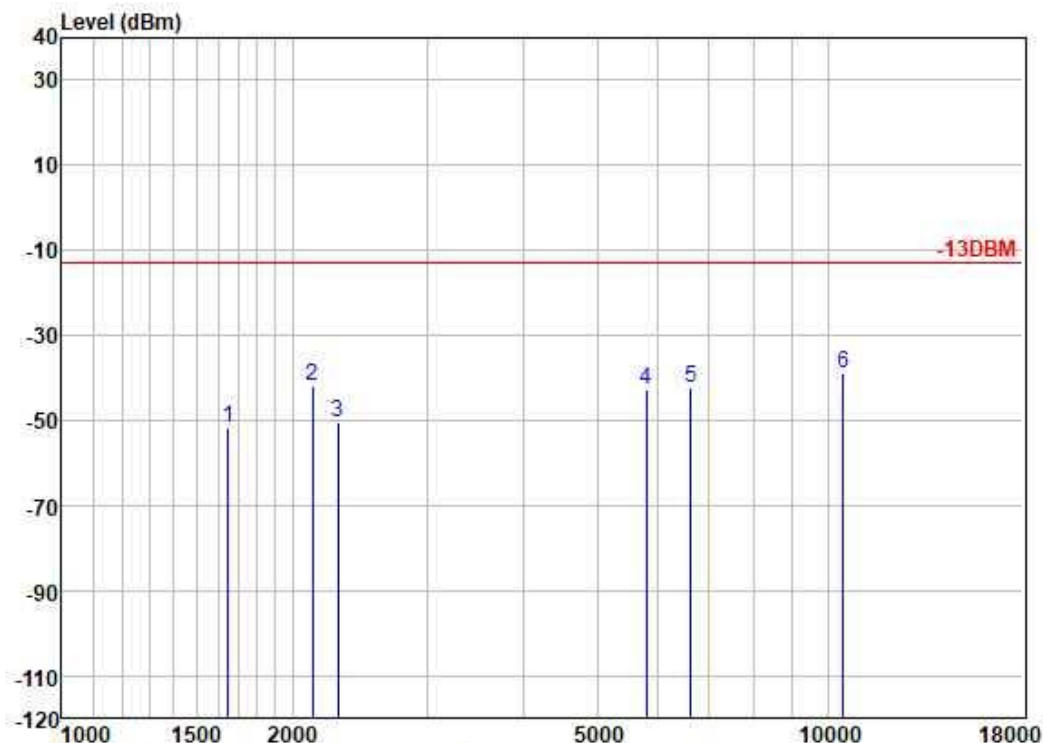
Freq. (MHz)	Level (dBm)	Limit (dBm)	Over Limit (dB)	Polarization	Verdict
37.812	-68.65	-13	-55.65	Horizontal	PASS
51.301	-72.56	-13	-59.56	Horizontal	PASS
71.832	-68.17	-13	-55.17	Horizontal	PASS
94.098	-64.68	-13	-51.68	Horizontal	PASS
115.321	-72.60	-13	-59.6	Horizontal	PASS
189.074	-67.80	-13	-54.8	Horizontal	PASS



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DL_1S_M_AWGN_Horizontal_above 1GHz



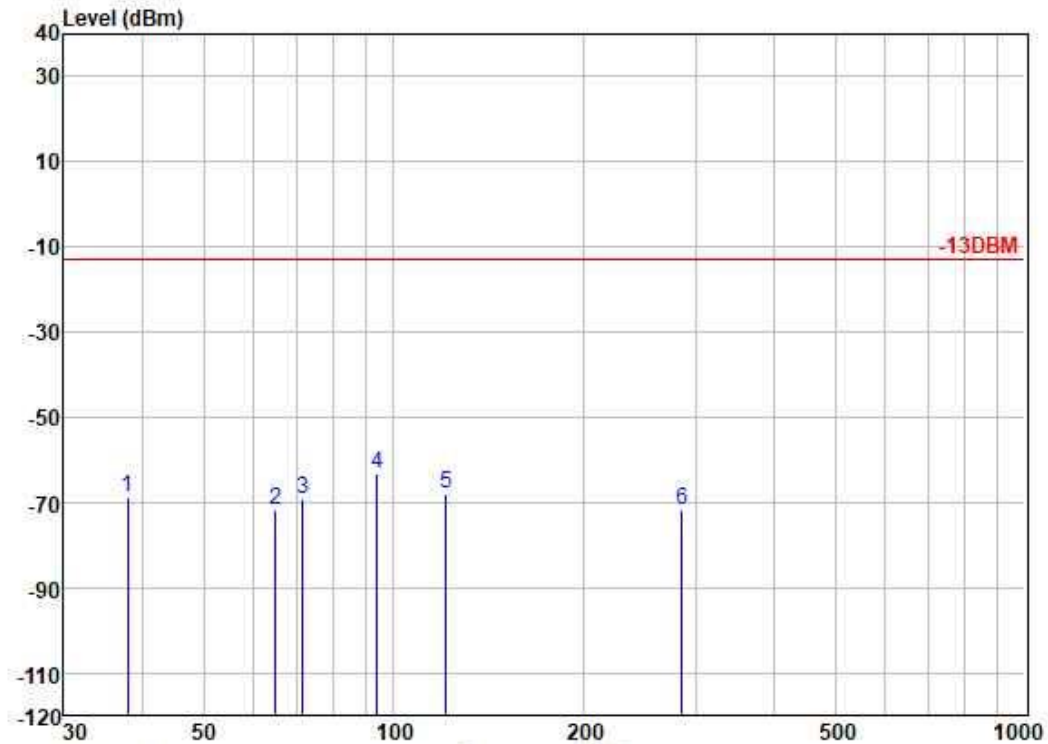
Freq. (MHz)	Level (dBm)	Limit (dBm)	Over Limit (dB)	Polarization	Verdict
1648.778	-51.65	-13	-38.65	Horizontal	PASS
2126.308	-41.97	-13	-28.97	Horizontal	PASS
2292.257	-50.37	-13	-37.37	Horizontal	PASS
5797.032	-42.89	-13	-29.89	Horizontal	PASS
6621.375	-42.43	-13	-29.43	Horizontal	PASS
10484.230	-39.00	-13	-26	Horizontal	PASS



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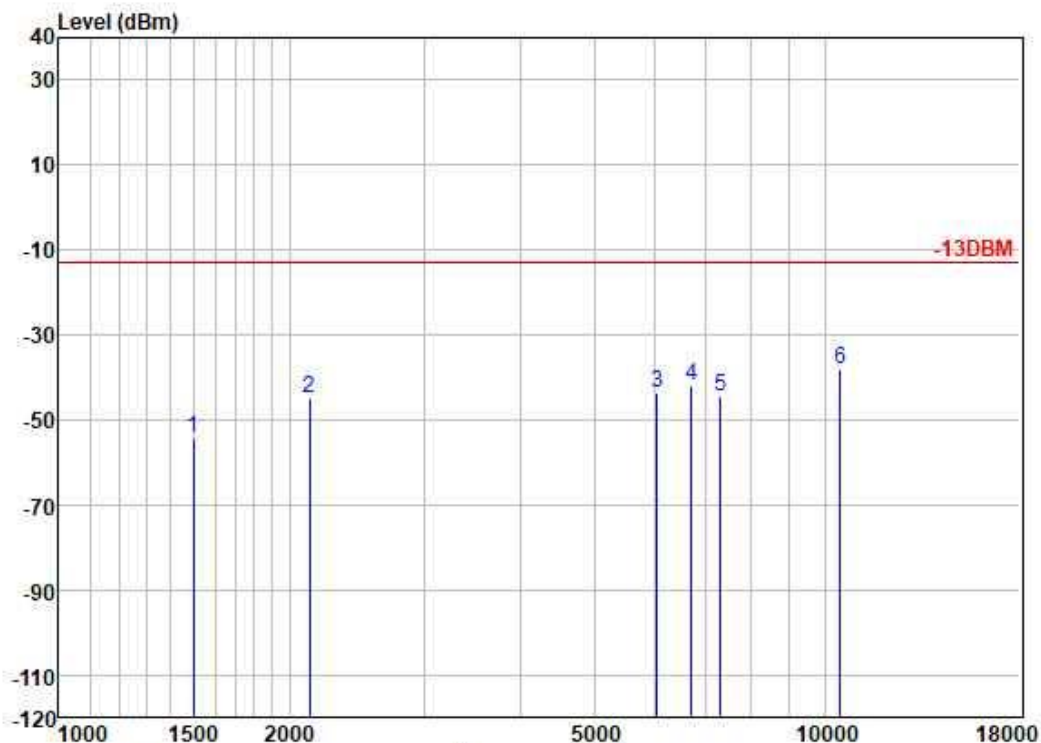
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DL_1S_M_AWGN_Vertical_30MHz~1GHz



Freq. (MHz)	Level (dBm)	Limit (dBm)	Over Limit (dB)	Polarization	Verdict
32.812	-68.88	-13	-55.88	Vertical	PASS
64.887	-71.70	-13	-58.7	Vertical	PASS
71.832	-69.26	-13	-56.26	Vertical	PASS
94.098	-63.18	-13	-50.18	Vertical	PASS
121.123	-67.86	-13	-54.86	Vertical	PASS
285.978	-71.92	-13	-58.92	Vertical	PASS

DL_1S_M_AWGN_Vertical_above 1GHz



Freq. (MHz)	Level (dBm)	Limit (dBm)	Over Limit (dB)	Polarization	Verdict
1498.781	-54.20	-13	-41.2	Vertical	PASS
2126.308	-44.76	-13	-31.76	Vertical	PASS
6036.421	-43.65	-13	-30.65	Vertical	PASS
6698.373	-42.06	-13	-29.06	Vertical	PASS
7305.122	-44.37	-13	-31.37	Vertical	PASS
10484.245	-38.04	-13	-25.04	Vertical	PASS



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**SGS-CSTC Standards Technical Services Co., Ltd.
Guangzhou Branch**

Application No.: GZEM2011016737CR

Page: 29 of 140

FCC ID: OJFDLRU1719235

2 AWS-3 (1755-1780MHz paired with 2155-2180MHz)

2.1 AGC threshold level

Test Conf.	AGC Threshold level
DL_1S_M_AWGN	-0.11dBm
DL_1S_M_GSM	-0.20dBm



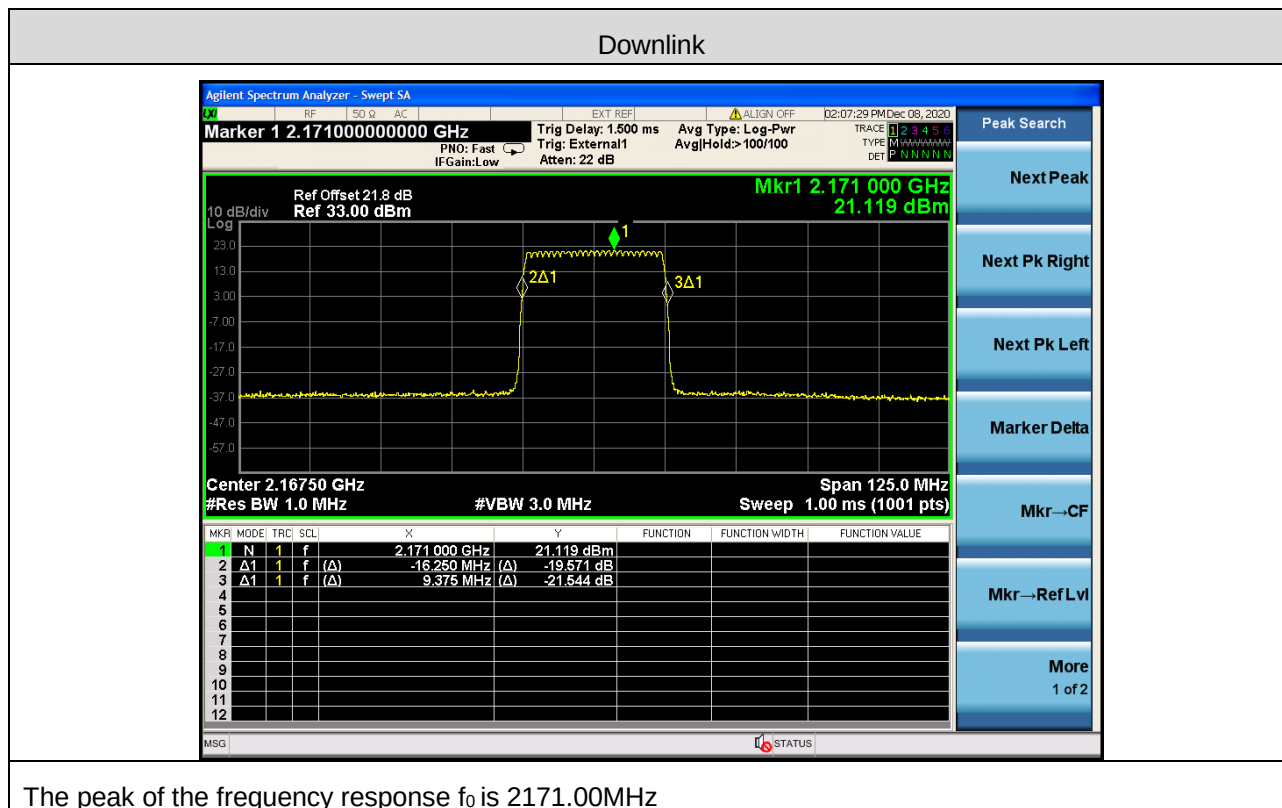
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Guangzhou Branch Testing Center EEC Laboratory | 中国·广州·经济技术开发区科学城科珠路198号 | 邮编: 510663 | t (86-20) 82155555 f (86-20) 82075058 sgs.china@sgs.com

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2.2 Out-of-band rejection



The peak of the frequency response f_0 is 2171.00MHz

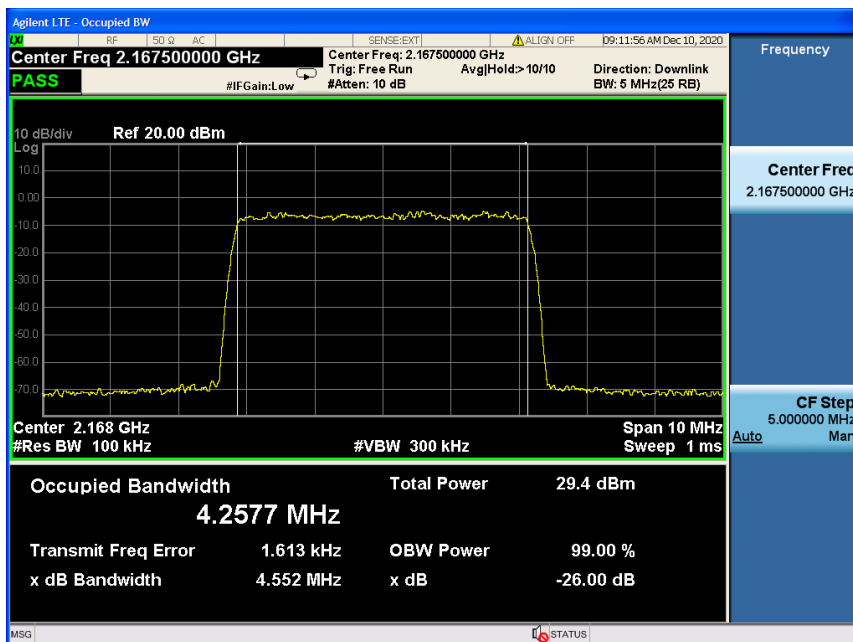


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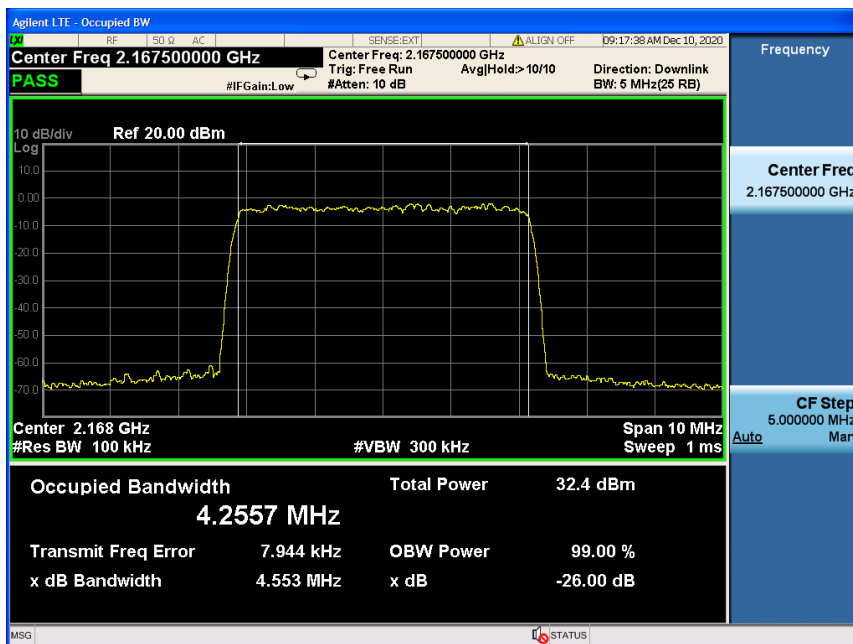
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2.3 Input-versus-output signal comparison

Input_DL_1S_M_AWGN_Pre-AGC_26dB Bandwidth & 99% OBW



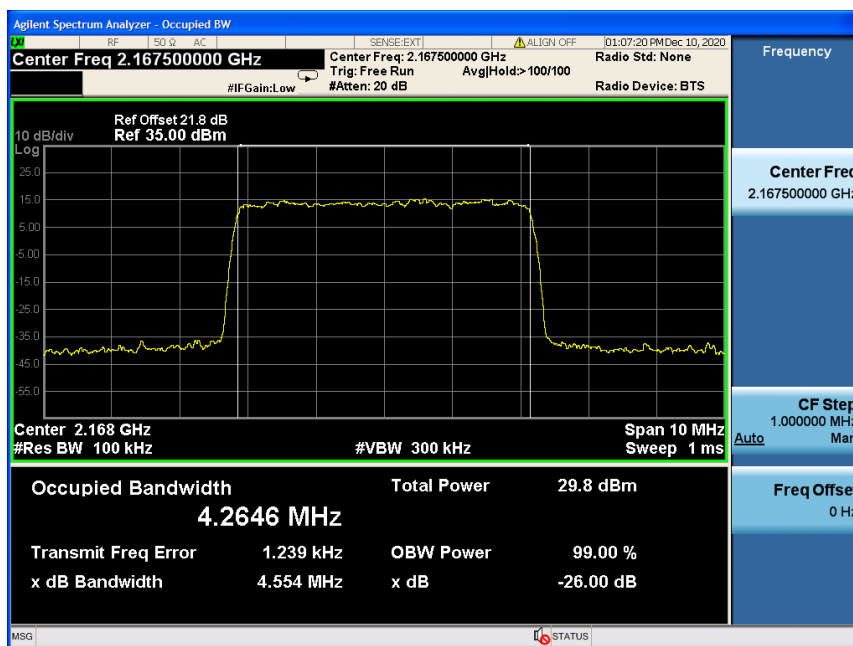
Input_DL_1S_M_AWGN_AGC+3dB_26dB Bandwidth & 99% OBW



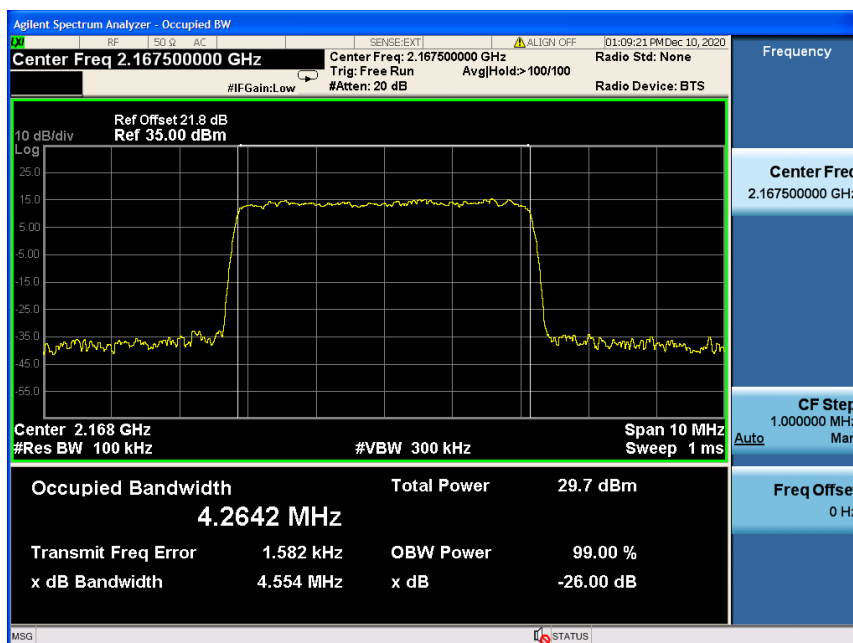
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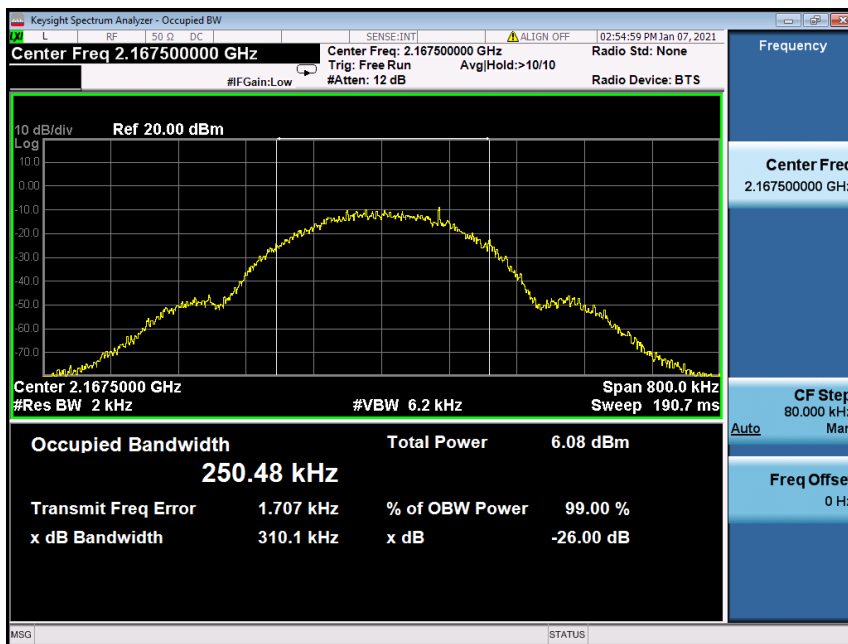
Output_DL_1S_M_AWGN_Pre-AGC_26dB Bandwidth & 99% OBW



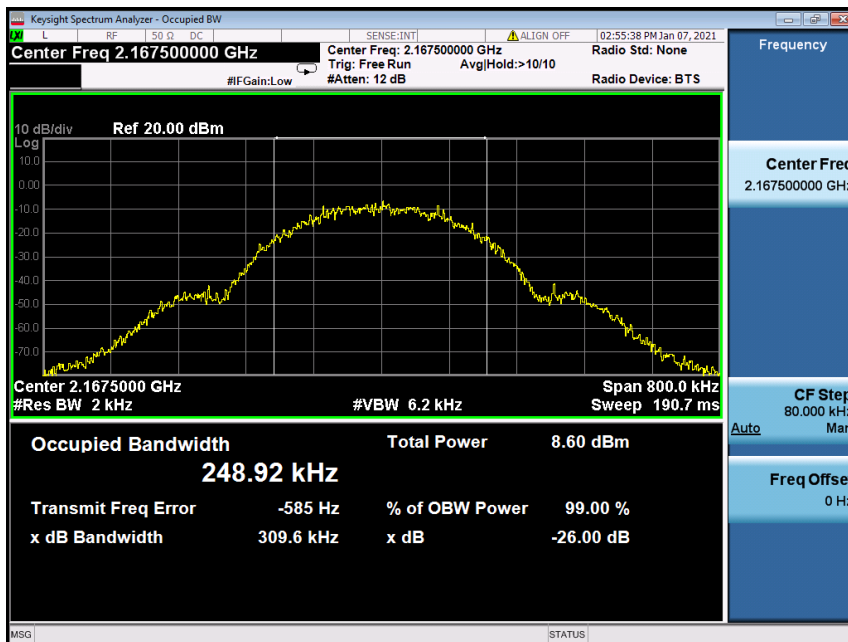
Output_DL_1S_M_AWGN_AGC+3dB_26dB Bandwidth & 99% OBW



Input_DL_1S_M_GSM_Pre-AGC_26dB Bandwidth & 99% OBW



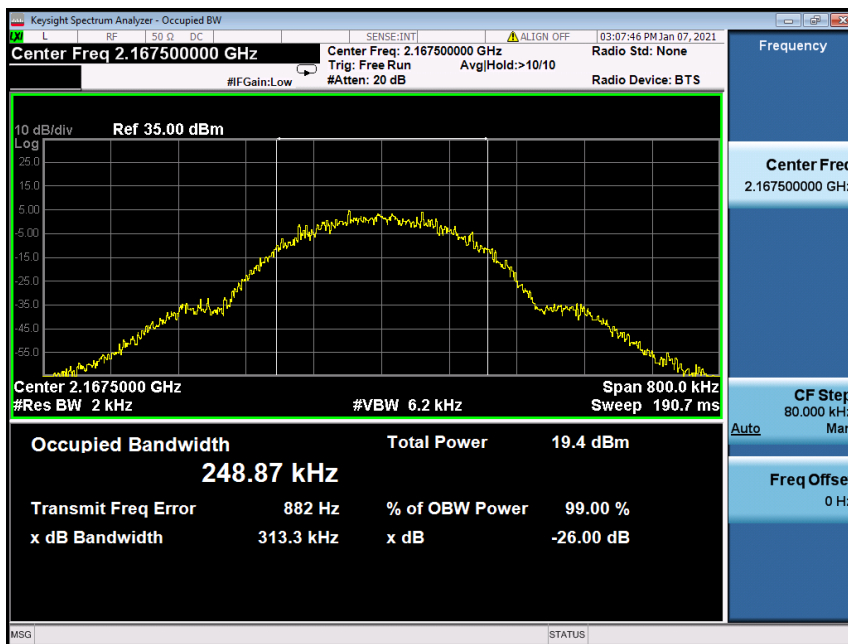
Input_DL_1S_M_GSM_AGC+3dB_26dB Bandwidth & 99% OBW



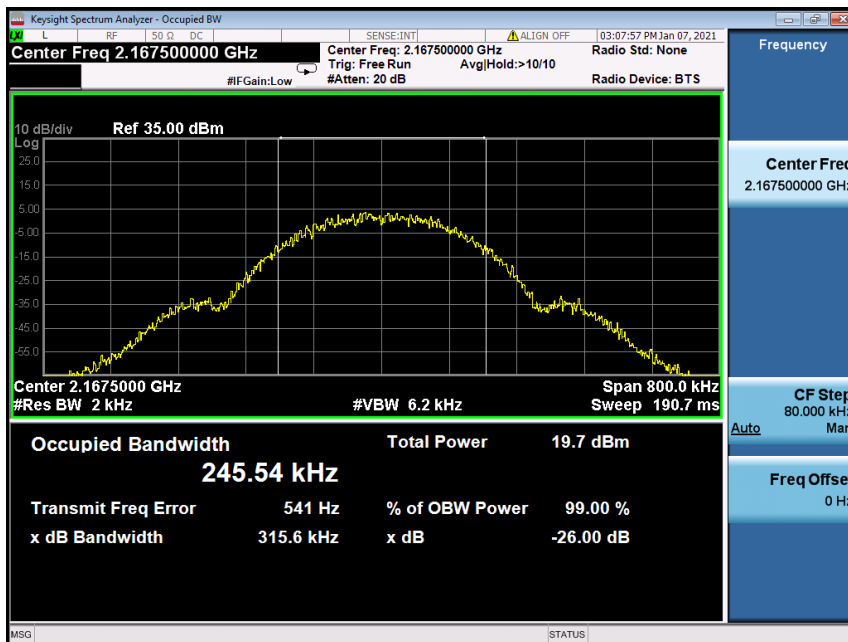
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Output_DL_1S_M_GSM_Pre-AGC_26dB Bandwidth & 99% OBW



Output_DL_1S_M_GSM_AGC+3dB_26dB Bandwidth & 99% OBW



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**SGS-CSTC Standards Technical Services Co., Ltd.
Guangzhou Branch**

Application No.: GZEM2011016737CR

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FCC ID: OJFDLRU1719235

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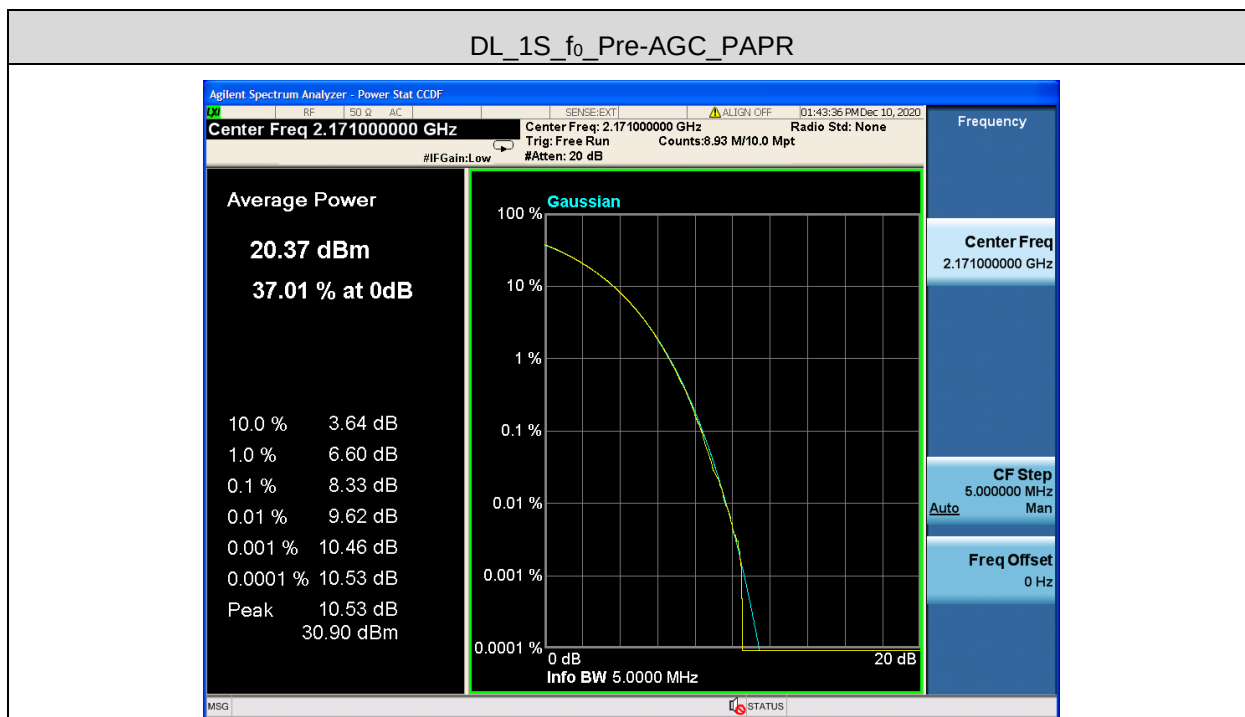
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Guangzhou Branch Testing Center EEC Laboratory. 中国·广州·经济技术开发区科学城科珠路198号 邮编: 510663 t (86-20) 82155555 f (86-20) 82075058 sgs.china@sgs.com

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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
DL_1S_AWGN	2171.0	Pre-AGC	-0.15	20.36	20.51	PASS
		AGC+3dB	2.85	20.24	/	PASS
DL_1S_GSM	2171.0	Pre-AGC	-0.15	20.24	20.39	PASS
		AGC+3dB	2.85	20.15	/	PASS
Remark: According to the declaration from the applicant, the antenna gain should not exceed 12.5dBi, the Directional gain = G(ANT) + 10 log (NANT) dBi = 12.5dBi+10log (2) dBi= 15.5dBi. The total maximum EIRP for the EUT is (20.36dBm+20.36dBm) +15.5dBi=38.87dBm (7.709W) which don't exceed the required EIRP limit (1640W/MHz)						

Test Conf.	Test Freq. f_0 (MHz)	Signal Level	PAPR (dB)	Limit (dB)	Verdict
DL_1S_AWGN	2171.0	Pre-AGC	8.3	13	PASS



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

Note: 1. The tested max conducted power for single antenna port is 20.36dBm, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least $43 + 10 \log_{10}(P)$ dB

Here,

$P=20.36\text{dBm}=0.1086\text{W}$.

So the limit =

$P(\text{dBm})-[43 + 10 \log(0.1050\text{W})] = -13\text{dBm}$

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.

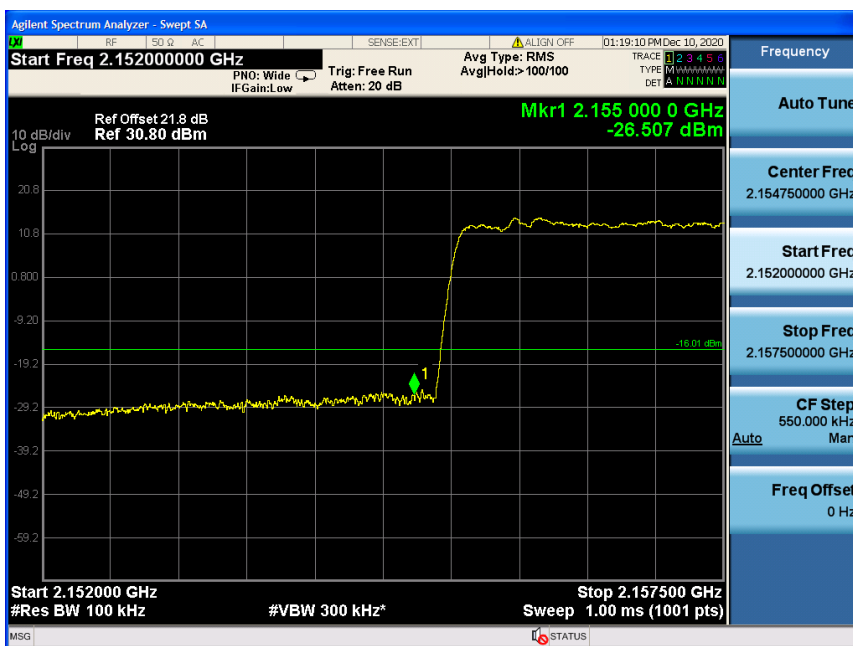
2. Out-of-band/out-of-block (including intermodulation) emissions and spurious emissions have been tested using an AWGN test signal and a GSM-TDMA test signal, only the worst-case was recorded in this report.



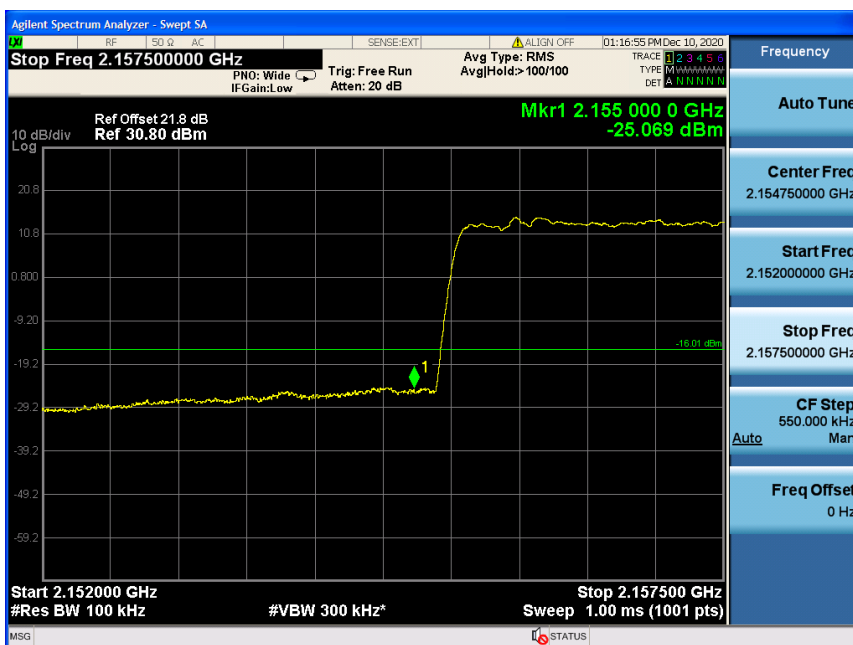
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DL_1S_B_AWGN_Pre-AGC_Out-of-band emission



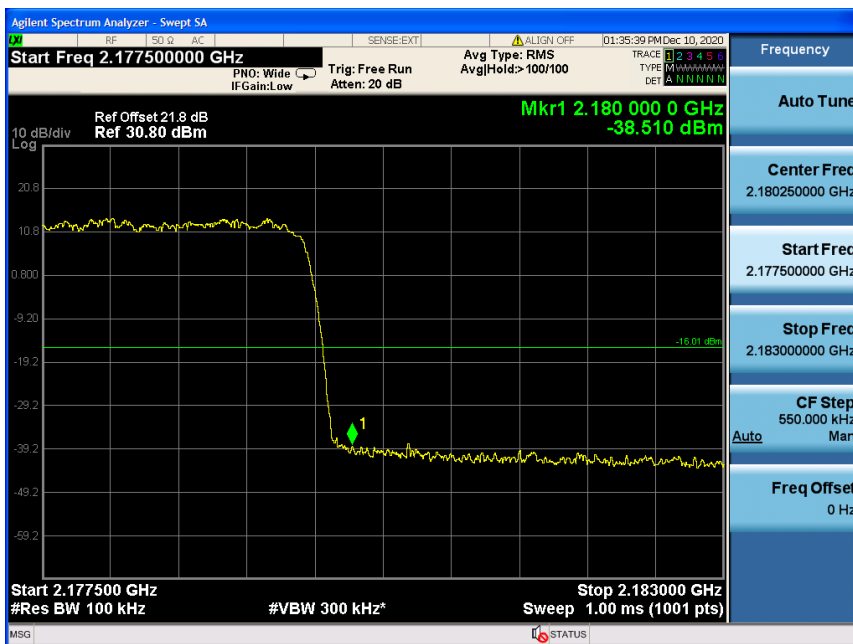
DL_1S_B_AWGN_AGC+3_Out-of-band emission



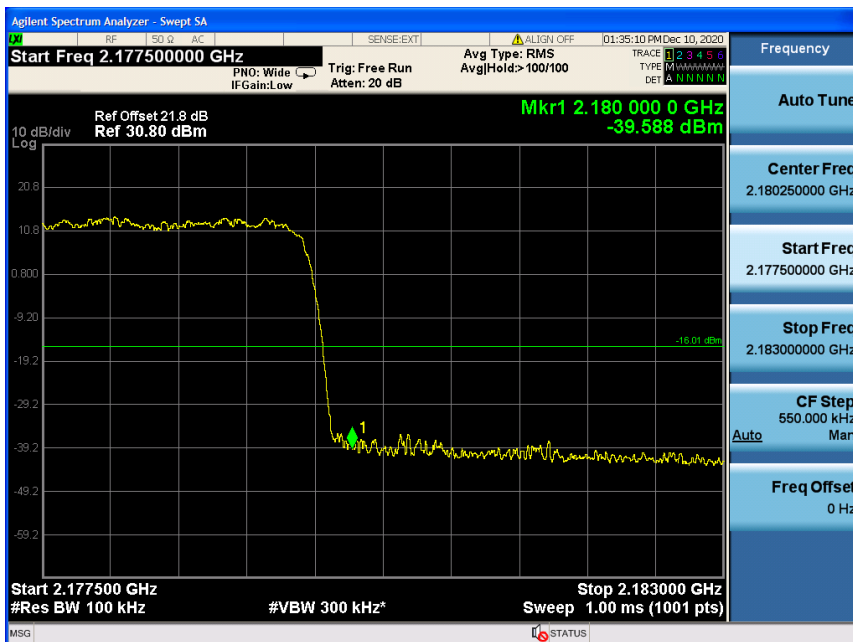
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DL_1S_T_AWGN_Pre-AGC_Out-of-band emission



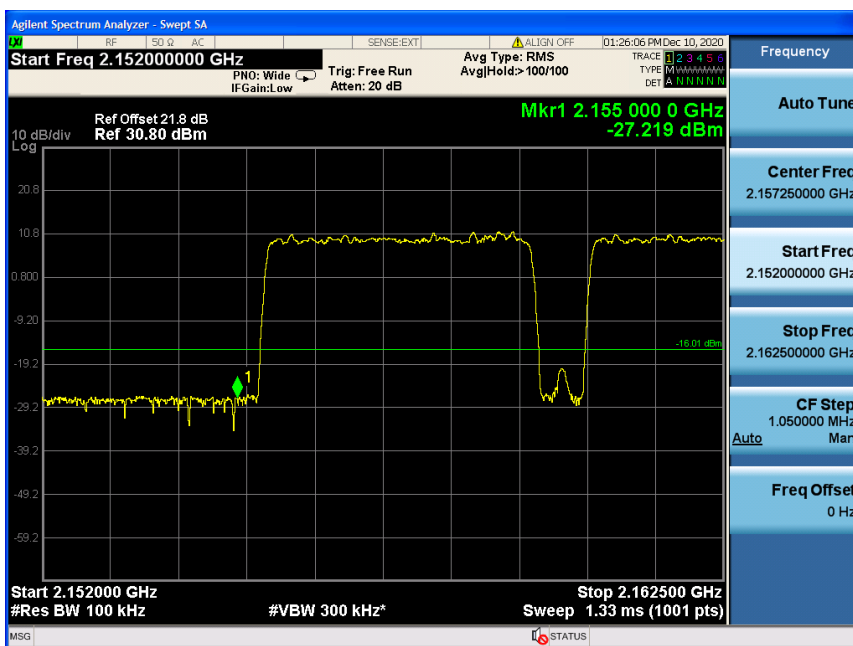
DL_1S_T_AWGN_AGC+3_Out-of-band emission



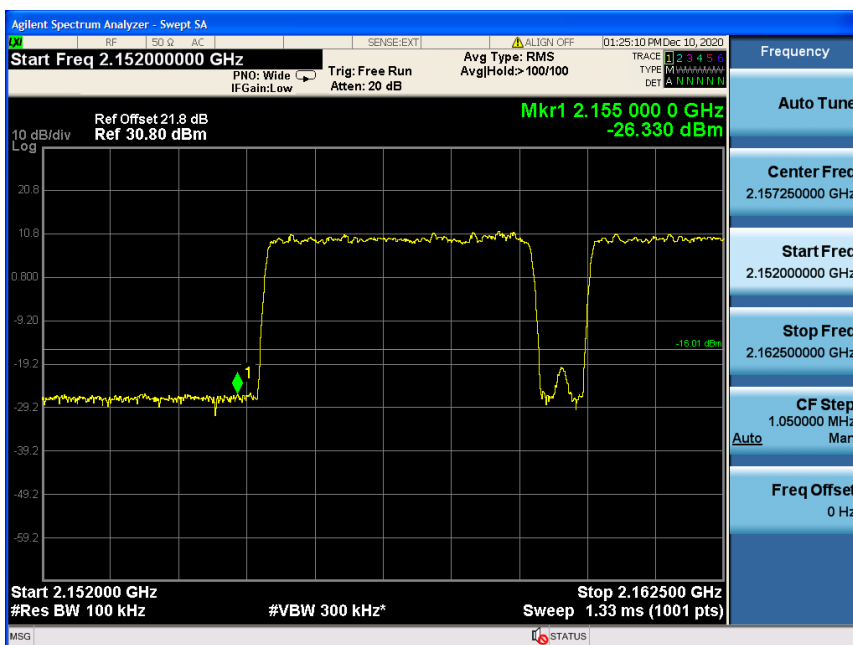
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DL_2S_B_AWGN_Pre-AGC_Out-of-band emission



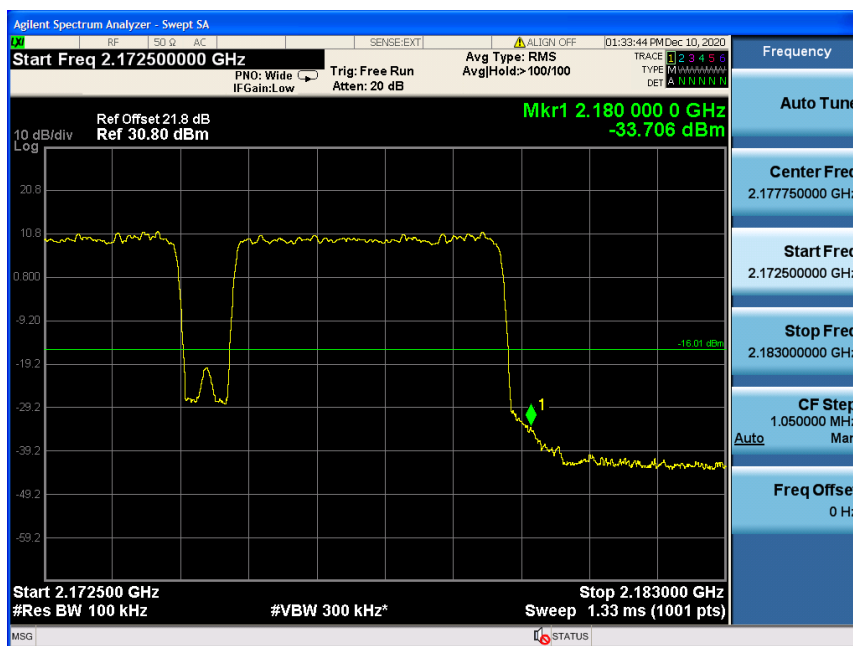
DL_2S_B_AWGN_AGC+3_Out-of-band emission



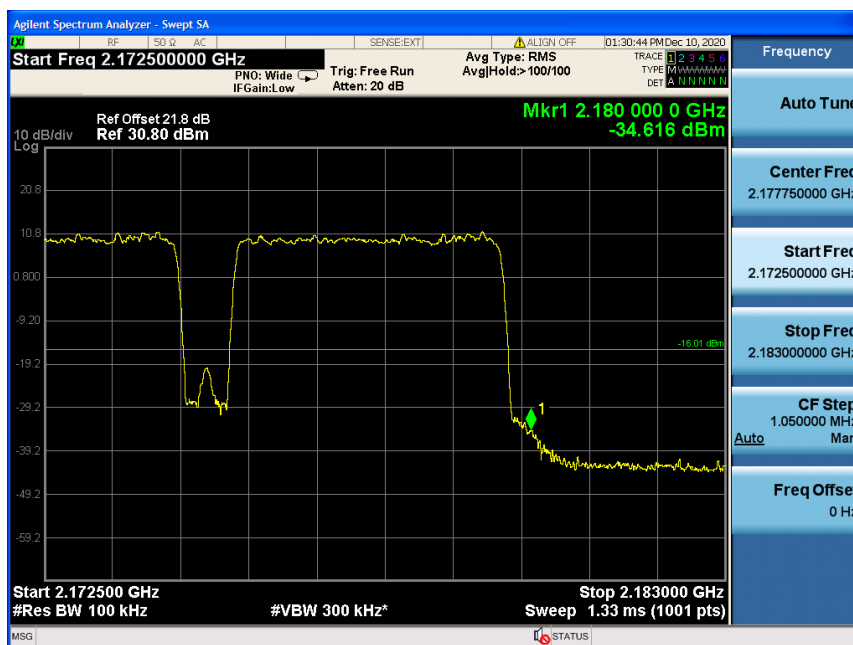
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DL_2S_T_AWGN_Pre-AGC_Out-of-band emission



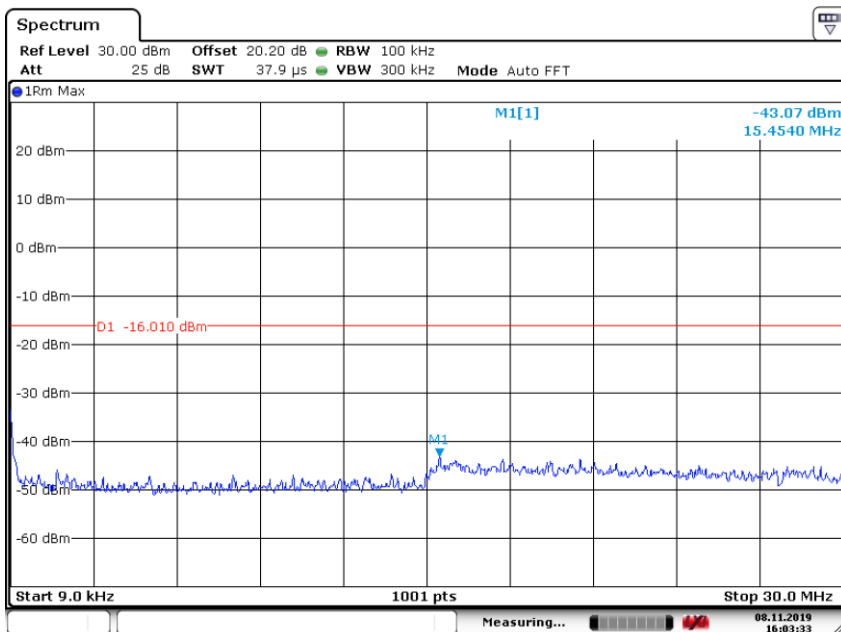
DL_2S_T_AWGN_AGC+3_Out-of-band emission



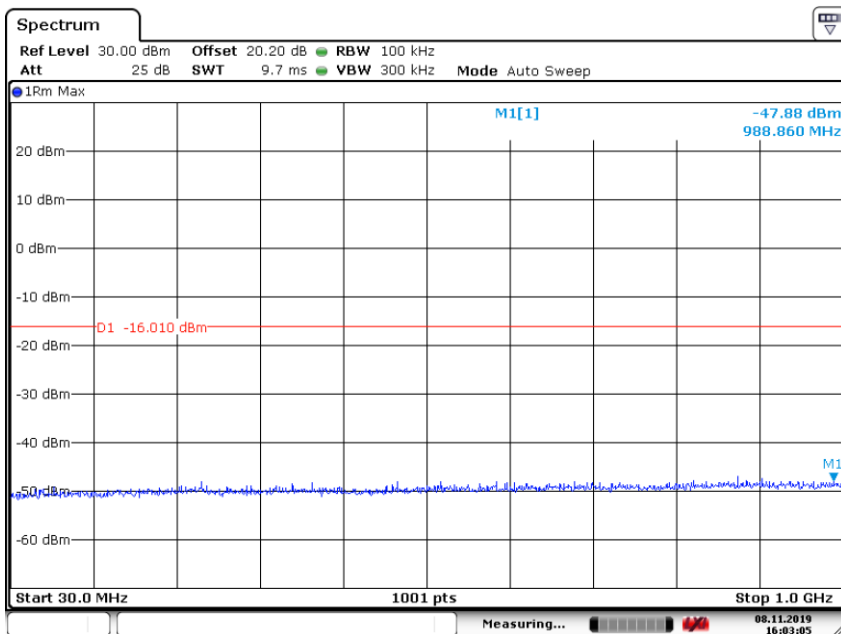
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DL_1S_B_AWGN_Pre-AGC_Spurious emission 1



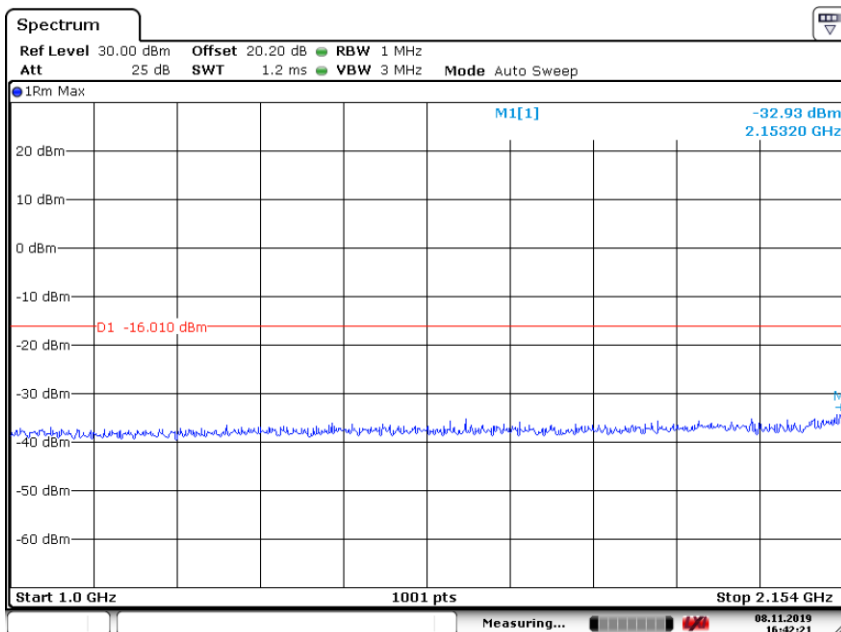
DL_1S_B_AWGN_Pre-AGC_Spurious emission 2



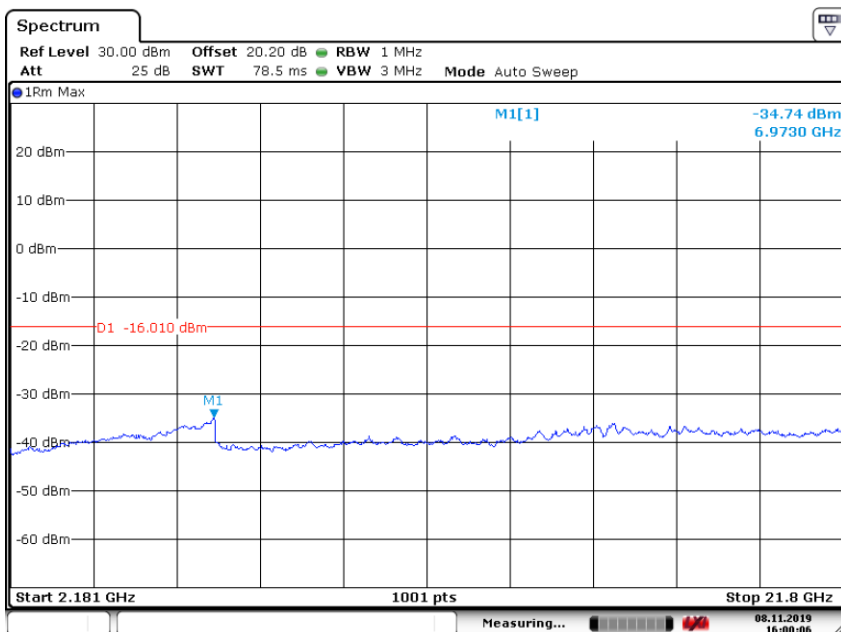
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DL_1S_B_AWGN_Pre-AGC_Spurious emission 3



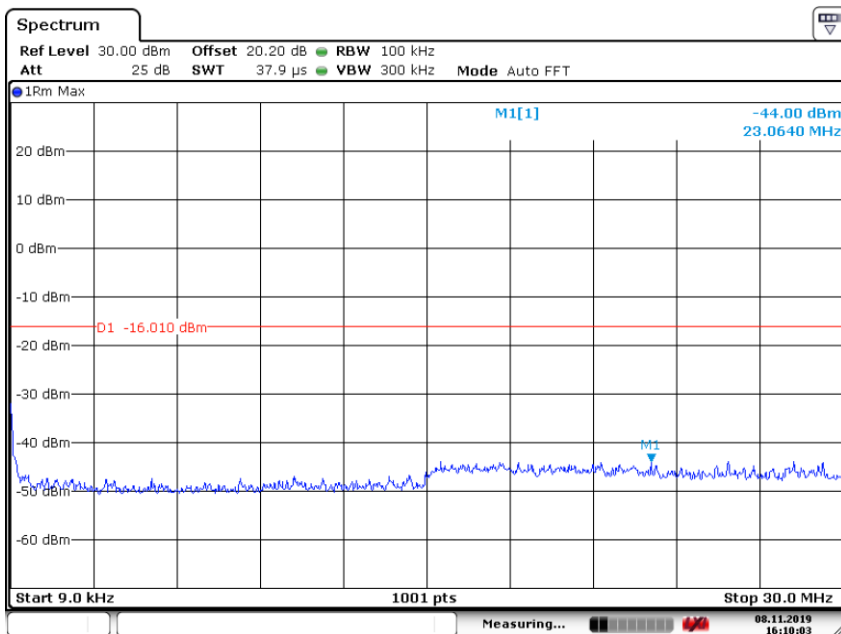
DL_1S_B_AWGN_Pre-AGC_Spurious emission 4



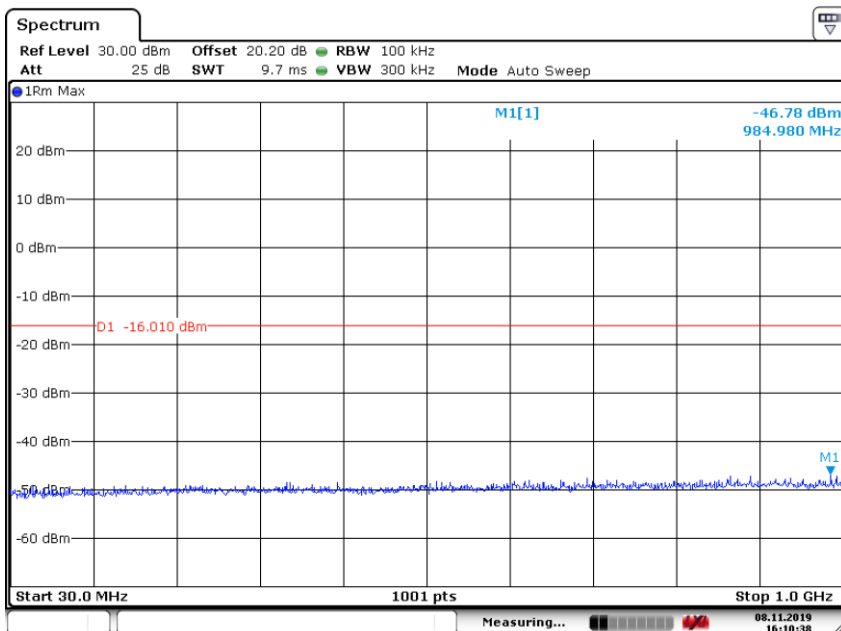
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DL_1S_M_AWGN_Pre-AGC_Spurious emission 1



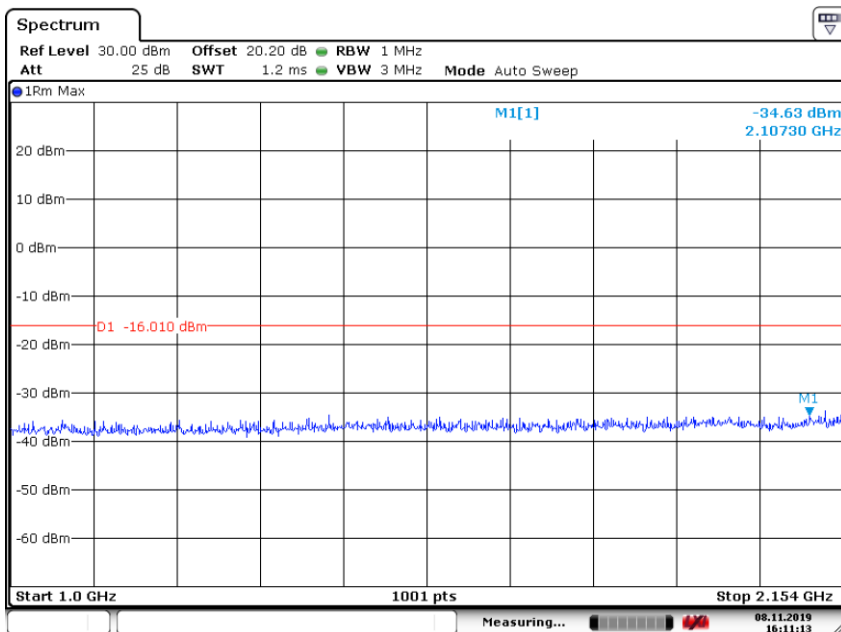
DL_1S_M_AWGN_Pre-AGC_Spurious emission 2



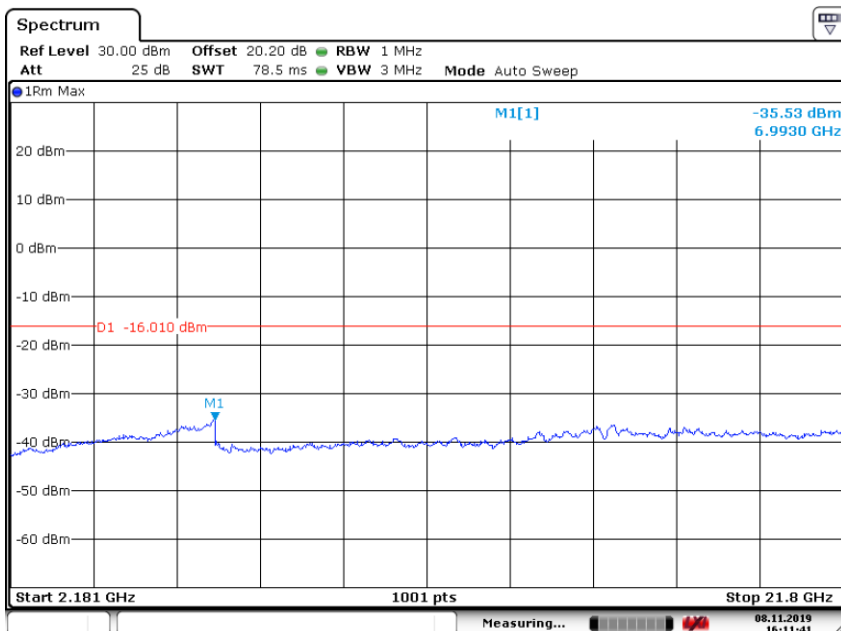
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DL_1S_M_AWGN_Pre-AGC_Spurious emission 3



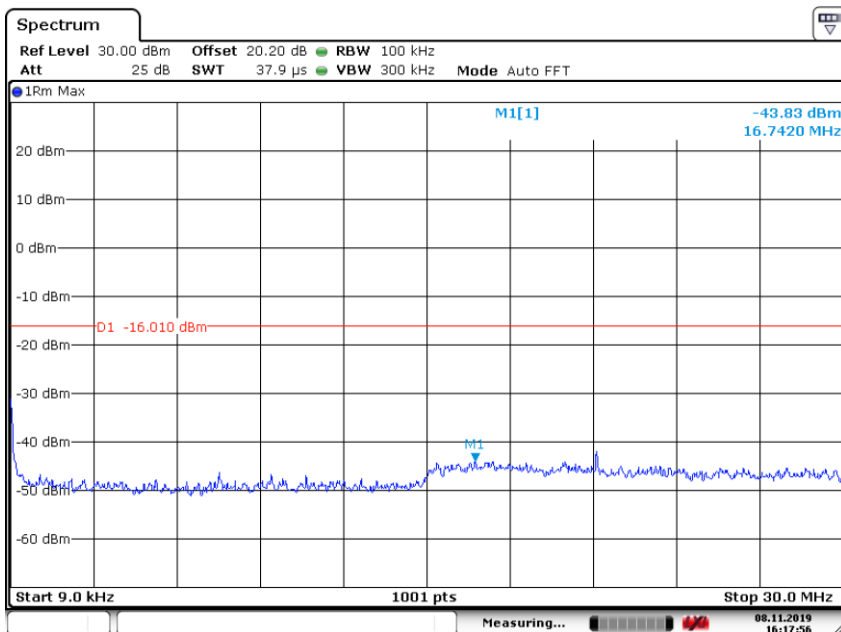
DL_1S_M_AWGN_Pre-AGC_Spurious emission 4



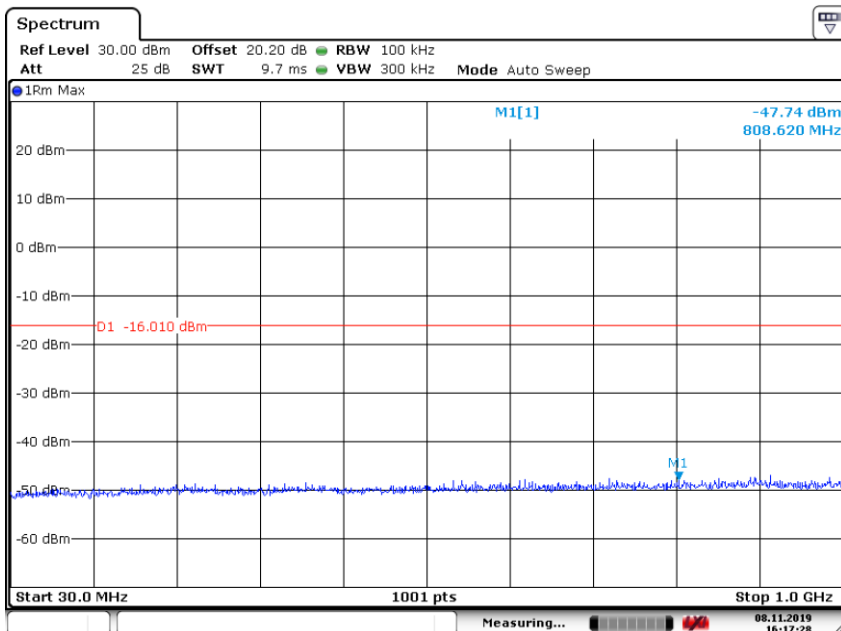
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DL_1S_T_AWGN_Pre-AGC_Spurious emission 1



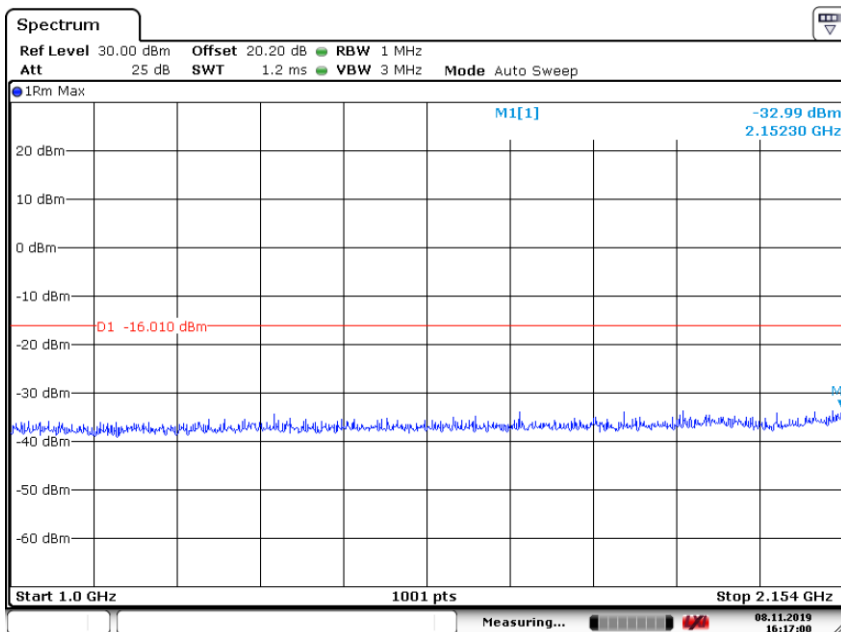
DL_1S_T_AWGN_Pre-AGC_Spurious emission 2



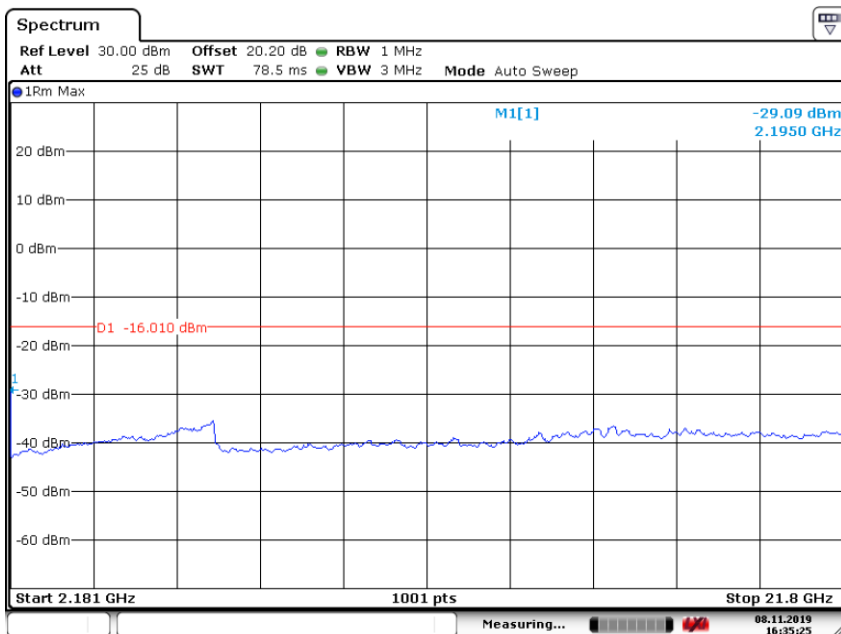
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DL_1S_T_AWGN_Pre-AGC_Spurious emission 3



DL_1S_T_AWGN_Pre-AGC_Spurious emission 4



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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 DC 48V.
 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	2167.500764	0.07	PASS
40		2167.500345	-0.13	PASS
30		2167.500543	-0.4	PASS
20		2167.500623	Reference	PASS
10		2167.500564	-0.3	PASS
0		2167.500466	-0.7	PASS
-10		2167.500643	0.01	PASS
-20		2167.500577	-0.03	PASS
-30		2167.500345	-0.13	PASS

Frequency stability vs voltage				
Voltage (V)	Test Conf.	Test data (MHz)	Tolerance (ppm)	Verdict
DC 40.8	DL_1S_M_AWGN	2167.500463	-0.13	PASS
DC 48		2167.500753	Reference	PASS
DC 55.2		2167.500864	0.05	PASS



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2.7 Radiated spurious emissions

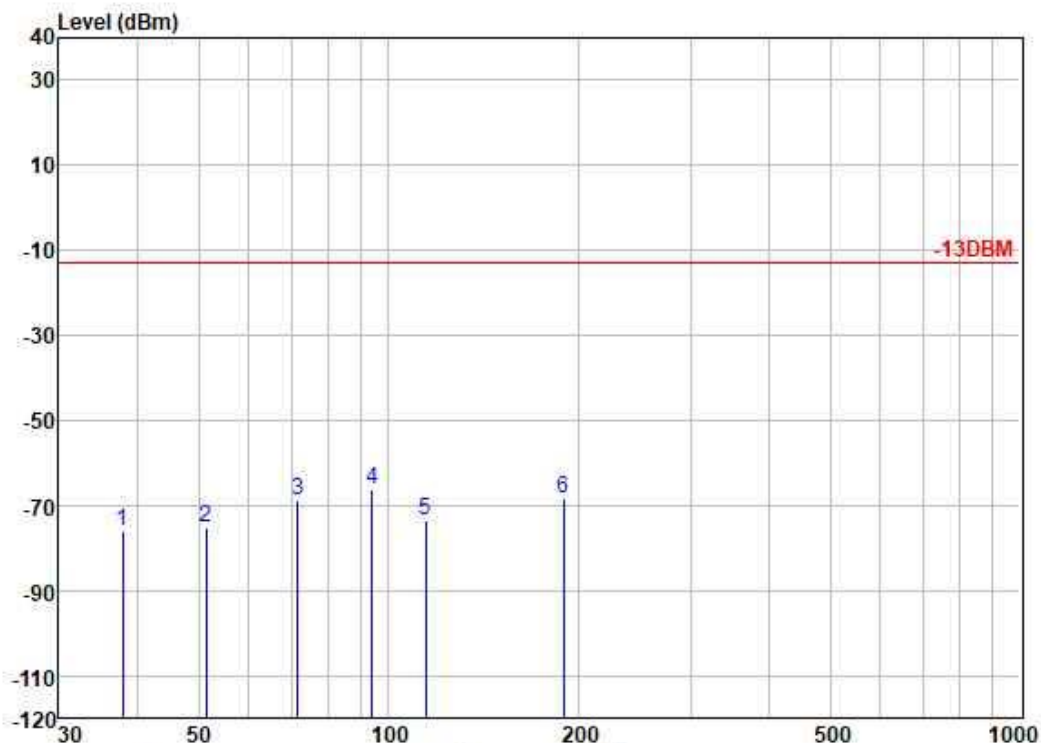
- Note:
1. The tested max conducted power for single antenna port is 20.36dBm. the 2x2 MIMO total power is 20.36dBm+20.36dBm= 0.2173W.
the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least $43 + 10 \log_{10} (P)$ dB
Here,
 $P=0.2173W$,
So the limit =
 $P(dBm)- [43 + 10 \log (0.2173W)] = -13dBm$
 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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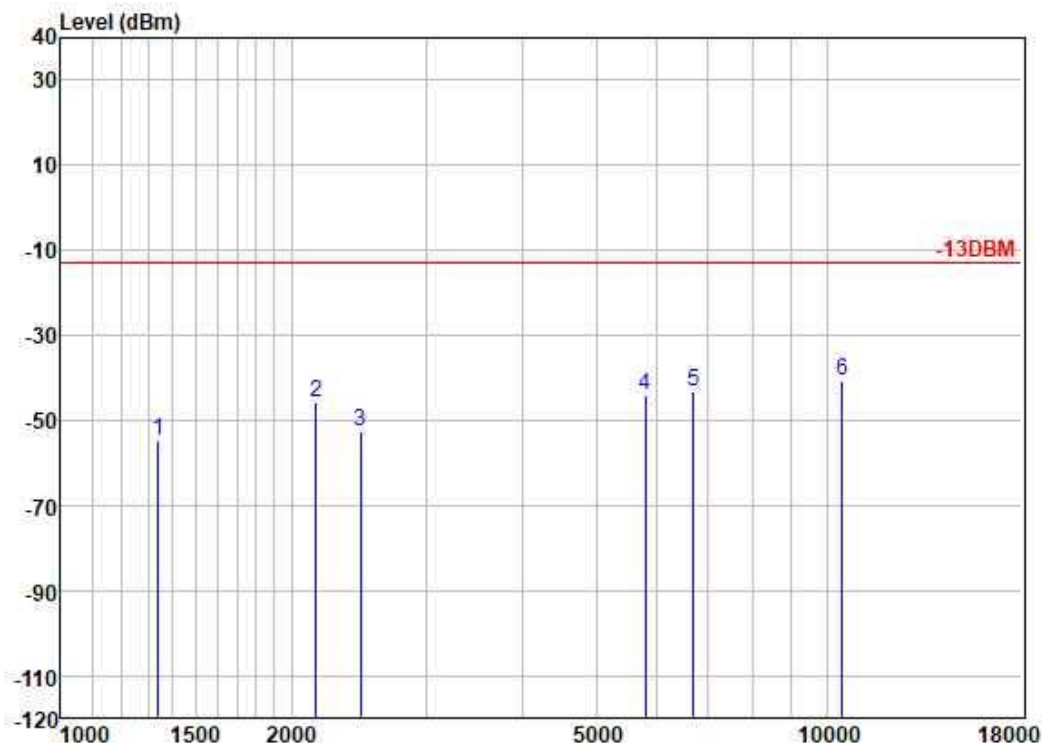
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DL_1S_M_AWGN_Horizontal_30MHz~1GHz



Freq. (MHz)	Level (dBm)	Limit (dBm)	Over Limit (dB)	Polarization	Verdict
37.812	-75.84	-13	-62.84	Horizontal	PASS
51.032	-75.37	-13	-62.37	Horizontal	PASS
71.832	-68.65	-13	-55.65	Horizontal	PASS
94.098	-66.04	-13	-53.04	Horizontal	PASS
114.098	-73.29	-13	-60.29	Horizontal	PASS
189.074	-68.54	-13	-55.54	Horizontal	PASS

DL_1S_M_AWGN_Horizontal_above 1GHz



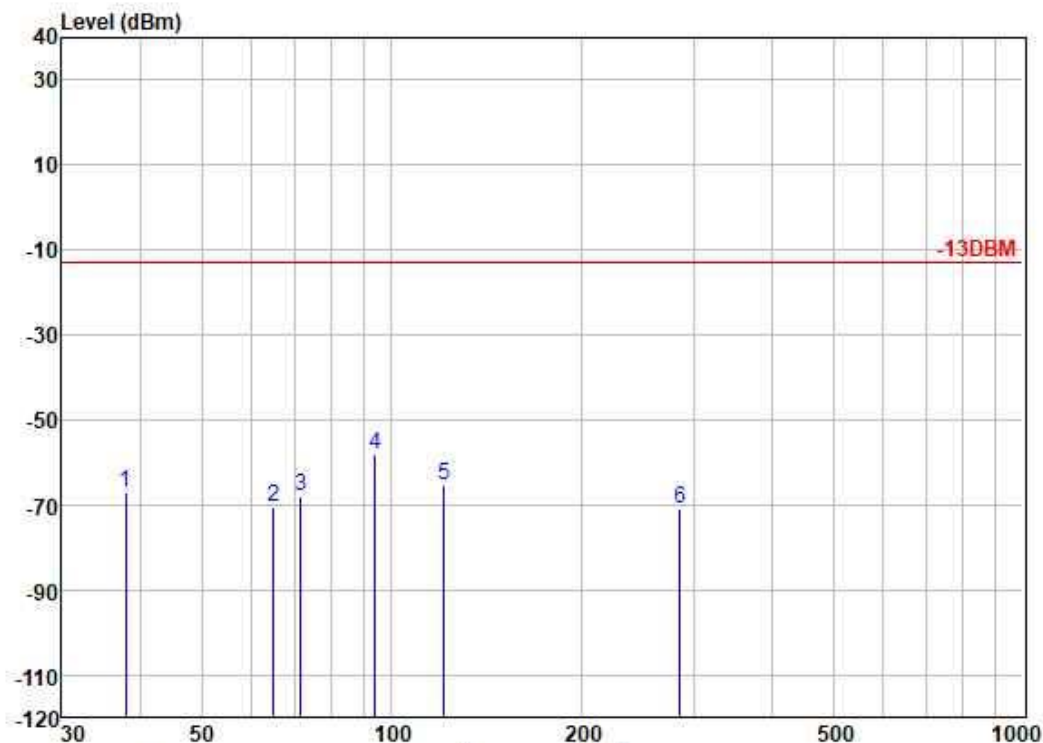
Freq. (MHz)	Level (dBm)	Limit (dBm)	Over Limit (dB)	Polarization	Verdict
1339.006	-54.70	-13	-41.7	Horizontal	PASS
2157.260	-45.61	-13	-32.61	Horizontal	PASS
2464.024	-52.38	-13	-39.38	Horizontal	PASS
5797.032	-44.09	-13	-31.09	Horizontal	PASS
6698.373	-43.11	-13	-30.11	Horizontal	PASS
10484.230	-40.64	-13	-27.64	Horizontal	PASS



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DL_1S_M_AWGN_Vertical_30MHz~1GHz



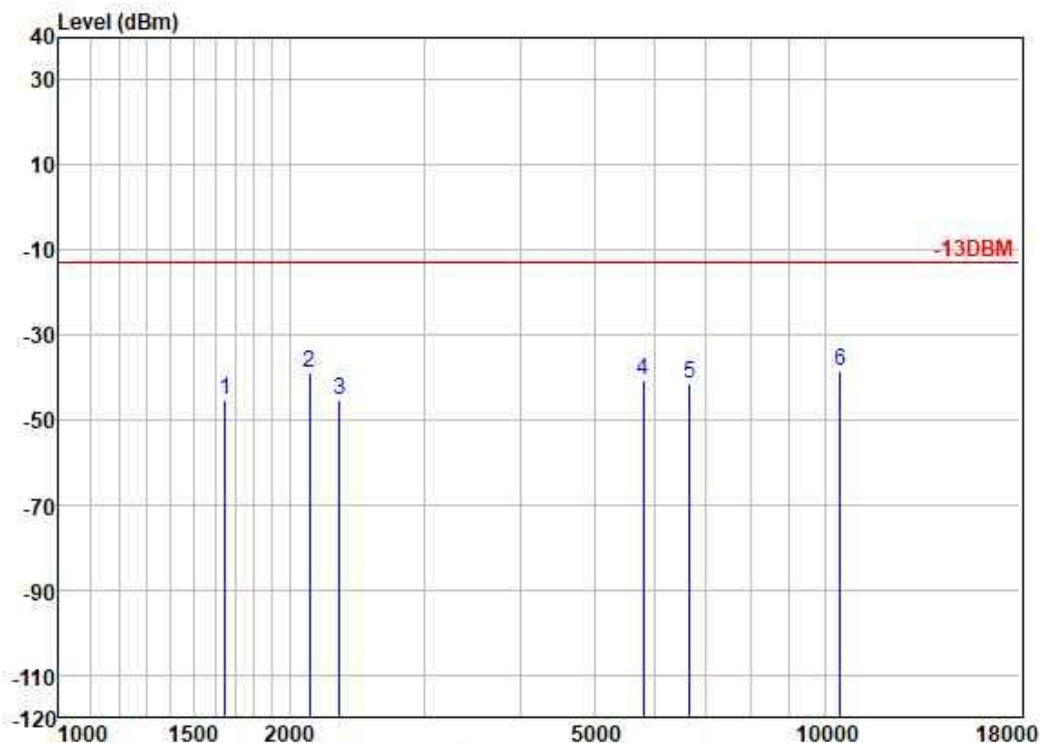
Freq. (MHz)	Level (dBm)	Limit (dBm)	Over Limit (dB)	Polarization	Verdict
37.812	-67.00	-13	-54	Vertical	PASS
64.887	-70.50	-13	-57.5	Vertical	PASS
71.832	-67.84	-13	-54.84	Vertical	PASS
94.098	-57.99	-13	-44.99	Vertical	PASS
121.123	-65.46	-13	-52.46	Vertical	PASS
285.978	-70.76	-13	-57.76	Vertical	PASS



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DL_1S_M_AWGN_Vertical_above 1GHz



Freq. (MHz)	Level (dBm)	Limit (dBm)	Over Limit (dB)	Polarization	Verdict
1648.778	-45.48	-13	-32.48	Vertical	PASS
2126.308	-38.78	-13	-25.78	Vertical	PASS
2325.624	-45.47	-13	58.47	Vertical	PASS
5797.032	-40.74	-13	-27.74	Vertical	PASS
6659.763	-41.31	-13	-28.31	Vertical	PASS
10484.421	-38.39	-13	-25.39	Vertical	PASS



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SGS-CSTC Standards Technical Services Co., Ltd. Guangzhou Branch

Application No.: GZEM2011016737CR

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3 Broadband PCS (1850-1915MHz paired with 1930-1995MHz)

3.1 AGC threshold level

Test Conf.	AGC Threshold level
DL_1S_M_AWGN	0.15dBm
DL_1S_M_GSM	0.04dBm



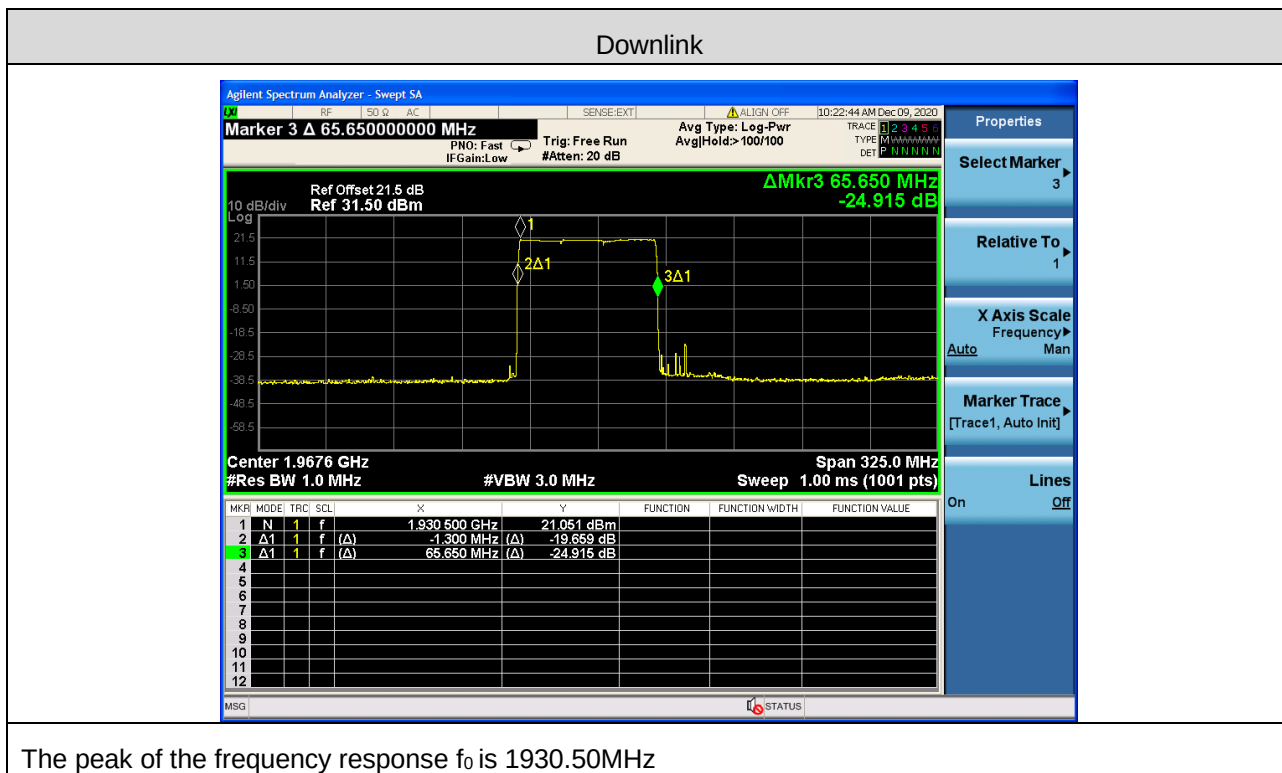
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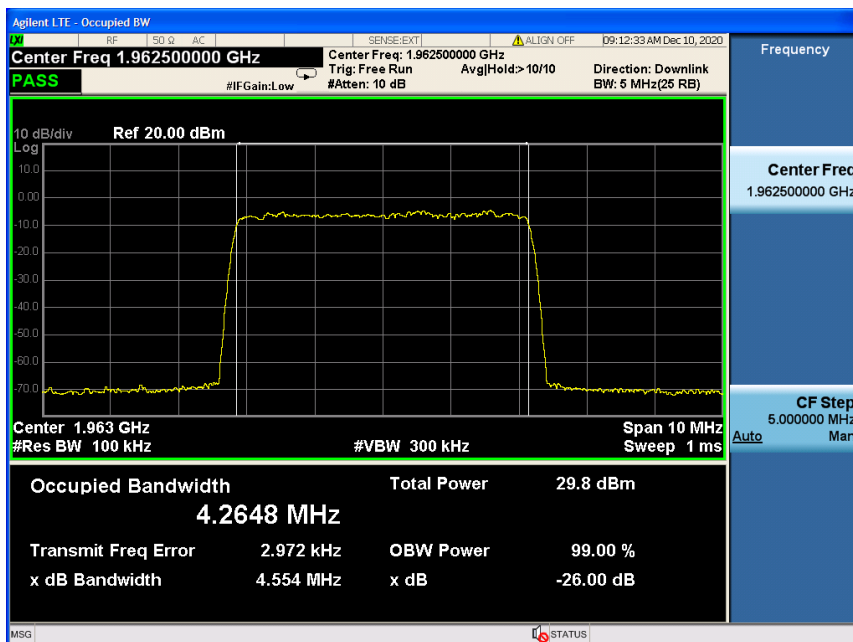
Member of the SGS Group (SGS SA)

3.2 Out-of-band rejection

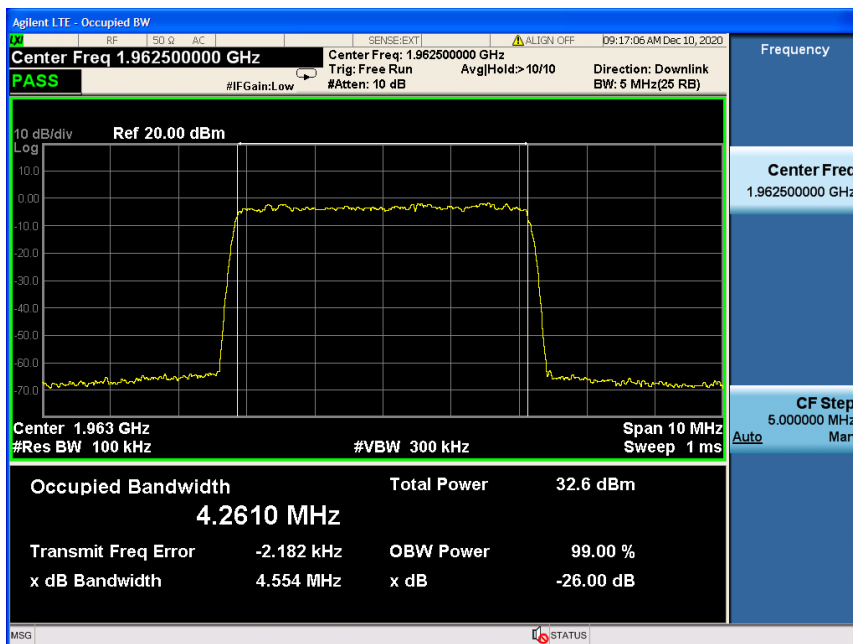


3.3 Input-versus-output signal comparison

Input_DL_1S_M_AWGN_Pre-AGC_26dB Bandwidth & 99% OBW



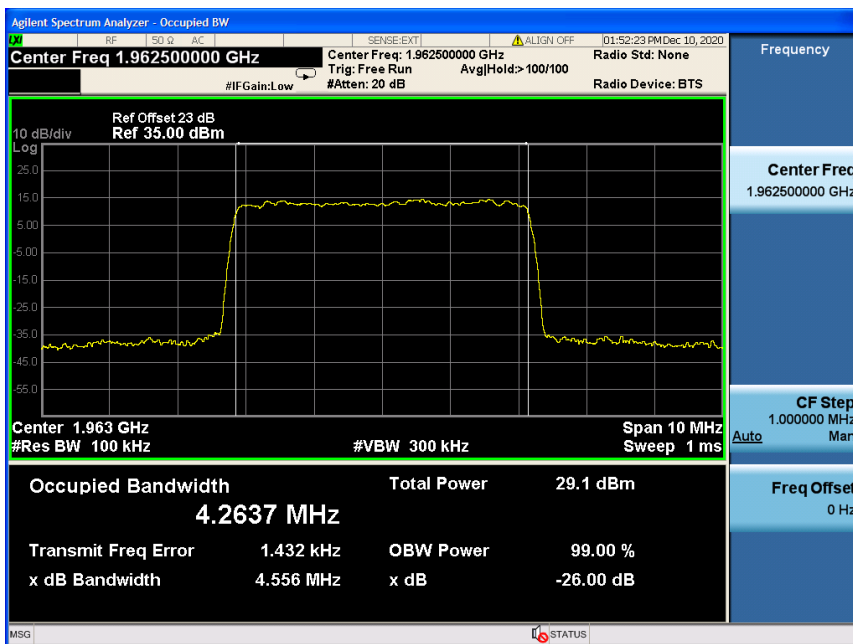
Input_DL_1S_M_AWGN_AGC+3dB_26dB Bandwidth & 99% OBW



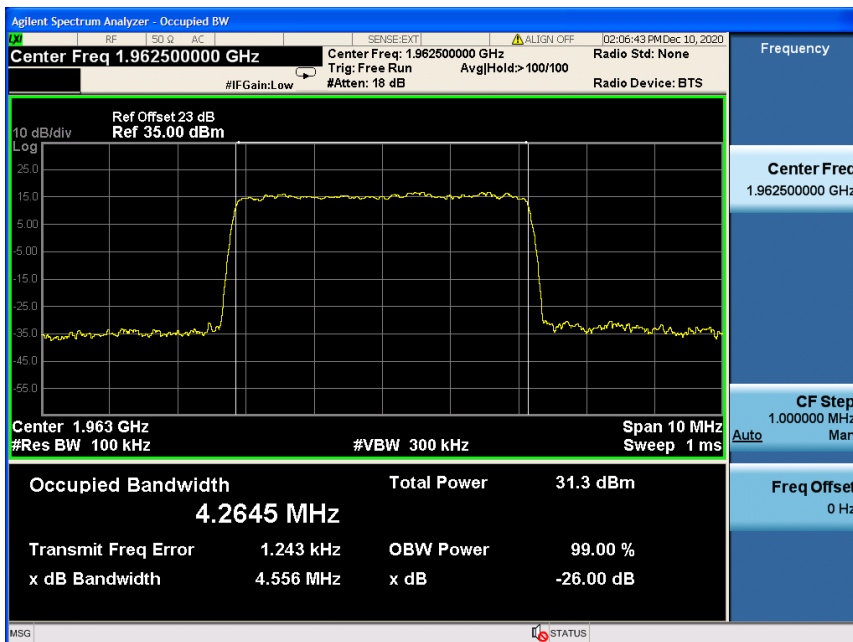
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Output_DL_1S_M_AWGN_Pre-AGC_26dB Bandwidth & 99% OBW



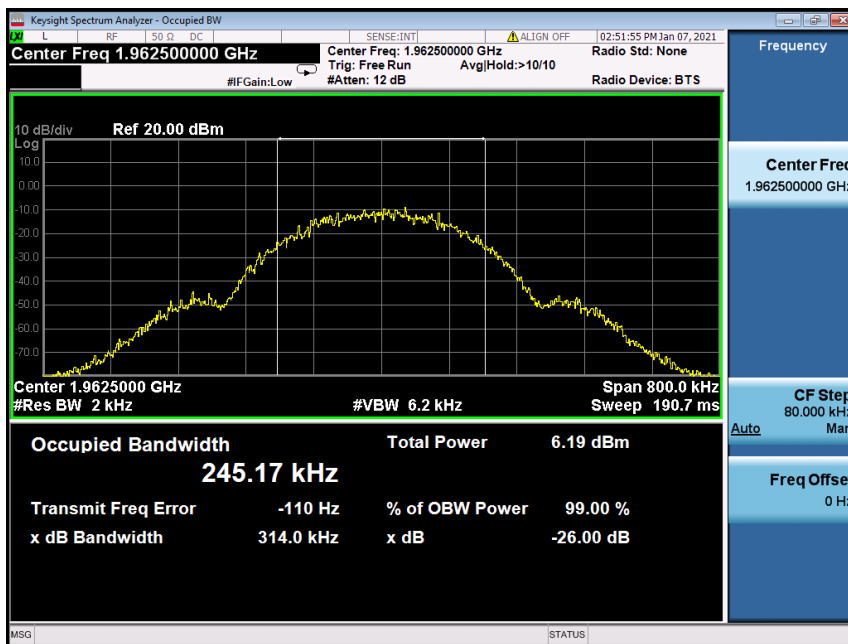
Output_DL_1S_M_AWGN_AGC+3dB_26dB Bandwidth & 99% OBW



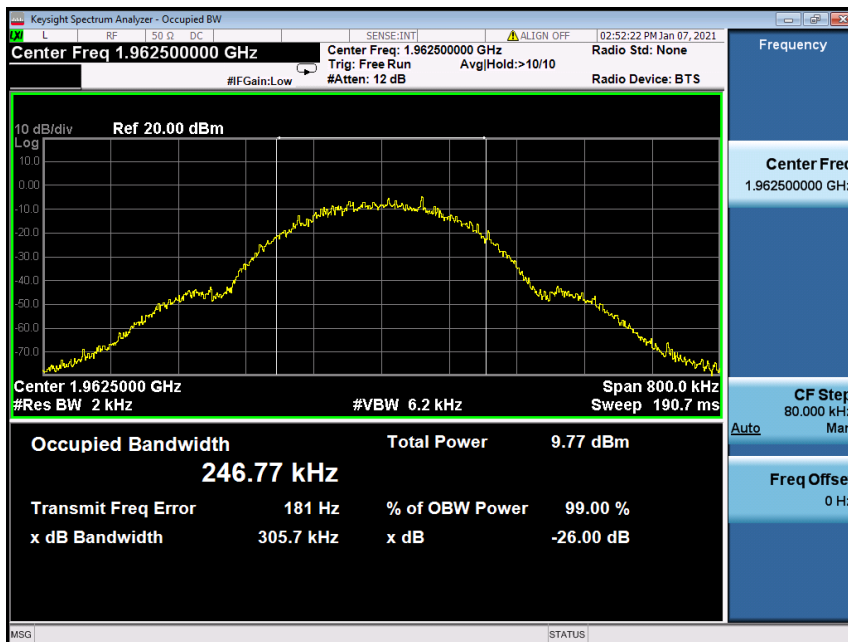
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Input_DL_1S_M_GSM_Pre-AGC_26dB Bandwidth & 99% OBW



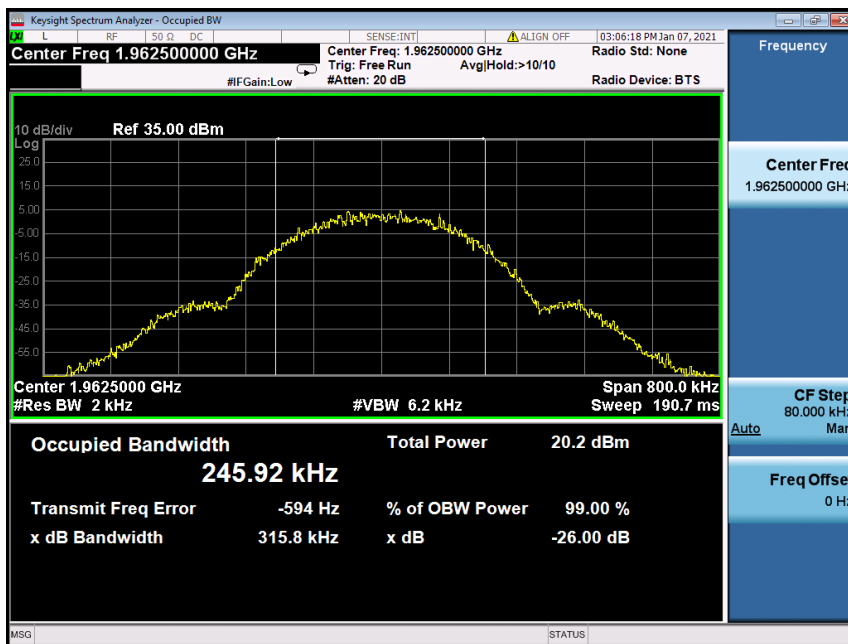
Input_DL_1S_M_GSM_AGC+3dB_26dB Bandwidth & 99% OBW



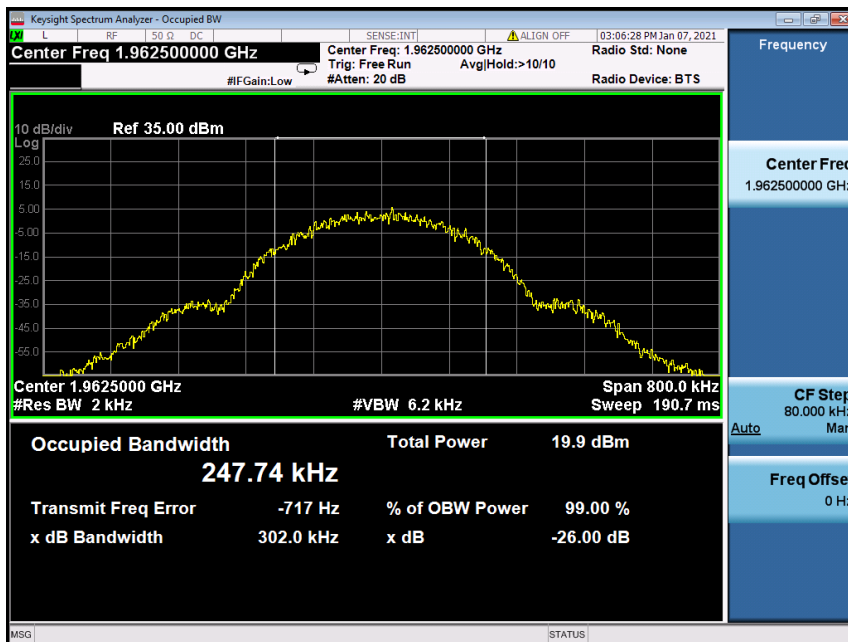
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Output_DL_1S_M_GSM_Pre-AGC_26dB Bandwidth & 99% OBW



Output_DL_1S_M_GSM_AGC+3dB_26dB Bandwidth & 99% OBW



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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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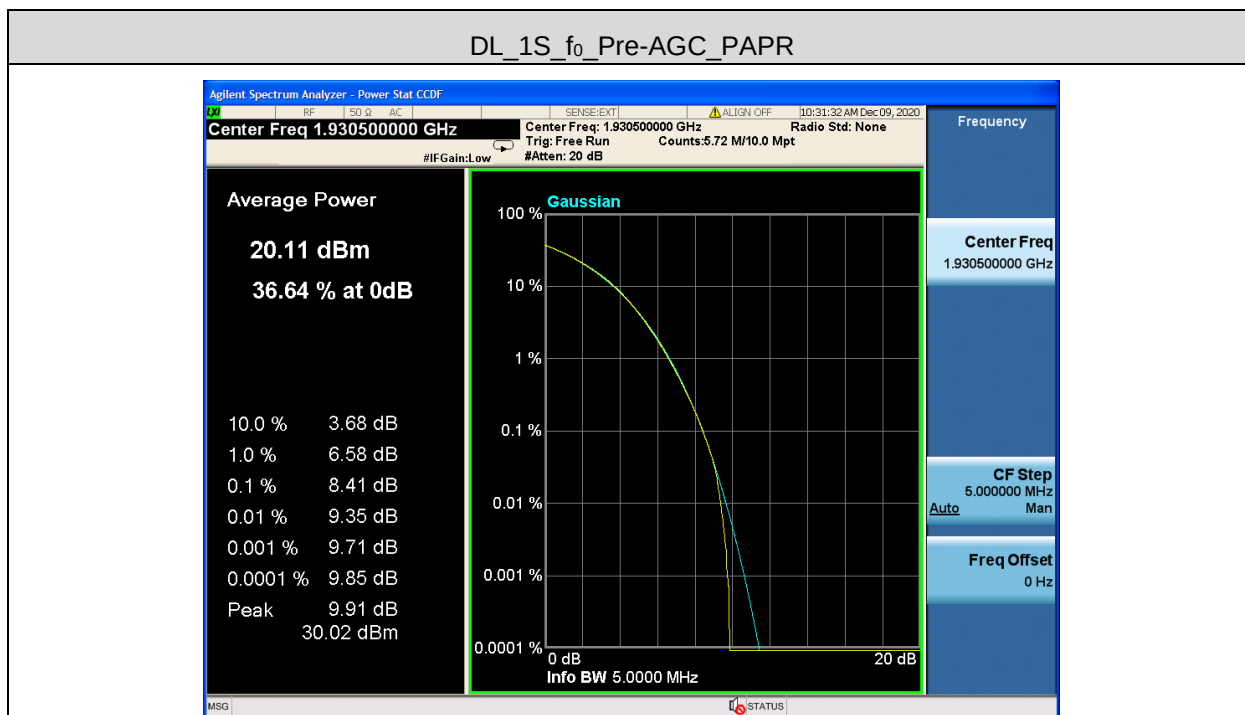
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3.4 Mean output power and amplifier/booster gain

Test Conf.	Test Freq. f ₀ (MHz)	Signal Level	Input Power (dBm)	Output Power (dBm)	Gain (dB)	Verdict
DL_1S_AWGN	1930.50	Pre-AGC	0.00	20.32	20.35	PASS
		AGC+3dB	3.00	20.35	/	PASS
DL_1S_GSM	1930.50	Pre-AGC	0.00	20.18	20.21	PASS
		AGC+3dB	3.00	20.20	/	PASS
Remark: According to the declaration from the applicant, the antenna gain should not exceed 12.5dBi, the Directional gain = G(ANT) + 10 log (NANT) dBi = 12.5dBi+10log (2) dBi= 15.5dBi. The total maximum EIRP for the EUT is (20.35dBm+20.35dBm) +15.5dBi=38.86dBm (7.691W) which don't exceed the required EIRP limit (1640W/MHz)						

Test Conf.	Test Freq. f_0 (MHz)	Signal Level	PAPR (dB)	Limit (dB)	Verdict
DL_1S_AWGN	1930.5	Pre-AGC	8.4	13	PASS



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

Note: 1. The tested max conducted power for single antenna port is 20.35dBm, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least $43 + 10 \log_{10}(P)$ dB

Here,

$P=20.35\text{dBm}=0.1084\text{W}$.

So the limit =

$P(\text{dBm})-[43 + 10 \log(0.1084\text{W})] = -13\text{dBm}$

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.

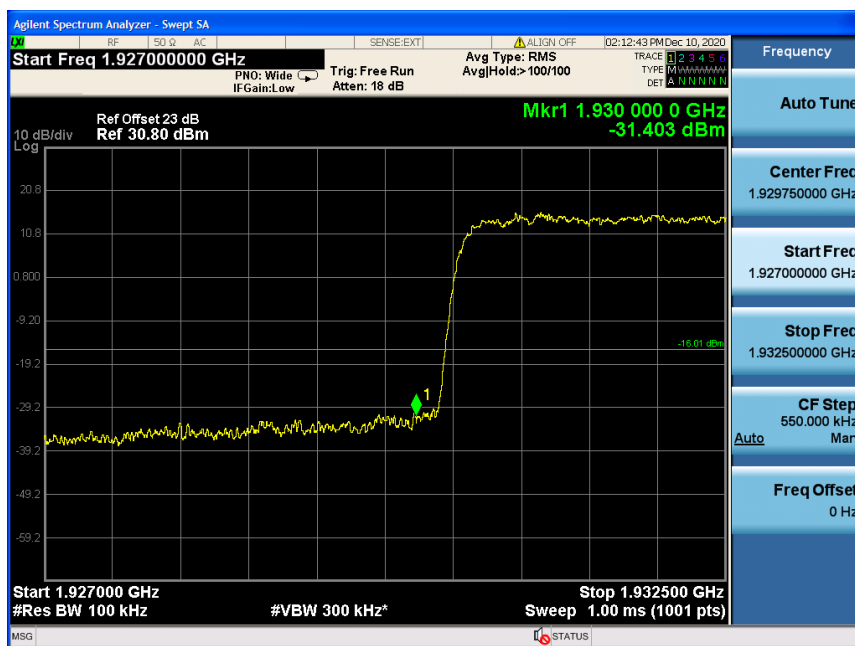
2. Out-of-band/out-of-block (including intermodulation) emissions and spurious emissions have been tested using an AWGN test signal and a GSM-TDMA test signal, only the worst-case was recorded in this report.



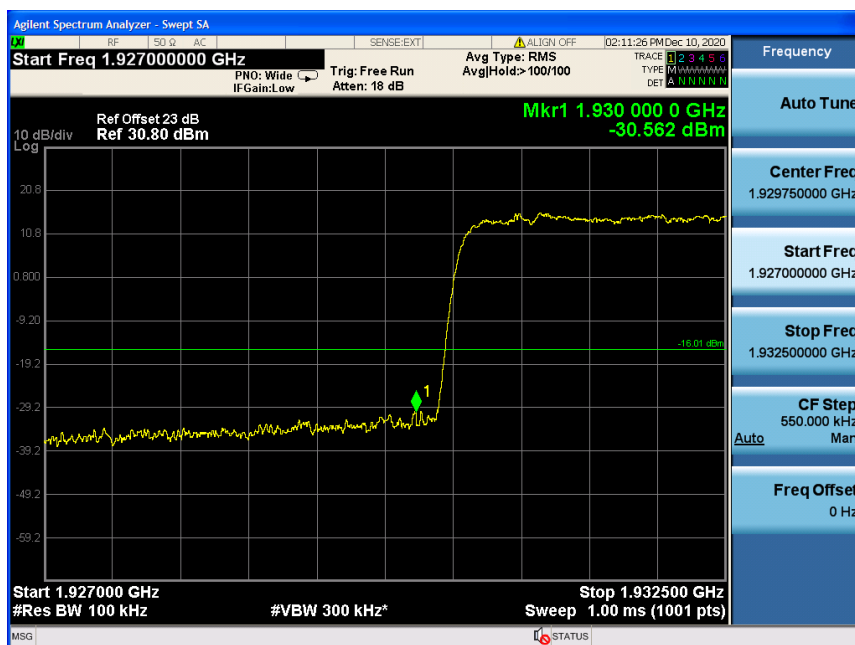
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DL_1S_B_AWGN_Pre-AGC_Out-of-band emission



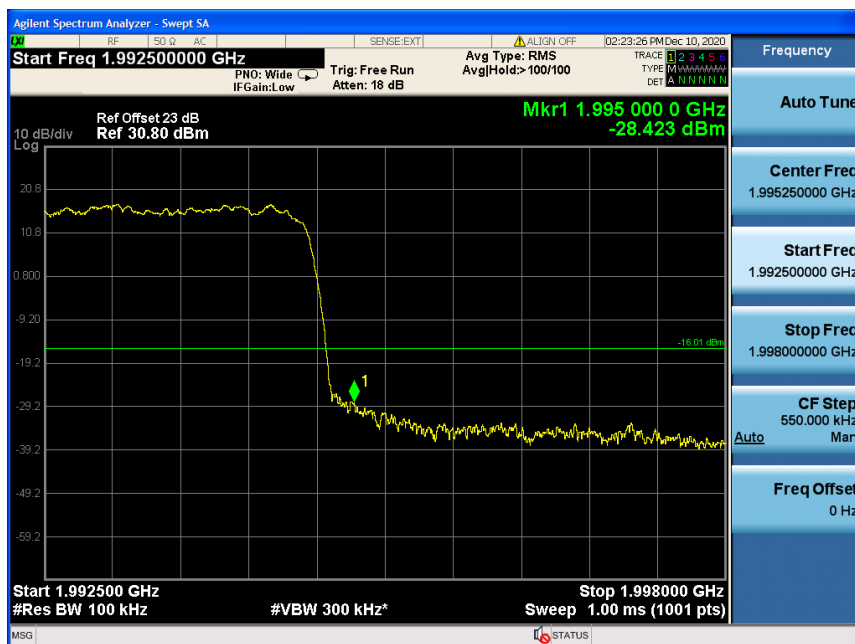
DL_1S_B_AWGN_AGC+3_Out-of-band emission



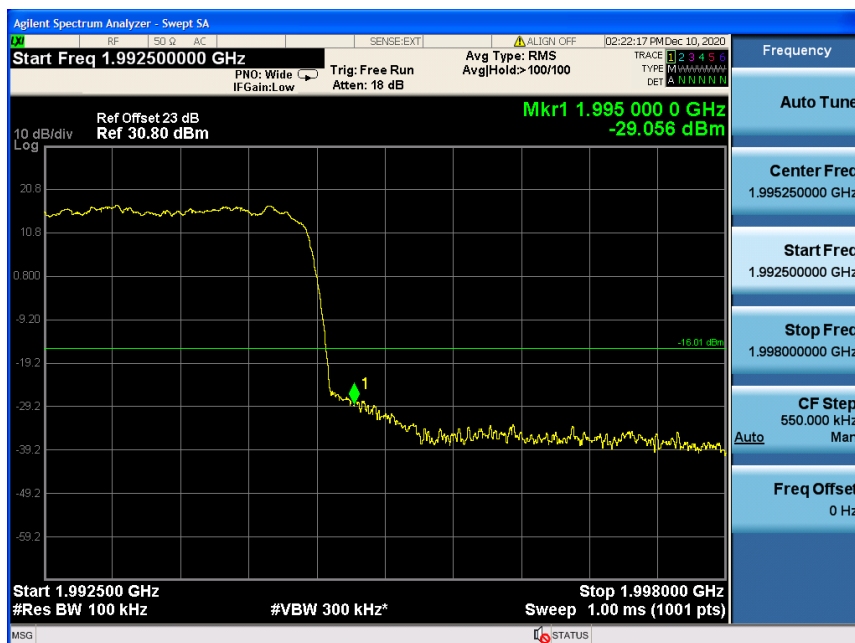
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DL_1S_T_AWGN_Pre-AGC_Out-of-band emission



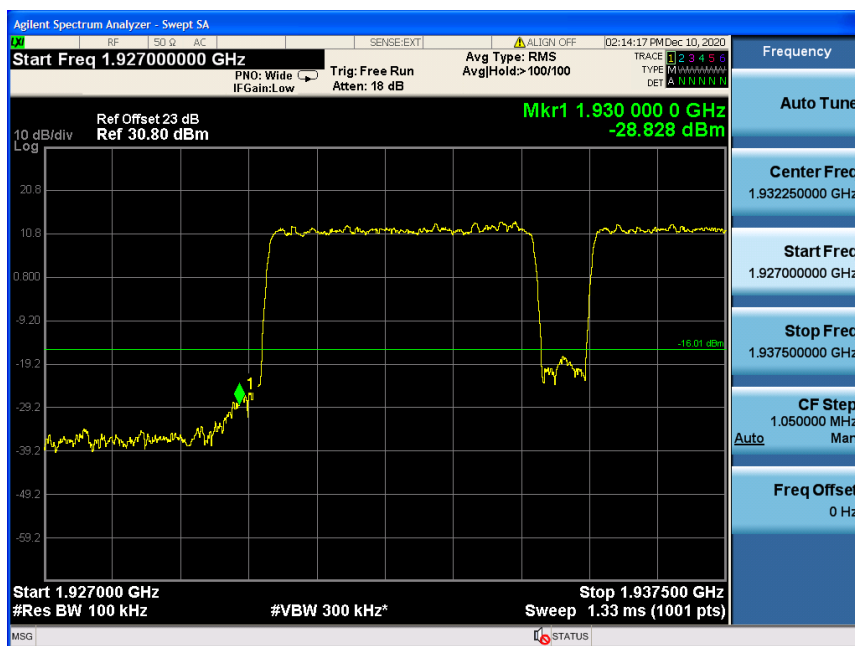
DL_1S_T_AWGN_AGC+3_Out-of-band emission



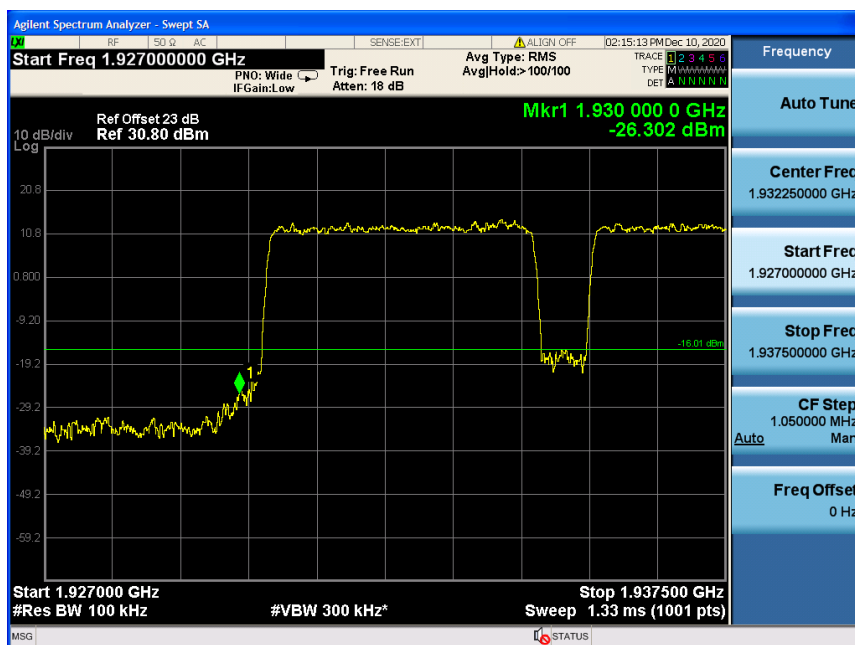
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DL_2S_B_AWGN_Pre-AGC_Out-of-band emission



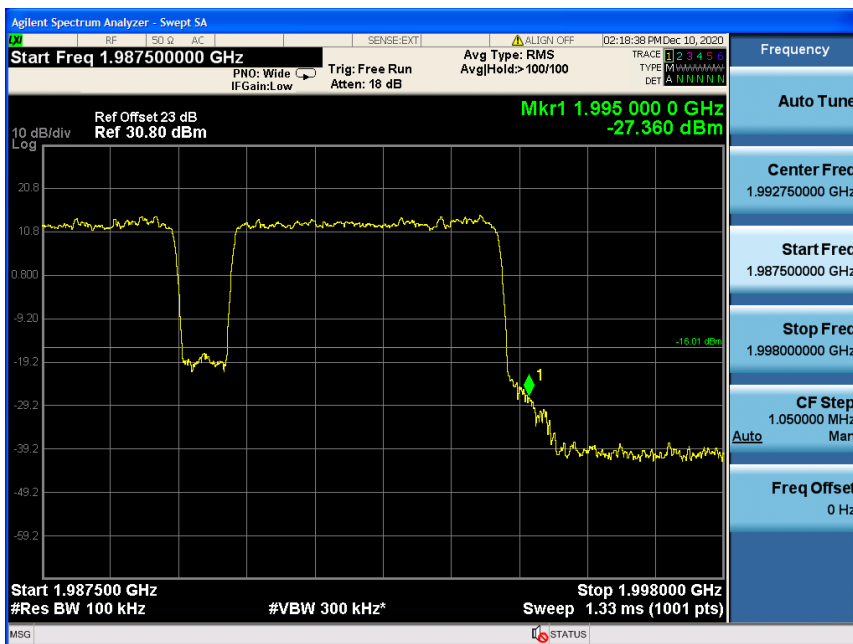
DL_2S_B_AWGN_AGC+3_Out-of-band emission



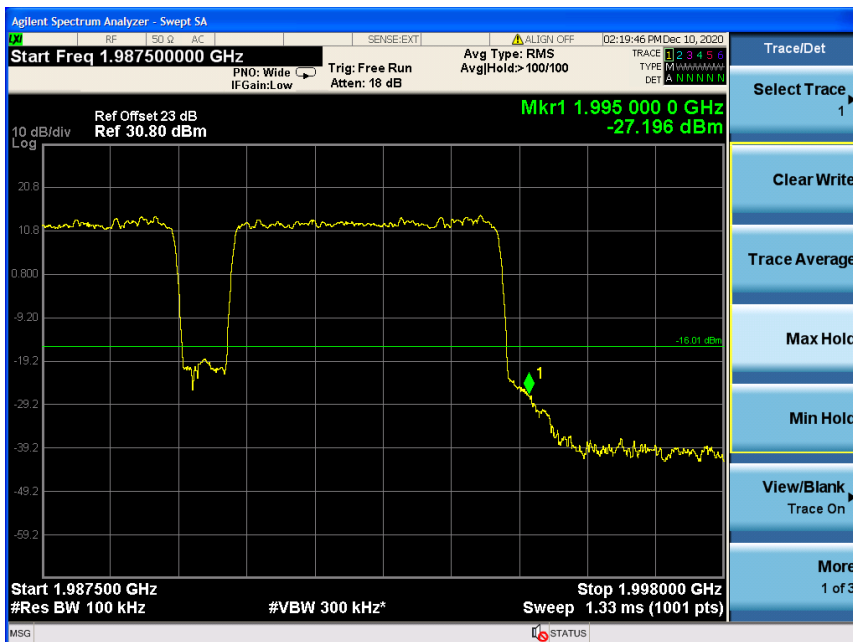
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DL_2S_T_AWGN_Pre-AGC_Out-of-band emission



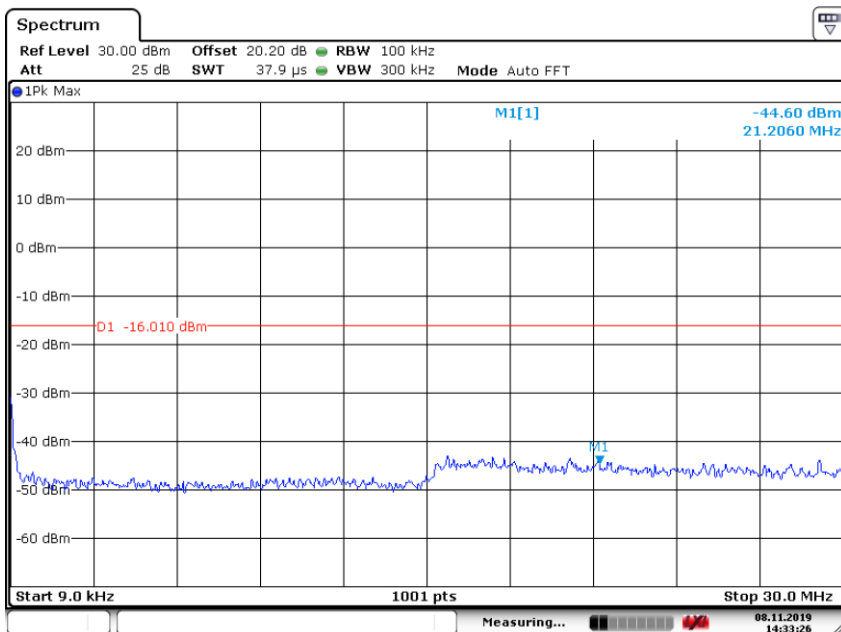
DL_2S_T_AWGN_AGC+3_Out-of-band emission



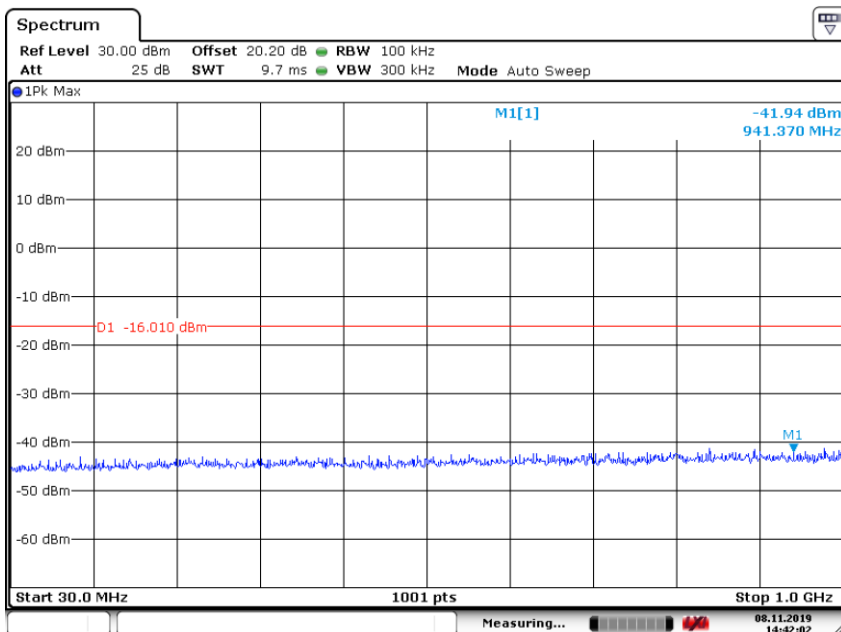
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DL_1S_B_AWGN_Pre-AGC_Spurious emission 1



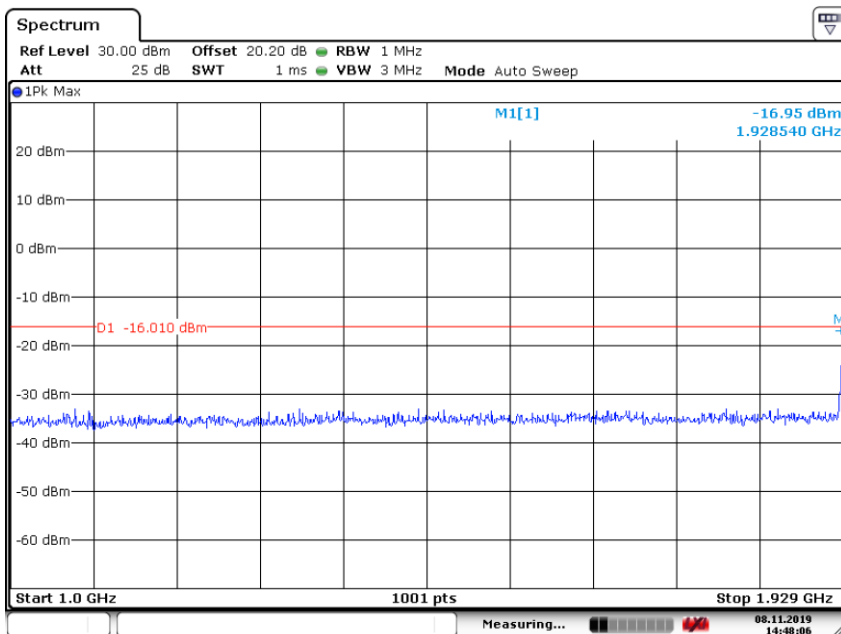
DL_1S_B_AWGN_Pre-AGC_Spurious emission 2



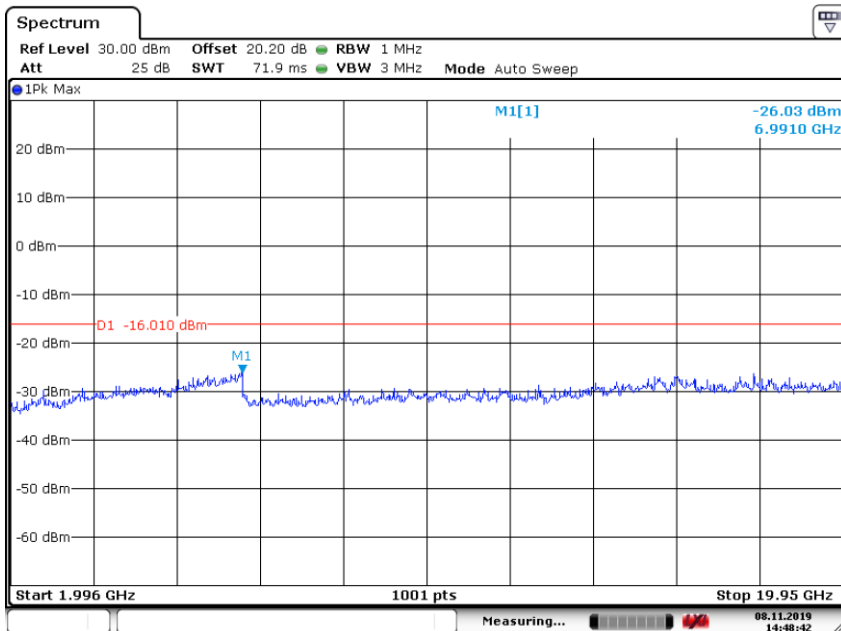
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DL_1S_B_AWGN_Pre-AGC_Spurious emission 3



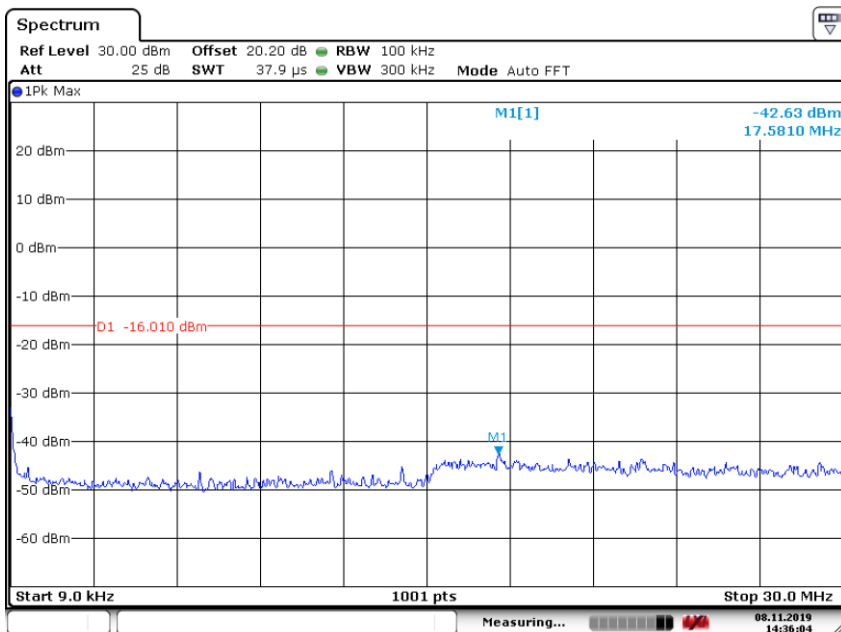
DL_1S_B_AWGN_Pre-AGC_Spurious emission 4



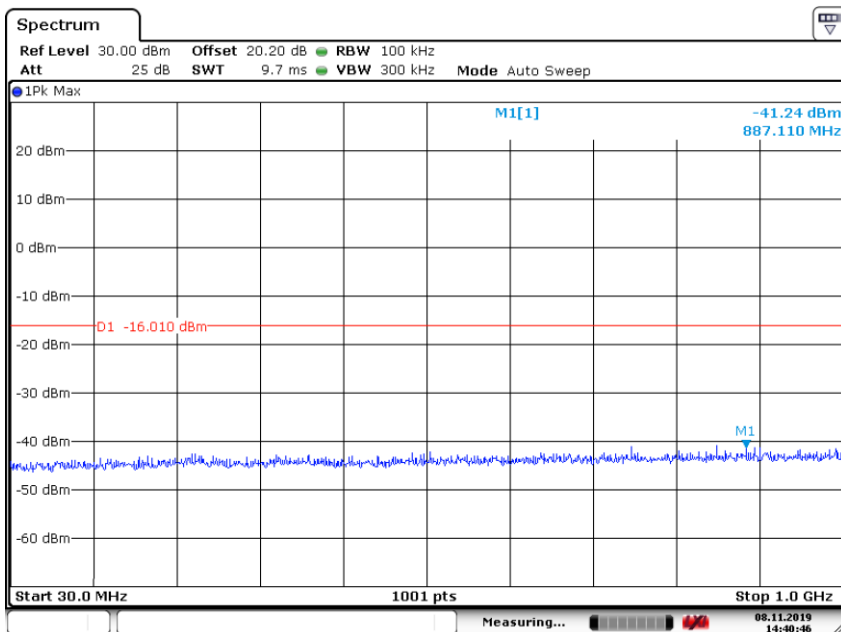
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DL_1S_M_AWGN_AWGN_Pre-AGC_Spurious emission 1



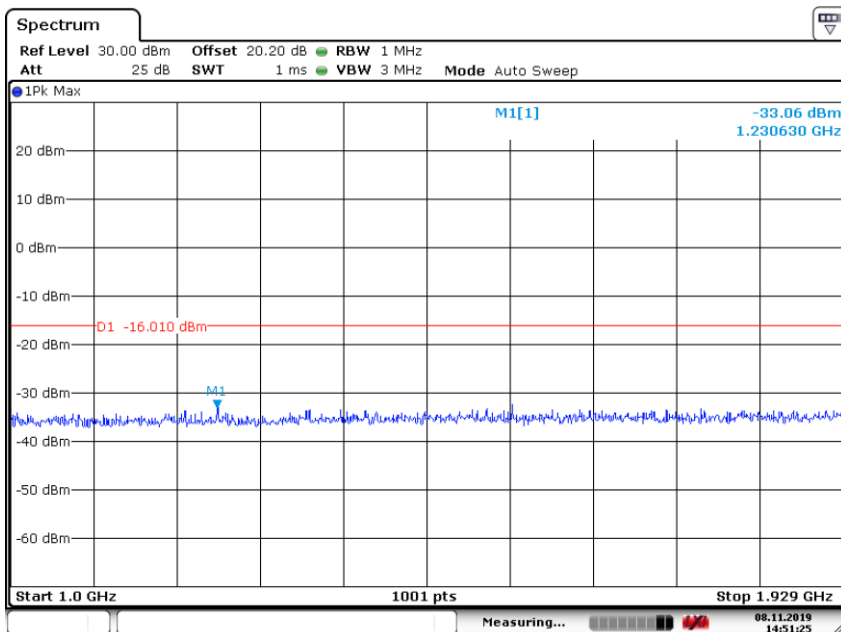
DL_1S_M_AWGN_Pre-AGC_Spurious emission 2



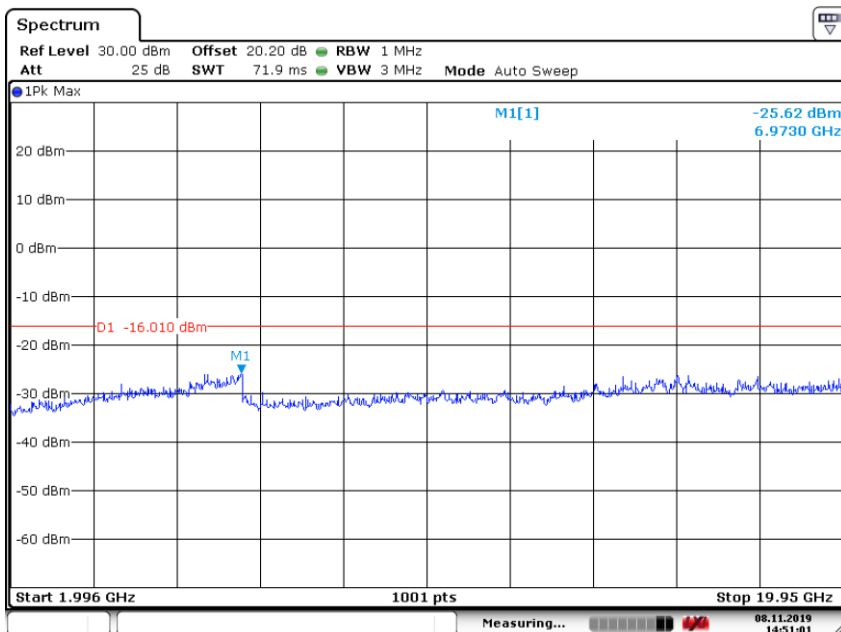
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DL_1S_M_AWGN_Pre-AGC_Spurious emission 3



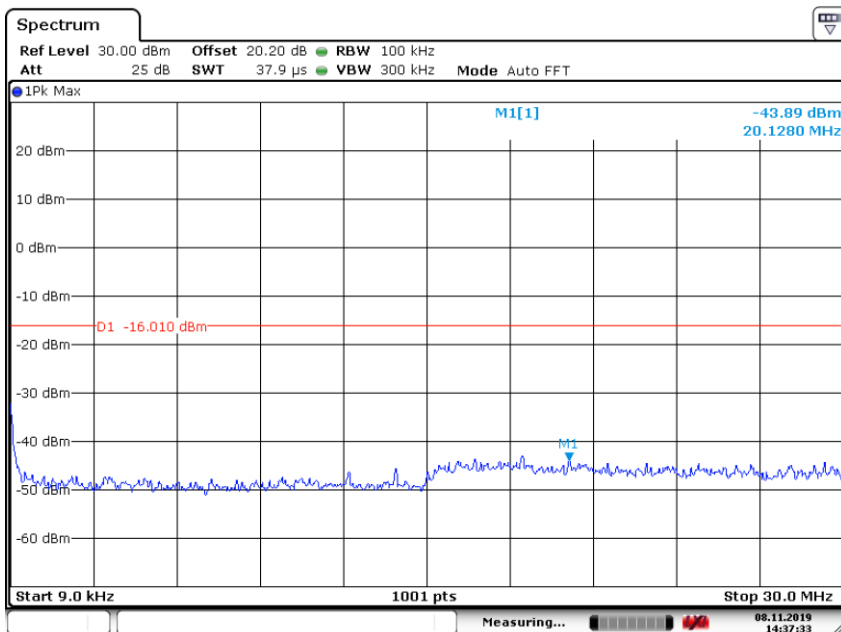
DL_1S_M_AWGN_Pre-AGC_Spurious emission 4



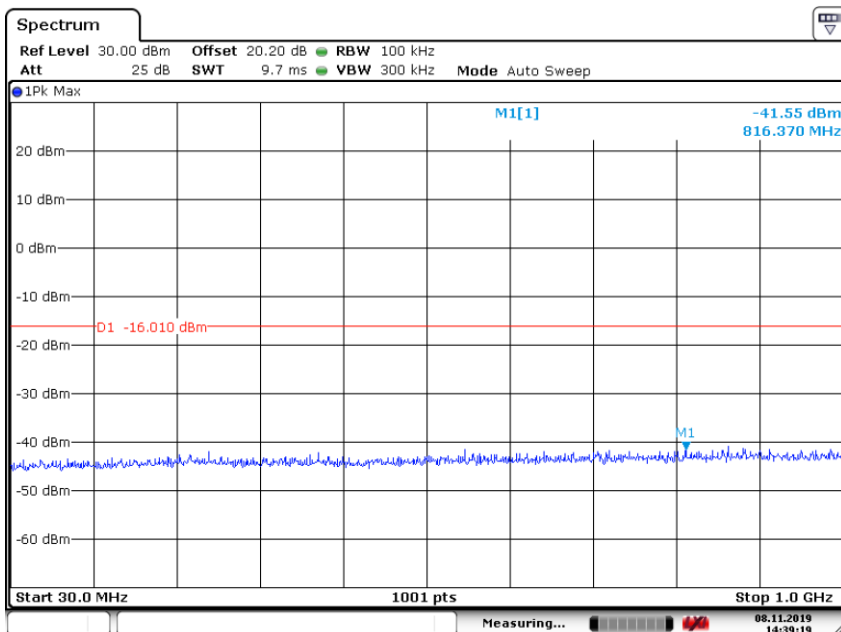
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DL_1S_T_AWGN_Pre-AGC_Spurious emission 1



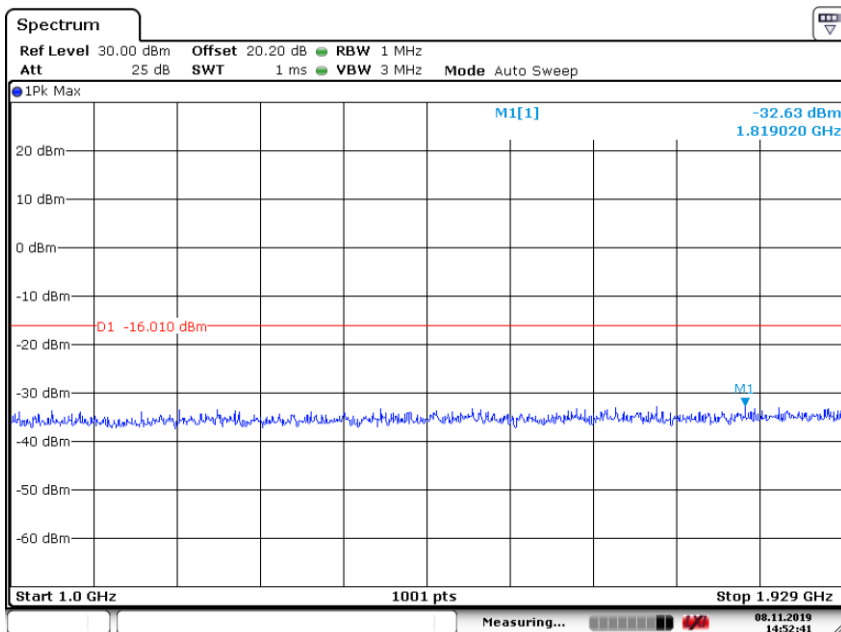
DL_1S_T_AWGN_Pre-AGC_Spurious emission 2



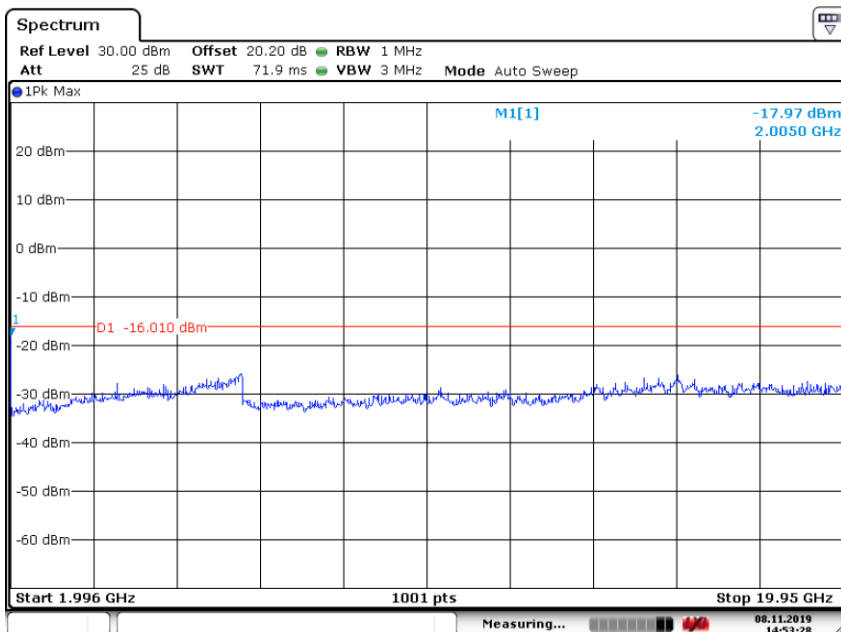
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DL_1S_T_AWGN_Pre-AGC_Spurious emission 3



DL_1S_T_AWGN_Pre-AGC_Spurious emission 4



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3.6 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 DC 48V.
 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	1962.500463	-0.05	PASS
40		1962.500674	0.06	PASS
30		1962.500372	-0.09	PASS
20		1962.500563	Reference	PASS
10		1962.500472	-0.05	PASS
0		1962.500372	-0.1	PASS
-10		1962.500384	-0.09	PASS
-20		1962.500472	-0.05	PASS
-30		1962.500785	0.13	PASS

Frequency stability vs voltage				
Voltage (V)	Test Conf.	Test data (MHz)	Tolerance (ppm)	Verdict
DC 40.8	DL_1S_M_AWGN	1962.500853	0.16	PASS
DC 48		1962.500543	Reference	PASS
DC 55.2		1962.500462	-0.04	PASS



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3.7 Radiated spurious emissions

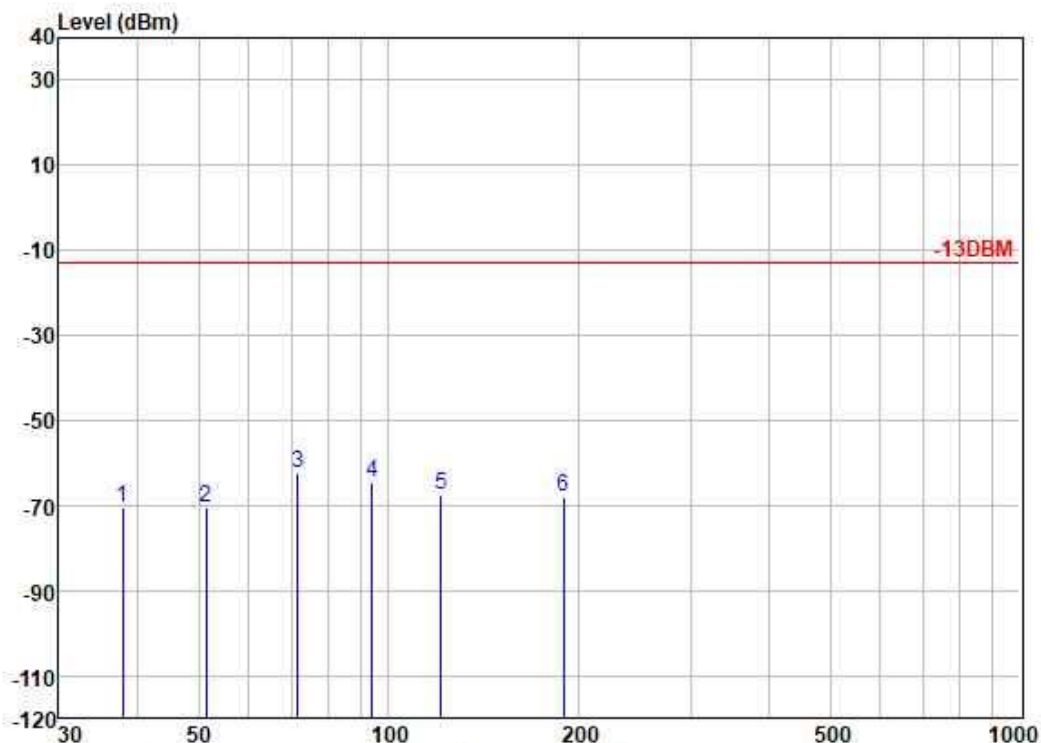
- Note:
1. The tested max conducted power for single antenna port is 20.35dBm. the 2x2 MIMO total power is 20.35dBm+20.35dBm= 0.2168W.
the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least $43 + 10 \log_{10} (P)$ dB
Here,
 $P=0.2168W$,
So the limit =
 $P(dBm)- [43 + 10 \log (0.2168W)] = -13dBm$
 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



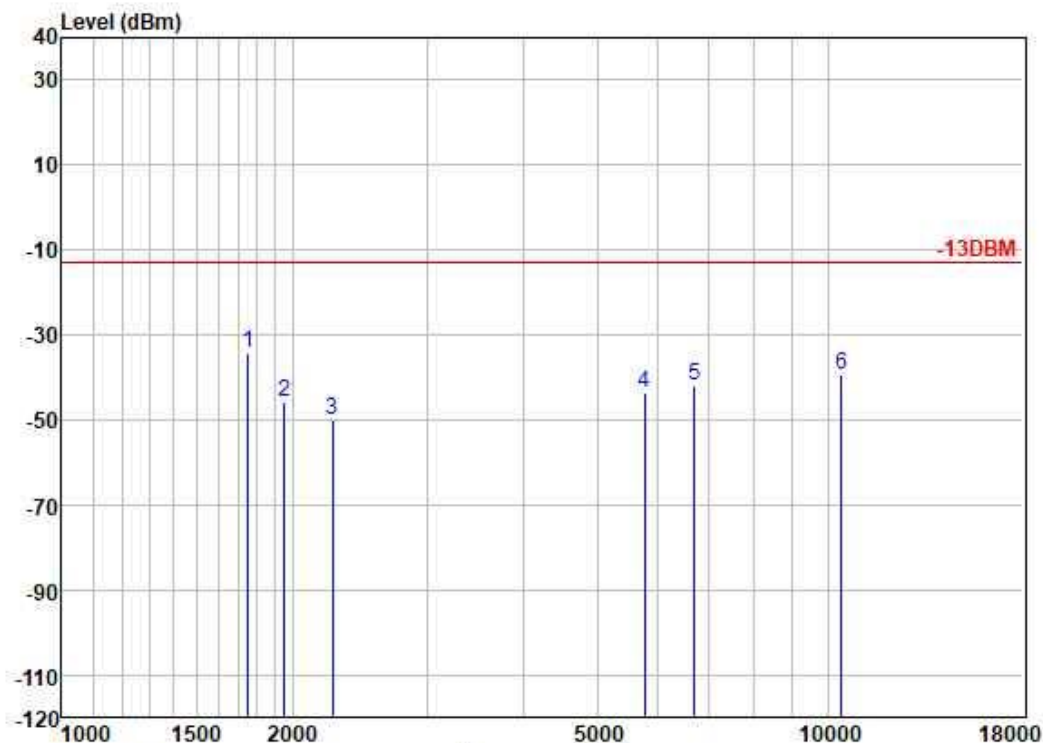
Freq. (MHz)	Level (dBm)	Limit (dBm)	Over Limit (dB)	Polarization	Verdict
37.812	-70.46	-13	-57.46	Horizontal	PASS
51.301	-69.98	-13	-56.98	Horizontal	PASS
71.832	-62.34	-13	-49.34	Horizontal	PASS
94.098	-64.51	-13	-51.51	Horizontal	PASS
121.432	-67.73	-13	-54.73	Horizontal	PASS
189.074	-67.84	-13	-54.84	Horizontal	PASS



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DL_1S_M_AWGN_Horizontal_above 1GHz



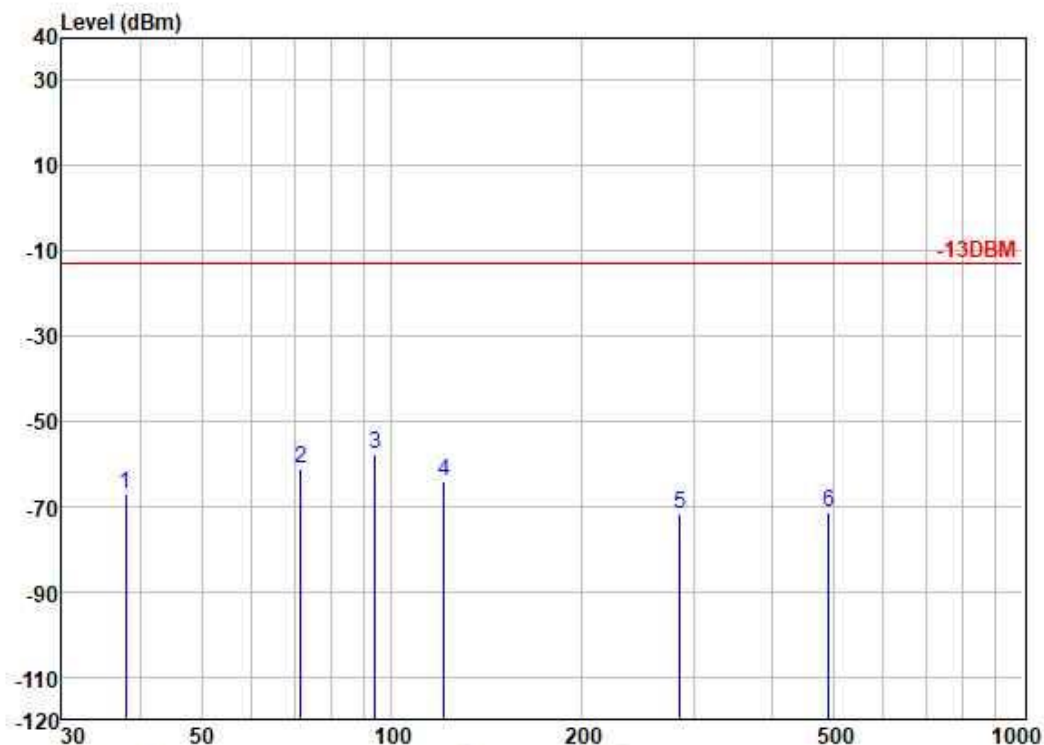
Freq. (MHz)	Level (dBm)	Limit (dBm)	Over Limit (dB)	Polarization	Verdict
1751.955	-34.43	-13	-21.43	Horizontal	PASS
1955.344	-45.59	-13	-32.59	Horizontal	PASS
2259.367	-50.07	-13	-37.07	Horizontal	PASS
5763.617	-43.82	-13	-30.82	Horizontal	PASS
6698.373	-42.09	-13	-29.09	Horizontal	PASS
10423.659	-39.41	-13	-26.41	Horizontal	PASS



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DL_1S_M_AWGN_Vertical_30MHz~1GHz



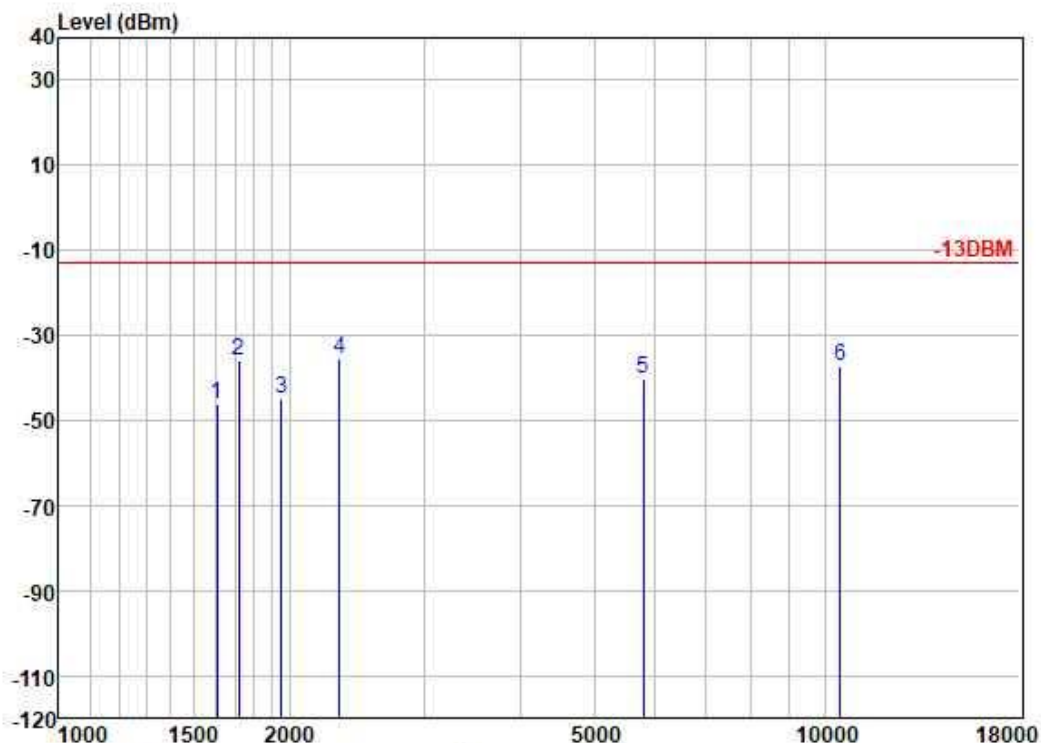
Freq. (MHz)	Level (dBm)	Limit (dBm)	Over Limit (dB)	Polarization	Verdict
37.812	-67.15	-13	-54.15	Vertical	PASS
71.832	-61.31	-13	-48.31	Vertical	PASS
94.098	-57.50	-13	-44.5	Vertical	PASS
121.342	-64.27	-13	-51.27	Vertical	PASS
286.978	-71.74	-13	-58.74	Vertical	PASS
492.476	-71.22	-13	-58.22	Vertical	PASS



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DL_1S_M_AWGN_Vertical_above 1GHz



Freq. (MHz)	Level (dBm)	Limit (dBm)	Over Limit (dB)	Polarization	Verdict
1611.091	-46.26	-13	-33.26	Vertical	PASS
1716.864	-35.96	-13	-22.96	Vertical	PASS
1955.344	-44.89	-13	-31.89	Vertical	PASS
2325.624	-35.41	-13	-22.41	Vertical	PASS
5797.032	-40.27	-13	-27.27	Vertical	PASS
10484.320	-37.30	-13	-24.3	Vertical	PASS



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4 WCS (2305-2315MHz paired with 2350-2360MHz)

4.1 AGC threshold level

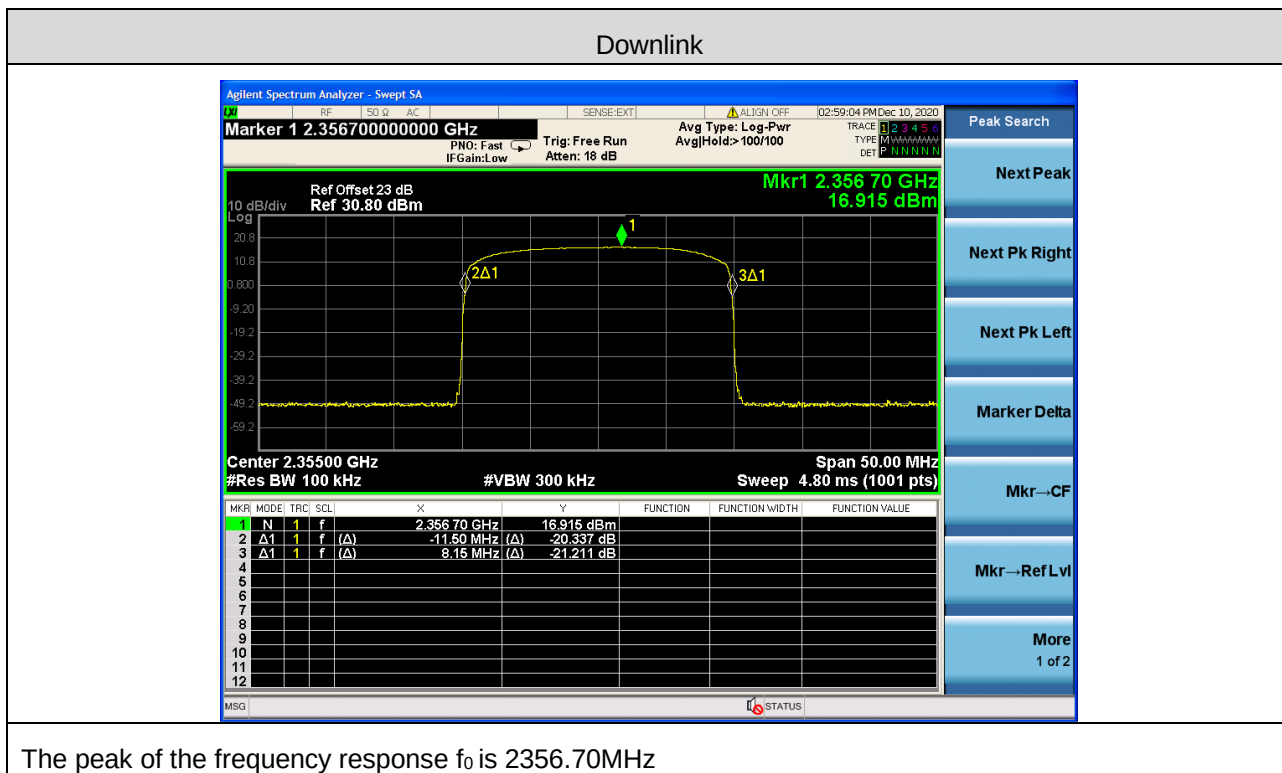
Test Conf.	AGC Threshold level
DL_1S_M_AWGN	-0.32dBm
DL_1S_M_GSM	-0.30dBm



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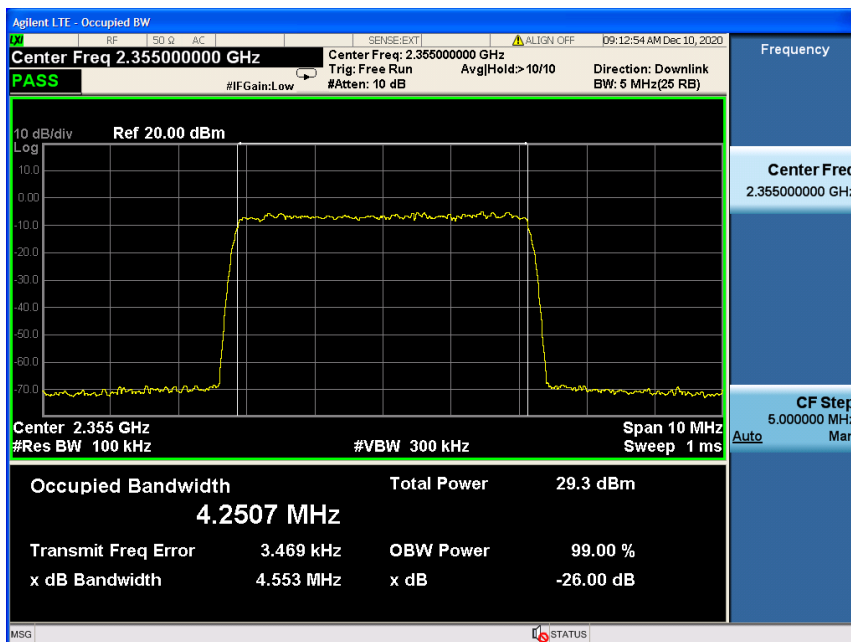
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4.2 Out-of-band rejection

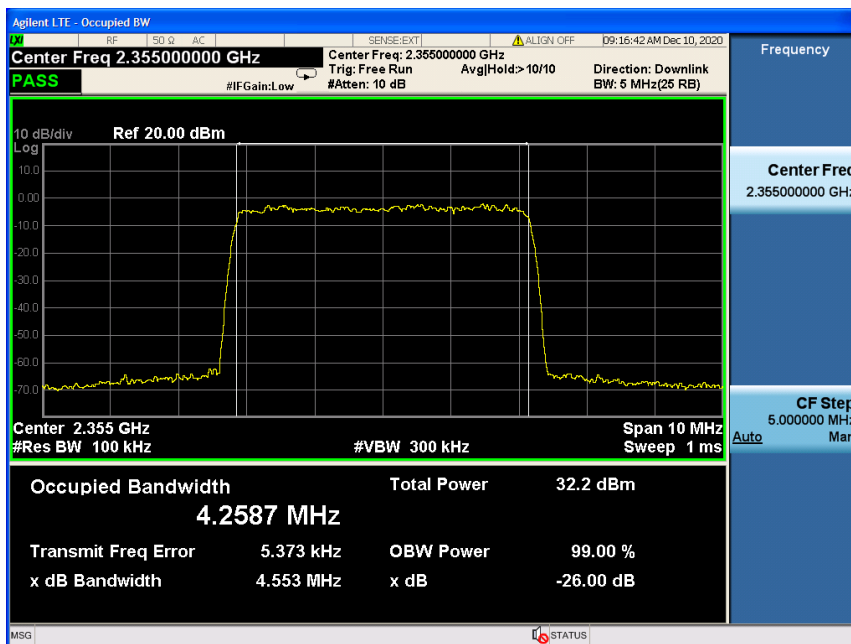


4.3 Input-versus-output signal comparison

Input_DL_1S_M_AWGN_Pre-AGC_26dB Bandwidth & 99% OBW



Input_DL_1S_M_AWGN_AGC+3dB_26dB Bandwidth & 99% OBW



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