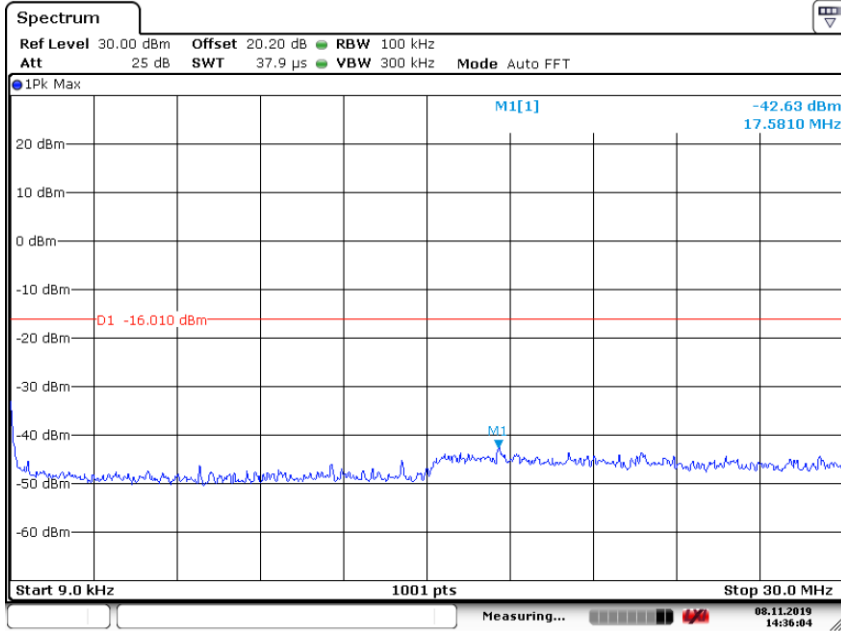
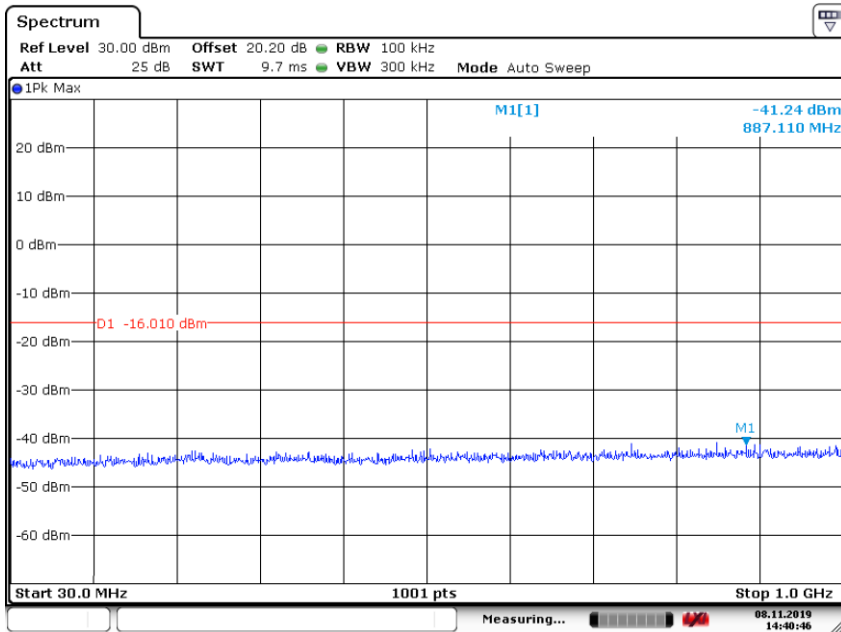


DL_1S_M_AWGN_AWGN_Pre-AGC_Spurious emission 1



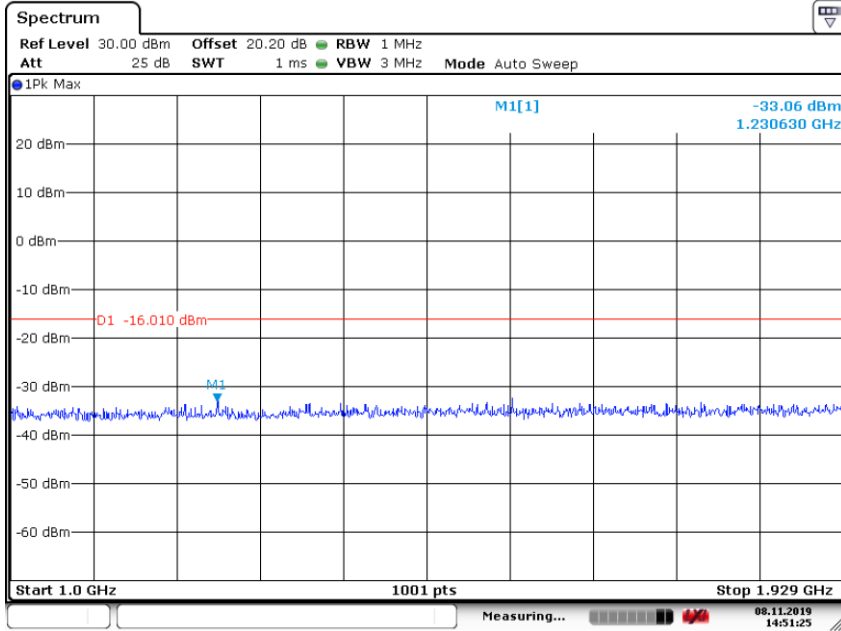
DL_1S_M_AWGN_Pre-AGC_Spurious emission 2



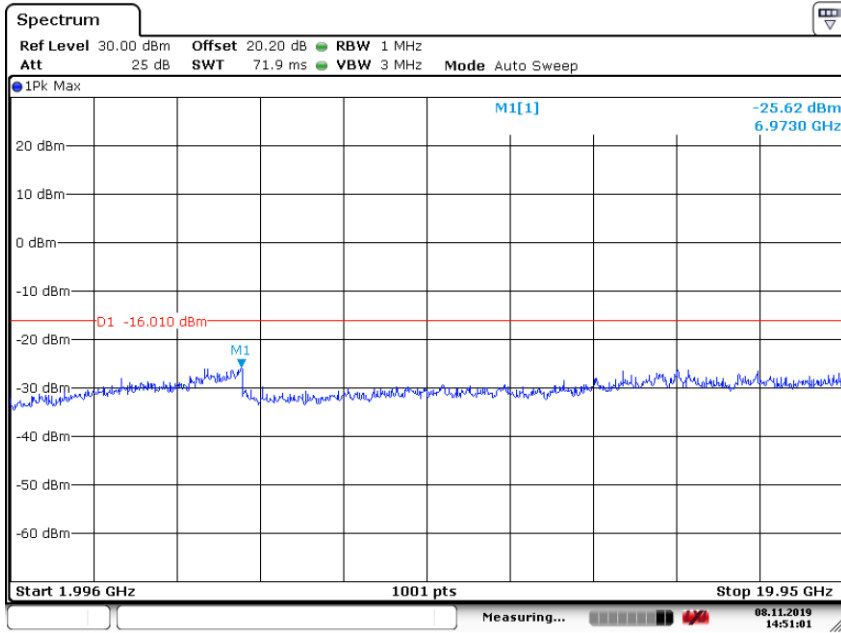
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DL_1S_M_AWGN_Pre-AGC_Spurious emission 3

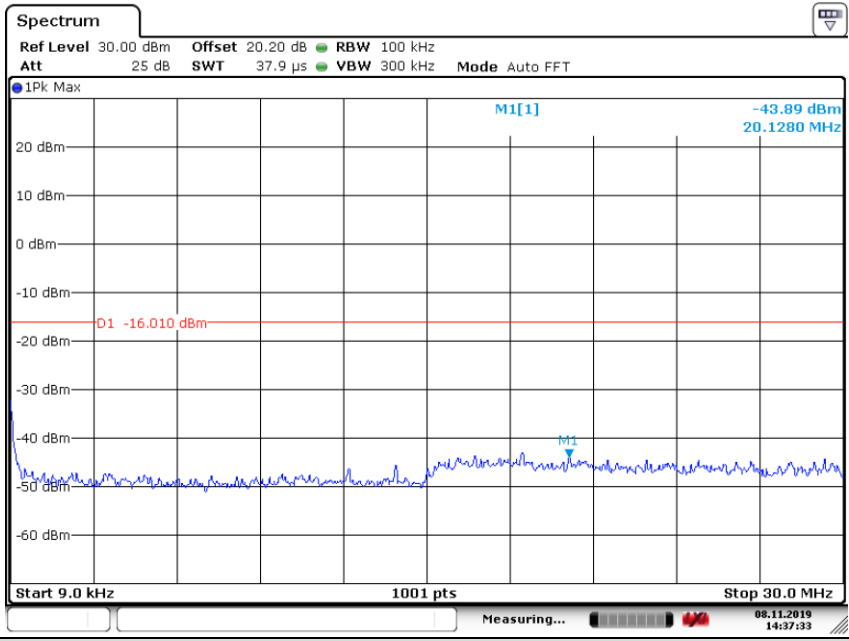


DL_1S_M_AWGN_Pre-AGC_Spurious emission 4

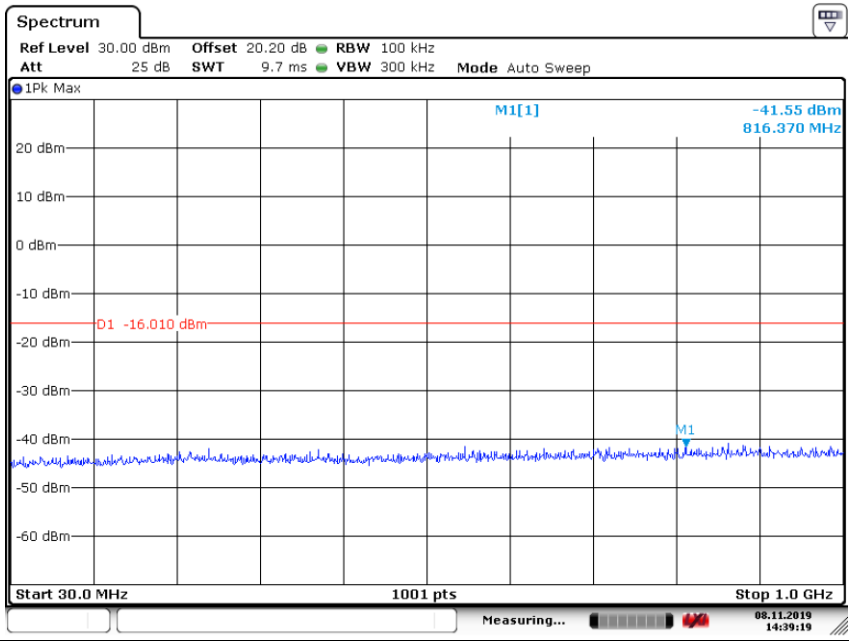


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DL_1S_T_AWGN_Pre-AGC_Spurious emission 1



DL_1S_T_AWGN_Pre-AGC_Spurious emission 2

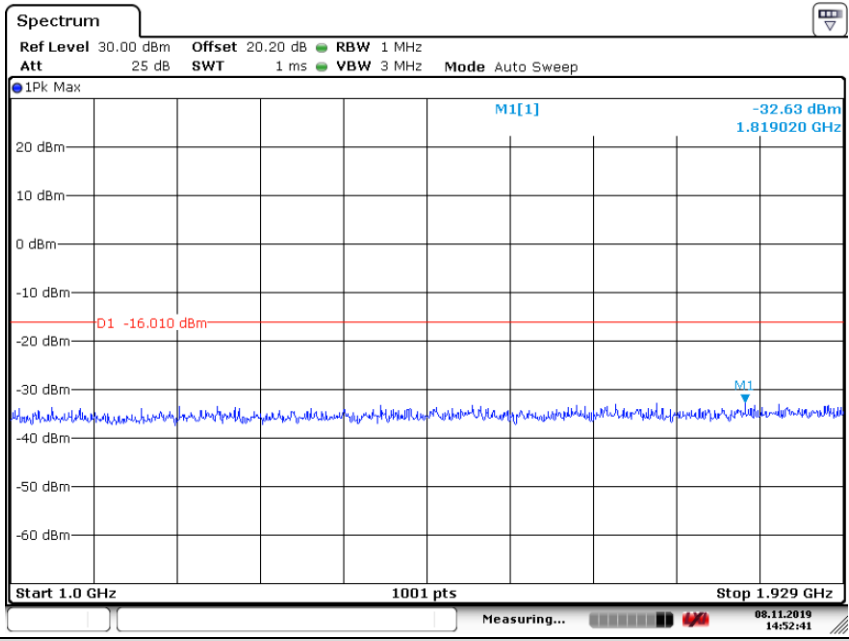


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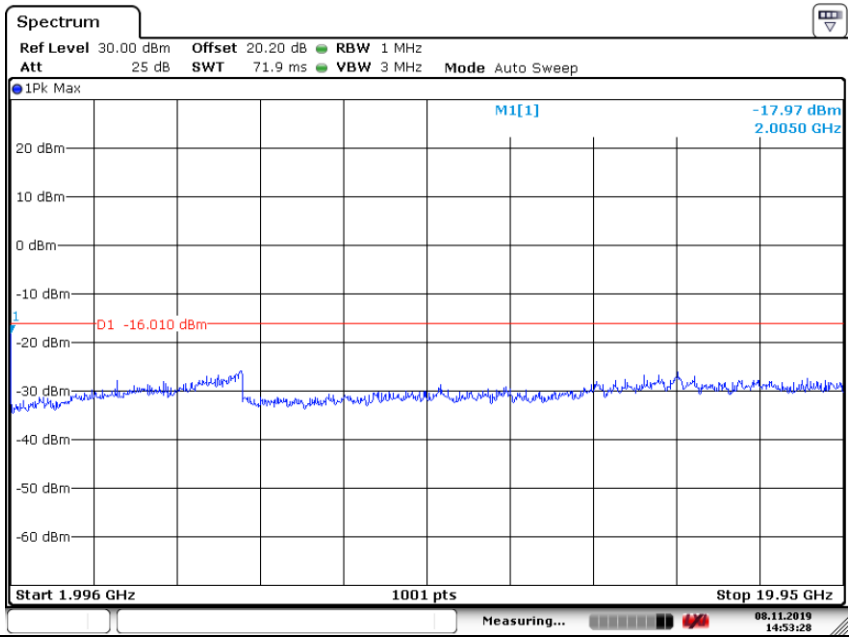
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 Guangzhou Branch Testing Center EEC Laboratory 中国·广州·经济技术开发区科学城科珠路198号 邮编: 510663 t (86-20) 82155555 f (86-20) 82075058 sgs.china@sgs.com

DL_1S_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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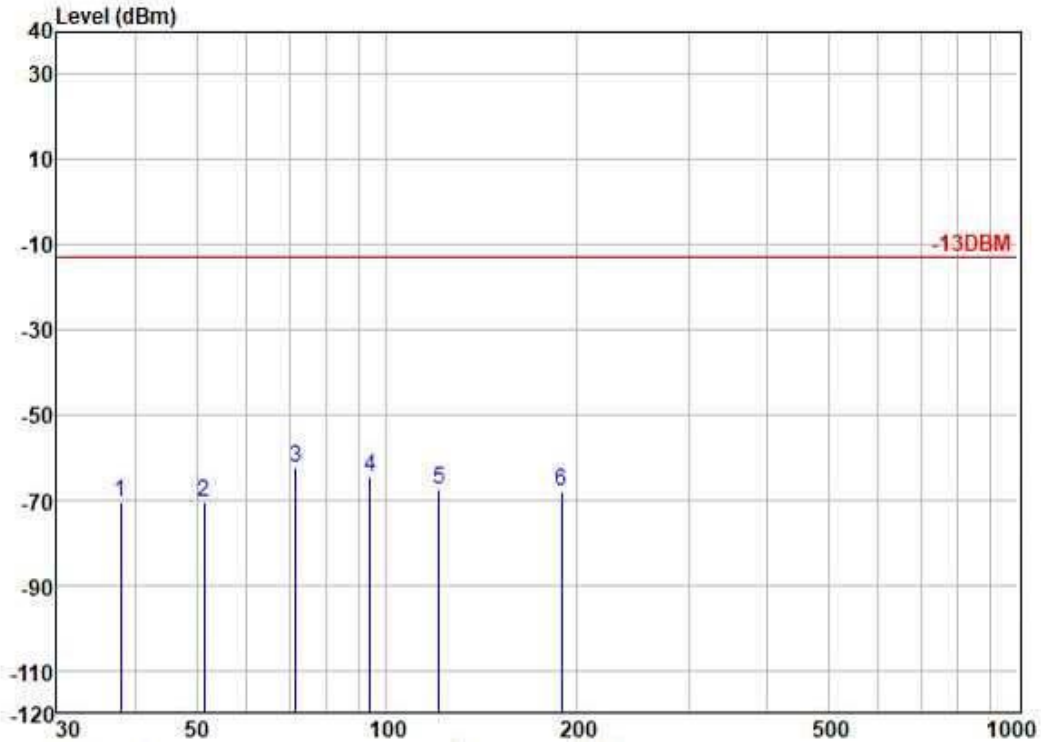
3.7 Radiated spurious emissions

- 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 =
 $P(\text{dBm}) - [43 + 10 \log (0.2168W)] = -13\text{dBm}$
 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

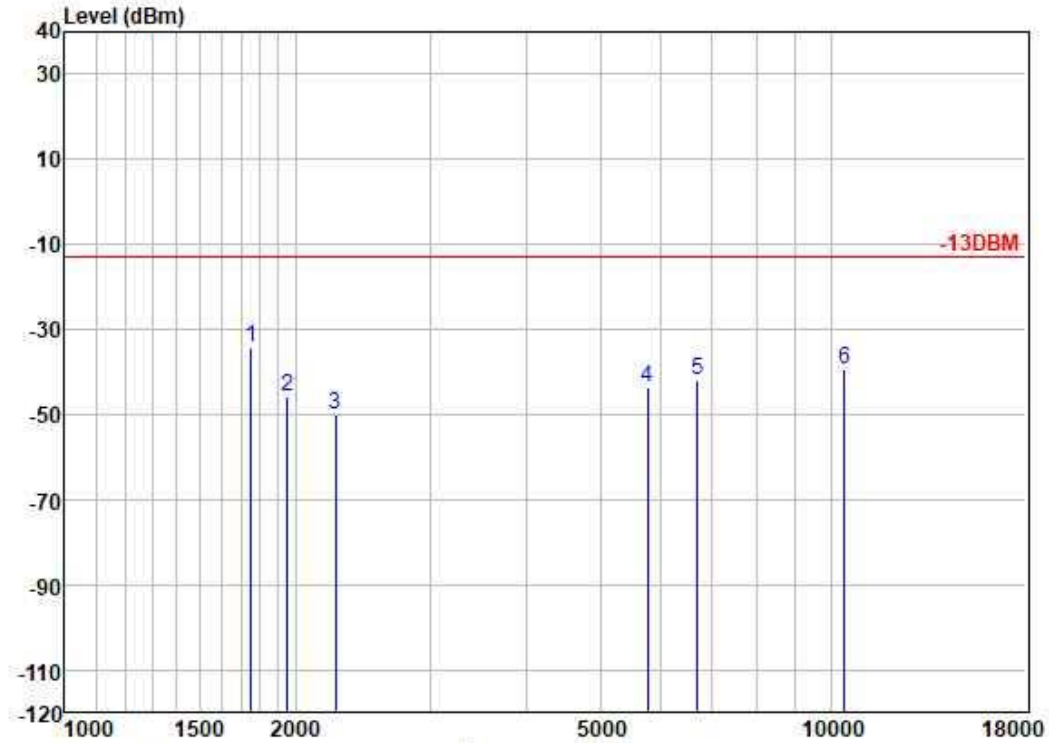


Freq. (MHz)	Level (dBm)	Limit (dBm)	Over Limit (dB)	Polarization	Verdict
37.812	-70.46	-13	-57.46	Horizontal	PASS
51.301	-69.98	-13	-56.98	Horizontal	PASS
71.832	-62.34	-13	-49.34	Horizontal	PASS
94.098	-64.51	-13	-51.51	Horizontal	PASS
121.432	-67.73	-13	-54.73	Horizontal	PASS
189.074	-67.84	-13	-54.84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



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DL_1S_M_AWGN_Horizontal_above 1GHz

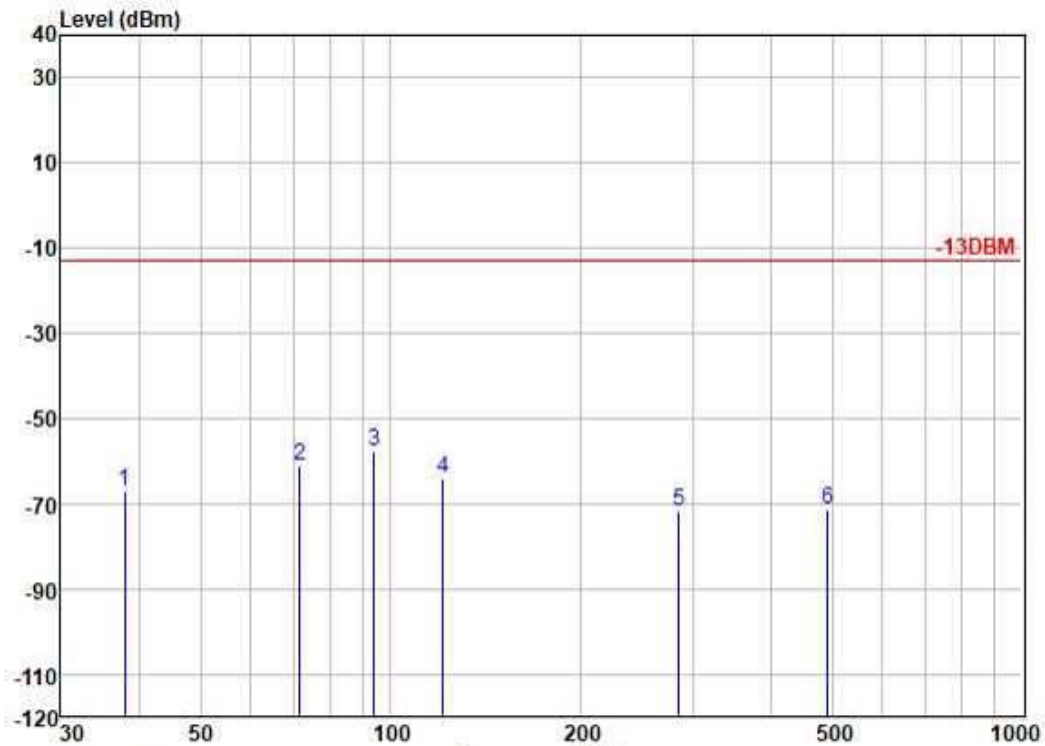


Freq. (MHz)	Level (dBm)	Limit (dBm)	Over Limit (dB)	Polarization	Verdict
1751.955	-34.43	-13	-21.43	Horizontal	PASS
1955.344	-45.59	-13	-32.59	Horizontal	PASS
2259.367	-50.07	-13	-37.07	Horizontal	PASS
5763.617	-43.82	-13	-30.82	Horizontal	PASS
6698.373	-42.09	-13	-29.09	Horizontal	PASS
10423.659	-39.41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



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DL_1S_M_AWGN_Vertical_30MHz~1GHz

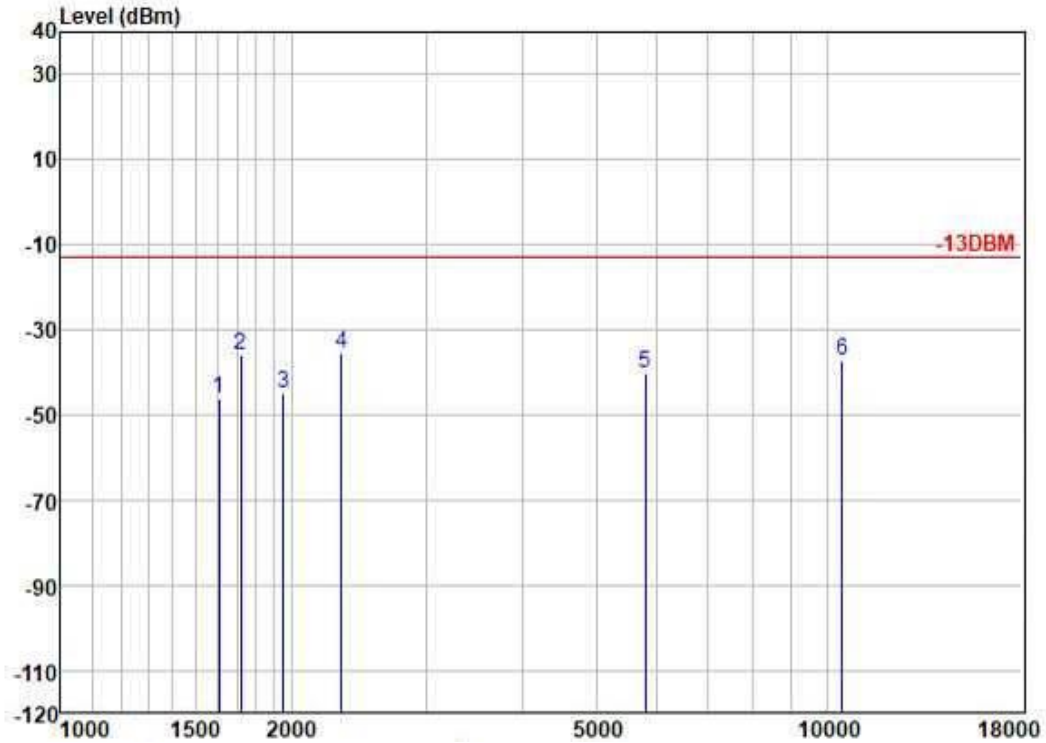


Freq. (MHz)	Level (dBm)	Limit (dBm)	Over Limit (dB)	Polarization	Verdict
37.812	-67.15	-13	-54.15	Vertical	PASS
71.832	-61.31	-13	-48.31	Vertical	PASS
94.098	-57.50	-13	-44.5	Vertical	PASS
121.342	-64.27	-13	-51.27	Vertical	PASS
286.978	-71.74	-13	-58.74	Vertical	PASS
492.476	-71.22	-13	-58.22	Vertical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

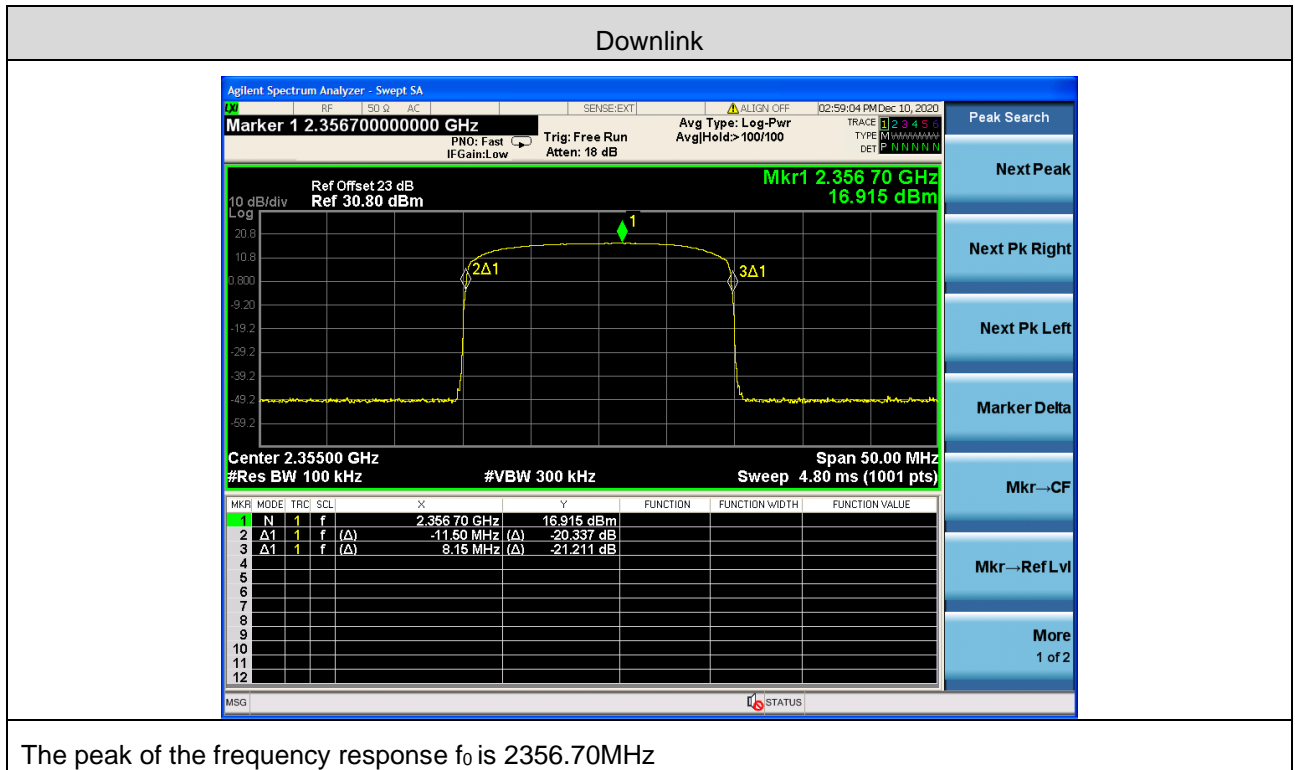
Test Conf.	AGC Threshold level
DL_1S_M_AWGN	-0.32dBm
DL_1S_M_GSM	-0.30dBm



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4.2 Out-of-band rejection



The peak of the frequency response f_0 is 2356.70MHz

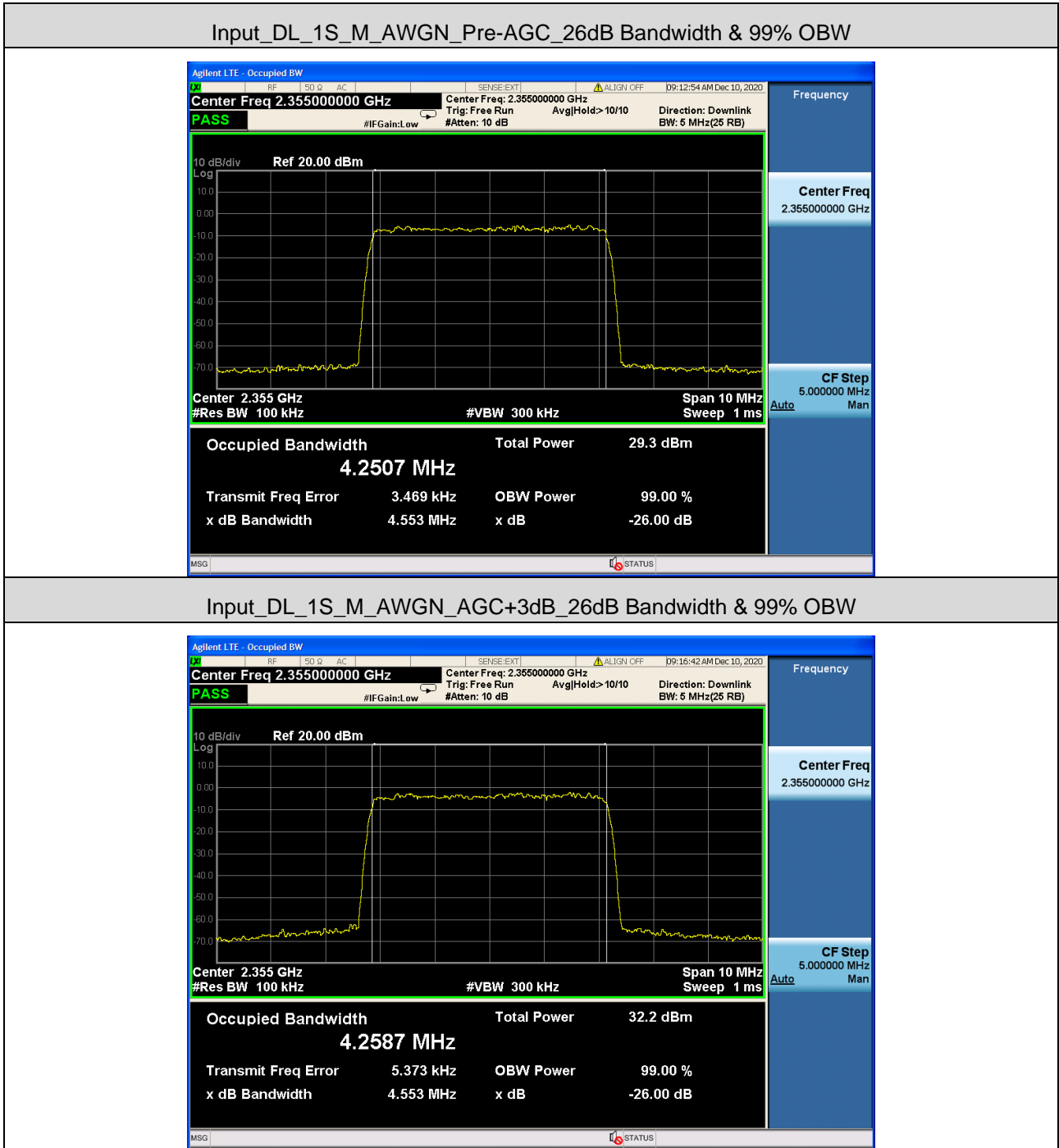


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4.3 Input-versus-output signal comparison

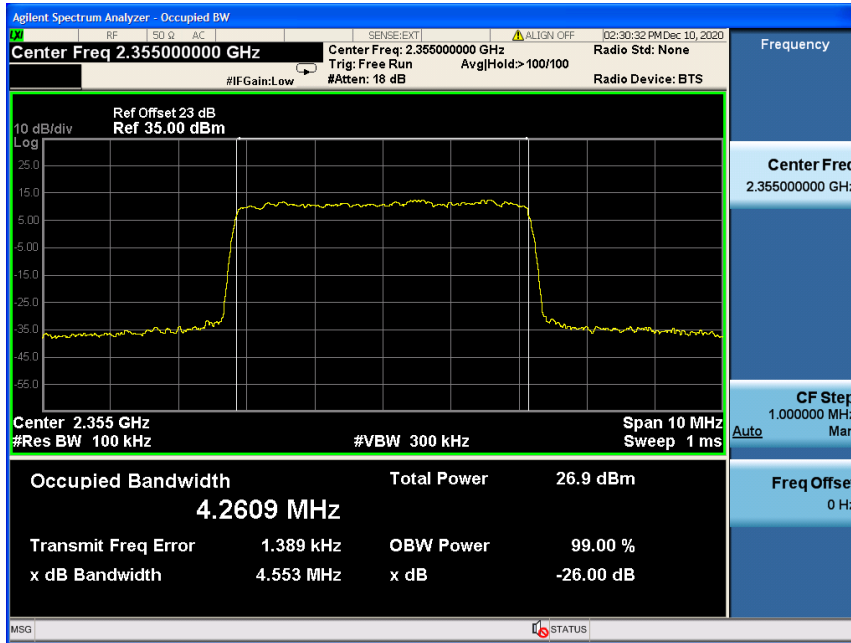


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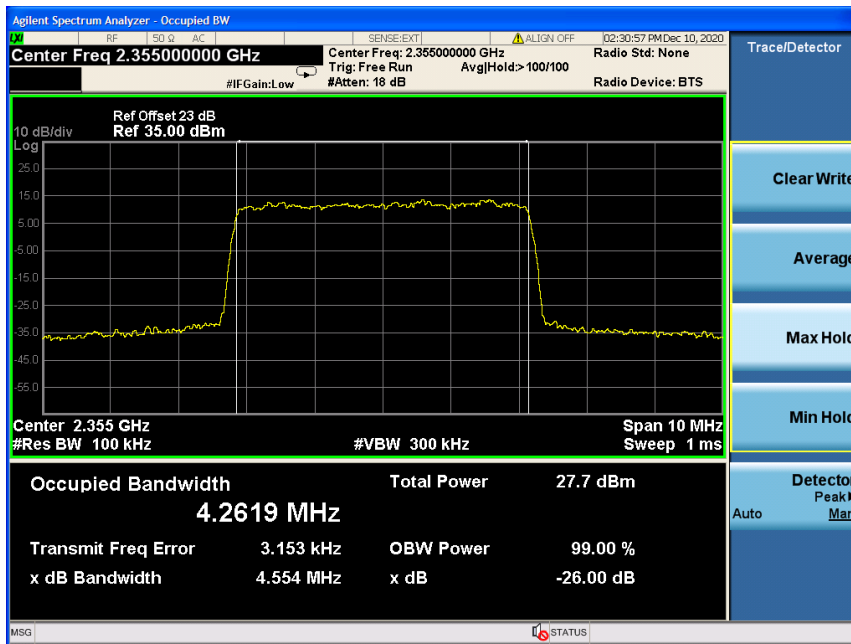
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Output_DL_1S_M_AWGN_Pre-AGC_26dB Bandwidth & 99% OBW



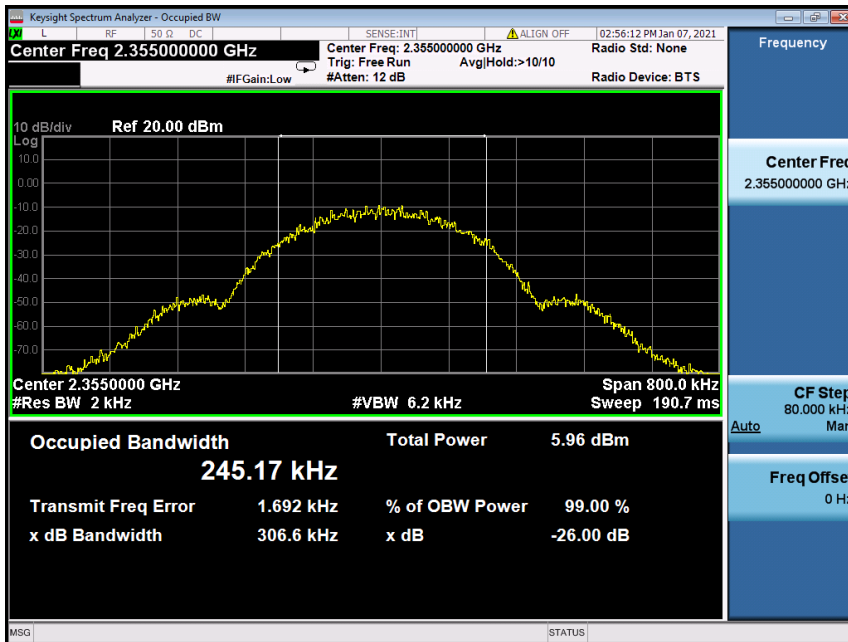
Output_DL_1S_M_AWGN_AGC+3dB_26dB Bandwidth & 99% OBW



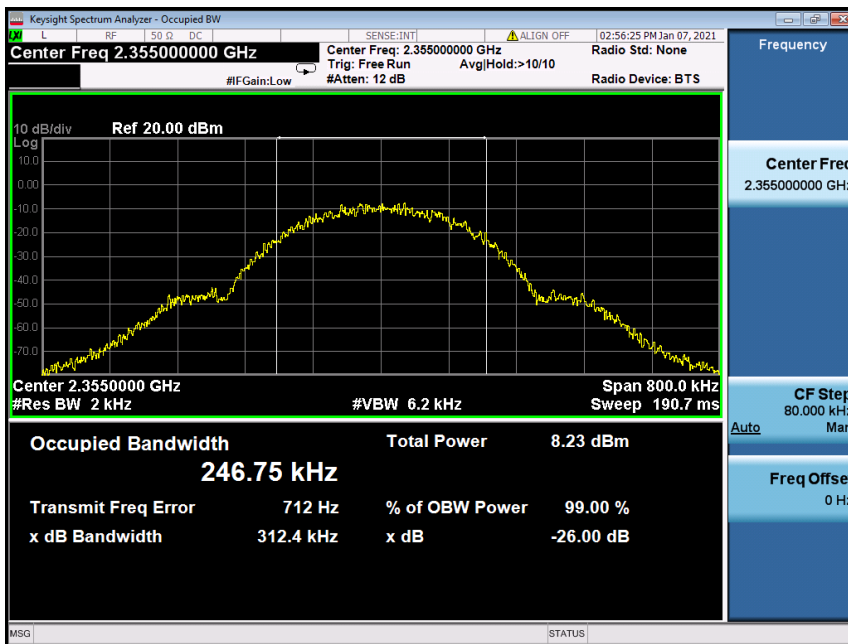
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Input_DL_1S_M_GSM_Pre-AGC_26dB Bandwidth & 99% OBW



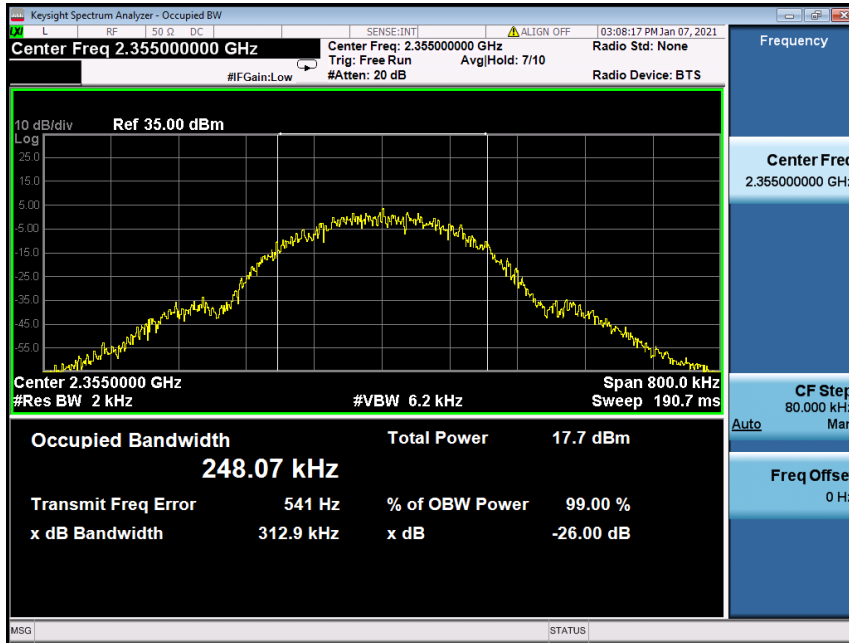
Input_DL_1S_M_GSM_AGC+3dB_26dB Bandwidth & 99% OBW



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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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Guangzhou Branch Technical Services Co., Ltd. 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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Page: 91 of 142

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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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

4.4 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	2356.70	Pre-AGC	-0.50	18.22	18.72	PASS
		AGC+3dB	2.50	18.18	/	PASS
DL_1S_GSM	2356.70	Pre-AGC	-0.50	18.08	18.58	PASS
		AGC+3dB	2.50	18.12	/	PASS

Remark:

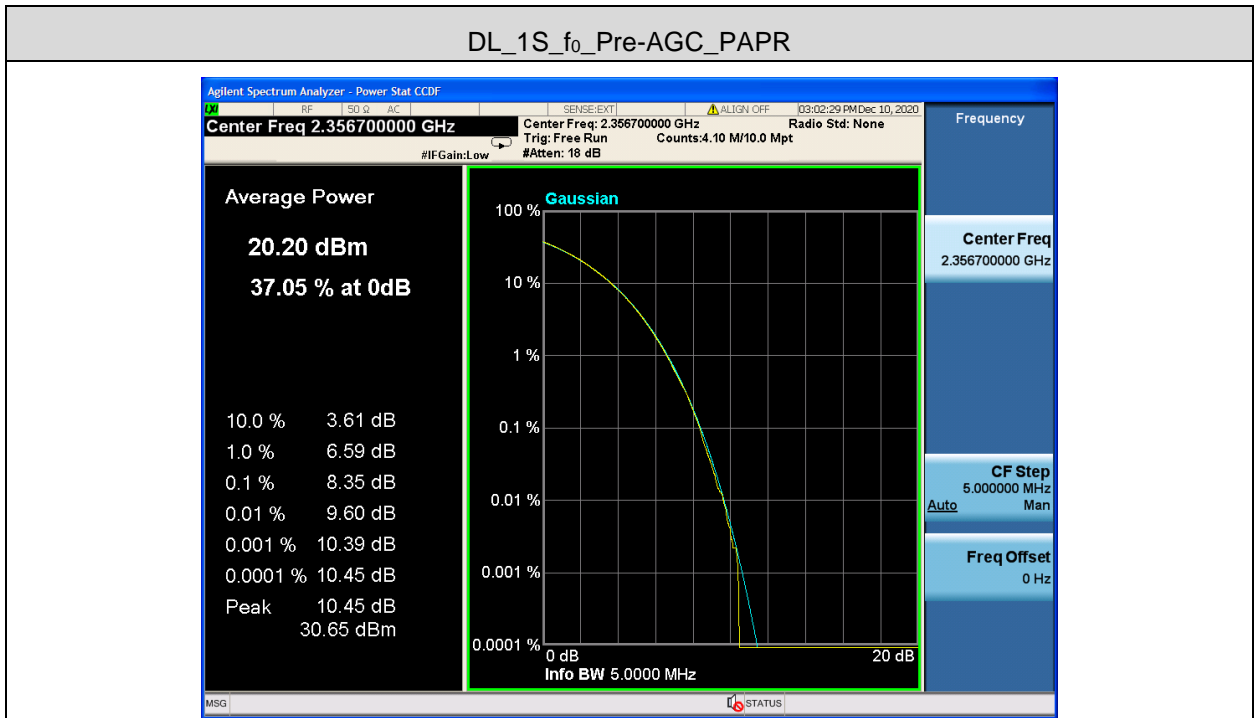
According to the declaration from the applicant, the antenna gain should not exceed 12.5dBi, the Directional gain = G(ANT) + 10 log (NANT) dBi = 12.5dBi+10log (2) dBi= 15.5dBi.

The total maximum EIRP for the EUT is (18.22dBm+18.22dBm) +15.5dBi=36.73dBm (4.710W) which don't exceed the required EIRP limit (400W/MHz)



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Test Conf.	Test Freq. f ₀ (MHz)	Signal Level	PAPR (dB)	Limit (dB)	Verdict
DL_1S_AWGN	2356.7	Pre-AGC	8.35	13	PASS



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

Note: 1. The tested max conducted power for single antenna port is 18.22dBm, the power of any emission outside a licensee's frequency band(s) shall be attenuated below the transmitter power (P) in watts

(i)

By a factor of not less than $43 + 10 \log (P)$ dB on all frequencies between 2305 and 2320 MHz and on all frequencies between 2345 and 2360 MHz that are outside the licensed band(s) of operation.

Here,

$$P=18.22\text{dBm}= 0.0664\text{W}.$$

So the limit =

$$P(\text{dBm})- [43 + 10 \log (0.0664\text{W})] =-13\text{dBm}$$

By a factor of not less than $75 + 10 \log (P)$ dB on all frequencies between 2320 and 2345 MHz

Here,

$$P=18.22\text{dBm}= 0.0664\text{W}.$$

So the limit =

$$P(\text{dBm})- [75 + 10 \log (0.0664\text{W})] =-45\text{dBm}$$

(ii)

By a factor of not less than $43 + 10 \log (P)$ dB on all frequencies between 2300 and 2305 MHz

Here,

$$P=18.22\text{dBm}= 0.0664\text{W}.$$

So the limit =

$$P(\text{dBm})- [43 + 10 \log (0.0664\text{W})] =-13\text{dBm}$$



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By a factor of not less than $70 + 10 \log (P)$ dB on all frequencies between 2287.5 and 2300 MHz

Here,

$$P=18.22\text{dBm}=0.0664\text{W}.$$

So the limit =

$$P(\text{dBm})- [70 + 10 \log (0.0664\text{W})] = -40\text{dBm}$$

By a factor of not less than $72 + 10 \log (P)$ dB on all frequencies between 2285 and 2287.5 MHz

Here,

$$P=18.22\text{dBm}=0.0664\text{W}.$$

So the limit =

$$P(\text{dBm})- [72 + 10 \log (0.0664\text{W})] = -42\text{dBm}$$

By a factor of not less than $75 + 10 \log (P)$ dB below 2285 MHz

Here,

$$P=18.22\text{dBm}=0.0664\text{W}.$$

So the limit =

$$P(\text{dBm})- [75 + 10 \log (0.0664\text{W})] = -45\text{dBm}$$

(iii)

By a factor of not less than $43 + 10 \log (P)$ dB on all frequencies between 2360 and 2362.5 MHz

Here,

$$P=18.22\text{dBm}=0.0664\text{W}.$$

So the limit =

$$P(\text{dBm})- [43 + 10 \log (0.0664\text{W})] = -13\text{dBm}$$



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By a factor of not less than $55 + 10 \log (P)$ dB on all frequencies between 2362.5 and 2365 MHz

Here,

$$P=18.22\text{dBm}=0.0664\text{W}.$$

So the limit =

$$P(\text{dBm})- [55 + 10 \log (0.0664\text{W})] = -25\text{dBm}$$

By a factor of not less than $70 + 10 \log (P)$ dB on all frequencies between 2365 and 2367.5 MHz

Here,

$$P=18.22\text{dBm}=0.0664\text{W}.$$

So the limit =

$$P(\text{dBm})- [70 + 10 \log (0.0664\text{W})] = -40\text{dBm}$$

By a factor of not less than $72 + 10 \log (P)$ dB on all frequencies between 2367.5 and 2370 MHz

Here,

$$P=18.22\text{dBm}=0.0664\text{W}.$$

So the limit =

$$P(\text{dBm})- [72 + 10 \log (0.0664\text{W})] = -42\text{dBm}$$

By a factor of not less than $75 + 10 \log (P)$ dB above 2370 MHz

Here,

$$P=18.22\text{dBm}=0.0664\text{W}.$$

So the limit =

$$P(\text{dBm})- [75 + 10 \log (0.0664\text{W})] = -45\text{dBm}$$

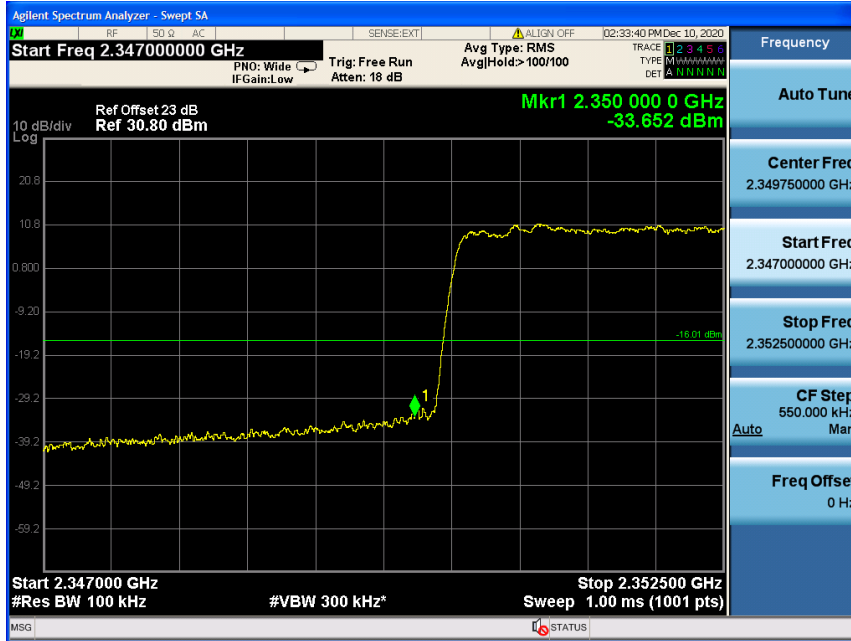
The EUT supports 2x2 MIMO and the emissions were measured at one of output port, so the limit lines were set to -16.01dBm/-48.01dBm/43.01dBm/45.01dBm/28.01dBm Separately in following test plots in order to determine the test result conveniently.

2. 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.

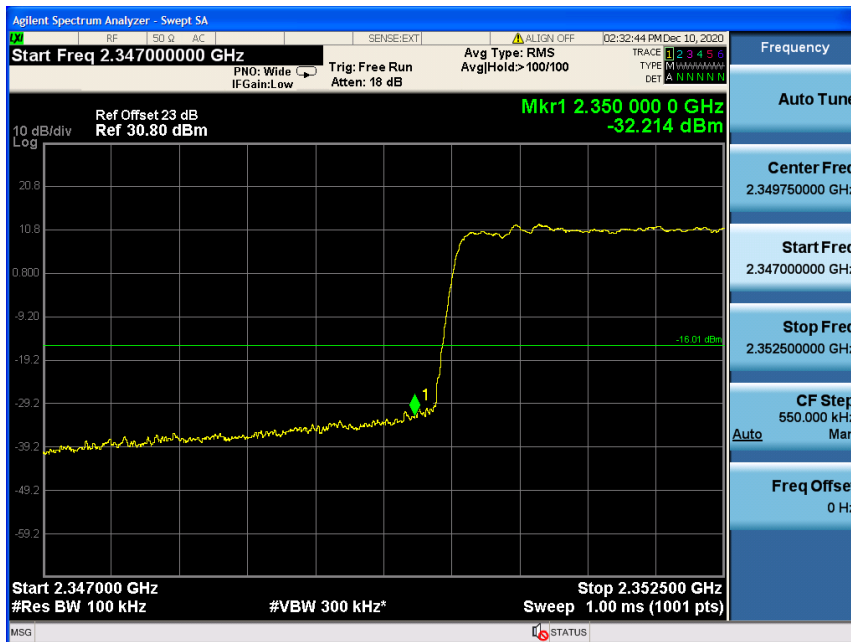


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DL_1S_B_AWGN_Pre-AGC_Out-of-band emission

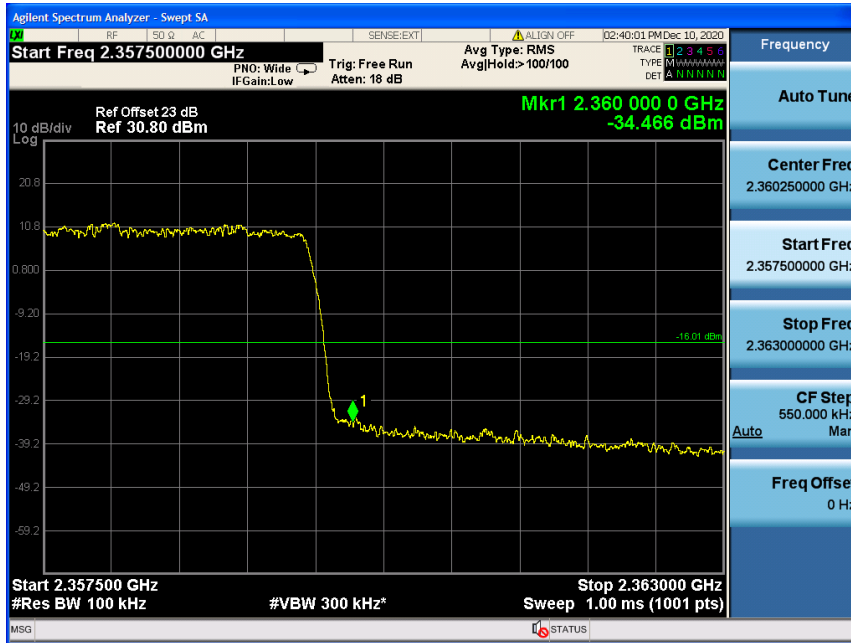


DL_1S_B_AWGN_AGC+3_Out-of-band emission

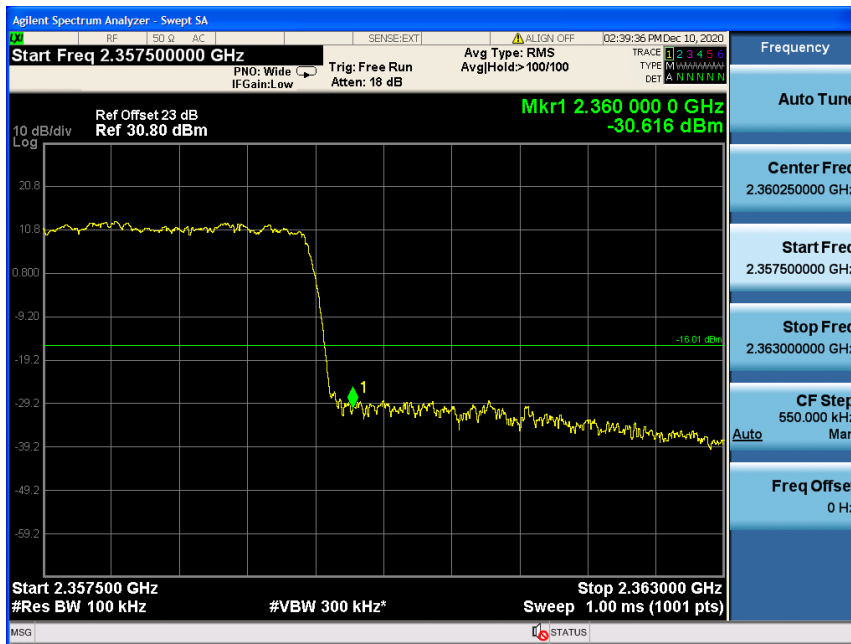


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DL_1S_T_AWGN_Pre-AGC_Out-of-band emission

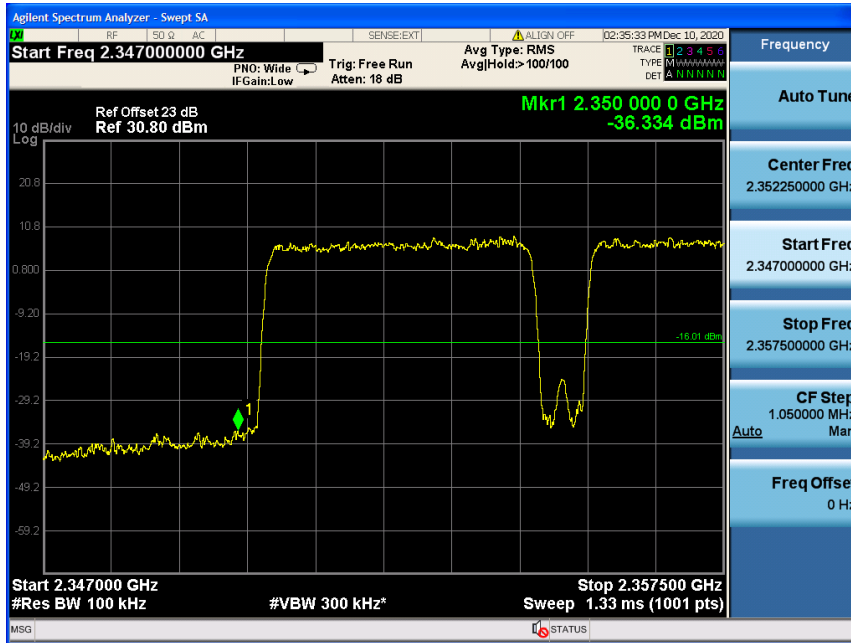


DL_1S_T_AWGN_AGC+3_Out-of-band emission

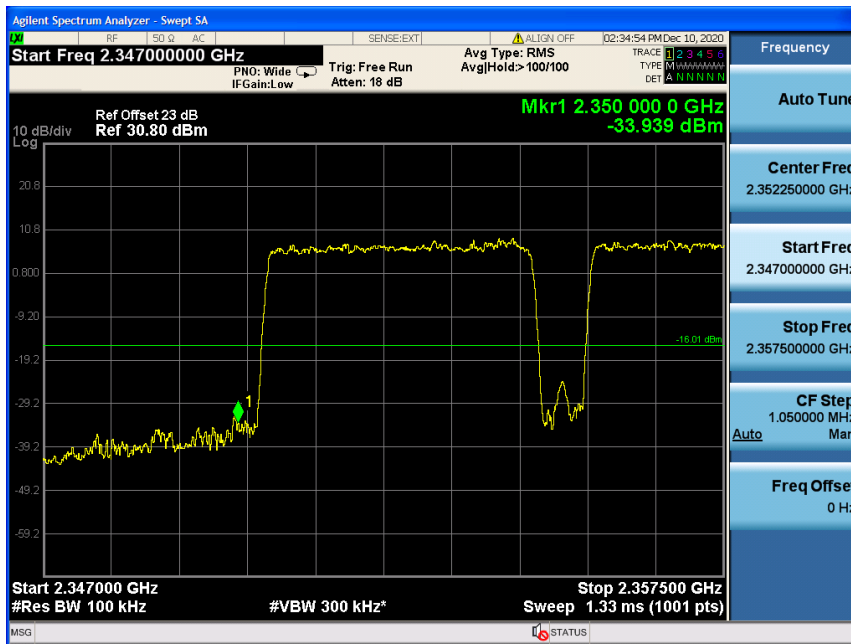


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DL_2S_B_AWGN_Pre-AGC_Out-of-band emission

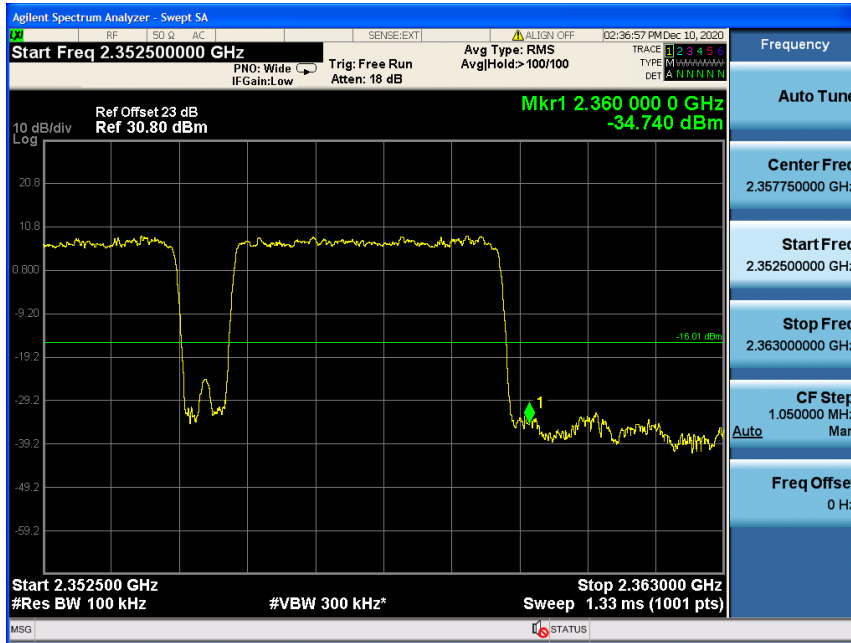


DL_2S_B_AWGN_AGC+3_Out-of-band emission

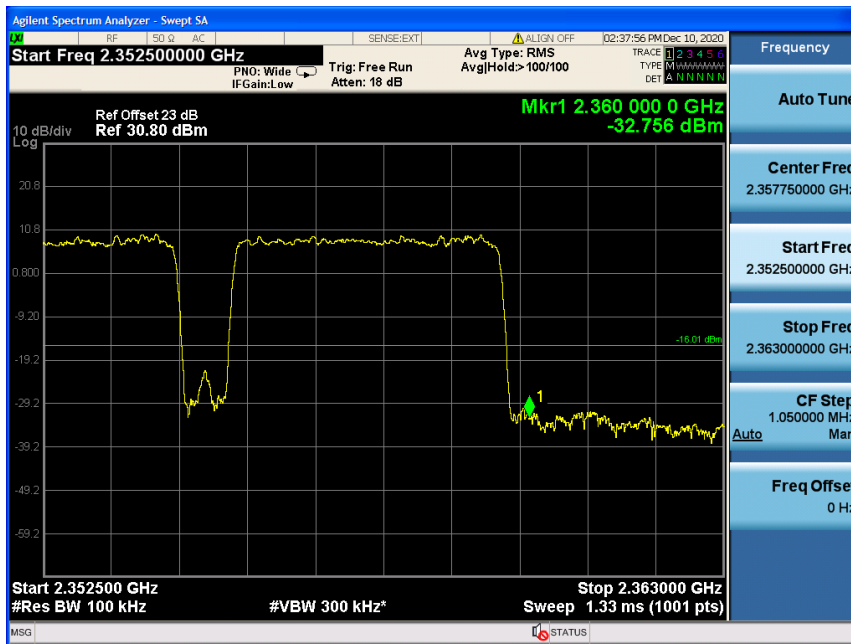


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DL_2S_T_AWGN_Pre-AGC_Out-of-band emission

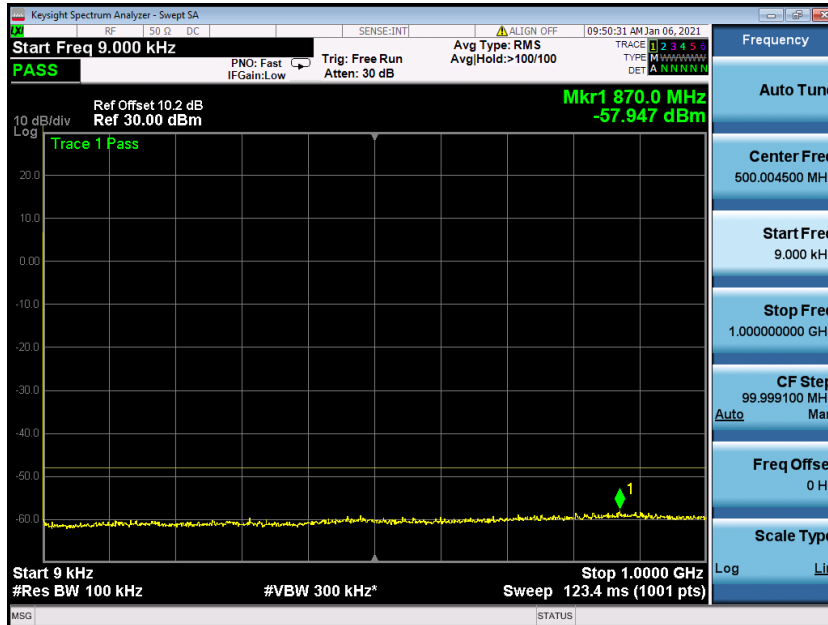


DL_2S_T_AWGN_AGC+3_Out-of-band emission

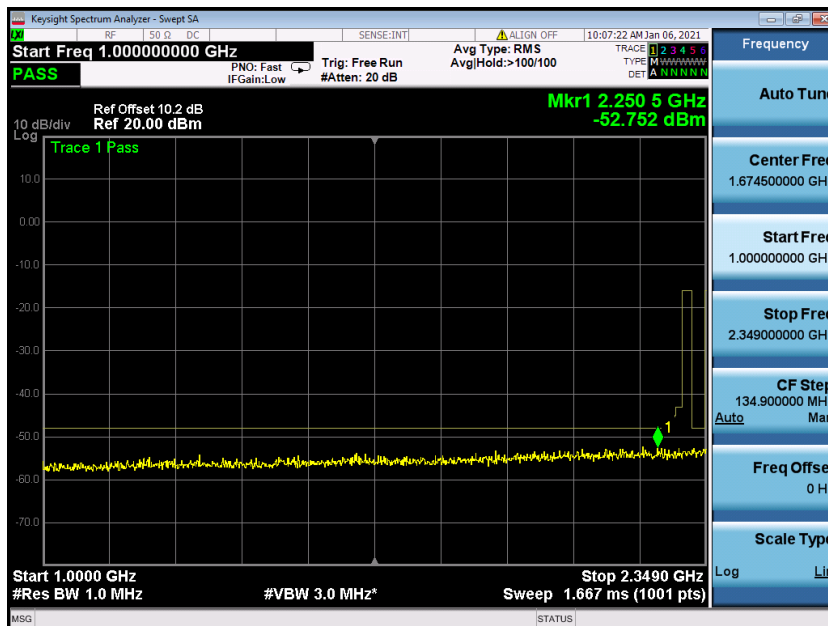


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DL_1S_B_AWGN_Pre-AGC_Spurious emission 1

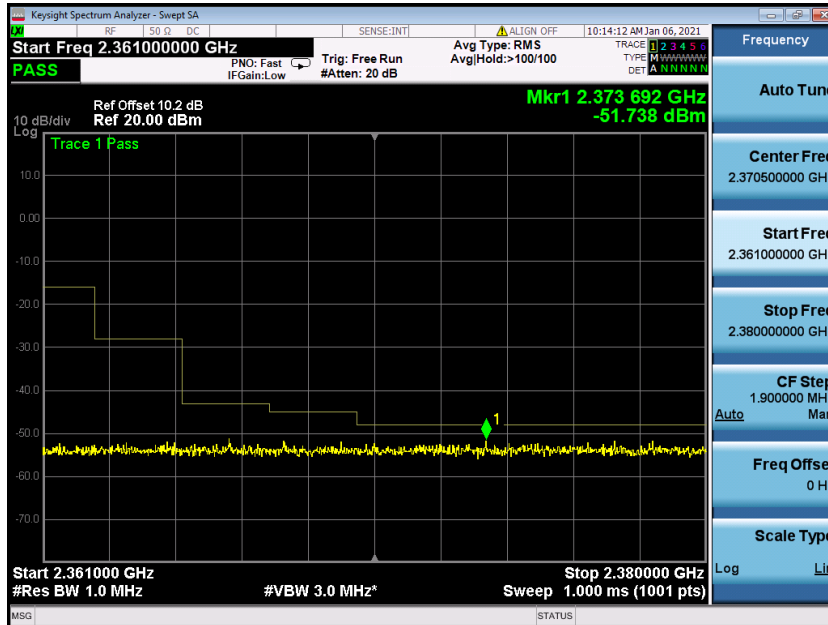


DL_1S_B_AWGN_Pre-AGC_Spurious emission 2

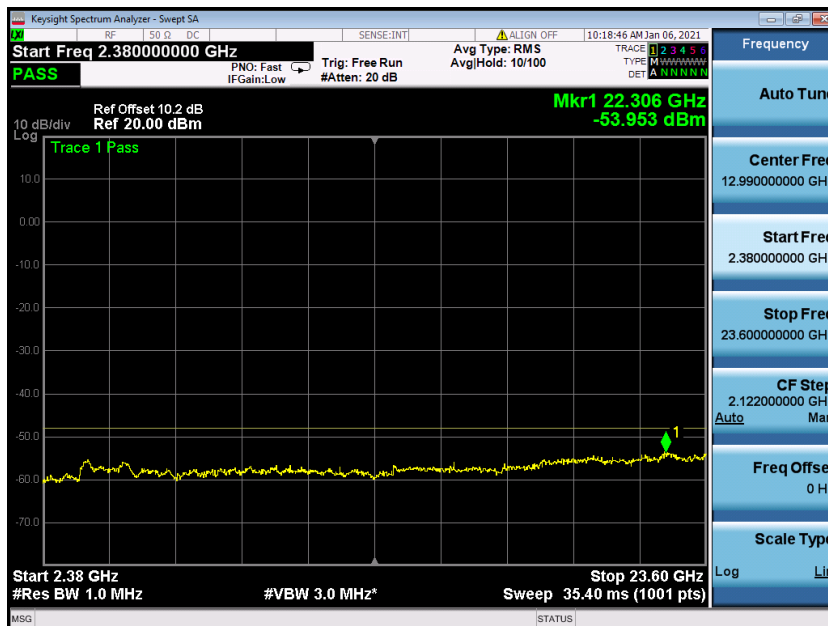


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DL_1S_B_AWGN_Pre-AGC_Spurious emission 3

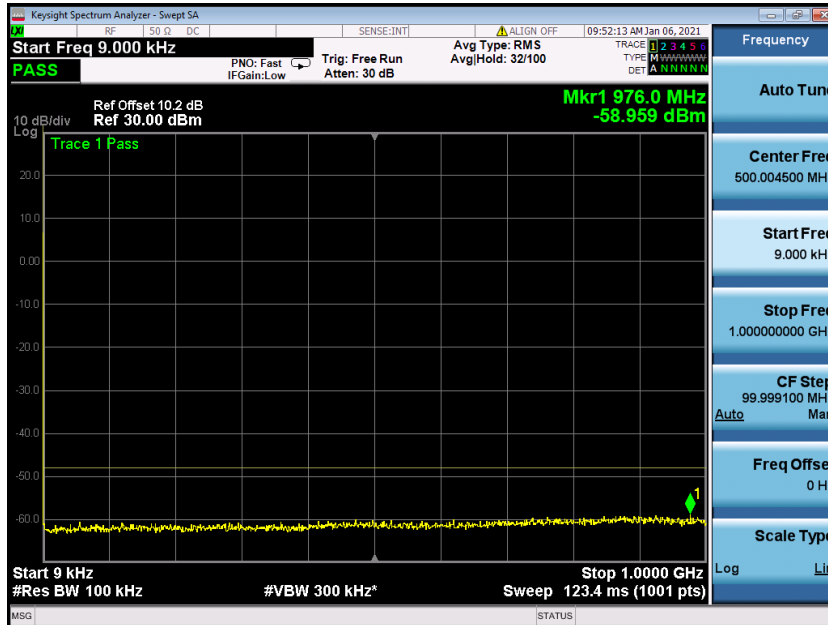


DL_1S_B_AWGN_Pre-AGC_Spurious emission 4

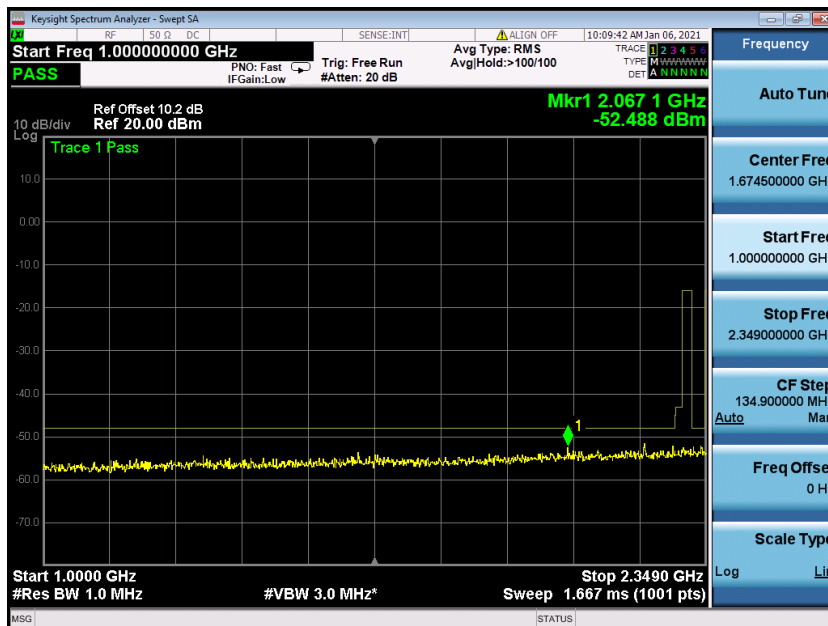


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DL_1S_M_AWGN_Pre-AGC_Spurious emission 1

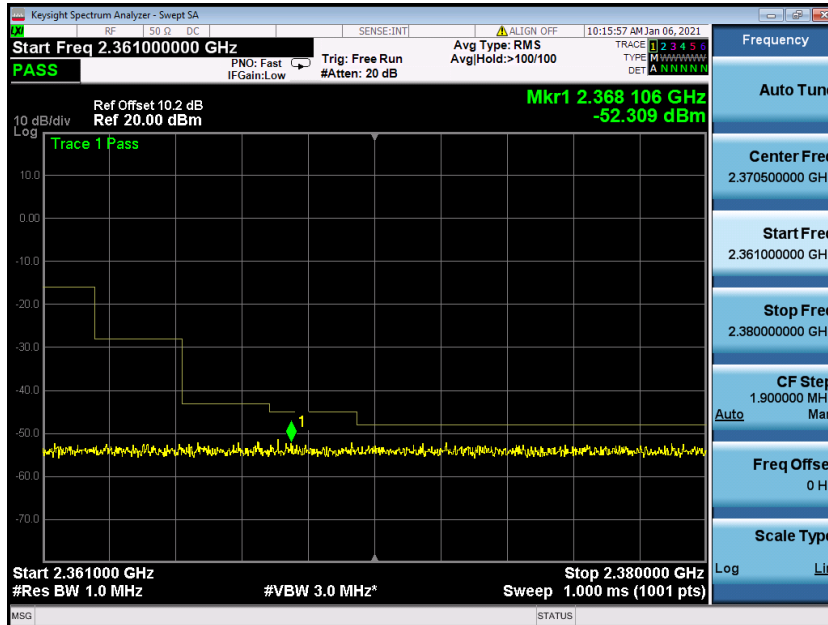


DL_1S_M_AWGN_Pre-AGC_Spurious emission 2

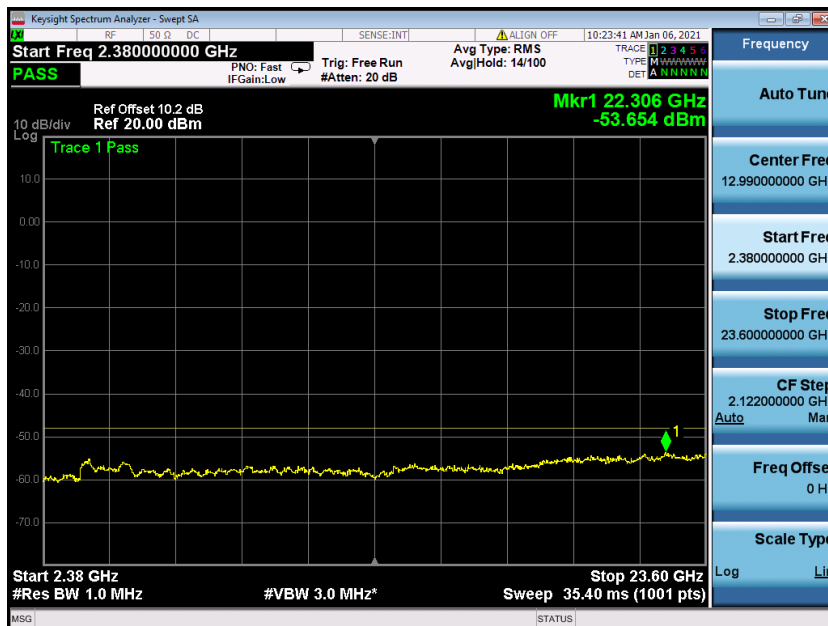


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DL_1S_M_AWGN_Pre-AGC_Spurious emission 3

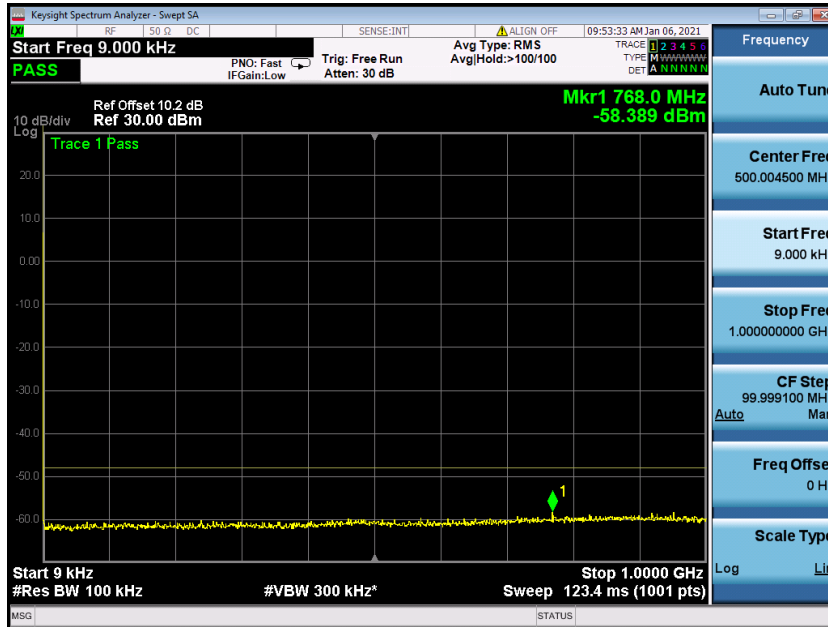


DL_1S_M_AWGN_Pre-AGC_Spurious emission 4

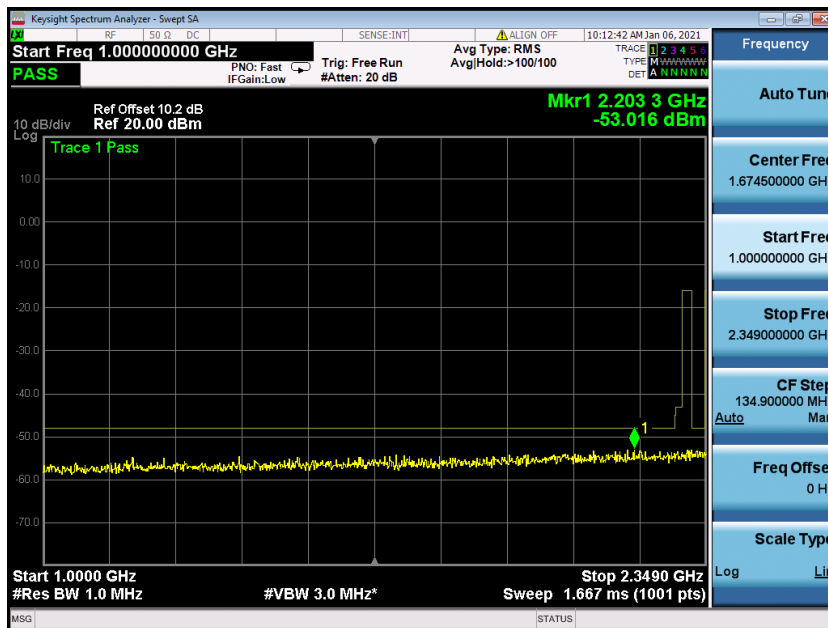


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DL_1S_T_AWGN_Pre-AGC_Spurious emission 1

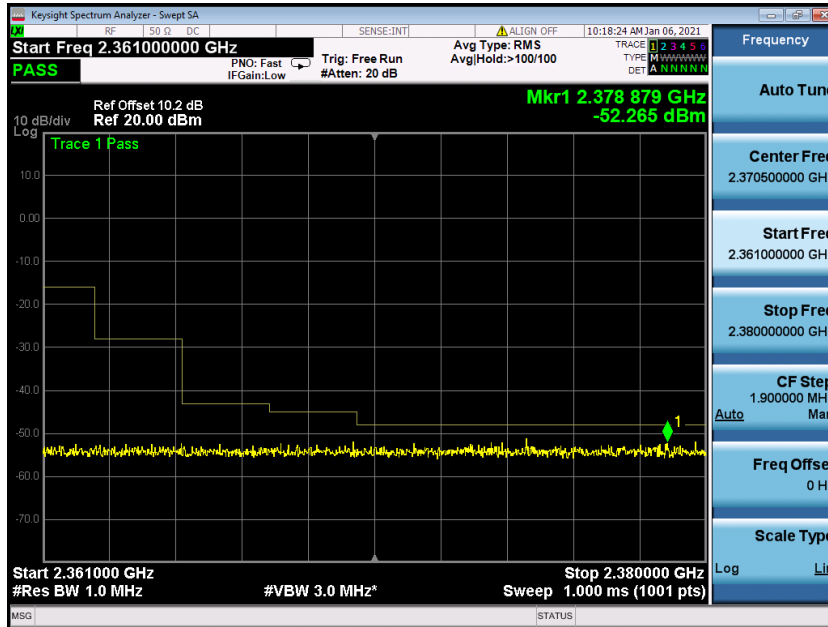


DL_1S_T_AWGN_Pre-AGC_Spurious emission 2

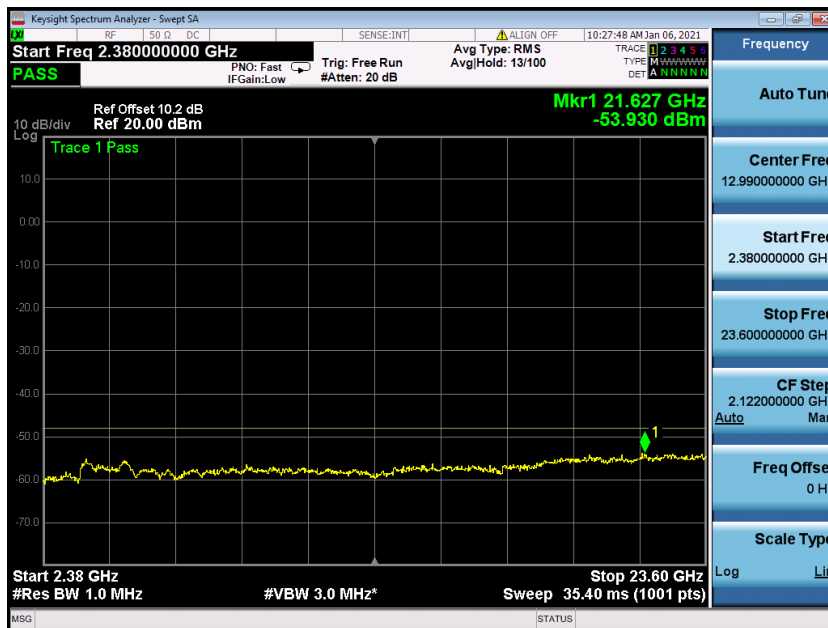


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DL_1S_T_AWGN_Pre-AGC_Spurious emission 3



DL_1S_T_AWGN_Pre-AGC_Spurious emission 4



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4.6 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	2355.02242	-0.42	PASS
40		2355.02121	-0.94	PASS
30		2355.02434	0.39	PASS
20		2355.02342	Reference	PASS
10		2355.02123	-0.92	PASS
0		2355.02442	0.42	PASS
-10		2355.02364	0.09	PASS
-20		2355.02345	0.01	PASS
-30		2355.02121	-0.94	PASS

Frequency stability vs voltage				
Voltage (V)	Test Conf.	Test data (MHz)	Tolerance (ppm)	Verdict
DC 40.8	DL_1S_M_AWGN	2355.02461	0.03	PASS
DC 48		2355.02453	Reference	PASS
DC 55.2		2355.02333	-0.51	PASS



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4.7 Radiated spurious emissions

Note(1): The tested max conducted power for single antenna port is 18.22dBm, the 2x2 MIMO total power is 18.22dBm+18.22dBm= 0.1327W, the power of any emission outside a licensee's frequency band(s) shall be attenuated below the transmitter power (P) in watts

(i)

By a factor of not less than $43 + 10 \log (P)$ dB on all frequencies between 2305 and 2320 MHz and on all frequencies between 2345 and 2360 MHz that are outside the licensed band(s) of operation.

Here,

$$P=18.22\text{dBm}= 0.0664\text{W}.$$

So the limit =

$$P(\text{dBm})- [43 + 10 \log (0.0664\text{W})] =-13\text{dBm}$$

By a factor of not less than $75 + 10 \log (P)$ dB on all frequencies between 2320 and 2345 MHz

Here,

$$P=18.22\text{dBm}= 0.0664\text{W}.$$

So the limit =

$$P(\text{dBm})- [75 + 10 \log (0.0664\text{W})] =-45\text{dBm}$$

(ii)

By a factor of not less than $43 + 10 \log (P)$ dB on all frequencies between 2300 and 2305 MHz

Here,

$$P=18.22\text{dBm}= 0.0664\text{W}.$$

So the limit =

$$P(\text{dBm})- [43 + 10 \log (0.0664\text{W})] =-13\text{dBm}$$



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By a factor of not less than $70 + 10 \log (P)$ dB on all frequencies between 2287.5 and 2300 MHz

Here,

$$P=18.22\text{dBm}= 0.0664\text{W}.$$

So the limit =

$$P(\text{dBm})- [70 + 10 \log (0.0664\text{W})] =-40\text{dBm}$$

By a factor of not less than $72 + 10 \log (P)$ dB on all frequencies between 2285 and 2287.5 MHz

Here,

$$P=18.22\text{dBm}= 0.0664\text{W}.$$

So the limit =

$$P(\text{dBm})- [72 + 10 \log (0.0664\text{W})] =-42\text{dBm}$$

By a factor of not less than $75 + 10 \log (P)$ dB below 2285 MHz

Here,

$$P=18.22\text{dBm}= 0.0664\text{W}.$$

So the limit =

$$P(\text{dBm})- [75 + 10 \log (0.0664\text{W})] =-45\text{dBm}$$

(iii)

By a factor of not less than $43 + 10 \log (P)$ dB on all frequencies between 2360 and 2362.5 MHz

Here,

$$P=18.22\text{dBm}= 0.0664\text{W}.$$

So the limit =

$$P(\text{dBm})- [43 + 10 \log (0.0664\text{W})] =-13\text{dBm}$$



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By a factor of not less than $55 + 10 \log (P)$ dB on all frequencies between 2362.5 and 2365 MHz

Here,

$$P=18.22\text{dBm}=0.0664\text{W}.$$

So the limit =

$$P(\text{dBm})- [55 + 10 \log (0.0664\text{W})] = -25\text{dBm}$$

By a factor of not less than $70 + 10 \log (P)$ dB on all frequencies between 2365 and 2367.5 MHz

Here,

$$P=18.22\text{dBm}=0.0664\text{W}.$$

So the limit =

$$P(\text{dBm})- [70 + 10 \log (0.0664\text{W})] = -40\text{dBm}$$

By a factor of not less than $72 + 10 \log (P)$ dB on all frequencies between 2367.5 and 2370 MHz

Here,

$$P=18.22\text{dBm}=0.0664\text{W}.$$

So the limit =

$$P(\text{dBm})- [72 + 10 \log (0.0664\text{W})] = -42\text{dBm}$$

By a factor of not less than $75 + 10 \log (P)$ dB above 2370 MHz

Here,

$$P=18.22\text{dBm}=0.0664\text{W}.$$

So the limit =

$$P(\text{dBm})- [75 + 10 \log (0.0664\text{W})] = -45\text{dBm}$$



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Note (2):

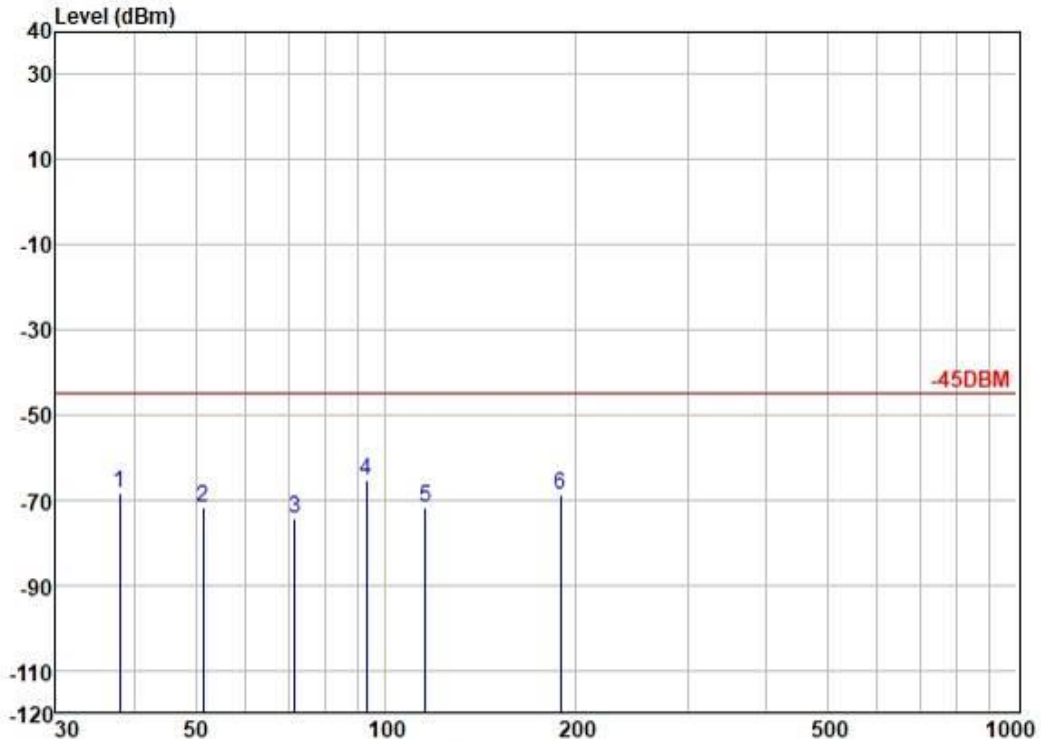
- (1) : The radiated test performed at bottom / middle / top channel, only the worst-case middle channel test data was recorded in the report.
- (2) : The disturbance 9kHz to 30MHz was very low and 20dB below the limit, therefore, the data was not recorded in the report.
- (3) : The strictest limit -45dbm was used for evaluate the emission from 9kHz~18GHz.



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DL_1S_M_AWGN_Horizontal_30MHz~1GHz

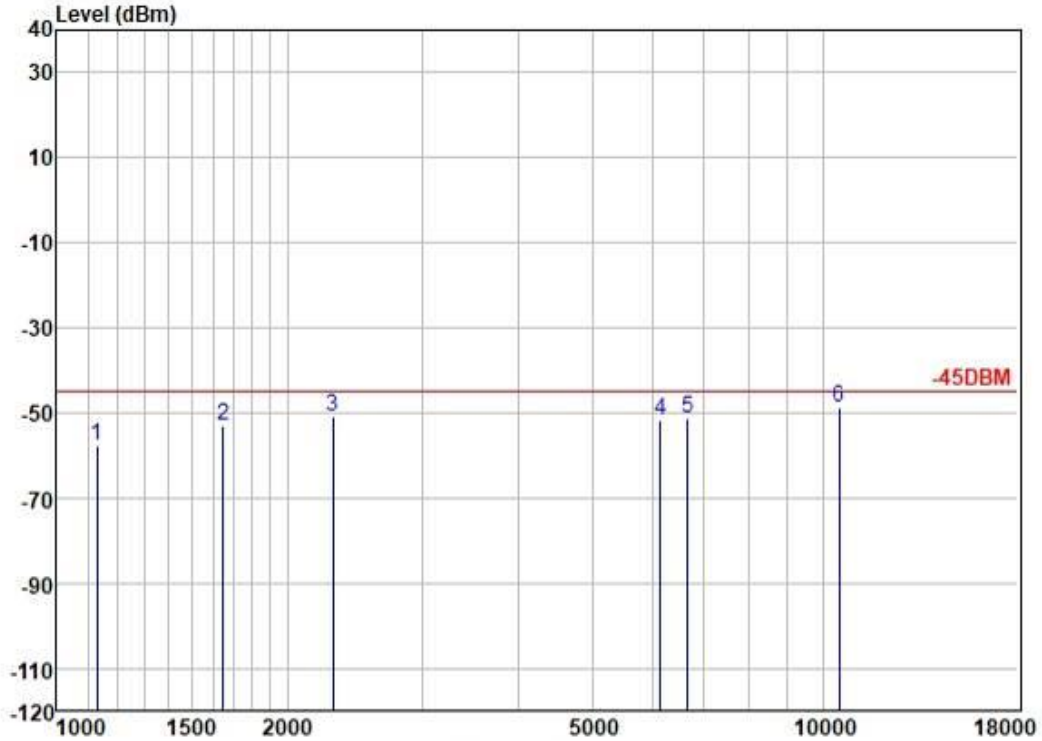


Freq. (MHz)	Level (dBm)	Limit (dBm)	Over Limit (dB)	Polarization	Verdict
37.812	-68.55	-45	-23.55	Horizontal	PASS
51.301	-71.85	-45	-26.85	Horizontal	PASS
71.863	-74.22	-45	-29.22	Horizontal	PASS
93.113	-65.19	-45	-20.19	Horizontal	PASS
115.321	-71.62	-45	-26.62	Horizontal	PASS
189.074	-69.01	-45	-24.01	Horizontal	PASS



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DL_1S_M_AWGN_Horizontal_above 1GHz



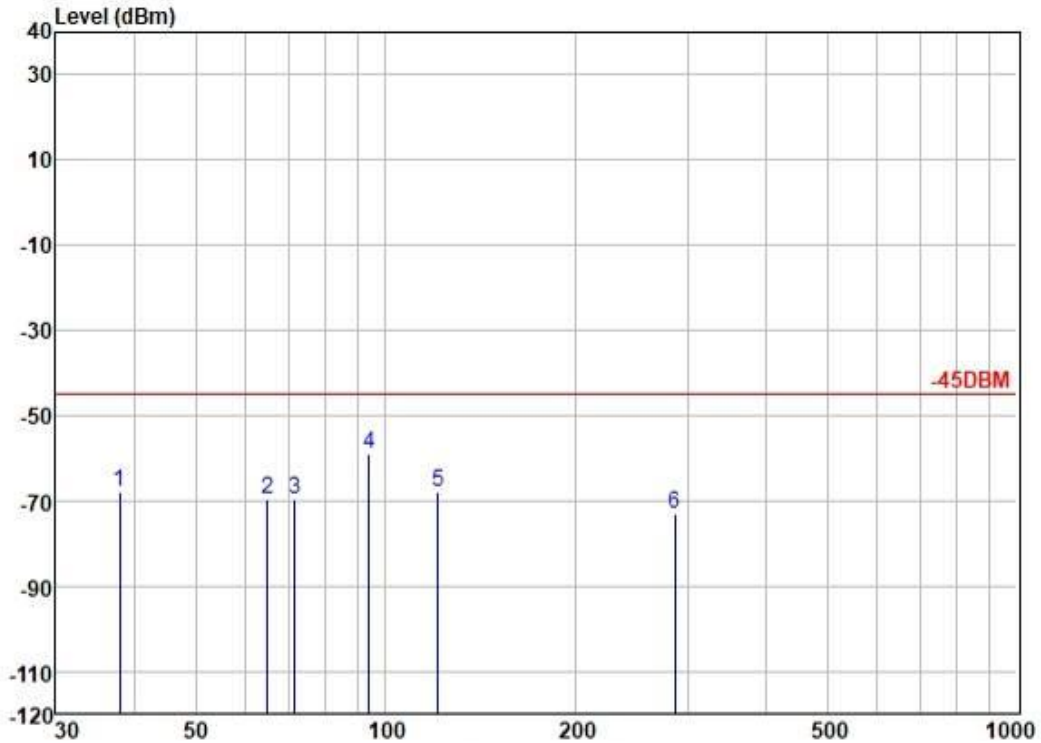
Freq. (MHz)	Level (dBm)	Limit (dBm)	Over Limit (dB)	Polarization	Verdict
1129.072	-57.84	-45	-12.84	Horizontal	PASS
1648.778	-52.85	-45	-7.85	Horizontal	PASS
2292.257	-50.70	-45	-5.7	Horizontal	PASS
6142.019	-51.77	-45	-6.77	Horizontal	PASS
6659.763	-51.10	-45	-6.1	Horizontal	PASS
10514.327	-48.62	-45	-3.62	Horizontal	PASS



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DL_1S_M_AWGN_Vertical_30MHz~1GHz



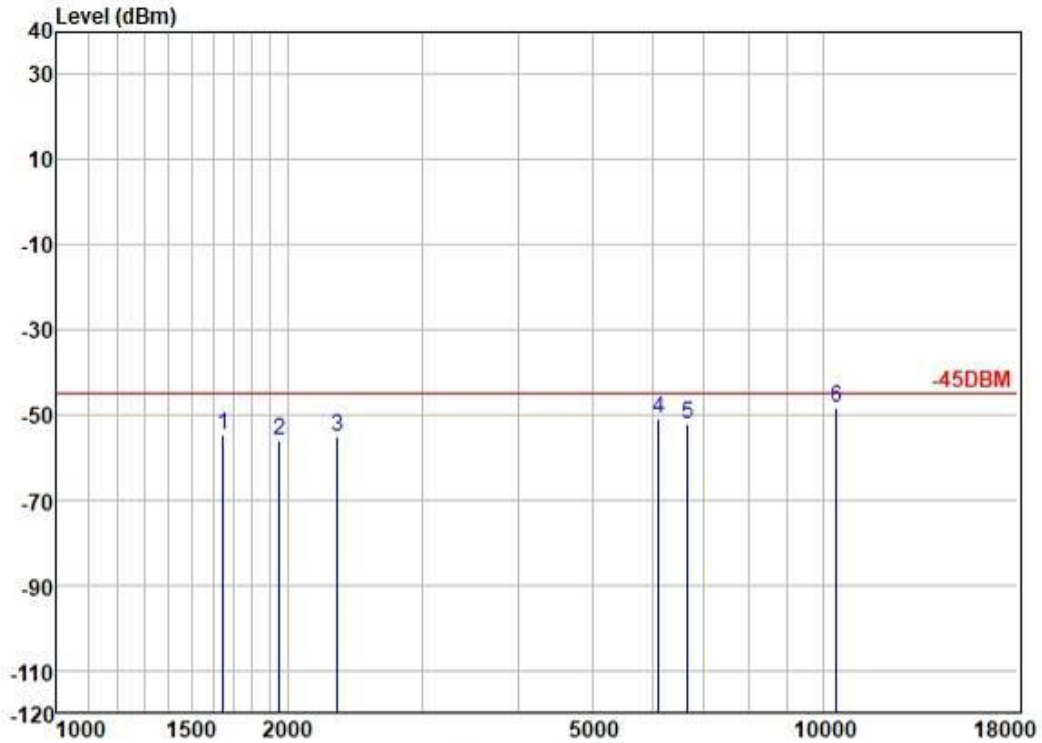
Freq. (MHz)	Level (dBm)	Limit (dBm)	Over Limit (dB)	Polarization	Verdict
37.812	-68.01	-45	-23.01	Vertical	PASS
64.887	-69.48	-45	-24.48	Vertical	PASS
71.832	-69.78	-45	-24.78	Vertical	PASS
94.098	-59.02	-45	-14.02	Vertical	PASS
121.462	-67.79	-45	-22.79	Vertical	PASS
286.982	-71.94	-45	-26.94	Vertical	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	-54.66	-45	-9.66	Vertical	PASS
1955.344	-56.17	-45	-11.17	Vertical	PASS
2325.634	-55.09	-45	-10.09	Vertical	PASS
6106.616	-50.67	-45	-5.67	Vertical	PASS
6659.763	-52.03	-45	-7.03	Vertical	PASS
10432.800	-48.31	-45	-3.31	Vertical	PASS



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5 BRS/EBS (2496-2690MHz unpaired)

5.1 AGC threshold level

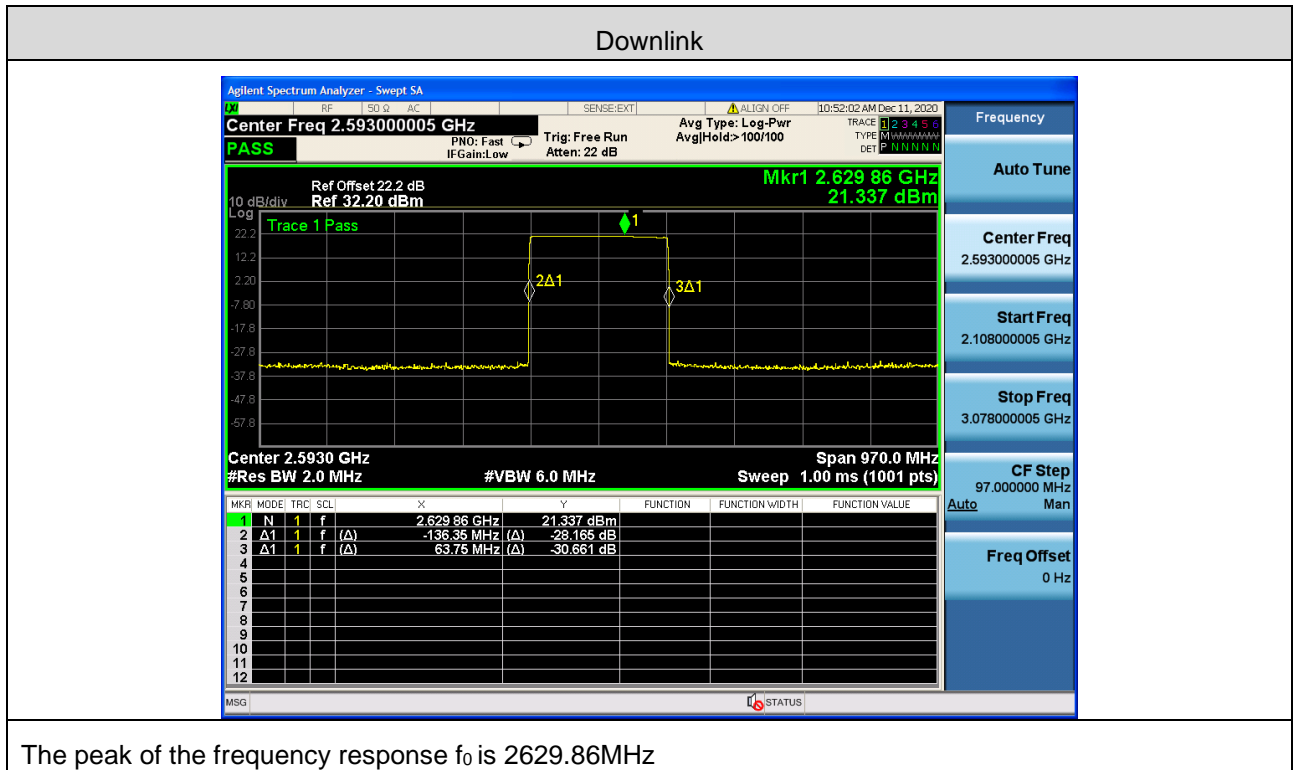
Test Conf.	AGC Threshold level
DL_1S_M_AWGN	0.08dBm
DL_1S_M_GSM	0.00dBm



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5.2 Out-of-band rejection



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Guangzhou Branch Calibration 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

5.3 Input-versus-output signal comparison

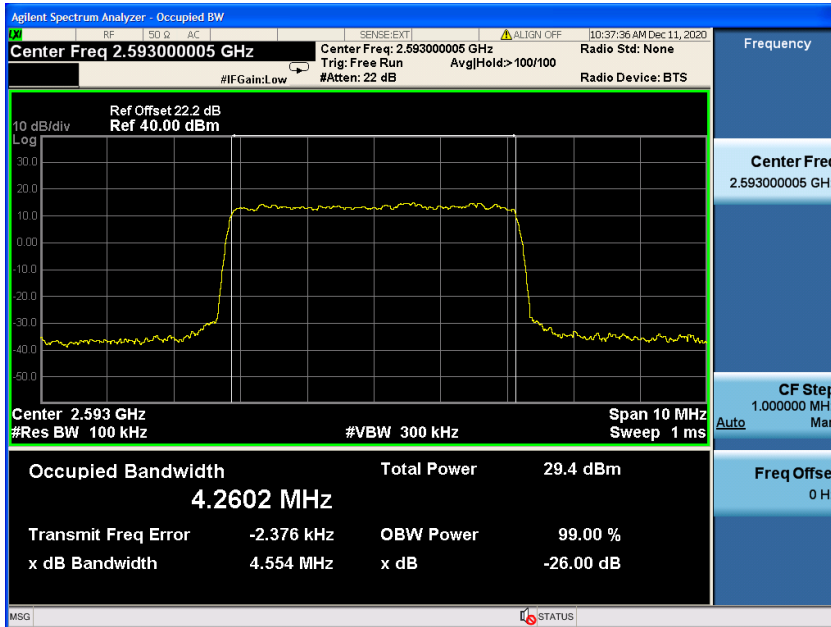


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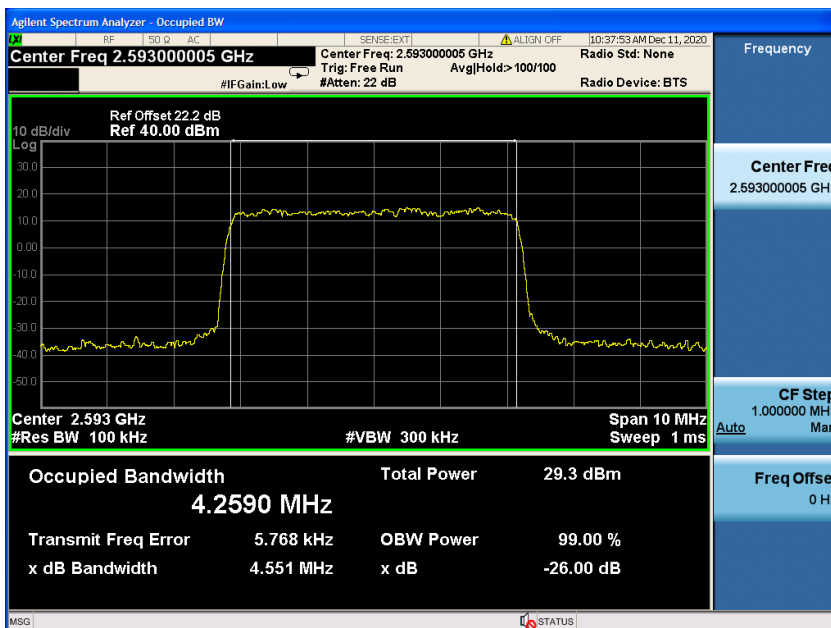
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Output_DL_1S_M_AWGN_Pre-AGC_26dB Bandwidth & 99% OBW



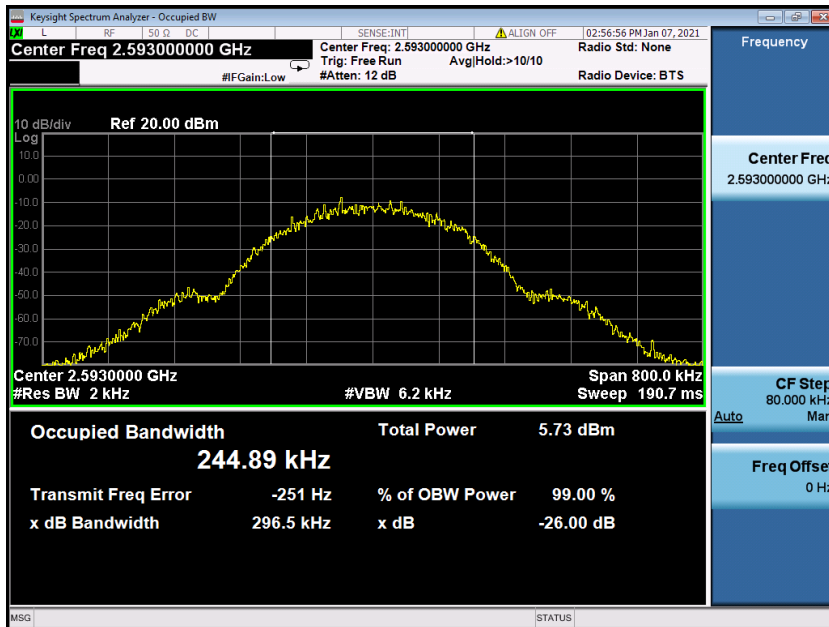
Output_DL_1S_M_AWGN_AGC+3dB_26dB Bandwidth & 99% OBW



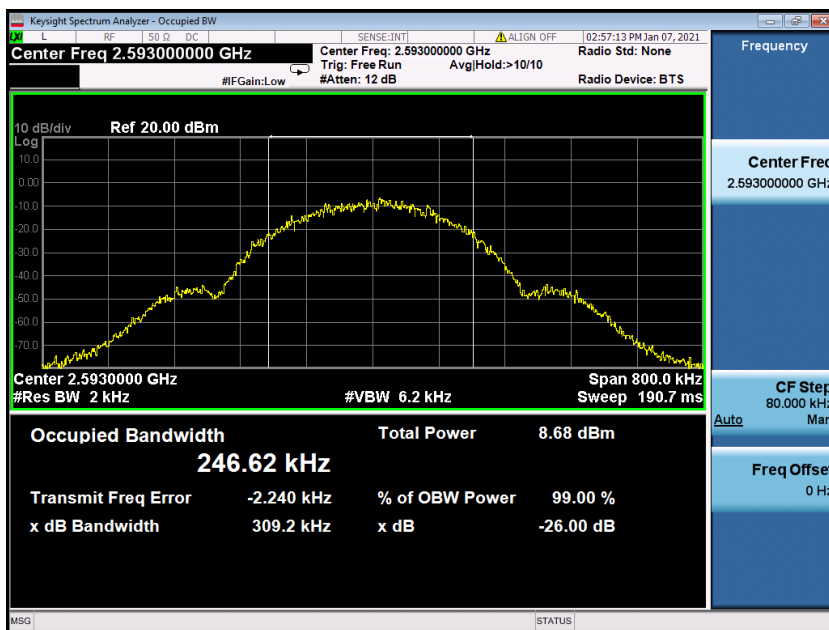
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Input_DL_1S_M_GSM_Pre-AGC_26dB Bandwidth & 99% OBW



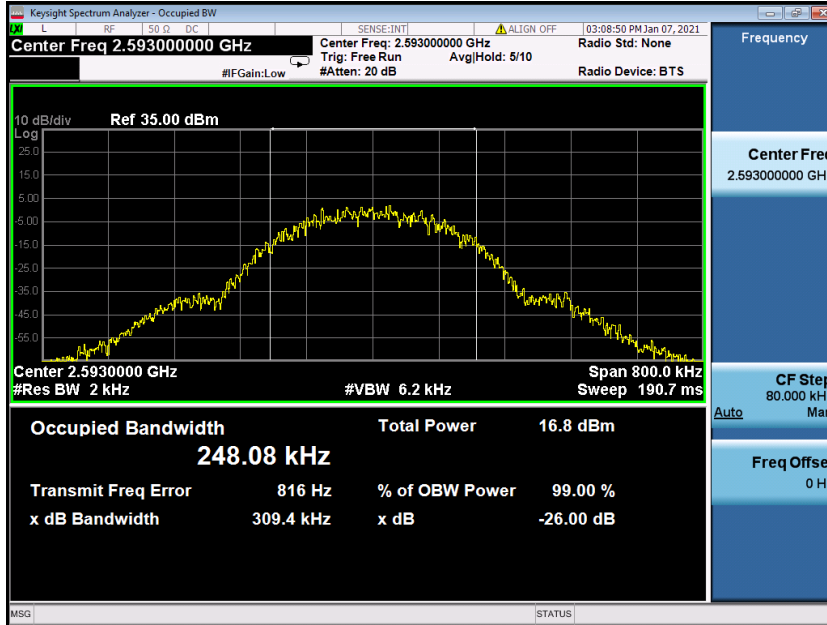
Input_DL_1S_M_GSM_AGC+3dB_26dB Bandwidth & 99% OBW



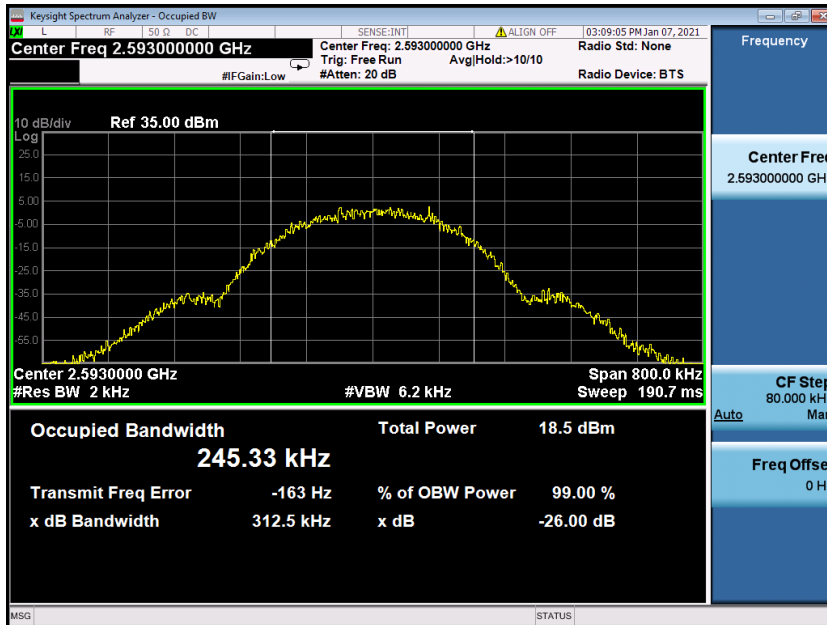
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Output_DL_1S_M_GSM_Pre-AGC_26dB Bandwidth & 99% OBW



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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5.4 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	2629.86	Pre-AGC	-0.10	20.24	20.34	PASS
		AGC+3dB	2.90	20.20	/	PASS
DL_1S_GSM	2629.86	Pre-AGC	-0.10	20.21	20.31	PASS
		AGC+3dB	2.90	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 (20.24dBm+20.24dBm) +15.5dBi=38.75dBm (7.500W) which don't exceed the required EIRP limit (1993W)



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

Note: 1. The tested max conducted power for single antenna port is 20.24dBm, 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,

$$P=20.35\text{dBm}=0.1057\text{W}.$$

So the limit =

$$P(\text{dBm})-[43 + 10 \log(0.1057\text{W})] = -13\text{dBm}$$

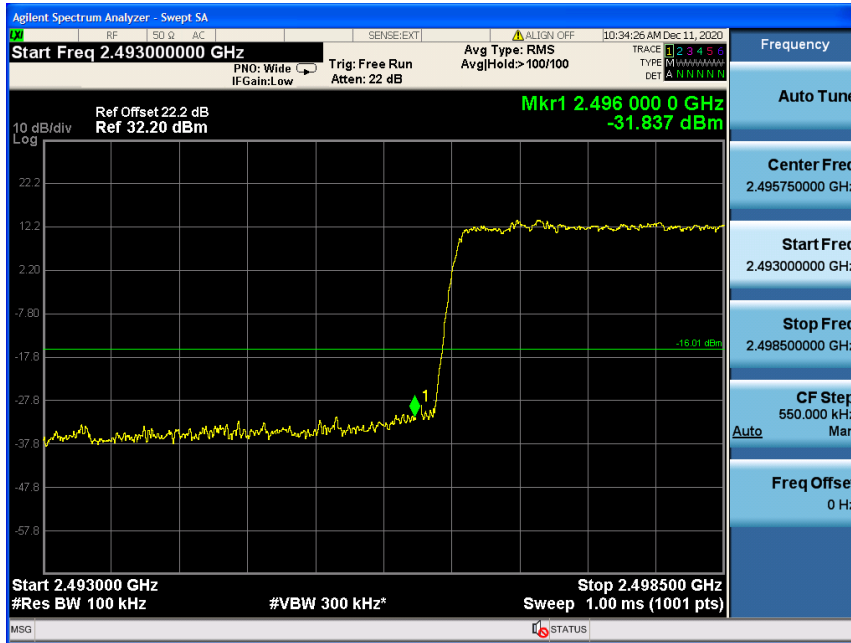
The EUT supports 2x2 MIMO and the emissions were measured at one of output port, so the limit line was set to -16.01dBm in following test plots in order to determine the test result conveniently.

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.

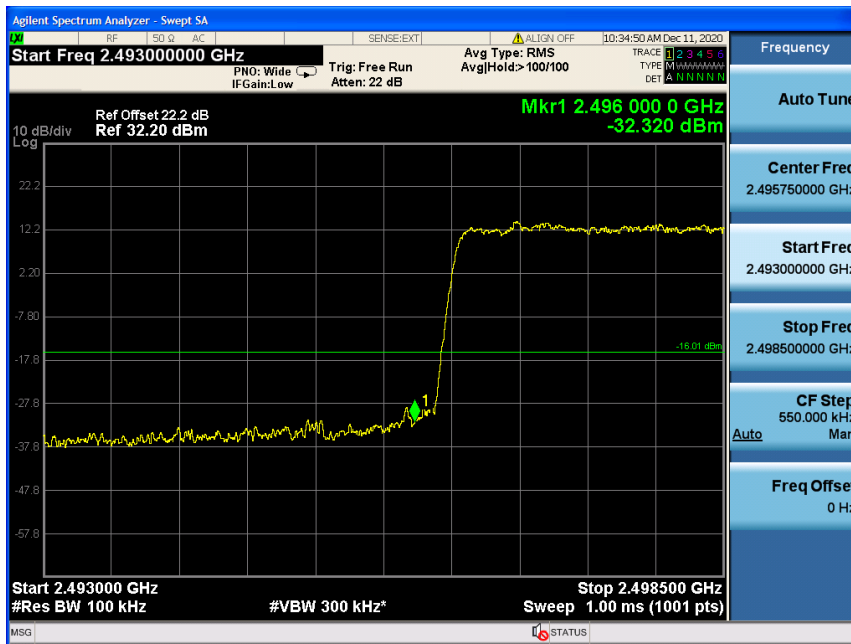


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DL_1S_B_AWGN_Pre-AGC_Out-of-band emission

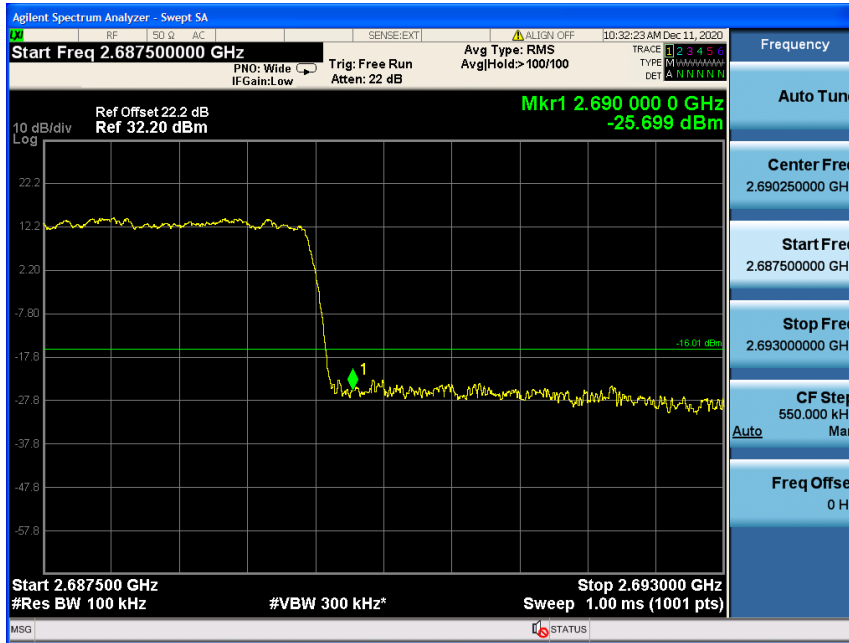


DL_1S_B_AWGN_AGC+3_Out-of-band emission

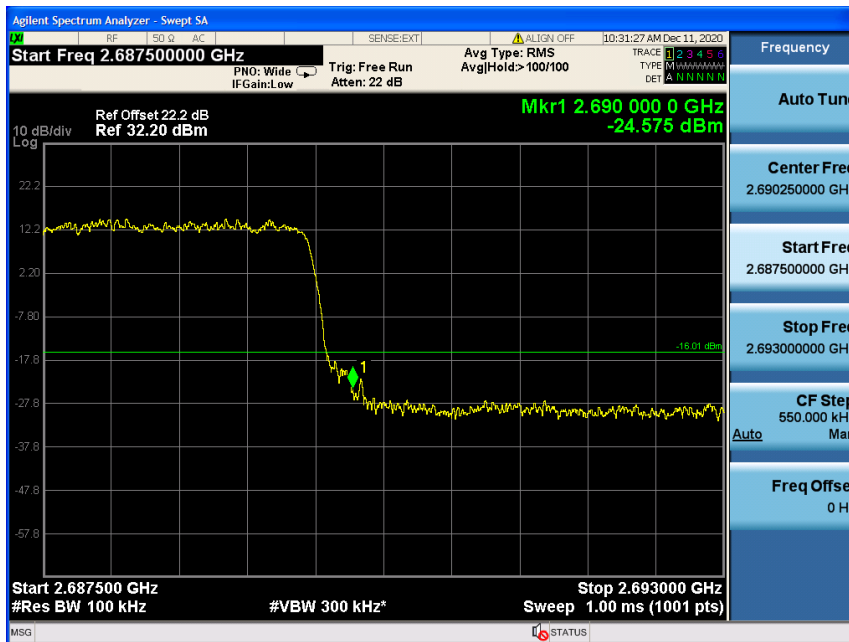


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DL_1S_T_AWGN_Pre-AGC_Out-of-band emission

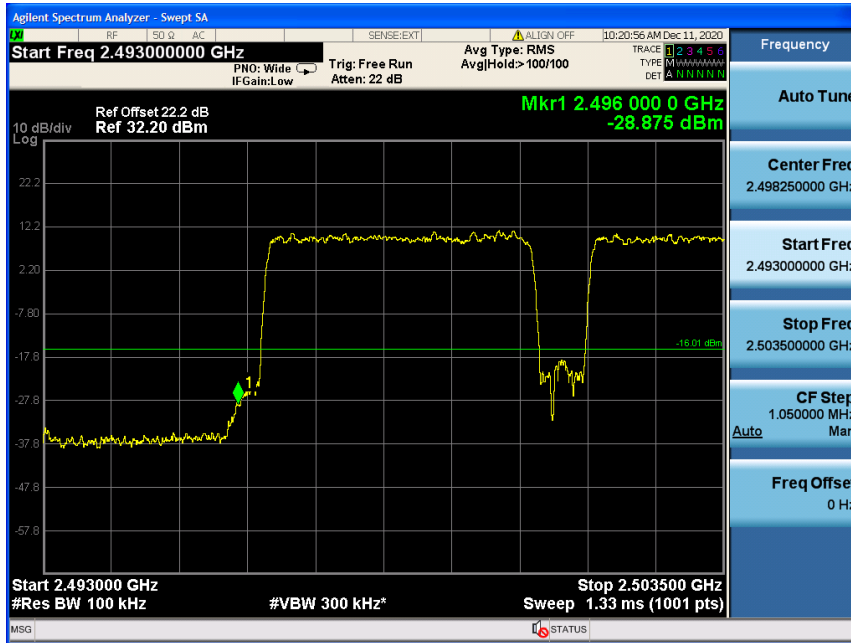


DL_1S_T_AWGN_AGC+3_Out-of-band emission

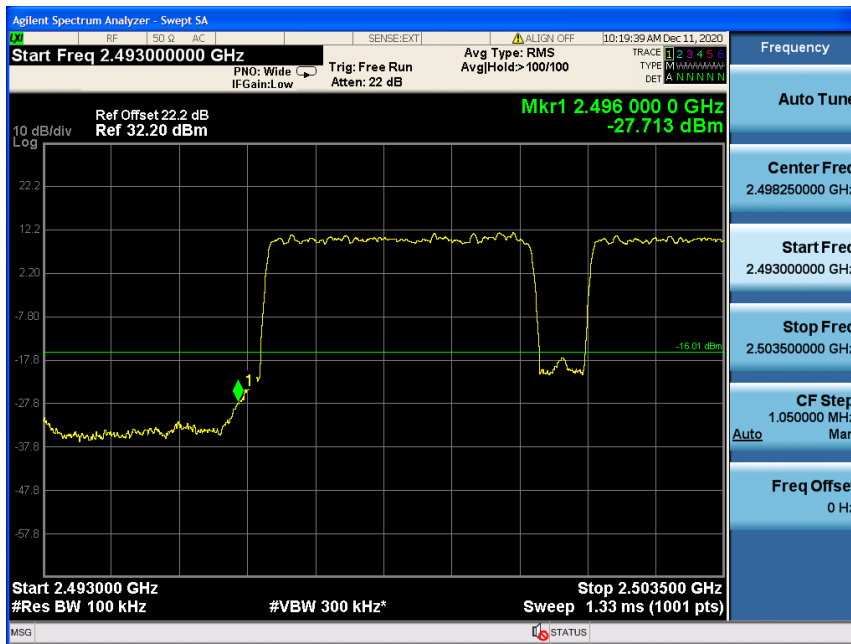


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DL_2S_B_AWGN_Pre-AGC_Out-of-band emission

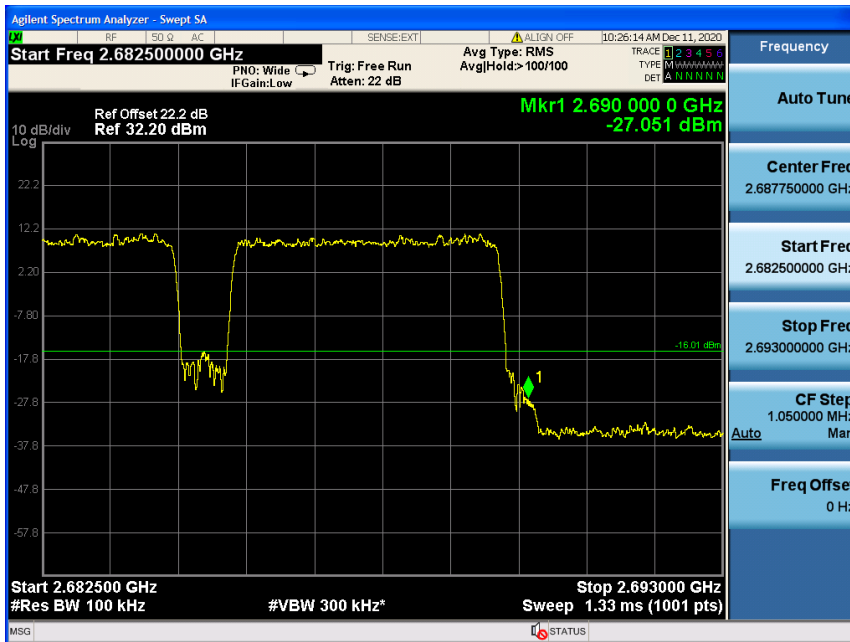


DL_2S_B_AWGN_AGC+3_Out-of-band emission

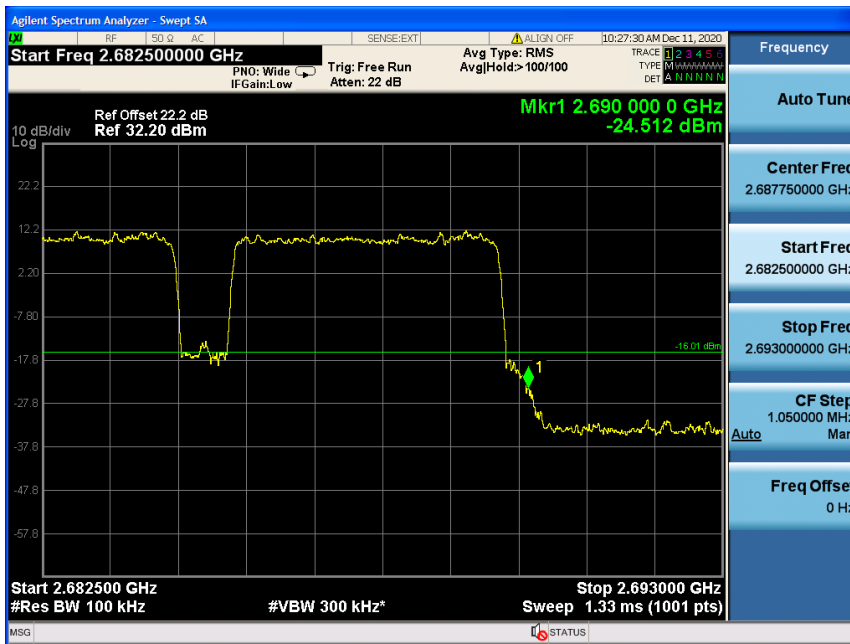


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DL_2S_T_AWGN_Pre-AGC_Out-of-band emission

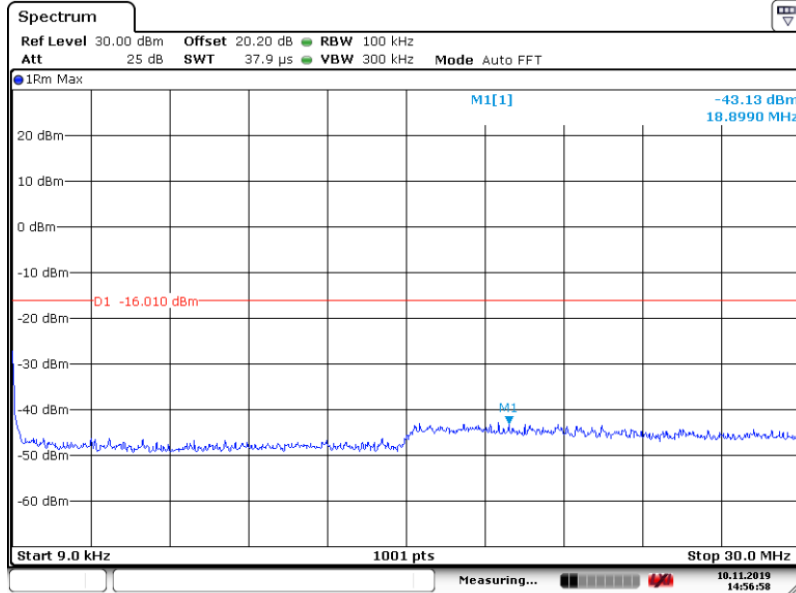


DL_2S_AWGN_T_AGC+3_Out-of-band emission

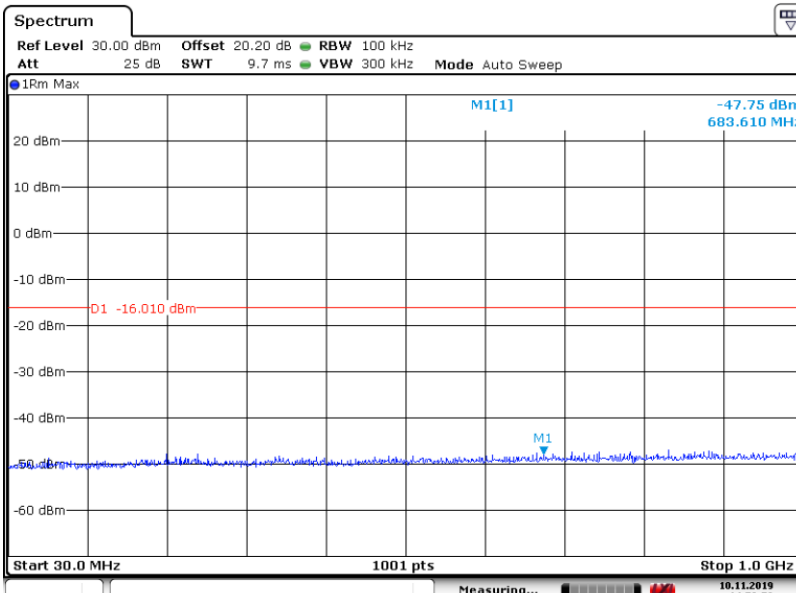


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DL_1S_B_AWGN_Pre-AGC_Spurious emission 1



DL_1S_B_AWGN_Pre-AGC_Spurious emission 2

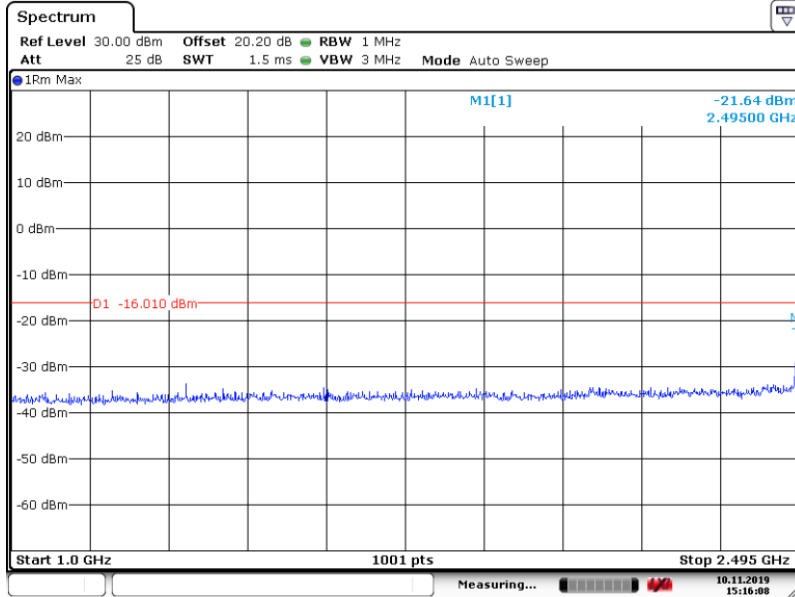


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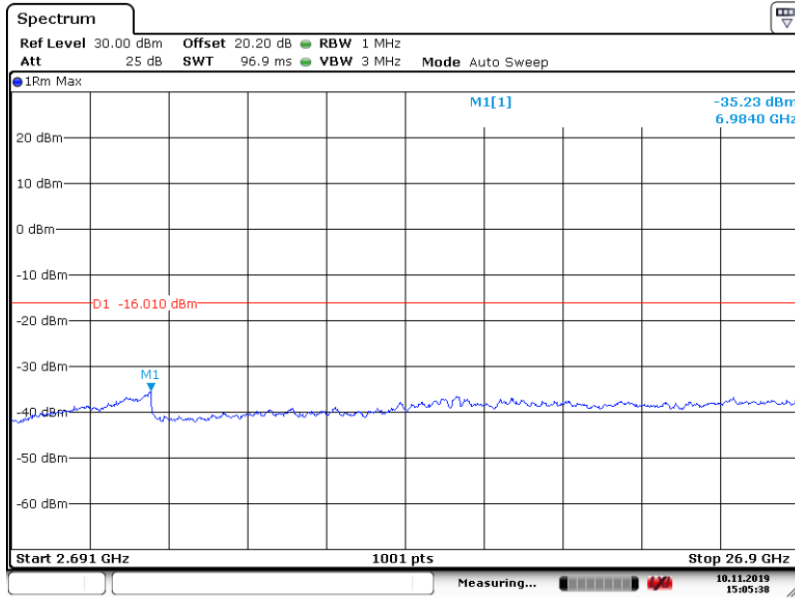
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DL_1S_B_AWGN_Pre-AGC_Spurious emission 3



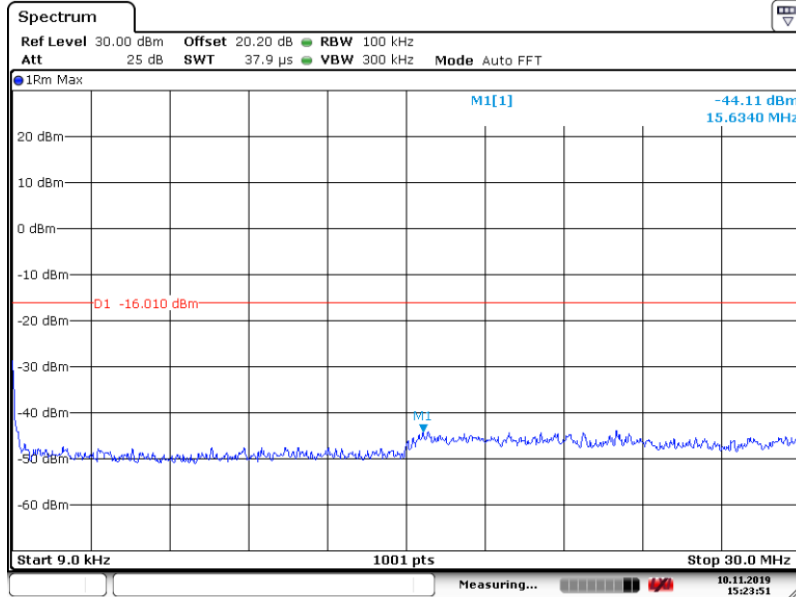
DL_1S_B_AWGN_Pre-AGC_Spurious emission 4



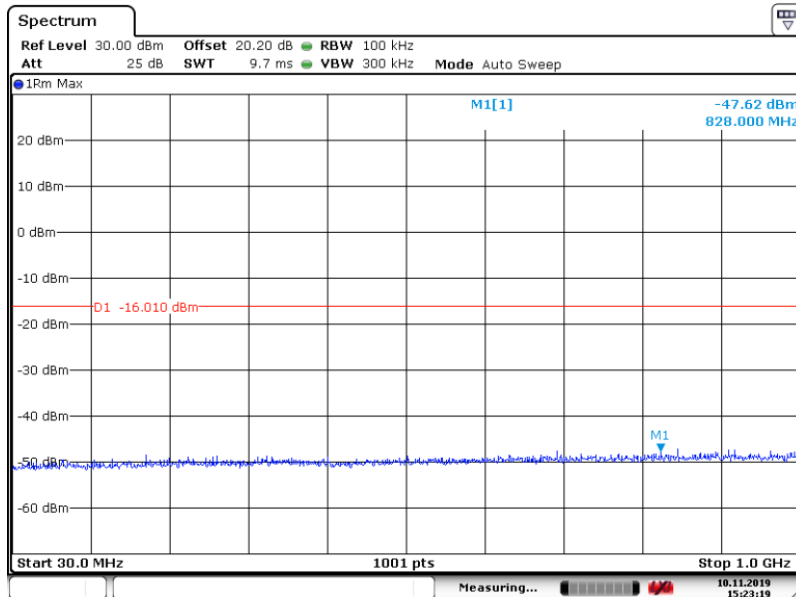
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DL_1S_M_AWGN_Pre-AGC_Spurious emission 1



DL_1S_M_AWGN_Pre-AGC_Spurious emission 2

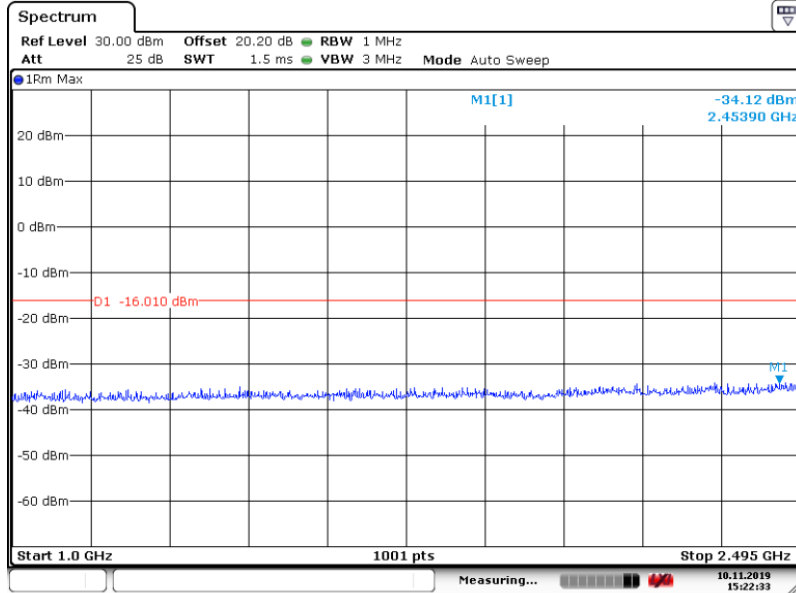


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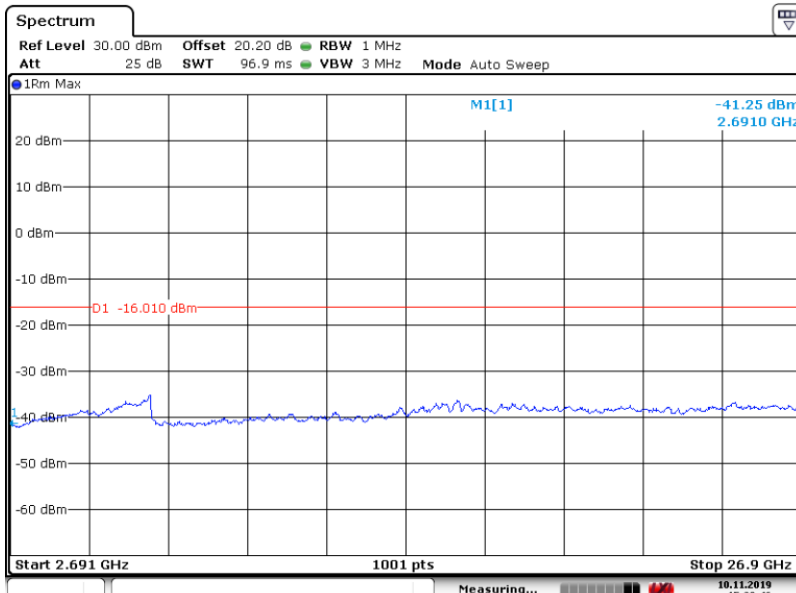
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DL_1S_M_AWGN_Pre-AGC_Spurious emission 3



DL_1S_M_AWGN_Pre-AGC_Spurious emission 4

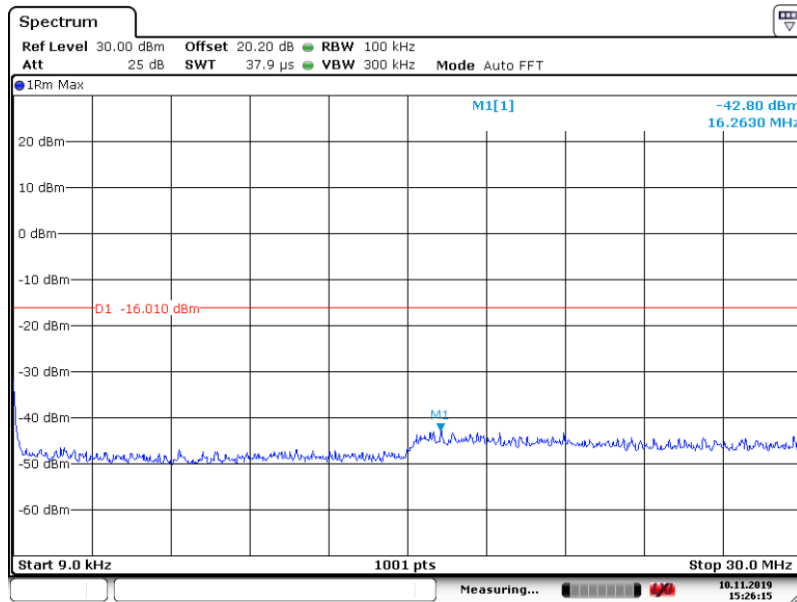


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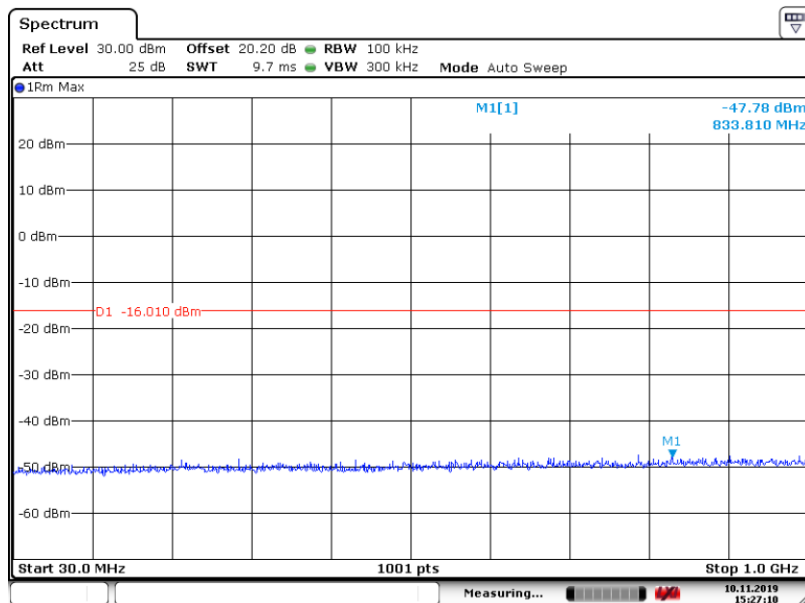
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DL_1S_T_AWGN_Pre-AGC_Spurious emission 1

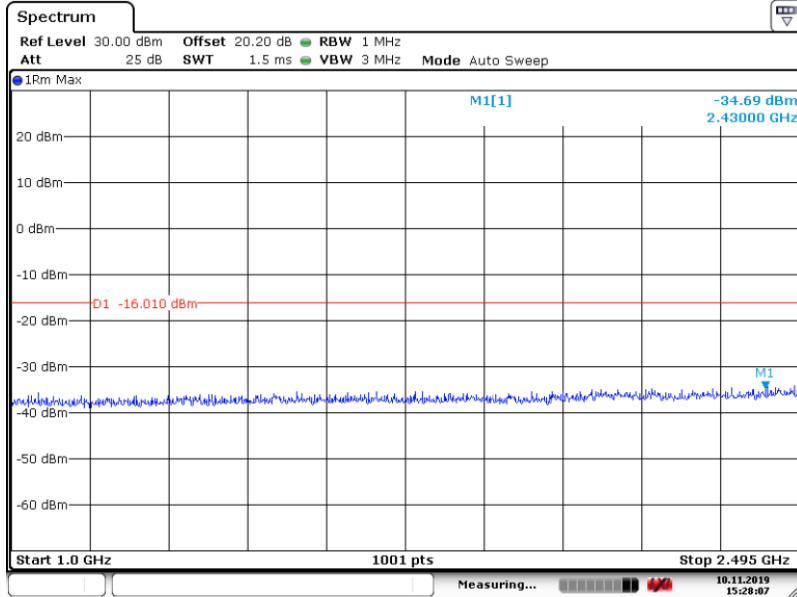


DL_1S_T_AWGN_Pre-AGC_Spurious emission 2

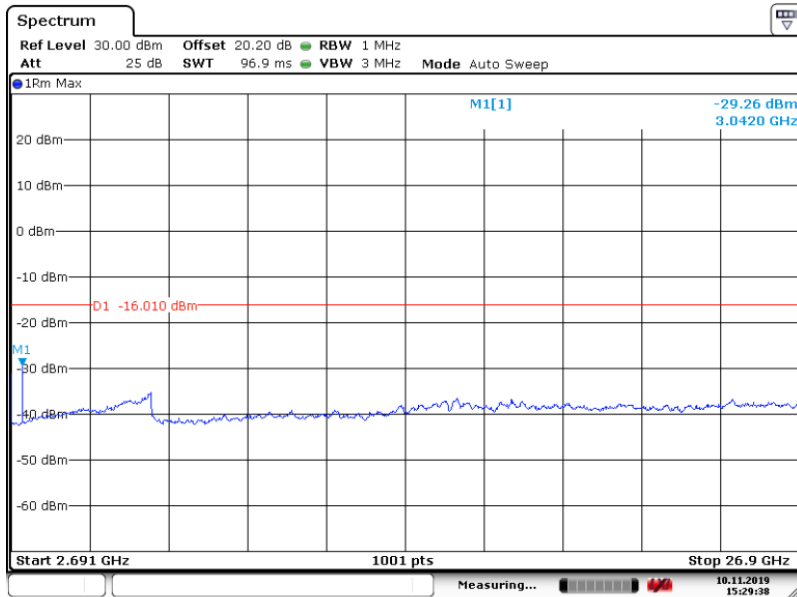


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DL_1S_T_AWGN_Pre-AGC_Spurious emission 3



DL_1S_T_AWGN_Pre-AGC_Spurious emission 4



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5.6 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	2593.001302	-0.02	PASS
40		2593.001412	0.02	PASS
30		2593.001311	-0.02	PASS
20		2593.001352	Reference	PASS
10		2593.001398	0.02	PASS
0		2593.001418	0.03	PASS
-10		2593.001431	0.03	PASS
-20		2593.001399	0.01	PASS
-30		2593.001428	0.03	PASS

Frequency stability vs voltage				
Voltage (V)	Test Conf.	Test data (MHz)	Tolerance (ppm)	Verdict
DC 40.8	DL_1S_M_AWGN	2593.001248	-0.04	PASS
DC 48		2593.001364	Reference	PASS
DC 55.2		2593.001417	0.02	PASS



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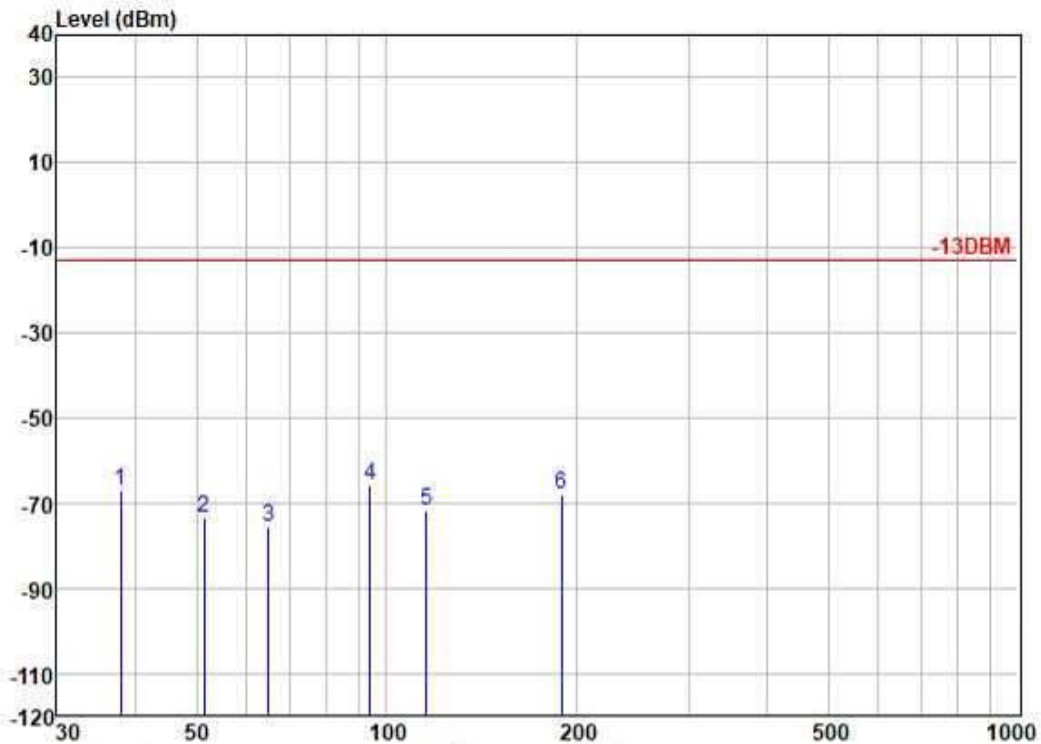
5.7 Radiated spurious emissions

- Note:
1. The tested max conducted power for single antenna port is 20.24dBm. the 2x2 MIMO total power is 20.24dBm+20.24dBm= 0.2114W.
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,
 $P=0.2114W$,
So the limit =
 $P(dBm)- [43 + 10 \log (0.2114W)] =-13dBm$
 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

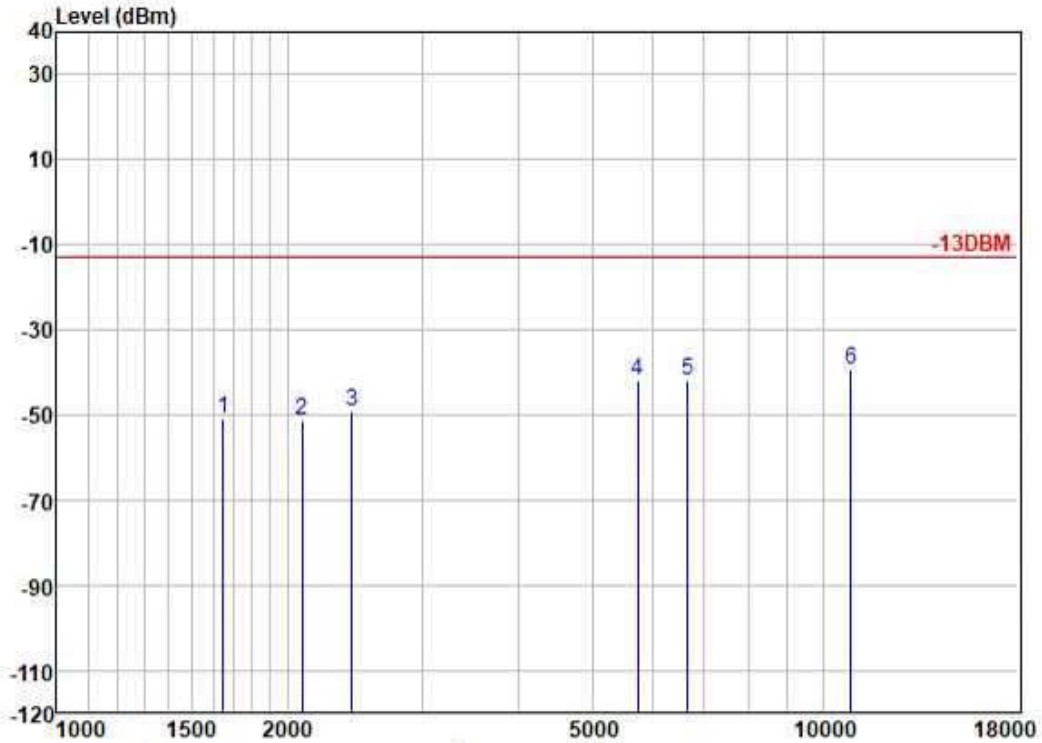


Freq. (MHz)	Level (dBm)	Limit (dBm)	Over Limit (dB)	Polarization	Verdict
37.812	-67.21	-13	-54.21	Horizontal	PASS
51.301	-73.41	-13	-60.41	Horizontal	PASS
64.887	-75.85	-13	-62.85	Horizontal	PASS
94.098	-65.79	-13	-52.79	Horizontal	PASS
115.321	-71.92	-13	-58.92	Horizontal	PASS
189.074	-67.88	-13	-54.88	Horizontal	PASS



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DL_1S_M_AWGN_Horizontal_above 1GHz

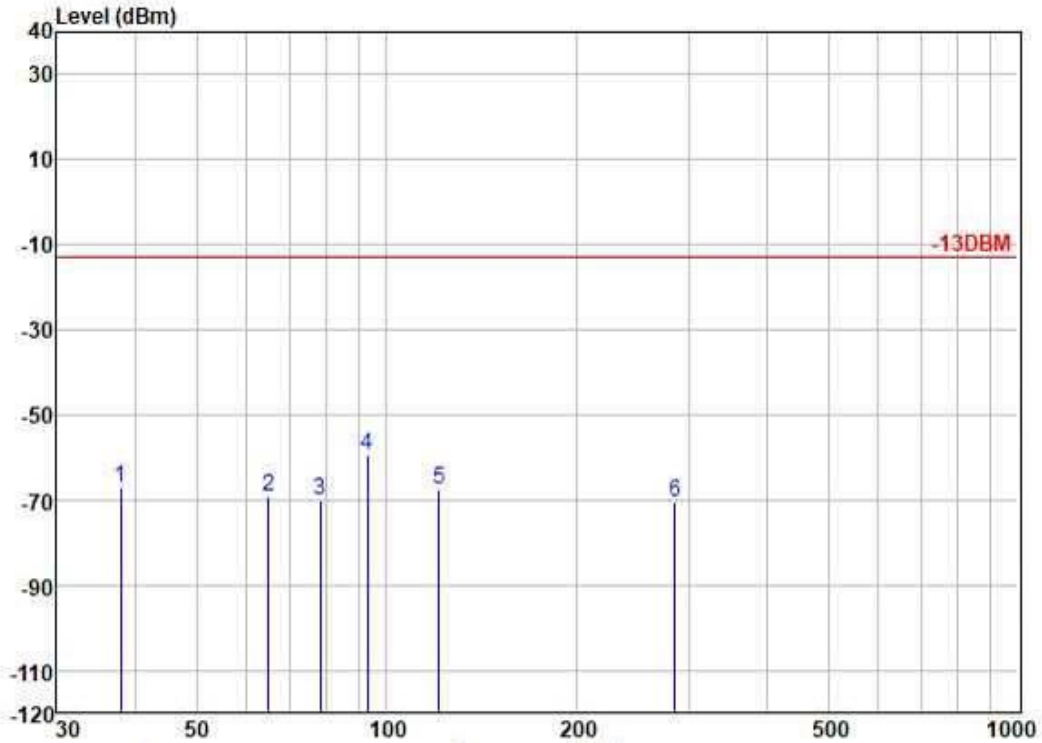


Freq. (MHz)	Level (dBm)	Limit (dBm)	Over Limit (dB)	Polarization	Verdict
1648.778	-50.96	-13	-37.96	Horizontal	PASS
2089.751	-51.20	-13	-38.2	Horizontal	PASS
2428.671	-49.35	-13	-36.35	Horizontal	PASS
5730.396	-41.72	-13	-28.72	Horizontal	PASS
6659.763	-41.75	-13	-28.75	Horizontal	PASS
10885.670	-39.22	-13	-26.22	Horizontal	PASS



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DL_1S_M_AWGN_Vertical_30MHz~1GHz



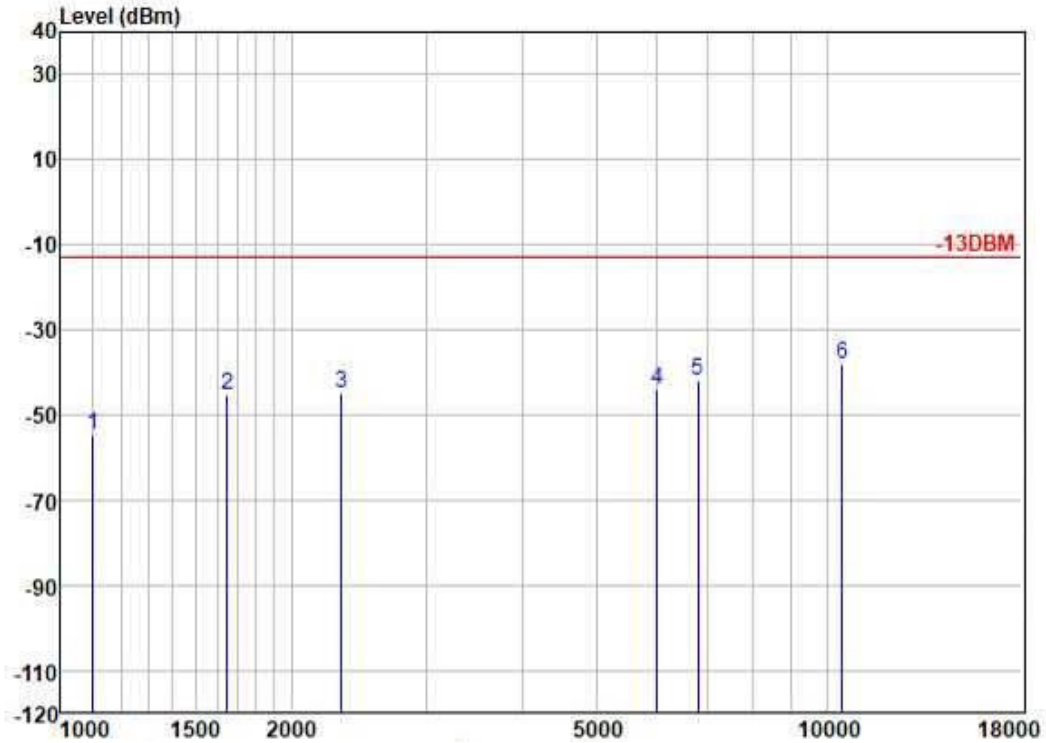
Freq. (MHz)	Level (dBm)	Limit (dBm)	Over Limit (dB)	Polarization	Verdict
37.815	-67.00	-13	-54	Vertical	PASS
64.887	-69.27	-13	-56.27	Vertical	PASS
78.413	-70.23	-13	-57.23	Vertical	PASS
93.113	-59.36	-13	-46.36	Vertical	PASS
121.213	-67.34	-13	-54.34	Vertical	PASS
285.978	-70.71	-13	-57.71	Vertical	PASS



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DL_1S_M_AWGN_Vertical_above 1GHz



Freq. (MHz)	Level (dBm)	Limit (dBm)	Over Limit (dB)	Polarization	Verdict
1100.079	-54.61	-13	-41.61	Vertical	PASS
1648.778	-45.49	-13	-32.49	Vertical	PASS
2325.624	-44.79	-13	-31.79	Vertical	PASS
6001.626	-43.95	-13	-30.95	Vertical	PASS
6795.879	-41.71	-13	-28.71	Vertical	PASS
10484.230	-38.29	-13	-25.29	Vertical	PASS

--End of Appendix B--



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