Appendix -

Test Data and Result for report

GZCR230300022302

(Lower 700MHz band)

No.198 Kezhu Road, Scientech Park, Guangzhou Economic & Technology Development District, Guangzhou, China 510663 t (86–20) 82155555 f (86–20) 82075058 www.sgsgroup.com.cn
中国·广州·经济技术开发区科学城科珠路198号 邮编: 510663 t (86–20) 82155555 f (86–20) 82075058 sgs.china@sgs.com

1 Out-of-band rejection

Out-of-band rejection
Downlink

The peak of the frequency response f0 is 737.5MHz.The frequency point f0 with the highest power level fall in the CMRS band under test, EUT is compiled the 935210 D05 Indus Booster Basic Meas v01r04 Out-of-band rejection verification test requirement.

2 Input versus Output comparison

Occupied Bandwidth				
Test Path	Test Signal	Test Channel	Signal Level	Verdict
Downlink	5MHz AWGN	Middle Channel	Pre-AGC	PASS
			3dB above AGC	PASS
	100MHz AWGN	Middle Channel	Pre-AGC	PASS*
			3dB above AGC	PASS*
	GSM	Middle Channel	Pre-AGC	PASS
			3dB above AGC	PASS
Remark: *: The Lower 700M band supports maximum channel BW is 15MHz @ NR, so the output OBW was less than the input when 100MHz AWGN was as stimulus signal.				

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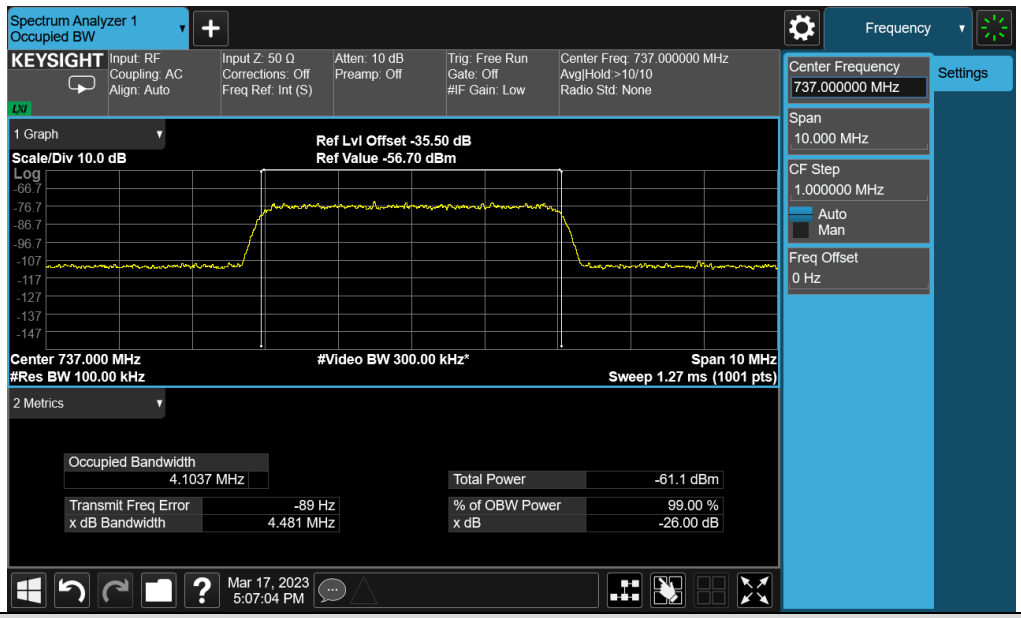
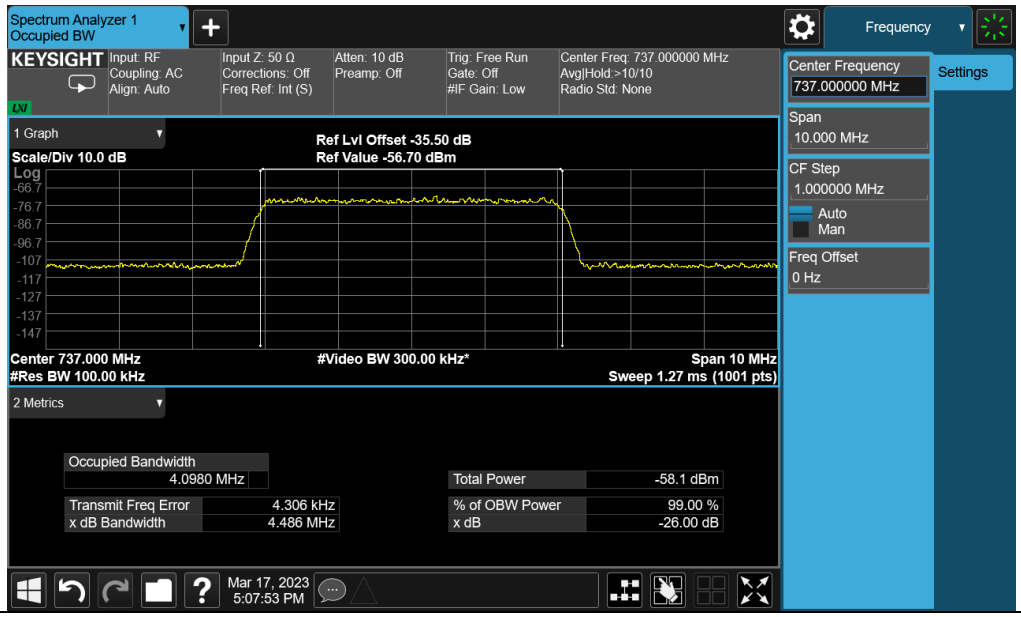
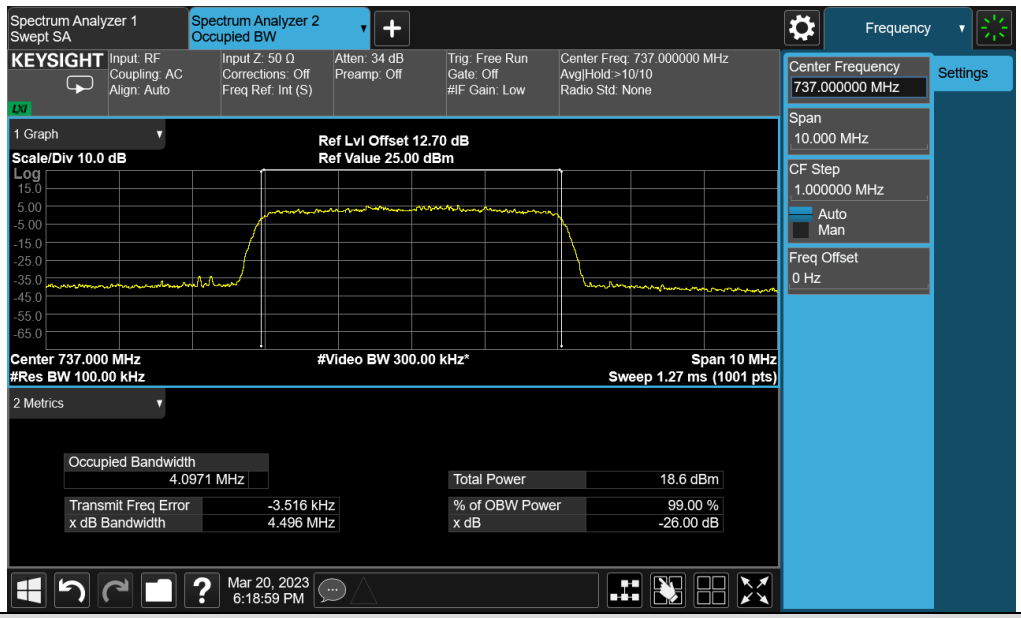
99% OBW
Downlink_5MHz AWGN_Middle Channel_Input pre-AGC



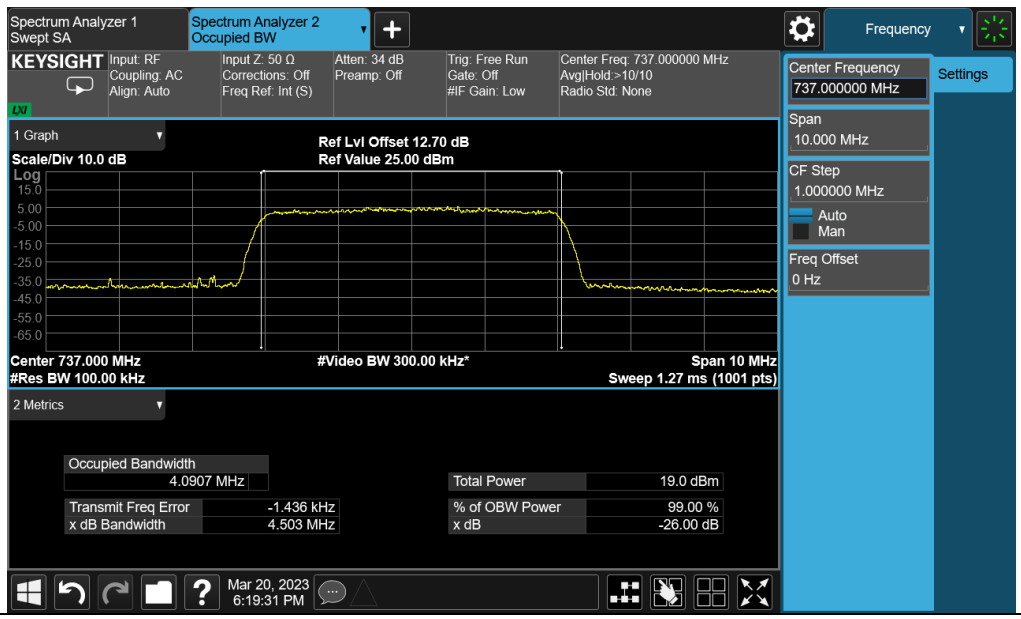
Downlink_5MHz AWGN_Middle Channel_Input 3dB above AGC



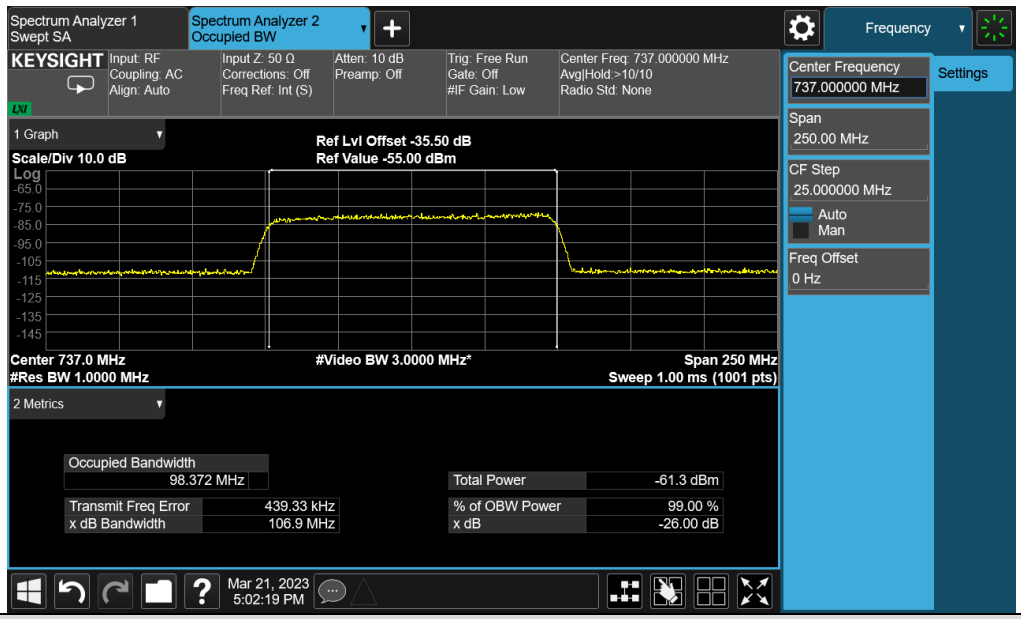
99% OBW
Downlink_5MHz AWGN_Middle Channel_Output pre-AGC



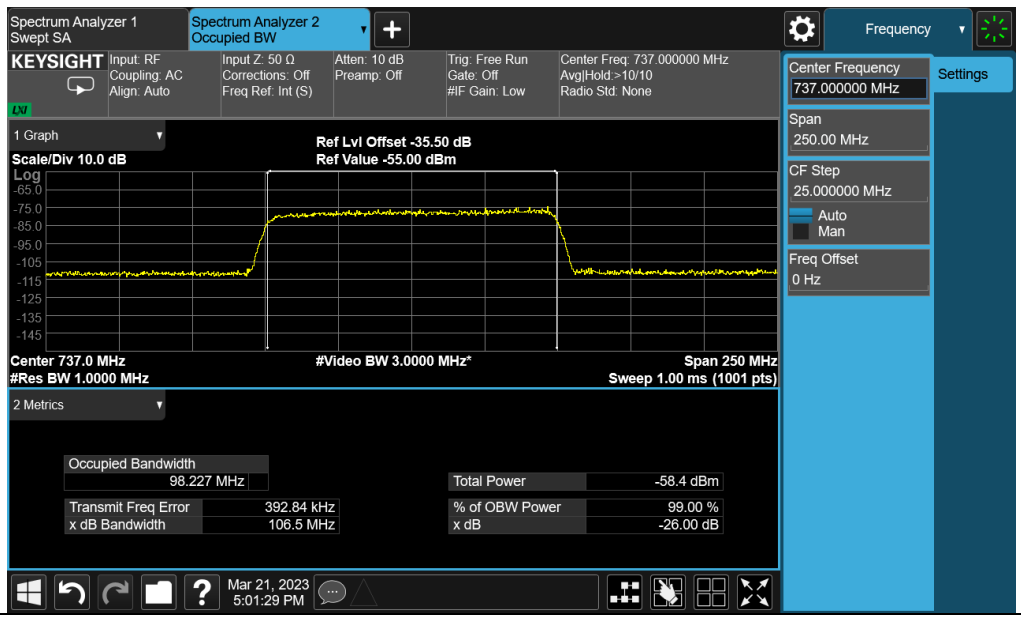
Downlink_5MHz AWGN_Middle Channel_Output 3dB above AGC



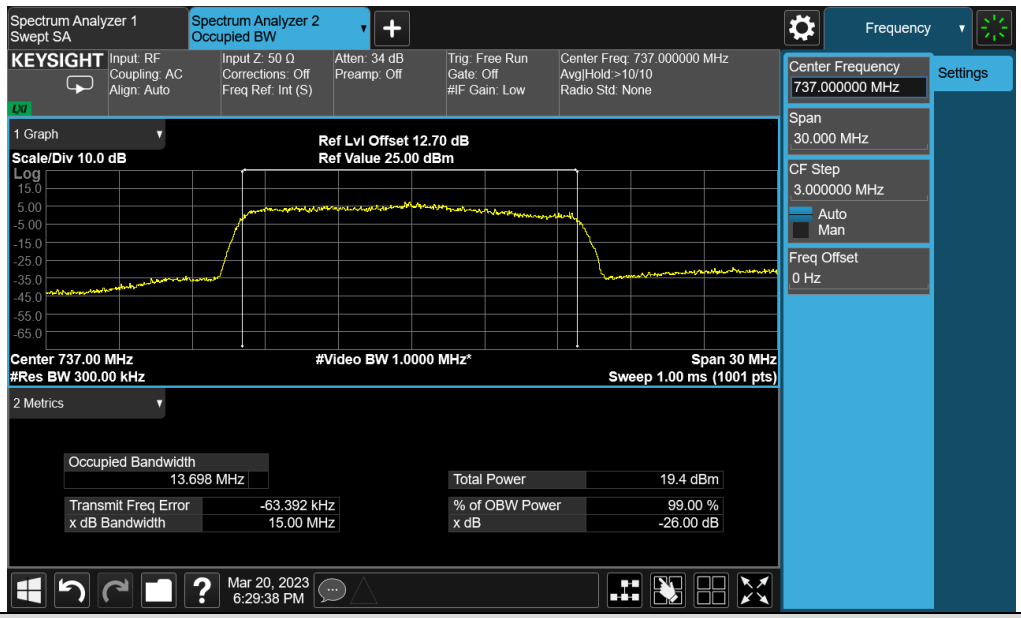
99% OBW
Downlink_100MHz AWGN_Middle Channel_Input pre-AGC



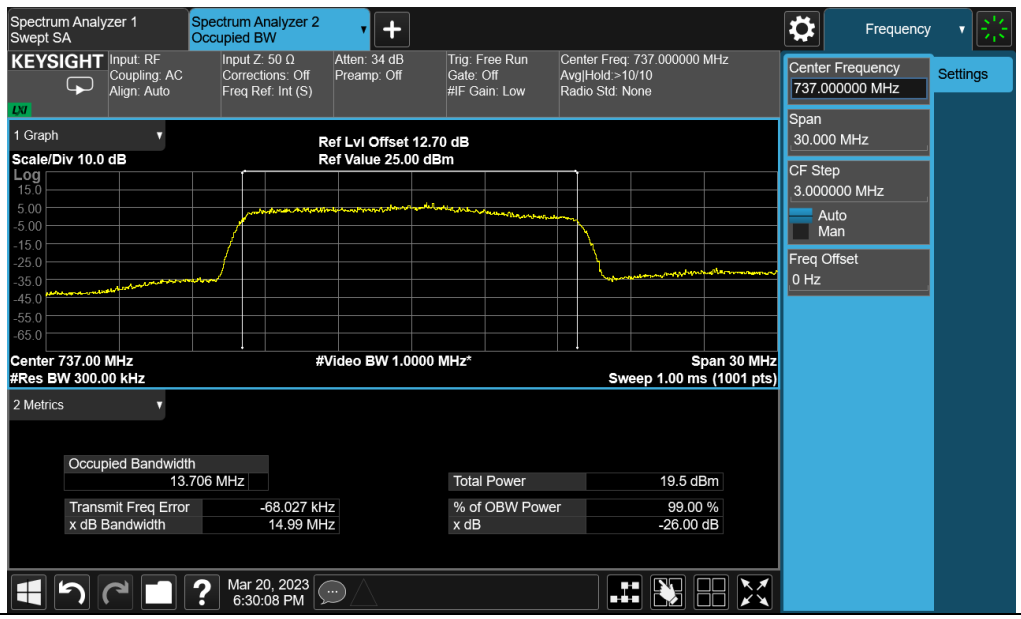
Downlink_100MHz AWGN_Middle Channel_Input 3dB above AGC



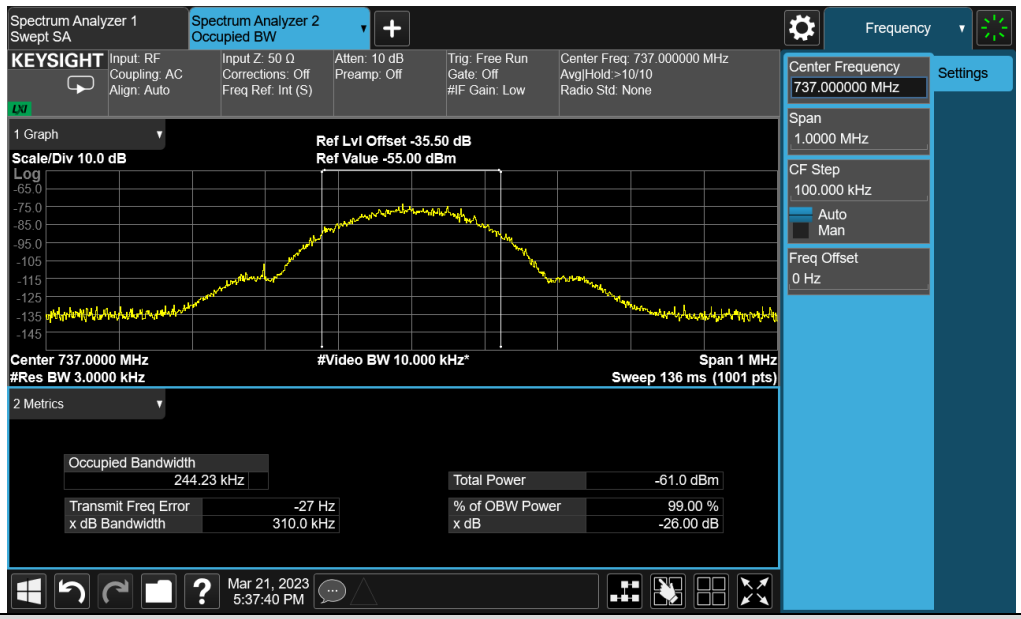
99% OBW
Downlink_100MHz AWGN_Middle Channel_Output pre-AGC



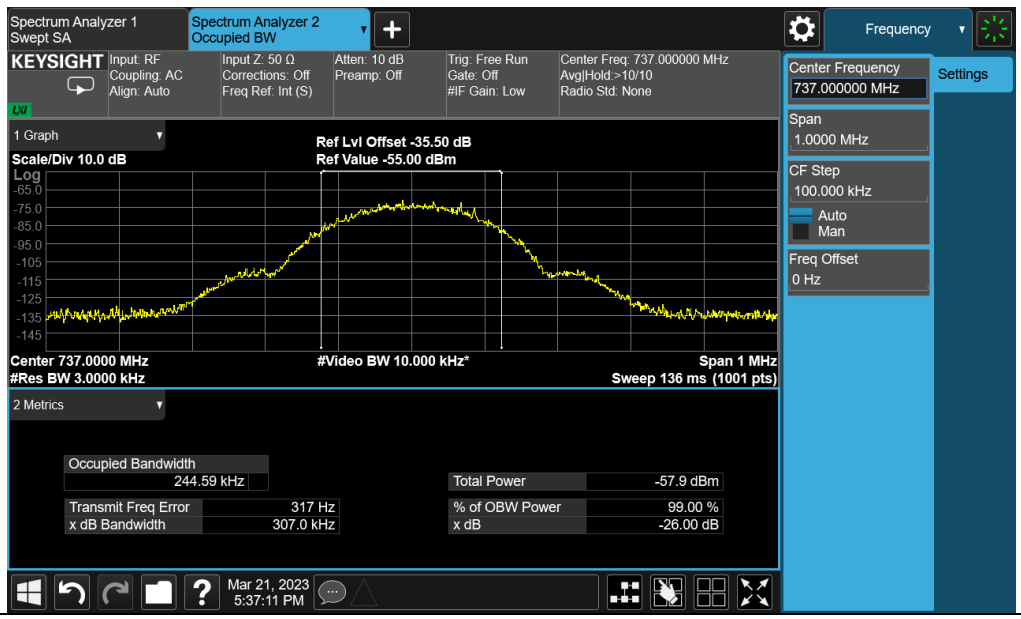
Downlink_100MHz AWGN_Middle Channel_Output 3dB above AGC



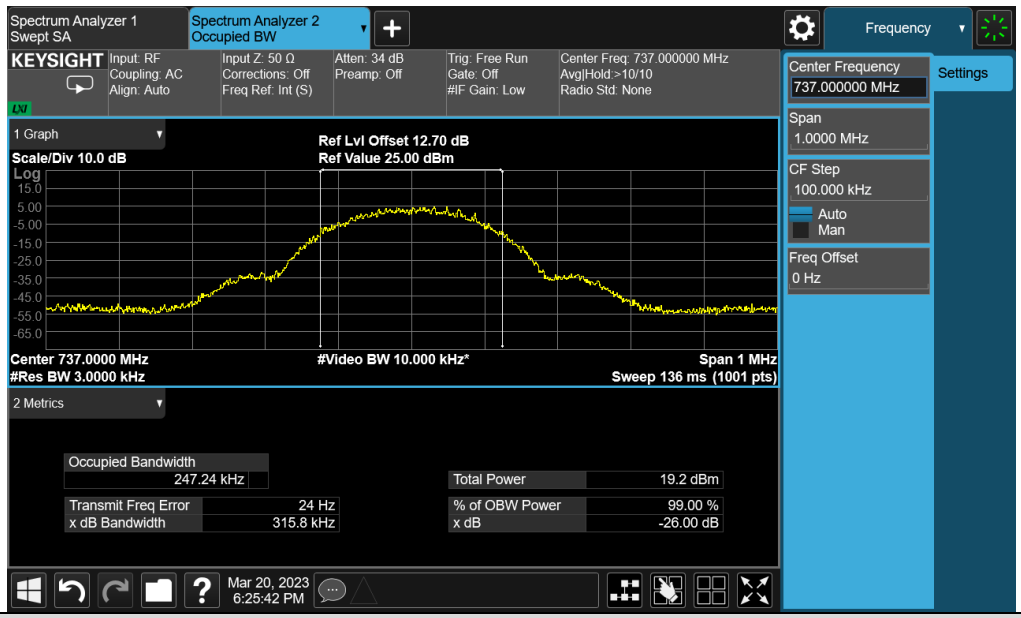
99% OBW
Downlink_GSM_Middle Channel_Input pre-AGC



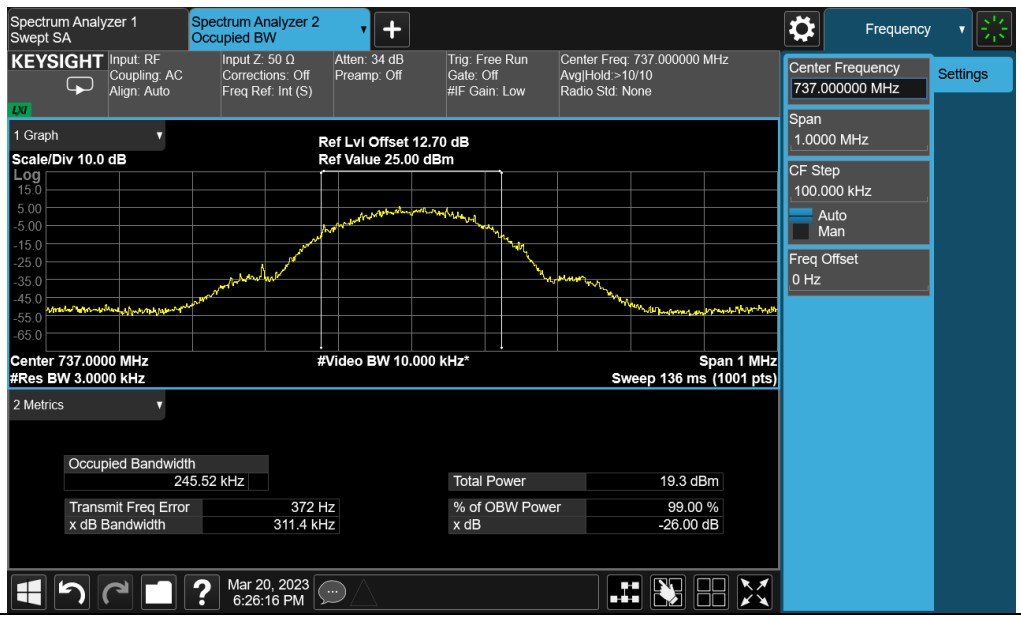
Downlink_GSM_Middle Channel_Input 3dB above AGC



99% OBW
Downlink_GSM_Middle Channel_Output pre-AGC



Downlink_GSM_Middle Channel_Output 3dB above AGC



3 Mean output power and amplifier/booster gain

Mean output power and gain							
Test Path	Test Freq. f0 (MHz)	Test Signal	Signal Level	Input power (dBm)	Output Power (dBm)	ERP (W)	Gain (dB)
Downlink	737.5	5MHz AWGN	Pre-AGC	-61.00	18.65	0.112	79.65
			3dB above AGC	-58.00	18.24	0.102	/
		100MHz AWGN	Pre-AGC	-61.00	14.83	0.047	75.83
			3dB above AGC	-58.00	14.18	0.040	/
		GSM	Pre-AGC	-61.00	19.63	0.141	80.63
			3dB above AGC	-58.00	19.35	0.132	/

Remark:
1. f0 is from Out-of-band Rejection test in the report.
2. ERP= output power (dBm)+ antenna gain (dBi)- 2.15, the antenna gain is 4dBi declared by the manufacturer.

Mean output power						
Test Path	Test Freq. f0 (MHz)	Test Signal	Signal Level	Output Power (dBm/MHz)	ERP (W/MHz)	Verdict
Downlink	737.5	5MHz AWGN	Pre-AGC	11.98	0.024	PASS
			3dB above AGC	11.32	0.021	PASS
		100MHz AWGN	Pre-AGC	3.56	0.003	PASS
			3dB above AGC	3.19	0.003	PASS
		GSM	Pre-AGC	19.47	0.136	PASS
			3dB above AGC	19.44	0.135	PASS

Remark:
1. f0 is from Out-of-band Rejection test in the report.
2. ERP= output power (dBm)+ antenna gain (dBi)- 2.15, the antenna gain is 4dBi declared by the manufacturer.
3. The output power is limited to an ERP of 1000W/MHz.

4 Out-of-band/out-of-block (including intermodulation) emissions

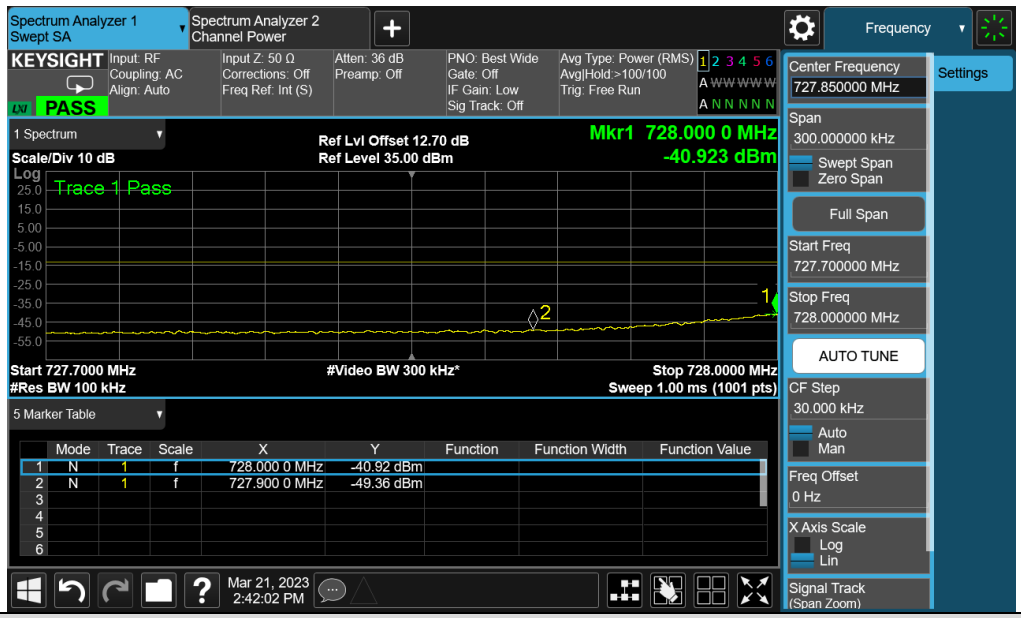
Out-of-band/out-of-block(including intermodulation) emissions							
Test Path	Test Channel	Test Signal	Stimulus Condition	Signal Level	Worst conducted test level (dBm)	Limit (dBm)	Verdict
Downlink	lower edge	5MHz AWGN	One signal input	Pre-AGC	-40.92	≤-13	PASS
				3dB above AGC	-40.25		PASS
			Two signals input	Pre-AGC	-36.72		PASS
				3dB above AGC	-36.53		PASS
	upper edge		One signal input	Pre-AGC	-29.92		PASS
				3dB above AGC	-30.32		PASS
			Two signals input	Pre-AGC	-29.41		PASS
				3dB above AGC	-29.60		PASS
Remark: 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 + 10log10 (P) dB, Rated power P = 19dBm = 0.08W, so the limit = 19dBm – [43 + 10 log10 (0.08W)] dB = -13dBm							

Out-of-band/out-of-block(including intermodulation) emissions							
Test Path	Test Channel	Test Signal	Stimulus Condition	Signal Level	Worst conducted test level (dBm)	Limit (dBm)	Verdict
Downlink	lower edge	100MHz AWGN	One signal input	Pre-AGC	-24.29	≤-13	PASS
				3dB above AGC	-24.94		PASS
			Two signals input	Pre-AGC	-22.95		PASS
				3dB above AGC	-22.60		PASS
	upper edge		One signal input	Pre-AGC	-22.22		PASS
				3dB above AGC	-22.00		PASS
			Two signals input	Pre-AGC	-22.65		PASS
				3dB above AGC	-22.33		PASS
Remark: 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 + 10log10 (P) dB, Rated power P = 19dBm = 0.08W, so the limit = 19dBm – [43 + 10 log10 (0.08W)] dB = -13dBm							

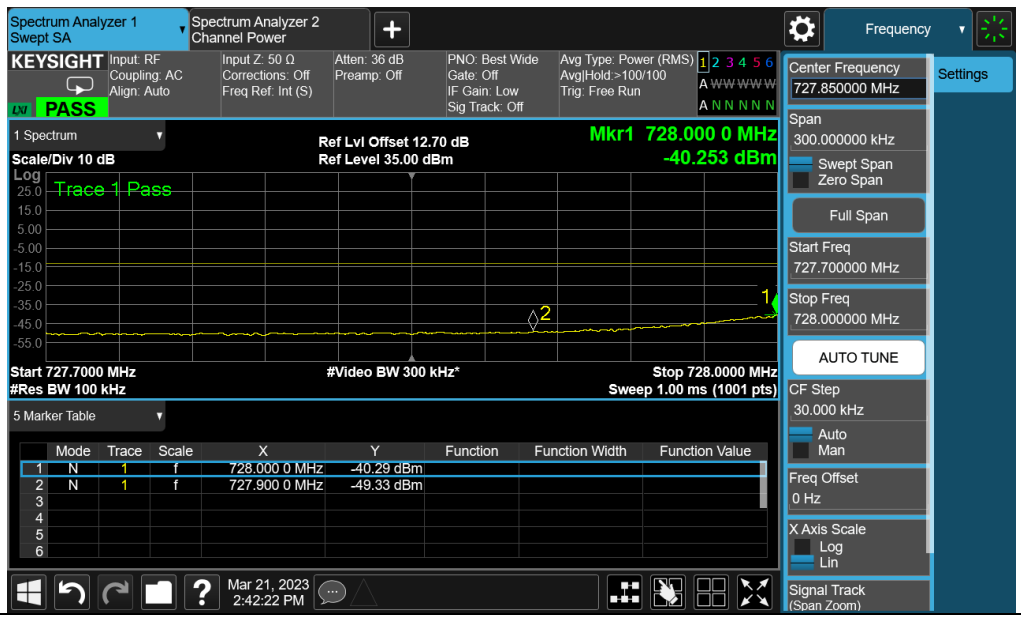
Out-of-band/out-of-block(including intermodulation) emissions							
Test Path	Test Channel	Test Signal	Stimulus Condition	Signal Level	Worst conducted test level (dBm)	Limit (dBm)	Verdict
Downlink	lower edge	GSM	One signal input	Pre-AGC	-31.04	≤-13	PASS
				3dB above AGC	-30.96		PASS
			Two signals input	Pre-AGC	-34.10		PASS
				3dB above AGC	-33.87		PASS
	upper edge		One signal input	Pre-AGC	-29.87		PASS
				3dB above AGC	-29.66		PASS
			Two signals input	Pre-AGC	-32.63		PASS
				3dB above AGC	-32.48		PASS
Remark: 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 + 10log10 (P) dB, Rated power P = 19dBm = 0.08W, so the limit = 19dBm – [43 + 10 log10 (0.08W)] dB = -13dBm							

Out-of-band/out-of-block emissions

Downlink_5MHz AWGN_One signal input_Pre-AGC_Lower edge



Downlink_5MHz AWGN_One signal input_3dB above AGC_Lower edge



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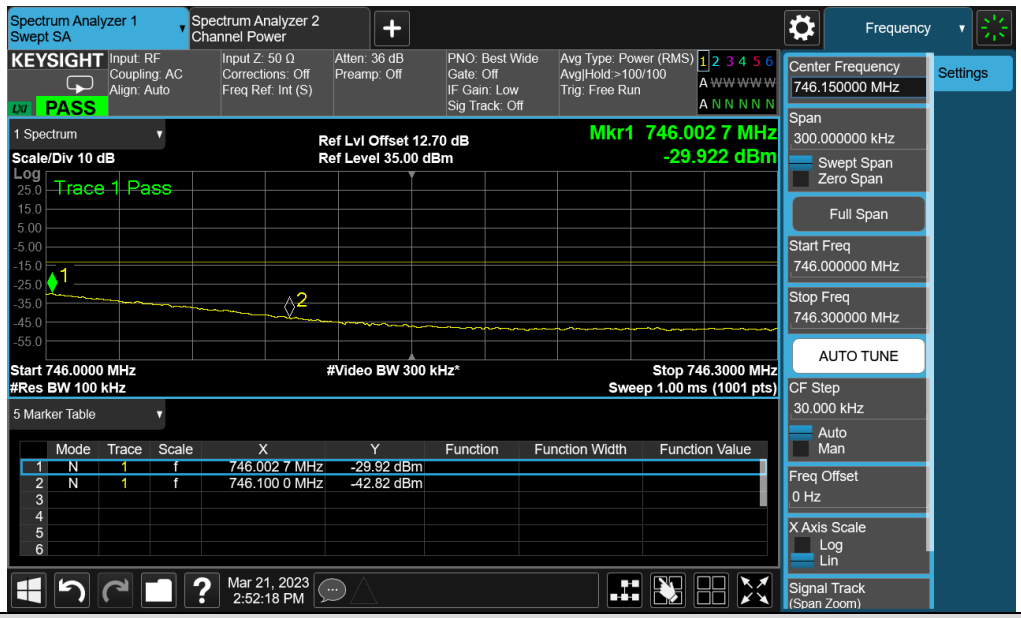
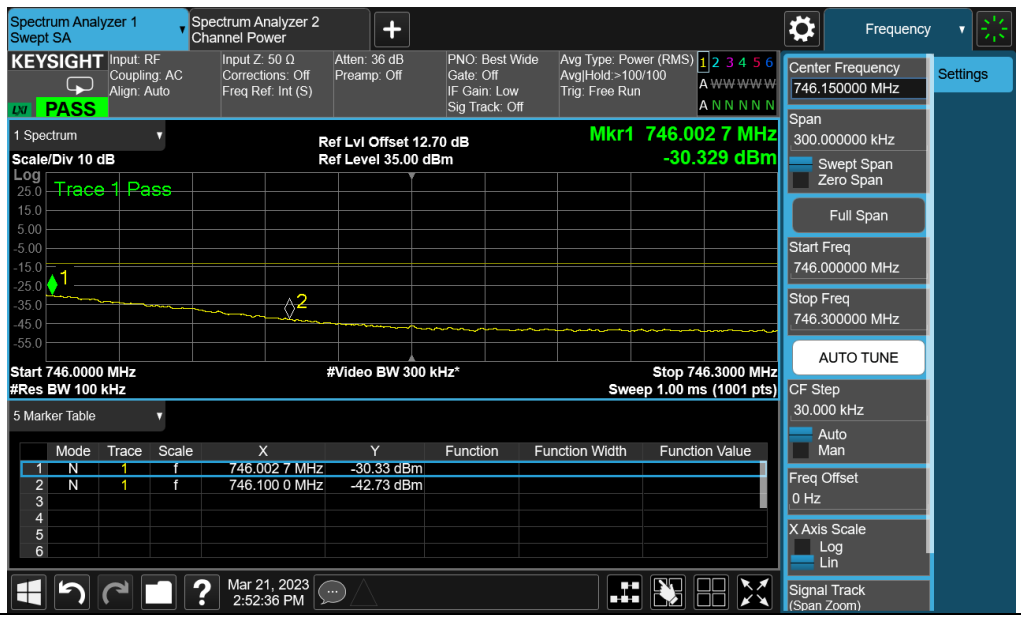
Out-of-band/out-of-block emissions

Downlink_5MHz AWGN_One signal input_Pre-AGC_Upper edge

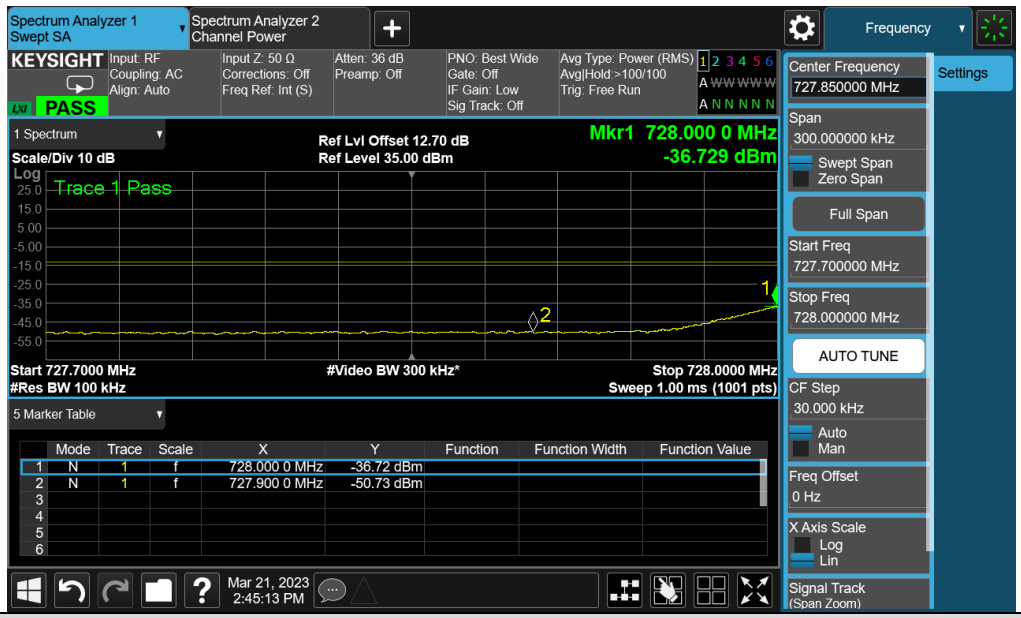


Downlink_5MHz AWGN_One signal input_3dB above AGC_Upper edge

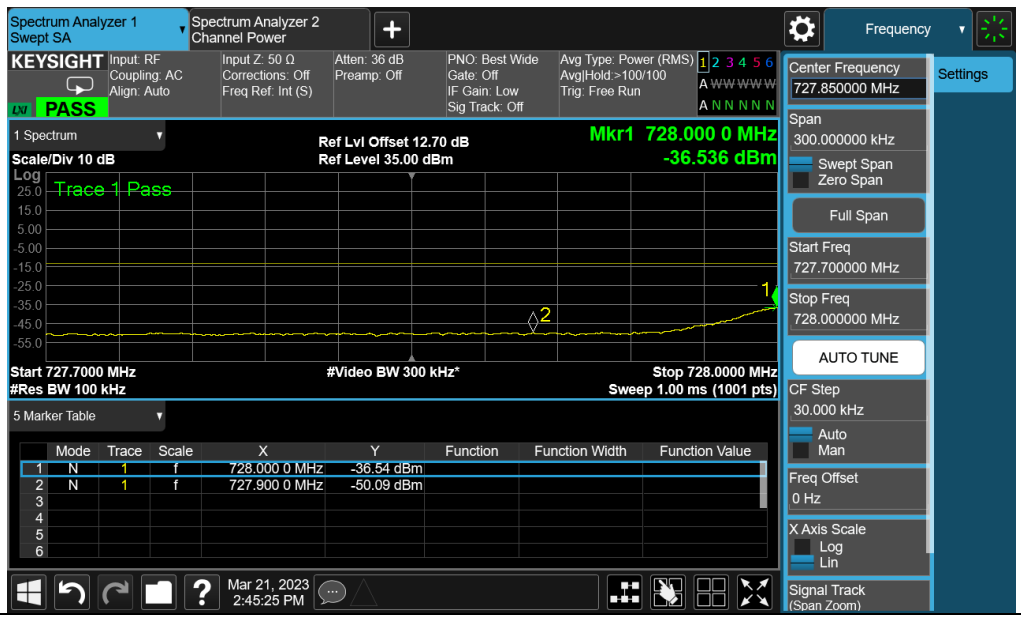


Out-of-band/out-of-block emissions

Downlink_5MHz AWGN_Two signals input_Pre-AGC_Lower edge

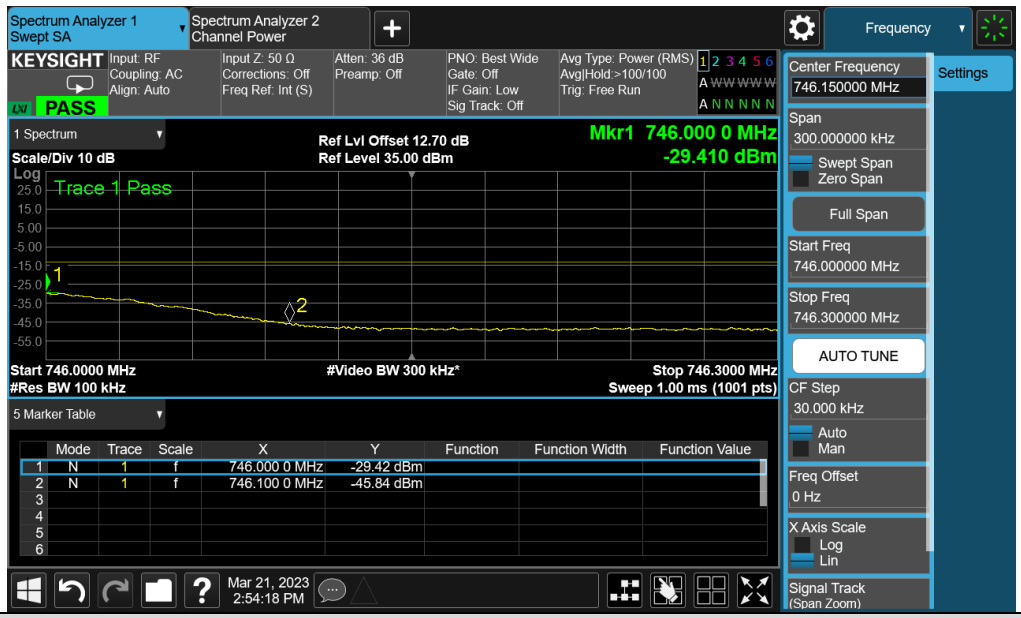


Downlink_5MHz AWGN_Two signals input_3dB above AGC_Lower edge

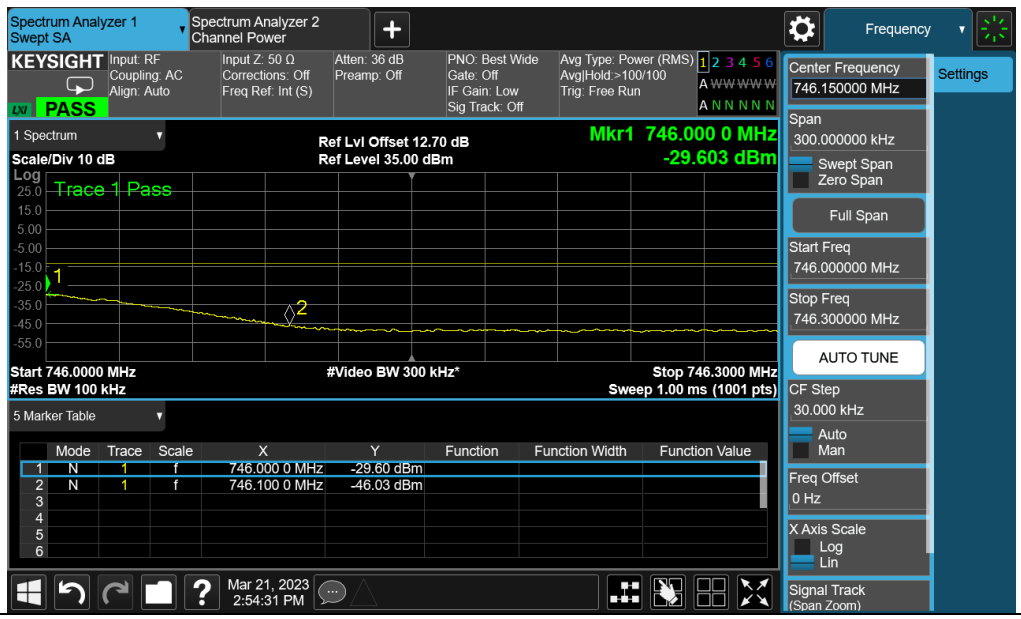


Out-of-band/out-of-block emissions

Downlink_5MHz AWGN_Two signals input_Pre-AGC_Upper edge

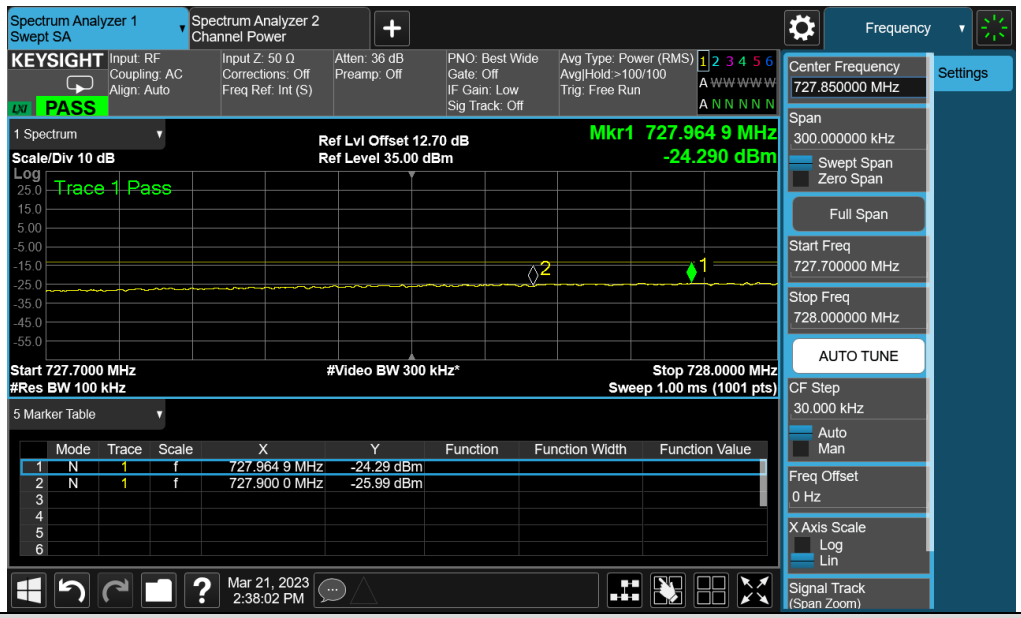


Downlink_5MHz AWGN_Two signals input_3dB above AGC_Upper edge

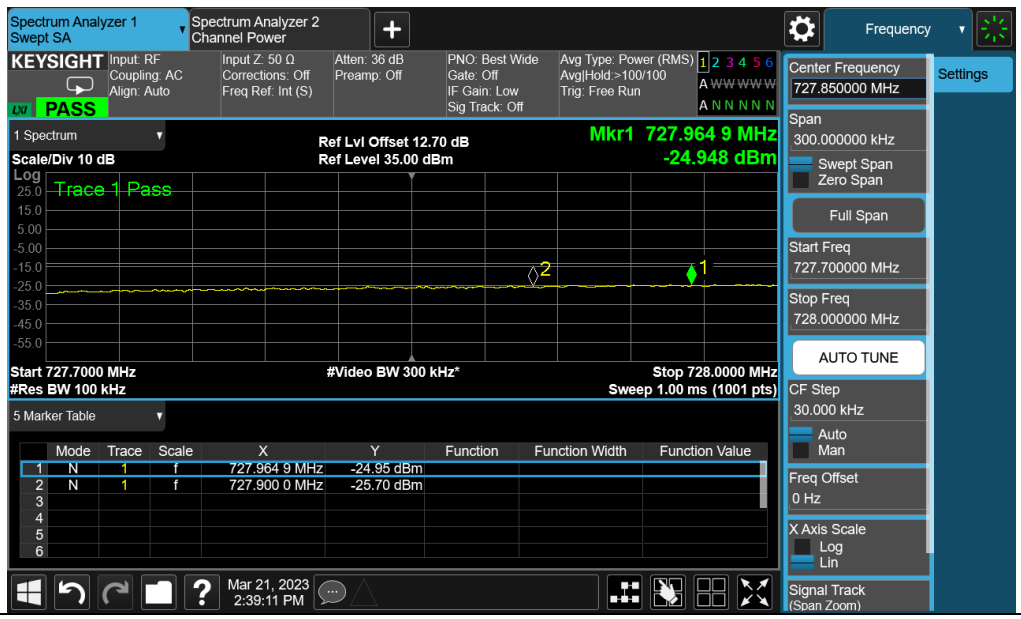


Out-of-band/out-of-block emissions

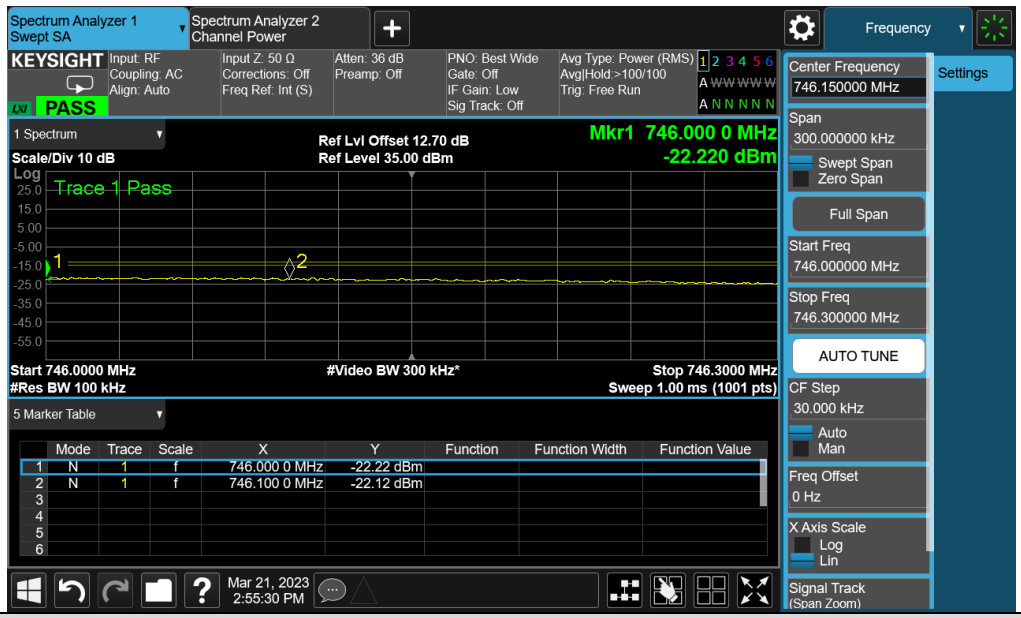
Downlink_100MHz AWGN_One signal input_Pre-AGC_Lower edge



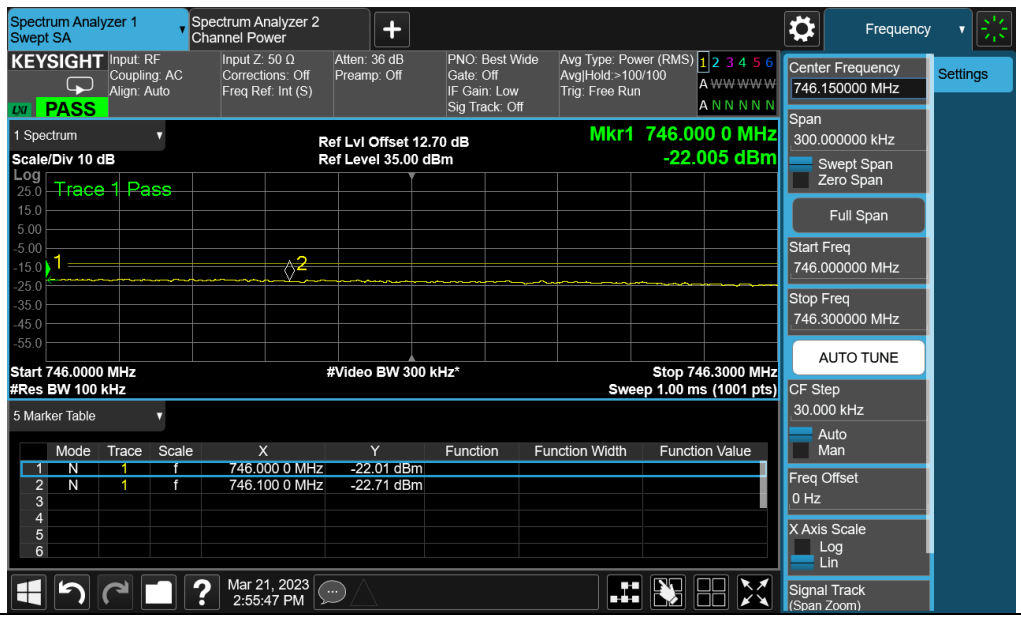
Downlink_100MHz AWGN_One signal input_3dB above AGC_Lower edge



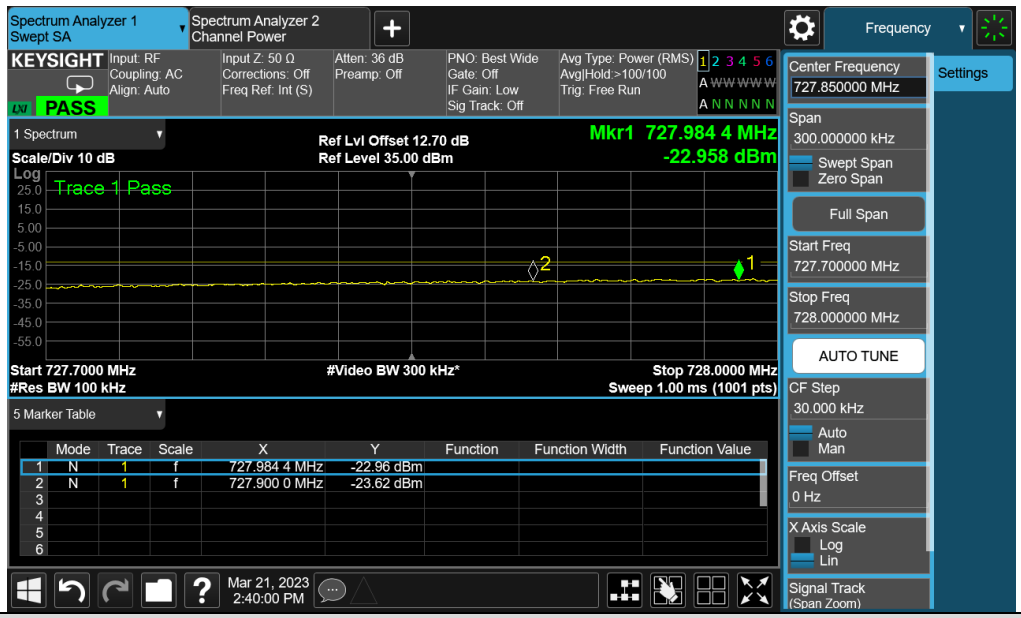
Out-of-band/out-of-block emissions
Downlink_100MHz AWGN_One signal input_Pre-AGC_Upper edge



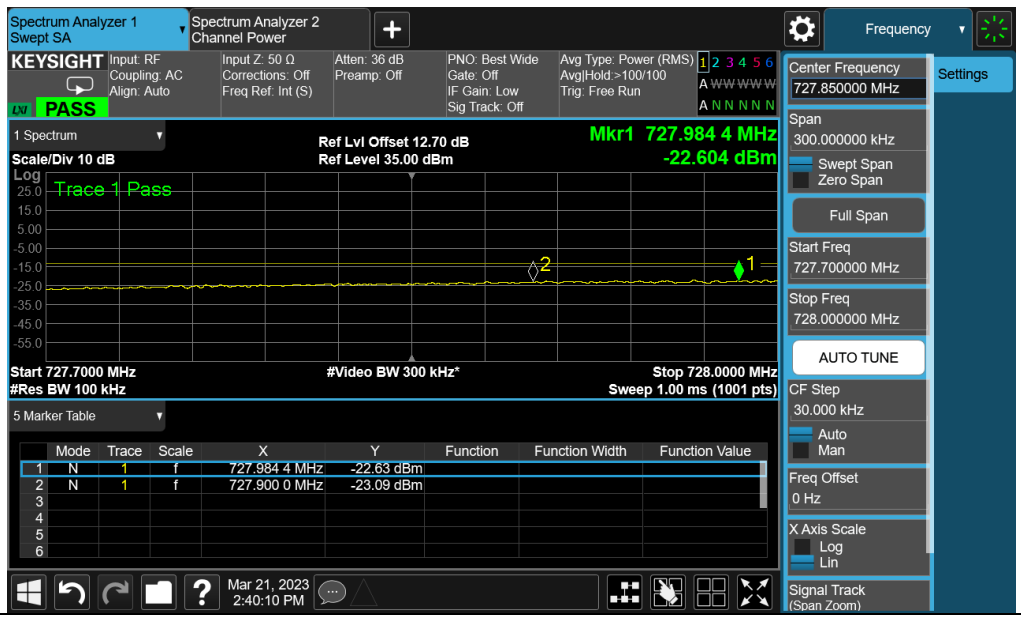
Downlink_100MHz AWGN_One signal input_3dB above AGC_Upper edge



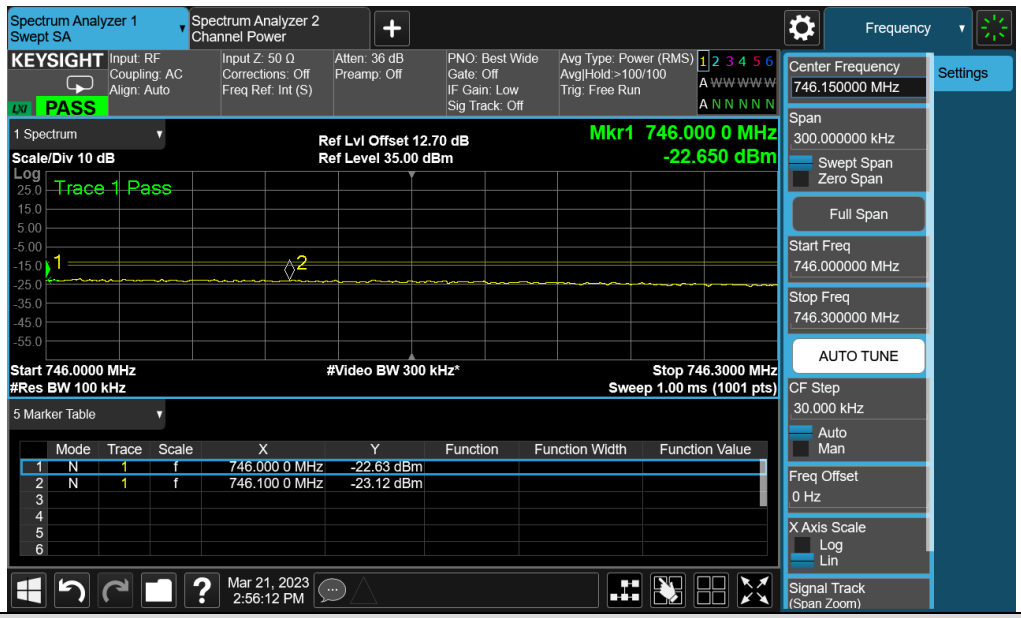
Out-of-band/out-of-block emissions
Downlink_100MHz AWGN_Two signals input_Pre-AGC_Lower edge



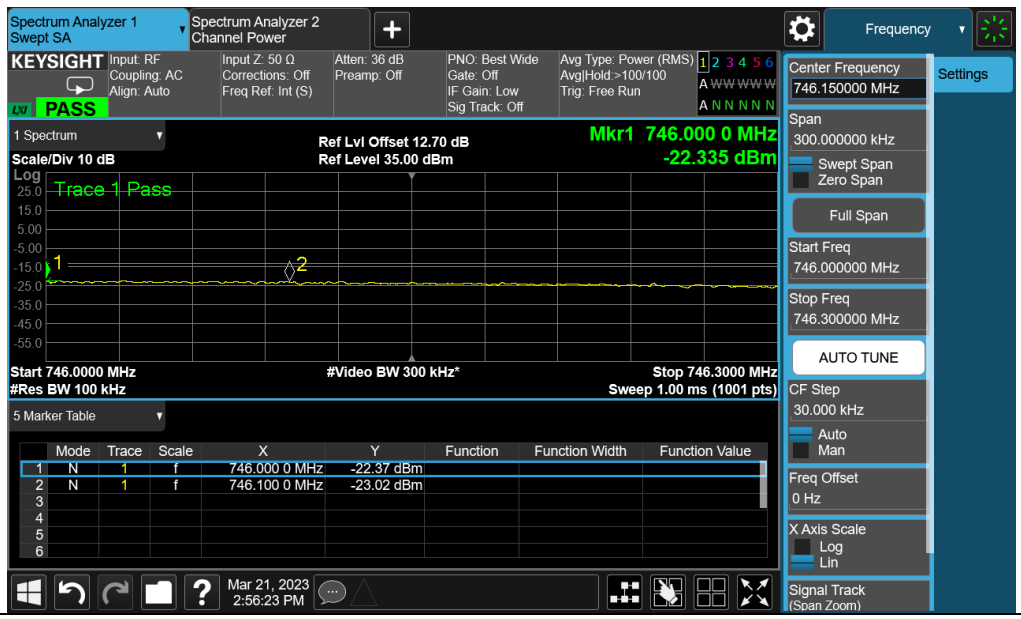
Downlink_100MHz AWGN_Two signals input_3dB above AGC_Lower edge



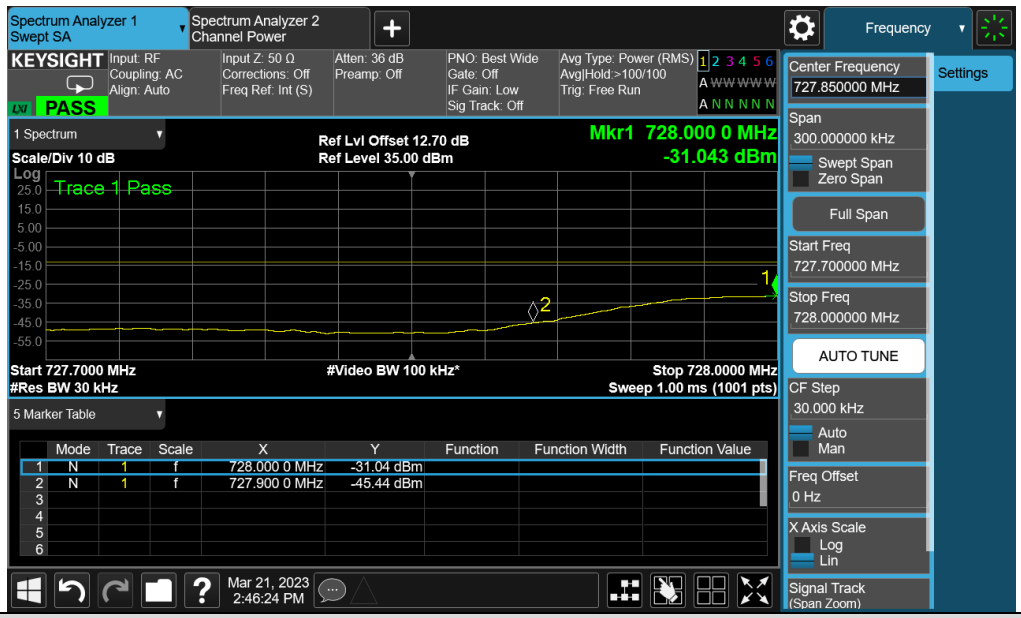
Out-of-band/out-of-block emissions
Downlink_100MHz AWGN_Two signals input_Pre-AGC_Upper edge



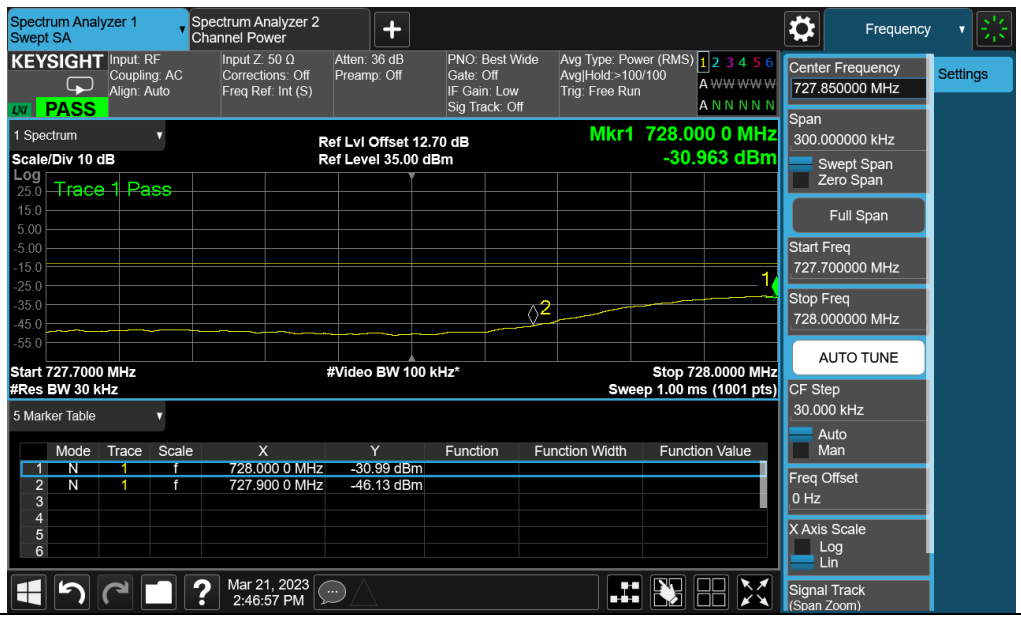
Downlink_100MHz AWGN_Two signals input_3dB above AGC_Upper edge



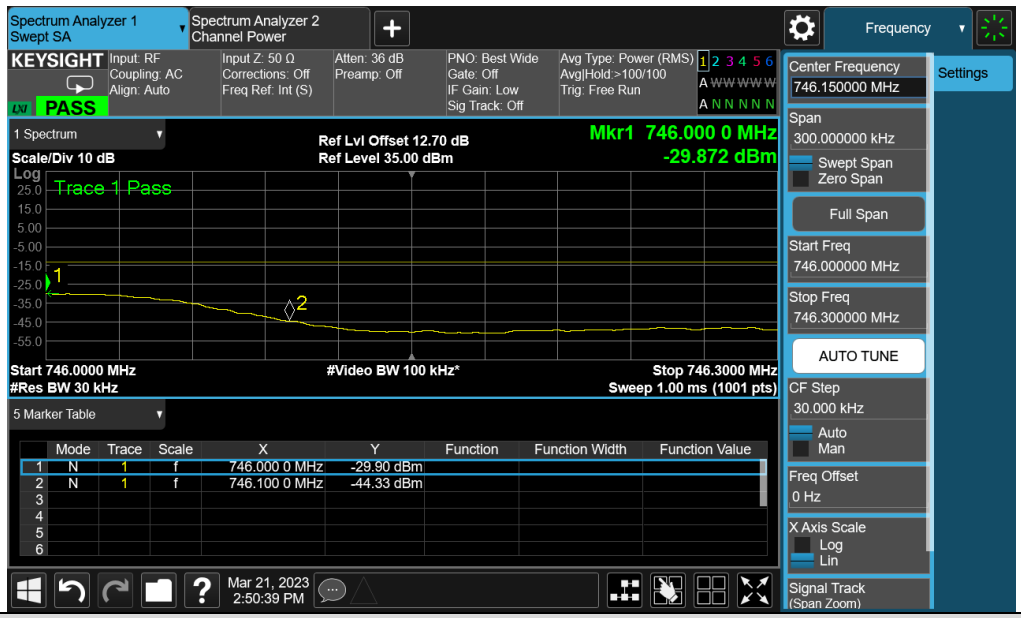
Out-of-band/out-of-block emissions
Downlink_GSM_One signal input_Pre-AGC_Lower edge



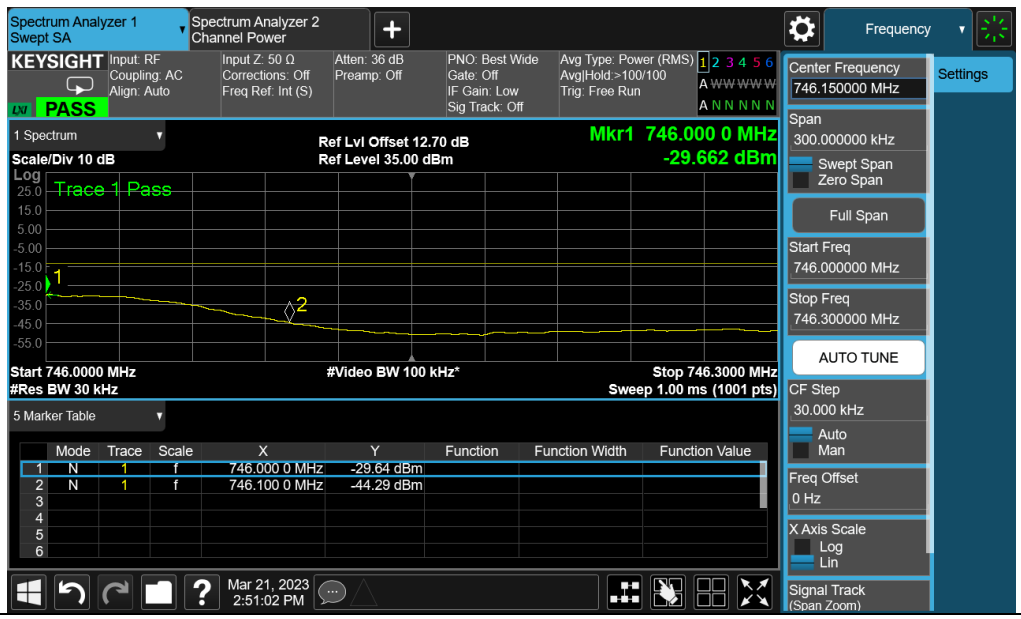
Downlink_GSM_One signal input_3dB above AGC_Lower edge



Out-of-band/out-of-block emissions
Downlink_GSM_One signal input_Pre-AGC_Upper edge

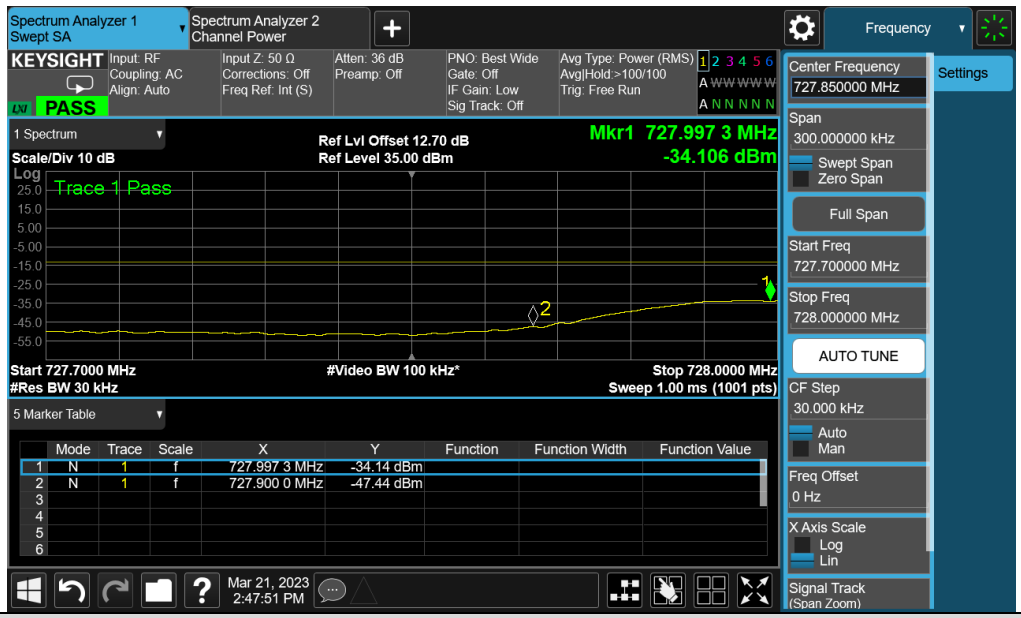


Downlink_GSM_One signal input_3dB above AGC_Upper edge

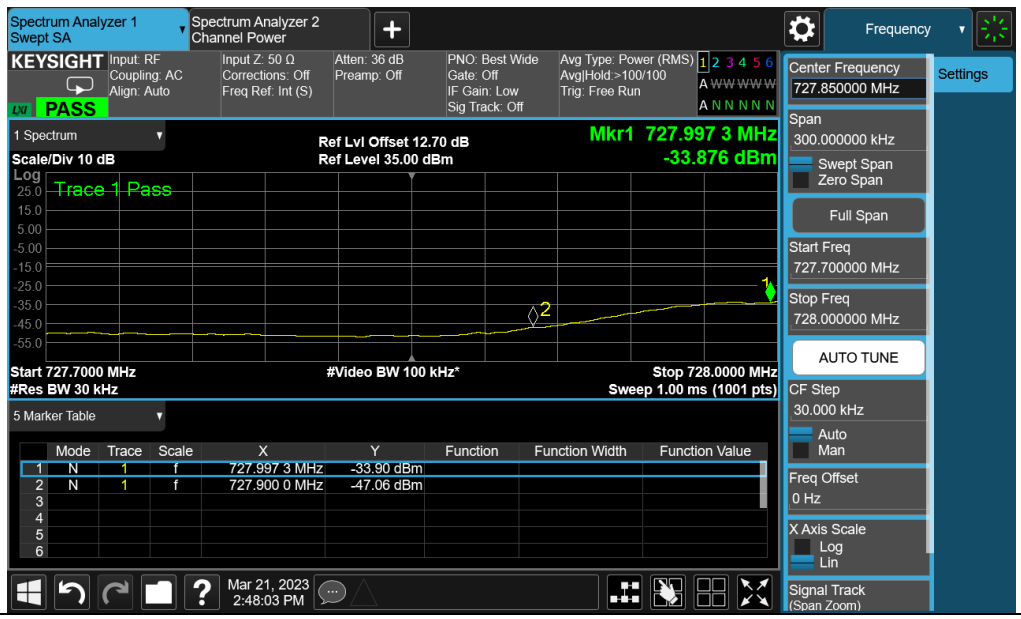


Out-of-band/out-of-block emissions

Downlink_GSM_Two signals input_Pre-AGC_Lower edge

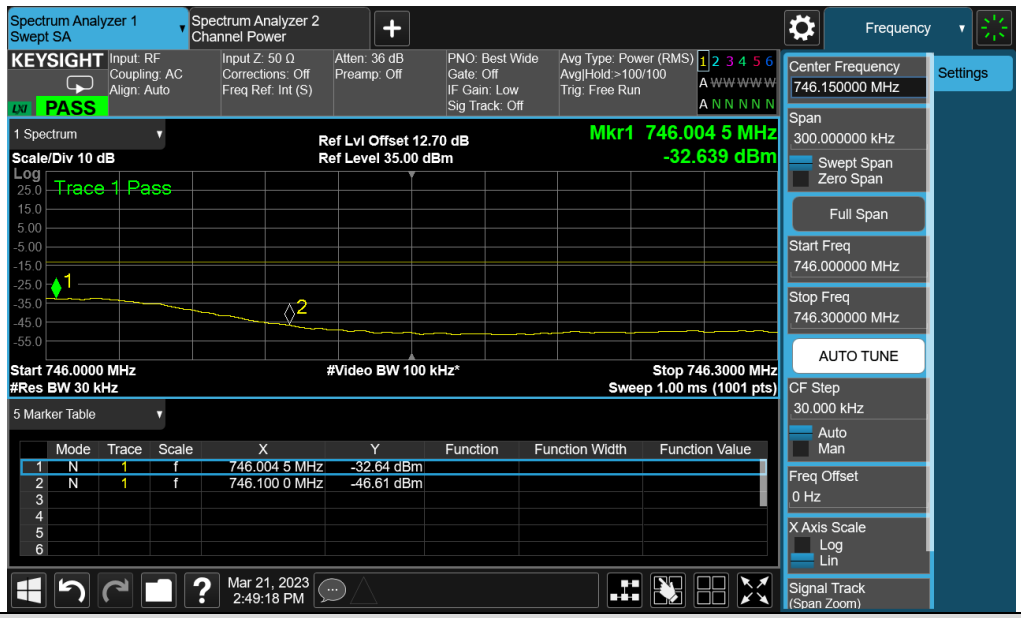


Downlink_GSM_Two signals input_3dB above AGC_Lower edge

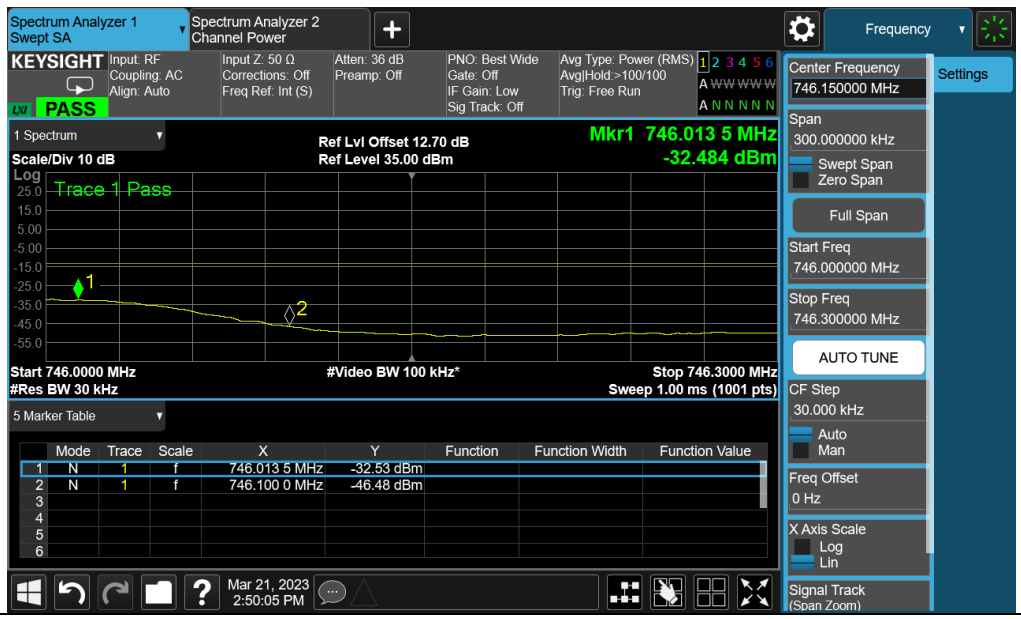


Out-of-band/out-of-block emissions

Downlink_GSM_Two signals input_Pre-AGC_Upper edge



Downlink_GSM_Two signals input_3dB above AGC_Upper edge



5 Conducted Spurious emissions

Conducted spurious emissions							
Test Path	Test Channel	Test Signal	Signal Level	Frequency range (MHz)	Worst test level (dBm)	Limit (dBm)	Verdict
Downlink	High Channel	5MHz AWGN	Pre-AGC	0.009-727.9	-43.21	≤-13	PASS
				746.1-1000	-32.73	≤-13	PASS
				1000-8000	-40.62	≤-13	PASS
		100MHz AWGN	Pre-AGC	0.009-727.9	-37.23	≤-13	PASS
				746.1-1000	-33.24	≤-13	PASS
				1000-8000	-34.38	≤-13	PASS
		GSM	Pre-AGC	0.009-727.9	-37.12	≤-13	PASS
				746.1-1000	-33.29	≤-13	PASS
				1000-8000	-40.84	≤-13	PASS
	Middle Channel	5MHz AWGN	Pre-AGC	0.009-727.9	-43.28	≤-13	PASS
				746.1-1000	-43.45	≤-13	PASS
				1000-8000	-36.73	≤-13	PASS
		100MHz AWGN	Pre-AGC	0.009-727.9	-31.46	≤-13	PASS
				746.1-1000	-33.47	≤-13	PASS
				1000-8000	-36.47	≤-13	PASS
		GSM	Pre-AGC	0.009-727.9	-39.37	≤-13	PASS
				746.1-1000	-33.29	≤-13	PASS
				1000-8000	-36.48	≤-13	PASS
	Low Channel	5MHz AWGN	Pre-AGC	0.009-727.9	-42.45	≤-13	PASS
				746.1-1000	-32.49	≤-13	PASS
				1000-8000	-42.28	≤-13	PASS
		100MHz AWGN	Pre-AGC	0.009-727.9	-34.57	≤-13	PASS
				746.1-1000	-33.34	≤-13	PASS
				1000-8000	-32.62	≤-13	PASS
		GSM	Pre-AGC	0.009-727.9	-34.74	≤-13	PASS
				746.1-1000	-34.68	≤-13	PASS
				1000-8000	-33.35	≤-13	PASS

Remark:
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 + 10log10 (P) dB,
Rated power P = 19dBm = 0.08W, so
the limit = 19dBm – [43 + 10 log10 (0.08W)] dB = -13dBm

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6 Frequency Stability

Frequency stability vs temperature						
Test Path	Test Frequency (MHz)	Temperature (℃)	Voltage (V DC)	Frequency error (Hz)	Tolerance (ppm)	Verdict
Downlink	737	+50	48	23	0.0312	PASS
		+40	48	17	0.0231	PASS
		+30	48	26	0.0353	PASS
		+20	48	32	0.0434	PASS
		+10	48	38	0.0516	PASS
		0	48	26	0.0353	PASS
		-10	48	16	0.0217	PASS
		-20	48	23	0.0312	PASS
		-30	48	19	0.0258	PASS

Frequency stability vs voltage						
Test path	Test Frequency (MHz)	Voltage (V DC)	Temperature (℃)	Frequency error (Hz)	Tolerance (ppm)	Verdict
Downlink	737	40.8	20	22	0.0299	PASS
		55.2	20	30	0.0407	PASS

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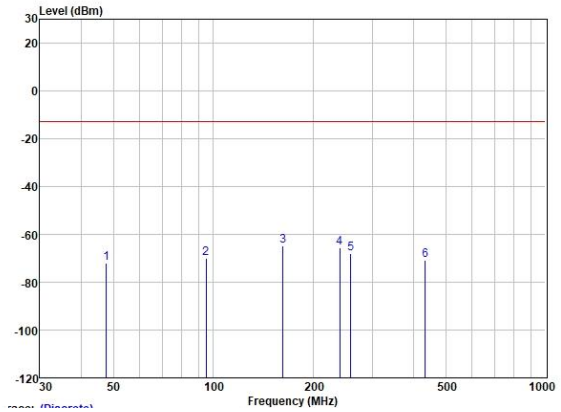
7 Radiated Spurious emissions

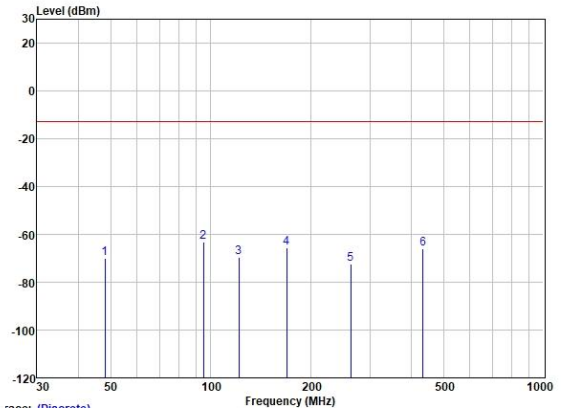
All modes (Lowest/Middle/Highest Channels, 5MHz AWGN input signal/100MHz AWGN input signal / GSM input signal) have been tested and only the worst test result was recorded in this report.

Radiated Spurious emissions

5MHz AWGN_Middle Channel_30MHz-1GHz



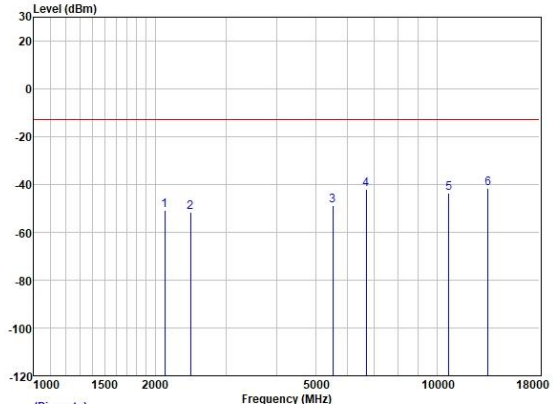
	Freq	Read Level	Correction Factor	Level	Limit Line	Over Limit	Pol/Phase
	MHz	dBm	dB	dBm	dBm	dB	
1	47.659	-69.11	-2.79	-71.90	-13.00	-58.90	HORIZONTAL
2	95.093	-60.27	-9.68	-69.95	-13.00	-56.95	HORIZONTAL
3	162.041	-58.40	-6.39	-64.79	-13.00	-51.79	HORIZONTAL
4	239.987	-59.59	-6.16	-65.75	-13.00	-52.75	HORIZONTAL
5	259.234	-63.60	-4.29	-67.89	-13.00	-54.89	HORIZONTAL
6	434.065	-71.09	0.21	-70.88	-13.00	-57.88	HORIZONTAL



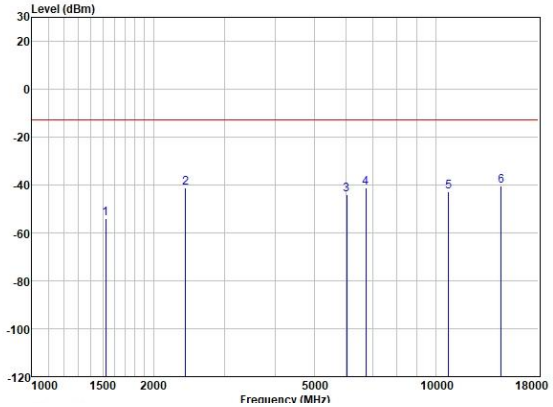
	Freq	Read Level	Correction Factor	Level	Limit Line	Over Limit	Pol/Phase
	MHz	dBm	dB	dBm	dBm	dB	
1	47.994	-60.89	-8.96	-69.85	-13.00	-56.85	VERTICAL
2	95.093	-57.26	-5.91	-63.17	-13.00	-50.17	VERTICAL
3	121.549	-65.52	-3.93	-69.45	-13.00	-56.45	VERTICAL
4	169.005	-61.57	-3.94	-65.51	-13.00	-52.51	VERTICAL
5	262.896	-68.38	-4.12	-72.50	-13.00	-59.50	VERTICAL
6	434.065	-67.33	1.32	-66.01	-13.00	-53.01	VERTICAL

Radiated Spurious emissions

5MHz AWGN_Middle Channel_above 1GHz



	Freq	Read Level	Correction Factor	Level	Limit Line	Over Limit	Pol/Phase
	MHz	dBm	dB	dBm	dBm	dB	
1	2114.052	-60.19	9.47	-50.72	-13.00	-37.72	HORIZONTAL
2	2449.822	-61.08	9.60	-51.48	-13.00	-38.48	HORIZONTAL
3	5519.072	-63.07	14.34	-48.73	-13.00	-35.73	HORIZONTAL
4	6679.040	-62.17	20.25	-41.92	-13.00	-28.92	HORIZONTAL
5	10698.510	-67.43	23.84	-43.59	-13.00	-30.59	HORIZONTAL
6	13404.010	-69.52	27.82	-41.70	-13.00	-28.70	HORIZONTAL



	Freq	Read Level	Correction Factor	Level	Limit Line	Over Limit	Pol/Phase
	MHz	dBm	dB	dBm	dBm	dB	
1	1525.000	-60.38	6.54	-53.84	-13.00	-40.84	VERTICAL
2	2400.753	-51.33	9.94	-41.39	-13.00	-28.39	VERTICAL
3	6018.999	-63.50	19.55	-43.95	-13.00	-30.95	VERTICAL
4	6717.762	-62.20	20.83	-41.37	-13.00	-28.37	VERTICAL
5	10760.540	-67.54	24.78	-42.76	-13.00	-29.76	VERTICAL
6	14533.910	-67.83	27.40	-40.43	-13.00	-27.43	VERTICAL

--End of Appendix--

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