

Appendix -

Test Data and Result for report

GZCR250300027202

(For Lower 700MHz Band UL)



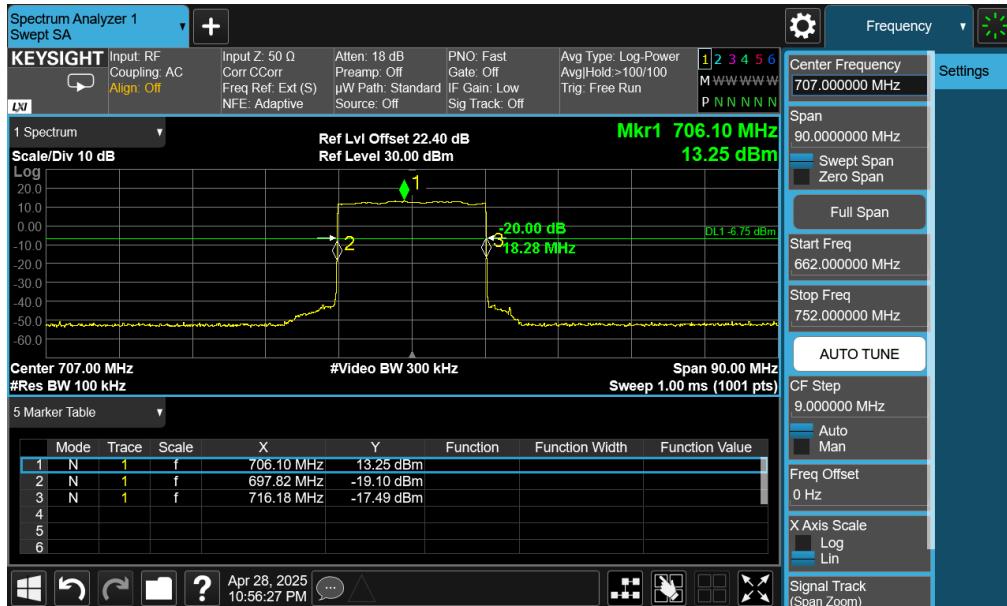
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1 Out-of-band rejection

Out-of-band rejection

UL



Remark:

1. The peak of the frequency response f_0 is 706.1MHz.
2. The frequency point f_0 with the highest power level fall in the CMRS band, EUT is compiled the KDB 935210 D05 Signal Booster Measurements v01r04 Out-of-band rejection verification test requirement.
3. AGC threshold level was measured as below:

Test Path	Test Signal	Test Channel	AGC threshold level
UL	4.1MHz AWGN	MCH	-60.90dBm
	100MHz AWGN	MCH	-52.85dBm
	GSM	MCH	-60.90dBm



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2 Input versus Output comparison

Occupied Bandwidth				
Test Path	Test Signal	Test Channel	Signal Level	Verdict
UL	4.1MHz AWGN	MCH	Pre-AGC	PASS
			3dB above AGC	PASS
	100MHz AWGN	MCH	Pre-AGC	PASS*
			3dB above AGC	PASS*
	GSM	MCH	Pre-AGC	PASS
			3dB above AGC	PASS

Remark:

1. * The band supports maximum channel BW is 15MHz for NR, so the output signal OBW was less than the input when 100MHz AWGN was as stimulus signal.
2. 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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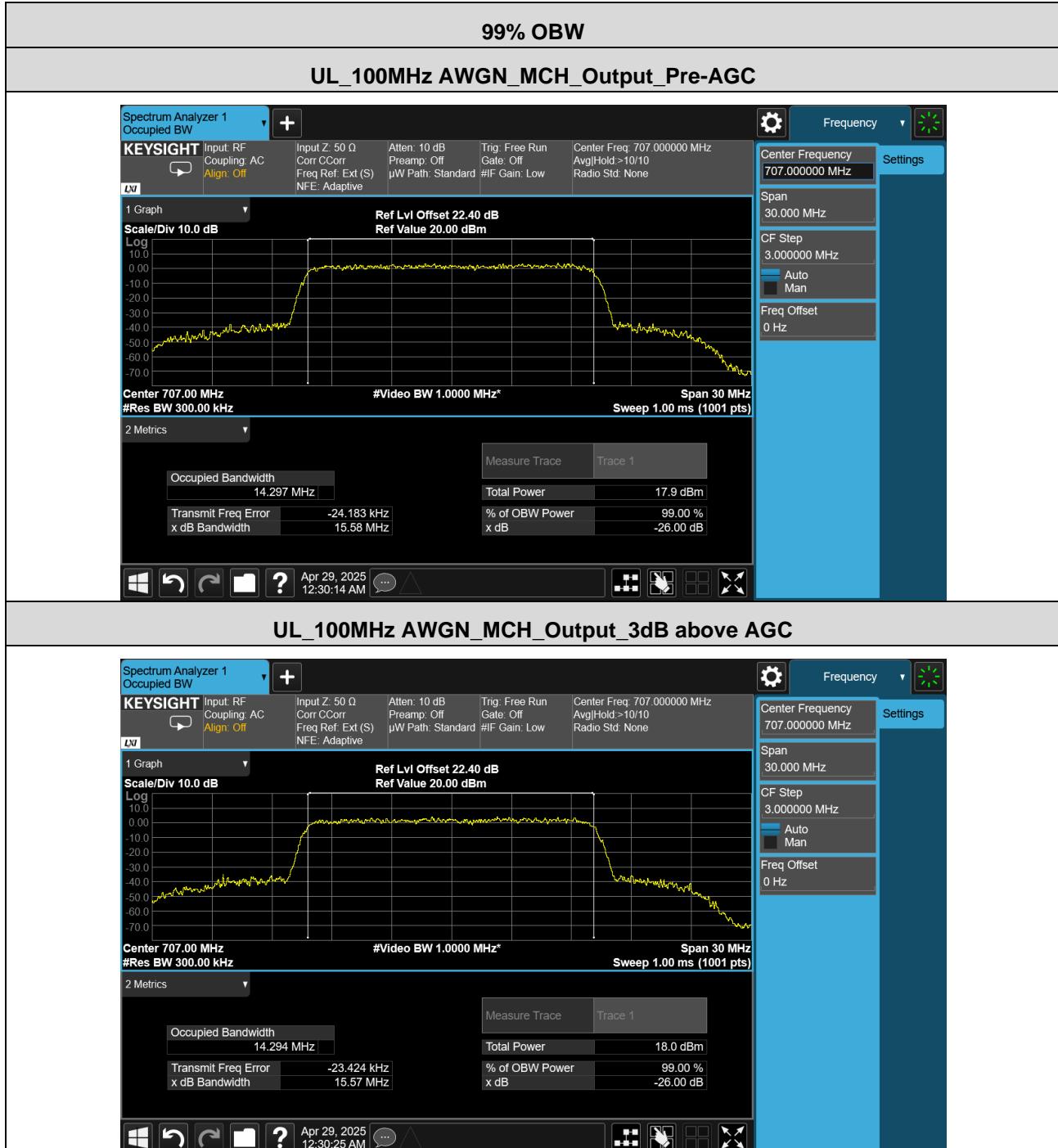
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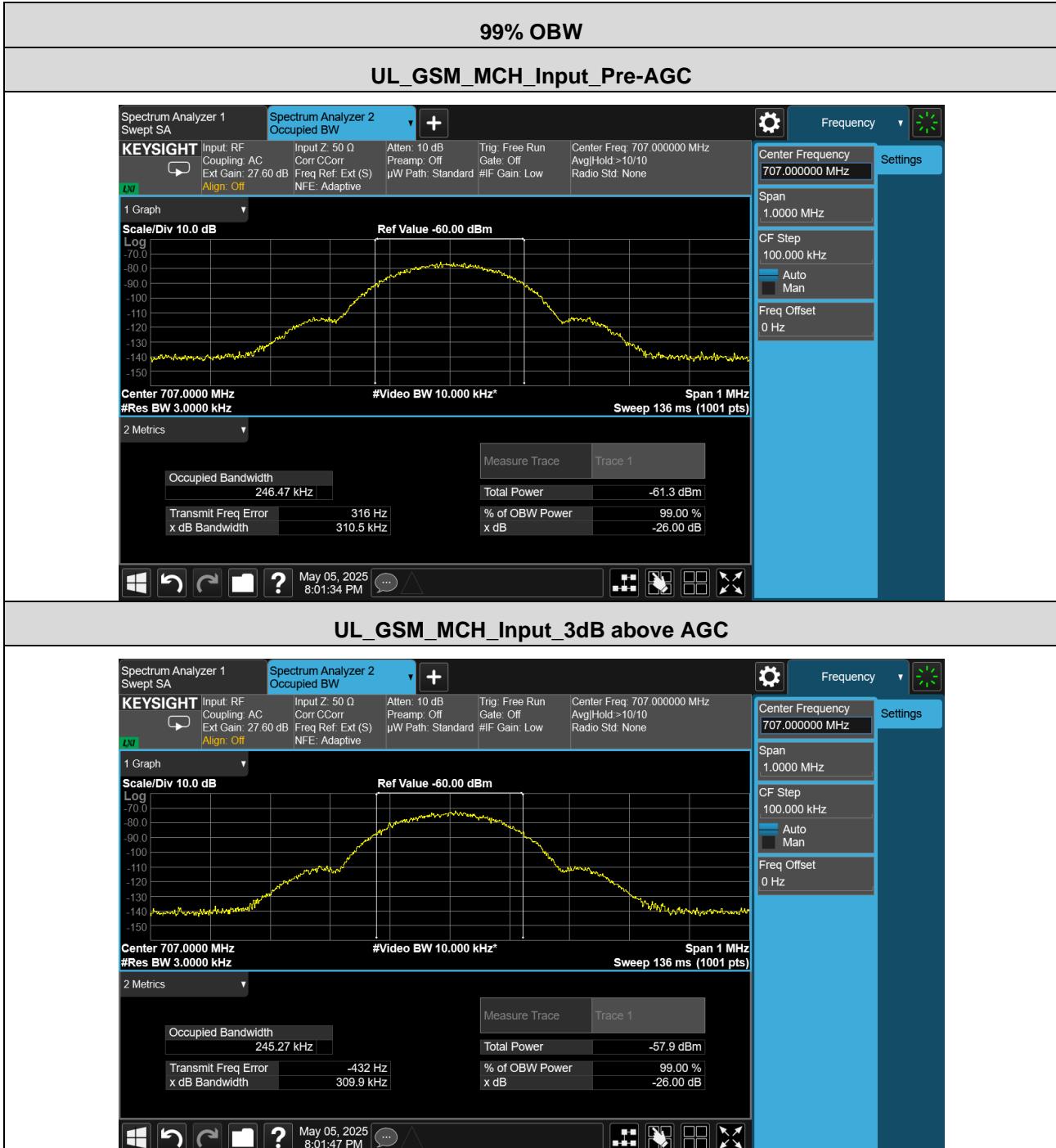
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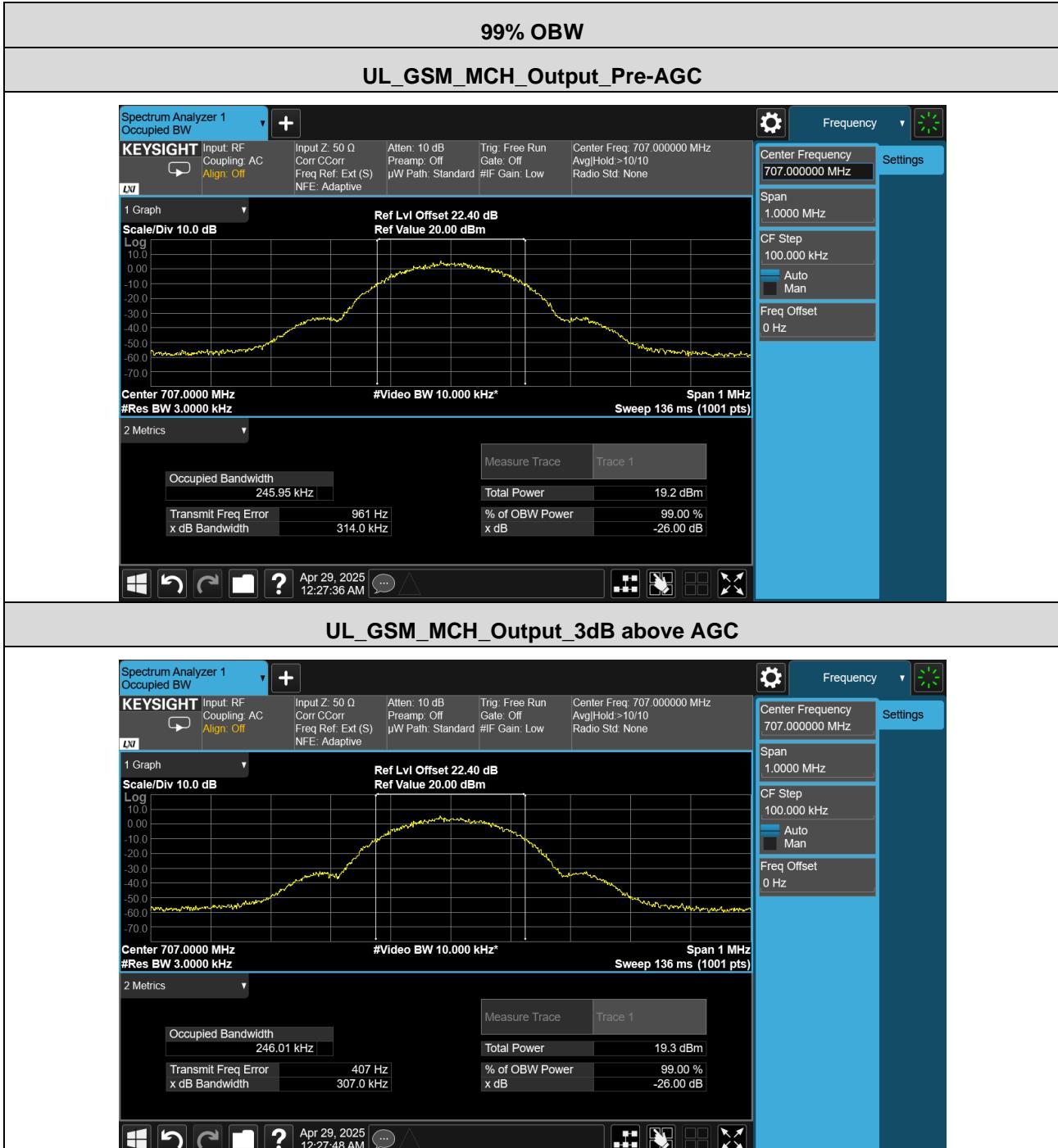
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3 Mean output power and amplifier/booster gain

Mean output power and gain								
Test Path	Test Freq. f0 (MHz)	Test Signal	Signal Level	Input power (dBm)	Output Power (dBm)	ERP (dBm)	ERP (W)	Gain (dB)
UL	706.1	4.1MHz AWGN	Pre-AGC	-61	18.21	30.06	1.02	79.21
			3dB above AGC	-58	18.34	30.19	1.05	/
		100MHz AWGN	Pre-AGC	-53	17.87	29.72	0.94	70.87
			3dB above AGC	-50	18.10	29.95	0.99	/
		GSM	Pre-AGC	-61	18.33	30.18	1.05	79.33
			3dB above AGC	-58	18.43	30.28	1.07	/

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 14dBi declared by the manufacturer.

Mean output power							
Test Path	Test Freq. f0 (MHz)	Test Signal	Signal Level	Output Power (dBm/MHz)	ERP (dBm/MHz)	ERP (W/MHz)	Verdict
UL	706.1	4.1MHz AWGN	Pre-AGC	12.13	23.98	0.26	PASS
			3dB above AGC	12.30	24.15	0.27	PASS
		100MHz AWGN	Pre-AGC	6.38	18.23	0.07	PASS
			3dB above AGC	6.51	18.36	0.07	PASS
		GSM	Pre-AGC	18.33	32.33	1.72	PASS
			3dB above AGC	18.43	32.43	1.75	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 14dBi declared by the manufacturer.
3. The output power is limited to an ERP of 1000W/MHz.

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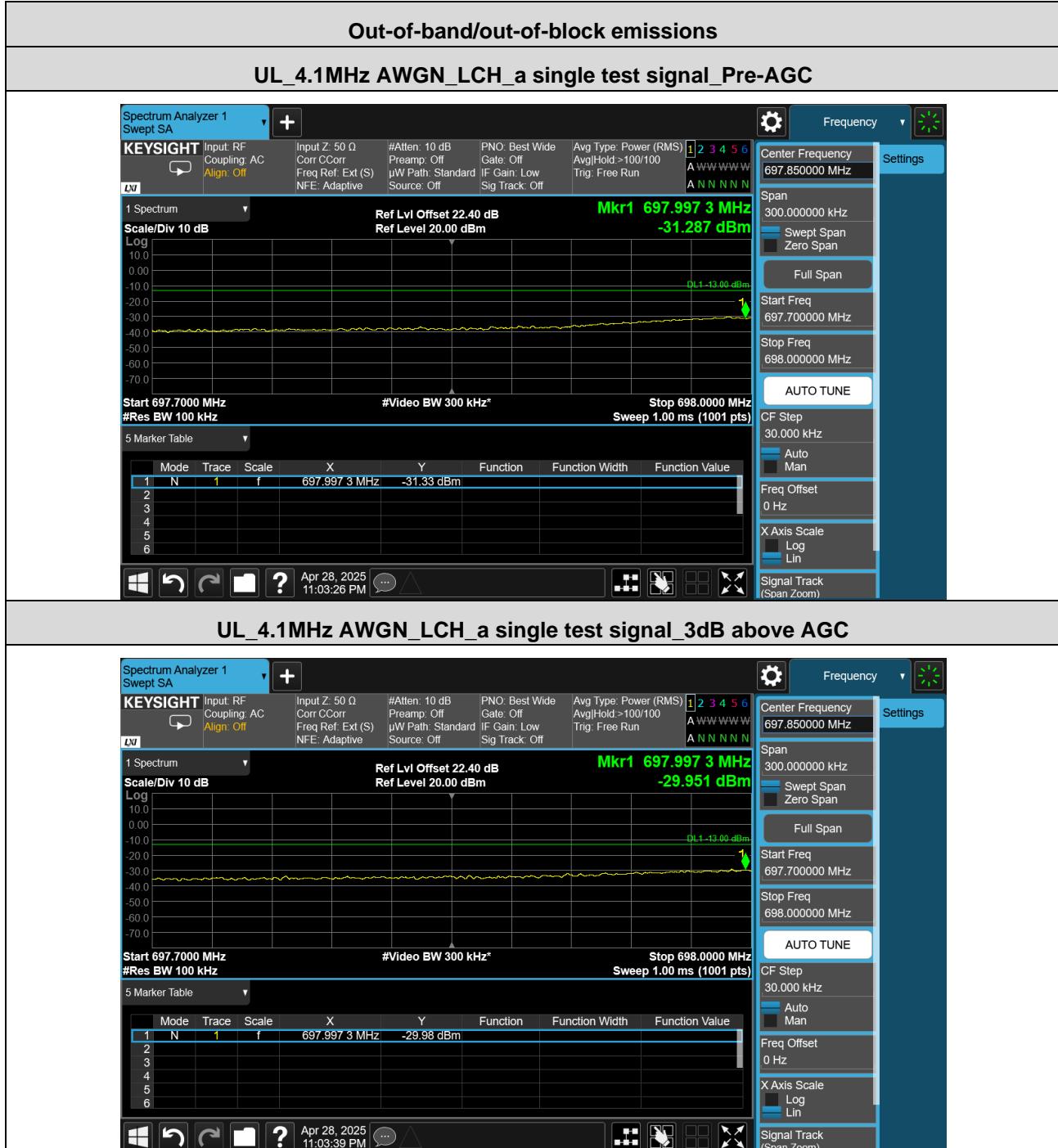
4 Out-of-band/out-of-block(including intermodulation) emissions

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	
UL	LCH	4.1MHz AWGN	One signal input	Pre-AGC	-31.28	≤-13	PASS	
				3dB above AGC	-29.95		PASS	
			Two signals input	Pre-AGC	-30.73		PASS	
				3dB above AGC	-28.21		PASS	
	HCH		One signal input	Pre-AGC	-29.80		PASS	
				3dB above AGC	-26.06		PASS	
			Two signals input	Pre-AGC	-28.98		PASS	
				3dB above AGC	-26.59		PASS	
UL	LCH	100MHz AWGN	One signal input	Pre-AGC	-28.64	≤-13	PASS	
				3dB above AGC	-27.36		PASS	
	HCH		One signal input	Pre-AGC	-37.30		PASS	
				3dB above AGC	-34.67		PASS	
UL	LCH	GSM	One signal input	Pre-AGC	-21.54	≤-13	PASS	
				3dB above AGC	-21.63		PASS	
	HCH		Two signals input	Pre-AGC	-23.78		PASS	
				3dB above AGC	-24.02		PASS	
			One signal input	Pre-AGC	-22.72		PASS	
				3dB above AGC	-22.81		PASS	
			Two signals input	Pre-AGC	-25.17		PASS	
				3dB above AGC	-25.22		PASS	
<p>Remark:</p> <p>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> <p>$P = 19\text{dBm} = 0.08\text{W}$</p> <p>the limit = $19\text{dBm} - [43 + 10 \log_{10}(0.08\text{W})]$ dB = -13dBm</p>								



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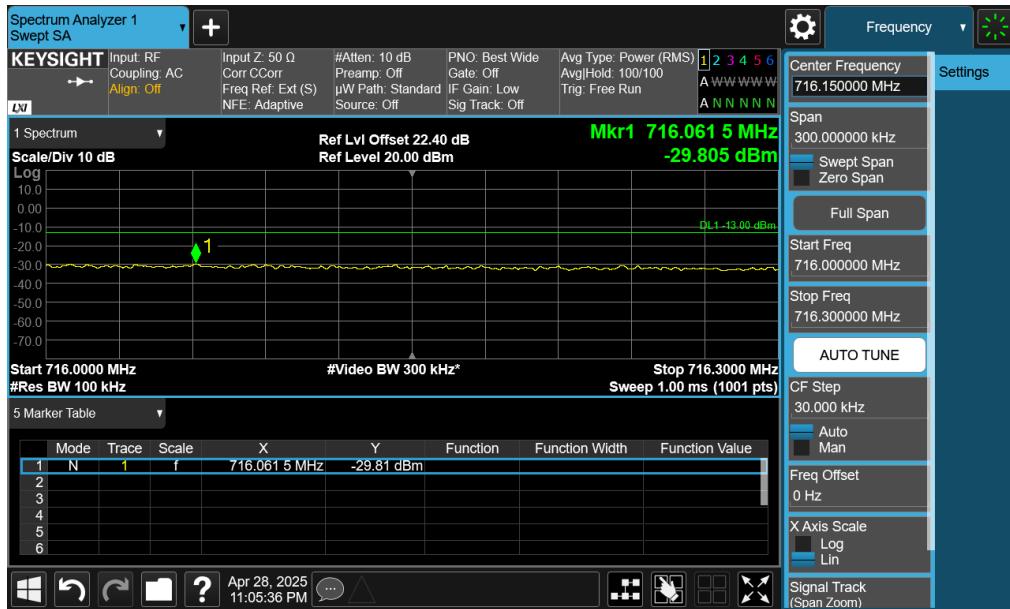
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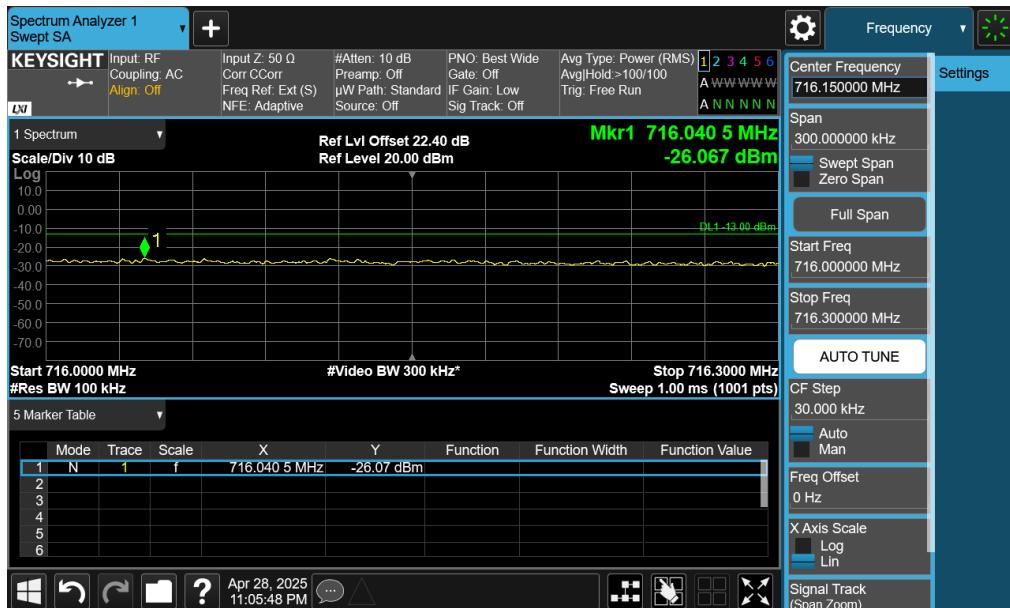


Out-of-band/out-of-block emissions

UL_4.1MHz AWGN_HCH_a single test signal_Pre-AGC



UL_4.1MHz AWGN_HCH_a single test signal_3dB above AGC



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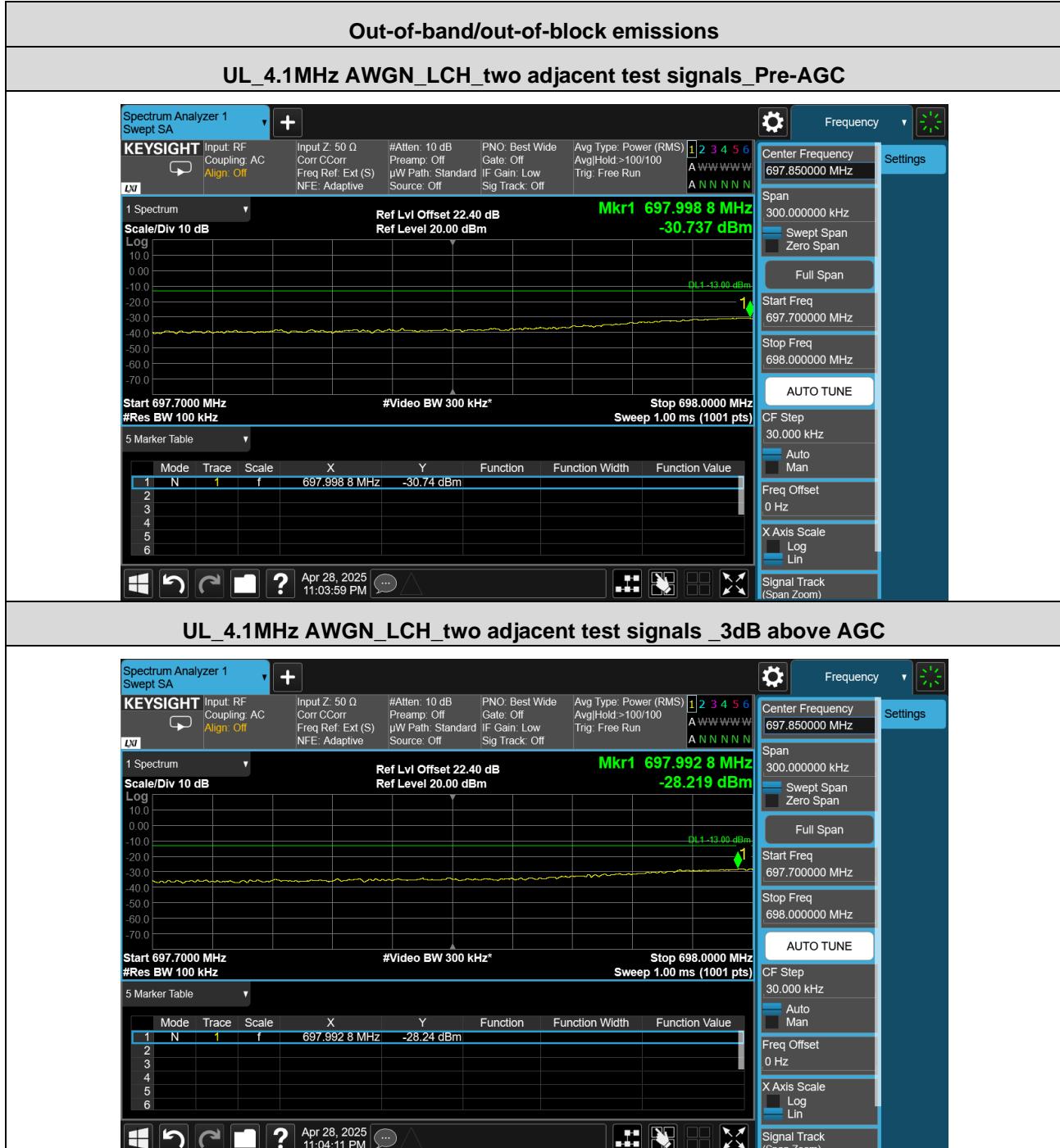
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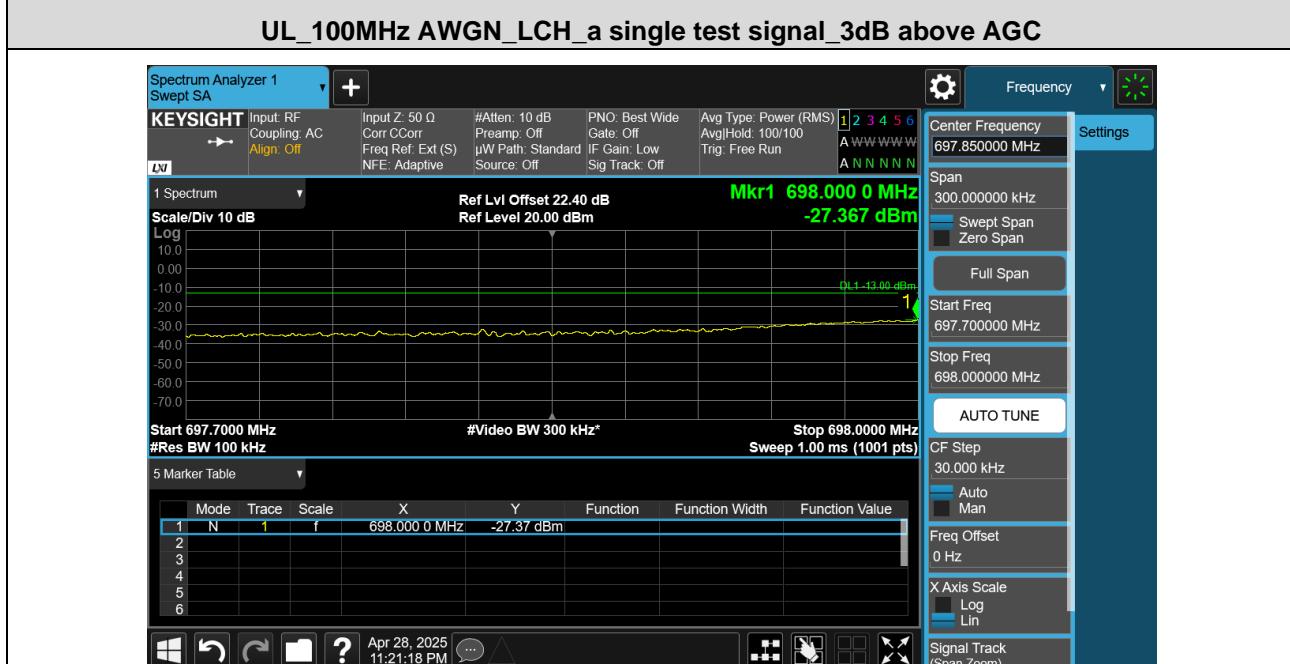
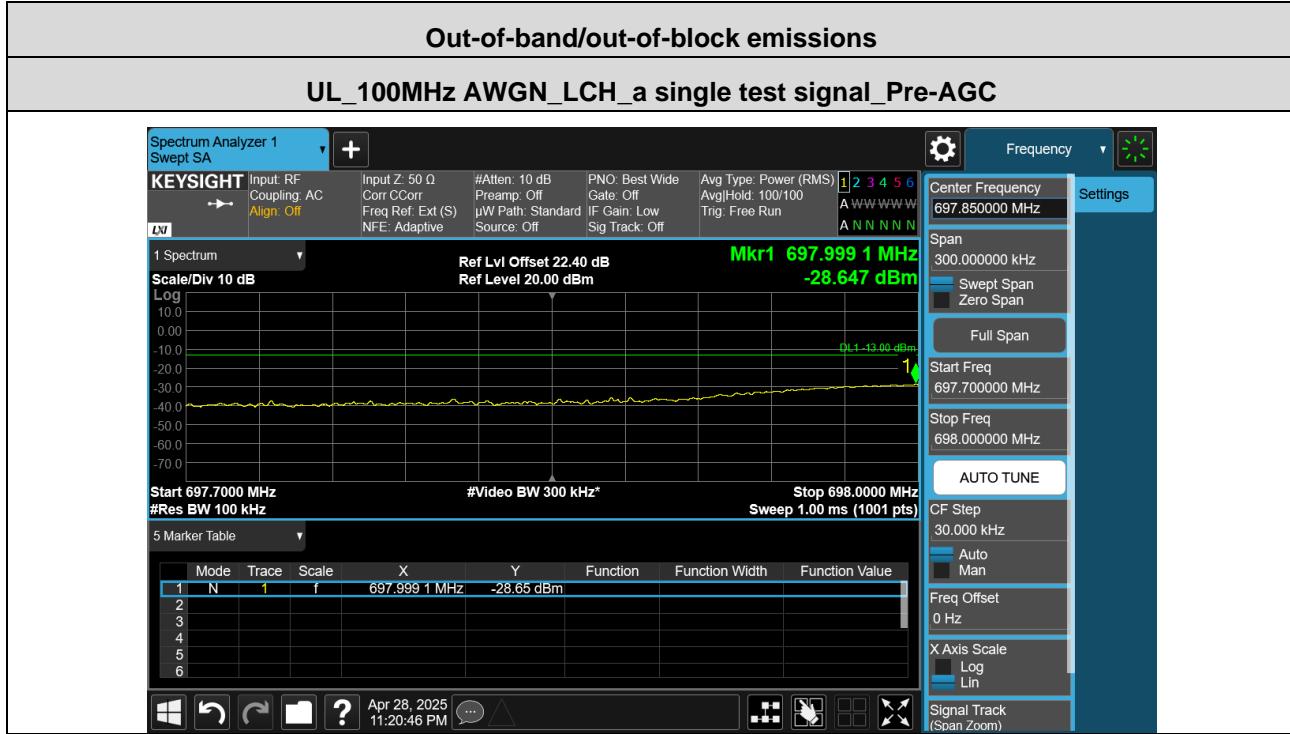




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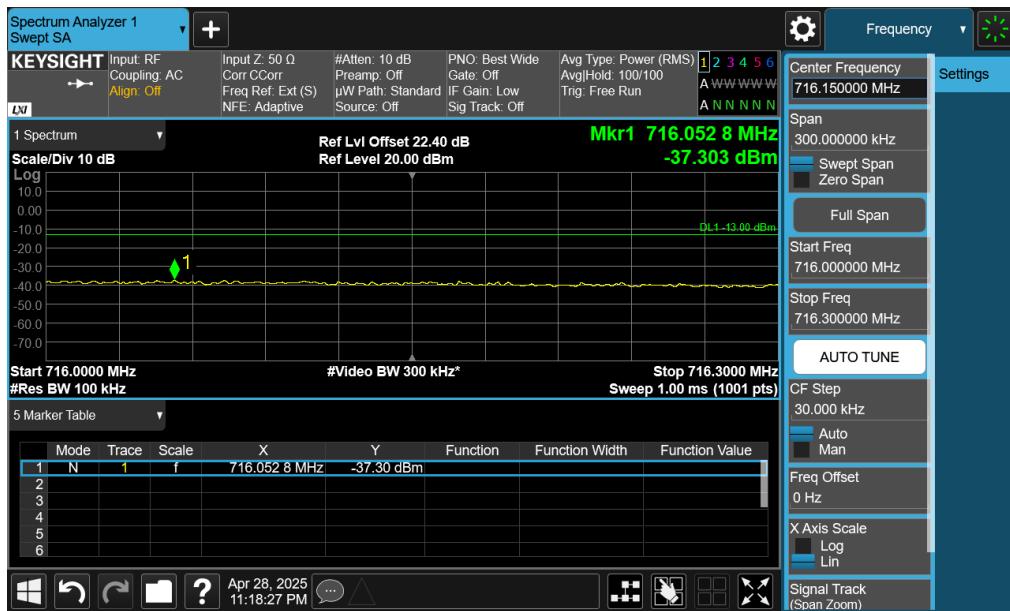
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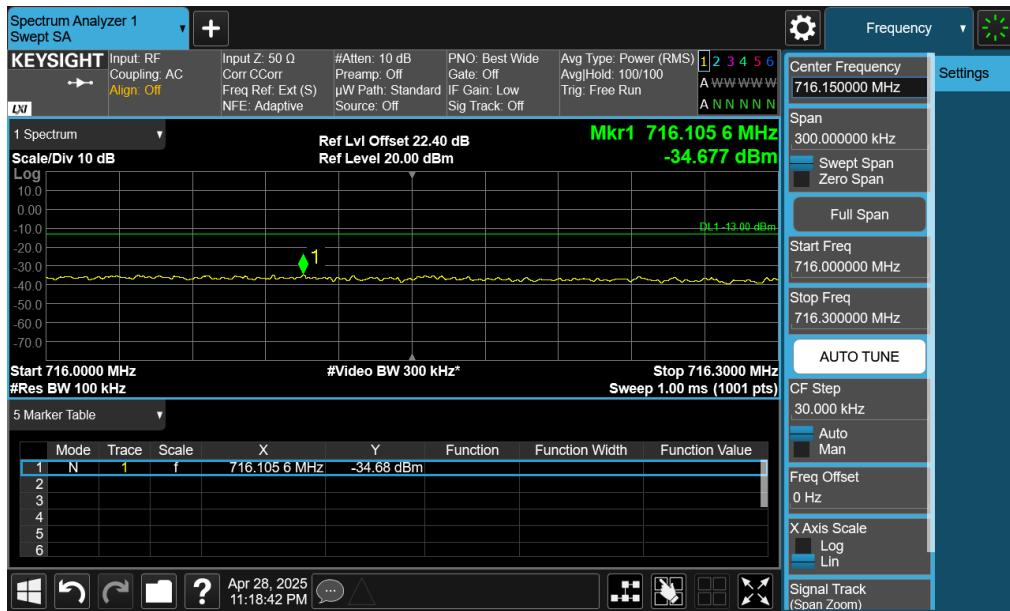


Out-of-band/out-of-block emissions

UL_100MHz AWGN_HCH_a single test signal_Pre-AGC



UL_100MHz AWGN_HCH_a single test signal_3dB above AGC



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

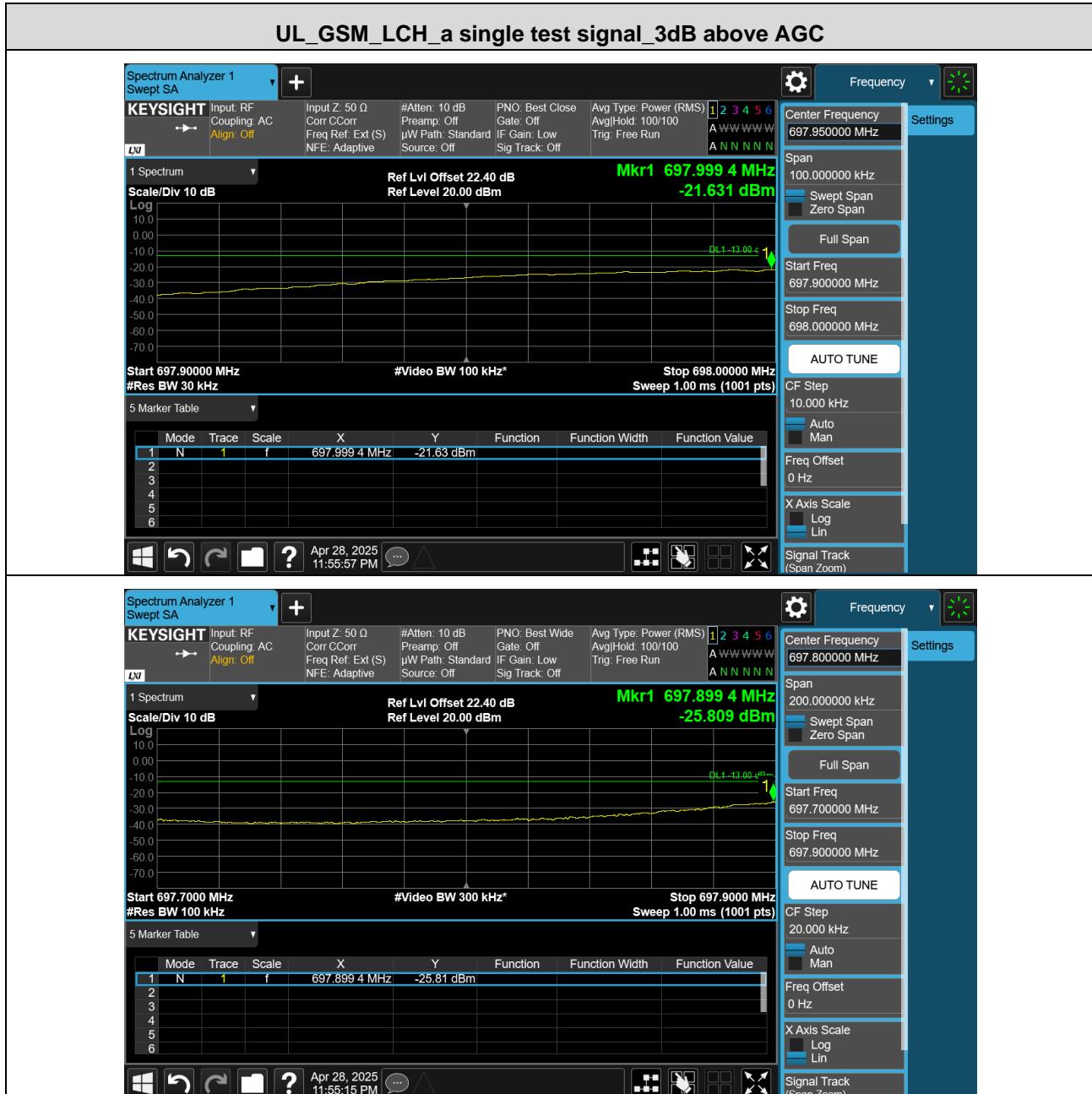
UL_GSM_LCH_a single test signal_Pre-AGC



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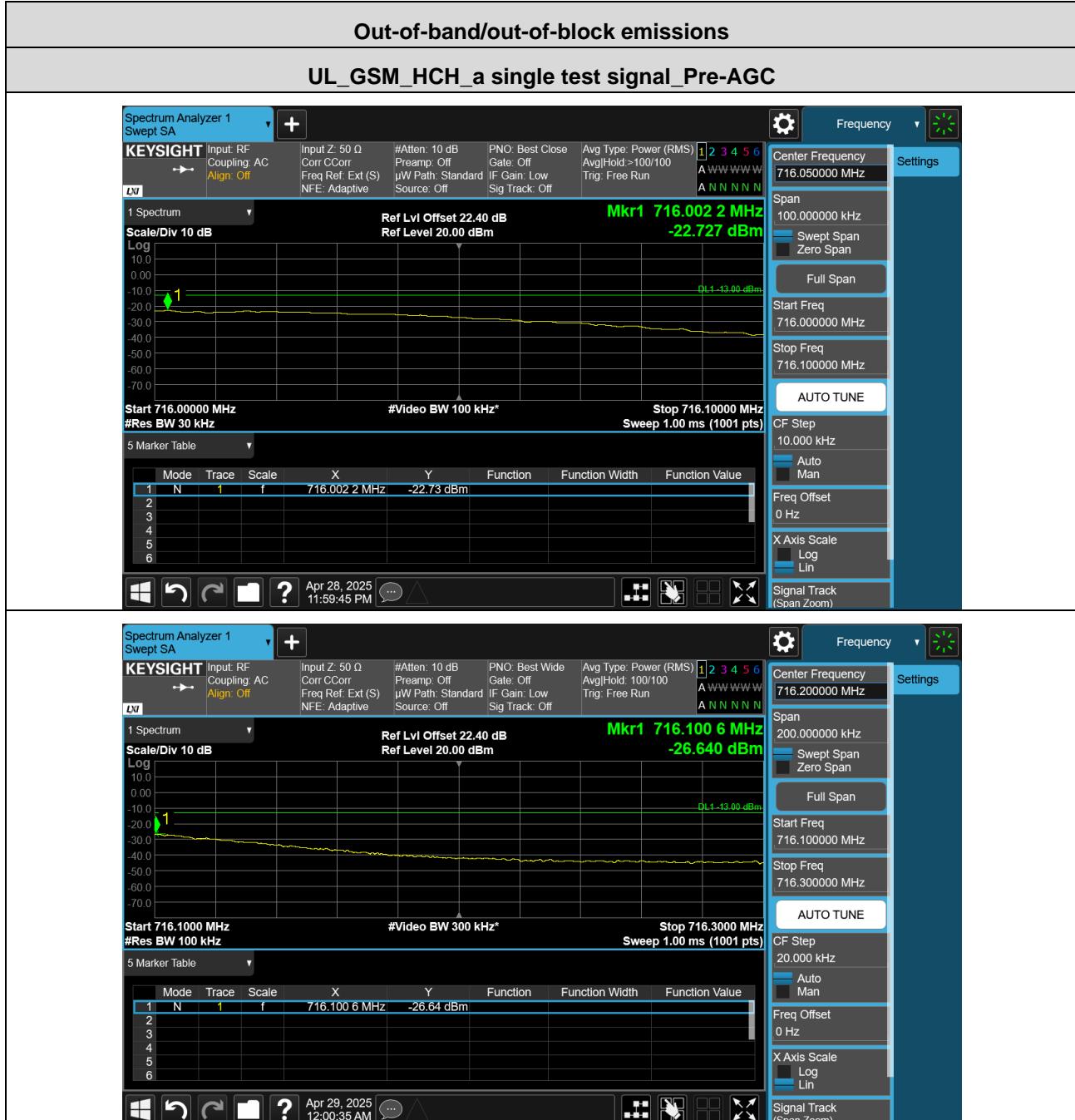




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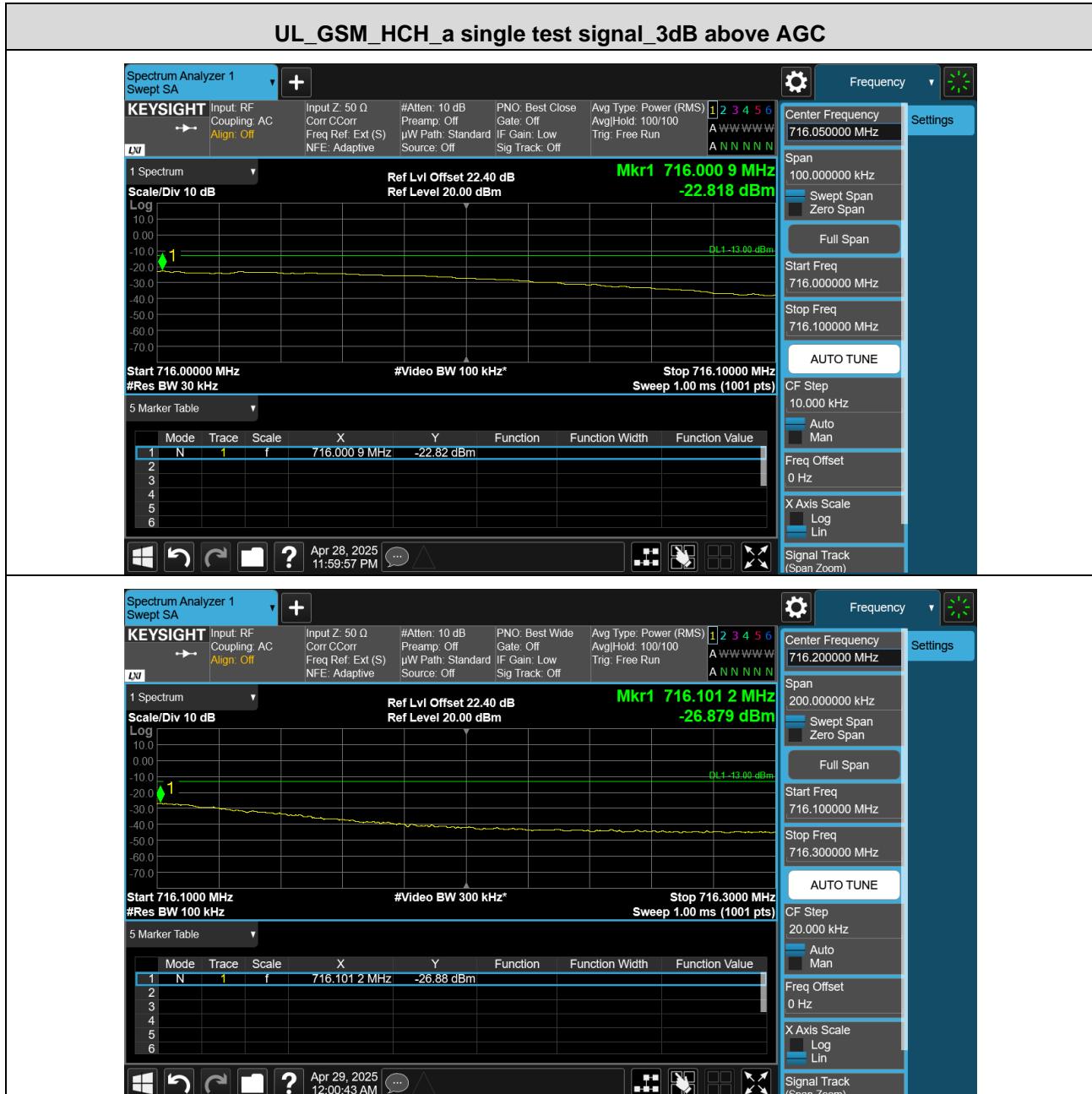




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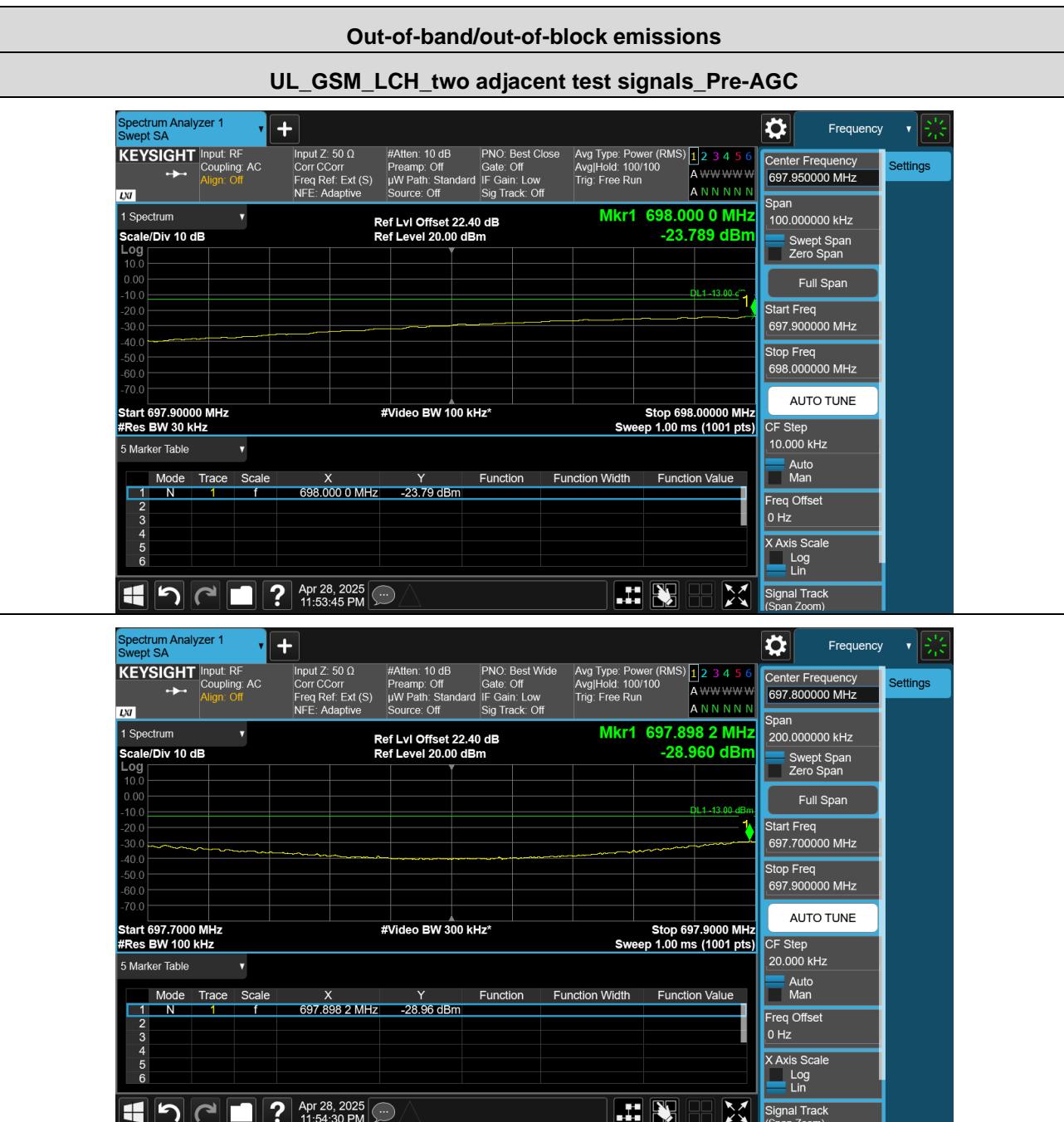
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Out-of-band/out-of-block emissions

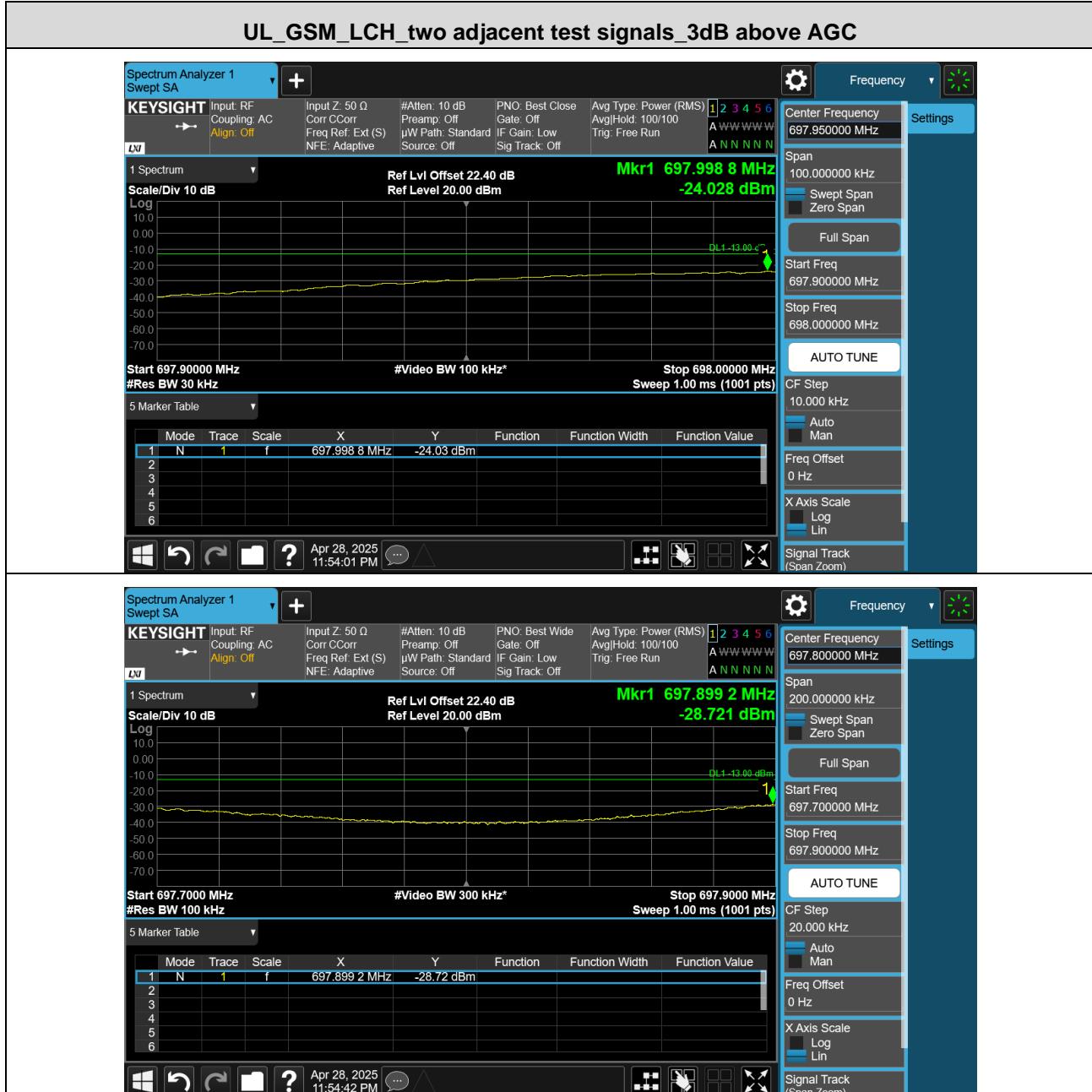
UL_GSM_LCH_two adjacent test signals_Pre-AGC



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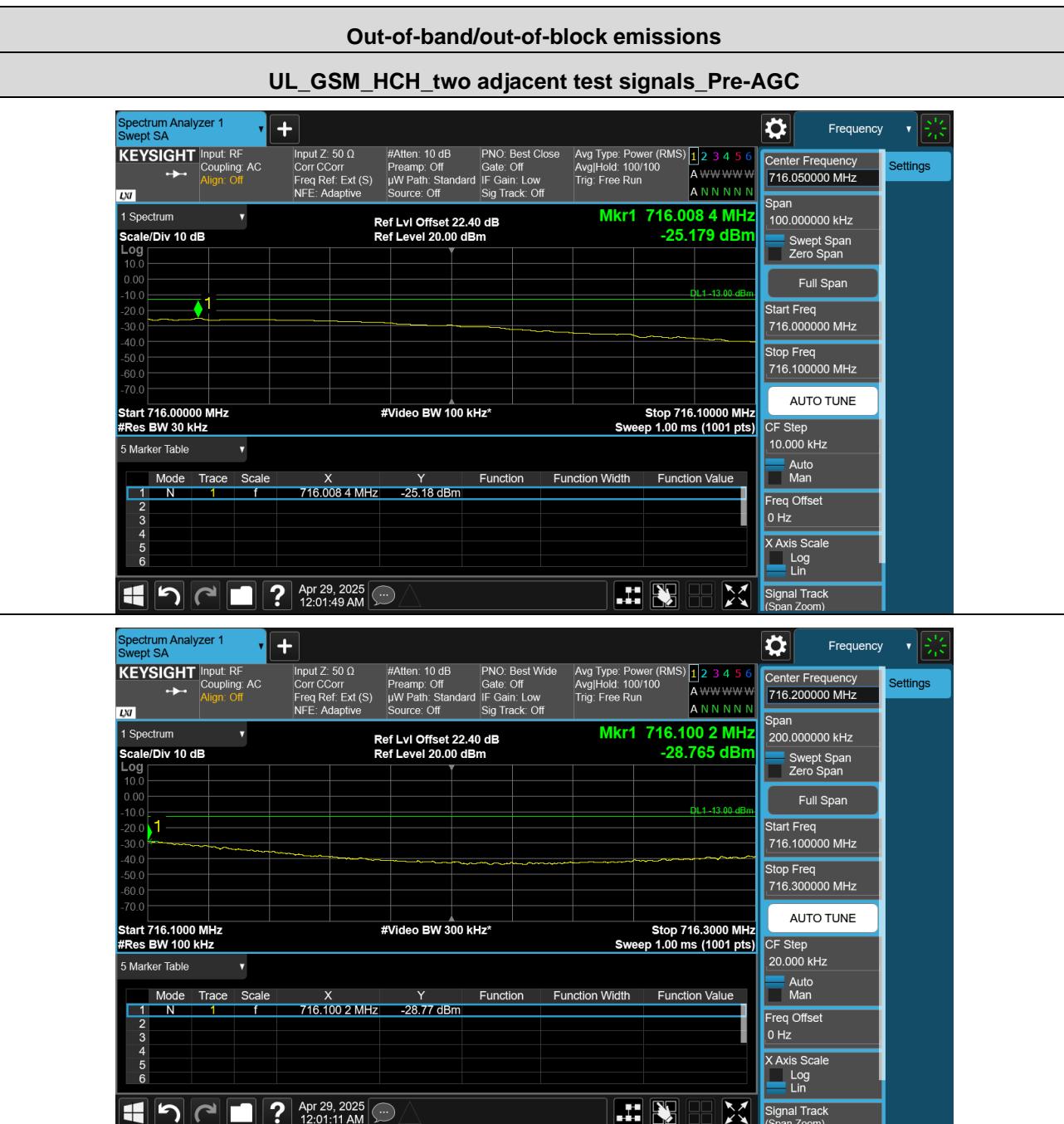
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Out-of-band/out-of-block emissions

UL_GSM_HCH_two adjacent test signals_Pre-AGC



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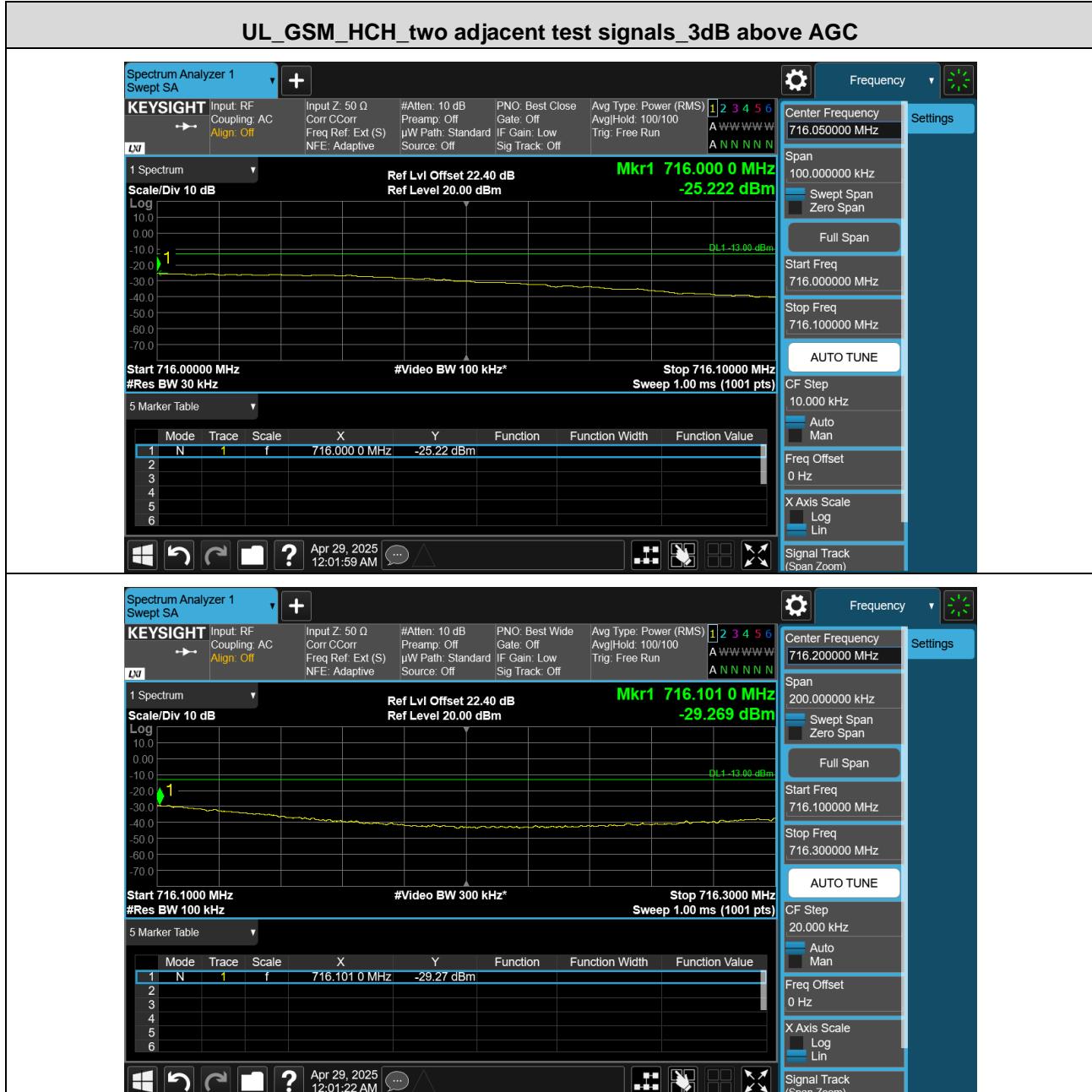
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5 Conducted Spurious emissions

Conducted Spurious emissions						
Test path	Test signal	Test channel	Frequency range (MHz)	Worst test level (dBm)	Limit (dBm)	Verdict
UL	GSM	LCH	0.09-697.9	-28.44	≤-13	PASS
		HCH	716.1-1000	-23.34	≤-13	PASS
			1000-7160	-29.31	≤-13	PASS

Remark:

1. 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,
 $P = 19\text{dBm} = 0.08\text{W}$
 $\text{limit} = 19\text{dBm} - [43 + 10 \log_{10} (0.08\text{W})] \text{ dB} = -13\text{dBm}$
2. All modes (LCH/MCH/HCH, with 4.1MHz AWGN signal/ with 100MHz AWGN signal/ with GSM signal) had been tested, only show the worst-case in this report.
3. The spurious emissions 9kHz to 30MHz were very low and not displayed test plots in this report.

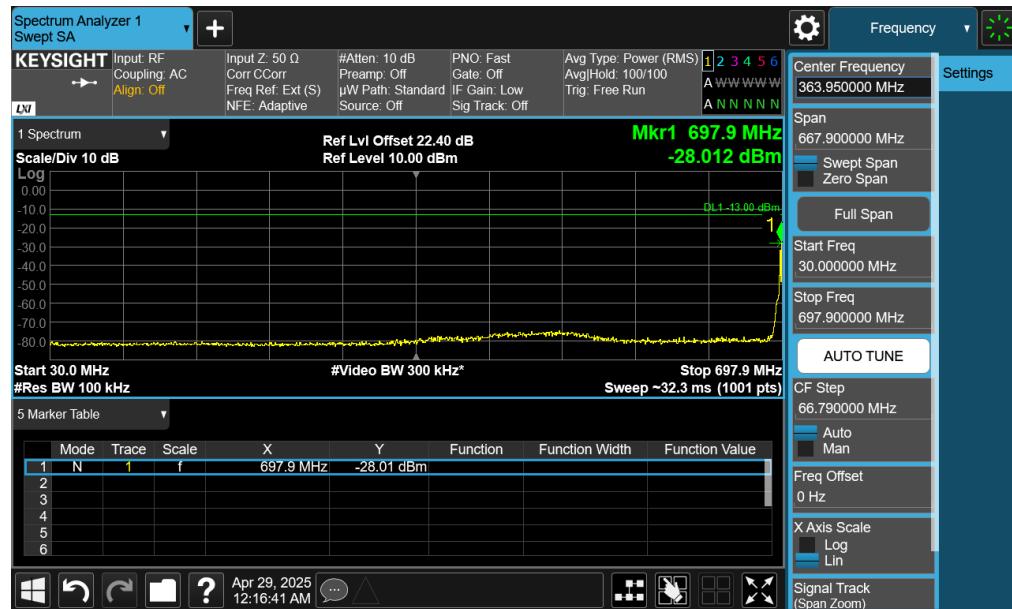


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Conducted spurious emissions

UL_GSM_LCH_Pre-AGC



UL_GSM_HCH_Pre-AGC



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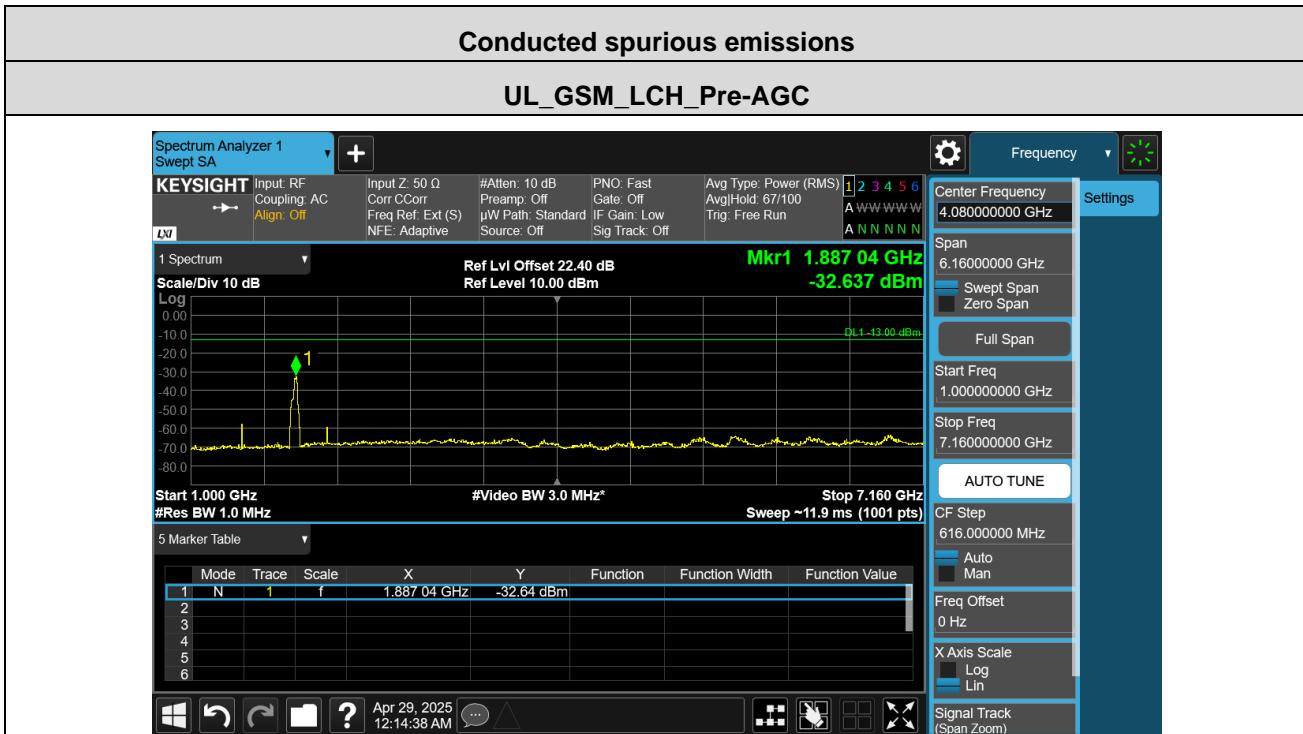
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6 Frequency Stability

Frequency stability vs voltage							
Test path	Test Channel	Test Signal	Temperature	Voltage	Freq. error (Hz)	Tolerance (ppm)	Verdict
UL	MCH	4.1MHz AWGN	TN	VL	7.3	0.01033	PASS
			TN	VH	7.3	0.01033	PASS
		100MHz AWGN	TN	VL	9.2	0.01301	PASS
			TN	VH	9.2	0.01301	PASS
		GSM	TN	VL	8.9	0.01259	PASS
			TN	VH	8.9	0.01259	PASS



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Frequency stability vs temperature							
Test Path	Test Channel	Test Signal	Voltage	Temperature (°C)	Freq. error (Hz)	Tolerance (ppm)	Verdict
UL	MCH	4.1MHz AWGN	VN	+50	8.9	0.01259	PASS
			VN	+40	7.9	0.01117	PASS
			VN	+30	5.5	0.00778	PASS
			VN	+20	6.7	0.00948	PASS
			VN	+10	7.2	0.01018	PASS
			VN	0	7.7	0.01089	PASS
			VN	-10	8.3	0.01174	PASS
			VN	-20	9.0	0.01273	PASS
			VN	-30	6.6	0.00934	PASS
UL	MCH	100MHz AWGN	VN	+50	9.2	0.01301	PASS
			VN	+40	5.6	0.00792	PASS
			VN	+30	8.7	0.01231	PASS
			VN	+20	8.0	0.01132	PASS
			VN	+10	4.7	0.00665	PASS
			VN	0	5.1	0.00721	PASS
			VN	-10	8.6	0.01216	PASS
			VN	-20	6.6	0.00934	PASS
			VN	-30	5.2	0.00736	PASS
UL	MCH	GSM	VN	+50	7.0	0.00990	PASS
			VN	+40	7.3	0.01033	PASS
			VN	+30	6.1	0.00863	PASS
			VN	+20	7.4	0.01047	PASS
			VN	+10	8.2	0.01160	PASS
			VN	0	9.3	0.01315	PASS
			VN	-10	5.2	0.00736	PASS
			VN	-20	7.4	0.01047	PASS
			VN	-30	7.4	0.01047	PASS

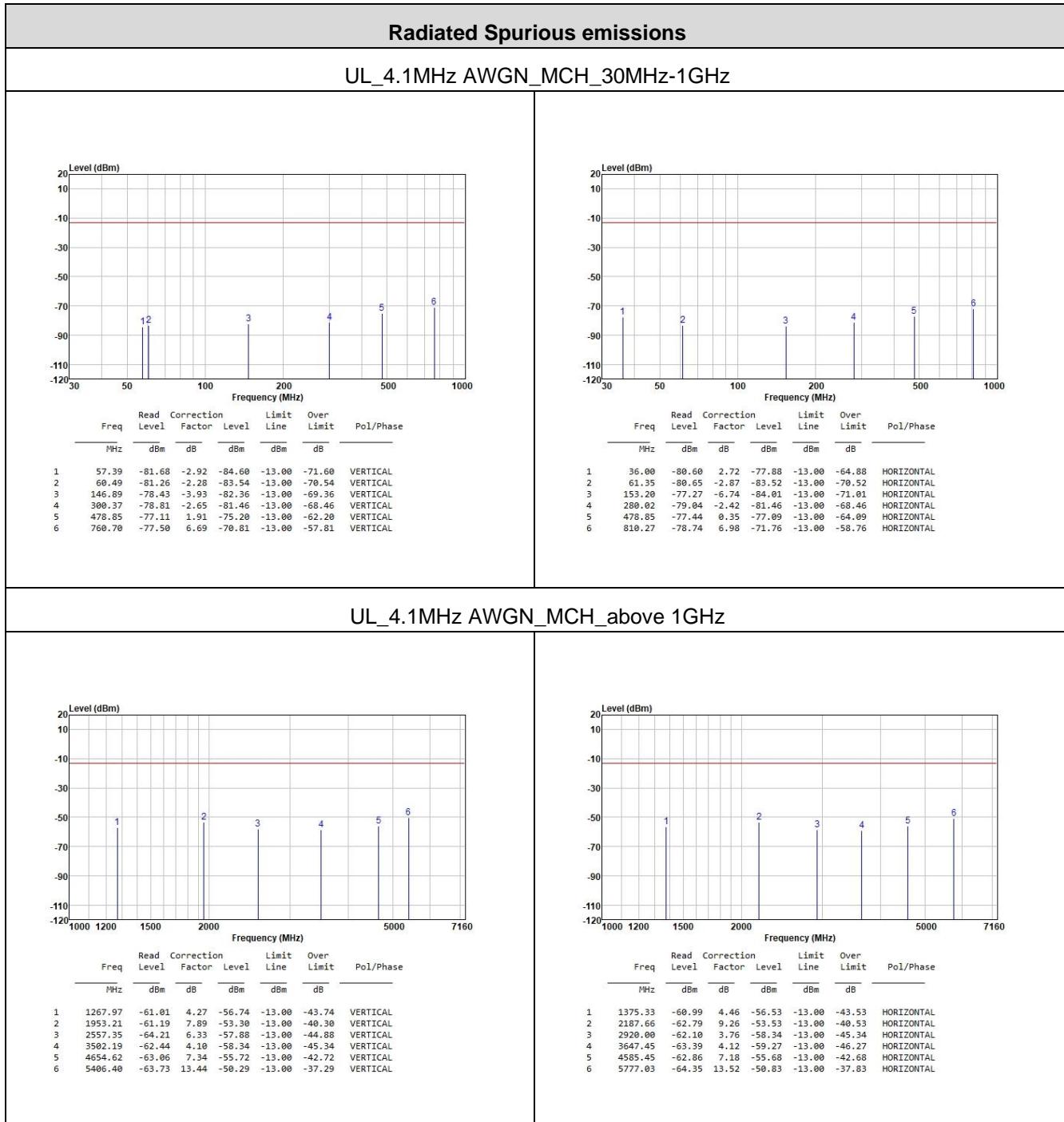
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7 Radiated Spurious emissions



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Remark:

Pre-test was performed for all modes (LCH/MCH/HCH, with GSM signal/ with 4.1MHz AWGN signals/ with 100MHz AWGN signals), the test result always keeps more than 20dB margin, the spurious emissions 9kHz to 30MHz were very low and not displayed in this report. Therefore, only show the worst-case in this report.

--End of Appendix--

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