

Appendix -

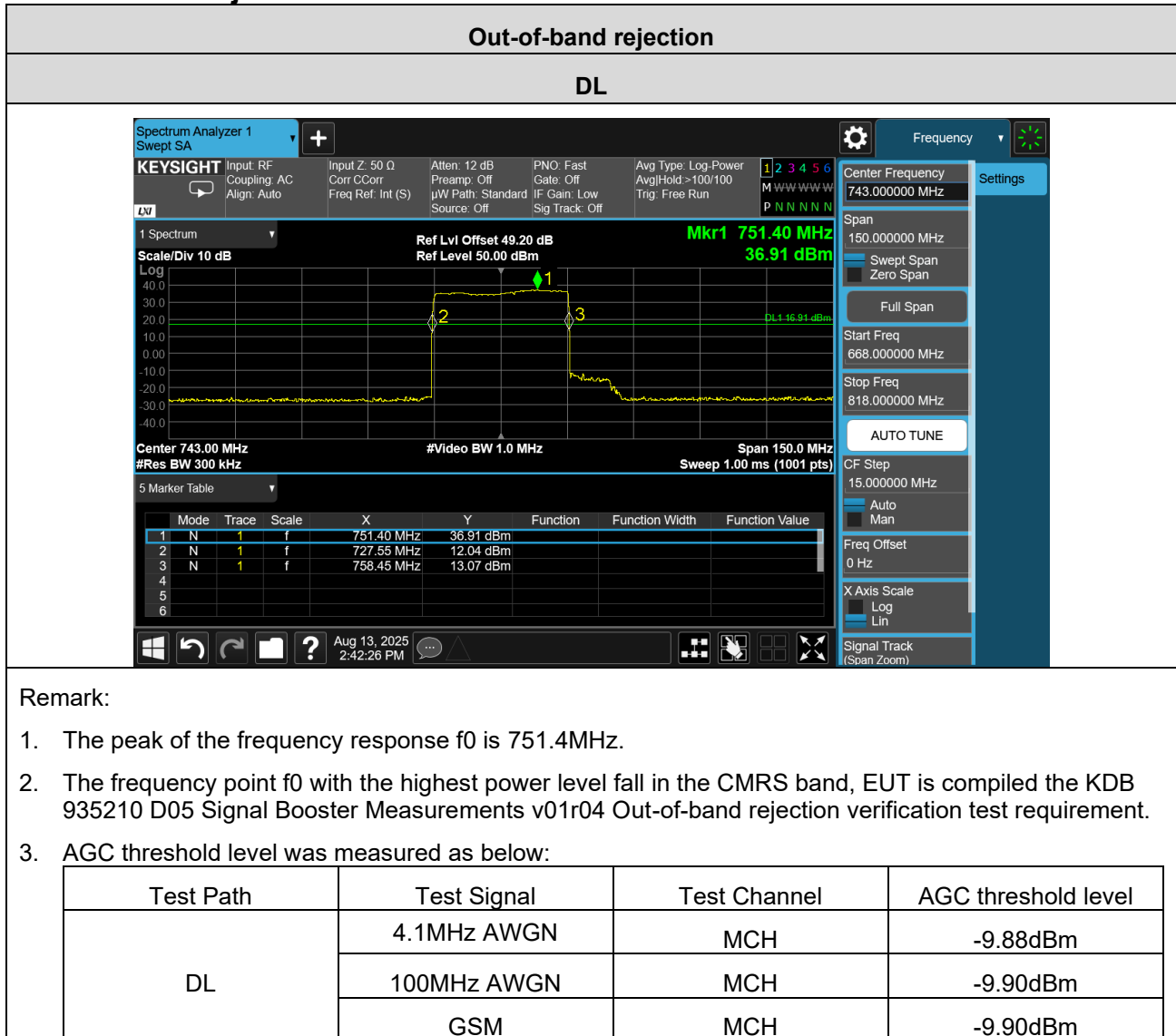
Test Data and Result for report

GZCR250800119302

(For Lower & Upper 700MHz Band DL)



1 Out-of-band rejection



2 Input versus Output comparison

Occupied Bandwidth				
Test Path	Test Signal	Test Channel	Signal Level	Verdict
DL	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:

- * The band supports maximum channel BW is 30MHz for NR, so the output signal OBW was less than the input when 100MHz AWGN was as stimulus signal.
- 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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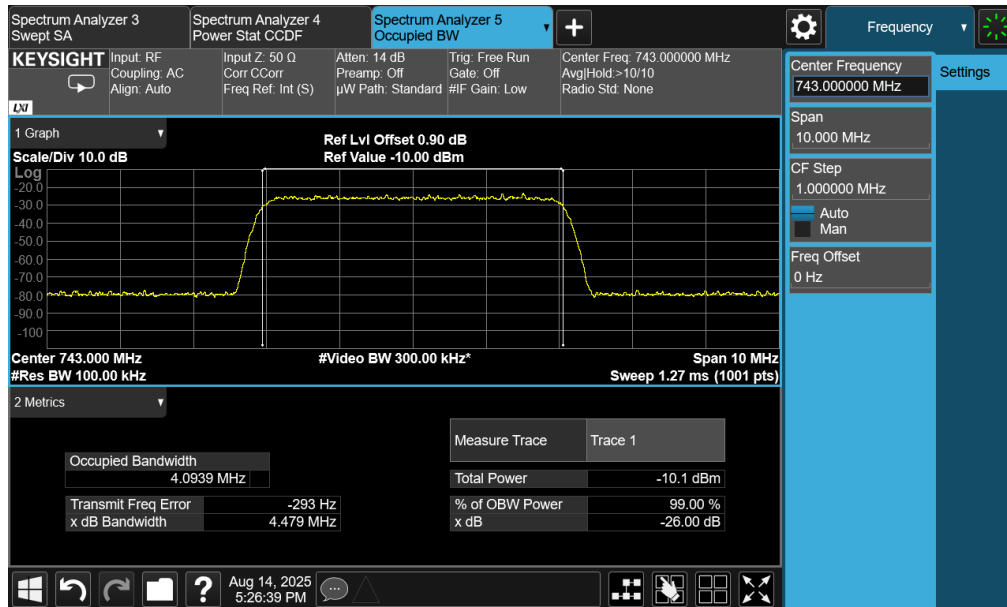
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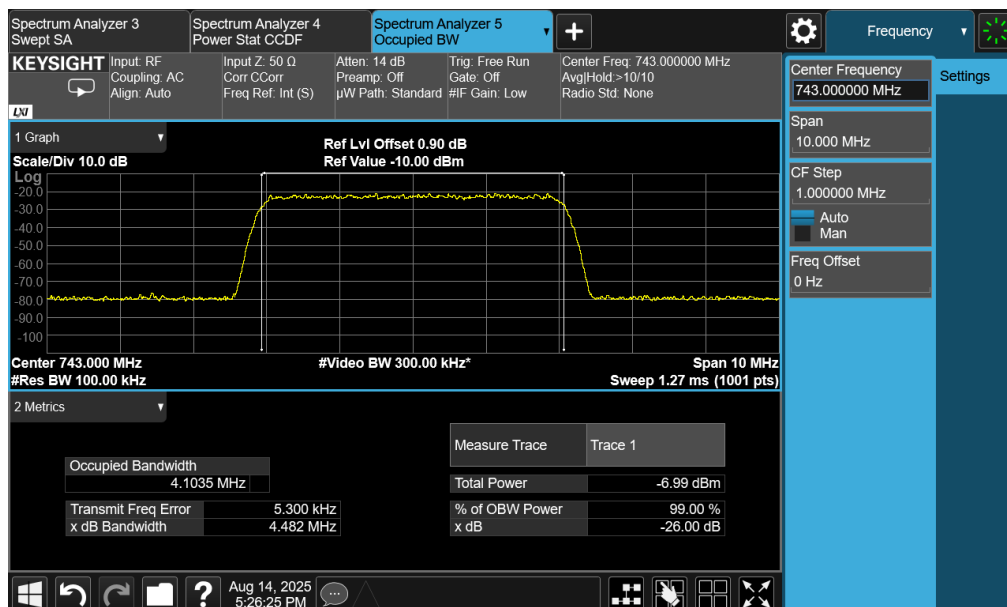
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99% OBW

DL_4.1MHz AWGN_MCH_Input_Pre-AGC



DL_4.1MHz AWGN_MCH_Input_3dB above AGC



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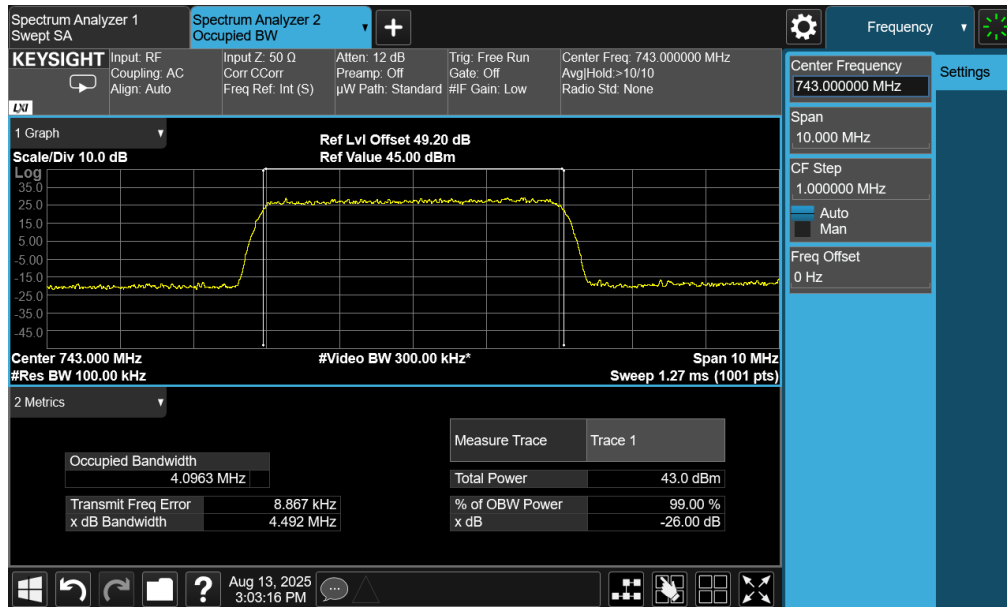
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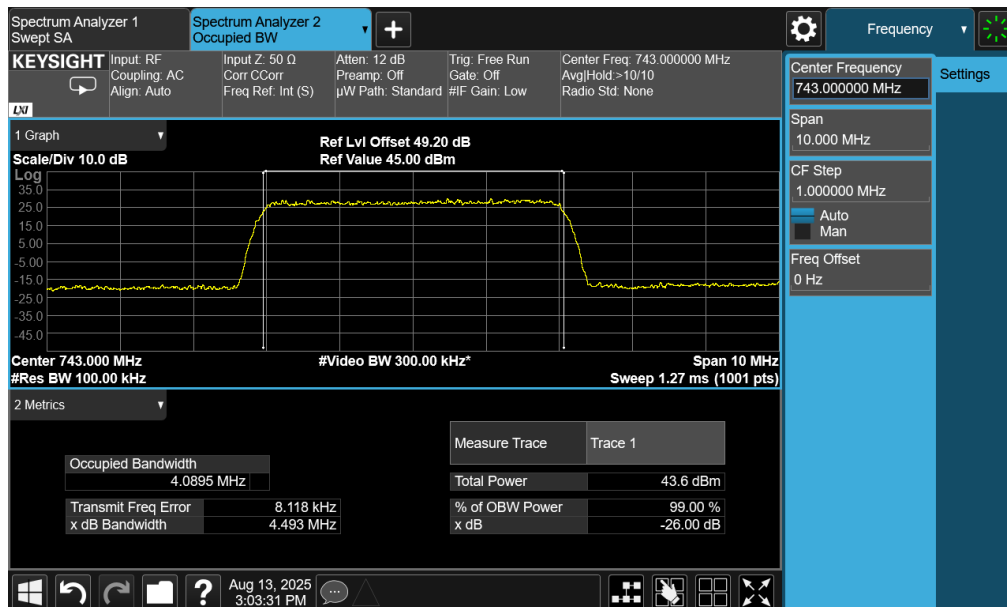
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99% OBW

DL_4.1MHz AWGN_MCH_Output_Pre-AGC

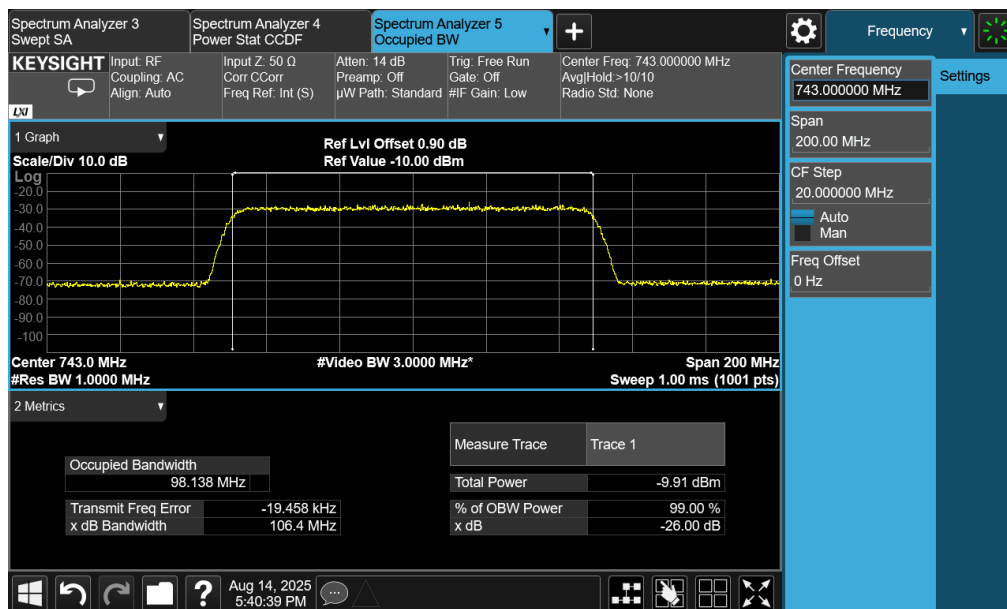


DL_4.1MHz AWGN_MCH_Output_3dB above AGC

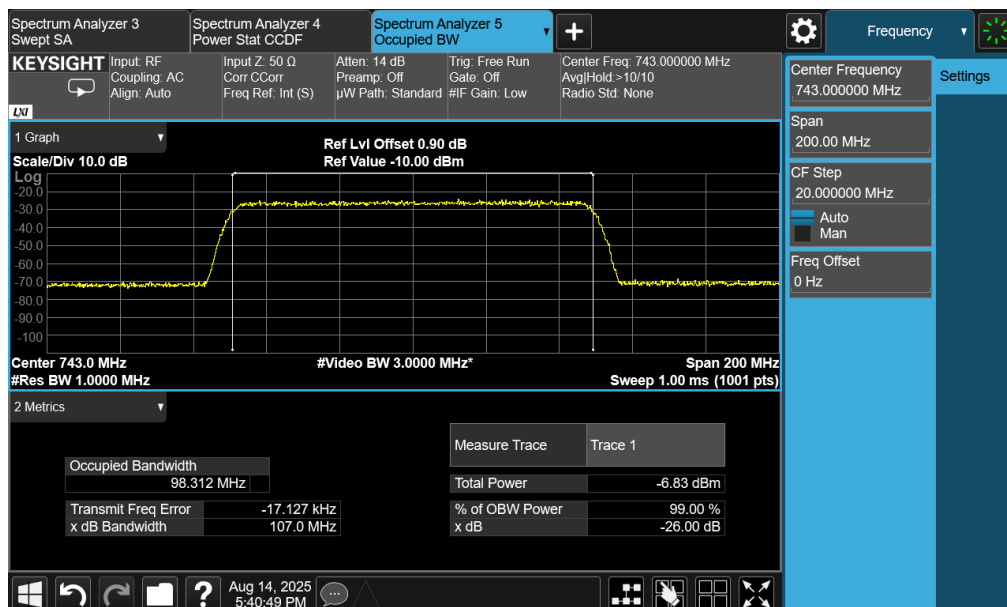


99% OBW

DL_100MHz AWGN_MCH_Input_Pre-AGC



DL_100MHz AWGN_MCH_Input_3dB above AGC



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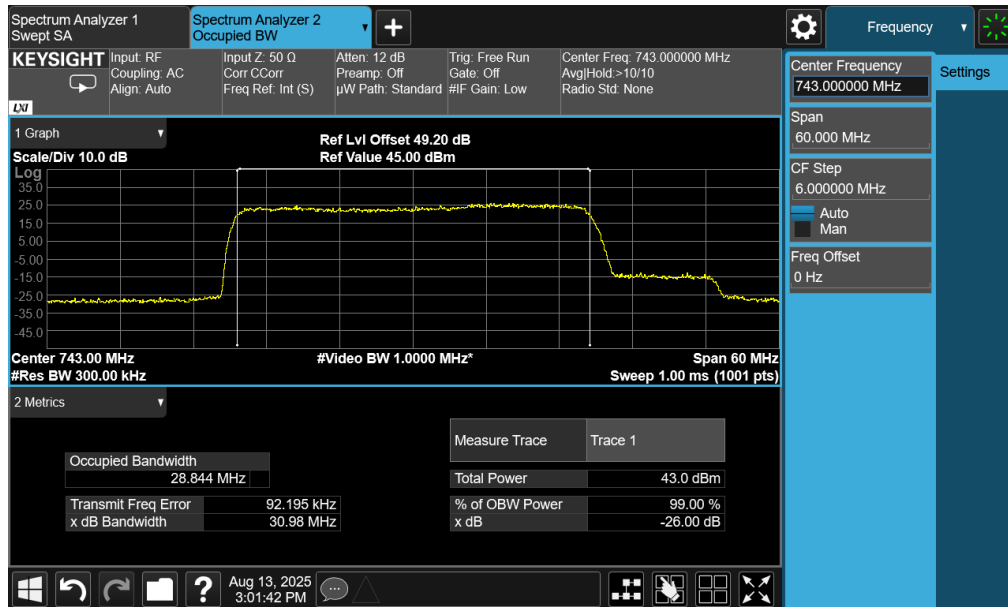
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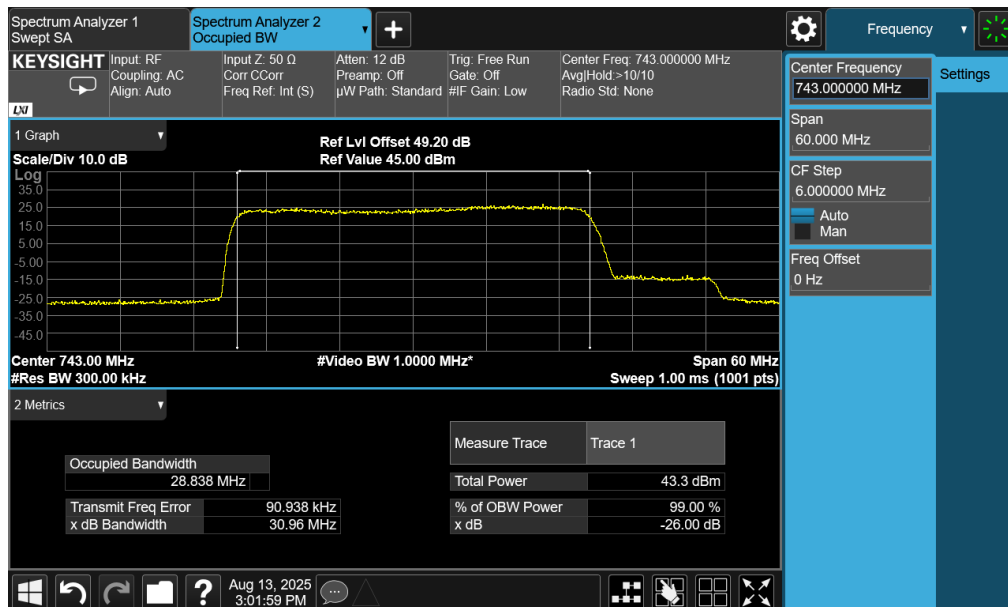
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DL_100MHz AWGN_MCH_Output_Pre-AGC



DL_100MHz AWGN_MCH_Output_3dB above AGC



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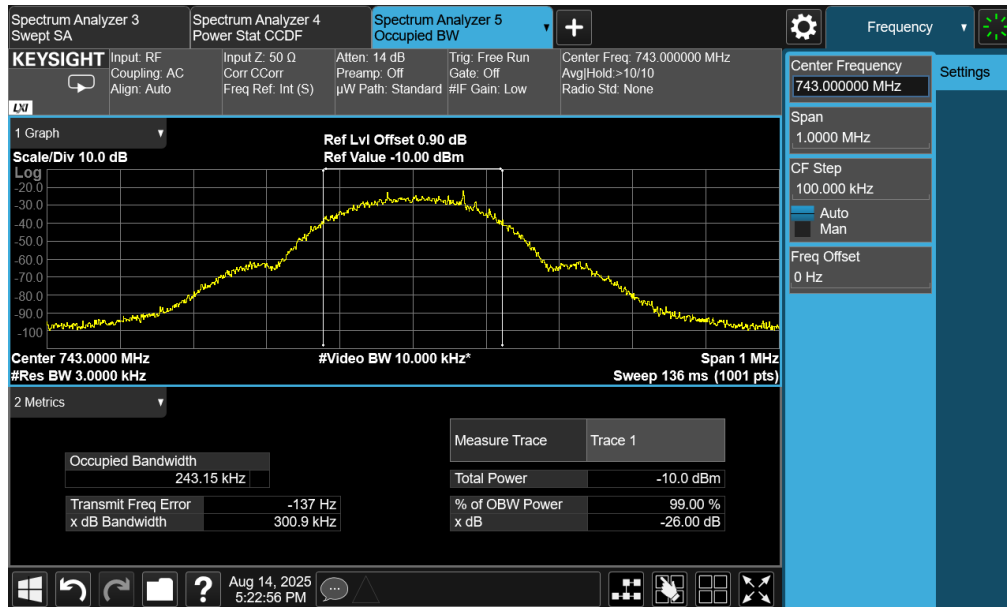
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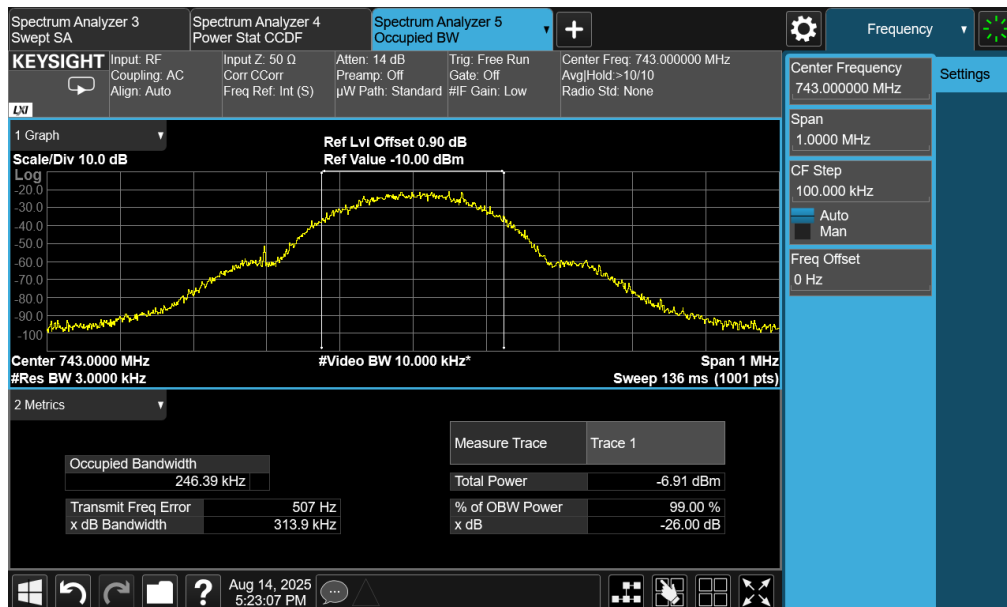
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99% OBW

DL_GSM_MCH_Input_Pre-AGC



DL_GSM_MCH_Input_3dB above AGC



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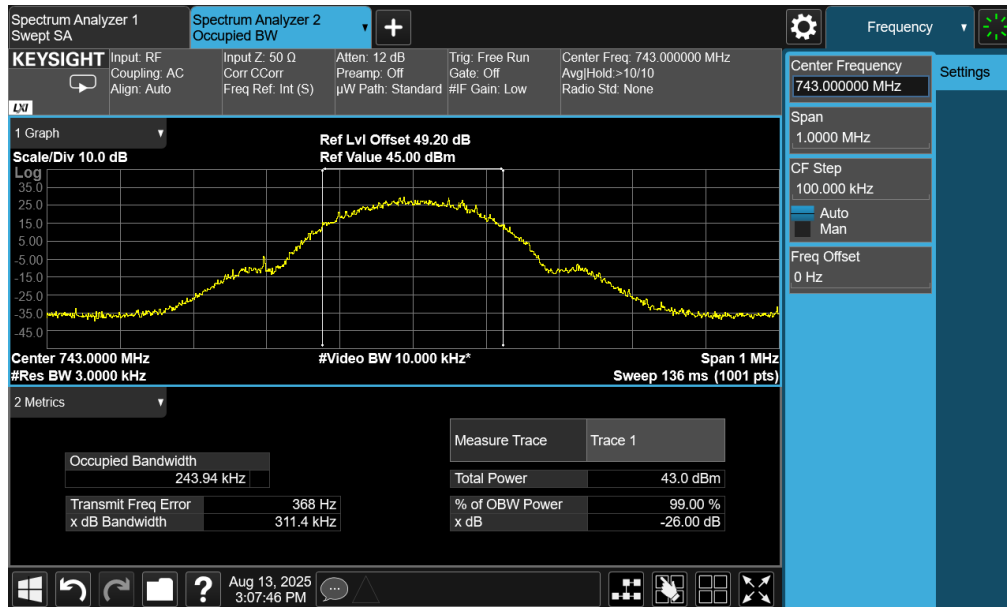
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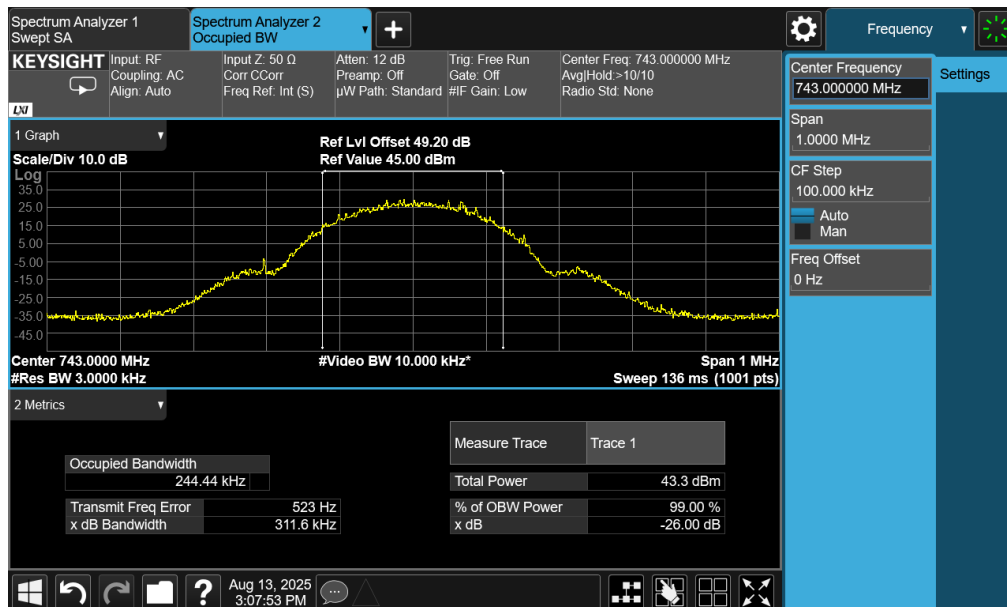
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99% OBW

DL_GSM_MCH_Output_Pre-AGC



DL_GSM_MCH_Output_3dB above AGC



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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)
DL	751.4	4.1MHz AWGN	Pre-AGC	-10	43.12	45.97	39.54	53.12
			3dB above AGC	-7	43.66	46.51	44.77	/
		100MHz AWGN	Pre-AGC	-10	43.06	45.91	38.99	53.06
			3dB above AGC	-7	43.32	46.17	41.40	/
		GSM	Pre-AGC	-10	43.08	45.93	39.17	53.08
			3dB above AGC	-7	43.37	46.22	41.88	/

Remark:

- f0 is from Out-of-band Rejection test in the report.
- ERP= output power (dBm)+ antenna gain (dBi)- 2.15, the antenna gain is 5dBi 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
DL	751.4	4.1MHz AWGN	Pre-AGC	37.32	40.17	10.40	PASS
			3dB above AGC	37.30	40.15	10.35	PASS
		100MHz AWGN	Pre-AGC	28.55	31.40	1.38	PASS
			3dB above AGC	28.63	31.48	1.41	PASS
		GSM	Pre-AGC	43.08	45.93	39.17	PASS
			3dB above AGC	43.37	46.22	41.88	PASS

Remark:

- f0 is from Out-of-band Rejection test in the report.
- ERP= output power (dBm)+ antenna gain (dBi)- 2.15, the antenna gain is 5dBi declared by the manufacturer.
- 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
DL	LCH	4.1MHz AWGN	One signal input	Pre-AGC	-32.78	≤-13	PASS
				3dB above AGC	-32.66		PASS
			Two signals input	Pre-AGC	-27.57		PASS
				3dB above AGC	-27.68		PASS
	HCH		One signal input	Pre-AGC	-26.00		PASS
				3dB above AGC	-23.90		PASS
			Two signals input	Pre-AGC	-26.78		PASS
				3dB above AGC	-26.49		PASS
DL	LCH	100MHz AWGN	One signal input	Pre-AGC	-27.51	≤-13	PASS
	3dB above AGC			-26.91	PASS		
	HCH		One signal input	Pre-AGC	-27.45		PASS
				3dB above AGC	-27.07		PASS
DL	LCH	GSM	One signal input	Pre-AGC	-20.00	≤-13	PASS
				3dB above AGC	-19.82		PASS
			Two signals input	Pre-AGC	-19.31		PASS
				3dB above AGC	-19.43		PASS
	HCH		One signal input	Pre-AGC	-17.09		PASS
				3dB above AGC	-16.98		PASS
			Two signals input	Pre-AGC	-17.50		PASS
				3dB above AGC	-17.04		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, here, P = 43dBm = 20W the limit = 43dBm – [43 + 10 log10 (20W)] dB = -13dBm							



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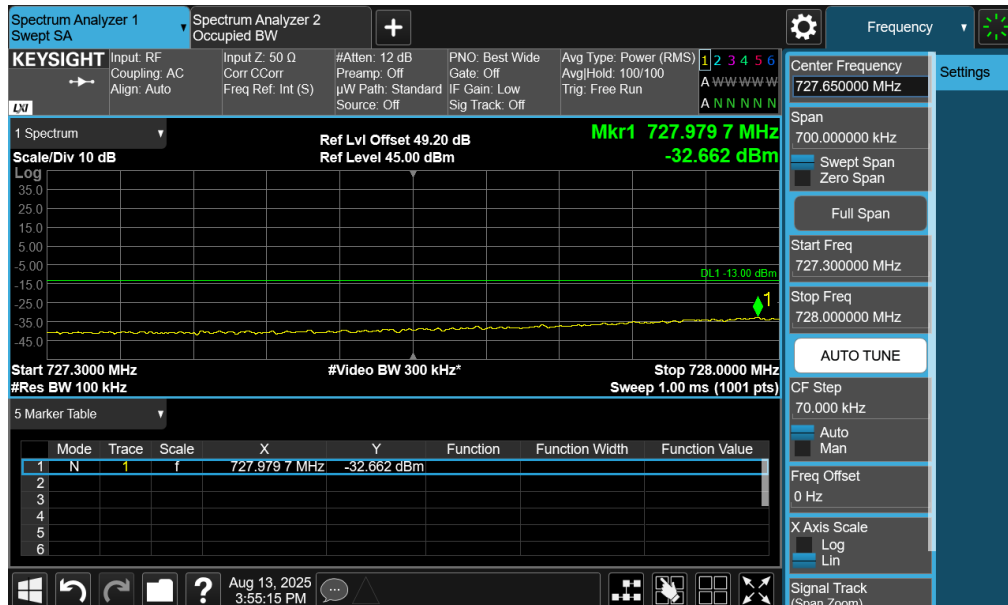
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Out-of-band/out-of-block emissions

DL_4.1MHz AWGN_LCH_a single test signal_Pre-AGC

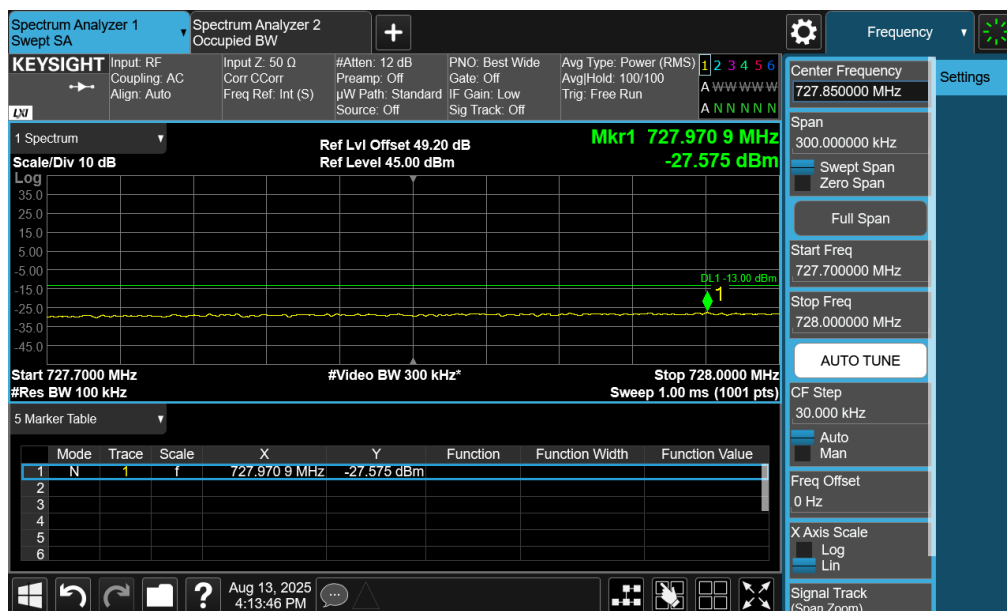


DL_4.1MHz AWGN_LCH_a single test signal_3dB above AGC

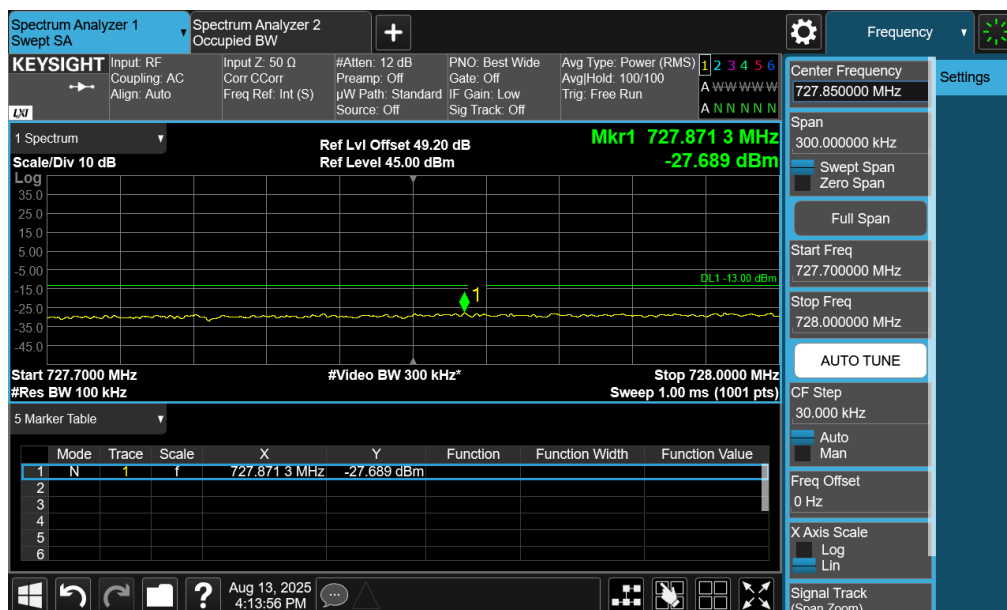


Out-of-band/out-of-block emissions

DL_4.1MHz AWGN_LCH_two adjacent test signals_Pre-AGC



DL_4.1MHz AWGN_LCH_two adjacent test signals_3dB above AGC



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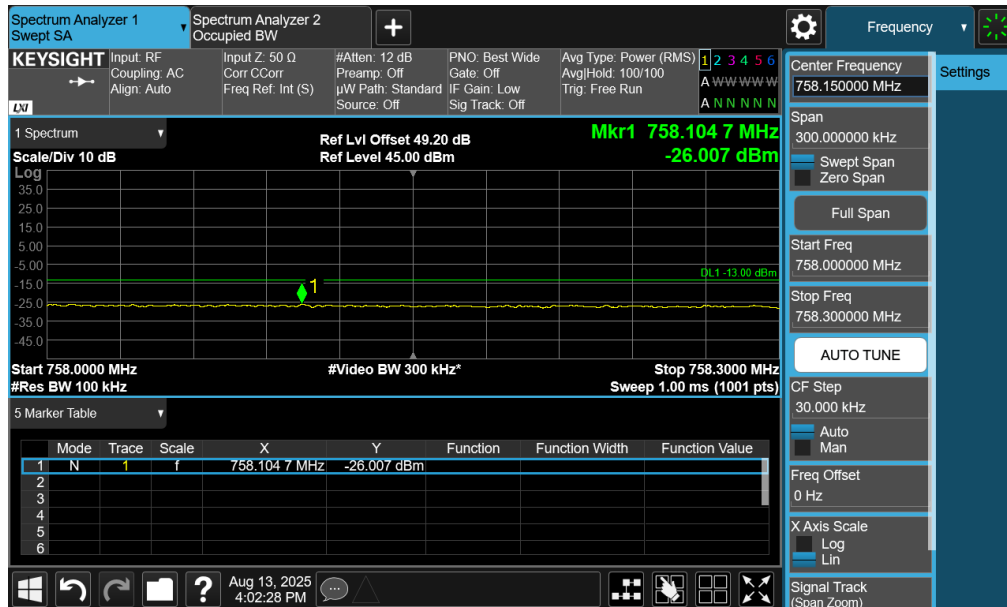
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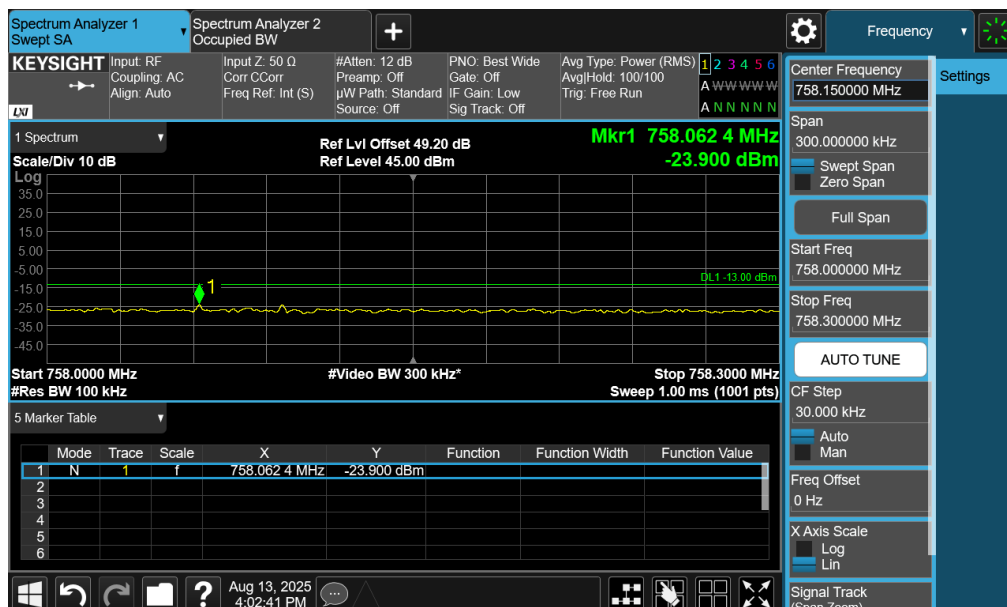
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Out-of-band/out-of-block emissions

DL_4.1MHz AWGN_HCH_a single test signal_Pre-AGC

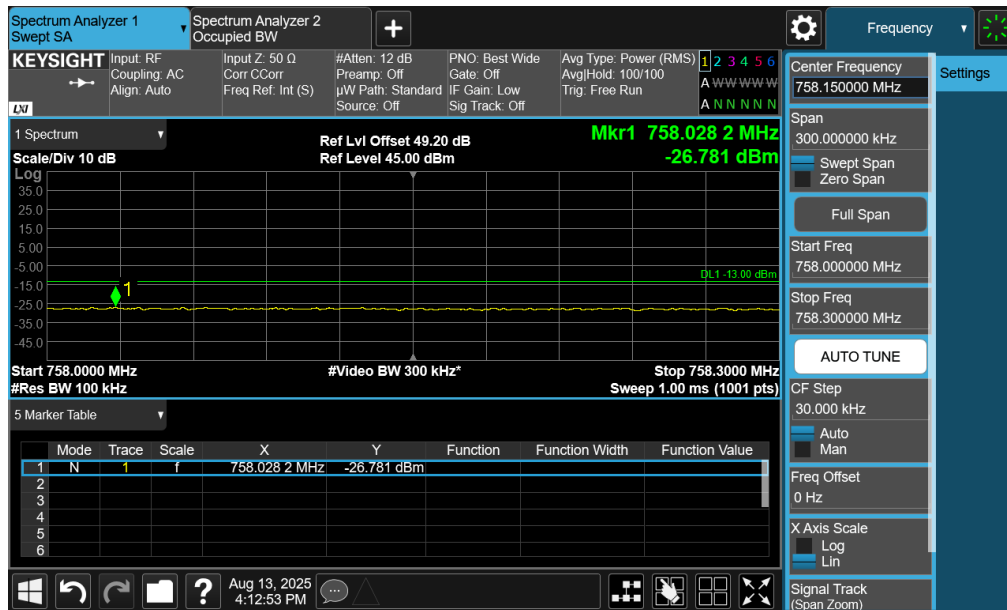


DL_4.1MHz AWGN_HCH_a single test signal_3dB above AGC

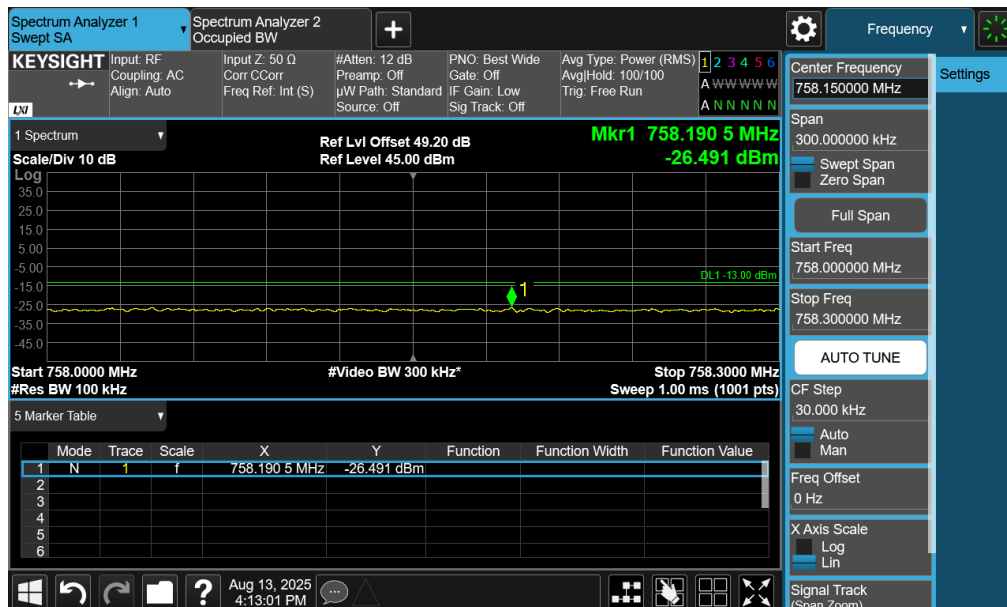


Out-of-band/out-of-block emissions

DL_4.1MHz AWGN_HCH_two adjacent test signals_Pre-AGC



DL_4.1MHz AWGN_HCH_two adjacent test signals_3dB above AGC

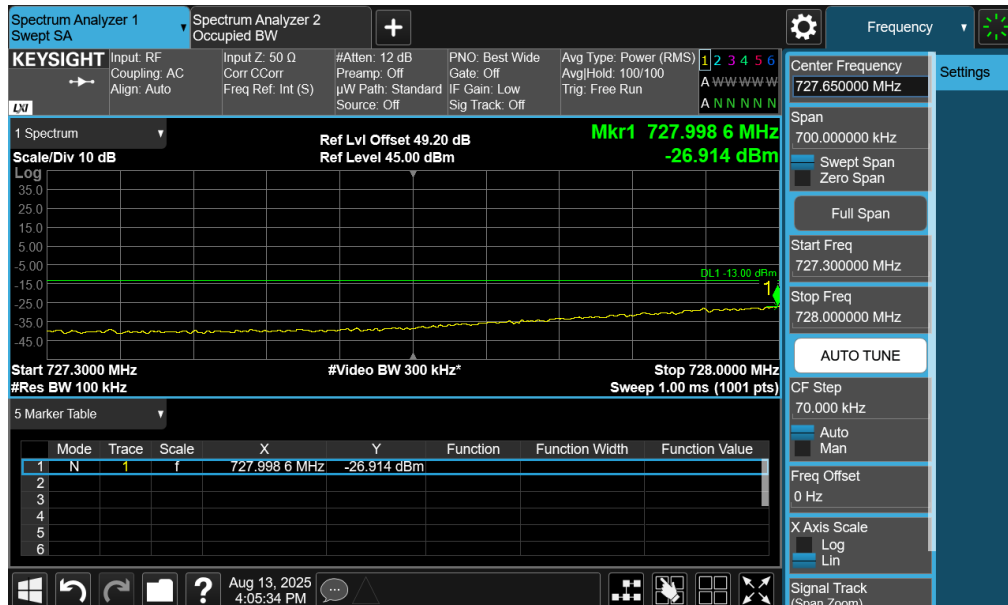


Out-of-band/out-of-block emissions

DL_100MHz AWGN_LCH_a single test signal_Pre-AGC

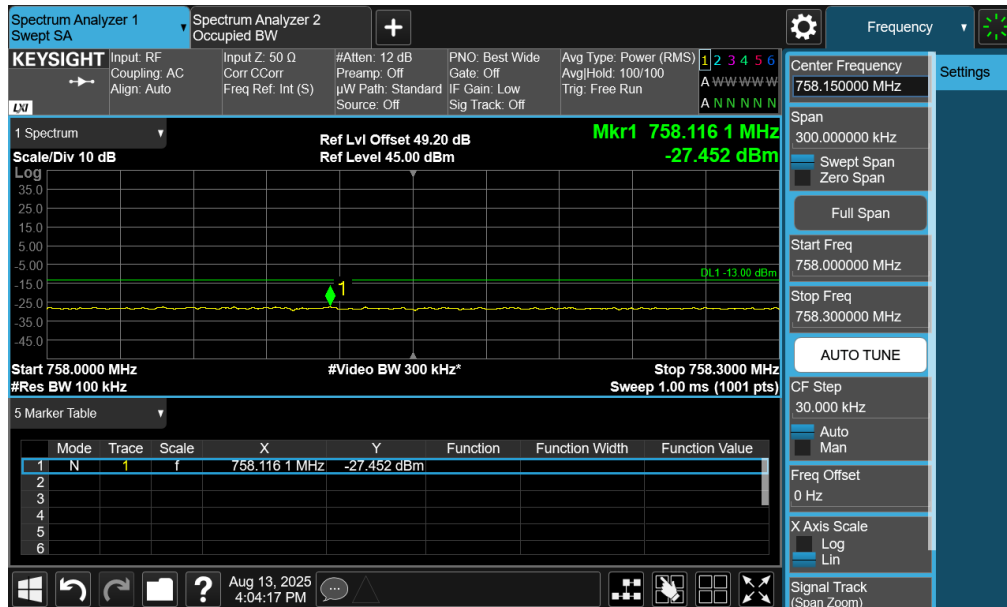


DL_100MHz AWGN_LCH_a single test signal_3dB above AGC

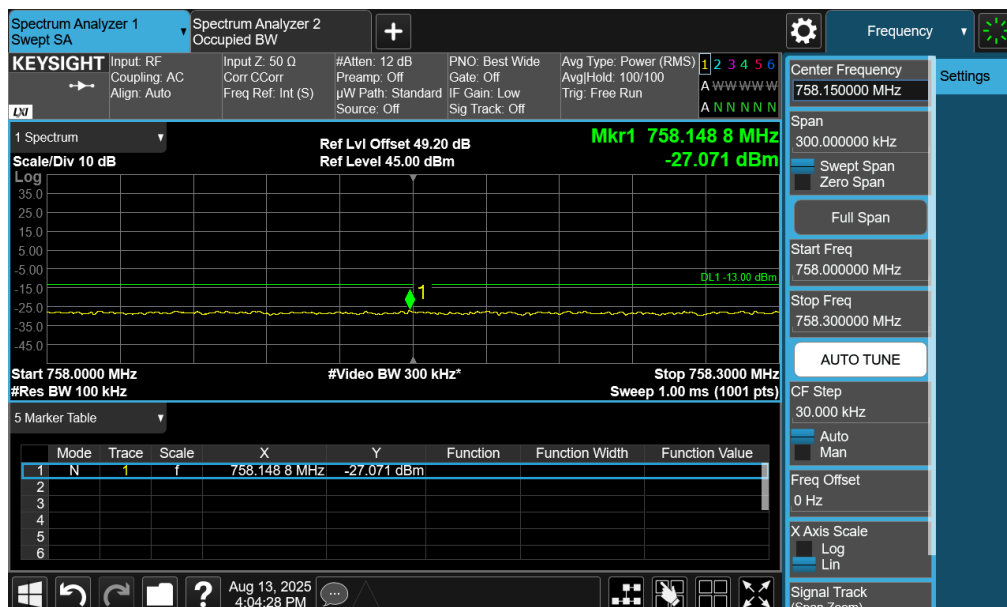


Out-of-band/out-of-block emissions

DL_100MHz AWGN_HCH_a single test signal_Pre-AGC

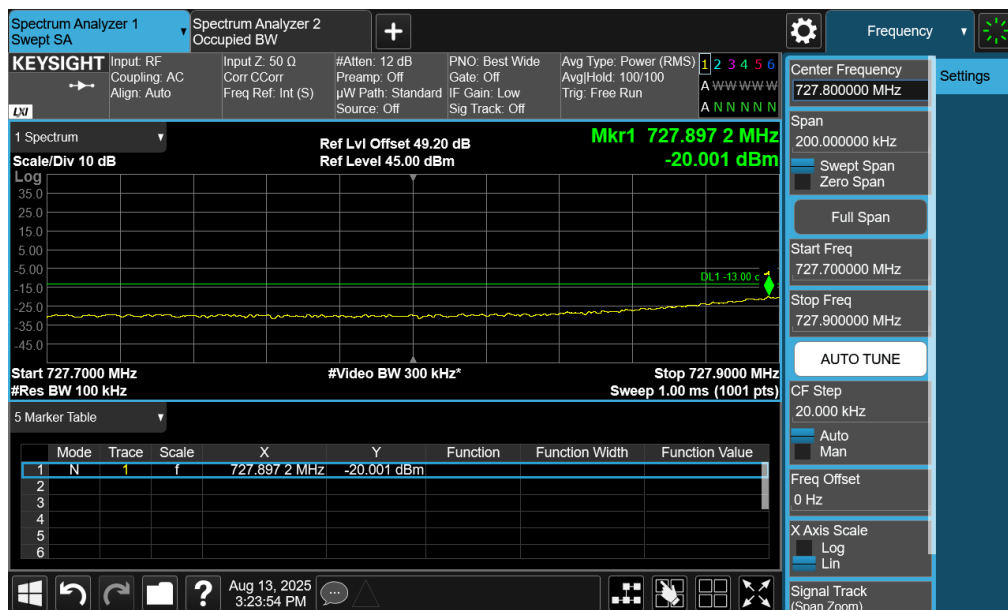
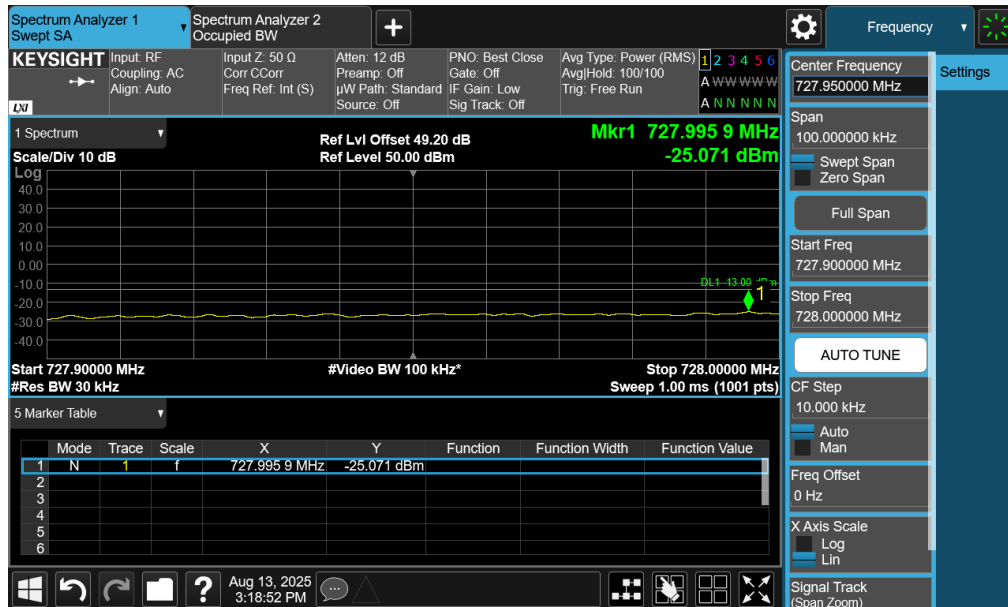


DL_100MHz AWGN_HCH_a single test signal_3dB above AGC

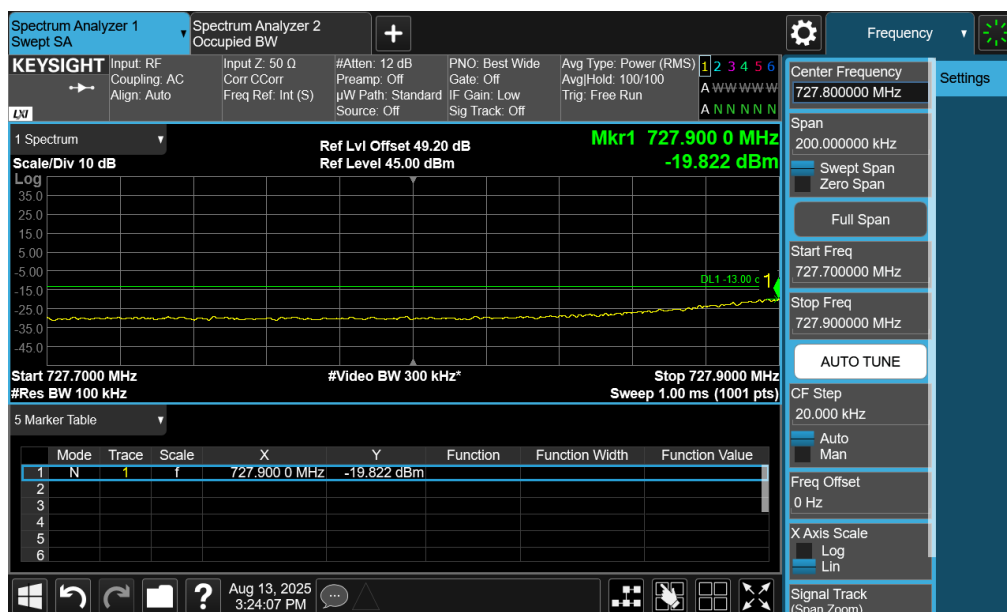
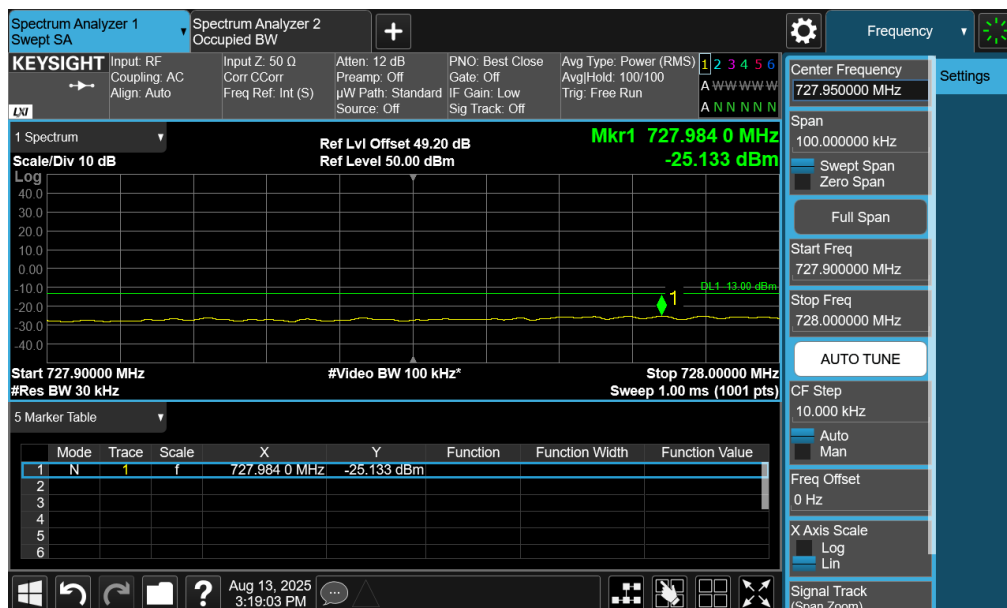


Out-of-band/out-of-block emissions

DL_GSM_LCH_a single test signal_Pre-AGC



DL_GSM_LCH_a single test signal_3dB above AGC



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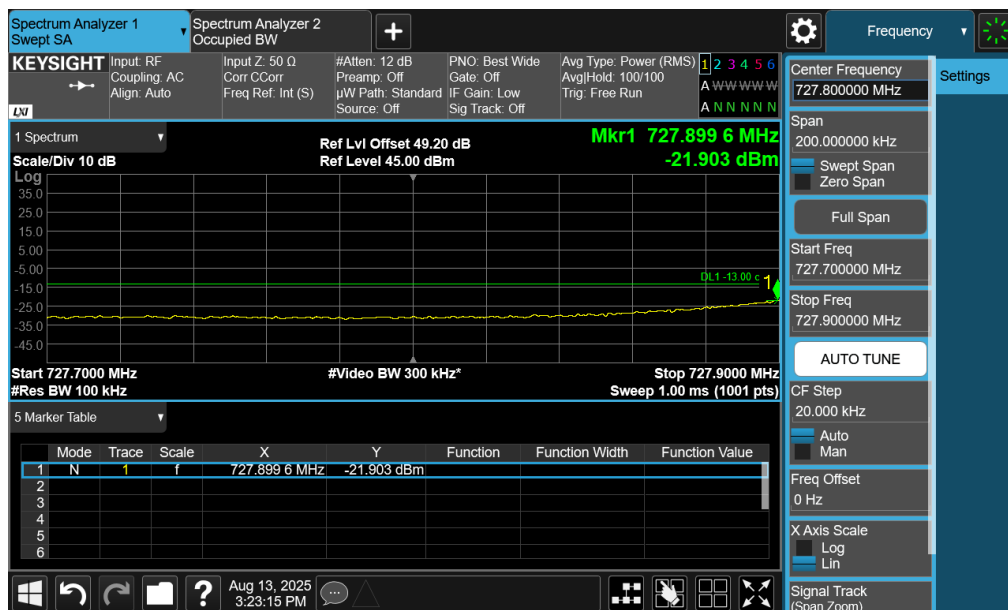
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Guangzhou Branch Testing & Calibration Laboratory

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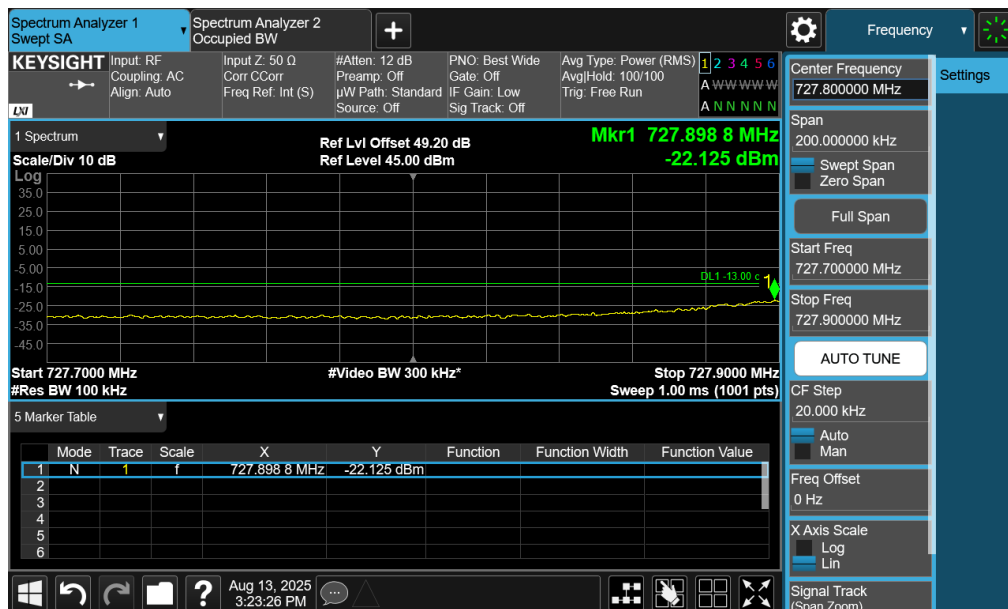
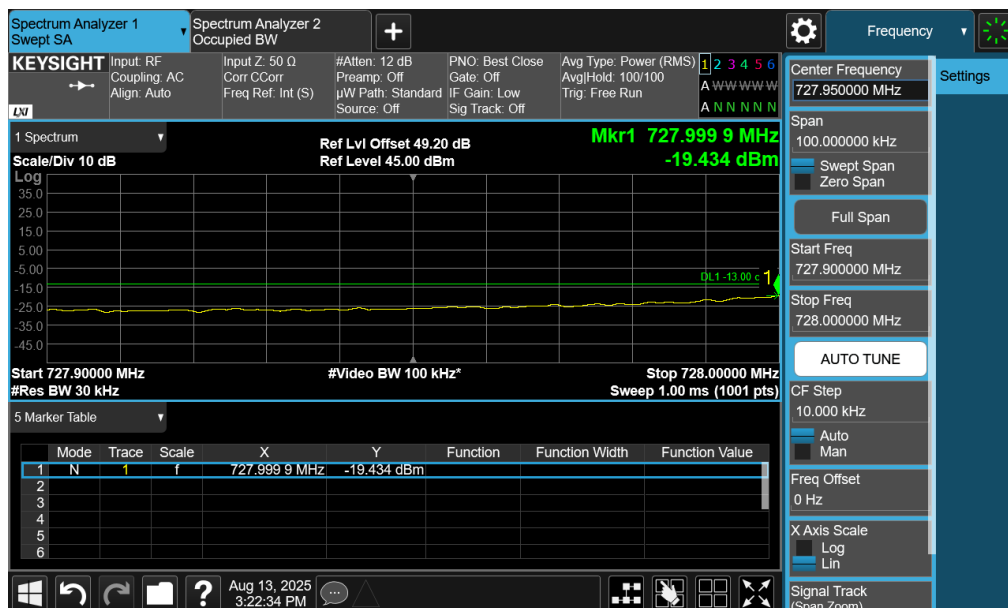
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Out-of-band/out-of-block emissions

DL_GSM_LCH_two adjacent test signals_Pre-AGC



DL_GSM_LCH_two adjacent test signals_3dB above AGC



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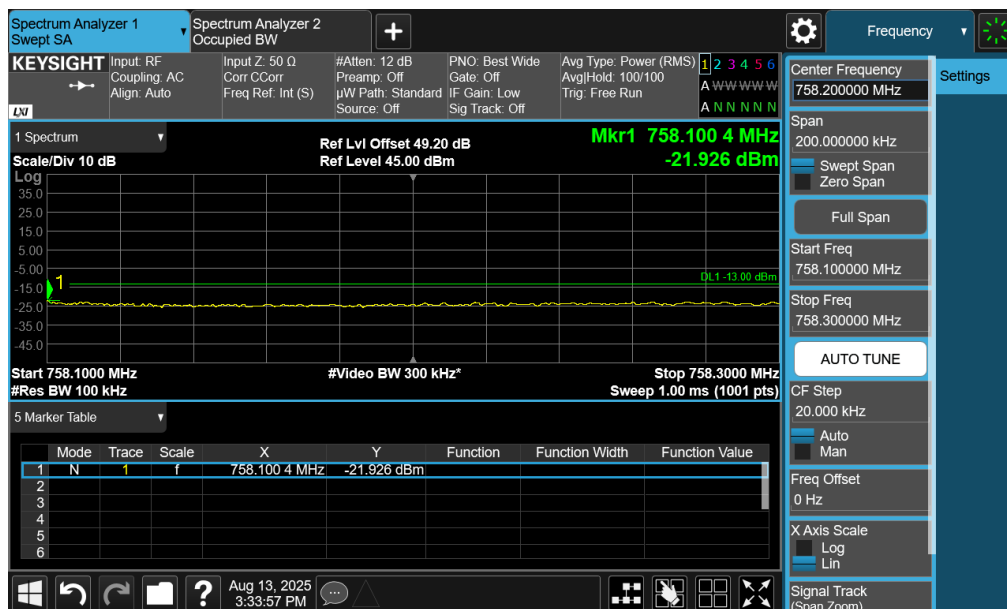
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Out-of-band/out-of-block emissions

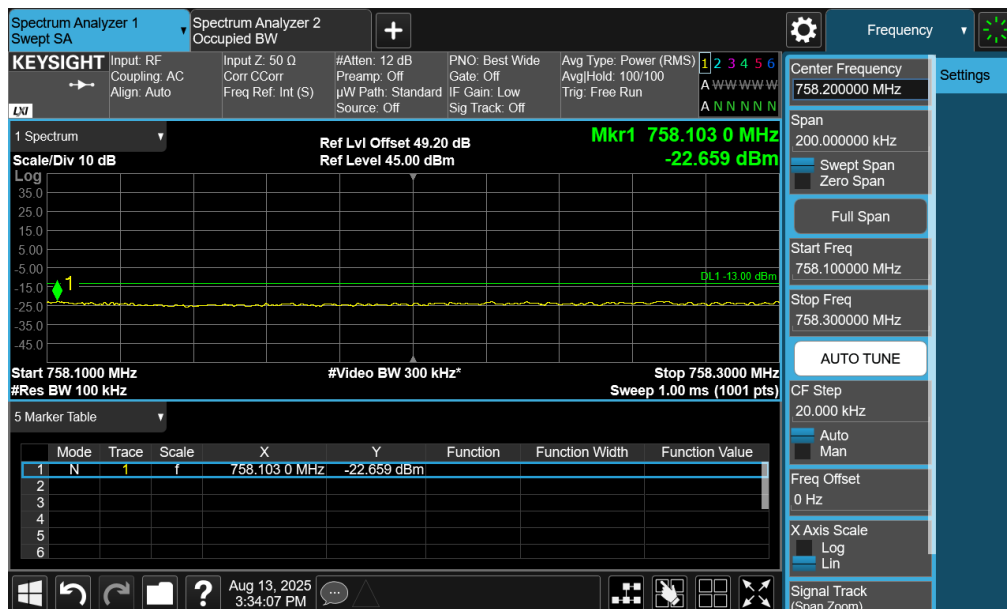
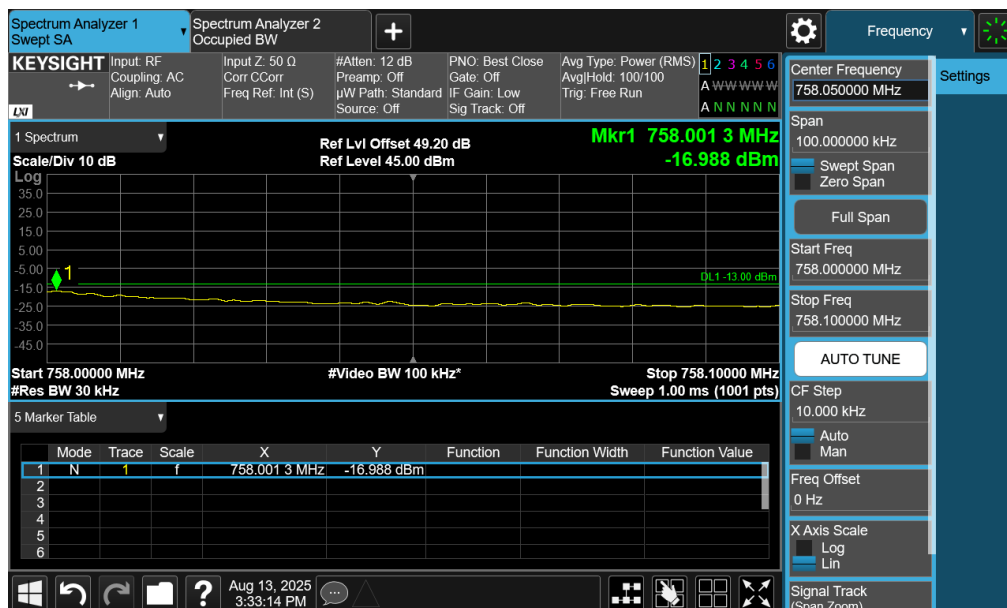
DL_GSM_HCH_a single test signal_Pre-AGC



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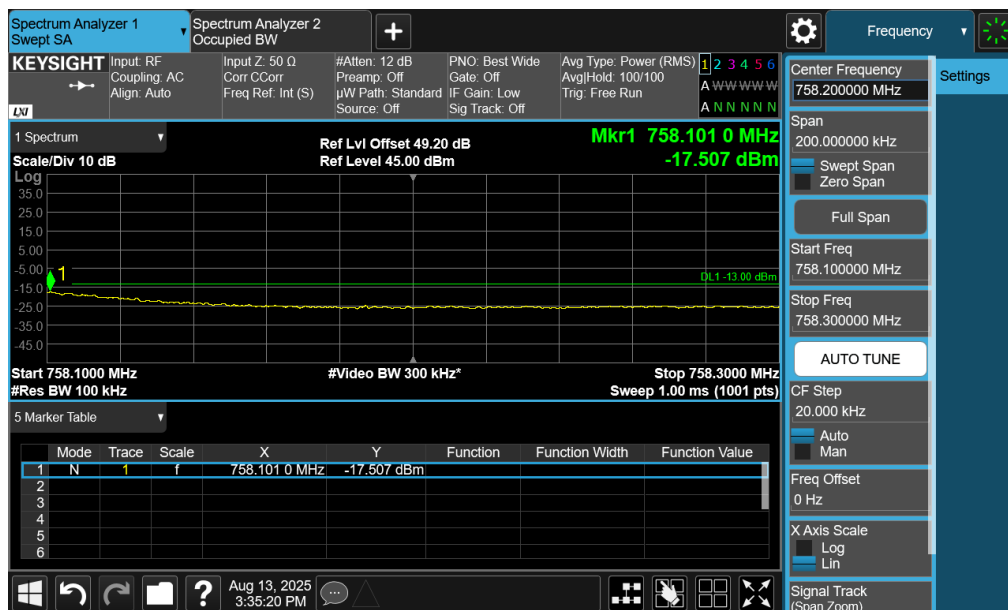
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DL_GSM_HCH_a single test signal_3dB above AGC

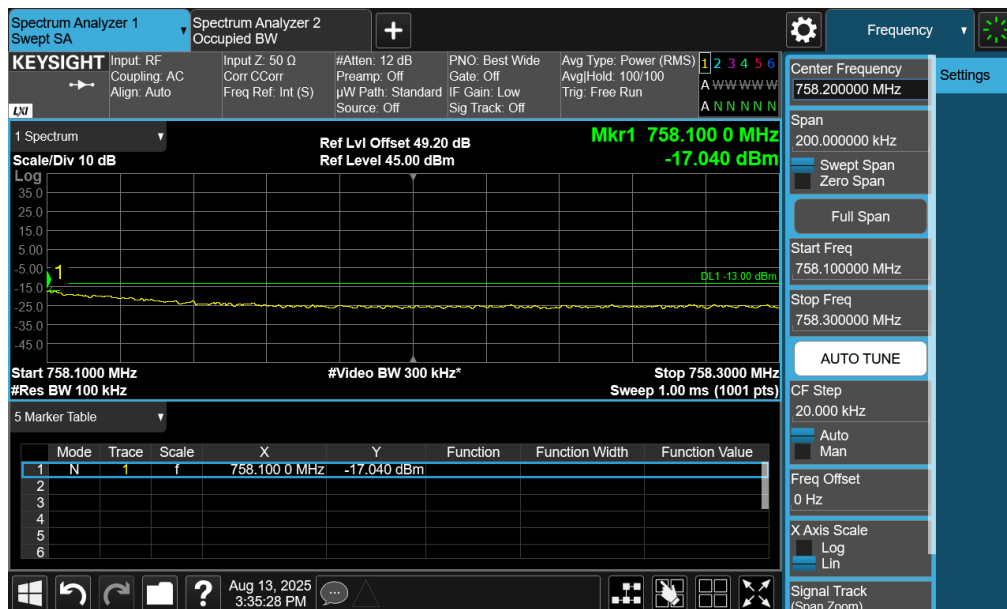
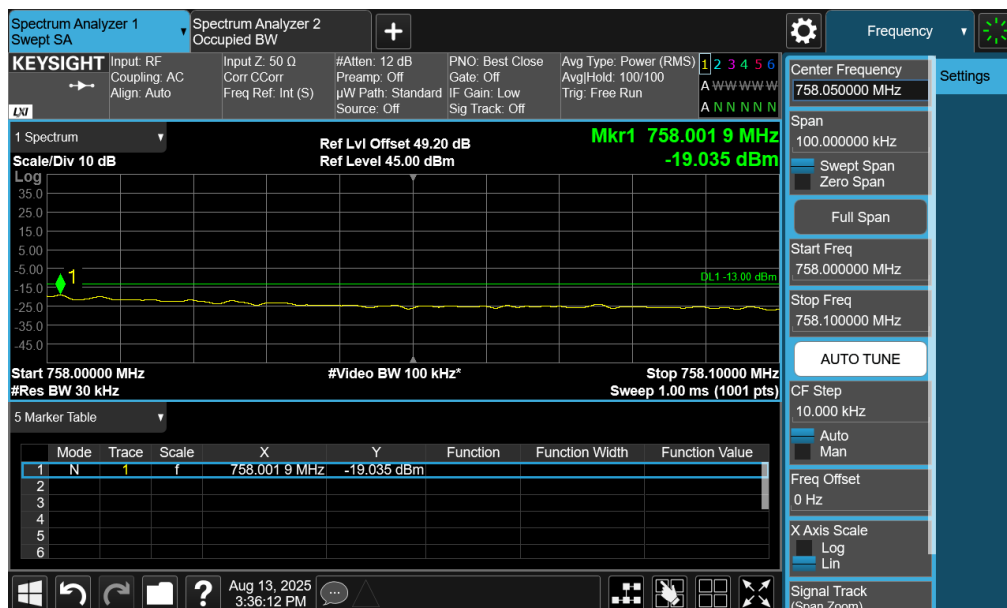


Out-of-band/out-of-block emissions

DL_GSM_HCH_two adjacent test signals_Pre-AGC



DL_GSM_HCH_two adjacent test signals_3dB above AGC



5 Conducted Spurious emissions

Conducted Spurious emissions						
Test path	Test signal	Test channel	Frequency range (MHz)	Worst test level (dBm)	Limit (dBm)	Verdict
DL	GSM	LCH	0.09-727.9	-18.25	≤-13	PASS
		HCH	758.1-1000	-16.18	≤-13	PASS
			1000-7580	-26.23	≤-13	PASS
			763-775	-47.52	≤-46	PASS
			793-805	-58.84	≤-46	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 $43 + 10\log_{10}(P)$ dB, here,
 $P = 43\text{dBm} = 20\text{W}$
 $\text{limit} = 43\text{dBm} - [43 + 10\log_{10}(20\text{W})] \text{ dB} = -13\text{dBm}$
- On all frequencies between 763-775 MHz and 793-805 MHz, by a factor not less than $76 + 10\log(P)$ dB in a 6.25 kHz band segment, for base and fixed stations, here,
 $P = 43\text{dBm} = 20\text{W}$
 $\text{limit} = 43\text{dBm} - [76 + 10\log_{10}(20\text{W})] \text{ dB} = -46\text{dBm}$
- All modes (LCH/MCH/HCH, with 4.1MHz AWGN signal/ with 100MHz AWGN signal) had been tested, only show the worst-case in this report.

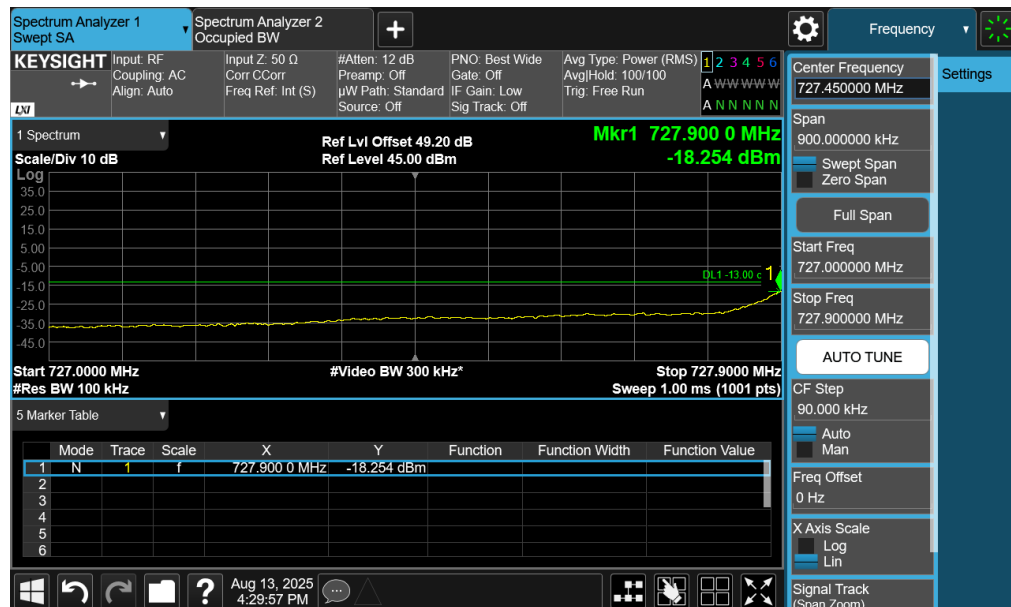
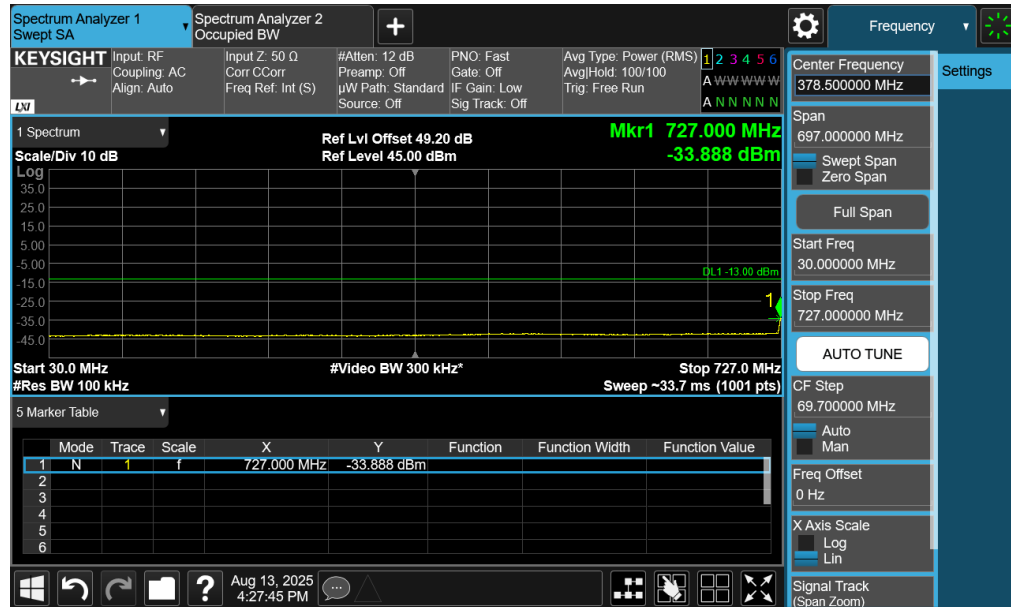


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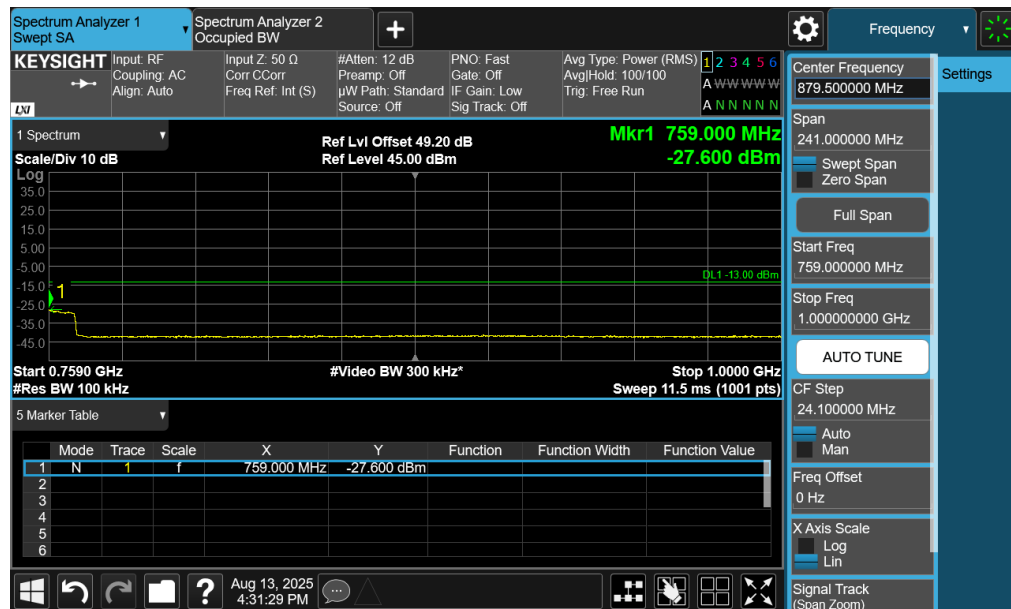
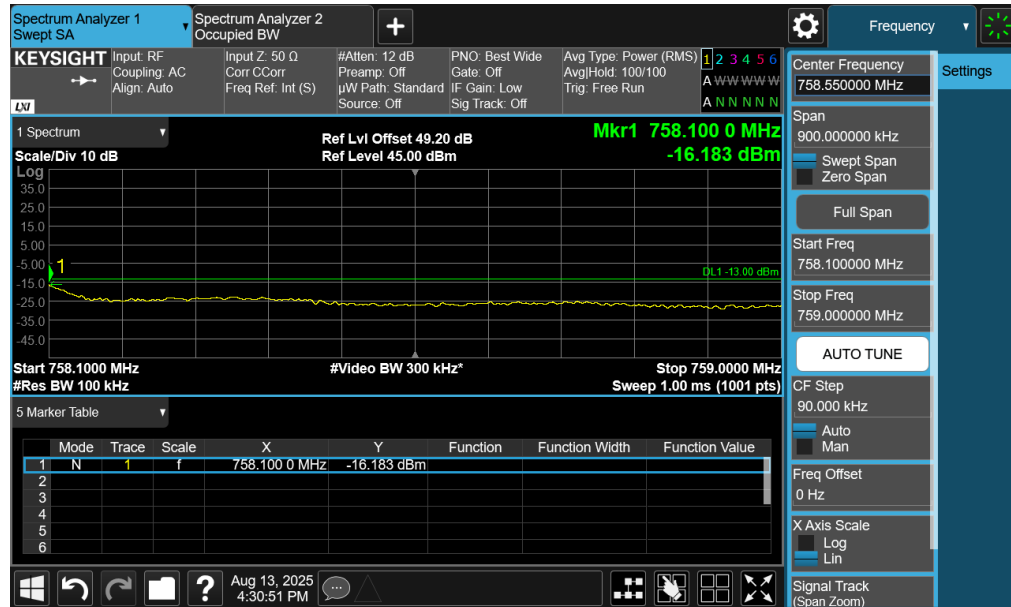
Conducted spurious emissions

DL_GSM_LCH_Pre-AGC



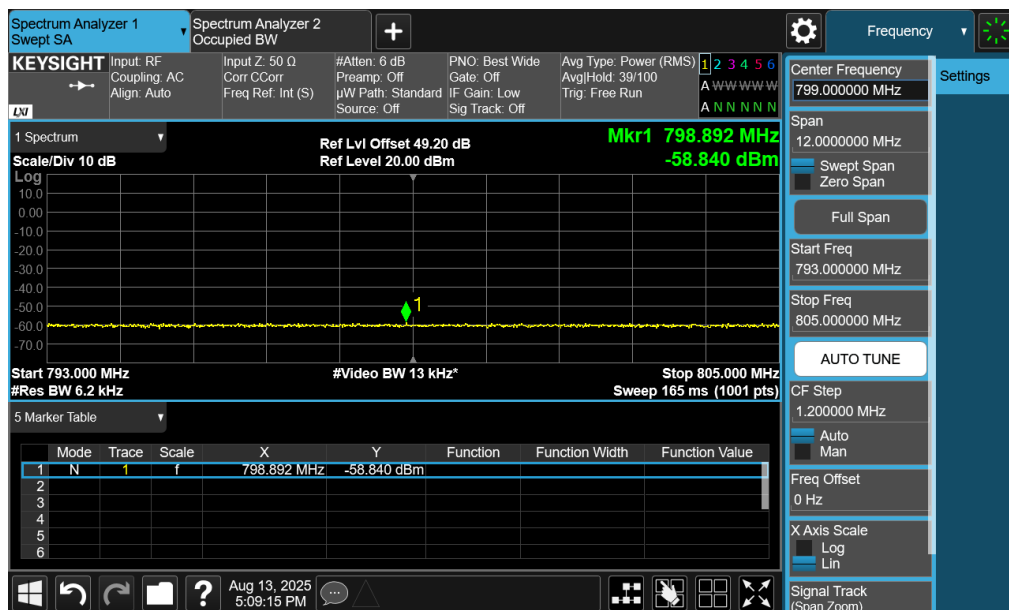
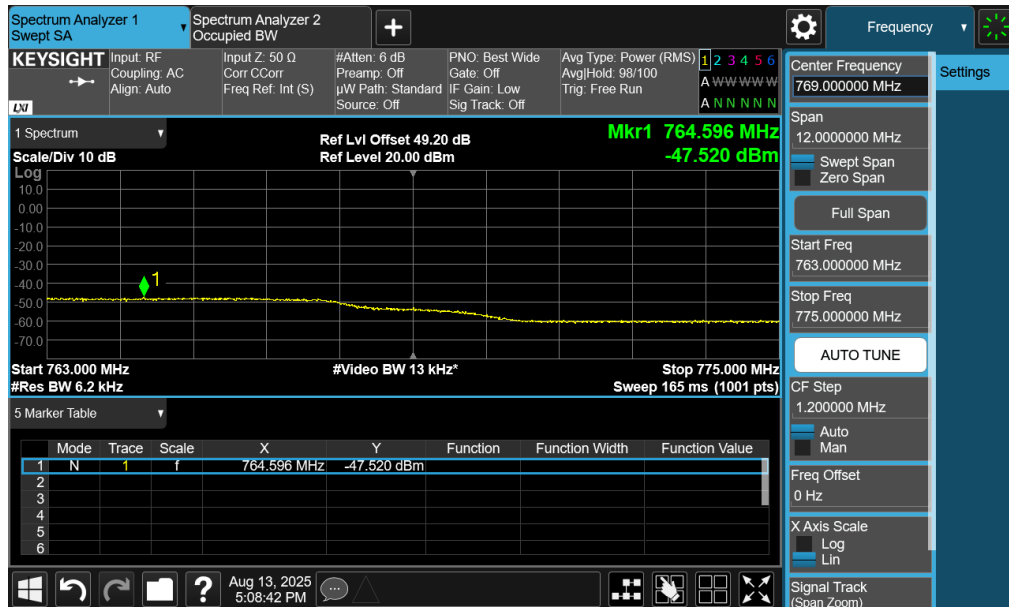
Conducted spurious emissions

DL_GSM_HCH_Pre-AGC



Conducted spurious emissions

DL_GSM_HCH_Pre-AGC



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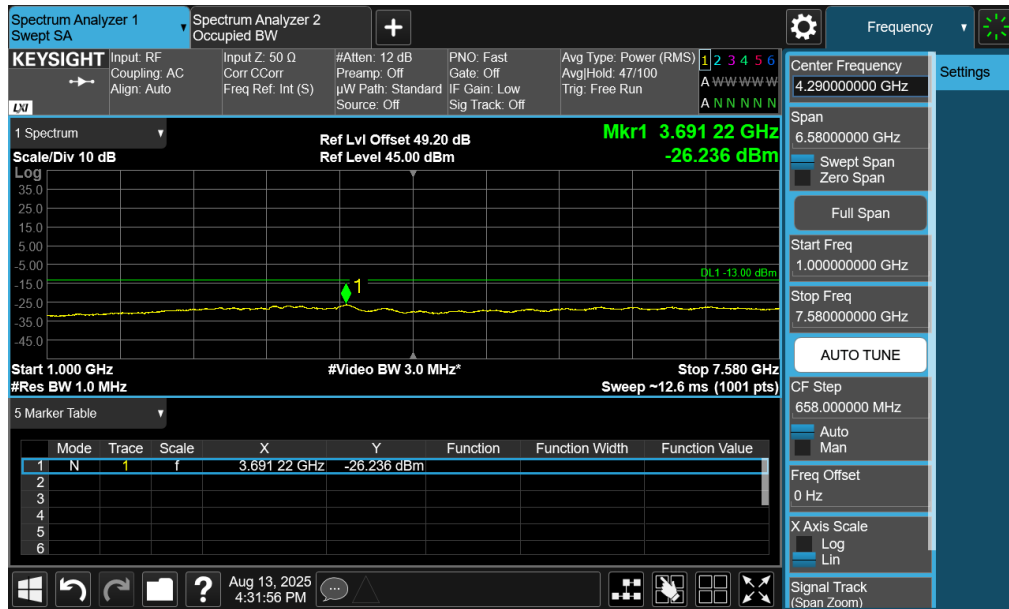
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Guangzhou Branch Test Laboratory

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Conducted spurious emissions

DL_GSM_HCH_Pre-AGC



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EMC-ARF-05 Rev 1.1

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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
DL	MCH	4.1MHz AWGN	TN	VL	3.1	0.00417	PASS
			TN	VH	3.1	0.00417	PASS
		100MHz AWGN	TN	VL	2.6	0.00350	PASS
			TN	VH	2.6	0.00350	PASS
		GSM	TN	VL	4.3	0.00579	PASS
			TN	VH	4.3	0.00579	PASS



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Frequency stability vs temperature							
Test Path	Test Channel	Test Signal	Voltage	Temperature (°C)	Freq. error (Hz)	Tolerance (ppm)	Verdict
DL	MCH	4.1MHz AWGN	VN	+50	4.0	0.00538	PASS
			VN	+40	4.7	0.00633	PASS
			VN	+30	2.2	0.00296	PASS
			VN	+20	3.0	0.00404	PASS
			VN	+10	2.4	0.00323	PASS
			VN	0	5.3	0.00713	PASS
			VN	-10	3.3	0.00444	PASS
			VN	-20	5.0	0.00673	PASS
			VN	-30	4.1	0.00552	PASS
		100MHz AWGN	VN	+50	4.8	0.00646	PASS
			VN	+40	5.0	0.00673	PASS
			VN	+30	5.7	0.00767	PASS
			VN	+20	5.0	0.00673	PASS
			VN	+10	3.6	0.00485	PASS
			VN	0	2.8	0.00377	PASS
			VN	-10	3.1	0.00417	PASS
			VN	-20	2.8	0.00377	PASS
			VN	-30	3.7	0.00498	PASS
		GSM	VN	+50	3.5	0.00471	PASS
			VN	+40	2.8	0.00377	PASS
			VN	+30	4.3	0.00579	PASS
			VN	+20	2.4	0.00323	PASS
			VN	+10	5.1	0.00686	PASS
			VN	0	4.3	0.00579	PASS
			VN	-10	4.9	0.00659	PASS
			VN	-20	5.7	0.00767	PASS
			VN	-30	5.1	0.00686	PASS



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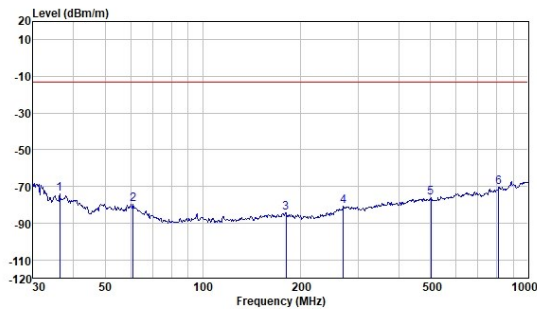
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7 Radiated Spurious emissions

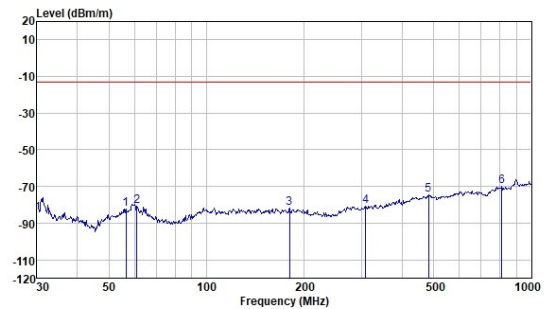
Radiated Spurious emissions

DL_4.1MHz AWGN_MCH_30MHz-1GHz

For HRU-7851719-DC

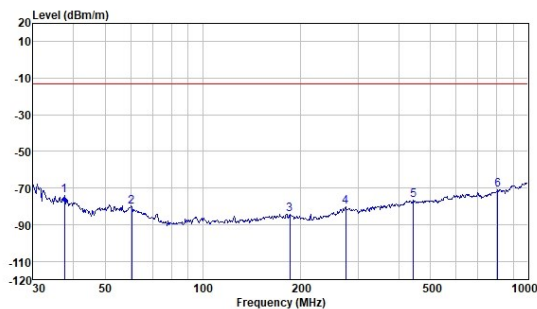


	Freq	Read Level	Correction Factor	Level	Limit	Over Limit	Pol/Phase
	MHz	dBm	dB	dBm	dBm	dB	
1	36.25	-76.93	2.67	-74.26	-13.00	-61.26	HORIZONTAL
2	60.92	-76.94	-2.75	-79.69	-13.00	-66.69	HORIZONTAL
3	180.02	-78.36	-6.01	-84.37	-13.00	-71.37	HORIZONTAL
4	270.37	-77.67	-3.02	-80.69	-13.00	-67.69	HORIZONTAL
5	502.94	-76.49	0.40	-76.09	-13.00	-63.09	HORIZONTAL
6	810.27	-77.28	6.98	-70.30	-13.00	-57.30	HORIZONTAL

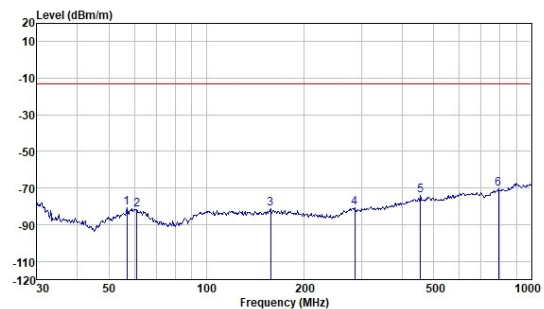


	Freq	Read Level	Correction Factor	Level	Limit	Over Limit	Pol/Phase
	MHz	dBm	dB	dBm	dBm	dB	
1	56.39	-78.87	-3.37	-82.24	-13.00	-69.24	VERTICAL
2	60.92	-78.23	-2.47	-80.70	-13.00	-67.70	VERTICAL
3	180.02	-77.57	-3.94	-81.51	-13.00	-68.51	VERTICAL
4	300.91	-78.05	-2.63	-80.68	-13.00	-67.68	VERTICAL
5	482.22	-76.42	1.94	-74.48	-13.00	-61.48	VERTICAL
6	810.27	-77.58	7.53	-70.05	-13.00	-57.05	VERTICAL

For HRU-7851719-AC



	Freq	Read Level	Correction Factor	Level	Limit	Over Limit	Pol/Phase
	MHz	dBm	dB	dBm	dBm	dB	
1	37.55	-76.55	2.33	-74.22	-13.00	-61.22	HORIZONTAL
2	60.28	-77.54	-2.57	-80.11	-13.00	-67.11	HORIZONTAL
3	185.14	-78.01	-6.13	-84.14	-13.00	-71.14	HORIZONTAL
4	274.19	-77.48	-2.75	-80.23	-13.00	-67.23	HORIZONTAL
5	443.29	-76.67	0.23	-76.44	-13.00	-63.44	HORIZONTAL
6	804.60	-77.56	6.86	-70.70	-13.00	-57.70	HORIZONTAL



	Freq	Read Level	Correction Factor	Level	Limit	Over Limit	Pol/Phase
	MHz	dBm	dB	dBm	dBm	dB	
1	56.79	-77.44	-3.18	-80.62	-13.00	-67.62	VERTICAL
2	60.92	-79.05	-2.47	-81.52	-13.00	-68.52	VERTICAL
3	157.56	-77.24	-3.94	-81.18	-13.00	-68.18	VERTICAL
4	285.98	-78.24	-2.70	-80.94	-13.00	-67.94	VERTICAL
5	455.91	-75.67	1.58	-74.09	-13.00	-61.09	VERTICAL
6	793.40	-77.75	7.28	-70.47	-13.00	-57.47	VERTICAL

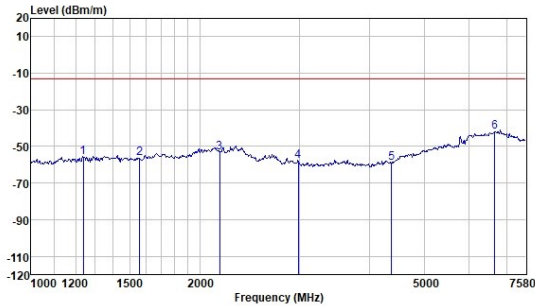


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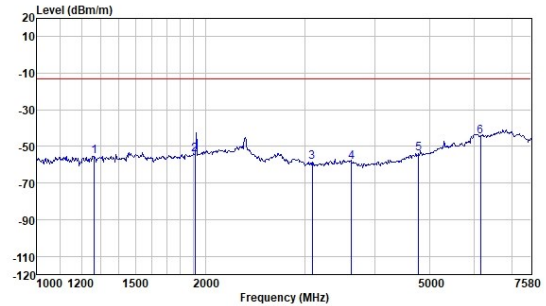
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Radiated Spurious emissions

DL_4.1MHz AWGN_MCH_above 1GHz

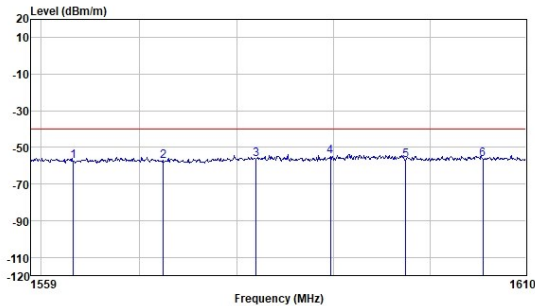


	Freq	Read Level	Correction Factor	Level	Limit	Over Limit	Pol/Phase
	MHz	dBm	dB	dBm	dBm	dB	
1	1239.50	-60.06	3.89	-56.17	-13.00	-43.17	HORIZONTAL
2	1558.29	-61.58	5.01	-56.57	-13.00	-43.57	HORIZONTAL
3	2163.49	-62.44	9.31	-53.13	-13.00	-40.13	HORIZONTAL
4	2985.53	-60.74	2.72	-58.02	-13.00	-45.02	HORIZONTAL
5	4369.17	-63.39	4.42	-58.97	-13.00	-45.97	HORIZONTAL
6	6658.41	-62.33	20.21	-42.12	-13.00	-29.12	HORIZONTAL

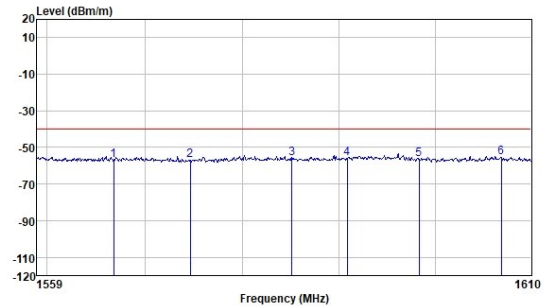


	Freq	Read Level	Correction Factor	Level	Limit	Over Limit	Pol/Phase
	MHz	dBm	dB	dBm	dBm	dB	
1	1264.86	-59.85	4.20	-55.65	-13.00	-42.65	VERTICAL
2	1912.03	-61.67	7.06	-54.61	-13.00	-41.61	VERTICAL
3	3090.12	-61.56	2.79	-58.77	-13.00	-45.77	VERTICAL
4	3626.35	-62.91	4.59	-58.32	-13.00	-45.32	VERTICAL
5	4776.44	-62.61	8.79	-53.82	-13.00	-40.82	VERTICAL
6	6152.67	-63.39	18.96	-44.43	-13.00	-31.43	VERTICAL

DL_4.1MHz AWGN_MCH_1559MHz-1610MHz



	Freq	Read Level	Correction Factor	Level	Limit	Over Limit	Pol/Phase
	MHz	dBm	dB	dBm	dBm	dB	
1	1563.32	-62.78	5.07	-57.71	-40.00	-17.71	HORIZONTAL
2	1572.46	-62.83	5.12	-57.71	-40.00	-17.71	HORIZONTAL
3	1582.00	-61.86	5.17	-56.69	-40.00	-16.69	HORIZONTAL
4	1589.65	-59.91	5.19	-54.72	-40.00	-14.72	HORIZONTAL
5	1597.46	-62.83	5.22	-56.81	-40.00	-16.81	HORIZONTAL
6	1605.50	-61.61	5.28	-56.33	-40.00	-16.33	HORIZONTAL



	Freq	Read Level	Correction Factor	Level	Limit	Over Limit	Pol/Phase
	MHz	dBm	dB	dBm	dBm	dB	
1	1566.80	-62.53	5.51	-57.02	-40.00	-17.02	VERTICAL
2	1574.64	-62.16	5.31	-56.85	-40.00	-16.85	VERTICAL
3	1585.11	-60.94	5.13	-55.81	-40.00	-15.81	VERTICAL
4	1590.84	-60.84	4.97	-55.87	-40.00	-15.87	VERTICAL
5	1598.28	-61.16	4.89	-56.27	-40.00	-16.27	VERTICAL
6	1606.84	-60.19	4.85	-55.34	-40.00	-15.34	VERTICAL

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

No.198, Kezhu Road, Science City, Economic & Technological Development Area, Guangzhou, Guangdong, China 510663
中国·广东·广州高新技术产业开发区科学城科珠路198号 邮编: 510663

t (86-20) 82155555 www.sgsgroup.com.cn
t (86-20) 82155555 sgs.china@sgs.com

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