

# Appendix -

## Test Data and Result for report

**GZCR230300022402**

(Lower 700MHz band)

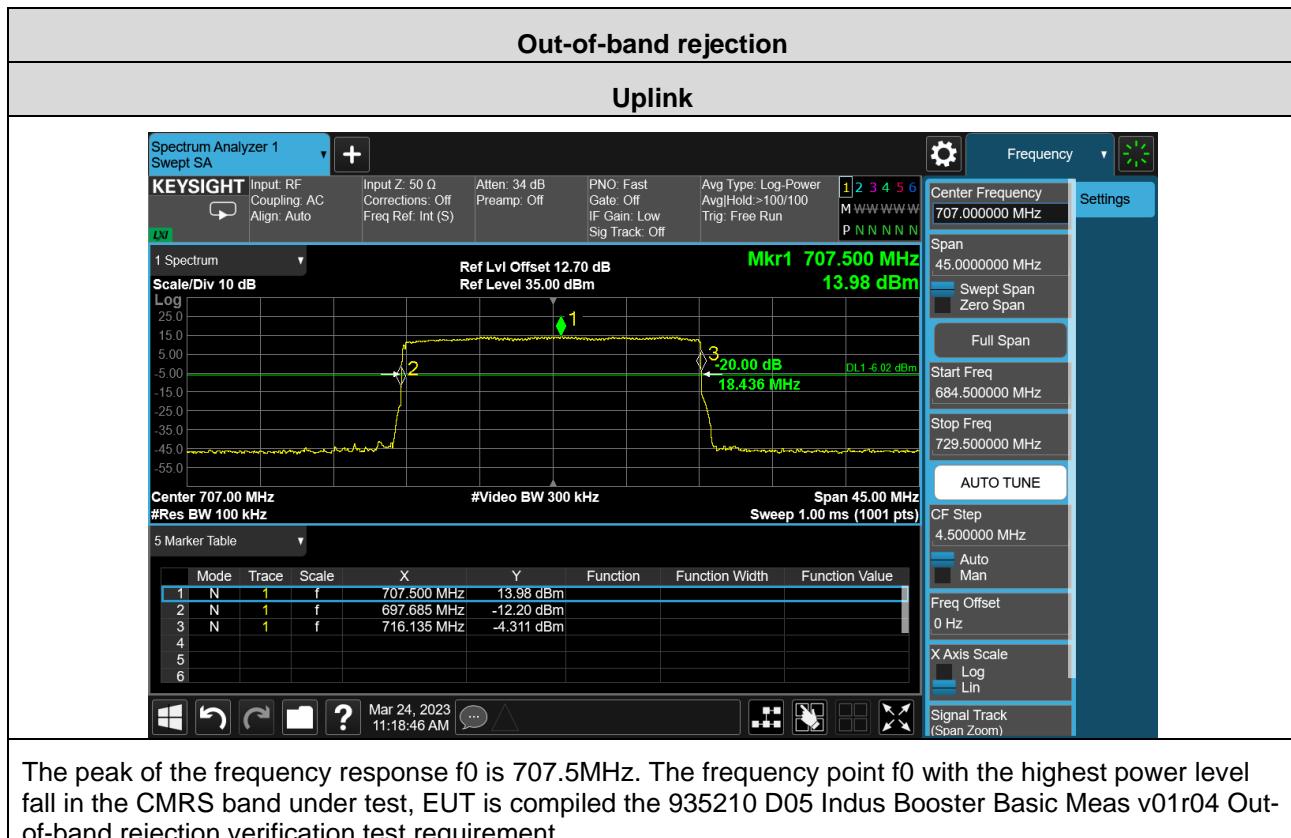
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## 1 Out-of-band rejection



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**2 Input versus Output comparison**

Occupied Bandwidth				
Test Path	Test Signal	Test Channel	Signal Level	Verdict
Uplink	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 700MHz 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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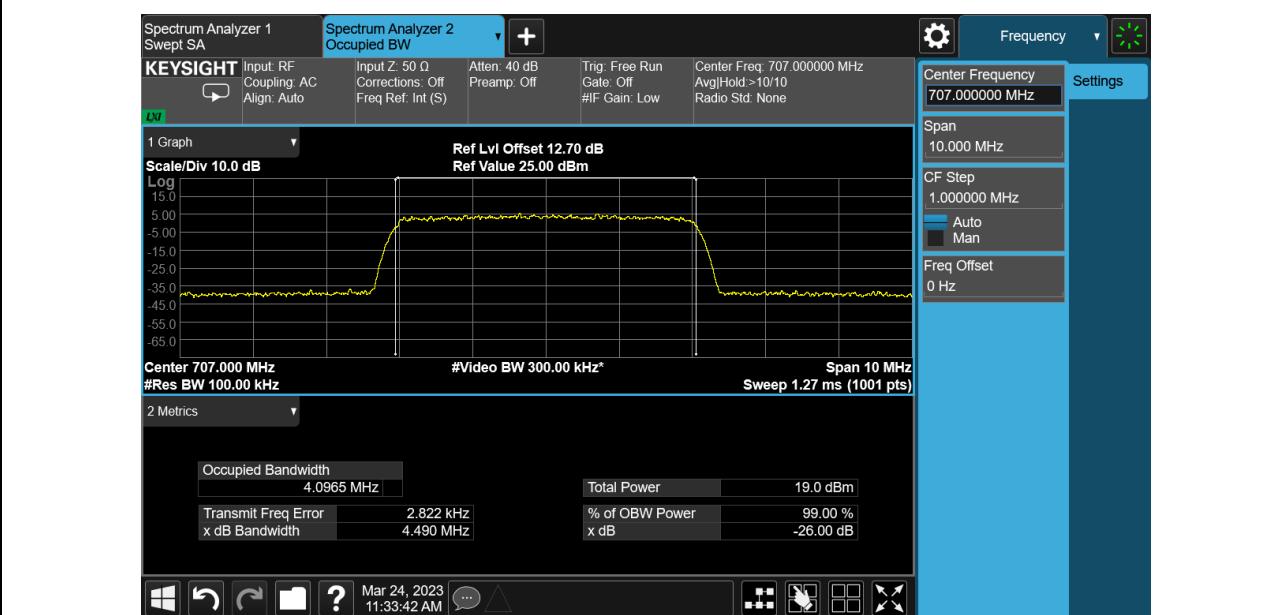
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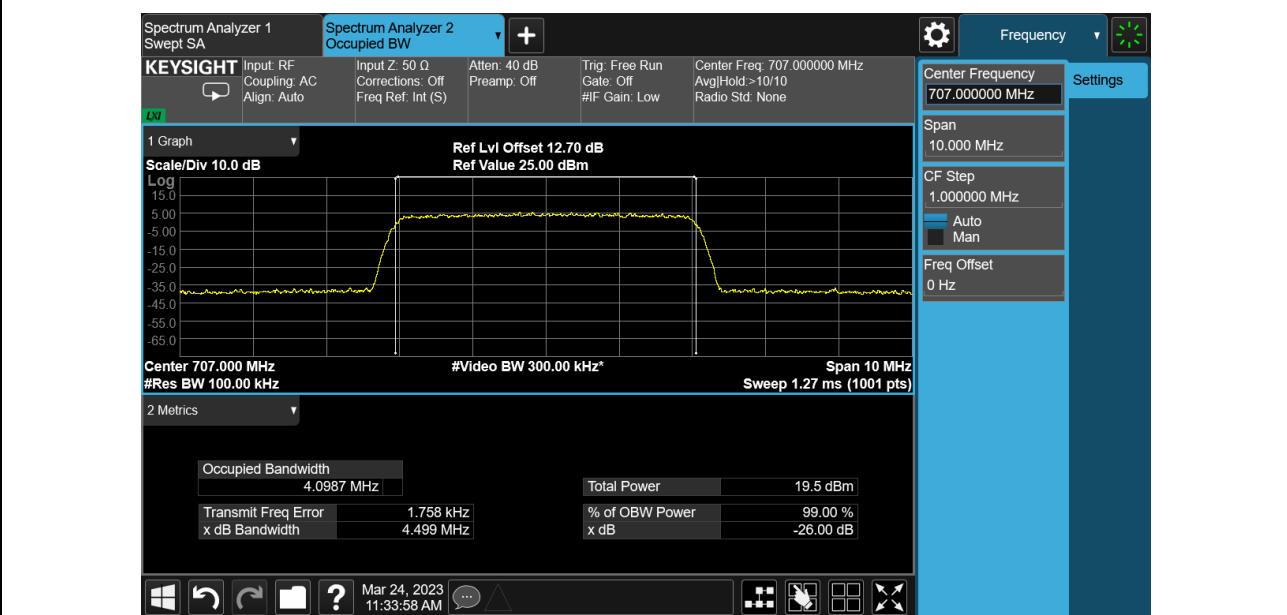
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99% OBW

## Uplink\_5MHz AWGN\_Middle Channel\_Output pre-AGC



## Uplink\_5MHz AWGN\_Middle Channel\_Output 3dB above AGC



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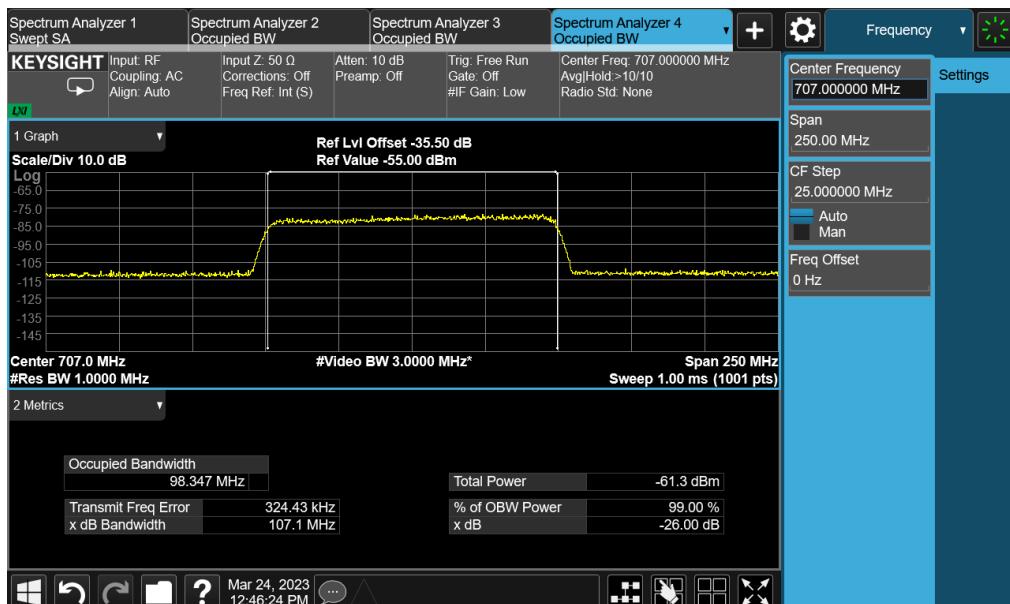
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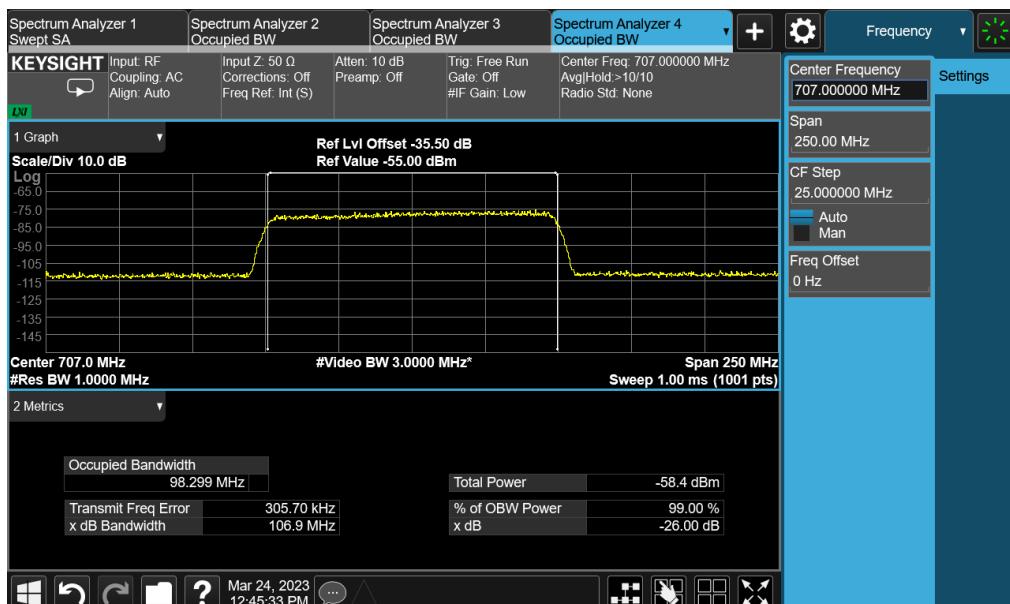
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## Uplink\_100MHz AWGN\_Middle Channel\_Input pre-AGC



## Uplink\_100MHz AWGN\_Middle Channel\_Input 3dB above AGC



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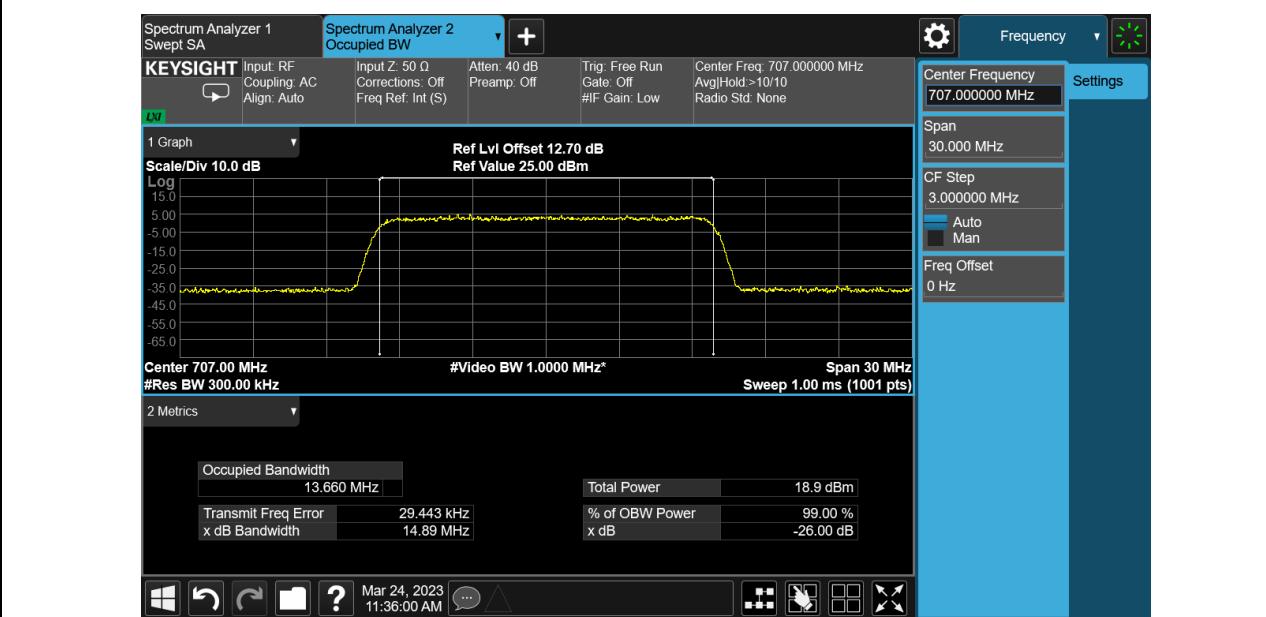
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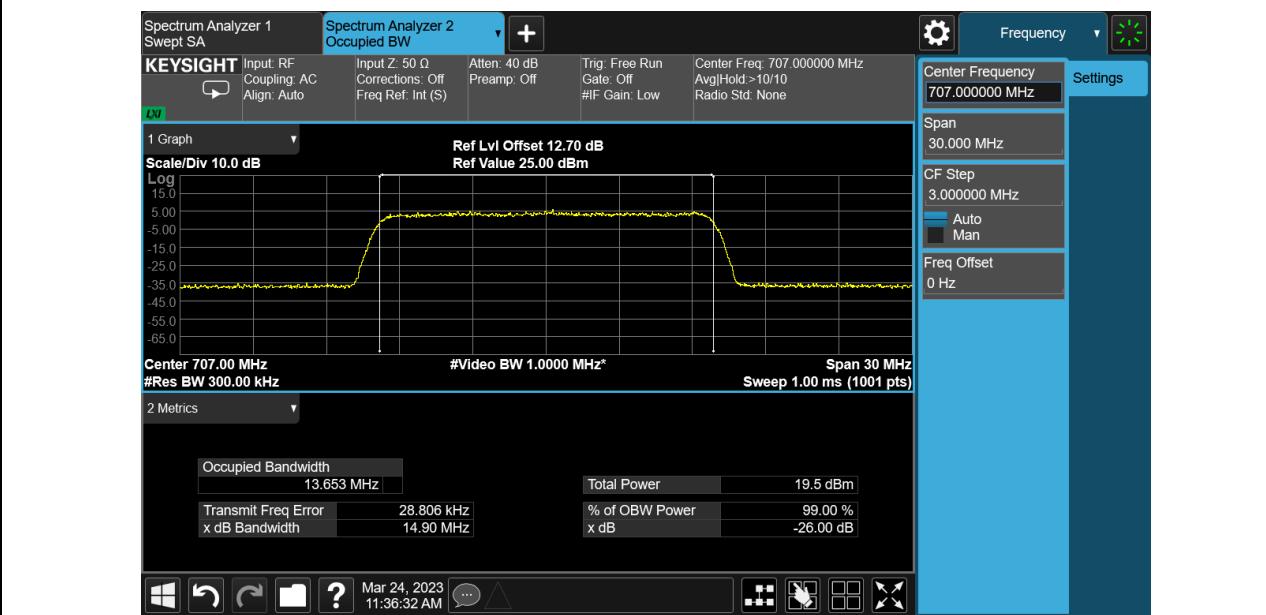
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99% OBW

## Uplink\_100MHz AWGN\_Middle Channel\_Output pre-AGC



## Uplink\_100MHz AWGN\_Middle Channel\_Output 3dB above AGC



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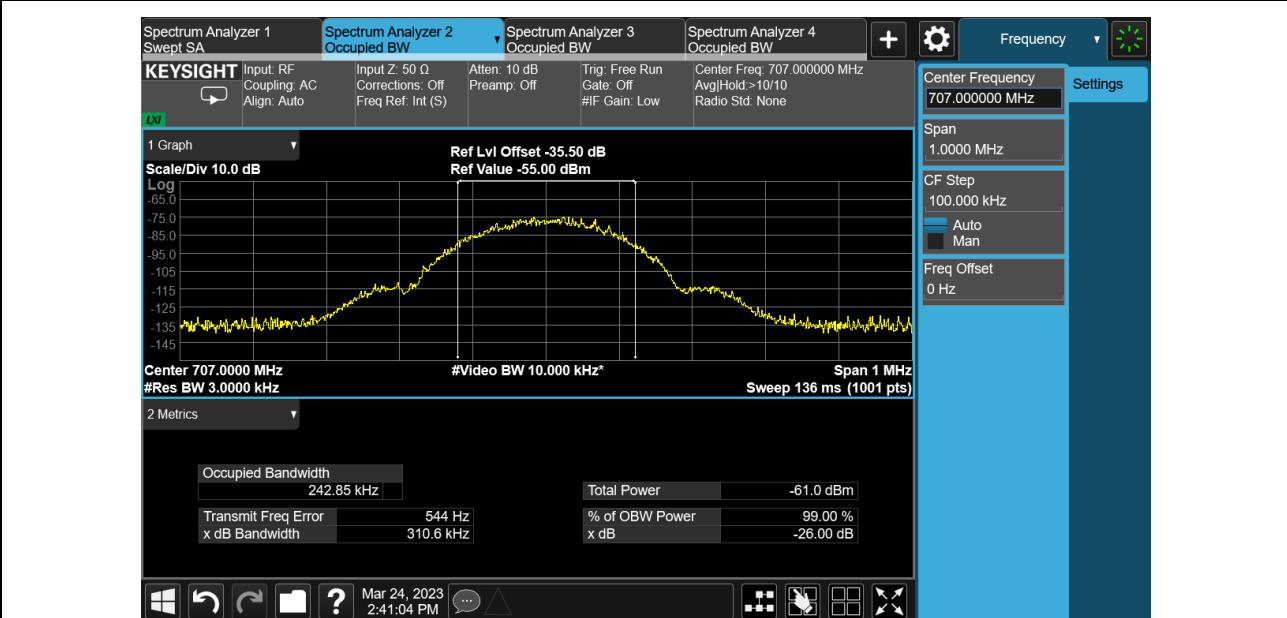
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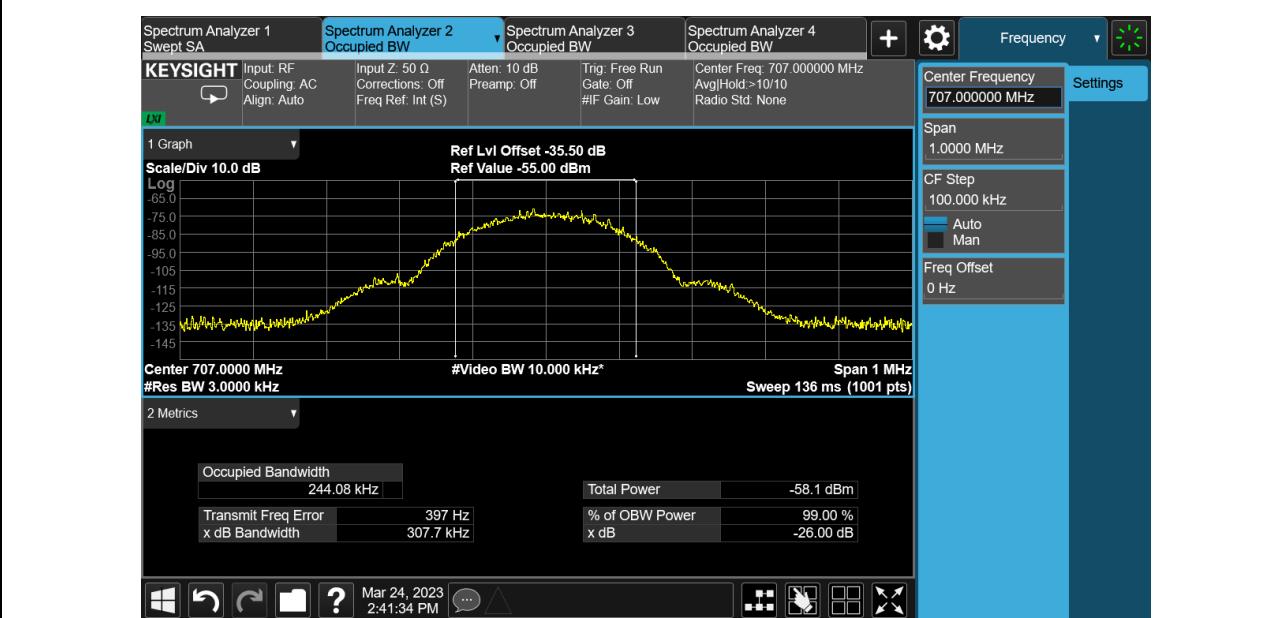
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## Uplink\_GSM\_Middle Channel\_Input pre-AGC



## Uplink\_GSM\_Middle Channel\_Input 3dB above AGC

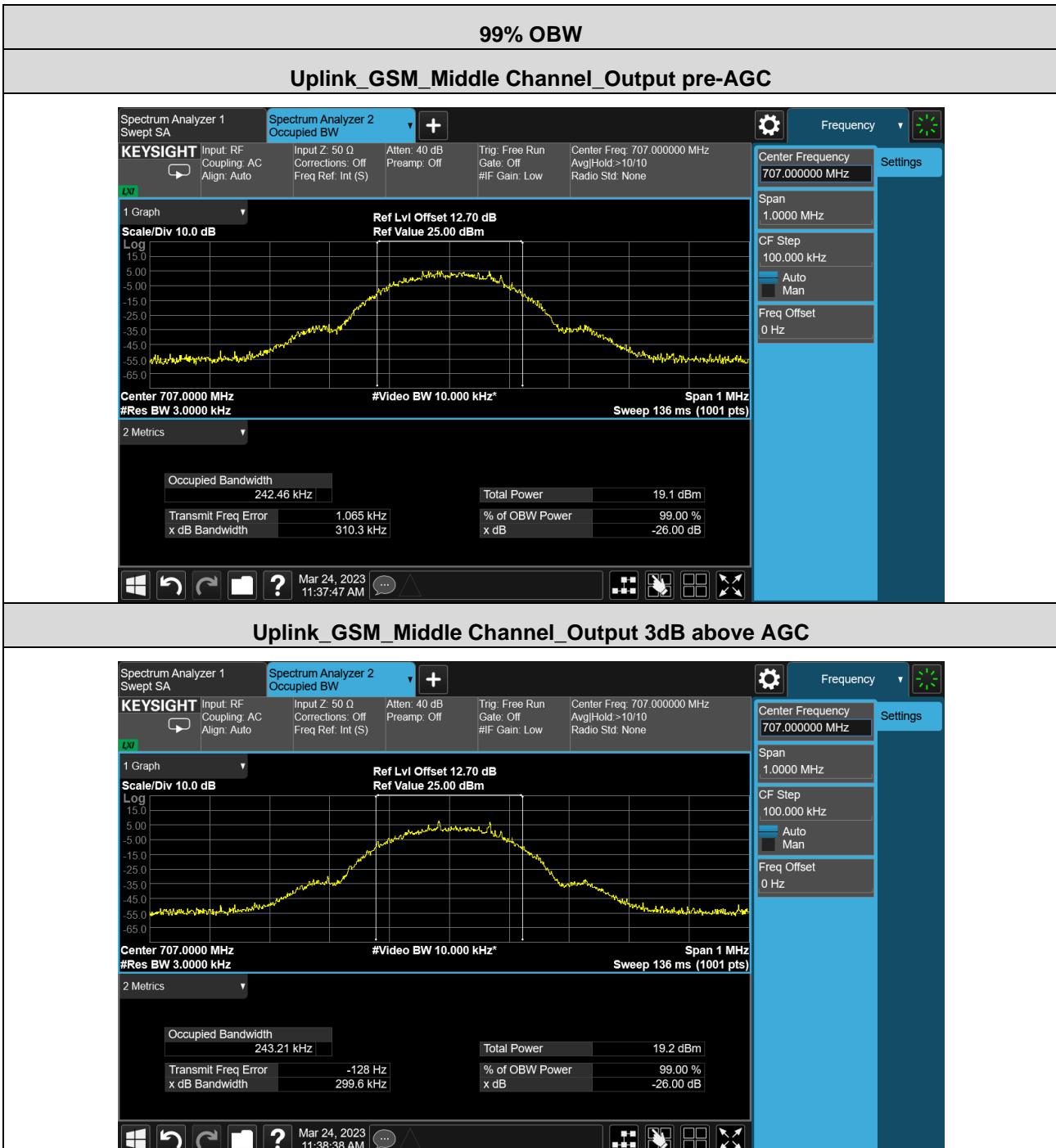


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### 3 Mean output power and amplifier/booster gain

Mean output power and gain							
Test Path	Test Freq. f0 (MHz)	Test Signal	Signal Level	Input power (dBm)	Output Power (dBm)	ERP (W)	Gain (dB)
Uplink	707.5	5MHz AWGN	Pre-AGC	-61.00	19.85	1.479	80.85
			3dB above AGC	-58.00	19.91	1.500	/
		100MHz AWGN	Pre-AGC	-61.00	14.87	0.470	75.87
			3dB above AGC	-58.00	14.02	0.386	/
		GSM	Pre-AGC	-61.00	20.16	1.589	81.16
			3dB above AGC	-58.00	19.89	1.493	/

Remark:

1. f0 is from Out-of-band Rejection test in the report.
2. ERP= output power (dBm)+ antenna gain (dBi)- 2.15dB, the max 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 (W/MHz)	Verdict
Uplink	707.5	5MHz AWGN	Pre-AGC	12.64	0.281	PASS
			3dB above AGC	12.97	0.303	PASS
		100MHz AWGN	Pre-AGC	4.21	0.040	PASS
			3dB above AGC	4.05	0.039	PASS
		GSM	Pre-AGC	20.11	1.570	PASS
			3dB above AGC	20.04	1.545	PASS

Remark:

1. f0 is from Out-of-band Rejection test in the report.
2. ERP= output power (dBm)+ antenna gain (dBi)- 2.15dB, the max 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	
Uplink	lower edge	5MHz AWGN	One signal input	Pre-AGC	-33.25	≤-13	PASS	
				3dB above AGC	-33.59		PASS	
			Two signals input	Pre-AGC	-32.49		PASS	
				3dB above AGC	-32.29		PASS	
	upper edge		One signal input	Pre-AGC	-31.42		PASS	
				3dB above AGC	-30.71		PASS	
			Two signals input	Pre-AGC	-31.38		PASS	
				3dB above AGC	-31.60		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  $43 + 10\log_{10}(P)$  dB,  
 $P = 19\text{dBm} = 0.08\text{W}$ , so  
 $\text{the limit} = 19\text{dBm} - [43 + 10 \log_{10} (0.08\text{W})] \text{ dB} = -13\text{dBm}$

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	
Uplink	lower edge	100MHz AWGN	One signal input	Pre-AGC	-42.57	≤-13	PASS	
				3dB above AGC	-42.16		PASS	
			Two signals input	Pre-AGC	-43.34		PASS	
				3dB above AGC	-44.03		PASS	
	upper edge		One signal input	Pre-AGC	-43.63		PASS	
				3dB above AGC	-43.91		PASS	
			Two signals input	Pre-AGC	-42.79		PASS	
				3dB above AGC	-42.42		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,  
 $P = 19\text{dBm} = 0.08\text{W}$ , so  
 $\text{the limit} = 19\text{dBm} - [43 + 10 \log_{10} (0.08\text{W})] \text{ dB} = -13\text{dBm}$

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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	
Uplink	lower edge	GSM	One signal input	Pre-AGC	-26.67	≤-13	PASS	
				3dB above AGC	-27.02		PASS	
			Two signals input	Pre-AGC	-27.44		PASS	
				3dB above AGC	-27.78		PASS	
	upper edge		One signal input	Pre-AGC	-27.89		PASS	
				3dB above AGC	-28.37		PASS	
			Two signals input	Pre-AGC	-29.68		PASS	
				3dB above AGC	-29.29		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,  
 $P = 19\text{dBm} = 0.08\text{W}$ , so  
the limit =  $19\text{dBm} - [43 + 10 \log_{10} (0.08\text{W})]$  dB = -13dBm

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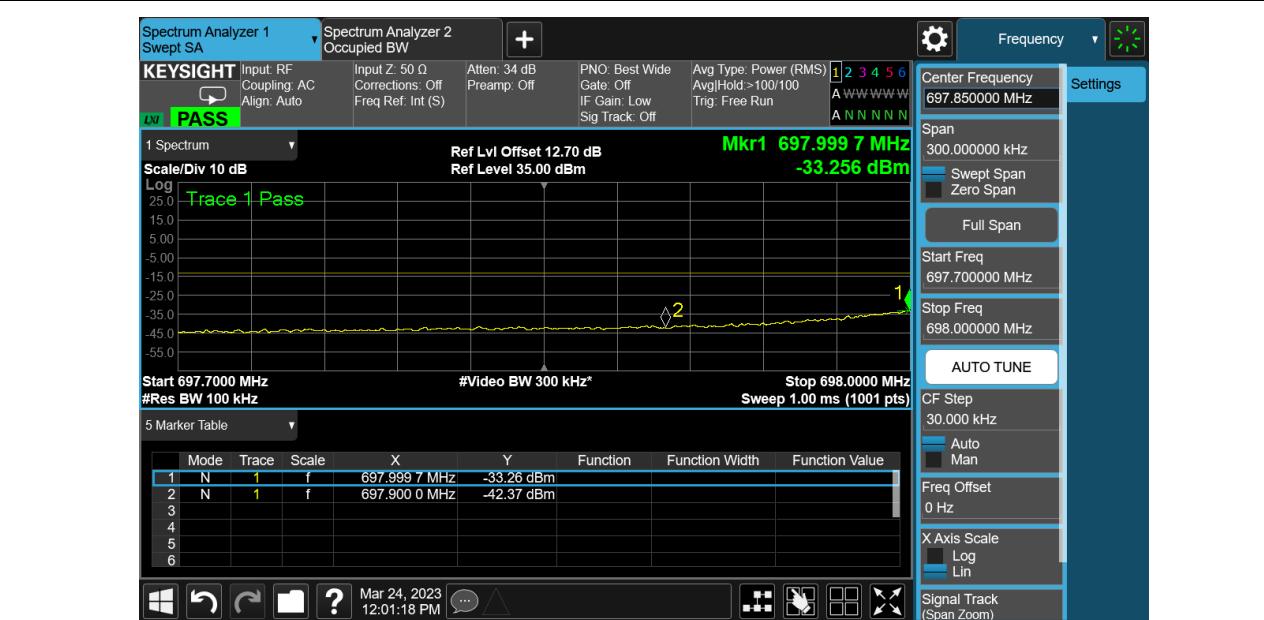
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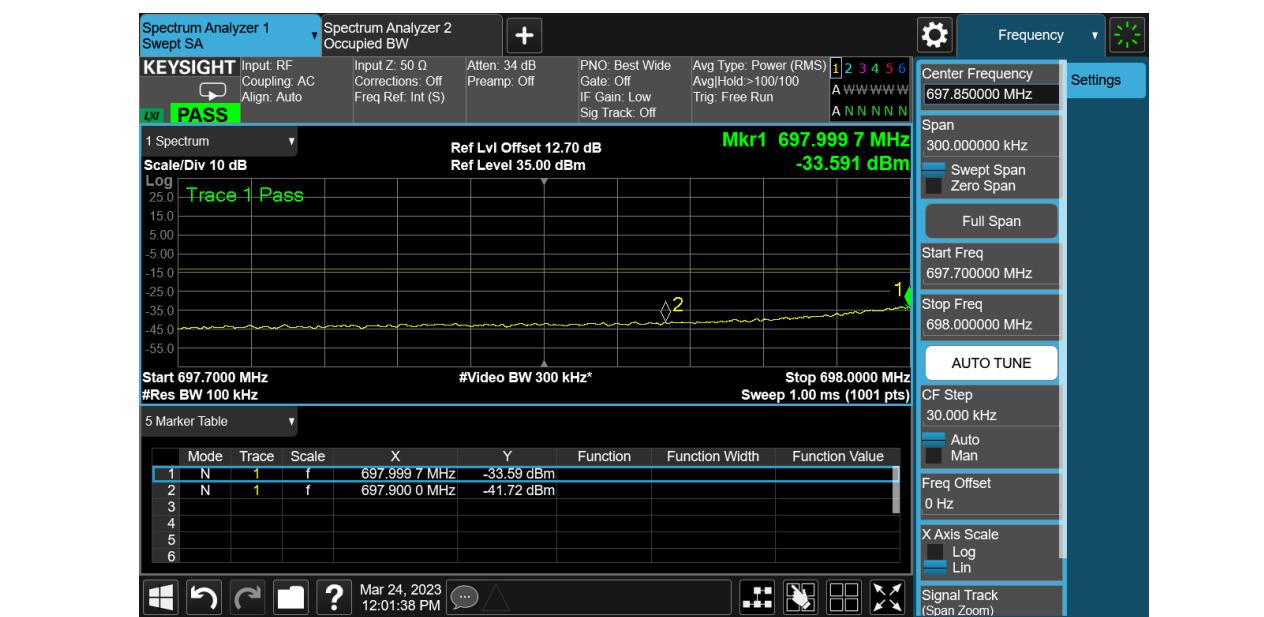
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## Out-of-band/out-of-block emissions

## Uplink\_5MHz AWGN\_One signal input\_Pre-AGC\_Lower edge



## Uplink\_5MHz AWGN\_One signal input\_3dB above AGC\_Lower edge



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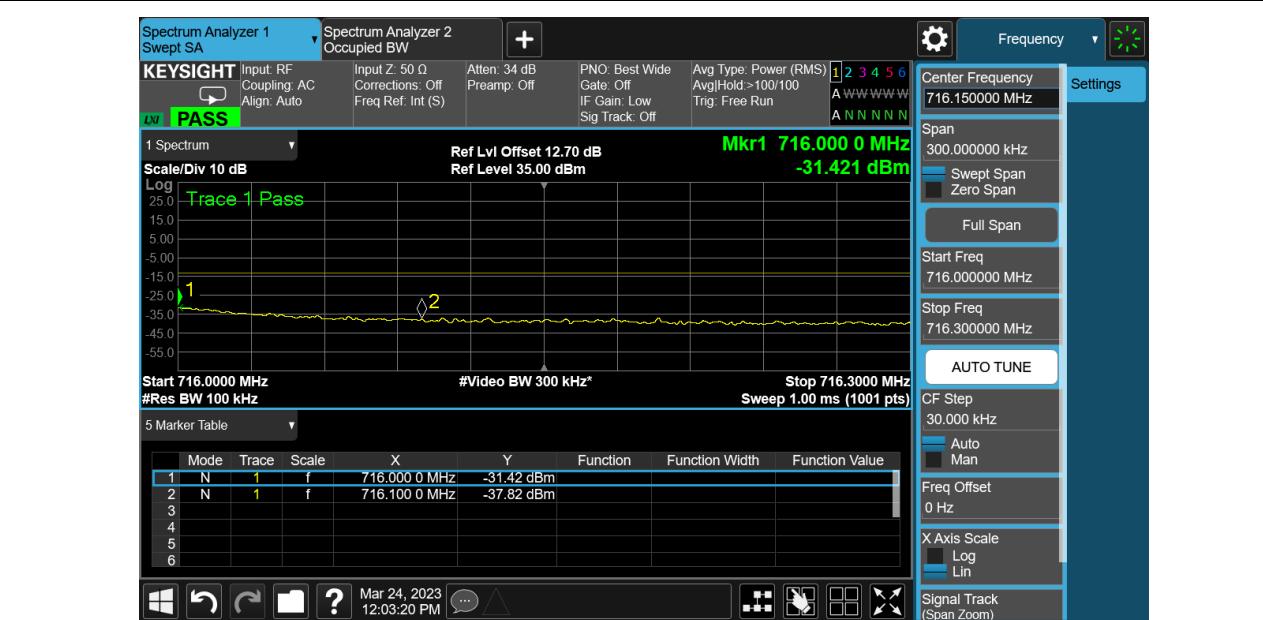
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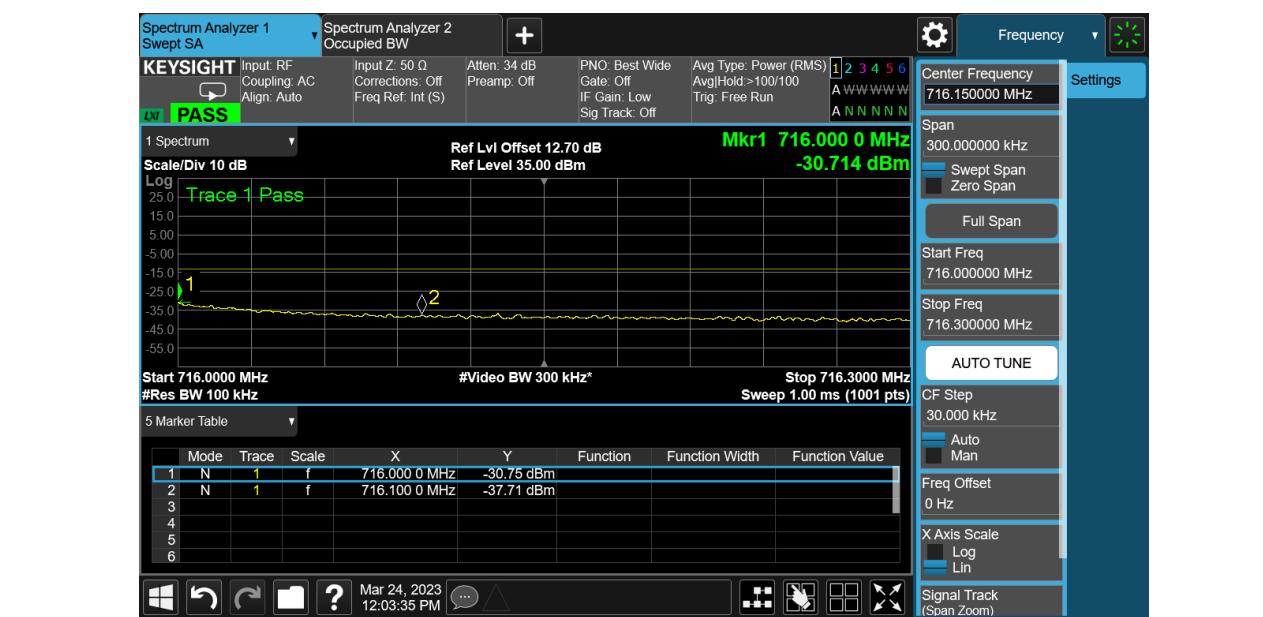
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## Out-of-band/out-of-block emissions

## Uplink\_5MHz AWGN\_One signal input\_Pre-AGC\_Upper edge



## Uplink\_5MHz AWGN\_One signal input\_3dB above AGC\_Upper edge



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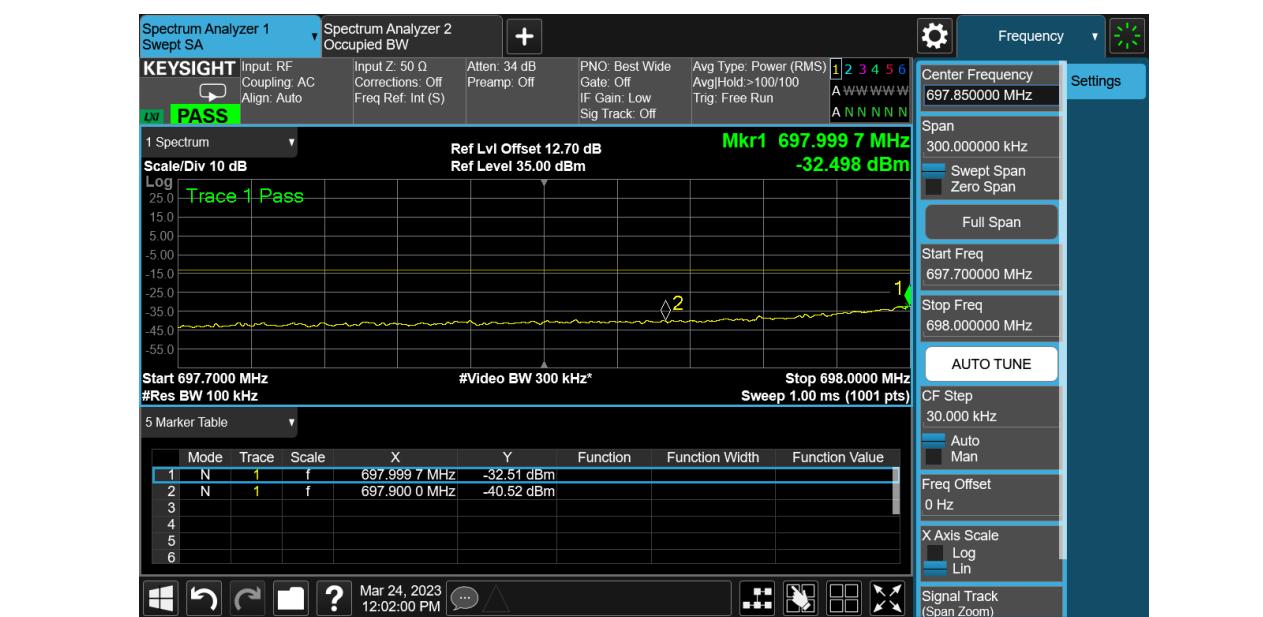
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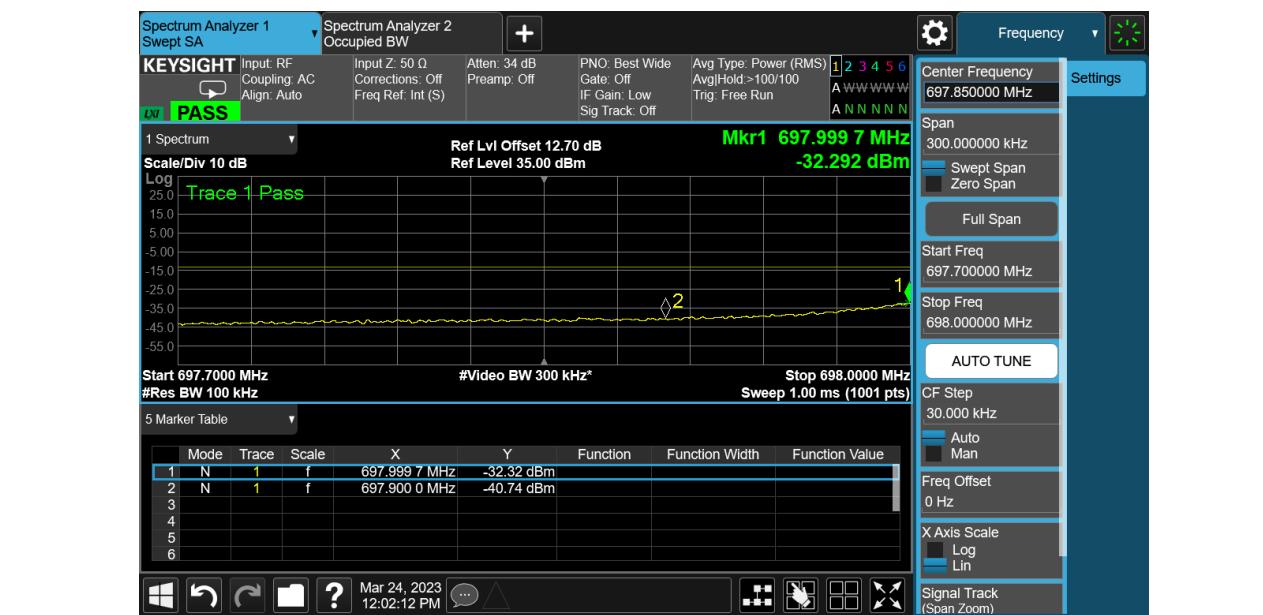
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## Out-of-band/out-of-block emissions

## Uplink\_5MHz AWGN\_Two signals input\_Pre-AGC\_Lower edge



## Uplink\_5MHz AWGN\_Two signals input\_3dB above AGC\_Lower edge



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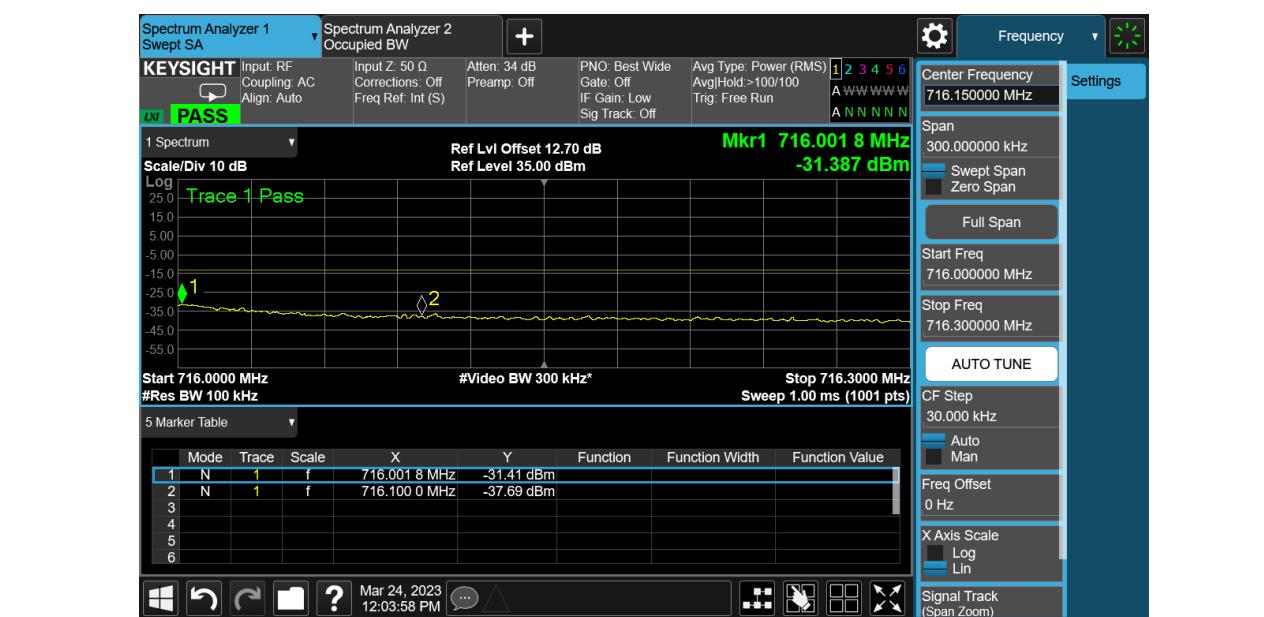
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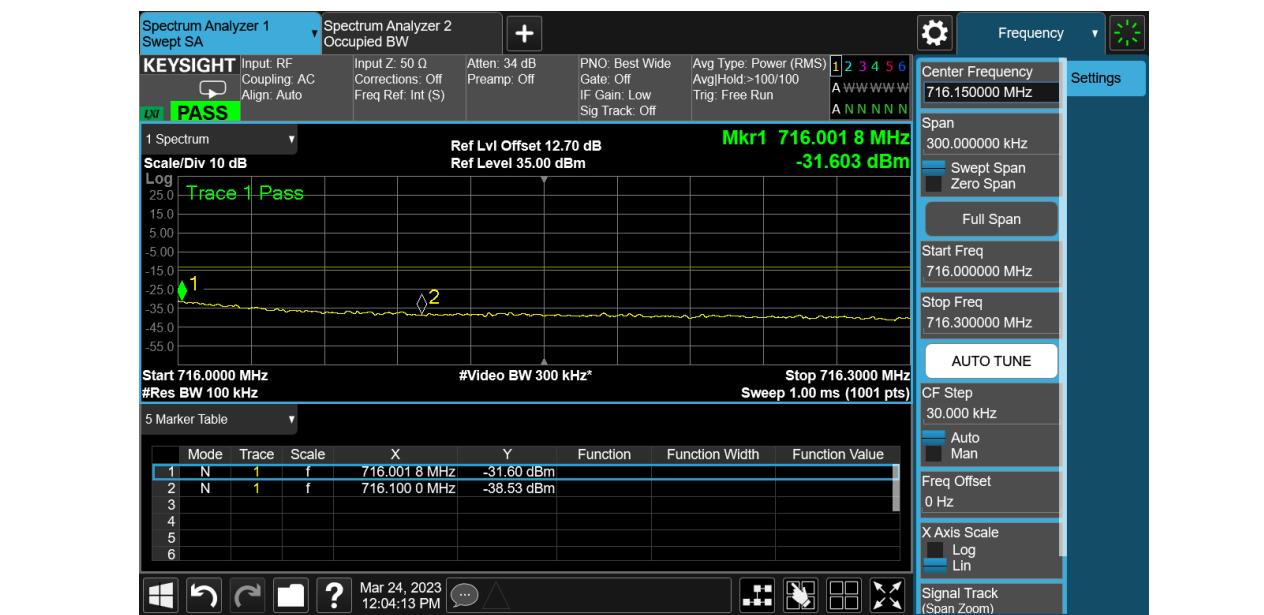
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## Out-of-band/out-of-block emissions

## Uplink\_5MHz AWGN\_Two signals input\_Pre-AGC\_Upper edge



## Uplink\_5MHz AWGN\_Two signals input\_3dB above AGC\_Upper edge



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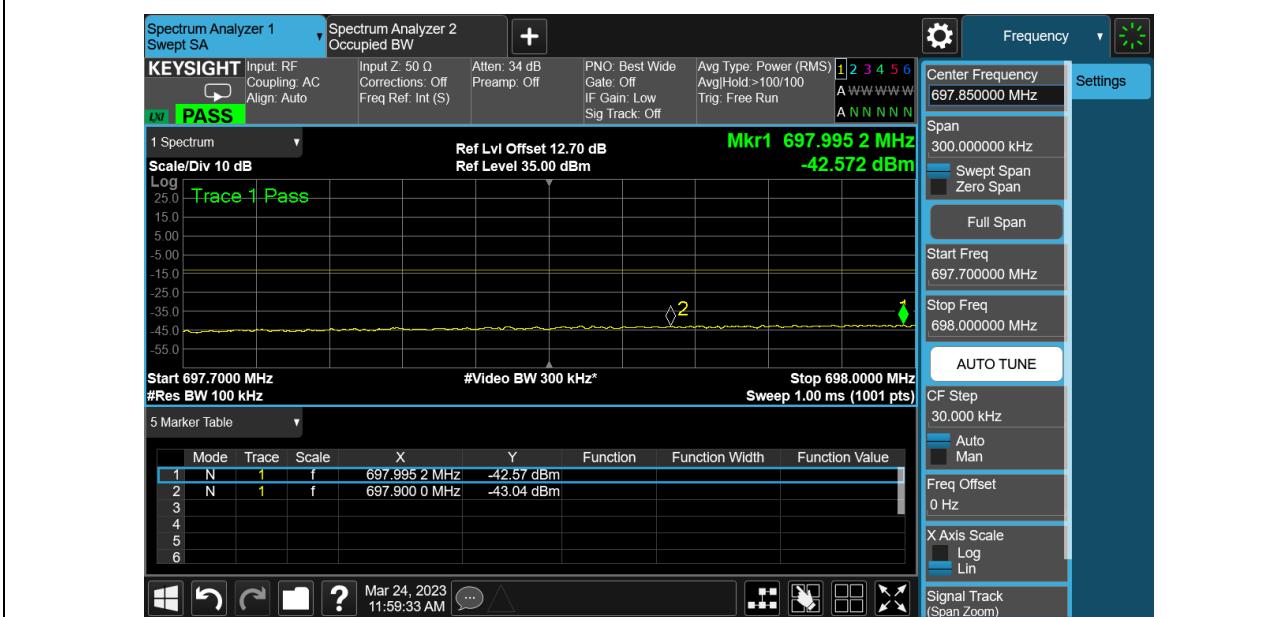
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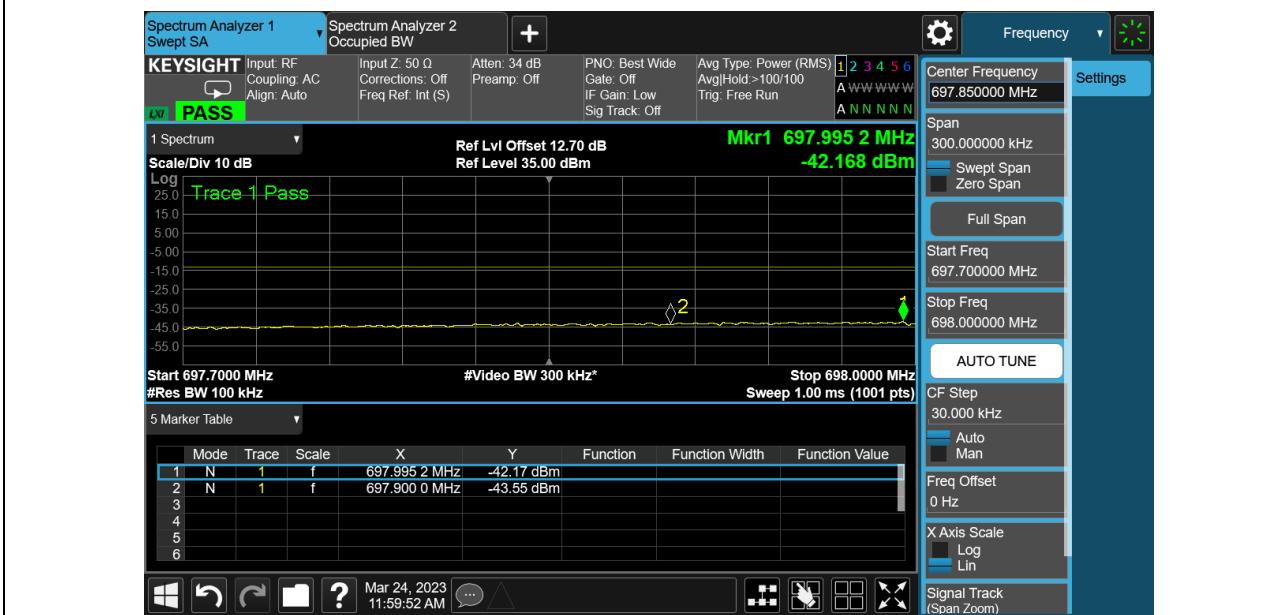
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## Out-of-band/out-of-block emissions

## Uplink\_100MHz AWGN\_One signal input\_Pre-AGC\_Lower edge



## Uplink\_100MHz AWGN\_One signal input\_3dB above AGC\_Lower edge



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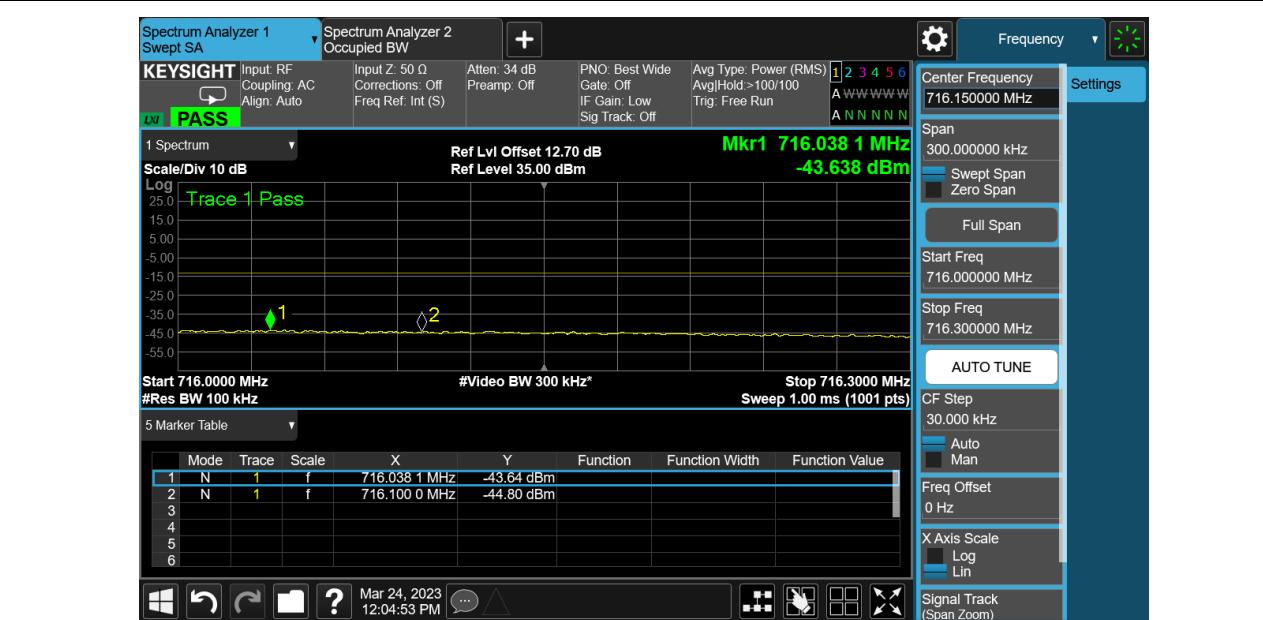
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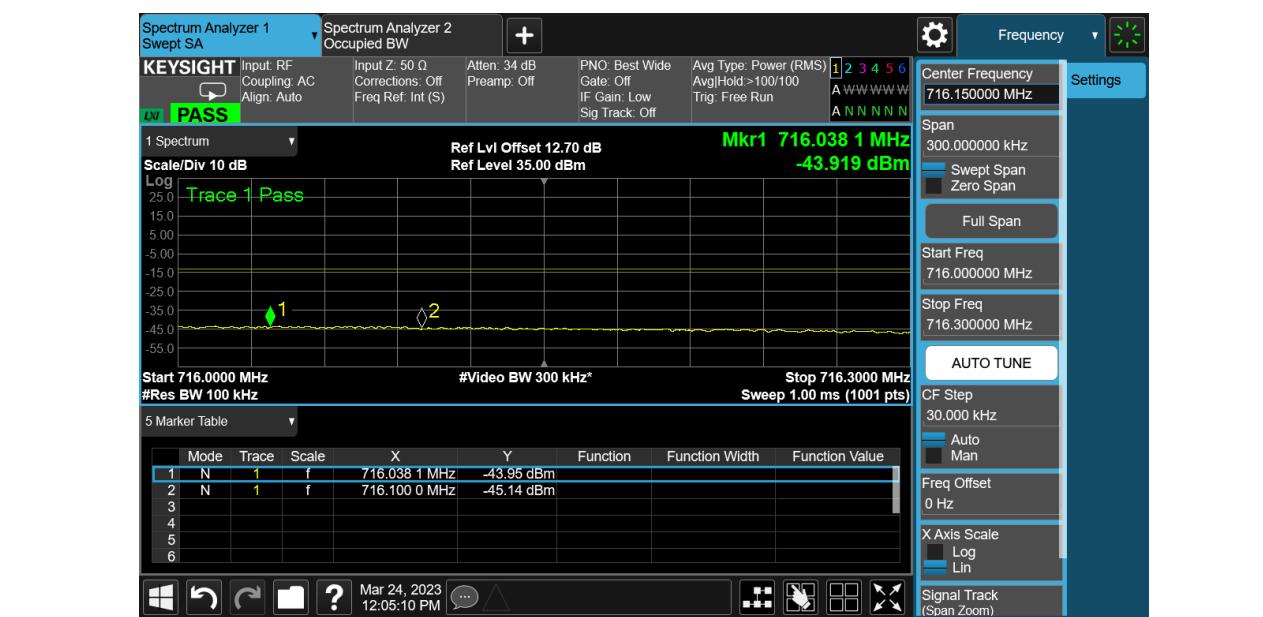
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## Out-of-band/out-of-block emissions

## Uplink\_100MHz AWGN\_One signal input\_Pre-AGC\_Upper edge



## Uplink\_100MHz AWGN\_One signal input\_3dB above AGC\_Upper edge



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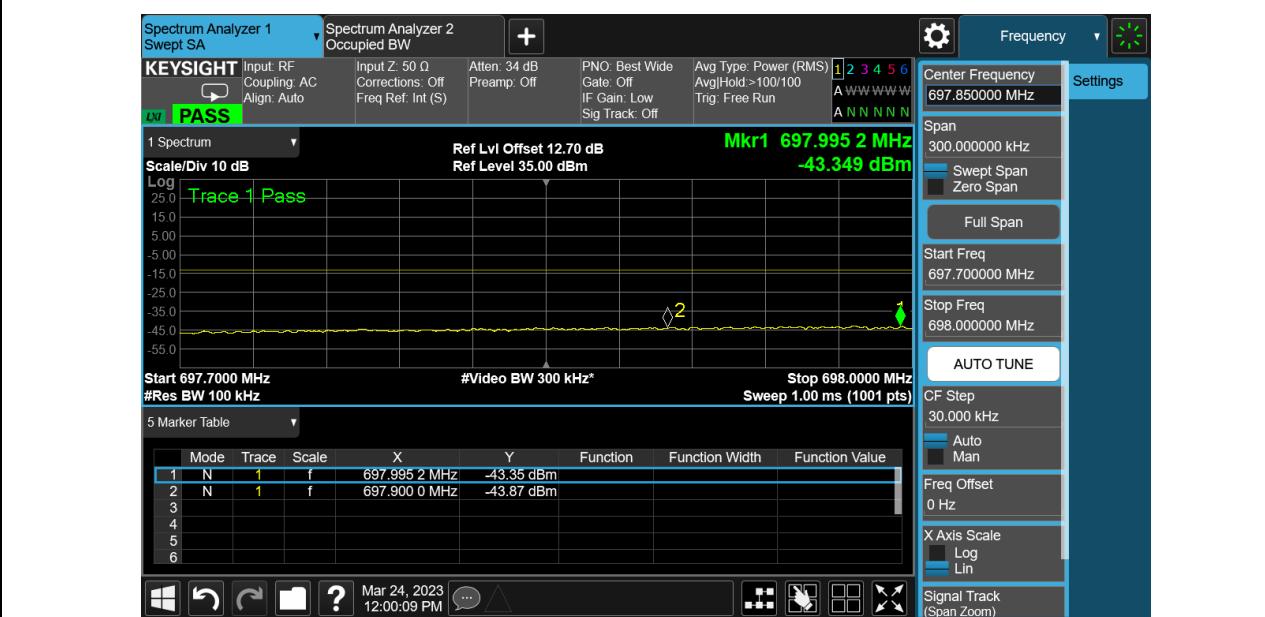
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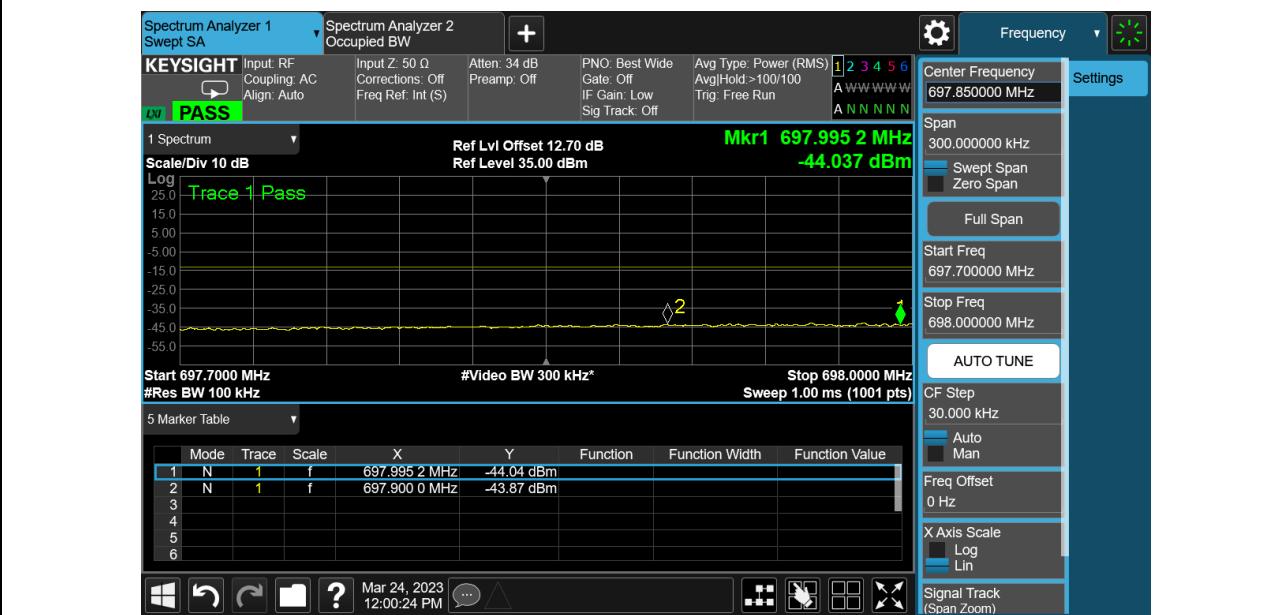
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## Out-of-band/out-of-block emissions

## Uplink\_100MHz AWGN\_Two signals input\_Pre-AGC\_Lower edge



## Uplink\_100MHz AWGN\_Two signals input\_3dB above AGC\_Lower edge



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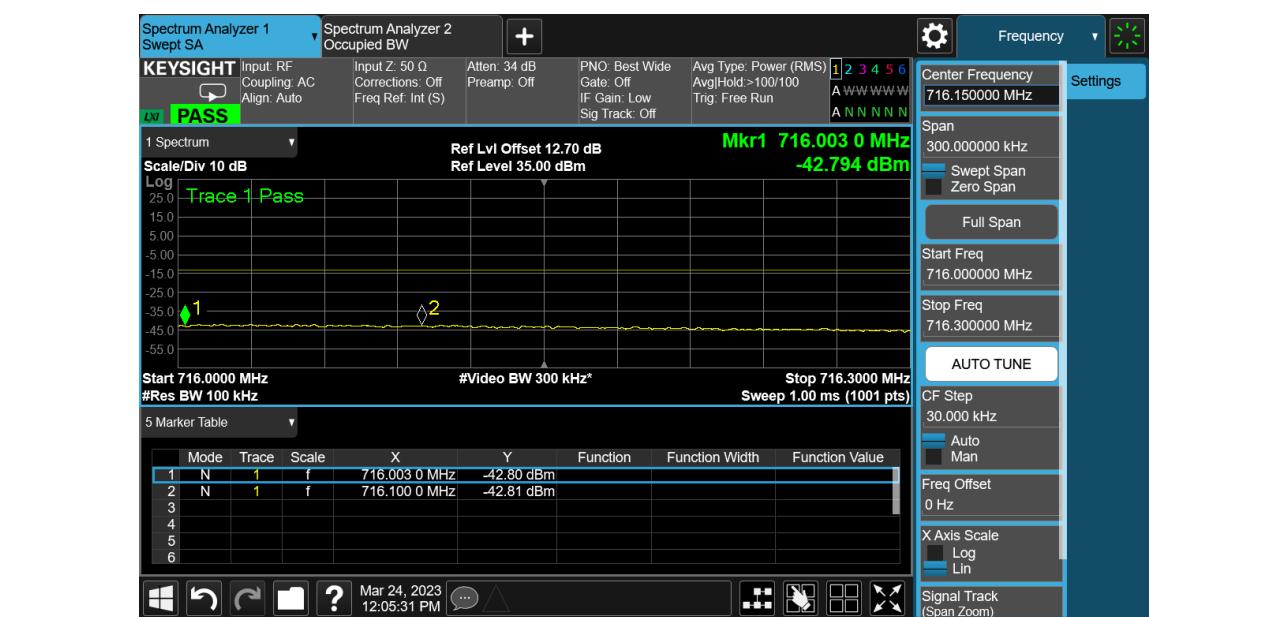
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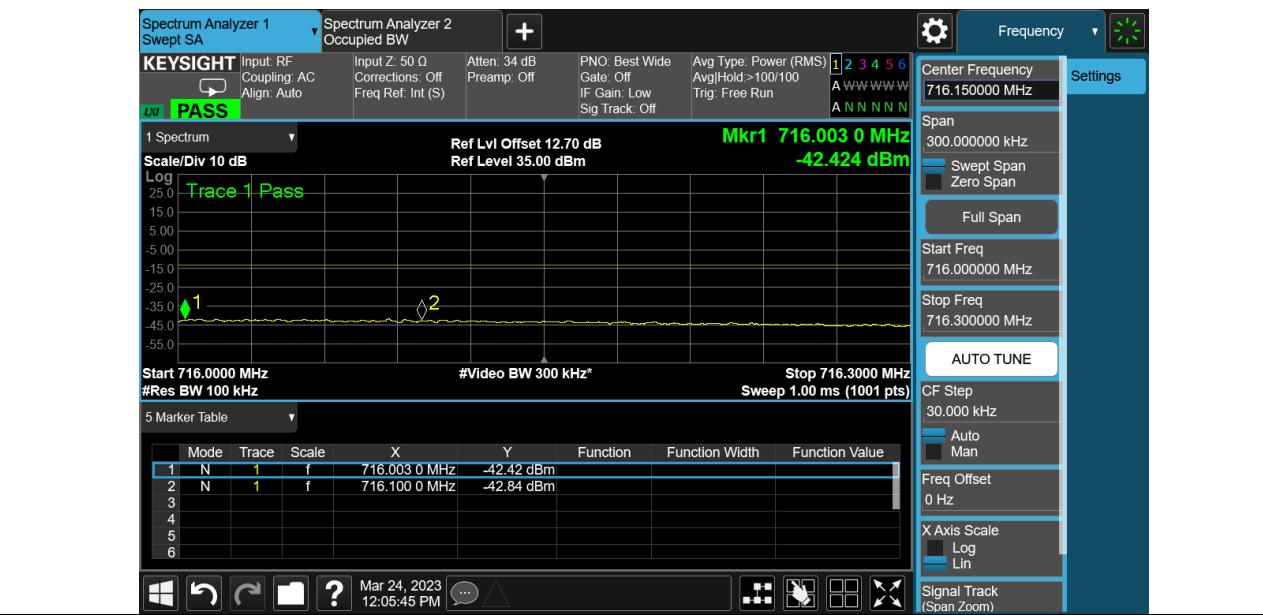
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## Out-of-band/out-of-block emissions

## Uplink\_100MHz AWGN\_Two signals input\_Pre-AGC\_Upper edge



## Uplink\_100MHz AWGN\_Two signals input\_3dB above AGC\_Upper edge



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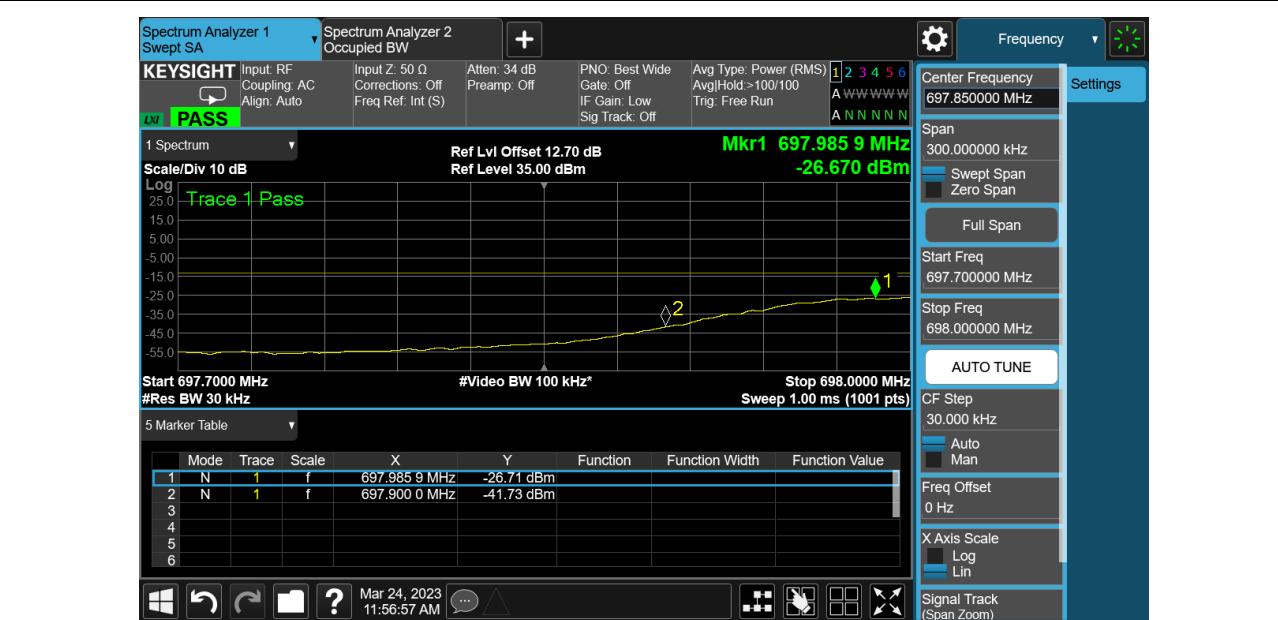
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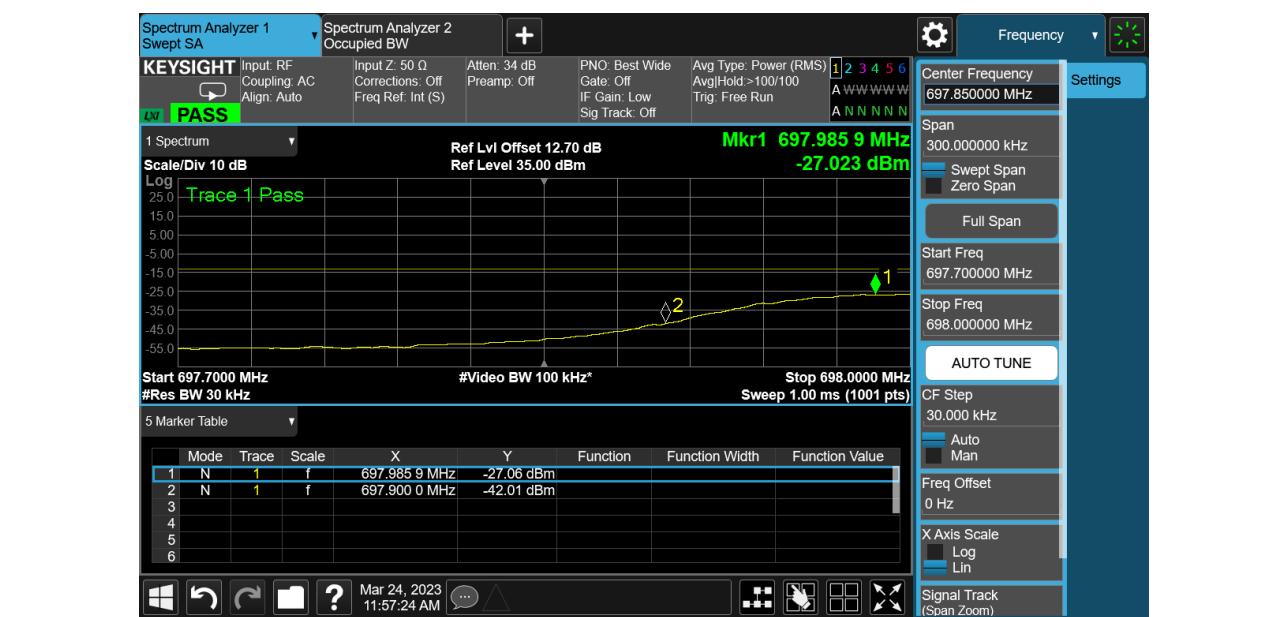
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## Out-of-band/out-of-block emissions

## Uplink\_GSM\_One signal input\_Pre-AGC\_Lower edge



## Uplink\_GSM\_One signal input\_3dB above AGC\_Lower edge



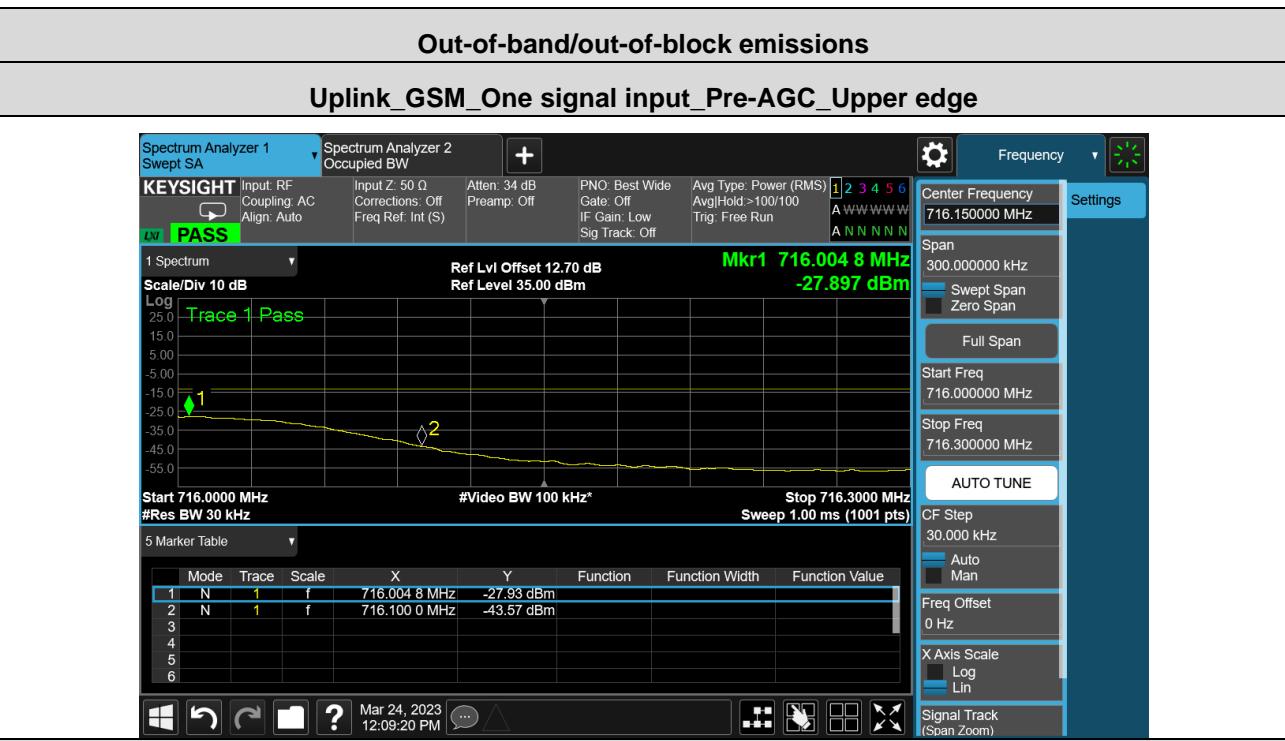
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## Out-of-band/out-of-block emissions

## Uplink\_GSM\_One signal input\_Pre-AGC\_Upper edge



## Uplink\_GSM\_One signal input\_3dB above AGC\_Upper edge



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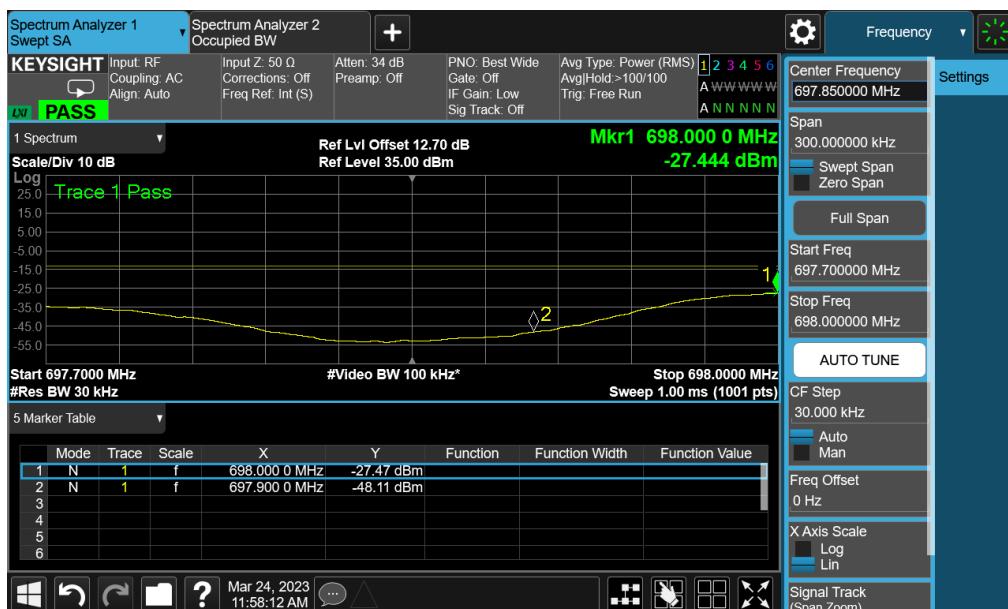
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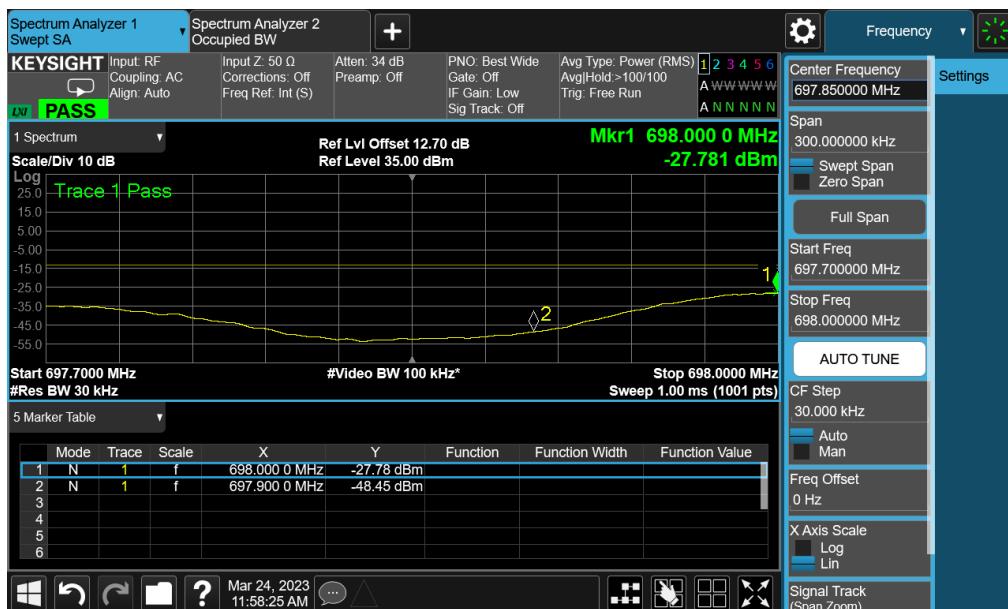
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## Out-of-band/out-of-block emissions

## Uplink\_GSM\_Two signals input\_Pre-AGC\_Lower edge



## Uplink\_GSM\_Two signals input\_3dB above AGC\_Lower edge



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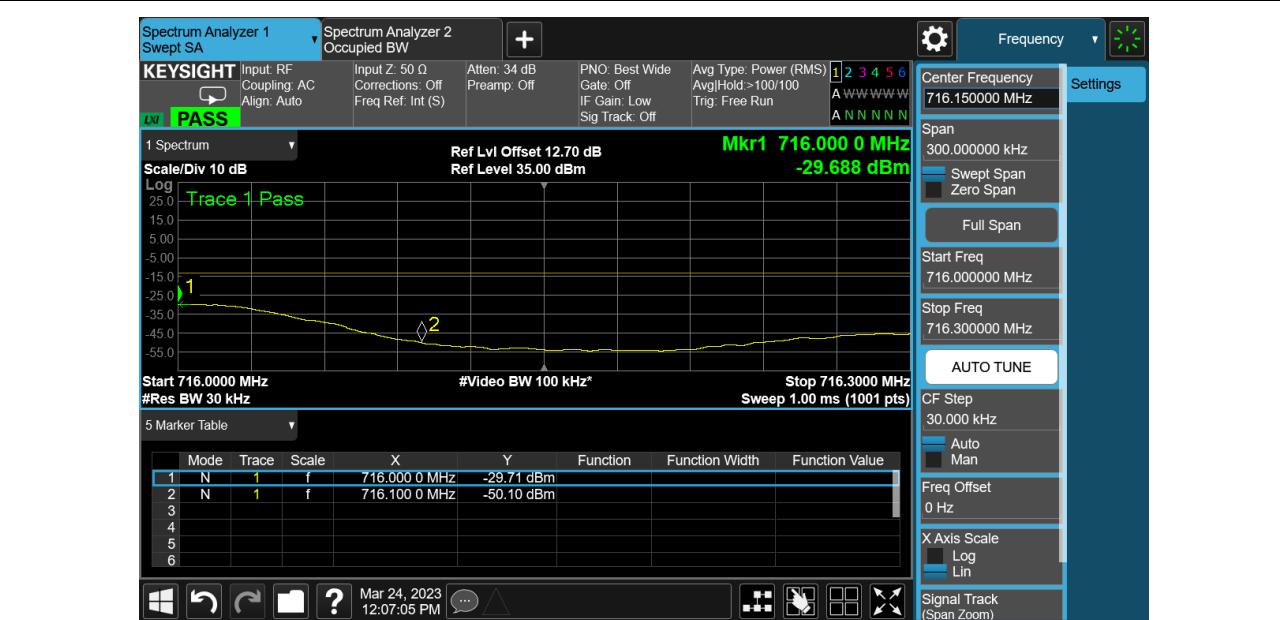
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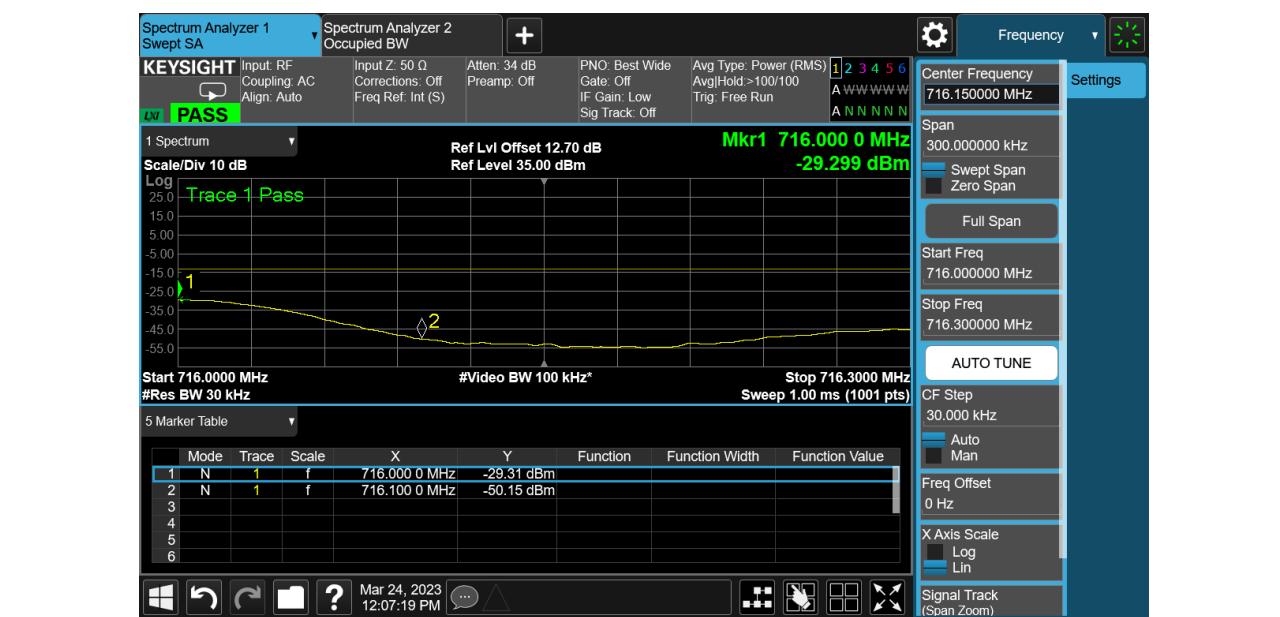
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## Out-of-band/out-of-block emissions

## Uplink\_GSM\_Two signals input\_Pre-AGC\_Upper edge



## Uplink\_GSM\_Two signals input\_3dB above AGC\_Upper edge



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## 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
Uplink	High Channel	5MHz AWGN	Pre-AGC	0.009-697.9	-43.43	≤-13	PASS
				716.1-1000	-39.45	≤-13	PASS
				1000-8000	-31.83	≤-13	PASS
		100MHz AWGN	Pre-AGC	0.009-697.9	-40.27	≤-13	PASS
				716.1-1000	-44.23	≤-13	PASS
				1000-8000	-33.21	≤-13	PASS
	Middle Channel	GSM	Pre-AGC	0.009-697.9	-33.84	≤-13	PASS
				716.1-1000	-30.12	≤-13	PASS
				1000-8000	-34.53	≤-13	PASS
		5MHz AWGN	Pre-AGC	0.009-697.9	-29.34	≤-13	PASS
				716.1-1000	-33.43	≤-13	PASS
				1000-8000	-37.23	≤-13	PASS
	Low Channel	100MHz AWGN	Pre-AGC	0.009-697.9	-30.26	≤-13	PASS
				716.1-1000	-35.35	≤-13	PASS
				1000-8000	-40.32	≤-13	PASS
		GSM	Pre-AGC	0.009-697.9	-32.23	≤-13	PASS
				716.1-1000	-34.52	≤-13	PASS
				1000-8000	-39.48	≤-13	PASS
		5MHz AWGN	Pre-AGC	0.009-697.9	-40.11	≤-13	PASS
				716.1-1000	-38.27	≤-13	PASS
				1000-8000	-31.35	≤-13	PASS
		100MHz AWGN	Pre-AGC	0.009-697.9	-31.02	≤-13	PASS
				716.1-1000	-33.28	≤-13	PASS
				1000-8000	-34.72	≤-13	PASS
		GSM	Pre-AGC	0.009-697.9	-35.46	≤-13	PASS
				716.1-1000	-30.27	≤-13	PASS
				1000-8000	-35.73	≤-13	PASS

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## 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,

$$P = 19\text{dBm} = 0.08\text{W}, \text{ so}$$

$$\text{the limit} = 19\text{dBm} - [43 + 10 \log_{10} (0.08\text{W})] \text{ dB} = -13\text{dBm}$$

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**6 Frequency Stability**

Frequency stability vs temperature						
Test Path	Test Frequency (MHz)	Temperature (°C)	Voltage (V AC)	Frequency error (Hz)	Tolerance (ppm)	Verdict
Uplink	707	+50	110	32	0.0453	PASS
		+40	110	35	0.0495	PASS
		+30	110	27	0.0382	PASS
		+20	110	19	0.0269	PASS
		+10	110	22	0.0311	PASS
		0	110	30	0.0424	PASS
		-10	110	23	0.0325	PASS
		-20	110	26	0.0368	PASS
		-30	110	16	0.0226	PASS

Frequency stability vs voltage						
Test path	Test Frequency (MHz)	Voltage (V AC)	Temperature (°C)	Frequency error (Hz)	Tolerance (ppm)	Verdict
Uplink	707	93.5	20	34	0.0481	PASS
		126.5	20	26	0.0368	PASS

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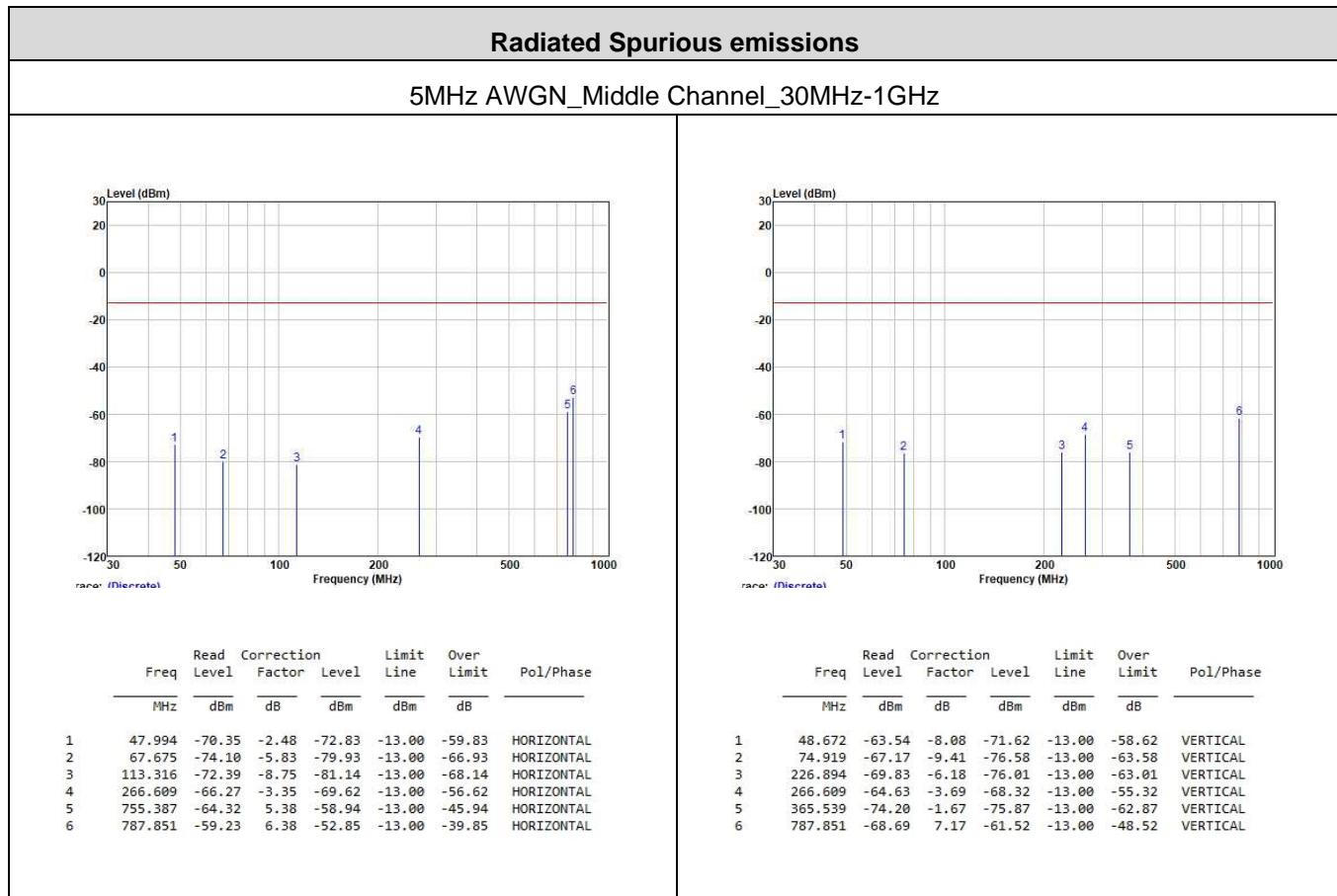
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## 7 Radiated Spurious emissions

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.

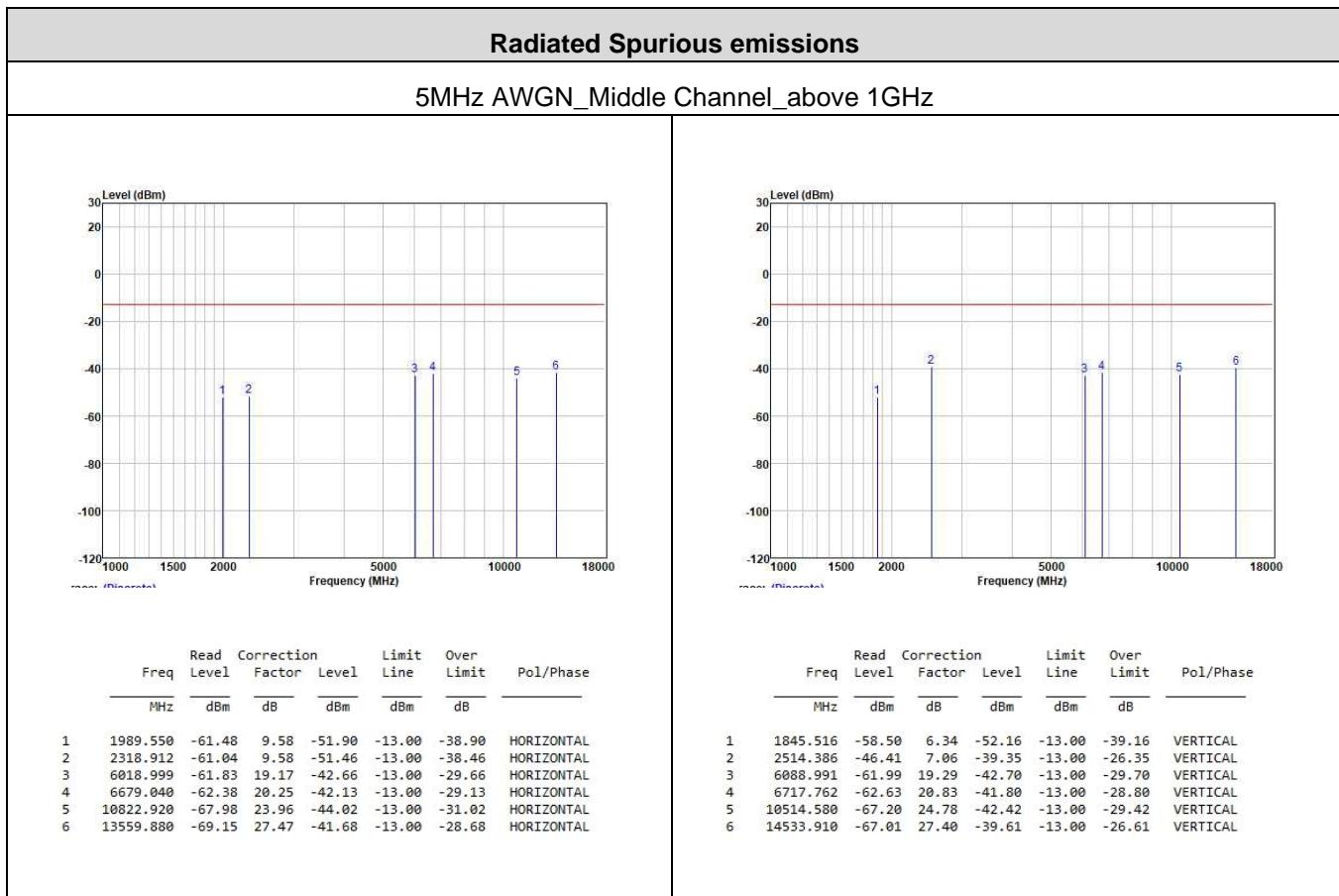


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--End of Appendix--

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