



SGS-CSTC Standards Technical Services Co., Ltd. Guangzhou Branch

EMC-ARF-05 Rev 1.1

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FCC ID: 2AYTR17K-A01

Appendix -

Test Data and Result for report

GZCR250300034202 (B)

(For Cellualr)



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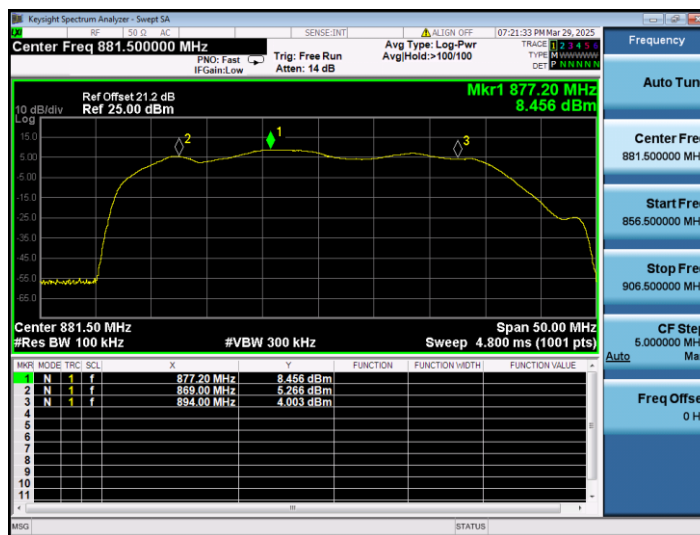
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1 Authorized frequency band verification

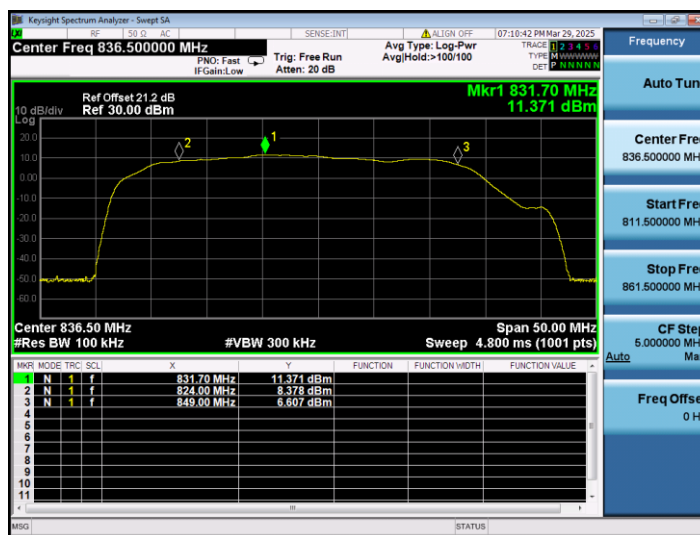
Authorized frequency band verification

DL



f₀ =877.2MHz

UL



f₀ =831.7MHz

Remark:

The frequency point f0 with the highest power level fall in the CMRS band under test with reset the spectrum analyser span to $2 \times$ the width of the CMRS band under test and adjust the tuned frequency of the signal generator to sweep $2 \times$ the width of the CMRS band using the sweep function. EUT is compiled the KDB 935210 D03 Signal Booster Measurements v04r04 Authorized frequency band verification test requirement.



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2 Maximum power

Maximum Output Power									
Path	Band	Signal Type	Input Signal Level (dBm)		Maximum Output Power				Verdict
					Conducted (dBm)	Limit (dBm)	ERP (dBm)	Limit (dBm)	
DL	Cellular	AWGN	Pre-AGC	-43	15.55	≤17	16.55	≤17	PASS
		GSM	Pre-AGC	-43	15.72		16.72		PASS
UL	Cellular	AWGN	Pre-AGC	-45	19.49	≥17 & ≤30	18.09	≤30	PASS
		GSM	Pre-AGC	-45	19.64		18.24		PASS

Remark:

- The test frequency f_0 was determined in Authorized frequency band verification test in this report.
- ERP = Conducted Output Power + Antenna Gain – Cable loss, refer to clause 2 for the details about the declared antenna gain and cable loss.

Maximum transmitter test input levels					
Path	Band	Signal Type	Input Power (dBm)	Conducted output power (dBm)	Verdict
DL	Cellular	AWGN	-23	15.23	PASS
		GSM	-23	15.49	PASS
UL	Cellular	AWGN	-25	19.31	PASS
		GSM	-25	19.53	PASS

Remark:

The EUT went into shutdown mode at the maximum input level indicated in 5.5 of KDB 935210 D03. Above test data was measured at input level 1dB less than that found to cause the shutdown, where the input power is much greater than 10dB above AGC.



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3 Maximum booster gain computation

Maximum Gain								
Path	Band	Signal Type	Input Signal Level (dBm)		Conducted Output Power (dBm)	Gain (dB)	Limit (dB)	Verdict
DL	Cellular	AWGN	Pre-AGC	-43	15.55	58.55	≤64.9	PASS
		GSM	Pre-AGC	-43	15.72	58.72		PASS
UL	Cellular	AWGN	Pre-AGC	-45	19.49	64.49	≤64.9	PASS
		GSM	Pre-AGC	-45	19.64	64.64		PASS

Equivalent Uplink and Downlink Gain						
Band	Signal Type	Uplink Gain (dB)	Downlink Gain (dB)	UL vs DL Gain (dB)	Limit (dB)	Verdict
Cellular	AWGN	58.55	64.49	5.94	≤9	PASS
	GSM	58.72	64.64	5.92		PASS



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4 Intermodulation product

Intermodulation product						
Path	Band	Input Signal		Worst Test Level (dBm)	Limit (dBm)	Verdict
DL	Cellular	two CW signals	Pre-AGC	-26.64	≤-19	PASS
			10dB above AGC	-26.35		PASS
UL	Cellular	two CW signals	Pre-AGC	-23.30	≤-19	PASS
			10dB above AGC	-23.26		PASS



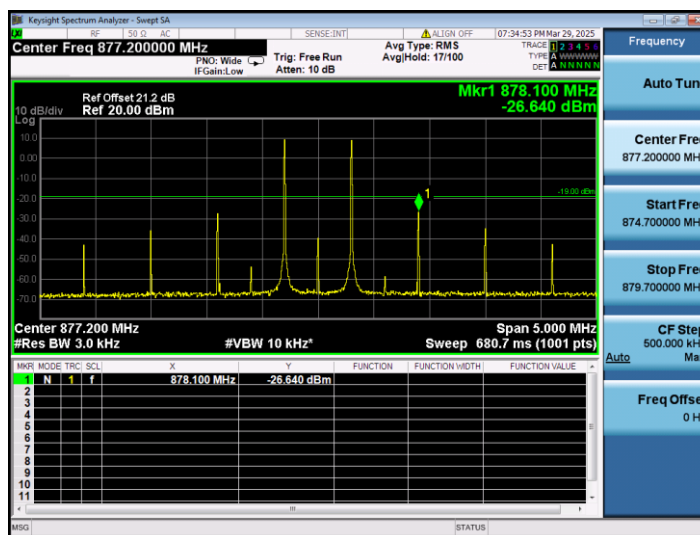
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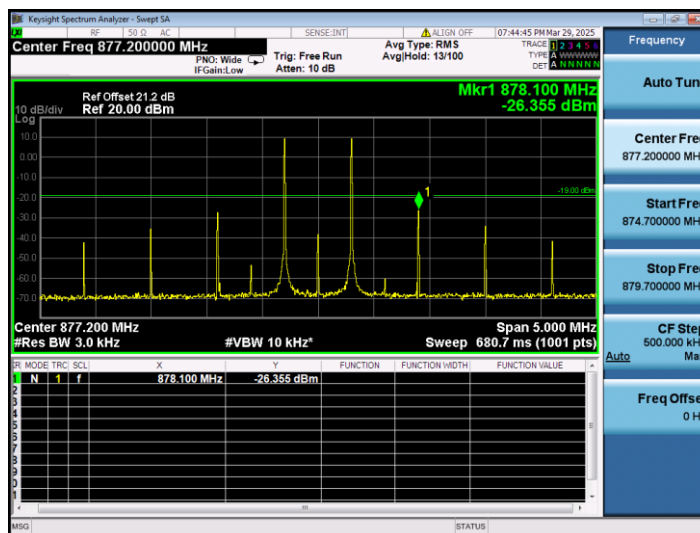
Intermodulation product

DL

Cellular Band_Pre-AGC



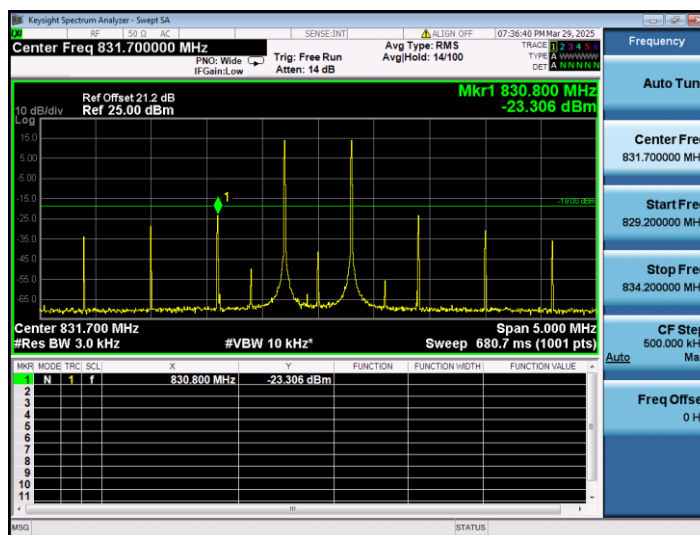
Cellular Band_10dB above AGC



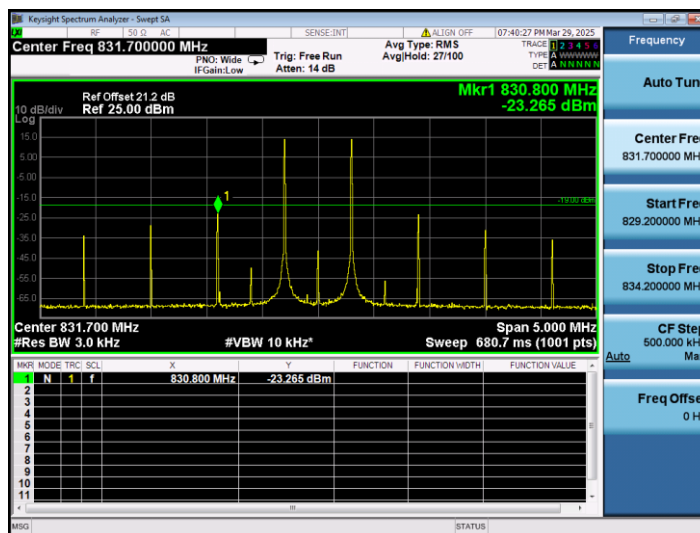
Intermodulation product

UL

Cellular Band_Pre-AGC



Cellular Band_10dB above AGC



5 Out-of-band emissions

Out-of-band emissions						
Path	Band	Input Signal			Limit (dBm)	Verdict
DL	Cellular	GSM	Lower Edge	Pre-AGC	≤-19	PASS
				10dB above AGC		PASS
			Upper Edge	Pre-AGC		PASS
				10dB above AGC		PASS
		1.25MHz AWGN	Lower Edge	Pre-AGC	≤-19	PASS
				10dB above AGC		PASS
			Upper Edge	Pre-AGC		PASS
				10dB above AGC		PASS
		4.1MHz AWGN	Lower Edge	Pre-AGC	≤-19	PASS
				10dB above AGC		PASS
			Upper Edge	Pre-AGC		PASS
				10dB above AGC		PASS
UL	Cellular	GSM	Lower Edge	Pre-AGC	≤-19	PASS
				10dB above AGC		PASS
			Upper Edge	Pre-AGC		PASS
				10dB above AGC		PASS
		1.25MHz AWGN	Lower Edge	Pre-AGC	≤-19	PASS
				10dB above AGC		PASS
			Upper Edge	Pre-AGC		PASS
				10dB above AGC		PASS
		4.1MHz AWGN	Lower Edge	Pre-AGC	≤-19	PASS
				10dB above AGC		PASS
			Upper Edge	Pre-AGC		PASS
				10dB above AGC		PASS



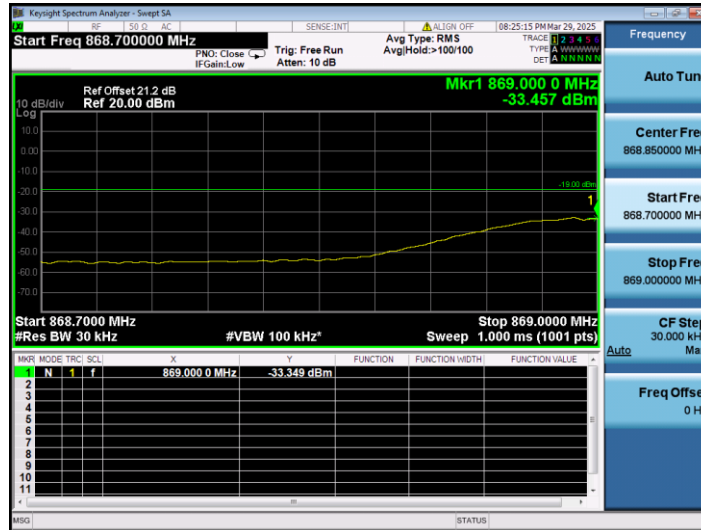
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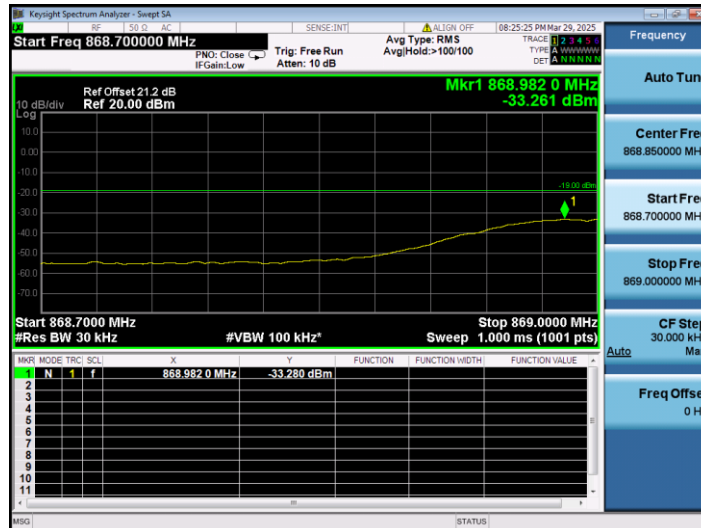
Out-of-band emissions

DL_Cellular Band

GSM signal input_Lower band edge_Pre-AGC



GSM signal input_Lower band edge_10dB above AGC



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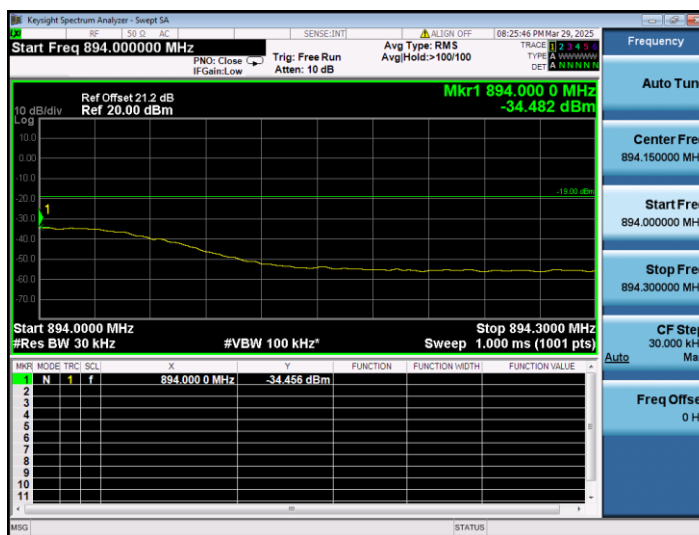
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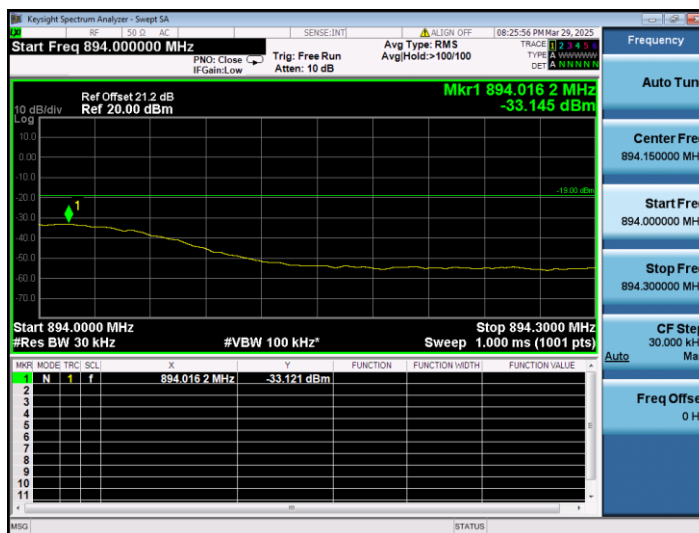
Out-of-band emissions

DL_Cellular Band

GSM signal input_Upper band edge_Pre-AGC



GSM signal input_Upper band edge_10dB above AGC



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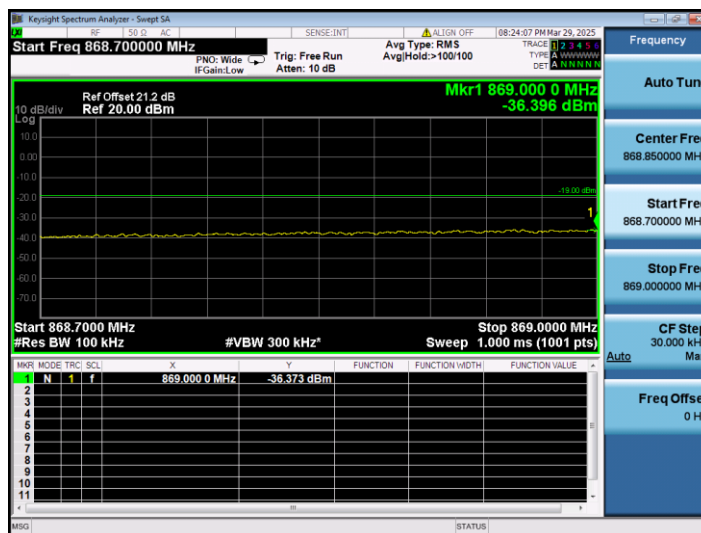
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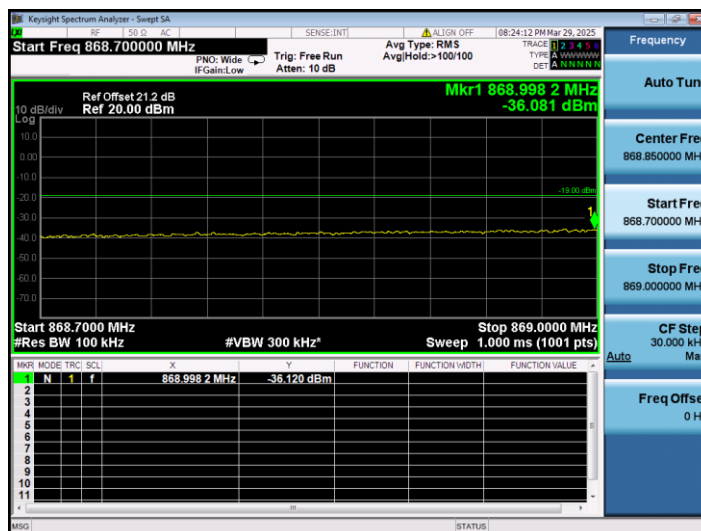
Out-of-band emissions

DL_Cellular Band

1.25MHz AWGN signal input_Lower band edge_Pre-AGC



1.25MHz AWGN signal input_Lower band edge_10dB above AGC



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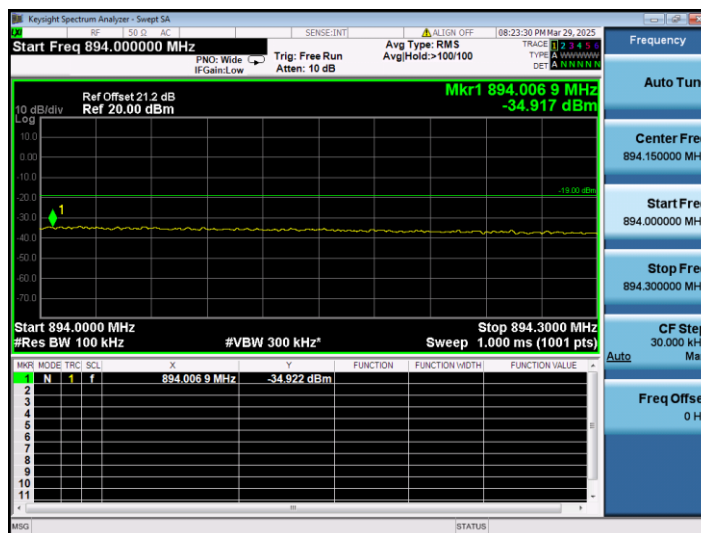
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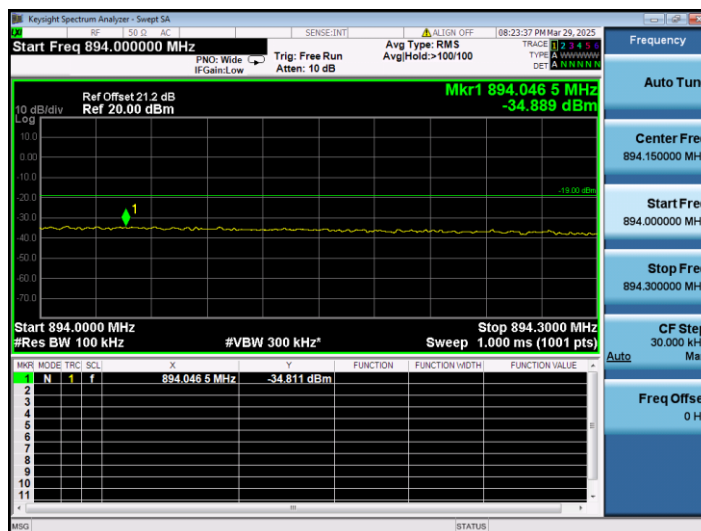
Out-of-band emissions

DL_Cellular Band

1.25MHz AWGN signal input_Upper band edge_Pre-AGC



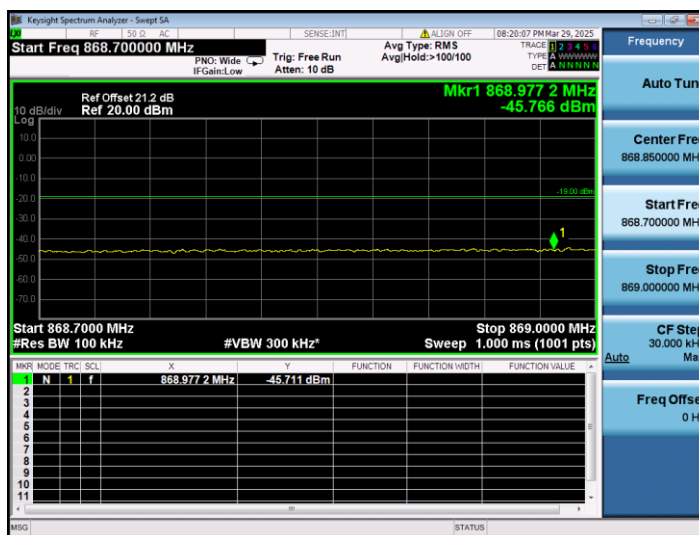
1.25MHz AWGN signal input_Upper band edge_10dB above AGC



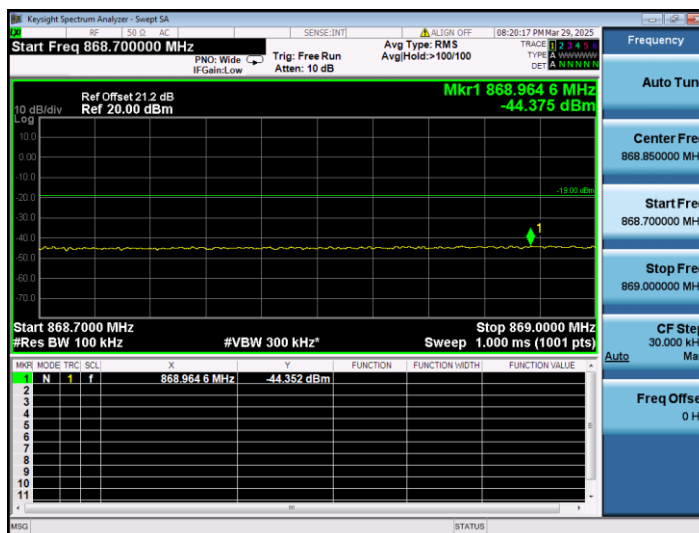
Out-of-band emissions

DL_Cellular Band

4.1MHz AWGN signal input_Lower band edge_Pre-AGC



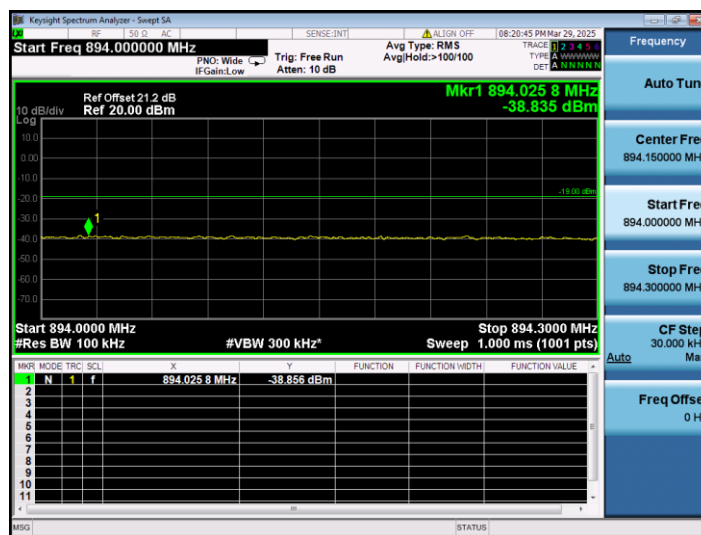
4.1MHz AWGN signal input_Lower band edge_10dB above AGC



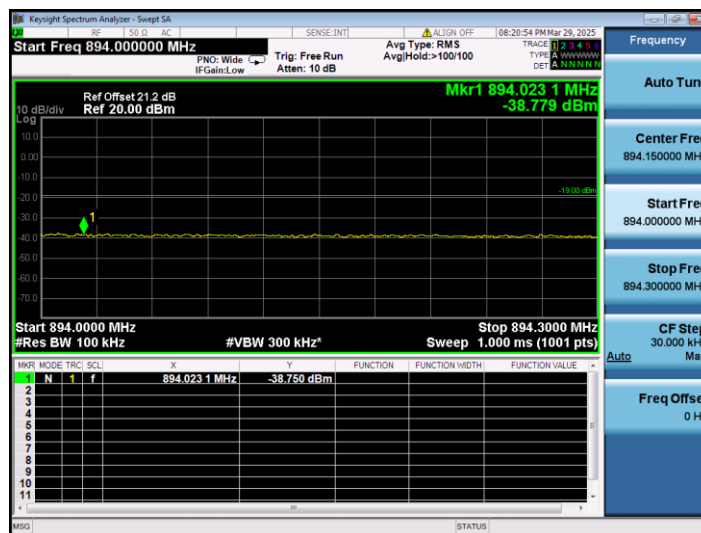
Out-of-band emissions

DL_Cellular Band

4.1MHz AWGN signal input_Upper band edge_Pre-AGC



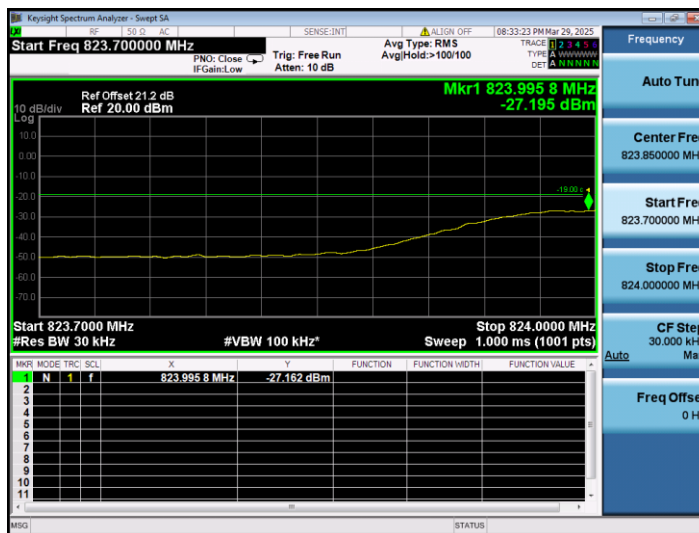
4.1MHz AWGN signal input_Upper band edge_10dB above AGC



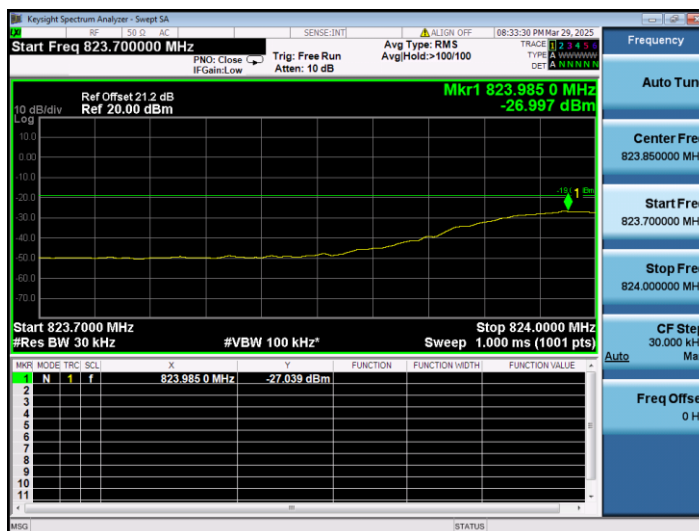
Out-of-band emissions

UL Cellular Band

GSM signal input_Lower band edge_Pre-AGC



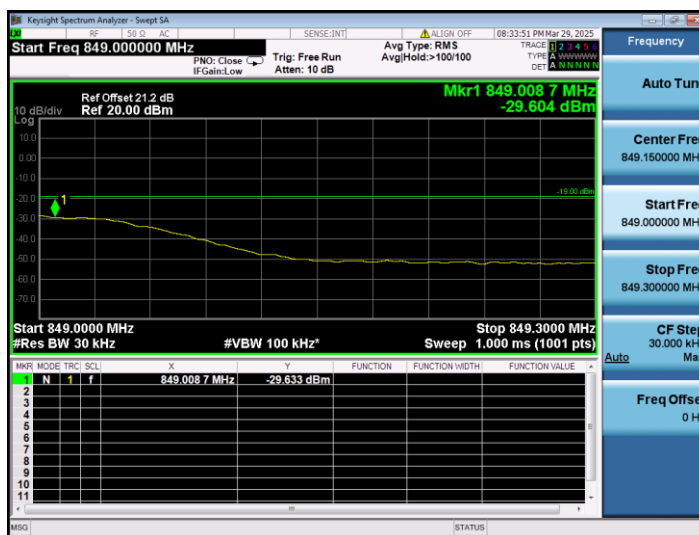
GSM signal input_Lower band edge_10dB above AGC



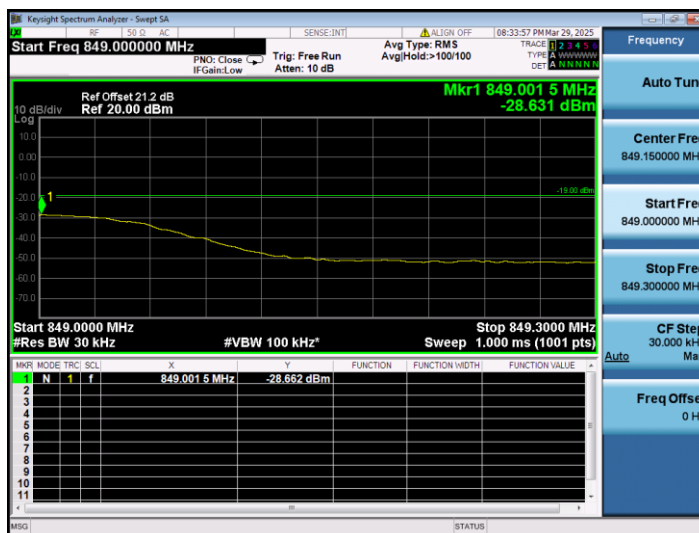
Out-of-band emissions

UL_Cellular Band

GSM signal input_Upper band edge_Pre-AGC



GSM signal input_Upper band edge_10dB above AGC



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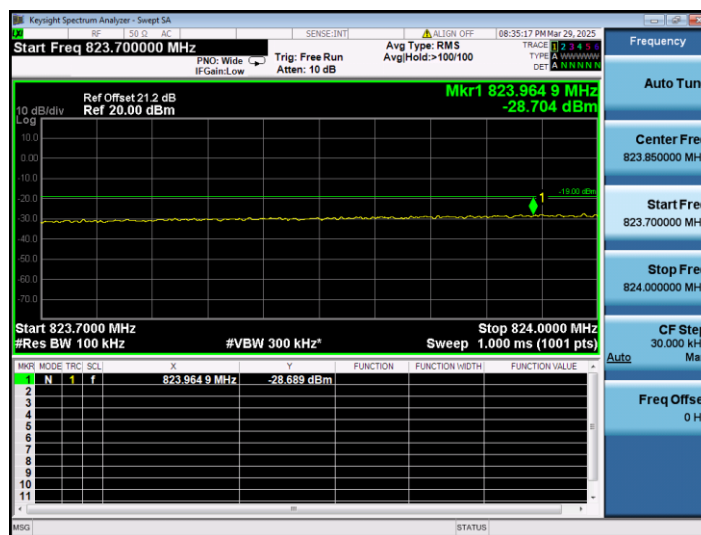
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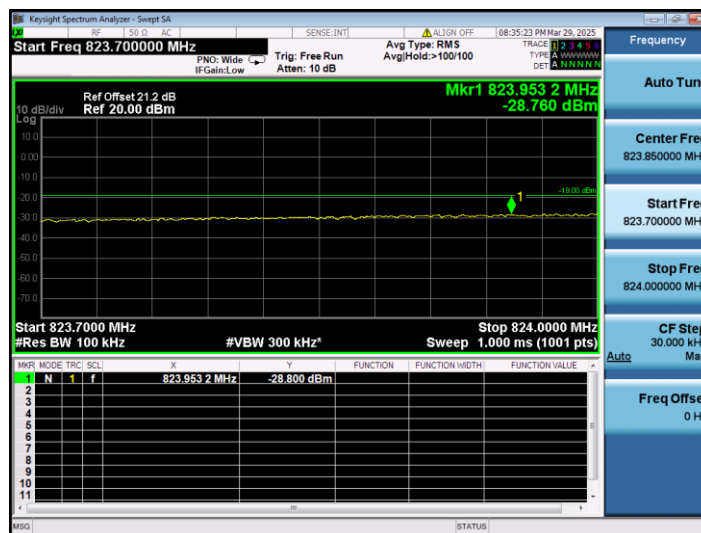
Out-of-band emissions

UL Cellular Band

1.25MHz AWGN signal input_Lower band edge_Pre-AGC



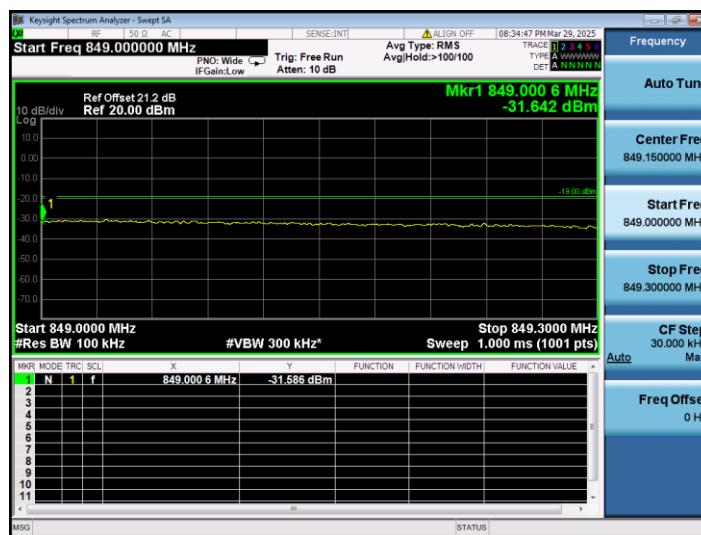
1.25MHz AWGN signal input_Lower band edge_10dB above AGC



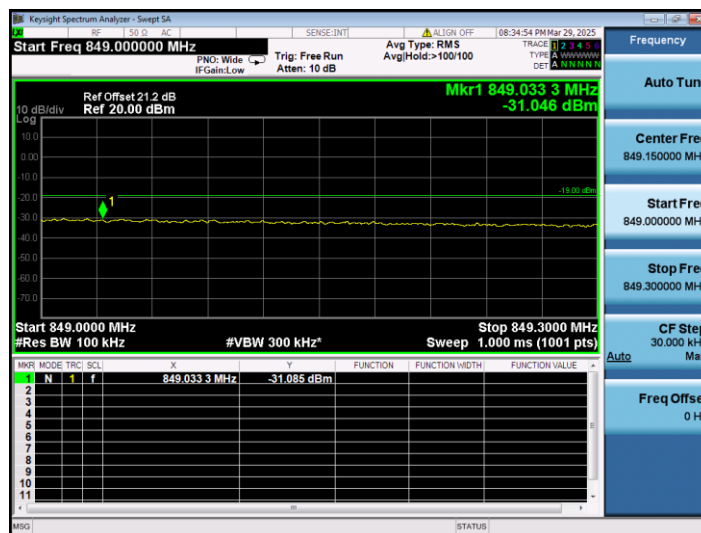
Out-of-band emissions

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1.25MHz AWGN signal input_Upper band edge_10dB above AGC



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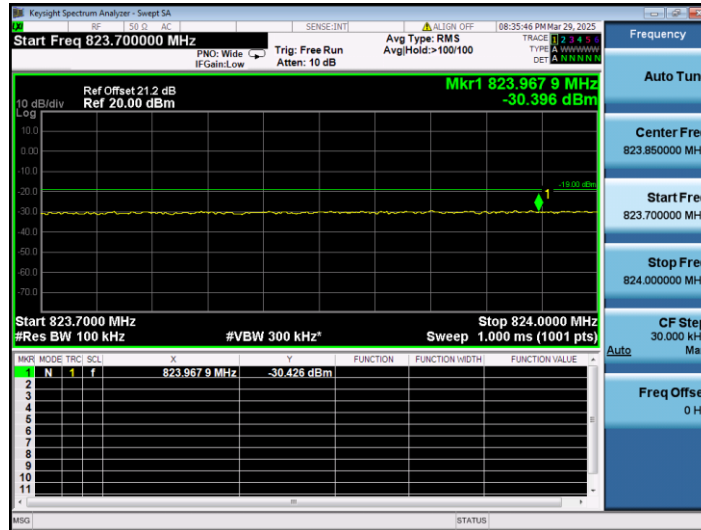
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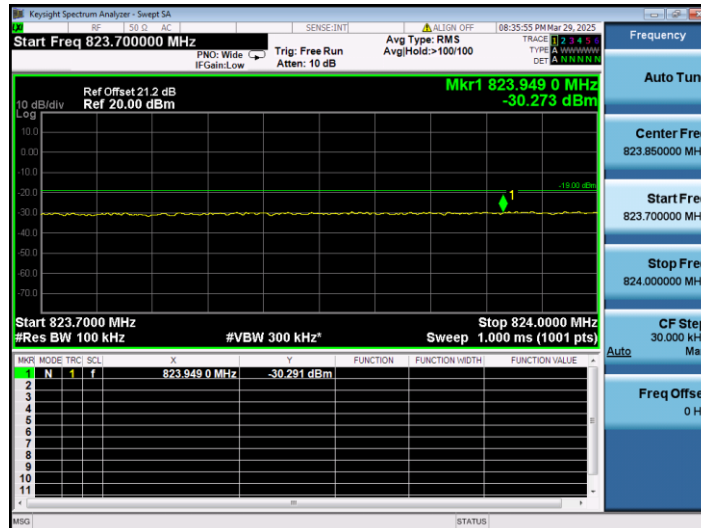
Out-of-band emissions

UL_Cellular Band

4.1MHz AWGN signal input_Lower band edge_Pre-AGC



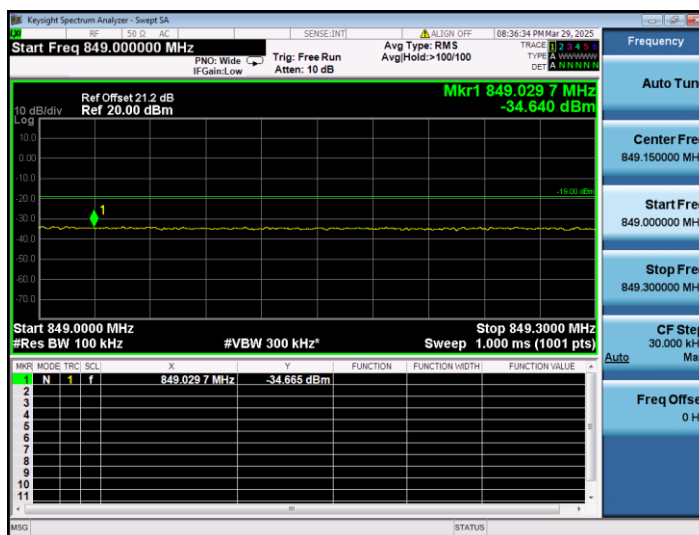
4.1MHz AWGN signal input_Lower band edge_10dB above AGC



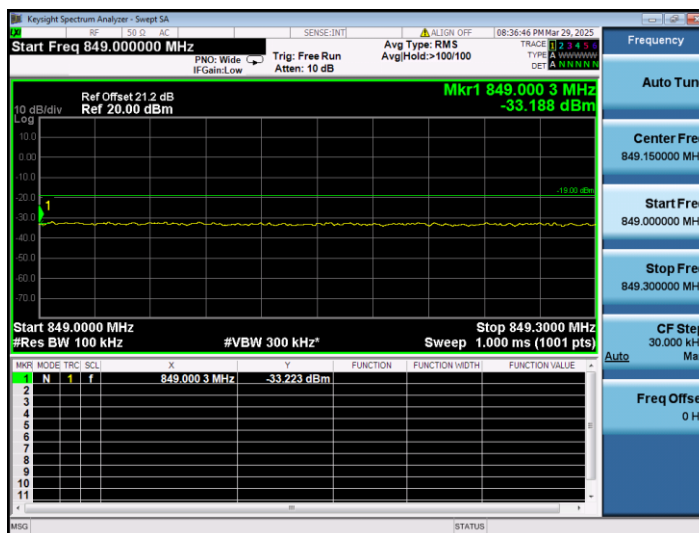
Out-of-band emissions

UL Cellular Band

4.1MHz AWGN signal input_Upper band edge_Pre-AGC



4.1MHz AWGN signal input_Upper band edge_10dB above AGC



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SGS-CSTC Standards Technical Services Co., Ltd.
Guangzhou Branch Testing Center EMC 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.sgs.com.cn
t (86-20) 82155555 sgs.china@sgs.com

6 Conducted spurious emissions

Conducted spurious emissions							
Path	Band	Input Signal		Frequency Range (MHz)	Worst Test Level (dBm)	Limit (dBm)	Verdict
DL	Cellular	4.1MHz AWGN	Pre-AGC	30-868.9	-44.47	≤-19	PASS
				894.1-8940	-42.77		PASS
UL	Cellular	4.1MHz AWGN	Pre-AGC	30-823.9	-41.83	≤-19	PASS
				849.1-8490	-43.76		PASS
Remark: The spurious emissions 9kHz to 30MHz and above 8GHz were very low and not displayed in this Appendix.							



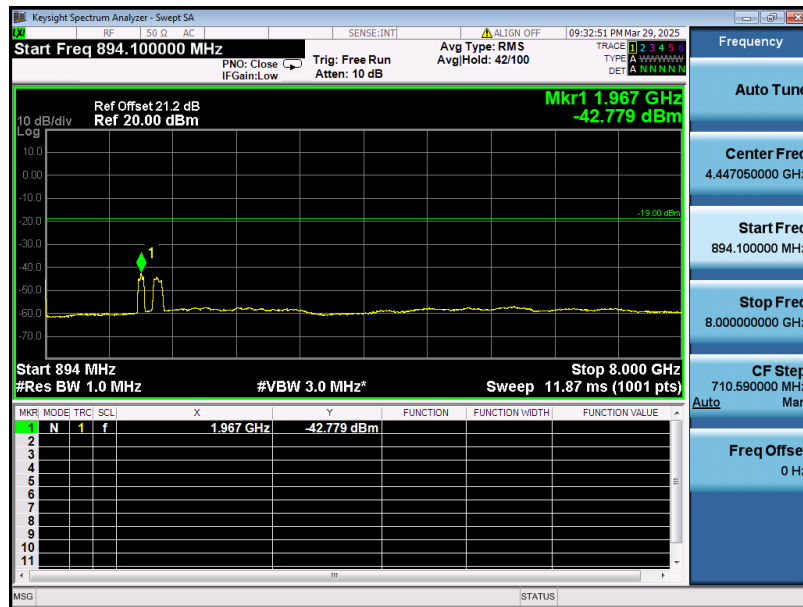
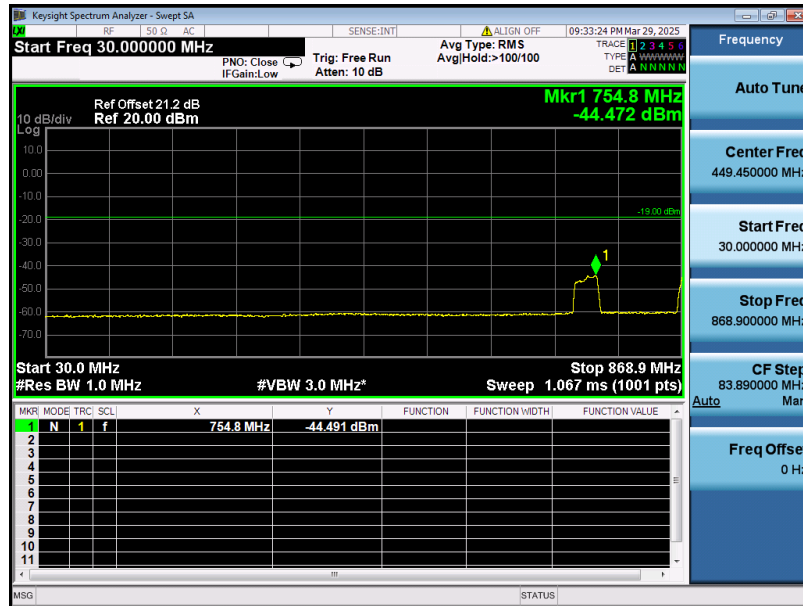
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Conducted spurious emissions

DL_Cellular Band

4.1MHz AWGN signal input_Pre-AGC



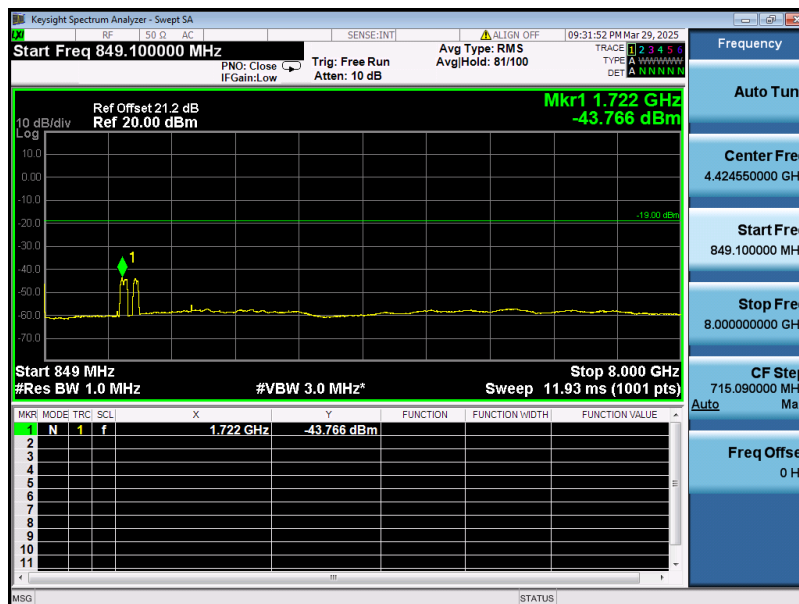
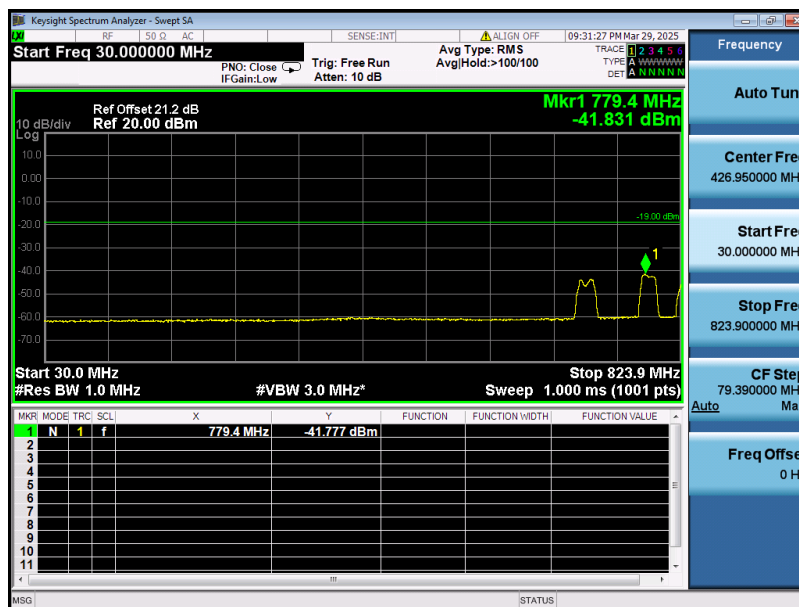
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Conducted spurious emissions

UL_Cellular Band

4.1MHz AWGN signal input_Pre-AGC



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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

7 Noise limit

Maximum transmitter Noise Power Level					
Path	Band	EUT Status	Noise Level (dBm/MHz)	Limit (dBm/MHz)	Verdict
DL	Cellular	Power On	-45.50	≤-45.5	PASS
		Power Off	-75.65	≤-70.0	PASS
UL	Cellular	Power On	-46.46	≤-45.5	PASS
		Power Off	-75.98	≤-70.0	PASS

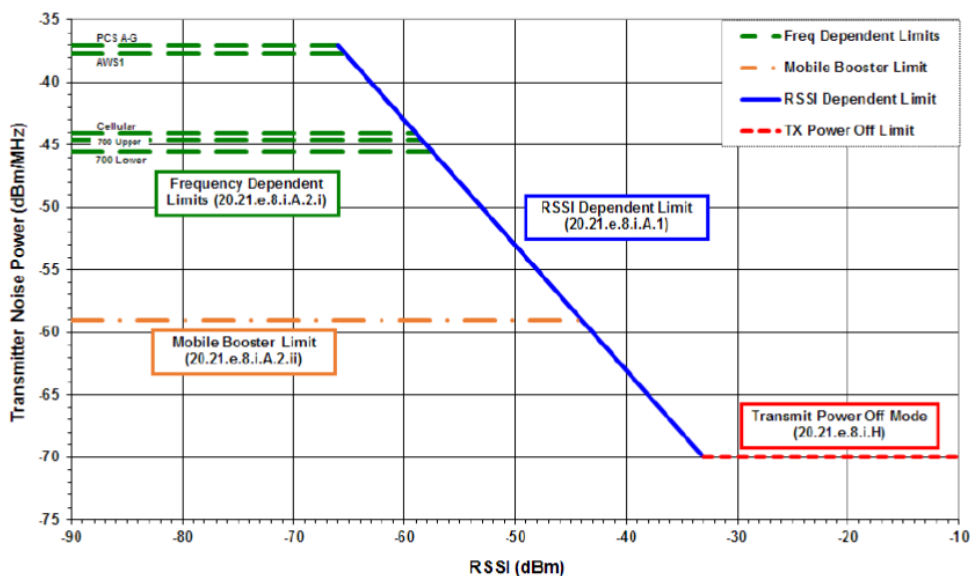
Variable Uplink Noise Power Level					
Path	Band	RSSI (dBm)	Noise Level (dBm/MHz)	Limit (dBm/MHz)	Verdict
UL	Cellular	-90	-45.50	≤-45.5	PASS
		-80	-45.50	≤-45.5	PASS
		-70	-45.50	≤-45.5	PASS
		-62	-45.50	≤-45.5	PASS
		-51	-53.02	≤-52.0	PASS
		-45	-59.43	≤-58.0	PASS
	Cellular	-90	-46.46	≤-45.5	PASS
		-80	-46.46	≤-45.5	PASS
		-70	-46.46	≤-45.5	PASS
		-64	-46.46	≤-45.5	PASS
		-44	-59.76	≤-59.0	PASS
		-41	-63.21	≤-62.0	PASS



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Remark:



According to KDB 935210 D03 v04r04 appendix D, the RSSI-dependent region can be calculated:
for Cellular, the RSSI-dependent region is -58.9 dBm to -33 dBm

Variable Uplink Noise Timing				
Path	Band	Time (ms)	Limit (ms)	Verdict
UL	Cellular	40	≤3000	PASS



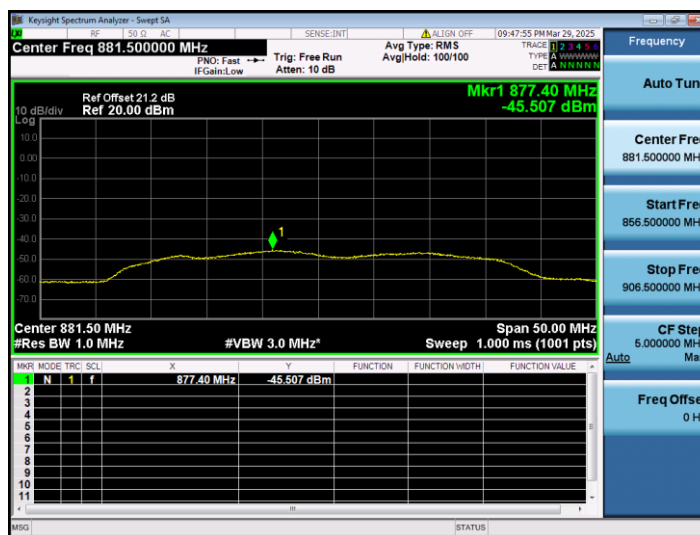
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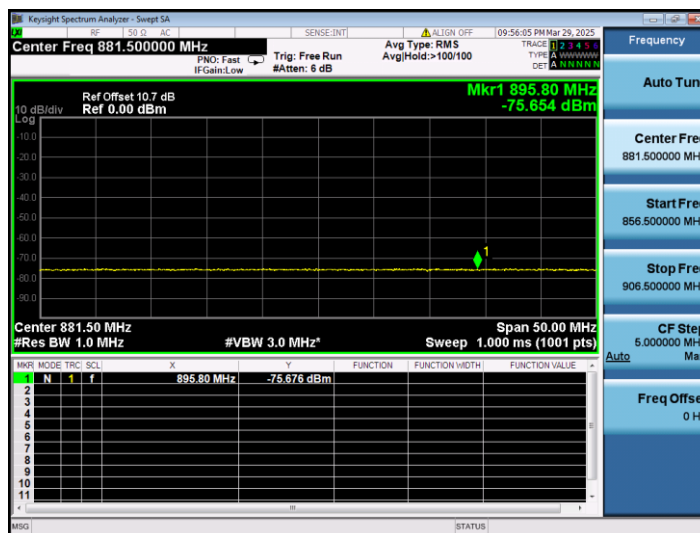
Maximum transmitter Noise Power Level

DL Cellular Band

Power on



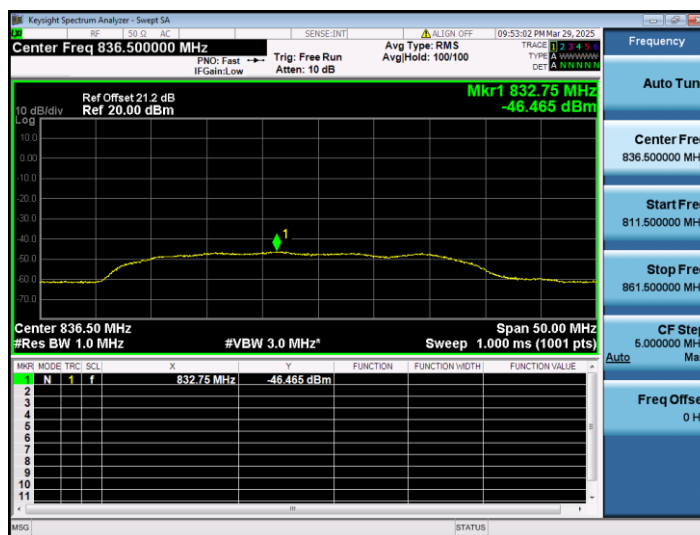
Power off



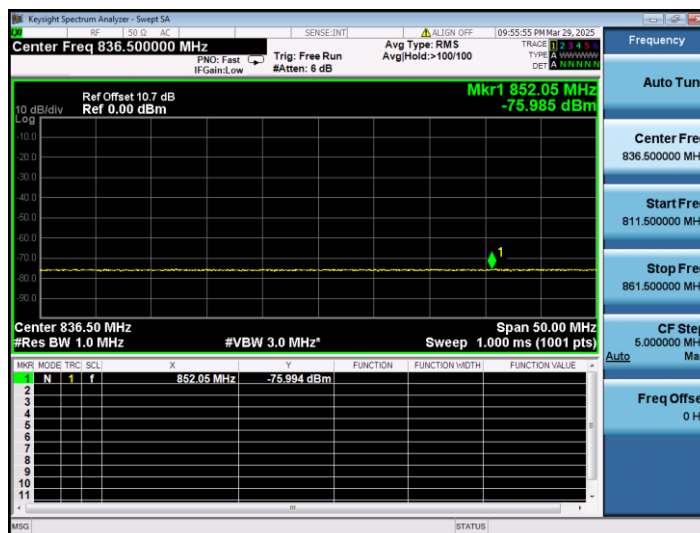
Maximum transmitter Noise Power Level

UL Cellular Band

Power on

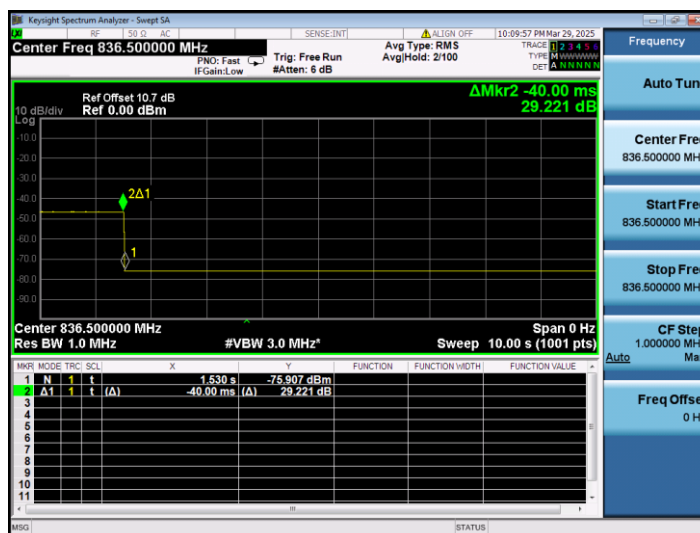


Power off



Variable Uplink Noise Timing

UL_Cellular Band



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8 Uplink inactivity

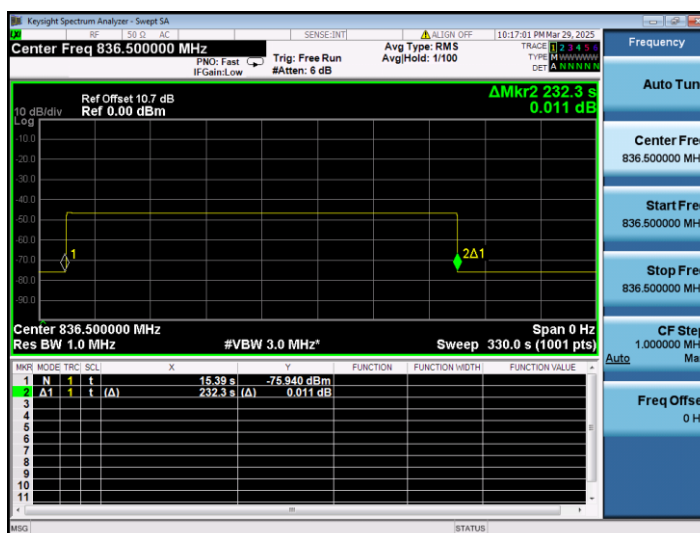
Uplink Inactivity						
Path	Band	Time (s)	limit (s)	Noise Level** (dBm/MHz)	Limit (dBm/MHz)	Verdict
UL	Cellular	232.3	≤300	-75.98	≤-70	PASS

Remark:

** The EUT operated in "Transmit Power Off Mode" after uplink inactivity, so refer to clause 7 Noise limit for more details for Noise Level plots.

Uplink Inactivity Timing

UL_Cellular Band



9 Variable booster gain

Variable Gain								
Path	Band	RSSI (dBm)	P _{in} (dBm)	P _{out} (dBm)	Gain (dB)	MSCL (dB)	Limit (dB)	Verdict
UL	Cellular	-90	-45	19.49	64.49	35.8	≤64.9	PASS
		-80	-45	19.49	64.49		≤64.9	PASS
		-70	-45	19.49	64.49		≤64.9	PASS
		-65	-45	16.40	61.40		≤62.8	PASS
		-55	-45	5.65	50.65		≤52.8	PASS
		-48	-45	-0.08	44.92		≤45.8	PASS

Remark:

- The EUT lost amplification ability when operating in shutoff mode, so the uplink and downlink gain was within the transmit power off mode gain limit 23dB.
- The lowest MSCL for each band can be calculated as follows:

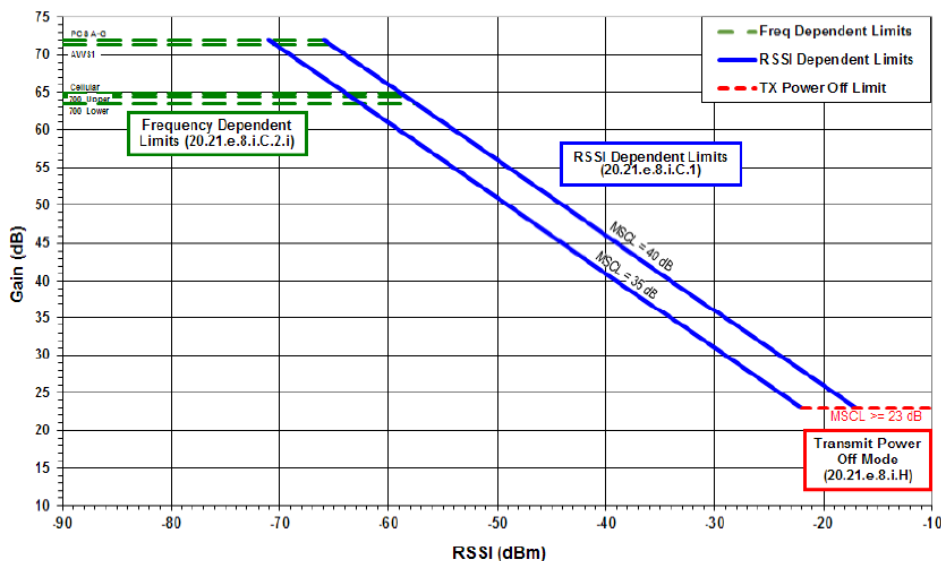
Bands	f (MHz)	d (m)	L _p (dB)	Indoor ANT Gain (dBi)	Indoor Cable Loss (dB)	MSCL (dB)
Cellular	824	1	30.8	1	0	31.8

Where

the minimum separation distance d, the indoor antenna gain and the minimum indoor cable loss, was declared by the manufacturer.

- According to KDB 935210 D03 v04r04 appendix D figurer D2, the RSSI-dependent region can be calculated:

for Cellular, the RSSI-dependent region is -66.5 dBm to -25.2 dBm



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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

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Variable Uplink Gain Timing				
Path	Band	Time (s)	Limit (s)	Verdict
UL	Cellular	0.15	≤3	PASS



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10 Occupied bandwidth

Occupied Bandwidth				
Path	Band	Center Frequency (MHz)	Input Signal	Verdict
DL	Cellular	881.5	GSM	PASS
			1.25MHz AWGN	PASS
			4.1MHz AWGN	PASS
UL	Cellular	836.5	GSM	PASS
			1.25MHz AWGN	PASS
			4.1MHz AWGN	PASS



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