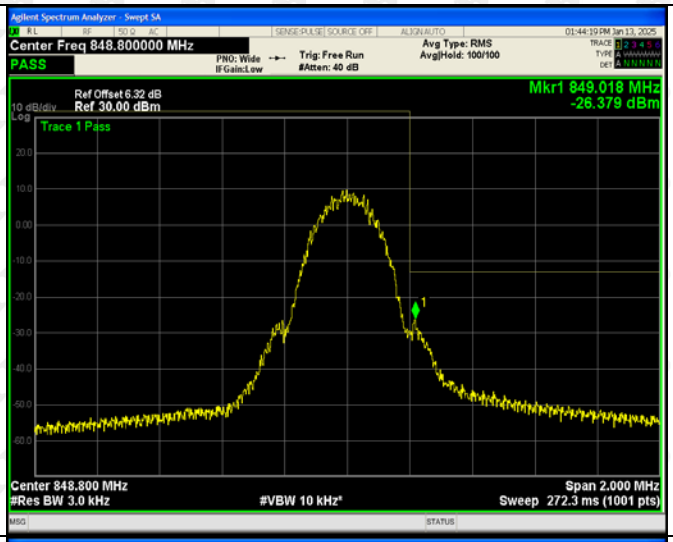
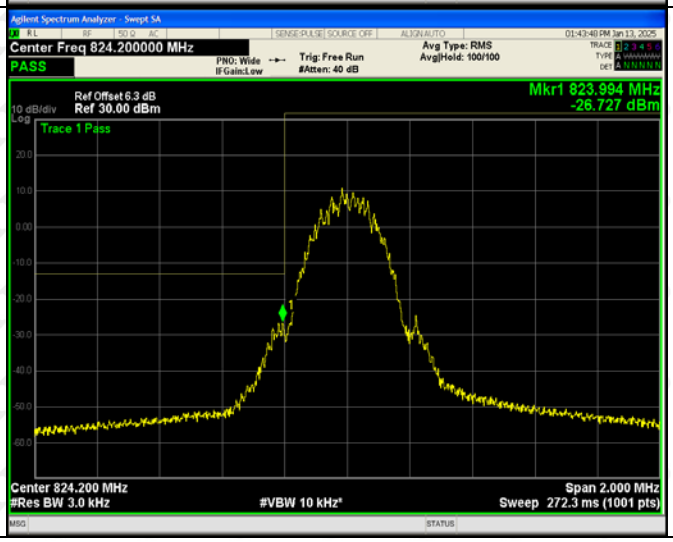
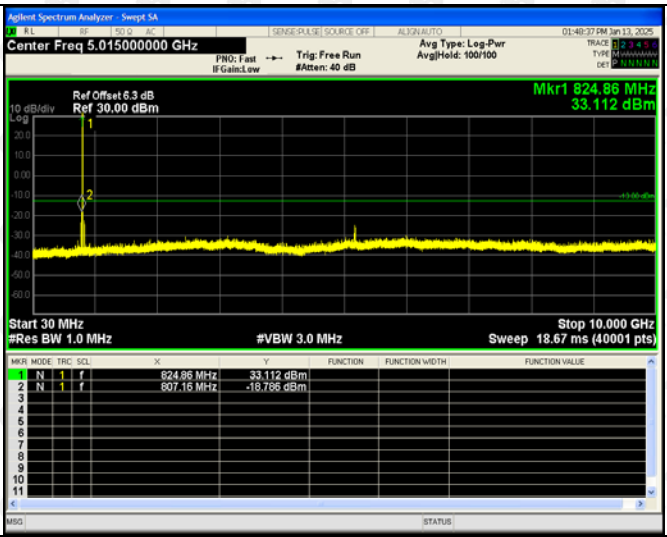
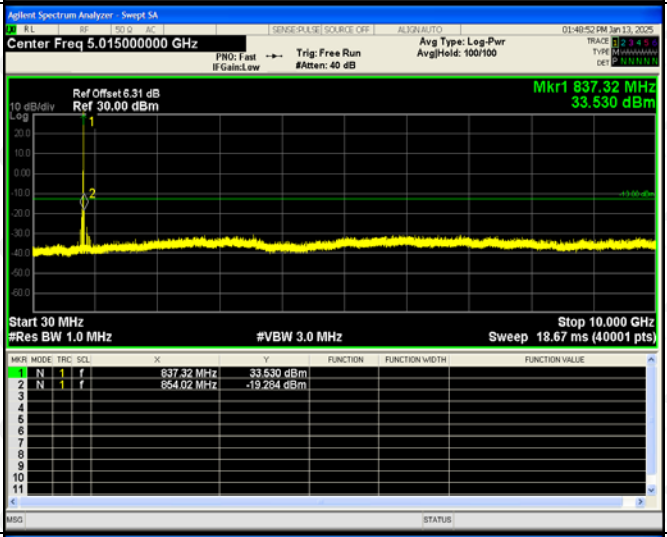
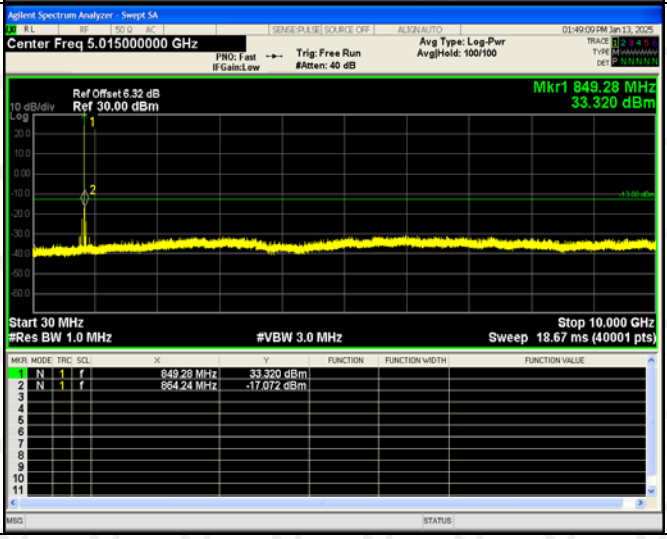
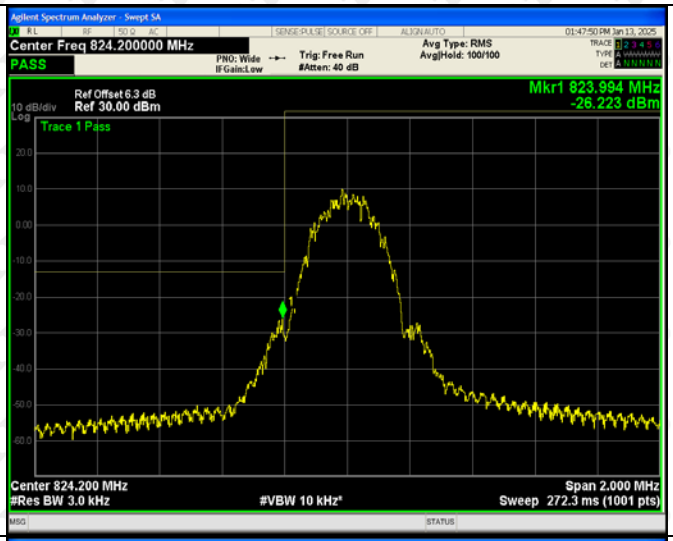
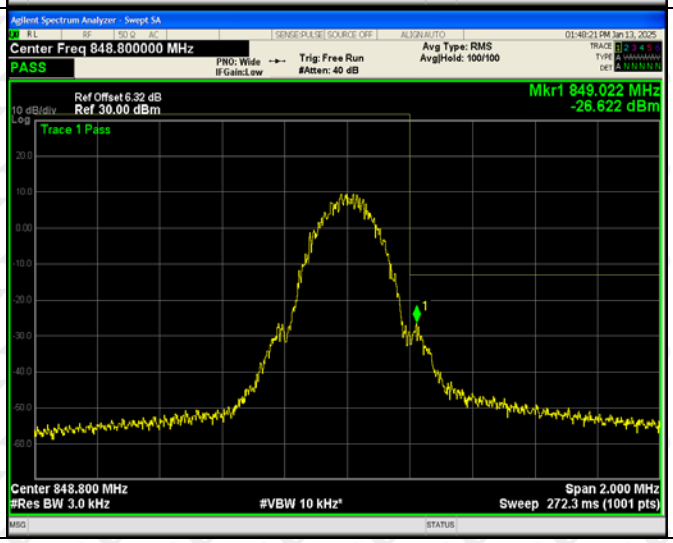
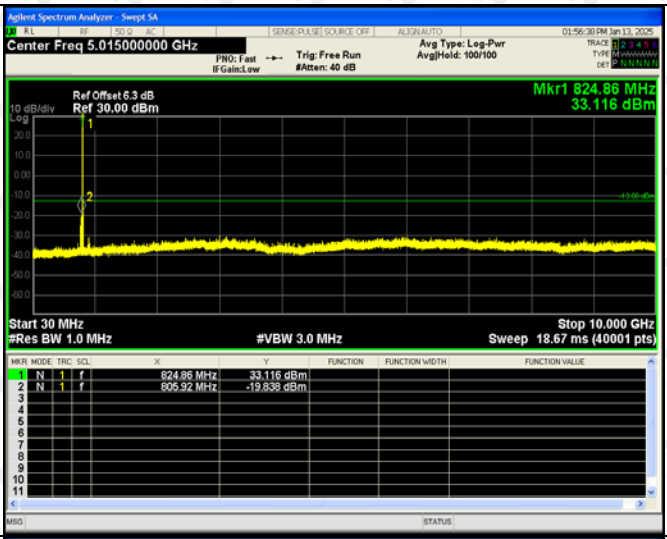
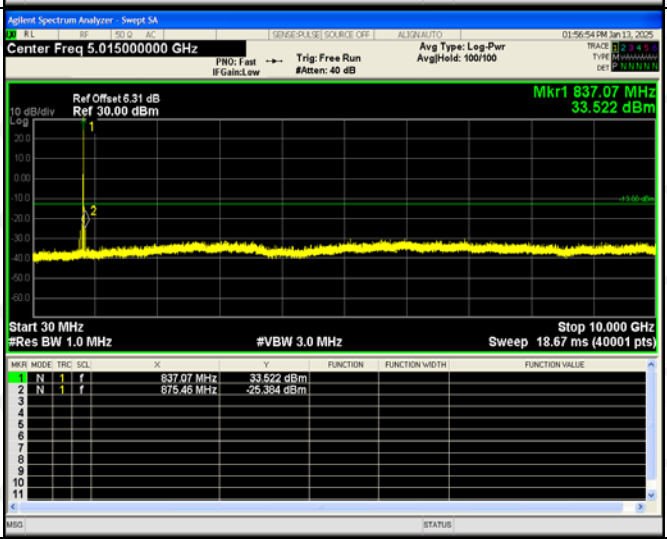
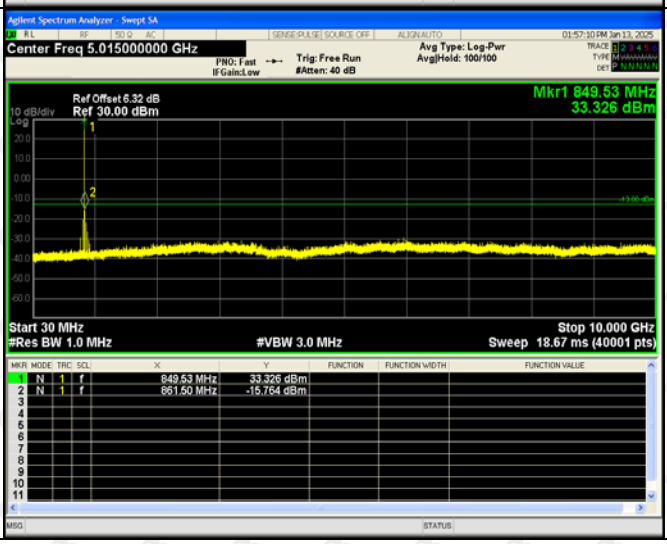
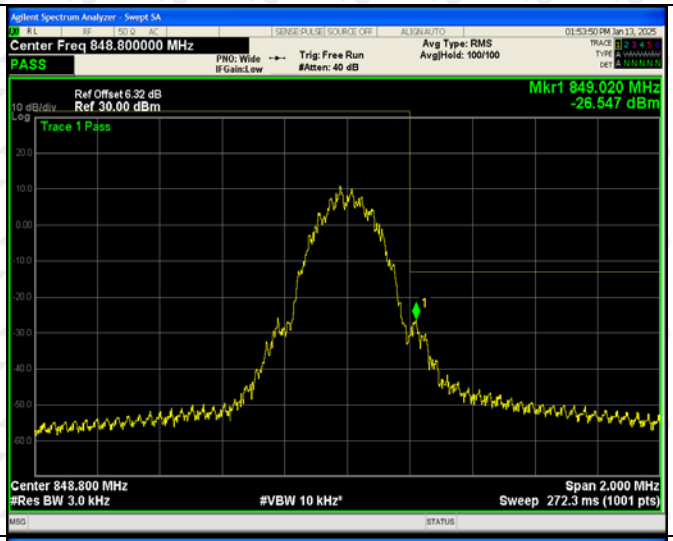
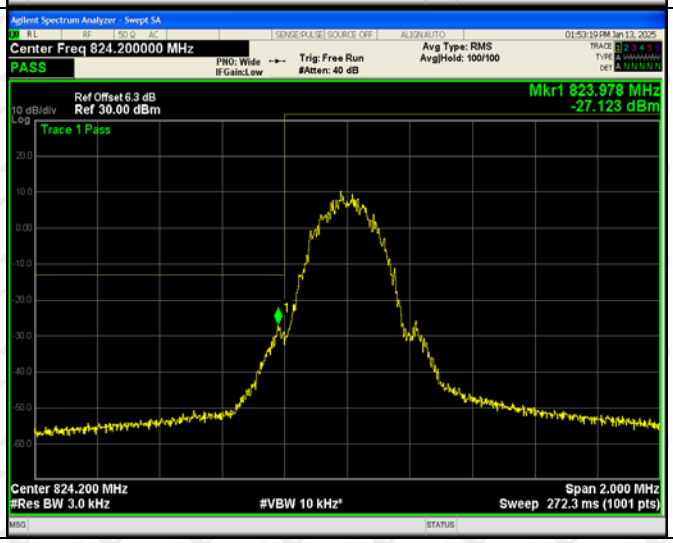
GSM Low Band Emission			
GSM High Band Emission			

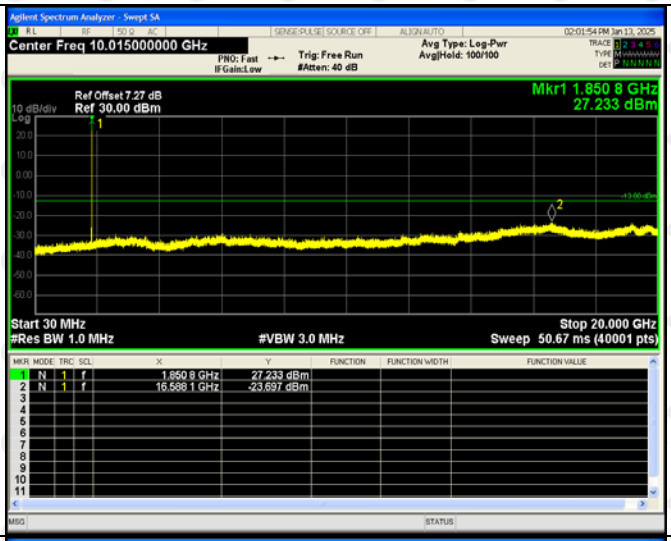
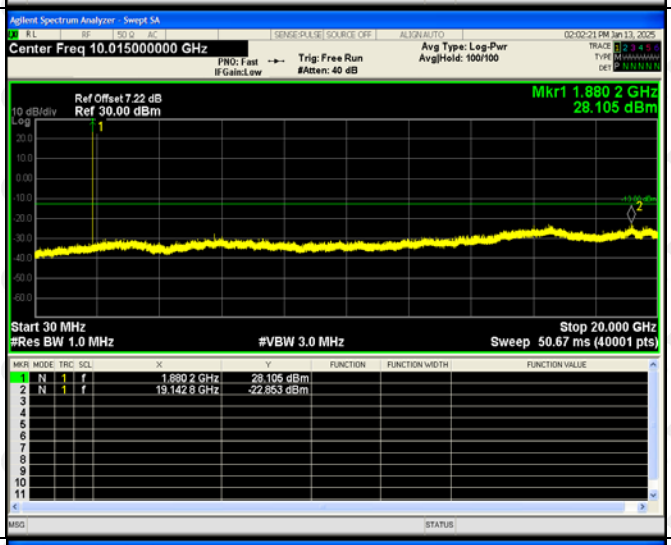
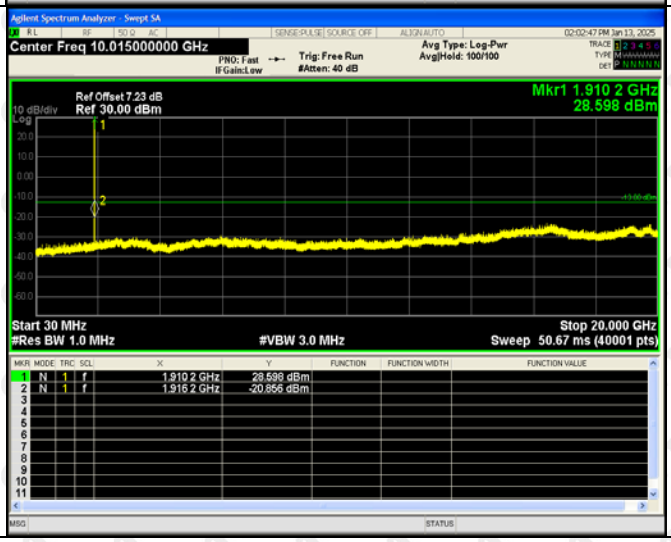
GPRS Low Channel			
GPRS Middle Channel			
GPRS High Channel			

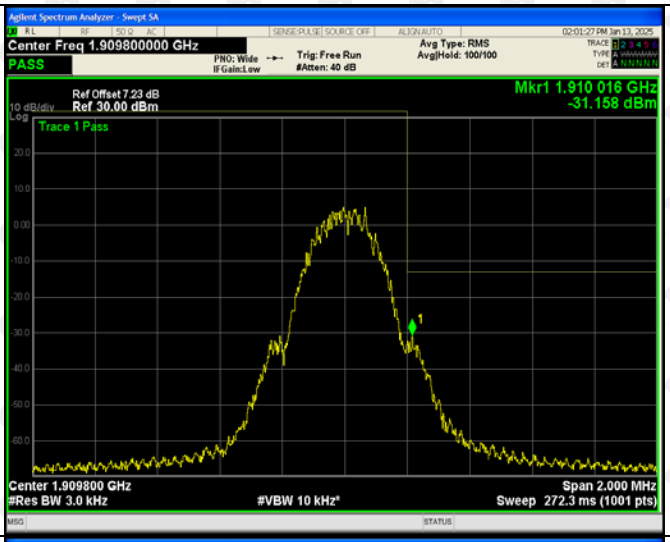
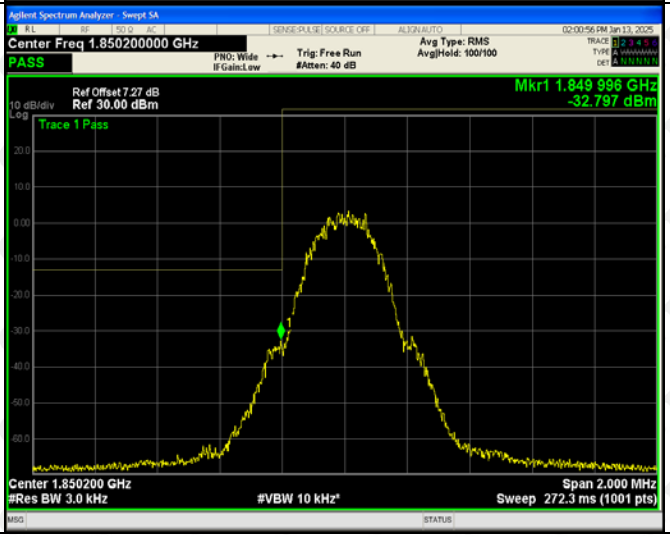
GPRS Low Band Emission			
GPRS High Band Emission			

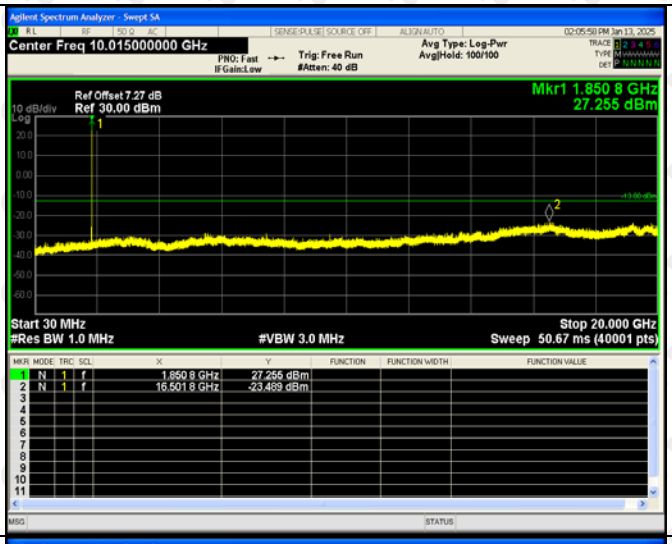
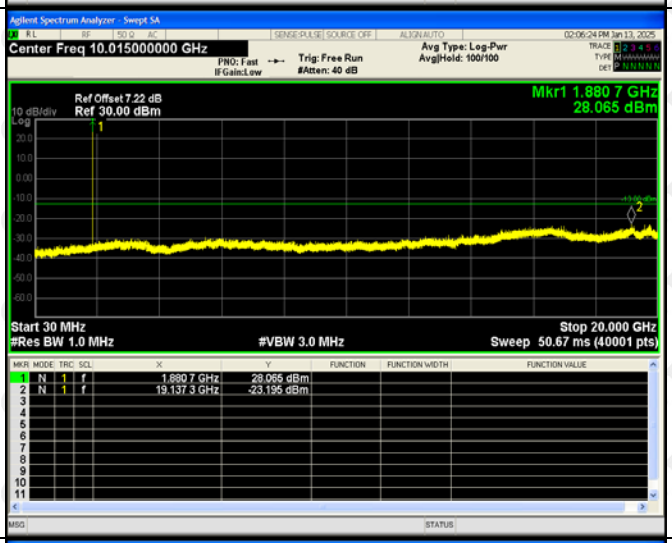
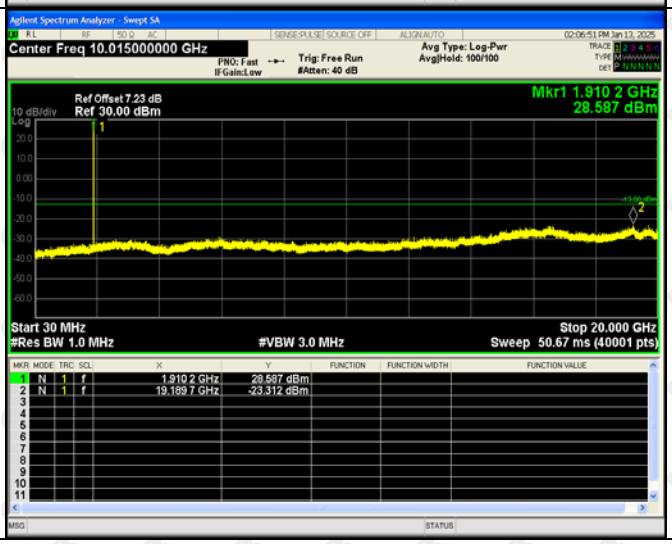
EDGE Low Channel			
EDGE Middle Channel			
EDGE High Channel			

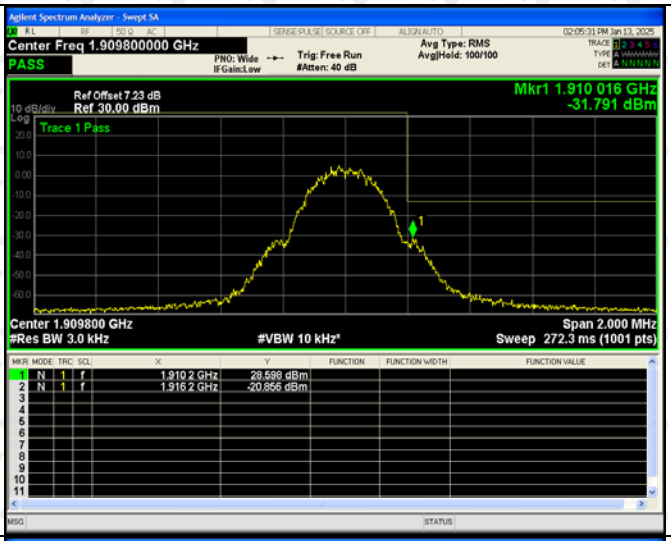
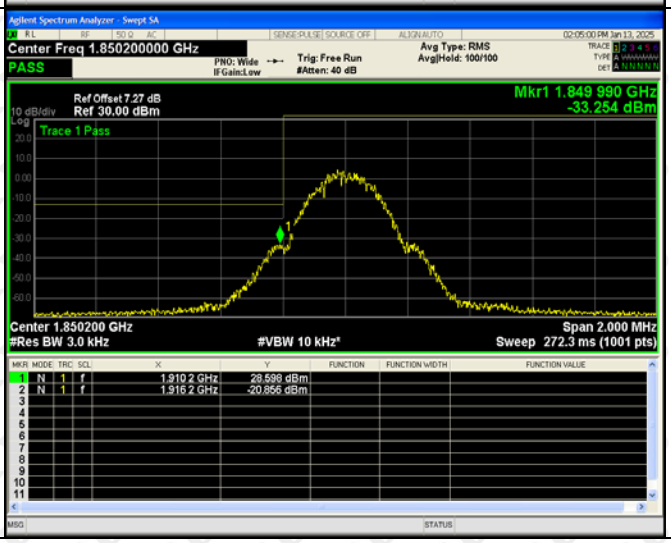
EDGE Low Band Emission			
EDGE High Band Emission			

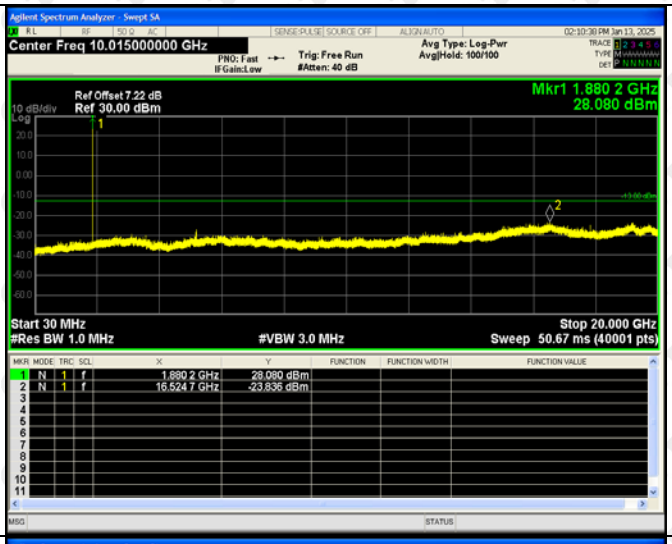
For PCS Band

GSM Low Channel			
GSM Middle Channel			
GSM High Channel			

GSM Low Band Emission			
GSM High Band Emission			

GPRS Low Channel			
GPRS Middle Channel			
GPRS High Channel			

GPRS Low Band Emission			
GPRS High Band Emission			

EDGE Low Channel			
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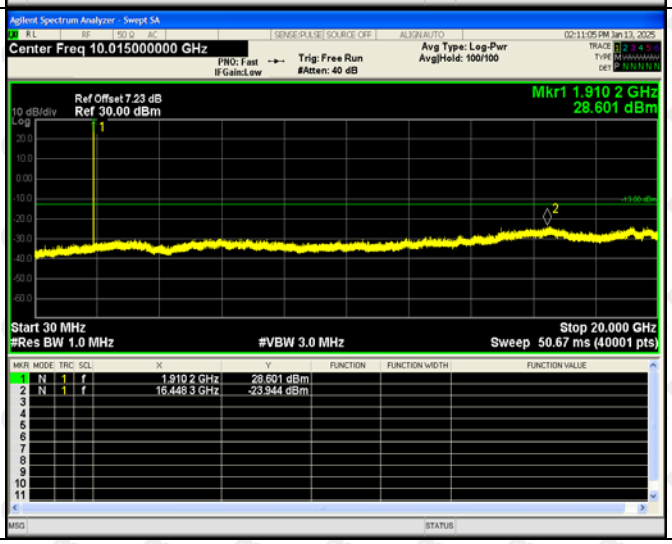
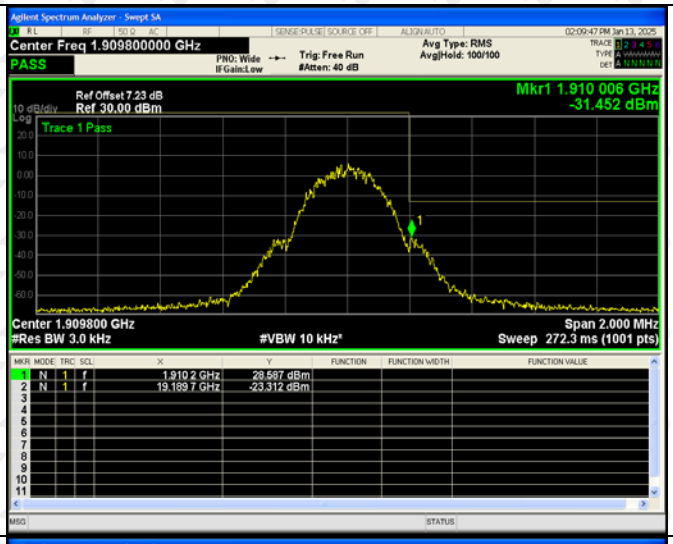
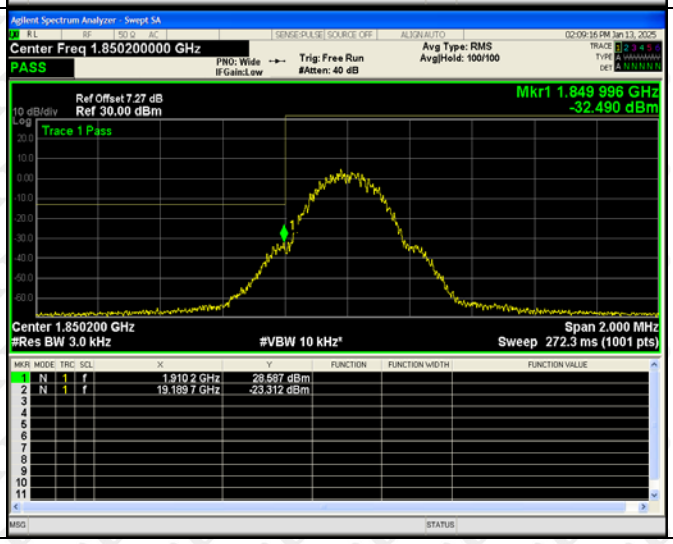
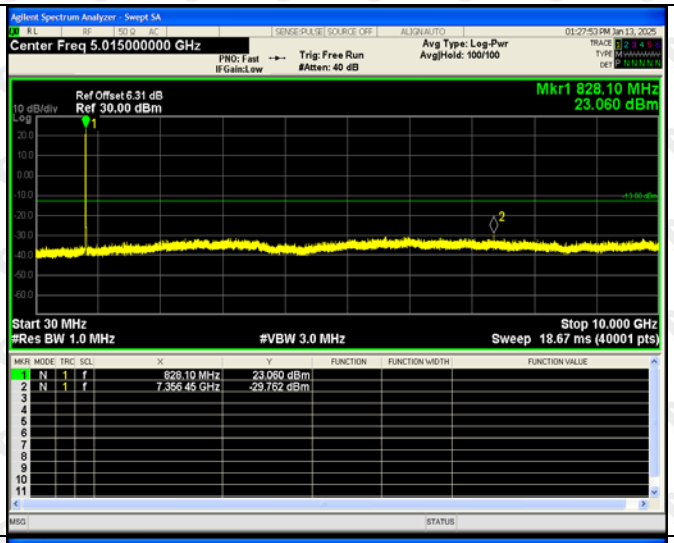
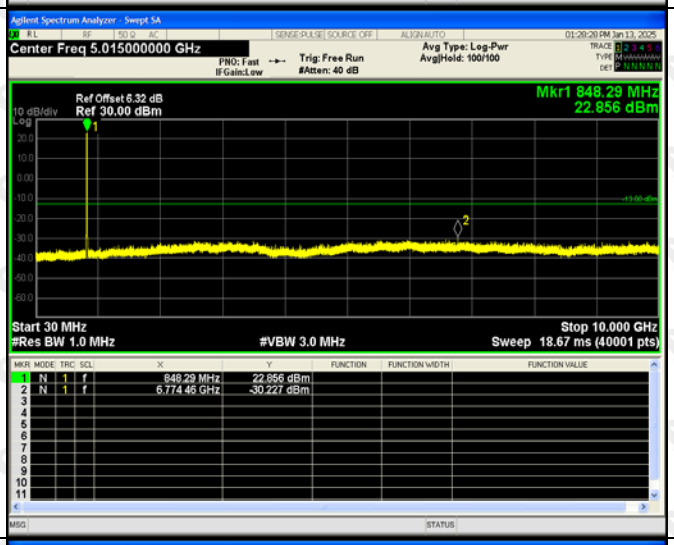
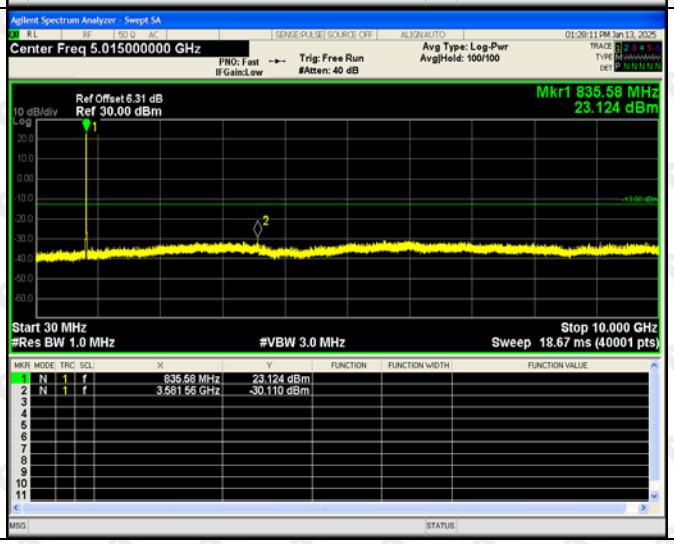
EDGE High Channel			

EDGE Low Band Emission			
EDGE High Band Emission			

For Band V

WCDMA Low Channel			
WCDMA Middle Channel			
WCDMA High Channel			

WCDMA Low Band Spurious Emission			
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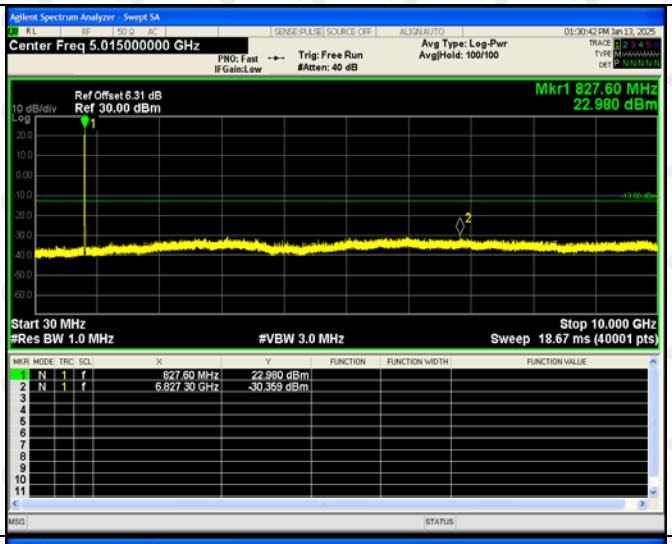
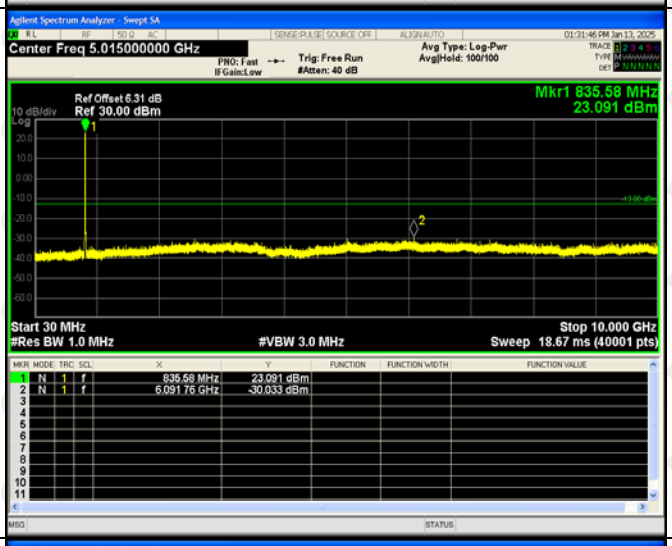
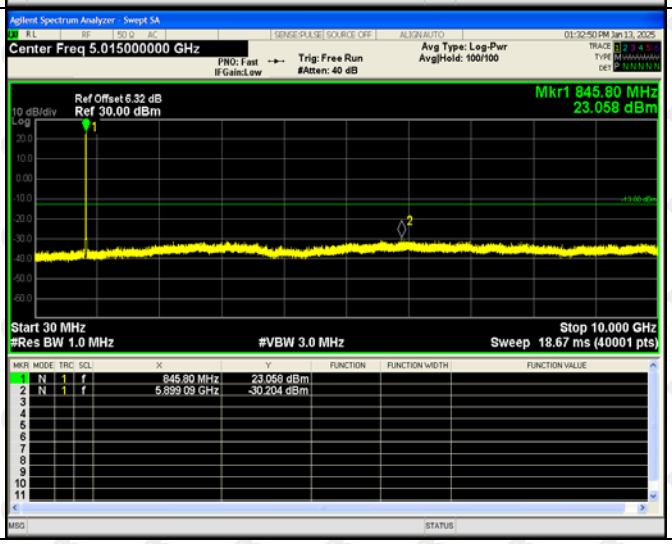
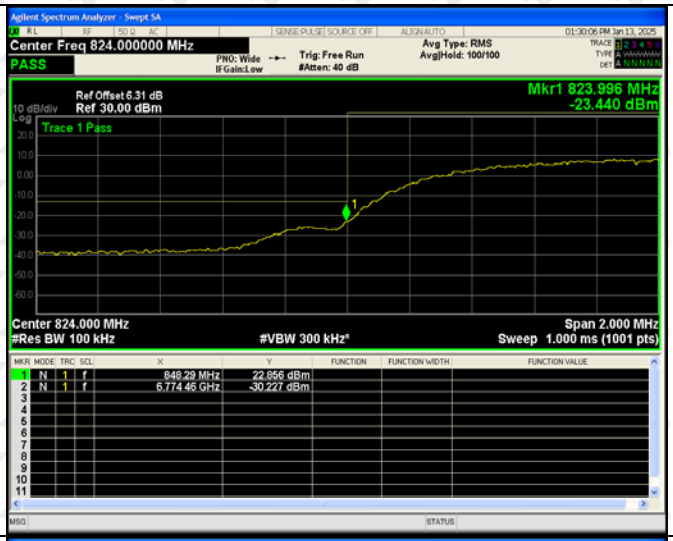
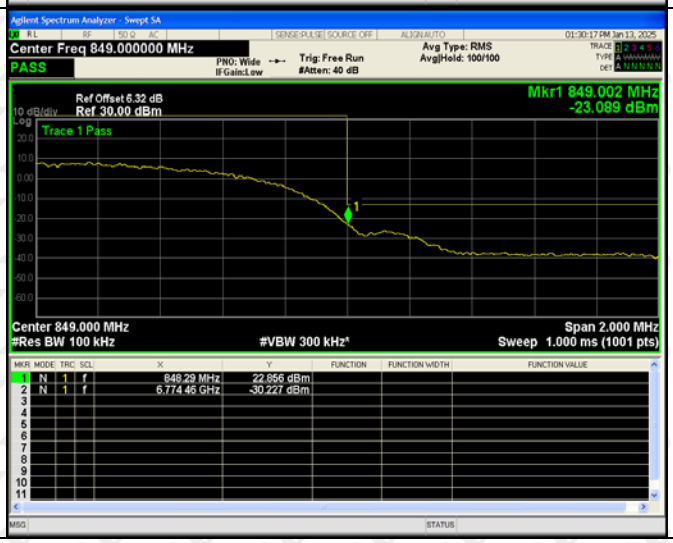
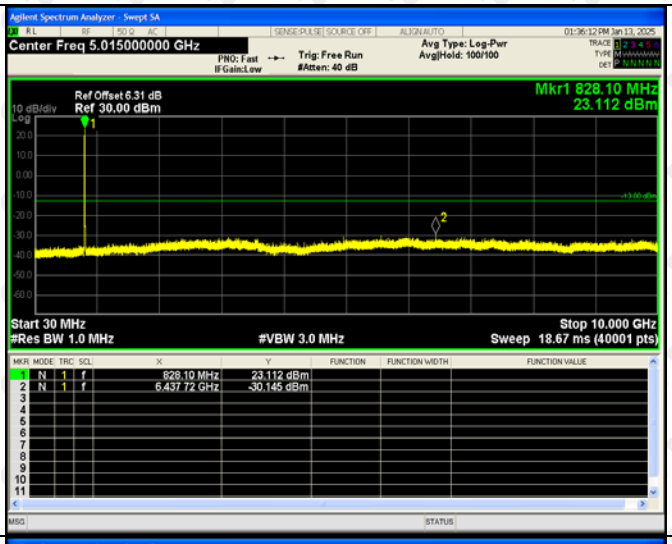
HSDPA Low Channel			
HSDPA Middle Channel			
HSDPA High Channel			

HSDPA Low Band Spurious Emission			
HSDPA High Band Spurious Emission			

HSUPA Low Channel			
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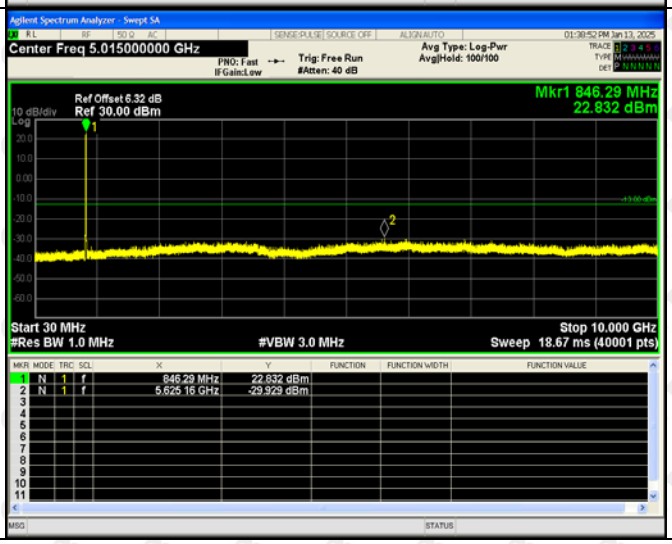
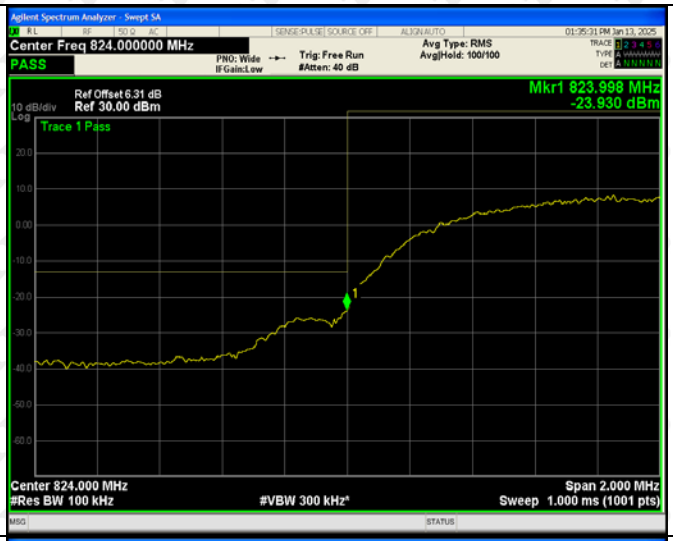
HSUPA High Channel			

HSUPA Low Band Spurious Emission			
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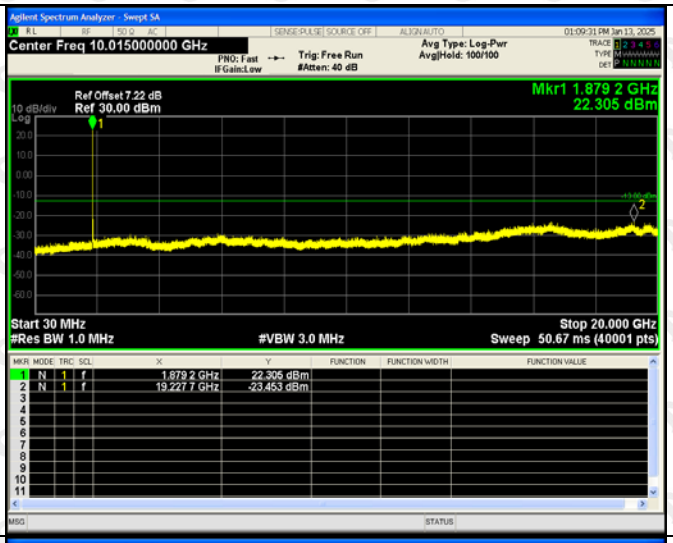
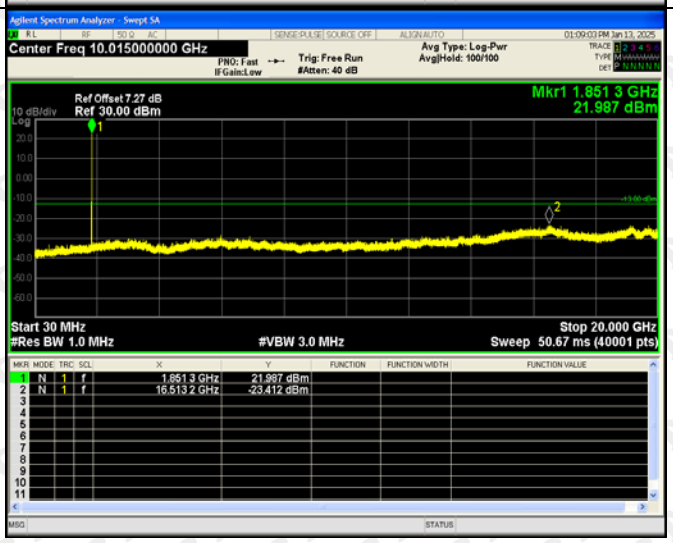
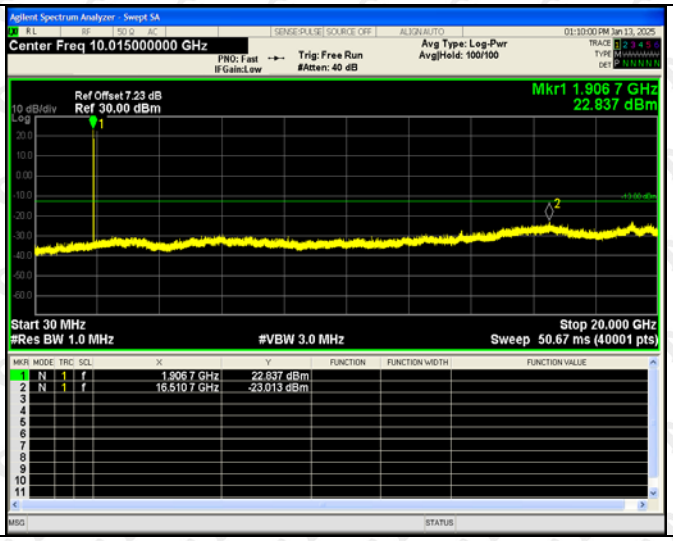
For Band II

WCDMA Low Channel			
WCDMA Middle Channel			
WCDMA High Channel			

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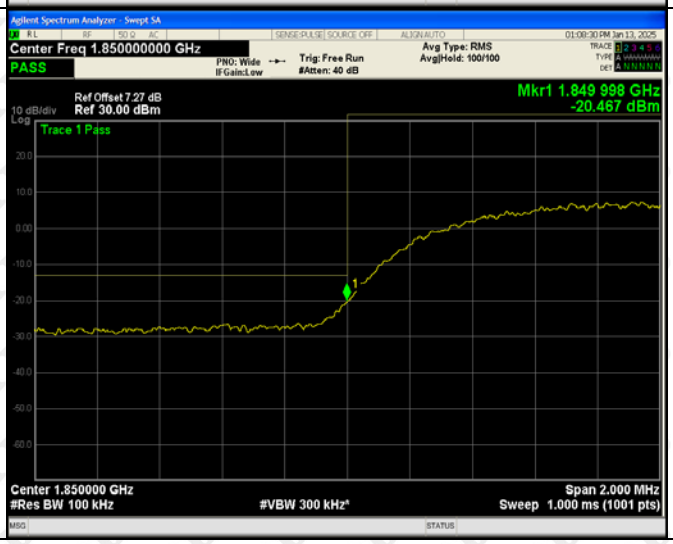
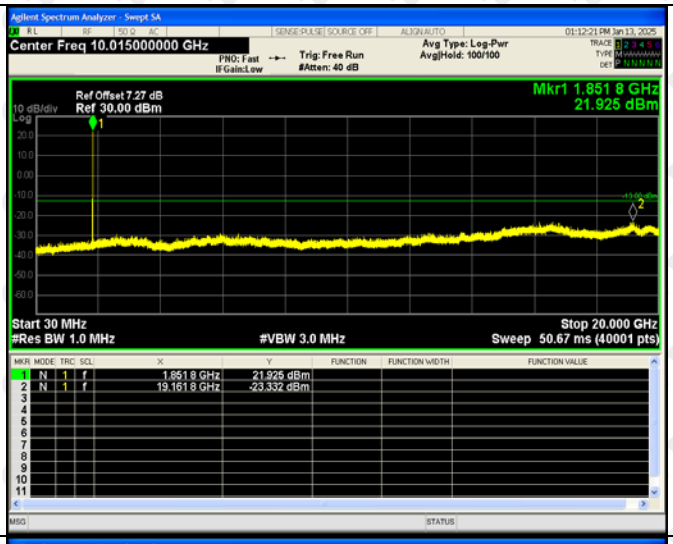
WCDMA High Band Spurious Emission			

HSDPA Low Channel			
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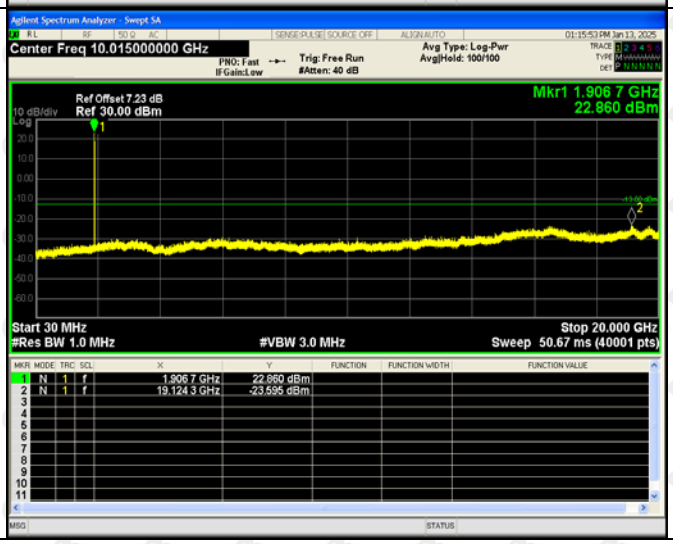
HSDPA High Channel			

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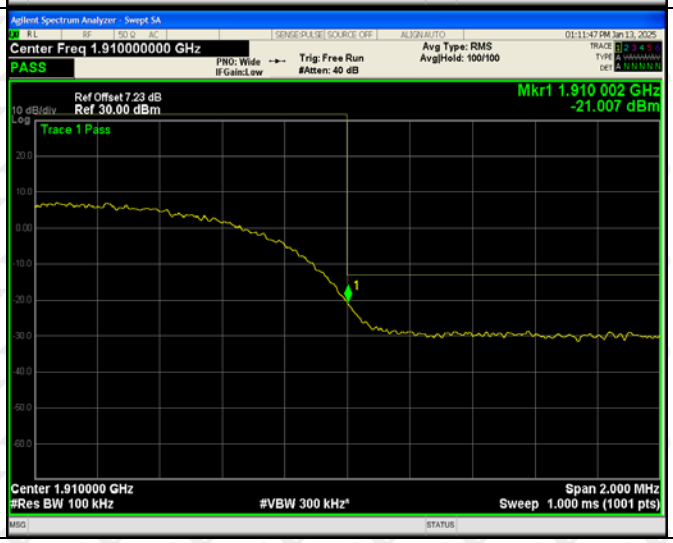
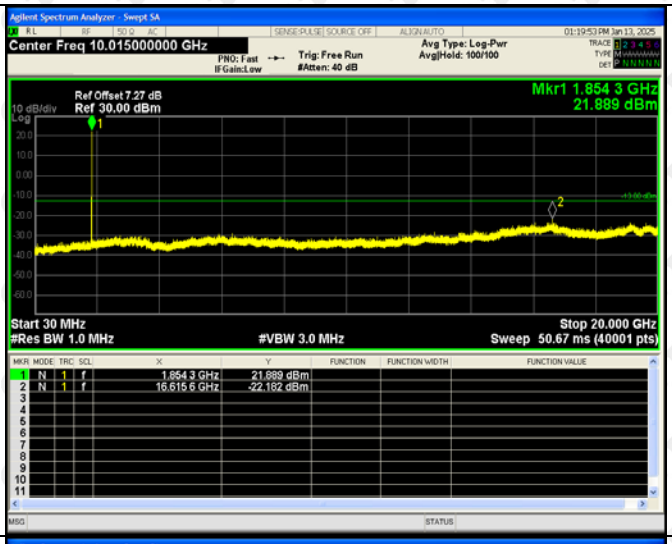
HSDPA High Band Spurious Emission			

HSUPA Low Channel			
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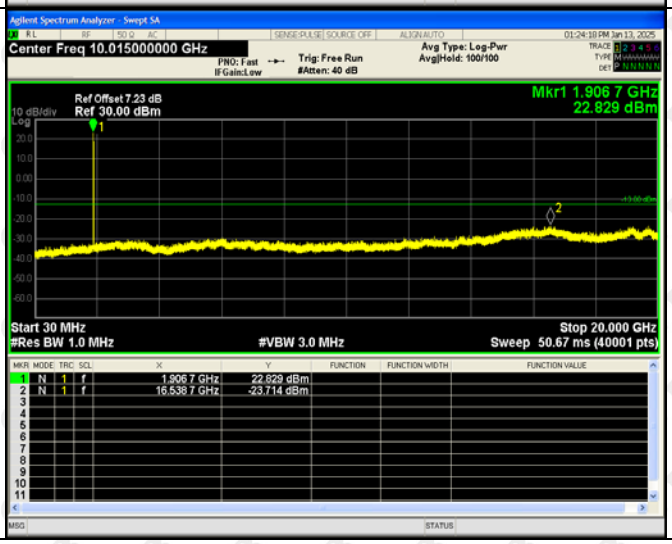
HSUPA High Channel			

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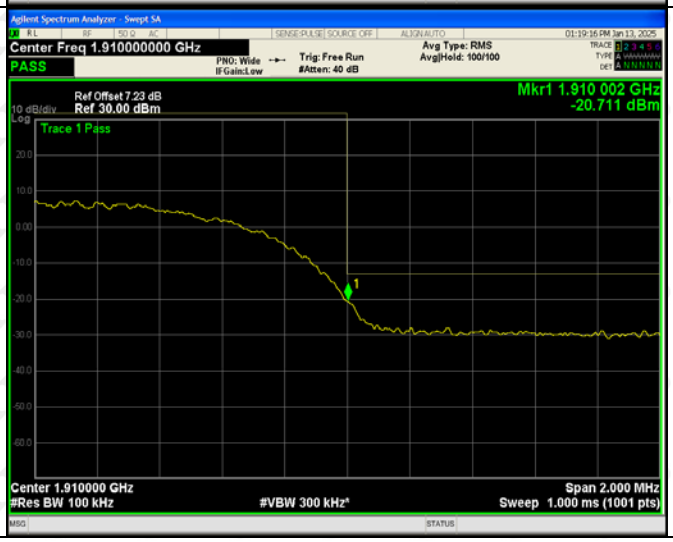
HSUPA High Band Spurious Emission			

10. SPURIOUS RADIATED EMISSIONS

10.1 Standard Applicable

According to §22.917(a), the power of any emissions outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.

According to §24.238(a), the power of any emissions outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.

10.2 Test Procedure

1. The setup of EUT is according with per ANSI/TIA Standard 603D and ANSI C63.4-2014 measurement procedure.
2. The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and polarization as well as EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. The test was performed by placing the EUT on 3-orthogonal axis.
3. The frequency range up to tenth harmonic of the fundamental frequency was investigated.
4. Remove the EUT and replace it with substitution antenna. A signal generator was connected to the substitution antenna by a non-radiating cable. The absolute levels of the spurious emissions were measured by the substitution.

Spurious attenuation limit in dB =43+10 Log_{10} (power out in Watts)

10.3 Environmental Conditions

Temperature:	23 °C
Relative Humidity:	54%
ATM Pressure:	101 kPa
Test Voltage	DC3.85V

10.4 Summary of Test Results/Plots

According to the data below, the FCC Part22.917 and 24.238 standards, and had the worst margin of:

Note: this EUT was tested in 3 orthogonal positions and the worst case position data was reported.

All test modes are performed, but only the worst case is recorded in this report.

For Cellular Band_GSM850 Mode

Frequency (MHz)	Reading (dBm)	Correct dB	Result (dBm)	Limit (dBm)	Margin (dB)	Polar H/V
Low Channel (824.2MHz)						
42.88	-73.87	3.9	-69.97	-13	-56.97	H
1640.12	-59.23	4.83	-54.40	-13	-41.40	H
2469.75	-56.16	8.08	-48.08	-13	-35.08	H
43.53	-68.82	4.02	-64.80	-13	-51.80	V
1644.24	-56.28	4.48	-51.80	-13	-38.80	V
2467.37	-56.49	8.2	-48.29	-13	-35.29	V
Middle Channel (836.6MHz)						
43.24	-75.41	3.84	-71.57	-13	-58.57	H
1663.86	-55.41	4.62	-50.79	-13	-37.79	H
2509.76	-56.67	8.25	-48.42	-13	-35.42	H
42.99	-65.92	4.25	-61.67	-13	-48.67	V
1665.66	-51.69	4.54	-47.15	-13	-34.15	V
2504.85	-52.60	8.35	-44.25	-13	-29.75	V
High Channel (848.8MHz)						
39.03	-75.13	4.22	-79.35	-13	-66.35	H
1689.25	-60.51	4.87	-65.38	-13	-52.38	H
2545.34	-50.74	8.38	-59.12	-13	-46.12	H
45.97	-68.62	4.02	-72.64	-13	-59.64	V
1694.68	-53.31	4.56	-57.87	-13	-44.87	V
2538.61	-47.84	8.41	-56.25	-13	-43.25	V

For PCS Band_GSM1900 Mode

Frequency (MHz)	Reading (dBm)	Correct dB	Result (dBm)	Limit (dBm)	Margin (dB)	Polar H/V
Low Channel (1850.2MHz)						
44.35	-74.59	4.34	-70.25	-13	-57.25	H
3693.23	-50.86	10.54	-40.32	-13	-27.32	H
5546.89	-56.25	13.37	-42.88	-13	-29.88	H
41.20	-72.92	4.34	-68.58	-13	-55.58	V
3693.30	-56.18	10.54	-45.64	-13	-32.64	V
5544.11	-55.65	13.37	-42.28	-13	-29.28	V
Middle Channel (1880MHz)						
44.08	-66.94	4.02	-62.92	-13	-49.92	H
3755.03	-53.41	10.71	-42.70	-13	-29.70	H
5635.79	-53.07	13.73	-39.34	-13	-26.34	H
38.96	-69.31	4.14	-65.17	-13	-52.17	V
3755.28	-56.52	10.22	-46.30	-13	-33.30	V
5634.31	-58.69	13.16	-45.53	-13	-32.53	V
High Channel (1909.8MHz)						
42.11	-70.76	4.02	-66.74	-13	-53.74	H
3814.26	-55.22	4.9	-50.32	-13	-37.32	H
5726.76	-43.28	8.09	-35.19	-13	-22.19	H
44.83	-63.69	4.25	-59.44	-13	-46.44	V
3812.40	-63.09	4.93	-58.16	-13	-45.16	V
5727.56	-59.78	8.43	-51.35	-13	-38.35	V

For Band 5 Mode

Frequency (MHz)	Reading (dBm)	Correct dB	Result (dBm)	Limit (dBm)	Margin (dB)	Polar H/V
Low Channel (826.4MHz)						
40.98	-73.56	3.91	-69.65	-13	-56.65	H
1645.86	-58.46	10.56	-47.90	-13	-34.90	H
2473.68	-58.84	13.5	-45.34	-13	-32.34	H
39.31	-65.27	3.93	-61.34	-13	-48.34	V
1649.55	-56.37	10.41	-45.96	-13	-32.96	V
2470.45	-62.71	13.16	-49.55	-13	-36.55	V
Middle Channel (836.6MHz)						
38.90	-73.99	4.02	-69.97	-13	-56.97	H
1662.96	-58.47	4.66	-53.81	-13	-40.81	H
2505.12	-42.74	8.34	-34.40	-13	-21.40	H
42.10	-59.39	4.17	-55.22	-13	-42.22	V
1663.98	-58.73	4.94	-53.79	-13	-40.79	V
2504.35	-55.95	8.19	-47.76	-13	-34.76	V
High Channel (846.6MHz)						
42.12	-74.79	3.87	-70.92	-13	-57.92	H
1688.31	-56.49	4.89	-51.60	-13	-38.60	H
2533.60	-41.42	8.42	-33.00	-13	-20.00	H
44.99	-59.59	3.95	-55.64	-13	-42.64	V
1688.09	-56.74	4.99	-51.75	-13	-38.75	V
2539.24	-59.30	8.12	-51.18	-13	-38.18	V

For Band 2 Mode

Frequency (MHz)	Reading (dBm)	Correct dB	Result (dBm)	Limit (dBm)	Margin (dB)	Polar H/V
Low Channel (1852.4MHz)						
42.36	-72.51	3.91	-68.60	-13	-55.60	H
1643.21	-56.73	10.56	-46.17	-13	-33.17	H
2470.17	-56.68	13.5	-43.18	-13	-30.18	H
43.98	-73.05	3.93	-69.12	-13	-56.12	V
1643.97	-55.28	10.41	-44.87	-13	-31.87	V
2470.88	-54.04	13.16	-40.88	-13	-27.88	V
Middle Channel (1880MHz)						
40.94	-74.31	4.02	-70.29	-13	-57.29	H
1669.07	-63.61	4.66	-58.95	-13	-45.95	H
2501.31	-49.37	8.34	-41.03	-13	-28.03	H
41.62	-54.66	4.17	-50.49	-13	-37.49	V
1671.00	-62.45	4.94	-57.51	-13	-44.51	V
2502.43	-62.93	8.19	-54.74	-13	-41.74	V
High Channel (1907.6MHz)						
38.79	-67.82	3.87	-63.95	-13	-50.95	H
1687.83	-61.19	4.89	-56.30	-13	-43.30	H
2537.67	-45.59	8.42	-37.17	-13	-24.17	H
45.84	-56.82	3.95	-52.87	-13	-39.87	V
1687.39	-55.76	4.99	-50.77	-13	-37.77	V
2537.72	-57.05	8.12	-48.93	-13	-35.93	V

Note: Result=Reading+ Correct, Margin= Result- Limit
Note: Testing is carried out with frequency rang 9kHz to the tenth harmonics, other than listedin the table above are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

11. FREQUENCY STABILITY

11.1 Standard Applicable

According to §22.355, the carrier frequency of each transmitter in the Public Mobile Services must be maintained within the tolerances given in Table below:

Frequency Tolerance for Cellular Band

Frequency range (MHz)	Base, fixed (ppm)	Mobile >3 watts (ppm)	Mobile ≤3 watts (ppm)
25 to 50	20.0	20.0	50.0
50 to 450	5.0	5.0	50.0
450 to 512	2.5	5.0	5.0
821 to 896	1.5	2.5	2.5
928 to 929	5.0	N/A	N/A
929 to 960	1.5	N/A	N/A
2110 to 2220	10.0	N/A	N/A

According to §24.235, the frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

According to §27.54 The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

11.2 Test Procedure

According to §2.1055, the following test procedure was performed.
The Frequency Stability is measured directly with a Frequency Domain Analyzer. Frequency Deviation in ppm is calculated from the measured peak to peak value.
The Carrier Frequency Stability over Power Supply Voltage and over Temperature is measured with a Frequency Domain Analyzer in histogram mode

11.3 Environmental Conditions

Temperature:	23°C
Relative Humidity:	54%
ATM Pressure:	101kPa

11.4 Summary of Test Results/Plots

For Cellular Band GSM Mode

Reference Frequency(Middle Channel): 836.6MHz, Limit: 2.5ppm			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		MCF (Hz)	Error (ppm)
50	NV	8.82	0.01054
40	NV	9.61	0.01149
30	NV	9.13	0.01092
20	NV	9.47	0.01132
10	NV	10.29	0.01230
0	NV	9.87	0.01180
-10	NV	9.96	0.01190
-20	NV	10.47	0.01252
-30	NV	10.82	0.01293

For PCS Band GSM Mode

Reference Frequency(Middle Channel): 1880 MHz, Limit: 2.5ppm			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		MCF (Hz)	Error (ppm)
50	NV	12.26	0.00652
40	NV	13.13	0.00699
30	NV	12.53	0.00667
20	NV	12.49	0.00665
10	NV	12.84	0.00683
0	NV	13.79	0.00734
-10	NV	13.54	0.00720
-20	NV	14.16	0.00753
-30	NV	14.32	0.00762

For Cellular Band GPRS Mode

Reference Frequency(Middle Channel): 836.6MHz, Limit: 2.5ppm			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		MCF (Hz)	Error (ppm)
50	NV	8.68	0.01038
40	NV	9.67	0.01155
30	NV	9.30	0.01112
20	NV	9.03	0.01080
10	NV	9.96	0.01191
0	NV	10.08	0.01205
-10	NV	10.06	0.01202
-20	NV	10.25	0.01225
-30	NV	10.84	0.01296

For PCS Band GPRS Mode

Reference Frequency(Middle Channel): 1880 MHz, Limit: 2.5ppm			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		MCF (Hz)	Error (ppm)
50	NV	12.61	0.00670
40	NV	12.89	0.00686
30	NV	12.73	0.00677
20	NV	12.68	0.00675
10	NV	13.01	0.00692
0	NV	13.54	0.00720
-10	NV	13.91	0.00740
-20	NV	14.53	0.00773
-30	NV	14.78	0.00786

For Cellular Band EDGE Mode

Reference Frequency(Middle Channel): 836.6MHz, Limit: 2.5ppm			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		MCF (Hz)	Error (ppm)
50	NV	11.09	0.01325
40	NV	11.66	0.01394
30	NV	11.78	0.01409
20	NV	11.51	0.01376
10	NV	12.13	0.01450
0	NV	11.81	0.01412
-10	NV	12.43	0.01486
-20	NV	12.32	0.01473
-30	NV	12.85	0.01536

For PCS Band EDGE Mode

Reference Frequency(Middle Channel): 1880 MHz, Limit: 2.5ppm			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		MCF (Hz)	Error (ppm)
50	NV	-9.32	-0.00496
40	NV	-9.70	-0.00516
30	NV	-9.74	-0.00518
20	NV	-8.41	-0.00447
10	NV	-8.46	-0.00450
0	NV	-9.10	-0.00484
-10	NV	-7.98	-0.00425
-20	NV	-8.04	-0.00427
-30	NV	-9.32	-0.00496

For WCDMA Band 5 Mode

Reference Frequency(Middle Channel): 836.6 MHz, Limit: 2.5ppm			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		MCF (Hz)	Error (ppm)
50	NV	0.38	0.00046
40	NV	-0.33	-0.00040
30	NV	0.32	0.00039
20	NV	0.22	0.00026
10	NV	1.29	0.00154
0	NV	0.61	0.00073
-10	NV	0.61	0.00073
-20	NV	1.28	0.00153
-30	NV	0.61	0.00073

For WCDMA Band 2 Mode

Reference Frequency(Middle Channel): 1880 MHz, Limit: 2.5ppm			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		MCF (Hz)	Error (ppm)
50	NV	0.06	0.00003
40	NV	0.12	0.00006
30	NV	0.62	0.00033
20	NV	1.10	0.00058
10	NV	0.54	0.00028
0	NV	0.72	0.00038
-10	NV	0.81	0.00043
-20	NV	1.20	0.00064
-30	NV	1.51	0.00080

For HSDPA Band 5 Mode

Reference Frequency(Middle Channel): 836.6 MHz, Limit: 2.5ppm			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		MCF (Hz)	Error (ppm)
50	NV	-0.62	-0.00074
40	NV	0.39	0.00047
30	NV	0.34	0.00040
20	NV	0.80	0.00095
10	NV	0.32	0.00038
0	NV	0.84	0.00100
-10	NV	0.98	0.00118
-20	NV	1.11	0.00133
-30	NV	1.39	0.00166

For HSDPA Band 2 Mode

Reference Frequency(Middle Channel): 1880 MHz, Limit: 2.5ppm			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		MCF (Hz)	Error (ppm)
50	NV	-0.09	-0.00005
40	NV	-0.60	-0.00032
30	NV	0.26	0.00014
20	NV	0.21	0.00011
10	NV	0.92	0.00049
0	NV	1.37	0.00073
-10	NV	1.55	0.00083
-20	NV	1.58	0.00084
-30	NV	1.90	0.00101

For HSUPA Band 5 Mode

Reference Frequency(Middle Channel): 836.6 MHz, Limit: 2.5ppm			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		MCF (Hz)	Error (ppm)
50	NV	0.02	0.00003
40	NV	0.64	0.00077
30	NV	1.23	0.00147
20	NV	1.08	0.00129
10	NV	1.00	0.00119
0	NV	1.93	0.00231
-10	NV	1.68	0.00201
-20	NV	2.35	0.00281
-30	NV	2.12	0.00253

For HSUPA Band 2 Mode

Reference Frequency(Middle Channel): 1880 MHz, Limit: 2.5ppm			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		MCF (Hz)	Error (ppm)
50	NV	4.72	0.00251
40	NV	4.39	0.00234
30	NV	5.11	0.00272
20	NV	6.23	0.00332
10	NV	6.42	0.00342
0	NV	6.25	0.00333
-10	NV	6.43	0.00342
-20	NV	6.85	0.00364
-30	NV	6.58	0.00350

So, Frequency Stability Versus Input Voltage is:

Reference Frequency(Middle Channel): GSM 836.6MHz, Limit: 2.5ppm			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		Frequency (Hz)	Error (ppm)
20	LV	11.03	0.01318
	NV	11.38	0.01361
	HV	11.70	0.01399
Reference Frequency(Middle Channel): GSM 1880 MHz, Limit: 2.5ppm			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		Frequency (Hz)	Error (ppm)
20	LV	15.01	0.00798
	NV	15.10	0.00803
	HV	14.90	0.00793
Reference Frequency(Middle Channel): GPRS 836.6MHz, Limit: 2.5ppm			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		Frequency (Hz)	Error (ppm)
20	LV	11.17	0.01336
	NV	11.48	0.01372
	HV	11.49	0.01373
Reference Frequency(Middle Channel): GPRS 1880 MHz, Limit: 2.5ppm			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		Frequency (Hz)	Error (ppm)
20	LV	14.68	0.00781
	NV	14.20	0.00755
	HV	14.79	0.00787
Reference Frequency(Middle Channel): EDGE 836.6MHz, Limit: 2.5ppm			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		Frequency (Hz)	Error (ppm)
20	LV	13.38	0.01600
	NV	12.69	0.01517
	HV	13.37	0.01599
Reference Frequency(Middle Channel): EDGE 1880 MHz, Limit: 2.5ppm			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		Frequency (Hz)	Error (ppm)
20	LV	-7.96	-0.00423
	NV	-7.33	-0.00390
	HV	-7.46	-0.00397

Reference Frequency(Middle Channel): WCDMA 836.6MHz, Limit: 2.5ppm			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		Frequency (Hz)	Error (ppm)
20	LV	1.48	0.00177
	NV	1.15	0.00137
	HV	1.72	0.00206

Reference Frequency(Middle Channel): WCDMA 1732.4MHz, Limit: 2.5ppm			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		Frequency (Hz)	Error (ppm)
20	LV	1.14	0.00066
	NV	0.88	0.00051
	HV	0.86	0.00050

Reference Frequency(Middle Channel): WCDMA 1880 MHz, Limit: 2.5ppm			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		Frequency (Hz)	Error (ppm)
20	LV	2.06	0.00109
	NV	2.94	0.00351
	HV	3.13	0.00374

Reference Frequency(Middle Channel): HSDPA 836.6MHz, Limit: 2.5ppm			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		Frequency (Hz)	Error (ppm)
20	LV	1.54	0.00184
	NV	1.69	0.00201
	HV	1.77	0.00212

Reference Frequency(Middle Channel): HSDPA 1732.4MHz, Limit: 2.5ppm			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		Frequency (Hz)	Error (ppm)
20	LV	5.82	0.00336
	NV	6.00	0.00346
	HV	6.48	0.00374

Reference Frequency(Middle Channel): HSDPA 1880 MHz, Limit: 2.5ppm			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		Frequency (Hz)	Error (ppm)
20	LV	7.07	0.00376
	NV	6.63	0.00353
	HV	7.24	0.00385

Reference Frequency(Middle Channel): HSUPA 836.6MHz, Limit: 2.5ppm			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		Frequency (Hz)	Error (ppm)
20	LV	2.50	0.00299
	NV	2.71	0.00324
	HV	2.91	0.00348

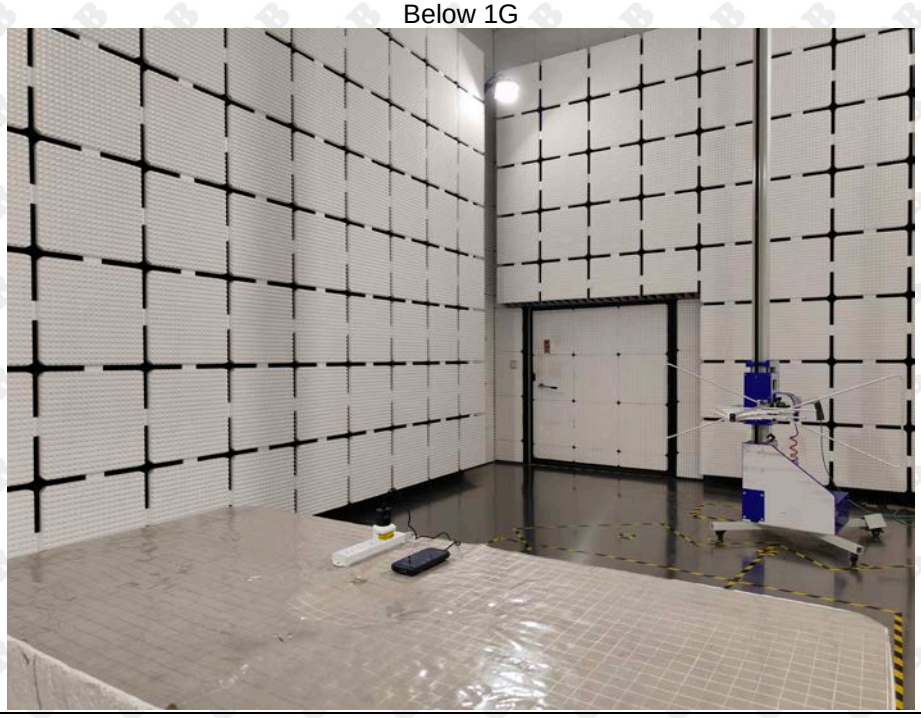
Reference Frequency(Middle Channel): HSUPA 1732.4MHz, Limit: 2.5ppm			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		Frequency (Hz)	Error (ppm)
20	LV	5.69	0.00329
	NV	5.78	0.00333
	HV	6.01	0.00347

Reference Frequency(Middle Channel): HSUPA 1880 MHz, Limit: 2.5ppm			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		Frequency (Hz)	Error (ppm)
20	LV	8.81	0.00469
	NV	9.12	0.00485
	HV	9.60	0.00511

12. EUT TEST PHOTO

Radiated Emission

Below 1G



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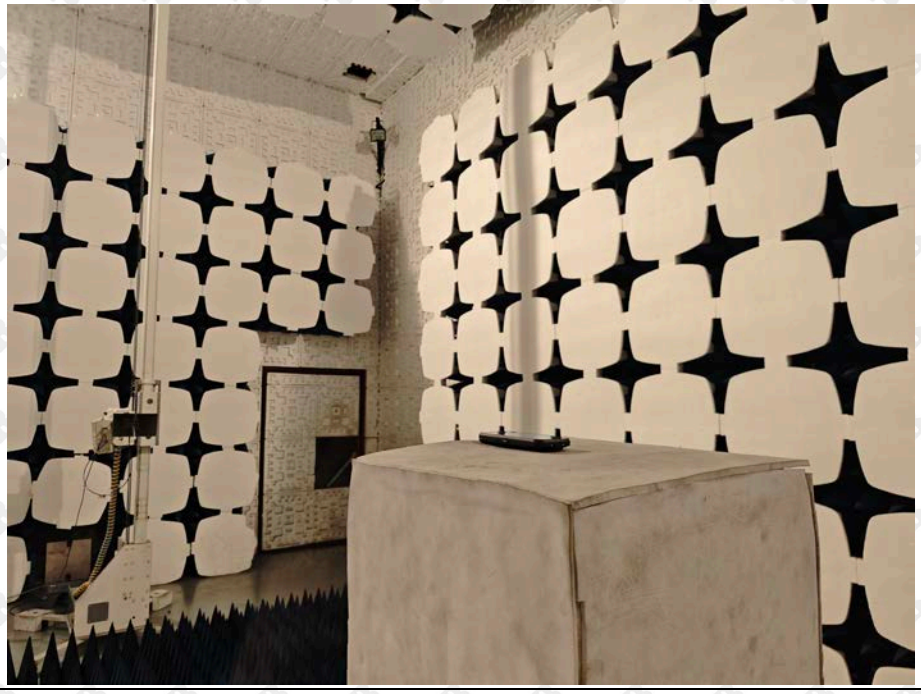

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