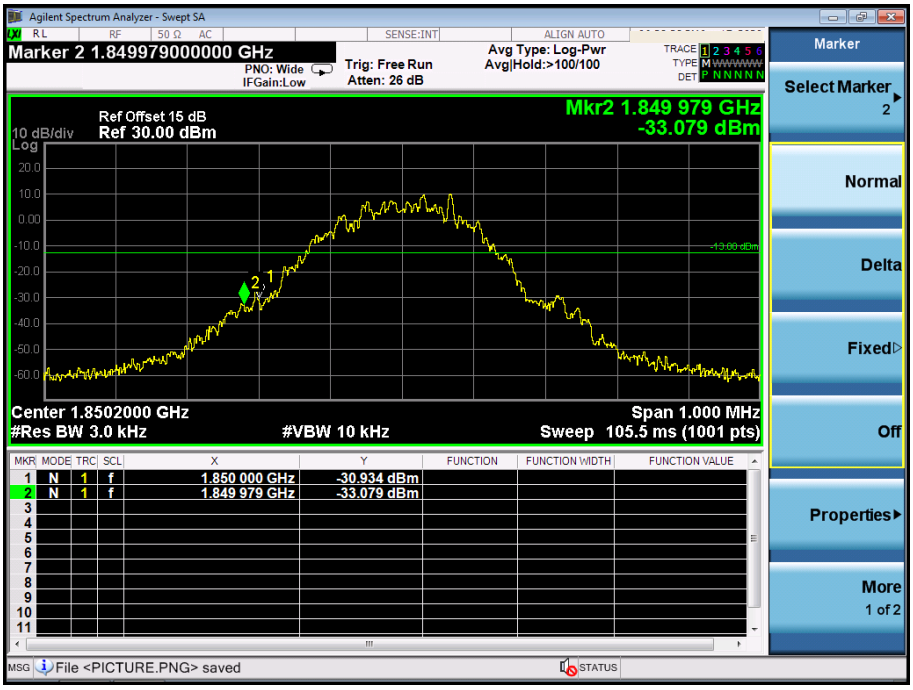
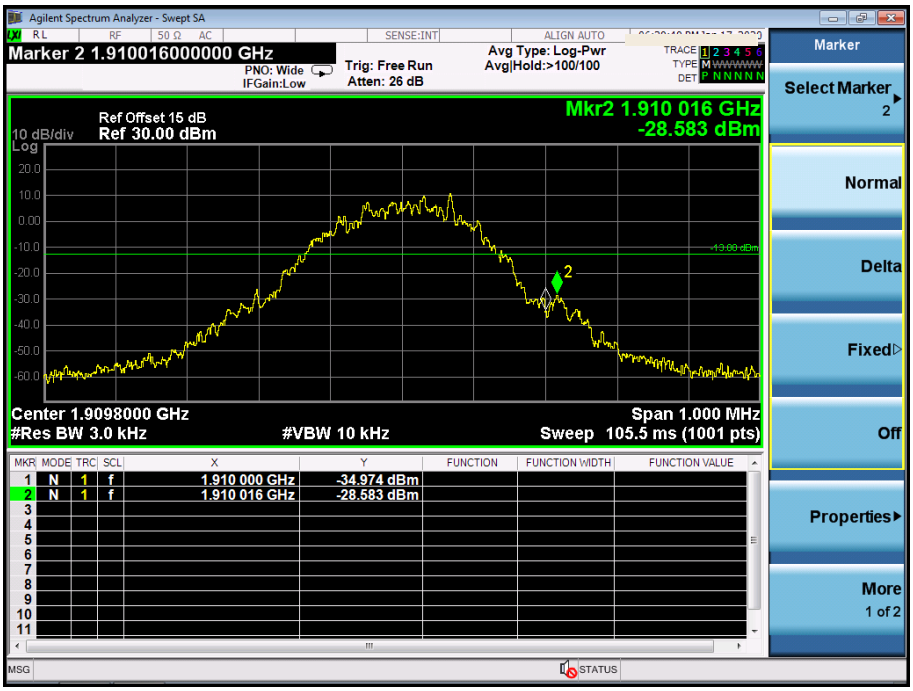
GPRS Middle Channel

GPRS High Channel

GPRS Low Band Emission

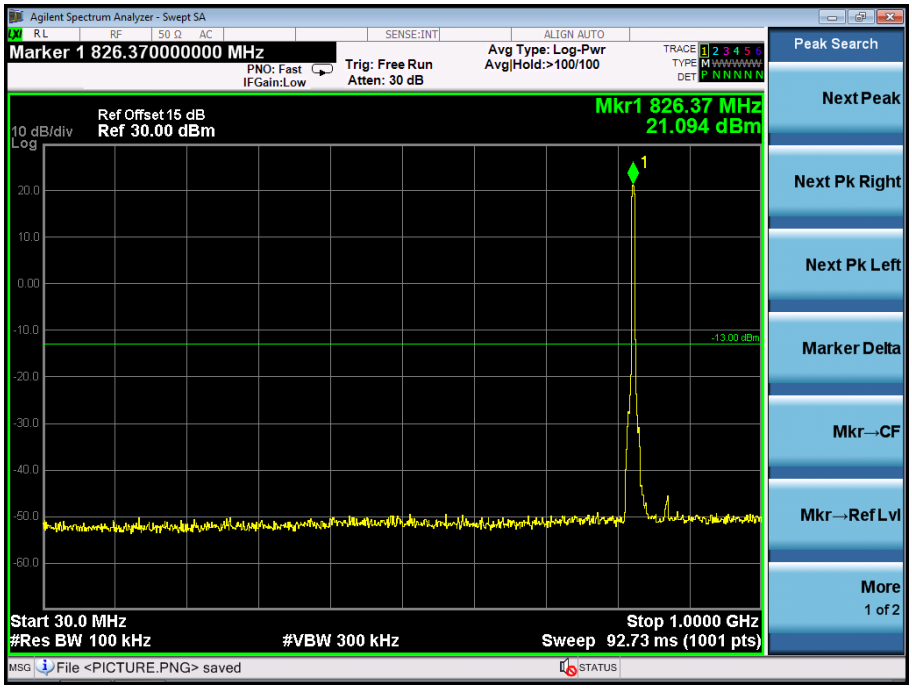


GPRS High Band Emission

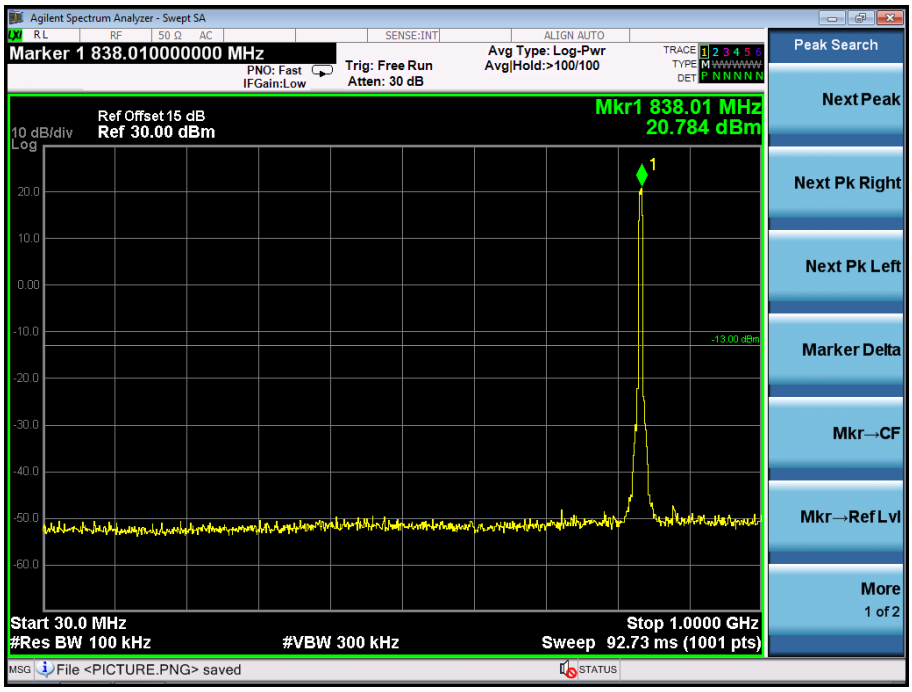


For Band V

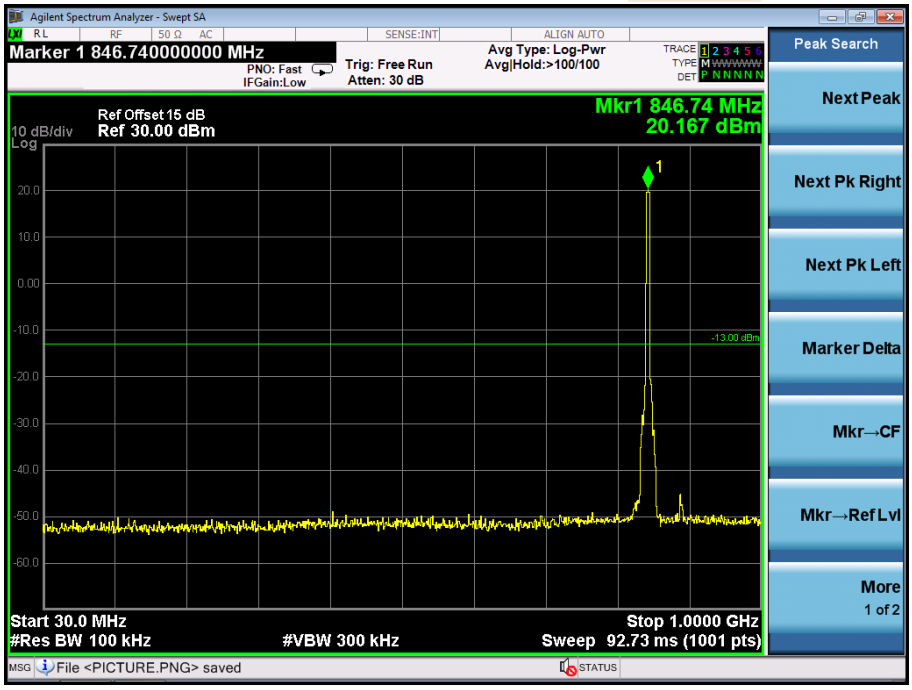
WCDMA Low Channel



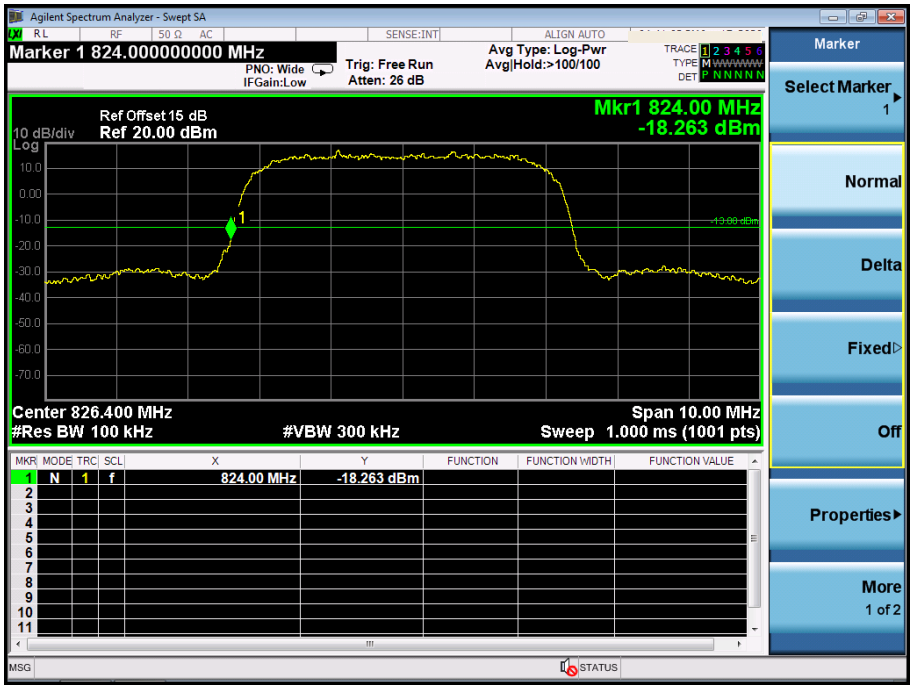
WCDMA Middle Channel



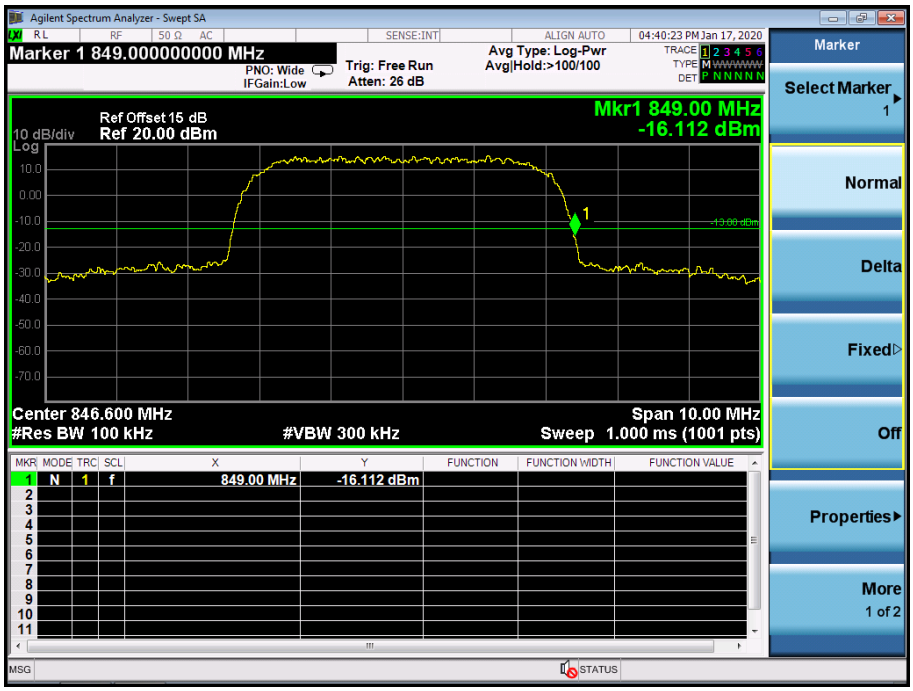
WCDMA High Channel



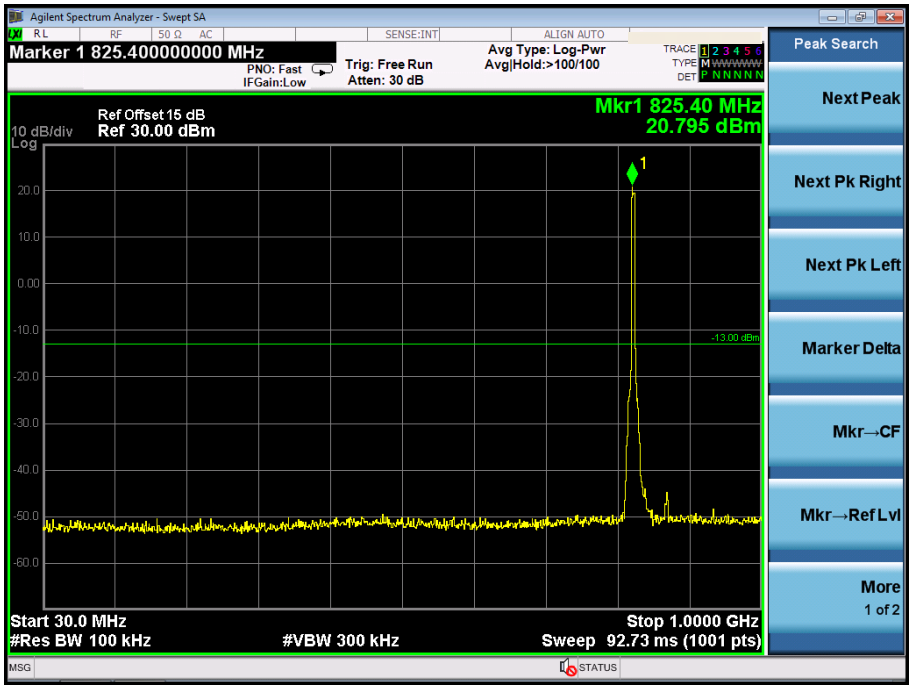
WCDMA Low Band Spurious Emission



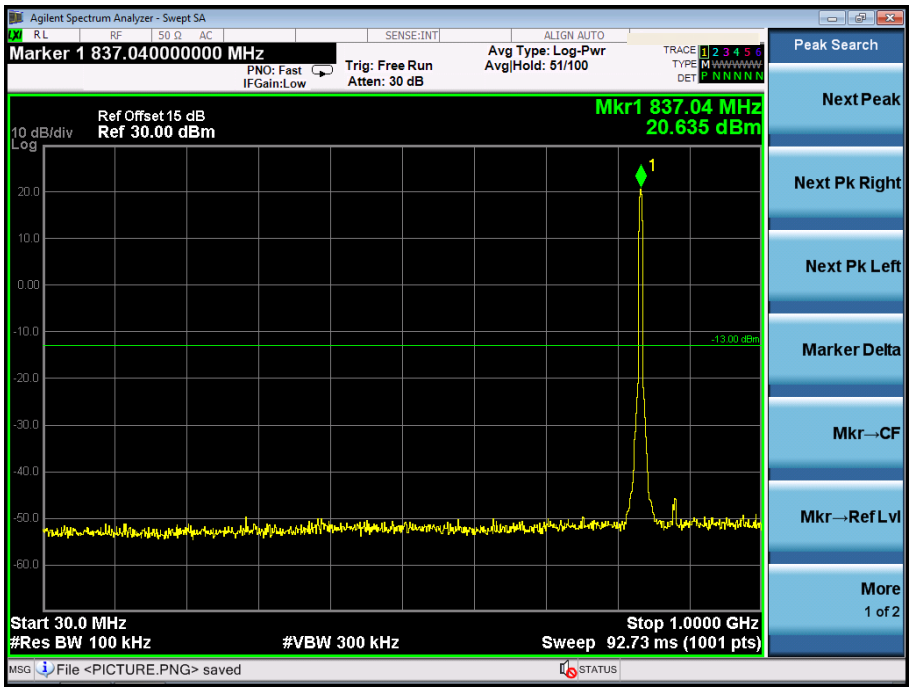
WCDMA High Band Spurious Emission



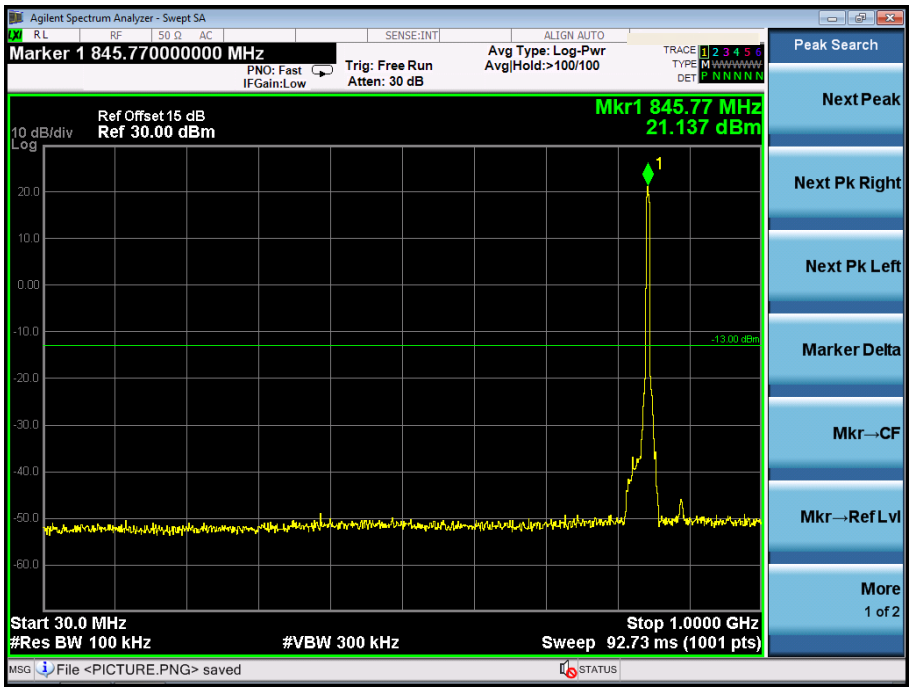
HSDPALow Channel



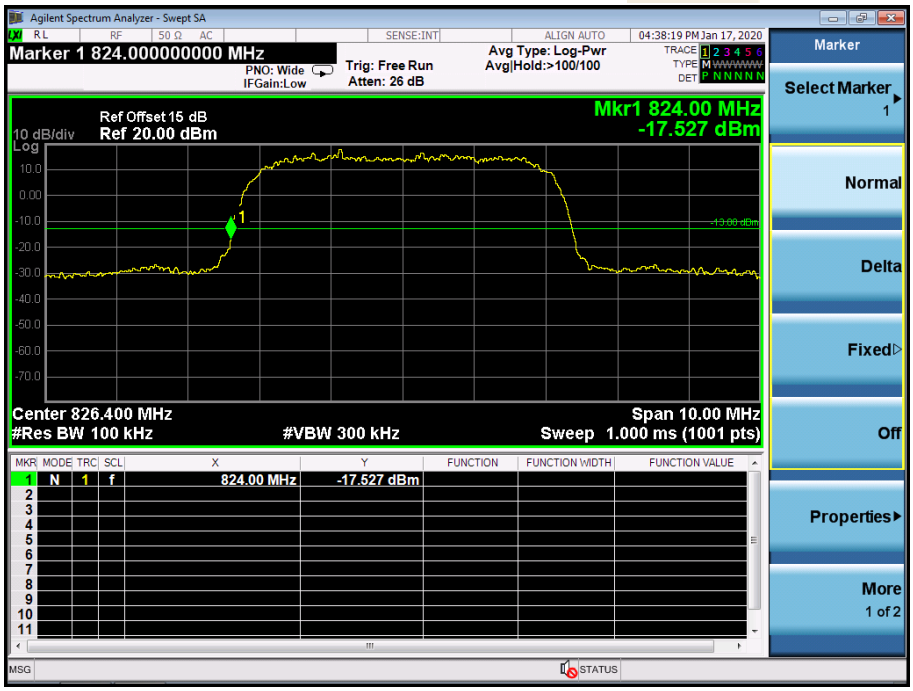
HSDPA Middle Channel



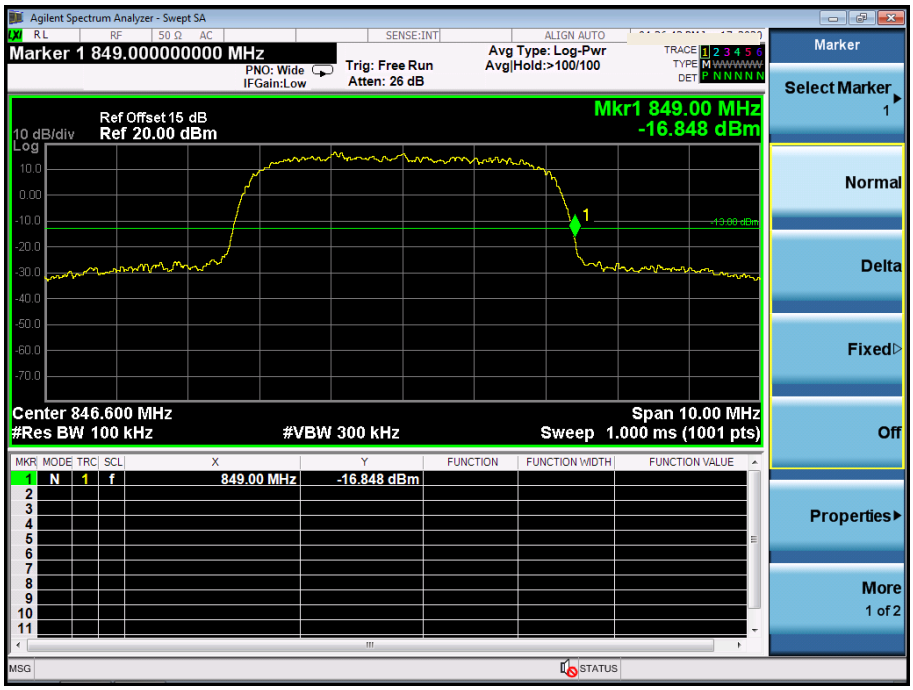
HSDPA High Channel



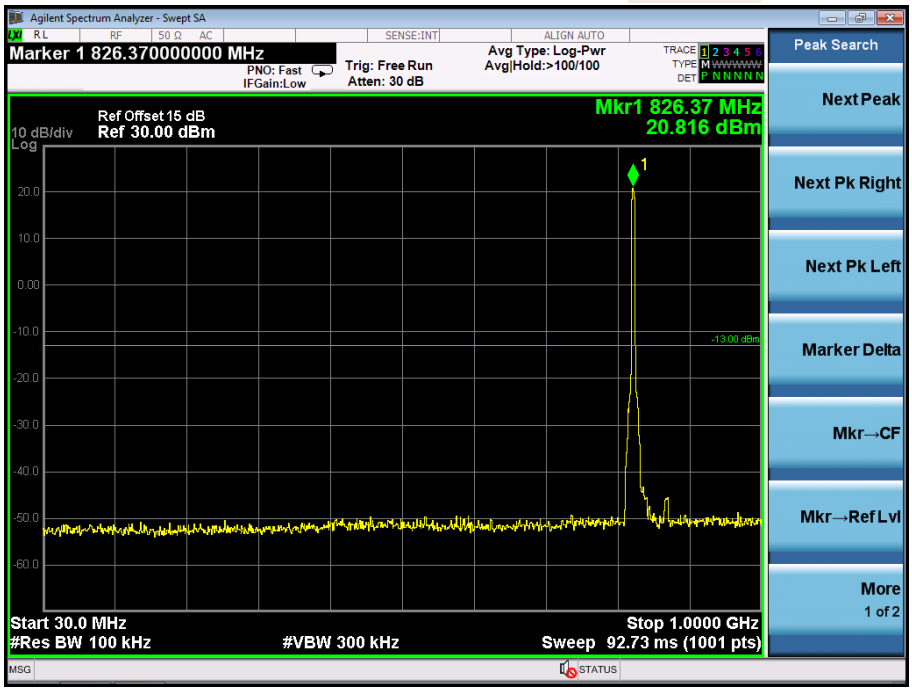
HSDPA Low Band Spurious Emission



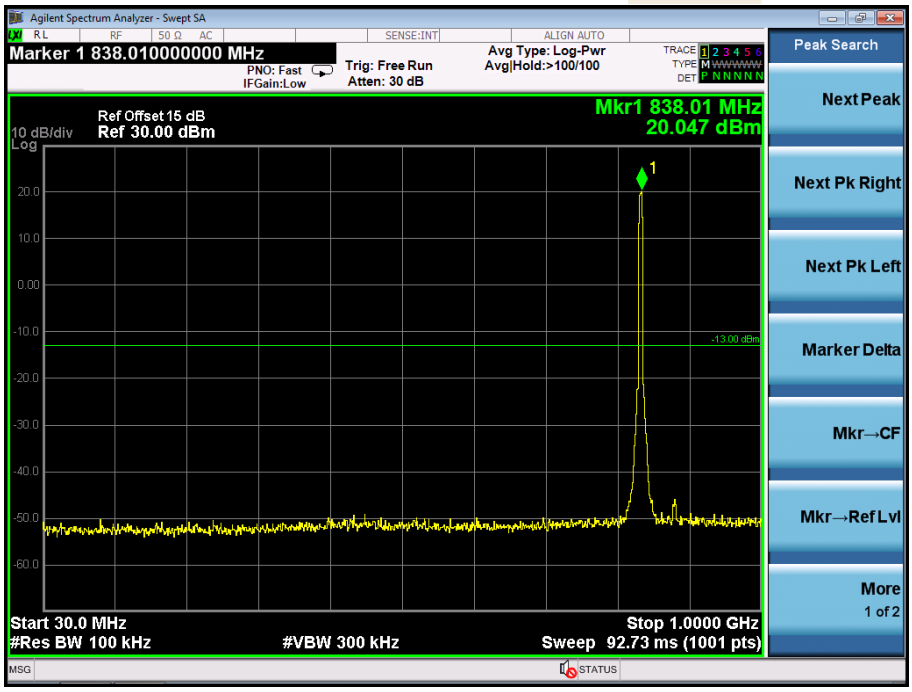
HSDPA High Band Spurious Emission



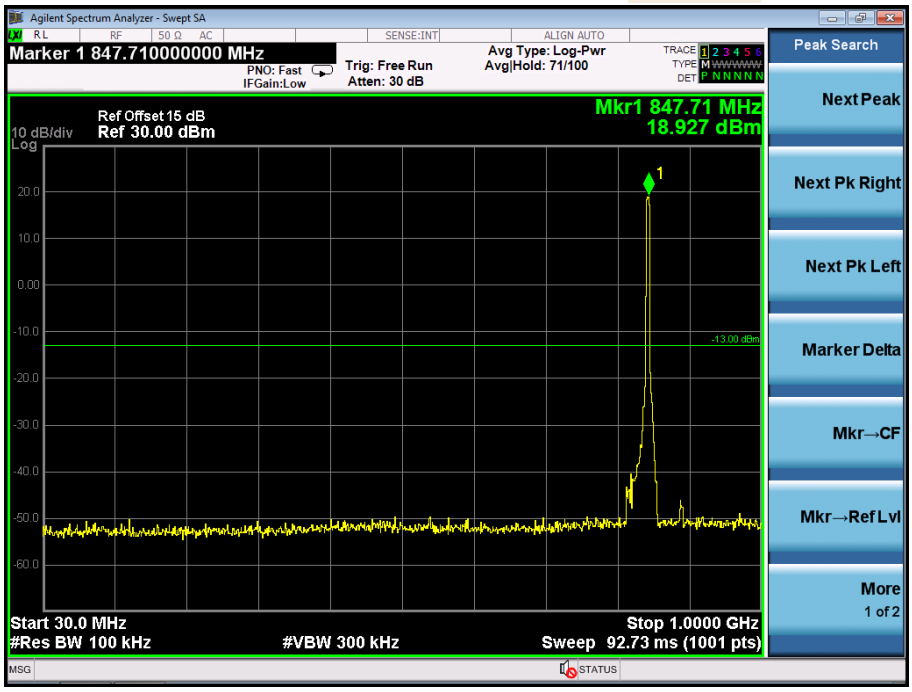
HSUPALow Channel



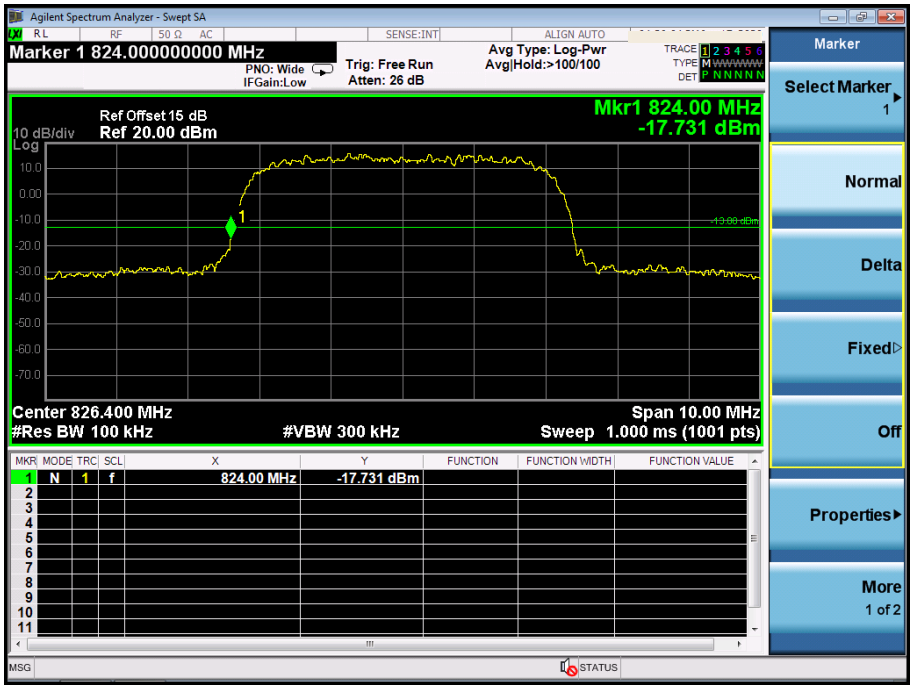
HSUPA Middle Channel



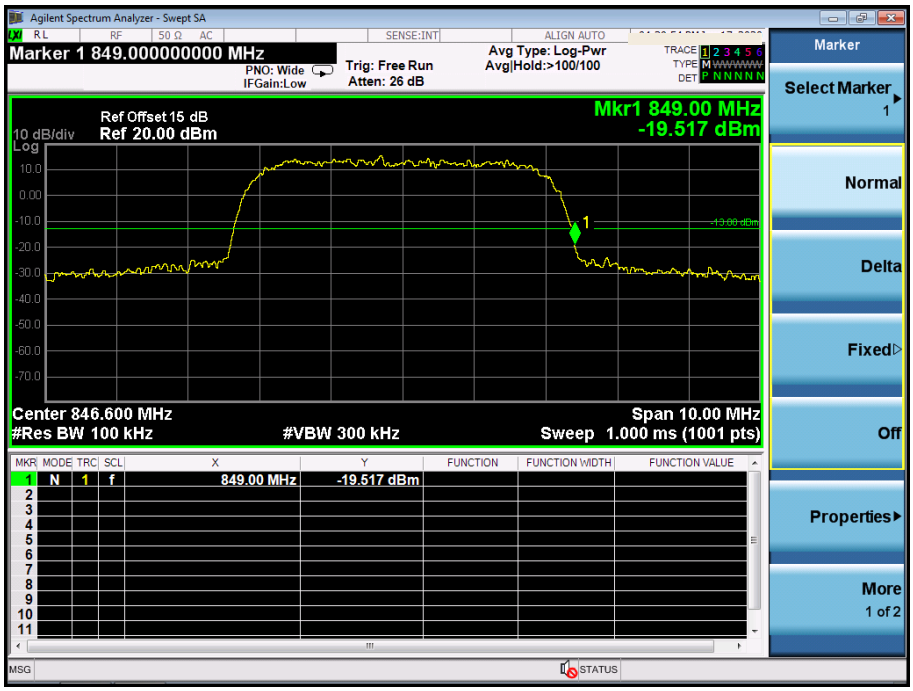
HSUPA High Channel



HSUPA Low Band Spurious Emission

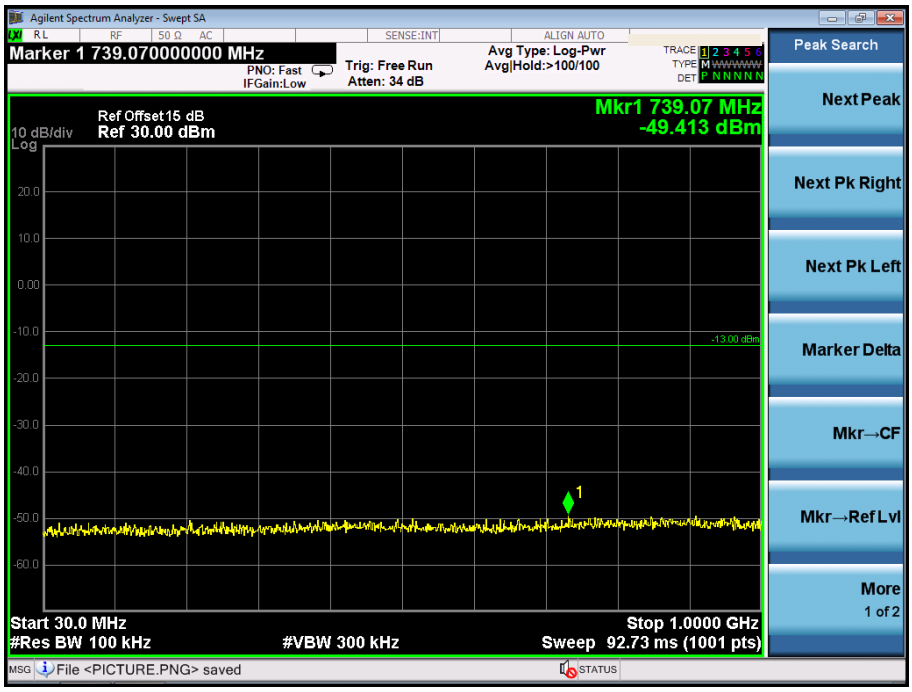


HSUPA High Band Spurious Emission

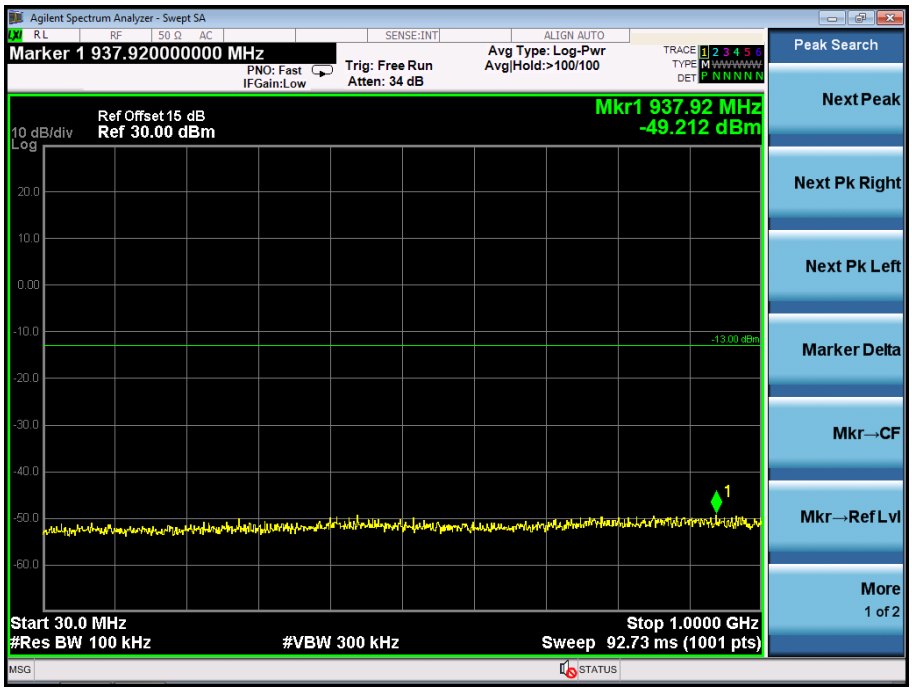


For Band II

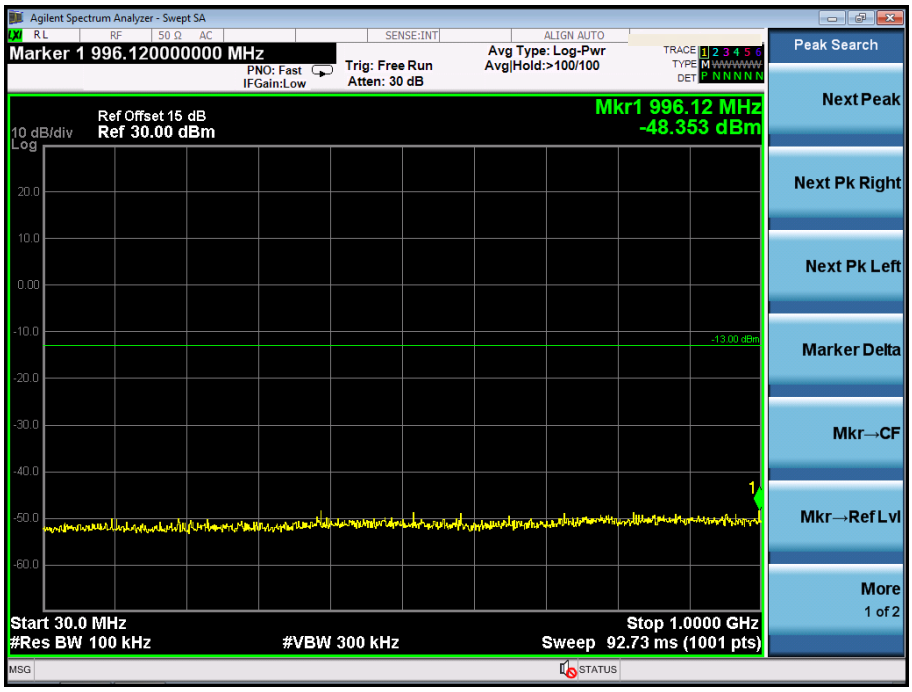
WCDMA Low Channel



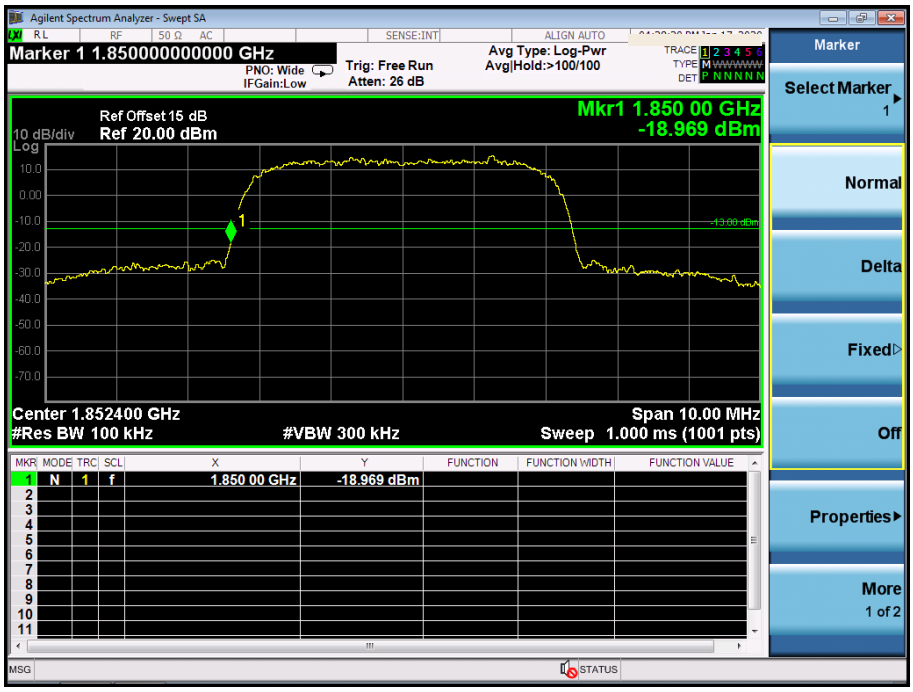
WCDMA Middle Channel



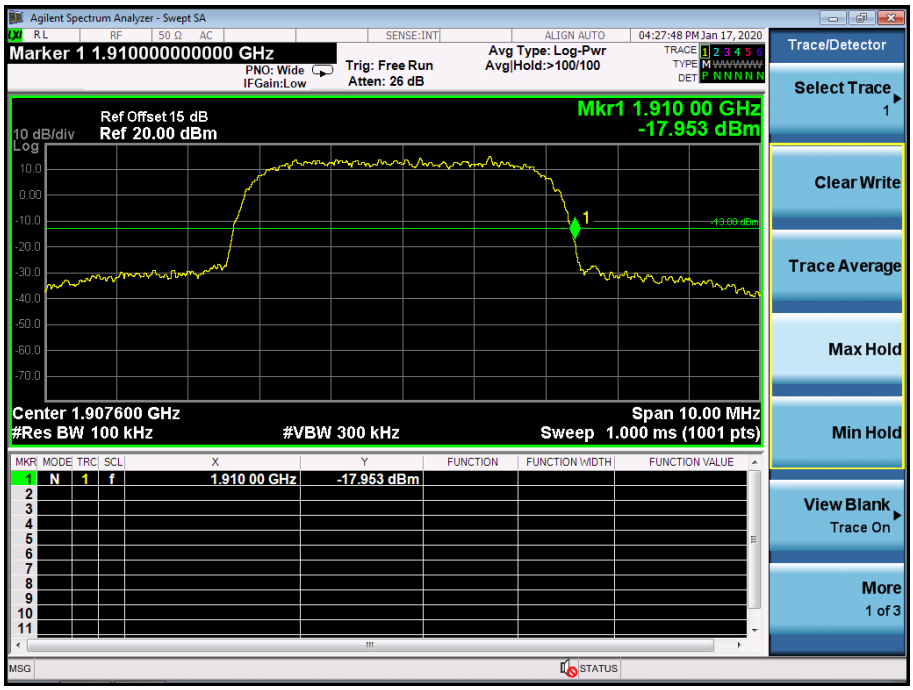
WCDMA High Channel



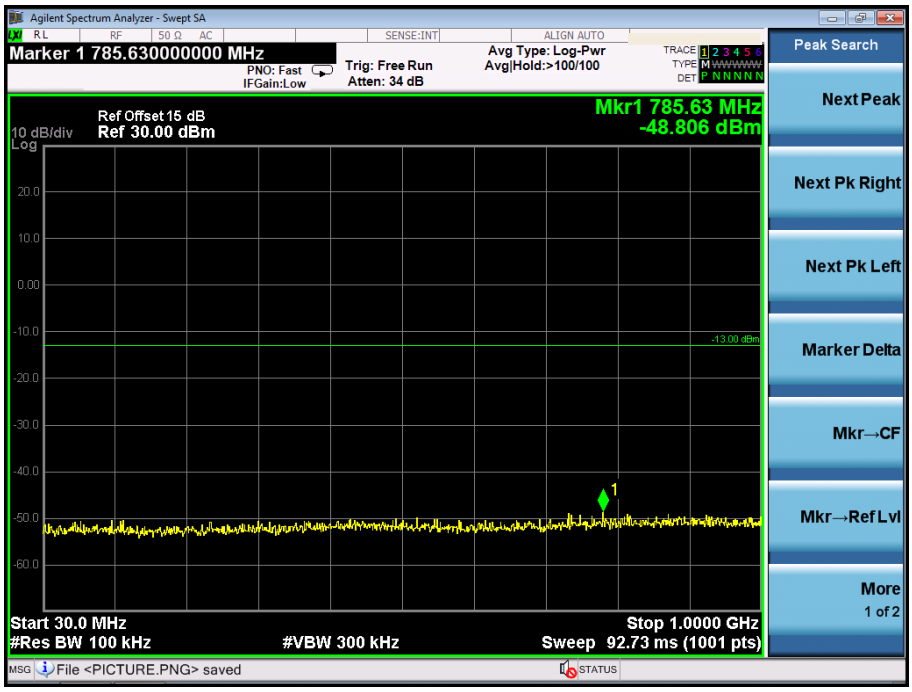
WCDMA Low Band Spurious Emission



WCDMA High Band Spurious Emission

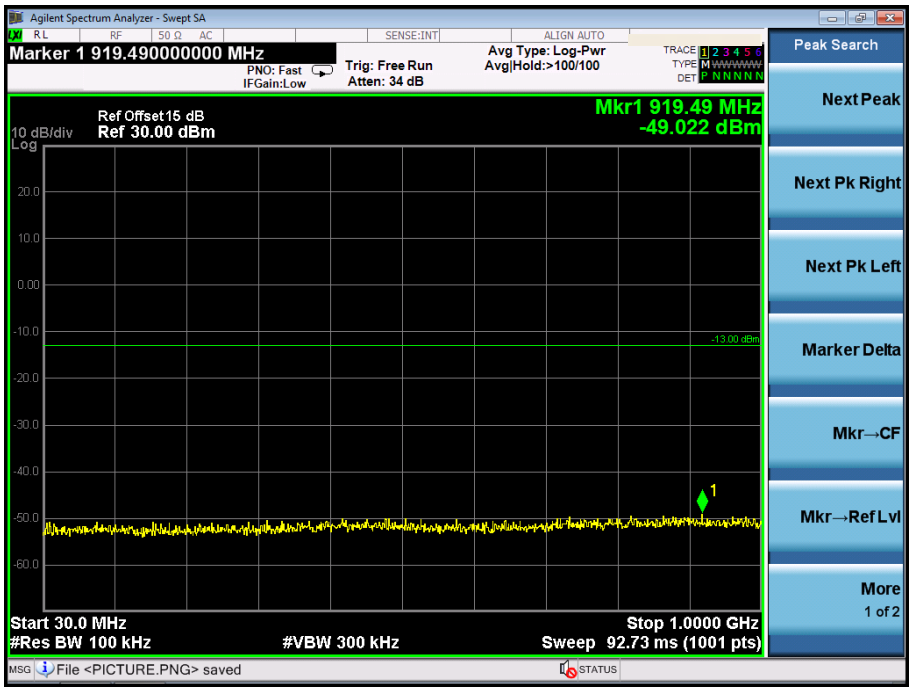


HSDPALow Channel

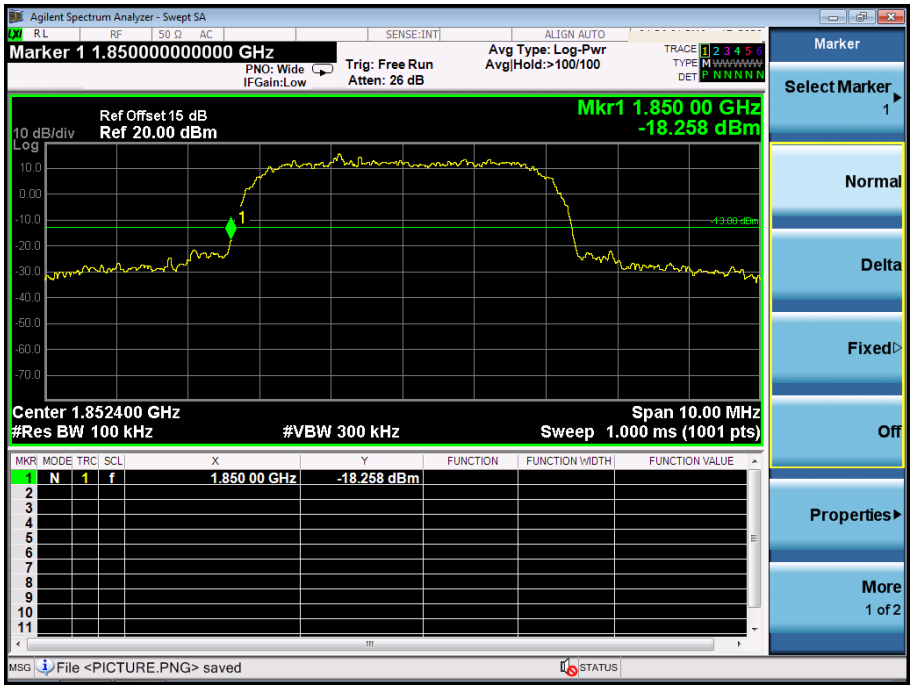


HSDPA Middle Channel

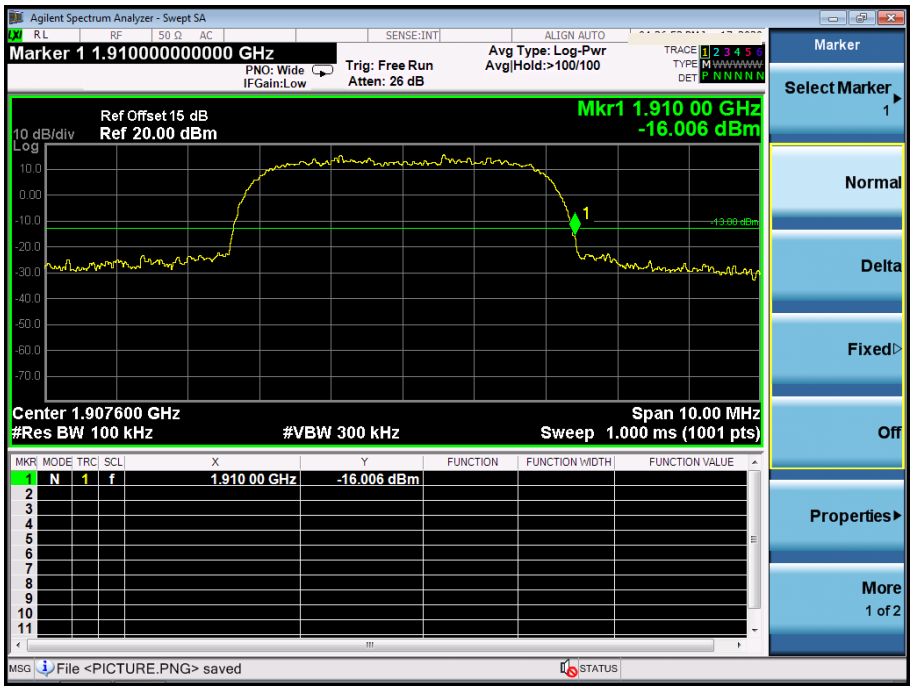
HSDPA High Channel



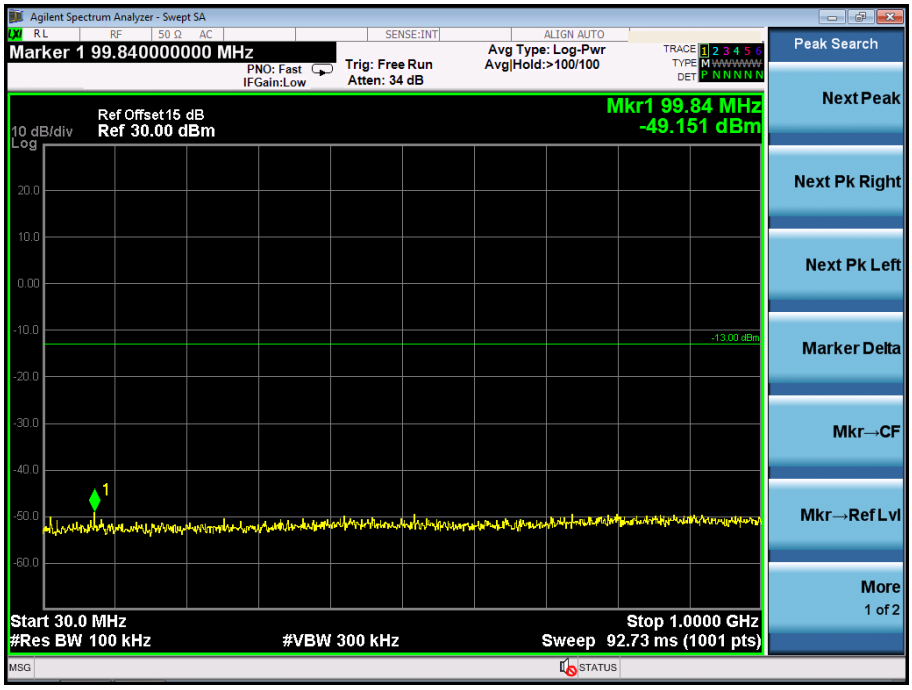
HSDPA Low Band Spurious Emission



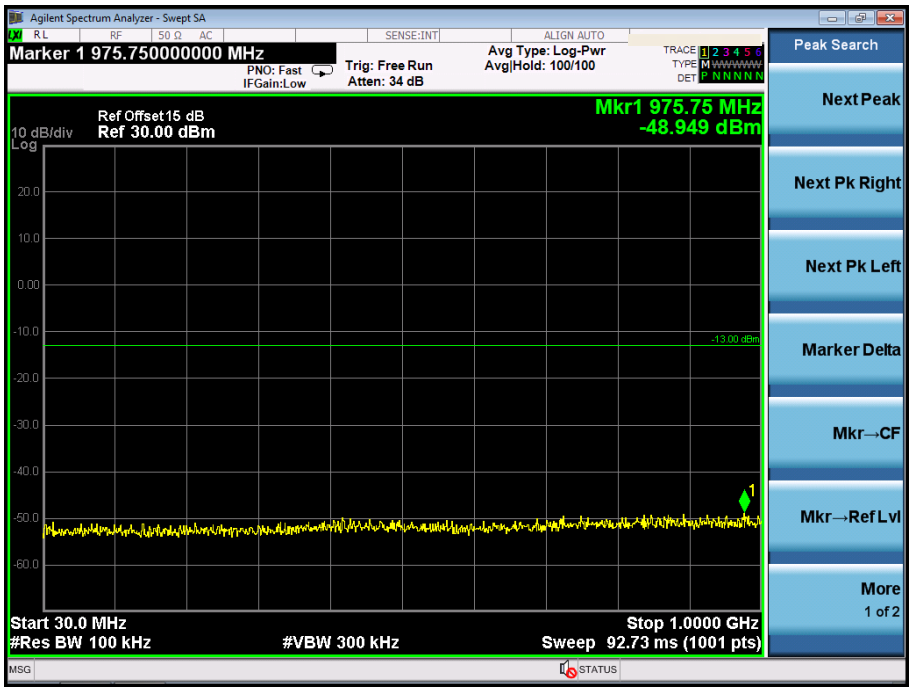
HSDPA High Band Spurious Emission



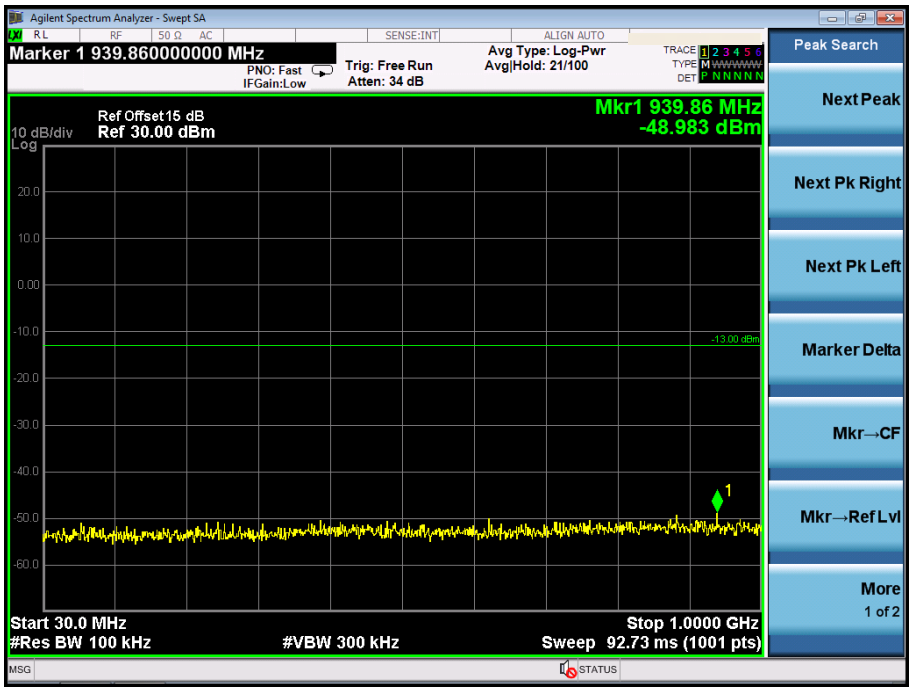
HSUPALow Channel



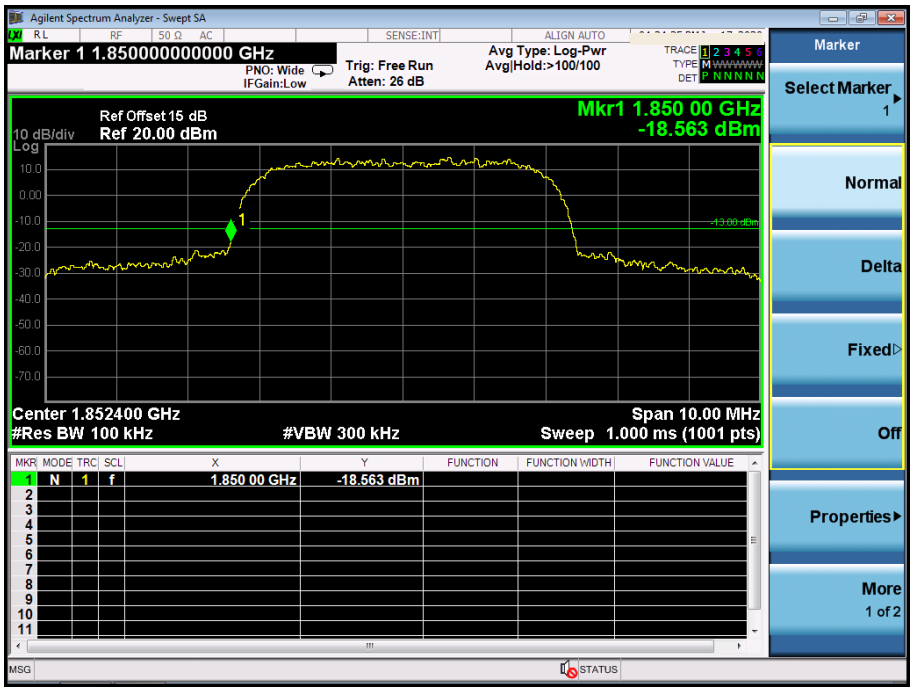
HSUPA Middle Channel



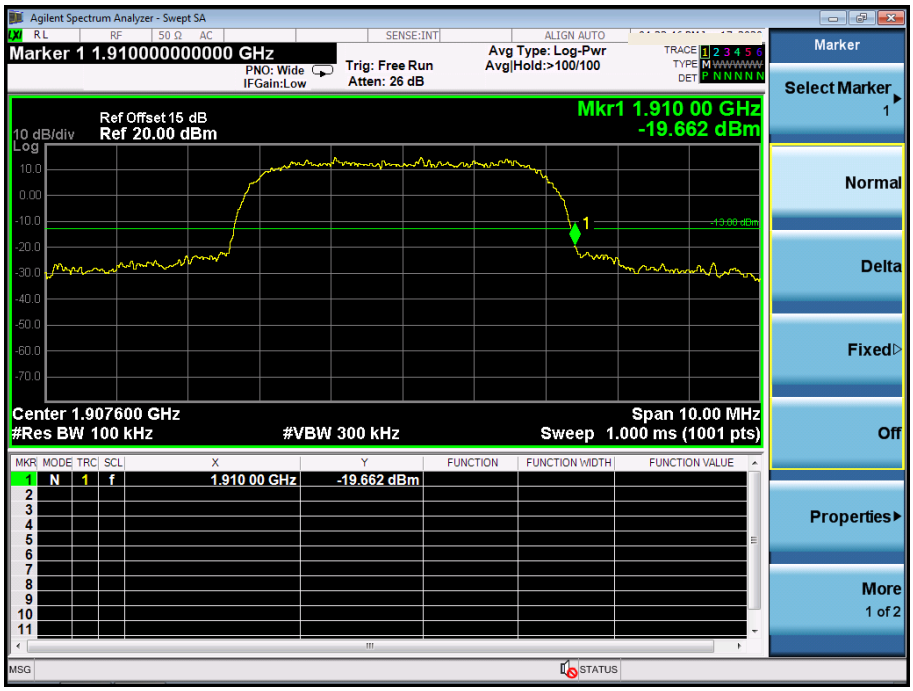
HSUPA High Channel



HSUPA Low Band Spurious Emission



HSUPA High Band Spurious Emission



7. Spurious Radiated Emissions

7.1Standard 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.

According to §27.53 (h), 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 log10 (P) dB.

7.2Test 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)

7.3Environmental Conditions

Temperature:	26 °C
Relative Humidity:	54%
ATM Pressure:	101 kPa
Test Voltage	DC3.7V

7.4Summary 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	Reading	Correct	Result	Limit	Margin	Polar
(MHz)	(dBm)	dB	(dBm)	(dBm)	(dB)	H/V
Low Channel (824.2MHz)						
46.34	-69.29	4.34	-64.95	-13.00	-51.95	H
1648.4	-53.25	4.94	-48.31	-13.00	-35.31	H
2472.6	-53.14	8.46	-44.47	-13.00	-31.47	H
46.34	-69.17	4.34	-64.83	-13.00	-51.83	V
1648.4	-50.59	4.94	-45.44	-13.00	-32.44	V
2472.6	-50.54	8.46	-42.48	-13.00	-29.48	V
Middle Channel (836.6MHz)						
46.34	-68.61	4.34	-64.27	-13.00	-51.27	H
1673.2	-53.24	5.11	-48.13	-13.00	-35.13	H
2509.8	-52.89	8.54	-44.47	-13.00	-31.47	H
46.34	-68.72	4.34	-64.38	-13.00	-51.38	V
1673.2	-50.17	5.11	-45.44	-13.00	-32.44	V
2509.8	-50.49	8.54	-42.48	-13.00	-29.48	V
High Channel (848.8MHz)						
46.34	-69.15	4.34	-64.81	-13.00	-51.81	H
1697.6	-49.25	5.29	-43.96	-13.00	-30.96	H
2546.4	-51.35	8.59	-44.47	-13.00	-31.47	H
46.34	-69.20	4.34	-64.86	-13.00	-51.86	V
1697.6	-50.01	5.29	-45.44	-13.00	-32.44	V
2546.4	-51.85	8.59	-42.48	-13.00	-29.48	V

For PCS Band_GSM1900 Mode

Frequency	Reading	Correct	Result	Limit	Margin	Polar
(MHz)	(dBm)	dB	(dBm)	(dBm)	(dB)	H/V
Low Channel (1850.2MHz)						
46.34	-69.22	4.34	-64.88	-13.00	-51.88	H
3700.4	-53.25	10.54	-42.71	-13.00	-29.71	H
5550.6	-55.47	13.37	-44.47	-13.00	-31.47	H
46.34	-68.54	4.34	-64.20	-13.00	-51.20	V
3700.4	-51.58	10.54	-45.44	-13.00	-32.44	V
5550.6	-55.98	13.37	-42.48	-13.00	-29.48	V
Middle Channel (1880MHz)						
46.34	-68.81	4.34	-64.47	-13.00	-51.47	H
3760	-52.67	10.64	-42.03	-13.00	-29.03	H
5640	-55.68	13.54	-44.47	-13.00	-31.47	H
46.34	-69.14	4.34	-64.80	-13.00	-51.80	V
3760	-52.14	10.64	-45.44	-13.00	-32.44	V
5640	-54.36	13.54	-42.48	-13.00	-29.48	V
High Channel (1909.8MHz)						
46.34	-69.50	4.34	-65.16	-13.00	-52.16	H
3819.6	-52.08	10.74	-41.34	-13.00	-28.34	H
5729.4	-55.74	13.71	-44.47	-13.00	-31.47	H
46.34	-68.88	4.34	-64.54	-13.00	-51.54	V
3819.6	-53.67	10.74	-45.44	-13.00	-32.44	V
5729.4	-55.18	13.71	-42.48	-13.00	-29.48	V

For Band 5 Mode

Frequency	Reading	Correct	Result	Limit	Margin	Polar
(MHz)	(dBm)	dB	(dBm)	(dBm)	(dB)	H/V
Low Channel (826.4MHz)						
46.34	-69.19	4.34	-64.85	-13.00	-51.85	H
1652.8	-58.65	4.94	-53.49	-13.00	-40.49	H
2479.2	-58.61	8.46	-49.99	-13.00	-36.99	H
46.34	-69.24	4.34	-64.90	-13.00	-51.90	V
1652.8	-57.18	4.94	-52.18	-13.00	-39.18	V
2479.2	-57.98	8.46	-50.07	-13.00	-37.07	V
Middle Channel (836.6MHz)						
46.34	-69.47	4.34	-65.13	-13.00	-52.13	H
1672.8	-56.98	5.11	-52.36	-13.00	-39.36	H
2509.2	-58.01	8.54	-49.00	-13.00	-36.00	H
46.34	-69.17	4.34	-64.83	-13.00	-51.83	V
1672.8	-57.69	5.11	-53.21	-13.00	-40.21	V
2509.2	-58.74	8.54	-50.93	-13.00	-37.93	V
High Channel (846.6MHz)						
46.34	-69.45	4.34	-65.11	-13.00	-52.11	H
1693.2	-58.12	5.29	-51.14	-13.00	-38.14	H
2539.8	-59.17	8.59	-50.64	-13.00	-37.64	H
46.34	-68.81	4.34	-64.47	-13.00	-51.47	V
1693.2	-58.05	5.29	-51.82	-13.00	-38.82	V
2539.8	-58.14	8.59	-49.73	-13.00	-36.73	V

For Band 2 Mode

Frequency	Reading	Correct	Result	Limit	Margin	Polar
(MHz)	(dBm)	dB	(dBm)	(dBm)	(dB)	H/V
Low Channel (1852.4MHz)						
46.34	-69.29	4.34	-64.95	-13.00	-51.95	H
3704.8	-57.68	10.17	-47.26	-13.00	-34.26	H
5557.2	-57.95	14.69	-43.48	-13.00	-30.48	H
46.34	-68.83	4.34	-64.49	-13.00	-51.49	V
3704.8	-58.51	10.17	-48.37	-13.00	-35.37	V
5557.2	-58.17	14.69	-43.87	-13.00	-30.87	V
Middle Channel (1880MHz)						
46.34	-68.94	4.34	-64.60	-13.00	-51.60	H
3760.8	-57.35	10.26	-48.2	-13.00	-35.2	H
5640	-57.39	14.78	-42.68	-13.00	-29.68	H
46.34	-68.72	4.34	-64.38	-13.00	-51.38	V
3760.8	-57.18	10.26	-47.61	-13.00	-34.61	V
5640	-57.35	14.78	-43.34	-13.00	-30.34	V
High Channel (1907.6MHz)						
46.34	-69.42	4.34	-65.08	-13.00	-52.08	H
3815.2	-58.25	10.59	-47.66	-13.00	-34.66	H
5722.8	-58.14	15.03	-43.11	-13.00	-30.11	H
46.34	-69.15	4.34	-64.81	-13.00	-51.81	V
3815.2	-58.38	10.59	-47.79	-13.00	-34.79	V
5722.8	-57.62	15.03	-42.59	-13.00	-29.59	H

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.

8. Frequency Stability

8.1 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.

8.2Test 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

8.3Environmental Conditions

Temperature:	26°C
Relative Humidity:	54%
ATM Pressure:	101kPa

8.4Summary of Test Results/Plots

For Cellular Band GSM 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	3.7	74	0.0885
40	3.7	72	0.0861
30	3.7	68	0.0813
20	3.7	85	0.1016
10	3.7	58	0.0693
0	3.7	69	0.0825
-10	3.7	61	0.0729
-20	3.7	68	0.0813
-30	3.7	63	0.0753

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	3.7	63	0.0335
40	3.7	62	0.0330
30	3.7	57	0.0303
20	3.7	73	0.0388
10	3.7	49	0.0261
0	3.7	48	0.0255
-10	3.7	52	0.0277
-20	3.7	53	0.0282
-30	3.7	69	0.0367

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	3.7	68	0.0813
40	3.7	58	0.0693
30	3.7	47	0.0562
20	3.7	89	0.1064
10	3.7	85	0.1016
0	3.7	42	0.0502
-10	3.7	65	0.0777
-20	3.7	45	0.0538
-30	3.7	49	0.0586

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	3.7	71	0.0849
40	3.7	74	0.0885
30	3.7	85	0.1016
20	3.7	89	0.0473
10	3.7	58	0.0693
0	3.7	64	0.0765
-10	3.7	82	0.0980
-20	3.7	39	0.0466
-30	3.7	59	0.0705

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	3.7	70	0.0837
40	3.7	73	0.0873
30	3.7	72	0.0861
20	3.7	94	0.1124
10	3.7	71	0.0849
0	3.7	74	0.0885
-10	3.7	73	0.0873
-20	3.7	75	0.0896
-30	3.7	79	0.0944

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	3.7	68	0.0362
40	3.7	65	0.0346
30	3.7	69	0.0367
20	3.7	74	0.0394
10	3.7	58	0.0309
0	3.7	49	0.0261
-10	3.7	59	0.0314
-20	3.7	55	0.0293
-30	3.7	68	0.0324

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	3.7	58	0.0693
40	3.7	57	0.0681
30	3.7	59	0.0705
20	3.7	56	0.0849
10	3.7	64	0.0765
0	3.7	63	0.0753
-10	3.7	62	0.0741
-20	3.7	55	0.0657
-30	3.7	49	0.0586

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	3.7	54	0.0287
40	3.7	55	0.0293
30	3.7	49	0.0261
20	3.7	65	0.0346
10	3.7	39	0.0207
0	3.7	58	0.0309
-10	3.7	68	0.0362
-20	3.7	64	0.0340
-30	3.7	63	0.0335

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	3.7	68	0.0813
40	3.7	64	0.0765
30	3.7	63	0.0753
20	3.7	84	0.1004
10	3.7	67	0.0801
0	3.7	65	0.0777
-10	3.7	63	0.0753
-20	3.7	64	0.0765
-30	3.7	62	0.0741

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	3.7	55	0.0293
40	3.7	74	0.0394
30	3.7	75	0.0399
20	3.7	78	0.0415
10	3.7	59	0.0314
0	3.7	68	0.0362
-10	3.7	48	0.0255
-20	3.7	59	0.0314
-30	3.7	38	0.0202

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	4.07	72	0.0861
	3.7	85	0.1016
	3.33	75	0.0896
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	4.07	61	0.0324
	3.7	73	0.0388
	3.33	63	0.0335
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	4.07	81	0.0968
	3.7	89	0.1064
	3.33	65	0.0777
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	4.07	74	0.0394
	3.7	89	0.0473
	3.33	71	0.0378

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	4.07	65	0.0777
	3.7	94	0.1124
	3.33	71	0.0849
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	4.07	61	0.0324
	3.7	74	0.0394
	3.33	58	0.0309
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	4.07	41	0.0490
	3.7	56	0.0669
	3.33	52	0.0622
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	4.07	61	0.0324
	3.7	73	0.0388
	3.33	58	0.0309
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	4.07	59	0.0705
	3.7	84	0.1004
	3.33	63	0.0753

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	4.07	58	0.0309
	3.7	78	0.0415
	3.33	66	0.0351

9. EUT PHOTO

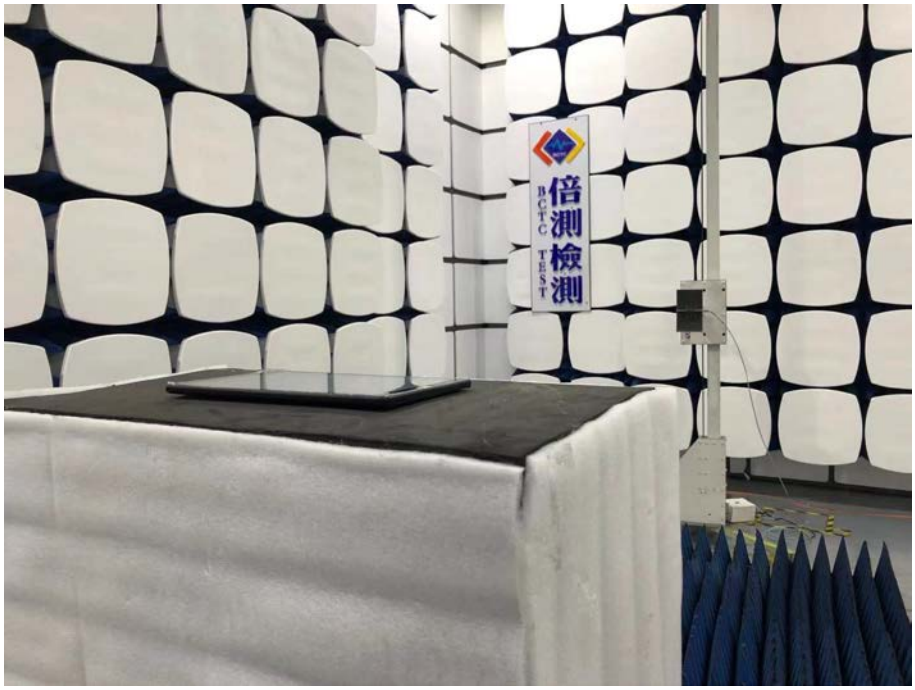
EUT Photo 1

EUT Photo 2

EUT Photo 3

10. EUT TEST PHOTO

Radiated Measurement Photos



※※※※※ END OF REPORT ※※※※※