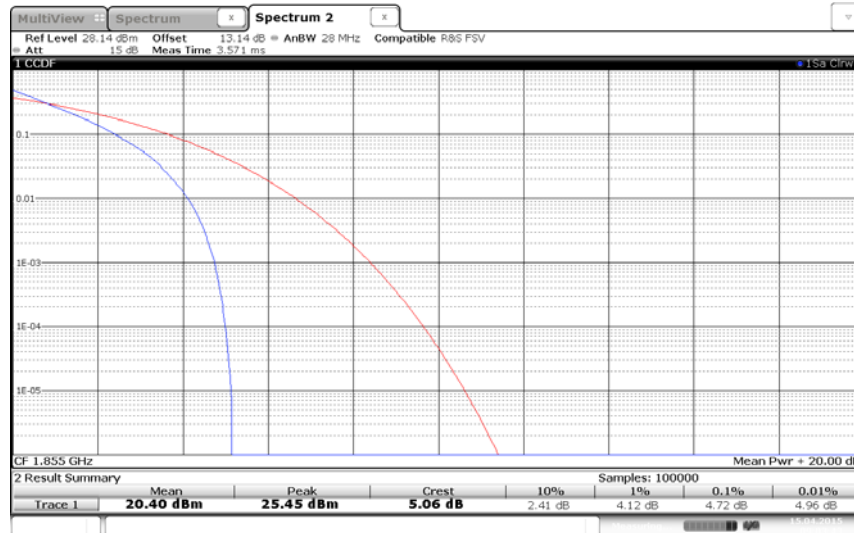
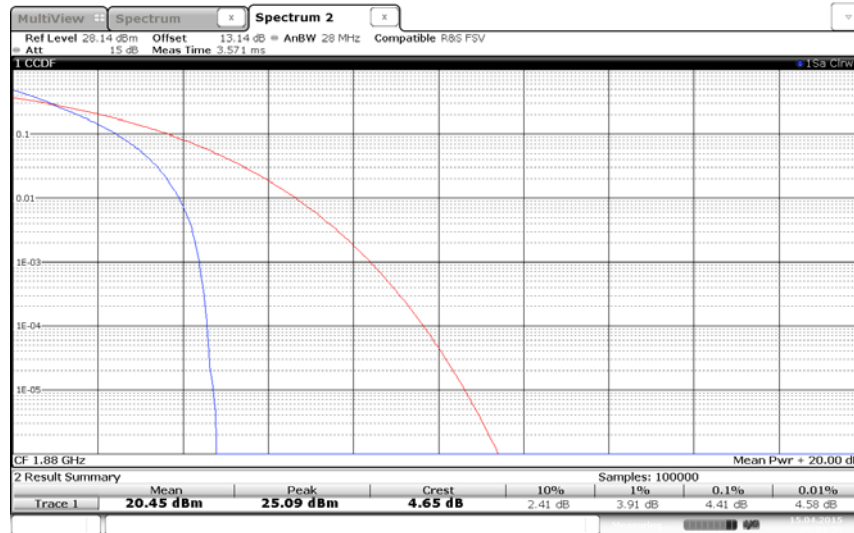


LTE Band 2 (10 MHz BW)/1855 MHz/QPSK



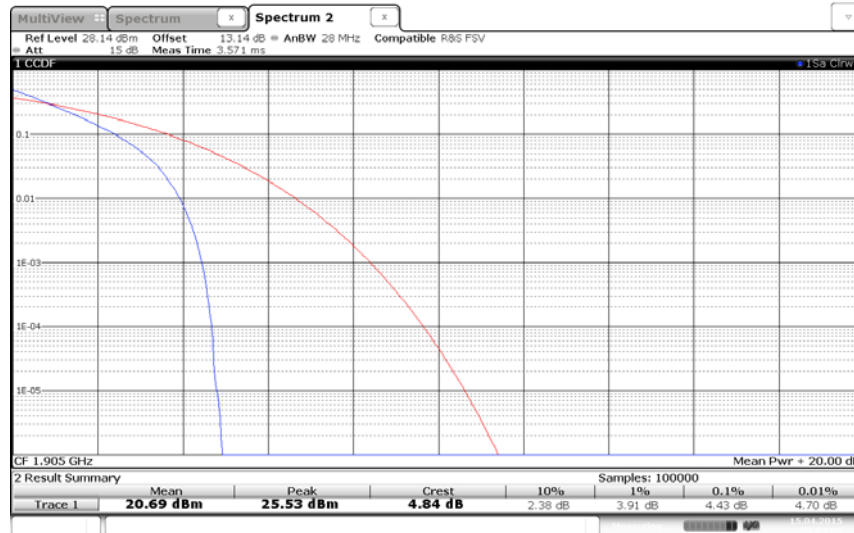
Date: 15 APR 2015 09:03:43

LTE Band 2 (10 MHz BW)/1880 MHz/QPSK



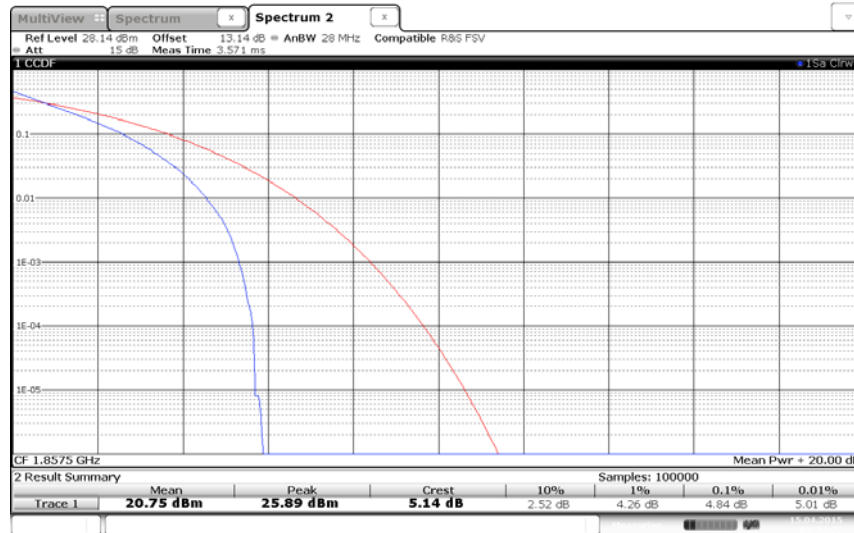
Date: 15 APR 2015 09:04:29

LTE Band 2 (10 MHz BW)/1905 MHz/QPSK



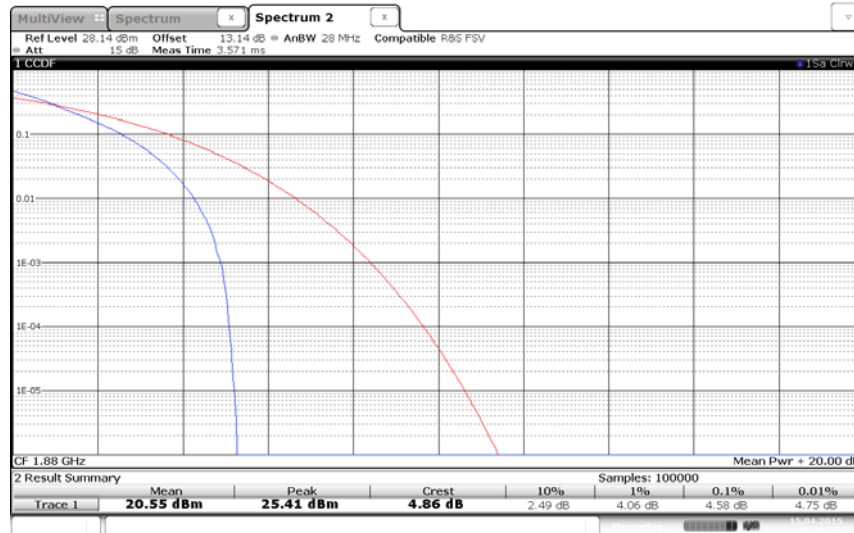
Date: 15 APR 2015 09:03:07

LTE Band 2 (15 MHz BW)/1857.5 MHz/QPSK



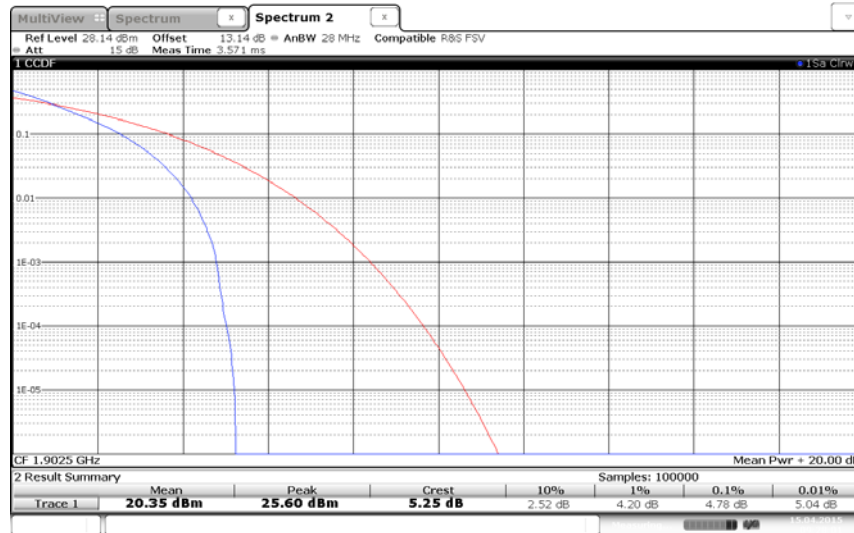
Date: 15 APR 2015 09:27:27

LTE Band 2 (15 MHz BW)/1880 MHz/QPSK



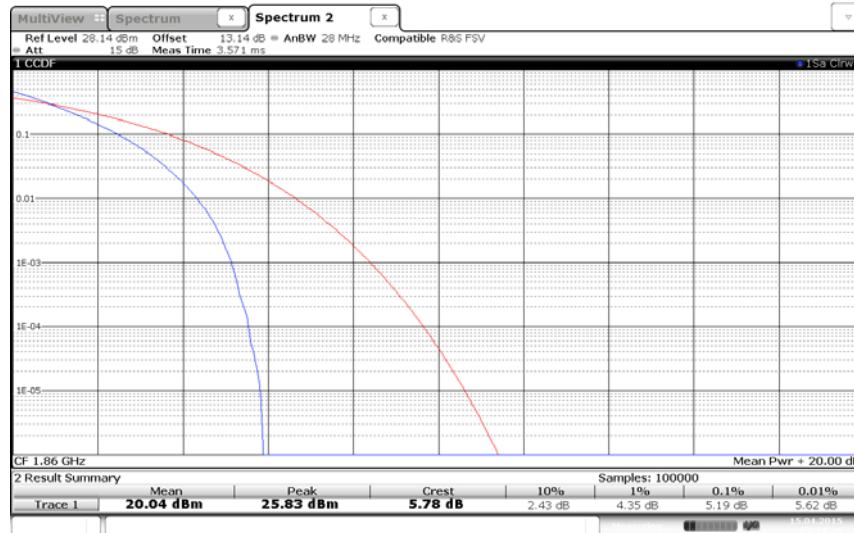
Date: 15 APR 2015 09:26:53

LTE Band 2 (15 MHz BW)/1902.5 MHz/QPSK



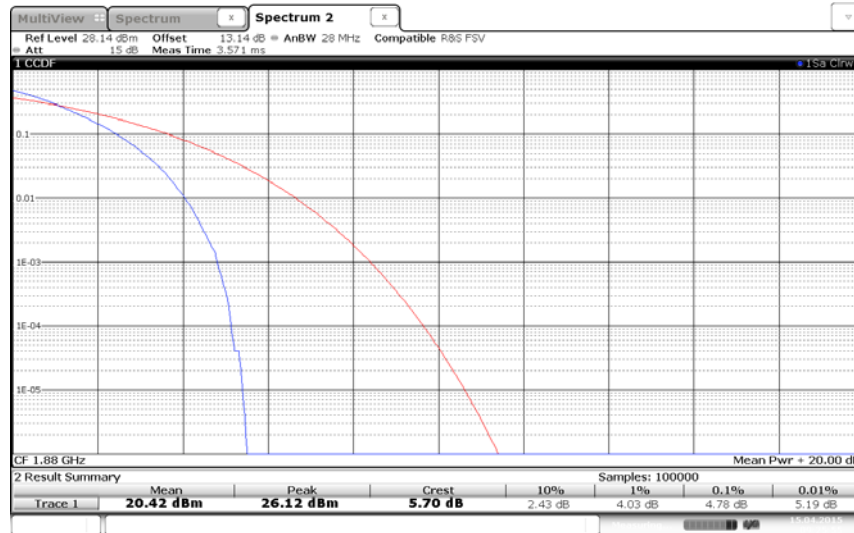
Date: 15 APR 2015 09:28:01

LTE Band 2 (20 MHz BW)/1860 MHz/QPSK



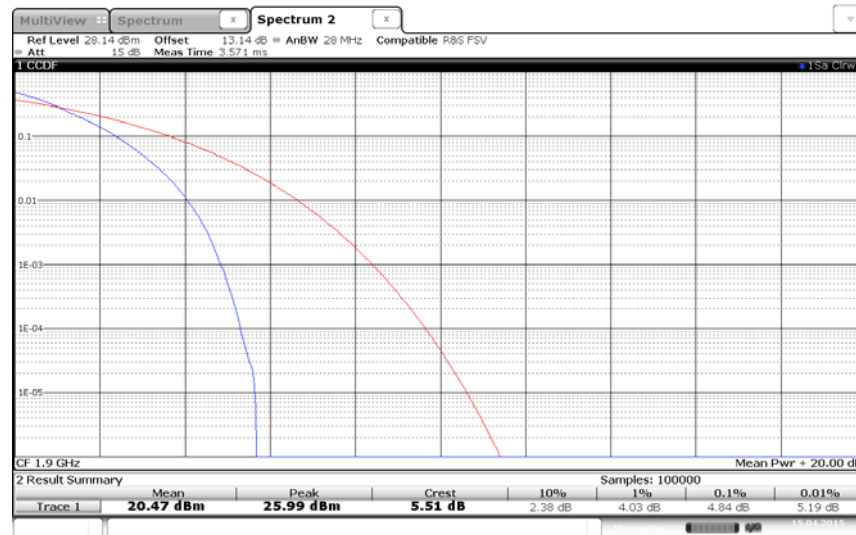
Date: 15 APR 2015 09:24:25

LTE Band 2 (20 MHz BW)/1880 MHz/QPSK



Date: 15 APR 2015 09:25:54

LTE Band 2 (20 MHz BW)/1900 MHz/QPSK



Date: 15 APR 2015 09:23:48



2.5 OCCUPIED BANDWIDTH

2.5.1 Specification Reference

FCC 47 CFR Part 2, Clause 2.1049
FCC 47 CFR Part 22, Clause 22.917(b)
FCC 47 CFR Part 24, Clause 24.238(b)
RSS-GEN 4.6.1

2.5.2 Standard Applicable

The transmitted signal bandwidth shall be reported as the 99% emission bandwidth, that is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission.

26dB Bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated by at least 26 dB below the transmitter power.

2.5.3 Equipment Under Test and Modification State

Serial No: SP070315900027 / Test Configuration A

2.5.4 Date of Test/Initial of test personnel who performed the test

April 06 to 22, 2015 / XYZ

2.5.5 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.5.6 Environmental Conditions/ Test Location

Test performed at TÜV SÜD America Inc. Rancho Bernardo facility

Ambient Temperature	24.3 - 25.4°C
Relative Humidity	37.8 – 42.4
ATM Pressure	99.2 - 99.7 kPa

2.5.7 Additional Observations

- This is a conducted test. Both 26dB bandwidth and 99% bandwidth presented.
- Using the occupied bandwidth measurement function in the spectrum analyzer, the 99% occupied bandwidth was measured.
- The 26dB bandwidth was measured in accordance with FCC KDB 971168 D01 V0202 Clause 4.1 using the ndB measurement function in the spectrum analyzer.
- The transmitter shall be operated at its maximum carrier power measured under normal test conditions.

- The span of the analyzer shall be set to capture all products of the modulation process, including the emission skirts.
- The resolution bandwidth (RBW) shall be in the range of 1% of the occupied bandwidth (OBW) and video bandwidth (VBW) shall be at least 3x RBW.
- Low, Mid and High channels for all bandwidths and modulations were verified. Test results of Mid channel were presented as representative.

2.5.8 Test Results

CDMA 2000 – 1xRTT					
Band	Service Option (SO) / (RC)	Channel	Frequency	99% OBW (MHz)	26dB BW (MHz)
Cell (BC0)	2 / 1	384	836.52	1.28	1.43
PCS (BC1)	2 / 1	600	1880.0	1.28	1.45

CDMA 2000 – 1xEvDO Release 0					
Band	RTAP Data Rate	Channel	Frequency	99% OBW (MHz)	26dB BW (MHz)
Cell (BC0)	153.6	384	836.52	1.28	1.43
PCS (BC1)	153.6	600	1880.0	1.28	1.44

CDMA 2000 – 1xEvDO Release A					
Band	RETAP Data Rate	Channel	Frequency	99% OBW (MHz)	26dB BW (MHz)
Cell (BC0)	4096	384	836.52	1.28	1.44
PCS (BC1)	4096	600	1880.0	1.29	1.45

GSM850 / GSM1900 (GPRS)				
Band	Channel	Frequency	99% OBW (kHz)	26dB BW (kHz)
Cell	190	836.6	244.0	318.5
PCS	661	1880.0	244.0	316.0

GSM850 / GSM1900 (EGPRS)				
Band	Channel	Frequency	99% OBW (kHz)	26dB BW (kHz)
Cell	190	836.6	244.0	318.0
PCS	661	1880.0	245.5	319.8

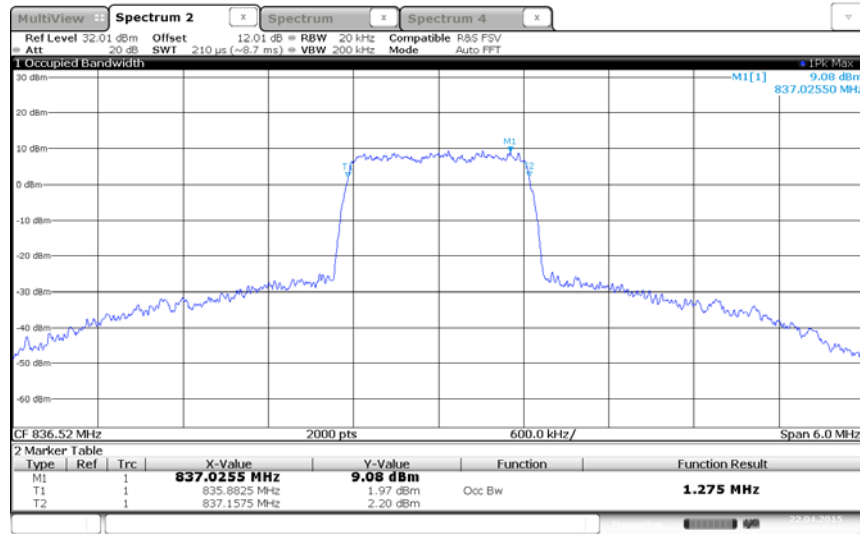
WCDMA (3GPP Release Version 99)				
Band	Channel	Frequency	99% OBW (MHz)	26dB BW (MHz)
Cell Band 5	4183	836.6	4.16	4.63
PCS Band 2	9400	1880.0	4.18	4.69

LTE (QPSK)					
Band	Bandwidth (MHz)	Channel	Frequency	99% OBW (kHz)	26dB BW (kHz)
5	1.4	190	836.6	1.08	1.27
	3			2.68	2.95
	5			4.48	4.95
	10			8.96	9.78
2	1.4	661	1880.0	1.09	1.29
	3			2.67	2.95
	5			4.48	4.93
	10			8.96	9.72
	15			13.44	14.61
	20			17.80	19.04

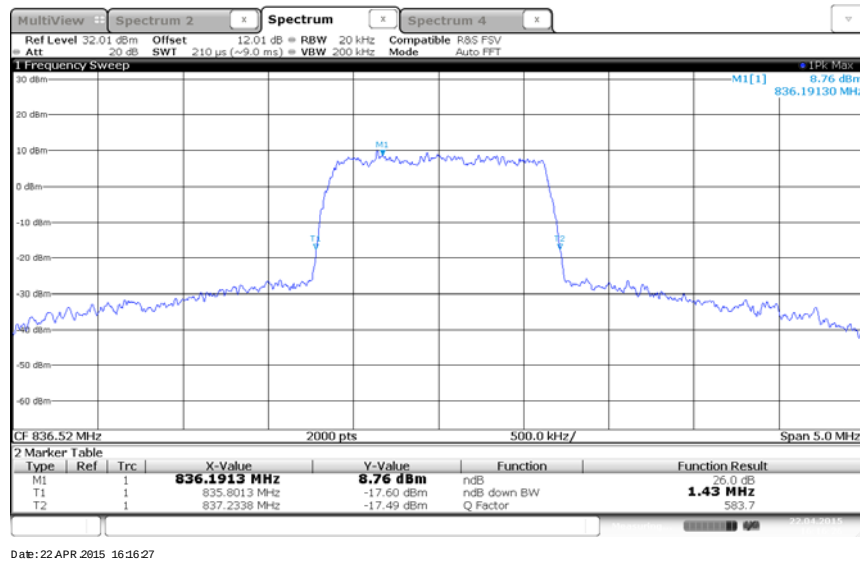
LTE (16QAM)					
Band	Bandwidth (MHz)	Channel	Frequency	99% OBW (kHz)	26dB BW (kHz)
5	1.4	190	836.6	1.09	1.29
	3			2.67	2.95
	5			4.46	4.86
	10			8.94	9.84
2	1.4	661	1880.0	1.09	1.30
	3			2.69	2.96
	5			4.47	4.89
	10			8.94	9.72
	15			13.41	14.58
	20			17.80	19.04

2.5.9 Example Test Plots

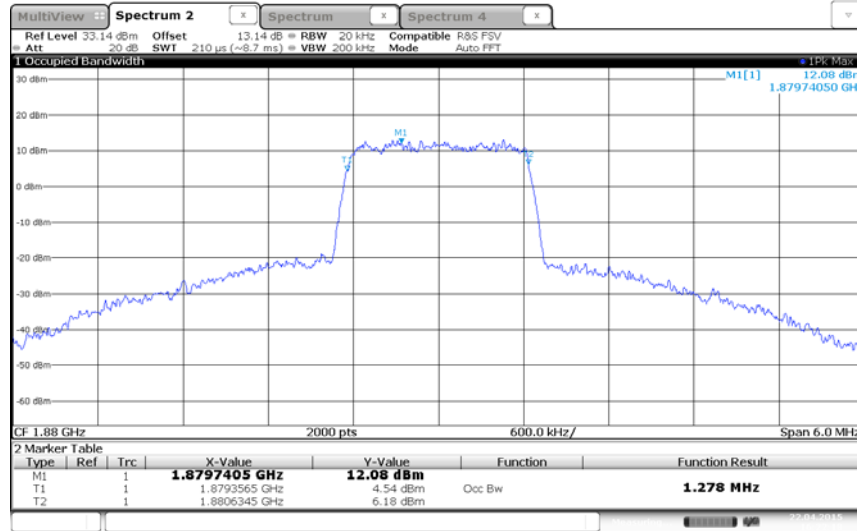
CDMA 2000 – 1xRTT (Cell-BC0)/Channel 384/99% OBW



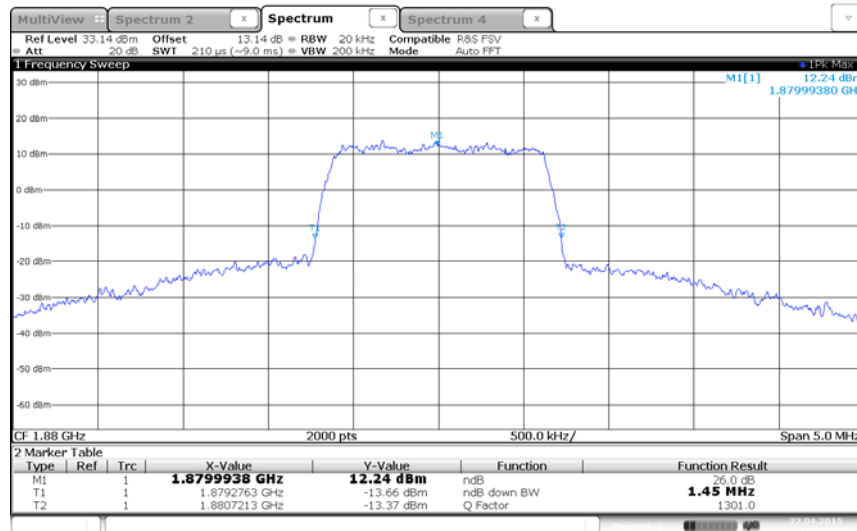
CDMA 2000 – 1xRTT (Cell-BC0)/Channel 384/26dB BW



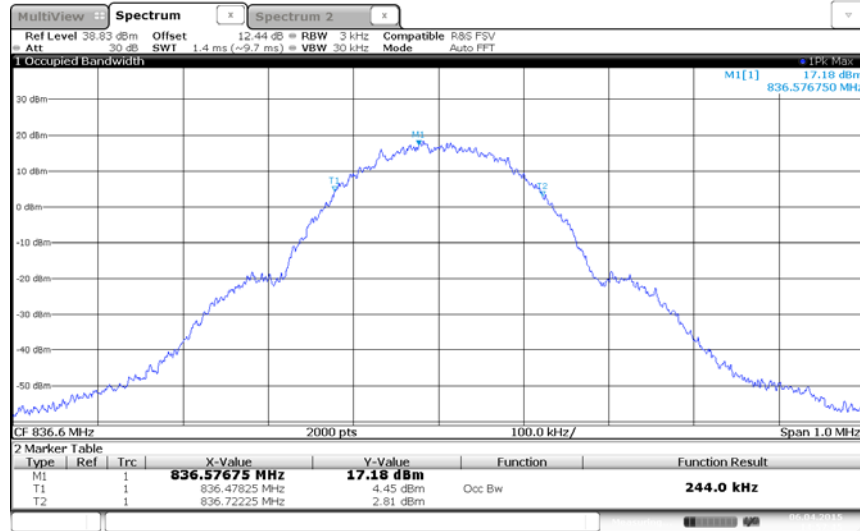
CDMA 2000 – 1xRTT (PCS-BC1)/Channel 600/99% OBW



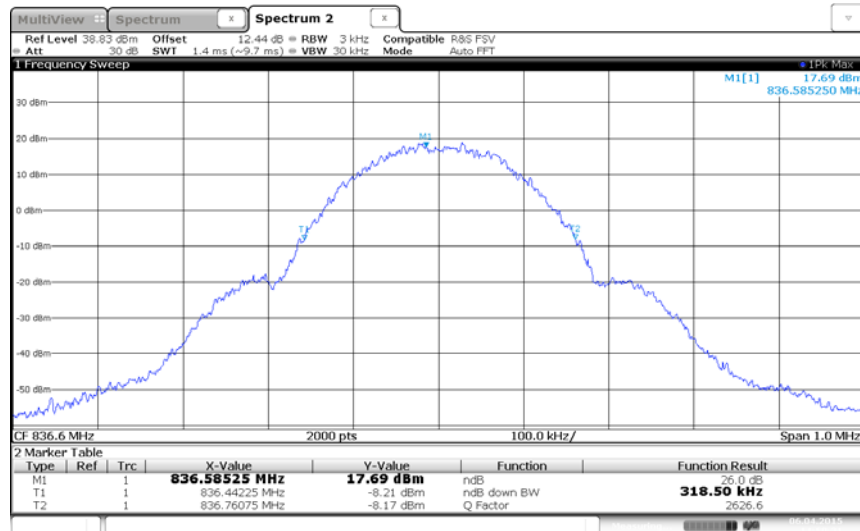
CDMA 2000 – 1xRTT (PCS-BC1)/Channel 600/26dB BW



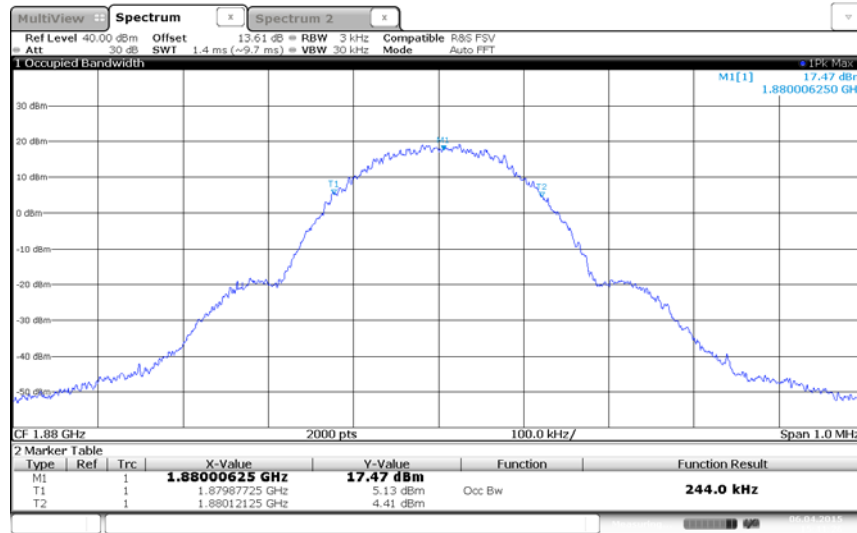
GSM850 (GPRS)/Cell/Channel 190/99% OBW



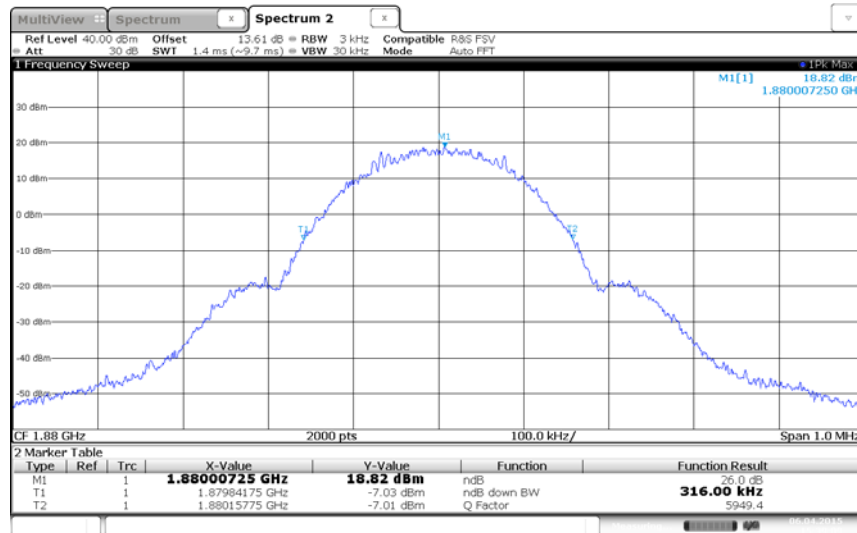
GSM850 (GPRS)/Cell/Channel 190/26dB BW



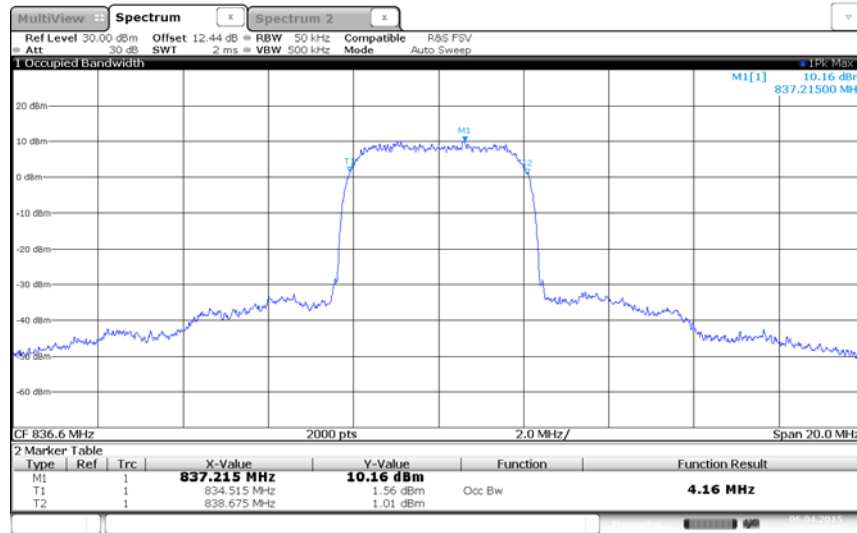
GSM1900 (GPRS)/PCS/Channel 661/99% OBW



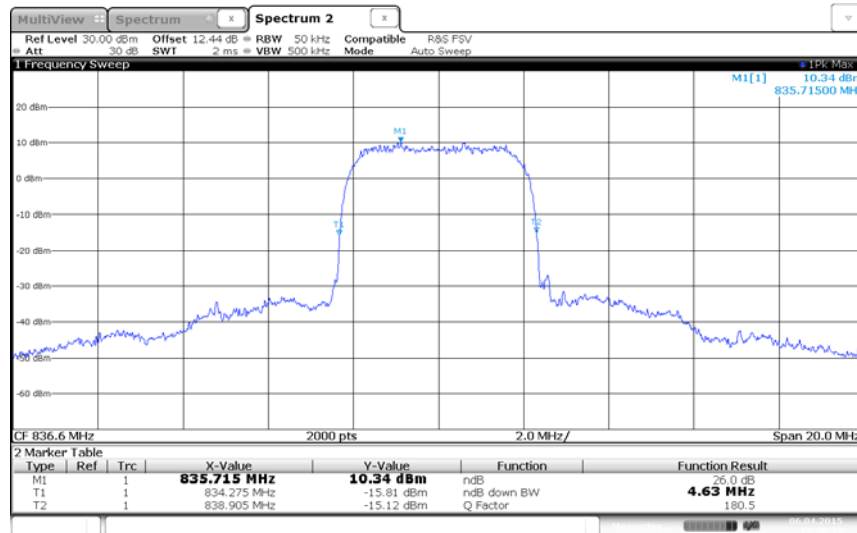
GSM1900 (GPRS)/PCS/Channel 661/26dB BW



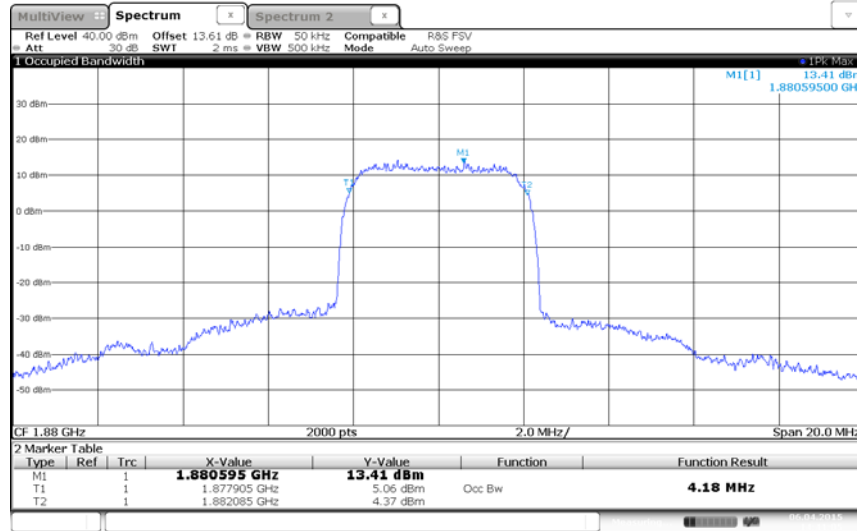
WCDMA (3GPP Release Version 99)/Cell/Channel 4183/99% OBW



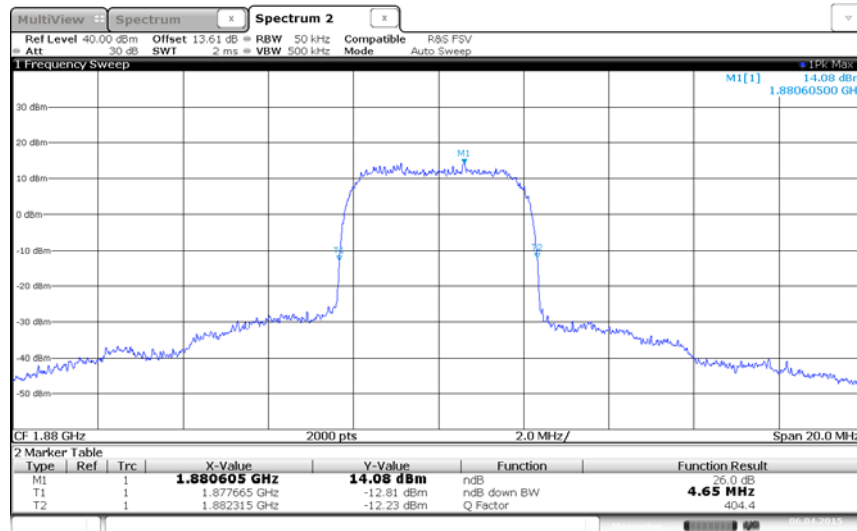
WCDMA (3GPP Release Version 99)/Cell/Channel 4183/26dB BW



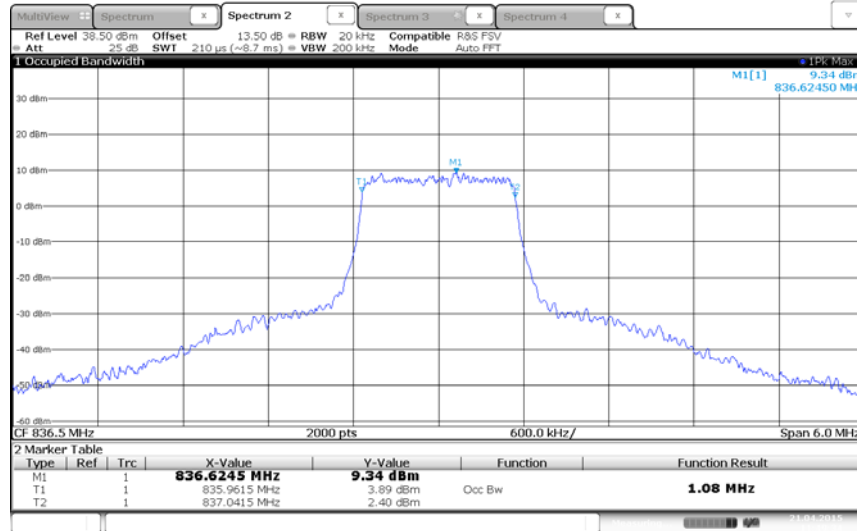
WCDMA (3GPP Release Version 99)/PCS/Channel 9400/99% OBW



WCDMA (3GPP Release Version 99)/PCS/Channel 9400/26dB BW

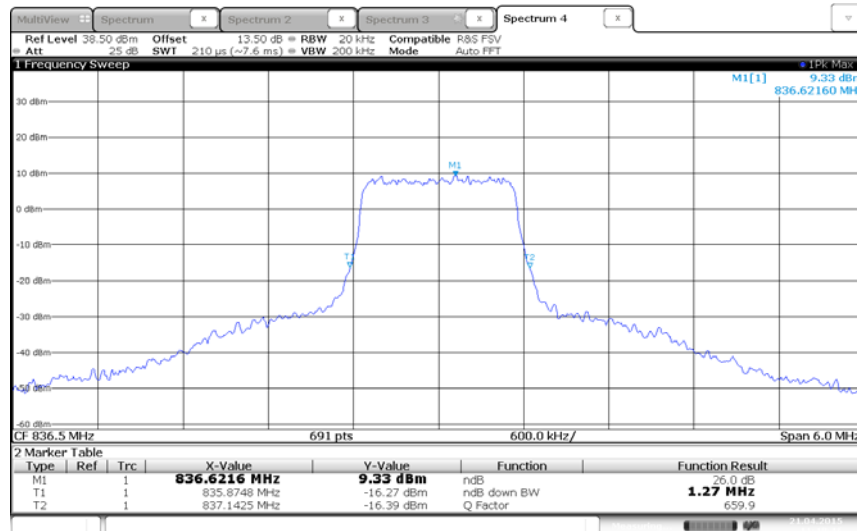


LTE Band 5 (1.4 MHz BW)/ Channel 20525/QPSK/99% OBW



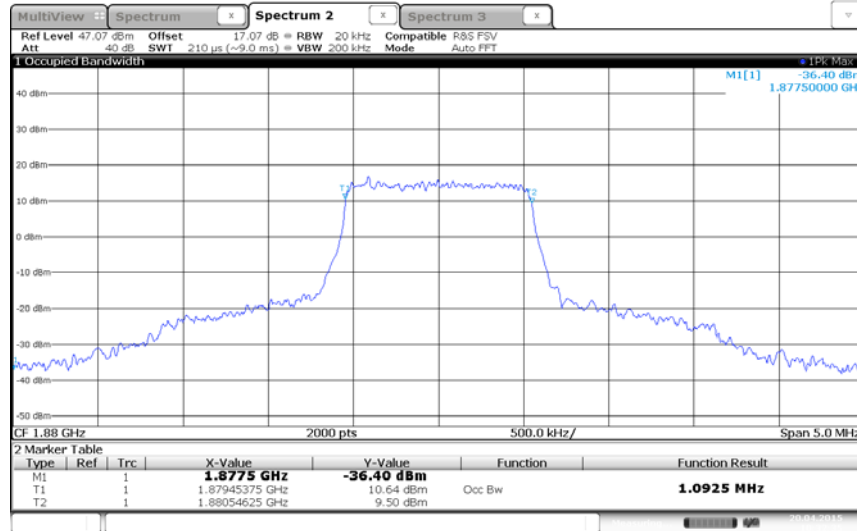
Date: 21 APR 2015 11:49:34

LTE Band 5 (1.4 MHz BW)/ Channel 20525/QPSK/26dB BW

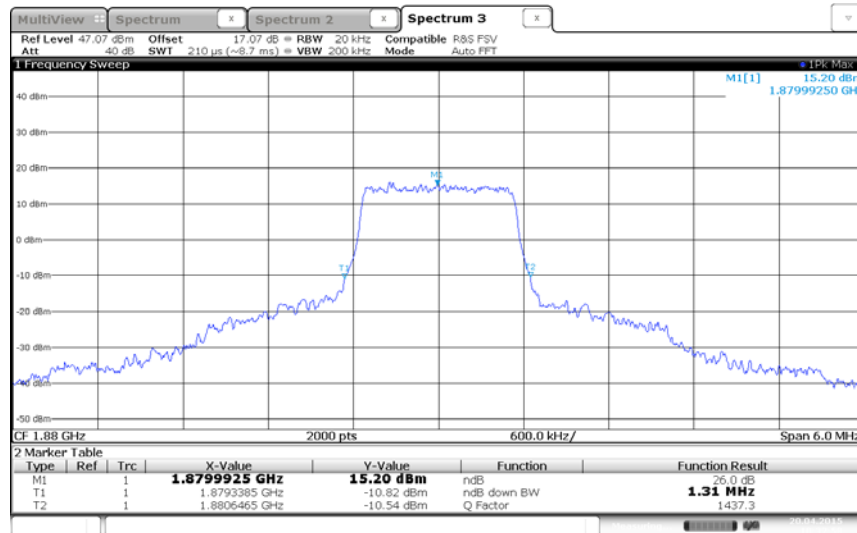


Date: 21 APR 2015 11:48:46

LTE Band 2 (1.4 MHz BW)/ Channel 18900/QPSK/99% OBW



LTE Band 2 (1.4 MHz BW)/ Channel 18900/QPSK/26dB BW





2.6 SPURIOUS EMISSION AT BAND EDGE

2.6.1 Specification Reference

FCC 47 CFR Part 2, Clause 2.1051
FCC 47 CFR Part 22, Clause 22.917(a)
FCC 47 CFR Part 24, Clause 24.238(a)
RSS-132, Clause 5.5
RSS-133, Clause 6.5

2.6.2 Standard Applicable

In the 1.0 MHz bands immediately outside and adjacent to the equipment's operating frequency block, the emission power per any 1% of the emission bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least $43 + 10 \log_{10} p(\text{watts})$.

2.6.3 Equipment Under Test and Modification State

Serial No: SP070315900027 / Test Configuration A

2.6.4 Date of Test/Initial of test personnel who performed the test

April 06, 07 and 22, 23, 2015 / XYZ

2.6.5 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.6.6 Environmental Conditions/ Test Location

Test performed at TÜV SÜD America Inc. Rancho Bernardo facility

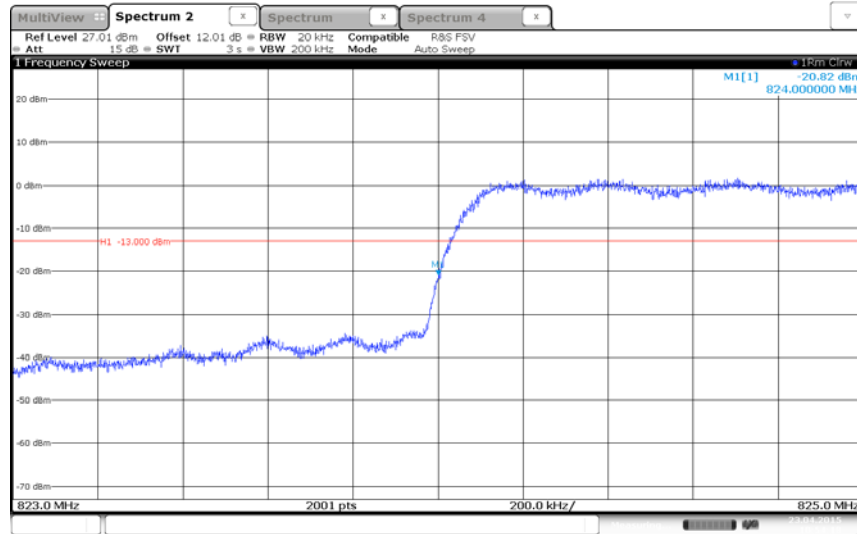
Ambient Temperature	24.3 - 25.7°C
Relative Humidity	37.8 - 41.5%
ATM Pressure	99.2 - 99.8 kPa

2.6.7 Additional Observations

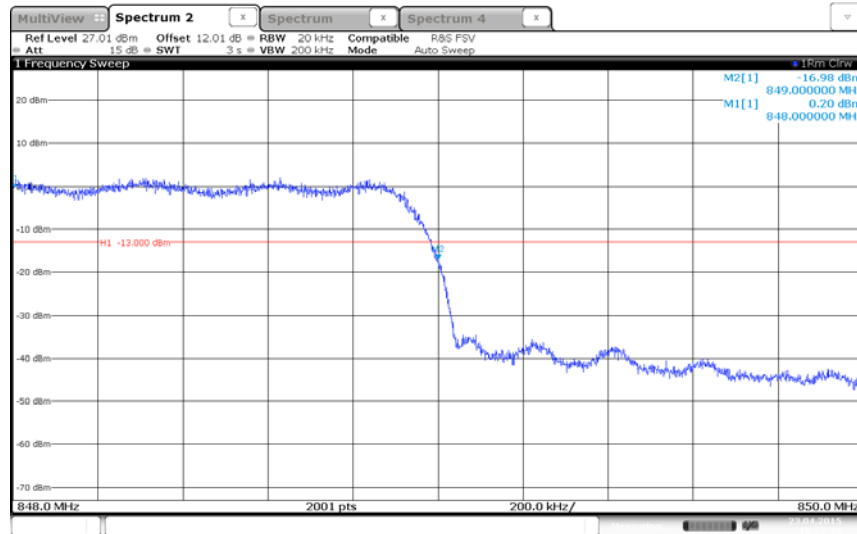
- This is a conducted test.
- The path loss for Cell Band (CDMA/EvDO/GSM850), WCDMA and LTE Band 5; PCS Band (CDMA/EvDO/GSM1900), WCDMA and LTE Band 2 was measured and entered as a level offset.
- RBW is set to minimum 1% of EBW and VBW is set to $>3 \times \text{RBW}$ in the 1 MHz band immediately outside and adjacent to the channel edge.
- For Cell Band (CDMA/EvDO/GSM850), WCDMA and LTE Band 5, RBW was set to 100 kHz from the channel edges to 5 MHz away.
- For PCS Band (CDMA/EvDO/GSM1900), WCDMA and LTE Band 2, RBW should be 1MHz from the channel edges to 5 MHz away, a narrower RBW was used and the Limit line was adjusted accordingly.
- Only worst case configuration for all technologies presented in this test report.

2.6.8 Test Results

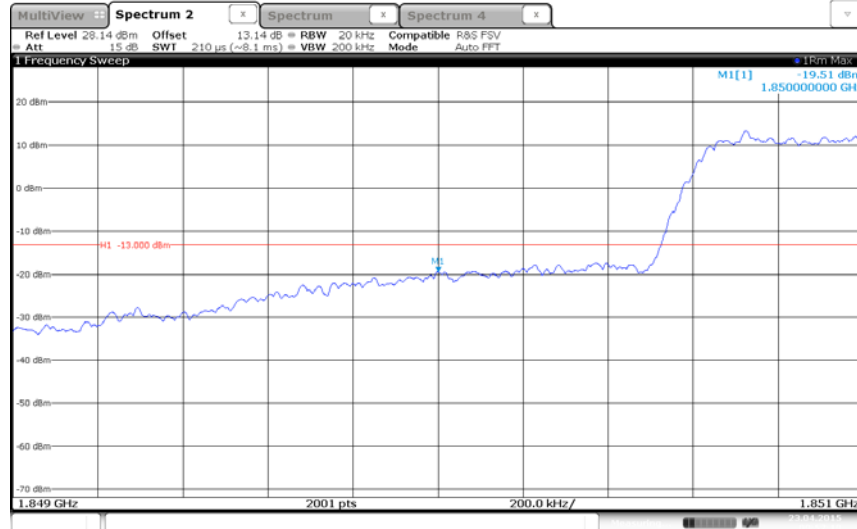
CDMA 2000 – 1xRTT/Low Channel (1013)/Cell BC0 Band Edge @ 824 MHz



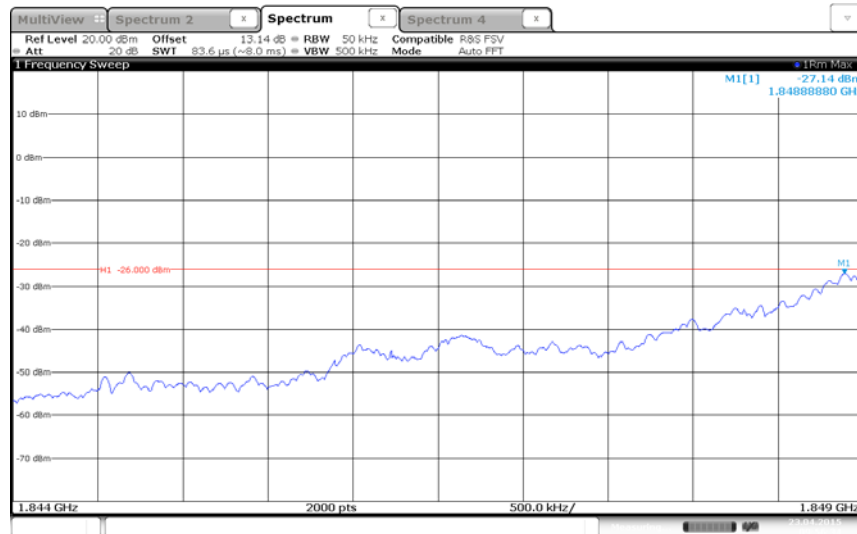
CDMA 2000 – 1xRTT/High Channel (777)/Cell BC0 Band Edge @ 849 MHz



CDMA 2000 – 1xRTT/Low Channel (25)/PCS BC1 Band Edge @ 1850 MHz

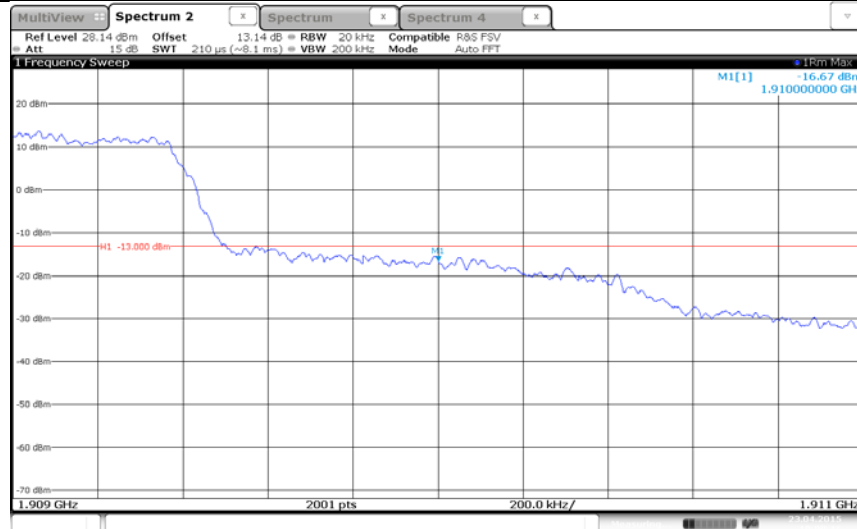


Date: 23 APR 2015 09:57:19

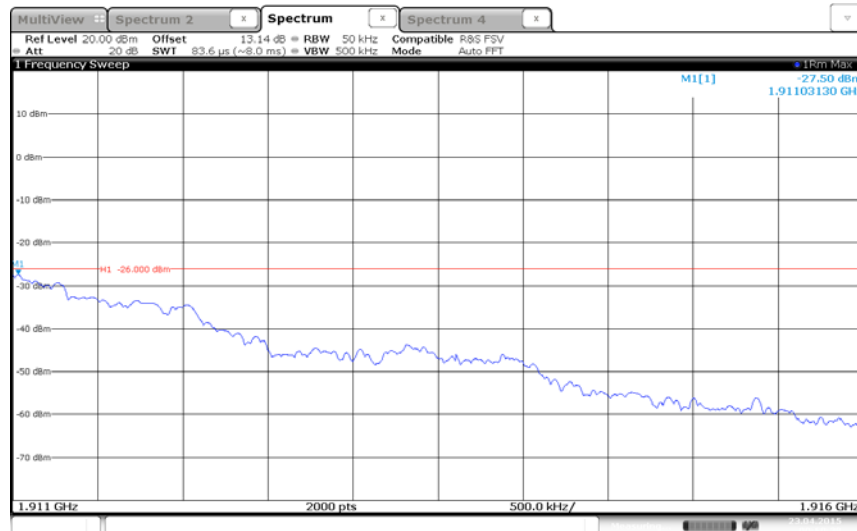


Date: 23 APR 2015 09:56:34

CDMA 2000 – 1xRTT/High Channel (1175)/PCS BC1 Band Edge @ 1910 MHz

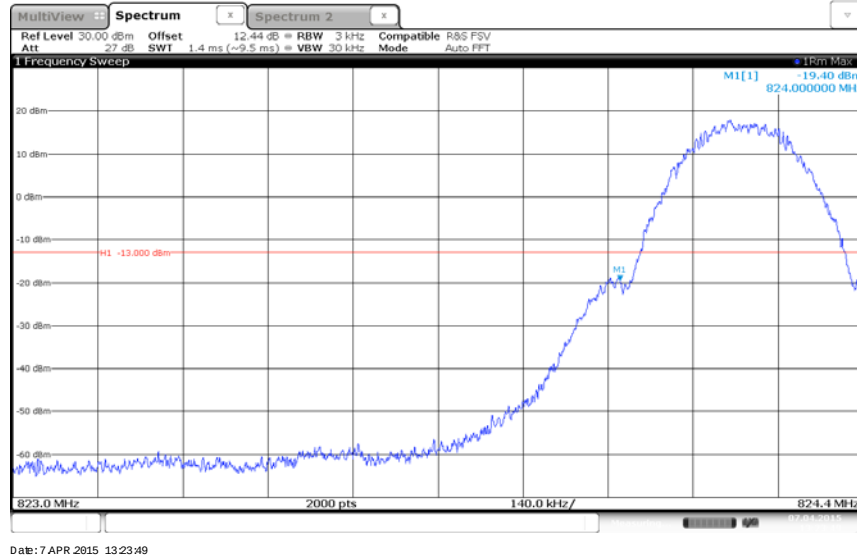


Date: 23 APR 2015 10:00:46

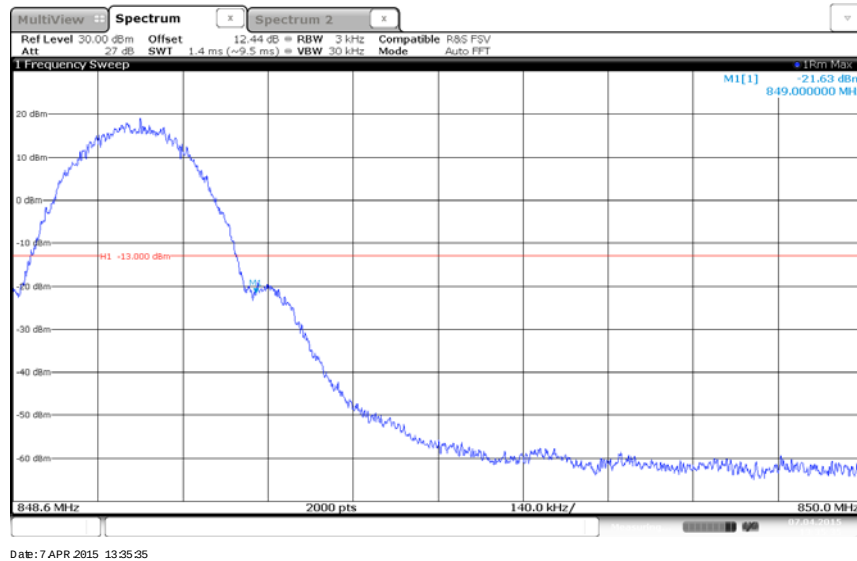


Date: 23 APR 2015 09:59:37

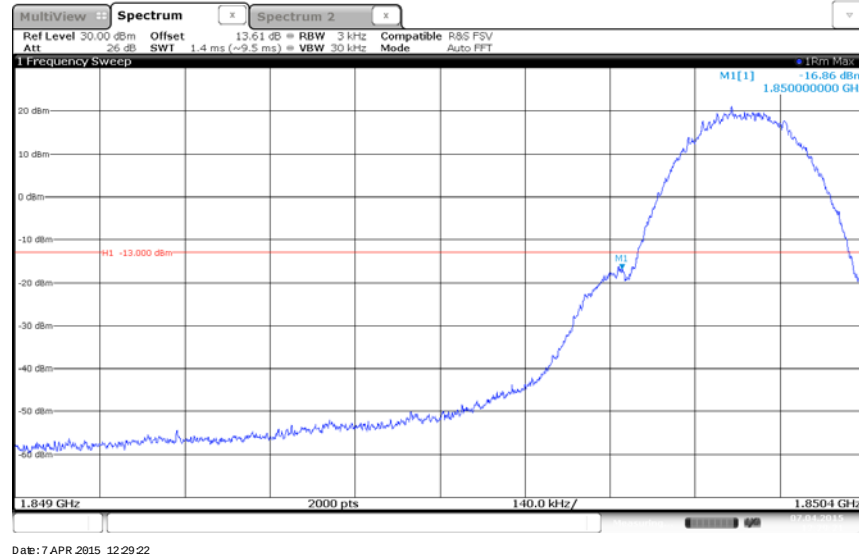
GSM850/GPRS/Low Channel (128)/Cell BC0 Band Edge @ 824 MHz



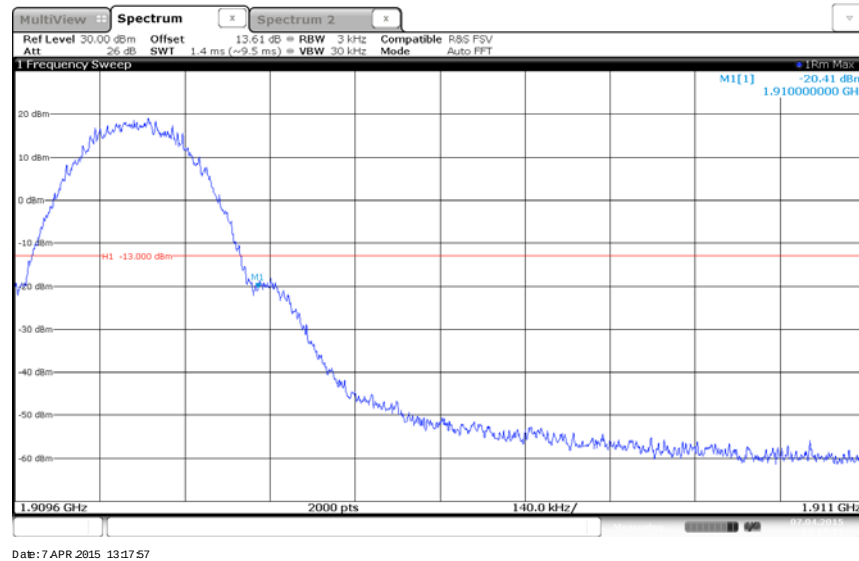
GSM850/GPRS/High Channel (251)/Cell BC0 Band Edge @ 849 MHz



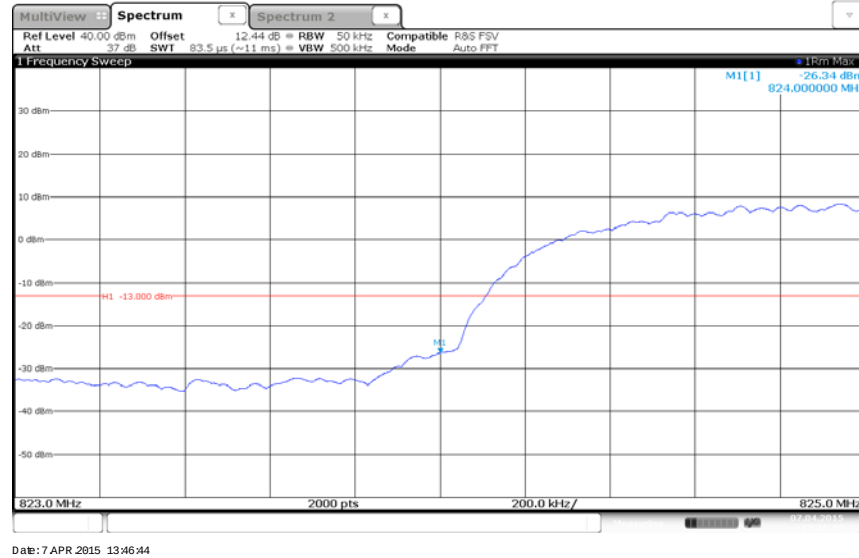
GSM1900/GPRS/Low Channel (512)/PCS BC1 Band Edge @ 1850 MHz



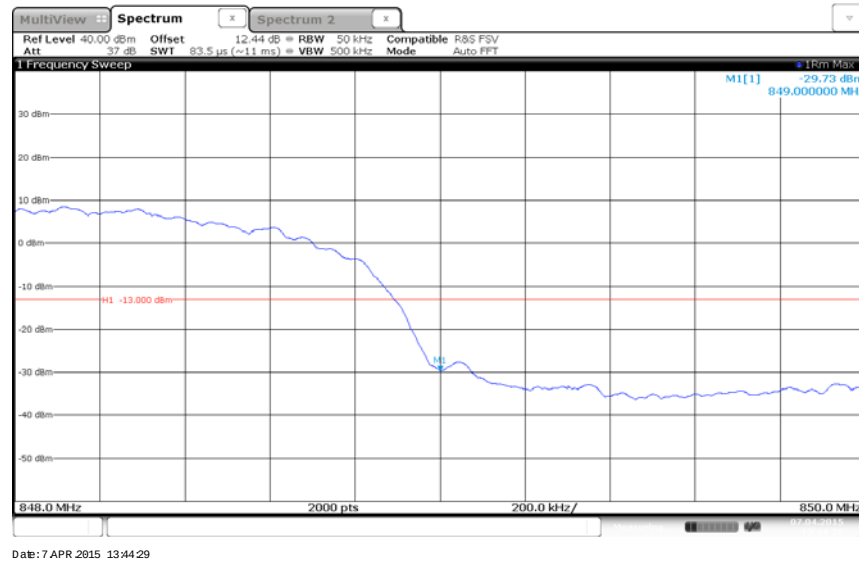
GSM1900/GPRS/High Channel (810)/PCS BC1 Band Edge @ 1910 MHz



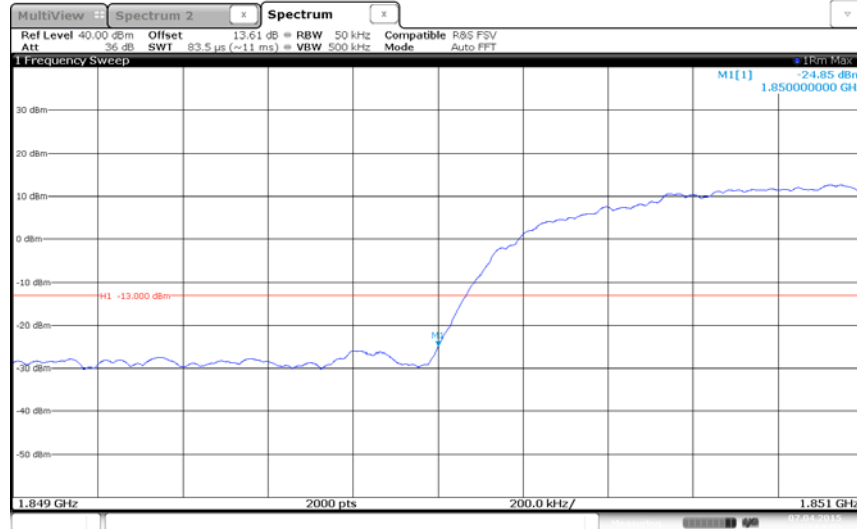
WCDMA/Low Channel (4132)/Cell Band 5 Band Edge @ 824 MHz



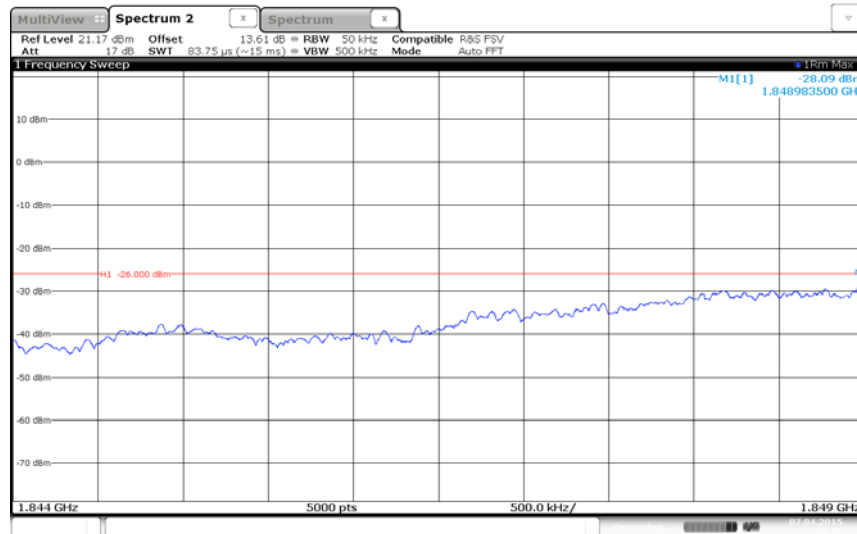
WCDMA/High Channel (4233)/Cell Band 5 Band Edge @ 849 MHz



WCDMA/Low Channel (9262)/PCS Band 2 Band Edge @ 1850 MHz

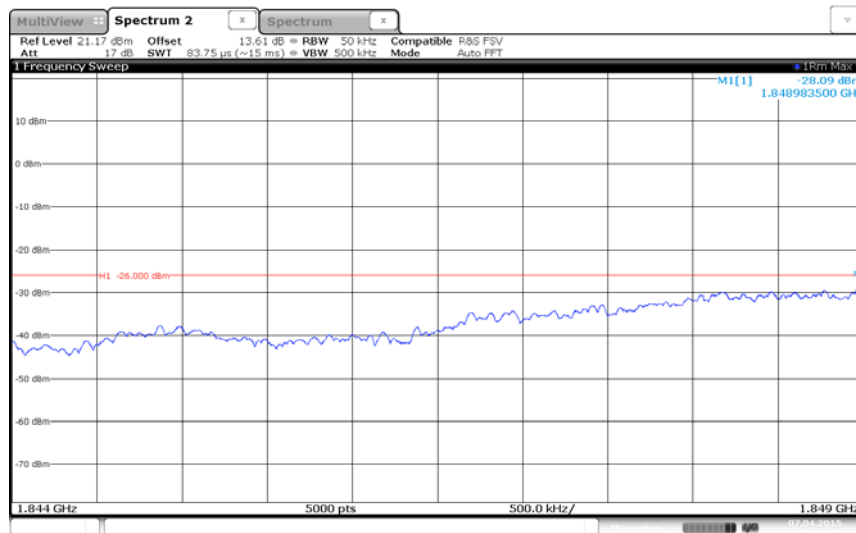
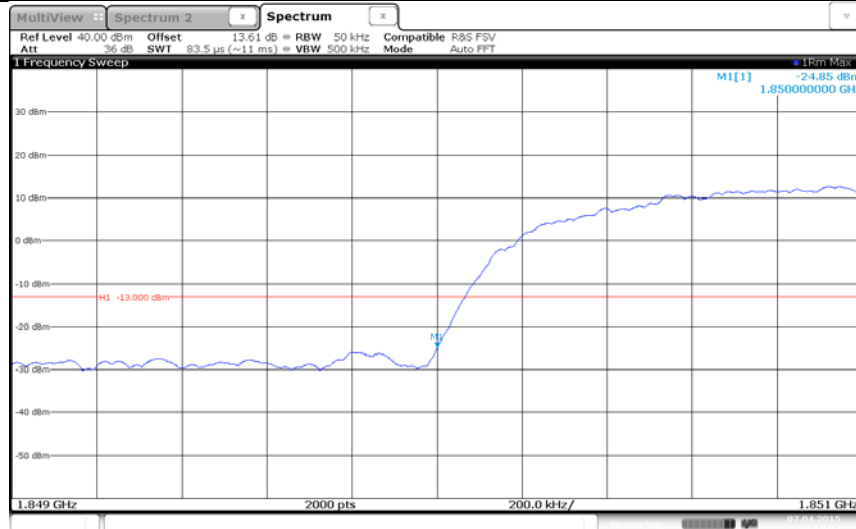


Date: 7 APR 2015 13:54:03

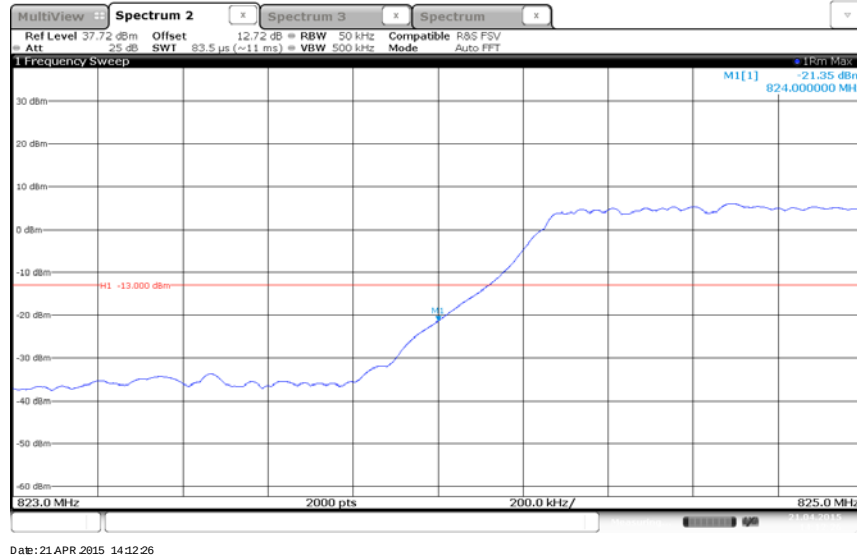


Date: 7 APR 2015 13:54:56

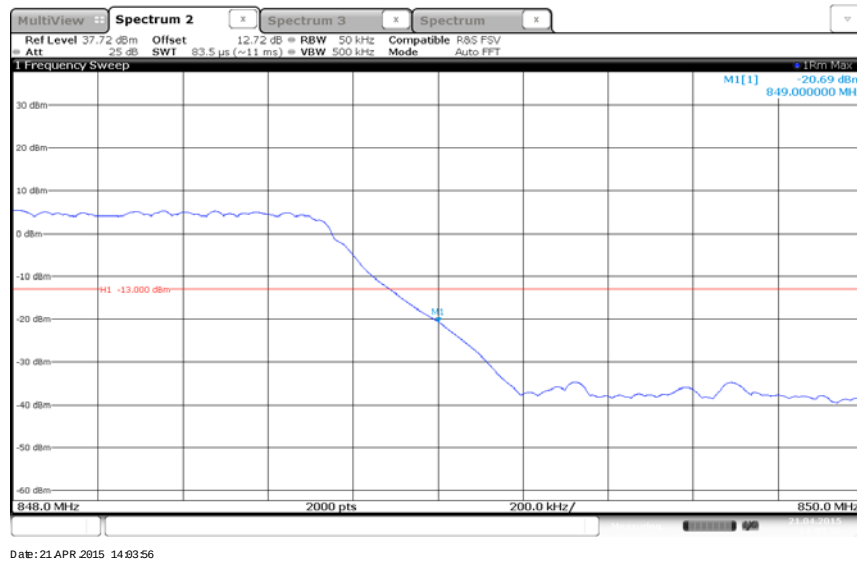
WCDMA/High Channel (9538)/PCS Band 2 Band Edge @ 1910 MHz



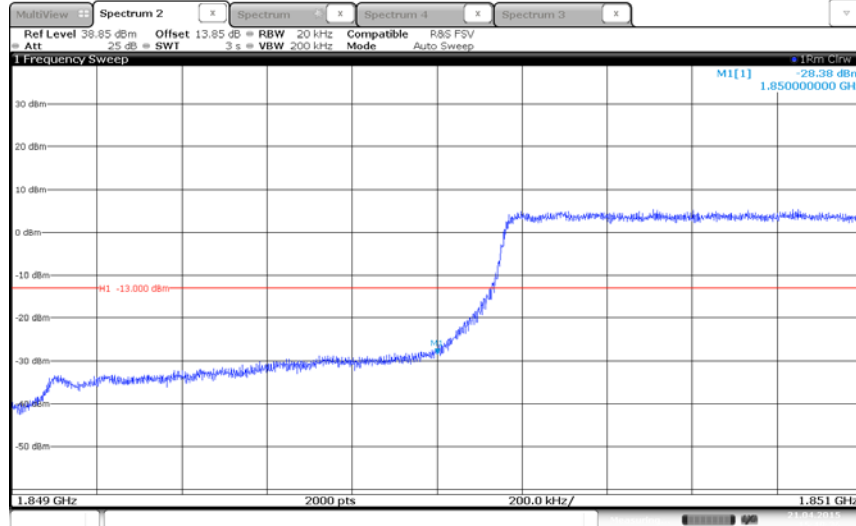
LTE Band 5 (5 MHz BW)/QPSK/Low Channel (20425) Band Edge @ 824 MHz



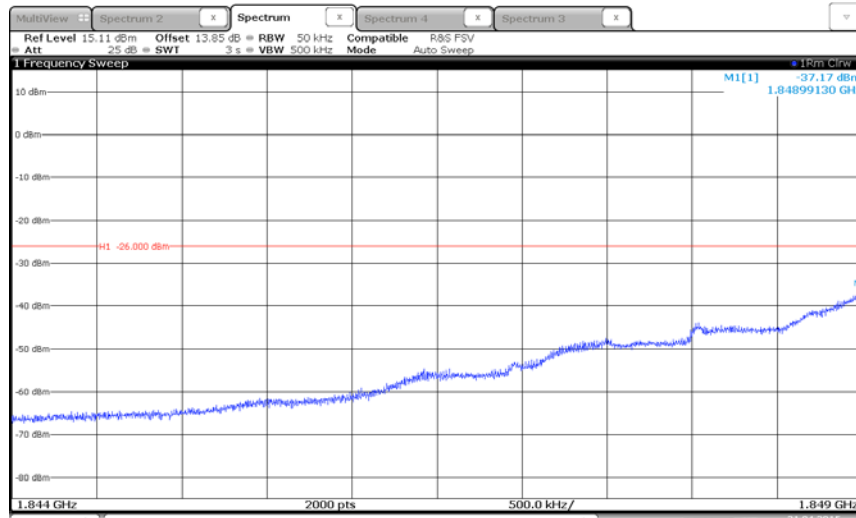
LTE Band 5 (5 MHz BW)/QPSK/Low Channel (20625) Band Edge @ 849 MHz



LTE Band 2 (3 MHz BW)/QPSK/Low Channel (18615) Band Edge @ 1850 MHz

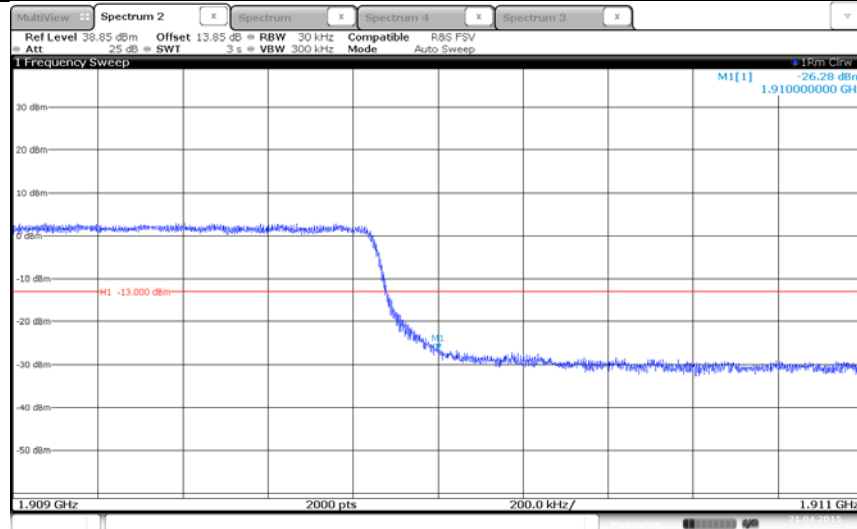


Date: 21 APR 2015 15:49:36

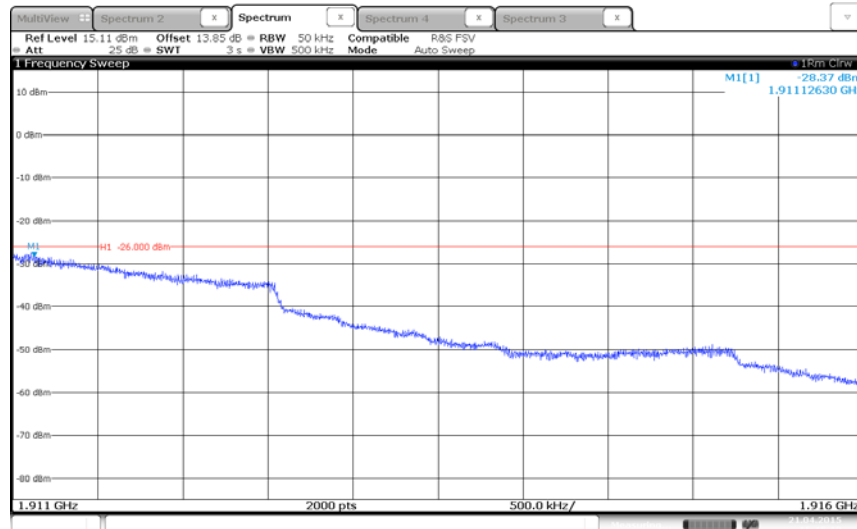


Date: 21 APR 2015 15:50:11

LTE Band 2 (3 MHz BW)/QPSK/High Channel (19185) Band Edge @ 1910 MHz



Date: 21 APR 2015 15:44:22



Date: 21 APR 2015 15:45:11



2.7 CONDUCTED SPURIOUS EMISSIONS

2.7.1 Specification Reference

FCC 47 CFR Part 2, Clause 2.1051
FCC 47 CFR Part 22, Clause 22.917(a)
FCC 47 CFR Part 24, Clause 24.238(a)
RSS-132, Clause 5.5
RSS-133, Clause 6.5

2.7.2 Standard Applicable

The power of any emission 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.

2.7.3 Equipment Under Test and Modification State

Serial No: SP070315900027 / Test Configuration A

2.7.4 Date of Test/Initial of test personnel who performed the test

April 06, 07 and 22, 23, 2015 / XYZ

2.7.5 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.7.6 Environmental Conditions/ Test Location

Test performed at TÜV SÜD America Inc. Rancho Bernardo facility

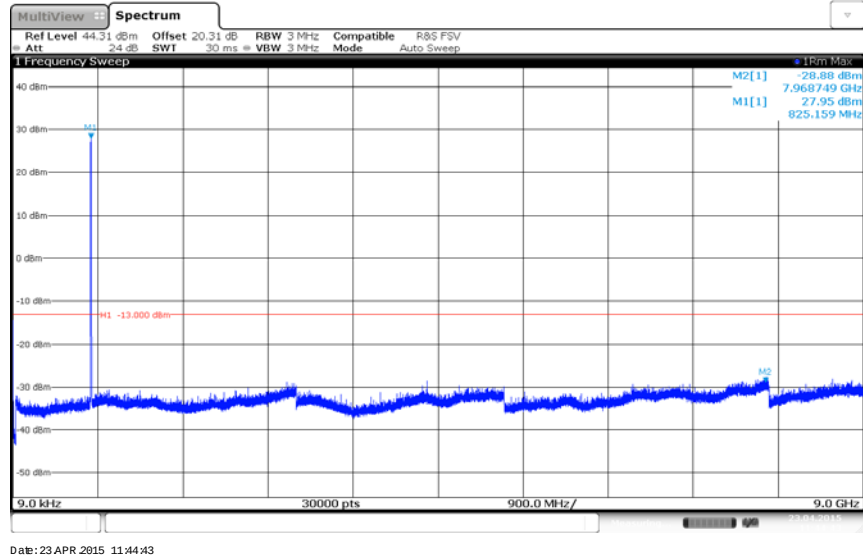
Ambient Temperature	24.3 - 25.7°C
Relative Humidity	37.8 - 41.5%
ATM Pressure	99.2 - 99.8 kPa

2.7.7 Additional Observations

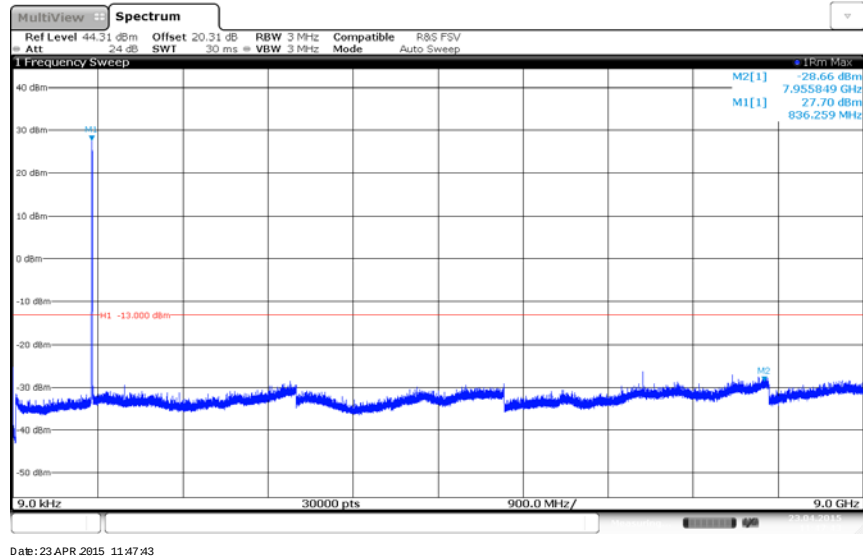
- This is a conducted test.
- The spectrum was searched from 9 kHz to the 10th harmonic.
- The path loss was measured and entered as a level offset.
- For Cell Band (CDMA/EvDO/GSM850), WCDMA and LTE Band 5, RBW was set to 100 kHz.
- For PCS Band (CDMA/EvDO/GSM1900), WCDMA and LTE Band 2, RBW was set to 1MHz.
- Only worst case configuration for all technologies presented in this test report.

2.7.8 Test Results

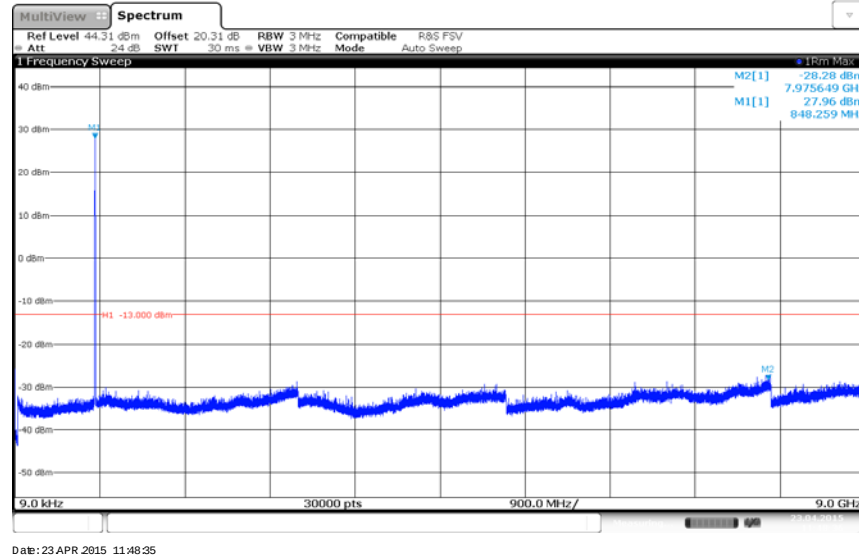
CDMA 2000 – 1xRTT/Low Channel (1013)/Cell BC0 @ 824.7MHz



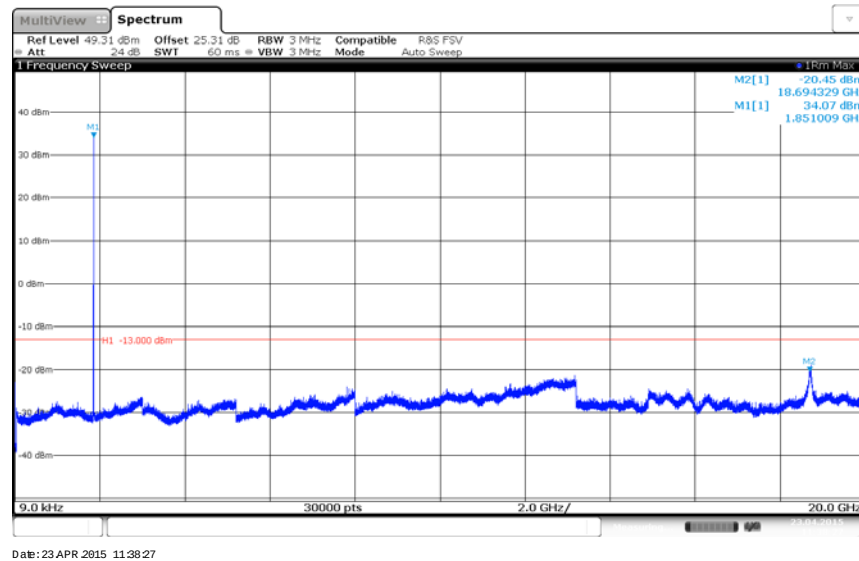
CDMA 2000 – 1xRTT/Mid Channel (384)/Cell BC0 @836.52 MHz



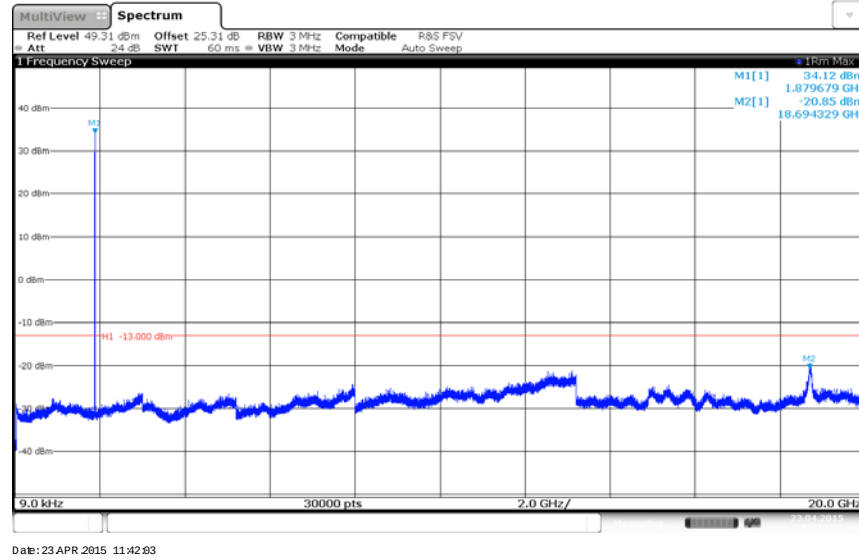
CDMA 2000 – 1xRTT/High Channel (777)/Cell BC0 @848.31 MHz



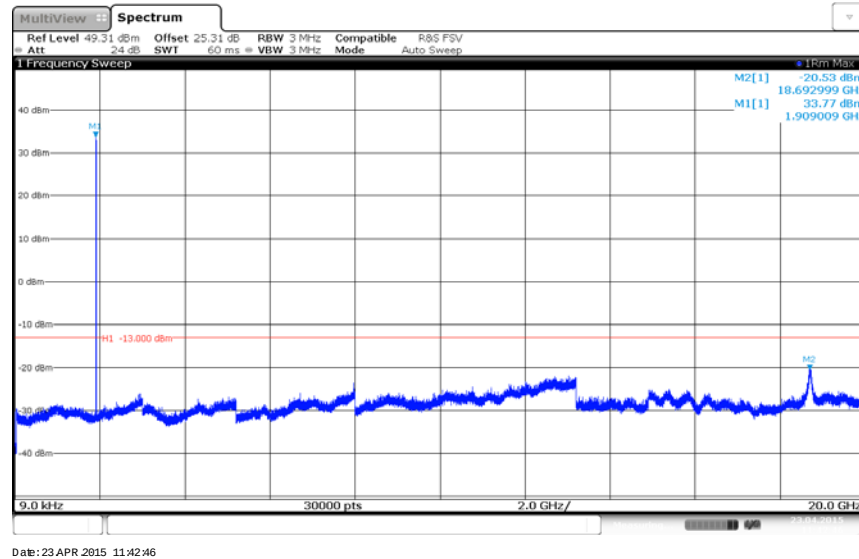
CDMA 2000 – 1xRTT/Low Channel (25)/PCS BC1 @ 1851.25 MHz



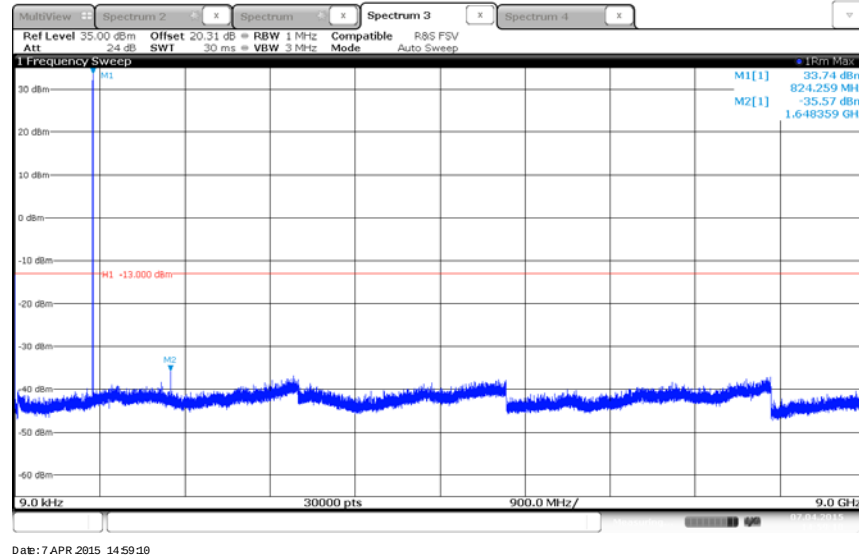
CDMA 2000 – 1xRTT/Mid Channel (600)/PCS BC1 @ 1880.0 MHz



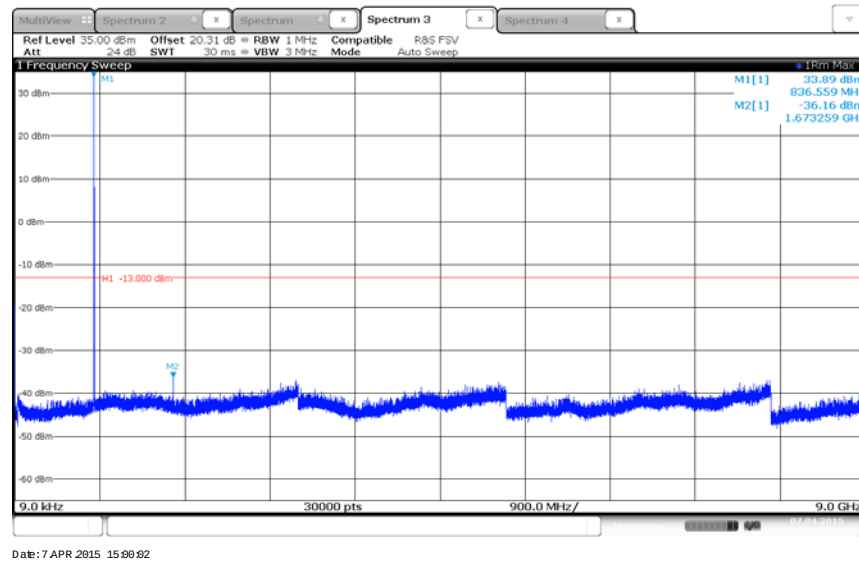
CDMA 2000 – 1xRTT/High Channel (1175)/PCS BC1 @ 1908.75 MHz



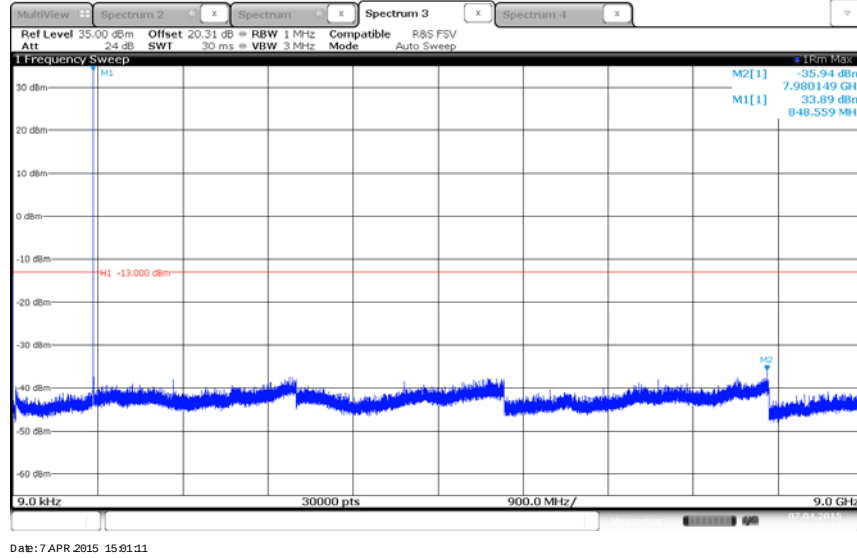
GSM850/GPRS/Low Channel (128)/Cell BC0 @ 824.2 MHz



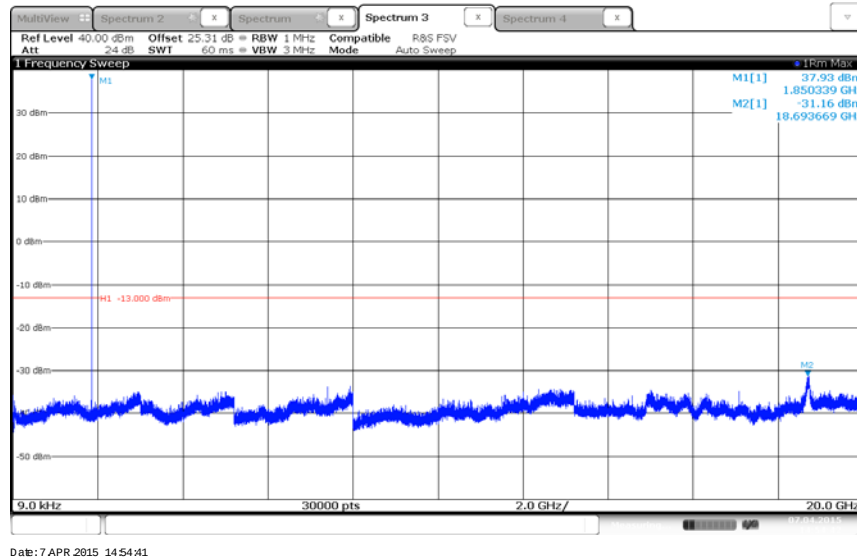
GSM850/GPRS/Mid Channel (190)/Cell BC0 @ 836.6 MHz



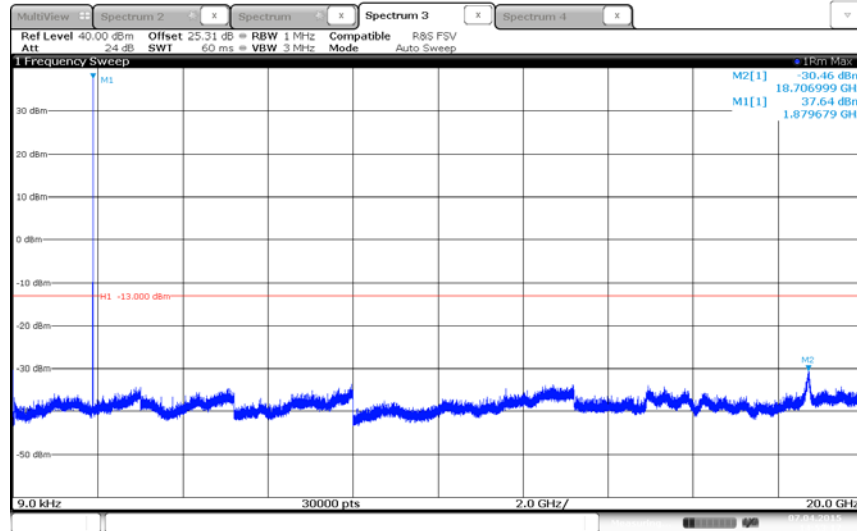
GSM850/GPRS/High Channel (251)/Cell BC0 @ 848.8 MHz



GSM1900/GPRS/Low Channel (512)/PCS BC1 @ 1850.2 MHz

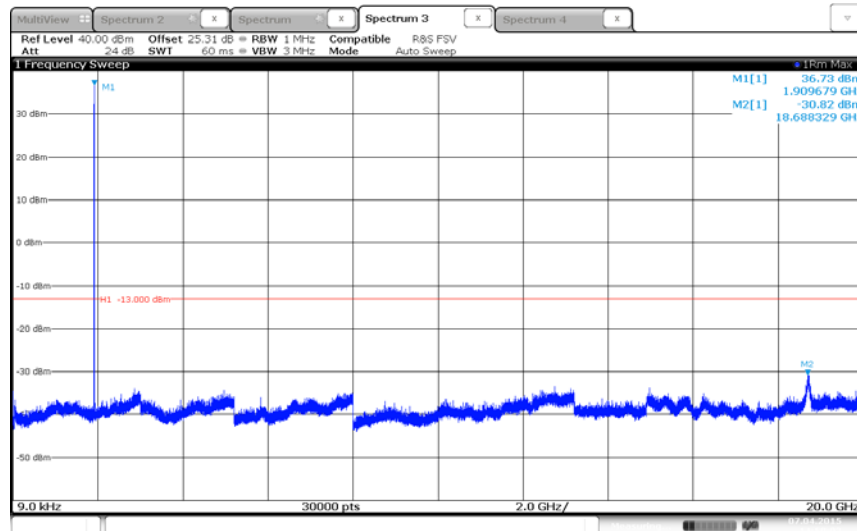


GSM1900/GPRS/Mid Channel (661)/PCS BC1 @ 1880.0 MHz



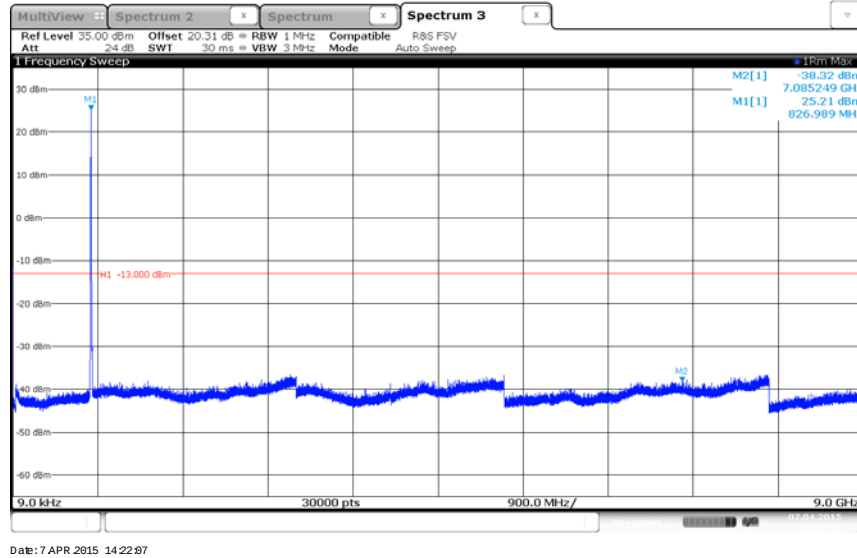
Date: 7 APR 2015 14:53:17

GSM1900/GPRS/High Channel (810)/PCS BC1 @ 1909.8 MHz

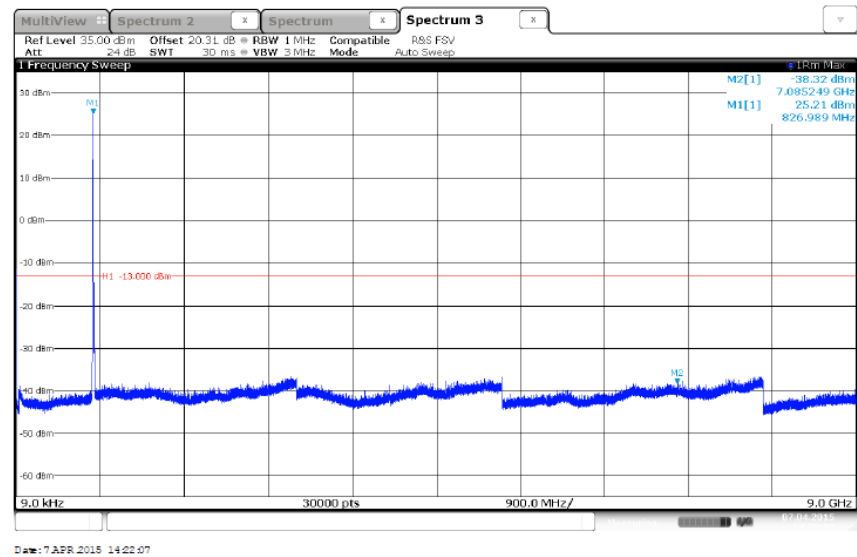


Date: 7 APR 2015 14:58:53

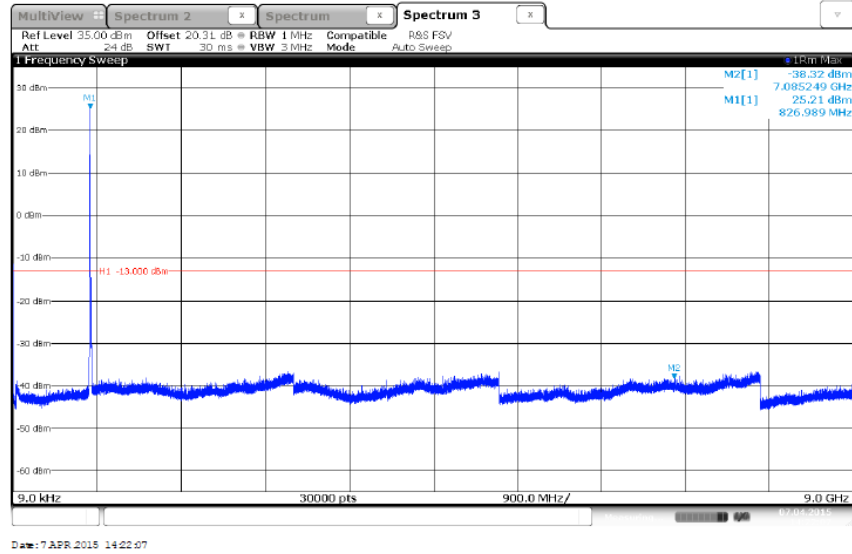
WCDMA/Low Channel (4132)/Cell Band 5 @ 826.4 MHz



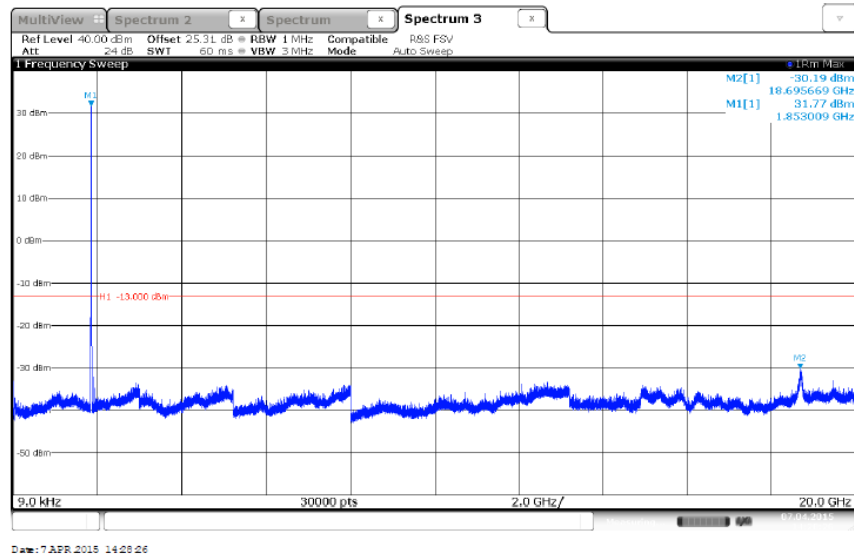
WCDMA/Mid Channel (4183)/Cell Band 5 @ 836.6 MHz



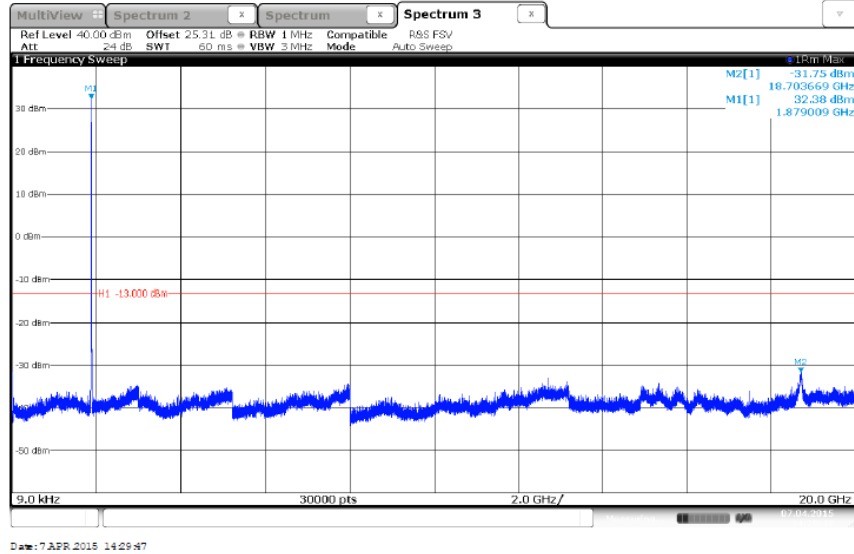
WCDMA/High Channel (4233)/Cell Band 5 @ 846.6 MHz



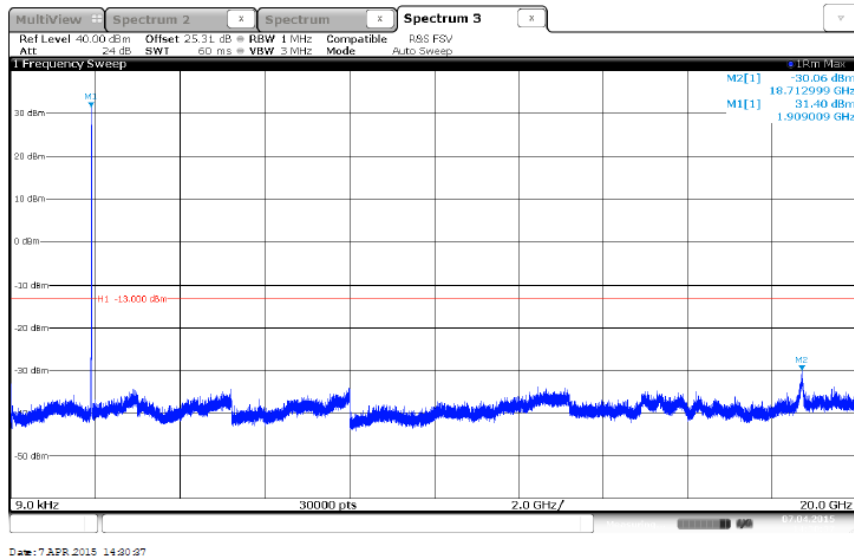
WCDMA/Low Channel (9262)/PCS Band 2 @ 1852.4 MHz



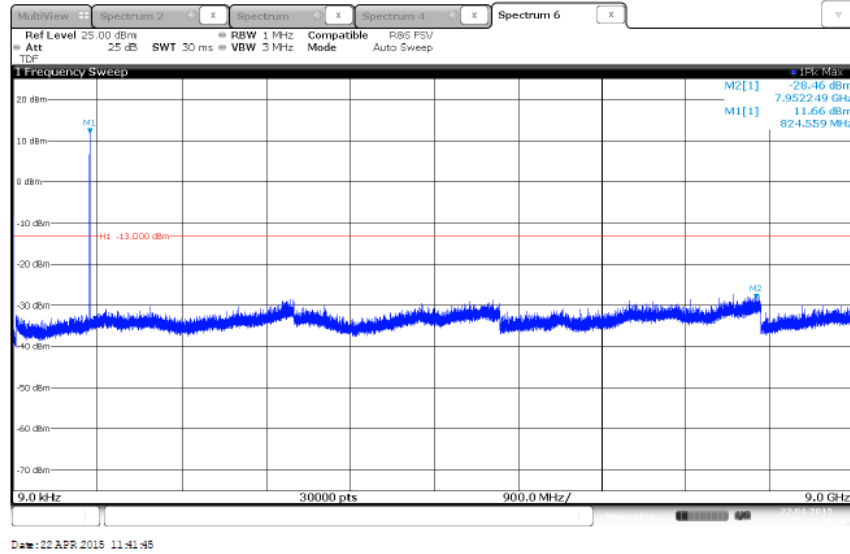
WCDMA/Mid Channel (9400)/PCS Band 2 @ 1880.0 MHz



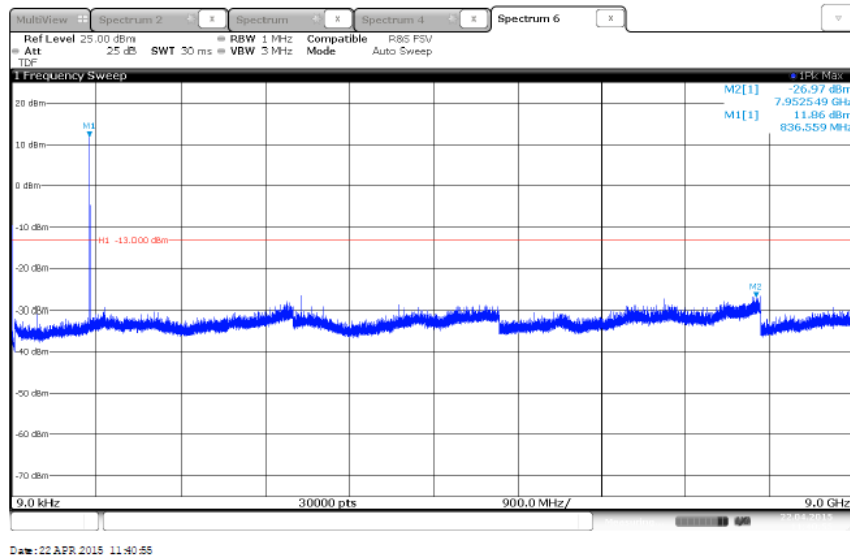
WCDMA/High Channel (9538)/PCS Band 2 @ 1907.6 MHz



LTE Band 5 (1.4 MHz BW)/QPSK/Low Channel (20407) @ 824.7 MHz



LTE Band 5 (1.4 MHz BW)/QPSK/Mid Channel (20525) @ 836.5 MHz



MultiView Spectrum 2 Spectrum 3 Spectrum 4 Spectrum 6

Ref Level 25.00 dBm
Att 25 dB RBW 1 MHz Compatible Mode R&S FSV
TBF 30 ms VBW 3 MHz Auto Sweep

1 Frequency Sweep

20 dBm
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm

M1 -13.000 dBm

M2 Max
-29.00 dBm
7.947449 GHz
M1[1]
11.71 dBm
847.959 MHz

9.0 kHz 30000 pts 900.0 MHz/ 9.0 GHz

Date: 20 APR 2015 11:42:25

Multiview Spectrum 2 Spectrum Spectrum 4 Spectrum 6
 Ref Level 25.00 dBm RBW 1 MHz Compatible R&S FSV
 Att 25 dB SWT 60 ms VBW 3 MHz Mode Auto Sweep
 TDF

1 Frequency Sweep

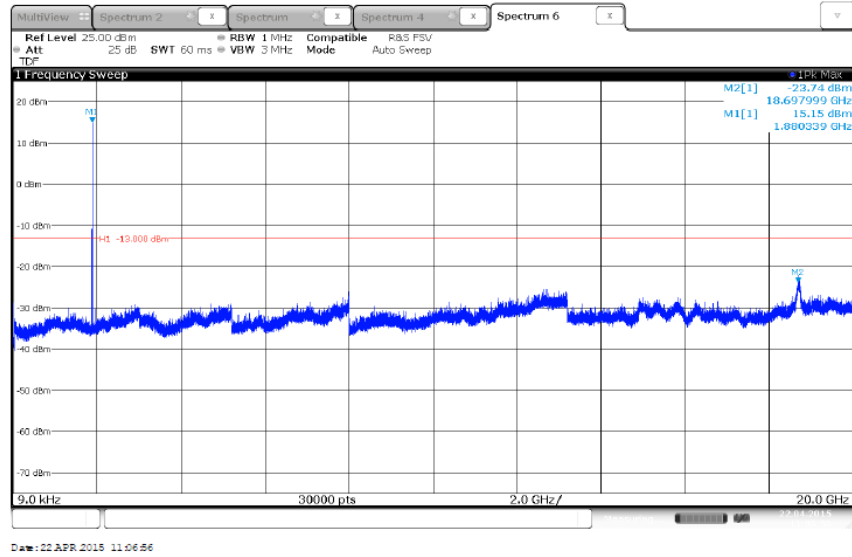
20 dBm
 10 dBm
 0 dBm
 -10 dBm
 -20 dBm
 -30 dBm
 -40 dBm
 -50 dBm
 -60 dBm
 -70 dBm

M1 -13.000 dBm
 M2 18.697999 GHz

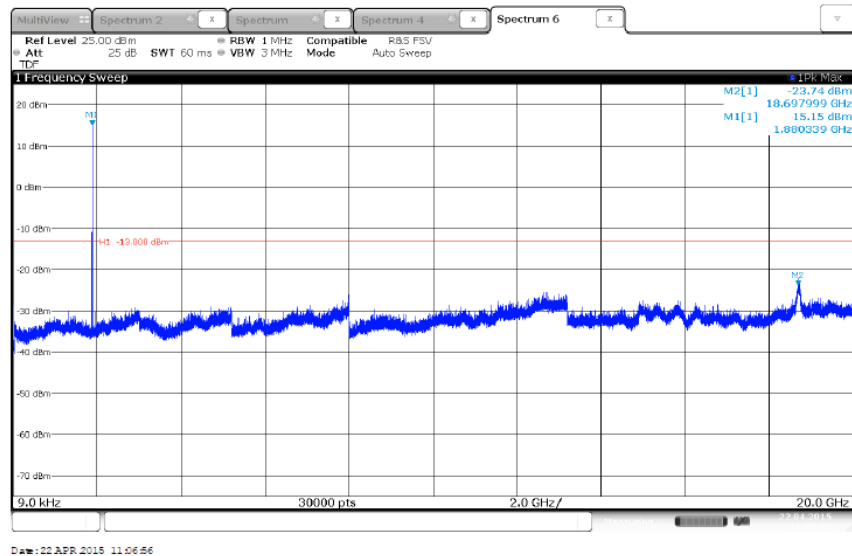
9.0 kHz 30000 pts 2.0 GHz/ 20.0 GHz

Date: 22 APR 2015 11:07:52

LTE Band 2 (1.4 MHz BW)/QPSK/Mid Channel (18900) @ 1880.0 MHz



LTE Band 2 (1.4 MHz BW)/QPSK/High Channel (19193) @ 1909.3 MHz





2.8 FIELD STRENGTH OF SPURIOUS RADIATION

2.8.1 Specification Reference

FCC 47 CFR Part 2, Clause 2.1053
FCC 47 CFR Part 22, Clause 22.917(a)
FCC 47 CFR Part 24, Clause 24.238(a)
RSS-132, Clause 5.5
RSS-133, Clause 6.5

2.8.2 Standard Applicable

Out of band emissions. The power of any emission 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.

2.8.3 Equipment Under Test and Modification State

Serial No: SP070315900027 / Test Configuration B

2.8.4 Date of Test/Initial of test personnel who performed the test

April 12 to 23, 2015 / XYZ

2.8.5 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.8.6 Environmental Conditions/ Test Location

Test performed at TÜV SÜD America Inc. Rancho Bernardo facility

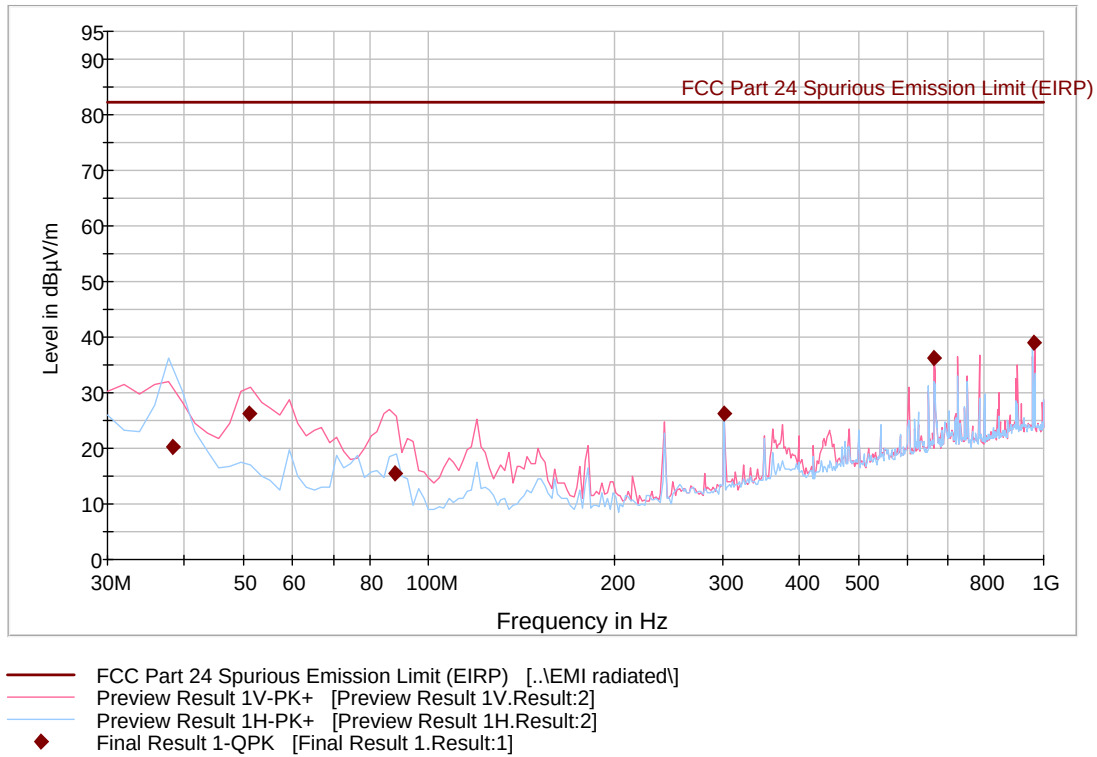
Ambient Temperature	23.8 - 24.6°C
Relative Humidity	45.2 - 47.0%
ATM Pressure	99.5 - 99.9 kPa

2.8.7 Additional Observations

- This is a radiated test using substitution method as per Unwanted Emissions: Radiated Spurious method of measurement of ANSI/TIA/EIA-603-C 2004, August 17, 2004.
- Only the worst case configuration presented in this test report.
- Only noise floor measurements observed above 18GHz.
- Measurement was done using EMC32 V8.52 automated software. Reported level is the actual level with all the correction factors factored in. Correction Factor column is for informational purposes only.

2.8.8 Test Results Below 1GHz_Worst Case Configuration_CDMA 2000-EvDO_Cell BC1_Release A_Mid Channel (600)

Continuous Rotation TUV 3m Radiated 30 to 1000MHz



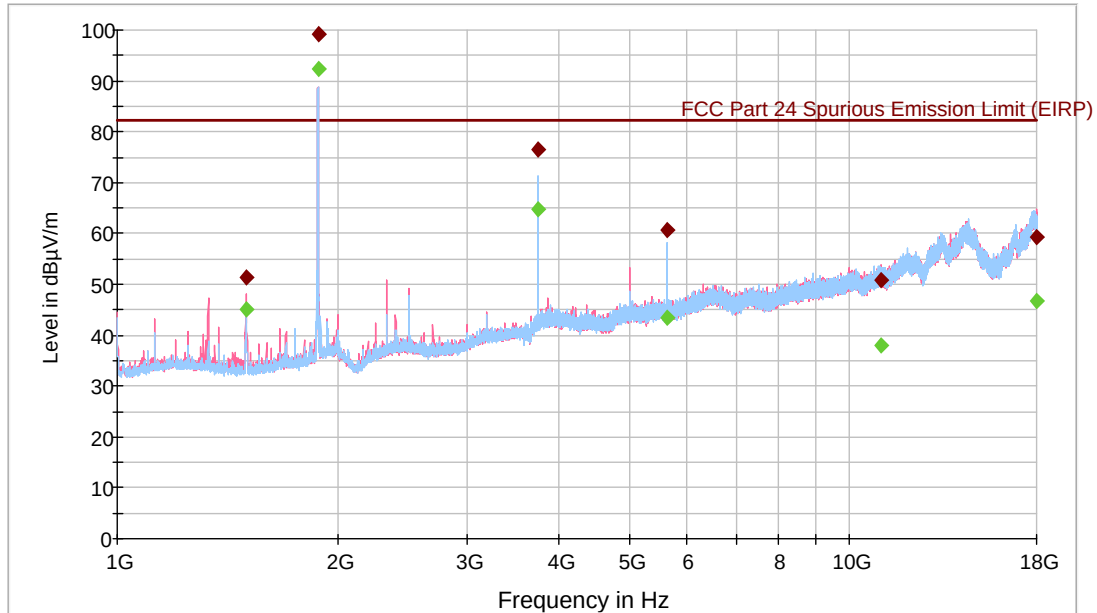
Quasi Peak Data

Frequency (MHz)	QuasiPeak (dBμV/m)	Meas. Time (ms)	Bandwidth h (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
38.335551	20.1	1000.0	120.000	400.0	H	15.0	-15.9	64.3	84.4
51.102766	26.3	1000.0	120.000	100.0	V	139.0	-20.2	58.2	84.4
87.932745	15.4	1000.0	120.000	200.0	V	219.0	-21.2	69.0	84.4
301.784289	26.2	1000.0	120.000	150.0	H	73.0	-12.3	58.2	84.4
663.987415	36.3	1000.0	120.000	100.0	V	121.0	-3.2	48.1	84.4
965.793908	39.0	1000.0	120.000	106.0	V	141.0	1.4	45.5	84.4
38.335551	20.1	1000.0	120.000	400.0	H	15.0	-15.9	64.3	84.4

Test Notes: Only worst case presented for spurious emissions below 1GHz.

2.8.9 Test Results Above 1GHz_Worst Case Configuration_CDMA 2000-EvDO_Cell BC1_Release A_Mid Channel (600)

Continuous Rotation TUV 3m Radiated 1000 to 18000MHz



— FCC Part 24 Spurious Emission Limit (EIRP) [..EMI radiated]
 — Preview Result 1V-PK+ [Preview Result 1V.Result:2]
 — Preview Result 1H-PK+ [Preview Result 1H.Result:2]
 ◆ Final Result 1-PK+ [Final Result 1.Result:1]
 ◆ Final Result 2-AVG [Final Result 2.Result:1]

Peak/Average Data

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Peak Margin (dB)	Limit (dBµV/m)
1500.000000	51.3	45.1	1000.0	1000.000	171.6	V	148.0	-8.8	33.1	84.4
1880.266667	99.3	92.4	1000.0	1000.000	138.7	V	152.0		Fundamental	
3759.300000	76.4	64.6	1000.0	1000.000	155.6	H	209.0	3.4	8.1	84.4
5638.933333	60.6	43.5	1000.0	1000.000	219.4	H	240.0	7.3	23.9	84.4
11022.300000	50.9	37.9	1000.0	1000.000	148.7	V	16.0	15.0	33.5	84.4
17970.766666	59.4	46.6	1000.0	1000.000	403.8	V	295.0	26.6	25.9	84.4

Test Notes: Only worst case modulation/bandwidth presented for spurious emissions above 1GHz.



2.9 FREQUENCY STABILITY

2.9.1 Specification Reference

FCC 47 CFR Part 2, Clause 2.1055
FCC 47 CFR Part 22, Clause 22.355
FCC 47 CFR Part 24, Clause 24.235
RSS-132, Clause 5.3
RSS-133, Clause 6.3

2.9.2 Standard Applicable

FCC:

Part 22, Clause 22.355: Except as otherwise provided in this part, the carrier frequency of each transmitter in the Public Mobile Services must be maintained within the tolerances given in Table C-1 of this section.

Table C-1—Frequency Tolerance for Transmitters in the Public Mobile Services

Frequency range (MHz)	Mobile ≤ 3 watts (ppm)
821 to 896	2.5

Part 24, Clause 24.235: The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

IC:

RSS-132 Clause 5.3: The carrier frequency shall not depart from the reference frequency in excess of ± 2.5 ppm for mobile stations.

RSS-133 Clause 6.3: The carrier frequency shall not depart from the reference frequency, in excess of ± 2.5 ppm for mobile stations.

2.9.3 Equipment Under Test and Modification State

Serial No: SP070315900027 / Test Configuration A

2.9.4 Date of Test/Initial of test personnel who performed the test

April 27 and 28, 2015 / XYZ

2.9.5 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.9.6 Environmental Conditions/ Test Location

Test performed at TÜV SÜD America Inc. Rancho Bernardo facility

Ambient Temperature 25.1 – 25.4°C
 Relative Humidity 23.0 - 24.5%
 ATM Pressure 98.7 kPa

2.9.7 Additional Observations

- This is a conducted test. The EUT was operated at 5VDC nominal voltage and was placed in the temperature chamber for this evaluation. The EUT was controlled by a CMW500 and the maximum frequency error was monitored through the Wideband Radio Communication Tester Frequency Error measurement function under Tx Measurement.
- The EUT was tested over the temperature -30°C to +50°C in 10°C steps and allowed to sit for 1 hour to allow the equipment and chamber temperature to stabilize. The measurements were then performed.
- Voltage variation was also performed at 85% and 115% of the nominal voltage at 20°C.

2.9.8 Test Results

CDMA 2000 – 1xRTT Cell Band (BC0) Mid Channel 384 @836.52 MHz		
Voltage (VDC)	Temperature (°C)	Frequency Deviation (Hz/ppm)
5.0	-30	6.73 / 0.008
	-20	7.44 / 0.009
	-10	4.15 / 0.005
	0	-5.30 / 0.006
	+10	-6.81 / 0.008
	+20	6.22 / 0.007
	+30	5.57 / 0.007
	+40	7.84 / 0.009
	+50	7.62 / 0.009

CDMA 2000 – 1xRTT Cell Band (BC0) Mid Channel 384 @836.52 MHz		
Temperature (°C)	Voltage (VDC)	Frequency Deviation (Hz/ppm)
20	4.25	3.59 / 0.004
	5.75	4.54 / 0.005

CDMA 2000 – 1xRTT Cell Band (BC1) Mid Channel 600 @1880.0 MHz		
<i>Voltage (VDC)</i>	<i>Temperature (°C)</i>	<i>Frequency Deviation (Hz/ppm)</i>
5.0	-30	8.06 / 0.004
	-20	8.42 / 0.004
	-10	7.69 / 0.004
	0	6.56 / 0.003
	+10	8.40 / 0.004
	+20	6.30 / 0.003
	+30	8.86 / 0.005
	+40	8.64 / 0.005
	+50	9.08 / 0.005

CDMA 2000 – 1xRTT Cell Band (BC1) Mid Channel 600@1880.0 MHz		
<i>Temperature (°C)</i>	<i>Voltage (VDC)</i>	<i>Frequency Deviation (Hz/ppm)</i>
20	4.25	7.59 / 0.004
	5.75	7.40 / 0.004

GSM850 (GPRS) Cell Band Mid Channel 190 @836.6 MHz		
<i>Voltage (VDC)</i>	<i>Temperature (°C)</i>	<i>Frequency Deviation (Hz/ppm)</i>
5.0	-30	26.42 / 0.03
	-20	27.44 / 0.03
	-10	18.49 / 0.02
	0	21.18 / 0.03
	+10	23.09 / 0.03
	+20	19.11 / 0.02
	+30	19.53 / 0.02
	+40	17.98 / 0.02
	+50	22.92 / 0.03

GSM850 (GPRS) Cell Band Mid Channel 190 @836.6 MHz		
<i>Temperature (°C)</i>	<i>Voltage (VDC)</i>	<i>Frequency Deviation (Hz/ppm)</i>
20	4.25	13.08 / 0.02
	5.75	20.27 / 0.02

GSM1900 (GPRS) PCS Band Mid Channel 661 @1880.0 MHz		
<i>Voltage (VDC)</i>	<i>Temperature (°C)</i>	<i>Frequency Deviation (Hz/ppm)</i>
5.0	-30	107.63 / 0.06
	-20	80.16 / 0.04
	-10	99.06 / 0.05
	0	70.76 / 0.04
	+10	112.85 / 0.06
	+20	60.47 / 0.03
	+30	68.48 / 0.04
	+40	71.0 / 0.04
	+50	86.75 / 0.05

GSM1900 (GPRS) PCS Band Mid Channel 661 @1880.0 MHz		
<i>Temperature (°C)</i>	<i>Voltage (VDC)</i>	<i>Frequency Deviation (Hz/ppm)</i>
20	4.25	67.19 / 0.04
	5.75	67.08 / 0.04

WCDMA (3GPP Release Version 99) Band 5 Mid Channel 4183 @836.6 MHz		
<i>Voltage (VDC)</i>	<i>Temperature (°C)</i>	<i>Frequency Deviation (Hz/ppm)</i>
5.0	-30	2.60 / 0.003
	-20	1.60 / 0.002
	-10	2.53 / 0.003
	0	-2.37 / 0.003
	+10	-4.12 / 0.005
	+20	-2.68 / 0.003
	+30	-3.10 / 0.004
	+40	-4.64 / 0.006
	+50	-3.96 / 0.005

WCDMA (3GPP Release Version 99) Band 5 Mid Channel 4183 @836.6 MHz		
<i>Temperature (°C)</i>	<i>Voltage (VDC)</i>	<i>Frequency Deviation (Hz/ppm)</i>
20	4.25	2.93 / 0.004
	5.75	-2.94 / 0.004

WCDMA (3GPP Release Version 99) Band 2 Mid Channel 9400 @1880.0 MHz		
<i>Voltage (VDC)</i>	<i>Temperature (°C)</i>	<i>Frequency Deviation (Hz/ppm)</i>
5.0	-30	8.83 / 0.005
	-20	6.97 / 0.004
	-10	5.76 / 0.003
	0	6.15 / 0.003
	+10	5.82 / 0.003
	+20	7.38 / 0.004
	+30	7.90 / 0.004
	+40	7.60 / 0.004
	+50	8.56 / 0.005

WCDMA (3GPP Release Version 99) Band 2 Mid Channel 9400 @1880.0 MHz		
<i>Temperature (°C)</i>	<i>Voltage (VDC)</i>	<i>Frequency Deviation (Hz/ppm)</i>
20	4.25	5.09 / 0.003
	5.75	7.47 / 0.004

LTE Band 5–QPSK–5MHz BW-Mid Channel 20525 @836.5 MHz		
<i>Voltage (VDC)</i>	<i>Temperature (°C)</i>	<i>Frequency Deviation (Hz/ppm)</i>
5.0	-30	-3.14 / 0.004
	-20	-2.82 / 0.003
	-10	-2.73 / 0.003
	0	-2.97 / 0.004
	+10	-3.22 / 0.004
	+20	-3.81 / 0.005
	+30	-5.42 / 0.006
	+40	-5.14 / 0.006
	+50	-4.42 / 0.005

LTE Band 5–QPSK–5MHz BW-Mid Channel 20525 @836.5 MHz		
<i>Temperature (°C)</i>	<i>Voltage (VDC)</i>	<i>Frequency Deviation (Hz/ppm)</i>
20	4.25	-5.31 / 0.006
	5.75	-4.19 / 0.005

LTE Band 2–QPSK – 5MHz BW-Mid Channel 18900 @1880.0 MHz		
<i>Voltage (VDC)</i>	<i>Temperature (°C)</i>	<i>Frequency Deviation (Hz/ppm)</i>
5.0	-30	-7.23 / 0.004
	-20	-8.46 / 0.005
	-10	-7.45 / 0.004
	0	-7.69 / 0.004
	+10	-9.82 / 0.005
	+20	-7.79 / 0.004
	+30	-8.14 / 0.004
	+40	-8.93 / 0.005
	+50	-7.67 / 0.004

LTE Band 2–QPSK – 5MHz BW-Mid Channel 18900 @1880.0 MHz		
<i>Temperature (°C)</i>	<i>Voltage (VDC)</i>	<i>Frequency Deviation (Hz/ppm)</i>
20	4.25	-7.12 / 0.004
	5.75	-7.32 / 0.004



SECTION 3

TEST EQUIPMENT USED



3.1 TEST EQUIPMENT USED

List of absolute measuring and other principal items of test equipment.

ID Number (SDGE/SDR B)	Test Equipment	Type	Serial Number	Manufacturer	Cal Date	Cal Due Date
Conducted Port Setup						
7582	Signal/Spectrum Analyzer	FSW26	101614	Rhode & Schwarz	12/22/14	12/22/15
7569	Series Power Meter	N1911A P-	MY45100625	Agilent	05/22/14	05/22/15
7570	50MHz-18GHz Wideband Power Sensor	N1921A	MY45240588	Agilent	05/09/14	05/09/15
7562	Wideband Radio Communication Tester	CMW 500	1201.0002k50 /103829	Rhode & Schwarz	10/09/14	10/09/15
-	Power Divider/Splitter	1506A	RR003	Weinschel	Verified by 7608 and 7569	
-	6dB Attenuator	606-06-1F4/DR	-	MECA	Verified by 7608 and 7569	
Radiated Test Setup						
1002	Bilog Antenna	3142C	00058717	ETS-Lindgren	01/30/14	01/30/16
1040	EMI Test Receiver	ESIB40	100292	Rhode & Schwarz	08/29/14	08/29/15
1016	Pre-amplifier	PAM-0202	187	PAM	12/10/14	12/10/15
1051	Double-ridged waveguide horn antenna	3115	00155511	EMCO	02/28/14	02/28/16
1049	EMI Test Receiver	ESU	100133	Rhode & Schwarz	03/11/14	03/11/16
8628	Pre-amplifier	QLJ 01182835- JO	8986002	QuinStar Technologies Inc.	05/03/14	05/03/15
1150	Horn antenna	RA42-K-F-4B-C	012054-004	CMT	04/26/13	04/26/2015
1151	Pre-amplifier	TS-PR26	100026	Rhode & Schwarz	05/02/13	05/02/2015
7562	Wideband Radio Communication Tester	CMW 500	1201.0002k50 /103829	Rhode & Schwarz	10/09/13	10/09/15
Miscellaneous						
	Test Software	EMC32	V8.53	Rhode & Schwarz	N/A	
1072	DC Power Supply	E3610A	KR51311519	Hewlett Packard	Verified by 6452	
6452	Multimeter	3478A	2911A52177	Hewlett Packard	08/12/14	08/12/15
7579	Temperature Chamber	115	151617	TestQuity	07/21/14	07/21/15
7560	Barometer/Temper ature/Humidity Transmitter	iBTHX-W	1240476	Omega	01/30/15	01/30/16

3.2 MEASUREMENT UNCERTAINTY

For a 95% confidence level, the measurement uncertainties for defined systems are:

3.2.1 Radiated Emission Measurements (Below 1GHz)

Contribution		Probability Distribution Type	Probability Distribution x_i	Standard Uncertainty $u(x_i)$	$[u(x_i)]^2$
1	Receiver/Spectrum Analyzer	Rectangular	0.45	0.26	0.07
2	Cables	Rectangular	0.50	0.29	0.08
3	Preamp	Rectangular	0.50	0.29	0.08
4	Antenna	Rectangular	0.75	0.43	0.19
5	Site	Rectangular	3.89	2.25	5.04
6	EUT Setup	Rectangular	1.00	0.58	0.33
Combined Uncertainty (u_c):					2.41
Coverage Factor (k):					2
Expanded Uncertainty:					4.82

3.2.2 Radiated Emission Measurements (Above 1GHz)

Contribution		Probability Distribution Type	Probability Distribution x_i	Standard Uncertainty $u(x_i)$	$[u(x_i)]^2$
1	Receiver/Spectrum Analyzer	Rectangular	0.57	0.33	0.11
2	Cables	Rectangular	0.70	0.40	0.16
3	Preamp	Rectangular	0.50	0.29	0.08
4	Antenna	Rectangular	0.37	0.21	0.05
5	Site	Rectangular	3.89	2.25	5.04
6	EUT Setup	Rectangular	1.00	0.58	0.33
Combined Uncertainty (u_c):					2.40
Coverage Factor (k):					2
Expanded Uncertainty:					4.81

3.2.3 Conducted Antenna Port Measurement

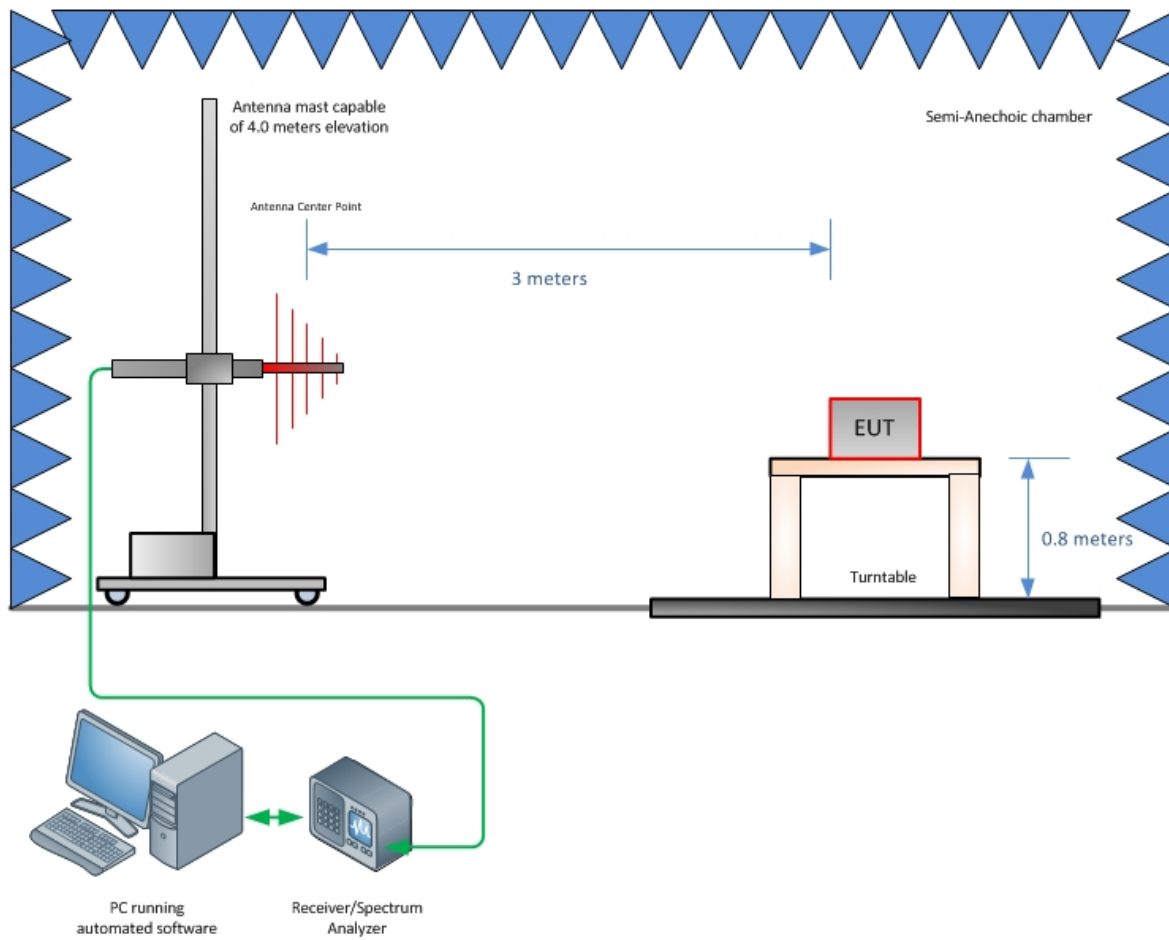
Contribution		Probability Distribution Type	Probability Distribution x_i	Standard Uncertainty $u(x_i)$	$[u(x_i)]^2$
1	Receiver/Spectrum Analyzer	Rectangular	0.57	0.33	0.11
2	Cables	Rectangular	0.50	0.29	0.08
3	EUT Setup	Rectangular	1.00	0.58	0.33
Combined Uncertainty (u_c):					0.72
Coverage Factor (k):					2
Expanded Uncertainty:					1.45



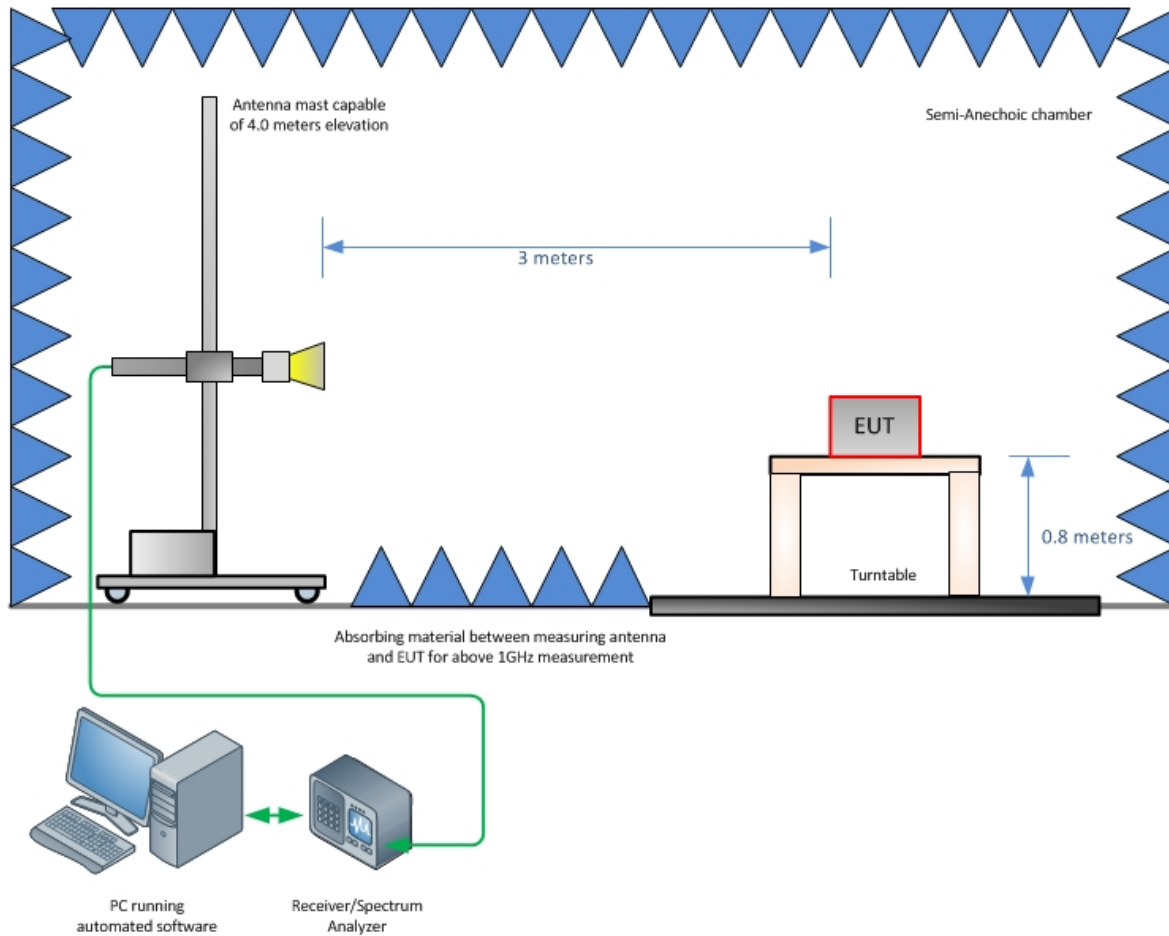
SECTION 4

DIAGRAM OF TEST SETUP

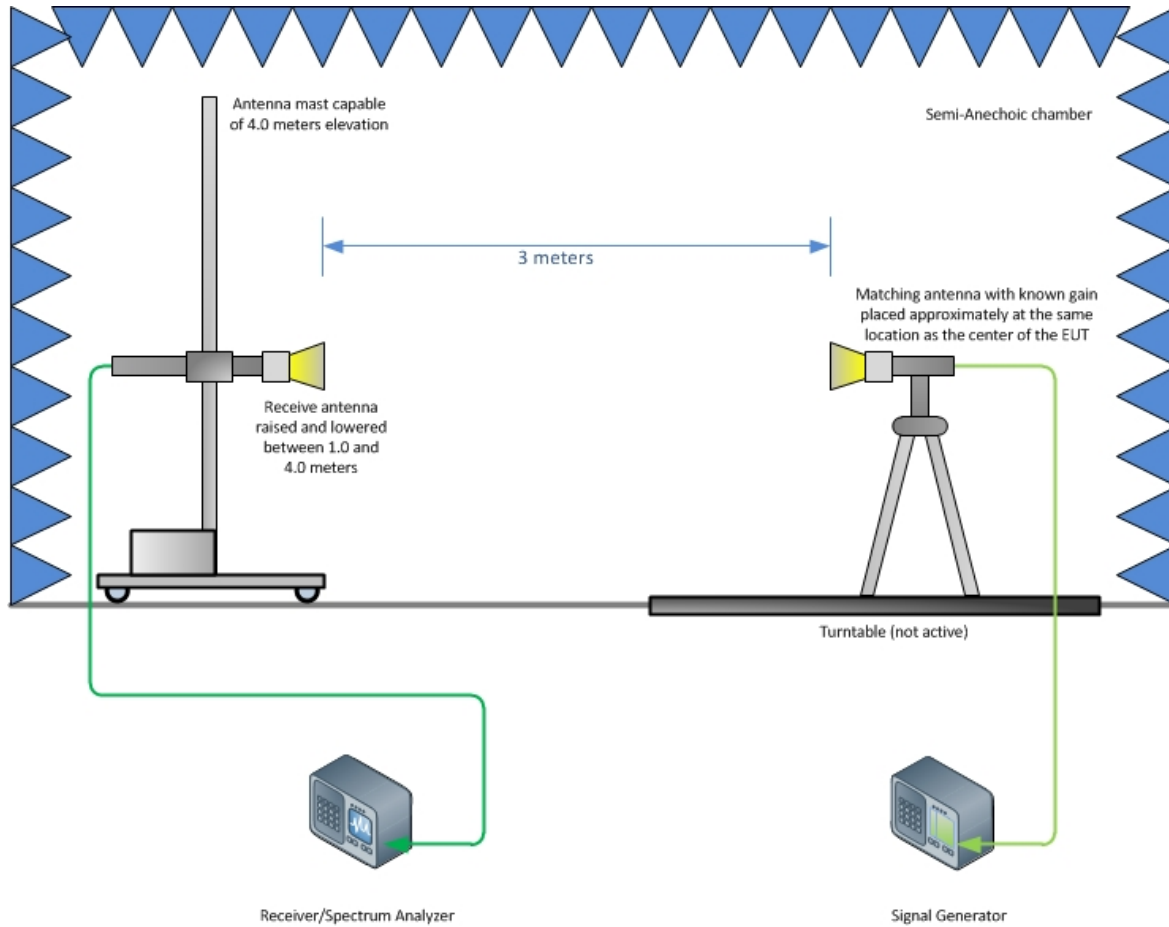
4.1 TEST SETUP DIAGRAM



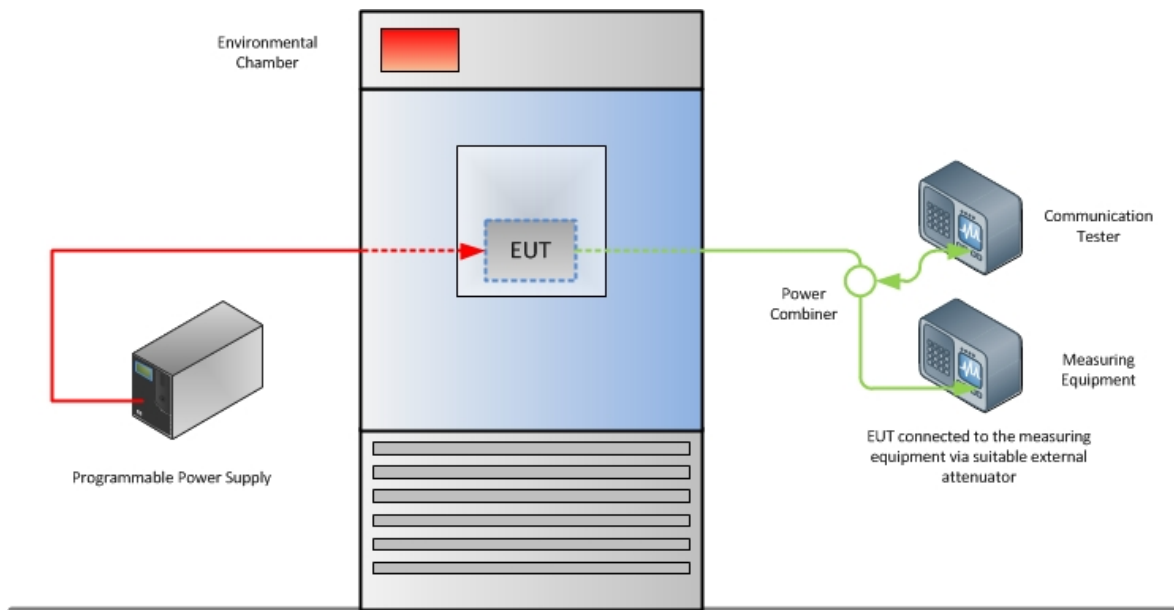
Radiated Emission Test Setup (Below 1GHz)



Radiated Emission Test Setup (Above 1GHz)



Substitution Test Method (Above 1GHz)



Frequency Stability Test Configuration



SECTION 5

ACCREDITATION, DISCLAIMERS AND COPYRIGHT



5.1 ACCREDITATION, DISCLAIMERS AND COPYRIGHT

TÜV SÜD America Inc.'s reports apply only to the specific sample tested under stated test conditions. It is the manufacturer's responsibility to assure the continued compliance of production units of this model. TÜV SÜD America, Inc. shall have no liability for any deductions, inferences or generalizations drawn by the client or others from TÜV SÜD America, Inc.'s issued reports.

This report is the confidential property of the client. As a mutual protection to our clients, the public and TÜV SÜD America, Inc., extracts from the test report shall not be reproduced, except in full without TÜV SÜD America, Inc.'s written approval.

This report must not be used to claim product certification, approval, or endorsement by A2LA, NIST, or any agency of the federal government.

TÜV SÜD America, Inc. and its professional staff hold government and professional organization certifications for AAMI, ACIL, AEA, ANSI, IEEE, A2LA, NIST and VCCI.

