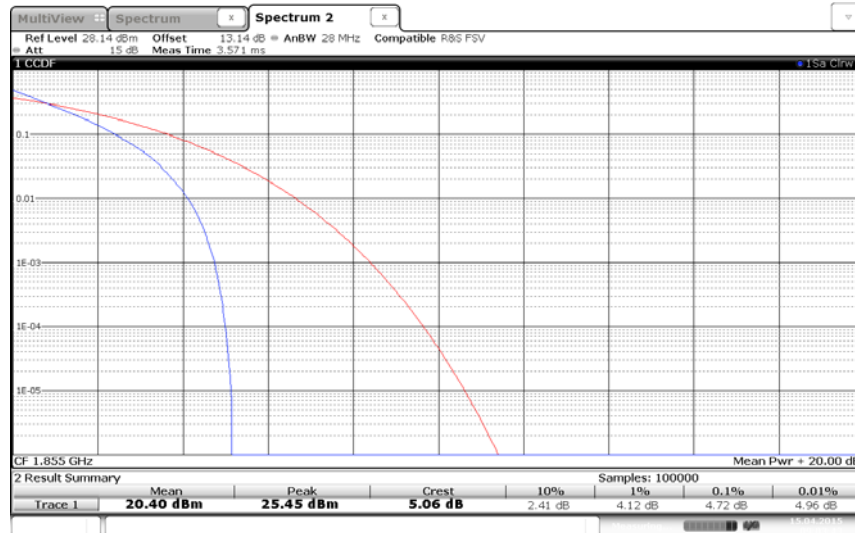
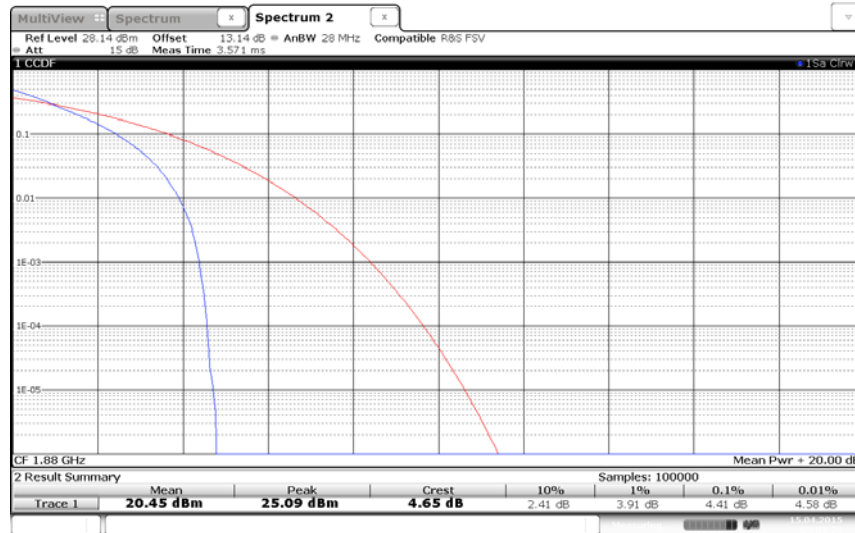


LTE Band 2 (10 MHz BW)/1855 MHz/QPSK



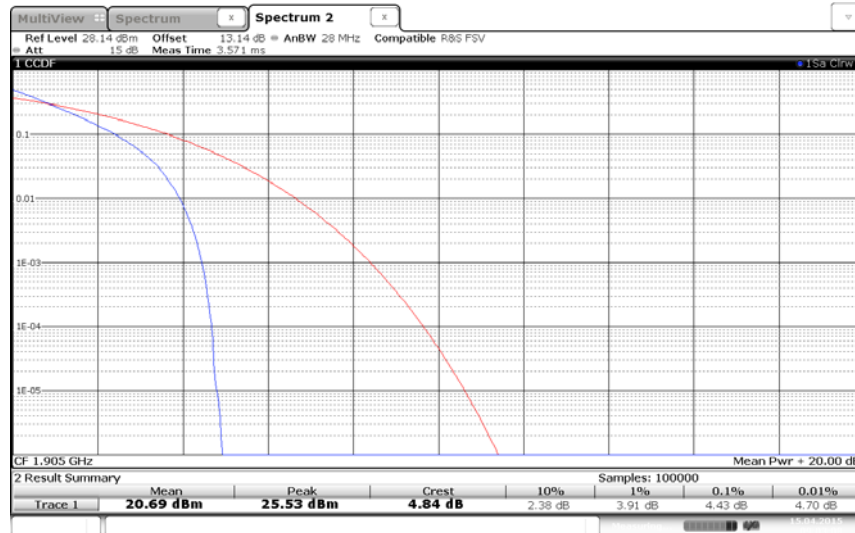
Date: 15 APR 2015 09:03:43

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



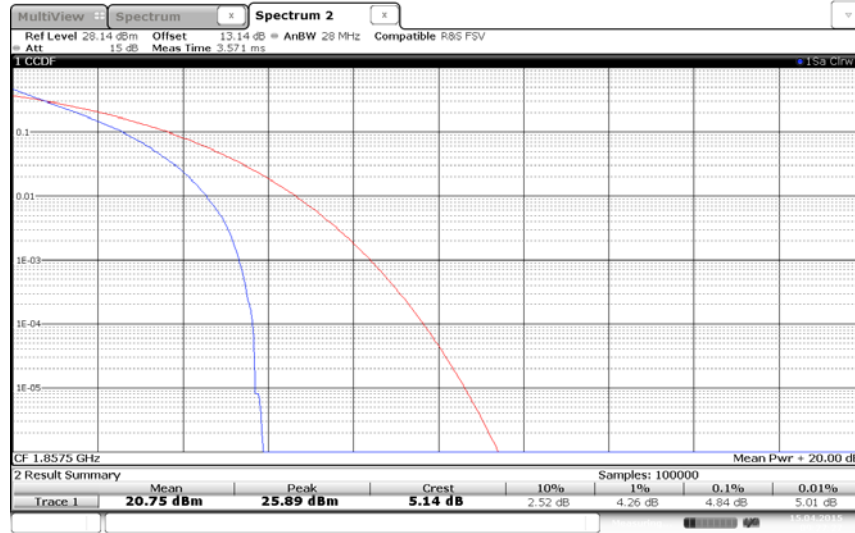
Date: 15 APR 2015 09:04:29

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



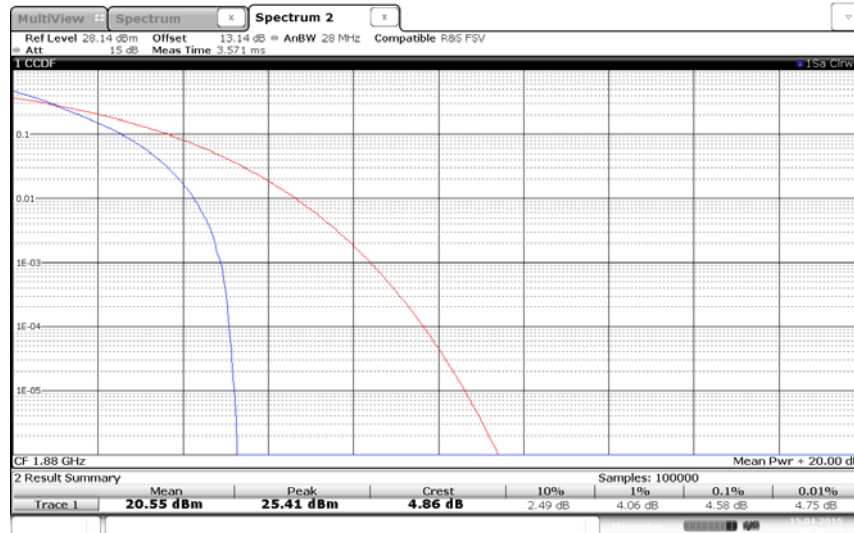
Date: 15 APR 2015 09:03:07

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



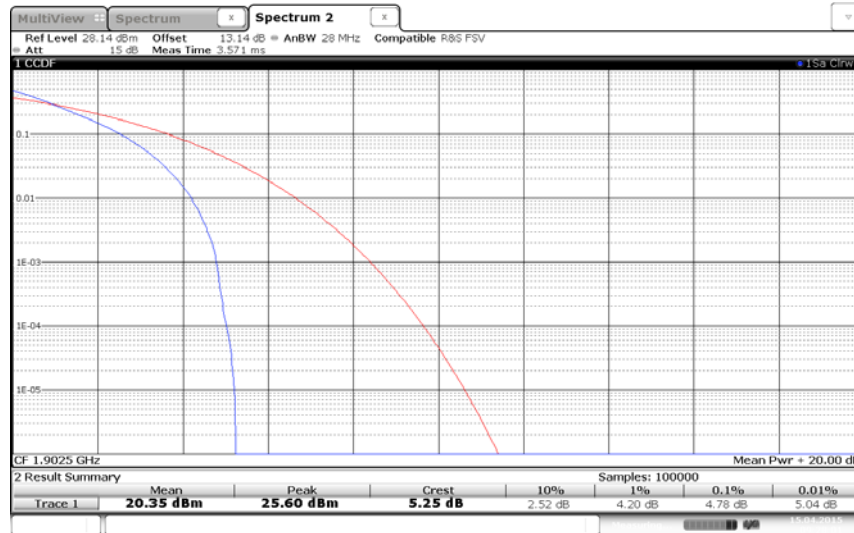
Date: 15 APR 2015 09:27:27

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



Date: 15 APR 2015 09:26:53

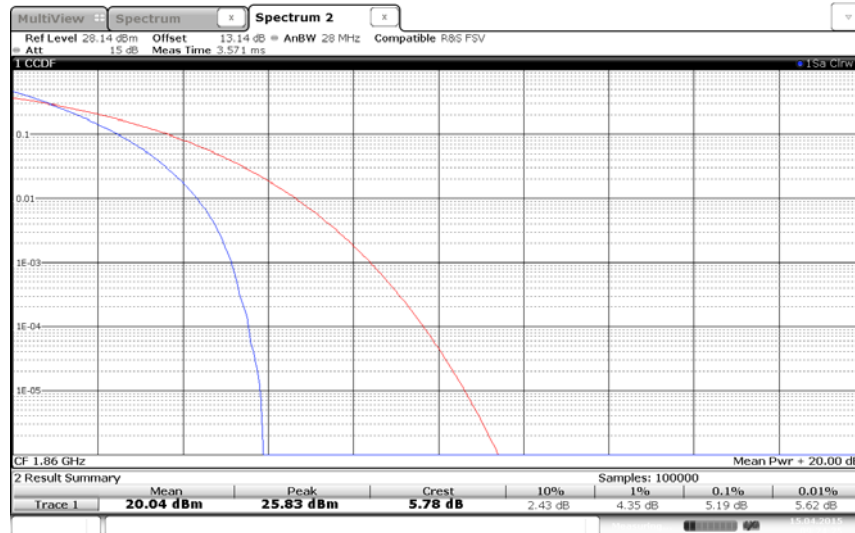
LTE Band 2 (15 MHz BW)/1902.5 MHz/QPSK



Date: 15 APR 2015 09:28:01

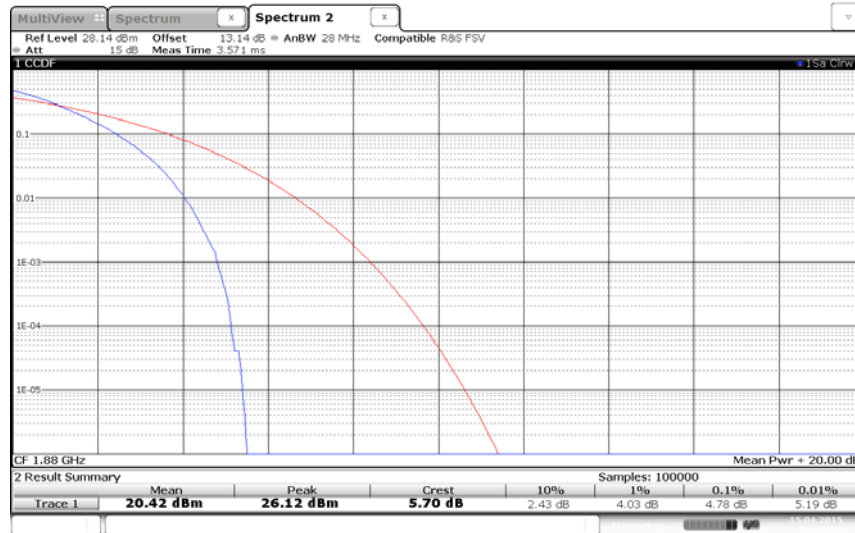


LTE Band 2 (20 MHz BW)/1860 MHz/QPSK



Date: 15 APR 2015 09:24:25

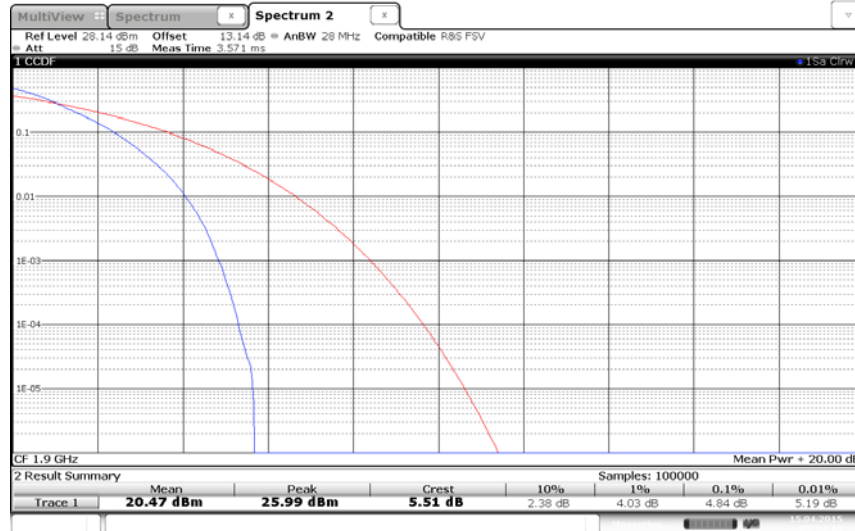
LTE Band 2 (20 MHz BW)/1880 MHz/QPSK



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 |

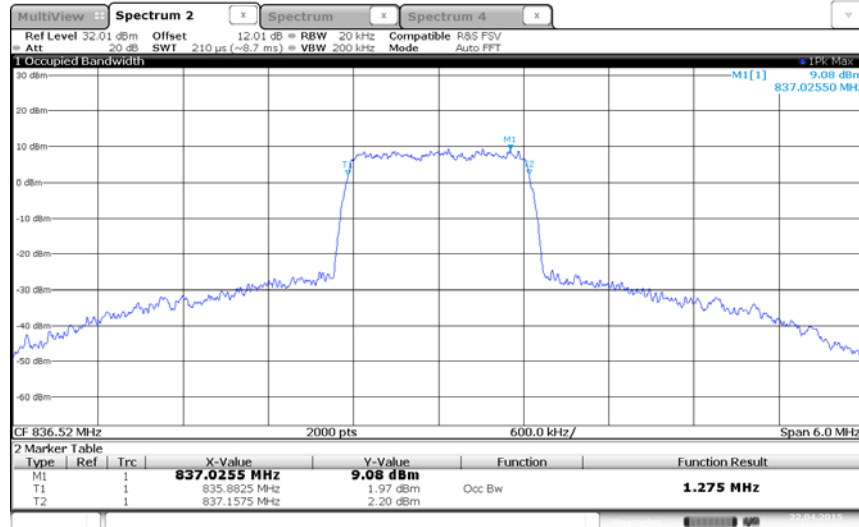
| LTE (QPSK) | | | | | |
|------------|-----------------|---------|-----------|---------------|---------------|
| Band | Bandwidth (MHz) | Channel | Frequency | 99% OBW (kHz) | 26dB BW (kHz) |
| 5 | 1.4 | 190 | 836.6 | 1.08 | 1.27 |
| | 3 | | | 2.68 | 2.95 |
| | 5 | | | 4.48 | 4.95 |
| | 10 | | | 8.96 | 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 |



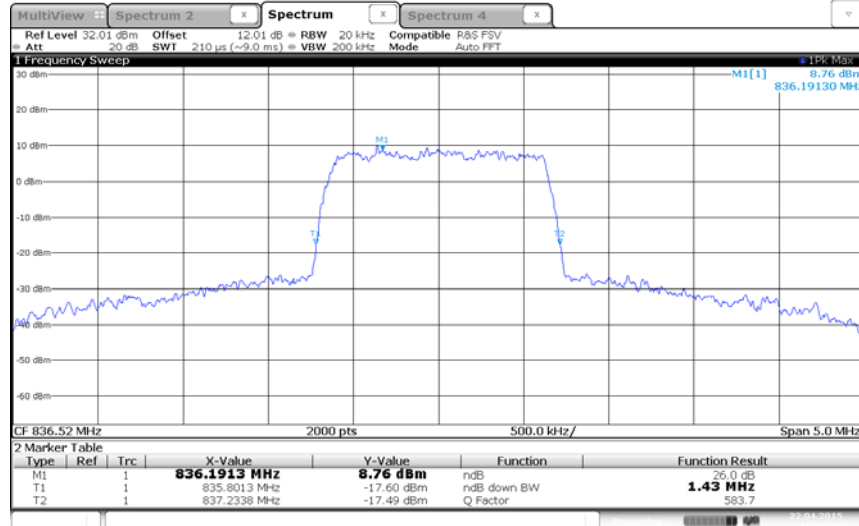
2.5.9 Example Test Plots

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



Date: 22 APR 2015 16:35:27

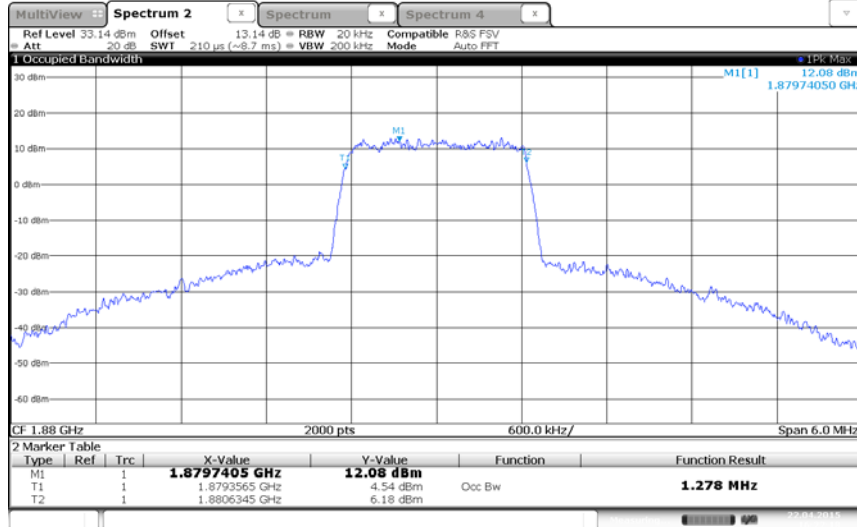
CDMA 2000 – 1xRTT (Cell-BC0)/Channel 384/26dB BW



Date: 22 APR 2015 16:36:27

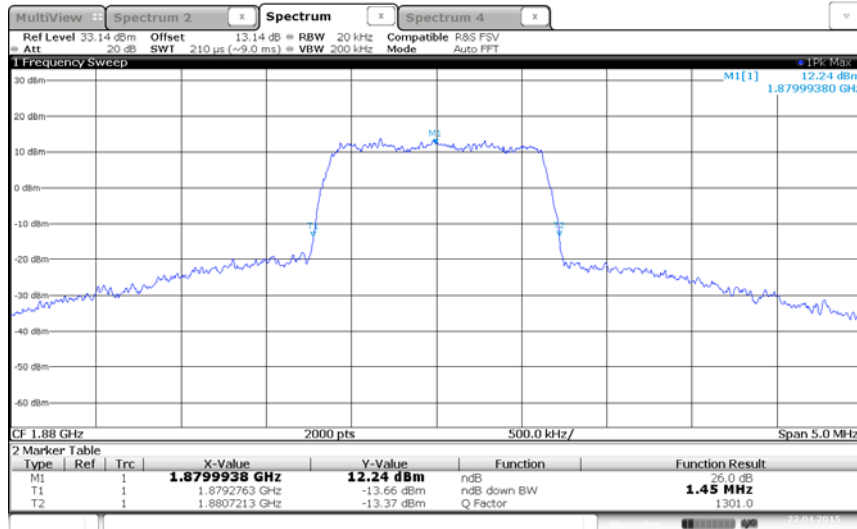


CDMA 2000 – 1xRTT (PCS-BC1)/Channel 600/99% OBW



Date: 22 APR 2015 16:22:19

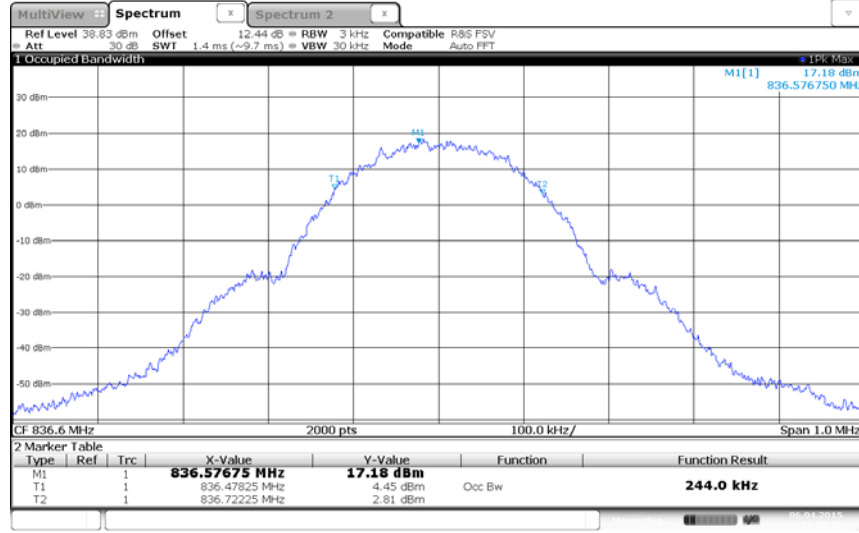
CDMA 2000 – 1xRTT (PCS-BC1)/Channel 600/26dB BW



Date: 22 APR 2015 16:21:52

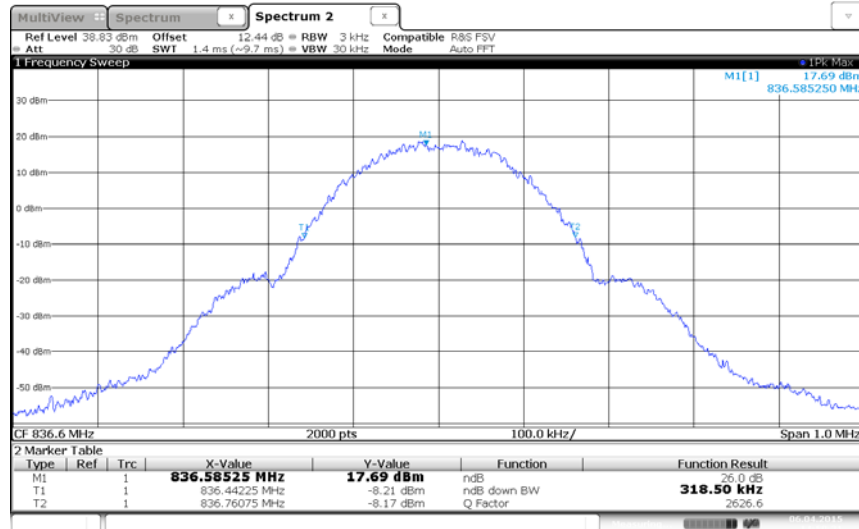


GSM850 (GPRS)/Cell/Channel 190/99% OBW



Date: 6 APR 2015 14:57:44

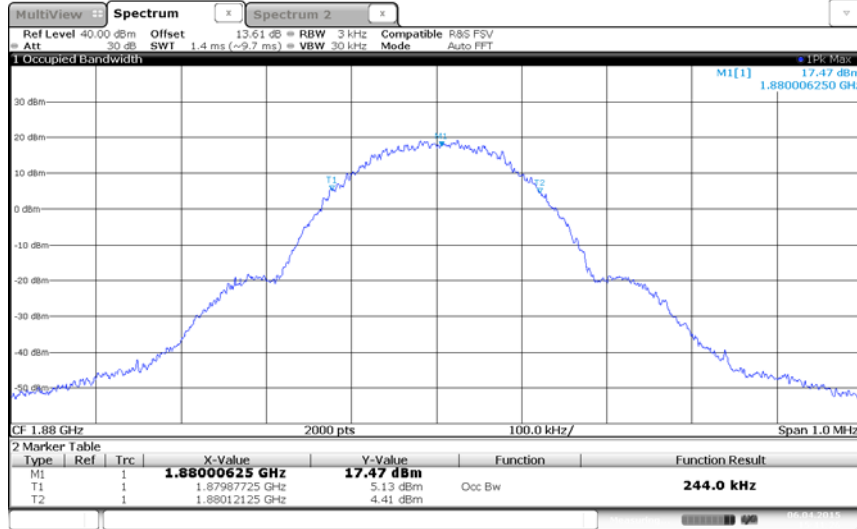
GSM850 (GPRS)/Cell/Channel 190/26dB BW



Date: 6 APR 2015 14:59:21

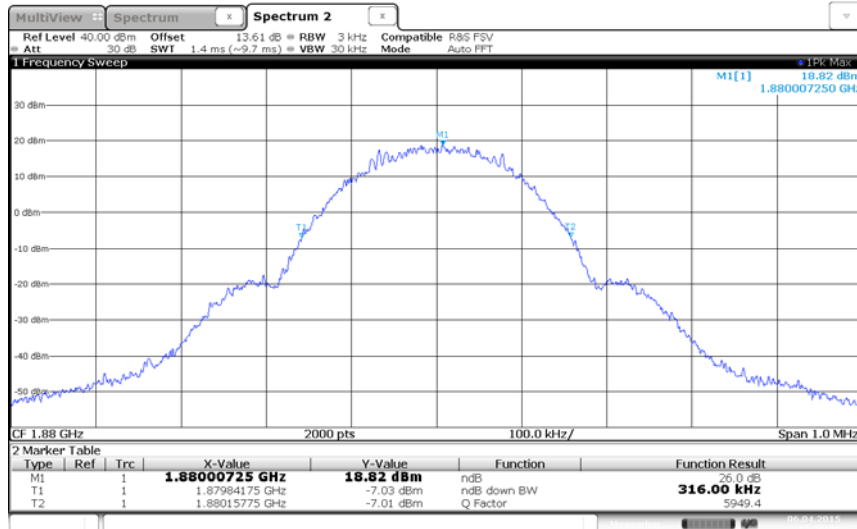


GSM1900 (GPRS)/PCS/Channel 661/99% OBW



Date: 6 APR 2015 15:41:26

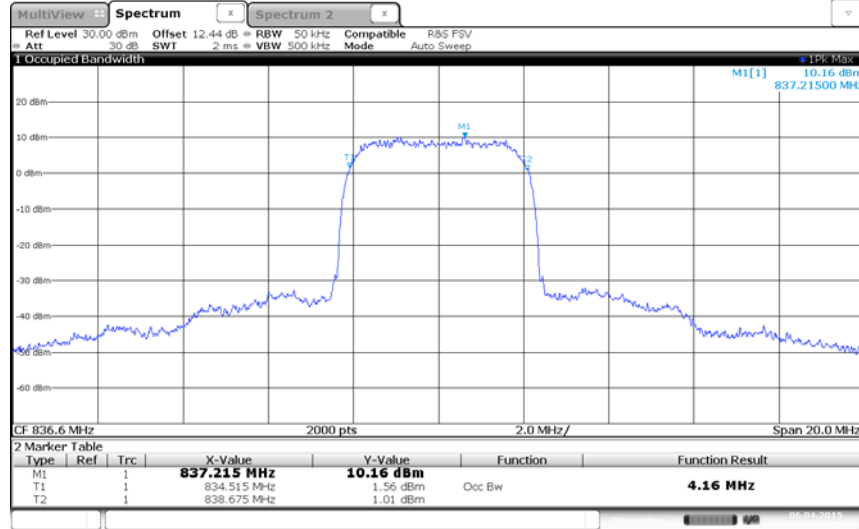
GSM1900 (GPRS)/PCS/Channel 661/26dB BW



Date: 6 APR 2015 15:39:10

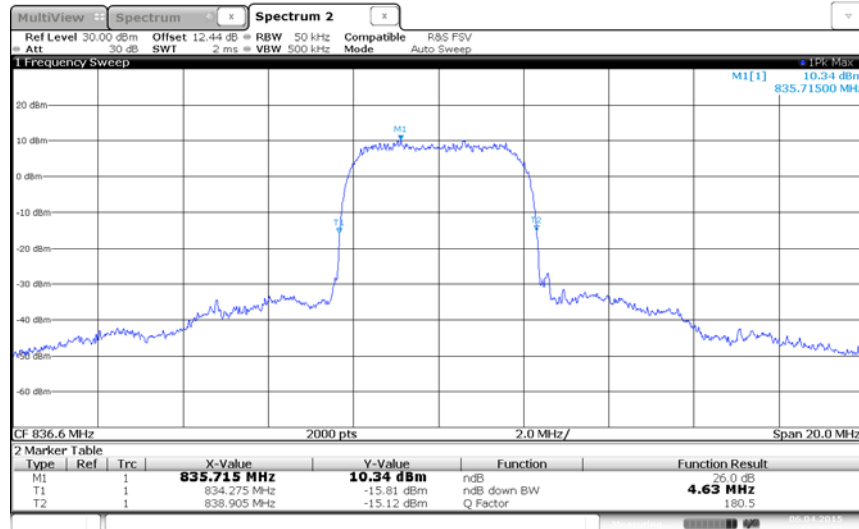


WCDMA (3GPP Release Version 99)/Cell/Channel 4183/99% OBW



Date: 6 APR 2015 14:01:52

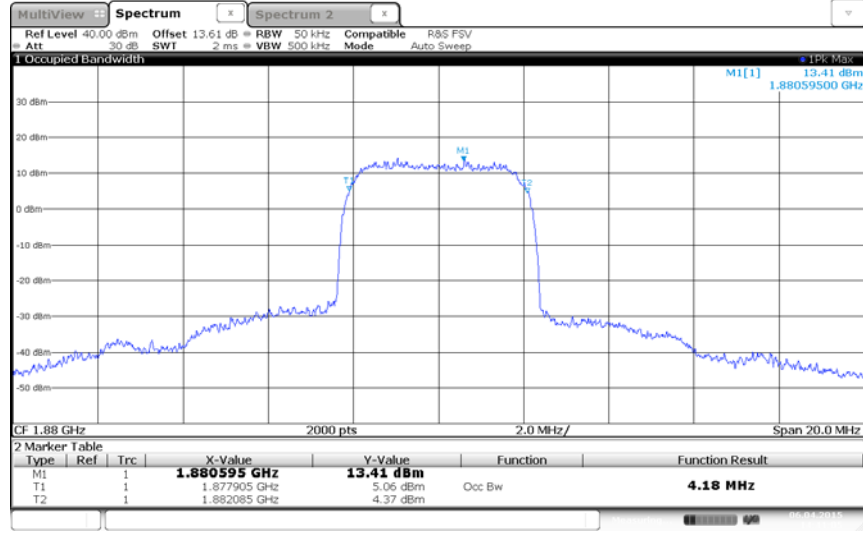
WCDMA (3GPP Release Version 99)/Cell/Channel 4183/26dB BW



Date: 6 APR 2015 14:30:32

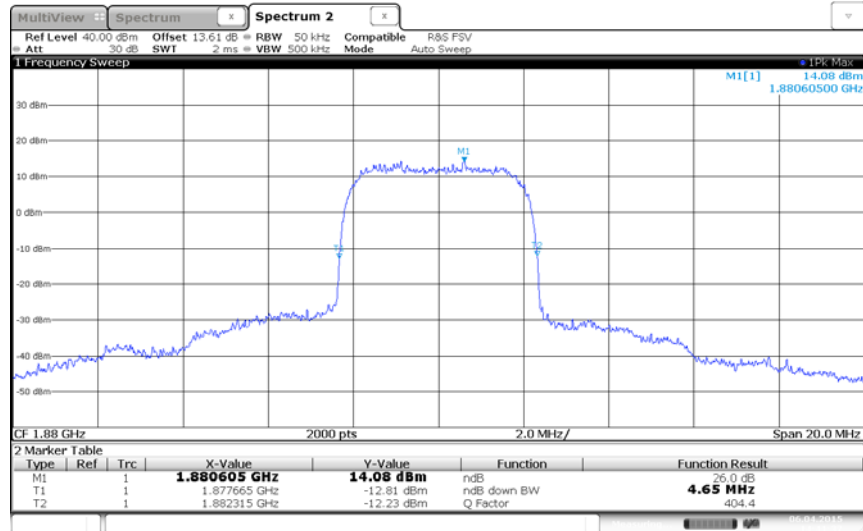


WCDMA (3GPP Release Version 99)/PCS/Channel 9400/99% OBW



Date: 6 APR 2015 14:41:05

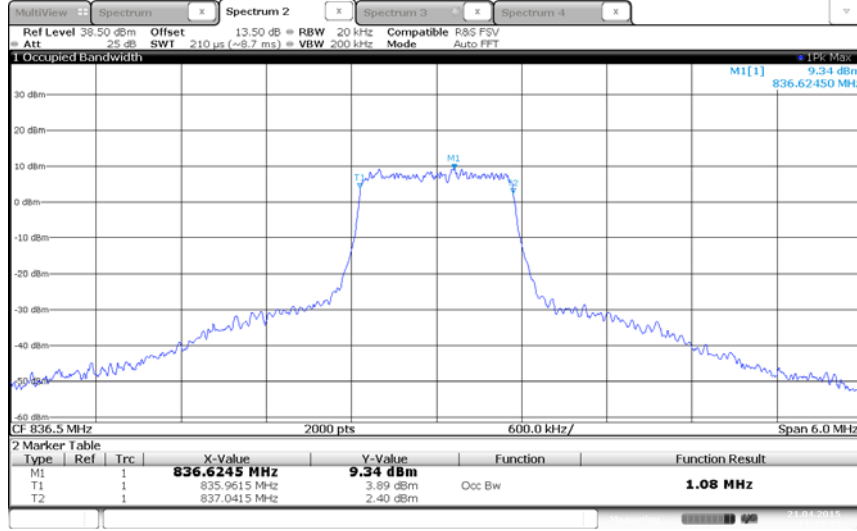
WCDMA (3GPP Release Version 99)/PCS/Channel 9400/26dB BW



Date: 6 APR 2015 14:41:37

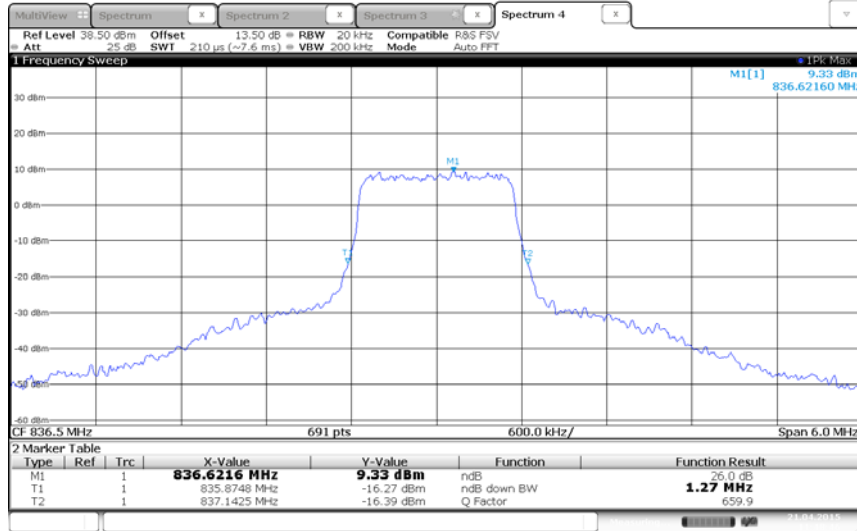


LTE Band 5 (1.4 MHz BW)/ Channel 20525/QPSK/99% OBW



Date: 21 APR 2015 11:49:34

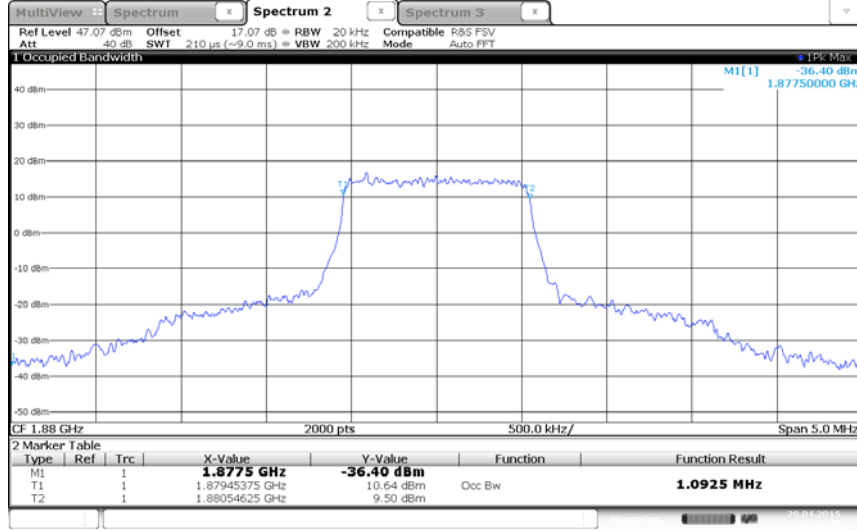
LTE Band 5 (1.4 MHz BW)/ Channel 20525/QPSK/26dB BW



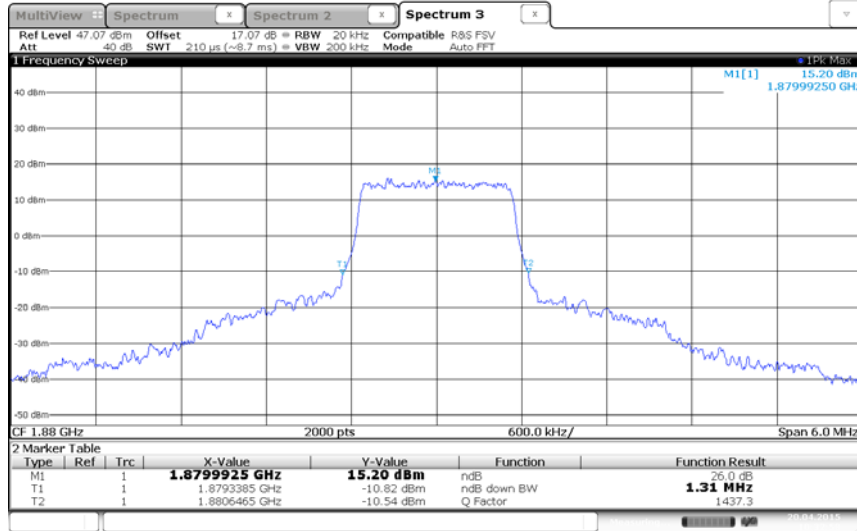
Date: 21 APR 2015 11:48:46



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 $43 + 10 \log_{10} P$ (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 |

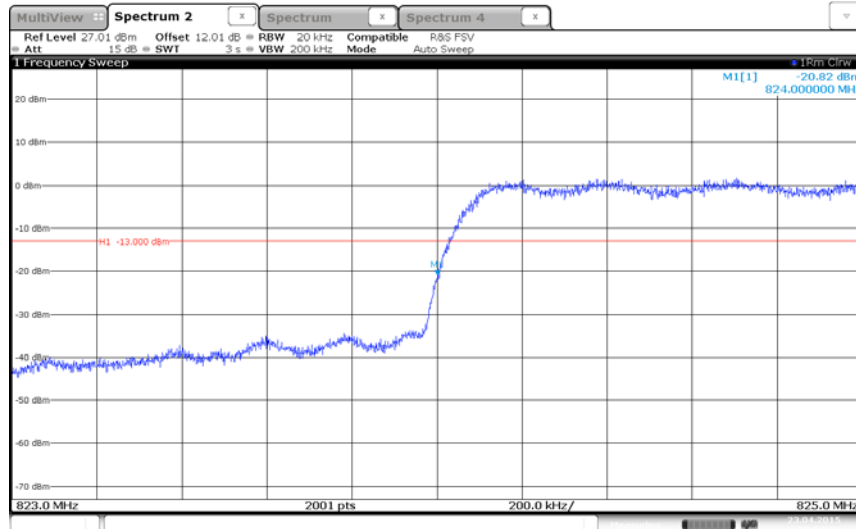
2.6.7 Additional Observations

- 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 $>3 \times RBW$ 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.

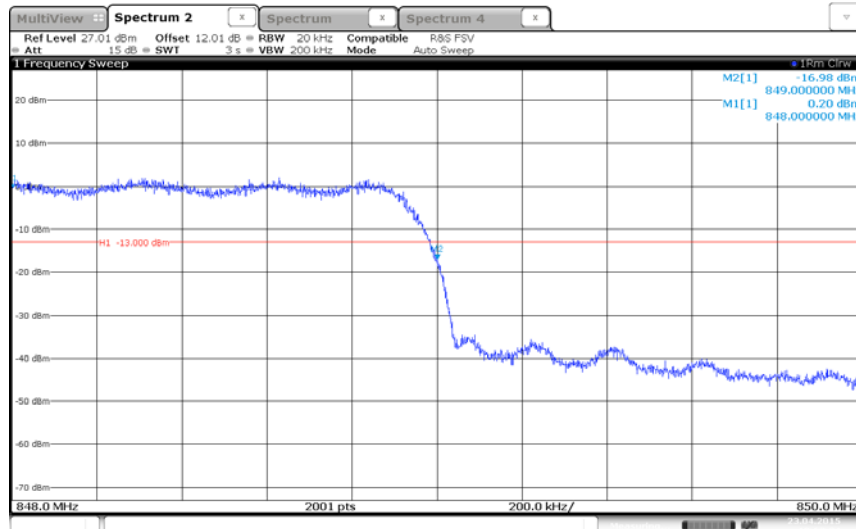


2.6.8 Test Results

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

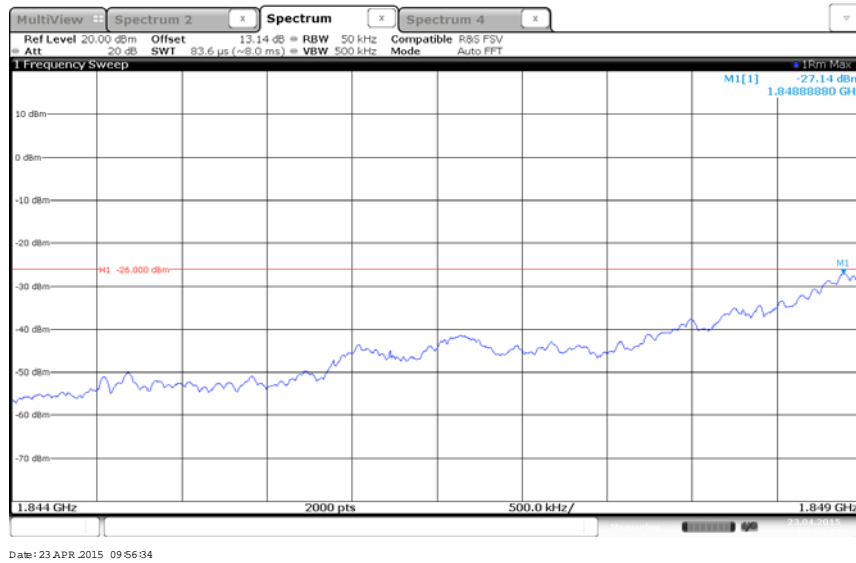
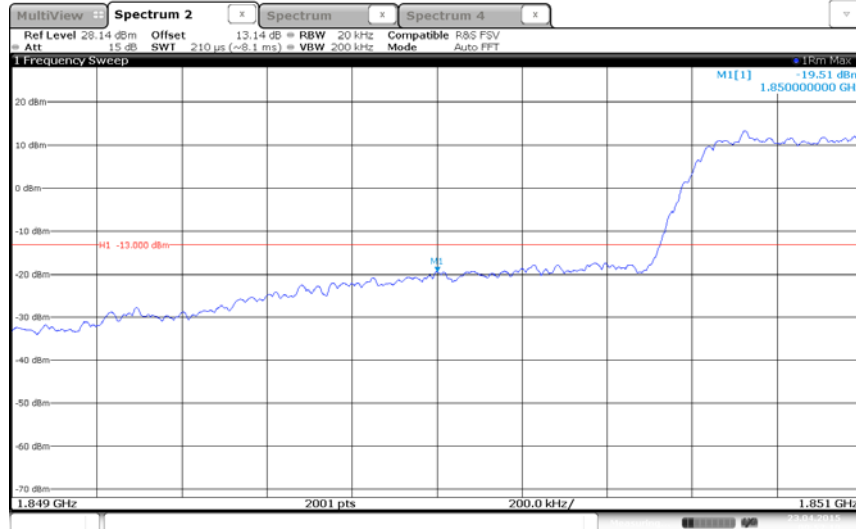


CDMA 2000 – 1xRTT/High Channel (777)/Cell BC0 Band Edge @ 849 MHz



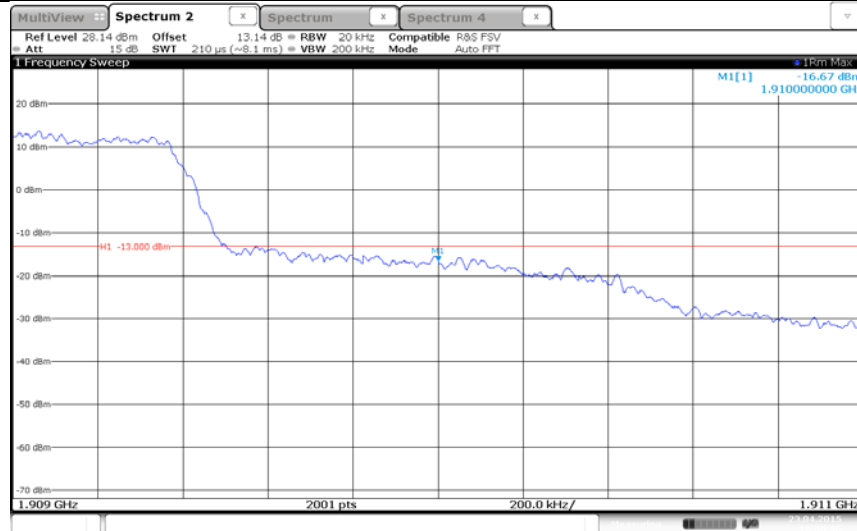


CDMA 2000 – 1xRTT/Low Channel (25)/PCS BC1 Band Edge @ 1850 MHz

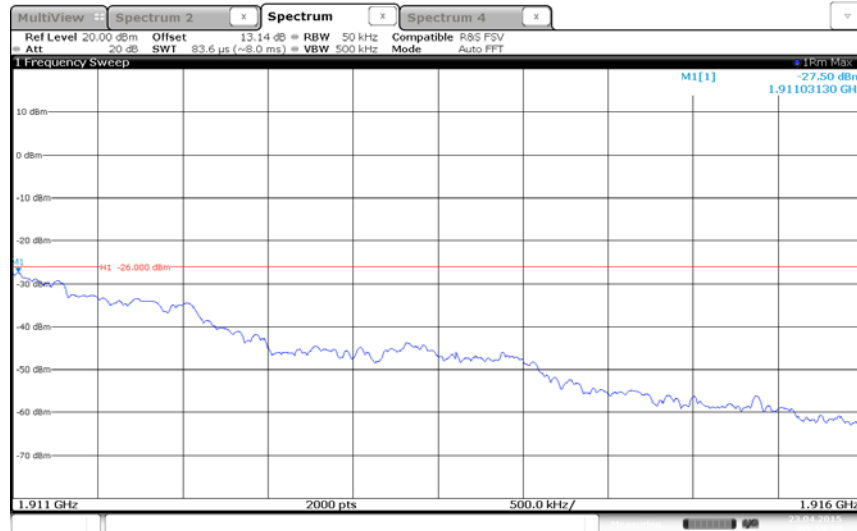




CDMA 2000 – 1xRTT/High Channel (1175)/PCS BC1 Band Edge @ 1910 MHz



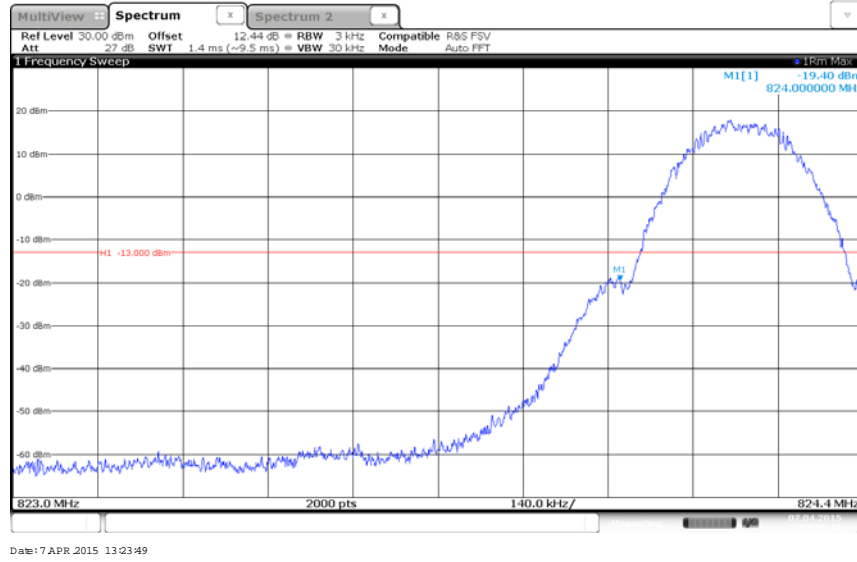
Date: 23 APR 2015 10:00:46



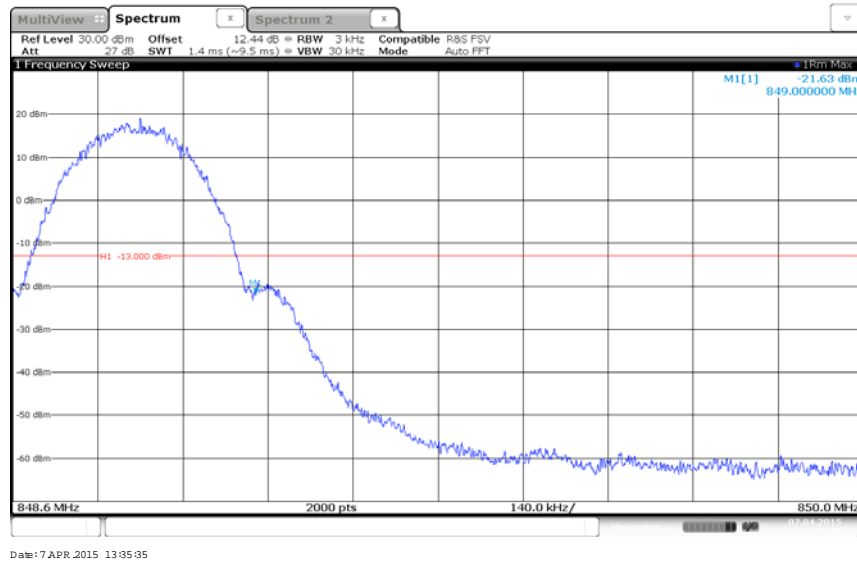
Date: 23 APR 2015 09:59:37



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

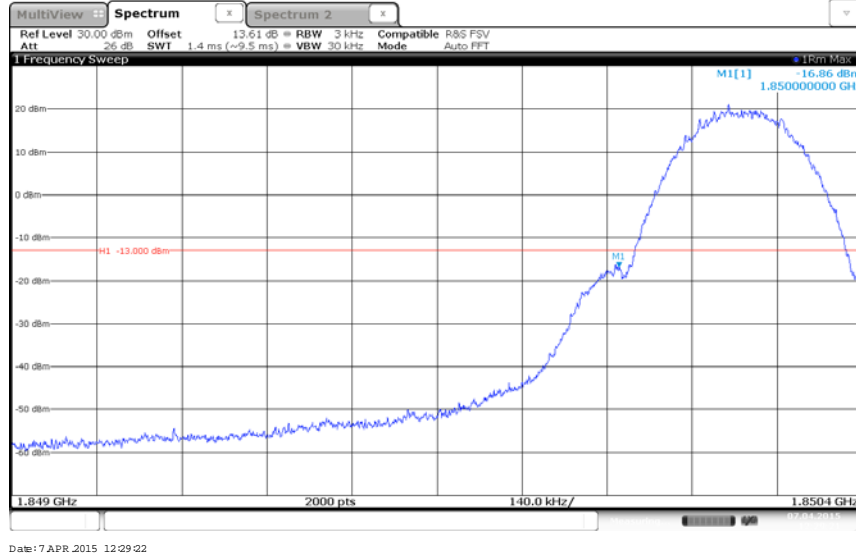


GSM850/GPRS/High Channel (251)/Cell BC0 Band Edge @ 849 MHz

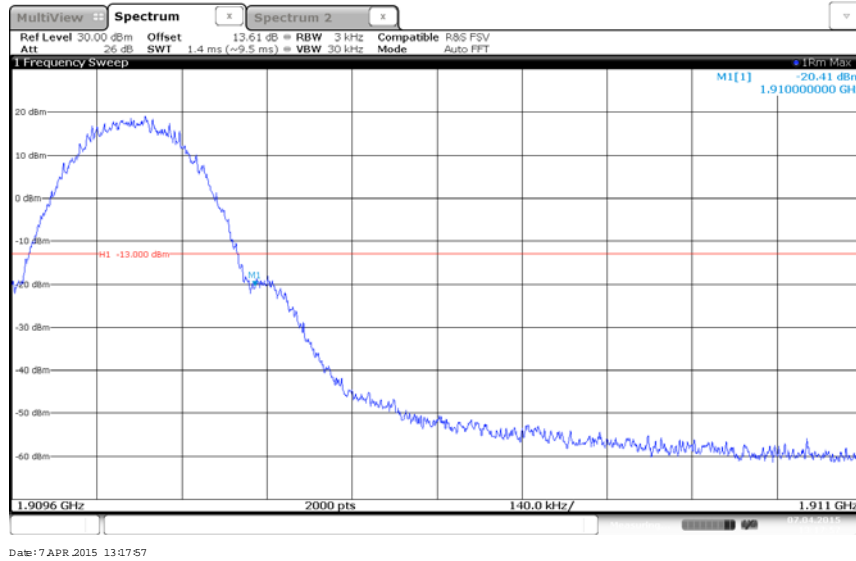




GSM1900/GPRS/Low Channel (512)/PCS BC1 Band Edge @ 1850 MHz

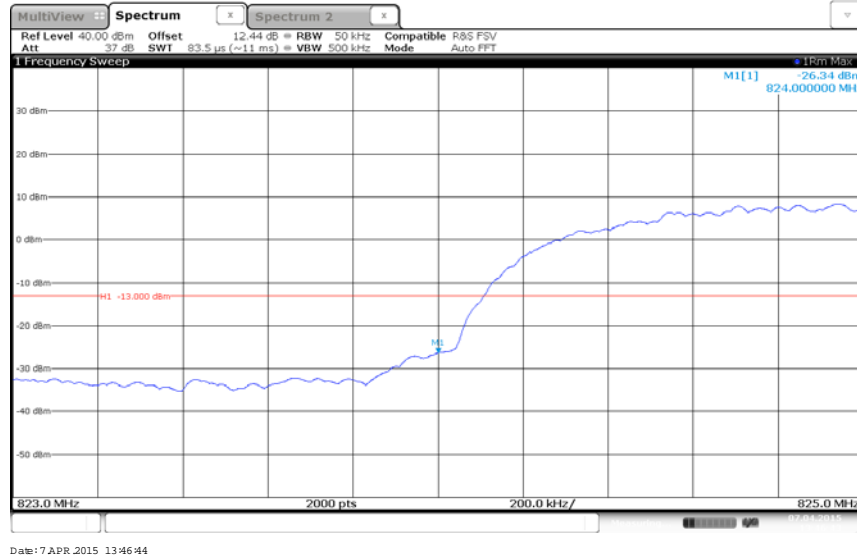


GSM1900/GPRS/High Channel (810)/PCS BC1 Band Edge @ 1910 MHz

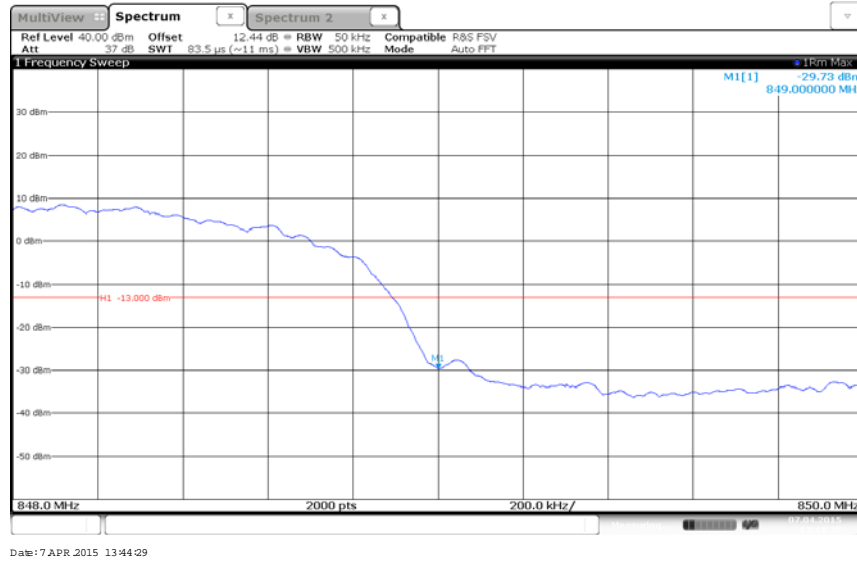




WCDMA/Low Channel (4132)/Cell Band 5 Band Edge @ 824 MHz

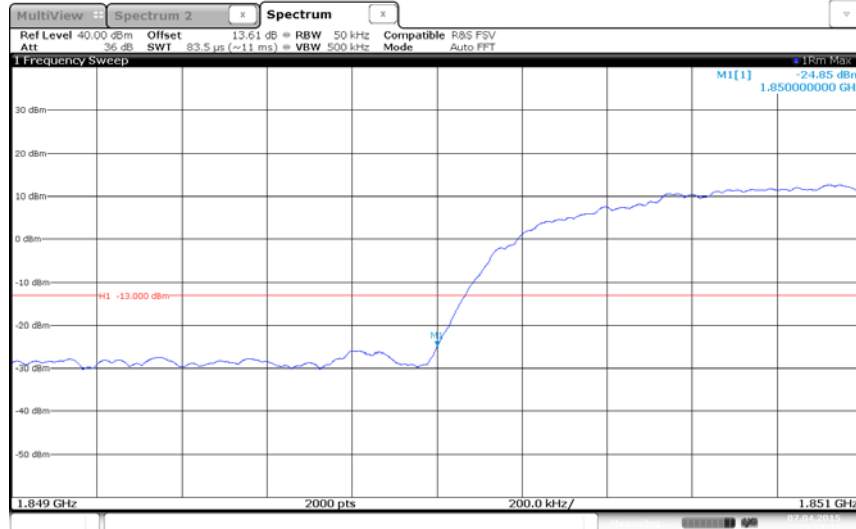


WCDMA/High Channel (4233)/Cell Band 5 Band Edge @ 849 MHz

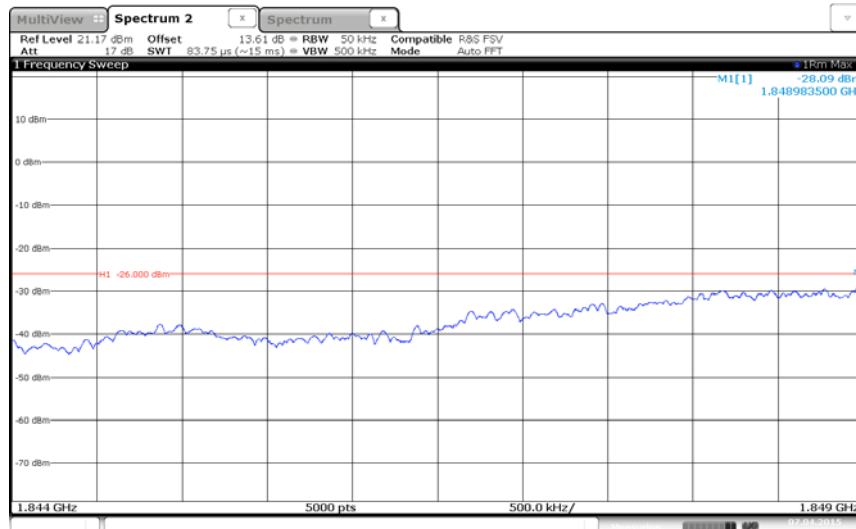




WCDMA/Low Channel (9262)/PCS Band 2 Band Edge @ 1850 MHz



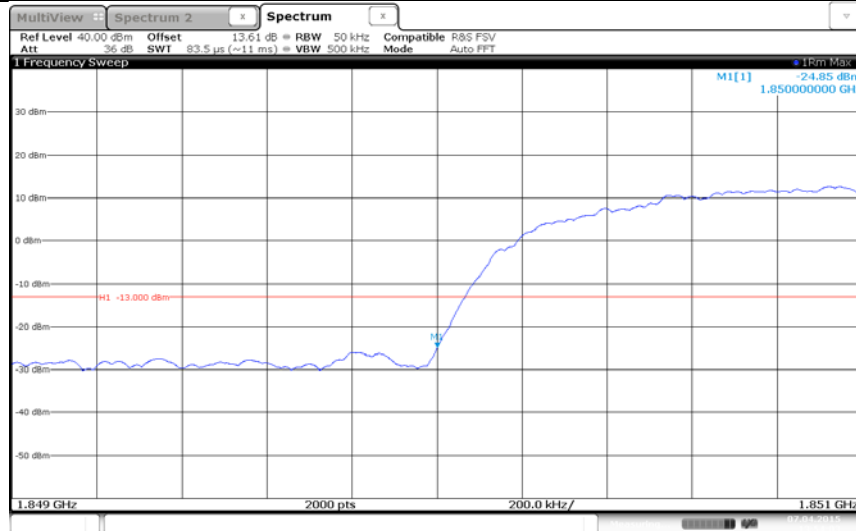
Date: 7 APR 2015 13:54:03



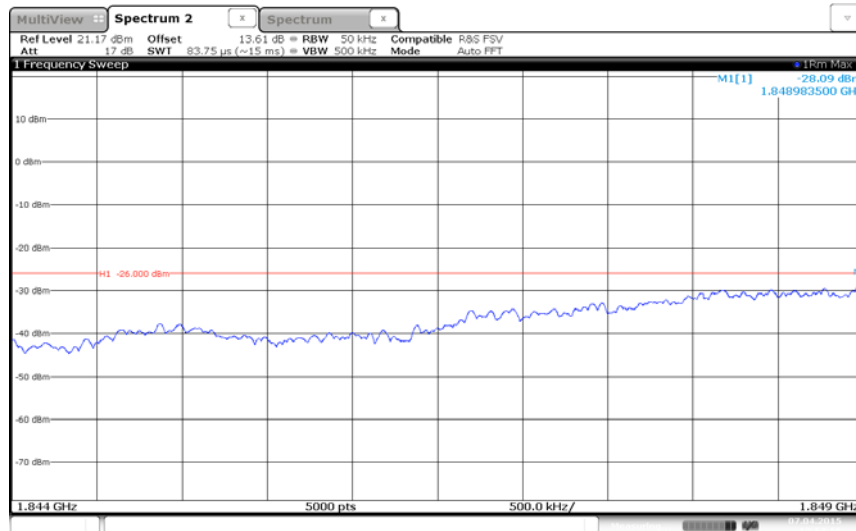
Date: 7 APR 2015 13:54:56



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



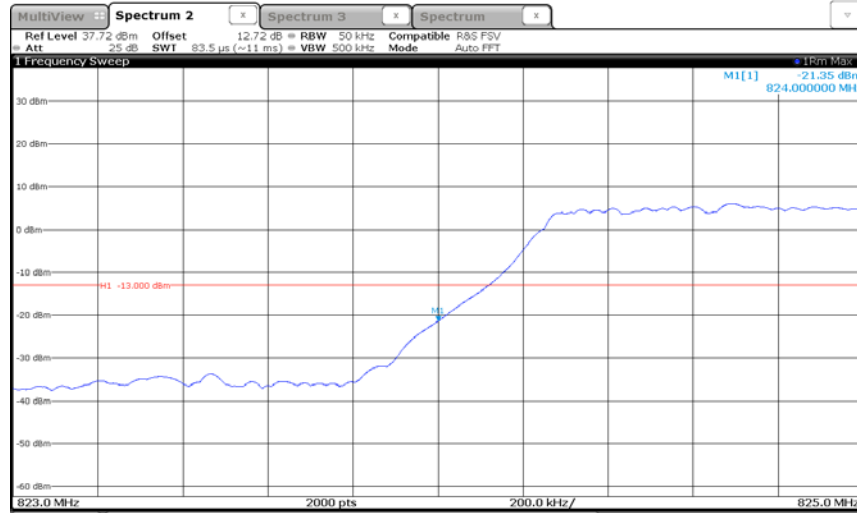
Date: 7 APR 2015 13:54:03



Date: 7 APR 2015 13:54:56

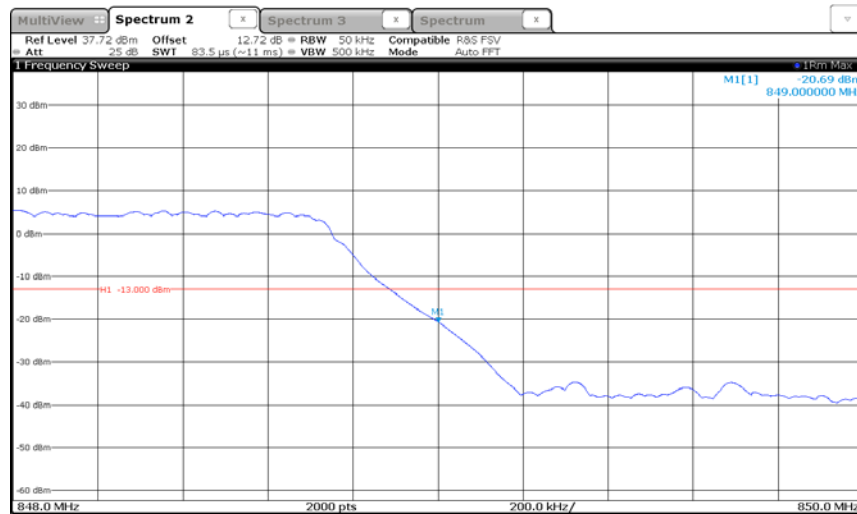


LTE Band 5 (5 MHz BW)/QPSK/Low Channel (20425) Band Edge @ 824 MHz



Date: 21 APR 2015 14:02:26

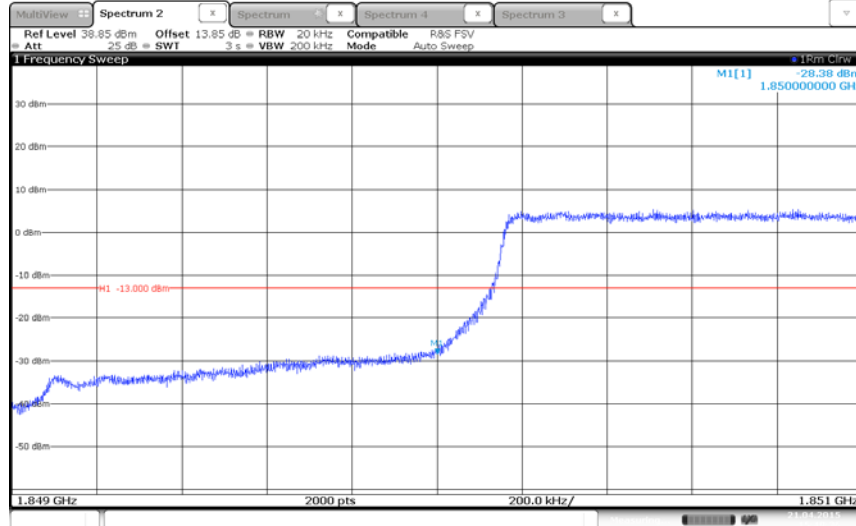
LTE Band 5 (5 MHz BW)/QPSK/Low Channel (20625) Band Edge @ 849 MHz



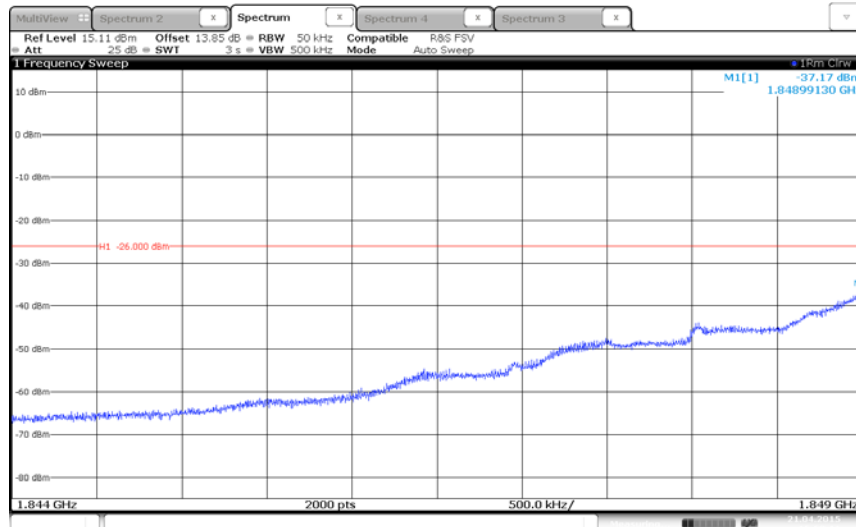
Date: 21 APR 2015 14:03:56



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



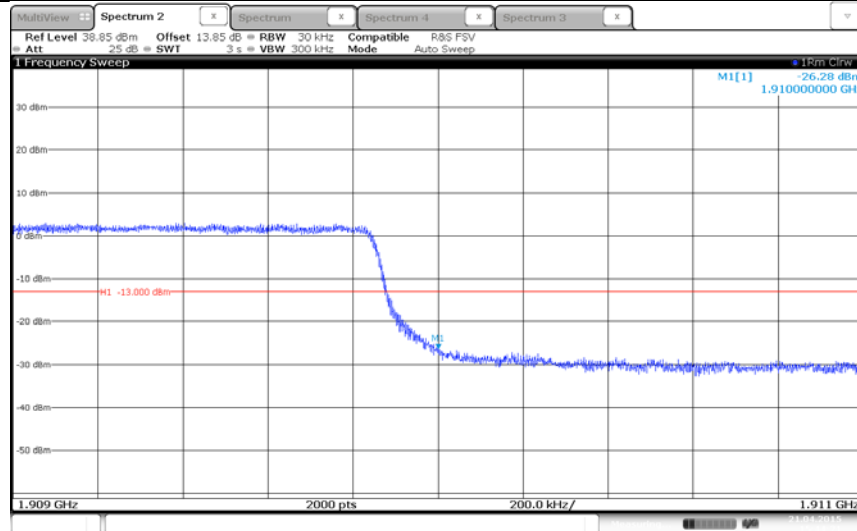
Date: 21 APR. 2015 15:49:36



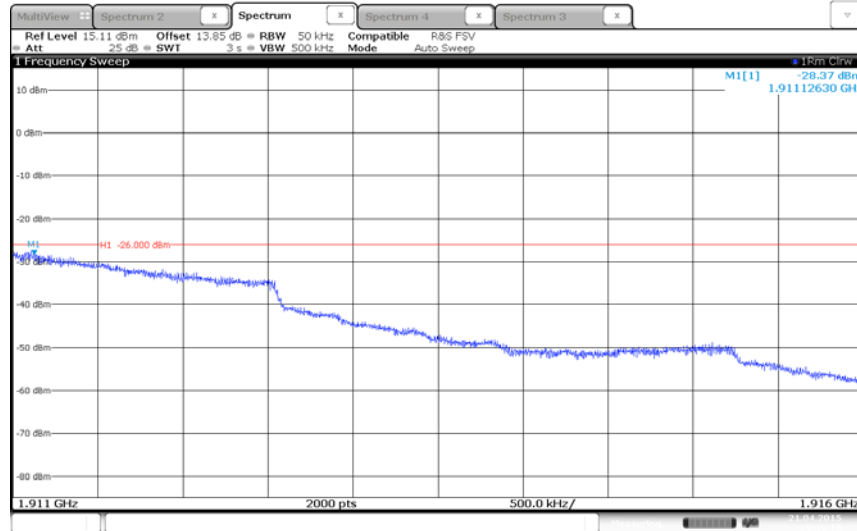
Date: 21 APR. 2015 15:50:11



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 |

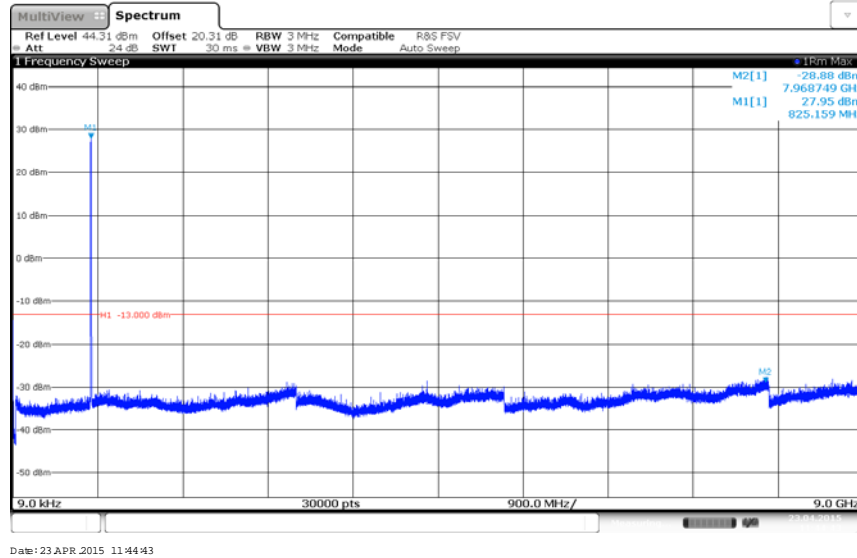
2.7.7 Additional Observations

- 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.

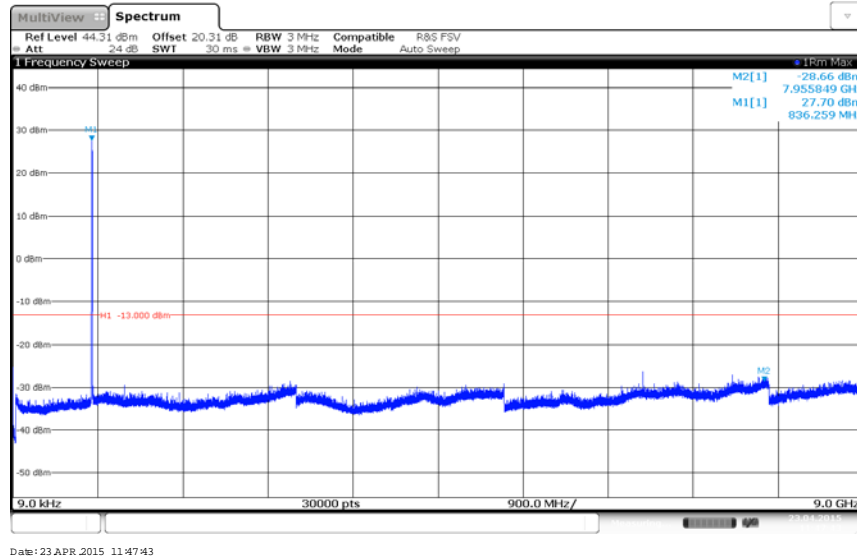


2.7.8 Test Results

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

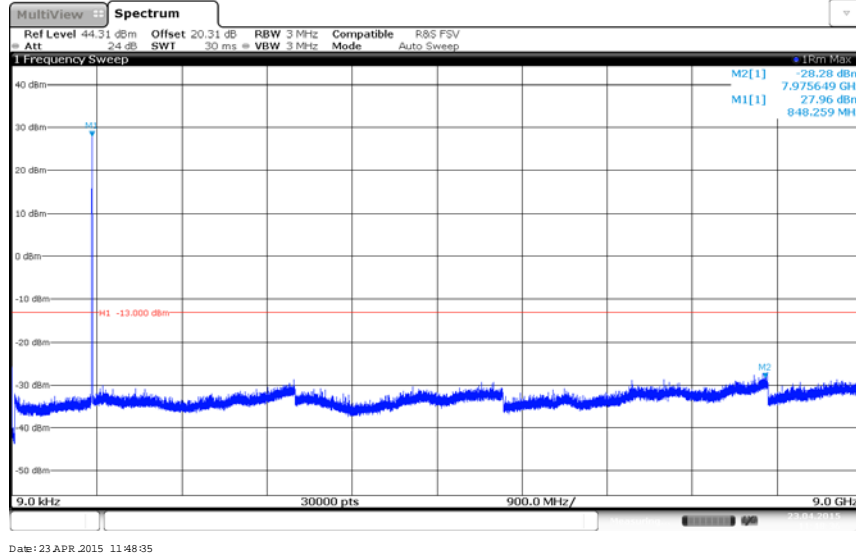


CDMA 2000 – 1xRTT/Mid Channel (384)/Cell BC0 @836.52 MHz

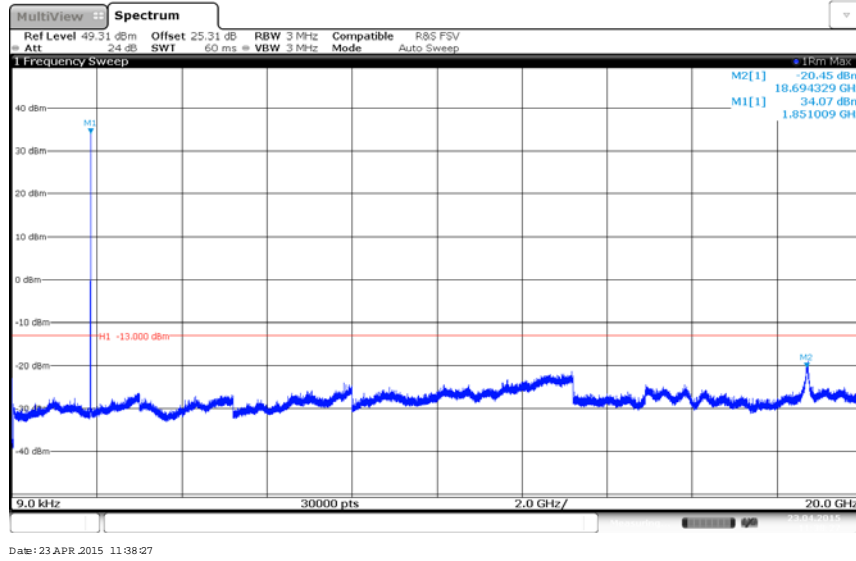




CDMA 2000 – 1xRTT/High Channel (777)/Cell BC0 @848.31 MHz

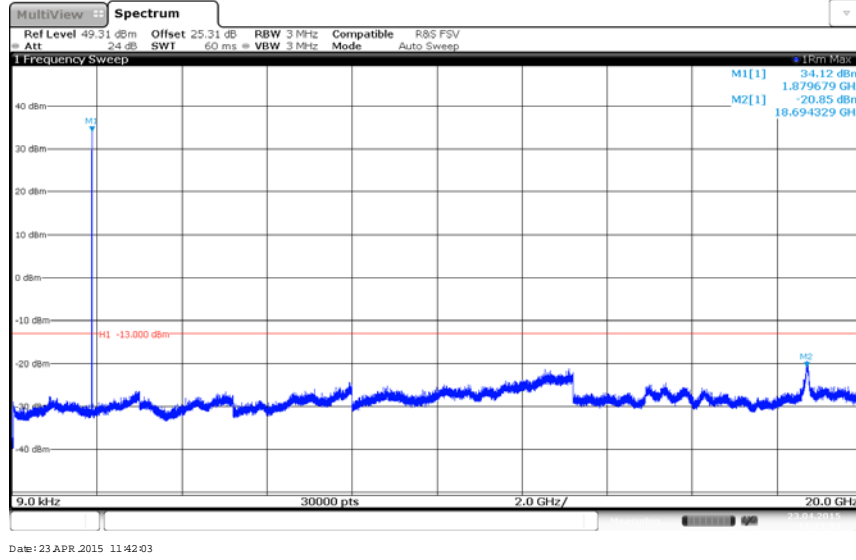


CDMA 2000 – 1xRTT/Low Channel (25)/PCS BC1 @ 1851.25 MHz

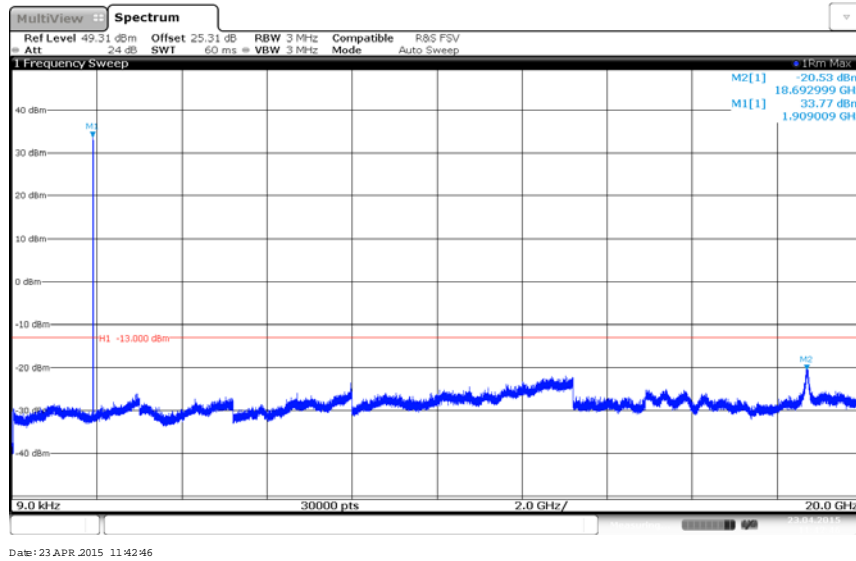




CDMA 2000 – 1xRTT/Mid Channel (600)/PCS BC1 @ 1880.0 MHz

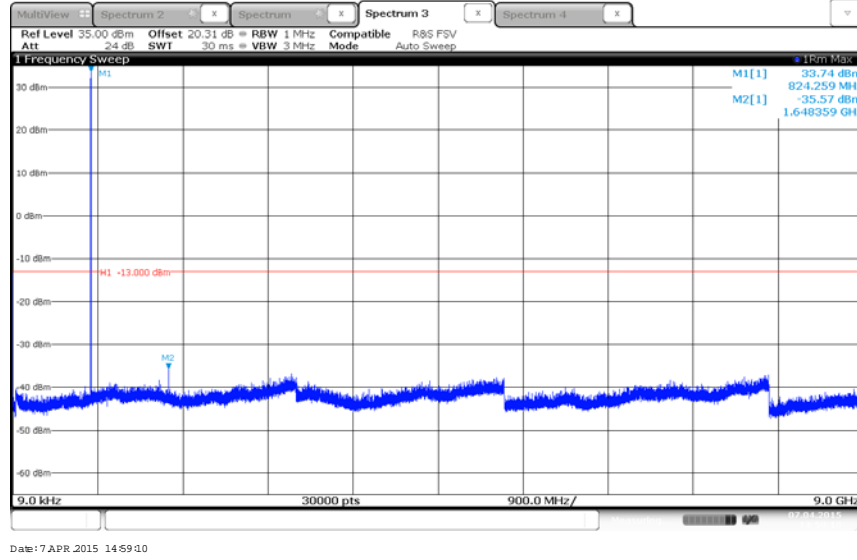


CDMA 2000 – 1xRTT/High Channel (1175)/PCS BC1 @ 1908.75 MHz

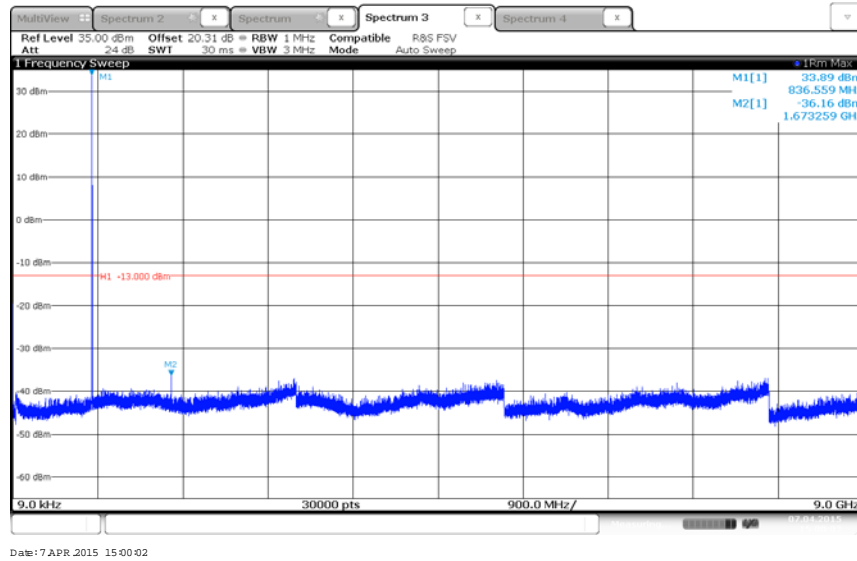




GSM850/GPRS/Low Channel (128)/Cell BC0 @ 824.2 MHz

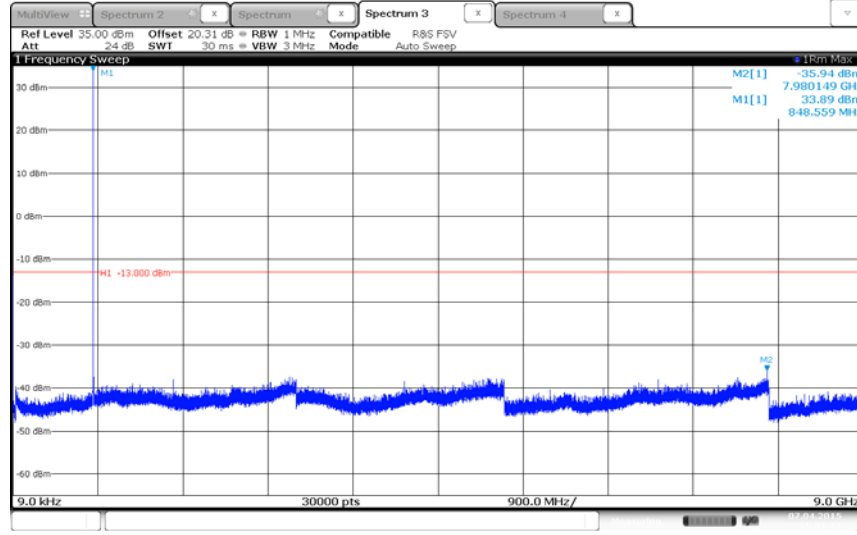


GSM850/GPRS/Mid Channel (190)/Cell BC0 @ 836.6 MHz

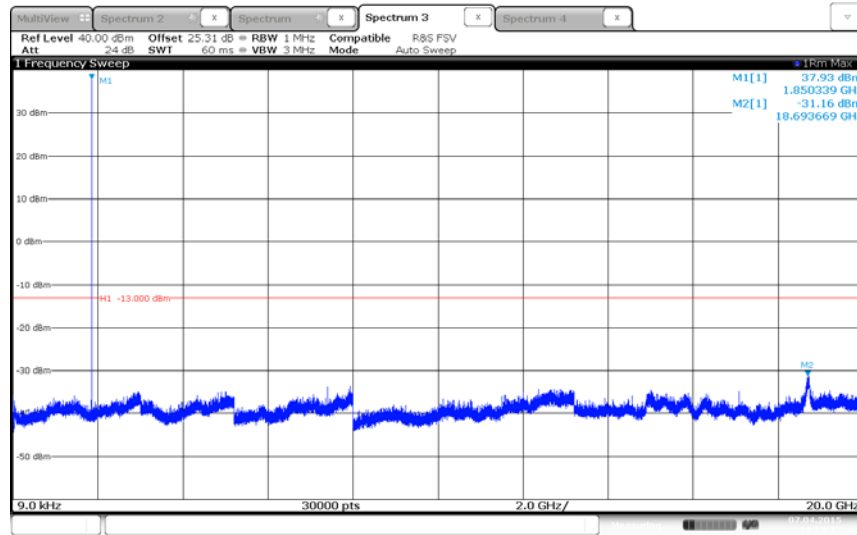




GSM850/GPRS/High Channel (251)/Cell BC0 @ 848.8 MHz

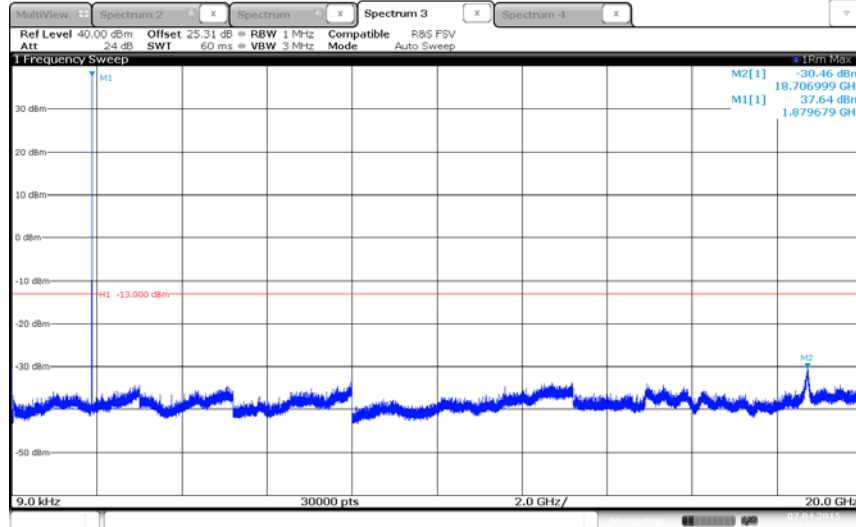


GSM1900/GPRS/Low Channel (512)/PCS BC1 @ 1850.2 MHz

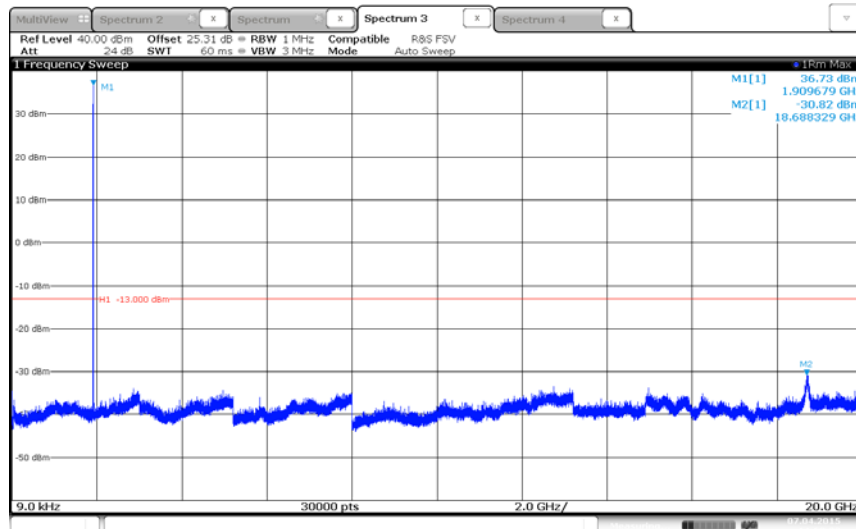




GSM1900/GPRS/Mid Channel (661)/PCS BC1 @ 1880.0 MHz

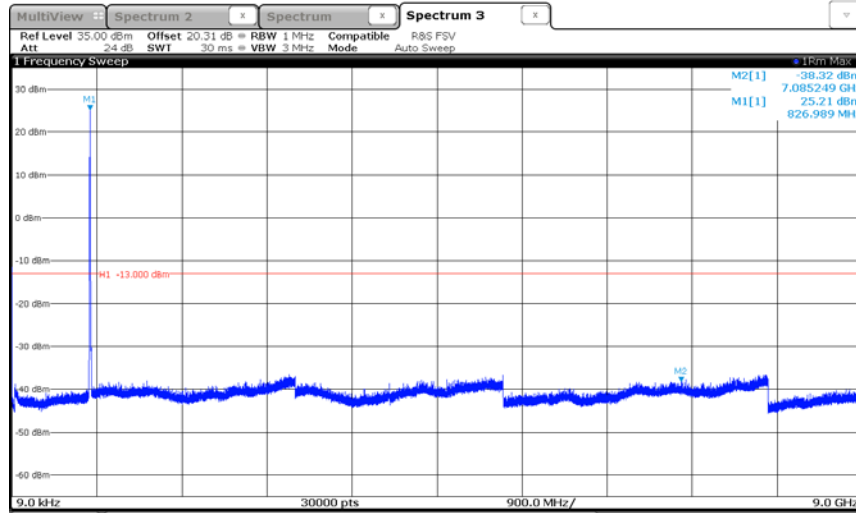


GSM1900/GPRS/High Channel (810)/PCS BC1 @ 1909.8 MHz



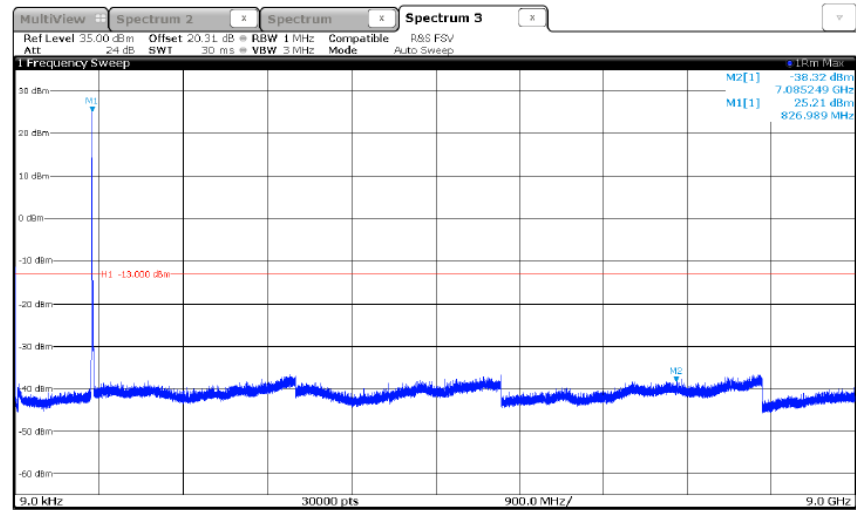


WCDMA/Low Channel (4132)/Cell Band 5 @ 826.4 MHz



Date: 7 APR 2015 14:22:07

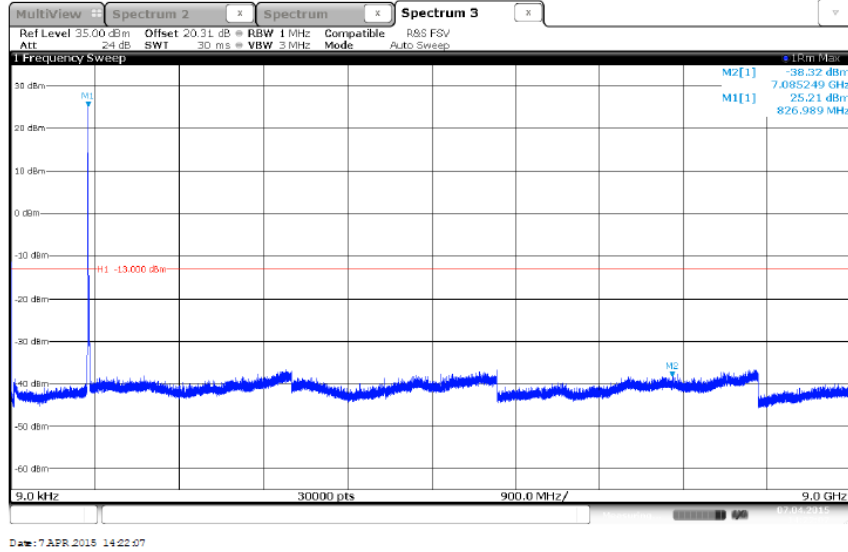
WCDMA/Mid Channel (4183)/Cell Band 5 @ 836.6 MHz



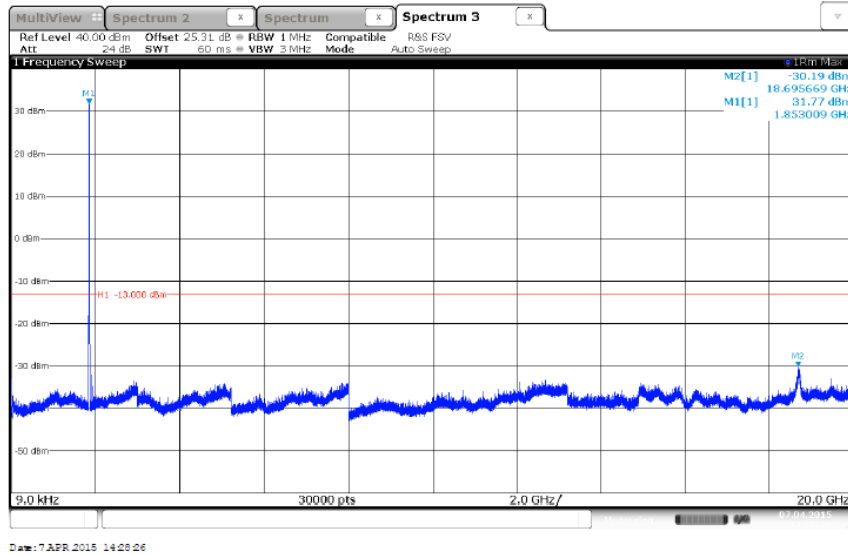
Date: 7 APR 2015 14:22:07



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

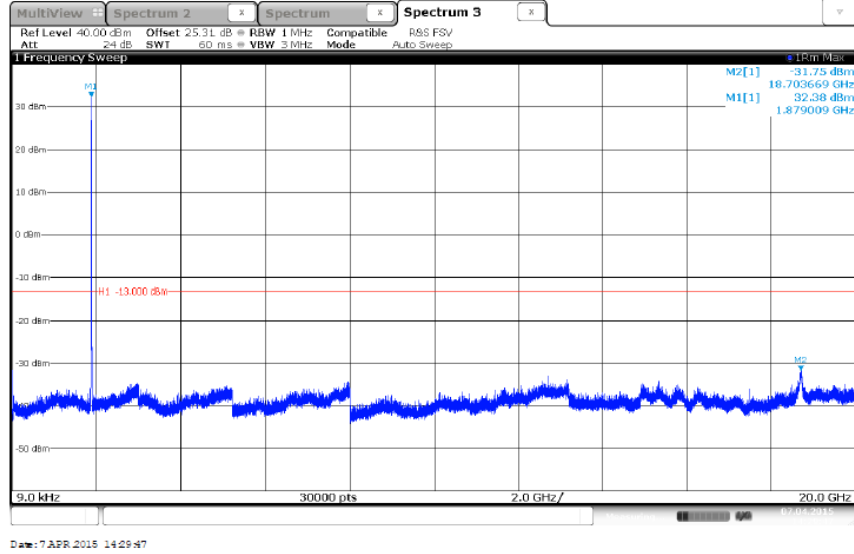


WCDMA/Low Channel (9262)/PCS Band 2 @ 1852.4 MHz

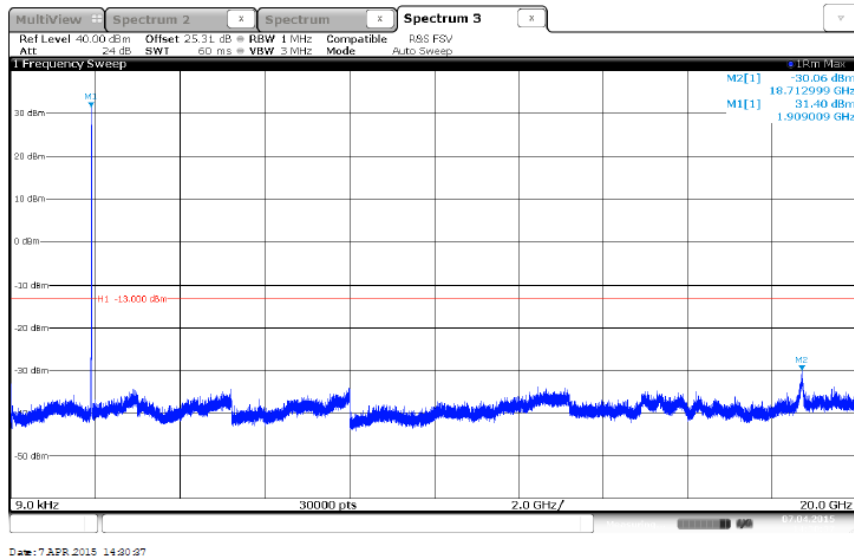




WCDMA/Mid Channel (9400)/PCS Band 2 @ 1880.0 MHz

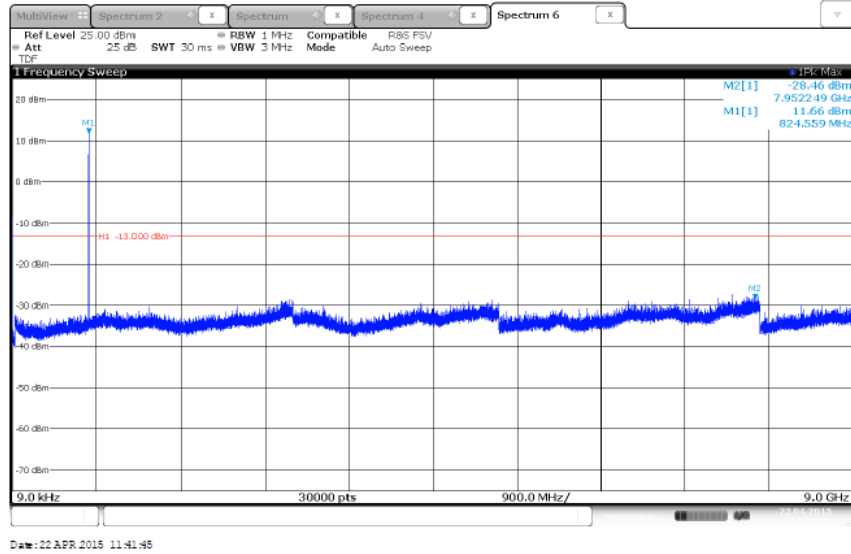


WCDMA/High Channel (9538)/PCS Band 2 @ 1907.6 MHz

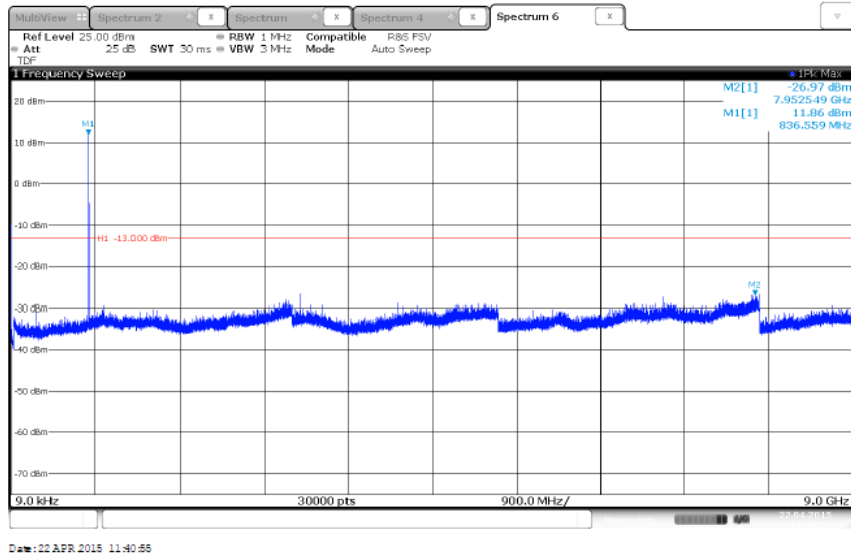




LTE Band 5 (1.4 MHz BW)/QPSK/Low Channel (20407) @ 824.7 MHz

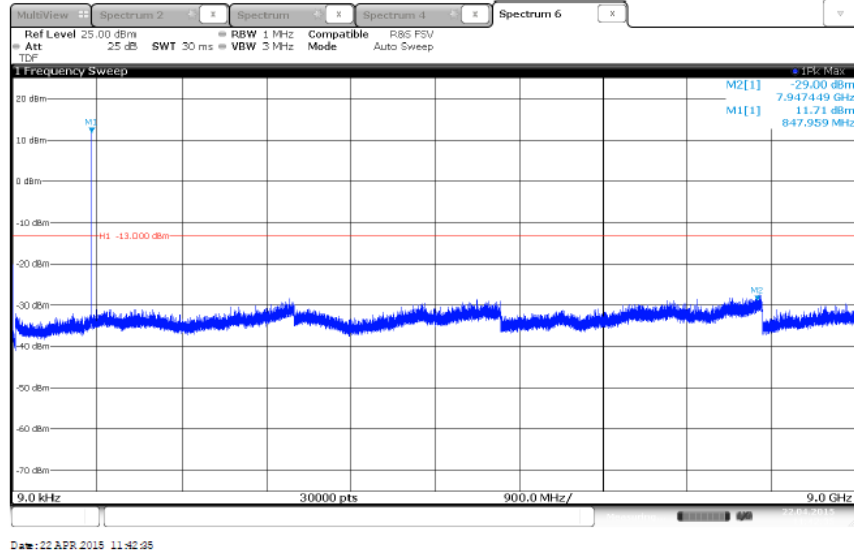


LTE Band 5 (1.4 MHz BW)/QPSK/Mid Channel (20525) @ 836.5 MHz

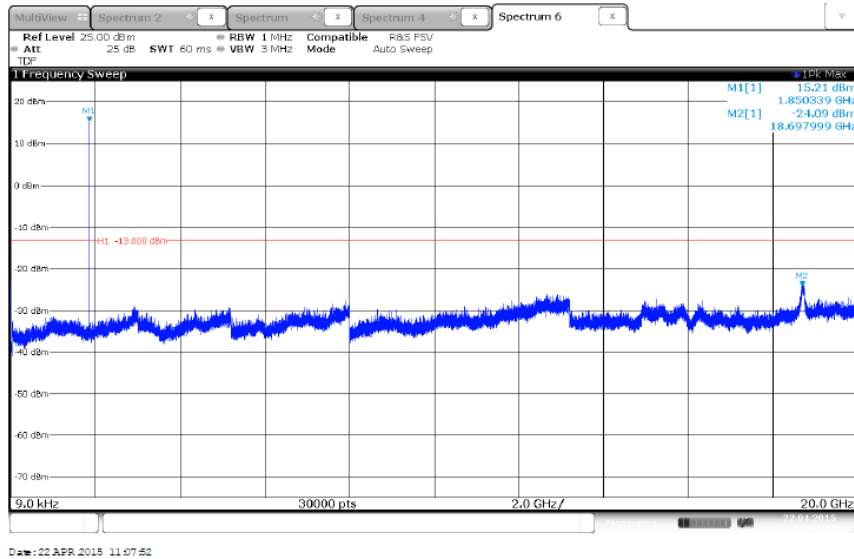




LTE Band 5 (1.4 MHz BW)/QPSK/High Channel (20643) @ 848.3 MHz

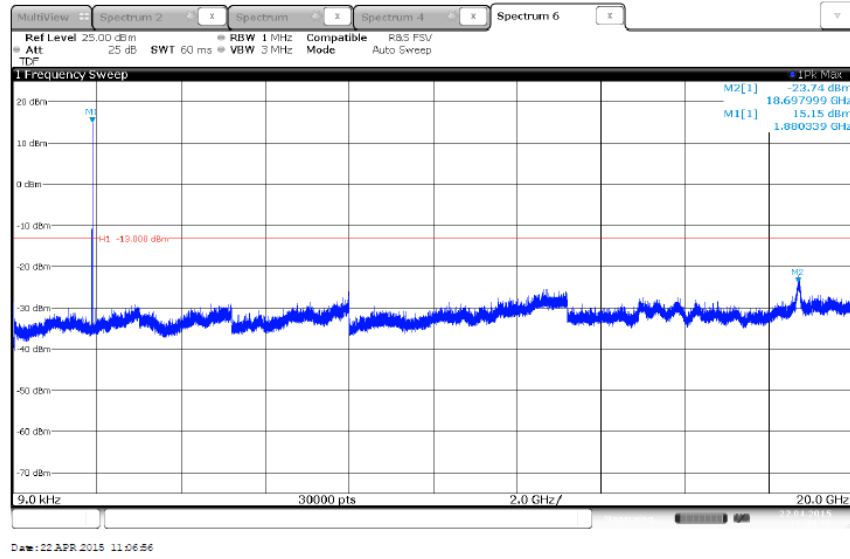


LTE Band 2 (1.4 MHz BW)/QPSK/Low Channel (18607) @ 1850.7 MHz

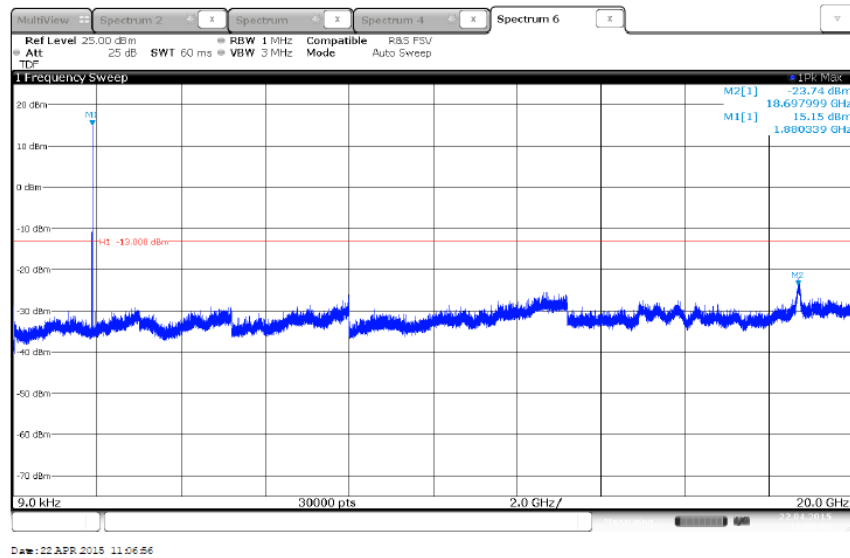




LTE Band 2 (1.4 MHz BW)/QPSK/Mid Channel (18900) @ 1880.0 MHz



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 |

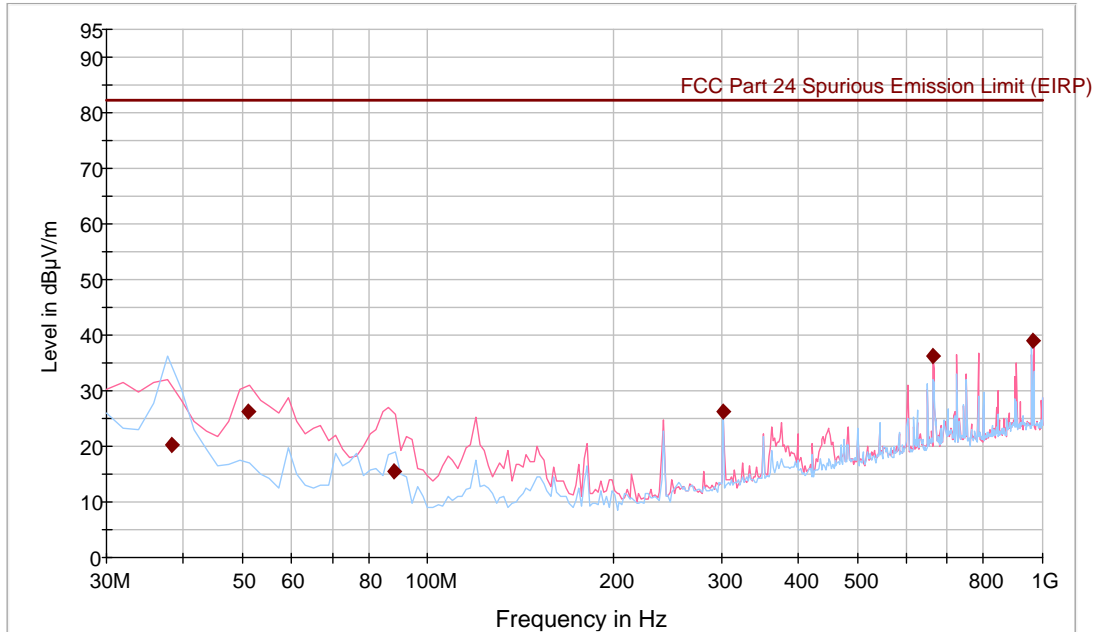
2.8.7 Additional Observations

- 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



- 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-QPK [Final Result 1.Result:1]

Quasi Peak Data

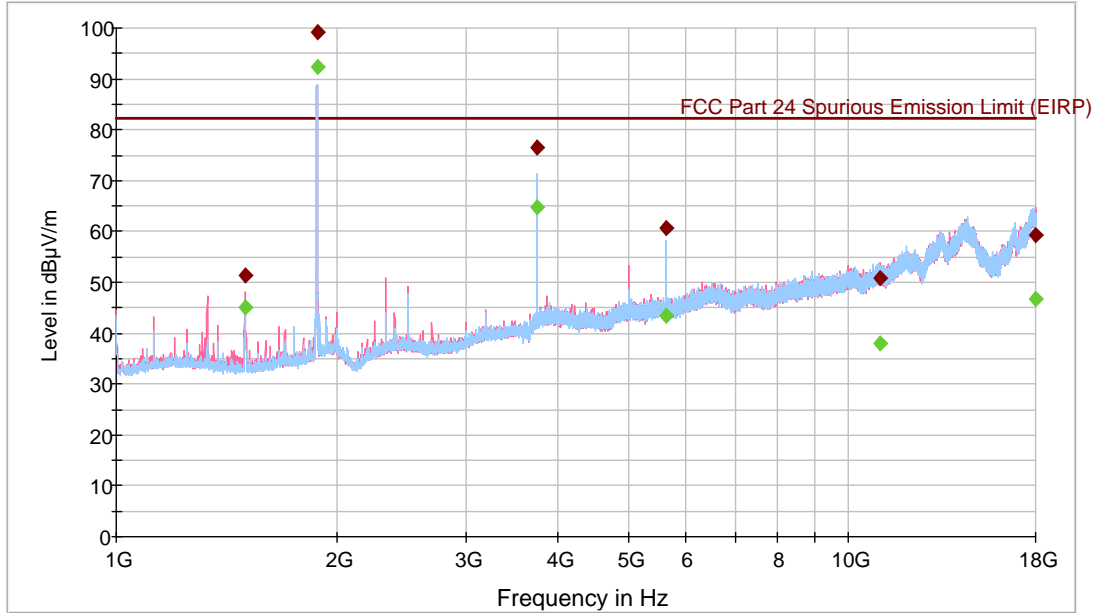
| Frequency (MHz) | QuasiPeak (dBµV/m) | Meas. Time (ms) | Bandwidth h (kHz) | Height (cm) | Polarization | Azimuth (deg) | Corr. (dB) | Margin (dB) | Limit (dBµV/m) |
|-----------------|--------------------|-----------------|-------------------|-------------|--------------|---------------|------------|-------------|----------------|
| 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 | | |
|---|------------------|------------------------------|
| Voltage (VDC) | Temperature (°C) | Frequency Deviation (Hz/ppm) |
| 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 | | |
|--|---------------|------------------------------|
| Temperature (°C) | Voltage (VDC) | Frequency Deviation (Hz/ppm) |
| 20 | 4.25 | 7.59 / 0.004 |
| | 5.75 | 7.40 / 0.004 |

| GSM850 (GPRS) Cell Band Mid Channel 190 @836.6 MHz | | |
|--|------------------|------------------------------|
| Voltage (VDC) | Temperature (°C) | Frequency Deviation (Hz/ppm) |
| 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 | | |
|--|---------------|------------------------------|
| Temperature (°C) | Voltage (VDC) | Frequency Deviation (Hz/ppm) |
| 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 | | |
|---|-------------------------|-------------------------------------|
| Voltage (VDC) | Temperature (°C) | Frequency Deviation (Hz/ppm) |
| 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 | | |
|---|----------------------|-------------------------------------|
| Temperature (°C) | Voltage (VDC) | Frequency Deviation (Hz/ppm) |
| 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 | | |
|--|-------------------------|-------------------------------------|
| Voltage (VDC) | Temperature (°C) | Frequency Deviation (Hz/ppm) |
| 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 | | |
|--|----------------------|-------------------------------------|
| Temperature (°C) | Voltage (VDC) | Frequency Deviation (Hz/ppm) |
| 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/Temperature/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

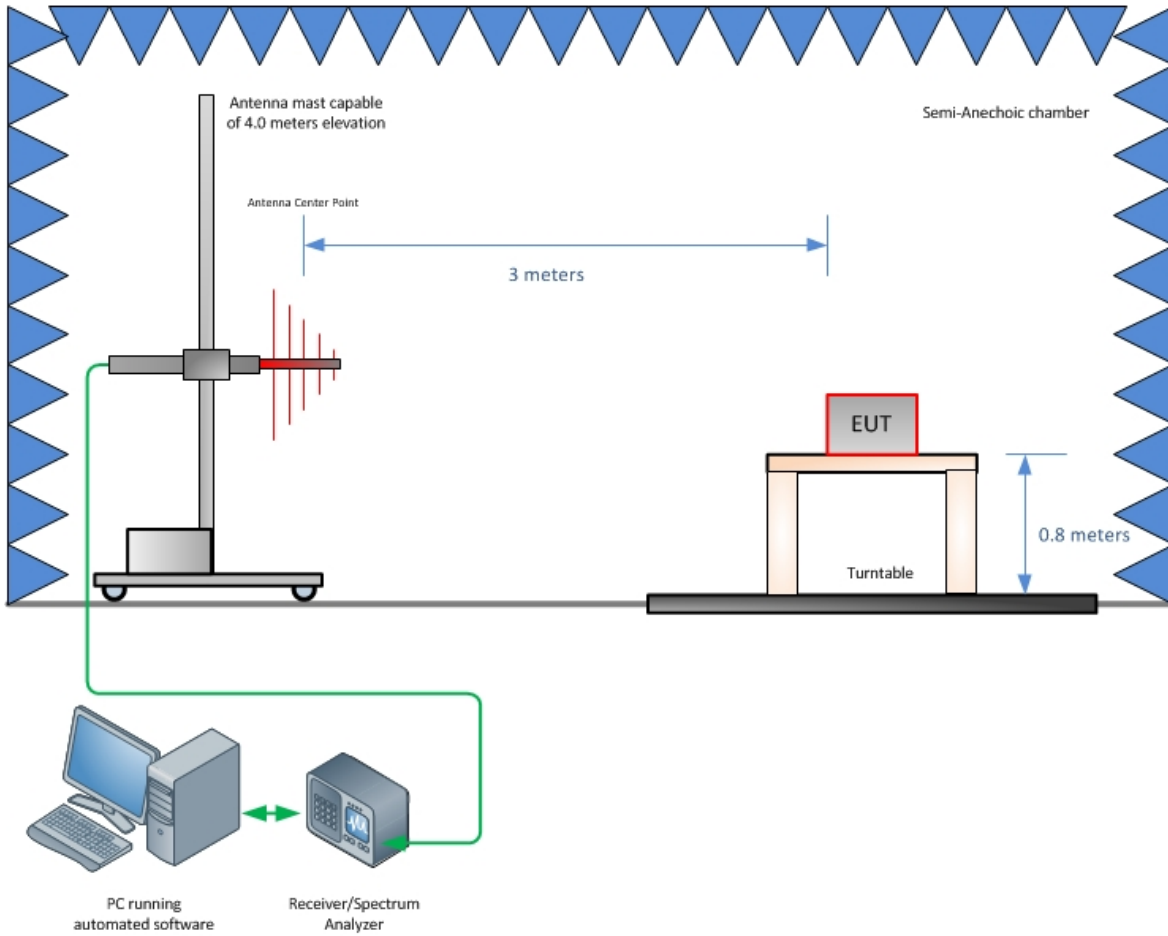
| Contribution | | Probability Distribution Type | Probability Distribution x_i | Standard Uncertainty $u(x_i)$ | $[u(x_i)]^2$ |
|---------------------------------|----------------------------|-------------------------------|--------------------------------|-------------------------------|--------------|
| 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 |



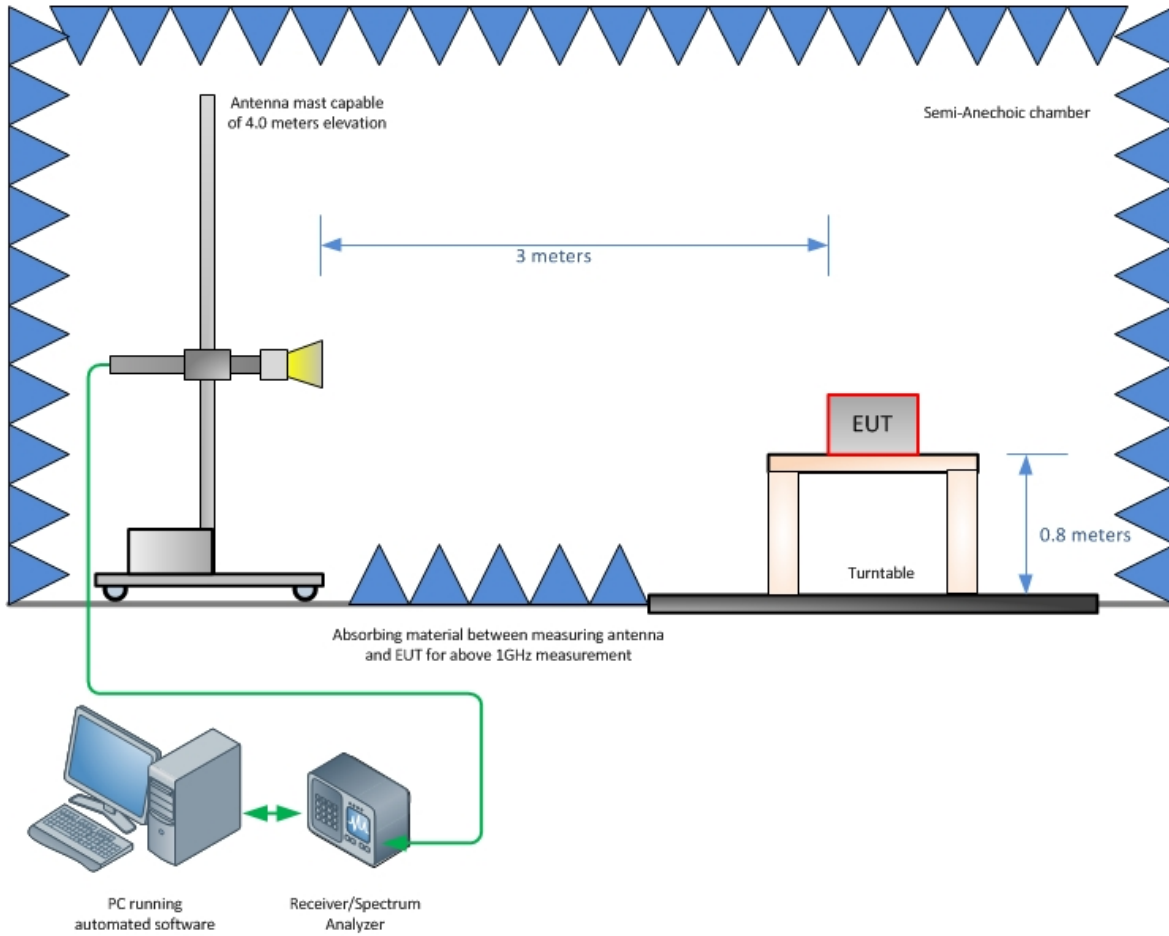
SECTION 4

DIAGRAM OF TEST SETUP

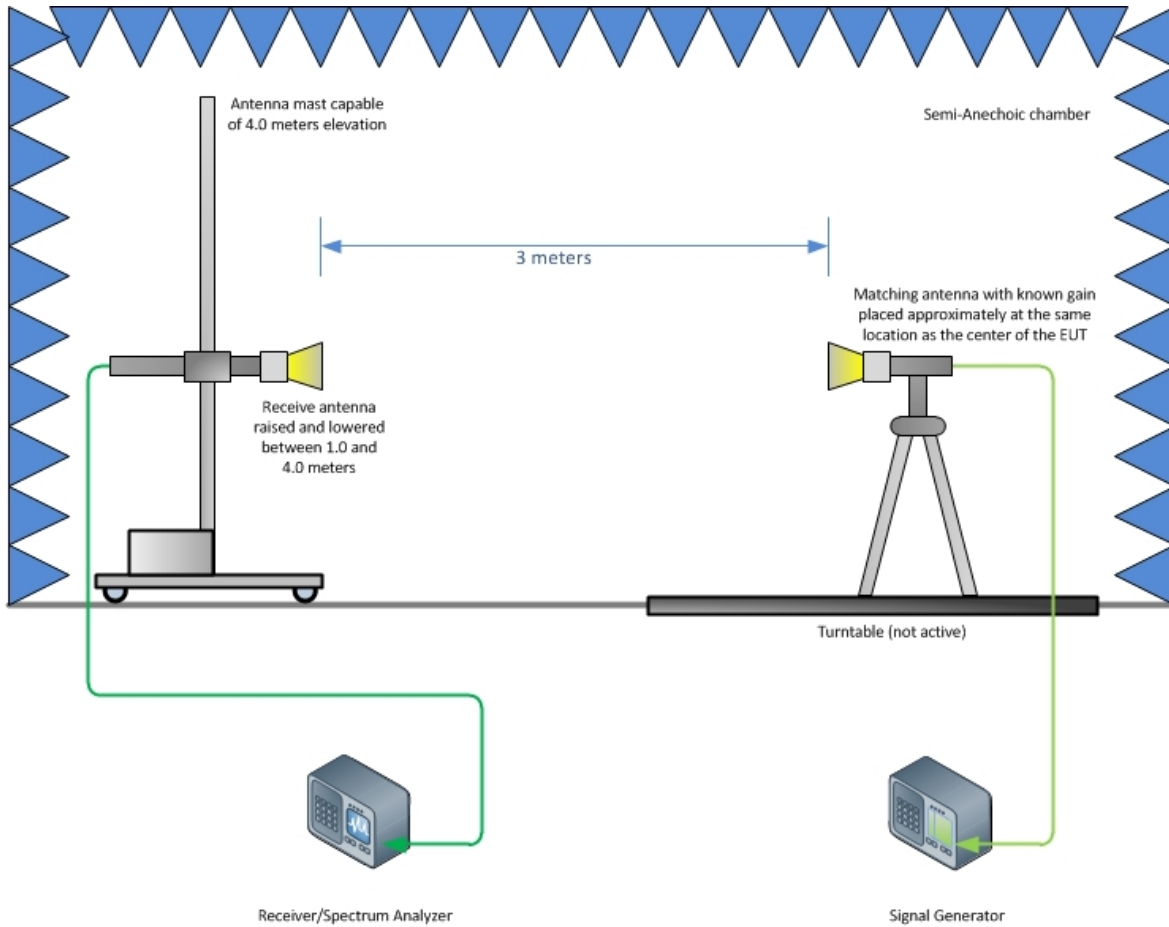
4.1 TEST SETUP DIAGRAM



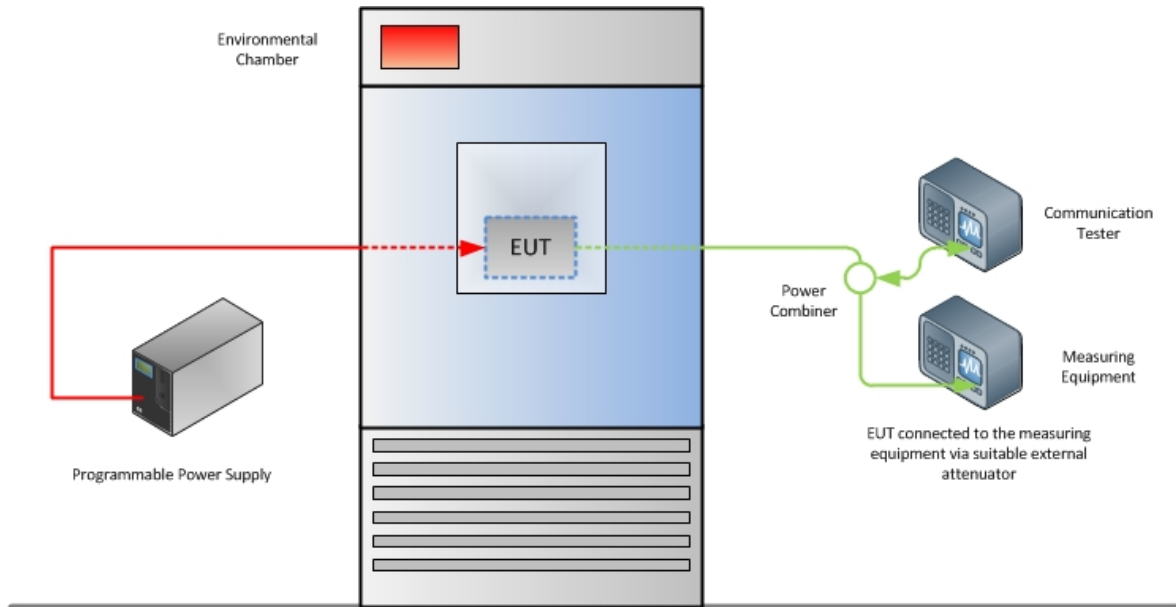
Radiated Emission Test Setup (Below 1GHz)



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

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