*Full*

# TEST REPORT

## No. I18D00141-SRD05

*For*

**Client : Shanghai Sunmi Technology Co.,Ltd.**

**Production : Handheld Wireless Terminal**

**Model Name : T8900/T8901**

**FCC ID: 2AH25L2**

**Hardware Version: 2DD021_V2.01**

**Software Version: L2_V2.6_20180621**

**Issued date: 2018-09-26**

**Note:**

The test results in this test report relate only to the devices specified in this report. This report shall not be reproduced except in full without the written approval of ECIT Shanghai.

**Test Laboratory:**

ECIT Shanghai, East China Institute of Telecommunications

Add: 7-8F, G Area, No.668, Beijing East Road, Huangpu District, Shanghai, P. R. China

Tel: (+86)-021-63843300, E-Mail: welcome@ecit.org.cn

**Revision Version**

| Report Number | Revision | Date | Memo |
|---|---|---|---|
| I18D00141-SRD05 | 00 | 2018-09-26 | Initial creation of test report |

# CONTENTS

# 1. Test Laboratory

## 1.1. Testing Location

| | |
|---|---|
| Company Name: | ECIT Shanghai, East China Institute of Telecommunications |
| Address: | 7-8F, G Area, No. 668, Beijing East Road, Huangpu District, Shanghai, P. R. China |
| Postal Code: | 200001 |
| Telephone: | (+86)-021-63843300 |
| Fax: | (+86)-021-63843301 |

## 1.2. Testing Environment

| | |
|---|---|
| Normal Temperature: | 15-35℃ |
| Extreme Temperature: | -30/+50℃ |
| Relative Humidity: | 20-75% |

## 1.3. Project data

| | |
|---|---|
| Project Leader: | Yu Anlu |
| Testing Start Date: | 2018-09-14 |
| Testing End Date: | 2018-09-18 |

## 1.4. Signature

**Yang Dejun**
**(Prepared this test report)**

**Shi Hongqi**
**(Reviewed this test report)**

**Zheng Zhongbin**
**Director of the laboratory**
**(Approved this test report)**

# 2. Client Information

## 2.1. Applicant Information

| | |
|---|---|
| Company Name: | Shanghai Sunmi Technology Co.,Ltd. |
| Address: | Room 505, KIC Plaza, No.388 Song Hu Road, Yang Pu District, Shanghai, China |
| Postcode: | 200433 |
| Telephone: | 18721763396 |

## 2.2. Manufacturer Information

| | |
|---|---|
| Company Name: | Shanghai Sunmi Technology Co.,Ltd. |
| Address: | Room 505, KIC Plaza, No.388 Song Hu Road, Yang Pu District, Shanghai, China |
| Postcode: | 200433 |
| Telephone: | 18721763396 |

# 3. Equipment Under Test (EUT) and Ancillary Equipment (AE)

## 3.1. About EUT

| | |
|---|---|
| EUT Description | Handheld Wireless Terminal |
| Model name | T8900/T8901 |
| FCC ID | 2AH25L2 |
| Frequency | GSM850/900/1800/1900；<br>WCDMA Band I/II/IV/V<br>CDMA2000 BC0/BC1<br>1xEV-DO BC0/BC1 |
| Extreme Temperature | -30/+50℃ |
| Nominal Voltage | 3.85V |
| Extreme High Voltage | 4.35V |
| Extreme Low Voltage | 3.5V |

Note: Photographs of EUT are shown in ANNEX A of this test report.

## 3.2. Internal Identification of EUT used during the test

| EUT ID* | Model Name | SN or IMEI | HW Version | SW Version | Date of receipt |
|---|---|---|---|---|---|
| N01 | T8900/T8901 | N/A | 2DD021_V2.01 | L2_V2.6_20180621 | 2018-07-25 |
| N07 | T8900/T8901 | N/A | 2DD021_V2.01 | L2_V2.6_20180621 | 2018-07-25 |

*EUT ID: is used to identify the test sample in the lab internally.

## 3.3. Internal Identification of AE used during the test

| AE ID* | Description | SN |
|---|---|---|
| AE1 | RF cable | --- |
| AE2 | --- | --- |

*AE ID: is used to identify the test sample in the lab internally.

## 3.4. Statements

The T8900/T8901, supporting GSM/GPRS/EDGE/WCDMA/CDMA/LTE/BT/BLE/WLAN/NFC, manufactured by Shanghai Sunmi Technology Co.,Ltd.., which is a new product for testing.

ECIT has verified that the compliance of the tested device specified in section 5 of this test report is successfully evaluated according to the procedure and test methods as defined in type certification requirement listed in section 5 of this test report.

# 4. Reference Documents

## 4.1. Reference Documents for testing

The following documents listed in this section are referred for testing.

| Reference | Title | Version |
|---|---|---|
| FCC Part 2 | ANSI/TIA-603-C:2004 ANSI/TIA-98-E:2003 | 2014 |
| FCC Part 22 | PUBLIC MOBILE SERVICES | 2014 |

# 5. SUMMARY OF TEST RESULTS

| Item | Test items | Clause in FCC rules | Clause in IC rules RSS-Gen and RSS- 130 | result |
|---|---|---|---|---|
| 1 | Output Power | part 2.1046,part 22.913 | / | Pass |
| 2 | Peak-to-Average | part 2.1046,part 22. subpart | / | Pass |
| 3 | 99%Occupied | part 2.1049,part 22. subpart | / | Pass |
| 4 | -26dB Emission | part 2.1049,part 22. subpart | / | Pass |
| 5 | Band Edge at antenna terminals | part 2.1051 and part 22.917 | / | Pass |
| 6 | Frequency stability | part 2.1055 and part 22.355 | / | Pass |
| 7 | Conducted Spurious mission | part 2.1055 and part 22.355 | / | Pass |
| 8 | Emission Limit | part 22.913(a) | / | Pass |

# 6. Test Equipment Utilized

**Climate chamber**

| No. | Equipment | Model | Serial Number | Manufacturer | Calibration date | Cal.interval |
|---|---|---|---|---|---|---|
| 1 | Climate chamber | SH-641 | 92012011 | ESPEC | 2017-12-25 | 2 Year |

**Radiated emission test system**

The test equipment and ancillaries used are as follows.

| No. | Equipment | Model | Serial Number | Manufacturer | Calibration date | Cal.interval |
|---|---|---|---|---|---|---|
| 1 | Universal Radio Communication Tester | CMU200 | 123123 | R&S | 2018-05-11 | 1 Year |
| 2 | EMI Test Receiver | ESU40 | 100307 | R&S | 2018-05-11 | 1 Year |
| 3 | TRILOG Broadband Antenna | VULB9163 | VULB9163-515 | Schwarzbeck | 2017-02-25 | 3 Year |
| 4 | Double-ridged Waveguide Antenna | ETS-3117 | 00135890 | ETS | 2017-01-11 | 3 Year |
| 5 | 2-Line V-Network | ENV216 | 101380 | R&S | 2018-05-11 | 1 Year |
| 6 | Substitution Antenna | ETS-3117 | 00135890 | ETS | 2017-01-11 | 3 Year |
| 7 | RF Signal Generator | SMF100A | 102314 | R&S | 2018-05-11 | 1 Year |
| 8 | Substitution Antenna | VUBA9117 | 9117-266 | Schwarzbeck | 2017-11-18 | 3 Year |
| 9 | Amplifier | SCU08 | 10146 | R&S | 2018-05-11 | 1 Year |

**Conducted test system**

| No. | Name | Type | SN | Manufacture | Calibration date | Cal.interval |
|---|---|---|---|---|---|---|
| 1 | Spectrum Analyzer | FSQ26 | 101096 | R&S | 2018-05-11 | 1 Year |
| 2 | Universal Radio Communicat | CMU200 | 123123 | R&S | 2018-05-11 | 1 Year |
| 3 | DC Power Supply | ZUP60-14 | LOC-220Z006-0007 | TDL-Lambda | 2018-05-11 | 1 Year |

# 7. Test Environment

**Shielding Room1** (6.0 meters×3.0 meters×2.7 meters) did not exceed following limits along the conducted RF performance testing:

| | |
|---|---|
| Temperature | Min. = 15 ℃, Max. = 35 ℃ |
| Relative humidity | Min. = 20 %, Max. = 75 % |
| Shielding effectiveness | > 100 dB |
| Ground system resistance | < 0.5 |

**Control room** did not exceed following limits along the EMC testing:

| | |
|---|---|
| Temperature | Min. = 15 ℃, Max. = 35 ℃ |
| Relative humidity | Min. =25 %, Max. = 75 % |
| Shielding effectiveness | > 100 dB |
| Electrical insulation | > 10 k |
| Ground system resistance | < 0.5 |

Fully-anechoic chamber1 (6.9 meters×10.9 meters×5.4 meters) did not exceed following limits along the EMC testing:

| | |
|---|---|
| Temperature | Min. = 15 ℃, Max. = 35 ℃ |
| Relative humidity | Min. = 25 %, Max. = 75 % |
| Shielding effectiveness | > 100 dB |
| Electrical insulation | > 10 k |
| Ground system resistance | < 0.5 |
| VSWR | Between 0 and 6 dB, from 1GHz to 18GHz |
| Site Attenuation Deviation | Between -4 and 4 dB,30MHz to 1GHz |
| Uniformity of field strength | Between 0 and 6 dB, from 80MHz to 3000 MHz |

# ANNEX A. MEASUREMENT RESULTS

## ANNEX A.1. OUTPUT POWER

### A.1.1. Summary

During the process of testing, the EUT was controlled Rhode & Schwarz Digital Radio. Communication tester (CMU-200) to ensure max power transmission and proper modulation. This result contains peak output power and EIRP measurements for the EUT. In all cases, output power is within the specified limits.

### A.1.2. Conducted

#### A.1.2.1. Method of Measurements

Method of measurements please refer to CFR47 (FCC) part 2.1046 and part 22.913.
The EUT was set up for the max output power with pseudo random data modulation.
The power was measured with Rhode & Schwarz Spectrum Analyzer FSQ(peak).
These measurements were done at 3 frequencies, 1850.2 MHz, 1880.0MHz and 1909.8MHz for PCS1900 band; 824.2MHz, 836.6MHz and 848.8MHz for GSM850 band. (bottom, middle and top of operational frequency range).
These measurements were done at 3 frequencies, 1852.4 MHz, 1880.0MHz and 1907.6MHz for WCDMA Band II; 826.4MHz, 836.6MHz and 846.6MHz for WCDMA Band V. (bottom, middle and top of operational frequency range).

**A.1.2.2 Test procedures:**

1. The transmitter output port was connected to base station.
2. Set the EUT at maximum power through base station.
3. Select lowest, middle, and highest channels for each band and different modulation.
4. Measure the maximum burst average power for GSM and maximum average power for other modulation signal.

**A.1.2.3 Limit:**

22.913(a) Mobile stations are limited to 7watts.
24.232(c) Mobile and portable stations are limited to 2 watts.

**A.1.2.4 Test Procedure:**

The transmitter output power was connected to calibrated attenuator, the other end of which was connected to signal analyzer. Transmitter output power was read off the power in dBm. The power outputs at the transmitter antenna port was determined by adding the value of attenuator to the signal analyzer reading.

**A.1.2.5 CDMA2000 Cellular Test Condition:**

| RBW | VBW | Sweep time | Span |
|---|---|---|---|

| | | | |
|---|---|---|---|
| 1MHz | 1MHz | 300ms | 10MHz |

**A.1.2.7 Measurement results:**

| CDMA2000 Cellular BC0 | | |
|---|---|---|
| Channel/fc(MHz) | Peak power (dBm) | AV power (dBm) |
| Mid 777/848.31 | 24.51 | 24.43 |
| Low 384/836.52 | 24.70 | 24.63 |
| High 1013/824.7 | 24.64 | 24.58 |

| CDMA2000 PCS BC1 | | |
|---|---|---|
| Channel/fc(MHz) | Peak power (dBm) | AV power (dBm) |
| Mid 600/1880.0 | 24.01 | 23.95 |
| Low 25/1851.25 | 24.17 | 24.10 |
| High 1175/1908.75 | 24.32 | 23.99 |

| 1xEV-DO BC0 Release 0 | | |
|---|---|---|
| Channel/fc(MHz) | Peak power (dBm) | AV power (dBm) |
| Mid 777/848.31 | 27.60 | 24.31 |
| Low 384/836.52 | 28.27 | 24.48 |
| High 1013/824.7 | 28.37 | 24.42 |

| 1xEV-DO BC1 Release 0 | | |
|---|---|---|
| Channel/fc(MHz) | Peak power (dBm) | AV power (dBm) |
| Mid 600/1880.0 | 27.06 | 23.72 |
| Low 25/1851.25 | 27.54 | 23.82 |
| High 1175/1908.75 | 26.87 | 23.77 |

| 1xEV-DO BC0 Release A |
|---|

| Channel/fc(MHz) | Peak power (dBm) | AV power (dBm) |
|---|---|---|
| Mid 777/848.31 | 27.75 | 24.36 |
| Low 384/836.52 | 28.43 | 24.61 |
| High 1013/824.7 | 28.68 | 24.63 |

| 1xEV-DO BC1 Release A | | |
|---|---|---|
| Channel/fc(MHz) | Peak power (dBm) | AV power (dBm) |
| Mid 600/1880.0 | 27.14 | 23.62 |
| Low 25/1851.25 | 27.81 | 23.96 |
| High 1175/1908.75 | 26.82 | 23.80 |

**Conclusion: PASS**

## ANNEX A.2. Peak-to-Average Power Ratio

Method of test measurements please refer to CFR47 (FCC) part 2.1046 and part 22.913.

### A.2.1 PAPR Limit

The peak-to-average power ratio (PAPR) of the transmission may not exceed 13dB

### A.2.2 Test procedures

1. The EUT was connected to the spectrum analyzer and system simulator via a power divider.
2. 
   1) Select the spectrum analyzer CCDF function.
   2) Set RBW≥signal's occupied bandwidth.
   3) Set the number of counts to a value that stabilizes the measured CCDF cure;
   4) Sweep time ≥ 1s.
3. Record the maximum PAPR level associated with a probability of 0.1%.

### A.2.3 Test results:

| CDMA2000 Cellular BC0 | | | |
|---|---|---|---|
| Channel | 384 | 777 | 1013 |
| Frequency (MHz) | 836.52 | 848.31 | 824.7 |
| PAPR(dB) | 6.41 | 6.37 | 6.41 |

| CDMA2000 PCS BC1 | | | |
|---|---|---|---|
| Channel | 25 | 600 | 1175 |
| Frequency (MHz) | 1851.25 | 1880.0 | 1908.75 |
| PAPR(dB) | 6.45 | 6.37 | 6.45 |

| 1xEV-DO BC0 Release 0 | | | |
|---|---|---|---|
| Channel | 384 | 777 | 1013 |
| Frequency (MHz) | 836.52 | 848.31 | 824.7 |
| PAPR(dB) | 6.59 | 6.45 | 6.48 |

| 1xEV-DO BC1 Release 0 | | | |
|---|---|---|---|
| Channel | 25 | 600 | 1175 |
| Frequency (MHz) | 1851.25 | 1880.0 | 1908.75 |
| PAPR(dB) | 6.40 | 6.33 | 6.28 |

| 1xEV-DO BC0 Release A | | | |
|---|---|---|---|
| Channel | 384 | 777 | 1013 |
| Frequency (MHz) | 836.52 | 848.31 | 824.7 |
| PAPR(dB) | 6.76 | 6.31 | 6.44 |

| 1xEV-DO BC1 Release A | | | |
|---|---|---|---|
| Channel | 25 | 600 | 1175 |
| Frequency (MHz) | 1851.25 | 1880.0 | 1908.75 |
| PAPR(dB) | 6.67 | 6.32 | 6.25 |

**Conclusion: PASS**

## ANNEX A.3. Occupied Bandwidth

Method of test please refer to CFR 47 (FCC) part 2.1049 and part 22 subpart .

### A.3.1. Occupied Bandwidth

Similar to conducted emissions; occupied bandwidth measurements are only provided for selected frequencies in order to reduce the amount of submitted data. Data were taken at the extreme and mid frequencies of CDMA2000 Cellular, CDMA2000 PCS.

### A.3.2 Test Procedure:

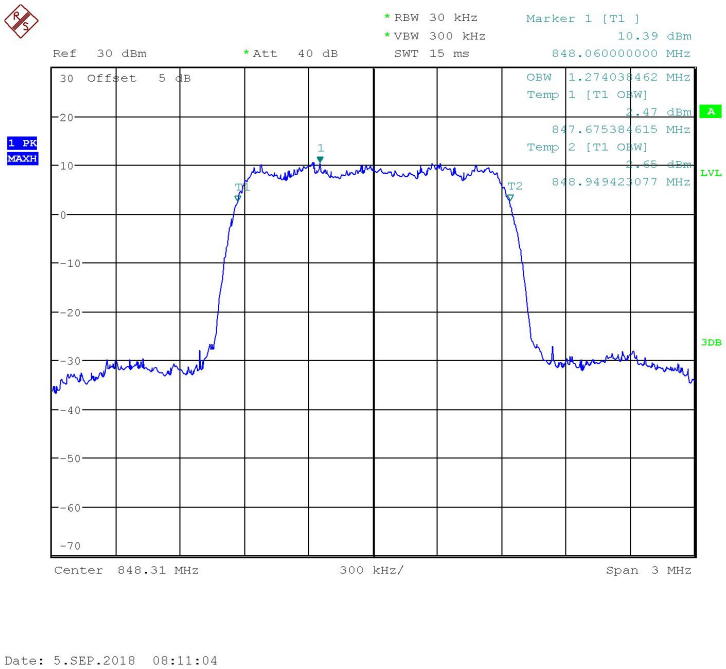
1. The EUT output RF connector was connected with a short cable to the signal analyzer.
2. RBW was set to about 1% of emission BW, VBW >= 3 times RBW,.
3. 99% bandwidth were measured, the occupied bandwidth is delta frequency between the two points where the display line intersects the signal trace.

### A.3.3 Test result:

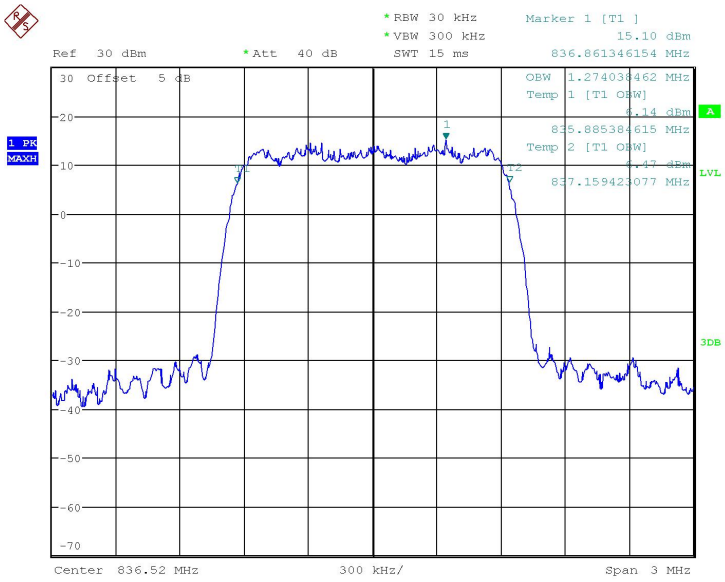
| CDMA2000 Cellular BC0 | | |
|---|---|---|
| Test channel | Frequency (MHz) | 99% Occupied Bandwidth(MHz) |
| Mid 777 | 848.31 | 1.274 |
| Low 384 | 836.52 | 1.274 |
| High 1013 | 824.7 | 1.274 |

**Conclusion: PASS**

**CDMA2000 Cellular**

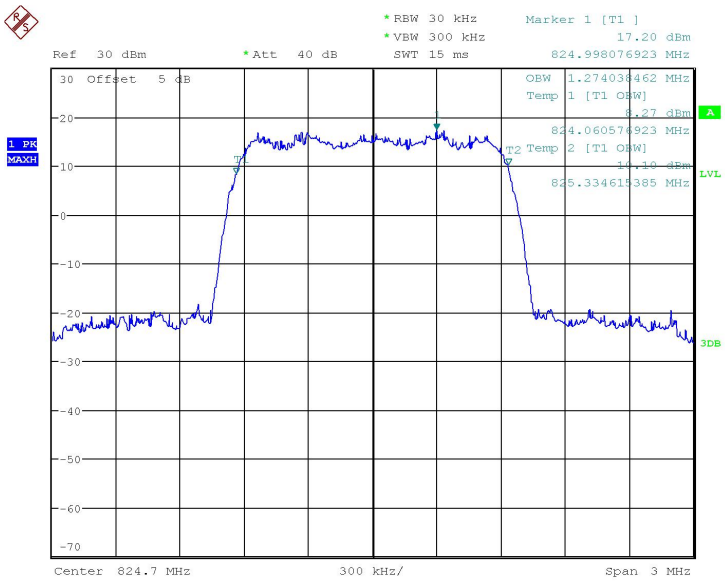


**Channel 777-Occupied Bandwidth (99%)**




Date: 5.SEP.2018 08:12:56

**Channel 384-Occupied Bandwidth (99%)**




Date: 5.SEP.2018 08:13:41

**Channel 1013-Occupied Bandwidth (99%)**

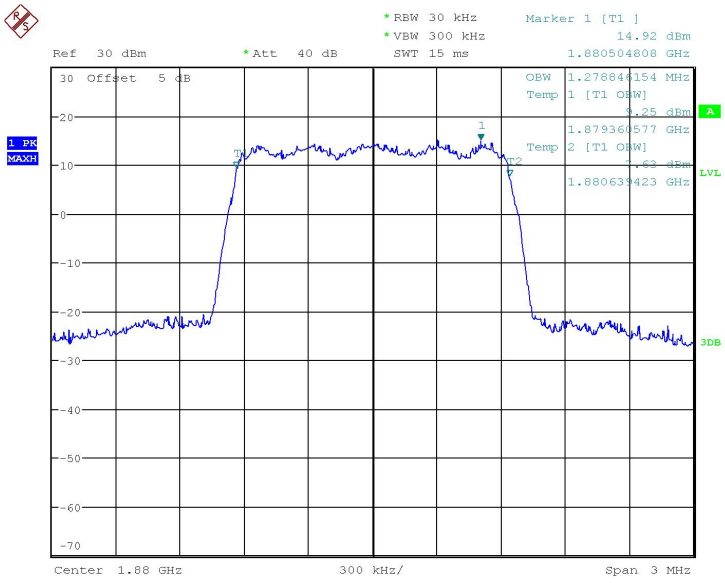
**Conclusion: PASS**

| CDMA2000 PCS BC1 | | |
|---|---|---|
| Test channel | Frequency (MHz) | 99% Occupied Bandwidth(MHz) |
| Mid 600 | 1880.0 | 1.279 |

| | | |
|---|---|---|
| Low 25 | 1851.25 | 1.284 |
| High 1175 | 1908.75 | 1.288 |

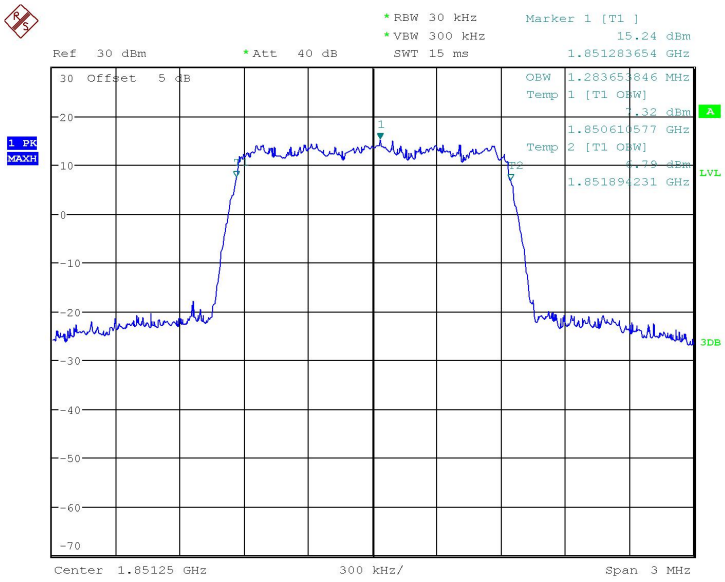
**Conclusion: PASS**

**CDMA2000 PCS**



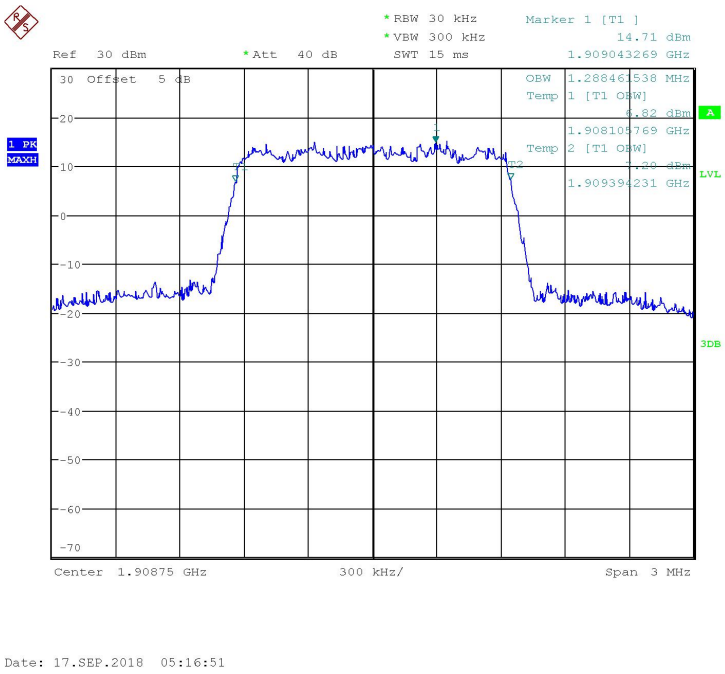

Date: 17.SEP.2018 05:15:19

**Channel 600-Occupied Bandwidth**




Date: 17.SEP.2018 05:16:04

**Channel 25-Occupied Bandwidth**

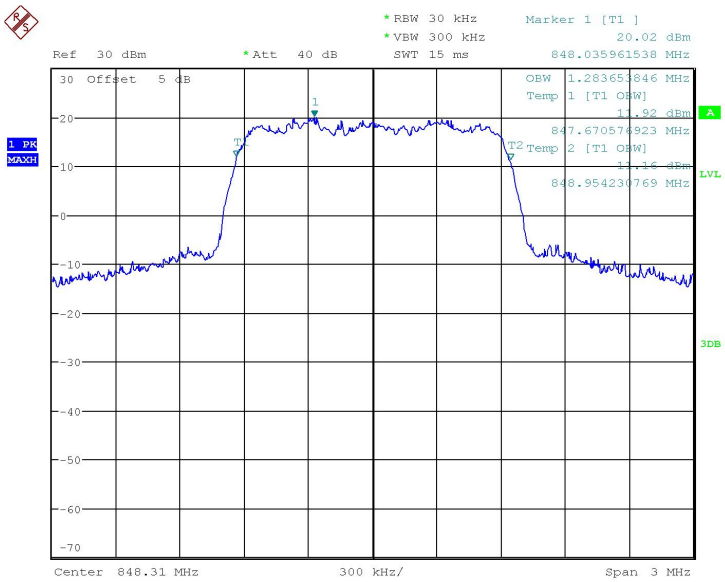



**Channel 1175-Occupied Bandwidth**

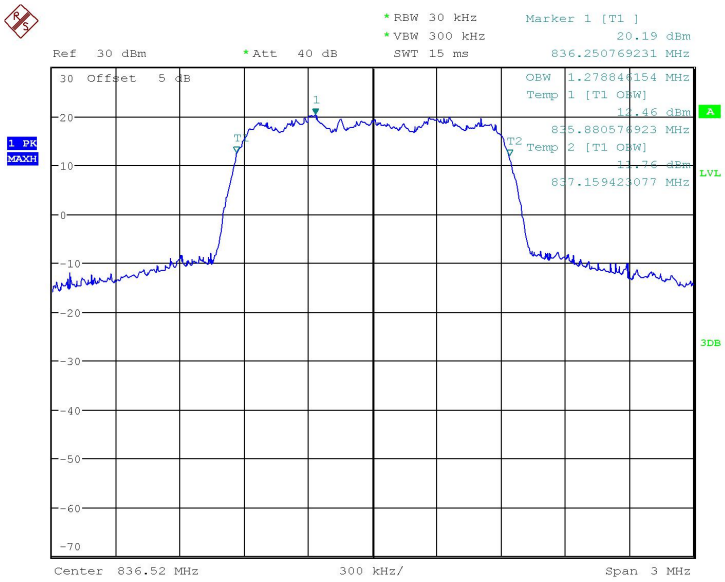
**Conclusion: PASS**

| 1xEV-DO BC0 Release 0 | | |
|---|---|---|
| Test channel | Frequency (MHz) | 99% Occupied Bandwidth(MHz) |
| Mid 777 | 848.31 | 1.284 |
| Low 384 | 836.52 | 1.279 |
| High 1013 | 824.7 | 1.274 |

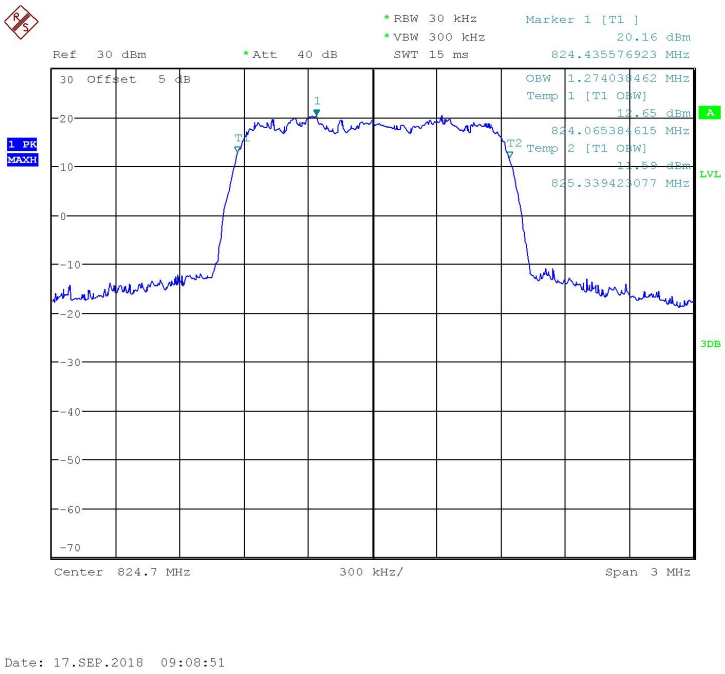
**1xEV-DO BC0 Release 0**




**Channel 777-Occupied Bandwidth (99%)**




**Channel 384-Occupied Bandwidth (99%)**

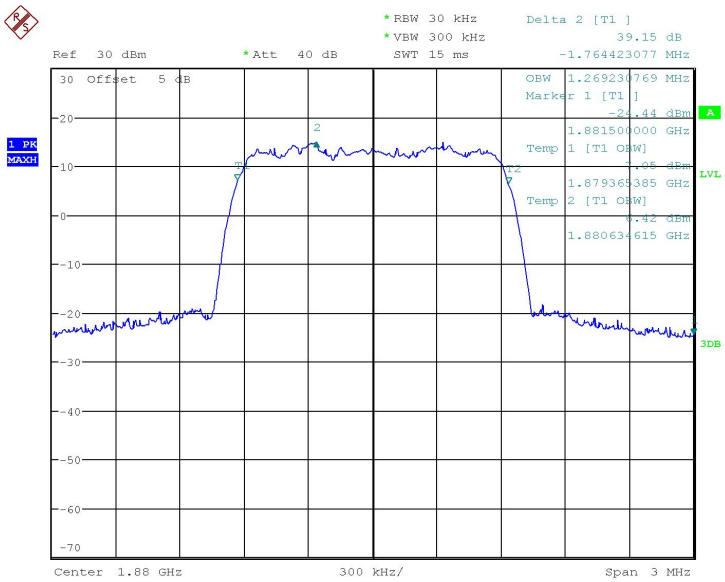



**Channel 1013-Occupied Bandwidth (99%)**

**Conclusion: PASS**

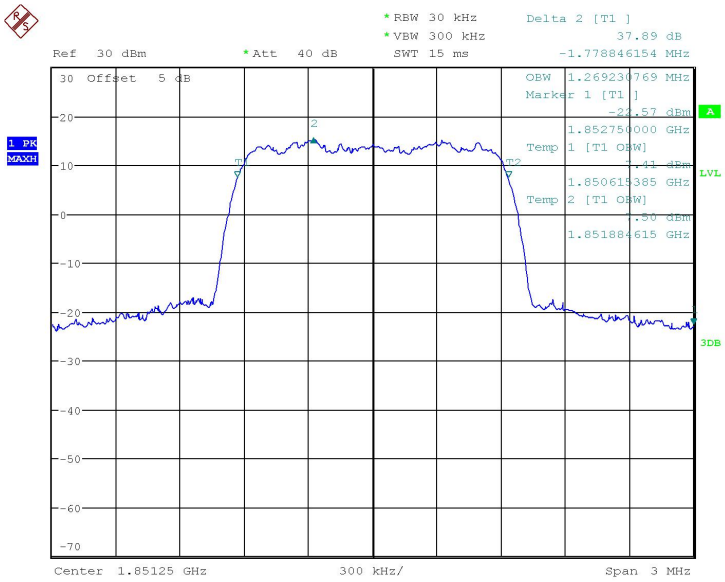
| 1xEV-DO BC1 Release 0 | | |
|---|---|---|
| Test channel | Frequency (MHz) | 99% Occupied Bandwidth(MHz) |
| Mid 600 | 1880.0 | 1.269 |
| Low 25 | 1851.25 | 1.269 |
| High 1175 | 1908.75 | 1.284 |

**1xEV-DO BC1 Release 0**



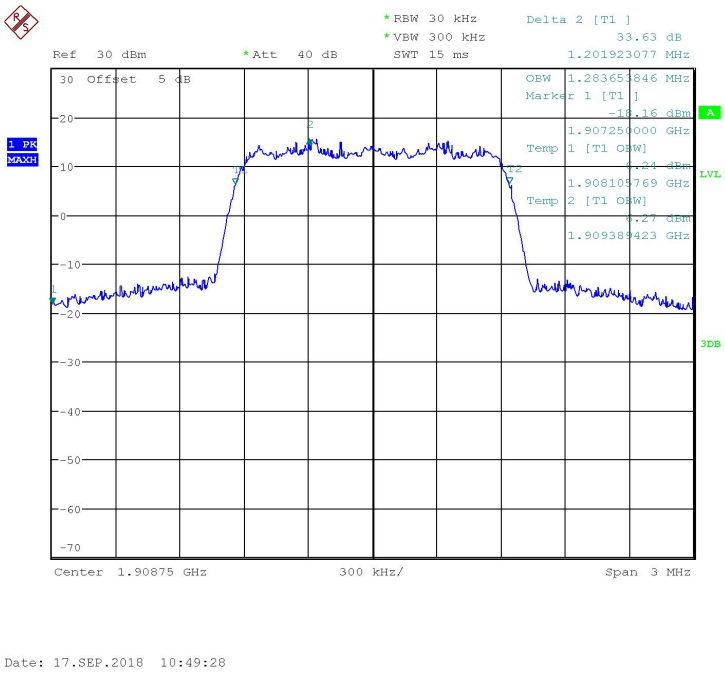

Date: 17.SEP.2018 10:03:58

**Channel 600-Occupied Bandwidth**




Date: 17.SEP.2018 10:48:21

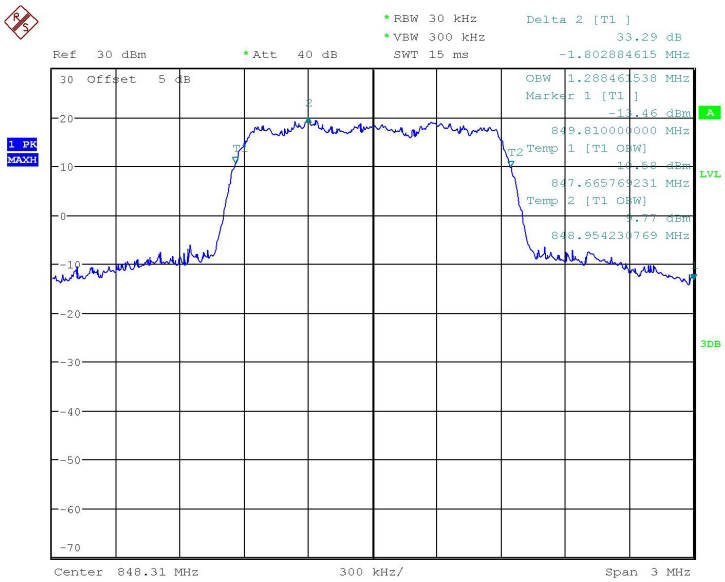
**Channel 25-Occupied Bandwidth**




**Channel 1175-Occupied Bandwidth**

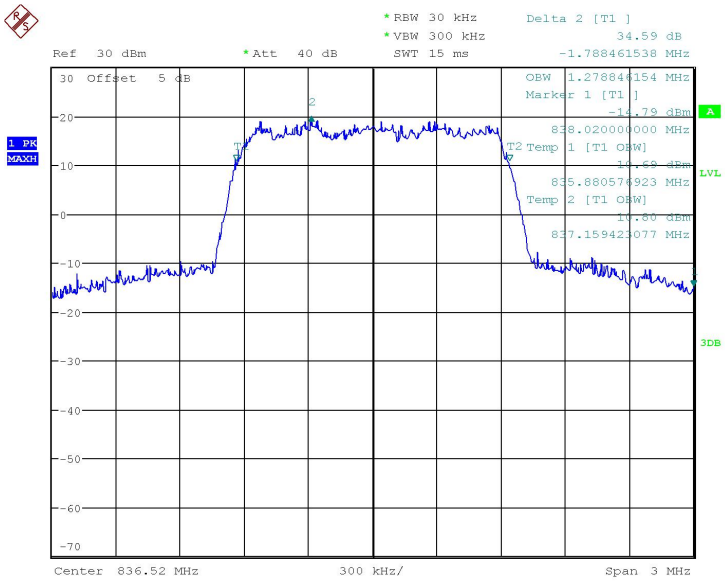
| 1xEV-DO BC0 Release A | | |
|---|---|---|
| Test channel | Frequency (MHz) | 99% Occupied Bandwidth(MHz) |
| Mid 777 | 848.31 | 1.288 |
| Low 384 | 836.52 | 1.279 |
| High 1013 | 824.7 | 1.274 |

**1xEV-DO BC0 Release A**



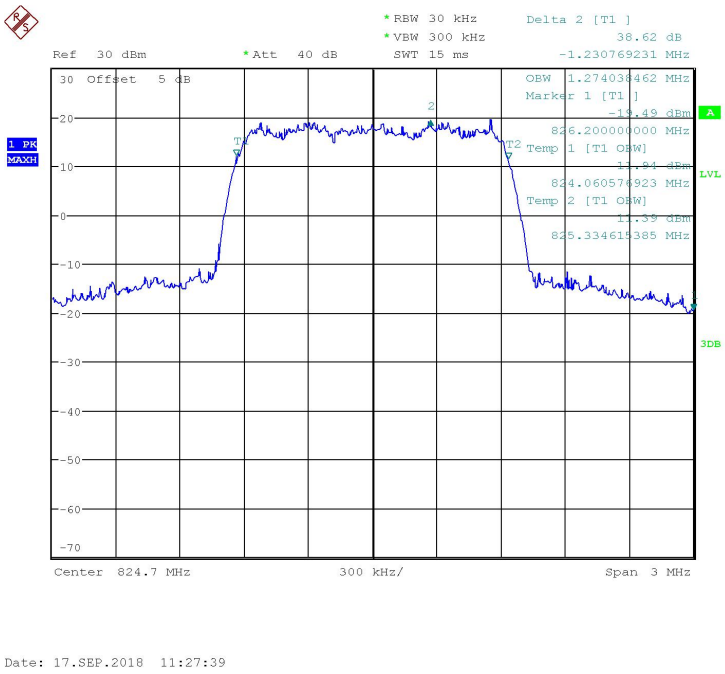

Date: 17.SEP.2018 11:26:10

**Channel 777-Occupied Bandwidth (99%)**




Date: 17.SEP.2018 11:27:03

**Channel 384-Occupied Bandwidth (99%)**

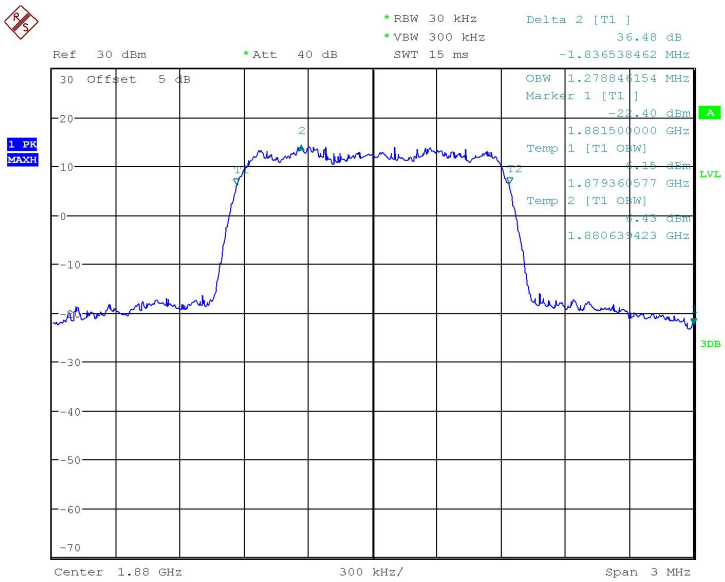



**Channel 1013-Occupied Bandwidth (99%)**

**Conclusion: PASS**

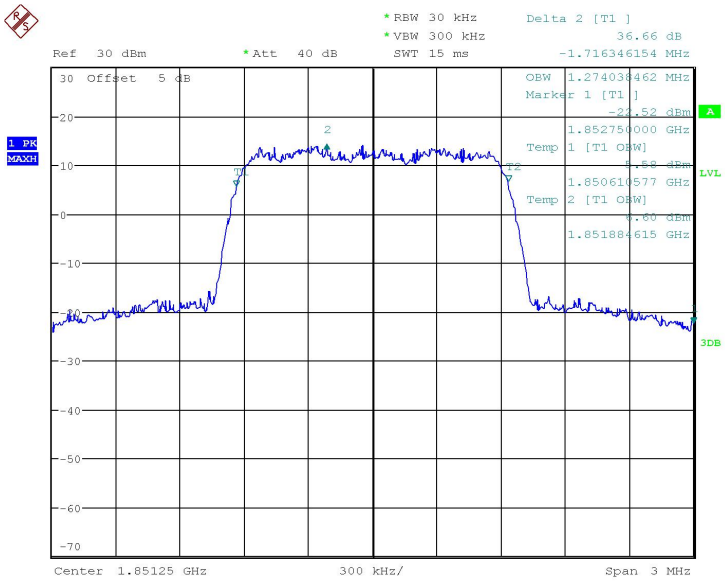
| 1xEV-DO BC1 Release A | | |
|---|---|---|
| Test channel | Frequency (MHz) | 99% Occupied Bandwidth(MHz) |
| Mid 600 | 1880.0 | 1.279 |
| Low 25 | 1851.25 | 1.274 |
| High 1175 | 1908.75 | 1.293 |

**1xEV-DO BC1 Release A**



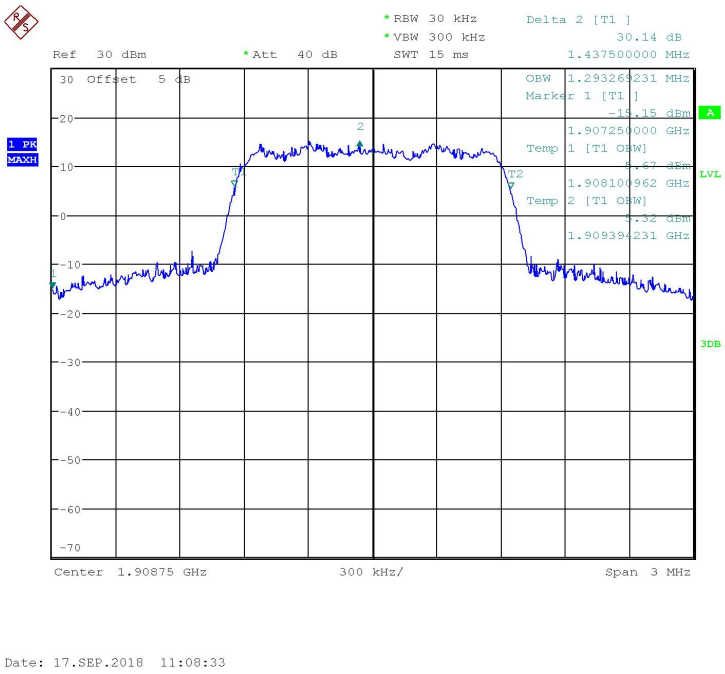

Date: 17.SEP.2018 11:06:58

**Channel 600-Occupied Bandwidth**




Date: 17.SEP.2018 11:07:39

**Channel 25-Occupied Bandwidth**




**Channel 1175-Occupied Bandwidth**

**Conclusion: PASS**

## ANNEX A.4. -26dB Emission Bandwidth

Method of test please refer to CFR 47 (FCC) part 2.1049 and part 22 subpart.

### A.4.1. -26dB Emission Bandwidth

Similar to conducted emissions; occupied bandwidth measurements are only provided for selected frequencies in order to reduce the amount of submitted data. Data were taken at the extreme and mid frequencies of CDMA2000 Cellular, CDMA2000 PCS.

### A.4.2 Test Procedure:

1. The EUT output RF connector was connected with a short cable to the signal analyzer.
2. RBW was set to about 1% of emission BW, VBW >= 3 times RBW,.
3. 26dB bandwidth were measured, the occupied bandwidth is delta frequency between the two points where the display line intersects the signal trace.

### A.4.3 Measurement methods:

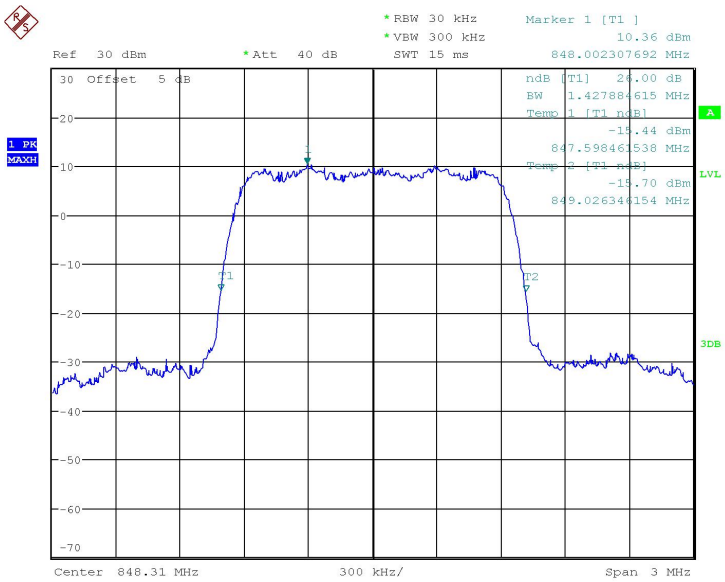
For CDMA: signal analyzer setting as: RBW=20KHz;VBW=200KHz;Span=3MHz.

### A.4.4 Test results:

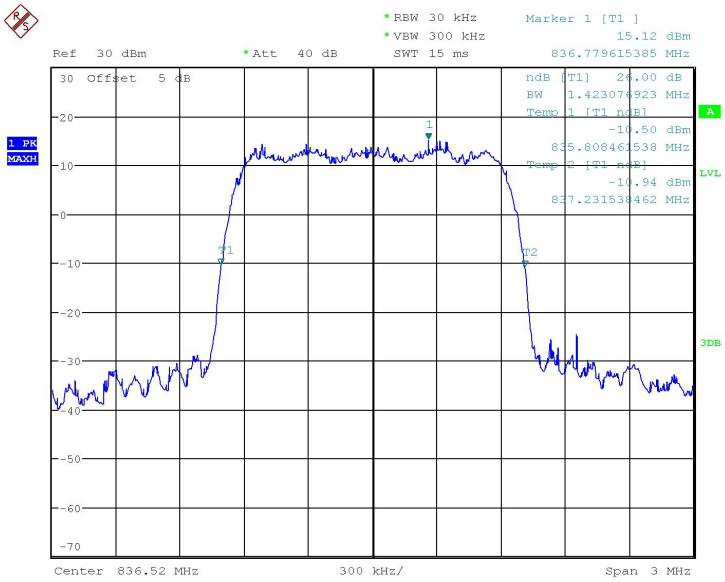
| CDMA2000 Cellular BC0 | | |
|---|---|---|
| Test channel | Frequency (MHz) | –26dBc Emission Bandwidth(MHz) |
| Mid 777 | 848.31 | 1.428 |
| Low 384 | 836.52 | 1.423 |
| High 1013 | 824.7 | 1.438 |

**Conclusion: PASS**

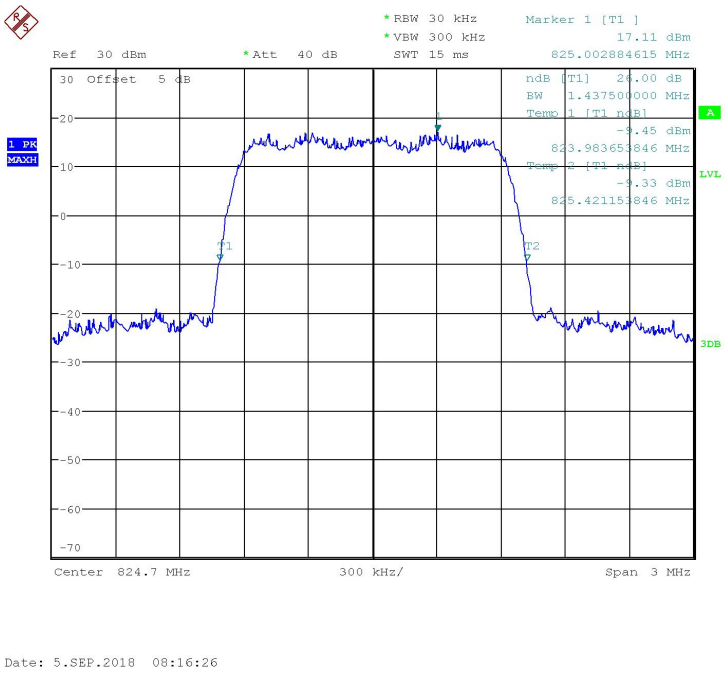
**CDMA2000 Cellular**




**Channel 777- Emission Bandwidth (-26dBc BW)**




**Channel 384- Emission Bandwidth (-26dBc BW)**

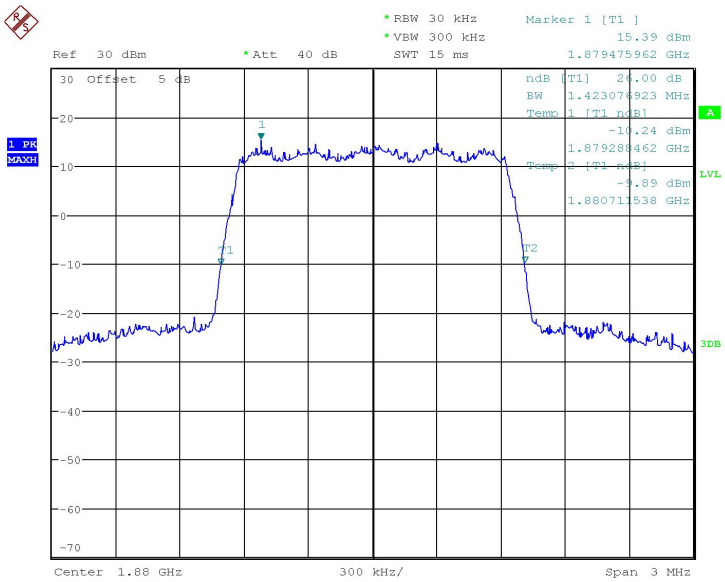



**Channel 1013- Emission Bandwidth (-26dBc BW)**

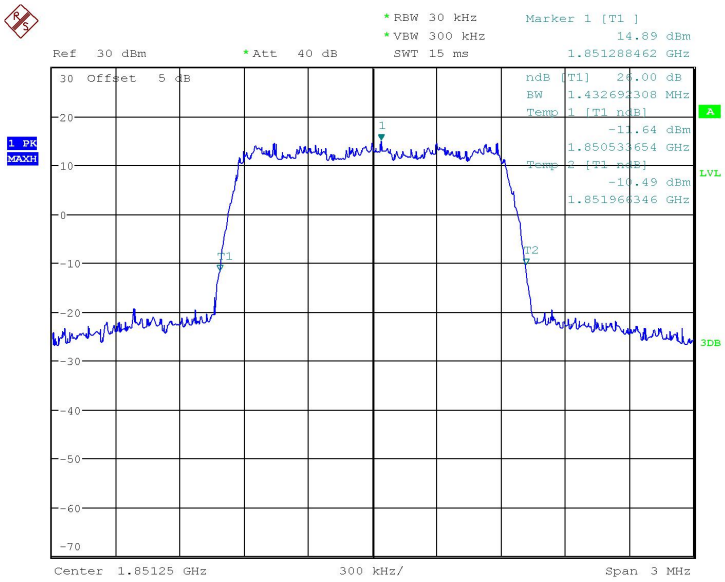
| CDMA2000 PCS BC1 | | |
|---|---|---|
| Test channel | Frequency (MHz) | –26dBc Emission Bandwidth(MHz) |
| Mid 600 | 1880.0 | 1.423 |
| Low 25 | 1851.25 | 1.433 |
| High 1175 | 1908.75 | 1.452 |

**Conclusion: PASS**

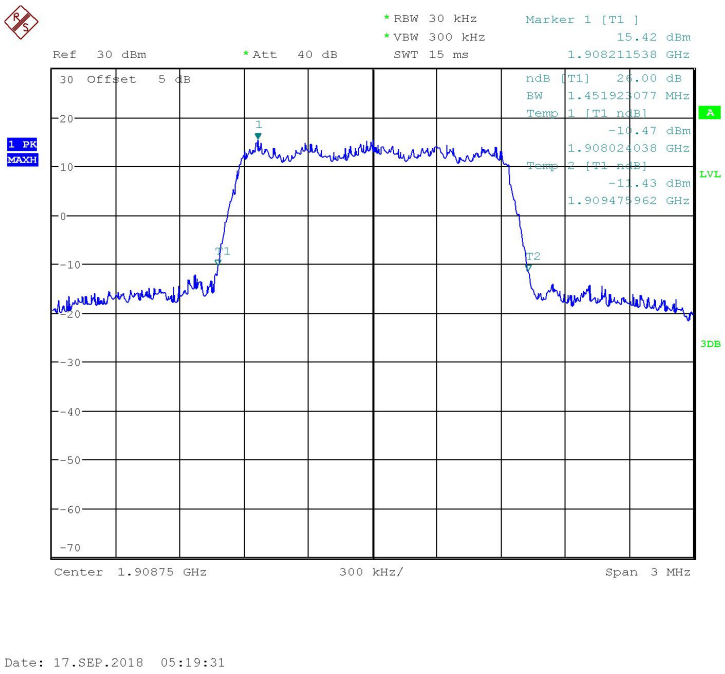
**CDMA2000 PCS BC1**




**Channel 600- Emission Bandwidth (-26dBc BW)**




**Channel 25- Emission Bandwidth (-26dBc BW)**




**Channel 1175- Emission Bandwidth (-26dBc BW)**

**Conclusion: PASS**

| 1xEV-DO BC0 Release 0 | | |
|---|---|---|
| Test channel | Frequency (MHz) | –26dBc Emission Bandwidth(MHz) |
| Mid 777 | 848.31 | 1.462 |
| Low 384 | 836.52 | 1.442 |
| High 1013 | 824.7 | 1.428 |

**Conclusion: PASS**

**1xEV-DO BC0 Release 0**