# TEST REPORT

## No. I17Z61374-WMD05

**for**

**Reliance Communications, LLC.**

**GSM/CDMA/WCDMA/LTE**

**Model Name: RC555L**

**FCC ID: 2AGBH-RC555L**

**with**

**Hardware Version: V1.1**

**Software Version: ORBIC-RC555L_V1.6.3**

**Issued Date: 2017-9-26**



TESTING
NVLAP LAB CODE 600118-0

**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 CTTL

*The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the U.S.Government..*

**Test Laboratory:**

**Test Firm Designation Number:CN5017**

CTTL, Telecommunication Technology Labs, CAICT

No. 52, Huayuan North Road, Haidian District, Beijing, P. R. China 100191.

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Email: cttl_terminals@caict.ac.cn, website: www.caict.ac.cn

## REPORT HISTORY

| Report Number | Revision | Description | Issue Date |
|---|---|---|---|
| I17Z61374-WMD05 | Rev.0 | 1st edition | 2017-9-26 |

# CONTENTS

# 1. Test Laboratory

## 1.1. Testing Location

Location 1: CTTL(huayuan North Road)

   Address:                 No. 52, Huayuan North Road, Haidian District, Beijing, P. R. China 100191

Location 2: CTTL(Shouxiang)

   Address:                 No. 51 Shouxiang Science Building, Xueyuan Road, Haidian District, Beijing, P. R. China 100191

## 1.2. Testing Environment

   Normal Temperature:    15-35℃

   Relative Humidity:     20-80%

## 1.3. Project data

   Testing Start Date:     2017-9-6

   Testing End Date:     2017-9-26

## 1.4. Signature

**Shen Yi**

**(Prepared this test report)**

**Zhou Yu**

**(Reviewed this test report)**

**Zhao Hui Lin**

**Deputy Director of the laboratory**

**(Approved this test report)**

## 2. Client Information

### 2.1. Applicant Information

| | |
|---|---|
| Company Name: | Reliance Communications, LLC. |
| Address /Post: | 555 Wireless BLVD, Hauppauge NY 11788 |
| City: | New York |
| Postal Code: | / |
| Country: | U.S.A |
| Contact Person: | Saqib Ghouri |
| Contact Email: | saqib.ghouri@reliance.us |
| Telephone: | +92 317 512 6111 |
| Fax: | / |

### 2.2. Manufacturer Information

| | |
|---|---|
| Company Name: | Unimaxcomm. |
| Address /Post: | Room 602, Building-B, Shenzhen Software Park T3, Hi-Tech Park South, Nan Shan District, Shenzhen, China |
| City: | Shenzhen |
| Postal Code: | 518000 |
| Country: | China |
| Contact Person: | Chunli.He |
| Contact Email: | hchunli@unimaxcomm.com |
| Telephone: | +86 130 7785 5257 |
| Fax: | 0755-86638991 |

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

### 3.1. About EUT

| | |
|---|---|
| Description | GSM/CDMA/WCDMA/LTE |
| Model | RC555L |
| FCC ID | 2AGBH-RC555L |
| Frequency | CDMA800MHz(BC0);CDMA1900MHz(BC1);CDMA2ND800MHz(BC10) |
| Antenna | Embedded |
| Power supply | Battery or Charger (AC Adaptor) |
| Extreme vol. Limits | 3.6VDC to 4.3VDC (nominal: 3.8 VDC) |
| Extreme temp. Tolerance | -10°C to +40°C |

Note: Components list, please refer to documents of the manufacturer; it is also included in the original test record of Telecommunication Metrology Center of MIIT of People's Republic of China.

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

| EUT ID* | SN or IMEI | HW Version | SW Version | Date of receipt |
|---|---|---|---|---|
| UT24a | 358924080002020 | V1.1 | ORBIC-RC555L_V1.6.3 | 2017-9-6 |

*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 | Battery | / |
| AE2 | Normal Charger | / |

AE1

| | |
|---|---|
| Model | RC555L |
| Manufacturer | Veken |
| Capacitance | 3000mAh |
| Nominal Voltage | 3.8V |

AE2

| | |
|---|---|
| Model | RC555L |
| Manufacturer | BLJ |

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

### 3.4. Normal Accessory setting

Fully charged battery was used during the test.

### 3.5. General Description

The Equipment Under Test (EUT) is a model of GSM/CDMA/WCDMA/LTE with integrated antenna. It consists of normal options: lithium battery, charger. Manual and specifications of the EUT were provided to fulfil the test.

## 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 90 | PRIVATE LAND MOBILE RADIO SERVICES | 10-1-16 Edition |
| FCC Part 2 | FREQUENCY ALLOCATIONS AND RADIO TREATY MATTERS;GENERAL RULES AND REGULATIONS | 10-1-16 Edition |
| ANSI/TIA-603-D | Land Mobile FM or PM Communications Equipment Measurement and Performance Standards | 2010 |
| KDB971168 D01 | Measurement Guidance for Certification of Licensed Digital Transmitters | v02r02 |

## 5.  <u>LABORATORY ENVIRONMENT</u>

**Shielding chamber** did not exceed following limits along the RF testing:

| Temperature | Min. = 15 °C, Max. = 35 °C |
|---|---|
| Relative humidity | Min. =20 %, Max. = 80 % |

## 6. <u>SUMMARY OF TEST RESULTS</u>

| Items | List | Clause in FCC rules | Verdict |
|:-----:|------|---------------------|:-------:|
| 1 | Output Power | 90.635 | Pass |
| 2 | Frequency Stability | 2.1055/90.213 | Pass |
| 3 | Occupied Bandwidth | 2.1049 | Pass |
| 4 | Emission Bandwidth | 90.1215 | Pass |
| 5 | Conducted Spurious Emission | 90.691 | Pass |

## 7. Test Equipments Utilized

| NO. | NAME | TYPE | SERIES NUMBER | PRODUCER | CALIBRATION INTERVAL | CAL DUE DATE |
|---|---|---|---|---|---|---|
| 1 | Spectrum Analyzer | FSV30 | 101576 | R&S | 1 Year | 2018-2-1 |
| 2 | Wireless Communications Test Set | 8960(E5515C) | GB461603 13 | Agilent | 1 Year | 2018-7-22 |
| 3 | Climatic chamber | SH-641 | 92009050 | ESPEC | 2 Years | 2018-2-16 |

# ANNEX A: MEASUREMENT RESULTS

## A.1 OUTPUT POWER

### A.1.1 Summary
During the process of testing, the EUT was controlled via Agilent Wireless Communications Test Set (8960(E5515C)) to ensure max power transmission and proper modulation.
This result is peak output power conducted measurements for the EUT. In all cases, output power is within the specified limits.

### A.1.2 Method of Measurements
The EUT was set up for the max output power with pseudo random data modulation.
The power was measured with Rhode & Schwarz Spectrum Analyzer FSV30 (average).
These measurements were done at 2 frequencies of CDMA BC10 (bottom and top of operational frequency range) for 1x RTT and 1xEVDO.
The measurement method is from KDB 971168 D01 5.2.1:
a) Set span to at least 1.5 times the OBW.
b) Set RBW = 1-5% of the OBW, not to exceed 1 MHz.
c) Set VBW ≥ 3 × RBW.
d) Set number of points in sweep ≥ 2 × span / RBW.
e) Sweep time = auto-couple.
f) Detector = RMS (power averaging).
g) If the EUT can be configured to transmit continuously (i.e., burst duty cycle ≥ 98%), then set the trigger to free run.
h) If the EUT cannot be configured to transmit continuously (i.e., burst duty cycle < 98 %), then use a sweep trigger with the level set to enable triggering only on full power bursts and configure the EUT to transmit at full power for the entire duration of each sweep. Ensure that the sweep time is less than or equal to the transmission burst duration.
i) Trace average at least 100 traces in power averaging (i.e., RMS) mode.
j) Compute the power by integrating the spectrum across the OBW of the signal using the instrument's band power measurement function, with the band limits set equal to the OBW band edges. If the instrument does not have a band power function, then sum the spectrum levels (in linear power units) at intervals equal to the RBW extending across the entire OBW of the spectrum.

### A.1.3 Measurement results
**CDMA BC10**
**Measurement result**

| Channel | Frequency(MHz) | Channel power(dBm) | | |
|---|---|---|---|---|
| | | 1xRTT | 1xEVDO | |
| | | | Rel0 | RevA |
| 476 | 817.9 | 24.32 | 24.32 | 24.28 |
| 684 | 823.1 | 24.24 | 24.27 | 24.21 |

## A.2 FREQUENCY STABILITY

### A.2.1 Method of Measurement

In order to measure the carrier frequency under the condition of AFC lock, it is necessary to make measurements with the EUT in a "call mode". This is accomplished with the use of Agilent 8960(E5515C) Wireless Communications Test Set.

1. Measure the carrier frequency at room temperature.
2. Subject the EUT to overnight soak at -10℃.
3. With the EUT, powered via nominal voltage, connected to the 8960(E5515C) and in a simulated call on mid channel of CDMA BC10, measure the carrier frequency. These measurements should be made within 2 minutes of Powering up the EUT, to prevent significant self-warming.
4. Repeat the above measurements at 10℃ increments from -10℃ to +40℃. Allow at least 1 1/2 hours at each temperature, unpowered, before making measurements.
5. Remeasure carrier frequency at room temperature with nominal voltage. Vary supply voltage from minimum voltage to maximum voltage, in 0.1Volt increments remeasuring carrier frequency at each voltage. Pause at nominal voltage for 1 1/2 hours unpowered, to allow any self-heating to stabilize, before continuing.
6. Subject the EUT to overnight soak at +40℃.
7. With the EUT, powered via nominal voltage, connected to the 8960(E5515C) and in a simulated call on the centre channel, measure the carrier frequency. These measurements should be made within 2 minutes of Powering up the EUT, to prevent significant self-warming.
8. Repeat the above measurements at 10 C decrements from +40℃ to -10℃. Allow at least 1 1/2 hours at each temperature, unpowered, before making measurements.
9. At all temperature levels hold the temperature to +/- 0.5℃ during the measurement procedure.

### A.2.2 Measurement Limit

### A.2.2.1 For Hand carried battery powered equipment

The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block. This requires that the lower voltage for frequency stability testing be specified by the manufacturer. This transceiver is specified to operate with an input voltage of between 3.6VDC and 4.3VDC, with a nominal voltage of 3.8VDC. Operation above or below these voltage limits is prohibited by transceiver software in order to prevent improper operation as well as to protect components from overstress.

### A.2.2.2 For equipment powered by primary supply voltage

For Part 90.213, the frequency stability of the transmitter shall be maintained within ±2.5ppm of the center frequency. This requires varying primary supply voltage from 85 to 115 percent of the nominal value for other than hand carried battery equipment.

**A.2.3 Measurement results**

**CDMA BC 10**
**Frequency Error vs Voltage**

| Voltage(V) | Frequency error(Hz) | Frequency error(ppm) |
|---|---|---|
| 3.6 | 2.43 | 0.003 |
| 3.8 | 2.38 | 0.003 |
| 4.3 | 2.35 | 0.003 |

**Frequency Error vs Temperature**

| temperature(℃) | Frequency error(Hz) | Frequency error(ppm) |
|---|---|---|
| -30 | / | / |
| -20 | / | / |
| -10 | 2.67 | 0.003 |
| 0 | -2.29 | 0.003 |
| 10 | 2.35 | 0.003 |
| 20 | 2.40 | 0.003 |
| 30 | 2.47 | 0.003 |
| 40 | 2.84 | 0.003 |
| 50 | / | / |

## A.3 OCCUPIED BANDWIDTH

### A.3.1 Occupied Bandwidth Results

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 the CDMA frequency band. The table below lists the measured 99% BW. Spectrum analyzer plots are included on the following pages.

**Test Condition**

| RBW | VBW | Span | Sweeptime | Detector | Trace Mode |
|------|--------|-------|-----------|----------|------------|
| 20KHz | 100KHz | 5MHz | 40ms | Peak | Max Hold |

The EUT was set up for the max output power with pseudo random data modulation. Use the Occupied Bandwidth function of SA to measure the 99% bandwidth.

**CDMA BC10 (99% BW)**

| Channel | Occupied Bandwidth (99% BW)(MHz) |
|---------|----------------------------------|
| 476 | 1.266 |
| 684 | 1.281 |

**CDMA BC10**

**Channel 476-Occupied Bandwidth (99% BW)**



Date: 15.SEP.2017  05:03:59
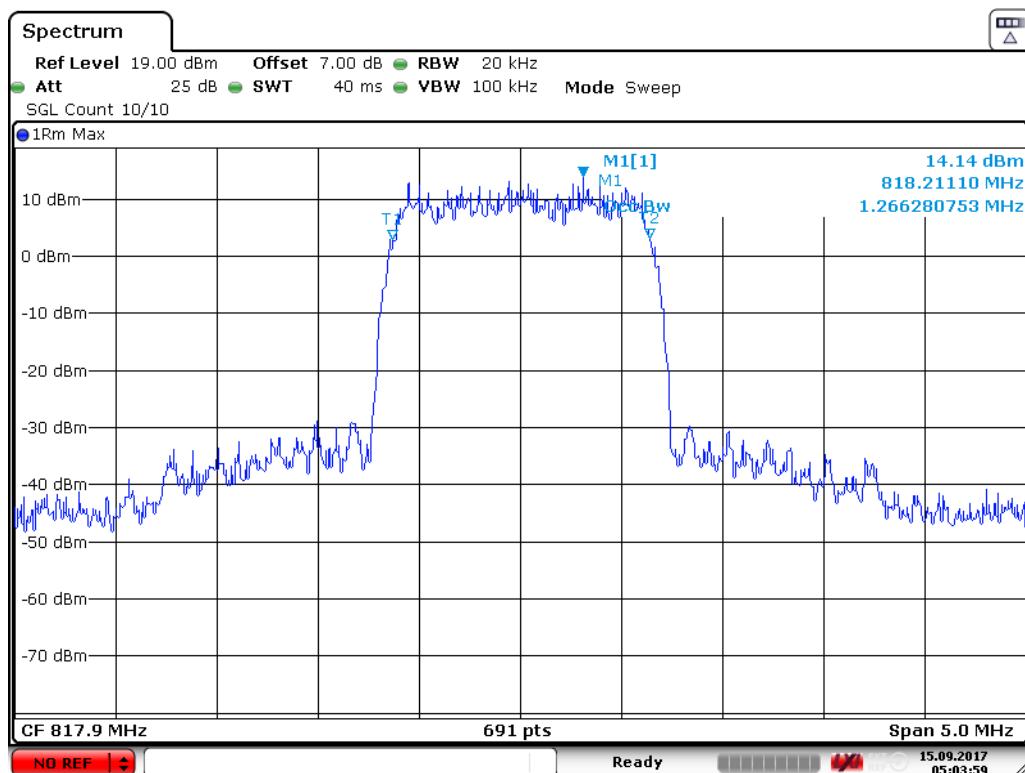
## Channel 684-Occupied Bandwidth (99% BW)
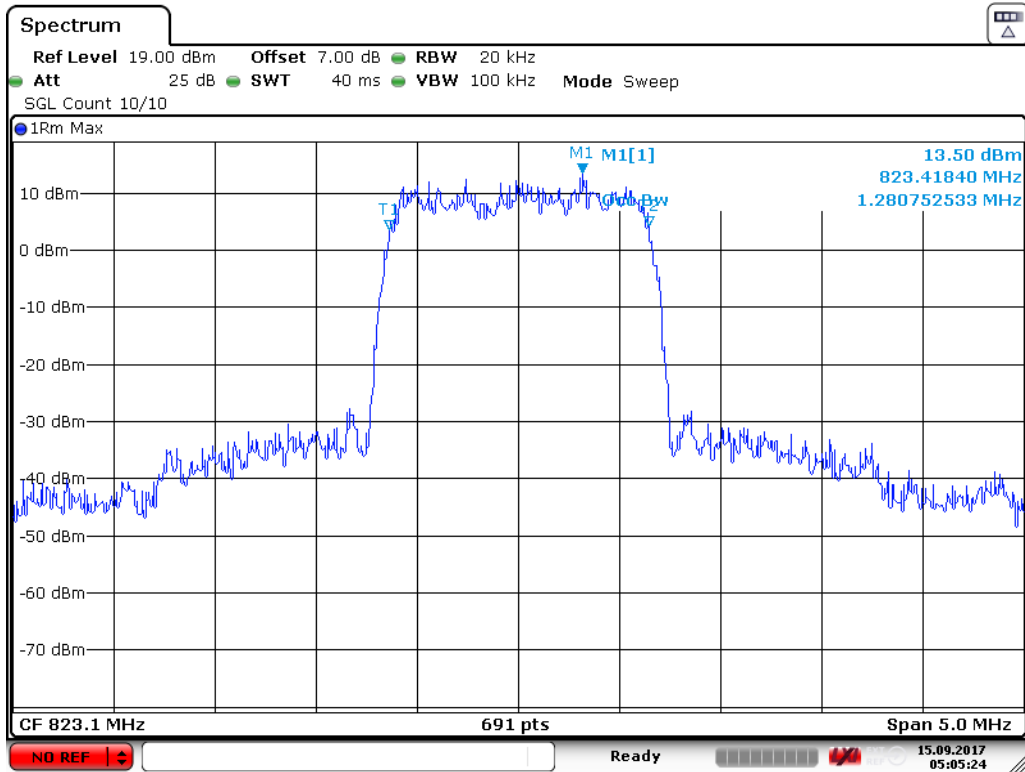


Date: 15.SEP.2017  05:05:24

## A.4 EMISSION BANDWIDTH

### A.4.1Emission Bandwidth Results

Similar to conducted emissions; Emission 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 the CDMA frequency band. Table below lists the measured -26dBc BW. Spectrum analyzer plots are included on the following pages.

**Test Condition**

| RBW | VBW | Span | Sweeptime | Detector | Trace Mode |
|------|--------|---------|-----------|----------|----------|
| 20KHz | 100KHz | 3.84MHz | 40ms | Peak | Max Hold |

The EUT was set up for the max output power with pseudo random data modulation. Use the Occupied Bandwidth function of SA to measure the 26dBc bandwidth.

**CDMA BC10 (-26dBc BW)**

| Channel | Emission Bandwidth (–26dBc BW) ( MHz) |
|---------|---------------------------------------|
| 476 | 1.423 |
| 684 | 1.423 |

**CDMA BC10**

**Channel 476- Emission Bandwidth (-26dBc BW)**



Date: 15.SEP.2017  05:08:29
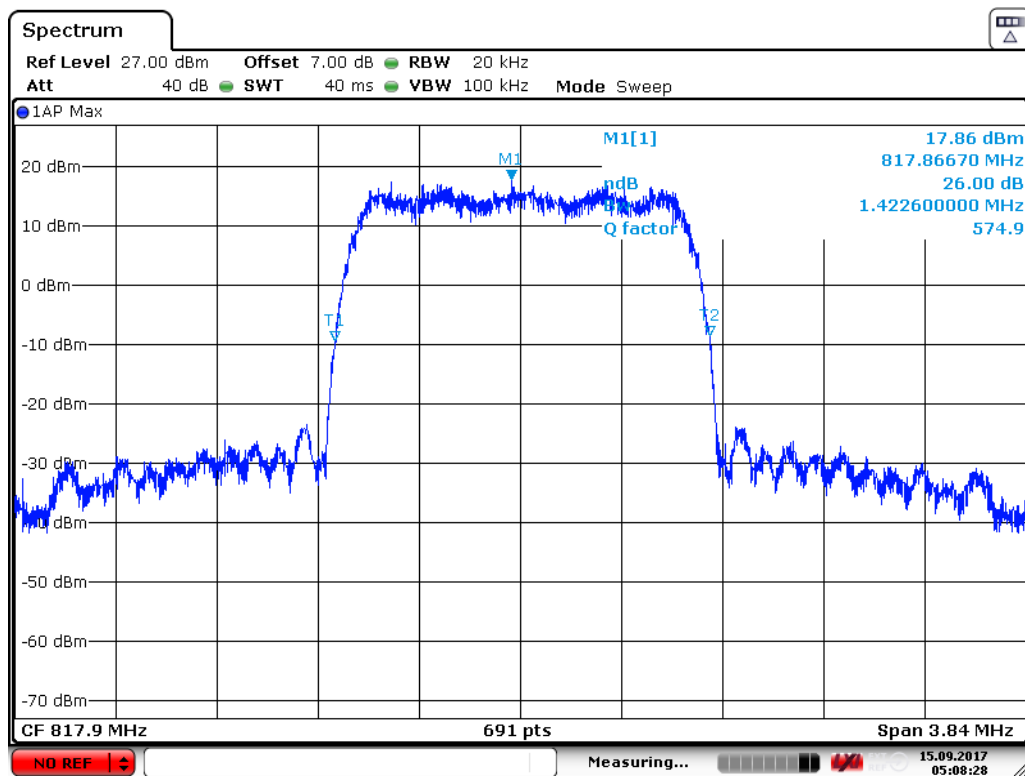
## Channel 684- Emission Bandwidth (-26dBc BW)
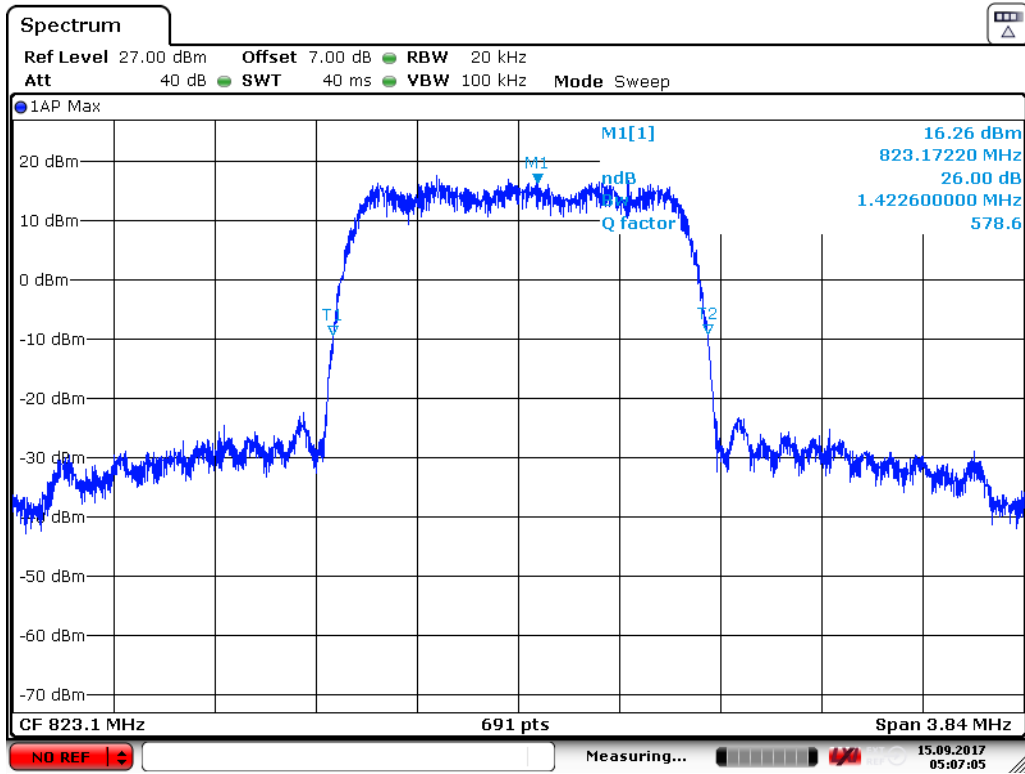


Date: 15.SEP.2017  05:07:06

## A.5 CONDUCTED SPURIOUS EMISSION

### A.5.1 Measurement Method

The spectrum should be investigated from the lowest radio frequency generated in the equipment up to at least the 10th harmonic of the carrier frequency. For CDMA BC10, data taken from 30 MHz to 10GHz.

Out-of-band emission requirement shall apply only to the ''outer'' channels included in an EA license and to spectrum adjacent to interior channels used by incumbent licensees. The emission limits are as follows:

For any frequency removed from the EA licensee's frequency block by up to and including 37.5 kHz, the power of any emission shall be attenuated below the transmitter power (P) in watts by at least $116Log_{10}(f/6.1)$ decibels or $50 + 10 Log_{10}(P)$ decibels or 80 decibels, whichever is the lesser attenuation, where f is the frequency removed from the center of the outer channel in the block in kilohertz and where f is greater than 12.5 kHz.

For any frequency removed from the EA licensee's frequency block greater than 37.5 kHz, the power of any emission shall be attenuated below the transmitter power (P) in watts by at least $43 + 10Log_{10}(P)$ decibels or 80 decibels, whichever is the lesser attenuation, where f is the frequency removed from the center of the outer channel in the block in kilohertz and where f is greater than 37.5 kHz.

### CDMA BC10 Transmitter

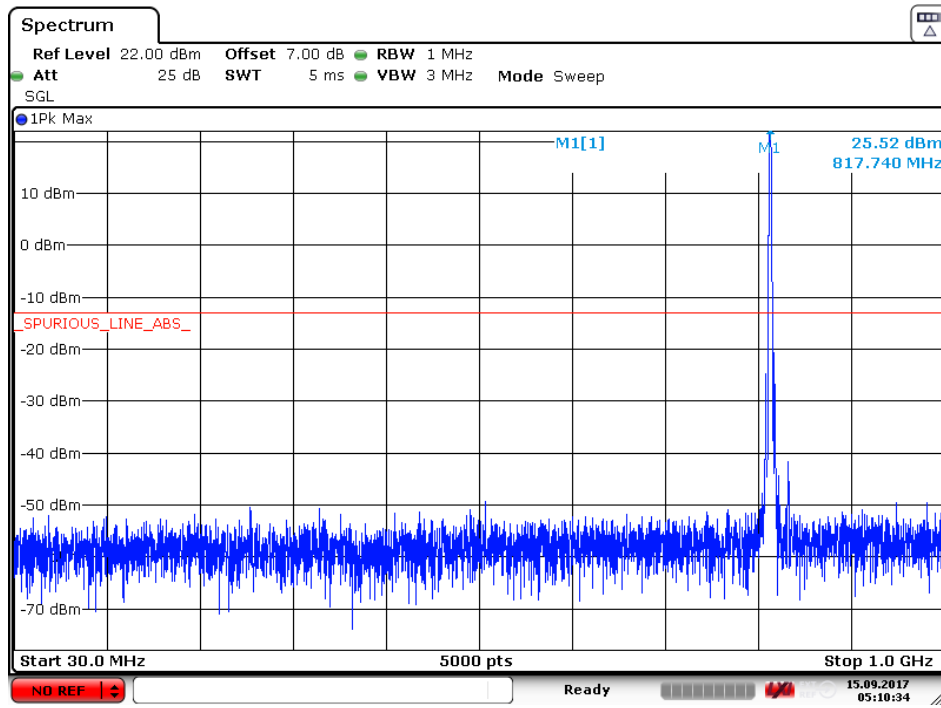| Channel | Frequency (MHz) |
|---------|-----------------|
| 476 | 817.9 |
| 684 | 823.1 |

## A.5.2 Measurement result

**CDMA BC10**

## A. 5.2.1 Channel 476: 30MHz –1GHz

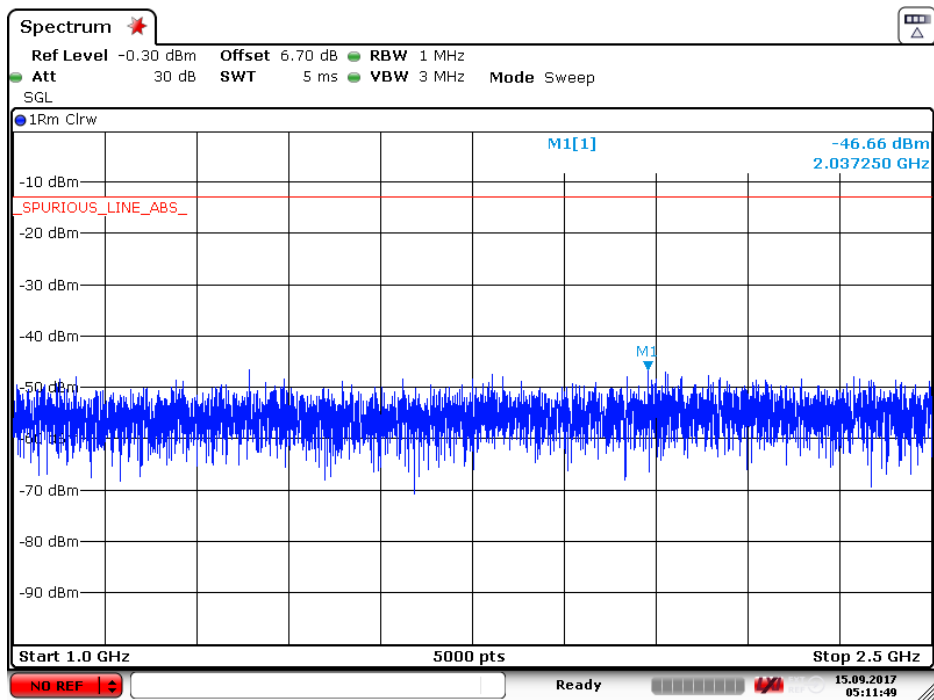Spurious emission limit –13dBm.

**NOTE: peak above the limit line is the carrier frequency.**



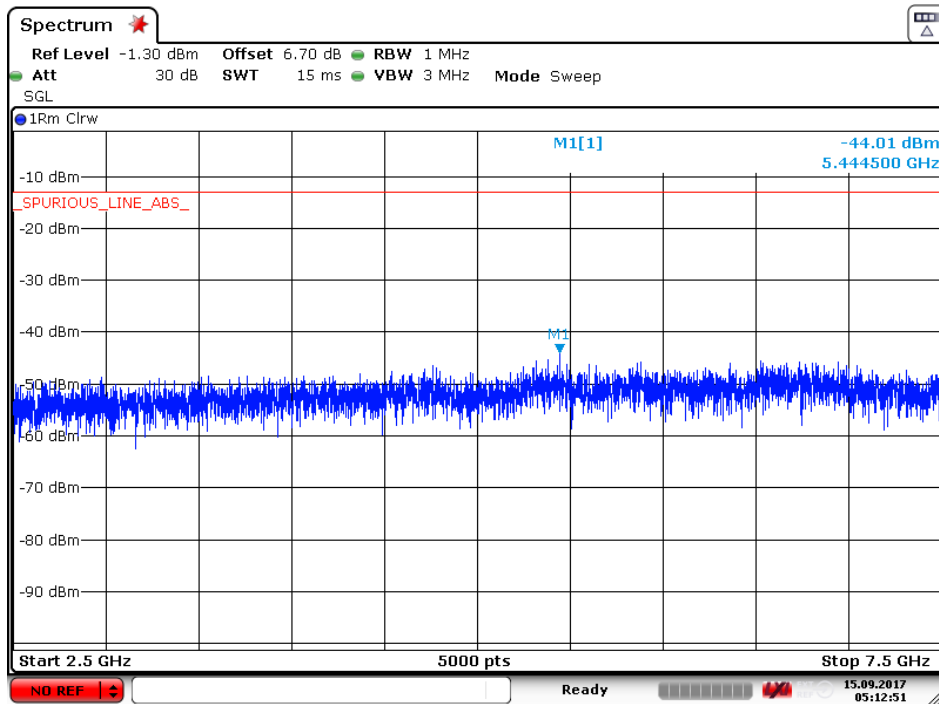Date: 15.SEP.2017   05:10:34

## A.5.2.2 Channel 476: 1GHz –2.5GHz
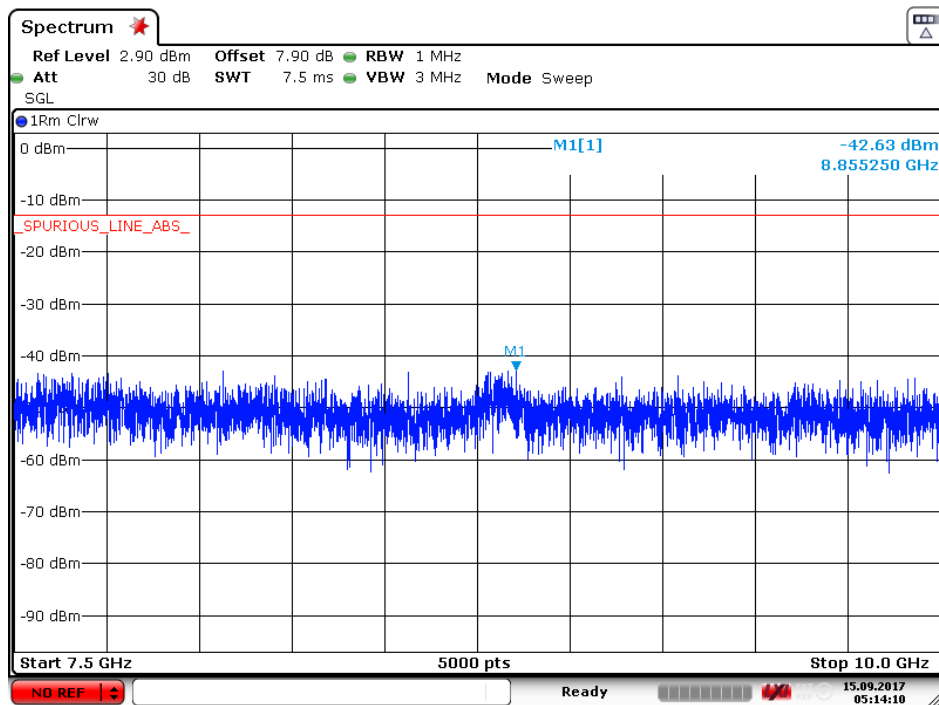
Spurious emission limit –13dBm.



Date: 15.SEP.2017   05:11:50

## A.5.2.3 Channel 476: 2.5GHz –7.5GHz
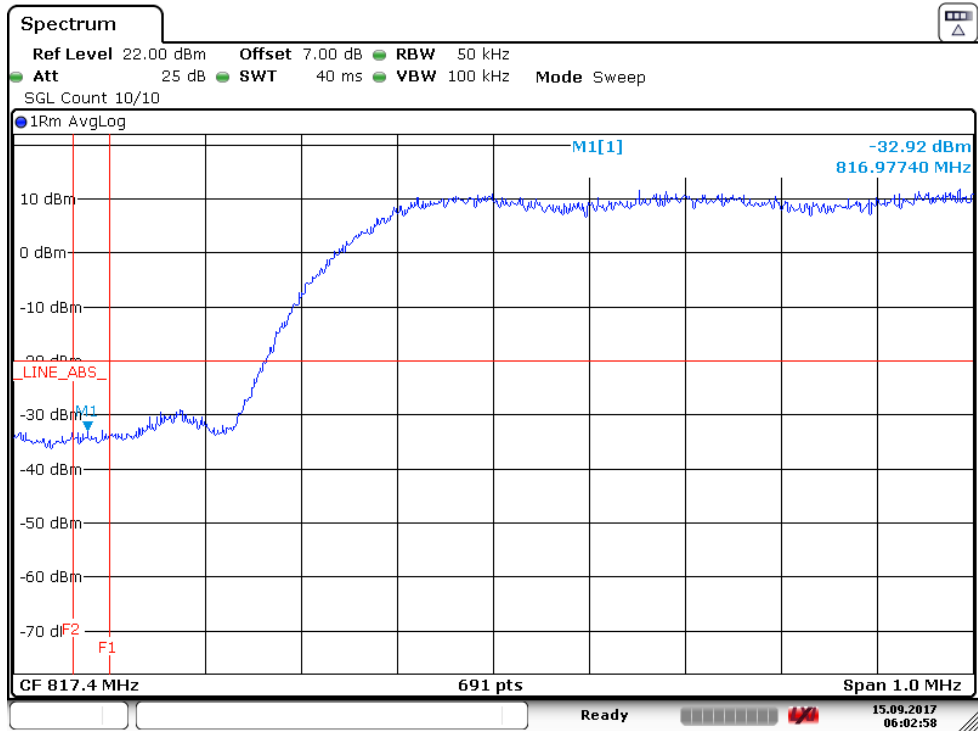
Spurious emission limit –13dBm.



Date: 15.SEP.2017  05:12:51

## A.5.2.4 Channel 476: 7.5GHz –10GHz
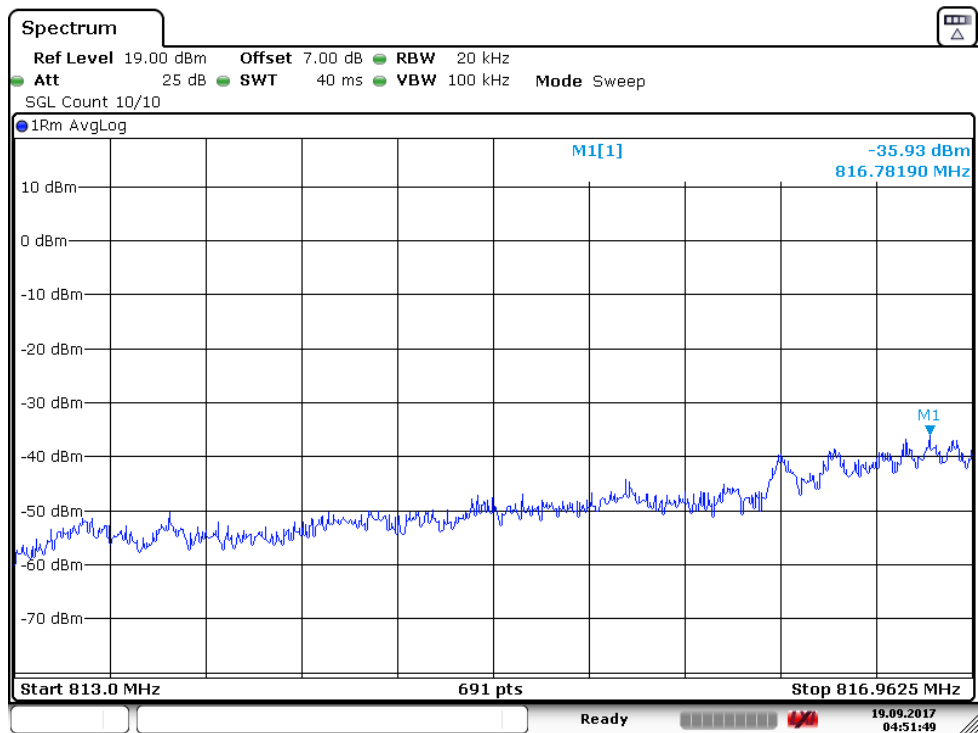
Spurious emission limit –13dBm.



Date: 15.SEP.2017  05:14:10

## A.5.2.5 Channel 476: Band Edge

Spurious emission limit –20dBm.



Date: 15.SEP.2017  06:02:58

## A.5.2.6 Channel 476: Outer Extended Band Edge
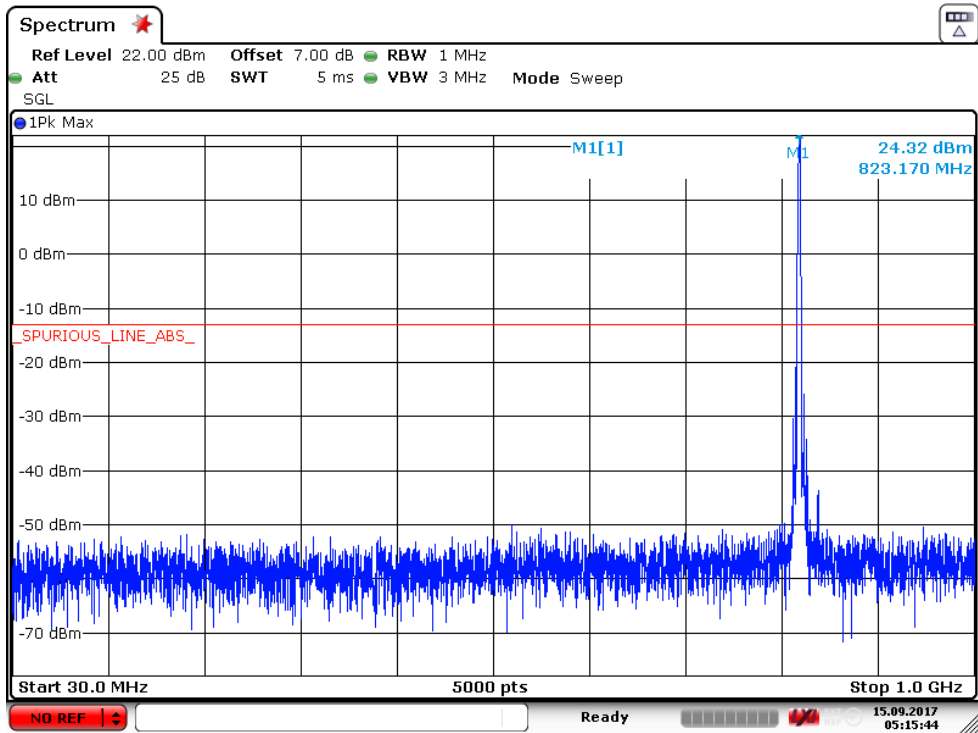
Spurious emission limit –13dBm.



Date: 19.SEP.2017  04:51:48

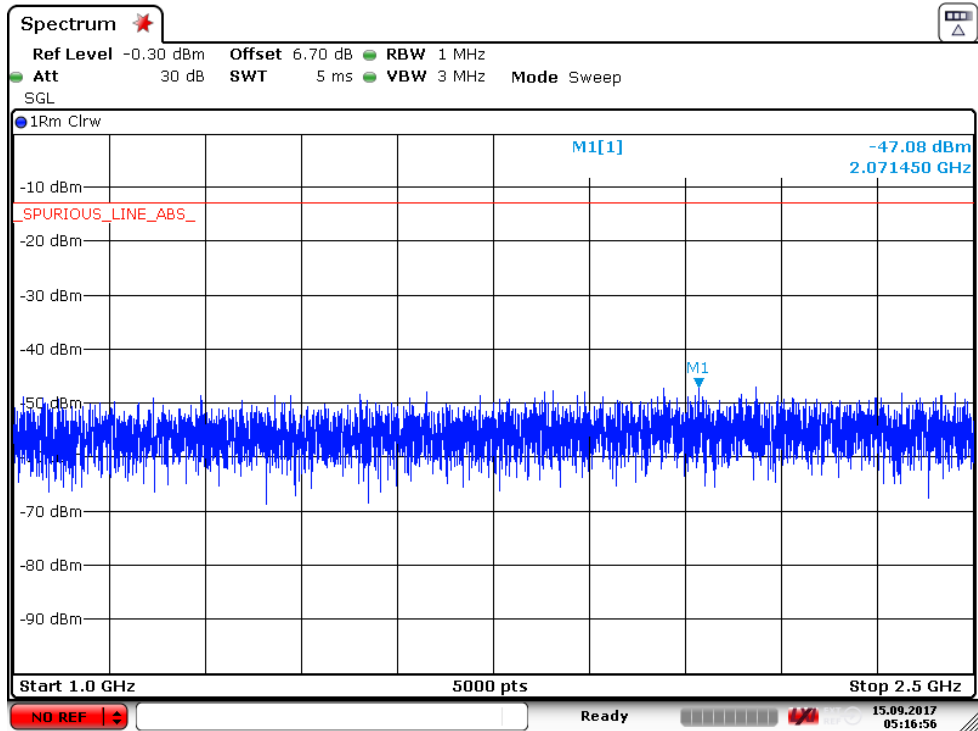## A. 5.2.7 Channel 684: 30MHz –1GHz

Spurious emission limit –13dBm.

**NOTE: peak above the limit line is the carrier frequency.**



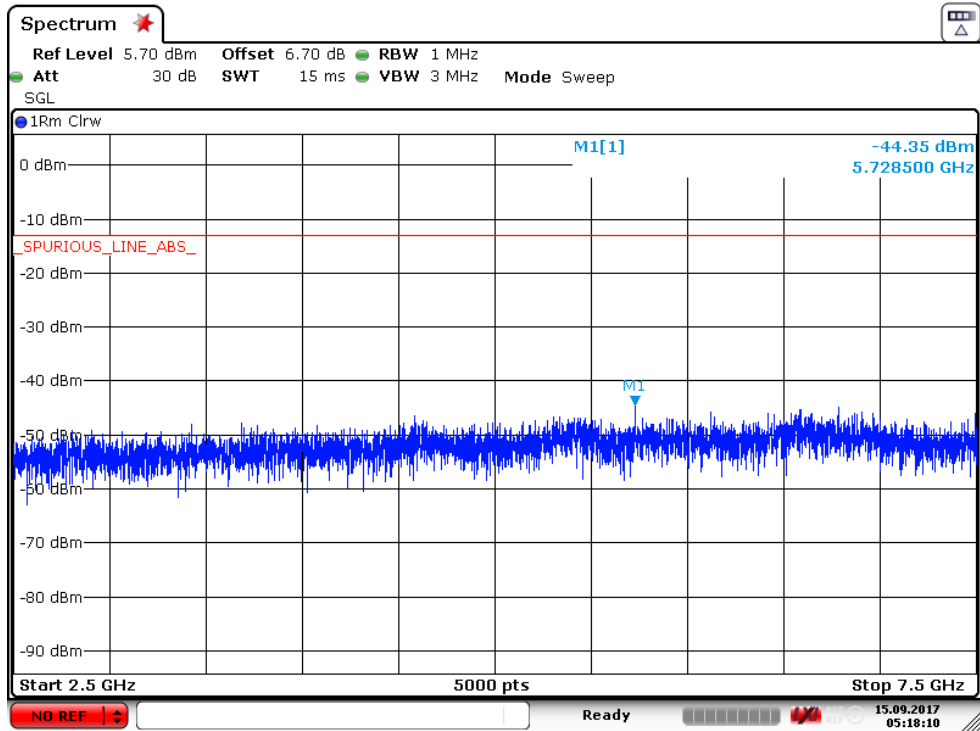Date: 15.SEP.2017  05:15:45

## A.5.2.8 Channel 684: 1GHz –2.5GHz
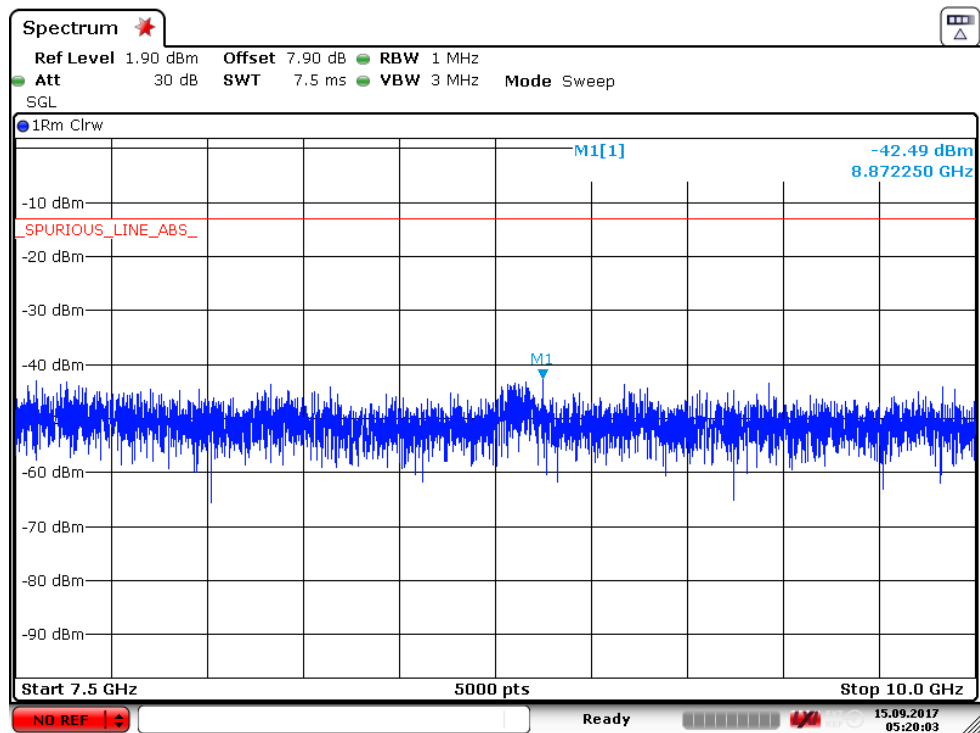
Spurious emission limit –13dBm.



Date: 15.SEP.2017  05:16:57

### A.5.2.9 Channel 684: 2.5GHz –7.5GHz
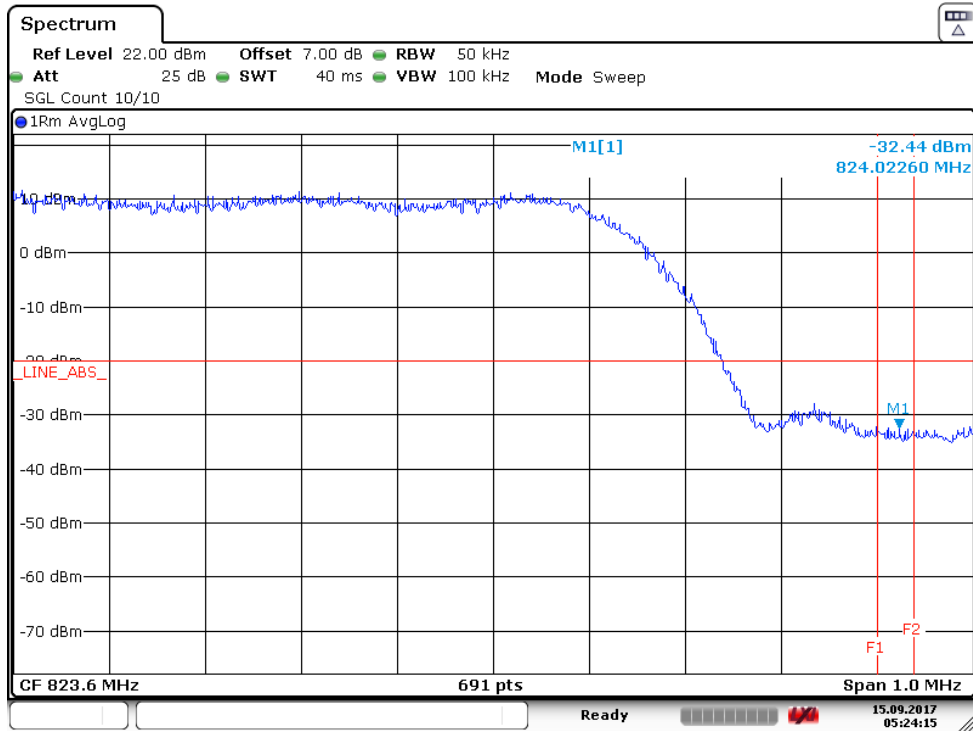
Spurious emission limit –13dBm.



Date: 15.SEP.2017  05:18:10

### A.5.2.10 Channel 684: 7.5GHz –10GHz
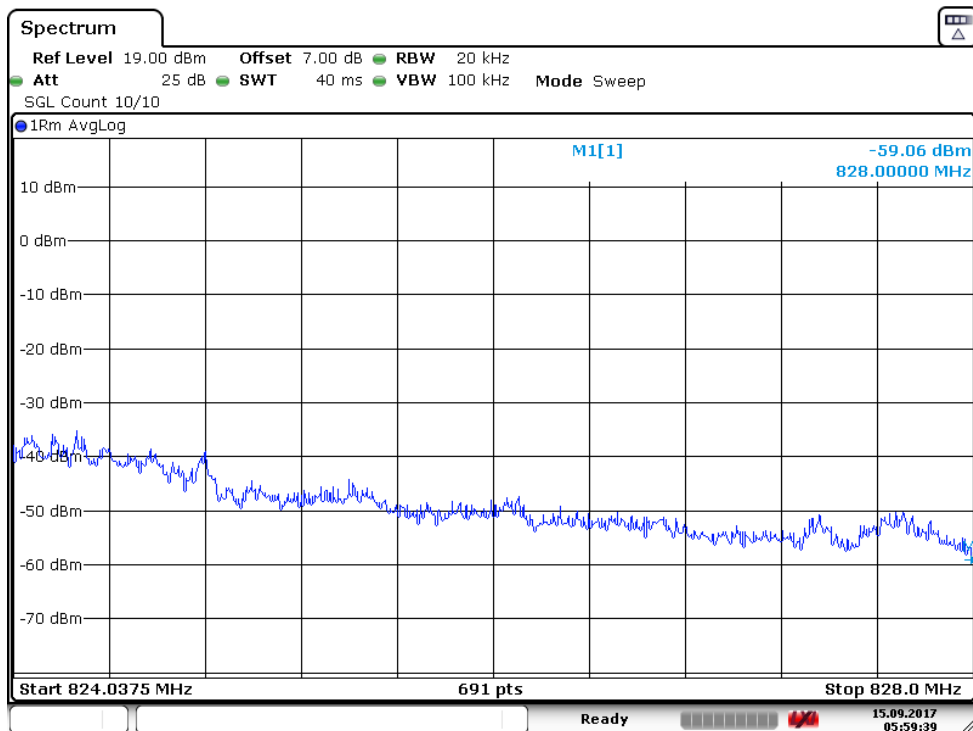
Spurious emission limit –13dBm.



Date: 15.SEP.2017  05:20:03

### A.5.2.11 Channel 684: Band Edge

Spurious emission limit –20dBm.

Spectrum

Ref Level 22.00 dBm    Offset 7.00 dB    RBW 50 kHz
Att    25 dB    SWT    40 ms    VBW 100 kHz    Mode Sweep
SGL Count 10/10

1Rm AvgLog

M1[1]    -32.44 dBm
824.02260 MHz

LINE_ABS_

M1

F2
F1

CF 823.6 MHz    691 pts    Span 1.0 MHz

Ready    15.09.2017 05:24:15

Date: 15.SEP.2017  05:24:15

### A.5.2.12 Channel 684: Outer Extended Band Edge

Spurious emission limit –13dBm.

Spectrum

Ref Level 19.00 dBm    Offset 7.00 dB    RBW 20 kHz
Att    25 dB    SWT    40 ms    VBW 100 kHz    Mode Sweep
SGL Count 10/10

1Rm AvgLog

M1[1]    -59.06 dBm
828.00000 MHz

Start 824.0375 MHz    691 pts    Stop 828.0 MHz

Ready    15.09.2017 05:59:39

Date: 15.SEP.2017  05:59:39

## ANNEX B: Accreditation Certificate

**United States Department of Commerce**
**National Institute of Standards and Technology**

# NVLAP®

## Certificate of Accreditation to ISO/IEC 17025:2005

**NVLAP LAB CODE: 600118-0**

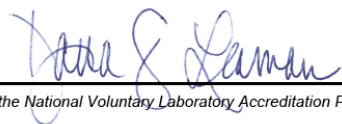### Telecommunication Technology Labs, CAICT
Beijing
China

*is accredited by the National Voluntary Laboratory Accreditation Program for specific services,*
*listed on the Scope of Accreditation, for:*

### Electromagnetic Compatibility & Telecommunications

*This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005.*
*This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality*
*management system (refer to joint ISO-ILAC-IAF Communique dated January 2009).*

2016-09-29 through 2017-09-30
*Effective Dates*

*For the National Voluntary Laboratory Accreditation Program*

**\*\*\*END OF REPORT\*\*\***