

# MEASUREMENT REPORT

## FCC PART 30.203 RSE

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**FCC ID:** 2ABGH-R500L5  
**Applicant:** Reliance Communications LLC  
  
**Product:** Orbic Speed 5G  
**Model No.:** R500L5  
**FCC Rule Part(s):** Part 30.203  
**Test Date:** July 18 ~ 20, 2021

Reviewed By:

*Sunny Sun*

Approved By:

*Robin Wu*



The test results relate only to the samples tested.

This equipment has been shown to be capable of compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in ANSI C63.26-2015. Test results reported herein relate only to the item(s) tested.

The test report shall not be reproduced except in full without the written approval of MRT Technology (Suzhou) Co., Ltd.

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## Revision History

| Report No.    | Version | Description                          | Issue Date | Note    |
|---------------|---------|--------------------------------------|------------|---------|
| 2107RSU043-U1 | Rev. 01 | Initial Report                       | 08-11-2021 | Invalid |
| 2107RSU043-U1 | Rev. 02 | Modified Product Name and HW Version | 10-12-2021 | Invalid |
| 2107RSU043-U1 | Rev. 03 | Add note from TCB comment            | 11-10-2021 | Valid   |

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## 1. GENERAL INFORMATION

### 1.1. Applicant

Reliance Communications LLC

91 Colin Drive, Unit 1, HOLBROOK, New York 11741, United States

### 1.2. Manufacturer

Unimaxcomm

35F, HBC HuiLong Center Building-II Minzhi Street, Longhua, Shenzhen, P.R. China 518110

### 1.3. Testing Facility

|                                     |                                                                                                                                           |
|-------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|
| <input checked="" type="checkbox"/> | <b>Test Site - MRT Suzhou Laboratory</b>                                                                                                  |
|                                     | <b>Laboratory Location (Suzhou - Wuzhong)</b><br>D8 Building, No.2 Tian'edang Rd., Wuzhong Economic Development Zone, Suzhou, China       |
|                                     | <b>Laboratory Location (Suzhou - SIP)</b><br>4b Building, Liando U Valley, No.200 Xingpu Rd., Shengpu Town, Suzhou Industrial Park, China |
|                                     | <b>Laboratory Accreditations</b><br>A2LA: 3628.01 CNAS: L10551<br>FCC: CN1166 ISED: CN0001<br>VCCI: R-20025, G-20034, C-20020, T-20020    |
| <input type="checkbox"/>            | <b>Test Site - MRT Shenzhen Laboratory</b>                                                                                                |
|                                     | <b>Laboratory Location (Shenzhen)</b><br>1G, Building A, Junxiangda Building, Zhongshanyuan Road West, Nanshan District, Shenzhen, China  |
|                                     | <b>Laboratory Accreditations</b><br>A2LA: 3628.02 CNAS: L10551<br>FCC: CN1284 ISED: CN0105                                                |
| <input type="checkbox"/>            | <b>Test Site - MRT Taiwan Laboratory</b>                                                                                                  |
|                                     | <b>Laboratory Location (Taiwan)</b><br>No. 38, Fuxing 2 <sup>nd</sup> Rd., Guishan Dist., Taoyuan City 333, Taiwan (R.O.C.)               |
|                                     | <b>Laboratory Accreditations</b><br>TAF: L3261-190725<br>FCC: 291082, TW3261 ISED: TW3261                                                 |

## 2. PRODUCT INFORMATION

### 2.1. Equipment Description

|                         |                                  |
|-------------------------|----------------------------------|
| Product Name:           | Orbic Speed 5G                   |
| Model No.:              | R500L5                           |
| IMEI:                   | 352241200003832                  |
| Hardware Version:       | V1.2                             |
| Software Version:       | ORB500L5_v1.0.1.3_BVZRT          |
| 5G NR FR2 Specification |                                  |
| Band:                   | n260                             |
| Frequency Range:        | 37000 ~ 40000MHz                 |
| Support Bandwidth:      | Single Carrier: 100MHz           |
| Modulation:             | DFT-s-OFDM: QPSK / 16QAM / 64QAM |
| SCS for NR cell:        | 120kHz                           |
| Battery Information     |                                  |
| Battery Model:          | BTE-4401                         |
| Battery Manufacturer:   | HUIZHOU DXDRAGON INC             |
| Battery Capacity:       | 4400mAh                          |

Note: The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.

### 2.2. Test Methodology

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- ANSI C63.26:2015
- FCC CFR 47 Part 30
- FCC KDB 971168 D01 v03r01: Power Meas License Digital Systems
- FCC KDB 842590 D01 Upper Microwave Flexible Use Service v01r01

### 2.3. Device Capabilities

The NR radio operation is controlled via software tool QRCT FTM mode (Factory mode). The EUT is forced to operate continuously (100% duty cycle) with maximum output power during the test.

## 2.4. Test Mode Applicability

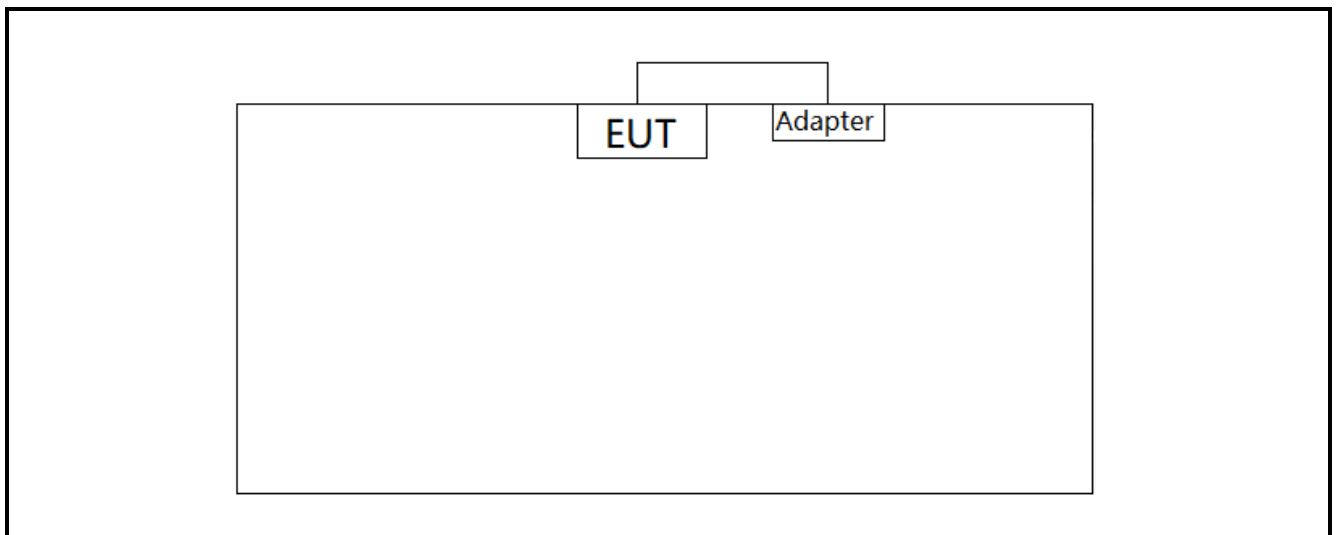
| Test Item         | Beam ID |    | Axis<br>(X, Y, Z) |
|-------------------|---------|----|-------------------|
|                   | RX      | TX |                   |
| n260              |         |    |                   |
| Spurious Emission | 144     | 16 | Y                 |

| Test Item                                                               | BW (MHz) |     | Modulation |      |       |       | CH.     | RB |       |      |
|-------------------------------------------------------------------------|----------|-----|------------|------|-------|-------|---------|----|-------|------|
|                                                                         | 50       | 100 | BPSK       | QPSK | 16QAM | 64QAM |         | 1  | Inner | Full |
|                                                                         |          |     |            |      |       |       |         |    |       |      |
| Spurious Emission                                                       | --       | √   | --         | √    | --    | --    | L, M, H | √  | --    | --   |
| Note: The mark “√” means that this configuration is chosen for testing. |          |     |            |      |       |       |         |    |       |      |

## 2.5. EMI Suppression Device(s)/Modifications

No EMI suppression device(s) were added and/or no modifications were made during testing.

## 2.6. Configuration of Tested System



## 2.7. Calculations of Measurement Result

### EIRP Caculation

$$\text{EIRP (dBm)} = \text{Spectrum Analyzer Level(dBm)} - \text{Antenna Gain (dBi)} + \text{Converter Loss(dB)} + 20\log(F) + 20\log(D) - 27.56$$

Where:

F: frequency (MHz)

D: Distance (m)

Example:

The frequency we select is 111.077GHz and the distance is 1m.

$$\begin{aligned}\text{Offset} &= - \text{Antenna Gain (dBi)} + \text{Converter Loss(dB)} + 20\log(F) + 20\log(D) - 27.56 \\ &= -24.70 + 11.60 + 100.91 + 20\log(1) - 27.56 \\ &= 60.25 \text{ dB}\end{aligned}$$

The test results in the screenshot already includes this offset.

## 2.8. Minimum Measurement Distance Evaluation

According to KDB842590 D01, the measurements of the fundamental emission, out of band, harmonics and spurious emissions shall be made in the far field of the measurement antenna. The far-field boundary for mmW antennas is greater than or equal to  $2D^2/\lambda$  (with D being the largest dimension of the antenna, and  $\lambda$  the wavelength of the emission). When the selected far-field measurement distance is different than the distance at which the applicable limit is specified, a linear inverse distance attenuation factor (20 dB/decade of distance change for field strength) shall be applied.

For fundamental or out-of-band emissions the largest far-field distance of either the EUT antenna or measurement antenna shall be used. For spurious emissions the far-field distance will be based on the measurement antenna.

### Spurious Emission

| Frequency Range<br>(GHz) | Measurement Distance<br>(m) |
|--------------------------|-----------------------------|
| 110 ~ 140                | 1                           |
| 140 ~ 220                | 1                           |

## 2.9. Test Environment Condition

|                     |            |
|---------------------|------------|
| Ambient Temperature | 15 ~ 35°C  |
| Relative Humidity   | 20 ~ 75%RH |

### 3. TEST EQUIPMENT CALIBRATION DATE

| Instrument          | Manufacturer | Model No. | Serial No. | Characteristics        | Cali. Date | Due Date   | Asset No.   |
|---------------------|--------------|-----------|------------|------------------------|------------|------------|-------------|
| EXA Signal Analyzer | Keysight     | N9030B    | MY57140549 | 3Hz-50GHz              | 2020/08/31 | 2021/08/30 | MRTSUE06395 |
| Micro-Wave Antenna  | MI-WWAVE     | 261F-25   | 385        | 90~140GHz              | 2016/12/26 | N/A        | MRTSUE06275 |
| Micro-Wave Antenna  | MI-WWAVE     | 261G      | 387        | 140~220GHz             | 2016/12/26 | N/A        | MRTSUE06274 |
| SA Extension Module | Keysight     | N9029AV06 | US53250010 | 110-170GH              | N/A        | N/A        | MRTSUE06368 |
| SA Extension Module | Keysight     | N9029AV05 | US53250008 | 140-220 GHz            | N/A        | N/A        | MRTSUE06367 |
| Thermal Hygrometer  | testo        | 608-H1    | 1945229024 | T: 0~50°C; H: 10~95%RH | 2020/12/04 | 2021/12/03 | MRTSUE06622 |
| Anechoic Chamber    | RIKEN        | SIP-AC3   | N/A        | N/A                    | 2020/12/25 | 2021/12/24 | MRTSUE06782 |

## 4. TEST RESULT

### 4.1. Summary

| FCC Part<br>Section(s) | Test<br>Description | Test<br>Limit | Test<br>Condition | Test<br>Result | Reference   |
|------------------------|---------------------|---------------|-------------------|----------------|-------------|
| 30.203                 | Spurious Emission   | < -13dBm      | Radiated          | Pass           | Section 4.2 |

**Note 1:** Only 110-200GHz spurious emissions were investigated in this report.

**Note 2:** We chose the maximum power configuration to complete the spurious emission test.

## **4.2. Radiated Spurious Emissions Measurements**

### **4.2.1. Test Limit**

All out of band emissions are measured in a radiated test setup while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies. All modulations were investigated to determine the worst case configuration. All modes of operation were investigated and the worst case configuration results are reported in this section.

The conductive power or total radiated power of any emissions outside a licensee's frequency block shall be -13dBm/1MHz.

### **4.2.2. Test Procedure Used**

ANSI C63.26-2015 - Section 5.7.4

KDB 842590 D01 v01 Section 4.4.2 and Section 4.4.3

### **4.2.3. Test Setting**

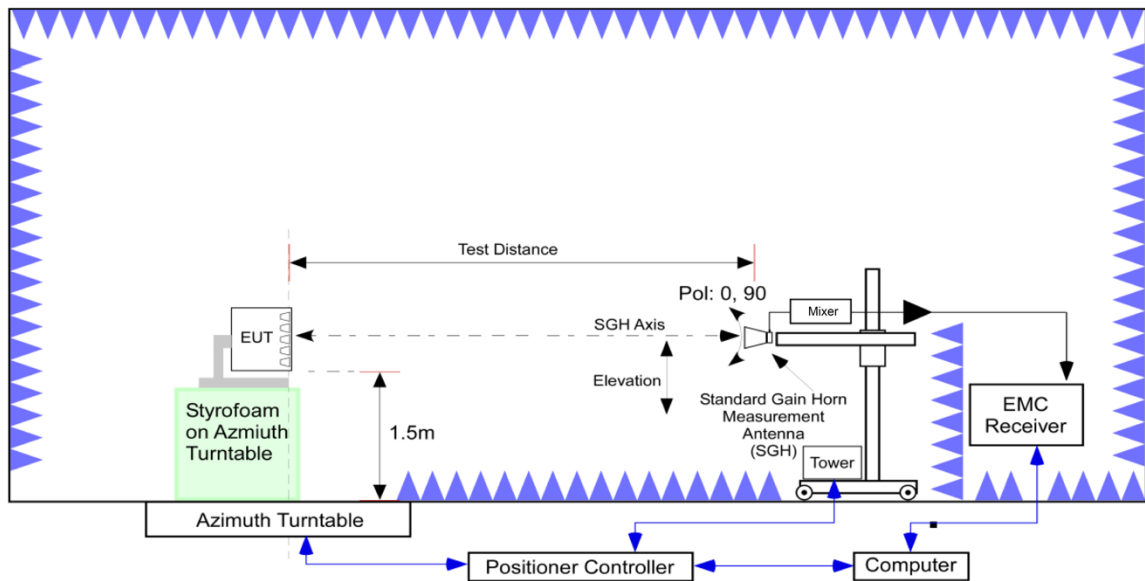
1. RBW = 1MHz
2. VBW  $\geq 3 \times$  RBW
3. Sweep time  $\geq 10 \times$  (number of points in sweep)  $\times$  (transmission symbol period)
4. Detector = RMS
5. Trace mode = Trace Average
6. The trace was allowed to stabilize

#### **Test Note:**

- 1) All radiated spurious emissions were measured as EIRP to compare with the §30.203 TRP limits.
- 2) The plots from 110-200GHz show corrected average EIRP levels and Harmonic Mixer Conversion Loss was also applied to the spectrum analyzer.

#### 4.2.4. Test Setup

110GHz ~ 200GHz Test Setup:



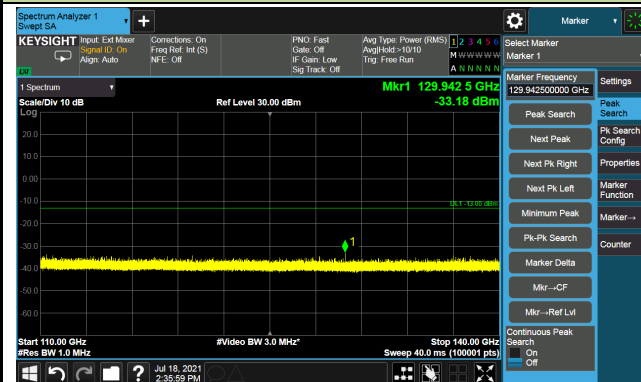
#### 4.2.5. Test Result

|               |                                                                |           |                         |
|---------------|----------------------------------------------------------------|-----------|-------------------------|
| Product       | Orbic Speed 5G                                                 | Test Site | SIP-AC3                 |
| Test Engineer | Andy Zhu                                                       | Test Date | 2021/07/18 ~ 2021/07/20 |
| Test Mode     | n260_MIMO Mode_RX Beam ID 144 & TX Beam ID 16 _110GHz ~ 140GHz |           |                         |

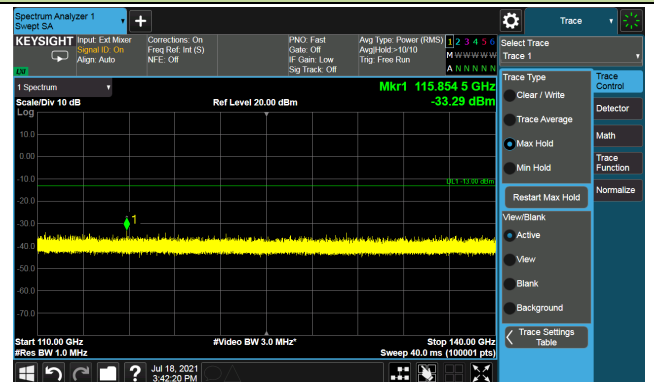
| CH     | BW<br>(MHz) | RB  | EIRP (dBm) |        | Limit<br>(dBm) | Result |
|--------|-------------|-----|------------|--------|----------------|--------|
|        |             |     | H          | V      |                |        |
| Low    | 100         | 1RB | -33.18     | -33.29 | ≤ -13.00       | Pass   |
| Middle |             | 1RB | -33.19     | -32.80 | ≤ -13.00       | Pass   |
| High   |             | 1RB | -32.58     | -29.86 | ≤ -13.00       | Pass   |

## Radiated Spurious Emissions - 100MHz

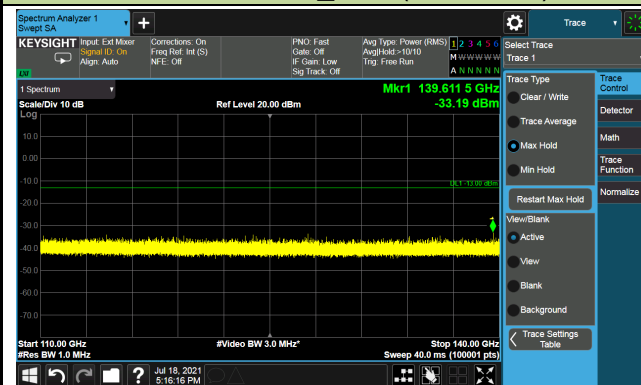
### Low Channel\_1RB (Horizontal)



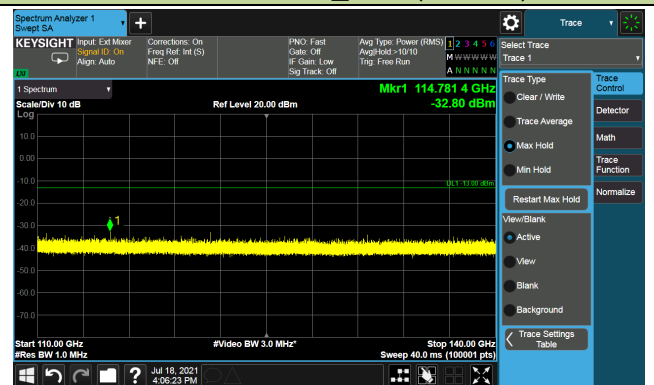
### Low Channel\_1RB (Vertical)



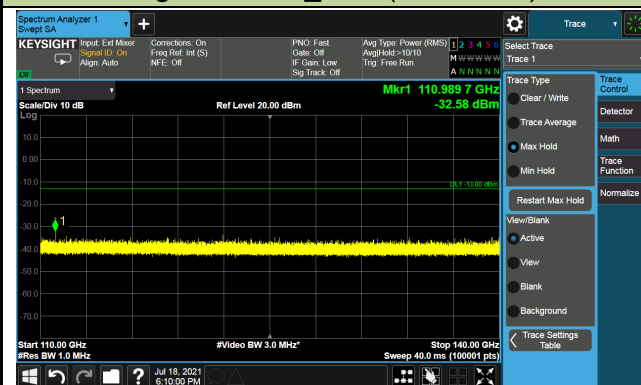
### Middle Channel\_1RB (Horizontal)



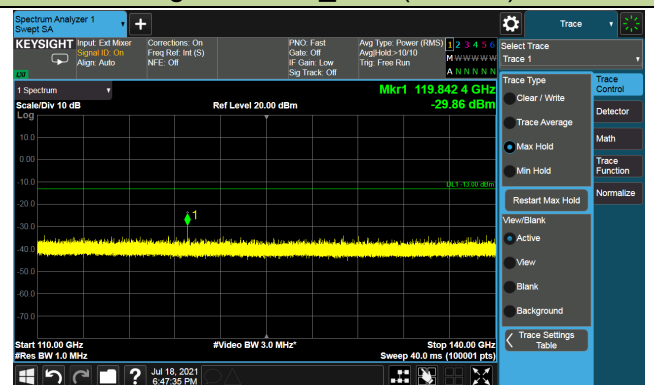
### Middle Channel\_1RB (Vertical)



### High Channel\_1RB (Horizontal)



### High Channel\_1RB (Vertical)

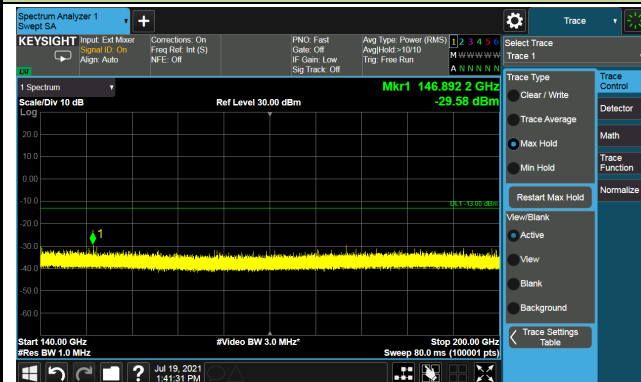


|               |                                                               |           |                         |
|---------------|---------------------------------------------------------------|-----------|-------------------------|
| Product       | Orbic Speed 5G                                                | Test Site | SIP-AC3                 |
| Test Engineer | Andy Zhu                                                      | Test Date | 2021/07/18 ~ 2021/07/20 |
| Test Mode     | n260_MIMO Mode_RX Beam ID 144 & TX Beam ID 16_140GHz ~ 200GHz |           |                         |

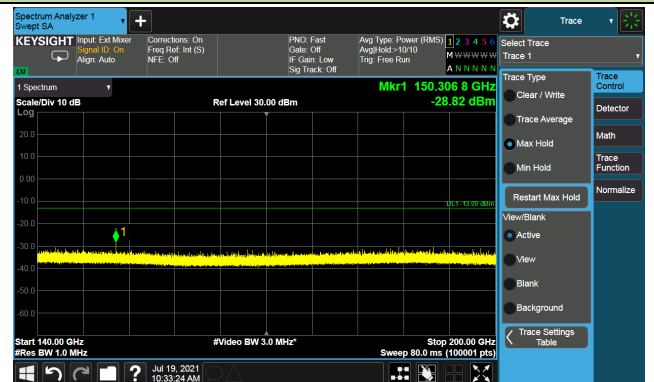
| CH     | BW<br>(MHz) | RB  | EIRP (dBm) |        | Limit<br>(dBm) | Result |
|--------|-------------|-----|------------|--------|----------------|--------|
|        |             |     | H          | V      |                |        |
| Low    | 100         | 1RB | -29.58     | -28.82 | $\leq -13.00$  | Pass   |
| Middle |             | 1RB | -30.43     | -29.58 | $\leq -13.00$  | Pass   |
| High   |             | 1RB | -29.54     | -30.23 | $\leq -13.00$  | Pass   |

## Radiated Spurious Emissions - 100MHz

### Low Channel\_1RB (Horizontal)



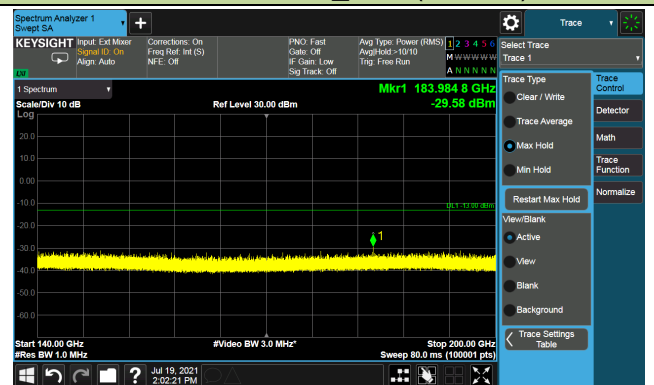
### Low Channel\_1RB (Vertical)



### Middle Channel\_1RB (Horizontal)



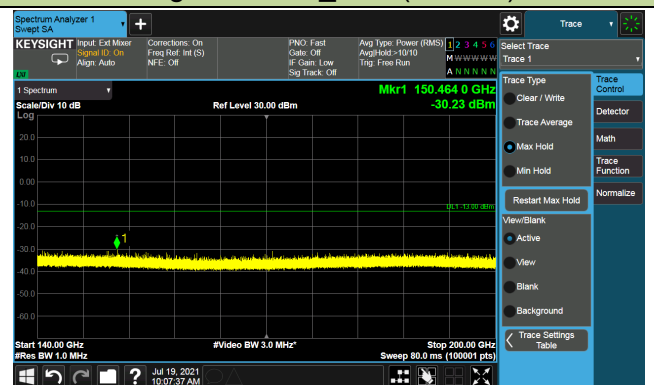
### Middle Channel\_1RB (Vertical)



### High Channel\_1RB (Horizontal)



### High Channel\_1RB (Vertical)



The End

## **Appendix A - Test Setup Photograph**

Refer to “2107RSU043-UT” file.

## Appendix B - Equipment Calibration Certificate

Micro-Wave Antenna - 90 - 140G

# ***MI-WAVE***

Millimeter Products Inc.

2200 Tall Pines Drive  
Suite 100  
Largo, FL 33771  
Tel. (727) 536-0033  
Fax. (727) 536-0012

Test Data Sheet  
261F-25/385

### Specifications

Frequency Range 90 to 140 GHz WR-08

| Frequency (GHz) | Gain (db) |
|-----------------|-----------|
| 90.0            | 23.4      |
| 95.0            | 23.7      |
| 100.0           | 24.1      |
| 105.0           | 24.4      |
| 110.0           | 24.7      |
| 115.0           | 25.0      |
| 120.0           | 25.2      |
| 125.0           | 25.4      |
| 130.0           | 25.5      |
| 135.0           | 25.7      |
| 140.0           | 25.9      |

Tested by \_\_\_\_\_ Date \_\_\_\_\_

## Micro-Wave Antenna - 140 - 220G

***MI-WAVE***

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Millimeter Products Inc.

2200 Tall Pines Drive  
Suite 100  
Largo, FL 33771  
Tel. (727) 536-0033  
Fax. (727) 536-0012

Test Data Sheet  
261G-25/387

## Specifications

Frequency Range 140 to 220 GHz WR-05

| Frequency (GHz) | Gain (db) |
|-----------------|-----------|
| 140.0           | 23.5      |
| 145.0           | 23.7      |
| 150.0           | 23.9      |
| 155.0           | 24.1      |
| 160.0           | 24.3      |
| 165.0           | 24.6      |
| 170.0           | 24.8      |
| 175.0           | 25.0      |
| 180.0           | 25.1      |
| 190.0           | 25.4      |
| 200.0           | 25.6      |
| 210.0           | 25.7      |
| 220.0           | 25.8      |

Tested by \_\_\_\_\_ Date \_\_\_\_\_

# N9029AV06 Conversion Loss Data

| SAX 176 Conversion Loss                                  |                       |                    |                      |                                 |                                     |  |
|----------------------------------------------------------|-----------------------|--------------------|----------------------|---------------------------------|-------------------------------------|--|
| Note: Out of band data is not guaranteed to be accurate. |                       |                    |                      |                                 |                                     |  |
| Freq(GHz)                                                | *A* LQ/F Input/Output | *B* Standard Input | *C* High Freq. Input | High Freq. Intrinsic Mixer Loss | Standard Freq. Intrinsic Mixer Loss |  |
| 140.00                                                   | 11.4588               | -1.4688            | -1.1281              | 10.66786047                     | 10.36815107                         |  |
| 140.80                                                   | 11.5383               | -1.3966            | -0.8949              | 10.89445437                     | 10.46188817                         |  |
| 141.60                                                   | 11.0199               | -1.8996            | -1.9279              | 9.962309899                     | 10.0161337                          |  |
| 142.40                                                   | 10.8230               | -2.0928            | -2.1223              | 10.0455533                      | 10.0809166                          |  |
| 143.20                                                   | 10.2939               | -2.6194            | -2.6477              | 9.508234121                     | 9.546949921                         |  |
| 144.00                                                   | 10.5276               | -2.3855            | -2.5330              | 9.458753579                     | 9.606467179                         |  |
| 144.80                                                   | 10.7186               | -2.2001            | -2.4504              | 9.809950087                     | 9.881112787                         |  |
| 145.60                                                   | 10.8598               | -2.0535            | -2.0581              | 10.19231355                     | 10.19994805                         |  |
| 146.40                                                   | 10.8395               | -2.0997            | -2.0531              | 10.19016394                     | 10.17189774                         |  |
| 147.20                                                   | 10.3411               | -2.5892            | -2.7161              | 9.437930045                     | 9.574288845                         |  |
| 148.00                                                   | 10.1682               | -2.7440            | -2.7252              | 9.408296151                     | 9.392292851                         |  |
| 148.80                                                   | 10.4312               | -2.4774            | -2.4081              | 9.79993444                      | 9.87248044                          |  |
| 149.60                                                   | 11.1054               | -1.8015            | -1.7488              | 10.52887381                     | 10.44524801                         |  |
| 150.40                                                   | 10.9527               | -1.9540            | -1.9272              | 10.34188817                     | 10.33444037                         |  |
| 151.20                                                   | 10.3938               | -2.5121            | -2.4870              | 9.69399972                      | 9.670922072                         |  |
| 152.00                                                   | 10.0649               | -2.8426            | -2.8004              | 9.303334237                     | 9.210159937                         |  |
| 152.80                                                   | 10.0625               | -2.8467            | -2.8216              | 9.288954158                     | 9.218948958                         |  |
| 153.60                                                   | 10.9998               | -1.8028            | -1.8725              | 10.41448511                     | 10.35928111                         |  |
| 154.40                                                   | 10.8115               | -2.2963            | -2.2781              | 9.88280159                      | 9.88064519                          |  |
| 155.20                                                   | 9.9006                | -2.9172            | -2.9040              | 9.232475278                     | 9.223703778                         |  |
| 156.00                                                   | 9.5877                | -3.3441            | -3.3780              | 8.631205461                     | 8.63650281                          |  |
| 156.80                                                   | 9.6287                | -3.2798            | -3.2513              | 8.78514208                      | 8.71267448                          |  |
| 157.60                                                   | 9.9245                | -2.9870            | -2.9418              | 9.261546722                     | 9.180329622                         |  |
| 158.40                                                   | 10.3302               | -2.5753            | -2.5254              | 9.686105406                     | 9.611893206                         |  |
| 159.20                                                   | 9.7928                | -3.1165            | -3.0783              | 9.083578478                     | 9.043854978                         |  |
| 160.00                                                   | 9.6837                | -3.2248            | -3.1909              | 8.866140831                     | 8.840870031                         |  |
| 160.80                                                   | 9.8528                | -3.2572            | -3.1940              | 9.011376848                     | 8.816598548                         |  |
| 161.60                                                   | 10.0987               | -2.8443            | -2.7812              | 9.426544062                     | 9.330216282                         |  |
| 162.40                                                   | 10.1768               | -2.7300            | -2.6757              | 9.551188073                     | 9.490809673                         |  |
| 163.20                                                   | 10.1639               | -2.7477            | -2.7009              | 9.480541232                     | 9.421341832                         |  |
| 164.00                                                   | 9.7090                | -3.1477            | -3.1004              | 9.014170048                     | 8.932272048                         |  |
| 164.80                                                   | 9.8200                | -3.0928            | -3.0769              | 9.023249704                     | 8.974455004                         |  |
| 165.60                                                   | 9.6429                | -3.2607            | -3.3014              | 8.77748016                      | 8.78546986                          |  |
| 166.40                                                   | 10.1895               | -2.7244            | -2.6486              | 9.298234378                     | 9.404854578                         |  |
| 167.20                                                   | 10.4734               | -2.4413            | -2.8359              | 9.343436032                     | 9.081399132                         |  |
| 168.00                                                   | 10.6109               | -2.4007            | -2.8911              | 9.235984312                     | 9.733901412                         |  |
| 168.80                                                   | 10.4358               | -2.4741            | -3.1097              | 9.677929285                     | 9.610299785                         |  |
| 169.60                                                   | 10.2394               | -2.6723            | -2.7157              | 9.382560716                     | 9.427606916                         |  |
| 170.40                                                   | 9.7855                | -3.1286            | -3.1283              | 8.953232779                     | 8.921142479                         |  |
| 171.20                                                   | 10.1972               | -2.7086            | -2.7452              | 9.354368723                     | 9.380948423                         |  |
| 172.00                                                   | 10.4727               | -2.4353            | -2.4847              | 9.658711115                     | 9.675122015                         |  |
| 172.80                                                   | 9.9584                | -2.9546            | -3.0205              | 9.054821718                     | 9.107839418                         |  |
| 173.60                                                   | 9.8533                | -3.0535            | -3.0679              | 8.855593372                     | 9.002038172                         |  |
| 174.40                                                   | 10.0012               | -2.9077            | -2.8314              | 9.10793709                      | 9.13874749                          |  |
| 175.20                                                   | 10.0303               | -2.8807            | -2.8781              | 9.175037865                     | 9.172080865                         |  |
| 176.00                                                   | 9.8435                | -3.0670            | -3.0647              | 8.9984844                       | 8.990178                            |  |
| 176.80                                                   | 9.8023                | -3.0076            | -3.0454              | 8.003381543                     | 9.046049543                         |  |
| 177.60                                                   | 9.7478                | -3.1641            | -3.1713              | 8.824558927                     | 8.880734327                         |  |
| 178.40                                                   | 10.0611               | -2.8518            | -3.0974              | 9.825458423                     | 9.191786023                         |  |
| 179.20                                                   | 9.8626                | -3.0488            | -3.1822              | 8.845248548                     | 8.980053448                         |  |
| 180.00                                                   | 10.3755               | -2.5384            | -3.0120              | 9.023615844                     | 9.524103744                         |  |
| 180.80                                                   | 10.5314               | -2.3831            | -3.0681              | 8.920277037                     | 9.663018137                         |  |
| 181.60                                                   | 9.9880                | -2.9225            | -3.4418              | 8.533230484                     | 9.086123884                         |  |
| 182.40                                                   | 10.5906               | -2.3181            | -3.3589              | 8.840469798                     | 9.714027398                         |  |
| 183.20                                                   | 10.2080               | -2.7072            | -3.1000              | 8.950815175                     | 9.354089475                         |  |
| 184.00                                                   | 10.2501               | -2.6807            | -2.9582              | 9.133575293                     | 9.424542593                         |  |
| 184.80                                                   | 10.1888               | -2.7125            | -2.7817              | 9.378246945                     | 9.427821345                         |  |
| 185.60                                                   | 10.0237               | -2.8884            | -2.9445              | 9.174109124                     | 9.221868424                         |  |
| 186.40                                                   | 10.1178               | -2.7958            | -2.8354              | 9.289582295                     | 9.328985895                         |  |
| 187.20                                                   | 9.9116                | -2.9994            | -3.0523              | 9.065394864                     | 9.119477464                         |  |
| 188.00                                                   | 10.2098               | -2.7005            | -2.7483              | 9.434581465                     | 9.489879165                         |  |
| 188.80                                                   | 10.6880               | -2.2278            | -2.2225              | 10.00903823                     | 10.00143813                         |  |
| 189.60                                                   | 10.7574               | -2.1584            | -2.1584              | 10.08530002                     | 10.08454792                         |  |
| 190.40                                                   | 10.5986               | -2.3146            | -2.3551              | 9.848088812                     | 9.889417112                         |  |

|        |         |         |         |             |             |
|--------|---------|---------|---------|-------------|-------------|
| 191.20 | 10.8515 | -2.2597 | -2.5395 | 9.596112581 | 9.835388381 |
| 192.00 | 10.3762 | -2.5347 | -2.8489 | 9.233643018 | 9.509987518 |
| 192.80 | 10.7083 | -2.2087 | -2.5091 | 9.827841926 | 9.939343326 |
| 193.60 | 10.8837 | -2.0458 | -2.3240 | 9.834691264 | 10.07647596 |
| 194.40 | 10.7557 | -2.1589 | -2.4970 | 9.840362477 | 9.958875877 |
| 195.20 | 10.2193 | -2.6975 | -2.8702 | 9.178649947 | 9.353568347 |
| 196.00 | 9.8135  | -3.1019 | -3.1998 | 8.759904457 | 8.849940957 |
| 196.80 | 9.5998  | -3.3150 | -3.3476 | 8.563703458 | 8.588409458 |
| 197.60 | 9.6098  | -3.3054 | -3.2870 | 8.621510827 | 8.592115427 |
| 198.40 | 9.4016  | -3.5132 | -3.5036 | 8.382574022 | 8.362881022 |
| 199.20 | 9.8133  | -3.3037 | -3.3083 | 8.618465337 | 8.628573137 |
| 200.00 | 9.5727  | -3.3428 | -3.3266 | 8.583692575 | 8.528602875 |
| 200.80 | 9.3390  | -3.5772 | -3.5887 | 8.288916047 | 8.284465547 |
| 201.60 | 9.2757  | -3.6425 | -3.6303 | 8.20791295  | 8.20144525  |
| 202.40 | 9.1983  | -3.7203 | -3.7062 | 8.123187399 | 8.106725599 |
| 203.20 | 9.0726  | -3.8420 | -3.8361 | 7.980378757 | 7.987916757 |
| 204.00 | 9.2989  | -3.6217 | -3.6117 | 8.264910727 | 8.246487927 |
| 204.80 | 9.7615  | -3.1578 | -3.1471 | 8.750031069 | 8.746040169 |
| 205.60 | 9.5844  | -3.3309 | -3.3183 | 8.547339897 | 8.538325497 |
| 206.40 | 9.6159  | -3.2975 | -3.2884 | 8.6036188   | 8.5929101   |
| 207.20 | 9.6157  | -3.3059 | -3.3010 | 8.612695198 | 8.590490598 |
| 208.00 | 9.8286  | -3.2908 | -3.2821 | 8.682428982 | 8.680478282 |
| 208.80 | 9.8952  | -3.0234 | -3.0145 | 8.853587078 | 8.864641578 |
| 209.60 | 10.0502 | -2.8666 | -2.8589 | 9.11055119  | 9.10742359  |
| 210.40 | 10.1977 | -2.7186 | -2.7033 | 9.208525342 | 9.198636042 |
| 211.20 | 9.9633  | -2.9544 | -2.9364 | 8.94524481  | 8.93983491  |
| 212.00 | 10.0197 | -2.8945 | -2.8813 | 9.001238918 | 8.986306918 |
| 212.80 | 10.1718 | -2.7425 | -2.7240 | 9.173380152 | 9.147048352 |
| 213.60 | 10.2939 | -2.6191 | -2.6015 | 9.326126482 | 9.309896682 |
| 214.40 | 10.3931 | -2.5179 | -2.4978 | 9.40016897  | 9.398568807 |
| 215.20 | 10.5424 | -2.3655 | -2.3485 | 9.591691357 | 9.581215557 |
| 216.00 | 10.5260 | -2.3849 | -2.3649 | 9.545030582 | 9.509073882 |
| 216.80 | 10.7628 | -2.1532 | -2.1237 | 9.803154612 | 9.724883912 |
| 217.60 | 10.5425 | -2.3716 | -2.3583 | 9.477087775 | 9.447100775 |
| 218.40 | 10.6178 | -2.2950 | -2.2767 | 9.528118206 | 9.504559306 |
| 219.20 | 10.6078 | -2.3078 | -2.2875 | 9.544223225 | 9.539561525 |
| 220.00 | 10.7875 | -2.1217 | -2.1096 | 9.74300038  | 9.74549638  |

## N9029AV05 Conversion Loss Data

| SAX 177 Conversion Loss                                  |                       |                    |                      |                                 |                                     |
|----------------------------------------------------------|-----------------------|--------------------|----------------------|---------------------------------|-------------------------------------|
| Note: Out of band data is not guaranteed to be accurate. |                       |                    |                      |                                 |                                     |
| Freq(GHz)                                                | *A* LO/F Input/Output | *B* Standard Input | *C* High Freq. Input | High Freq. Intrinsic Mixer Loss | Standard Freq. Intrinsic Mixer Loss |
| 110                                                      | 11.68394112           | -3.383088078       | -3.284527678         | 10.15474872                     | 10.06337012                         |
| 110.6                                                    | 11.57308777           | -3.498883729       | -3.568183529         | 9.794878271                     | 9.864229971                         |
| 111.2                                                    | 11.991107             | -3.0770951         | -3.2918364           | 9.878209                        | 10.1049861                          |
| 111.8                                                    | 11.98779416           | -3.074688439       | -2.975434636         | 10.08663266                     | 10.02446926                         |
| 112.4                                                    | 11.00529689           | -4.06860307        | -4.025038407         | 9.269993593                     | 9.237336893                         |
| 113                                                      | 10.8932281            | -4.210285397       | -4.217390897         | 9.255584503                     | 9.263078203                         |
| 113.6                                                    | 10.91497407           | -4.182371434       | -4.168123534         | 9.318568666                     | 9.329251366                         |
| 114.2                                                    | 10.89089864           | -4.084266657       | -4.083900257         | 9.408154243                     | 9.409753643                         |
| 114.8                                                    | 11.08061626           | -4.015065241       | -4.004458541         | 9.432385059                     | 9.426758159                         |
| 115.4                                                    | 11.35193185           | -3.720155048       | -3.648222748         | 9.542657852                     | 9.465904952                         |
| 116                                                      | 11.41763792           | -3.654806184       | -3.617456484         | 9.614491316                     | 9.600550416                         |
| 116.6                                                    | 11.46837949           | -3.609815605       | -3.612624805         | 9.744009295                     | 9.749827795                         |
| 117.2                                                    | 11.24394817           | -3.832673226       | -3.858841326         | 9.598371174                     | 9.626489574                         |
| 117.8                                                    | 12.13468057           | -2.839075534       | -2.967255834         | 10.821989057                    | 10.848003317                        |
| 118.4                                                    | 11.81514805           | -3.261696349       | -3.293168949         | 10.28307455                     | 10.31377575                         |
| 119                                                      | 11.07245991           | -4.001813685       | -4.040085185         | 9.433749615                     | 9.475085215                         |
| 119.6                                                    | 10.6021445            | -4.475087598       | -4.462485498         | 8.848882102                     | 8.849784602                         |
| 120.2                                                    | 10.67841275           | -4.398393646       | -4.396865446         | 8.914752254                     | 8.901209254                         |
| 120.8                                                    | 10.54034626           | -4.535781244       | -4.503172944         | 8.733081458                     | 8.713703958                         |
| 121.4                                                    | 10.43688939           | -4.639304805       | -4.641873005         | 8.723823495                     | 8.731438295                         |
| 122                                                      | 10.73766783           | -4.34008807        | -4.36364627          | 9.06399843                      | 9.08444773                          |
| 122.6                                                    | 11.18180133           | -3.89750617        | -3.93439927          | 9.60312293                      | 9.6052633                           |
| 123.2                                                    | 10.98592437           | -4.09134593        | -4.13101813          | 9.38273377                      | 9.42817707                          |
| 123.8                                                    | 10.80572596           | -4.473785537       | -4.509993337         | 8.908536693                     | 8.951818893                         |
| 124.4                                                    | 10.26158773           | -4.814082667       | -4.814839667         | 8.527585333                     | 8.547649433                         |
| 125                                                      | 10.29704907           | -4.778142334       | -4.744799034         | 8.503953466                     | 8.487753966                         |
| 125.6                                                    | 10.2834205            | -4.784596796       | -4.769800196         | 8.504213204                     | 8.500806604                         |
| 126.2                                                    | 10.14617007           | -4.930938233       | -4.935063433         | 8.412498067                     | 8.427475267                         |
| 126.8                                                    | 10.32517229           | -4.753865515       | -4.792939815         | 8.680832985                     | 8.723357985                         |
| 127.4                                                    | 10.72703093           | -4.350860098       | -4.391482698         | 9.108328532                     | 9.151334732                         |
| 128                                                      | 10.59086882           | -4.488057181       | -4.554195581         | 8.918502319                     | 8.989988219                         |
| 128.6                                                    | 10.29146755           | -4.788938747       | -4.852441347         | 8.543652553                     | 8.621702853                         |
| 129.2                                                    | 10.13747132           | -4.940275694       | -4.954622494         | 8.358197716                     | 8.383355616                         |
| 129.8                                                    | 10.13804141           | -4.94301379        | -4.92917239          | 8.31752111                      | 8.31847441                          |
| 130.4                                                    | 10.05111355           | -5.02571795        | -4.98910985          | 8.20328995                      | 8.18415085                          |
| 131                                                      | 9.844265812           | -5.134197988       | -5.131907288         | 8.135169912                     | 8.144953112                         |
| 131.6                                                    | 9.819267082           | -5.158011838       | -5.171745638         | 8.150525992                     | 8.171902992                         |
| 132.2                                                    | 10.21798389           | -4.894699005       | -4.889313705         | 8.468845195                     | 8.501053995                         |
| 132.8                                                    | 10.1754814            | -4.901749898       | -4.933994598         | 8.420883002                     | 8.464122602                         |
| 133.4                                                    | 10.13821303           | -4.942454274       | -4.951791874         | 8.302749726                     | 8.328267426                         |
| 134                                                      | 10.12951225           | -4.94837545        | -4.96585725          | 8.29808545                      | 8.33451345                          |
| 134.6                                                    | 10.18166064           | -4.894831257       | -4.906888757         | 8.344387243                     | 8.367777443                         |
| 135.2                                                    | 9.971954356           | -5.104816044       | -5.117878744         | 8.110247356                     | 8.131887956                         |
| 135.8                                                    | 9.807437588           | -5.268872504       | -5.279411704         | 7.954848996                     | 7.978883296                         |
| 136.4                                                    | 9.697643456           | -5.379426544       | -5.403232944         | 7.851466756                     | 7.883915856                         |
| 137                                                      | 9.680205948           | -5.118276252       | -5.148837452         | 8.127309348                     | 8.165217948                         |
| 137.6                                                    | 9.825817484           | -5.151427518       | -5.178410318         | 8.081951784                     | 8.116921984                         |
| 138.2                                                    | 9.819354108           | -5.158658792       | -5.188698192         | 8.073004208                     | 8.118497708                         |
| 138.8                                                    | 10.23777035           | -4.839845854       | -4.868235954         | 8.398365246                     | 8.432570246                         |
| 139.4                                                    | 10.13996516           | -4.938238138       | -4.967744738         | 8.274453492                     | 8.312944492                         |
| 140                                                      | 10.08040165           | -4.996442152       | -5.018328252         | 8.192915048                     | 8.227040348                         |
| 140.6                                                    | 9.889714990           | -5.087688834       | -5.109378534         | 8.100458896                     | 8.134620996                         |
| 141.2                                                    | 10.12940496           | -4.947642842       | -4.968378442         | 8.259190758                     | 8.291700858                         |
| 141.8                                                    | 10.25036396           | -4.827805796       | -4.852789396         | 8.392201804                     | 8.427210904                         |
| 142.4                                                    | 10.18987497           | -4.908530031       | -4.930509131         | 8.324533499                     | 8.355295599                         |
| 143                                                      | 10.1487116            | -4.930242597       | -4.956637797         | 8.273785103                     | 8.313147903                         |
| 143.6                                                    | 10.05627483           | -5.017684267       | -5.046291167         | 8.207837633                     | 8.246257233                         |
| 144.2                                                    | 10.0938837            | -4.983466998       | -5.011733298         | 8.258377602                     | 8.294802302                         |
| 144.8                                                    | 10.08779894           | -4.988928853       | -5.021805163         | 8.258260237                     | 8.303108537                         |
| 145.4                                                    | 10.14389393           | -4.933785974       | -4.951388974         | 8.297843826                     | 8.330288026                         |
| 146                                                      | 10.18878762           | -4.879804076       | -4.918414776         | 8.415587724                     | 8.465679124                         |
| 146.6                                                    | 10.33665906           | -4.738089742       | -4.788201342         | 8.598551658                     | 8.657989158                         |
| 147.2                                                    | 10.28622714           | -4.777755558       | -4.824349158         | 8.547656041                     | 8.605455341                         |
| 147.8                                                    | 10.40400017           | -4.872716727       | -4.722047827         | 8.653449973                     | 8.716856773                         |

Note: Out of band data is not guaranteed to be accurate.

|       |             |              |              |             |             |
|-------|-------------|--------------|--------------|-------------|-------------|
| 148.4 | 10.41871373 | -4.055984766 | -4.701166668 | 8.660555834 | 8.716235734 |
| 149   | 10.61704695 | -4.45634625  | -4.49827305  | 8.89344215  | 8.94058145  |
| 148.6 | 10.78381732 | -4.287180677 | -4.326787077 | 8.082489423 | 9.139747823 |
| 150.2 | 10.91422647 | -4.154844781 | -4.201813831 | 8.243608769 | 9.503173669 |
| 150.6 | 10.89764612 | -4.177070275 | -4.218219975 | 8.228124325 | 9.279521225 |
| 151.4 | 11.03332069 | -4.045804506 | -4.112178806 | 9.321604294 | 9.394774394 |
| 152   | 11.04539127 | -4.023083433 | -4.089204333 | 9.332892267 | 9.418491667 |
| 152.6 | 10.64529085 | -4.429078151 | -4.499956051 | 8.871868749 | 8.957024449 |
| 152.2 | 10.28146891 | -4.782218891 | -4.833392891 | 8.478825509 | 8.549272809 |
| 153.8 | 10.18745393 | -4.886304071 | -4.921833271 | 8.364828529 | 8.417209029 |
| 154.4 | 10.26608537 | -4.806173332 | -4.839881932 | 8.439852768 | 8.487441568 |
| 155   | 10.18598004 | -4.910518965 | -4.940348465 | 8.306879035 | 8.353188035 |
| 155.6 | 10.22469658 | -4.8492024   | -4.8673778   | 8.3738428   | 8.4097188   |
| 156.2 | 9.984389189 | -5.091953101 | -5.095343001 | 8.100506989 | 8.112480389 |
| 156.8 | 9.938263262 | -5.139303038 | -5.149130538 | 8.058994362 | 8.078223262 |
| 157.4 | 10.10350448 | -4.974325217 | -4.978439617 | 8.203510983 | 8.217241383 |
| 158   | 10.01580289 | -5.059739813 | -5.058429713 | 8.083063087 | 8.101983287 |
| 158.6 | 10.04992727 | -5.026637534 | -5.021229834 | 8.134158166 | 8.143541066 |
| 158.2 | 9.999188909 | -5.079774791 | -5.073828391 | 8.084533109 | 8.091975109 |
| 159.8 | 10.28292388 | -4.811482617 | -4.825544117 | 8.400794483 | 8.422885683 |
| 160.4 | 10.42051026 | -4.654485639 | -4.674805839 | 8.835618881 | 8.868203961 |
| 161   | 10.40855468 | -4.698038023 | -4.698050523 | 8.849440677 | 8.884748877 |
| 161.6 | 10.5859407  | -4.4875449   | -4.5083604   | 8.832814    | 8.8609311   |
| 162.2 | 10.58910213 | -4.485138268 | -4.500856168 | 8.781372232 | 8.810040232 |
| 162.8 | 10.23460207 | -4.841260135 | -4.794720735 | 8.361583565 | 8.335323865 |
| 163.4 | 10.76013128 | -4.315841219 | -4.243530019 | 8.800906881 | 8.745507281 |
| 164   | 10.7436443  | -4.331556504 | -4.308102904 | 8.816604796 | 8.812476396 |
| 164.6 | 10.39266314 | -4.682340061 | -4.690636261 | 8.508988339 | 8.529903439 |
| 165.2 | 10.73900094 | -4.330418604 | -4.350848504 | 8.812247498 | 8.840071698 |
| 165.8 | 10.7744981  | -4.2844983   | -4.3188387   | 8.971459    | 9.0040597   |
| 166.4 | 10.66896975 | -4.404105245 | -4.414225845 | 8.851824455 | 8.888904855 |
| 167   | 10.6084867  | -4.483356295 | -4.459720395 | 8.744884205 | 8.740988805 |
| 167.6 | 11.01030085 | -4.082801647 | -4.067296247 | 9.001789853 | 9.007664853 |
| 168.2 | 11.72842324 | -3.347318758 | -3.306085958 | 9.653628442 | 9.819054842 |
| 168.8 | 11.39678122 | -3.674839879 | -3.834377579 | 9.382207421 | 9.329430421 |
| 169.4 | 11.05544431 | -4.015065485 | -3.982721985 | 9.104862415 | 9.084423915 |
| 170   | 11.12089628 | -3.951708841 | -3.952433341 | 9.228127259 | 9.237770759 |



中国赛宝实验室计量检测中心  
(工业和信息化部电子第五研究所计量检测中心)  
CHINA CEPREI LABORATORY CALIBRATION & TESTING CENTRE

# 校准证书

## CALIBRATION CERTIFICATE

证书编号: 1JA20004438-0004

Certificate No.



中国认可  
国际互认  
校准  
CALIBRATION  
CNAS L13344

委托单位:  
Client

曼瑞检测科技(苏州)有限公司

委托方地址:  
Address

苏州市吴中经济开发区天鹅荡路2号友新工业园D8幢

仪器名称:  
Description

PXA Signal Analyzer

型号规格:  
Model/Type

N9030B

制造商:  
Manufacturer

KEYSIGHT

机身号:  
Serial No.

MY57140549

管理号:  
Asset No.

MRTSUE06395

接收日期:  
Rec. Date

2020-08-31

校准日期:  
Cal. Date

2020-08-31

签发日期:  
App. Date

2020-09-01

建议校准周期:  
Reference Cal. Period

12个月(12 months)

结论:  
Conclusion

所校准项目合格(Passed at Calibration Items)

校准:  
Calibrated by

周永

核验:  
Inspected by

陈金鑫

签发:  
Approved by

朱昇亮

印章:  
Stamp

赛宝计量检测中心

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