



**TRANSMITTER REQUIREMENTS PORTION OF  
FCC CFR47 PART 101 SUBPART C**

**CERTIFICATION TEST REPORT**

**FOR**

**OPTICAL NETWORK TERMINAL**

**MODEL NUMBER: INTELLIMAX SERIES ULL-3000 AND MB-2000**

**FCC ID: RY7HYBRID4GIGE70G**

**REPORT NUMBER: 13U14926-1, Revision B**

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Revision History

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## TABLE OF CONTENTS

<b>1. ATTESTATION OF TEST RESULTS .....</b>	<b>5</b>
<b>2. TEST METHODOLOGY .....</b>	<b>6</b>
<b>3. FACILITIES AND ACCREDITATION .....</b>	<b>6</b>
<b>4. CALIBRATION AND UNCERTAINTY .....</b>	<b>6</b>
4.1. MEASURING INSTRUMENT CALIBRATION .....	6
4.2. SAMPLE CALCULATION .....	6
4.3. MEASUREMENT UNCERTAINTY .....	6
<b>5. SCOPE OF REPORT .....</b>	<b>7</b>
<b>6. EQUIPMENT UNDER TEST .....</b>	<b>7</b>
6.1. DESCRIPTION OF EUT .....	7
6.1. DESCRIPTION OF MODEL DIFFERENCES .....	7
6.2. MAXIMUM OUTPUT POWER .....	7
6.3. DESCRIPTION OF AVAILABLE ANTENNAS .....	7
6.4. SOFTWARE AND FIRMWARE .....	8
6.5. WORST-CASE CONFIGURATION AND MODE .....	8
6.1. DESCRIPTION OF TEST SETUP .....	9
<b>7. TEST AND MEASUREMENT EQUIPMENT .....</b>	<b>11</b>
<b>8. APPLICABLE LIMITS AND TEST RESULTS .....</b>	<b>12</b>
8.1. FREQUENCY TOLERANCE .....	12
8.2. BANDWIDTH .....	13
8.3. EMISSION MASK AND POWER DENSITY .....	15
8.4. SPURIOUS EMISSIONS .....	18
8.5. EIRP AND POWER DENSITY .....	23
<b>9. RF EXPOSURE .....</b>	<b>24</b>
9.1. FCC RULES .....	24
9.2. FCC LIMITS .....	24
9.3. EQUATIONS .....	25
9.5. FAR-FIELD CALCULATIONS .....	26
9.6. RADIATING NEAR-FIELD CALCULATIONS .....	27
9.6.1. RADIATING NEAR-FIELD BASED ON FAR-FIELD CONDITIONS .....	27
9.6.2. RADIATING NEAR-FIELD BASED ON NEAR-FIELD CONDITIONS .....	28
<b>10. TEST SETUP PHOTOS .....</b>	<b>29</b>



## 1. ATTESTATION OF TEST RESULTS

**COMPANY NAME:** AOPTIX TECHNOLOGIES, INC.  
695 CAMPBELL TECHNOLOGY PKY  
CAMPBELL, CA 95008, U.S.A.

**EUT DESCRIPTION:** OPTICAL NETWORK TERMINAL

**MODEL:** INTELLIMAX SERIES ULL-3000 AND MB-2000

**SERIAL NUMBER:** AD110392000210-130905, ICB3 RED

**DATE TESTED:** MARCH 11 TO 15, 2013

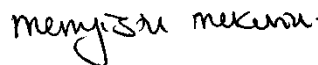
APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
Transmitter Requirements Portion Of FCC PART 101 SUBPART C	Pass

UL CCS tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by UL CCS based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

**Note:** The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by UL CCS and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL CCS will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, any agency of the Federal Government, or any agency of any government.

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## 2. TEST METHODOLOGY

The tests and calculations documented in this report were performed in accordance with TIA/EIA-603-C-2004, FCC CFR 47 Part 2, FCC CFR 47 Part 101 and IEEE C95.3-2002, "IEEE Recommended Practice for Measurements and Computations of Radio Frequency Electromagnetic Fields With Respect to Human Exposure to Such Fields, 100 kHz–300 GHz". In frequency bands where measurement equipment limitations preclude the use of TIA/EIA-603-C procedures, tests documented in this report were performed in accordance with ANSI C63.4-2009.

## 3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 47173 Benicia Street, Fremont, California, USA.

UL CCS is accredited by NVLAP, Laboratory Code 200065-0. The full scope of accreditation can be viewed at <http://www.ccsemc.com>.

## 4. CALIBRATION AND UNCERTAINTY

### 4.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

### 4.2. SAMPLE CALCULATION

Where relevant, the following sample calculation is provided:

$$\begin{aligned} \text{Field Strength (dBuV/m)} &= \text{Measured Voltage (dBuV)} + \text{Antenna Factor (dB/m)} + \\ &\text{Cable Loss (dB)} - \text{Preamplifier Gain (dB)} \\ 36.5 \text{ dBuV} + 18.7 \text{ dB/m} + 0.6 \text{ dB} - 26.9 \text{ dB} &= 28.9 \text{ dBuV/m} \end{aligned}$$

### 4.3. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

PARAMETER	UNCERTAINTY
Conducted Disturbance, 0.15 to 30 MHz	3.52 dB
Radiated Disturbance, 30 to 1000 MHz	4.94 dB

Uncertainty figures are valid to a confidence level of 95%.

## 5. SCOPE OF REPORT

This report documents the characteristics of FCC ID: RY7HYBRID4GIGE70G.

## 6. EQUIPMENT UNDER TEST

### 6.1. DESCRIPTION OF EUT

The ULL-3000 and MB-2000 series provide ultra-low latency, high availability, 2Gbps Committed information rate (CIR), wireless solution for low-latency market, with single hop distances up to 10 km. It consists in a hybrid link combining a Free Space Optical (FSO) link and a radio Frequency (RF) E-Band link (70/80 GHz), enabling the data link through the heaviest rain and fog conditions.

The radio operates with a 2500 MHz bandwidth.

Two frequency-band configurations are manufactured:

- (1) Transmit in the 71-76 GHz band and receive in the 81-86 GHz band  
(FCC ID: RY7HYBRID4GIGE70G)
- (2) Receive in the 71-76 GHz band and transmit in the 81-86 GHz band  
(FCC ID: RY7HYBRID4GIGE80G)

One pair of devices is needed to configure a wireless link.

### 6.1. DESCRIPTION OF MODEL DIFFERENCES

The ULL-3000 and MB-2000 model series are used for marketing purposes.

Within each authorized frequency band and for each FCC ID, the radios for the two model series are electrically identical.

### 6.2. MAXIMUM OUTPUT POWER

The 71-76 GHz band transmitter has a maximum conducted output power of 0.187 W (-7.29 dBW) and a maximum radiated output power of 5023 W EIRP (37.01 dBW EIRP).

### 6.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes an integral Cassegrain Dish antenna, with a nominal gain of 44 dBi in the 71-76 GHz band and 46 dBi in the 81-86 GHz band.

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## **6.4. SOFTWARE AND FIRMWARE**

The firmware installed in the EUT during testing was ICB SW version 2.3.20.0, Rev 00.

The EUT driver software installed during testing was Xilinx Chipscope Pro version v2012.4, v14.4.

The test utility software used during testing was TeraTerm, ver. 2.72.

## **6.5. WORST-CASE CONFIGURATION AND MODE**

The EUT only has one modulation (QPSK) and bandwidth (2500 MHz).