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: RY7HYBRID4GIGE80G

REPORT NUMBER: 13U14926-2, Revision B

ISSUE DATE: APRIL 15, 2013

Prepared for
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NVLAP LAB CODE 200065-0

Revision History

Rev.	Issue Date	Revisions	Revised By
--	4/9/2013	Initial Issue	M. Heckrotte
A	4/11/2013	Revised Antenna Gain	M. Heckrotte
B	4/15/2013	Revised FCC ID	M. Heckrotte

TABLE OF CONTENTS

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: AD110401000210-130902, ICB3 BLUE

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.

Approved & Released For UL CCS By:

MICHAEL HECKROTTE
PRINCIPAL ENGINEER
UL CCS

Tested By:

MENGISTU MEKURIA
EMC ENGINEER
UL CCS

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:

Field Strength (dBuV/m) = Measured Voltage (dBuV) + Antenna Factor (dB/m) + Cable Loss (dB) – Preamp Gain (dB)
36.5 dBuV + 18.7 dB/m + 0.6 dB – 26.9 dB = 28.9 dBuV/m

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: RY7HYBRID4GIGE80G.

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 81-86 GHz band transmitter has a maximum conducted output power of or 0.131 W (-8.84 dBW) and a maximum radiated output power of 5082 W EIRP (37.06 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.

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).

6.1. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	**Manufacturer**	**Model**	**Serial Number**	**FCC ID**
48V DC Power Supply	V-infinity	VGS-100-48	N/A	N/A
24V DC Power Supply	V-infinity	VGS-100-24	N/A	N/A
Control Board	AOptix	SCB3	AD11036000301-1013009	N/A
ChipScope Pro Analyzer	Xilinx			N/A

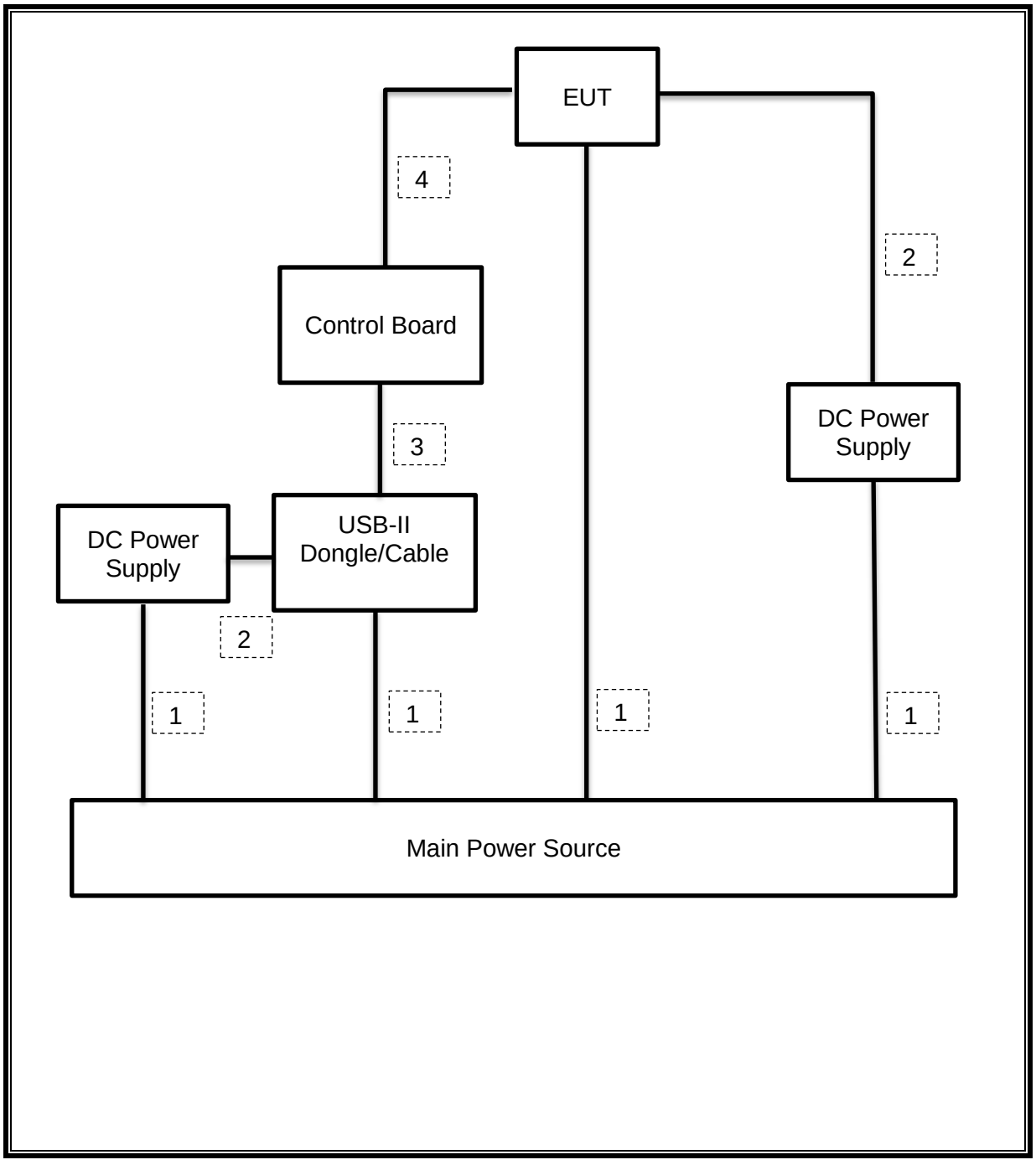
I/O CABLES

I/O Cable List						
Cable No	**Port**	**# of identical ports**	**Connector Type**	**Cable Type**	**Cable Length (m)**	**Remarks**
1	AC	4	AC	Un-Shielded	1.5m	N/A
2	DC	2	DC	Un-Shielded	2.5m	N/A
3	Data	1	USB	Un-Shielded	0.3m	N/A
4	Data	1	(Test Interface)	Un-Shielded	0.6m	N/A

TEST SETUP

The radio (ICB3) was connected to the controller (SCB3) via two mini-coaxial, ICB HI SPD, cables. Data was generated using Xilinx Chipscope Pro Analyzer & FPGA on the SCB3, and it was sent to the ICB3 for modulation (in the ISA) and transmit out (via Baseband radio & TR module).

SETUP DIAGRAM FOR TESTS



7. TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment was utilized for the tests documented in this report:

Test Equipment List				
Description	**Manufacturer**	**Model**	**Asset**	**Cal Due**
Antenna, Bilog, 30MHz-1 GHz	Sunol Sciences	JB1	C01171	02/13/14
Antenna, Horn, 18 GHz	EMCO	3115	C00945	11/12/13
Antenna, Horn, 26.5 GHz	ARA	MWH-1826/B	C00980	11/14/13
Antenna, Horn, 40 GHz	ARA	MWH-2640/B	C00981	06/14/13
Preamplifier, 1300 MHz	Agilent / HP	8447D	C00885	01/16/14
Preamplifier, 26.5 GHz	Agilent / HP	8449B	C01052	10/22/13
Preamplifier, 40 GHz	Miteq	NSP4000-SP2	C00990	08/02/13
Harmonic Mixer, 50 GHz	Agilent / HP	11970Q	C00769	05/21/13
Harmonic Mixer, 75 GHz	Agilent / HP	11970V	C00768	01/31/14
Harmonic Mixer, 110 GHz	Agilent / HP	11970W	C00770	02/09/14
Harmonic Mixer, 140 GHz	OML	M08HWA	C00868	03/01/16
Harmonic Mixer, 220 GHz	OML	M05HWA	C00867	03/01/16
Mixer Diplexer for HP	OML	DPL.313B	N02429	CNR
Power Meter	Agilent / HP	437B	N/A	07/25/13
Power Sensor, 50 to 75 GHz	Agilent / HP	V8486A	C01193	12/07/13
Power Sensor, 75 to 110 GHz	Agilent / HP	W8486A	MY5239005	06/01/13
Spectrum Analyzer, 44 GHz	Agilent / HP	E4446A	C01159	04/09/13
Spectrum Analyzer, 44 GHz	Agilent / HP	E4446A	C00996	05/11/13
Analog Signal Generator, 40 GHz	Agilent / HP	E8257D	C01177	09/09/13

8. APPLICABLE LIMITS AND TEST RESULTS

8.1. FREQUENCY TOLERANCE

LIMIT

§101.107 (a)

BAND	NOTES
71,000 – 76,000 MHz	\8\
81,000 – 86,000 MHz	\8\

\8\ Equipment authorized to be operated in the 71,000-76,000 MHz, 81,000-86,000 MHz, 92,000-94,000 MHz and 94,100-95,000 MHz bands is exempt from the frequency tolerance requirement noted in the table of paragraph (a) of this section.

RESULTS

Exempt. No testing required.

8.2. BANDWIDTH

LIMIT

§101.109 (c)

BAND	LIMIT
71,000 – 76,000 MHz	5000 MHz
81,000 – 86,000 MHz	5000 MHz

TEST PROCEDURE

The spectrum analyzer and external mixer are set up to measure the conducted output of the transmitter. The RBW and VBW are set to 3 MHz. The sweep time is coupled.

The expected bandwidth is larger than 2 times (First IF of the Spectrum Analyzer) therefore the internal 99% bandwidth function of the spectrum analyzer cannot be used, due to the simultaneous display of the desired mixing product and the adjacent image mixing product.

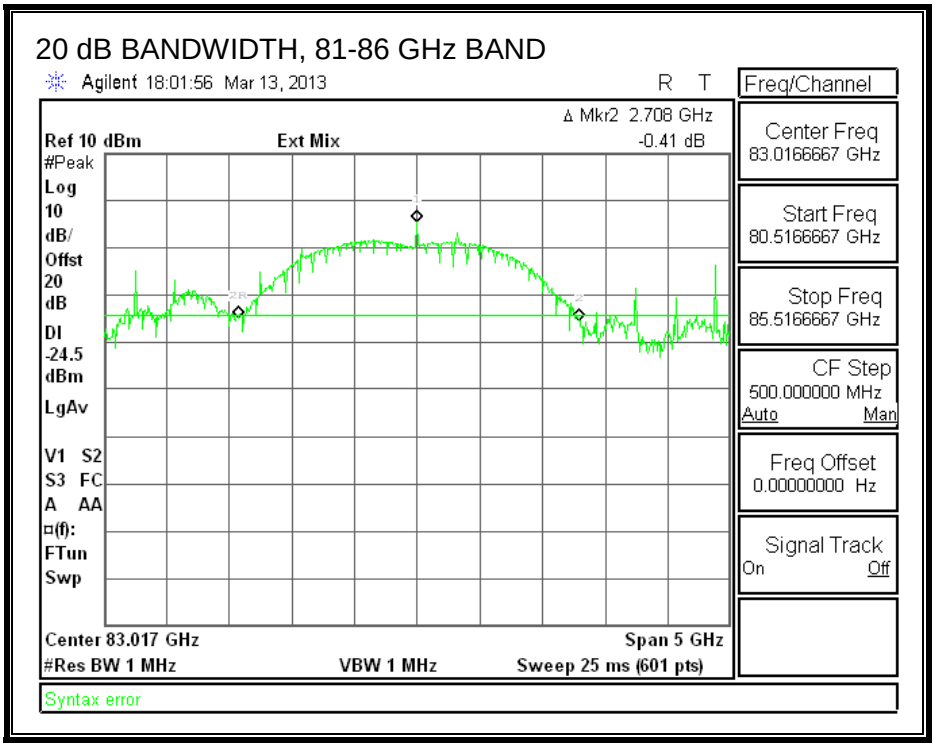
The spectrum analyzer is equipped with a Signal ID function that automatically suppresses the image response, however in this mode the trace can only be written; the max hold and all channel measurement functions are disabled when the Signal ID function is on.

Therefore, the 20 dB bandwidth is measured instead of the 99% bandwidth.

RESULTS

Band (GHz)	Declared Bandwidth (MHz)	20 dB Bandwidth (MHz)	Limit (MHz)
81-86	2500	2708	5000

BANDWIDTH



8.3. EMISSION MASK AND POWER DENSITY

LIMIT

§101.111 (a) The mean power of emissions must be attenuated below the mean output power of the transmitter in accordance with the following schedule:

§101.111 (a) (2) (ii) For operating frequencies above 15 GHz, in any 1 MHz band, the center frequency of which is removed from the assigned frequency by more than 50 percent up to and including 250 percent of the authorized bandwidth: As specified by the following equation but in no event less than 11 decibels:

$A = 11 + 0.4(P-50) + 10 \text{Log}_{10}B$. (Attenuation greater than 56 decibels or to an absolute power of less than −13 dBm/1MHz is not required.)

§101.11 (a) (2) (v) The emission mask for the 71–76 GHz, 81–86 GHz, 92–94 GHz, and 94.1–95 GHz bands used in the equation in paragraph (a)(2)(ii) of this section applies only to the edge of each channel, but not to sub-channels established by licensees. The value of P in the equation is for the percentage removed from the carrier frequency and assumes that the carrier frequency is the center of the actual bandwidth used. The value of B will always be 500 MHz. In the case where a narrower sub-channel is used within the assigned bandwidth, such sub-carrier will be located sufficiently far from the channel edges to satisfy the emission levels of the mask. The mean output power used in the calculation is the sum of the output power of a fully populated channel.

TEST PROCEDURE

The transmitter output is connected to an external mixer and conducted measurements are made on a spectrum analyzer.

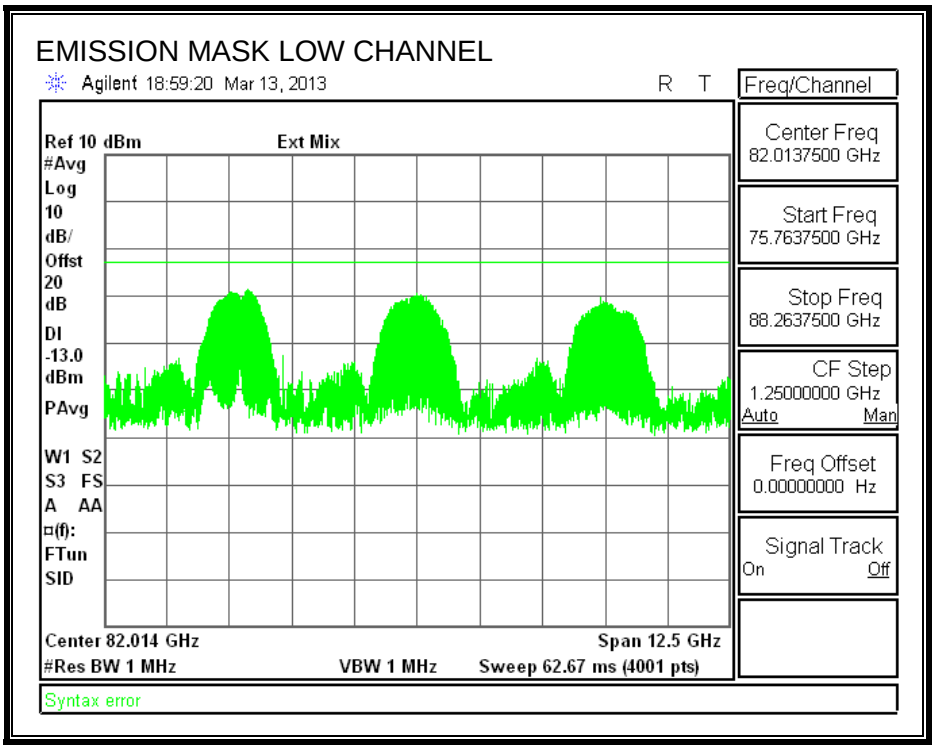
NOTES

The spectral envelopes from the emission masks tests are also used to demonstrate compliance with the power density limit.

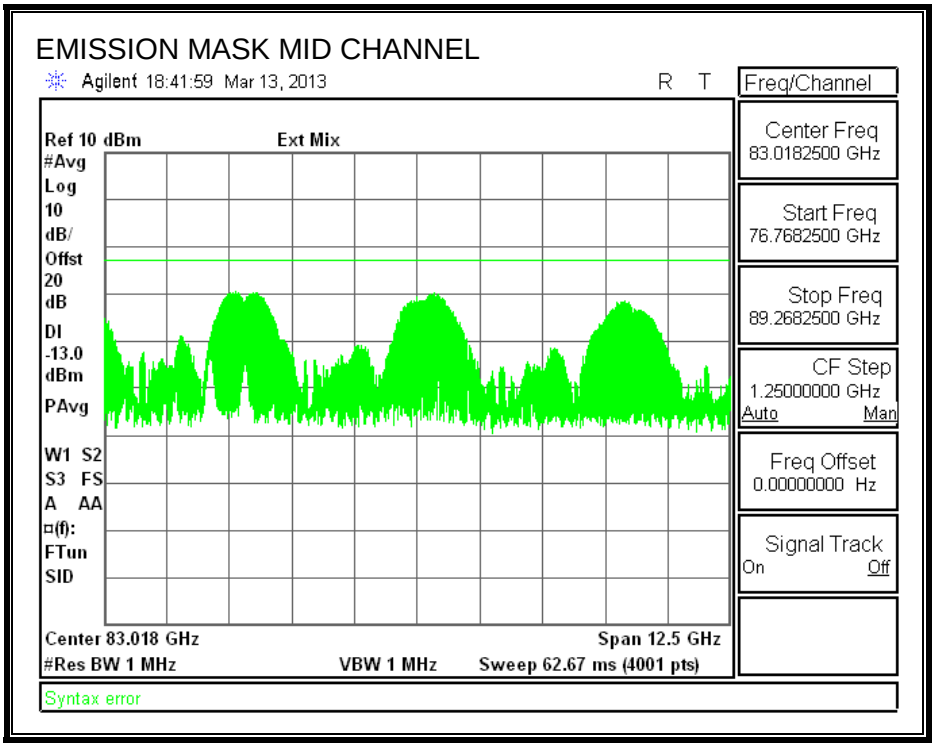
The spectral envelope is less than the absolute limit of -13 dBm/MHz therefore only the absolute limit line is shown on the following plots.

RESULTS

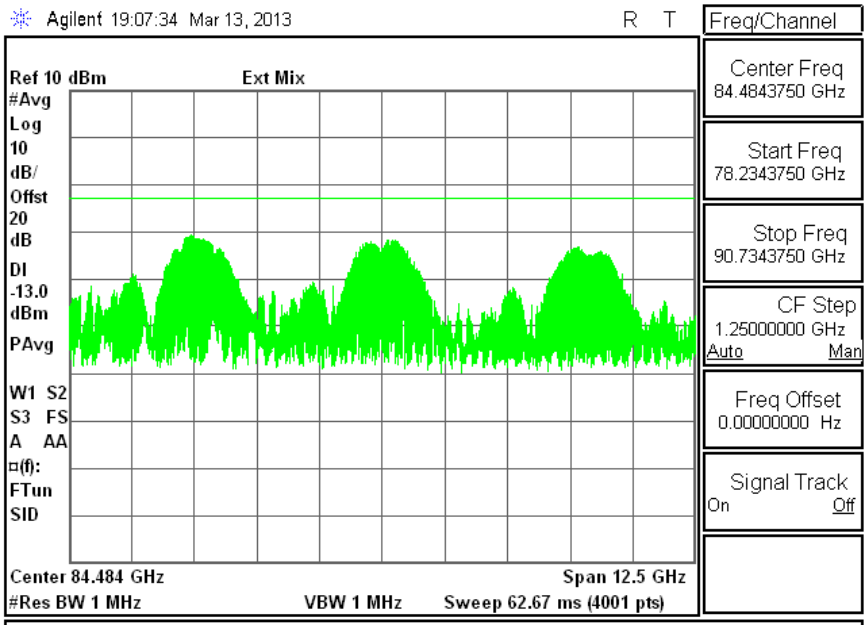
EMISSION MASK LOW CHANNEL



EMISSION MASK MID CHANNEL



EMISSION MASK HIGH CHANNEL



8.4. SPURIOUS EMISSIONS

LIMITS

§101.111 (a) The mean power of emissions must be attenuated below the mean output power of the transmitter in accordance with the following schedule:

§101.111 (a) (2) (iii) In any 1 MHz band, the center frequency of which is removed from the assigned frequency by more than 250 percent of the authorized bandwidth: At least 43 + 10 Log 10 (the mean output power in watts) decibels, or 80 decibels, whichever is the lesser attenuation. The authorized bandwidth includes the nominal radio frequency bandwidth of an individual transmitter/modulator in block-assigned bands.

Limit = -13 dBm

CONVERSION OF FIELD STRENGTH TO EIRP

For frequencies where measurement equipment limitations preclude substitution measurements, the measured field strength at a 3 meter test distance is converted to EIRP using:

EIRP (dBm) = Field Strength at 3 meters (dBuV/m) – 95.2

PROCEDURE FOR 30 MHz TO 26 GHz

The laboratory is equipped with sufficient measurement antennas and preamplifiers that allow substitution measurements to be made at a standard distance of 3 meters.

PROCEDURE FOR 26 TO 40 GHz

The laboratory is equipped with measurement antennas and preamplifiers that allow field strength measurements to be made at a standard distance of 3 meters. The field strength is converted to EIRP using the above equation.

PROCEDURE FOR 40 TO 200 GHz

External harmonic mixers are utilized. The maximum distance from the EUT that yields a minimum system noise floor at least 6 dB below the spurious emissions limit is calculated for each separate harmonic mixer band. This distance is shown in the noise floor calculations below.

The antenna is scanned around the entire perimeter surface of the EUT, kept closer to the EUT than the maximum distance calculated above, in both horizontal and vertical polarizations. A final test is made at any frequencies at which emissions are found.

A final test is made at any frequencies at which emissions are found. During this final scan, the antenna is kept no further from the EUT than the maximum distance calculated for each mixer band, the field strength is measured and extrapolated to a 3 meter distance, then converted to EIRP using the above equation.

SYSTEM NOISE FLOOR FROM 40 TO 200 GHz

Freq (GHz)	SA Voltage (dBuV)	Antenna Factor (dBuV/m)	Distance (m)	Distance Factor (dB)	Field Strength (dBuV/m)	EIRP Limit (dBm)	F.S. Limit (dBuV/m)	Sensitivity Margin (dB)
33 to 50 GHz Mixer								
50	27.0	44.2	3.00	0.0	71.2	-13.0	82.2	-11.0
50 to 75 GHz Mixer								
75	40.8	47.7	0.50	-15.6	72.9	-13.0	82.2	-9.3
75 to 110 GHz Mixer								
110	46.5	48.0	0.30	-20.0	74.5	-13.0	82.2	-7.7
90 to 140 GHz Mixer								
140	59.1	49.1	0.03	-40.0	68.2	-13.0	82.2	-14.0
140 to 220 GHz Mixer								
220	68.9	53.1	0.01	-49.5	72.5	-13.0	82.2	-9.7

RADIATED SPURIOUS EMISSIONS BELOW 1 GHz

Compliance Certification Services
30 - 1000MHz Substitution Measurement

Company: AOPTIX
Project #: 13U14926
Date: 41348
Test Engineer: MENGISTU MEKURIA
Configuration: EUT AND SUPPORT EQUIPMENT
Mode: TX, WORST CASE ON HIGH BAND RADIO

Chamber	Pre-amplifer	Filter	Limit
5m Chamber A	T64 8447D		Part 101 Tx

f MHz	SA reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Path Loss (dB)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
100.80	-43.1	H	3.0	17.7	28.3		-53.6	-13.0	-40.6	
159.00	-43.8	H	3.0	22.1	28.2		-49.9	-13.0	-36.9	
170.60	-44.3	H	3.0	20.2	28.2		-52.3	-13.0	-39.3	
250.20	-52.0	H	3.0	19.5	28.2		-60.7	-13.0	-47.7	
350.10	-59.7	H	3.0	21.4	28.1		-66.4	-13.0	-53.4	
375.30	-61.2	H	3.0	21.9	28.0		-67.3	-13.0	-54.3	
456.80	-64.9	H	3.0	24.0	27.9		-68.8	-13.0	-55.8	
504.30	-68.0	H	3.0	25.3	27.8		-70.5	-13.0	-57.5	
528.60	-65.7	H	3.0	26.0	27.7		-67.4	-13.0	-54.4	
549.90	-63.5	H	3.0	26.6	27.7		-64.6	-13.0	-51.6	
576.10	-70.0	H	3.0	27.3	27.6		-70.3	-13.0	-57.3	
600.40	-70.0	H	3.0	27.9	27.5		-69.5	-13.0	-56.5	
624.60	-70.6	H	3.0	28.1	27.4		-69.9	-13.0	-56.9	
749.70	-69.8	H	3.0	29.7	27.3		-67.4	-13.0	-54.4	
800.20	-68.4	H	3.0	30.6	27.4		-65.2	-13.0	-52.2	
849.60	-68.3	H	3.0	31.2	27.5		-64.7	-36.0	-28.7	
874.90	-66.2	H	3.0	31.4	27.6		-62.3	-36.0	-26.3	
960.20	-63.8	H	3.0	32.2	27.8		-59.3	-36.0	-23.3	
87.20	-46.4	V	3.0	21.7	28.3		-53.0	-13.0	-40.0	
134.80	-49.7	V	3.0	27.4	28.3		-50.6	-13.0	-37.6	
177.40	-50.1	V	3.0	21.4	28.2		-57.0	-13.0	-44.0	
250.20	-56.6	V	3.0	21.4	28.2		-63.3	-13.0	-50.3	
375.30	-63.3	V	3.0	24.6	28.0		-66.7	-13.0	-53.7	
431.60	-62.4	V	3.0	26.1	27.9		-64.2	-13.0	-51.2	
450.00	-66.1	V	3.0	26.4	27.9		-67.5	-13.0	-54.5	
480.10	-67.3	V	3.0	27.0	27.8		-68.1	-13.0	-55.1	
533.40	-67.7	V	3.0	28.3	27.7		-67.1	-13.0	-54.1	
549.90	-68.1	V	3.0	28.8	27.7		-67.0	-13.0	-54.0	
624.60	-66.7	V	3.0	30.4	27.4		-63.7	-13.0	-50.7	
800.20	-68.7	V	3.0	33.3	27.4		-62.7	-36.0	-26.7	
874.90	-65.7	V	3.0	33.5	27.6		-59.8	-36.0	-23.8	

Rev. 03.03.09

RADIATED SPURIOUS EMISSIONS FROM 1 TO 26.5 GHz

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: AOPTIX
Project #: 13U14926
Date: 3/15/2013
Test Engineer: MENGISTU MEKURIA
Configuration: EUT AND SUPPORT EQUIPMENT
Mode: TX, HIGH BAND RADIO

Chamber	Pre-amplifer	Filter	Limit
5m Chamber A	T144 8449B		Part 101

f GHz	SA reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Path Loss (dB)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 82.250 GHz										
1.128	-46.5	V	3.0	31.8	39.2		-53.8	-13.0	-40.8	
2.003	-63.5	V	3.0	40.8	37.7		-60.5	-13.0	-47.5	
2.498	-65.0	V	3.0	41.8	37.5		-60.6	-13.0	-47.6	
2.876	-65.8	V	3.0	43.0	37.4		-60.2	-13.0	-47.2	
4.997	-69.9	V	3.0	48.2	36.3		-57.9	-13.0	-44.9	
6.250	-73.9	V	3.0	50.3	36.4		-60.0	-13.0	-47.0	
6.852	-68.8	V	3.0	51.1	36.5		-54.2	-13.0	-41.2	
12.248	-51.9	V	3.0	57.5	36.5		-31.0	-13.0	-18.0	
13.712	-61.3	V	3.0	58.9	35.5		-37.9	-13.0	-24.9	
1.128	-48.6	H	3.0	32.6	39.2		-55.2	-13.0	-42.2	
4.997	-73.2	H	3.0	48.8	36.3		-60.7	-13.0	-47.7	
6.124	-71.9	H	3.0	50.9	36.4		-57.3	-13.0	-44.3	
6.852	-70.2	H	3.0	52.1	36.5		-54.5	-13.0	-41.5	
12.248	-50.7	H	3.0	56.0	36.5		-31.2	-13.0	-18.2	
13.712	-63.5	H	3.0	58.5	35.5		-40.5	-13.0	-27.5	
Mid Ch, 83.500GHz										
1.128	-46.5	V	3.0	31.8	39.2		-53.8	-13.0	-40.8	
2.003	-63.5	V	3.0	40.8	37.7		-60.4	-13.0	-47.4	
2.876	-65.8	V	3.0	43.0	37.4		-60.2	-13.0	-47.2	
4.997	-68.7	V	3.0	48.2	36.3		-56.8	-13.0	-43.8	
6.957	-69.2	V	3.0	51.2	36.5		-54.4	-13.0	-41.4	
12.248	-51.9	V	3.0	57.5	36.5		-30.9	-13.0	-17.9	
13.920	-64.3	V	3.0	59.2	35.4		-40.5	-13.0	-27.5	
1.128	-48.1	H	3.0	32.6	39.2		-54.8	-13.0	-41.8	
6.124	-71.4	H	3.0	50.9	36.4		-56.9	-13.0	-43.9	
6.957	-69.6	H	3.0	52.3	36.5		-53.7	-13.0	-40.7	
12.248	-52.7	H	3.0	56.0	36.5		-33.2	-13.0	-20.2	
13.920	-66.3	H	3.0	58.9	35.4		-42.8	-13.0	-29.8	
High Ch, 84.750 GHz										
1.128	-45.6	V	3.0	31.8	39.2		-53.0	-13.0	-40.0	
2.498	-63.8	V	3.0	41.8	37.5		-59.4	-13.0	-46.4	
2.876	-65.9	V	3.0	43.0	37.4		-60.3	-13.0	-47.3	
4.997	-69.2	V	3.0	48.2	36.3		-57.3	-13.0	-44.3	
6.124	-66.8	V	3.0	50.1	36.4		-53.1	-13.0	-40.1	
12.248	-52.5	V	1.0	57.5	36.5		-41.1	-13.0	-28.1	
14.128	-66.8	V	3.0	59.4	35.3		-42.7	-13.0	-29.7	
1.128	-48.2	H	3.0	32.6	39.2		-54.8	-13.0	-41.8	
4.997	-73.1	H	3.0	48.8	36.3		-60.7	-13.0	-47.7	
6.124	-71.7	H	3.0	50.9	36.4		-57.2	-13.0	-44.2	
7.063	-67.6	H	3.0	52.5	36.5		-51.6	-13.0	-38.6	
12.248	-51.1	H	3.0	56.0	36.5		-31.6	-13.0	-18.6	
14.128	-69.4	H	3.0	59.3	35.3		-45.4	-13.0	-32.4	

Rev. 03.03.09

RADIATED SPURIOUS EMISSIONS 26.5 to 40 GHz

No emissions were observed above the noise floor.

RADIATED SPURIOUS EMISSIONS 40 to 200 GHz

No emissions were observed above the noise floor.

8.5. EIRP AND POWER DENSITY

LIMIT

§101.113 (a)

BAND	LIMIT	NOTES
71,000 – 76,000 MHz	55 dBW EIRP	\13\
81,000 – 86,000 MHz	55 dBW EIRP	\13\

\13\ The maximum transmitter power is limited to 3 watts (5 dBW) unless a proportional reduction in maximum authorized EIRP is required under §101.115. The maximum transmitter power spectral density is limited to 150 mW per 100 MHz.

§101.115 (b)

\15\ Antenna gain less than 50 dBi (but greater than or equal to 43 dBi) is permitted only with a proportional reduction in maximum authorized EIRP in a ratio of 2 dB of power per 1 dB of gain, so that the maximum allowable EIRP (in dBW) for antennas of less than 50 dBi gain becomes +55 - 2(50–G), where G is the antenna gain in dBi.

POWER LIMITS, CONDUCTED POWER AND EIRP RESULTS

Frequency (GHz)	Antenna Gain (dBi)	Cond Output Power (dBm)	Cond Output Power (dBW)	Cond Output Power (W)	Cond Power Limit (W)	Rad Output Power (W EIRP)	Rad Output Power (dBW EIRP)	Rad Power Limit (dBW EIRP)
82.25	**45.9**	**21.16**	**-8.84**	**0.131**	**1.230**	**5082**	**37.06**	**46.8**
83.50	**46.1**	**20.83**	**-9.17**	**0.121**	**1.288**	**4932**	**36.93**	**47.2**
84.75	**46.0**	**20.36**	**-9.64**	**0.109**	**1.259**	**4325**	**36.36**	**47.0**

POWER SPECTRAL DENSITY RESULTS

The maximum power spectral density limit of 150 mW/100 MHz is satisfied if the maximum power spectral density is less than 1.5 mW/MHz over the entire channel. This is equivalent to a maximum power spectral density of +1.76 dBm/MHz.

Referencing the Emission Mask measurement plots above, it is noted that the maximum power spectral density is always lower than the 0 dBm graticule line, which corresponds to a spectral density of 0 dBm/MHz, for all channels.