

# CyberOptics Semiconductor, Inc.

## ATS

January 11, 2008

Report No. CYBR0075

Report Prepared By



[www.nwemc.com](http://www.nwemc.com)  
1-888-EMI-CERT

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EMC Test Report

**Certificate of Test**  
**Issue Date: January 11, 2008**  
**CyberOptics Semiconductor, Inc.**  
**Model: ATS**

Emissions			
Test Description	Specification	Test Method	Pass/Fail
Spurious Radiated Emissions	FCC 15.247 (DTS):2006	ANSI C63.4:2003 KDB No. 558074	Pass
Radiated Emissions	FCC 15.109(g) (CISPR 22:1997):2006 Class A	ANSI C63.4:2003	Pass

Modifications made to the product
See the Modifications section of this report

**Test Facility**

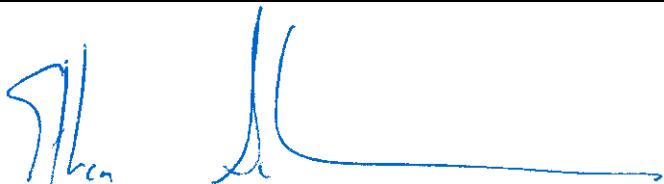
The measurement facility used to collect the data is located at:

Northwest EMC, Inc.  
22975 NW Evergreen Parkway, Suite 400  
Hillsboro, OR 97124

Phone: (503) 844-4066 Fax: 844-3826

This site has been fully described in a report filed with and accepted by the FCC (Federal Communications Commission) and Industry Canada.

Approved By:



Ethan Schoonover, Sultan Lab Manager

**NVLAP**

NVLAP Lab Code: 200630-0

*This report must not be used to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government of the United States of America.*

*Product compliance is the responsibility of the client, therefore the tests and equipment modes of operation represented in this report were agreed upon by the client, prior to testing. This Report may only be duplicated in its entirety. The results of this test pertain only to the sample(s) tested. The specific description is noted in each of the individual sections of the test report supporting this certificate of test.*

Revision Number	Description	Date	Page Number
00	None		

**FCC:** Accredited by NVLAP for performance of FCC radio, digital, and ISM device testing. Our Open Area Test Sites, certification chambers, and conducted measurement facilities have been fully described in reports filed with the FCC and accepted by the FCC in letters maintained in our files. Northwest EMC has been accredited by ANSI to ISO / IEC Guide 65 as a product certifier. We have been designated by the FCC as a Telecommunications Certification Body (TCB). This allows Northwest EMC to certify transmitters to FCC specifications in accordance with 47 CFR 2.960 and 2.962.



**NVLAP:** Northwest EMC, Inc. is accredited under the United States Department of Commerce, National Institute of Standards and Technology, and National Voluntary Laboratory Accreditation Program for satisfactory compliance with the requirements of ISO/IEC 17025 for Testing Laboratories. The NVLAP accreditation encompasses Electromagnetic Compatibility Testing in accordance with the European Union EMC Directive 2004/108/EC, and ANSI C63.4. Additionally, Northwest EMC is accredited by NVLAP to perform radio testing in accordance with the European Union R&TTE Directive 1999/5/EEC, the requirements of FCC, and the RSS radio standards for Industry Canada.



NVLAP LAB CODE 200629-0  
NVLAP LAB CODE 200630-0  
NVLAP LAB CODE 200676-0  
NVLAP LAB CODE 200761-0

**Industry Canada:** Accredited by NVLAP for performance of Industry Canada RSS and ICES testing. Our Open Area Test Sites and certification chambers comply with RSS 212, Issue 1 (Provisional) and have been filed with Industry Canada and accepted. Northwest EMC has been accredited by ANSI to ISO / IEC Guide 65 as a product certifier. We have been designated by NIST and recognized by Industry Canada as a Certification Body (CB) per the APEC Mutual Recognition Arrangement (MRA). This allows Northwest EMC to certify transmitters to Industry Canada technical requirements.



**CAB:** Designated by NIST and validated by the European Commission as a Conformity Assessment Body (CAB) to conduct tests and approve products to the EMC directive and transmitters to the R&TTE directive, as described in the U.S. - EU Mutual Recognition Agreement.



**TÜV Product Service:** Included in TÜV Product Service Group's Listing of Recognized Laboratories. It qualifies in connection with the TÜV Certification after Recognition of Agent's Testing Program for the product categories and/or standards shown in TÜV's current Listing of CARAT Laboratories, available from TÜV. A certificate was issued to represent that this laboratory continues to meet TÜV's CARAT Program requirements. Certificate No. USA0604C.



**TÜV Rheinland:** Authorized to carryout EMC tests by order and under supervision of TÜV Rheinland. This authorization is based on "Conditions for EMC-Subcontractors" of November 1992.



**NEMKO:** Assessed and accredited by NEMKO (Norwegian testing and certification body) for European emissions and immunity testing. As a result of NEMKO's laboratory assessment, they will accept test results from Northwest EMC, Inc. for product certification (Authorization No. ELA 119).



**Australia/New Zealand:** The National Association of Testing Authorities (NATA), Australia has been appointed by the ACA as an accreditation body to accredit test laboratories and competent bodies for EMC standards. Accredited test reports or assessments by competent bodies must carry the NATA logo. Test reports made by an overseas laboratory that has been accredited for the relevant standards by an overseas accreditation body that has a Mutual Recognition Agreement (MRA) with NATA are also accepted as technical grounds for product conformity. The report should be endorsed with the respective logo of the accreditation body (NVLAP).



**VCCI:** Accepted as an Associate Member to the VCCI, Acceptance No. 564. Conducted and radiated measurement facilities have been registered in accordance with Regulations for Voluntary Control Measures, Article 8. (Registration Numbers. - Hillsboro: C-1071, R-1025, C-2687, T-289, and R-2318, Irvine: R-1943, C-2766, and T-298, Sultan: R-871, C-1784, and T-294).



**BSMI:** Northwest EMC has been designated by NIST and validated by C-Taipei (BSMI) as a CAB to conduct tests as described in the APEC Mutual Recognition Agreement. License No.SL2-IN-E-1017.



**GOST:** Northwest EMC, Inc. has been assessed and accredited by the Russian Certification bodies Certinform VNIINMASH, CERTINFO, SAMTES, and Federal CHEC, to perform EMC and Hygienic testing for Information Technology Products. As a result of their laboratory assessment, they will accept test results from Northwest EMC, Inc. for product certification

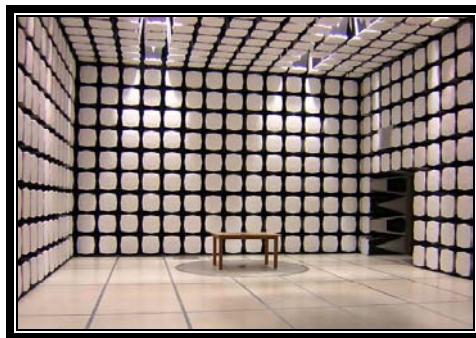


**MIC:** Northwest EMC, Inc is a CAB designated by MRA partners and recognized by Korea. (Assigned Lab Numbers: Hillsboro: US0017, Irvine: US0158, Sultan: US0157)



## SCOPE

For details on the Scopes of our Accreditations, please visit:  
<http://www.nwemc.com/scope.asp>



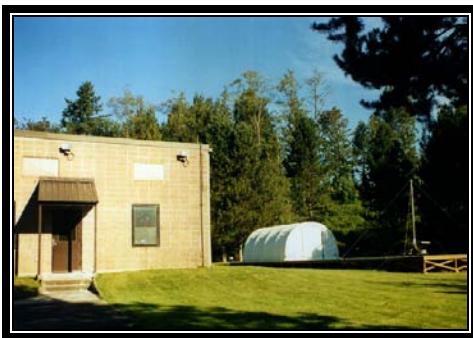
**California – Orange County Facility  
Labs OC01 – OC13**

41 Tesla Ave. Irvine, CA 92618  
(888) 364-2378 Fax: (503) 844-3826



**Oregon – Evergreen Facility  
Labs EV01 – EV11**

22975 NW Evergreen Pkwy. Suite 400 Hillsboro, OR 97124  
(503) 844-4066 Fax: (503) 844-3826



**Washington – Sultan Facility  
Labs SU01 – SU07**

14128 339<sup>th</sup> Ave. SE Sultan, WA 98294  
(888) 364-2378

**Party Requesting the Test**

<b>Company Name:</b>	CyberOptics Semiconductor, Inc.
<b>Address:</b>	13555 SW Millikan Way
<b>City, State, Zip:</b>	Beaverton, OR 97005
<b>Test Requested By:</b>	Greg Huntzinger
<b>Model:</b>	ATS
<b>First Date of Test:</b>	January 2, 2008
<b>Last Date of Test:</b>	January 3, 2008
<b>Receipt Date of Samples:</b>	January 2, 2008
<b>Equipment Design Stage:</b>	Prototype
<b>Equipment Condition:</b>	No Damage

**Information Provided by the Party Requesting the Test****Functional Description of the EUT (Equipment Under Test):**

The WaferSense ATS contains a Bluetooth transceiver. Wireless and wafer-like, WaferSense ATS moves through semiconductor equipment, just as a wafer would, to capture three-dimensional offset data (x, y and z) for accurate calibration of transfer positions. Because it is vacuum compatible, ATS can take measurements while equipment is sealed, saving both qualification time and consumables. The machine vision-teaching instrument also helps the user find lost or broken wafers, so the correct portion of the tool can be serviced.

**Testing Objective:**

To demonstrate compliance with the spurious radiated emissions requirements of FCC 15.247. The Bluetooth module has been previously certified. This testing is to support a Class II Permissive Change for the addition of a new antenna. No other changes have been made to the radio.

**CONFIGURATION 1 CYBR0075**

Software/Firmware Running during test	
Description	Version
Bluetest	3

EUT			
Description	Manufacturer	Model/Part Number	Serial Number
EUT - Wafer Camera	CyberOptics Semiconductor, Inc.	ATS	Unknown

**CONFIGURATION 2 CYBR0075**

Software/Firmware Running during test	
Description	Version
TraceView	1.1.0.0

EUT			
Description	Manufacturer	Model/Part Number	Serial Number
EUT - Link	CyberOptics Semiconductor, Inc.	Link	Unknown
EUT - Wafer Camera	CyberOptics Semiconductor, Inc.	ATS	Unknown

Remote Equipment Outside of Test Setup Boundary			
Description	Manufacturer	Model/Part Number	Serial Number
Laptop PC	Fujitsu	S Series Lifebook	nnn

Cables					
Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
USB	Yes	2.0m	No	Laptop PC	EUT - Link
USB Extension	Yes	5.0m	No	Laptop PC	EUT - Link
PA = Cable is permanently attached to the device. Shielding and/or presence of ferrite may be unknown.					

<b>Equipment modifications</b>					
Item	Date	Test	Modification	Note	Disposition of EUT
1	1/2/2008	Spurious Radiated Emissions	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Northwest EMC following the test.
2	1/3/2008	Radiated Emissions	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	Scheduled testing completed.

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

#### MODES OF OPERATION

Typical operational mode.

#### POWER SETTINGS INVESTIGATED

Battery

#### CONFIGURATIONS INVESTIGATED

2 - Typical operating mode

#### FREQUENCY RANGE INVESTIGATED

Start Frequency	30 MHz	Stop Frequency	1000 MHz
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#### CLOCKS AND OSCILLATORS

None Provided

#### SAMPLE CALCULATIONS

Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation

#### TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval
Spectrum Analyzer	Agilent	E4443A	AAS	12/7/2006	13 mo
EV11 cables a,b,c			EVL	5/1/2007	13 mo
Pre-Amplifier	Miteq	AM-1551	AOY	5/1/2007	13 mo
Antenna, Biconilog	EMCO	3142	AXB	12/28/2006	24 mo

#### MEASUREMENT BANDWIDTHS

	Frequency Range	Peak Data	Quasi-Peak Data	Average Data
	(MHz)	(kHz)	(kHz)	(kHz)
0.01 - 0.15	1.0	0.2	0.2	0.2
0.15 - 30.0	10.0	9.0	9.0	9.0
30.0 - 1000	100.0	120.0	120.0	120.0
Above 1000	1000.0	N/A	N/A	1000.0

Measurements were made using the bandwidths and detectors specified. No video filter was used.

#### MEASUREMENT UNCERTAINTY

Measurement uncertainty is used to reflect the accuracy of the measured result as compared with its "true" or theoretically correct value. Our measurement data meets or exceeds the measurement uncertainty requirements of CISPR 16-4. In the case of transient tests our test equipment has been demonstrated by calibration to provide at least a 95% confidence that it complies with the test specification requirements. The measurement uncertainty for any test is available upon request.

#### TEST DESCRIPTION

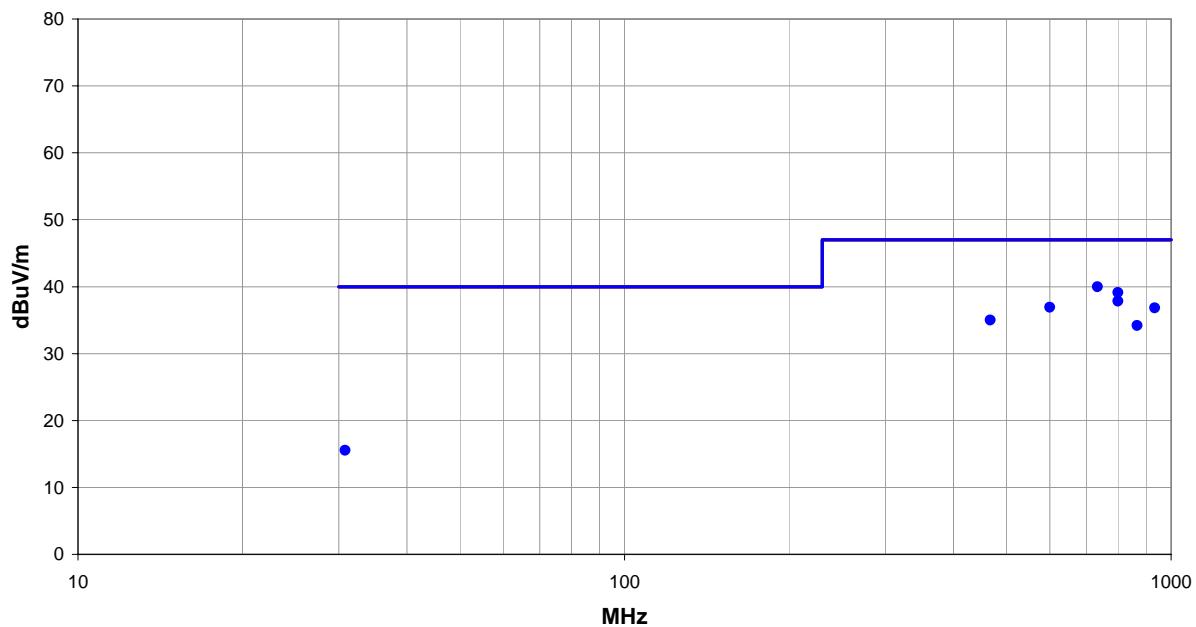
Using the mode of operation and configuration noted within this report, a final radiated emissions test was performed. The frequency range investigated (scanned), is also noted in this report. Radiated emissions measurements were made at the EUT azimuth and antenna height such that the maximum radiated emissions level will be detected. This requires the use of a turntable and an antenna positioner. The preferred method of a continuous azimuth search is utilized for frequency scans of the EUT field strength with both polarities of the measuring antenna. A calibrated, linearly polarized antenna was positioned at the specified distance from the periphery of the EUT.

Tests were made with the antenna positioned in both the horizontal and vertical planes of polarization. The antenna was varied in height above the conducting ground plane to obtain the maximum signal strength. Though specified in the report, the measurement distance shall be 3 meters or 10 meters. At any measurement distance, the antenna height was varied from 1 meter to 4 meters. These height scans apply for both horizontal and vertical polarization, except that for vertical polarization the minimum height of the center of the antenna shall be increased so that the lowest point of the bottom of the antenna clears the ground surface by at least 25 cm.

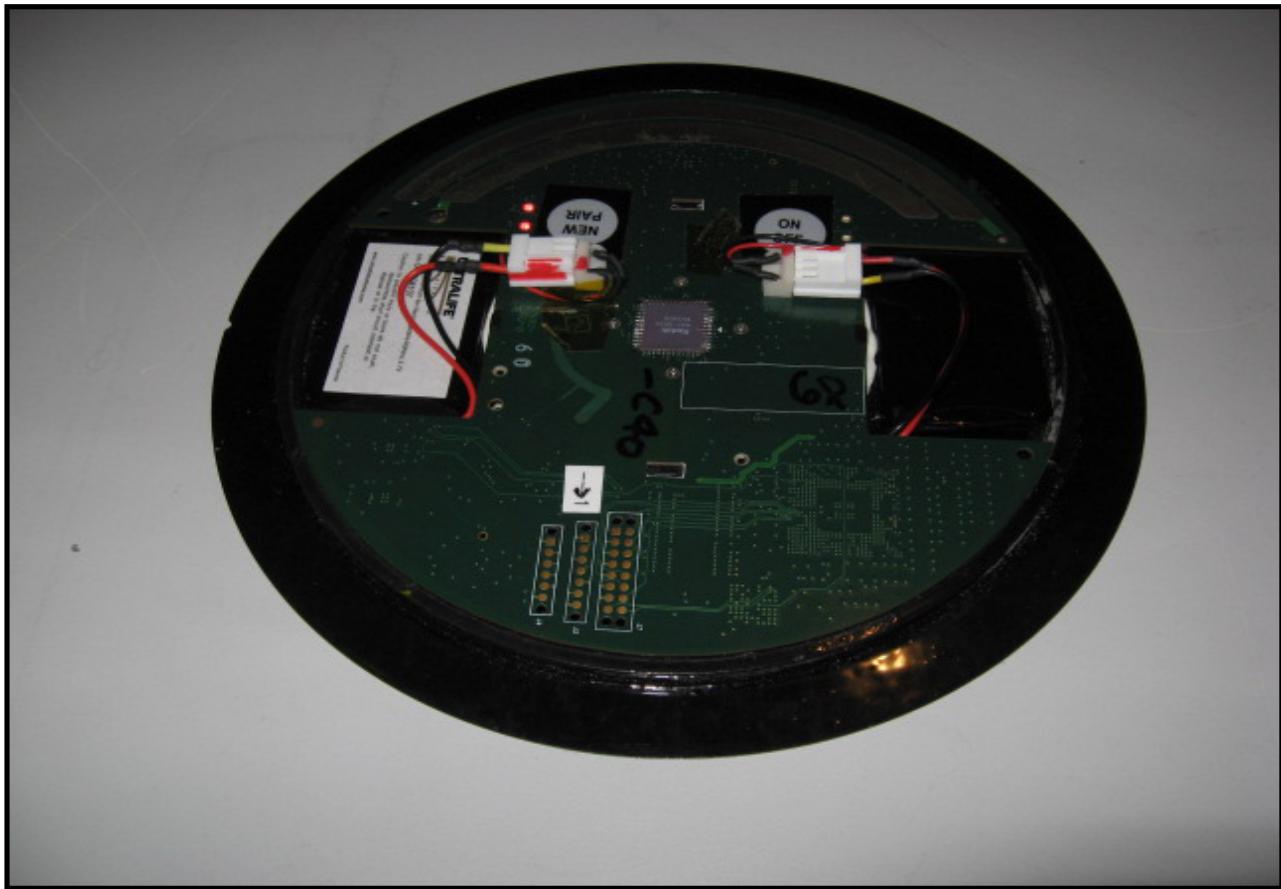
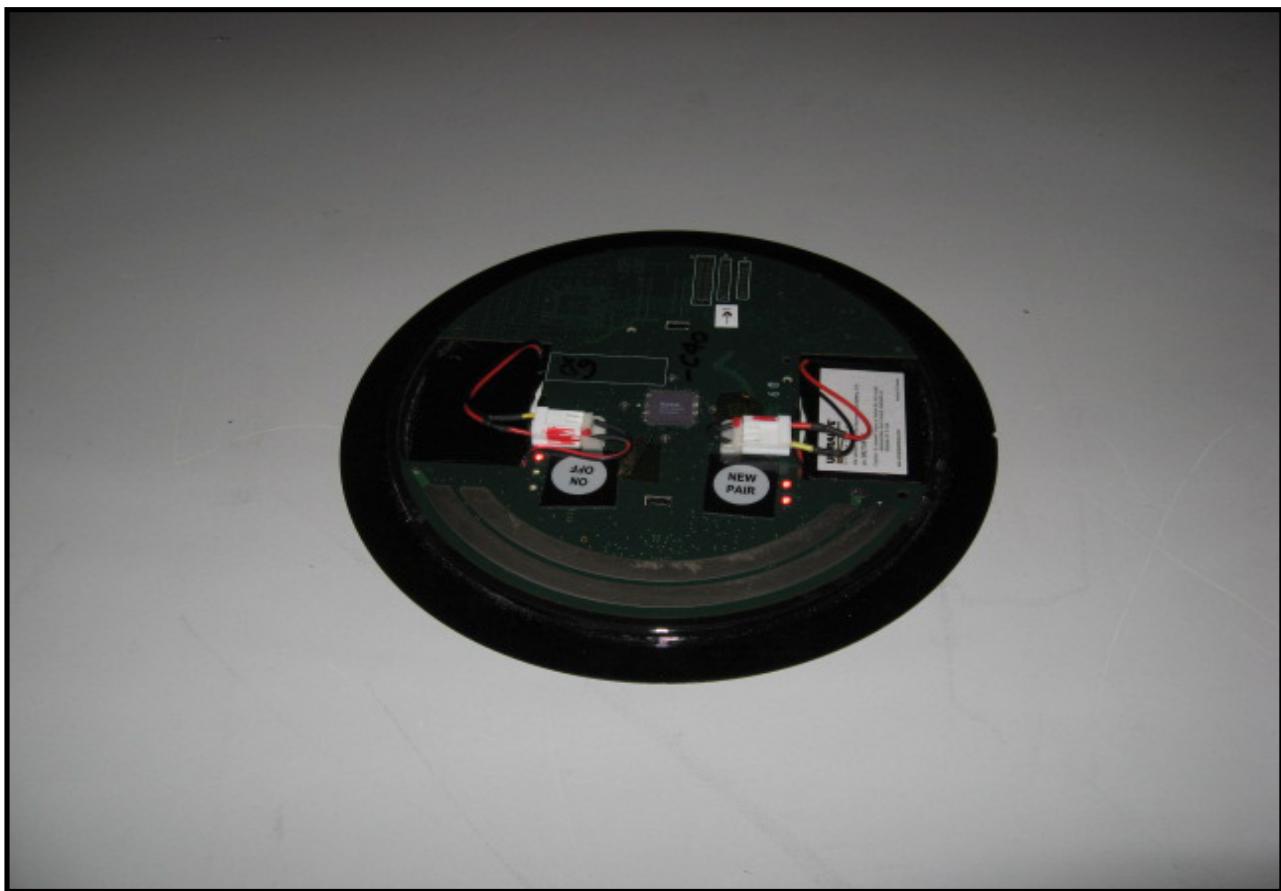
Work Order:	CYBR0075	Date:	01/03/08	
Project:	None	Temperature:	22 °C	
Job Site:	EV11	Humidity:	30	
Serial Number:	None	Barometric Pres.:	1001.3mb	
				<i>Kyle Holgate</i>
EUT:	ATS			
Configuration:	2 - Typical operating mode			
Customer:	CyberOptics Semiconductor, Inc.			
Attendees:	Greg Huntzinger			
EUT Power:	Battery			
Operating Mode:	Typical operational mode.			
Deviations:	No deviations.			
Comments:	Laptop and wafer Link under hatch.			

Test Specifications		Class A	Test Method
FCC 15.109(g) (CISPR 22:1997):2006			ANSI C63.4:2003

Run #	2	Test Distance (m)	10	Antenna Height(s)	1-4m	Results	Pass



Freq	Amplitude	Factor	Antenna Height	Azimuth (degrees)	Test Distance	External Attenuation	Polarity/Transducer Type	Detector	Distance Adjustment	Adjusted	Spec. Limit	Compared to Spec. (dB)
733.255	50.6	-10.6	1.3	324.0	10.0	0.0	Horz	QP	0.0	40.0	47.0	-7.0
799.919	49.6	-10.5	1.1	181.0	10.0	0.0	Horz	QP	0.0	39.1	47.0	-7.9
799.919	48.3	-10.5	2.0	273.0	10.0	0.0	Vert	QP	0.0	37.8	47.0	-9.2
599.928	49.3	-12.4	1.5	324.0	10.0	0.0	Horz	QP	0.0	36.9	47.0	-10.1
933.247	45.3	-8.5	1.0	165.0	10.0	0.0	Horz	QP	0.0	36.8	47.0	-10.2
466.600	50.1	-15.1	2.1	325.0	10.0	0.0	Horz	QP	0.0	35.0	47.0	-12.0
866.583	43.6	-9.4	1.1	109.0	10.0	0.0	Horz	QP	0.0	34.2	47.0	-12.8
30.829	31.6	-16.1	3.5	283.0	10.0	0.0	Horz	QP	0.0	15.5	40.0	-24.5



Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

**MODES OF OPERATION**

Transmitting Bluetooth, GFSK modulation, power setting 42, low channel
Transmitting Bluetooth, GFSK modulation, power setting 42, mid channel
Transmitting Bluetooth, GFSK modulation, power setting 42, High channel

**POWER SETTINGS INVESTIGATED**

Battery
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**FREQUENCY RANGE INVESTIGATED**

Start Frequency	30 MHz	Stop Frequency	25 GHz
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**SAMPLE CALCULATIONS**

Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation

**TEST EQUIPMENT**

Description	Manufacturer	Model	ID	Last Cal.	Interval
Spectrum Analyzer	Agilent	E4446A	AAT	12/7/2007	13
Low Pass Filter 0-1000 MHz	Micro-Tronics	LPM50004	LFD	12/29/2006	13
High Pass Filter	Micro-Tronics	HPM50111	HFO	12/29/2006	13
Pre-Amplifier	Miteq	AM-1616-1000	AOL	12/29/2006	13
Antenna, Biconilog	EMCO	3141	AXE	12/28/2005	27
EV01 cables c,g, h			EVA	10/23/2007	13
Pre-Amplifier	Miteq	AMF-4D-010100-24-10P	APW	5/10/2007	13
Antenna, Horn	EMCO	3115	AHC	8/24/2006	24
EV01 cables g,h,j			EVB	10/23/2007	13
Pre-Amplifier	Miteq	AMF-6F-08001200-30-10P	AVC	6/22/2007	13
Antenna, Horn	ETS	3160-08	AHV	NCR	0
EV01 cables g,h,l			EVF	10/23/2007	13
Pre-Amplifier	Miteq	JSD4-18002600-26-8P	APU	7/25/2007	13
Antenna, Horn	EMCO	3160-09	AHG	NCR	0
EV01 Cable D			EVD	7/25/2007	13

**MEASUREMENT BANDWIDTHS**

	Frequency Range	Peak Data	Quasi-Peak Data	Average Data
	(MHz)	(kHz)	(kHz)	(kHz)
0.01 - 0.15	1.0	0.2	0.2	0.2
0.15 - 30.0	10.0	9.0	9.0	9.0
30.0 - 1000	100.0	120.0	120.0	120.0
Above 1000	1000.0	N/A		1000.0

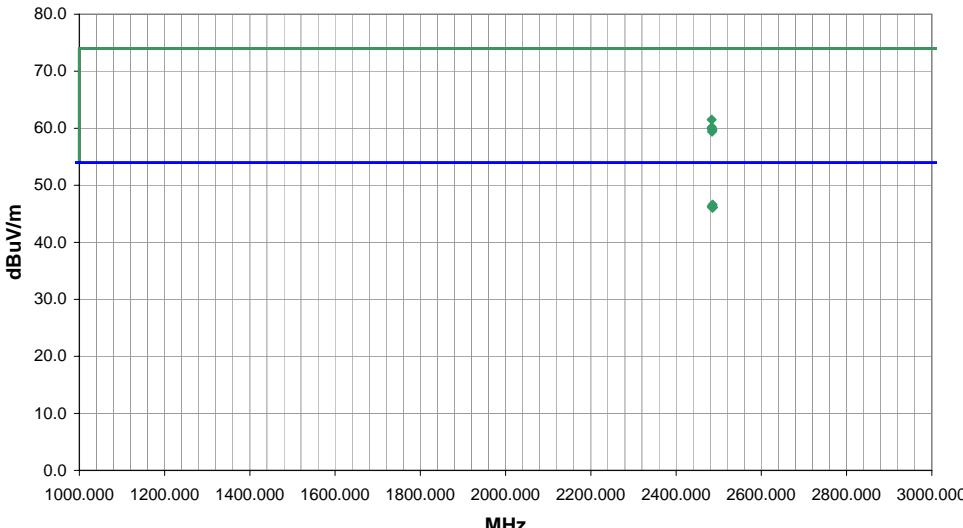
Measurements were made using the bandwidths and detectors specified. No video filter was used.

**MEASUREMENT UNCERTAINTY**

Measurement uncertainty is used to reflect the accuracy of the measured result as compared with its "true" or theoretically correct value. Our measurement data meets or exceeds the measurement uncertainty requirements of CISPR 16-4. In the case of transient tests our test equipment has been demonstrated by calibration to provide at least a 95% confidence that it complies with the test specification requirements. The measurement uncertainty for any test is available upon request.

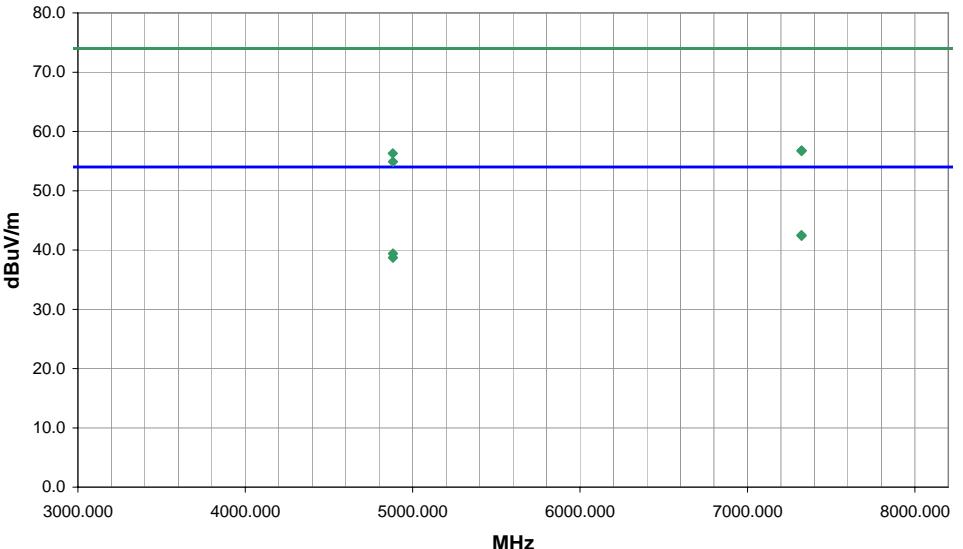
**TEST DESCRIPTION**

The highest gain of each type of antenna to be used with the EUT was tested. The EUT was configured for low, mid, and high band transmit frequencies. For each configuration, the spectrum was scanned throughout the specified range. In addition, measurements were made in the restricted bands to verify compliance. While scanning, emissions from the EUT were maximized by rotating the EUT on a turntable, adjusting the position of the EUT and the EUT antenna in three orthogonal axis, and adjusting measurement antenna height and polarization, and manipulating the EUT antenna in 3 orthogonal planes (per ANSI C63.4:2003). A preamp and high pass filter were used for this test in order to provide sufficient measurement sensitivity.

SPURIOUS RADIATED EMISSIONS												PSA 2007.05.07 EMI 2006.11.29																																																																																																																																																																																						
EUT: ATS Serial Number: None Customer: CyberOptics Semiconductor, Inc. Attendees: None Project: None Tested by: Rod Peloquin						Work Order: CYBR0075 Date: 01/02/08 Temperature: 24 Humidity: 24% Barometric Pres.: 29.98 Job Site: EV01																																																																																																																																																																																												
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Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Distance (meters)	External Attenuation (dB)	Polarity	Detector	Distance Adjustment (dB)	Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)	Comments																																																																																																																																																																																					
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2485.718	24.4	2.2	179.0	1.0	3.0	20.0	H-Horn	AV	0.0	46.6	54.0	-7.4	EUT on side, antenna vertical
2483.347	24.1	2.2	163.0	1.0	3.0	20.0	V-Horn	AV	0.0	46.3	54.0	-7.7	EUT horizontal
2485.987	24.0	2.2	334.0	1.0	3.0	20.0	V-Horn	AV	0.0	46.2	54.0	-7.8	EUT on side, antenna horizontal
2485.357	23.9	2.2	108.0	1.0	3.0	20.0	H-Horn	AV	0.0	46.1	54.0	-7.9	EUT on side, antenna horizontal
2485.547	23.9	2.2	234.0	2.4	3.0	20.0	H-Horn	AV	0.0	46.1	54.0	-7.9	EUT horizontal
2485.683	23.9	2.2	-1.0	1.0	3.0	20.0	V-Horn	AV	0.0	46.1	54.0	-7.9	EUT on side, antenna vertical
2483.531	39.3	2.2	179.0	1.0	3.0	20.0	H-Horn	PK	0.0	61.5	74.0	-12.5	EUT on side, antenna vertical
2483.773	38.0	2.2	163.0	1.0	3.0	20.0	V-Horn	PK	0.0	60.2	74.0	-13.8	EUT horizontal
2483.587	37.8	2.2	-1.0	1.0	3.0	20.0	V-Horn	PK	0.0	60.0	74.0	-14.0	EUT on side, antenna vertical
2484.617	37.6	2.2	334.0	1.0	3.0	20.0	V-Horn	PK	0.0	59.8	74.0	-14.2	EUT on side, antenna horizontal
2485.193	37.5	2.2	234.0	2.4	3.0	20.0	H-Horn	PK	0.0	59.7	74.0	-14.3	EUT horizontal
2484.300	37.2	2.2	108.0	1.0	3.0	20.0	H-Horn	PK	0.0	59.4	74.0	-14.6	EUT on side, antenna horizontal

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(dB)</th> </tr> </thead> <tbody> <tr><td>7440.010</td><td>25.4</td><td>17.9</td><td>275.0</td><td>1.1</td><td>3.0</td><td>0.0</td><td>H-Horn</td><td>AV</td><td>0.0</td><td>43.3</td><td>54.0</td><td>-10.7</td><td>EUT on side, antenna vertical</td></tr> <tr><td>7439.913</td><td>24.5</td><td>17.9</td><td>244.0</td><td>1.1</td><td>3.0</td><td>0.0</td><td>V-Horn</td><td>AV</td><td>0.0</td><td>42.4</td><td>54.0</td><td>-11.6</td><td>EUT on side, antenna vertical</td></tr> <tr><td>7439.883</td><td>24.4</td><td>17.9</td><td>339.0</td><td>1.8</td><td>3.0</td><td>0.0</td><td>V-Horn</td><td>AV</td><td>0.0</td><td>42.3</td><td>54.0</td><td>-11.7</td><td>EUT horizontal</td></tr> <tr><td>7439.947</td><td>24.4</td><td>17.9</td><td>159.0</td><td>1.1</td><td>3.0</td><td>0.0</td><td>V-Horn</td><td>AV</td><td>0.0</td><td>42.3</td><td>54.0</td><td>-11.7</td><td>EUT on side, antenna horizontal</td></tr> <tr><td>7439.997</td><td>24.0</td><td>17.9</td><td>82.0</td><td>1.0</td><td>3.0</td><td>0.0</td><td>H-Horn</td><td>AV</td><td>0.0</td><td>41.9</td><td>54.0</td><td>-12.1</td><td>EUT on side, antenna horizontal</td></tr> <tr><td>7439.363</td><td>23.4</td><td>17.9</td><td>108.0</td><td>1.2</td><td>3.0</td><td>0.0</td><td>H-Horn</td><td>AV</td><td>0.0</td><td>41.3</td><td>54.0</td><td>-12.7</td><td>EUT horizontal</td></tr> <tr><td>4959.934</td><td>28.8</td><td>10.2</td><td>357.0</td><td>1.0</td><td>3.0</td><td>0.0</td><td>V-Horn</td><td>AV</td><td>0.0</td><td>39.0</td><td>54.0</td><td>-15.0</td><td>EUT on side, antenna vertical</td></tr> <tr><td>4960.033</td><td>28.7</td><td>10.2</td><td>334.0</td><td>1.0</td><td>3.0</td><td>0.0</td><td>H-Horn</td><td>AV</td><td>0.0</td><td>38.9</td><td>54.0</td><td>-15.1</td><td>EUT on side, antenna vertical</td></tr> <tr><td>7439.140</td><td>39.8</td><td>17.9</td><td>275.0</td><td>1.1</td><td>3.0</td><td>0.0</td><td>H-Horn</td><td>PK</td><td>0.0</td><td>57.7</td><td>74.0</td><td>-16.3</td><td>EUT on side, antenna vertical</td></tr> <tr><td>7439.477</td><td>38.5</td><td>17.9</td><td>159.0</td><td>1.1</td><td>3.0</td><td>0.0</td><td>V-Horn</td><td>PK</td><td>0.0</td><td>56.4</td><td>74.0</td><td>-17.6</td><td>EUT on side, antenna horizontal</td></tr> <tr><td>7439.837</td><td>38.5</td><td>17.9</td><td>82.0</td><td>1.0</td><td>3.0</td><td>0.0</td><td>H-Horn</td><td>PK</td><td>0.0</td><td>56.4</td><td>74.0</td><td>-17.6</td><td>EUT on side, antenna horizontal</td></tr> <tr><td>4959.963</td><td>26.1</td><td>10.2</td><td>138.0</td><td>1.0</td><td>3.0</td><td>0.0</td><td>V-Horn</td><td>AV</td><td>0.0</td><td>36.3</td><td>54.0</td><td>-17.7</td><td>EUT horizontal</td></tr> <tr><td>7439.330</td><td>38.3</td><td>17.9</td><td>340.0</td><td>1.8</td><td>3.0</td><td>0.0</td><td>V-Horn</td><td>PK</td><td>0.0</td><td>56.2</td><td>74.0</td><td>-17.8</td><td>EUT horizontal</td></tr> <tr><td>7440.353</td><td>38.3</td><td>17.9</td><td>244.0</td><td>1.1</td><td>3.0</td><td>0.0</td><td>V-Horn</td><td>PK</td><td>0.0</td><td>56.2</td><td>74.0</td><td>-17.8</td><td>EUT on side, antenna vertical</td></tr> <tr><td>4959.644</td><td>45.1</td><td>10.2</td><td>357.0</td><td>1.0</td><td>3.0</td><td>0.0</td><td>V-Horn</td><td>PK</td><td>0.0</td><td>55.3</td><td>74.0</td><td>-18.7</td><td>EUT on side, antenna vertical</td></tr> <tr><td>7440.563</td><td>37.1</td><td>17.9</td><td>108.0</td><td>1.2</td><td>3.0</td><td>0.0</td><td>H-Horn</td><td>PK</td><td>0.0</td><td>55.0</td><td>74.0</td><td>-19.0</td><td>EUT horizontal</td></tr> <tr><td>4959.791</td><td>44.4</td><td>10.2</td><td>334.0</td><td>1.0</td><td>3.0</td><td>0.0</td><td>H-Horn</td><td>PK</td><td>0.0</td><td>54.6</td><td>74.0</td><td>-19.4</td><td>EUT on side, antenna vertical</td></tr> <tr><td>4959.747</td><td>40.6</td><td>10.2</td><td>138.0</td><td>1.0</td><td>3.0</td><td>0.0</td><td>V-Horn</td><td>PK</td><td>0.0</td><td>50.8</td><td>74.0</td><td>-23.2</td><td>EUT horizontal</td></tr> </tbody> </table>													Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Distance (meters)	External Attenuation (dB)	Polarity	Detector	Distance Adjustment (dB)	Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)	Comments	Spec. (dB)	7440.010	25.4	17.9	275.0	1.1	3.0	0.0	H-Horn	AV	0.0	43.3	54.0	-10.7	EUT on side, antenna vertical	7439.913	24.5	17.9	244.0	1.1	3.0	0.0	V-Horn	AV	0.0	42.4	54.0	-11.6	EUT on side, antenna vertical	7439.883	24.4	17.9	339.0	1.8	3.0	0.0	V-Horn	AV	0.0	42.3	54.0	-11.7	EUT horizontal	7439.947	24.4	17.9	159.0	1.1	3.0	0.0	V-Horn	AV	0.0	42.3	54.0	-11.7	EUT on side, antenna horizontal	7439.997	24.0	17.9	82.0	1.0	3.0	0.0	H-Horn	AV	0.0	41.9	54.0	-12.1	EUT on side, antenna horizontal	7439.363	23.4	17.9	108.0	1.2	3.0	0.0	H-Horn	AV	0.0	41.3	54.0	-12.7	EUT horizontal	4959.934	28.8	10.2	357.0	1.0	3.0	0.0	V-Horn	AV	0.0	39.0	54.0	-15.0	EUT on side, antenna vertical	4960.033	28.7	10.2	334.0	1.0	3.0	0.0	H-Horn	AV	0.0	38.9	54.0	-15.1	EUT on side, antenna vertical	7439.140	39.8	17.9	275.0	1.1	3.0	0.0	H-Horn	PK	0.0	57.7	74.0	-16.3	EUT on side, antenna vertical	7439.477	38.5	17.9	159.0	1.1	3.0	0.0	V-Horn	PK	0.0	56.4	74.0	-17.6	EUT on side, antenna horizontal	7439.837	38.5	17.9	82.0	1.0	3.0	0.0	H-Horn	PK	0.0	56.4	74.0	-17.6	EUT on side, antenna horizontal	4959.963	26.1	10.2	138.0	1.0	3.0	0.0	V-Horn	AV	0.0	36.3	54.0	-17.7	EUT horizontal	7439.330	38.3	17.9	340.0	1.8	3.0	0.0	V-Horn	PK	0.0	56.2	74.0	-17.8	EUT horizontal	7440.353	38.3	17.9	244.0	1.1	3.0	0.0	V-Horn	PK	0.0	56.2	74.0	-17.8	EUT on side, antenna vertical	4959.644	45.1	10.2	357.0	1.0	3.0	0.0	V-Horn	PK	0.0	55.3	74.0	-18.7	EUT on side, antenna vertical	7440.563	37.1	17.9	108.0	1.2	3.0	0.0	H-Horn	PK	0.0	55.0	74.0	-19.0	EUT horizontal	4959.791	44.4	10.2	334.0	1.0	3.0	0.0	H-Horn	PK	0.0	54.6	74.0	-19.4	EUT on side, antenna vertical	4959.747	40.6	10.2	138.0	1.0	3.0	0.0	V-Horn	PK	0.0	50.8	74.0	-23.2	EUT horizontal
Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Distance (meters)	External Attenuation (dB)	Polarity	Detector	Distance Adjustment (dB)	Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)													Comments																																																																																																																																																																																																																																																														
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Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Distance (meters)	External Attenuation (dB)	Polarity	Detector	Distance Adjustment (dB)	Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)	Comments																																																																																																																															
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7323.114	39.4	17.4	267.0	1.0	3.0	0.0	H-Horn	PK	0.0	56.8	74.0	-17.2	EUT on side, antenna vertical																																																																																																																															
7323.117	39.3	17.4	234.0	1.1	3.0	0.0	V-Horn	PK	0.0	56.7	74.0	-17.3	EUT on side, antenna vertical																																																																																																																															
4881.582	46.5	9.8	355.0	1.2	3.0	0.0	H-Horn	PK	0.0	56.3	74.0	-17.7	EUT on side, antenna vertical																																																																																																																															
4881.718	45.1	9.8	346.0	1.0	3.0	0.0	V-Horn	PK	0.0	54.9	74.0	-19.1	EUT on side, antenna vertical																																																																																																																															

## SPURIOUS RADIATED EMISSIONS

EUT: <b>ATS</b>	Work Order: <b>CYBR0075</b>																																																																																	
Serial Number: <b>None</b>	Date: <b>01/02/08</b>																																																																																	
Customer: <b>CyberOptics Semiconductor, Inc.</b>	Temperature: <b>24</b>																																																																																	
Attendees: <b>None</b>	Humidity: <b>24%</b>																																																																																	
Project: <b>None</b>	Barometric Pres.: <b>29.98</b>																																																																																	
Tested by: <b>Rod Peloquin</b>	Power: <b>Battery</b>																																																																																	
TEST SPECIFICATIONS																																																																																		
FCC 15.247 (DTS)-2006 Class A																																																																																		
Test Method ANSI C63.4:2003 KDB No. 558074																																																																																		
TEST PARAMETERS																																																																																		
Antenna Height(s) (m)	1 - 4																																																																																	
Test Distance (m)	3																																																																																	
COMMENTS																																																																																		
EUT OPERATING MODES Transmitting Bluetooth, GFSK modulation, power setting 42, low channel																																																																																		
DEVIATIONS FROM TEST STANDARD No deviations.																																																																																		
Run #	4																																																																																	
Configuration #	1																																																																																	
Results	Pass																																																																																	
<i>Rod Peloquin</i> Signature																																																																																		
<table border="1"> <thead> <tr> <th>Freq (MHz)</th> <th>Amplitude (dBuV)</th> <th>Factor (dB)</th> <th>Azimuth (degrees)</th> <th>Height (meters)</th> <th>Distance (meters)</th> <th>External Attenuation (dB)</th> <th>Polarity</th> <th>Detector</th> <th>Distance Adjustment (dB)</th> <th>Adjusted dBuV/m</th> <th>Spec. Limit dBuV/m</th> <th>Compared to Spec. (dB)</th> <th>Comments</th> </tr> </thead> <tbody> <tr> <td>4803.952</td> <td>30.2</td> <td>9.5</td> <td>214.0</td> <td>1.4</td> <td>3.0</td> <td>0.0</td> <td>V-Horn</td> <td>AV</td> <td>0.0</td> <td>39.7</td> <td>54.0</td> <td>-14.3</td> <td>EUT on side, antenna vertical</td> </tr> <tr> <td>4804.000</td> <td>30.1</td> <td>9.5</td> <td>2.0</td> <td>1.0</td> <td>3.0</td> <td>0.0</td> <td>H-Horn</td> <td>AV</td> <td>0.0</td> <td>39.6</td> <td>54.0</td> <td>-14.4</td> <td>EUT on side, antenna vertical</td> </tr> <tr> <td>4803.487</td> <td>47.5</td> <td>9.5</td> <td>2.0</td> <td>1.0</td> <td>3.0</td> <td>0.0</td> <td>H-Horn</td> <td>PK</td> <td>0.0</td> <td>57.0</td> <td>74.0</td> <td>-17.0</td> <td>EUT on side, antenna vertical</td> </tr> <tr> <td>4803.791</td> <td>47.5</td> <td>9.5</td> <td>214.0</td> <td>1.4</td> <td>3.0</td> <td>0.0</td> <td>V-Horn</td> <td>PK</td> <td>0.0</td> <td>57.0</td> <td>74.0</td> <td>-17.0</td> <td>EUT on side, antenna vertical</td> </tr> </tbody> </table>													Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Distance (meters)	External Attenuation (dB)	Polarity	Detector	Distance Adjustment (dB)	Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)	Comments	4803.952	30.2	9.5	214.0	1.4	3.0	0.0	V-Horn	AV	0.0	39.7	54.0	-14.3	EUT on side, antenna vertical	4804.000	30.1	9.5	2.0	1.0	3.0	0.0	H-Horn	AV	0.0	39.6	54.0	-14.4	EUT on side, antenna vertical	4803.487	47.5	9.5	2.0	1.0	3.0	0.0	H-Horn	PK	0.0	57.0	74.0	-17.0	EUT on side, antenna vertical	4803.791	47.5	9.5	214.0	1.4	3.0	0.0	V-Horn	PK	0.0	57.0	74.0	-17.0	EUT on side, antenna vertical
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