

Emissions Testing
Performed
on the
Harmonix Corporation
Communications Transceiver
Model: EK6HOC3JH-SGM

To

FCC Part 15 Subpart C, 15.255

Date of Test: May 24, 25 & 26, 2000

Page 1 of 72

Report Number: J20013614

Contact: Mr. Dana Wheeler

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Table of Contents

I – INTRODUCTION AND SUMMARY	4
II – TECHNICAL REQUIREMENTS	6
15.1 SCOPE	6
15.15 GENERAL TECHNICAL REQUIREMENTS.....	6
15.27 SPECIAL ACCESSORIES	6
15.31(E) VARIATION OF RADIATED SIGNAL LEVEL DUE TO VOLTAGE VARIATION	6
15.37 MEASUREMENT STANDARDS.....	6
15.33 FREQUENCY RANGE OF MEASUREMENT	6
15.35 MEASUREMENT DETECTOR FUNCTIONS AND BANDWIDTH.....	7
15.37 TRANSITION PROVISIONS.....	7
15.201 CERTIFICATION	7
15.203 ANTENNA REQUIREMENTS	7
15.204 EXTERNAL RADIO AMPLIFIER	7
15.205 RESTRICTED BANDS OF OPERATION.....	8
15.207 CONDUCTED LIMITS.....	8
15.209 RADIATED EMISSION LIMITS; GENERAL REQUIREMENTS	8
JUSTIFICATIONS.....	8
15.255 OPERATION IN THE BAND 59.0 – 64.0 GHZ.....	9
RESTRICTIONS ON OPERATIONS	9
POWER DENSITY	10
SPURIOUS EMISSIONS	11
PEAK OUTPUT POWER.....	12
FREQUENCY STABILITY	13
HUMAN EXPOSURE TO RF FIELDS.....	13
PROHIBITION ON EXTERNAL PHASE-LOCKING INPUTS	13
TRANSMITTER IDENTIFICATION REQUIREMENT	15
PART 2.....	16
2.201 EMISSION MODULATION AND TRANSMISSION CHARACTERISTICS	16
2.1041 MEASUREMENT PROCEDURES.....	16

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2.1091 RADIOFREQUENCY RADIATION EXPOSURE EVALUATION: MOBILE DEVICES	16
2.1093 RADIOFREQUENCY RADIATION EXPOSURE EVALUATION: PORTABLE DEVICES.....	16
III - ATTESTATION.....	17
IV - SITE DESCRIPTION.....	18
V - MEASUREMENT EQUIPMENT	19
VI – SUMMARY OF EQUIPMENT UNDER TEST.....	20
VII - CONFIGURATION INFORMATION.....	21
VIII - CONFIGURATION PHOTOGRAPHS	22
IX - SAMPLE CALCULATION.....	26
X - DATA TABLES	27
XI - BANDWIDTH.....	31
PATCH ANTENNA RADIO	31
PARABOLIC ANTENNA RADIO	34
XII - FREQUENCY DEVIATION.....	36
ANNEX A – RESPONSE TO FCC COMMENTS	39
1) INDICATE HOW AVERAGE POWER DENSITY MEASUREMENT WAS CALCULATED, BASED ON 15.255(B)(5).....	39
2) THE DEVICE APPEARS TO OPERATE IN THE 59 – 59.05 GHZ RESTRICTED BAND.	41
3) PEAK TRANSMITTER OUTPUT POWER PURSUANT TO 15.255(E)(2).	42
4) EMISSION BANDWIDTH PER 15.255(E)(1).....	43
PATCH ANTENNA EMISSION DATA	44
PATCH ANTENNA TRANSMITTER EMISSION POWER DATA	61
EMISSION PLOTS	68

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I – Introduction and Summary

TO: Mr. David Russell

FROM: Michael J. Peters, Senior Project Engineer

DATE: May 24, 25 & 26, 2000

JOB #: J20013614

RE: Emissions Testing Performed on the Communications Transceiver, Model: EK6HOC3JH-SGM

On May 24, 25 & 26, 2000 we tested the Communications Transceiver, Model: EK6HOC3JH-SGM to determine if it was in compliance with the FCC Part 15, Subpart C, Section 15.255. A Production version of the sample was received on Wednesday, May 24, 2000 in good condition. We found that the unit met the Part 15 requirements when tested as received.

The following table presents the results of testing at typical frequencies. Details can be found in the referenced sections of this report.

Test	Frequency (MHz)	Measurement	Requirement	Pass/Fail	Section of FCC Rules	Section of Test Report
Fundamental Power Density	61,842.2	16.7pk/6.7ave uW/cm ²	18pk/9ave uW/cm ²	P	15.255(b)(2)	II
Restricted Band Emissions	30-40000; >40000	Table 1-3 Section X		P	15.209/15.205	X
Line-conducted Emissions	0.45-30	Table 4 Section X		P	15.207	X
Antenna Conducted Emissions – Receiver	No removable antenna					
Antenna Conducted Emissions – Transmit	No removable antenna					
Frequency Deviation Temperature	59,162,828,479	+389,014Hz - 476,541Hz	10 MHz	P	15.255(f)	XII
Field Strength Deviation Voltage	See Annex A	See Annex A		P	15.31(e)	See Annex A
Frequency Deviation Voltage	59,162,828,479	+120,230Hz -266,038Hz	10MHz	P	15.255(f)	XII

Modifications Required for Compliance

The following modifications were installed during compliance testing in order to bring the product into compliance (Please note that this list does not include changes made specifically by Harmonix Corporation prior to compliance testing):

- 1) A ferrite sleeve (Fair-Rite P/N: 0443164251) was placed around the power cord, internal to the device, in a straight through configuration.
- 2) 0.022 uF Y-capacitors were installed from each line to ground at the power input isolation block.
- 3) 0.1 uF X-capacitor was installed across each line at the power input isolation block.
- 4)

In summary, this report confirms that the Model: EK6HOC3JH-SGM is compliant with the FCC Part 15, Subpart C Section 15.255 requirements when production units conform to the initial sample. Please address all questions and comments concerning this report to Michael J. Peters, Senior Project Engineer.

II – Technical Requirements

15.1 Scope

The device is an intentional and un-intentional (based on receiver per Part 15.101 “all other receivers” declaration of conformity) radiator intended to operate in accordance with 15.255 Operation in the band 59.05 to 64.0 GHz Of Part 15 of the FCC rules without a license.

15.15 General Technical Requirements

There are no controls accessible to the user that would cause the device to operate in violation of the FCC rules.

15.27 Special Accessories

No special accessories are necessary to meet compliance requirements.

15.31(e) Variation of radiated signal level due to voltage variation

Variation of field strength level is discussed in Annex A of this report.

15.37 Measurement Standards

The measurement procedures specified by ANSI C63.4:1992 were used to setup and test the device. See Section IV of this test report for detailed description of the test procedure.

15.33 Frequency range of measurement

The device was scanned for spurious and harmonic emissions from 30 MHz to 200 GHz. Line-conducted emission measurements were made from 450kHz – 30MHz

15.35 Measurement detector functions and bandwidth

The following table illustrates the detector functions and bandwidth used to test the device.

No deviations to the following were made.

Frequency Range	Measurement Detector	Measurement Bandwidth
450 kHz to 30 MHz	Quasi-Peak	9 kHz
30 MHz to 1000 MHz	Quasi-Peak	120 kHz
1000 MHz to 200 GHz	Average	1 MHz

Note: The quasi-peak detector meets the requirements of CISPR 16.
An averaging factor was not used for the device.

15.37 Transition Provisions

Transition provisions were not applied to the device.
A separate receiver is not being certified with the device.
The device does not operate in the band 902-905 MHz.

15.201 Certification

The device is required to be certified in accordance with Part 2 of the FCC rules, Subpart J.

15.203 Antenna Requirements

The antenna is integral to the device and cannot be readily removed or replaced by the end-user.

15.204 External Radio Amplifier

The device is not an amplifier.

15.205 Restricted bands of operation

The emissions requirements below 40 GHz are the same as the general requirements of 15.209, which is the same as the requirement for emissions in restricted bands. Other than the fundamental emission, no other emissions were detected above 40 GHz. Measurements can be found in Table 1-3 of Section X of this report.

Below 1000 MHz a quasi-peak detector was employed to measure emissions

Above 1000 MHz, peak measurements were performed to and compared to the average requirement.

15.207 Conducted Limits

The device complies with the conducted emissions requirements when modified as described in the introduction.

15.209 Radiated emission limits; general requirements

Below 40 GHz, the device is required to comply with the general emissions requirements. All measurements below 40 GHz were compared with the requirement.

Detailed description of operation

The transmitter was tested using worst-case OC3 and OC12 modulation. The modulation was present during radiated emissions testing. For frequency stability and output power test, the modulation signal was removed and the unmodulated carrier was measured.

Justifications

The system was configured for testing in a typical fashion (as a customer would normally use it), and in the confines as outlined in C63.4 (1992).

The worst case bit sequence was applied during test.

For maximizing emissions, the system was rotated through 360°, the antenna height was varied from 1 meter to 4 meters above the ground plane, and the antenna polarization was changed. This step by step procedure for maximizing emissions led to the radiated emissions data contained in this report

Radiated emissions were tested in the range of 30 MHz to 200 GHz.

For simplicity of testing, the unit was wired to transmit continuously.

15.255 Operation in the band 59.0 – 64.0 GHz

Restrictions on Operations

(a) Operation under the provisions of this section is not permitted for the following products:

(1) Equipment used on aircraft or satellites.

(2) Field disturbance sensors, including vehicle radar systems, unless the field disturbance sensors are employed for fixed operation. For the purposes of this section, the reference to fixed operation includes field disturbance sensors installed in fixed equipment, even if the sensor itself moves within the equipment.

The device is a low power communication device. It does not fall under either category 1) or 2) above.

(d) Only spurious emissions and transmissions related to a publicly accessible coordination channel, whose purpose is to coordinate operation between diverse transmitters with a view towards reducing the probability of interference throughout the 59-64 GHz band, are permitted in the 59.0-59.05 GHz band.

The device does not operate in the 50.0 to 59.05 band. The lowest carrier frequency is 59.210 GHz.

Note: The 59.0-59.05 GHz is reserved exclusively for a publicly accessible coordination channel. The development of standards for this channel shall be performed pursuant to authorizations issued under Part 5 of this chapter.

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Power Density

The following table summarizes the power density limits for the devices operating in this band:

Type of Transmitter	Power Density		Test Distance (meters)
	Average(3) ($\mu\text{W}/\text{cm}^2$)	Peak (2) ($\mu\text{W}/\text{cm}^2$)	
NOT Field Disturbance Sensors	9	18	3
Fixed Field Disturbance Sensors (BW < 500 MHz)			
Frequency Range - 61.0 to 61.5 GHz	9	18	3
Frequency Range – 59.0 to 61.0 & 61.5 to 64 GHz	0.009	0.018	3
Fixed Field Disturbance Sensors			
Not operating under Paragraph 15.255 (b)(2)	0.1 mW(1)	9	3

- 1) Output Power measurement (distance not applicable)
- 2) Peak power density shall be measured with an RF detector that has a detection bandwidth that encompasses the 59-64 GHz band and has a video bandwidth of at least 10 MHz, or using an equivalent measurement method.
- 3) The average emission limits shall be calculated, based on the measured peak levels, over the actual time period during which transmission occurs.

The following Table summarizes the results of field strength testing:

Antenna	Fundamental Frequency (MHz)	Measurement ($\mu\text{W}/\text{cm}^2$)		Limit ($\mu\text{W}/\text{cm}^2$)		Pass/Fail	Table #	Test Distance (m)
		Peak	Avg	Peak	Avg			
Patch	59,162.0	2.3	1.1	18	9	Pass	1	3
Patch	61,380.0	3.6	1.4	18	9	Pass	1	3
Patch	63,597.0	3.0	1.0	18	9	Pass	1	3
Parabola	59,845.7	16.0	6.1	18	9	Pass	2	3
Parabola	61,842.2	16.7	6.7	18	9	Pass	2	3

Spurious Emissions

(b) Limits on spurious emissions:

- (1) The power density of any emissions outside the 59.0-64.0 GHz band shall consist solely of spurious emissions.
- (2) Radiated emissions below 40 GHz shall not exceed the general limits in Section 15.209 of this part.
- (3) Between 40 GHz and 200 GHz, the level of these emissions shall not exceed 90 pW/cm² at a distance of 3 meters.
- (4) The levels of the spurious emissions shall not exceed the level of the fundamental emission.

Spurious Emissions are summarized on Tables 1 through 3 in Section X of this report.

No emissions exceed the limits after modifications.
No emissions other than the fundamental were found >40GHz

Peak Output Power

(e) Except as specified below, the total peak transmitter output power shall not exceed 500 mW.

(1) Transmitters with an emission bandwidth of less than 100 MHz must limit their peak transmitter output power to the product of 500 mW times their emission bandwidth divided by 100 MHz. For the purposes of this paragraph, emission bandwidth is defined as the instantaneous frequency range occupied by a steady state radiated signal with modulation, outside which the radiated power spectral density never exceeds 6 dB below the maximum radiated power spectral density in the band, as measured with a 100 kHz resolution bandwidth spectrum analyzer. The center frequency must be stationary during the measurement interval, even if not stationary during normal operation (e.g. for frequency hopping devices).

(2) Peak transmitter output power shall be measured with an RF detector that has a detection bandwidth that encompasses the 59-64 GHz band and that has a video bandwidth of at least 10 MHz, or using an equivalent measurement method.

(3) For purposes of demonstrating compliance with this paragraph, corrections to the transmitter output power may be made due to the antenna and circuit loss.

The output power of the transmitter is calculated based on the peak field strength readings from the previous section:

Antenna gain is calculated as:

$$G = 4\pi A_e / \lambda^2$$

Where,

G – Numeric gain, A_e – effective antenna area, λ - wavelength in meters

Using the actual area yields worst-case results (3"x5" = 0.0097 meters)

$$G = 4\pi * (0.0097) / (300/59,162)^2 = 4,740.5 \text{ (36.8 dB)}$$

The Power is derived from the field strength by the following formula:

$$P = (E*r)^2 / 30*G$$

Where,

E – Field Strength in V/m, r – measurement distance in meters

The field strength is related to power density (s) by $s = E^2 / 377$

$$\begin{aligned} P &= ((377*s)^{1/2} * r)^2 / 30 * G \\ &= ((377*2.3)^{1/2} * 3)^2 / 30 * 4,740.5 = 0.0549 \text{ watts or } 54.9 \text{ mW} \end{aligned}$$

Frequency Stability

(f) Fundamental emissions must be contained within the frequency bands specified in this section during all conditions of operation. Equipment is presumed to operate over the temperature range -20 to +50 degrees Celsius with an input voltage variation of 85% to 115% of rated input voltage, unless justification is presented to demonstrate otherwise.

Since there is not specific frequency deviation tolerance other than the emission must stay in the band, the maximum frequency deviation is determined as follows using the transmitters side-band frequency:

$$\begin{aligned}\text{Maximum Frequency Deviation} &= \text{Side-band Frequency} - \text{Band Start Frequency} \\ &= 60,010 - 60,000 = \pm 10 \text{ MHz}\end{aligned}$$

For the highest frequency, the separation from the band edge to the side-band frequency is greater so the 10 MHz will be used there as well.

Measurement results are found in Section XII of this test report.

Human Exposure to RF Fields

(g) Regardless of the power density levels permitted under this section, devices operating under the provisions of this section are subject to the radio frequency radiation exposure requirements specified in § 1.1307(b), § 1.1310, § 2.1091 and § 2.1093 of this chapter, as appropriate. Applications for equipment authorization of devices operating under this section must contain a statement confirming compliance with these requirements for both fundamental emissions and unwanted emissions. Technical information showing the basis for this statement must be submitted to the Commission upon request.

Statement of compliance, and MPE calculation can be found in the attached document "Part 15MPE.doc". Calculations were performed in accordance with OET Bulletin 65, edition 97.01 and detailed in the confidential package.
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Prohibition on external Phase-Locking Inputs

(h) Any transmitter that has received the necessary FCC equipment authorization under the rules of this chapter may be mounted in a group installation for simultaneous operation with one or more other transmitter(s) that have received the necessary FCC equipment authorization, without any additional equipment authorization. However, no transmitter operating under the provisions of this section may be equipped with external phase-locking inputs that permit beam-forming arrays to be realized.

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No provisions exist for external phase locking of this device.

Transmitter Identification Requirement

(i) Within any one second interval of signal transmission, each transmitter with a peak output power equal to or greater than 0.1 mW or a peak power density equal to or greater than 3 nW/cm², as measured 3 meters from the radiating structure, must transmit a transmitter identification at least once. Each application for equipment authorization must declare that the equipment contains the required transmitter identification feature and must specify a method whereby interested parties can obtain sufficient information, at no cost, to enable them to fully detect and decode this transmitter identification information. Upon the completion of decoding, the transmitter identification data block must provide the following fields.

1. FCC Identifier, which shall be programmed at the factory.
2. Manufacturer's serial number, which shall be programmed at the factory.
3. Provision for at least 24 bytes of data relevant to the specific device, which shall be field programmable. The grantee must implement a method that makes it possible for users to specify and update this data. The recommended content of this field is information to assist in contacting the operator.

Discussion of the transmitter identification feature is described in the attached documents "FCC Identifier.doc" and "FCC Letter.pdf".
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Part 2

2.201 Emission Modulation and transmission characteristics

The emission designator is determined as follows

Bandwidth is measured to be:

The main carrier modulation is pulse modulation using a sequence of un-modulated pulses. Therefore the first symbol is 'M'.

The modulating signal is a single channel of digital information without the use of a modulating sub-carrier. Therefore the second symbol is '2'.

The type of information transmitted is a combination of all information types described in FCC section 2.201. Therefore the third symbol is 'W'

The emissions designator is:

'M2W'

2.1041 Measurement Procedures

Only the measurement procedures of Part 15 are required for this device.

2.1091 Radio frequency radiation exposure evaluation: Mobile Devices

The device does not meet the definition of a mobile device (That is, it is intended to be utilized in a fixed location.) and is therefore exempt from the requirements of this section.

2.1093 Radio frequency radiation exposure evaluation: Portable Devices

The device does not meet the definition of a portable device (That is it is not intended to operate within 20 cm of a person's body.) and is therefore exempt from the requirements of this section.

III -

This page is left intentionally blank. See Attestation file under the Attestation category.

IV - Site Description

Introduction

The following is a description of the test procedure used by Intertek Testing Services in the measurements of transmitters operating under Part 15, Subpart C, General Requirements.

- A. **Test Set-Up:** The test set-up and procedures described below are designed to meet the requirements of ANSI C63.4 (1992).
1. The test site is a Plastic/Fiberglass structure with a groundplane. The site has attenuation characteristics that meet the requirements of ANSI C63.4 (1992). Information on the site has been filed with the FCC as required by Rule 2.948. The address of the site is 70 Codman Hill Road, Boxborough, MA 01719.
 2. Power to the site is nominal line voltage of 117 V_{AC} and 230 V_{AC}, 60 Hz.
 3. The equipment under test (EUT) is placed on a wooden turntable, which is four feet in diameter and approximately one meter in height above the groundplane. During the radiated emissions test, the turntable is rotated 360 degrees and any cables leaving the EUT are manipulated to find the configuration resulting in maximum emissions. The antenna height and polarization are also varied during the search for maximum signal levels. The height of the antenna is varied from one meter to four meters. Body-worn, hand-held and small portable devices are mounted on a non-conductive box and emissions are investigated on three orthogonal axis.
 4. Detector function for radiated emissions is in peak or quasi-peak mode. Average readings, when required, are taken by measuring the duty cycle of the equipment under test and subtracting the corresponding amount in dB from the measured peak readings according to the following formula:

$$\text{Averaging Factor in dB} = 20 \text{ LOG (duty cycle)}$$

The time period over which the duty cycle is measured is 100 msec. The worst-case (highest percentage on) duty cycle is used and described specifically in the data section. The duty cycle is measured by placing the spectrum analyzer in zero scan (receiver mode) and linear mode at maximum bandwidth (3 MHz at 3 dB down) and viewing the resulting time domain signal output from the analyzer on a Tektronix 465 Oscilloscope. The oscilloscope is used because of its superior time base and triggering facilities.

5. Antennas used below 1000 MHz were EMCO Model 3142 Biconolog Antennas and Compliance Design Inc. Model A100 tuned Dipole Antennas. For measurements between 1000 MHz and 18000 MHz above 1 GHz, an EMCO Model: 3115 Horn Antenna is used. The Antennas used are listed in the Test Equipment Summary.
6. The field strength measuring equipment used included:

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V - Measurement Equipment

The following equipment was used to make measurements for emissions testing:

Description	Manufacturer	Model	Serial #	Cal Due
ANTENNA	EMCO	3142	9711-1223	10/12/2000
RECEIVER	HEWLETT PACKARD	8542E	3625A00188	01/19/2001
RF FILTER	HEWLETT PACKARD	85420E	3427A00177	01/19/2001
PREAMPLIFIER	MITEQ	NSP 4000-NF	507145	11/25/2000
MIXER, 140-220GHZ	MILLITECH	MSH-05-8FDSCN 8807	017	
MIXER, 50-75GHZ	MILLITECH	MHB-15-R00W0 8203	019	
MIXER, 33-50GHZ	MILLITECH	MHB-22-R00W0 8203	013	
MIXER, 110-170GHZ	MILLITECH	MHB-06-R00WN 8807	022	
MIXER, 75-110GHZ	MILLITECH	MHB-10-R00W0 8203	015	
LISN	SOLAR ELECTRONICS	8012-50-R-24-BNC	865575	04/20/2001
HORN ANTENNA	EMCO	3115	9602-4675	11/04/2000

7. The frequency range to be scanned is from the lowest radio frequency signal generated in the device that is greater than 9 kHz to the tenth harmonic of the highest fundamental frequency, or 40 GHz, whichever is lower. For line-conducted emissions, the range scanned is 450 kHz to 30 MHz.
8. The EUT is warmed up for 15 minutes prior to the test. AC power to the unit is varied from 85% to 115% nominal and variation in the fundamental emission field strength is recorded. If battery powered, a new battery is used.
9. Conducted measurements were made as described in ANSI C63.4 (1992). An IF bandwidth of 9 kHz is used, and peak or quasi-peak detection is employed.
10. The IF bandwidth used for measurement of radiated signal strength was 100 kHz or greater below 1000 MHz. Where pulsed transmissions of short enough pulse duration warrant, a greater bandwidth is selected according to the recommendations of Hewlett Packard Application No. 150-2. A discussion of whether pulse desensitivity is applicable to this unit is included in this report. Above 1000 MHz, a bandwidth of 1 MHz is generally used.
11. Transmitter measurements are normally conducted at a measurement distance of three meters. However, to assure low enough noise floor in the forbidden bands and above 1 GHz (where no preamplifier is used), signals are acquired at a distance of one meter or less. All measurements are extrapolated to three meters using inverse scaling, but those measurements taken at a closer distance are so marked.

12. For measurements made in the 9 kHz to 30 MHz range, a distance of 30 meters was used unless a good signal-to-noise ratio could not be obtained. In that case, a closer distance was used and that distance is so marked in the data table.

VI – Summary of Equipment Under Test

1	Manufacturer:	Harmonix Corporation
2	Grantee:	Harmonix Corporation
3	Model No.:	EK6HOC3JH-SGM
4	Trade Name:	GigaLINK™
5	Serial No.:	
6	Date of Test:	May 24, 25 & 26, 2000
7	Frequencies to which device can be tuned:	59.16 to 63.60 GHz
8	Can customer tune device?	NO
9	Detailed description of operation pursuant to 15.209:	See Section II - 15.209
10	Applicable emissions limits:	15.255, 15.209
11	Additional Comments:	

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VII - Configuration Information

Equipment Under Test: Communications Transceiver

Model: EK6HOC3JH-SGM

Serial No.:

FCC Identifier: O2700000-30-30

Support Equipment:

COMMS Analyzer

* Remotely Located *

Manufacturer: Hewlett Packard
Model: 37717C
Serial Number: GB00000407

OC3port Plus

* Remotely Located *

Manufacturer: Fluke
Model: OC3P2S
Serial Number: 7468001

ITE Power Supply

* Remotely Located *

Manufacturer: Ault Inc
Model: SW 108
Serial Number: Not Labeled

Power Supply

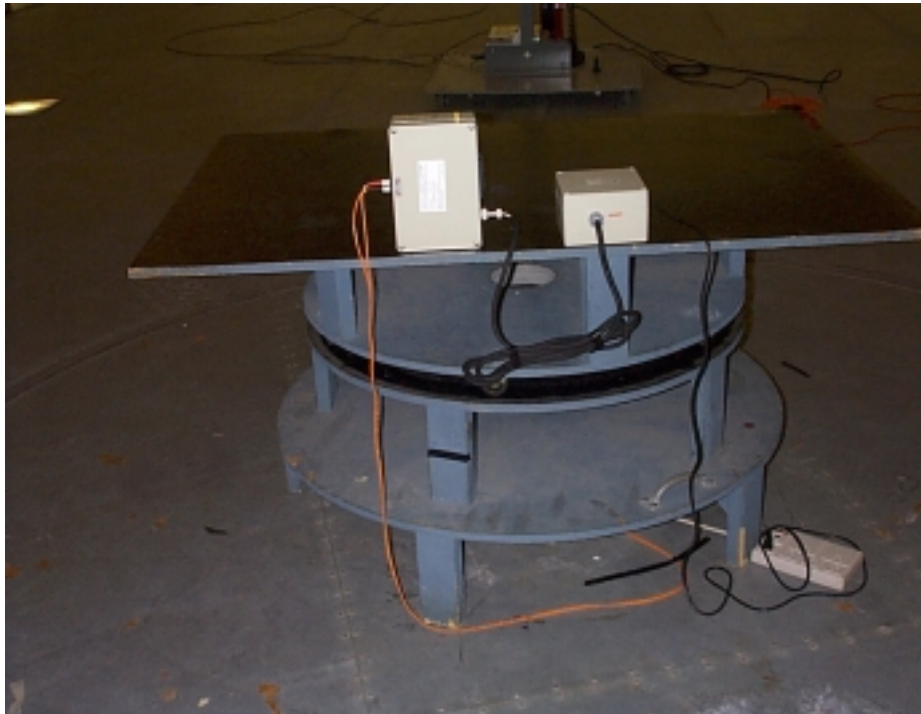
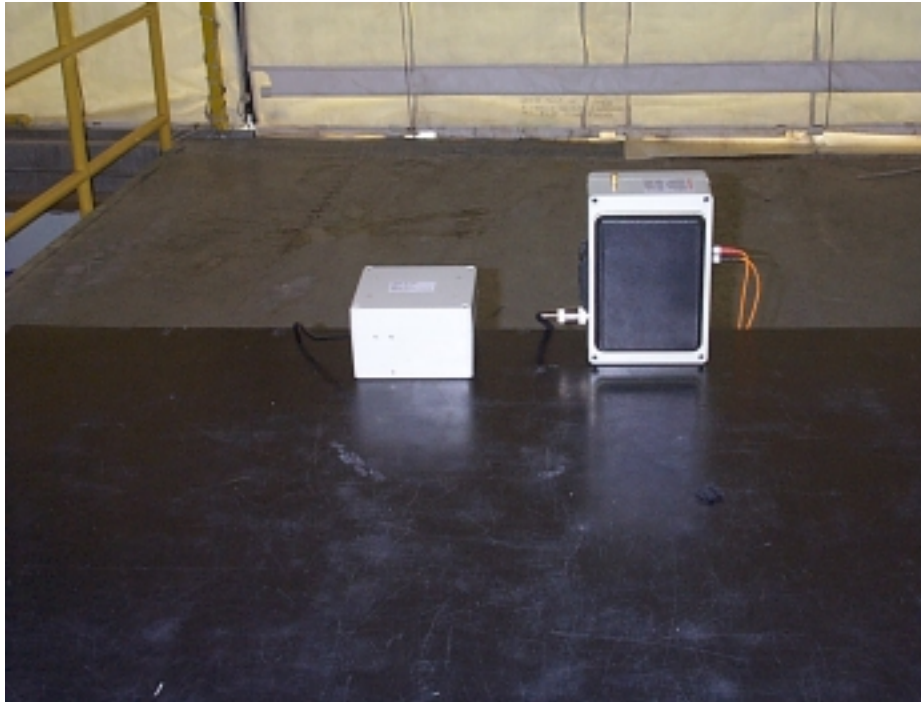
Manufacturer: Harmonix
Model: Not Labeled
Serial Number: Not Labeled

Cables:

QTY	Description	Shield Description	Hood Description	Length (m)
2	Fiber-optic	Unshielded	Plastic	5
1	Power Cord	Unshielded	Plastic	2

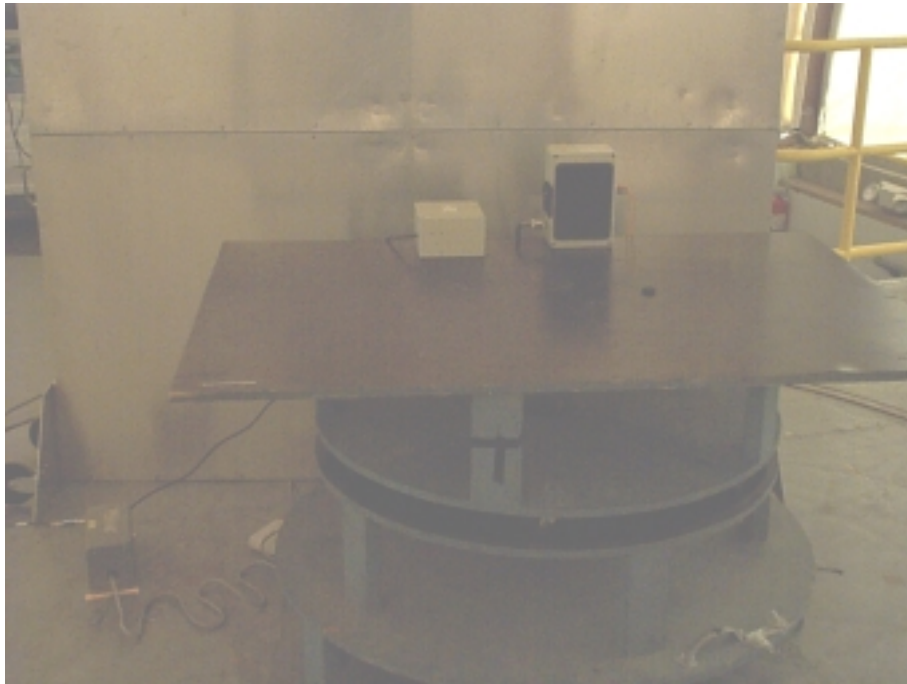
VIII - Configuration Photographs

Worst-Case Radiated Emissions

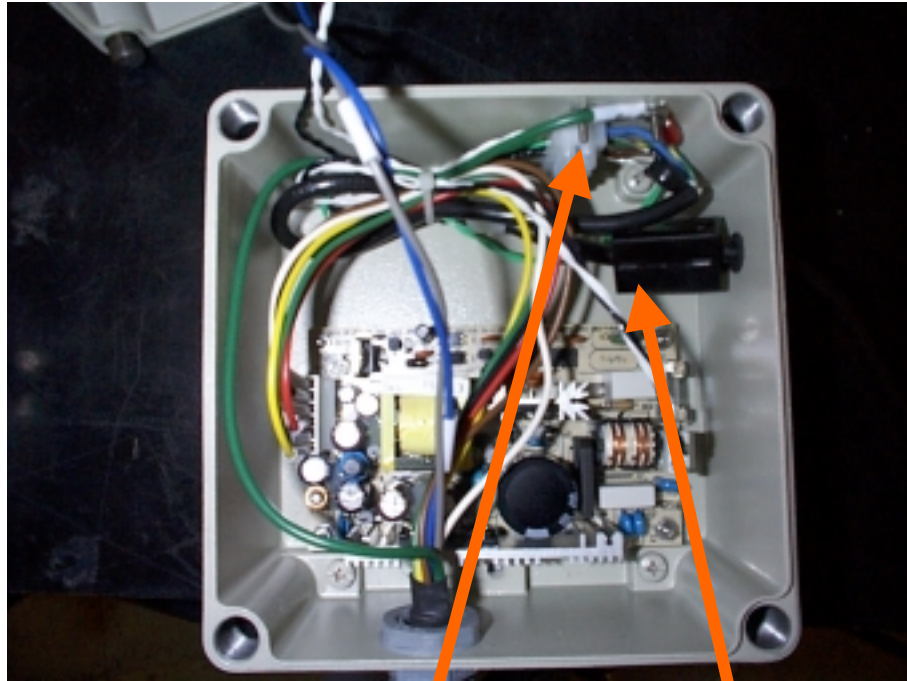




Worst-Case Line-Conducted Emissions



Photograph of Ferrite Sleeve Modification:



Power Block where
Capacitors are installed

Ferrite
Sleeve

IX - Sample Calculation

The following is how net field strength readings were determined:

$$NF = RF + AF + CF + PF + DF$$

Where,

NF = Net Reading in dB μ V/m

RF = Reading from receiver in dB μ V/m

AF = Antenna Correction Factor in dB

CF = Cable Correction Factor in dB

PF = Preamplifier Correction Factor in dB

DF = Distance Factor in dB (using 20 dB/decade), from 3 to 1 meters 10.5 dB was added for measurements performed at 1 meter

To convert from dB μ V/m to μ V/m or mV/m the following was used:

$$UF = 10^{(NF / 20)}$$

Where,

UF = Net Reading in μ V/m

$$MF = UF / 1000$$

Where,

MF = Net Reading in mV/m

Example:

For the fundamental field strength measurement at [Frequency] (distance = [d] meters) see table [x].

$$NF = NF = RF + AF + CF + PF + DF$$

$$UF = xx^{(xx.x \text{ dB}\mu\text{V} / 20)} = yyy,yyy \mu\text{V/m}$$

$$MF = yyy,yyy \mu\text{V} / 1000 = zz.z \text{ mV/m}$$

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X - Data Tables

Radiated Emissions / Interference

Table: 1

	Company: Harmonix	Tested by: Michael Peters
	Model: Patch Antenna - SGM	Location: Site 3C
	Job No.: J20013614	Detector: TEK 2784
av = average	Date: 05/24/00	Antenna: Mixer + Horn (33-200)
pk = peak	Standard: FCC Part 15, 15.255	PreAmp: None
	Class: None Group: None	Cable(s): 1.5 m High Frequency
	Notes: RBW=1MHz, VBW=7MHz	Distance: 3.000 meters

	Ant. Pol. (V/H)	Frequency MHz	Reading dBm	Antenna Factor dB(1/m)	Cable Loss dB	Mixer Factor dB	Net dB(uV/m)	Net (uW/cm ²)	Limit (uW/cm ²)	Pass/ Fail
	MID Channel									
av pk	h	61380.090	61.4	40.945	0.8	23.0	126.1	1.092	9.0	Pass
		61380.090	64.7	40.9	0.8	23.0	129.4	2.334	18.0	Pass
	h	61224.530	34.6	40.9	0.8	23.0	99.3	0.002	9.0	Pass
	h	61069.160	34.2	40.9	0.8	23.0	98.9	0.002	9.0	Pass
	h	61516.500	----	41.0	0.8	23.0				
	h	61540.000	37.6	41.0	0.8	23.0	102.4	0.005	9.0	Pass
	h	60913.450	26.0	40.9	0.8	23.0	90.7	0.000	9.0	Pass
	Low Channel									
av pk	h	59162.060	63.7	40.6	0.8	22.0	127.1	1.368	9.0	Pass
	h	59162.060	67.9	40.6	0.8	22.0	131.3	3.599	18.0	Pass
	h	59010.000	34.8	40.6	0.8	22.0	98.2	0.002	9.0	Pass
	h	59321.000	35.6	40.6	0.8	22.0	99.0	0.002	9.0	Pass
	High Channel									
av pk	h	63597.860	59.7	41.3	0.8	24.0	125.8	0.998	9.0	Pass
	h	63597.860	64.5	41.3	0.8	24.0	130.6	3.013	18.0	Pass
	h	63573.140	32.3	41.2	0.8	24.0	98.3	0.002	9.0	Pass
	h	63442.300	33.4	41.2	0.8	24.0	99.4	0.002	9.0	Pass
no emissions other than the fundamental were detected above 40GHz										

Intertek Testing Services NA, Inc.

Radiated Emissions / Interference

Table 2

	Company: Harmonix	Tested by: Michael Peters
	Model: Parabolic Antenna - SGM	Location: Ste3C
	Job No.: J20013614	Detector: TEK 2784
av = average	Date: 05/25/00	Antenna: Mxer + Horn (33-200)
pk = peak	Standard: FCC Part 15, 15.255	PreAmp: None
	Class: None Group: None	Cable(s): 1.5 m High Frequency
	Notes: RBW=1MHz, VBW=7MHz	Distance: 3.000 meters

	Ant. Pol. (V/H)	Frequency MHz	Reading dBm	Antenna Factor dB(1/m)	Cable Loss dB	Mixer Factor dB	Net dB(uV/m)	Net (uW/cm ²)	Limit (uW/cm ²)	Pass/ Fail
av pk	HIGH Channel									
	V	62024.000	---	41.0	0.8	23.0				
	V	61842.220	68.8	41.0	0.8	23.0	133.6	6.090	9.0	Pass
	V	61842.220	73.0	41.0	0.8	23.0	137.8	16.019	18.0	Pass
	V	62464.100	45.0	41.1	0.8	23.0	109.9	0.026	9.0	Pass
av pk	V	61220.100	45.4	40.9	0.8	23.0	110.1	0.027	9.0	Pass
	LOW Channel									
	V	59845.700	70.5	40.7	0.8	22.0	134.0	6.701	9.0	Pass
	V	59845.700	74.5	40.7	0.8	22.0	138.0	16.736	18.0	Pass
	V	60467.560	50.0	40.8	0.8	22.0	113.6	0.061	9.0	Pass
	V	59223.350	48.8	40.6	0.8	22.0	112.2	0.044	9.0	Pass
no emissions other than the fundamental were detected above 40GHz										

Intertek Testing Services NA, Inc.

Radiated Emissions / Interference

Table: 3

Company: **Harmonix** Tested by: Michael Peters
 Model: **Patch Antenna - SGM** Location: Site 3C
 Job No.: **J20013614** Detector: HP 8542E
 Date: 05/24/00 Antenna: LOG1 7-2-99 H10
 Standard: FCC15 PreAmp: None
 Class: B Group: None Cable(s): 3C-3m 3-1-00
 Notes: Radiated Emissions from 30 MHz to 40 GHz Distance: **3** meters
 RBW 120 kHz < 1 GHz, 1MHz > 1GHz

	Ant. Pol. (V/H)	Frequency MHz	Reading dB(uV)	Antenna Factor dB(1/m)	Cable Loss dB	Pre-amp Factor dB	Distance Factor dB	Net dB(uV/m)	Limit dB(uV/m)	Margin dB	
bb	V	35.570	25.4	15.1	0.3	0.0	0.0	40.8	40.0	+0.8	*
	V	39.750	20.4	12.7	0.3	0.0	0.0	33.4	40.0	-6.6	
	Installed a 1/4" ferrite on the power (to AC mains) internal to the unit.										
bb	V	35.500	21.5	15.1	0.3	0.0	0.0	36.9	40.0	-3.1	
bb	V	56.350	19.6	7.8	0.5	0.0	0.0	27.9	40.0	-12.1	
bb	V	74.300	14.7	6.5	0.1	0.0	0.0	21.3	40.0	-18.7	
	V	155.710	20.7	8.7	0.5	0.0	0.0	29.9	43.5	-13.6	
	V	155.250	21.5	8.7	0.5	0.0	0.0	30.7	43.5	-12.8	
	V	137.600	14.4	7.4	0.4	0.0	0.0	22.1	43.5	-21.4	
	V	200.550	13.9	9.9	1.0	0.0	0.0	24.8	43.5	-18.7	
	V	181.250	16.9	9.9	0.8	0.0	0.0	27.6	43.5	-15.9	
	V	234.000	13.5	11.7	1.2	0.0	0.0	26.4	46.0	-19.6	
	V	267.380	13.7	12.7	1.3	0.0	0.0	27.7	46.0	-18.3	
	V	401.640	8.1	16.3	1.7	0.0	0.0	26.1	46.0	-19.9	
bb	V	3860.000	41.9	33.5	1.9	22.1	9.5	45.7	54.0	-8.3	
	V	28500.000	38.6	47.0	4.1	34.9	9.5	45.3	54.0	-8.7	

Conducted Emissions / Interference

Table: 4

Company: Harmonix

Model: Patch Antenna - SGM

Job No.: J20013614

Date: 05/25/00

Standard: FCC15

Class: B

Group: None

Notes:

Tested by: Michael Peters

Location: Site 3C

Detector: HP 8542E

Cable(s): 3C-3m 3-1-00

Limiter: yes

System Loss: Includes the Cable and LISN loss.

INITIAL

Frequency MHz	Reading Side A dB	Reading Side B dB	Attenuator Factor dB	System Loss dB	Quasi-Peak		
					Net dB(uV)	Limit dB(uV)	Margin dB
0.483	31.1		20.0	0.9	52.0	48.0	+4.0
0.690	25.3		20.0	0.9	46.2	48.0	-1.8
0.897	29.8		20.0	0.9	50.7	48.0	+2.7
2.829	29.6		20.0	0.9	50.5	48.0	+2.5
6.008	31.2		20.0	0.7	51.9	48.0	+3.9
26.660	32.8		20.0	0.1	52.9	48.0	+4.9
26.150	34.1		20.0	0.1	54.2	48.0	+6.2

FINAL

New Power Supply with 22,000 pF Y caps (and ferrite as installed yesterday)

Frequency MHz	Reading Side A dB	Reading Side B dB	Attenuator Factor dB	System Loss dB	Quasi-Peak		
					Net dB(uV)	Limit dB(uV)	Margin dB
15.200	23.3	21.7	20.0	0.4	43.7	48.0	-4.3
15.320	22.2	22.3	20.0	0.4	42.7	48.0	-5.3
14.412	17.9	21.3	20.0	0.4	41.7	48.0	-6.3
15.917	22.3	23.6	20.0	0.4	44.0	48.0	-4.0
15.148	22.5	19.5	20.0	0.4	42.9	48.0	-5.1
8.925	14.4	20.2	20.0	0.7	40.9	48.0	-7.1
11.978	12.5	14.0	20.0	0.4	34.4	48.0	-13.6
14.575	21.4	20.3	20.0	0.4	41.8	48.0	-6.2

XI - Bandwidth

The following plot(s) show bandwidth measurements made.

Patch Antenna Radio

Occupied Bandwidth - Low Channel

Center Frequency: 59166.5 MHz

Resolution Bandwidth: 1000 kHz

Video Bandwidth: 7000 kHz

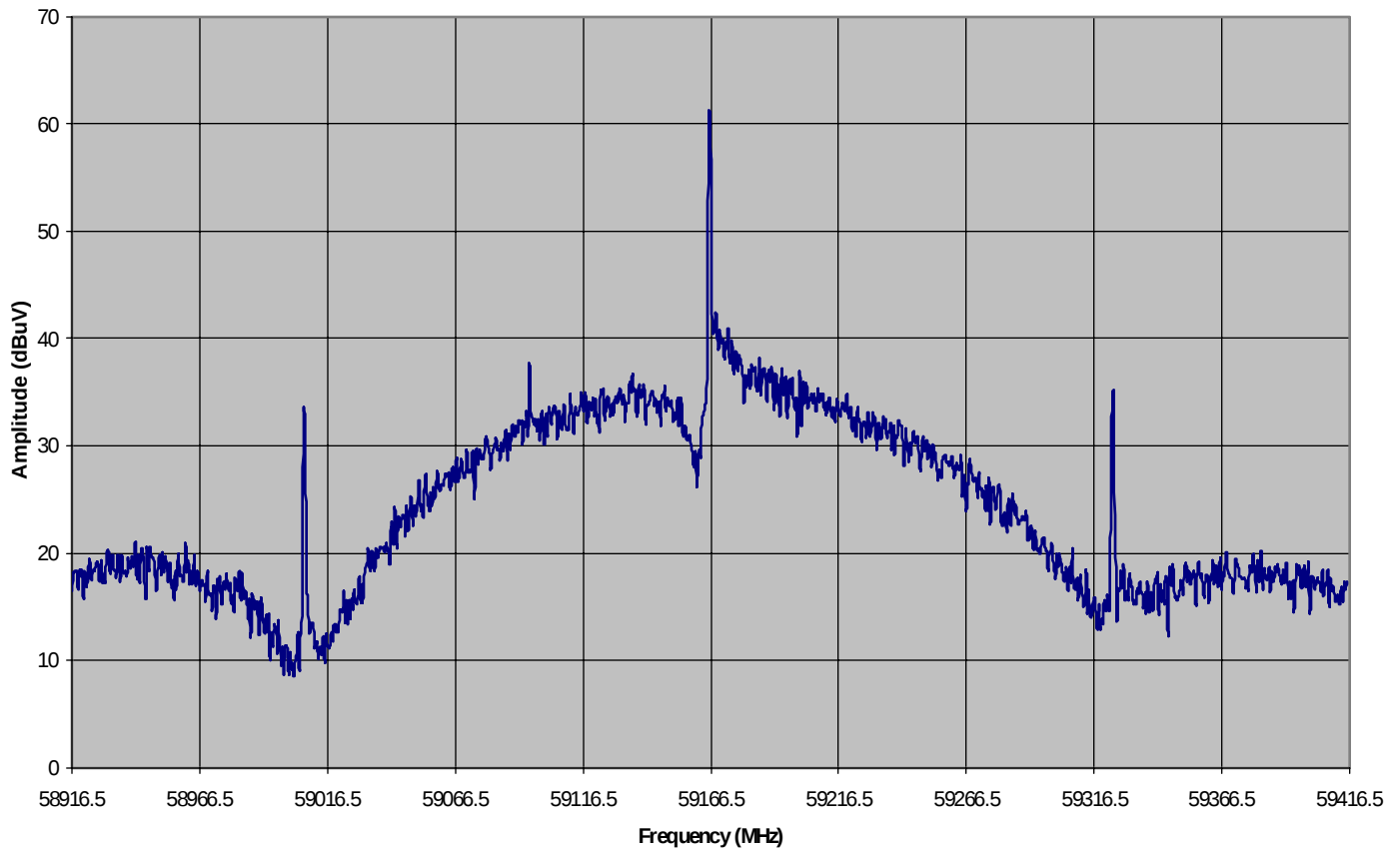
Reference Level: 87 dBuV

Attenuation: 0 dB

Span: 500 MHz

Occupied BW: 313 kHz

Date: May 25, 2000



Occupied Bandwidth - Mid Channel

Center Frequency: 61382 MHz

Resolution Bandwidth: 1000 kHz

Video Bandwidth: 7000 kHz

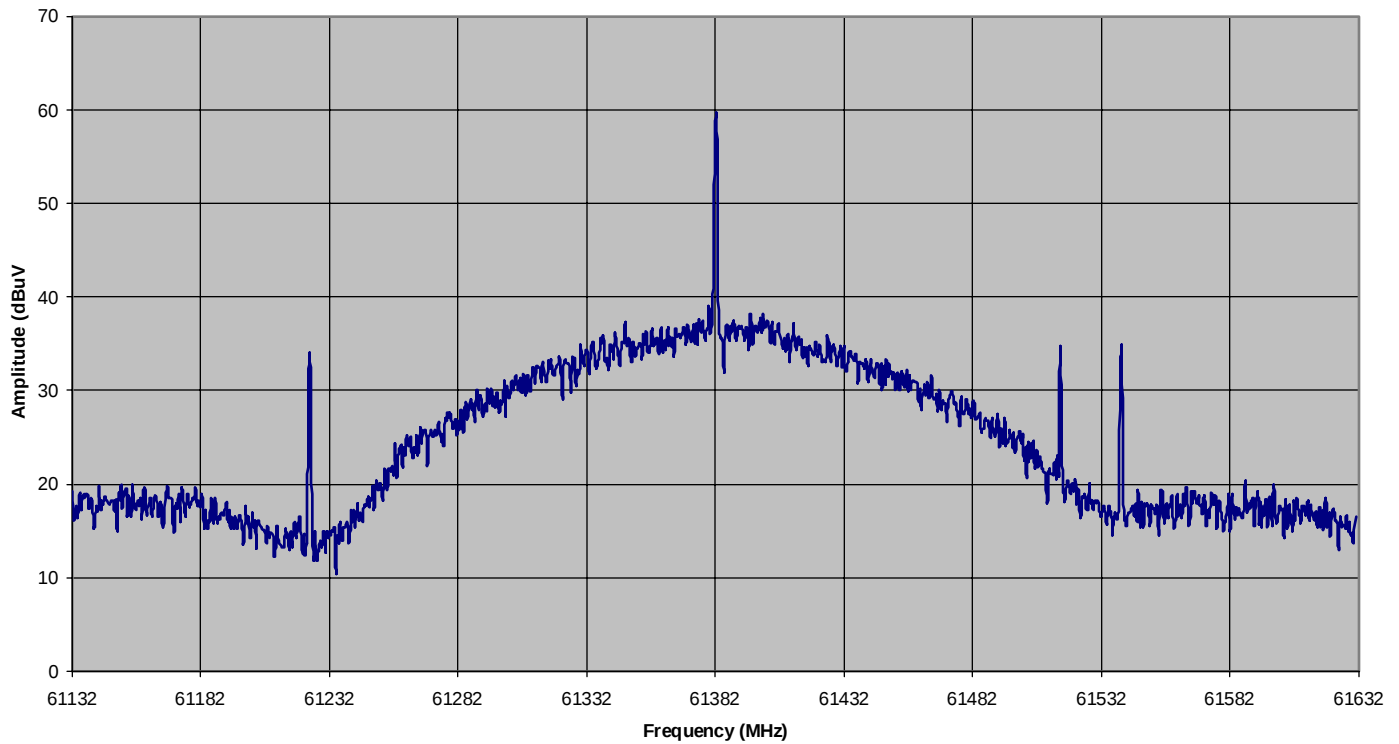
Reference Level: 87 dBuV

Attenuation: 0 dB

Span: 500 MHz

Occupied BW: 315 kHz

Date: May 25, 2000



Occupied Bandwidth - High Channel

Center Frequency: 63600 MHz

Resolution Bandwidth: 1000 kHz

Video Bandwidth: 7000 kHz

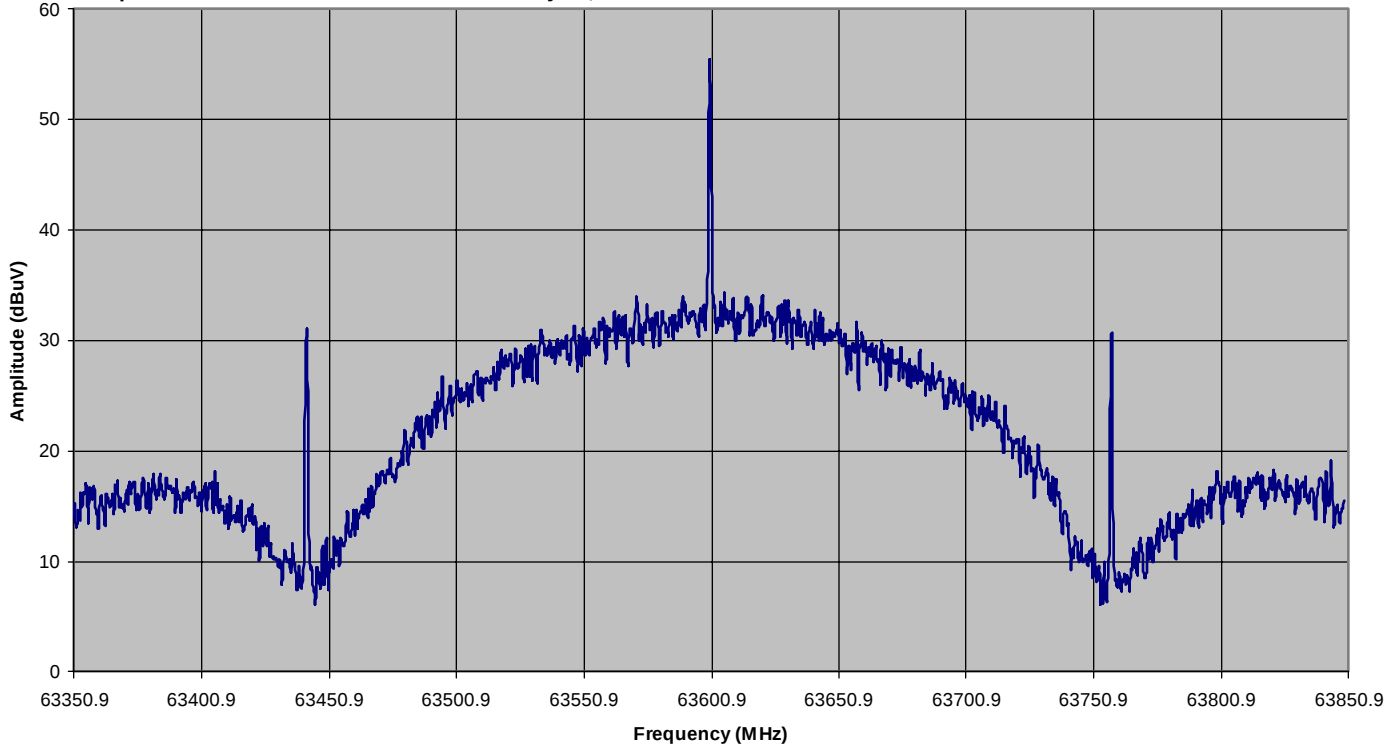
Reference Level: 87 dBuV

Attenuation: 0 dB

Span: 500 MHz

Occupied BW: 376 kHz

Date: May 25, 2000



Parabolic Antenna Radio

Occupied Bandwidth - Low Channel

Center Frequency: 59848 MHz

Resolution Bandwidth: 1000 kHz

Video Bandwidth: 7000 kHz

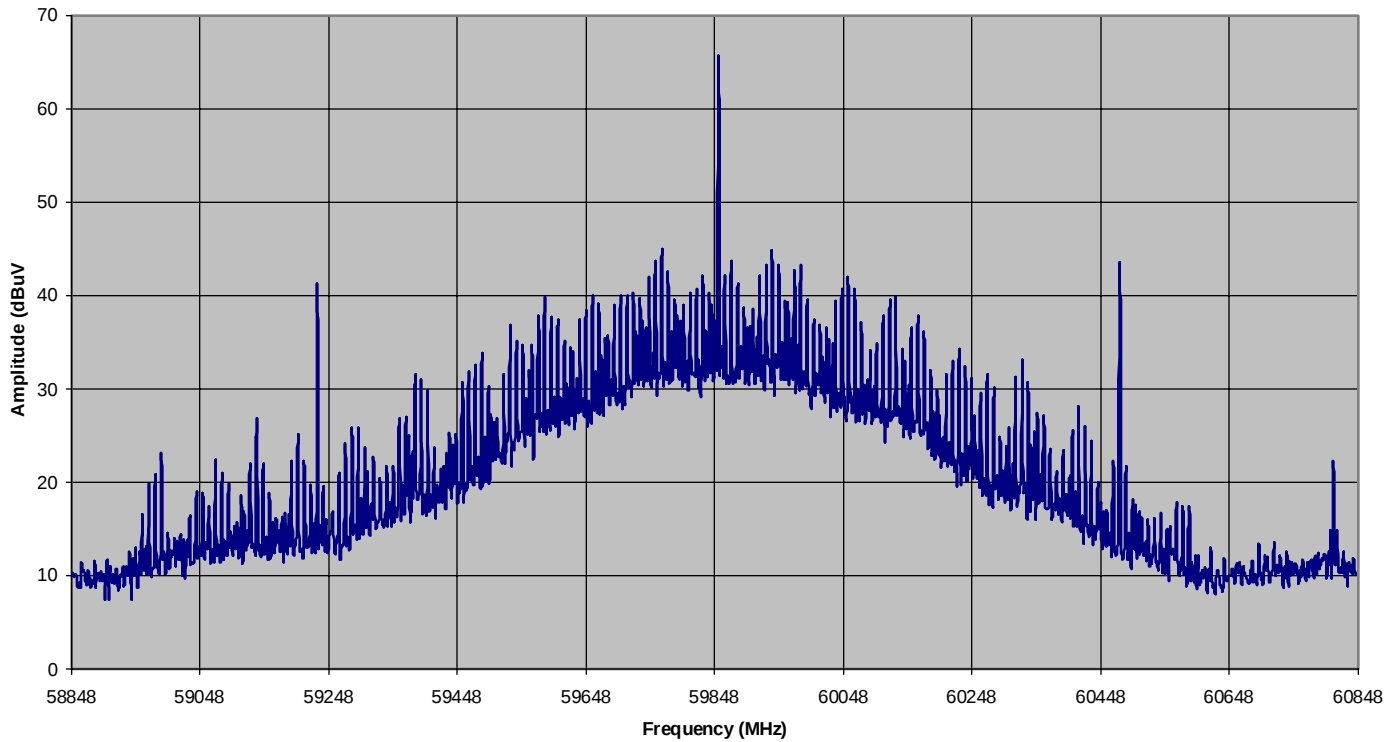
Reference Level: 95.9 dBuV

Attenuation: 0 dB

Span: 2 GHz

Occupied BW: 1148 kHz

Date: May 25, 2000



Occupied Bandwidth - Low Channel

Center Frequency: 61852 MHz

Resolution Bandwidth: 1000 kHz

Video Bandwidth: 7000 kHz

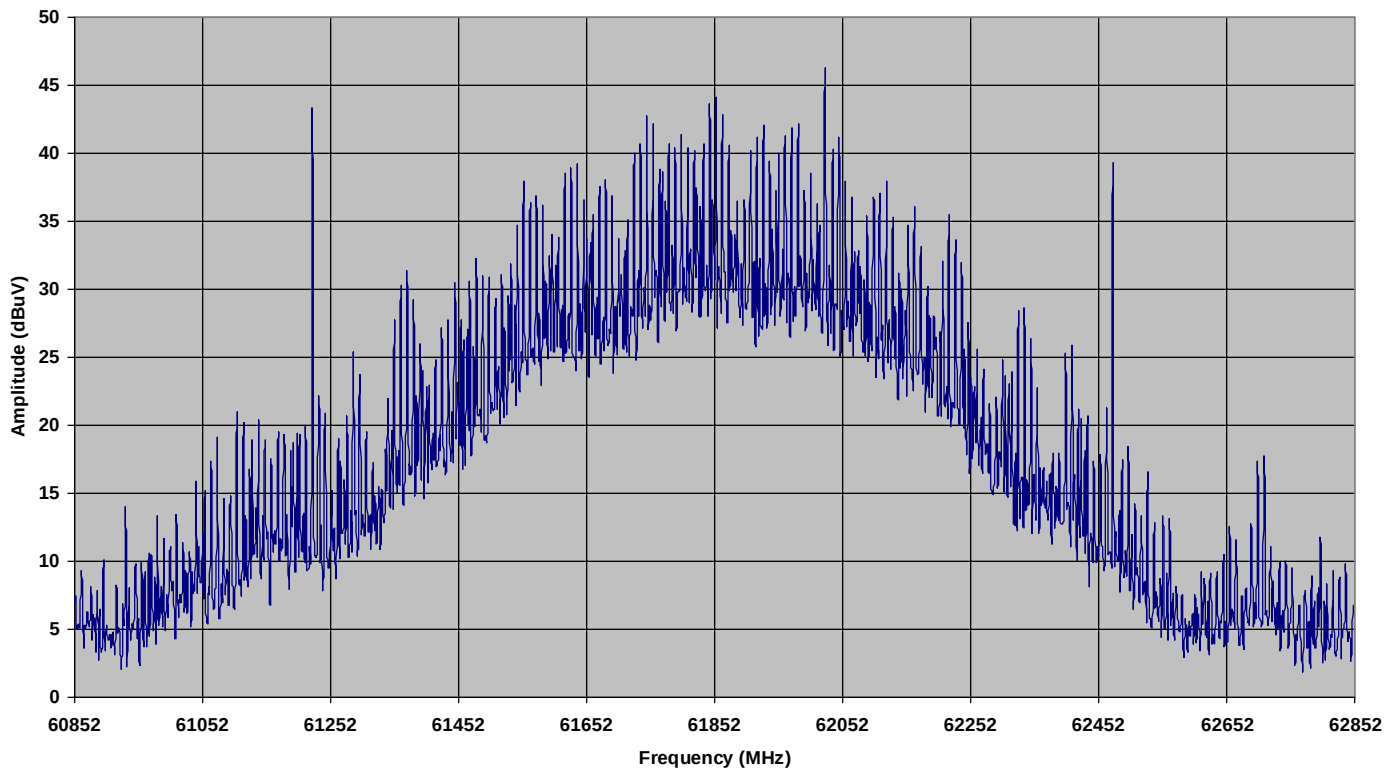
Reference Level: 87 dBuV

Attenuation: 0 dB

Span: 2 GHz

Occupied BW: 1256 kHz

Date: May 25, 2000



Intertek Testing Services NA, Inc.

XII - Frequency Deviation

Date of Test	May 26 & 29, 2000	Test Engineer	Michael Peters	
Test Site	Safety Lab	Temperature/Humidity	-20 to 50 °C	35 %

Frequency Stability over Temperature

Maximum Allowed Frequency Deviation:		10 MHz			
Temperature (°C)		Reference Frequency (MHz)	Measured Frequency (MHz)	Deviation (Hz)	Pass/Fail?
-20	@ 0 min	59,162,828,479	59,163,286,596	-458,117	Pass
-20	@ 2 min	59,162,828,479	59,163,287,351	-458,872	Pass
-20	@ 5 min	59,162,828,479	59,163,296,242	-467,763	Pass
-20	@ 10 min	59,162,828,479	59,163,305,020	-476,541	Pass
20		59,162,828,479			
+50	@ 0 min	59,162,828,479	59,162,583,632	244,847	Pass
+50	@ 2 min	59,162,828,479	59,162,523,962	304,517	Pass
+50	@ 5 min	59,162,828,479	59,162,490,007	338,472	Pass
+50	@ 10 min	59,162,828,479	59,162,439,465	389,014	Pass

Frequency Stability over Voltage

Maximum Allowed Frequency Deviation:		10 MHz			
		Rated Input Voltage:		120 VAC	
Voltage (VAC)		Reference Frequency (MHz)	Measured Frequency (MHz)	Deviation (Hz)	Pass/Fail?
102	@ 0 min	59,162,828,479	59,163,094,517	-266,038	Pass
102	@ 2 min	59,162,828,479	59,163,076,843	-248,264	Pass
102	@ 5 min	59,162,828,479	59,163,032,101	-203,622	Pass
102	@ 10 min	59,162,828,479	59,162,954,073	-125,594	Pass
120		59,162,828,479			
138	@ 0 min	59,162,828,479	59,162,948,709	-120,230	Pass
138	@ 2 min	59,162,828,479	59,162,901,701	-73,222	Pass
138	@ 5 min	59,162,828,479	59,162,881,431	-52,952	Pass
138	@ 10 min	59,162,828,479	59,162,838,507	-10,028	Pass

Intertek Testing Services NA, Inc.

Date of Test	May 26 & 29, 2000	Test Engineer	Michael Peters
Test Site	Safety Lab	Temperature/Humidity	-20 to 50 °C 35 %

Frequency Stability over Temperature

Maximum Allowed Frequency Deviation:		10 MHz			
Temperature (°C)		Reference Frequency (MHz)	Measured Frequency (MHz)	Deviation (Hz)	Pass/Fail?
-20	@ 0 min	63,598,076,053	63,598,145,509	-69,456	Pass
-20	@ 2 min	63,598,076,053	63,598,142,113	-66,060	Pass
-20	@ 5 min	63,598,076,053	63,598,145,443	-69,390	Pass
-20	@ 10 min	63,598,076,053	63,598,165,672	-89,619	Pass
20		63,598,076,053			
+50	@ 0 min	63,598,076,053	63,597,538,609	537,444	Pass
+50	@ 2 min	63,598,076,053	63,597,488,206	587,847	Pass
+50	@ 5 min	63,598,076,053	63,597,448,977	627,076	Pass
+50	@ 10 min	63,598,076,053	63,597,524,735	551,318	Pass

Frequency Stability over Voltage

Maximum Allowed Frequency Deviation:		10 MHz			
Rated Input Voltage:		120 VAC			
Voltage (VAC)		Reference Frequency (MHz)	Measured Frequency (MHz)	Deviation (Hz)	Pass/Fail?
102	@ 0 min	63,598,076,053	63,598,041,400	34,653	Pass
102	@ 2 min	63,598,076,053	63,598,018,138	57,915	Pass
102	@ 5 min	63,598,076,053	63,597,983,159	92,894	Pass
102	@ 10 min	63,598,076,053	63,597,919,044	157,009	Pass
120		63,598,076,053			
138	@ 0 min	63,598,076,053	63,597,901,206	174,847	Pass
138	@ 2 min	63,598,076,053	63,597,863,001	213,052	Pass
138	@ 5 min	63,598,076,053	63,597,848,409	227,644	Pass
138	@ 10 min	63,598,076,053	63,597,817,169	258,884	Pass

Annex A – Response to FCC Comments

Harmonix FCC ID: O2700000-30-30

The following information is submitted pursuant to requests from the FCC for further information, Correspondence Reference numbers 15203.

1) Indicate how average power density measurement was calculated, based on 15.255(b)(5).

The radio transmits pulsed signals. The peak power is equal to the un-modulated High State, which is the spectrum analyzer reading of the carrier only (CW). The average power depends on the data transmitted through the radio. Modulation during test was OC3 (155.5Mbps) CCITT 2²³ –1 pseudo random sequence data pattern. (For a detailed analysis, refer to the detailed description of GigaLINK™ operation contained in the confidential exhibit.)

Field strength measurements were taken at 500 kHz increments across a band > 160 MHz centered on the carrier frequency. The resolution bandwidth of the Tektronix 2784 was 1 MHz, and the video bandwidth was 7 MHz, the maximum available on the instrument. Antenna position and polarization were maximized prior to downloading the data points into a file. A standard-gain (25 dB) horn antenna WR-15-7025 and harmonic mixer MHB-15-R00W0 were used. A plot of raw data is given at the end of this annex in an Excel file.

a) individual data points from the Tektronix spectrum analyzer included frequency (MHz) and signal amplitude (dBm). Conversion loss of the mixer was programmed into the analyzer reading.

b) the dBm readings were converted to dBμV using $\text{dBm} = \text{dB}\mu\text{V} - 120$.

c) the dBμV readings were converted to dBμV/m at 3m using the antenna factor, in the range 40.6 but computed exactly at each frequency.

d) the dBμV/m values were converted to net μV/m using antilog (dBμV/20).

e) an oversampling correction (0.7*reading) was applied to each value, to account for the overlap between adjacent readings taken 500 kHz apart with a 1 MHz resolution bandwidth.

f) the corrected readings were converted to units of power density using the equation:

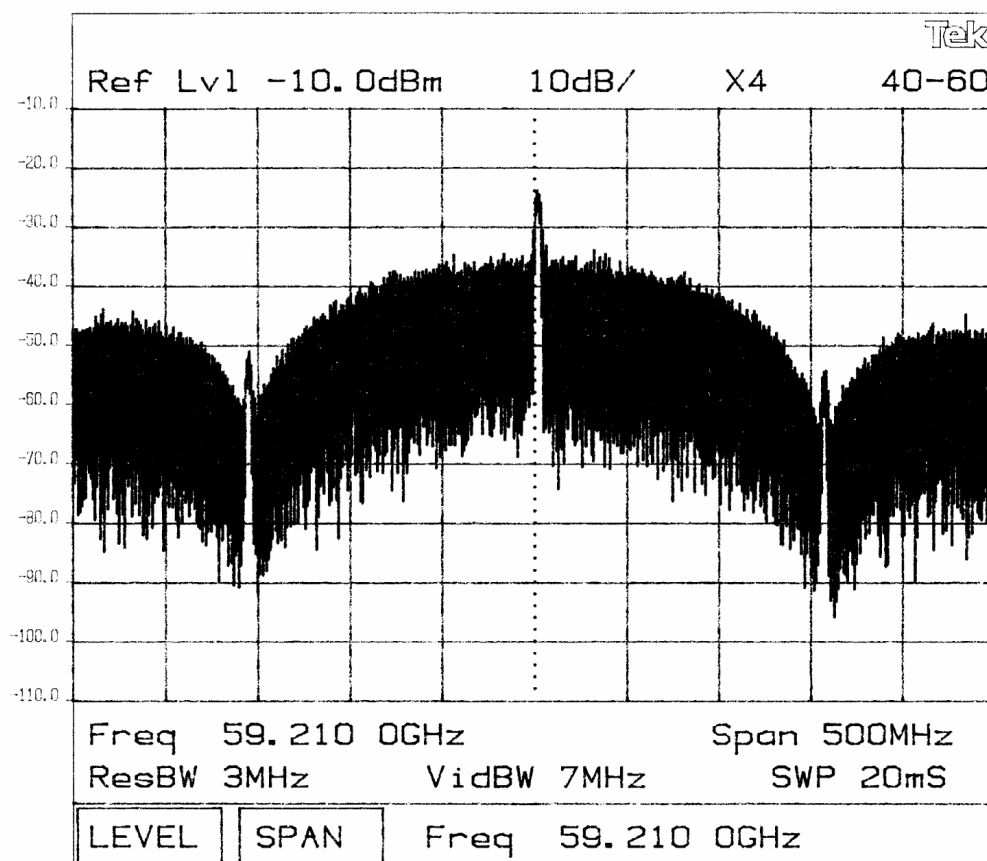
$$\text{pfd } (\mu\text{W}/\text{cm}^2) = E^2(\mu\text{V}/\text{m})/(3.77 \times 10^{12})$$

g) the individual pfd values were summed to yield the total measured power density, 1.1 μW/cm², shown in the item 4) of this annex.

2) The device appears to operate in the 59 – 59.05 GHz restricted band.

a) Channel selection on this device is factory set, and was inadvertently set to a lower channel than it should have been. The manufacturer will restrict operation of the transmitter to the lowest channel carrier frequency 59.210 GHz, which avoids spurious emissions in the restricted band. Plots of the emissions from the 59.210 GHz channel are given at the end of this annex, to indicate compliance, and one is shown below. The formula which applies is (lowest carrier frequency) – (data rate) = lowest emission. For the case of OC-3 (155 MHz) the formula yields 59210 MHz – 155 MHz = 59055 MHz.

The plots at the end of this annex also indicate compliance with 15.31(e) emission variations with temperature variations. The three wide bandwidth plots are derived from 85%, 100%, and 115% nominal line voltage. No change of emission level is observed.



3) Peak transmitter output power pursuant to 15.255(e)(2).

The radio transmits pulsed signals. The peak power is equal to the unmodulated High State, which is the spectrum analyzer reading of the carrier only (CW). The average power depends on the data transmitted through the radio. Modulation during test was OC3 (155.5Mbps) CCITT 2²³ -1 pseudo random sequence data pattern. (For a detailed analysis, refer to the detailed description of GigaLINK™ operation contained in the confidential exhibit.) Peak and average power and were measured by the method described in point #1 page 39. The Tektronix spectrum analyzer provided data points taken at 1 MHz resolution bandwidth, at 500 kHz increments. The individual data points were summed, after correction for oversampling, to calculate peak output power. The maximum analyzer video bandwidth is 7 MHz, and this was used for the measurements.

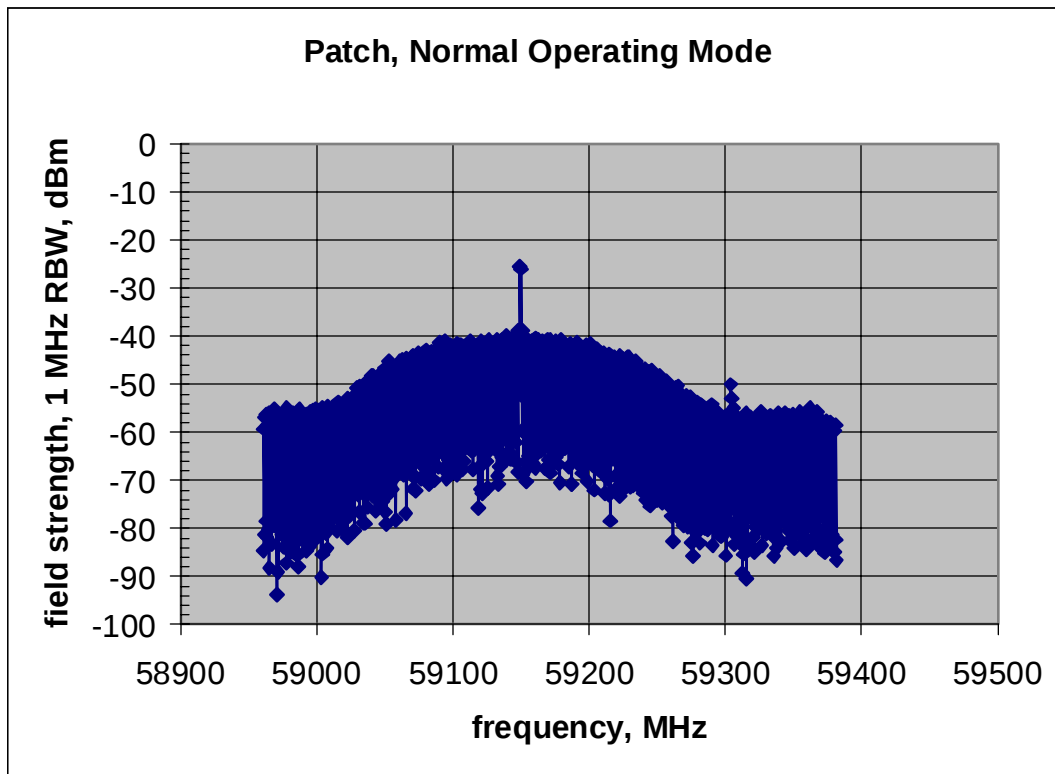
Owing to the nature of the construction of the transmitter, the patch antenna is an integral part of the assembly and cannot be removed for testing. Peak power density was used to estimate total output power in the following manner:

- a) power density of $1.1 \mu\text{W}/\text{cm}^2$ was derived in item #1 page 39.
- b) the patch antenna array area is estimated as 81 cm^2 . Divergence of the radiated beam is 3° , adding 0.32m of diameter at a measurement distance of 3m. The total beam area at 3m is thus estimated as 93.3 cm^2 . Using 100 cm^2 as a conservative figure, the output power is calculated from: output power = power density x beam area, or $1.1 \mu\text{W}/\text{cm}^2 \times 100 \text{ cm}^2 = 110 \mu\text{W}$.

4) Emission bandwidth per 15.255(e)(1).

The modulated output of the transmitter produces a narrow carrier, approximately 100 kHz wide, riding on a broad shoulder of modulation products. Plots at the end of this section illustrate the shape and nature of the carrier. Applying the 6 dB emission bandwidth definition found in 15.255(e)(1) would result in a calculated power limit of $500 \text{ mW} \times (100 \text{ kHz}/100 \text{ MHz})$ or 0.5 mW.

Instead, the emission bandwidth is set to the carrier and modulation envelope of ~ 160 MHz for the purpose of calculating power density and output power. A separate measurement of occupied bandwidth is also attached, and indicates a bandwidth of 406 MHz for the plotted patch antenna emission. The following chart is derived from the measurement data shown in the accompanying Excel Spreadsheet(s).



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Patch Antenna Emission Data

patch antenna transmitter

f, MHz	dBm	uV	cum uV	% total	
58960.5	-84.6	13.1828			
58961	-59.3	242.6696	242.6696	0.0005	
58961.5	-81.3	19.2756	261.9453	0.0006	
58962	-57	316.2396	578.1848	0.0013	
58962.5	-78.4	26.9159	605.1007	0.0014	
58963	-56.3	342.7807	947.8815	0.0021	
58963.5	-81.7	18.4081	966.2895	0.0022	
58964	-58.4	269.1632	1235.4528	0.0028	
58964.5	-80.2	21.8781	1257.3308	0.0028	
58965	-56	354.8269	1612.1577	0.0036	
58965.5	-88.2	8.7098	1620.8675	0.0036	
58966	-56.6	331.1436	1952.0110	0.0044	
58966.5	-83.2	15.4884	1967.4995	0.0044	
58967	-57.9	285.1123	2252.6117	0.0051	0.50%
58967.5	-77.3	30.5499	2283.1616	0.0051	
58968	-58.8	257.0488	2540.2104	0.0057	
58968.5	-79.5	23.7142	2563.9246	0.0058	
58969	-55.1	393.5653	2957.4899	0.0067	
58969.5	-77.3	30.5499	2988.0398	0.0067	
58970	-57.2	309.0410	3297.0808	0.0074	
58970.5	-93.7	4.6239	3301.7047	0.0074	
58971	-57.8	288.4137	3590.1184	0.0081	
58971.5	-89.1	7.8525	3597.9709	0.0081	
58972	-57.9	285.1123	3883.0831	0.0087	
58972.5	-80.3	21.6276	3904.7108	0.0088	
58973	-56.9	319.9015	4224.6122	0.0095	
58973.5	-78.4	26.9159	4251.5281	0.0096	
58974	-57.1	312.6196	4564.1477	0.0103	
58974.5	-81.3	19.2756	4583.4233	0.0103	
58975	-56.6	331.1436	4914.5669	0.0111	
58975.5	-83.9	14.2892	4928.8561	0.0111	
58976	-57.1	312.6196	5241.4756	0.0118	
58976.5	-80.2	21.8781	5263.3537	0.0118	
58977	-58.8	257.0488	5520.4025	0.0124	
58977.5	-87.2	9.7725	5530.1750	0.0124	
58978	-54.8	407.3961	5937.5711	0.0134	
58978.5	-81.9	17.9890	5955.5602	0.0134	
58979	-57.3	305.5034	6261.0636	0.0141	
58979.5	-81.7	18.4081	6279.4717	0.0141	
58980	-55.8	363.0919	6642.5636	0.0149	
58980.5	-84.8	12.8827	6655.4463	0.0150	
58981	-57.2	309.0410	6964.4873	0.0157	
58981.5	-80.6	20.8934	6985.3807	0.0157	
58982	-56	354.8269	7340.2076	0.0165	
58982.5	-82.6	16.5962	7356.8037	0.0165	

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58983	-58.5	266.0821	7622.8859	0.0171
58983.5	-84.9	12.7352	7635.6211	0.0172
58984	-56.6	331.1436	7966.7647	0.0179
58984.5	-76.3	34.2776	8001.0422	0.0180
58985	-57.8	288.4137	8289.4560	0.0186
58985.5	-85.6	11.7492	8301.2051	0.0187
58986	-58.5	266.0821	8567.2872	0.0193
58986.5	-87.9	9.0158	8576.3031	0.0193
58987	-55.2	389.0602	8965.3632	0.0202
58987.5	-75.7	36.7291	9002.0923	0.0202
58988	-57.1	312.6196	9314.7119	0.0209
58988.5	-82.2	17.3783	9332.0902	0.0210
58989	-58.8	257.0488	9589.1390	0.0216
58989.5	-78.1	27.8618	9617.0009	0.0216
58990	-56.8	323.6058	9940.6066	0.0224
58990.5	-81.3	19.2756	9959.8822	0.0224
58991	-57.1	312.6196	10272.5018	0.0231
58991.5	-73	50.1200	10322.6218	0.0232
58992	-56.3	342.7807	10665.4025	0.0240
58992.5	-84.7	13.0319	10678.4344	0.0240
58993	-56.4	338.8569	11017.2914	0.0248
58993.5	-78.2	27.5429	11044.8342	0.0248
58994	-57	316.2396	11361.0738	0.0256
58994.5	-83.7	14.6220	11375.6958	0.0256
58995	-55.6	371.5495	11747.2453	0.0264
58995.5	-79.1	24.8318	11772.0771	0.0265
58996	-57.2	309.0410	12081.1181	0.0272
58996.5	-78	28.1844	12109.3026	0.0272
58997	-55.4	380.2040	12489.5066	0.0281
58997.5	-81.1	19.7246	12509.2312	0.0281
58998	-55.6	371.5495	12880.7807	0.0290
58998.5	-79.6	23.4428	12904.2234	0.0290
58999	-55.3	384.6066	13288.8300	0.0299
58999.5	-82.1	17.5796	13306.4096	0.0299
59000	-56.5	334.9780	13641.3876	0.0307
59000.5	-76.2	34.6745	13676.0621	0.0308
59001	-55.4	380.2040	14056.2661	0.0316
59001.5	-81.8	18.1974	14074.4635	0.0317
59002	-58.3	272.2800	14346.7435	0.0323
59002.5	-80.4	21.3800	14368.1235	0.0323
59003	-55.5	375.8518	14743.9754	0.0332
59003.5	-90.2	6.9184	14750.8938	0.0332
59004	-55	398.1226	15149.0164	0.0341
59004.5	-85.4	12.0228	15161.0392	0.0341
59005	-57.4	302.0063	15463.0456	0.0348
59005.5	-77.4	30.2002	15493.2457	0.0348
59006	-56	354.8269	15848.0726	0.0356
59006.5	-81	19.9530	15868.0256	0.0357
59007	-57.4	302.0063	16170.0320	0.0364
59007.5	-84.2	13.8041	16183.8360	0.0364

Intertek Testing Services NA, Inc.

59008	-54.6	416.8857	16600.7217	0.0373
59008.5	-79.3	24.2666	16624.9883	0.0374
59009	-56.3	342.7807	16967.7690	0.0382
59009.5	-77.5	29.8545	16997.6235	0.0382
59010	-58.9	254.1064	17251.7299	0.0388
59010.5	-75.8	36.3086	17288.0386	0.0389
59011	-55.8	363.0919	17651.1305	0.0397
59011.5	-75.8	36.3086	17687.4391	0.0398
59012	-56	354.8269	18042.2660	0.0406
59012.5	-77.7	29.1749	18071.4409	0.0406
59013	-57.9	285.1123	18356.5532	0.0413
59013.5	-77.3	30.5499	18387.1030	0.0414
59014	-55	398.1226	18785.2256	0.0422
59014.5	-80.6	20.8934	18806.1190	0.0423
59015	-55.8	363.0919	19169.2109	0.0431
59015.5	-77.7	29.1749	19198.3858	0.0432
59016	-53.6	467.7538	19666.1396	0.0442
59016.5	-77.3	30.5499	19696.6895	0.0443
59017	-55.1	393.5653	20090.2548	0.0452
59017.5	-79.9	22.6469	20112.9017	0.0452
59018	-56	354.8269	20467.7286	0.0460
59018.5	-76.9	31.9897	20499.7182	0.0461
59019	-56	354.8269	20854.5451	0.0469
59019.5	-77.6	29.5127	20884.0578	0.0470
59020	-55.8	363.0919	21247.1498	0.0478
59020.5	-80.4	21.3800	21268.5298	0.0478
59021	-56.9	319.9015	21588.4313	0.0486
59021.5	-76.7	32.7348	21621.1661	0.0486
59022	-52.8	512.8821	22134.0482	0.0498
59022.5	-81.9	17.9890	22152.0372	0.0498
59023	-54.6	416.8857	22568.9229	0.0508
59023.5	-77.3	30.5499	22599.4728	0.0508
59024	-54.4	426.5962	23026.0690	0.0518
59024.5	-71.5	59.5678	23085.6368	0.0519
59025	-53.3	484.1917	23569.8286	0.0530
59025.5	-76.3	34.2776	23604.1061	0.0531
59026	-54.3	431.5360	24035.6421	0.0541
59026.5	-72.5	53.0898	24088.7320	0.0542
59027	-53.4	478.6492	24567.3812	0.0553
59027.5	-80.4	21.3800	24588.7612	0.0553
59028	-52.4	537.0537	25125.8149	0.0565
59028.5	-69.2	77.6269	25203.4418	0.0567
59029	-50.7	653.1580	25856.5997	0.0581
59029.5	-70.2	69.1850	25925.7847	0.0583
59030	-52.8	512.8821	26438.6668	0.0595
59030.5	-73	50.1200	26488.7868	0.0596
59031	-50.4	676.1115	27164.8983	0.0611
59031.5	-76.5	33.4973	27198.3956	0.0612
59032	-52.8	512.8821	27711.2777	0.0623
59032.5	-71.2	61.6611	27772.9389	0.0625

Intertek Testing Services NA, Inc.

59033	-51.8	575.4636	28348.4025	0.0638
59033.5	-70.4	67.6101	28416.0126	0.0639
59034	-50.2	691.8603	29107.8729	0.0655
59034.5	-78.8	25.7045	29133.5774	0.0655
59035	-51	630.9837	29764.5611	0.0669
59035.5	-79	25.1194	29789.6804	0.0670
59036	-50.8	645.6813	30435.3617	0.0684
59036.5	-71.7	58.2119	30493.5736	0.0686
59037	-49.3	767.3945	31260.9681	0.0703
59037.5	-75.6	37.1544	31298.1225	0.0704
59038	-50.2	691.8603	31989.9827	0.0719
59038.5	-71	63.0974	32053.0801	0.0721
59039	-49.7	732.8558	32785.9360	0.0737
59039.5	-69.4	75.8599	32861.7959	0.0739
59040	-48.2	871.0018	33732.7976	0.0759
59040.5	-72.8	51.2874	33784.0851	0.0760
59041	-48.3	861.0314	34645.1165	0.0779
59041.5	-73.3	48.4185	34693.5349	0.0780
59042	-50.3	683.9406	35377.4755	0.0796
59042.5	-72.5	53.0898	35430.5653	0.0797
59043	-49.1	785.2695	36215.8348	0.0814
59043.5	-76.4	33.8852	36249.7200	0.0815
59044	-49.8	724.4668	36974.1869	0.0832
59044.5	-70.3	68.3930	37042.5799	0.0833
59045	-48.4	851.1752	37893.7551	0.0852
59045.5	-72.2	54.9555	37948.7106	0.0853
59046	-48.7	822.2784	38770.9890	0.0872
59046.5	-74.8	40.7390	38811.7280	0.0873
59047	-48.5	841.4318	39653.1598	0.0892
59047.5	-67.9	90.1597	39743.3196	0.0894
59048	-49.7	732.8558	40476.1754	0.0910
59048.5	-74.3	43.1530	40519.3284	0.0911
59049	-48	891.2901	41410.6185	0.0931
59049.5	-71.5	59.5678	41470.1863	0.0933
59050	-46.7	1035.1887	42505.3750	0.0956
59050.5	-76.5	33.4973	42538.8723	0.0957
59051	-47.6	933.2956	43472.1679	0.0978
59051.5	-79.1	24.8318	43496.9998	0.0978
59052	-47.9	901.6109	44398.6106	0.0998
59052.5	-72.7	51.8813	44450.4919	0.1000
59053	-45.1	1244.5720	45695.0640	0.1028
59053.5	-70.3	68.3930	45763.4570	0.1029
59054	-48.1	881.0876	46644.5446	0.1049
59054.5	-72	56.2356	46700.7802	0.1050
59055	-46.6	1047.1757	47747.9559	0.1074
59055.5	-71.8	57.5455	47805.5014	0.1075
59056	-47.3	966.0939	48771.5952	0.1097
59056.5	-69.8	72.4456	48844.0408	0.1098
59057	-47.5	944.1027	49788.1436	0.1120
59057.5	-67.3	96.6079	49884.7515	0.1122

Intertek Testing Services NA, Inc.

59058	-49	794.3626	50679.1141	0.1140
59058.5	-78.3	27.2276	50706.3417	0.1140
59059	-46.7	1035.1887	51741.5304	0.1164
59059.5	-67.2	97.7266	51839.2570	0.1166
59060	-46.8	1023.3389	52862.5959	0.1189
59060.5	-67.2	97.7266	52960.3225	0.1191
59061	-45.3	1216.2419	54176.5645	0.1218
59061.5	-66	112.2053	54288.7697	0.1221
59062	-46.9	1011.6248	55300.3945	0.1244
59062.5	-67.7	92.2598	55392.6544	0.1246
59063	-45	1258.9836	56651.6379	0.1274
59063.5	-68.9	80.3549	56731.9928	0.1276
59064	-45.6	1174.9513	57906.9442	0.1302
59064.5	-66.6	104.7160	58011.6602	0.1305
59065	-45.3	1216.2419	59227.9021	0.1332
59065.5	-76.8	32.3601	59260.2622	0.1333
59066	-44.8	1288.3093	60548.5715	0.1362
59066.5	-67	100.0030	60648.5745	0.1364
59067	-47.6	933.2956	61581.8701	0.1385
59067.5	-68.1	88.1074	61669.9775	0.1387
59068	-46.3	1083.9760	62753.9535	0.1411
59068.5	-61.7	184.0834	62938.0369	0.1415
59069	-47.1	988.5972	63926.6341	0.1438
59069.5	-68.8	81.2854	64007.9195	0.1439
59070	-44.4	1349.0258	65356.9453	0.1470
59070.5	-71.8	57.5455	65414.4908	0.1471
59071	-43.9	1428.9612	66843.4520	0.1503
59071.5	-69	79.4351	66922.8871	0.1505
59072	-45.2	1230.3254	68153.2125	0.1533
59072.5	-72.2	54.9555	68208.1680	0.1534
59073	-46.9	1011.6248	69219.7928	0.1557
59073.5	-65.5	118.8539	69338.6467	0.1559
59074	-45.2	1230.3254	70568.9721	0.1587
59074.5	-65.2	123.0307	70692.0028	0.1590
59075	-43.6	1479.1783	72171.1811	0.1623
59075.5	-61.3	192.7591	72363.9402	0.1627
59076	-44.3	1364.6469	73728.5871	0.1658
59076.5	-69.7	73.2845	73801.8716	0.1660
59077	-43.9	1428.9612	75230.8327	0.1692
59077.5	-62.8	162.1864	75393.0191	0.1696
59078	-44	1412.6039	76805.6230	0.1727
59078.5	-67.1	98.8582	76904.4812	0.1730
59079	-45.3	1216.2419	78120.7231	0.1757
59079.5	-64.1	139.6413	78260.3644	0.1760
59080	-42.9	1603.3220	79863.6864	0.1796
59080.5	-69.1	78.5258	79942.2122	0.1798
59081	-44.4	1349.0258	81291.2380	0.1828
59081.5	-68.3	86.1019	81377.3399	0.1830
59082	-44.8	1288.3093	82665.6492	0.1859
59082.5	-70.7	65.3148	82730.9640	0.1861

Intertek Testing Services NA, Inc.

59083	-43.4	1513.6330	84244.5970	0.1895
59083.5	-65.7	116.1484	84360.7454	0.1897
59084	-43.1	1566.8257	85927.5711	0.1932
59084.5	-61	199.5331	86127.1042	0.1937
59085	-43.6	1479.1783	87606.2825	0.1970
59085.5	-65.3	121.6224	87727.9049	0.1973
59086	-43.2	1548.8903	89276.7951	0.2008
59086.5	-70.1	69.9861	89346.7813	0.2009
59087	-45.5	1188.5567	90535.3380	0.2036
59087.5	-63.9	142.8940	90678.2320	0.2039
59088	-42.8	1621.8877	92300.1197	0.2076
59088.5	-64.3	136.4627	92436.5823	0.2079
59089	-44.1	1396.4338	93833.0161	0.2110
59089.5	-67.3	96.6079	93929.6241	0.2112
59090	-41.4	1905.5539	95835.1780	0.2155
59090.5	-62.6	165.9642	96001.1422	0.2159
59091	-42.8	1621.8877	97623.0299	0.2195
59091.5	-62.6	165.9642	97788.9941	0.2199
59092	-43.8	1445.5079	99234.5019	0.2232
59092.5	-63.9	142.8940	99377.3959	0.2235
59093	-41.3	1927.6193	101305.0152	0.2278
59093.5	-67.7	92.2598	101397.2751	0.2280
59094	-41.1	1972.5196	103369.7947	0.2325
59094.5	-65	125.8965	103495.6912	0.2328
59095	-43.8	1445.5079	104941.1990	0.2360
59095.5	-69.7	73.2845	105014.4835	0.2362
59096	-43.2	1548.8903	106563.3738	0.2397
59096.5	-65.8	114.8189	106678.1927	0.2399
59097	-43	1584.9688	108263.1615	0.2435
59097.5	-64	141.2583	108404.4197	0.2438
59098	-41.9	1798.9582	110203.3780	0.2478
59098.5	-63.7	146.2224	110349.6004	0.2482
59099	-42.9	1603.3220	111952.9224	0.2518
59099.5	-66.5	105.9286	112058.8509	0.2520
59100	-43.8	1445.5079	113504.3588	0.2553
59100.5	-68.1	88.1074	113592.4663	0.2555
59101	-44.2	1380.4489	114972.9151	0.2586
59101.5	-64.8	128.8290	115101.7441	0.2589
59102	-43.8	1445.5079	116547.2520	0.2621
59102.5	-68.8	81.2854	116628.5374	0.2623
59103	-41.7	1840.8616	118469.3990	0.2664
59103.5	-64.6	131.8298	118601.2288	0.2667
59104	-43	1584.9688	120186.1976	0.2703
59104.5	-61.1	197.2490	120383.4466	0.2707
59105	-42	1778.3656	122161.8122	0.2747
59105.5	-64.2	138.0428	122299.8550	0.2750
59106	-41.8	1819.7893	124119.6443	0.2791
59106.5	-67.7	92.2598	124211.9042	0.2793
59107	-43	1584.9688	125796.8730	0.2829
59107.5	-66.1	110.9209	125907.7938	0.2832

Intertek Testing Services NA, Inc.

59108	-42.1	1758.0087	127665.8025	0.2871
59108.5	-63.2	154.8867	127820.6892	0.2875
59109	-42.8	1621.8877	129442.5769	0.2911
59109.5	-60	223.8800	129666.4568	0.2916
59110	-42	1778.3656	131444.8224	0.2956
59110.5	-62.1	175.7982	131620.6207	0.2960
59111	-42.6	1659.6666	133280.2872	0.2997
59111.5	-63.2	154.8867	133435.1739	0.3001
59112	-42.6	1659.6666	135094.8405	0.3038
59112.5	-62.2	173.7859	135268.6264	0.3042
59113	-41.2	1949.9402	137218.5666	0.3086
59113.5	-63.9	142.8940	137361.4606	0.3089
59114	-42.7	1640.6684	139002.1290	0.3126
59114.5	-67.7	92.2598	139094.3889	0.3128
59115	-42.3	1717.9912	140812.3801	0.3167
59115.5	-63.7	146.2224	140958.6025	0.3170
59116	-43.6	1479.1783	142437.7808	0.3203
59116.5	-61.5	188.3713	142626.1521	0.3208
59117	-42.3	1717.9912	144344.1434	0.3246
59117.5	-62.9	160.3298	144504.4732	0.3250
59118	-41.8	1819.7893	146324.2625	0.3291
59118.5	-75.7	36.7291	146360.9915	0.3292
59119	-43.6	1479.1783	147840.1698	0.3325
59119.5	-67.1	98.8582	147939.0281	0.3327
59120	-41.9	1798.9582	149737.9863	0.3367
59120.5	-71.9	56.8868	149794.8731	0.3369
59121	-41.1	1972.5196	151767.3927	0.3413
59121.5	-72.7	51.8813	151819.2740	0.3414
59122	-42.6	1659.6666	153478.9406	0.3452
59122.5	-64.4	134.9006	153613.8412	0.3455
59123	-41.5	1883.7411	155497.5822	0.3497
59123.5	-63.6	147.9156	155645.4978	0.3500
59124	-42.6	1659.6666	157305.1644	0.3538
59124.5	-66	112.2053	157417.3697	0.3540
59125	-41.4	1905.5539	159322.9236	0.3583
59125.5	-71.5	59.5678	159382.4914	0.3584
59126	-40.7	2065.4822	161447.9736	0.3631
59126.5	-63.8	144.5486	161592.5222	0.3634
59127	-42.1	1758.0087	163350.5309	0.3674
59127.5	-61.1	197.2490	163547.7799	0.3678
59128	-42.2	1737.8848	165285.6646	0.3717
59128.5	-60.2	218.7838	165504.4484	0.3722
59129	-42.7	1640.6684	167145.1168	0.3759
59129.5	-60.5	211.3562	167356.4731	0.3764
59130	-41.8	1819.7893	169176.2624	0.3805
59130.5	-63.3	153.1137	169329.3761	0.3808
59131	-41.5	1883.7411	171213.1171	0.3850
59131.5	-63.5	149.6284	171362.7456	0.3854
59132	-40.7	2065.4822	173428.2278	0.3900
59132.5	-69.1	78.5258	173506.7536	0.3902

Intertek Testing Services NA, Inc.

59133	-41.5	1883.7411	175390.4946	0.3944
59133.5	-70.9	63.8281	175454.3227	0.3946
59134	-42.4	1698.3254	177152.6481	0.3984
59134.5	-67.1	98.8582	177251.5064	0.3986
59135	-41.4	1905.5539	179157.0602	0.4029
59135.5	-59.8	229.0948	179386.1551	0.4034
59136	-40.6	2089.3995	181475.5546	0.4081
59136.5	-65.1	124.4553	181600.0100	0.4084
59137	-42.3	1717.9912	183318.0012	0.4123
59137.5	-61	199.5331	183517.5343	0.4127
59138	-42	1778.3656	185295.8998	0.4167
59138.5	-65.8	114.8189	185410.7187	0.4170
59139	-39.9	2264.7576	187675.4763	0.4221
59139.5	-64.2	138.0428	187813.5191	0.4224
59140	-40.6	2089.3995	189902.9187	0.4271
59140.5	-62.1	175.7982	190078.7169	0.4275
59141	-40.8	2041.8387	192120.5556	0.4321
59141.5	-64.2	138.0428	192258.5984	0.4324
59142	-42.7	1640.6684	193899.2668	0.4361
59142.5	-65.7	116.1484	194015.4153	0.4363
59143	-40.9	2018.4658	196033.8811	0.4409
59143.5	-65.6	117.4934	196151.3744	0.4411
59144	-42.5	1678.8847	197830.2592	0.4449
59144.5	-65.5	118.8539	197949.1131	0.4452
59145	-41.6	1862.1779	199811.2910	0.4494
59145.5	-62.1	175.7982	199987.0892	0.4498
59146	-40.6	2089.3995	202076.4888	0.4545
59146.5	-66.5	105.9286	202182.4173	0.4547
59147	-39.6	2344.3466	204526.7639	0.4600
59147.5	-68.3	86.1019	204612.8658	0.4602
59148	-38.8	2570.5264	207183.3922	0.4659
59148.5	-39	2512.0137	209695.4060	0.4716
59149	-25.4	12023.3756	221718.7816	0.4986
59149.5	-52.3	543.2725	222262.0540	0.4998
59150	-26	11220.8620	233482.9160	0.5251
59150.5	-59.6	234.4312	233717.3472	0.5256
59151	-38.8	2570.5264	236287.8736	0.5314
59151.5	-68.8	81.2854	236369.1590	0.5316
59152	-41.4	1905.5539	238274.7129	0.5359
59152.5	-68.3	86.1019	238360.8147	0.5361
59153	-41.8	1819.7893	240180.6040	0.5401
59153.5	-70.3	68.3930	240248.9971	0.5403
59154	-41	1995.3605	242244.3575	0.5448
59154.5	-65.6	117.4934	242361.8509	0.5451
59155	-40.9	2018.4658	244380.3167	0.5496
59155.5	-65	125.8965	244506.2132	0.5499
59156	-41.4	1905.5539	246411.7671	0.5542
59156.5	-65.4	120.2302	246531.9973	0.5544
59157	-41.6	1862.1779	248394.1752	0.5586
59157.5	-66.7	103.5173	248497.6925	0.5589

Intertek Testing Services NA, Inc.

59158	-41.2	1949.9402	250447.6327	0.5632
59158.5	-61.1	197.2490	250644.8817	0.5637
59159	-42	1778.3656	252423.2473	0.5677
59159.5	-66.6	104.7160	252527.9633	0.5679
59160	-40.6	2089.3995	254617.3629	0.5726
59160.5	-67.4	95.5021	254712.8649	0.5728
59161	-40.3	2162.8260	256875.6910	0.5777
59161.5	-64.5	133.3564	257009.0473	0.5780
59162	-40.8	2041.8387	259050.8860	0.5826
59162.5	-63.7	146.2224	259197.1085	0.5829
59163	-42.8	1621.8877	260818.9962	0.5866
59163.5	-61.1	197.2490	261016.2452	0.5870
59164	-41.4	1905.5539	262921.7991	0.5913
59164.5	-63.8	144.5486	263066.3477	0.5916
59165	-41.3	1927.6193	264993.9670	0.5959
59165.5	-59	251.1976	265245.1647	0.5965
59166	-41	1995.3605	267240.5251	0.6010
59166.5	-62.8	162.1864	267402.7115	0.6014
59167	-42	1778.3656	269181.0770	0.6054
59167.5	-67.5	94.4089	269275.4859	0.6056
59168	-42.3	1717.9912	270993.4771	0.6094
59168.5	-60.9	201.8436	271195.3207	0.6099
59169	-40.6	2089.3995	273284.7202	0.6146
59169.5	-57.2	309.0410	273593.7613	0.6153
59170	-43.4	1513.6330	275107.3943	0.6187
59170.5	-65.7	116.1484	275223.5427	0.6190
59171	-40.8	2041.8387	277265.3814	0.6235
59171.5	-68.5	84.1419	277349.5233	0.6237
59172	-42.7	1640.6684	278990.1917	0.6274
59172.5	-67	100.0030	279090.1947	0.6277
59173	-42.8	1621.8877	280712.0824	0.6313
59173.5	-63.4	151.3610	280863.4435	0.6316
59174	-42.2	1737.8848	282601.3282	0.6355
59174.5	-64	141.2583	282742.5865	0.6359
59175	-41.3	1927.6193	284670.2058	0.6402
59175.5	-65.1	124.4553	284794.6612	0.6405
59176	-41.2	1949.9402	286744.6014	0.6449
59176.5	-62	177.8339	286922.4353	0.6453
59177	-42.8	1621.8877	288544.3230	0.6489
59177.5	-66.7	103.5173	288647.8403	0.6491
59178	-42.9	1603.3220	290251.1623	0.6528
59178.5	-70.5	66.8362	290317.9985	0.6529
59179	-40.9	2018.4658	292336.4643	0.6574
59179.5	-61.7	184.0834	292520.5477	0.6579
59180	-41.3	1927.6193	294448.1670	0.6622
59180.5	-63.5	149.6284	294597.7955	0.6625
59181	-44.3	1364.6469	295962.4424	0.6656
59181.5	-63.4	151.3610	296113.8034	0.6659
59182	-44.5	1333.5836	297447.3870	0.6689
59182.5	-63.3	153.1137	297600.5007	0.6693

Intertek Testing Services NA, Inc.

59183	-42.8	1621.8877	299222.3884	0.6729
59183.5	-62.9	160.3298	299382.7182	0.6733
59184	-42.5	1678.8847	301061.6029	0.6771
59184.5	-67.1	98.8582	301160.4612	0.6773
59185	-43.2	1548.8903	302709.3515	0.6808
59185.5	-63.4	151.3610	302860.7125	0.6811
59186	-41.6	1862.1779	304722.8904	0.6853
59186.5	-70.7	65.3148	304788.2052	0.6854
59187	-42.7	1640.6684	306428.8736	0.6891
59187.5	-70.9	63.8281	306492.7017	0.6893
59188	-42.3	1717.9912	308210.6929	0.6931
59188.5	-61.1	197.2490	308407.9420	0.6936
59189	-42.7	1640.6684	310048.6104	0.6973
59189.5	-63.7	146.2224	310194.8328	0.6976
59190	-42.5	1678.8847	311873.7175	0.7014
59190.5	-65.9	113.5046	311987.2221	0.7016
59191	-41.4	1905.5539	313892.7760	0.7059
59191.5	-66.4	107.1552	313999.9312	0.7062
59192	-43.2	1548.8903	315548.8214	0.7096
59192.5	-62.7	164.0644	315712.8858	0.7100
59193	-43	1584.9688	317297.8546	0.7136
59193.5	-64.4	134.9006	317432.7552	0.7139
59194	-43.1	1566.8257	318999.5809	0.7174
59194.5	-68.5	84.1419	319083.7228	0.7176
59195	-43.1	1566.8257	320650.5485	0.7211
59195.5	-62.4	169.8300	320820.3785	0.7215
59196	-42.3	1717.9912	322538.3697	0.7254
59196.5	-63.8	144.5486	322682.9184	0.7257
59197	-44.4	1349.0258	324031.9442	0.7287
59197.5	-66.6	104.7160	324136.6602	0.7290
59198	-41.9	1798.9582	325935.6184	0.7330
59198.5	-70.2	69.1850	326004.8034	0.7332
59199	-43.1	1566.8257	327571.6291	0.7367
59199.5	-65.5	118.8539	327690.4830	0.7369
59200	-43.9	1428.9612	329119.4442	0.7402
59200.5	-65.4	120.2302	329239.6743	0.7404
59201	-41.7	1840.8616	331080.5359	0.7446
59201.5	-66.4	107.1552	331187.6911	0.7448
59202	-43.7	1462.2462	332649.9373	0.7481
59202.5	-66.8	102.3324	332752.2696	0.7483
59203	-43.2	1548.8903	334301.1599	0.7518
59203.5	-72.1	55.5919	334356.7518	0.7519
59204	-43.1	1566.8257	335923.5775	0.7555
59204.5	-67.3	96.6079	336020.1854	0.7557
59205	-42.7	1640.6684	337660.8538	0.7594
59205.5	-61.1	197.2490	337858.1028	0.7598
59206	-42.7	1640.6684	339498.7712	0.7635
59206.5	-66.9	101.1610	339599.9322	0.7637
59207	-44.5	1333.5836	340933.5158	0.7667
59207.5	-64.9	127.3543	341060.8701	0.7670

Intertek Testing Services NA, Inc.

59208	-43.5	1496.3065	342557.1765	0.7704
59208.5	-64.7	130.3208	342687.4973	0.7707
59209	-43.8	1445.5079	344133.0052	0.7739
59209.5	-64.4	134.9006	344267.9058	0.7742
59210	-43.9	1428.9612	345696.8669	0.7774
59210.5	-68.7	82.2266	345779.0935	0.7776
59211	-43.5	1496.3065	347275.4000	0.7810
59211.5	-72.7	51.8813	347327.2813	0.7811
59212	-44.4	1349.0258	348676.3072	0.7841
59212.5	-64.9	127.3543	348803.6615	0.7844
59213	-45	1258.9836	350062.6451	0.7873
59213.5	-69.6	74.1331	350136.7782	0.7874
59214	-45.1	1244.5720	351381.3502	0.7902
59214.5	-73	50.1200	351431.4702	0.7903
59215	-43.7	1462.2462	352893.7163	0.7936
59215.5	-78.4	26.9159	352920.6323	0.7937
59216	-44.7	1303.2273	354223.8596	0.7966
59216.5	-64.2	138.0428	354361.9024	0.7969
59217	-45.3	1216.2419	355578.1443	0.7997
59217.5	-65.6	117.4934	355695.6377	0.7999
59218	-44.4	1349.0258	357044.6635	0.8030
59218.5	-65.4	120.2302	357164.8937	0.8032
59219	-44.6	1318.3181	358483.2117	0.8062
59219.5	-69.1	78.5258	358561.7375	0.8064
59220	-44.9	1273.5620	359835.2996	0.8092
59220.5	-71.6	58.8859	359894.1855	0.8094
59221	-45.5	1188.5567	361082.7422	0.8120
59221.5	-62.8	162.1864	361244.9285	0.8124
59222	-45	1258.9836	362503.9121	0.8152
59222.5	-73.4	47.8642	362551.7763	0.8153
59223	-44.2	1380.4489	363932.2252	0.8185
59223.5	-72.3	54.3264	363986.5517	0.8186
59224	-44.7	1303.2273	365289.7789	0.8215
59224.5	-69	79.4351	365369.2140	0.8217
59225	-45.6	1174.9513	366544.1653	0.8243
59225.5	-68.8	81.2854	366625.4507	0.8245
59226	-45.4	1202.3196	367827.7703	0.8272
59226.5	-68.6	83.1788	367910.9491	0.8274
59227	-44.7	1303.2273	369214.1764	0.8303
59227.5	-70.9	63.8281	369278.0045	0.8305
59228	-44.4	1349.0258	370627.0303	0.8335
59228.5	-69.3	76.7383	370703.7686	0.8337
59229	-44.3	1364.6469	372068.4155	0.8368
59229.5	-62.3	171.7966	372240.2121	0.8371
59230	-46.3	1083.9760	373324.1880	0.8396
59230.5	-71.4	60.2576	373384.4456	0.8397
59231	-46.1	1109.2252	374493.6707	0.8422
59231.5	-71	63.0974	374556.7682	0.8423
59232	-47.9	901.6109	375458.3790	0.8444
59232.5	-70	70.7965	375529.1756	0.8445

Intertek Testing Services NA, Inc.

59233	-47	1000.0447	376529.2203	0.8468
59233.5	-70.8	64.5672	376593.7874	0.8469
59234	-45.3	1216.2419	377810.0294	0.8497
59234.5	-67.2	97.7266	377907.7560	0.8499
59235	-47.8	912.0511	378819.8071	0.8519
59235.5	-65.8	114.8189	378934.6260	0.8522
59236	-46.6	1047.1757	379981.8017	0.8545
59236.5	-69.9	71.6163	380053.4180	0.8547
59237	-47.1	988.5972	381042.0152	0.8569
59237.5	-67.7	92.2598	381134.2751	0.8571
59238	-46.9	1011.6248	382145.8998	0.8594
59238.5	-71.7	58.2119	382204.1117	0.8595
59239	-48.3	861.0314	383065.1431	0.8615
59239.5	-72.6	52.4821	383117.6252	0.8616
59240	-48.7	822.2784	383939.9036	0.8634
59240.5	-72.1	55.5919	383995.4954	0.8636
59241	-46.9	1011.6248	385007.1202	0.8658
59241.5	-74.1	44.1581	385051.2783	0.8659
59242	-48.2	871.0018	385922.2801	0.8679
59242.5	-68.4	85.1163	386007.3964	0.8681
59243	-48.2	871.0018	386878.3981	0.8701
59243.5	-74.2	43.6527	386922.0508	0.8702
59244	-47.3	966.0939	387888.1446	0.8723
59244.5	-75.4	38.0198	387926.1645	0.8724
59245	-48	891.2901	388817.4546	0.8744
59245.5	-68.9	80.3549	388897.8095	0.8746
59246	-47.1	988.5972	389886.4067	0.8768
59246.5	-71.9	56.8868	389943.2935	0.8770
59247	-48.3	861.0314	390804.3249	0.8789
59247.5	-73.6	46.7747	390851.0996	0.8790
59248	-48	891.2901	391742.3897	0.8810
59248.5	-68.7	82.2266	391824.6164	0.8812
59249	-49.4	758.6101	392583.2265	0.8829
59249.5	-74	44.6695	392627.8960	0.8830
59250	-49.9	716.1739	393344.0698	0.8846
59250.5	-71.7	58.2119	393402.2817	0.8847
59251	-49	794.3626	394196.6443	0.8865
59251.5	-72.4	53.7046	394250.3488	0.8866
59252	-48.2	871.0018	395121.3506	0.8886
59252.5	-68.9	80.3549	395201.7055	0.8888
59253	-50.2	691.8603	395893.5658	0.8903
59253.5	-74.6	41.6879	395935.2537	0.8904
59254	-51.3	609.5622	396544.8159	0.8918
59254.5	-73.9	45.1867	396590.0026	0.8919
59255	-50.9	638.2902	397228.2928	0.8933
59255.5	-72.9	50.7004	397278.9931	0.8934
59256	-50.7	653.1580	397932.1511	0.8949
59256.5	-71.4	60.2576	397992.4087	0.8951
59257	-49.3	767.3945	398759.8032	0.8968
59257.5	-72.6	52.4821	398812.2852	0.8969

Intertek Testing Services NA, Inc.

59258	-51	630.9837	399443.2689	0.8983
59258.5	-75.2	38.9054	399482.1744	0.8984
59259	-51.6	588.8680	400071.0423	0.8997
59259.5	-67.6	93.3282	400164.3705	0.8999
59260	-51.9	568.8763	400733.2468	0.9012
59260.5	-77.5	29.8545	400763.1013	0.9013
59261	-53	501.2074	401264.3087	0.9024
59261.5	-82.7	16.4062	401280.7149	0.9024
59262	-52.9	507.0112	401787.7260	0.9036
59262.5	-74.3	43.1530	401830.8790	0.9037
59263	-50.9	638.2902	402469.1692	0.9051
59263.5	-74.4	42.6590	402511.8282	0.9052
59264	-51.7	582.1272	403093.9554	0.9065
59264.5	-73.7	46.2392	403140.1946	0.9066
59265	-50.3	683.9406	403824.1352	0.9082
59265.5	-74.4	42.6590	403866.7942	0.9083
59266	-52.2	549.5633	404416.3575	0.9095
59266.5	-76.3	34.2776	404450.6350	0.9096
59267	-52.8	512.8821	404963.5171	0.9107
59267.5	-78.1	27.8618	404991.3790	0.9108
59268	-52.8	512.8821	405504.2611	0.9119
59268.5	-76.4	33.8852	405538.1462	0.9120
59269	-52.5	530.9060	406069.0523	0.9132
59269.5	-79.4	23.9888	406093.0411	0.9133
59270	-53	501.2074	406594.2485	0.9144
59270.5	-78.7	26.0021	406620.2506	0.9145
59271	-52.5	530.9060	407151.1566	0.9156
59271.5	-74.6	41.6879	407192.8446	0.9157
59272	-54.2	436.5330	407629.3776	0.9167
59272.5	-79.6	23.4428	407652.8204	0.9168
59273	-53.6	467.7538	408120.5741	0.9178
59273.5	-75.9	35.8930	408156.4672	0.9179
59274	-52.7	518.8210	408675.2882	0.9191
59274.5	-79.2	24.5476	408699.8358	0.9191
59275	-53.3	484.1917	409184.0275	0.9202
59275.5	-82.9	16.0327	409200.0603	0.9203
59276	-53.4	478.6492	409678.7095	0.9213
59276.5	-85.7	11.6147	409690.3242	0.9214
59277	-53.8	457.1063	410147.4305	0.9224
59277.5	-76.8	32.3601	410179.7906	0.9225
59278	-54.1	441.5879	410621.3784	0.9235
59278.5	-81	19.9530	410641.3314	0.9235
59279	-53.7	462.3994	411103.7308	0.9245
59279.5	-76.4	33.8852	411137.6160	0.9246
59280	-55.2	389.0602	411526.6762	0.9255
59280.5	-78	28.1844	411554.8606	0.9256
59281	-56.5	334.9780	411889.8387	0.9263
59281.5	-83.1	15.6678	411905.5065	0.9263
59282	-54.2	436.5330	412342.0395	0.9273
59282.5	-74.6	41.6879	412383.7274	0.9274

Intertek Testing Services NA, Inc.

59283	-56.7	327.3530	412711.0804	0.9282
59283.5	-79.4	23.9888	412735.0692	0.9282
59284	-57.3	305.5034	413040.5726	0.9289
59284.5	-79.6	23.4428	413064.0154	0.9289
59285	-56.5	334.9780	413398.9934	0.9297
59285.5	-79.9	22.6469	413421.6403	0.9298
59286	-55.7	367.2963	413788.9367	0.9306
59286.5	-80.3	21.6276	413810.5643	0.9306
59287	-55.3	384.6066	414195.1709	0.9315
59287.5	-76.3	34.2776	414229.4485	0.9316
59288	-55.9	358.9356	414588.3841	0.9324
59288.5	-79.1	24.8318	414613.2159	0.9324
59289	-55.3	384.6066	414997.8225	0.9333
59289.5	-76.6	33.1139	415030.9364	0.9334
59290	-54.2	436.5330	415467.4694	0.9344
59290.5	-83.5	14.9626	415482.4320	0.9344
59291	-58	281.8486	415764.2806	0.9350
59291.5	-77.7	29.1749	415793.4555	0.9351
59292	-58.2	275.4329	416068.8884	0.9357
59292.5	-79.9	22.6469	416091.5353	0.9358
59293	-59.7	231.7476	416323.2829	0.9363
59293.5	-77.2	30.9036	416354.1866	0.9363
59294	-55.8	363.0919	416717.2785	0.9372
59294.5	-78.1	27.8618	416745.1403	0.9372
59295	-58.2	275.4329	417020.5732	0.9378
59295.5	-80.2	21.8781	417042.4512	0.9379
59296	-58.2	275.4329	417317.8841	0.9385
59296.5	-81.7	18.4081	417336.2922	0.9386
59297	-58.7	260.0253	417596.3175	0.9391
59297.5	-78.8	25.7045	417622.0220	0.9392
59298	-57.2	309.0410	417931.0630	0.9399
59298.5	-78.6	26.3032	417957.3663	0.9400
59299	-58.2	275.4329	418232.7992	0.9406
59299.5	-80.8	20.4178	418253.2169	0.9406
59300	-58.2	275.4329	418528.6498	0.9412
59300.5	-85.6	11.7492	418540.3990	0.9413
59301	-56.4	338.8569	418879.2559	0.9420
59301.5	-80.3	21.6276	418900.8835	0.9421
59302	-57.6	295.1318	419196.0153	0.9427
59302.5	-78.6	26.3032	419222.3186	0.9428
59303	-59.2	245.4796	419467.7982	0.9433
59303.5	-78.9	25.4103	419493.2085	0.9434
59304	-50.1	699.8717	420193.0801	0.9450
59304.5	-52.9	507.0112	420700.0913	0.9461
59305	-59.1	248.3222	420948.4135	0.9467
59305.5	-75.8	36.3086	420984.7221	0.9468
59306	-55	398.1226	421382.8447	0.9477
59306.5	-83.4	15.1359	421397.9806	0.9477
59307	-57.7	291.7534	421689.7340	0.9483
59307.5	-80.1	22.1314	421711.8654	0.9484

Intertek Testing Services NA, Inc.

59308	-57.4	302.0063	422013.8717	0.9491
59308.5	-81.6	18.6212	422032.4930	0.9491
59309	-56.9	319.9015	422352.3944	0.9498
59309.5	-81.4	19.0550	422371.4494	0.9499
59310	-58.4	269.1632	422640.6126	0.9505
59310.5	-81.3	19.2756	422659.8882	0.9505
59311	-58.2	275.4329	422935.3211	0.9511
59311.5	-83.4	15.1359	422950.4570	0.9512
59312	-59.2	245.4796	423195.9366	0.9517
59312.5	-89.2	7.7626	423203.6992	0.9518
59313	-57.1	312.6196	423516.3188	0.9525
59313.5	-85.3	12.1621	423528.4808	0.9525
59314	-58.3	272.2800	423800.7609	0.9531
59314.5	-82.2	17.3783	423818.1392	0.9531
59315	-55.9	358.9356	424177.0748	0.9539
59315.5	-90.4	6.7609	424183.8357	0.9540
59316	-58.4	269.1632	424452.9989	0.9546
59316.5	-82.9	16.0327	424469.0317	0.9546
59317	-59	251.1976	424720.2293	0.9552
59317.5	-77.3	30.5499	424750.7792	0.9552
59318	-56.8	323.6058	425074.3850	0.9560
59318.5	-76.7	32.7348	425107.1198	0.9560
59319	-58.5	266.0821	425373.2019	0.9566
59319.5	-78	28.1844	425401.3863	0.9567
59320	-57.4	302.0063	425703.3927	0.9574
59320.5	-81.9	17.9890	425721.3817	0.9574
59321	-59.7	231.7476	425953.1293	0.9579
59321.5	-84.8	12.8827	425966.0121	0.9580
59322	-58.5	266.0821	426232.0942	0.9586
59322.5	-79.7	23.1744	426255.2686	0.9586
59323	-57.3	305.5034	426560.7720	0.9593
59323.5	-79.8	22.9091	426583.6812	0.9594
59324	-58.3	272.2800	426855.9612	0.9600
59324.5	-80.3	21.6276	426877.5888	0.9600
59325	-58.8	257.0488	427134.6376	0.9606
59325.5	-78.4	26.9159	427161.5535	0.9607
59326	-55.6	371.5495	427533.1030	0.9615
59326.5	-83.5	14.9626	427548.0656	0.9615
59327	-61.4	190.5525	427738.6182	0.9619
59327.5	-80	22.3877	427761.0058	0.9620
59328	-56.6	331.1436	428092.1494	0.9627
59328.5	-78.2	27.5429	428119.6923	0.9628
59329	-57.6	295.1318	428414.8241	0.9635
59329.5	-76.8	32.3601	428447.1841	0.9635
59330	-60.3	216.2794	428663.4635	0.9640
59330.5	-80.9	20.1841	428683.6476	0.9641
59331	-57.4	302.0063	428985.6539	0.9648
59331.5	-78	28.1844	429013.8384	0.9648
59332	-58.9	254.1064	429267.9447	0.9654
59332.5	-79.5	23.7142	429291.6590	0.9654

Intertek Testing Services NA, Inc.

59333	-56.4	338.8569	429630.5159	0.9662
59333.5	-79.4	23.9888	429654.5047	0.9663
59334	-58.2	275.4329	429929.9376	0.9669
59334.5	-78	28.1844	429958.1220	0.9669
59335	-58	281.8486	430239.9706	0.9676
59335.5	-85.7	11.6147	430251.5853	0.9676
59336	-58.1	278.6223	430530.2076	0.9682
59336.5	-82.2	17.3783	430547.5859	0.9683
59337	-57.7	291.7534	430839.3393	0.9689
59337.5	-84.1	13.9639	430853.3032	0.9690
59338	-57.5	298.5493	431151.8525	0.9696
59338.5	-75.5	37.5846	431189.4371	0.9697
59339	-56.1	350.7652	431540.2023	0.9705
59339.5	-83.2	15.4884	431555.6908	0.9705
59340	-59.4	239.8918	431795.5826	0.9711
59340.5	-82.6	16.5962	431812.1787	0.9711
59341	-57.2	309.0410	432121.2198	0.9718
59341.5	-77.7	29.1749	432150.3947	0.9719
59342	-56.4	338.8569	432489.2516	0.9726
59342.5	-77.9	28.5108	432517.7624	0.9727
59343	-57.7	291.7534	432809.5158	0.9734
59343.5	-76.8	32.3601	432841.8759	0.9734
59344	-55.9	358.9356	433200.8115	0.9742
59344.5	-75.2	38.9054	433239.7170	0.9743
59345	-58.6	263.0363	433502.7532	0.9749
59345.5	-79.3	24.2666	433527.0199	0.9750
59346	-58.6	263.0363	433790.0561	0.9756
59346.5	-80.4	21.3800	433811.4362	0.9756
59347	-56.5	334.9780	434146.4142	0.9764
59347.5	-82.6	16.5962	434163.0104	0.9764
59348	-58	281.8486	434444.8590	0.9770
59348.5	-82	17.7831	434462.6421	0.9771
59349	-56.2	346.7500	434809.3921	0.9779
59349.5	-80.6	20.8934	434830.2855	0.9779
59350	-58.4	269.1632	435099.4487	0.9785
59350.5	-84.1	13.9639	435113.4126	0.9785
59351	-58	281.8486	435395.2612	0.9792
59351.5	-81.1	19.7246	435414.9858	0.9792
59352	-57.4	302.0063	435716.9921	0.9799
59352.5	-79.1	24.8318	435741.8240	0.9799
59353	-56.4	338.8569	436080.6809	0.9807
59353.5	-77.9	28.5108	436109.1917	0.9808
59354	-58.4	269.1632	436378.3550	0.9814
59354.5	-80.2	21.8781	436400.2330	0.9814
59355	-55.8	363.0919	436763.3249	0.9822
59355.5	-81.3	19.2756	436782.6005	0.9823
59356	-58	281.8486	437064.4491	0.9829
59356.5	-78.8	25.7045	437090.1536	0.9830
59357	-56.6	331.1436	437421.2972	0.9837
59357.5	-82.8	16.2184	437437.5156	0.9838

Intertek Testing Services NA, Inc.

59358	-57.6	295.1318	437732.6474	0.9844	
59358.5	-79.9	22.6469	437755.2943	0.9845	
59359	-58.4	269.1632	438024.4575	0.9851	
59359.5	-84.3	13.6461	438038.1036	0.9851	
59360	-57.5	298.5493	438336.6528	0.9858	
59360.5	-82.4	16.9827	438353.6356	0.9858	
59361	-57	316.2396	438669.8751	0.9865	
59361.5	-77.9	28.5108	438698.3859	0.9866	
59362	-54.9	402.7327	439101.1186	0.9875	
59362.5	-79.2	24.5476	439125.6662	0.9876	
59363	-56.3	342.7807	439468.4470	0.9883	
59363.5	-82.8	16.2184	439484.6653	0.9884	
59364	-59.2	245.4796	439730.1450	0.9889	
59364.5	-82.3	17.1794	439747.3244	0.9890	
59365	-58.1	278.6223	440025.9467	0.9896	
59365.5	-80.5	21.1353	440047.0820	0.9896	
59366	-57.7	291.7534	440338.8354	0.9903	
59366.5	-81.9	17.9890	440356.8244	0.9903	
59367	-55.6	371.5495	440728.3739	0.9912	
59367.5	-76.7	32.7348	440761.1087	0.9912	
59368	-58.1	278.6223	441039.7310	0.9919	
59368.5	-80	22.3877	441062.1186	0.9919	
59369	-58.9	254.1064	441316.2250	0.9925	
59369.5	-83.8	14.4546	441330.6797	0.9925	
59370	-58.6	263.0363	441593.7160	0.9931	
59370.5	-77.5	29.8545	441623.5704	0.9932	
59371	-57.6	295.1318	441918.7022	0.9938	
59371.5	-80.8	20.4178	441939.1200	0.9939	
59372	-58.3	272.2800	442211.4000	0.9945	
59372.5	-85.1	12.4453	442223.8454	0.9945	
59373	-59.4	239.8918	442463.7372	0.9951	99.50%
59373.5	-82	17.7831	442481.5203	0.9951	
59374	-57.6	295.1318	442776.6521	0.9958	
59374.5	-83.3	15.3111	442791.9632	0.9958	
59375	-60.1	221.3172	443013.2804	0.9963	
59375.5	-78.3	27.2276	443040.5080	0.9964	
59376	-60.2	218.7838	443259.2918	0.9969	
59376.5	-77.4	30.2002	443289.4920	0.9969	
59377	-57.9	285.1123	443574.6043	0.9976	
59377.5	-80.9	20.1841	443594.7883	0.9976	
59378	-59.3	242.6696	443837.4580	0.9982	
59378.5	-81.3	19.2756	443856.7336	0.9982	
59379	-58.5	266.0821	444122.8157	0.9988	
59379.5	-84.9	12.7352	444135.5510	0.9988	
59380	-59.8	229.0948	444364.6458	0.9993	
59380.5	-82.3	17.1794	444381.8252	0.9994	
59381	-58.5	266.0821	444647.9073	1.0000	
59381.5	-86.7	10.3516	444658.2589	1.0000	

Intertek Testing Services NA, Inc.

Patch Antenna Transmitter Emission Power Data

patch antenna transmitter

f, MHz	reading, dBm	dBuV	antenna factor	net dBuV	net uV	corrected for oversampling	uW/cm2
59070	-44.4	62.6	40.61	103.21	144768	101337	2.72E-03
59070.5	-71.8	35.2	40.61	75.81	6175	4323	4.96E-06
59071	-43.9	63.1	40.61	103.71	153348	107344	3.06E-03
59071.5	-69	38	40.61	78.61	8525	5967	9.45E-06
59072	-45.2	61.8	40.61	102.41	132034	92424	2.27E-03
59072.5	-72.2	34.8	40.61	75.41	5898	4128	4.52E-06
59073	-46.9	60.1	40.61	100.71	108566	75996	1.53E-03
59073.5	-65.5	41.5	40.61	82.11	12755	8929	2.11E-05
59074	-45.2	61.8	40.61	102.41	132038	92427	2.27E-03
59074.5	-65.2	41.8	40.61	82.41	13204	9243	2.27E-05
59075	-43.6	63.4	40.61	104.01	158748	111124	3.28E-03
59075.5	-61.3	45.7	40.61	86.31	20687	14481	5.56E-05
59076	-44.3	62.7	40.61	103.31	146459	102521	2.79E-03
59076.5	-69.7	37.3	40.61	77.91	7865	5506	8.04E-06
59077	-43.9	63.1	40.61	103.71	153364	107355	3.06E-03
59077.5	-62.8	44.2	40.61	84.81	17407	12185	3.94E-05
59078	-44	63	40.61	103.61	151611	106128	2.99E-03
59078.5	-67.1	39.9	40.61	80.51	10610	7427	1.46E-05
59079	-45.3	61.7	40.61	102.31	130538	91377	2.21E-03
59079.5	-64.1	42.9	40.61	83.51	14988	10491	2.92E-05
59080	-42.9	64.1	40.61	104.71	172086	120460	3.85E-03
59080.5	-69.1	37.9	40.61	78.51	8428	5900	9.23E-06
59081	-44.4	62.6	40.61	103.21	144794	101356	2.72E-03
59081.5	-68.3	38.7	40.61	79.31	9242	6469	1.11E-05
59082	-44.8	62.2	40.61	102.81	138280	96796	2.49E-03
59082.5	-70.7	36.3	40.61	76.91	7011	4907	6.39E-06
59083	-43.4	63.6	40.61	104.21	162468	113727	3.43E-03
59083.5	-65.7	41.3	40.61	81.91	12467	8727	2.02E-05
59084	-43.1	63.9	40.61	104.51	168180	117726	3.68E-03
59084.5	-61	46	40.61	86.61	21418	14992	5.96E-05
59085	-43.6	63.4	40.61	104.01	158775	111142	3.28E-03
59085.5	-65.3	41.7	40.62	82.32	13055	9139	2.22E-05
59086	-43.2	63.8	40.62	104.42	166261	116382	3.59E-03
59086.5	-70.1	36.9	40.62	77.52	7512	5259	7.34E-06
59087	-45.5	61.5	40.62	102.12	127584	89309	2.12E-03
59087.5	-63.9	43.1	40.62	83.72	15339	10737	3.06E-05
59088	-42.8	64.2	40.62	104.82	174102	121871	3.94E-03
59088.5	-64.3	42.7	40.62	83.32	14649	10254	2.79E-05
59089	-44.1	62.9	40.62	103.52	149903	104932	2.92E-03
59089.5	-67.3	39.7	40.62	80.32	10371	7259	1.40E-05
59090	-41.4	65.6	40.62	106.22	204559	143191	5.44E-03
59090.5	-62.6	44.4	40.62	85.02	17816	12471	4.13E-05
59091	-42.8	64.2	40.62	104.82	174111	121878	3.94E-03
59091.5	-62.6	44.4	40.62	85.02	17817	12472	4.13E-05
59092	-43.8	63.2	40.62	103.82	155179	108625	3.13E-03
59092.5	-63.9	43.1	40.62	83.72	15340	10738	3.06E-05

Intertek Testing Services NA, Inc.

59093	-41.3	65.7	40.62	106.32	206938	144857	5.57E-03
59093.5	-67.7	39.3	40.62	79.92	9905	6933	1.28E-05
59094	-41.1	65.9	40.62	106.52	211762	148234	5.83E-03
59094.5	-65	42	40.62	82.62	13516	9461	2.37E-05
59095	-43.8	63.2	40.62	103.82	155187	108631	3.13E-03
59095.5	-69.7	37.3	40.62	77.92	7868	5507	8.05E-06
59096	-43.2	63.8	40.62	104.42	166289	116402	3.59E-03
59096.5	-65.8	41.2	40.62	81.82	12327	8629	1.98E-05
59097	-43	64	40.62	104.62	170165	119115	3.76E-03
59097.5	-64	43	40.62	83.62	15166	10616	2.99E-05
59098	-41.9	65.1	40.62	105.72	193142	135200	4.85E-03
59098.5	-63.7	43.3	40.62	83.92	15699	10989	3.20E-05
59099	-42.9	64.1	40.62	104.72	172141	120499	3.85E-03
59099.5	-66.5	40.5	40.62	81.12	11373	7961	1.68E-05
59100	-43.8	63.2	40.62	103.82	155200	108640	3.13E-03
59100.5	-68.1	38.9	40.62	79.52	9460	6622	1.16E-05
59101	-44.2	62.8	40.62	103.42	148217	103752	2.86E-03
59101.5	-64.8	42.2	40.62	82.82	13832	9683	2.49E-05
59102	-43.8	63.2	40.62	103.82	155205	108644	3.13E-03
59102.5	-68.8	38.2	40.62	78.82	8728	6109	9.90E-06
59103	-41.7	65.3	40.62	105.92	197658	138361	5.08E-03
59103.5	-64.6	42.4	40.62	83.02	14155	9909	2.60E-05
59104	-43	64	40.62	104.62	170185	119130	3.76E-03
59104.5	-61.1	45.9	40.62	86.52	21180	14826	5.83E-05
59105	-42	65	40.62	105.62	190954	133668	4.74E-03
59105.5	-64.2	42.8	40.62	83.42	14823	10376	2.86E-05
59106	-41.8	65.2	40.62	105.82	195405	136784	4.96E-03
59106.5	-67.7	39.3	40.62	79.92	9907	6935	1.28E-05
59107	-43	64	40.62	104.62	170194	119136	3.76E-03
59107.5	-66.1	40.9	40.62	81.52	11911	8338	1.84E-05
59108	-42.1	64.9	40.62	105.52	188778	132145	4.63E-03
59108.5	-63.2	43.8	40.62	84.42	16632	11642	3.60E-05
59109	-42.8	64.2	40.62	104.82	174164	121915	3.94E-03
59109.5	-60	47	40.62	87.62	24041	16829	7.51E-05
59110	-42	65	40.62	105.62	190970	133679	4.74E-03
59110.5	-62.1	44.9	40.62	85.52	18878	13215	4.63E-05
59111	-42.6	64.4	40.62	105.02	178227	124759	4.13E-03
59111.5	-63.2	43.8	40.62	84.42	16633	11643	3.60E-05
59112	-42.6	64.4	40.62	105.02	178230	124761	4.13E-03
59112.5	-62.2	44.8	40.62	85.42	18663	13064	4.53E-05
59113	-41.2	65.8	40.62	106.42	209406	146584	5.70E-03
59113.5	-63.9	43.1	40.62	83.72	15346	10742	3.06E-05
59114	-42.7	64.3	40.62	104.92	176196	123337	4.04E-03
59114.5	-67.7	39.3	40.62	79.92	9908	6936	1.28E-05
59115	-42.3	64.7	40.62	105.32	184503	129152	4.42E-03
59115.5	-63.7	43.3	40.62	83.92	15704	10993	3.21E-05
59116	-43.6	63.4	40.62	104.02	158858	111201	3.28E-03
59116.5	-61.5	45.5	40.62	86.12	20231	14161	5.32E-05
59117	-42.3	64.7	40.62	105.32	184509	129156	4.42E-03
59117.5	-62.9	44.1	40.62	84.72	17219	12053	3.85E-05

Intertek Testing Services NA, Inc.

59118	-41.8	65.2	40.62	105.82	195445	136812	4.96E-03
59118.5	-75.7	31.3	40.62	71.92	3945	2761	2.02E-06
59119	-43.6	63.4	40.62	104.02	158866	111206	3.28E-03
59119.5	-67.1	39.9	40.62	80.52	10618	7432	1.47E-05
59120	-41.9	65.1	40.62	105.72	193214	135250	4.85E-03
59120.5	-71.9	35.1	40.62	75.72	6110	4277	4.85E-06
59121	-41.1	65.9	40.62	106.52	211859	148301	5.83E-03
59121.5	-72.7	34.3	40.62	74.92	5572	3901	4.04E-06
59122	-42.6	64.4	40.62	105.02	178260	124782	4.13E-03
59122.5	-64.4	42.6	40.62	83.22	14489	10143	2.73E-05
59123	-41.5	65.5	40.62	106.12	202331	141631	5.32E-03
59123.5	-63.6	43.4	40.62	84.02	15888	11121	3.28E-05
59124	-42.6	64.4	40.62	105.02	178266	124786	4.13E-03
59124.5	-66	41	40.62	81.62	12052	8437	1.89E-05
59125	-41.4	65.6	40.62	106.22	204680	143276	5.45E-03
59125.5	-71.5	35.5	40.62	76.12	6398	4479	5.32E-06
59126	-40.7	66.3	40.62	106.92	221862	155304	6.40E-03
59126.5	-63.8	43.2	40.62	83.82	15527	10869	3.13E-05
59127	-42.1	64.9	40.62	105.52	188839	132187	4.63E-03
59127.5	-61.1	45.9	40.62	86.52	21188	14832	5.83E-05
59128	-42.2	64.8	40.62	105.42	186680	130676	4.53E-03
59128.5	-60.2	46.8	40.62	87.42	23502	16451	7.18E-05
59129	-42.7	64.3	40.62	104.92	176240	123368	4.04E-03
59129.5	-60.5	46.5	40.62	87.12	22704	15893	6.70E-05
59130	-41.8	65.2	40.62	105.82	195485	136839	4.97E-03
59130.5	-63.3	43.7	40.62	84.32	16448	11514	3.52E-05
59131	-41.5	65.5	40.62	106.12	202358	141651	5.32E-03
59131.5	-63.5	43.5	40.62	84.12	16074	11252	3.36E-05
59132	-40.7	66.3	40.62	106.92	221885	155320	6.40E-03
59132.5	-69.1	37.9	40.62	78.52	8436	5905	9.25E-06
59133	-41.5	65.5	40.62	106.12	202365	141655	5.32E-03
59133.5	-70.9	36.1	40.62	76.72	6857	4800	6.11E-06
59134	-42.4	64.6	40.62	105.22	182449	127714	4.33E-03
59134.5	-67.1	39.9	40.62	80.52	10620	7434	1.47E-05
59135	-41.4	65.6	40.62	106.22	204715	143301	5.45E-03
59135.5	-59.8	47.2	40.62	87.82	24612	17228	7.87E-05
59136	-40.6	66.4	40.62	107.02	224470	157129	6.55E-03
59136.5	-65.1	41.9	40.62	82.52	13371	9359	2.32E-05
59137	-42.3	64.7	40.62	105.32	184571	129200	4.43E-03
59137.5	-61	46	40.62	86.62	21437	15006	5.97E-05
59138	-42	65	40.62	105.62	191061	133743	4.74E-03
59138.5	-65.8	41.2	40.62	81.82	12336	8635	1.98E-05
59139	-39.9	67.1	40.62	107.72	243321	170325	7.70E-03
59139.5	-64.2	42.8	40.62	83.42	14831	10382	2.86E-05
59140	-40.6	66.4	40.62	107.02	224485	157139	6.55E-03
59140.5	-62.1	44.9	40.62	85.52	18888	13222	4.64E-05
59141	-40.8	66.2	40.62	106.82	219378	153565	6.26E-03
59141.5	-64.2	42.8	40.62	83.42	14832	10382	2.86E-05
59142	-42.7	64.3	40.62	104.92	176279	123395	4.04E-03
59142.5	-65.7	41.3	40.62	81.92	12479	8736	2.02E-05

Intertek Testing Services NA, Inc.

59143	-40.9	66.1	40.62	106.72	216875	151812	6.11E-03
59143.5	-65.6	41.4	40.62	82.02	12624	8837	2.07E-05
59144	-42.5	64.5	40.62	105.12	180391	126274	4.23E-03
59144.5	-65.5	41.5	40.62	82.12	12771	8939	2.12E-05
59145	-41.6	65.4	40.62	106.02	200089	140062	5.20E-03
59145.5	-62.1	44.9	40.62	85.52	18889	13223	4.64E-05
59146	-40.6	66.4	40.62	107.02	224507	157155	6.55E-03
59146.5	-66.5	40.5	40.62	81.12	11382	7968	1.68E-05
59147	-39.6	67.4	40.62	108.02	251906	176334	8.25E-03
59147.5	-68.3	38.7	40.62	79.32	9252	6476	1.11E-05
59148	-38.8	68.2	40.62	108.82	276214	193350	9.92E-03
59148.5	-39	68	40.62	108.62	269929	188950	9.47E-03
59149	-25.4	81.6	40.62	122.22	1291986	904390	2.17E-01
59149.5	-52.3	54.7	40.62	95.32	58378	40865	4.43E-04
59150	-26	81	40.62	121.62	1205771	844040	1.89E-01
59150.5	-59.6	47.4	40.62	88.02	25192	17634	8.25E-05
59151	-38.8	68.2	40.62	108.82	276228	193360	9.92E-03
59151.5	-68.8	38.2	40.62	78.82	8735	6114	9.92E-06
59152	-41.4	65.6	40.62	106.22	204774	143342	5.45E-03
59152.5	-68.3	38.7	40.62	79.32	9253	6477	1.11E-05
59153	-41.8	65.2	40.62	105.82	195561	136893	4.97E-03
59153.5	-70.3	36.7	40.63	77.33	7350	5145	7.02E-06
59154	-41	66	40.63	106.63	214432	150102	5.98E-03
59154.5	-65.6	41.4	40.63	82.03	12627	8839	2.07E-05
59155	-40.9	66.1	40.63	106.73	216919	151843	6.12E-03
59155.5	-65	42	40.63	82.63	13530	9471	2.38E-05
59156	-41.4	65.6	40.63	106.23	204788	143351	5.45E-03
59156.5	-65.4	41.6	40.63	82.23	12921	9045	2.17E-05
59157	-41.6	65.4	40.63	106.03	200130	140091	5.21E-03
59157.5	-66.7	40.3	40.63	80.93	11125	7788	1.61E-05
59158	-41.2	65.8	40.63	106.43	209565	146695	5.71E-03
59158.5	-61.1	45.9	40.63	86.53	21199	14839	5.84E-05
59159	-42	65	40.63	105.63	191129	133790	4.75E-03
59159.5	-66.6	40.4	40.63	81.03	11254	7878	1.65E-05
59160	-40.6	66.4	40.63	107.03	224561	157192	6.55E-03
59160.5	-67.4	39.6	40.63	80.23	10264	7185	1.37E-05
59161	-40.3	66.7	40.63	107.33	232456	162719	7.02E-03
59161.5	-64.5	42.5	40.63	83.13	14333	10033	2.67E-05
59162	-40.8	66.2	40.63	106.83	219456	153619	6.26E-03
59162.5	-63.7	43.3	40.63	83.93	15716	11001	3.21E-05
59163	-42.8	64.2	40.63	104.83	174323	122026	3.95E-03
59163.5	-61.1	45.9	40.63	86.53	21201	14841	5.84E-05
59164	-41.4	65.6	40.63	106.23	204815	143371	5.45E-03
59164.5	-63.8	43.2	40.63	83.83	15537	10876	3.14E-05
59165	-41.3	65.7	40.63	106.33	207191	145033	5.58E-03
59165.5	-59	48	40.63	88.63	27000	18900	9.48E-05
59166	-41	66	40.63	106.63	214475	150133	5.98E-03
59166.5	-62.8	44.2	40.63	84.83	17433	12203	3.95E-05
59167	-42	65	40.63	105.63	191154	133808	4.75E-03
59167.5	-67.5	39.5	40.63	80.13	10148	7104	1.34E-05

Intertek Testing Services NA, Inc.

59168	-42.3	64.7	40.63	105.33	184668	129268	4.43E-03
59168.5	-60.9	46.1	40.63	86.73	21696	15188	6.12E-05
59169	-40.6	66.4	40.63	107.03	224595	157216	6.56E-03
59169.5	-57.2	49.8	40.63	90.43	33220	23254	1.43E-04
59170	-43.4	63.6	40.63	104.23	162707	113895	3.44E-03
59170.5	-65.7	41.3	40.63	81.93	12485	8740	2.03E-05
59171	-40.8	66.2	40.63	106.83	219490	153643	6.26E-03
59171.5	-68.5	38.5	40.63	79.13	9045	6332	1.06E-05
59172	-42.7	64.3	40.63	104.93	176368	123458	4.04E-03
59172.5	-67	40	40.63	80.63	10750	7525	1.50E-05
59173	-42.8	64.2	40.63	104.83	174353	122047	3.95E-03
59173.5	-63.4	43.6	40.63	84.23	16271	11390	3.44E-05
59174	-42.2	64.8	40.63	105.43	186825	130778	4.54E-03
59174.5	-64	43	40.63	83.63	15186	10630	3.00E-05
59175	-41.3	65.7	40.63	106.33	207226	145058	5.58E-03
59175.5	-65.1	41.9	40.63	82.53	13379	9366	2.33E-05
59176	-41.2	65.8	40.63	106.43	209629	146740	5.71E-03
59176.5	-62	45	40.63	85.63	19118	13383	4.75E-05
59177	-42.8	64.2	40.63	104.83	174364	122055	3.95E-03
59177.5	-66.7	40.3	40.63	80.93	11129	7790	1.61E-05
59178	-42.9	64.1	40.63	104.73	172371	120660	3.86E-03
59178.5	-70.5	36.5	40.63	77.13	7186	5030	6.71E-06
59179	-40.9	66.1	40.63	106.73	217007	151905	6.12E-03
59179.5	-61.7	45.3	40.63	85.93	19791	13854	5.09E-05
59180	-41.3	65.7	40.63	106.33	207243	145070	5.58E-03
59180.5	-63.5	43.5	40.63	84.13	16087	11261	3.36E-05
59181	-44.3	62.7	40.63	103.33	146719	102703	2.80E-03
59181.5	-63.4	43.6	40.63	84.23	16274	11392	3.44E-05
59182	-44.5	62.5	40.63	103.13	143382	100367	2.67E-03
59182.5	-63.3	43.7	40.63	84.33	16462	11524	3.52E-05
59183	-42.8	64.2	40.63	104.83	174382	122067	3.95E-03
59183.5	-62.9	44.1	40.63	84.73	17238	12067	3.86E-05
59184	-42.5	64.5	40.63	105.13	180513	126359	4.24E-03
59184.5	-67.1	39.9	40.63	80.53	10629	7441	1.47E-05
59185	-43.2	63.8	40.63	104.43	166539	116577	3.60E-03
59185.5	-63.4	43.6	40.63	84.23	16275	11392	3.44E-05
59186	-41.6	65.4	40.63	106.03	200228	140159	5.21E-03
59186.5	-70.7	36.3	40.63	76.93	7023	4916	6.41E-06
59187	-42.7	64.3	40.63	104.93	176413	123489	4.04E-03
59187.5	-70.9	36.1	40.63	76.73	6863	4804	6.12E-06
59188	-42.3	64.7	40.63	105.33	184730	129311	4.44E-03
59188.5	-61.1	45.9	40.63	86.53	21210	14847	5.85E-05
59189	-42.7	64.3	40.63	104.93	176419	123493	4.05E-03
59189.5	-63.7	43.3	40.63	83.93	15723	11006	3.21E-05
59190	-42.5	64.5	40.63	105.13	180532	126372	4.24E-03
59190.5	-65.9	41.1	40.63	81.73	12205	8544	1.94E-05
59191	-41.4	65.6	40.63	106.23	204909	143436	5.46E-03
59191.5	-66.4	40.6	40.63	81.23	11523	8066	1.73E-05
59192	-43.2	63.8	40.63	104.43	166559	116591	3.61E-03
59192.5	-62.7	44.3	40.63	84.93	17643	12350	4.05E-05

Intertek Testing Services NA, Inc.

59193	-43	64	40.63	104.63	170441	119309	3.78E-03
59193.5	-64.4	42.6	40.63	83.23	14507	10155	2.74E-05
59194	-43.1	63.9	40.63	104.53	168493	117945	3.69E-03
59194.5	-68.5	38.5	40.63	79.13	9049	6334	1.06E-05
59195	-43.1	63.9	40.63	104.53	168496	117947	3.69E-03
59195.5	-62.4	44.6	40.63	85.23	18264	12785	4.34E-05
59196	-42.3	64.7	40.63	105.33	184755	129329	4.44E-03
59196.5	-63.8	43.2	40.63	83.83	15545	10882	3.14E-05
59197	-44.4	62.6	40.63	103.23	145079	101555	2.74E-03
59197.5	-66.6	40.4	40.63	81.03	11262	7883	1.65E-05
59198	-41.9	65.1	40.63	105.73	193469	135428	4.86E-03
59198.5	-70.2	36.8	40.63	77.43	7441	5208	7.20E-06
59199	-43.1	63.9	40.63	104.53	168507	117955	3.69E-03
59199.5	-65.5	41.5	40.63	82.13	12782	8948	2.12E-05
59200	-43.9	63.1	40.63	103.73	153683	107578	3.07E-03
59200.5	-65.4	41.6	40.63	82.23	12931	9052	2.17E-05
59201	-41.7	65.3	40.63	105.93	197986	138590	5.09E-03
59201.5	-66.4	40.6	40.63	81.23	11525	8067	1.73E-05
59202	-43.7	63.3	40.63	103.93	157268	110088	3.21E-03
59202.5	-66.8	40.2	40.63	80.83	11006	7704	1.57E-05
59203	-43.2	63.8	40.63	104.43	166590	116613	3.61E-03
59203.5	-72.1	34.9	40.63	75.53	5979	4185	4.65E-06
59204	-43.1	63.9	40.63	104.53	168522	117965	3.69E-03
59204.5	-67.3	39.7	40.63	80.33	10391	7274	1.40E-05
59205	-42.7	64.3	40.63	104.93	176467	123527	4.05E-03
59205.5	-61.1	45.9	40.63	86.53	21216	14851	5.85E-05
59206	-42.7	64.3	40.63	104.93	176470	123529	4.05E-03
59206.5	-66.9	40.1	40.63	80.73	10881	7617	1.54E-05
59207	-44.5	62.5	40.63	103.13	143442	100410	2.67E-03
59207.5	-64.9	42.1	40.63	82.73	13699	9589	2.44E-05
59208	-43.5	63.5	40.63	104.13	160948	112663	3.37E-03
59208.5	-64.7	42.3	40.63	82.93	14018	9813	2.55E-05
59209	-43.8	63.2	40.63	103.83	155486	108840	3.14E-03
59209.5	-64.4	42.6	40.63	83.23	14511	10158	2.74E-05
59210	-43.9	63.1	40.63	103.73	153709	107596	3.07E-03
59210.5	-68.7	38.3	40.63	78.93	8845	6191	1.02E-05
59211	-43.5	63.5	40.63	104.13	160956	112669	3.37E-03
59211.5	-72.7	34.3	40.63	74.93	5581	3907	4.05E-06
59212	-44.4	62.6	40.63	103.23	145116	101581	2.74E-03
59212.5	-64.9	42.1	40.63	82.73	13700	9590	2.44E-05
59213	-45	62	40.63	102.63	135432	94802	2.38E-03
59213.5	-69.6	37.4	40.63	78.03	7975	5582	8.27E-06
59214	-45.1	61.9	40.63	102.53	133884	93719	2.33E-03
59214.5	-73	34	40.63	74.63	5392	3774	3.78E-06
59215	-43.7	63.3	40.63	103.93	157303	110112	3.22E-03
59215.5	-78.4	28.6	40.63	69.23	2896	2027	1.09E-06
59216	-44.7	62.3	40.63	102.93	140198	98139	2.55E-03
59216.5	-64.2	42.8	40.63	83.43	14850	10395	2.87E-05
59217	-45.3	61.7	40.63	102.33	130843	91590	2.23E-03
59217.5	-65.6	41.4	40.63	82.03	12640	8848	2.08E-05

Intertek Testing Services NA, Inc.

59218	-44.4	62.6	40.63	103.23	145130	101591	2.74E-03
59218.5	-65.4	41.6	40.63	82.23	12935	9054	2.17E-05
59219	-44.6	62.4	40.63	103.03	141829	99280	2.61E-03
59219.5	-69.1	37.9	40.63	78.53	8448	5914	9.28E-06
59220	-44.9	62.1	40.63	102.73	137016	95911	2.44E-03
59220.5	-71.6	35.4	40.63	76.03	6335	4435	5.22E-06
59221	-45.5	61.5	40.63	102.13	127873	89511	2.13E-03
59221.5	-62.8	44.2	40.64	84.84	17449	12214	3.96E-05
59222	-45	62	40.64	102.64	135453	94817	2.38E-03
59222.5	-73.4	33.6	40.64	74.24	5150	3605	3.45E-06
59223	-44.2	62.8	40.64	103.44	148523	103966	2.87E-03
59223.5	-72.3	34.7	40.64	75.34	5845	4092	4.44E-06
59224	-44.7	62.3	40.64	102.94	140217	98152	2.56E-03
59224.5	-69	38	40.64	78.64	8547	5983	9.49E-06
59225	-45.6	61.4	40.64	102.04	126418	88493	2.08E-03
59225.5	-68.8	38.2	40.64	78.84	8746	6122	9.94E-06
59226	-45.4	61.6	40.64	102.24	129365	90555	2.18E-03
59226.5	-68.6	38.4	40.64	79.04	8950	6265	1.04E-05
59227	-44.7	62.3	40.64	102.94	140224	98157	2.56E-03
59227.5	-70.9	36.1	40.64	76.74	6868	4807	6.13E-06
59228	-44.4	62.6	40.64	103.24	145155	101608	2.74E-03
59228.5	-69.3	37.7	40.64	78.34	8257	5780	8.86E-06
59229	-44.3	62.7	40.64	103.34	146838	102787	2.80E-03
59229.5	-62.3	44.7	40.64	85.34	18486	12940	4.44E-05
59230	-46.3	60.7	40.64	101.34	116639	81648	1.77E-03
sum					23266559	1.1 uW/cm2	
energy over					100 sq. cm:	109.4 uW	

EMISSION PLOTS

