

ENGINEERING TEST REPORT



**SafePlug Outlet Control Board
Model No.: 3064**

FCC ID: S9C-3064

Applicant:

OFI, Inc. (subsidiary of 2D2C Inc.)
100 Hanson Avenue
Kitchener, Ontario
Canada N2C 2E2

In Accordance With

**Federal Communications Commission (FCC)
Part 15, Subpart C
Unlicensed Low Power Transmitter Operating in the Band 13.110-14.010 MHz**

UltraTech's File No.: OFI-015_F15C225

This Test report is Issued under the Authority of
Tri M. Luu, B.A.Sc,
Vice President of Engineering
UltraTech Group of Labs

Date: November 12, 2010

Report Prepared by: Dharmajit Solanki

Tested by: Hung Trinh, EMC/RFI Technician

Issued Date: November 12, 2010

Test Dates: October 25-28 & June 04, 2010

- The results in this Test Report apply only to the sample(s) tested, and the sample tested is randomly selected.*
- This report must not be used by the client to claim product endorsement by NVLAP or any agency of the US Government.*

UltraTech

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NvLap Lab Code
200093-0



SL2-IN-E-1119R



Korea KCC-RRL

CA2049

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EXHIBIT 1. INTRODUCTION

1.1. SCOPE

Reference:	FCC Part 15, Subpart C, Sec. 15.225 - Operation within the band 13.110 – 14.010 MHz.
Title:	Title 47, Code of Federal Regulations (CFR), Part 15, Subpart C
Purpose of Test:	To gain FCC Certification Authorization for Section 15.225 - Operation within the Band 13.110 - 14.010 MHz.
Test Procedures:	Both conducted and radiated emissions measurements were conducted in accordance with American National Standards Institute ANSI C63.4 - American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz.
Environmental Classification:	Residential, commercial, industrial environment

1.2. RELATED SUBMITTAL(S)/GRANT(S)

None.

1.3. NORMATIVE REFERENCES

Publication	Year	Title
FCC 47 CFR 15	2009	Code of Federal Regulations – Telecommunication
ANSI C63.4	2003	American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 KHz to 40 GHz
CISPR 22 EN 55022	2008-09, Edition 6.0 2006	Information Technology Equipment - Radio Disturbance Characteristics - Limits and Methods of Measurement
CISPR 16-1-1 +A1 +A2	2006 2006 2007	Specification for radio disturbance and immunity measuring apparatus and methods. Part 1-1: Measuring Apparatus
CISPR 16-1-2 +A1 +A2	2003 2004 2006	Specification for radio disturbance and immunity measuring apparatus and methods. Part 1-2: Conducted disturbances

EXHIBIT 2. PERFORMANCE ASSESSMENT

2.1. CLIENT INFORMATION

APPLICANT	
Name:	OFI, Inc. (subsidiary of 2D2C Inc.)
Address:	100 Hanson Avenue Kitchener, Ontario Canada N2C 2E2
Contact Person:	Nick Jones Phone #: 519-884-3100 Fax #: 519-884-9800 Email Address: njones@safeplug.com

MANUFACTURER	
Name:	OFI, Inc. (subsidiary of 2D2C Inc.)
Address:	100 Hanson Avenue Kitchener, Ontario Canada N2C 2E2
Contact Person:	Nick Jones Phone #: 519-884-3100 Fax #: 519-884-9800 Email Address: njones@safeplug.com

2.2. EQUIPMENT UNDER TEST (EUT) INFORMATION

The following information (with the exception of the Date of Receipt) has been supplied by the applicant.

Brand Name:	OFI, Inc. (subsidiary of 2D2C Inc.)
Product Name:	SafePlug Outlet Control Board
Model Name or Number:	3064
Serial Number:	Test sample
Type of Equipment:	Low Power Communication Device Transmitter
Input Power Supply Type:	5 Vdc regulated \pm 5%
Primary User Functions of EUT:	Periodically polls for presence of contact-less memory at each receptacle (7.5 Hz at each receptacle)

2.3. EUT'S TECHNICAL SPECIFICATIONS

Transmitter	
Equipment Type:	Fixed based / mobile
Intended Operating Environment:	Residential, commercial, industrial or business
Power Supply Requirement:	5 Vdc regulated <u>±5%</u>
Field Strength:	29.5 dB μ V/m at 10 m
Operating Frequency Range:	13.56 MHz
RF Output Impedance:	50 Ω
20 dB Bandwidth:	5.46 kHz
Modulation Type:	ASK
Oscillator Frequencies:	13.56 MHz
Antenna Connector Type:	Integral etched circuit board trace magnetic loop

2.4. LIST OF EUT'S PORTS

Port Number	EUT's Port Description	Number of Identical Ports	Connector Type	Cable Type (Shielded/Non-shielded)
1	0-5 V analog input	3	Solder pin	Direct board to board / no cable
2	12 V relay drive	2	Solder pin	Direct board to board / no cable
3	12 V power in	1	Solder pin	Direct board to board / no cable
4	5 V power in	1	Solder pin	Direct board to board / no cable
5	Firmware download port	For manufacturing use only		
6	Firmware download port	For manufacturing use only		

2.5. ANCILLARY EQUIPMENT

The EUT was tested while connected to the following representative configuration of ancillary equipment necessary to exercise the ports during tests:

Ancillary Equipment # 1	
Description:	5 Vdc regulated power supply
Brand Name:	NexxTech
Model Name or Number:	1711184
Serial Number:	N/A
Cable Length & Type:	> 3 m, Non-shielded

2.6. GENERAL TEST SETUP BLOCK DIAGRAM

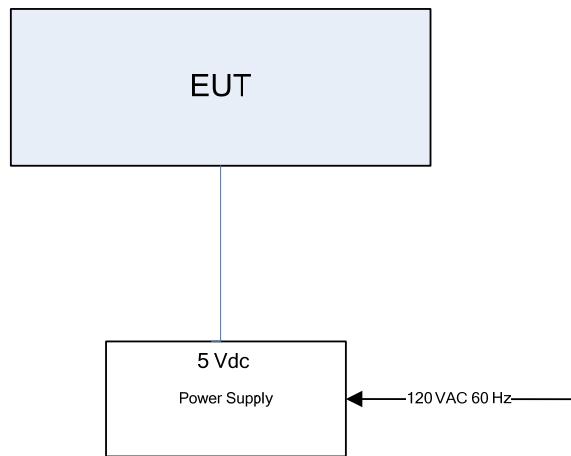


EXHIBIT 3. EUT OPERATING CONDITIONS AND CONFIGURATIONS DURING TESTS

3.1. CLIMATE TEST CONDITIONS

The climate conditions of the test environment are as follows:

Temperature:	21°C
Humidity:	51%
Pressure:	102 kPa
Power input source:	5 Vdc

3.2. OPERATIONAL TEST CONDITIONS & ARRANGEMENT FOR TESTS

Operating Modes:	The EUT was configured for continuous transmission for the duration of testing.
Special Test Software:	N/A
Special Hardware Used:	N/A
Transmitter Test Antenna:	The EUT was tested with the antenna fitted in a manner typical of normal intended use as integral antenna equipment.

Transmitter Test Signals:	
Frequency:	13.56 MHz
Transmitter Wanted Output Test Signals:	
▪ RF Power Output (measured maximum output power):	29.5 dB μ V/m at 10 m
▪ Normal Test Modulation:	ASK
▪ Modulating signal source:	Internal

EXHIBIT 4. SUMMARY OF TEST RESULTS

4.1. LOCATION OF TESTS

All of the measurements described in this report were performed at Ultratech Group of Labs located in the city of Oakville, Province of Ontario, Canada.

- AC Power Line Conducted Emissions were performed in UltraTech's shielded room, 24'(L) by 16'(W) by 8'(H).
- Radiated Emissions were performed at the Ultratech's 3-10 TDK Semi-Anechoic Chamber situated in the Town of Oakville, province of Ontario. This test site been calibrated in accordance with ANSI C63.4, and found to be in compliance with the requirements of Sec. 2.948 of the FCC Rules. The descriptions and site measurement data of the Oakville 3-10 TDK Semi-Anechoic Chamber has been filed with FCC office (FCC File No.: 91038) and Industry Canada office (Industry Canada File No.: 2049A-3). Expiry Date: 2011-05-01.

4.2. APPLICABILITY & SUMMARY OF EMC EMISSION TEST RESULTS

FCC Regulations	Test Requirements	Compliance (Yes/No)
15.203 & 15.204	The transmitter shall use a transmitting antenna that is an integral part of the device	Yes
15.215	20 dB & 99% Bandwidth	Yes
15.225(a) – (d), 15.209 & 15.109	Field Strength of Emissions Inside and Outside the Permitted Band 13.110 - 14.010 MHz & Unintentional radiator	Yes
15.225(e)	Frequency Stability	Yes
15.107 & 15.207	Class B - Power Line Conducted Emissions	Yes

4.3. MODIFICATIONS INCORPORATED IN THE EUT FOR COMPLIANCE PURPOSES

N/A

ULTRATECH GROUP OF LABS

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File #: OFI-015_F15C225

November 12, 2010

EXHIBIT 5. MEASUREMENTS, EXAMINATIONS & TEST DATA FOR EMC EMISSIONS

5.1. TEST PROCEDURES

This section contains test results only. Details of test methods and procedures can be found in ANSI C63.4 and ULTR-P001-2004.

5.2. MEASUREMENT UNCERTAINTIES

The measurement uncertainties stated were calculated in accordance with the requirements of CISPR 16-4-2 @ IEC:2003 and JCGM 100:2008 (GUM 1995) – Guide to the Expression of Uncertainty in Measurement with a confidence level of 95%. Please refer to Exhibit 7 for Measurement Uncertainties.

5.3. MEASUREMENT EQUIPMENT USED

The measurement equipment used complied with the requirements of the Standards referenced in the Methods & Procedures ANSI C63.4 and CISPR 16-1-1.

5.4. COMPLIANCE WITH FCC PART 15 – GENERAL TECHNICAL REQUIREMENTS

FCC Section	FCC Rules	
15.203	<p>Described how the EUT complies with the requirement that either its antenna is permanently attached, or that it employs a unique antenna connector, for every antenna proposed for use with the EUT.</p> <p>The exception is in those cases where EUT must be professionally installed. In order to demonstrate that professional installation is required, the following 3 points must be addressed:</p> <ul style="list-style-type: none">• The application (or intended use) of the EUT• The installation requirements of the EUT• The method by which the EUT will be marketed	Integral PCB antenna
15.204	<p>Provided the information for every antenna proposed for use with the EUT:</p> <ul style="list-style-type: none">(a) type (e.g. Yagi, patch, grid, dish, etc...),(b) manufacturer and model number(c) gain with reference to an isotropic radiator	Only furnished integral antenna will be used in the EUT.

5.5. OCCUPIED BANDWIDTH

5.5.1. Limits

The 20 dB bandwidth of the emission shall be contained within the band 13.110–14.010 MHz.

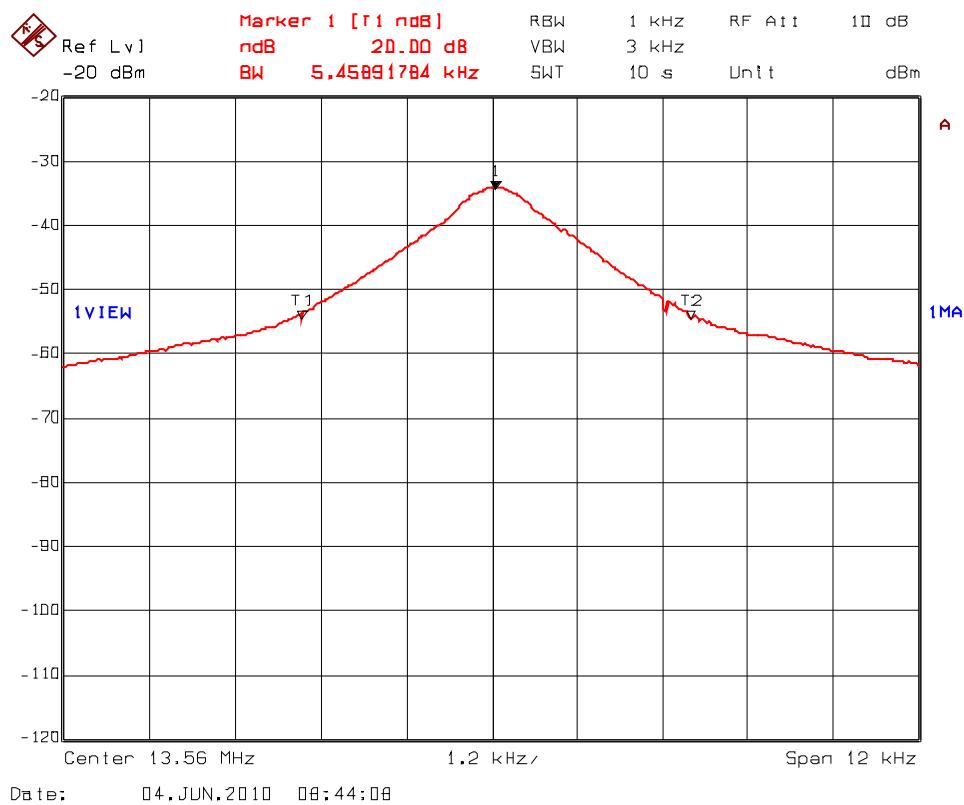
5.5.2. Method of Measurements

Refer to Ultratech Test Procedures, File # ULTR P001-2004 and ANSI C63.4 for measurement methods

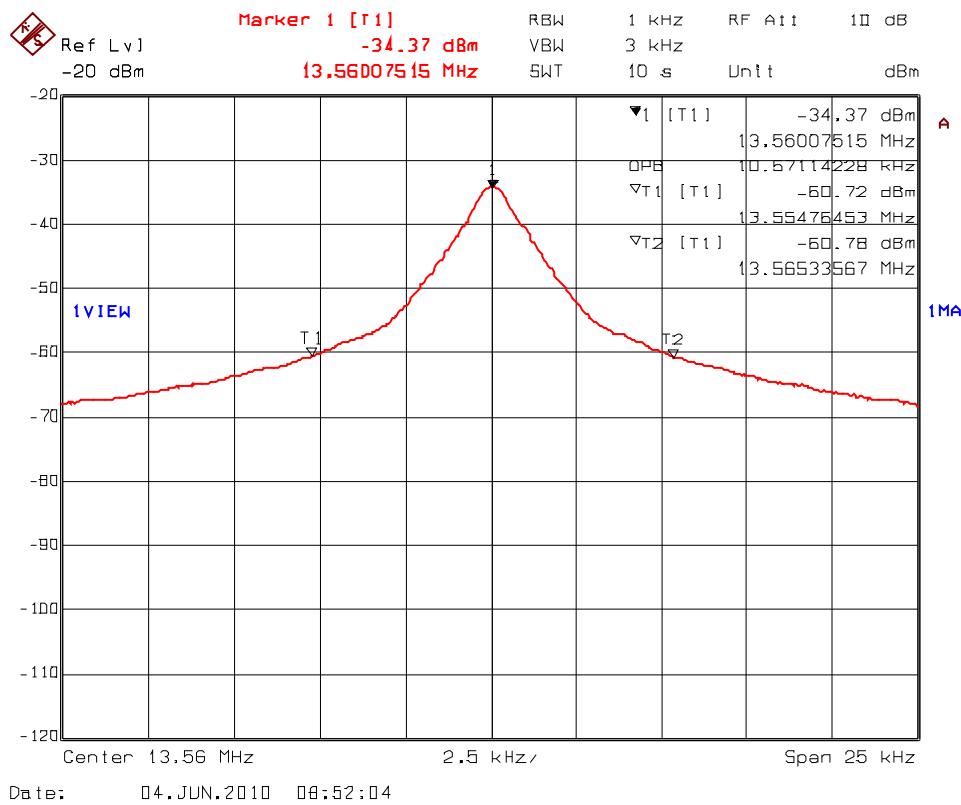
5.5.3. Test Data

Test Frequency (MHz)	Occupied Bandwidth (kHz)	
	20 dB BW	99 % BW
13.56	5.46	10.57

Plot #1: 20 dB Bandwidth - Test Frequency: 13.56 MHz



Plot #2: 99% Occupied Bandwidth - Test Frequency: 13.56 MHz



5.6. FIELD STRENGTH OF EMISSIONS INSIDE & OUTSIDE THE PERMITTED BAND 13.110-14.010 MHz [47 CFR 15.225 (a) to (d)] & 15.109, 15.209

5.6.1. Limits

- (a) The field strength of any emissions within the band 13.553-13.567 MHz shall not exceed 15,848 microvolts/meter at 30 meters.
- (b) Within the bands 13.410-13.553 MHz and 13.567-13.710 MHz, the field strength of any emissions shall not exceed 334 microvolts/meter at 30 meters.
- (c) Within the bands 13.110-13.410 MHz and 13.710-14.010 MHz the field strength of any emissions shall not exceed 106 microvolts/meter at 30 meters.
- (d) The field strength of any emissions appearing outside of the 13.110 – 14.010 MHz band shall not exceed the general radiated emission limits in § 15.209.

47 CFR 15.209(a) – Radiated Emission Limits; general requirements

Frequency (MHz)	Field Strength Limits (microvolts/m)	Distance (Meters)
0.009 - 0.490	2,400 / F (KHz)	300
0.490 - 1.705	24,000 / F (KHz)	30
1.705 - 30.0	30	30
30 – 88	100	3
88 – 216	150	3
216 – 960	200	3
Above 960	500	3

5.6.2. Method of Measurements

Refer to Ultratech Test Procedures, File # ULTR P001-2004 and ANSI C63.4 for measurement methods

Applies to harmonics/spurious that fall in the restricted bands listed in Section 15.205. the maximum permitted average field strength is listed in Section 15.209. A Pre-Amp and high-pass filter are used for this measurement.

- For measurements from 9 KHz to 150 KHz, set RBW = 200 Hz, VBW \geq RBW, SWEEP=AUTO.
- For measurements from 150 KHz to 30 MHz, set RBW = 10 KHz, VBW \geq RBW, SWEEP=AUTO.
- For measurements from 30 MHz to 1 GHz, set RBW = 100 KHz, VBW \geq RBW, SWEEP=AUTO.
- For measurement above 1 GHz, set RBW = 1 MHz, VBW = 1 MHz, SWEEP=AUTO.

If the emission is pulsed, modified the unit for continuous operation, then use the settings above for measurements, then correct the reading by subtracting the peak-average correction factor derived from the appropriate duty cycle calculation. See Section 15.35(b) and (c).

5.6.3. Test Data

Remarks:

- For frequencies below 30 MHz, radiated spurious emissions measurements were performed at 10 m distance. The results at 10 meters can be extrapolated to 30 meters using a factor of 40 dB/decade.
- For frequencies at or above 30 MHz, the results measured at 3 m distance shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade.
- The 13.56 MHz radio and the 2.4 GHz radio were set to transmit continuously during radiated emission tests.

5.6.3.1. Field Strength of Emissions Inside the Permitted Band

Frequency (MHz)	Measured Field Strength @ 10 m (dB μ V/m)	Detector Used (Peak/QP)	Antenna Plane (H/V)	Field Strength Extrapolated Value @ 30m (dB μ V/m)	§ 15.225 Field Strength Limits @ 30m	Margin (dB)
13.56	21.5	Peak	V	2.4	84.0	-81.6
13.56	29.5	Peak	H	10.4	84.0	-73.6

5.6.3.2. Field Strength of Emissions Outside the Permitted Band

Note: The spurious emissions recorded below were measured while both transmitter (13.56 MHz & 2.4 GHz) transmitting simultaneously.

FREQUENCY (MHz)	RF PEAK LEVEL (dB μ V/m)	ANTENNA PLANE (H/V)	LIMIT	LIMIT MARGIN	PASS/FAIL	Distance (m)
			15.209 (dB μ V/m)	(dB)		
40.68	20.7	V	40.0	-19.4	PASS	3
40.68	18.9	H	40.0	-21.1	PASS	3
54.24	24.7	V	40.0	-15.3	PASS	3
54.24	22.8	H	40.0	-17.2	PASS	3
57.13	22.7	V	40.0	-17.3	PASS	3
81.36	21.7	V	40.0	-18.3	PASS	3
81.36	19.6	H	40.0	-20.4	PASS	3
190.00	22.3	V	43.5	-21.2	PASS	3
190.00	26.8	H	43.5	-16.7	PASS	3
312.30	24.0	V	46.0	-22.0	PASS	3
312.30	35.0	H	46.0	-11.0	PASS	3
325.80	25.3	V	46.0	-20.7	PASS	3
325.80	35.1	H	46.0	-10.9	PASS	3
352.80	27.7	V	46.0	-18.3	PASS	3
352.80	30.8	H	46.0	-15.2	PASS	3
366.50	25.6	V	46.0	-20.4	PASS	3
366.50	26.5	H	46.0	-19.5	PASS	3

Continued ...

FREQUENCY (MHz)	RF PEAK LEVEL (dBuV/m)	ANTENNA PLANE (H/V)	LIMIT 15.209 (dBuV/m)	LIMIT MARGIN (dB)	PASS/ FAIL	Distance (m)
379.80	25.6	V	46.0	-20.4	PASS	3
379.80	25.6	H	46.0	-20.4	PASS	3
393.50	27.6	V	46.0	-18.4	PASS	3
393.50	25.3	H	46.0	-20.7	PASS	3
420.50	27.8	V	46.0	-18.2	PASS	3
420.50	25.3	H	46.0	-20.7	PASS	3
434.00	27.7	V	46.0	-18.3	PASS	3
434.00	24.7	H	46.0	-21.3	PASS	3
447.80	28.1	V	46.0	-17.9	PASS	3
447.80	25.8	H	46.0	-20.2	PASS	3
461.30	32.0	V	46.0	-14.0	PASS	3
461.30	32.2	H	46.0	-13.8	PASS	3
474.80	27.1	V	46.0	-18.9	PASS	3
474.80	25.8	H	46.0	-20.2	PASS	3
488.30	29.4	V	46.0	-16.6	PASS	3
488.30	28.7	H	46.0	-17.3	PASS	3
502.00	31.8	V	46.0	-14.3	PASS	3
502.00	29.7	H	46.0	-16.3	PASS	3
529.00	28.9	V	46.0	-17.1	PASS	3
529.00	28.0	H	46.0	-18.0	PASS	3
542.80	26.2	V	46.0	-19.8	PASS	3
542.80	26.8	H	46.0	-19.2	PASS	3
569.80	25.1	V	46.0	-20.9	PASS	3
569.80	25.6	H	46.0	-20.4	PASS	3
610.30	26.9	V	46.0	-19.1	PASS	3
610.30	31.8	H	46.0	-14.2	PASS	3

- The spurious radiated emissions were scanned from 30 – 25 GHz at 3 m distance
- All spurious emissions that are in excess of 20 dB below the specified limit shall be recorded.

5.7. FREQUENCY STABILITY [47 CFR 15.225(e)]

5.7.1. Limits

The frequency tolerance of the carrier signal shall be maintained within +/- 0.01% of the operating frequency over a temperature variation of -20 degrees to +50 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C. For battery operated equipment, the equipment tests shall be performed using a new battery.

5.7.2. Method of Measurements

Refer to Ultratech Test Procedures, File # ULTR P001-2004.

5.7.3. Test Data

Frequency Band:	13.56 MHz
Center Frequency:	13.56 MHz
Frequency Tolerance Limit:	$\pm 0.01\% (\pm 1356 \text{ Hz})$
Max. Frequency Tolerance Measured:	+156 Hz
Input Voltage Rating:	5 Vdc

Ambient Temperature (°C)	Frequency Drift (Hz)		
	Supply Voltage (Nominal) 5 Vdc	Supply Voltage (85 % of Nominal) 4.52 Vdc	Supply Voltage (115% of Nominal) 5.75 Vdc
-40	-12	--	--
-30	48	--	--
-20	156	--	--
-10	120	--	--
0	108	--	--
+10	84	--	--
+20	0	-24	-12
+30	-12	--	--
+40	-72	--	--
+50	-96	--	--
+65	-132	--	--

5.8. POWERLINE CONDUCTED EMISSIONS [47 CFR 15.107(a) & 15.207]

5.8.1. Limits

The equipment shall meet the limits of the following table:

Test Frequency Range (MHz)	Class B Limits (dB μ V)		Measuring Bandwidth
	Quasi-Peak	Average	
0.15 to 0.5	66 to 56*	56 to 46*	RBW = 9 kHz VBW \geq 9 kHz for QP VBW = 1 Hz for Average
0.5 to 5	56	46	RBW = 9 kHz VBW \geq 9 kHz for QP VBW = 1 Hz for Average
5 to 30	60	50	RBW = 9 kHz VBW \geq 9 kHz for QP VBW = 1 Hz for Average

* Decreasing linearly with logarithm of frequency

5.8.2. Method of Measurements

Refer to Ultratech Test Procedures, File # ULTR P001-2004 and ANSI C63.4 for measurement methods

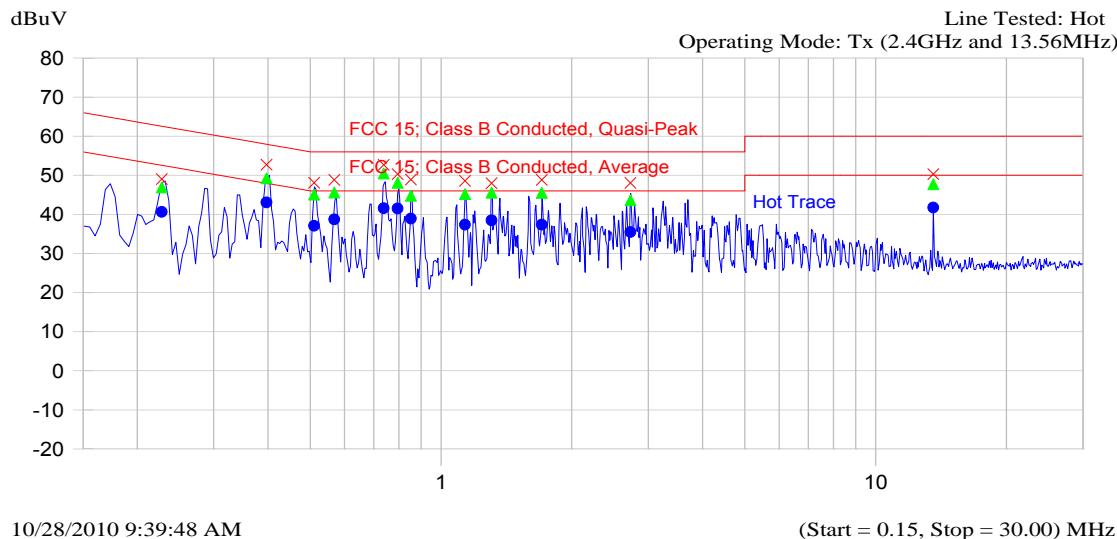
5.8.3. Test Data

Plot # 3: Power Line Conducted Emission – Line tested: Hot

Test Configuration: Tested when both Transmitters(13.56 MHz & 2.4 GHz) were ON, Line Voltage: 5 Vdc
 (tests were performed using off-shelf external AC/DC adaptor)

Description: Line Voltage: 120Vac
 Power Supply: nextech 1711184 3 IN 1 AC/DC Charger
 Setup Name: FCC 15 Class B
 Customer Name: OFI Inc
 Project Number: OFI-015Q
 Date Created: 10/28/2010 6:54:23 AM

Current Graph



Current List

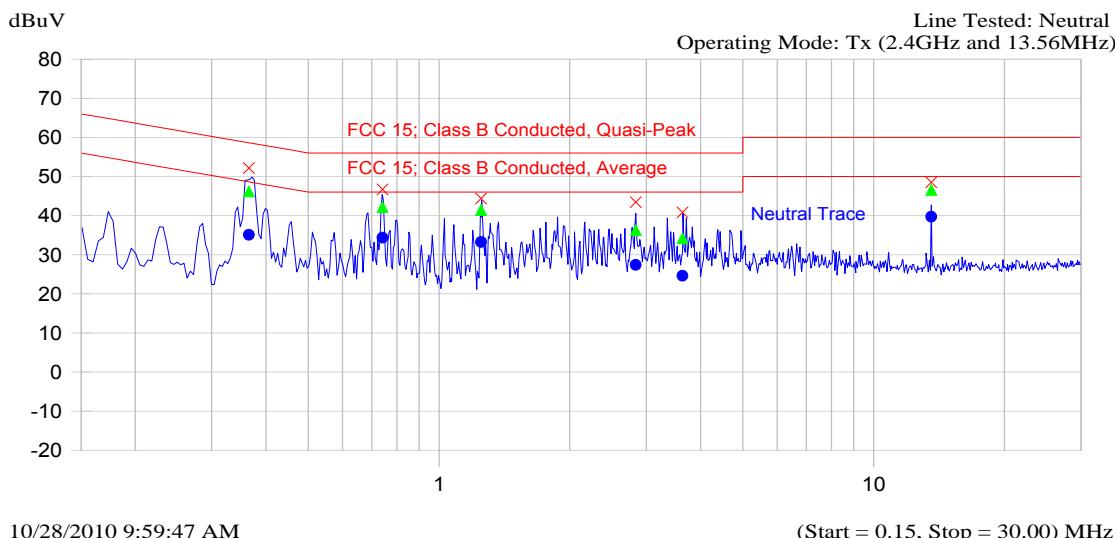
Frequency MHz	Peak dBuV	QP dBuV	Delta QP-QP Limit dB	Avg dBuV	Delta Avg-Avg Limit dB	Trace Name
0.228	49.0	46.9	-16.8	40.6	-13.1	Hot Trace
0.397	52.7	49.2	-9.7	43.1	-5.8	Hot Trace
0.511	48.1	45.1	-10.9	37.1	-8.9	Hot Trace
0.568	48.8	45.6	-10.4	38.7	-7.3	Hot Trace
0.738	52.7	50.5	-5.5	41.6	-4.4	Hot Trace
0.795	50.3	48.1	-7.9	41.5	-4.5	Hot Trace
0.853	48.9	44.8	-11.2	38.9	-7.1	Hot Trace
1.136	48.6	45.2	-10.8	37.4	-8.6	Hot Trace
1.306	48.0	45.5	-10.5	38.4	-7.6	Hot Trace
1.707	48.8	45.5	-10.5	37.3	-8.7	Hot Trace
2.728	48.0	43.6	-12.4	35.5	-10.5	Hot Trace
13.559	50.3	47.7	-12.3	41.7	-8.3	Hot Trace

Plot # 4: Power Line Conducted Emission – Line tested: Neutral

Test Configuration: Tested when both Transmitters(13.56 MHz & 2.4 GHz) were ON, Line Voltage: 5 Vdc
(tests were performed using off-shelf external AC/DC adaptor)

Description: Line Voltage: 120Vac
Power Supply: nextech, M/N: 1711184 3 IN 1 AC/DC Charger
Setup Name: FCC 15 Class B
Customer Name: OFI Inc
Project Number: OFI-015Q
Date Created: 10/28/2010 6:54:23 AM

Current Graph



Current List

Frequency MHz	Peak dBuV	QP dBuV	Delta QP-QP Limit dB	Avg dBuV	Delta Avg-Avg Limit dB	Trace Name
0.365	52.1	46.2	-13.6	35.1	-14.7	Neutral Trace
0.741	46.7	42.2	-13.8	34.4	-11.6	Neutral Trace
1.249	44.4	41.4	-14.6	33.3	-12.7	Neutral Trace
2.835	43.4	36.3	-19.7	27.4	-18.6	Neutral Trace
3.634	40.8	34.2	-21.8	24.6	-21.4	Neutral Trace
13.560	48.5	46.6	-13.4	39.7	-10.3	Neutral Trace

EXHIBIT 6. TEST EQUIPMENT LIST

Test Instruments	Manufacturer	Model No.	Serial No.	Operating Range	Calibration Due
EMI Receiver System	Agilent	E7401A	US4024043 2	9 KHz-1.5 GHz, 50 Ohms	22 Dec 2010
Transient Limiter	Pasternack	PE7010-20	--	DC – 2 GHz 20 dB attenuation	04 Jan 2011
L.I.S.N.	EMCO	3810/2	2209	9 kHz – 30 MHz 50 Ohms / 50 μ H	25 Aug 2011
12'x16'x12' RF Shielded Chamber	RF Shielding	
EMI-Test Receiver	Rohde & Schwarz	ESU40	100037	20 Hz- 40 GHz Build in amplifier	09 Mar 2011
Spectrum Analyzer	Rohde & Schwarz	FSEK30	100077	20 Hz- 40 GHz	14 Aug 2011
Loop Antenna	Emco	6502	2611	10 kHz – 30 MHz	8 Aug 2011
Biconi-Log Antenna	Emco	3142C	00026873	26 – 3000 MHz	18 April 2011
Horn Antenna	Emco	3155	9701-6570	1 – 18 GHz	20 Nov 2010
DRG Horn	ETS-Lindgren	3117	00119425	1 – 18 GHz	13 Jan 2011
Temperature & Humidity Chamber	Tenney	T5	9723B	-40°C - +80°C range	--

EXHIBIT 7. MEASUREMENT UNCERTAINTY

7.1. Line Conducted Emission Measurement Uncertainty (0.15-30 MHz)

Test Instruments	Manufacturer	Model No.	Serial No.	Frequency Range	Cal Due Date
EMI Receiver System/Spectrum Analyzer with built-in Amplifier	Hewlett Packard	8546A	3650A00371	9KHz-6.5GHz	January 25, 2011
Attenuator	Pasternack	PE7010-20	---	DC to 2 GHz 20dB attenuation	January 04, 2011
L.I.S.N. Used	EMCO	3810/2	2209	9 KHz – 30 MHz	August 25, 2011

	Line Conducted Emission Measurement Uncertainty (150 KHz – 30 MHz):	Measured	Limit
u_c	Combined standard uncertainty: $u_c(y) = \sqrt{\sum_{i=1}^m u_i^2(y)}$	± 1.57	± 1.8
U	Expanded uncertainty U: $U = 2u_c(y)$	± 3.14	± 3.6

7.2. Radiated Emission Measurement Uncertainty

Test Instruments	Manufacturer	Model No.	Serial No.	Frequency Range	Cal Due Date
EMI Receiver	Rohde & Schwarz	ESU40	100037	20 Hz to 40 GHz	March 09, 2011
Pre Amplifier	AH System	PAM-0118	225	20 MHz to 18 GHz	March 08, 2011
Biconilog Antenna	EMCO	3142C	00026873	26 – 3000 MHz	April 18, 2011
Horn Antenna	EMCO	3155	6570	1GHz – 18 GHz	November 20, 2010
Semi-Anechoic Chamber	TDK	FCC: 91038 IC: 2049A-3	--	--	May 01, 2011

	Radiated Emission Measurement Uncertainty @ 3m, Horizontal (30-1000 MHz):	Measured	Limit
u_c	Combined standard uncertainty: $u_c(y) = \sqrt{\sum_{i=1}^m u_i^2(y)}$	± 2.15	± 2.6
U	Expanded uncertainty U: $U = 2u_c(y)$	± 4.30	± 5.2

	Radiated Emission Measurement Uncertainty @ 3m, Vertical (30-1000 MHz):	Measured	Limit
u_c	Combined standard uncertainty: $u_c(y) = \sqrt{\sum_{i=1}^m u_i^2(y)}$	± 2.39	± 2.6
U	Expanded uncertainty U: $U = 2u_c(y)$	± 4.78	± 5.2

	Radiated Emission Measurement Uncertainty @ 3 m, Horizontal & Vertical (1 – 18 GHz):	Measured	Limit
u_c	Combined standard uncertainty: $u_c(y) = \sqrt{\sum_{i=1}^m u_i^2(y)}$	± 1.87	Under consideration
U	Expanded uncertainty U: $U = 2u_c(y)$	± 3.75	Under consideration