

## FCC Test Report

## 47CFR15, Subpart C for Intentional Radiators, per Section 247 Operation within the band 2400MHz-2483.5MHz

On Eye-Fi Card (2 GB) [FCC ID:VHE-2]

Report number

20080611-03-FCC

Manufactured by Eye-Fi, Inc. 305 W. Evelyn Avenue Mountain View, CA 94041

> judgement Complies as tested

Tests and report by ITC Engineering Services, Inc. 9959 Calaveras Road, P.O. Box 543 Sunol, California 94586 Tel.: (925) 862-2944 Fax: (925) 862-9013 E-Mail: docs@itcemc.com Web Site: www.itcemc.com



ISO17025 Accredited Compliance Laboratory

## **Table of Contents**

PART 1 GE	NERAL INFORMATION	
Section 1.1	Test Information	
Section 1.2	Tests Performed:	
Section 1.3	Declaration/Disclaimer	5
Section 1.4	Test Facility	6
Section 1.5	Measurement Uncertainty	6
Section 1.6	Accuracy of Test Data	6
PART 2	MAXIMUM RADIATED POWER PER 47 CFR 15.247 a(1)	7
Section 2.1	Maximum Power Measurement	7
Section 2.2	Administrative Details – Maximum Power Measurement	7
2.3: Test Equi	pment Used	7
Section 2.4	Test Data – Maximum Power Measurement (CH 1 -2.412MHz)	7
Section 2.5	Test Data – Maximum Power Measurement (CH 6 – 2.437MHz)	
Section 2.6	Test Data – Maximum Power Measurement (CH 11 – 2.462MHz)	9
PART 3 6dl	B BANDWIDTH per 47 CFR 15.247(a) (2)	
Section 3.1	6dB Bandwidth Measurement	
Section 3.2	Administrative & Environmental - 6dB Bandwidth Details	
3.3: Test Equi	pment Used	
Section 3.4	Test Data – 6dB Bandwidth Measurement (CH 1 -2412MHz)	
Section 3.5	Test Data – 6dB Bandwidth Measurement (CH 6 – 2437MHz)	11
Section 3.6	Test Data – 6dB Bandwidth Measurement (CH 11 – 2462MHz)	
PART 4 100	kHz Bandwidth Out-of-Band Emissions per 47 CFR 15.247(d)	
Section 4.1	100kHz Bandwidth Out-of-Band Emissions Measurement	
Section 4.2	Administrative & Environmental - (Out of Band details)	
4.3: Test Equi	pment Used	
Section 4.4	Test Data – 100kHz (Out-of-Band) Measurement (Channel 1)	14
Section 4.5	Test Data - 100 kHz Bandwidth (out-of-band) (CHannel 1) 200MHZ-1 Ghz	15
Section 4.6	Test Data – 100 kHz Bandwidth (out-of-band) (Channel 1)	
Section 4.7	Test Data – 100 kHz Bandwidth (out-of-band) (channel 6)	17
Section 4.8	Test Data – 100 kHz Bandwidth (out-of-band) (channel 6)	
Section 4.9	Test Data – 100 kHz Bandwidth (Out-of-Band) (Channel 6)	
Section 4.10	Test Data – 100 kHz Bandwidth (Out-of-Band) (Channel 11)	
Section 4.11	Test Data – 100 kHz Bandwidth (Out-of-Band) (Channel 11)	
Section 4.12	Test Data – 100 kHz Bandwidth (Out-of-Band) (Channel 11)	
	setup Photographs	
Part 6: APPEN	DICES	
	chnical Specification	
B. EUT PHote	ographs	



## **List of Figures**

Figure 1: Plot of Maximum Power Measurement at Channel 1	7
Figure 2: Plot of Maximum Power Measurement at Channel 6	8
Figure 3: Plot of Maximum Power Measurement at Channel 11	9
Figure 4: Plot of 6dB Bandwidth Measurement at Channel 1	10
Figure 5: Plot of Maximum Power Measurement at Channel1 6	11
Figure 6: Plot of 6dB Bandwidth Measurement at Channel 11	12
Figure 7: Plot of 100 kHz Bandwidth Out-of-Band Measurement Channel 1	. 14
Figure 8 Plot of 100 kHz Bandwidth Out-of-Band Measurement at Channel 1	15
Figure 9: Plot of 100 kHz Bandwidth Out-of-Band Measurement at Channel 1	16
Figure 10 Plot of 100 kHz Bandwidth Out-of-Band Measurement at Channel 6	17
Figure 11: Plot of 100 kHz Bandwidth Out-of-Band Measurement at Channel 6	18
Figure 12: Plot of 100 kHz Bandwidth Out-of-Band Measurement at Channel 6	19
Figure 13: Plot of 100 kHz Bandwidth Out-of-Band Measurement at Channel 11	20
Figure 14: Plot of 100 kHz Bandwidth Out-of-Band Measurement at Channel 11	21
Figure 15: Plot of 100 kHz Bandwidth Out-of-Band Measurement at Channel 11	22
Figure 16: Test setup for below 1 GHz	23
Figure 17: Test setup for above 1 GHz	
Figure 18: Test setup for above 1 GHz	25
Figure 19: EUT Front View	26
Figure 20: EUT Rear View	27

## PART 1 GENERAL INFORMATION

#### SECTION 1.1 TEST INFORMATION

Product Type	Eye-Fi Card (2 GB)	
Manufacturer's Name Manufacturer's Address Contact	Eye-Fi, Inc. 305 W. Evelyn Avenue Mountain View, CA-94041 408-896-1240 (cell) Mr. Van Krueger	Fax: : 650-625-0905 email : van@eye.fi
Test Laboratory	ITC Engineering Services, Inc. 9959 Calaveras Road, PO Box 543 Sunol, CA 94586-0543 Web Site: <u>http://www.itcemc.com</u>	Tel: +1(925) 862-2944 Fax: +1(925) 862-9013
Test Number and Report Numbers	20080611-03	20080611-03-FCC
Test Date(s) & Issue Date	June 19 <sup>th</sup> – July2 <sup>nd</sup> ,2008	July 8 <sup>th</sup> ,2008
Test Engineer(s)	Sharmistha Modak	
Chief Engineer	Michael Gbadebo, P.E	
Documentation	Sharmistha Modak	
Test Results	Complies as Tested	🗅 Fail

The electromagnetic interference tests, which this report describes, were performed by an independent electromagnetic compatibility consultant, ITC Engineering Services, Inc. (ITC), in accordance with the emissions requirements specified in the FCC rules, 47CFR Part 15, Subpart C. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical characteristics. Any modifications specified in this report for compliance must be implemented in all production units for compliance to be maintained.

#### SECTION 1.2 TESTS PERFORMED:

#### **RF Requirements:**

MAXIMUM PEAK OUTPUT OF FUNDAMENTAL in accordance with the FCC 47 CFR 15.247(a) (1) 6dB BANDWIDTH in accordance with FCC 47 CFR 15.247(a)(2) HARMONIC/SPURIOUS EMISSIONS out of band in 100 KHz BW in accordance with the FCC 47 CFR 15.247(d)



#### Applicant: EYE-FI Inc SECTION 1.3 DECLARATION/DISCLAIMER

ITC Engineering Services, Inc. (ITC) reports apply only to the specific samples tested under stated test conditions. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical components. ITC Engineering Services, Inc. shall have no liability for any deductions, inferences or generalizations drawn by the client or others from ITC Engineering Services, Inc. issued reports.

This report is the confidential property of the client. As a mutual protection to our clients, the public and ourselves, extracts from the test report shall not be reproduced except in full with our written approval. The applicant/manufacturer shall not use this report to claim product endorsement by NVLAP or any US Government agency.

**ITC Engineering Services, Inc. (ITC) is:** Accredited by NVLAP (Ref: NVLAP Lab Code 200172-0)

#### Applicant: EYE-FI Inc

#### SECTION 1.4 TEST FACILITY

The open area test site, the conducted measurement facility, and the test equipment used to collect the emissions data is located in Sunol, California, and is fully described in a site attenuation report. The approved site attenuation description is on file at the Federal Communications Commission.

#### SECTION 1.5 MEASUREMENT UNCERTAINTY

Radiated Emissions Measurements - 30MHz to 25GHz

	Uncertainty Contribution	3m Value	Probability
			Distribution
1	Antenna factor calibration	± 2.0	Normal
2	Cable loss calibration	± 0.5	Normal
3	Receiver/SA specification	± 2.0	Rectangular
4	Antenna directivity	± 0.5	Rectangular
5	Antenna factor vs height	± 2.0	Rectangular
6	Site imperfection	± 4.0	Triangular
7	Mismatch		
	Receiver/SA VRC = 0.33		
	Antenna VRC = 0.82		
	Uncertainty = 20log [(1- (0.33 x 0.82)]	± 2.74	U-shaped
8	Measurement system repeatability	± 1.0	Normal
	Combined standard uncertainty u <sub>c</sub> (y)	± 3.24	Normal
	Expanded uncertainty U	± 6.48	Normal (k = 2)

#### Notes:

Antenna factor vs height is worst for biconical antenna at horizontal polarization.

VRC stands for Voltage Reflection Coefficient and is related to VSWR as follows:

VRC = (VSWR-1)/(VSWR+1). The Receiver/SA has a CISPR 16 compliant VSWR of 2:1 (0dB attenuation). The antenna VSWR is a worst-case value of 10:1 for the biconical antenna.

 $\lim_{x \to 0} u_{c}(y) = \left[ (2.0/2)^{2} + (0.5/2)^{2} + (2.0/1.73)^{2} + (0.5/1.73)^{2} + (2.0/1.73)^{2} + (4.0/2.45)^{2} + (2.74/1.41)^{2} + (1.0/2)^{2} \right] \frac{1}{2} = 3.24$ 

 $10m u_{c}(y) = [(2.0/2)^{2} + (0.5/2)^{2} + (2.0/1.73)^{2} + (0.5/1.73)^{2} + (2.0/1.73)^{2} + (4.0/2.45)^{2} + (2.74/1.41)^{2} + (1.0/2)^{2}]$   $\frac{1}{2} = 3.24$ 

#### SECTION 1.6 ACCURACY OF TEST DATA

The test results contained in this report accurately represent the emissions generated by the sample equipment under test. ITC Engineering Services, Inc. (ITC) as an independent testing laboratory declares that the equipment as tested complies with the requirements of:

1. FCC standard 47CFR15.247.

For Intentional Radiators Operation within the band 2400MHz – 2483.5MHz

#### PART 2 MAXIMUM RADIATED POWER PER 47 CFR 15.247 A(1)

#### SECTION 2.1 MAXIMUM POWER MEASUREMENT

The Card was inserted in a Ricoh GR Digital and powered on. The card was programmed for continues transmission mode. The camera was set on a plastic non-conductive fixture at 1.5 m height from the ground plane and 3 m away from the antenna. The measurement data below represents the maximum worst-case result from the measurement performed in accordance to the requirements of this section.

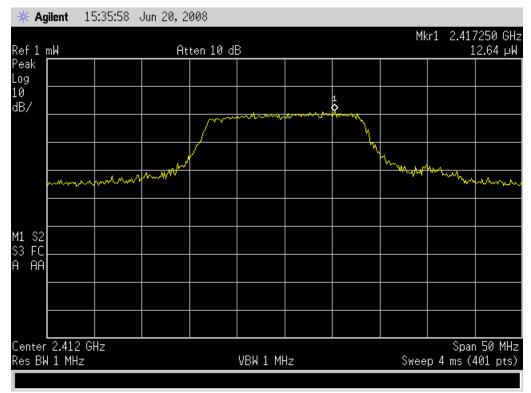
#### SECTION 2.2 ADMINISTRATIVE DETAILS – MAXIMUM POWER MEASUREMENT

Test Date(s):	June 19 <sup>th</sup> - June 20 <sup>th</sup> ,2008
<b>Test Engineer(s):</b>	Sharmistha Modak
Temperature	65°F
Humidity	50%

#### 2.3: Test Equipment Used

Equipment Description	Manufacturer	Model Name	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	E7402A	MY45112376	07/28/2008
Horn Antenna	EMCO	3115	8812-3050	03/26/2009

#### SECTION 2.4 TEST DATA – MAXIMUM POWER MEASUREMENT (CH 1 -2.412MHZ)



#### Figure 1: Plot of Maximum Power Measurement at Channel 1

#### Test-Data Summary – Peak Measurement (CH 1– 2.412MHz)

Center Frequency Peak Level:	= 2.412MHz = 12.64µW	
Prepared By: ITC Engineeri	ng Services, Inc.	Product:: Eye-Fi 2 GB Card
9959 Calaveras Road, PO B	ox 543	
Sunol, California 94586-054	3	
Tel: [925] 862-2944	Fax: [925] 862-9013	
Email: docs@itcemc.com	Web: www.itcemc.com	FCC ID:VHE-2



#### SECTION 2.5 TEST DATA – MAXIMUM POWER MEASUREMENT (CH 6 – 2.437MHZ)

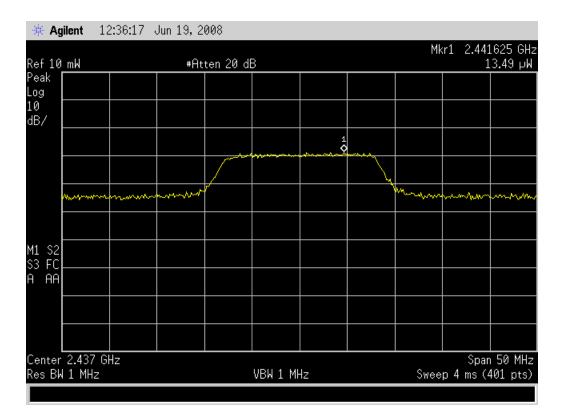
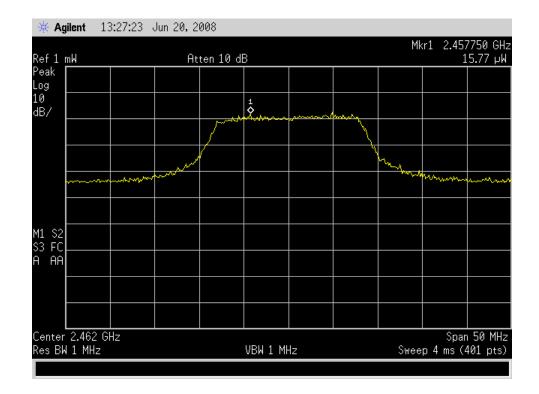


Figure 2: Plot of Maximum Power Measurement at Channel 6

#### Test-Data Summary – Maximum Power Measurement (CH 6 – 2.437MHz)

Center Frequency	=	2.437MHz
Peak Level:	=	13.49uW
Limit = 125mW		





#### SECTION 2.6 TEST DATA – MAXIMUM POWER MEASUREMENT (CH 11 – 2.462MHZ)

Figure 3: Plot of Maximum Power Measurement at Channel 11

#### Test-Data Summary – Maximum Power Measurement (CH 11 – 2.462MHz)

Center Frequency	=	2.462MHz
Peak Level:	=	15.77uW
Limit = 125mW		



#### Applicant: EYE-FI Inc

### PART 3 6dB BANDWIDTH per 47 CFR 15.247(a) (2)

#### SECTION 3.1 6DB BANDWIDTH MEASUREMENT

The Card was inserted in a Ricoh GR Digital and powered on. The card was programmed for continues transmission mode. The camera was set on a plastic non-conductive fixture at 1.5 m height from the ground plane and 3 m away from the antenna. The measurement data below represents the maximum worst-case result from the measurement performed in accordance to the requirements of this section.

#### SECTION 3.2 ADMINISTRATIVE & ENVIRONMENTAL - 6DB BANDWIDTH DETAILS

Test Date(s):	June 19 <sup>th</sup> - June 20 <sup>th</sup> ,2008	
Test Engineer(s):	Sharmistha Modak	
Temperature	65°F	
Humidity	50%	
3.3: Test Equipment Used		

# Equipment DescriptionManufacturerModel NameSerial NumberCalibration DueSpectrum AnalyzerAgilentE7402AMY4511237607/28/2008Horn AntennaEMCO31158812-305003/26/2009

#### SECTION 3.4 TEST DATA – 6DB BANDWIDTH MEASUREMENT (CH 1 -2412MHZ)

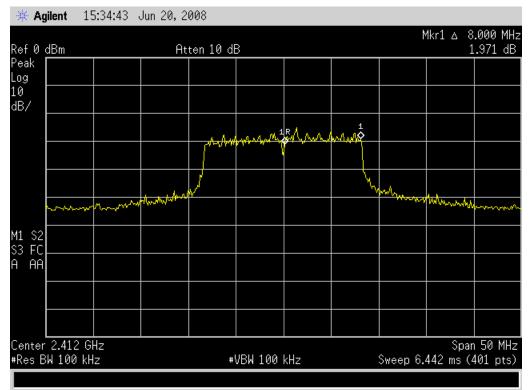


Figure 4: Plot of 6dB Bandwidth Measurement at Channel 1

#### Test-Data Summary – Peak Measurement (CH 1– 2412MHz)

Center Frequency	=	2.412MHz
6dB Bandwidth	=	8MHz
Limit per 15.247(a)(2)	=	500kHz minimum



#### SECTION 3.5 TEST DATA - 6DB BANDWIDTH MEASUREMENT (CH 6 - 2437MHZ)

Applicant: EYE-FI Inc

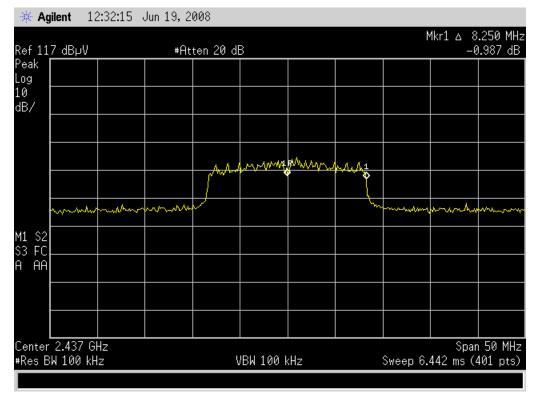
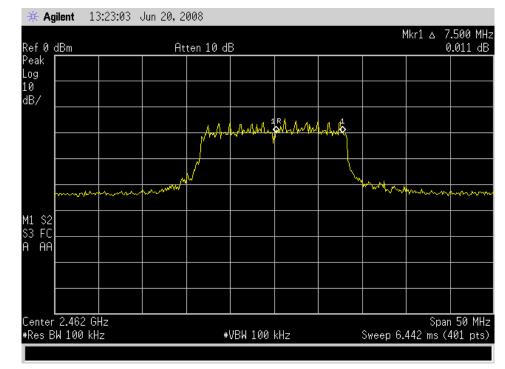


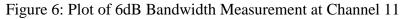
Figure 5: Plot of Maximum Power Measurement at Channel1 6

#### Test-Data Summary – Maximum Power Measurement (CH 6 – 2437MHz)

Center Frequency	=	2.437MHz
6dB Bandwidth	=	8.25Hz
Limit per 15.247(a)(2)	=	500kHz minimum



#### SECTION 3.6 TEST DATA - 6DB BANDWIDTH MEASUREMENT (CH 11 - 2462MHZ)



#### Test-Data Summary – Maximum Power Measurement (CH 11 – 2.462MHz)

Center Frequency	=	2.462MHz
6dB Bandwidth	=	7.5MHz
Limit per 15.247(a)(2)	=	500kHz minimum

## PART 4 100 kHz Bandwidth Out-of-Band Emissions per 47 CFR 15.247(d)

#### SECTION 4.1 100KHZ BANDWIDTH OUT-OF-BAND EMISSIONS MEASUREMENT

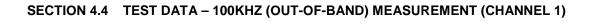
The Card was inserted in a Ricoh GR Digital and powered on. The card was programmed for continues transmission mode. The camera was set on a plastic non-conductive fixture at 1.5 m height from the ground plane and 3 m away from the antenna. The measurement data below represents the maximum worst-case result from the measurement performed in accordance to the requirements of this section.

#### SECTION 4.2 ADMINISTRATIVE & ENVIRONMENTAL - (OUT OF BAND DETAILS)

Test Date(s):	July 2 <sup>nd</sup> ,2008
<b>Test Engineer(s):</b>	Sharmistha Modak
Temperature	75°F
Humidity	40%

#### 4.3: Test Equipment Used

Equipment Description	Manufacturer	Model Name	Serial Number	Calibration Due
Spectrum Analyzer	Hewlett-Packard	8565E	3943A01328	06/13/2010
Spectrum Analyzer	Agilent	E7402A	MY45112376	07/28/2008
Horn Antenna	EMCO	3115	8812-3050	03/26/2009
Bi-conical Antenna	EMCO	3104	890-3885	1/03/2009
L. P. Ant. (200-1000 MHz)	EMCO	3146	9510-4202	1/25/2009



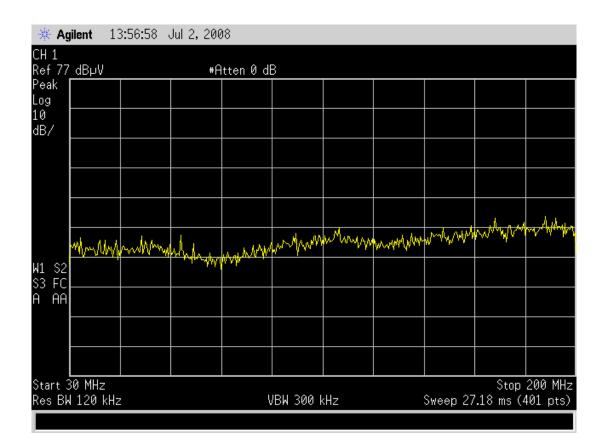


Figure 7: Plot of 100 kHz Bandwidth Out-of-Band Measurement Channel 1

#### Test-Data Summary – 100 kHz Bandwidth Out-of-Band Measurement

Maximum Peak (30MHz – 200MHz) = Noise floor No spurious or harmonics found

#### SECTION 4.5 TEST DATA - 100 KHZ BANDWIDTH (OUT-OF-BAND) (CHANNEL 1) 200MHZ-1 GHZ

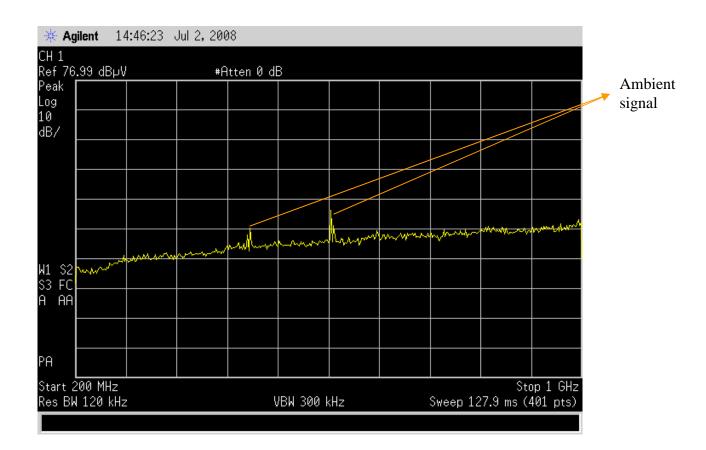


Figure 8: Plot of 100 kHz Bandwidth Out-of-Band Measurement at Channel 1

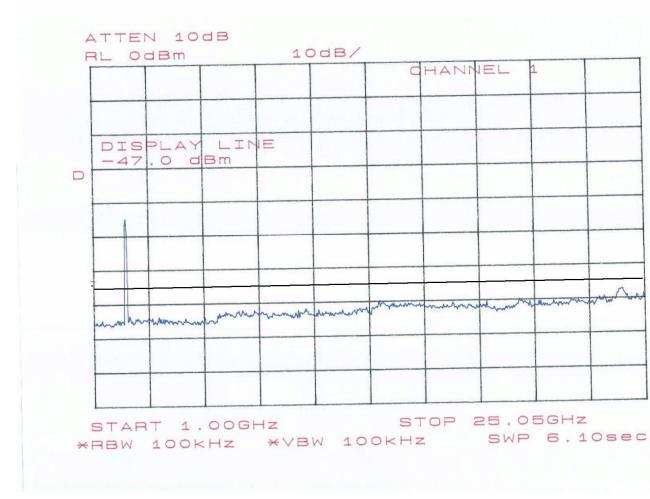
Test-Data Summary – 100 kHz Bandwidth Out-of-Band Measurement (Channel 1)

Maximum Peak (200MHz – 1GHz) No spurious or harmonics found Noise Floor

=

Page 15 of 28Prepared By:ITC Engineering Services, Inc.9959 Calaveras Road, PO Box 543Sunol, California 94586-0543Tel:[925] 862-2944Fax:[925] 862-9013Email:docs@itcemc.comWeb:www.itcemc.com



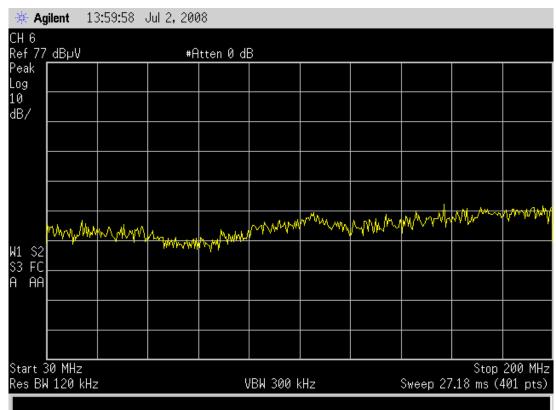


#### SECTION 4.6 TEST DATA – 100 KHZ BANDWIDTH (OUT-OF-BAND) (CHANNEL 1)

Figure 9: Plot of 100 kHz Bandwidth Out-of-Band Measurement at Channel 1

Test-Data Summary – 100 kHz Bandwidth Out-of-Band Measurement (Channel 1) for 200MHZ-1 GHzPeak Frequency (Fundamental)=2412MHzNo spurious or harmonics found=2412MHz





#### SECTION 4.7 TEST DATA - 100 KHZ BANDWIDTH (OUT-OF-BAND) (CHANNEL 6)

Figure 10 Plot of 100 kHz Bandwidth Out-of-Band Measurement at Channel 6

Test-Data Summary – 100 kHz Bandwidth Out-of-Band Measurement (Channel 6)

Maximum Peak (30MHz – 200MHz) = Noise floor



#### SECTION 4.8 TEST DATA – 100 KHZ BANDWIDTH (OUT-OF-BAND) (CHANNEL 6)

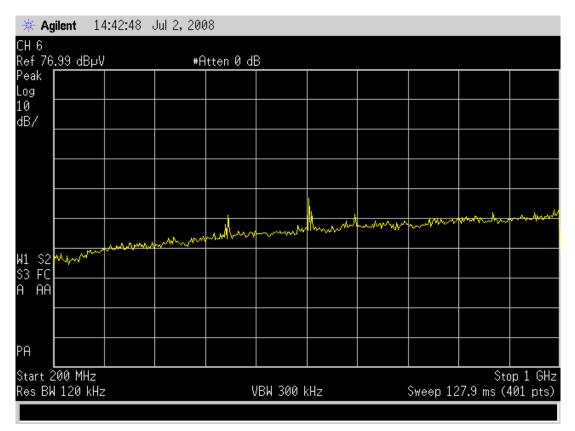
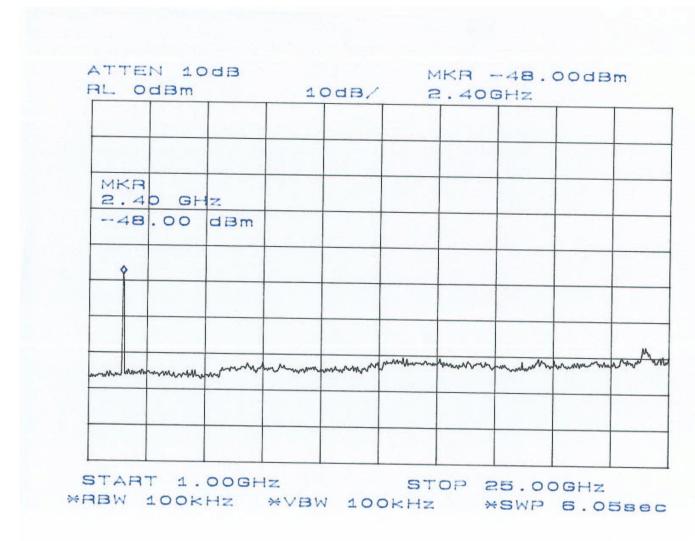


Figure 11: Plot of 100 kHz Bandwidth Out-of-Band Measurement at Channel 6

Test-Data Summary – 100 kHz Bandwidth Out-of-Band Measurement (Channel 6)

Maximum Peak (200MHz – 1GHz) = Noise floor



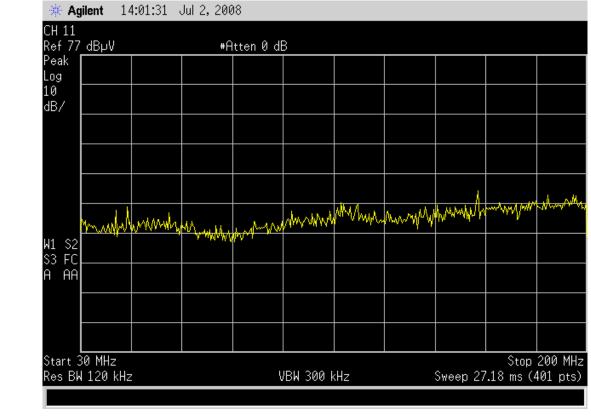


#### SECTION 4.9 TEST DATA - 100 KHZ BANDWIDTH (OUT-OF-BAND) (CHANNEL 6)

Figure 12: Plot of 100 kHz Bandwidth Out-of-Band Measurement at Channel 6

Test-Data Summary – 100 kHz Bandwidth Out-of-Band Measurement (Channel 16) 1~GHz - 25~GHz

Peak Frequency (Fundamental) = 2437MHz



#### SECTION 4.10 TEST DATA - 100 KHZ BANDWIDTH (OUT-OF-BAND) (CHANNEL 11)

Figure 13: Plot of 100 kHz Bandwidth Out-of-Band Measurement at Channel 11

Test-Data Summary – 100 kHz Bandwidth Out-of-Band Measurement (Channel 11) for 30MHz – 200MHz Maximum Peak (30MHz – 200MHz) = Noise Floor



#### SECTION 4.11 TEST DATA - 100 KHZ BANDWIDTH (OUT-OF-BAND) (CHANNEL 11)

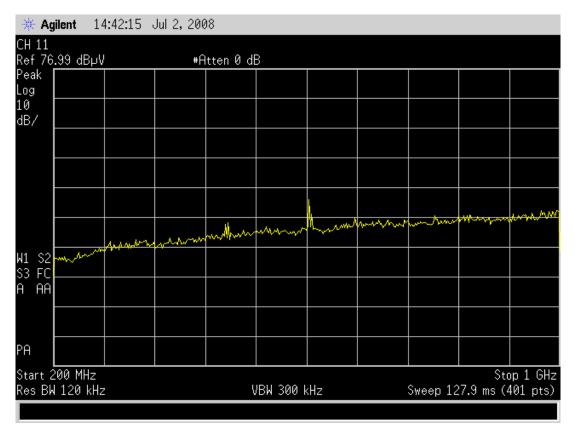
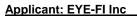


Figure 14: Plot of 100 kHz Bandwidth Out-of-Band Measurement at Channel 11

Test-Data Summary – 100 kHz Bandwidth Out-of-Band Measurement (Channel 11)

Maximum Peak (200MHz – 1GHz) = Noise Floor



#### SECTION 4.12 TEST DATA – 100 KHZ BANDWIDTH (OUT-OF-BAND) (CHANNEL 11)

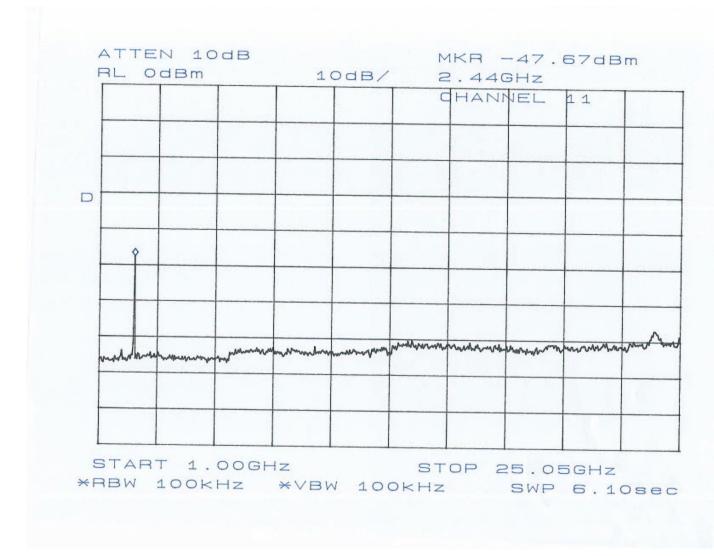


Figure 15: Plot of 100 kHz Bandwidth Out-of-Band Measurement at Channel 11

Test-Data Summary – 100 kHz Bandwidth Out-of-Band Measurement (Channel 11) for 1GHz – 25GHz

Peak Frequency (Fundamental) = 2462MHz

## **PART 5: Test setup Photographs**

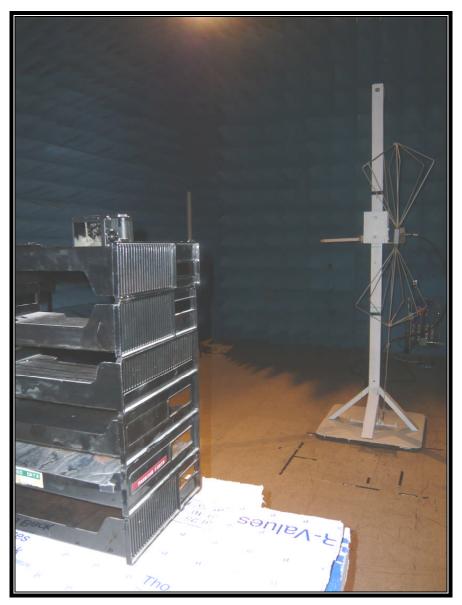


Figure 16: Test setup for below 1 GHz



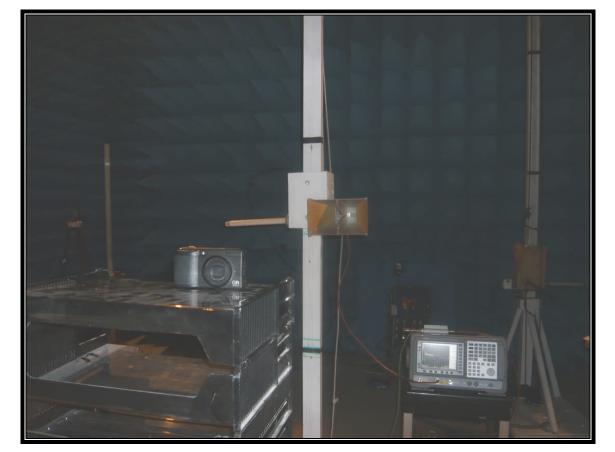


Figure 17: Test setup for above 1 GHz

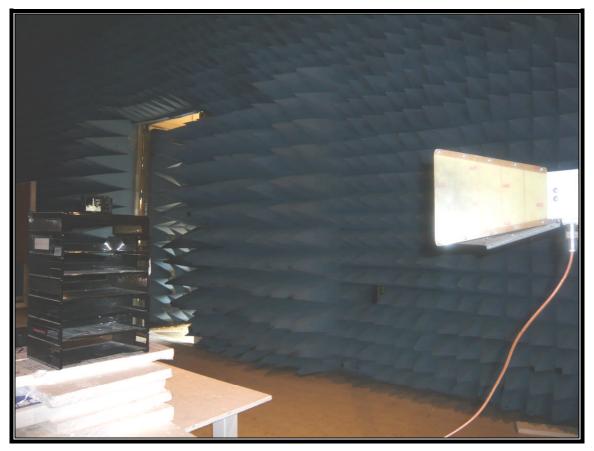


Figure 18: Test setup for above 1 GHz



#### Applicant: EYE-FI Inc Part 6: APPENDICES

#### A. EUT TECHNICAL SPECIFICATION

Applicant	EYE-Fi Inc
General Description	The Eye-Fi EYE-FI-2GB is a combination 2 gigabyte storage and WiFi (802.11b/g) standard transceiver device in the Secure Digital Memory Card <sub>1</sub> form factor. The product is intended for use as a module in digital cameras to permit transfer of data between the camera and other network attached devices.
Dimension	1"H X 1 ¼" W
Power Input	Draw 3.3Vdc from the host

#### **B. EUT PHOTOGRAPHS**



**Figure 19: EUT Front View** 

Page 26 of 28Prepared By:ITC Engineering Services, Inc.9959 Calaveras Road, PO Box 543Sunol, California 94586-0543Tel:[925] 862-2944Fax:[925] 862-9013Email:docs@itcemc.comWeb:www.itcemc.com

Product: Eye-Fi 2GB Card

FCC ID:VHE-2

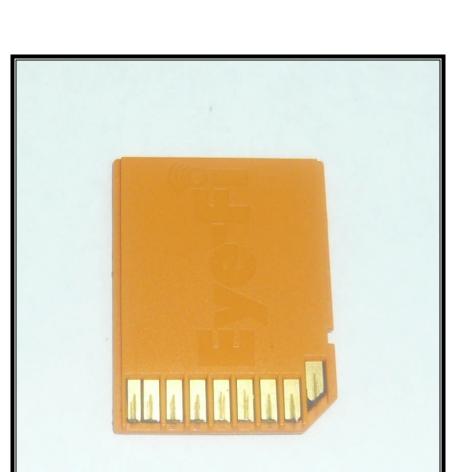


Figure 20: EUT Rear View

#### Applicant: EYE-FI Inc

To Whom It May Concern:

This is to certify that no modifications were necessary for Eye-Fi Card to comply with the requirements of the standard listed below.

#### FCC Rules and Regulations per 47 CFR 15.247

It is the manufacturer's responsibility to ensure that additional production units of the Eye-Fi Card are manufactured with identical electrical and mechanical characteristics.

For further information, please contact the manufacturer at: Mr. Van Krueger Eye-Fi, Inc. 305 W. Evelyn Avenue Mountain View, CA 94041 Tel: 408-896-1240 (cell) Fax: 650-625-0905 Email: van@eye.fi