FCC Test Report

Product Name	Wireless Interactive Whiteboard System – IW2
Model No.	CSW2-02IP
FCC ID	WKP-CSW2-02IP

Applicant	IPEVO Corp.
Address	3F, No.53, Bo-ai Road, Taipei 100, Taiwan

Date of Receipt	Jun. 14, 2016
Issued Date	Jul. 11, 2016
Report No.	1660310R-RFUSP15V00
Report Version	V1.0

Testing Laboratory
3023

Test Report

Issued Date: Jul. 11, 2016
Report No.: 1660310R-RFUSP15V00

Product Name	Wireless Interactive Whiteboard System – IW2
Applicant	IPEVO Corp.
Address	3F, No.53, Bo-ai Road, Taipei 100, Taiwan
Manufacturer	IPEVO Corp.
Model No.	CSW2-02IP
EUT Rated Voltage	AC 100-240V, 50/60Hz
EUT Test Voltage	AC 120V/60Hz
Trade Name	IPEVO
Applicable Standard	FCC CFR Title 47 Part 15 Subpart C: 2015 ANSI C63.4: 2014, ANSI C63.10: 2013
Test Result	Complied

Documented By : Joanne Lin

(Senior Adm. Specialist / Joanne Lin)

Tested By : Xiao Chen

(Engineer / Xiao Chen)

Approved By :

(Director / Vincent Lin)

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1. GENERAL INFORMATION

1.1. EUT Description

Product Name	Wireless Interactive Whiteboard System – IW2
Trade Name	IPEVO
Model No.	CSW2-02IP
FCC ID	WKP-CSW2-02IP
Frequency Range	2405-2468MHz
Channel Number	3
Type of Modulation	GFSK
Antenna Type	Chip Antenna
Channel Control	Auto
Antenna Gain	Refer to the table “Antenna List”
USB Cable	Non-Shielded, 3.5m
Power Adapter	MFR: IPEVO, M/N: DSA-5PFU1-05 FCA 050100 Input: AC 100-240V~50/60Hz, 0.2A Output: DC +5V, 1A

Antenna List

No.	Manufacturer	Part No.	Antenna Type	Peak Gain
1	WinWave	WAN8010F245M03 WAN8010F245M04 WAN8010F245M05	Chip Antenna	3.45dBi for 2.4 GHz

Note: The antenna of EUT is conform to FCC 15.203

Center Frequency of Each Channel

Channel	Frequency	Channel	Frequency	Channel	Frequency
Channel 1:	2405 MHz	Channel 2:	2440 MHz	Channel 3:	2468 MHz

Note:

1. The EUT is a Wireless Interactive Whiteboard System – IW2 with a built-in 2.4GHz wireless transceiver.
2. Regarding to the operation frequency, the lowest, middle and highest frequency are selected to perform the test.
3. The radiation measurements are performed in X, Y, Z axis positioning. Only the worst case is shown in the report.

Test Mode	Mode 1: Transmit

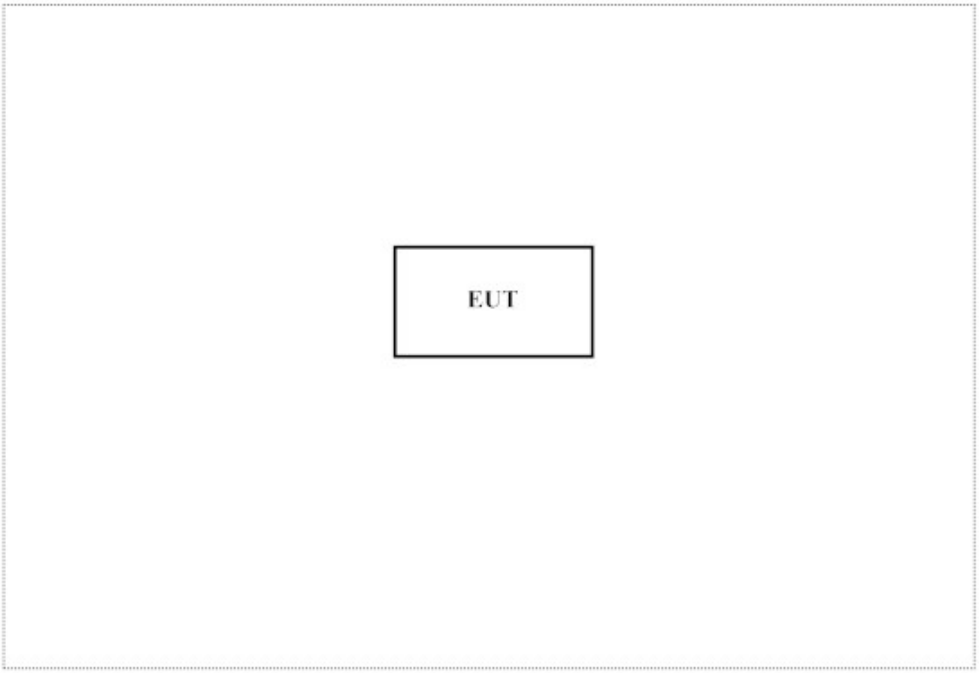
1.3. Tested System Datails

The types for all equipment, plus descriptions of all cables used in the tested system (including inserted cards) are:

Product	Manufacturer	Model No.	Serial No.	Power Cord
N/A				

Signal Cable Type	Signal Cable Description
N/A	

1.4. Configuration of Test System



1.5. EUT Exercise Software

(1) Setup the EUT as shown in Section 1.4.
(2) The Internal Test Fixture uses in controlling EUT to transmit continuously.
(3) Configure the test mode and the test channel
(4) Start the continuous Transmit.
(5) Verify that the EUT works properly.

1.6. Test Facility

Ambient conditions in the laboratory:

Items	Required (IEC 68-1)	Actual
Temperature (°C)	15-35	20-35
Humidity (%RH)	25-75	50-65
Barometric pressure (mbar)	860-1060	950-1000

The related certificate for our laboratories about the test site and management system can be downloaded from QuieTek Corporation's Web Site: http://www.quietek.com/chinese/about/certificates.aspx?bval=5
The address and introduction of QuieTek Corporation's laboratories can be founded in our Web site: http://www.quietek.com/

Site Description: File on
Federal Communications Commission
FCC Engineering Laboratory
7435 Oakland Mills Road
Columbia, MD 21046
Registration Number: 92195

Site Name: Quietek Corporation
Site Address: No.5-22, Ruishukeng,
Linkou Dist. New Taipei City 24451,
Taiwan, R.O.C.
TEL: 886-2-8601-3788 / FAX : 886-2-8601-3789
E-Mail : service@quietek.com

FCC Accreditation Number: TW1014

2. Conducted Emission

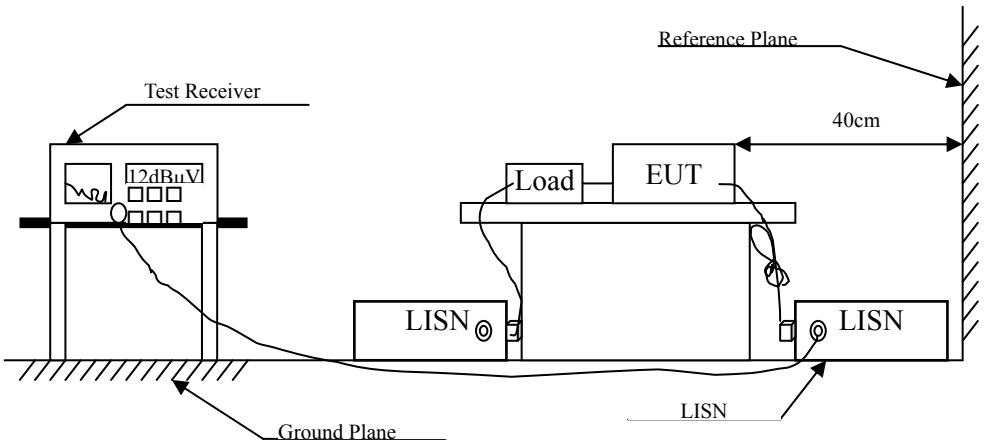
2.1. Test Equipment

	Equipment	Manufacturer	Model No. / Serial No.	Last Cal.	Remark
X	Test Receiver	R & S	ESCS 30 / 825442/018	Sep., 2015	
X	Artificial Mains Network	R & S	ENV4200 / 848411/10	Feb., 2016	Peripherals
X	LISN	R & S	ESH3-Z5 / 825562/002	Feb., 2016	EUT
	DC LISN	Schwarzbeck	8226 / 176	Mar., 2016	EUT
X	Pulse Limiter	R & S	ESH3-Z2 / 357.8810.52	Feb., 2016	
	No.1 Shielded Room				

Note:

1. All equipments are calibrated every one year.
2. The test instruments marked by "X" are used to measure the final test results.

2.2. Test Setup



2.3. Limits

FCC Part 15 Subpart C Paragraph 15.207 (dBμV) Limit		
Frequency MHz	Limits	
	QP	AV
0.15 - 0.50	66-56	56-46
0.50-5.0	56	46
5.0 - 30	60	50

Remarks: In the above table, the tighter limit applies at the band edges.

2.4. Test Procedure

The EUT and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50 ohm /50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm /50uH coupling impedance with 50ohm termination. (Please refers to the block diagram of the test setup and photographs.)
Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.4: 2014 on conducted measurement.
Conducted emissions were invested over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9kHz.

2.5. Uncertainty

± 2.26 dB

2.6. Test Result of Conducted Emission

Product : Wireless Interactive Whiteboard System – IW2
Test Item : Conducted Emission Test
Power Line : Line 1
Test Mode : Mode 1: Transmit (2440MHz)

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBµV	dBµV	dB	dBµV
LINE 1					
Quasi-Peak					
0.377	9.672	24.830	34.502	-25.012	59.514
0.580	9.678	37.120	46.798	-9.202	56.000
0.748	9.694	26.260	35.954	-20.046	56.000
1.302	9.711	25.640	35.351	-20.649	56.000
3.041	9.768	24.500	34.268	-21.732	56.000
11.548	9.915	28.410	38.325	-21.675	60.000
Average					
0.377	9.672	15.420	25.092	-24.422	49.514
0.580	9.678	35.610	45.288	-0.712	46.000
0.748	9.694	20.140	29.834	-16.166	46.000
1.302	9.711	14.200	23.911	-22.089	46.000
3.041	9.768	15.410	25.178	-20.822	46.000
11.548	9.915	25.370	35.285	-14.715	50.000

Note:

1. All Reading Levels are Quasi-Peak and average value.
2. " " means the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

Product : Wireless Interactive Whiteboard System – IW2
Test Item : Conducted Emission Test
Power Line : Line 2
Test Mode : Mode 1: Transmit (2440MHz)

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBµV	dBµV	dB	dBµV
LINE 2					
Quasi-Peak					
0.314	9.740	23.320	33.060	-28.254	61.314
0.576	9.748	36.580	46.328	-9.672	56.000
1.568	9.790	24.940	34.730	-21.270	56.000
2.060	9.805	27.330	37.135	-18.865	56.000
4.771	9.865	24.820	34.685	-21.315	56.000
11.552	10.015	28.650	38.665	-21.335	60.000
Average					
0.314	9.740	18.640	28.380	-22.934	51.314
0.576	9.748	33.800	43.548	-2.452	46.000
1.568	9.790	20.650	30.440	-15.560	46.000
2.060	9.805	15.210	25.015	-20.985	46.000
4.771	9.865	20.000	29.865	-16.135	46.000
11.552	10.015	19.070	29.085	-20.915	50.000

Note:

1. All Reading Levels are Quasi-Peak and average value.
2. " " means the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

3. Radiated Emission

3.1. Test Equipment

The following test equipments are used during the radiated emission test:

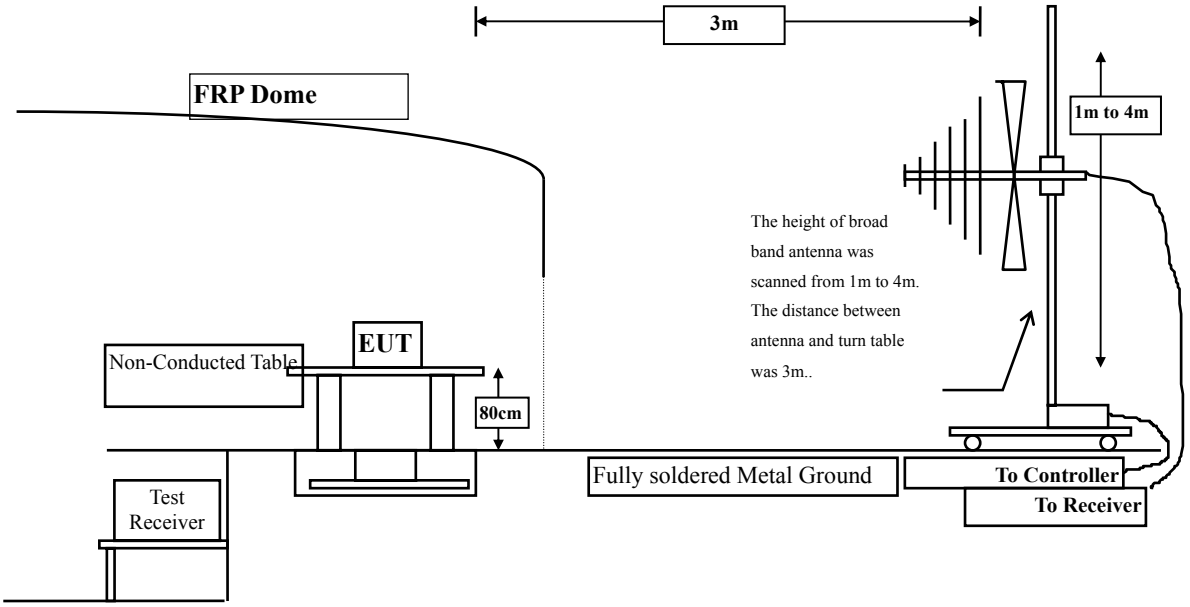
Test Site		Equipment	Manufacturer	Model No./Serial No.	Last Cal.
☒Site # 3	X	Magnetic Loop Antenna	Teseq	HLA6121/ 37133	Sep., 2015
	X	Bilog Antenna	Schaffner Chase	CBL6112B/ 2707	Jun., 2016
	X	EMI Test Receiver	R&S	ESCS 30/838251/ 001	Jun., 2016
	X	Coaxial Cable	QTK(Arnist)	RG 214/ LC003-RG	Jun., 2016
	X	Coaxial signal switch	Arnist	MP59B/ 6200798682	Jun., 2016

Test Site		Equipment	Manufacturer	Model No./Serial No.	Last Cal.
☒CB # 8	X	Spectrum Analyzer	R&S	FSP40/ 100339	Oct, 2015
	X	Horn Antenna	ETS-Lindgren	3117/ 35205	Mar., 2016
	X	Horn Antenna	Schwarzbeck	BBHA9170/209	Jan, 2016
	X	Horn Antenna	TRC	AH-0801/95051	Aug., 2015
	X	Pre-Amplifier	EMCI	EMC012630SE/980210	Jan., 2016
	X	Pre-Amplifier	MITEQ	JS41-001040000-58-5P/153945	Jul., 2016
	X	Pre-Amplifier	NARDA	DBL-1840N506/013	Jul., 2016

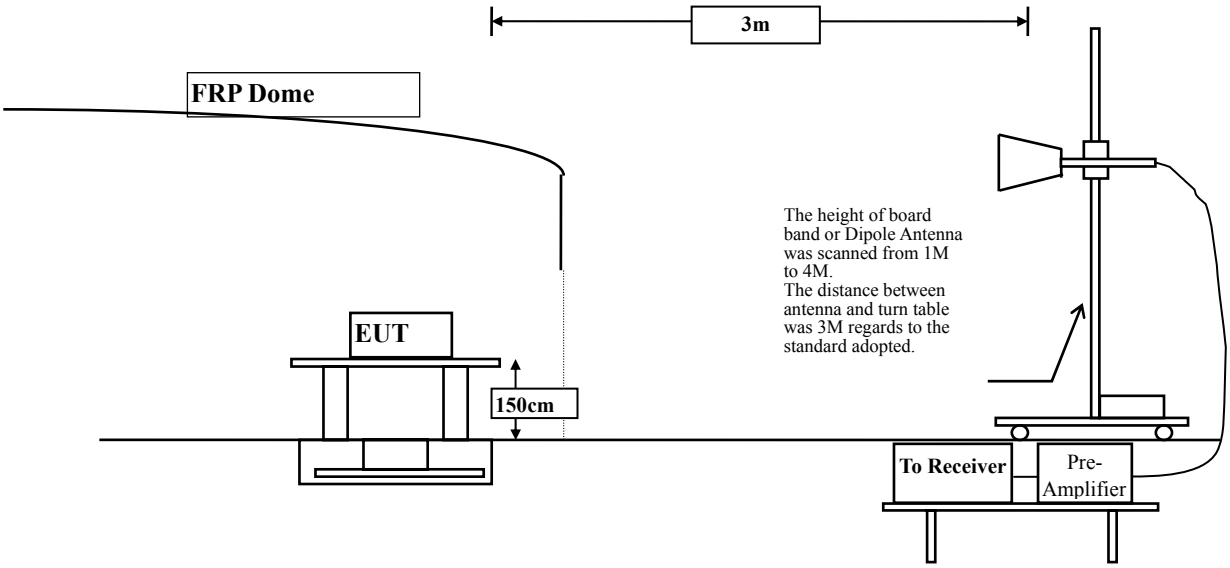
Note: 1. All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.
2. The test instruments marked with "X" are used to measure the final test results.

3.2. Test Setup

Radiated Emission Below 1GHz



Radiated Emission Above 1GHz



3.3. Limits

➢ **Fundamental and Harmonics Emission Limits**

FCC Part 15 Subpart C Paragraph 15.249 Limits				
Frequency MHz	Field Strength of Fundamental		Field Strength of Harmonics	
	(mV/m @3m)	(dBμV /m @3m)	(uV/m @3m)	(dBμV /m @3m)
902-928	50	94	500	54
2400-2483.5	50	94	500	54
5725-5875	50	94	500	54

Remarks : 1. RF Voltage (dBμV /m) = 20 log RF Voltage (uV/m)

2. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.

➢ **General Radiated Emission Limits**

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50dB below the level of the fundamental or to the general radiated emission limits in paragraph 15.209, whichever is the lesser attenuation.

FCC Part 15 Subpart C Paragraph 15.209(a) Limits		
Frequency MHz	Field strength (microvolts/meter)	Measurement distance (meter)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Remarks: E field strength (dBμV /m) = 20 log E field strength (uV/m)

3.4. Test Procedure

The EUT was setup according to ANSI C63.10, 2013 and tested compliance to FCC 47CFR 15.249 requirements.

Measuring the frequency range below 1GHz, the EUT is placed on a turn table which is 0.8 meter above ground,when measuring the frequency range above 1GHz, the EUT is placed on a turn table which is 1.5 meter above ground.
The turn table is rotated 360 degrees to determine the position of the maximum emission level.
The EUT was positioned such that the distance from antenna to the EUT was 3 meters.
The antenna is scanned between 1 meter and 4 meters to find out the maximum emission level.
This is repeated for both horizontal and vertical polarization of the antenna. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.10: 2013 on radiated measurement.
The resolution bandwidth below 30MHz setting on the field strength meter is 9kHz and 30MHz~1GHz is 120kHz and above 1GHz is 1MHz.
Radiated emission measurements below 30MHz are made using Loop Antenna and 30MHz~1GHz are made using broadband Bilog antenna and above 1GHz are made using Horn Antennas.
The measurement is divided into the Preliminary Measurement and the Final Measurement.
The suspected frequencies are searched for in Preliminary Measurement with the measurement antenna kept pointed at the source of the emission both in azimuth and elevation, with the polarization of the antenna oriented for maximum response. The antenna is pointed at an angle towards the source of the emission, and the EUT is rotated in both height and polarization to maximize the measured emission. The emission is kept within the illumination area of the 3 dB bandwidth of the antenna.
The worst radiated emission is measured in the Open Area Test Site on the Final Measurement.
The measurement frequency range form 9kHz - 10th Harmonic of fundamental was investigated.

3.5. Uncertainty

± 3.9 dB above 1GHz
± 3.8 dB below 1GHz

3.6. Test Result of Radiated Emission

Product : Wireless Interactive Whiteboard System – IW2
Test Item : Fundamental Radiated Emission
Test Site : No.3OATS
Test Mode : Mode 1: Transmit

X-Axis

Frequency MHz	Correct Factor dB	Reading Level dBμV	Measurement Level dBμV /m	Margin dB	Limit dBμV /m
Horizontal Peak Detector:					
2405.000	31.593	72.680	104.273	-9.727	114.000
2440.000	31.852	74.740	106.592	-7.408	114.000
2468.000	32.065	75.330	107.395	-6.605	114.000
Average Detector:					
2405.000	31.593	46.650	78.243	-15.757	94.000
2440.000	31.852	48.740	80.592	-13.408	94.000
2468.000	32.065	49.718	81.783	-12.217	94.000

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss –Amplifier gain.

Product : Wireless Interactive Whiteboard System – IW2
Test Item : Fundamental Radiated Emission
Test Site : No.3OATS
Test Mode : Mode 1: Transmit

X-Axis

Frequency MHz	Correct Factor dB	Reading Level dBμV	Measurement Level dBμV /m	Margin dB	Limit dBμV /m
Vertical					
Peak Detector:					
2405.000	30.926	68.420	99.346	-14.654	114.000
2440.000	31.139	70.820	101.959	-12.041	114.000
2468.000	31.331	72.160	103.491	-10.509	114.000
Average					
Detector:					
2405.000	30.926	46.950	77.876	-16.124	94.000
2440.000	31.139	47.940	79.079	-14.921	94.000
2468.000	31.331	48.920	80.251	-13.749	94.000

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss –Amplifier gain.

Product : Wireless Interactive Whiteboard System – IW2
Test Item : Fundamental Radiated Emission
Test Site : No.3OATS
Test Mode : Mode 1: Transmit

Y-Axis

Frequency MHz	Correct Factor dB	Reading Level dBμV	Measurement Level dBμV /m	Margin dB	Limit dBμV /m
Horizontal					
Peak Detector:					
2405.000	31.593	73.390	104.983	-9.017	114.000
2440.000	31.852	74.950	106.802	-7.198	114.000
2468.000	32.065	75.060	107.125	-6.875	114.000
Average					
Detector:					
2405.000	31.593	51.700	83.293	-10.707	94.000
2440.000	31.852	53.390	85.242	-8.758	94.000
2468.000	32.065	54.270	86.335	-7.665	94.000

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss –Amplifier gain.

Product : Wireless Interactive Whiteboard System – IW2
Test Item : Fundamental Radiated Emission
Test Site : No.3OATS
Test Mode : Mode 1: Transmit

Y-Axis

Frequency MHz	Correct Factor dB	Reading Level dBμV	Measurement Level dBμV /m	Margin dB	Limit dBμV /m
Vertical					
Peak Detector:					
2405.000	30.926	68.980	99.906	-14.094	114.000
2440.000	31.139	70.530	101.669	-12.331	114.000
2468.000	31.331	71.110	102.441	-11.559	114.000
Average					
Detector:					
2405.000	30.926	49.377	80.303	-13.697	94.000
2440.000	31.139	51.123	82.262	-11.738	94.000
2468.000	31.331	52.374	83.705	-10.295	94.000

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss –Amplifier gain.

Product : Wireless Interactive Whiteboard System – IW2
Test Item : Fundamental Radiated Emission
Test Site : No.3OATS
Test Mode : Mode 1: Transmit

Z-Axis

Frequency MHz	Correct Factor dB	Reading Level dBμV	Measurement Level dBμV /m	Margin dB	Limit dBμV /m
Horizontal					
Peak Detector:					
2405.000	31.593	73.400	104.993	-9.007	114.000
2440.000	31.852	74.620	106.472	-7.528	114.000
2468.000	32.065	75.040	107.105	-6.895	114.000
Average					
Detector:					
2405.000	31.593	50.688	82.281	-11.719	94.000
2440.000	31.852	52.470	84.322	-9.678	94.000
2468.000	32.065	53.353	85.418	-8.582	94.000

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss –Amplifier gain.

Product : Wireless Interactive Whiteboard System – IW2
Test Item : Fundamental Radiated Emission
Test Site : No.3OATS
Test Mode : Mode 1: Transmit

Z-Axis

Frequency MHz	Correct Factor dB	Reading Level dBμV	Measurement Level dBμV /m	Margin dB	Limit dBμV /m
Vertical					
Peak Detector:					
2405.000	30.926	76.960	107.886	-6.114	114.000
2440.000	31.139	77.870	109.009	-4.991	114.000
2468.000	31.331	79.260	110.591	-3.409	114.000
Average					
Detector:					
2405.000	30.926	53.095	84.021	-9.979	94.000
2440.000	31.139	55.040	86.179	-7.821	94.000
2468.000	31.331	56.470	87.801	-6.199	94.000

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss –Amplifier gain.

Product : Wireless Interactive Whiteboard System – IW2
Test Item : Harmonic Radiated Emission Data
Test Site : No.3 OATS
Test Mode : Mode 1: Transmit (2405MHz)

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBμV	dBμV /m	dB	dBμV /m
Horizontal					
Peak Detector:					
4810.000	3.005	54.840	57.846	-16.154	74.000
7215.000	10.289	35.640	45.930	-28.070	74.000
9620.000	13.595	41.930	55.526	-18.474	74.000
Average Detector:					
4810.000	3.005	30.710	33.716	-20.284	54.000
9620.000	13.595	22.670	36.266	-17.734	54.000
Vertical					
Peak Detector:					
4810.000	3.323	58.210	61.533	-12.467	74.000
7215.000	10.289	34.880	45.170	-26.830	74.000
9620.000	14.014	39.850	53.865	-20.135	74.000
Average Detector:					
4810.000	6.591	31.970	38.561	-15.439	54.000

Note:
1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : Wireless Interactive Whiteboard System – IW2
Test Item : Harmonic Radiated Emission Data
Test Site : No.3 OATS
Test Mode : Mode 1: Transmit (2440MHz)

Frequency MHz	Correct Factor dB	Reading Level dBμV	Measurement Level dBμV /m	Margin dB	Peak Limit dBμV /m
Horizontal Peak Detector:					
4880.000	3.010	54.070	57.080	-16.920	74.000
7320.000	11.833	39.080	50.914	-23.086	74.000
9760.000	12.580	43.120	55.701	-18.299	74.000
Average Detector					
4880.000	3.010	30.600	33.610	-20.390	54.000
9760.000	12.580	23.060	35.641	-18.359	54.000
Vertical Peak Detector:					
4880.000	3.010	56.620	59.630	-14.370	74.000
7320.000	11.833	40.110	51.944	-22.056	74.000
9760.000	13.052	40.790	53.842	-20.158	74.000
Average Detector					
4880.000	5.738	31.850	37.588	-16.412	54.000

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : Wireless Interactive Whiteboard System – IW2
Test Item : Harmonic Radiated Emission Data
Test Site : No.3 OATS
Test Mode : Mode 1: Transmit (2468MHz)

Frequency MHz	Correct Factor dB	Reading Level dBμV	Measurement Level dBμV /m	Margin dB	Peak Limit dBμV /m
Horizontal					
Peak Detector:					
4936.000	2.827	48.130	50.956	-23.044	74.000
7404.000	13.360	37.040	50.400	-23.600	74.000
9872.000	13.648	42.220	55.868	-18.132	74.000
Average Detector					
9872.000	13.080	23.410	36.490	-17.510	54.000
Vertical					
Peak Detector:					
4936.000	2.827	50.400	53.226	-20.774	74.000
7404.000	12.240	38.070	50.310	-23.690	74.000
9872.000	13.648	39.600	53.248	-20.752	74.000
Average Detector					
--					

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : Wireless Interactive Whiteboard System – IW2
Test Item : General Radiated Emission Data
Test Site : No.3 OATS
Test Mode : Mode 1: Transmit (2440MHz)

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBμV	dBμV /m	dB	dBμV /m
Horizontal					
167.768	-10.795	35.545	24.750	-18.750	43.500
301.319	-3.412	31.535	28.123	-17.877	46.000
374.420	-1.202	28.533	27.331	-18.669	46.000
579.667	3.490	33.068	36.558	-9.442	46.000
745.551	3.310	27.174	30.485	-15.515	46.000
918.464	6.388	23.822	30.210	-15.790	46.000
Vertical					
100.290	0.009	30.021	30.030	-13.470	43.500
371.609	-2.706	25.336	22.631	-23.369	46.000
540.304	0.105	23.540	23.645	-22.355	46.000
753.986	3.234	23.938	27.172	-18.828	46.000
900.188	3.388	24.579	27.967	-18.033	46.000
966.261	8.016	23.261	31.277	-22.723	54.000

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.
8. No emission found between lowest internal used/generated frequency to 30MHz.

4. Band Edge

4.1. Test Equipment

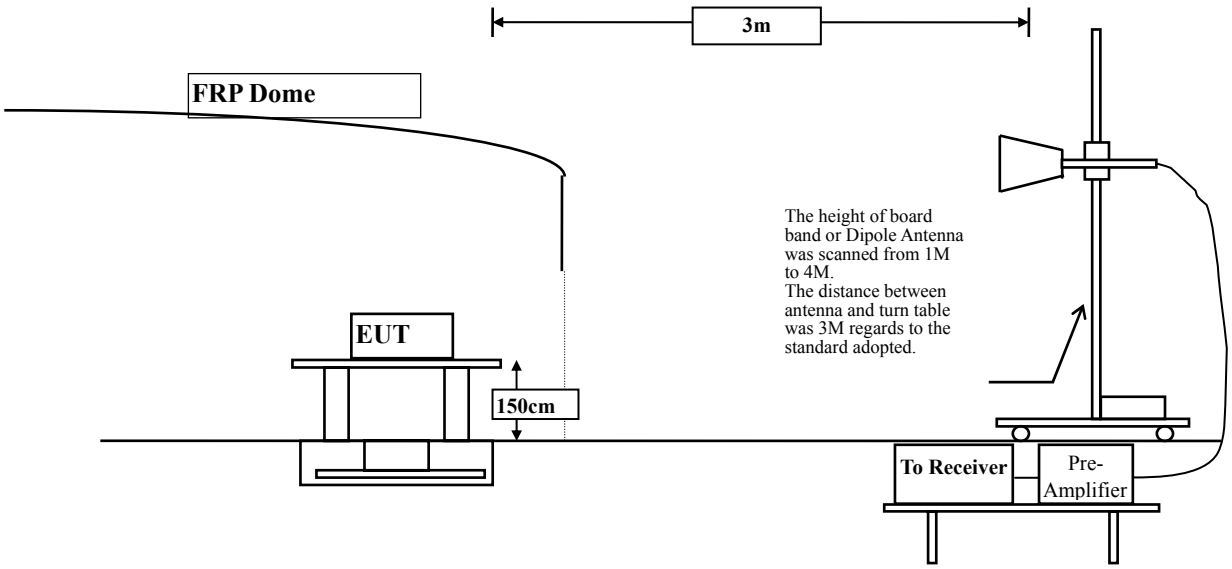
The following test equipments are used during the band edge tests:

Test Site		Equipment	Manufacturer	Model No./Serial No.	Last Cal.
☒CB # 8	X	Spectrum Analyzer	R&S	FSP40/ 100339	Oct., 2015
	X	Horn Antenna	ETS-Lindgren	3117/ 35205	Mar., 2016
	X	Horn Antenna	Schwarzbeck	BBHA9170/209	Jan., 2016
	X	Horn Antenna	TRC	AH-0801/95051	Aug., 2015
	X	Pre-Amplifier	EMCI	EMC012630SE/980210	Jan., 2016
	X	Pre-Amplifier	MITEQ	JS41-001040000-58-5P/153945	Jul., 2016
	X	Pre-Amplifier	NARDA	DBL-1840N506/013	Jul., 2016

Note: 1. All equipments are calibrated every one year.

2. The test equipments marked by "X" are used to measure the final test results.

4.2. Test Setup



4.3. Limits

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 50 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

4.4. Test Procedure

The EUT is placed on a turn table which is 1.5 meter above ground. The turn table is rotated 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.
The antenna can move up and down between 1 meter and 4 meters to find out the maximum emission level.
Both horizontal and vertical polarization of the antenna are set on measurement. In order to find the maximum emission, all of the interface cables must be manipulated according to ANSI C63.10: 2013 on radiated measurement.
The bandwidth setting below 1GHz and above 1GHz on the field strength meter is 120 kHz and 1MHz, respectively.

4.5. Uncertainty

Conducted is ± 1.27 dB
Radiated is ± 3.9 dB

4.6. Test Result of Band Edge

Product : Wireless Interactive Whiteboard System – IW2
Test Item : Band Edge Data
Test Site : No.3 OATS
Test Mode : Mode 1: Transmit (2405MHz)

RF Radiated Measurement (Horizontal):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBμV)	Emission Level (dBμV /m)	Peak Limit (dBμV /m)	Average Limit (dBμV /m)	Result
1 (Peak)	2389.565	31.508	32.796	64.303	74.00	54.00	Pass
1 (Peak)	2390.000	31.509	31.509	63.018	74.00	54.00	Pass
1 (Peak)	2400.000	31.561	40.165	71.726	--	--	--
1 (Peak)	2404.928	31.592	68.019	99.611	--	--	--
1 (Average)	2390.000	31.509	14.043	45.552	74.00	54.00	Pass
1 (Average)	2400.000	31.561	14.666	46.227	--	--	--
1 (Average)	2405.072	31.593	66.749	98.342	--	--	--

Figure Channel 1: Horizontal (Peak)

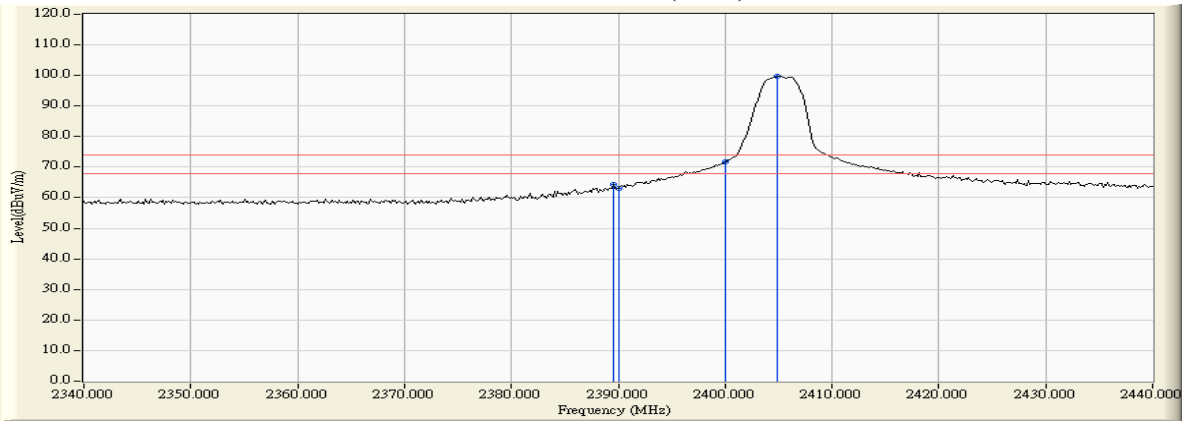
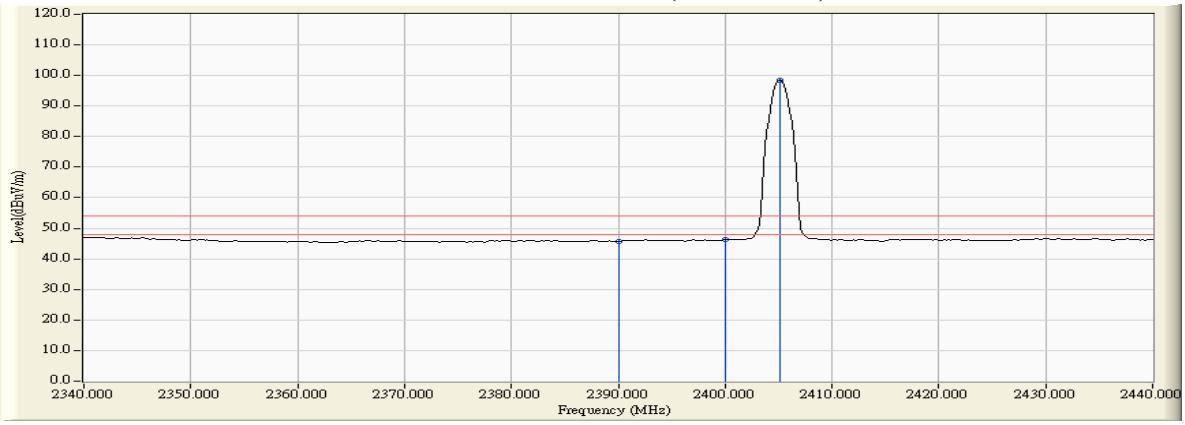


Figure Channel 1: Horizontal (AVERAGE)



Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. " * ", means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.

Product : Wireless Interactive Whiteboard System – IW2
Test Item : Band Edge Data
Test Site : No.3 OATS
Test Mode : Mode 1: Transmit (2405MHz)

RF Radiated Measurement (Vertical):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBμV)	Emission Level (dBμV /m)	Peak Limit (dBμV /m)	Average Limit (dBμV /m)	Result
1 (Peak)	2390.000	30.915	35.540	66.455	74.00	54.00	Pass
1 (Peak)	2400.000	30.912	44.537	75.449	--	--	--
1 (Peak)	2404.928	30.926	72.757	103.683	--	--	--
1 (Average)	2390.000	30.915	14.372	45.287	74.00	54.00	Pass
1 (Average)	2400.000	30.912	15.125	46.037	--	--	--
1 (Average)	2405.072	30.926	71.488	102.414	--	--	--

Figure Channel 1: Vertical (Peak)

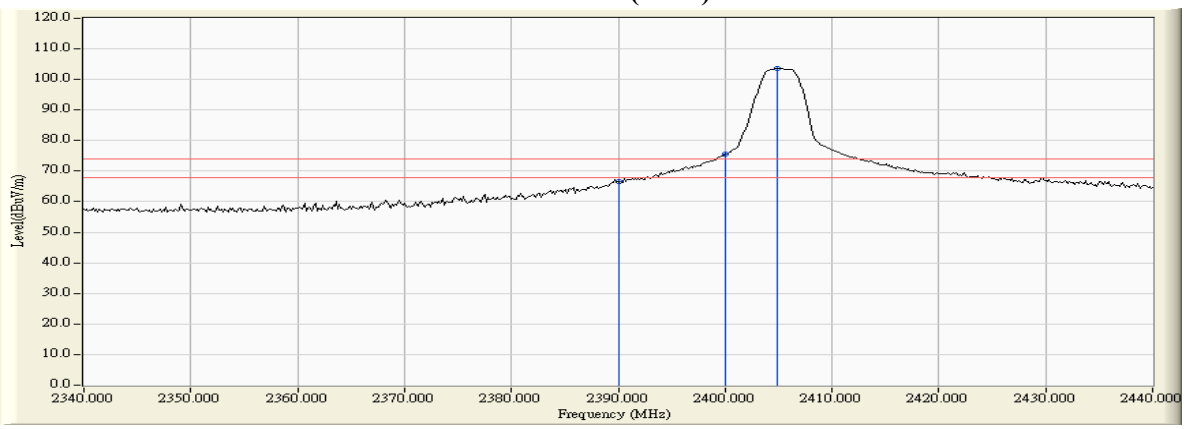
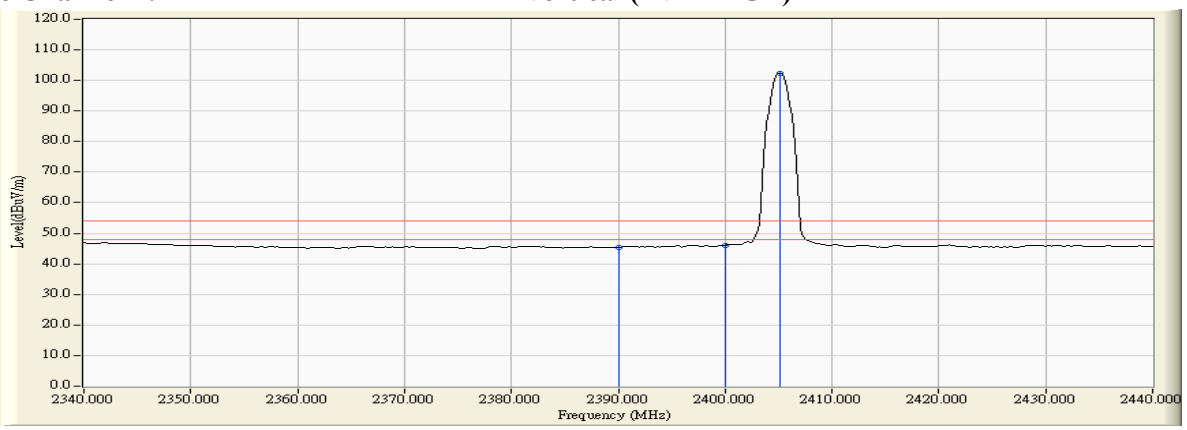


Figure Channel 1: Vertical (AVERAGE)



Note:
1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. " * ", means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.

Product : Wireless Interactive Whiteboard System – IW2
Test Item : Band Edge Data
Test Site : No.3 OATS
Test Mode : Mode 1: Transmit (2468MHz)

RF Radiated Measurement (Horizontal):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBμV)	Emission Level (dBμV /m)	Peak Limit (dBμV /m)	Average Limit (dBμV /m)	Result
3 (Peak)	2467.993	32.065	74.798	106.863	--	--	--
3 (Peak)	2483.500	32.182	35.677	67.859	74.00	54.00	Pass
3 (Average)	2468.138	32.066	73.279	105.345	--	--	--
3 (Average)	2483.500	32.182	14.597	46.779	74.00	54.00	Pass

Figure Channel 3: Horizontal (Peak)

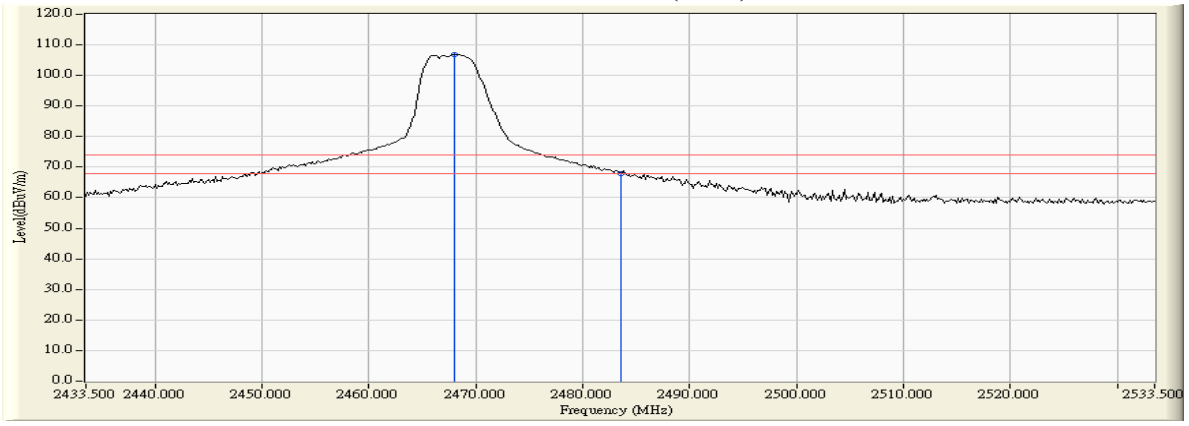
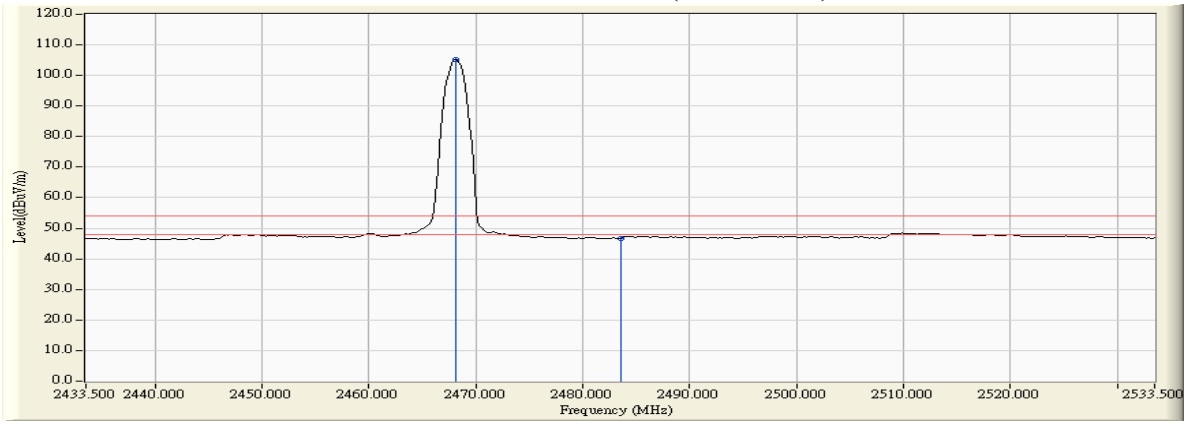


Figure Channel 3: Horizontal (AVERAGE)



Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. " * ", means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.

Product : Wireless Interactive Whiteboard System – IW2
Test Item : Band Edge Data
Test Site : No.3 OATS
Test Mode : Mode 1: Transmit (2468MHz)

RF Radiated Measurement (Vertical):

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBμV)	Emission Level (dBμV /m)	Peak Limit (dBμV /m)	Average Limit (dBμV /m)	Result
3 (Peak)	2467.993	31.331	78.978	110.309	--	--	--
3 (Peak)	2483.500	31.435	40.603	72.038	74.00	54.00	Pass
3 (Average)	2467.993	31.331	77.428	108.759	--	--	--
3 (Average)	2483.500	31.435	14.688	46.123	74.00	54.00	Pass

Figure Channel 3: Vertical (Peak)

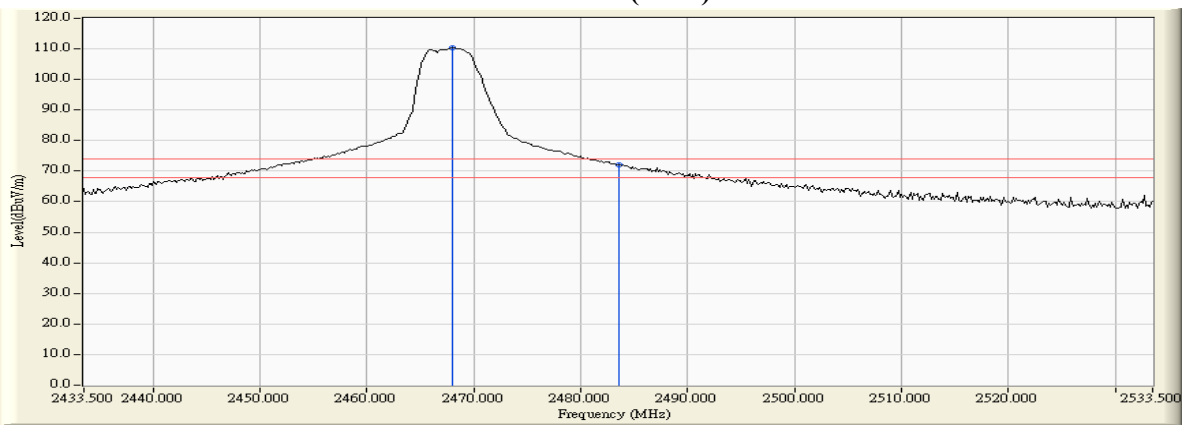
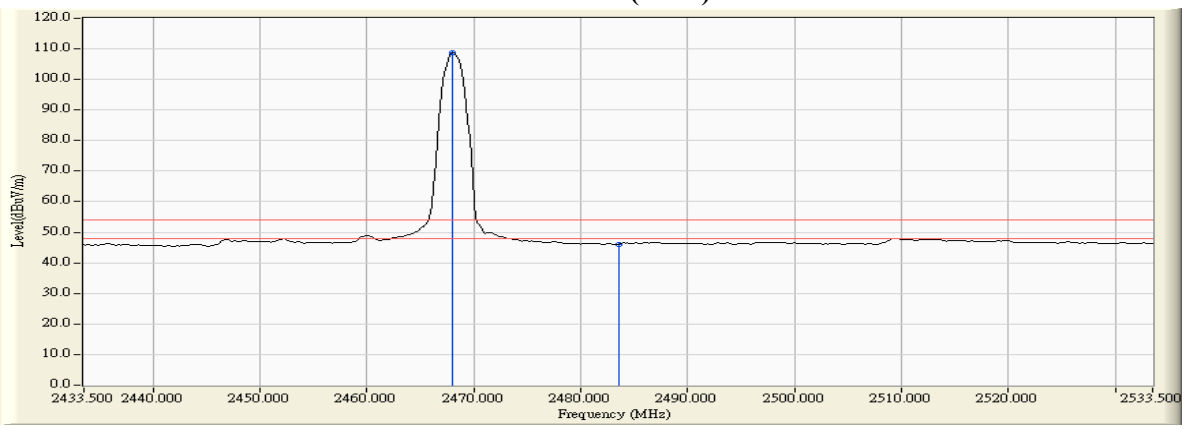


Figure Channel 3: Vertical (Peak)



Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. " * ", means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.

5. EMI Reduction Method During Compliance Testing

No modification was made during testing.

Attachment 1: EUT Test Photographs

Attachment 2: EUT Detailed Photographs