

EMI CERTIFICATION REPORT

Applicant:**SAMSUNG Electronics Co., Ltd.**129, Samsung-ro, Yeongtong-gu, Suwon-si,
Gyeonggi-do, 16677, Korea**Date of Receipt: March 15, 2016****Date of Issue: March 15, 2016****Test Report No. HCT-E-1603-F031****HCT FRN: 0005866421****FCC ID:****A3LWEA403SI**

Rule Part(s) / Standard(s): FCC CFR 47 PART 15 Subpart B Class B
FCC Classification: JBP (Part 15 B – Class B Computing Device Peripheral)
EUT Type: WLAN Access Point
Model Name: WEA403Si
Test Port: DC IN / Ethernet / Ethernet (POE) Port
Date of Test: March 15, 2016

The device bearing the trade name and model specified above, has been shown to comply with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in ANSI C63.4-2003. (See Test Report if any modifications were made for compliance)

I attest to the accuracy of data. All measurements reported herein were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

HCT certifies that no party to application has been denied the FCC benefits pursuant to Section 5301 of the Anti-Drug Abuse Act of 1988, 21 U.S.C 862

Tested By

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DOCUMENT HISTORY

The revision history for this document is shown in table.

Version	Date	Description
HCT-E-1603-F031	March 15, 2016	Initial Release



TABLE OF CONTENTS

	PAGE
1. GENERAL INFORMATION	4
1.1 Description of EUT	4
1.2 Related Submittal(s) / Grant(s).....	5
1.3 Test Facility	5
1.4 Tested System Details.....	6
1.5 Cable Description	7
1.6 Noise Suppression Parts on Cable. (I/O Cable)	8
2. DESCRIPTION OF TEST	9
2.1 Measurement of Conducted Emission.....	9
2.2 Measurement of Radiated Emission.....	10
3. PRELIMINARY TEST	13
3.1 Conducted Emission Test	13
3.2 Radiated Emission Test	13
4. CONDUCTED AND RADIATED EMISSION TEST SUMMARY	14
4.1 Conducted Emission Test	14
4.2 Radiated Emission Test	21
5. LIST OF TEST EQUIPMENT	24
6. CONCLUSION	25

ATTACHMENT: TEST SETUP PHOTOGRAPHS



1. GENERAL INFORMATION

1.1 Description of EUT

The EUT is WLAN Access Point.

Model Name	WEA403Si
FCC ID	A3LWEA403SI
EUT Type	WLAN Access Point
Configuration	802.11ac 5G WiFi service 802.11n 2.4G WiFi service 802.11ac 2.4G/5G WiFi monitoring 802.15.1 2.4G BLE service 802.15.4 2.4G ZigBee service
Data throughput (WiFi PHY)	11ac 1.3Gbps + 11n 450Mbps: 1.75Gbps
NPU	Broadcom Corp., NPU (1GHz, Dual Core)
RF chip	Broadcom Corp., BCM43460
SRAM	32bit DDR3(256MB, 1600MHz) (Data rate)
Memory	256MB NAND Flash
Ethernet interface	Integrated GbE PHY & RGMII
Giga Ethernet PHY	Not used. *NPU, PHY (2 EA)
RF chip interface	PCIe 2.0 (3 Lane) *PCIe 1.1 : 2.5Gbps, *PCIe 2.0 : 5Gbps
PoE(PD)	802.3at (25.5W↓)
Giga Ethernet Port	2 Port *1 Port: Data + PoE support *1 Port: Data only
Spectrum Analysis	3 stream *NPU, PHY (2 EA)



1.2 Related Submittal(s) / Grant(s)

Original submittal only.

1.3 Test Facility

Test site is located at 74, SEOICHEON-RO, 578BEON-GIL, MAJANG-MYEON, ICHEON-SI, GYEONGGI-DO, KOREA. Those measurement facilities are constructed in conformance with the requirements of ANSI C63.4-2003.

Measurement Facilities	Reg. No.
Radiated Field strength measurement facility (3 m)	90661 (February 28, 2014)
Radiated Field strength measurement facility (10 m)	90661 (February 28, 2014)



1.4 Tested System Details

All equipment descriptions used in the tested system (including inserted cards) are:

Device Type	Model Name	Serial Number	Manufacturer
EUT	WEA403Si	-	SAMSUNG
AC/DC adaptor	AP36-48	-	A.C.T
POE switch	JG236A	CN27F5Y1xY	H.P
Notebook PC 1	ProBook6560b	4CZ128S6G	HP
Notebook PC adaptor	PPP012H-S	F12941119063672	CHICONY POWER TECHNOLOGY CO,LTD
Notebook PC 2	ProBook6570b	5CB2522G55	HP
Notebook PC adaptor	PPP012D-S	WCNXF0AAR 308K7	HP
Notebook PC 3	ProBook6560b	1A22GA000600 G110720K02Z	HP
Notebook PC adaptor	PPP012H-S	F12941205024288	CHICONY POWER TECHNOLOGY CO,LTD
Notebook PC 4	ProBook650 G1	5CG4430PZG	HP
Notebook PC adaptor	PPP012H-S	F12941040036612	HP
ZigBee module	-	-	-
WLAN Access Point	WEA403Si		SAMSUNG
Key board	PR1101U		DONGGUAN PRIMAX ELECTRONIC& TELECOMMUNICATION PRODUCTS LTD
Serial mouse	Serial 2 button mouse		Radio shack



1.5 Cable Description

Product Name	Port	Power Cord Shielded (Y/N)	I/O Cable Shielded (Y/N)	Length (m)
EUT	DC IN	N	N	(P) 1.5
	Ethernet	N	N	(D) 5.0
	Ethernet (POE)	N	N	(P,D) 5.0
Notebook PC 1	DC IN	N	N	(P) 1.8
	USB	N	N	(D) 1.5
	Serial	N	N	(D) 1.5
Notebook PC 2	DC IN	N	N	(P) 1.8
	LAN	N	N	(D) 3.0
Notebook PC 3	DC IN	N	N	(P) 1.8
Notebook PC 4	DC IN	N	N	(P) 1.8
	USB	N	Y	(P) 1.8
	USB	N	Y	(D) 2.0
POE Switch	AC IN	N	N	(P) 1.8
	LAN	N	N	(D) 3.0

* The marked "(D)" means the data cable and "(P)" means the power cable.



1.6 Noise Suppression Parts on Cable. (I/O Cable)

Product Name	Port	Ferrite Bead (Y/N)	Location	Metal Hood (Y/N)	Location
EUT	DC IN	Y	EUT end	N	N/A
	Ethernet	N	N/A	N	N/A
	Ethernet (POE)	N	N/A	N	N/A
Notebook PC 1	DC IN	N	N/A	N	N/A
	USB	N	N/A	Y	Notebook PC
	Serial	N	N/A	Y	Notebook PC
Notebook PC 2	DC IN	N	N/A	N	N/A
	LAN	N	N/A	N	N/A
Notebook PC 3	DC IN	N	N/A	N	N/A
Notebook PC 4	DC IN	N	N/A	N	N/A
	USB	N	N/A	N	N/A
	USB	N	N/A	N	N/A
POE Switch	AC IN	N	N/A	N	N/A
	LAN	N	N/A	N	N/A



2. DESCRIPTION OF TEST

2.1 Measurement of Conducted Emission

The test procedure was in accordance with ANSI C63.4-2003, Clause 7

- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN).
If the EUT is connected to the PC through USB, the AC power-line adapter of the PC is directly connected to a line impedance stabilization network (LISN).
Other support units were connected to the power mains through another LISN. The two LISNs provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- b. Both conducted lines are measured in Quasi-Peak and Average mode, including the worst-case data points for each tested configuration.
- c. The frequency range from 150 kHz to 30 MHz was searched.

[Conducted Emission Limit]

Frequency (MHz)	Resolution Bandwidth (kHz)	Class A		Class B	
		Quasi-Peak (dBμV)	Average (dBμV)	Quasi-Peak (dBμV)	Average (dBμV)
0.15 to 0.5	9	79	66	66 to 56*	56 to 46*
0.5 to 5	9	73	60	56	46
5 to 30	9	73	60	60	50

**NOTE: Decreases with the logarithm of the frequency.*



2.2 Measurement of Radiated Emission

The test procedure was in accordance with ANSI C63.4-2003, Clause 8

- The EUT was placed on the top of a turn table 0.8 meters above the ground at a semi anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- The EUT was set 3 m away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- The antenna height is varied from 1 m to 4 m above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 m to 4 m and the turn table was turned from 0 degrees to 360 degrees to find the maximum reading.
- The test-receiver system was set to Quasi-Peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.
- The test-receiver system was set to Peak and Average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz.
- The antenna height scans apply for both horizontal and vertical polarizations, except that for vertical polarization, the minimum height of the center of the antenna shall be increased so that the lowest point of the bottom of the lowest antenna element clears the site reference ground plane by at least 25 cm. (below 1 GHz)

[Radiated Emission Limits]

Frequency (MHz)	Class A			Class B		
	Antenna Distance (m)	Field Strength (μ V/m)	Quasi-Peak (dB μ V/m)	Antenna Distance (m)	Field Strength (μ V/m)	Quasi-Peak (dB μ V/m)
30 to 88	10	90	39.0	3	100	40.0
88 to 216	10	150	43.5	3	150	43.5
216 to 960	10	210	46.4	3	200	46.0
Above 960	10	300	49.5	3	500	54.0
Frequency (MHz)	Antenna Distance (m)	Class A		Class B		
		Peak (dB μ V/m)	Average (dB μ V/m)	Peak (dB μ V/m)	Average (dB μ V/m)	
Above 1 000	3	80	60	74	54	



2.2.1 Frequency Range of Radiated Measurements

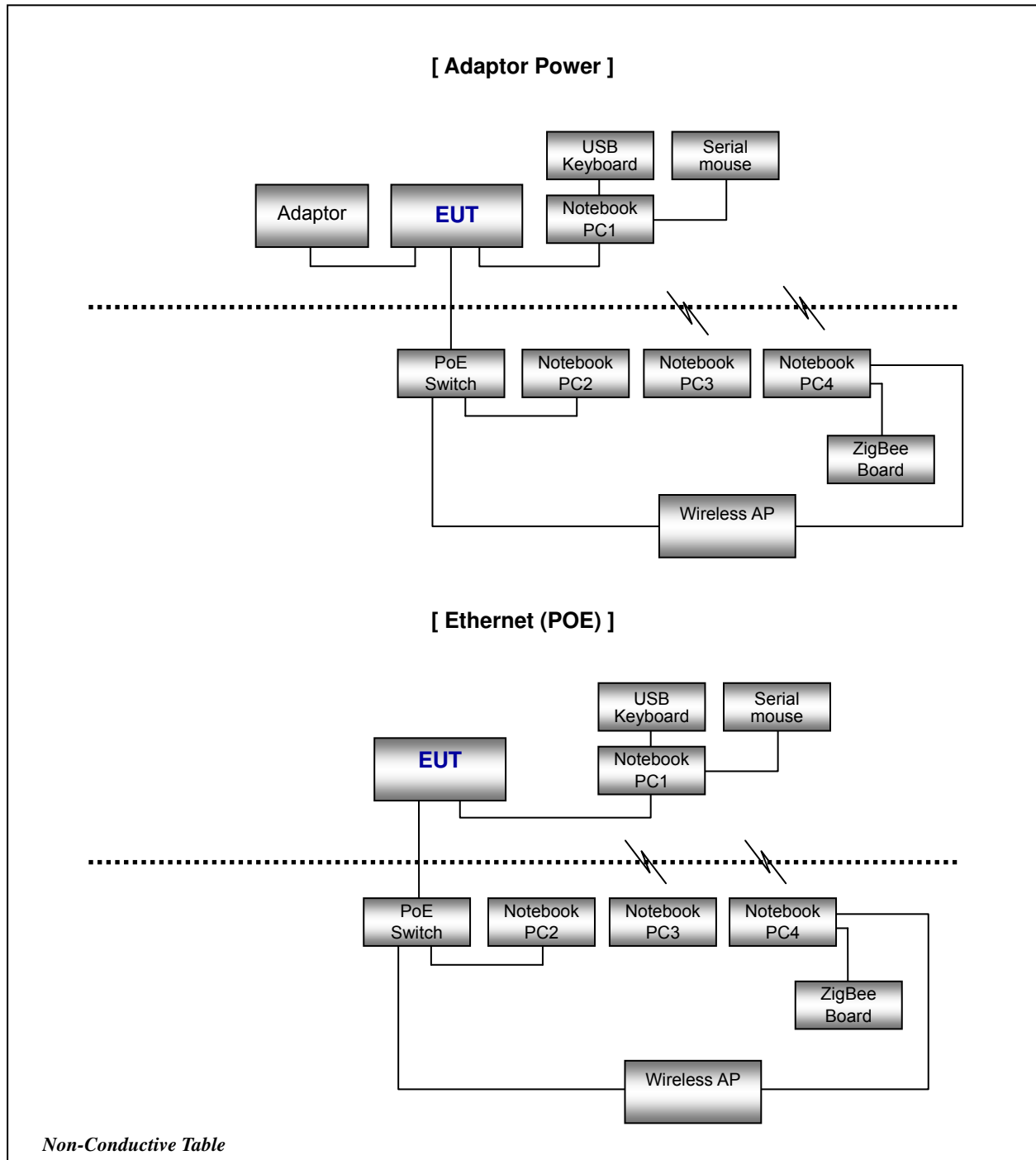
An unintentional radiator, including a digital device, the spectrum shall be investigated from the lowest radio frequency signal generated or used in the device, without going below the lowest frequency for which a Radiated Emission limit is specified, up to the frequency shown in the following table

Highest frequency generated or used in the device or on which the device operates or tunes (MHz)	Upper frequency of measurement range (MHz)
Below 1.705	30
1.705 to 108	1 000
108 to 500	2 000
500 to 1 000	5 000
Above 1 000	5 th harmonic of the highest frequency or 40 GHz, whichever is lower



2.3 Configuration of Tested System

The EUT was configured in the following manner.





3. PRELIMINARY TEST

3.1 Conducted Emission Test

During preliminary tests, the following operating mode was investigated:

Operation Mode: Adaptor Power & Ethernet & Ethernet (POE) & Idle Mode

3.2 Radiated Emission Test

During preliminary tests, the following operating mode was investigated:

Operation Mode: Adaptor Power & Ethernet & Ethernet (POE) & Idle mode
Ethernet & Ethernet (POE) & Idle mode



4. CONDUCTED AND RADIATED EMISSION TEST SUMMARY

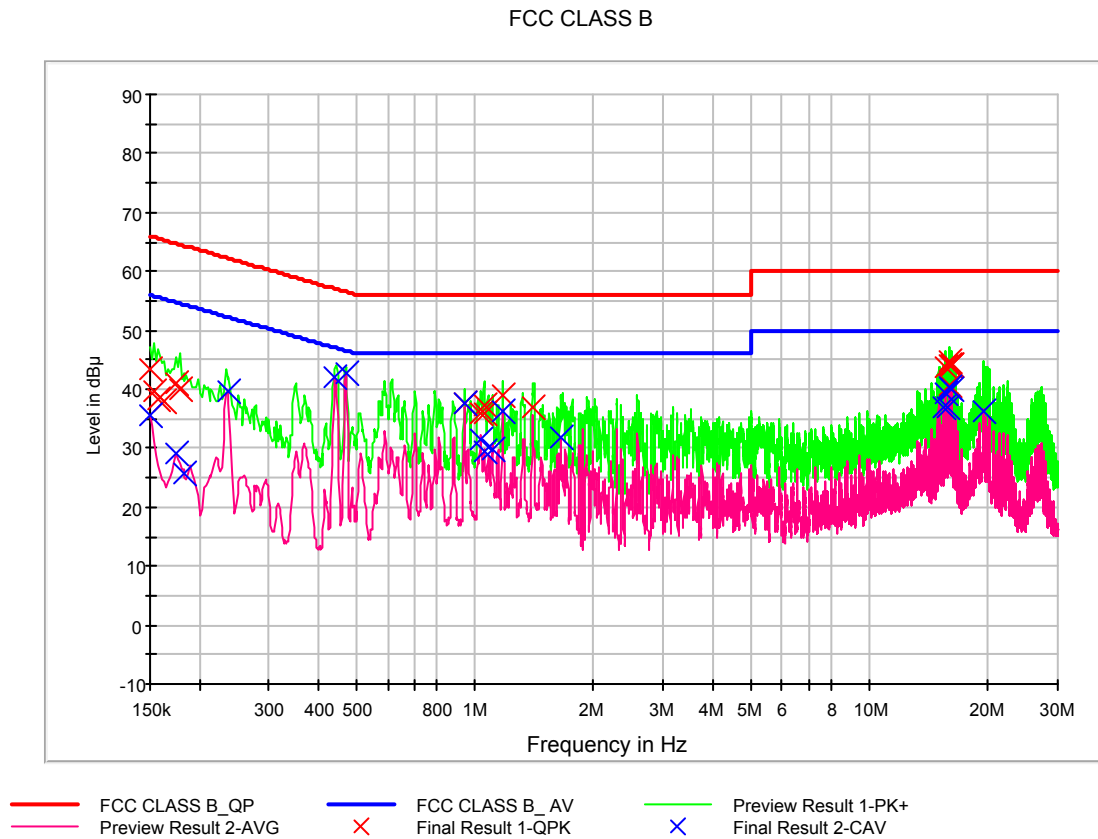
4.1 Conducted Emission Test

The test results of conducted emission at mains ports provide the following information:

Rule Part / Standard	FCC PART 15 Subpart B Class B
Detector	Quasi-Peak, CISPR-Average
Frequency Range	0.15 MHz to 30 MHz
Bandwidth	9 kHz (6 dB)
Operation Mode	Adaptor Power & Ethernet & Ethernet (POE) & Idle mode
Kind of Test Site	EMI Shielded Room
Temperature	20.7 °C
Relative Humidity	29.1 %
Test Date	March 15, 2016

✳ Calculation Formula:

1. Conductor L1 = Hot, Conductor N = Neutral
2. Corr. = LISN Factor + Cable Loss
3. QuasiPeak or CAverage= Receiver Reading + Corr.
4. Margin = Limit – QuasiPeak or CAverage

**Figure 1: Adaptor Power & Ethernet & Ethernet (POE) & Idle Mode, Line (L1)**



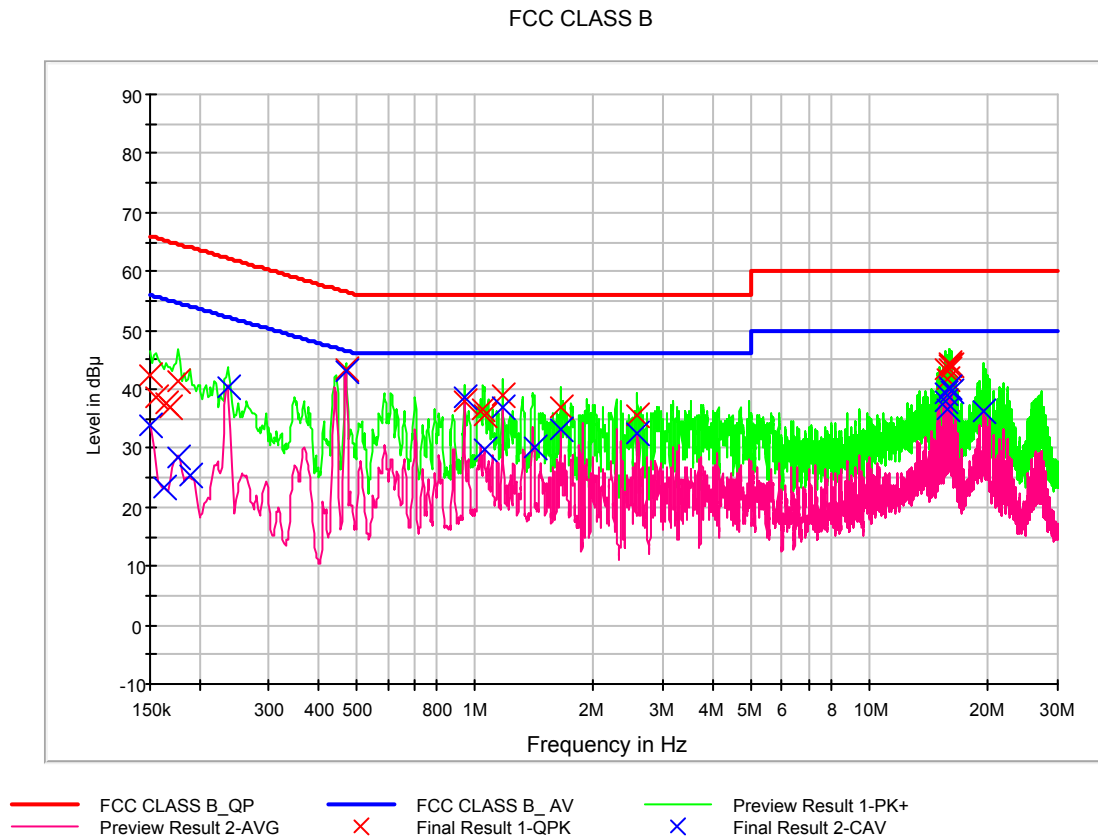
QuasiPeak Final Result

Frequency (MHz)	QuasiPeak (dBμV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.150000	43.4	9.000	L1	9.7	22.6	66.0
0.154000	39.8	9.000	L1	9.6	26.0	65.8
0.158000	38.4	9.000	L1	9.6	27.2	65.6
0.162000	37.8	9.000	L1	9.6	27.5	65.4
0.174000	41.1	9.000	L1	9.6	23.7	64.8
0.178000	39.9	9.000	L1	9.6	24.7	64.6
0.940000	37.6	9.000	L1	9.7	18.4	56.0
1.030000	36.0	9.000	L1	9.7	20.0	56.0
1.052000	37.3	9.000	L1	9.7	18.7	56.0
1.058000	35.8	9.000	L1	9.7	20.2	56.0
1.176000	38.9	9.000	L1	9.7	17.1	56.0
1.408000	36.9	9.000	L1	9.7	19.1	56.0
15.548000	43.6	9.000	L1	10.2	16.4	60.0
15.980000	40.5	9.000	L1	10.2	19.5	60.0
15.988000	44.2	9.000	L1	10.2	15.8	60.0
15.992000	44.6	9.000	L1	10.2	15.4	60.0
16.134000	44.2	9.000	L1	10.2	15.8	60.0
16.138000	44.0	9.000	L1	10.2	16.0	60.0



CAverage Final Result

Frequency (MHz)	CAverage (dBuV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.150000	35.5	9.000	L1	9.7	20.5	56.0
0.174000	29.2	9.000	L1	9.6	25.6	54.8
0.182000	25.7	9.000	L1	9.6	28.7	54.4
0.236000	39.6	9.000	L1	9.6	12.6	52.2
0.442000	42.1	9.000	L1	9.7	4.9	47.0
0.470000	42.8	9.000	L1	9.7	3.7	46.5
0.940000	37.6	9.000	L1	9.7	8.4	46.0
1.034000	31.6	9.000	L1	9.7	14.4	46.0
1.054000	29.6	9.000	L1	9.7	16.4	46.0
1.108000	29.9	9.000	L1	9.7	16.1	46.0
1.174000	36.3	9.000	L1	9.7	9.7	46.0
1.646000	32.0	9.000	L1	9.7	14.0	46.0
15.406000	36.9	9.000	L1	10.2	13.1	50.0
15.548000	39.5	9.000	L1	10.2	10.5	50.0
15.698000	36.8	9.000	L1	10.2	13.2	50.0
15.992000	40.5	9.000	L1	10.2	9.5	50.0
16.136000	40.1	9.000	L1	10.2	9.9	50.0
19.512000	36.3	9.000	L1	10.2	13.7	50.0

**Figure 2: Adaptor Power & Ethernet & Ethernet (POE) & Idle Mode, Line (N)**



QuasiPeak Final Result

Frequency (MHz)	QuasiPeak (dBμV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.150000	42.4	9.000	N	9.6	23.6	66.0
0.156000	38.6	9.000	N	9.6	27.0	65.7
0.164000	37.6	9.000	N	9.6	27.6	65.3
0.168000	37.1	9.000	N	9.6	28.0	65.1
0.176000	41.4	9.000	N	9.6	23.2	64.7
0.470000	43.3	9.000	N	9.6	13.2	56.5
0.938000	37.9	9.000	N	9.7	18.1	56.0
1.050000	36.6	9.000	N	9.7	19.4	56.0
1.056000	35.7	9.000	N	9.7	20.3	56.0
1.174000	39.0	9.000	N	9.7	17.0	56.0
1.646000	37.0	9.000	N	9.7	19.0	56.0
2.584000	35.5	9.000	N	9.7	20.5	56.0
15.548000	43.3	9.000	N	10.2	16.7	60.0
15.698000	41.6	9.000	N	10.2	18.4	60.0
15.988000	44.1	9.000	N	10.2	15.9	60.0
15.992000	44.4	9.000	N	10.2	15.6	60.0
15.996000	43.2	9.000	N	10.2	16.8	60.0
16.136000	44.1	9.000	N	10.2	15.9	60.0



CAverage Final Result

Frequency (MHz)	CAverage (dBuV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.150000	34.0	9.000	N	9.6	22.0	56.0
0.162000	23.5	9.000	N	9.6	31.9	55.4
0.176000	28.5	9.000	N	9.6	26.2	54.7
0.190000	25.5	9.000	N	9.6	28.6	54.0
0.236000	40.5	9.000	N	9.6	11.8	52.2
0.470000	43.1	9.000	N	9.6	3.4	46.5
0.940000	38.8	9.000	N	9.7	7.2	46.0
1.054000	29.7	9.000	N	9.7	16.3	46.0
1.176000	36.9	9.000	N	9.7	9.1	46.0
1.410000	30.2	9.000	N	9.7	15.8	46.0
1.646000	33.2	9.000	N	9.7	12.8	46.0
2.584000	32.5	9.000	N	9.7	13.5	46.0
15.544000	38.0	9.000	N	10.2	12.0	50.0
15.548000	39.3	9.000	N	10.2	10.7	50.0
15.696000	36.6	9.000	N	10.2	13.4	50.0
15.990000	40.3	9.000	N	10.2	9.7	50.0
16.138000	39.5	9.000	N	10.2	10.5	50.0
19.512000	36.2	9.000	N	10.3	13.8	50.0



4.2 Radiated Emission Test

The test results of radiated emission provide the following information:

-For Measurement Below 1 GHz

Rule Part / Standard	FCC PART 15 Subpart B Class B
Detector	Quasi-Peak
Frequency Range	30 MHz to 1 000 MHz
Bandwidth	120 kHz (6 dB)
Operation Mode	Adaptor Power & Ethernet & Ethernet (POE) & Idle mode Ethernet & Ethernet (POE) & Idle mode
Kind of Test Site	10 m semi anechoic chamber
Temperature	21.3 °C
Relative Humidity	28.4 %
Test Date	March 15, 2016

※ Calculation Formula:

1. POL. H: Horizontal, POL. V: Vertical
2. Quasi Peak = Reading (Receiver Reading) + Corr.
3. Corr. (Correction Factor) = Antenna Factor + Cable Loss
4. Margin = Limit – Quasi Peak



Adaptor Power & Ethernet & Ethernet (POE) & Idle mode

Frequency (MHz)	Quasi Peak (dBμV/m)	Antenna Height (cm)	POL. (H/V)	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
51.686900	33.1	100.0	V	321.0	14.3	6.9	40.0
117.763900	31.6	250.0	H	129.0	12.0	11.9	43.5
137.752200	37.9	100.0	V	287.0	14.1	5.6	43.5

Ethernet & Ethernet (POE) & Idle mode

Frequency (MHz)	Quasi Peak (dBμV/m)	Antenna Height (cm)	POL. (H/V)	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
32.903400	30.8	100.0	V	197.0	13.2	9.2	40.0
62.507800	33.8	100.0	V	90.0	13.6	6.2	40.0
119.247200	33.5	400.0	H	127.0	12.2	10.0	43.5
137.705300	36.5	100.0	V	30.0	14.2	7.0	43.5



-For Measurement Above 1 GHz

Rule Part / Standard	FCC PART 15 Subpart B Class B
Detector	Peak mode: Peak (RBW: 1 MHz, VBW: 3 MHz) CISPR-Average mode: Peak (RBW: 1 MHz, VBW: 10 Hz)
Highest Operating Frequency	1 GHz
Testing Frequency Range	1 GHz to 6 GHz
Operation Mode	Adaptor Power & Ethernet & Ethernet (POE) & Idle mode Ethernet & Ethernet (POE) & Idle mode
Kind of Test Site	10 m semi anechoic chamber
Temperature	21.3 °C
Relative Humidity	28.4 %
Test Date	March 15, 2016

Frequency (MHz)	Peak (dBμV/m)	Antenna Height (cm)	POL. (H/V)	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
-	-	-	-	-	-	-	-

Frequency (MHz)	CAverage (dBμV/m)	Antenna Height (cm)	POL. (H/V)	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
-	-	-	-	-	-	-	-

****NOTE**

- 1) For measurement above 1 GHz, emission noise was not founded over the ambient noise.
- 2) The disturbance over the -20 dB against limit doesn't occur.



5. LIST OF TEST EQUIPMENT

<u>Type</u>	<u>Manufacturer</u>	<u>Model Name</u>	<u>Serial Number</u>	<u>Calibration Cycle</u>	<u>CAL Date</u>
<u>Conducted Emission</u>					
☒ EMI Test Receiver	Rohde & Schwarz	ESCI	100584	1 year	12.28.2015
☒ LISN	Rohde & Schwarz	ESH3-Z5	100282	1 year	06.11.2015
☒ LISN	Rohde & Schwarz	ENV216	100073	1 year	12.28.2015
☒ Software	Rohde & Schwarz	EMC32	-	-	-
<u>Radiated Emission</u>					
-For measurement below 1 GHz					
☐ EMI Test Receiver	Rohde & Schwarz	ESI40	831564103	1 year	04.01.2015
☐ Trilog Antenna	Schwarzbeck	VULB9160	3301	2 year	11.17.2014
☐ Antenna master	HD GmbH	MA240	240/520	N/A	-
☐ Antenna master controller	HD GmbH	HD 100	100/637	N/A	-
☐ Turn Table	EMCO	1060-2M	-	N/A	-
☐ Turn Table controller	EMCO	2090	9702-1224	N/A	-
☒ EMI Test Receiver	Rohde & Schwarz	ESU 26	100241	1 year	06.05.2015
☒ Antenna master	INNCO Systems	MA4000-EP	MA4000/283	N/A	-
☒ Turn Table	INNCO Systems	DT3000-3T	DT3000/69	N/A	-
☒ Trilog Antenna	Schwarzbeck	VULB9168	185	2 year	04.24.2015
☒ Software	Rohde & Schwarz	EMC32	-	-	-
-For measurement above 1 GHz					
☐ EMI Test Receiver	Rohde & Schwarz	ESI40	831564103	1 year	04.01.2015
☐ Antenna master	HD GmbH	MA240	240/520	N/A	-
☐ Antenna master controller	HD GmbH	HD 100	100/637	N/A	-
☐ Turn Table	EMCO	1060-2M	-	N/A	-
☐ Turn Table controller	EMCO	2090	9702-1224	N/A	-
☒ Power Amplifier	CERNEX	CBLU1183540	21691	1 year	07.06.2015
☐ Power Amplifier	CERNEX	CBLU5183530	24348	1 year	06.15.2015
☒ Horn Antenna	Schwarzbeck	BBHA 9120D	296	2 year	10.07.2014
☒ EMI Test Receiver	Rohde & Schwarz	ESU 26	100241	1 year	06.05.2015
☒ Antenna master	INNCO Systems	MA4000-EP	MA4000/283	N/A	-
☒ Turn Table	INNCO Systems	DT3000-3T	DT3000/69	N/A	-
☐ Antenna Master	AS2000-PP	INNCO systems	AS2000/135/342 70914/L	-	-
☐ Software	Rohde & Schwarz	EMC32	-	-	-



6. CONCLUSION

The data collected shows that the **EUT Type: WLAN Access Point, Model: WEA403Si, FCC ID: A3LWEA403SI** complies with §15.111 and §15.109 of the FCC rules.