

 ESTECH Co., Ltd. Rm 1015, World Venture Center 11, 426-5 Gasan-dong, Guncheon-gu, Seoul, 158-803, Korea	   	Electromagnetic Interference Test Report

Test Report for FCC

FCC ID : TKWBEWIOC

Report Number		ESTF151303-003			
Applicant	Company name	Suprema Inc.			
	Address	16F Parkview Tower, Jeongja-dong, Bundang-gu, Seongnam, Gyeonggi, 463-863 Korea			
	Telephone	+82-31-710-2494			
Product	Product name	BioEntry W			
	Model No.	BEWI-OC	Manufacturer	Suprema Inc.	
	Serial No.	NONE	Country of origin	KOREA	
Test date	27-Feb-13		Date of issue	13-Mar-13	
Testing location	ESTECH Co., Ltd. 97-1 Hoiuk-Ri Majang-Myon, Icheon-Si, KyungKi-Do, Korea				
Standard	FCC PART 15 (2010) , ANSI C 63.4 2003				
Test item	☒ Conducted Emission	☐ Class A	☒ Class B	Test result	OK
	☒ Radiated Emission	☐ Class A	☒ Class B	Test result	OK
Measurement facility registration number		915135			
Tested by	Engineer S.B.Lee  (Signature)				
Reviewed by	Engineering Manager J.M.Yang  (Signature)				
Abbreviation	OK, Pass = Complied, Fail = Failed, N/A = not applicable				
* Note - This test report is not permitted to copy partly without our permission - This test result is dependent on only equipment to be used - This test result based on a single evaluation of one sample of the above mentioned					

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Appendix 1. Special diagram

1. Laboratory Information

1.1 General

This EUT (Equipment Under Test) has been shown to be capable of compliance with the applicable technical standards and is tested in accordance with the measurement procedures as indicated in this report. ESTECH Lab attests to accuracy of test data. All measurement reported herein were performed by ESTECH Co., Ltd.

ESTECH Lab assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

1.2 Test Lab.

Corporation Name : ESTECH Co., Ltd.

Head Office : Rm 1015, World Venture Center II, 426-5, Gasan-dong, Geumcheon-gu, Seoul, Korea
(Safety & Telecom. Test Lab)

EMC Test Lab : 97-1 Hoiuk-Ri Majang-Myon, Icheon-city, KyungKi-Do, Korea

1.3 Official Qualification(s)

KCC : Granted Accreditation from Ministry of Information & Communication for EMC, Safety and Telecommunication

KOLAS : Accredited Lab By Korea Laboratory Accreditation Schema base on CENELEC requirements

FCC : Filed Laboratory at Federal Communications Commission

VCCI : Granted Accreditation from Voluntary Control Council for Interference from ITE

2. Description of EUT

2.1 Summary of Equipment Under Test

Product : BioEntry W
 Model Number : BEWI-OC
 Serial Number : NONE
 Manufacturer : Suprema Inc.
 Country of origin : KOREA

 Power Rating : INPUT : (100 – 240) Va.c., (50 – 60) Hz, 1.0 A
 : OUTPUT : 12 Vd.c., 2.5 A
 : PoE : Power over Ethernet

 Receipt Date : 14-Feb-13
 X-tal list(s) or : The highest operating frequency is 533 MHz in the CPU.
 Frequencies generated

2.2 General descriptions of EUT

System	Max Users		5000 users (10,000 templates) [1:1 & 1:N]
	Log Capacity		50,000 logs
	CPU		533MHz DSP
	Memory		8MB Flash + 8MB RAM
	RF Options		13.56MHz iClass
	Interfaces		TCP/IP, RS485, Wiegand
	Input / Output		2 TTL Inputs, 1 Relay Output
	Power		12VDC, PoE (Power over Ethernet)
General	Dimensions	BioEntry W (W x H x D)	50 x 172 x 44 mm
		Wall Bracket (W x H)	40 x 157 mm (screw joint included)

3. Test Standards

Test Standard : FCC PART 15 (2010)

This Standard sets out the regulations under which an intentional, unintentional, or incidental radiator may be operated without an individual license. It also contains the technical specifications, administrative requirements and other conditions relating to the marketing of Part 15 devices.

Test Method : ANSI C 63.4 (2003)

This standard sets forth uniform methods of measurement of radio-frequency (RF) signals and noise emitted from both unintentional and intentional emitters of RF energy in the frequency range 9 kHz to 40 GHz. Methods for the measurement of radiated and AC power-line conducted radio noise are covered and may be applied to any such equipment unless otherwise specified by individual equipment requirements. These methods cover measurement of certain devices that deliberately radiate energy, such as intentional emitters, but does not cover licensed transmitters. This standard is not intended for certification/approval of avionic equipment or for industrial, scientific, and medical (ISM) equipment. These methods apply to the measurement of individual units or systems comprised of multiple units.

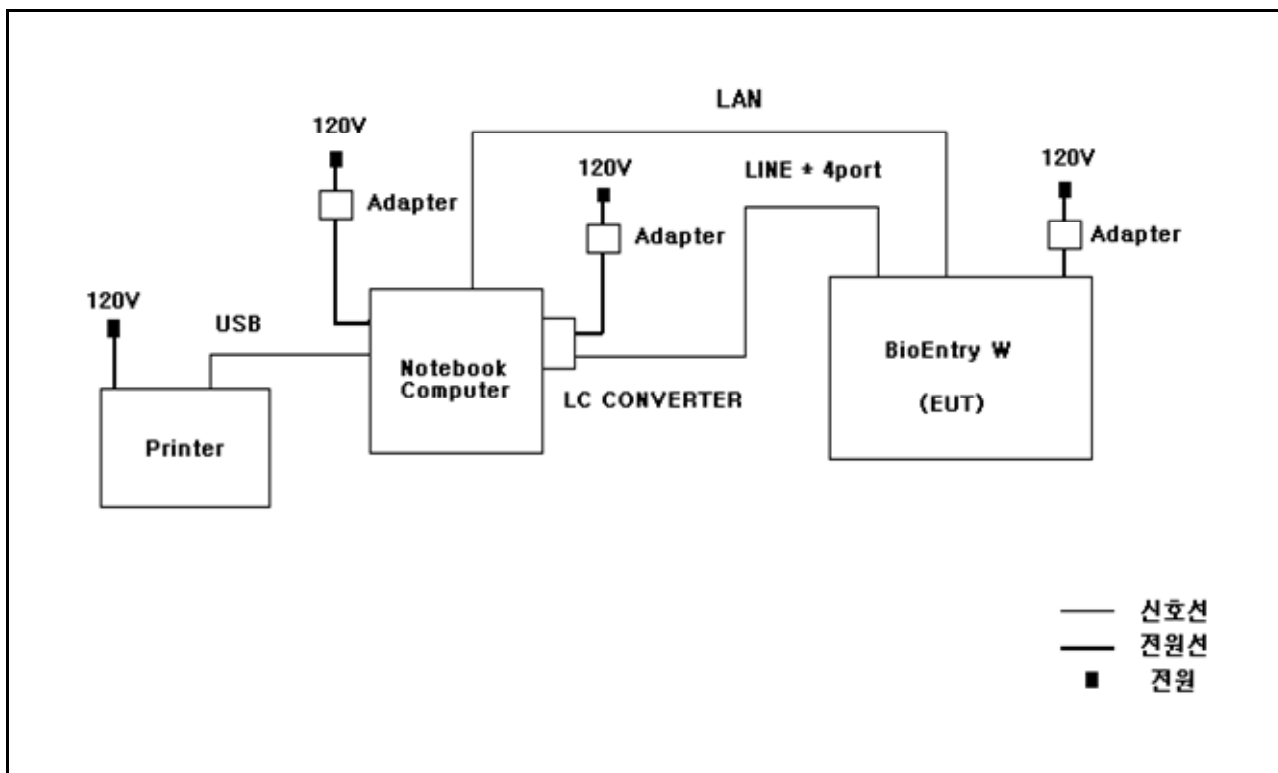
4. Measurement Condition (ADAPTER MODE)

4.1 EUT Operation.

- The EUT was in the following operation mode during all testing

1. EUT Configuration and Peripherals such as connection settings
2. Program companies provide a fingerprint recognition scan and LAN Cable connection
3. ping data transmit / receive the best action status to the test

4.2 Configuration and Peripherals



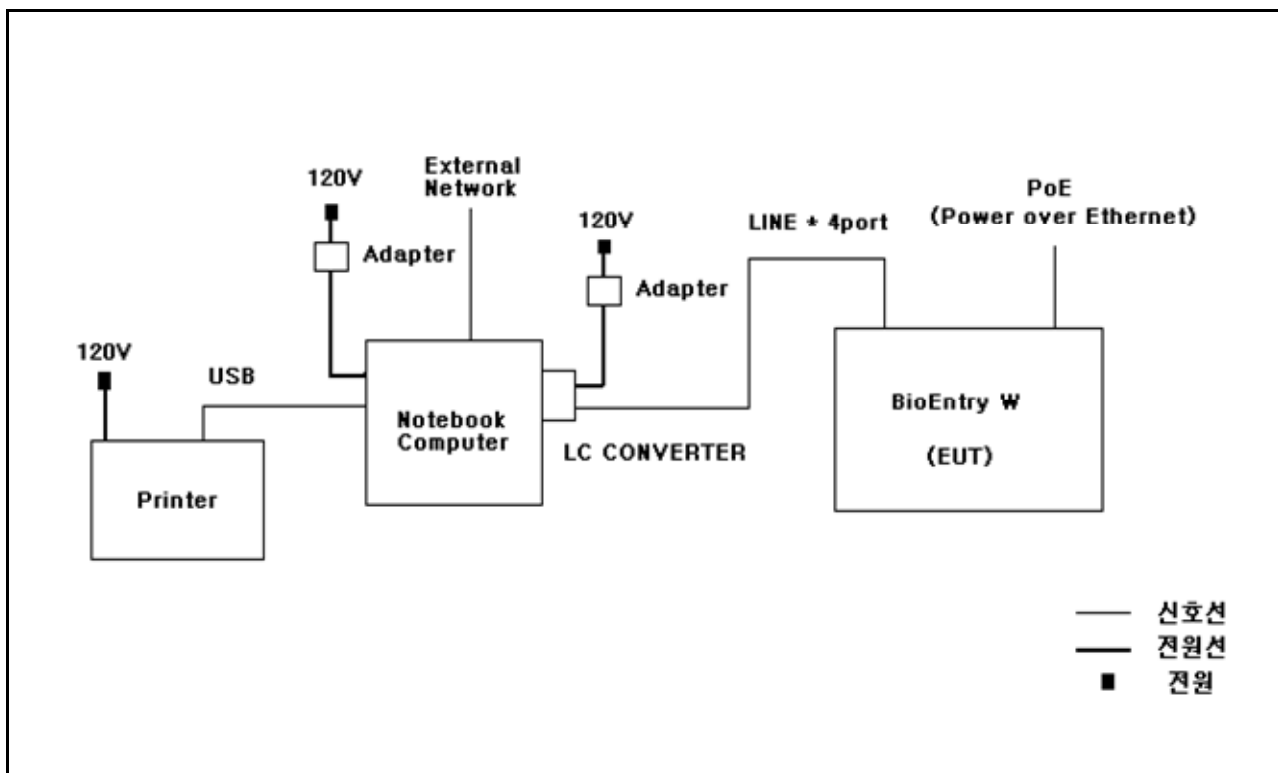
4. Measurement Condition (PoE MODE)

4.1 EUT Operation.

- The EUT was in the following operation mode during all testing

1. EUT Configuration and Peripherals such as connection settings
2. Program companies provide a fingerprint recognition scan and LAN Cable connection
3. ping data transmit / receive the best action status to the test

4.2 Configuration and Peripherals



4.3 EUT and Support equipment (ADAPTER MODE)

Equipment Name	Model Name	S/N	Manufacturer	Remark (FCC ID)
BioEntry W	BEWI-OC	NONE	Suprema Inc.	EUT
Adapter	JPW128KA1200N05	NONE	I.T.E POWER SUPPLY	
Notebook Computer	GW687AV	CNU0295R8D	HEWLETT-PACKARD COMPANY	
Adapter	PPP009C	F120881248037039	CHICONY POWER TECHNOLOGY(SUZHOU)CO.,LTD.	
LC CONVERTER	LC-485S	NONE	Comms.	
Adapter	EO-0560	NONE	Eoelectronics Inc.	
Printer	K10229	NONE	CANON VIETNAM CO.,LTD.	

4.4 Cable Connecting

Start Equipment		End Equipment		Cable Standard		Remark
Name	I/O port	Name	I/O port	Length	Shielded	
BioEntry W	POWER	Adapter	-	2.0	Unshielded	
BioEntry W	LAN	Notebook Computer	LAN	3.0	Unshielded	
BioEntry W	LINE(RS-485)	LC CONVERTER	LINE(RS-485)	3.0	Unshielded	
BioEntry W	LINE(Switch)	-	-	3.0	Unshielded	
BioEntry W	LINE(Wiegand)	-	-	3.0	Unshielded	
BioEntry W	LINE(Relay)	-	-	3.0	Unshielded	
Notebook Computer	Serial	LC CONVERTER	Serial	-	-	
Notebook Computer	USB	Printer	USB	2.0	Shielded	
Notebook Computer	POWER	Adapter	-	2.0	Shielded	
LC CONVERTER	POWER	Adapter	-	2.0	Unshielded	

4.3 EUT and Support equipment (PoE MODE)

Equipment Name	Model Name	S/N	Manufacturer	Remark (FCC ID)
BioEntry W	BEWI-OC	NONE	Suprema Inc.	EUT
Notebook Computer	GW687AV	CNU0295R8D	HEWLETT-PACKARD COMPANY	
Adapter	PPP009C	F120881248037039	CHICONY POWER TECHNOLOGY(SUZHOU)CO.,LTD.	
LC CONVERTER	LC-485S	NONE	Comms.	
Adapter	EO-0560	NONE	Eoelectronics Inc.	
Printer	K10229	NONE	CANON VIETNAM CO.,LTD.	

4.4 Cable Connecting

Start Equipment		End Equipment		Cable Standard		Remark
Name	I/O port	Name	I/O port	Length	Shielded	
BioEntry W	PoE(Power over Ethernet)	PoE Switch hub	PoE(Power over Ethernet)	20.0	Unshielded	
BioEntry W	LINE(RS-485)	LC CONVERTER	LINE(RS-485)	3.0	Unshielded	
BioEntry W	LINE(Switch)	-	-	3.0	Unshielded	
BioEntry W	LINE(Wiegand)	-	-	3.0	Unshielded	
BioEntry W	LINE(Relay)	-	-	3.0	Unshielded	
Notebook Computer	LAN	External Network	LAN	20.0	Unshielded	
Notebook Computer	Serial	LC CONVERTER	Serial	-	-	
Notebook Computer	POWER	Adapter	-	2.0	Shielded	
Notebook Computer	USB	Printer	USB	2.0	Shielded	
LC CONVERTER	POWER	Adapter	-	2.0	Unshielded	

5. Measurement of radiated disturbance

Above 30 MHz Electric Field strength was measured in accordance with FCC PART 15 (2010). The test setup was made according to ANSI C 63.4 (2003) on an open test site, which allows a 3 m distance measurement. The EUT was placed in the center of wooden turntable. The height of this table was 0.8 m. The measurement was conducted with both horizontal and vertical antenna polarization. The turntable has fully rotated. For further description of the configuration refer to the picture of the test setup.

5.1 Measurement equipments

Equipment Name	Type	Manufacturer	Serial No.	Next Calibration date
TEST Receiver	ESCI7	ROHDE & SCHWARZ	1166.5950.07	25-Jan-14
Logbicon Antenna	VULB 9168	SCHWARZBECK	9168-193	22-May-13
Turn Table	DT3000-2t	Innco System GmbH	N/A	-
Antenna Mast	MA4000-EP	Innco System GmbH	N/A	-
PREAMPLIFIER	8449B	AGILENT	3008A00595	25-Jan-14
Horn Antenna	BBHA9120D	SCHWARZBECK	352	15-May-13
Spectrum Analyzer	R3273	ADVANTEST	110600592	26-Jan-14
Turn Table	DT1500-S	Innco System GmbH	N/A	-
Antenna Mast	MA4000-EP	Innco System GmbH	N/A	-
Antenna Master & Turn table controller	C02000-P	Innco System GmbH	CO2000/642 /28051111/L	-

5.2 Environmental Condition

Below 1 GHz –Test Place : 10 m Semi-anechoic chamber

ADAPTER MODE

Temperature (°C) : 23.3 °C
 Humidity (% R.H.) : 51.8 % R.H.

PoE MODE

Temperature (°C) : 22.5 °C
 Humidity (% R.H.) : 53.4 % R.H.

Above 1 GHz–Test Place : 3 m Semi-anechoic chamber

ADAPTER MODE

Temperature (°C) : 23.5 °C
 Humidity (% R.H.) : 52.8 % R.H.

PoE MODE

Temperature (°C) : 23.4 °C
 Humidity (% R.H.) : 52.1 % R.H.

5.3 Test data (Below 1 GHz) – ADAPTER MODE

Test Date : 27-Feb-13

Measurement Distance : 3 m

Frequency (MHz)	Reading (dB μ V)	Position (V/H)	Height (m)	Correction Factor		Result Value(Quasi-peak)		
				Ant Factor (dB)	Cable (dB)	Limit (dB μ V/m)	Result (dB μ V/m)	Margin (dB)
81.40	24.91	V	1.0	10.12	1.51	40.00	36.54	3.46
90.00	22.57	V	1.0	8.76	1.60	43.50	32.93	10.57
162.50	19.27	V	1.0	13.42	2.03	43.50	34.71	8.79
174.20	21.91	V	1.0	12.30	2.14	43.50	36.35	7.15
181.40	19.62	V	1.0	11.62	2.21	43.50	33.45	10.05
298.30	21.19	H	2.5	13.74	2.69	46.00	37.62	8.38
491.70	16.56	V	1.0	17.82	3.47	46.00	37.85	8.15
508.40	14.48	V	1.0	18.16	3.53	46.00	36.16	9.84
658.40	16.13	V	1.0	20.68	4.03	46.00	40.84	5.16
683.40	15.90	V	1.0	20.99	4.13	46.00	41.02	4.98
933.40	8.58	V	1.0	24.12	4.77	46.00	37.46	8.54
Remark	H : Horizontal, V : Vertical *Result Value = Reading + Antenna + Cable loss *Correction Factor = Ant Factor + Cable *The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Quasi-peak detection							

PoE MODE

Test Date : 27-Feb-13

Measurement Distance : 3 m

Frequency (MHz)	Reading (dB μ V)	Position (V/H)	Height (m)	Correction Factor		Result Value(Quasi-peak)		
				Ant Factor (dB)	Cable (dB)	Limit (dB μ V/m)	Result (dB μ V/m)	Margin (dB)
54.20	21.44	V	1.0	13.82	1.24	40.00	36.50	3.50
81.40	24.47	V	1.0	10.12	1.51	40.00	36.10	3.90
122.00	26.31	V	1.0	10.99	1.81	43.50	39.10	4.40
125.00	24.06	V	1.0	11.35	1.83	43.50	37.24	6.26
203.20	26.81	V	1.0	10.14	2.31	43.50	39.27	4.23
266.70	23.35	V	1.0	12.56	2.57	46.00	38.48	7.52
491.70	17.58	V	1.0	17.82	3.47	46.00	38.87	7.13
641.70	16.15	V	1.0	20.47	3.97	46.00	40.59	5.41
658.40	16.32	V	1.0	20.68	4.03	46.00	41.03	4.97
691.70	15.45	V	1.0	21.09	4.17	46.00	40.70	5.30
Remark	H : Horizontal, V : Vertical *Result Value = Reading + Antenna + Cable loss *Correction Factor = Ant Factor + Cable *The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Quasi-peak detection							

5.3 Test data (Above 1 GHz)–ADAPTER MODE

Test Date : 27-Feb-13

Measurement Distance : 3 m

Frequency (MHz)	Reading (dB μ V)	Position (V/H)	Height (m)	Correction Factor		Result Value		
				Ant Factor (dB)	Cable (dB)	Limit (dB μ V/m)	Result (dB μ V/m)	Margin (dB)
Peak(RBW:1 MHz VBW:1 MHz)								
1197.00	47.52	H	1.5	24.97	-31.11	74.00	41.38	32.62
1197.00	46.15	V	1.0	24.97	-31.11	74.00	40.01	33.99
1600.00	43.77	H	1.0	25.22	-29.89	74.00	39.11	34.89
1600.00	48.19	V	1.0	25.22	-29.89	74.00	43.53	30.47
Average(RBW:1 MHz VBW:10 Hz)								
1197.00	31.69	H	1.5	24.97	-31.11	54.00	25.55	28.45
1197.00	31.94	V	1.0	24.97	-31.11	54.00	25.80	28.20
1600.00	34.48	H	1.0	25.22	-29.89	54.00	29.82	24.18
1600.00	32.77	V	1.0	25.22	-29.89	54.00	28.11	25.89
Remark	H : Horizontal, V : Vertical *Reading = receiver reading + Amplifier Gain *CL = Cable Loss-Amplifier Gain *The resolution bandwidth and video bandwidth of spectrum analyzer is 1 MHz and 10 Hz for average detection at frequency above 1 GHz.							
	*Application method of the highest frequency is in the following							
	*Highest frequency of the EUT is less than 108 MHz, the measurement shall only be made up to 1 GHz.							
	*Highest frequency of the EUT is between 108 MHz and 500 MHz, the measurement shall only be made up to 2 GHz.							
	*Highest frequency of the EUT is between 500 MHz and 1 GHz, the measurement shall only be made up to 5 GHz.							
	*Highest frequency of the EUT is above 1 GHz, the measurement shall be made up to 5 times the highest frequency or 40 GHz,							

PoE MODE

Test Date : 27-Feb-13

Measurement Distance : 3 m

Frequency (MHz)	Reading (dBμV)	Position (V/H)	Height (m)	Correction Factor		Result Value		
				Ant Factor (dB)	Cable (dB)	Limit (dBμV/m)	Result (dBμV/m)	Margin (dB)
Peak(RBW:1 MHz VBW:1 MHz)								
1000.00	43.38	V	1.0	24.84	−31.77	74.00	36.45	37.55
1197.00	50.96	H	1.5	24.97	−31.11	74.00	44.82	29.18
1197.00	49.25	V	1.0	24.97	−31.11	74.00	43.11	30.89
1375.00	44.11	V	1.0	25.08	−30.51	74.00	38.68	35.32
1596.00	50.51	V	1.0	25.22	−29.90	74.00	45.84	28.16
Average(RBW:1 MHz VBW:10 Hz)								
1000.00	35.16	V	1.0	24.84	−31.77	54.00	28.23	25.77
1197.00	37.10	H	1.5	24.97	−31.11	54.00	30.96	23.04
1197.00	34.05	V	1.0	24.97	−31.11	54.00	27.91	26.09
1375.00	37.14	V	1.0	25.08	−30.51	54.00	31.71	22.29
1596.00	35.06	V	1.0	25.22	−29.90	54.00	30.39	23.61
Remark	H : Horizontal, V : Vertical *Reading = receiver reading + Amplifier Gain *CL = Cable Loss−Amplifier Gain *The resolution bandwidth and video bandwidth of spectrum analyzer is 1 MHz and 10 Hz for average detection at frequency above 1 GHz.							
	*Application method of the highest frequency is in the following *Highest frequency of the EUT is less than 108 MHz, the measurement shall only be made up to 1 GHz. *Highest frequency of the EUT is between 108 MHz and 500 MHz, the measurement shall only be made up to 2 GHz. *Highest frequency of the EUT is between 500 MHz and 1 GHz, the measurement shall only be made up to 5 GHz. *Highest frequency of the EUT is above 1 GHz, the measurement shall be made up to 5 times the highest frequency or 40 GHz,							

6. Measurement of conducted disturbance

The continuous disturbance voltage of AC Mains in the frequency from 0.15 MHz to 30 MHz was measured in accordance to FCC PART 15 (2010). The test setup was made according to ANSI C 63.4 (2003) in a shielded room. The EUT was placed on a non-conductive table at least 0.8 m above the ground plan. A grounded vertical reference plane was positioned in a distance of 0.4 m from the EUT. The distance from the EUT to other metal surfaces was at least 0.8 m. The EUT was only earthen by its power cord through the line impedance stabilizing network. The power cord has been bundled to a length of 1.0 m. The test receiver with Quasi Peak detector complies with CISPR 16.

6.1 Measurement equipments

Equipment Name	Type	Manufacturer	Serial No.	Next Calibration date
TEST Receiver	ESHS 30	Rohde & Schwarz	828765/002	25-Jan-14
LISN	ENV216	Rohde & Schwarz	101231	25-Jan-14
LISN	ESH3-Z5	Rohde & Schwarz	838979/010	25-Jan-14
Pulse Limiter	ESH3Z2	Rohde & Schwarz	NONE	25-Jan-14

6.2 Environmental Condition

Test Place : Shielded Room

Temperature (°C) : 24.1 °C

Humidity (% R.H.) : 46.5 % R.H.

6.3 Test data

Test Date : 27-Feb-13

Frequency (MHz)	Correction Factor		Line (H/N)	Quasi-peak Value			Average Value		
	Lisn (dB)	Cable (dB)		Limit (dB μ V)	Reading (dB μ V)	Result (dB μ V)	Limit (dB μ V)	Reading (dB μ V)	Result (dB)
0.20	0.13	0.16	N	63.61	42.28	42.57	53.61		
12.39	0.29	0.39	N	60.00	41.55	42.23	50.00		
12.39	0.32	0.39	H	60.00	40.59	41.30	50.00		
12.59	0.29	0.39	N	60.00	41.68	42.37	50.00		
12.59	0.33	0.39	H	60.00	40.04	40.77	50.00		
12.79	0.30	0.40	N	60.00	41.55	42.25	50.00		
12.79	0.34	0.40	H	60.00	40.15	40.89	50.00		
13.00	0.31	0.40	N	60.00	41.71	42.42	50.00		
13.00	0.36	0.40	H	60.00	39.96	40.72	50.00		
13.21	0.37	0.41	H	60.00	40.12	40.90	50.00		
13.74	0.34	0.42	N	60.00	40.88	41.64	50.00		
13.74	0.40	0.42	H	60.00	39.59	40.41	50.00		
Remark	H : Hot Line, N : Neutral Line *Correction Factor = Lisn + Cable *Result = Correction Factor + Reading								



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7. Photographs of test setup

7.1 Setup for Radiated Test : 30 MHz ~ 1000 MHz – ADAPTER MODE

[Front]



[Rear]

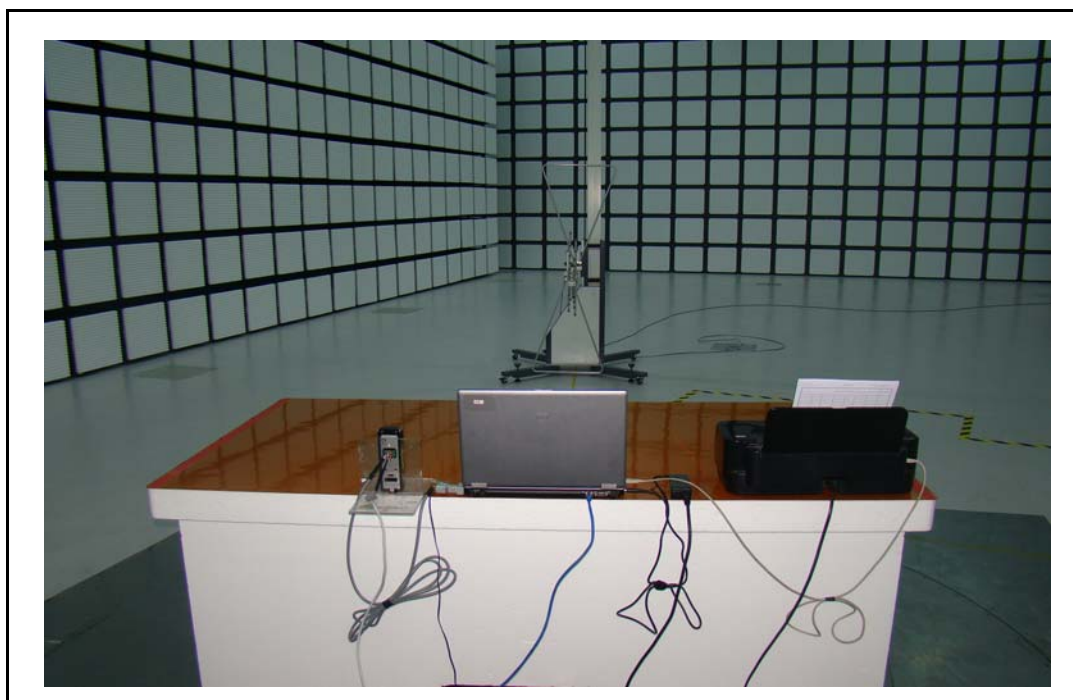


PoE MODE

[Front]

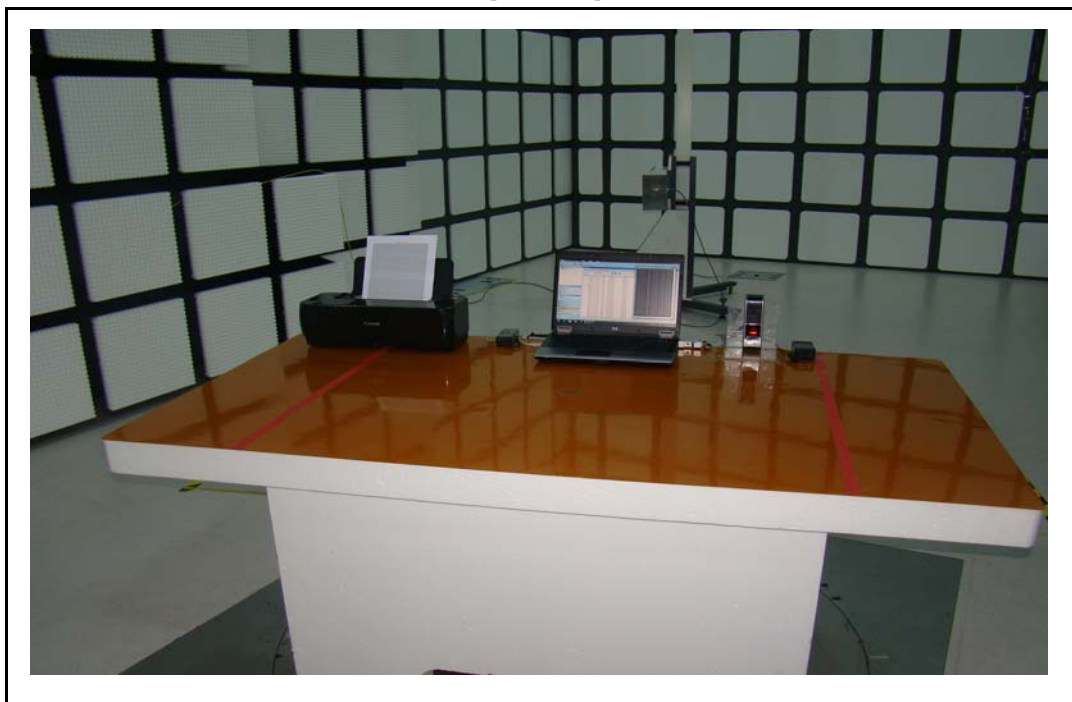


[Rear]

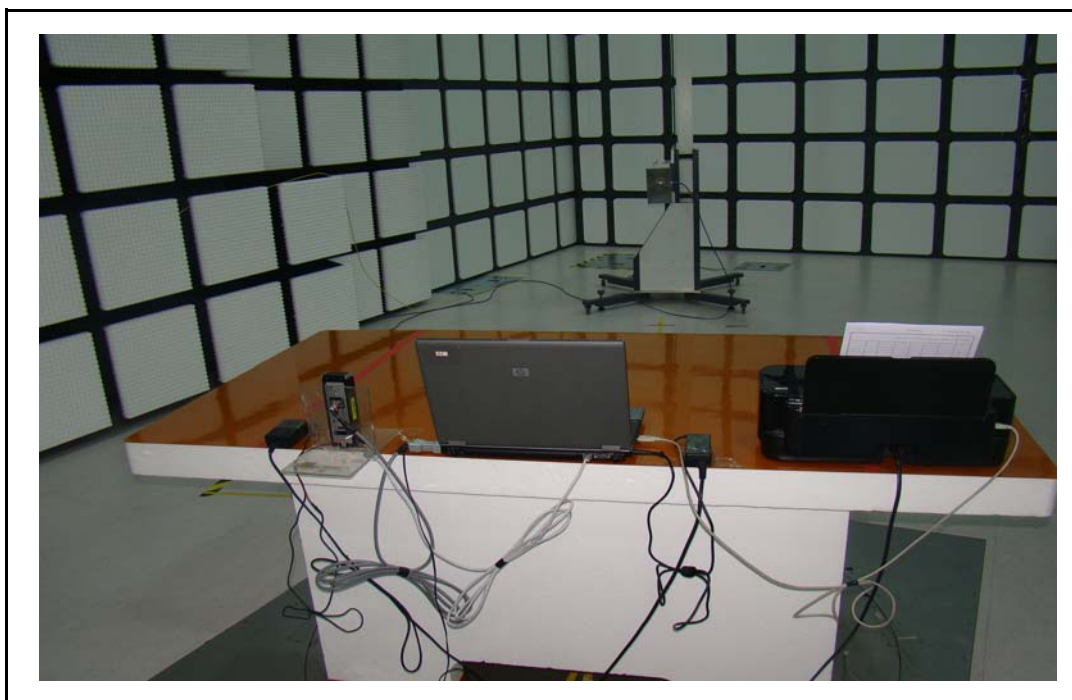


7.2 Setup for Radiated Test : Above 1 GHz – ADAPTER MODED

[Front]



[Rear]





ESTECH Co., Ltd.

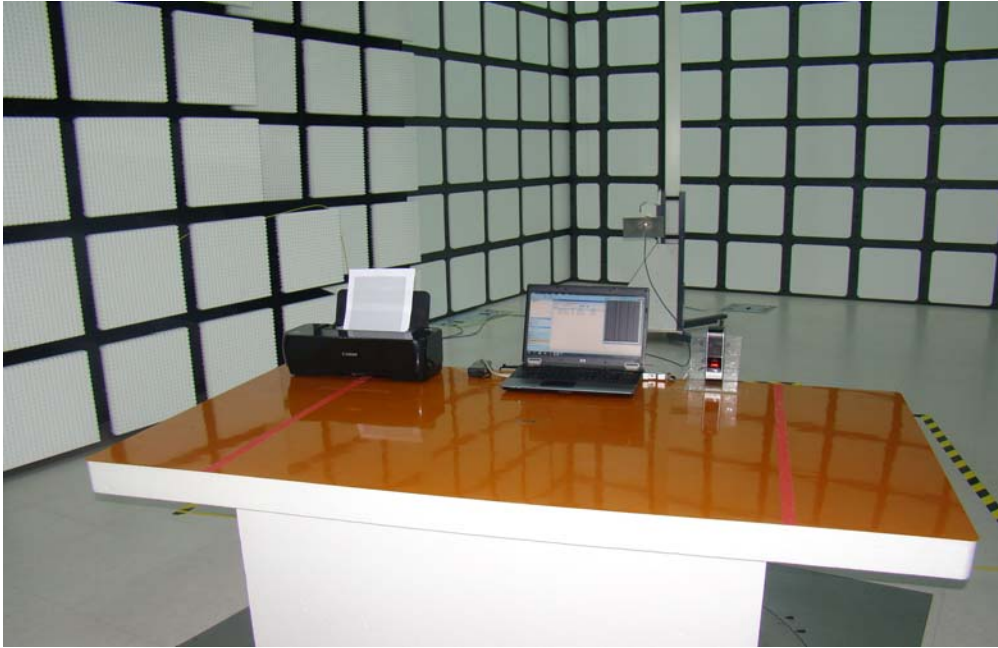
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PoE MODE

[Front]



[Rear]





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**Electromagnetic
Interference
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7.3 Setup for Conducted Test : 0.15 MHz ~ 30 MHz

[Front]



[Rear]



8. Photographs of EUT

[Front]



[Rear]



Appendix 1. Special diagram

*HOT

ES TECH

27 Feb 2013 10:43

HOT

EUT: BEWI-OC

Manuf:

Op Cond: 120 V

Operator: Engineer S.B.Lee

Test Spec: CLASS B

Comment:

Result File: 130303_h.dat :

Scan Settings

(1 Range)

Frequencies

Start 150kHz

Stop 30MHz

Step 0.8%

IF BW 10kHz

Detector PK+AV

Receiver Settings

M-Time 10msec

Atten Auto

Preamp OFF

OpRge 60dB

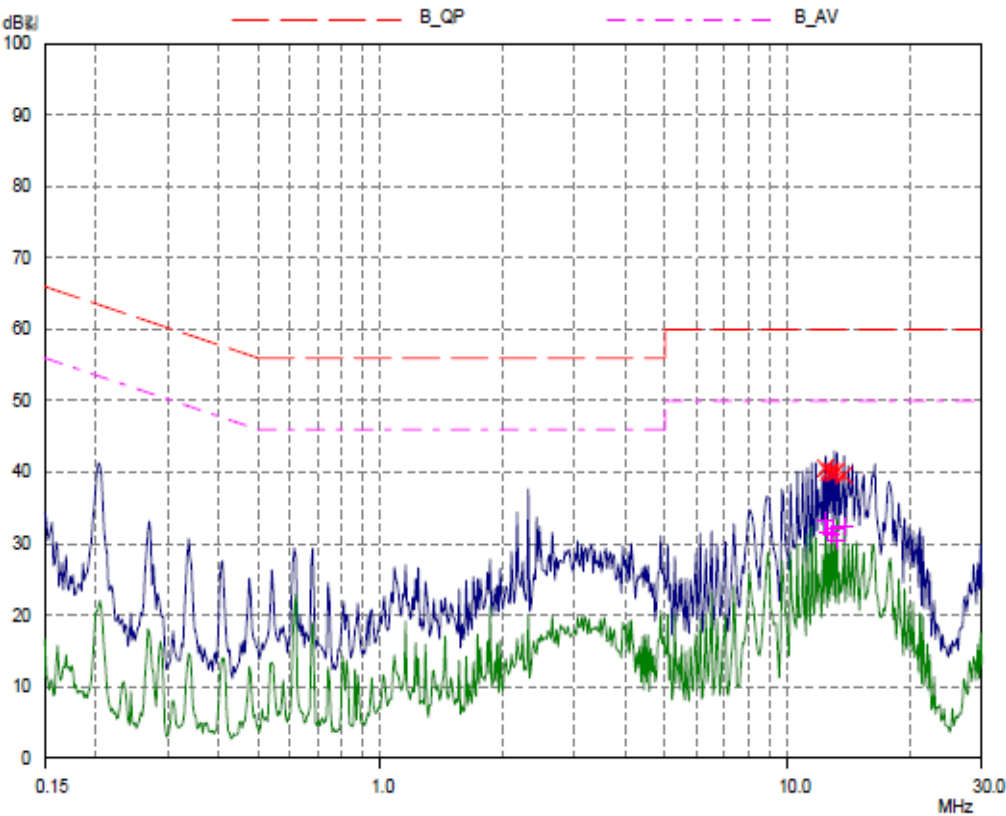
Final Measurement:

Detectors: X QP / + AV

Meas Time: 1sec

Subranges: 25

Acc Margin: 0 dB



*NEUTRAL

ES TECH

27 Feb 2013 10:48

NEUTRAL

EUT: BEWI-OC
Manuf:
Op Cond: 120 V
Operator: Engineer S.B.Lee
Test Spec: CLASS B
Comment:

Result File: 130303_n.dat :

Scan Settings			Receiver Settings		
(1 Range)					
Frequencies					
Start	Stop	Step	IF BW	Detector	M-Time
150kHz	30MHz	0.8%	10kHz	PK+AV	10msec
			Atten	Preampl	OpRge
			Auto	OFF	60dB
Final Measurement:			Detectors: X QP / + AV		
			Meas Time: 1sec		
			Subranges: 25		
			Acc Margin: 0 dB		

