FCC COMPLIANCE REPORT

Test report No	:	**EMC-2015/E035**
Type of Equipment	:	**Slate**
Model Name	:	**Slate6**
Applicant	:	**Cuattro, LLC** **3760, Rockymoutain Drv., Loveland, Co. USA, 80538**
Manufacturer	:	**ISOL** **402, Star Tower, 37, 62, Sagimakgol-ro, Jungwon-gu, Seongnam-si, Gyeonggi-do, Republic of Korea**
Test standards	:	**FCC part 15 subpart B, Class B**
FCC ID	:	**2AFCFSLATE6**

Test Procedure and Items

- AC Power Line Conducted Emissions Measurement: ANSI C63.4-2009

- Radiated Emissions Measurement : ANSI C63.4-2009

Testing Laboratory	:	**EMC Compliance Ltd.**
Test result	:	**Complied**

The above equipment was tested by EMC compliance Testing Laboratory for compliance with the requirements of FCC Rules and Regulations. The results of testing in this report apply to the product/system which was tested only. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties.
These results are deemed satisfactory evidence of compliance with ICES-003 of the Canadian Interference-Causing Equipment Regulations.

Date of receipt: 2015. 06. 12

Date of testing: 2015. 06. 21 ~ 06. 25

Issued date: 2015. 07. 10

Tested by: MOON, HO-JIN

Approved by: BAEK, JEONG-SOO

Contents

1. Applicant information

Applicant:	Cuattro, LLC
Address:	3760, Rockymoutain Drv., Loveland, Co. USA, 80538
E-mail:	jkim@cuattro.com
Contact name:	**Kim Jong Cheol**

Manufacturer:	ISOL
Address:	402, Star Tower, 37, 62, Sagimakgol-ro, Jungwon-gu, Seongnam-si, Gyeonggi-do, Republic of Korea

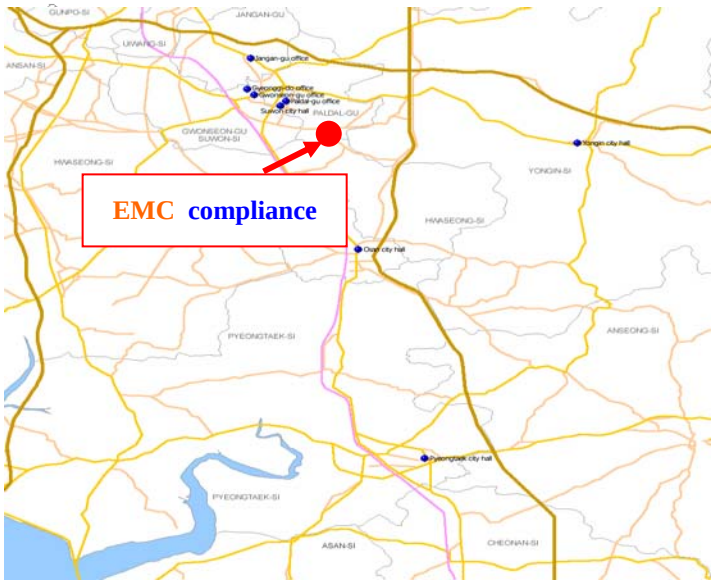
2. Laboratory information

Address

EMC compliance Ltd.
65, Sinwon-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 443-390, Korea
Telephone Number: 82 70 5008 1021
Facsimile Number: 82 505 299 8311

FCC Site Designation No: KR0040, FCC Site Registration No: 687132
VCCI Registration No. : R-3327, G-198, C-3706, T-1849
Industry Canada Registration No.: 8035A
KOLAS NO.: 231

SITE MAP



3. Test system configuration

3.1 Operation environment

		Temperature	Humidity	Pressure
Chamber(10 m)	:	20.7 ~ 25.1 °C	49.2 ~ 50.8 % R.H.	-
Shielded room(CE)	:	25.1 °C	50.5 % R.H.	-

Test site

These testing items were performed following locations;

Test item	Test site
Conducted Emission	Shielded Room
Radiated Emission	10 m, 3 m Chamber

3.2 Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC.
The factors contributing to uncertainties are test receiver, cable loss, antenna factor calibration, Antenna directivity, antenna factor variation with height, antenna phase center variation, antenna frequency interpolation, measurement distance variation, site imperfection, mismatch, and system repeatability. Based on CISPR 16-4-2, the measurement uncertainty level with a 95 % confidence level was applied.

Conducted emission measurement (C.L: Approx 95 %, k = 2)		
Shielded Room (CE#1)	9 ㎑ ~ 150 ㎑: ± 3.75 ㏈	
	150 ㎑ ~ 30 ㎒: ± 3.36 ㏈	
Shielded Room (CE#2)	9 ㎑ ~ 150 ㎑: ± 3.79 ㏈	
	150 ㎑ ~ 30 ㎒: ± 3.42 ㏈	
Radiated Emission measurement (C.L: Approx 95 %, k = 2)		
10 m Chamber (4F)	30 ㎒ ~ 300 ㎒	3 m: + 5.20 ㏈, - 5.31 ㏈
		10 m: + 5.19 ㏈, - 5.30 ㏈
	300 ㎒ ~ 1000 ㎒	3 m: + 6.56 ㏈, - 6.65 ㏈
		10 m: + 6.45 ㏈, - 6.64 ㏈
	1 ㎓ ~ 6 ㎓	3 m: + 6.70 ㏈, - 6.81 ㏈
	6 ㎓ ~ 18 ㎓	3 m: + 6.95 ㏈, - 7.12 ㏈
10 m Chamber (2F)	30 ㎒ ~ 300 ㎒	3 m: + 5.21 ㏈, - 5.32 ㏈
		10 m: + 5.20 ㏈, - 5.31 ㏈
	300 ㎒ ~ 1000 ㎒	3 m: + 5.82 ㏈, - 5.91 ㏈
		10 m: + 5.69 ㏈, - 5.91 ㏈
	1 ㎓ ~ 6 ㎓	3 m: + 6.28 ㏈, - 6.30 ㏈
	6 ㎓ ~ 18 ㎓	3 m: + 6.72 ㏈, - 6.90 ㏈

3.3 Measurement Program

These test items were performed by software programs;

Test item	Measurement Program
Conducted Emission	EP5CE_V 5.4.0(TOYO)
Radiated Emission	EP5RE_V 4.6.0(TOYO)

4. Description of E.U.T.

4.1 General information

Item	Spec.	Remarks
Dimension(wXdXh)	280mm x 42mm x 510mm	11"x 1.7" x 20"
Weight	3.15kg	6.95lb
Tablet	Sharp RW-16G1	15.6", i5,GPU 3200x1800(IGZO),4G,128GSSD , 44Wh(4400mAh,11V)
OS	Windows 8.1 64Bit	
User External USB	1 Port	
Internal USB	3Port **(USB3.0 #3-1,#3-2,#3-3),**	
Case	ABS plastic	Rubber Bumper Combine
Quick Stand	Portrait and Landscape Mode	
Wall Mount	Vesa Bracket Compatible	
Generator Interface	AED(Auto Exposure Detection) only	

4.2 Product description

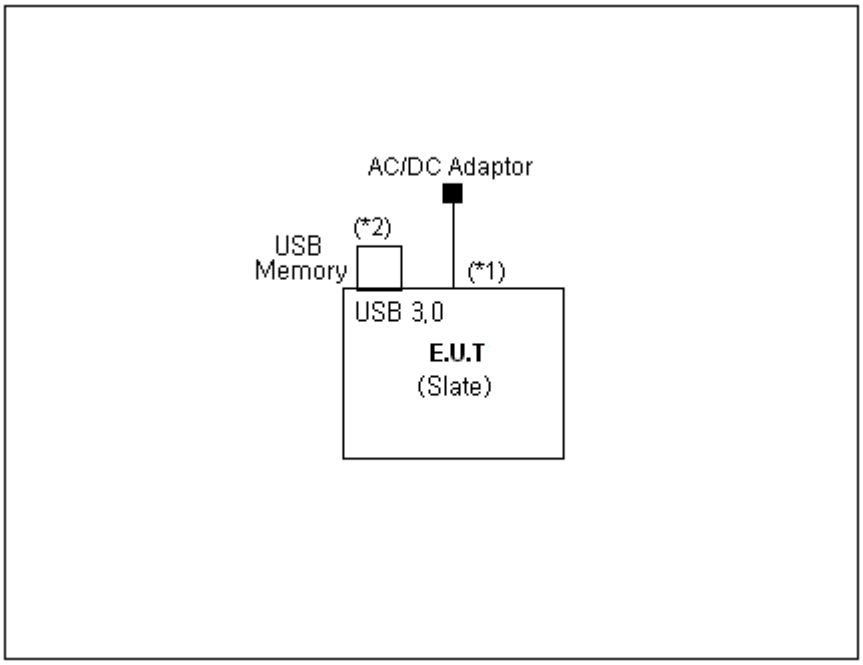
Type of product	Slate
Model name (Basic)	Slate6
Model name (Variant)	-
Difference	-
Trade name	-
Serial no	-
Testing voltage	* 120 Ⅴ, 60 Hz * DC 3.8 Ⅴ (Built in Battery)
Input/Output range	* AC/DC Adaptor (ADP-65JH AB) Input: AC 100 ~ 240 Ⅴ, 50/60 Hz, 1.5 A Output: DC 19 Ⅴ, 3.42 A * DC 3.8 Ⅴ
Internal clock frequency	600 ㎒
Note	* AC/DC adaptor was provided by the manufacturer.

4.3 Auxiliary equipments

Type	Model / Part #	Serial number	Manufacturer
USB Memory	-	-	-

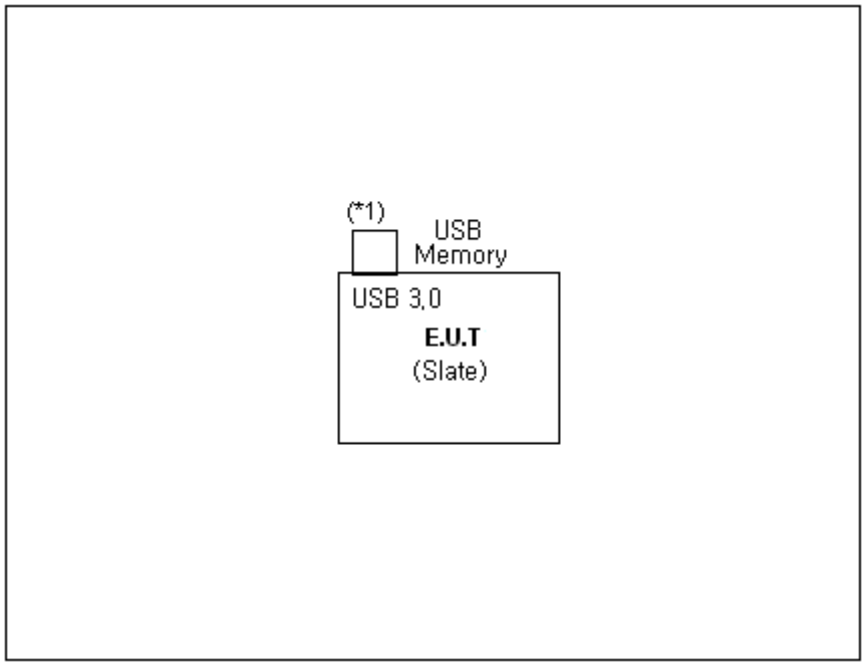
4.4 Test configuration

*** Charging Mode**



Note	Start		End		Cable	
*	Name	I/O port	Name	I/O port	Length (m)	Spec.
1	**EUT** (Slate)	Power	AC/DC Adaptor	Power	2.0	Non-Shield
2		USB 3.0	USB Memory	USB 3.0	Direct	-

*** Alone Mode**



Note	Start		End		Cable	
*	Name	I/O port	Name	I/O port	Length (m)	Spec.
1	**EUT** (Slate)	USB 3.0	USB Memory	USB 3.0	Direct	-

4.5 Operating conditions

The EUT was configured as normal intended use.

Test mode	Normal operating
Charging Mode	Charging Test.
	H Pattern Scrolling Test.
	Read/Write Test. (Using EMI Tool Program)
Alone Mode	H Pattern Scrolling Test.
	Read/Write Test. (Using EMI Tool Program)

5. Summary of test results

In the above configuration tested, The EUT complied with the requirement of the specification

5.1 Summary of EMI emission test results

FCC Part 15 Subpart B (Class B)

ANSI C63.4 – 2009

Applied	Test items	Test method	Result
☒	Conducted Emission	ANSI C63.4 – 2009	Pass
☒	Radiated Emission	ANSI C63.4 – 2009	Pass

6. Test results

6.1 Conducted Emission

Test specification	FCC Part 15, Section 15.107(a), Class B		
Testing voltage	120 V, 60 Hz		
Test facility	Shielded room (CE#2)		
Date	2015. 06. 21		
Temperature(°C)	25.1 °C	Humidity (% R.H.)	50.5 % R.H.
Remarks	Pass		

6.1.1 Limits of conducted emission measurement

Frequency [㎒]	Class A (dB(㎶))		Class B (dB(㎶))	
	Quasi-peak	Average	Quasi-peak	Average
0.15 ~ 0.5	79	66	66 ~ 56 *	56 ~ 46*
0.5 ~ 5	73	60	56	46
5 ~ 30	73	60	60	50

*The limit decreases linearly with the logarithm of frequency.

6.1.2 Measurement procedure

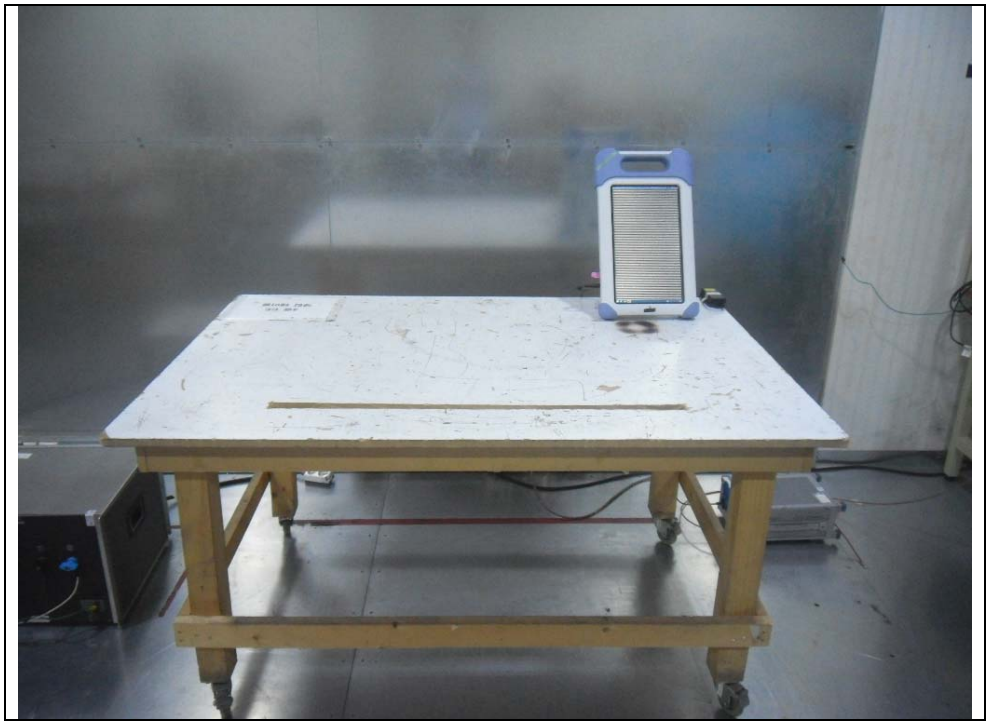
The measurements were performed in a shielded room. EUT was setup as shown in photograph and placed on a non-metallic table height of 0.8 m above the reference ground plane. The rear of table was located 0.4 m to the vertical conducted plane. EUT was power through the LISN, which was bonded to the ground plane. The LISN power was filtered. Each EUT power lead, except ground (safety) lead was individually connected through a LISN to input power source. EUT signal cables that hung closer than 0.4 m to the Horizontal metal ground 0.3 m ~ 0.4 m long. The power cord was bundles in the center. All peripheral equipment was powered from a sub LISN. The LISN and ISN were positioned 0.8 m from the EUT. Peak and Average detection were used in preliminary testing and Quasi-peak and Average detections were used at final measurement. Both lines of power cord, hot and neutral, were measured.

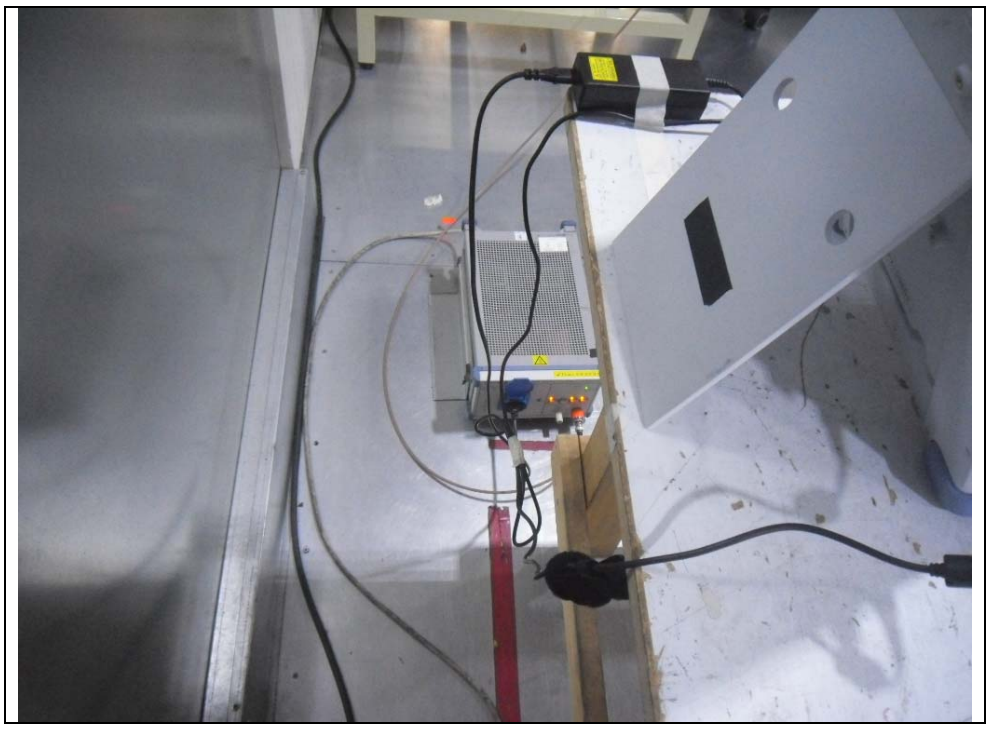
6.1.3 Used equipments

Equipment	Model	Serial No.	Makers	Next Cal. Date	Used
Test Receiver	ESCI	101408	R&S	2016.03.02	☐
Test Receiver	ESCI	100001	R&S	2015.07.14	☐
Test Receiver	ESCI	100710	R&S	2015.10.13	☒
TWO-LINE V-NETWORK	ENV216	101352	R&S	2015.10.13	☒
TWO-LINE V-NETWORK	NNLK8121	8121-472	SCHWARZBECK	2016.06.16	☐

6.1.4 Photographs of test setup

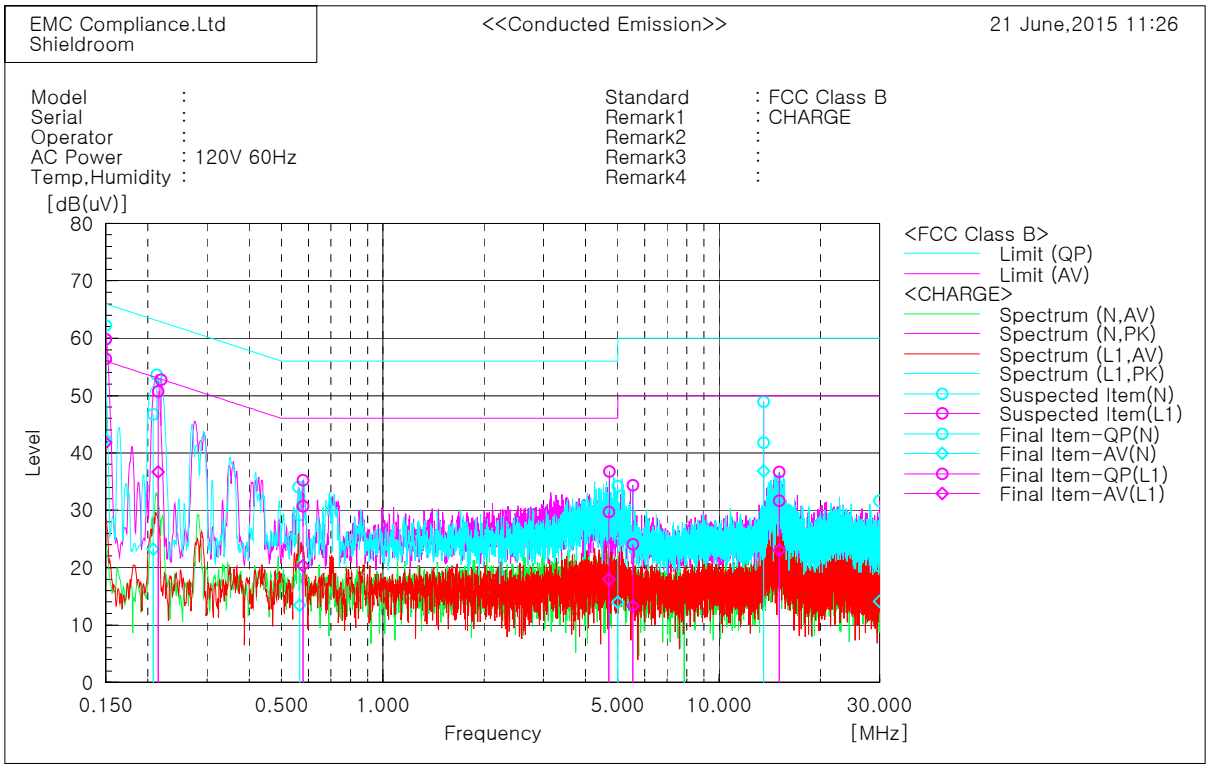
* AC main (Charging Mode)





6.1.5 Conducted emission measurement result

* AC main (Slate6)_Charging Mode



Final Result

--- N Phase ---

No.	Frequency [MHz]	Reading QP [dB(uV)]	Reading CAV [dB(uV)]	c.f [dB]	Result QP [dB(uV)]	Result CAV [dB(uV)]	Limit QP [dB(uV)]	Limit AV [dB(uV)]	Margin QP [dB]	Margin CAV [dB]
1	0.15009	50.3	32.8	9.5	59.8	42.3	66.0	56.0	6.2	13.7
2	0.20754	37.2	13.7	9.5	46.7	23.2	63.3	53.3	16.6	30.1
3	0.56503	19.7	4.0	9.5	29.2	13.5	56.0	46.0	26.8	32.5
4	4.99445	16.5	4.5	9.5	26.0	14.0	56.0	46.0	30.0	32.0
5	13.56036	32.0	27.0	9.8	41.8	36.8	60.0	50.0	18.2	13.2
6	29.98608	10.3	4.3	9.9	20.2	14.2	60.0	50.0	39.8	35.8

--- L1 Phase ---

No.	Frequency [MHz]	Reading QP [dB(uV)]	Reading CAV [dB(uV)]	c.f [dB]	Result QP [dB(uV)]	Result CAV [dB(uV)]	Limit QP [dB(uV)]	Limit AV [dB(uV)]	Margin QP [dB]	Margin CAV [dB]
1	0.15008	50.3	32.3	9.5	59.8	41.8	66.0	56.0	6.2	14.2
2	0.2144	41.2	27.2	9.5	50.7	36.7	63.0	53.0	12.3	16.3
3	0.57908	21.2	10.9	9.5	30.7	20.4	56.0	46.0	25.3	25.6
4	4.70714	20.2	8.5	9.5	29.7	18.0	56.0	46.0	26.3	28.0
5	5.54162	14.6	3.8	9.5	24.1	13.3	60.0	50.0	35.9	36.7
6	15.11133	22.0	13.4	9.7	31.7	23.1	60.0	50.0	28.3	26.9

6.2 Radiated Emission

Test specification	FCC Part 15, Section 15.109(g), Class B		
Testing voltage	120 V, 60 Hz / DC 3.8 V		
Test facility	10 m Chamber (4F), 3 m Chamber (3F)		
Test distance	3 m		
Date	2015. 06. 22 ~ 06. 25		
Temperature (°C)	20.7 ~ 25.1 °C	Humidity (% R.H.)	49.2 ~ 50.8 % R.H.
Remarks	Pass		

6.2.1 Limits of radiated emission measurement

Frequency [㎒]	Class A (dB(㎶/m)) @ 10 m	Class B (dB(㎶/m)) @ 3 m
30-88	39	40
88-216	43.5	43.5
216-960	46.4	46
Above 960	49.5	54

*** Note- Alternative standard: CISPR, Pub. 22 ***

6.2.2 Measurement procedure

The test was done at a 10 m chamber with a quasi-peak detector. EUT was placed on a non-metallic table height of 0.8 m above the reference ground plane. Cables were folded back and forth forming a bundle 0.3 m to 0.4 m long and were hanged at a 0.4 m height to the ground plane.
Cables connected to EUT were fixed to cause maximum emission. Test was made with the antenna positioned in both the horizontal and vertical planes of polarization. The measurement antenna was varied in height above the conducting ground plane to obtain the maximum signal strength.

6.2.3 Used equipments

* 30 ㎒ ~ 1 ㎓

Equipment	Model no.	Serial no.	Makers	Next Cal. Date	Used
Test Receiver	ESR	101078	R&S	2016.02.16	☒
Bi-Log Antenna	VULB 9163	552	SCHWARZBECK	2016.07.10	☒
Amplifier	310N	186280	SONOMA INSTRUMENT	2016.03.02	☒
Coaxial Fixed Attenuator	8491A	MY52460424	AGILENT	2015.07.23	☒
Antenna Mast	AM4.0	079/3440509	MATURO	-	☒
Turn Table	CO2000-SOFT	-	MATURO	-	☒

* 1 ㎓ ~ 6 ㎓

Equipment	Model no.	Serial no.	Makers	Next Cal. Date	Used
Test Receiver	ESR	101078	R&S	2016.02.16	☒
Bi-Log Antenna	VULB 9163	552	SCHWARZBECK	2016.07.10	☒
Amplifier	310N	186280	SONOMA INSTRUMENT	2016.03.02	☒
Coaxial Fixed Attenuator	8491A	MY52460424	AGILENT	2015.07.23	☒
Antenna Mast	AM4.0	079/3440509	MATURO	-	☒
Turn Table	CO2000-SOFT	-	MATURO	-	☒
Preamplifier	8449B	3008A01802	AGILENT	2015.08.05	☒
Horn ANT	3115	00086706	ETS	2015.09.01	☒

6.2.4 Sample calculation

The field strength is calculated adding the antenna Factor, cable loss and, Antenna pad adding, subtracting the amplifier gain from the measured reading.

The sample calculation is as follow:

Result = M.R + C.F(A.F + C.L +3 ㏈ Att – A.G)

M.R = Meter Reading

C.F = Correction Factor

A.F = Antenna Factor

C.L = Cable Loss

A.G= Amplifier Gain

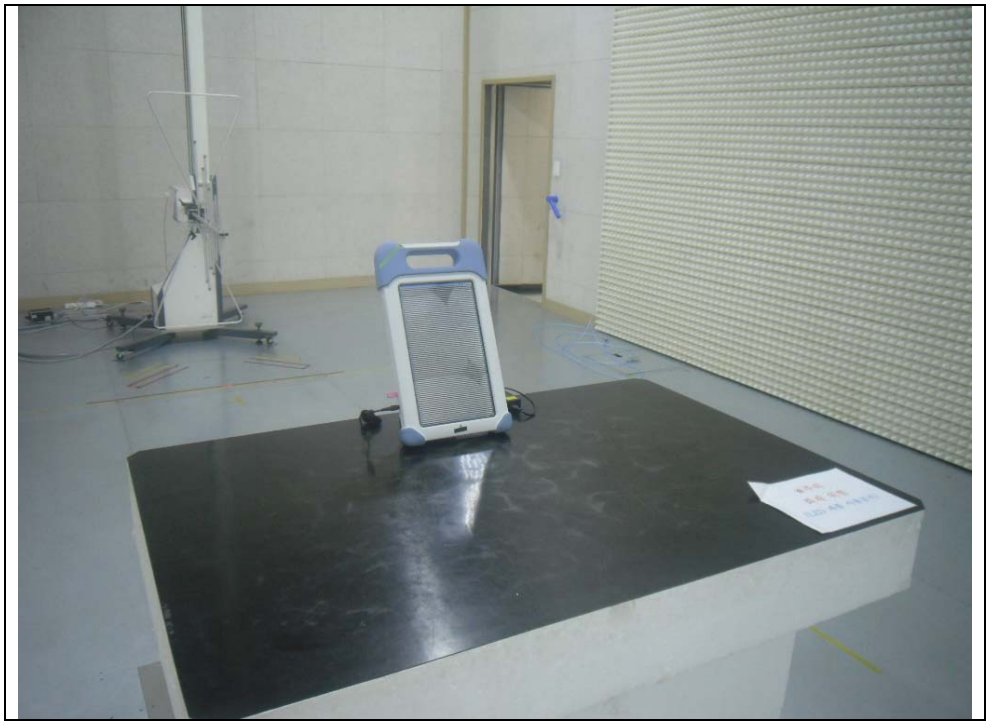
3 ㏈ Att = 3 ㏈ Attenuator

If M.R is 30 ㏈, A.F 12 ㏈, C.L 5 ㏈, 3 ㏈, A.G 35 ㏈

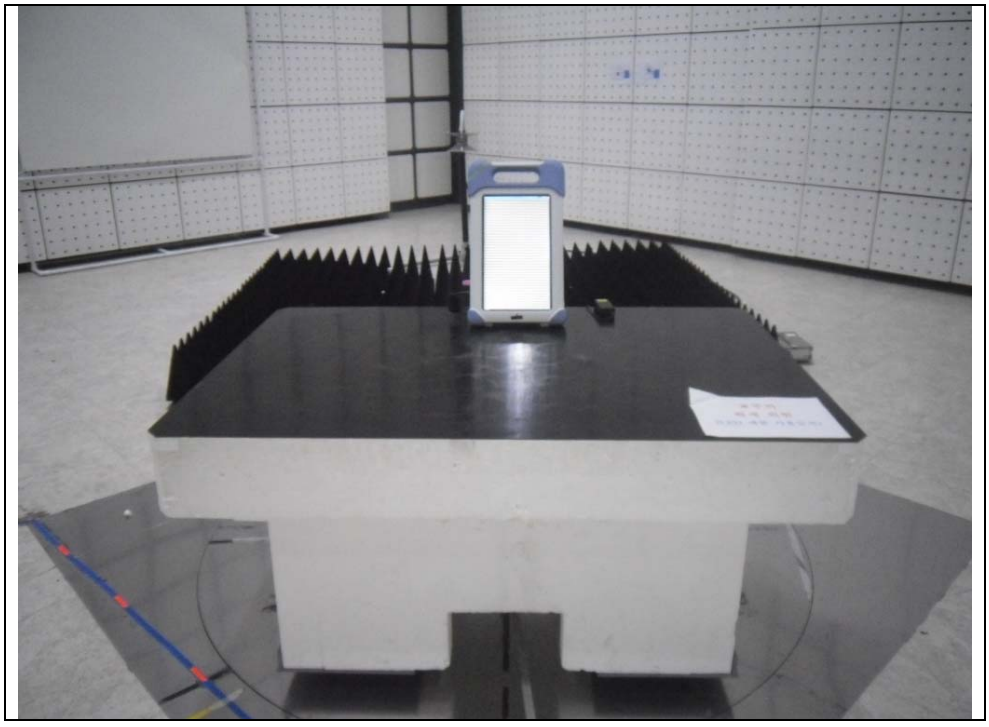
The result is 30 + 12 + 5 + 3 – 35 = 15 ㏈(㎶/m)

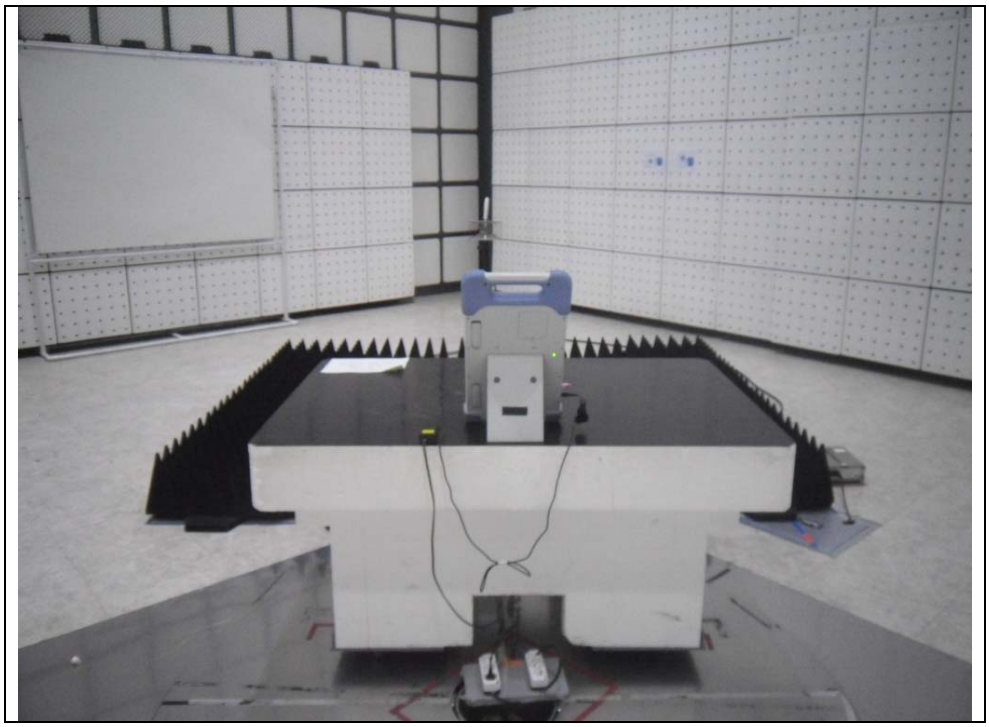
6.2.5 Photographs of test setup

* 30 ㎒ ~ 1 ㎓ (Charging Mode)

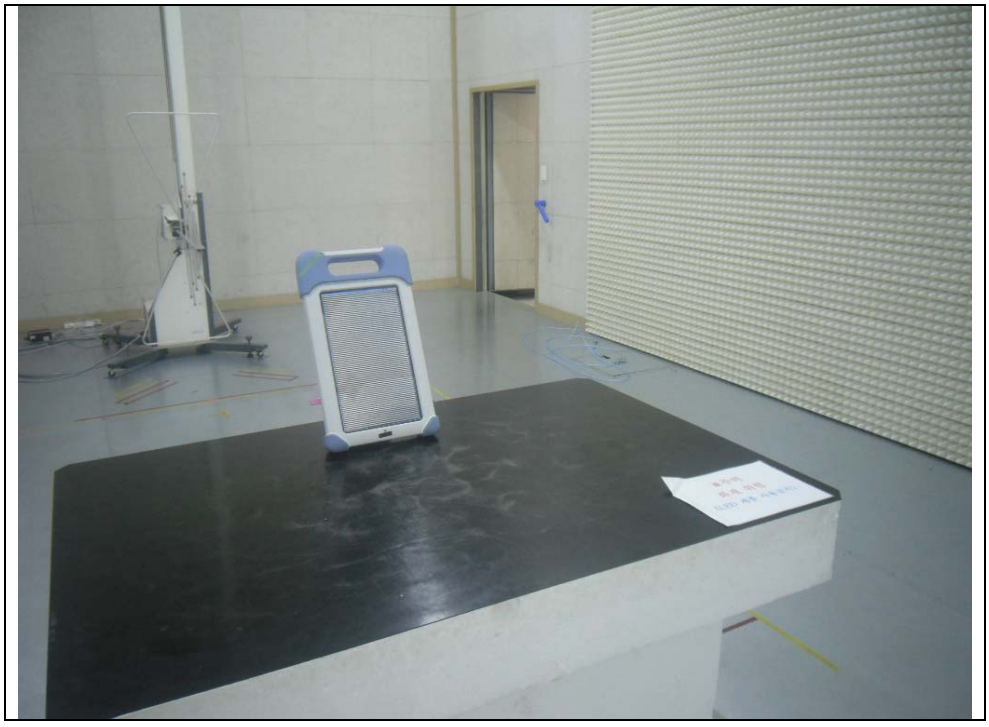


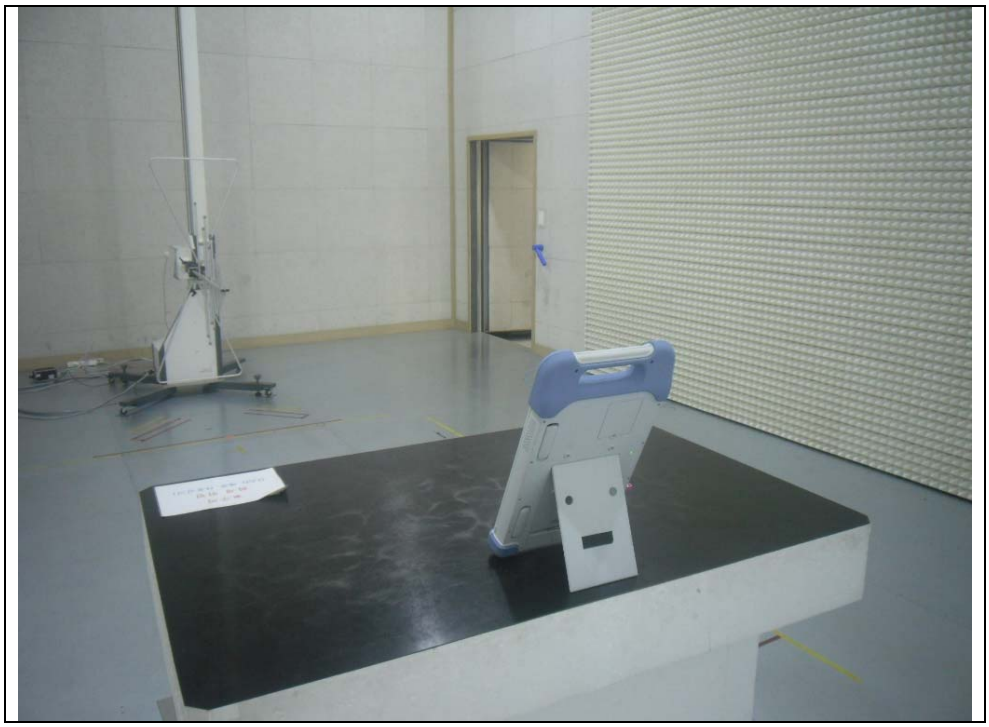
* 1 ㎓ ~ 6 ㎓ (Charging Mode)



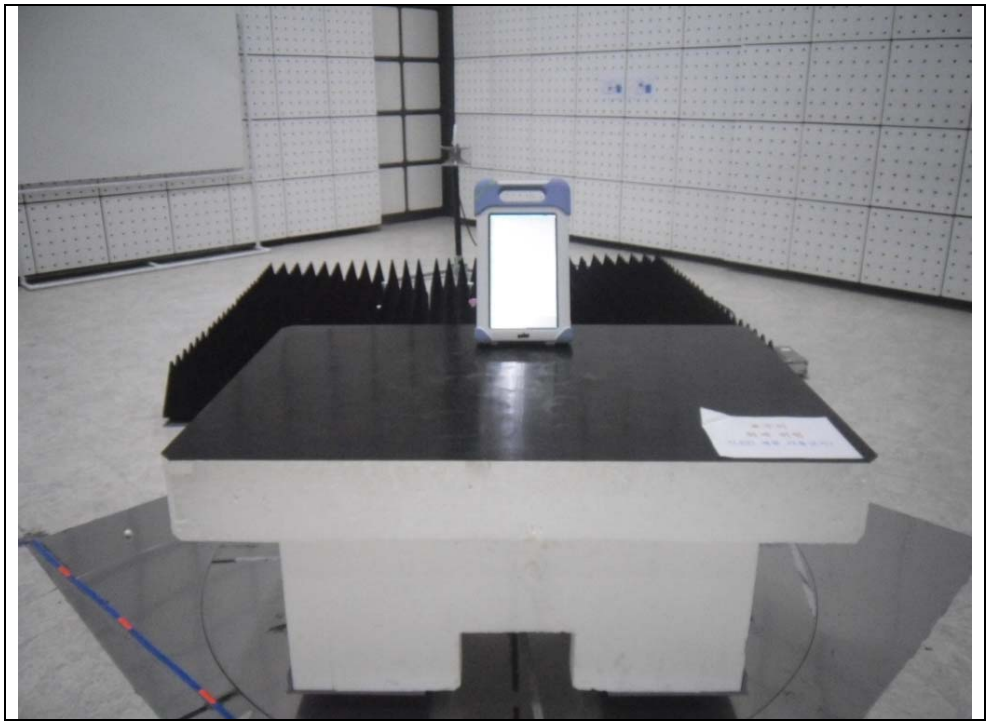


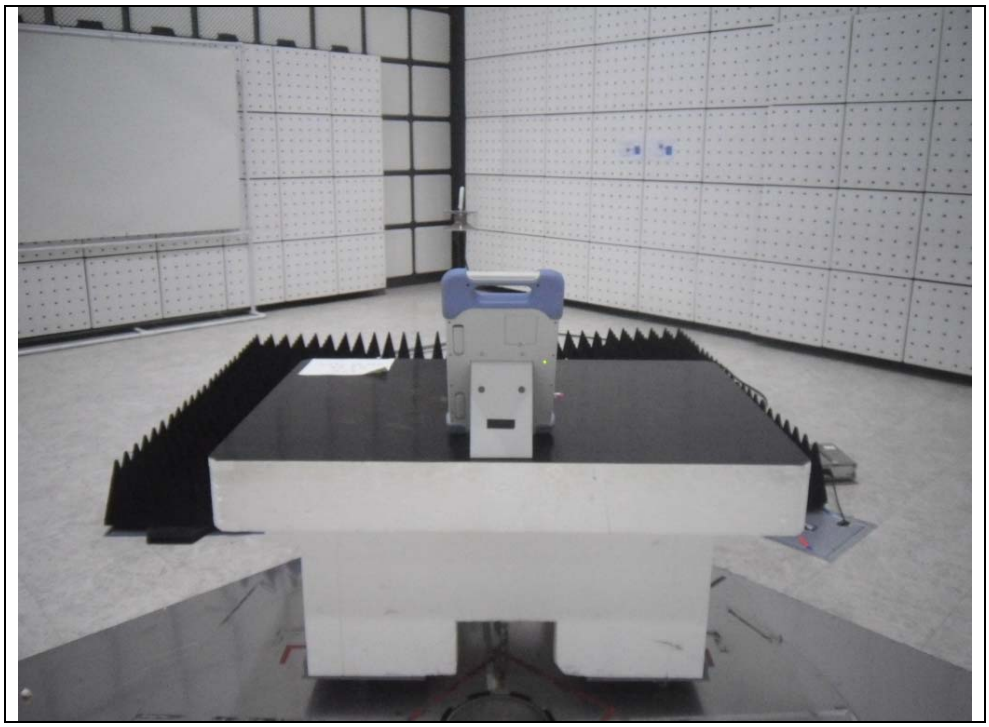
* 30 ㎒ ~ 1 ㎓ (Alone Mode)





* 1 ㎓ ~ 6 ㎓ (Alone Mode)

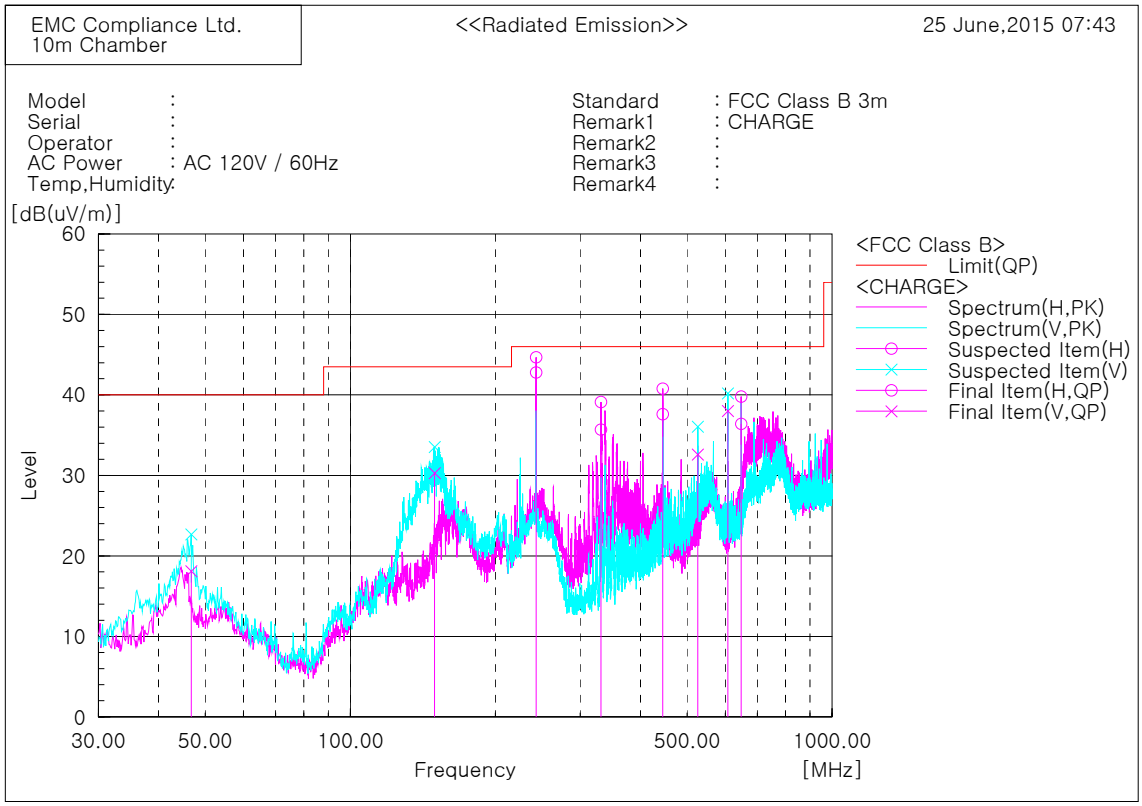




6.2.6 Radiated emission measurement result

*** Graph and Data**

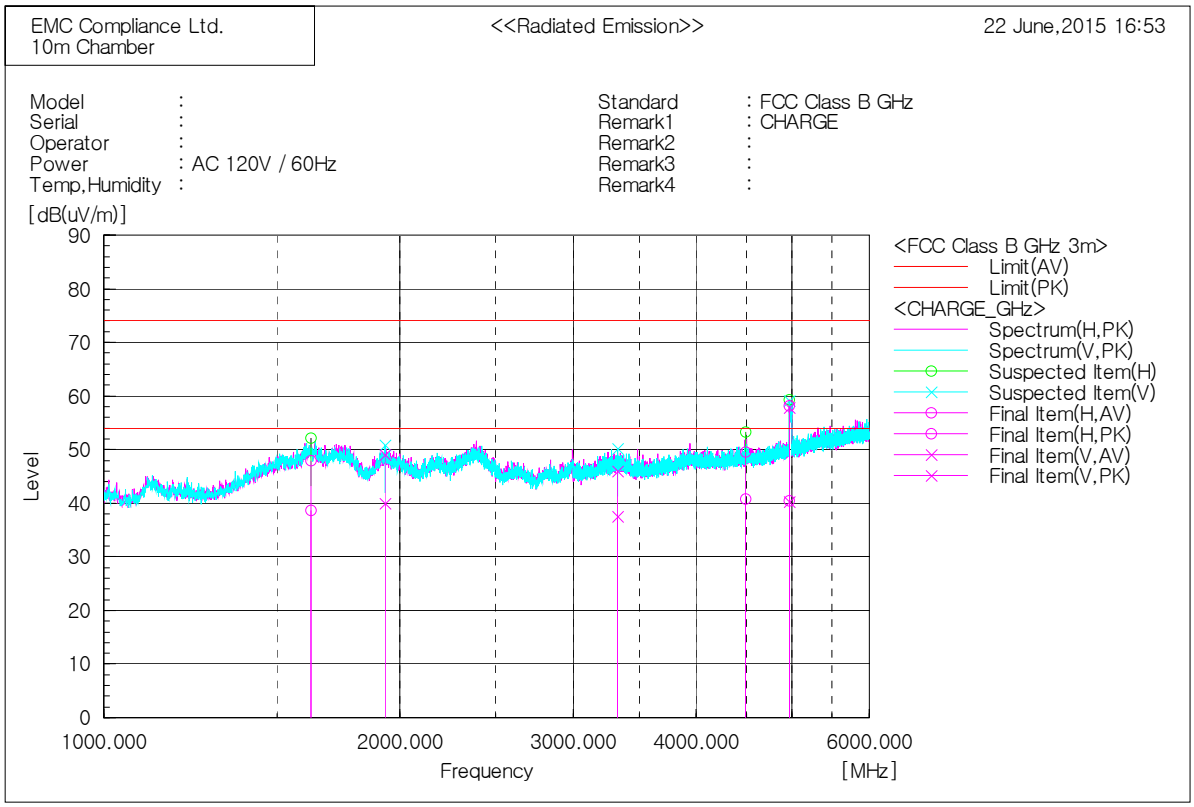
* 30 ㎒ ~ 1 ㎓ (Slate6)_Charging Mode



Final Result

No.	Frequency [MHz]	(P)	Reading QP [dB(uV)]	c.f [dB(1/m)]	Result QP [dB(uV/m)]	Limit QP [dB(uV/m)]	Margin QP [dB]	Height [cm]	Angle [deg]
1	46.733	V	31.3	-13.2	18.1	40.0	21.9	100.0	252.1
2	149.553	V	48.5	-18.2	30.3	43.5	13.2	100.0	158.3
3	242.915	H	56.4	-13.6	42.8	46.0	3.2	99.8	183.5
4	331.428	H	46.9	-11.2	35.7	46.0	10.3	99.8	200.6
5	445.403	H	45.7	-8.1	37.6	46.0	8.4	99.8	166.5
6	526.519	V	39.2	-6.6	32.6	46.0	13.4	100.0	39.0
7	607.393	V	43.0	-5.0	38.0	46.0	8.0	100.0	97.1
8	648.011	H	41.1	-4.7	36.4	46.0	9.6	99.8	318.8

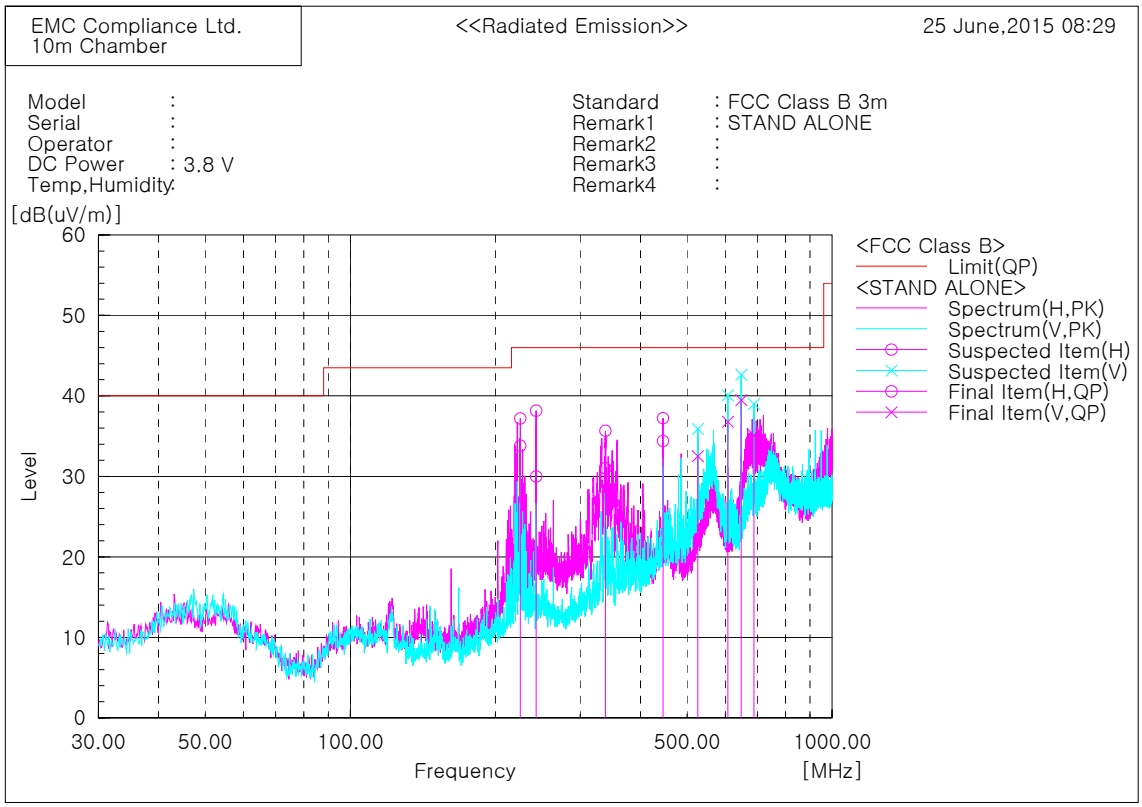
* 1 ㎓ ~ 6 ㎓ (Slate6)_Charging Mode



Final Result

No.	Frequency [MHz]	(P)	Reading AV [dB(uV)]	Reading PK [dB(uV)]	c.f [dB(1/m)]	Result AV [dB(uV/m)]	Result PK [dB(uV/m)]	Limit AV [dB(uV/m)]	Limit PK [dB(uV/m)]	Margin AV [dB]	Margin PK [dB]	Height [cm]	Angle [deg]
1	1623.750	H	40.0	49.3	-1.4	38.6	47.9	54.0	74.0	15.4	26.1	100.0	262.3
2	1931.250	V	37.8	46.9	2.2	40.0	49.1	54.0	74.0	14.0	24.9	100.0	28.8
3	3326.875	V	32.1	40.5	5.5	37.6	46.0	54.0	74.0	16.4	28.0	100.0	220.4
4	4492.500	H	30.7	39.6	10.0	40.7	49.6	54.0	74.0	13.3	24.4	100.0	328.7
5	4977.500	H	28.5	46.1	12.0	40.5	58.1	54.0	74.0	13.5	15.9	100.0	196.0
6	4978.750	V	28.2	45.8	12.1	40.3	57.9	54.0	74.0	13.7	16.1	100.0	230.9

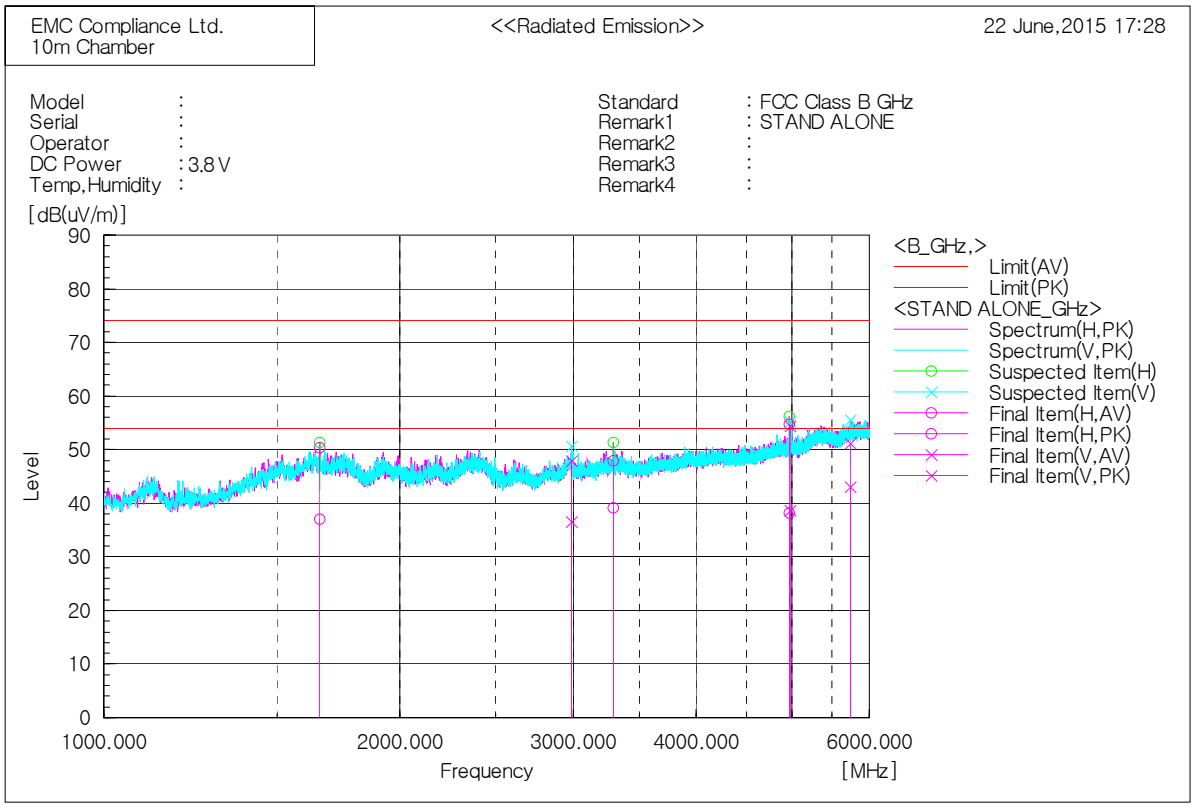
* 30 ㎒ ~ 1 ㎓ (Slate6)_Alone Mode



Final Result

No.	Frequency [MHz]	(P)	Reading QP [dB(uV)]	c.f [dB(1/m)]	Result QP [dB(uV/m)]	Limit QP [dB(uV/m)]	Margin QP [dB]	Height [cm]	Angle [deg]
1	225.334	H	47.9	-14.1	33.8	46.0	12.2	100.1	11.5
2	242.915	H	43.6	-13.6	30.0	46.0	16.0	100.1	193.8
3	338.581	H	42.0	-11.0	31.0	46.0	15.0	100.1	336.7
4	445.524	H	42.5	-8.1	34.4	46.0	11.6	100.1	202.0
5	526.519	V	39.1	-6.6	32.5	46.0	13.5	99.9	65.1
6	607.393	V	41.8	-5.0	36.8	46.0	9.2	99.9	105.9
7	647.526	V	44.2	-4.7	39.5	46.0	6.5	99.9	105.9
8	688.388	V	39.4	-4.3	35.1	46.0	10.9	99.9	105.9

* 1 ㎓ ~ 6 ㎓ (Slate6)_Alone Mode



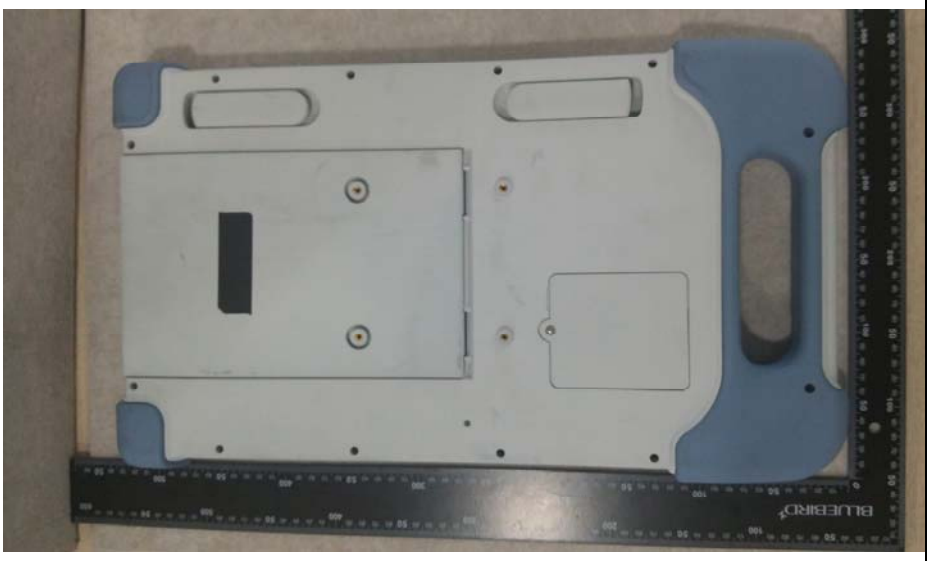
Final Result

No.	Frequency [MHz]	(P)	Reading AV [dB(uV)]	Reading PK [dB(uV)]	c.f [dB(1/m)]	Result AV [dB(uV/m)]	Result PK [dB(uV/m)]	Limit AV [dB(uV/m)]	Limit PK [dB(uV/m)]	Margin AV [dB]	Margin PK [dB]	Height [cm]	Angle [deg]
1	1656.875	H	37.9	51.3	-0.9	37.0	50.4	54.0	74.0	17.0	23.6	100.0	160.9
2	2988.125	V	32.5	43.9	4.1	36.6	48.0	54.0	74.0	17.4	26.0	100.0	135.6
3	3295.000	H	33.7	42.6	5.4	39.1	48.0	54.0	74.0	14.9	26.0	100.0	138.2
4	4978.125	H	26.2	42.8	12.0	38.2	54.8	54.0	74.0	15.8	19.2	100.0	53.3
5	4981.250	V	26.5	42.4	12.1	38.6	54.5	54.0	74.0	15.4	19.5	100.0	40.2
6	5740.625	V	28.1	36.2	15.0	43.1	51.2	54.0	74.0	10.9	22.8	100.0	176.4

7. E.U.T. photographs

Front View

Rear View

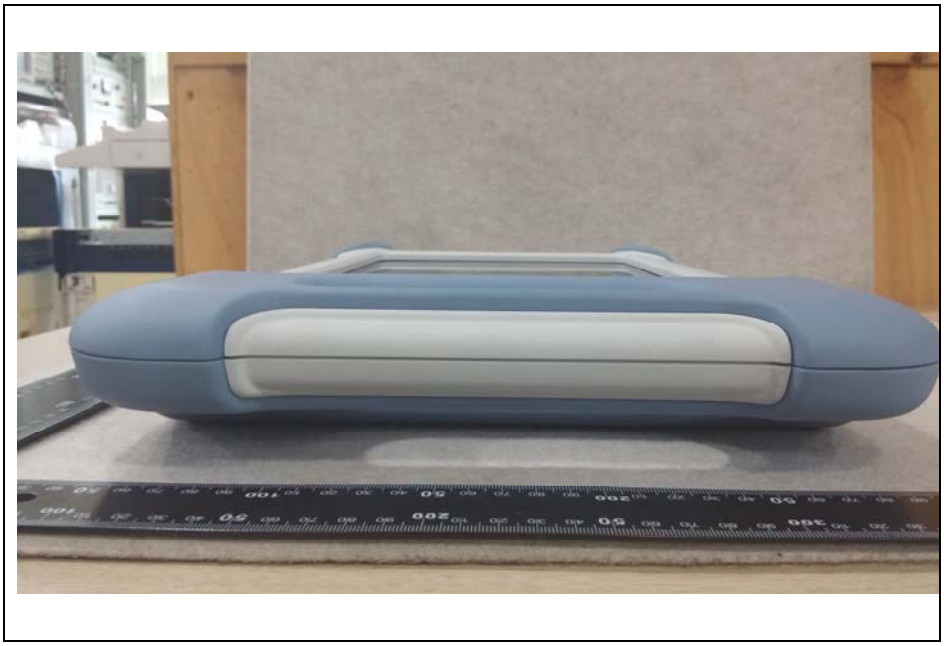


Left View

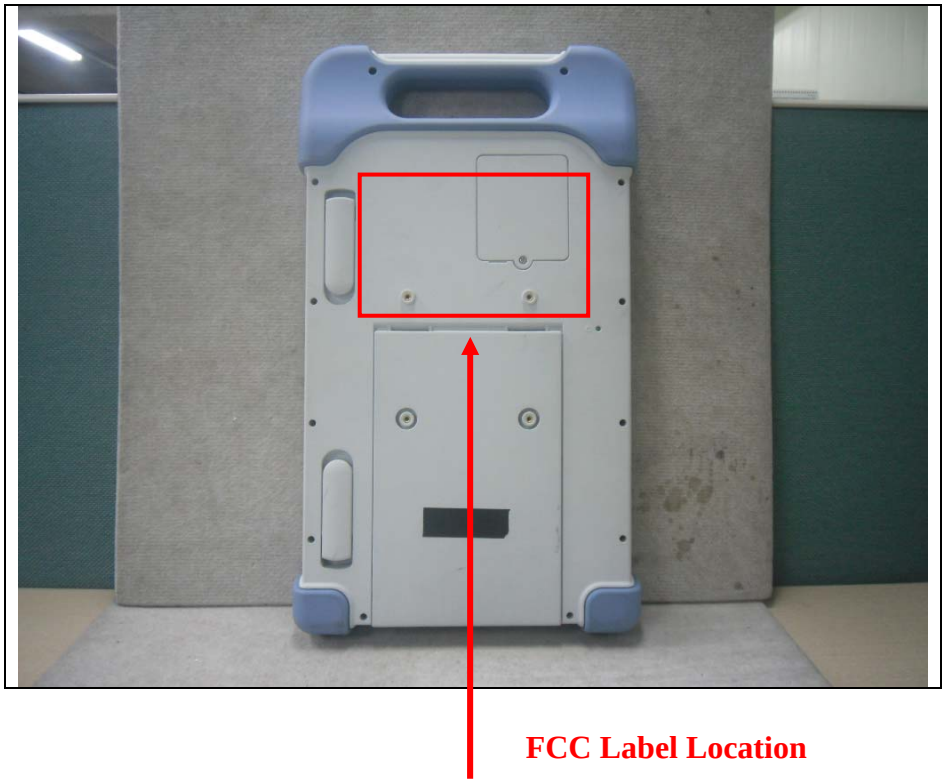
Right View

Top View

Bottom View



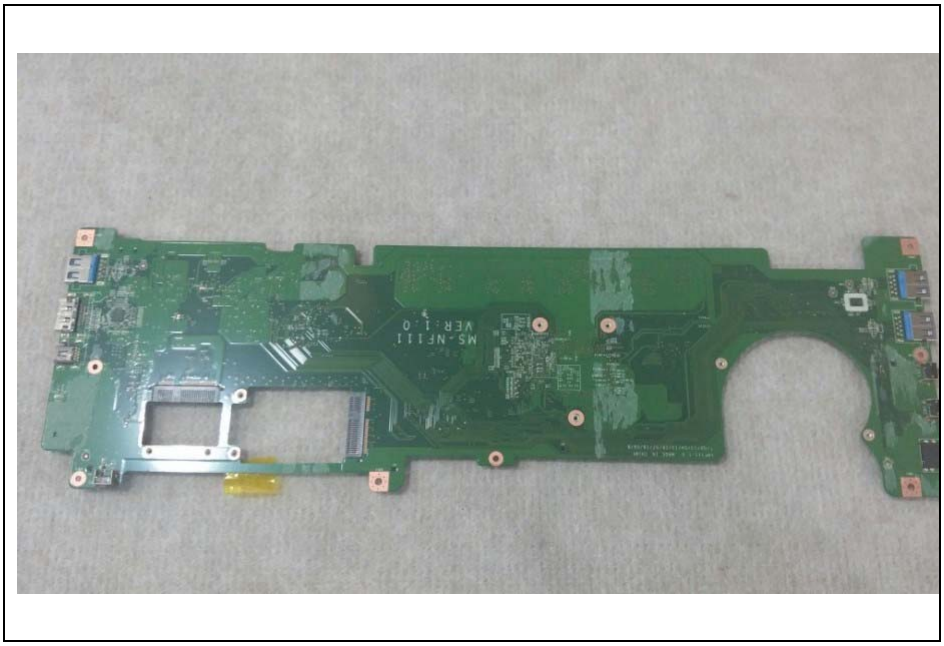
Label



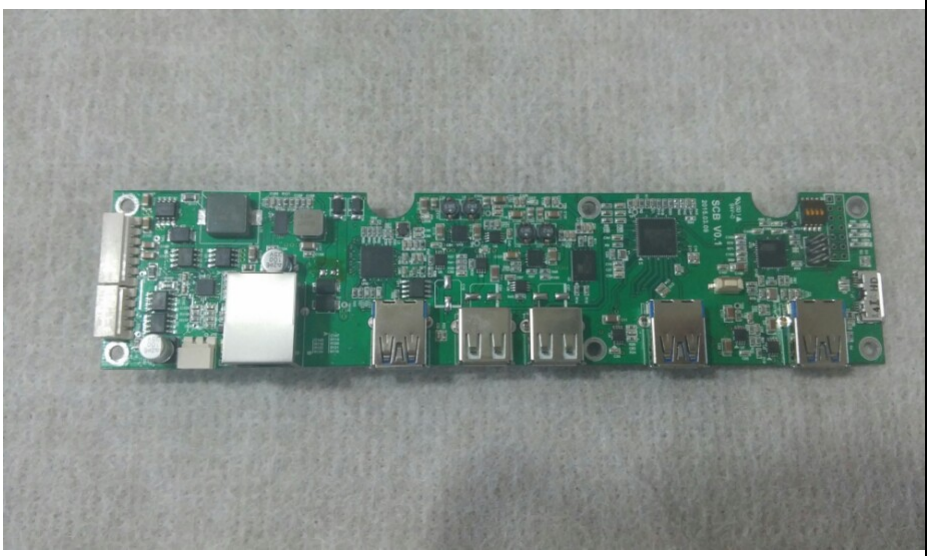
FCC Label Location

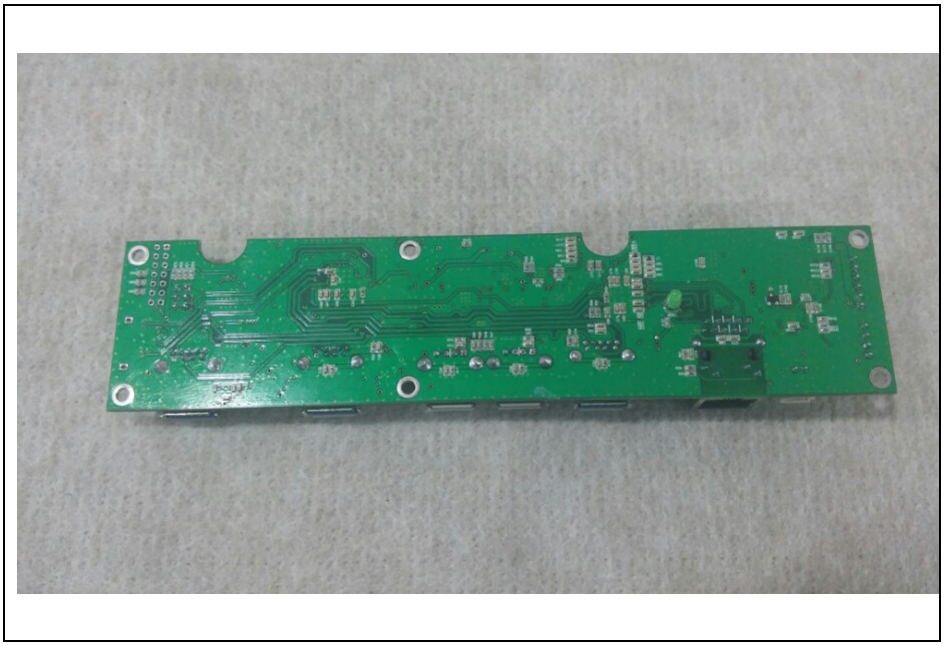
Slate
Slate6

Main Board

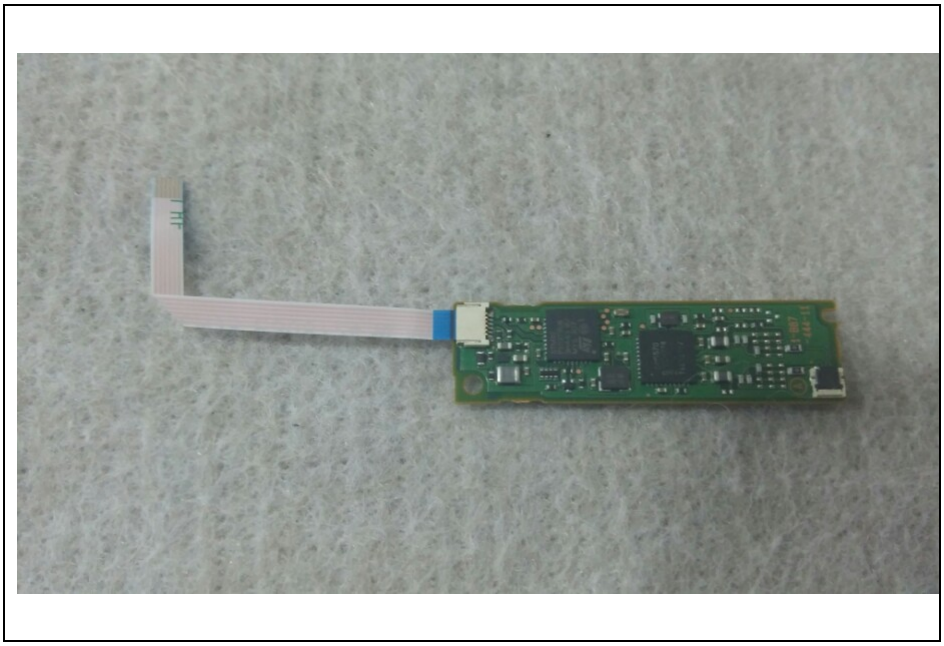


SUB Board #1

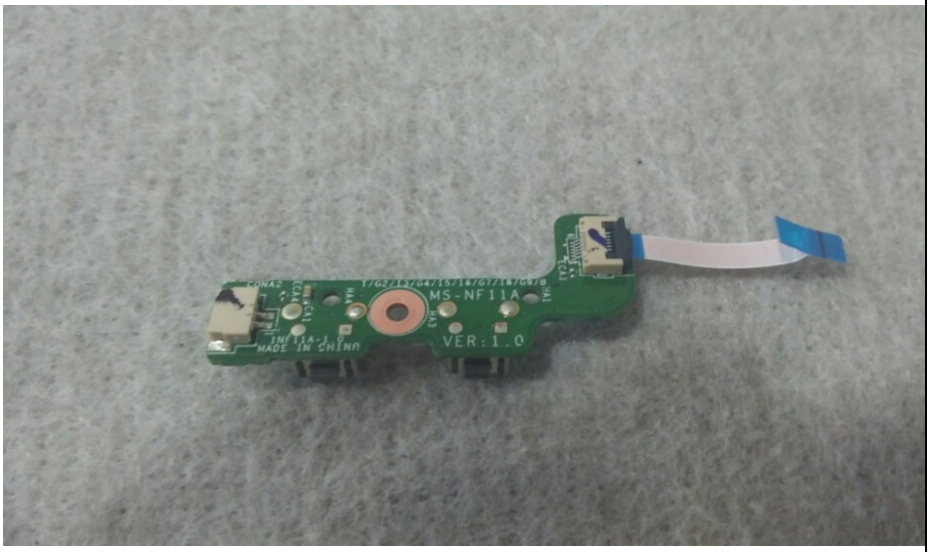


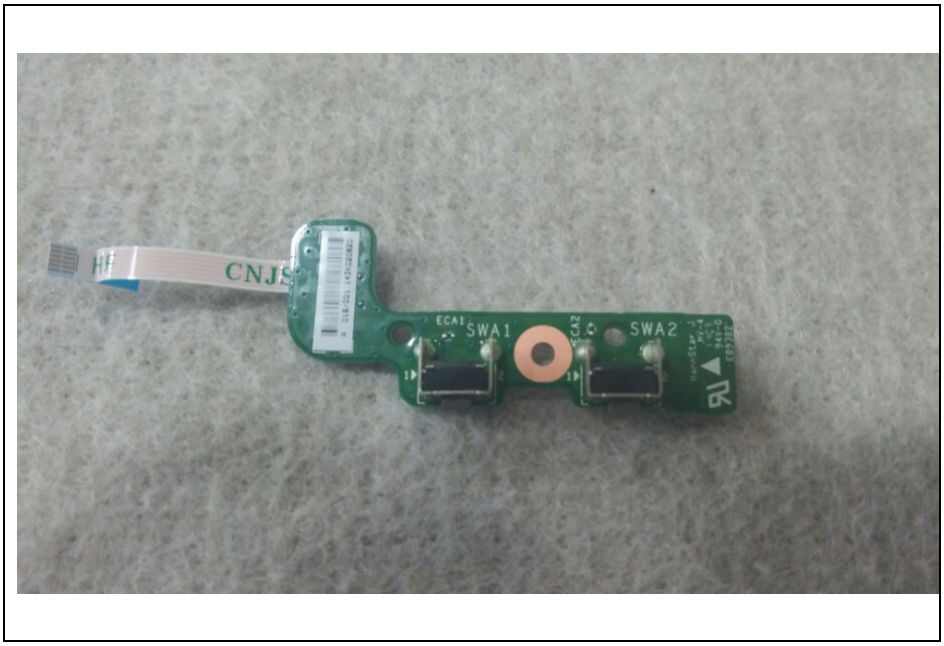


SUB Board #2



SUB Board #3





SUB Board #4

FAN

RF Module

AC/DC Adaptor