

EMC TEST REPORT

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Emission of electromagnetic disturbance

Test Report No. : ERI-FCC05-0049
Equipment : USB Flash Drive
Name of basic model : SUB-1G
Family model : SUB-512MB, SUB-256MB, SUB-128MB
Manufacturer : HANA MICRON Inc.
Applicant : HANA MICRON Inc.
Date of receipt EUT : 10. NOV 2005
Tested date : 14 ~ 28. Nov 2005
Issued date : 29. Nov, 2005
Test results : PASS
Test Standards : FCC Part 15 Subpart B (Class B)
 / Class B digital devices, peripherals

Affirmation

Measurements performed by
 Name : Sang-ik, Lee (signature)

Approved by
 Title : Manager
 Name : Uk-Cho, Rim (signature)

EMC Research Institute President

29. NOV 2005

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Appendix (None)

1. CLIENT INFORMATION

The EUT has been tested by request of :

Company : HANA MICRON Inc.

Address : #902 Ssangyong IT Twin-Tower 1,442-17 Sangdaewon1-Dong,
Joongwon-Gu, Seongnam-City, Gyeonggi-Fo, 462-807, Korea

Name of contact : Mr. JungWoo Lee

Telephone : +82-31-608-5510

Facsimile : +82-31-608-5400

2. LABORATORY INFORMATION

The 10m semi-anechoic chamber and/or EMC facilities are used for these testing.

These facilities were accredited by KOLAS, EK, MIC of Korea, FCC of USA. and VCCI of Japan.

Address

ELECTROMAGNETIC RESEARCH INSTITUTE.

66-6, Jeil-ri, Yangji-myun, Youngin-si, Gyeonggi-do, Korea.

Telephone No. : +82-31-336-1186~7

Facsimile No. : +82-31-336-1184

Registered No.

KOLAS : 111

EK : J

MIC : KR0030

FCC Filing No. : 302567

VCCI Reg. No. : C-2363, R-2183

3. EQUIPMENT UNDER TEST INFORMATION(EUT)

3.1 Identification of the EUT

Type of equipment: USB Flash Drive

Model name : SUB-1G

Brand name : NONE

Manufacturer : HANA MICRON Inc.

Address : #902 Ssangyong IT Twin-Tower 1,442-17 Sangdaewon1-Dong,
Joongwon-Gu, Seongnam-City, Gyeonggi-Fo, 462-807, Korea

Telephone : +82-31-608-5510

Facsimile : +82-31-608-5400

Power Rating: : DC 5.0V to PC

Country of origin : KOREA

3.2 Additional information about the EUT

Class B, Family Models List:

Basic Model	Family Model	Different Point
SUB-1G	SUB-512MB SUB-256MB SUB-128MB	Difference of Memory Size

3.3 Peripheral equipment

Equipment needed for correct operation of the EUT is given below.

Description	Model No.	Serial No.	Manufacture
Monitor	PN15VT	PSZS91S	Cheong wha elec.
PC	MTC2	FSZS91S	DELL
Printer	C6427A	CN13V1B1RY	HP
Keyboard	SK-8115	CN-0J4636-71616-57B-OYSL	YET Foundate Ltd.
Mouse	SMH-120C	TAKY413157H	Monterey International Corp.

4. TEST SPECIFICATIONS

4.1 Standards

The standard for a EUT is given below.

Standard	Remark
ANSI 63.4: 2003	Methods of Measurement of Radio-Noise Emission from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz

5. TEST RESULTS SUMMARY

5.1 Test Results

Standards	Test items / Frequency	Result
ANSI 63.4: 2003	1. Main Terminal disturbance voltage(150kHz~30MHz)	Pass
	2. Radiated disturbance(30MHz ~ 1000MHz)	Pass

5.2 Measurement Uncertainty

Although the measured emissions indicate that the EUT complies with required limits, some measurements are close to these limits. When the uncertainty of measurement is considered, there is some possibility that the EUT may not be compliant

Compliance or non-compliance with a disturbance limit shall be determined in the following manner.

If U_{lab} is less than or equal to U_{Cispr}

- compliance is deemed to occur if no measured disturbance exceeds the disturbance limit;
- non-compliance is deemed to occur if any measured disturbance exceeds the disturbance limit

If U_{lab} is greater than U_{Cispr}

- compliance is deemed to occur if no measured disturbance, increased by $(U_{lab}-U_{Cispr})$, exceeds the disturbance limit;
- non-compliance is deemed to occur if any measured disturbance, increased by $(U_{lab}-U_{Cispr})$, exceeds the disturbance limit;

● Measurement uncertainty for Test Items

- Conducted disturbance(150 kHz ~ 30 MHz) : ± 3.0 dB(k=2)
- Radiated disturbance(30 MHz ~ 300 MHz) : ± 4.6 dB(k=2)
- Radiated disturbance (300 MHz ~ 1 000 MHz) : ± 4.7 dB(k=2)

6, TEST RESULTS

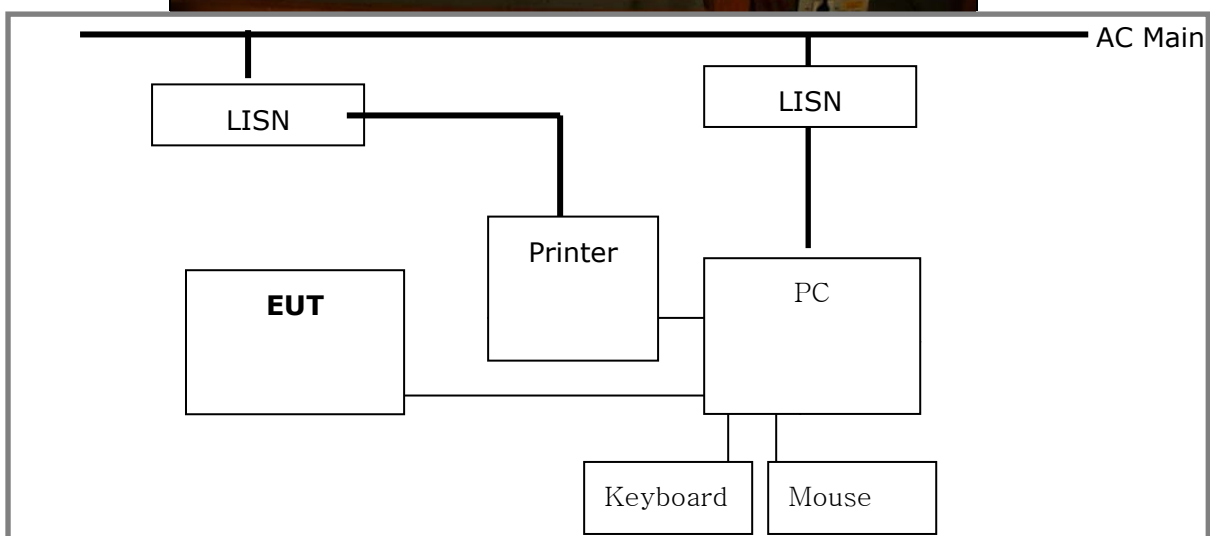
6.1 CONTINUOUS DISTURBANCE VOLTAGE, MAIN TERMINAL : Frequency range 0.15 MHz to 30 MHz

6.1.1 Operating environment

Temperature : $22.0\text{ }^{\circ}\text{C} \pm 0.7\text{ }^{\circ}\text{C}$
 Relative Humidity : $35.0\text{ \%} \pm 4.5\text{ \%}$
 Atmospheric pressure : $998\text{ hpa} \pm 0.25\text{ hpa}$
 Test location : Shield room

6.1.2 Test set-up and test procedures

- Photograph -



The EUT was connected to an artificial mains network (LISN) placed on the floor. The EUT was placed on non-metallic table 0.8m above the metallic, grounded floor. The distance to other metallic surface was 0.8 m. Amplitude measurements were performed with a quasi-peak detector and an average detector.

Operation condition: Within this test report, EUT was tested under operation mode of Data transmitting with PC Via USB port and tested under rated USB voltage. When the EUT is in the mode of data transmitting with the PC, the EUT is connected with the PC USB port make use of USB cable.

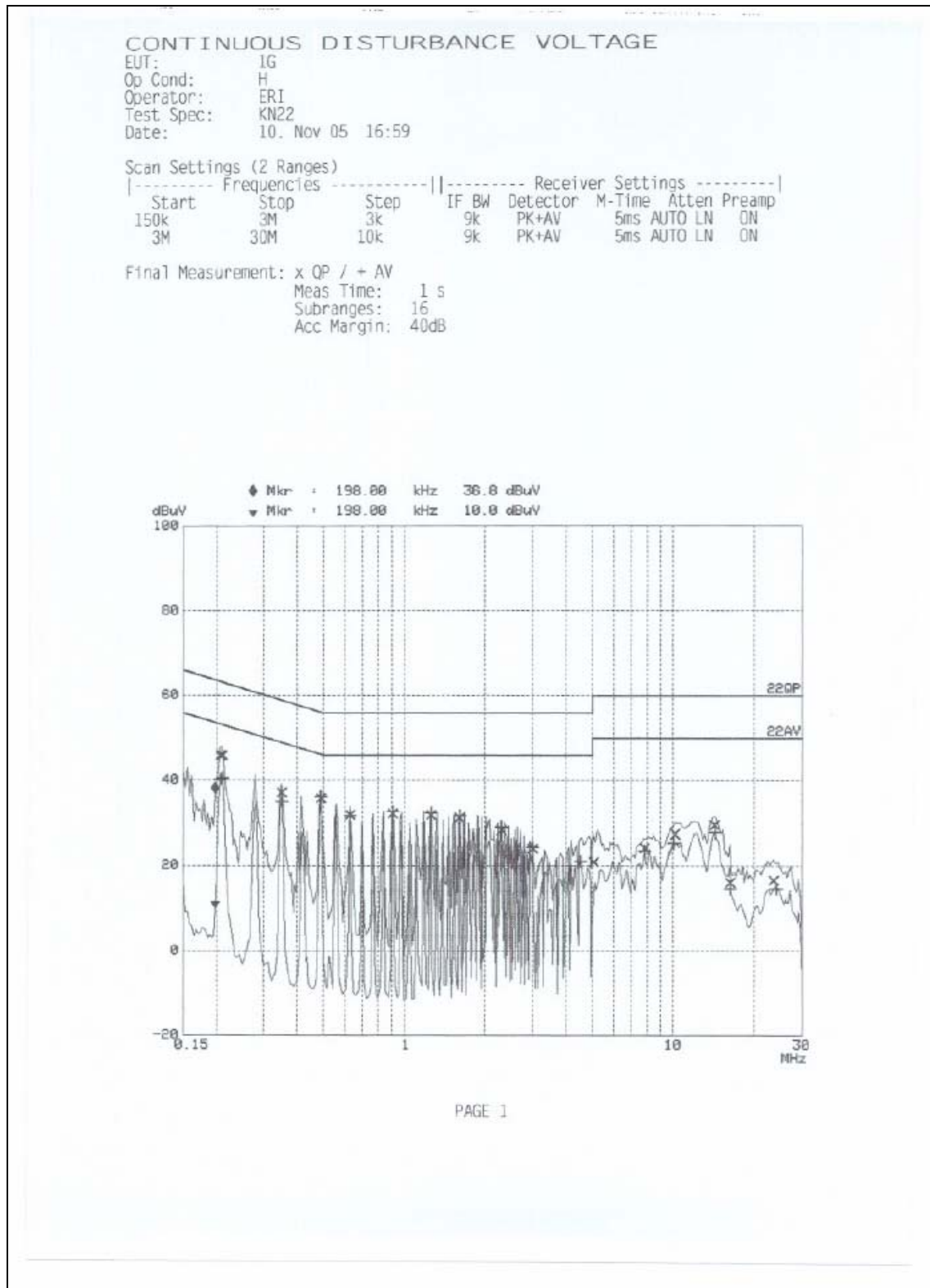
6.13 Test instrument

Instrument	Model No	Serial No.	Makers	Range (MHz)	Next cal.date	Used
Test receiver	ESCS30	100021	R&S	0.009 ~ 2 750	2006. 2. 6	O
L.I.S.N.	ESH3-Z5	827246/008	R&S	0.009 ~ 30	2006. 3. 31	O
	ESH3-Z5	831887/018	R&S	-	2006. 3. 31	
Shield room	8 × 6 × 3.3m/H	-	-	-	-	O

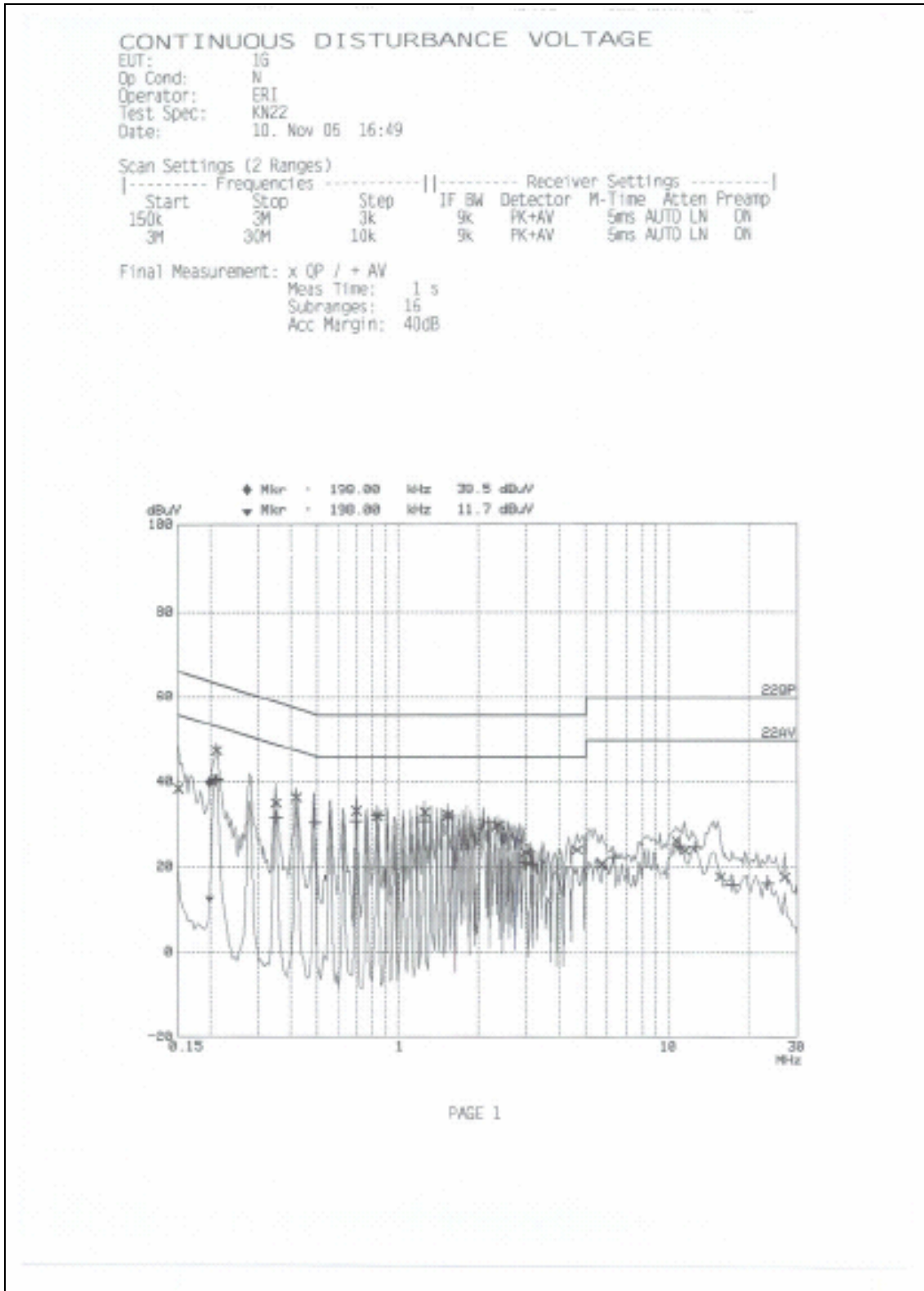
6.1.4 Test results

Date of test: 10. Nov 2005

An overview sweep performed with the peak detector & the average detector was included in the report **as test reports.**



[Live line]



[Neutral line]

Comments: All over frequencies had found below specified limits of this standard.

6.2 RADIATED DISTURBANCE : 30 MHz – 1 000 MHz

6.2.1 Operating environment

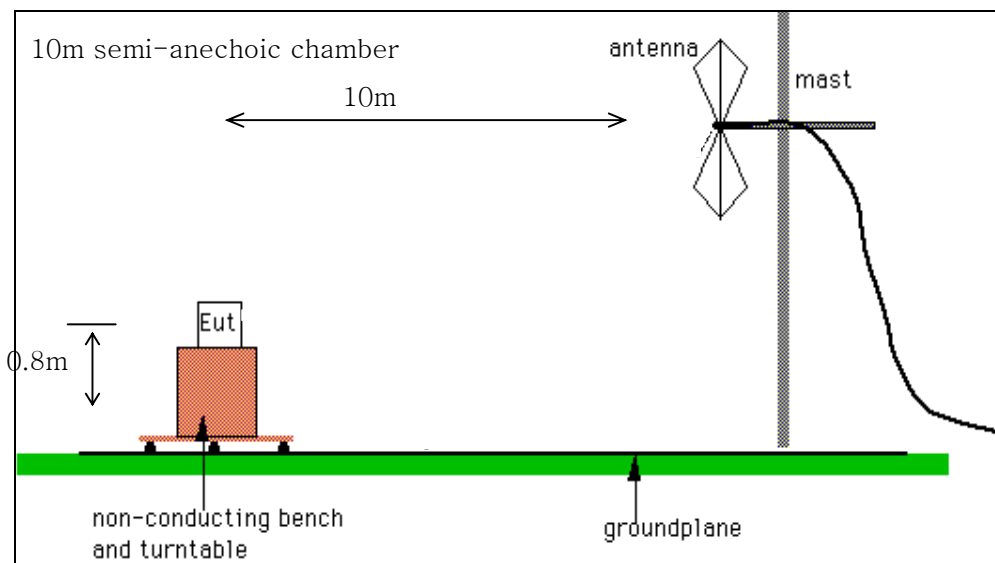
Temperature	: 22.0 °C ± 0.7 °C
Relative Humidity	: 35.0 % ± 4.5 %
Atmospheric pressure	: 998 hpa ± 0.25 hpa
Test location	: 10m semi-anechoic chamber

6.2.2 Test set-up

The frequency range investigated was 30 MHz to 1 000MHz. All readings are quasi-peak unless stated otherwise. The half-wave dipole antenna was tuned to the frequency found during Preliminary radiated measurements. The EUT, support equipment and Interconnecting cables were re-configured to the set-up to produce the Maximum emission for the frequency and were placed on top of a 0.8 meter high non-metallic 1 X 1.5 meter table. The EUT, support equipment, and interconnecting cables were re-arranged and manipulated to maximize each EME -> 삭제 emission. The turntable containing the system was rotated the antenna height was varied 1 m to 4 m and stopped at the azimuth or height producing the maximum emission. And this device (EUT) was tested in 3 orthogonal planes. The antenna measured both horizontal and vertical polarization.

- Photograph -





<General test set-up for radiated emissions>

6.2.3 Operation Conditions

Within this test report, EUT was tested under operation mode of Data transmitting with PC Via USB port and tested under rated USB voltage. When the EUT is in the mode of data transmitting with the PC, the EUT is connected with the PC USB port make use of USB cable.

6.2.4 Test instrument

Instrument	Model No.	Serial No.	Makers	Range (MHz)	Next cal.date	Used
Test receiver	ESCS30	100021	R&S	0.009~2750	2006. 2. 6	O
L.I.S.N.	ESH3-Z5	827246/008	R&S	-	2006. 3. 31	
	ESH3-Z5	831887/018	R&S	-	2006. 3. 31	
Biconical Antenna	VHA9103	91031950	Schwarzbeck	30~300	2006. 2. 4	O
Log-Periodic Antenna	UHALP9108A	0392	Schwarzbeck	300~2200	2006. 2. 4	O
Antenna Mast	MA240	N/A	HD	-	-	O
Turn Table	DT430S	N/A	HD	-	-	O

6.2.5 Test results

Date of test: 28. NOV 2005

Freq (MHz)	Reading (dBuV)	Ant POL	AF (dB/m)	CL (dB)	Limit (dBuV/m)	Result (dBuV/m)	Margin (dB)
32.70	4.36	H	18.06	0.79	30	23.2	6.80
120.00	10.3	H	13.34	1.37	30	25.00	5.00
129.00	5.52	H	14.06	1.42	30	21.00	9.00
131.90	9.23	V	14.23	1.44	30	24.90	5.10
240.00	14.66	H	17.36	1.98	37	34.00	3.00
298.00	1.21	H	19.71	2.08	37	23.00	14.00

* Receiving Antenna Mode : **Horizontal, Vertical**

* <5 : mean less than 5dB

Note : Reading = Test Receiver meter, P= Polarization → POL H = Horizontal POL V = Vertical

A = Angle, AF = Antenna Factor CL = Cable Loss Result = Field Strength(AF + CL+ Reading)

Result: Pass

The measured emissions level of the EUT have found the below of the specified limit.

7. PRODUCT PHOTOGRAPHS

7.1 Front Photograph of EUT



7.2 Rear Photograph of EUT

