LABORATORY MEASUREMENTS

Pursuant To
47 CFR Part 15 Subpart B (June, 2005)
And
FCC Procedure ANSI C63.4 (2003)

Applicant:	CTC Union Technologies Co., Ltd. 8F, No. 60, ZhouZi St. NeiHu, Taipei 114, Taiwan
Model No.:	MD20
Issue Date:	Mar. 05, 2007
Test Site Location:	No. 11, Lane 275, Ko-Nan 1st St., Chia-Tung Li, Shiang-Shan District, Hsinchu City, Taiwan

We attest to the accuracy of this report：
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Testing Laboratory

Project Engineer

Frank Wang

Reviewed By

Kevin Chen

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1. General Information

1.1 General Description of EUT

Product:	Mini DSLAM
Model No.:	MD20
Applicant:	CTC Union Technologies Co., Ltd.
Rated Power:	DC 48V
Power Cord:	2C×2.0 meter unshielded cable
Data Cable:	1. RJ-45 UTP Cat.5 10meter ㄨ 2 2. RJ-45 STP Cat.5 3meter ㄨ 3 3. MDF cable IDC50F AWG26 50C 5meter ㄨ 10
Sample receiving date:	Nov. 24, 2005
Testing date:	May 11, 2006 ~ May 26, 2006

1.2 Additional information about the EUT

The EUT is a Mini DSLAM, and was defined as information technology equipment.

All the modules are listed below:

Card Type	P/N	DESCRIPTION
IM8AC	F2CU-IM8A-0001C	R3 8E1 IMA UNIT GTLP HE500
ST1AC	F2CU-ST1A-0001B	R3 STM1 UNIT GTLP HE500
GE1AC	F2CU-GE1A-0001C	R3 GBE UNIT GTLP WIN747
AL5EC	F2CU-AL5E-0001D	ADSL 24L ETSI 270 SPLTR ANX-A
AL5AC	F2CU-AL5A-0001D	ADSL 24L ANSI 600 SPLTR ANX-A
AL5BC	F2CU-AL5B-0001D	ADSL 24L ISDN SPLTR ANX-B
SL6AC	F2CU-SL6A-0001C	SHDSL 24L W/O WETTING CURRENT ANX-A/B
	F2CU-MA1A-0000C	R3 MECH ASSY UNIT 2U
	F2CU-FA1A-C200A	R3 FAN ASSY UNIT 2U
	F2CU-DP1A-0000D	R3 DC PWR UNIT 2U

For more detail features, please refer to user's Manual.

1.3 Description of Peripherals

Peripherals	Manufacturer	Product No.	Serial No.
Notebook PC	IBM	1860	L3WM776
Notebook PC	HP	HSTNN-I04C	CNU5240X14
CPE	XVAi Tech	X8121r	A811A4003373
CPE	Tailyn	GS-R250S	G32RG3-017290
CPE	ADC	MM701G2	047016982

2. Test Summary

Emission			
Standard	**Test Type**	**Result**	**Remarks**
FCC Subpart B Section 15.109 Class A	Radiated Emission Test	PASS	Pass by –0.90 dB at 200.000 MHz With antenna polarization Vertical

Remark:

The EUT has been tested/evaluated and pass the FCC Part 15 Subpart B without modification.

3. Test Specifications

3.1 Standards

According to 47 CFR Part 15.109 (g), the radiated emission test was performed with a distance of 10m, and to comply with the limit level regulated in CISPR 22.

The EUT setup configuration please refer to the photo of test configuration in item.

3.2 Definition of Device Classification

Unintentional radiator:
A device which is not intended to emit RF energy by radiation or induction.

Class A Digital Device:
A digital device which is marketed for use in commercial or business environment.

Class B Digital Device:
A digital device which is marketed for use by the general public or in a residential environment.

Note:
A manufacturer may also qualify a device intended to be marketed in a commercial, business or industrial environment as a Class B digital device, and in fact is encouraged to do so, provided the device complies with the technical specifications for a Class B Digital Device. In the event that a particular type of device has been found to repeatedly cause harmful interference to radio communications, the Commission may classify such a digital device as a Class B Digital Device, Regardless of its intended use.

3.3 EUT Operation Condition

The EUT was supplied with DC 48V and was tested in normal operating mode.

EUT Operation Condition
1. Power on all equipment
2. Run testing program on two Notebook PCs
3. Traffic cable length: (1) RJ-45 UTP Cat.5 10meter ㄨ 2
(2) RJ-45 STP Cat.5 3meter ㄨ 3
(3) MDF cable IDC50F AWG26 50C 5meter ㄨ 10

There are three testing configurations listed below:

(1) Configuration 1: R3.1 W/ GE1AC
(2) Configuration 2: R3.0 W/ IM8AC
(3) Configuration 3: R3.0 W/ ST1AC

Intertek found configurations 1 was the worst case.

4. Radiated Emission Measurements (FCC 15.109)

4.1 Operating Environment

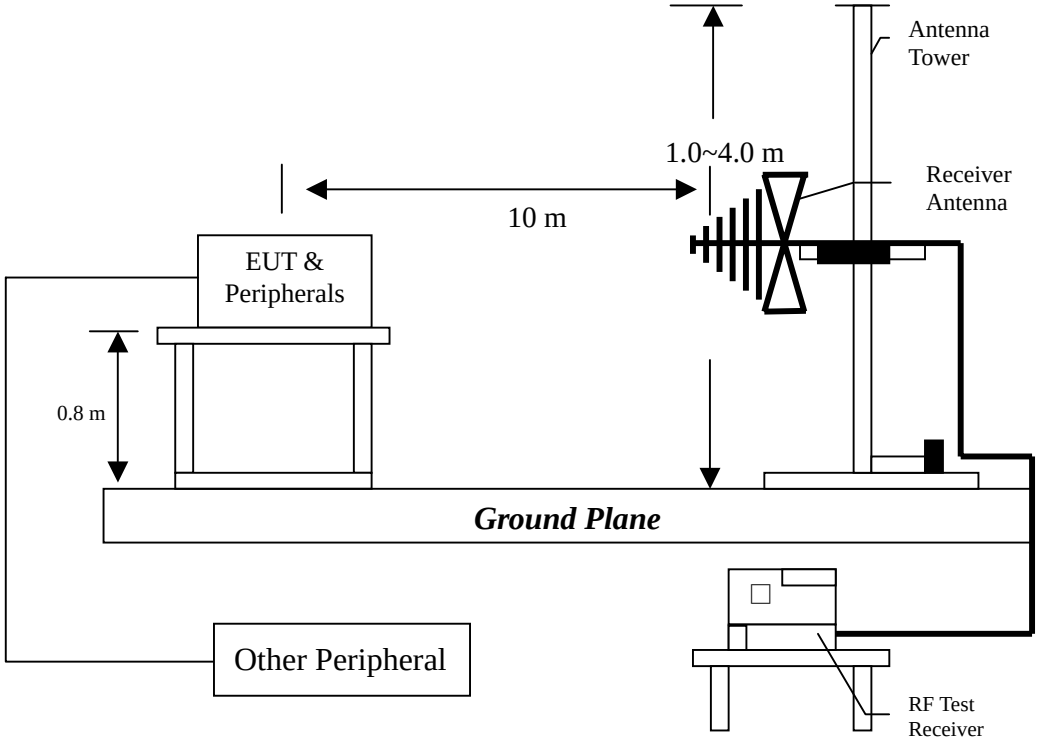
Temperature: 25 ℃ Atmospheric Pressure: 1023 hPa

Relative Humidity: 50 % Test Voltage: DC 48V

4.2 Test Setup and Procedure

The Diagram below shows the test setup, which is utilized to make these measurements.

The frequency spectrum from 30MHz to 1000MHz was investigated.



The equipment under test was placed on the top of rotation table 0.8 meter above ground plane.

The table was 360 degrees to determine the position of the highest radiation.

EUT is set 10 meters from the EMI receiving antenna, which is mounted on a variable height mast. The antenna height is varied between one meter and four meters above ground to find the maximum value of the field strength. Both horizontal polarization and vertical polarization of the antenna are set to make the measurement. The bandwidth was setting on the EMI meter 120 kHz.

The levels are quasi peak value readings.

4.3 Test Equipment

Equipment	Brand	Model No.	Intertek ID No.	Next Cat. Date
EMI Receiver	Rohde & Schwarz	ESCS 30	EC318	06/16/2006
EMI Spectrum	Rohde & Schwarz	ESMI	EC317	08/07/2006
Turn Table	Electro-Metrics	EM4710	EP306	N/A
Bilog Antenna	Schaffner	CBL611213	EC366	03/02/2007
Ferrite Clamp	Rohde & Schwarz	EZ-24	N/A	N/A

Note: The above equipments are within the valid calibration period.

4.4 Radiated Emission Limits:

According to FCC 15.109(g), to perform digital device radiated emission using CISPR 22 limits and method, the field strength of radiated emission from unintentional radiators at a distance of 10 meters shall not exceed the following values:

Frequency (MHz)	Distance (m)	Class A	Class B
30~230	10	40	30
230~1000	10	47	37

Note:
1. The tighter limit shall apply at the edge between two frequency bands.
2. Distance refers to the distance in meters between the measuring instrument Antenna and the closet point of EUT.

4.5 Uncertainty of Radiated Emission

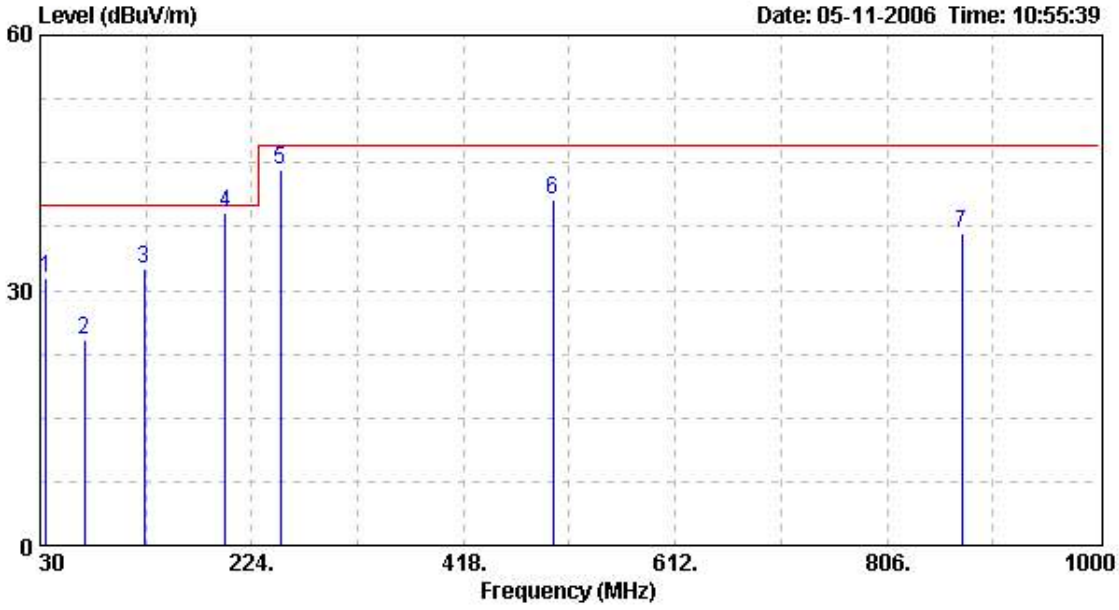
Expanded uncertainty (k=2) of radiated emission measurement is 3.58 dB.

4.6 Radiated Emission Test Data

Polarity: Vertical
Model No.: MD20
Worst Case: Configuration 1

Freq	Pol/Phase	Factor	Read Level	Level	Limit Line	Over Limit	Ant Pos	Table Pos	Remark
MHz		dB	dBuV	dBuV/m	dBuV/m	dB	cm	deg	
35.3	VERTICAL	18.50	13.00	31.50	40.00	-8.50	100	360	QP
70.7	VERTICAL	8.12	16.00	24.12	40.00	-15.88	100	81	QP
125.0	VERTICAL	14.48	18.00	32.48	40.00	-7.52	100	360	QP
200.0	VERTICAL	12.10	27.00	39.10	40.00	-0.90	100	160	QP
250.0	VERTICAL	15.70	28.50	44.20	47.00	-2.80	100	266	QP
500.0	VERTICAL	22.15	18.40	40.55	47.00	-6.45	100	190	QP
875.0	VERTICAL	27.00	9.80	36.80	47.00	-10.20	201	256	QP

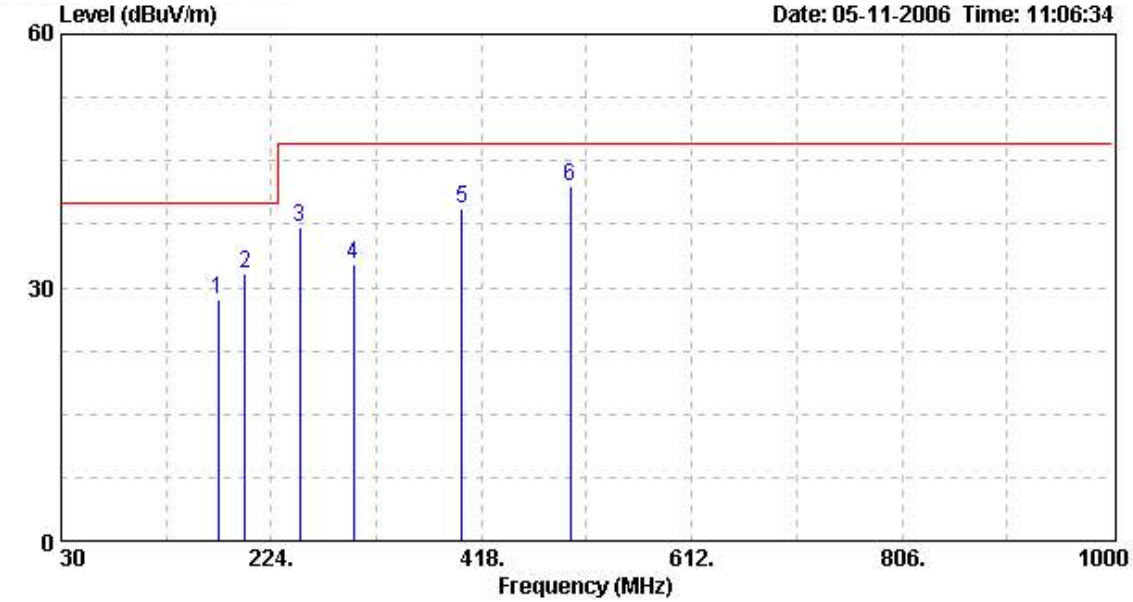
Remark:
1. Level (dB μ V/m)= Factor (dB/m)+ Read Level (dB μ V)
2. Factor = Antenna Factor (dB/m) + Cable Loss (dB)
3. Over Limit (Margin) (dB) = Level (dB μ V/m) – Limit Line(dB μ V/m)



Polarity: Horizontal
Model No.: MD20
Worst Case: Configuration 1

Freq	Pol/Phase	Factor	Read Level	Level	Limit Line	Over Limit	Ant Pos	Table Pos	Remark
MHz		dB	dBuV	dBuV/m	dBuV/m	dB	cm	deg	
175.0	HORIZONTAL	12.13	16.50	28.63	40.00	-11.37	400	175	QP
200.0	HORIZONTAL	12.10	19.50	31.60	40.00	-8.40	400	48	QP
250.0	HORIZONTAL	15.70	21.40	37.10	47.00	-9.90	261	348	QP
300.0	HORIZONTAL	17.05	15.80	32.85	47.00	-14.15	344	146	QP
400.0	HORIZONTAL	19.93	19.50	39.43	47.00	-7.57	308	108	QP
500.0	HORIZONTAL	22.15	19.80	41.95	47.00	-5.05	215	60	QP

Remark:
1. Level (dB μ V/m)= Factor (dB/m)+ Read Level (dB μ V)
2. Factor = Antenna Factor (dB/m) + Cable Loss (dB)
3. Over Limit (Margin) (dB) = Level (dB μ V/m) – Limit Line(dB μ V/m)



Appendix A1: External photo of EUT

Configuration 1

Configuration 2

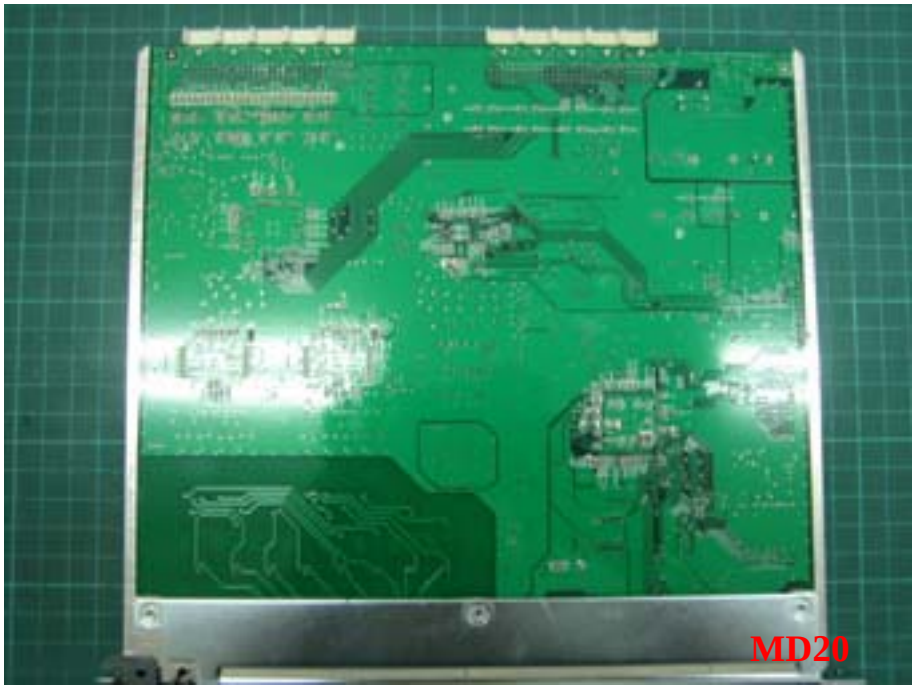
Configuration 3


MD20
VARTA
PANASONIC
MICRON
ELCO
HERG
KYOCERA
AMP

Appendix A2: Internal photo of EUT

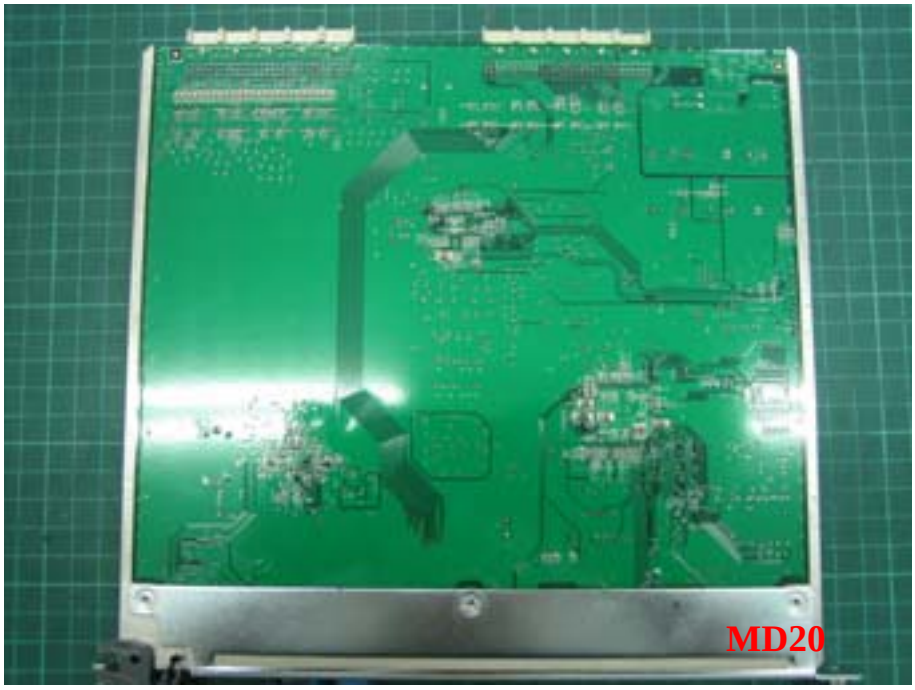
IM8AC

IM8AC

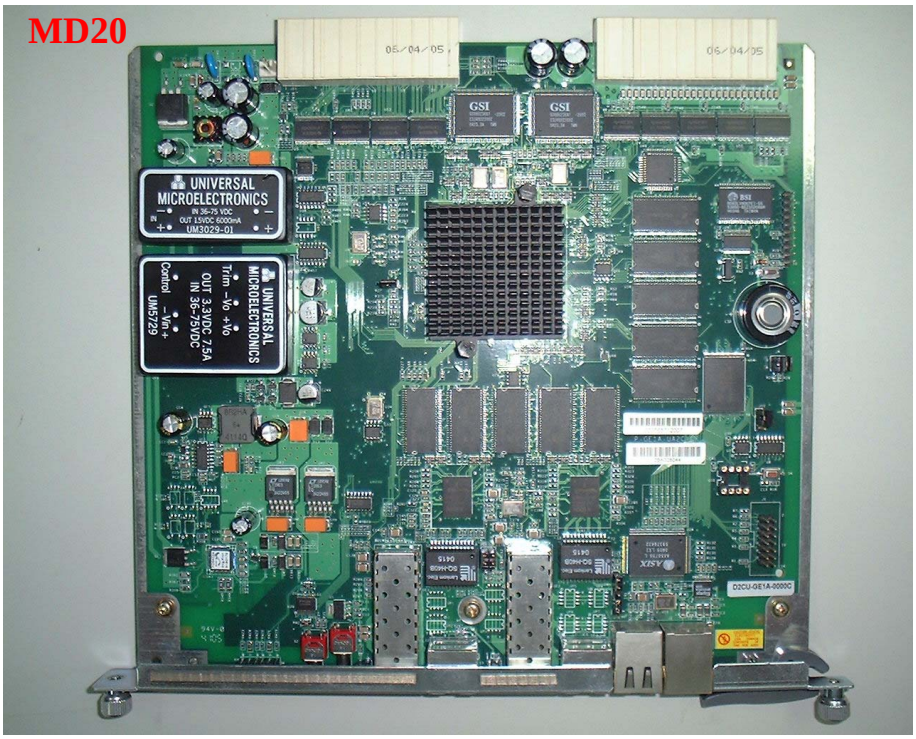


ST1AC

ST1AC



GE1AC



GE1AC

AL5EC

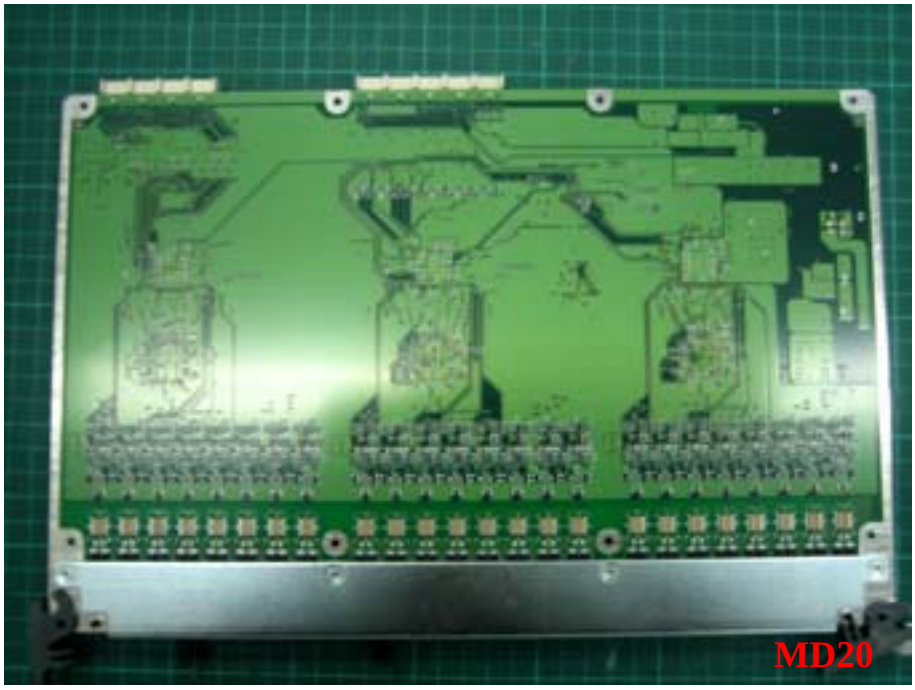
AL5EC

AL5BC

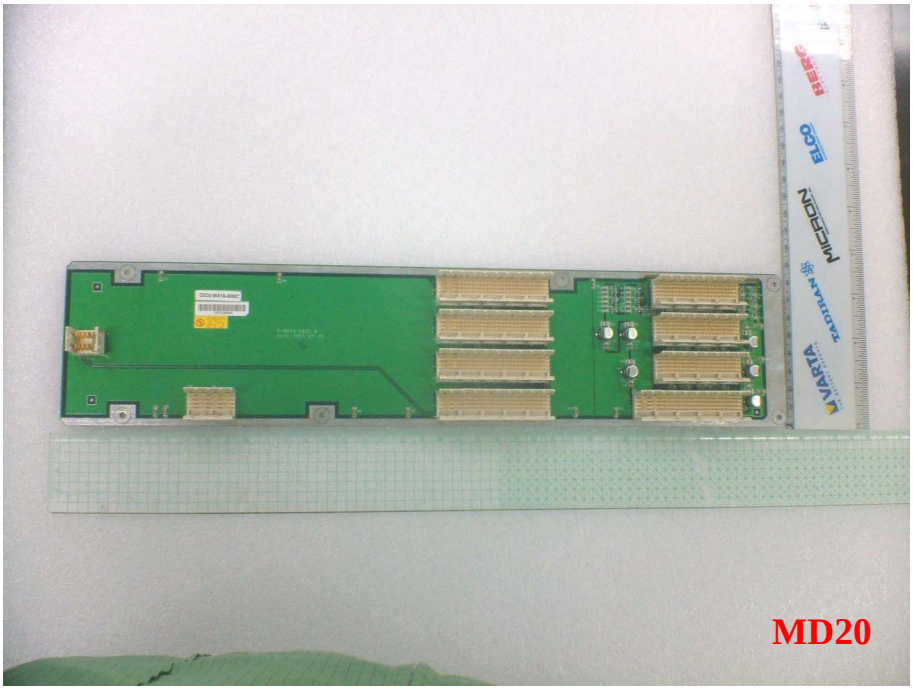
AL5BC

SL6AC

SL6AC



MA1A



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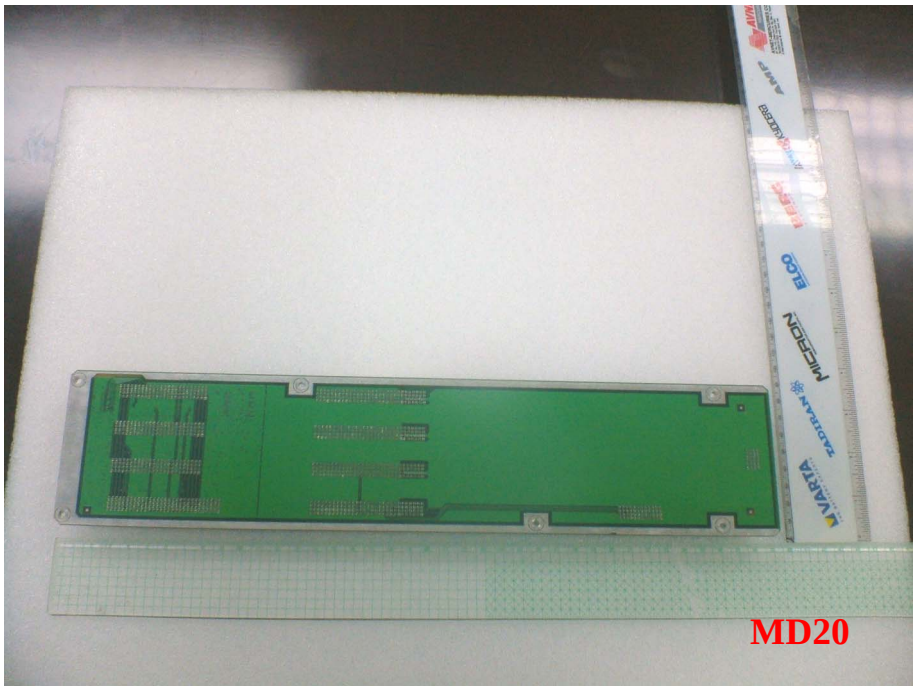
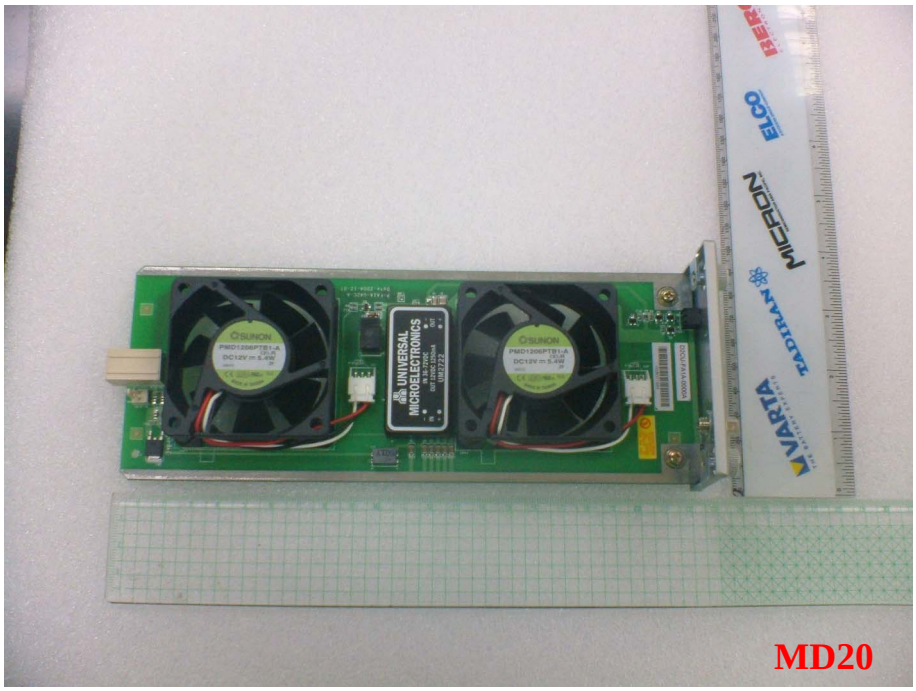
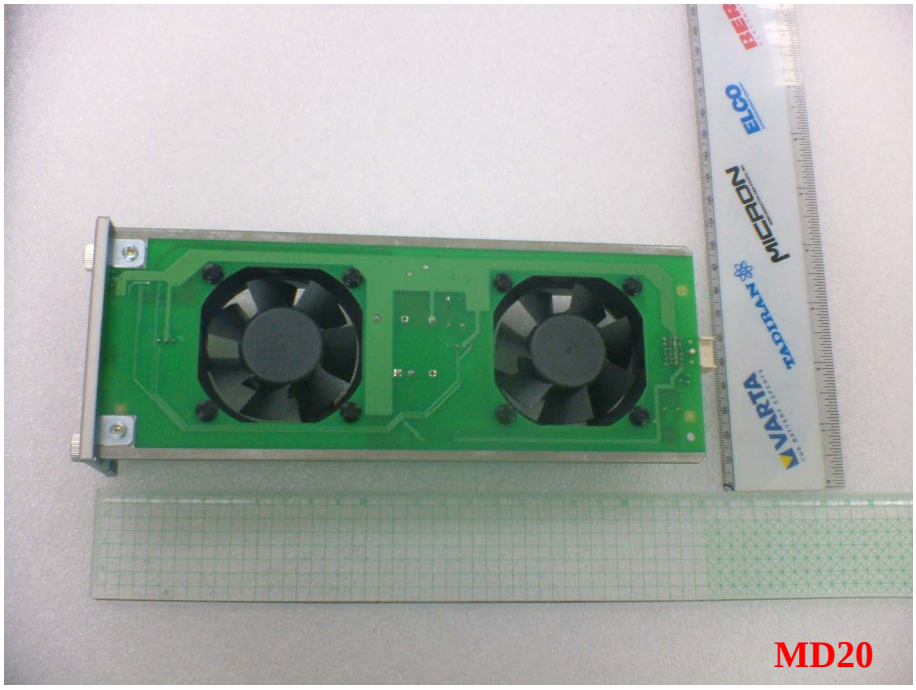


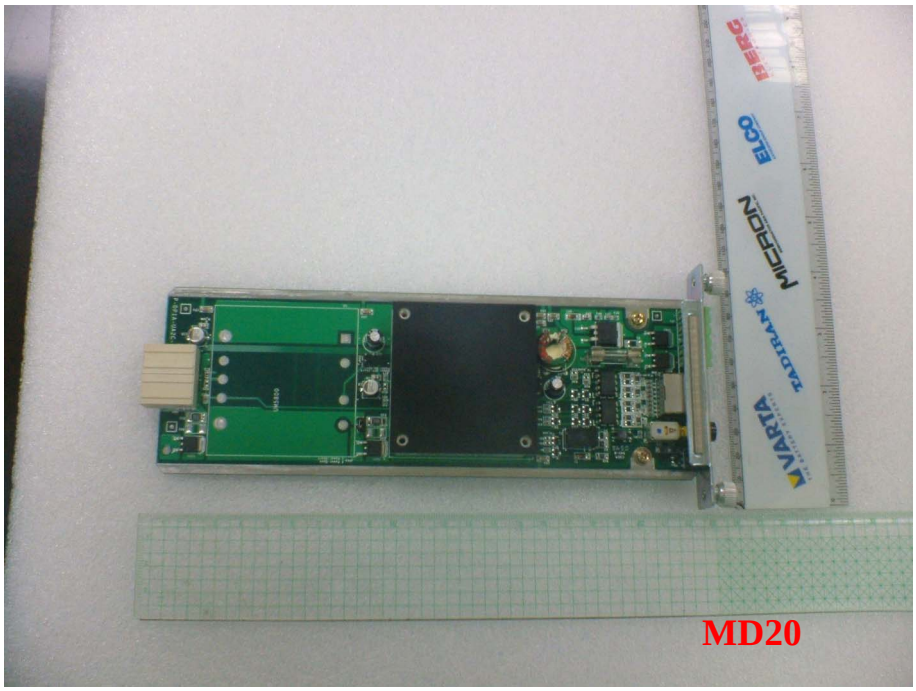
FA1A



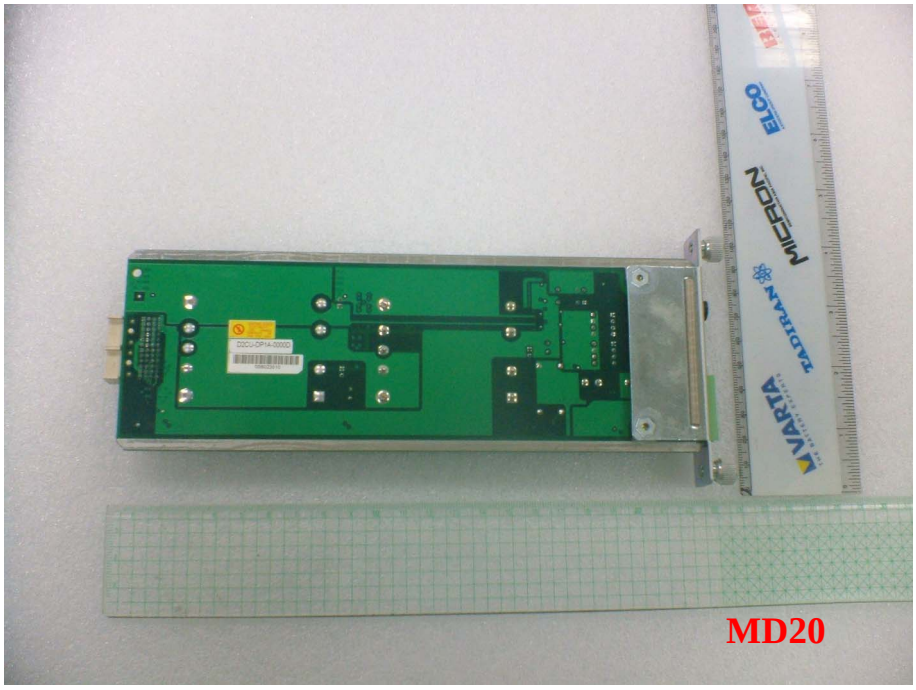
FA1A

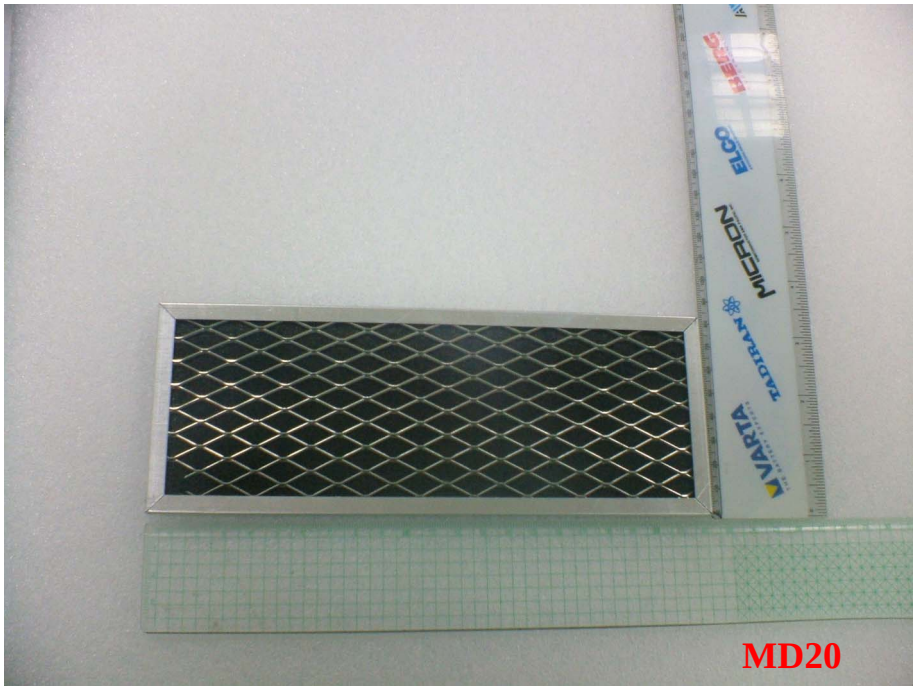


DP1A



DP1A




MD20

Appendix B1: Radiated Emission Test Set-up