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RADIATED EMISSION TEST **15**

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PHOTO OF FCC ID LABEL **20**

APPENDIX A

PHOTOS OF TEST CONFIGURATION

APPENDIX B

PHOTOS OF EUT

GENERAL INFORMATION

1 APPLICANT : DELTA ELECTRONICS INCORPORATED

2 ADDRESS : No. 3, Tung Yuan Road,
Chung Li Industrial Zone,
Taoyuan, Taiwan, R. O. C.

3 MANUFACTURER : DELTA ELECTRONICS INCORPORATED

4 ADDRESS : No. 3, Tung Yuan Road,
Chung Li Industrial Zone,
Taoyuan, Taiwan, R. O. C.

5 DESCRIPTION OF EUT :

EUT	:	PORT REPLICATOR
FCC ID	:	H79REP-X15
Model Number	:	REP-X15
Serial #	:	N/A
Data Cable	:	N/A
Power Cord	:	N/A
Power Supply Type	:	FROM NOTEBOOK

5.1 The EUT were investigated with delta notebook (Model No. : REP-X15) and test three modes as below
(1) 1024 x 768 Monitor display
(2) 800 x 600 LCD display
(3) 640 x 480 TV display
The test mode of (3) 640 x 480, TV display is worst case, and the final test data were shown with this test mode.

6 FEATURES OF EUT :

6.1 Parallel Port
The 25-pin D-Sub parallel/printer port supports parallel devices such as a printer

6.2 Serial Port
The 9-pin D-Sub serial port supports serial devices such as a mouse, or modem

6.3 USB Port
The USB (Universal Serial Bus) port supports several USB compatible devices such as keyboards, pointers, modems, and printers connected in series

6.4 Game Port
The 15-pin D-Sub Game/MIDI port supports a joystick, or gamepad devices

6.5 Audio Input Jack
You can use this jack to input stereo sound from other devices, such as a radio or tape recorder, into your notebook

6.6 External Microphone Jack
You can use this jack to input sound from an external microphone into your notebook

6.7 Audio Output Jack
You can use this jack to output sound generated by your notebook to an external device, such as stereo loudspeakers or headphones. When an external device is connected, the built-in speakers are automatically disabled

6.8 VGA Port
The 15-pin D-Sub VGA port supports a standard VGA-compatible device such as a monitor

6.9 Video Out
The video out port supports video display devices such as a television through an S-Video (SVHS) connector (or RCA connector using the supplied adapter)

6.10 PS/2 Port for Keyboard
You can connect your notebook to an external PS/2 keyboard

6.11 PS/2 Port for Mouse
You can connect your notebook to an external PS/2 mouse

6.12 S-Video Port
The S-Video out port supports video display devices such as a television through an S-Video (SVHS)

MODIFICATION LIST

THE FOLLOWING ACCESSORIES WERE ADDED TO THE EUT DURING TESTING :

1. These are copper-coated housing case.
2. One conductive gasket is paste on the extension connector to contact the housing case.
3. Two conductive gaskets are paste on the ground pad to contact I/O bracket.
4. Two conductive gaskets are separate pastes on the PS2 and S-Video connector.
5. One conductive gasket is paste on the I/O bracket to contact the housing case.
6. One conductive gasket is paste on the USB connector to contact the housing case.

CONDUCTED POWER LINE TEST

1 TEST INSTRUMENTS & FACILITIES

The following test Instruments was used during the conducted test :

Item	Instruments/ Facilities	Specification	Manufacturer	Model #	Date Of Cal.
1	EMI Receiver	9KHz ~ 30MHz	ROHDE & SCHWARZ	ESHS 30	MAR/99
2	LISN	50•/50uH/100A 9KHz ~ 30MHz	SCHWARZ BECK	NNLK 8121	MAR/99
3	LISN	9KHz ~ 30MHz	ROHDE & SCHWARZ	ESH3-Z5	MAR/99
4	ESXS-K1	Version 2.03b	ROHDE & SCHWARZ	1082.9678.02 840.913/246	N/A
5	Cables	10KHz ~ 30MHz		NO : 10	JUL/99

2 TEST PROCEDURE

2.1 The EUT was tested according to **ANSI C63.4 - 1992 & CISPR 22**.

2.2 The EUT was placed 0.4 meter from the conducting wall of shielding room and kept at least 0.8 meter from any other grounded conducting surface.

2.3 The frequency range form 0.15 MHz to 30 MHz was investigated.

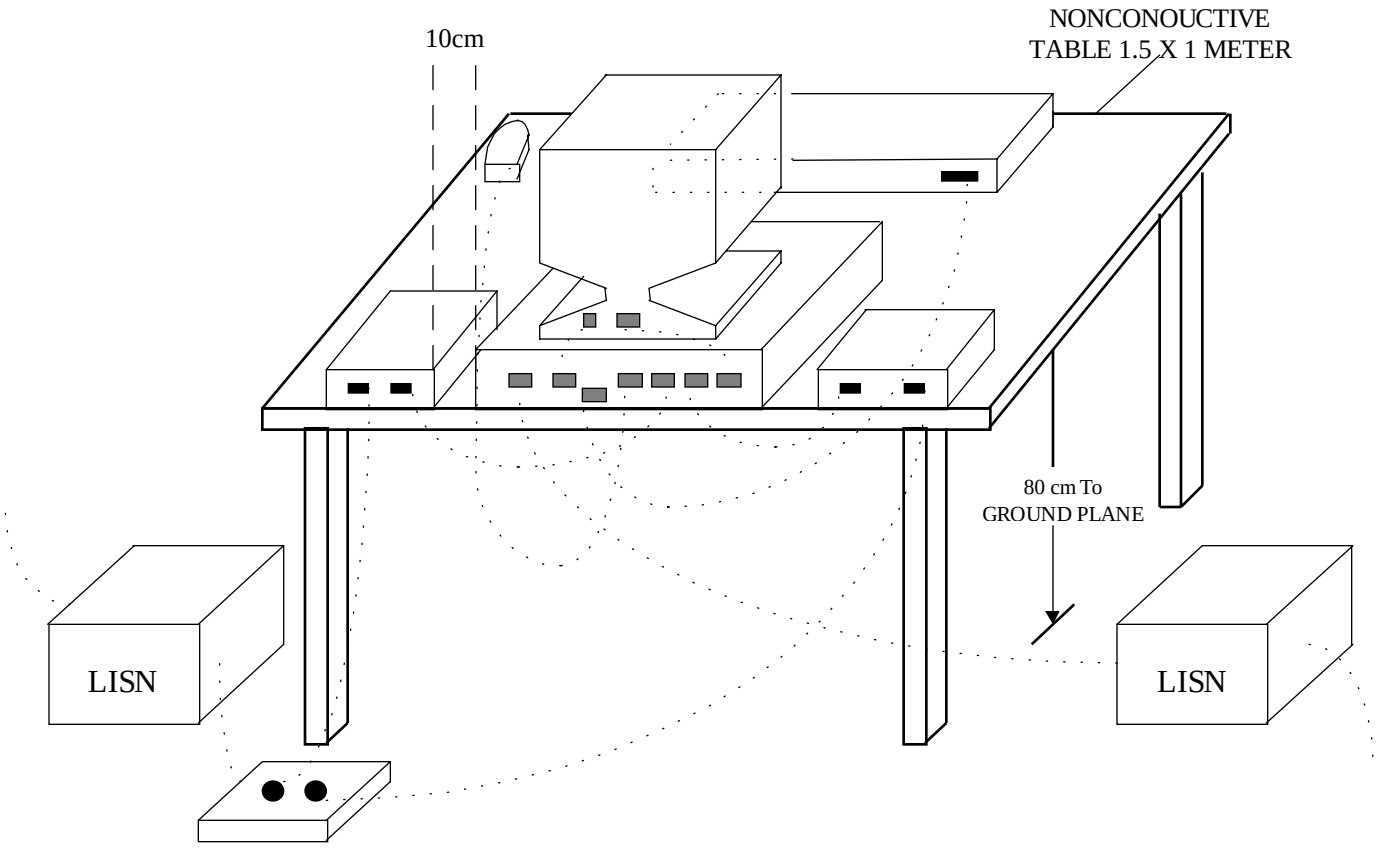
2.4 The LISN used was 50 Ohm / 50 uHenry as specified by **ANSI C63.4 - 1992 & CISPR 22**.
and AC power source is 110V/60Hz.

2.5 All the support peripherals are connect to the other LISN.

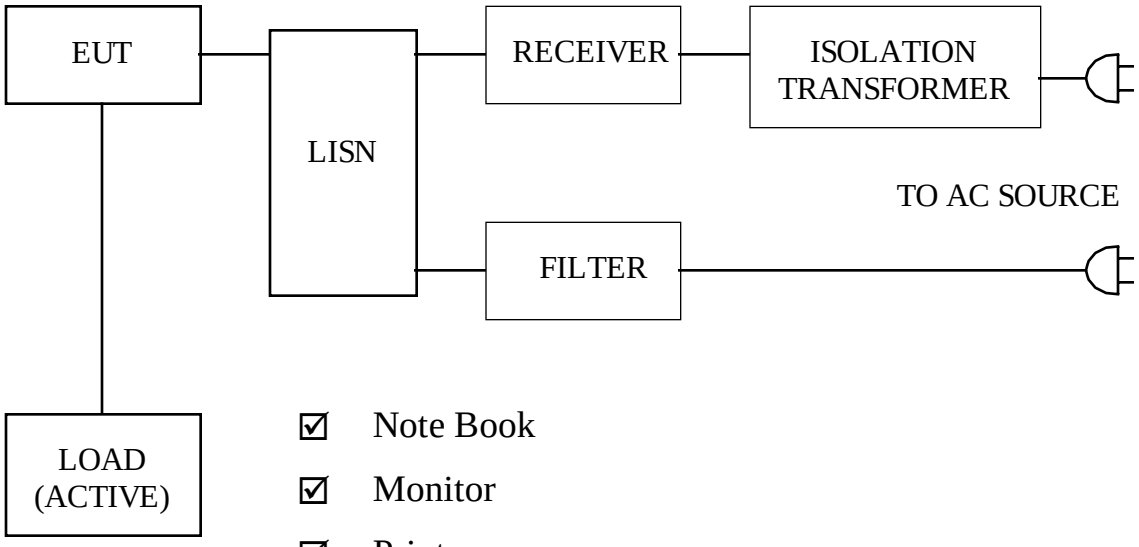
2.6 Cables and peripherals were moved to find the maximum emission levels for each frequency.

3 TEST SETUP

3.1 Typical : Setup Of Conducted Test



3.2 Block Diagram Of Conducted Test



- ☑ Note Book
- ☑ Monitor
- ☑ Printer
- ☑ Modem
- ☑ Mouse
- ☑ Key Board
- ☑ TV
- ☑ Joystick
- ☑ Micro Phone
- ☑ Walk Man
- ☑ Speaker

4 CONFIGURATION OF THE EUT

The EUT was configured according to **ANSI C63.4 - 1992 & CISPR 22**. All I/O ports were connected to the appropriate peripherals. All peripherals and cables are listed below (including internal device) :

4.1 EUT

EUT Type	:	☐Proto Type ☑Engineer Type ☐Mass Production
Condition when received	:	☑Good ☐Damage :
Connector Type	:	☑Metal Type ☐Plastic Type
Device	:	PORT REPLICATOR
Applicant	:	DELTA
Manufacturer	:	DELTA
Model Number	:	REP-X15
Serial Number	:	N/A
FCC ID	:	H79REP-X15
Data Cable	:	N/A
Power Cord	:	N/A

4.2 PERIPHERALS

☑ Notebook

Manufacturer	:	DELTA
Model Number	:	DN-715
Serial Number	:	N/A
FCC ID	:	N/A
Data Cable	:	N/A
Power Cord	:	Un-Shielded, 1.8 m

☑ Monitor

Manufacturer	:	HITACHI
Model Number	:	CM769ET
Serial Number	:	DJ71
FCC ID	:	FCC DoC
Data Cable	:	Shielded, 1.5 m, Connected to the VGA port
Power Cord	:	Un-Shielded, 1.8 m

☑ Printer

Manufacturer	:	HP
Model Number	:	DJ400
Serial Number	:	MY7781C1BB
FCC ID	:	B94C2642X
Data Cable	:	Shielded, 1.5 m, Connected to the Printer port
Power Cord & Adaptor	:	Un-Shielded, 1.8 m

☑ Modem

Manufacturer	:	ACEEX
Model Number	:	1414
Serial Number	:	9013522
FCC ID	:	IFAXDM1414
Data Cable	:	Shielded, 1.5 m, Connected to the COM port
Power Cord & Adaptor	:	Un-Shielded, 1.8 m

☑ Mouse (PSII)

Manufacturer	:	HP
Model Number	:	M-S34
Serial Number	:	LZA64519290
FCC ID	:	DZL211029
Data Cable	:	Shielded, 1.8 m, Connected to the PSII port
Power Cord	:	N/A

☑ Mouse (USB)

Manufacturer	:	LOGITECH
Model Number	:	M-UA34
Serial Number	:	LTC73700263
FCC ID	:	DZL211087
Data Cable	:	Shielded, 1.8 m, Connected to the USB port
Power Cord	:	N/A

☑ Mouse (USB)

Manufacturer	:	SANYO
Model Number	:	SYMS-109
Serial Number	:	80918815
FCC ID	:	HQXPC97010-38
Data Cable	:	Shielded, 1.8 m, Connected to the USB port
Power Cord	:	N/A

☑ KeyBoard (PSII)

Manufacturer	:	AST
Model Number	:	SK-2000REW
Serial Number	:	N/A
FCC ID	:	GYUR26SK
Data Cable	:	Shielded, 1.5 m, Connected to the PSII port
Power Cord	:	N/A

☑ TV

Manufacturer	:	NEC
Model Number	:	C-19R25(T)
Serial Number	:	N/A
FCC ID	:	N/A
Data Cable	:	Shielded, 1.5 m, Connected to the AV/S-Video port
Power Cord	:	Un-Shielded

☑ Joystick

Manufacturer	:	CHAMP
Model Number	:	JS-308
Serial Number	:	N/A
FCC ID	:	N/A
Data Cable	:	Shielded, Connected to the Game port
Power Cord	:	N/A

☑ Micro Phone

Manufacturer	:	SR
Model Number	:	SR-M02
Serial Number	:	N/A
FCC ID	:	N/A
Data Cable	:	Un-Shielded, Connected to the MIC port
Power Cord	:	N/A

☑ Walk Man

Manufacturer	:	National
Model Number	:	RQ-310
Serial Number	:	N/A
FCC ID	:	N/A
Data Cable	:	Shielded, 1.5 m, Connected to the Line In port
Power Cord	:	N/A

☑ Speaker

Manufacturer	:	JASS HIPSTER
Model Number	:	J-008
Serial Number	:	N/A
FCC ID	:	N/A
Data Cable	:	Un-Shielded, 1.5 m, Connected to the Line Out port
Power Cord	:	N/A

4.3 REMARK :

5 EUT OPERATING CONDITION

5.1 Operating condition is according to **ANSI C63.4 - 1992 & CISPR 22**.

5.2 The oscillator frequency of the EUT were 100 MHz for notebook.

5.3 Turn on the power of all equipments.

5.4 Test program sent "H" pattern to peripherals as following :

5.4.1 Printer

5.4.2 Monitor

5.4.3 Modem

5.4.4 Keyboard

5.5 The photos of conducted test configuration, please refer to appendix A.

6 LIMIT OF CONDUCTED POWER LINE EMISSION CLASS B :

CISPR 22

Frequency Range	Quasi Peak	Average
0.15 ~ 0.5 MHz	66 - 56 dBuV	56 - 46 dBuV
0.5 ~ 5 MHz	56 dBuV	46 dBuV
5 ~ 30 MHz	60 dBuV	50 dBuV

6.1 In the above table, the tighter limit applies at the band edges.

7 RESULT OF CONDUCTED POWER LINE TEST

7.1 The frequency range from 0.15 MHz to 30 MHz was investigated. All readings are quasi-peak values and average.

7.2 IF bandwidth : 9 kHz, Meas Time : 1 sec.

7.3 Temperature : 27 •, Humidity : 75 % RH.

7.4 Deviations from the specifications : None

7.5 Quasi-Peak :

Frequency (MHz)	Line 1 (dBuV)	Line 2 (dBuV)	Limit (dBuV)
0.150	56.09	57.42	66.00
0.317	43.24	46.26	59.79
0.632	27.34	27.18	56.00
2.280	36.87	31.61	56.00
7.850	28.63	29.63	60.00
24.000	36.60	34.69	60.00

7.6 Average :

Frequency (MHz)	Line 1 (dBuV)	Line 2 (dBuV)	Limit (dBuV)
0.191	47.57	48.27	53.99
0.317	40.91	39.73	49.79
0.632	25.70	24.80	46.00
2.280	36.43	30.61	46.00
7.025	25.04	26.01	50.00
24.000	36.58	34.59	50.00

REMARK :

1. Model : REP-X15
2. Measuring mode : 640 x 480
3. Uncertainty in conduction emission measured : < ± 2.0dB.
4. " * ", means this data is worse case emission level.
5. Result : **PASSED**

RADIATED EMISSION TEST

1 TEST INSTRUMENTS & FACILITIES

The following test Instruments was used during the radiated emission test :

Item	Instruments /facilities	Specification	Manufacturer	Model # / S/N#	Location	Date of Cal.
1	OPEN AREA TEST SITE	☐ OATS 1 ☑ OATS 2				NOV/99 JUN/99
2	EMI TEST RECEIVER	20MHz ~ 5GHz	ROHDE & SCHWARZ	ESBI 845636/007	Open Site I	SEP/99
3	PRE-AMPLIFIER	0.1MHz ~ 1.3 GHz	HP	8447D 1937A02095	Open Site II	MAY/99
4	EMI TEST RECEIVER	20Hz ~ 26.5GHz	ROHDE & SCHWARZ	ESMI 845442/006	Open Site II	APR/99
5	PRE-AMPLIFIER	20MHz ~ 7GHz	ROHDE & SCHWARZ	ESMI-Z7 664126/008	Open Site I	SEP/99
6	ANTENNA (BI-LOG)	25MHz ~ 2GHz	SCHAFFNER	CBL6112B S/N : 2614	Open Site II	JUN/99
7	ANTENNA (BI-LOG)	25MHz ~ 2GHz	SCHAFFNER	CBL6112B S/N : 2611	Open Site I	JUN/99
8	CABLES	30MHz ~ 1GHz		No. 2, No. 4 No. 1, No. 3	OATS 1 OATS 2	NOV/99 JUN/99
9	ANTENNA (DIPOLE)	30 ~ 300MHz	ROHDE & SCHWARZ	HZ-12 842899/08		JUL/99
10	ANTENNA (DIPOLE)	300 ~ 1000MHz	ROHDE & SCHWARZ	HZ-13 842007/0004		JUL/99
11	EMIVM	30 ~ 1000MHz	AUDIX	A582445 A582443	OATS 1 OATS 2	N/A

Note : 1. Items 1 ~ 8 upon which need to calibrated are with period of 1 year, except item 9-10.

2. Items 2 (for Site 1) is used for the final measurement.

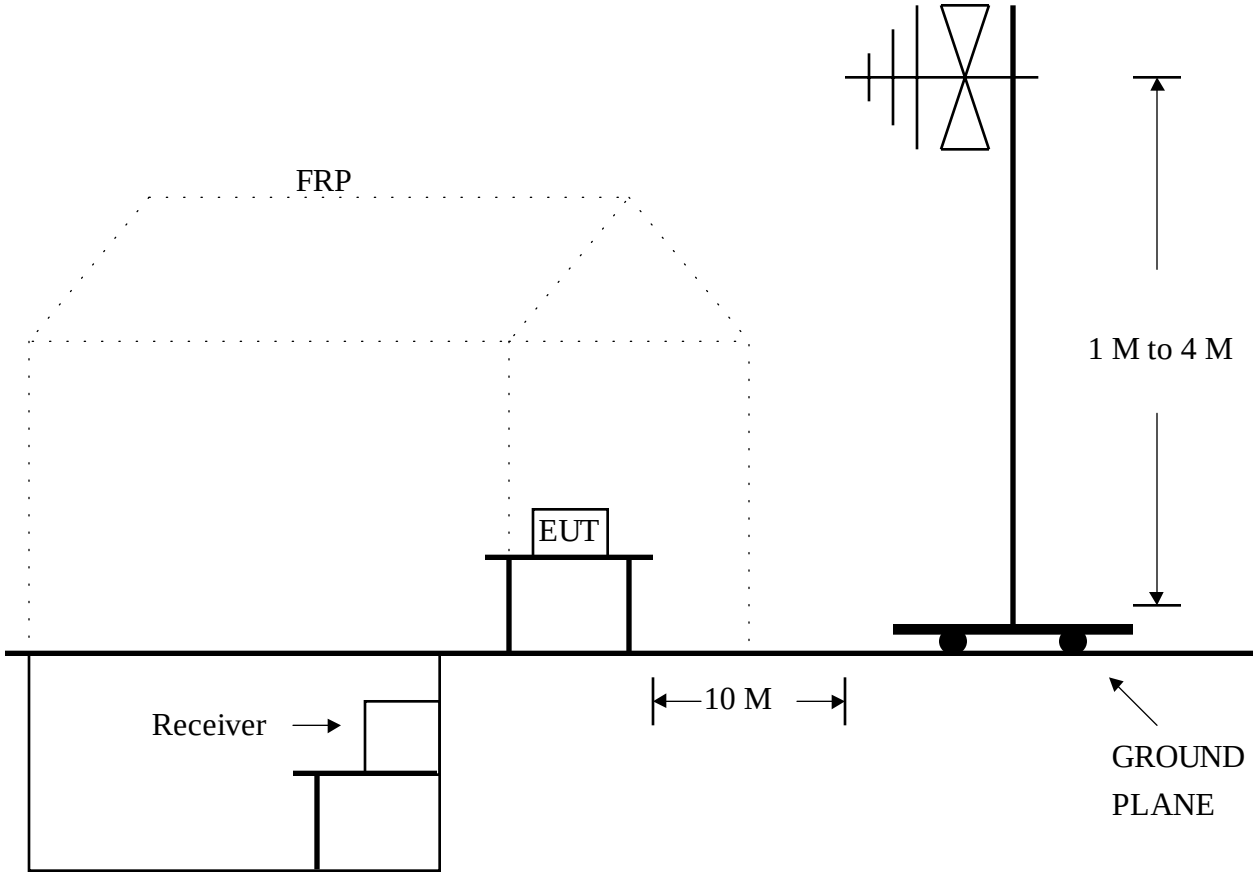
2 TEST PROCEDURE

2.1 The EUT was test according to **ANSI C63.4 - 1992 & CISPR 22**.

2.2 The radiated test was performed at HomeTek Lab's Open Site I.

2.3 The frequency range from 30 MHz to 1 GHz, the measurement were made at 10 meters, with a BI-log antenna.

3 TEST SETUP



4 CONFIGURATION OF THE EUT

Same as "Conducted Power Line test", section 4

5 EUT OPERATING CONDITION

5.1 Same as "Conducted Power Line test", section 5

5.2 The radiated emission in the frequency range from 30 MHz - 1000 MHz was test in a horizontal and vertical polarization at HomeTek Lab's open site I.

5.3 The photos of radiated test configuration, please refer to appendix A.

6 LIMIT OF RADIATED EMISSION CLASS B :

CISPR 22

Frequency (MHz)	Measurement Distance	Limit (dBuV/m)
30 - 230	10 (M)	30
230 - 1000	10 (M)	37

6.1 The tighter limit shall apply at the edge between two frequency bands.

6.2 Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.

7 RESULT OF RADIATED EMISSION TEST

7.1 The frequency range from 30 MHz to 1 GHz was investigated. All readings are quasi-peak values with resolution bandwidth of 120 kHz.

7.2 The measurements above 1 GHz with a resolution bandwidth of 1 MHz are peak reading at 10 meters.

7.3 The measurements were made at 10 meters of HomeTek Lab's open site I.

7.4 Temperature : 27 •, Humidity : 75 % RH.

7.5 Radiated Emission data : **Horizontal**

Frequency (MHz)	Reading Level (dBuV)	ANT factor (dB/m)	Cable Loss (dB)	Emission Level (dBuV/m)	Limit (dBuV/m)
66.42	17.45	5.00	0.70	23.15	30
74.98	12.40	5.85	0.71	18.96	30
125.12	11.41	11.60	0.94	23.95	30
141.35	14.34	10.55	1.07	25.96	30
195.45	17.26	8.90	1.22	27.38	30
224.75	15.44	9.04	1.32	25.80	30
400.04	12.57	16.00	1.85	30.42	37
664.82	7.56	19.10	2.56	29.22	37

- Emission Level = Reading Level + ANT Factor + Cable Loss.
- Sample Calculation for 664.82 MHz .
- Corrected Reading : (7.56) + (19.10) + (2.56) = 29.22 . (Emission Level)

7.6 Radiated Emission data : **Vertical**

Frequency (MHz)	Reading Level (dBuV)	ANT factor (dB/m)	Cable Loss (dB)	Emission Level (dBuV/m)	Limit (dBuV/m)
39.14	11.36	12.95	0.48	24.79	30
79.46	18.39	6.43	0.71	25.53	30
133.11	9.96	11.10	1.02	22.08	30
195.41	18.73	8.90	1.22	28.85	30
228.00	17.32	9.16	1.33	27.81	30
233.17	19.32	9.74	1.35	30.41	37
299.95	14.66	13.00	1.50	29.16	37
702.87	9.28	19.35	2.27	30.90	37

- Emission Level = Reading Level + ANT Factor + Cable Loss.
- Sample Calculation for 702.87 MHz .
- Corrected Reading : (9.28) + (19.35) + (2.27) = 30.90 . (Emission Level)

REMARK :

1. Model : REP-X15
2. Measuring mode : 640 x 480
3. Uncertainty in radiated emission measured : < ± 4.0dB.
4. " * ", means this data is worse case emission level.
5. Result : **PASSED**

PHOTO OF FCC ID LABEL

SAMPLE OF FCC ID LABEL :

FCC ID : H79REP-X15

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference. And (2) this device must accept any interference that may cause undesired operation.

Please refer to appendix B photo of ID location.