FCC TEST REPORT

REPORT NO.:	RF900906R05A
MODEL NO.:	G-RA4B (for Gamepad) C-X2A10A (for Transceiver)
RECEIVED:	Dec. 1, 2001
TESTED:	Dec. 3 ~ Dec. 4, 2001

APPLICANT:	Logitech Inc.
ADDRESS:	6505 Kaiser Drive Fremont, CA 94555-3615

ISSUED BY:	Advance Data Technology Corporation
LAB LOCATION:	47 14th Lin, Chiapau Tsun, Linko, Taipei, Taiwan, R.O.C.

0528
ILAC MRA

Lab Code: 200102-0

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1 CERTIFICATION

PRODUCT :	Logitech (R) Cordless Controller
BRAND NAME :	Logitech
MODEL NO. :	G-RA4B (for Gamepad) C-X2A10A (for Transceiver)
APPLICANT :	Logitech Inc.
STANDARDS :	47 CFR Part 15, Subpart C (Section 15.249), ANSI C63.4-1992, Canada RSS 210

We, **Advance Data Technology Corporation**, hereby certify that one sample of the designation has been tested in our facility from Dec. 3, 2001 to Dec. 4, 2001,
The test record, data evaluation and Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions herein specified.

TESTED BY: James Lee , DATE: Dec. 12, 2001
James Lee

CHECKED BY: Demi Chen , DATE: Dec. 12, 2001
Demi Chen

APPROVED BY: Alan Lane , DATE: Dec. 12, 2001
Dr. Alan Lane
Manager

2 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: 47 CFR Part 15, Subpart C			
Standard Section	**Test Type and Limit**	**Result**	**REMARK**
15.207	AC Power Conducted Emission Limit: 48dBuV	PASS	Meet the requirement of limit Minimum passing margin is –14.81dBuV at 0.556 MHz
15.249	Transmitter Radiated Emissions Spec.: Table 15.209	PASS	Meet the requirement of limit Minimum passing margin is –5.0dBuV at 4804.00 MHz
15.249	Band Edge Measurement	PASS	Meet the requirement of limit

3 GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

PRODUCT	Logitech (R) Cordless Controller
MODEL NO.	G-RA4B / C-X2A10A
POWER SUPPLY	6VDC from Batteries for GamePad DC power from host equipment for Transceiver
MODULATION TYPE	FHSS (GFSK)
FREQUENCY RANGE	2402MHz ~ 2480MHz
NUMBER OF CHANNEL	79
OUTPUT POWER	-1.9dBm
ANTENNA TYPE	Sheet metal inverted-F antenna
DATA CABLE	1.5m (shielded)
I/O PORTS	PlayStation Controller Port
ASSOCIATED DEVICES	NA

NOTE:

1. The EUT is wireless game player which contains two parts in this report. One is Gamepad which is hold by the user. Another is Transceiver which is connected with PS2.
2. Model name G-RA4B is for product Gamepad and model name C-X2A10A is for Transceiver.
3. This report is prepared for FCC class II permissive change. The differences compared with the model: C-UD10A, original design, is the connected port which has been replaced by PlayStation Controller Port instead of USB, and also the associated baseband digital circuit for PS2 interface connection.
4. The model: G-RA4B and C-X2A10A with original design has been approved by FCC under FCC ID: DZLCUD10A
5. For a more detailed features description, please refer to the manufacturer's specifications or User's Manual.

3.2 DESCRIPTION OF TEST MODES

The software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel frequencies individually.

NOTE: The test results (A) is for Transceiver which is connected with PlayStation Controller Port, and (B) is for GamePad which is held on user's hand

3.3 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is a computer wireless game player. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

FCC CFR 47 Part 15, Subpart C. (15.249)
ANSI C63.4 : 1992, Canada RSS 210

All tests have been performed and recorded as per the above standards.

NOTE: The receiver part to communicate with the EUT has been verified to comply with FCC part 15, subpart, Class B (DoC). The test report has been issued separately.

3.4 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	Play Station II	SONY	DTL-H30001	323329	FCC DoC Approved
2	COLOR VIDEO MONITOR	Matsushita Electric intustrial Co.,Ltd	BT-H1390Y	EM9642284	VERIFICATION
3					
4					
5					
6					

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	NA
2	1.8 m braid shielded wire, terminal with VGA connector covered by metallic frame, w/o Core
3	
4	
5	
6	

NOTE: All power cords of the above support units are non shielded (1.8m).

4 TEST PROCEDURES AND RESULTS

4.1 CONDUCTED EMISSION MEASUREMENT

4.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

FREQUENCY (MHz)	Class A (dBuV)		Class B (dBuV)	
	Quasi-peak	Average	Quasi-peak	Average
0.45 – 30	48	-	48	-

Notes:

1. The lower limit shall apply at the transition frequencies.
1. All emanations from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

4.1.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
*ROHDE & SCHWARZ Test Receiver	ESHS30	828109/007	July 4, 2002
*ROHDE & SCHWARZ Artificial Mains Network (for EUT)	ESH3-Z5	839135/006	July 3, 2002
ROHDE & SCHWARZ 4-wire ISN	ENY41	837032/016	Dec. 3, 2002
ROHDE & SCHWARZ 2-wire ISN	ENY22	837497/016	Dec. 3, 2002
*EMCO-L.I.S.N. (for peripheral)	3825/2	9204-1964	July 3, 2002
*Software	Cond-V2J	NA	NA
*RF cable (JYEBAO)	RG-58A/U	Cable-C02.01	July 9, 2002
HP Terminator (For EMCO LISN)	11593A	E1-01-298	Feb. 20, 2002
HP Terminator (For EMCO LISN)	11593A	E1-01-299	Feb. 20, 2002
Shielded Room	Site 2	ADT-C02	NA
VCCI Site Registration No.	Site 2	C-240	NA

NOTE:

1. The measurement uncertainty is less than +/- 2.6dB, which is calculated as per the NAMAS document NIS81.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

"*" = These equipments are used for the final measurement.

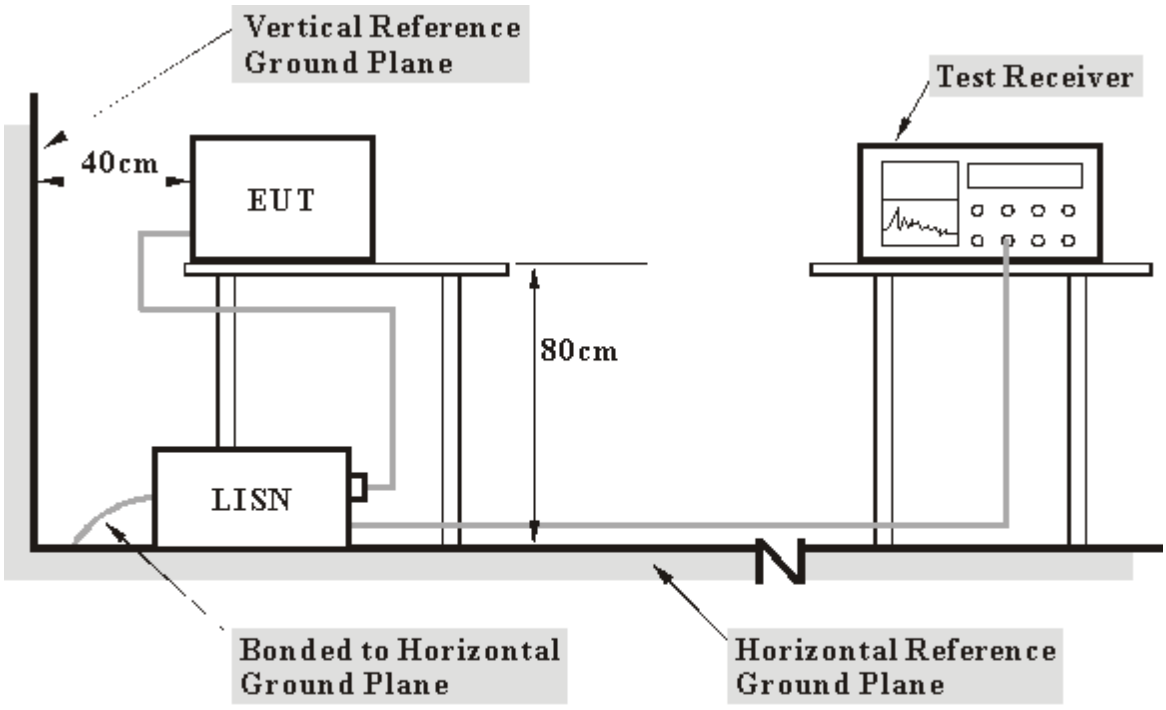
4.1.3 TEST PROCEDURES

a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.

b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.

c. The frequency range from 450 kHz to 30 MHz was searched. Emission levels over 10dB under the prescribed limits could not be reported

4.1.4 TEST SETUP



Note: 1. Support units were connected to second LISN.
2. Both of LISNs (AMN) 80 cm from EUT and at the least 80 cm from other units and other metal planes support units.

For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

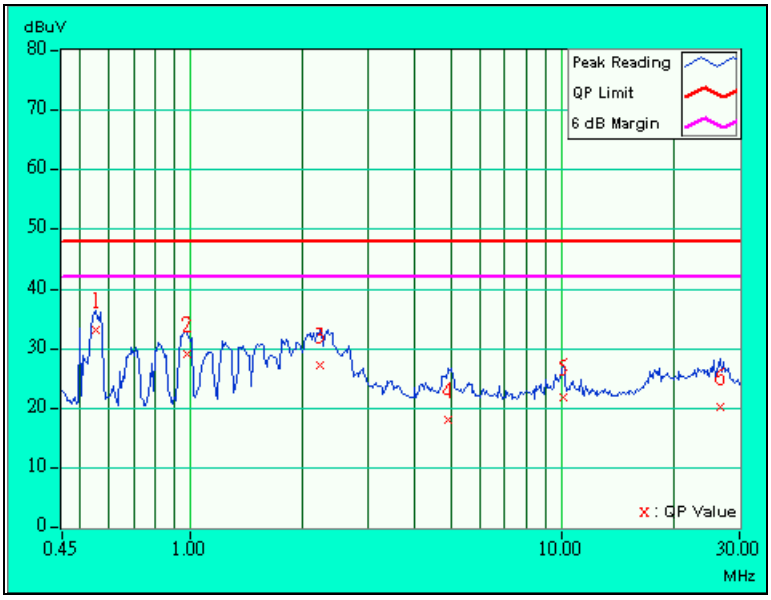
4.1.5 TEST RESULTS(A)

EUT	Transceiver	MODEL	C-X2A10A
MODE	Channel 0	6dB BANDWIDTH	10 kHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	PHASE	Line (L)
ENVIRONMENTAL CONDITIONS	23 deg. C, 70%RH, 1005 hPa	TESTED BY: James Lee	

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.556	0.10	33.09	-	33.19	-	48.00	-	-14.81	-
2	0.972	0.10	29.07	-	29.17	-	48.00	-	-18.83	-
3	2.229	0.12	27.21	-	27.33	-	48.00	-	-20.67	-
4	4.941	0.33	18.17	-	18.50	-	48.00	-	-29.50	-
5	10.065	0.50	21.91	-	22.41	-	48.00	-	-25.59	-
6	26.646	1.13	20.31	-	21.44	-	48.00	-	-26.56	-

NOTE:

1. QP. and AV. are abbreviations of quasi-peak and average individually.
2. "-": NA
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission level - Limit value
5. Emission Level = Reading Value + Correction Factor.

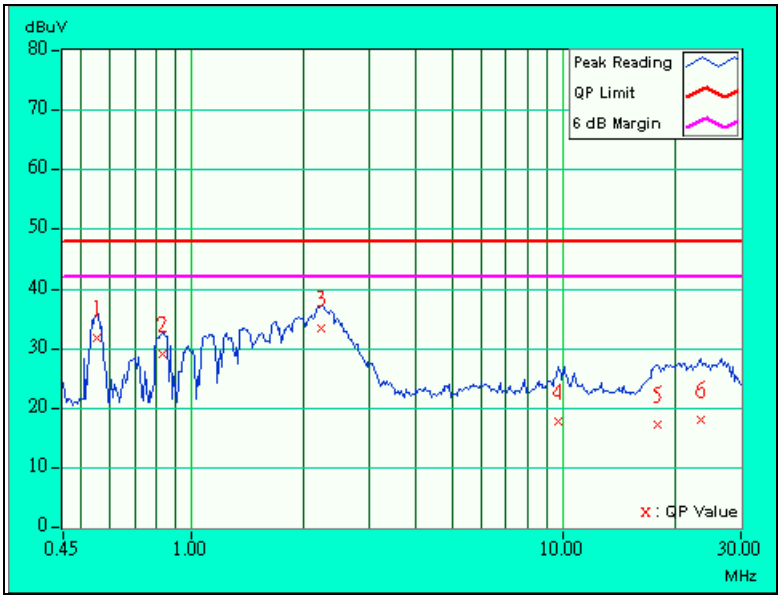


EUT	Transceiver	**MODEL**	C-X2A10A
MODE	Channel 0	**6dB BANDWIDTH**	10 kHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	**PHASE**	Neutral (N)
ENVIRONMENTAL CONDITIONS	23 deg. C, 70%RH, 1005 hPa	**TESTED BY**: James Lee	

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.555	0.10	31.73	-	31.83	-	48.00	-	-16.17	-
2	0.837	0.10	29.15	-	29.25	-	48.00	-	-18.75	-
3	2.235	0.12	33.27	-	33.39	-	48.00	-	-14.61	-
4	9.710	0.40	17.77	-	18.17	-	48.00	-	-29.83	-
5	17.882	0.72	17.31	-	18.03	-	48.00	-	-29.97	-
6	22.364	0.87	18.09	-	18.96	-	48.00	-	-29.04	-

NOTE:

1. QP. and AV. are abbreviations of quasi-peak and average individually.
2. "-": NA
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission level - Limit value
5. Emission Level = Reading Value + Correction Factor.

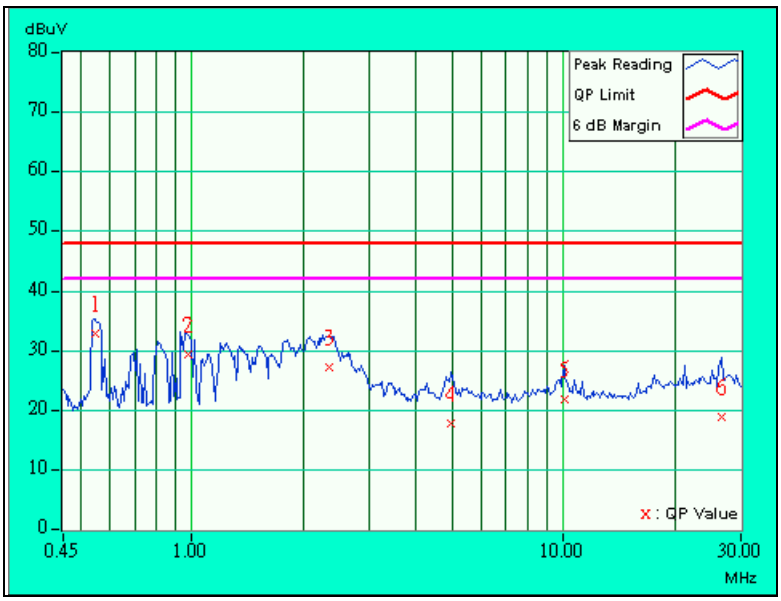


EUT	Transceiver	MODEL	C-X2A10A
MODE	Channel 39	6dB BANDWIDTH	10 kHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	PHASE	Line (L)
ENVIRONMENTAL CONDITIONS	23 deg. C, 70%RH, 1005 hPa	TESTED BY: James Lee	

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.551	0.10	32.97	-	33.01	-	48.00	-	-14.99	-
2	0.974	0.10	29.47	-	29.57	-	48.00	-	-18.43	-
3	2.349	0.13	27.33	-	27.46	-	48.00	-	-20.54	-
4	4.992	0.33	17.69	-	18.02	-	48.00	-	-29.98	-
5	10.067	0.50	21.83	-	22.33	-	48.00	-	-25.67	-
6	26.648	1.13	18.97	-	20.10	-	48.00	-	-27.90	-

NOTE:

1. QP. and AV. are abbreviations of quasi-peak and average individually.
2. "-": NA
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission level - Limit value
5. Emission Level = Reading Value + Correction Factor.

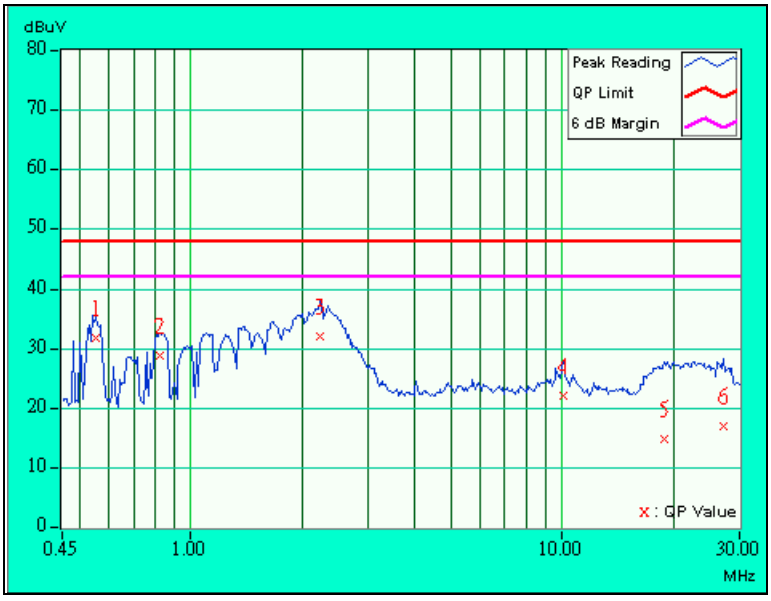


EUT	Transceiver	**MODEL**	C-X2A10A
MODE	Channel 39	**6dB BANDWIDTH**	10 kHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	**PHASE**	Neutral (N)
ENVIRONMENTAL CONDITIONS	23 deg. C, 60%RH, 1005 hPa	**TESTED BY**: James Lee	

No	Freq.	Corr. Factor	Reading Value [dB (Uv)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.554	0.10	31.79	-	31.89	-	48.00	-	-16.11	-
2	0.829	0.10	28.73	-	28.83	-	48.00	-	-19.17	-
3	2.228	0.12	32.05	-	32.17	-	48.00	-	-15.83	-
4	10.066	0.40	22.21	-	22.61	-	48.00	-	-25.39	-
5	18.803	0.75	14.75	-	15.50	-	48.00	-	-32.50	-
6	27.140	0.94	16.99	-	17.93	-	48.00	-	-30.07	-

NOTE:

1. QP. and AV. are abbreviations of quasi-peak and average individually.
2. "-": NA
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission level - Limit value
5. Emission Level = Reading Value + Correction Factor.

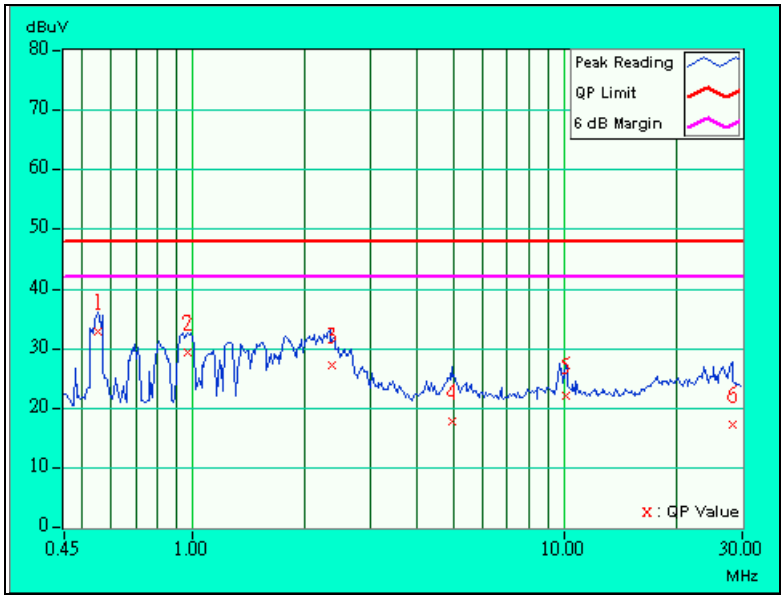


EUT	Transceiver	**MODEL**	C-X2A10A
MODE	Channel 78	**6dB BANDWIDTH**	10 kHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	**PHASE**	Line (L)
ENVIRONMENTAL CONDITIONS	23 deg. C, 70%RH, 1005 hPa	**TESTED BY**: James Lee	

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.555	0.10	32.99	-	33.09	-	48.00	-	-14.91	-
2	0.966	0.10	29.43	-	29.53	-	48.00	-	-18.47	-
3	2.353	0.14	27.21	-	27.35	-	48.00	-	-20.65	-
4	4.950	0.33	17.77	-	18.10	-	48.00	-	-29.90	-
5	10.067	0.50	22.01	-	22.51	-	48.00	-	-25.49	-
6	28.142	1.16	17.23	-	18.39	-	48.00	-	-29.61	-

NOTE:

1. QP. and AV. are abbreviations of quasi-peak and average individually.
2. "-": NA
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission level - Limit value
5. Emission Level = Reading Value + Correction Factor.

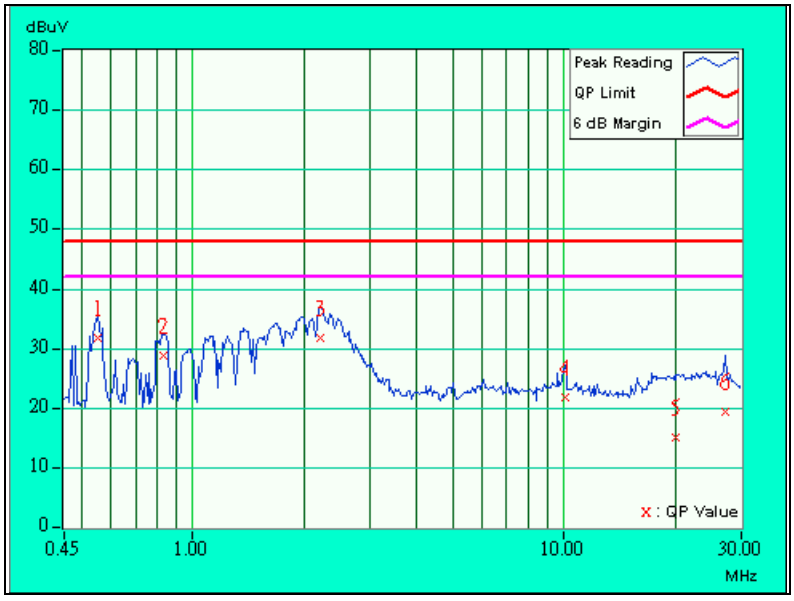


EUT	Transceiver	**MODEL**	C-X2A10A
MODE	Channel 78	**6dB BANDWIDTH**	10 kHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	**PHASE**	Netural (N)
ENVIRONMENTAL CONDITIONS	23 deg. C, 70%RH, 1005 hPa	**TESTED BY**: James Lee	

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.554	0.10	31.79	-	31.89	-	48.00	-	-16.11	-
2	0.832	0.10	28.93	-	29.03	-	48.00	-	-18.97	-
3	2.199	0.12	31.91	-	32.03	-	48.00	-	-15.97	-
4	10.067	0.40	21.95	-	22.35	-	48.00	-	-25.65	-
5	20.000	0.80	15.01	-	15.81	-	48.00	-	-32.19	-
6	27.143	0.94	19.47	-	20.41	-	48.00	-	-27.59	-

NOTE:

1. QP. and AV. are abbreviations of quasi-peak and average individually.
2. "-": NA
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission level - Limit value
5. Emission Level = Reading Value + Correction Factor.



4.1.6 TEST RESULTS(B)

This EUT is excused from investigation of conducted emission, for it is powered by battery only. According to paragraph 15.207(a), measurements to demonstrate compliance with the conducted limited are not required for devices which only employ battery power for operation and which do not operate from the AC power lines or contain provisions for operation while connected to the AC power lines.

4.2 RADIATED EMISSION MEASUREMENT

4.2.1 LIMITS OF RADIATED EMISSION MEASUREMENT

According to 15.249 the field strength of emissions from intentional radiators operated under these frequencies bands shall not exceed the following:

Fundamental Frequency (MHz)	Field Strength of Fundamental (dBuV/m)	
	Peak	Average
2400 ~ 2483.5	114	94

Field strength limits are at the distance of 3 meters, emissions radiated outside of the specified bands, shall be according to the general radiated limits in 15.209 as following:

Frequencies (MHz)	Field Strength of Fundamental	
	uV/m	dBuV/m
30-88	100	40.0
88-216	150	43.5
216-960	200	46.0
Above 960	500	54.0

NOTE:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
3. As shown in 15.35(b), for frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.

4.2.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
*HP Spectrum Analyzer	8590L	3544A01176	May 7, 2002
*HP Preamplifier	8447D	2944A08485	May 7, 2002
*HP Preamplifier	8449B	3008A01201	Dec. 13, 2001
*HP Preamplifier	8449B	3008A01292	Aug. 21, 2002
*ROHDE & SCHWARZ TEST RECEIVER	ESMI	839013/007 839379/002	Jan. 25, 2002
SCHWARZBECK Tunable Dipole Antenna	VHA 9103 UHA 9105	E101051 E101055	Nov. 23, 2002
*CHASE BILOG Antenna	CBL6112A	2221	Aug. 2, 2002
*SCHWARZBECK Horn Antenna	BBHA9120-D1	D130	July 6, 2002
*EMCO Horn Antenna	3115	9312-4192	April 15, 2002
*EMCO Turn Table	1060	1115	NA
*SHOSHIN Tower	AP-4701	A6Y005	NA
*Software	AS61D4	NA	NA
*ANRITSU RF Switches	MP59B	M35046	Aug. 2, 2002
*TIMES RF cable	LMR-600	CABLE-ST5-01	Aug. 2, 2002
Antenna (Horn)	BBHA9120-D	D130	July 10, 2002
Open Field Test Site	Site 5	ADT-R05	July 28, 2002
VCCI Site Registration No.	Site 5	R-1039	NA
Site Registration No.	FCC: 90422 Canada IC: IC 3789 VCCI : R-1039		

NOTE:

1. The measurement uncertainty is less than +/- 3.0dB, which is calculated as per the NAMAS document NIS81.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
3. "*" = These equipment are used for the final measurement.

4.2.3 TEST PROCEDURES

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 10 meter open area test site. The table was rotated 360 degrees to determine the position of the highest radiation.

b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

c. The antenna is a broadband antenna, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

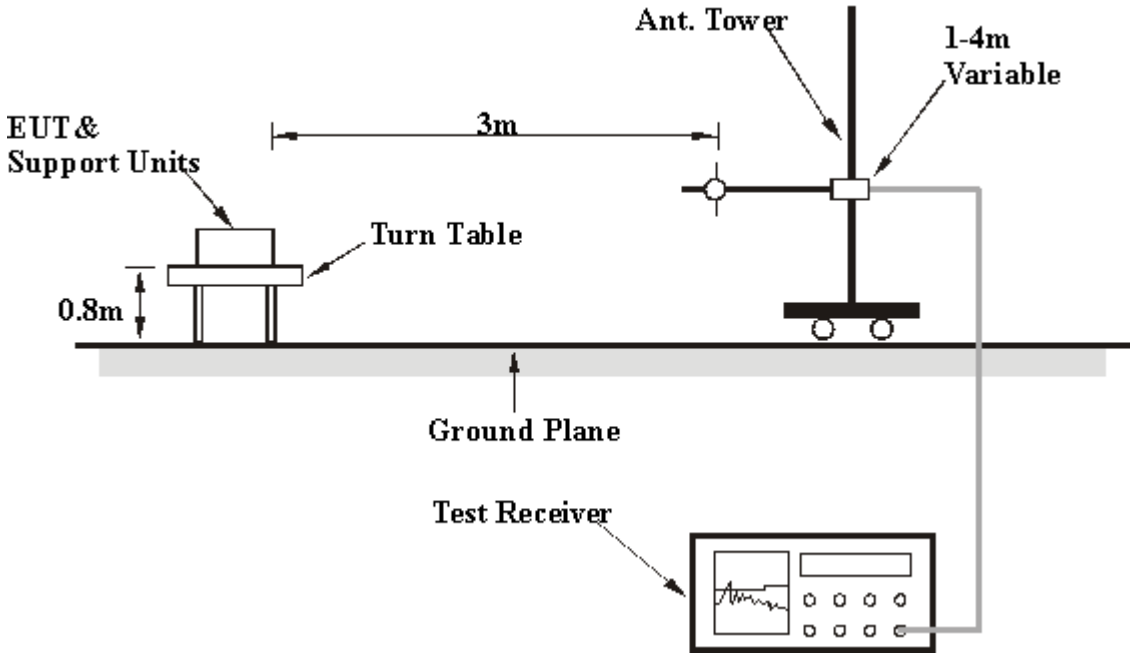
e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

f. If the emission level of the EUT in peak mode was 10 dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10 dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

NOTE:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Peak detection (PK) and Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1 MHz for Peak detection at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 30 Hz for Average detection (AV) at frequency above 1GHz.

4.2.4 TEST SETUP



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

4.2.5 TEST RESULTS(A)

Digital Portion:

EUT	Transceiver	**MODEL**	C-X2A10A
MODE	Channel 78	**FREQUENCY RANGE**	30-1000 MHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	**DETECTOR FUNCTION**	Quasi-Peak
ENVIRONMENTAL CONDITIONS	25 deg. C, 70%RH, 1050 hPa	**TESTED BY**: Gary Chang	

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB)	Cable Factor (dB)	Pre-Amp. Factor (dB)	Correction Factor (dB)
1	150.00	30.5 QP	43.50	-13.00	1.99H	135	19.00	10.30	1.20	0.00	-11.51
2	169.34	28.6 QP	43.50	-14.90	1.77H	106	18.00	9.35	1.30	0.00	-10.65
3	203.00	30.5 QP	43.50	-13.00	1.81H	195	20.00	9.11	1.43	0.00	-10.54
4	250.00	39.7 QP	46.00	-6.30	1.42H	239	26.00	12.02	1.66	0.00	-13.69
5	300.00	34.1 QP	46.00	-11.90	1.45H	313	19.00	13.18	1.88	0.00	-15.06
6	393.00	35.1 QP	46.00	-10.90	2.10H	356	17.00	15.86	2.21	0.00	-18.08
7	589.70	39.3 QP	46.00	-6.70	2.27H	317	18.00	18.48	2.80	0.00	-21.29
8	786.42	36.9 QP	46.00	-9.10	1.78H	201	13.00	20.55	3.30	0.00	-23.87
9	812.83	36.0 QP	46.00	-10.00	1.35H	100	12.00	20.63	3.37	0.00	-24.00
10	884.75	36.2 QP	46.00	-9.80	1.36H	209	12.00	20.70	3.55	0.00	-24.25
11	949.30	35.4 QP	46.00	-10.60	1.73H	202	10.40	21.20	3.79	0.00	-24.99
12	959.40	35.0 QP	46.00	-11.00	1.37H	317	10.00	21.24	3.79	0.00	-25.03

NOTE:

1. Emission level = Raw value - Correction Factor
2. Correction Factor = Pre-Amp. Factor - Ant. Factor - Cable loss
   (Pre-Amp. Factor = 0, when a Pre-Amplifier is not used for the test.)
3. Margin value = Emission level - Limit value
4. The other emission levels were very low against the limit.

EUT	Transceiver	**MODEL**	C-X2A10A
MODE	Channel 78	**FREQUENCY RANGE**	30-1000 MHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	**DETECTOR FUNCTION**	Quasi-Peak
ENVIRONMENTAL CONDITIONS	25 deg. C, 70%RH, 1050 hPa	**TESTED BY**: Gary Chang	

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB)	Cable Factor (dB)	Pre-Amp. Factor (dB)	Correction Factor (dB)
1	139.20	30.0 QP	43.50	-13.50	1.38V	328	18.00	10.85	1.16	0.00	-12.00
2	169.70	28.1 QP	43.50	-15.40	1.77V	146	17.50	9.26	1.31	0.00	-10.57
3	295.00	31.9 QP	46.00	-14.10	1.09V	35	17.00	13.06	1.85	0.00	-14.91
4	393.00	34.5 QP	46.00	-11.50	2.11V	151	16.40	15.86	2.21	0.00	-18.08
5	508.00	34.9 QP	46.00	-11.10	1.26V	291	15.00	17.36	2.53	0.00	-19.88
6	590.00	39.3 QP	46.00	-6.70	1.34V	272	18.00	18.48	2.80	0.00	-21.29
7	786.40	35.9 QP	46.00	-10.10	1.68V	156	12.00	20.55	3.30	0.00	-23.86
8	812.00	33.7 QP	46.00	-12.30	1.22V	149	9.70	20.64	3.36	0.00	-24.01
9	846.70	36.0 QP	46.00	-10.00	1.01V	70	12.00	20.49	3.49	0.00	-23.99
10	885.00	34.3 QP	46.00	-11.70	1.73V	265	10.00	20.71	3.56	0.00	-24.27
11	948.50	36.0 QP	46.00	-10.00	1.04V	153	11.00	21.20	3.79	0.00	-24.99

NOTE:

1. Emission level = Raw value - Correction Factor
2. Correction Factor = Pre-Amp. Factor - Ant. Factor - Cable loss
   (Pre-Amp. Factor = 0, when a Pre-Amplifier is not used for the test.)
3. Margin value = Emission level - Limit value
4. The other emission levels were very low against the limit.

RF Portion :

EUT	Transceiver	**MODEL**	C-X2A10A
MODE	Channel 0	**FREQUENCY RANGE**	Above 1000 MHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	**DETECTOR FUNCTION**	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25 deg. C, 70%RH, 1050 hPa	**TESTED BY**: Gary Chang	

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB)	Cable Factor (dB)	Pre-Amp. Factor (dB)	Correction Factor (dB)
1	*2402.00	92.6 PK	114.00	-21.40	1.69H	309	60.40	27.11	5.10	0.00	-32.21
2	*2402.00	91.3 AV	94.00	-2.70	1.69H	309	59.12	27.11	5.10	0.00	-32.21
3	4804.00	55.0 PK	74.00	-19.00	1.81H	20	51.00	31.43	7.23	34.63	-4.02
4	4804.00	49.0 AV	54.00	-5.00	1.81H	20	45.00	31.43	7.23	34.63	-4.02

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (DbuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB)	Cable Factor (dB)	Pre-Amp. Factor (dB)	Correction Factor (dB)
1	*2402.00	92.0 PK	114.00	-22.00	2.21V	180	59.80	27.11	5.10	0.00	-32.21
2	*2402.00	87.2 AV	94.00	-6.80	2.21V	180	55.00	27.11	5.10	0.00	-32.21
3	4803.90	54.0 PK	74.00	-20.00	1.15V	33	50.00	31.43	7.23	34.63	-4.02.
4	4803.90	47.8 AV	54.00	-6.20	1.15V	33	43.80	31.43	7.23	34.63	-4.02

NOTE:

1. Emission level = Raw value - Correction Factor
2. Correction Factor = Pre-Amp. Factor - Ant. Factor - Cable loss
   (Pre-Amp. Factor = 0, when a Pre-Amplifier is not used for the test.)
3. Margin value = Emission level - Limit value
4. " * " : Fundamental frequency
5. The other emission levels were very low against the limit.

EUT	Transceiver	**MODEL**	C-X2A10A
MODE	Channel 39	**FREQUENCY RANGE**	Above 1000 MHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	**DETECTOR FUNCTION**	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	27 deg. C, 60%RH, 1050 hPa	**TESTED BY**: Steven Lu	

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB)	Cable Factor (dB)	Pre-Amp. Factor (dB)	Correction Factor (dB)
1	*2441.00	92.6 PK	114.00	-21.40	1.47H	241	60.20	27.33	5.08	0.00	-32.40
2	*2441.00	90.9 AV	94.00	-3.10	1.47H	241	58.50	27.33	5.08	0.00	-32.40
3	4882.00	54.5 PK	74.00	-19.50	2.41H	18	50.40	31.47	7.21	34.63	-4.05
4	4882.00	48.6 AV	54.00	-5.40	2.41H	18	44.50	31.47	7.21	34.63	-4.05

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB)	Cable Factor (dB)	Pre-Amp. Factor (dB)	Correction Factor (dB)
1	*2441.00	91.8 PK	114.00	-22.20	1.75V	51	59.40	27.33	5.08	0.00	-32.40
2	*2441.00	89.9 AV	94.00	-4.10	1.75V	51	57.47	27.33	5.08	0.00	-32.40
3	4882.00	52.1 PK	74.00	-21.90	1.25V	305	48.00	31.47	7.21	34.63	-4.05

NOTE:

1. Emission level = Raw value - Correction Factor
2. Correction Factor = Pre-Amp. Factor - Ant. Factor - Cable loss
   (Pre-Amp. Factor = 0, when a Pre-Amplifier is not used for the test.)
3. Margin value = Emission level - Limit value
4. " * " : Fundamental frequency
5. The other emission levels were very low against the limit.

EUT	Transceiver	**MODEL**	C-X2A10A
MODE	Channel 78	**FREQUENCY RANGE**	Above 1000 MHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	**DETECTOR FUNCTION**	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	27 deg. C, 60%RH, 1050 hPa	**TESTED BY**: Steven Lu	

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB)	Cable Factor (dB)	Pre-Amp. Factor (dB)	Correction Factor (dB)
1	*2480.00	94.6 PK	114.00	-19.40	1.08H	268	62.00	27.54	5.06	0.00	-32.59
2	*2480.00	90.2 AV	94.00	-3.80	1.08H	268	57.57	27.54	5.06	0.00	-32.59
3	4960.00	52.2 PK	74.00	-21.80	2.33H	3	48.00	31.55	7.26	34.61	-4.21

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (DbuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB)	Cable Factor (dB)	Pre-Amp. Factor (dB)	Correction Factor (dB)
1	*2480.00	92.6 PK	114.00	-21.40	1.96V	62	60.00	27.54	5.06	0.00	-32.59
2	*2480.00	90.0 AV	94.00	-4.00	1.96V	62	57.40	27.54	5.06	0.00	-32.59
3	4960.00	51.7 PK	74.00	-22.30	1.29V	329	47.50	31.55	7.26	34.61	-4.21

NOTE:

1. Emission level = Raw value - Correction Factor
2. Correction Factor = Pre-Amp. Factor - Ant. Factor - Cable loss
   (Pre-Amp. Factor = 0, when a Pre-Amplifier is not used for the test.)
3. Margin value = Emission level - Limit value
4. " * " : Fundamental frequency
5. The other emission levels were very low against the limit.

4.2.6 TEST RESULTS(B)

Digital Portion:

EUT	Gamepad	**MODEL**	G-RA4B
MODE	Channel 78	**FREQUENCY RANGE**	30-1000 MHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	**DETECTOR FUNCTION**	Quasi-Peak
ENVIRONMENTAL CONDITIONS	25 deg. C, 70%RH, 1050 hPa	**TESTED BY**: Gary Chang	

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB)	Cable Factor (dB)	Pre-Amp. Factor (dB)	Correction Factor (dB)
1	144.00	32.8 QP	43.50	-10.70	1.69H	154	21.00	10.58	1.18	0.00	-11.76
2	400.24	35.1 QP	46.00	-10.90	1.28H	66	16.80	16.11	2.24	0.00	-18.36
3	432.02	35.6 QP	46.00	-10.40	1.00H	250	17.00	16.28	2.35	0.00	-18.63
4	463.90	34.1 QP	46.00	-11.90	2.21H	153	15.00	16.62	2.44	0.00	-19.05
5	792.10	36.9 QP	46.00	-9.10	1.18H	68	13.00	20.60	3.31	0.00	-23.91
6	840.20	35.0 QP	46.00	-11.00	1.93H	136	11.00	20.52	3.46	0.00	-23.99
7	861.00	34.5 QP	46.00	-11.50	1.64H	6	10.40	20.56	3.52	0.00	-24.08

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB)	Cable Factor (dB)	Pre-Amp. Factor (dB)	Correction Factor (dB)
1	144.00	29.8 QP	43.50	-13.70	1.19V	272	18.00	10.58	1.18	0.00	-11.76
2	401.00	33.0 QP	46.00	-13.00	1.35V	297	14.70	16.11	2.24	0.00	-18.35
3	431.80	34.6 QP	46.00	-11.40	1.20V	331	16.00	16.28	2.35	0.00	-18.63
4	880.00	36.2 QP	46.00	-9.80	1.41V	190	12.00	20.68	3.55	0.00	-24.23
5	921.00	34.8 QP	46.00	-11.20	1.12V	219	10.20	20.96	3.66	0.00	-24.63
6	948.25	37.0 QP	46.00	-9.00	1.77V	201	12.00	21.20	3.79	0.00	-24.99

NOTE:

1. Emission level = Raw value - Correction Factor
2. Correction Factor = Pre-Amp. Factor - Ant. Factor - Cable loss
   (Pre-Amp. Factor = 0, when a Pre-Amplifier is not used for the test.)
3. Margin value = Emission level - Limit value
4. The other emission levels were very low against the limit.

RF Portion :

EUT	Gamepad	MODEL	G-RA4B
MODE	Channel 0	FREQUENCY RANGE	Above 1000 MHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25 deg. C, 70%RH, 1050 hPa	**TESTED BY**: Gary Chang	

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB)	Cable Factor (dB)	Pre-Amp. Factor (dB)	Correction Factor (dB)
1	*2402.00	88.0 PK	114.00	-26.00	1.45H	4	55.80	27.11	5.10	0.00	-32.21
2	*2402.00	87.1 AV	94.00	-6.90	1.45H	4	54.90	27.11	5.10	0.00	-32.21
3	4804.00	49.8 PK	74.00	-24.20	1.50H	342	45.80	31.43	7.23	34.63	-4.02

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB)	Cable Factor (dB)	Pre-Amp. Factor (dB)	Correction Factor (dB)
1	*2402.00	90.2 PK	114.00	-23.80	1.18V	120	58.00	27.11	5.10	0.00	-32.21
2	*2402.00	86.2 AV	94.00	-7.80	1.18V	120	54.00	27.11	5.10	0.00	-32.21
3	4804.00	50.0 PK	74.00	-24.00	1.80V	309	46.00	31.43	7.23	34.63	-4.02

NOTE:

1. Emission level = Raw value - Correction Factor
2. Correction Factor = Pre-Amp. Factor - Ant. Factor - Cable loss
   (Pre-Amp. Factor = 0, when a Pre-Amplifier is not used for the test.)
3. Margin value = Emission level - Limit value
4. " * " : Fundamental frequency
5. The other emission levels were very low against the limit.

EUT	Gamepad	**MODEL**	G-RA4B
MODE	Channel 39	**FREQUENCY RANGE**	Above 1000 MHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	**DETECTOR FUNCTION**	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25 deg. C, 70%RH, 1050 hPa	**TESTED BY**: Gary Chang	

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB)	Cable Factor (dB)	Pre-Amp. Factor (dB)	Correction Factor (dB)
1	*2441.00	89.4 PK	114.00	-24.60	1.37H	349	57.00	27.33	5.08	0.00	-32.40
2	*2441.00	85.9 AV	94.00	-8.10	1.37H	349	53.48	27.33	5.08	0.00	-32.40
3	4882.00	50.8 PK	74.00	-23.20	1.83H	60	46.70	31.47	7.21	34.63	-4.05

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB)	Cable Factor (dB)	Pre-Amp. Factor (dB)	Correction Factor (dB)
1	*2441.00	89.2 PK	114.00	-24.80	1.25V	4	56.80	27.33	5.08	0.00	-32.40
2	*2441.00	86.4 AV	94.00	-7.60	1.25V	4	54.00	27.33	5.08	0.00	-32.40
3	4882.00	49.8 PK	74.00	-24.20	1.52V	335	45.70	31.47	7.21	34.63	-4.05

NOTE:

1. Emission level = Raw value - Correction Factor
2. Correction Factor = Pre-Amp. Factor - Ant. Factor - Cable loss
   (Pre-Amp. Factor = 0, when a Pre-Amplifier is not used for the test.)
3. Margin value = Emission level - Limit value
4. " * " : Fundamental frequency
5. The other emission levels were very low against the limit.

EUT	Gamepad	**MODEL**	G-RA4B
MODE	Channel 78	**FREQUENCY RANGE**	Above 1000 MHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	**DETECTOR FUNCTION**	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25 deg. C, 70%RH, 1050 hPa	**TESTED BY**: Gary Chang	

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M											
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB)	Cable Factor (dB)	Pre-Amp. Factor (dB)	Correction Factor (dB)
1	*2480.00	88.0 PK	114.00	-26.00	1.06H	10	55.40	27.54	5.06	0.00	-32.59
2	*2480.00	85.6 AV	94.00	-8.40	1.06H	10	53.00	27.54	5.06	0.00	-32.59
3	4960.00	50.4 PK	74.00	-23.60	1.12H	302	46.20	31.55	7.26	34.61	-4.21

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M											
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (DbuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB)	Cable Factor (dB)	Pre-Amp. Factor (dB)	Correction Factor (dB)
1	*2480.00	86.6 PK	114.00	-27.40	1.18V	20	54.00	27.54	5.06	0.00	-32.59
2	*2480.00	84.7 AV	94.00	-9.30	1.18V	20	52.10	27.54	5.06	0.00	-32.59
3	4960.00	50.9 PK	74.00	-23.10	1.22V	37	46.70	31.55	7.26	34.61	-4.21

NOTE:

1. Emission level = Raw value - Correction Factor
2. Correction Factor = Pre-Amp. Factor - Ant. Factor - Cable loss
   (Pre-Amp. Factor = 0, when a Pre-Amplifier is not used for the test.)
3. Margin value = Emission level - Limit value
4. " * " : Fundamental frequency
5. The other emission levels were very low against the limit.

4.3 BAND EDGES MEASUREMENT

4.3.1 LIMITS OF BAND EDGES MEASUREMENT

Below –20dB of the highest emission level of operating band (in 100KHz RB).

4.3.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
R&S SPECTRUM ANALYZER	FSEK30	100049	Jul. 16, 2002

Notes:

1. The measurement uncertainty is less than +/- 2.6dB, which is calculated as per the NAMAS document NIS81.
2. The calibration interval of the above test instruments is 12 months. And the calibrations are traceable to NML/ROC and NIST/USA.

4.3.3 TEST PROCEDURE

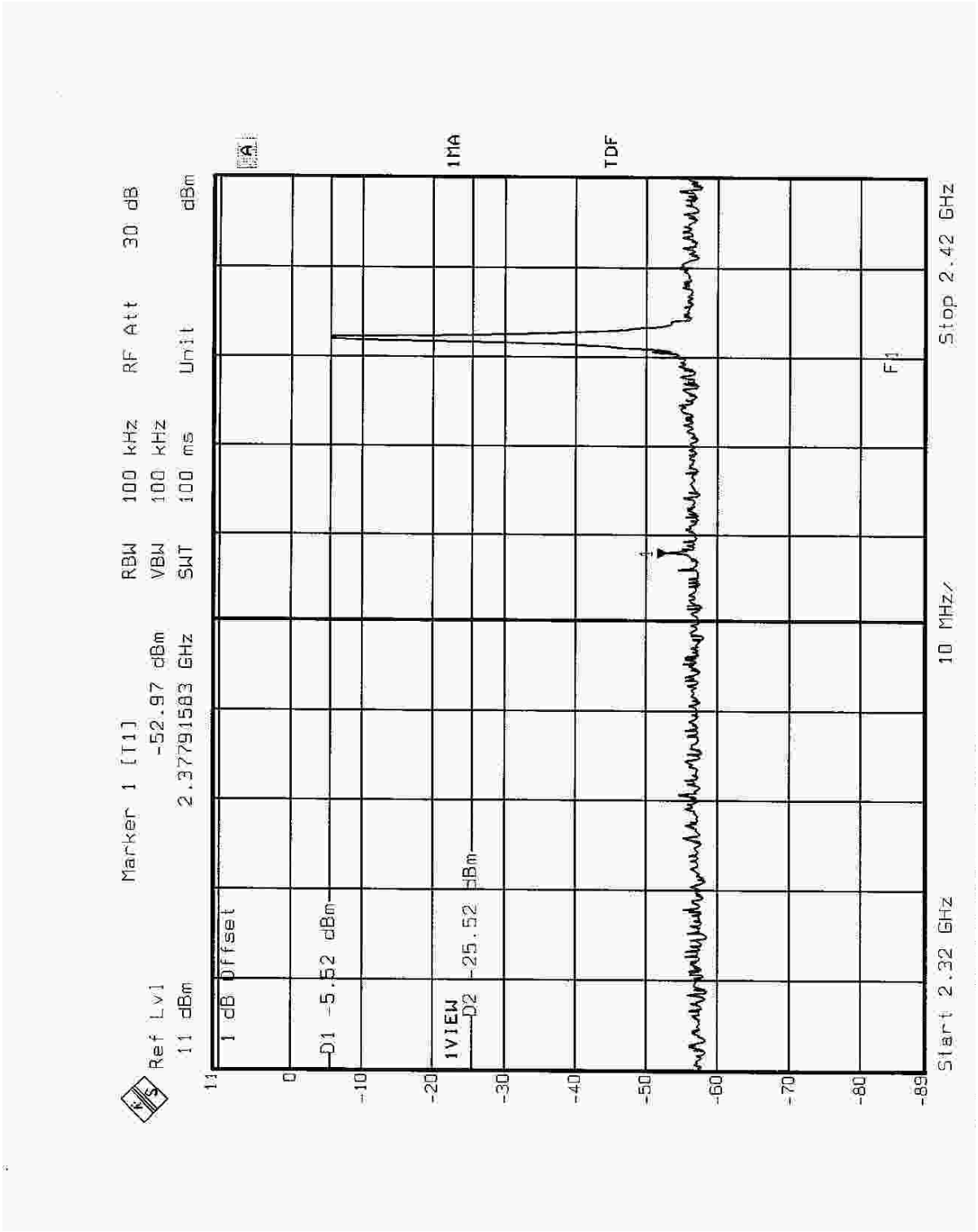
The transmitter output was connected to the spectrum analyzer via a low lose cable. Set both RBW and VBW of spectrum analyzer to 100 kHz with suitable frequency span including 100 kHz bandwidth from band edge. The band edges was measured and recorded.

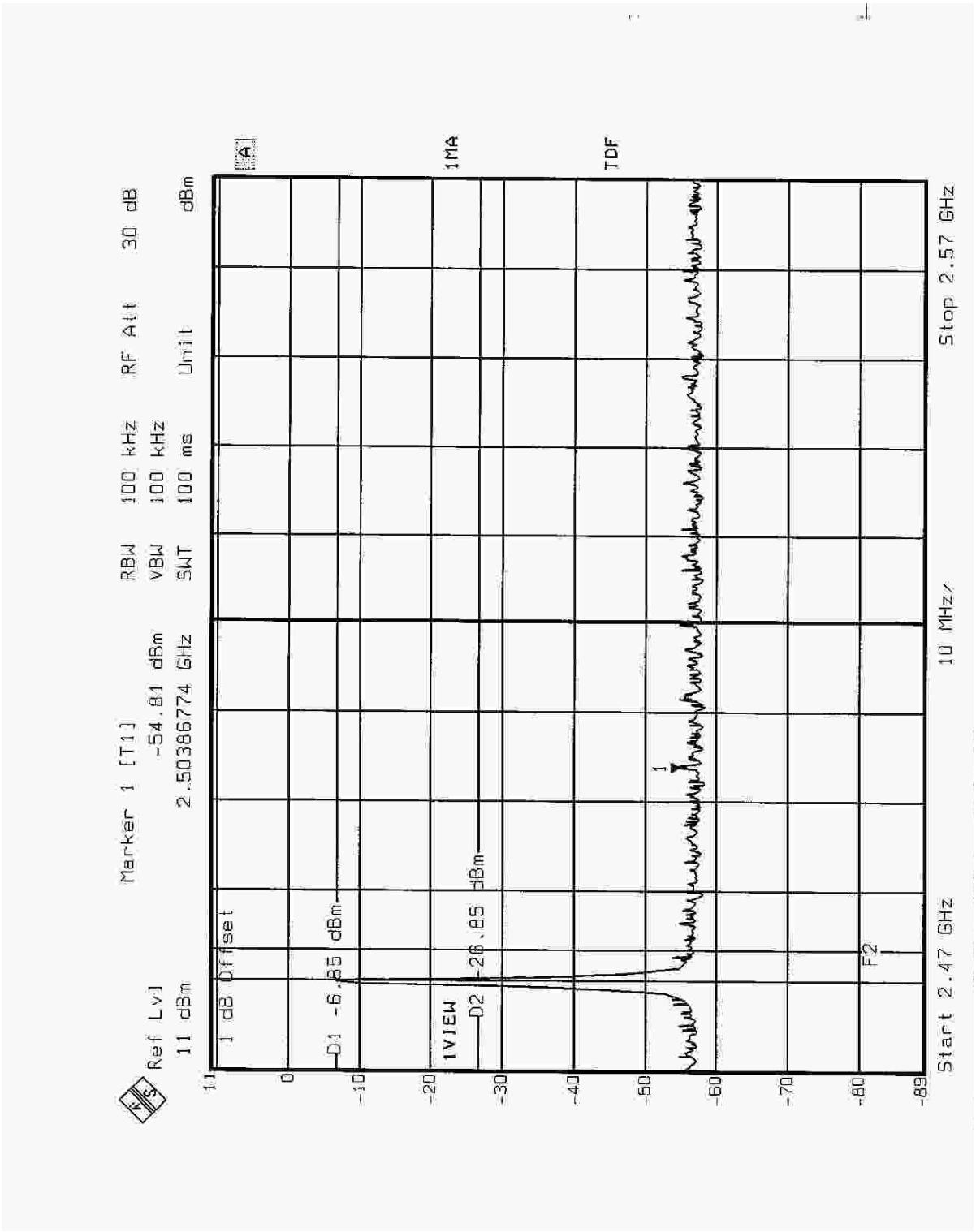
4.3.4 EUT OPERATING CONDITION

The software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel frequencies individually.

4.3.5 TEST RESULTS (A)

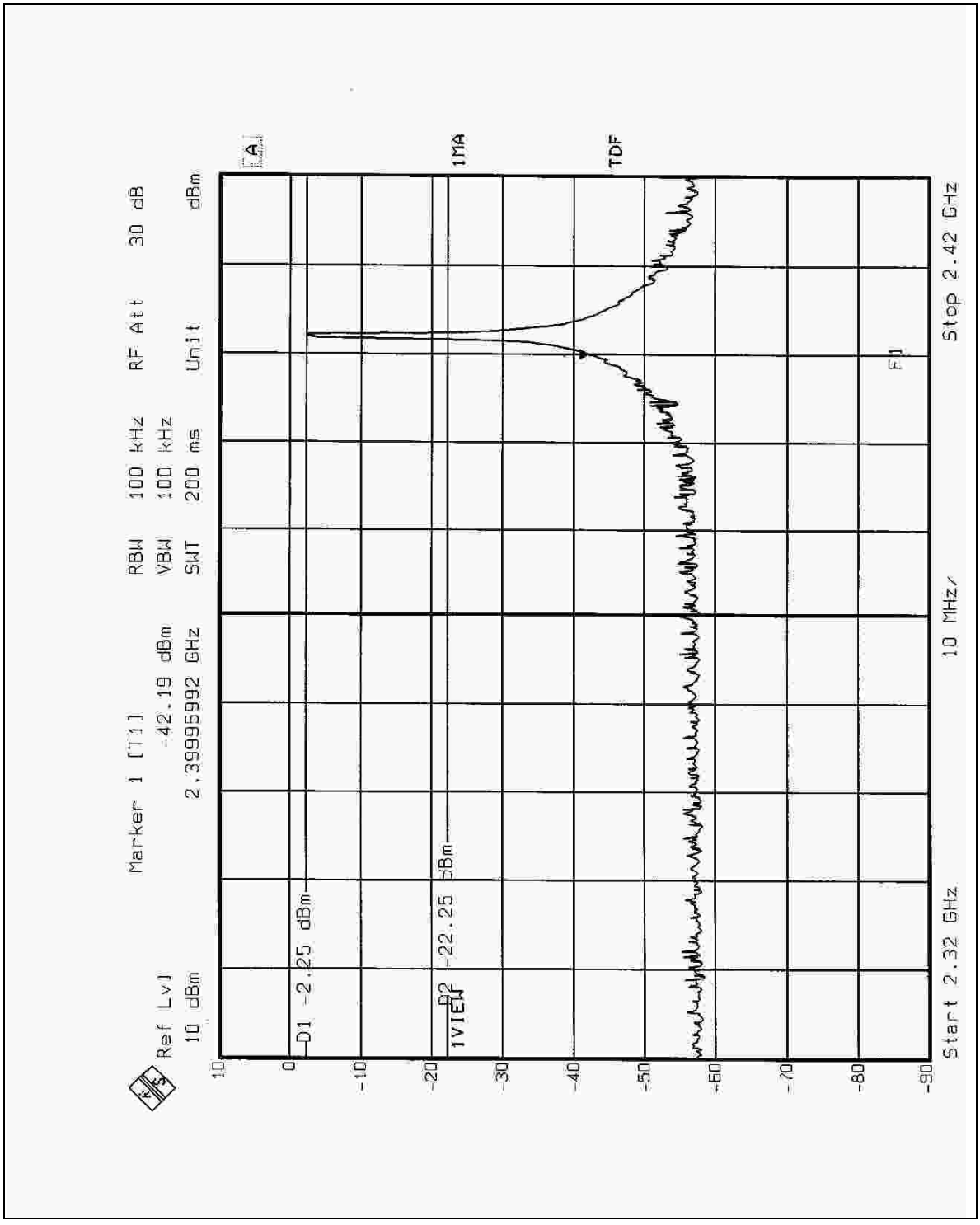
The spectrum plots are attached below. D2 line indicates the highest level, D1 line indicates the 20dB offset below D2. It shows compliance with the requirement in part 15.249.

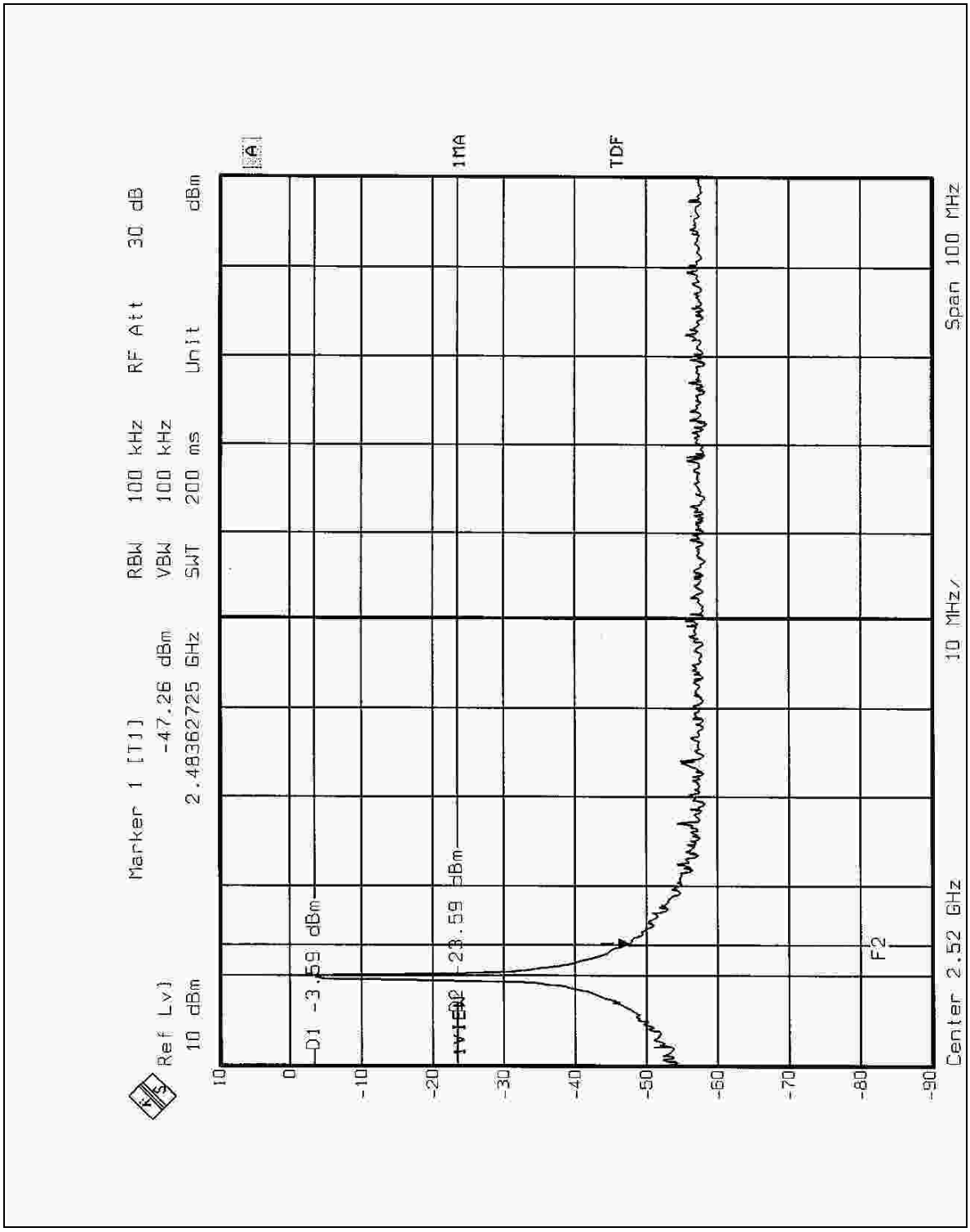

Marker 1 [T1]
-52.97 dBm
2.37791583 GHz
RBW 100 kHz
VBW 100 kHz
SWT 100 ms
RF Att 30 dB
Unit dBm
Ref Lvl
11 dBm
1 dB Offset
D1 -5.52 dBm
1VIEW
D2 -25.52 dBm
1MA
TDF
F1
Start 2.32 GHz
10 MHz/
Stop 2.42 GHz


Marker 1 [T1]
-54.81 dBm
2.50386774 GHz
RBW 100 kHz
VBW 100 kHz
SWT 100 ms
RF Att 30 dB
Unit dBm
Ref Lvl
11 dBm
1 dB Offset
D1 -6.85 dBm
D2 -26.85 dBm
1VIEW
1MA
TDF
F2
Start 2.47 GHz
10 MHz/
Stop 2.57 GHz

4.3.6 TEST RESULTS (B)

The spectrum plots are attached below. D2 line indicates the highest level, D1 line indicates the 20dB offset below D2. It shows compliance with the requirement in part 15.249.


Marker 1 [T1]
-42.19 dBm
2.39995992 GHz
RBW 100 kHz
VBW 100 kHz
SWT 200 ms
RF Att 30 dB
Unit dBm
Ref Lvl
10 dBm
D1 -2.25 dBm
D2 -22.25 dBm
1MA
TDF
F1
Start 2.32 GHz
10 MHz/
Stop 2.42 GHz


Marker 1 [T1]
-47.26 dBm
2.48362725 GHz
RBW 100 kHz
VBW 100 kHz
SWT 200 ms
RF Att 30 dB
Unit dBm
Ref Lvl
10 dBm
1MA
TDF
D1 -3.59 dBm
-28.59 dBm
F2
Center 2.52 GHz
10 MHz/
Span 100 MHz

4.4 ANTENNA REQUIREMENT

4.4.1 STANDARD APPLICABLE

For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.
And according to FCC 47 CFR Section 15.247 (b), if transmitting antennas of directional gain greater than 6 dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

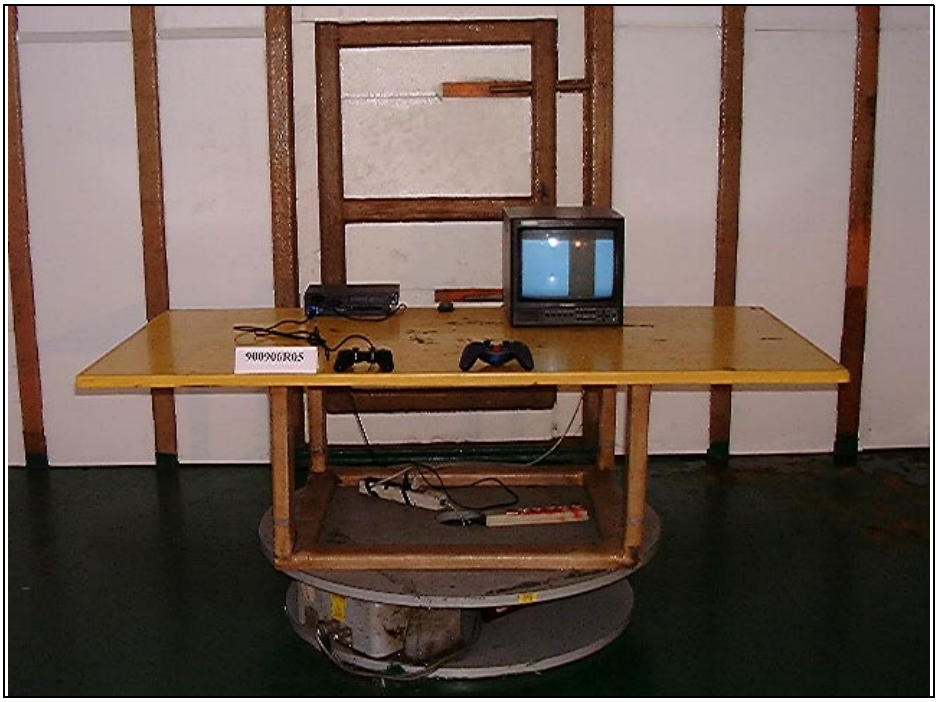
4.4.2 ANTENNA CONNECTED CONSTRUCTION

The antenna used in this product is Sheet metal inverted-F antenna. There is no antenna connector. The maximum Gain of this antenna is only 0dBi.

5 PHOTOGRAPHS OF THE TEST CONFIGURATION

CONDUCTED EMISSION TEST

RADIATED EMISSION TEST



6 INFORMATION ON THE TESTING LABORATORIES

We, ADT Corp., were founded in 1988 to provide our best service in EMC and Safety consultation. Our laboratories are accredited and approved by the following approval agencies according to ISO/IEC 17025, Guide 25 or EN 45001:

USA	FCC, NVLAP
Germany	TUV Rheinland
Japan	VCCI
New Zealand	MoC
Norway	NEMKO
R.O.C.	BSMI, DGT, CNLA

Copies of accreditation certificates of our laboratories obtained from approval agencies can be downloaded from our web site: www.adt.com.tw/index.5/phtml.

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The address and road map of all our labs can be found in our web site also.