



FCC TEST REPORT

REPORT NO. : RF931116A05

MODEL NO. : R-RB5

RECEIVED : Nov. 16, 2004

TESTED : Nov. 23 ~ Nov. 26, 2004

APPLICANT : Lite-On Technology Corporation

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1 CERTIFICATION

PRODUCT : Presenter
BRAND NAME : LOGITECH
MODEL NO. : R-RB5
APPLICANT : Lite-On Technology Corporation
TESTED : Nov. 23 ~ Nov. 26, 2004
TEST SAMPLE : ENGINEERING SAMPLE
STANDARDS : FCC Part 15, Subpart C (Section 15.247)
ANSI C63.4:2003

The above equipment has been tested by **Advance Data Technology Corporation**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions specified in this report.

PREPARED BY : Suntee Liu, **DATE:** Nov. 26, 2004
(Suntee Liu)

TECHNICAL
ACCEPTANCE : Gary Chang, **DATE:** Nov. 26, 2004
Responsible for RF (Gary Chang)

APPROVED BY : Cody Chang, **DATE:** Nov. 26, 2004
(Cody Chang, Deputy Manager)

2 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC Part 15, Subpart C			
Standard Section	Test Type and Limit	Result	REMARK
15.207	AC Power Conducted Emission	NA	NA
15.247(a)(2)	Spectrum Bandwidth of a Direct Sequence Spread Spectrum System Limit: min. 500kHz	PASS	Meet the requirement of limit.
15.247(b)	Maximum Peak Output Power Limit: max. 30dBm	PASS	Meet the requirement of limit.
15.247(d)	Transmitter Radiated Emissions Limit: Table 15.209	PASS	Meet the requirement of limit. Minimum passing margin is -5.86 dB at 7206.00 MHz
15.247(e)	Power Spectral Density Limit: max. 8dBm	PASS	Meet the requirement of limit.
15.247(d)	Band Edge Measurement Limit: 20 dB less than the peak value of fundamental frequency	PASS	Meet the requirement of limit.

2.1 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4:

Measurement	Frequency	Uncertainty
Conducted emissions	9kHz~30MHz	2.44 dB
Radiated emissions	30MHz ~ 200MHz	3.63 dB
	200MHz ~1000MHz	3.65 dB
	1GHz ~ 18GHz	2.20 dB
	18GHz ~ 40GHz	1.88 dB



3 GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

PRODUCT	Presenter
MODEL NO.	R-RB5
POWER SUPPLY	3Vdc from AAA battery x2
MODULATION TYPE	GFSK
RADIO TECHNOLOGY	DSSS
FREQUENCY RANGE	2.402GHz ~ 2.479GHz
NUMBER OF CHANNEL	78
OUTPUT POWER	0.63 mW
ANTENNA TYPE	Printed antenna with -5.42 dBi gain
DATA CABLE	NA
I/O PORTS	NA

NOTE:

1. The above EUT information was declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or User's Manual.

3.2 DESCRIPTION OF TEST MODES

78 channels are provided to this EUT.

Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)
0	2402	20	2422	40	2442	60	2462
1	2403	21	2423	41	2443	61	2463
2	2404	22	2424	42	2444	62	2464
3	2405	23	2425	43	2445	63	2465
4	2406	24	2426	44	2446	64	2466
5	2407	25	2427	45	2447	65	2467
6	2408	26	2428	46	2448	66	2468
7	2409	27	2429	47	2449	67	2469
8	2410	28	2430	48	2450	68	2470
9	2411	29	2431	49	2451	69	2471
10	2412	30	2431	50	2452	70	2472
11	2413	31	2433	51	2453	71	2473
12	2414	32	2434	52	2454	72	2474
13	2415	33	2435	53	2455	73	2475
14	2416	34	2436	54	2456	74	2476
15	2417	35	2437	55	2457	75	2477
16	2418	36	2438	56	2458	76	2478
17	2419	37	2439	57	2459	77	2479
18	2420	38	2440	58	2460		
19	2421	39	2441	59	2461		

NOTE:

1. For radiated emission below 1 GHz, the channel 0, 39 and 77 were pre-tested in chamber. The channel 0, the worst case one, was chosen for final test.
2. For conducted emission and radiated emission above 1 GHz, the channel 0, 39 and 77 were tested individually.
3. Since the EUT is considered a portable unit, it was tested on the positioned of each 3 axis. There are 3 test results for radiated test presented in the report.

Test Results	Axis
A	X
B	Y
C	Z



3.3 GENERAL DESCRIPTION OF APPLIED STANDARDS

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

FCC Part 15, Subpart C (15.247)

ANSI C63.4:2003

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

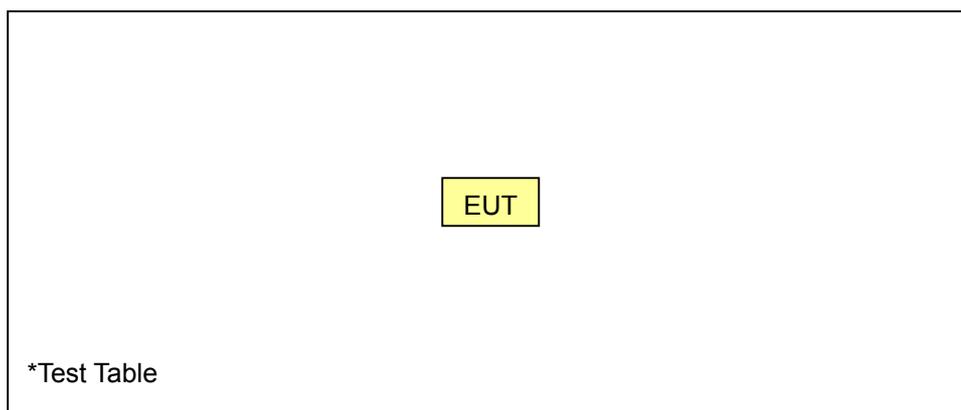
NOTE: The EUT is also considered as a kind of computer peripheral, because the connection to computer is necessary for typical use. It has been verified to comply with the requirements of FCC Part 15, Subpart B, Class A. The test report has been issued separately.



3.4 DESCRIPTION OF SUPPORT UNITS

NA

3.5 CONFIGURATION OF SYSTEM UNDER TEST





4 TEST TYPES AND RESULTS

4.1 RADIATED EMISSION MEASUREMENT

4.1.1 LIMITS OF RADIATED EMISSION MEASUREMENT

Emissions radiated outside of the specified bands, shall be according to the general radiated limits in 15.209 as following:

Frequencies (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

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.



4.1.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
Test Receiver ROHDE & SCHWARZ	ESI7	838496/016	Feb. 09, 2005
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100041	Dec. 15, 2004
BILOG Antenna SCHWARZBECK	VULB9168	9168-155	Feb. 03, 2005
HORN Antenna SCHWARZBECK	BBHA 9120D	9120D-404	Feb. 03, 2005
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA 9170242	Feb. 23, 2005
Preamplifier Agilent	8447D	2944A10631	Jan. 15, 2005
Preamplifier Agilent	8449B	3008A01960	Jan. 22, 2005
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	219272/4	Mar. 04, 2005
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	219275/4	Mar. 04, 2005
Software ADT.	ADT_Radiated_V5.14	NA	NA
Antenna Tower inn-co GmbH	MA 4000	010303	NA
Antenna Tower Controller inn-co GmbH	CO2000	019303	NA
Turn Table ADT.	TT100.	TT93021704	NA
Turn Table Controller ADT.	SC100.	SC93021704	NA

- NOTE:**
1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
 2. The test was performed in HwaYa Chamber 3.
 3. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
 4. The IC Site Registration No. is IC4924-4.



4.1.3 TEST PROCEDURES

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meters semi-anechoic chamber. 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.

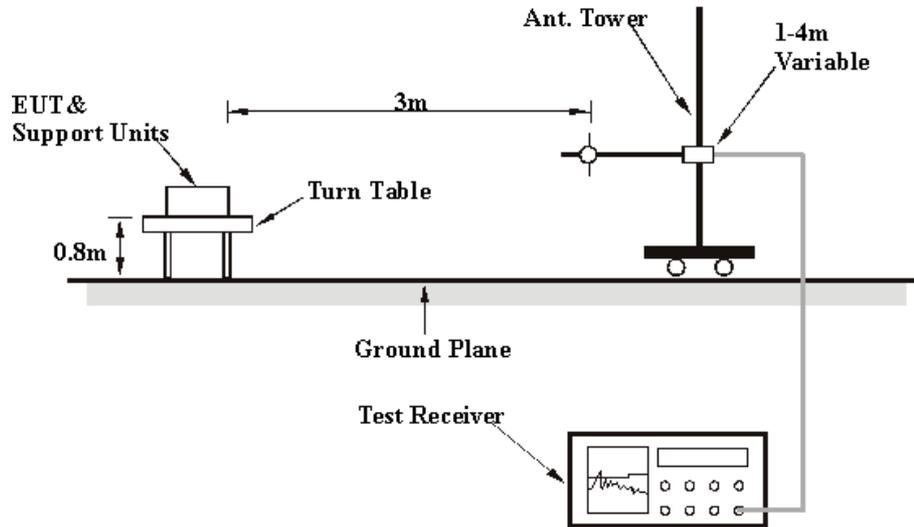
NOTE:

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 10 Hz for Average detection (AV) at frequency above 1GHz.

4.1.4 DEVIATION FROM TEST STANDARD

No deviation.

4.1.5 TEST SETUP



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

4.1.6 EUT OPERATING CONDITIONS

- a. Placed the EUT on the test table.
- b. Set the EUT under transmission mode.



4.1.7 TEST RESULTS (A)

EUT	Presenter	MODEL	R-RB5
CHANNEL	0	FREQUENCY RANGE	Below 1000 MHz
INPUT POWER (SYSTEM)	120 Vac, 60Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	25 deg. C, 60% RH, 991 hPa	TESTED BY	Rush Kao

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)	Correction Factor (dB/m)
1	66.93	16.76 QP	40.00	-23.24	1.50 H	334	3.93	12.83
2	127.19	18.67 QP	43.50	-24.83	1.50 H	124	5.25	13.43
3	156.35	20.11 QP	43.50	-23.39	1.25 H	88	5.26	14.85
4	185.51	16.37 QP	43.50	-27.13	1.50 H	295	3.92	12.45
5	735.63	23.96 QP	46.00	-22.04	1.25 H	55	1.07	22.89
6	766.73	22.77 QP	46.00	-23.23	1.00 H	22	-0.54	23.31

- REMARKS:**
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
 2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
 3. The other emission levels were very low against the limit.
 4. Margin value = Emission level – Limit value.



EUT	Presenter	MODEL	R-RB5
CHANNEL	0	FREQUENCY RANGE	Below 1000 MHz
INPUT POWER (SYSTEM)	120 Vac, 60Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	25 deg. C, 60% RH, 991 hPa	TESTED BY	Rush Kao

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)	Correction Factor (dB/m)
1	70.82	20.03 QP	40.00	-19.97	1.00 V	166	7.77	12.27
2	84.43	23.73 QP	40.00	-16.27	1.00 V	43	13.76	9.97
3	127.19	24.56 QP	43.50	-18.94	1.50 V	124	11.14	13.43
4	156.35	26.33 QP	43.50	-17.17	1.00 V	289	11.48	14.85
5	185.51	20.93 QP	43.50	-22.57	1.25 V	286	8.48	12.45
6	842.55	25.49 QP	46.00	-20.51	1.25 V	286	1.65	23.84

- REMARKS:**
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
 2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
 3. The other emission levels were very low against the limit.
 4. Margin value = Emission level – Limit value.



EUT	Presenter	MODEL	R-RB5
CHANNEL	0	FREQUENCY RANGE	1~25 GHz
INPUT POWER (SYSTEM)	120 Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25 deg. C, 60% RH, 991 hPa	TESTED BY	Rush Kao

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)	Correction Factor (dB/m)
1	*2402.00	94.87 PK			1.09 H	141	60.99	33.88
1	*2402.00	93.44 AV			1.09 H	141	59.56	33.88
2	4804.00	54.13 PK	74.00	-19.87	1.12 H	141	13.48	40.64
2	4804.00	45.03 AV	54.00	-8.97	1.12 H	141	4.39	40.64

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)	Correction Factor (dB/m)
1	*2402.00	92.62 PK			1.15 V	41	58.74	33.88
1	*2402.00	91.42 AV			1.15 V	41	57.54	33.88
2	4804.00	53.97 PK	74.00	-20.03	1.11 V	238	13.32	40.64
2	4804.00	44.68 AV	54.00	-9.32	1.11 V	238	4.04	40.64

- REMARKS:**
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
 2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
 3. The other emission levels were very low against the limit.
 4. Margin value = Emission level – Limit value.



EUT	Presenter	MODEL	R-RB5
CHANNEL	39	FREQUENCY RANGE	1~25 GHz
INPUT POWER (SYSTEM)	120 Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25 deg. C, 60% RH, 991 hPa	TESTED BY	Rush Kao

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)	Correction Factor (dB/m)
1	*2441.00	93.98 PK			1.07 H	318	59.92	34.06
1	*2441.00	92.52 AV			1.07 H	318	58.46	34.06
2	4882.00	54.27 PK	74.00	-19.73	1.31 H	18	13.57	40.70
2	4882.00	45.76 AV	54.00	-8.24	1.31 H	18	5.06	40.70

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)	Correction Factor (dB/m)
1	*2441.00	91.78 PK			1.17 V	210	57.72	34.06
1	*2441.00	90.59 AV			1.17 V	210	56.53	34.06
2	4882.00	54.39 PK	74.00	-19.61	1.22 V	241	13.69	40.70
2	4882.00	45.49 AV	54.00	-8.51	1.22 V	241	4.79	40.70

- REMARKS:**
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
 2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
 3. The other emission levels were very low against the limit.
 4. Margin value = Emission level – Limit value.



EUT	Presenter	MODEL	R-RB5
CHANNEL	77	FREQUENCY RANGE	1~25 GHz
INPUT POWER (SYSTEM)	120 Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25 deg. C, 60% RH, 991 hPa	TESTED BY	Rush Kao

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)	Correction Factor (dB/m)
1	*2479.00	93.08 PK			1.05 H	331	58.84	34.24
1	*2479.00	91.94 AV			1.05 H	331	57.70	34.24
2	4958.00	53.98 PK	74.00	-20.02	1.10 H	131	12.90	41.08
2	4958.00	42.78 AV	54.00	-11.22	1.10 H	131	1.70	41.08

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)	Correction Factor (dB/m)
1	*2479.00	91.36 PK			1.37 V	67	57.12	34.24
1	*2479.00	90.17 AV			1.37 V	67	55.93	34.24
2	4958.00	54.98 PK	74.00	-19.02	1.21 V	254	13.90	41.08
2	4958.00	45.64 AV	54.00	-8.36	1.21 V	254	4.56	41.08

- REMARKS:**
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
 2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
 3. The other emission levels were very low against the limit.
 4. Margin value = Emission level – Limit value.



4.1.8 TEST RESULTS (B)

EUT	Presenter	MODEL	R-RB5
CHANNEL	0	FREQUENCY RANGE	Below 1000 MHz
INPUT POWER (SYSTEM)	120 Vac, 60Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	25 deg. C, 60% RH, 991 hPa	TESTED BY	Rush Kao

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)	Correction Factor (dB/m)
1	66.93	14.85 QP	40.00	-25.15	1.25 H	52	2.02	12.83
2	127.19	16.59 QP	43.50	-26.91	1.25 H	145	3.16	13.43
3	142.75	16.02 QP	43.50	-27.48	1.00 H	148	1.52	14.51
4	156.35	19.71 QP	43.50	-23.79	1.25 H	211	4.87	14.85
5	749.24	23.31 QP	46.00	-22.69	1.00 H	22	0.09	23.22
6	780.34	24.22 QP	46.00	-21.78	1.25 H	358	0.85	23.37
7	825.05	24.35 QP	46.00	-21.65	1.25 H	127	0.66	23.69

- REMARKS:**
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
 2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
 3. The other emission levels were very low against the limit.
 4. Margin value = Emission level – Limit value.



EUT	Presenter	MODEL	R-RB5
CHANNEL	0	FREQUENCY RANGE	Below 1000 MHz
INPUT POWER (SYSTEM)	120 Vac, 60Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	25 deg. C, 60% RH, 991 hPa	TESTED BY	Rush Kao

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)	Correction Factor (dB/m)
1	66.93	20.25 QP	40.00	-19.75	1.50 V	256	7.43	12.83
2	84.43	23.97 QP	40.00	-16.03	1.00 V	16	14.00	9.97
3	127.19	23.75 QP	43.50	-19.75	1.25 V	82	10.32	13.43
4	156.35	25.43 QP	43.50	-18.07	1.00 V	61	10.58	14.85
5	185.51	20.22 QP	43.50	-23.28	1.00 V	307	7.77	12.45
6	1000.00	24.38 QP	54.00	-29.62	3.00 V	211	-1.11	25.49

- REMARKS:**
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
 2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
 3. The other emission levels were very low against the limit.
 4. Margin value = Emission level – Limit value.



EUT	Presenter	MODEL	R-RB5
CHANNEL	0	FREQUENCY RANGE	1~25 GHz
INPUT POWER (SYSTEM)	120 Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25 deg. C, 60% RH, 991 hPa	TESTED BY	Rush Kao

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)	Correction Factor (dB/m)
1	*2402.00	95.36 PK			1.07 H	189	61.48	33.88
1	*2402.00	94.17 AV			1.07 H	189	60.29	33.88
2	4804.00	54.85 PK	74.00	-19.15	1.35 H	307	14.20	40.64
2	4804.00	43.58 AV	54.00	-10.42	1.35 H	307	2.94	40.64
3	7206.00	57.77 PK	74.00	-16.23	1.04 H	200	10.01	47.76
3	7206.00	48.10 AV	54.00	-5.90	1.04 H	200	0.34	47.76

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)	Correction Factor (dB/m)
1	*2402.00	85.69 PK			1.06 V	35	51.81	33.88
1	*2402.00	84.38 AV			1.06 V	35	50.50	33.88
2	4804.00	51.16 PK	74.00	-22.84	1.27 V	34	10.51	40.64
2	4804.00	42.86 AV	54.00	-11.14	1.27 V	34	2.22	40.64
3	7206.00	57.67 PK	74.00	-16.33	1.00 V	50	9.91	47.76
3	7206.00	48.14 AV	54.00	-5.86	1.00 V	50	0.38	47.76

- REMARKS:**
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
 2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
 3. The other emission levels were very low against the limit.
 4. Margin value = Emission level – Limit value.



EUT	Presenter	MODEL	R-RB5
CHANNEL	39	FREQUENCY RANGE	1~25 GHz
INPUT POWER (SYSTEM)	120 Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25 deg. C, 60% RH, 991 hPa	TESTED BY	Rush Kao

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)	Correction Factor (dB/m)
1	*2441.00	95.54 PK			1.34 H	309	61.48	34.06
1	*2441.00	94.38 AV			1.34 H	309	60.32	34.06
2	4882.00	54.22 PK	74.00	-19.78	1.05 H	337	13.52	40.70
2	4882.00	43.48 AV	54.00	-10.52	1.05 H	337	2.78	40.70

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)	Correction Factor (dB/m)
1	*2441.00	86.32 PK			1.08 V	137	52.26	34.06
1	*2441.00	85.09 AV			1.08 V	137	51.03	34.06
2	4882.00	51.05 PK	74.00	-22.95	1.05 V	123	10.35	40.70
2	4882.00	42.08 AV	54.00	-11.92	1.05 V	123	1.38	40.70

- REMARKS:**
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
 2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
 3. The other emission levels were very low against the limit.
 4. Margin value = Emission level – Limit value.



EUT	Presenter	MODEL	R-RB5
CHANNEL	77	FREQUENCY RANGE	1~25 GHz
INPUT POWER (SYSTEM)	120 Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25 deg. C, 60% RH, 991 hPa	TESTED BY	Rush Kao

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)	Correction Factor (dB/m)
1	*2479.00	94.09 PK			1.07 H	305	59.85	34.24
1	*2479.00	92.86 AV			1.07 H	305	58.62	34.24
2	4948.00	55.39 PK	74.00	-18.61	1.12 H	327	14.38	41.01
2	4948.00	46.84 AV	54.00	-7.16	1.12 H	327	5.83	41.01

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)	Correction Factor (dB/m)
1	*2479.00	85.14 PK			1.04 V	6	50.90	34.24
1	*2479.00	84.02 AV			1.04 V	6	49.78	34.24
2	4948.00	52.33 PK	74.00	-21.67	1.00 V	33	11.32	41.01
2	4948.00	43.15 AV	54.00	-10.85	1.00 V	33	2.14	41.01

- REMARKS:**
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
 2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
 3. The other emission levels were very low against the limit.
 4. Margin value = Emission level – Limit value.



4.1.9 TEST RESULTS (C)

EUT	Presenter	MODEL	R-RB5
CHANNEL	0	FREQUENCY RANGE	Below 1000 MHz
INPUT POWER (SYSTEM)	120 Vac, 60Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	25 deg. C, 60% RH, 991 hPa	TESTED BY	Rush Kao

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)	Correction Factor (dB/m)
1	127.19	16.73 QP	43.50	-26.77	1.25 H	7	3.30	13.43
2	142.75	16.70 QP	43.50	-26.80	1.00 H	274	2.19	14.51
3	156.35	22.02 QP	43.50	-21.48	1.50 H	16	7.17	14.85
4	434.33	20.36 QP	46.00	-25.64	1.25 H	151	2.76	17.60
5	760.90	23.84 QP	46.00	-22.16	1.25 H	325	0.55	23.29
6	826.99	23.97 QP	46.00	-22.03	1.00 H	49	0.27	23.70



EUT	Presenter	MODEL	R-RB5
CHANNEL	0	FREQUENCY RANGE	Below 1000 MHz
INPUT POWER (SYSTEM)	120 Vac, 60Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	25 deg. C, 60% RH, 991 hPa	TESTED BY	Rush Kao

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)	Correction Factor (dB/m)
1	84.43	22.79 QP	40.00	-17.21	1.25 V	244	12.82	9.97
2	127.19	24.79 QP	43.50	-18.71	1.50 V	40	11.36	13.43
3	142.75	24.61 QP	43.50	-18.89	1.25 V	250	10.11	14.51
4	156.35	25.85 QP	43.50	-17.65	1.25 V	58	11.01	14.85
5	434.33	22.43 QP	46.00	-23.57	1.00 V	340	4.83	17.60
6	751.18	24.43 QP	46.00	-21.57	1.25 V	355	1.19	23.25

- REMARKS:**
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
 2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
 3. The other emission levels were very low against the limit.
 4. Margin value = Emission level – Limit value.



EUT	Presenter	MODEL	R-RB5
CHANNEL	0	FREQUENCY RANGE	1~25 GHz
INPUT POWER (SYSTEM)	120 Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25 deg. C, 60% RH, 991 hPa	TESTED BY	Rush Kao

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)	Correction Factor (dB/m)
1	*2402.00	87.98 PK			1.00 H	172	54.10	33.88
1	*2402.00	86.75 AV			1.00 H	172	52.87	33.88
2	4804.00	51.14 PK	74.00	-22.86	1.00 H	189	10.49	40.64
2	4804.00	42.34 AV	54.00	-11.66	1.00 H	189	1.70	40.64

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)	Correction Factor (dB/m)
1	*2402.00	92.90 PK			1.11 V	307	59.02	33.88
1	*2402.00	91.64 AV			1.11 V	307	57.76	33.88
2	4804.00	53.70 PK	74.00	-20.30	1.13 V	149	13.05	40.64
2	4804.00	44.53 AV	54.00	-9.47	1.13 V	149	3.89	40.64

- REMARKS:**
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
 2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
 3. The other emission levels were very low against the limit.
 4. Margin value = Emission level – Limit value.



EUT	Presenter	MODEL	R-RB5
CHANNEL	39	FREQUENCY RANGE	1~25 GHz
INPUT POWER (SYSTEM)	120 Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25 deg. C, 60% RH, 991 hPa	TESTED BY	Rush Kao

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)	Correction Factor (dB/m)
1	*2441.00	89.19 PK			1.06 H	192	55.13	34.06
1	*2441.00	88.57 AV			1.06 H	192	54.51	34.06
2	4882.00	52.27 PK	74.00	-21.73	1.52 H	11	11.57	40.70
2	4882.00	43.49 AV	54.00	-10.51	1.52 H	11	2.79	40.70

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)	Correction Factor (dB/m)
1	*2441.00	92.51 PK			1.08 V	302	58.45	34.06
1	*2441.00	91.37 AV			1.08 V	302	57.31	34.06
2	4882.00	54.57 PK	74.00	-19.43	1.22 V	112	13.87	40.70
2	4882.00	45.28 AV	54.00	-8.72	1.22 V	112	4.58	40.70

- REMARKS:**
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
 2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
 3. The other emission levels were very low against the limit.
 4. Margin value = Emission level – Limit value.



EUT	Presenter	MODEL	R-RB5
CHANNEL	77	FREQUENCY RANGE	1~25 GHz
INPUT POWER (SYSTEM)	120 Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25 deg. C, 60% RH, 991 hPa	TESTED BY	Rush Kao

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)	Correction Factor (dB/m)
1	*2479.00	88.65 PK			1.04 H	189	54.41	34.24
1	*2479.00	87.28 AV			1.04 H	189	53.04	34.24
2	4958.00	53.67 PK	74.00	-20.33	1.38 H	8	12.59	41.08
2	4958.00	44.17 AV	54.00	-9.83	1.38 H	8	3.09	41.08

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)	Correction Factor (dB/m)
1	*2479.00	92.60 PK			1.60 V	313	58.36	34.24
1	*2479.00	91.37 AV			1.60 V	313	57.13	34.24
2	4958.00	55.43 PK	74.00	-18.57	1.64 V	56	14.35	41.08
2	4958.00	46.18 AV	54.00	-7.82	1.64 V	56	5.10	41.08

- REMARKS:**
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
 2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
 3. The other emission levels were very low against the limit.
 4. Margin value = Emission level – Limit value.



4.2 6dB BANDWIDTH MEASUREMENT

4.2.1 LIMITS OF 6dB BANDWIDTH MEASUREMENT

The minimum of 6dB Bandwidth Measurement is 0.5MHz.

4.2.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
SPECTRUM ANALYZER	FSEK30	100049	Aug. 12, 2005

NOTE:

The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

4.2.3 TEST PROCEDURE

The transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with 100kHz RBW and 100kHz VBW. The 6dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 6dB.

4.2.4 DEVIATION FROM TEST STANDARD

No deviation.

4.2.5 TEST SETUP



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

4.2.6 EUT OPERATING CONDITIONS

The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.



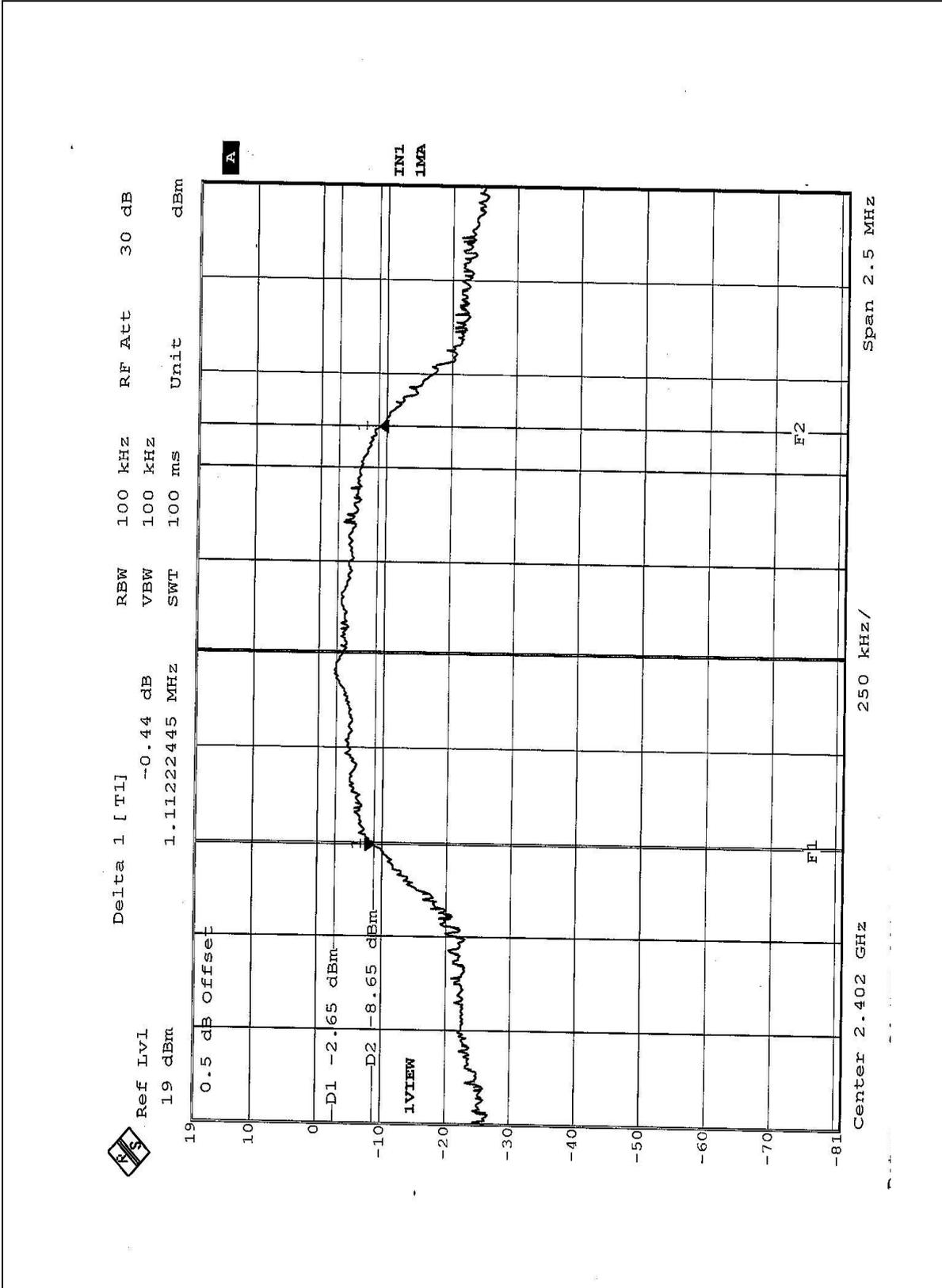
4.2.7 TEST RESULTS

EUT	Presenter	MODEL	R-RB5
ENVIRONMENTAL CONDITIONS	24 deg. C, 64% RH, 991 hPa	INPUT POWER (SYSTEM)	120 Vac, 60 Hz
TESTED BY	Leo Hung		

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS/FAIL
0	2402	1.11	0.5	PASS
39	2441	1.10	0.5	PASS
77	2479	1.13	0.5	PASS

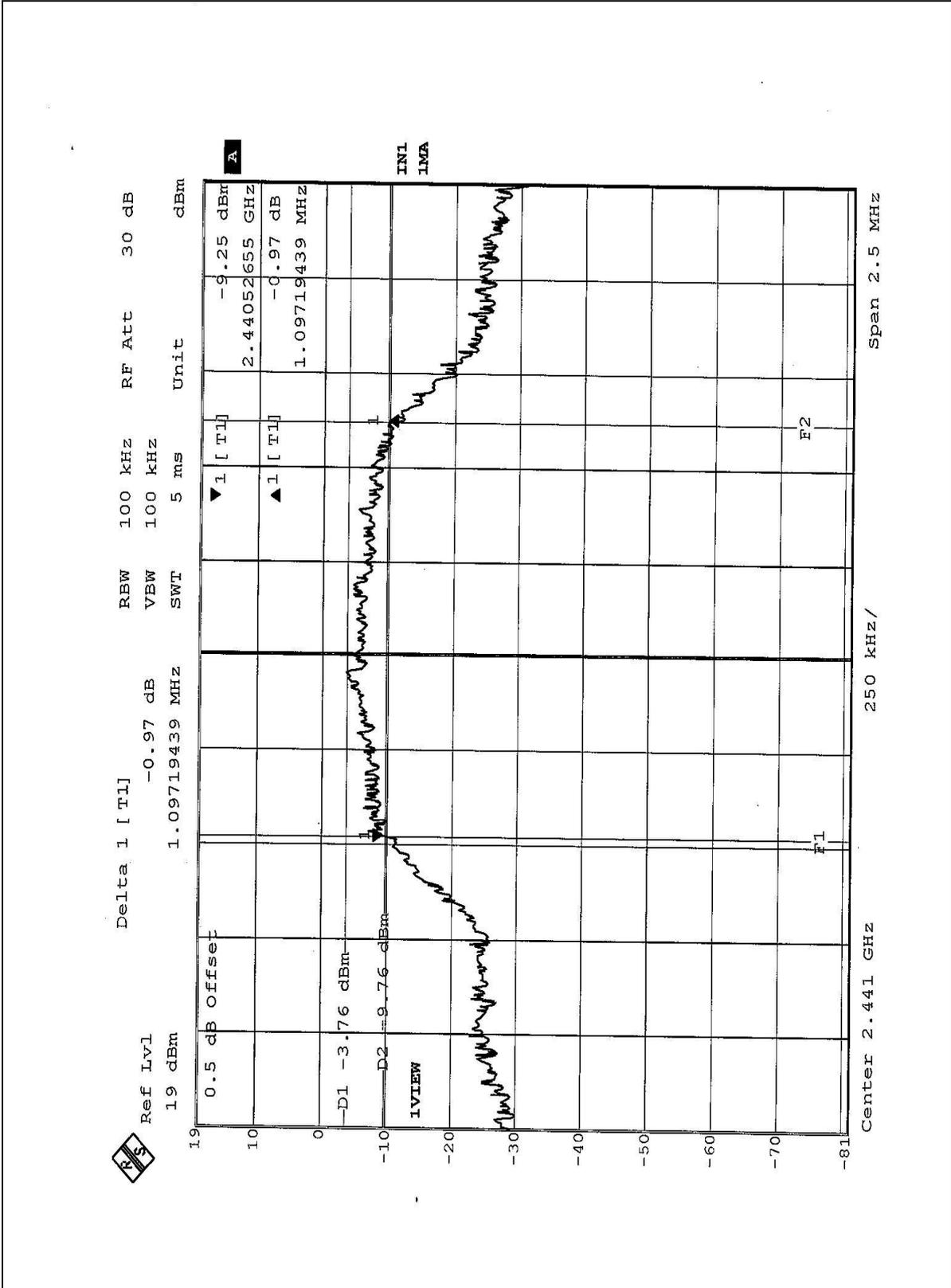


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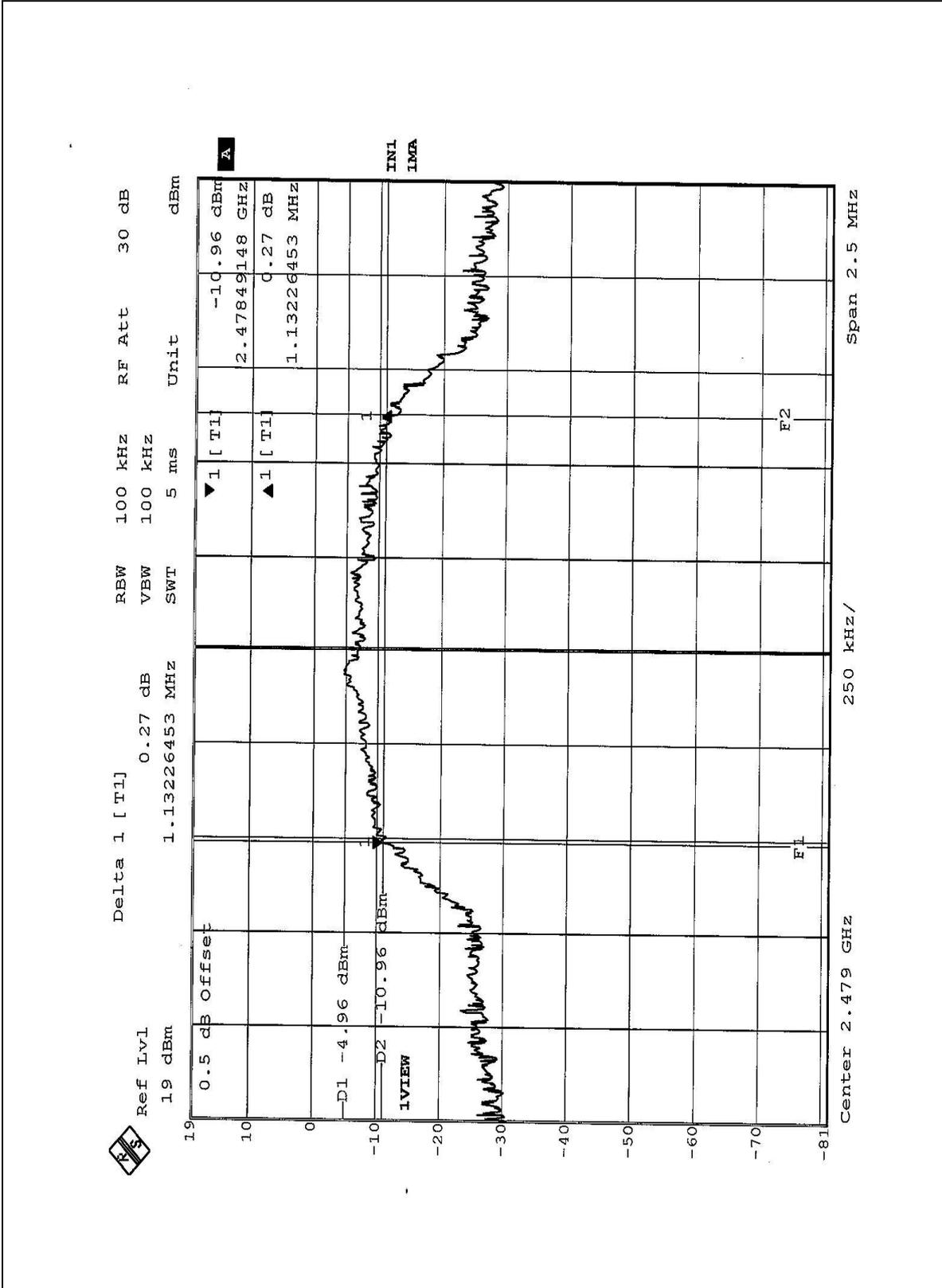


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4.3 MAXIMUM PEAK OUTPUT POWER

4.3.1 LIMITS OF MAXIMUM PEAK OUTPUT POWER MEASUREMENT

The Maximum Peak Output Power Measurement is 30dBm.

4.3.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
R&S SPECTRUM ANALYZER	FSEK30	100049	Aug. 12, 2005
AGILENT SIGNAL GENERATOR	E8257C	MY43320668	Dec. 31, 2004
TEKTRONIX OSCILLOSCOPE	TDS 220	C019167	Feb. 1, 2005
NARDA DETECTOR	4503A	FSCM99899	NA

NOTE:

The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

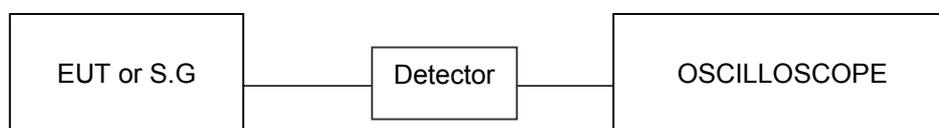
4.3.3 TEST PROCEDURES

1. A detector was used on the output port of the EUT. An oscilloscope was used to read the response of the detector.
2. Replaced the EUT by the signal generator. The center frequency of the S.G. was adjusted to the center frequency of the measured channel.
3. Adjusted the power to have the same reading on oscilloscope. Record the power level.

4.3.4 DEVIATION FROM TEST STANDARD

No deviation.

4.3.5 TEST SETUP



4.3.6 EUT OPERATING CONDITIONS

Same as Item 4.3.6.



4.3.7 TEST RESULTS

EUT	Presenter	MODEL	R-RB5
ENVIRONMENTAL CONDITIONS	24 deg. C, 64% RH, 991 hPa	INPUT POWER (SYSTEM)	120 Vac, 60 Hz
TESTED BY	Leo Hung		

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (mW)	PEAK POWER OUTPUT (dBm)	PEAK POWER LIMIT (dBm)	PASS/FAIL
0	2402	0.634	-1.98	30	PASS
39	2441	0.486	-3.13	30	PASS
77	2479	0.378	-4.22	30	PASS



4.4 POWER SPECTRAL DENSITY MEASUREMENT

4.4.1 LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT

The Maximum of Power Spectral Density Measurement is 8dBm.

4.4.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
SPECTRUM ANALYZER	FSEK30	100049	Aug. 12, 2005

NOTE:

The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

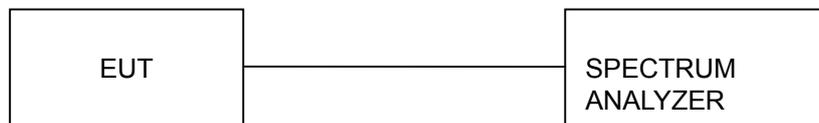
4.4.3 TEST PROCEDURE

The transmitter output was connected to the spectrum analyzer through an attenuator, the bandwidth of the fundamental frequency was measured with the spectrum analyzer using 3 kHz RBW and 30 kHz VBW, set sweep time=span/3kHz. The power spectral density was measured and recorded. The sweep time is allowed to be longer than span/3kHz for a full response of the mixer in the spectrum analyzer.

4.4.4 DEVIATION FROM TEST STANDARD

No deviation.

4.4.5 TEST SETUP



4.4.6 EUT OPERATING CONDITIONS

Same as 4.3.6.



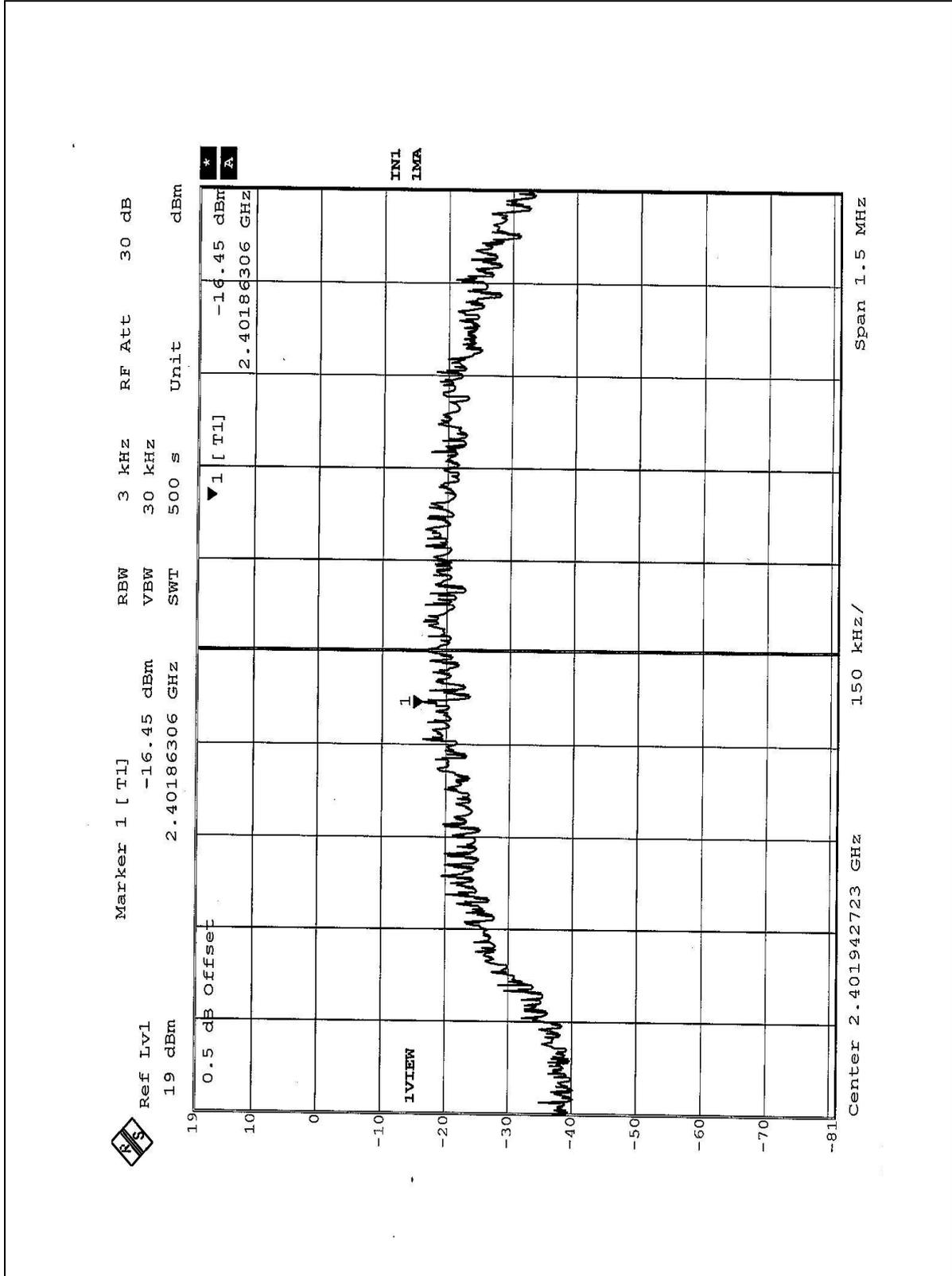
4.4.7 TEST RESULTS

EUT	Presenter	MODEL	R-RB5
ENVIRONMENTAL CONDITIONS	24 deg. C, 64% RH, 991 hPa	INPUT POWER (SYSTEM)	120 Vac, 60 Hz
TESTED BY	Leo Hung		

CHANNEL NUMBER	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 3kHz BW (dBm)	MAXIMUM LIMIT (dBm)	PASS/FAIL
0	2402	-16.45	8	PASS
39	2441	-16.51	8	PASS
77	2479	-18.05	8	PASS

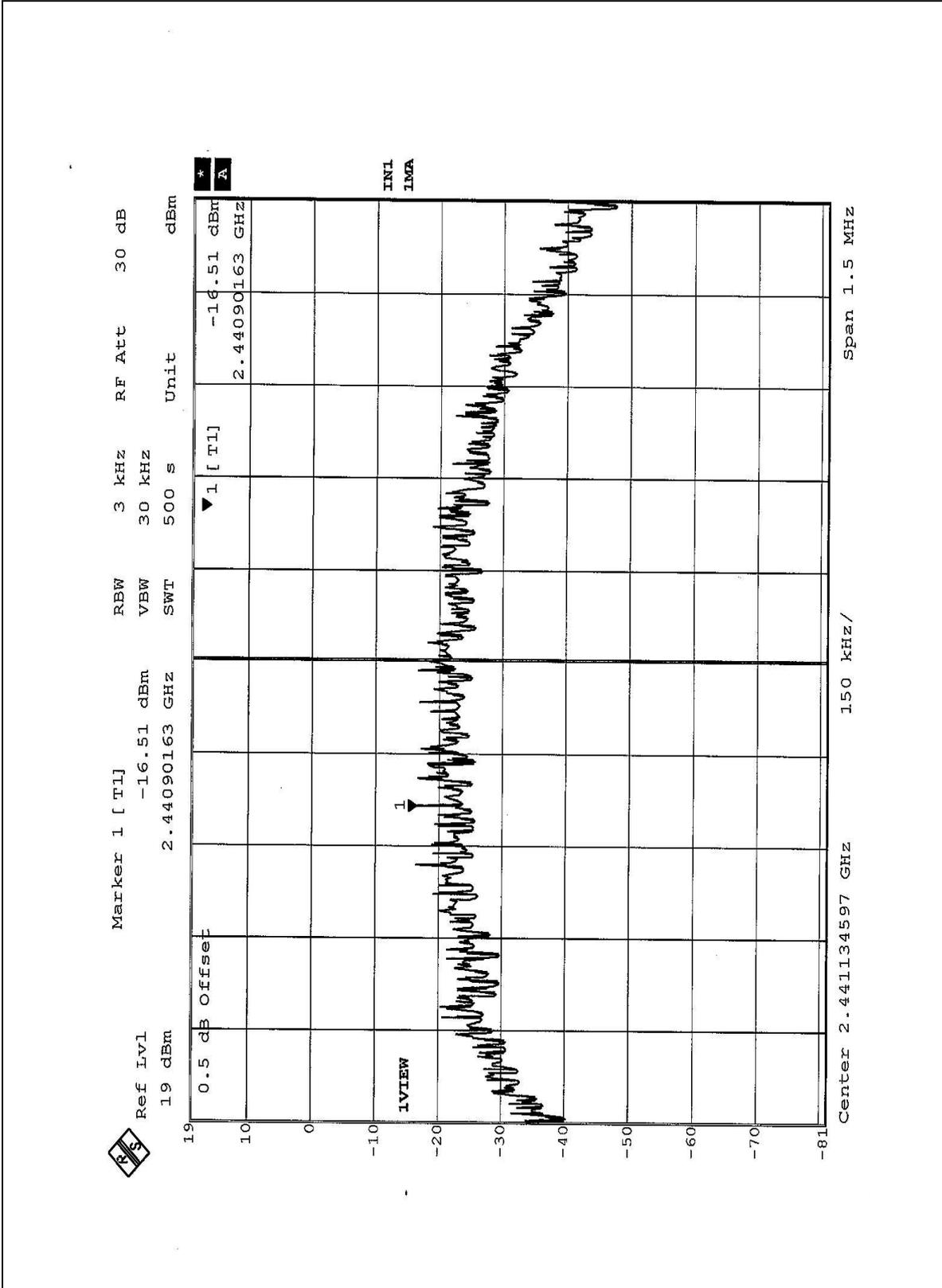


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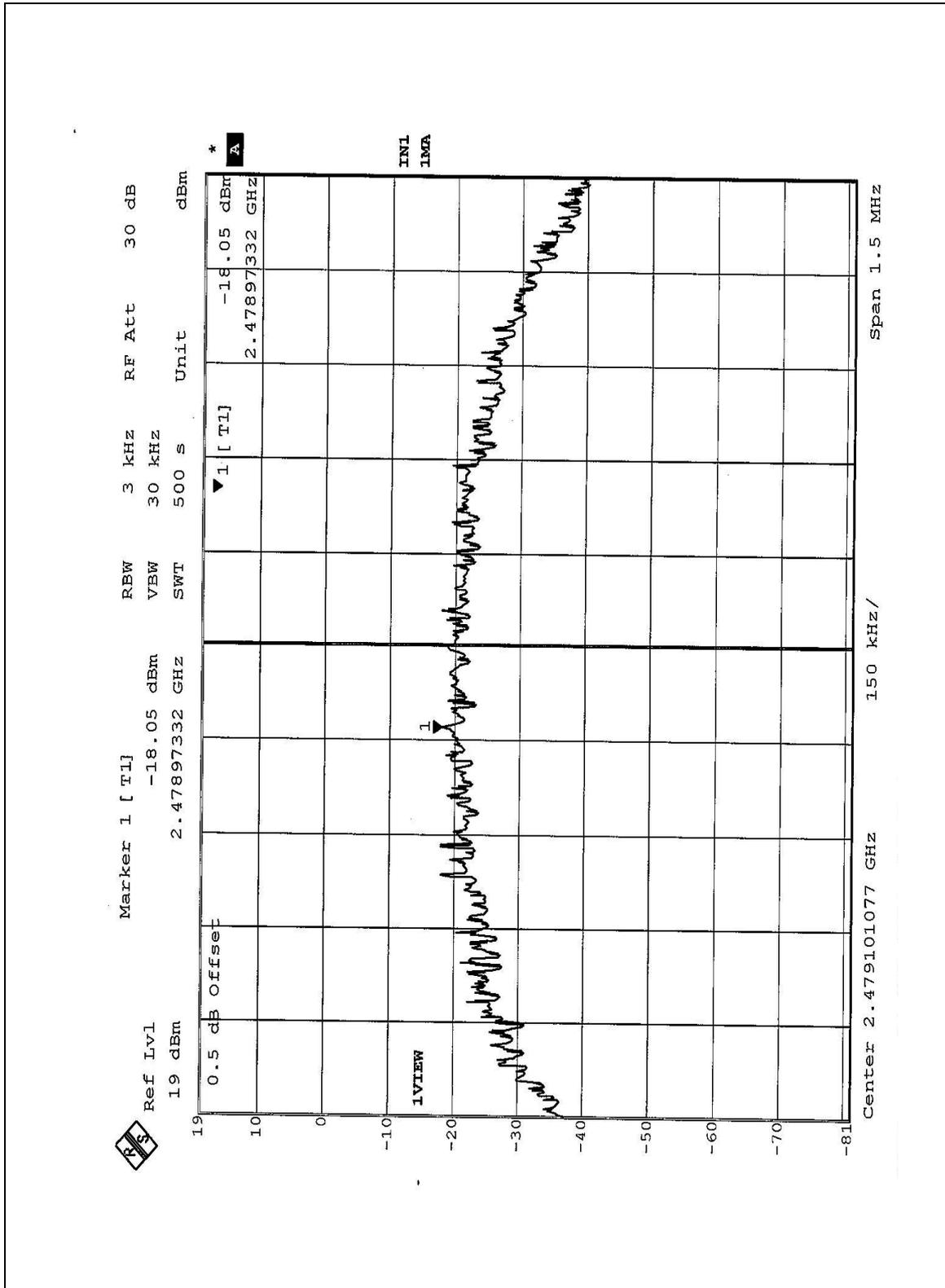


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4.5 BAND EDGES MEASUREMENT

4.5.1 LIMITS OF BAND EDGES MEASUREMENT

Below -20dB of the highest emission level of operating band (in 100kHz Resolution Bandwidth).

4.5.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
SPECTRUM ANALYZER	FSEK30	100049	Aug. 12, 2005

NOTE:

The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

4.5.3 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 100kHz with suitable frequency span including 100MHz bandwidth from band edge. The band edges was measured and recorded.

4.5.4 DEVIATION FROM TEST STANDARD

No deviation.

4.5.5 EUT OPERATING CONDITION

Same as Item 4.3.6.



4.5.6 TEST RESULTS

The spectrum plots are attached on the following 4 pages. D2 line indicates the highest level, D1 line indicates the 20dB offset below D2. It shows compliance with the requirement in part 15.247(d).

4.5.7 TEST RESULTS (A)

The band edge emission plot on the following 1~2 pages show 52.49dB delta between carrier maximum power and local maximum emission in restrict band (2.3782GHz). The emission of carrier strength list in the test result of channel 0 at the item 4.1.7 is 93.44dBuV/m, so the maximum field strength in restrict band is $93.44 - 52.49 = 40.95$ dBuV/m which is under 54dBuV/m limit.

The band edge emission plot on the following 3~4 pages show 43.08dB delta between carrier maximum power and local maximum emission in restrict band (2.4835GHz). The emission of carrier strength list in the test result of channel 78 at the item 4.1.7 is 91.94dBuV/m, so the maximum field strength in restrict band is $91.94 - 43.08 = 48.86$ dBuV/m which is under 54dBuV/m limit.

4.5.8 TEST RESULTS (B)

The band edge emission plot on the following 1~2 pages show 52.49dB delta between carrier maximum power and local maximum emission in restrict band (2.3782GHz). The emission of carrier strength list in the test result of channel 0 at the item 4.1.8 is 94.17dBuV/m, so the maximum field strength in restrict band is $94.17 - 52.49 = 41.68$ dBuV/m which is under 54dBuV/m limit.

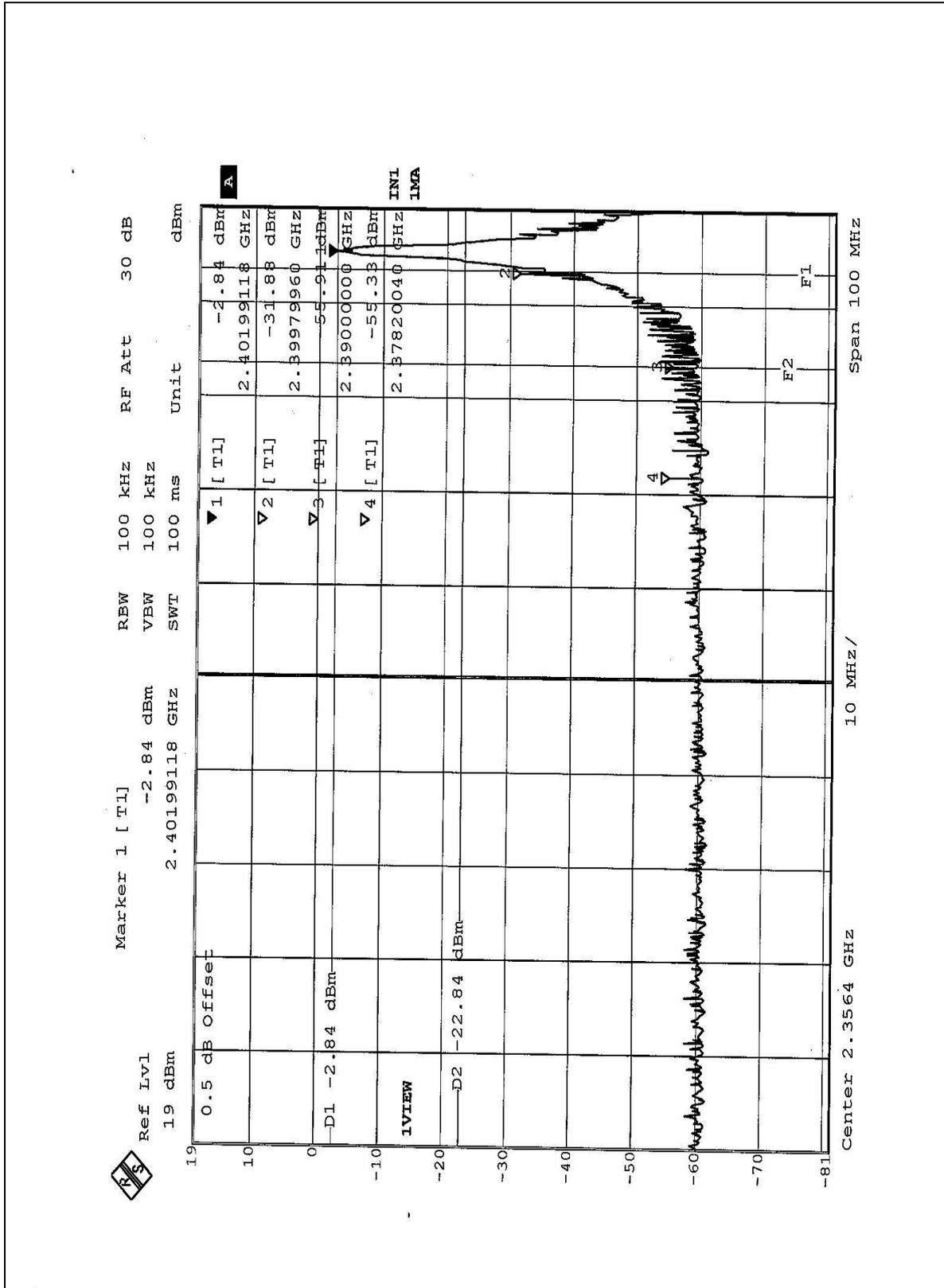
The band edge emission plot on the following 3~4 pages show 43.08dB delta between carrier maximum power and local maximum emission in restrict band (2.4835GHz). The emission of carrier strength list in the test result of channel 78 at the item 4.1.8 is 92.86dBuV/m, so the maximum field strength in restrict band is $92.86 - 43.08 = 49.78$ dBuV/m which is under 54dBuV/m limit.

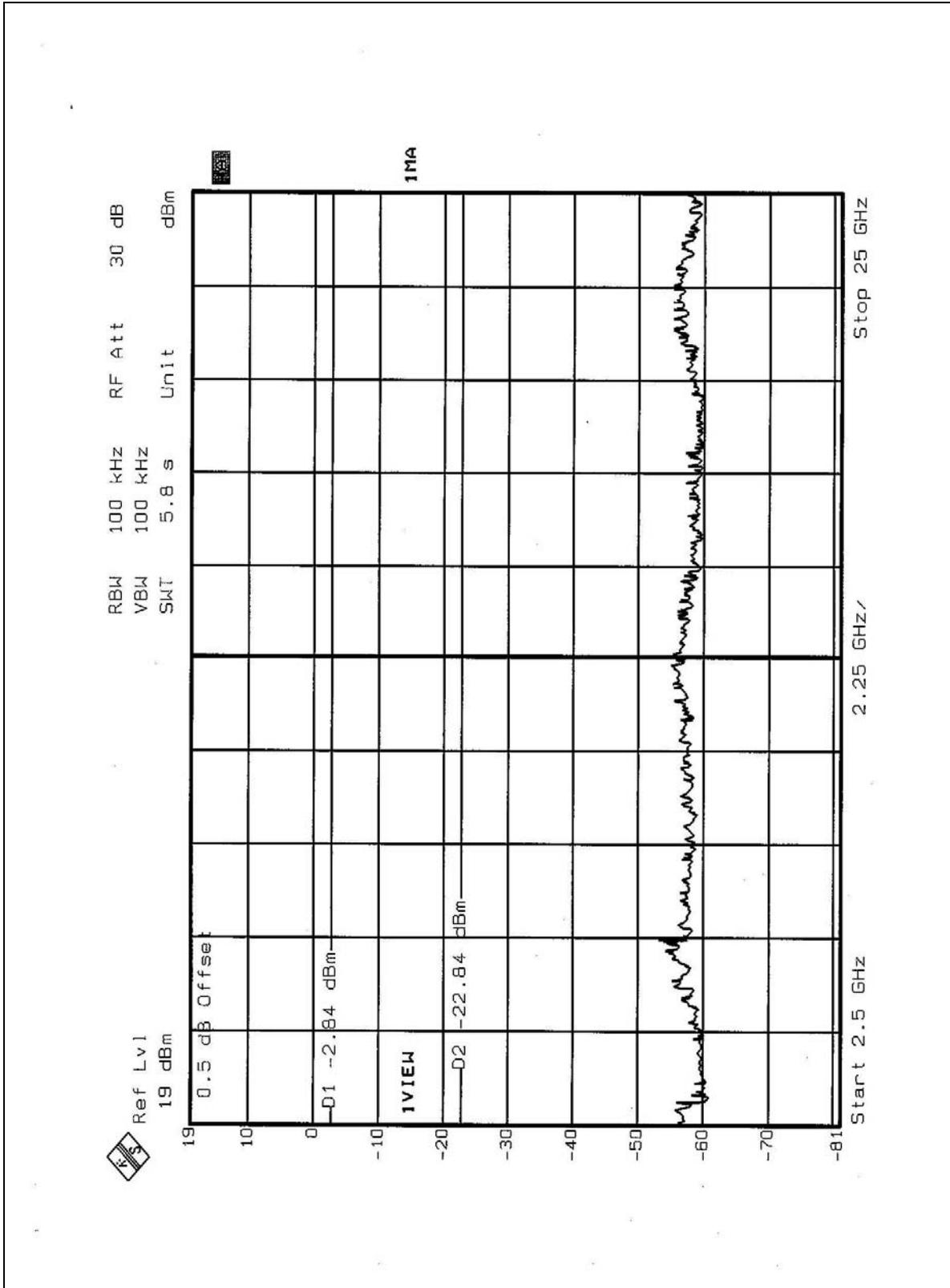


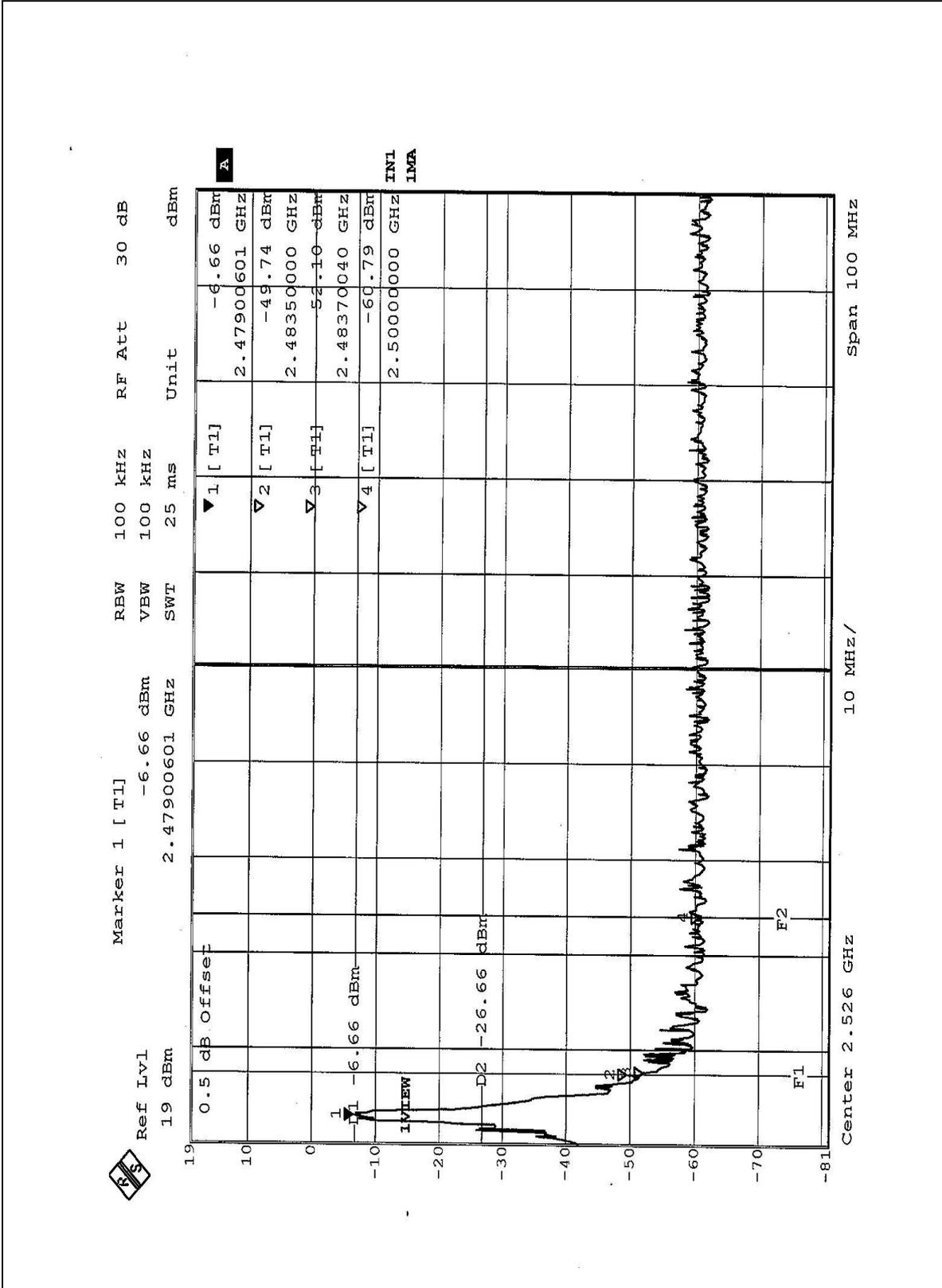
4.5.9 TEST RESULTS (C)

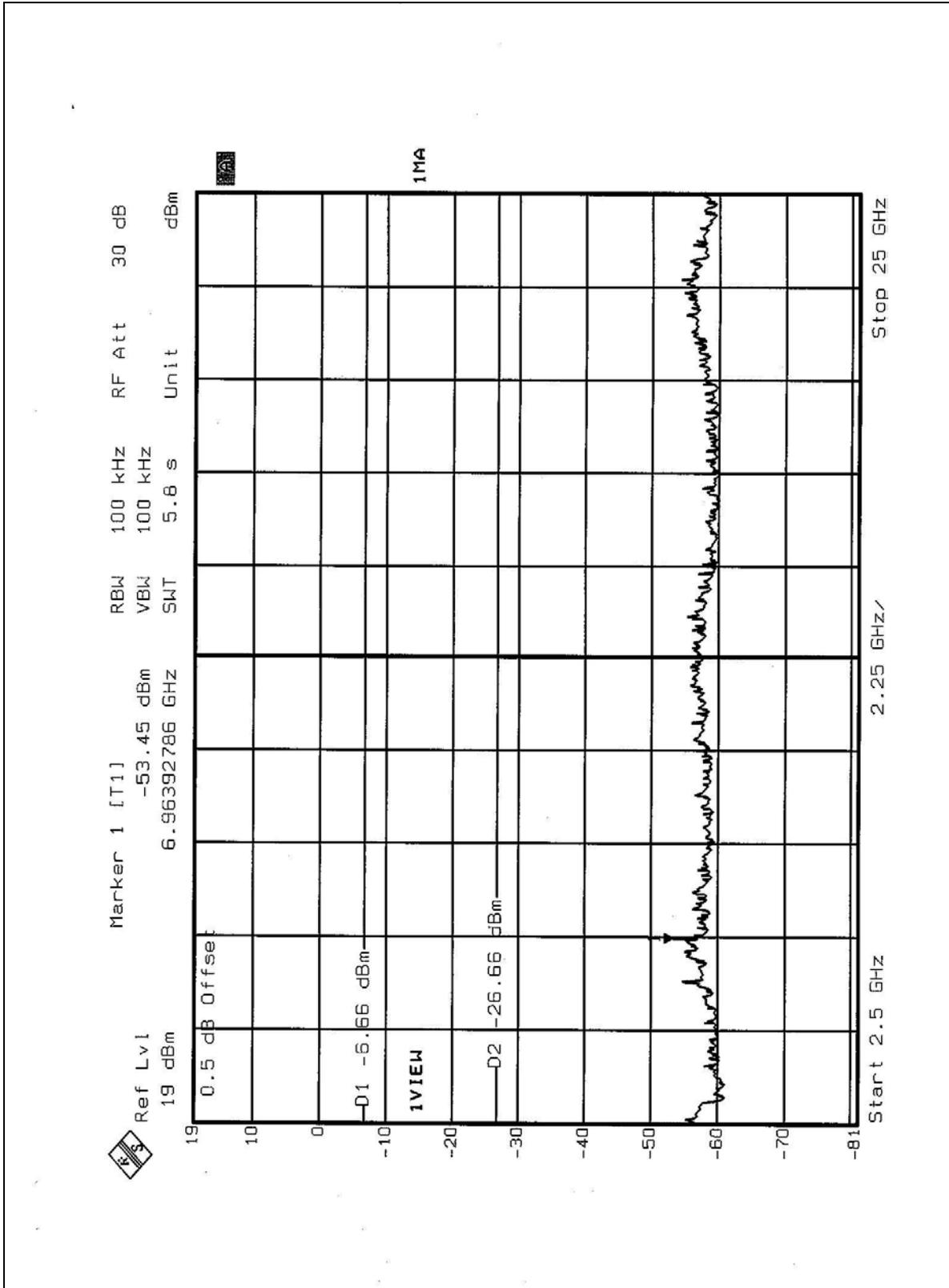
The band edge emission plot on the following 1~2 pages show 52.49dB delta between carrier maximum power and local maximum emission in restrict band (2.3782GHz). The emission of carrier strength list in the test result of channel 0 at the item 4.1.9 is 91.64dBuV/m, so the maximum field strength in restrict band is $91.64 - 52.49 = 39.15$ dBuV/m which is under 54dBuV/m limit.

The band edge emission plot on the following 3~4 pages show 43.08dB delta between carrier maximum power and local maximum emission in restrict band (2.4835GHz). The emission of carrier strength list in the test result of channel 78 at the item 4.1.9 is 91.37dBuV/m, so the maximum field strength in restrict band is $91.37 - 43.08 = 48.29$ dBuV/m which is under 54dBuV/m limit.











4.6 ANTENNA REQUIREMENT

4.6.1 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 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

4.6.2 ANTENNA CONNECTED CONSTRUCTION

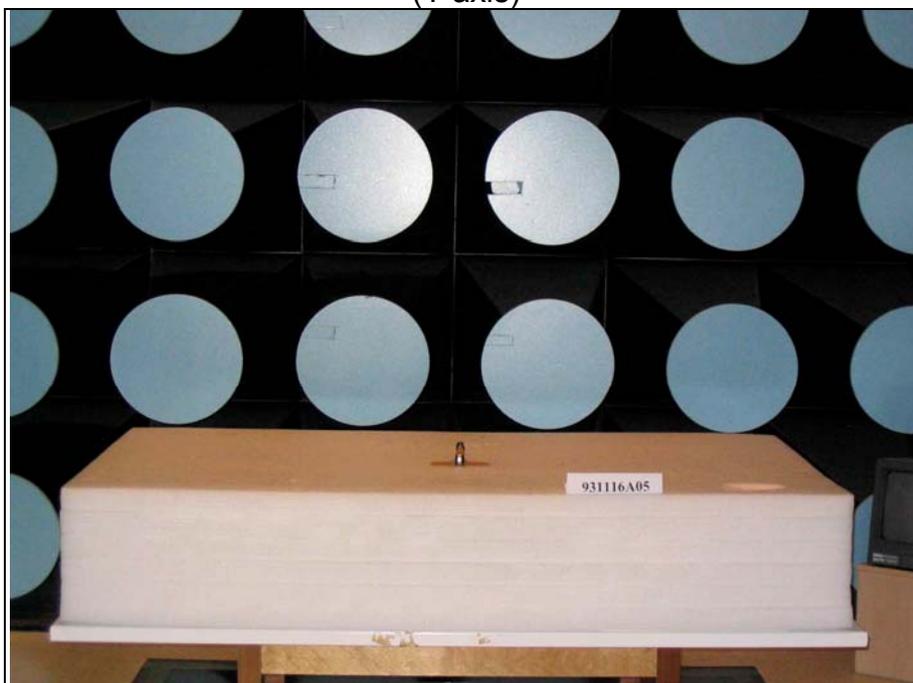
The antenna used in this product is printed antenna without connector and the maximum gain of this antenna is -5.42dBi .

5 PHOTOGRAPHS OF THE TEST CONFIGURATION

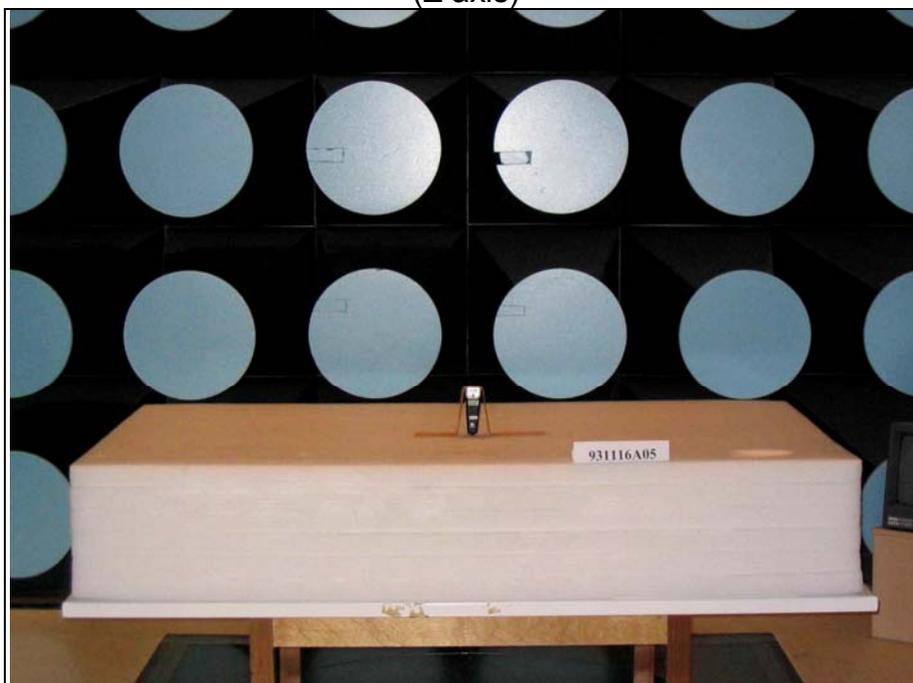
RADIATED EMISSION TEST (X axis)



RADIATED EMISSION TEST
(Y axis)



RADIATED EMISSION TEST
(Z axis)





6 INFORMATION ON THE TESTING LABORATORIES

We, ADT Corp., were founded in 1988 to provide our best service in EMC, Radio, Telecom 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, UL, A2LA
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Netherlands	Telefication
Singapore	PSB , GOST-ASIA(MOU)
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Copies of accreditation certificates of our laboratories obtained from approval agencies can be downloaded from our web site:

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

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