

FCC TEST REPORT

REPORT NO.: RF930129R03

MODEL NO.: F8T031

RECEIVED: Jan. 12, 2003

TESTED: Feb. 12 ~ Feb. 23, 2004

APPLICANT: Belkin Corporation

ADDRESS: 501 West Walnut Street, Compton USA 90220-5221

ISSUED BY: Advance Data Technology Corporation

LAB LOCATION: 47 14th Lin, Chiapau Tsun, Linko, Taipei,
Taiwan, R.O.C.

This test report consists of 70 pages in total. It may be duplicated completely for legal use with the approval of the applicant. It should not be reproduced except in full, without the written approval of our laboratory. The client should not use it to claim product endorsement by CNLA or any government agencies. The test results in the report only apply to the tested sample.



0528
ILAC MRA

TABLE OF CONTENTS

1	CERTIFICATION	4
2	SUMMARY OF TEST RESULTS	5
3	GENERAL INFORMATION	6
3.1	GENERAL DESCRIPTION OF EUT	6
3.2	DESCRIPTION OF TEST MODES	7
3.3	GENERAL DESCRIPTION OF APPLIED STANDARDS	7
3.4	DESCRIPTION OF SUPPORT UNITS	8
3.5	CONFIGURATION OF SYSTEM UNDER TEST	8
4	TEST PROCEDURES AND RESULTS	9
4.1	CONDUCTED EMISSION MEASUREMENT	9
4.1.1	LIMITS OF CONDUCTED EMISSION MEASUREMENT	9
4.1.2	TEST INSTRUMENTS	9
4.1.3	TEST PROCEDURES	10
4.1.4	DEVIATION FROM TEST STANDARD	10
4.1.5	TEST SETUP	11
4.1.6	EUT OPERATING CONDITIONS	11
4.1.7	TEST RESULTS	12
4.2	NUMBER OF HOPPING FREQUENCY USED	18
4.2.1	LIMIT OF HOPPING FREQUENCY USED	18
4.2.2	TEST INSTRUMENTS	18
4.2.3	TEST PROCEDURES	19
4.2.4	DEVIATION FROM TEST STANDARD	19
4.2.5	TEST SETUP	20
4.2.6	TEST RESULTS	20
4.3	DWELL TIME ON EACH CHANNEL	23
4.3.1	LIMIT OF DWELL TIME USED	23
4.3.2	TEST INSTRUMENTS	23
4.3.3	TEST PROCEDURES	24
4.3.4	DEVIATION FROM TEST STANDARD	24
4.3.5	TEST SETUP	24
4.3.6	TEST RESULTS	25
4.4	CHANNEL BANDWIDTH	32
4.4.1	LIMITS OF CHANNEL BANDWIDTH	32
4.4.2	TEST INSTRUMENTS	32
4.4.3	TEST PROCEDURE	33
4.4.4	DEVIATION FROM TEST STANDARD	33
4.4.5	TEST SETUP	33
4.4.6	EUT OPERATING CONDITION	33
4.4.7	TEST RESULTS	34

4.5	HOPPING CHANNEL SEPARATION	38
4.5.1	LIMIT OF HOPPING CHANNEL SEPARATION	38
4.5.2	TEST INSTRUMENTS	38
4.5.3	TEST PROCEDURES	39
4.5.4	DEVIATION FROM TEST STANDARD	39
4.5.5	TEST SETUP	39
4.5.6	TEST RESULTS	40
4.6	MAXIMUM PEAK OUTPUT POWER –USING POWER METTER.....	44
4.6.1	LIMITS OF MAXIMUM PEAK OUTPUT POWER MEASUREMENT	44
4.6.2	INSTRUMENTS	44
4.6.3	TEST PROCEDURES	45
4.6.4	DEVIATION FROM TEST STANDARD	45
4.6.5	TEST SETUP	46
4.6.6	EUT OPERATING CONDITION	46
4.6.7	TEST RESULTS	47
4.7	RADIATED EMISSION MEASUREMENT	51
4.7.1	LIMITS OF RADIATED EMISSION MEASUREMENT	51
4.7.2	TEST INSTRUMENTS	52
4.7.3	TEST PROCEDURES	53
4.7.4	DEVIATION FROM TEST STANDARD	53
4.7.5	TEST SETUP	54
4.7.6	TEST RESULTS	55
4.8	BAND EDGES MEASUREMENT	59
4.8.1	LIMITS OF BAND EDGES MEASUREMENT	59
4.8.2	TEST INSTRUMENTS	59
4.8.3	TEST PROCEDURE	59
4.8.4	DEVIATION FROM TEST STANDARD	59
4.8.5	EUT OPERATING CONDITION	60
4.8.6	TEST RESULTS	60
4.9	ANTENNA REQUIREMENT	65
4.9.1	STANDARD APPLICABLE	65
4.9.2	ANTENNA CONNECTED CONSTRUCTION	65
5	PHOTOGRAPHS OF THE TEST CONFIGURATION	66
6	INFORMATION ON THE TESTING LABORATORIES	70



1 CERTIFICATION

PRODUCT : Wireless USB Printer Adapter
BRAND NAME : BELKIN
MODEL NO. : F8T031
TEST ITEM : Engineering Sample
APPLICANT : Belkin Corporation
STANDARDS : FCC Part 15, Subpart C (Section 15.247),
ANSI C63.4-1992

We, **Advance Data Technology Corporation**, hereby certify that one sample of the designation has been tested in our facility from Feb. 12 ~ Feb. 23, 2004. 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.

PREPARED BY: Windy Chou, **DATE:** Feb. 24, 2003

Windy Chou

APPROVED BY: Ellis Wu, **DATE:** Feb. 24, 2003

Ellis Wu, 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	PASS	Meet the requirement of limit Minimum passing margin is -3.64dB at 0.150 MHz
15.247(a)(1)(I)-(ii)	Number of Hopping Frequency Used Spec.: At least 75 channels	PASS	Meet the requirement of limit
15.247(a)(1)(ii)	Dwell Time on Each Channel Spec. : Max. 0.4 second within 30 second	PASS	Meet the requirement of limit
15.247(a)(1)(I)-(ii)	Hopping Channel Separation Spec. : Min. 25 kHz or 20 dB bandwidth	PASS	Meet the requirement of limit
15.247(a)(2)	Spectrum Bandwidth of a Frequency Hopping Sequence Spread Spectrum System Spec.: Max. 1 MHz	PASS	Meet the requirement of limit
15.247(b)	Maximum Peak Output Power Spec.: max. 30dBm	PASS	Meet the requirement of limit
15.247(c)	Transmitter Radiated Emissions Spec.: Table 15.209	PASS	Meet the requirement of limit Minimum passing margin is -2.20dB at 58.99MHz
15.247(c)	Band Edge Measurement	PASS	Meet the requirement of limit

Note: The information of measurement uncertainty is available upon the customer's request.

3 GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

PRODUCT	Wireless USB Printer Adapter
MODEL NO.	F8T031
POWER SUPPLY	5.0Vdc from AC adapter
MODULATION TYPE	FHSS
MODULATION TECHNOLOGY	GFSK
FREQUENCY RANGE	2402MHz ~ 2480MHz
NUMBER OF CHANNEL	79
OUTPUT POWER	4.07dBm
ANTENNA TYPE	Patch Antenna with 2dBi Antenna gain
DATA CABLE	USB 1.1m shielded cable with core
I/O PORTS	NA
ASSOCIATED DEVICES	NA

NOTE:

1. The EUT is powered by the following adapter:

BRAND:	LEI
MODEL:	MA3F-050030-A1
INPUT:	100-240Vac, 50~60Hz, 150mA
OUTPUT:	5.0Vdc, 300mA

2. For a more detailed features description, please refer to the manufacturer's specifications or User's Manual.

3.2 DESCRIPTION OF TEST MODES

Seventy-nine 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	78	2480
19	2421	39	2441	59	2461		

NOTE:

1. Below 1 GHz, the channel 0, 39, and 78 were pre-tested in chamber. The channel 78, worst case one, was chosen for final test.
2. Above 1 GHz, the channel 0, 39, and 78 were tested individually.

3.3 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is a Wireless USB Printer Adapter. 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 : 1992

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 B (DoC). The test report has been issued separately.

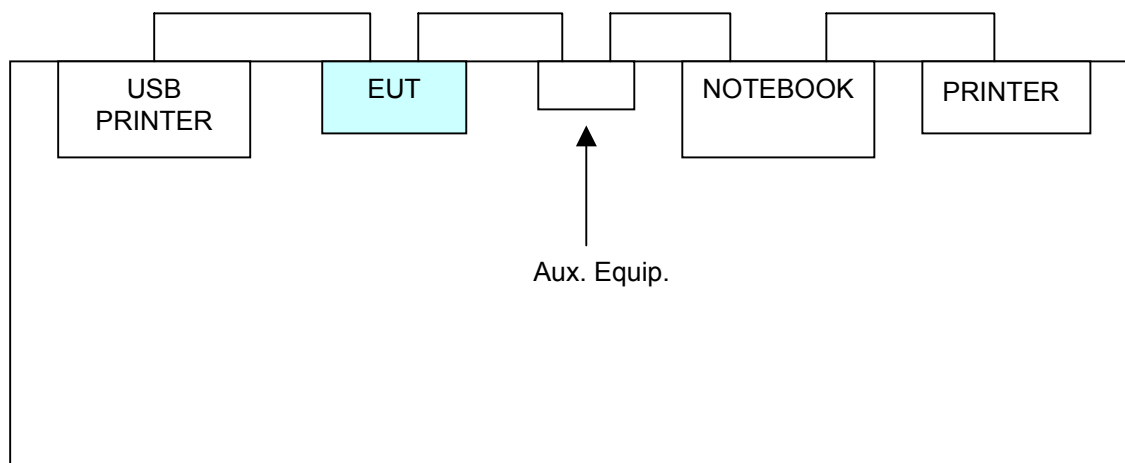
3.4 DESCRIPTION OF SUPPORT UNITS

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	NOTEBOOK	Dell	PP01L	TW-09C748-12800-16M-5064	FCC DoC Approved
2	USB PRINTER	LEXMARK	Z33	NA	FCC DoC Approved
3	PRINTER	EPSON	LQ-300+	DCGY017076	FCC DoC Approved

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	NA
2	2.0 m foil shielded wire , terminated with USB connector via metallic frame, w/o core.
3	1.2m braid shielded wire, terminated with DB25 and Centronics connector via metallic frame, w/o core

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

3.5 CONFIGURATION OF SYSTEM UNDER TEST



4 TEST PROCEDURES AND RESULTS

4.1 CONDUCTED EMISSION MEASUREMENT

4.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

FREQUENCY OF EMISSION (MHz)	CONDUCTED LIMIT (dB μ V)	
	Quasi-peak	Average
0.15-0.5	66 to 56	56 to 46
0.5-5	56	46
5-30	60	50

Notes:

1. The lower limit shall apply at the transition frequencies.
2. 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	ESCS 30	838251/021	Jan. 04, 2005
ROHDE & SCHWARZ Artificial Mains Network (for EUT)	ESH3-Z5	100218	Dec. 09, 2004
ROHDE & SCHWARZ Artificial Mains Network (for peripherals)	ESH3-Z5	100219	Dec. 09, 2004
ROHDE & SCHWARZ Artificial Mains Network (for peripherals)	ESH3-Z5	100220	Dec. 09, 2004
*ROHDE & SCHWARZ 4-wire ISN	ENY41	837032/016	Nov. 19, 2004
*ROHDE & SCHWARZ 2-wire ISN	ENY22	837497/016	Nov. 19, 2004
Software	Cond-V2M3	NA	NA
RF cable (JYEBAO)	5D-FB	Cable-C10.01	May 01, 2004
SUHNTER Terminator (For ROHDE & SCHWARZ LISN)	65BNC-5001	E1-010770	Mar. 24, 2004
SUHNTER Terminator (For ROHDE & SCHWARZ LISN)	65BNC-5001	E1-010773	Apr. 06, 2004

- 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. “*”: These equipment are used for conducted telecom port test only (if tested).
 3. The test was performed in ADT Shielded Room No. 10.
 4. The VCCI Site Registration No. is C-1312.

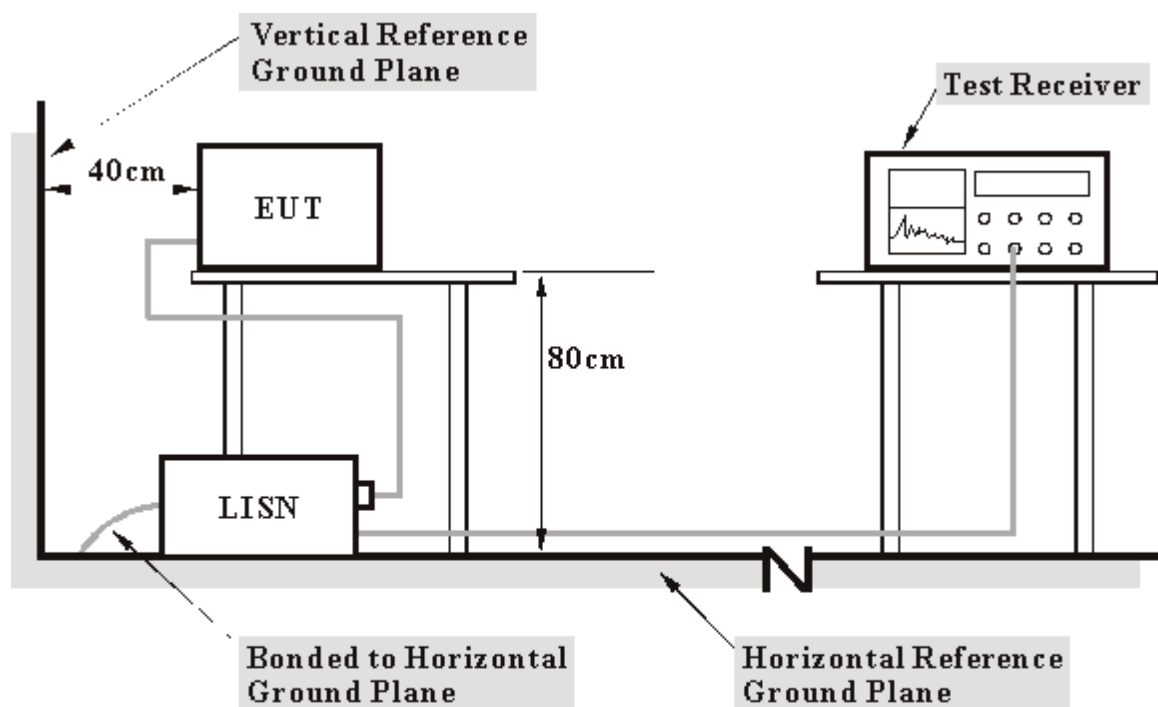
4.1.3 TEST PROCEDURES

- 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 150kHz to 30MHz was searched. Emission levels under Limit - 20dB was not recorded.

4.1.4 DEVIATION FROM TEST STANDARD

No deviation

4.1.5 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.

4.1.6 EUT OPERATING CONDITIONS

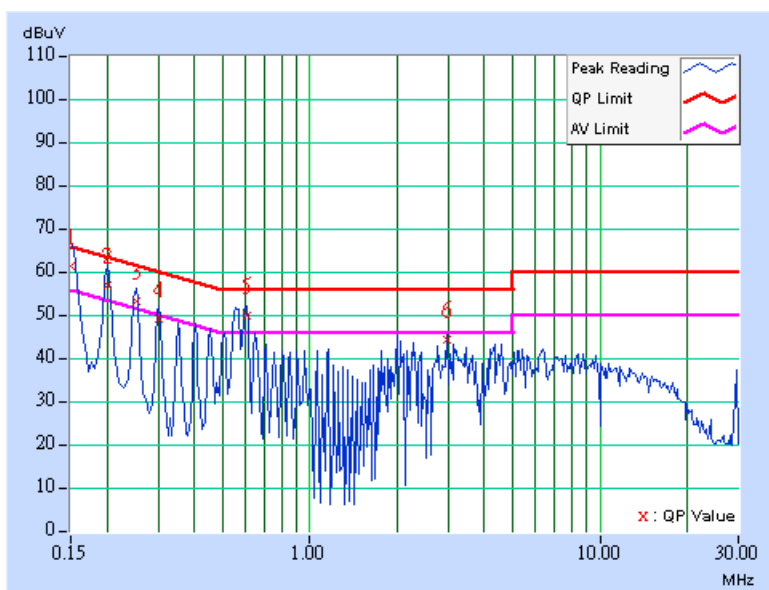
- a. Plug the EUT into the Notebook system placed on a testing table.
- b. The Notebook system ran a test program to enable EUT under transmission/receiving condition continuously at specific channel frequency.

4.1.7 TEST RESULTS

EUT	Wireless USB Printer Adapter	MODEL	F8T031
MODE	Channel 0	6dB BANDWIDTH	9 kHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	PHASE	Line (L)
ENVIRONMENTAL CONDITIONS	20 deg. C, 60%RH, 991 hPa	TESTED BY: Steven Lu	

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.150	0.10	61.17	51.99	61.27	52.09	66.00	56.00	-4.73	-3.91
2	0.201	0.10	56.97	48.35	57.07	48.45	63.58	53.58	-6.51	-5.13
3	0.252	0.10	53.08	45.43	53.18	45.53	61.71	51.71	-8.53	-6.18
4	0.302	0.10	49.11	-	49.21	-	60.18	50.18	-10.97	-
5	0.604	0.13	49.80	40.82	49.93	40.95	56.00	46.00	-6.07	-5.05
6	2.965	0.25	44.08	-	44.33	-	56.00	46.00	-11.67	-

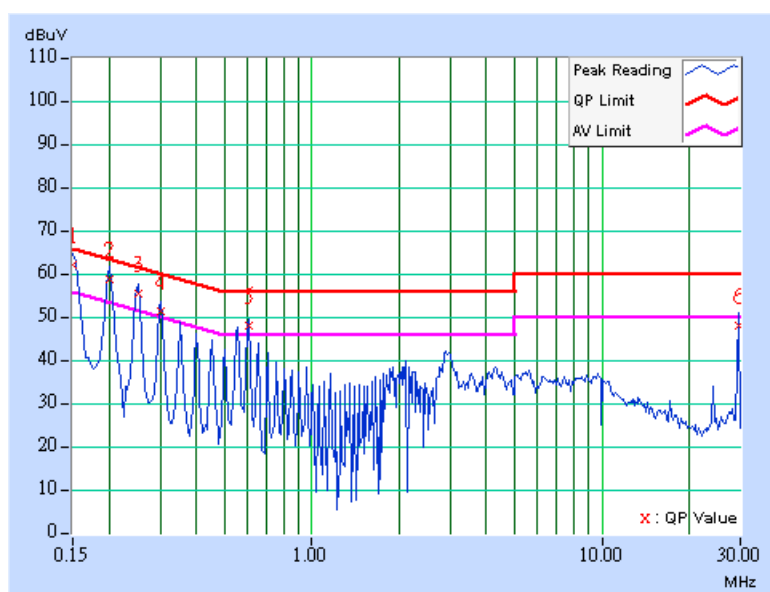
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value = Emission level - Limit value
 5. Correction factor = Insertion loss + Cable loss
 6. Emission Level = Correction Factor + Reading Value.



EUT	Wireless USB Printer Adapter	MODEL	F8T031
MODE	Channel 0	6dB BANDWIDTH	9 kHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	PHASE	Neutral (N)
ENVIRONMENTAL CONDITIONS	20 deg. C, 60%RH, 991 hPa	TESTED BY: Steven Lu	

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.150	0.10	61.29	52.26	61.39	52.36	66.00	56.00	-4.61	-3.64
2	0.201	0.10	57.80	48.57	57.90	48.67	63.58	53.58	-5.68	-4.91
3	0.252	0.10	54.52	45.53	54.62	45.63	61.71	51.71	-7.09	-6.08
4	0.302	0.10	50.42	42.04	50.52	42.14	60.18	50.18	-9.66	-8.04
5	0.603	0.13	47.00	41.23	47.13	41.36	56.00	46.00	-8.87	-4.64
6	29.492	1.00	47.14	-	48.14	-	60.00	50.00	-11.86	-

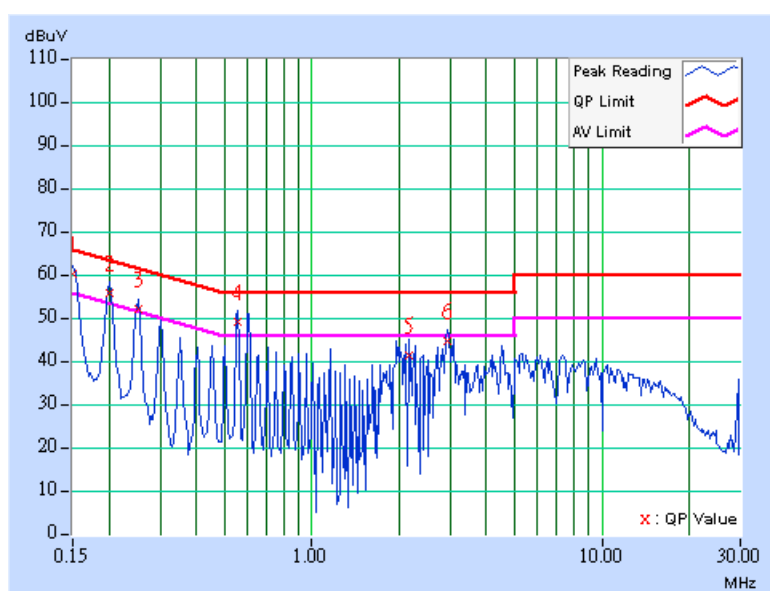
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value = Emission level - Limit value
 5. Correction factor = Insertion loss + Cable loss
 6. Emission Level = Correction Factor + Reading Value.



EUT	Wireless USB Printer Adapter	MODEL	F8T031
MODE	Channel 39	6dB BANDWIDTH	9 kHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	PHASE	Line (L)
ENVIRONMENTAL CONDITIONS	20 deg. C, 60%RH, 991 hPa	TESTED BY: Steven Lu	

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.150	0.10	60.06	51.19	60.16	51.29	66.00	56.00	-5.84	-4.71
2	0.201	0.10	55.83	47.47	55.93	47.57	63.58	53.58	-7.65	-6.01
3	0.252	0.10	51.92	44.17	52.02	44.27	61.71	51.71	-9.69	-7.44
4	0.552	0.13	48.95	39.28	49.08	39.41	56.00	46.00	-6.92	-6.59
5	2.160	0.21	41.30	-	41.51	-	56.00	46.00	-14.49	-
6	2.918	0.25	44.71	-	44.96	-	56.00	46.00	-11.04	-

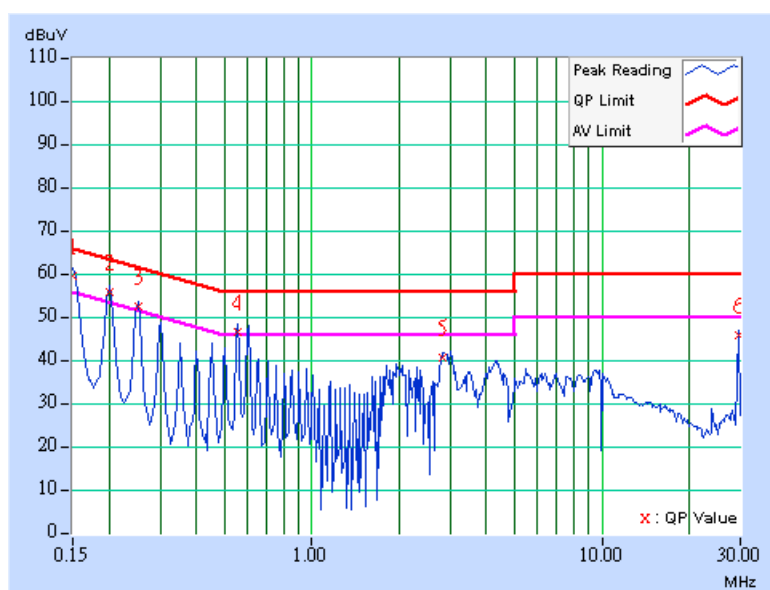
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value = Emission level - Limit value
 5. Correction factor = Insertion loss + Cable loss
 6. Emission Level = Correction Factor + Reading Value.



EUT	Wireless USB Printer Adapter	MODEL	F8T031
MODE	Channel 39	6dB BANDWIDTH	9 kHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	PHASE	Neutral (N)
ENVIRONMENTAL CONDITIONS	20 deg. C, 60%RH, 991 hPa	TESTED BY: Steven Lu	

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.150	0.10	58.68	50.12	58.78	50.22	66.00	56.00	-7.22	-5.78
2	0.201	0.10	54.98	46.17	55.08	46.27	63.58	53.58	-8.50	-7.31
3	0.252	0.10	51.58	-	51.68	-	61.71	51.71	-10.03	-
4	0.552	0.13	45.60	-	45.73	-	56.00	46.00	-10.27	-
5	2.816	0.24	39.80	-	40.04	-	56.00	46.00	-15.96	-
6	29.492	1.00	45.10	-	46.10	-	60.00	50.00	-13.90	-

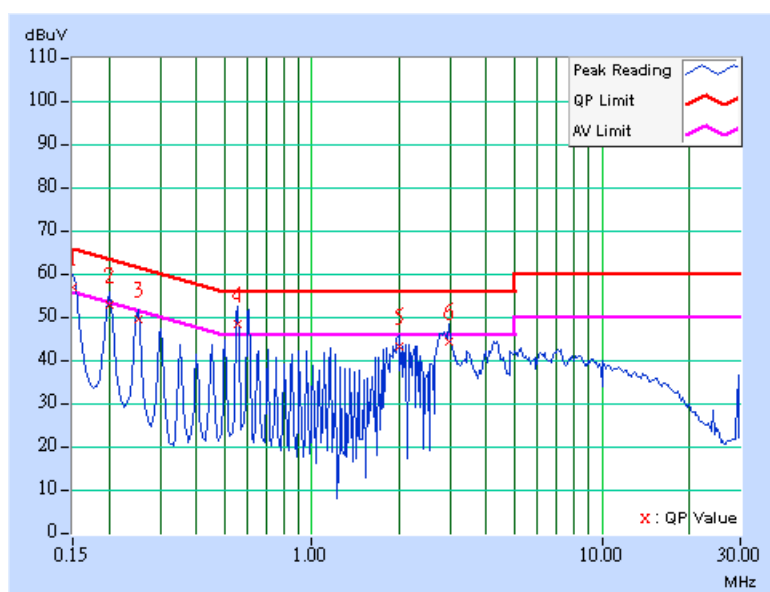
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value = Emission level - Limit value
 5. Correction factor = Insertion loss + Cable loss
 6. Emission Level = Correction Factor + Reading Value.



EUT	Wireless USB Printer Adapter	MODEL	F8T031
MODE	Channel 78	6dB BANDWIDTH	9 kHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	PHASE	Line (L)
ENVIRONMENTAL CONDITIONS	20 deg. C, 60%RH, 991 hPa	TESTED BY: Steven Lu	

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.150	0.10	56.79	48.05	56.89	48.15	66.00	56.00	-9.11	-7.85
2	0.201	0.10	52.82	-	52.92	-	63.58	53.58	-10.66	-
3	0.252	0.10	49.21	-	49.31	-	61.71	51.71	-12.40	-
4	0.552	0.13	48.45	40.41	48.58	40.54	56.00	46.00	-7.42	-5.46
5	2.012	0.20	43.22	-	43.42	-	56.00	46.00	-12.58	-
6	2.965	0.25	44.10	-	44.35	-	56.00	46.00	-11.65	-

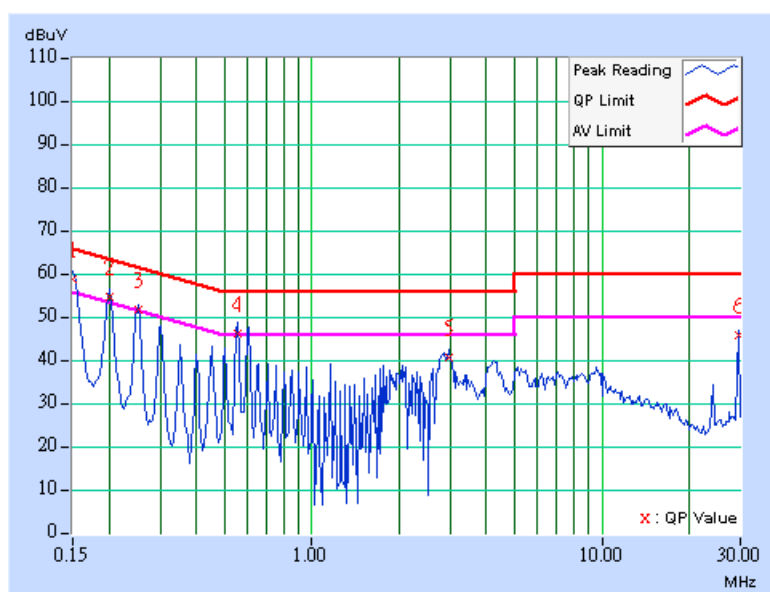
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value = Emission level - Limit value
 5. Correction factor = Insertion loss + Cable loss
 6. Emission Level = Correction Factor + Reading Value.



EUT	Wireless USB Printer Adapter	MODEL	F8T031
MODE	Channel 78	6dB BANDWIDTH	9 kHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	PHASE	Neurral (N)
ENVIRONMENTAL CONDITIONS	20 deg. C, 60%RH, 991 hPa	TESTED BY: Steven Lu	

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.150	0.10	57.87	49.21	57.97	49.31	66.00	56.00	-8.03	-6.69
2	0.201	0.10	53.86	45.86	53.96	45.96	63.58	53.58	-9.62	-7.62
3	0.252	0.10	50.86	-	50.96	-	61.71	51.71	-10.75	-
4	0.552	0.13	45.46	-	45.59	-	56.00	46.00	-10.41	-
5	2.967	0.25	39.72	-	39.97	-	56.00	46.00	-16.03	-
6	29.492	1.00	45.00	-	46.00	-	60.00	50.00	-14.00	-

- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value = Emission level - Limit value
 5. Correction factor = Insertion loss + Cable loss
 6. Emission Level = Correction Factor + Reading Value.



4.2 NUMBER OF HOPPING FREQUENCY USED

4.2.1 LIMIT OF HOPPING FREQUENCY USED

At least 15 hopping frequencies, and should be equally spaced.

4.2.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
SPECTRUM ANALYZER	FSEK30	100049	Aug. 12, 2004

NOTE:

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

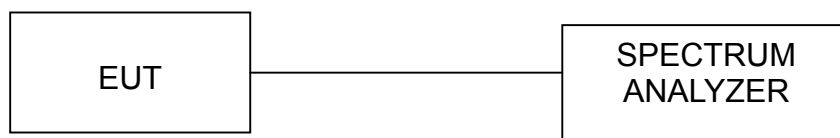
4.2.3 TEST PROCEDURES

1. Check the calibration of the measuring instrument (SA) using either an internal calibrator or a known signal from an external generator.
2. Turn on the EUT and connect its antenna terminal to measurement via a low loss cable. Then set it to any one measured frequency within its operating range and make sure the instrument is operated in its linear range.
3. Set the SA on MaxHold Mode, and then keep the EUT in hopping mode. Record all the signals from each channel until each one has been recorded.
4. Set the SA on View mode and then plot the result on SA screen.
5. Repeat above procedures until all frequencies measured were complete.

4.2.4 DEVIATION FROM TEST STANDARD

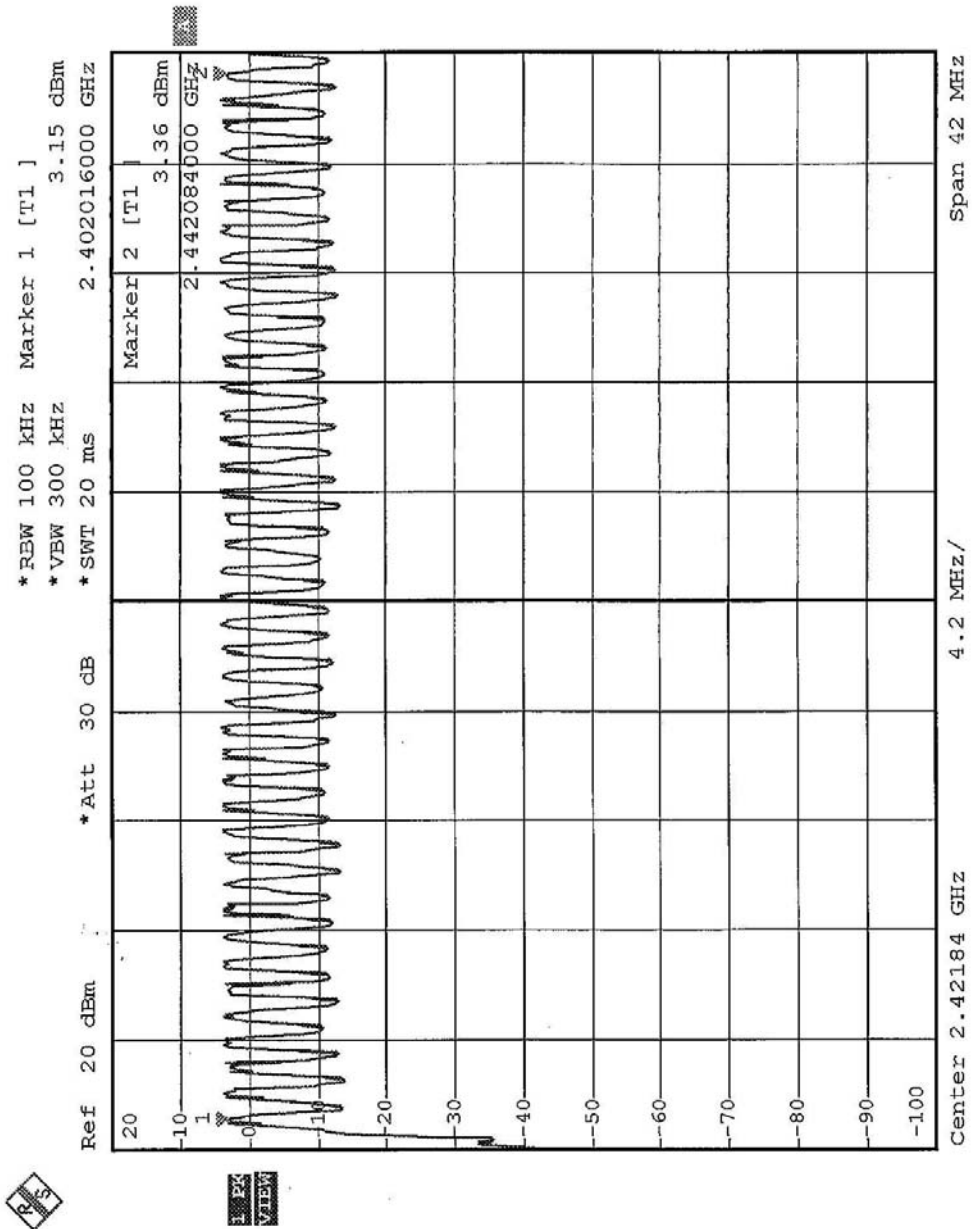
No deviation

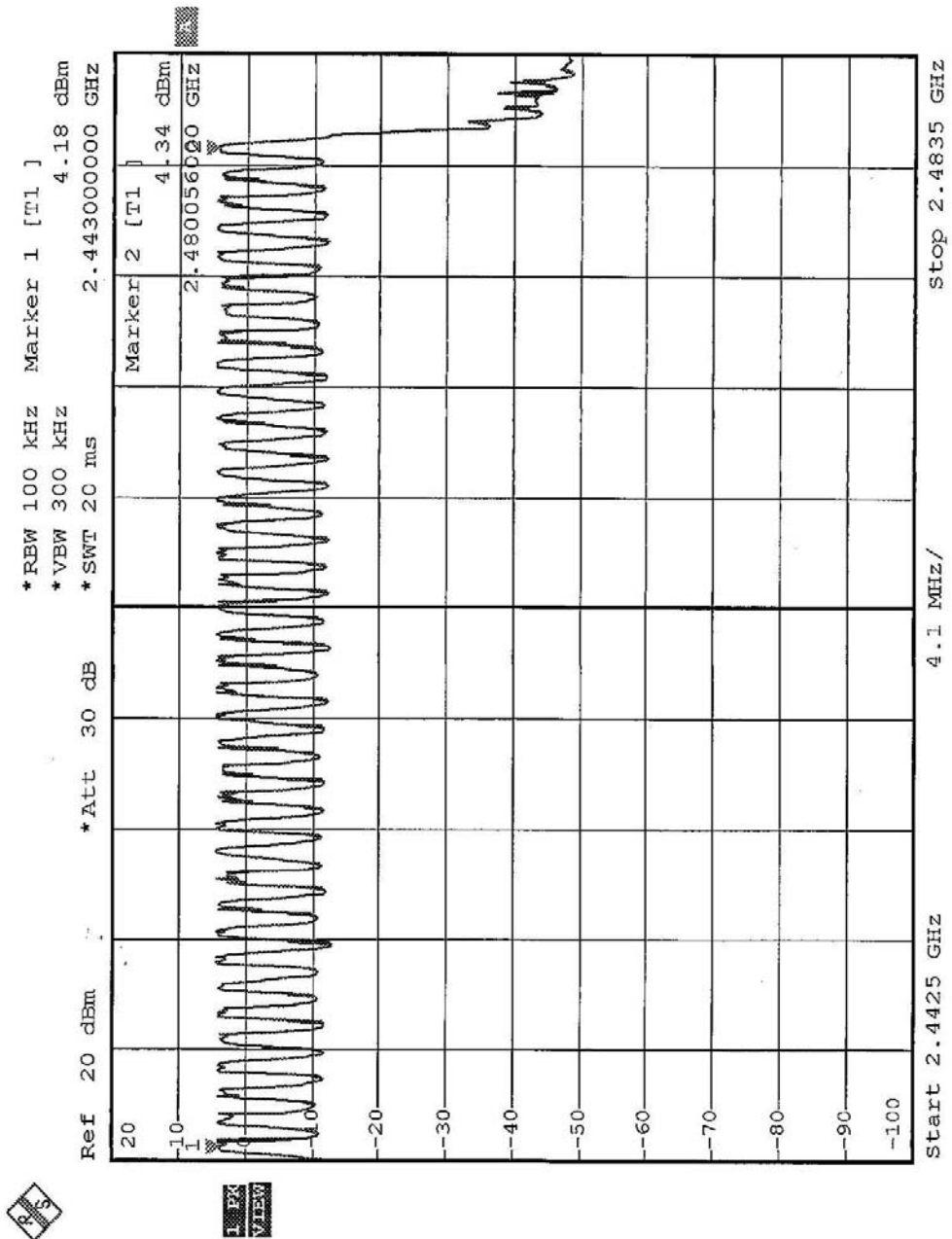
4.2.5 TEST SETUP



4.2.6 TEST RESULTS

There are 79 hopping frequencies in the hopping mode. Please refer to next two pages for the test result. On the plots, it shows that the hopping frequencies are equally spaced.





4.3 DWELL TIME ON EACH CHANNEL

4.3.1 LIMIT OF DWELL TIME USED

For FHSS, the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 31.6 second period. For hybrid systems, the average time of occupancy on any frequency should not exceed 0.4 seconds within a time period in seconds equal to the number of hopping frequencies employed multiplied by 0.4.

4.3.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
SPECTRUM ANALYZER	FSEK30	100049	Aug. 12, 2004

NOTES:

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

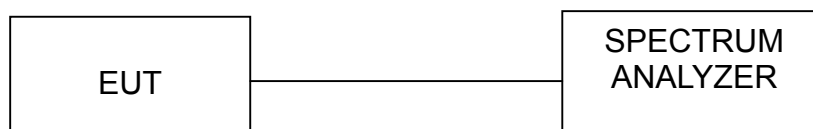
4.3.3 TEST PROCEDURES

1. Check the calibration of the measuring instrument (SA) using either an internal calibrator or a known signal from an external generator.
2. Turn on the EUT and connect its antenna terminal to measurement via a low loss cable. Then set it to any one measured frequency within its operating range and make sure the instrument is operated in its linear range.
3. Adjust the center frequency of SA on any frequency be measured and set SA to zero span mode. And then, set RBW and VBW of spectrum analyzer to proper value.
4. Measure the time duration of one transmission on the measured frequency. And then plot the result with time difference of this time duration.
5. Repeat above procedures until all frequencies measured were complete.

4.3.4 DEVIATION FROM TEST STANDARD

No deviation

4.3.5 TEST SETUP

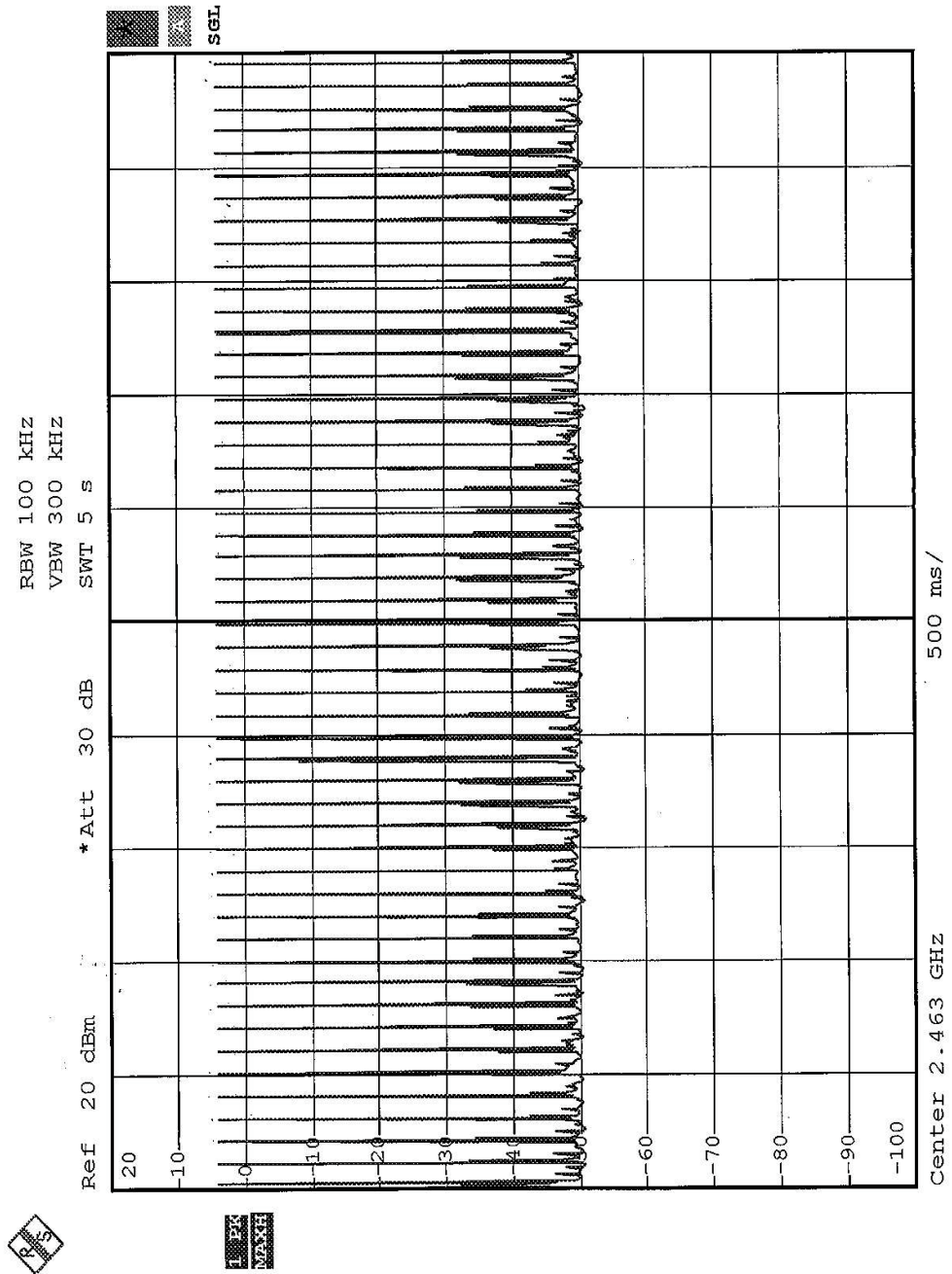


4.3.6 TEST RESULTS

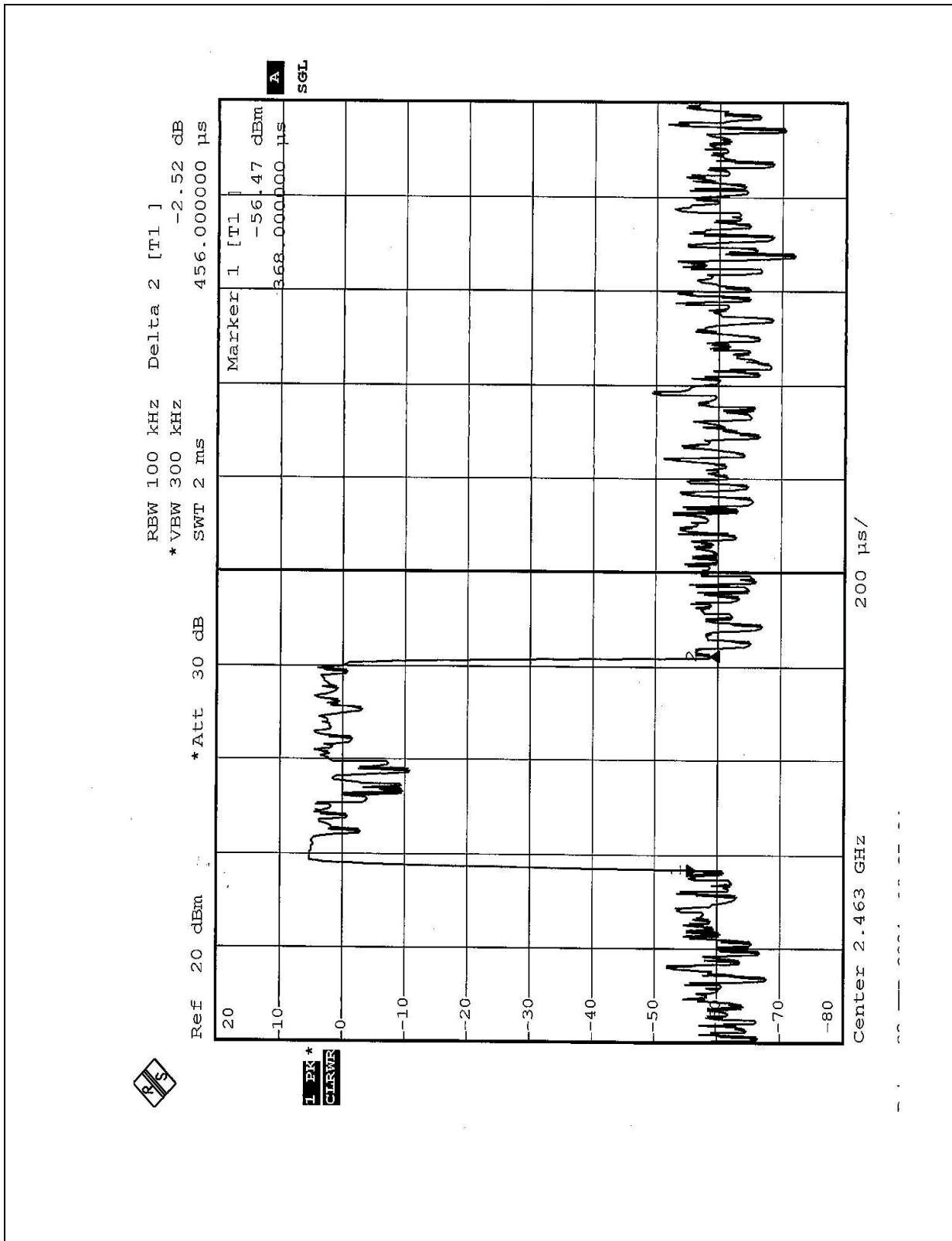
Mode	Number of transmission in a 31.6 (79Hopping*0.4)	Length of transmission time (msec)	Result (msec)	Limit (msec)
DH1	51 (times / 5 sec) *6.32=322.32 times	0.456	149.980	400
DH3	25 (times / 5 sec) *6.32=158.00 times	1.712	270.496	400
DH5	17 (times / 5 sec) *6.32=107.44 times	3.000	322.320	400

Test plots of the transmitting time slot are shown on next six pages.

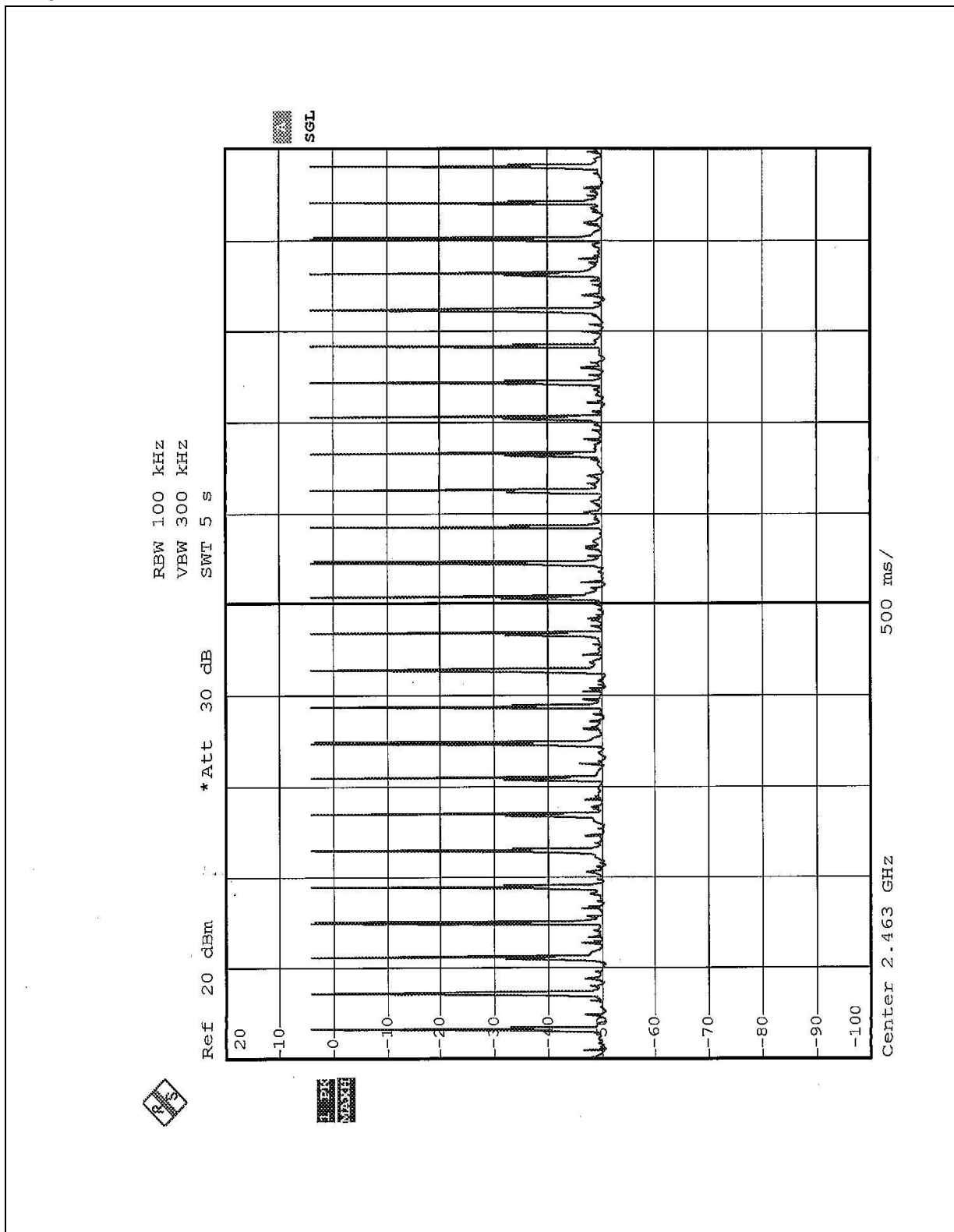
DH1



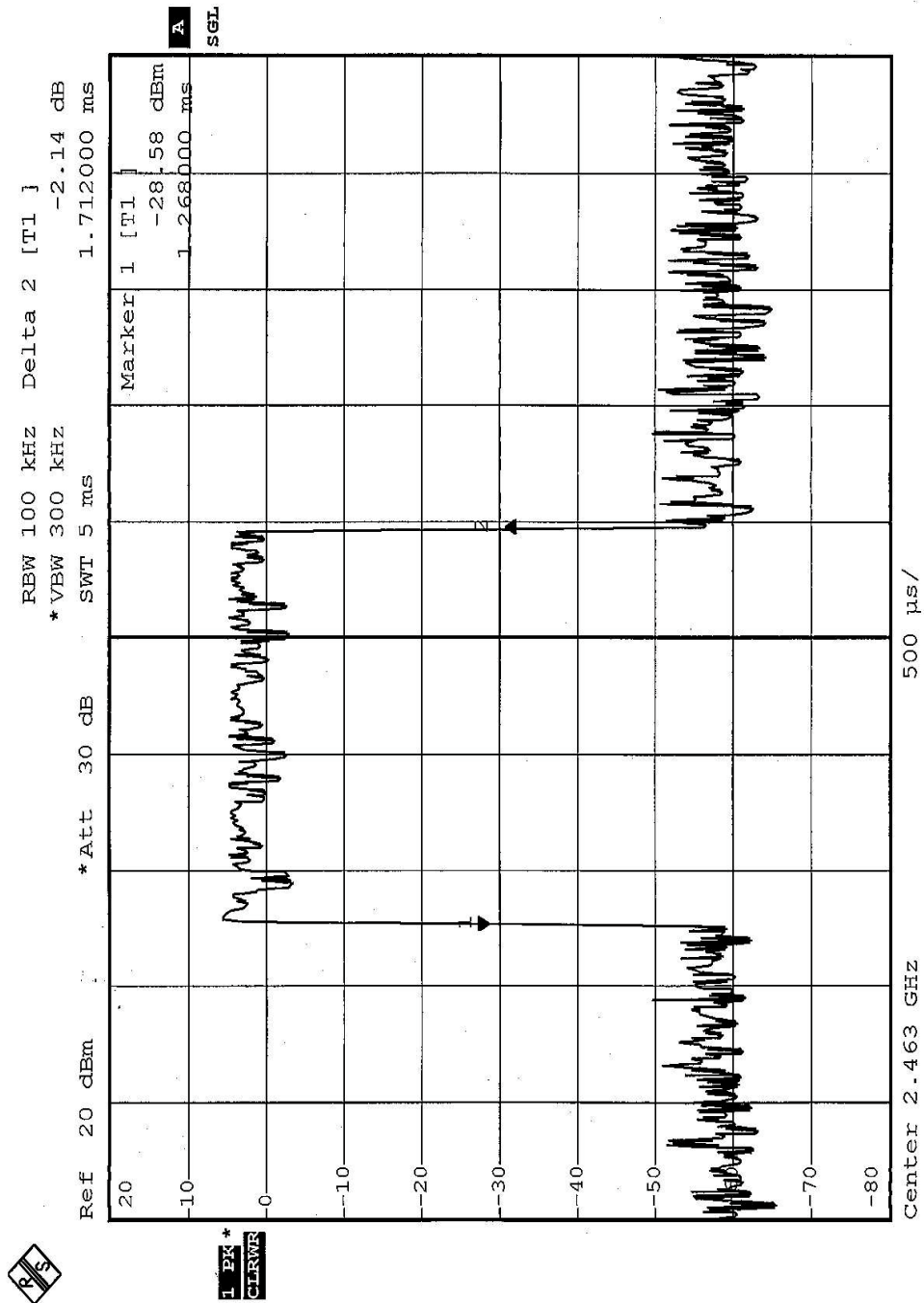
DH1



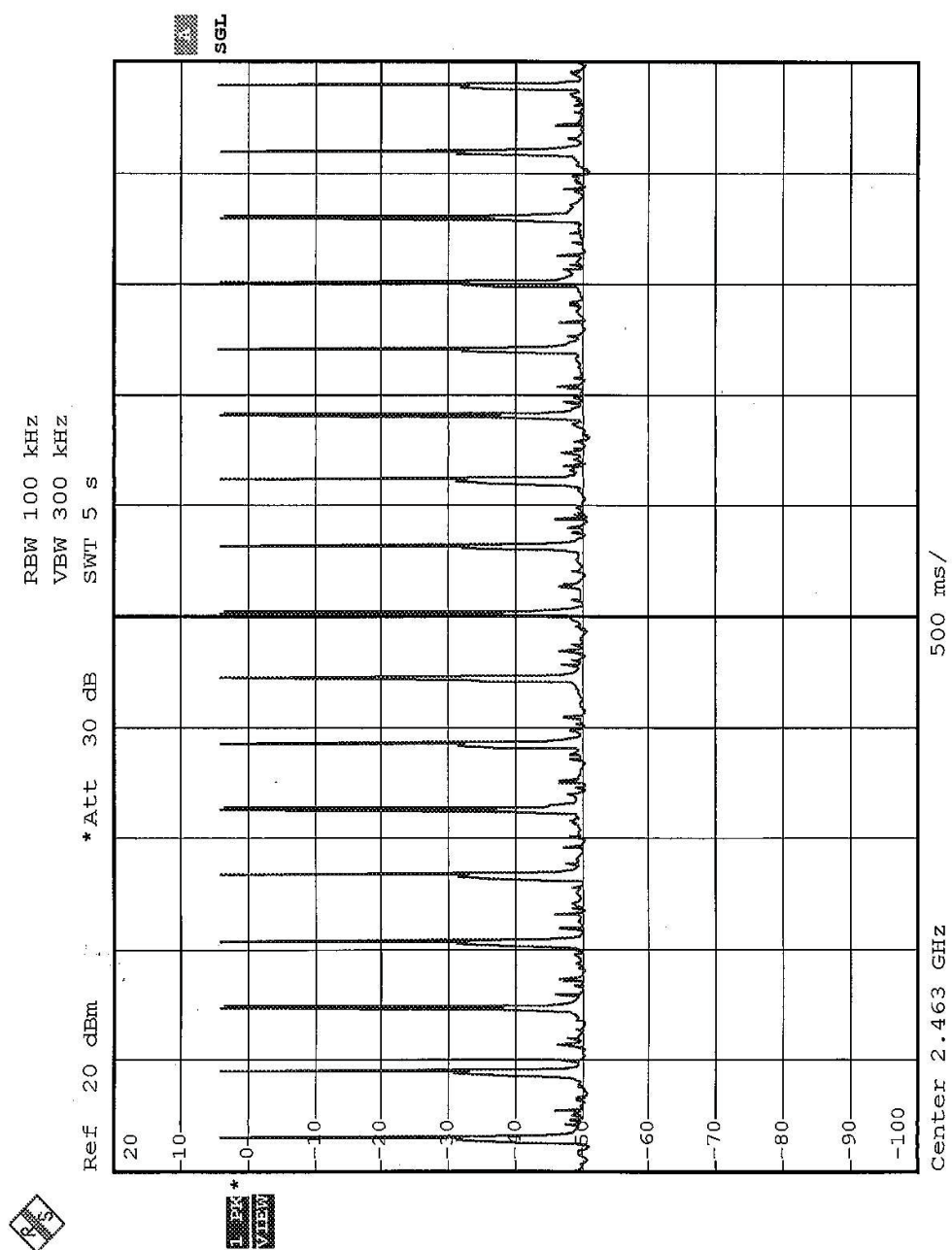
DH3



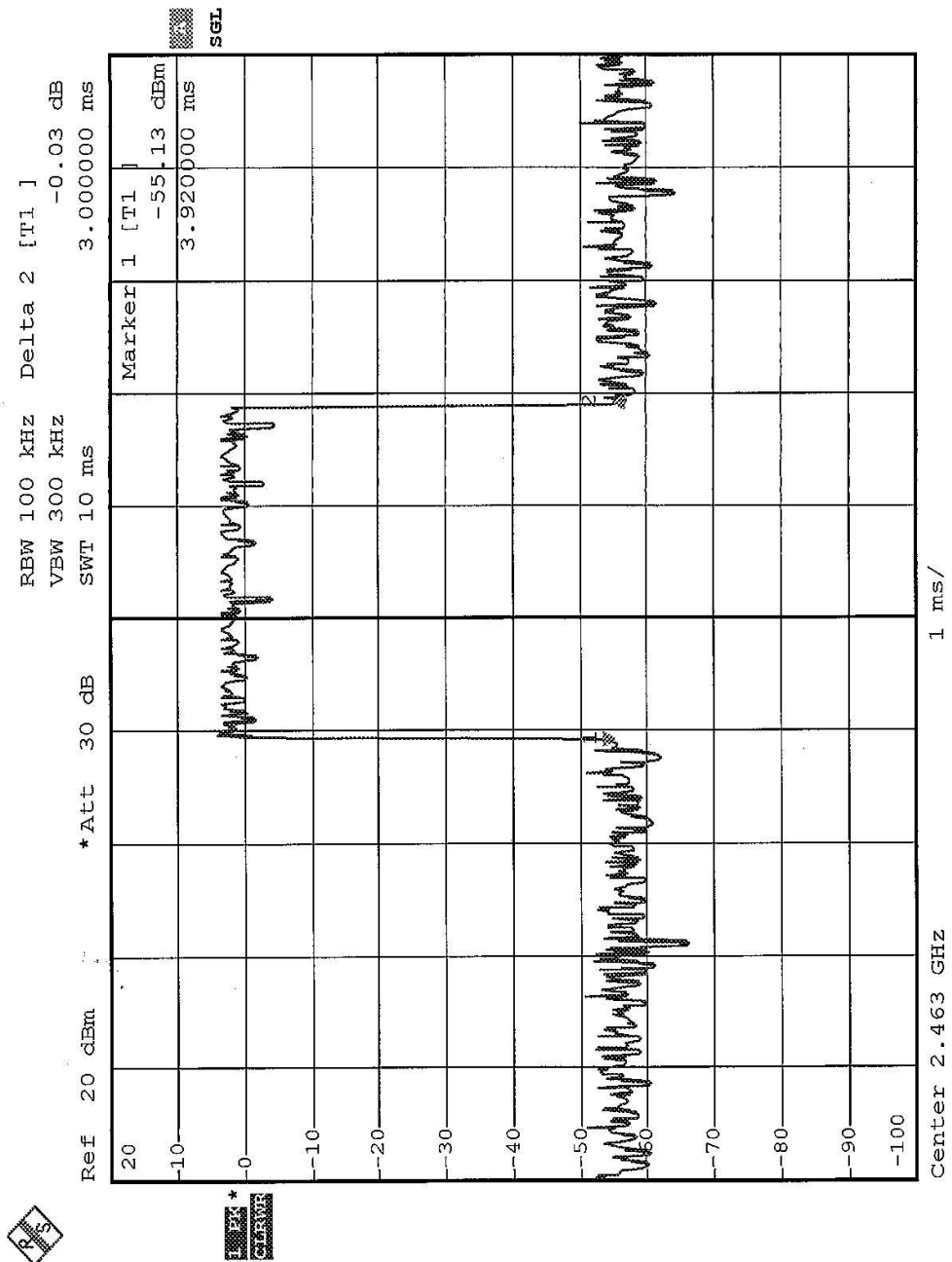
DH3



DH5



DH5



4.4 CHANNEL BANDWIDTH

4.4.1 LIMITS OF CHANNEL BANDWIDTH

For frequency hopping system operating in the 2400-2483.5 MHz and 5725-5850 MHz bands, the maximum 20dB bandwidth of the hopping channel is 1 MHz.

4.4.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
SPECTRUM ANALYZER	FSEK30	100049	Aug. 12, 2004

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.

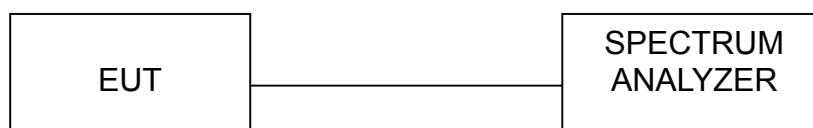
4.4.3 TEST PROCEDURE

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
3. Measure the frequency difference of two frequencies that were attenuated 20dB from the reference level. Record the frequency difference as the emission bandwidth.
4. Repeat above procedures until all frequencies measured were complete.

4.4.4 DEVIATION FROM TEST STANDARD

No deviation

4.4.5 TEST SETUP



4.4.6 EUT OPERATING CONDITION

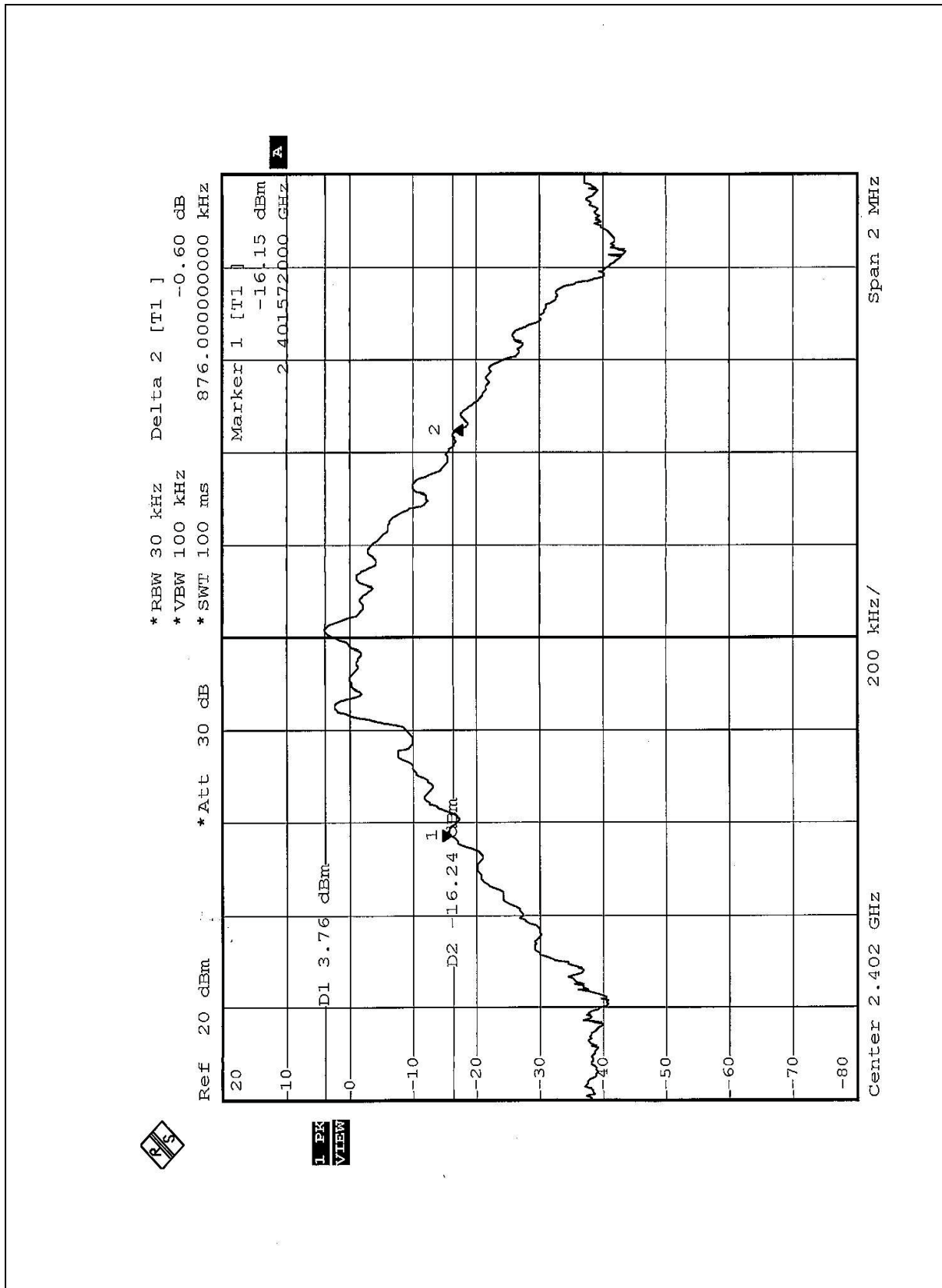
The software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel frequencies individually.

4.4.7 TEST RESULTS

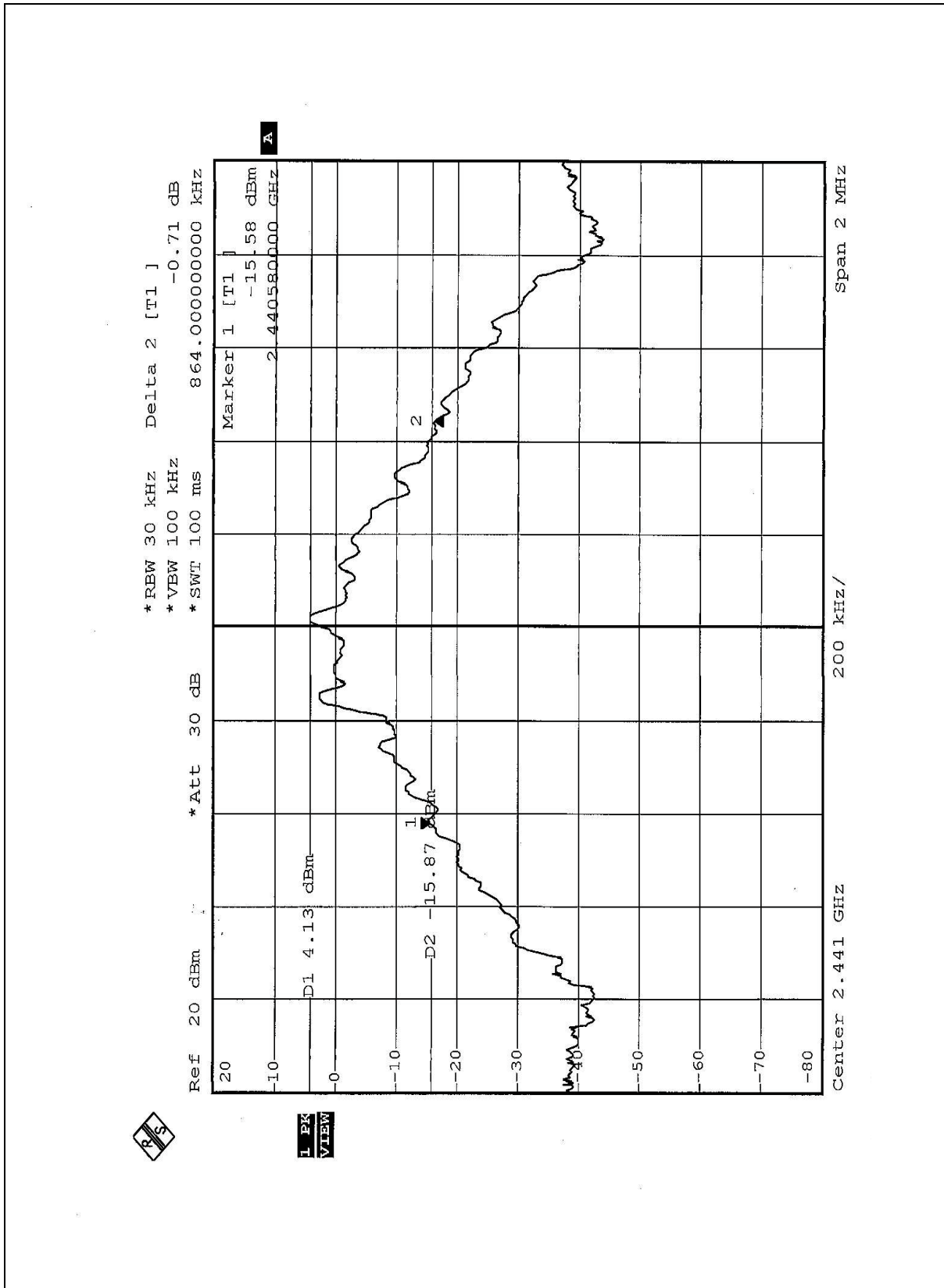
EUT	Wireless USB Printer Adapter	MODEL	F8T031
ENVIRONMENTAL CONDITIONS	23deg. C, 60%RH, 991 hPa	INPUT POWER (SYSTEM)	120Vac, 60 Hz
TESTED BY: Ansen Lei			

CHANNEL	CHANNEL FREQUENCY (MHz)	20dB BANDWIDTH (kHz)	MAXIMUM LIMIT (MHz)	PASS/FAIL
0	2402	876	1	PASS
39	2441	864	1	PASS
78	2480	940	1	PASS

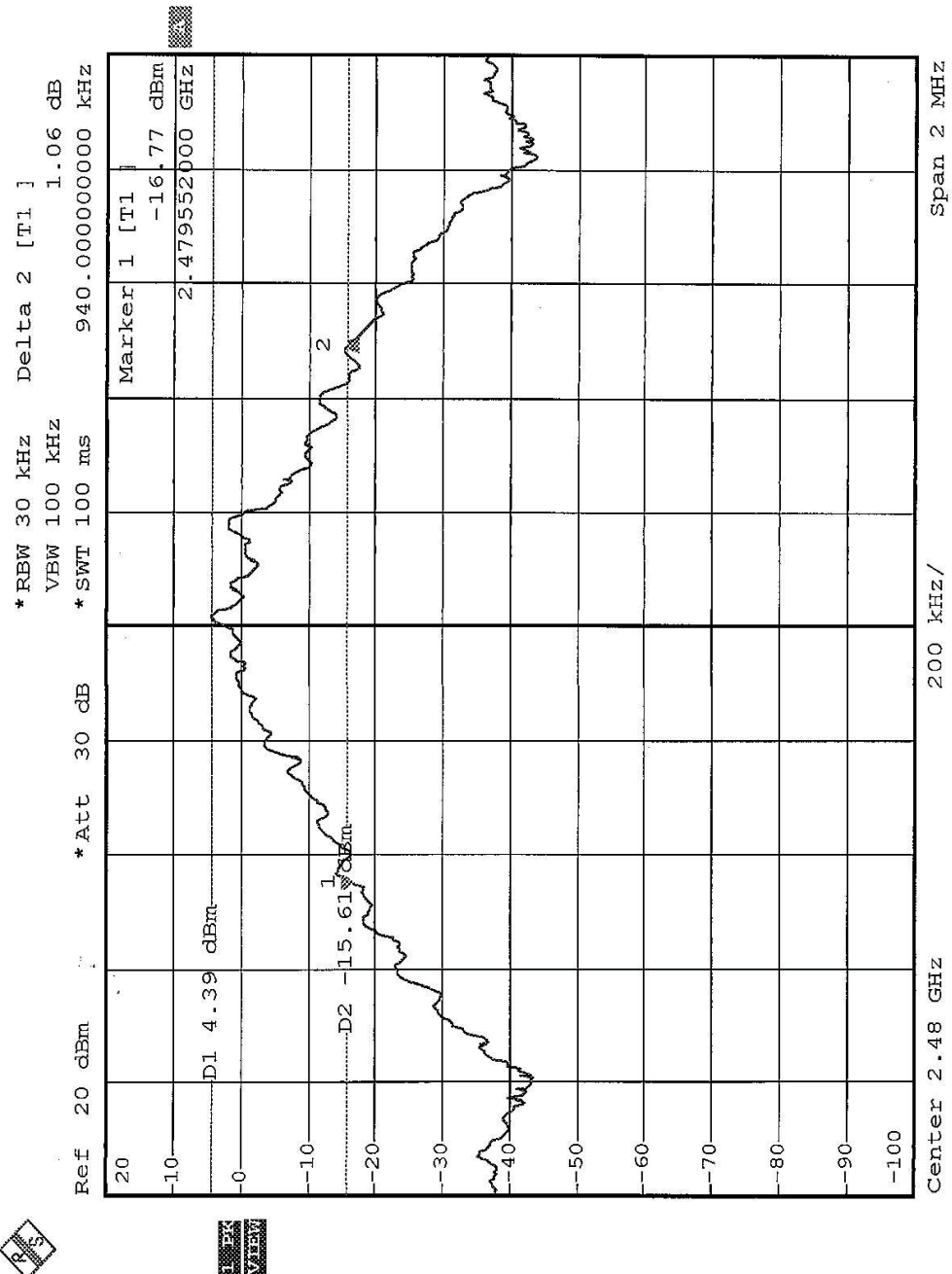
Channel 0



Channel 39



Channel 78



4.5 HOPPING CHANNEL SEPARATION

4.5.1 LIMIT OF HOPPING CHANNEL SEPARATION

At least 25KHz or 20dB bandwidth (whichever is greater).

4.5.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
SPECTRUM ANALYZER	FSEK30	100049	Aug. 12, 2004

NOTES:

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

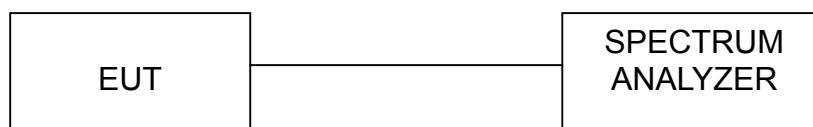
4.5.3 TEST PROCEDURES

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range.
3. By using the MaxHold function record the separation of two adjacent channels.
4. Measure the frequency difference of these two adjacent channels by SA MARK function. And then plot the result on SA screen.
5. Repeat above procedures until all frequencies measured were complete.

4.5.4 DEVIATION FROM TEST STANDARD

No deviation

4.5.5 TEST SETUP

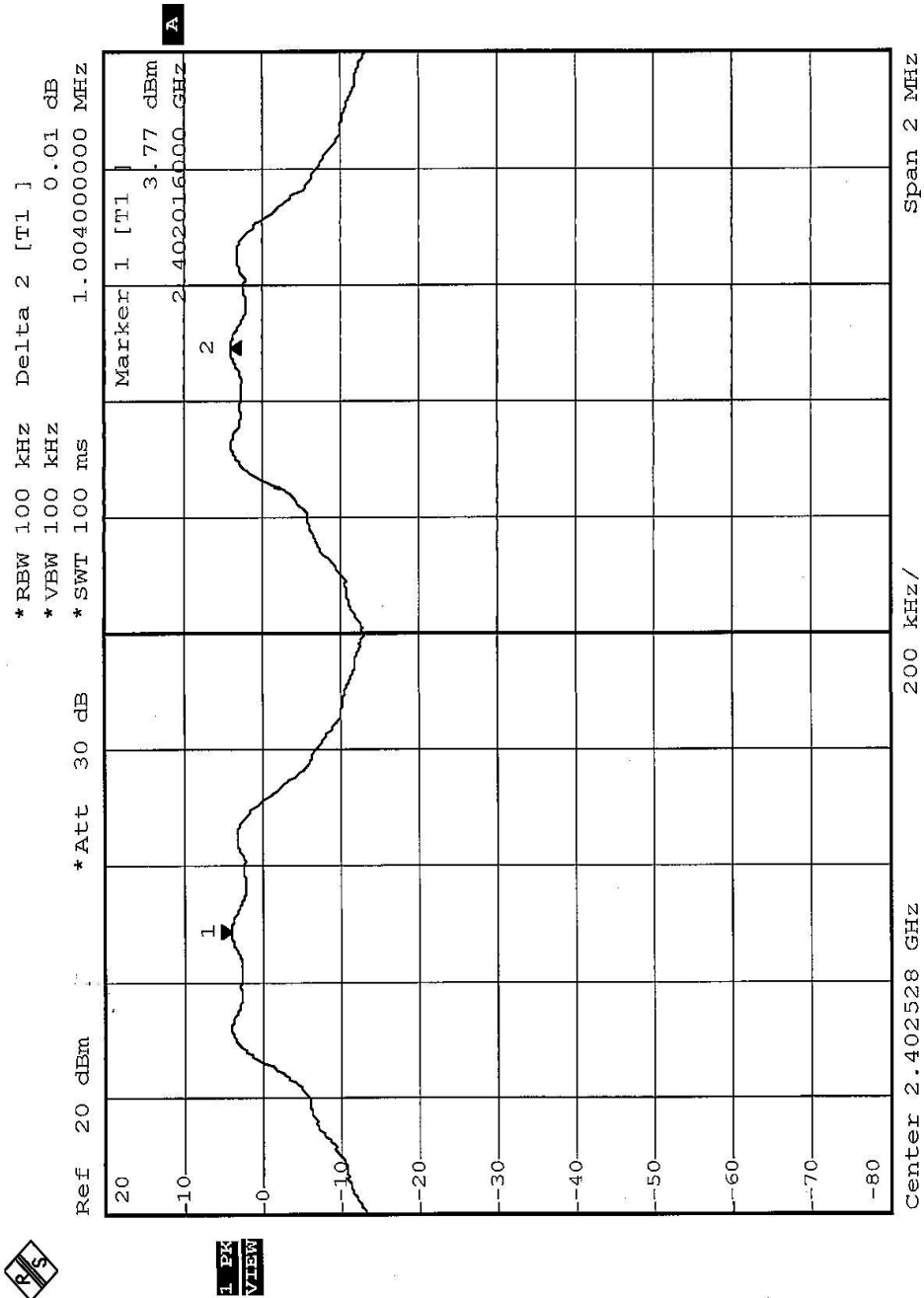


4.5.6 TEST RESULTS

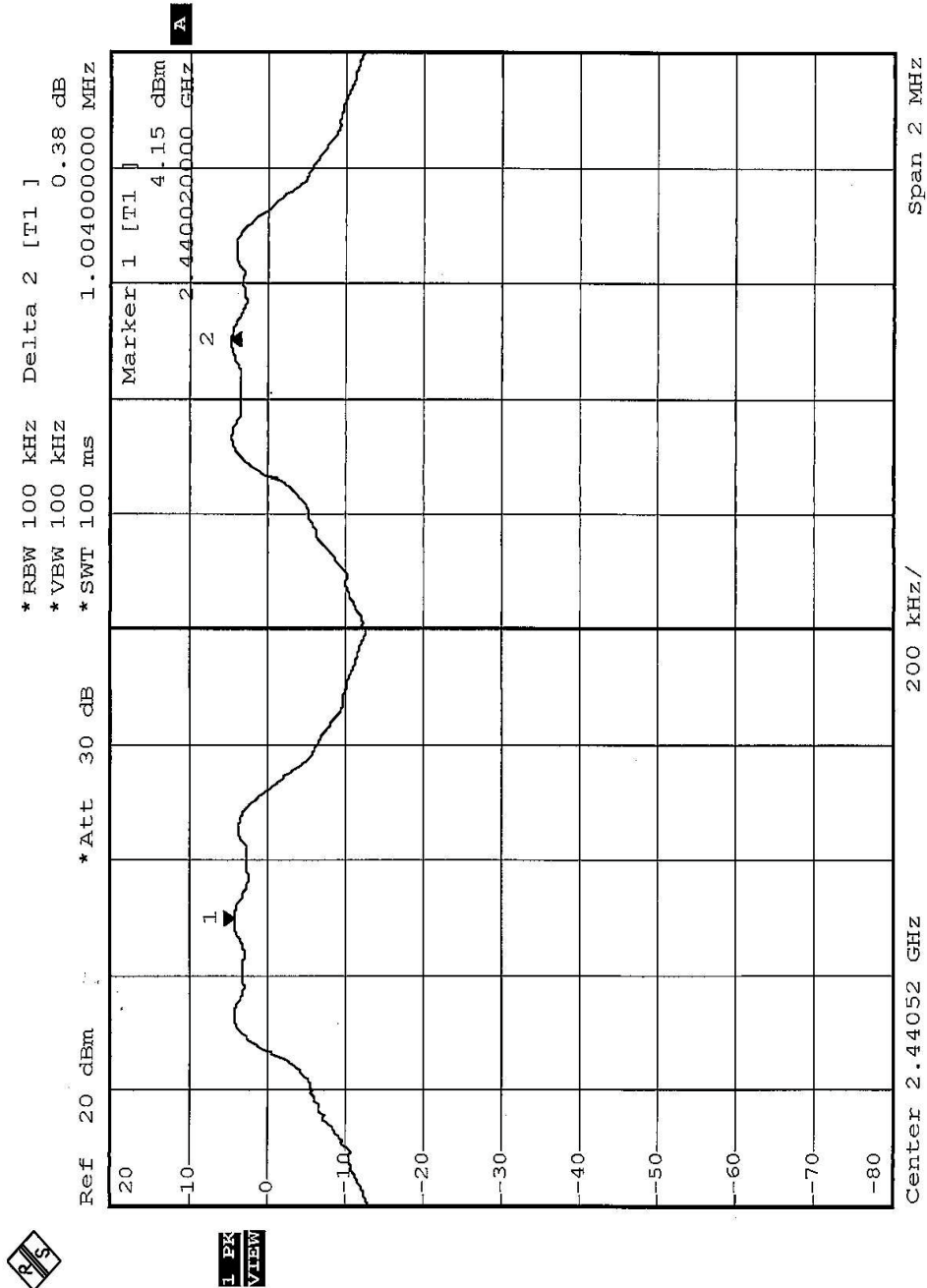
EUT	Wireless USB Printer Adapter	MODEL	F8T031
ENVIRONMENTAL CONDITIONS	23 deg. C, 60%RH, 991 hPa	INPUT POWER (SYSTEM)	120Vac, 60 Hz
TESTED BY: Ansen Lei			

Channel	Frequency (MHz)	Adjacent Channel Separation	Minimum Limit (kHz)	Pass / Fail
0	2402	1.004MHz	876	PASS
39	2441	1.004MHz	864	PASS
78	2480	1.008MHz	940	PASS

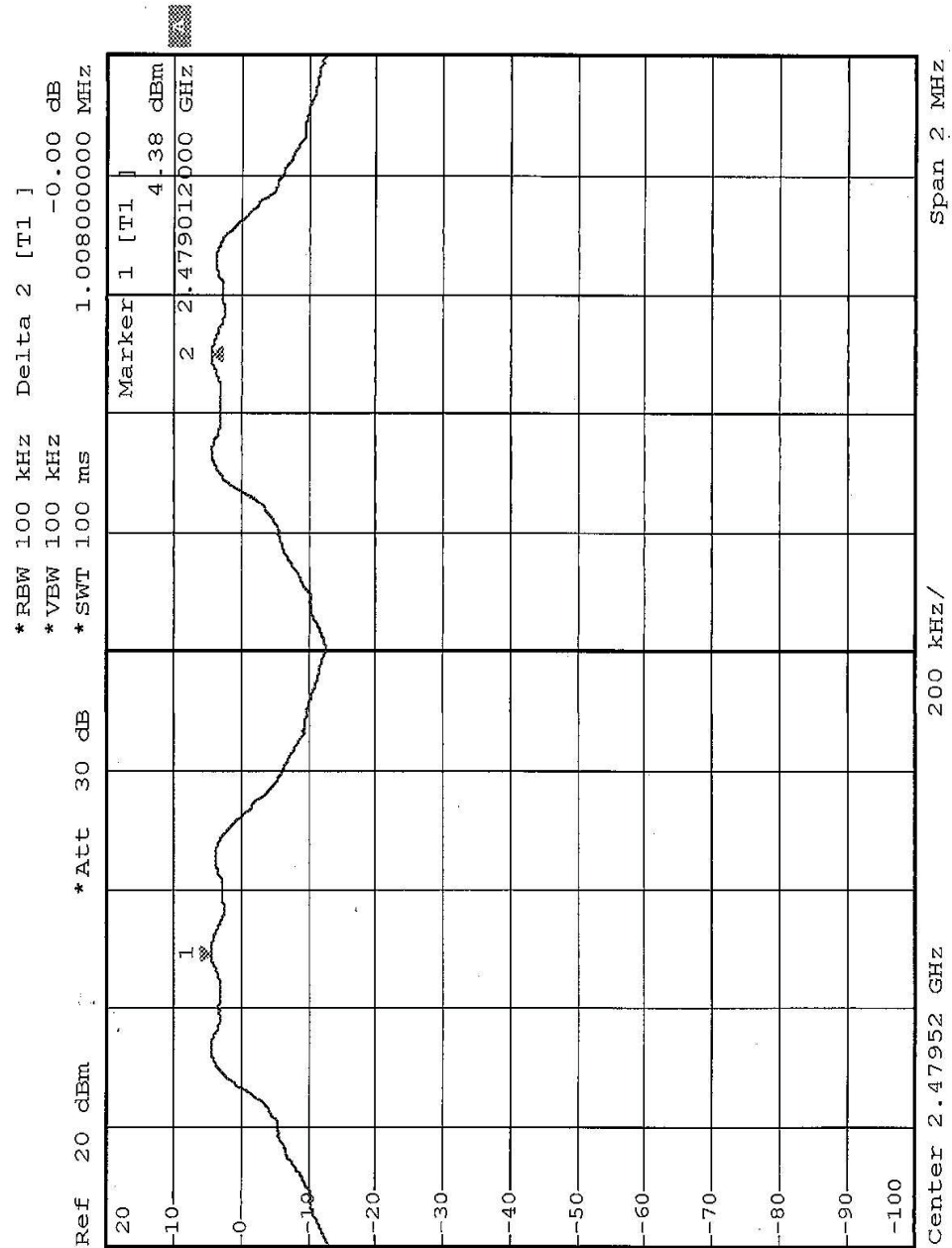
The minimum limit is 20dB bandwidth. Test results please refer to next three pages.

Channel 0

Channel 39



Channel 78



4.6 MAXIMUM PEAK OUTPUT POWER –USING POWER METTER

4.6.1 LIMITS OF MAXIMUM PEAK OUTPUT POWER MEASUREMENT

The Maximum Peak Output Power Measurement is 30dBm.

4.6.2 INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
SPECTRUM ANALYEER	FSEK30	100049	Aug. 12, 2004

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

4.6.3 TEST PROCEDURES

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
3. The center frequency of the spectrum analyzer is set to the fundamental frequency and using 1 MHz RBW and 1 MHz VBW.
4. Measure the frequency difference of two frequencies that were attenuated 20dB from the reference level. Record the frequency difference as the emission bandwidth.
5. Repeat above procedures until all frequencies measured were complete.

4.6.4 DEVIATION FROM TEST STANDARD

No deviation

4.6.5 TEST SETUP



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

4.6.6 EUT OPERATING CONDITION

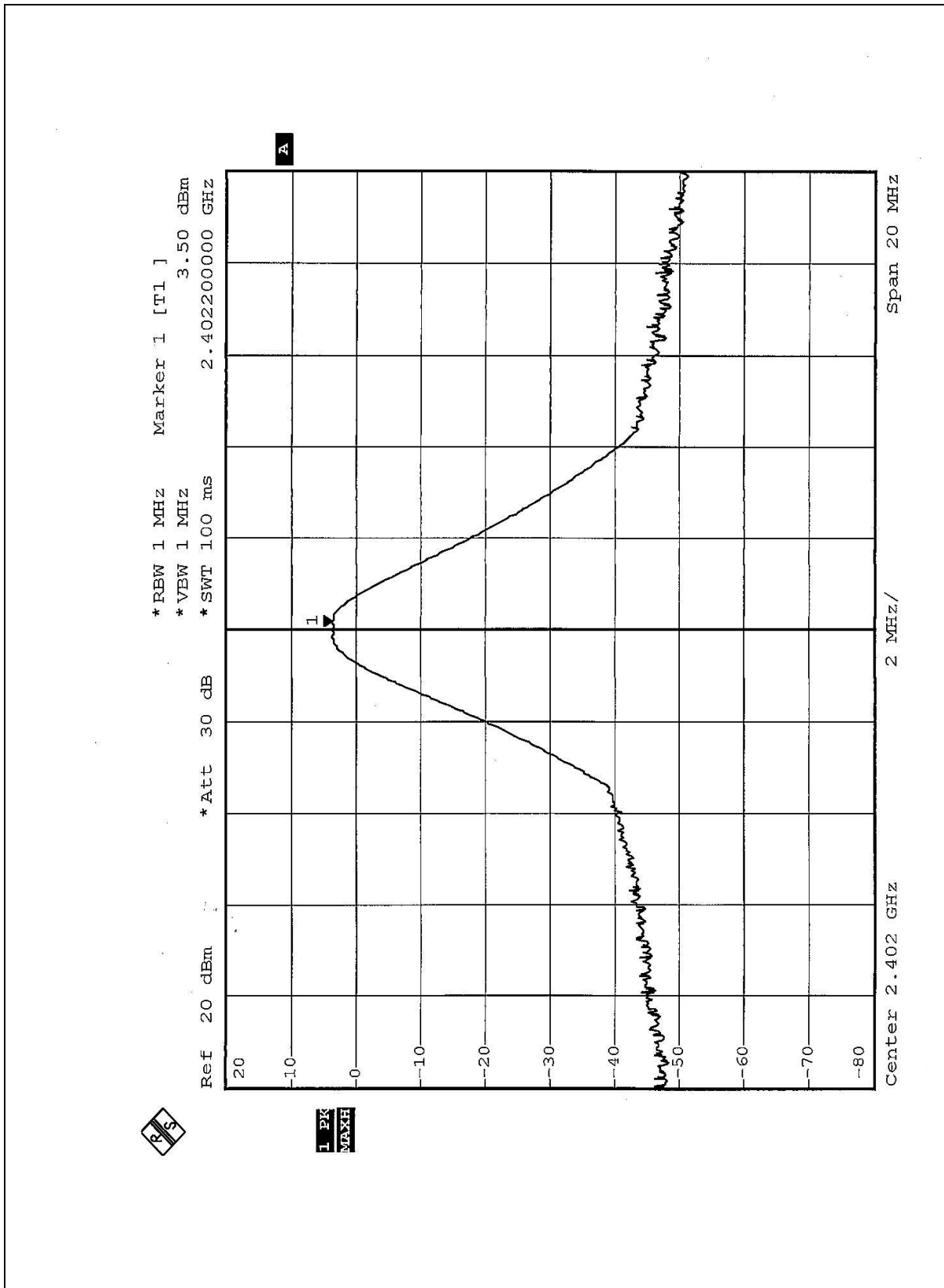
The software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel frequencies individually.

4.6.7 TEST RESULTS

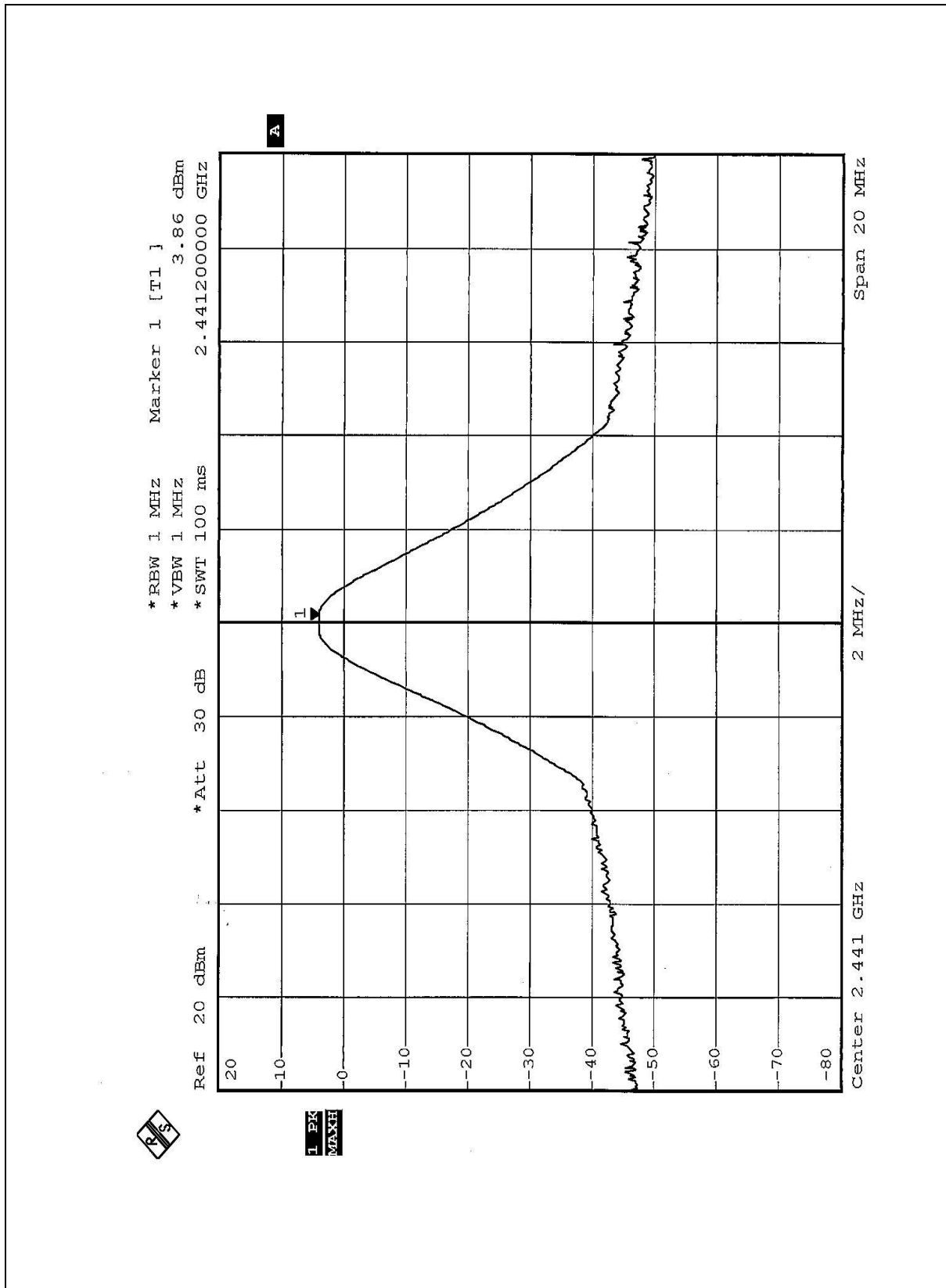
EUT	Wireless USB Printer Adapter	MODEL	F8T031
ENVIRONMENTAL CONDITIONS	23 deg. C, 60%RH, 991 hPa	INPUT POWER (SYSTEM)	120Vac, 60 Hz
TESTED BY: Ansen Lei			

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (dBm)	PEAK POWER LIMIT (dBm)	PASS/FAIL
0	2402	3.50	30	PASS
39	2441	3.86	30	PASS
78	2480	4.07	30	PASS

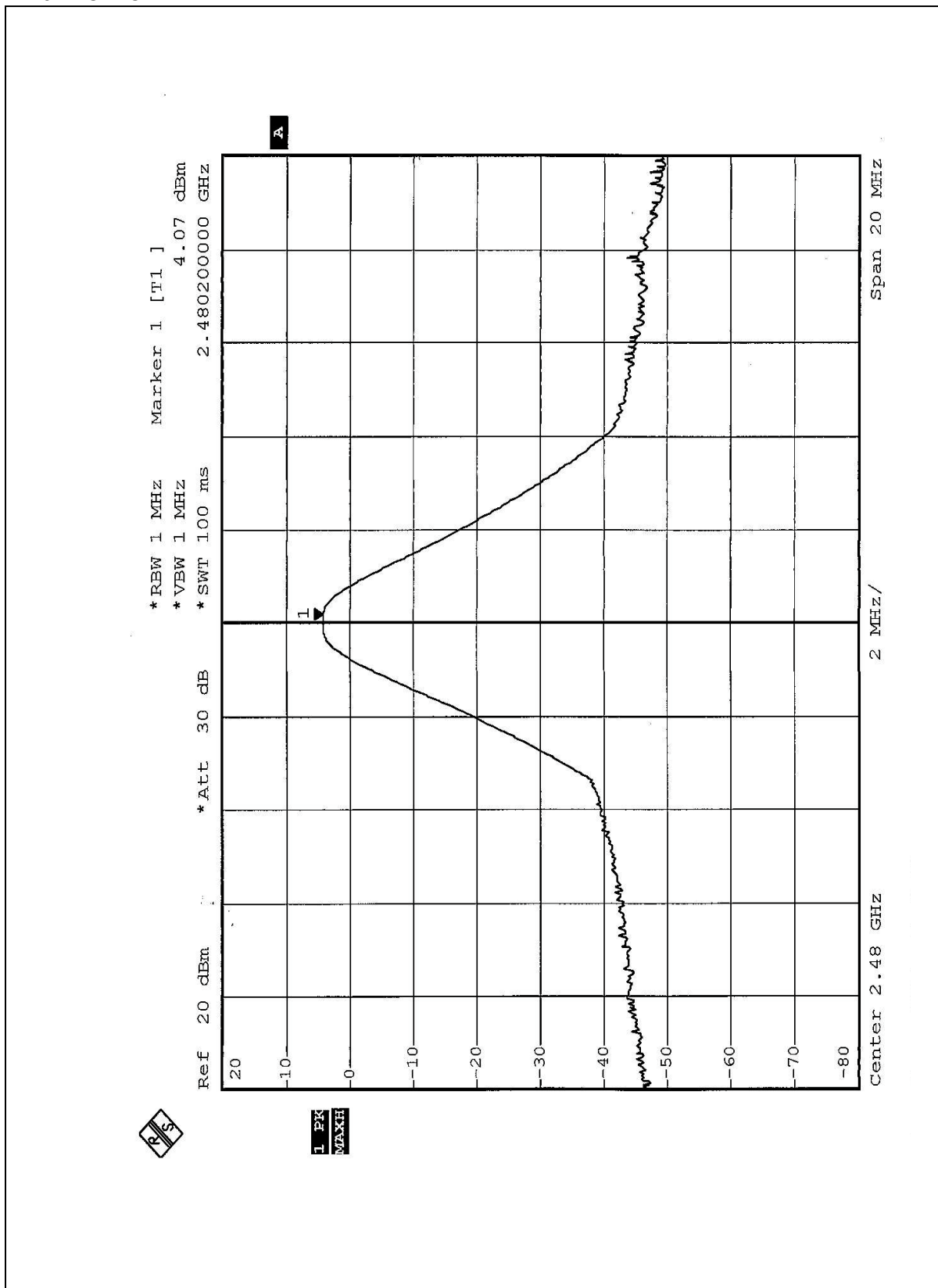
Channel 0



Channel 39



Channel 78



4.7 RADIATED EMISSION MEASUREMENT

4.7.1 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

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.

4.7.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
*HP Spectrum Analyzer	8593E	3911A07465	Jul. 07, 2004
*HP Preamplifier	8447D	2944A10386	Aug. 12, 2004
* HP Preamplifier	8449B	3008A01292	Aug. 11, 2004
SCHAFFNER Tunable Dipole Antenna	VHBA 9123	459	Jun. 26, 2004
SCHWARZBECK Tunable Dipole Antenna	UHA 9105	977	
*SCHAFFNER TEST RECEIVER	SCR 3501	409	Nov. 06, 2004
* SCHAFFNER BILOG Antenna	CBL6111C	2727	Jul. 15, 2004
* SCHWARZBECK Horn Antenna	BBHA9120-D1	D130	Jun. 30, 2004
* ADT. Turn Table	TT100	0201	NA
* ADT. Tower	AT100	0201	NA
* Software	ADT_Radiated_V5.14	NA	NA
* ANRITSU RF Switches	MP59B	6100237246	Oct. 17, 2004
* TIMES RF cable	LMR-600	CABLE-ST10-01	Oct. 17, 2004

- 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. "*" = These equipment are used for the final measurement.
3. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
4. The test was performed in ADT Open Site No. 10.
5. The VCCI Site Registration No. is R-1625.

4.7.3 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.

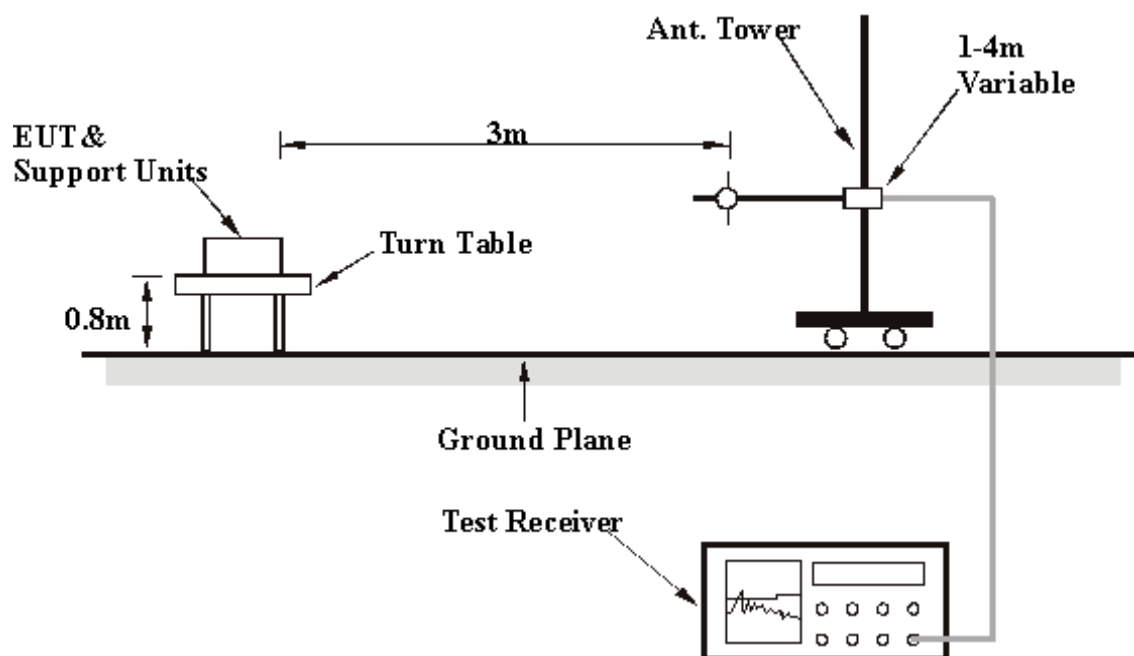
NOTE:

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

4.7.4 DEVIATION FROM TEST STANDARD

No deviation

4.7.5 TEST SETUP



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

4.7.6 TEST RESULTS

EUT	Wireless USB Printer Adapter	MODEL	F8T031
MODE	Channel 78	FREQUENCY RANGE	Below 1GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	23 deg. C, 70 % RH, 991hPa	TESTED BY: Jun Wu	

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	127.18	19.97 QP	43.50	-23.53	1.00 H	72	7.50	12.47
2	168.02	27.40 QP	43.50	-16.10	1.60 H	266	16.91	10.49
3	192.02	38.15 QP	43.50	-5.35	1.78 H	20	27.84	10.31
4	216.03	32.67 QP	46.00	-13.33	1.63 H	189	21.09	11.58
5	240.15	36.49 QP	46.00	-9.51	1.58 H	148	23.25	13.24
6	265.70	30.40 QP	46.00	-15.60	1.40 H	0	15.07	15.33
7	288.03	41.53 QP	46.00	-4.47	1.48 H	344	25.68	15.85
8	361.30	28.55 QP	46.00	-17.45	1.54 H	24	10.79	17.76
9	527.50	32.70 QP	46.00	-13.30	1.63 H	239	10.01	22.69

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	48.02	36.94 QP	40.00	-3.06	1.41 V	2	27.81	9.13
2	58.99	37.80 QP	40.00	-2.20	1.00 V	28	31.84	5.96
3	120.13	35.91 QP	43.50	-7.59	1.14 V	293	23.46	12.45
4	168.01	35.99 QP	43.50	-7.51	1.17 V	6	25.50	10.49
5	192.03	40.04 QP	43.50	-3.46	1.00 V	129	29.73	10.31
6	216.03	28.41 QP	46.00	-17.59	1.06 V	319	16.83	11.58
7	288.28	32.40 QP	46.00	-13.60	1.46 V	294	16.54	15.86
8	385.80	36.28 QP	46.00	-9.72	1.19 V	1	17.47	18.81
9	528.06	32.74 QP	46.00	-13.26	1.02 V	72	10.04	22.70
10	576.50	31.69 QP	46.00	-14.31	1.50 V	4	7.76	23.93

- 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	Wireless USB Printer Adapter	MODEL	F8T031
CHANNEL	Channel 0	FREQUENCY RANGE	1 ~25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	20 deg. C, 65 % RH, 991hPa	TESTED BY	Allen 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)	Correction Factor (dB/m)
1	2385.90	50.72 PK	74.00	-23.28	1.68 H	33	20.15	30.57
1	2385.90	47.10 AV	54.00	-6.90	1.68 H	33	16.53	30.57
2	*2402.00	100.98 PK			1.68 H	33	70.57	30.41
2	*2402.00	70.98 AV			1.68 H	33	40.57	30.41
3	2594.00	55.69 PK	74.00	-18.31	1.91 H	205	24.72	30.97
3	2594.00	51.70 AV	54.00	-2.30	1.91 H	205	20.73	30.97
4	2658.00	52.13 PK	74.00	-21.87	1.55 H	225	20.83	31.30
4	2658.00	46.66 AV	54.00	-7.34	1.55 H	225	15.36	31.30
5	4804.00	58.45 PK	74.00	-15.55	1.91 H	344	21.97	36.48
5	4804.00	28.45 AV	54.00	-25.55	1.91 H	344	-8.03	36.48

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	2385.90	49.48 PK	74.00	-24.52	1.57 V	42	18.91	30.57
1	2385.90	45.84 AV	54.00	-8.16	1.57 V	42	15.27	30.57
2	*2402.00	99.74 PK			1.57 V	42	69.33	30.41
2	*2402.00	69.74 AV			1.57 V	42	39.33	30.41
3	2594.00	52.93 PK	74.00	-21.07	1.00 V	334	21.96	30.97
3	2594.00	48.62 AV	54.00	-5.38	1.00 V	334	17.65	30.97
4	2658.00	52.17 PK	74.00	-21.83	1.17 V	335	20.87	31.30
4	2658.00	47.06 AV	54.00	-6.94	1.17 V	335	15.76	31.30
5	4804.00	56.52 PK	74.00	-17.48	2.07 V	332	20.04	36.48
5	4804.00	26.52 AV	54.00	-27.48	2.07 V	332	-9.96	36.48

REMARKS:

1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB)
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.
5. “ * ” : Fundamental frequency
6. The DH5 packet was the worse case duty cycle for a transmit dwell time on a channel, based upon bluetooth theory the transmitter is on 0.625*5 per 247 ms per channel. Therefore, the duty cycle be equal to: $20\log(3.125/100) = -30\text{dB}$
7. Average value = peak reading $-20\log(\text{duty cycle})$

EUT	Wireless USB Printer Adapter	MODEL	F8T031
CHANNEL	Channel 39	FREQUENCY RANGE	1 ~25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	20 deg. C, 65 % RH, 991hPa	TESTED BY	Allen Chang

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3M

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	100.03 PK			1.43 H	200	69.60	30.43
1	*2441.00	70.03 AV			1.43 H	200	39.60	30.43
2	2681.00	51.42 PK	74.00	-22.58	1.56 H	211	20.00	31.42
2	2681.00	46.01 AV	54.00	-7.99	1.56 H	211	14.59	31.42
3	2697.00	53.37 PK	74.00	-20.63	1.58 H	181	21.87	31.50
3	2697.00	47.88 AV	54.00	-6.12	1.58 H	181	16.38	31.50
4	4882.00	54.74 PK	74.00	-19.26	1.42 H	78	17.97	36.77
4	4882.00	24.74 AV	54.00	-29.26	1.42 H	78	-12.03	36.77

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3M

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	100.79 PK			1.12 V	37	70.36	30.43
1	*2441.00	70.79 AV			1.12 V	37	40.36	30.43
2	2681.00	49.63 PK	74.00	-24.37	2.11 V	26	18.21	31.42
2	2681.00	44.00 AV	54.00	-10.00	2.11 V	26	12.58	31.42
3	2697.00	49.41 PK	74.00	-24.59	2.09 V	26	17.91	31.50
3	2697.00	43.42 AV	54.00	-10.58	2.09 V	26	11.92	31.50
4	4882.00	52.25 PK	74.00	-21.75	2.10 V	334	15.48	36.77
4	4882.00	22.25 AV	54.00	-31.75	2.10 V	334	-14.52	36.77

- REMARKS:**
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB)
 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.
 5. " * " : Fundamental frequency
 6. The DH5 packet was the worse case duty cycle for a transmit dwell time on a channel, based upon bluetooth theory the transmitter is on 0.625*5 per 247 ms per channel. Therefore, the duty cycle be equal to: $20\log(3.125/100) = -30\text{dB}$
 7. Average value = peak reading $-20\log(\text{duty cycle})$

EUT	Wireless USB Printer Adapter	MODEL	F8T031
CHANNEL	Channel 78	FREQUENCY RANGE	1 ~25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak(PK) Average (AV)
ENVIRONMENTAL CONDITIONS	20 deg. C, 65 % RH, 991hPa	TESTED BY	Allen Chang

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3M

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	*2480.00	100.41 PK			1.91 H	44	69.95	30.46
1	*2480.00	70.41 AV			1.91 H	44	-39.95	30.46
2	2483.58	46.48 PK	74.00	-27.52	1.91 H	44	16.02	30.46
2	2483.58	42.83 AV	54.00	-11.17	1.91 H	44	12.37	30.46
3	2672.00	48.88 PK	74.00	-25.12	2.22 H	170	17.51	31.37
3	2672.00	43.31 AV	54.00	-10.69	2.22 H	170	11.94	31.37
4	2688.00	47.76 PK	74.00	-26.24	1.05 H	195	16.31	31.46
4	2688.00	40.52 AV	54.00	-13.48	1.05 H	195	9.07	31.46
5	4960.00	54.61 PK	74.00	-19.39	1.95 H	114	17.56	37.05
5	4960.00	24.61 AV	54.00	-29.39	1.95 H	114	-12.44	37.05

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3M

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	*2480.00	101.14 PK			1.00 V	1	75.68	30.46
1	*2480.00	71.14 AV			1.00 V	1	40.68	30.46
2	2483.58	52.21 PK	74.00	-21.79	1.00 V	1	21.75	30.46
2	2483.58	48.52 AV	54.00	-5.48	1.00 V	1	18.06	30.46
3	2672.00	48.67 PK	74.00	-25.33	1.25 V	8	17.30	31.37
3	2672.00	43.37 AV	54.00	-10.63	1.25 V	8	12.00	31.37
4	2688.00	46.41 PK	74.00	-27.59	1.50 V	230	14.96	31.46
4	2688.00	37.94 AV	54.00	-16.06	1.50 V	230	6.49	31.46
5	4960.00	53.19 PK	74.00	-20.81	2.10 V	312	16.14	37.05
5	4960.00	23.17 AV	54.00	-30.83	2.10 V	312	-13.88	37.05

REMARKS:

1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB)
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.
5. “ * ” : Fundamental frequency
6. The DH5 packet was the worse case duty cycle for a transmit dwell time on a channel, based upon bluetooth theory the transmitter is on 0.625*5 per 247 ms per channel. Therefore, the duty cycle be equal to: $20\log(3.125/100) = -30\text{dB}$
7. Average value = peak reading $-20\log(\text{duty cycle})$

4.8 BAND EDGES MEASUREMENT

4.8.1 LIMITS OF BAND EDGES MEASUREMENT

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

4.8.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
SPECTRUM ANALYZER	FSEK30	100049	Aug. 12, 2004

NOTES:

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

4.8.3 TEST PROCEDURE

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

4.8.4 DEVIATION FROM TEST STANDARD

No deviation

4.8.5 EUT OPERATING CONDITION

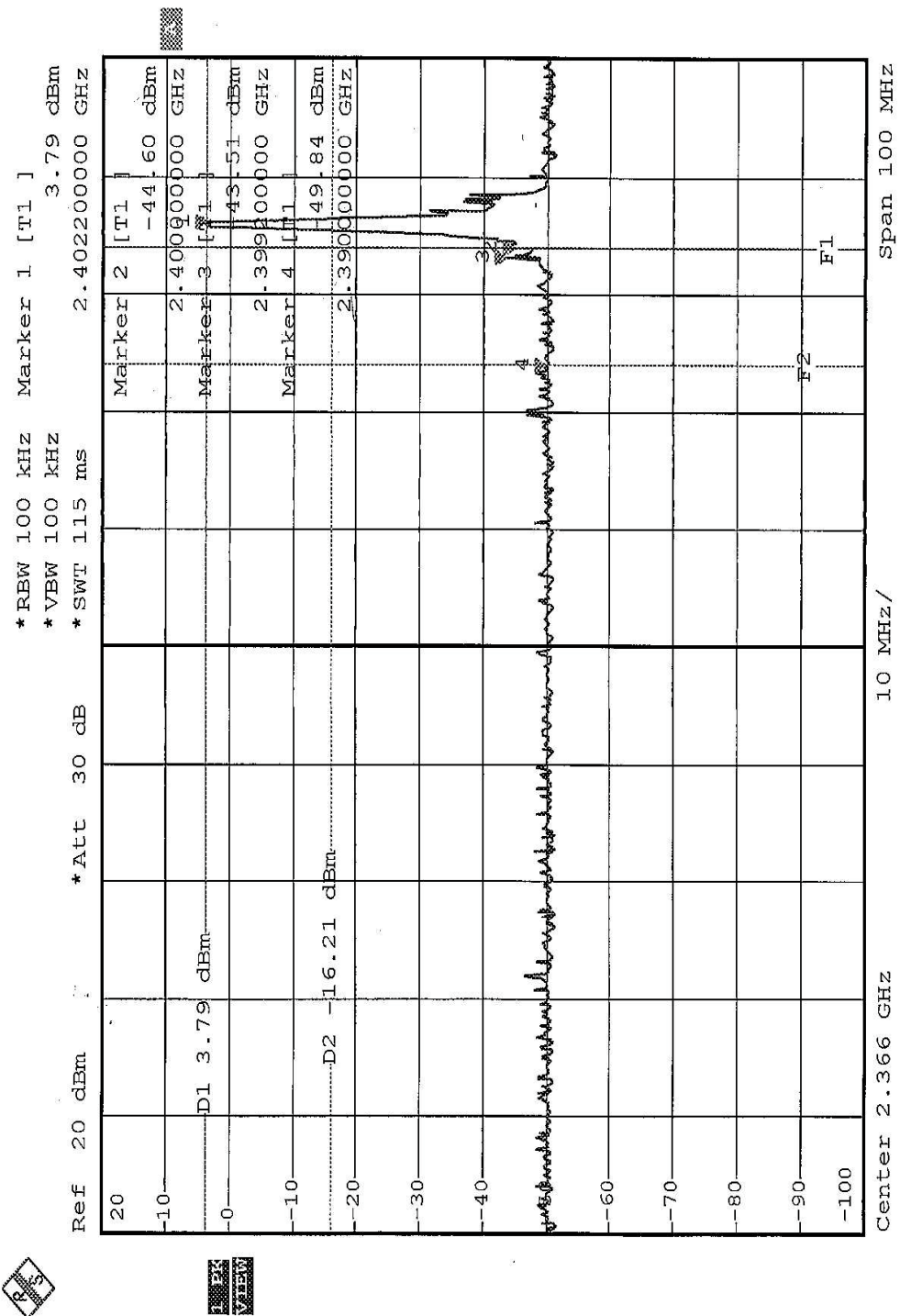
The software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel frequencies individually.

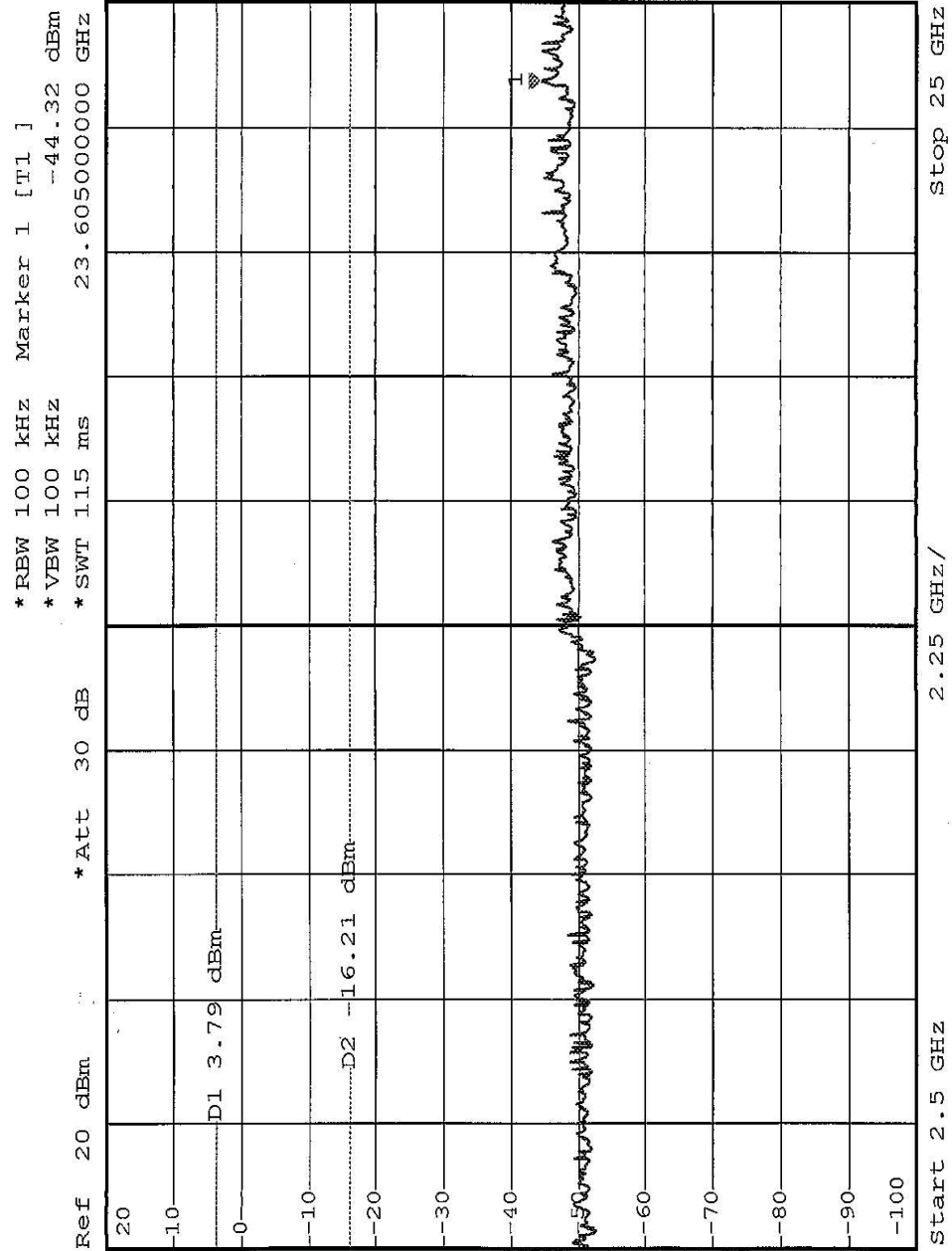
4.8.6 TEST RESULTS

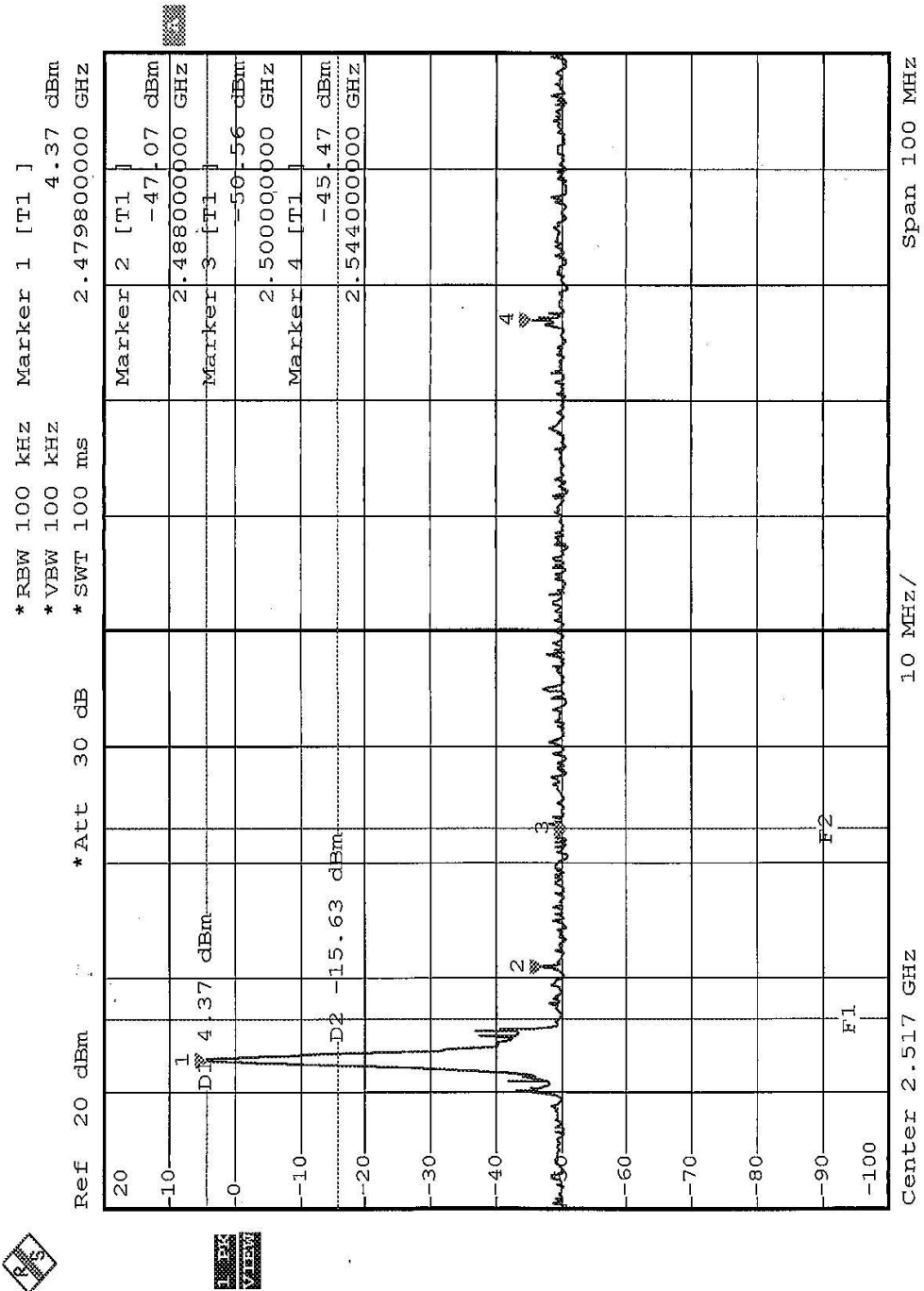
The spectrum plots are attached on the following 4 pages. D2 line indicates the highest level, D1 line indicates the 20dB offset below D2. It shows compliance with the requirement in part 15.247(C).

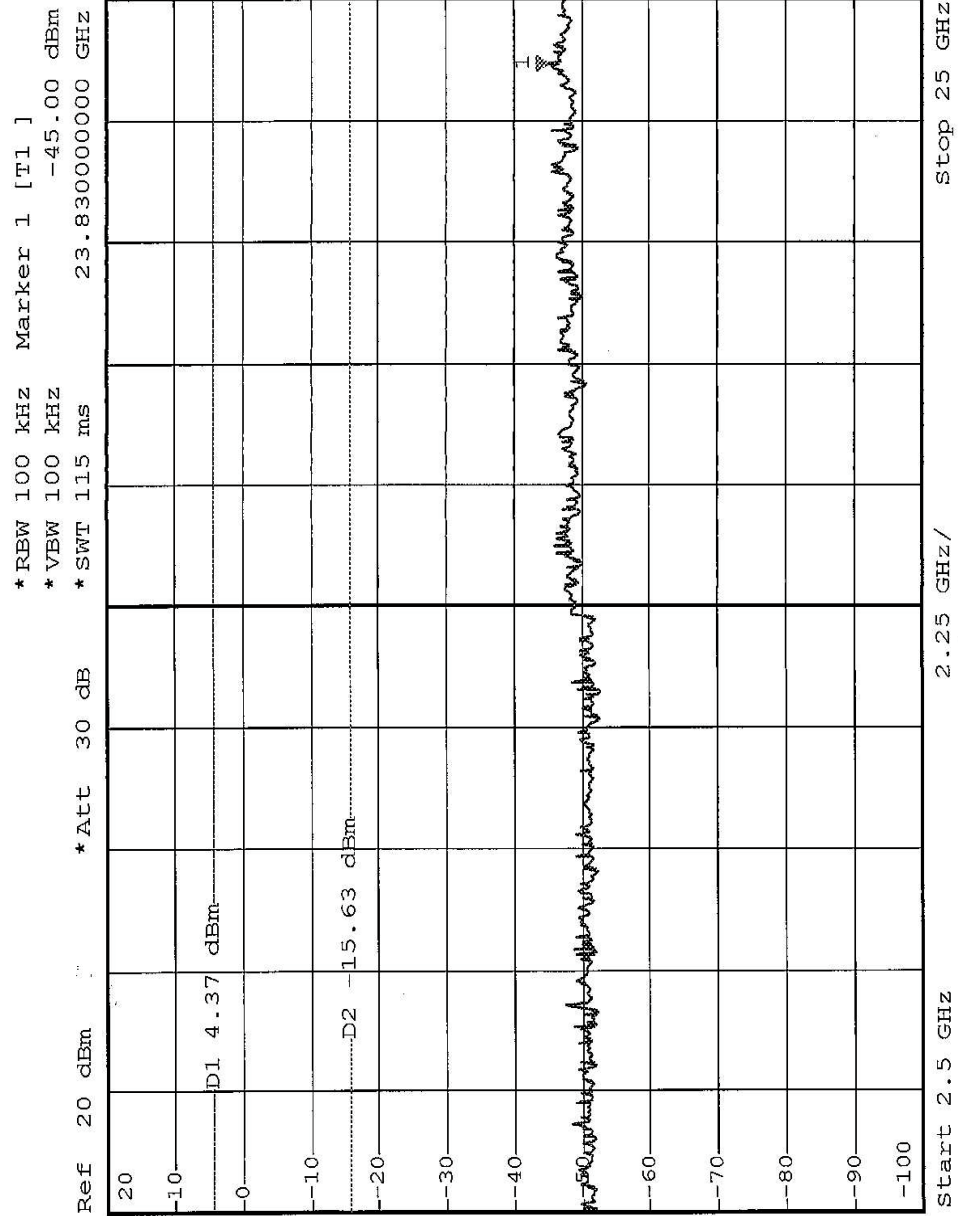
NOTE1: The band edge emission plot on the following 1 ~ 2 page shows 53.63dB delta between carrier maximum power and local maximum emission in restrict band (2.3900GHz). The emission of carrier strength list in the test result of channel 0 at the item 4.7.9 is 70.98dBuV/m, so the maximum field strength in restrict band is $70.98 - 53.63 = 17.35$ dBuV/m which is under 54 dBuV/m limit.

NOTE2: The band edge emission plot on the following 3 ~ 4 page shows 51.44dB delta between carrier maximum power and local maximum emission in restrict band (2.4839GHz). The emission of carrier strength list in the test result of channel 78 at the item 4.7.9 is 71.14dBuV/m, so the maximum field strength in restrict band is $71.14 - 51.44 = 19.70$ dBuV/m which is under 54 dBuV/m limit.











4.9 ANTENNA REQUIREMENT

4.9.1 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.

4.9.2 ANTENNA CONNECTED CONSTRUCTION

The antenna used in this product is Internal Patch Antenna without antenna connector. The maximum Gain of this antenna is only 2dBi.

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, 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
Germany	TUV Rheinland
Japan	VCCI
Norway	NEMKO
Canada	INDUSTRY CANADA , CSA
R.O.C.	CNLA, BSMI, DGT
Netherlands	Telefication
Singapore	PSB , GOST-ASIA(MOU)
Russia	CERTIS(MOU)

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.
If you have any comments, please feel free to contact us at the following:

Linko EMC/RF Lab:
Tel: 886-2-26052180
Fax: 886-2-26052943

Hsin Chu EMC/RF Lab:
Tel: 886-3-5935343
Fax: 886-3-5935342

Hwa Ya EMC/RF/Safety Lab:
Tel: 886-3-3183232
Fax: 886-3-3185050

Linko RF & Telecom Lab.
Tel: 886-3-3270910
Fax: 886-3-3270892

Email: service@mail.adt.com.tw
Web Site: www.adt.com.tw

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