



# FCC TEST REPORT

**REPORT NO.:** RF930420A10

**MODEL NO.:** XTBT01

**RECEIVED:** April 20, 2004

**TESTED:** April 27 ~ 28, 2004

**APPLICANT:** Think Outside, Inc.

**ADDRESS:** 85 Saratoga Ave Suite 200 Santa Clara.  
CA 95051, U.S.A.

**ISSUED BY:** Advance Data Technology Corporation

**LAB LOCATION:** 47 14th Lin, Chiapau Tsun, Linko, Taipei,  
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ILAC MRA

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## 1 CERTIFICATION

**PRODUCT :** Axim Executive keyboard with Bluetooth wireless technology

**BRAND NAME :** Dell

**MODEL NO. :** XTBT01

**APPLICANT :** Think Outside, Inc.

**TESTED:** April 27 ~ 28, 2004

**TEST ITEM :** Engineering Sample

**STANDARDS :** FCC Part 15, Subpart C (Section 15.247),  
ANSI C63.4-2001

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:** Annie Chang, **DATE:** May 6, 2004  
( Annie Chang )

**APPROVED BY:** Mike Su., **DATE:** May 6, 2004  
( Mike Su, 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	N/A	Please refer to item 3.3
15.247(a)(1)(I)-(ii)	Number of Hopping Frequency	PASS	Meet the requirement of limit
15.247(a)(1)(ii)	Dwell Time on Each Channel Spec. : Max. 0.4 second within 31.6 second	PASS	Meet the requirement of limit
15.247(a)(1)(I)-(ii)	Hopping Channel Separation Spec. : Min. 25 kHz or 20 dB bandwidth, whichever is greater	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 -2.11dB at 4960.00MHz
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

<b>PRODUCT</b>	Axim Executive keyboard with Bluetooth wireless technology
<b>MODEL NO.</b>	XTBT01
<b>POWER SUPPLY</b>	3.0Vdc from AAA Batteryx2
<b>MODULATION TYPE</b>	FHSS
<b>MODULATION TECHNOLOGY</b>	GFSK
<b>FREQUENCY RANGE</b>	2402MHz ~ 2480MHz
<b>NUMBER OF CHANNEL</b>	79
<b>OUTPUT POWER</b>	-2.46dBm
<b>ANTENNA TYPE</b>	Printed Antenna with 0dBi Antenna gain
<b>DATA CABLE</b>	NA
<b>I/O PORTS</b>	NA
<b>ASSOCIATED DEVICES</b>	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

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 Axim Executive keyboard with Bluetooth wireless technology. 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 : 2001

The EUT consumes DC power from battery and therefore, the test item **Conducted Test** was not tested.

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

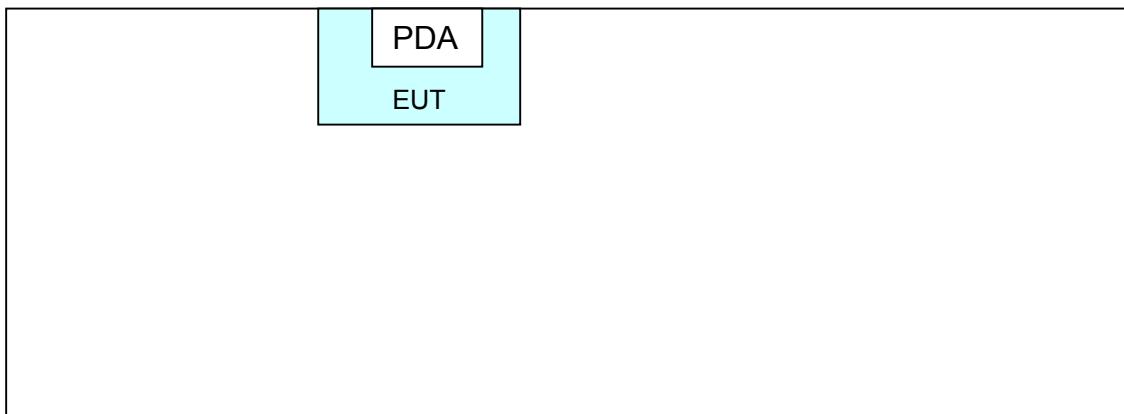
### 3.4 DESCRIPTION OF SUPPORT UNITS

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	PDA	HP	iPAQ	422-677	N/A

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	NA

**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 NUMBER OF HOPPING FREQUENCY USED

#### 4.1.1 LIMIT OF HOPPING FREQUENCY USED

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

#### 4.1.2 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.

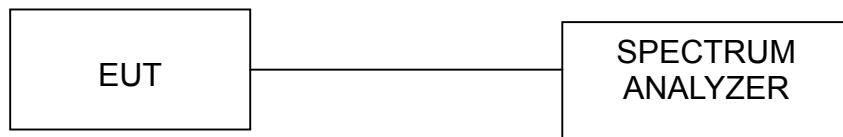
#### 4.1.3 TEST PROCEDURES

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.

#### 4.1.4 DEVIATION FROM TEST STANDARD

No deviation

#### 4.1.5 TEST SETUP

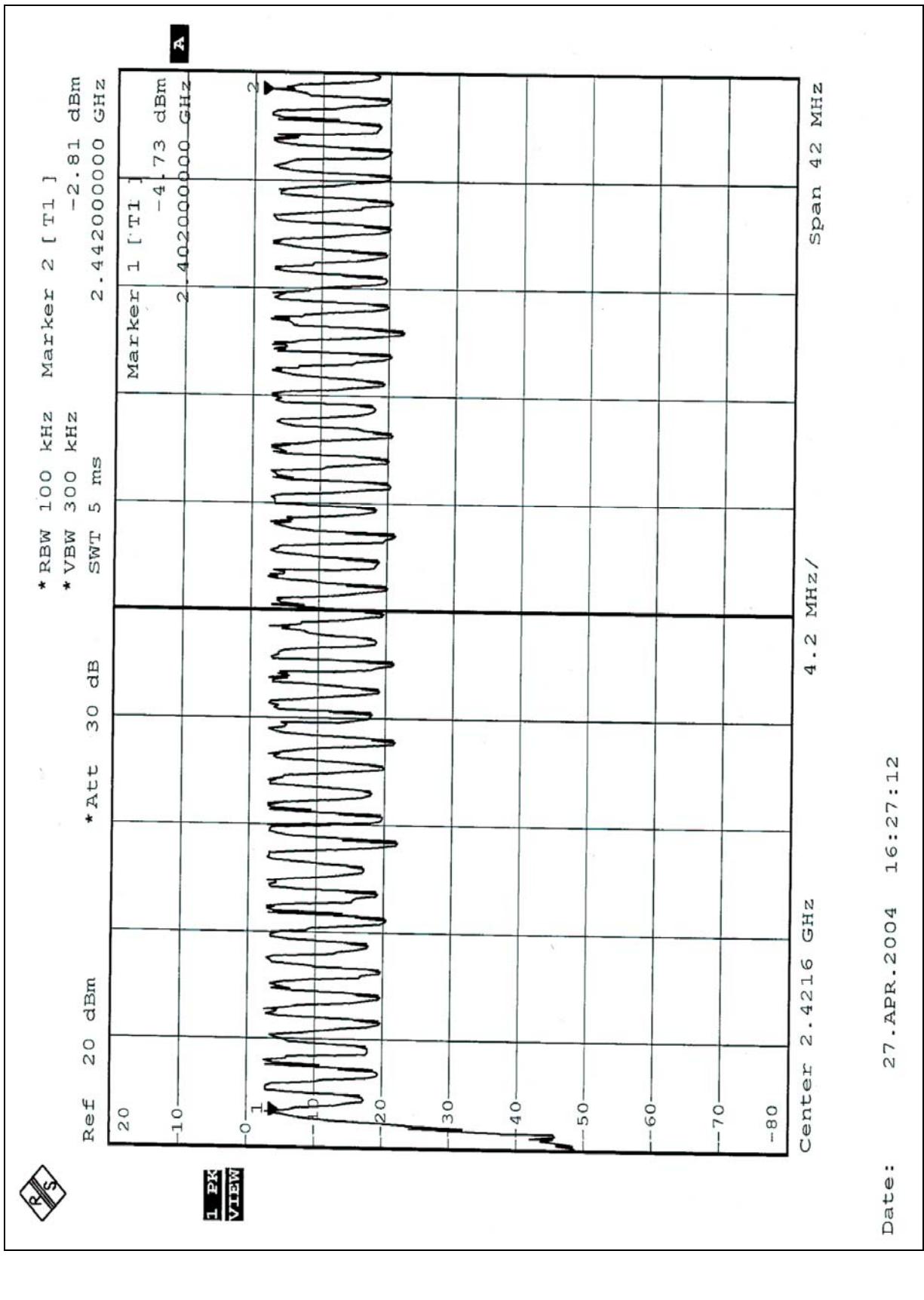


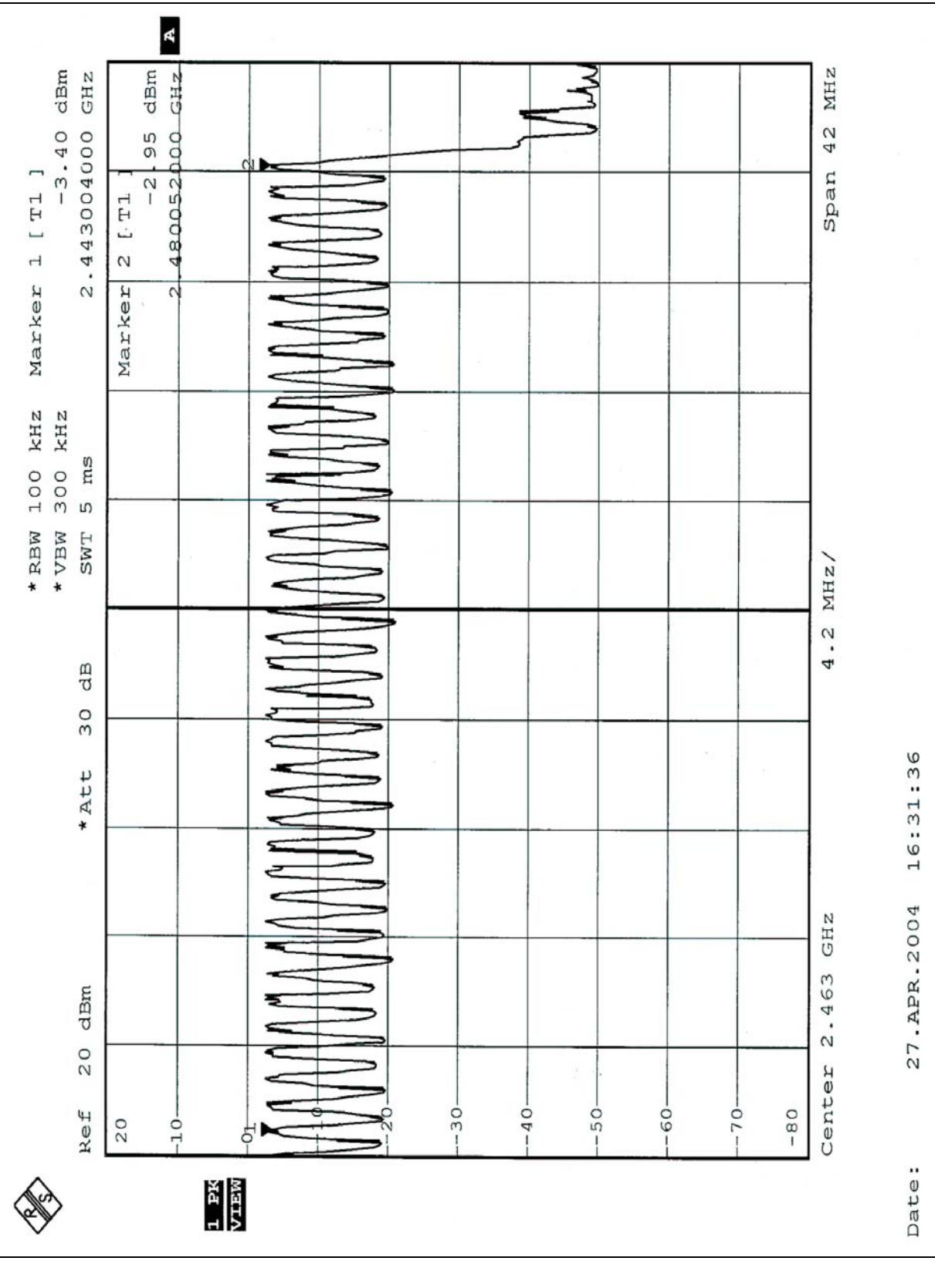
#### 4.1.6 EUT OPERATING CONDITIONS

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

#### 4.1.7 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.







## 4.2 DWELL TIME ON EACH CHANNEL

### 4.2.1 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.

### 4.2.2 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.

#### 4.2.3 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. Adjust the center frequency of SA on any frequency to 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.

#### 4.2.4 DEVIATION FROM TEST STANDARD

No deviation

#### 4.2.5 TEST SETUP

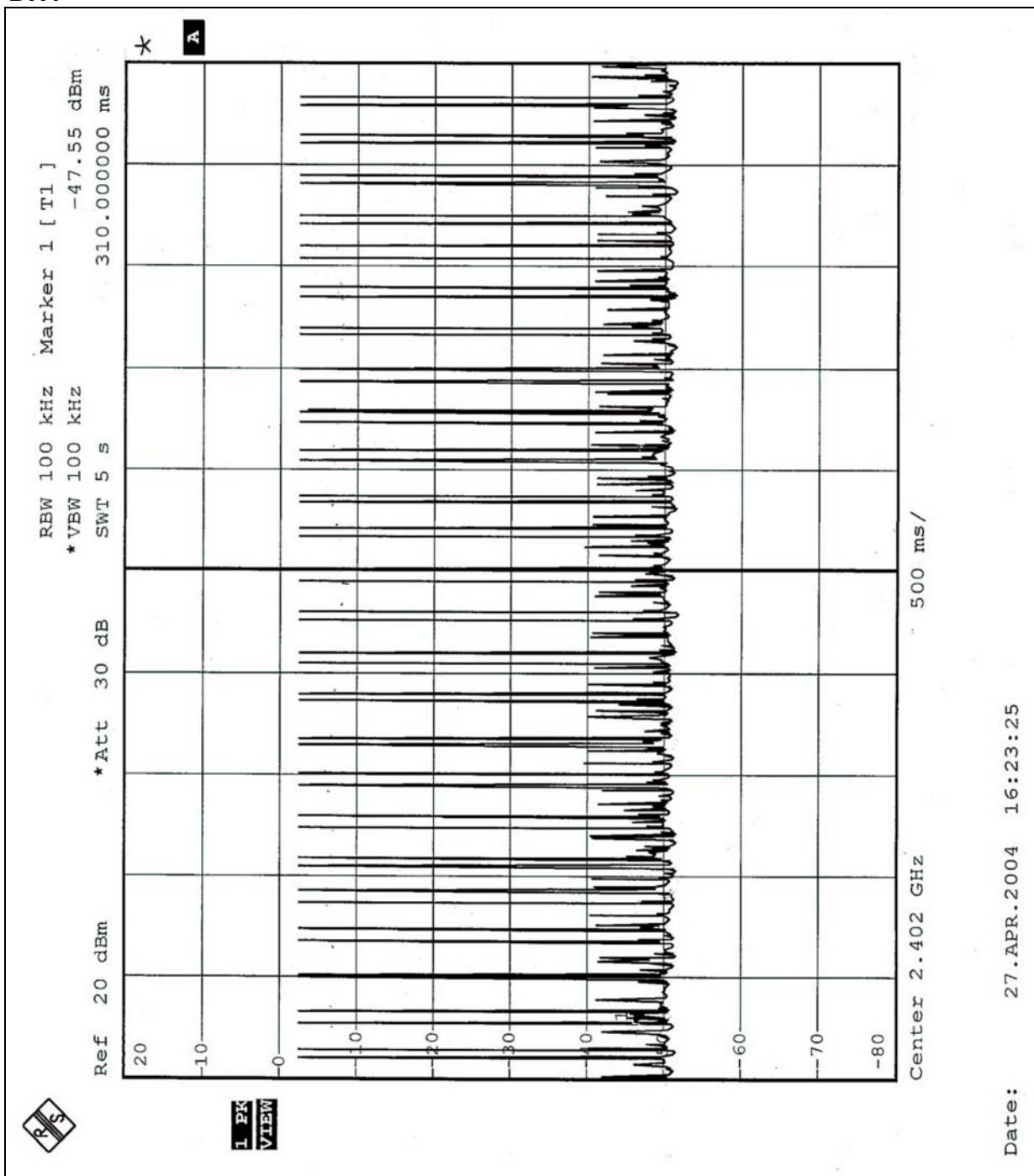


#### 4.2.6 TEST RESULTS

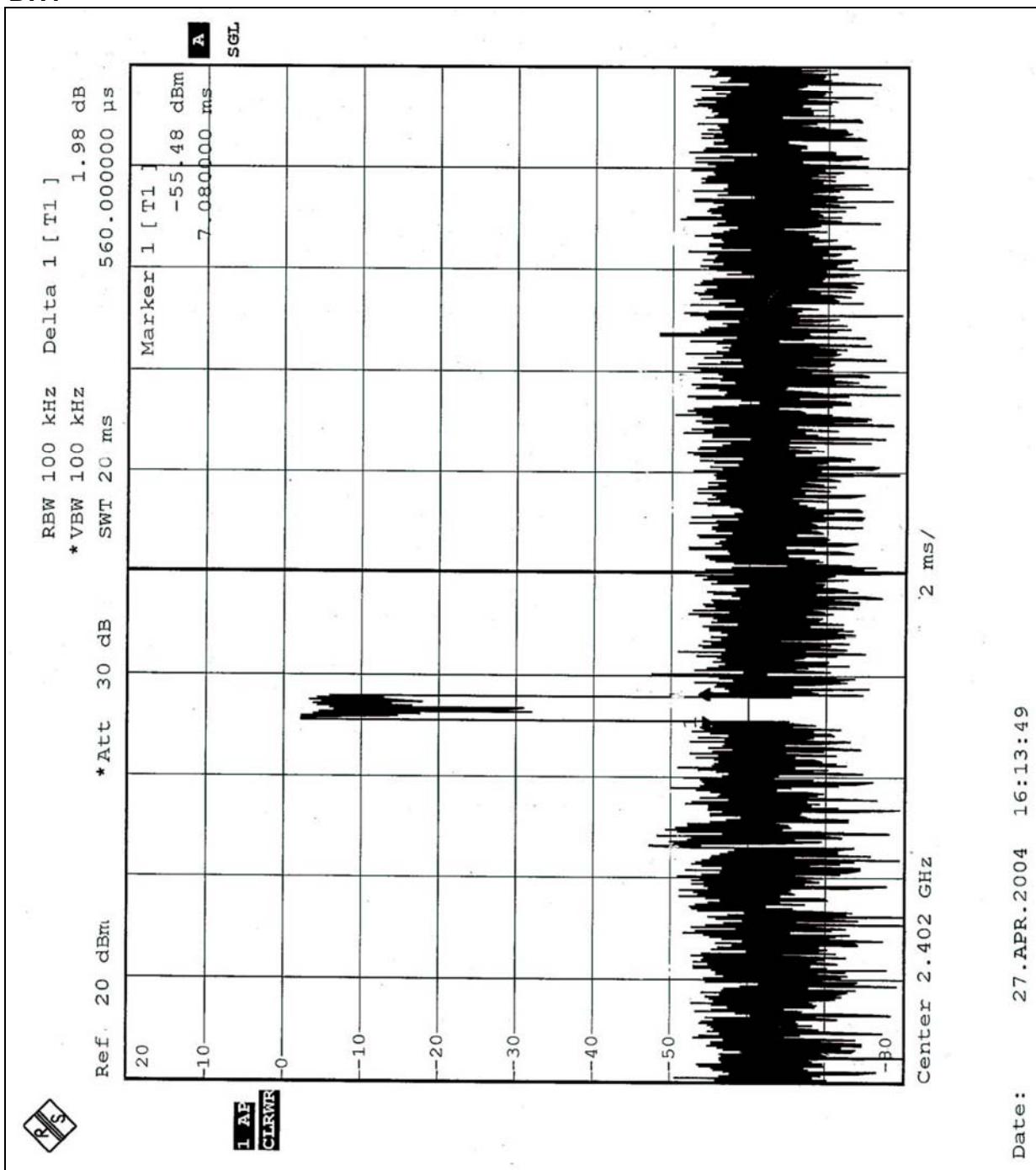
Mode	Number of transmission in a 31.6 (79Hopping*0.4)	Length of transmission time (msec)	Result (msec)	Limit (msec)
DH1	48 (times / 5 sec) *6.32=303.36 times	0.56	169.88	400

Test plots of the transmitting time slot are shown on next two pages, only DH1.

DH1



DH1



### 4.3 CHANNEL BANDWIDTH

#### 4.3.1 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.

#### 4.3.2 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.

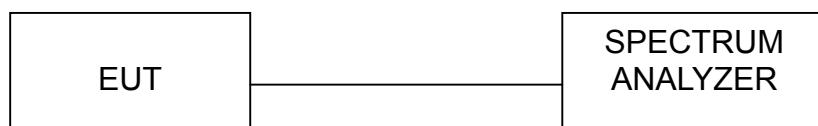
#### 4.3.3 TEST PROCEDURE

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.

#### 4.3.4 DEVIATION FROM TEST STANDARD

No deviation

#### 4.3.5 TEST SETUP



#### 4.3.6 EUT OPERATING CONDITION

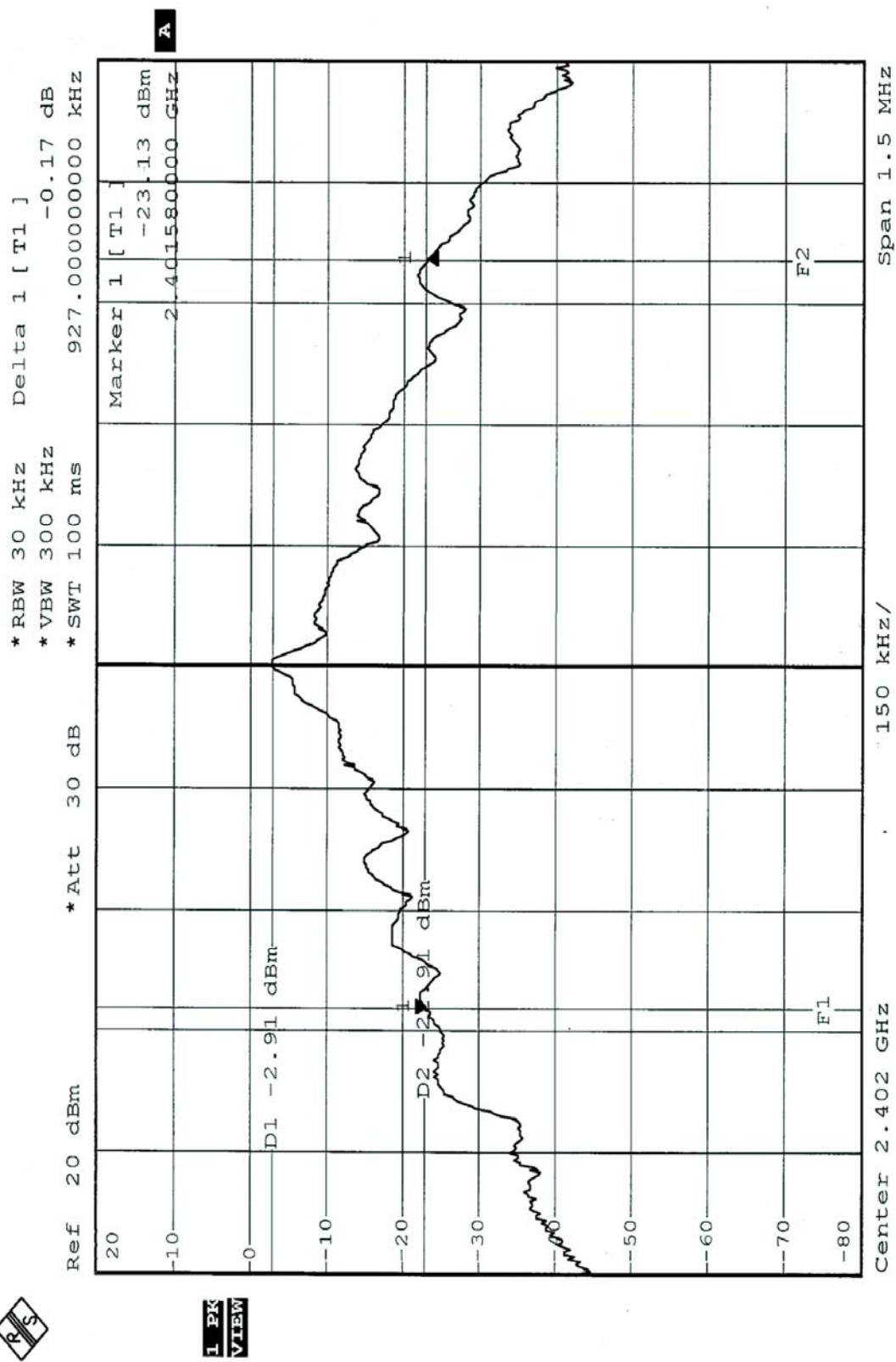
The software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel frequencies individually.

## 4.3.7 TEST RESULTS

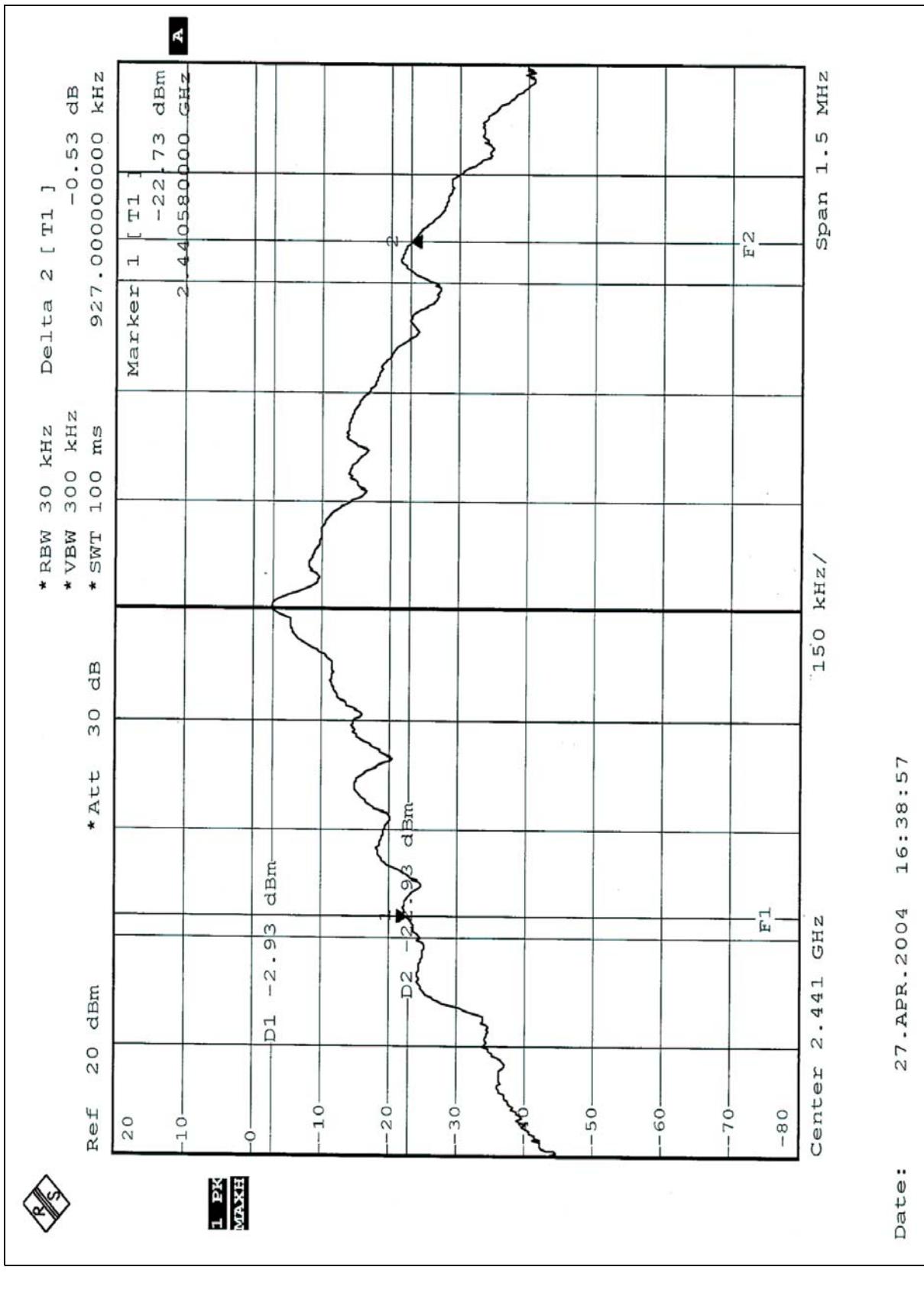
<b>EUT</b>	Axim Executive keyboard with Bluetooth wireless technology	<b>MODEL</b>	XTBT01
<b>ENVIRONMENTAL CONDITIONS</b>	20deg. C, 70%RH, 991 hPa	<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz
<b>TESTED BY:</b> Ansen Lei			

<b>CHANNEL</b>	<b>CHANNEL FREQUENCY (MHz)</b>	<b>20dB BANDWIDTH (kHz)</b>	<b>MAXIMUM LIMIT (MHz)</b>	<b>PASS/FAIL</b>
0	2402	927	1	PASS
39	2441	927	1	PASS
78	2480	915	1	PASS

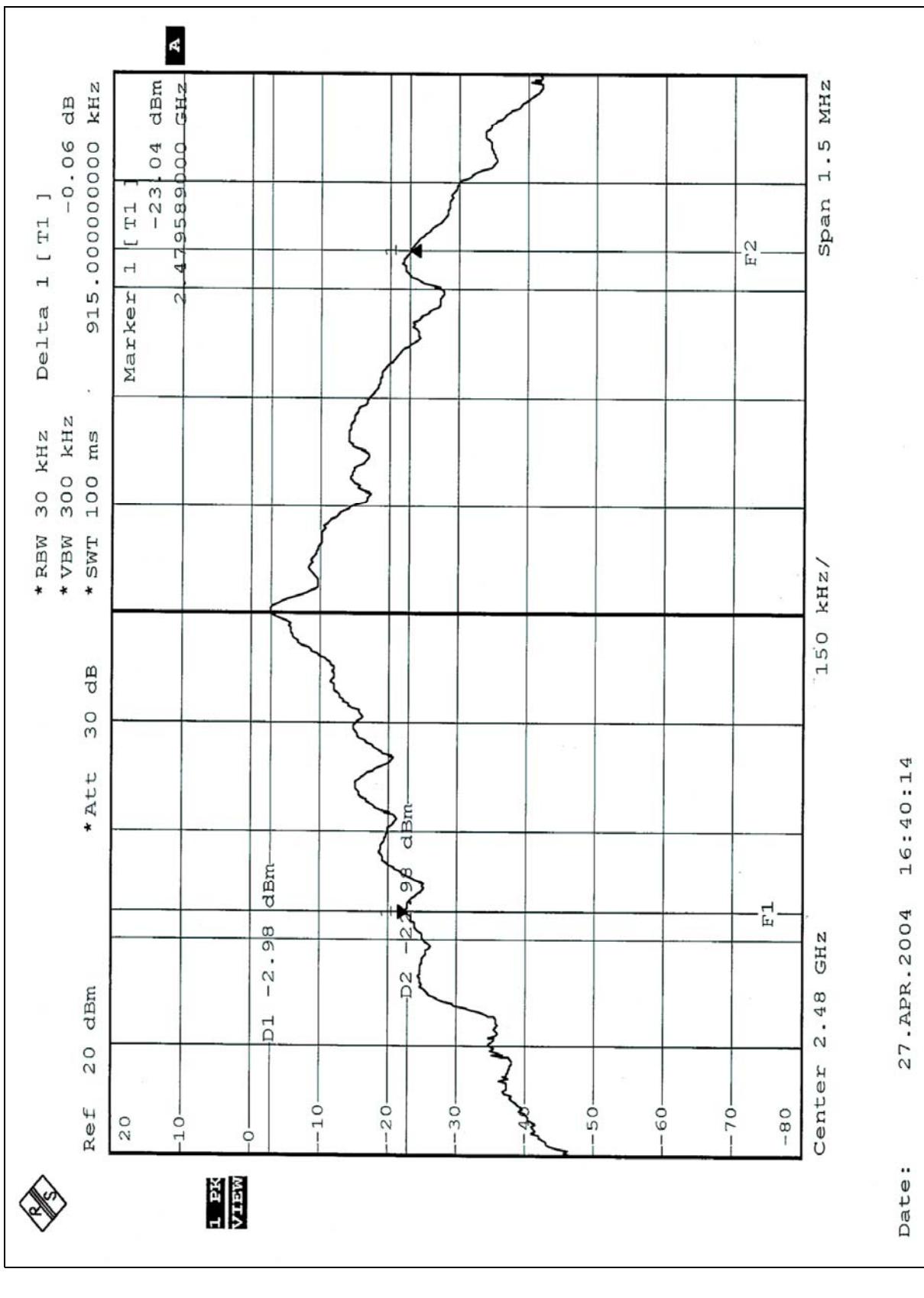
## Channel 0



## Channel 39



## Channel 78





## 4.4 HOPPING CHANNEL SEPARATION

### 4.4.1 LIMIT OF HOPPING CHANNEL SEPARATION

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

### 4.4.2 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.

#### 4.4.3 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.

#### 4.4.4 DEVIATION FROM TEST STANDARD

No deviation

#### 4.4.5 TEST SETUP



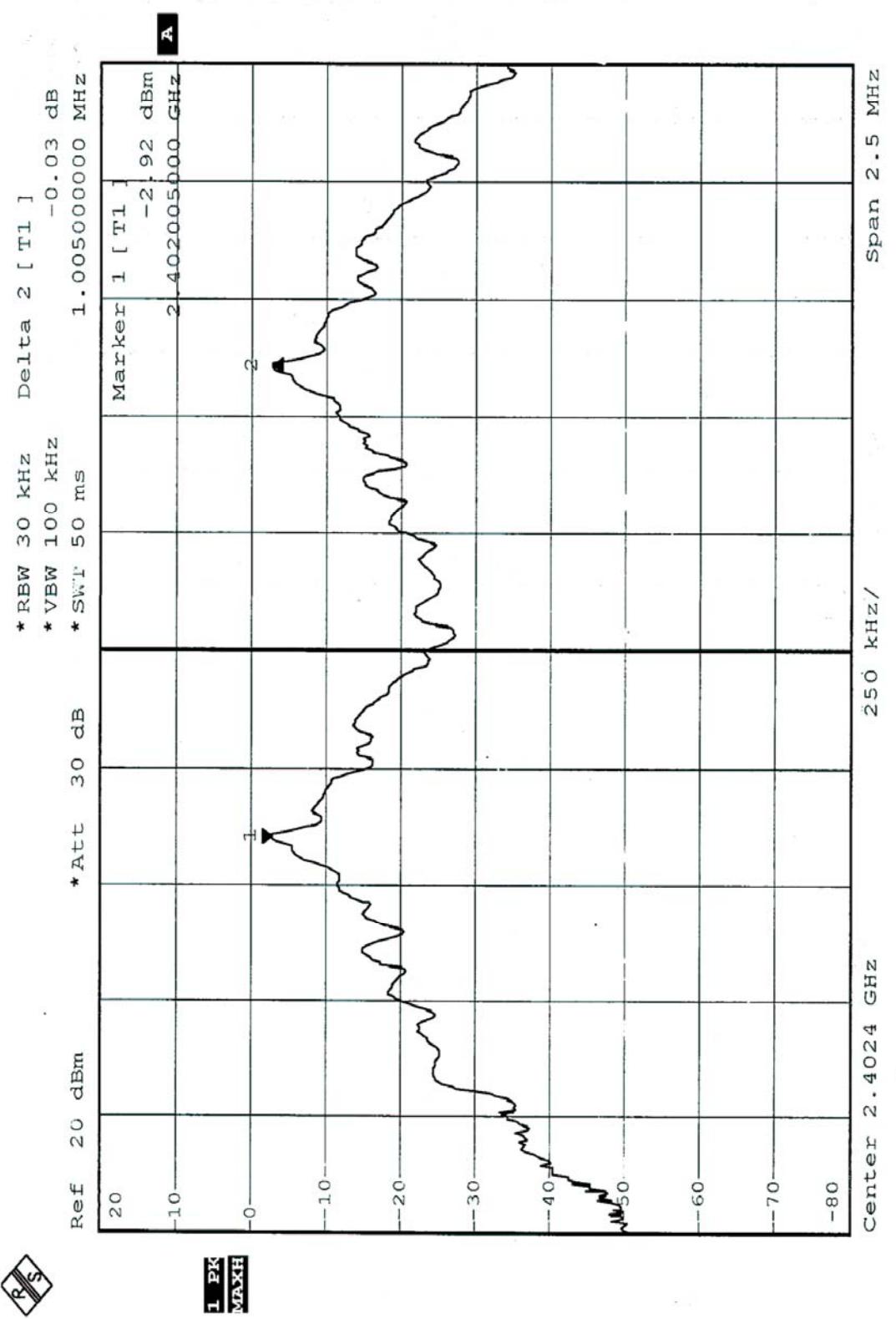
## 4.4.6 TEST RESULTS

<b>EUT</b>	Axim Executive keyboard with Bluetooth wireless technology	<b>MODEL</b>	XTBT01
<b>ENVIRONMENTAL CONDITIONS</b>	23 deg. C, 60%RH, 991 hPa	<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz
<b>TESTED BY:</b> Ansen Lei			

<b>Channel</b>	<b>Frequency (MHz)</b>	<b>Adjacent Channel Separation</b>	<b>Minimum Limit (kHz)</b>	<b>Pass / Fail</b>
0	2402	1.005MHz	927	PASS
39	2441	1.000MHz	927	PASS
78	2480	1.005MHz	915	PASS

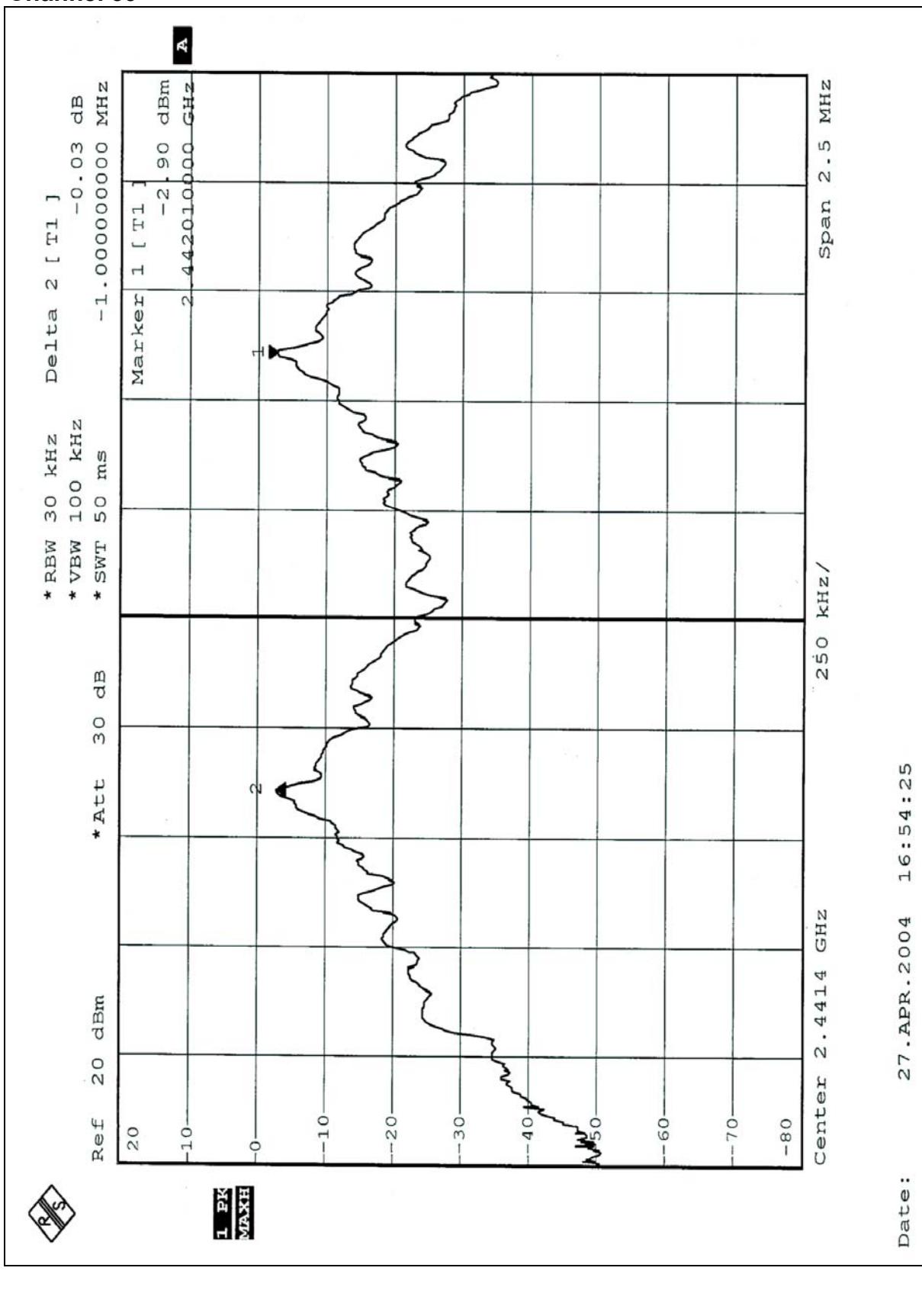
The minimum limit is 20dB bandwidth. Test results please refer to next three pages.

## Channel 0

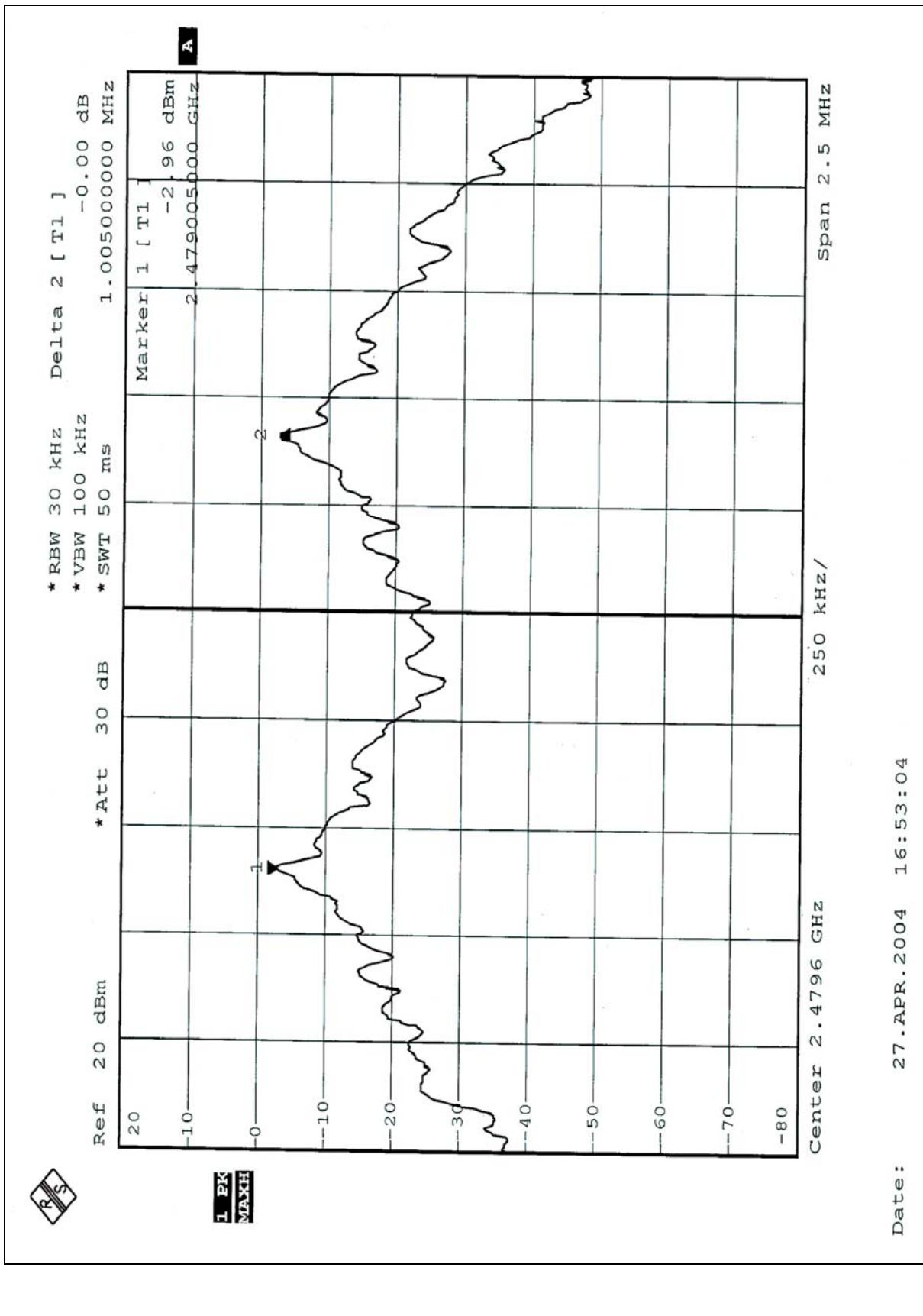


Date: 27 . APR . 2004 16 : 55 : 32

## Channel 39



## Channel 78



Date: 27.APR.2004 16:53:04

## 4.5 MAXIMUM PEAK OUTPUT POWER –USING POWER METTER

### 4.5.1 LIMITS OF MAXIMUM PEAK OUTPUT POWER MEASUREMENT

The Maximum Peak Output Power Measurement is 30dBm.

### 4.5.2 INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
SPECTRUM ANALYER	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.

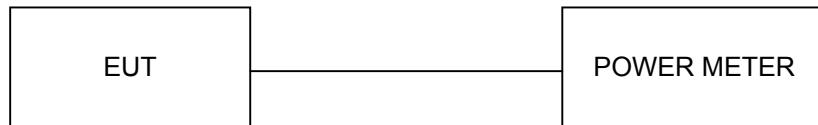
#### 4.5.3 TEST PROCEDURES

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. 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 3 MHz RBW and 3 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.

#### 4.5.4 DEVIATION FROM TEST STANDARD

No deviation

#### 4.5.5 TEST SETUP



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

#### 4.5.6 EUT OPERATING CONDITION

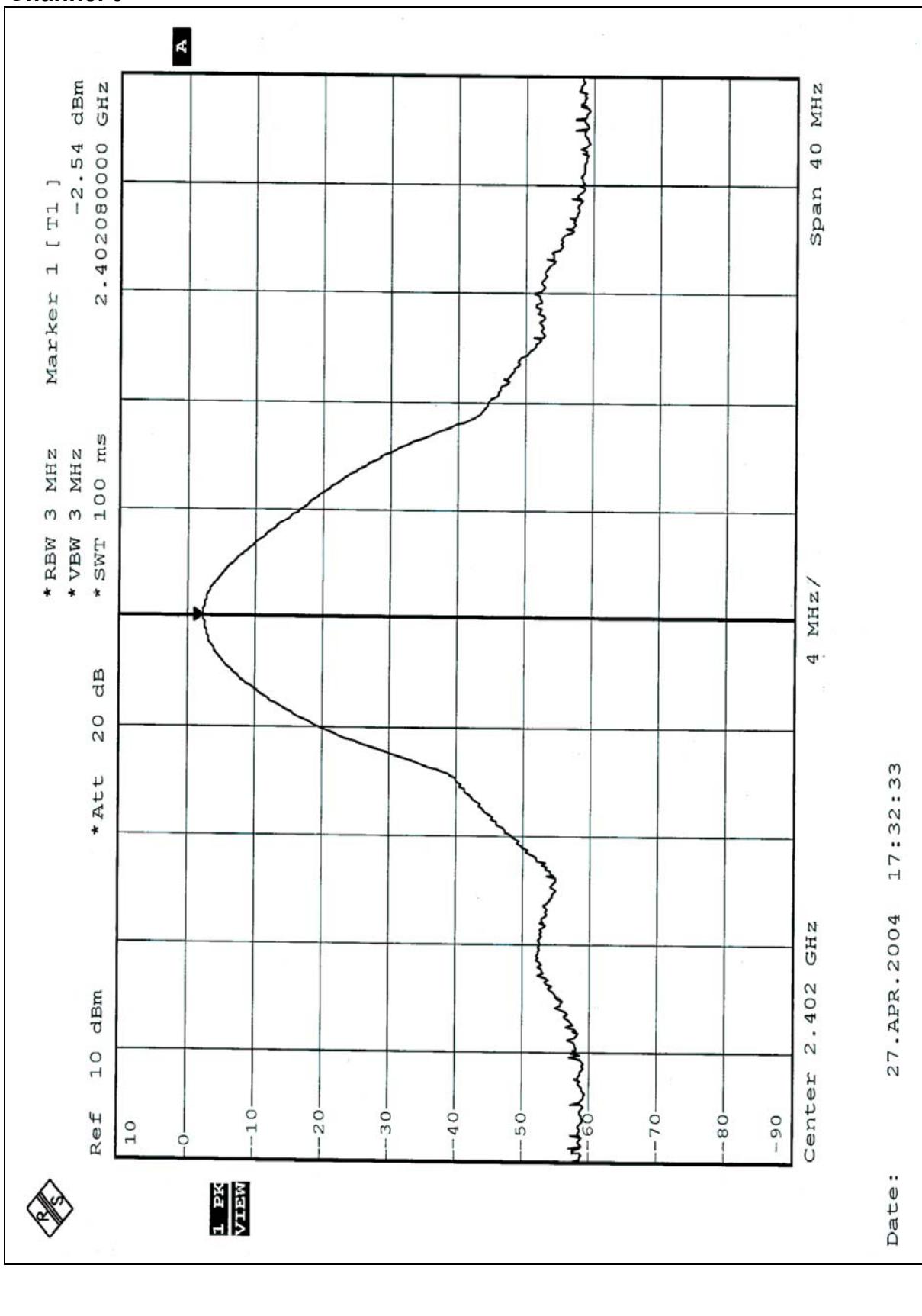
The software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel frequencies individually.

## 4.5.7 TEST RESULTS

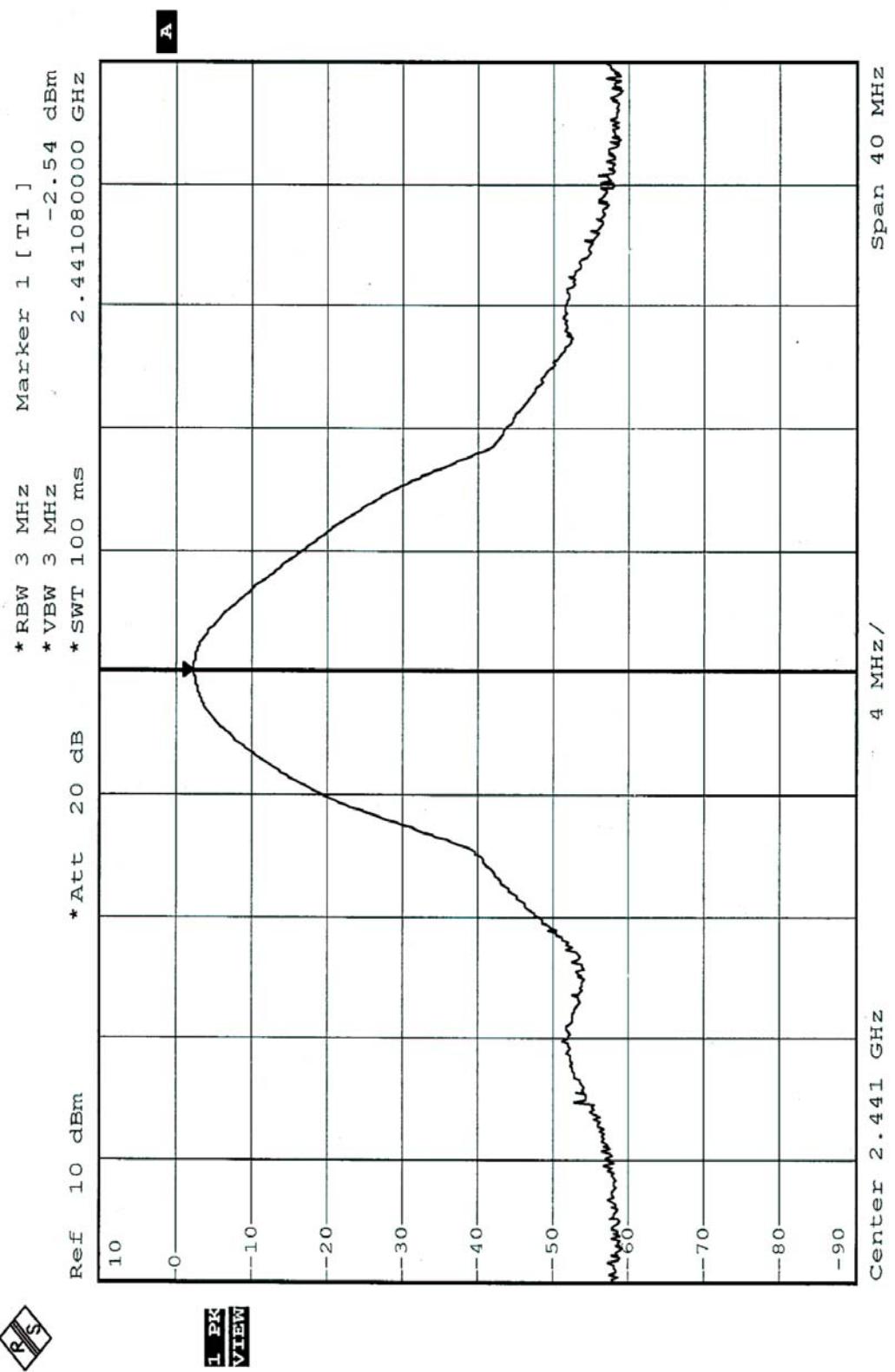
<b>EUT</b>	Axim Executive keyboard with Bluetooth wireless technology	<b>MODEL</b>	XTBT01
<b>ENVIRONMENTAL CONDITIONS</b>	23 deg. C, 60%RH, 991 hPa	<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz
<b>TESTED BY:</b> Ansen Lei			

<b>CHANNEL</b>	<b>CHANNEL FREQUENCY (MHz)</b>	<b>PEAK POWER OUTPUT (dBm)</b>	<b>PEAK POWER LIMIT (dBm)</b>	<b>PASS/FAIL</b>
0	2402	-2.54	30	PASS
39	2441	-2.54	30	PASS
78	2480	-2.46	30	PASS

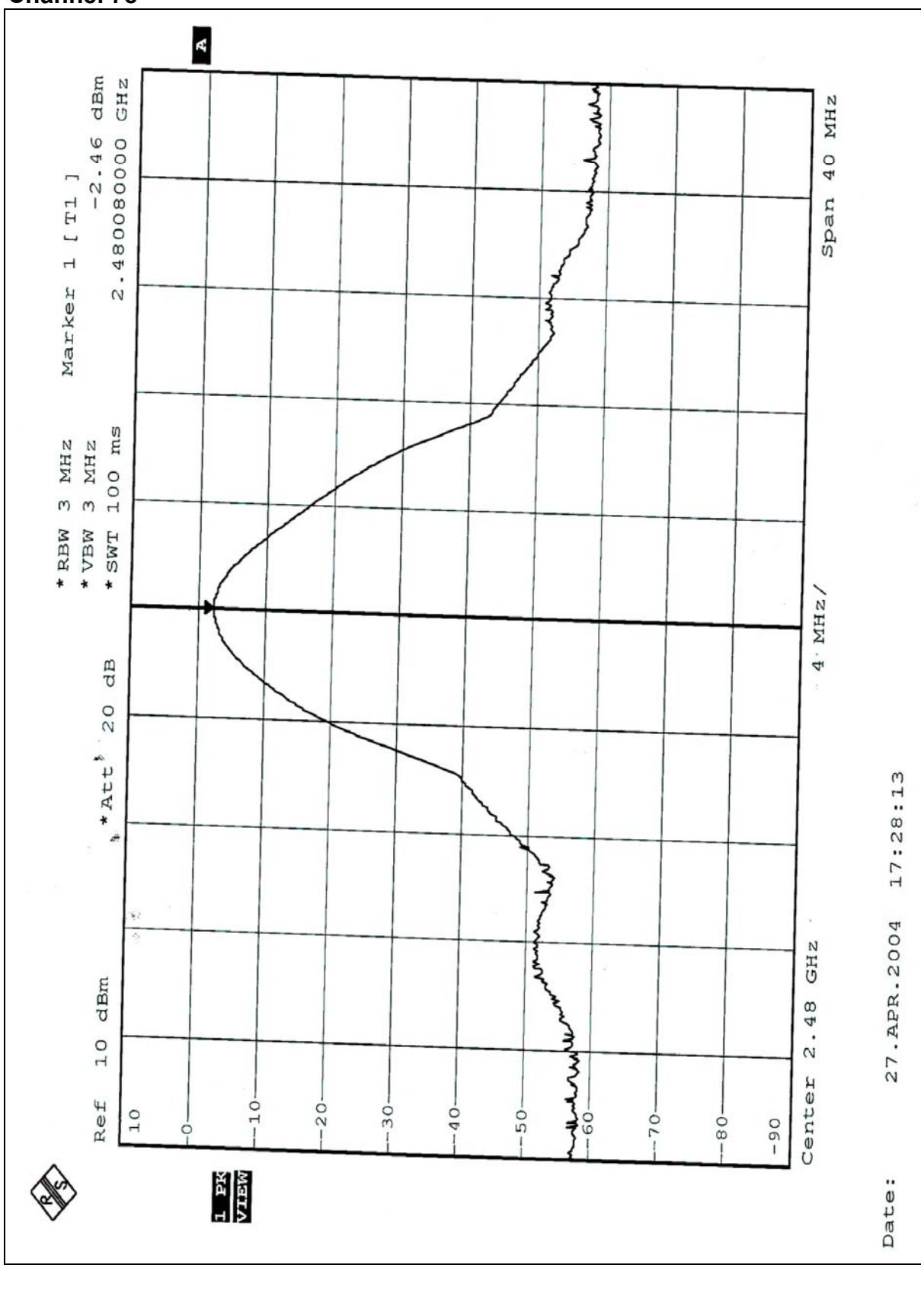
## Channel 0



## Channel 39



## Channel 78



## 4.6 RADIATED EMISSION MEASUREMENT

### 4.6.1 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.

#### 4.6.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
* HP Preamplifier	8447D	2432A03504	June 10, 2004
* HP Preamplifier	8449B	3008A01924	Oct. 12, 2004
* HP Preamplifier	8449B	3008A01638	Oct. 17, 2004
SCHWARZBECK Tunable Dipole Antenna	VHA 9103	NA	
SCHWARZBECK Tunable Dipole Antenna	UHA 9105	977	Nov. 15, 2004
* ROHDE & SCHWARZ TEST RECEIVER	ESMI	839013/007 839379/002	Feb. 12, 2005
Schwarzbeck Antenna	VULB9168	137	Feb. 27, 2005
* EMCO Horn Antenna	3115	6714	Nov. 26, 2004
* EMCO Horn Antenna	3115	9312-4192	Feb. 28, 2005
ADT. Turn Table	TT100	0306	NA
ADT. Tower	AT100	0306	NA
Software	ADT_Radiated_V6	NA	NA
TIMES RF cable	LL142	CABLE-CH6-01	Apr. 16, 2005

**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 Chamber No. 6.  
 5. The Industry Canada Reference No. IC 3789-6.

#### 4.6.3 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.

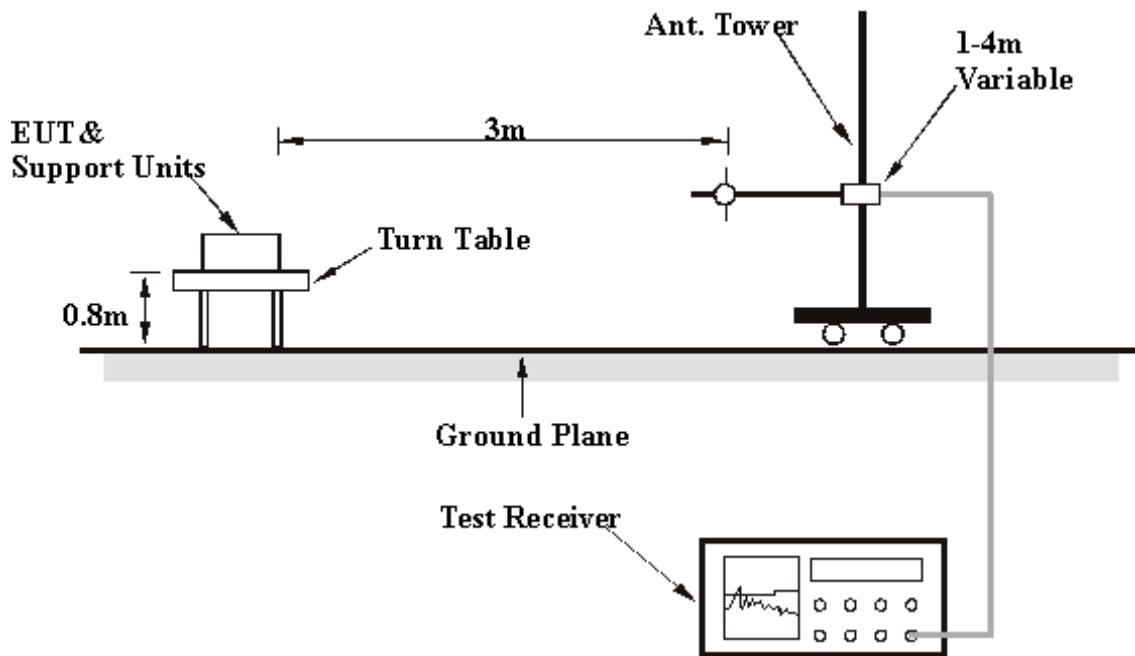
**NOTE:**

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.

#### 4.6.4 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 TEST RESULTS

<b>EUT</b>	Axim Executive keyboard with Bluetooth wireless technology	<b>MODEL</b>	XTBT01
<b>MODE</b>	Channel 78	<b>FREQUENCY RANGE</b>	Below 1GHz
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>DETECTOR FUNCTION</b>	Quasi-Peak
<b>ENVIRONMENTAL CONDITIONS</b>	21 deg. C, 70 % RH, 991hPa		<b>TESTED BY:</b> Martin Lee

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	210.78	26.74 QP	43.50	-16.76	3.00 H	112	15.17	11.57
2	241.88	28.14 QP	46.00	-17.86	2.50 H	232	15.60	12.55
3	346.85	26.38 QP	46.00	-19.62	4.00 H	91	9.61	16.77
4	447.94	26.14 QP	46.00	-19.86	3.00 H	124	6.83	19.31
5	498.48	28.06 QP	46.00	-17.94	3.00 H	103	7.32	20.74
6	597.62	27.70 QP	46.00	-18.30	3.00 H	277	4.79	22.91
7	852.26	26.43 QP	46.00	-19.57	3.00 H	7	-0.01	26.43
8	945.57	27.18 QP	46.00	-18.82	4.00 H	331	-0.29	27.47

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	37.78	24.27 QP	40.00	-15.73	1.00 V	109	10.84	13.43
2	105.81	24.15 QP	43.50	-19.35	1.00 V	304	14.09	10.05
3	179.68	26.00 QP	43.50	-17.50	1.00 V	334	12.69	13.32
4	216.61	30.62 QP	46.00	-15.38	2.00 V	172	18.87	11.75
5	253.55	31.45 QP	46.00	-14.55	1.50 V	178	18.60	12.85
6	284.65	31.90 QP	46.00	-14.10	1.50 V	4	16.53	15.37
7	315.75	30.67 QP	46.00	-15.33	1.50 V	340	14.39	16.29
8	358.52	29.19 QP	46.00	-16.81	1.00 V	346	12.12	17.07
9	414.89	26.43 QP	46.00	-19.57	1.00 V	328	7.83	18.60
10	447.94	30.54 QP	46.00	-15.46	1.00 V	40	11.24	19.31
11	498.48	36.46 QP	46.00	-9.54	1.00 V	334	15.72	20.74
12	558.74	31.61 QP	46.00	-14.39	1.00 V	37	9.76	21.85
13	597.62	35.19 QP	46.00	-10.81	1.00 V	10	12.28	22.91
14	648.16	29.88 QP	46.00	-16.12	1.50 V	4	6.79	23.10
15	696.75	32.48 QP	46.00	-13.52	1.50 V	22	8.51	23.97
16	795.89	26.73 QP	46.00	-19.27	1.00 V	40	0.99	25.74
17	828.94	26.54 QP	46.00	-19.46	4.00 V	220	0.40	26.14
18	896.97	31.33 QP	46.00	-14.67	2.50 V	277	4.81	26.51
19	943.63	27.48 QP	46.00	-18.52	4.00 V	4	0.05	27.43

**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.

<b>EUT</b>	Axim Executive keyboard with Bluetooth wireless technology	<b>MODEL</b>	XTBT01
<b>CHANNEL</b>	Channel 0	<b>FREQUENCY RANGE</b>	1 ~25GHz
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>DETECTOR FUNCTION</b>	Peak(PK) Average (AV)
<b>ENVIRONMENTAL CONDITIONS</b>	21 deg. C, 74 % RH, 991hPa	<b>TESTED BY</b>	Martin Lee

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	2378.00	39.05 PK	74.00	-34.95	1.00 H	208	5.08	33.97
1	2378.00	38.53 AV	54.00	-15.47	1.00 H	208	4.56	33.97
2	2390.00	36.83 PK	74.00	-37.17	1.00 H	208	2.82	34.01
2	2390.00	36.31 AV	54.00	-17.69	1.00 H	208	2.30	34.01
3	*2402.00	94.40 PK			1.00 H	208	60.34	34.06
3	*2402.00	64.40 AV			1.00 H	208	30.34	34.06
4	4804.00	56.10 PK	74.00	-17.90	1.10 H	175	14.70	41.40
4	4804.00	26.10 AV	54.00	-4.24	1.10 H	175	-15.3	41.40
5	7206.00	55.80 PK	74.00	-18.20	1.47 H	22	9.21	46.59
5	7206.00	25.80 AV	54.00	-10.16	1.47 H	22	-20.79	46.59
6	9608.00	61.68 PK	74.00	-12.32	1.48 H	135	11.28	50.40
6	9608.00	31.68 AV	54.00	-5.19	1.48 H	135	-18.72	50.40

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	2378.00	41.04 PK	74.00	-32.96	1.00 V	0	6.55	34.49
1	2378.00	40.04 AV	54.00	-13.96	1.00 V	0	5.55	34.49
2	2390.00	38.82 PK	74.00	-35.18	1.00 V	0	4.31	34.51
2	2390.00	37.82 AV	54.00	-16.18	1.00 V	0	3.31	34.51
3	*2402.00	96.39 PK			1.00 V	0	61.86	34.53
3	*2402.00	66.39 AV			1.00 V	0	31.86	34.53
4	4804.00	57.26 PK	74.00	-16.74	1.23 V	265	15.88	41.38
4	4804.00	27.26 AV	54.00	-2.00	1.23 V	265	-14.12	41.38
5	7206.00	56.51 PK	74.00	-17.49	1.23 V	265	10.06	46.45
5	7206.00	26.51 AV	54.00	-9.22	1.23 V	265	-19.94	46.45

**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 – $20\log(\text{duty cycle})$

<b>EUT</b>	Axim Executive keyboard with Bluetooth wireless technology	<b>MODEL</b>	XTBT01
<b>CHANNEL</b>	Channel 39	<b>FREQUENCY RANGE</b>	1 ~25GHz
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>DETECTOR FUNCTION</b>	Peak(PK) Average (AV)
<b>ENVIRONMENTAL CONDITIONS</b>	21 deg. C, 74 % RH, 991hPa	<b>TESTED BY</b>	Martin Lee

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	91.19 PK			1.29 H	359	56.58	34.61
1	*2441.00	61.19 AV			1.29 H	359	26.58	34.61
2	4882.00	55.65 PK	74.00	-18.35	1.31 H	207	14.09	41.56
2	4882.00	25.65 AV	54.00	-5.40	1.31 H	207	-15.91	41.56
3	9764.00	60.70 PK	74.00	-13.30	1.31 H	207	10.17	50.53
3	9764.00	30.70 AV	54.00	-4.83	1.31 H	207	-19.83	50.53

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	93.54 PK			1.93 V	14	58.93	34.61
1	*2441.00	73.54 AV			1.93 V	14	38.93	34.61
2	4882.00	58.38 PK	74.00	-15.62	1.87 V	14	16.82	41.56
2	4882.00	38.38 AV	54.00	-3.20	1.87 V	14	-3.18	41.56
3	9764.00	62.99 PK	74.00	-11.01	1.29 V	359	12.46	50.53
3	9764.00	42.99 AV	54.00	-10.53	1.29 V	359	-7.54	50.53

**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  $-20\log(\text{duty cycle})$

<b>EUT</b>	Axim Executive keyboard with Bluetooth wireless technology	<b>MODEL</b>	XTBT01
<b>CHANNEL</b>	Channel 78	<b>FREQUENCY RANGE</b>	1 ~25GHz
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>DETECTOR FUNCTION</b>	Peak(PK) Average (AV)
<b>ENVIRONMENTAL CONDITIONS</b>	20 deg. C, 65 % RH, 991hPa	<b>TESTED BY</b>	Martin Lee

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	94.58 PK			1.06 H	273	59.89	34.69
1	*2480.00	64.58 AV			1.06 H	273	29.89	34.69
2	2483.50	50.18 PK	74.00	-23.82	1.06 H	273	15.48	34.70
2	2483.50	38.52 AV	54.00	-5.48	1.06 H	273	3.82	34.70
3	4960.00	57.10 PK	74.00	-16.90	1.82 H	348	15.27	41.83
3	4960.00	27.10 AV	54.00	-3.09	1.82 H	348	-14.73	41.83
4	9920.00	60.78 PK	74.00	-13.22	1.73 H	286	10.13	50.65
4	9920.00	30.78 AV	54.00	-4.44	1.73 H	286	-19.87	50.65

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	94.72 PK			1.50 V	59	60.03	34.69
1	*2480.00	64.72 AV			1.50 V	59	30.03	34.69
2	2483.50	50.32 PK	74.00	-23.68	1.50 V	59	15.62	34.70
2	2483.50	49.41 AV	54.00	-4.59	1.50 V	59	14.71	34.70
3	4960.00	58.02 PK	74.00	-15.98	1.56 V	308	16.19	41.83
3	4960.00	28.02 AV	54.00	-2.11	1.56 V	308	-13.81	41.83
4	9920.00	61.57 PK	74.00	-12.43	1.25 V	36	10.92	50.65
4	9920.00	31.57 AV	54.00	-2.90	1.25 V	36	-19.08	50.65

**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 – $20\log(\text{duty cycle})$

## 4.7 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 was measured and recorded.

### 4.8.4 DEVIATION FROM TEST STANDARD

No deviation

#### 4.8.5 EUT OPERATING CONDITION

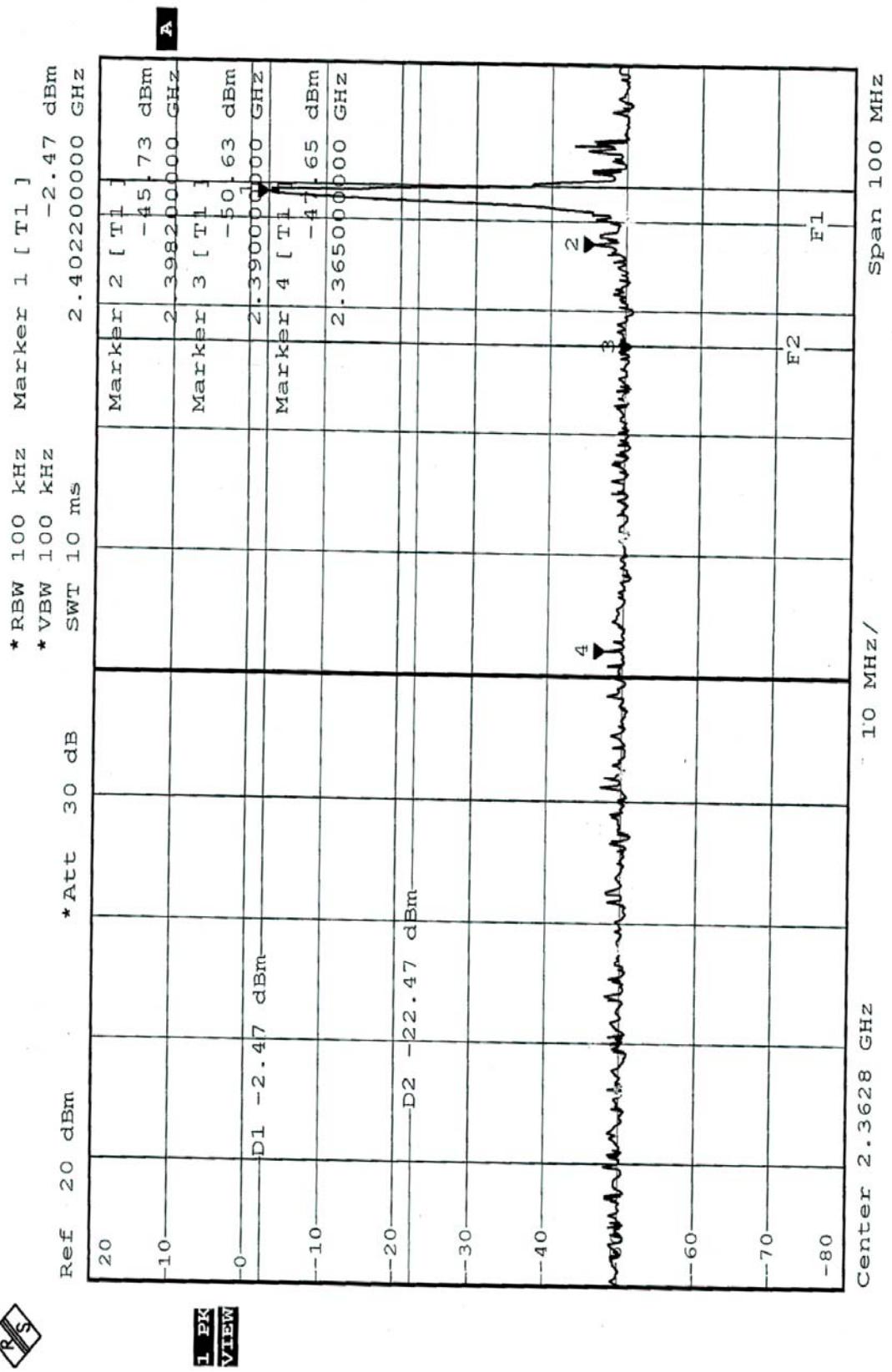
The software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel frequencies individually.

#### 4.8.6 TEST RESULTS

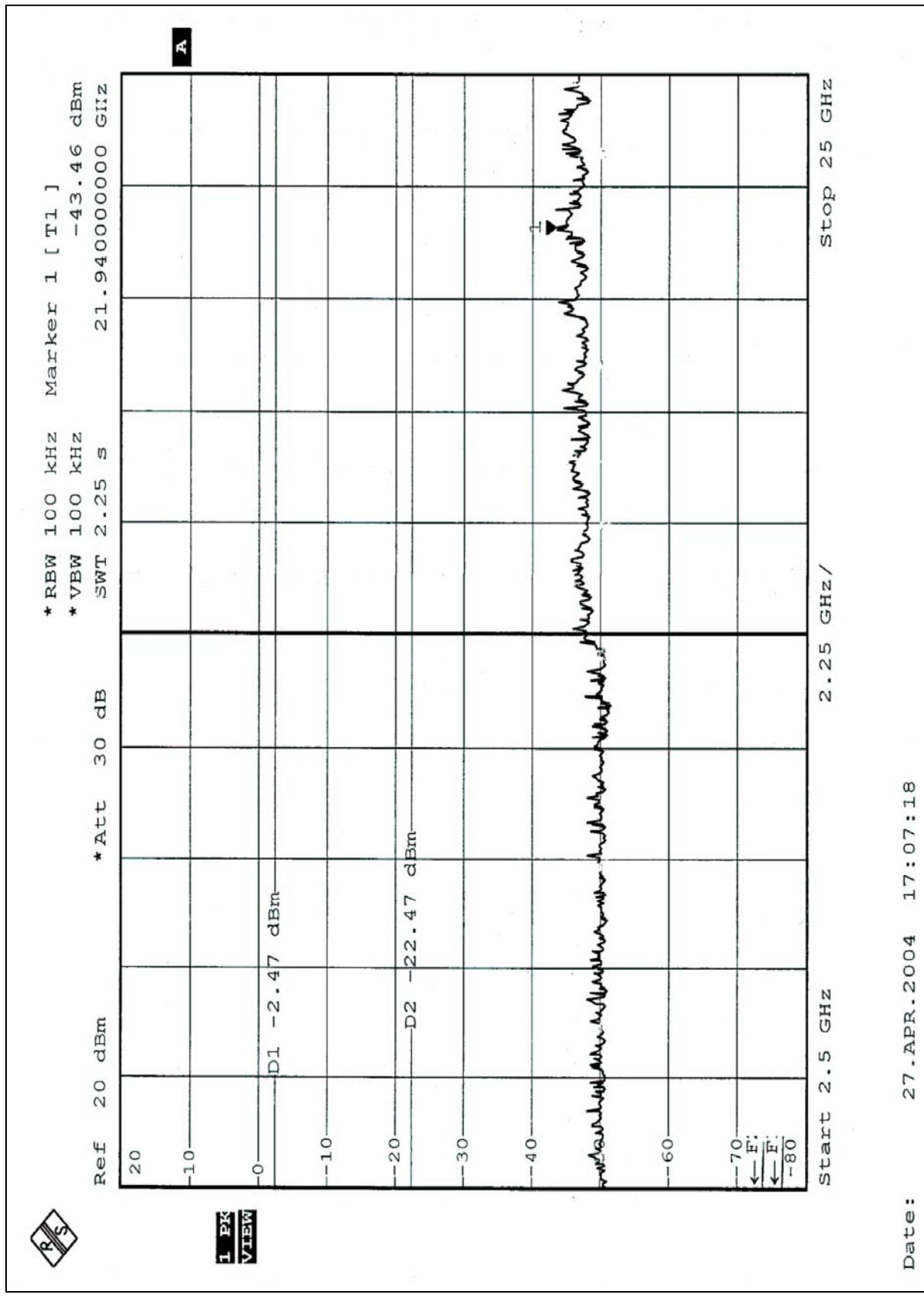
The spectrum plots are attached on the following 4 pages. D2 line indicates the highest level, D1 line indicates the 20dB offset below D2. It shows compliance with the requirement in part 15.247(C).

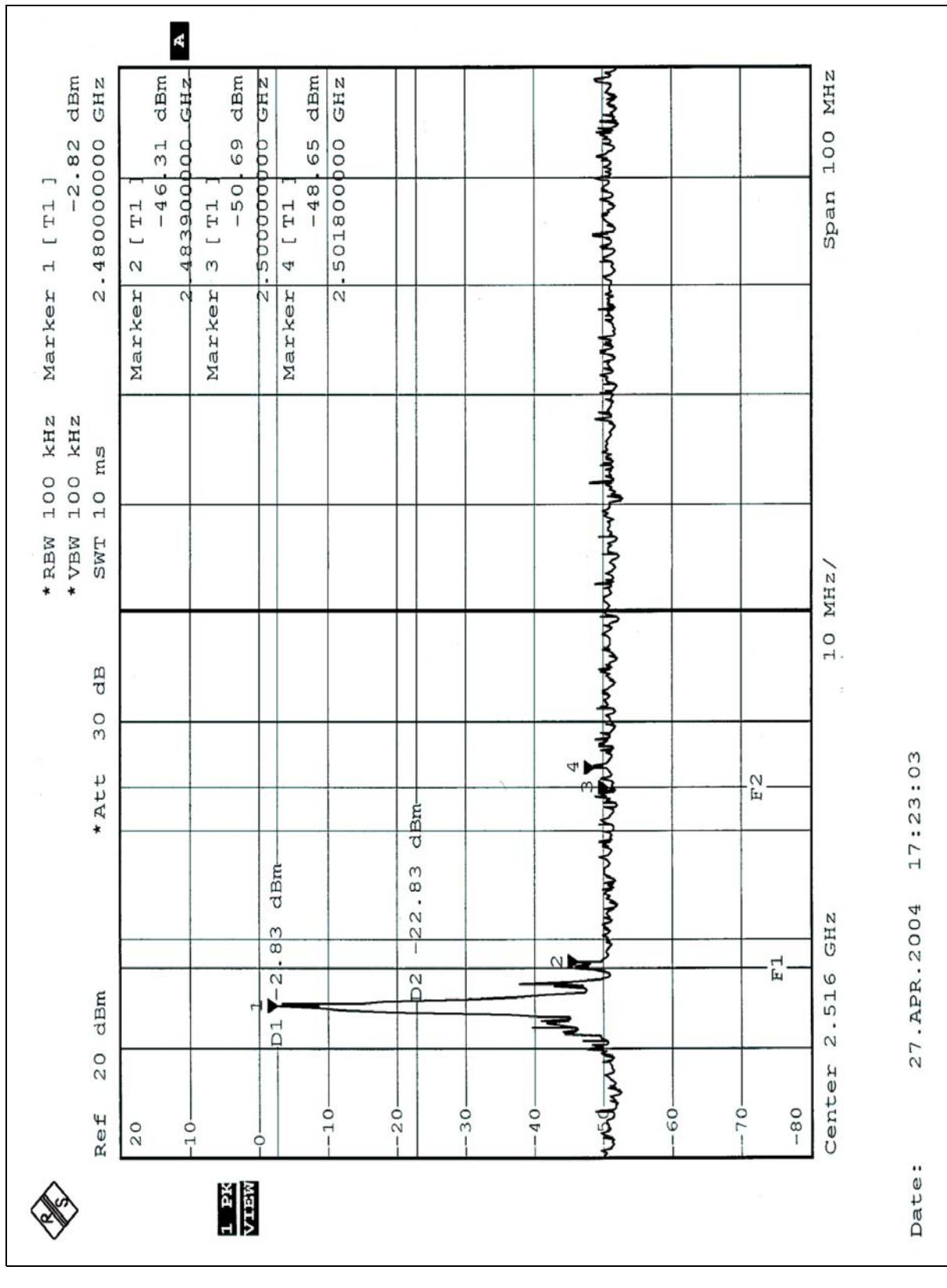
**NOTE1:** The band edge emission plot on the following 1 ~ 2 page shows 41.58dB delta between carrier maximum power and local maximum emission in restrict band (2.3650GHz). The emission of carrier strength list in the test result of channel 0 at the item 4.7.9 is 66.39dBuV/m, so the maximum field strength in restrict band is  $66.39 - 41.58 = 24.81$  dBuV/m which is under 54 dBuV/m limit.

**NOTE2:** The band edge emission plot on the following 3 ~ 4 page shows 43.48dB 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 64.72dBuV/m, so the maximum field strength in restrict band is  $64.72 - 43.48 = 21.24$  dBuV/m which is under 54 dBuV/m limit.



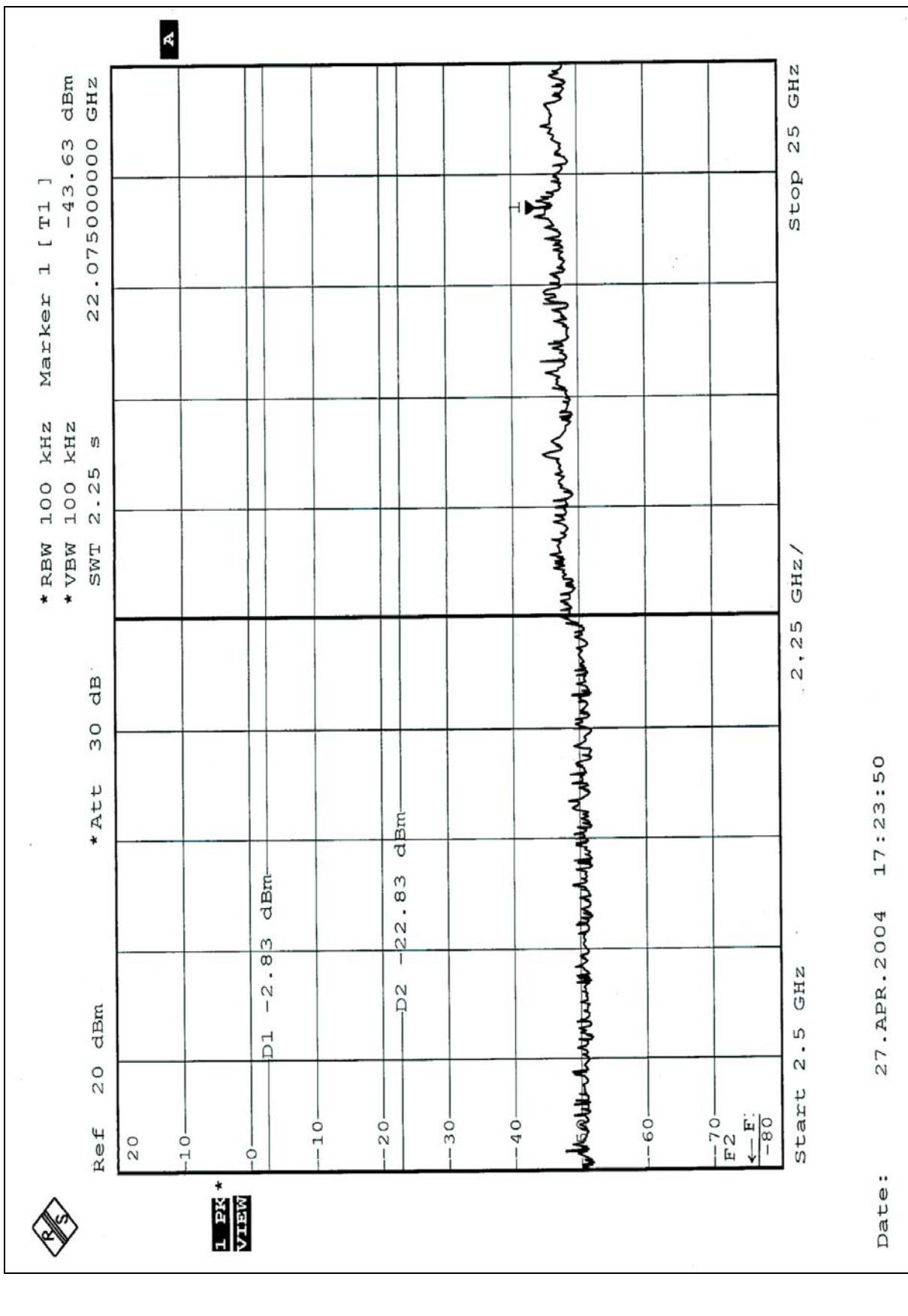
Date: 27 . APR . 2004 17 : 06 : 00





Date:

27.APR.2004 17:23:03



Date: 27 APR 2004 17:23:50

## 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

Printed Antenna with 0dBi Antenna gain.

## 5 PHOTOGRAPHS OF THE TEST CONFIGURATION

### 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:

<b>USA</b>	FCC, NVLAP, UL
<b>Germany</b>	TUV Rheinland
<b>Japan</b>	VCCI
<b>Norway</b>	NEMKO
<b>Canada</b>	INDUSTRY CANADA , CSA
<b>R.O.C.</b>	CNLA, BSMI, DGT
<b>Netherlands</b>	Telefication
<b>Singapore</b>	PSB
<b>Russia</b>	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](http://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:**

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Fax: 886-3-5935342

**Hwa Ya EMC/RF/Safety/Telecom Lab:**

Tel: 886-3-3183232  
Fax: 886-3-3185050

**Linko RF Lab.**

Tel: 886-3-3270910  
Fax: 886-3-3270892

**Email:** [service@mail.adt.com.tw](mailto:service@mail.adt.com.tw)

**Web Site:** [www.adt.com.tw](http://www.adt.com.tw)

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