

# FCC TEST REPORT

**REPORT NO.:** RF930726L02

**MODEL NO.:** FTP-628WSL110

**RECEIVED:** Jul. 26, 2004

**TESTED:** Sep. 20 ~ Sep. 30, 2004

**APPLICANT:** Fujitsu Component Limited

**ADDRESS:** 1174, Suzaka, Oaza, Suzaka-shi, Nagano 382-0076, Japan

**ISSUED BY:** Advance Data Technology Corporation

**LAB ADDRESS:** No. 47, 14th Ling, Chia Pau Tsuen, Lin Kou Hsiang 244, Taipei Hsien, Taiwan, R.O.C.

**TEST LOCATION:** No. 19, Hwa Ya 2<sup>nd</sup> Rd., Wen Hwa Tsuen, Kwei Shan Hsiang, Taoyuan Hsien 333, Taiwan, R.O.C.

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No. 2177-01



0528  
ILAC MRA

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## 1 CERTIFICATION

**PRODUCT :** Bluetooth Printer  
**BRAND NAME :** FUJITSU  
**MODEL NO. :** FTP-628WSL110  
**APPLICANT :** Fujitsu Component Limited  
**TESTED DATE :** Sep. 20 ~ Sep. 30, 2004  
**TEST SAMPLE :** R&D 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 :** Windy Chou , **DATE:** Oct. 05, 2004  
( Windy Chou )

**TECHNICAL**  
**ACCEPTANCE :** Gary Chang , **DATE:** Oct. 05, 2004  
Responsible for RF ( Gary Chang )

**APPROVED BY :** Cody Chang , **DATE:** Oct. 05, 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                                               | PASS   | Meet the requirement of limit<br>Minimum passing margin is -20.08dB at 0.482 MHz |
| 15.247(a)(1)(iii)                        | Number of Hopping Frequency Used Spec.: At least 75 channels              | PASS   | Meet the requirement of limit                                                    |
| 15.247(a)(1)(iii)                        | Dwell Time on Each Channel Spec. : Max. 0.4 second within 30 second       | PASS   | Meet the requirement of limit                                                    |
| 15.247(a)(1)                             | Hopping Channel Separation Spec. : Min. 25 kHz or 20 dB bandwidth         | PASS   | Meet the requirement of limit                                                    |
| 15.247(a)(1)                             | Spectrum Bandwidth of a Frequency Hopping Sequence Spread Spectrum System | NA     | NA                                                                               |
| 15.247(b)                                | Maximum Peak Output Power Spec.: max. 30dBm                               | PASS   | Meet the requirement of limit                                                    |
| 15.247(d)                                | Transmitter Radiated Emissions Spec.: Table 15.209                        | PASS   | Meet the requirement of limit<br>Minimum passing margin is -1.96dB at 206.89MHz  |
| 15.247(d)                                | Band Edge Measurement                                                     | PASS   | Meet the requirement of limit                                                    |

## 2.0 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 | 9k~30MHz        | 2.44 dB     |
| Radiated emissions  | 30MHz ~ 200MHz  | 3.55 dB     |
|                     | 200MHz ~1000MHz | 3.58 dB     |
|                     | 1GHz ~ 18GHz    | 2.20 dB     |
|                     | 18GHz ~ 40GHz   | 1.88 dB     |

### 3 GENERAL INFORMATION

#### 3.1 GENERAL DESCRIPTION OF EUT

|                              |                               |
|------------------------------|-------------------------------|
| <b>PRODUCT</b>               | Bluetooth Printer             |
| <b>MODEL NO.</b>             | FTP-628WSL110                 |
| <b>POWER SUPPLY</b>          | 5Vdc from AC adapter          |
| <b>MODULATION TYPE</b>       | GFSK                          |
| <b>MODULATION TECHNOLOGY</b> | FHSS                          |
| <b>FREQUENCY RANGE</b>       | 2402MHz ~ 2480MHz             |
| <b>NUMBER OF CHANNEL</b>     | 79                            |
| <b>OUTPUT POWER</b>          | 1.233mW                       |
| <b>ANTENNA TYPE</b>          | PIFA antenna with 0.5dBi gain |
| <b>DATA CABLE</b>            | NA                            |
| <b>I/O PORTS</b>             | NA                            |
| <b>ASSOCIATED DEVICES</b>    | NA                            |

**NOTE:**

1. The EUT is powered by the following adapter:

|                |                                  |
|----------------|----------------------------------|
| <b>BRAND:</b>  | KAMI ELECTRONICS INDUSTRY CO., L |
| <b>MODEL :</b> | KSW523U                          |
| <b>INPUT:</b>  | 100Vac, 29VA, 50/60Hz            |
| <b>OUTPUT:</b> | 5Vdc, 2.3A                       |

2. Bluetooth technology is used for the EUT.
3. 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 Bluetooth Printer. 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 B (DoC). The test report has been issued separately.

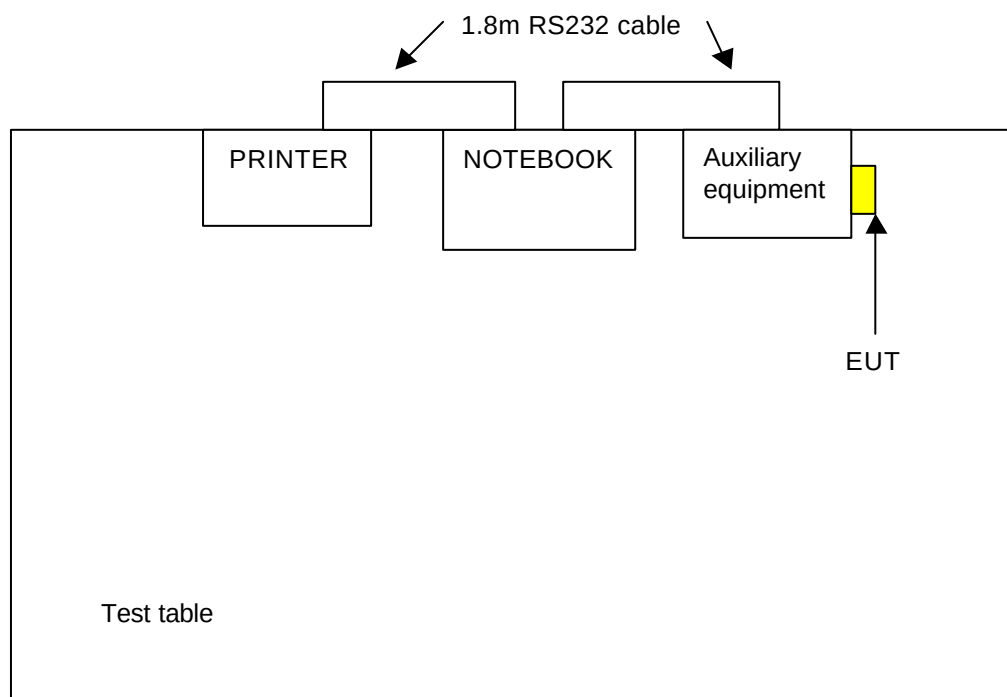
### 3.4 DESCRIPTION OF SUPPORT UNITS

| NO. | PRODUCT              | BRAND     | MODEL NO. | SERIAL NO. | FCC ID              |
|-----|----------------------|-----------|-----------|------------|---------------------|
| 1   | NOTEBOOK<br>COMPUTER | Panasonic | CF-LIEA   | A990994JP  | NA                  |
| 2   | PRINTER              | EPSON     | LQ-300+   | DCGY054147 | FCC DoC<br>Approved |

| NO. | SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS |
|-----|-----------------------------------------------------|
| 1   | NA                                                  |
| 2   | 1.2m shielded cable without 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 $\mu$ 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 |
|----------------------------------|-------------|----------------|------------------|
| Test Receiver<br>ROHDE & SCHWARZ | ESCS30      | 100291         | Dec. 12, 2004    |
| RF signal cable<br>Woken         | 5D-FB       | Cable-HYC01-01 | Mar. 02, 2005    |
| LISN<br>ROHDE & SCHWARZ          | ESH3-Z5     | 100312         | Mar. 03, 2005    |
| LISN<br>ROHDE & SCHWARZ          | ESH2-Z5     | 100104         | Mar. 02, 2005    |
| Software<br>ADT                  | ADT_Cond_V3 | NA             | 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 Shielded Room 1.
  3. The VCCI Site Registration No. is C-2040.

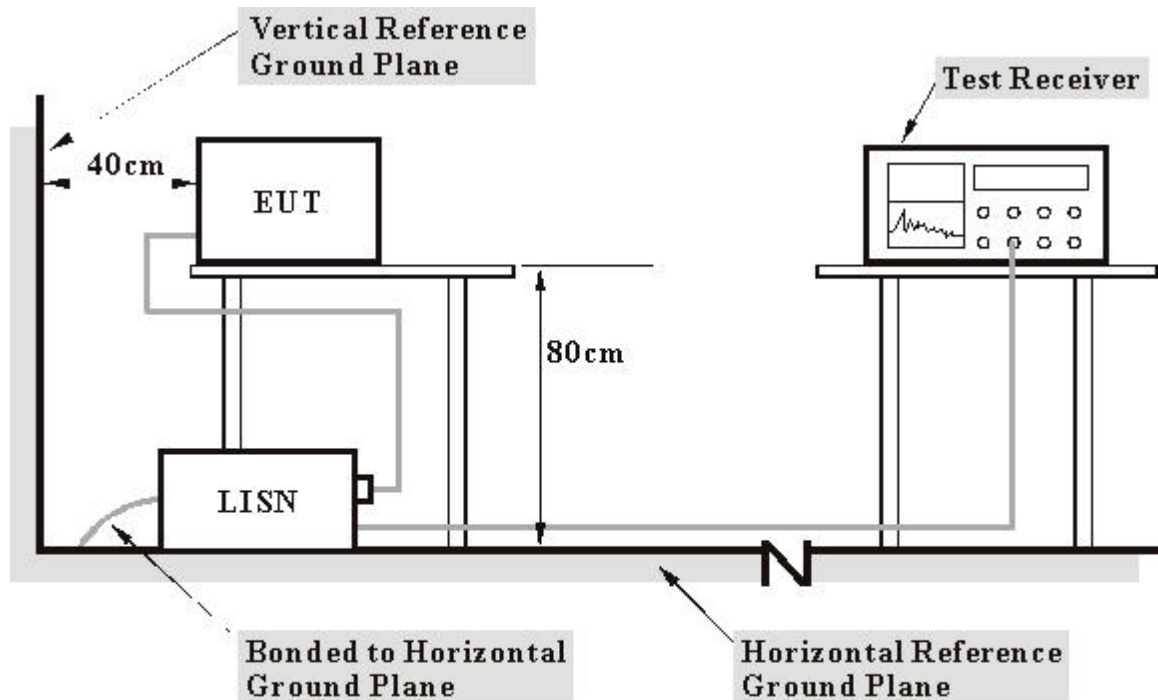
#### 4.1.3 TEST PROCEDURES

- 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

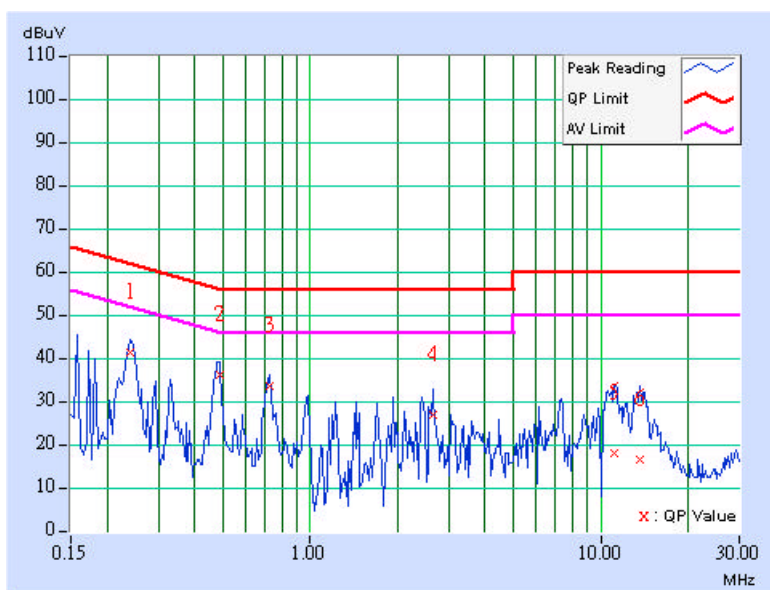
- a. Connected the EUT into the Notebook system and placed on a testing table.
- b. The Notebook system ran a test program (provided by manufacturer) to enable EUT under transmission/receiving condition continuously at specific channel frequency.
- c. The notebook system sent "H" messages to printer, and the printer prints them on paper.

## 4.1.7 TEST RESULTS

|                                 |                              |                            |               |
|---------------------------------|------------------------------|----------------------------|---------------|
| <b>EUT</b>                      | Bluetooth Printer            | <b>MODEL</b>               | FTP-628WSL110 |
| <b>CHANNEL</b>                  | 0                            | <b>6dB BANDWIDTH</b>       | 9 kHz         |
| <b>INPUT POWER (SYSTEM)</b>     | 120Vac, 60 Hz                | <b>PHASE</b>               | Line (L)      |
| <b>ENVIRONMENTAL CONDITIONS</b> | 25 deg. C, 65%RH,<br>991 hPa | <b>TESTED BY:</b> Rush Kao |               |

| No | Freq.<br>[MHz] | Corr.<br>Factor<br>(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  | 0.240          | 0.12                    | 40.70         | -   | 40.82          | -   | 62.10     | 52.10 | -21.28 | -   |
| 2  | 0.486          | 0.13                    | 35.78         | -   | 35.91          | -   | 56.24     | 46.24 | -20.33 | -   |
| 3  | 0.724          | 0.14                    | 33.11         | -   | 33.25          | -   | 56.00     | 46.00 | -22.75 | -   |
| 4  | 2.656          | 0.18                    | 26.34         | -   | 26.52          | -   | 56.00     | 46.00 | -29.48 | -   |
| 5  | 11.164         | 0.41                    | 17.50         | -   | 17.91          | -   | 60.00     | 50.00 | -42.09 | -   |
| 6  | 13.684         | 0.65                    | 16.05         | -   | 16.70          | -   | 60.00     | 50.00 | -43.30 | -   |

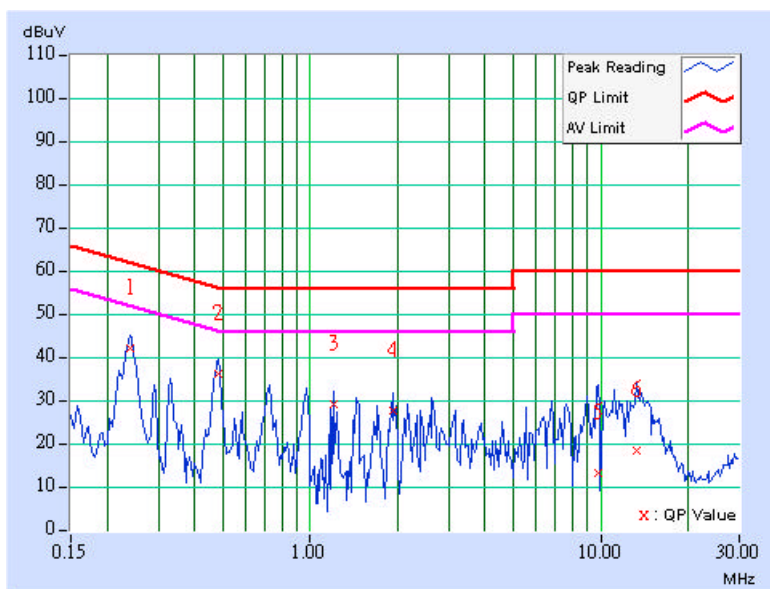
- REMARKS:** 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.  
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.  
3. The emission levels of other frequencies were very low against the limit.  
4. Margin value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



|                                 |                              |                            |               |
|---------------------------------|------------------------------|----------------------------|---------------|
| <b>EUT</b>                      | Bluetooth Printer            | <b>MODEL</b>               | FTP-628WSL110 |
| <b>CHANNEL</b>                  | 0                            | <b>6dB BANDWIDTH</b>       | 9 kHz         |
| <b>INPUT POWER (SYSTEM)</b>     | 120Vac, 60 Hz                | <b>PHASE</b>               | Neutral (N)   |
| <b>ENVIRONMENTAL CONDITIONS</b> | 25 deg. C, 65%RH,<br>991 hPa | <b>TESTED BY:</b> Rush Kao |               |

| No | Freq.<br>[MHz] | Corr.<br>Factor<br>(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  | 0.240          | 0.11                    | 41.84         | -   | 41.95          | -   | 62.10     | 52.10 | -20.15 | -   |
| 2  | 0.482          | 0.12                    | 35.88         | -   | 36.00          | -   | 56.30     | 46.30 | -20.31 | -   |
| 3  | 1.199          | 0.15                    | 28.64         | -   | 28.79          | -   | 56.00     | 46.00 | -27.21 | -   |
| 4  | 1.926          | 0.16                    | 27.32         | -   | 27.48          | -   | 56.00     | 46.00 | -28.52 | -   |
| 5  | 9.832          | 0.28                    | 12.67         | -   | 12.95          | -   | 60.00     | 50.00 | -47.05 | -   |
| 6  | 13.223         | 0.51                    | 17.85         | -   | 18.36          | -   | 60.00     | 50.00 | -41.64 | -   |

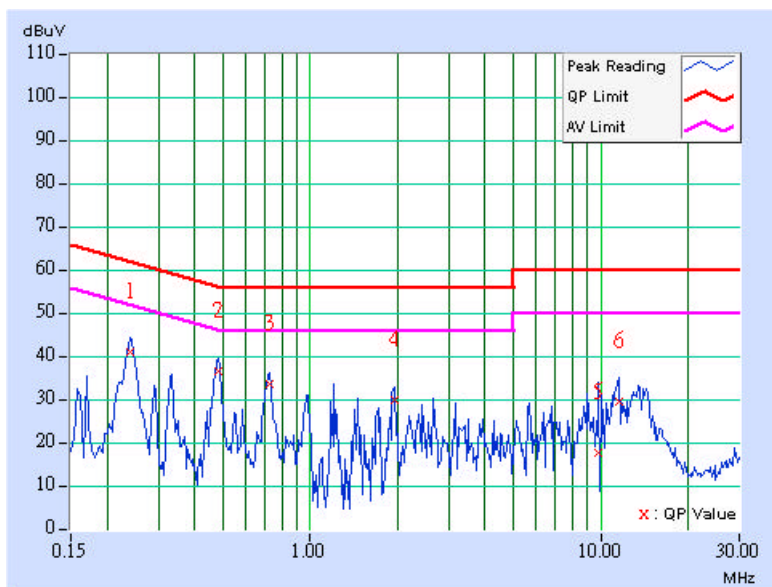
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  4. Margin value = Emission level - Limit value
  5. Correction factor = Insertion loss + Cable loss
  6. Emission Level = Correction Factor + Reading Value.



|                                 |                              |                            |               |
|---------------------------------|------------------------------|----------------------------|---------------|
| <b>EUT</b>                      | Bluetooth Printer            | <b>MODEL</b>               | FTP-628WSL110 |
| <b>CHANNEL</b>                  | 39                           | <b>6dB BANDWIDTH</b>       | 9 kHz         |
| <b>INPUT POWER (SYSTEM)</b>     | 120Vac, 60 Hz                | <b>PHASE</b>               | Line (L)      |
| <b>ENVIRONMENTAL CONDITIONS</b> | 25 deg. C, 65%RH,<br>991 hPa | <b>TESTED BY:</b> Rush Kao |               |

| No       | Freq.<br>[MHz] | Corr.<br>Factor<br>(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        | 0.240          | 0.12                    | 40.82         | -   | 40.94          | -   | 62.10        | 52.10        | -21.16        | -   |
| <b>2</b> | <b>0.482</b>   | <b>0.13</b>             | <b>36.10</b>  | -   | <b>36.23</b>   | -   | <b>56.30</b> | <b>46.30</b> | <b>-20.08</b> | -   |
| 3        | 0.724          | 0.14                    | 33.31         | -   | 33.45          | -   | 56.00        | 46.00        | -22.55        | -   |
| 4        | 1.941          | 0.16                    | 29.55         | -   | 29.71          | -   | 56.00        | 46.00        | -26.29        | -   |
| 5        | 9.863          | 0.30                    | 17.22         | -   | 17.52          | -   | 60.00        | 50.00        | -42.48        | -   |
| 6        | 11.512         | 0.45                    | 29.24         | -   | 29.69          | -   | 60.00        | 50.00        | -30.31        | -   |

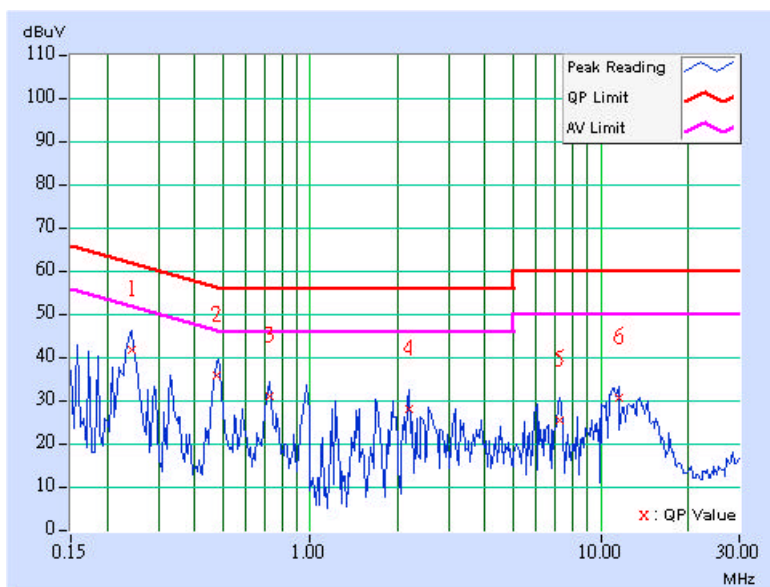
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|                                 |                              |                            |               |
|---------------------------------|------------------------------|----------------------------|---------------|
| <b>EUT</b>                      | Bluetooth Printer            | <b>MODEL</b>               | FTP-628WSL110 |
| <b>CHANNEL</b>                  | 39                           | <b>6dB BANDWIDTH</b>       | 9 kHz         |
| <b>INPUT POWER (SYSTEM)</b>     | 120Vac, 60 Hz                | <b>PHASE</b>               | Neutral (N)   |
| <b>ENVIRONMENTAL CONDITIONS</b> | 25 deg. C, 65%RH,<br>991 hPa | <b>TESTED BY:</b> Rush Kao |               |

| No | Freq.<br>[MHz] | Corr.<br>Factor<br>(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  | 0.244          | 0.11                    | 41.40         | -   | 41.51          | -   | 61.97     | 51.97 | -20.46 | -   |
| 2  | 0.478          | 0.12                    | 35.72         | -   | 35.84          | -   | 56.37     | 46.37 | -20.53 | -   |
| 3  | 0.724          | 0.13                    | 30.56         | -   | 30.69          | -   | 56.00     | 46.00 | -25.31 | -   |
| 4  | 2.191          | 0.16                    | 27.87         | -   | 28.03          | -   | 56.00     | 46.00 | -27.97 | -   |
| 5  | 7.242          | 0.28                    | 25.07         | -   | 25.35          | -   | 60.00     | 50.00 | -34.65 | -   |
| 6  | 11.523         | 0.39                    | 30.31         | -   | 30.70          | -   | 60.00     | 50.00 | -29.30 | -   |

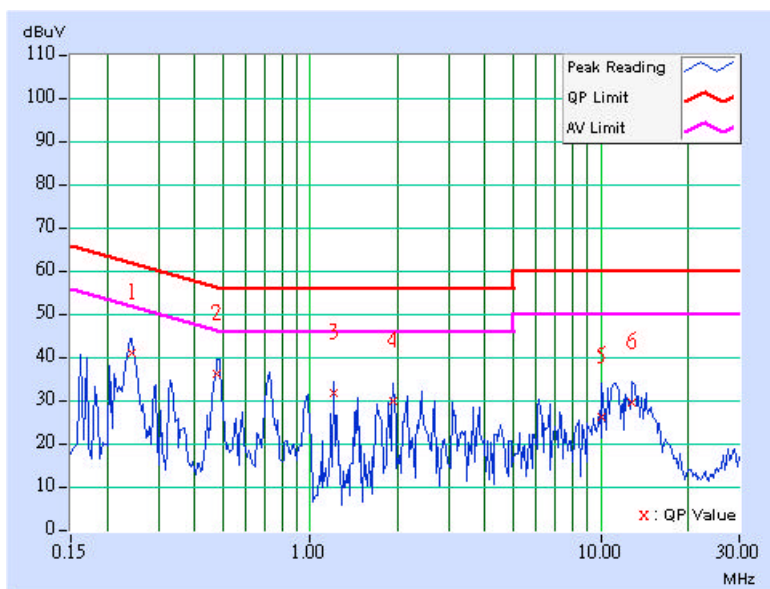
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
  2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
  3. The emission levels of other frequencies were very low against the limit.
  4. Margin value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



|                                 |                              |                            |               |
|---------------------------------|------------------------------|----------------------------|---------------|
| <b>EUT</b>                      | Bluetooth Printer            | <b>MODEL</b>               | FTP-628WSL110 |
| <b>CHANNEL</b>                  | 78                           | <b>6dB BANDWIDTH</b>       | 9 kHz         |
| <b>INPUT POWER (SYSTEM)</b>     | 120Vac, 60 Hz                | <b>PHASE</b>               | Line (L)      |
| <b>ENVIRONMENTAL CONDITIONS</b> | 25 deg. C, 65%RH,<br>991 hPa | <b>TESTED BY:</b> Rush Kao |               |

| No | Freq.<br>[MHz] | Corr.<br>Factor<br>(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  | 0.244          | 0.12                    | 40.47         | -   | 40.59          | -   | 61.97     | 51.97 | -21.38 | -   |
| 2  | 0.478          | 0.13                    | 35.90         | -   | 36.03          | -   | 56.37     | 46.37 | -20.34 | -   |
| 3  | 1.207          | 0.15                    | 31.13         | -   | 31.28          | -   | 56.00     | 46.00 | -24.72 | -   |
| 4  | 1.938          | 0.16                    | 29.51         | -   | 29.67          | -   | 56.00     | 46.00 | -26.33 | -   |
| 5  | 10.000         | 0.30                    | 25.82         | -   | 26.12          | -   | 60.00     | 50.00 | -33.88 | -   |
| 6  | 12.859         | 0.57                    | 28.88         | -   | 29.45          | -   | 60.00     | 50.00 | -30.55 | -   |

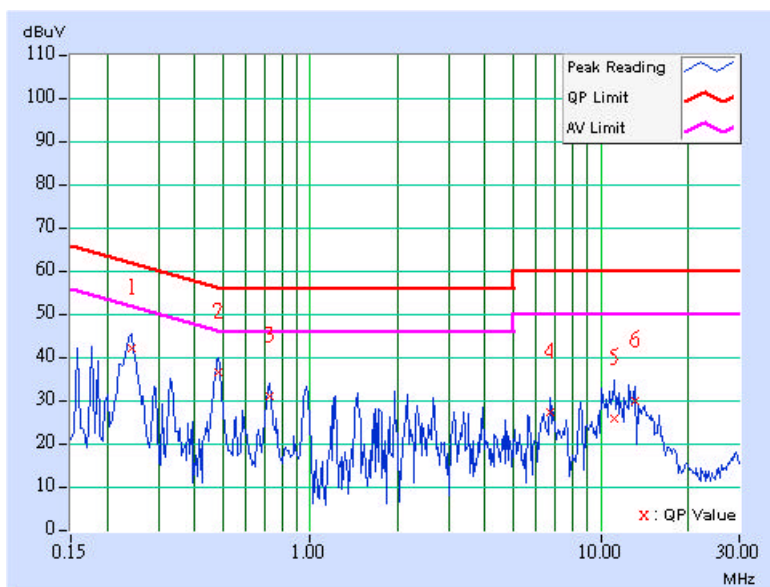
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
  2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
  3. The emission levels of other frequencies were very low against the limit.
  4. Margin value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



|                                 |                              |                            |               |
|---------------------------------|------------------------------|----------------------------|---------------|
| <b>EUT</b>                      | Bluetooth Printer            | <b>MODEL</b>               | FTP-628WSL110 |
| <b>CHANNEL</b>                  | 78                           | <b>6dB BANDWIDTH</b>       | 9 kHz         |
| <b>INPUT POWER (SYSTEM)</b>     | 120Vac, 60 Hz                | <b>PHASE</b>               | Neurral (N)   |
| <b>ENVIRONMENTAL CONDITIONS</b> | 25 deg. C, 65%RH,<br>991 hPa | <b>TESTED BY:</b> Rush Kao |               |

| No | Freq.<br>[MHz] | Corr.<br>Factor<br>(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  | 0.244          | 0.11                    | 41.56         | -   | 41.67          | -   | 61.97     | 51.97 | -20.30 | -   |
| 2  | 0.482          | 0.12                    | 36.10         | -   | 36.22          | -   | 56.30     | 46.30 | -20.09 | -   |
| 3  | 0.724          | 0.13                    | 30.66         | -   | 30.79          | -   | 56.00     | 46.00 | -25.21 | -   |
| 4  | 6.699          | 0.27                    | 26.92         | -   | 27.19          | -   | 60.00     | 50.00 | -32.81 | -   |
| 5  | 11.199         | 0.37                    | 25.40         | -   | 25.77          | -   | 60.00     | 50.00 | -34.23 | -   |
| 6  | 13.180         | 0.51                    | 29.34         | -   | 29.85          | -   | 60.00     | 50.00 | -30.15 | -   |

- 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, 2005    |

**NOTE:**

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

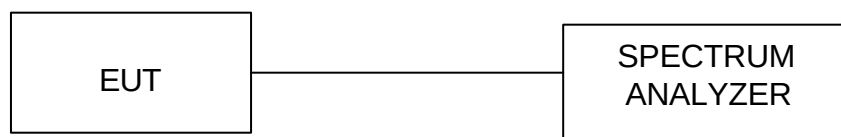
#### 4.2.3 TEST PROCEDURES

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

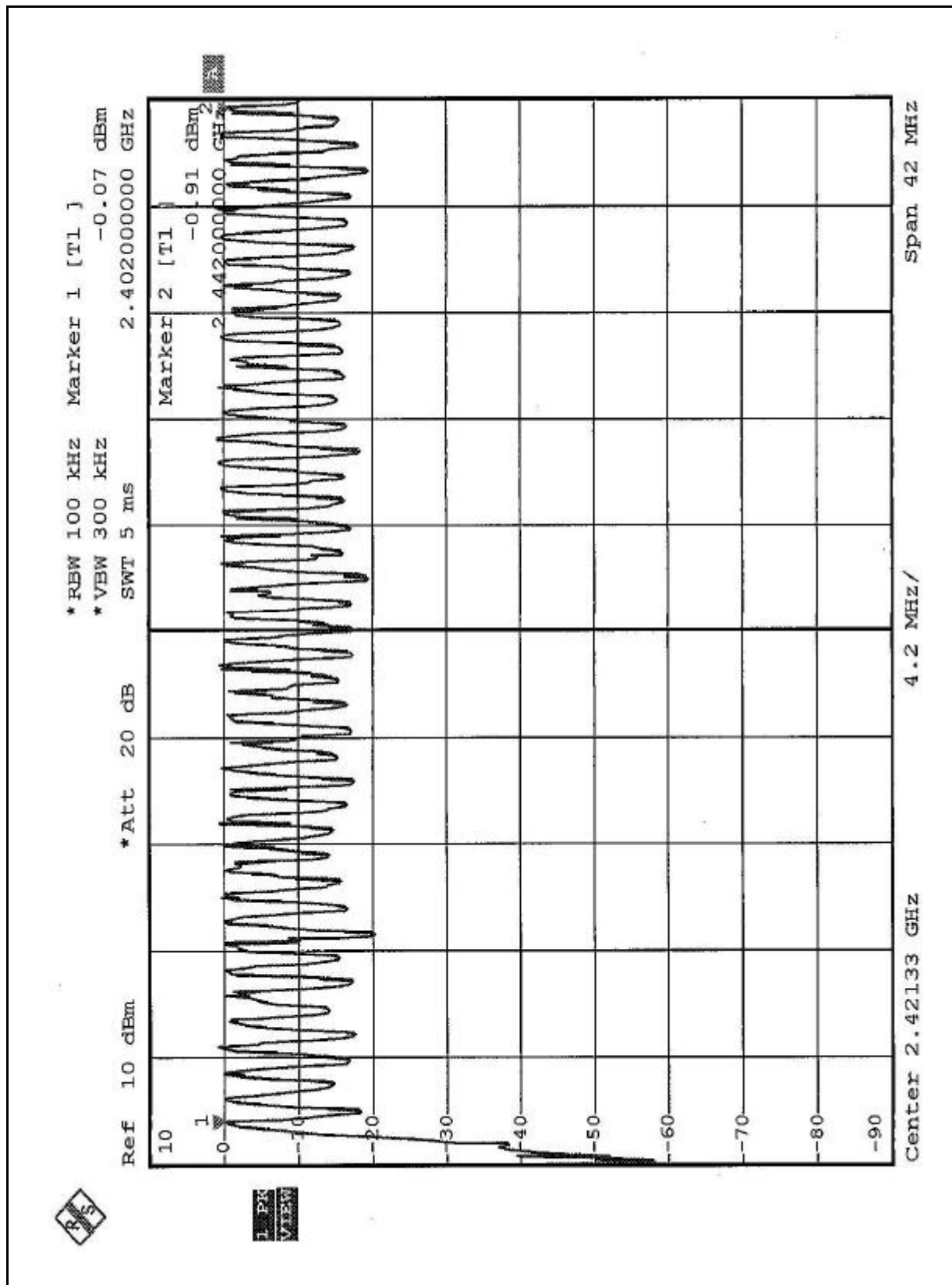
No deviation

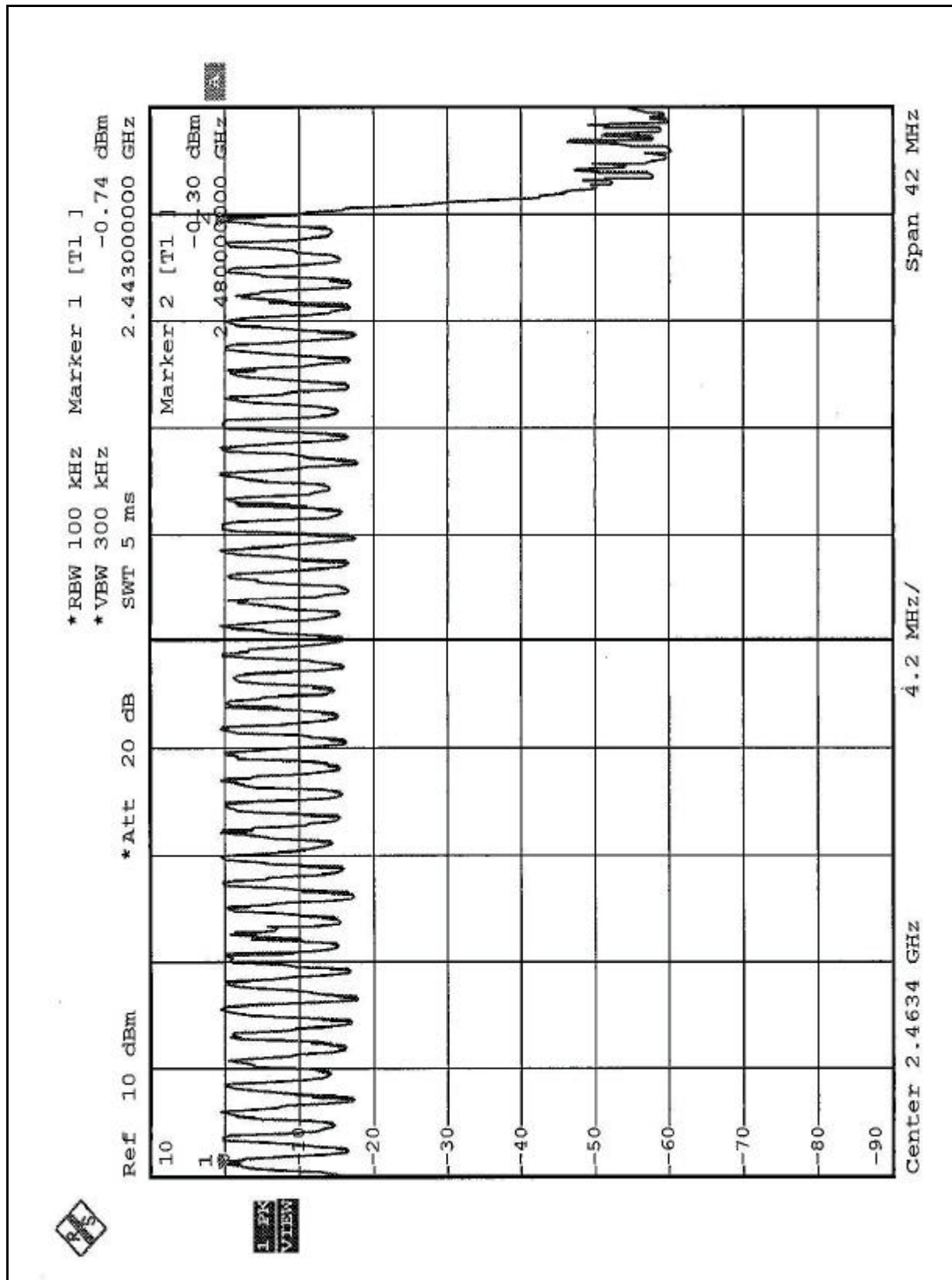
#### 4.2.5 TEST SETUP



#### 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, 2005    |

**NOTES:**

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

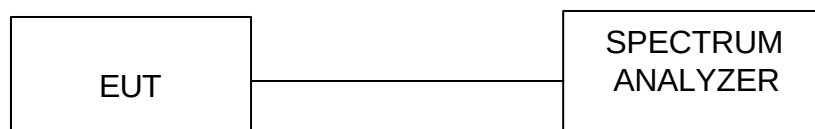
#### 4.3.3 TEST PROCEDURES

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

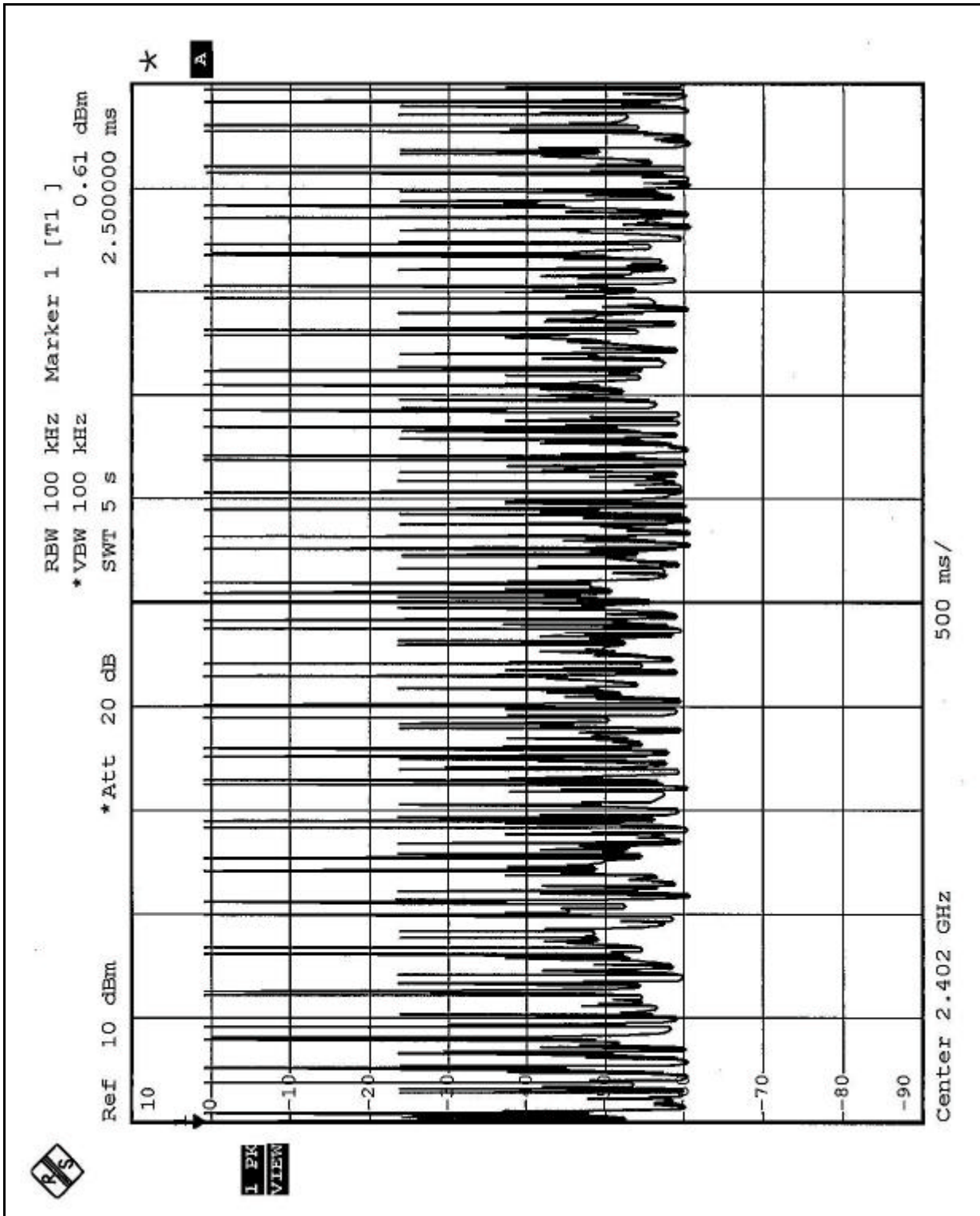


## 4.3.6 TEST RESULTS

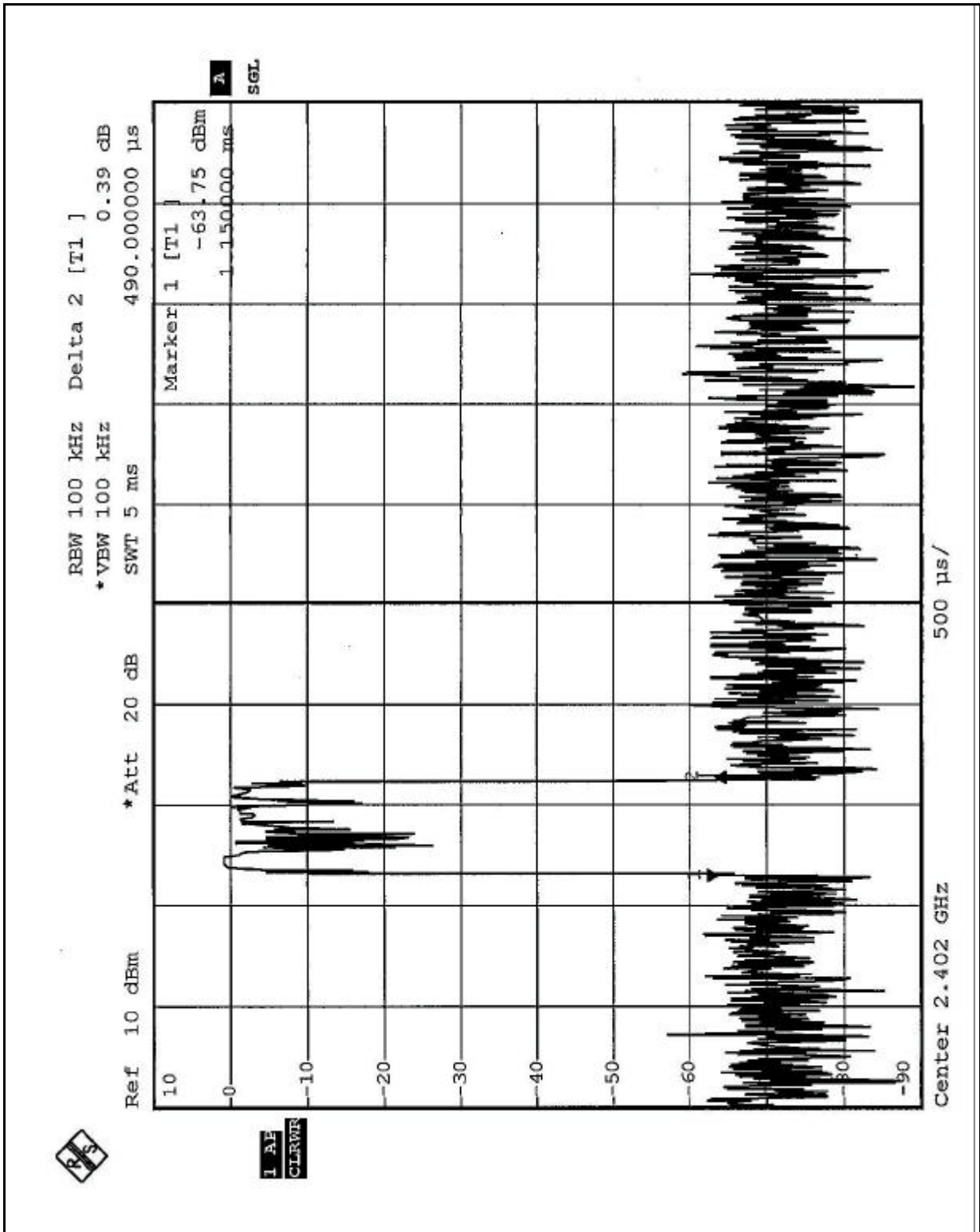
| Mode | Number of transmission in a<br>31.6 (79Hopping*0.4) | Length of<br>transmission<br>time (msec) | Result<br>(msec) | Limit<br>(msec) |
|------|-----------------------------------------------------|------------------------------------------|------------------|-----------------|
| DH1  | 50 (times / 5 sec) *6.32=316.00 times               | 0.490                                    | 154.840          | 400             |
| DH3  | 26 (times / 5 sec) *6.32=164.32 times               | 1.780                                    | 292.490          | 400             |
| DH5  | 17 (times / 5 sec) *6.32=107.44 times               | 3.020                                    | 324.469          | 400             |

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

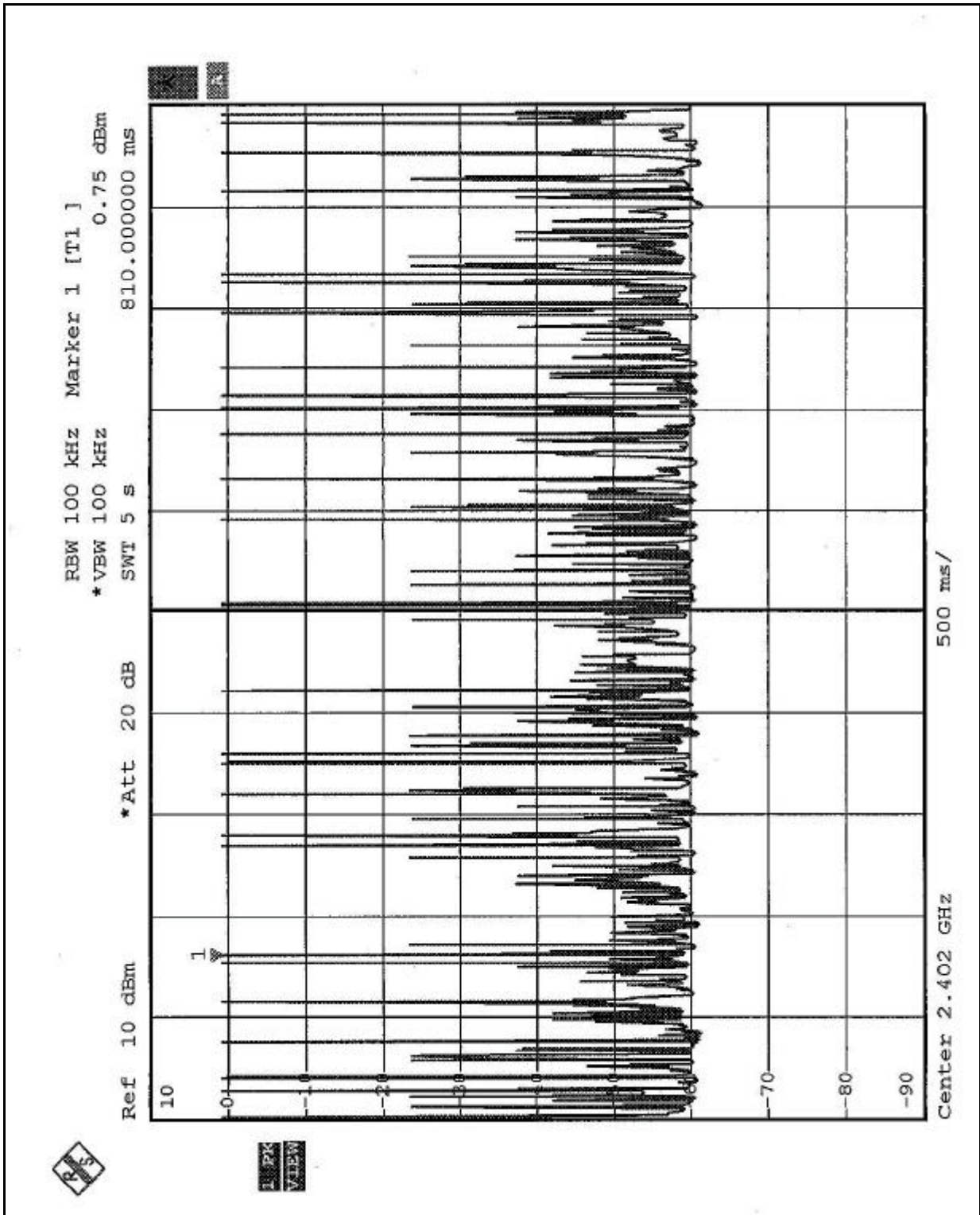
## DH1



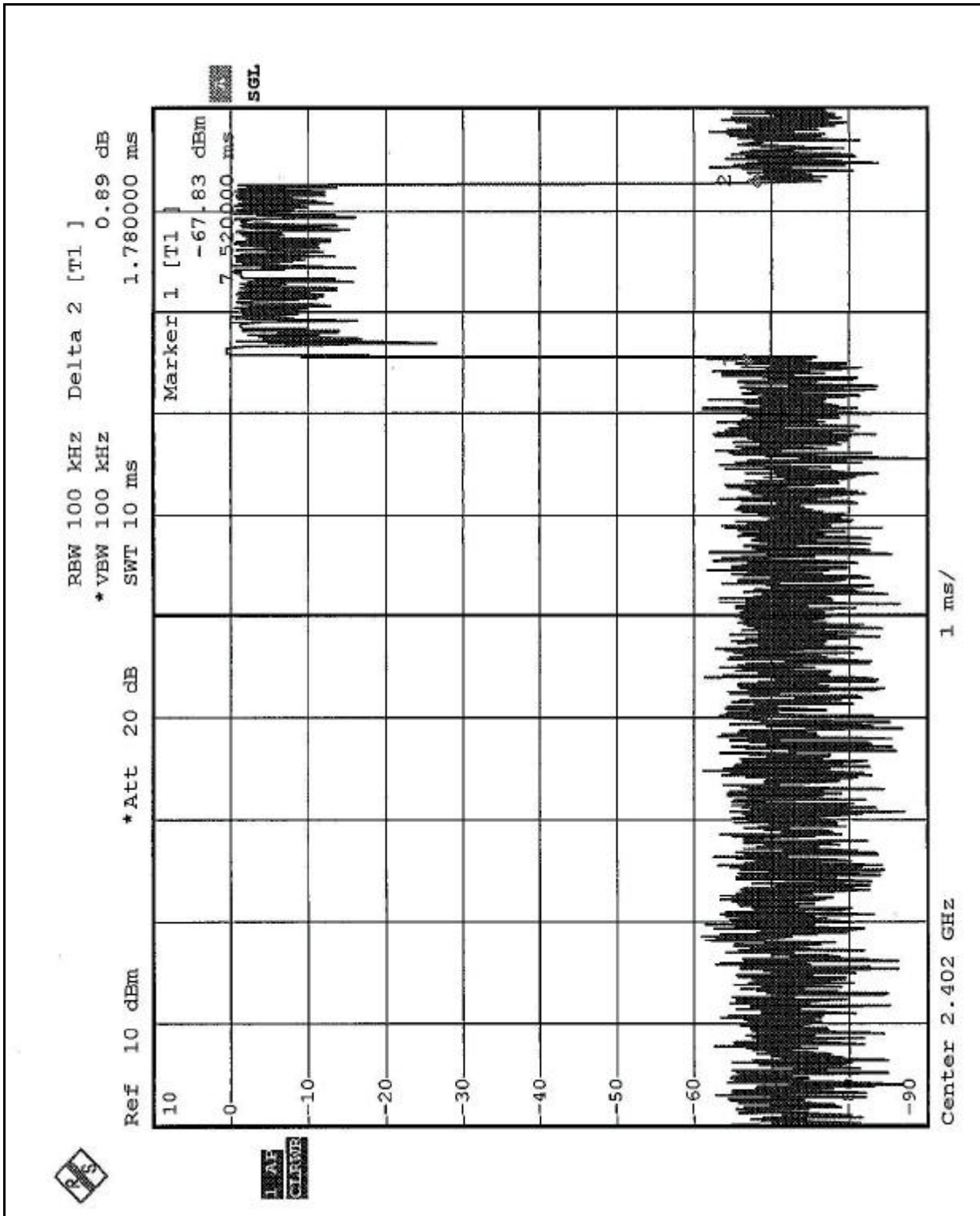
DH1



### DH3



### DH3



[illegible]

## DH5

