FCC Part 74 Subpart H

EMI TEST REPORT

of

E.U.T. : EARPHONE GUIDE (Transmitter)
MODEL : KR-100F
FCC ID. : SYZKR100F
Working Frequency : 740-806MHz

for

APPLICANT : KENNET CO., LTD.
ADDRESS : Fundex Ginza Bild. 5F, 1-9-4 Shintomi, Chou-ku, Tokyo, Japan

Test Performed by

ELECTRONICS TESTING CENTER, TAIWAN
NO. 34, LIN 5, DING FU TSUN, LINKOU HSIANG
TAIPEI HSIEN, TAIWAN, R.O.C.
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Report Number : ET93R-10-109-04

TEST REPORT CERTIFICATION

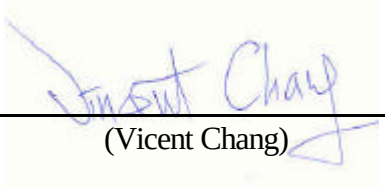
Applicant	: KENNET CO., LTD. Fundex Ginza Bild. 5F, 1-9-4 Shintomi, Chou-ku, Tokyo, Japan
Manufacturer	: E-J ELECTRONICS CO., LTD. 4F, No. 11, Lane 125, Sec. 1, Kuo Kwang Road, Ta Li City, Taichung Hsien, Taiwan, R.O.C.
Description of EUT	
a) Type of EUT	: EARPHONE GUIDEs (Transmitter)
b) Trade Name	: KENNET
c) Model No.	: KR-100F
d) Power Supply	: DC 3V Batteries
e) Frequency Range	: 740MHz-806MHz

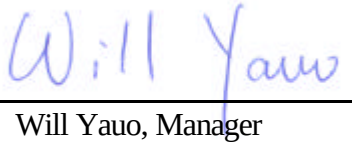
Regulation Applied : FCC Rules and Regulations Part 74 Subpart H (2003)

I HEREBY CERTIFY THAT; The data shown in this report were made in accordance with the procedures given in ANSI C63.4 and the energy emitted by the device was founded to be within the limits applicable. I assume full responsibility for accuracy and completeness of these data.

Note: 1. The result of the testing report relate only to the item tested.
2. The testing report shall not be reproduced expect in full, without the written approval of ETC.

Issued Date : Feb. 21, 2005

Test Engineer : 
(Vicent Chang)

Approve & Authorized Signer : 
Will Yauo, Manager
EMC Dept. II of ELECTRONICS
TESTING CENTER, TAIWAN

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1 GENERAL INFORMATION

1.1 Product Description

a) Type of EUT : EARPHONE GUIDEs(Transmitter)

b) Trade Name : KENNET

c) Model No. : KR-100F

d) Power Supply : DC 3V Batteries

e) Frequency Range : 740MHz-806MHz

1.2 Characteristics of Device:

1. Operating Frequency Range: 744-752 MHz, 794-806 MHz
2. Communication System: Single Emission
3. Type of Modulation: FM, 172KF3E (2M+2DK: 2 x 38+2 x 48 x 1=172kHz)
4. Output Power: 10mW
5. Battery: AAA sized 1.5V *2
6. Operation Temperature: -10°C ~ +50°C

1.3 Test Methodology

Both Wireless Handheld Transmitter Microphone conducted and radiated testing were performed according to the procedures in chapter 13 of ANSI C63.4 (2003). and section 2.1046, 2.1047, 2.1049, 2.1051, 2.1053, and 2.1055 of Part 2 of CFR 47

1.4 Test Facility

The open area test site and conducted measurement facility used to collect the radiated data is located on the roof top of Building at No. 34, Lin 5, Ding Fu Tsun, Linkou Hsiang, Taipei Hsien, Taiwan, R.O.C.

This site has been fully described in a report submitted to your office, and accepted in a letter dated June. 30, 2004.

2 REQUIREMENTS OF PROVISIONS

2.1 Definition

Intentional radiator:
A device that intentionally generates and emits radio frequency energy by radiation or induction.

2.2 Frequencies Available

According to sec. 74.802 of Part 74, the following frequencies are available for low power auxiliary station :

Frequencies (MHz)

26.100-26.480	455.000-456.000
54.000-72.000	470.000-488.000
76.000-88.000	488.000-494.000
161.625-161.775	614.000-806.000
174.000-216.000	450.000-451.000
944.000-952.000	

2.3 Requirements for Radio Equipment on Certification

(1) RF Output Power

For transmitters, the power output shall be measured at the RF output terminals.

(2) Modulation Characteristics

For Voice Modulated Communication Equipment, a curve or equivalent data showing the frequency response of the audio modulating circuit over a range of 100 to 5000 Hz shall be submitted.

(3) Occupied Bandwidth

For radiotelephone transmitter, other than single sideband or indenpent sideband transmitter, when modulateed by a 2.5kHz tone at an input level 16 dB greater than that necessary to produce 50 percent modulation.

(4) Spurious Emissions at Antenna Terminals

The radio frequency voltage or power generated within the equipment and appearing on a spurious frequency shall be checked at the equipment output terminal when properly loaded with a suitable artificial antenna.

(5) Field Strength of Spurious Emissions

Measurements shall be made to detect spurious emission that may be radiated directly from the cabinet, control circuits, power leads, or intermediate circuit elements under normal condition of installation and operation.

(6) Frequencies Tolerance

a) The frequency stability shall be measured with variation of ambient temperature.
b) The frequency stability shall be measured with variation of primary supply voltage.

2.4 Labeling Requirement

Each equipment for which a type acceptance application is filed on or after May 1,1981, shall bear an identification plate or label pursuant to §2.925（Identification of equipment） and § 2.926（FCC identifier）.

3 OUTPUT POWER MEASUREMENT

3.1 Provision Applicable

According to §74.861(e)(1)(ii), the output power shall not exceed 250 milliwatts.

3.2 Measurement Procedure

1. Setup the configuration per figure 1 and 2 for frequencies measured below and above 1 GHz respectively, adjusting the input voltage to produce the maximum power.
2. Adjust the analyzer for each frequency measured in chapter 6 on a 1 MHz frequency span and 1MHz resolution bandwidth.
3. The search antenna is to be raised and lowered over a range from 1 to 4 meters in horizontally polarized orientation. Position the highness when the highest value is indicated on spectrum analyzer, then change the orientation of EUT on test table over a range from 0◦ to 360◦, and record the highest value indicated on spectrum analyzer as reference value.
4. Repeat step 3 until all frequencies need to be measured were complete.
5. Repeat step 4 with search antenna in vertical polarized orientations.
6. Replace the EUT with a tuned dipole antenna (horn antenna for above 1 GHz) relative to each frequency in horizontally polarized orientation and as the same polarized orientation with search antenna. Connect the tuned dipole antenna to a standard signal generator (SG) via a low loss cable. Power on the SG and tune the right frequency in measuring as well as set SG at a appreciated output level. Rise and lower the search antenna to get the highest value on spectrum analyzer, and then hold this position. Adjust the SG output to get a identical value derived from step 3 on spectrum analyzer. Record this value for result calculated.
7. Repeat step 6 until all frequencies need to be measured were complete.
8. Repeat step 7 with both dipole antenna (horn antenna for above 1 GHz) and search antenna in vertical polarized orientations.

Figure 1 : Frequencies measured below 1 GHz configuration

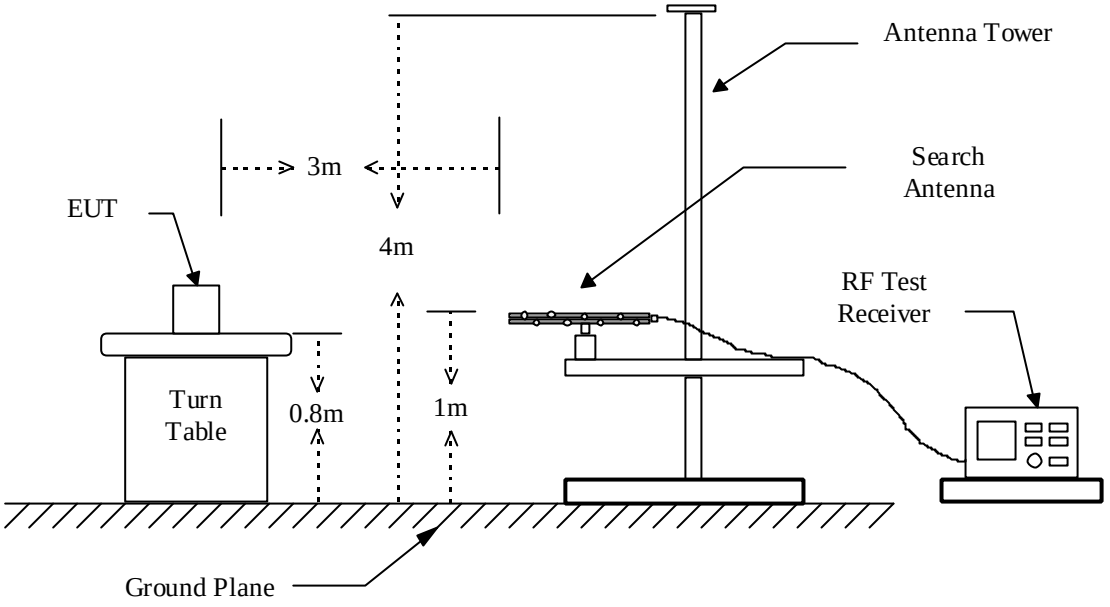
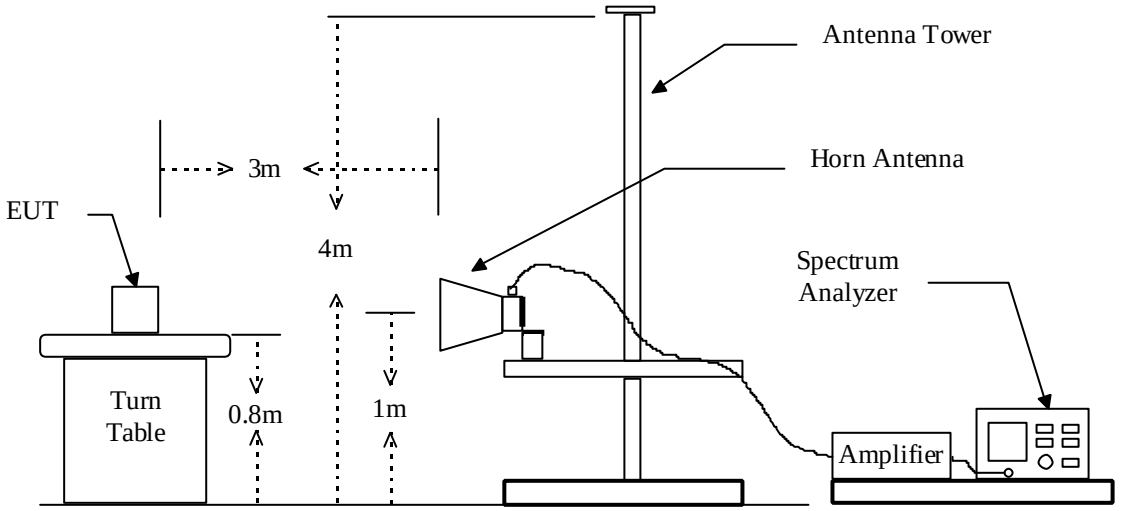


Figure 2 : Frequencies measured above 1 GHz configuration



3.3 Test Data

A) 744.000~752.000 MHz

1. Channel Low (ERP)

Operation Mode : TX Test Date : Dec. 10, 2004

Temperature : 20 °C Humidity : 60 %

Frequency (MHz)	Meter Reading (dB μ V/m)	SG Reading (dBm)	Cable Loss (dB)	Antenna Gain	Result (dBm)	Output Power (mW)	Limit (mW)
744.215	70.93	0.97	-2.5	----	-1.53	0.70	250

2. Channel Middle (ERP)

Operation Mode : TX Test Date : Dec. 10, 2004

Temperature : 20 °C Humidity : 60 %

Frequency (MHz)	Meter Reading (dB μ V/m)	SG Reading (dBm)	Cable Loss (dB)	Antenna Gain	Result (dBm)	Output Power (mW)	Limit (mW)
747.815	71.15	1.15	-2.5	----	-1.35	0.73	250

3. Channel High (ERP)

Operation Mode : TX Test Date : Dec. 10, 2004

Temperature : 20 °C Humidity : 60 %

Frequency (MHz)	Meter Reading (dB μ V/m)	SG Reading (dBm)	Cable Loss (dB)	Antenna Gain	Result (dBm)	Output Power (mW)	Limit (mW)
751.615	71.4	1.5	2.5	----	-1.00	0.79	250

Note: For measured frequency below 1GHz, a tuned dipole antenna is used.

B) 794.000~806.000 MHz

1. Channel Low (ERP)

Operation Mode : TX Test Date : Dec. 10, 2004

Temperature : 20 °C Humidity : 60 %

Frequency (MHz)	Meter Reading (dB μ V/m)	SG Reading (dBm)	Cable Loss (dB)	Antenna Gain	Result (dBm)	Output Power (mW)	Limit (mW)
794.815	66.42	-1.28	-2.6	----	-3.88	0.41	250

2. Channel Middle (ERP)

Operation Mode : TX Test Date : Dec. 10, 2004

Temperature : 20 °C Humidity : 60 %

Frequency (MHz)	Meter Reading (dB μ V/m)	SG Reading (dBm)	Cable Loss (dB)	Antenna Gain	Result (dBm)	Output Power (mW)	Limit (mW)
800.415	67.10	-0.50	-2.6	----	-3.10	0.49	250

3. Channel High (ERP)

Operation Mode : TX Test Date : Dec. 10, 2004

Temperature : 20 °C Humidity : 60 %

Frequency (MHz)	Meter Reading (dB μ V/m)	SG Reading (dBm)	Cable Loss (dB)	Antenna Gain	Result (dBm)	Output Power (mW)	Limit (mW)
805.315	66.90	-0.60	-2.6	----	-3.20	0.48	250

Note: For measured frequency below 1GHz, a tuned dipole antenna is used.

3.4 Result Calculation

Result calculation is as following :

Result = SG Reading + Cable Loss + Antenna Gain Corrected

Antenna Gain Corrected : is used for antenna other than dipole to convert radiated power to ERP.

$$mW = \log^{-1}[\frac{Result(dBm)}{10}]$$

3.5 Test Equipment

Equipment	Manufacturer	Model No.	Next Cal. Date
Spectrum Analyzer	R&S	FSP	05/31/2005
Plotter	HP	7440A	N/A
Dipole Antenna	EMCO	3121C	06/06/2005
Signal generator	HP	8656B	11/07/2005

4 MODULATION CHARACTERISTICS

4.1 Provisions Applicable

According to §2.1047 (a), for Voice Modulated Communication Equipment, the frequency response of the audio modulating circuit over a range of 100 to 5000 Hz shall be measured.

4.2 Measurement Method

A) Frequency response of audio circuits

1. Position the EUT as shown in figure 3.

2. Vary the modulating frequency from 100 Hz to 5000 Hz with varying the input voltage from 0V to maximum permitted input voltage, and observe the change in output.

B) Modulation Limit

1. Position the EUT as shown in figure 3, adjust the audio input frequency to 100 Hz and the input level from 0V to maximum permitted input voltage with recording each carrier frequency deviation responding to respective input level.

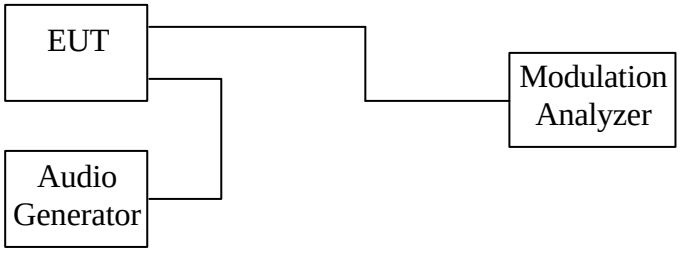
2. Repeat step 1 with changing the input frequency for 200, 500, 1000, 3000, and 5000 Hz in sequence.

C) Frequency response of all circuits

1. Position the EUT as shown in figure 3.

2. Vary the modulating frequency from 100 Hz to 15000 Hz with constant input voltage (derived from 5.4(a) of this test report), and observe the change in output.

Figure 3 : Modulation characteristic measurement configuration



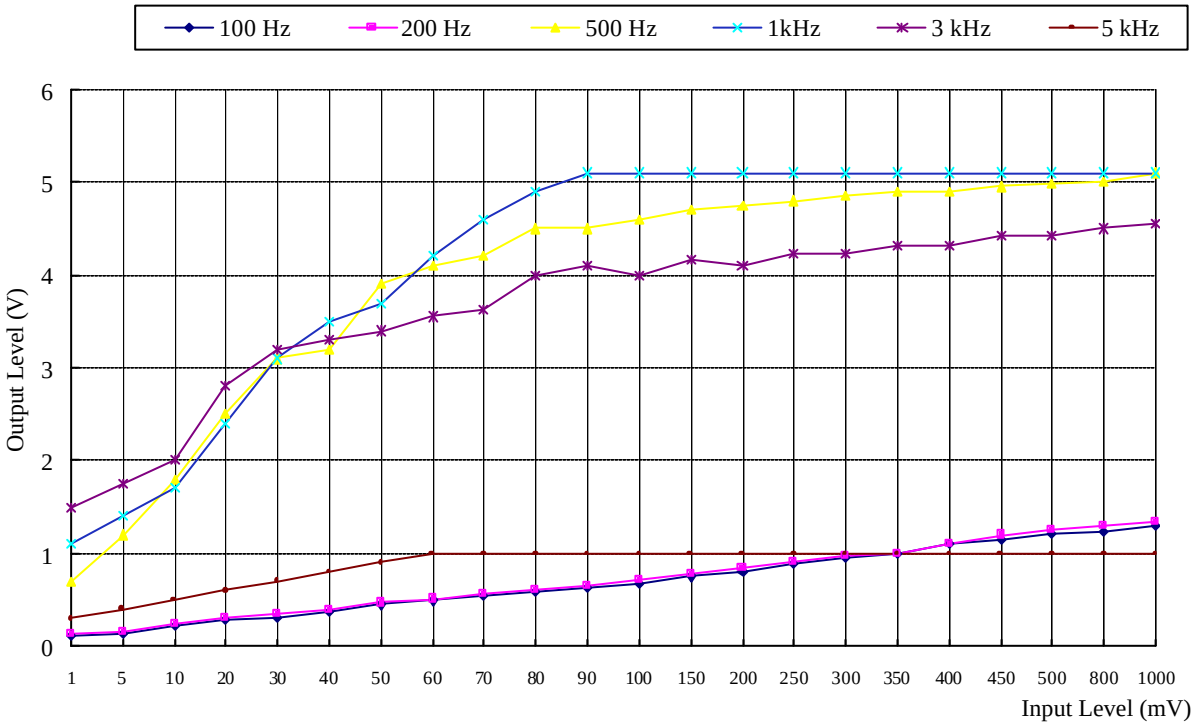
4.3 Measurement Instrument

Equipment	Manufacturer	Model No.	Next Cal. Date
Modulation Analyzer	Hewlett-Packard	8901A	11/30/2005
Multifunction Synthesizer	Hewlett-Packard	8904A	12/23/2005
Oscillscope	Lecroy	9350A	06/01/2005
Preamplifier	Hewlett-Packard	8447D	10/12/2004
Spectrum	Advantest	R3361C	08/10/2005

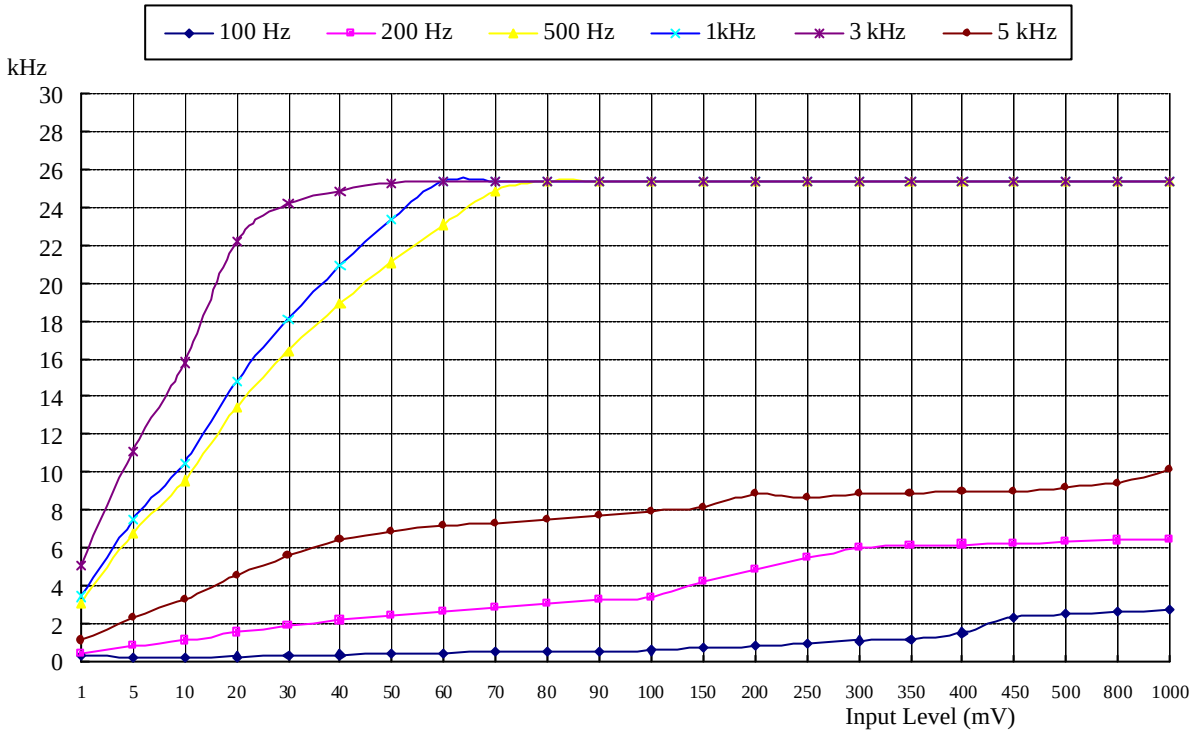
4.4 Measurement Result

1. 744.000~752.000 MHz

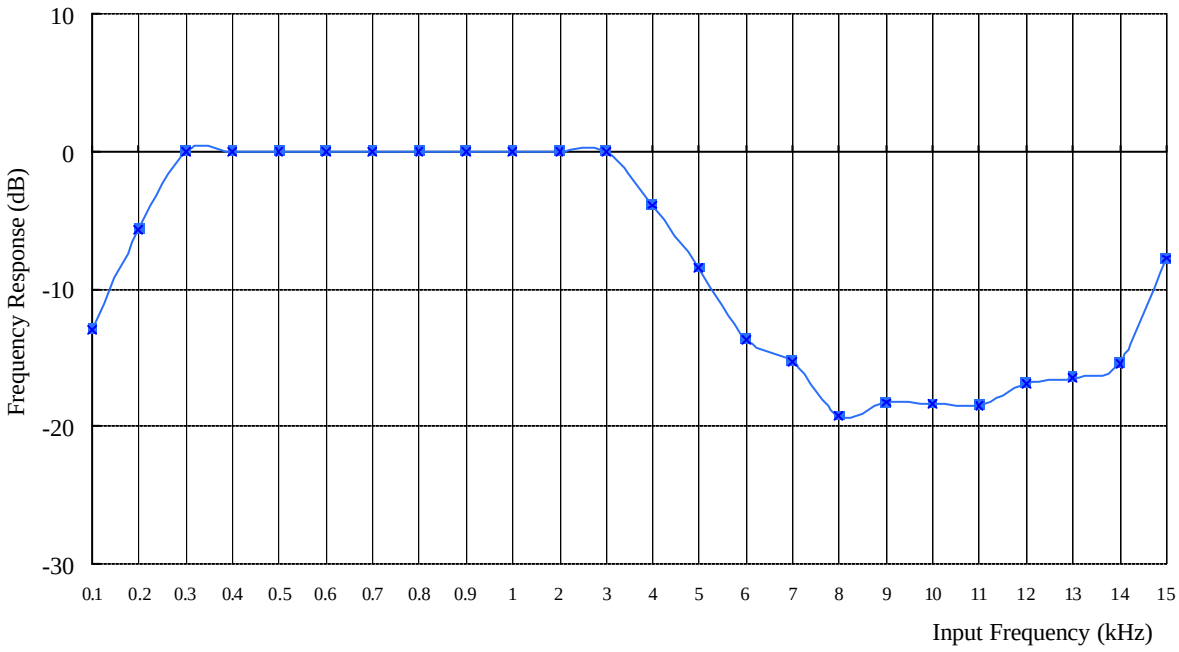
A). Frequency response



B). Modulation Limit

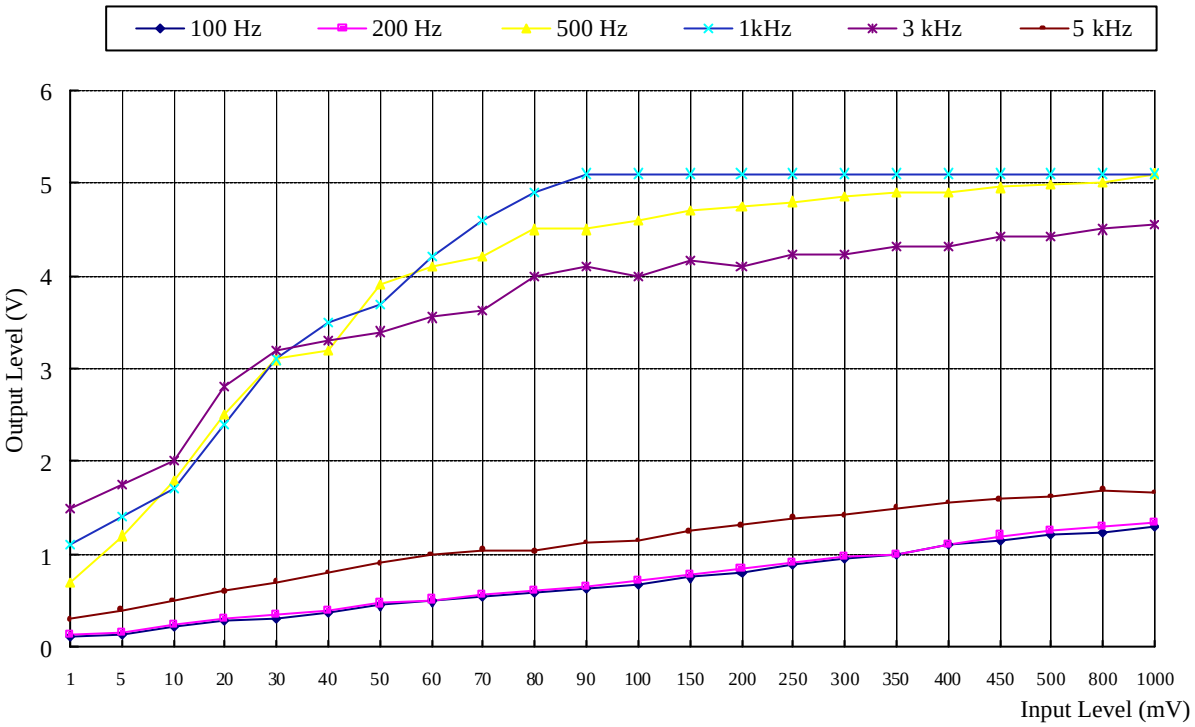


C). Frequency response of all circuits

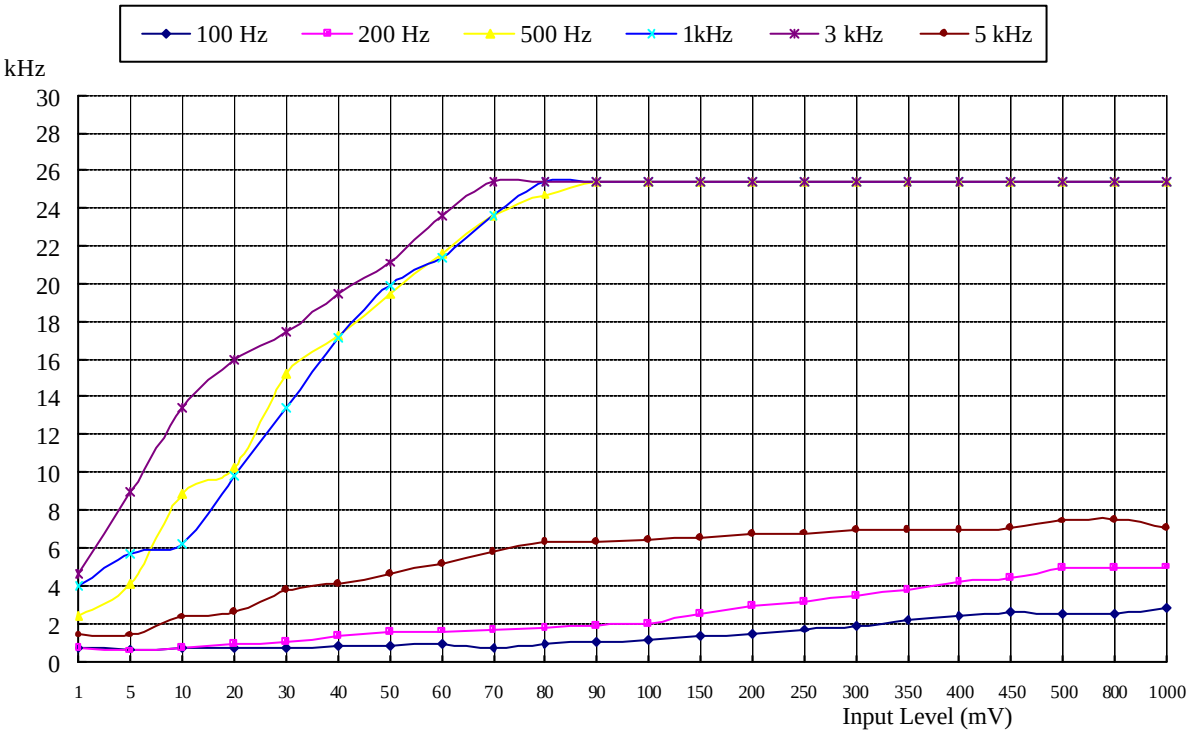


2. 794.000~806.000 MHz

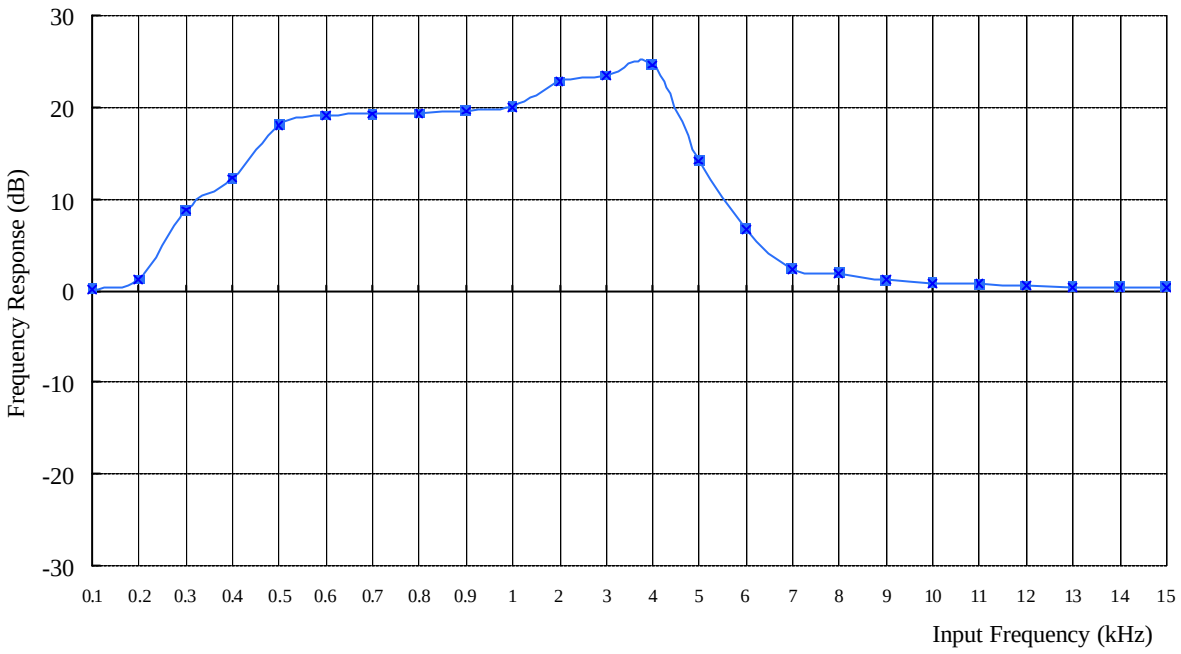
A). Frequency response



B). Modulation Limit



C). Frequency response of all circuits



5 OCCUPIED BANDWIDTH OF EMISSION

5.1 Provisions Applicable

According to §2.1049(c)(1), For radiotelephone transmitter, other than single sideband or indenpent sideband transmitter, when modulateed by a 2.5kHz tone at an input level 16 dB greater than that necessary to produce 50 percent modulation.
According to §74.861(e)(5), the frequency emission bandwidth shall not exceed 200 kHz.

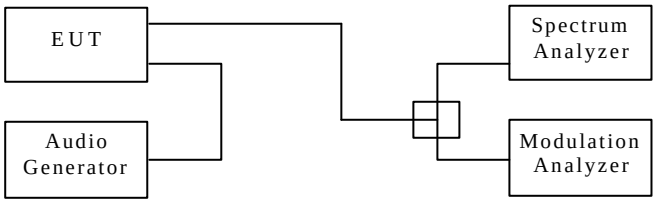
5.2 Measurement Method

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.

2. Position the EUT as shown in figure 4, and Install new batteries in the EUT. Turn on the EUT ant 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. Apply a 2.5 kHz modulation signal to EUT and measure the frequencies of the modulated signal from the EUT where it is the specified number of dB below the reference level set in step 2. This is the occupied bandwidth specified.

Figure 4 : Occupied bandwidth measurement configuration



5.3 Occupied Bandwidth Test Equipment

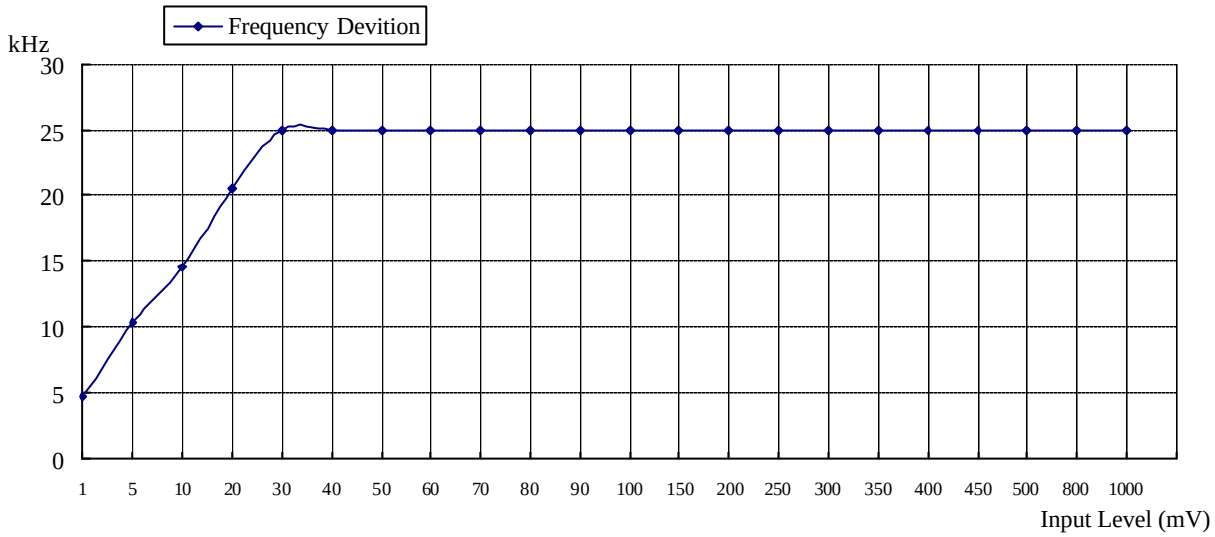
Equipment	Manufacturer	Model No.	Next Cal. Date
Spectrum Analyzer	R&S	FSP	05/31/2005
Modulation Analyzer	Hewlett-Packard	8901A	11/30/2005
Multifunction Synthesizer	Hewlett-Packard	8904A	12/23/2005
Plotter	Hewlett-Packard	7440A	N/A

5.4 Bandwidth Measured

5.4.1 Input Level Derived

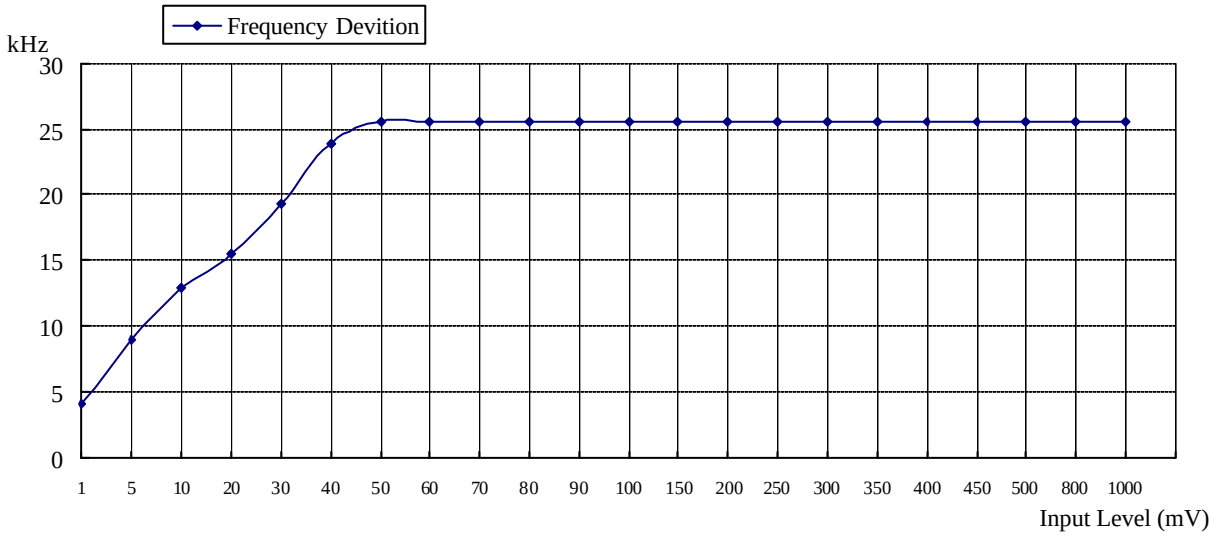
1. 744.000~752.000 MHz

Input Audio Frequency : 2.5 kHz, Sine Wave



The Level input to produce 50 % modulation is 20 mV, therefore the magnitude 16 dB greater than it is 126 mV.

2. 740.000~752.000 MHz



The Level input to produce 50 % modulation is 25 mV, therefore the magnitude 16 dB greater than it is 157 mV.

5.4.2 Occupied Bandwidth Plotted

1. 744.000~752.000 MHz

The Channel Low 26 dB Bandwidth is 146.6KHz.
The Channel Mid 26 dB Bandwidth is 145.8KHz.
The Channel High 26 dB Bandwidth is 146.3KHz.

2. 794.000~806.000 MHz

The Channel Low 26 dB Bandwidth is 134.7KHz.
The Channel Mid 26 dB Bandwidth is 134.4KHz.
The Channel High 26 dB Bandwidth is 134.7KHz.

Please see appendix 1 for plotted data.

6 FIELD STRENGTH OF EMISSION

6.1 Provisions Applicable

According to §2.1053, measurements shall be made to detect spurious emission that may be radiated directly from the cabinet, control circuits, power leads, or intermediate circuit elements under normal condition of installation and operation. Information submitted shall include the relative radiated power of spurious emission with reference to the rated power output of the transmitter, assuming all emissions are radiated from a halfwave dipole antenna.

According to §74.861(e)(6), the mean power of emissions shall be attenuated below the mean output power of the transmitter in accordance with the follwing sceedule:

(i) on any frequency removed from the operating frequency by more than 50 percent up to and including 100 percent of the authorized bandwidth: at least 25 dB.

(ii) on any frequency removed from the operating frequency by more than 100 percent up to and including 250 percent of the authorized bandwidth: at least 35 dB.

(iii) on any frequency removed from the operating frequency by more than 250 percent of the authorized bandwidth shall be attenuated below the unmodulated carrier by at least 43 plus 10 Log(output power in watts) dB.

6.2 Measurement Procedure

1. Setup the configuration per figure 1 and 2 for frequencies measured below and above 1 GHz respectively, adjusting the input voltage to produce the maximum power as measured in chapter 3.
2. Adjust the analyzer for each frequency measured in chapter 6 on a 1 MHz frequency span and 1MHz resolution bandwidth.
3. The search antenna is to be raised and lowered over a range from 1 to 4 meters in horizontally polarized orientation. Position the highness when the highest value is indicated on spectrum analyzer, then change the orientation of EUT on test table over a range from 0◦ to 360 ◦ , and record the highest value indicated on spectrum analyzer as reference value.
4. Repeat step 3 until all frequencies need to be measured were complete.
5. Repeat step 4 with search antenna in vertical polarized orientations.
6. Replace the EUT with a tuned dipole antenna (horn antenna for above 1 GHz) relative to each frequency in horizontally polarized orientation and as the same polarized orientation with search antenna. Connect the tuned dipole antenna to a standard signal generator (SG) via a low loss cable. Power on the SG and tune the right frequency in measuring as well as set SG at a appreciated output level. Rise and lower the search antenna to get the highest value on spectrum analyzer, and then hold this position. Adjust the SG output to get a identical value derived from step 3 on spectrum analyzer. Record this value for result calculated.

7. Repeat step 6 until all frequencies need to be measured were complete.
8. Repeat step 7 with both dipole antenna (horn antenna for above 1 GHz) and search antenna in vertical polarized orientations.

6.3 Measuring Instrument

Equipment	Manufacturer	Model No.	Next Cal. Date
Spectrum Analyzer	Hewlett-Packard	8564E	08/11/2005
Horn Antenna	EMCO	3115	08/26/2005
Log periodic Antenna	EMCO	3146	10/05/2005
Biconical Antenna	EMCO	3110B	10/05/2005
Preamplifier	Hewlett-Packard	8449B	09/07/2005
Preamplifier	Hewlett-Packard	8447D	08/12/2005

Measuring instrument setup in frequency band measured is as following :

Frequency Band (MHz)	Instrument	Function	Resolution bandwidth	Video Bandwidth
30 to 1000	Spectrum Analyzer	Peak	100 kHz	100 kHz
Above 1000	Spectrum Analyzer	Peak	1 MHz	1 MHz

6.4 Measuring Data

A) 744.000~752.000 MHz

1. Channel Low

Operation Mode : TX Test Date : Dec. 10, 2004

Temperature : 20 ℃ Humidity : 60 %

Unmodulated carrier output power is –1.53 dBm , or 0.70 mW (ERP).

The limit of spurious or harmonics is calculated as following :

-1.53-[43+10log(carrier output power in W)], or -13dBm

Frequency (MHz)	Meter Reading (dBuV) H	V	SG Reading (dBm) H	V	Antenna Gain	Antenna Gain Corr'	Cable Loss (dB)	Result (dBm) H	V	Limit (dBm)	Margin (dB)
1488.430	---	---	---	---	7.3	-2.0	1.3	---	---	-13.0	---
2232.645	---	---	---	---	9.4	-2.0	1.7	---	---	-13.0	---
2976.860	---	---	---	---	9.6	-2.0	1.7	---	---	-13.0	---
3721.075	---	---	---	---	9.6	-2.0	2.1	---	---	-13.0	---
4465.290	---	---	---	---	10.6	-2.0	2.1	---	---	-13.0	---
5209.505	---	---	---	---	10.9	-2.0	2.1	---	---	-13.0	---
5953.720	---	---	---	---	11.7	-2.0	2.6	---	---	-13.0	---
6697.935	---	---	---	---	12.1	-2.0	2.6	---	---	-13.0	---
7442.150	---	---	---	---	11.6	-2.0	2.9	---	---	-13.0	---

Note :

1. Remark "---" means that the emission level is too weak to be detected.
2. For measured frequency below 1GHz, a tuned dipole antenna is used.
3. Result calculation is as following :

   Result = SG Reading +Cable Loss +Antenna Gain +Antenna Gain Corrected

   Antenna Gain Corrected : is used for antenna other than dipole to convert radiated power to ERP.
4. Spurious or harmonics above 1 GHz is too low to be detected or attenuated more than 60 dB from limit value.

2. Channel Middle

Operation Mode : TX Test Date : Dec. 10, 2004

Temperature : 20 °C Humidity : 60 %

Unmodulated carrier output power is –1.35 dBm , or 0.73 mW (ERP).

The limit of spurious or harmonics is calculated as following :

-1.35-[43+10log(carrier output power in W)], or -13dBm

Frequency (MHz)	Meter Reading (dBuV) H	V	SG Reading (dBm) H	V	Antenna Gain	Antenna Gain Corr'	Cable Loss (dB)	Result (dBm) H	V	Limit (dBm)	Margin (dB)
1495.630	---	---	---	---	9.1	-2.0	1.3	---	---	-13.0	---
2243.445	---	---	---	---	9.4	-2.0	1.7	---	---	-13.0	---
2991.260	---	---	---	---	9.7	-2.0	1.7	---	---	-13.0	---
3739.075	---	---	---	---	9.6	-2.0	2.1	---	---	-13.0	---
4486.890	---	---	---	---	10.9	-2.0	2.1	---	---	-13.0	---
5234.705	---	---	---	---	10.9	-2.0	2.1	---	---	-13.0	---
5982.520	---	---	---	---	11.0	-2.0	2.6	---	---	-13.0	---
6730.335	---	---	---	---	12.1	-2.0	2.6	---	---	-13.0	---
7478.150	---	---	---	---	11.6	-2.0	2.9	---	---	-13.0	---

Note :

1. Remark "---" means that the emission level is too weak to be detected.
2. For measured frequency below 1GHz, a tuned dipole antenna is used.
3. Result calculation is as following :

   Result = SG Reading +Cable Loss +Antenna Gain +Antenna Gain Corrected

   Antenna Gain Corrected : is used for antenna other than dipole to convert radiated power to ERP.
4. Spurious or harmonics above 1 GHz is too low to be detected or attenuated more than 60 dB from limit value.

3. Channel High

Operation Mode : TX Test Date : Dec. 10, 2004

Temperature : 20 °C Humidity : 60 %

Unmodulated carrier output power is –1.00 dBm , or 0.79 mW (ERP).

The limit of spurious or harmonics is calculated as following :

-1.00-[43+10log(carrier output power in W)], or -13dBm

Frequency (MHz)	Meter Reading (dBuV) H	V	SG Reading (dBm) H	V	Antenna Gain	Antenna Gain Corr'	Cable Loss (dB)	Result (dBm) H	V	Limit (dBm)	Margin (dB)
1503.230	---	---	---	---	9.1	-2.0	1.3	---	---	-13.0	---
2254.845	---	---	---	---	9.3	-2.0	1.7	---	---	-13.0	---
3006.460	---	---	---	---	9.7	-2.0	1.7	---	---	-13.0	---
3758.075	---	---	---	---	9.6	-2.0	2.1	---	---	-13.0	---
4509.690	---	---	---	---	10.9	-2.0	2.1	---	---	-13.0	---
5261.305	---	---	---	---	10.9	-2.0	2.1	---	---	-13.0	---
6012.920	---	---	---	---	11.9	-2.0	2.5	---	---	-13.0	---
6764.535	---	---	---	---	11.8	-2.0	2.5	---	---	-13.0	---
7616.150	---	---	---	---	11.5	-2.0	2.9	---	---	-13.0	---

Note :

1. Remark "---" means that the emission level is too weak to be detected.
2. For measured frequency below 1GHz, a tuned dipole antenna is used.
3. Result calculation is as following :

   Result = SG Reading +Cable Loss +Antenna Gain +Antenna Gain Corrected

   Antenna Gain Corrected : is used for antenna other than dipole to convert radiated power to ERP.
4. Spurious or harmonics above 1 GHz is too low to be detected or attenuated more than 60 dB from limit value.

B) 794.000~806.000 MHz

1. Channel Low

Operation Mode : TX Test Date : Dec. 10, 2004

Temperature : 20 °C Humidity : 60 %

Unmodulated carrier output power is –3.88 dBm , or 0.41 mW (ERP).

The limit of spurious or harmonics is calculated as following :

-3.88-[43+10log(carrier output power in W)], or -13dBm

Frequency (MHz)	Meter Reading (dBuV) H	V	SG Reading (dBm) H	V	Antenna Gain	Antenna Gain Corr'	Cable Loss (dB)	Result (dBm) H	V	Limit (dBm)	Margin (dB)
1589.630	---	---	---	---	7.3	-2.0	1.3	---	---	-13.0	---
2384.445	---	---	---	---	9.4	-2.0	1.7	---	---	-13.0	---
3179.260	---	---	---	---	9.6	-2.0	1.7	---	---	-13.0	---
3974.075	---	---	---	---	9.6	-2.0	2.1	---	---	-13.0	---
4768.890	---	---	---	---	10.6	-2.0	2.1	---	---	-13.0	---
5563.705	---	---	---	---	10.9	-2.0	2.1	---	---	-13.0	---
6358.520	---	---	---	---	11.7	-2.0	2.6	---	---	-13.0	---
7153.335	---	---	---	---	12.1	-2.0	2.6	---	---	-13.0	---
7948.150	---	---	---	---	11.6	-2.0	2.9	---	---	-13.0	---

Note :

1. Remark "---" means that the emission level is too weak to be detected.
2. For measured frequency below 1GHz, a tuned dipole antenna is used.
3. Result calculation is as following :

   Result = SG Reading +Cable Loss +Antenna Gain +Antenna Gain Corrected

   Antenna Gain Corrected : is used for antenna other than dipole to convert radiated power to ERP.
4. Spurious or harmonics above 1 GHz is too low to be detected or attenuated more than 60 dB from limit value.

2. Channel Middle

Operation Mode : TX Test Date : Dec. 10, 2004

Temperature : 20 °C Humidity : 60 %

Unmodulated carrier output power is –3.10 dBm , or 0.49 mW (ERP).

The limit of spurious or harmonics is calculated as following :

-3.10-[43+10log(carrier output power in W)], or -13dBm

Frequency (MHz)	Meter Reading (dBuV) H	V	SG Reading (dBm) H	V	Antenna Gain	Antenna Gain Corr'	Cable Loss (dB)	Result (dBm) H	V	Limit (dBm)	Margin (dB)
1600.830	---	---	---	---	9.1	-2.0	1.3	---	---	-13.0	---
2401.245	---	---	---	---	9.4	-2.0	1.7	---	---	-13.0	---
3201.660	---	---	---	---	9.7	-2.0	1.7	---	---	-13.0	---
4002.075	---	---	---	---	9.6	-2.0	2.1	---	---	-13.0	---
4802.490	---	---	---	---	10.9	-2.0	2.1	---	---	-13.0	---
5602.905	---	---	---	---	10.9	-2.0	2.1	---	---	-13.0	---
6403.320	---	---	---	---	11.0	-2.0	2.6	---	---	-13.0	---
7203.735	---	---	---	---	12.1	-2.0	2.6	---	---	-13.0	---
8004.150	---	---	---	---	11.6	-2.0	2.9	---	---	-13.0	---

Note :

1. Remark "---" means that the emission level is too weak to be detected.
2. For measured frequency below 1GHz, a tuned dipole antenna is used.
3. Result calculation is as following :

   Result = SG Reading +Cable Loss +Antenna Gain +Antenna Gain Corrected

   Antenna Gain Corrected : is used for antenna other than dipole to convert radiated power to ERP.
4. Spurious or harmonics above 1 GHz is too low to be detected or attenuated more than 60 dB from limit value.

3. Channel High

Operation Mode : TX Test Date : Dec. 10, 2004

Temperature : 20 °C Humidity : 60 %

Unmodulated carrier output power is –3.20 dBm , or 0.48 mW (ERP).

The limit of spurious or harmonics is calculated as following :

-3.20-[43+10log(carrier output power in W)], or -13dBm

Frequency (MHz)	Meter Reading (dBuV) H	V	SG Reading (dBm) H	V	Antenna Gain	Antenna Gain Corr'	Cable Loss (dB)	Result (dBm) H	V	Limit (dBm)	Margin (dB)
1610.630	---	---	---	---	9.1	-2.0	1.3	---	---	-13.0	---
2415.945	---	---	---	---	9.3	-2.0	1.7	---	---	-13.0	---
3221.260	---	---	---	---	9.7	-2.0	1.7	---	---	-13.0	---
4026.575	---	---	---	---	9.6	-2.0	2.1	---	---	-13.0	---
4831.890	---	---	---	---	10.9	-2.0	2.1	---	---	-13.0	---
5637.205	---	---	---	---	10.9	-2.0	2.1	---	---	-13.0	---
6442.520	---	---	---	---	11.9	-2.0	2.5	---	---	-13.0	---
7247.835	---	---	---	---	11.8	-2.0	2.5	---	---	-13.0	---
8053.150	---	---	---	---	11.5	-2.0	2.9	---	---	-13.0	---

Note :

1. Remark "---" means that the emission level is too weak to be detected.
2. For measured frequency below 1GHz, a tuned dipole antenna is used.
3. Result calculation is as following :

   Result = SG Reading +Cable Loss +Antenna Gain +Antenna Gain Corrected

   Antenna Gain Corrected : is used for antenna other than dipole to convert radiated power to ERP.
4. Spurious or harmonics above 1 GHz is too low to be detected or attenuated more than 60 dB from limit value.

C. Emission mask plots

Please see appendix 2 for plotted data.

D. Other Emission

1. 744.000-752.000MHz

a) Emission frequencies below 1 GHz

Test Date : Dec. 10, 2004 Temperature : 20 °C Humidity : 60 %

Frequency (MHz)	Ant-Pol H/V	Meter Reading (dBuV)	Corrected Factor (dB)	Result @3m (dBuV/m)	Limit @3m (dBuV/m)	Margin (dB)	Table Degree (Deg.)	Ant. High (m)
103.710	V	51.2	-13.1	38.1	43.5	-5.4	74	1.0
134.760	V	42.8	-11.2	31.6	43.5	-11.9	272	1.0
248.970	H	34.6	-4.0	30.6	46.0	-15.4	254	1.0
535.200	V	39.3	-5.1	34.2	46.0	-11.8	162	1.0
837.600	V	36.5	1.9	38.4	46.0	-7.6	153	1.0
849.500	H	39.4	2.2	41.6	46.0	-4.4	20	1.0

Note :

1. Remark "---" means that the emissions level is too low to be measured.
2. The expanded uncertainty of the radiated emission tests is 3.53 dB.

b) Emission frequencies above 1 GHz

Radiated emission frequencies above 1 GHz to 5 GHz were too low to be measured with a pre-amplifier of 35 dB.

2. 794.000-806.000MHz

a) Emission frequencies below 1 GHz

Test Date : Dec. 10, 2004 Temperature : 20 °C Humidity : 60 %

Frequency (MHz)	Ant-Pol H/V	Meter Reading (dBuV)	Corrected Factor (dB)	Result @3m (dBuV/m)	Limit @3m (dBuV/m)	Margin (dB)	Table Degree (Deg.)	Ant. High (m)
172.290	V	33.4	-9.0	24.4	43.5	-19.1	74	1.0
200.370	V	33.1	-7.1	26.0	43.5	-17.5	272	1.0
292.170	V	31.9	-1.7	30.2	46.0	-15.8	254	1.0
470.100	V	32.3	-4.7	27.6	46.0	-18.4	162	1.0
676.600	H	32.2	-1.0	31.2	46.0	-14.8	153	1.0
746.600	H	32.2	-0.4	31.8	46.0	-14.2	20	1.0

Note :

1. Remark "---" means that the emissions level is too low to be measured.
2. The expanded uncertainty of the radiated emission tests is 3.53 dB.

b) Emission frequencies above 1 GHz

Radiated emission frequencies above 1 GHz to 5 GHz were too low to be measured with a pre-amplifier of 35 dB.

6.5 Radiated Measurement Photos

7 FREQUENCY STABILITY MEASUREMENT

7.1 Provisions Applicable

According to §2.1055 (a)(1), the frequency stability shall be measured with variation of ambient temperature from -30°C to +50°C centigrade, and according to §2.1055 (d)(2), the frequency stability shall be measured with reducing primary supply voltage to the battery operating end point which is specified by the manufacturer.

According to §74.861(e)(4), the frequency tolerance of the transmitter shall be 0.005 percent.

7.2 Measurement Procedure

A) Frequency stability versus environmental temperature

1. Setup the configuration per figure 5 for frequencies measured at ambient temperature if it is within 15℃ to 25°C. Otherwise, an environmental chamber set for a temperature of 20℃ shall be used. Install new batteries in the EUT.

2. Turn on EUT and set SA center frequency to the right frequency needs to be measured. Then set SA RBW to 30 kHz, VBW to 100kHz and frequency span to 500 kHz. Record this frequency to be a reference.

3. Set the temperature of chamber to 50℃. Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize. While maintaining a constant temperature inside the chamber, turn the EUT on and measure the EUT operating frequency.

4. Repeat step 2 with a 10℃ decreased per stage until the lowest temperature -30°C is measured, record all measurement frequencies.

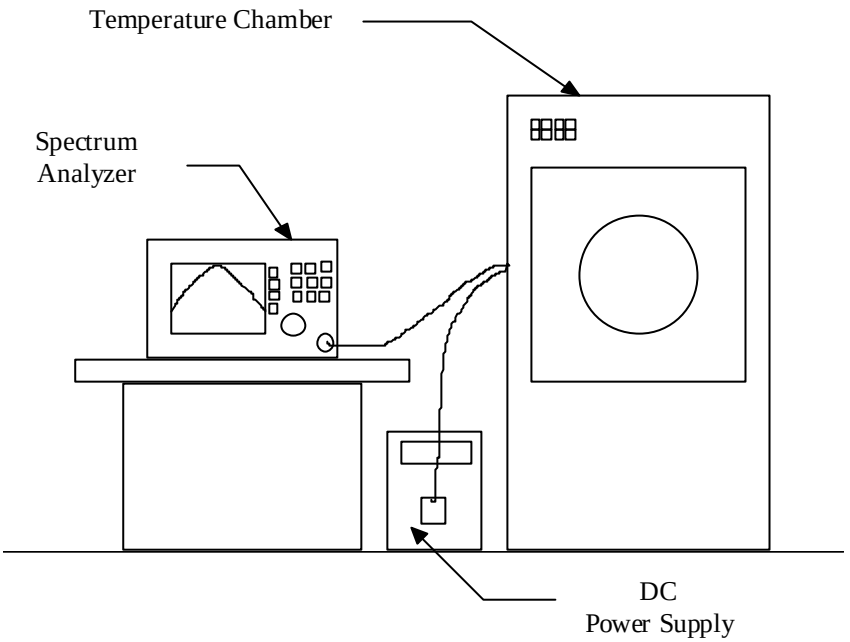
B) Frequency stability versus input voltage

1. Setup the configuration per figure 7 for frequencies measured at ambient temperature if it is within 15℃ to 25°C. Otherwise, an environmental chamber set for a temperature of 20℃ shall be used. Install new batteries in the EUT.

2. Set SA center frequency to the right frequency needs to be measured. Then set SA RBW to 30 kHz, VBW to 100kHz and frequency span to 500 kHz. Record this frequency to be a reference.

3. For battery operated only device, supply the EUT primary voltage at the battery operating end point which is specified by the manufacturer and record the frequency.

Figure 5 : Frequency stability measurement configuration



7.3 Measurement Instrument

Equipment	Manufacturer	Model No.	Next Cal. Date
Spectrum Analyzer	HP	8564E	08/11/2005
Temperature Chamber	MALLIER	MCT-2X-M	11/01/2005

7.4 Measurement Data

A1. Frequency stability versus enviroment tempture

Reference Frequency : 744.215 MHz		Limit：0.005%					
Enviroment Tempture (°C)	Power Supplied (Vdc)	Frequency measured with time elapsed					
		2 minute		5 minute		10 minute	
		(MHz)	(%)	(MHz)	(%)	(MHz)	(%)
50	New Batt.	744.2085	-0.00088	744.2221	0.00095	744.2410	0.00349
40		744.2402	0.00339	744.2073	-0.00104	744.2057	-0.00124
30		744.2100	-0.00067	744.2426	0.00371	744.1884	-0.00357
20		744.2038	-0.00150	744.2276	0.00169	744.2091	-0.00080
10		744.1999	-0.00203	744.2022	-0.00173	744.1938	-0.00285
0		744.2299	0.00200	744.2062	-0.00119	744.2198	0.00065
-10		744.2083	-0.00090	744.1931	-0.00294	744.1993	-0.00212
-20		744.2365	0.00288	744.2210	0.00081	744.2294	0.00193
-30		744.2189	0.00052	744.2114	-0.00049	744.2223	0.00098

A2. Frequency stability versus end-point supplied voltage (2Vdc)

Reference Frequency : 744.215 MHz		Limit：0.005%					
Enviroment Tempture (°C)	Power Supplied (Vdc)	Frequency measured with time elapsed					
		2 minute		5 minute		10 minute	
		(MHz)	(%)	(MHz)	(%)	(MHz)	(%)
25	End-Point	744.2317	0.00225	744.2131	-0.00026	744.2095	-0.00073

B1. Frequency stability versus enviroment tempture

Reference Frequency : 747.815 MHz		Limit：0.005%					
Enviroment	Power	Frequency measured with time elapsed					
Tempture	Supplied	2 minute		5 minute		10 minute	
(℃)	(Vdc)	(MHz)	(%)	(MHz)	(%)	(MHz)	(%)
50	New Batt.	747.8212	0.00083	747.8362	0.00283	747.8348	0.00265
40		747.8213	0.00084	747.8089	-0.00082	747.8188	0.00050
30		747.7879	-0.00362	747.8340	0.00254	747.8173	0.00031
20		747.8104	-0.00061	747.8209	0.00079	747.8246	0.00129
10		747.8136	-0.00019	747.7916	-0.00313	747.8235	0.00113
0		747.8147	-0.00005	747.8415	0.00355	747.8374	0.00300
-10		747.8072	-0.00104	747.7918	-0.00310	747.8022	-0.00172
-20		747.8134	-0.00021	747.8097	-0.00071	747.8131	-0.00025
-30		747.8072	-0.00104	747.8360	0.00281	747.8401	0.00336

B2. Frequency stability versus end-point supplied voltage (2Vdc)

Reference Frequency : 747.815 MHz		Limit：0.005%					
Enviroment	Power	Frequency measured with time elapsed					
Tempture	Supplied	2 minute		5 minute		10 minute	
(℃)	(Vdc)	(MHz)	(%)	(MHz)	(%)	(MHz)	(%)
25	End-Point	747.8167	0.00022	747.7918	-0.00310	747.8119	-0.00041

C1. Frequency stability versus enviroment tempture

Reference Frequency : 751.615 MHz		Limit：0.005%					
Enviroment	Power	Frequency measured with time elapsed					
Tempture	Supplied	2 minute		5 minute		10 minute	
(°C)	(Vdc)	(MHz)	(%)	(MHz)	(%)	(MHz)	(%)
50	New Batt.	751.5989	-0.00215	751.6329	0.00239	751.5964	-0.00248
40		751.5881	-0.00358	751.6334	0.00245	751.5868	-0.00375
30		751.6001	-0.00198	751.6029	-0.00160	751.6062	-0.00117
20		751.6308	0.00210	751.6415	0.00352	751.6271	0.00161
10		751.6157	0.00010	751.5880	-0.00359	751.5918	-0.00308
0		751.5982	-0.00224	751.5961	-0.00251	751.6274	0.00164
-10		751.5965	-0.00246	751.6119	-0.00041	751.6436	0.00380
-20		751.5888	-0.00349	751.6364	0.00285	751.5914	-0.00314
-30		751.5990	-0.00213	751.6057	-0.00124	751.6061	-0.00118

C2. Frequency stability versus end-point supplied voltage (2Vdc)

Reference Frequency : 751.615 MHz		Limit：0.005%					
Enviroment	Power	Frequency measured with time elapsed					
Tempture	Supplied	2 minute		5 minute		10 minute	
(°C)	(Vdc)	(MHz)	(%)	(MHz)	(%)	(MHz)	(%)
25	End-Point	751.6023	-0.00169	751.6385	0.00312	751.6103	-0.00062

D1. Frequency stability versus enviroment tempture

Reference Frequency : 794.815 MHz		Limit：0.005%					
Enviroment	Power	Frequency measured with time elapsed					
Tempture	Supplied	2 minute		5 minute		10 minute	
(℃)	(Vdc)	(MHz)	(%)	(MHz)	(%)	(MHz)	(%)
50	New Batt.	794.8168	0.00023	794.8106	-0.00055	794.7957	-0.00243
40		794.8042	-0.00136	794.7981	-0.00213	794.7902	-0.00312
30		794.8385	0.00296	794.8448	0.00375	794.8284	0.00169
20		794.8060	-0.00113	794.8422	0.00342	794.7880	-0.00340
10		794.8073	-0.00096	794.8205	0.00069	794.8363	0.00268
0		794.8055	-0.00120	794.8416	0.00334	794.8229	0.00099
-10		794.8149	-0.00001	794.8398	0.00312	794.8022	-0.00161
-20		794.8431	0.00354	794.8240	0.00113	794.8050	-0.00125
-30		794.7910	-0.00302	794.7989	-0.00202	794.8398	0.00311

D2. Frequency stability versus end-point supplied voltage (2Vdc)

Reference Frequency : 794.815 MHz		Limit：0.005%					
Enviroment	Power	Frequency measured with time elapsed					
Tempture	Supplied	2 minute		5 minute		10 minute	
(℃)	(Vdc)	(MHz)	(%)	(MHz)	(%)	(MHz)	(%)
25	End-Point	794.8363	0.00268	794.8270	0.00151	794.8449	0.00376

E1. Frequency stability versus enviroment tempture

Reference Frequency : 748.870 MHz		Limit：0.005%					
Enviroment	Power	Frequency measured with time elapsed					
Tempture	Supplied	2 minute		5 minute		10 minute	
(℃)	(Vdc)	(MHz)	(%)	(MHz)	(%)	(MHz)	(%)
50	New Batt.	800.3933	-0.00272	800.4142	-0.00010	800.4153	0.00004
40		800.4374	0.00280	800.3901	-0.00311	800.4366	0.00270
30		800.4031	-0.00149	800.4210	0.00075	800.4282	0.00165
20		800.4059	-0.00113	800.4344	0.00242	800.3991	-0.00199
10		800.4431	0.00351	800.4044	-0.00132	800.4146	-0.00005
0		800.4291	0.00176	800.4020	-0.00162	800.4314	0.00205
-10		800.4097	-0.00066	800.4212	0.00077	800.4011	-0.00173
-20		800.4354	0.00255	800.4035	-0.00143	800.4370	0.00275
-30		800.4217	0.00084	800.4188	0.00048	800.4276	0.00157

E2. Frequency stability versus end-point supplied voltage (2Vdc)

Reference Frequency : 748.870 MHz		Limit：0.005%					
Enviroment	Power	Frequency measured with time elapsed					
Tempture	Supplied	2 minute		5 minute		10 minute	
(℃)	(Vdc)	(MHz)	(%)	(MHz)	(%)	(MHz)	(%)
25	End-Point	800.4190	0.00050	800.4087	-0.00078	800.4012	-0.00172

F1. Frequency stability versus enviroment tempture

Reference Frequency : 751.627 MHz		Limit：0.005%					
Enviroment	Power	Frequency measured with time elapsed					
Tempture	Supplied	2 minute		5 minute		10 minute	
(℃)	(Vdc)	(MHz)	(%)	(MHz)	(%)	(MHz)	(%)
50	New Batt.	805.3240	0.00112	805.3388	0.00296	805.3297	0.00183
40		805.3343	0.00240	805.2998	-0.00189	805.3421	0.00336
30		805.3360	0.00260	805.2924	-0.00281	805.3168	0.00022
20		805.2945	-0.00255	805.3194	0.00055	805.3239	0.00111
10		805.3408	0.00320	805.3305	0.00193	805.2954	-0.00243
0		805.3409	0.00322	805.3215	0.00081	805.3362	0.00263
-10		805.2870	-0.00348	805.3092	-0.00072	805.3434	0.00353
-20		805.3141	-0.00012	805.3034	-0.00144	805.3314	0.00204
-30		805.3284	0.00166	805.2867	-0.00351	805.3169	0.00024

F2. Frequency stability versus end-point supplied voltage (2Vdc)

Reference Frequency : 751.627 MHz		Limit：0.005%					
Enviroment	Power	Frequency measured with time elapsed					
Tempture	Supplied	2 minute		5 minute		10 minute	
(℃)	(Vdc)	(MHz)	(%)	(MHz)	(%)	(MHz)	(%)
25	End-Point	805.2946	-0.00253	805.3410	0.00322	805.3432	0.00351

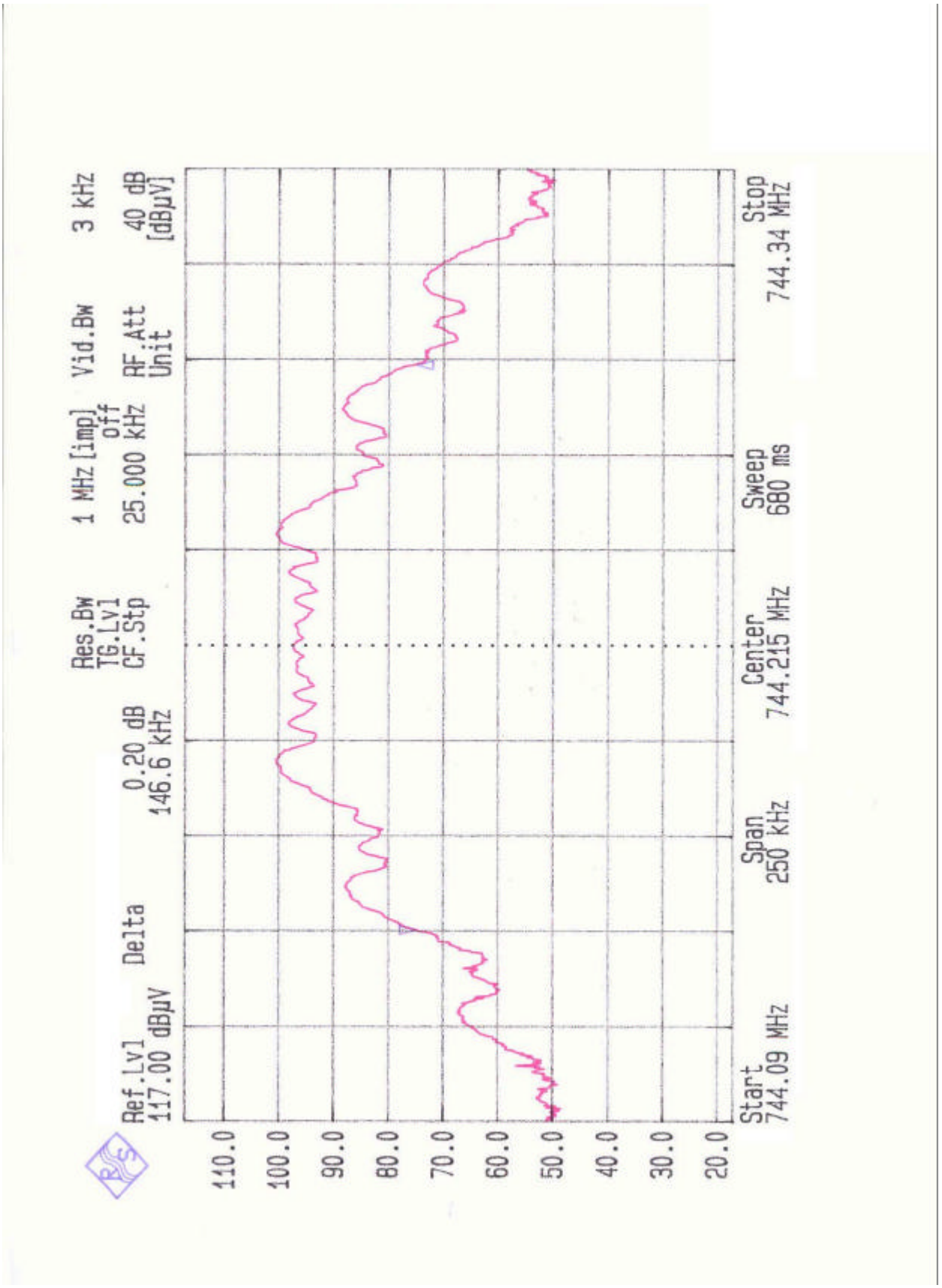
8 CONDUCTED EMISSION MEASUREMENT

8.1 Description

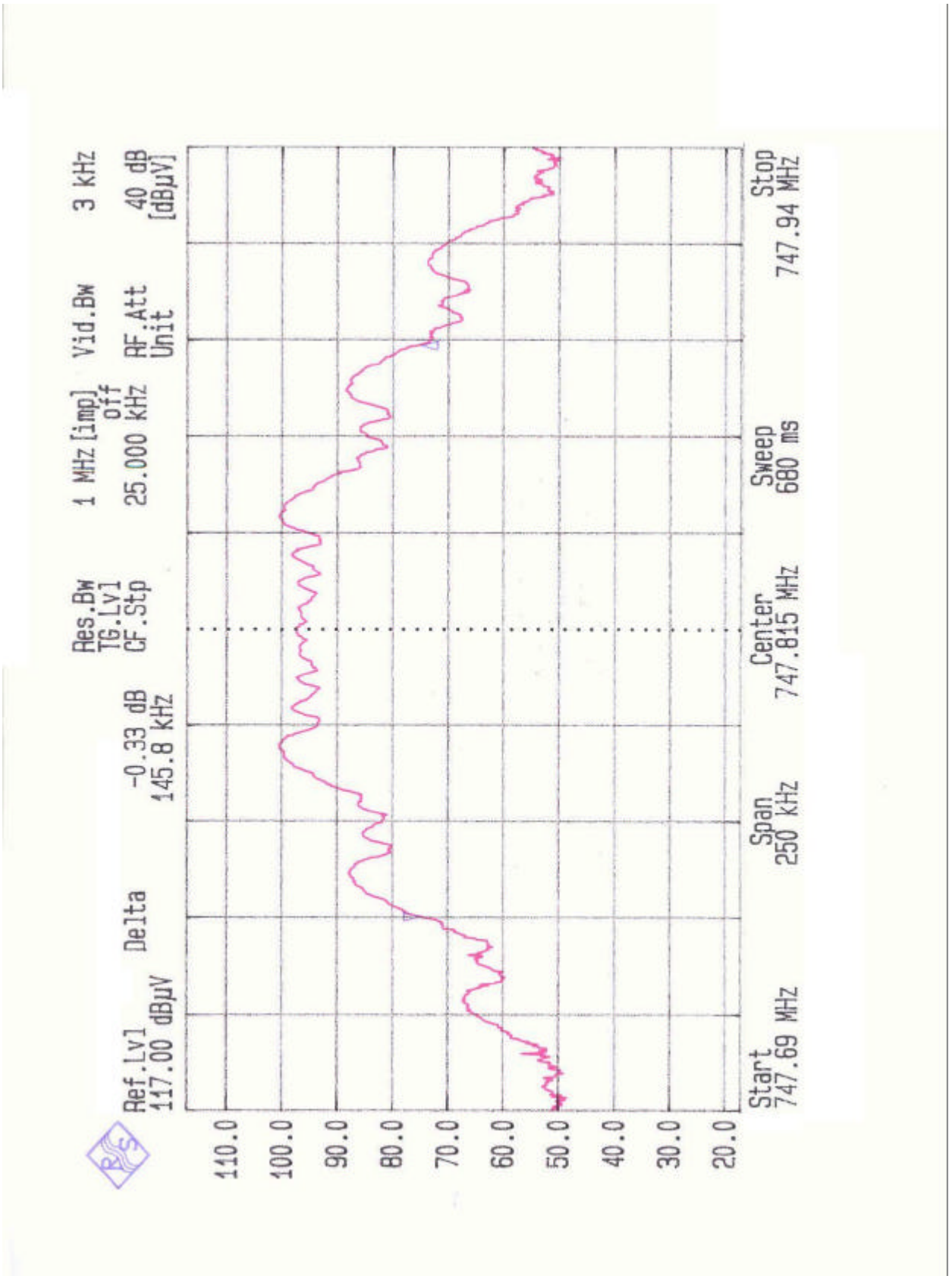
This EUT is excused from investigation of conducted emission, for it is powered by DC only. According to 15.207(d), measurements to demonstrate compliance with the conducted limits are not required for devices which only employ battery power for operation and which do not operate from the AC power lines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

Appendix 1 : Occupied Emission Bandwidth Plotted Data

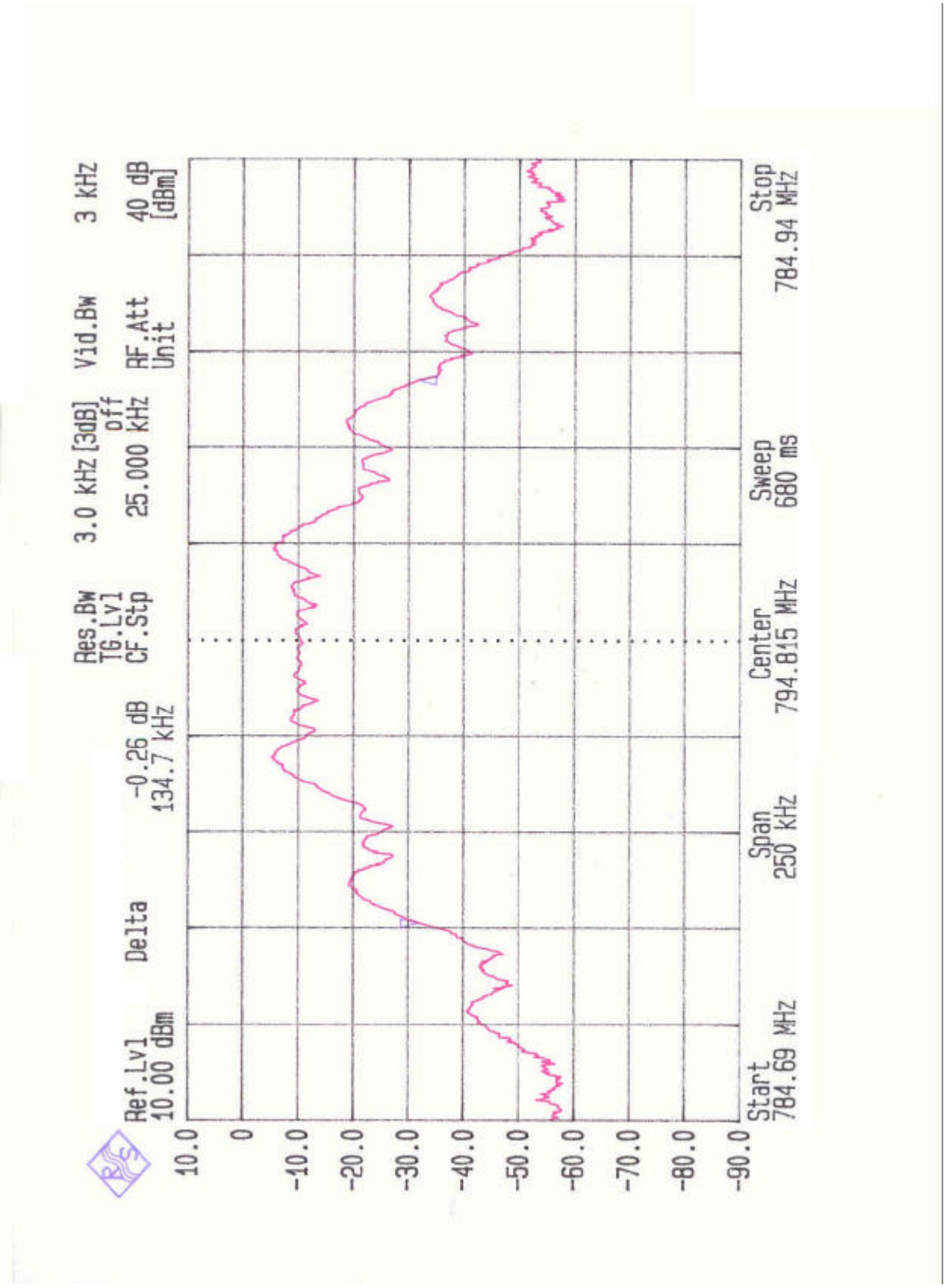
744.000~752.00MHz



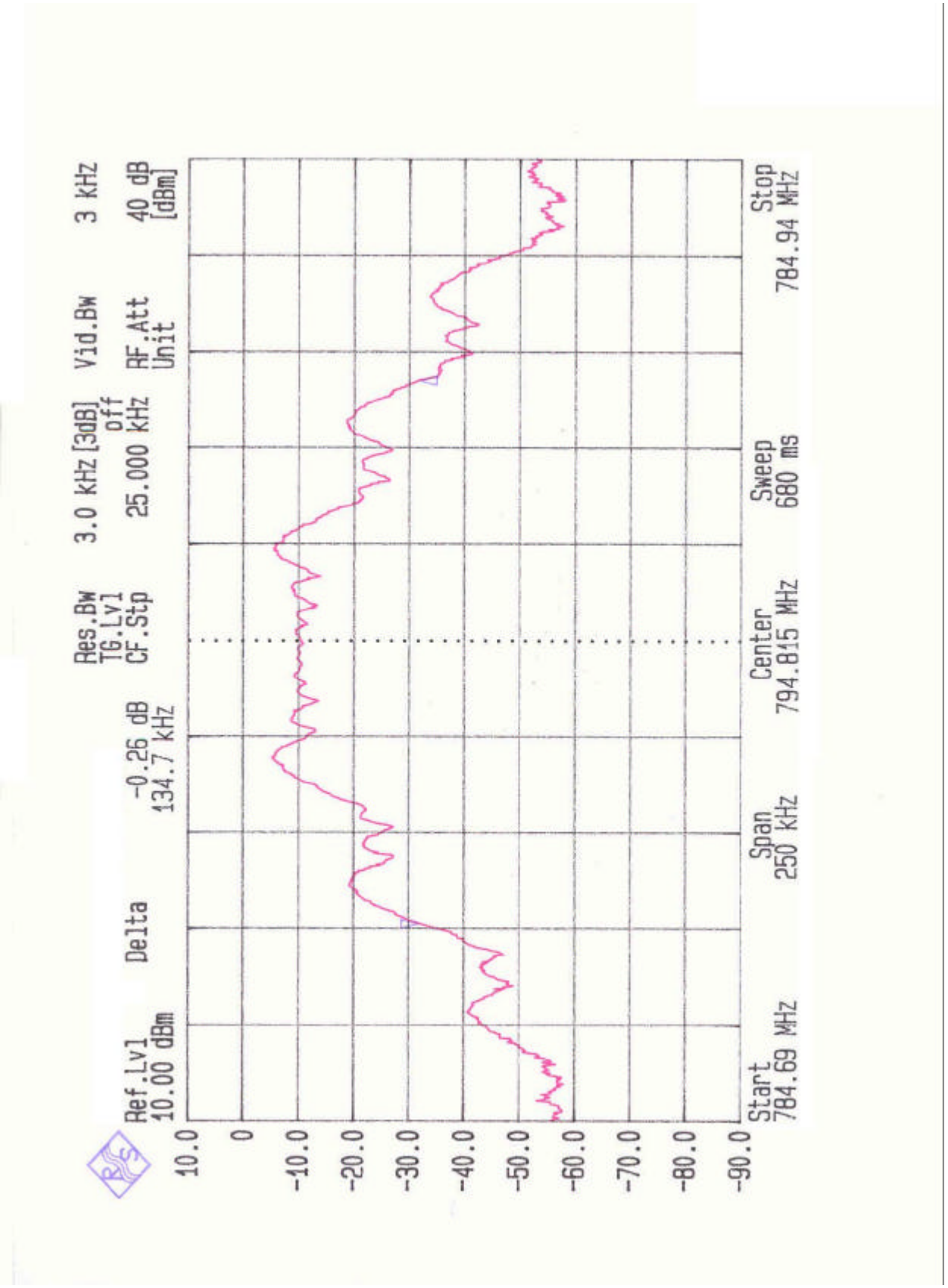
740.000~752.00MHz



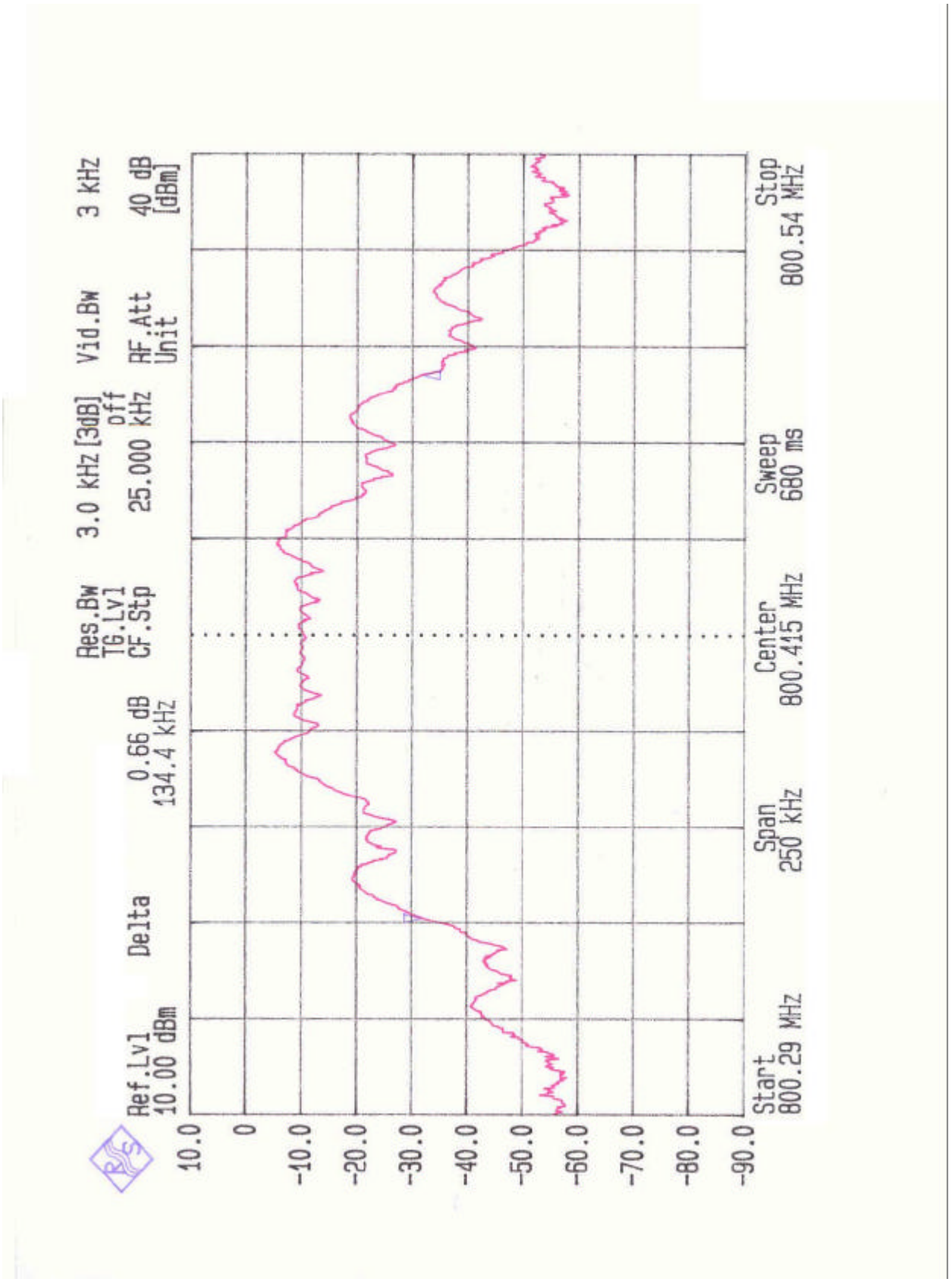
740.000~752.00MHz



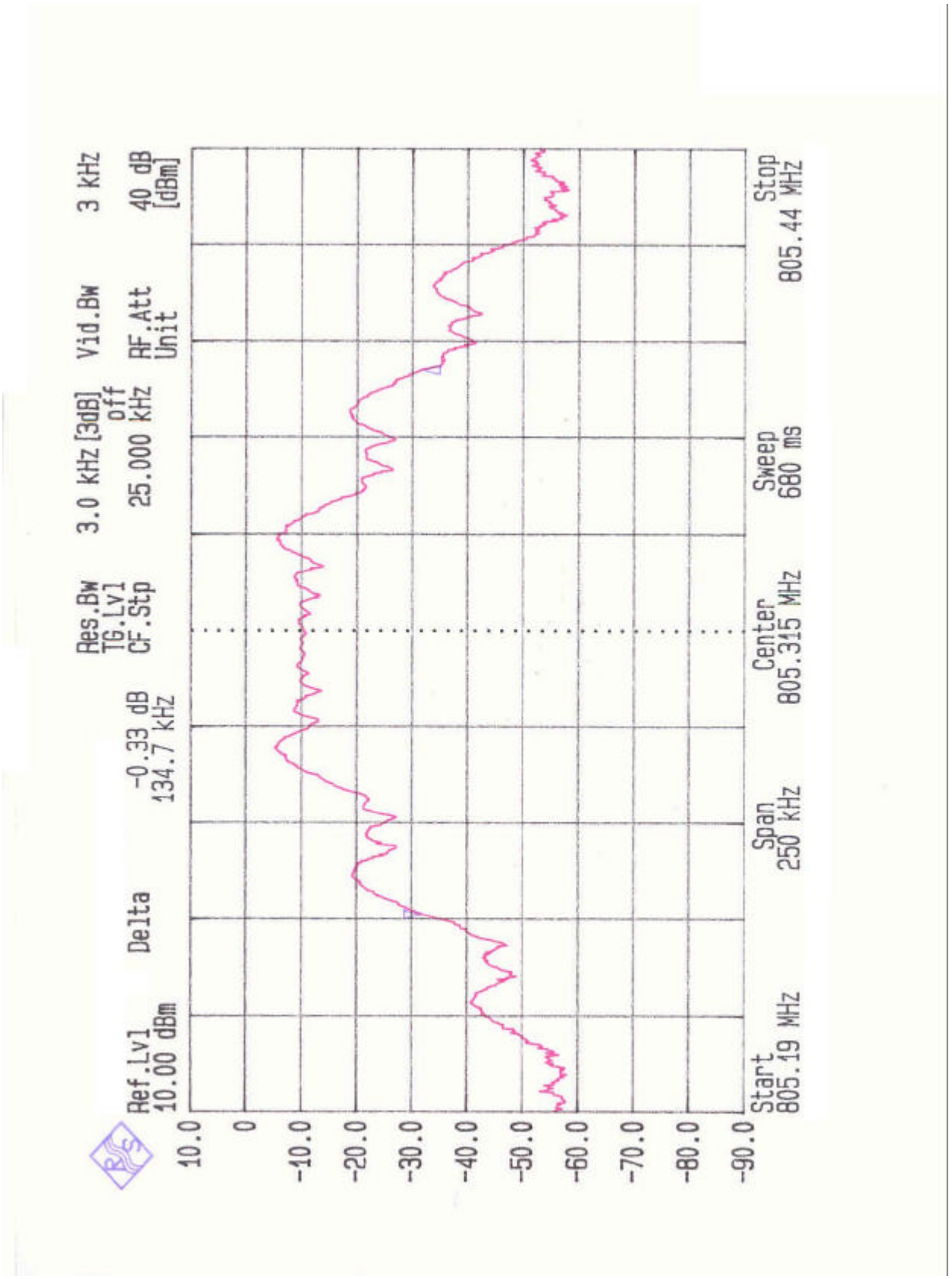
794.000~806.00MHz



790.000~806.00MHz

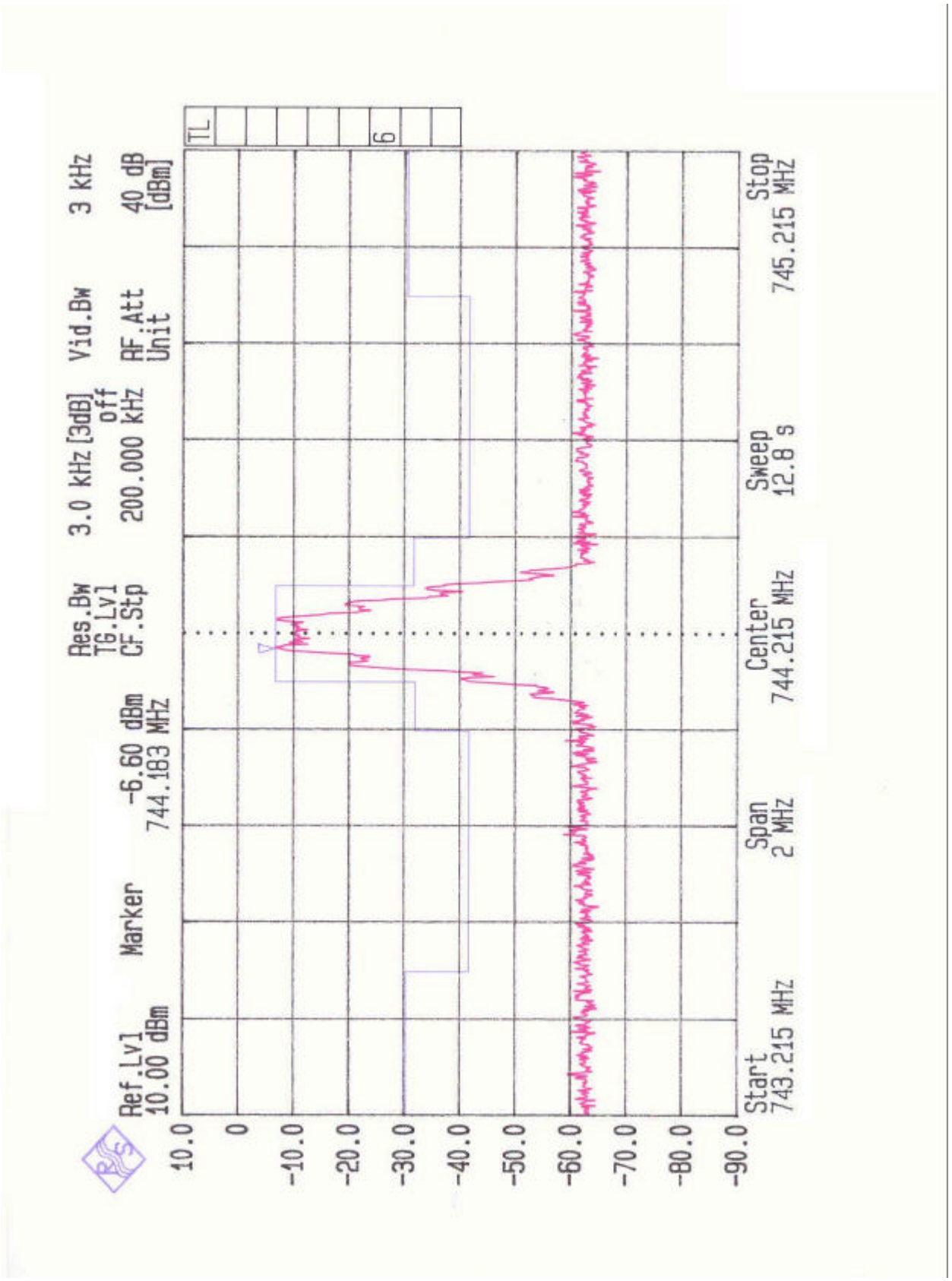


790.000~806.00MHz

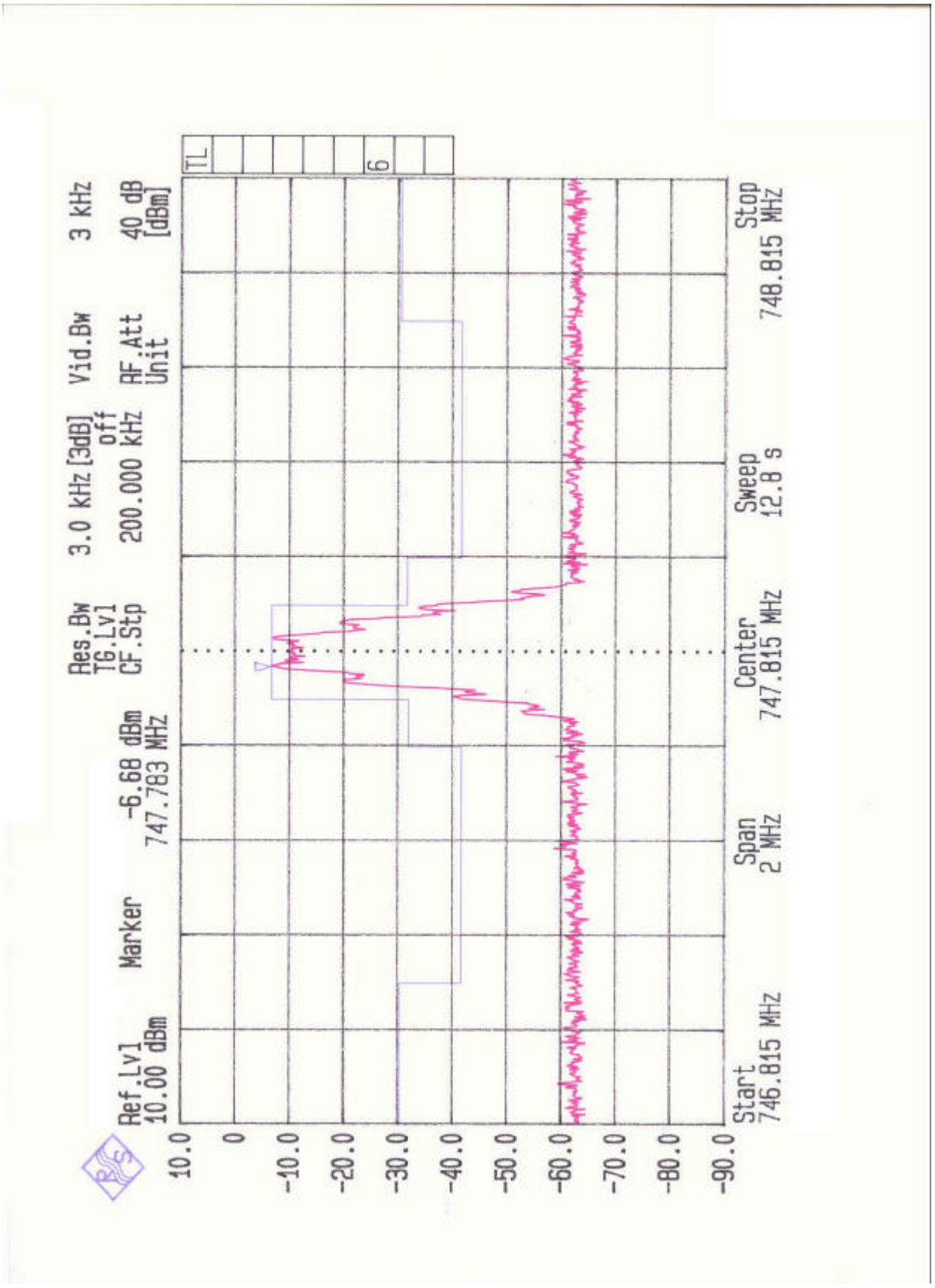


Appendix 2 : Emission Mask Plotted Data

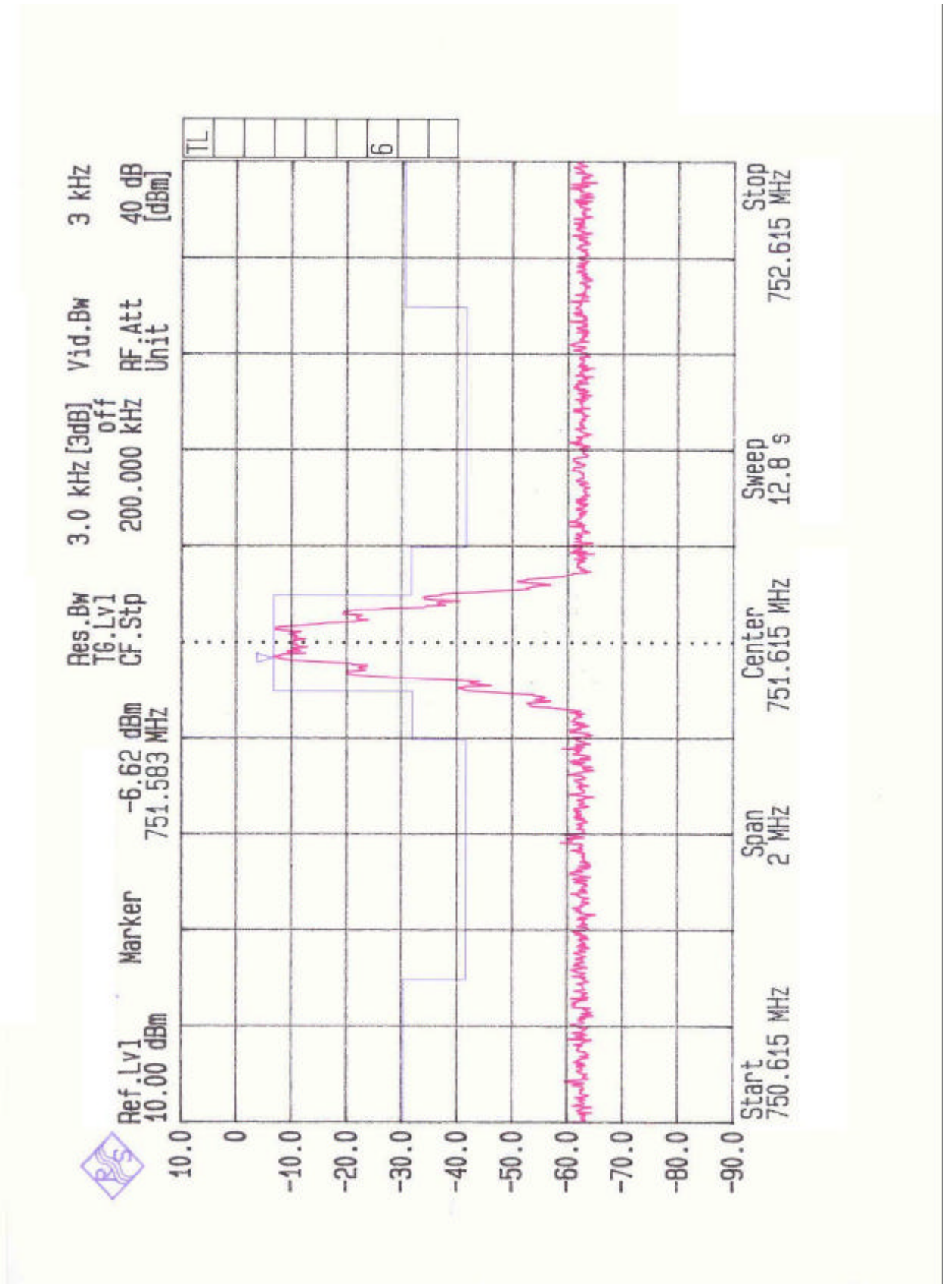
740.000~752.00MHz



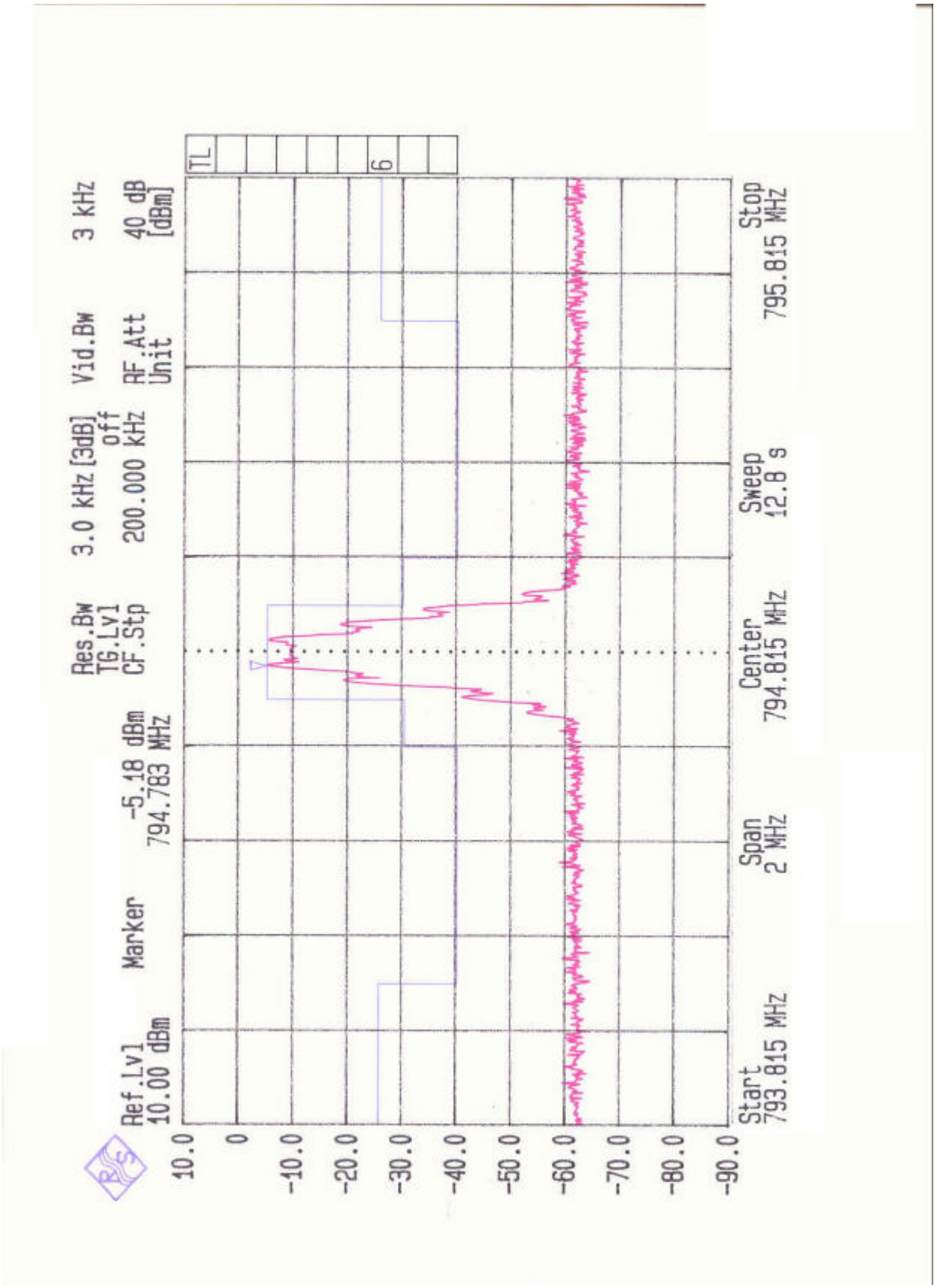
740.000~752.00MHz



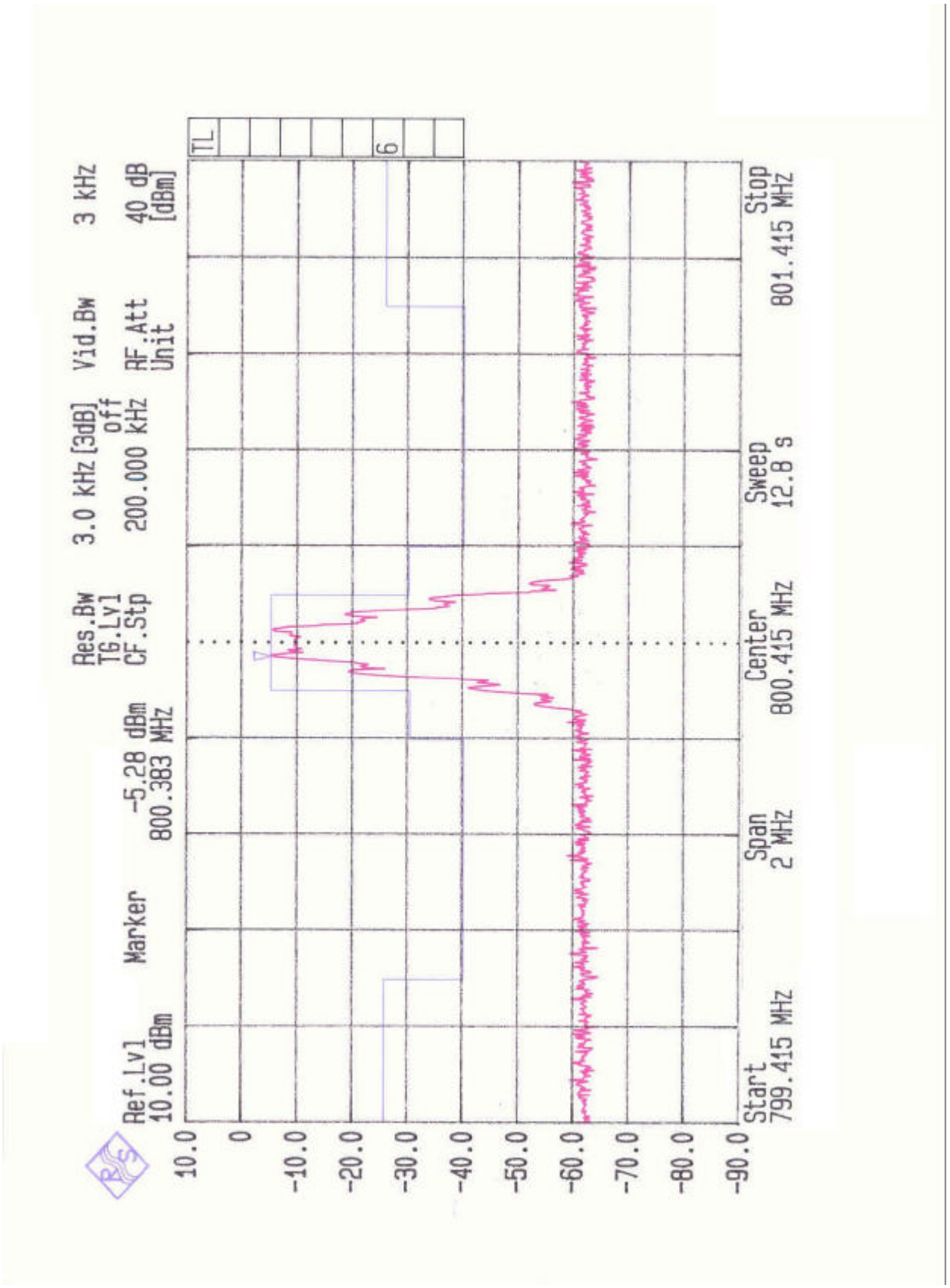
740.000~752.00MHz



794.000~806.00MHz



794.000~806.00MHz



794.000~806.00MHz