FCC Part 74 Subpart H
EMI TEST REPORT

of

E.U.T.　: Wireless Bodypack Transmitter
　　　　 Microphone

FCC ID. : JEBUT-18C

MODEL : UT-18

Working Frequency :　682MHz-806MHz

for

APPLICANT : MASCOT ELECTRONIC CO., LTD.
ADDRESS　　: No. 85 Chang Hsing First Street, Tai-tzu
　　　　　　　 Village, Jen-Te Hsian, Tainan Hsien, Taiwan,
　　　　　　　 R.O.C.

TEST REPORT CIRTIFICATION

Applicant : MASCOT ELECTRONIC CO., LTD.
No. 85 Chang Hsing First Street, Tai-tzu Village, Jen-Te Hsian,
Tainan Hsien, Taiwan, R.O.C.

Manufacturer : MASCOT ELECTRONIC CO., LTD.
No. 85 Chang Hsing First Street, Tai-tzu Village, Jen-Te Hsian,
Tainan Hsien, Taiwan, R.O.C.

Description of EUT :

a) Type of EUT	: Wireless Bodypack Transmitter Microphone
b) Trade Name	: MASCOT
c) Model No.	: UT-18
d) FCC ID	: JEBUT-18C
e) Working Frequency	: 682MHz-806MHz
f) Power Supply	: DC 3V Batteries

Regulation Applied : FCC Rules and Regulations Part 74 Subpart H (2001)

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.

Issued Date : Dec. 12, 2003

Test Engineer : *Tien Lu Liao*
(Tien Lu Liao)

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

Table of Contents   *Page*

1. GENERAL INFORMATION

1.1 Product Description

a) Type of EUT	: Wireless Bodypack Transmitter Microphone
b) Trade Name	: MASCOT
c) Model No.	: UT-18
d) FCC ID	: JEBUT-18C
e) Working Frequency	: 682MHz-806MHz
f) Power Supply	: DC 3V Batteries

1.2 Characteristics of Device:

1. Operating Frequency: 682MHz -698MHz, 740MHz -752MHz, 790MHz -806MHz
2. The handheld microphone operates in UHF band frequency with PLL synthesized control. UHF 64 preprogrammed selectable frequencies to avoid interference. Uni-directional dynamic or uni-directional condenser capsules with different characters for various choices. Use 1.5V x 2 AA size batteries for low operating cost.
3. The emission designator is 161KF3E. The calculation is (2M+2DK), K=1 and (2 x 32.768 + 2 x 48) = 161.5kHz, so the emission designator is 161KF3E.

1.3 Test Methodology

Both conducted and radiated testing were performed according to the procedures in chapter 13 of ANSI C63.4. 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 Feb. 10, 2000.

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 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.

Figure 2 : Frequencies measured below 1 GHz configuration

Antenna Tower

Search
Antenna

RF Test
Receiver

EUT

3m

4m

Turn
Table

0.8m   1m

Ground Plane
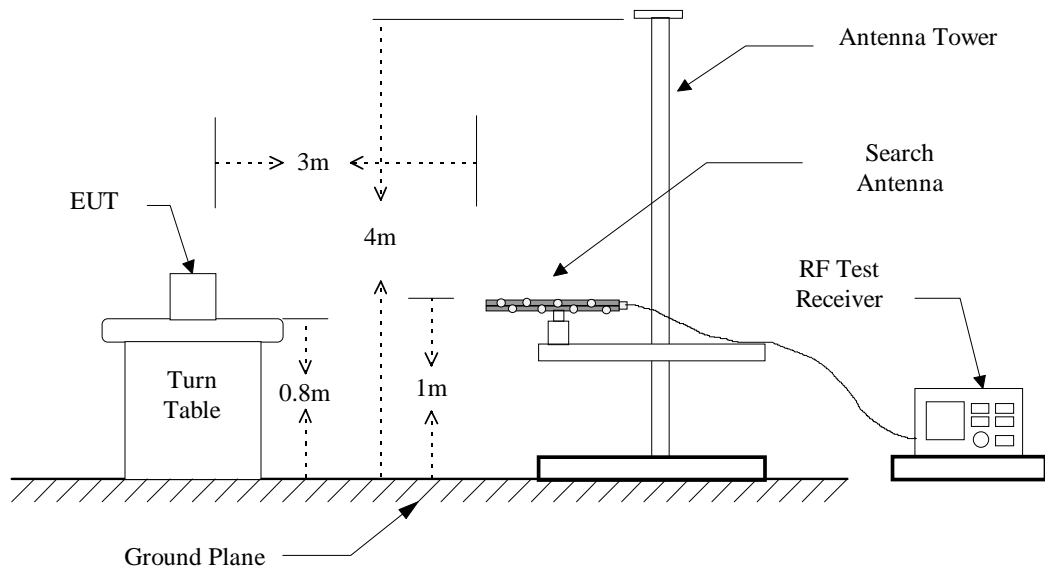
Figure 1 : Frequencies measured above 1 GHz configuration

Antenna Tower

Horn Antenna

Spectrum
Analyzer

EUT

3m

4m

Turn
Table

0.8m   1m

Amplifier

Rev. 2.0
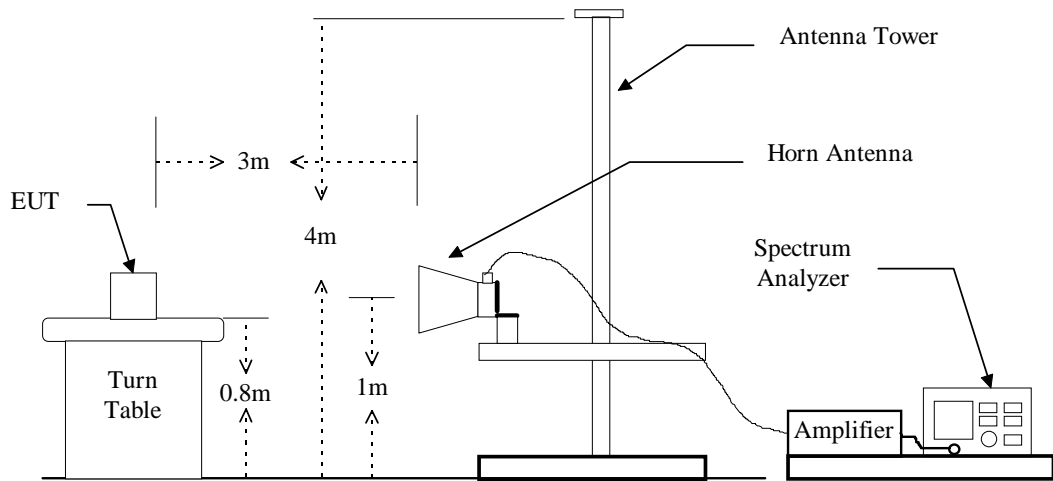
3.3 Test Data

1. 682.000~698.000 MHz

A. Channel Low (ERP)

Operated mode : 682.375 MHz   Test Date : Nov. 12, 2003
Temperature : 21   Humidity : 68

Frequency (MHz)	Meter Reading (dBμ V/m)	SG Reading (dBm)	Cable Loss (dB)	Antenna Gain	Result (dBm)	Output Power (mW)	Limit (dBm)
682.358	76.4	6.7	2.3	---	4.4	2.7	24.0

B. Channel Mid (ERP)

Operated mode : 690.250 MHz   Test Date : Nov. 12, 2003
Temperature : 21   Humidity : 68

Frequency (MHz)	Meter Reading (dBμ V/m)	SG Reading (dBm)	Cable Loss (dB)	Antenna Gain	Result (dBm)	Output Power (mW)	Limit (dBm)
690.232	77.3	7.7	2.3	---	5.4	3.5	24.0

C. Channel High (ERP)

Operated mode : 697.875 MHz   Test Date : Nov. 12, 2003
Temperature : 21   Humidity : 68

Frequency (MHz)	Meter Reading (dBμ V/m)	SG Reading (dBm)	Cable Loss (dB)	Antenna Gain	Result (dBm)	Output Power (mW)	Limit (dBm)
697.861	78.5	8.9	2.3	---	6.6	4.6	24.0

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

2. 740.000~752.000 MHz

A. Channel Low (ERP)

Operated mode : 740.625 MHz   Test Date   : Nov. 12, 2003
Temperature   : 21   Humidity   : 68

Frequency (MHz)	Meter Reading (dBμ V/m)	SG Reading (dBm)	Cable Loss (dB)	Antenna Gain	Result (dBm)	Output Power (mW)	Limit (dBm)
740.613	75.0	5.0	2.5	---	2.5	1.8	24.0

B. Channel Mid (ERP)

Operated mode : 746.250 MHz   Test Date   : Nov. 12, 2003
Temperature   : 21   Humidity   : 68

Frequency (MHz)	Meter Reading (dBμ V/m)	SG Reading (dBm)	Cable Loss (dB)	Antenna Gain	Result (dBm)	Output Power (mW)	Limit (dBm)
746.234	74.6	5.0	2.5	---	2.5	1.8	24.0

C. Channel High (ERP)

Operated mode : 751.625 MHz   Test Date   : Nov. 12, 2003
Temperature   : 21   Humidity   : 68

Frequency (MHz)	Meter Reading (dBμ V/m)	SG Reading (dBm)	Cable Loss (dB)	Antenna Gain	Result (dBm)	Output Power (mW)	Limit (dBm)
751.611	74.0	4.3	2.5	---	1.8	1.5	24.0

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

3. 790.000~806.000 MHz

A. Channel Low (ERP)

Operated mode : 790.375 MHz   Test Date : Nov. 12, 2003
Temperature : 21   Humidity : 68

Frequency (MHz)	Meter Reading (dBμ V/m)	SG Reading (dBm)	Cable Loss (dB)	Antenna Gain	Result (dBm)	Output Power (mW)	Limit (dBm)
790.366	76.9	9.5	2.6	---	6.9	4.9	24.0

B. Channel Mid (ERP)

Operated mode : 797.750 MHz   Test Date : Nov. 12, 2003
Temperature : 21   Humidity : 68

Frequency (MHz)	Meter Reading (dBμ V/m)	SG Reading (dBm)	Cable Loss (dB)	Antenna Gain	Result (dBm)	Output Power (mW)	Limit (dBm)
797.742	76.0	8.4	2.6	---	5.8	3.8	24.0

C. Channel High (ERP)

Operated mode : 805.750 MHz   Test Date : Nov. 12, 2003
Temperature : 21   Humidity : 68

Frequency (MHz)	Meter Reading (dBμ V/m)	SG Reading (dBm)	Cable Loss (dB)	Antenna Gain	Result (dBm)	Output Power (mW)	Limit (dBm)
805.737	74.6	6.9	2.6	---	4.3	2.7	24.0

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

Rev. 2.0

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
EMI Test Receiver	R&S	ESBI	05/25/2004
Plotter	HP	7440A	N/A

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
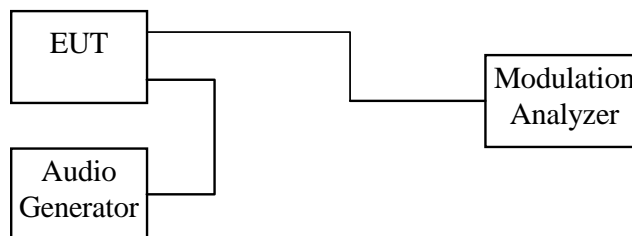
4.3 Measurement Instrument

Equipment	Manufacturer	Model No.	Next Cal. Date
Modulation Analyzer	Hewlett-Packard	8901A	12/01/2004
Multifunction Synthesizer	Hewlett-Packard	8904A	12/07/2004
Oscillscope	Lecroy	9350A	05/26/2004

4.4 Measurement Result

1. 682.000~698.000 MHz

A). Frequency response

B). Modulation Limit

C). Frequency response of all circuits

Rev. 2.0
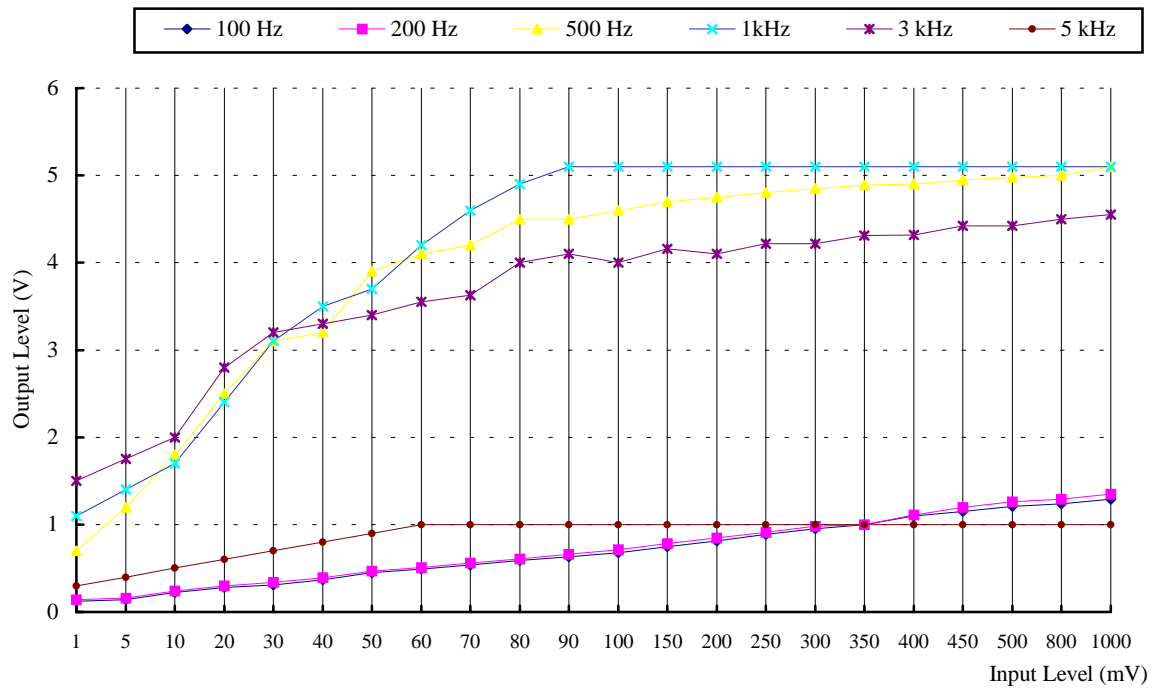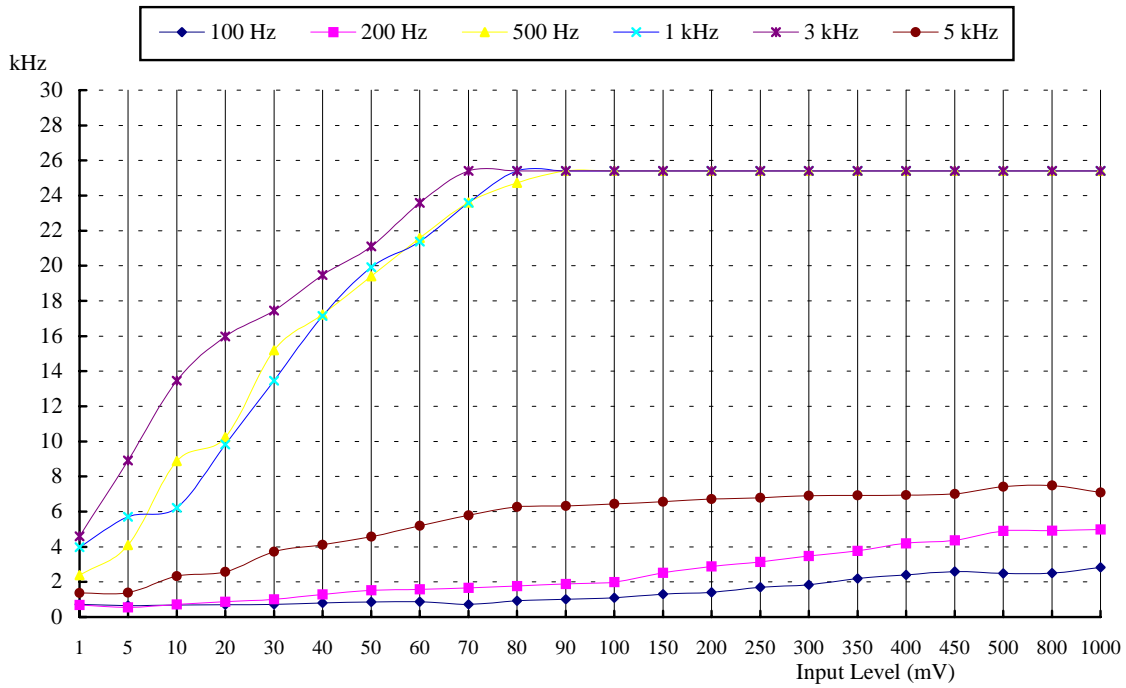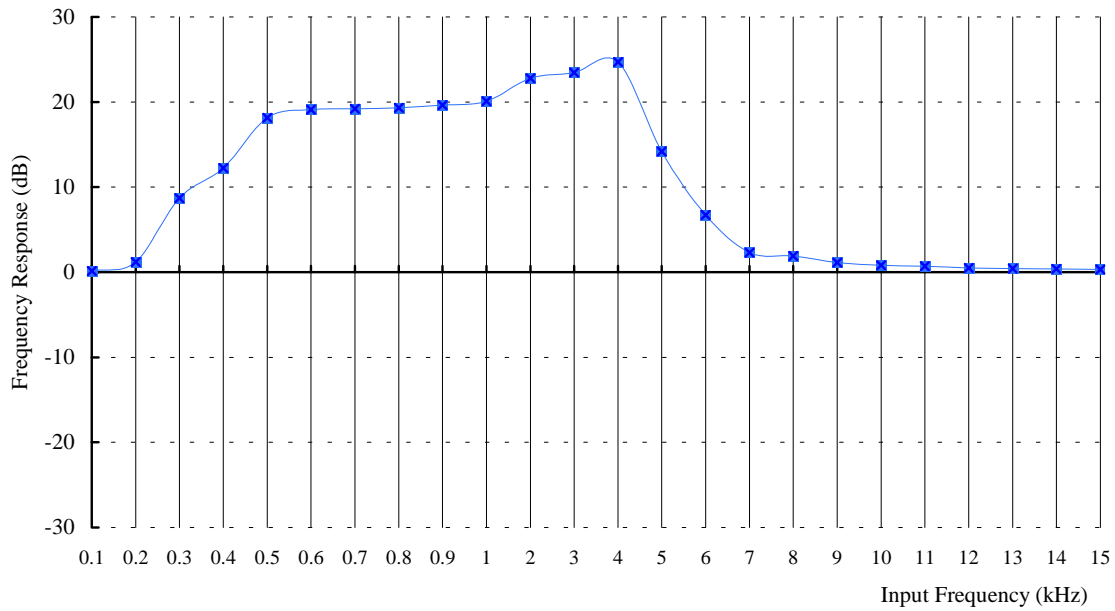
2. 740.000~752.000 MHz

A). Frequency response
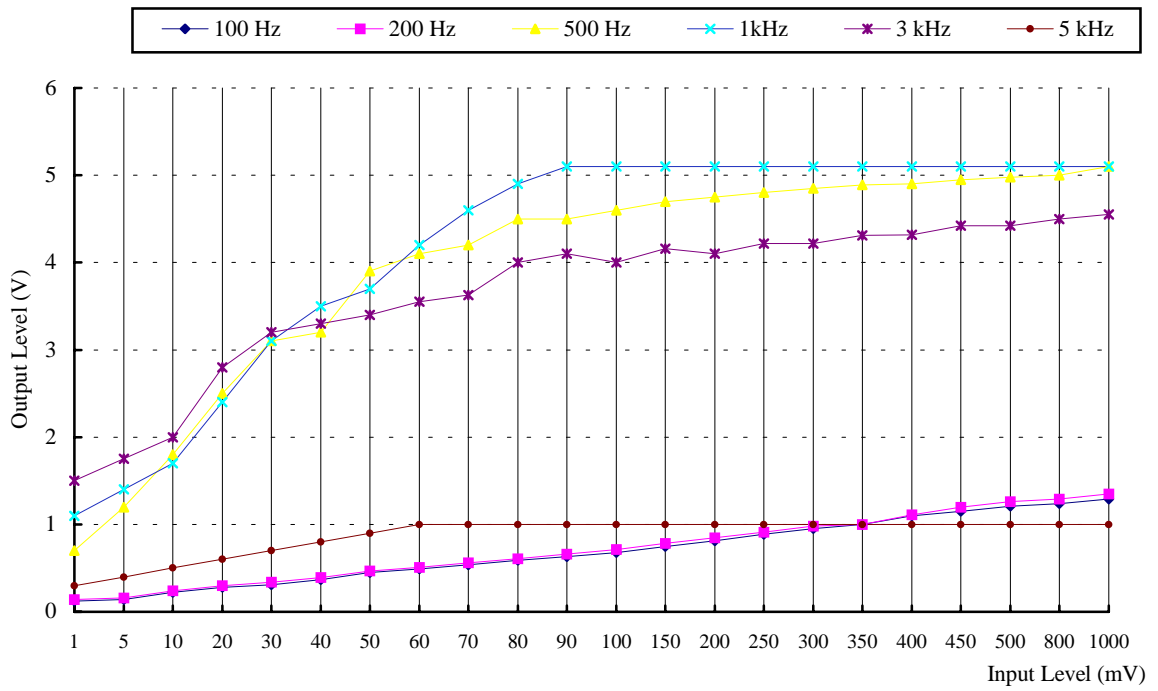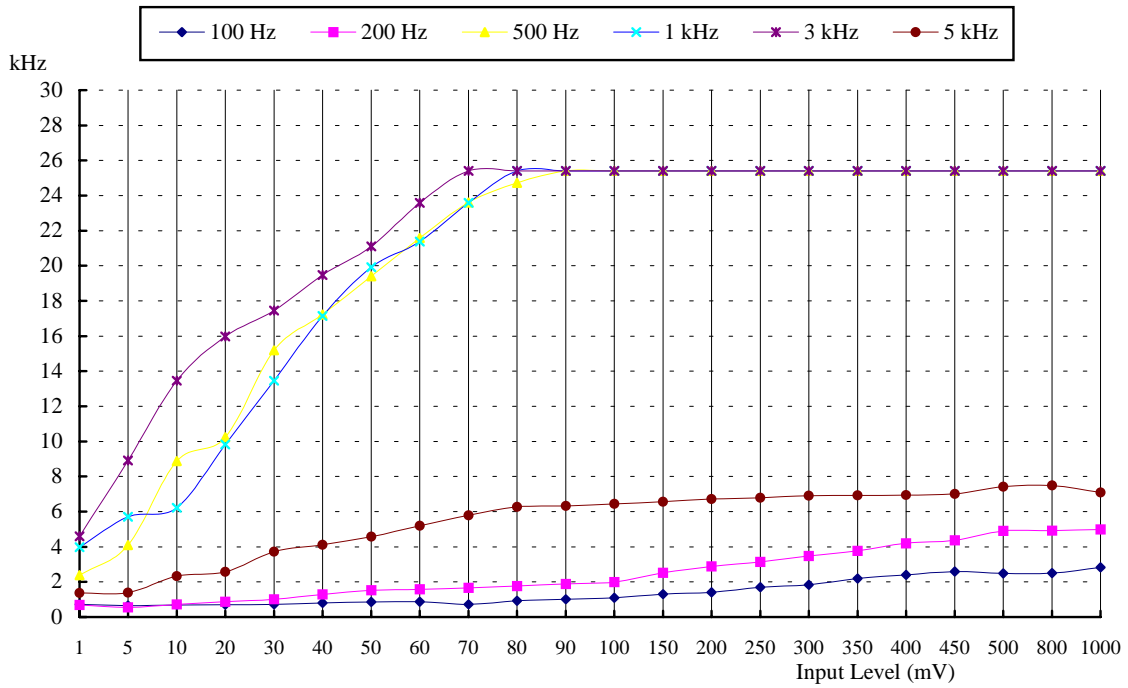
B). Modulation Limit

C). Frequency response of all circuits
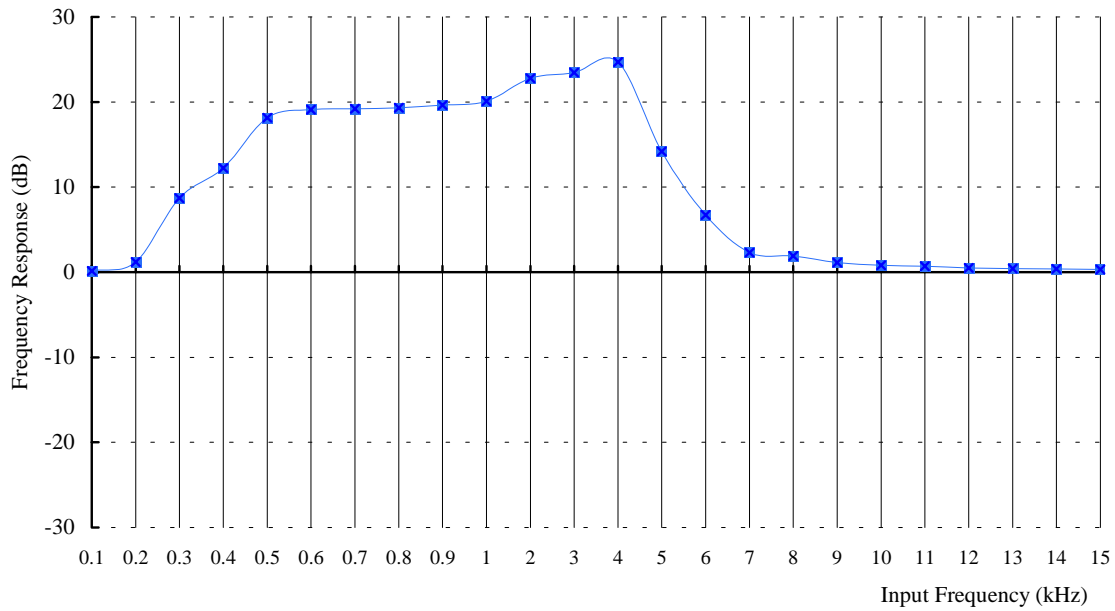
3. 790.000~806.000 MHz

A). Frequency response
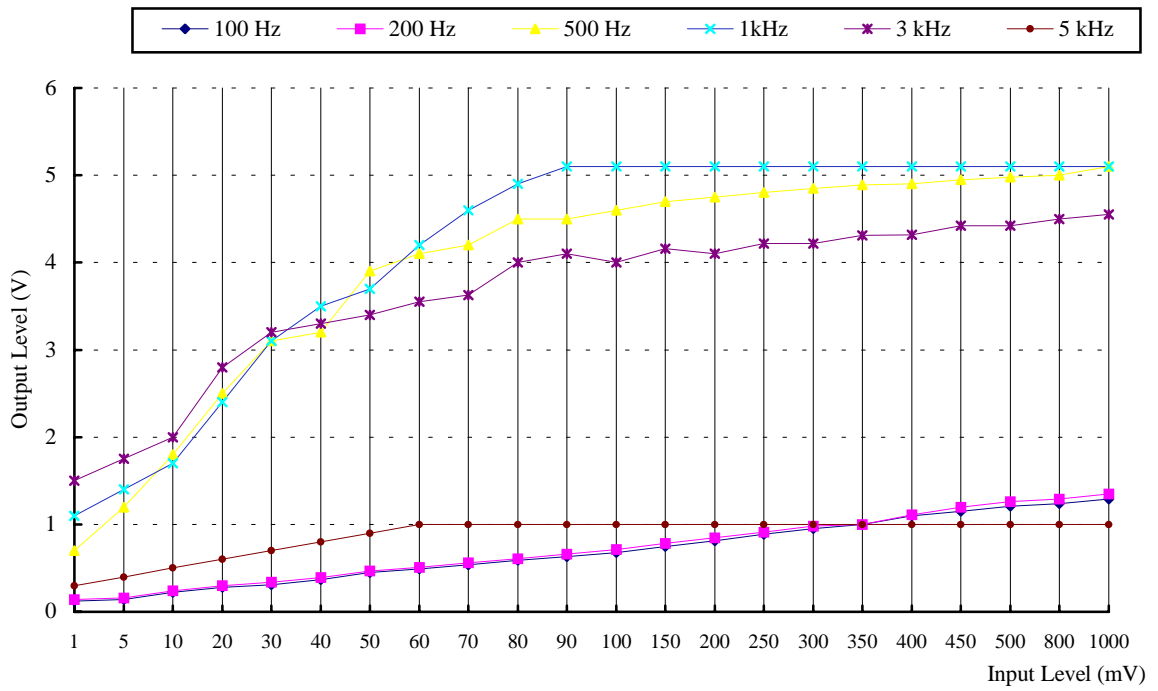
B). Modulation Limit
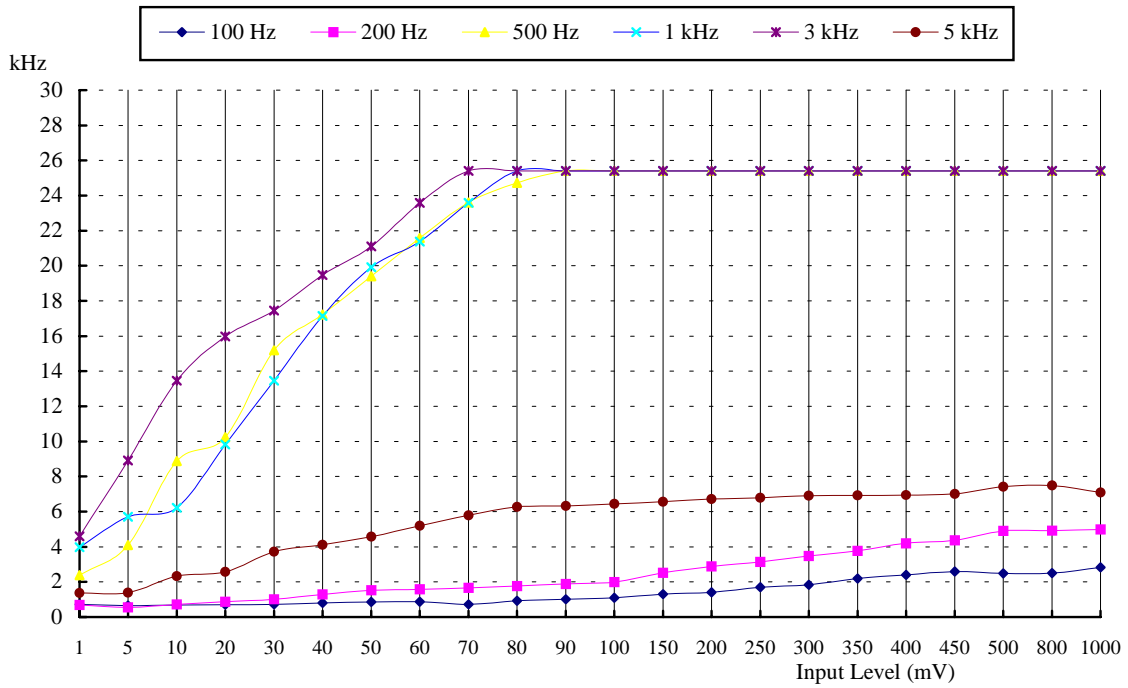
C). Frequency response of all circuits
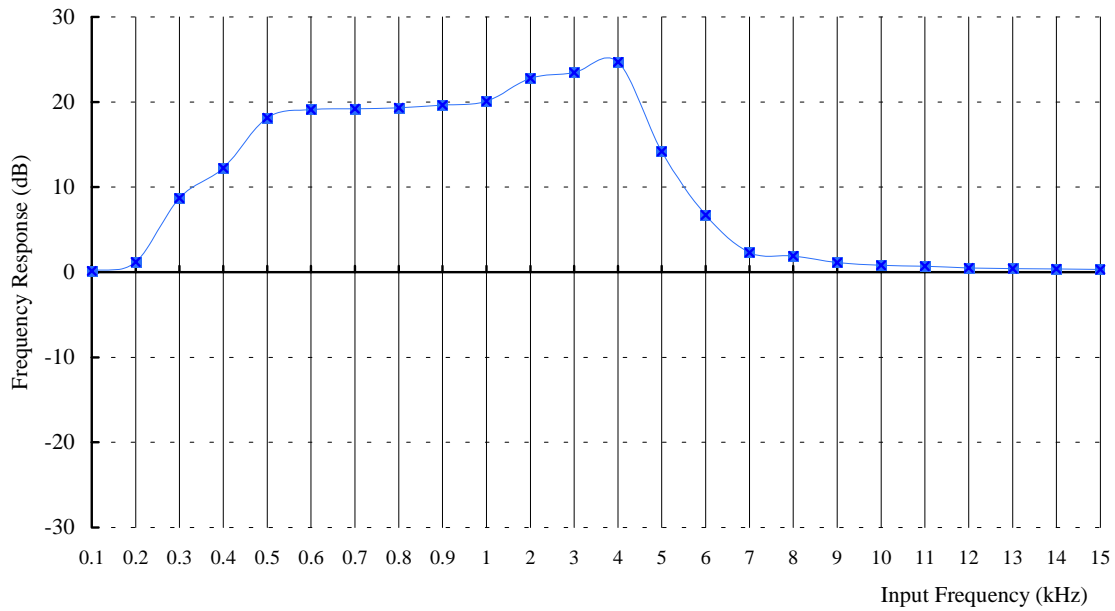
5. OCCUPIED BANDWIDTH OF EMISSION

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
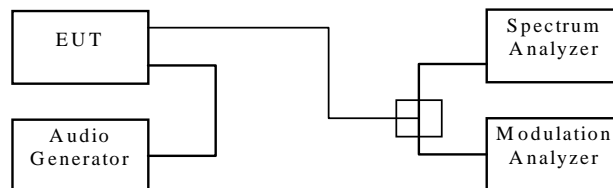
5.3 Occupied Bandwidth Test Equipment

Equipment	Manufacturer	Model No.	Next Cal. Date
Spectrum Analyzer	R&S	ESBI	05/25/2004
Modulation Analyzer	Hewlett-Packard	8901A	12/01/2004
Multifunction Synthesizer	Hewlett-Packard	8904A	12/07/2004
Plotter	Hewlett-Packard	7440A	N/A

5.4 Bandwidth Measured

5.4.1 Input Level Derived

1. 682.000~698.000 MHz

Input Audio Frequency : 2.5 kHz, Sine Wave
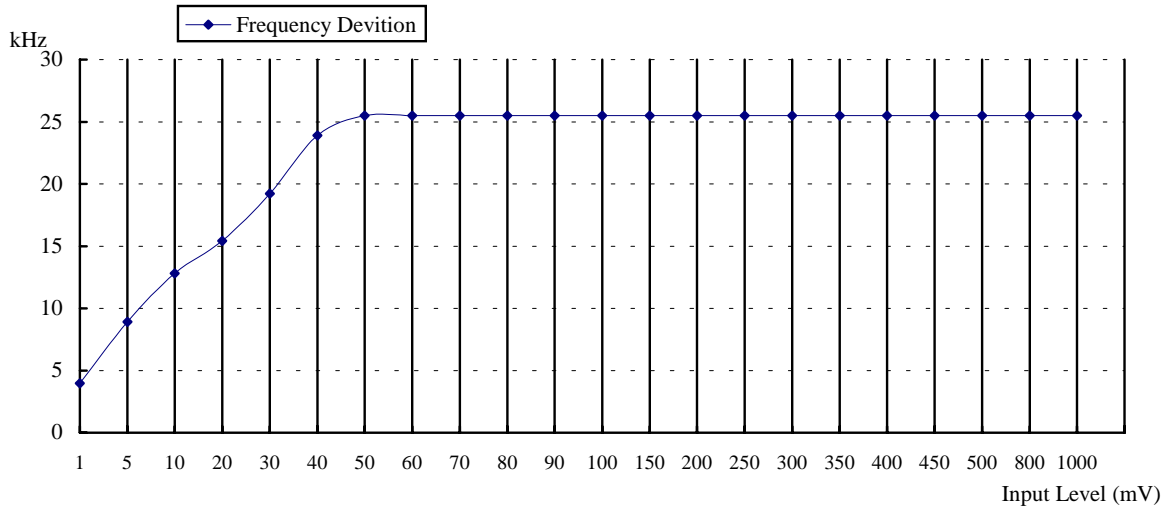
The Level input to produce 50   modulation is 20 mV, therefore the magnitude 16 dB greater than it is 796 mV.

2. 740.000~752.000 MHz

Input Audio Frequency : 2.5 kHz, Sine Wave
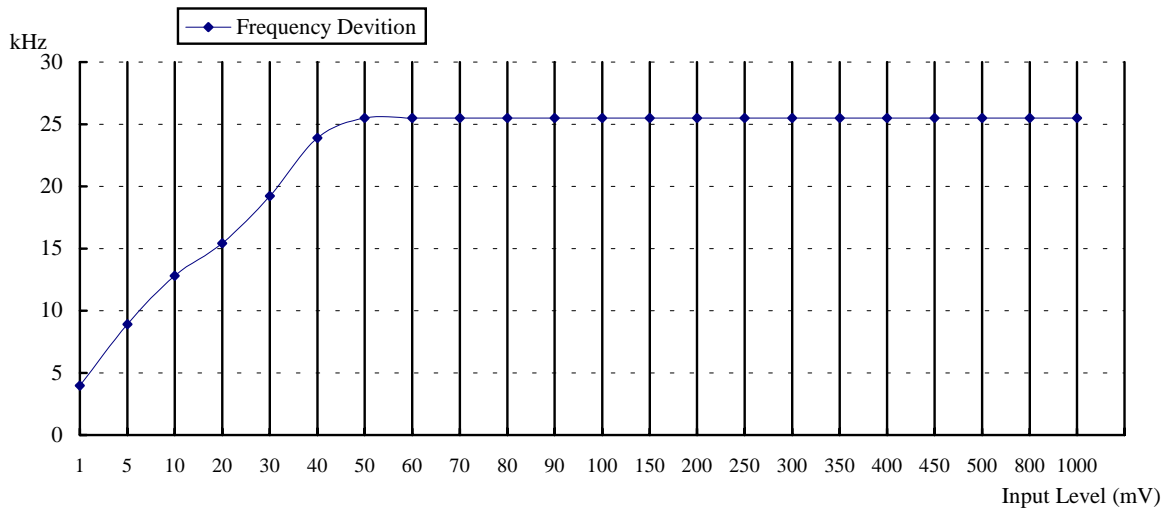
The Level input to produce 50   modulation is 20 mV, therefore the magnitude 16 dB greater than it is 796 mV.

3.　790.000~806.000 MHz

Input Audio Frequency : 2.5 kHz, Sine Wave
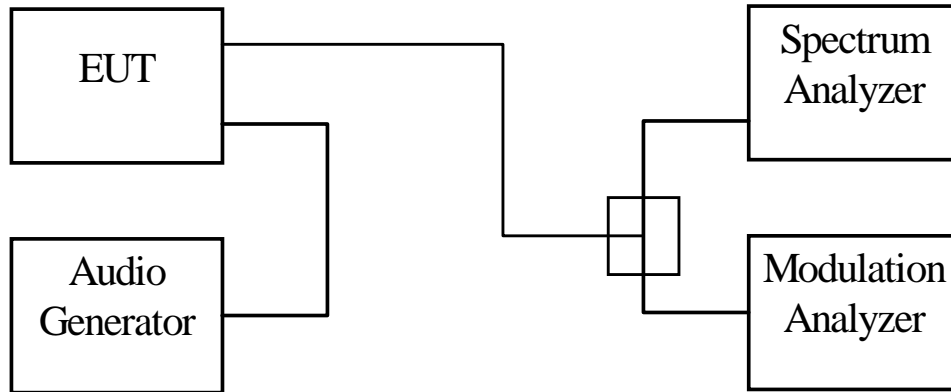
```
┌──────────────┐                          ┌──────────────┐
│              │                          │  Spectrum    │
│     EUT      │──────────────┐           │  Analyzer    │
│              │              │           │              │
└──────────────┘              │           └──────────────┘
        ┌──────────────┐      │    ┌──┐   ┌──────────────┐
        │    Audio     │      └────┤  ├───│  Modulation  │
        │  Generator   │──────     └──┘   │   Analyzer   │
        │              │                  │              │
        └──────────────┘                  └──────────────┘
```

The Level input to produce 50　modulation is 20 mV, therefore the magnitude 16 dB greater than it is 796 mV.

5.4.2 Occupied Bandwidth Plotted

1.   682.000~698.000 MHz

The Channel Low 26 dB Bandwidth is 148.8KHz.
The Channel Mid 26 dB Bandwidth is 141.3KHz.
The Channel High 26 dB Bandwidth is 148.6KHz.

2.   740.000~752.000 MHz

The Channel Low 26 dB Bandwidth is 148.8KHz.
The Channel Mid 26 dB Bandwidth is 148.6KHz.
The Channel High 26 dB Bandwidth is 141.3KHz.

3.   790.000~806.000 MHz

The Channel Low 26 dB Bandwidth is 148.8KHz.
The Channel Mid 26 dB Bandwidth is 141.3KHz.
The Channel High 26 dB Bandwidth is 148.6KHz.

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	8568B	01/25/2004
Quasi Peak Detector	Hewlett-Packard	85650A	01/25/2004
Pre-selector	Hewlett-Packard	85685A	01/25/2004
Spectrum Analyzer	Hewlett-Packard	8564E	05/16/2004
Horn Antenna	EMCO	3115	05/14/2004
Log periodic Antenna	EMCO	3146	11/05/2004
Biconical Antenna	EMCO	3110B	11/05/2004
Preamplifier	Hewlett-Packard	8449B	05/10/2004
Preamplifier	Hewlett-Packard	8447D	09/29/2004

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

1. 682.000~698.000 MHz

A. Channel Low

Operated mode : 682.375 MHz   Test Date   : Nov.12, 2003
Temperature   : 21   Humidity   : 68%

Unmodulated carrier output power is 4.4 dBm , or 2.7 mW (ERP).

The limit of spurious or harmonics is calculated as following :

$$4.4-[43+10\log(\text{carrier output power in W)]}, \text{ or } -13\text{dBm}$$

Frequency (MHz)	Meter Reading (dBuV)		SG Reading (dBm)		Antenna Gain	Antenna Gain Corr'	Cable Loss (dB)	Result (dBm)		Limit (dBm)	Margin (dB)
	H	V	H	V				H	V		
1364.698	---	---	---	---	8.2	-2.0	1.3	---	---	-13.0	---
2047.047	---	---	---	---	9.5	-2.0	1.8	---	---	-13.0	---
2729.396	---	---	---	---	9.4	-2.0	1.8	---	---	-13.0	---
3411.745	---	---	---	---	9.7	-2.0	1.8	---	---	-13.0	---
4094.094	---	---	---	---	9.8	-2.0	2.2	---	---	-13.0	---
4776.443	---	---	---	---	10.9	-2.0	2.2	---	---	-13.0	---
5458.792	---	---	---	---	10.9	-2.0	2.2	---	---	-13.0	---
6141.141	---	---	---	---	12.0	-2.0	2.6	---	---	-13.0	---
6823.490	---	---	---	---	11.9	-2.0	2.6	---	---	-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 + Antenna Gain + Antenna Gain Corrected + Cable Loss

   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. Channel Mid

Operated mode   : 690.250 MHz   Test Date   : Nov. 12, 2003

Temperature   : 21   Humidity   : 68%

Unmodulated carrier output power is 5.4 dBm , or 3.5 mW (ERP).

The limit of spurious or harmonics is calculated as following :

$$5.4-[43+10\log(\text{carrier output power in W})], \text{ or } -13\text{dBm}$$

Frequency	Meter Reading (dBuV)		SG Reading (dBm)		Antenna Gain	Antenna Gain Corr'	Cable Loss (dB)	Result (dBm)		Limit (dBm)	Margin (dB)
(MHz)	H	V	H	V				H	V		
1380.460	---	---	---	---	8.2	-2.0	1.3	---	---	-13.0	---
2070.690	---	---	---	---	9.4	-2.0	1.8	---	---	-13.0	---
2760.920	---	---	---	---	9.5	-2.0	1.8	---	---	-13.0	---
3451.150	---	---	---	---	9.7	-2.0	1.8	---	---	-13.0	---
4141.380	---	---	---	---	9.8	-2.0	1.8	---	---	-13.0	---
4831.610	---	---	---	---	10.9	-2.0	2.2	---	---	-13.0	---
5521.840	---	---	---	---	10.9	-2.0	2.2	---	---	-13.0	---
6212.070	---	---	---	---	12.0	-2.0	2.6	---	---	-13.0	---
6902.300	---	---	---	---	11.8	-2.0	2.6	---	---	-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 + Antenna Gain + Antenna Gain Corrected + Cable Loss

   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. Channel High

Operated mode   : 697.875 MHz   Test Date   : Nov. 12, 2003

Temperature   : 21   Humidity   : 68%

Unmodulated carrier output power is 6.6 dBm , or 4.6 mW (ERP).

The limit of spurious or harmonics is calculated as following :

6.6-[43+10log(carrier output power in W)], or -13dBm

Frequency	Meter Reading (dBuV)		SG Reading (dBm)		Antenna Gain	Antenna Gain	Cable Loss	Result (dBm)		Limit	Margin
(MHz)	H	V	H	V		Corr'	(dB)	H	V	(dBm)	(dB)
1395.722	---	---	---	---	8.2	-2.0	1.3	---	---	-13.0	---
2093.583	---	---	---	---	9.4	-2.0	1.8	---	---	-13.0	---
2791.444	---	---	---	---	9.5	-2.0	1.8	---	---	-13.0	---
3489.305	---	---	---	---	9.7	-2.0	1.8	---	---	-13.0	---
4187.166	---	---	---	---	10.1	-2.0	1.8	---	---	-13.0	---
4885.027	---	---	---	---	10.9	-2.0	2.2	---	---	-13.0	---
5582.888	---	---	---	---	11.1	-2.0	2.6	---	---	-13.0	---
6280.749	---	---	---	---	12.1	-2.0	2.6	---	---	-13.0	---
6978.610	---	---	---	---	11.7	-2.0	2.6	---	---	-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 + Antenna Gain + Antenna Gain Corrected + Cable Loss

     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.

D. Emission mask plots

      Please see appendix 2 for plotted data.

2. 740.000~752.000 MHz

A. Channel Low

Operated mode : 740.625 MHz   Test Date : Nov.12, 2003
Temperature : 21   Humidity : 68%

Unmodulated carrier output power is2.5 dBm , or 1.8 mW (ERP).

The limit of spurious or harmonics is calculated as following :

2.5-[43+10log(carrier output power in W)], or -13dBm

Frequency	Meter Reading (dBuV)		SG Reading (dBm)		Antenna Gain	Antenna Gain Corr'	Cable Loss (dB)	Result (dBm)		Limit (dBm)	Margin (dB)
(MHz)	H	V	H	V				H	V		
1481.212	---	---	---	---	9.1	-2.0	1.3	---	---	-13.0	---
2221.818	---	---	---	---	9.4	-2.0	1.8	---	---	-13.0	---
2962.424	---	---	---	---	9.7	-2.0	1.8	---	---	-13.0	---
3703.030	---	---	---	---	9.6	-2.0	2.2	---	---	-13.0	---
4443.636	---	---	---	---	10.6	-2.0	2.2	---	---	-13.0	---
5184.242	---	---	---	---	10.9	-2.0	2.2	---	---	-13.0	---
5924.848	---	---	---	---	11.7	-2.0	2.6	---	---	-13.0	---
6665.454	---	---	---	---	12.0	-2.0	2.6	---	---	-13.0	---
7406.060	---	---	---	---	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 + Antenna Gain + Antenna Gain Corrected + Cable Loss

    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. Channel Mid

Operated mode   : 746.250 MHz   Test Date   : Nov. 12, 2003

Temperature   : 21   Humidity   : 68%

Unmodulated carrier output power is 2.5 dBm , or 1.8 mW (ERP).

The limit of spurious or harmonics is calculated as following :

$$2.5-[43+10\log(\text{carrier output power in W})], \text{ or } -13\text{dBm}$$

Frequency	Meter Reading (dBuV)		SG Reading (dBm)		Antenna Gain	Antenna Gain Corr'	Cable Loss (dB)	Result (dBm)		Limit (dBm)	Margin (dB)
(MHz)	H	V	H	V				H	V		
1492.468	---	---	---	---	9.1	-2.0	1.3	---	---	-13.0	---
2238.702	---	---	---	---	9.4	-2.0	1.8	---	---	-13.0	---
2984.936	---	---	---	---	9.7	-2.0	1.8	---	---	-13.0	---
3731.170	---	---	---	---	9.6	-2.0	2.2	---	---	-13.0	---
4477.404	---	---	---	---	10.9	-2.0	2.2	---	---	-13.0	---
5223.638	---	---	---	---	10.9	-2.0	2.2	---	---	-13.0	---
5969.872	---	---	---	---	11.9	-2.0	2.6	---	---	-13.0	---
6716.106	---	---	---	---	12.0	-2.0	2.6	---	---	-13.0	---
7462.340	---	---	---	---	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 + Antenna Gain + Antenna Gain Corrected + Cable Loss

    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. Channel High

Operated mode   : 751.625 MHz   Test Date   : Nov. 12, 2003

Temperature   : 21   Humidity   : 68%

Unmodulated carrier output power is 1.8 dBm , or 1.5 mW (ERP).

The limit of spurious or harmonics is calculated as following :

$$1.8-[43+10\log(\text{carrier output power in W})], \text{ or } -13\text{dBm}$$

Frequency	Meter Reading (dBuV)		SG Reading (dBm)		Antenna Gain	Antenna Gain Corr'	Cable Loss (dB)	Result (dBm)		Limit (dBm)	Margin (dB)
(MHz)	H	V	H	V				H	V		
1503.222	---	---	---	---	9.1	-2.0	1.3	---	---	-13.0	---
2254.833	---	---	---	---	9.4	-2.0	1.8	---	---	-13.0	---
3006.444	---	---	---	---	9.7	-2.0	1.8	---	---	-13.0	---
3758.055	---	---	---	---	9.6	-2.0	2.2	---	---	-13.0	---
4509.666	---	---	---	---	10.9	-2.0	2.2	---	---	-13.0	---
5261.277	---	---	---	---	10.9	-2.0	2.2	---	---	-13.0	---
6012.888	---	---	---	---	11.9	-2.0	2.6	---	---	-13.0	---
6764.499	---	---	---	---	11.9	-2.0	2.6	---	---	-13.0	---
7516.110	---	---	---	---	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 + Antenna Gain + Antenna Gain Corrected + Cable Loss

    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.

D. Emission mask plots

     Please see appendix 2 for plotted data.

3. 790.000~806.000 MHz

A. Channel Low
Operated mode : 790.375 MHz   Test Date   : Nov.12, 2003
Temperature   : 21   Humidity   : 68%

Unmodulated carrier output power is 6.9 dBm , or 4.9 mW (ERP).

The limit of spurious or harmonics is calculated as following :

$$6.9-[43+10\log(\text{carrier output power in W})], \text{ or } -13\text{dBm}$$

Frequency	Meter Reading (dBuV)		SG Reading (dBm)		Antenna Gain	Antenna Gain Corr'	Cable Loss (dB)	Result (dBm)		Limit (dBm)	Margin (dB)
(MHz)	H	V	H	V				H	V		
1580.724	---	---	---	---	9.2	-2.0	1.3	---	---	-13.0	---
2371.086	---	---	---	---	9.3	-2.0	1.8	---	---	-13.0	---
3161.448	---	---	---	---	9.7	-2.0	1.8	---	---	-13.0	---
3951.810	---	---	---	---	9.5	-2.0	2.2	---	---	-13.0	---
4742.172	---	---	---	---	10.9	-2.0	2.2	---	---	-13.0	---
5532.534	---	---	---	---	10.9	-2.0	2.6	---	---	-13.0	---
6322.896	---	---	---	---	12.1	-2.0	2.6	---	---	-13.0	---
7113.258	---	---	---	---	11.7	-2.0	2.6	---	---	-13.0	---
7903.620	---	---	---	---	11.3	-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 + Antenna Gain + Antenna Gain Corrected + Cable Loss

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. Channel Mid
Operated mode : 797.750 MHz   Test Date : Nov. 12, 2003
Temperature : 21   Humidity : 68%

Unmodulated carrier output power is 5.8 dBm , or 3.8 mW (ERP).

The limit of spurious or harmonics is calculated as following :

$$5.8-[43+10\log(\text{carrier output power in W})], \text{ or } -13\text{dBm}$$

Frequency	Meter Reading (dBuV)		SG Reading (dBm)		Antenna Gain	Antenna Gain Corr'	Cable Loss (dB)	Result (dBm)		Limit	Margin
(MHz)	H	V	H	V				H	V	(dBm)	(dB)
1595.484	---	---	---	---	9.2	-2.0	1.3	---	---	-13.0	---
2393.226	---	---	---	---	9.3	-2.0	1.8	---	---	-13.0	---
3190.968	---	---	---	---	9.7	-2.0	1.8	---	---	-13.0	---
3988.710	---	---	---	---	9.5	-2.0	2.2	---	---	-13.0	---
4786.452	---	---	---	---	10.9	-2.0	2.2	---	---	-13.0	---
5584.194	---	---	---	---	11.1	-2.0	2.6	---	---	-13.0	---
6381.936	---	---	---	---	12.1	-2.0	2.6	---	---	-13.0	---
7179.678	---	---	---	---	11.6	-2.0	2.6	---	---	-13.0	---
7977.420	---	---	---	---	11.3	-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 + Antenna Gain + Antenna Gain Corrected + Cable Loss

    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. Channel High

Operated mode : 805.750 MHz   Test Date : Nov. 12, 2003

Temperature : 21   Humidity : 68%

Unmodulated carrier output power is 4.3 dBm , or 2.7 mW (ERP).

The limit of spurious or harmonics is calculated as following :

4.3-[43+10log(carrier output power in W)], or -13dBm

Frequency	Meter Reading (dBuV)		SG Reading (dBm)		Antenna Gain	Antenna Gain Corr'	Cable Loss (dB)	Result (dBm)		Limit (dBm)	Margin (dB)
(MHz)	H	V	H	V				H	V		
1611.476	---	---	---	---	9.2	-2.0	1.3	---	---	-13.0	---
2417.214	---	---	---	---	9.3	-2.0	1.8	---	---	-13.0	---
3222.952	---	---	---	---	9.7	-2.0	1.8	---	---	-13.0	---
4028.690	---	---	---	---	9.5	-2.0	2.2	---	---	-13.0	---
4834.428	---	---	---	---	10.9	-2.0	2.2	---	---	-13.0	---
5640.166	---	---	---	---	11.1	-2.0	2.6	---	---	-13.0	---
6445.904	---	---	---	---	12.1	-2.0	2.6	---	---	-13.0	---
7251.642	---	---	---	---	11.6	-2.0	2.9	---	---	-13.0	---
8057.380	---	---	---	---	11.3	-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 + Antenna Gain + Antenna Gain Corrected + Cable Loss

    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.

D. Emission mask plots

Please see appendix 2 for plotted data.

6.5 Radiated Emission Data

a) **1. 682.000~698.000 MHz**

Operation Mode : <u>Charge</u>
Test Date   : <u>Nov. 12, 2003</u>   Temperature : <u>21</u>   Humidity: <u>68 %</u>

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)
30.000	H/V	---	-9.8	---	40.0	---	---	---
50.000	H/V	---	-14.1	---	40.0	---	---	---
80.000	H/V	---	-15.0	---	40.0	---	---	---
150.000	H/V	---	-10.0	---	43.5	---	---	---
250.000	H/V	---	-3.9	---	46.0	---	---	---
500.000	H/V	---	-4.4	---	46.0	---	---	---
800.000	H/V	---	0.7	---	46.0	---	---	---

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.

2. 740.000~752.000 MHz

Operation Mode : <u>Charge</u>
Test Date   : <u>Nov. 12, 2003</u>   Temperature : <u>21</u>   Humidity: <u>68 %</u>

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)
30.000	H/V	---	-9.8	---	40.0	---	---	---
50.000	H/V	---	-14.1	---	40.0	---	---	---
80.000	H/V	---	-15.0	---	40.0	---	---	---
150.000	H/V	---	-10.0	---	43.5	---	---	---
250.000	H/V	---	-3.9	---	46.0	---	---	---
500.000	H/V	---	-4.4	---	46.0	---	---	---
800.000	H/V	---	0.7	---	46.0	---	---	---

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.

3. 790.000~806.000 MHz

Operation Mode : <u>Charge</u>
Test Date   : <u>Nov. 12, 2003</u>   Temperature : <u>21</u>   Humidity: <u>68 %</u>

Frequency	Ant-Pol	Meter Reading	Corrected Factor	Result @3m	Limit @3m	Margin (dB)	Table Degree	Ant. High
(MHz)	H/V	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)		(Deg.)	(m)
30.000	H/V	---	-9.8	---	40.0	---	---	---
50.000	H/V	---	-14.1	---	40.0	---	---	---
80.000	H/V	---	-15.0	---	40.0	---	---	---
150.000	H/V	---	-10.0	---	43.5	---	---	---
250.000	H/V	---	-3.9	---	46.0	---	---	---
500.000	H/V	---	-4.4	---	46.0	---	---	---
800.000	H/V	---	0.7	---	46.0	---	---	---

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 25 GHz were too low to be measured with a pre-amplifier of 35 dB.

6.6 Field Strength Calculation

The field strength is calculated by adding the Antenna Factor, High Pass Filter Loss(if used) and Cable Loss, and subtracting the Amplifier Gain (if any) from the measured reading. The basic equation calculation is as follows:

Result = Reading + Corrected Factor

where
 Corrected Factor = Antenna FACTOR + Cable Loss + High Pass Filter Loss -
 Amplifier Gain

6.7 Radiated Measurement Photos

Please see Exhibit-F-Setup_Photos

Please see Exhibit-F-Setup_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   to +50   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

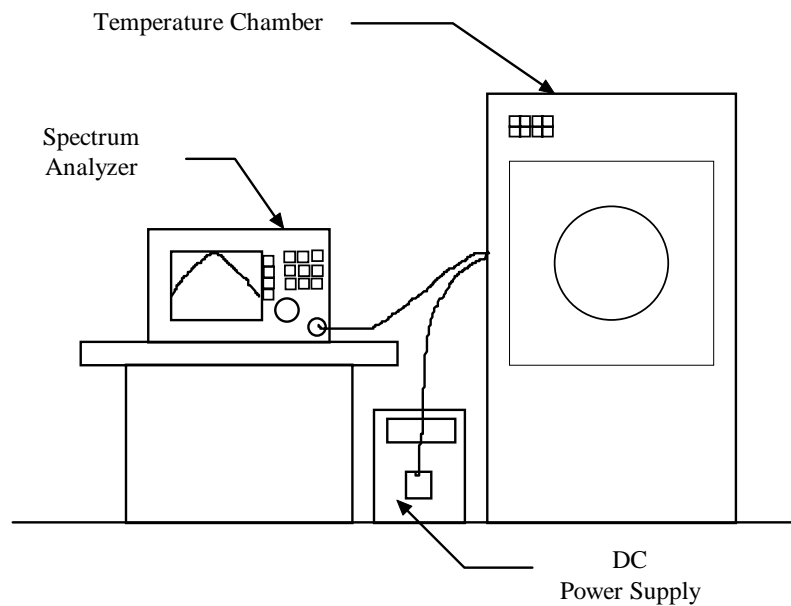A) Frequency stability versus environmental temperature

1. Setup the configuration per figure 5 for frequencies measured at ambient temperature if it is within 15   to 25   . 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   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   . 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	05/16/2004
Temperature Chamber	ACS	EOS 200T	01/17/2004

7.4 Measurement Data

7.4.1 682.000~698.000MHz

A1. Frequency stability versus enviroment tempture

Reference Frequency : 682.375 MHz		Limit 0.005%					
Enviroment	Power	Frequency measured with time elapsed					
Tempture	Supplied	2 minute		5 minute		10 minute	
( )	(Vdc)	(MHz)	(%)	(MHz)	(%)	(MHz)	(%)
50		682.3940	0.00278	682.3564	-0.00272	682.3766	0.00023
40		682.3513	-0.00347	682.3502	-0.00364	682.3659	-0.00133
30		682.3666	-0.00123	682.3735	-0.00022	682.3970	0.00323
20	New Batt.	682.3888	0.00202	682.3864	0.00167	682.3709	-0.00060
10		682.3669	-0.00119	682.3973	0.00327	682.3773	0.00033
0		682.3947	0.00289	682.3512	-0.00349	682.3952	0.00295
-10		682.3504	-0.00361	682.3506	-0.00357	682.3918	0.00246
-20		682.3800	0.00074	682.3598	-0.00223	682.3960	0.00308
-30		682.3796	0.00067	682.4008	0.00379	682.3655	-0.00139

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

Reference Frequency : 682.375 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	682.3683	-0.00099	682.3968	0.00319	682.3983	0.00342

B1. Frequency stability versus enviroment tempture

Reference Frequency : 690.250 MHz		Limit 0.005%					
Enviroment	Power	Frequency measured with time elapsed					
Tempture	Supplied	2 minute		5 minute		10 minute	
( )	(Vdc)	(MHz)	(%)	(MHz)	(%)	(MHz)	(%)
50		690.2693	0.00280	690.2408	-0.00133	690.2672	0.00249
40		690.2632	0.00191	690.2478	-0.00032	690.2689	0.00274
30		690.2734	0.00339	690.2417	-0.00121	690.2335	-0.00239
20	New Batt.	690.2588	0.00127	690.2610	0.00159	690.2437	-0.00092
10		690.2588	0.00127	690.2679	0.00260	690.2663	0.00236
0		690.2635	0.00195	690.2669	0.00245	690.2622	0.00177
-10		690.2473	-0.00039	690.2671	0.00248	690.2507	0.00010
-20		690.2464	-0.00052	690.2510	0.00014	690.2674	0.00251
-30		690.2646	0.00212	690.2537	0.00053	690.2446	-0.00079

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

Reference Frequency : 690.250 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	690.2598	0.00142	690.2487	-0.00019	690.2249	-0.00364

Rev. 2.0

C1. Frequency stability versus enviroment tempture

Reference Frequency : 697.875 MHz Limit 0.005%							
Enviroment	Power	Frequency measured with time elapsed					
Tempture	Supplied	2 minute		5 minute		10 minute	
( )	(Vdc)	(MHz)	(%)	(MHz)	(%)	(MHz)	(%)
50		697.8738	-0.00017	697.8938	0.00270	697.8559	-0.00274
40		697.8852	0.00147	697.8773	0.00033	697.8485	-0.00380
30		697.8661	-0.00127	697.8837	0.00125	697.8558	-0.00276
20	New Batt.	697.8613	-0.00197	697.8693	-0.00082	697.8838	0.00127
10		697.8528	-0.00319	697.8789	0.00056	697.8769	0.00027
0		697.8656	-0.00135	697.8967	0.00310	697.8745	-0.00007
-10		697.8860	0.00158	697.8811	0.00088	697.8799	0.00071
-20		697.8982	0.00333	697.8753	0.00004	697.8952	0.00290
-30		697.8808	0.00083	697.8587	-0.00233	697.8816	0.00094

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

Reference Frequency : 697.875 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	697.8640	-0.00157	697.8664	-0.00123	697.8546	-0.00293

7.4.2 740.000~752.000MHz

A1. Frequency stability versus enviroment tempture

Reference Frequency : 740.625 MHz		Limit	0.005%				
Enviroment	Power	Frequency measured with time elapsed					
Tempture	Supplied	2 minute		5 minute		10 minute	
( )	(Vdc)	(MHz)	(%)	(MHz)	(%)	(MHz)	(%)
50		740.6116	-0.00180	740.6112	-0.00186	740.6026	-0.00302
40		740.6050	-0.00270	740.6487	0.00320	740.6511	0.00352
30		740.6147	-0.00139	740.6406	0.00211	740.6262	0.00016
20	New Batt.	740.6199	-0.00069	740.6165	-0.00115	740.6197	-0.00072
10		740.6271	0.00029	740.6053	-0.00266	740.6020	-0.00310
0		740.6124	-0.00170	740.6085	-0.00223	740.6322	0.00097
-10		740.6149	-0.00137	740.6143	-0.00144	740.5987	-0.00355
-20		740.6166	-0.00114	740.6380	0.00175	740.6323	0.00099
-30		740.6524	0.00370	740.6522	0.00368	740.6127	-0.00166

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

Reference Frequency : 740.625 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	740.6453	0.00274	740.6305	0.00074	740.6394	0.00194

B1. Frequency stability versus enviroment tempture

Reference Frequency : 746.250 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.	746.2281	-0.00294	746.2509	0.00012	746.2349	-0.00203
40		746.2252	-0.00332	746.2271	-0.00306	746.2380	-0.00161
30		746.2240	-0.00348	746.2536	0.00048	746.2404	-0.00128
20		746.2305	-0.00261	746.2571	0.00095	746.2258	-0.00324
10		746.2254	-0.00329	746.2541	0.00055	746.2309	-0.00255
0		746.2543	0.00058	746.2659	0.00213	746.2294	-0.00276
-10		746.2639	0.00187	746.2456	-0.00059	746.2387	-0.00152
-20		746.2570	0.00094	746.2503	0.00004	746.2308	-0.00258
-30		746.2725	0.00302	746.2547	0.00063	746.2621	0.00162

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

Reference Frequency : 746.250 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	746.2265	-0.00315	746.2627	0.00170	746.2333	-0.00223

C1. Frequency stability versus enviroment tempture

Reference Frequency : 751.625 MHz　　　Limit　0.005%							
Enviroment	Power	Frequency measured with time elapsed					
Tempture	Supplied	2 minute		5 minute		10 minute	
( )	(Vdc)	(MHz)	(%)	(MHz)	(%)	(MHz)	(%)
50		751.6064	-0.00248	751.6109	-0.00188	751.6333	0.00110
40		751.6062	-0.00250	751.6492	0.00322	751.6152	-0.00130
30		751.6090	-0.00213	751.6013	-0.00316	751.6269	0.00026
20	New Batt.	751.6172	-0.00104	751.6385	0.00180	751.6492	0.00322
10		751.6137	-0.00150	751.6512	0.00349	751.6209	-0.00055
0		751.6283	0.00045	751.6504	0.00338	751.6086	-0.00218
-10		751.6185	-0.00086	751.6110	-0.00186	751.6091	-0.00211
-20		751.6473	0.00297	751.6071	-0.00238	751.6238	-0.00016
-30		751.6253	0.00004	751.6233	-0.00023	751.5986	-0.00351

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

Reference Frequency : 751.625 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	751.6161	-0.00118	751.6210	-0.00054	751.6204	-0.00061

7.4.3 790.000~806.000MHz

A1. Frequency stability versus enviroment tempture

Reference Frequency : 790.375 MHz		Limit 0.005%					
Enviroment	Power	Frequency measured with time elapsed					
Tempture	Supplied	2 minute		5 minute		10 minute	
( )	(Vdc)	(MHz)	(%)	(MHz)	(%)	(MHz)	(%)
50		790.3813	0.00080	790.4001	0.00317	790.3870	0.00151
40		790.3696	-0.00069	790.3793	0.00054	790.3540	-0.00266
30		790.3908	0.00199	790.3627	-0.00156	790.3485	-0.00335
20	New Batt.	790.3634	-0.00146	790.3573	-0.00224	790.3983	0.00295
10		790.3521	-0.00289	790.4031	0.00355	790.3461	-0.00365
0		790.3632	-0.00149	790.3580	-0.00215	790.3870	0.00152
-10		790.3617	-0.00168	790.3802	0.00066	790.3661	-0.00112
-20		790.3996	0.00311	790.4044	0.00371	790.3478	-0.00344
-30		790.3969	0.00277	790.3497	-0.00320	790.4041	0.00368

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

Reference Frequency : 790.375 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	790.3998	0.00313	790.3989	0.00303	790.3928	0.00225

B1. Frequency stability versus enviroment tempture

Reference Frequency : 797.750 MHz		Limit 0.005%					
Enviroment	Power	Frequency measured with time elapsed					
Tempture	Supplied	2 minute		5 minute		10 minute	
( )	(Vdc)	(MHz)	(%)	(MHz)	(%)	(MHz)	(%)
50		790.7530	0.00037	790.7435	-0.00082	790.7732	0.00293
40		790.7667	0.00211	790.7663	0.00206	790.7507	0.00009
30		790.7586	0.00109	790.7455	-0.00057	790.7339	-0.00204
20	New Batt.	790.7305	-0.00246	790.7466	-0.00043	790.7330	-0.00215
10		790.7567	0.00085	790.7232	-0.00339	790.7567	0.00085
0		790.7676	0.00222	790.7670	0.00215	790.7233	-0.00338
-10		790.7721	0.00280	790.7657	0.00199	790.7496	-0.00005
-20		790.7613	0.00143	790.7419	-0.00103	790.7736	0.00299
-30		797.7351	-0.00187	797.7291	-0.00261	797.7471	-0.00037

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

Reference Frequency : 797.750 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	790.7585	0.00108	790.7386	-0.00145	790.7317	-0.00231

C1. Frequency stability versus enviroment tempture

Reference Frequency : 805.750 MHz		Limit	0.005%				
Enviroment	Power	Frequency measured with time elapsed					
Tempture	Supplied	2 minute		5 minute		10 minute	
( )	(Vdc)	(MHz)	(%)	(MHz)	(%)	(MHz)	(%)
50		805.7224	-0.00343	805.7224	-0.00343	805.7328	-0.00213
40		805.7604	0.00130	805.7390	-0.00137	805.7378	-0.00151
30		805.7576	0.00094	805.7629	0.00160	805.7492	-0.00009
20	New Batt.	805.7809	0.00384	805.7403	-0.00120	805.7341	-0.00198
10		805.7523	0.00029	805.7252	-0.00308	805.7669	0.00210
0		805.7501	0.00001	805.7369	-0.00162	805.7516	0.00019
-10		805.7687	0.00232	805.7360	-0.00174	805.7348	-0.00189
-20		805.7613	0.00140	805.7288	-0.00264	805.7299	-0.00250
-30		805.7518	0.00022	805.7412	-0.00109	805.7800	0.00373

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

Reference Frequency : 805.750 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	805.7780	0.00347	805.7213	-0.00357	805.7293	-0.00257

8 CONDUCTED EMISSION MEASUREMENT

8.1 Standard Applicable

For unintentional and intentional device, Line Conducted Emission Limits are in accordance to § 15.107(a) and § 15.207(a) respectively. Both Limits are identical specification.

8.2 Measurement Procedure

1. Setup the configuration per figure 3.

2. A preliminary scan with a spectrum monitor is performed to identify the frequency of emission that has the highest amplitude relative to the limit by operating the EUT in selected modes of operation, typical cable positions, and with a typical system configuration.

3. Record the 6 or 8 highest emissions relative to the limit.

4. Measure each frequency obtained from step 3 by a test receiver set on quasi peak detector function, and then record the accuracy frequency and emission level. If all emissions measured in the specified band are attenuated more than 20 dB from the limit, this step would be ignored, and the peak detector function would be used.

5. Confirm the highest three emissions with variation of the EUT cable configuration and record the final data.

6. Repeat all above procedures on measuring each operation mode of EUT.

Figure 3 : Conducted emissions measurement configuration
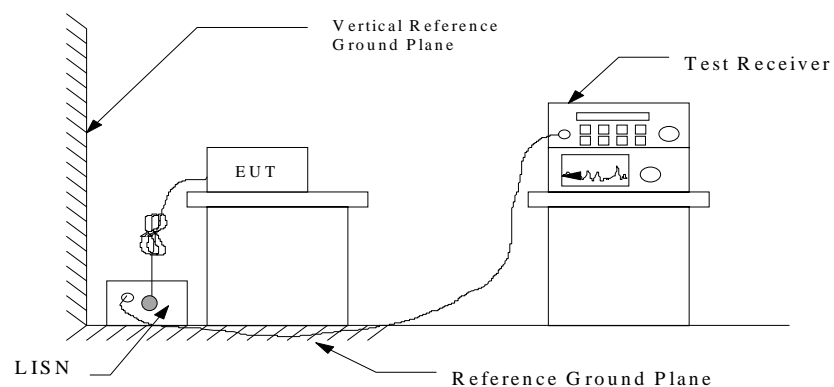
8.3 Conducted Emission Data

a) 682.000~698.000 MHz

Operation Mode：Charge

Test Date ： <u>Nov. 13, 2003</u>　　Temperature：<u>23</u>　　Humidity: <u>58 %</u>

Freq.	Meter Reading (dBµV)				Factor	Limit (dBµV)		Result (dBµV)			
	Q.P Value		AVG. Value			Q.P	AVG.	Q.P Value		AVG. Value	
(MHz)	N	L1	N	L1	(dB)	Value	Value	N	L1	N	L1
0.170	43.3	43.1	----	----	0.2	65.0	55.0	43.5	43.3	----	----
0.220	41.8	41.6	----	----	0.2	62.8	52.8	42.0	41.8	----	----
0.244	41.3	40.9	----	----	0.2	62.0	52.0	41.5	41.1	----	----
0.322	39.6	39.3	----	----	0.3	59.7	49.7	39.9	39.6	----	----
0.420	38.1	38.0	----	----	0.3	57.4	47.4	38.4	38.3	----	----
0.656	31.3	29.6	----	----	0.3	56.0	46.0	31.6	29.9	----	----

b) 740.000~752.000 MHz

Operation Mode：Charge

Test Date ： <u>Nov. 13, 2003</u>　　Temperature：<u>23</u>　　Humidity: <u>58 %</u>

Freq.	Meter Reading (dBµV)				Factor	Limit (dBµV)		Result (dBµV)			
	Q.P Value		AVG. Value			Q.P	AVG.	Q.P Value		AVG. Value	
(MHz)	N	L1	N	L1	(dB)	Value	Value	N	L1	N	L1
0.170	43.3	43.1	----	----	0.2	65.0	55.0	43.5	43.3	----	----
0.220	41.8	41.6	----	----	0.2	62.8	52.8	42.0	41.8	----	----
0.244	41.3	40.9	----	----	0.2	62.0	52.0	41.5	41.1	----	----
0.322	39.6	39.3	----	----	0.3	59.7	49.7	39.9	39.6	----	----
0.420	38.1	38.0	----	----	0.3	57.4	47.4	38.4	38.3	----	----
0.656	31.3	29.6	----	----	0.3	56.0	46.0	31.6	29.9	----	----

Note : 1. Please see appendix 1 for Plotted Data

2. The expanded uncertainty of the conducted emission tests is 2.45 dB.

Rev. 2.0

c) 790.000~806.000 MHz

Operation Mode : Charge
Test Date   : <u>Nov. 13, 2003</u>   Temperature : <u>23</u>   Humidity: <u>58 %</u>

Freq.	Meter Reading (dBμV)				Factor	Limit (dBμV)		Result (dBμV)			
	Q.P Value		AVG. Value			Q.P	AVG.	Q.P Value		AVG. Value	
(MHz)	N	L1	N	L1	(dB)	Value	Value	N	L1	N	L1
0.170	43.3	43.1	----	----	0.2	65.0	55.0	43.5	43.3	----	----
0.220	41.8	41.6	----	----	0.2	62.8	52.8	42.0	41.8	----	----
0.244	41.3	40.9	----	----	0.2	62.0	52.0	41.5	41.1	----	----
0.322	39.6	39.3	----	----	0.3	59.7	49.7	39.9	39.6	----	----
0.420	38.1	38.0	----	----	0.3	57.4	47.4	38.4	38.3	----	----
0.656	31.3	29.6	----	----	0.3	56.0	46.0	31.6	29.9	----	----

Note : 1. Please see appendix 3 for Plotted Data
*   2. The expanded uncertainty of the conducted emission tests is 2.45 dB.*

8.4 Result Data Calculation

The result data is calculated by adding the LISN Factor to the measured reading. The basic equation with a sample calculation is as follows:

RESULT = READING + LISN FACTOR

Assume a receiver reading of 22.5 dBμ V is obtained, and LISN Factor is 0.1 dB, then the total of disturbance voltage is 22.6 dBμ V.

RESULT = 22.5 + 0.1 = 22.6 dBμ V
Level in μ V = Common Antilogarithm[(22.6 dBμ V)/20]
                    = 13.48 μ V

8.5 Conducted Measurement Equipment

The following test equipment are used during the conducted test .

Equipment	Manufacturer	Model No.	Next Cal. Due
EMI Test Receiver	Rohde and Schwarz	ESCS 30	11/27/2003
Line Impedance Stabilization network	Rohde and Schwarz	ESH2-Z5	09/03/2004
Monitor	IBM	E54	N.C.R.
Printer	HP	LaserJet 1000	N.C.R.
Shielded Room	Riken		N.C.R.
Computer	Acer	Veriton	N.C.R.
EMI Test Receiver	Rohde and Schwarz	ESCS 30	11/27/2003

8.6 Photos of Conduction Measuring Setup

Please see Exhibit-F-Setup_Photos
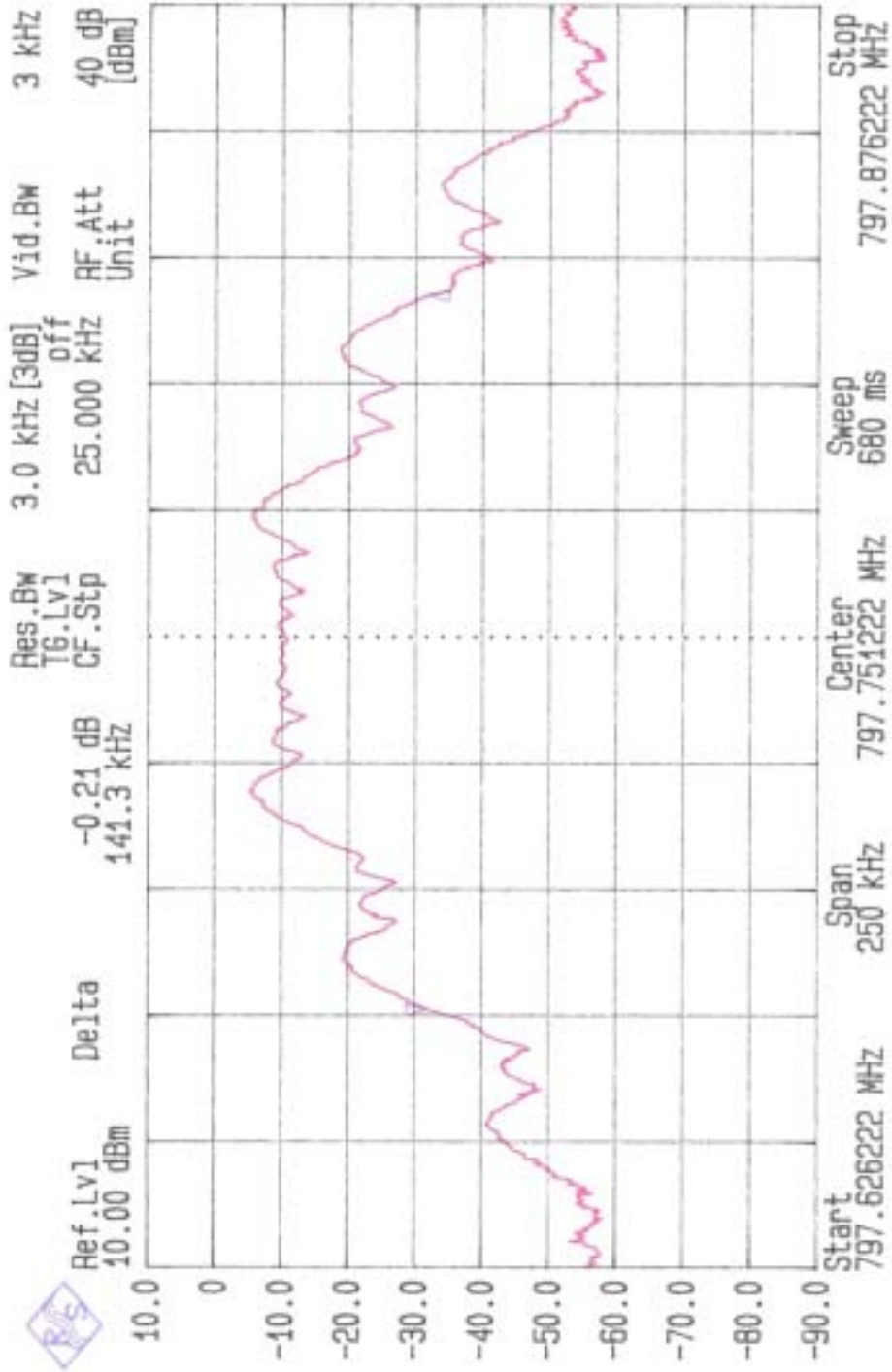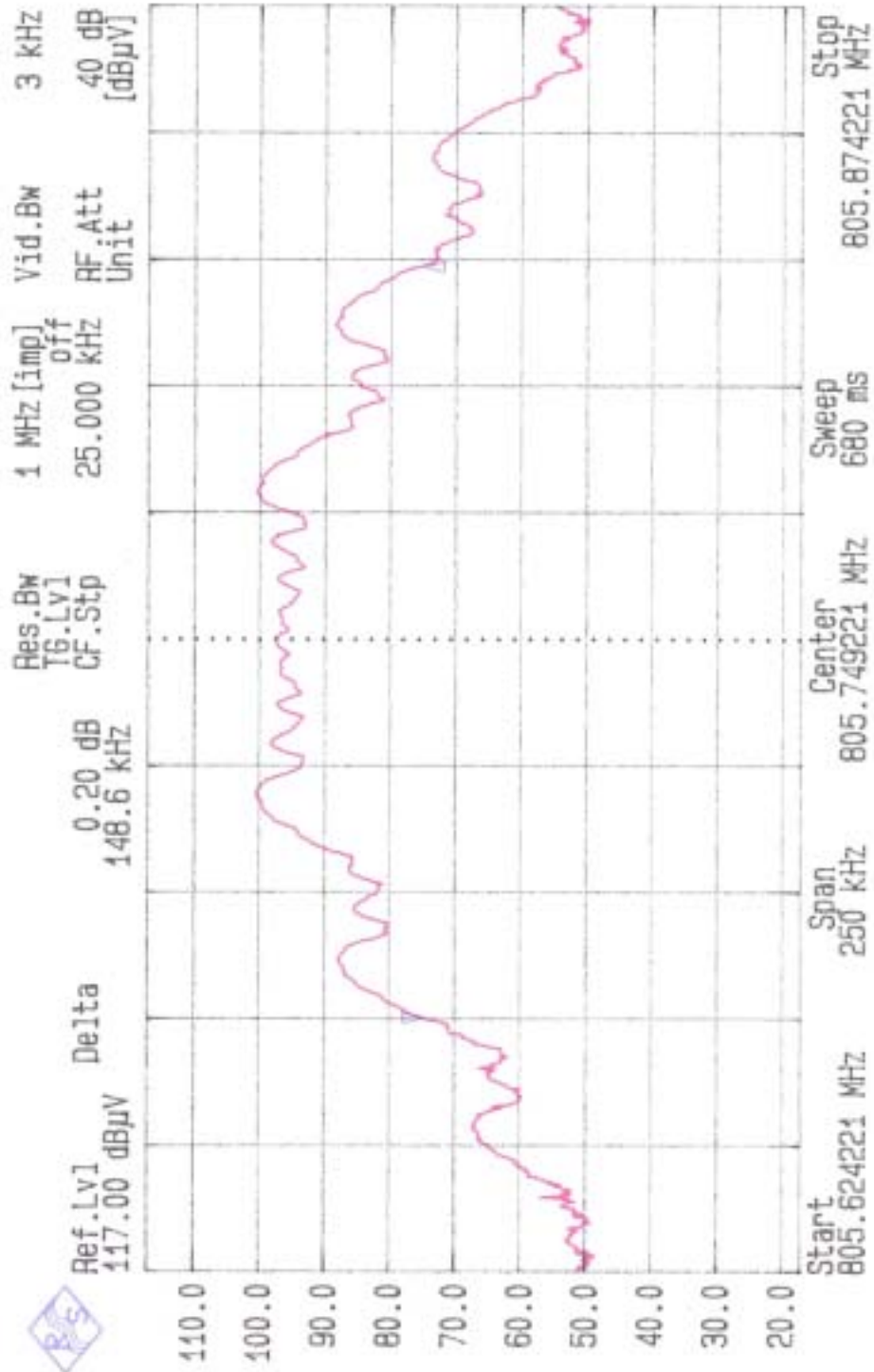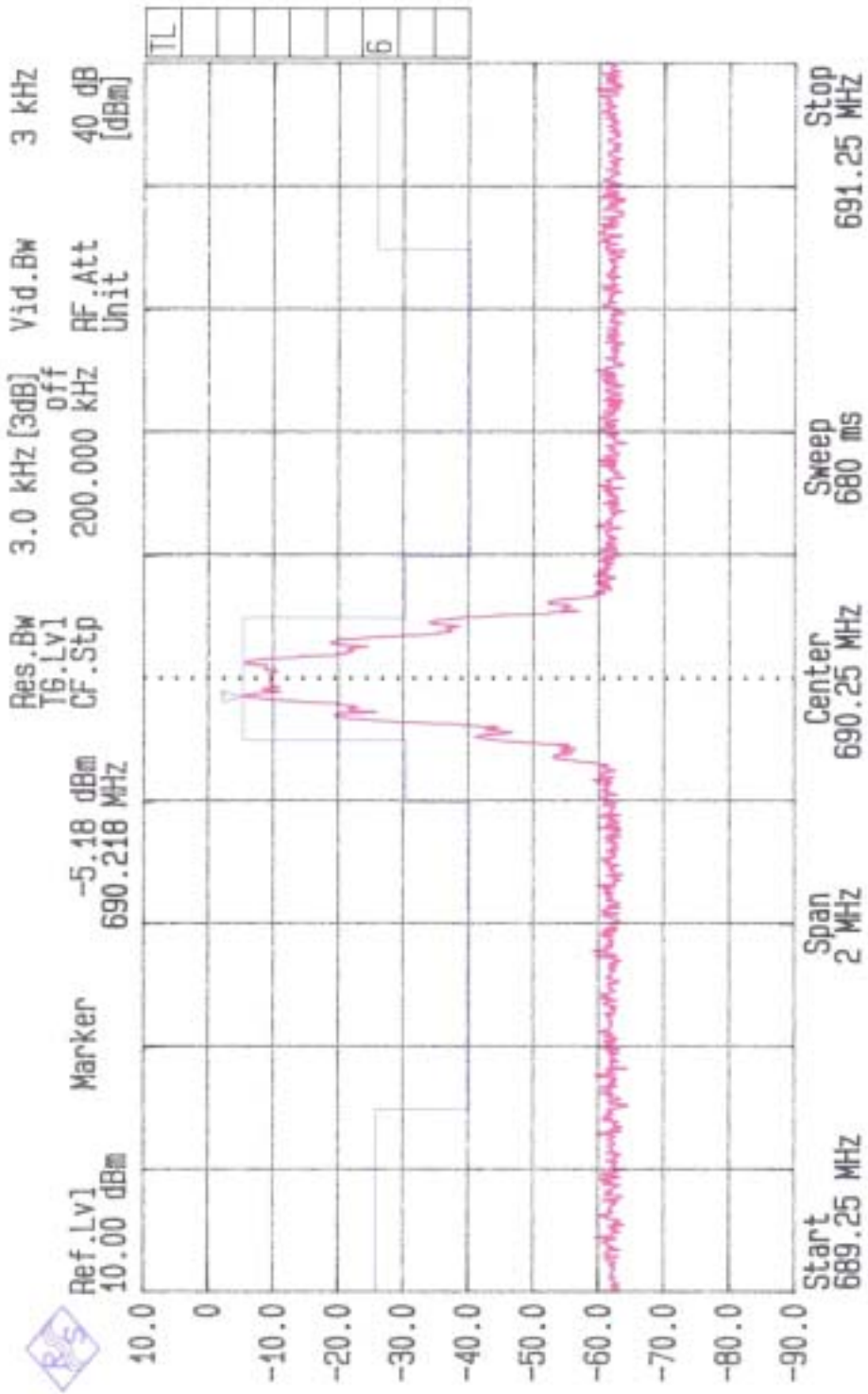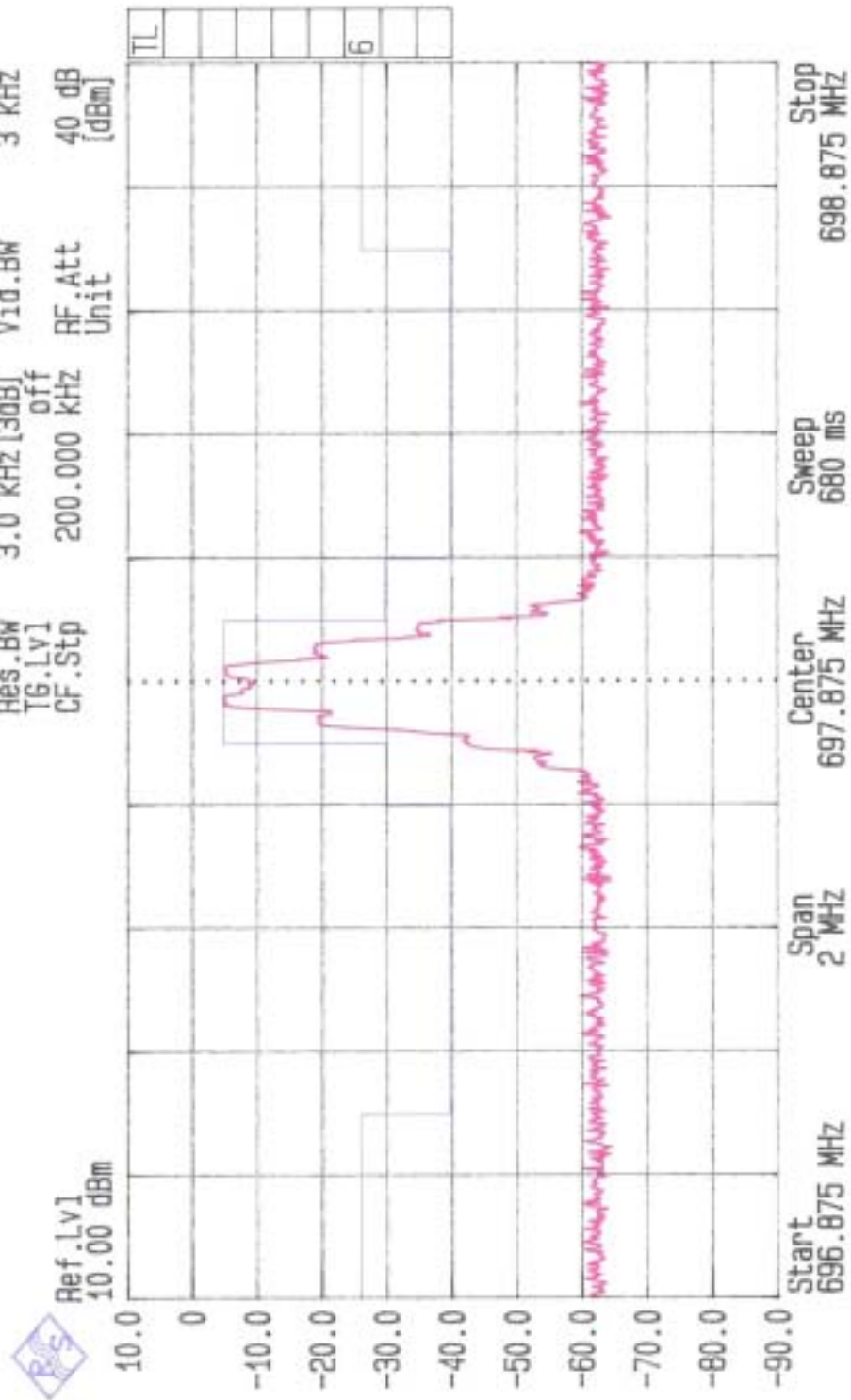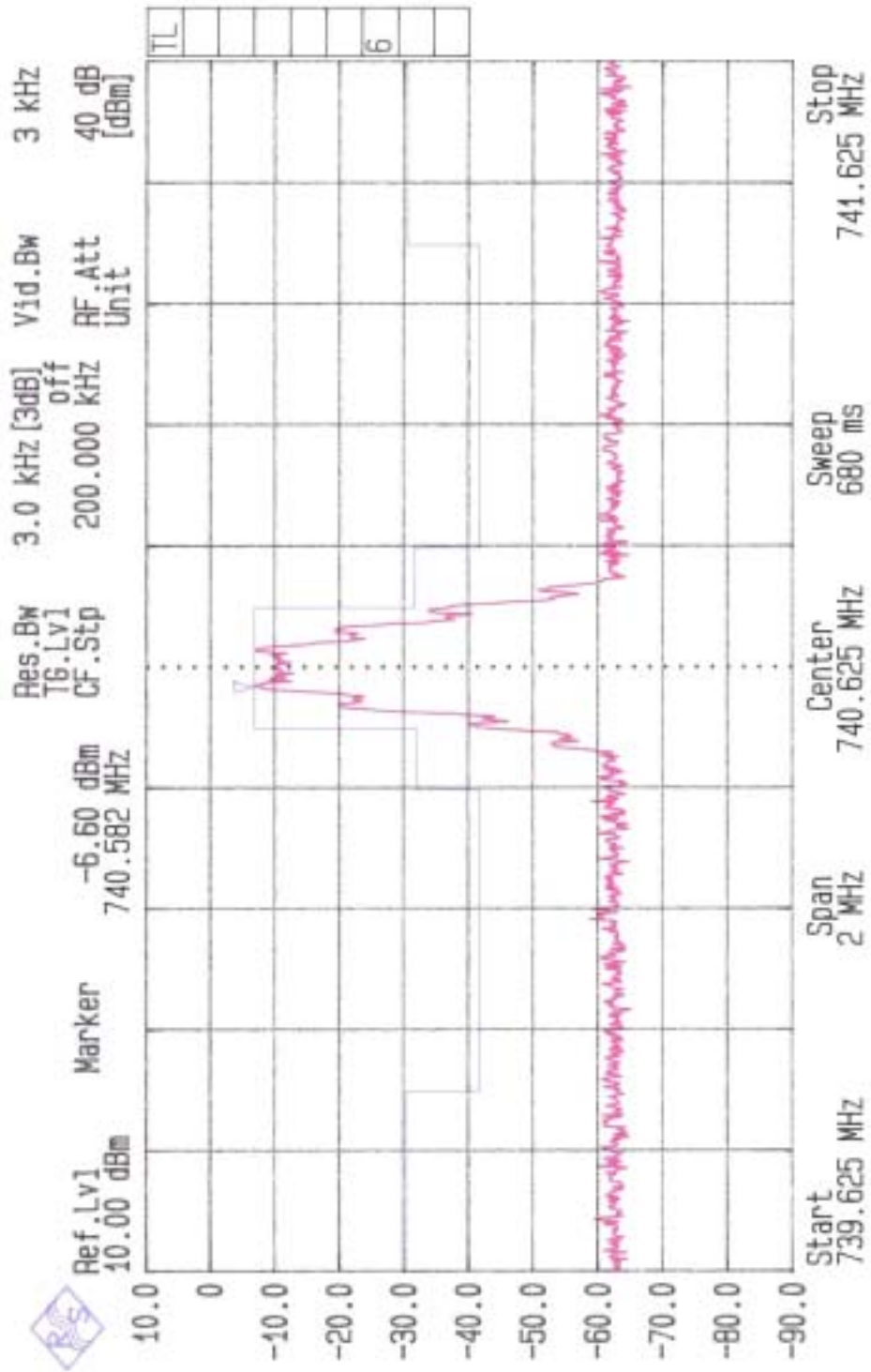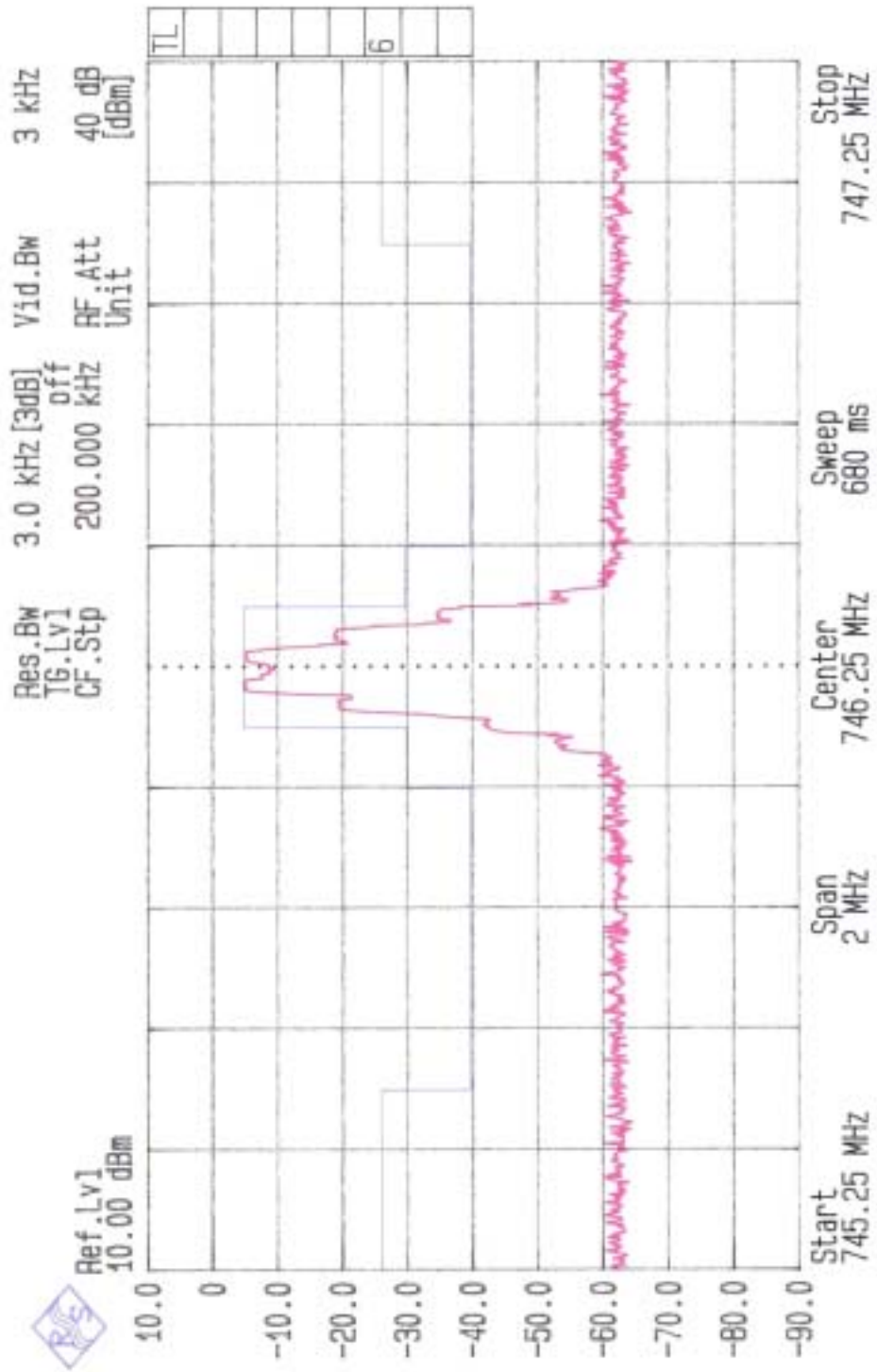
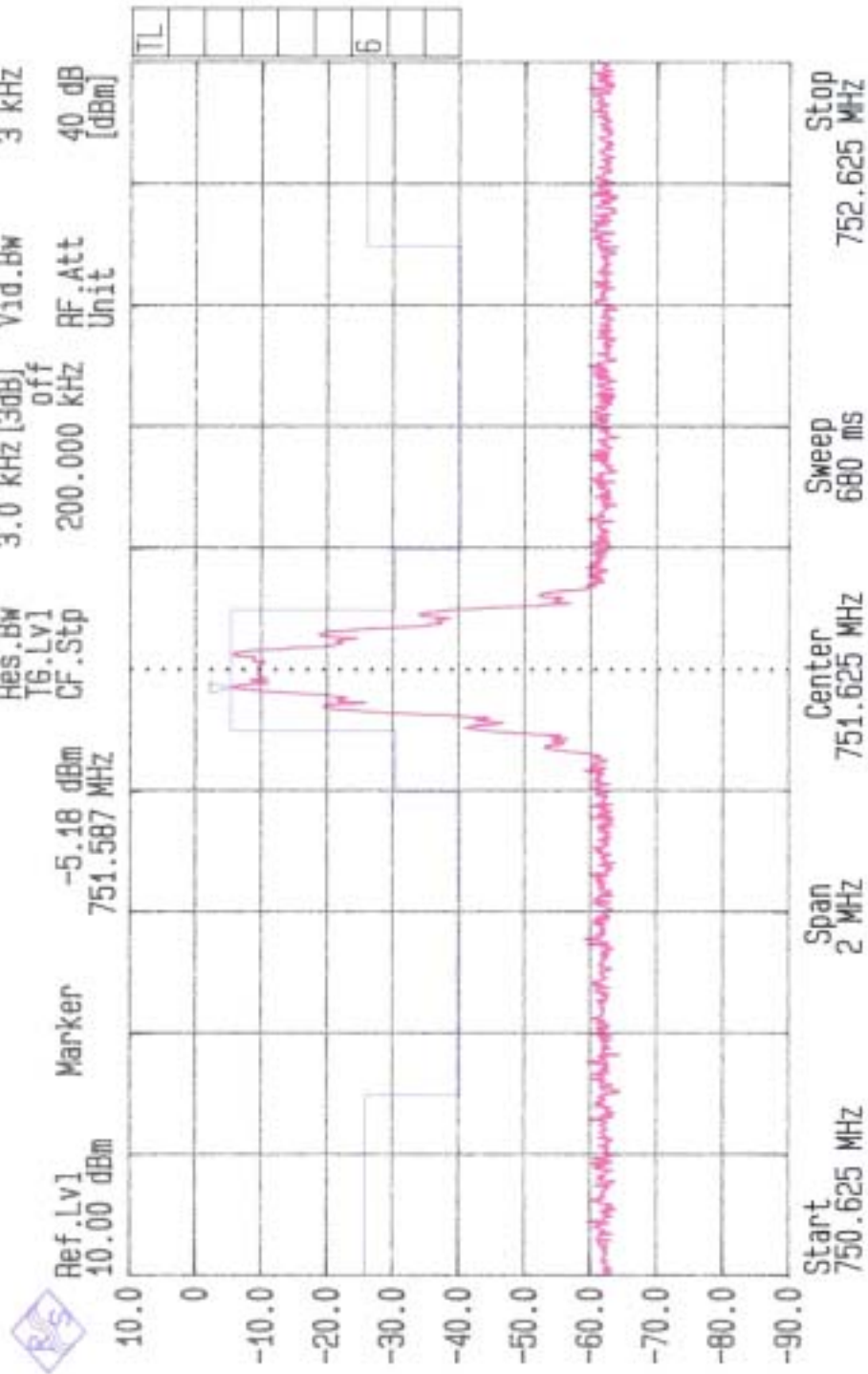**Appendix 1 : Occupied Emission Bandwidth Plotted Data**
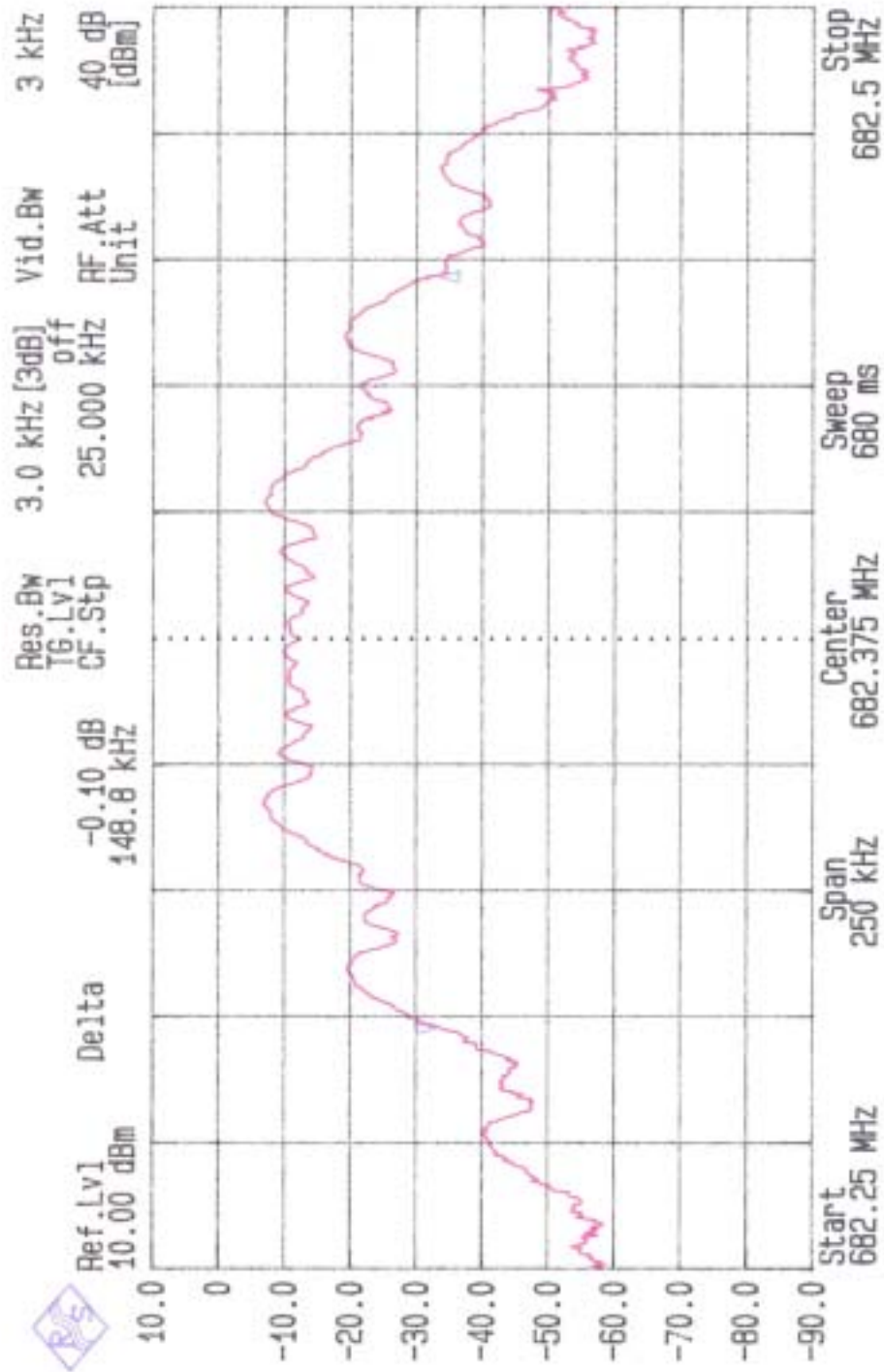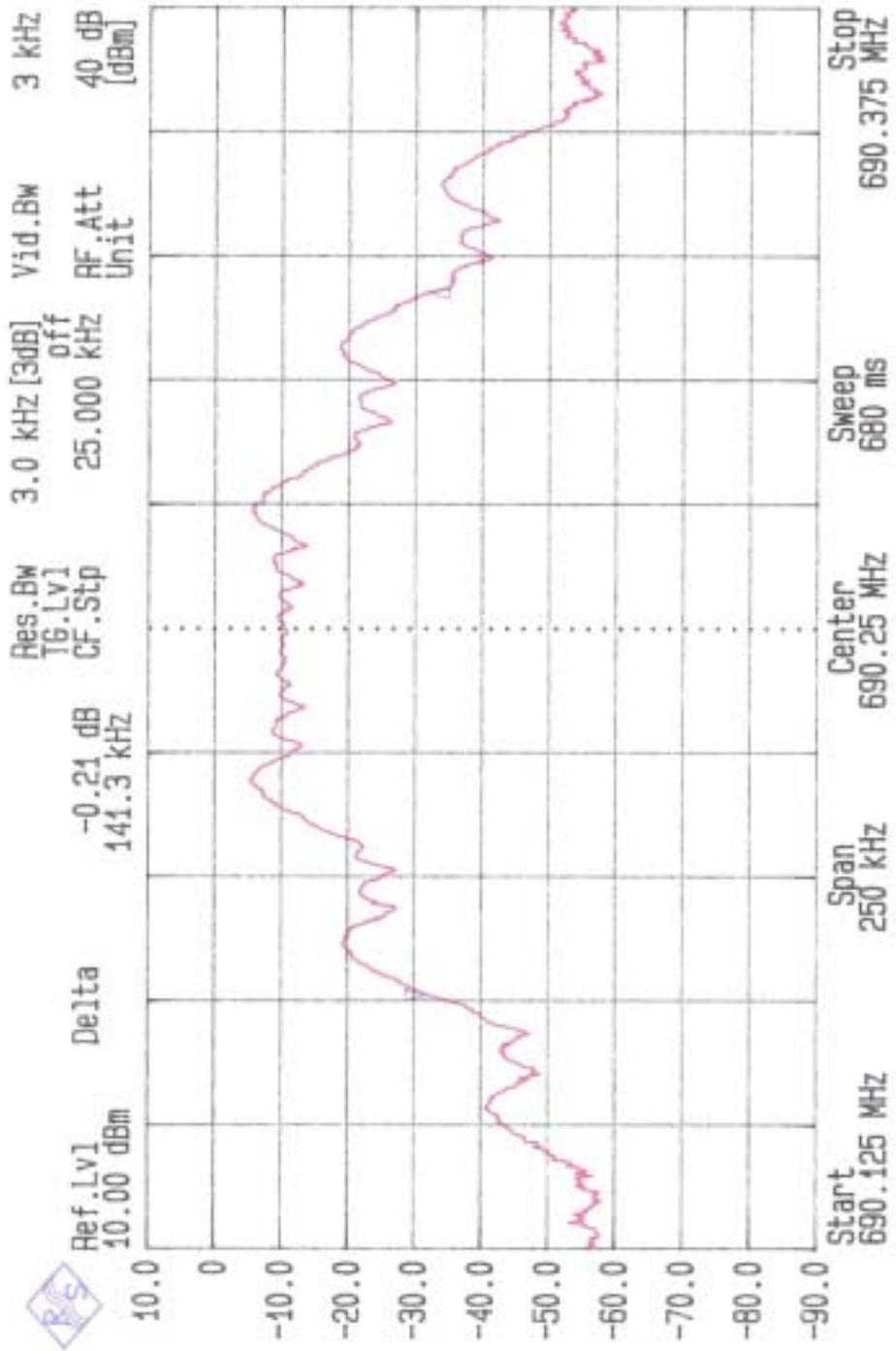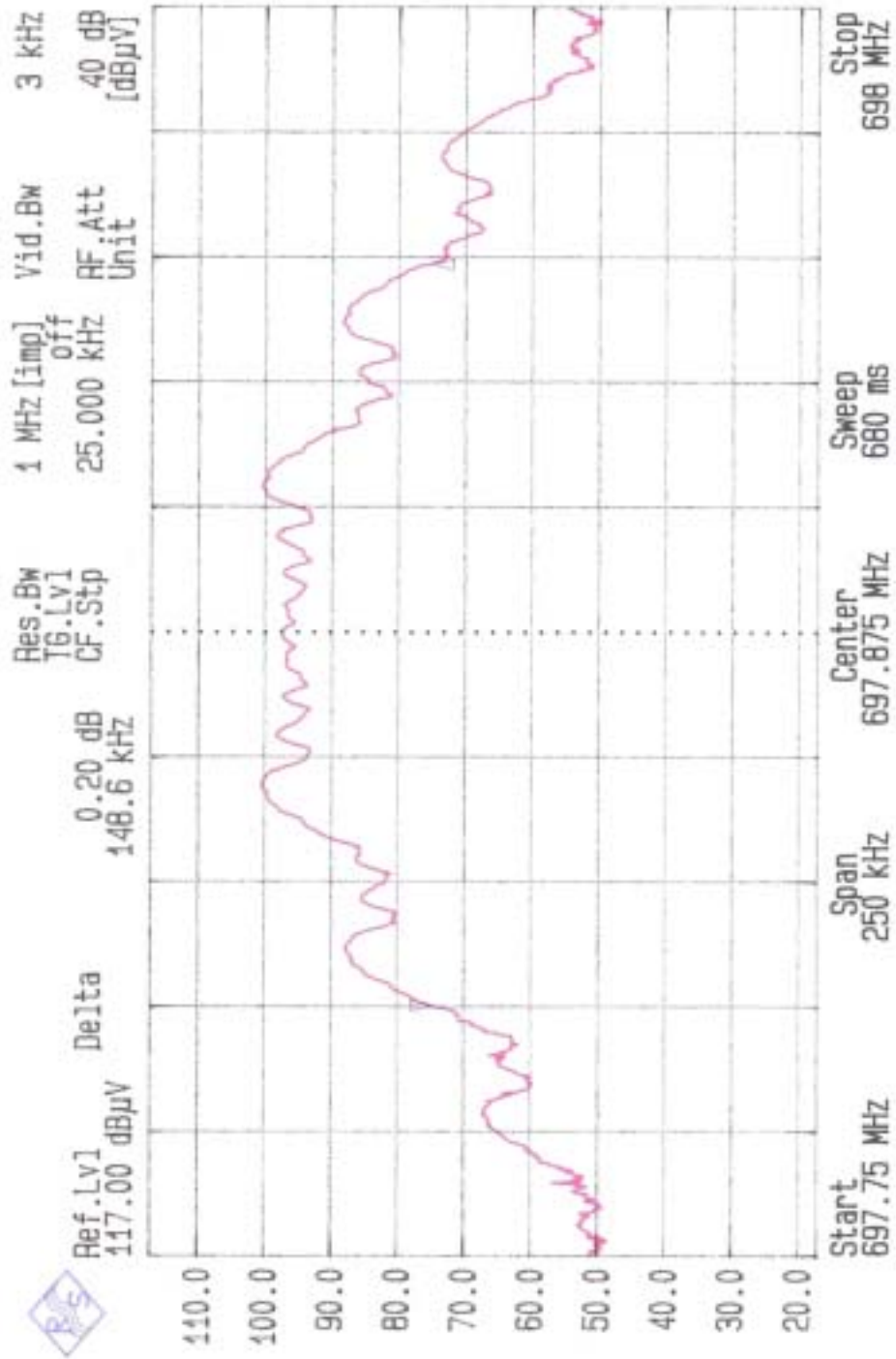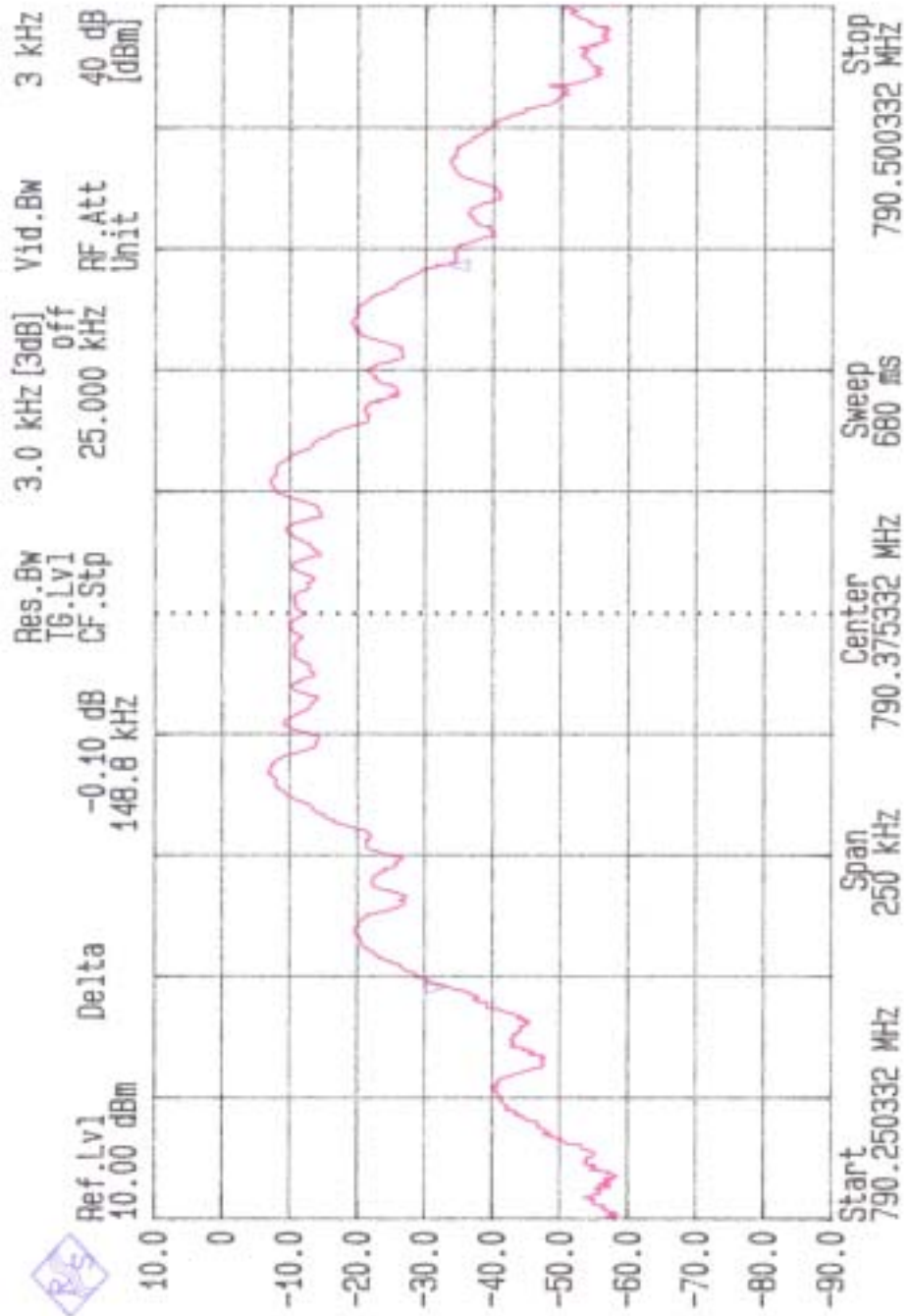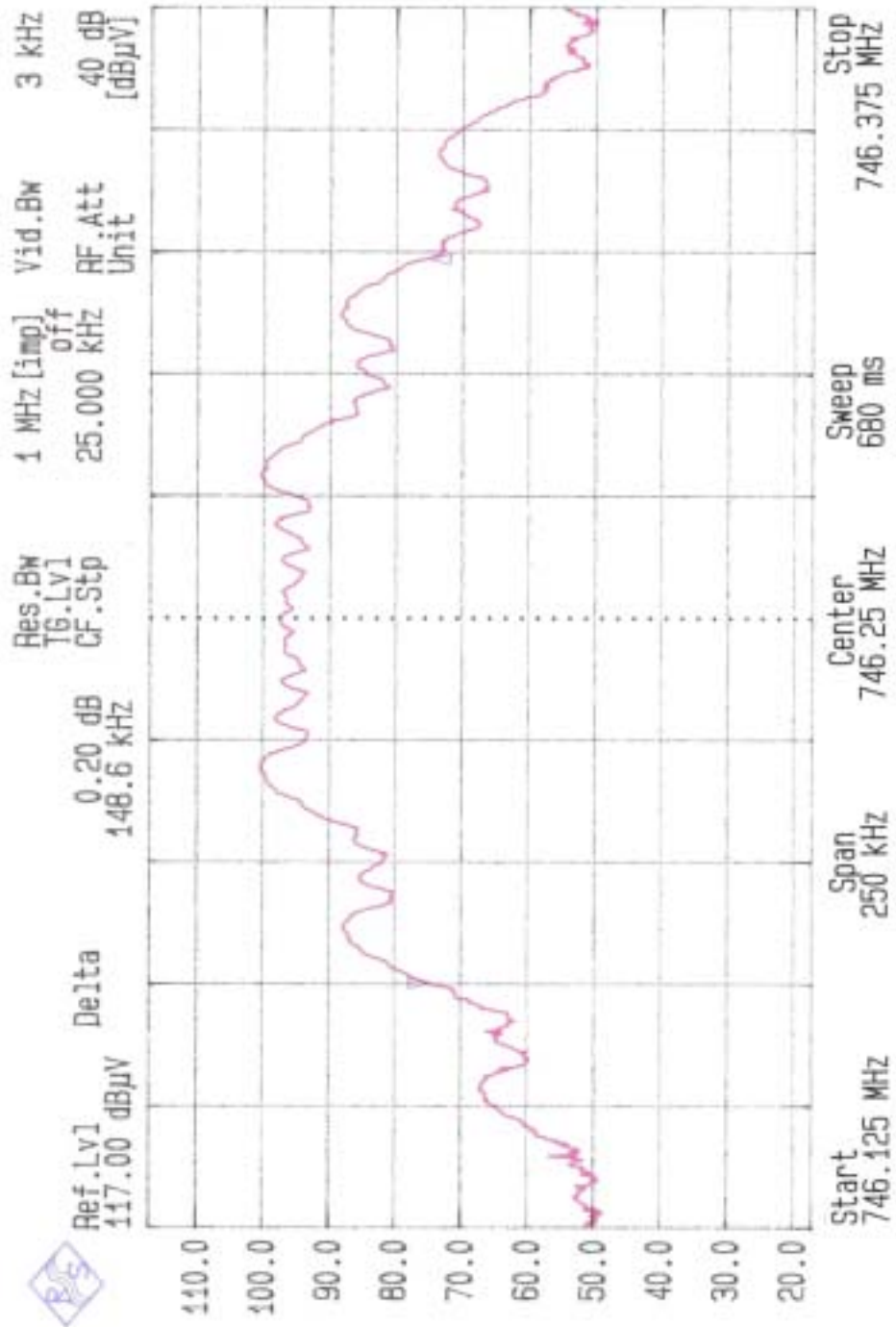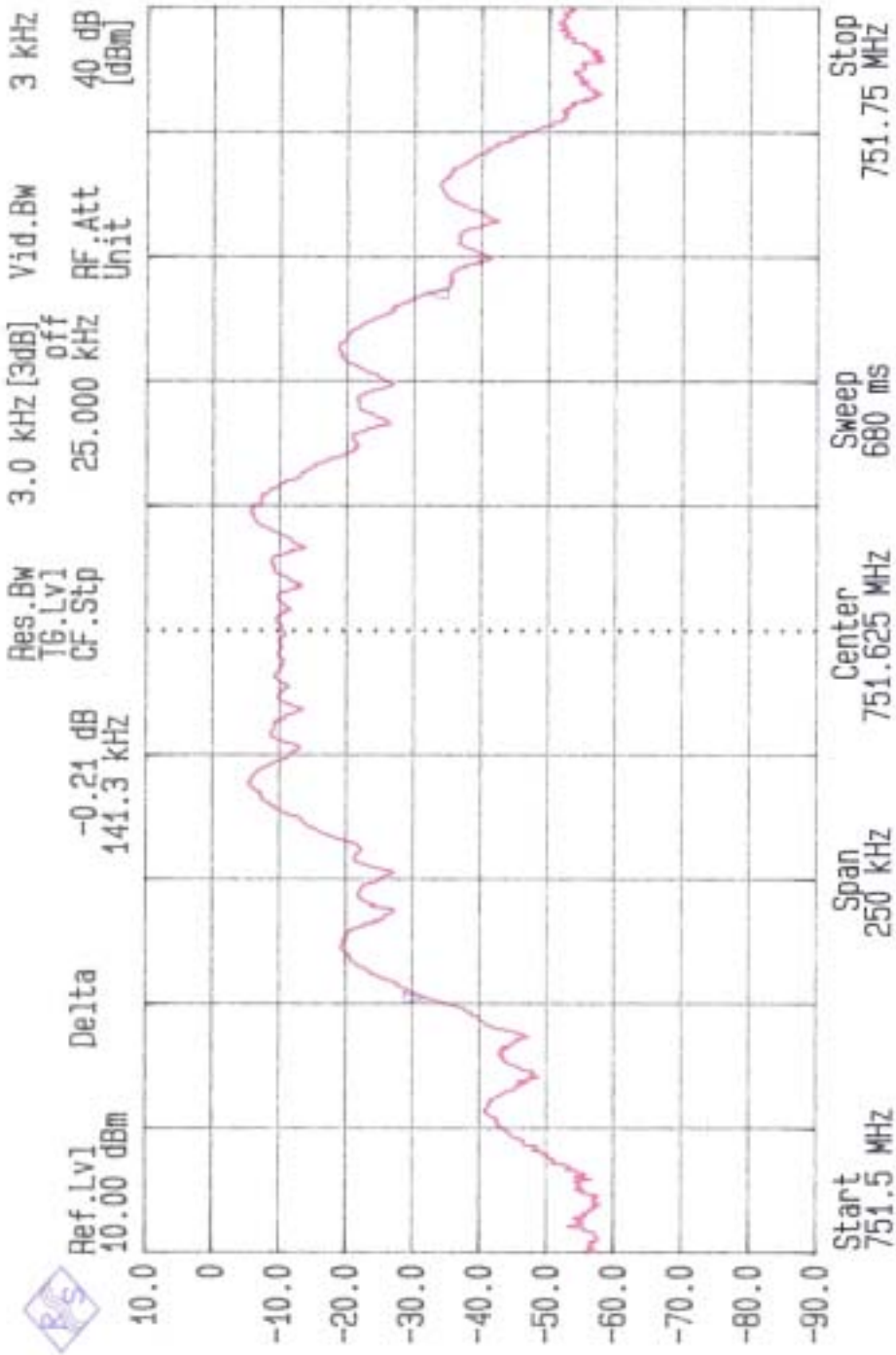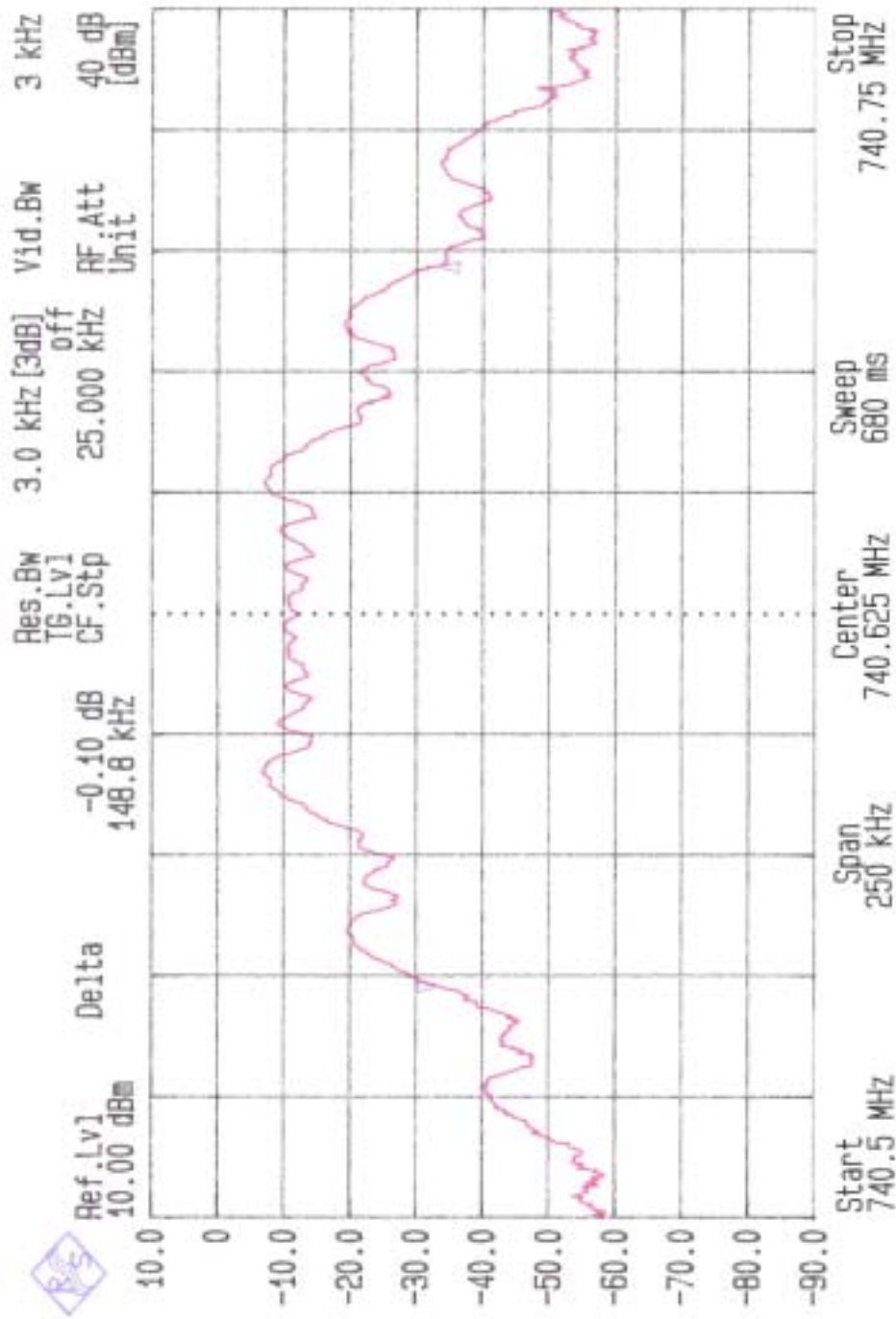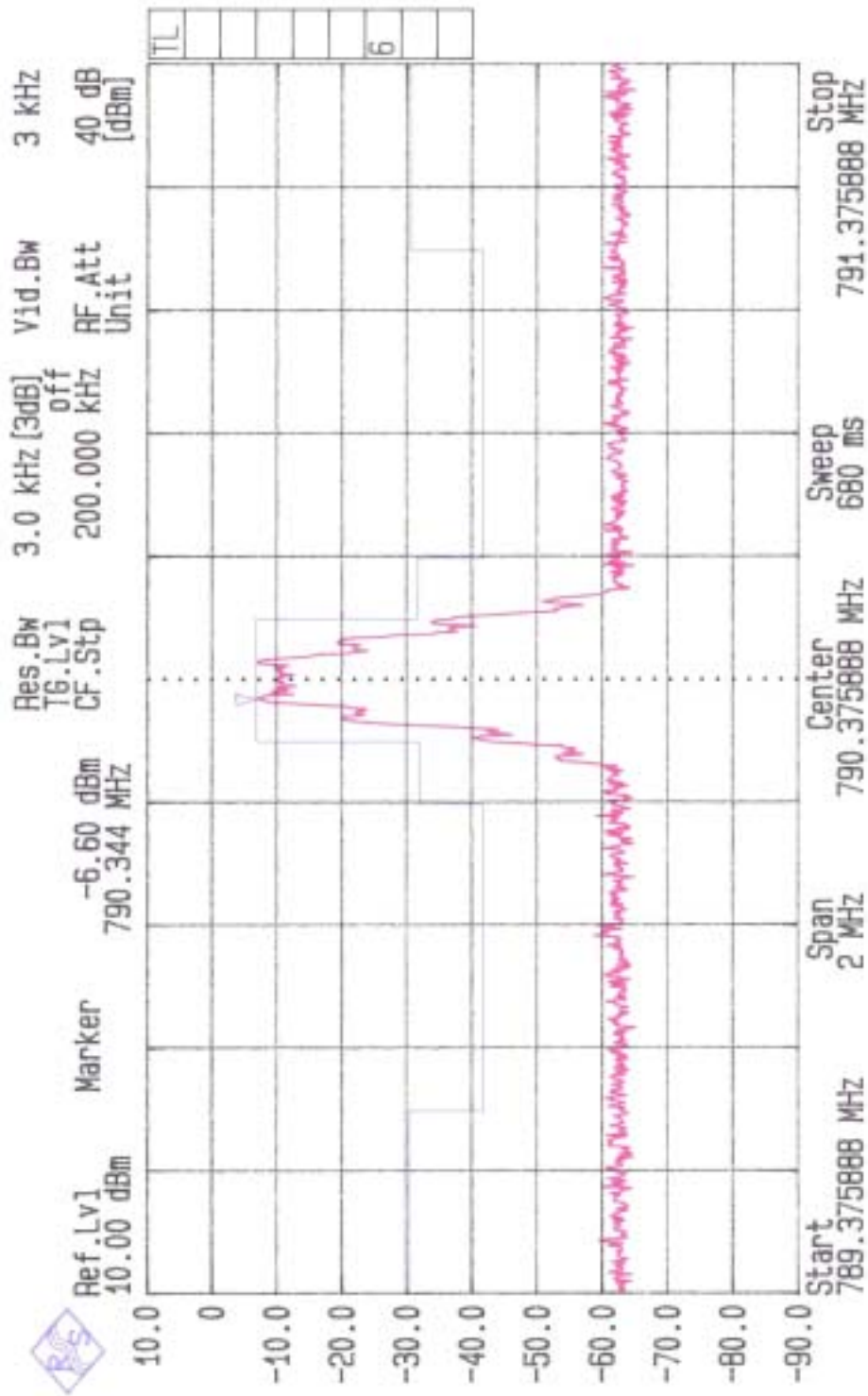
Appendix 2 : Emission Mask Plotted Data
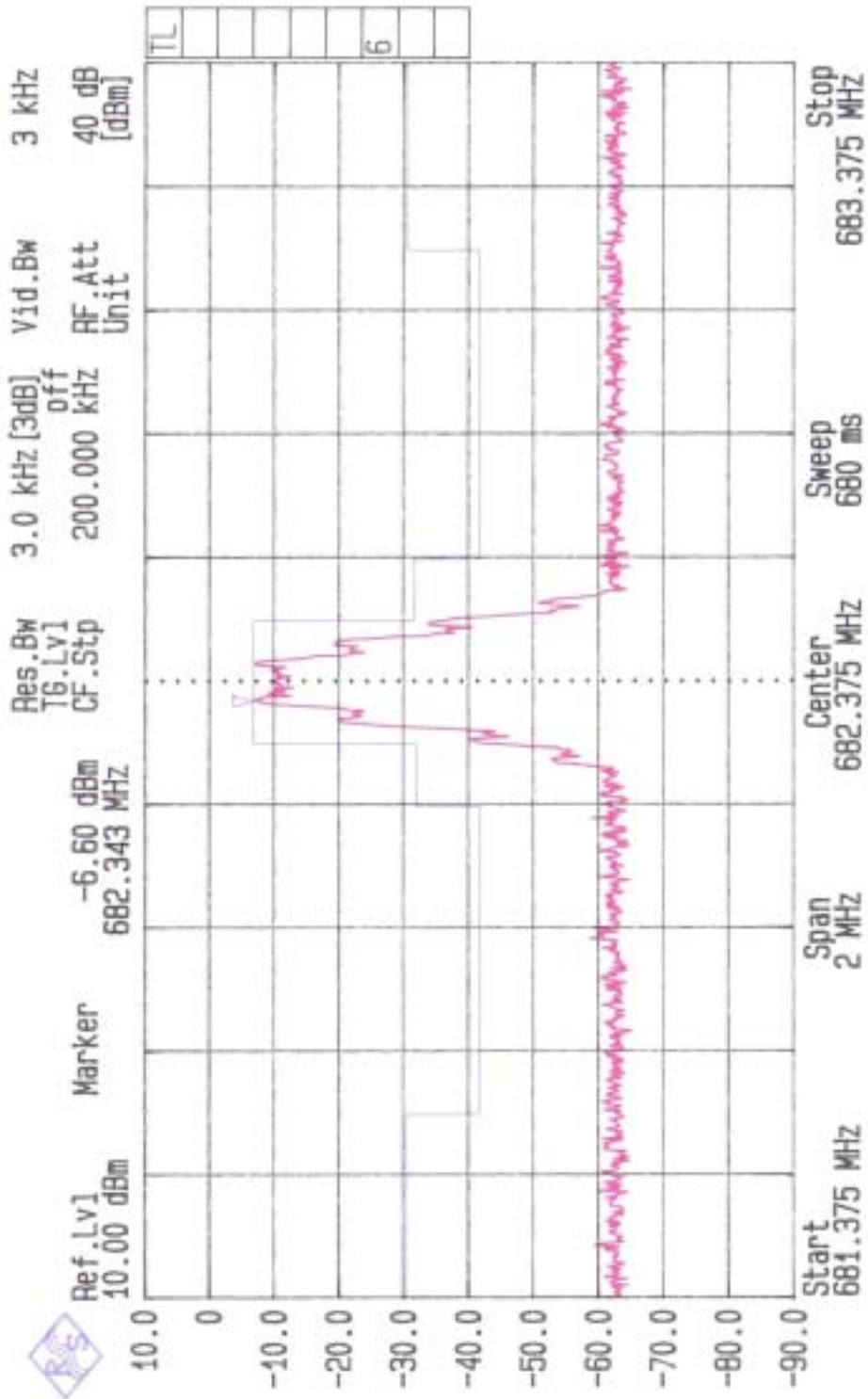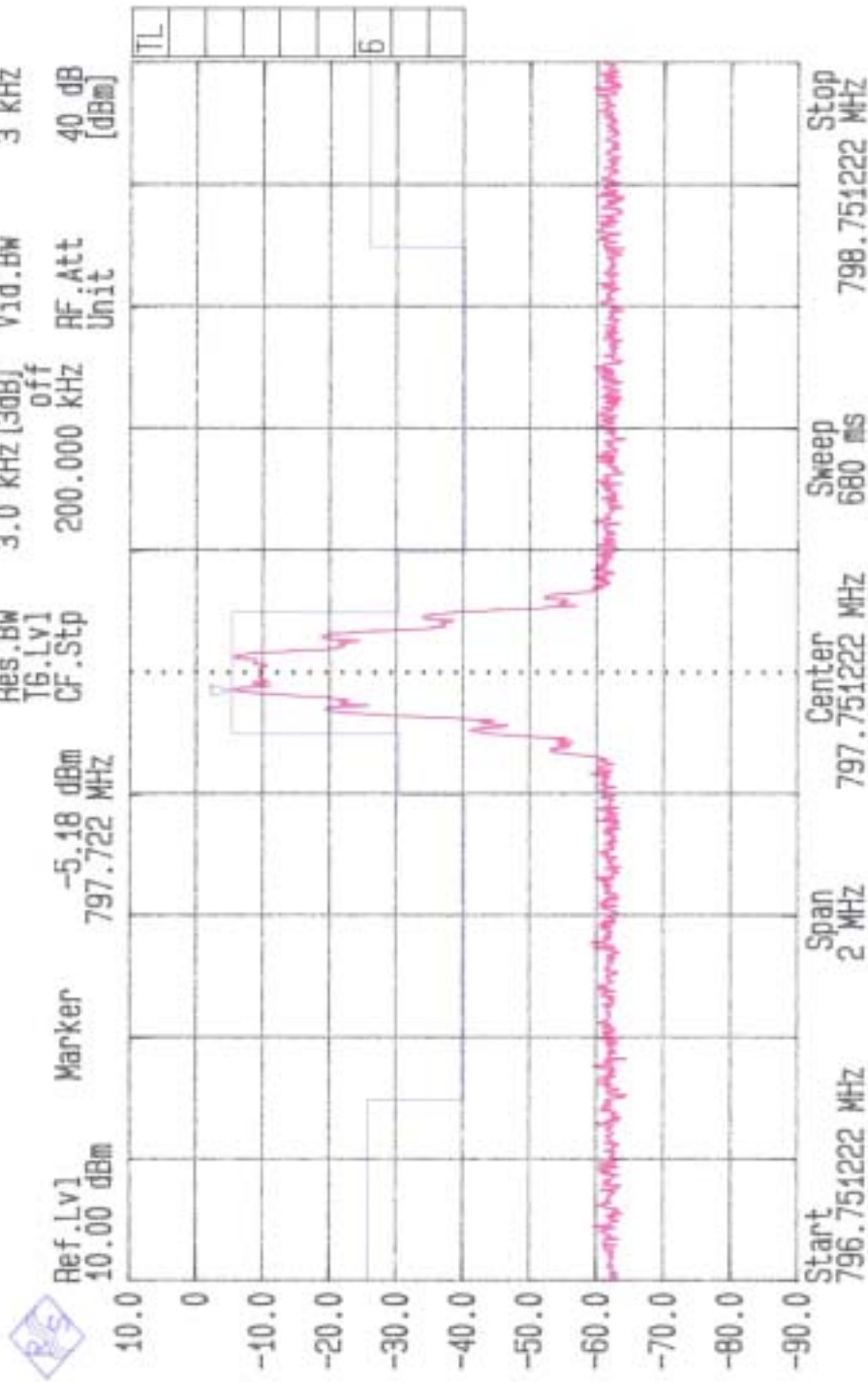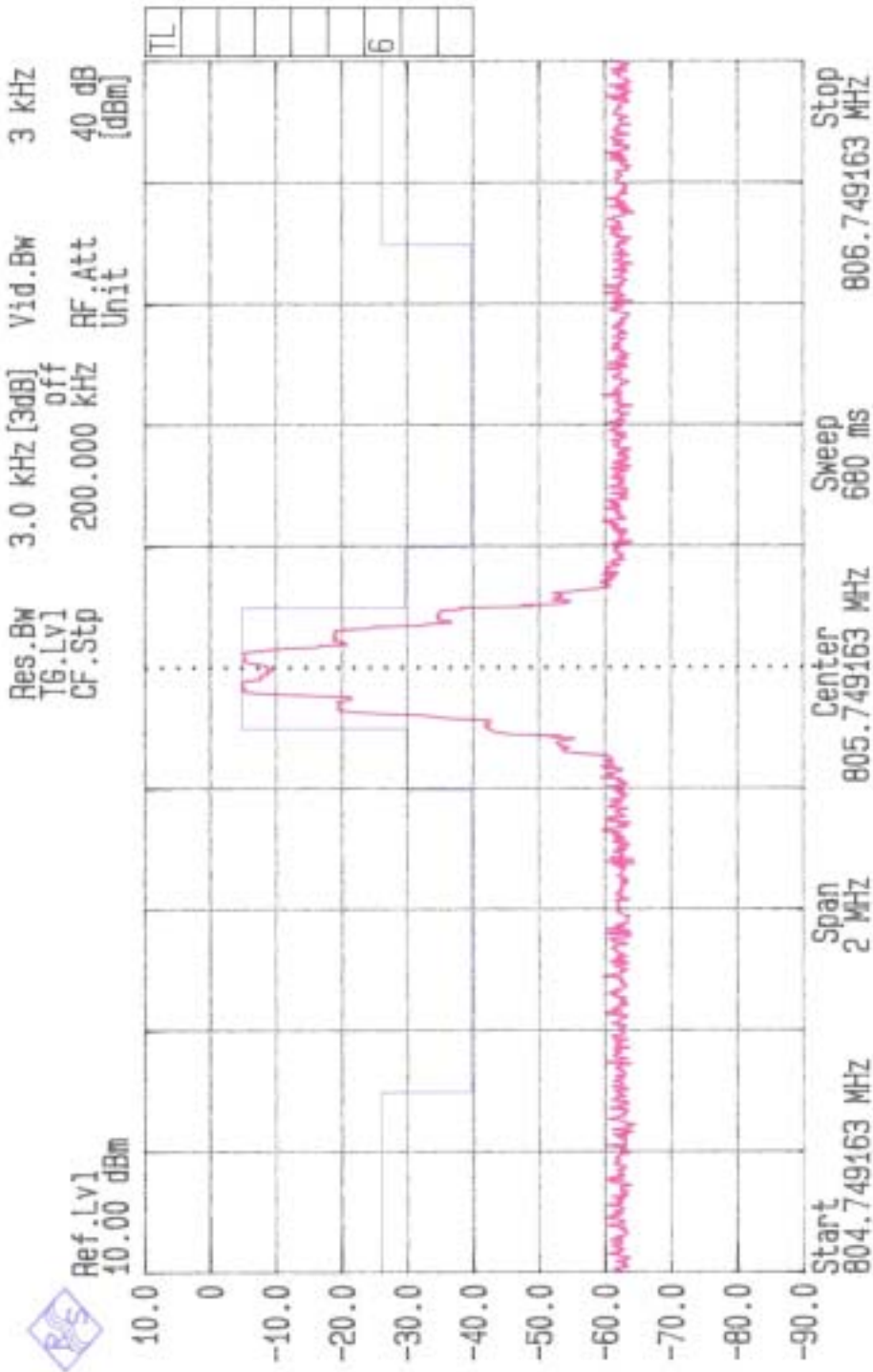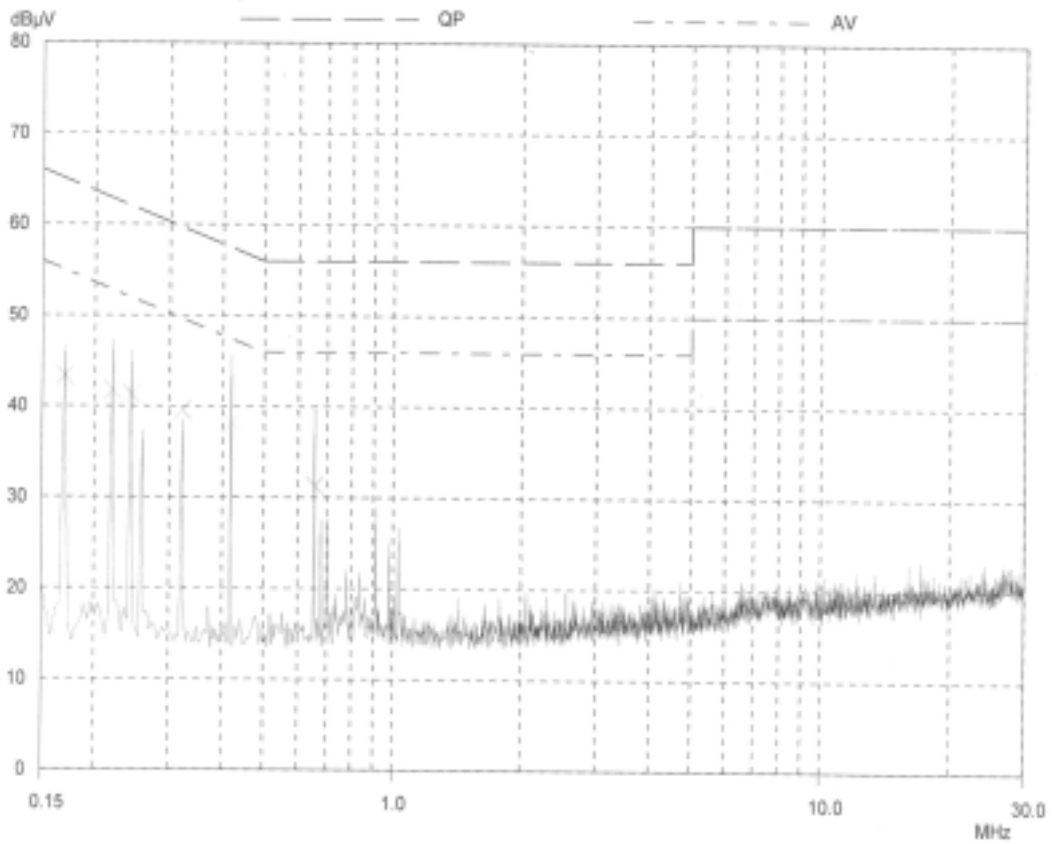
Appendix 3 : Plotted Data of Conducted Emissions

CONDUCTION EMISSION TEST

Peak Value

EUT: UT-18
Manuf:
Op Cond: CHARGE
Operator:
Test Spec:
Comment:

                    N

Final Measurement: Detector: X QP
                         Meas Time: 1sec
                         Peaks: 8
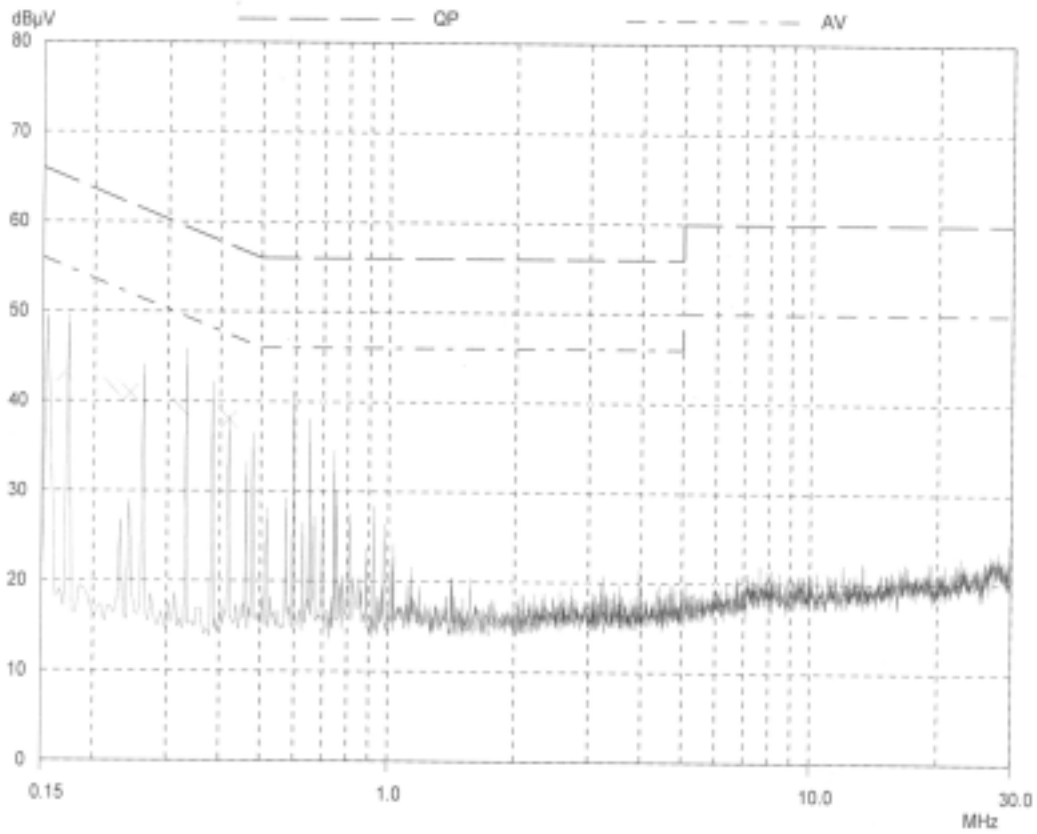   Acc Margin: 25 dB

CONDUCTION EMISSION TEST

Peak Value

EUT: UT-18
Manuf:
Op Cond: CHARGE
Operator:
Test Spec:
Comment:

L1

Final Measurement: Detector: X QP
                        Meas Time: 1sec
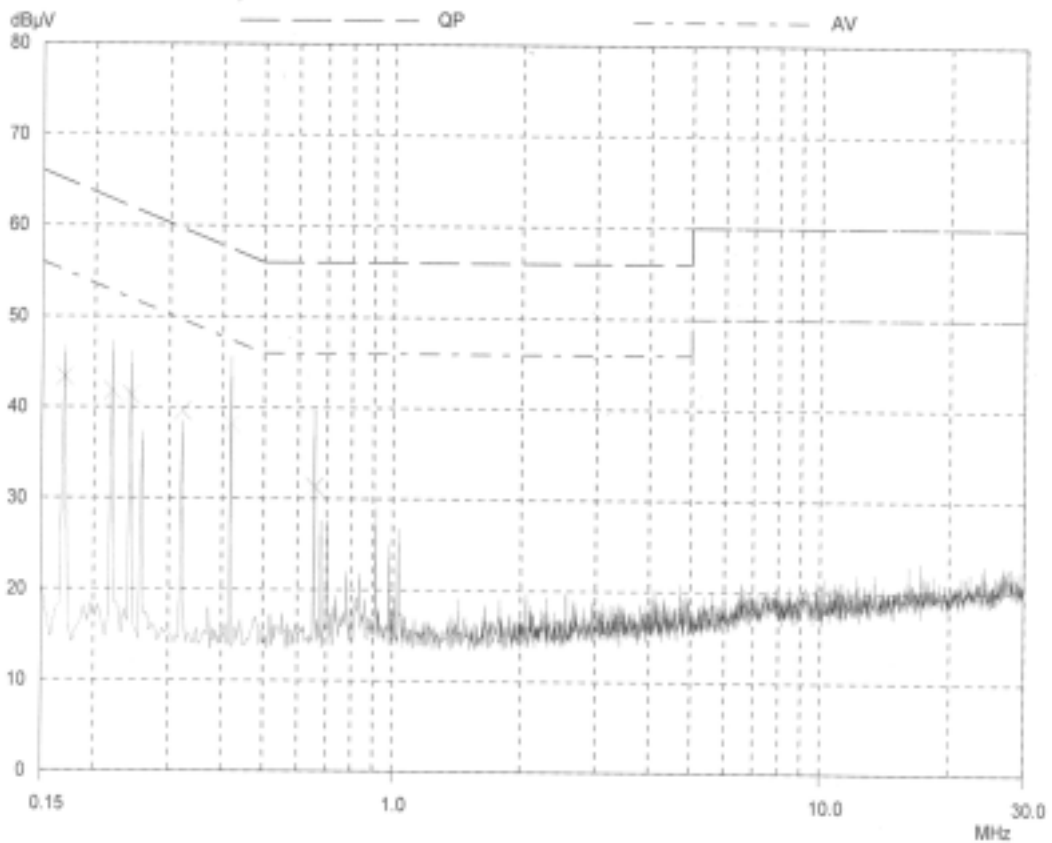   Peaks: 8
                        Acc Margin: 25 dB

CONDUCTION EMISSION TEST

Peak Value

EUT:	UT-18
Manuf:	
Op Cond:	CHARGE
Operator:	
Test Spec:	
Comment:	
	N

Final Measurement:	Detector:	X QP
	Meas Time:	1sec
	Peaks:	8
	Acc Margin:	25 dB

CONDUCTION EMISSION TEST

Peak Value

EUT:	UT-18
Manuf:	
Op Cond:	CHARGE
Operator:	
Test Spec:	
Comment:	
	L1

Final Measurement:	Detector:	X QP
	Meas Time:	1sec
	Peaks:	8
	Acc Margin:	25 dB

CONDUCTION EMISSION TEST

Peak Value

EUT: UT-18
Manuf:
Op Cond: CHARGE
Operator:
Test Spec:
Comment:

                    N

Final Measurement: Detector: X QP
                        Meas Time: 1sec
                        Peaks: 8
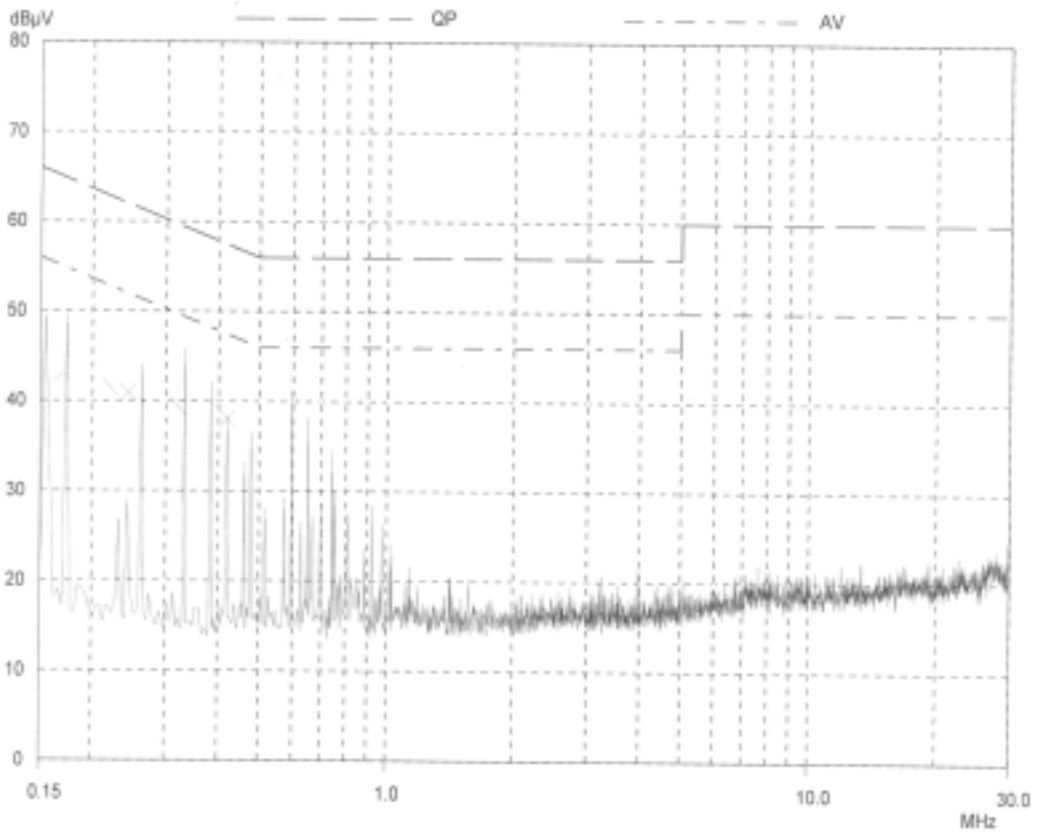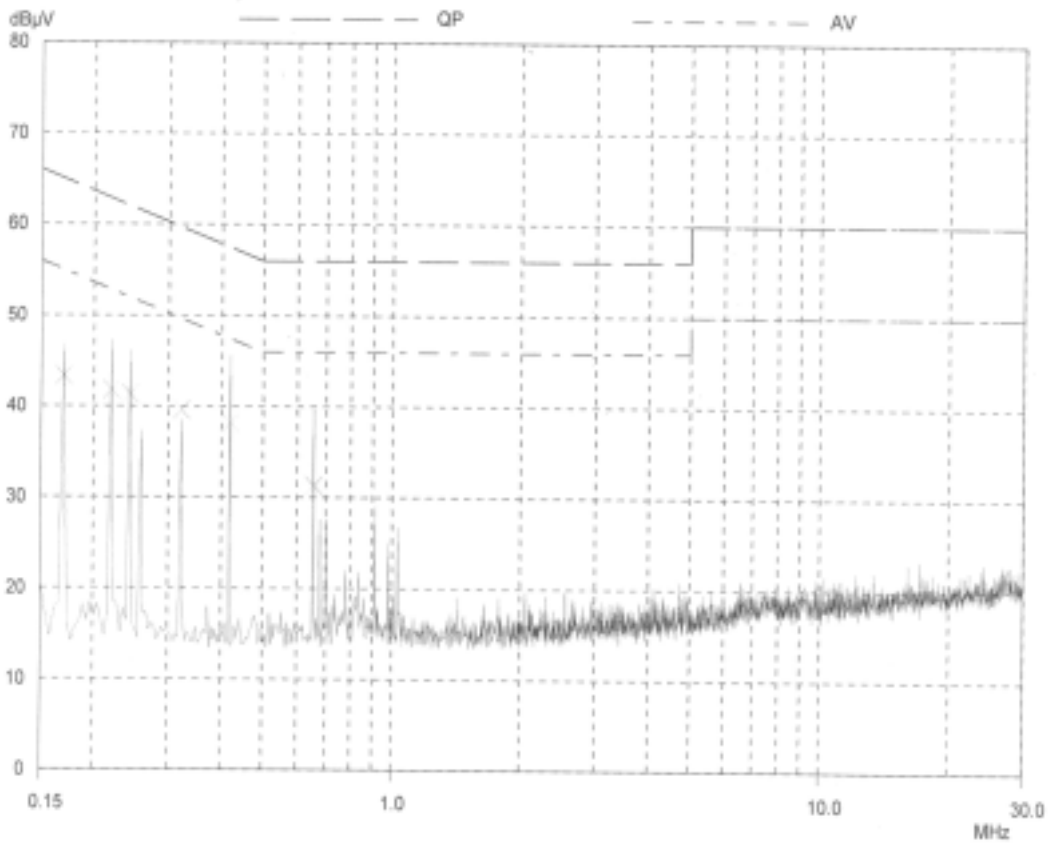   Acc Margin: 25 dB

CONDUCTION EMISSION TEST

Peak Value

EUT: UT-18
Manuf:
Op Cond: CHARGE
Operator:
Test Spec:
Comment:
            L1

Final Measurement: Detector: X QP
                         Meas Time: 1sec
                         Peaks: 8
                         Acc Margin: 25 dB