FCC Part 74 Subpart H

EMI TEST REPORT

of

E.U.T. : Wireless Microphone Systems

FCC ID. : M5X-707TE

MODEL : ACT-707TE

Working Frequency : 614MHz-806MHz

for

APPLICANT : MIPRO Electronics Co., Ltd.
ADDRESS : 814 Pei-Kang Road, Chia-Yi, Taiwan

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 : ET91R-12-074-01

TEST REPORT CIRTIFICATION

Applicant : MIPRO Electronics Co., Ltd..
814 Pei-Kang Road, Chia-Yi, Taiwan

Manufacturer : MIPRO Electronics Co., Ltd..
814 Pei-Kang Road, Chia-Yi, Taiwan

Description of EUT :

a) Type of EUT	: Wireless Microphone Systems
b) Trade Name	: MIPRO
c) Model No.	: ACT-707TE
d) FCC ID	: M5X-707TE
e) Working Frequency	: 614MHz-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 : Jan. 28, 2003

Test Engineer : Vincent Chang
(Vincent Chang)

Approve & Authorized Signer : Will Yauo
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 : Wireless Microphone Systems
b) Trade Name : MIPRO
c) Model No. : ACT-707TE
d) FCC ID : M5X-707TE
e) Working Frequency : 614MHz-806MHz
f) Power Supply : DC 3V Batteries

1.2 Characteristics of Device:

1. Operating Frequency: 614 MHz -806 MHz
2. To adjust GT/MT Switch, and Gain Control, simply push down both snap locks on the sides of battery cover and flip it backwards to expose the adjustment panel.
3. Before power on, ascertain if same channel was set up for both receiver and microphone. If not adjust to same channel accordingly.
4. The LED indicator flashes briefly when power on indicating normal battery status. If no flash occurs it has either no battery, the battery is drained or installed incorrectly. Change accordingly.
5. Plug the microphone connector into the input jack and tighten the connector screw by clockwise direction.

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)(i), the output power shall not exceed 50 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

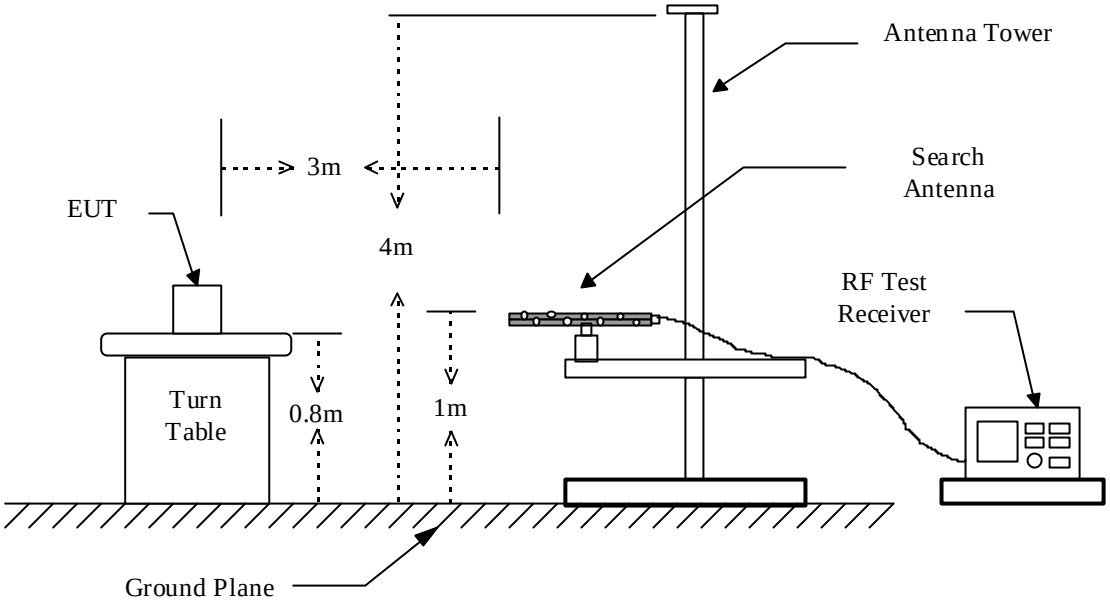
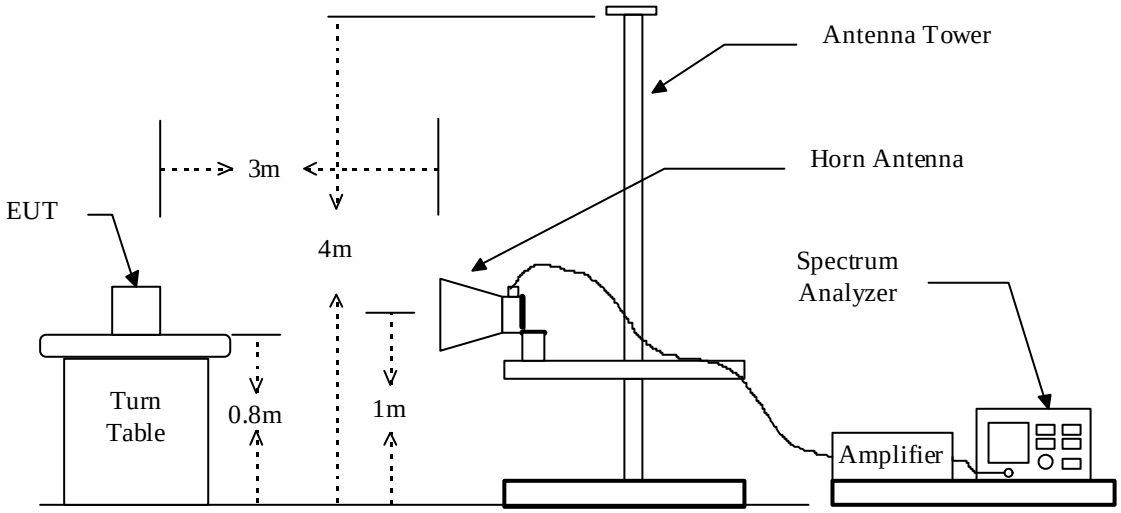


Figure 1 : Frequencies measured above 1 GHz configuration



3.3 Test Data

A. Channel Low (ERP)

Operated mode : 6A
Test Date : Dec. 21, 2002
Temperature : 25 ℃
Humidity : 65 %

Frequency (MHz)	Meter Reading (dB μV/m)	SG Reading (dBm)	Cable Loss (dB)	Antenna Gain	Result (dBm)	Output Power (mW)	Limit (mW)
625.252	85.4	14.8	2.3	---	12.5	16.2	50.0

B. Channel Mid (ERP)

Operated mode : 7C
Test Date : Dec. 21, 2002
Temperature : 25 ℃
Humidity : 65 %

Frequency (MHz)	Meter Reading (dB μV/m)	SG Reading (dBm)	Cable Loss (dB)	Antenna Gain	Result (dBm)	Output Power (mW)	Limit (mW)
740.251	81.3	11.4	2.5	---	8.9	7.7	50.0

C. Channel High (ERP)

Operated mode : 8A
Test Date : Dec. 21, 2002
Temperature : 25 ℃
Humidity : 65 %

Frequency (MHz)	Meter Reading (dB μV/m)	SG Reading (dBm)	Cable Loss (dB)	Antenna Gain	Result (dBm)	Output Power (mW)	Limit (mW)
801.977	76.2	8.6	2.6	---	6.0	7.78	50.0

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
EMI Test Receiver	R&S	ESBI	05/25/2003
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.

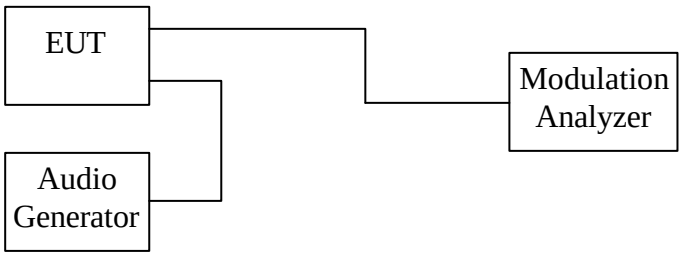
2. Repeat step 1 with changing the input frequency for 200, 500, 1000, 3000, and 5000 Hz in sequence.

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

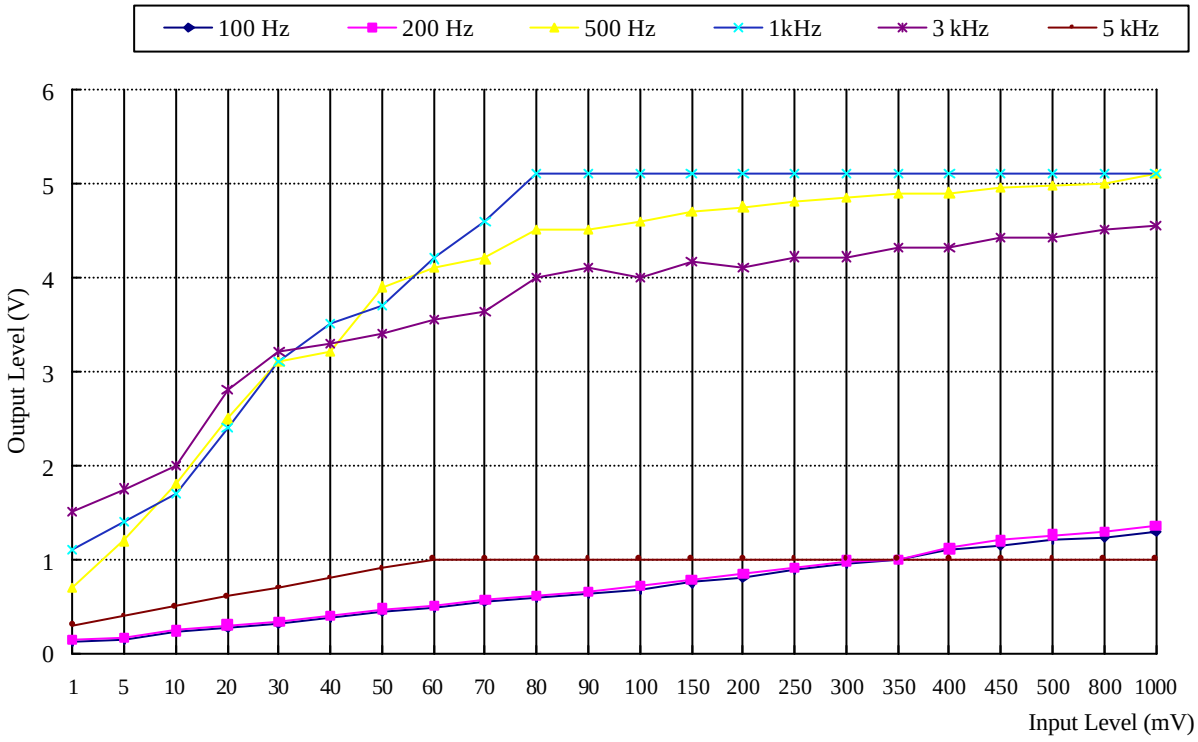


4.3 Measurement Instrument

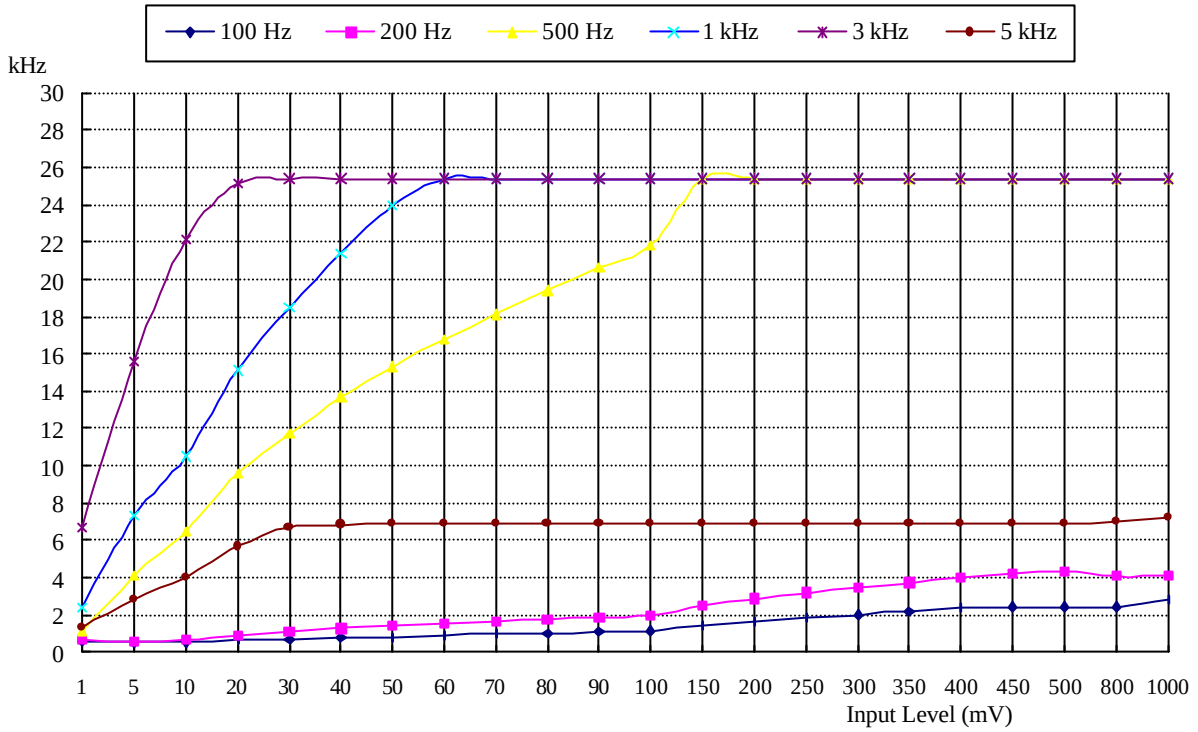
Equipment	Manufacturer	Model No.	Next Cal. Date
Modulation Analyzer	Hewlett-Packard	8901A	12/01/2003
Multifunction Synthesizer	Hewlett-Packard	8904A	12/07/2003
Oscillscope	Lecroy	9350A	05/26/2003

4.4 Measurement Result

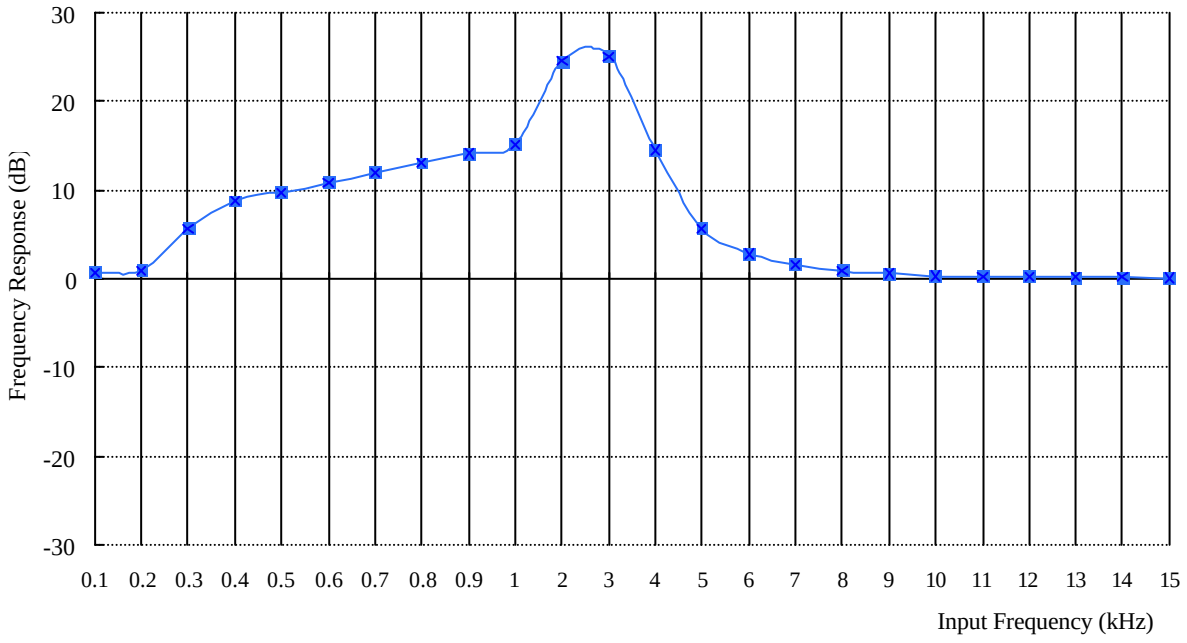
A). Frequency response



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.

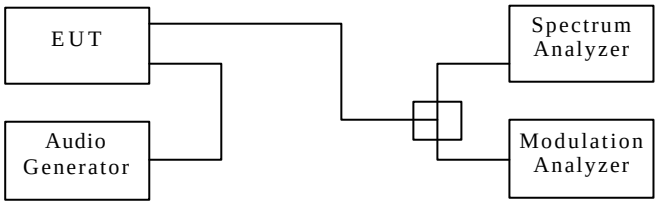
5.2 Measurement Method

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



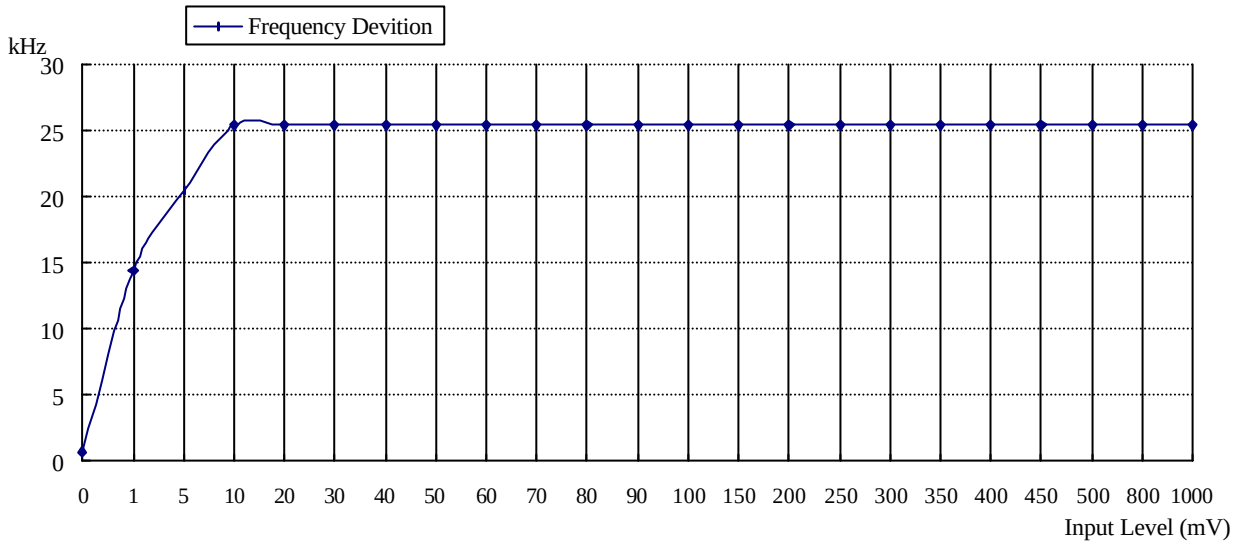
5.3 Occupied Bandwidth Test Equipment

Equipment	Manufacturer	Model No.	Next Cal. Date
Spectrum Analyzer	R&S	ESBI	05/25/2003
Modulation Analyzer	Hewlett-Packard	8901A	12/01/2003
Multifunction Synthesizer	Hewlett-Packard	8904A	12/07/2003
Plotter	Hewlett-Packard	7440A	N/A

5.4 Bandwidth Measured

5.4.1 Input Level Derived

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.

5.4.2 Occupied Bandwidth Plotted

The Channel Low 26 dB Bandwidth is 75.8KHz.
The Channel Mid 26 dB Bandwidth is 70.2KHz.
The Channel High 26 dB Bandwidth is 72.7KHz.

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	8568B	01/25/2003
Quasi Peak Detector	Hewlett-Packard	85650A	01/25/2003
Pre-selector	Hewlett-Packard	85685A	01/25/2003
Spectrum Analyzer	Hewlett-Packard	8564E	05/16/2003
Horn Antenna	EMCO	3115	05/14/2003
Log periodic Antenna	EMCO	3146	11/05/2003
Biconical Antenna	EMCO	3110B	11/05/2003
Preamplifier	Hewlett-Packard	8449B	05/10/2003
Preamplifier	Hewlett-Packard	8447D	09/29/2003

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. Channel Low

Operated mode : 6A
Test Date : Dec. 21, 2002
Temperature : 25℃
Humidity : 65%

Unmodulated carrier output power is –9.4 dBm , or 0.11 mW (ERP).

The limit of spurious or harmonics is calculated as following :

-9.4-[43+10log(carrier output power in W)], or -13dBm

Frequency (MHz)	Meter Reading (dBuV) H	V	SG Reading (dBm) H	V	Antenna Gain	Cable Loss (dB)	Result (dBm) H	V	Limit (dBm)	Margin (dB)
1240.504	---	---	---	---	---	---	---	---	-13.0	---
1860.756	---	---	---	---	---	---	---	---	-13.0	---
2481.008	---	---	---	---	---	---	---	---	-13.0	---
3101.260	---	---	---	---	---	---	---	---	-13.0	---
3721.512	---	---	---	---	---	---	---	---	-13.0	---
4341.764	---	---	---	---	---	---	---	---	-13.0	---
4962.016	---	---	---	---	---	---	---	---	-13.0	---
5582.268	---	---	---	---	---	---	---	---	-13.0	---
6202.520	---	---	---	---	---	---	---	---	-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 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. Channel Mid

Operated mode : 7C
Test Date : Dec. 21, 2002
Temperature : 25℃
Humidity : 65%

Unmodulated carrier output power is –13.3 dBm , or 0.05 mW (ERP).

The limit of spurious or harmonics is calculated as following :

-11.6-[43+10log(carrier output power in W)], or -13dBm

Frequency (MHz)	Meter Reading (dBuV) H	V	SG Reading (dBm) H	V	Antenna Gain	Cable Loss (dB)	Result (dBm) H	V	Limit (dBm)	Margin (dB)
1480.500	---	---	---	---	---	---	---	---	-13.0	---
2220.753	---	---	---	---	---	---	---	---	-13.0	---
2961.004	---	---	---	---	---	---	---	---	-13.0	---
3701.255	---	---	---	---	---	---	---	---	-13.0	---
4441.506	---	---	---	---	---	---	---	---	-13.0	---
5181.757	---	---	---	---	---	---	---	---	-13.0	---
5922.008	---	---	---	---	---	---	---	---	-13.0	---
6662.259	---	---	---	---	---	---	---	---	-13.0	---
7402.510	---	---	---	---	---	---	---	---	-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 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. Channel High

Operated mode : 8A
Test Date : Dec. 21, 2002
Temperature : 25℃
Humidity : 65%

Unmodulated carrier output power is –13.3 dBm , or 0.05 mW (ERP).

The limit of spurious or harmonics is calculated as following :

-11.6-[43+10log(carrier output power in W)], or -13dBm

Frequency (MHz)	Meter Reading (dBuV) H	V	SG Reading (dBm) H	V	Antenna Gain	Cable Loss (dB)	Result (dBm) H	V	Limit (dBm)	Margin (dB)
1604.004	---	---	---	---	---	---	---	---	-13.0	---
2406.006	---	---	---	---	---	---	---	---	-13.0	---
3208.008	---	---	---	---	---	---	---	---	-13.0	---
4010.010	---	---	---	---	---	---	---	---	-13.0	---
4812.012	---	---	---	---	---	---	---	---	-13.0	---
5614.014	---	---	---	---	---	---	---	---	-13.0	---
6416.016	---	---	---	---	---	---	---	---	-13.0	---
7218.018	---	---	---	---	---	---	---	---	-13.0	---
8020.020	---	---	---	---	---	---	---	---	-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 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.

D. Emission mask plots

Please see appendix 2 for plotted data.

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.

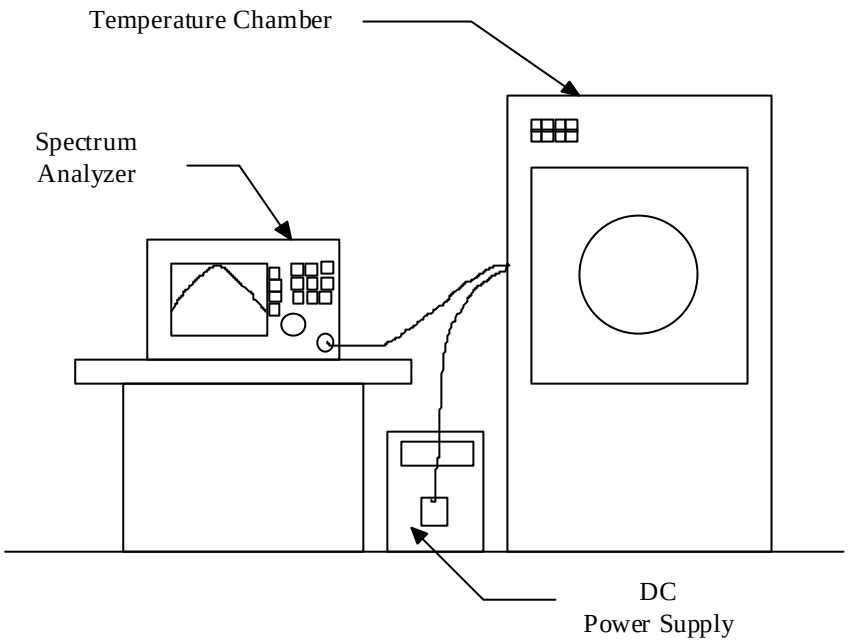
B) Frequency stability versus input voltage

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	05/16/2003
Temperature Chamber	ACS	EOS 200T	01/17/2003

7.4 Measurement Data

A1. Frequency stability versus enviroment tempture

Reference Frequency : 625.252 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.	625.2647	0.00202	625.2731	0.00337	625.2324	-0.00313
	New Batt.	625.2623	0.00165	625.2344	-0.00282	625.2598	0.00125
	New Batt.	625.2307	-0.00341	625.2741	0.00354	625.2394	-0.00202
40	New Batt.	625.2681	0.00258	625.2304	-0.00346	625.2490	-0.00048
	New Batt.	625.2647	0.00203	625.2476	-0.00071	625.2401	-0.00191
	New Batt.	625.2574	0.00087	625.2389	-0.00210	625.2478	-0.00067
30	New Batt.	625.2724	0.00326	625.2499	-0.00034	625.2433	-0.00139
	New Batt.	625.2637	0.00187	625.2398	-0.00196	625.2646	0.00201
	New Batt.	625.2314	-0.00330	625.2581	0.00097	625.2281	-0.00382
20	New Batt.	625.2355	-0.00264	625.2610	0.00145	625.2685	0.00264
	New Batt.	625.2457	-0.00101	625.2468	-0.00083	625.2746	0.00361
	New Batt.	625.2604	0.00134	625.2446	-0.00118	625.2433	-0.00139
10	New Batt.	625.2478	-0.00067	625.2356	-0.00263	625.2417	-0.00164
	New Batt.	625.2543	0.00037	625.2410	-0.00175	625.2485	-0.00056
	New Batt.	625.2458	-0.00099	625.2287	-0.00372	625.2454	-0.00106
0	New Batt.	625.2669	0.00238	625.2587	0.00107	625.2312	-0.00333
	New Batt.	625.2426	-0.00151	625.2482	-0.00060	625.2487	-0.00053
	New Batt.	625.2543	0.00037	625.2342	-0.00285	625.2356	-0.00262
-10	New Batt.	625.2618	0.00157	625.2532	0.00019	625.2506	-0.00023
	New Batt.	625.2389	-0.00209	625.2289	-0.00370	625.2737	0.00347
	New Batt.	625.2576	0.00089	625.2415	-0.00169	625.2533	0.00020
-20	New Batt.	625.2709	0.00302	625.2751	0.00370	625.2726	0.00330
	New Batt.	625.2760	0.00385	625.2630	0.00176	625.2688	0.00269
	New Batt.	625.2654	0.00215	625.2605	0.00136	625.2412	-0.00173

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

Reference Frequency : 625.252 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	625.2648	0.00204	625.2661	0.00225	625.2659	0.00222

B1. Frequency stability versus enviroment tempture

Reference Frequency : 740.251 MHz		Limit：0.005%					
Enviroment Tempture (℃)	Power Supplied (Vdc)	Frequency measured with time elapsed					
		2 minute		5 minute		10 minute	
		(MHz)	(%)	(MHz)	(%)	(MHz)	(%)
50	New Batt.	740.2637	0.00172	740.2638	0.00173	740.2549	0.00052
	New Batt.	740.2536	0.00036	740.2459	-0.00068	740.2228	-0.00380
	New Batt.	740.2505	-0.00007	740.2626	0.00156	740.2255	-0.00345
40	New Batt.	740.2360	-0.00203	740.2271	-0.00323	740.2440	-0.00094
	New Batt.	740.2566	0.00076	740.2344	-0.00224	740.2375	-0.00183
	New Batt.	740.2543	0.00045	740.2545	0.00048	740.2333	-0.00239
30	New Batt.	740.2563	0.00071	740.2628	0.00159	740.2665	0.00209
	New Batt.	740.2645	0.00182	740.2600	0.00121	740.2370	-0.00190
	New Batt.	740.2729	0.00296	740.2729	0.00296	740.2362	-0.00200
20	New Batt.	740.2321	-0.00255	740.2660	0.00202	740.2614	0.00140
	New Batt.	740.2575	0.00088	740.2551	0.00056	740.2453	-0.00077
	New Batt.	740.2428	-0.00111	740.2689	0.00242	740.2430	-0.00108
10	New Batt.	740.2501	-0.00012	740.2710	0.00270	740.2717	0.00280
	New Batt.	740.2624	0.00154	740.2351	-0.00215	740.2307	-0.00275
	New Batt.	740.2617	0.00145	740.2278	-0.00313	740.2431	-0.00107
0	New Batt.	740.2412	-0.00132	740.2664	0.00208	740.2643	0.00180
	New Batt.	740.2550	0.00054	740.2698	0.00254	740.2252	-0.00349
	New Batt.	740.2494	-0.00022	740.2465	-0.00060	740.2751	0.00325
-10	New Batt.	740.2790	0.00378	740.2717	0.00280	740.2517	0.00010
	New Batt.	740.2415	-0.00128	740.2246	-0.00356	740.2426	-0.00113
	New Batt.	740.2452	-0.00078	740.2400	-0.00149	740.2532	0.00030
-20	New Batt.	740.2447	-0.00085	740.2785	0.00372	740.2270	-0.00324
	New Batt.	740.2568	0.00079	740.2692	0.00246	740.2269	-0.00325
	New Batt.	740.2508	-0.00003	740.2610	0.00135	740.2235	-0.00371

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

Reference Frequency : 740.251 MHz		Limit：0.005%					
Enviroment Tempture (℃)	Power Supplied (Vdc)	Frequency measured with time elapsed					
		2 minute		5 minute		10 minute	
		(MHz)	(%)	(MHz)	(%)	(MHz)	(%)
25	End-Point	740.2385	-0.00170	740.2393	-0.00158	740.2593	0.00112

C1. Frequency stability versus enviroment tempture

Reference Frequency : 801.977 MHz		Limit：0.005%					
Enviroment Tempture (℃)	Power Supplied (Vdc)	Frequency measured with time elapsed					
		2 minute		5 minute		10 minute	
		(MHz)	(%)	(MHz)	(%)	(MHz)	(%)
50	New Batt.	801.9464	-0.00382	801.9583	-0.00234	801.9532	-0.00296
	New Batt.	801.9483	-0.00358	801.9789	0.00024	801.9753	-0.00021
	New Batt.	801.9690	-0.00100	801.9784	0.00018	801.9953	0.00228
40	New Batt.	801.9588	-0.00227	802.0038	0.00334	801.9921	0.00189
	New Batt.	801.9719	-0.00063	801.9579	-0.00238	801.9661	-0.00136
	New Batt.	801.9708	-0.00077	801.9687	-0.00104	801.9938	0.00210
30	New Batt.	801.9526	-0.00305	802.0009	0.00299	801.9503	-0.00333
	New Batt.	801.9543	-0.00283	802.0068	0.00372	802.0014	0.00305
	New Batt.	801.9823	0.00066	801.9701	-0.00086	801.9492	-0.00347
20	New Batt.	801.9751	-0.00024	801.9601	-0.00211	801.9939	0.00211
	New Batt.	801.9942	0.00214	801.9919	0.00186	802.0021	0.00313
	New Batt.	801.9755	-0.00019	801.9876	0.00132	801.9717	-0.00067
10	New Batt.	801.9512	-0.00321	801.9607	-0.00203	801.9826	0.00070
	New Batt.	801.9800	0.00038	801.9550	-0.00274	801.9714	-0.00070
	New Batt.	801.9833	0.00079	801.9521	-0.00310	801.9626	-0.00179
0	New Batt.	801.9959	0.00235	801.9987	0.00270	801.9712	-0.00072
	New Batt.	801.9542	-0.00284	801.9644	-0.00157	801.9682	-0.00109
	New Batt.	801.9825	0.00069	801.9851	0.00100	801.9674	-0.00119
-10	New Batt.	801.9965	0.00244	801.9569	-0.00250	801.9701	-0.00087
	New Batt.	801.9841	0.00089	801.9819	0.00061	801.9897	0.00159
	New Batt.	801.9909	0.00173	801.9908	0.00172	801.9495	-0.00342
-20	New Batt.	801.9635	-0.00169	802.0071	0.00375	801.9475	-0.00368
	New Batt.	802.0046	0.00345	801.9544	-0.00282	801.9806	0.00045
	New Batt.	801.9911	0.00176	801.9635	-0.00168	802.0054	0.00354

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

Reference Frequency : 801.977 MHz		Limit：0.005%					
Enviroment Tempture (℃)	Power Supplied (Vdc)	Frequency measured with time elapsed					
		2 minute		5 minute		10 minute	
		(MHz)	(%)	(MHz)	(%)	(MHz)	(%)
25	End-Point	801.9675	-0.00119	801.9973	0.00253	801.9539	-0.00288

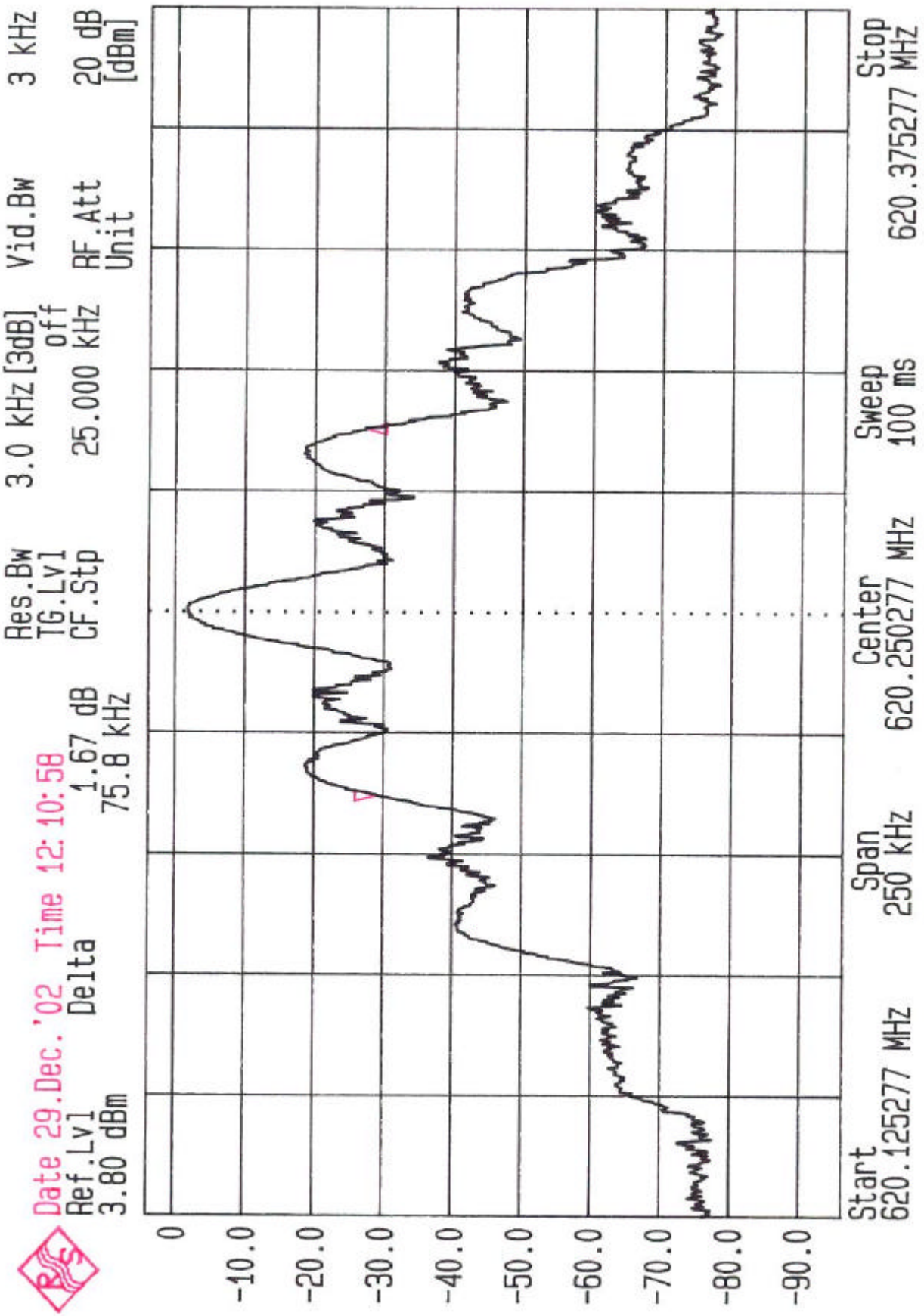
8 CONDUCTED EMISSION MEASUREMENT

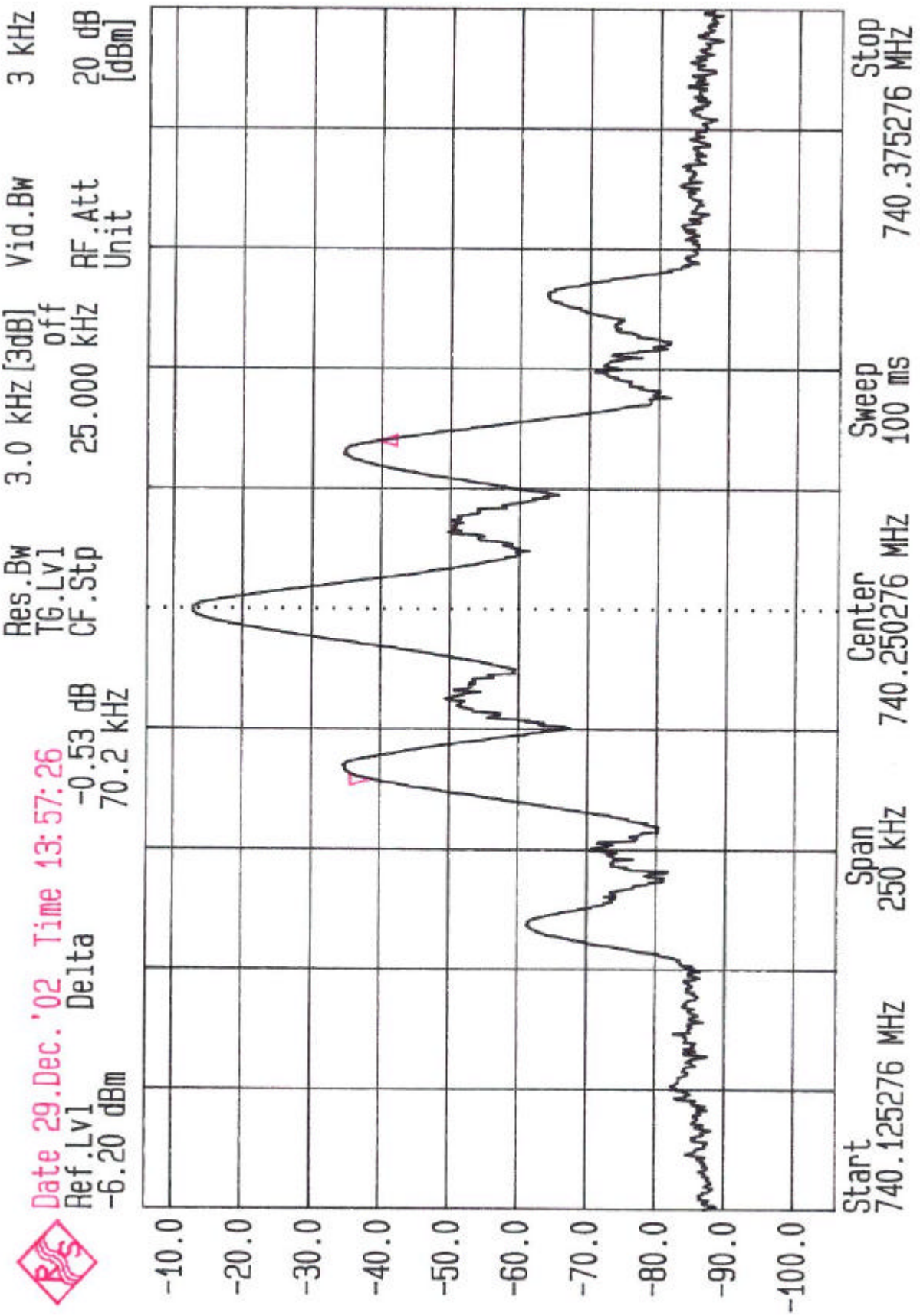
8.1 Standard Applicable

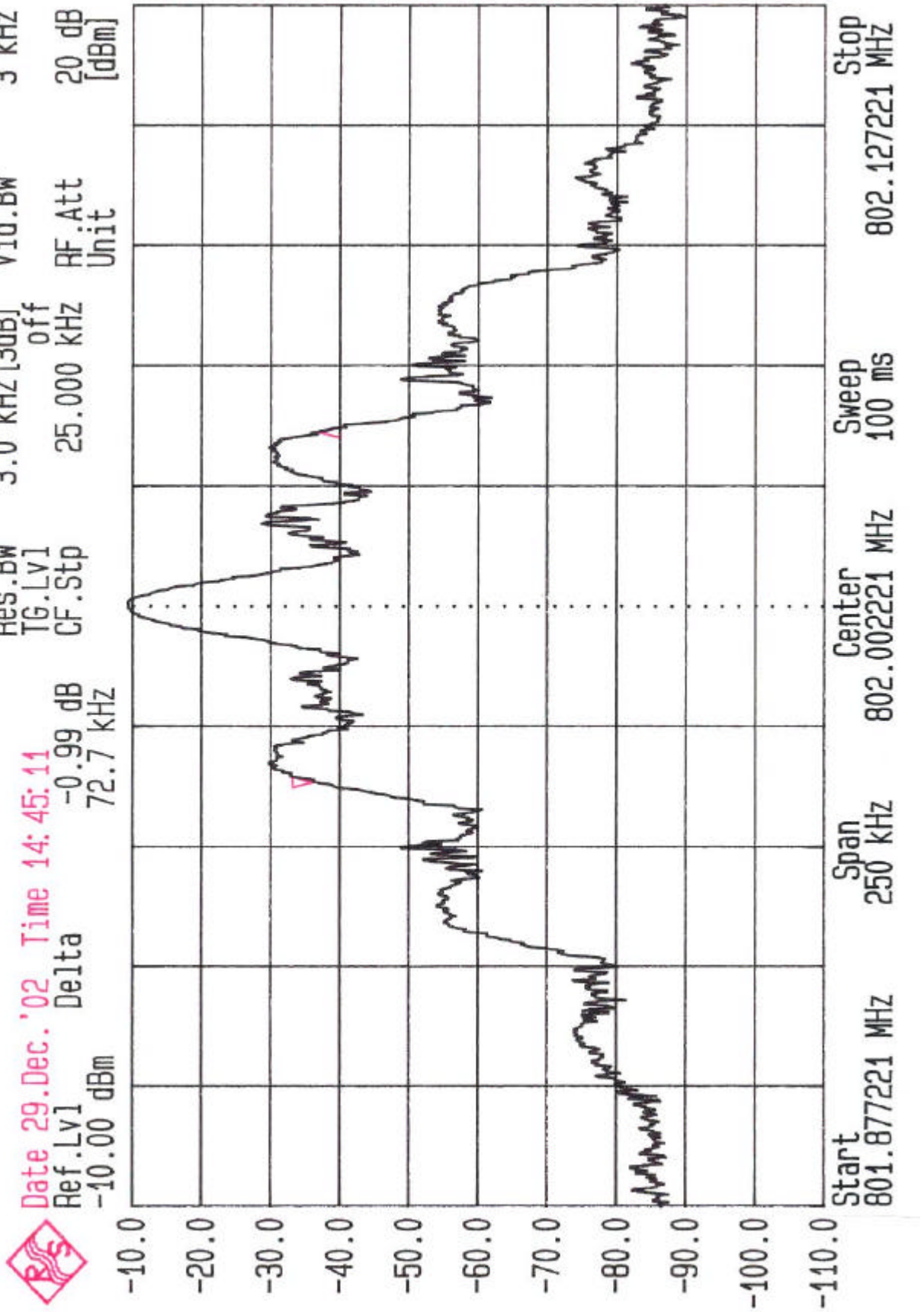
This EUT is excused from investigation of conducted emission, for it is powered by battery only. According to § 15.207 (c), measurements to demonstrate compliance with the conducted limits are not required for devices which only employ battery power for operation and which do not operate from the AC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

For intentional device, Line Conducted Emission Limits are in accordance to § 15.207(a)

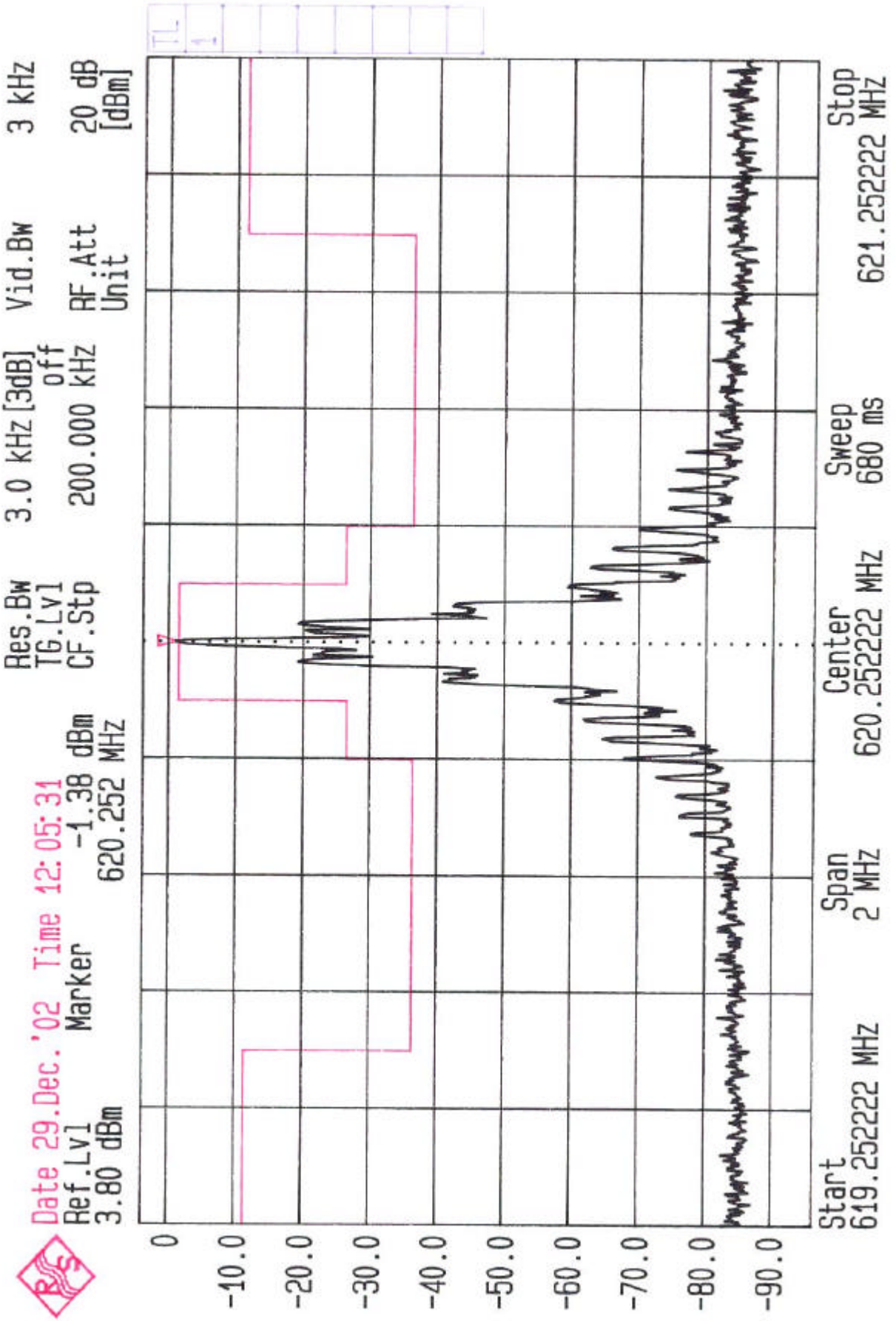
Appendix 1 : Occupied Emission Bandwidth Plotted Data

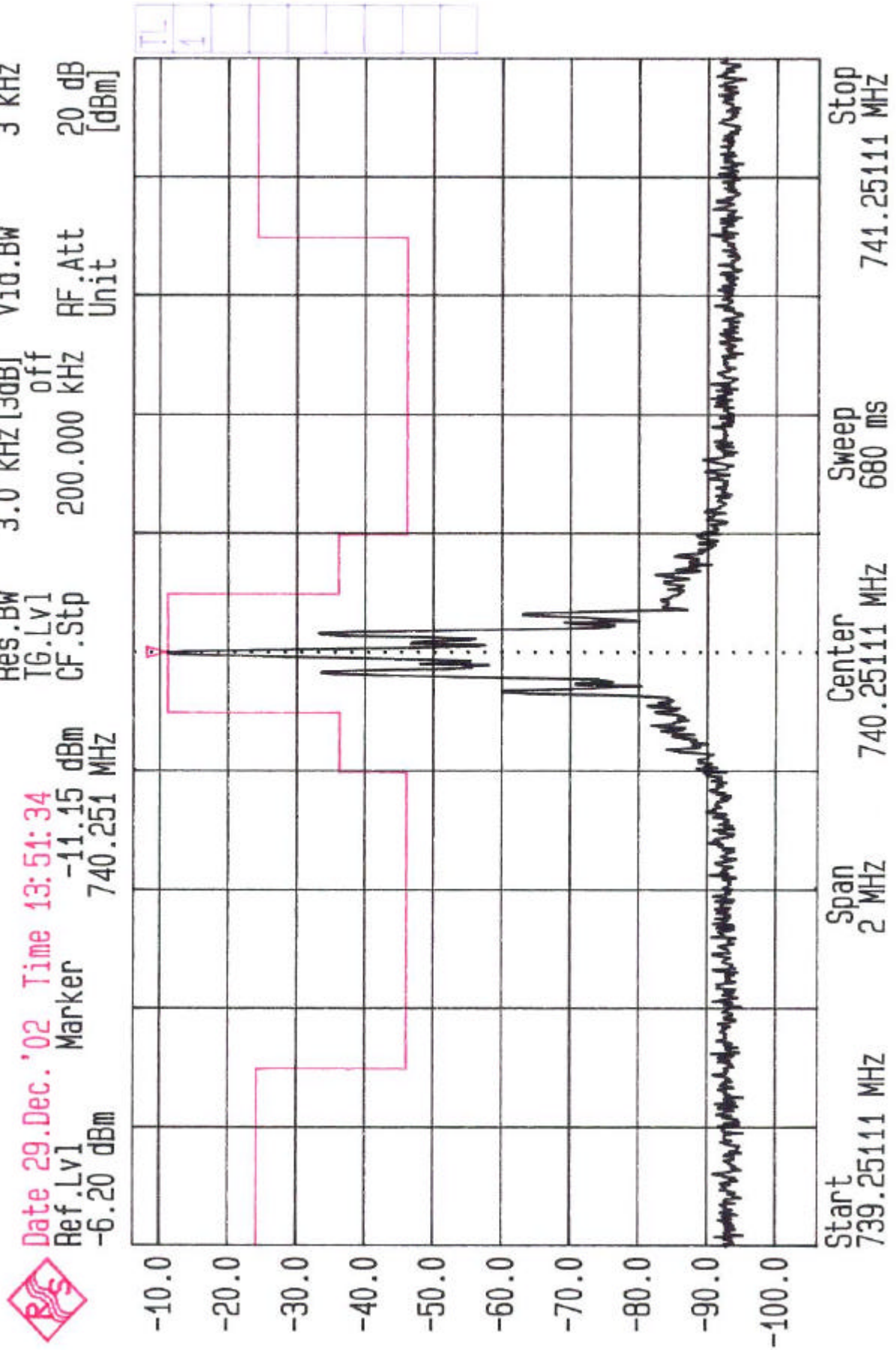

Date 29.Dec. '02 Time 12: 10:58
Ref.Lvl
3.80 dBm
Delta
1.67 dB
75.8 kHz
Res.Bw
3.0 kHz [3dB]
TG.Lvl
off
CF.Stp
25.000 kHz
Vid.Bw
3 kHz
RF.Att
20 dB
Unit
[dBm]
0
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
-80.0
-90.0
Start
620.125277 MHz
Span
250 kHz
Center
620.250277 MHz
Sweep
100 ms
Stop
620.375277 MHz

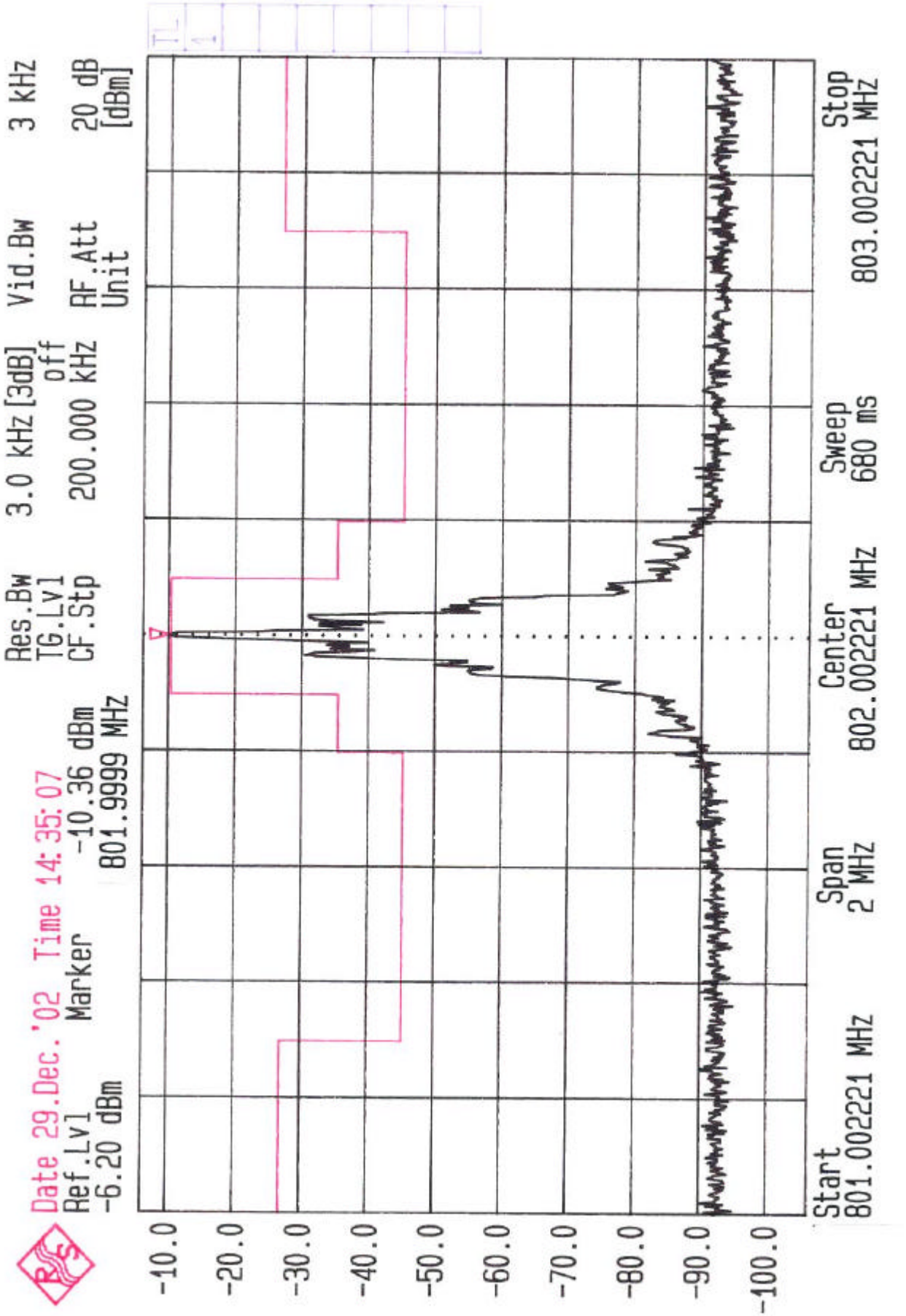

Date 29.Dec.'02 Time 13:57:26
Ref.Lvl
-6.20 dBm
Delta
-0.53 dB
70.2 kHz
Res.Bw
3.0 kHz [3dB]
TG.Lvl
off
CF.Stp
25.000 kHz
Vid.Bw
3 kHz
RF.Att
20 dB
Unit
[dBm]
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
-80.0
-90.0
-100.0
Start
740.125276 MHz
Span
250 kHz
Center
740.250276 MHz
Sweep
100 ms
Stop
740.375276 MHz


Date 29.Dec. '02 Time 14: 45: 11
Ref.Lvl
-10.00 dBm
Delta
-0.99 dB
72.7 kHz
Res.Bw
3.0 kHz [3dB]
TG.Lvl
off
CF.Stp
25.000 kHz
Vid.Bw
3 kHz
RF.Att
20 dB
Unit
[dBm]
Start
801.877221 MHz
Span
250 kHz
Center
802.002221 MHz
Sweep
100 ms
Stop
802.127221 MHz
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
-80.0
-90.0
-100.0
-110.0

Appendix 2 : Emission Mask Plotted Data


Date 29.Dec.'02 Time 12:05:31
Ref.Lvl
3.80 dBm
Marker
-1.38 dBm
620.252 MHz
Res.Bw
3.0 kHz [3dB]
TG.Lvl
off
CF.Stp
200.000 kHz
Vid.Bw
3 kHz
RF.Att
20 dB
Unit
[dBm]
0
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
-80.0
-90.0
Start
619.252222 MHz
Span
2 MHz
Center
620.252222 MHz
Sweep
680 ms
Stop
621.252222 MHz


Date 29.Dec.'02 Time 13:51:34
Ref.Lvl
-6.20 dBm
Marker
-11.15 dBm
740.251 MHz
Res.Bw
3.0 kHz [3dB]
TG.Lvl
off
CF.Stp
200.000 kHz
Vid.Bw
3 kHz
RF.Att
20 dB
Unit
[dBm]
Start
739.25111 MHz
Span
2 MHz
Center
740.25111 MHz
Sweep
680 ms
Stop
741.25111 MHz
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
-80.0
-90.0
-100.0


Date 29.Dec.'02 Time 14:35:07
Ref.Lvl
-6.20 dBm
Marker
-10.36 dBm
801.9999 MHz
Res.Bw
3.0 kHz [3dB]
TG.Lvl
off
CF.Stp
200.000 kHz
Vid.Bw
3 kHz
RF.Att
20 dB
Unit
[dBm]
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
-80.0
-90.0
-100.0
Start
801.002221 MHz
Span
2 MHz
Center
802.002221 MHz
Sweep
680 ms
Stop
803.002221 MHz