

FCC Part 74 Subpart H
EMI TEST REPORT
of

E.U.T. : Wireless Microphone TX

FCC ID. : NTMEJ-880T

MODEL : EJ-880T

Working Frequency : 744MHz-806MHz

for

APPLICANT : E-J ELECTRONICS CO., LTD.

ADDRESS : 4F, No.11, Lane 125, Sec 1, Kuo Kwang Road
Ta Li City, Taichung Hsien Taiwan R.O.C.

Test Performed by

ELECTRONICS TESTING CENTER, TAIWAN

NO. 34, LIN 5, DING FU TSUN, LINKOU HSIANG
TAIPEI HSIEN, TAIWAN, R.O.C.

Tel:(02)226023052

Fax:(02)26010910

<http://www.etc.org.tw> ; e-mail : etcemi@seed.net.tw

Report Number : ET92R-06-058-04

TEST REPORT CERTIFICATION

Applicant : E-J ELECTRONICS CO., LTD.
4F, No.11, Lane 125, Sec 1, Kuo Kwang Road Ta Li City,
Taichung Hsien Taiwan R.O.C.

Manufacturer : E-J ELECTRONICS CO., LTD..
4F, No.11, Lane 125, Sec 1, Kuo Kwang Road Ta Li City, Taichung
Hsien Taiwan R.O.C.

Description of EUT :

a) Type of EUT : Wireless Microphone TX
b) Trade Name : OKAYO
c) Model No. : EJ-880T
d) FCC ID : NTMEJ-880T
e) Working Frequency : 744MHz-806MHz
f) Power Supply : Input : AC 100~240V ; 50/60Hz 250mA
Output : DC 11V ; 800mA

Regulation Applied : FCC Rules and Regulations Part 74 Subpart H (2002)

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 : Aug. 25, 2003

Test Engineer : Kevin Lee
(Kevin Lee)

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 TX
b) Trade Name	: OKAYO
c) Model No.	: EJ-880T
d) FCC ID	: NTMEJ-880T
e) Working Frequency	: 744MHz-806MHz
f) Power Supply	: Input : AC 100~240V~ ; 50/60Hz 250mA Output : DC 11V ; 800mA

1.2 Characteristics of Device:

The EUT is A frequency modulation Wireless Microphone with following feature:Operation Frequency Range:740-806MHz. Type of Modulation:FM, 172KF3E. This Wireless Microphone operates within UHF band with PLL synthesized. There are 16 channel available and channel used can be selected from a DIP switch.

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

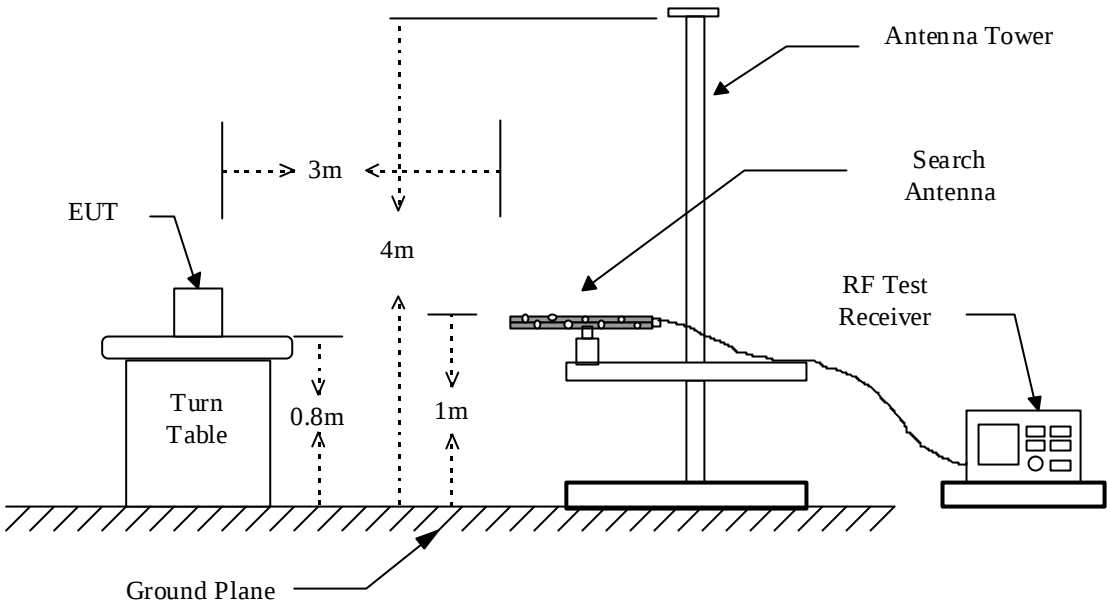
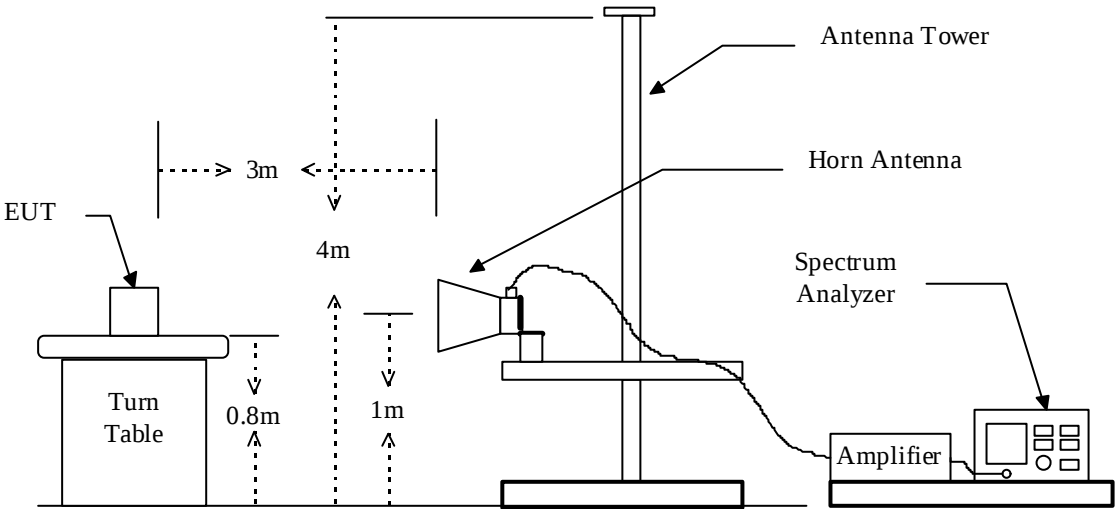


Figure 1 : Frequencies measured above 1 GHz configuration



3.3 Test Data

A. Channel Low (ERP)

Operated mode : TX

Test Date : Jul. 05, 2003

Temperature : 24

Humidity : 57 %

Frequency (MHz)	Meter Reading (dB μ V/m)	SG Reading (dBm)	Cable Loss (dB)	Antenna Gain	Result (dBm)	Output Power (mW)	Limit (mW)
744.210	74.9	5.0	2.5	---	2.5	1.78	250

B. Channel Mid (ERP)

Operated mode : TX

Test Date : Jul. 05, 2003

Temperature : 24

Humidity : 57 %

Frequency (MHz)	Meter Reading (dB μ V/m)	SG Reading (dBm)	Cable Loss (dB)	Antenna Gain	Result (dBm)	Output Power (mW)	Limit (mW)
794.810	74.7	4.9	2.6	---	3.9	2.45	250

C. Channel High (ERP)

Operated mode : TX

Test Date : Jul. 05, 2003

Temperature : 24

Humidity : 57 %

Frequency (MHz)	Meter Reading (dB μ V/m)	SG Reading (dBm)	Cable Loss (dB)	Antenna Gain	Result (dBm)	Output Power (mW)	Limit (mW)
805.310	73.1	3.3	2.6	---	2.2	1.65	250

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

3.4 Result Calculation

Result calculation is as following :

Result = SG Reading + Cable Loss + Antenna Gain Corrected

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

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

3.5 Test Equipment

Equipment	Manufacturer	Model No.	Next Cal. Date
EMI Test Receiver	R&S	ESBI	05/24/2004
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.

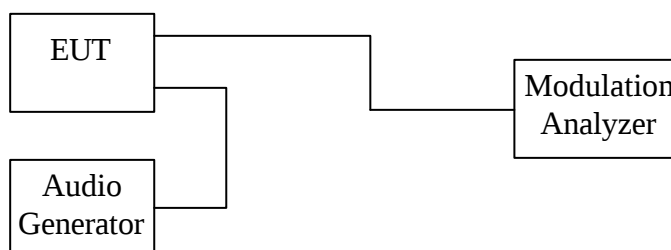
B) Modulation Limit

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

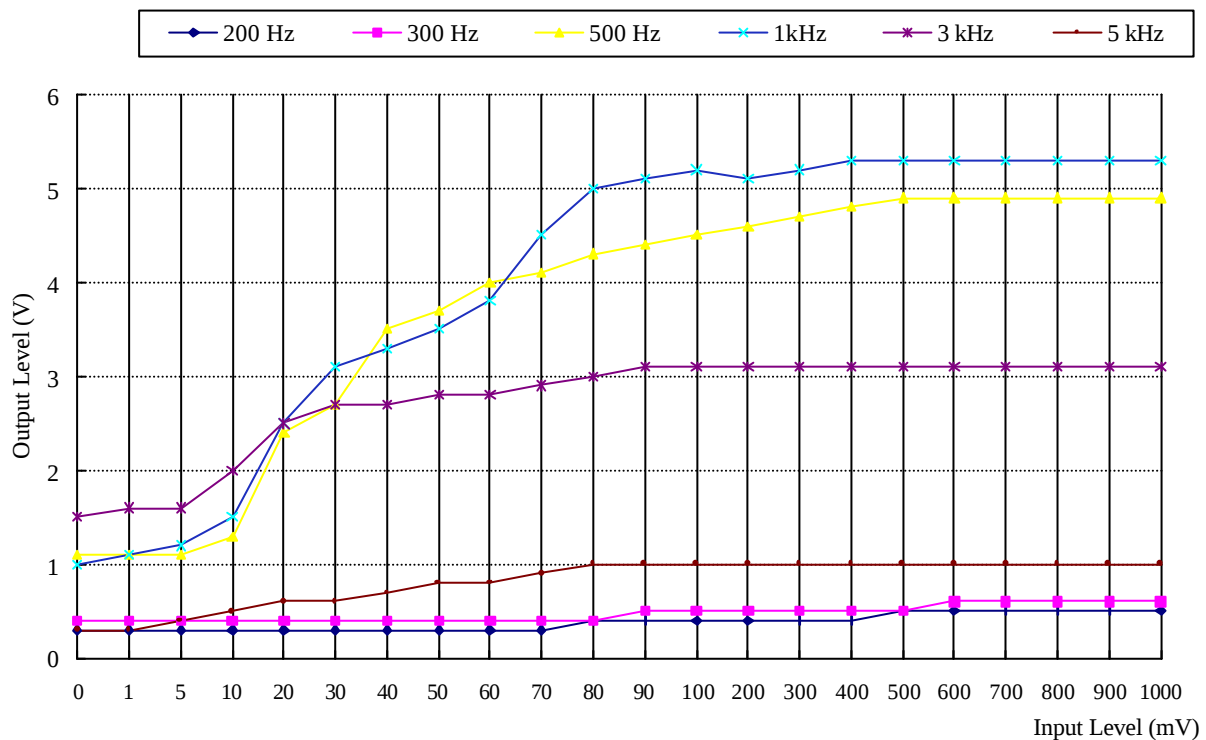


4.3 Measurement Instrument

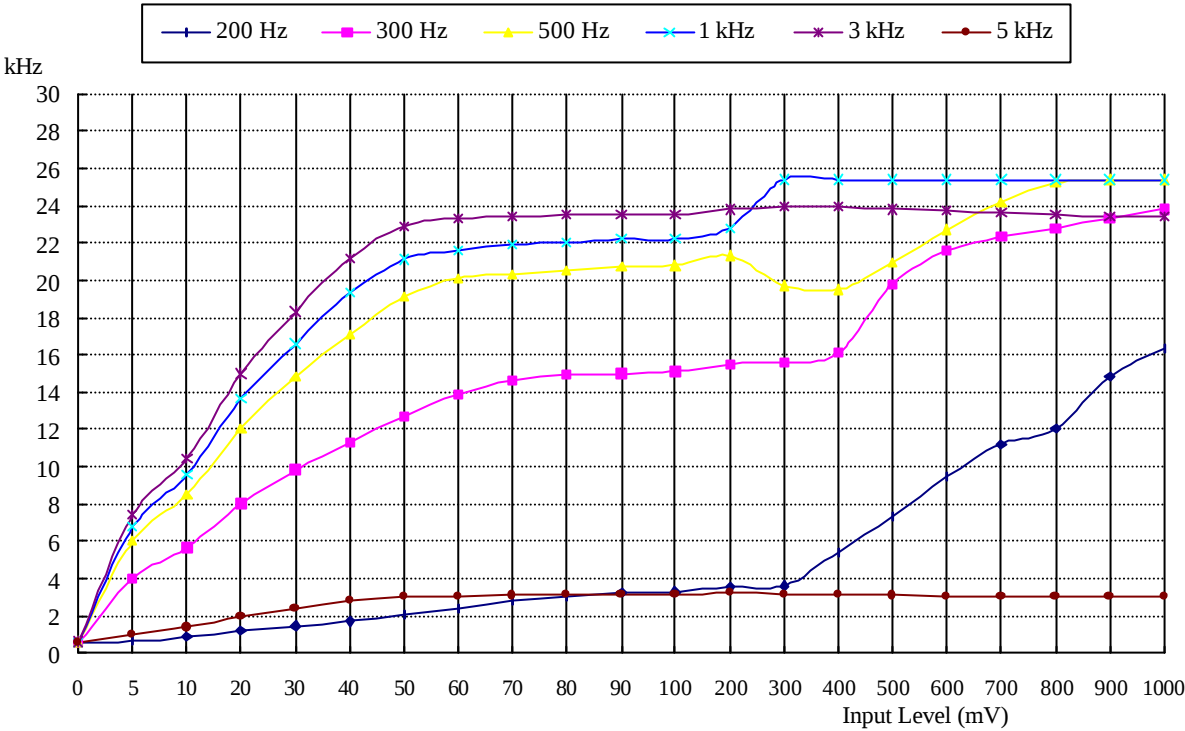
Equipment	Manufacturer	Model No.	Next Cal. Date
Modulation Analyzer	Hewlett-Packard	8901A	12/01/2003
Multifunction Synthesizer	Hewlett-Packard	8904A	12/07/2003
Oscilloscope	Lecroy	9350A	05/25/2004

4.4 Measurement Result

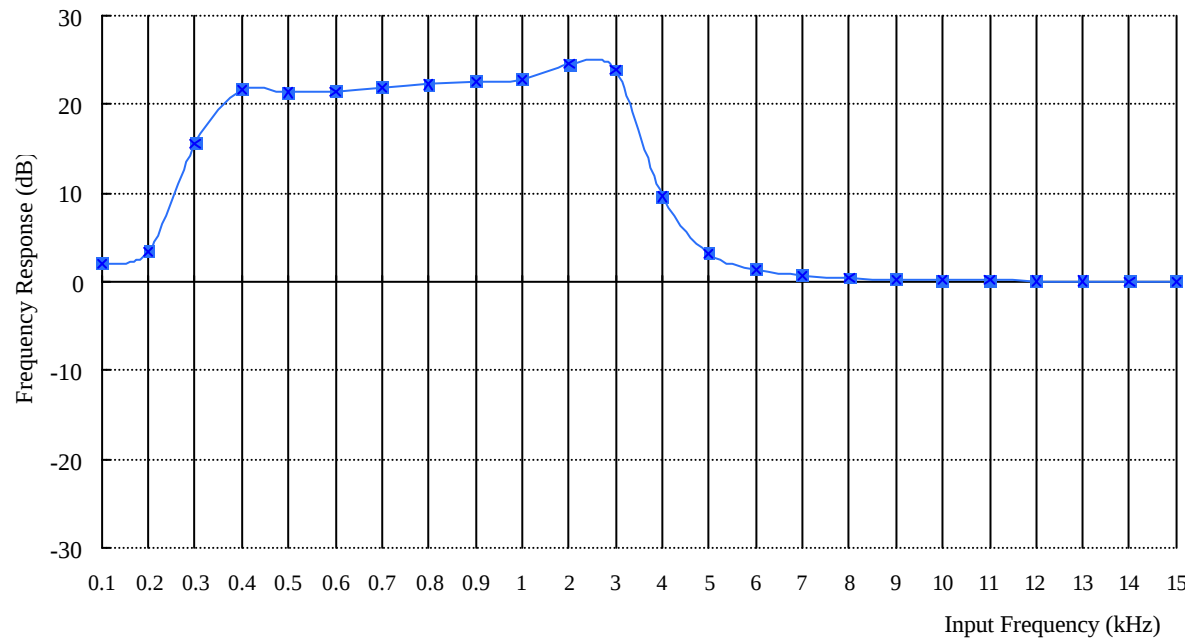
A). Frequency response



B). Modulation Limit



C). Frequency response of all circuits



5. OCCUPIED BANDWIDTH OF EMISSION

5.1 Provisions Applicable

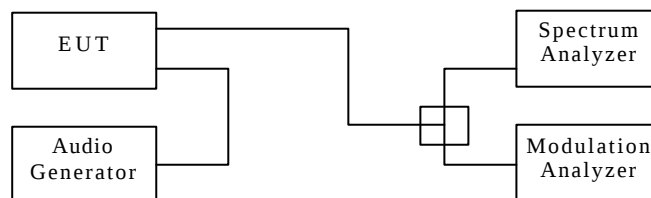
According to § 2.1049 (c)(1), For radiotelephone transmitter, other than single sideband or indenpent sideband transmitter, when modulateed by a 2.5kHz tone at an input level 16 dB greater than that necessary to produce 50 percent modulation.

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

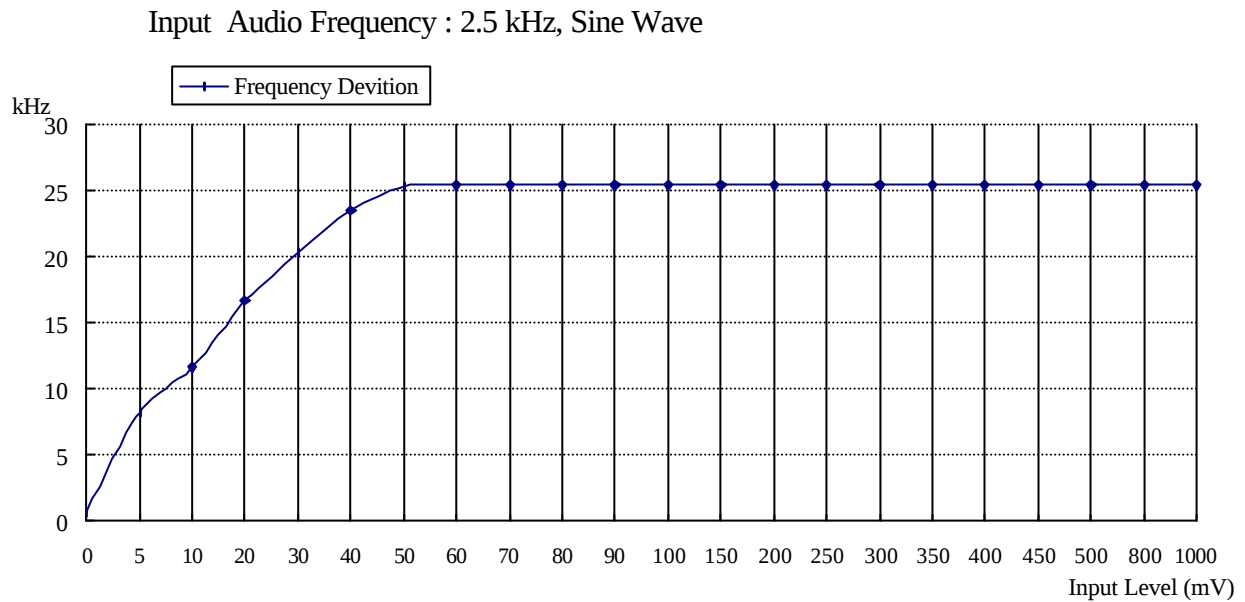


5.3 Occupied Bandwidth Test Equipment

Equipment	Manufacturer	Model No.	Next Cal. Date
Spectrum Analyzer	R&S	ESBI	05/24/2004
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



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 100.5KHz.
The Channel Mid 26 dB Bandwidth is 103.3KHz.
The Channel High 26 dB Bandwidth is 111.1KHz.

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 following schedule:

- (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	01/09/2004
Quasi Peak Detector	Hewlett-Packard	85650A	01/09/2004
Pre-selector	Hewlett-Packard	85685A	01/09/2004
Spectrum Analyzer	Hewlett-Packard	8564E	05/16/2004
Horn Antenna	EMCO	3115	05/14/2004
Log periodic Antenna	EMCO	3146	11/05/2003
Biconical Antenna	EMCO	3110B	11/05/2003
Preamplifier	Hewlett-Packard	8449B	05/10/2004
Preamplifier	Hewlett-Packard	8447D	09/29/2003
EMC Analyzer	Agilent	E7405A	07/01/2004

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

A. Channel Low

Operated mode : TX

Test Date : Jul. 05, 2003

Temperature : 25

Humidity : 65%

Unmodulated carrier output power is -2.5 dBm , or 1.78 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 (MHz)	Meter Reading (dBuV)		SG Reading (dBm)		Antenna Gain	Cable Loss (dB)	Result (dBm)		Limit (dBm)	Margin (dB)
	H	V	H	V			H	V		
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 :

$$\text{Result} = \text{SG Reading} + \text{Cable Loss} + \text{Antenna Gain Corrected}$$

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 : TX
 Temperature : 25

Test Date : Jul. 05, 2003
 Humidity : 65%

Unmodulated carrier output power is 3.9 dBm , or 2.45 mW (ERP).

The limit of spurious or harmonics is calculated as following :

$$3.9 - [43 + 10 \log(\text{carrier output power in W})], \text{ or } -13 \text{ dBm}$$

Frequency (MHz)	Meter Reading (dBuV)		SG Reading (dBm)		Antenna Gain	Cable Loss (dB)	Result (dBm)		Limit (dBm)	Margin (dB)
	H	V	H	V			H	V		
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 :

$$\text{Result} = \text{SG Reading} + \text{Cable Loss} + \text{Antenna Gain Corrected}$$

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 : TX
 Temperature : 25

Test Date : Jul. 05, 2003
 Humidity : 65%

Unmodulated carrier output power is 2.2 dBm , or 1.65 mW (ERP).

The limit of spurious or harmonics is calculated as following :

$$2.2 - [43 + 10 \log(\text{carrier output power in W})], \text{ or } -13 \text{ dBm}$$

Frequency (MHz)	Meter Reading (dBuV)		SG Reading (dBm)		Antenna Gain	Cable Loss (dB)	Result (dBm)		Limit (dBm)	Margin (dB)
	H	V	H	V			H	V		
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 :

$$\text{Result} = \text{SG Reading} + \text{Cable Loss} + \text{Antenna Gain Corrected}$$

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.

6.5 Radiated Measurement Photos

Please See Exhibit_F Test 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)(1), the frequency stability shall be measured with varying primary supply voltage from 85 to 115 percent of the nominal value for other than hand carried battery equipment.

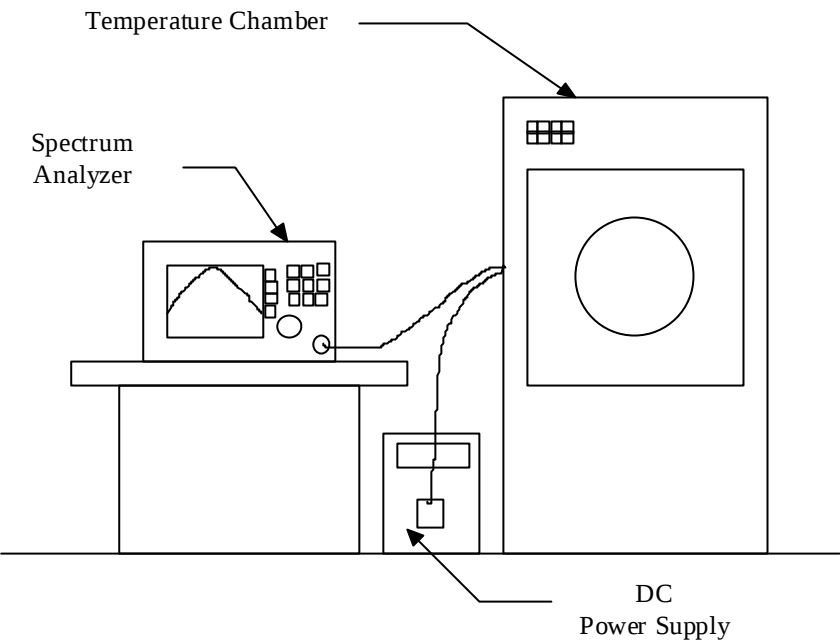
According to § 74.861(e)(4), the frequency tolerance of the transmitter shall be 0.005 percent.

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.

Figure 5 : Frequency stability measurement configuration



7.3 Measurement Instrument

Equipment	Manufacturer	Model No.	Next Cal. Date
Spectrum Analyzer	HP	8564E	04/13/2004
Temperature Chamber	Mallier	MCT-2X-M	10/08/2003

7.4 Measurement Data**A1. Frequency stability versus environment tempture**

Reference Frequency : 744.21 MHz		Limit : 0.005%					
Enviroment Tempture ()	Power Supplied (Vac)	Frequency measured with time elapsed					
		2 minute		5 minute		10 minute	
		(MHz)	(%)	(MHz)	(%)	(MHz)	(%)
50	102.00	744.1851	-0.00335	744.2278	0.00240	744.2041	-0.00080
	120.00	744.2335	0.00316	744.1927	-0.00233	744.2338	0.00320
	138.00	744.2091	-0.00012	744.1896	-0.00274	744.1851	-0.00335
40	102.00	744.2260	0.00215	744.2063	-0.00049	744.2195	0.00128
	120.00	744.2038	-0.00083	744.1858	-0.00325	744.1848	-0.00339
	138.00	744.1969	-0.00176	744.2206	0.00142	744.1887	-0.00287
30	102.00	744.2146	0.00062	744.2100	0.00000	744.2005	-0.00128
	120.00	744.2163	0.00085	744.2372	0.00365	744.2155	0.00074
	138.00	744.2069	-0.00042	744.2316	0.00290	744.2022	-0.00105
20	102.00	744.2372	0.00365	744.2077	-0.00030	744.2189	0.00120
	120.00	744.1849	-0.00338	744.2362	0.00352	744.1891	-0.00280
	138.00	744.2045	-0.00074	744.2257	0.00211	744.1927	-0.00233
10	102.00	744.1869	-0.00310	744.2212	0.00151	744.2184	0.00114
	120.00	744.1816	-0.00381	744.2058	-0.00056	744.1964	-0.00183
	138.00	744.1992	-0.00145	744.2017	-0.00112	744.1902	-0.00267
0	102.00	744.2202	0.00138	744.1996	-0.00140	744.1877	-0.00300
	120.00	744.1908	-0.00258	744.2209	0.00146	744.1818	-0.00379
	138.00	744.2127	0.00036	744.1851	-0.00335	744.1956	-0.00194
-10	102.00	744.2099	-0.00001	744.2215	0.00155	744.1936	-0.00221
	120.00	744.2030	-0.00094	744.1841	-0.00348	744.1896	-0.00274
	138.00	744.2066	-0.00046	744.2043	-0.00077	744.1990	-0.00147
-20	102.00	744.2238	0.00185	744.2084	-0.00021	744.1814	-0.00384
	120.00	744.2071	-0.00039	744.2128	0.00037	744.1952	-0.00198
	138.00	744.1897	-0.00272	744.2110	0.00013	744.2206	0.00142
-30	102.00	744.2344	0.00328	744.1974	-0.00170	744.2191	0.00123
	120.00	744.2109	0.00012	744.2274	0.00234	744.2279	0.00240
	138.00	744.1880	-0.00296	744.2333	0.00313	744.2150	0.00068

B1. Frequency stability versus enviroment tempture

Reference Frequency : 794.81 MHz Limit : 0.005%							
Enviroment Tempture ()	Power Supplied (Vac)	Frequency measured with time elapsed					
		2 minute		5 minute		10 minute	
		(MHz)	(%)	(MHz)	(%)	(MHz)	(%)
50	102.00	794.8200	0.00125	794.7846	-0.00320	794.8020	-0.00100
	120.00	794.8157	0.00071	794.7955	-0.00183	794.8237	0.00172
	138.00	794.8378	0.00349	794.7848	-0.00317	794.7812	-0.00362
40	102.00	794.8024	-0.00096	794.7845	-0.00320	794.7826	-0.00344
	120.00	794.8146	0.00057	794.8395	0.00371	794.8108	0.00010
	138.00	794.8198	0.00124	794.7989	-0.00139	794.8271	0.00216
30	102.00	794.7874	-0.00284	794.8011	-0.00112	794.8216	0.00146
	120.00	794.7876	-0.00281	794.8162	0.00077	794.8108	0.00010
	138.00	794.7867	-0.00294	794.7900	-0.00252	794.7839	-0.00328
20	102.00	794.8111	0.00014	794.7985	-0.00145	794.8200	0.00126
	120.00	794.7829	-0.00341	794.8124	0.00030	794.8318	0.00274
	138.00	794.8047	-0.00067	794.7840	-0.00327	794.7964	-0.00171
10	102.00	794.8245	0.00183	794.8374	0.00344	794.8397	0.00373
	120.00	794.8201	0.00127	794.8146	0.00057	794.8211	0.00140
	138.00	794.8258	0.00199	794.7925	-0.00220	794.8325	0.00283
0	102.00	794.8080	-0.00025	794.8349	0.00314	794.8337	0.00298
	120.00	794.8144	0.00055	794.7807	-0.00369	794.7927	-0.00217
	138.00	794.8272	0.00216	794.8295	0.00245	794.8027	-0.00091
-10	102.00	794.8062	-0.00048	794.8139	0.00049	794.8380	0.00352
	120.00	794.8020	-0.00100	794.8155	0.00069	794.8352	0.00317
	138.00	794.7936	-0.00206	794.8391	0.00366	794.7800	-0.00378
-20	102.00	794.7879	-0.00278	794.7985	-0.00145	794.8155	0.00069
	120.00	794.8307	0.00261	794.8299	0.00250	794.8022	-0.00099
	138.00	794.7949	-0.00190	794.8175	0.00094	794.8240	0.00176
-30	102.00	794.7843	-0.00323	794.8076	-0.00030	794.8009	-0.00115
	120.00	794.7960	-0.00177	794.8237	0.00172	794.8135	0.00044
	138.00	794.8302	0.00254	794.8087	-0.00016	794.7843	-0.00323

C1. Frequency stability versus environment tempture

Reference Frequency : 805.31 MHz Limit : 0.005%							
Enviroment Tempture ()	Power Supplied (Vac)	Frequency measured with time elapsed					
		2 minute		5 minute		10 minute	
		(MHz)	(%)	(MHz)	(%)	(MHz)	(%)
50	102.00	805.3209	0.00135	805.2795	-0.00379	805.2903	-0.00245
	120.00	805.2837	-0.00327	805.3277	0.00219	805.2993	-0.00133
	138.00	805.2852	-0.00308	805.2910	-0.00236	805.3003	-0.00121
40	102.00	805.3303	0.00252	805.2897	-0.00252	805.3265	0.00205
	120.00	805.3246	0.00181	805.2802	-0.00370	805.2899	-0.00250
	138.00	805.2992	-0.00134	805.2906	-0.00241	805.3006	-0.00117
30	102.00	805.3330	0.00286	805.2813	-0.00356	805.2916	-0.00228
	120.00	805.3012	-0.00110	805.3322	0.00276	805.3226	0.00156
	138.00	805.3056	-0.00054	805.3048	-0.00064	805.3276	0.00218
20	102.00	805.3272	0.00214	805.2890	-0.00261	805.3299	0.00247
	120.00	805.3030	-0.00087	805.2814	-0.00355	805.3077	-0.00028
	138.00	805.3384	0.00353	805.3299	0.00247	805.3031	-0.00086
10	102.00	805.3395	0.00367	805.3398	0.00370	805.3302	0.00251
	120.00	805.3321	0.00275	805.3318	0.00271	805.3005	-0.00118
	138.00	805.2895	-0.00255	805.3316	0.00268	805.3237	0.00170
0	102.00	805.3134	0.00042	805.3365	0.00329	805.3398	0.00369
	120.00	805.2795	-0.00378	805.3342	0.00301	805.2952	-0.00184
	138.00	805.2861	-0.00296	805.3234	0.00166	805.2977	-0.00153
-10	102.00	805.2802	-0.00370	805.3211	0.00137	805.3188	0.00109
	120.00	805.3206	0.00131	805.3040	-0.00075	805.3037	-0.00078
	138.00	805.3374	0.00340	805.3376	0.00342	805.3170	0.00087
-20	102.00	805.2849	-0.00312	805.3391	0.00361	805.3163	0.00079
	120.00	805.3346	0.00306	805.2792	-0.00383	805.3331	0.00287
	138.00	805.2803	-0.00369	805.2834	-0.00330	805.3304	0.00253
-30	102.00	805.2988	-0.00139	805.3300	0.00248	805.3261	0.00200
	120.00	805.2926	-0.00216	805.3209	0.00135	805.3215	0.00142
	138.00	805.3231	0.00162	805.3371	0.00336	805.2804	-0.00367

8 CONDUCTED EMISSION MEASUREMENT

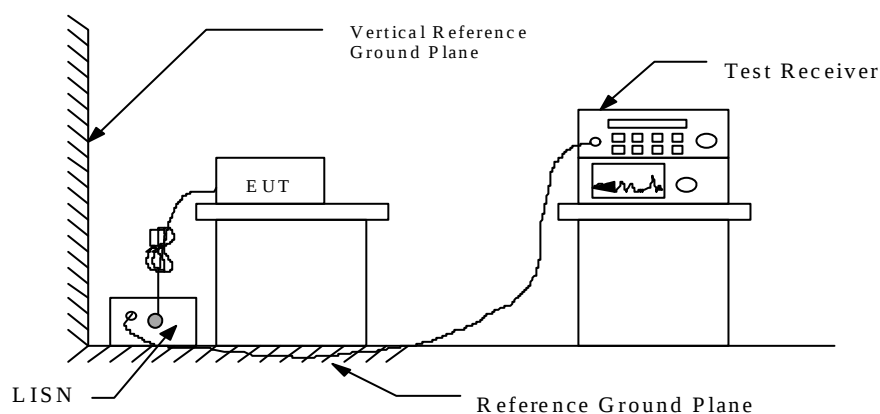
8.1 Standard Applicable

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) 744.21MHz

Operation Mode : Working

Test Date : Jul. 05, 2003Temperature : 24Humidity: 57 %

Freq. (MHz)	Meter Reading				Facto r (dB)	Limit		Result			
	(dBi V)					(dBi V)		(dBi V)			
	Q.P Value		AVG. Value			Q.P	AVG.	Q.P Value		AVG. Value	
	N	L1	N	L1		Value	Value	N	L1	N	L1
0.189	37.6	37.2	----	----	0.2	64.1	54.1	37.8	37.4	----	----
0.334	33.4	33.4	----	----	0.3	59.4	49.4	33.7	33.7	----	----
0.405	29.1	30.5	----	----	0.3	57.8	47.8	29.4	30.8	----	----
0.490	19.7	25.3	----	----	0.3	56.2	46.2	20.0	25.6	----	----
0.750	21.3	12.9	----	----	0.3	56.0	46.0	21.6	13.2	----	----
1.074	10.6	15.4	----	----	0.3	56.0	46.0	10.9	15.7	----	----

b) 794.81MHz

Operation Mode : Working

Test Date : Jul. 05, 2003Temperature : 24Humidity: 57 %

Freq. (MHz)	Meter Reading				Facto r (dB)	Limit		Result			
	(dBi V)					(dBi V)		(dBi V)			
	Q.P Value		AVG. Value			Q.P	AVG.	Q.P Value		AVG. Value	
	N	L1	N	L1		Value	Value	N	L1	N	L1
0.228	36.6	36.4	----	----	0.2	62.5	52.5	36.8	36.6	----	----
0.267	35.4	34.9	----	----	0.2	61.2	51.2	35.6	35.1	----	----
0.310	34.3	34.1	----	----	0.3	60.0	50.0	34.6	34.4	----	----
0.809	22.6	19.3	----	----	0.3	56.0	46.0	22.9	19.6	----	----
0.922	18.7	19.3	----	----	0.3	56.0	46.0	19.0	19.6	----	----
2.340	8.8	5.3	----	----	0.5	56.0	46.0	9.3	5.8	----	----

Note : 1. Please see appendix 1 for Plotted Data

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

c) 805.31MHz

Operation Mode : Working

Test Date : Jul. 05, 2003

Temperature : 24

Humidity: 57 %

Freq. (MHz)	Meter Reading				Factor (dB)	Limit		Result			
	(dBμ V)					(dBμ V)		(dBμ V)			
	Q.P Value		AVG. Value			Q.P	AVG.	Q.P Value		AVG. Value	
	N	L1	N	L1		Value	Value	N	L1	N	L1
0.170	38.1	38.0	----	----	0.2	65.0	55.0	38.3	38.2	----	----
0.333	33.5	33.6	----	----	0.3	59.4	49.4	33.8	33.9	----	----
0.423	27.3	29.3	----	----	0.3	57.4	47.4	27.6	29.6	----	----
0.463	23.1	27.1	----	----	0.3	56.6	46.6	23.4	27.4	----	----
1.105	13.3	13.7	----	----	0.3	56.0	46.0	13.6	14.0	----	----
2.422	5.6	4.1	----	----	0.5	56.0	46.0	6.1	4.6	----	----

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 dBμV is obtained, and LISN Factor is 0.1 dB, then the total of disturbance voltage is 22.6 dBμV.

$$RESULT = 22.5 + 0.1 = 22.6 \text{ dB } \mu\text{V}$$

$$\begin{aligned} \text{Level in } \mu\text{V} &= \text{Common Antilogarithm}[(22.6 \text{ dB } \mu\text{V})/20] \\ &= 13.48 \text{ } \mu\text{V} \end{aligned}$$

8.5 Conducted Measurement Equipment

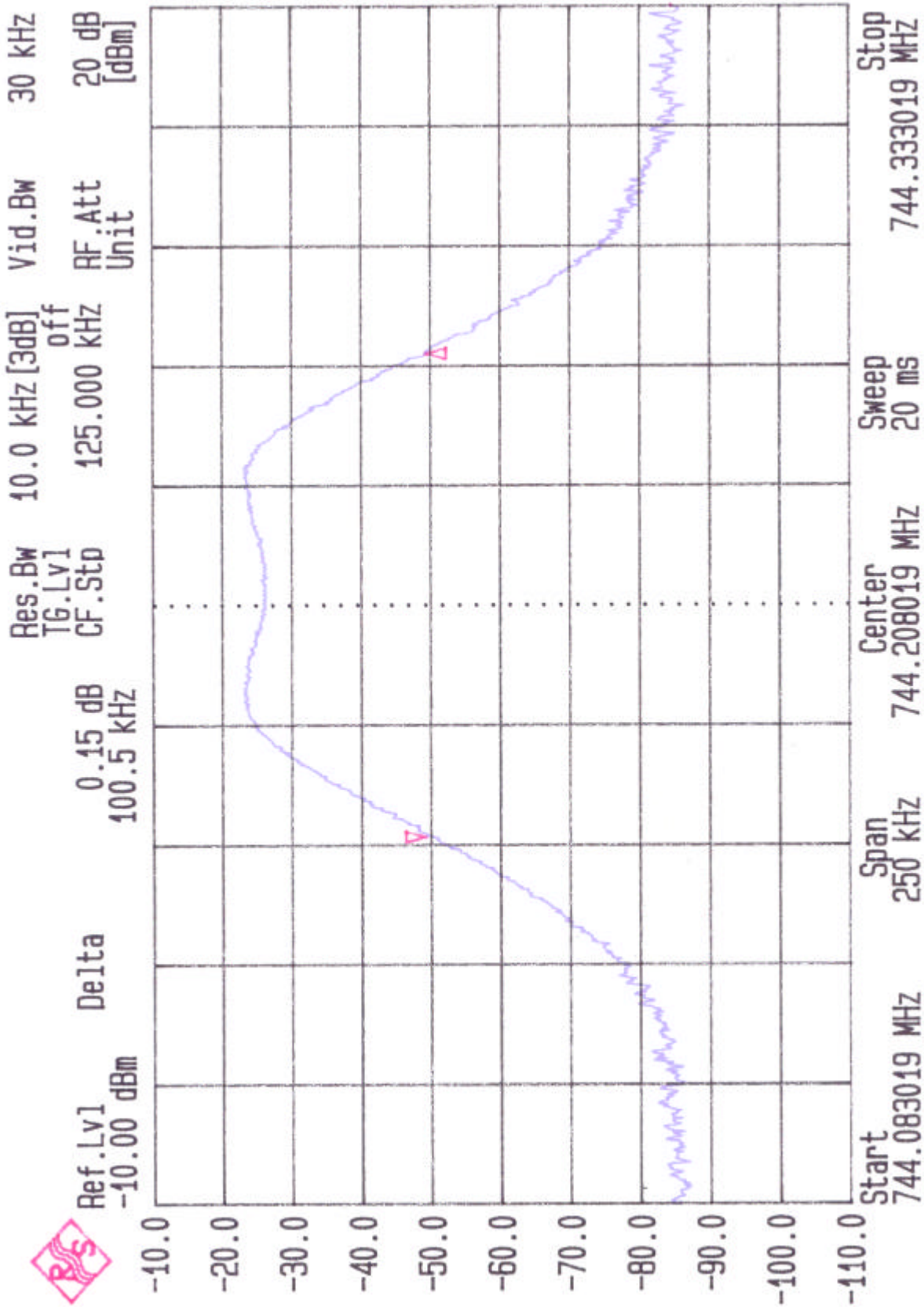
The following test equipment are used during the conducted test .

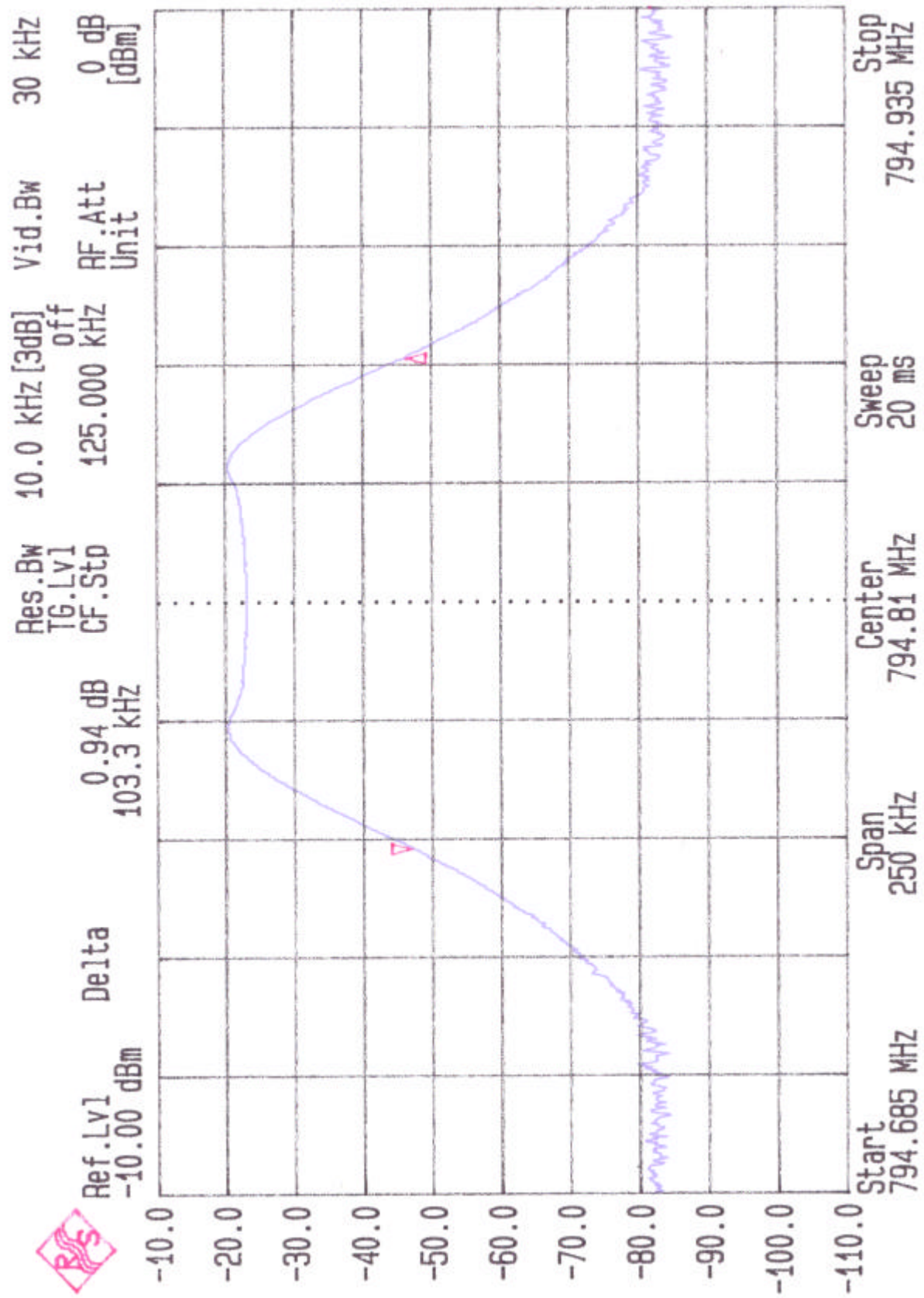
Equipment	Manufacturer	Model No.	Next Cal. Due
EMI Test Receiver	Rohde and Schwarz	ESCS 30	11/27/2003
Line Impedance Stabilization network	Rohde and Schwarz	ESH2-Z5	09/03/2003
Monitor	IBM	E54	N.C.R.
Printer	HP	LaserJet 1000	N.C.R.
Shielded Room	Riken		N.C.R.
Computer	Acer	Veriton	N.C.R.
EMI Test Receiver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

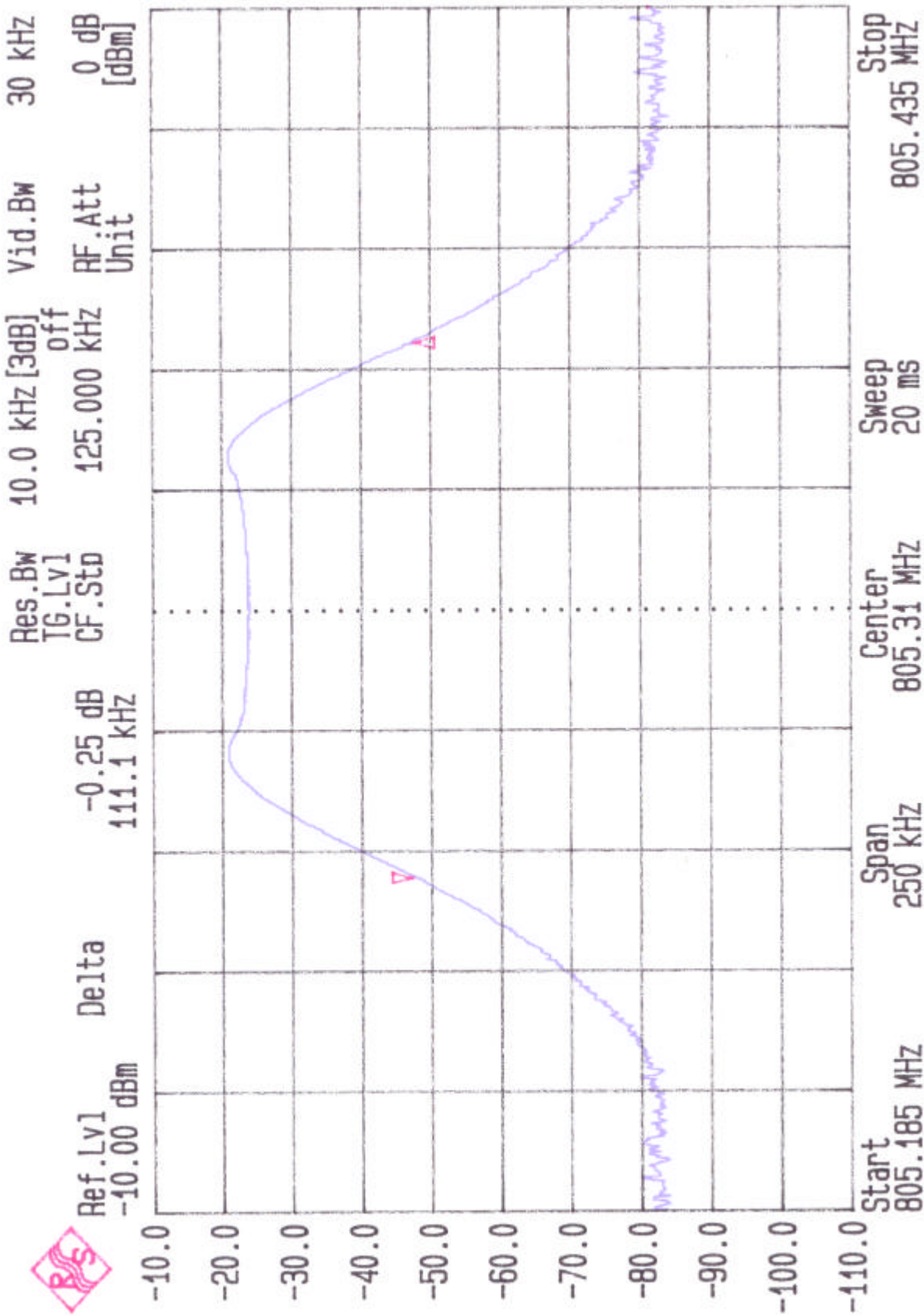
8.6 Photos of Conduction Measuring Setup

Please Exhibit_F Test Setup Photos

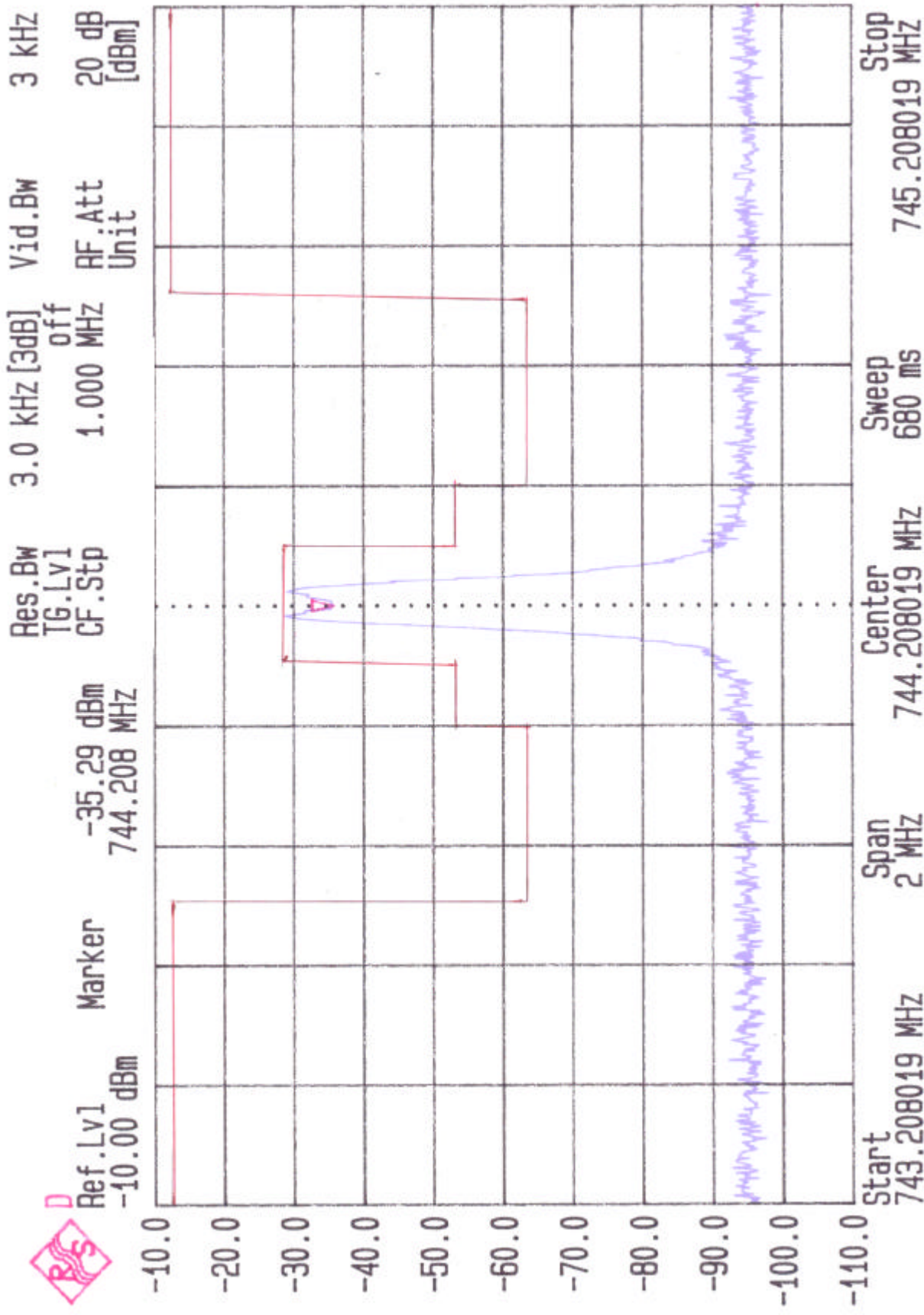
Appendix 1 : Occupied Emission Bandwidth Plotted Data

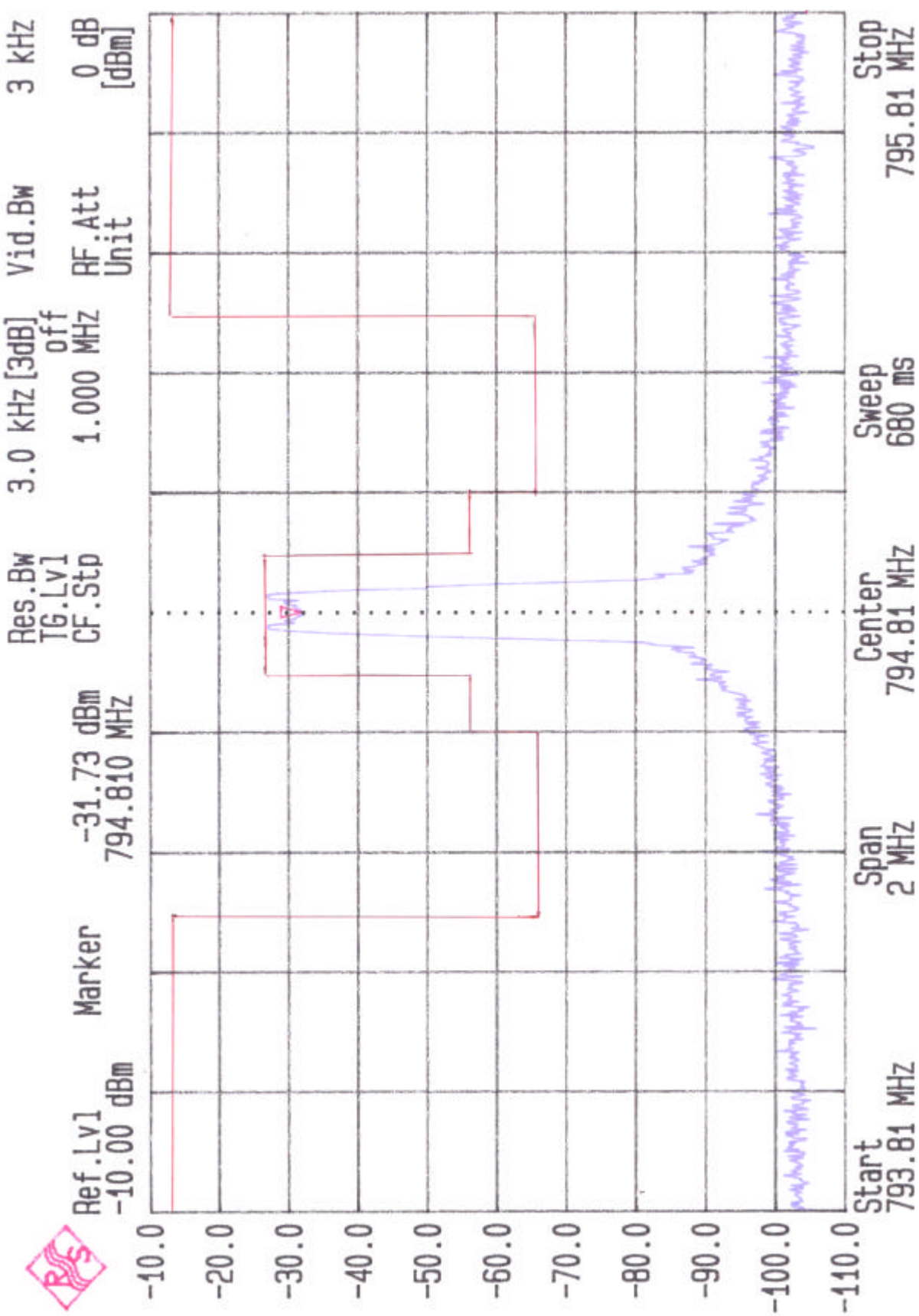


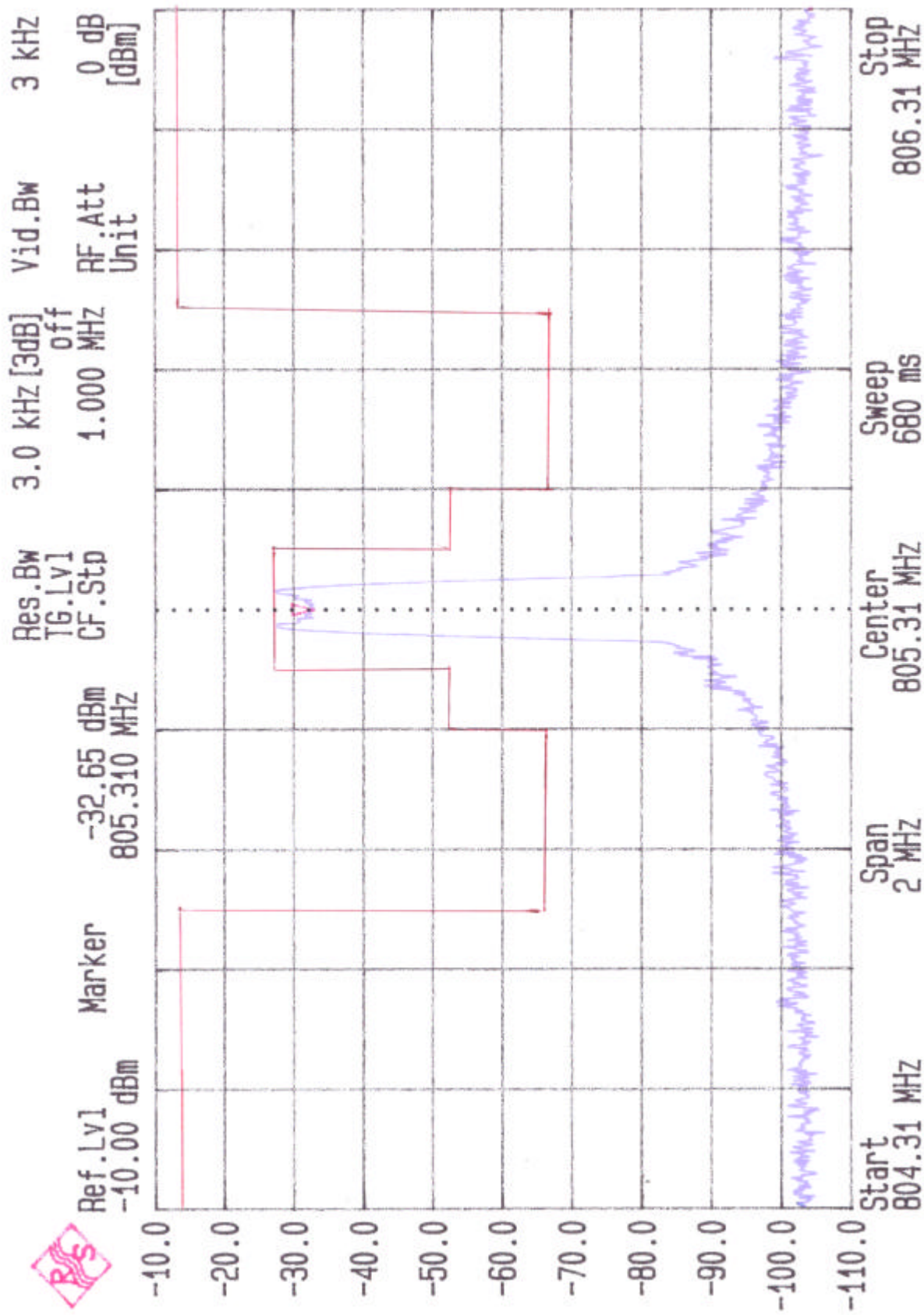




Appendix 2 : Emission Mask Plotted Data







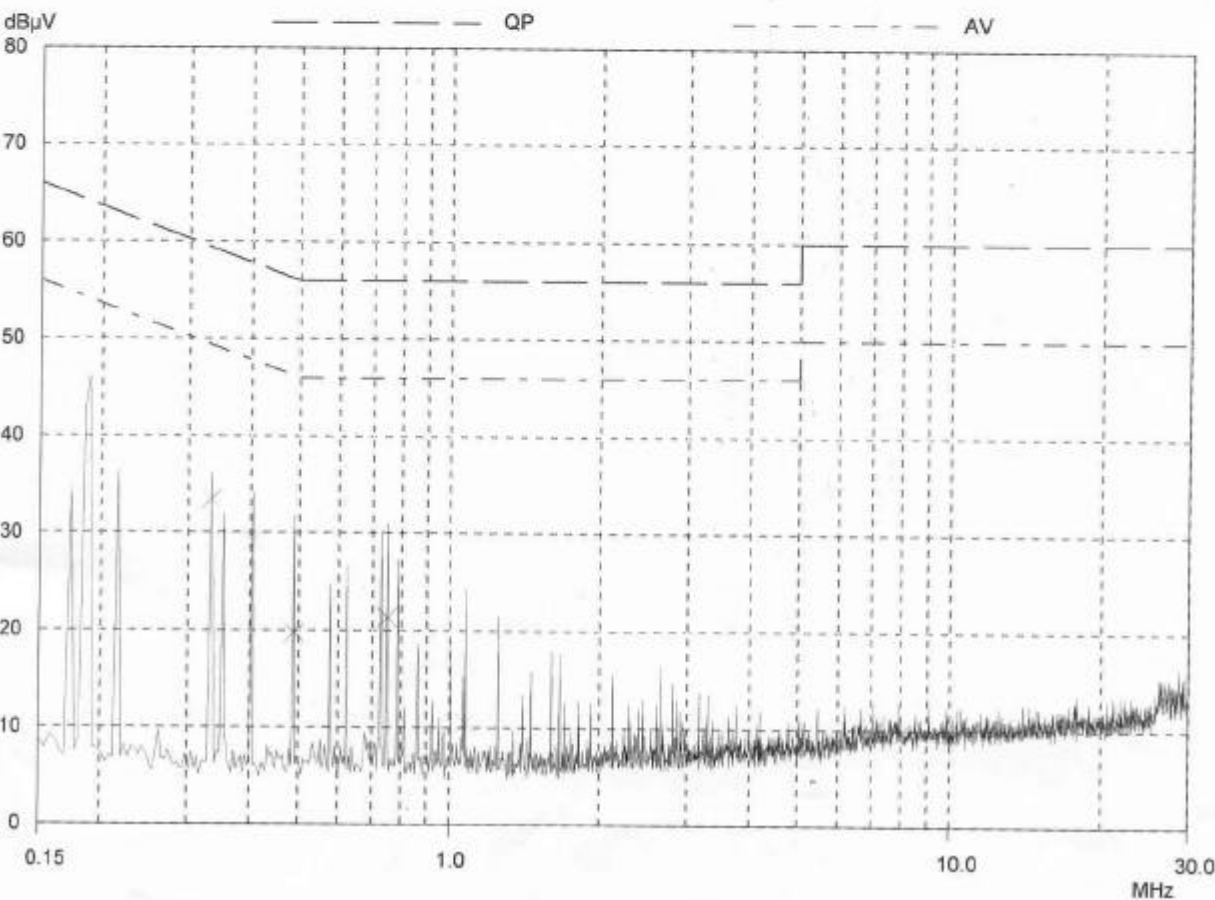
Appendix 3 : Plotted Data of Conducted Emissions

CONDUCTION EMISSION TEST

Peak Value

EUT:
Manuf:
Op Cond: 744.21MHz
Operator:
Test Spec:
Comment:
N

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

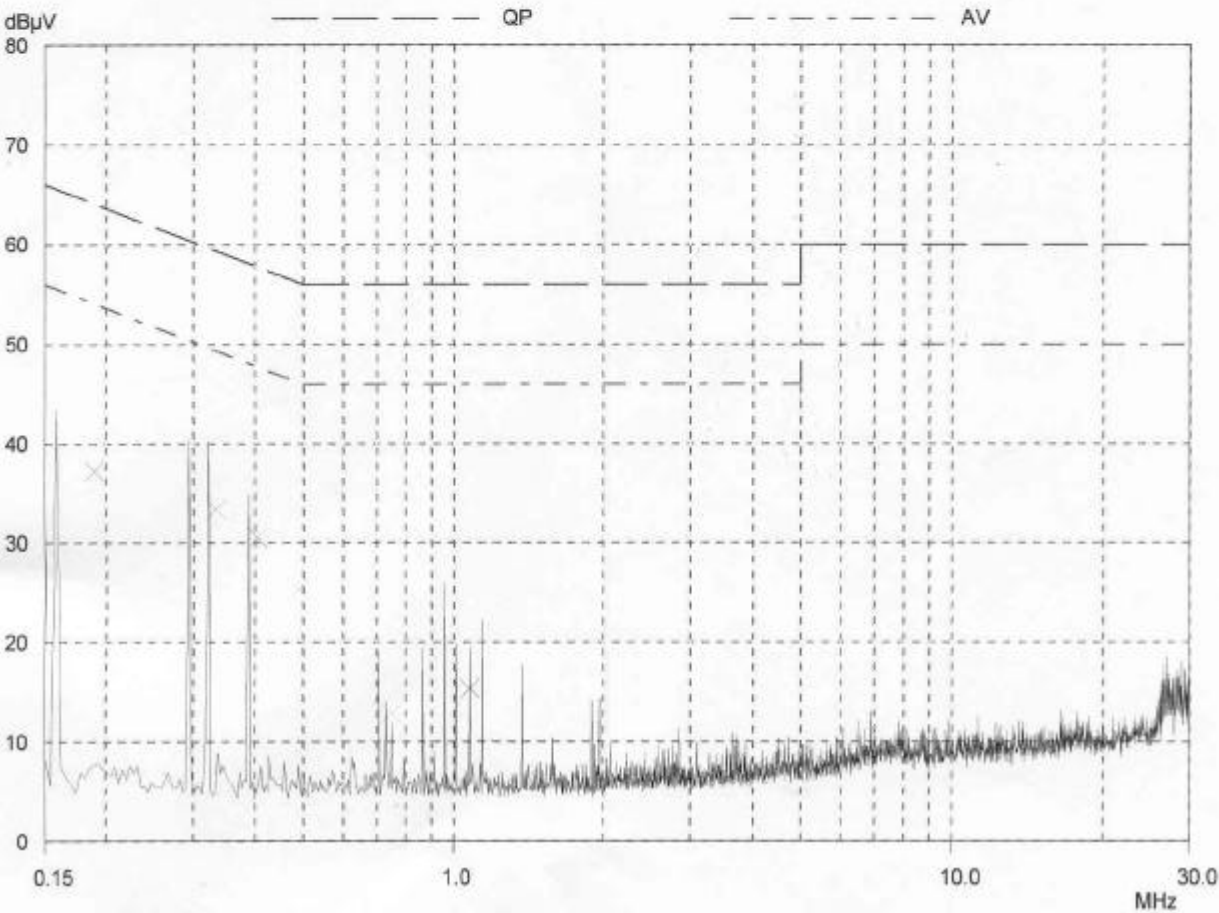


CONDUCTION EMISSION TEST

Peak Value

EUT:
Manuf:
Op Cond: 744.21MHz
Operator:
Test Spec:
Comment:
L1

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

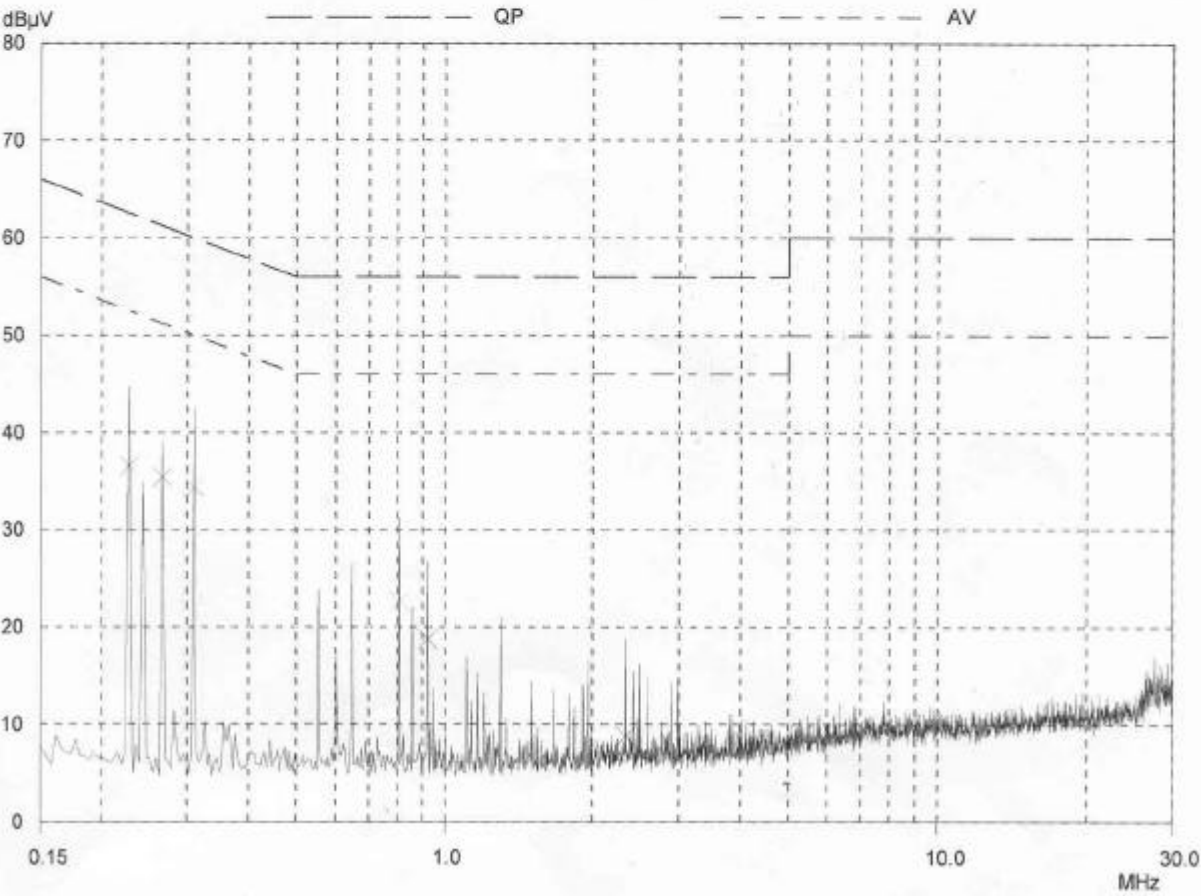


CONDUCTION EMISSION TEST

Peak Value

EUT:
Manuf:
Op Cond: 794.81MHz
Operator:
Test Spec:
Comment:
N

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

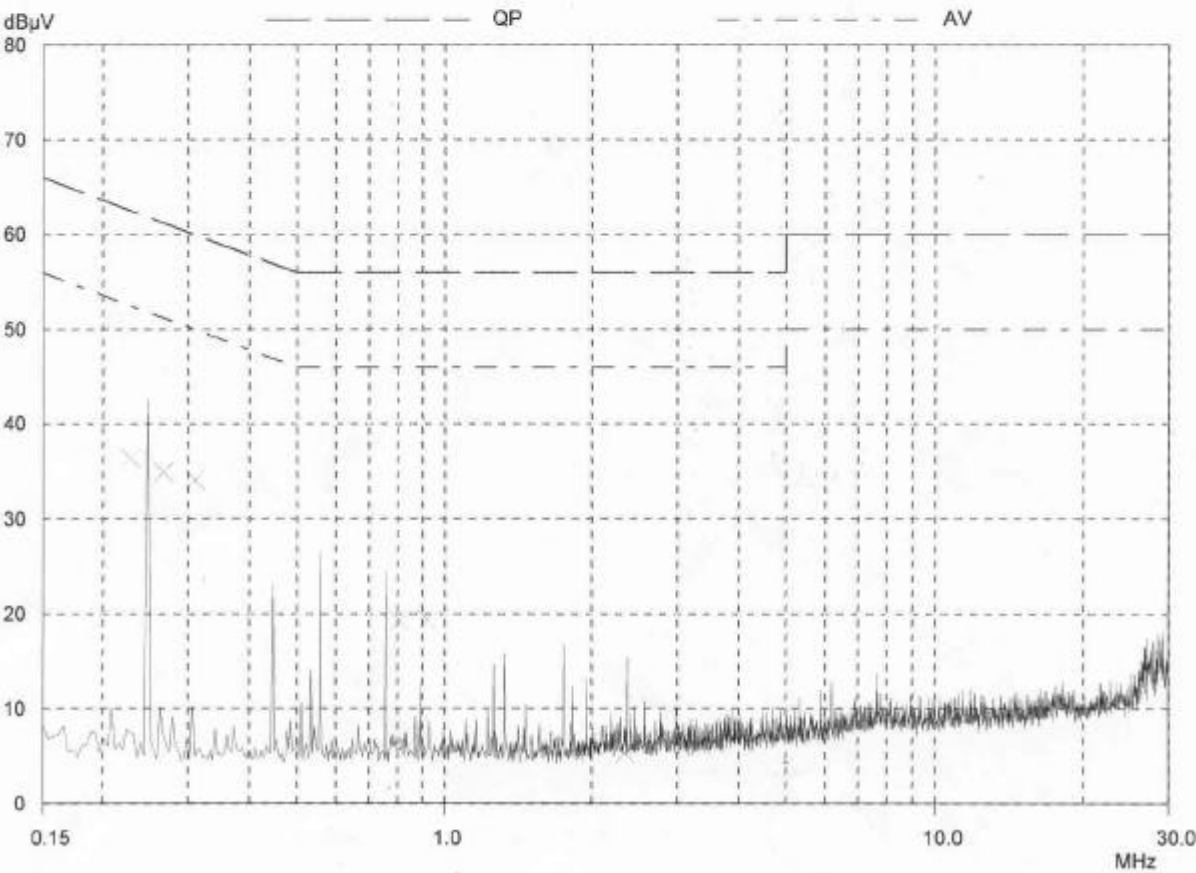


CONDUCTION EMISSION TEST

Peak Value

EUT:
Manuf:
Op Cond: 794.81MHz
Operator:
Test Spec:
Comment:
L1

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

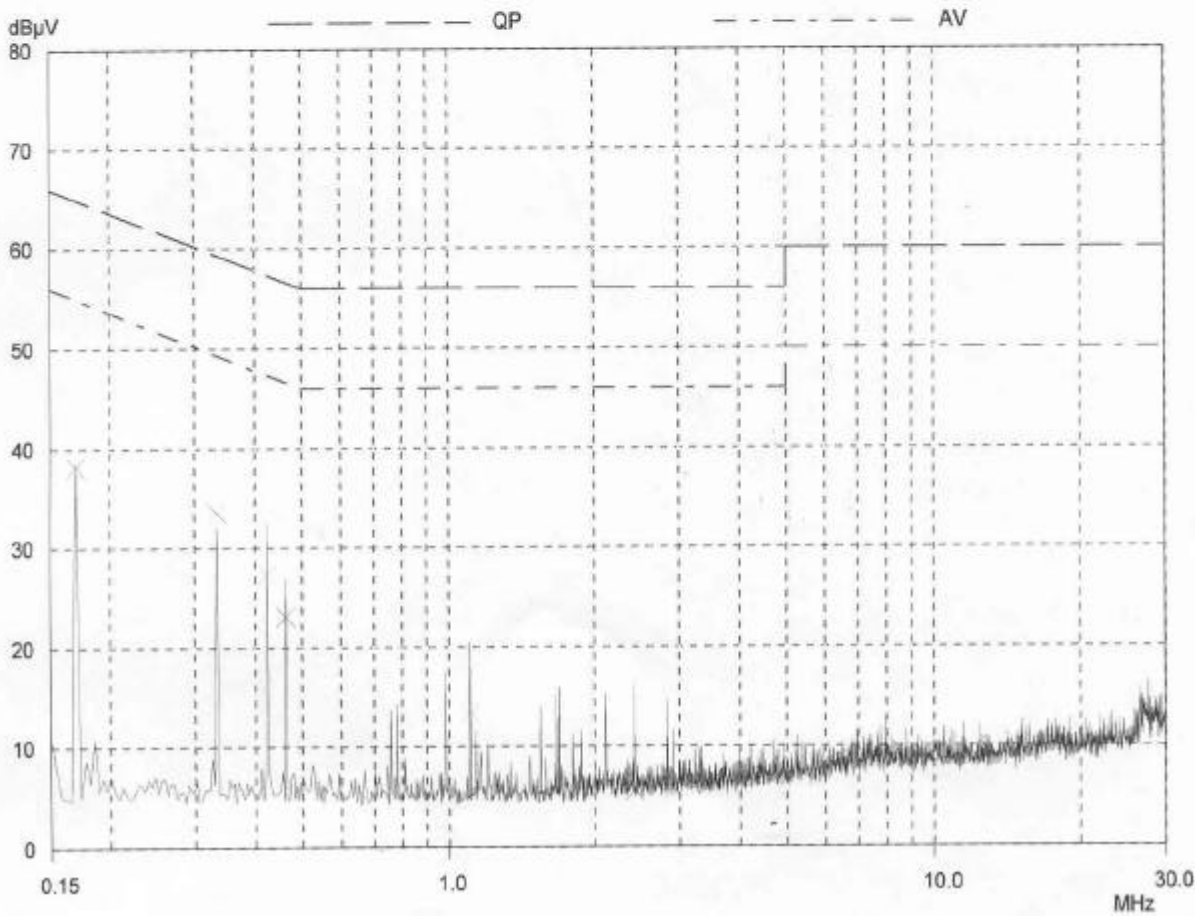


CONDUCTION EMISSION TEST

Peak Value

EUT:
Manuf:
Op Cond: 805.31MHz
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:
Manuf:
Op Cond: 805.31MHz
Operator:
Test Spec:
Comment:
L1

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

