FCC Part 74 Subpart H

EMI TEST REPORT

of

E.U.T. : UHF Transmitter
FCC ID. : JEBIEM-168
MODEL : IEM-168
Working Frequency : 630.000MHz-806.000MHz;

for

APPLICANT : MASCOT ELECTRIC CO., LTD.
ADDRESS : No. 85, Chang Hsing First Street, Tai-Tzu Village, Jen-Te Hsian, Tainan Hsien, 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 : ET94R-11-041-04

TEST REPORT CERTIFICATION

Applicant : MASCOT ELECTRIC CO., LTD.
No. 85, Chang Hsing First Street, Tai-Tzu Village,
Jen-Te Hsian, Tainan Hsien, Taiwan

Manufacturer : MASCOT ELECTRIC CO., LTD.
No. 85, Chang Hsing First Street, Tai-Tzu Village,
Jen-Te Hsian, Tainan Hsien, Taiwan

Description of EUT :

a) Type of EUT	: UHF Transmitter
b) Trade Name	: MASCOT; Gemini
c) Model No.	: IEM-168
d) The data also apple to	: IEM-1000 (Gemini)
e) FCC ID	: JEBIEM-168
f) Working Frequency	: 630.000MHz-806.000MHz;
g) Power Supply	: Model:SCP41-120500 Input:120VAC 60Hz 9W Output:12VDC 500mA

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

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

Issued Date : Jan. 19, 2006

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 : UHF Transmitter
b) Trade Name : MASCOT; Gemini
c) Model No. : IEM-168
d) The data also apple to : IEM-1000 (Gemini)
e) FCC ID : JEBIEM-168
f) Working Frequency : 630.000MHz-806.000MHz;
g) Power Supply : Model:SCP41-120500
Input:120VAC 60Hz 9W
Output:12VDC 500mA

1.2 Characteristics of Device:

1. Frequency range: UHF 630-806MHz
2. Type of Modulation:FM, 126KF3E.
3. The emission designator is 126KF3E. The calculation is (2M+2DK), K=1 and (2 x 15+ 2 x 48) = 126kHz, so the emission designator is 126KF3E.
4. Frequency stability: ±0.005%

1.3 Test Methodology

Both UHF Transmitter Microphone conducted and radiated testing were performed according to the procedures in chapter 13 of ANSI C63.4 (2001). 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 Oct. 20, 2005.

2. REQUIREMENTS OF PROVISIONS

2.1 Definition

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

2.2 Frequencies Available

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

Frequencies (MHz)

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

2.3 Requirements for Radio Equipment on Certification

(1) RF Output Power

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

(2) Modulation Characteristics

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

(3) Occupied Bandwidth

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

(4) Spurious Emissions at Antenna Terminals

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

(5) Field Strength of Spurious Emissions

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

(6) Frequencies Tolerance

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

2.4 Labeling Requirement

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

3. OUTPUT POWER MEASUREMENT

3.1 Provision Applicable

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

3.2 Measurement Procedure

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

Figure 2 : Frequencies measured below 1 GHz configuration

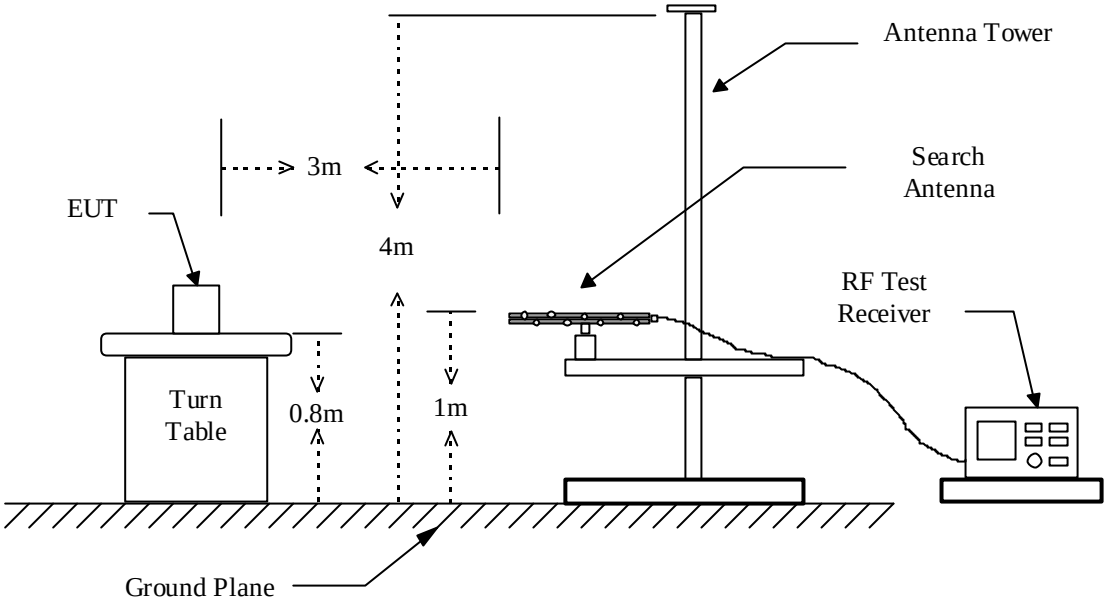
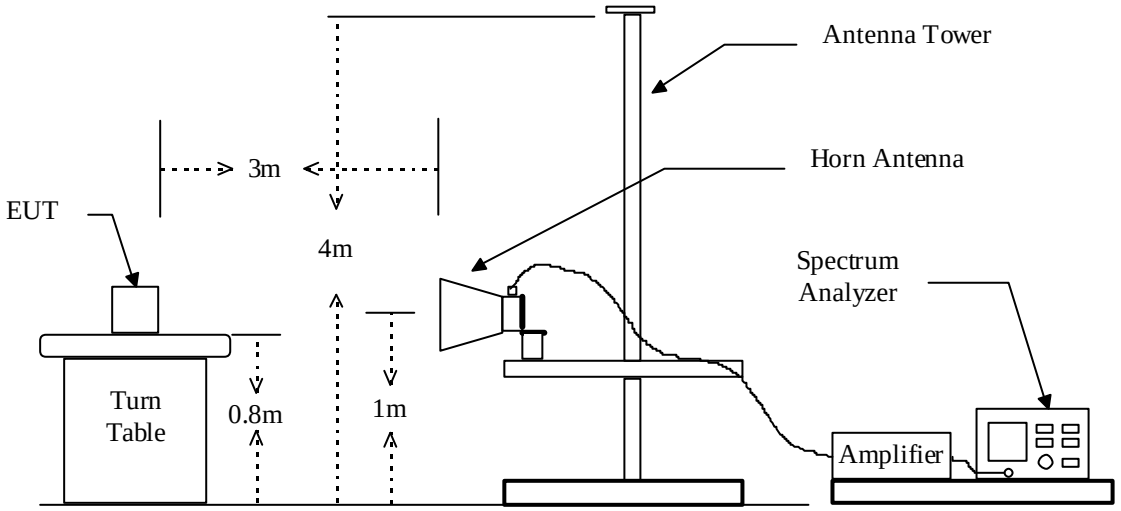


Figure 1 : Frequencies measured above 1 GHz configuration



3.3 Test Data

A. Channel Low (ERP)

Operated mode : TX Test Date : Jan. 19, 2006
Temperature : 19 °C Humidity : 65 %

Frequency (MHz)	Meter Reading (dB μ V/m)	SG Reading (dBm)	Cable Loss (dB)	Antenna Gain	Result (dBm)	Output Power (mW)	Limit (mW)
630.248	91.7	21.1	2.3	----	18.8	75.858	100

B. Channel Mid (ERP)

Operated mode : TX Test Date : Jan. 19, 2006
Temperature : 19 °C Humidity : 65 %

Frequency (MHz)	Meter Reading (dB μ V/m)	SG Reading (dBm)	Cable Loss (dB)	Antenna Gain	Result (dBm)	Output Power (mW)	Limit (mW)
748.871	90.8	20.9	2.5	----	18.4	69.183	100

C. Channel High (ERP)

Operated mode : TX Test Date : Jan. 19, 2006
Temperature : 19 °C Humidity : 65 %

Frequency (MHz)	Meter Reading (dB μ V/m)	SG Reading (dBm)	Cable Loss (dB)	Antenna Gain	Result (dBm)	Output Power (mW)	Limit (mW)
805.492	88.0	21.7	2.6	----	18.5	72.444	100

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

3.3.2 Conducted Test of Output Power

Operated mode : TX Test Date : Jan. 19, 2006
Temperature : 19 °C Humidity : 65 %

The Channel Low Output Power is 19.94 dBm.
The Channel Mid Output Power is 19.29 dBm.
The Channel High Output Power is 19.50 dBm.

Please see appendix 4 for plotted data.

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	ESCI	11/28/2006
Plotter	HP	7440A	N/A
Dipole Antenna	EMCO	3121C	06/06/2006
Signal generator	HP	8656B	11/20/2006

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.

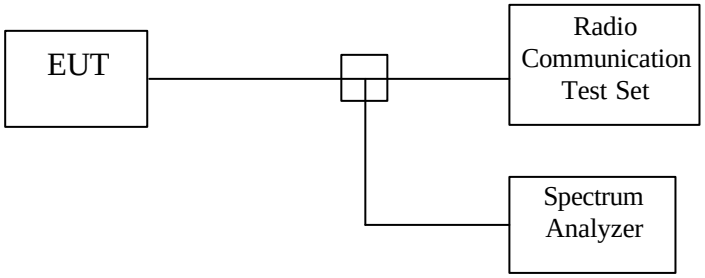
2. Repeat step 1 with changing the input frequency for 200, 500, 1000, 3000, and 5000 Hz in sequence.

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

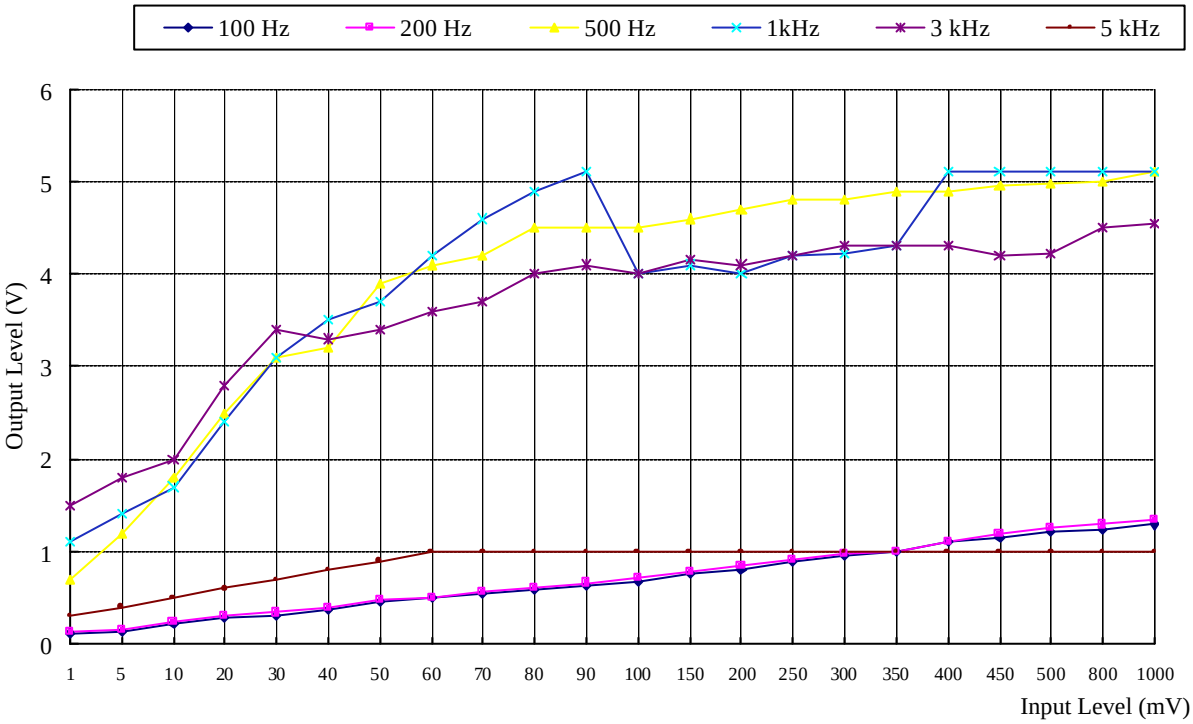


4.3 Measurement Instrument

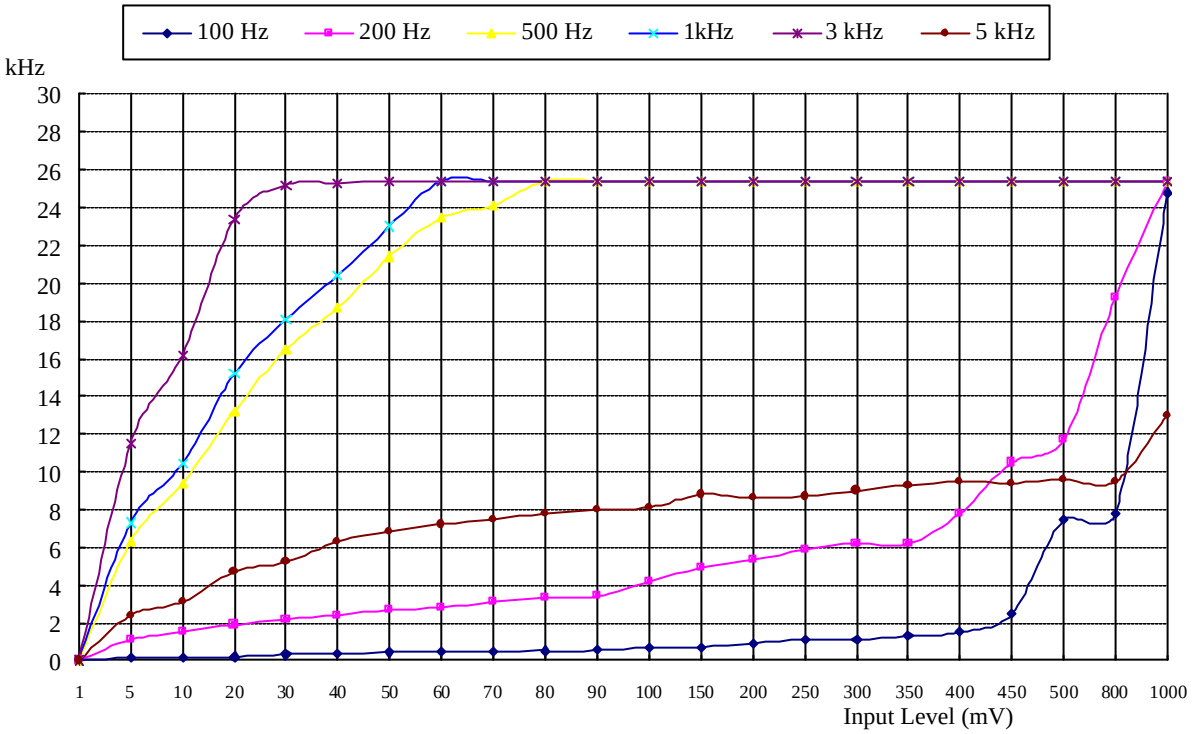
Equipment	Manufacturer	Model No.	Next Cal. Date
Radio Communication Test Set	Marconi	2955B	07/19/2006
Spectrum Analyzer	Rohde & Schwarz	FSP40	07/05/2006

4.4 Measurement Result

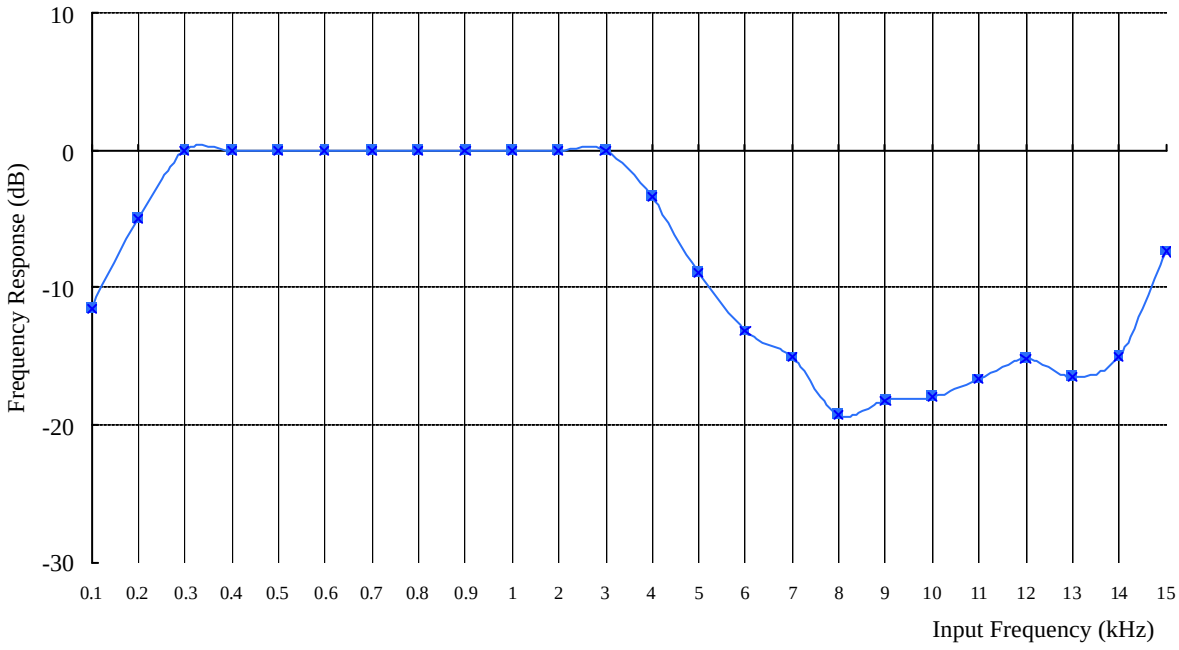
A). Frequency response



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.

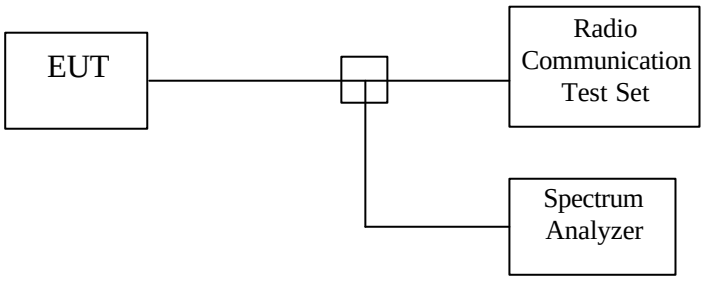
5.2 Measurement Method

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

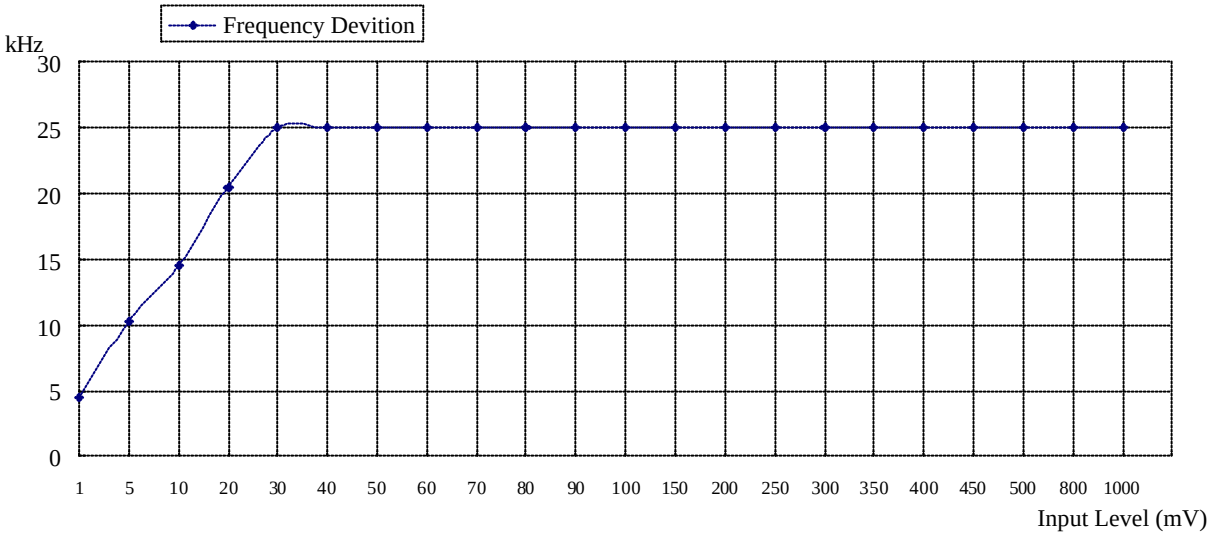
Equipment	Manufacturer	Model No.	Next Cal. Date
Radio Communication Test Set	Marconi	2955B	07/19/2006
Spectrum Analyzer	Rohde & Schwarz	FSP40	07/05/2006

5.4 Bandwidth Measured

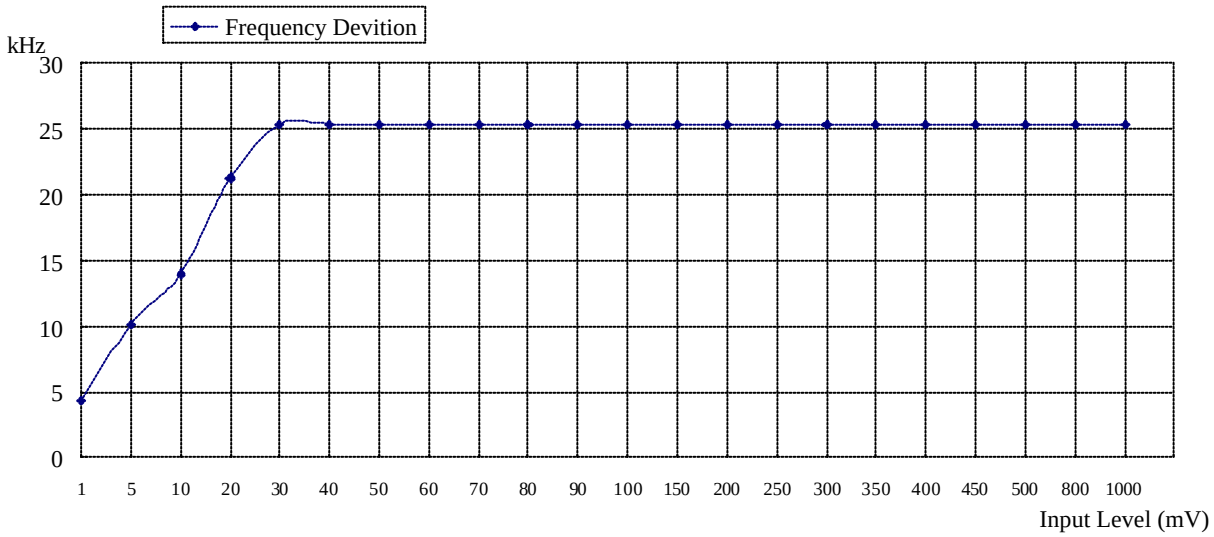
5.4.1 Input Level Derived

1. 630.000MHz

Input Audio Frequency : 2.5 kHz, Sine Wave

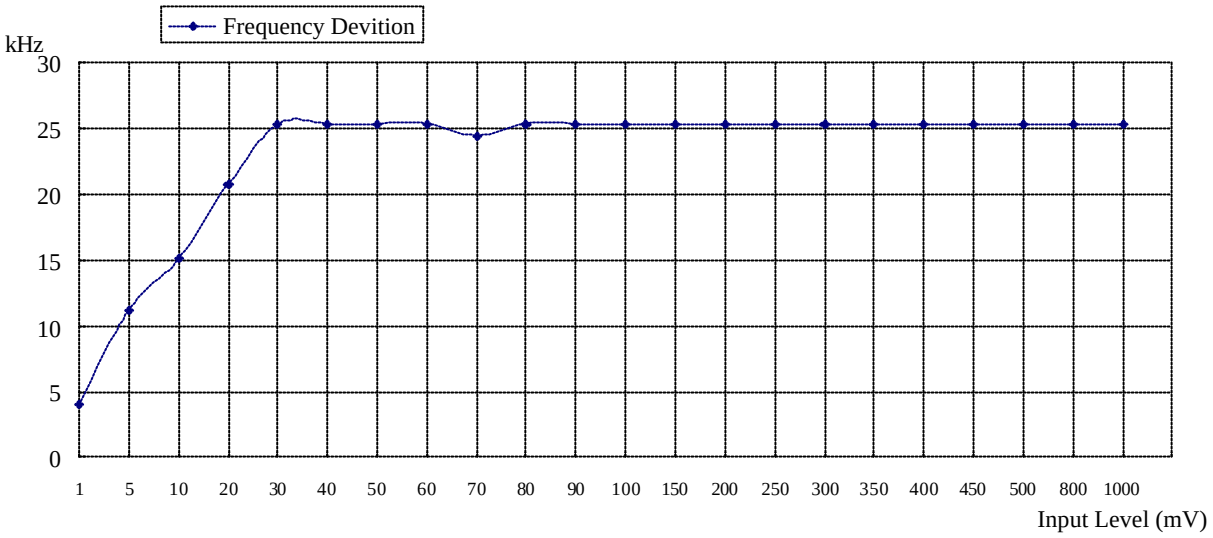


2. 740.200MHz



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

3. 806.000 MHz



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 139.0KHz.
The Channel Mid 26 dB Bandwidth is 146.0KHz.
The Channel High 26 dB Bandwidth is 136.0KHz.

Please see appendix 1 for plotted data.

6. FIELD STRENGTH OF EMISSION

6.1 Provisions Applicable

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

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

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

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

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

6.2 Measurement Procedure

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

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

6.3 Measuring Instrument

Equipment	Manufacturer	Model No.	Next Cal. Date
Spectrum Analyzer	Hewlett-Packard	8564E	08/08/2006
Horn Antenna	EMCO	3115	08/18/2006
Log periodic Antenna	EMCO	3146	07/31/2006
Biconical Antenna	EMCO	3110B	10/05/2006
Preamplifier	Hewlett-Packard	8449B	09/13/2006
Preamplifier	Hewlett-Packard	8447D	08/03/2006

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 : Jan. 19, 2006
Temperature : 19 °C
Humidity : 65 %

Unmodulated carrier output power is 18.8 dBm , or 75.858 mW (ERP).

The limit of spurious or harmonics is calculated as following :

18.8-[43+10log(carrier output power in W)], or -13dBm

Frequency (MHz)	Meter Reading (dBuV) H	V	SG Reading (dBm) H	V	Antenna Gain	Antenna Gain Corr'	Cable Loss (dB)	Result (dBm) H	V	Limit (dBm)	Margin (dB)
1260.496	52.1	50.3	-19.1	-24.3	6.4	-2.0	1.30	-18.0	-23.6	-13.0	-10.6
1890.744	---	---	---	---	9.3	-2.0	1.75	---	---	-13.0	---
2520.992	---	---	---	---	9.2	-2.0	1.75	---	---	-13.0	---
3151.240	---	---	---	---	9.7	-2.0	1.75	---	---	-13.0	---
3781.488	---	---	---	---	9.6	-2.0	2.10	---	---	-13.0	---
4411.736	---	---	---	---	10.6	-2.0	2.10	---	---	-13.0	---
5041.984	---	---	---	---	10.9	-2.0	2.10	---	---	-13.0	---
5672.232	---	---	---	---	10.9	-2.0	2.60	---	---	-13.0	---
6302.480	---	---	---	---	12.1	-2.0	2.60	---	---	-13.0	---

Note :

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

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

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

B. Channel Mid

Operated mode : TX
Temperature : 19 °C
Test Date : Jan. 19, 2006
Humidity : 65 %

Unmodulated carrier output power is 18.4 dBm , or 69.183 mW (ERP).
The limit of spurious or harmonics is calculated as following :

18.4-[43+10log(carrier output power in W)], or -13dBm

Frequency (MHz)	Meter Reading (dBuV) H	V	SG Reading (dBm) H	V	Antenna Gain	Antenna Gain Corr'	Cable Loss (dB)	Result (dBm) H	V	Limit (dBm)	Margin (dB)
1497.748	49.3	52.1	-28.0	-22.1	9.1	-2.0	1.3	-18.2	-18.3	-13.0	-5.3
2246.625	---	---	---	---	9.4	-2.0	1.7	---	---	-13.0	---
2995.502	---	---	---	---	9.7	-2.0	1.7	---	---	-13.0	---
3744.379	---	---	---	---	9.6	-2.0	2.1	---	---	-13.0	---
4493.256	---	---	---	---	10.9	-2.0	2.1	---	---	-13.0	---
5242.133	---	---	---	---	10.9	-2.0	2.1	---	---	-13.0	---
5991.010	---	---	---	---	11.0	-2.0	2.6	---	---	-13.0	---
6739.887	---	---	---	---	12.1	-2.0	2.6	---	---	-13.0	---
7488.764	---	---	---	---	11.6	-2.0	2.9	---	---	-13.0	---

Note :

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

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

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

C. Channel High

Operated mode : TX
Temperature : 19 °C
Test Date : Jan. 19, 2006
Humidity : 65 %

Unmodulated carrier output power is 18.5 dBm , or 72.444 mW (ERP).
The limit of spurious or harmonics is calculated as following :

18.5-[43+10log(carrier output power in W)], or -13dBm

Frequency (MHz)	Meter Reading (dBuV) H	V	SG Reading (dBm) H	V	Antenna Gain	Antenna Gain Corr'	Cable Loss (dB)	Result (dBm) H	V	Limit (dBm)	Margin (dB)
1610.984	50.0	49.2	-26.6	-27.3	9.1	-2.0	1.3	-18.8	-17.5	-13.0	-5.8
2416.476	---	---	---	---	9.3	-2.0	1.7	---	---	-13.0	---
3221.968	---	---	---	---	9.7	-2.0	1.7	---	---	-13.0	---
4027.460	---	---	---	---	9.6	-2.0	2.1	---	---	-13.0	---
4832.952	---	---	---	---	10.9	-2.0	2.1	---	---	-13.0	---
5638.444	---	---	---	---	10.9	-2.0	2.1	---	---	-13.0	---
6443.936	---	---	---	---	11.9	-2.0	2.5	---	---	-13.0	---
7249.428	---	---	---	---	11.8	-2.0	2.5	---	---	-13.0	---
8054.920	---	---	---	---	11.5	-2.0	2.9	---	---	-13.0	---

Note :

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

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

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

D. Emission mask plots

Please see appendix 2 for plotted data.

6.5 Other Emission

1. TX(630.000MHz)

a) Emission frequencies below 1 GHz

Test Date : Jan. 19, 2006 Temperature : 19 °C Humidity : 65 %

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)
92.150	H	35.4	-14.0	21.4	43.5	-22.1	74	1.0
112.320	H	33.9	-11.5	22.4	43.5	-21.1	272	1.0
134.770	V	33.6	-11.2	22.4	43.5	-21.1	254	1.0
136.210	V	33.1	-11.1	22.0	43.5	-21.5	162	1.0
174.250	H	35.2	-9.0	26.2	43.5	-17.3	153	1.0
178.500	H	36.5	-9.1	27.4	43.5	-16.1	20	1.0

Note :

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

b) Emission frequencies above 1 GHz

Radiated emission frequencies above 1 GHz to 25 GHz were too low to be measured with a pre-amplifier of 35 dB.

2. TX(748.804MHz)

a) Emission frequencies below 1 GHz

Test Date : Jan. 19, 2006 Temperature : 19 °C Humidity : 65 %

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)
44.310	V	37.9	-12.8	25.1	40.0	-14.9	62	2.0
48.360	V	34.1	-13.7	20.4	40.0	-19.6	152	1.5
72.390	V	34.5	-16.1	18.4	40.0	-21.6	33	1.7
737.500	H	22.0	-0.6	21.4	46.0	-24.6	122	1.2
792.800	H	21.8	0.4	22.2	46.0	-23.8	162	1.0
878.900	H	21.8	2.4	24.2	46.0	-21.8	154	1.0

Note :

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

b) Emission frequencies above 1 GHz

Radiated emission frequencies above 1 GHz to 25 GHz were too low to be measured with a pre-amplifier of 35 dB.

3. TX(806.000MHz)

a) Emission frequencies below 1 GHz

Test Date : Jan. 19, 2006 Temperature : 19 °C Humidity : 65 %

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)
132.600	V	30.6	-11.3	19.3	43.5	-24.2	27	1.0
152.580	V	28.1	-9.9	18.2	43.5	-25.3	34	1.0
158.700	V	27.0	-9.6	17.4	43.5	-26.1	128	1.5
742.900	H	22.8	-0.4	22.4	46.0	-23.6	156	1.5
794.900	H	24.6	0.5	25.1	46.0	-20.9	315	1.0
871.200	H	23.7	2.4	26.1	46.0	-19.9	25	1.0

Note :

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

b) Emission frequencies above 1 GHz

Radiated emission frequencies above 1 GHz to 25 GHz were too low to be measured with a pre-amplifier of 35 dB.

6.6 Radiated Measurement Photos

Mode: TX

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 variation of 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.

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.

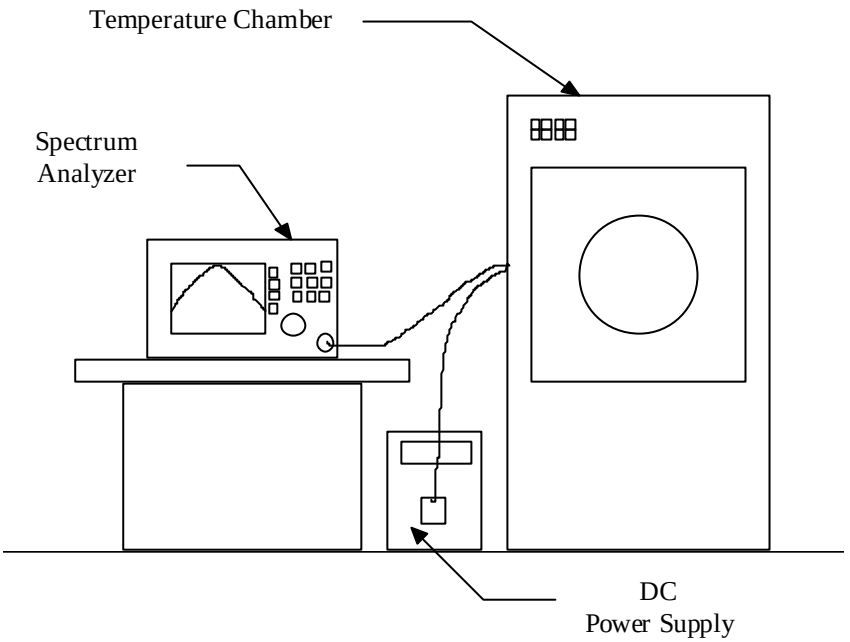
B) Frequency stability versus input voltage

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 non hand carried, battery operated device, supply the EUT primary voltage with 85 and 115 percent of the nominal value and record the frequency.

Figure 5 : Frequency stability measurement configuration



7.3 Measurement Instrument

Equipment	Manufacturer	Model No.	Next Cal. Date
Spectrum Analyzer	HP	8564E	08/08/2006
Temperature Chamber	MALLIER	MCT-2X-M	11/01/2006

7.4 Measurement Data

A1. Frequency stability versus enviroment tempture

Reference Frequency : 630.248 MHz		Limit：0.005%					
Enviroment Tempture (℃)	Power Supplied (Vac)	Frequency measured with time elapsed					
		2 minute		5 minute		10 minute	
		(MHz)	(%)	(MHz)	(%)	(MHz)	(%)
50	120	630.2401	-0.00126	630.2442	-0.00061	630.2528	0.00076
40		630.2529	0.00077	630.2248	-0.00369	630.2409	-0.00112
30		630.2560	0.00126	630.2543	0.00100	630.2317	-0.00258
20		630.2718	0.00378	630.2500	0.00032	630.2658	0.00283
10		630.2500	0.00032	630.2348	-0.00209	630.2405	-0.00119
0		630.2592	0.00178	630.2589	0.00173	630.2618	0.00219
-10		630.2481	0.00002	630.2361	-0.00189	630.2344	-0.00215
-20		630.2372	-0.00172	630.2615	0.00215	630.2320	-0.00254
-30		630.2675	0.00310	630.2529	0.00077	630.2603	0.00195

A2. Frequency stability versus supplied voltage (85% - 115%)

Reference Frequency : 630.248 MHz		Limit：0.005%					
Enviroment Tempture (℃)	Power Supplied (Vac)	Frequency measured with time elapsed					
		2 minute		5 minute		10 minute	
		(MHz)	(%)	(MHz)	(%)	(MHz)	(%)
25	102	630.2631	0.00239	630.2359	-0.00192	630.2469	-0.00017
25	138	630.2605	0.00198	630.2317	-0.00259	630.2381	-0.00157

B1. Frequency stability versus enviroment tempture

Reference Frequency : 748.804 MHz		Limit：0.005%					
Enviroment Tempture (℃)	Power Supplied (Vac)	Frequency measured with time elapsed					
		2 minute		5 minute		10 minute	
		(MHz)	(%)	(MHz)	(%)	(MHz)	(%)
50	120	748.8228	0.00251	748.8243	0.00271	748.7885	-0.00207
40		748.7947	-0.00124	748.7922	-0.00158	748.7874	-0.00222
30		748.8131	0.00121	748.8217	0.00237	748.7835	-0.00274
20		748.8054	0.00019	748.8161	0.00162	748.8248	0.00277
10		748.7757	-0.00378	748.8205	0.00221	748.7985	-0.00074
0		748.8096	0.00074	748.7979	-0.00082	748.7843	-0.00263
-10		748.8092	0.00069	748.8091	0.00068	748.8023	-0.00022
-20		748.7768	-0.00363	748.8008	-0.00042	748.8114	0.00099
-30		748.7969	-0.00094	748.8094	0.00072	748.7850	-0.00253

B2. Frequency stability versus supplied voltage (85% - 115%)

Reference Frequency : 748.804 MHz		Limit：0.005%					
Enviroment Tempture (℃)	Power Supplied (Vac)	Frequency measured with time elapsed					
		2 minute		5 minute		10 minute	
		(MHz)	(%)	(MHz)	(%)	(MHz)	(%)
25	102	748.7776	-0.00353	748.8027	-0.00018	748.8172	0.00177
25	138	748.7766	-0.00366	748.7932	-0.00144	748.8159	0.00159

C1. Frequency stability versus enviroment tempture

Reference Frequency : 806.000 MHz		Limit：0.005%					
Enviroment Tempture (℃)	Power Supplied (Vac)	Frequency measured with time elapsed					
		2 minute		5 minute		10 minute	
		(MHz)	(%)	(MHz)	(%)	(MHz)	(%)
50	120	805.4662	-0.00321	805.5009	0.00110	805.4866	-0.00068
40		805.5162	0.00300	805.4761	-0.00198	805.4663	-0.00319
30		805.4655	-0.00329	805.4619	-0.00374	805.5011	0.00113
20		805.4913	-0.00009	805.5044	0.00154	805.5182	0.00325
10		805.5025	0.00130	805.4981	0.00076	805.5182	0.00326
0		805.5196	0.00343	805.5010	0.00112	805.4999	0.00098
-10		805.4975	0.00068	805.4773	-0.00183	805.5187	0.00332
-20		805.5026	0.00131	805.5185	0.00329	805.5133	0.00264
-30		805.4649	-0.00337	805.4704	-0.00268	805.5124	0.00253

C2. Frequency stability versus supplied voltage (85% - 115%)

Reference Frequency : 806.000 MHz		Limit：0.005%					
Enviroment Tempture (℃)	Power Supplied (Vac)	Frequency measured with time elapsed					
		2 minute		5 minute		10 minute	
		(MHz)	(%)	(MHz)	(%)	(MHz)	(%)
25	102	806.0219	0.00271	805.9892	-0.00134	805.9779	-0.00274
25	138	805.9906	-0.00116	806.0058	0.00072	805.9732	-0.00332

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.

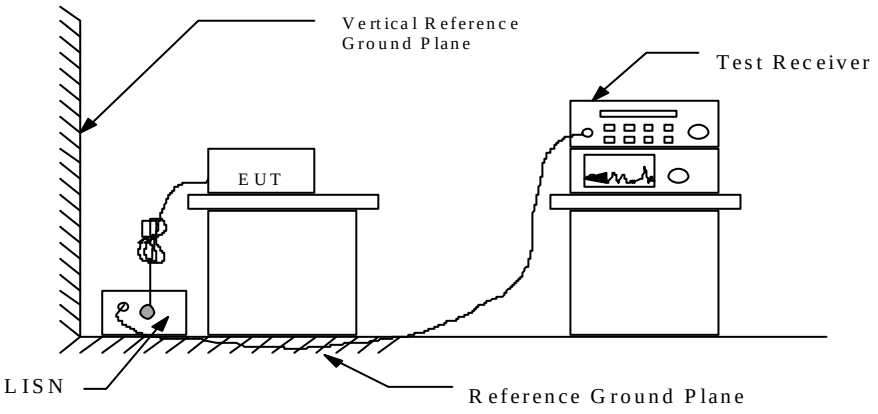
3. Record the 6 or 8 highest emissions relative to the limit.

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

1. Operation Mode: TX(630.000MHz)

Test Date : Nov. 17, 2005 Temperature : 26 °C Humidity : 55 %

Frequency (MHz)	**Meter Reading** (dBuV)				**Factor** (dB)	**Result** (dBuV)				**Limit** (dBuV)		**Margins** (dBuV)	
	Q.P. Value		AVG. Value			Q.P. Value		AVG. Value		Q.P. Value	AVG. Value	Q.P.	AVG.
	N	L1	N	L1		N	L1	N	L1				
0.1920	44.2	43.0	----	----	0.2	44.4	43.2	----	----	63.9	53.9	-19.5	----
0.2080	43.9	42.3	----	----	0.2	44.1	42.5	----	----	63.3	53.3	-19.2	----
0.2240	43.0	41.9	----	----	0.2	43.2	42.1	----	----	62.7	52.7	-19.5	----
0.2820	42.2	39.5	----	----	0.2	42.4	39.7	----	----	60.8	50.8	-18.3	----
0.3250	41.4	37.6	----	----	0.3	41.7	37.9	----	----	59.6	49.6	-17.9	----
0.3570	40.9	36.3	----	----	0.3	41.2	36.6	----	----	58.8	48.8	-17.6	----

2. Operation Mode: TX(740.200MHz)

Test Date : Nov. 17, 2005 Temperature : 26 °C Humidity : 55 %

Frequency (MHz)	**Meter Reading** (dBuV)				**Factor** (dB)	**Result** (dBuV)				**Limit** (dBuV)		**Margins** (dBuV)	
	Q.P. Value		AVG. Value			Q.P. Value		AVG. Value		Q.P. Value	AVG. Value	Q.P.	AVG.
	N	L1	N	L1		N	L1	N	L1				
0.1650	44.7	44.1	----	----	0.2	44.9	44.3	----	----	65.2	55.2	-20.3	----
0.2240	43.3	42.0	----	----	0.2	43.5	42.2	----	----	62.7	52.7	-19.2	----
0.2550	42.6	40.9	----	----	0.2	42.8	41.1	----	----	61.6	51.6	-18.8	----
0.3410	41.1	37.3	----	----	0.3	41.4	37.6	----	----	59.2	49.2	-17.8	----
0.3880	40.3	35.4	----	----	0.3	40.6	35.7	----	----	58.1	48.1	-17.5	----
0.4070	39.9	34.5	----	----	0.3	40.2	34.8	----	----	57.7	47.7	-17.5	----

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

3. Operation Mode: TX(806.000MHz)

Test Date : Nov. 17, 2005 Temperature : 26 °C Humidity : 55 %

Frequency (MHz)	**Meter Reading** (dBuV)				**Factor** (dB)	**Result** (dBuV)				**Limit** (dBuV)		**Margins** (dBuV)	
	Q.P. Value		AVG. Value			Q.P. Value		AVG. Value		Q.P. Value	AVG. Value	Q.P.	AVG.
	N	L1	N	L1		N	L1	N	L1				
0.1690	45.3	44.5	----	----	0.2	45.5	44.7	----	----	65.0	55.0	-19.5	----
0.1850	44.9	43.9	----	----	0.2	45.1	44.1	----	----	64.3	54.3	-19.2	----
0.2000	44.5	43.3	----	----	0.2	44.7	43.5	----	----	63.6	53.6	-18.9	----
0.2590	43.1	41.4	----	----	0.2	43.3	41.6	----	----	61.5	51.5	-18.1	----
0.2750	42.8	40.7	----	----	0.2	43.0	40.9	----	----	61.0	51.0	-17.9	----
0.2900	42.5	39.8	----	----	0.2	42.7	40.0	----	----	60.5	50.5	-17.8	----

Note : 1. Please see appendix 1 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.

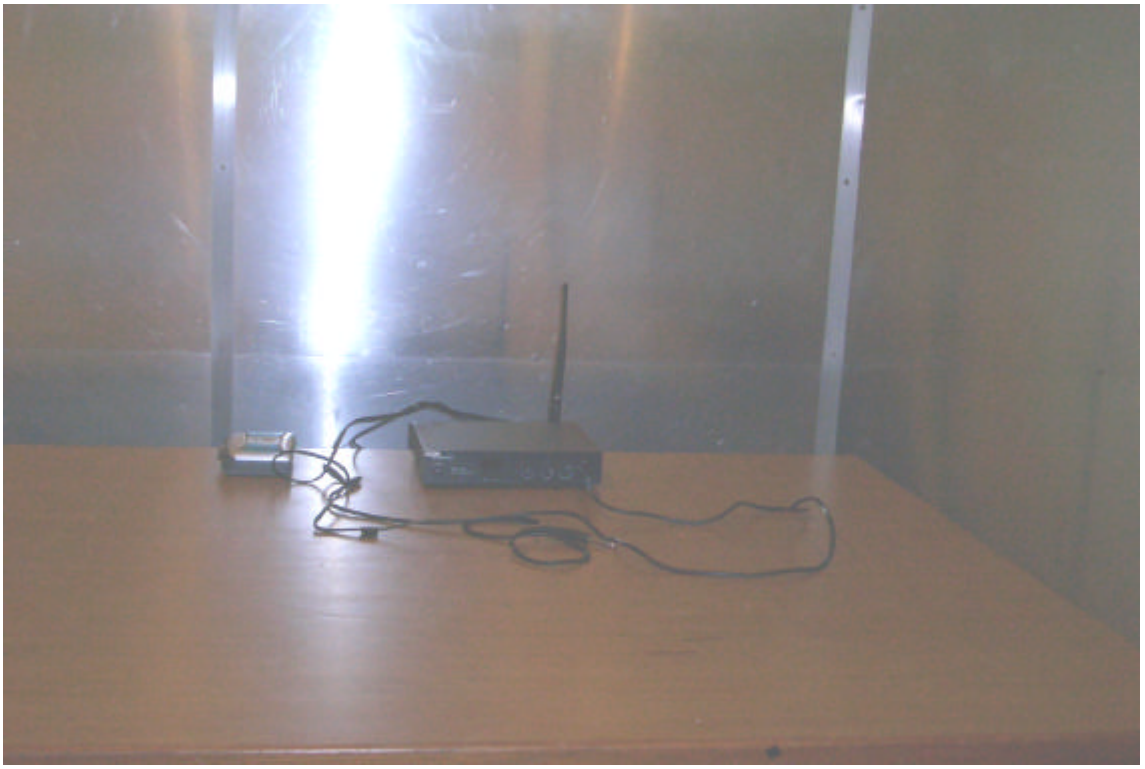
RESULT = 22.5 + 0.1 = 22.6 dBμV
Level in μV = Common Antilogarithm[(22.6 dBμV)/20]
= 13.48 μV

8.5 Conducted Measurement Equipment

The following test equipment are used during the conducted test .

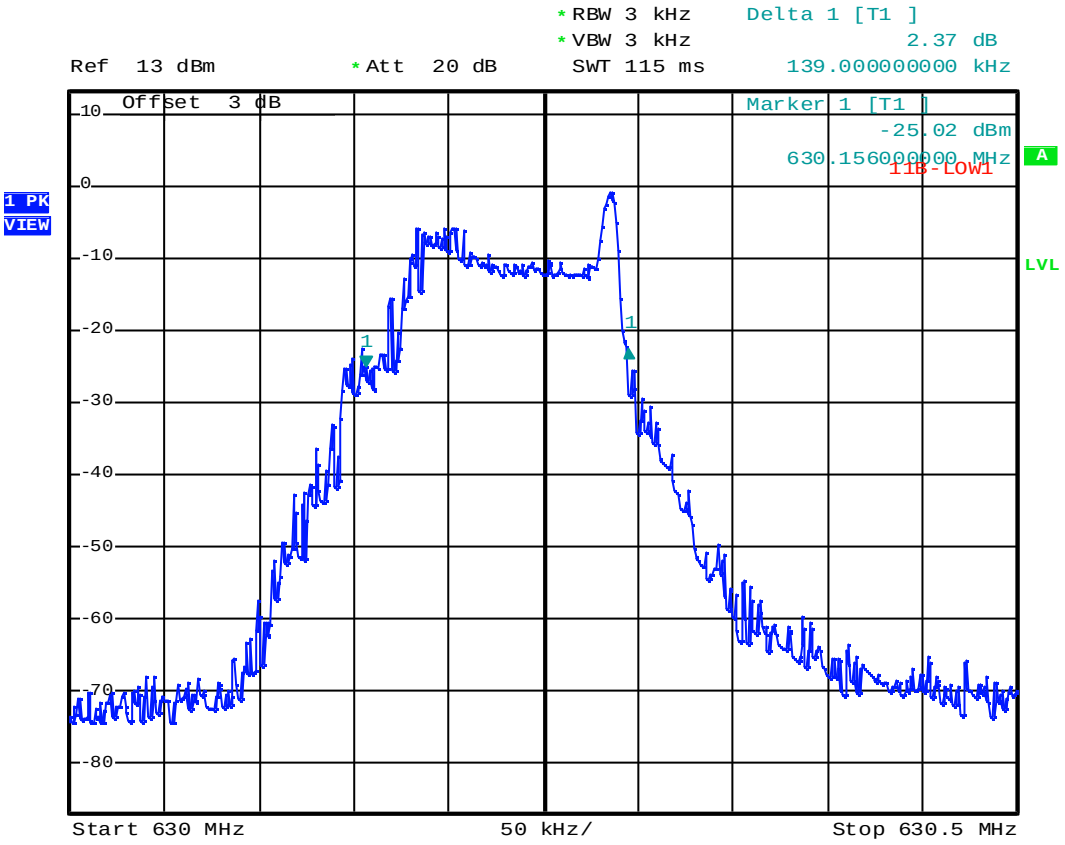
Equipment	Manufacturer	Model No.	Next Cal. Due
EMI Test Receiver	Rohde and Schwarz	ESCS30	12/06/2005
Line Impedance Stabilization network	Rohde and Schwarz	ESH2-Z5	09/11/2006
Line Impedance Stabilization network	Kyoritsu	KNW-407	12/25/2005
Shielded Room	Riken	----	N/A
Monitor	IBM	E54	N/A
Printer	HP	LASERJET 1000	N/A
Computer	ACER	Veriton 7500G	N/A

8.6 Photos of Conduction Measuring Setup



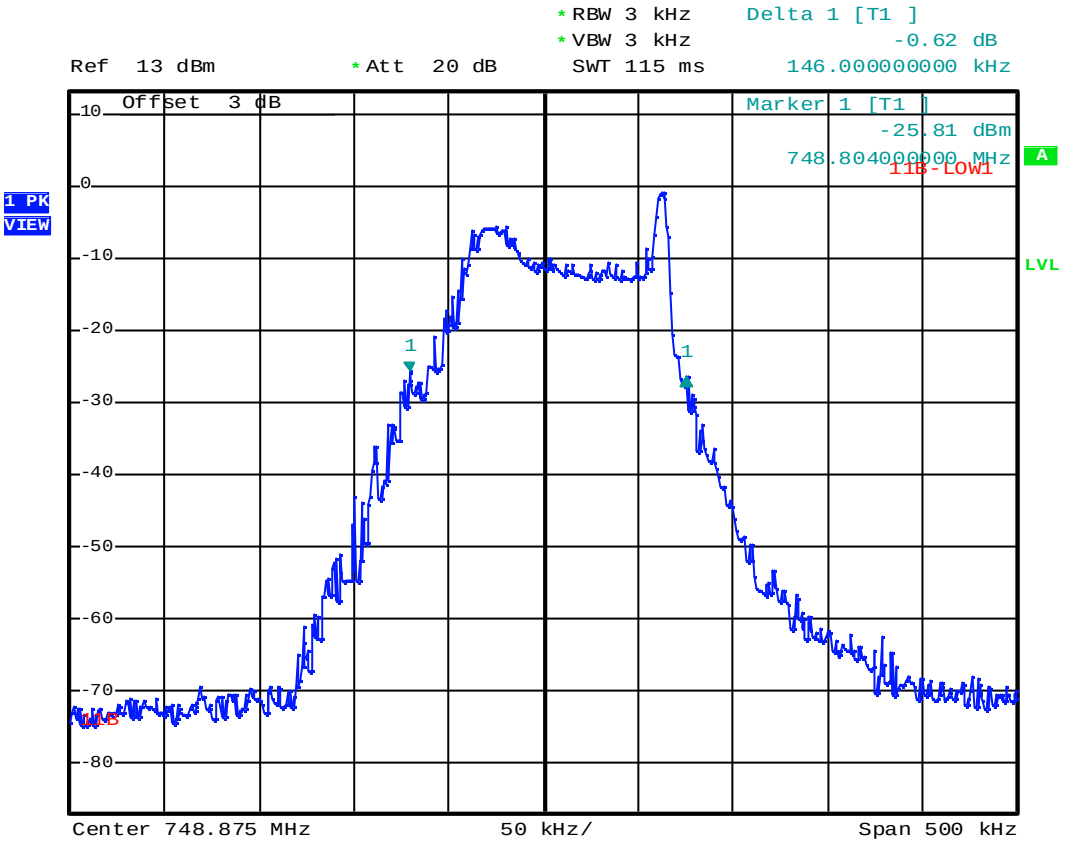
Appendix 1 : Occupied Emission Bandwidth Plotted Data

630.000MHz



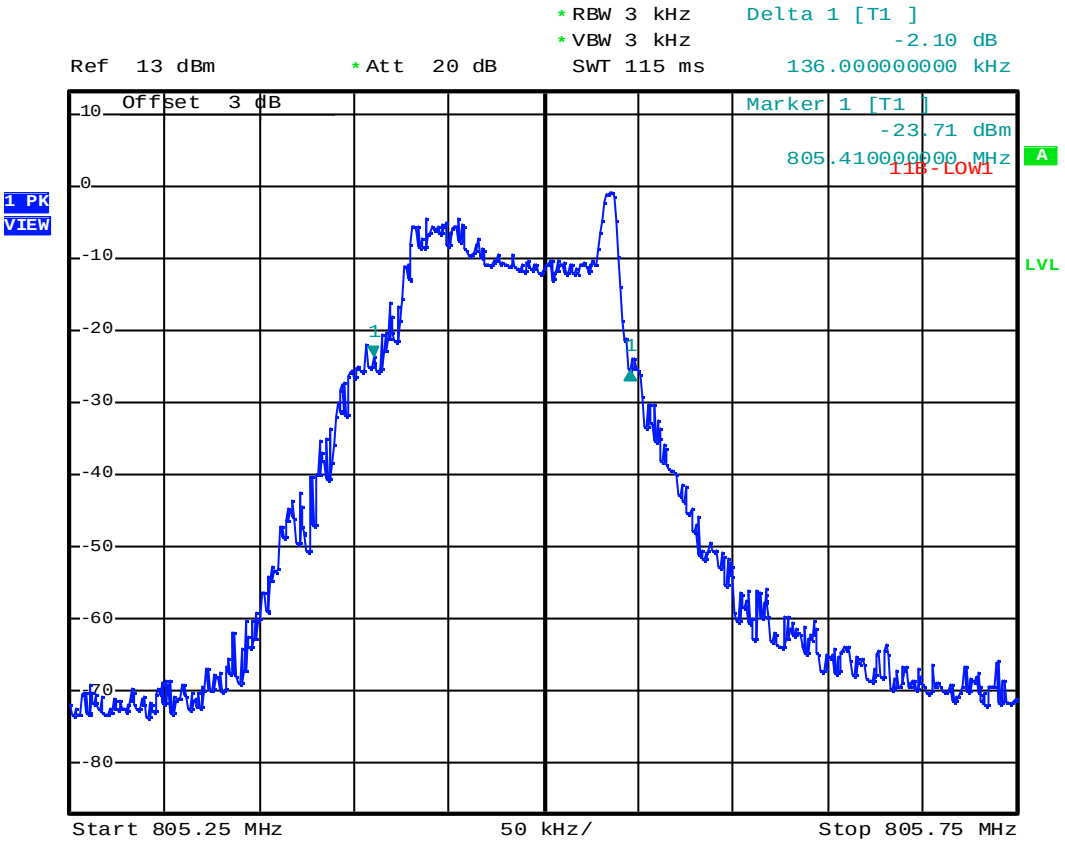
Date: 4.DEC.2005 10:44:07

748.804MHz



Date: 4.DEC.2005 10:35:14

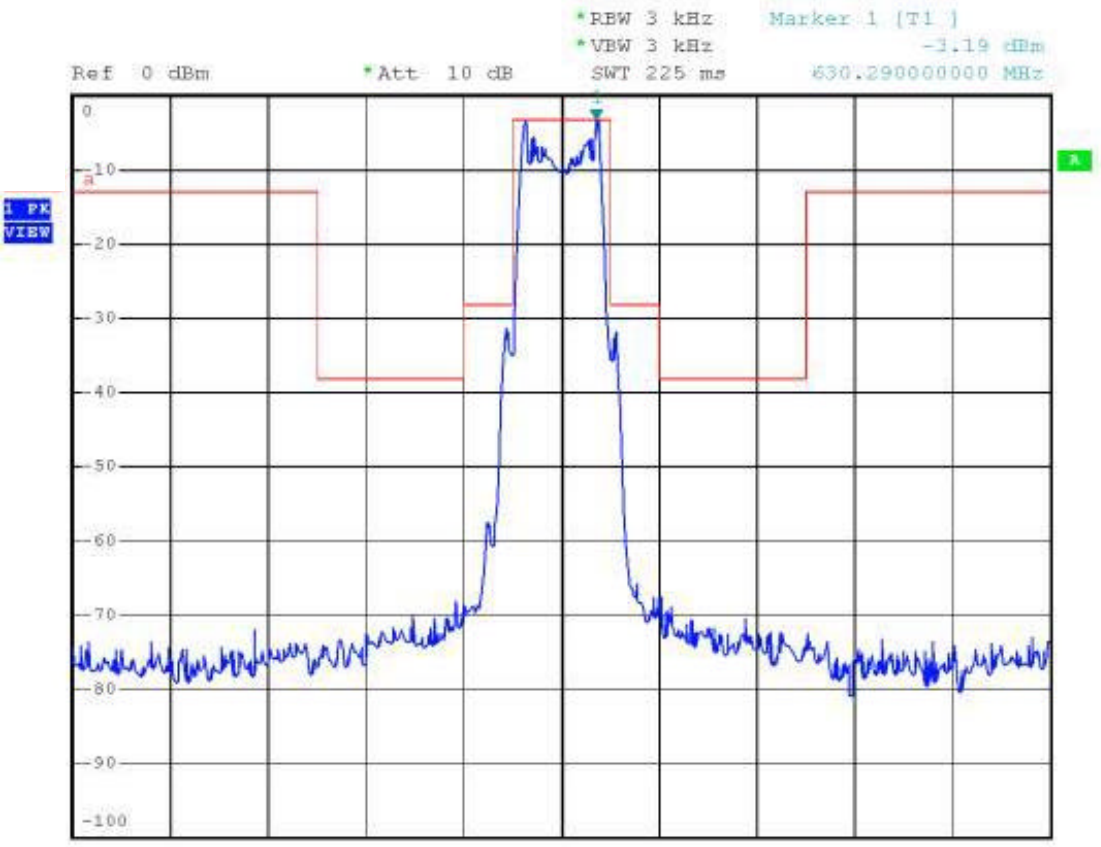
806.000MHz



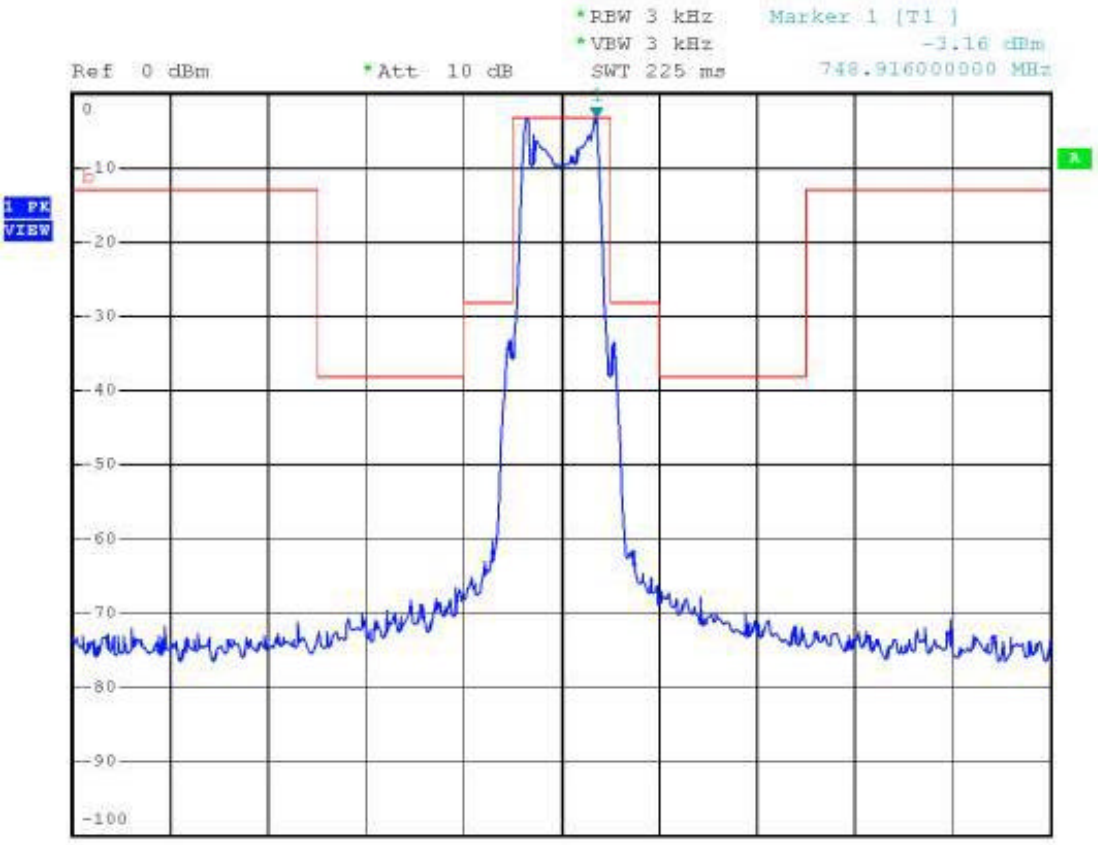
Date: 4.DEC.2005 10:42:38

Appendix 2 : Emission Mask Plotted Data

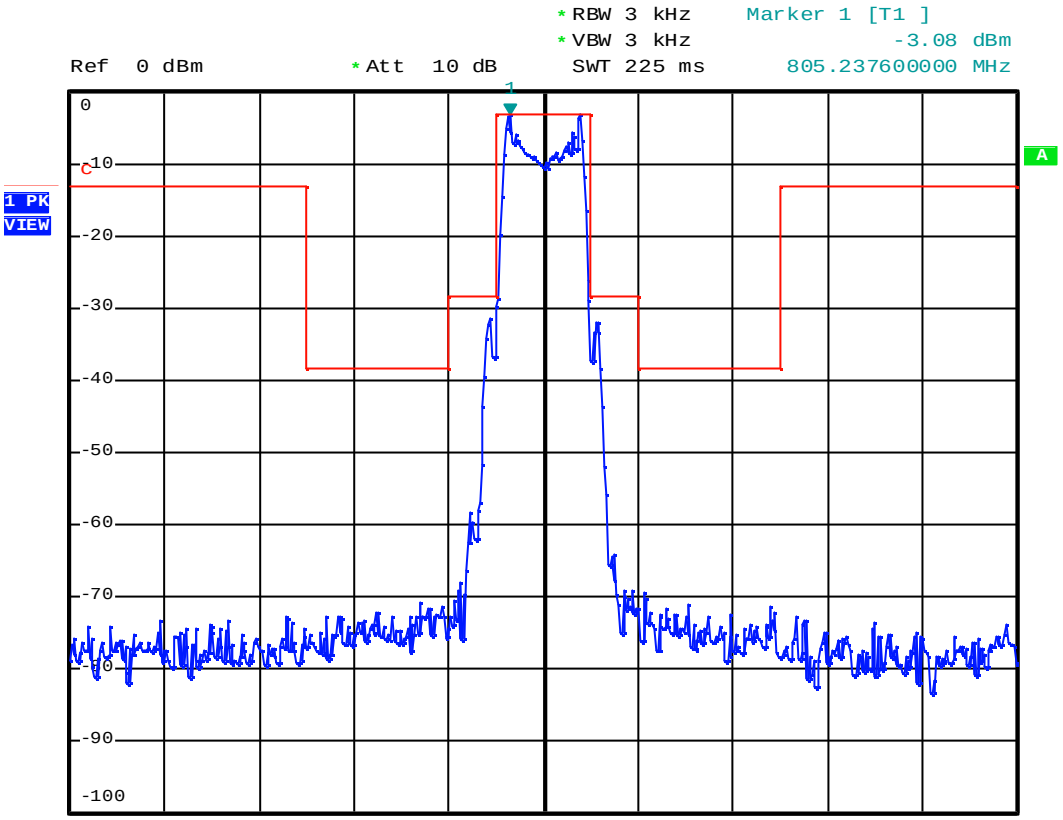
630.000MHz


*RBW 3 kHz
*VBW 3 kHz
SWT 225 ms
Marker 1 [T1]
-3.19 dBm
630.290000000 MHz
Ref 0 dBm
*Att 10 dB
1 PK
VIEW
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100

748.804MHz


*RBW 3 kHz
*VBW 3 kHz
SWT 225 ms
Marker 1 [T1]
-3.16 dBm
748.916000000 MHz
Ref 0 dBm
*Att 10 dB
1 PK
VIEW
A
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100

806.000MHz


*RBW 3 kHz
Marker 1 [T1]
*VBW 3 kHz
-3.08 dBm
Ref 0 dBm
*Att 10 dB
SWT 225 ms
805.237600000 MHz
1
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
1 PK
VIEW
A

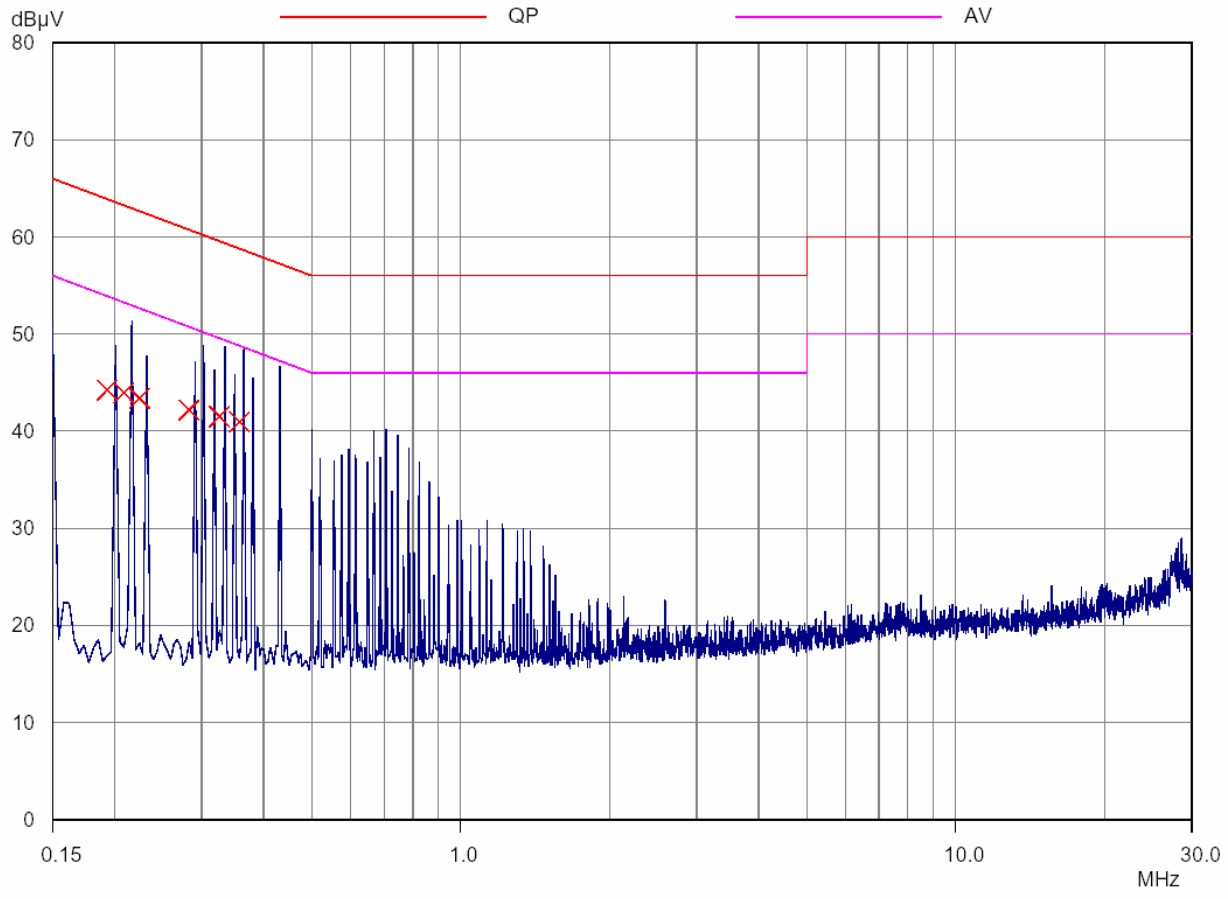
Appendix 3 : Plotted Data of Conducted Emissions

CONDUCTION EMISSION TEST

Peak Value

EUT:	TX 630-646
Manuf:	
Op Cond:	
Operator:	
Test Spec:	
Comment:	N

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

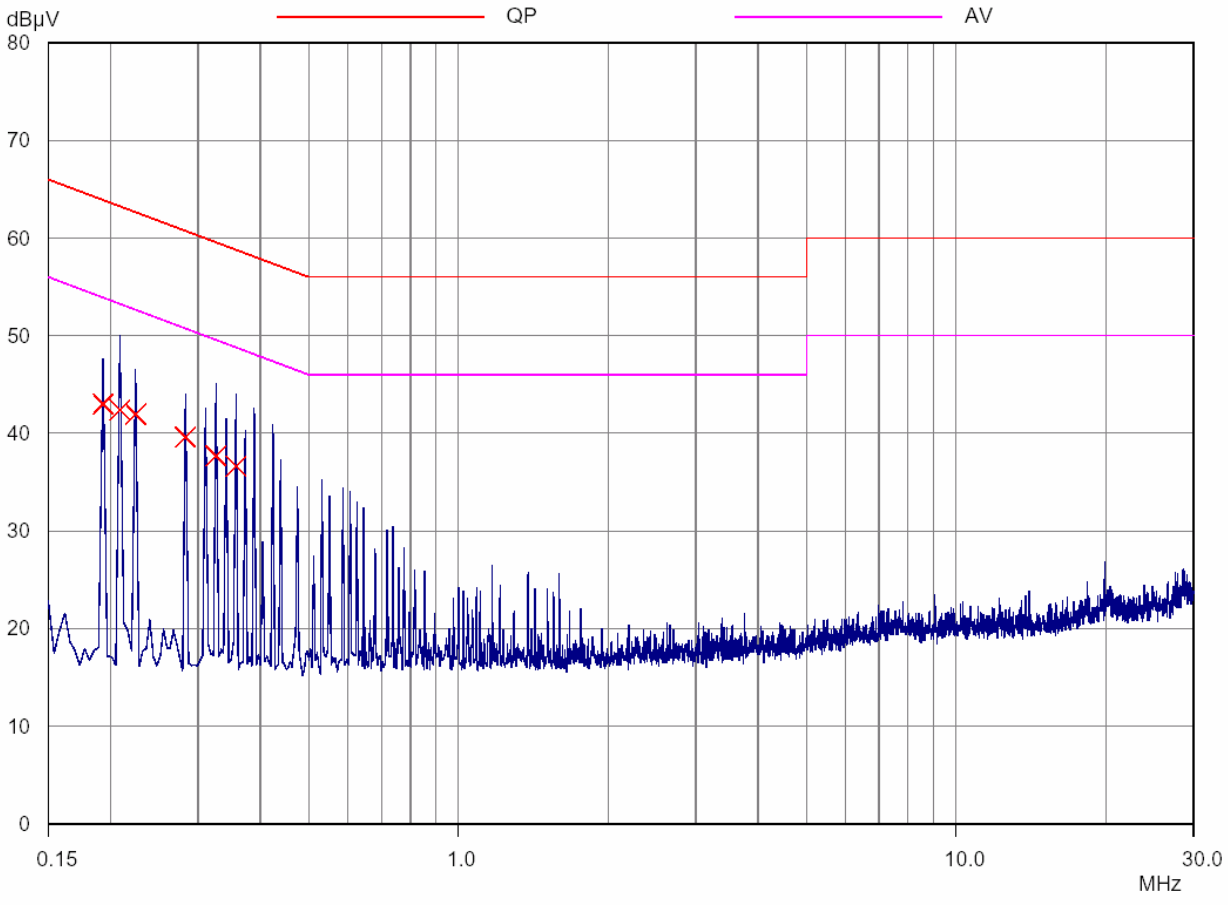


CONDUCTION EMISSION TEST

Peak Value

EUT: TX 630-646
Manuf:
Op Cond:
Operator:
Test Spec:
Comment: L1

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

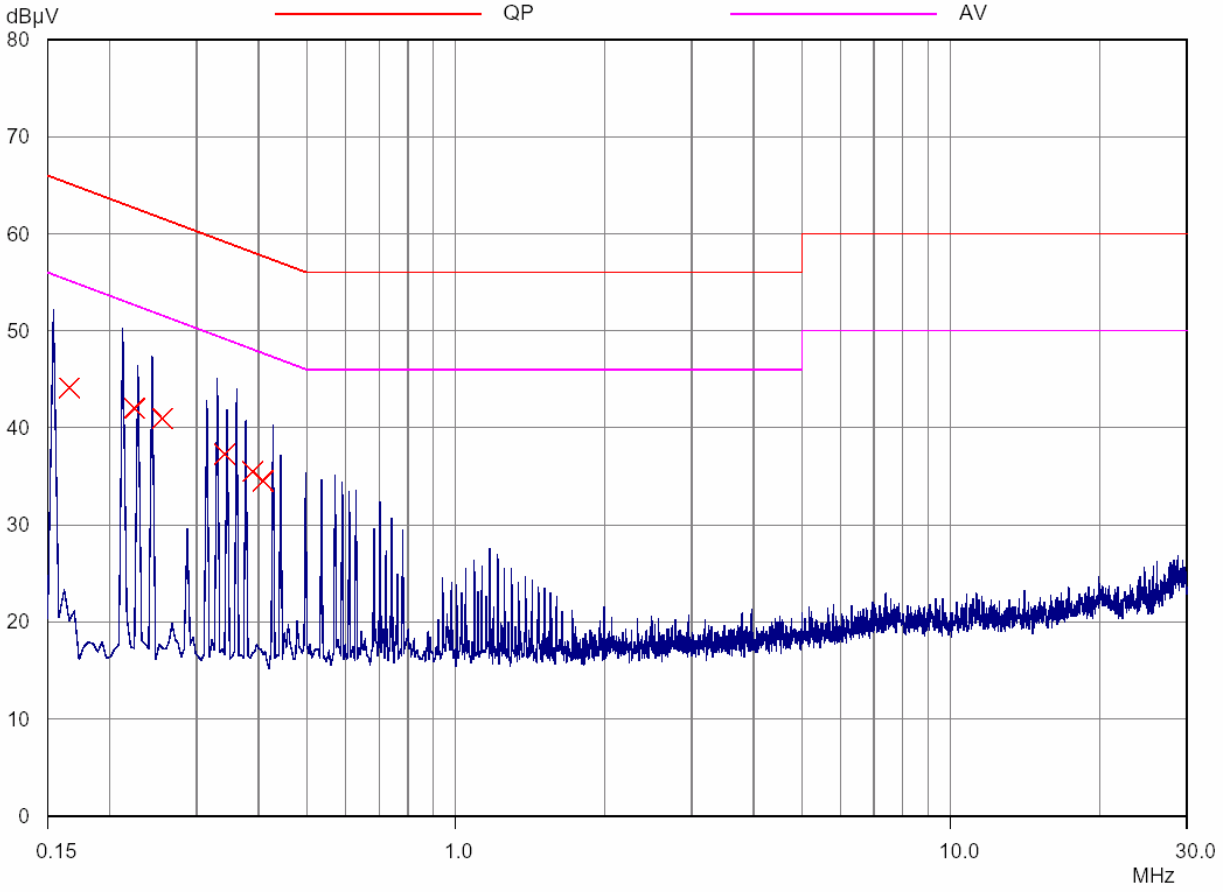


CONDUCTION EMISSION TEST

Peak Value

EUT: TX 740-752
Manuf:
Op Cond:
Operator:
Test Spec:
Comment: L1

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

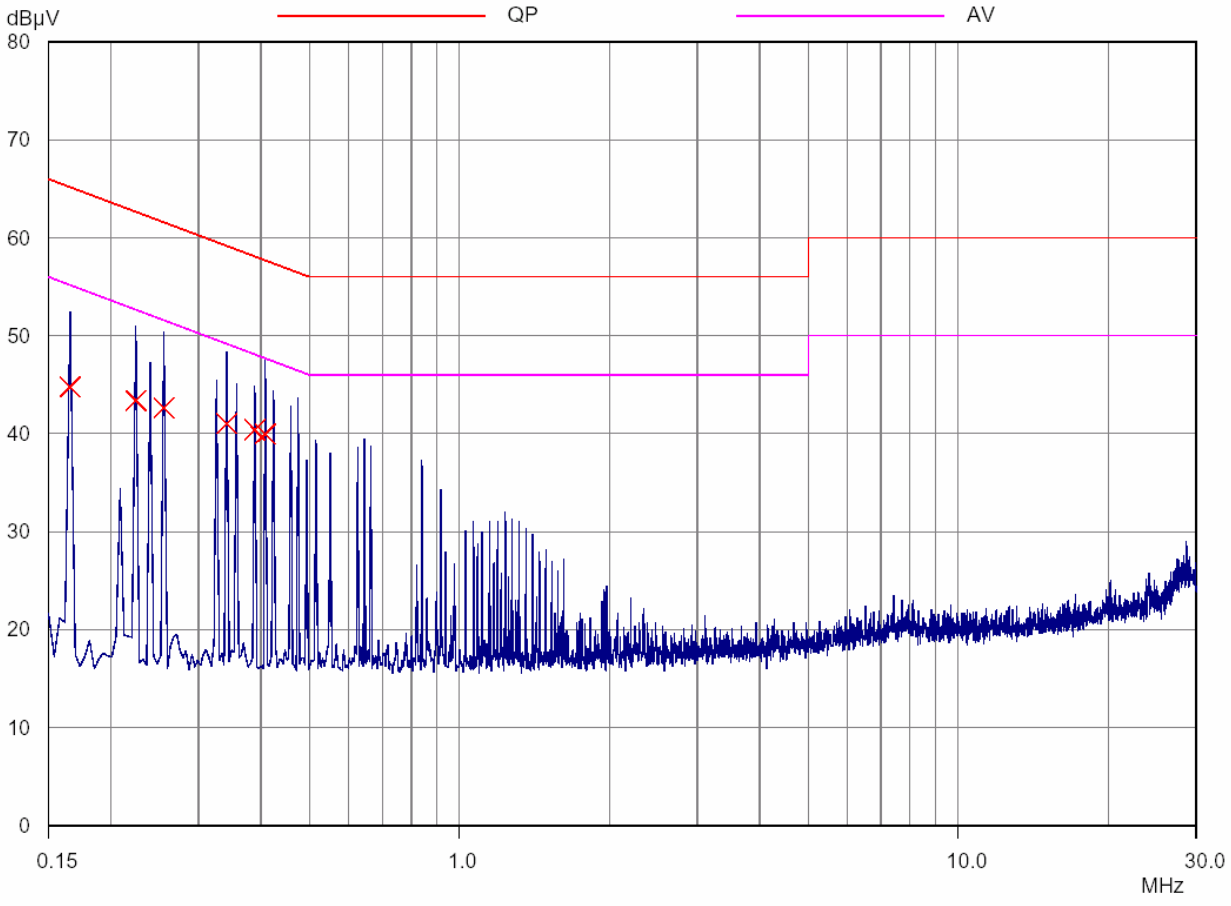


CONDUCTION EMISSION TEST

Peak Value

EUT: TX 740-752
Manuf:
Op Cond:
Operator:
Test Spec:
Comment: N

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

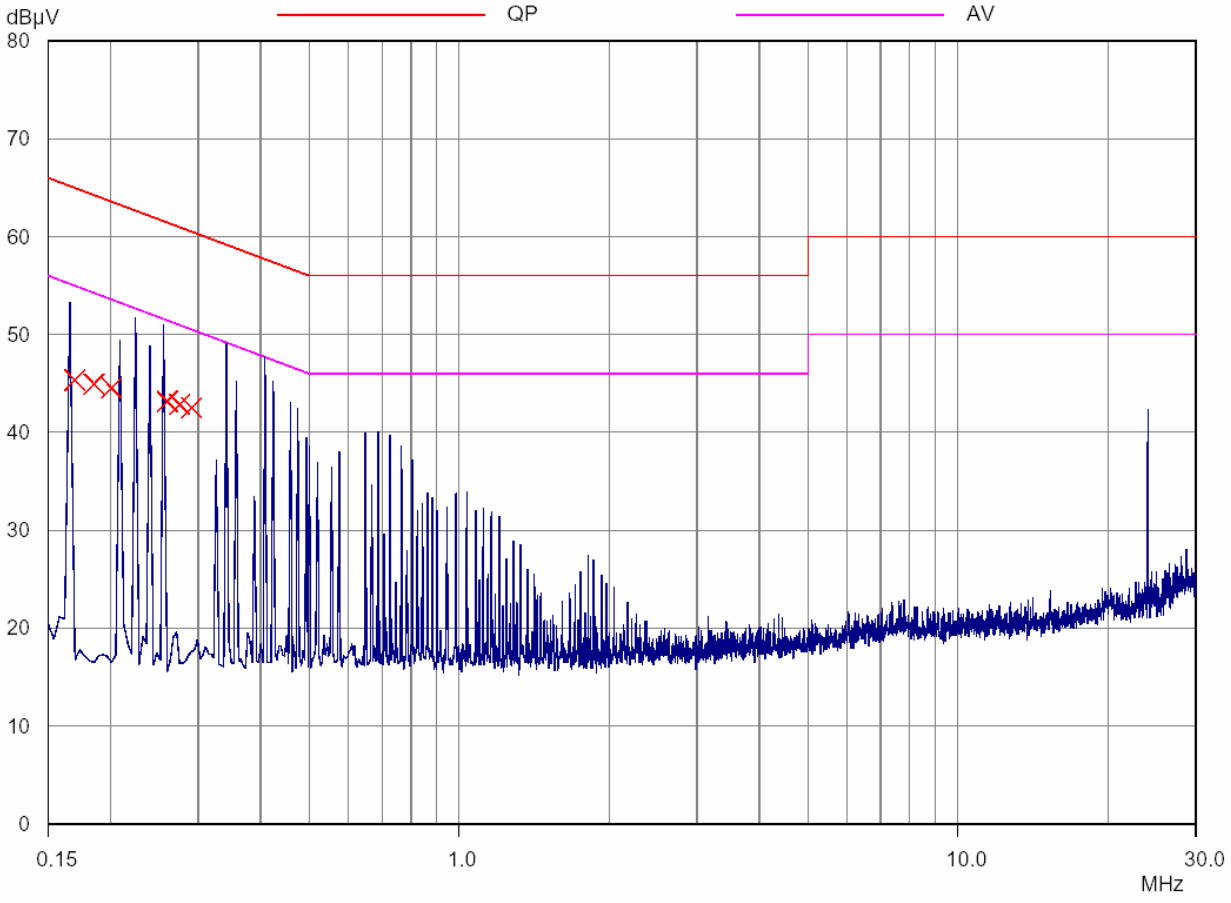


CONDUCTION EMISSION TEST

Peak Value

EUT: TX 794-813
Manuf:
Op Cond:
Operator:
Test Spec:
Comment: N

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

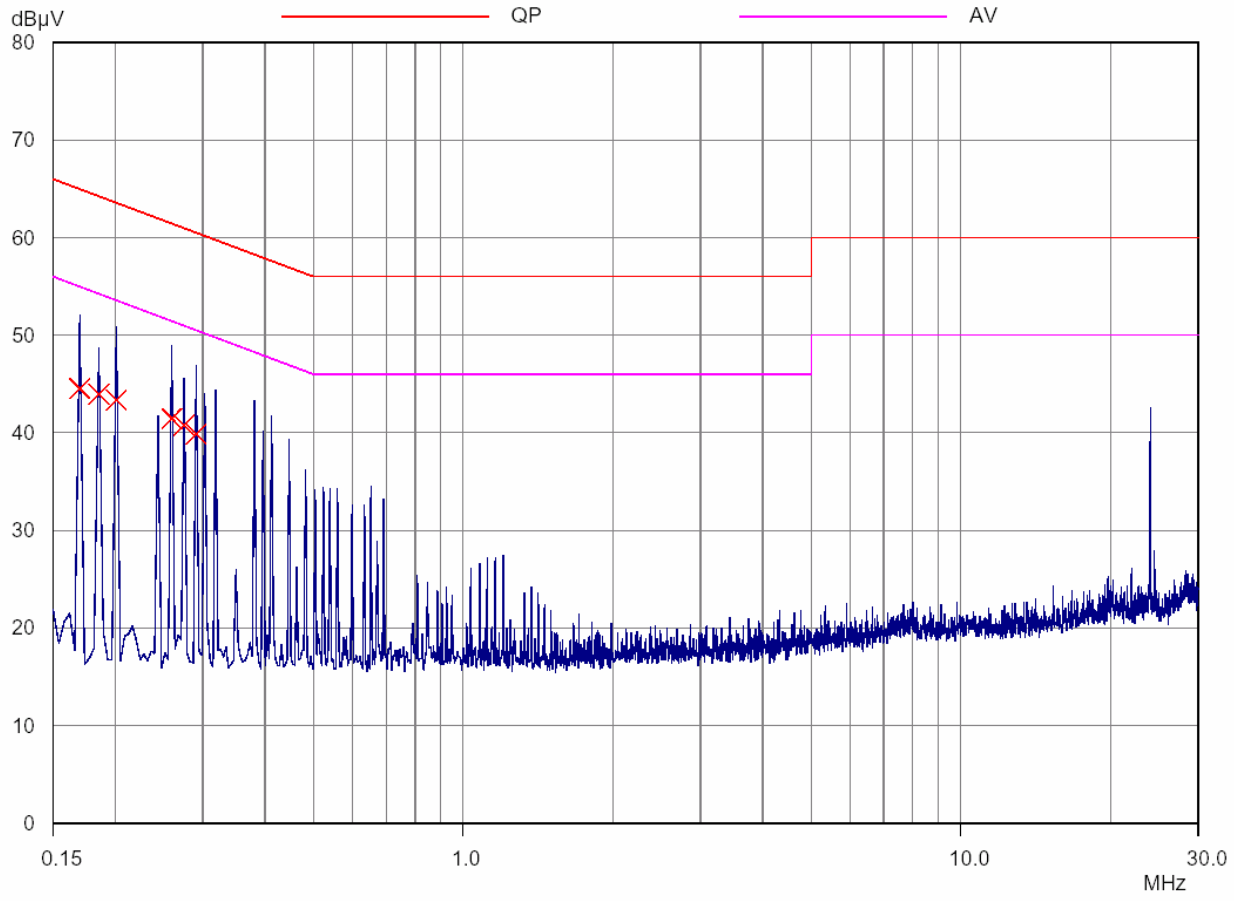


CONDUCTION EMISSION TEST

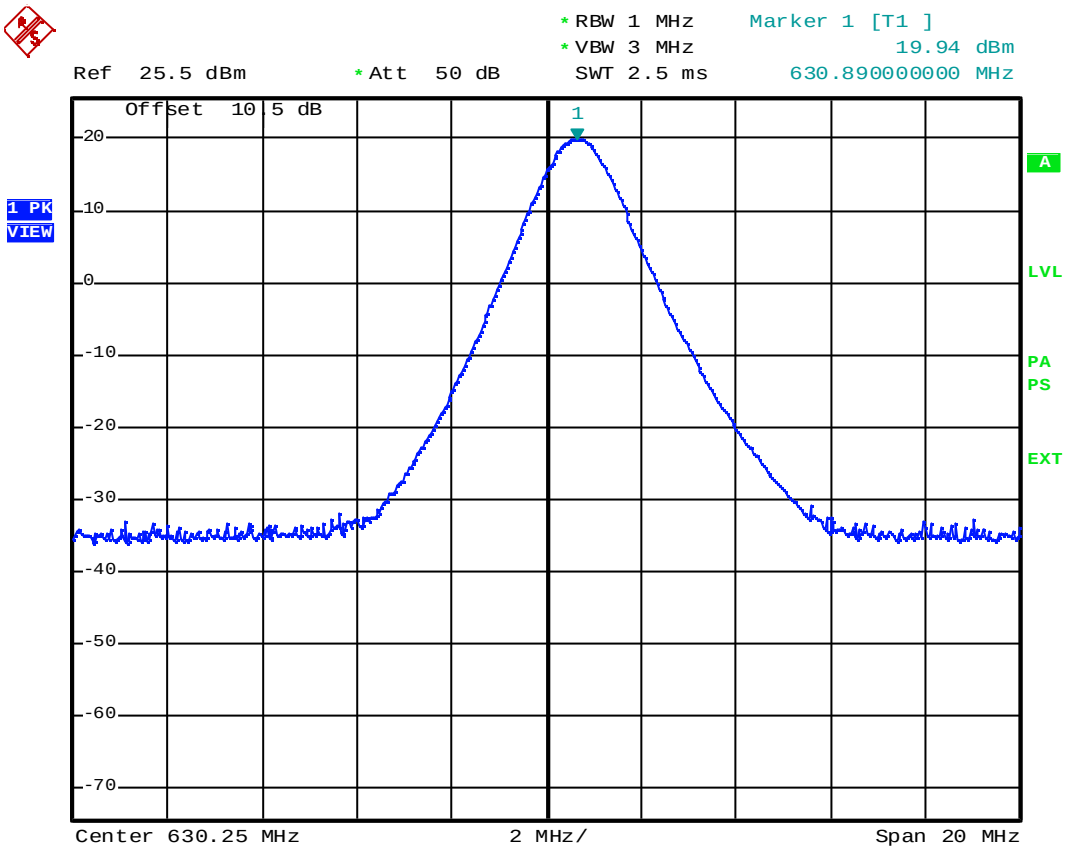
Peak Value

EUT: TX 794-813
Manuf:
Op Cond:
Operator:
Test Spec:
Comment: L1

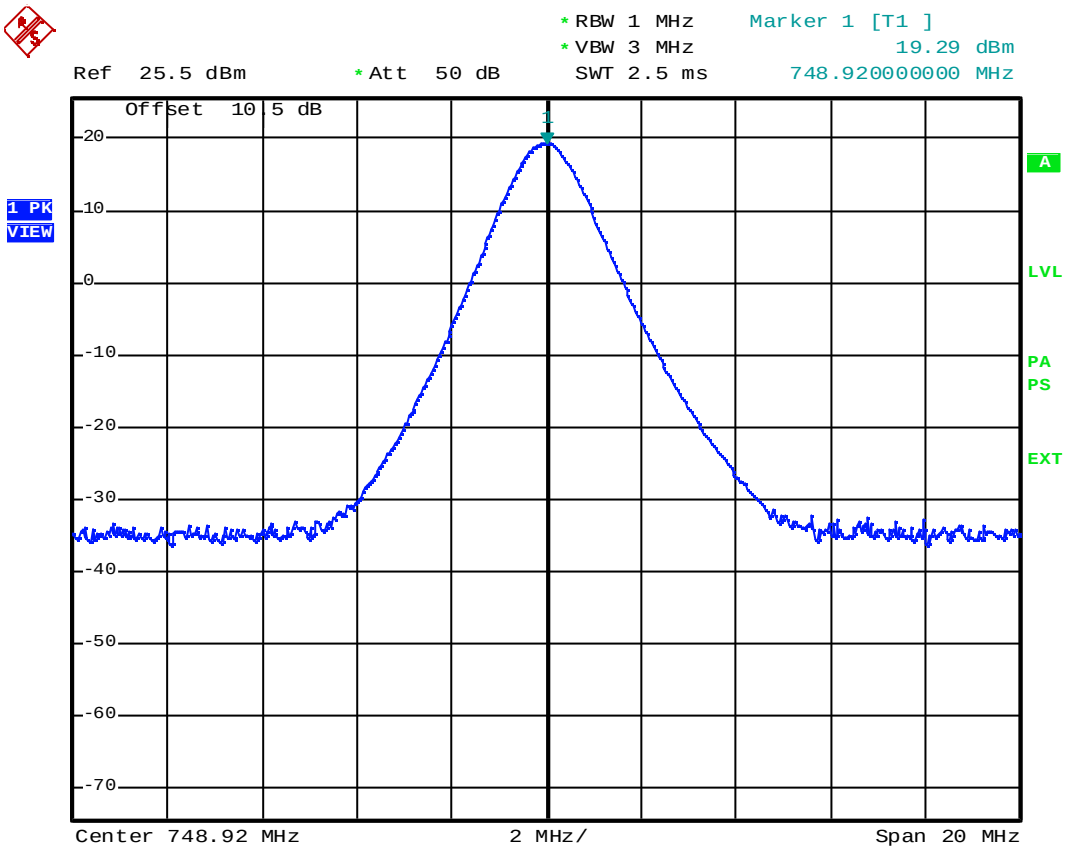
Final Measurement: Detector: X QP
Meas Time: 1sec
Peaks: 8
Acc Margin: 25 dB



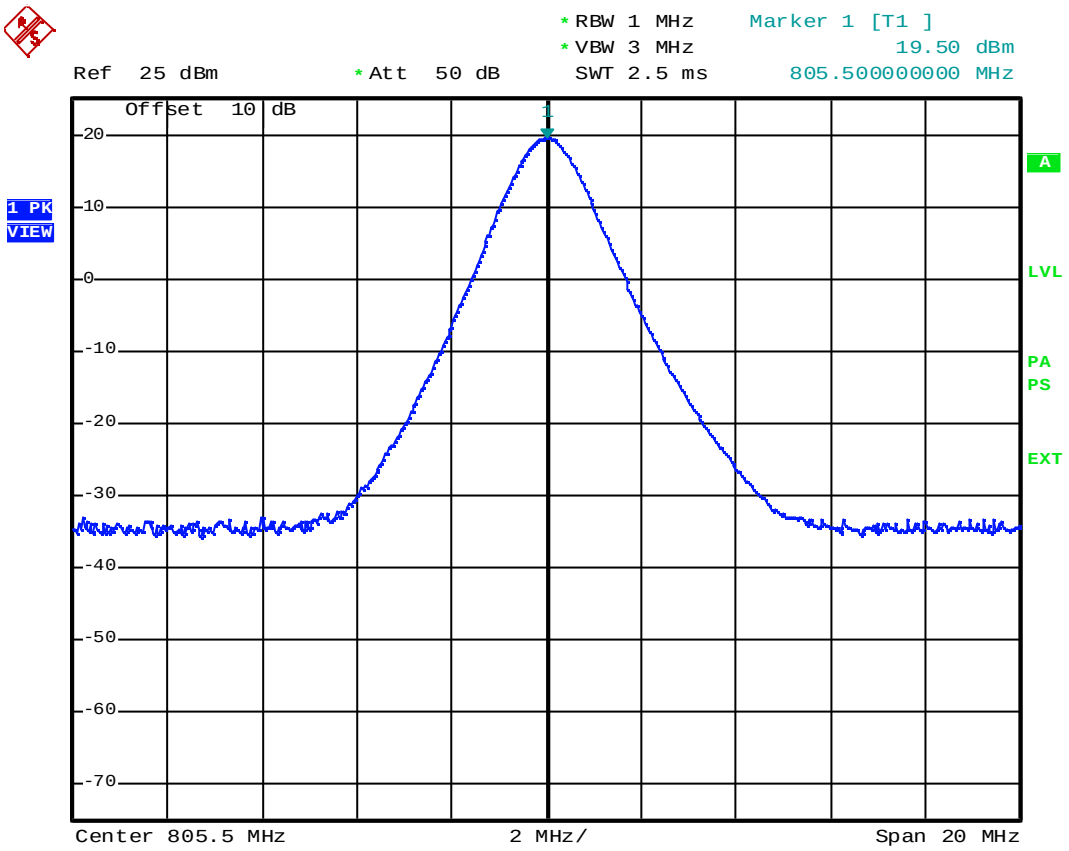
Appendix 4 : Plotted Data of Conducted Output Power Emissions



Date: 19.JAN.2006 04:31:25



Date: 19.JAN.2006 04:22:51



Date: 19.JAN.2006 04:33:13